



RADIO TEST REPORT

Test Report No. : 13170804H-B-R2

Applicant : Sony Interactive Entertainment Inc.
Type of EUT : Wireless communication module
Model Number of EUT : J20H100
FCC ID : AK8M19DFR1
Test regulation : FCC Part 15 Subpart C: 2020
* Bluetooth (BR / EDR) part
Test Result : Complied (Refer to SECTION 3.2)

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3. This sample tested is in compliance with the limits of the above standard.
4. The test results in this test report are traceable to the national or international standards.
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8. The information provided from the customer for this report is identified in SECTION 1.
9. This report is a revised version of 13170804H-B-R1. 13170804H-B-R1 is replaced with this report.

Date of test: December 19, 2019 to February 22, 2020

Representative test engineer:

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☒ There is no testing item of "Non-accreditation".

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REVISION HISTORY

Original Test Report No.: 13170804H-B

Revision	Test report No.	Date	Page revised	Contents
- (Original)	13170804H-B	June 3, 2020	-	-
1	13170804H-B-R1	June 10, 2020	P16	Corrected the Test setup; Test Distance of No.3 Semi Anechoic Chamber of frequency range 1 GHz - 10 GHz * Test Distance: $(3 + \text{Test Volume} / 2) - r = 2.95 \text{ m}$ ↓ * Test Distance: $(3 + \text{Test Volume} / 2) - r = 3.95 \text{ m}$
1	13170804H-B-R1	June 10, 2020	P120 - 121	Added Item H: DC Power supply and Cable No.7: AC Cable
2	13170804H-B-R2	June 17, 2020	P45, 47, 48, 55, 57, 65, 68, 80, 82, 83, 85	Added the note to the data; "Noise synchronized with duty of carrier frequency."

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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		
FHSS	Frequency Hopping Spread Spectrum		
FM	Frequency Modulation		
Freq.	Frequency		
FSK	Frequency Shift Keying		
GFSK	Gaussian Frequency-Shift Keying		
GNSS	Global Navigation Satellite System		
GPS	Global Positioning System		
Hori.	Horizontal		
ICES	Interference-Causing Equipment Standard		
IEC	International Electrotechnical Commission		
IEEE	Institute of Electrical and Electronics Engineers		
IF	Intermediate Frequency		
ILAC	International Laboratory Accreditation Conference		
ISED	Innovation, Science and Economic Development Canada		
ISO	International Organization for Standardization		
JAB	Japan Accreditation Board		
LAN	Local Area Network		
LIMS	Laboratory Information Management System		

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CONTENTS	PAGE
SECTION 1: Customer information.....	5
SECTION 2: Equipment under test (EUT).....	5
SECTION 3: Test specification, procedures & results.....	8
SECTION 4: Operation of EUT during testing.....	12
SECTION 5: Conducted Emission.....	14
SECTION 6: Radiated Spurious Emission	15
SECTION 7: Antenna Terminal Conducted Tests.....	17
APPENDIX 1: Test data	18
Conducted Emission	18
20dB Bandwidth, 99%Occupied Bandwidth and Carrier Frequency Separation	26
Number of Hopping Frequency	33
Dwell time.....	36
Maximum Peak Output Power.....	41
Average Output Power.....	42
Radiated Spurious Emission	45
Conducted Spurious Emission	96
Conducted Emission Band Edge compliance	108
APPENDIX 2: Test instruments	112
APPENDIX 3: Photographs of test setup	114
Conducted Emission	114
Radiated Spurious Emission	115
Worst Case Position Module.....	117
Test Configuration and peripherals.....	120

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 Foxconn Industrial Internet Co Ltd 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	J20H100
Serial Number	Refer to SECTION 4.2
Country of Manufacture	China
Receipt Date	December 16, 2019
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: J20H100 (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

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 *1)	PIFA	IFA
Antenna Gain: G _{ANT}	Antenna 1: 6.0 dBi	Antenna 1: 4.0 dBi
	Antenna 2: 6.0 dBi	Antenna 2: 3.5 dBi
Directional Gain *2)	9.01 dBi	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 *1)	PIFA	IFA
Antenna Gain: G _{ANT}	Antenna 1: 5.0 dBi	Antenna 1: 5.0 dBi
	Antenna 3: 3.5 dBi	Antenna 3: 2.0 dBi
Directional Gain *2)	7.29 dBi	6.64 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 *2)	PIFA	IFA
Antenna Gain	Antenna 3: 5.8 dBi	Antenna 3: 3.0 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 *2)	PIFA	IFA
Antenna Gain	Antenna 4: 5.8 dBi	Antenna 4: 4.0 dBi
Maximum clock frequency	128 MHz	

*1) Details for the antenna combinations are as follows.

	WLAN	BT1	BT2
Combination 1	PIFA	PIFA	PIFA
Combination 2	IFA	IFA	IFA

*2) 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 May 26, 2020 and effective July 27, 2020 except 15.258

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	27.65 dB, 0.96867 MHz, 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	3.9 dB 2483.500 MHz, PK, Horizontal (PIFA Antenna BT1)	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.

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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

The EUT has a unique coupling/antenna connector (U.FL). Therefore the equipment complies with the requirement of 15.203.

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	RSS-Gen 6.7	ISED: -	N/A	- a)	Conducted
a) Refer to APPENDIX 1 (data of 20dB Bandwidth, 99%Occupied Bandwidth and Carrier Frequency Separation)					

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) (Vertical)	4.8 dB
		5.0 dB
	200 MHz to 1000 MHz (Horizontal) (Vertical)	5.2 dB
		6.3 dB
10 m	30 MHz to 200 MHz (Horizontal) (Vertical)	4.8 dB
		4.8 dB
	200 MHz to 1000 MHz (Horizontal) (Vertical)	5.0 dB
		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

3.5 Test Location

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*NVLAP Lab. code: 200572-0 / FCC Test Firm Registration Number: 199967 / ISED Lab Company Number: 2973C

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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	Antenna type	Tested Antenna	Tested frequency
Conducted Emission*1)	Tx (Hopping Off) DH5, 3DH5	PIFA	Antenna 3 (BT1) Antenna 4 (BT2)	2402 MHz 2441 MHz 2480 MHz
Radiated Spurious Emission	Tx (Hopping Off) DH5, 3DH5	PIFA IFA	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: 1.0.0.101

(Date: December 16, 2019, 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 *2)	Antenna type
Radiated Spurious Emission	Tx 3DH5 2402 MHz + Tx 11ax-40 5755MHz Tx 3DH5 2441 MHz + Tx 11ax-40 5755MHz Tx 3DH5 2480 MHz + Tx 11ax-40 5755MHz	PIFA IFA

*2) 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, 0.5 m by 1.0 m, raised 0.8 m above the conducting ground plane. The rear of tabletop was located 40 cm to the vertical conducting plane. The rear of EUT, including peripherals 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.

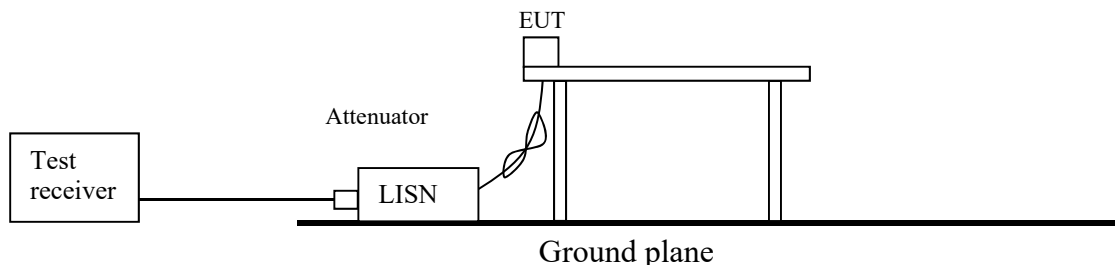
The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber. The EUT was connected to a LISN (AMN).

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, 0.5 m by 1.0 m, raised 0.8 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

[For above 1 GHz]

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

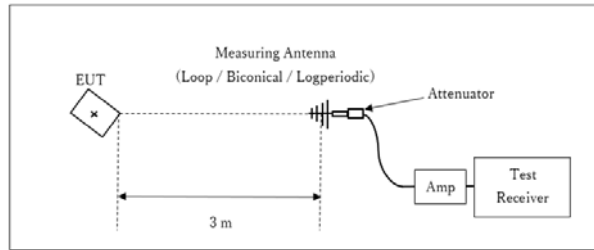
20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9 (ISED) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (ISED).

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

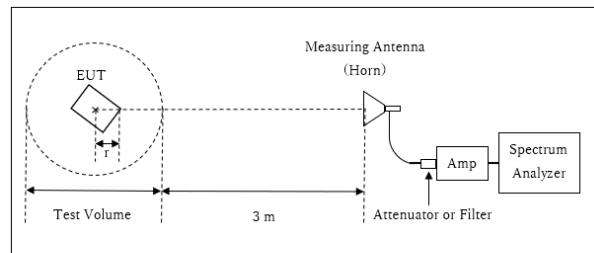
Below 1 GHz



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

[No.2 Semi Anechoic Chamber]

Distance Factor: $20 \times \log (3.7 \text{ m} / 3.0 \text{ m}) = 1.83 \text{ dB}$

* Test Distance: $(3 + \text{Test Volume} / 2) - r = 3.7 \text{ m}$

Test Volume : 1.5 m

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

$r = 0.05 \text{ m}$

[No.3 Semi Anechoic Chamber]

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

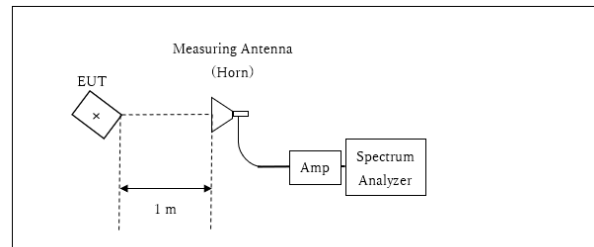
* Test Distance: $(3 + \text{Test Volume} / 2) - r = 3.95 \text{ m}$

Test Volume : 2.0 m

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

$r = 0.05 \text{ m}$

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 and antennas 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

UL Japan, Inc.

Ise EMC Lab.

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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.

*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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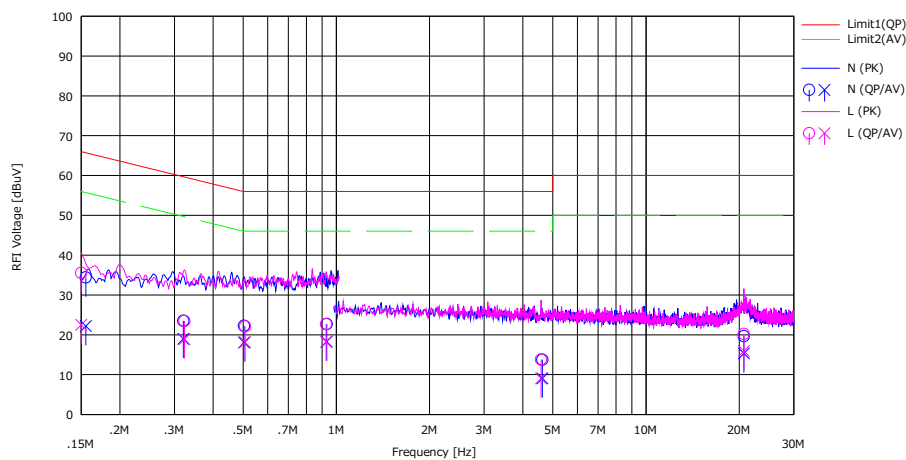
Facsimile : +81 596 24 8124

APPENDIX 1: Test data

Conducted Emission (PIFA Antenna BT1)

Report No.	13170804H
Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Date	February 22, 2020
Temperature / Humidity	24 deg. C / 32 % RH
Engineer	Yuta Moriya
Mode	Tx, Hopping Off, DH5 2441MHz

Limit : FCC_Part 15 Subpart C(15.207)

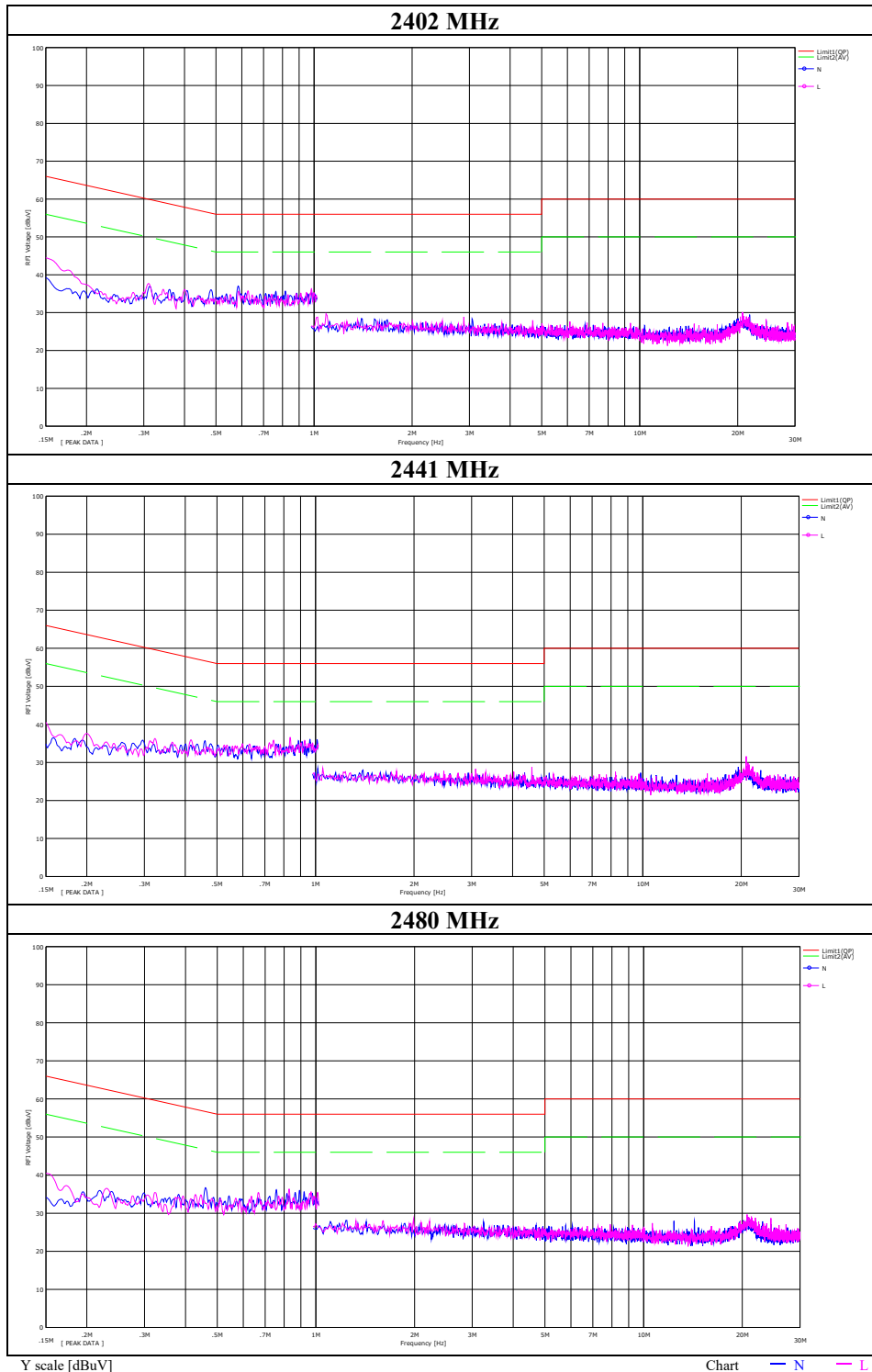


No.	Freq. [MHz]	Reading		LISN	LOSS	Results		Limit		Margin		Phase	Comment
		(QP) [dBuV]	(AV) [dBuV]			(QP) [dBuV]	(AV) [dBuV]	(QP) [dBuV]	(AV) [dBuV]	(QP) [dB]	(AV) [dB]		
1	0.15522	21.20	8.99	0.07	13.14	34.41	22.20	65.70	55.70	31.29	33.50	N	
2	0.32052	10.30	5.76	0.07	13.16	23.53	18.99	59.70	49.70	36.17	30.71	N	
3	0.50322	9.01	4.83	0.08	13.17	22.26	18.08	56.00	46.00	33.74	27.92	N	
4	0.93126	9.40	5.00	0.08	13.21	22.69	18.29	56.00	46.00	33.31	27.71	N	
5	4.62614	0.21	-4.49	0.14	13.41	13.76	9.06	56.00	46.00	42.24	36.94	N	
6	20.69680	5.41	1.10	0.39	13.84	19.64	15.33	60.00	50.00	40.36	34.67	N	
7	0.15000	22.30	9.30	0.07	13.14	35.51	22.51	66.00	56.00	30.49	33.49	L	
8	0.32313	10.25	5.69	0.06	13.16	23.47	18.91	59.60	49.60	36.13	30.69	L	
9	0.50757	8.88	4.90	0.05	13.17	22.10	18.12	56.00	46.00	33.90	27.88	L	
10	0.92691	9.40	5.00	0.06	13.21	22.67	18.27	56.00	46.00	33.33	27.73	L	
11	4.58079	0.23	-4.50	0.15	13.41	13.79	9.06	56.00	46.00	42.21	36.94	L	
12	20.69680	5.88	1.61	0.48	13.84	20.20	15.93	60.00	50.00	39.80	34.07	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 (PIFA Antenna BT1)

Report No. 13170804H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date February 22, 2020
Temperature / Humidity 24 deg. C / 32 % RH
Engineer Yuta Moriya
Mode Tx, Hopping Off, DH5



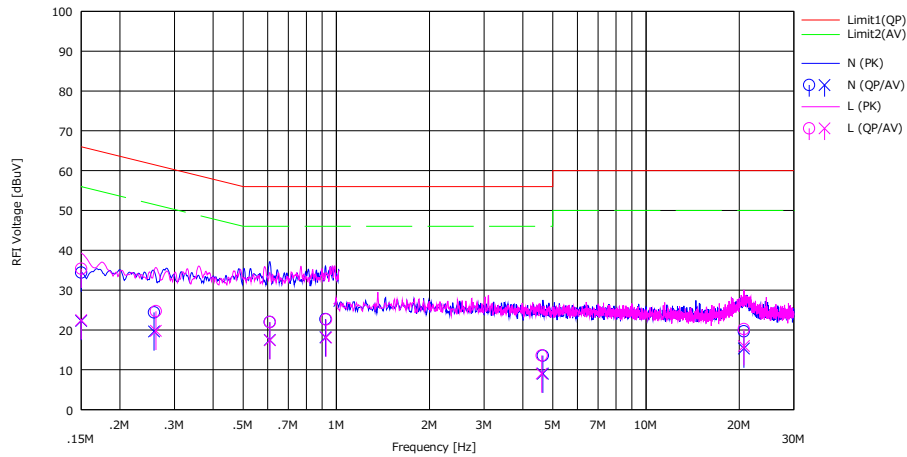
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Ise EMC Lab.

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Facsimile : +81 596 24 8124

Conducted Emission (PIFA Antenna BT1)

Report No. 13170804H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date February 22, 2020
Temperature / Humidity 24 deg. C / 32 % RH
Engineer Yuta Moriya
Mode Tx, Hopping Off, 3DH5 2402MHz

Limit : FCC_Part 15 Subpart C(15.207)



No.	Freq. [MHz]	Reading		USN	LOSS	Results		Limit		Margin		Phase	Comment
		(QP)	(AV)			(QP)	(AV)	(QP)	(AV)	(QP)	(AV)		
		[dBuV]	[dBuV]			[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	21.19	9.04	0.07	13.14	34.40	22.25	66.00	56.00	31.60	33.75	N	
2	0.25788	11.20	6.40	0.07	13.15	24.42	19.62	61.50	51.50	37.08	31.88	N	
3	0.60936	8.70	4.24	0.08	13.18	21.96	17.50	56.00	46.00	34.04	28.50	N	
4	0.92256	9.40	4.86	0.08	13.21	22.69	18.15	56.00	46.00	33.31	27.85	N	
5	4.64428	0.00	-4.51	0.14	13.41	13.55	9.04	56.00	46.00	42.45	36.96	N	
6	20.69680	5.45	1.12	0.39	13.84	19.68	15.35	60.00	50.00	40.32	34.65	N	
7	0.15000	22.15	9.24	0.07	13.14	35.36	22.45	66.00	56.00	30.64	33.55	L	
8	0.26136	11.49	6.58	0.06	13.15	24.70	19.79	61.40	51.40	36.70	31.61	L	
9	0.61023	8.75	4.20	0.05	13.18	21.98	17.43	56.00	46.00	34.02	28.57	L	
10	0.92691	9.37	4.82	0.06	13.21	22.64	18.09	56.00	46.00	33.36	27.91	L	
11	4.60800	0.03	-4.51	0.15	13.41	13.59	9.05	56.00	46.00	42.41	36.95	L	
12	20.69680	5.92	1.63	0.48	13.84	20.24	15.95	60.00	50.00	39.76	34.05	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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Ise EMC Lab.

