



RADIO TEST REPORT

Test Report No. : 13671144H-B

Applicant : Sony Interactive Entertainment Inc.

Type of EUT : Wireless communication module

Model Number of EUT : AW-XM501

FCC ID : AK8M20DAL1

Test regulation : FCC Part 15 Subpart C: 2021
*Bluetooth (BR / EDR) parts

Test Result : Complied (Refer to SECTION 3)

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
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7. The all test items in this test report are conducted by UL Japan, Inc. Ise EMC Lab.
8. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
9. The information provided from the customer for this report is identified in Section 1.

Date of test: January 13 to February 4, 2021

Representative test engineer:

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Leader
Consumer Technology Division



CERTIFICATE 5107.02

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

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REVISION HISTORY

Original Test Report No.: 13671144H-B

Revision	Test report No.	Date	Page revised	Contents
- (Original)	13671144H-B	March 23, 2021	-	-

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Reference: Abbreviations (Including words undescribed in this report)

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

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SECTION 1: Customer information

Company Name	Sony Interactive Entertainment Inc.
Brand Name	SONY
Address	1-7-1 Konan, Minato-ku, Tokyo, 108-0075 Japan
Telephone Number	+81-50-3807-5639
Facsimile Number	+81-50-3807-9594
Contact Person	Miho Nakamura

***Remarks:**

Sony Interactive Entertainment Inc. designates AzureWave Technologies, Inc. as manufacturer of the product (Wireless communication module).

The information provided from the customer is as follows;

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

* The laboratory is exempted from liability of any test results affected from the above information in SECTION 2 and 4.

SECTION 2: Equipment under test (EUT)

2.1 Identification of EUT

Type	Wireless communication module
Model Number	AW-XM501
Serial Number	Refer to SECTION 4.2
Country of Manufacture	China
Receipt Date	January 12, 2021
Condition	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification	No modification by the test lab.

2.2 Product Description

Model: AW-XM501 (referred to as the EUT in this report) is a Wireless communication module.

Product Specification

Operating Temperature	-5 deg. C to 85 deg. C
Power Supply	DC 3.3 V, DC 1.8 V

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Radio Specification

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

Equipment Type	Transceiver	
Frequency of Operation	2412 MHz to 2462 MHz	
Type of Modulation	DSSS, OFDM	
	OFDMA (IEEE802.11ax only)	20 MHz: 26/52/106/242-tone RU
Bandwidth & Channel spacing	Less than 20 MHz & 5 MHz	
Method of frequency generation	Synthesizer	
Antenna Type	IFA	
Antenna Gain: G_{ANT}	Antenna 1: 4.0 dBi Antenna 2: 3.5 dBi	
Directional Gain *1)	6.76 dBi	
Maximum clock frequency	320 MHz	

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

Equipment Type	Transceiver	
Frequency of Operation	20 M Band: 5180 MHz to 5240 MHz 5260 MHz to 5320 MHz 5500 MHz to 5720 MHz 5745 MHz to 5825 MHz	
	40 M Band: 5190 MHz to 5230 MHz 5270 MHz to 5310 MHz 5510 MHz to 5710 MHz 5755 MHz to 5795 MHz	
	80 M Band: 5210 MHz 5290 MHz 5530 MHz to 5690 MHz 5775 MHz	
Type of Modulation	OFDM	
	OFDMA (IEEE802.11ax only)	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
Bandwidth & Channel spacing	Less than 20 MHz / 40 MHz / 80 MHz & 20 MHz / 40 MHz / 80 MHz	
Method of frequency generation	Synthesizer	
Antenna Type	IFA	PIFA
Antenna Gain: G_{ANT}	Antenna 1: 6.0 dBi	Antenna 3: 4.5 dBi
Directional Gain *1)	8.29 dBi	
Maximum clock frequency	512 MHz	

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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
Bandwidth / Channel spacing	BT: 79 MHz / 1 MHz BT LE: 1 MHz & 2 MHz / 2 MHz
Method of frequency generation	Synthesizer
Antenna Type	PIFA
Antenna Gain	Antenna 3: 5.8 dBi
Maximum clock frequency	128 MHz

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
Bandwidth / Channel spacing	BT: 79 MHz / 1 MHz BT LE: 1 MHz & 2 MHz / 2 MHz
Method of frequency generation	Synthesizer
Antenna Type	PIFA
Antenna Gain	Antenna 4: 5.8 dBi
Maximum clock frequency	128 MHz

*1) Directional antenna gain = $10 \log \left(\frac{G_{ANT1}}{(10^{-20} + 10^{-20})^2 / 2} \right)$

*This test report applies to Bluetooth (BR / EDR) part.

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C
FCC Part 15 final revised on January 12, 2021 and effective February 11, 2021

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

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

3.2 Procedures and results

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.10-2013 6. Standard test methods ----- ISED: RSS-Gen 8.8	FCC: Section 15.207 ----- ISED: RSS-Gen 8.8	17.59 dB 22.02115 MHz, AV, Phase: N	Complied a)	-
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 b)	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 b)	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 c)	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 d)	Conducted
Maximum Peak Output Power	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: RSS-Gen 6.12	FCC: Section15.247(a)(b)(1) ----- ISED: RSS-247 5.4 (b)		Complied e)	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	4.8 dB 165.080 MHz Horizontal, QP	Complied# f) / g)	Conducted/ Radiated (above 30 MHz) *1)

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

*1) Radiated test was selected over 30 MHz based on section 15.247(d).

a) Refer to APPENDIX 1 (data of Conducted Emission)

b) Refer to APPENDIX 1 (data of 20dB Bandwidth, 99%Occupied Bandwidth and Carrier Frequency Separation)

c) Refer to APPENDIX 1 (data of Number of Hopping Frequency)

d) Refer to APPENDIX 1 (data of Dwell time)

e) Refer to APPENDIX 1 (data of Maximum Peak Output Power)

f) Refer to APPENDIX 1 (data of Conducted Spurious Emission)

g) Refer to APPENDIX 1 (data of Radiated Spurious Emission)

Symbols:

Complied The data of this test item has enough margin, more than the measurement uncertainty.

Complied# The data of this test item meets the limits unless the measurement uncertainty is taken into consideration.

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

FCC Part 15.31 (e)

The 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 antenna is not removable from the EUT.

[Antenna 3 and 4] The EUT has a unique coupling/antenna connector (U.FL).

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

3.3 Addition to standard

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

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

3.4 Uncertainty

There is no applicable rule of uncertainty in this applied standard. Therefore, the results are derived depending on whether or not laboratory uncertainty is applied.

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

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Antenna Terminal test

Test Item	Uncertainty (+/-)
20 dB Bandwidth / 99 % Occupied Bandwidth	0.96 %
Maximum Peak Output Power / Average Output Power	1.4 dB
Carrier Frequency Separation	0.42 %
Dwell time / Burst rate	0.10 %
Conducted Spurious Emission	2.6 dB

Conducted emission

using Item	Frequency range	Uncertainty (+/-)
AMN (LISN)	0.009 MHz to 0.15 MHz	3.4 dB
	0.15 MHz to 30 MHz	2.9 dB

Radiated emission

Measurement distance	Frequency range	Uncertainty (+/-)
3 m	9 kHz to 30 MHz	3.3 dB
10 m		3.2 dB
3 m	30 MHz to 200 MHz (Horizontal)	4.8 dB
	(Vertical)	5.0 dB
	200 MHz to 1000 MHz (Horizontal)	5.2 dB
	(Vertical)	6.3 dB
10 m	30 MHz to 200 MHz (Horizontal)	4.8 dB
	(Vertical)	4.8 dB
	200 MHz to 1000 MHz (Horizontal)	5.0 dB
	(Vertical)	5.0 dB
3 m	1 GHz to 6 GHz	4.9 dB
	6 GHz to 18 GHz	5.2 dB
1 m	10 GHz to 26.5 GHz	5.5 dB
	26.5 GHz to 40 GHz	5.5 dB
10 m	1 GHz to 18 GHz	5.2 dB

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3.5 Test Location

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*A2LA Certificate Number: 5107.02 / FCC Test Firm Registration Number: 199967

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

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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.11 measurement room	6.2 x 4.7 x 3.0	4.8 x 4.6	-	-

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

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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SECTION 4: Operation of EUT during testing

4.1 Operating Mode(s)

Bluetooth (BT): Transmitting (Tx), Payload: PRBS9

Details of Operating Mode(s)

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

*EUT has the power settings by the software as follows;
 - Power settings: 2 dBm
 - Software: Dut labtool
 - Version: 1.0.0.110
 (Date: January 13, 2021, 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.

*1) The test was conducted with PIFA Antenna which had higher antenna gain.

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

Test Item	Mode *1)	Antenna type
Radiated Spurious Emission	Tx DH5 2402 MHz + Tx 11ax-20 (OFDM) 5700 MHz Tx DH5 2441 MHz + Tx 11ax-20 (OFDM) 5700 MHz Tx DH5 2480 MHz + Tx 11ax-20 (OFDM) 5700 MHz	Antenna 3 (BT1)

*1) The test was performed on the mode as a representative, because it had the highest power of 5GHz band at antenna terminal test.

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4.2 Configuration and peripherals

This page has been submitted for a separate exhibit.

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 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.

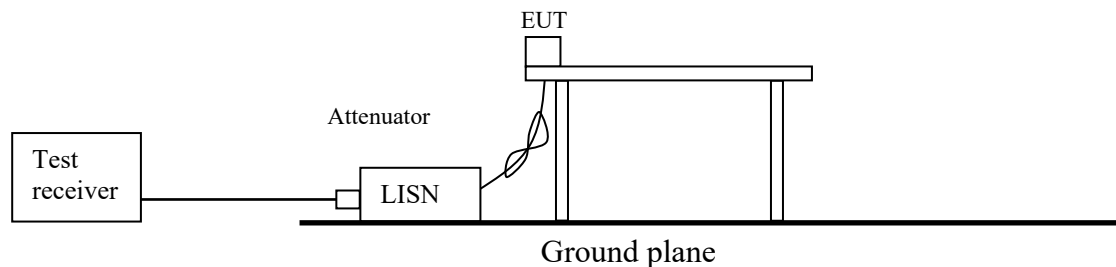
The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber. The EUT was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

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

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

Figure 1: Test Setup



SECTION 6: Radiated Spurious Emission

Test Procedure

[For below 1 GHz]

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 Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

[For above 1 GHz]

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

The height of the measuring antenna varied between 1 m and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.

Test antenna was aimed at the EUT for receiving the maximum signal and always kept within the illumination area of the 3 dB beamwidth of the antenna.

The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer.

The measurements were made with the following detector function of the test receiver and the Spectrum analyzer (in linear mode).

The test was made with the detector (RBW/VBW) in the following table.

When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

Test Antennas are used as below;

Frequency	30 MHz to 200 MHz	200 MHz to 1 GHz	Above 1 GHz
Antenna Type	Biconical	Logperiodic	Horn

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

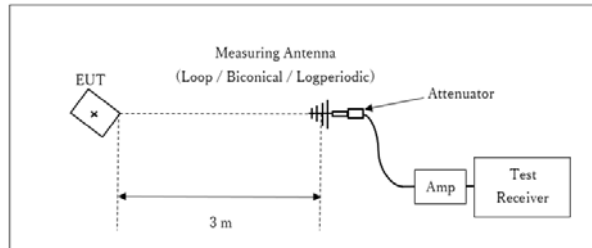
20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9 (ISED) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (ISED).

Frequency	Below 1 GHz	Above 1 GHz		20 dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV *1)	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	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

*1) Average Power Measurement was performed based on KDB 558074 D01 15.247 Meas Guidance v05r02.

Figure 2: Test Setup

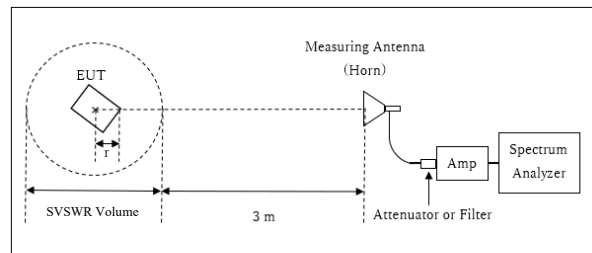
Below 1 GHz



x : Center of turn table

Test Distance: 3 m

1 GHz - 10 GHz



r : Radius of an outer periphery of EUT

x : Center of turn table

Distance Factor: $20 \times \log (3.95 \text{ m} / 3.0 \text{ m}) = 2.39 \text{ dB}$

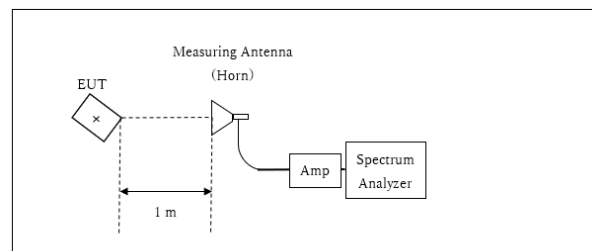
* Test Distance: $(3 + \text{SVSWR Volume} / 2) - r = 3.95 \text{ m}$

SVSWR Volume : 2.0 m

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

r = 0.05m

10 GHz - 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.

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

Measurement range : 30 MHz - 26.5 GHz

Test data : APPENDIX

Test result : Pass

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	9.1 kHz	27 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 = 9.1 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.

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

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

Test data : APPENDIX

Test result : Pass

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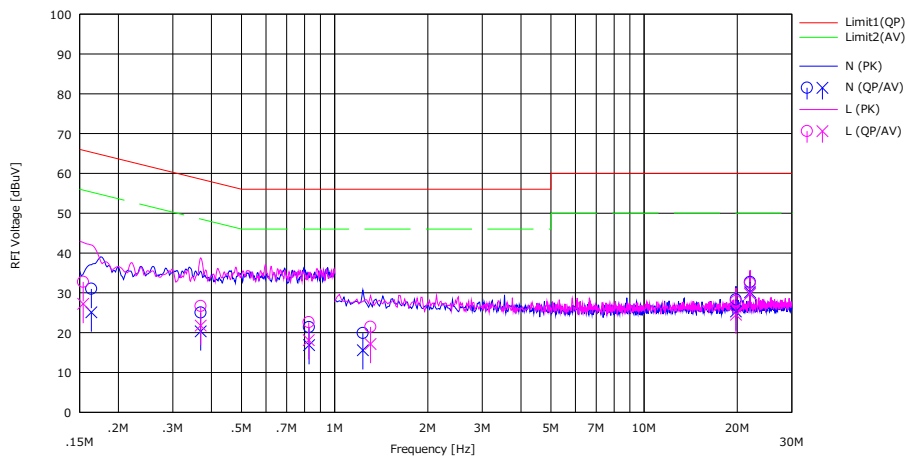
Facsimile : +81 596 24 8124

APPENDIX 1: Test data

Conducted Emission BT1

Report No.	13671144H
Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Date	February 3, 2021
Temperature / Humidity	23 deg. C / 39 % RH
Engineer	Hiroki Numata
Mode	Tx, Hopping Off, DH5 2402 MHz

Limit : FCC_Part 15 Subpart C(15.207)



No.	Freq. [MHz]	Reading		USN	LOSS	Results		Limit		Margin		Phase	Comment
		(QP) [dBuV]	(AV) [dBuV]			(QP) [dBuV]	(AV) [dBuV]	(QP) [dBuV]	(AV) [dBuV]	(QP) [dB]	(AV) [dB]		
1	0.16360	17.70	11.80	0.07	13.23	31.00	25.10	65.28	55.28	34.28	30.18	N	
2	0.36930	11.70	7.00	0.06	13.26	25.02	20.32	58.52	48.52	33.50	28.20	N	
3	0.82660	8.00	3.50	0.07	13.30	21.37	16.87	56.00	46.00	34.63	29.13	N	
4	1.23400	6.50	2.20	0.07	13.32	19.89	15.59	56.00	46.00	36.11	30.41	N	
5	19.80000	14.00	11.00	0.40	13.92	28.32	25.32	60.00	50.00	31.68	24.68	N	
6	22.01232	18.30	15.70	0.44	13.97	32.71	30.11	60.00	50.00	27.29	19.89	N	
7	0.15400	19.40	13.90	0.10	13.23	32.73	27.23	65.78	55.78	33.05	28.55	L	
8	0.36930	13.30	8.40	0.10	13.26	26.66	21.76	58.52	48.52	31.86	26.76	L	
9	0.82490	9.20	4.70	0.11	13.30	22.61	18.11	56.00	46.00	33.39	27.89	L	
10	1.30600	8.00	3.70	0.12	13.33	21.45	17.15	56.00	46.00	34.55	28.85	L	
11	19.81170	13.50	10.10	0.48	13.92	27.90	24.50	60.00	50.00	32.10	25.50	L	
12	22.01232	17.90	15.20	0.54	13.97	32.41	29.71	60.00	50.00	27.59	20.29	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.

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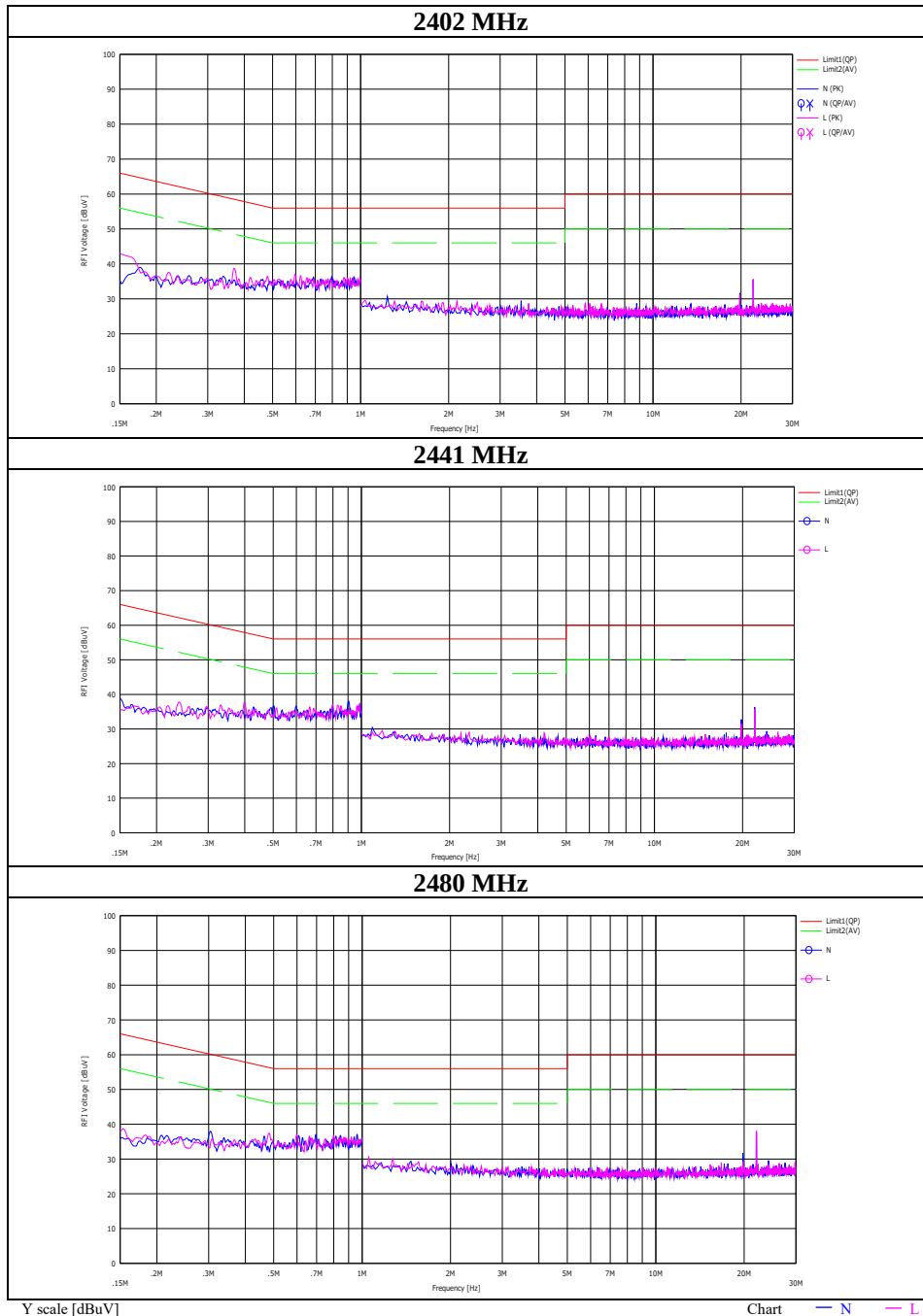
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Emission

BT1

Report No. 13671144H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date February 3, 2021
Temperature / Humidity 23 deg. C / 39 % RH
Engineer Hiroki Numata
Mode Tx, Hopping Off, DH5



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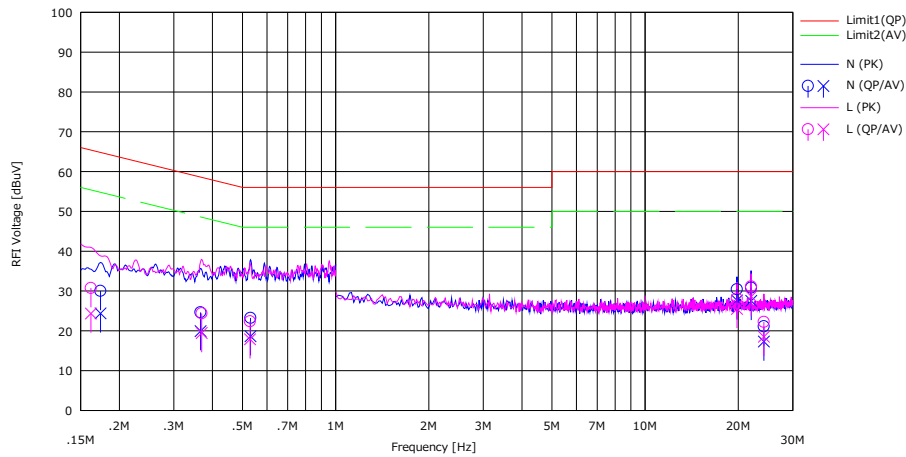
Facsimile : +81 596 24 8124

Conducted Emission

BT1

Report No. 13671144H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date February 3, 2021
Temperature / Humidity 23 deg. C / 39 % RH
Engineer Hiroki Numata
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) [dBuV]	(AV) [dBuV]			(QP) [dBuV]	(AV) [dBuV]	(QP) [dBuV]	(AV) [dBuV]	(QP) [dB]	(AV) [dB]		
1	0.17380	16.70	11.10	0.07	13.23	30.00	24.40	64.78	54.78	34.78	30.38	N	
2	0.36590	11.30	6.60	0.06	13.26	24.62	19.92	58.59	48.59	33.97	28.67	N	
3	0.53080	9.90	5.30	0.06	13.27	23.23	18.63	56.00	46.00	32.77	27.37	N	
4	19.81160	16.10	13.30	0.40	13.92	30.42	27.62	60.00	50.00	29.58	22.38	N	
5	22.02463	16.40	13.10	0.44	13.97	30.81	27.51	60.00	50.00	29.19	22.49	N	
6	24.22000	6.60	2.80	0.49	14.01	21.10	17.30	60.00	50.00	38.90	32.70	N	
7	0.16190	17.40	11.00	0.10	13.23	30.73	24.33	65.37	55.37	34.64	31.04	L	
8	0.36930	11.00	6.10	0.10	13.26	24.36	19.46	58.52	48.52	34.16	29.06	L	
9	0.52910	9.00	4.50	0.10	13.27	22.37	17.87	56.00	46.00	33.63	28.13	L	
10	19.81770	13.70	11.10	0.48	13.92	28.10	25.50	60.00	50.00	31.90	24.50	L	
11	22.01850	16.60	14.10	0.54	13.97	31.11	28.61	60.00	50.00	28.89	21.39	L	
12	24.21420	7.60	3.90	0.60	14.01	22.21	18.51	60.00	50.00	37.79	31.49	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.

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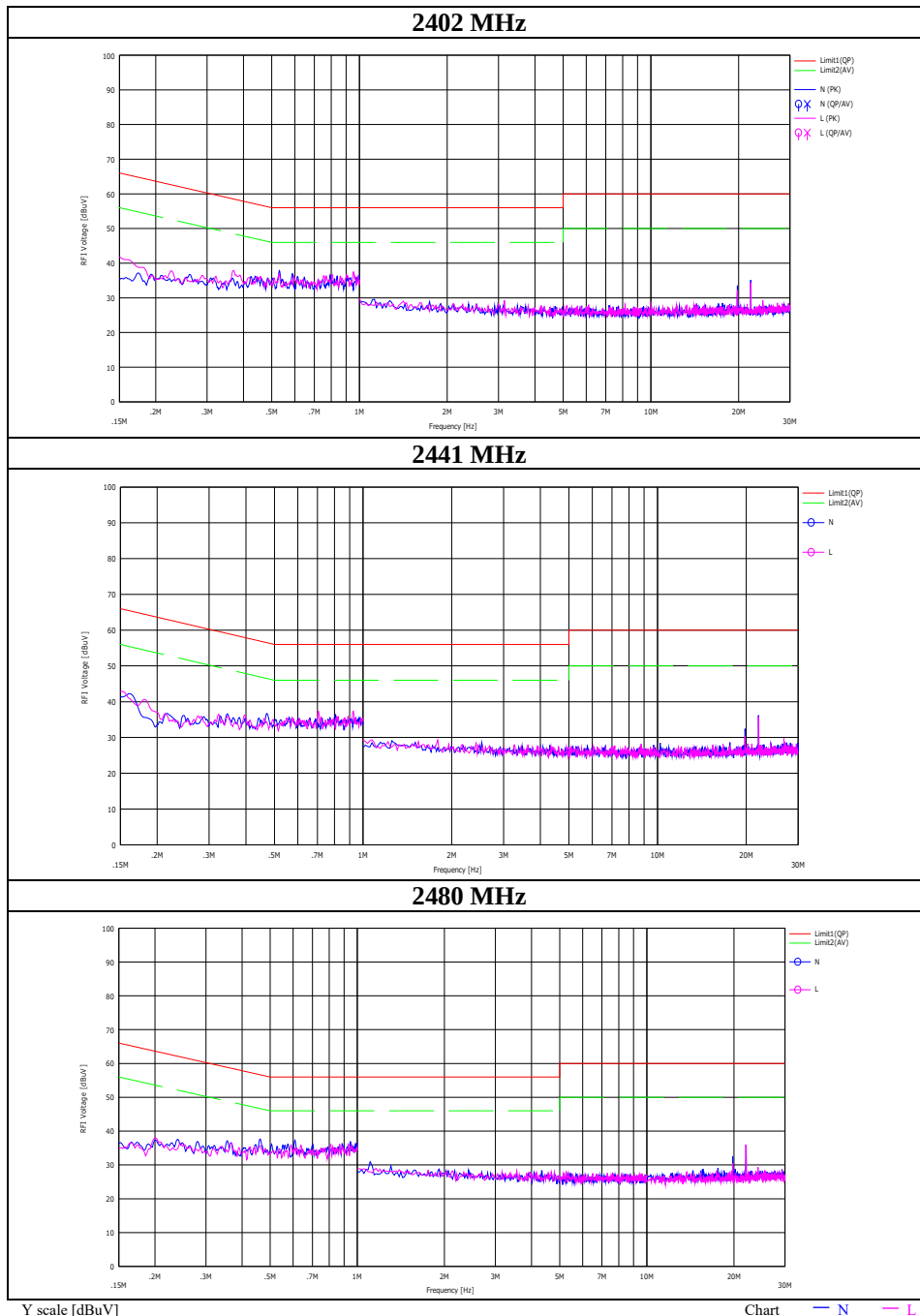
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Facsimile : +81 596 24 8124

Conducted Emission

BT1

Report No. 13671144H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date February 3, 2021
Temperature / Humidity 23 deg. C / 39 % RH
Engineer Hiroki Numata
Mode Tx, Hopping Off, 3DH5



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Ise EMC Lab.

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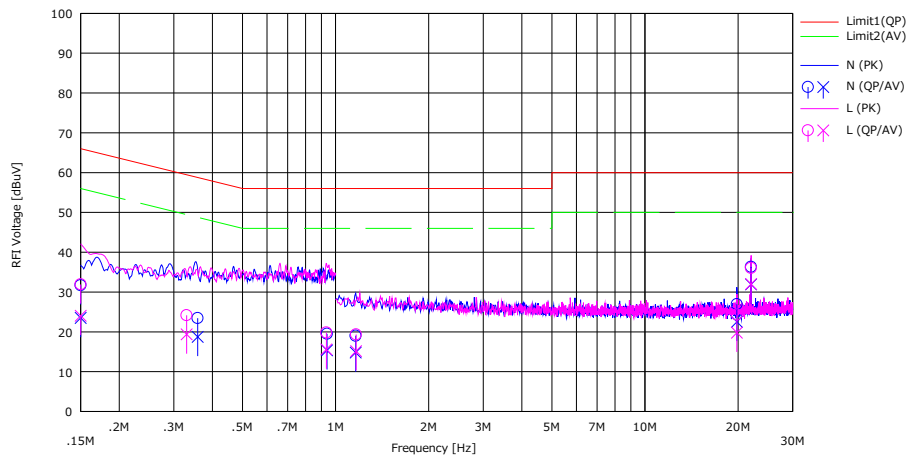
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Emission BT2

Report No. 13671144H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date February 4, 2021
Temperature / Humidity 24 deg. C / 32 % RH
Engineer Nachi Konegawa
Mode Tx, Hopping Off, DH5 2402 MHz

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	18.40	10.20	0.07	13.23	31.70	23.50	66.00	56.00	34.30	32.50	N	
2	0.35850	10.10	5.40	0.06	13.26	23.42	18.72	58.76	48.76	35.34	30.04	N	
3	0.93880	6.10	2.00	0.07	13.31	19.48	15.38	56.00	46.00	36.52	30.62	N	
4	1.16200	5.60	1.40	0.07	13.32	18.99	14.79	56.00	46.00	37.01	31.21	N	
5	19.81560	12.60	8.20	0.40	13.92	26.92	22.52	60.00	50.00	33.08	27.48	N	
6	22.02820	21.90	17.50	0.44	13.97	36.31	31.91	60.00	50.00	23.69	18.09	N	
7	0.15000	18.60	10.70	0.10	13.23	31.93	24.03	66.00	56.00	34.07	31.97	L	
8	0.32985	10.80	6.00	0.10	13.25	24.15	19.35	59.45	49.45	35.30	30.10	L	
9	0.93370	6.40	2.20	0.12	13.30	19.82	15.62	56.00	46.00	36.18	30.38	L	
10	1.16480	5.90	1.70	0.12	13.32	19.34	15.14	56.00	46.00	36.66	30.86	L	
11	19.81560	9.90	5.40	0.48	13.92	24.30	19.80	60.00	50.00	35.70	30.20	L	
12	22.02820	21.50	17.50	0.54	13.97	36.01	32.01	60.00	50.00	23.99	17.99	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.