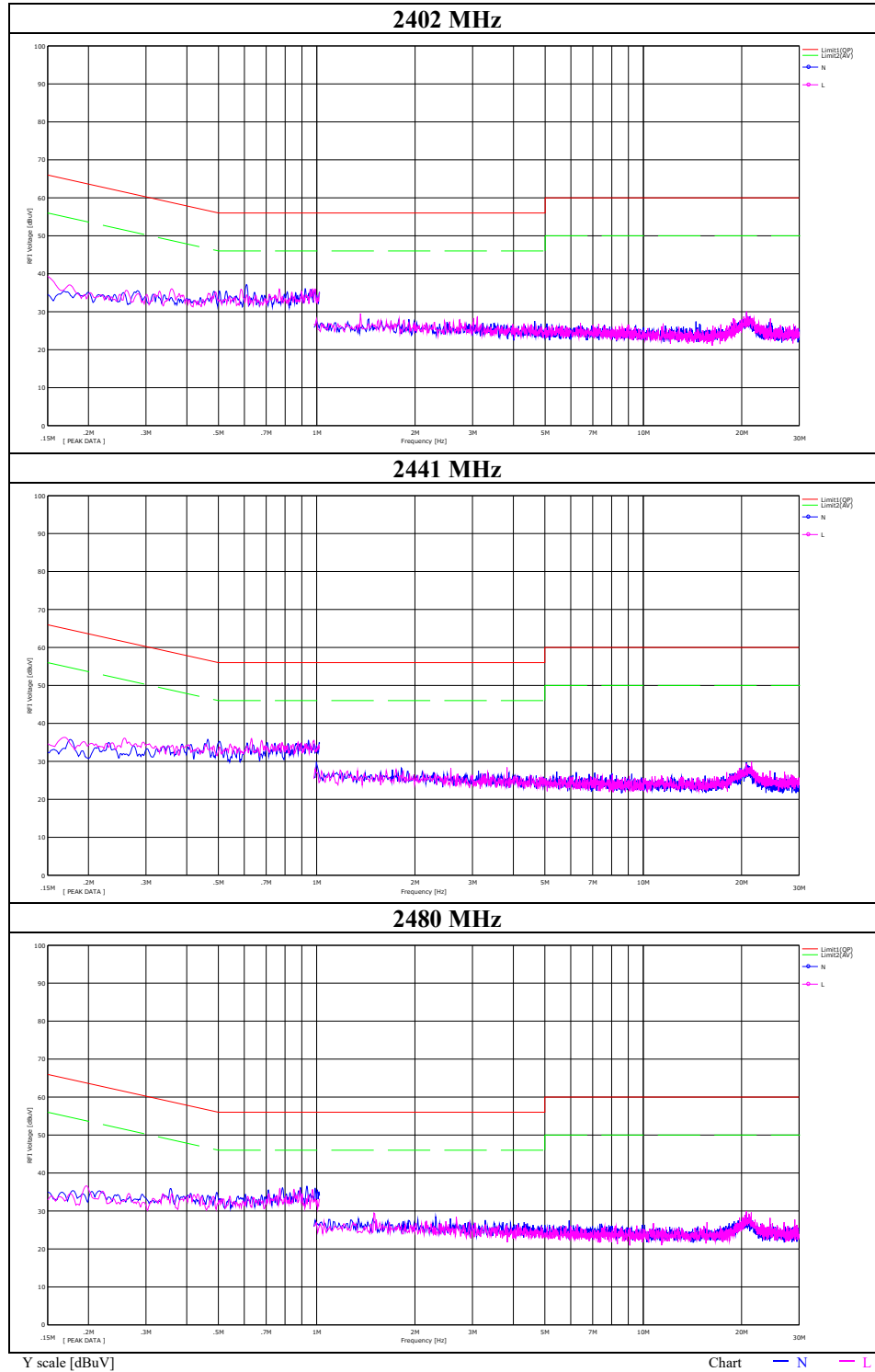
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Conducted Emission (PIFA Antenna BT1)

Report No. 13170804H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date February 22, 2020
Temperature / Humidity 24 deg. C / 32 % RH
Engineer Yuta Moriya
Mode Tx, Hopping Off, 3DH5



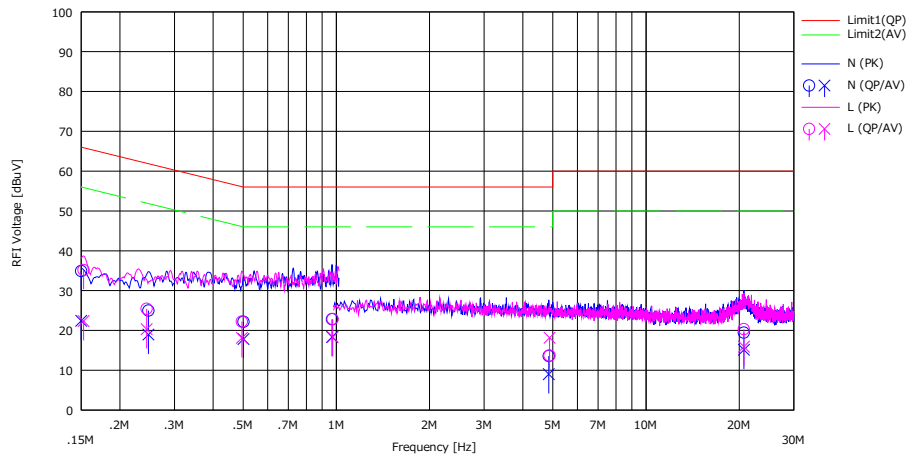
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Ise EMC Lab.

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Telephone : +81 596 24 8999
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Conducted Emission (PIFA Antenna BT2)

Report No. 13170804H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date February 22, 2020
Temperature / Humidity 24 deg. C / 32 % RH
Engineer Yuta Moriya
Mode Tx, Hopping Off, DH5 2402MHz

Limit : FCC_Part 15 Subpart C(15.207)



No.	Freq. [MHz]	Reading		USN	LOSS	Results		Limit		Margin		Phase	Comment
		(QP)	(AV)			(QP)	(AV)	(QP)	(AV)	(QP)	(AV)		
		[dBuV]	[dBuV]			[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	21.70	9.20	0.07	13.14	34.91	22.41	66.00	56.00	31.09	33.59	N	
2	0.24744	11.74	5.73	0.07	13.15	24.96	18.95	61.80	51.80	36.84	32.85	N	
3	0.50148	8.91	4.59	0.08	13.17	22.16	17.84	56.00	46.00	33.84	28.16	N	
4	0.96867	9.50	5.05	0.08	13.22	22.80	18.35	56.00	46.00	33.20	27.65	N	
5	4.85289	0.00	-4.54	0.14	13.42	13.56	9.02	56.00	46.00	42.44	36.98	N	
6	20.69680	5.23	0.90	0.39	13.84	19.46	15.13	60.00	50.00	40.54	34.87	N	
7	0.15261	21.93	9.15	0.07	13.14	35.14	22.36	65.90	55.90	30.76	33.54	L	
8	0.24396	12.20	7.09	0.07	13.15	25.42	20.31	62.00	52.00	36.58	31.69	L	
9	0.49539	9.00	4.88	0.05	13.17	22.22	18.10	56.10	46.10	33.88	28.00	L	
10	0.97302	9.57	5.05	0.06	13.22	22.85	18.33	56.00	46.00	33.15	27.67	L	
11	4.88010	0.10	4.59	0.15	13.42	13.67	18.16	56.00	46.00	42.33	27.84	L	
12	20.69680	5.99	1.61	0.48	13.84	20.31	15.93	60.00	50.00	39.69	34.07	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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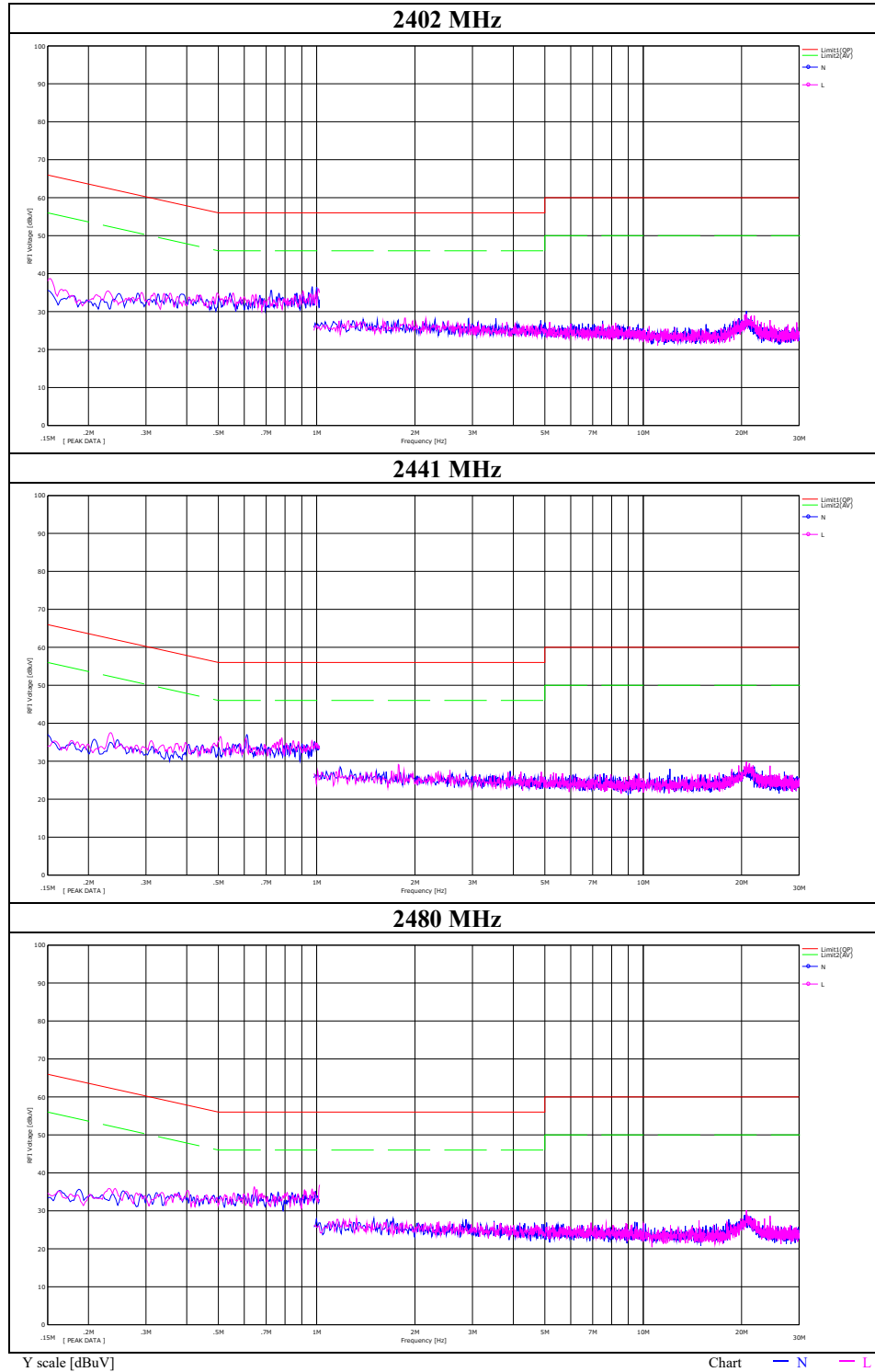
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Conducted Emission (PIFA Antenna BT2)

Report No. 13170804H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date February 22, 2020
Temperature / Humidity 24 deg. C / 32 % RH
Engineer Yuta Moriya
Mode Tx, Hopping Off, DH5



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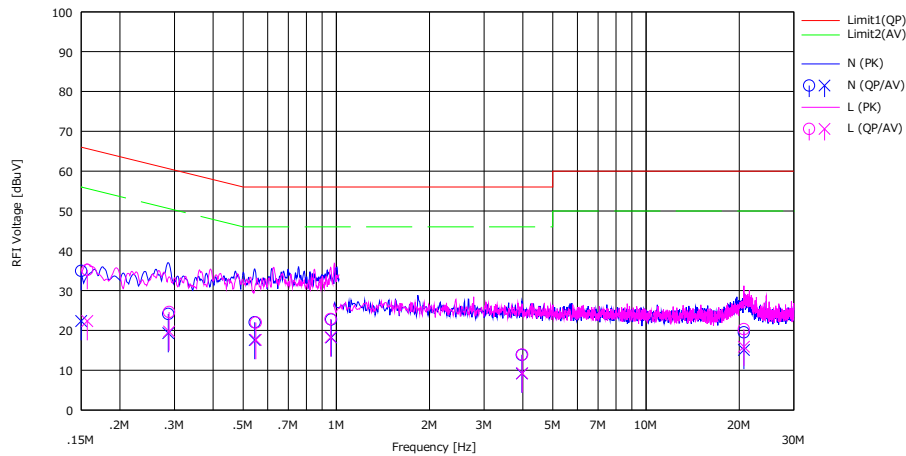
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Emission (PIFA Antenna BT2)

Report No. 13170804H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date February 22, 2020
Temperature / Humidity 24 deg. C / 32 % RH
Engineer Yuta Moriya
Mode Tx, Hopping Off, 3DH5 2402MHz

Limit : FCC_Part 15 Subpart C(15.207)



No.	Freq. [MHz]	Reading		USN	LOSS	Results		Limit		Margin		Phase	Comment
		(QP)	(AV)			(QP)	(AV)	(QP)	(AV)	(QP)	(AV)		
		[dBuV]	[dBuV]			[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	21.73	9.15	0.07	13.14	34.94	22.36	66.00	56.00	31.06	33.64	N	
2	0.28659	10.91	6.11	0.07	13.16	24.14	19.34	60.60	50.60	36.46	31.26	N	
3	0.54498	8.80	4.34	0.08	13.17	22.05	17.59	56.00	46.00	33.95	28.41	N	
4	0.96258	9.45	4.95	0.08	13.22	22.75	18.25	56.00	46.00	33.25	27.75	N	
5	3.97310	0.37	-4.33	0.13	13.38	13.88	9.18	56.00	46.00	42.12	36.82	N	
6	20.69680	5.29	0.88	0.39	13.84	19.52	15.11	60.00	50.00	40.48	34.89	N	
7	0.15696	21.96	9.16	0.07	13.14	35.17	22.37	65.60	55.60	30.43	33.23	L	
8	0.28833	11.38	6.50	0.06	13.16	24.60	19.72	60.60	50.60	36.00	30.88	L	
9	0.54933	8.75	4.40	0.05	13.17	21.97	17.62	56.00	46.00	34.03	28.38	L	
10	0.95823	9.57	4.98	0.06	13.22	22.85	18.26	56.00	46.00	33.15	27.74	L	
11	3.98217	0.41	-4.27	0.14	13.38	13.93	9.25	56.00	46.00	42.07	36.75	L	
12	20.69680	5.99	1.57	0.48	13.84	20.31	15.89	60.00	50.00	39.69	34.11	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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Ise EMC Lab.

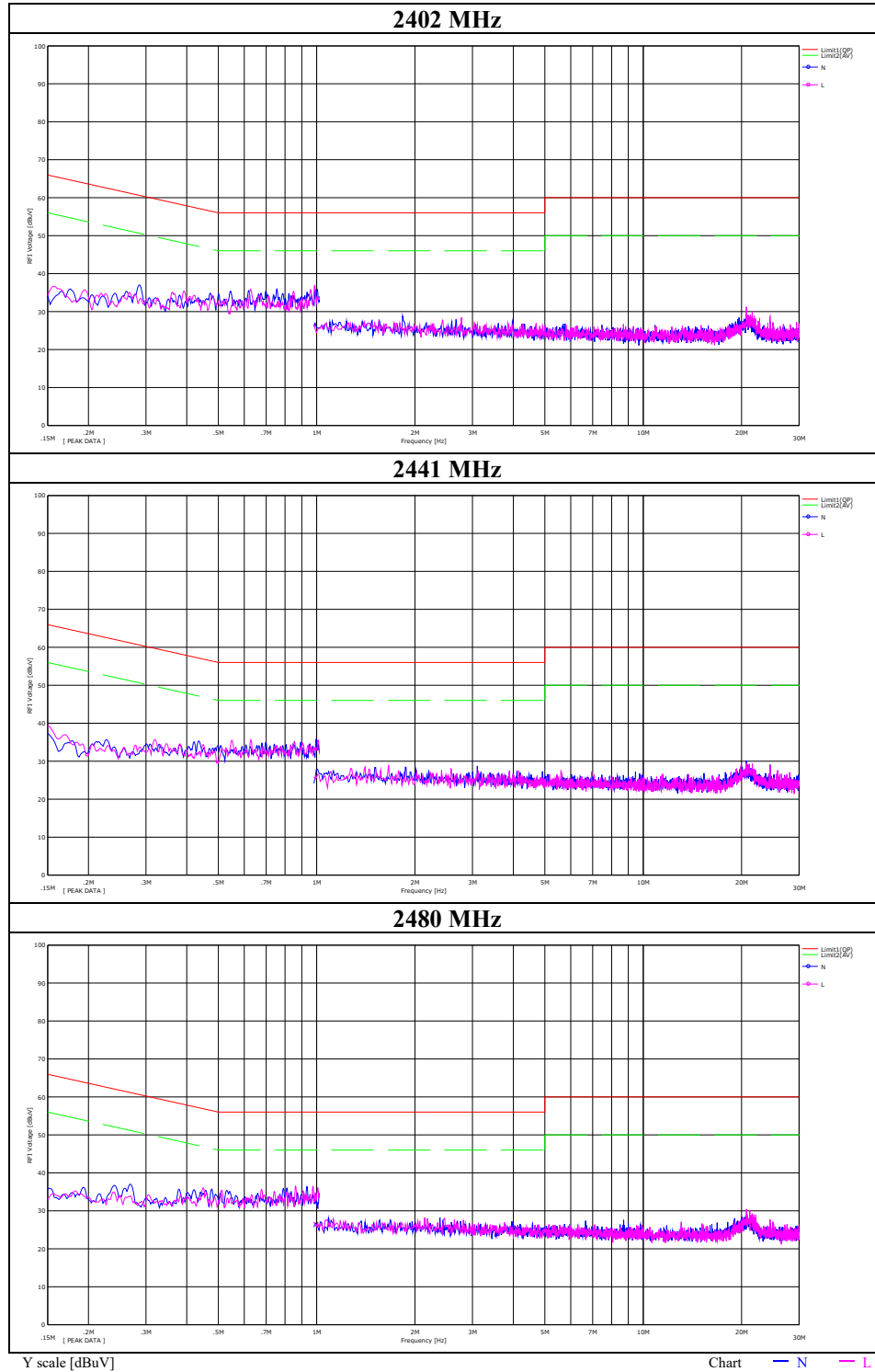
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Conducted Emission (PIFA Antenna BT2)

Report No. 13170804H
Test place Ise EMC Lab. No.3 Semi Anechoic Chamber
Date February 22, 2020
Temperature / Humidity 24 deg. C / 32 % RH
Engineer Yuta Moriya
Mode Tx, Hopping Off, 3DH5



UL Japan, Inc.

Ise EMC Lab.

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

Telephone : +81 596 24 8999

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

Report No.	13170804H
Test place	Ise EMC Lab. No.3 Measurement Room
Date	December 19, 2019
Temperature / Humidity	24 deg. C / 32 % RH
Engineer	Takafumi Noguchi
	BT1
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	1.007	879.062	1.000	≥ 0.671
DH5	2441.0	1.005	878.366	1.000	≥ 0.670
DH5	2480.0	1.007	881.521	1.000	≥ 0.671
DH5	Hopping On	-	78660.400	-	-
3DH5	2402.0	1.302	1173.200	1.000	≥ 0.868
3DH5	2441.0	1.304	1174.100	1.000	≥ 0.869
3DH5	2480.0	1.300	1175.400	1.000	≥ 0.867
3DH5	Hopping On	-	78740.900	-	-

BT2

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	99% Occupied Bandwidth [kHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.958	860.934	1.000	≥ 0.639
DH5	2441.0	0.956	850.100	1.000	≥ 0.637
DH5	2480.0	0.958	856.277	1.000	≥ 0.639
DH5	Hopping On	-	78656.800	-	-
3DH5	2402.0	1.299	1175.000	1.000	≥ 0.866
3DH5	2441.0	1.302	1178.200	1.000	≥ 0.868
3DH5	2480.0	1.300	1177.300	1.000	≥ 0.867
3DH5	Hopping On	-	78710.900	-	-

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

No limit applies to 20dB Bandwidth.

UL Japan, Inc.

Ise EMC Lab.

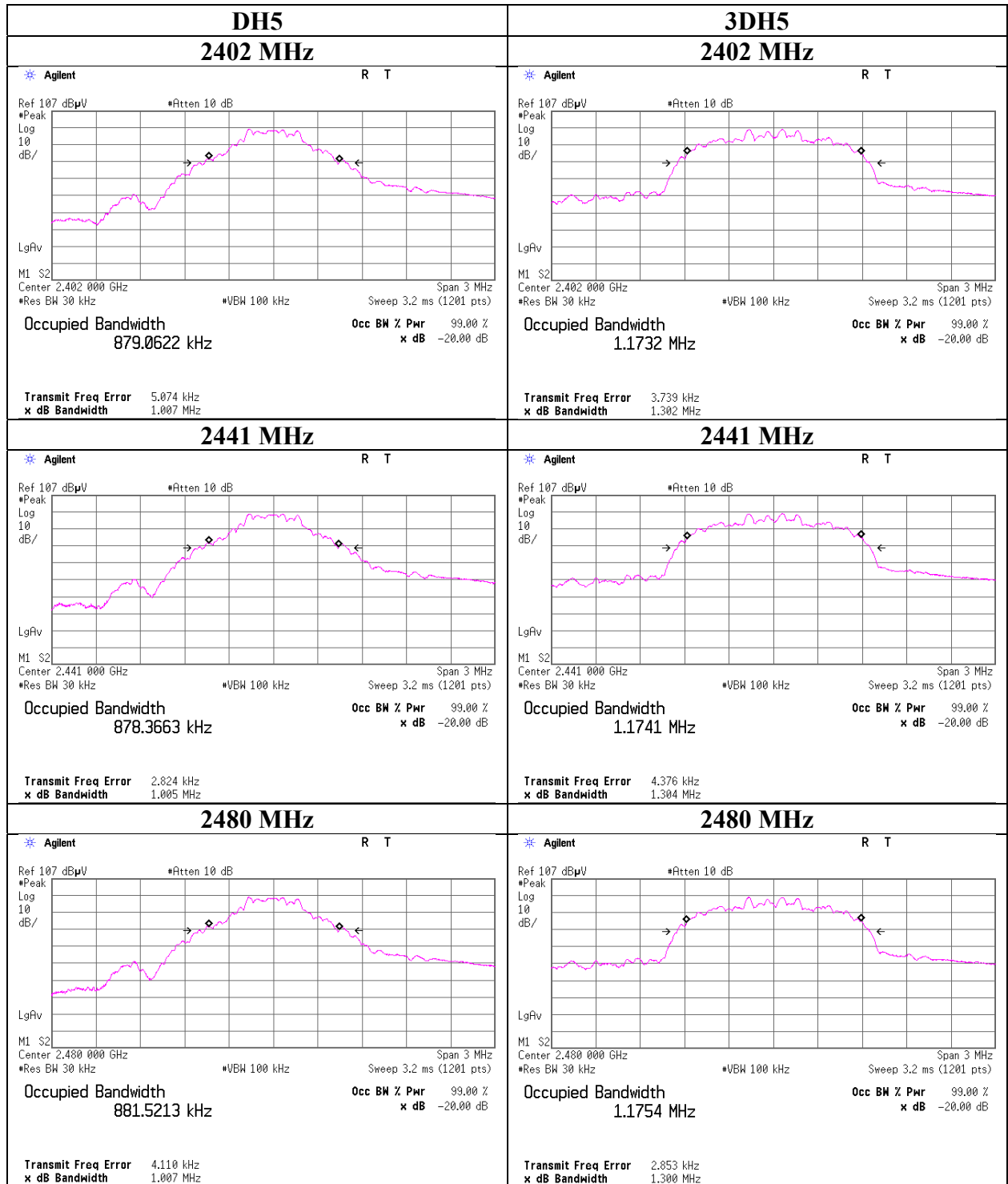
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20dB Bandwidth and 99% Occupied Bandwidth

BT1



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Ise EMC Lab.