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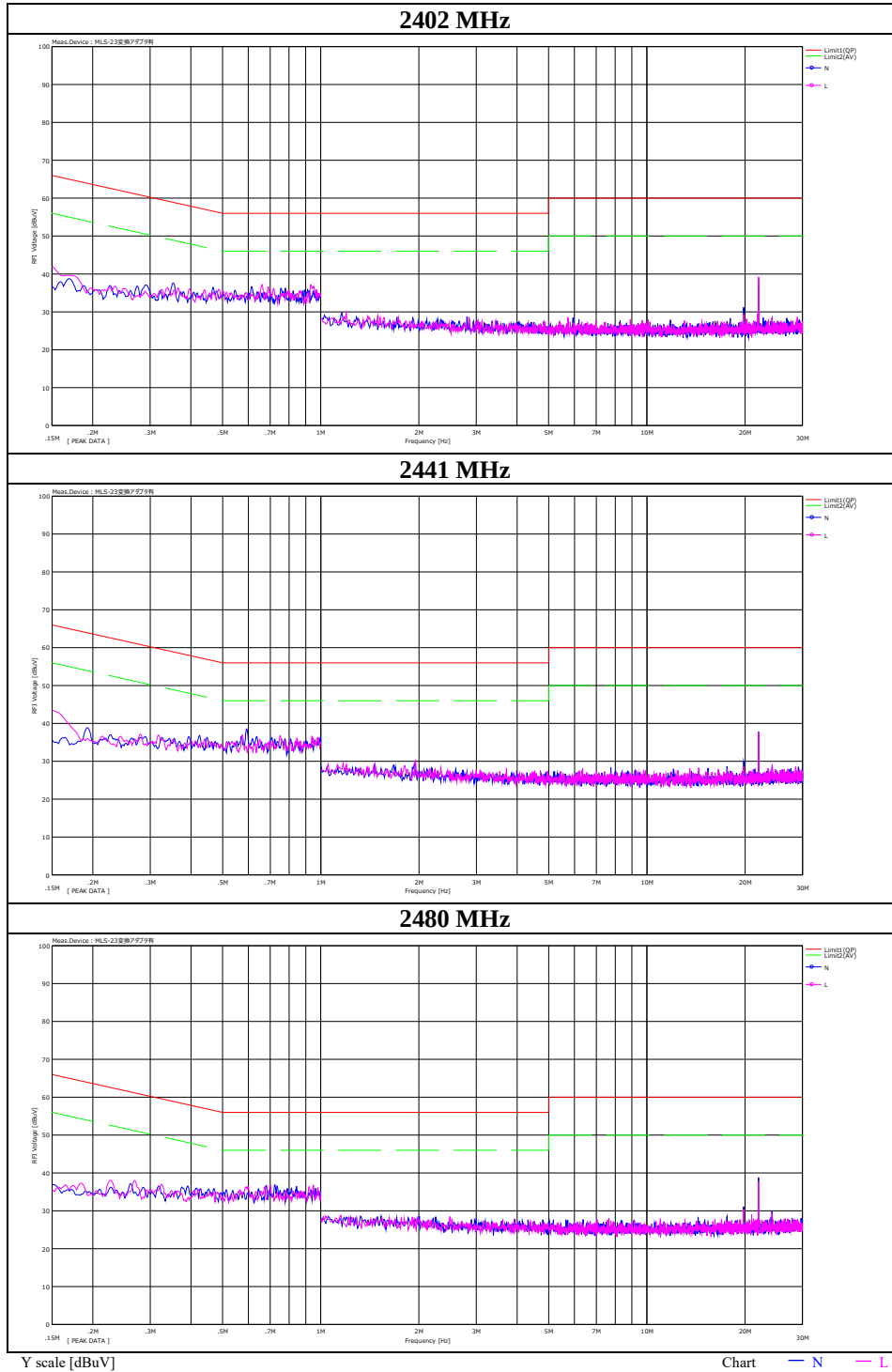
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Emission

BT2

Report No. 13671144H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date February 4, 2021
Temperature / Humidity 24 deg. C / 32 % RH
Engineer Nachi Konegawa
Mode Tx, Hopping Off, DH5



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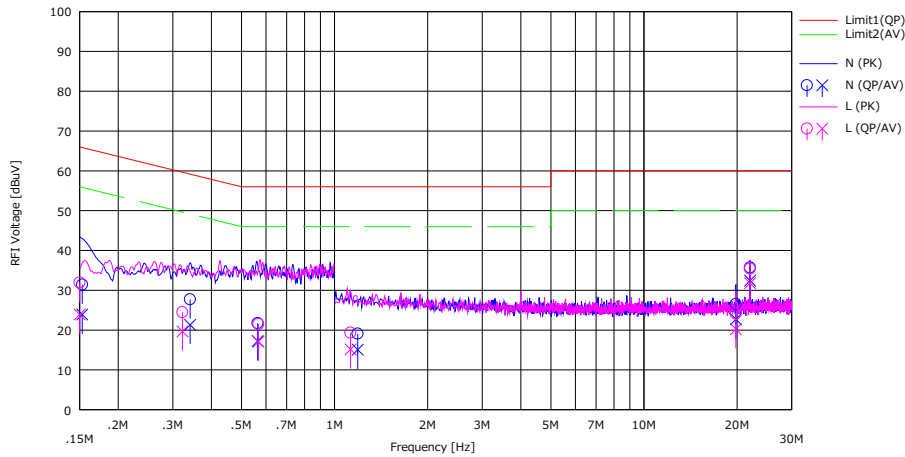
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Emission BT2

Report No. 13671144H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date February 4, 2021
Temperature / Humidity 24 deg. C / 32 % RH
Engineer Nachi Konegawa
Mode Tx, Hopping Off, 3DH5 2402 MHz

Limit : FCC_Part 15 Subpart C(15.207)

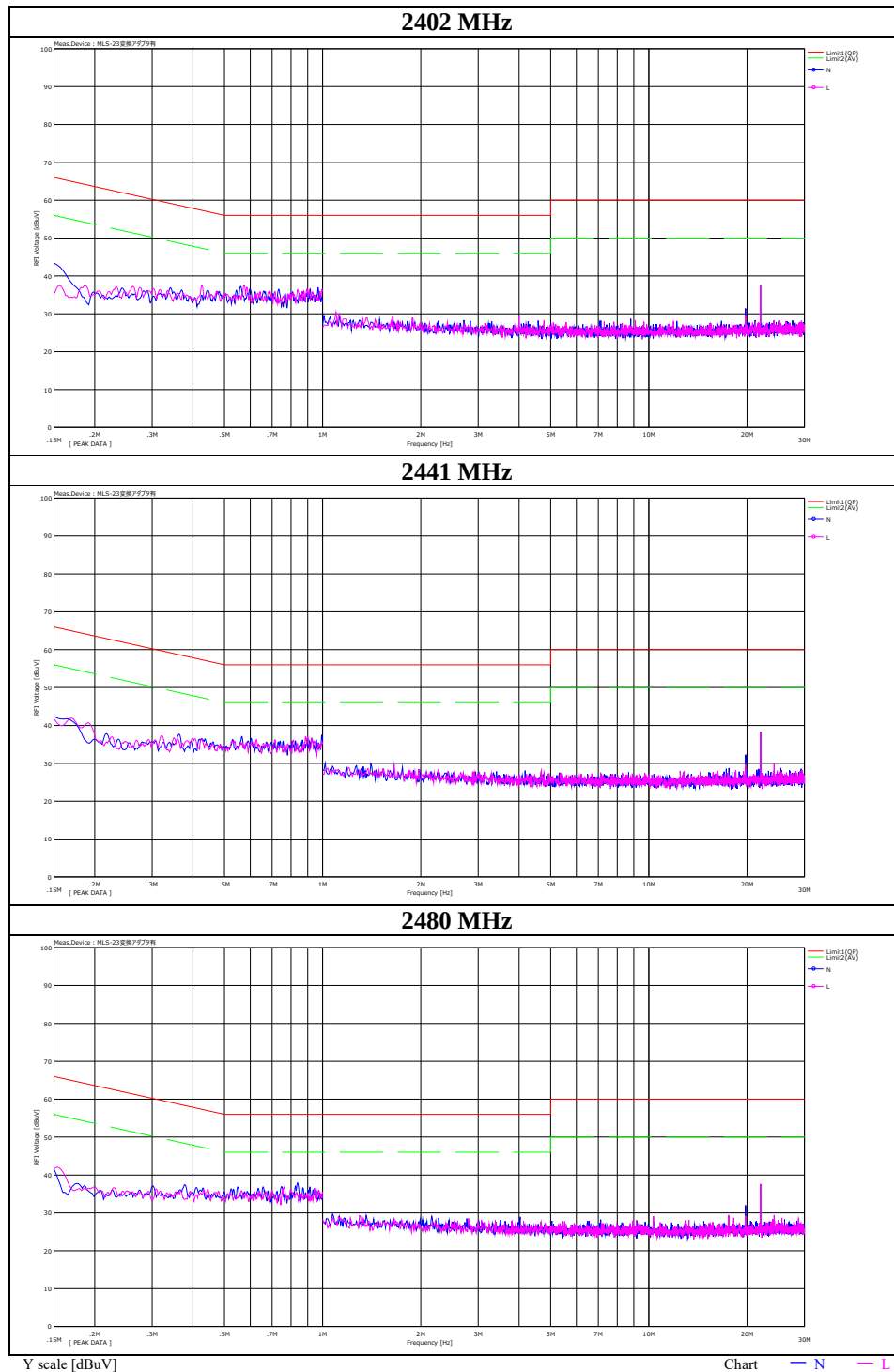


No.	Freq. [MHz]	Reading		LISN	LOSS	Results		Limit		Margin		Phase	Comment
		(QP)	(AV)			(QP)	(AV)	(QP)	(AV)	(QP)	(AV)		
		[dBuV]	[dBuV]			[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15295	18.10	10.60	0.07	13.23	31.40	23.90	65.84	55.84	34.44	31.94	N	
2	0.34125	14.40	8.00	0.06	13.25	27.71	21.31	59.17	49.17	31.46	27.86	N	
3	0.56460	8.40	3.90	0.06	13.28	21.74	17.24	56.00	46.00	34.26	28.76	N	
4	1.18780	5.70	1.70	0.07	13.32	19.09	15.09	56.00	46.00	36.91	30.91	N	
5	19.81980	12.20	8.40	0.40	13.92	26.52	22.72	60.00	50.00	33.48	27.28	N	
6	22.02115	21.30	18.00	0.44	13.97	35.71	32.41	60.00	50.00	24.29	17.59	N	
7	0.15000	18.60	10.60	0.10	13.23	31.93	23.93	66.00	56.00	34.07	32.07	L	
8	0.32260	11.10	6.30	0.10	13.25	24.45	19.65	59.64	49.64	35.19	29.99	L	
9	0.56765	8.10	3.70	0.10	13.28	21.48	17.08	56.00	46.00	34.52	28.92	L	
10	1.12575	5.90	1.70	0.12	13.32	19.34	15.14	56.00	46.00	36.66	30.86	L	
11	19.81980	9.70	5.80	0.48	13.92	24.10	20.20	60.00	50.00	35.90	29.80	L	
12	22.02115	20.90	17.30	0.54	13.97	35.41	31.81	60.00	50.00	24.59	18.19	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

Report No. 13671144H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date February 4, 2021
Temperature / Humidity 24 deg. C / 32 % RH
Engineer Nachi Konegawa
Mode Tx, Hopping Off, 3DH5



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

Report No. 13671144H
Test place Ise EMC Lab. No.8 Measurement Room
Date January 13, 2021 January 14, 2021
Temperature / Humidity 22 deg. C / 33 % RH 22 deg. C / 36 % RH
Engineer Nachi Konegawa Nachi Konegawa
BT1 BT2
Mode Tx, Hopping Off, Tx, Hopping On

BT1

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	99% Occupied Bandwidth [kHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.990	885.622	1.000	>= 0.660
DH5	2441.0	0.983	884.806	1.000	>= 0.655
DH5	2480.0	0.986	880.129	1.000	>= 0.657
DH5	Hopping On	-	78658.700	-	-
3DH5	2402.0	1.289	1173.400	1.000	>= 0.859
3DH5	2441.0	1.292	1174.700	1.000	>= 0.861
3DH5	2480.0	1.287	1171.900	1.000	>= 0.858
3DH5	Hopping On	-	78739.400	-	-

BT2

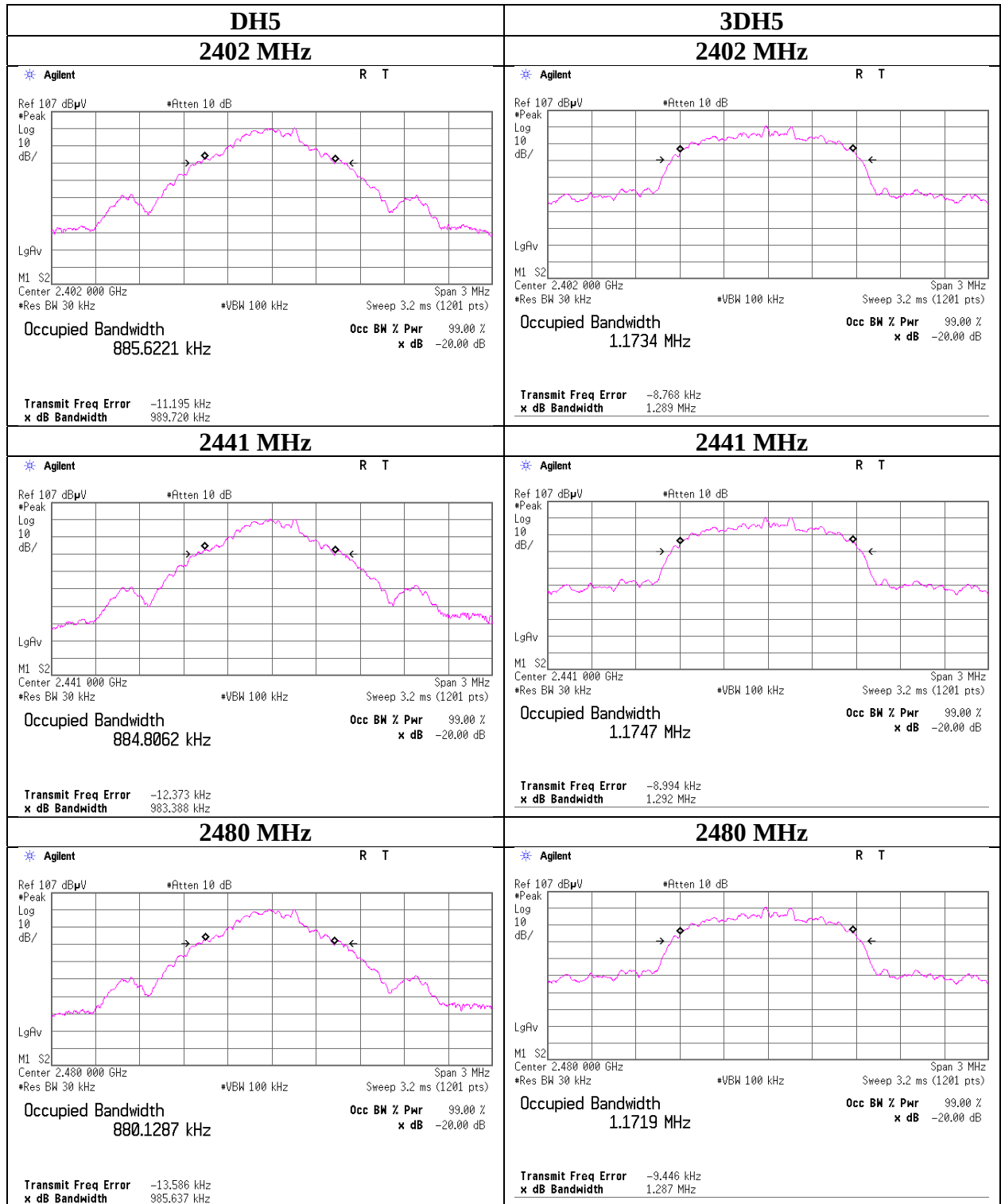
Mode	Freq. [MHz]	20dB Bandwidth [MHz]	99% Occupied Bandwidth [kHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.953	854.679	1.000	>= 0.635
DH5	2441.0	0.954	850.818	1.000	>= 0.636
DH5	2480.0	0.954	853.389	1.000	>= 0.636
DH5	Hopping On	-	78656.300	-	-
3DH5	2402.0	1.295	1172.200	1.000	>= 0.863
3DH5	2441.0	1.297	1170.500	1.000	>= 0.865
3DH5	2480.0	1.298	1184.600	1.000	>= 0.865
3DH5	Hopping On	-	78743.600	-	-

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

No limit applies to 20dB Bandwidth.

20dB Bandwidth and 99% Occupied Bandwidth

BT1



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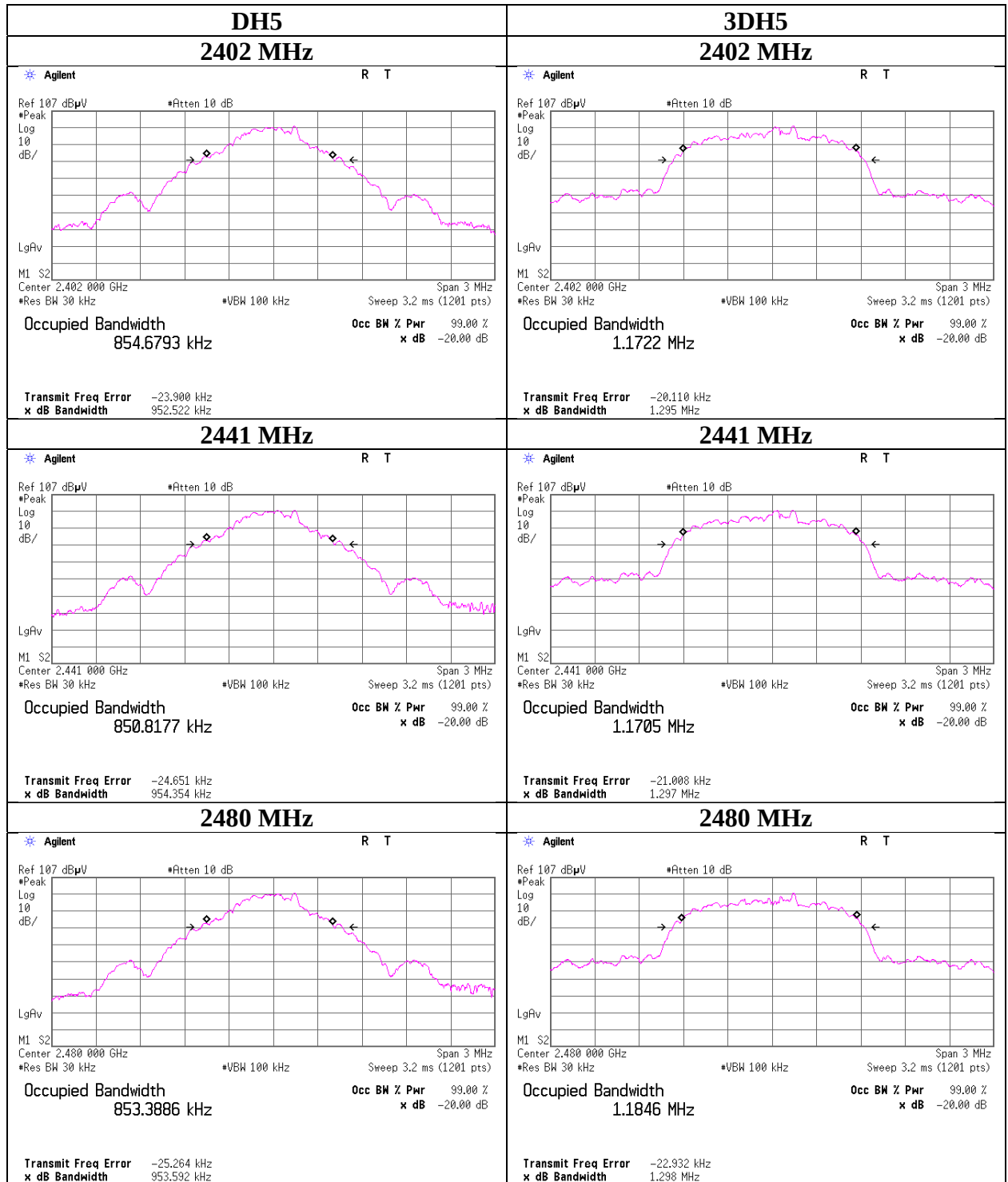
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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20dB Bandwidth and 99% Occupied Bandwidth

BT2



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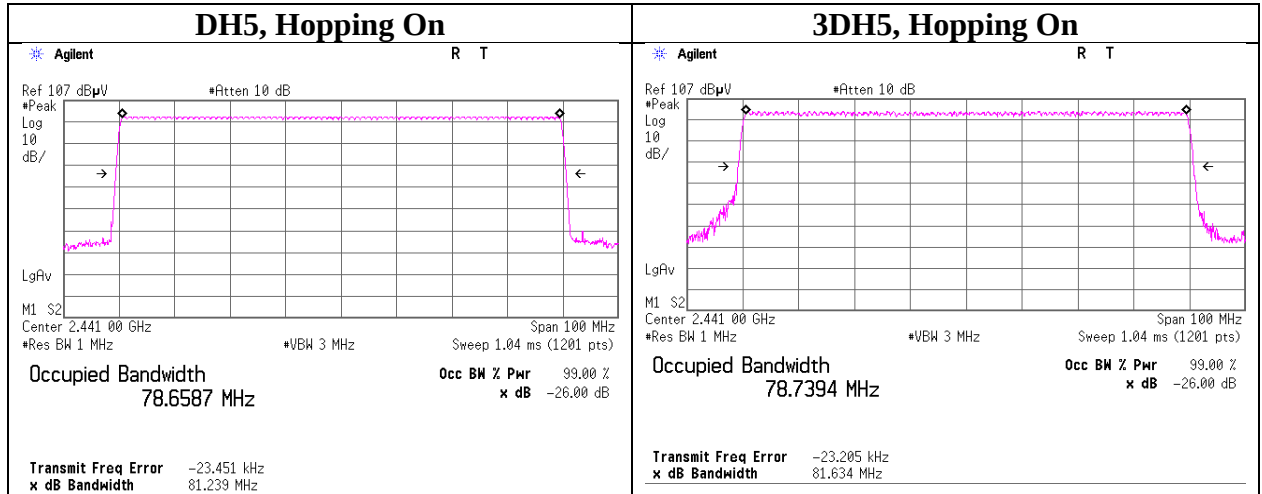
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

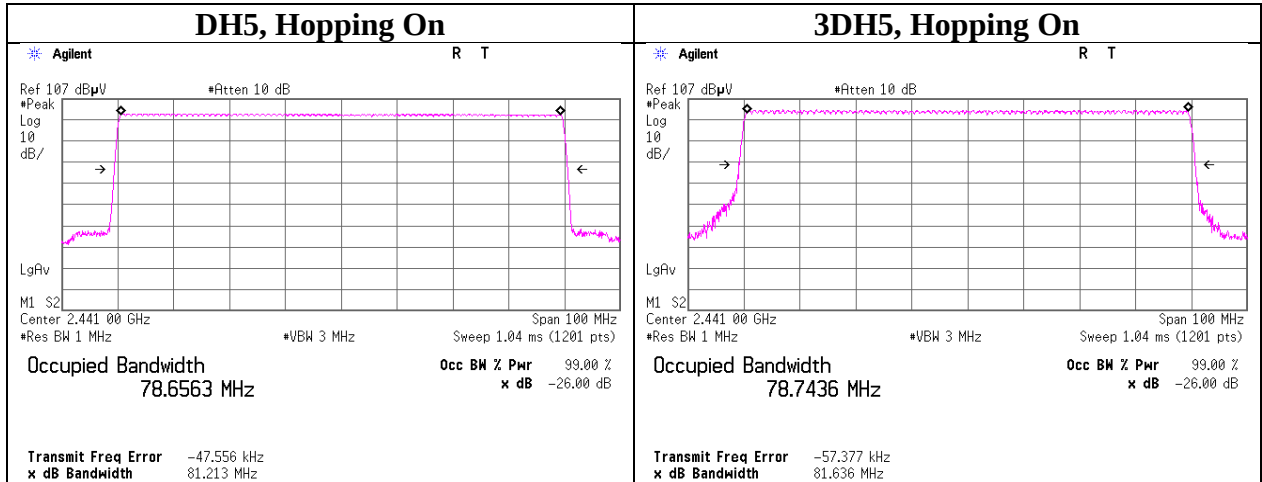
Facsimile : +81 596 24 8124

20dB Bandwidth and 99% Occupied Bandwidth

BT1

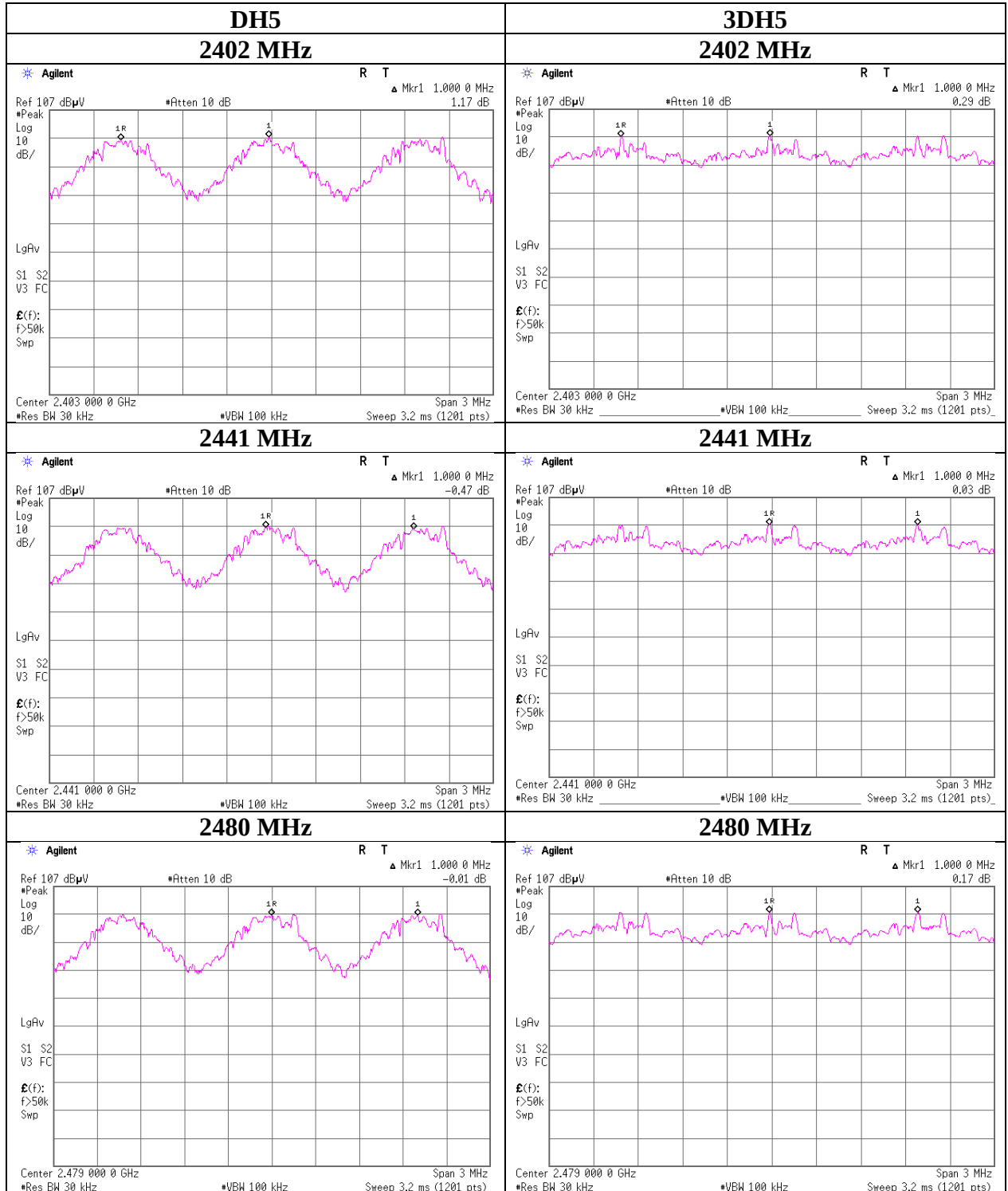


BT2



Carrier Frequency Separation

BT1



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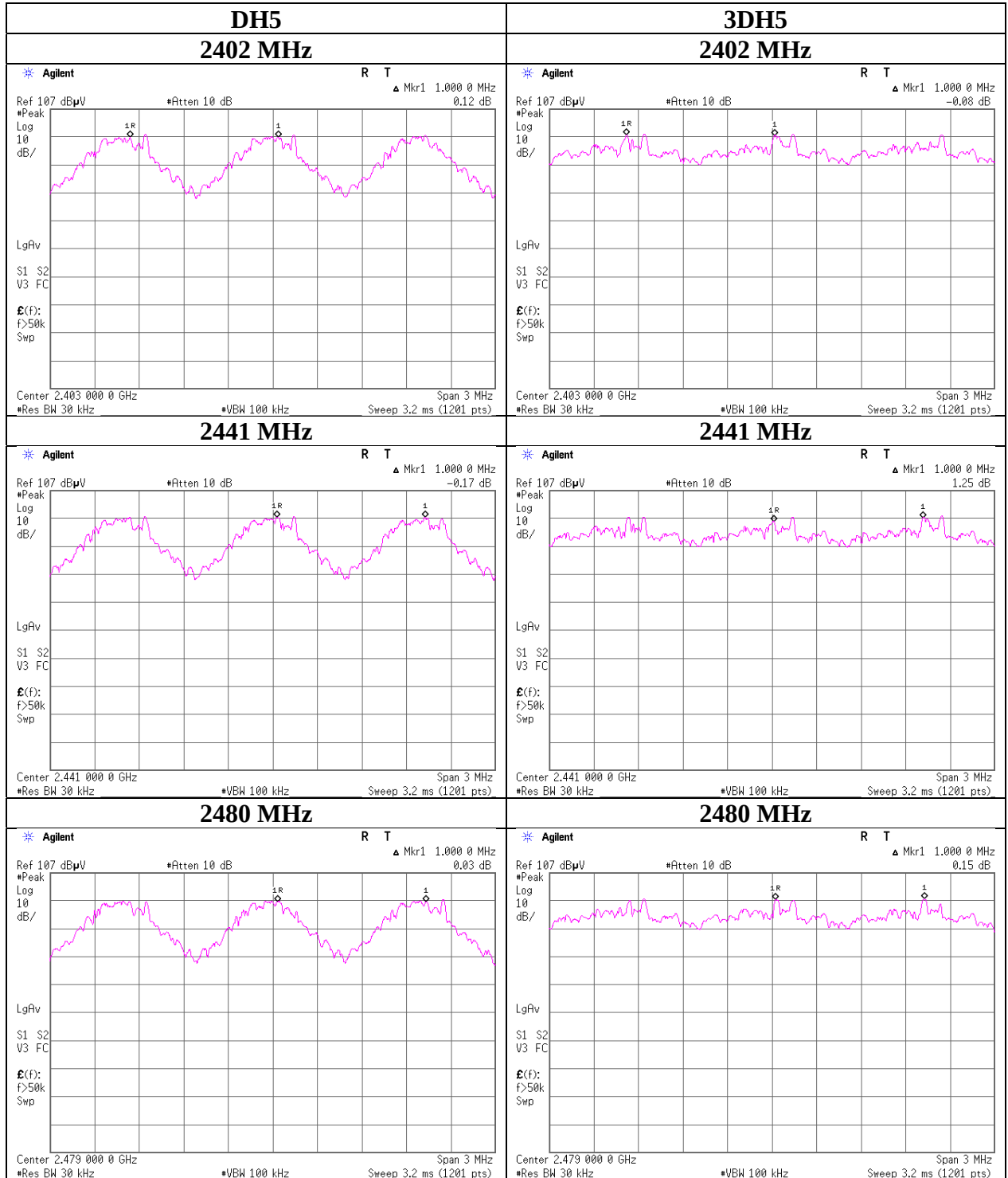
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Carrier Frequency Separation

BT2



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Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Number of Hopping Frequency

Report No. 13671144H
Test place Ise EMC Lab. No.8 Measurement Room
Date January 13, 2021 January 13, 2021
Temperature / Humidity 22 deg. C / 33 % RH 22 deg. C / 33 % RH
Engineer Nachi Konegawa Nachi Konegawa
BT1 BT2
Mode Tx, Hopping On

BT1

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

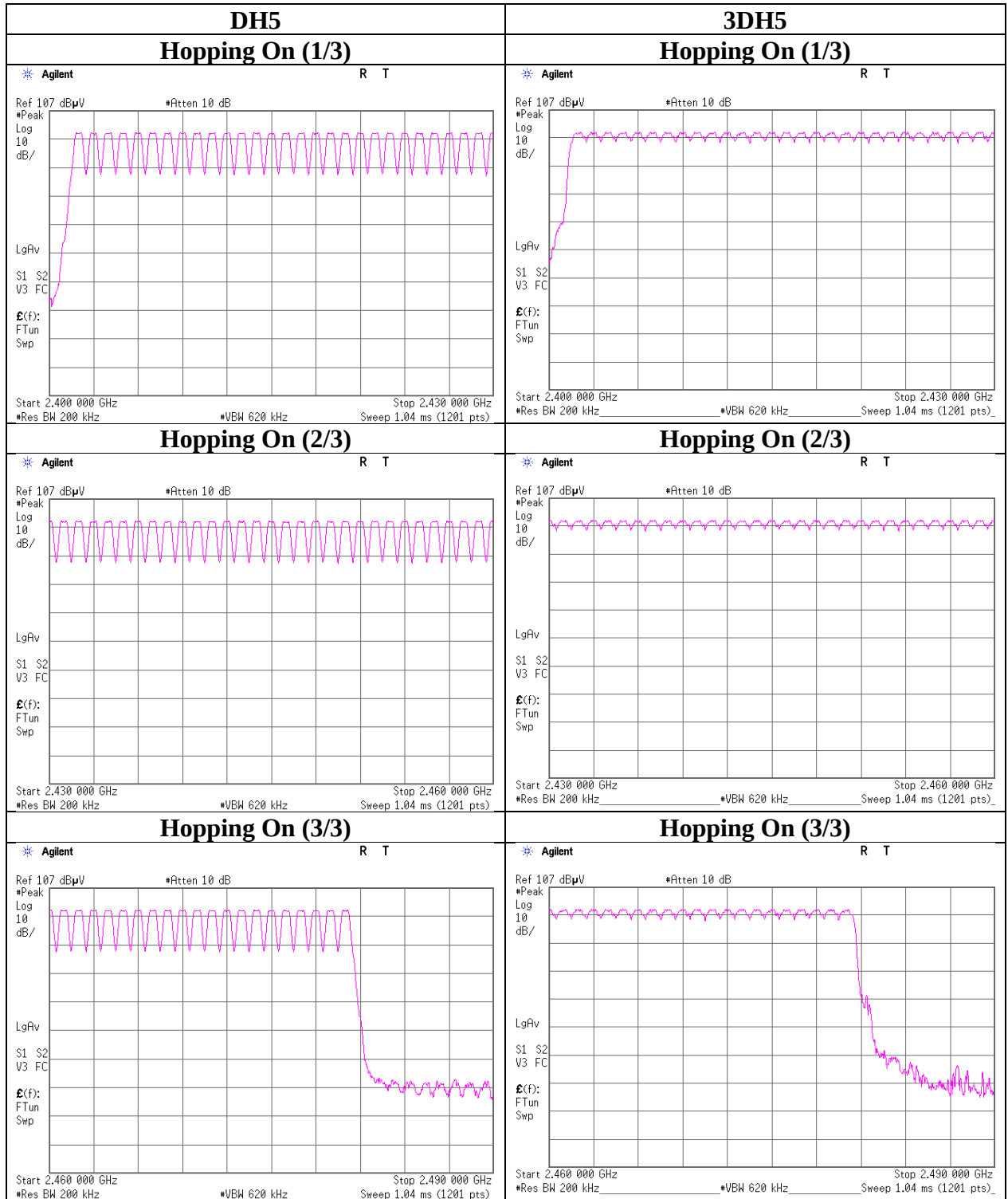
BT2

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



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Ise EMC Lab.