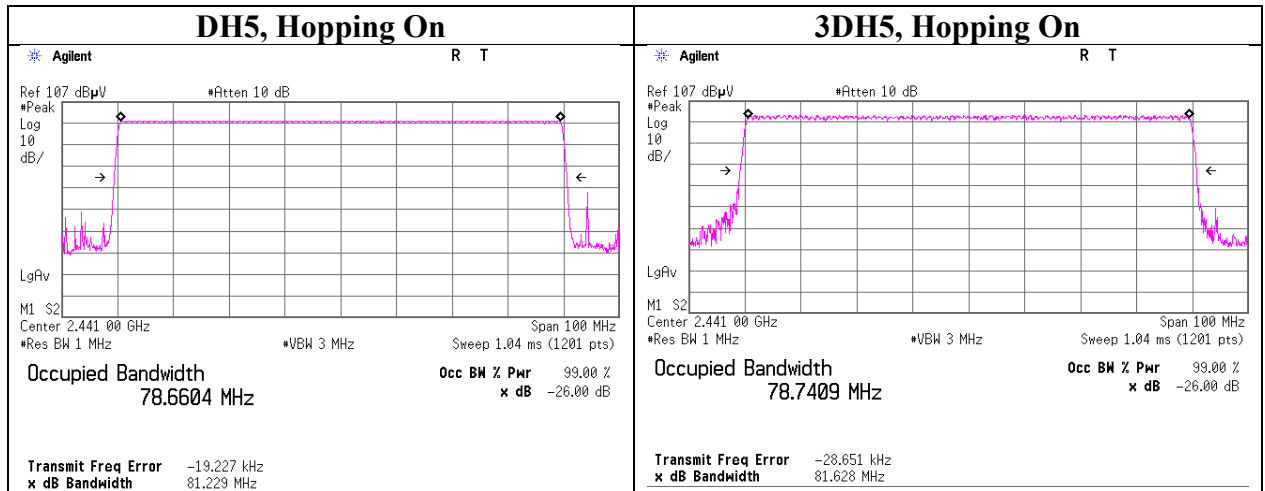
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Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

99% Occupied Bandwidth

BT1



UL Japan, Inc.

Ise EMC Lab.

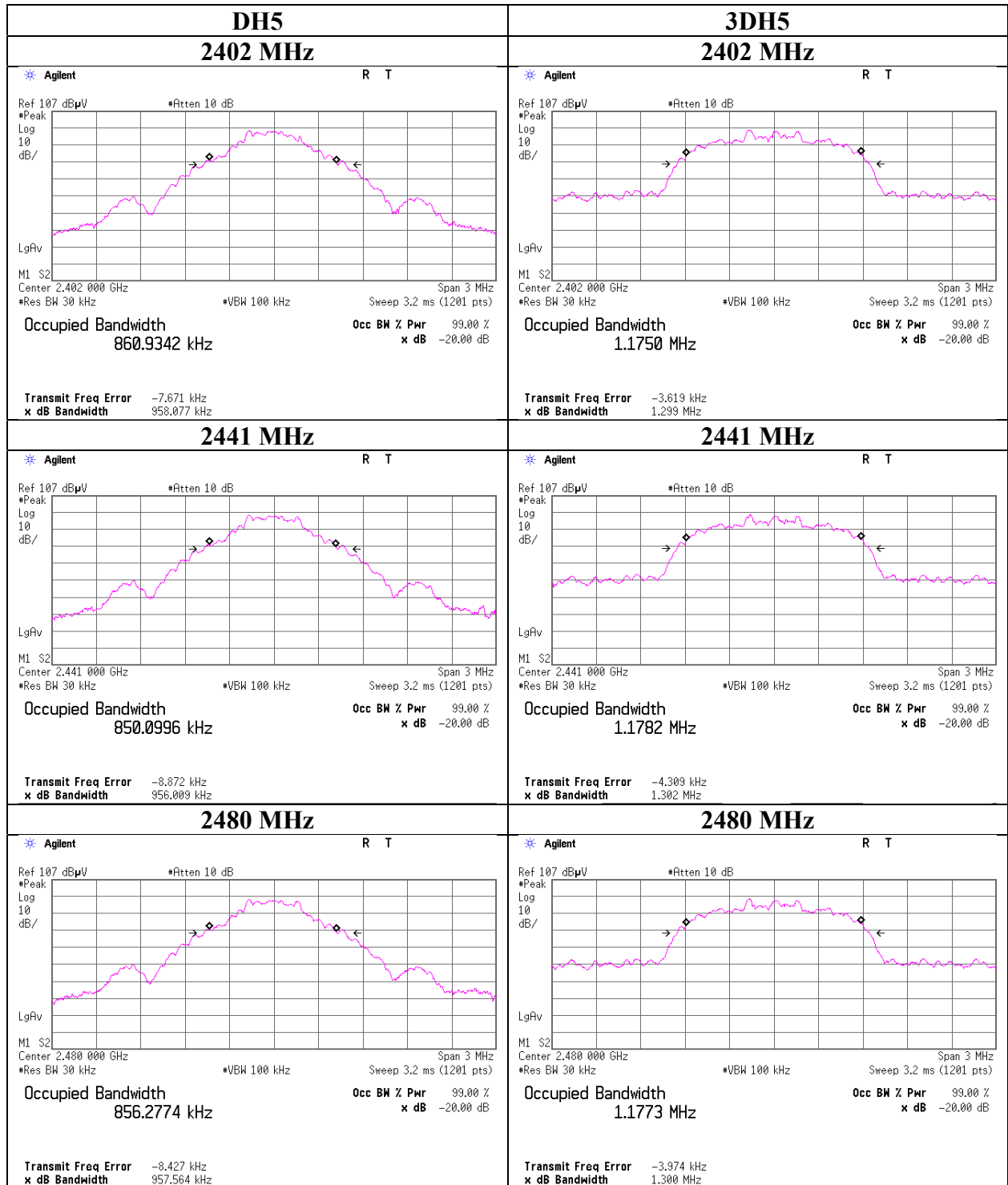
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

20dB Bandwidth and 99% Occupied Bandwidth

BT2



UL Japan, Inc.

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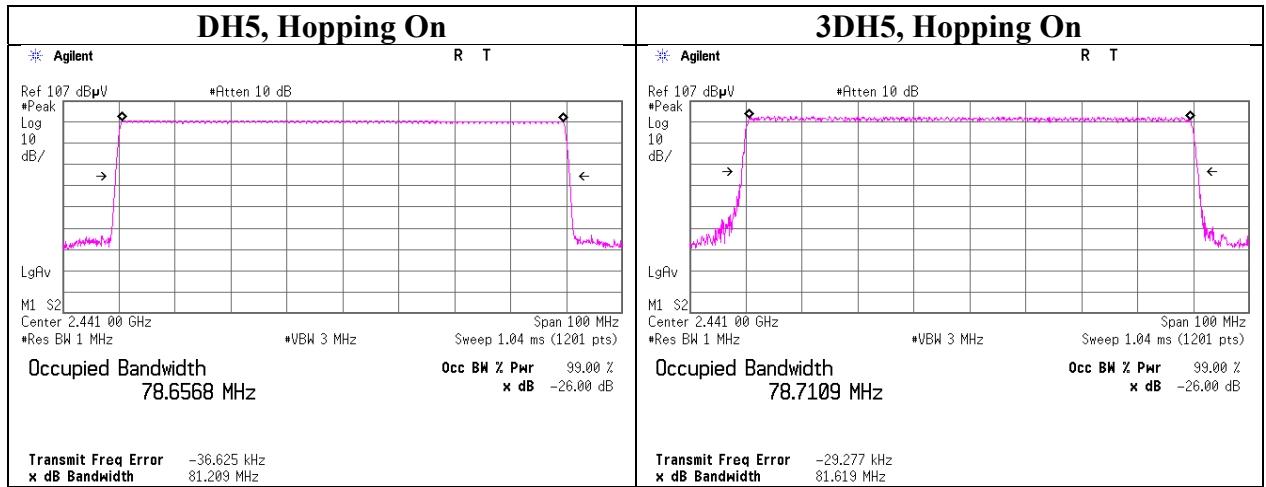
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Telephone : +81 596 24 8999

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99% Occupied Bandwidth

BT2



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Ise EMC Lab.

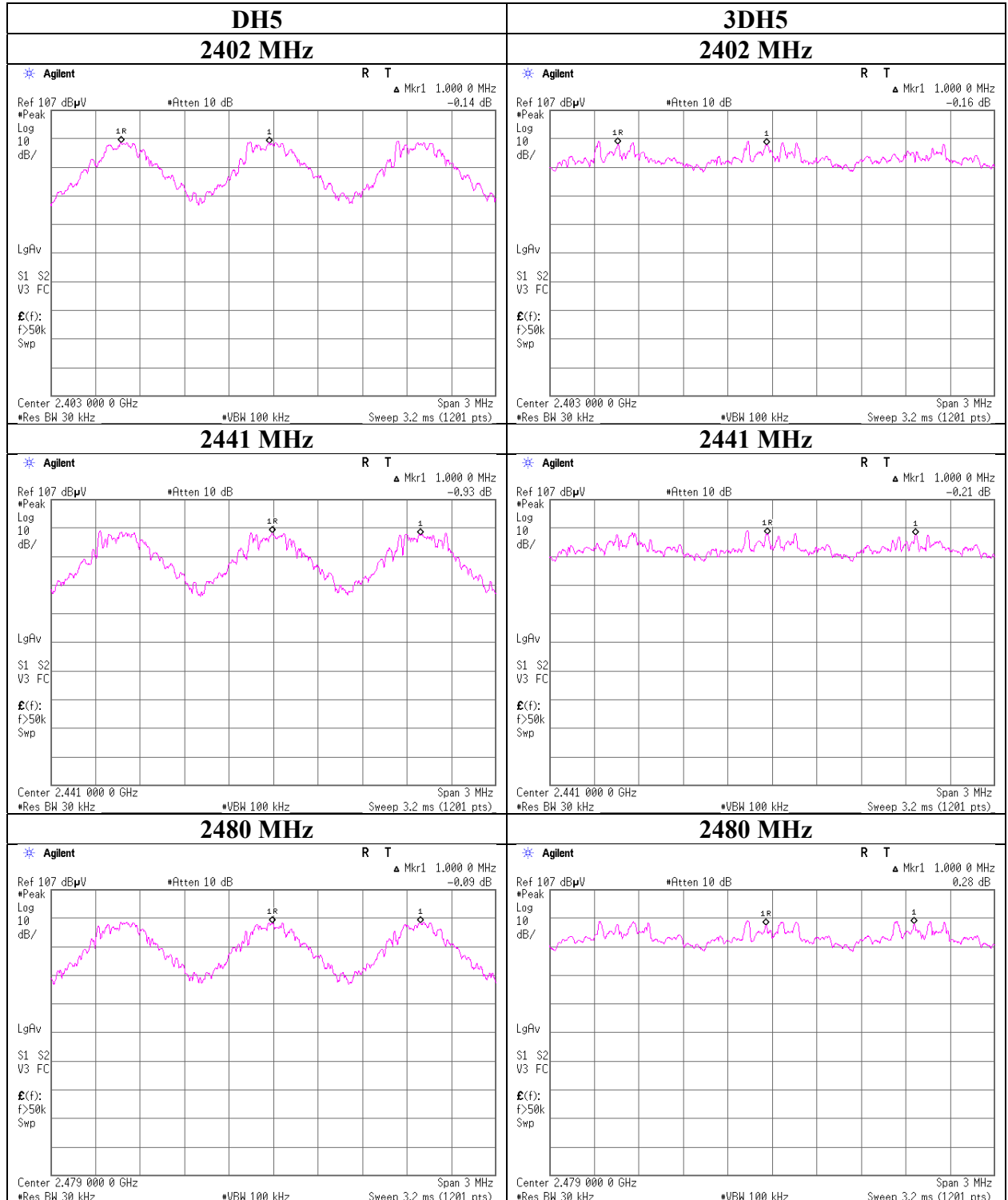
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Carrier Frequency Separation

BT1



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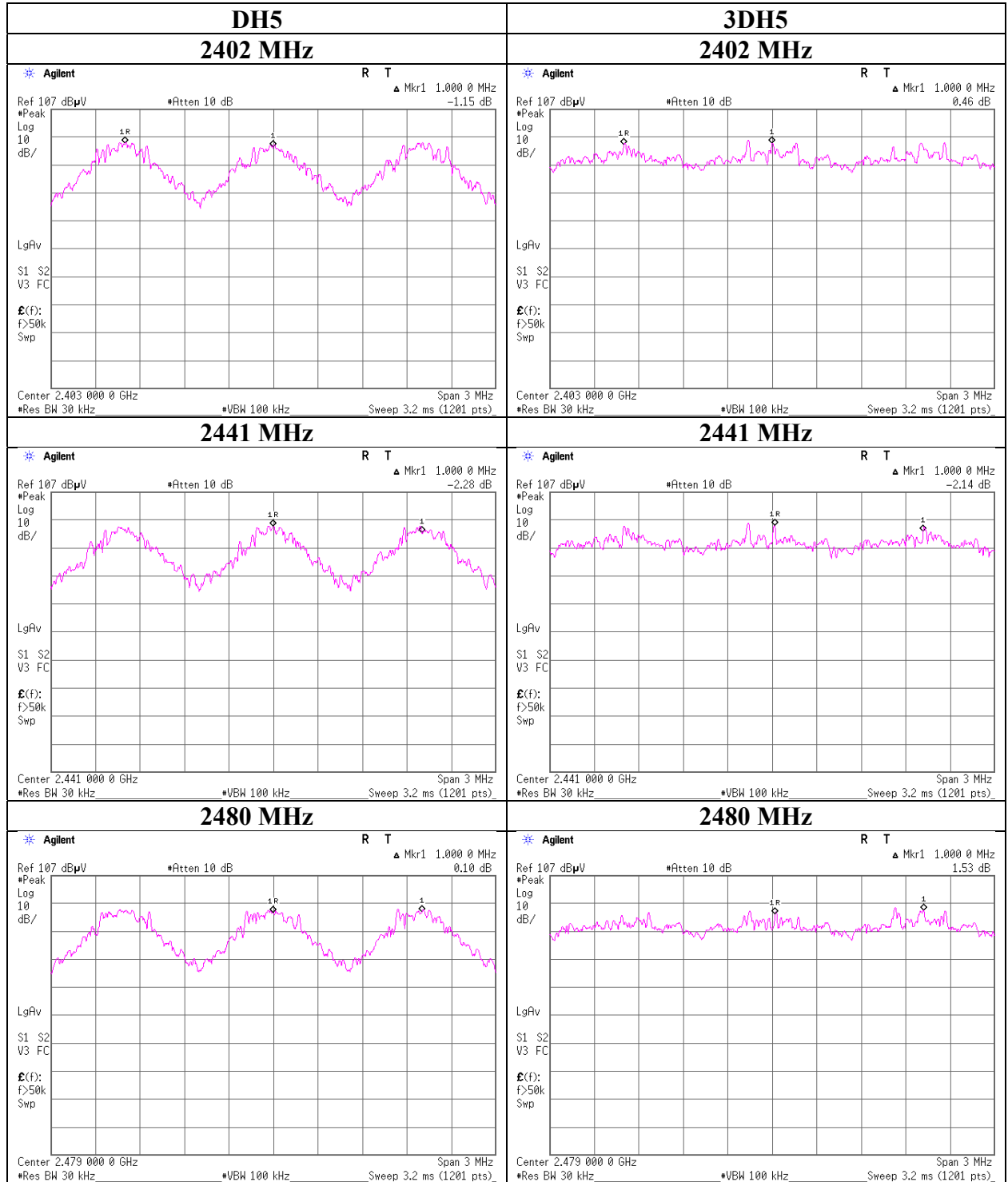
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Facsimile : +81 596 24 8124

Carrier Frequency Separation

BT2



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Number of Hopping Frequency

Report No. 13170804H
Test place Ise EMC Lab. No.3 Measurement Room
Date December 19, 2019 December 25, 2019
Temperature / Humidity 24 deg. C / 32 % RH 22 deg. C / 36 % RH
Engineer Takafumi Noguchi Koji Yamamoto
BT1 BT2
Mode Tx, Hopping On

BT1

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

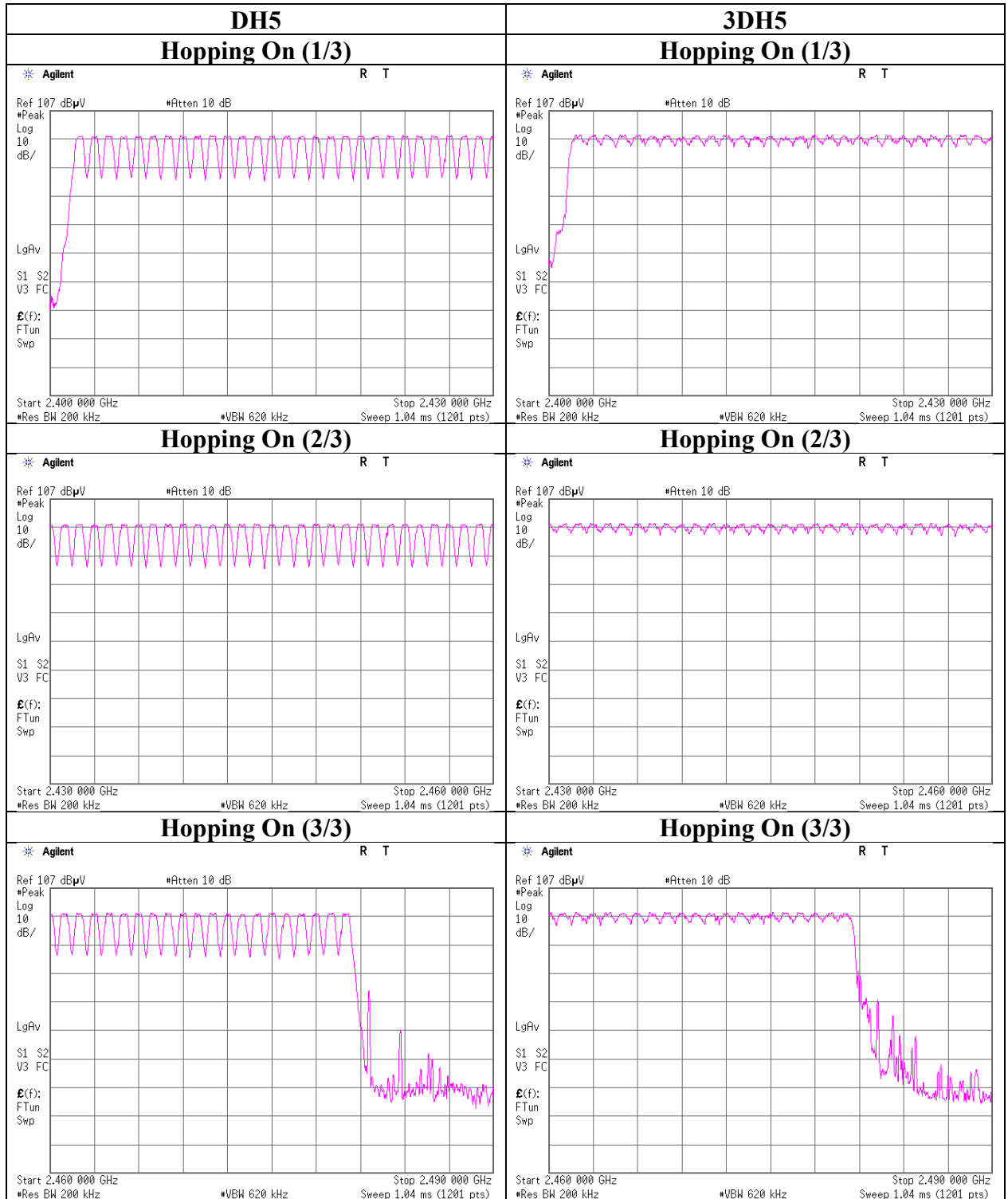
BT2

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



UL Japan, Inc.

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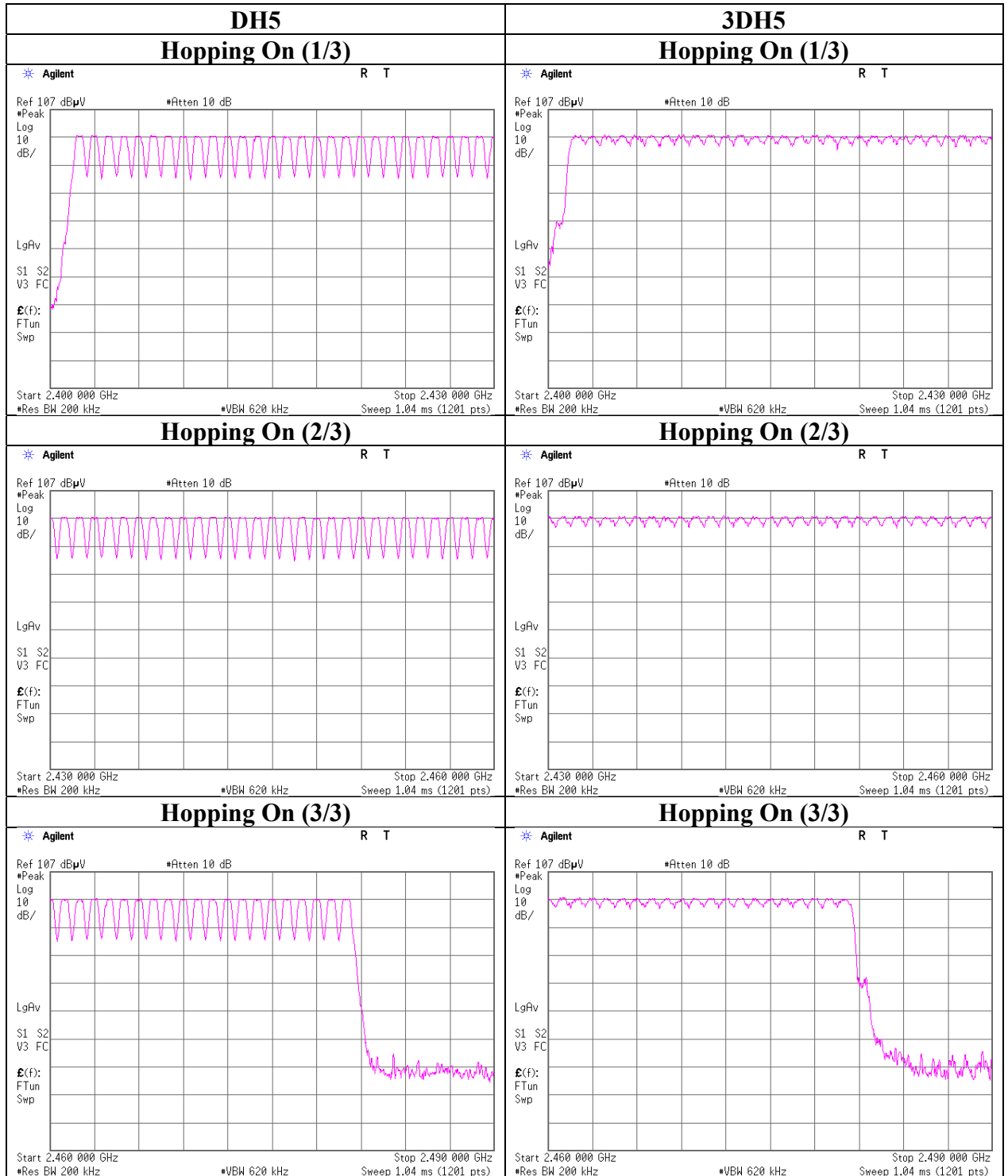
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Number of Hopping Frequency

BT2



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Dwell time

Report No. 13170804H
Test place Ise EMC Lab. No.3 Measurement Room
Date December 19, 2019 December 25, 2019
Temperature / Humidity 24 deg. C / 32 % RH 22 deg. C / 36 % RH
Engineer Takafumi Noguchi Koji Yamamoto
BT1
Mode Tx, Hopping On BT2