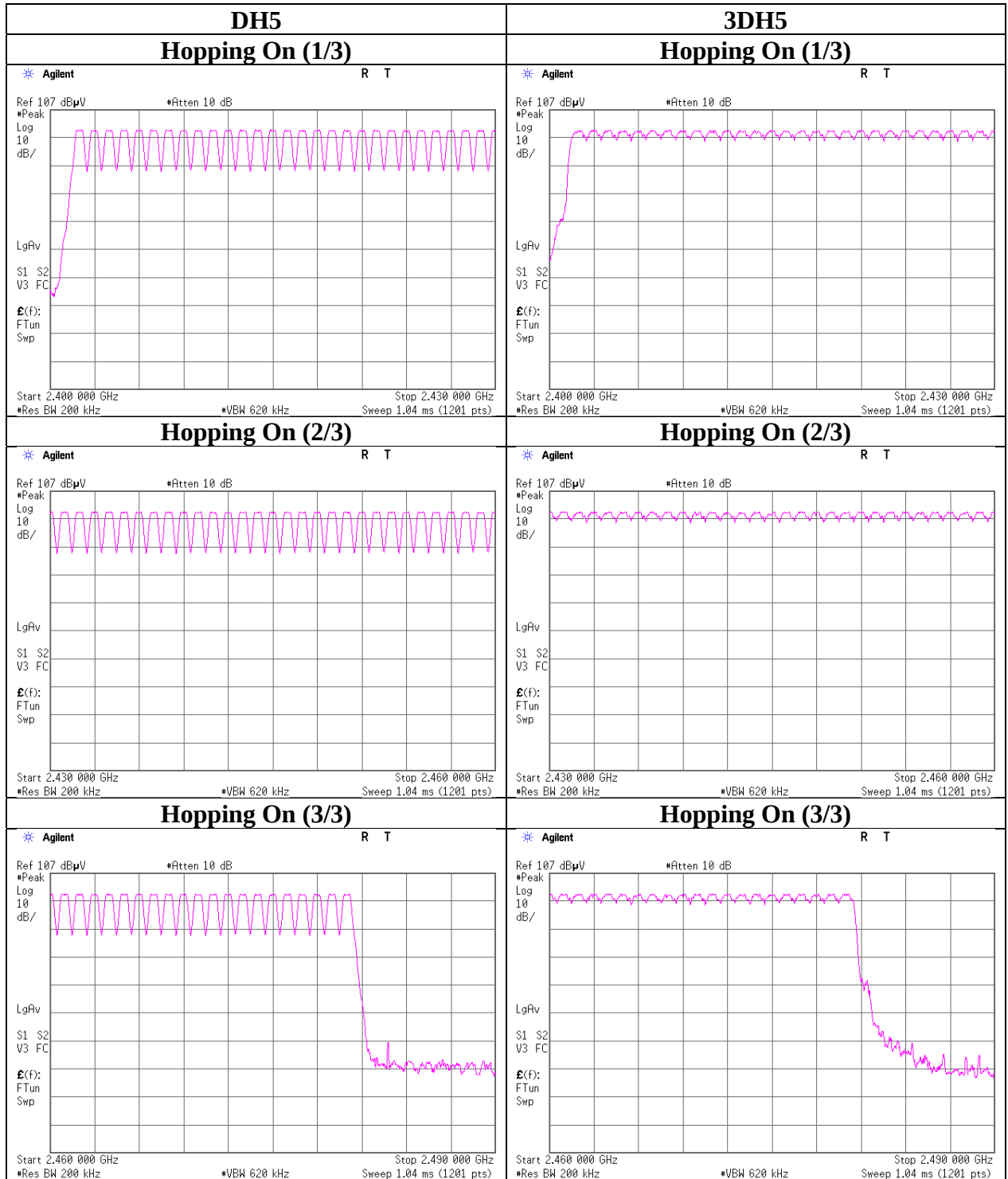
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Number of Hopping Frequency

BT2



UL Japan, Inc.

Ise EMC Lab.

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

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Facsimile : +81 596 24 8124

Dwell time

Report No. 13671144H
Test place Ise EMC Lab. No.8 Measurement Room
Date January 13, 2021 January 13, 2021
Temperature / Humidity 22 deg. C / 33 % RH 22 deg. C / 33 % RH
Engineer Nachi Konegawa Nachi Konegawa
BT1 BT2
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 [msec]	Result [msec]	Limit [msec]
DH1	49.8 times	/ 5 sec. x	31.6 sec. = 315 times	0.392	123	400
DH3	27.6 times	/ 5 sec. x	31.6 sec. = 175 times	1.657	290	400
DH5	19.6 times	/ 5 sec. x	31.6 sec. = 124 times	2.910	361	400
3DH1	50.0 times	/ 5 sec. x	31.6 sec. = 316 times	0.391	124	400
3DH3	26.4 times	/ 5 sec. x	31.6 sec. = 167 times	1.647	275	400
3DH5	21.4 times	/ 5 sec. x	31.6 sec. = 136 times	2.907	395	400

BT2

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 [msec]	Result [msec]	Limit [msec]
DH1	50.4 times	/ 5 sec. x	31.6 sec. = 319 times	0.393	125	400
DH3	27.2 times	/ 5 sec. x	31.6 sec. = 172 times	1.659	285	400
DH5	19.8 times	/ 5 sec. x	31.6 sec. = 126 times	2.903	366	400
3DH1	50.2 times	/ 5 sec. x	31.6 sec. = 318 times	0.392	125	400
3DH3	28.4 times	/ 5 sec. x	31.6 sec. = 180 times	1.647	296	400
3DH5	18.6 times	/ 5 sec. x	31.6 sec. = 118 times	2.907	343	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	50	50	50	50	49.8
DH3	27	29	25	30	27	27.6
DH5	17	22	17	20	22	19.6
3DH1	50	48	50	52	50	50
3DH3	24	27	24	28	29	26.4
3DH5	22	19	21	22	23	21.4

BT2

*Average data of 5 tests.(except Inquiry)

Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	50	51	50	51	50	50.4
DH3	29	24	29	28	26	27.2
DH5	19	22	20	19	19	19.8
3DH1	50	50	49	50	52	50.2
3DH3	28	26	27	29	32	28.4
3DH5	19	18	22	18	16	18.6

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 $N \times 0.4s$, where N is the number of channels being used in the hopping sequence ($20 \leq N \leq 79$), is always less than $0.4s$ regardless of packet size. This is confirmed in the test report for $N = 79$.

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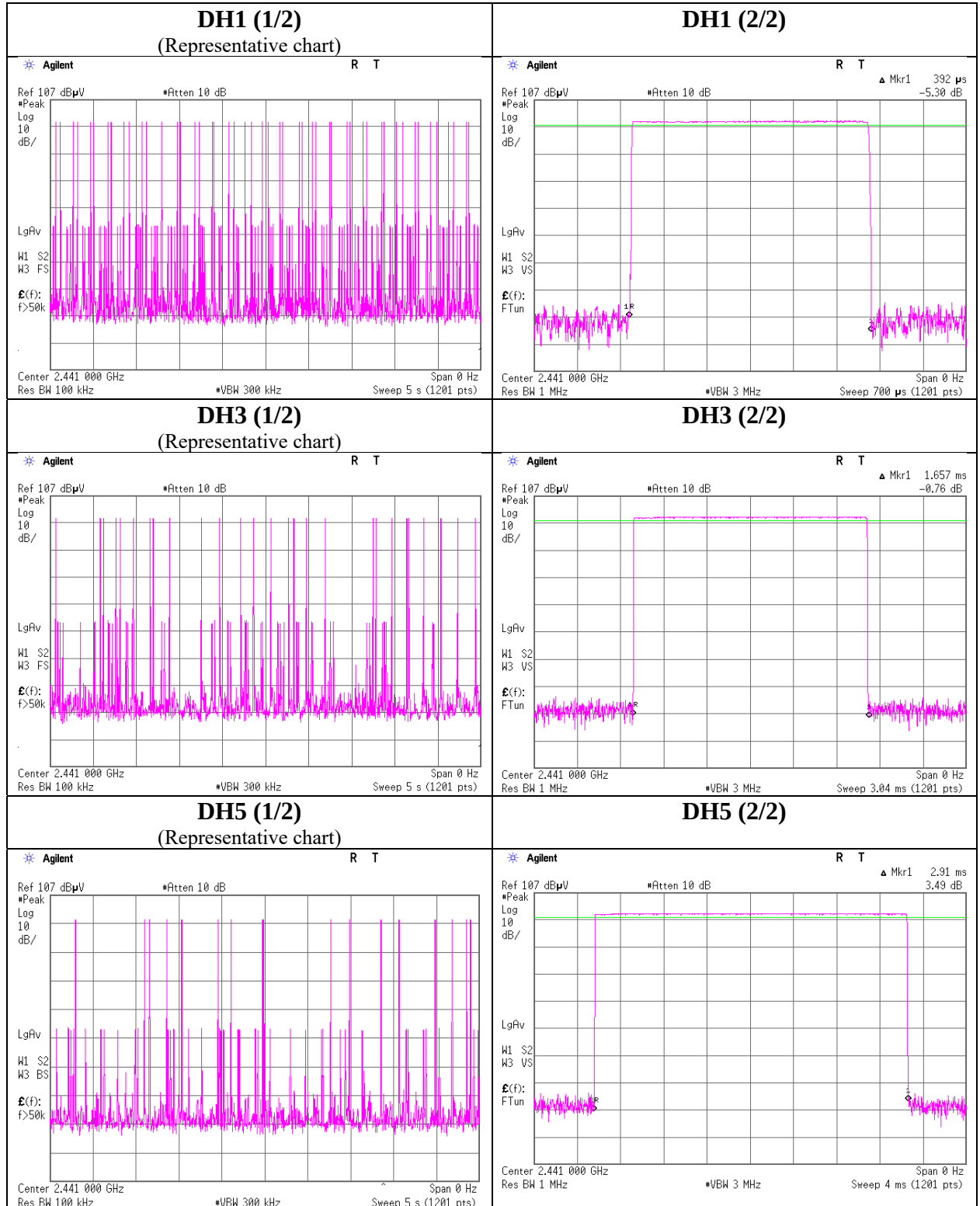
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Dwell time

BT1



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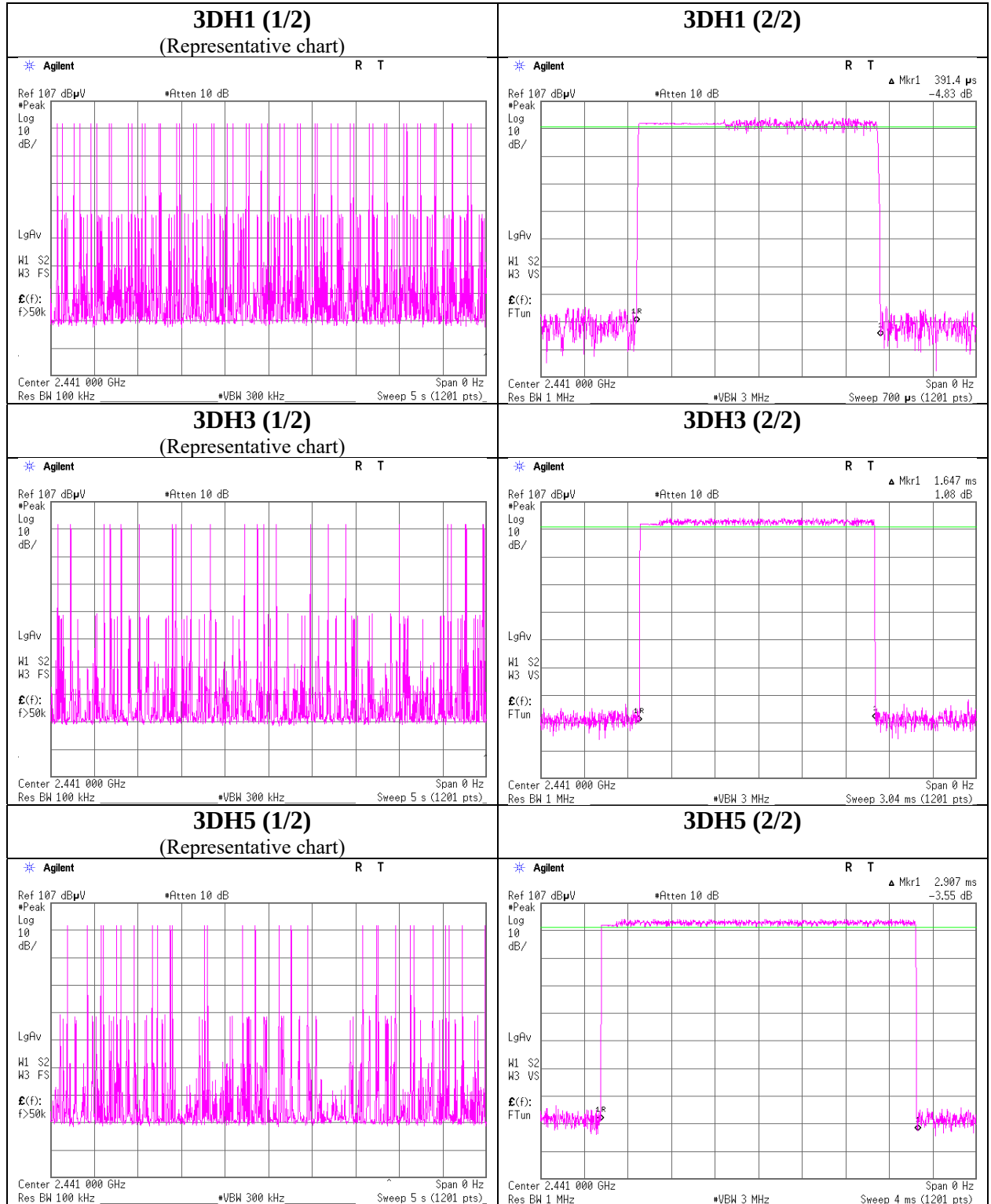
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Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Dwell time

BT1



UL Japan, Inc.

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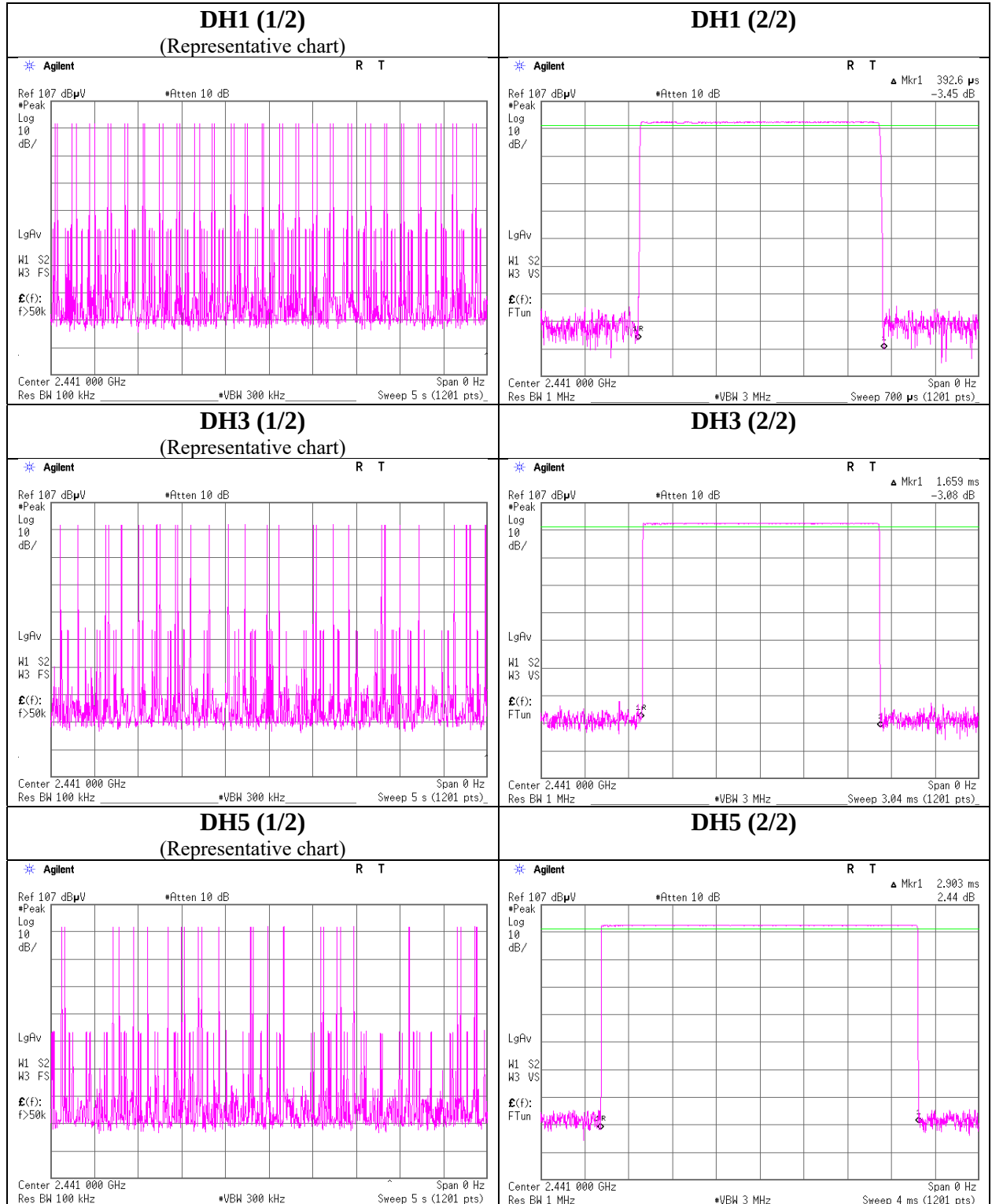
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Dwell time

BT2



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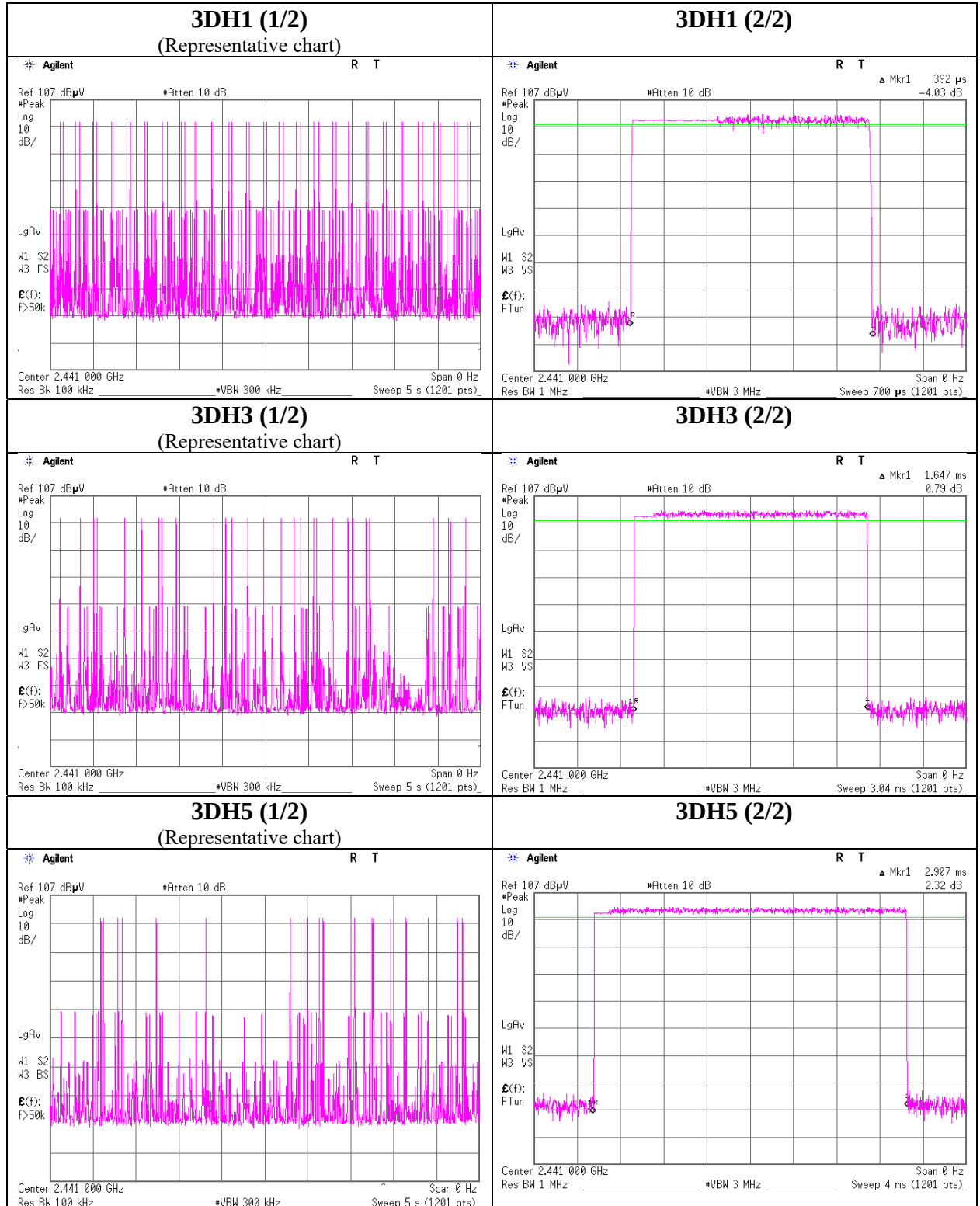
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Dwell time

BT2



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Maximum Peak Output Power

Report No. 13671144H
Test place Ise EMC Lab. No.8 Measurement Room
Date January 13, 2021 January 14, 2021
Temperature / Humidity 22 deg. C / 33 % RH 22 deg. C / 36 % RH
Engineer Nachi Konegawa Nachi Konegawa
BT1 BT2
Mode Tx, Hopping Off

BT1					Conducted Power					e.i.r.p. for RSS-247					
Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]	Antenna Gain [dBi]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]			[dBm]	[mW]	[dBm]	[mW]	
DH5	2402.0	-8.12	0.50	9.75	2.13	1.63	20.96	125	18.83	5.80	7.93	6.21	36.02	4000	28.09
DH5	2441.0	-8.15	0.50	9.75	2.10	1.62	20.96	125	18.86	5.80	7.90	6.17	36.02	4000	28.12
DH5	2480.0	-8.20	0.50	9.75	2.05	1.60	20.96	125	18.91	5.80	7.85	6.10	36.02	4000	28.17
2DH5	2402.0	-6.14	0.50	9.75	4.11	2.58	20.96	125	16.85	5.80	9.91	9.79	36.02	4000	26.11
2DH5	2441.0	-6.15	0.50	9.75	4.10	2.57	20.96	125	16.86	5.80	9.90	9.77	36.02	4000	26.12
2DH5	2480.0	-6.18	0.50	9.75	4.07	2.55	20.96	125	16.89	5.80	9.87	9.71	36.02	4000	26.15
3DH5	2402.0	-5.87	0.50	9.75	4.38	2.74	20.96	125	16.58	5.80	10.18	10.42	36.02	4000	25.84
3DH5	2441.0	-5.88	0.50	9.75	4.37	2.74	20.96	125	16.59	5.80	10.17	10.40	36.02	4000	25.85
3DH5	2480.0	-5.91	0.50	9.75	4.34	2.72	20.96	125	16.62	5.80	10.14	10.33	36.02	4000	25.88

BT2					Conducted Power					e.i.r.p. for RSS-247					
Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]	Antenna Gain [dBi]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]			[dBm]	[mW]	[dBm]	[mW]	
DH5	2402.0	-7.79	0.50	9.75	2.46	1.76	20.96	125	18.50	5.80	8.26	6.70	36.02	4000	27.76
DH5	2441.0	-7.87	0.50	9.75	2.38	1.73	20.96	125	18.58	5.80	8.18	6.58	36.02	4000	27.84
DH5	2480.0	-7.99	0.50	9.75	2.26	1.68	20.96	125	18.70	5.80	8.06	6.40	36.02	4000	27.96
2DH5	2402.0	-5.59	0.50	9.75	4.66	2.92	20.96	125	16.30	5.80	10.46	11.12	36.02	4000	25.56
2DH5	2441.0	-5.68	0.50	9.75	4.57	2.86	20.96	125	16.39	5.80	10.37	10.89	36.02	4000	25.65
2DH5	2480.0	-5.79	0.50	9.75	4.46	2.79	20.96	125	16.50	5.80	10.26	10.62	36.02	4000	25.76
3DH5	2402.0	-5.33	0.50	9.75	4.92	3.10	20.96	125	16.04	5.80	10.72	11.80	36.02	4000	25.30
3DH5	2441.0	-5.43	0.50	9.75	4.82	3.03	20.96	125	16.14	5.80	10.62	11.53	36.02	4000	25.40
3DH5	2480.0	-5.54	0.50	9.75	4.71	2.96	20.96	125	16.25	5.80	10.51	11.25	36.02	4000	25.51

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: 20ch) 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 20dB BW without 2/3 relaxation, 125mW power limit was applied to it.

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

Report No. 13671144H
Test place Ise EMC Lab. No.8 Measurement Room
Date January 13, 2021 January 14, 2021
Temperature / Humidity 22 deg. C / 33 % RH 22 deg. C / 36 % RH
Engineer Nachi Konegawa Nachi Konegawa
BT1 BT2
Mode Tx, Hopping Off

BT1

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)	
					[dBm]	[mW]
DH5	2402.0	-9.37	0.50	9.75	0.88	1.22
DH5	2441.0	-9.40	0.50	9.75	0.85	1.22
DH5	2480.0	-9.45	0.50	9.75	0.80	1.20
2DH5	2402.0	-9.71	0.50	9.75	0.54	1.13
2DH5	2441.0	-9.72	0.50	9.75	0.53	1.13
2DH5	2480.0	-9.73	0.50	9.75	0.52	1.13
3DH5	2402.0	-9.70	0.50	9.75	0.55	1.14
3DH5	2441.0	-9.71	0.50	9.75	0.54	1.13
3DH5	2480.0	-9.72	0.50	9.75	0.53	1.13

BT2

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)	
					[dBm]	[mW]
DH5	2402.0	-9.03	0.50	9.75	1.22	1.32
DH5	2441.0	-9.12	0.50	9.75	1.13	1.30
DH5	2480.0	-9.24	0.50	9.75	1.01	1.26
2DH5	2402.0	-9.20	0.50	9.75	1.05	1.27
2DH5	2441.0	-9.28	0.50	9.75	0.97	1.25
2DH5	2480.0	-9.37	0.50	9.75	0.88	1.22
3DH5	2402.0	-9.20	0.50	9.75	1.05	1.27
3DH5	2441.0	-9.28	0.50	9.75	0.97	1.25
3DH5	2480.0	-9.36	0.50	9.75	0.89	1.23

Sample Calculation:

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

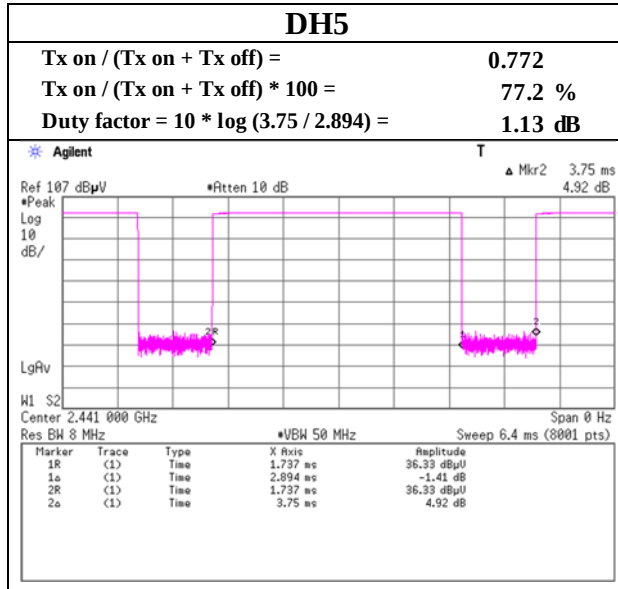
Result (Burst power average) = Time average + Duty factor

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

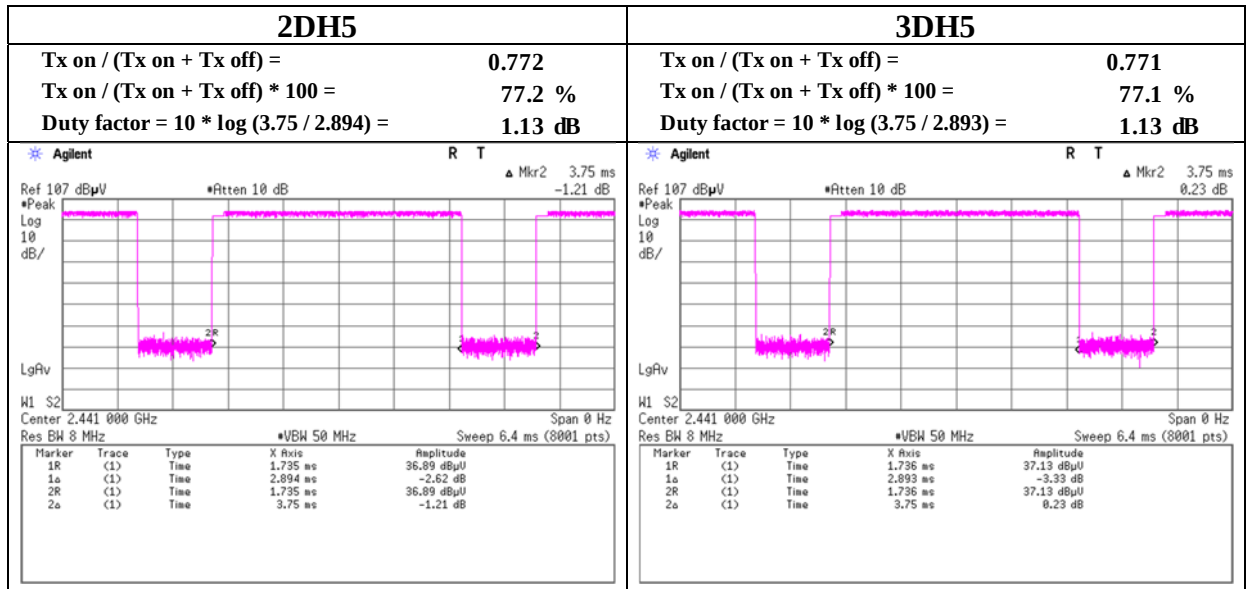
Burst Rate Confirmation

Report No. 13671144H
Test place Ise EMC Lab. No.8 Measurement Room
Date January 13, 2021
Temperature / Humidity 22 deg. C / 33 % RH
Engineer Nachi Konegawa
Mode Tx, Hopping Off