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	49.4 times / 5 sec. x 31.6 sec. = 313 times	0.390	122	400
DH3	26.0 times / 5 sec. x 31.6 sec. = 165 times	1.649	272	400
DH5	18.0 times / 5 sec. x 31.6 sec. = 114 times	2.907	331	400
3DH1	49.4 times / 5 sec. x 31.6 sec. = 313 times	0.391	122	400
3DH3	23.6 times / 5 sec. x 31.6 sec. = 150 times	1.644	247	400
3DH5	18.4 times / 5 sec. x 31.6 sec. = 117 times	2.903	340	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	50.0 times / 5 sec. x 31.6 sec. = 316 times	0.392	124	400
DH3	27.6 times / 5 sec. x 31.6 sec. = 175 times	1.659	290	400
DH5	21.0 times / 5 sec. x 31.6 sec. = 133 times	2.920	388	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	1.649	297	400
3DH5	19.6 times / 5 sec. x 31.6 sec. = 124 times	2.907	360	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	50	50	49	48	50	49.4
DH3	27	28	25	22	28	26
DH5	17	17	19	17	20	18
3DH1	50	49	50	50	48	49.4
3DH3	24	26	23	23	22	23.6
3DH5	16	21	19	17	19	18.4

BT2

*Average data of 5 tests.(except Inquiry)

Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	50	50	51	50	49	50
DH3	29	28	25	30	26	27.6
DH5	21	21	19	22	22	21
3DH1	51	50	50	50	50	50.2
3DH3	29	28	28	28	29	28.4
3DH5	21	19	19	20	19	19.6

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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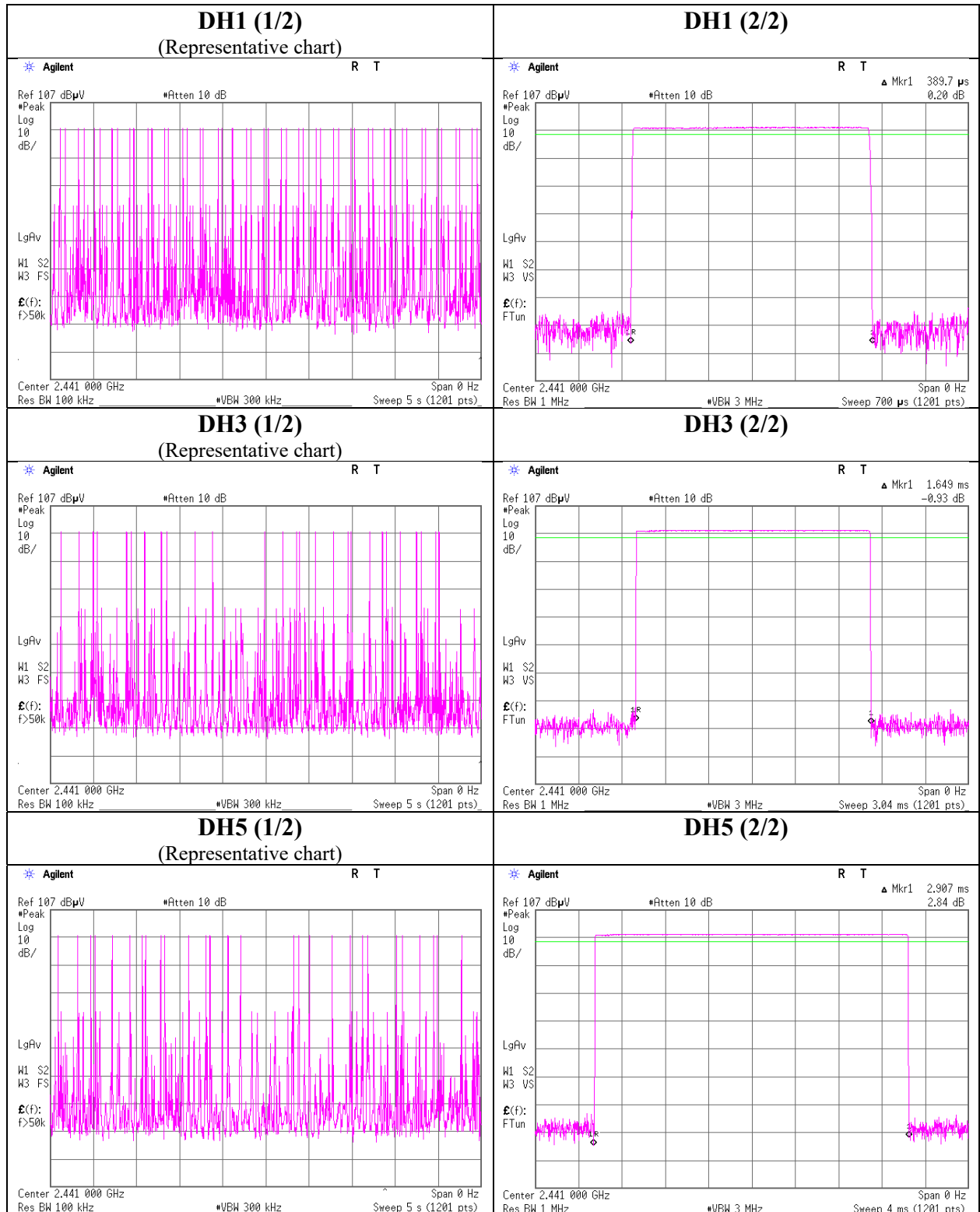
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Dwell time

BT1



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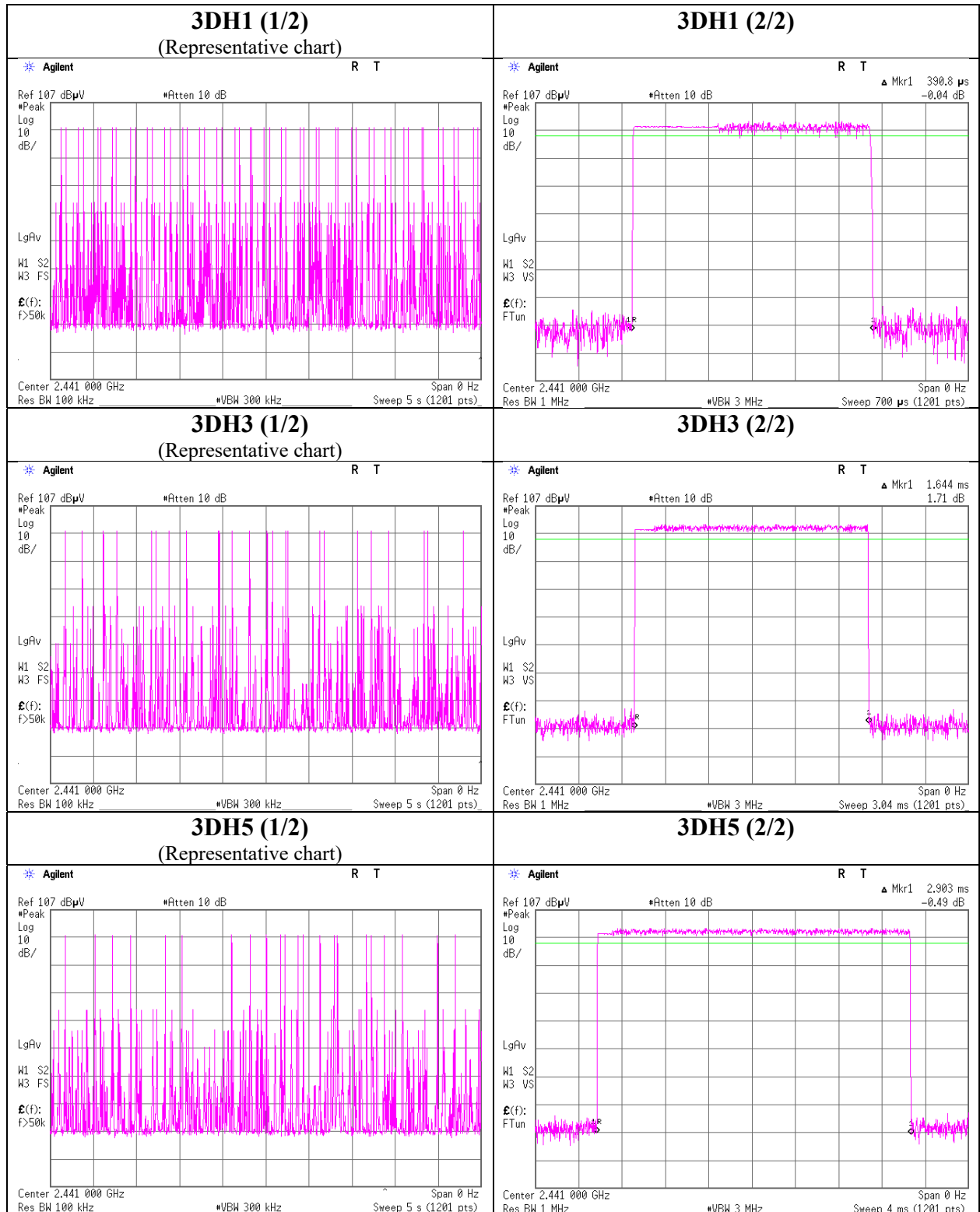
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Facsimile : +81 596 24 8124

Dwell time

BT1



UL Japan, Inc.

Ise EMC Lab.

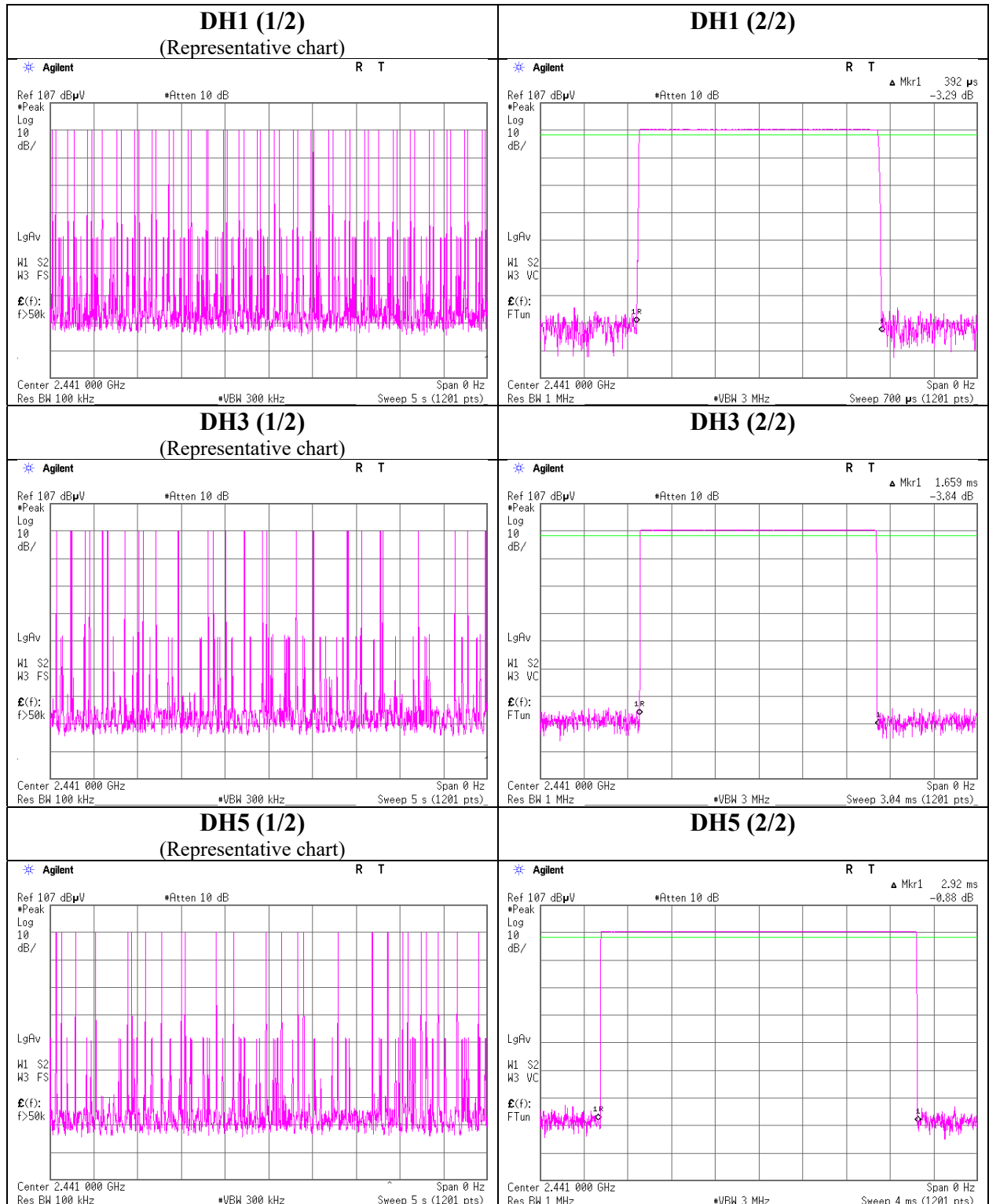
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Dwell time

BT2



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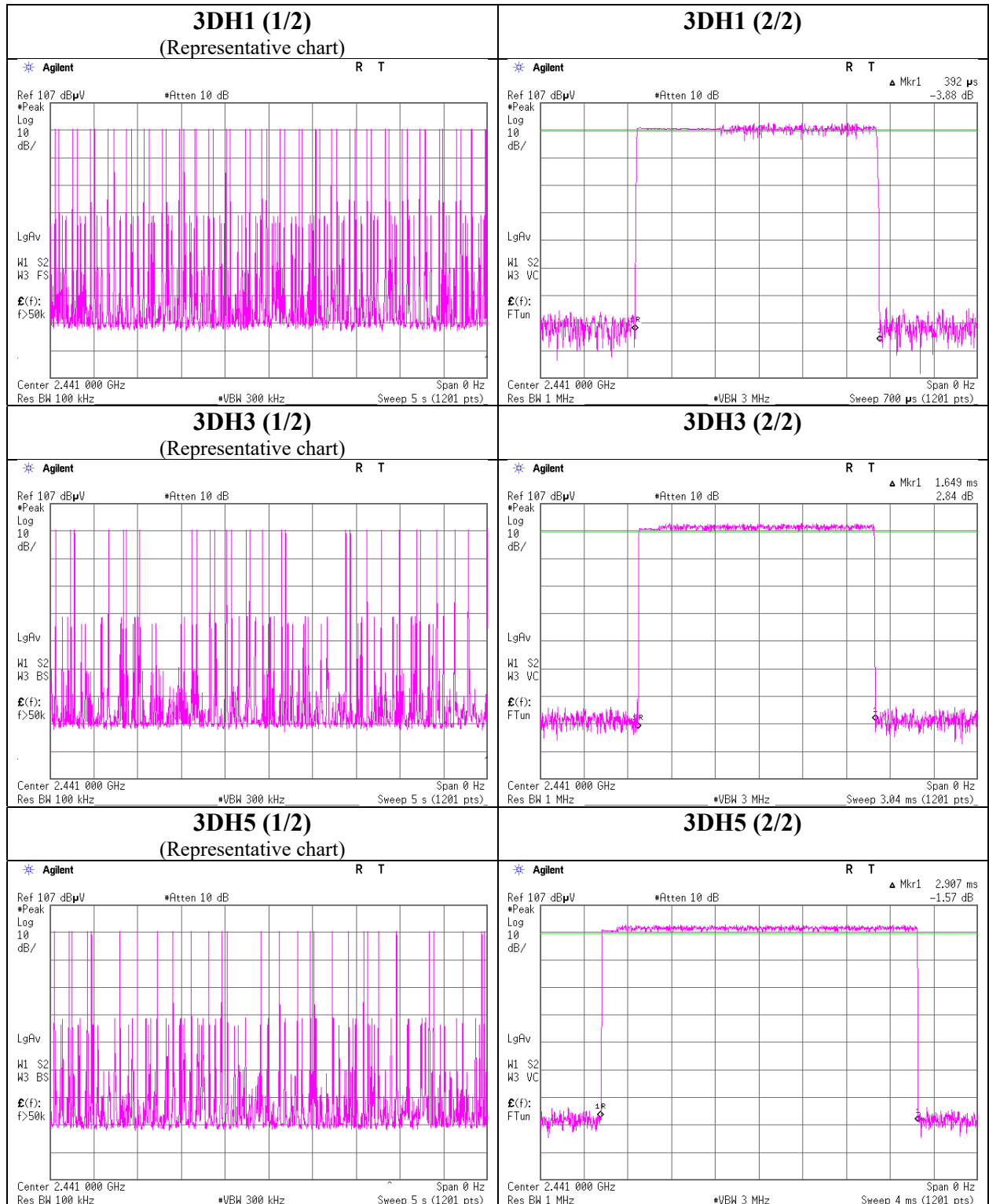
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Dwell time

BT2



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Maximum Peak Output Power

Report No. 13170804H
Test place Ise EMC Lab. No.3 Measurement Room
Date December 19, 2019
Temperature / Humidity 24 deg. C / 32 % RH
Engineer Takafumi Noguchi
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	Antenna Gain [dBi]	Result		Limit	
					[dBm]	[mW]	[dBm]	[mW]			[dBm]	[mW]	[dBm]	[mW]
DH5	2402.0	-8.75	0.50	9.73	1.48	1.41	20.96	125	19.48	5.80	7.28	5.35	36.02	4000
DH5	2441.0	-8.74	0.50	9.73	1.49	1.41	20.96	125	19.47	5.80	7.29	5.36	36.02	4000
DH5	2480.0	-8.77	0.50	9.73	1.46	1.40	20.96	125	19.50	5.80	7.26	5.32	36.02	4000
2DH5	2402.0	-6.55	0.50	9.73	3.68	2.33	20.96	125	17.28	5.80	9.48	8.87	36.02	4000
2DH5	2441.0	-6.57	0.50	9.73	3.66	2.32	20.96	125	17.30	5.80	9.46	8.83	36.02	4000
2DH5	2480.0	-6.68	0.50	9.73	3.55	2.26	20.96	125	17.41	5.80	9.35	8.61	36.02	4000
3DH5	2402.0	-6.27	0.50	9.73	3.96	2.49	20.96	125	17.00	5.80	9.76	9.46	36.02	4000
3DH5	2441.0	-6.33	0.50	9.73	3.90	2.45	20.96	125	17.06	5.80	9.70	9.33	36.02	4000
3DH5	2480.0	-6.44	0.50	9.73	3.79	2.39	20.96	125	17.17	5.80	9.59	9.10	36.02	4000

BT2					Conducted Power					e.i.r.p. for RSS-247				
Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin	Antenna Gain [dBi]	Result		Limit	
					[dBm]	[mW]	[dBm]	[mW]			[dBm]	[mW]	[dBm]	[mW]
DH5	2402.0	-8.33	0.50	9.99	2.16	1.64	20.96	125	18.80	5.80	7.96	6.25	36.02	4000
DH5	2441.0	-8.47	0.50	9.99	2.02	1.59	20.96	125	18.94	5.80	7.82	6.05	36.02	4000
DH5	2480.0	-8.56	0.50	9.99	1.93	1.56	20.96	125	19.03	5.80	7.73	5.93	36.02	4000
2DH5	2402.0	-6.25	0.50	9.99	4.24	2.65	20.96	125	16.72	5.80	10.04	10.09	36.02	4000
2DH5	2441.0	-6.35	0.50	9.99	4.14	2.59	20.96	125	16.82	5.80	9.94	9.86	36.02	4000
2DH5	2480.0	-6.52	0.50	9.99	3.97	2.49	20.96	125	16.99	5.80	9.77	9.48	36.02	4000
3DH5	2402.0	-6.03	0.50	9.99	4.46	2.79	20.96	125	16.50	5.80	10.26	10.62	36.02	4000
3DH5	2441.0	-6.12	0.50	9.99	4.37	2.74	20.96	125	16.59	5.80	10.17	10.40	36.02	4000
3DH5	2480.0	-6.28	0.50	9.99	4.21	2.64	20.96	125	16.75	5.80	10.01	10.02	36.02	4000

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.	13170804H
Test place	Ise EMC Lab. No.3 Measurement Room
Date	December 19, 2019
Temperature / Humidity	24 deg. C / 32 % RH
Engineer	Takafumi Noguchi
Mode	Tx, Hopping Off

BT1

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)	
					[dBm]	[mW]
DH5	2402.0	-10.23	0.50	9.73	0.00	1.00
DH5	2441.0	-10.22	0.50	9.73	0.01	1.00
DH5	2480.0	-10.24	0.50	9.73	-0.01	1.00
2DH5	2402.0	-10.10	0.50	9.73	0.13	1.03
2DH5	2441.0	-10.13	0.50	9.73	0.10	1.02
2DH5	2480.0	-10.17	0.50	9.73	0.06	1.01
3DH5	2402.0	-10.10	0.50	9.73	0.13	1.03
3DH5	2441.0	-10.13	0.50	9.73	0.10	1.02
3DH5	2480.0	-10.16	0.50	9.73	0.07	1.02

BT2

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)	
					[dBm]	[mW]
DH5	2402.0	-9.76	0.50	9.99	0.73	1.18
DH5	2441.0	-9.85	0.50	9.99	0.64	1.16
DH5	2480.0	-9.98	0.50	9.99	0.51	1.12
2DH5	2402.0	-9.70	0.50	9.99	0.79	1.20
2DH5	2441.0	-9.79	0.50	9.99	0.70	1.17
2DH5	2480.0	-9.92	0.50	9.99	0.57	1.14
3DH5	2402.0	-9.69	0.50	9.99	0.80	1.20
3DH5	2441.0	-9.80	0.50	9.99	0.69	1.17
3DH5	2480.0	-9.91	0.50	9.99	0.58	1.14

Sample Calculation:

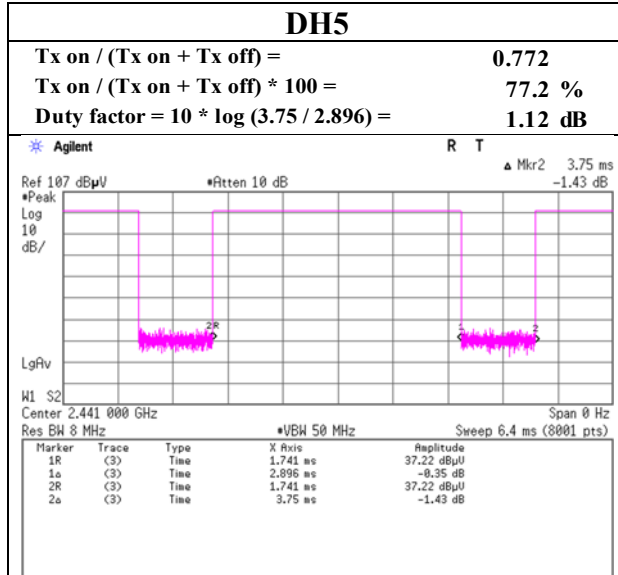
Result (Time average) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenu

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

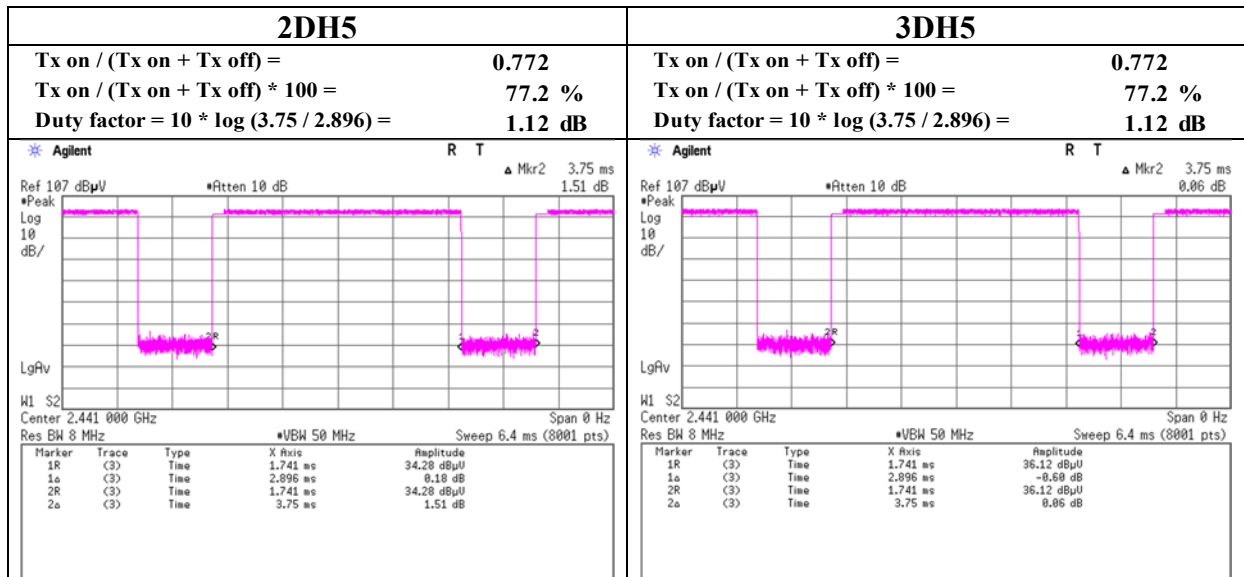
Burst Rate Confirmation

Report No. 13170804H
Test place Ise EMC Lab. No.3 Measurement Room
Date December 19, 2019
Temperature / Humidity 24 deg. C / 32 % RH
Engineer Takafumi Noguchi
Mode Tx, Hopping Off

BT1



BT1



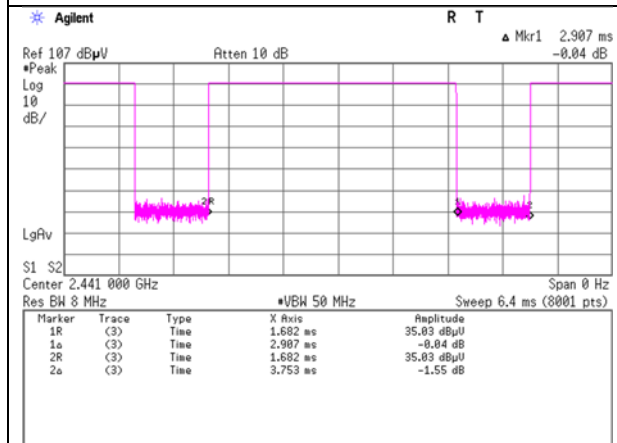
Burst Rate Confirmation

Report No. 13170804H
Test place Ise EMC Lab. No.3 Measurement Room
Date December 25, 2019
Temperature / Humidity 22 deg. C / 36 % RH
Engineer Koji Yamamoto
Mode Tx, Hopping Off

BT2

DH5

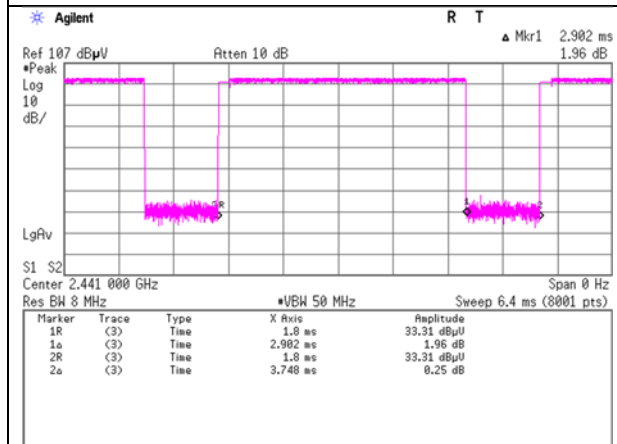
Tx on / (Tx on + Tx off) = 0.775
Tx on / (Tx on + Tx off) * 100 = 77.5 %
Duty factor = 10 * log (3.753 / 2.907) = 1.11 dB



BT2

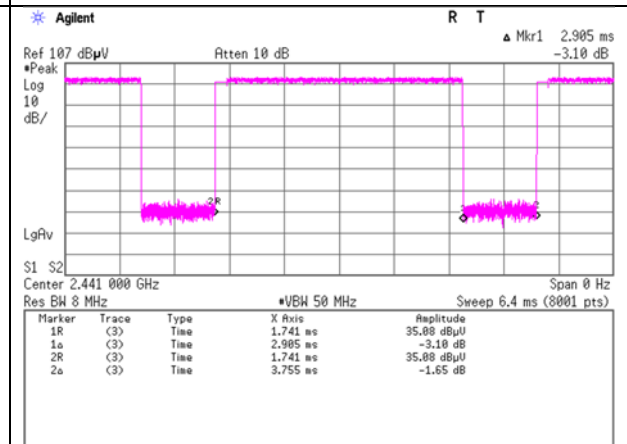
2DH5

Tx on / (Tx on + Tx off) = 0.774
Tx on / (Tx on + Tx off) * 100 = 77.4 %
Duty factor = 10 * log (3.748 / 2.902) = 1.11 dB



3DH5

Tx on / (Tx on + Tx off) = 0.774
Tx on / (Tx on + Tx off) * 100 = 77.4 %
Duty factor = 10 * log (3.755 / 2.905) = 1.11 dB



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Radiated Spurious Emission (PIFA Antenna BT1)

Report No.	13170804H			
Test place	Ise EMC Lab.			
Semi Anechoic Chamber	No.3	No.3	No.3	No.3
Date	December 22, 2019	January 8, 2020	January 9, 2020	January 14, 2020
Temperature / Humidity	23 deg. C / 43 % RH	23 deg. C / 35 % RH	22 deg. C / 34 % RH	22 deg. C / 30 % RH
Engineer	Akihiko Maeda (1 GHz -10 GHz)	Tomohisa Nakagawa (10 GHz - 18 GHz)	Junki Nagatomi (18 GHz - 26.5 GHz)	Junki Nagatomi (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.	60.804	QP	22.3	7.6	7.6	32.2	-	5.3	40.0	34.7	
Hori.	62.611	QP	22.5	7.3	7.6	32.2	-	5.2	40.0	34.8	
Hori.	100.425	QP	22.2	10.3	8.1	32.2	-	8.4	43.5	35.1	
Hori.	366.938	QP	21.5	15.0	10.5	31.9	-	15.0	46.0	31.0	
Hori.	548.055	QP	21.4	17.8	11.6	32.0	-	18.9	46.0	27.2	
Hori.	959.997	QP	26.8	22.2	13.8	30.6	-	32.1	46.0	13.9	
Hori.	2390.000	PK	52.6	27.7	5.4	32.8	-	52.9	73.9	21.0	
Hori.	2497.940	PK	47.0	27.4	5.5	32.7	-	47.2	73.9	26.7	
Hori.	4804.000	PK	41.3	31.6	7.5	31.8	-	48.6	73.9	25.3	Floor noise
Hori.	7206.000	PK	42.6	36.0	8.9	32.7	-	54.8	73.9	19.1	Floor noise
Hori.	9608.000	PK	42.3	38.5	9.4	33.3	-	56.9	73.9	17.0	Floor noise
Hori.	2390.000	AV	37.3	27.7	5.4	32.8	1.1	38.7	53.9	15.2	*1)
Hori.	2497.940	AV	38.3	27.4	5.5	32.7	1.1	39.6	53.9	14.3	*2)
Hori.	4804.000	AV	32.5	31.6	7.5	31.8	-	39.8	53.9	14.1	Floor noise
Hori.	7206.000	AV	33.9	36.0	8.9	32.7	-	46.1	53.9	7.8	Floor noise
Hori.	9608.000	AV	32.6	38.5	9.4	33.3	-	47.1	53.9	6.8	Floor noise
Vert.	60.084	QP	25.7	7.9	7.5	32.2	-	8.9	40.0	31.1	
Vert.	62.000	QP	25.7	7.4	7.6	32.2	-	8.5	40.0	31.5	
Vert.	100.424	QP	22.2	10.3	8.1	32.2	-	8.4	43.5	35.1	
Vert.	366.708	QP	21.5	15.0	10.4	31.9	-	15.0	46.0	31.0	
Vert.	548.382	QP	21.5	17.8	11.6	32.0	-	19.0	46.0	27.0	
Vert.	959.989	QP	24.5	22.2	13.8	30.6	-	29.8	46.0	16.2	
Vert.	2390.000	PK	53.5	27.7	5.4	32.8	-	53.9	73.9	20.1	
Vert.	2497.940	PK	46.6	27.4	5.5	32.7	-	46.8	73.9	27.1	
Vert.	4804.000	PK	42.2	31.6	7.5	31.8	-	49.4	73.9	24.5	Floor noise
Vert.	7206.000	PK	42.7	36.0	8.9	32.7	-	54.9	73.9	19.0	Floor noise
Vert.	9608.000	PK	41.6	38.5	9.4	33.3	-	56.2	73.9	17.7	Floor noise
Vert.	2390.000	AV	35.7	27.7	5.4	32.8	1.1	37.1	53.9	16.8	*1)
Vert.	2497.940	AV	36.4	27.4	5.5	32.7	1.1	37.7	53.9	16.2	*2)
Vert.	4804.000	AV	32.0	31.6	7.5	31.8	-	39.3	53.9	14.6	Floor noise
Vert.	7206.000	AV	31.9	36.0	8.9	32.7	-	44.1	53.9	9.8	Floor noise
Vert.	9608.000	AV	32.5	38.5	9.4	33.3	-	47.0	53.9	6.9	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 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	97.4	27.7	5.4	32.7	97.7	-	-	Carrier
Hori	2400.000	PK	45.8	27.7	5.4	32.7	46.1	77.7	31.6	
Vert	2402.000	PK	95.8	27.7	5.4	32.7	96.1	-	-	Carrier
Vert	2400.000	PK	41.9	27.7	5.4	32.7	42.2	76.1	33.9	

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

UL Japan, Inc.

Ise EMC Lab.

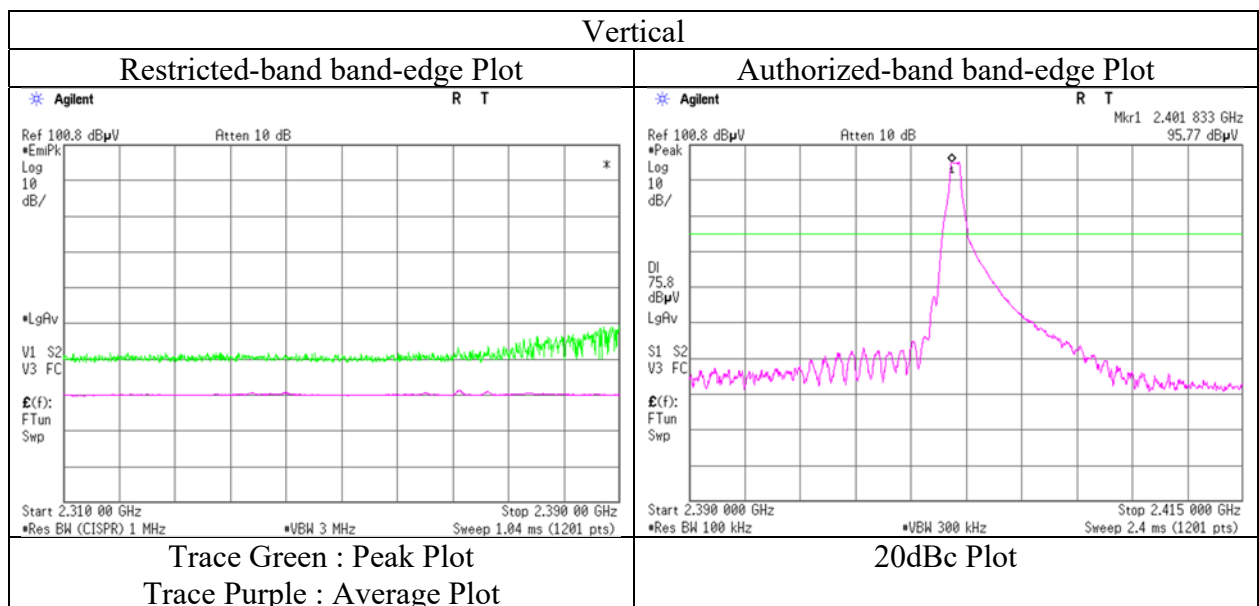
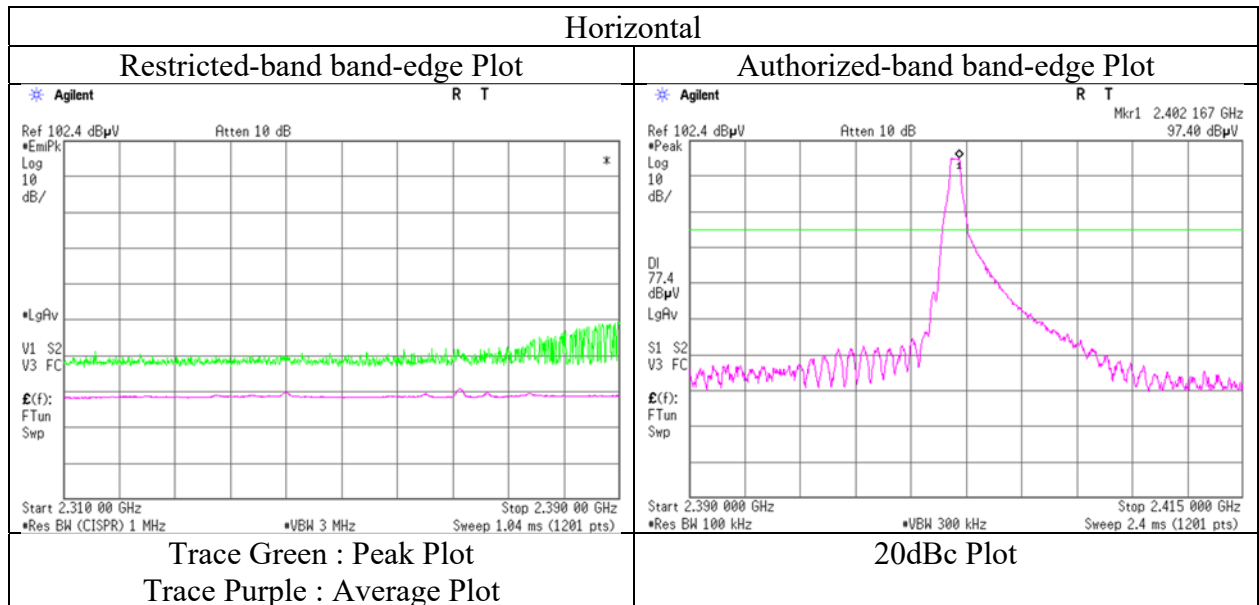
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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

Report No.	13170804H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	December 22, 2019
Temperature / Humidity	23 deg. C / 43 % RH
Engineer	Akihiko Maeda (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.

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Ise EMC Lab.

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Radiated Spurious Emission (PIFA Antenna BT1)

Report No.	13170804H			
Test place	Ise EMC Lab.			
Semi Anechoic Chamber	No.3	No.3	No.3	No.3
Date	December 22, 2019	January 8, 2020	January 9, 2020	January 14, 2020
Temperature / Humidity	23 deg. C / 43 % RH	23 deg. C / 35 % RH	22 deg. C / 34 % RH	22 deg. C / 30 % RH
Engineer	Akihiko Maeda (1 GHz - 10 GHz)	Tomohisa Nakagawa (10 GHz - 18 GHz)	Junki Nagatomi (18 GHz - 26.5 GHz)	Junki Nagatomi (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.	59.120	QP	22.8	8.1	7.5	32.2	-	6.3	40.0	33.8	
Hori.	62.650	QP	22.5	7.3	7.6	32.2	-	5.2	40.0	34.8	
Hori.	100.781	QP	22.2	10.3	8.1	32.2	-	8.5	43.5	35.1	
Hori.	366.938	QP	21.5	15.0	10.5	31.9	-	15.0	46.0	31.0	
Hori.	548.055	QP	21.4	17.8	11.6	32.0	-	18.9	46.0	27.2	
Hori.	959.891	QP	26.7	22.2	13.8	30.6	-	32.0	46.0	14.0	
Hori.	2342.717	PK	48.1	27.8	5.4	32.8	-	48.5	73.9	25.4	
Hori.	4882.000	PK	40.9	31.5	7.5	31.8	-	48.2	73.9	25.7	Floor noise
Hori.	7323.000	PK	41.7	36.2	8.9	32.7	-	54.0	73.9	19.9	Floor noise
Hori.	9764.000	PK	42.3	38.8	9.4	33.4	-	57.1	73.9	16.8	Floor noise
Hori.	2342.717	AV	40.3	27.8	5.4	32.8	1.1	41.8	53.9	12.2	*1)
Hori.	4882.000	AV	32.4	31.5	7.5	31.8	-	39.7	53.9	14.2	Floor noise
Hori.	7323.000	AV	33.9	36.2	8.9	32.7	-	46.2	53.9	7.7	Floor noise
Hori.	9764.000	AV	32.4	38.8	9.4	33.4	-	47.3	53.9	6.7	Floor noise
Vert.	60.804	QP	24.3	7.6	7.6	32.2	-	7.3	40.0	32.7	
Vert.	62.602	QP	28.3	7.3	7.6	32.2	-	11.0	40.0	29.0	
Vert.	100.321	QP	22.3	10.3	8.1	32.2	-	8.5	43.5	35.0	
Vert.	366.732	QP	21.5	15.0	10.4	31.9	-	15.0	46.0	31.0	
Vert.	548.323	QP	21.5	17.8	11.6	32.0	-	19.0	46.0	27.0	
Vert.	959.990	QP	24.4	22.2	13.8	30.6	-	29.7	46.0	16.3	
Vert.	2342.717	PK	46.1	27.8	5.4	32.8	-	46.5	73.9	27.4	
Vert.	4882.000	PK	41.2	31.5	7.5	31.8	-	48.5	73.9	25.4	Floor noise
Vert.	7323.000	PK	42.4	36.2	8.9	32.7	-	54.8	73.9	19.1	Floor noise
Vert.	9764.000	PK	42.2	38.8	9.4	33.4	-	57.0	73.9	16.9	Floor noise
Vert.	2342.717	AV	38.3	27.8	5.4	32.8	1.1	39.8	53.9	14.1	*1)
Vert.	4882.000	AV	32.4	31.5	7.5	31.8	-	39.7	53.9	14.3	Floor noise
Vert.	7323.000	AV	33.8	36.2	8.9	32.7	-	46.2	53.9	7.7	Floor noise
Vert.	9764.000	AV	32.5	38.8	9.4	33.4	-	47.3	53.9	6.6	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) Noise synchronized with duty of carrier frequency.

Radiated Spurious Emission (PIFA Antenna BT1)

Report No.	13170804H			
Test place	Ise EMC Lab.			
Semi Anechoic Chamber	No.3	No.3	No.3	No.3
Date	December 22, 2019	January 8, 2020	January 9, 2020	January 14, 2020
Temperature / Humidity	23 deg. C / 43 % RH	23 deg. C / 35 % RH	22 deg. C / 34 % RH	22 deg. C / 30 % RH
Engineer	Akihiko Maeda (1 GHz - 10 GHz)	Tomohisa Nakagawa (10 GHz - 18 GHz)	Junki Nagatomi (18 GHz - 26.5 GHz)	Junki Nagatomi (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.	59.120	QP	22.8	8.1	7.5	32.2	-	6.3	40.0	33.8	
Hori.	62.650	QP	22.5	7.3	7.6	32.2	-	5.2	40.0	34.8	
Hori.	100.781	QP	22.2	10.3	8.1	32.2	-	8.5	43.5	35.1	
Hori.	366.938	QP	21.5	15.0	10.5	31.9	-	15.0	46.0	31.0	
Hori.	548.055	QP	21.4	17.8	11.6	32.0	-	18.9	46.0	27.2	
Hori.	959.891	QP	26.7	22.2	13.8	30.6	-	32.0	46.0	14.0	
Hori.	2378.576	PK	48.3	27.7	5.4	32.8	-	48.6	73.9	25.3	
Hori.	2483.500	PK	68.4	27.5	5.5	32.7	-	68.6	73.9	5.3	
Hori.	4960.000	PK	41.1	31.6	7.5	31.8	-	48.4	73.9	25.5	Floor noise
Hori.	7440.000	PK	42.5	36.3	8.9	32.7	-	55.0	73.9	18.9	Floor noise
Hori.	9920.000	PK	42.9	38.9	9.4	33.4	-	57.8	73.9	16.1	Floor noise
Hori.	2378.576	AV	40.6	27.7	5.4	32.8	1.1	42.0	53.9	11.9	*2)
Hori.	2483.500	AV	47.2	27.5	5.5	32.7	1.1	48.6	53.9	5.3	*1)
Hori.	4960.000	AV	32.6	31.6	7.5	31.8	-	39.9	53.9	14.0	Floor noise
Hori.	7440.000	AV	34.3	36.3	8.9	32.7	-	46.8	53.9	7.1	Floor noise
Hori.	9920.000	AV	32.4	38.9	9.4	33.4	-	47.3	53.9	6.6	Floor noise
Vert.	60.804	QP	24.3	7.6	7.6	32.2	-	7.3	40.0	32.7	
Vert.	62.602	QP	28.3	7.3	7.6	32.2	-	11.0	40.0	29.0	
Vert.	100.321	QP	22.3	10.3	8.1	32.2	-	8.5	43.5	35.0	
Vert.	366.732	QP	21.5	15.0	10.4	31.9	-	15.0	46.0	31.0	
Vert.	548.323	QP	21.5	17.8	11.6	32.0	-	19.0	46.0	27.0	
Vert.	959.990	QP	24.4	22.2	13.8	30.6	-	29.7	46.0	16.3	
Vert.	2378.576	PK	46.9	27.7	5.4	32.8	-	47.2	73.9	26.7	
Vert.	2483.500	PK	67.5	27.5	5.5	32.7	-	67.7	73.9	6.2	
Vert.	4960.000	PK	41.8	31.6	7.5	31.8	-	49.0	73.9	24.9	Floor noise
Vert.	7440.000	PK	43.1	36.3	8.9	32.7	-	55.6	73.9	18.3	Floor noise
Vert.	9920.000	PK	42.9	38.9	9.4	33.4	-	57.8	73.9	16.1	Floor noise
Vert.	2378.576	AV	38.6	27.7	5.4	32.8	1.1	40.1	53.9	13.8	*2)
Vert.	2483.500	AV	46.1	27.5	5.5	32.7	1.1	47.4	53.9	6.5	*1)
Vert.	4960.000	AV	32.3	31.6	7.5	31.8	-	39.6	53.9	14.3	Floor noise
Vert.	7440.000	AV	34.5	36.3	8.9	32.7	-	47.0	53.9	6.9	Floor noise
Vert.	9920.000	AV	32.4	38.9	9.4	33.4	-	47.3	53.9	6.6	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).

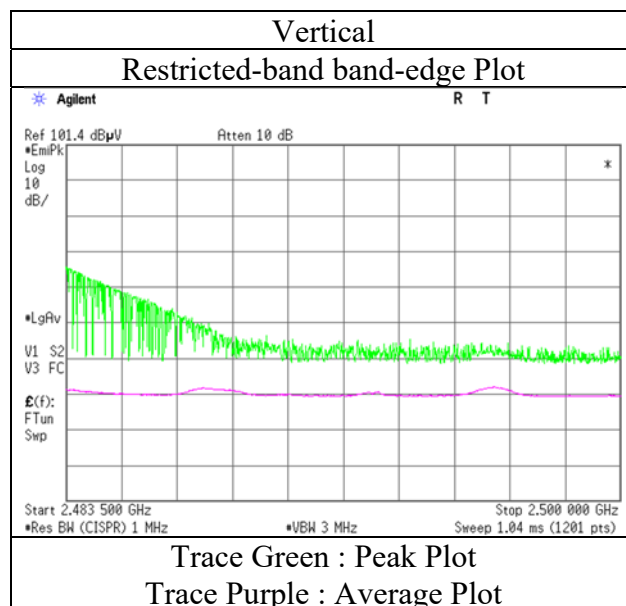
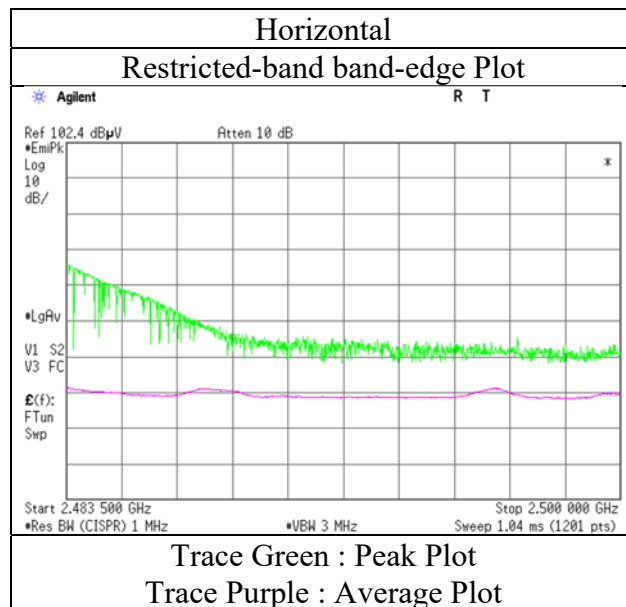
Distance factor: 1 GHz - 10 GHz 20log (3.95 m / 3.0 m) = 2.39 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

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

*2) Noise synchronized with duty of carrier frequency.

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

Report No.	13170804H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	December 22, 2019
Temperature / Humidity	23 deg. C / 43 % RH
Engineer	Akihiko Maeda (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 (PIFA Antenna BT1)

Report No. 13170804H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date December 22, 2019 No.3
Temperature / Humidity 23 deg. C / 43 % RH 23 deg. C / 35 % RH No.3
Engineer Akihiko Maeda Tomohisa Nakagawa January 9, 2020 No.3
(1 GHz - 10 GHz) (10 GHz - 18 GHz) January 14, 2020
Mode Tx, Hopping Off, 3DH5 2402 MHz (18 GHz - 26.5 GHz) 22 deg. C / 30 % RH
Junki Nagatomi
(Below 1 GHz)

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.	60.812	QP	22.3	7.6	7.6	32.2	-	5.3	40.0	34.7	
Hori.	62.221	QP	24.0	7.4	7.6	32.2	-	6.7	40.0	33.3	
Hori.	99.910	QP	22.2	10.2	8.1	32.2	-	8.3	43.5	35.2	
Hori.	368.170	QP	21.6	15.0	10.5	31.9	-	15.2	46.0	30.9	
Hori.	548.120	QP	21.5	17.8	11.6	32.0	-	19.0	46.0	27.1	
Hori.	959.992	QP	25.7	22.2	13.8	30.6	-	31.0	46.0	15.0	
Hori.	2390.000	PK	44.6	27.7	5.4	32.8	-	44.9	73.9	29.0	
Hori.	4804.000	PK	41.2	31.6	7.5	31.8	-	48.5	73.9	25.4	Floor noise
Hori.	7206.000	PK	43.0	36.0	8.9	32.7	-	55.2	73.9	18.7	Floor noise
Hori.	9608.000	PK	41.8	38.5	9.4	33.3	-	56.4	73.9	17.5	Floor noise
Hori.	2390.000	AV	34.1	27.7	5.4	32.8	1.1	35.5	53.9	18.4	*1)
Hori.	4804.000	AV	32.4	31.6	7.5	31.8	-	39.7	53.9	14.2	Floor noise
Hori.	7206.000	AV	33.8	36.0	8.9	32.7	-	46.0	53.9	7.9	Floor noise
Hori.	9608.000	AV	32.3	38.5	9.4	33.3	-	46.9	53.9	7.0	Floor noise
Vert.	60.804	QP	24.3	7.6	7.6	32.2	-	7.3	40.0	32.7	
Vert.	62.642	QP	27.8	7.3	7.6	32.2	-	10.5	40.0	29.5	
Vert.	99.278	QP	22.8	10.1	8.1	32.2	-	8.9	43.5	34.7	
Vert.	367.023	QP	21.5	15.0	10.5	31.9	-	15.0	46.0	31.0	
Vert.	547.983	QP	21.5	17.8	11.6	32.0	-	19.0	46.0	27.1	
Vert.	959.997	QP	23.8	22.2	13.8	30.6	-	29.1	46.0	16.9	
Vert.	2390.000	PK	43.7	27.7	5.4	32.8	-	44.0	73.9	29.9	
Vert.	4804.000	PK	41.1	31.6	7.5	31.8	-	48.4	73.9	25.5	Floor noise
Vert.	7206.000	PK	42.3	36.0	8.9	32.7	-	54.5	73.9	19.4	Floor noise
Vert.	9608.000	PK	41.9	38.5	9.4	33.3	-	56.5	73.9	17.4	Floor noise
Vert.	2390.000	AV	33.8	27.7	5.4	32.8	1.1	35.3	53.9	18.6	*1)
Vert.	4804.000	AV	32.4	31.6	7.5	31.8	-	39.6	53.9	14.3	Floor noise
Vert.	7206.000	AV	34.3	36.0	8.9	32.7	-	46.5	53.9	7.4	Floor noise
Vert.	9608.000	AV	32.5	38.5	9.4	33.3	-	47.1	53.9	6.8	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)

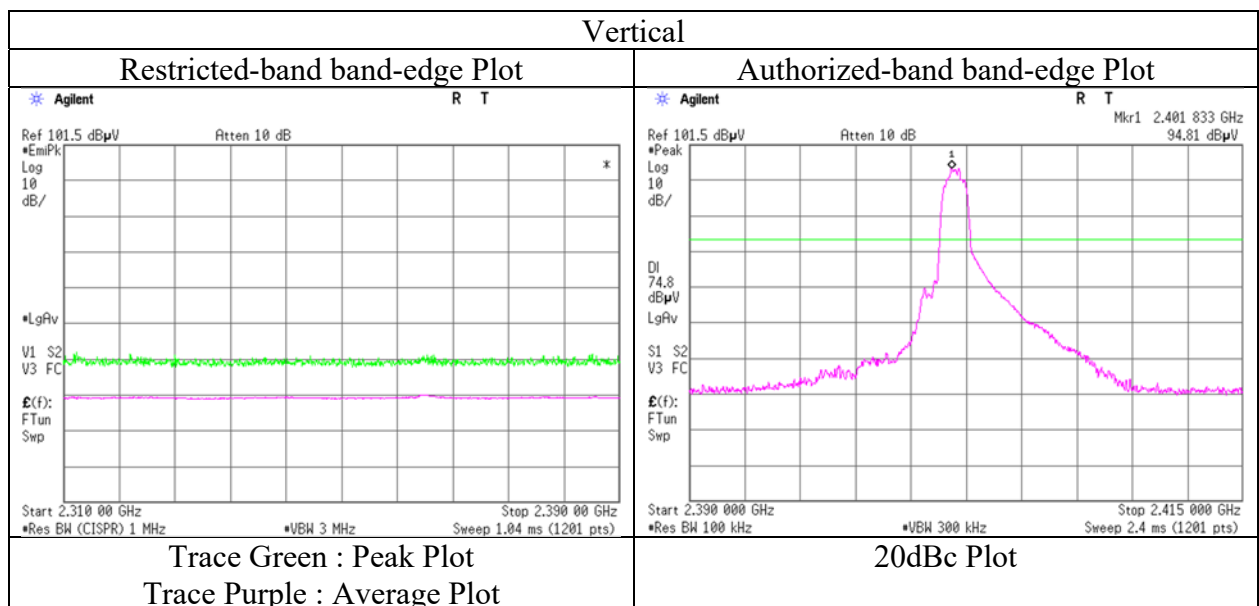
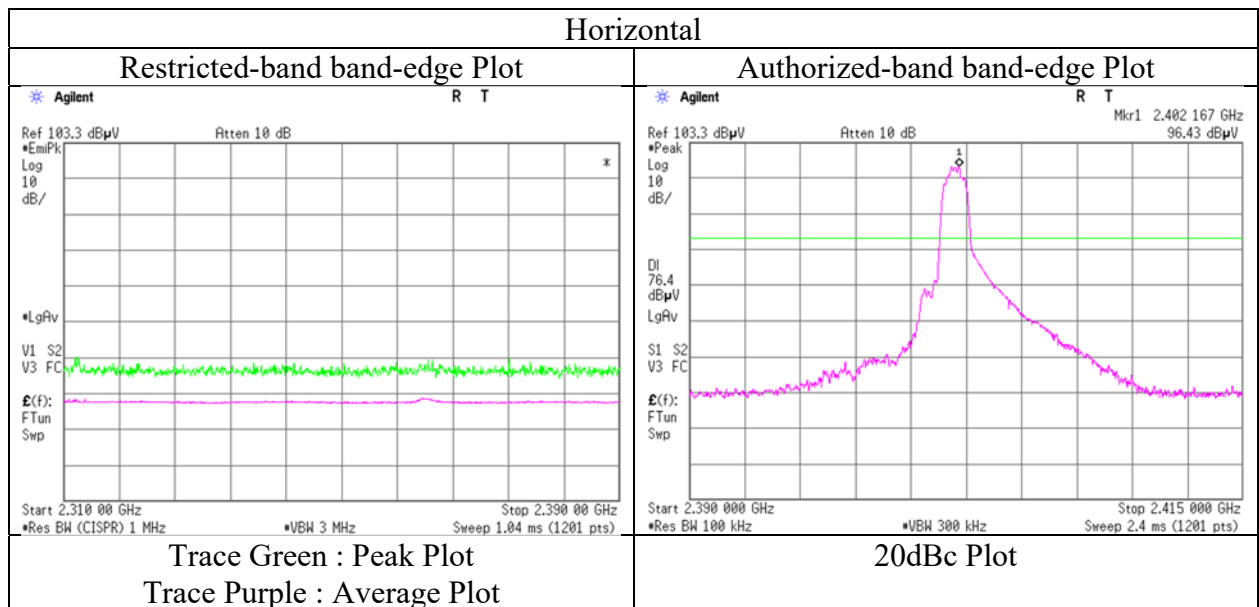
20dBc Data Sheet

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	96.4	27.7	5.4	32.7	96.8	-	-	Carrier
Hori	2400.000	PK	46.8	27.7	5.4	32.7	47.2	76.8	29.6	
Vert	2402.000	PK	94.8	27.7	5.4	32.7	95.2	-	-	Carrier
Vert	2400.000	PK	45.5	27.7	5.4	32.7	45.8	75.2	29.3	

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

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

Report No.	13170804H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	December 22, 2019
Temperature / Humidity	23 deg. C / 43 % RH
Engineer	Akihiko Maeda (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.

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Radiated Spurious Emission (PIFA Antenna BT1)

Report No.	13170804H			
Test place	Ise EMC Lab.			
Semi Anechoic Chamber	No.3	No.3	No.3	No.3
Date	December 22, 2019	January 8, 2020	January 9, 2020	January 14, 2020
Temperature / Humidity	23 deg. C / 43 % RH	23 deg. C / 35 % RH	22 deg. C / 34 % RH	22 deg. C / 30 % RH
Engineer	Akihiko Maeda (1 GHz -10 GHz)	Tomohisa Nakagawa (10 GHz - 18 GHz)	Junki Nagatomi (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.	60.792	QP	22.3	7.6	7.6	32.2	-	5.3	40.0	34.7	
Hori.	62.632	QP	24.1	7.3	7.6	32.2	-	6.8	40.0	33.2	
Hori.	100.120	QP	22.3	10.2	8.1	32.2	-	8.5	43.5	35.0	
Hori.	367.003	QP	21.6	15.0	10.5	31.9	-	15.1	46.0	30.9	
Hori.	548.089	QP	21.5	17.8	11.6	32.0	-	19.0	46.0	27.1	
Hori.	959.991	QP	25.7	22.2	13.8	30.6	-	31.0	46.0	15.0	
Hori.	4882.000	PK	41.2	31.5	7.5	31.8	-	48.5	73.9	25.4	Floor noise
Hori.	7323.000	PK	41.6	36.2	8.9	32.7	-	54.0	73.9	19.9	Floor noise
Hori.	9764.000	PK	42.3	38.8	9.4	33.4	-	57.1	73.9	16.8	Floor noise
Hori.	4882.000	AV	32.2	31.5	7.5	31.8	-	39.4	53.9	14.5	Floor noise
Hori.	7323.000	AV	33.7	36.2	8.9	32.7	-	46.1	53.9	7.8	Floor noise
Hori.	9764.000	AV	32.3	38.8	9.4	33.4	-	47.2	53.9	6.8	Floor noise
Vert.	60.810	QP	24.3	7.6	7.6	32.2	-	7.3	40.0	32.7	
Vert.	62.623	QP	27.7	7.3	7.6	32.2	-	10.4	40.0	29.6	
Vert.	99.567	QP	22.8	10.2	8.1	32.2	-	8.9	43.5	34.6	
Vert.	367.032	QP	21.5	15.0	10.5	31.9	-	15.0	46.0	31.0	
Vert.	548.055	QP	21.5	17.8	11.6	32.0	-	19.0	46.0	27.1	
Vert.	960.021	QP	23.9	22.2	13.8	30.6	-	29.2	54.0	24.8	
Vert.	4882.000	PK	40.7	31.5	7.5	31.8	-	48.0	73.9	25.9	Floor noise
Vert.	7323.000	PK	42.8	36.2	8.9	32.7	-	55.1	73.9	18.8	Floor noise
Vert.	9764.000	PK	42.3	38.8	9.4	33.4	-	57.1	73.9	16.8	Floor noise
Vert.	4882.000	AV	32.4	31.5	7.5	31.8	-	39.6	53.9	14.3	Floor noise
Vert.	7323.000	AV	33.7	36.2	8.9	32.7	-	46.0	53.9	7.9	Floor noise
Vert.	9764.000	AV	32.2	38.8	9.4	33.4	-	47.0	53.9	6.9	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 (PIFA Antenna BT1)

Report No.	13170804H			
Test place	Ise EMC Lab.			
Semi Anechoic Chamber	No.3	No.3	No.3	No.3
Date	December 22, 2019	January 8, 2020	January 9, 2020	January 14, 2020
Temperature / Humidity	23 deg. C / 43 % RH	23 deg. C / 35 % RH	22 deg. C / 34 % RH	22 deg. C / 30 % RH
Engineer	Akihiko Maeda (1 GHz - 10 GHz)	Tomohisa Nakagawa (10 GHz - 18 GHz)	Junki Nagatomi (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.	60.784	QP	22.3	7.6	7.6	32.2	-	5.3	40.0	34.7	
Hori.	62.642	QP	24.2	7.3	7.6	32.2	-	6.9	40.0	33.1	
Hori.	99.989	QP	22.3	10.2	8.1	32.2	-	8.5	43.5	35.1	
Hori.	357.012	QP	21.6	15.0	10.4	31.9	-	15.1	46.0	30.9	
Hori.	548.062	QP	21.5	17.8	11.6	32.0	-	19.0	46.0	27.1	
Hori.	959.989	QP	25.6	22.2	13.8	30.6	-	30.9	46.0	15.1	
Hori.	2483.500	PK	69.8	27.5	5.5	32.7	-	70.0	73.9	3.9	
Hori.	4960.000	PK	41.4	31.6	7.5	31.8	-	48.7	73.9	25.2	Floor noise
Hori.	7440.000	PK	43.0	36.3	8.9	32.7	-	55.5	73.9	18.4	Floor noise
Hori.	9920.000	PK	42.1	38.9	9.4	33.4	-	57.0	73.9	16.9	Floor noise
Hori.	2483.500	AV	47.6	27.5	5.5	32.7	1.1	48.9	53.9	5.0	*1)
Hori.	4960.000	AV	32.3	31.6	7.5	31.8	-	39.5	53.9	14.4	Floor noise
Hori.	7440.000	AV	34.4	36.3	8.9	32.7	-	46.9	53.9	7.0	Floor noise
Hori.	9920.000	AV	32.3	38.9	9.4	33.4	-	47.2	53.9	6.7	Floor noise
Vert.	60.821	QP	24.3	7.6	7.6	32.2	-	7.3	40.0	32.7	
Vert.	62.611	QP	27.6	7.3	7.6	32.2	-	10.3	40.0	29.7	
Vert.	100.023	QP	22.8	10.2	8.1	32.2	-	9.0	43.5	34.6	
Vert.	367.022	QP	21.5	15.0	10.5	31.9	-	15.0	46.0	31.0	
Vert.	548.061	QP	21.5	17.8	11.6	32.0	-	19.0	46.0	27.1	
Vert.	960.002	QP	23.8	22.2	13.8	30.6	-	29.1	54.0	24.9	
Vert.	2483.500	PK	67.0	27.5	5.5	32.7	-	67.3	73.9	6.6	
Vert.	4960.000	PK	41.2	31.6	7.5	31.8	-	48.5	73.9	25.4	Floor noise
Vert.	7440.000	PK	42.6	36.3	8.9	32.7	-	55.0	73.9	18.9	Floor noise
Vert.	9920.000	PK	42.8	38.9	9.4	33.4	-	57.7	73.9	16.2	Floor noise
Vert.	2483.500	AV	45.2	27.5	5.5	32.7	1.1	46.5	53.9	7.4	*1)
Vert.	4960.000	AV	32.4	31.6	7.5	31.8	-	39.7	53.9	14.2	Floor noise
Vert.	7440.000	AV	34.4	36.3	8.9	32.7	-	46.9	53.9	7.1	Floor noise
Vert.	9920.000	AV	32.3	38.9	9.4	33.4	-	47.2	53.9	6.7	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 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)

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Ise EMC Lab.

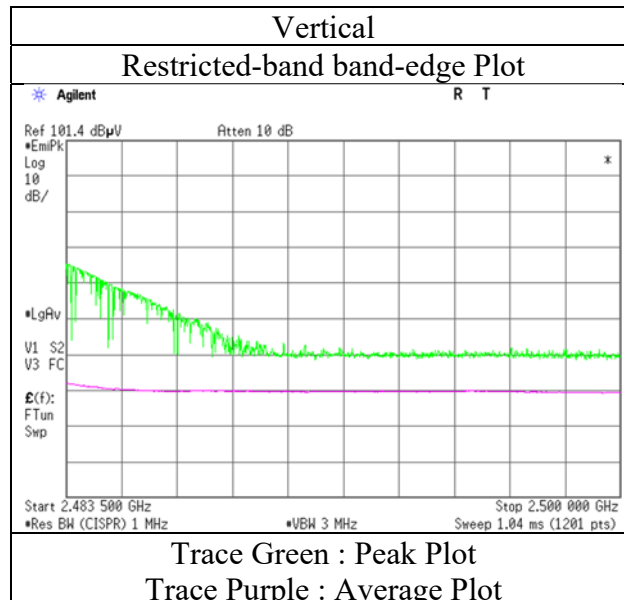
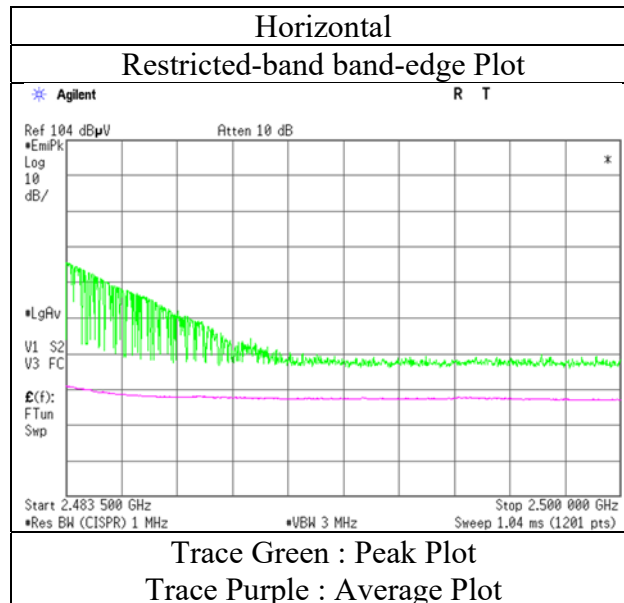
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Radiated Spurious Emission (Reference Plot for band-edge) (PIFA Antenna BT1)

Report No.	13170804H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	December 22, 2019
Temperature / Humidity	23 deg. C / 43 % RH
Engineer	Akihiko Maeda (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 (PIFA Antenna BT2)