BT1 DH5



BT1



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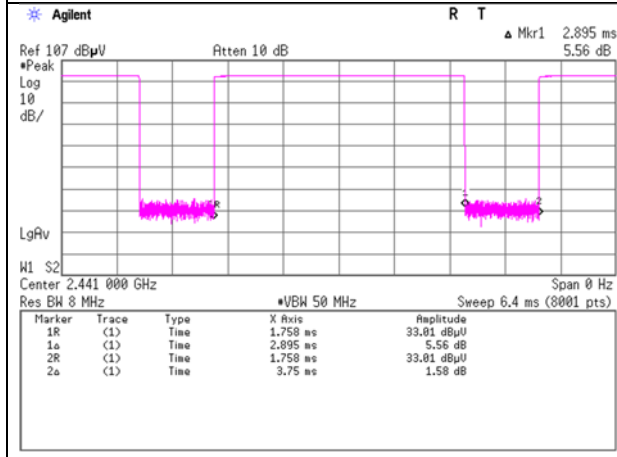
Burst Rate Confirmation

Report No. 13671144H
Test place Ise EMC Lab. No.8 Measurement Room
Date January 14, 2021
Temperature / Humidity 22 deg. C / 36 % RH
Engineer Nachi Konegawa
Mode Tx, Hopping Off

BT2

DH5

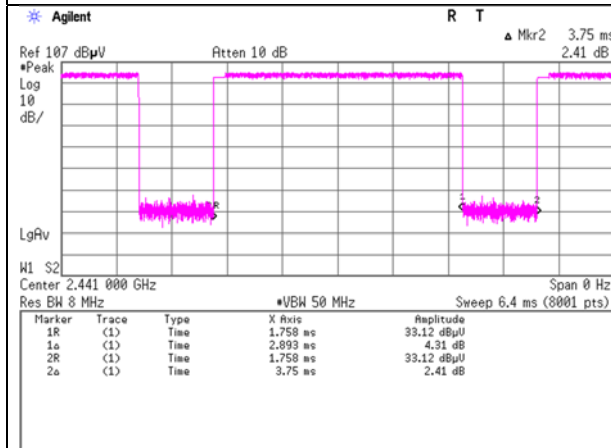
$Tx\ on / (Tx\ on + Tx\ off) = 0.772$
 $Tx\ on / (Tx\ on + Tx\ off) * 100 = 77.2\ \%$
 $Duty\ factor = 10 * \log (3.75 / 2.895) = 1.12\ dB$



BT2

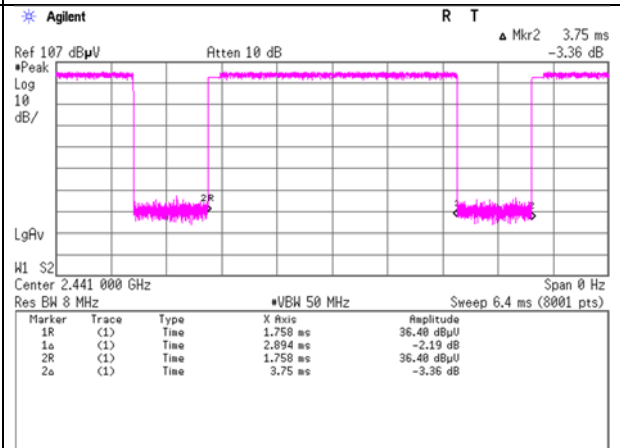
2DH5

$Tx\ on / (Tx\ on + Tx\ off) = 0.771$
 $Tx\ on / (Tx\ on + Tx\ off) * 100 = 77.1\ \%$
 $Duty\ factor = 10 * \log (3.75 / 2.893) = 1.13\ dB$



3DH5

$Tx\ on / (Tx\ on + Tx\ off) = 0.772$
 $Tx\ on / (Tx\ on + Tx\ off) * 100 = 77.2\ \%$
 $Duty\ factor = 10 * \log (3.75 / 2.894) = 1.13\ dB$



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Radiated Spurious Emission (BT1)

Report No. 13671144H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date January 19, 2021 No.3 January 29, 2021 No.3 January 31, 2021 No.3 January 31, 2021
Temperature / Humidity 22 deg. C / 32 % RH 20 deg. C / 32 % RH 22 deg. C / 23 % RH 22 deg. C / 27 % RH
Engineer Yuta Moriya Takeshi Hiyaji Yuta Moriya Junki Nagatomi
(1 GHz -10 GHz) (10 GHz -18 GHz) (18 GHz -26.5 GHz) (Below 1 GHz)
Mode Tx, Hopping Off, DH5 2402 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	72.545	QP	42.6	6.4	7.8	32.2	-	24.7	40.0	15.3	
Hori.	74.812	QP	40.6	6.5	7.9	32.2	-	22.8	40.0	17.2	
Hori.	165.211	QP	37.5	15.7	8.9	32.1	-	29.9	43.5	13.6	
Hori.	609.012	QP	36.1	19.4	12.1	32.0	-	35.6	46.0	10.4	
Hori.	613.423	QP	34.6	19.5	12.1	32.0	-	34.2	46.0	11.8	
Hori.	834.956	QP	34.8	21.0	13.3	31.3	-	37.8	46.0	8.2	
Hori.	2390.000	PK	44.0	27.5	5.5	32.7	-	44.3	73.9	29.6	
Hori.	2496.821	PK	48.3	27.3	5.6	32.7	-	48.5	73.9	25.4	
Hori.	4804.000	PK	41.5	31.7	7.6	31.7	-	49.1	73.9	24.8	Floor noise
Hori.	7206.000	PK	42.7	36.1	9.0	32.6	-	55.1	73.9	18.8	Floor noise
Hori.	9608.000	PK	44.3	38.7	9.4	33.3	-	59.1	73.9	14.8	Floor noise
Hori.	2390.000	AV	34.5	27.5	5.5	32.7	1.1	35.9	53.9	18.0	*1)
Hori.	2496.821	AV	39.5	27.3	5.6	32.7	1.1	40.8	53.9	13.1	*2)
Hori.	4804.000	AV	32.8	31.7	7.6	31.7	-	40.4	53.9	13.5	Floor noise
Hori.	7206.000	AV	32.3	36.1	9.0	32.6	-	44.7	53.9	9.2	Floor noise
Hori.	9608.000	AV	30.2	38.7	9.4	33.3	-	45.0	53.9	8.9	Floor noise
Vert.	72.623	QP	52.8	6.4	7.8	32.2	-	34.9	40.0	5.1	
Vert.	74.803	QP	51.1	6.5	7.9	32.2	-	33.3	40.0	6.7	
Vert.	164.955	QP	43.1	15.7	8.9	32.1	-	35.6	43.5	7.9	
Vert.	609.173	QP	39.3	19.4	12.1	32.0	-	38.8	46.0	7.2	
Vert.	613.511	QP	39.5	19.5	12.1	32.0	-	39.0	46.0	7.0	
Vert.	833.023	QP	32.0	21.0	13.3	31.3	-	35.0	46.0	11.0	
Vert.	2390.000	PK	44.1	27.5	5.5	32.7	-	44.4	73.9	29.5	
Vert.	2496.821	PK	46.3	27.3	5.6	32.7	-	46.4	73.9	27.5	
Vert.	4804.000	PK	41.3	31.7	7.6	31.7	-	49.0	73.9	24.9	Floor noise
Vert.	7206.000	PK	42.4	36.1	9.0	32.6	-	54.8	73.9	19.1	Floor noise
Vert.	9608.000	PK	43.2	38.7	9.4	33.3	-	58.0	73.9	15.9	Floor noise
Vert.	2390.000	AV	35.1	27.5	5.5	32.7	1.1	36.5	53.9	17.4	*1)
Vert.	2496.821	AV	37.7	27.3	5.6	32.7	1.1	38.9	53.9	15.0	*2)
Vert.	4804.000	AV	32.2	31.7	7.6	31.7	-	39.9	53.9	14.0	Floor noise
Vert.	7206.000	AV	31.2	36.1	9.0	32.6	-	43.7	53.9	10.2	Floor noise
Vert.	9608.000	AV	30.3	38.7	9.4	33.3	-	45.1	53.9	8.8	Floor noise

Result = 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).

Distance factor: 1 GHz - 10 GHz $20\log(3.95\text{ m} / 3.0\text{ m}) = 2.39\text{ dB}$
10 GHz - 26.5 GHz $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

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

*2) Noise synchronized with duty of carrier frequency

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	97.4	27.5	5.5	32.7	97.6	-	-	Carrier
Hori.	2400.000	PK	41.6	27.5	5.5	32.7	41.9	77.6	35.8	
Hori.	2304.642	PK	42.8	27.9	5.4	32.8	43.3	77.6	34.3	
Vert.	2402.000	PK	99.4	27.5	5.5	32.7	99.7	-	-	Carrier
Vert.	2400.000	PK	42.2	27.5	5.5	32.7	42.4	79.7	37.3	
Vert.	2304.642	PK	43.9	27.9	5.4	32.8	44.4	79.7	35.3	

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

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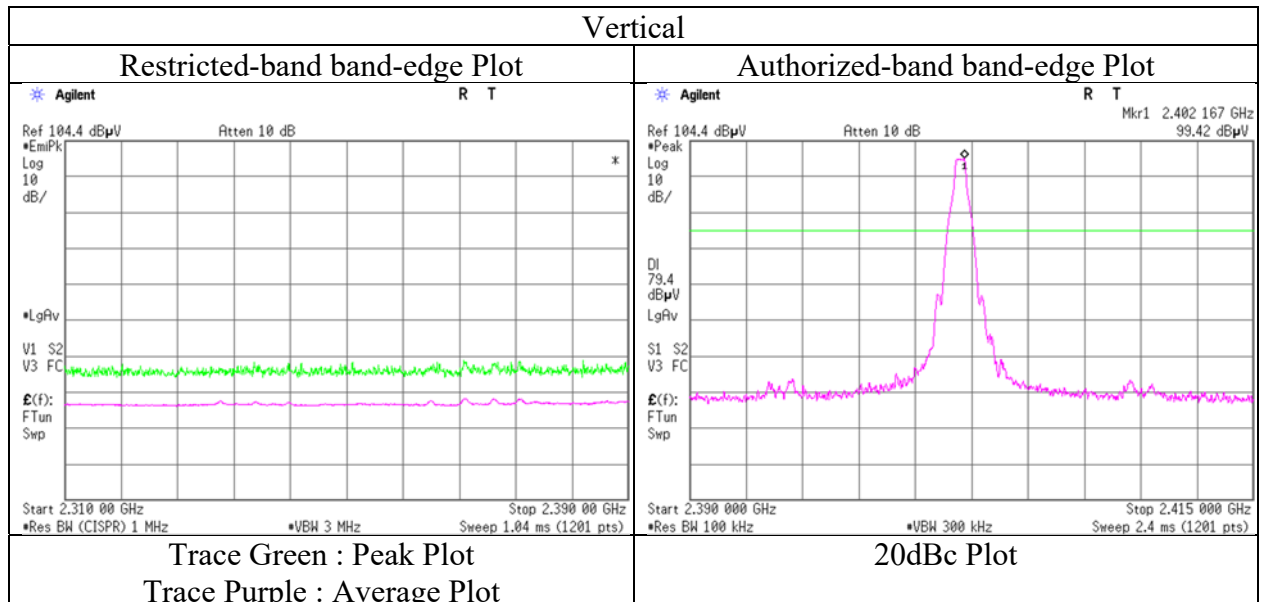
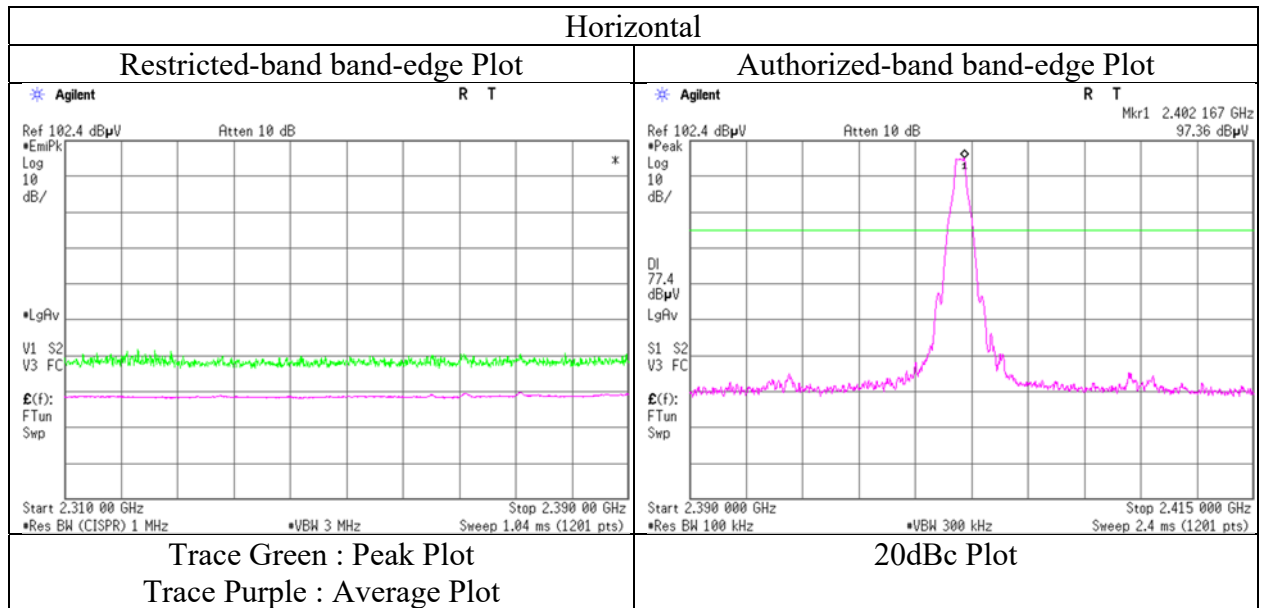
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Radiated Spurious Emission (Reference Plot for band-edge) (BT1)

Report No.	13671144H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 19, 2021
Temperature / Humidity	22 deg. C / 32 % RH
Engineer	Yuta Moriya
	(1 GHz -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 was shown in tabular data.

UL Japan, Inc.

Ise EMC Lab.

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Radiated Spurious Emission (BT1)

Report No. 13671144H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date January 19, 2021 No.3 January 29, 2021 No.3 January 31, 2021 No.3 January 31, 2021
Temperature / Humidity 22 deg. C / 32 % RH 20 deg. C / 32 % RH 22 deg. C / 23 % RH 22 deg. C / 27 % RH
Engineer Yuta Moriya Takeshi Hiyaji Yuta Moriya Junki Nagatomi
(1 GHz -10 GHz) (10 GHz -18 GHz) (18 GHz -26.5 GHz) (Below 1 GHz)
Mode Tx, Hopping Off, DH5 2441 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	72.618	QP	42.7	6.4	7.8	32.2	-	24.8	40.0	15.2	
Hori.	74.826	QP	40.6	6.5	7.9	32.2	-	22.8	40.0	17.2	
Hori.	165.101	QP	37.5	15.7	8.9	32.1	-	30.0	43.5	13.5	
Hori.	608.980	QP	36.2	19.4	12.1	32.0	-	35.7	46.0	10.4	
Hori.	613.470	QP	34.7	19.5	12.1	32.0	-	34.3	46.0	11.7	
Hori.	834.991	QP	34.8	21.0	13.3	31.3	-	37.8	46.0	8.2	
Hori.	2341.736	PK	47.4	27.7	5.4	32.7	-	47.8	73.9	26.2	
Hori.	2343.323	PK	45.1	27.7	5.5	32.7	-	45.5	73.9	28.4	
Hori.	4882.000	PK	40.9	31.4	7.6	31.6	-	48.3	73.9	25.6	Floor noise
Hori.	7323.000	PK	41.9	36.2	9.0	32.6	-	54.5	73.9	19.4	Floor noise
Hori.	9764.000	PK	40.4	39.0	9.5	33.4	-	55.4	73.9	18.5	Floor noise
Hori.	2341.736	AV	34.1	27.7	5.4	32.7	1.1	35.6	53.9	18.3	*1)
Hori.	2343.323	AV	36.6	27.7	5.5	32.7	1.1	38.1	53.9	15.8	*1)
Hori.	4882.000	AV	31.5	31.4	7.6	31.6	-	38.9	53.9	15.0	Floor noise
Hori.	7323.000	AV	30.2	36.2	9.0	32.6	-	42.8	53.9	11.1	Floor noise
Hori.	9764.000	AV	30.5	39.0	9.5	33.4	-	45.6	53.9	8.3	Floor noise
Vert.	72.612	QP	52.8	6.4	7.8	32.2	-	34.9	40.0	5.1	
Vert.	74.804	QP	51.1	6.5	7.9	32.2	-	33.3	40.0	6.7	
Vert.	164.976	QP	43.2	15.7	8.9	32.1	-	35.7	43.5	7.8	
Vert.	609.162	QP	39.3	19.4	12.1	32.0	-	38.8	46.0	7.2	
Vert.	613.481	QP	39.5	19.5	12.1	32.0	-	39.1	46.0	6.9	
Vert.	833.000	QP	32.1	21.0	13.3	31.3	-	35.1	46.0	10.9	
Vert.	2341.736	PK	48.4	27.7	5.4	32.7	-	48.8	73.9	25.1	
Vert.	2343.323	PK	47.4	27.7	5.5	32.7	-	47.8	73.9	26.1	
Vert.	4882.000	PK	40.9	31.4	7.6	31.6	-	48.3	73.9	25.6	Floor noise
Vert.	7323.000	PK	42.4	36.2	9.0	32.6	-	54.9	73.9	19.0	Floor noise
Vert.	9764.000	PK	41.8	39.0	9.5	33.4	-	56.9	73.9	17.0	Floor noise
Vert.	2341.736	AV	34.0	27.7	5.4	32.7	1.1	35.5	53.9	18.4	*1)
Vert.	2343.323	AV	39.2	27.7	5.5	32.7	1.1	40.7	53.9	13.2	*1)
Vert.	4882.000	AV	32.5	31.4	7.6	31.6	-	39.9	53.9	14.0	Floor noise
Vert.	7323.000	AV	31.4	36.2	9.0	32.6	-	44.0	53.9	9.9	Floor noise
Vert.	9764.000	AV	30.1	39.0	9.5	33.4	-	45.2	53.9	8.7	Floor noise

Result = 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).

Distance factor: 1 GHz - 10 GHz $20\log(3.95\text{ m} / 3.0\text{ m}) = 2.39\text{ dB}$
10 GHz - 26.5 GHz $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

*1) Noise synchronized with duty of carrier frequency

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2441.000	PK	97.8	27.5	5.5	32.7	98.1	-	-	Carrier
Hori.	2537.931	PK	39.6	27.4	5.6	32.7	39.9	78.1	38.2	
Vert.	2441.000	PK	99.1	27.5	5.5	32.7	99.3	-	-	Carrier
Vert.	2537.931	PK	42.0	27.4	5.6	32.7	42.3	79.3	37.0	

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

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Radiated Spurious Emission (BT1)

Report No.	13671144H			
Test place	Ise EMC Lab.			
Semi Anechoic Chamber	No.3	No.3	No.3	No.3
Date	January 19, 2021	January 29, 2021	January 31, 2021	January 31, 2021
Temperature / Humidity	22 deg. C / 32 % RH	20 deg. C / 32 % RH	22 deg. C / 23 % RH	22 deg. C / 27 % RH
Engineer	Yuta Moriya	Takeshi Hiyaji	Yuta Moriya	Junki Nagatomi
	(1 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)	(Below 1 GHz)
Mode	Tx, Hopping Off, DH5 2480 MHz			

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	72.587	QP	42.1	6.4	7.8	32.2	-	24.2	40.0	15.8	
Hori.	74.810	QP	39.9	6.5	7.9	32.2	-	22.1	40.0	17.9	
Hori.	165.051	QP	39.0	15.7	8.9	32.1	-	31.5	43.5	12.0	
Hori.	608.878	QP	36.1	19.4	12.1	32.0	-	35.6	46.0	10.5	
Hori.	613.512	QP	34.8	19.5	12.1	32.0	-	34.4	46.0	11.6	
Hori.	835.021	QP	34.9	21.0	13.3	31.3	-	37.9	46.0	8.1	
Hori.	2379.846	PK	47.3	27.6	5.5	32.7	-	47.6	73.9	26.3	
Hori.	2483.500	PK	51.7	27.3	5.6	32.7	-	51.9	73.9	22.0	
Hori.	4960.000	PK	40.6	31.5	7.6	31.6	-	48.1	73.9	25.8	Floor noise
Hori.	7440.000	PK	42.3	36.3	9.0	32.7	-	54.9	73.9	19.0	Floor noise
Hori.	9920.000	PK	43.6	38.8	9.5	33.5	-	58.5	73.9	15.5	Floor noise
Hori.	2379.846	AV	34.5	27.6	5.5	32.7	1.1	35.9	53.9	18.0	*2)
Hori.	2483.500	AV	37.8	27.3	5.6	32.7	1.1	39.1	53.9	14.8	*1)
Hori.	4960.000	AV	32.1	31.5	7.6	31.6	-	39.6	53.9	14.4	Floor noise
Hori.	7440.000	AV	31.0	36.3	9.0	32.7	-	43.6	53.9	10.3	Floor noise
Hori.	9920.000	AV	31.0	38.8	9.5	33.5	-	45.8	53.9	8.1	Floor noise
Vert.	72.591	QP	52.4	6.4	7.8	32.2	-	34.5	40.0	5.5	
Vert.	74.812	QP	50.6	6.5	7.9	32.2	-	32.8	40.0	7.2	
Vert.	164.976	QP	42.7	15.7	8.9	32.1	-	35.2	43.5	8.3	
Vert.	609.223	QP	39.5	19.4	12.1	32.0	-	39.0	46.0	7.0	
Vert.	613.832	QP	40.0	19.5	12.1	32.0	-	39.6	46.0	6.4	
Vert.	833.012	QP	32.0	21.0	13.3	31.3	-	35.0	46.0	11.0	
Vert.	2379.846	PK	47.3	27.6	5.5	32.7	-	47.6	73.9	26.3	
Vert.	2483.500	PK	49.8	27.3	5.6	32.7	-	49.9	73.9	24.0	
Vert.	4960.000	PK	40.3	31.5	7.6	31.6	-	47.8	73.9	26.1	Floor noise
Vert.	7440.000	PK	41.6	36.3	9.0	32.7	-	54.1	73.9	19.8	Floor noise
Vert.	9920.000	PK	41.3	38.8	9.5	33.5	-	56.1	73.9	17.8	Floor noise
Vert.	2379.846	AV	38.3	27.6	5.5	32.7	1.1	39.7	53.9	14.2	*2)
Vert.	2483.500	AV	36.6	27.3	5.6	32.7	1.1	37.9	53.9	16.0	*1)
Vert.	4960.000	AV	32.0	31.5	7.6	31.6	-	39.4	53.9	14.5	Floor noise
Vert.	7440.000	AV	31.5	36.3	9.0	32.7	-	44.0	53.9	9.9	Floor noise
Vert.	9920.000	AV	31.0	38.8	9.5	33.5	-	45.8	53.9	8.1	Floor noise

Result = 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).

Distance factor: 1 GHz - 10 GHz 20log(3.95 m / 3.0 m) = 2.39 dB
10 GHz - 26.5 GHz 20log(1.0 m / 3.0 m) = -9.5 dB

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

*2) Noise synchronized with duty of carrier frequency

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2480.000	PK	97.5	27.3	5.6	32.7	97.7	-	-	Carrier
Hori.	2580.224	PK	39.8	27.6	5.6	32.7	40.4	77.7	37.3	
Vert.	2480.000	PK	96.0	27.3	5.6	32.7	96.2	-	-	Carrier
Vert.	2580.224	PK	41.9	27.6	5.6	32.7	42.4	76.2	33.8	

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

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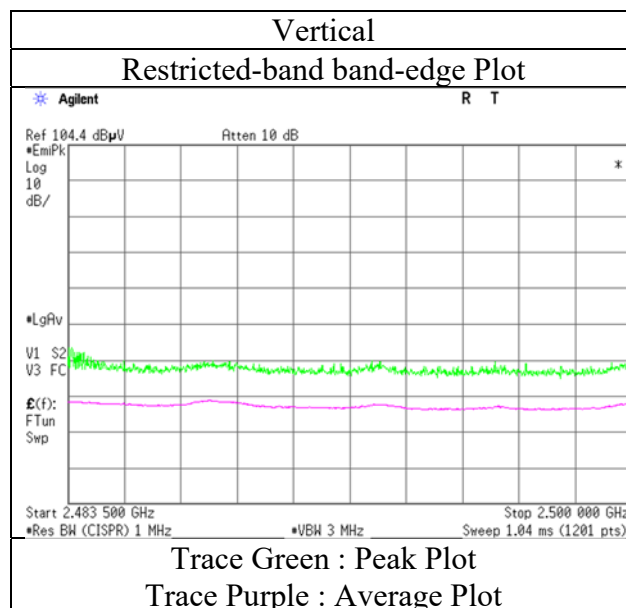
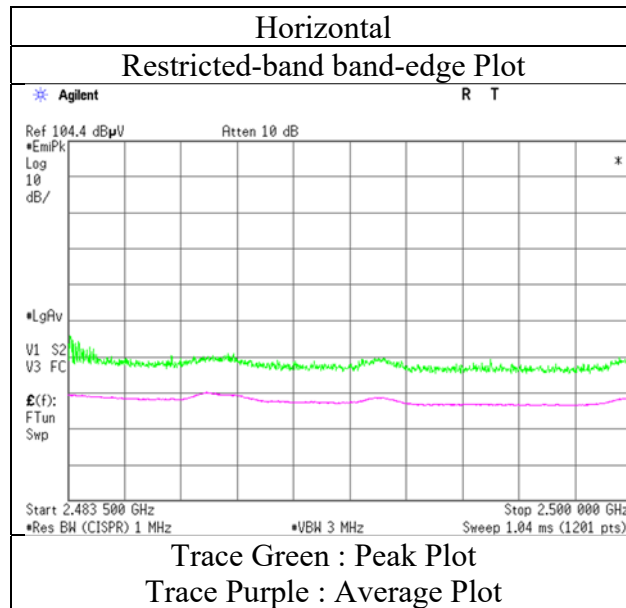
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Radiated Spurious Emission (Reference Plot for band-edge) (BT1)

Report No. 13671144H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date January 19, 2021
Temperature / Humidity 22 deg. C / 32 % RH
Engineer Yuta Moriya
(1 GHz -10 GHz)
Mode 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.

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Radiated Spurious Emission (BT1)

Report No.	13671144H			
Test place	Ise EMC Lab.			
Semi Anechoic Chamber	No.3	No.3	No.3	No.3
Date	January 20, 2021	January 29, 2021	January 31, 2021	January 31, 2021
Temperature / Humidity	18 deg. C / 24 % RH	20 deg. C / 32 % RH	22 deg. C / 23 % RH	22 deg. C / 27 % RH
Engineer	Tomohisa Nakagawa (1 GHz -10 GHz)	Takeshi Hiyaji (10 GHz -18 GHz)	Yuta Moriya (18 GHz -26.5 GHz)	Junki Nagatomi (Below 1 GHz)
Mode	Tx, Hopping Off, 3DH5 2402 MHz			

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	72.607	QP	42.5	6.4	7.8	32.2	-	24.5	40.0	15.5	
Hori.	74.848	QP	40.3	6.5	7.9	32.2	-	22.5	40.0	17.5	
Hori.	165.145	QP	38.7	15.7	8.9	32.1	-	31.2	43.5	12.3	
Hori.	607.121	QP	37.1	19.3	12.1	32.0	-	36.5	46.0	9.5	
Hori.	613.448	QP	36.0	19.5	12.1	32.0	-	35.6	46.0	10.4	
Hori.	839.125	QP	34.3	21.1	13.3	31.2	-	37.4	46.0	8.6	
Hori.	2390.000	PK	43.0	27.5	5.5	32.7	-	43.3	73.9	30.6	
Hori.	4804.000	PK	42.3	31.7	7.6	31.7	-	49.9	73.9	24.0	Floor noise
Hori.	7206.000	PK	43.8	36.1	9.0	32.6	-	56.3	73.9	17.6	Floor noise
Hori.	9608.000	PK	45.1	38.7	9.4	33.3	-	59.9	73.9	14.0	Floor noise
Hori.	2390.000	AV	34.5	27.5	5.5	32.7	1.1	35.9	53.9	18.0	*1)
Hori.	4804.000	AV	31.0	31.7	7.6	31.7	-	38.7	53.9	15.2	Floor noise
Hori.	7206.000	AV	32.2	36.1	9.0	32.6	-	44.6	53.9	9.3	Floor noise
Hori.	9608.000	AV	33.6	38.7	9.4	33.3	-	48.4	53.9	5.5	Floor noise
Vert.	72.649	QP	52.6	6.4	7.8	32.2	-	34.7	40.0	5.3	
Vert.	74.835	QP	50.3	6.5	7.9	32.2	-	32.5	40.0	7.5	
Vert.	165.057	QP	41.8	15.7	8.9	32.1	-	34.3	43.5	9.2	
Vert.	608.554	QP	39.7	19.4	12.1	32.0	-	39.1	46.0	6.9	
Vert.	613.923	QP	40.1	19.5	12.1	32.0	-	39.7	46.0	6.3	
Vert.	838.999	QP	31.5	21.1	13.3	31.2	-	34.6	46.0	11.4	
Vert.	2390.000	PK	43.3	27.5	5.5	32.7	-	43.6	73.9	30.4	
Vert.	4804.000	PK	41.2	31.7	7.6	31.7	-	48.9	73.9	25.1	Floor noise
Vert.	7206.000	PK	43.1	36.1	9.0	32.6	-	55.5	73.9	18.4	Floor noise
Vert.	9608.000	PK	44.1	38.7	9.4	33.3	-	58.9	73.9	15.0	Floor noise
Vert.	2390.000	AV	34.3	27.5	5.5	32.7	1.1	35.7	53.9	18.3	*1)
Vert.	4804.000	AV	30.1	31.7	7.6	31.7	-	37.8	53.9	16.1	Floor noise
Vert.	7206.000	AV	31.9	36.1	9.0	32.6	-	44.4	53.9	9.5	Floor noise
Vert.	9608.000	AV	32.7	38.7	9.4	33.3	-	47.6	53.9	6.3	Floor noise

Result = 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).