Report No.	13170804H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.3
Date	December 23, 2019	January 8, 2020	January 9, 2020
Temperature / Humidity	23 deg. C / 37 % RH	23 deg. C / 35 % RH	22 deg. C / 34 % RH
Engineer	Ken Fujita	Tomohisa Nakagawa	Junki Nagatomi
	(1 GHz -10 GHz)	(10 GHz - 18 GHz)	(18 GHz - 26.5 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.	60.970	QP	22.2	7.6	7.6	32.2	-	5.1	40.0	34.9	
Hori.	62.020	QP	22.4	7.4	7.6	32.2	-	5.2	40.0	34.8	
Hori.	99.770	QP	22.2	10.2	8.1	32.2	-	8.3	43.5	35.2	
Hori.	367.176	QP	21.6	15.0	10.5	31.9	-	15.1	46.0	30.9	
Hori.	547.790	QP	21.5	17.8	11.6	32.0	-	19.0	46.0	27.1	
Hori.	959.997	QP	27.2	22.2	13.8	30.6	-	32.5	46.0	13.5	
Hori.	2390.000	PK	51.9	27.7	5.4	32.8	-	52.2	73.9	21.7	
Hori.	2497.052	PK	46.2	27.4	5.5	32.7	-	46.4	73.9	27.5	
Hori.	4804.000	PK	42.2	31.6	6.8	31.8	-	48.7	73.9	25.2	Floor noise
Hori.	7206.000	PK	42.3	36.0	8.0	32.7	-	53.6	73.9	20.3	Floor noise
Hori.	9608.000	PK	42.6	38.5	8.8	33.3	-	56.6	73.9	17.3	Floor noise
Hori.	2390.000	AV	39.9	27.7	5.4	32.8	1.1	41.3	53.9	12.6	*1)
Hori.	2497.052	AV	37.1	27.4	5.5	32.7	1.1	38.5	53.9	15.4	*2)
Hori.	4804.000	AV	32.9	31.6	6.8	31.8	-	39.4	53.9	14.5	Floor noise
Hori.	7206.000	AV	33.0	36.0	8.0	32.7	-	44.2	53.9	9.7	Floor noise
Hori.	9608.000	AV	32.8	38.5	8.8	33.3	-	46.8	53.9	7.1	Floor noise
Vert.	58.381	QP	23.7	8.3	7.5	32.2	-	7.3	40.0	32.7	
Vert.	62.796	QP	27.9	7.3	7.6	32.2	-	10.6	40.0	29.4	
Vert.	99.898	QP	22.5	10.2	8.1	32.2	-	8.6	43.5	34.9	
Vert.	367.042	QP	21.5	15.0	10.5	31.9	-	15.0	46.0	31.0	
Vert.	547.215	QP	21.4	17.8	11.6	32.0	-	18.8	46.0	27.2	
Vert.	960.012	QP	24.9	22.2	13.8	30.6	-	30.2	54.0	23.8	
Vert.	2390.000	PK	51.7	27.7	5.4	32.8	-	52.0	73.9	21.9	
Vert.	2497.052	PK	46.2	27.4	5.5	32.7	-	46.4	73.9	27.5	
Vert.	4804.000	PK	42.0	31.6	6.8	31.8	-	48.5	73.9	25.4	Floor noise
Vert.	7206.000	PK	42.4	36.0	8.0	32.7	-	53.6	73.9	20.3	Floor noise
Vert.	9608.000	PK	42.3	38.5	8.8	33.3	-	56.3	73.9	17.6	Floor noise
Vert.	2390.000	AV	39.9	27.7	5.4	32.8	1.1	41.3	53.9	12.6	*1)
Vert.	2497.052	AV	37.4	27.4	5.5	32.7	1.1	38.8	53.9	15.1	*2)
Vert.	4804.000	AV	32.6	31.6	6.8	31.8	-	39.1	53.9	14.8	Floor noise
Vert.	7206.000	AV	32.7	36.0	8.0	32.7	-	43.9	53.9	10.0	Floor noise
Vert.	9608.000	AV	32.9	38.5	8.8	33.3	-	46.9	53.9	7.0	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 $20\log(3.95\text{ m} / 3.0\text{ m}) = 2.39\text{ dB}$
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	95.4	27.7	5.4	32.7	95.8	-	-	Carrier
Hori.	2400.000	PK	51.3	27.7	5.4	32.7	51.7	75.8	24.1	
Vert.	2402.000	PK	92.4	27.7	5.4	32.7	92.7	-	-	Carrier
Vert.	2400.000	PK	51.2	27.7	5.4	32.7	51.6	72.7	21.1	

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

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Ise EMC Lab.

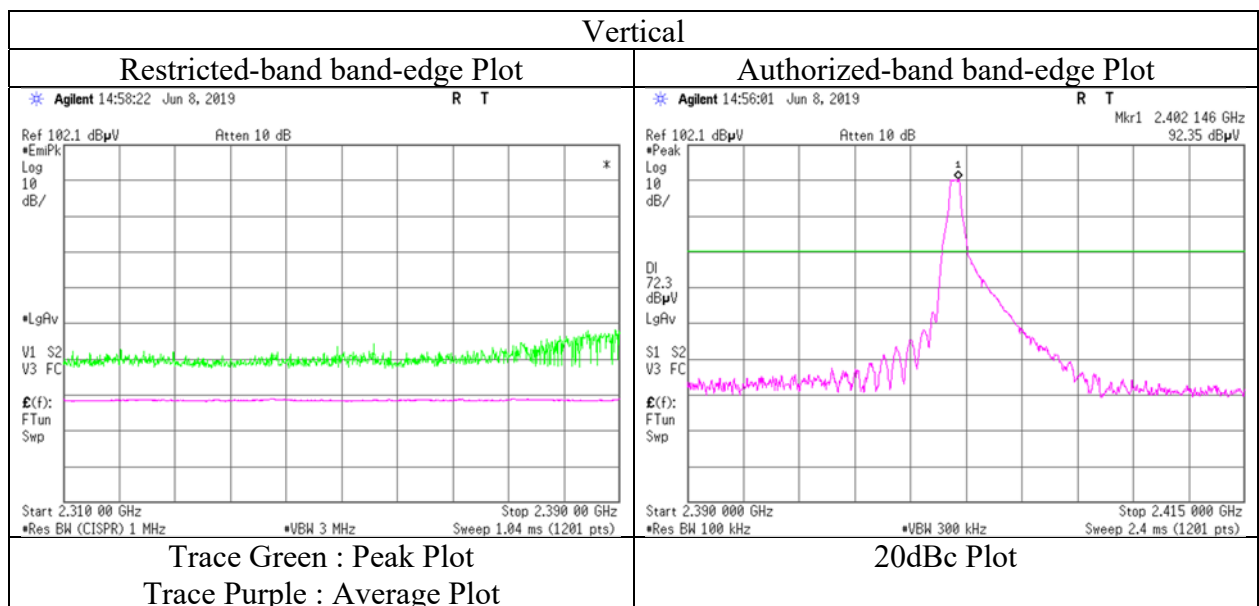
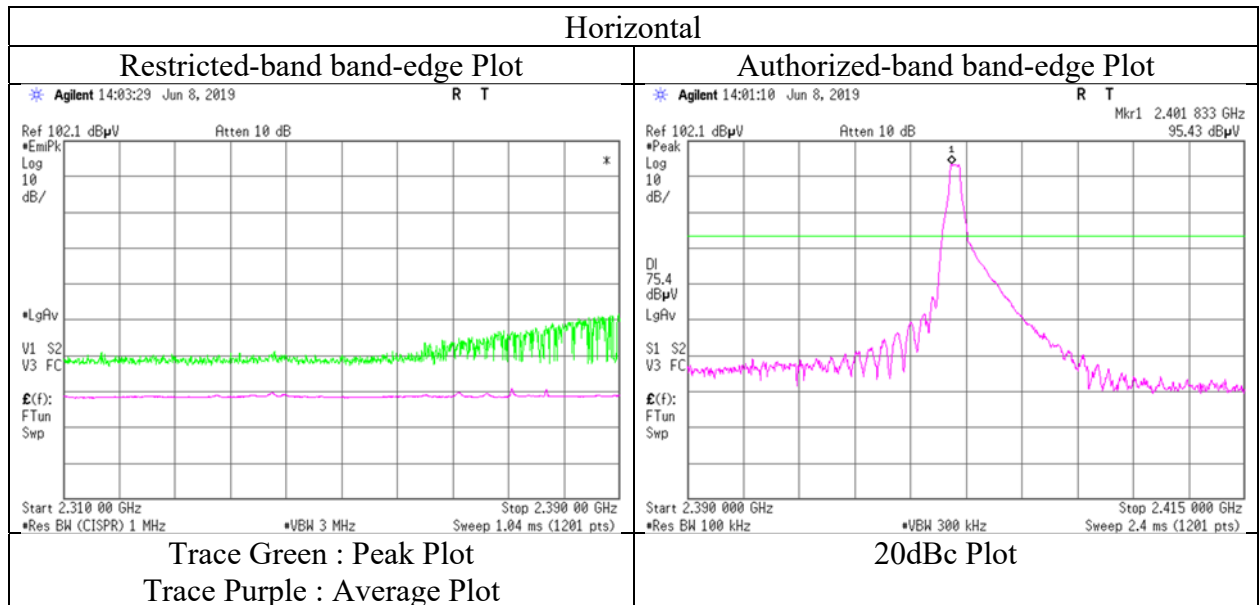
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Radiated Spurious Emission (Reference Plot for band-edge) (PIFA Antenna BT2)

Report No.	13170804H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	December 23, 2019
Temperature / Humidity	23 deg. C / 37 % RH
Engineer	Ken Fujita (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 (PIFA Antenna BT2)

Report No.	13170804H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.3
Date	December 23, 2019	January 8, 2020	January 9, 2020
Temperature / Humidity	23 deg. C / 37 % RH	23 deg. C / 35 % RH	22 deg. C / 34 % RH
Engineer	Ken Fujita	Tomohisa Nakagawa	Junki Nagatomi
	(1 GHz -10 GHz)	(10 GHz - 18 GHz)	(18 GHz - 26.5 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.	60.870	QP	22.2	7.6	7.6	32.2	-	5.2	40.0	34.8	
Hori.	62.100	QP	22.3	7.4	7.6	32.2	-	5.1	40.0	35.0	
Hori.	99.762	QP	22.2	10.2	8.1	32.2	-	8.3	43.5	35.2	
Hori.	367.210	QP	21.6	15.0	10.5	31.9	-	15.1	46.0	30.9	
Hori.	547.812	QP	21.5	17.8	11.6	32.0	-	19.0	46.0	27.1	
Hori.	960.023	QP	27.1	22.2	13.8	30.6	-	32.4	54.0	21.6	
Hori.	2342.193	PK	41.3	27.8	5.4	32.8	-	41.7	73.9	32.2	
Hori.	4882.000	PK	41.9	31.5	6.8	31.8	-	48.4	73.9	25.5	Floor noise
Hori.	7323.000	PK	41.9	36.2	8.0	32.7	-	53.4	73.9	20.5	Floor noise
Hori.	9764.000	PK	42.1	38.8	8.9	33.4	-	56.4	73.9	17.5	Floor noise
Hori.	2342.193	AV	37.2	27.8	5.4	32.8	1.1	38.7	53.9	15.2	*1)
Hori.	4882.000	AV	32.8	31.5	6.8	31.8	-	39.3	53.9	14.6	Floor noise
Hori.	7323.000	AV	32.0	36.2	8.0	32.7	-	43.5	53.9	10.4	Floor noise
Hori.	9764.000	AV	32.5	38.8	8.9	33.4	-	46.8	53.9	7.1	Floor noise
Vert.	58.412	QP	23.7	8.3	7.5	32.2	-	7.3	40.0	32.7	
Vert.	62.102	QP	27.8	7.4	7.6	32.2	-	10.6	40.0	29.5	
Vert.	99.782	QP	22.5	10.2	8.1	32.2	-	8.6	43.5	34.9	
Vert.	367.022	QP	21.4	15.0	10.5	31.9	-	14.9	46.0	31.1	
Vert.	547.220	QP	21.4	17.8	11.6	32.0	-	18.8	46.0	27.2	
Vert.	960.121	QP	24.8	22.2	13.8	30.6	-	30.1	54.0	23.9	
Vert.	2342.193	PK	43.9	27.8	5.4	32.8	-	44.3	73.9	29.6	
Vert.	4882.000	PK	42.2	31.5	6.8	31.8	-	48.7	73.9	25.2	Floor noise
Vert.	7323.000	PK	42.4	36.2	8.0	32.7	-	53.9	73.9	20.0	Floor noise
Vert.	9764.000	PK	43.1	38.8	8.9	33.4	-	57.4	73.9	16.5	Floor noise
Vert.	2342.193	AV	36.4	27.8	5.4	32.8	1.1	37.9	53.9	16.0	*1)
Vert.	4882.000	AV	32.2	31.5	6.8	31.8	-	38.7	53.9	15.2	Floor noise
Vert.	7323.000	AV	32.3	36.2	8.0	32.7	-	43.8	53.9	10.1	Floor noise
Vert.	9764.000	AV	32.7	38.8	8.9	33.4	-	47.0	53.9	6.9	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 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 (PIFA Antenna BT2)

Report No.	13170804H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.3
Date	December 23, 2019	January 8, 2020	January 9, 2020
Temperature / Humidity	23 deg. C / 37 % RH	23 deg. C / 35 % RH	22 deg. C / 34 % RH
Engineer	Ken Fujita	Tomohisa Nakagawa	Junki Nagatomi
	(1 GHz -10 GHz)	(10 GHz - 18 GHz)	(18 GHz - 26.5 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.	60.861	QP	22.2	7.6	7.6	32.2	-	5.2	40.0	34.8	
Hori.	62.110	QP	22.3	7.4	7.6	32.2	-	5.1	40.0	35.0	
Hori.	99.773	QP	22.2	10.2	8.1	32.2	-	8.3	43.5	35.2	
Hori.	367.201	QP	21.6	15.0	10.5	31.9	-	15.1	46.0	30.9	
Hori.	547.814	QP	21.5	17.8	11.6	32.0	-	19.0	46.0	27.1	
Hori.	960.022	QP	27.2	22.2	13.8	30.6	-	32.5	54.0	21.5	
Hori.	2483.500	PK	67.3	27.5	5.5	32.7	-	67.5	73.9	6.4	
Hori.	4960.000	PK	42.8	31.6	6.8	31.8	-	49.4	73.9	24.6	Floor noise
Hori.	7440.000	PK	42.2	36.3	8.1	32.7	-	53.8	73.9	20.1	Floor noise
Hori.	9920.000	PK	42.2	38.9	8.9	33.4	-	56.6	73.9	17.4	Floor noise
Hori.	2483.500	AV	47.1	27.5	5.5	32.7	1.1	48.5	53.9	5.5	*1)
Hori.	4960.000	AV	32.7	31.6	6.8	31.8	-	39.3	53.9	14.6	Floor noise
Hori.	7440.000	AV	32.3	36.3	8.1	32.7	-	44.0	53.9	9.9	Floor noise
Hori.	9920.000	AV	32.2	38.9	8.9	33.4	-	46.6	53.9	7.3	Floor noise
Vert.	58.412	QP	23.8	8.3	7.5	32.2	-	7.4	40.0	32.6	
Vert.	62.104	QP	27.8	7.4	7.6	32.2	-	10.6	40.0	29.5	
Vert.	99.822	QP	22.5	10.2	8.1	32.2	-	8.6	43.5	34.9	
Vert.	367.013	QP	21.4	15.0	10.5	31.9	-	14.9	46.0	31.1	
Vert.	547.203	QP	21.4	17.8	11.6	32.0	-	18.8	46.0	27.2	
Vert.	960.109	QP	24.8	22.2	13.8	30.6	-	30.1	54.0	23.9	
Vert.	2483.500	PK	67.8	27.5	5.5	32.7	-	68.0	73.9	5.9	
Vert.	4960.000	PK	42.8	31.6	6.8	31.8	-	49.3	73.9	24.6	Floor noise
Vert.	7440.000	PK	43.0	36.3	8.1	32.7	-	54.7	73.9	19.3	Floor noise
Vert.	9920.000	PK	42.3	38.9	8.9	33.4	-	56.7	73.9	17.2	Floor noise
Vert.	2483.500	AV	47.2	27.5	5.5	32.7	1.1	48.6	53.9	5.3	*1)
Vert.	4960.000	AV	32.0	31.6	6.8	31.8	-	38.5	53.9	15.4	Floor noise
Vert.	7440.000	AV	32.1	36.3	8.1	32.7	-	43.7	53.9	10.2	Floor noise
Vert.	9920.000	AV	32.1	38.9	8.9	33.4	-	46.4	53.9	7.5	Floor noise

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

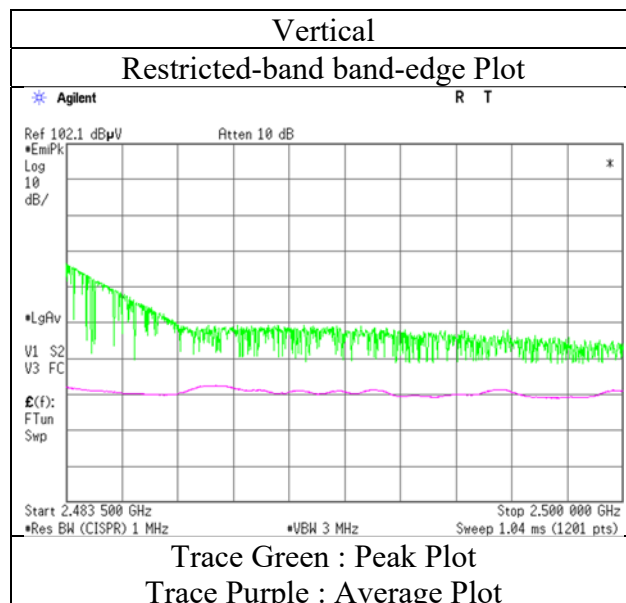
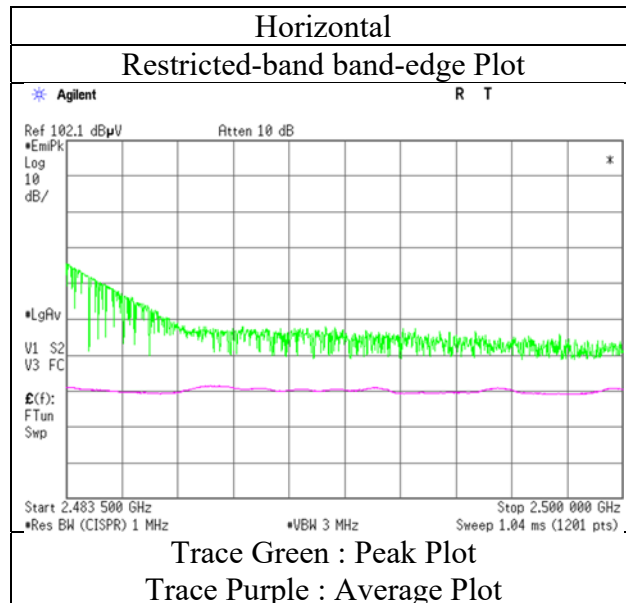
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

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) (PIFA Antenna BT2)

Report No.	13170804H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	December 22, 2019
Temperature / Humidity	23 deg. C / 43 % RH
Engineer	Akihiko Maeda (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.

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Radiated Spurious Emission (PIFA Antenna BT2)

Report No.	13170804H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.3
Date	December 23, 2019	January 8, 2020	January 9, 2020
Temperature / Humidity	23 deg. C / 37 % RH	23 deg. C / 35 % RH	22 deg. C / 34 % RH
Engineer	Ken Fujita	Tomohisa Nakagawa	Junki Nagatomi
	(1 GHz -10 GHz)	(10 GHz - 18 GHz)	(18 GHz - 26.5 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.	60.286	QP	23.1	7.8	7.5	32.2	-	6.2	40.0	33.8	
Hori.	62.171	QP	22.9	7.4	7.6	32.2	-	5.6	40.0	34.4	
Hori.	100.270	QP	22.2	10.3	8.1	32.2	-	8.4	43.5	35.1	
Hori.	367.182	QP	21.6	15.0	10.5	31.9	-	15.1	46.0	30.9	
Hori.	546.907	QP	21.5	17.8	11.6	32.0	-	18.9	46.0	27.1	
Hori.	958.842	QP	20.4	22.1	13.8	30.6	-	25.7	46.0	20.3	
Hori.	2390.000	PK	47.3	27.7	5.4	32.8	-	47.6	73.9	26.3	
Hori.	4960.000	PK	41.9	31.6	6.8	31.8	-	48.5	73.9	25.4	Floor noise
Hori.	7440.000	PK	42.1	36.3	8.1	32.7	-	53.7	73.9	20.2	Floor noise
Hori.	9920.000	PK	42.3	38.9	8.9	33.4	-	56.7	73.9	17.2	Floor noise
Hori.	2390.000	AV	33.9	27.7	5.4	32.8	1.1	35.3	53.9	18.6	*1)
Hori.	4960.000	AV	32.8	31.6	6.8	31.8	-	39.4	53.9	14.6	Floor noise
Hori.	7440.000	AV	31.9	36.3	8.1	32.7	-	43.6	53.9	10.3	Floor noise
Hori.	9920.000	AV	32.0	38.9	8.9	33.4	-	46.4	53.9	7.5	Floor noise
Vert.	60.286	QP	24.1	7.8	7.5	32.2	-	7.2	40.0	32.8	
Vert.	62.584	QP	28.2	7.3	7.6	32.2	-	10.9	40.0	29.1	
Vert.	99.581	QP	22.9	10.2	8.1	32.2	-	9.0	43.5	34.5	
Vert.	366.985	QP	21.6	15.0	10.5	31.9	-	15.1	46.0	30.9	
Vert.	547.291	QP	21.5	17.8	11.6	32.0	-	18.9	46.0	27.1	
Vert.	959.983	QP	25.1	22.2	13.8	30.6	-	30.4	46.0	15.6	
Vert.	2390.000	PK	46.4	27.7	5.4	32.8	-	46.7	73.9	27.2	
Vert.	4804.000	PK	42.4	31.6	6.8	31.8	-	48.9	73.9	25.0	Floor noise
Vert.	7206.000	PK	42.3	36.0	8.0	32.7	-	53.6	73.9	20.3	Floor noise
Vert.	9608.000	PK	42.2	38.5	8.8	33.3	-	56.2	73.9	17.7	Floor noise
Vert.	2390.000	AV	34.1	27.7	5.4	32.8	1.1	35.6	53.9	18.3	*1)
Vert.	4804.000	AV	33.0	31.6	6.8	31.8	-	39.5	53.9	14.4	Floor noise
Vert.	7206.000	AV	32.8	36.0	8.0	32.7	-	44.0	53.9	9.9	Floor noise
Vert.	9608.000	AV	32.6	38.5	8.8	33.3	-	46.6	53.9	7.3	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) 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	94.6	27.7	5.4	32.7	94.9	-	-	Carrier
Hori.	2400.000	PK	45.8	27.7	5.4	32.7	46.2	74.9	28.7	
Vert.	2402.000	PK	91.9	27.7	5.4	32.7	92.3	-	-	Carrier
Vert.	2400.000	PK	43.0	27.7	5.4	32.7	43.4	72.3	28.9	