Distance factor: 1 GHz - 10 GHz $20\log(3.95\text{ m} / 3.0\text{ m}) = 2.39\text{ dB}$
10 GHz - 26.5 GHz $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

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

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	95.4	27.5	5.5	32.7	95.6	-	-	Carrier
Hori.	2400.000	PK	46.3	27.5	5.5	32.7	46.5	75.6	29.1	
Vert.	2402.000	PK	97.2	27.5	5.5	32.7	97.4	-	-	Carrier
Vert.	2400.000	PK	47.9	27.5	5.5	32.7	48.1	77.4	29.3	

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

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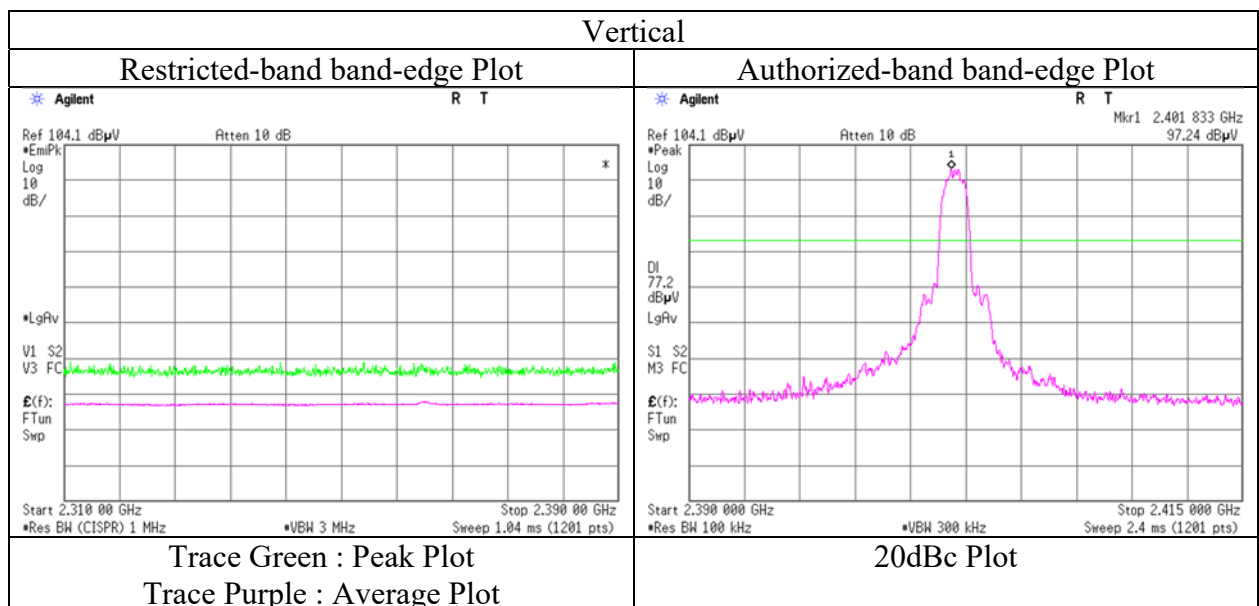
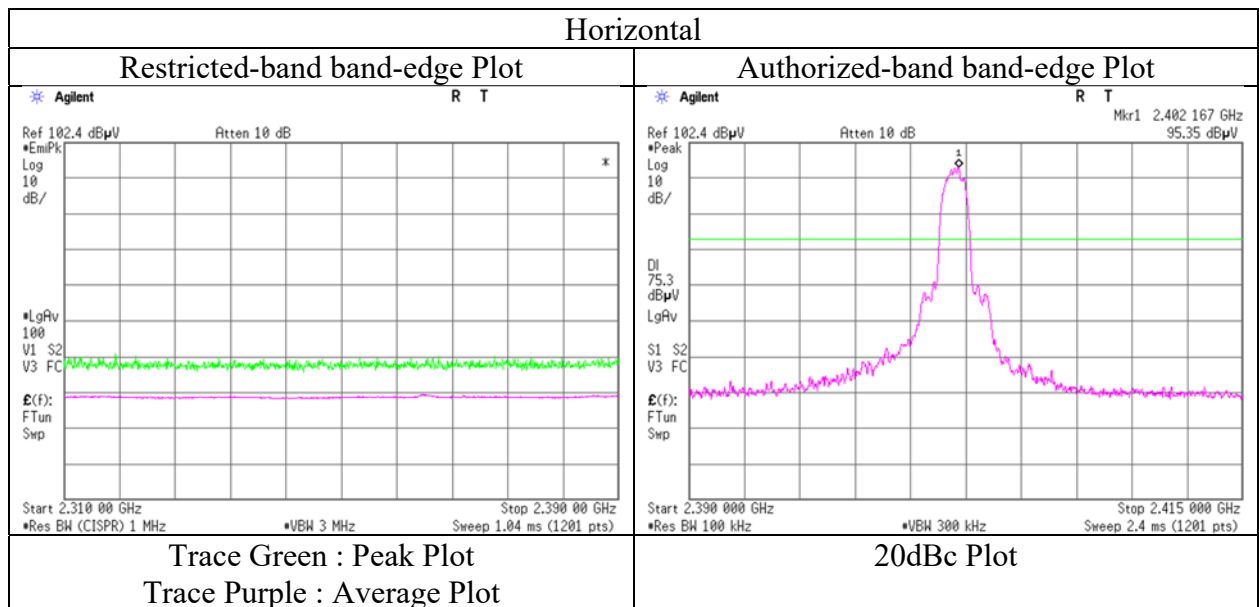
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Radiated Spurious Emission (Reference Plot for band-edge (BT1))

Report No.	13671144H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 20, 2021
Temperature / Humidity	18 deg. C / 24 % RH
Engineer	Tomohisa Nakagawa (1 GHz -10 GHz)
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 was shown in tabular data.

UL Japan, Inc.

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Radiated Spurious Emission (BT1)

Report No.	13671144H			
Test place	Ise EMC Lab.			
Semi Anechoic Chamber	No.3	No.3	No.3	No.3
Date	January 20, 2021	January 29, 2021	January 31, 2021	January 31, 2021
Temperature / Humidity	18 deg. C / 24 % RH	20 deg. C / 32 % RH	22 deg. C / 23 % RH	22 deg. C / 27 % RH
Engineer	Tomohisa Nakagawa (1 GHz -10 GHz)	Takeshi Hiyaji (10 GHz -18 GHz)	Yuta Moriya (18 GHz -26.5 GHz)	Junki Nagatomi (Below 1 GHz)
Mode	Tx, Hopping Off, 3DH5 2441 MHz			

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	72.652	QP	42.7	6.4	7.8	32.2	-	24.8	40.0	15.2	
Hori.	74.899	QP	40.4	6.5	7.9	32.2	-	22.6	40.0	17.4	
Hori.	165.211	QP	38.5	15.7	8.9	32.1	-	31.0	43.5	12.5	
Hori.	607.234	QP	37.0	19.3	12.1	32.0	-	36.4	46.0	9.6	
Hori.	613.443	QP	36.0	19.5	12.1	32.0	-	35.6	46.0	10.4	
Hori.	839.611	QP	33.9	21.1	13.3	31.2	-	37.1	46.0	9.0	
Hori.	4882.000	PK	40.9	31.4	7.6	31.6	-	48.3	73.9	25.6	Floor noise
Hori.	7323.000	PK	42.3	36.2	9.0	32.6	-	54.8	73.9	19.1	Floor noise
Hori.	9764.000	PK	44.0	39.0	9.5	33.4	-	59.1	73.9	14.9	Floor noise
Hori.	4882.000	AV	32.4	31.4	7.6	31.6	-	39.8	53.9	14.1	Floor noise
Hori.	7323.000	AV	33.8	36.2	9.0	32.6	-	46.3	53.9	7.6	Floor noise
Hori.	9764.000	AV	34.7	39.0	9.5	33.4	-	49.8	53.9	4.1	Floor noise
Vert.	72.661	QP	52.0	6.4	7.8	32.2	-	34.1	40.0	5.9	
Vert.	74.881	QP	50.1	6.5	7.9	32.2	-	32.3	40.0	7.7	
Vert.	165.076	QP	41.5	15.7	8.9	32.1	-	34.0	43.5	9.5	
Vert.	608.592	QP	39.8	19.4	12.1	32.0	-	39.2	46.0	6.8	
Vert.	614.152	QP	40.0	19.5	12.1	32.0	-	39.6	46.0	6.4	
Vert.	839.456	QP	31.4	21.1	13.3	31.2	-	34.6	46.0	11.5	
Vert.	4882.000	PK	42.5	31.4	7.6	31.6	-	49.9	73.9	24.0	Floor noise
Vert.	7323.000	PK	42.6	36.2	9.0	32.6	-	55.1	73.9	18.8	Floor noise
Vert.	9764.000	PK	43.7	39.0	9.5	33.4	-	58.8	73.9	15.1	Floor noise
Vert.	4882.000	AV	32.9	31.4	7.6	31.6	-	40.3	53.9	13.6	Floor noise
Vert.	7323.000	AV	34.2	36.2	9.0	32.6	-	46.7	53.9	7.2	Floor noise
Vert.	9764.000	AV	34.7	39.0	9.5	33.4	-	49.8	53.9	4.1	Floor noise

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

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

Distance factor: 1 GHz - 10 GHz $20\log(3.95\text{ m} / 3.0\text{ m}) = 2.39\text{ dB}$
10 GHz - 26.5 GHz $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

Radiated Spurious Emission (BT1)

Report No.	13671144H			
Test place	Ise EMC Lab.			
Semi Anechoic Chamber	No.3	No.3	No.3	No.3
Date	January 20, 2021	January 29, 2021	January 31, 2021	January 31, 2021
Temperature / Humidity	18 deg. C / 24 % RH	20 deg. C / 32 % RH	22 deg. C / 23 % RH	22 deg. C / 27 % RH
Engineer	Tomohisa Nakagawa (1 GHz -10 GHz)	Takeshi Hiyaji (10 GHz -18 GHz)	Yuta Moriya (18 GHz -26.5 GHz)	Junki Nagatomi (Below 1 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz			

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	72.652	QP	42.6	6.4	7.8	32.2	-	24.7	40.0	15.3	
Hori.	74.899	QP	40.4	6.5	7.9	32.2	-	22.6	40.0	17.4	
Hori.	165.211	QP	38.5	15.7	8.9	32.1	-	31.0	43.5	12.5	
Hori.	607.234	QP	37.0	19.3	12.1	32.0	-	36.5	46.0	9.6	
Hori.	613.443	QP	35.9	19.5	12.1	32.0	-	35.5	46.0	10.5	
Hori.	839.611	QP	33.8	21.1	13.3	31.2	-	36.9	46.0	9.1	
Hori.	2483.500	PK	50.7	27.3	5.6	32.7	-	50.9	73.9	23.0	
Hori.	4960.000	PK	40.9	31.5	7.6	31.6	-	48.3	73.9	25.6	Floor noise
Hori.	7440.000	PK	42.4	36.3	9.0	32.7	-	54.9	73.9	19.0	Floor noise
Hori.	9920.000	PK	44.6	38.8	9.5	33.5	-	59.4	73.9	14.5	Floor noise
Hori.	2483.500	AV	35.3	27.3	5.6	32.7	1.1	36.6	53.9	17.4	*1)
Hori.	4960.000	AV	30.3	31.5	7.6	31.6	-	37.8	53.9	16.1	Floor noise
Hori.	7440.000	AV	31.8	36.3	9.0	32.7	-	44.3	53.9	9.6	Floor noise
Hori.	9920.000	AV	32.9	38.8	9.5	33.5	-	47.7	53.9	6.2	Floor noise
Vert.	72.661	QP	52.1	6.4	7.8	32.2	-	34.2	40.0	5.8	
Vert.	74.881	QP	50.0	6.5	7.9	32.2	-	32.2	40.0	7.8	
Vert.	165.076	QP	41.4	15.7	8.9	32.1	-	33.9	43.5	9.6	
Vert.	608.592	QP	39.7	19.4	12.1	32.0	-	39.1	46.0	6.9	
Vert.	614.152	QP	39.9	19.5	12.1	32.0	-	39.5	46.0	6.5	
Vert.	839.456	QP	31.4	21.1	13.3	31.2	-	34.6	46.0	11.4	
Vert.	2483.500	PK	51.2	27.3	5.6	32.7	-	51.4	73.9	22.5	
Vert.	4960.000	PK	42.0	31.5	7.6	31.6	-	49.5	73.9	24.4	Floor noise
Vert.	7440.000	PK	42.6	36.3	9.0	32.7	-	55.2	73.9	18.7	Floor noise
Vert.	9920.000	PK	43.8	38.8	9.5	33.5	-	58.6	73.9	15.3	Floor noise
Vert.	2483.500	AV	35.2	27.3	5.6	32.7	1.1	36.5	53.9	17.4	*1)
Vert.	4960.000	AV	31.6	31.5	7.6	31.6	-	39.0	53.9	14.9	Floor noise
Vert.	7440.000	AV	32.0	36.3	9.0	32.7	-	44.5	53.9	9.4	Floor noise
Vert.	9920.000	AV	32.7	38.8	9.5	33.5	-	47.5	53.9	6.4	Floor noise

Result = 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).

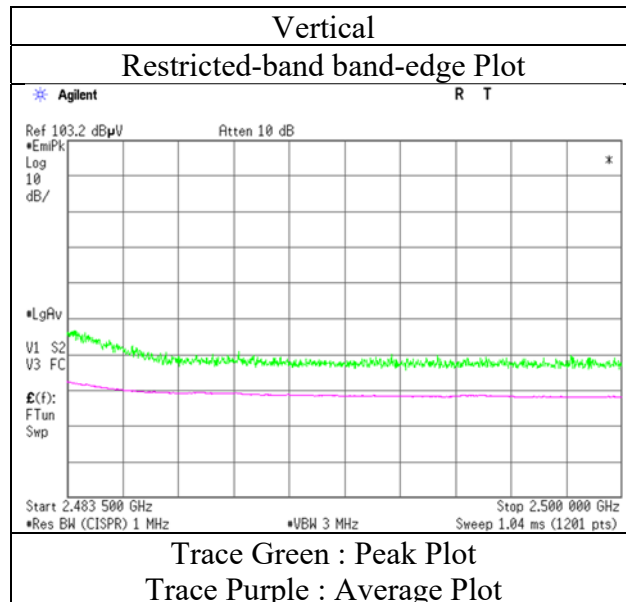
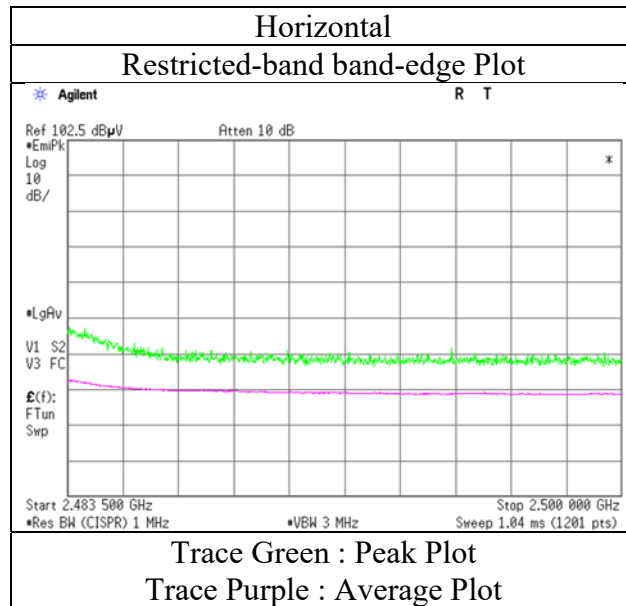
Distance factor: 1 GHz - 10 GHz 20log (3.95 m / 3.0 m) = 2.39 dB

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

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

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

Report No.	13671144H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 20, 2021
Temperature / Humidity	18 deg. C / 24 % RH
Engineer	Tomohisa Nakagawa (1 GHz -10 GHz)
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.

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Radiated Spurious Emission (BT2)

Report No.	13671144H			
Test place	Ise EMC Lab.			
Semi Anechoic Chamber	No.3	No.3	No.3	No.3
Date	January 21, 2021	January 29, 2021	January 31, 2021	February 2, 2021
Temperature / Humidity	21 deg. C / 34 % RH	20 deg. C / 32 % RH	22 deg. C / 23 % RH	21 deg. C / 38 % RH
Engineer	Yuta Moriya	Takeshi Hiyaji	Yuta Moriya	Nachi Konegawa
	(1 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)	(Below 1 GHz)
Mode	Tx, Hopping Off, DH5 2402 MHz			

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	72.648	QP	42.3	6.3	7.7	32.0	-	24.3	40.0	15.7	
Hori.	74.808	QP	42.4	6.4	7.7	32.0	-	24.6	40.0	15.5	
Hori.	165.080	QP	46.5	15.5	8.6	31.9	-	38.7	43.5	4.8	
Hori.	614.600	QP	38.7	19.3	11.3	32.0	-	37.3	46.0	8.7	
Hori.	620.360	QP	36.6	19.4	11.3	32.0	-	35.3	46.0	10.7	
Hori.	851.350	QP	33.0	21.4	12.2	31.3	-	35.3	46.0	10.7	
Hori.	2390.000	PK	43.1	27.5	5.5	32.7	-	43.4	73.9	30.6	
Hori.	2496.807	PK	46.2	27.3	5.6	32.7	-	46.4	73.9	27.5	
Hori.	4804.000	PK	43.0	31.7	7.6	31.7	-	50.7	73.9	23.3	Floor noise
Hori.	7206.000	PK	42.4	36.1	9.0	32.6	-	54.8	73.9	19.1	Floor noise
Hori.	9608.000	PK	41.6	38.7	9.4	33.3	-	56.4	73.9	17.5	Floor noise
Hori.	2390.000	AV	34.5	27.5	5.5	32.7	1.1	35.8	53.9	18.1	*1)
Hori.	2496.807	AV	38.0	27.3	5.6	32.7	1.1	39.3	53.9	14.6	*2)
Hori.	4804.000	AV	31.9	31.7	7.6	31.7	-	39.6	53.9	14.3	Floor noise
Hori.	7206.000	AV	31.5	36.1	9.0	32.6	-	44.0	53.9	10.0	Floor noise
Hori.	9608.000	AV	30.6	38.7	9.4	33.3	-	45.4	53.9	8.5	Floor noise
Vert.	72.648	QP	37.4	6.3	7.7	32.0	-	19.4	40.0	20.6	
Vert.	74.808	QP	37.2	6.4	7.7	32.0	-	19.4	40.0	20.7	
Vert.	165.080	QP	44.6	15.5	8.6	31.9	-	36.8	43.5	6.7	
Vert.	614.600	QP	41.0	19.3	11.3	32.0	-	39.6	46.0	6.4	
Vert.	620.360	QP	39.2	19.4	11.3	32.0	-	37.9	46.0	8.1	
Vert.	851.350	QP	32.5	21.4	12.2	31.3	-	34.8	46.0	11.2	
Vert.	2390.000	PK	43.9	27.5	5.5	32.7	-	44.2	73.9	29.7	
Vert.	2496.807	PK	47.2	27.3	5.6	32.7	-	47.3	73.9	26.6	
Vert.	4804.000	PK	42.9	31.7	7.6	31.7	-	50.6	73.9	23.3	Floor noise
Vert.	7206.000	PK	41.6	36.1	9.0	32.6	-	54.1	73.9	19.8	Floor noise
Vert.	9608.000	PK	40.7	38.7	9.4	33.3	-	55.5	73.9	18.4	Floor noise
Vert.	2390.000	AV	34.7	27.5	5.5	32.7	1.1	36.1	53.9	17.8	*1)
Vert.	2496.807	AV	38.3	27.3	5.6	32.7	1.1	39.6	53.9	14.3	*2)
Vert.	4804.000	AV	32.1	31.7	7.6	31.7	-	39.7	53.9	14.2	Floor noise
Vert.	7206.000	AV	31.6	36.1	9.0	32.6	-	44.0	53.9	9.9	Floor noise
Vert.	9608.000	AV	30.5	38.7	9.4	33.3	-	45.3	53.9	8.6	Floor noise

Result = 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).

Distance factor: 1 GHz - 10 GHz 20log(3.95 m / 3.0 m) = 2.39 dB
10 GHz - 26.5 GHz 20log(1.0 m / 3.0 m) = -9.5 dB

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

*2) Noise synchronized with duty of carrier frequency

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	96.5	27.5	5.5	32.7	96.8	-	-	Carrier
Hori.	2400.000	PK	40.9	27.5	5.5	32.7	41.2	76.8	35.6	
Vert.	2402.000	PK	98.2	27.5	5.5	32.7	98.5	-	-	Carrier
Vert.	2400.000	PK	41.8	27.5	5.5	32.7	42.0	78.5	36.5	

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

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Ise EMC Lab.

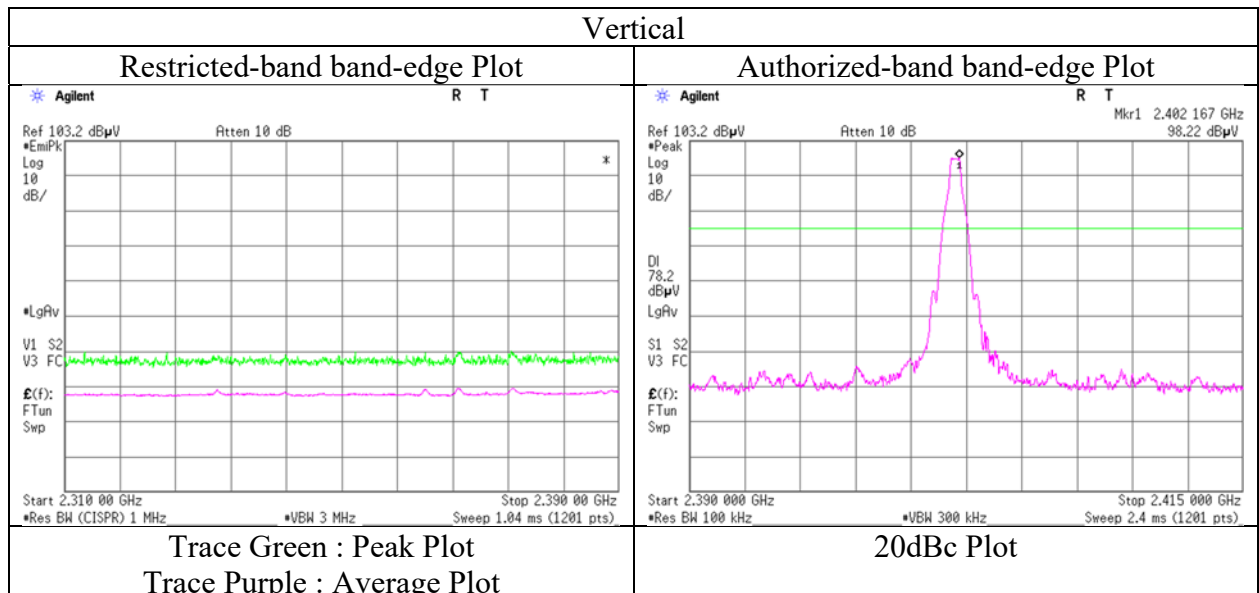
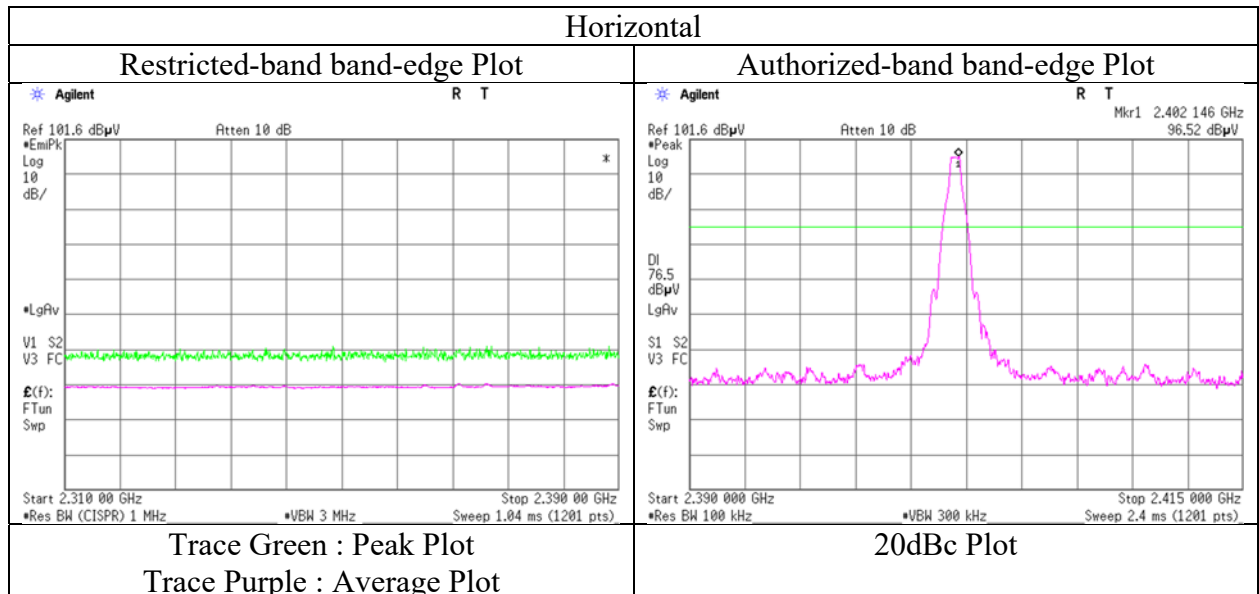
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Radiated Spurious Emission (Reference Plot for band-edge) (BT2)

Report No.	13671144H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 21, 2021
Temperature / Humidity	21 deg. C / 34 % RH
Engineer	Yuta Moriya
	(1 GHz -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 was shown in tabular data.

UL Japan, Inc.

Ise EMC Lab.

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Radiated Spurious Emission (BT2)

Report No.	13671144H			
Test place	Ise EMC Lab.			
Semi Anechoic Chamber	No.3	No.3	No.3	No.3
Date	January 21, 2021	January 29, 2021	January 31, 2021	February 2, 2021
Temperature / Humidity	21 deg. C / 34 % RH	20 deg. C / 32 % RH	22 deg. C / 23 % RH	21 deg. C / 38 % RH
Engineer	Yuta Moriya (1 GHz -10 GHz)	Takeshi Hiyaji (10 GHz -18 GHz)	Yuta Moriya (18 GHz -26.5 GHz)	Nachi Konegawa (Below 1 GHz)
Mode	Tx, Hopping Off, DH5 2441 MHz			

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	72.576	QP	41.7	6.3	7.7	32.0	-	23.7	40.0	16.3	
Hori.	74.842	QP	41.8	6.4	7.7	32.0	-	24.0	40.0	16.1	
Hori.	165.008	QP	45.6	15.5	8.6	31.9	-	37.8	43.5	5.7	
Hori.	615.214	QP	38.6	19.4	11.3	32.0	-	37.2	46.0	8.8	
Hori.	620.460	QP	35.7	19.4	11.3	32.0	-	34.4	46.0	11.6	
Hori.	840.274	QP	33.0	21.1	12.1	31.4	-	34.9	46.0	11.1	
Hori.	2341.297	PK	47.5	27.7	5.4	32.7	-	47.9	73.9	26.0	
Hori.	4882.000	PK	42.7	31.4	7.6	31.6	-	50.1	73.9	23.8	Floor noise
Hori.	7323.000	PK	41.5	36.2	9.0	32.6	-	54.0	73.9	19.9	Floor noise
Hori.	9764.000	PK	40.9	39.0	9.5	33.4	-	55.9	73.9	18.0	Floor noise
Hori.	2341.297	AV	38.3	27.7	5.4	32.7	1.1	39.8	53.9	14.1	*1)
Hori.	4882.000	AV	33.0	31.4	7.6	31.6	-	40.4	53.9	13.5	Floor noise
Hori.	7323.000	AV	31.4	36.2	9.0	32.6	-	43.9	53.9	10.0	Floor noise
Hori.	9764.000	AV	30.6	39.0	9.5	33.4	-	45.7	53.9	8.2	Floor noise
Vert.	72.576	QP	50.3	6.3	7.7	32.0	-	32.3	40.0	7.7	
Vert.	74.842	QP	50.4	6.4	7.7	32.0	-	32.6	40.0	7.5	
Vert.	165.008	QP	40.3	15.5	8.6	31.9	-	32.5	43.5	11.0	
Vert.	615.214	QP	41.2	19.4	11.3	32.0	-	39.8	46.0	6.2	
Vert.	620.460	QP	38.5	19.4	11.3	32.0	-	37.2	46.0	8.8	
Vert.	840.274	QP	31.6	21.1	12.1	31.4	-	33.5	46.0	12.5	
Vert.	2341.297	PK	47.9	27.7	5.4	32.7	-	48.3	73.9	25.7	
Vert.	4882.000	PK	42.4	31.4	7.6	31.6	-	49.8	73.9	24.1	Floor noise
Vert.	7323.000	PK	41.3	36.2	9.0	32.6	-	53.9	73.9	20.0	Floor noise
Vert.	9764.000	PK	40.9	39.0	9.5	33.4	-	56.0	73.9	17.9	Floor noise
Vert.	2341.297	AV	39.1	27.7	5.4	32.7	1.1	40.6	53.9	13.3	*1)
Vert.	4882.000	AV	32.2	31.4	7.6	31.6	-	39.6	53.9	14.3	Floor noise
Vert.	7323.000	AV	31.6	36.2	9.0	32.6	-	44.2	53.9	9.7	Floor noise
Vert.	9764.000	AV	30.6	39.0	9.5	33.4	-	45.7	53.9	8.3	Floor noise

Result = 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).

Distance factor: 1 GHz - 10 GHz 20log(3.95 m / 3.0 m) = 2.39 dB

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

*1) Noise synchronized with duty of carrier frequency

Radiated Spurious Emission (BT2)

Report No.	13671144H			
Test place	Ise EMC Lab.			
Semi Anechoic Chamber	No.3	No.3	No.3	No.3
Date	January 21, 2021	January 29, 2021	January 31, 2021	February 2, 2021
Temperature / Humidity	21 deg. C / 34 % RH	20 deg. C / 32 % RH	22 deg. C / 23 % RH	21 deg. C / 38 % RH
Engineer	Yuta Moriya	Takeshi Hiyaji	Yuta Moriya	Nachi Konegawa
	(1 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)	(Below 1 GHz)
Mode	Tx, Hopping Off, DH5 2480 MHz			

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	72.590	QP	41.2	6.3	7.7	32.0	-	23.2	40.0	16.8	
Hori.	74.826	QP	42.5	6.4	7.7	32.0	-	24.7	40.0	15.4	
Hori.	165.000	QP	45.4	15.5	8.6	31.9	-	37.6	43.5	5.9	
Hori.	615.274	QP	38.3	19.4	11.3	32.0	-	36.9	46.0	9.1	
Hori.	620.880	QP	35.2	19.4	11.3	32.0	-	33.9	46.0	12.1	
Hori.	846.844	QP	33.2	21.3	12.1	31.4	-	35.3	46.0	10.7	
Hori.	2483.500	PK	43.9	27.3	5.6	32.7	-	44.1	73.9	29.8	
Hori.	2484.175	PK	44.6	27.3	5.6	32.7	-	44.8	73.9	29.1	
Hori.	4960.000	PK	41.2	31.5	7.6	31.6	-	48.7	73.9	25.2	Floor noise
Hori.	7440.000	PK	40.4	36.3	9.0	32.7	-	53.0	73.9	20.9	Floor noise
Hori.	9920.000	PK	40.4	38.8	9.5	33.5	-	55.3	73.9	18.6	Floor noise
Hori.	2483.500	AV	35.6	27.3	5.6	32.7	1.1	36.9	53.9	17.0	*1)
Hori.	2484.175	AV	35.9	27.3	5.6	32.7	1.1	37.2	53.9	16.7	*2)
Hori.	4960.000	AV	32.0	31.5	7.6	31.6	-	39.5	53.9	14.4	Floor noise
Hori.	7440.000	AV	31.5	36.3	9.0	32.7	-	44.0	53.9	9.9	Floor noise
Hori.	9920.000	AV	31.8	38.8	9.5	33.5	-	46.7	53.9	7.2	Floor noise
Vert.	72.590	QP	49.5	6.3	7.7	32.0	-	31.5	40.0	8.5	
Vert.	74.826	QP	50.9	6.4	7.7	32.0	-	33.1	40.0	7.0	
Vert.	165.000	QP	40.0	15.5	8.6	31.9	-	32.2	43.5	11.3	
Vert.	615.274	QP	41.3	19.4	11.3	32.0	-	39.9	46.0	6.1	
Vert.	620.880	QP	38.2	19.4	11.3	32.0	-	36.9	46.0	9.1	
Vert.	846.844	QP	32.6	21.3	12.1	31.4	-	34.7	46.0	11.3	
Vert.	2483.500	PK	45.1	27.3	5.6	32.7	-	45.3	73.9	28.6	
Vert.	2484.175	PK	46.2	27.3	5.6	32.7	-	46.4	73.9	27.5	
Vert.	4960.000	PK	42.8	31.5	7.6	31.6	-	50.3	73.9	23.6	Floor noise
Vert.	7440.000	PK	41.4	36.3	9.0	32.7	-	53.9	73.9	20.0	Floor noise
Vert.	9920.000	PK	40.6	38.8	9.5	33.5	-	55.4	73.9	18.5	Floor noise
Vert.	2483.500	AV	36.4	27.3	5.6	32.7	1.1	37.7	53.9	16.2	*1)
Vert.	2484.175	AV	37.2	27.3	5.6	32.7	1.1	38.5	53.9	15.5	*2)
Vert.	4960.000	AV	32.5	31.5	7.6	31.6	-	39.9	53.9	14.0	Floor noise
Vert.	7440.000	AV	31.5	36.3	9.0	32.7	-	44.0	53.9	9.9	Floor noise
Vert.	9920.000	AV	31.2	38.8	9.5	33.5	-	46.1	53.9	7.8	Floor noise

Result = 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).

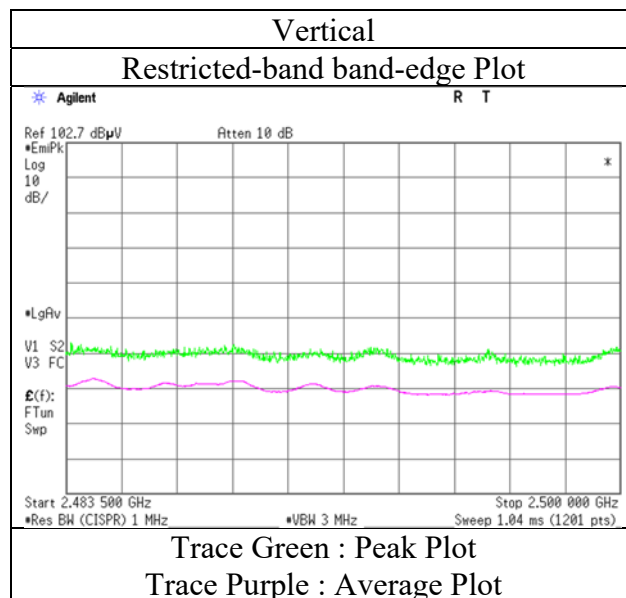
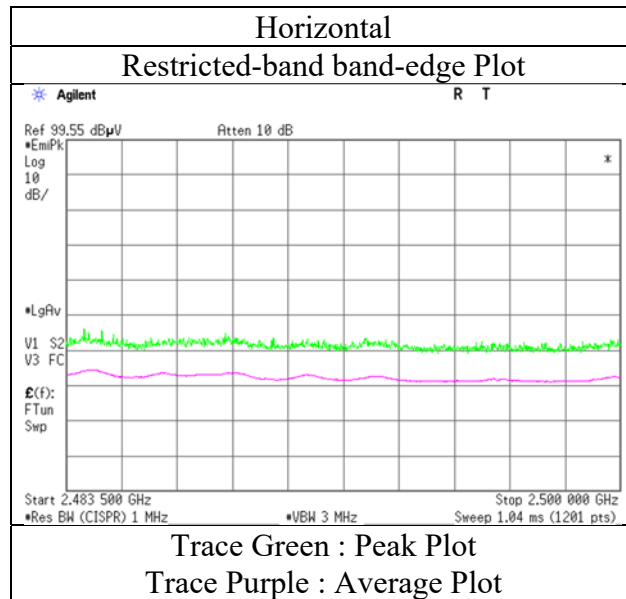
Distance factor: 1 GHz - 10 GHz $20\log(3.95\text{ m} / 3.0\text{ m}) = 2.39\text{ dB}$
10 GHz - 26.5 GHz $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

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

*2) Noise synchronized with duty of carrier frequency

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

Report No.	13671144H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 21, 2021
Temperature / Humidity	21 deg. C / 34 % RH
Engineer	Yuta Moriya (1 GHz -10 GHz)
Mode	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.

UL Japan, Inc.

Ise EMC Lab.

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Radiated Spurious Emission (BT2)

Report No.	13671144H			
Test place	Ise EMC Lab.			
Semi Anechoic Chamber	No.3	No.3	No.3	No.3
Date	January 21, 2021	January 29, 2021	January 31, 2021	February 2, 2021
Temperature / Humidity	21 deg. C / 34 % RH	20 deg. C / 32 % RH	22 deg. C / 23 % RH	21 deg. C / 38 % RH
Engineer	Yuta Moriya (1 GHz -10 GHz)	Takeshi Hiyaji (10 GHz -18 GHz)	Yuta Moriya (18 GHz -26.5 GHz)	Nachi Konegawa (Below 1 GHz)
Mode	Tx, Hopping Off, 3DH5 2402 MHz			

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	72.642	QP	41.8	6.3	7.7	32.0	-	23.8	40.0	16.2	
Hori.	74.848	QP	42.8	6.4	7.7	32.0	-	25.0	40.0	15.1	
Hori.	165.004	QP	45.2	15.5	8.6	31.9	-	37.4	43.5	6.1	
Hori.	614.790	QP	38.2	19.3	11.3	32.0	-	36.8	46.0	9.2	
Hori.	620.660	QP	35.4	19.4	11.3	32.0	-	34.1	46.0	11.9	
Hori.	846.420	QP	33.6	21.3	12.1	31.4	-	35.7	46.0	10.3	
Hori.	2390.000	PK	44.0	27.5	5.5	32.7	-	44.2	73.9	29.7	
Hori.	4804.000	PK	41.8	31.7	7.6	31.7	-	49.5	73.9	24.4	Floor noise
Hori.	7206.000	PK	40.3	36.1	9.0	32.6	-	52.7	73.9	21.2	Floor noise
Hori.	9608.000	PK	40.6	38.7	9.4	33.3	-	55.4	73.9	18.5	Floor noise
Hori.	2390.000	AV	34.6	27.5	5.5	32.7	1.1	36.0	53.9	17.9	*1)
Hori.	4804.000	AV	32.1	31.7	7.6	31.7	-	39.8	53.9	14.1	Floor noise
Hori.	7206.000	AV	31.3	36.1	9.0	32.6	-	43.8	53.9	10.1	Floor noise
Hori.	9608.000	AV	31.4	38.7	9.4	33.3	-	46.2	53.9	7.7	Floor noise
Vert.	72.642	QP	50.2	6.3	7.7	32.0	-	32.2	40.0	7.8	
Vert.	74.848	QP	51.2	6.4	7.7	32.0	-	33.4	40.0	6.7	
Vert.	165.004	QP	40.1	15.5	8.6	31.9	-	32.3	43.5	11.2	
Vert.	614.790	QP	41.6	19.3	11.3	32.0	-	40.2	46.0	5.8	
Vert.	620.660	QP	38.5	19.4	11.3	32.0	-	37.2	46.0	8.8	
Vert.	846.420	QP	33.0	21.3	12.1	31.4	-	35.1	46.0	10.9	
Vert.	2390.000	PK	43.6	27.5	5.5	32.7	-	43.8	73.9	30.1	
Vert.	4804.000	PK	42.0	31.7	7.6	31.7	-	49.7	73.9	24.2	Floor noise
Vert.	7206.000	PK	41.4	36.1	9.0	32.6	-	53.8	73.9	20.1	Floor noise
Vert.	9608.000	PK	40.9	38.7	9.4	33.3	-	55.8	73.9	18.1	Floor noise
Vert.	2390.000	AV	34.9	27.5	5.5	32.7	1.1	36.3	53.9	17.6	*1)
Vert.	4804.000	AV	32.0	31.7	7.6	31.7	-	39.7	53.9	14.3	Floor noise
Vert.	7206.000	AV	31.7	36.1	9.0	32.6	-	44.2	53.9	9.7	Floor noise
Vert.	9608.000	AV	31.0	38.7	9.4	33.3	-	45.9	53.9	8.0	Floor noise

Result = 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).

Distance factor: 1 GHz - 10 GHz 20log (3.95 m / 3.0 m) = 2.39 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

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

20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	96.7	27.5	5.5	32.7	97.0	-	-	Carrier
Hori.	2400.000	PK	48.2	27.5	5.5	32.7	48.5	77.0	28.5	
Vert.	2402.000	PK	96.0	27.5	5.5	32.7	96.2	-	-	Carrier
Vert.	2400.000	PK	47.4	27.5	5.5	32.7	47.7	76.2	28.6	

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

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Ise EMC Lab.

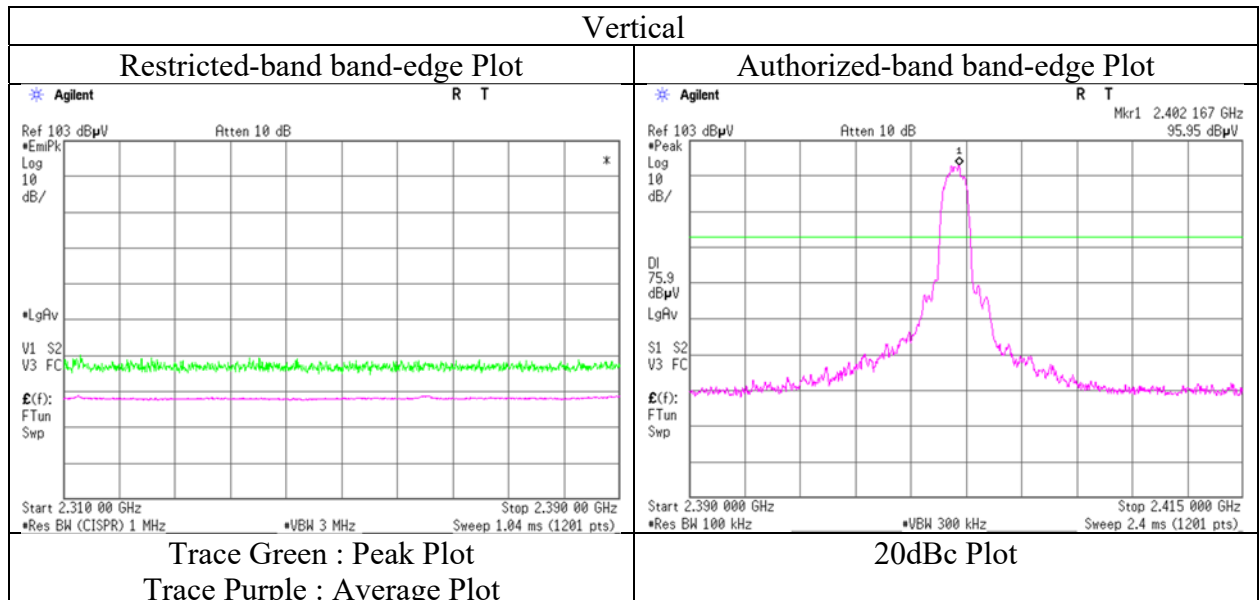
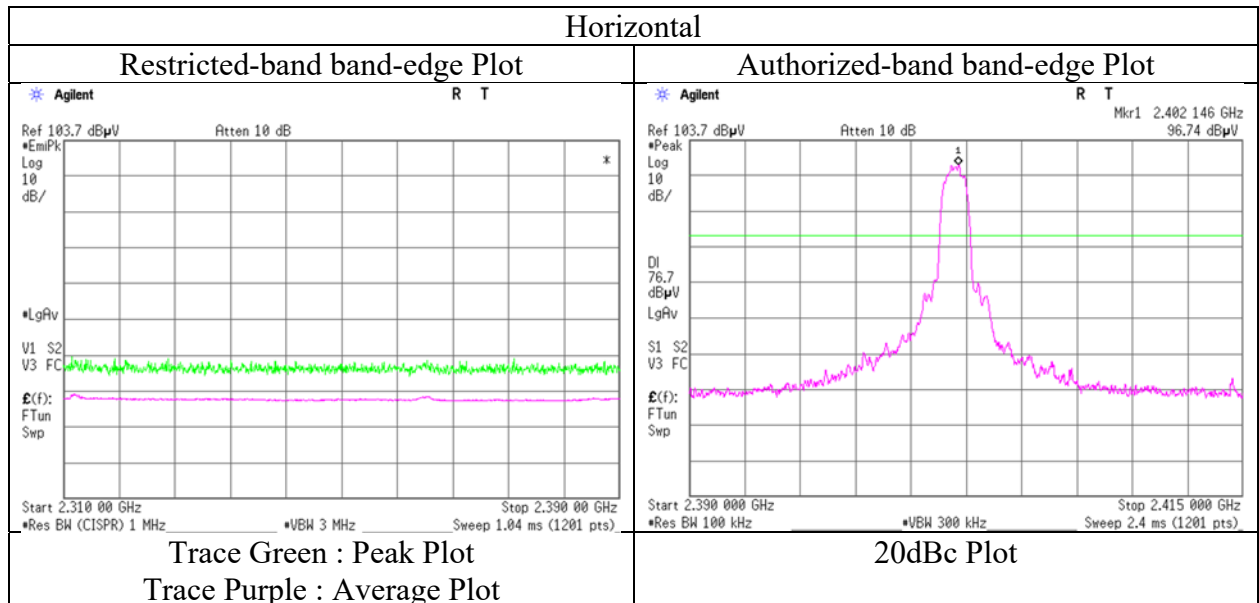
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Radiated Spurious Emission (Reference Plot for band-edge) (BT2)

Report No.	13671144H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 21, 2021
Temperature / Humidity	21 deg. C / 34 % RH
Engineer	Yuta Moriya (1 GHz -10 GHz)
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 was shown in tabular data.

UL Japan, Inc.

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Radiated Spurious Emission (BT2)

Report No.	13671144H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.3
Date	January 21, 2021	January 29, 2021	January 31, 2021
Temperature / Humidity	21 deg. C / 34 % RH	20 deg. C / 32 % RH	22 deg. C / 23 % RH
Engineer	Yuta Moriya	Takeshi Hiyaji	Yuta Moriya
	(1 GHz -10 GHz)	(10 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx, Hopping Off, 3DH5 2441 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	72.636	QP	41.4	6.3	7.7	32.0	-	23.4	40.0	16.6	
Hori.	74.890	QP	42.4	6.4	7.7	32.0	-	24.6	40.0	15.5	
Hori.	165.140	QP	45.7	15.5	8.6	31.9	-	37.9	43.5	5.6	
Hori.	615.010	QP	38.3	19.4	11.3	32.0	-	36.9	46.0	9.1	
Hori.	620.450	QP	35.1	19.4	11.3	32.0	-	33.8	46.0	12.2	
Hori.	846.180	QP	33.7	21.3	12.1	31.4	-	35.8	46.0	10.2	
Hori.	4882.000	PK	42.0	31.4	7.6	31.6	-	49.4	73.9	24.5	Floor noise
Hori.	7323.000	PK	41.9	36.2	9.0	32.6	-	54.4	73.9	19.5	Floor noise
Hori.	9764.000	PK	41.3	39.0	9.5	33.4	-	56.4	73.9	17.5	Floor noise
Hori.	4882.000	AV	32.0	31.4	7.6	31.6	-	39.4	53.9	14.5	Floor noise
Hori.	7323.000	AV	32.0	36.2	9.0	32.6	-	44.5	53.9	9.4	Floor noise
Hori.	9764.000	AV	30.4	39.0	9.5	33.4	-	45.5	53.9	8.4	Floor noise
Vert.	72.636	QP	49.4	6.3	7.7	32.0	-	31.4	40.0	8.6	
Vert.	74.890	QP	50.7	6.4	7.7	32.0	-	32.9	40.0	7.2	
Vert.	165.140	QP	40.1	15.5	8.6	31.9	-	32.3	43.5	11.2	
Vert.	615.010	QP	41.6	19.4	11.3	32.0	-	40.2	46.0	5.8	
Vert.	620.450	QP	38.3	19.4	11.3	32.0	-	37.0	46.0	9.0	
Vert.	846.180	QP	33.0	21.3	12.1	31.4	-	35.1	46.0	10.9	
Vert.	4882.000	PK	42.9	31.4	7.6	31.6	-	50.3	73.9	23.7	Floor noise
Vert.	7323.000	PK	41.7	36.2	9.0	32.6	-	54.3	73.9	19.6	Floor noise
Vert.	9764.000	PK	41.0	39.0	9.5	33.4	-	56.1	73.9	17.8	Floor noise
Vert.	4882.000	AV	32.1	31.4	7.6	31.6	-	39.5	53.9	14.5	Floor noise
Vert.	7323.000	AV	31.8	36.2	9.0	32.6	-	44.4	53.9	9.5	Floor noise
Vert.	9764.000	AV	31.5	39.0	9.5	33.4	-	46.5	53.9	7.4	Floor noise

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

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

Distance factor: 1 GHz - 10 GHz 20log(3.95 m / 3.0 m) = 2.39 dB
10 GHz - 26.5 GHz 20log(1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission (BT2)

Report No.	13671144H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.3
Date	January 21, 2021	January 29, 2021	January 31, 2021
Temperature / Humidity	21 deg. C / 34 % RH	20 deg. C / 32 % RH	22 deg. C / 23 % RH
Engineer	Yuta Moriya (1 GHz -10 GHz)	Takeshi Hiyaji (10 GHz -18 GHz)	Yuta Moriya (18 GHz -26.5 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	72.684	QP	41.9	6.3	7.7	32.0	-	23.9	40.0	16.1	
Hori.	74.892	QP	42.7	6.4	7.7	32.0	-	24.9	40.0	15.2	
Hori.	165.128	QP	45.7	15.5	8.6	31.9	-	37.9	43.5	5.6	
Hori.	614.900	QP	38.3	19.4	11.3	32.0	-	36.9	46.0	9.1	
Hori.	620.049	QP	35.3	19.4	11.3	32.0	-	34.0	46.0	12.0	
Hori.	852.040	QP	34.1	21.4	12.2	31.3	-	36.4	46.0	9.6	
Hori.	2483.500	PK	52.8	27.3	5.6	32.7	-	53.0	73.9	20.9	
Hori.	4960.000	PK	42.9	31.5	7.6	31.6	-	50.4	73.9	23.5	Floor noise
Hori.	7440.000	PK	41.8	36.3	9.0	32.7	-	54.4	73.9	19.5	Floor noise
Hori.	9920.000	PK	41.6	38.8	9.5	33.5	-	56.4	73.9	17.5	Floor noise
Hori.	2483.500	AV	42.1	27.3	5.6	32.7	1.1	43.4	53.9	10.5	*1)
Hori.	4960.000	AV	32.2	31.5	7.6	31.6	-	39.7	53.9	14.2	Floor noise
Hori.	7440.000	AV	31.4	36.3	9.0	32.7	-	44.0	53.9	9.9	Floor noise
Hori.	9920.000	AV	31.0	38.8	9.5	33.5	-	45.8	53.9	8.1	Floor noise
Vert.	72.684	QP	49.5	6.3	7.7	32.0	-	31.5	40.0	8.5	
Vert.	74.892	QP	50.5	6.4	7.7	32.0	-	32.7	40.0	7.4	
Vert.	165.128	QP	40.2	15.5	8.6	31.9	-	32.4	43.5	11.1	
Vert.	614.900	QP	41.7	19.4	11.3	32.0	-	40.3	46.0	5.7	
Vert.	620.049	QP	38.3	19.4	11.3	32.0	-	37.0	46.0	9.0	
Vert.	852.040	QP	33.3	21.4	12.2	31.3	-	35.6	46.0	10.4	
Vert.	2483.500	PK	54.6	27.3	5.6	32.7	-	54.8	73.9	19.2	
Vert.	4960.000	PK	42.3	31.5	7.6	31.6	-	49.8	73.9	24.1	Floor noise
Vert.	7440.000	PK	41.9	36.3	9.0	32.7	-	54.5	73.9	19.4	Floor noise
Vert.	9920.000	PK	40.5	38.8	9.5	33.5	-	55.4	73.9	18.5	Floor noise
Vert.	2483.500	AV	43.3	27.3	5.6	32.7	1.1	44.6	53.9	9.3	*1)
Vert.	4960.000	AV	32.0	31.5	7.6	31.6	-	39.5	53.9	14.4	Floor noise
Vert.	7440.000	AV	31.6	36.3	9.0	32.7	-	44.1	53.9	9.8	Floor noise
Vert.	9920.000	AV	31.2	38.8	9.5	33.5	-	46.0	53.9	7.9	Floor noise

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

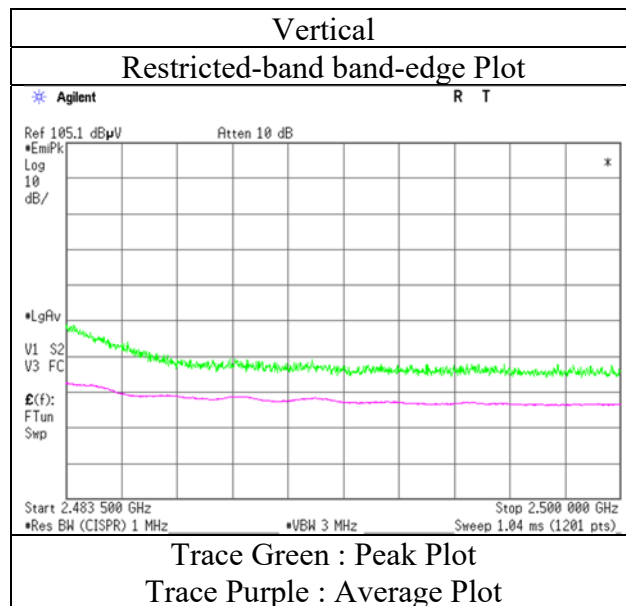
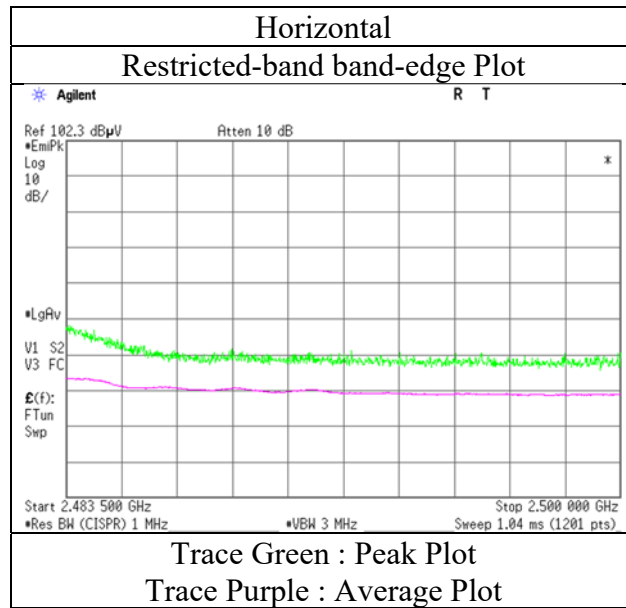
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz $20\log(3.95\text{ m} / 3.0\text{ m}) = 2.39\text{ dB}$
10 GHz - 26.5 GHz $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

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

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

Report No.	13671144H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 21, 2021
Temperature / Humidity	21 deg. C / 34 % RH
Engineer	Yuta Moriya (1 GHz -10 GHz)
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)

Report No. 13671144H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date January 28, 2021
Temperature / Humidity 23 deg. C / 35 % RH
Engineer Nachi Konegawa
(1 GHz -10 GHz)
Mode Tx, Hopping Off, DH5 2402 MHz + 11ax-20 (OFDM) 5700 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	PK	45.5	27.5	5.5	32.7	-	45.8	73.9	28.1	
Hori.	2390.000	AV	33.9	27.5	5.5	32.7	1.1	35.3	53.9	18.6	*1)
Vert.	2390.000	PK	46.1	27.5	5.5	32.7	-	46.3	73.9	27.6	
Vert.	2390.000	AV	34.1	27.5	5.5	32.7	1.1	35.5	53.9	18.4	*1)

Result = 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).

Distance factor: 1 GHz - 10 GHz $20\log(3.95 \text{ m} / 3.0 \text{ m}) = 2.39 \text{ dB}$
10 GHz - 26.5 GHz $20\log(1.0 \text{ m} / 3.0 \text{ m}) = -9.5 \text{ dB}$

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

20dBc Data Sheet

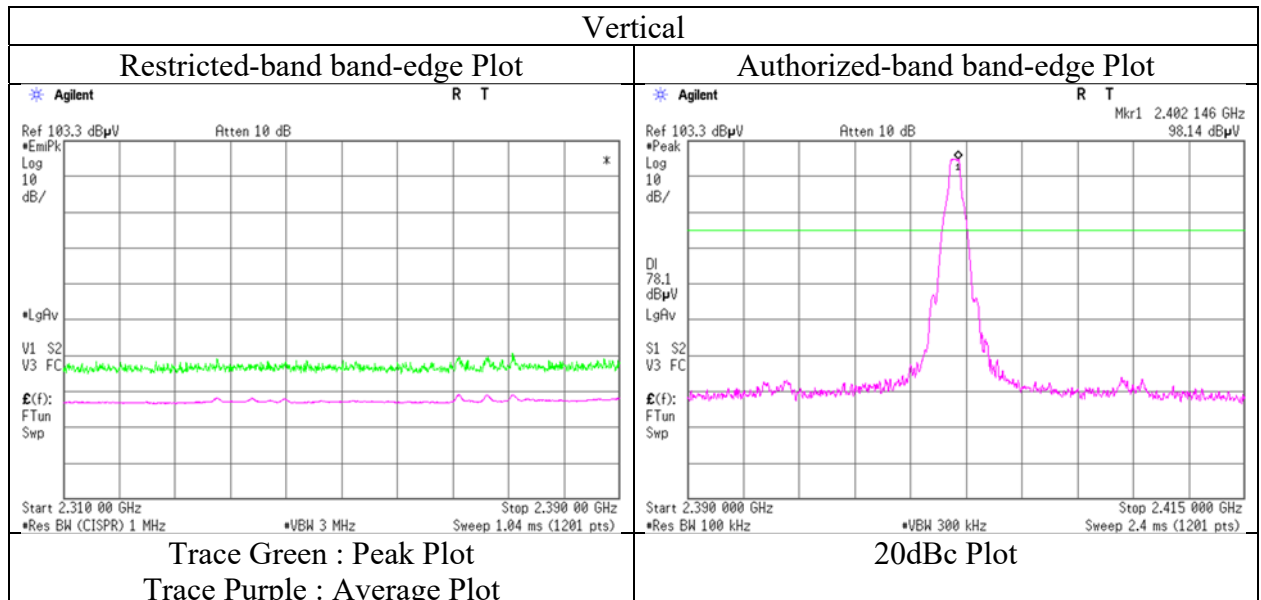
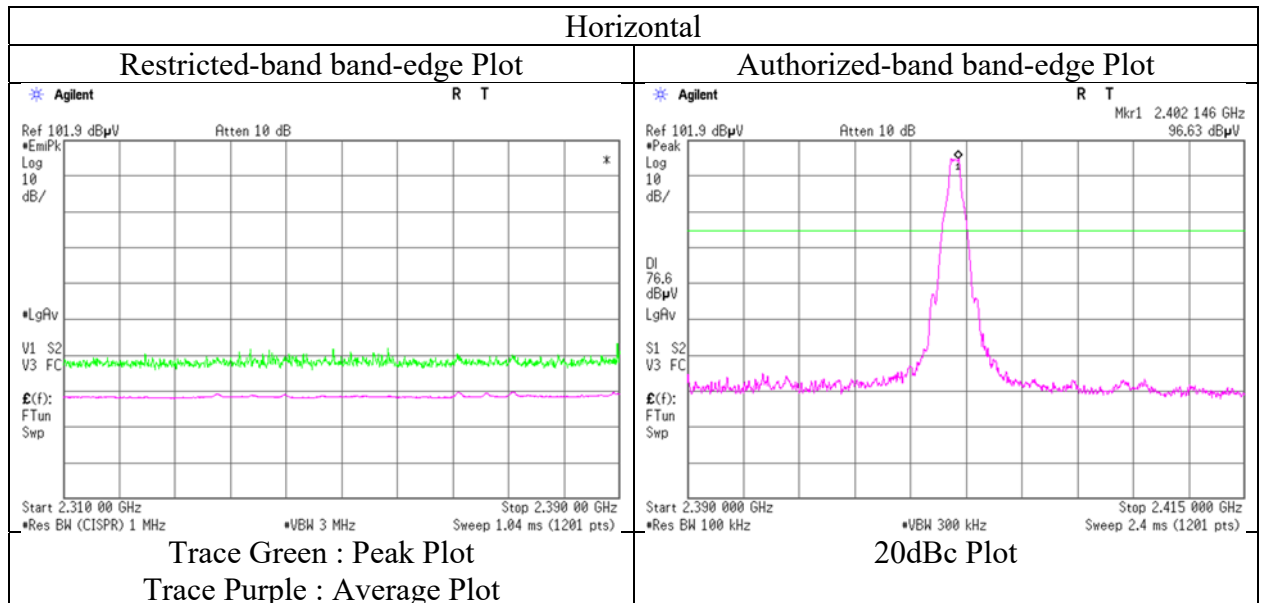
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	96.6	27.5	5.5	32.7	96.9	-	-	Carrier
Hori.	2400.000	PK	41.2	27.5	5.5	32.7	41.5	76.9	35.4	
Vert.	2402.000	PK	98.1	27.5	5.5	32.7	98.4	-	-	Carrier
Vert.	2400.000	PK	42.4	27.5	5.5	32.7	42.6	78.4	35.8	

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

Distance factor: 1 GHz - 10 GHz $20\log(3.95 \text{ m} / 3.0 \text{ m}) = 2.39 \text{ dB}$
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)

Report No.	13671144H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 28, 2021
Temperature / Humidity	23 deg. C / 35 % RH
Engineer	Nachi Konegawa (1 GHz -10 GHz)
Mode	Tx, Hopping Off, DH5 2402 MHz + 11ax-20 (OFDM) 5700 MHz



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

UL Japan, Inc.

Ise EMC Lab.

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Radiated Spurious Emission (BT1)

Report No.	13671144H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.3
Date	January 28, 2021	January 31, 2021	January 31, 2021
Temperature / Humidity	23 deg. C / 35 % RH	22 deg. C / 23 % RH	22 deg. C / 27 % RH
Engineer	Nachi Konegawa (1 GHz -18 GHz)	Yuta Moriya (18 GHz -26.5 GHz)	Junki Nagatomi (Below 1 GHz)
Mode	Tx, Hopping Off, DH5 2441 MHz + 11ax-20 (OFDM) 5700 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	72.912	QP	42.5	6.4	7.8	32.2	-	24.6	40.0	15.5	
Hori.	75.163	QP	36.4	6.5	7.9	32.2	-	18.6	40.0	21.4	
Hori.	79.564	QP	35.6	7.0	7.9	32.2	-	18.3	40.0	21.7	
Hori.	163.566	QP	37.6	15.6	8.9	32.1	-	30.1	43.5	13.5	
Hori.	609.222	QP	38.7	19.4	12.1	32.0	-	38.2	46.0	7.8	
Hori.	833.178	QP	35.5	21.0	13.3	31.3	-	38.5	46.0	7.5	
Hori.	4882.000	PK	41.1	31.4	7.6	31.6	-	48.5	73.9	25.4	Floor noise
Hori.	7323.000	PK	42.7	36.2	9.0	32.6	-	55.3	73.9	18.6	Floor noise
Hori.	9764.000	PK	42.1	39.0	9.5	33.4	-	57.2	73.9	16.7	Floor noise
Hori.	4882.000	AV	31.7	31.4	7.6	31.6	-	39.1	53.9	14.8	Floor noise
Hori.	7323.000	AV	33.4	36.2	9.0	32.6	-	45.9	53.9	8.0	Floor noise
Hori.	9764.000	AV	32.3	39.0	9.5	33.4	-	47.4	53.9	6.5	Floor noise
Vert.	72.913	QP	55.2	6.4	7.8	32.2	-	37.3	40.0	2.7	
Vert.	75.098	QP	48.3	6.5	7.9	32.2	-	30.5	40.0	9.5	
Vert.	79.538	QP	45.0	7.0	7.9	32.2	-	27.7	40.0	12.3	
Vert.	163.586	QP	42.2	15.6	8.9	32.1	-	34.7	43.5	8.8	
Vert.	609.312	QP	41.2	19.4	12.1	32.0	-	40.7	46.0	5.3	
Vert.	832.532	QP	34.2	21.0	13.2	31.3	-	37.1	46.0	8.9	
Vert.	4882.000	PK	41.3	31.4	7.6	31.6	-	48.7	73.9	25.2	Floor noise
Vert.	7323.000	PK	42.5	36.2	9.0	32.6	-	55.1	73.9	18.8	Floor noise
Vert.	9764.000	PK	42.0	39.0	9.5	33.4	-	57.1	73.9	16.9	Floor noise
Vert.	4882.000	AV	31.8	31.4	7.6	31.6	-	39.2	53.9	14.7	Floor noise
Vert.	7323.000	AV	33.5	36.2	9.0	32.6	-	46.1	53.9	7.8	Floor noise
Vert.	9764.000	AV	32.3	39.0	9.5	33.4	-	47.4	53.9	6.5	Floor noise

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

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

Distance factor: 1 GHz - 10 GHz 20log(3.95 m / 3.0 m) = 2.39 dB
 10 GHz - 26.5 GHz 20log(1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission
(BT1)

Report No. 13671144H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date January 28, 2021
Temperature / Humidity 23 deg. C / 35 % RH
Engineer Nachi Konegawa
(1 GHz -10 GHz)
Mode Tx, Hopping Off, DH5 2480 MHz + 11ax-20 (OFDM) 5700 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	PK	49.2	27.3	5.6	32.7	-	49.3	73.9	24.6	
Hori.	2483.500	AV	35.9	27.3	5.6	32.7	1.1	37.2	53.9	16.7	*1)
Vert.	2483.500	PK	51.2	27.3	5.6	32.7	-	51.4	73.9	22.5	
Vert.	2483.500	AV	37.5	27.3	5.6	32.7	1.1	38.8	53.9	15.1	*1)

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

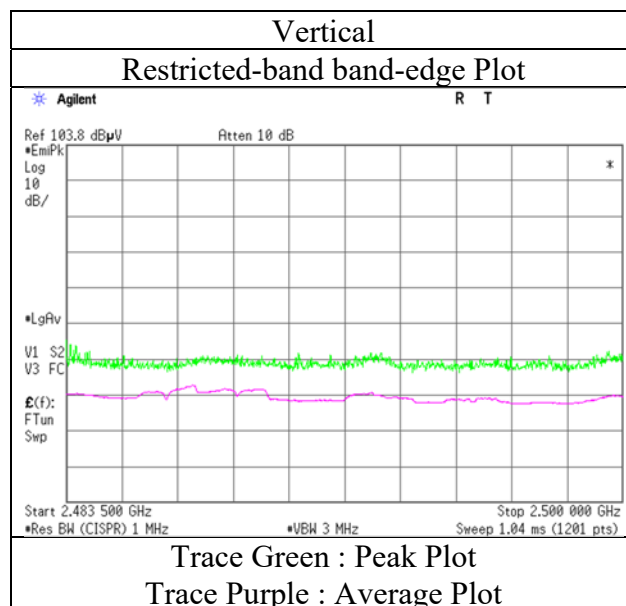
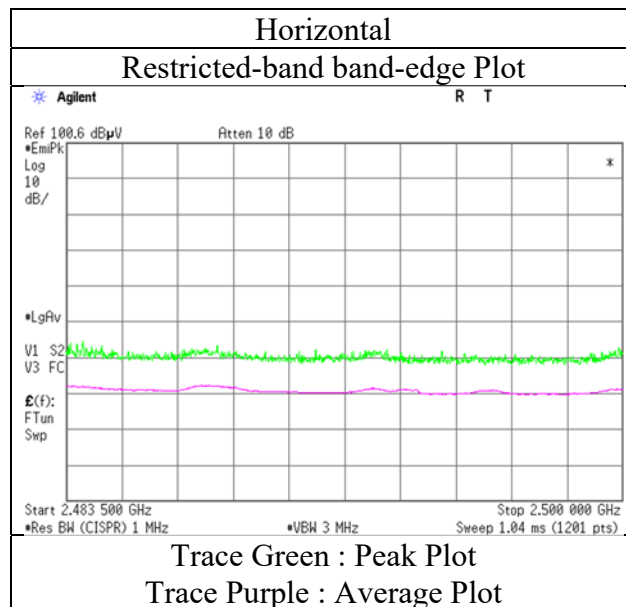
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz $20\log(3.95\text{ m} / 3.0\text{ m}) = 2.39\text{ dB}$
10 GHz - 26.5 GHz $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

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

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

Report No.	13671144H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 28, 2021
Temperature / Humidity	23 deg. C / 35 % RH
Engineer	Nachi Konegawa (1 GHz -10 GHz)
Mode	Tx, Hopping Off, DH5 2480 MHz + 11ax-20 (OFDM) 5700 MHz



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

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Ise EMC Lab.

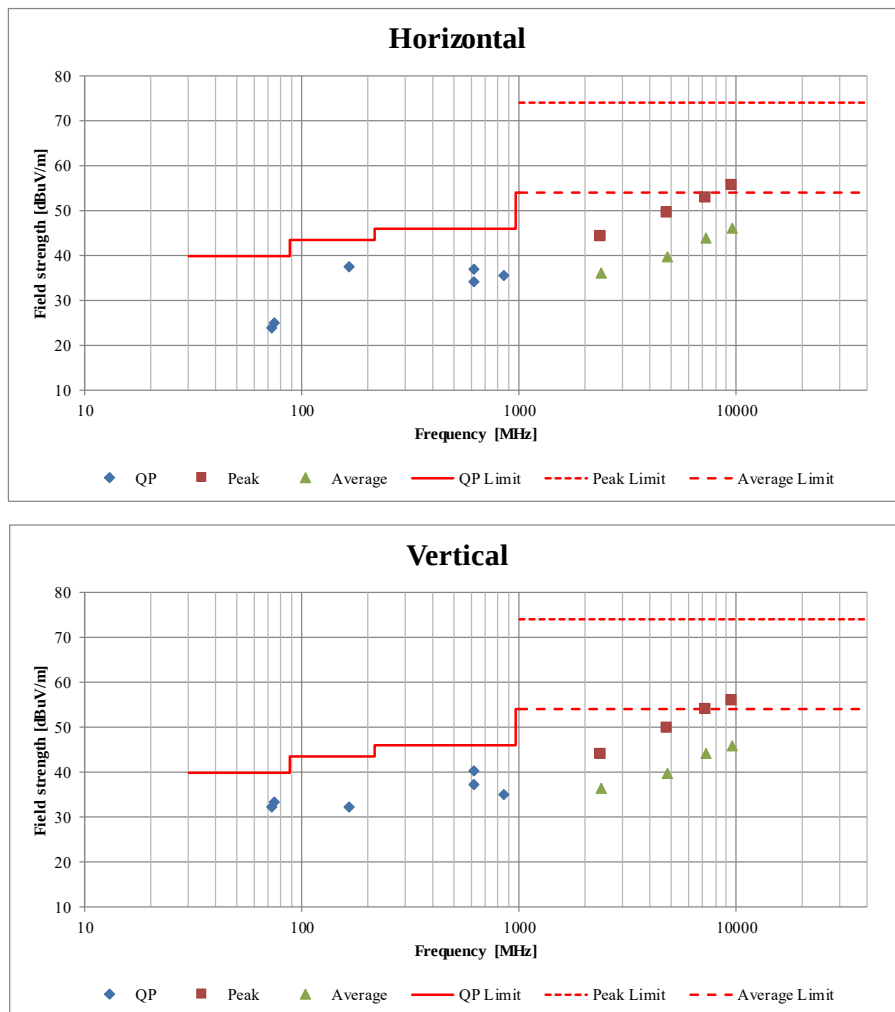
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission
(Plot data, Worst case)
(BT2)

Report No.	13671144H			
Test place	Ise EMC Lab.			
Semi Anechoic Chamber	No.3	No.3	No.3	No.3
Date	January 21, 2021	January 29, 2021	January 31, 2021	February 2, 2021
Temperature / Humidity	21 deg. C / 34 % RH	20 deg. C / 32 % RH	22 deg. C / 23 % RH	21 deg. C / 38 % RH
Engineer	Yuta Moriya (1 GHz -10 GHz)	Takeshi Hiyaji (10 GHz -18 GHz)	Yuta Moriya (18 GHz -26.5 GHz)	Nachi Konegawa (Below 1 GHz)
Mode	Tx, Hopping Off, 3DH5 2402 MHz			

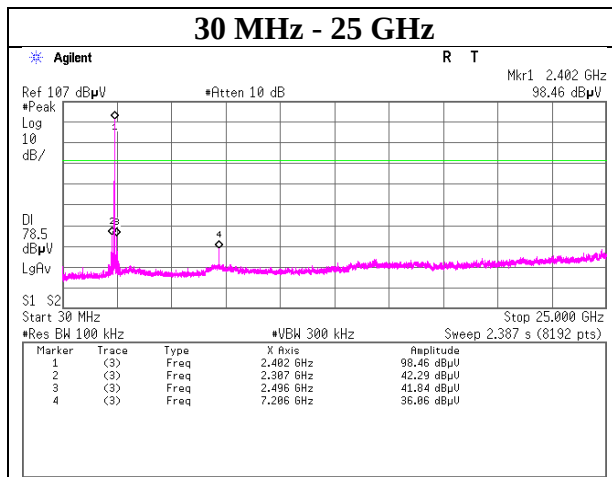
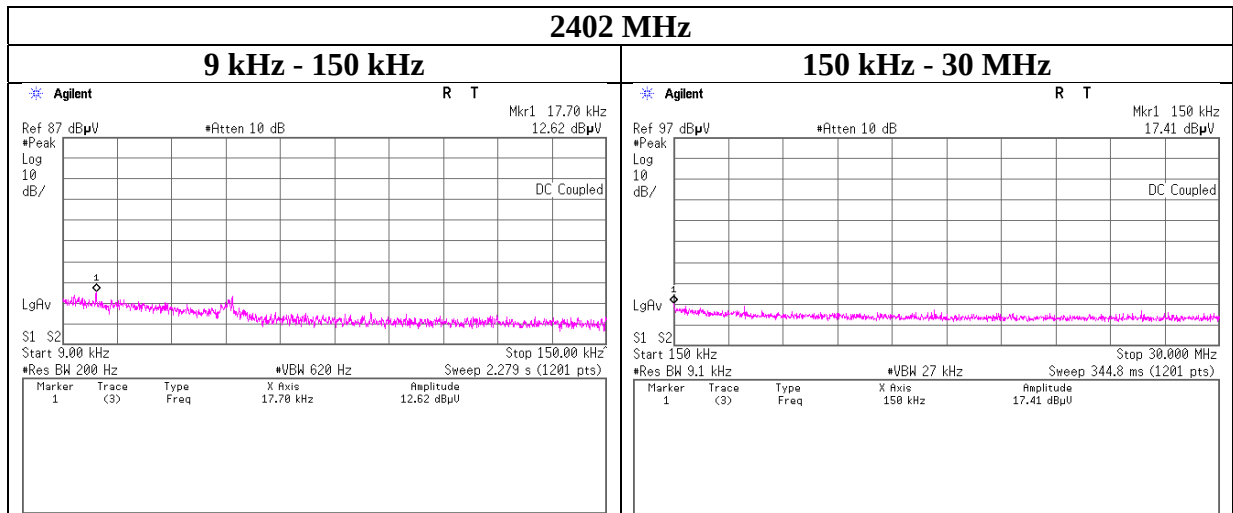


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

Conducted Spurious Emission

Report No.	13671144H
Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 13, 2021
Temperature / Humidity	22 deg. C / 33 % RH
Engineer	Nachi Konegawa
Mode	Tx, Hopping Off, DH5

BT1



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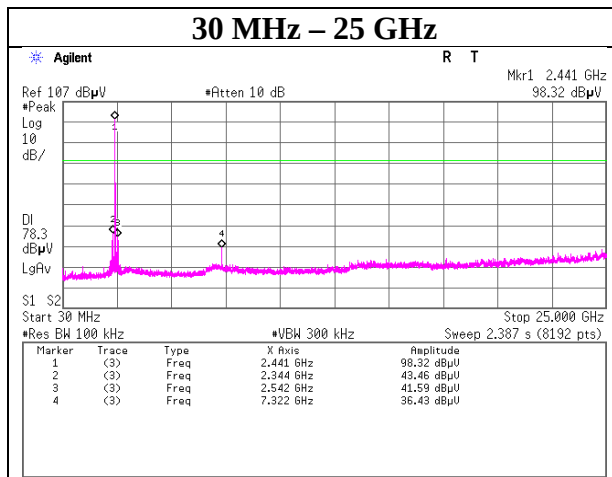
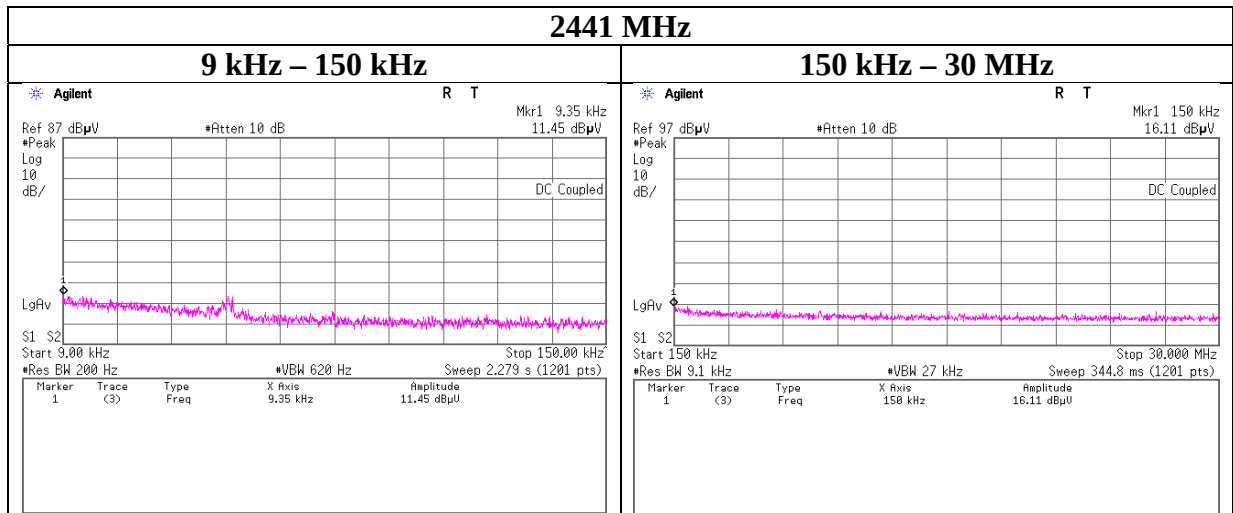
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Report No.	13671144H
Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 13, 2021
Temperature / Humidity	22 deg. C / 33 % RH
Engineer	Nachi Konegawa
Mode	Tx, Hopping Off, DH5

BT1



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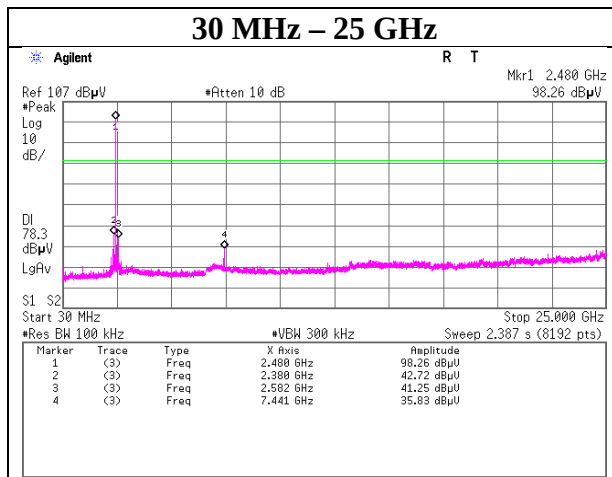
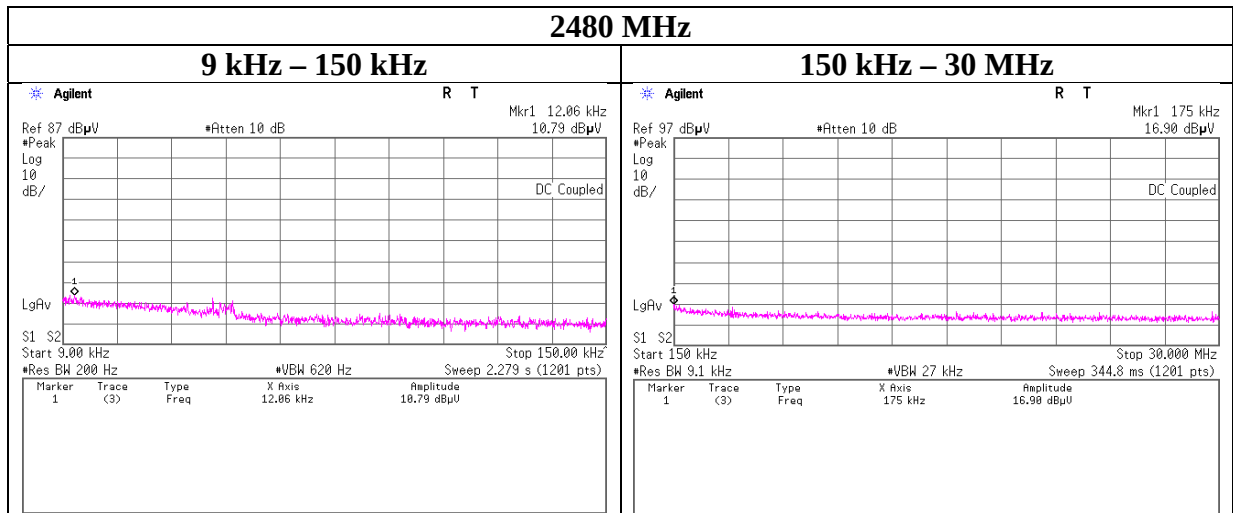
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Report No.	13671144H
Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 13, 2021
Temperature / Humidity	22 deg. C / 33 % RH
Engineer	Nachi Konegawa
Mode	Tx, Hopping Off, DH5

BT1



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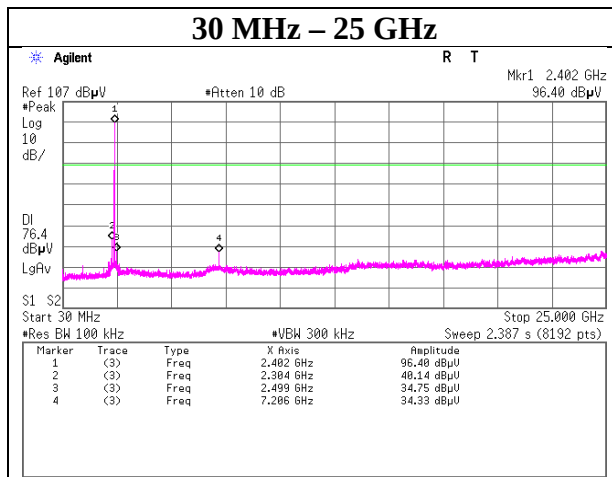
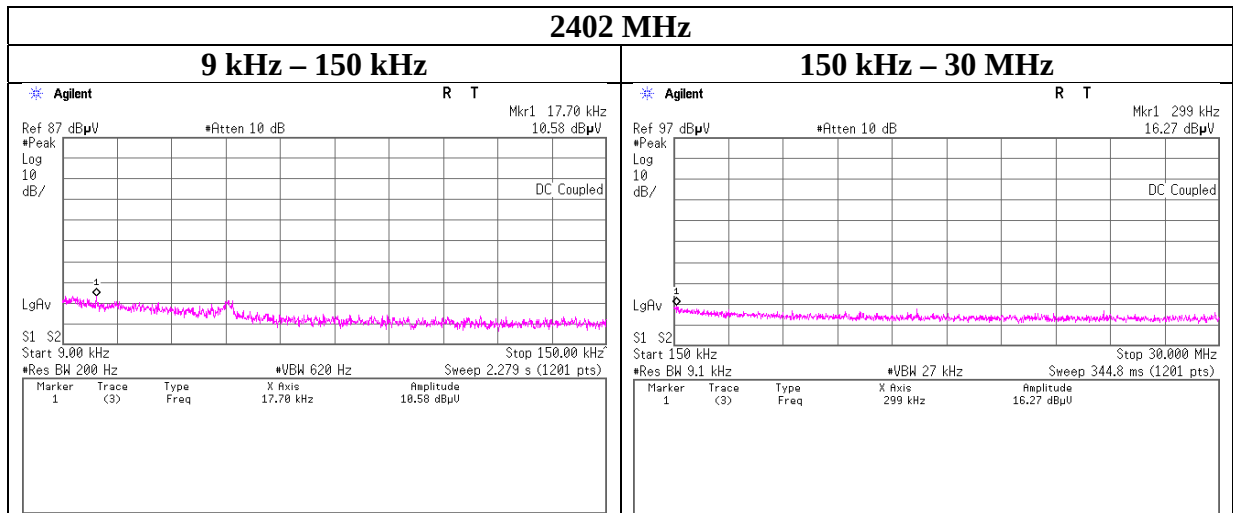
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Report No.	13671144H
Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 13, 2021
Temperature / Humidity	22 deg. C / 33 % RH
Engineer	Nachi Konegawa
Mode	Tx, Hopping Off, 3DH5

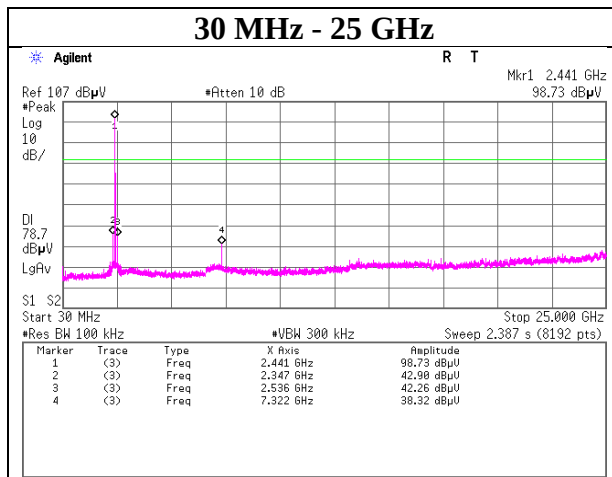
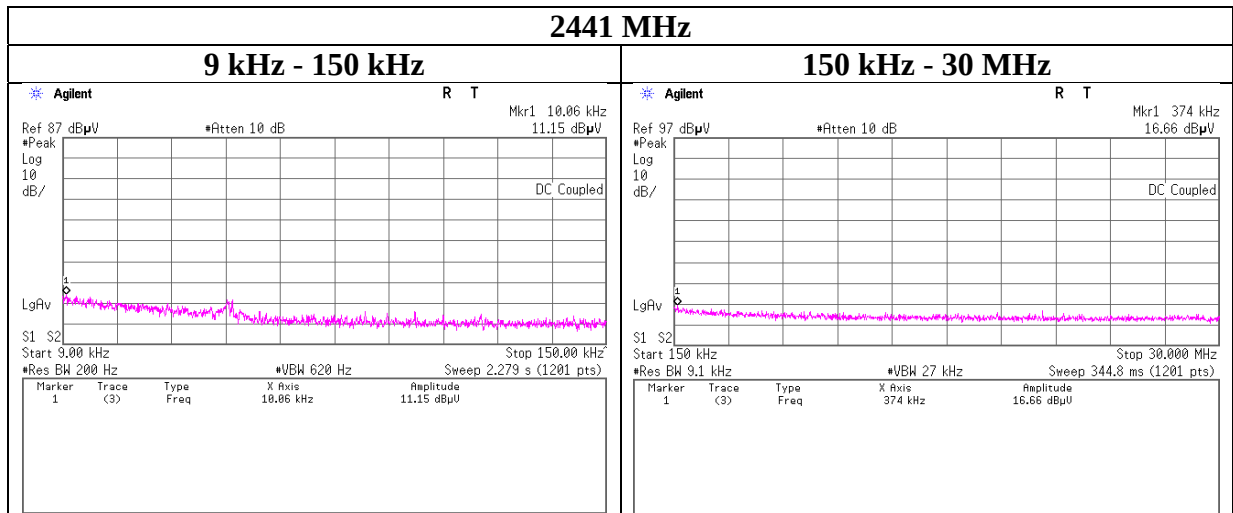
BT1



Conducted Spurious Emission

Report No.	13671144H
Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 13, 2021
Temperature / Humidity	22 deg. C / 33 % RH
Engineer	Nachi Konegawa
Mode	Tx, Hopping Off, 3DH5

BT1



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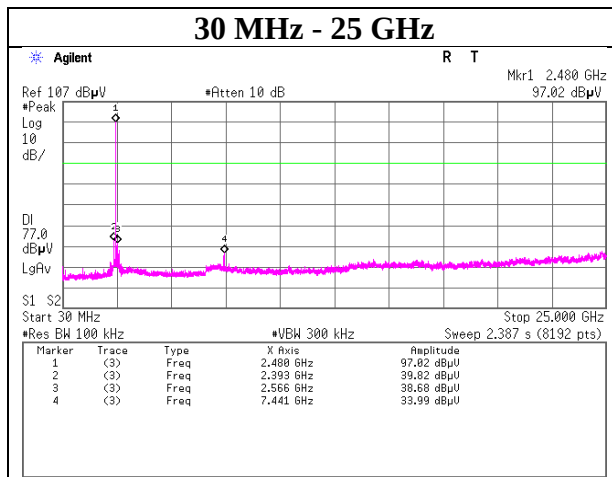
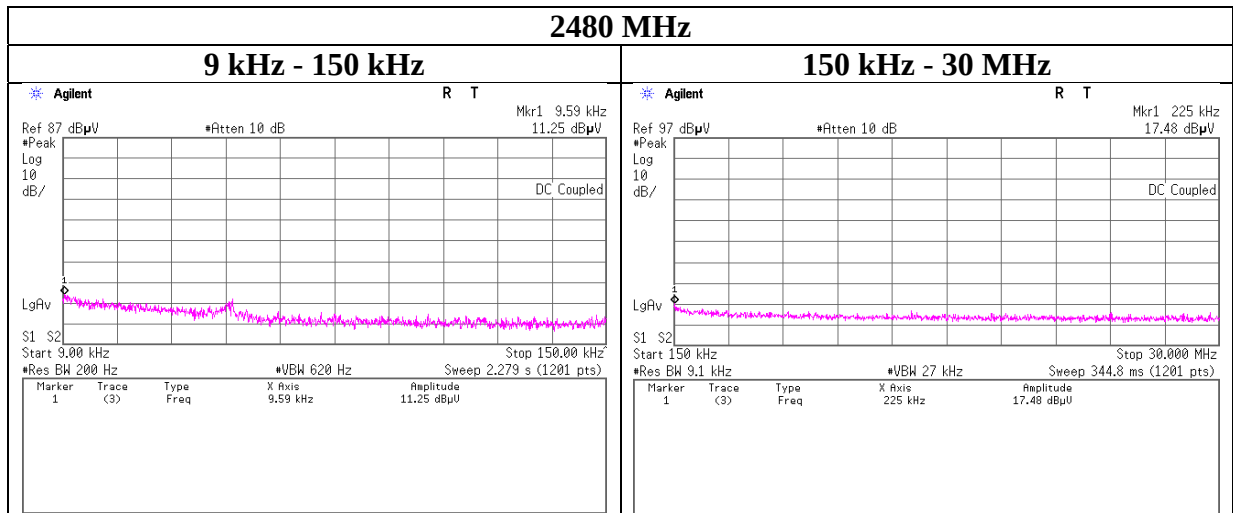
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Report No.	13671144H
Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 13, 2021
Temperature / Humidity	22 deg. C / 33 % RH
Engineer	Nachi Konegawa
Mode	Tx, Hopping Off, 3DH5

BT1



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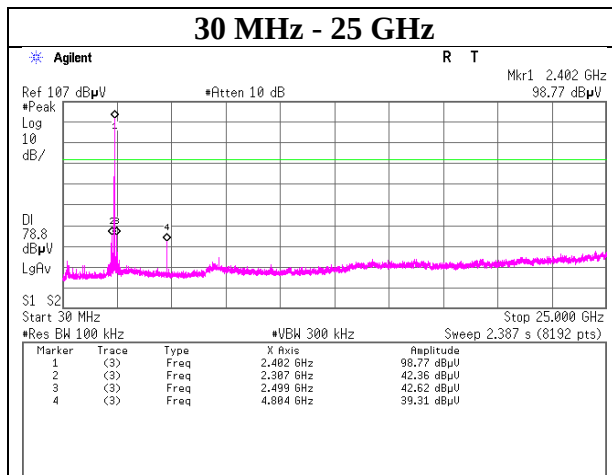
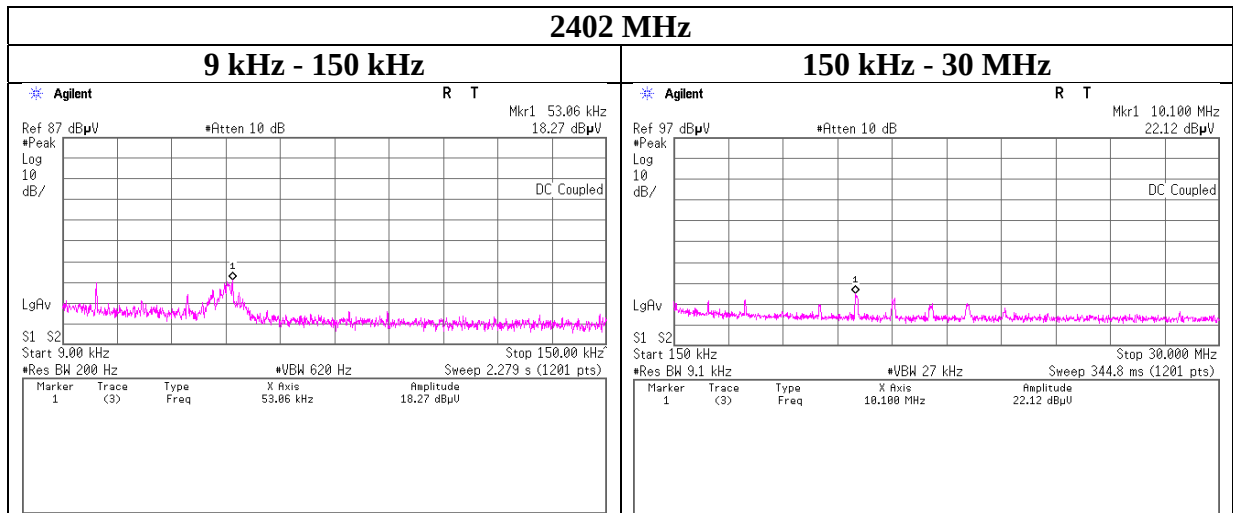
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Report No. 13671144H
Test place Ise EMC Lab. No.8 Measurement Room
Date January 13, 2021
Temperature / Humidity 22 deg. C / 33 % RH
Engineer Nachi Konegawa
Mode Tx, Hopping Off, DH5

BT2



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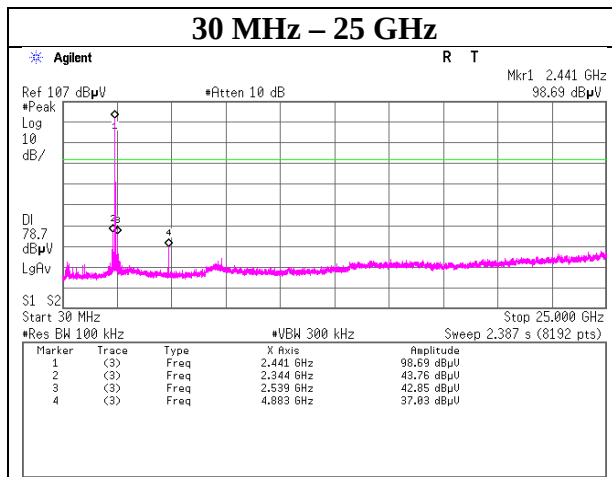
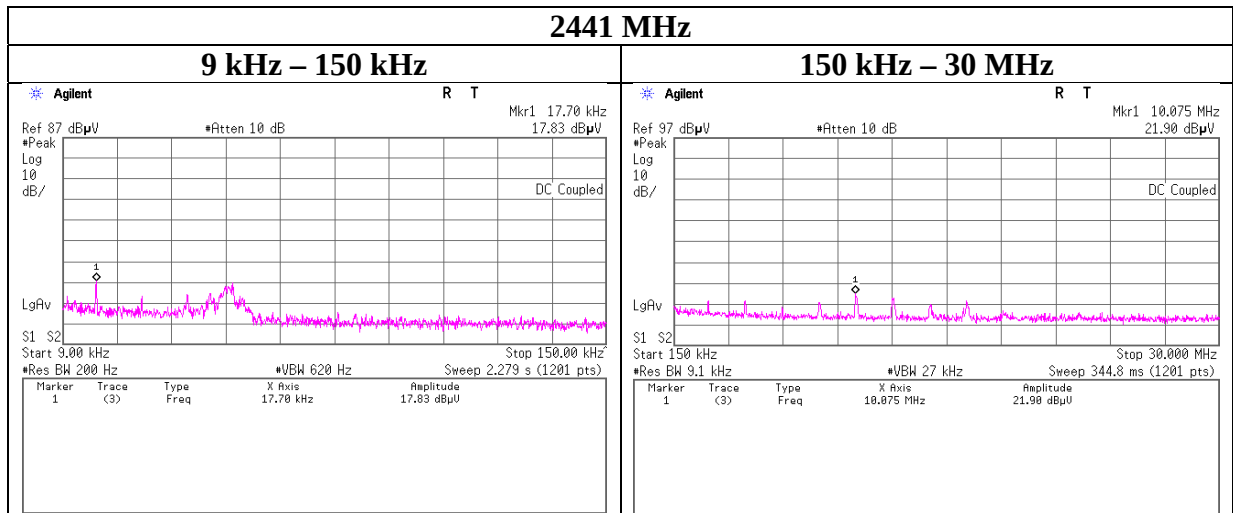
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Report No.	13671144H
Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 13, 2021
Temperature / Humidity	22 deg. C / 33 % RH
Engineer	Nachi Konegawa
Mode	Tx, Hopping Off, DH5

BT2



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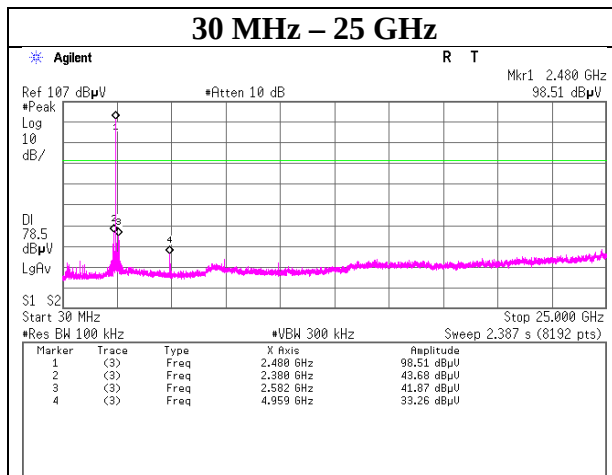
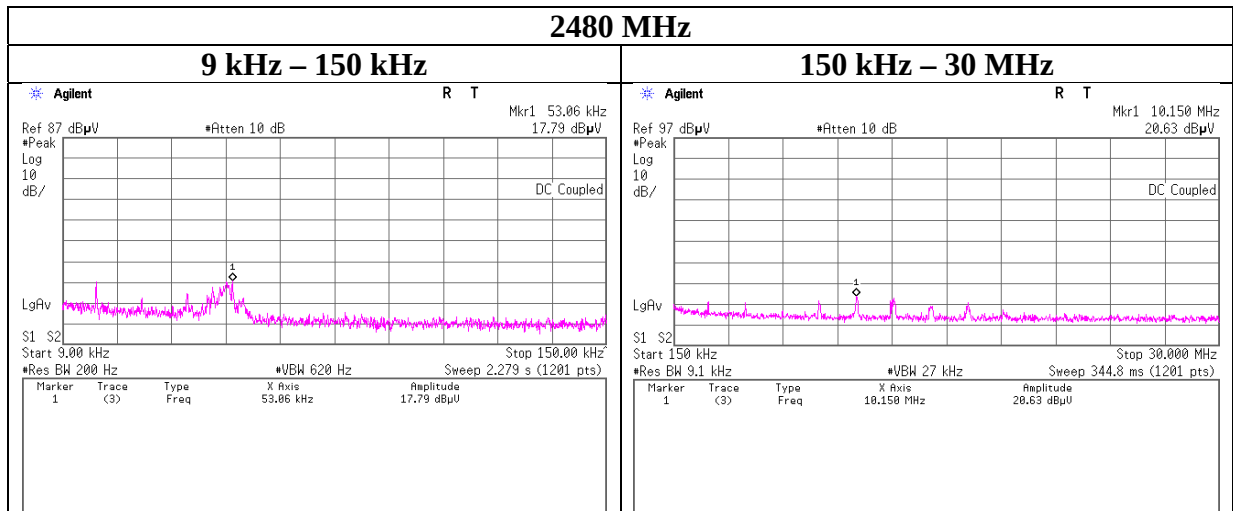
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Report No.	13671144H
Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 13, 2021
Temperature / Humidity	22 deg. C / 33 % RH
Engineer	Nachi Konegawa
Mode	Tx, Hopping Off, DH5

BT2



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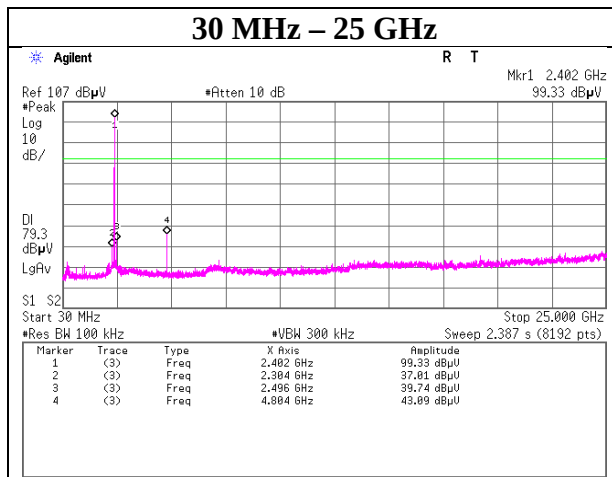
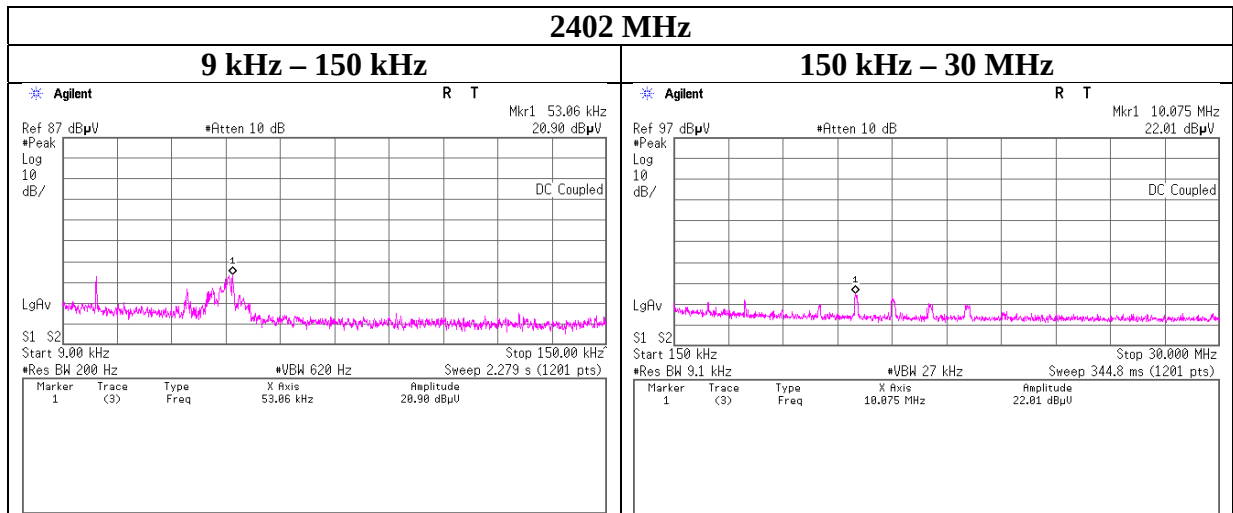
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Report No.	13671144H
Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 13, 2021
Temperature / Humidity	22 deg. C / 33 % RH
Engineer	Nachi Konegawa
Mode	Tx, Hopping Off, 3DH5

BT2



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Ise EMC Lab.

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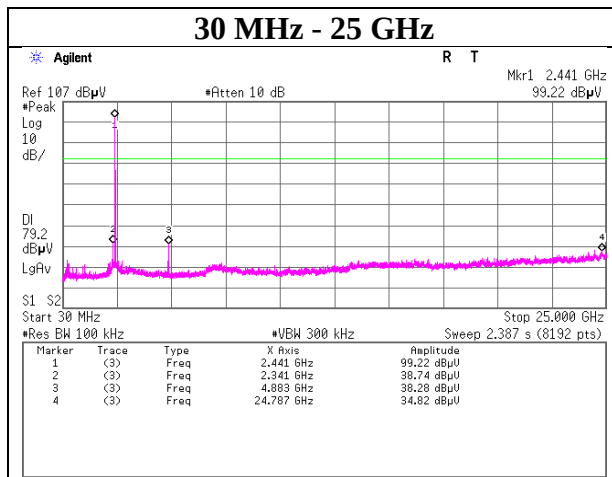
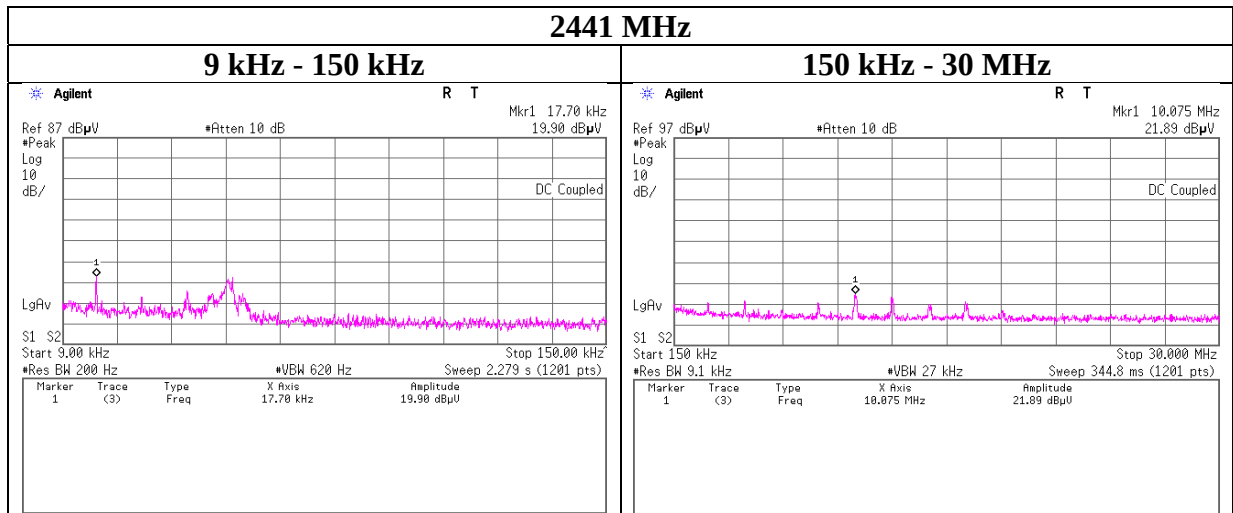
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Report No.	13671144H
Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 13, 2021
Temperature / Humidity	22 deg. C / 33 % RH
Engineer	Nachi Konegawa
Mode	Tx, Hopping Off, 3DH5

BT2



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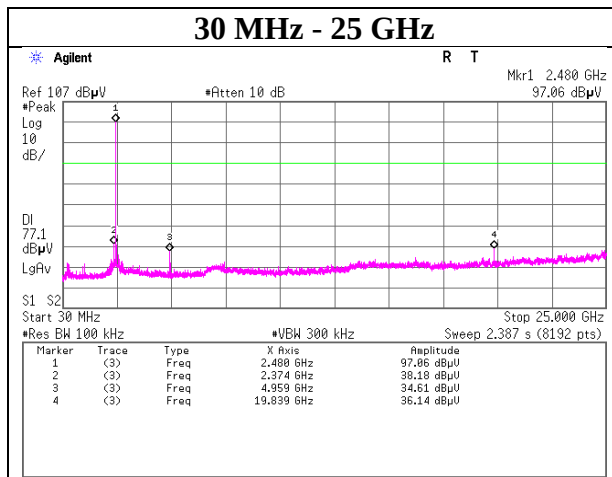
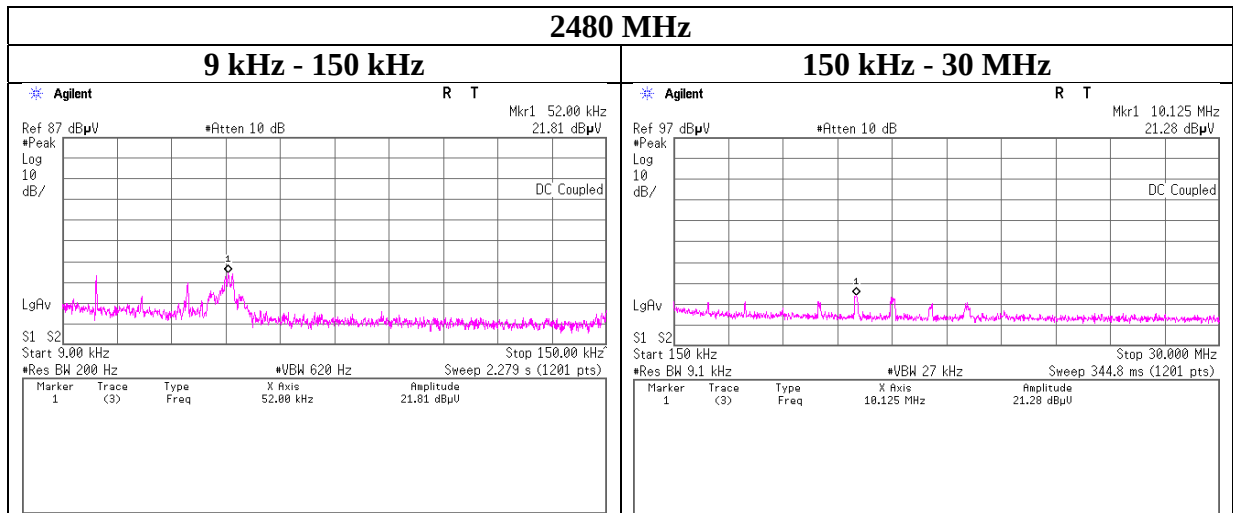
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Report No.	13671144H
Test place	Ise EMC Lab. No.8 Measurement Room
Date	January 13, 2021
Temperature / Humidity	22 deg. C / 33 % RH
Engineer	Nachi Konegawa
Mode	Tx, Hopping Off, 3DH5

BT2



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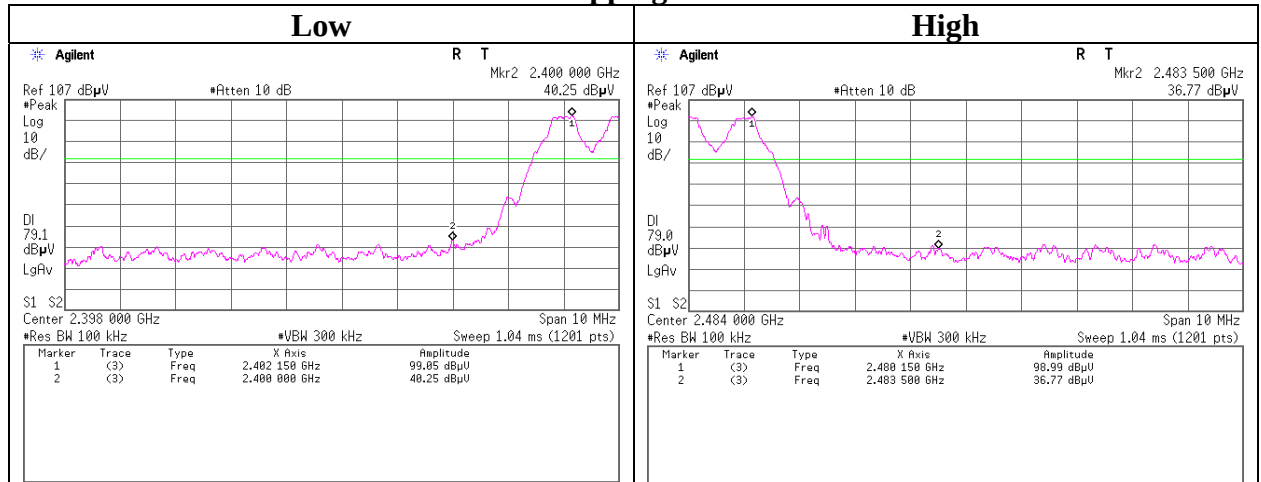
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

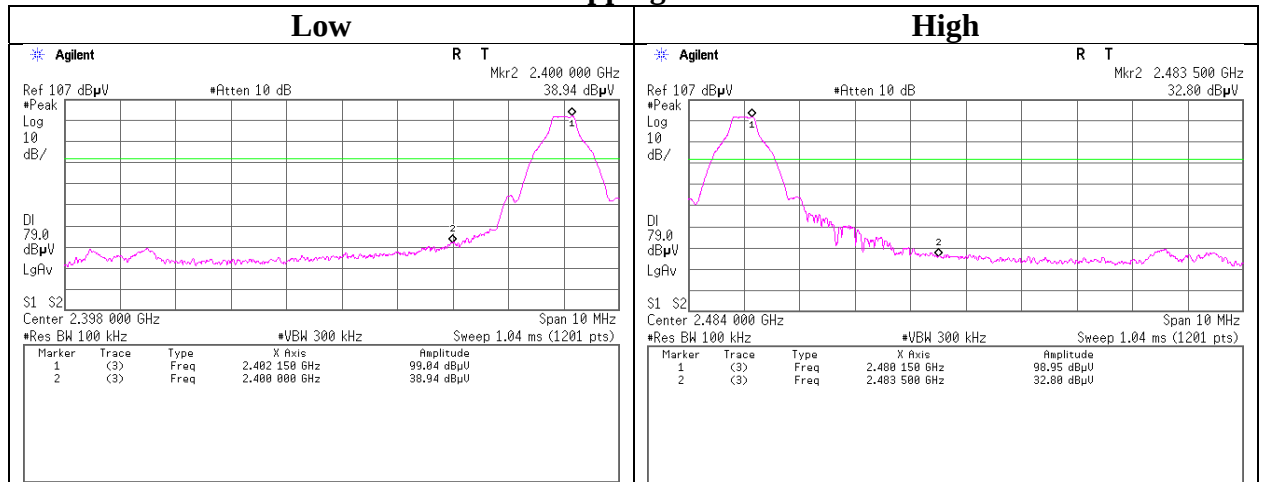
Conducted Emission Band Edge compliance

Report No. 13671144H
Test place Ise EMC Lab. No.8 Measurement Room
Date January 13, 2021
Temperature / Humidity 22 deg. C / 33 % RH
Engineer Nachi Konegawa
Mode Tx DH5

BT1 Hopping On



Hopping Off



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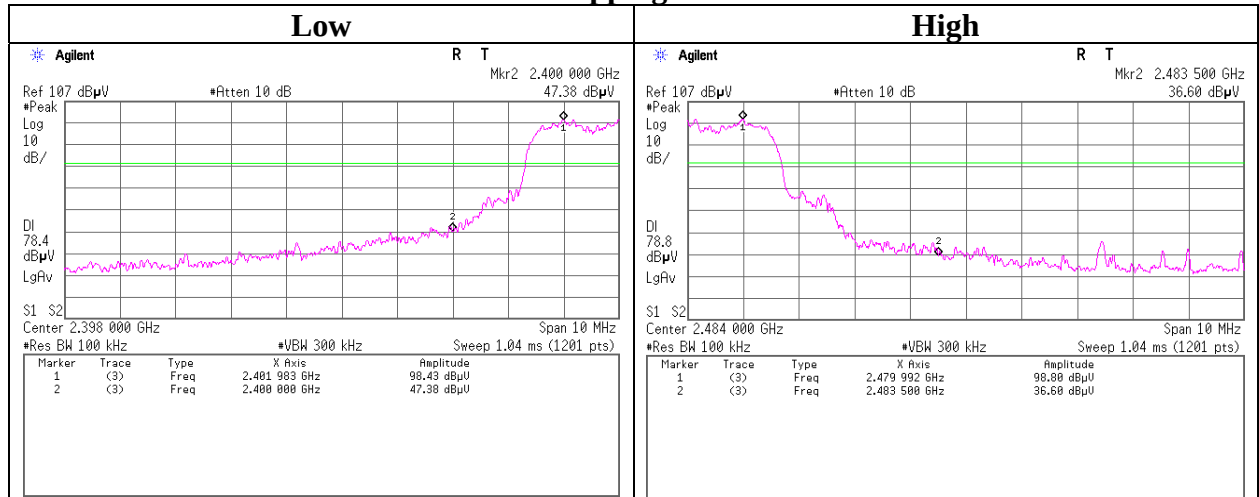
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

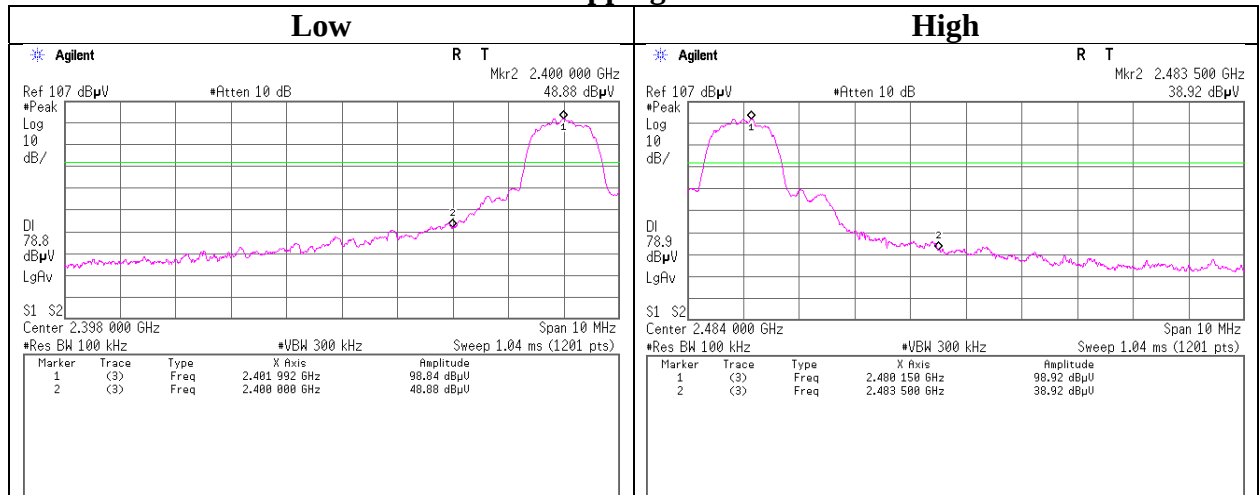
Conducted Emission Band Edge compliance

Report No. 13671144H
Test place Ise EMC Lab. No.8 Measurement Room
Date January 13, 2021
Temperature / Humidity 22 deg. C / 33 % RH
Engineer Nachi Konegawa
Mode Tx 3DH5

BT1 Hopping On



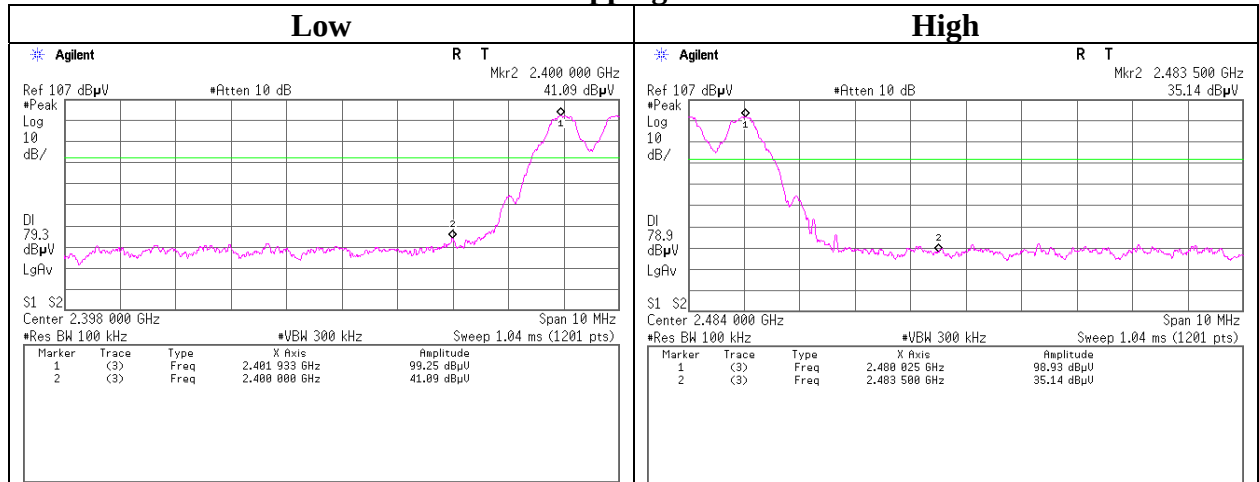
Hopping Off



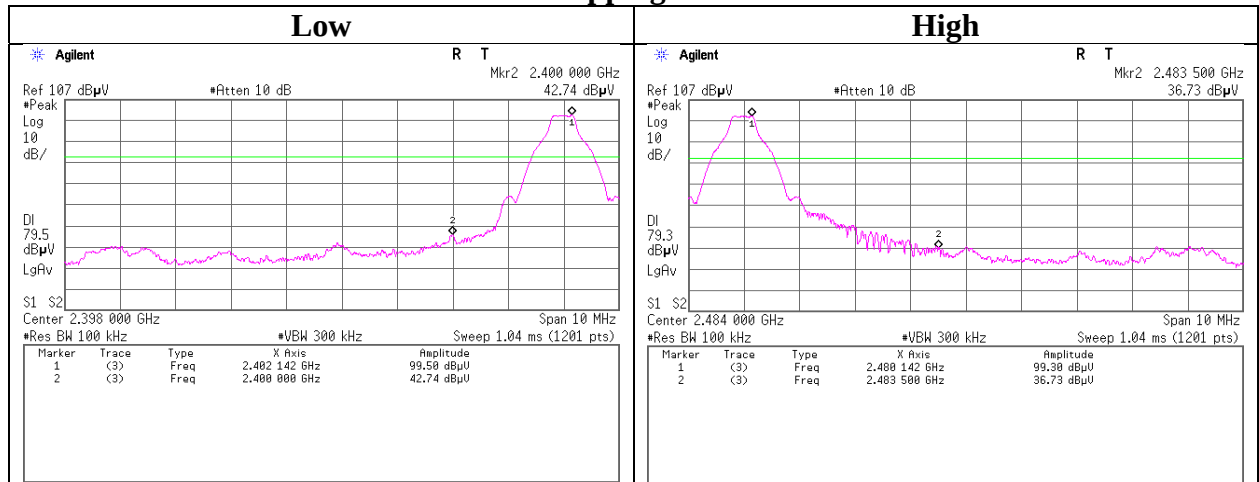
Conducted Emission Band Edge compliance

Report No. 13671144H
Test place Ise EMC Lab. No.8 Measurement Room
Date January 13, 2021
Temperature / Humidity 22 deg. C / 33 % RH
Engineer Nachi Konegawa
Mode Tx DH5

BT2 Hopping On



Hopping Off



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Ise EMC Lab.

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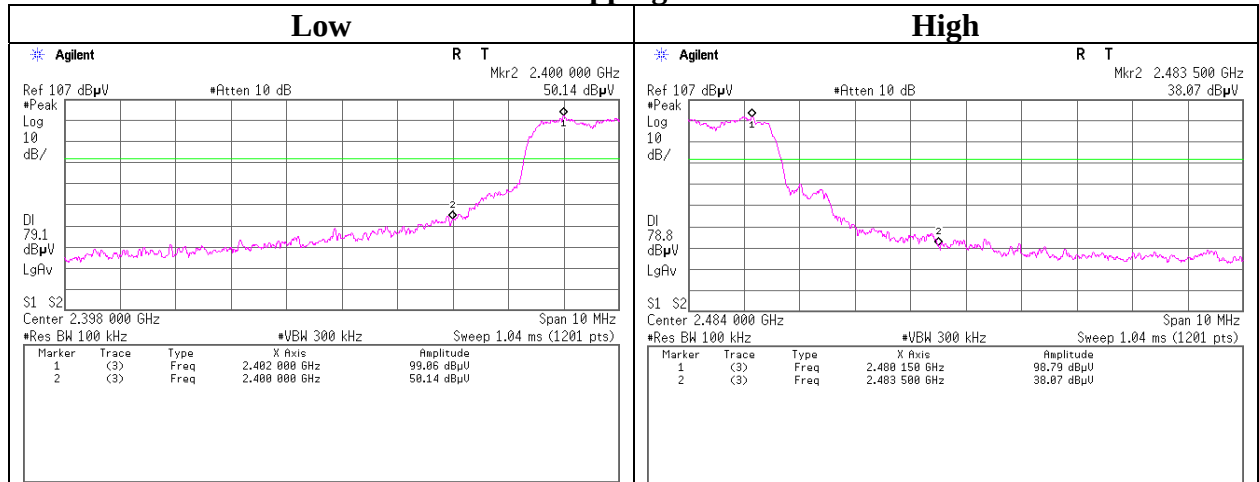
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

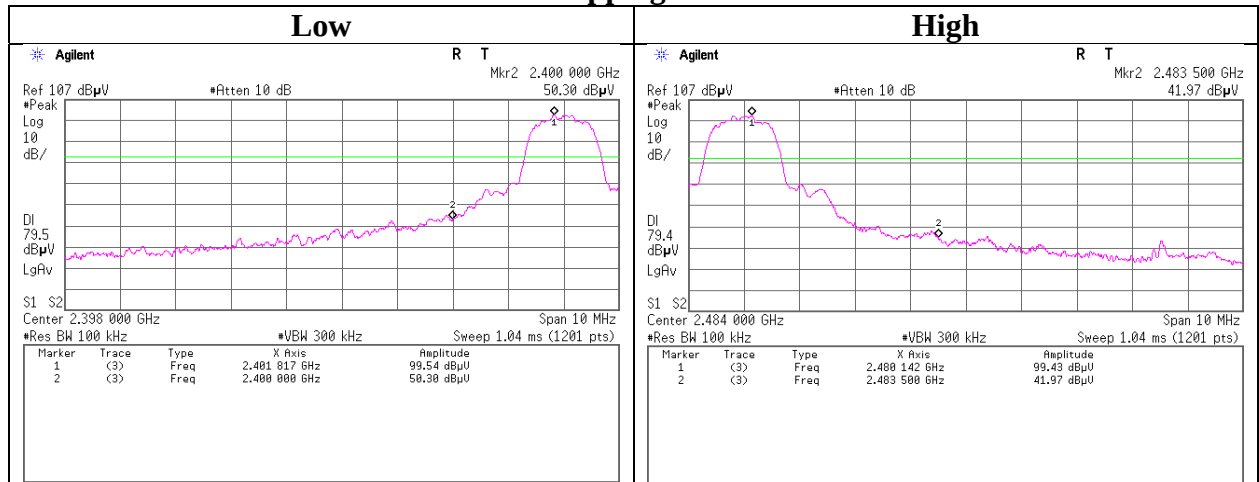
Conducted Emission Band Edge compliance

Report No. 13671144H
Test place Ise EMC Lab. No.8 Measurement Room
Date January 13, 2021
Temperature / Humidity 22 deg. C / 33 % RH
Engineer Nachi Konegawa
Mode Tx 3DH5

BT2 Hopping On



Hopping Off



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Telephone : +81 596 24 8999

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APPENDIX 2: Test instruments

Test equipment

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
AT	MOS-28	141567	Thermo-Hygrometer	CUSTOM	CTH-201	8	01/15/2021	12
AT	MMM-17	141557	DIGITAL HiTESTER	HIOKI	3805	70900530	01/07/2021	12
AT	MSA-13	141900	Spectrum Analyzer	AGILENT	E4440A	MY46185823	09/24/2020	12
AT	MAT-89	141419	Attenuator	Weinschel Associates	WA56-10	56100305	05/27/2020	12
AT	MPM-08	141805	Power Meter	ANRITSU	ML2495A	6K00003338	10/15/2020	12
AT	MPSE-11	141840	Power sensor	ANRITSU	MA2411B	11737	10/15/2020	12
RE	MAEC-03	142008	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	05/22/2020	24
RE	MOS-13	141554	Thermo-Hygrometer	CUSTOM	CTH-180	1301	01/15/2021	12
RE	MMM-08	141532	DIGITAL HiTESTER	HIOKI	3805	51201197	01/07/2021	12
RE	MJM-16	142183	Measure	KOMELON	KMC-36	-	-	-
RE	COTS-MEMI-02	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
RE	MAEC-03-SVSWR	142013	Semi Anechoic Chamber(SVSWR)	TDK	Semi Anechoic Chamber 3m	DA-10005	04/08/2020	12
RE	MHA-20	141507	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	10/31/2020	12
RE	MPA-11	141580	MicroWave System Amplifier	AGILENT	83017A	MY39500779	03/24/2020	12
RE	MCC-231	177964	Microwave Cable	Junkosha INC.	MMX221	1901S329(1m)/1902S579(5m)	03/04/2021	12
RE	MHF-25	141232	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	1	09/23/2020	12
RE	MSA-16	141903	Spectrum Analyzer	AGILENT	E4440A	MY46186390	12/18/2020	12
RE	MSA-03	141884	Spectrum Analyzer	AGILENT	E4448A	MY44020357	03/04/2020	12
RE	MHF-22	141293	High Pass Filter 7-20GHz	TOKIMEC	TF37NCCB	602	01/14/2021	12
RE	MCC-177	141226	Microwave Cable	Junkosha	MMX221-00500DM SDMS	1502S304	03/01/2021	12
RE	MHA-16	141513	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170306	05/21/2020	12
RE	MTR-03	141942	Test Receiver	Rohde & Schwarz	ESCI	100300	08/18/2020	12
RE	MAT-95	142314	Attenuator	Pasternack	PE7390-6	D/C 1504	06/17/2020	12
RE	MBA-03	141424	Biconical Antenna	Schwarzbeck	BBA9106	1915	08/13/2020	12
RE	MCC-51	141323	Coaxial cable	UL Japan	-	-	07/06/2020	12
RE	MLA-22	141266	Logperiodic Antenna (200-1000MHz)	Schwarzbeck	VUSLP9111B	911B-191	08/13/2020	12
RE	MPA-13	141582	Pre Amplifier	SONOMA INSTRUMENT	11/5/1900	260834	02/03/2021	12
RE	MSA-04	141885	Spectrum Analyzer	AGILENT	E4448A	US44300523	11/09/2020	12
CE	MAEC-03	142008	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	05/22/2020	24
CE	MOS-13	141554	Thermo-Hygrometer	CUSTOM	CTH-180	1301	01/15/2021	12
CE	MMM-08	141532	DIGITAL HiTESTER	HIOKI	3805	51201197	01/07/2021	12
CE	MJM-16	142183	Measure	KOMELON	KMC-36	-	-	-
CE	COTS-MEMI-02	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
CE	MLS-23	141357	LISN(AMN)	Schwarzbeck	NSLK8127	8127-729	07/22/2020	12
CE	MCC-112	141216	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W/SFM14/sucoform141-PE/421-010/RFM-E321(SW)	-/00640	07/06/2020	12
CE	MTR-03	141942	Test Receiver	Rohde & Schwarz	ESCI	100300	08/18/2020	12
CE	MSA-04	141885	Spectrum Analyzer	AGILENT	E4448A	US44300523	11/09/2020	12
CE	MAT-67	141248	Attenuator	JFW Industries, Inc.	50FP-013H2 N	-	12/07/2020	12

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*Hyphens for Last Calibration Date and Cal Int (month) are instruments that Calibration is not required (e.g. software), or instruments checked in advance before use.

The expiration date of the calibration is the end of the expired month.

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

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

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