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

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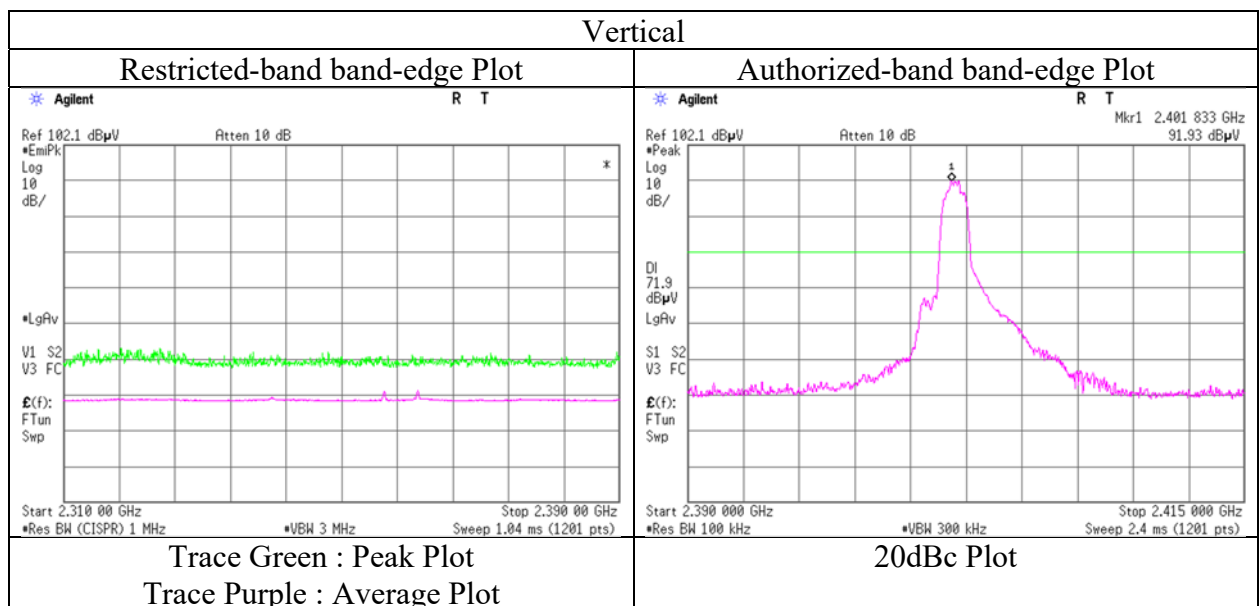
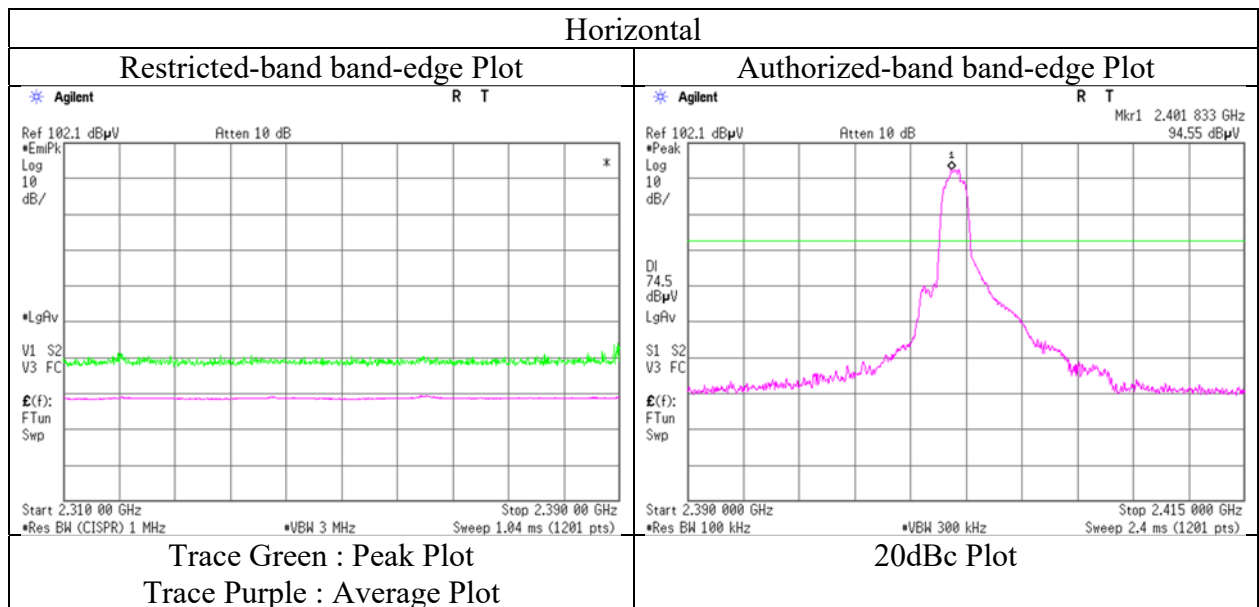
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Radiated Spurious Emission (Reference Plot for band-edge) (PIFA Antenna BT2)

Report No.	13170804H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	December 23, 2019
Temperature / Humidity	23 deg. C / 37 % RH
Engineer	Ken Fujita (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 (PIFA Antenna BT2)

Report No.	13170804H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.3	No.3	No.3
Date	December 23, 2019	January 8, 2020	January 9, 2020
Temperature / Humidity	23 deg. C / 37 % RH	23 deg. C / 35 % RH	22 deg. C / 34 % RH
Engineer	Ken Fujita	Tomohisa Nakagawa	Junki Nagatomi
	(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.	60.278	QP	23.0	7.8	7.5	32.2	-	6.1	40.0	33.9	
Hori.	62.111	QP	22.9	7.4	7.6	32.2	-	5.7	40.0	34.4	
Hori.	100.123	QP	22.2	10.2	8.1	32.2	-	8.4	43.5	35.1	
Hori.	367.188	QP	21.7	15.0	10.5	31.9	-	15.2	46.0	30.8	
Hori.	546.932	QP	21.5	17.8	11.6	32.0	-	18.9	46.0	27.1	
Hori.	958.812	QP	20.5	22.1	13.8	30.6	-	25.8	46.0	20.2	
Hori.	4882.000	PK	42.3	31.5	6.8	31.8	-	48.8	73.9	25.1	Floor noise
Hori.	7323.000	PK	42.3	36.2	8.0	32.7	-	53.8	73.9	20.1	Floor noise
Hori.	9764.000	PK	42.2	38.8	8.9	33.4	-	56.5	73.9	17.4	Floor noise
Hori.	4882.000	AV	32.1	31.5	6.8	31.8	-	38.6	53.9	15.3	Floor noise
Hori.	7323.000	AV	32.6	36.2	8.0	32.7	-	44.1	53.9	9.8	Floor noise
Hori.	9764.000	AV	32.8	38.8	8.9	33.4	-	47.1	53.9	6.8	Floor noise
Vert.	60.267	QP	24.2	7.8	7.5	32.2	-	7.4	40.0	32.7	
Vert.	62.165	QP	28.2	7.4	7.6	32.2	-	10.9	40.0	29.1	
Vert.	100.289	QP	22.8	10.3	8.1	32.2	-	9.0	43.5	34.5	
Vert.	367.189	QP	21.6	15.0	10.5	31.9	-	15.1	46.0	30.9	
Vert.	546.987	QP	21.5	17.8	11.6	32.0	-	18.9	46.0	27.1	
Vert.	958.855	QP	25.2	22.1	13.8	30.6	-	30.5	46.0	15.5	
Vert.	4882.000	PK	42.0	31.5	6.8	31.8	-	48.5	73.9	25.4	Floor noise
Vert.	7323.000	PK	42.3	36.2	8.0	32.7	-	53.8	73.9	20.1	Floor noise
Vert.	9764.000	PK	42.7	38.8	8.9	33.4	-	57.0	73.9	16.9	Floor noise
Vert.	4882.000	AV	32.1	31.5	6.8	31.8	-	38.6	53.9	15.3	Floor noise
Vert.	7323.000	AV	32.8	36.2	8.0	32.7	-	44.3	53.9	9.7	Floor noise
Vert.	9764.000	AV	32.1	38.8	8.9	33.4	-	46.4	53.9	7.5	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 (PIFA Antenna BT2)

Report No.	13170804H			
Test place	Ise EMC Lab.			
Semi Anechoic Chamber	No.3	No.3	No.3	No.3
Date	December 23, 2019	January 8, 2020	January 9, 2020	January 14, 2020
Temperature / Humidity	23 deg. C / 37 % RH	23 deg. C / 35 % RH	22 deg. C / 34 % RH	22 deg. C / 30 % RH
Engineer	Ken Fujita	Tomohisa Nakagawa	Junki Nagatomi	Junki Nagatomi
	(1 GHz -10 GHz)	(10 GHz - 18 GHz)	(18 GHz - 26.5 GHz)	(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.	60.301	QP	23.1	7.8	7.5	32.2	-	6.2	40.0	33.8	
Hori.	62.021	QP	22.9	7.4	7.6	32.2	-	5.7	40.0	34.3	
Hori.	99.989	QP	22.2	10.2	8.1	32.2	-	8.4	43.5	35.2	
Hori.	367.211	QP	21.7	15.0	10.5	31.9	-	15.2	46.0	30.8	
Hori.	546.897	QP	21.6	17.8	11.6	32.0	-	19.0	46.0	27.0	
Hori.	958.801	QP	20.6	22.1	13.8	30.6	-	25.9	46.0	20.1	
Hori.	2483.500	PK	69.3	27.5	5.5	32.7	-	69.6	73.9	4.3	
Hori.	4960.000	PK	41.7	31.6	6.8	31.8	-	48.3	73.9	25.7	Floor noise
Hori.	7440.000	PK	42.0	36.3	8.1	32.7	-	53.7	73.9	20.2	Floor noise
Hori.	9920.000	PK	42.3	38.9	8.9	33.4	-	56.7	73.9	17.2	Floor noise
Hori.	2483.500	AV	48.2	27.5	5.5	32.7	1.1	49.6	53.9	4.3	*1)
Hori.	4960.000	AV	32.2	31.6	6.8	31.8	-	38.8	53.9	15.1	Floor noise
Hori.	7440.000	AV	32.1	36.3	8.1	32.7	-	43.7	53.9	10.2	Floor noise
Hori.	9920.000	AV	32.8	38.9	8.9	33.4	-	47.2	53.9	6.7	Floor noise
Vert.	60.257	QP	24.1	7.8	7.5	32.2	-	7.3	40.0	32.8	
Vert.	62.221	QP	28.3	7.4	7.6	32.2	-	11.0	40.0	29.0	
Vert.	100.132	QP	22.8	10.2	8.1	32.2	-	9.0	43.5	34.5	
Vert.	367.168	QP	21.6	15.0	10.5	31.9	-	15.1	46.0	30.9	
Vert.	546.913	QP	21.5	17.8	11.6	32.0	-	18.9	46.0	27.1	
Vert.	958.803	QP	25.1	22.1	13.8	30.6	-	30.4	46.0	15.6	
Vert.	2483.500	PK	68.2	27.5	5.5	32.7	-	68.5	73.9	5.4	
Vert.	4960.000	PK	42.3	31.6	6.8	31.8	-	48.9	73.9	25.0	Floor noise
Vert.	7440.000	PK	41.9	36.3	8.1	32.7	-	53.6	73.9	20.3	Floor noise
Vert.	9920.000	PK	42.0	38.9	8.9	33.4	-	56.4	73.9	17.5	Floor noise
Vert.	2483.500	AV	46.2	27.5	5.5	32.7	1.1	47.6	53.9	6.3	*1)
Vert.	4960.000	AV	32.0	31.6	6.8	31.8	-	38.6	53.9	15.3	Floor noise
Vert.	7440.000	AV	32.4	36.3	8.1	32.7	-	44.1	53.9	9.8	Floor noise
Vert.	9920.000	AV	32.8	38.9	8.9	33.4	-	47.2	53.9	6.7	Floor noise

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

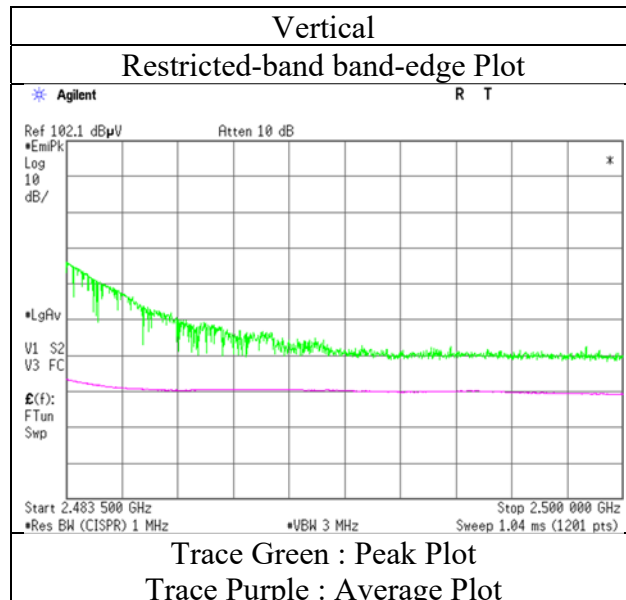
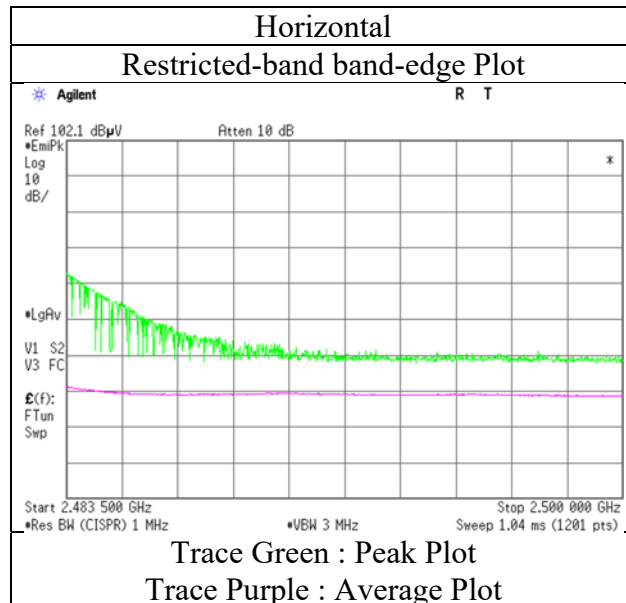
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

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) Not Out of Band emission(Leakage Power)

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

Report No.	13170804H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	December 23, 2019
Temperature / Humidity	23 deg. C / 37 % RH
Engineer	Ken Fujita (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 (PIFA Antenna BT1)

Report No.	13170804H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	January 20, 2020
Temperature / Humidity	22 deg. C / 30 % RH
Engineer	Koji Yamamoto
	(1 GHz -10 GHz)
Mode	Tx, Hopping Off, 3DH5 2402 MHz + Tx 11ax-40 5755MHz

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.	2373.399	PK	55.8	27.6	5.0	35.2	-	53.3	73.9	20.6	
Hori.	2390.000	PK	50.2	27.6	5.1	35.2	-	47.6	73.9	26.3	
Hori.	2373.399	AV	45.5	27.6	5.0	35.2	1.1	44.1	53.9	9.8	*2)
Hori.	2390.000	AV	39.7	27.6	5.1	35.2	1.1	38.2	53.9	15.7	*1)
Vert.	2373.399	PK	51.7	27.6	5.0	35.2	-	49.1	73.9	24.8	
Vert.	2390.000	PK	57.0	27.6	5.1	35.2	-	54.5	73.9	19.5	
Vert.	2373.399	AV	40.8	27.6	5.0	35.2	1.1	39.4	53.9	14.5	*2)
Vert.	2390.000	AV	40.7	27.6	5.1	35.2	1.1	39.2	53.9	14.7	*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 $20\log(3.7\text{ m} / 3.0\text{ m}) = 1.83\text{ dB}$
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.

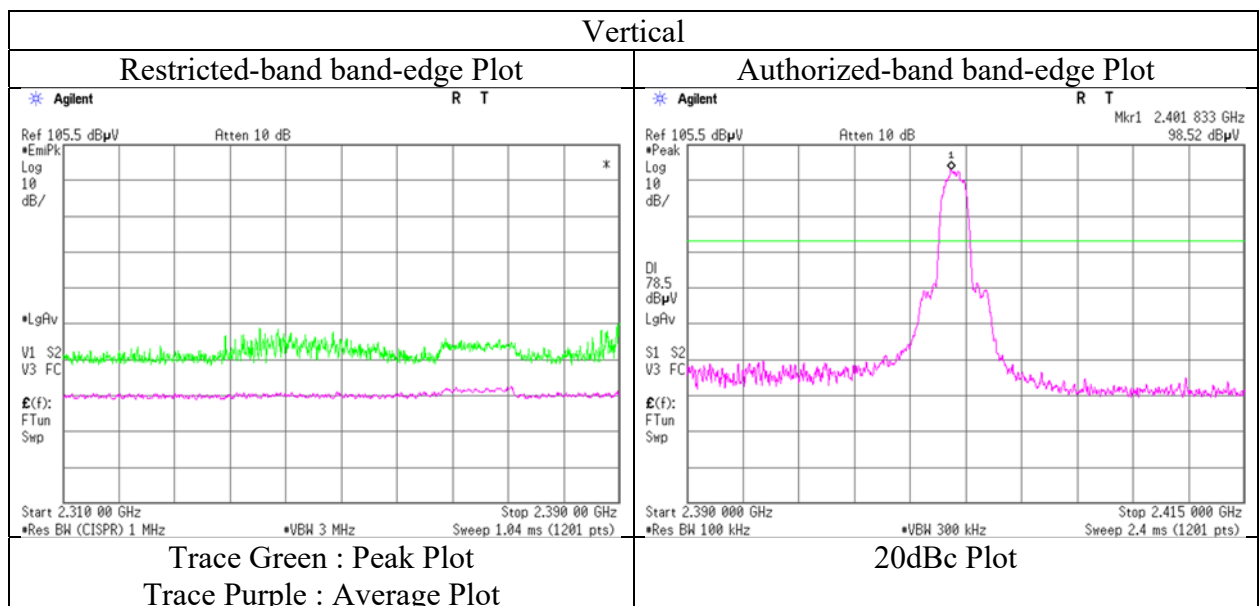
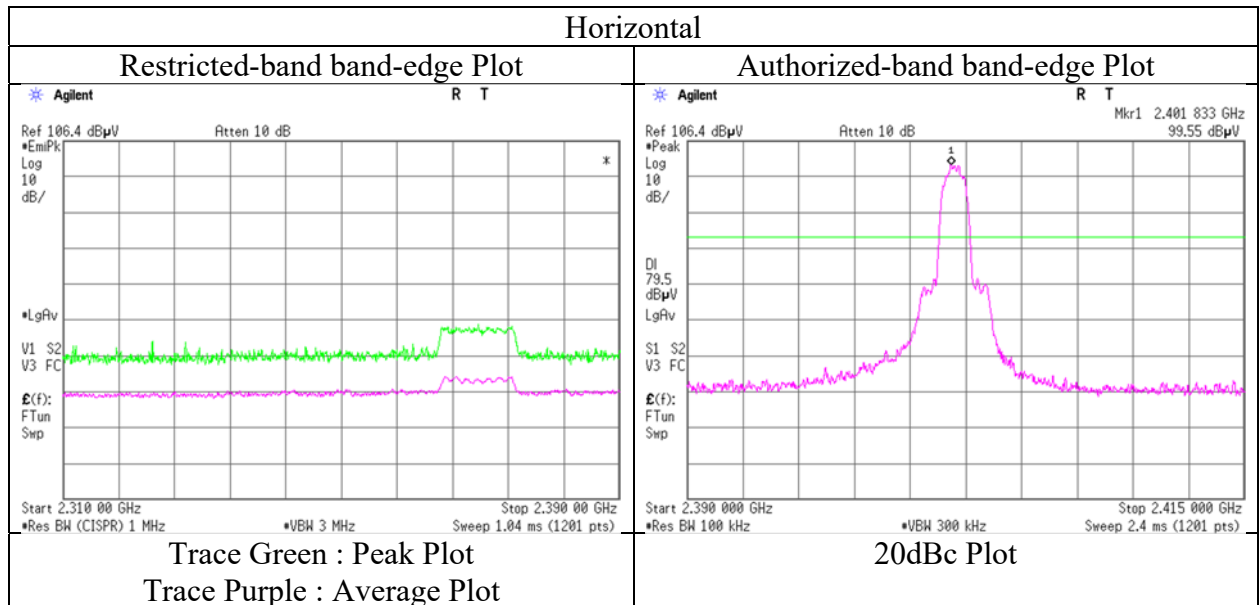
20dBc Data Sheet

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	99.6	27.6	5.1	35.2	96.9	-	-	Carrier
Hori	2400.000	PK	50.3	27.6	5.1	35.2	47.6	76.9	29.3	
Vert	2402.000	PK	98.5	27.6	5.1	35.2	95.9	-	-	Carrier
Vert	2400.000	PK	49.6	27.6	5.1	35.2	46.9	75.9	29.0	

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

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

Report No.	13170804H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	January 20, 2020
Temperature / Humidity	22 deg. C / 30 % RH
Engineer	Koji Yamamoto (1 GHz -10 GHz)
Mode	Tx, Hopping Off, 3DH5 2402 MHz + Tx 11ax-40 5755MHz



* 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 (PIFA Antenna BT1)

Report No. 13170804H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.2
Date January 20, 2020 No.2 January 21, 2020 No.2 January 22, 2020
Temperature / Humidity 22 deg. C / 30 % RH 22 deg. C / 30 % RH 21 deg. C / 41 % RH
Engineer Koji Yamamoto Koji Yamamoto Takumi Shimada
(1 GHz -10 GHz) (10 GHz -26.5 GHz) (Below 1 GHz)
Mode Tx, Hopping Off, 3DH5 2441 MHz + Tx 11ax-40 5755MHz

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.	34.421	QP	26.1	17.0	7.1	30.5	-	19.7	40.0	20.3	
Hori.	54.310	QP	24.9	9.8	7.4	30.4	-	11.7	40.0	28.4	
Hori.	98.330	QP	25.4	10.0	8.0	30.2	-	13.2	43.5	30.3	
Hori.	345.593	QP	23.8	14.9	10.2	29.4	-	19.5	46.0	26.5	
Hori.	500.649	QP	23.8	17.5	11.0	30.1	-	22.3	46.0	23.7	
Hori.	987.241	QP	22.0	22.3	13.3	27.8	-	29.8	54.0	24.2	
Hori.	4882.000	PK	46.1	31.6	7.5	34.4	-	50.7	73.9	23.2	Floor noise
Hori.	7323.000	PK	46.1	36.1	8.4	34.4	-	56.2	73.9	17.7	Floor noise
Hori.	9764.000	PK	45.4	39.2	9.6	34.9	-	59.2	73.9	14.7	Floor noise
Hori.	4882.000	AV	34.1	31.6	7.5	34.4	-	38.7	53.9	15.2	Floor noise
Hori.	7323.000	AV	33.3	36.1	8.4	34.4	-	43.4	53.9	10.5	Floor noise
Hori.	9764.000	AV	33.1	39.2	9.6	34.9	-	47.0	53.9	6.9	Floor noise
Vert.	34.421	QP	28.6	17.0	7.1	30.5	-	22.2	40.0	17.8	
Vert.	54.457	QP	31.2	9.7	7.4	30.4	-	17.9	40.0	22.1	
Vert.	98.330	QP	26.2	10.0	8.0	30.2	-	14.0	43.5	29.5	
Vert.	345.593	QP	25.0	14.9	10.2	29.4	-	20.7	46.0	25.3	
Vert.	500.649	QP	23.8	17.7	11.3	32.0	-	20.9	46.0	25.1	
Vert.	987.241	QP	22.1	22.3	13.3	27.8	-	29.9	54.0	24.1	
Vert.	4882.000	PK	47.5	31.6	7.5	34.4	-	52.1	73.9	21.8	Floor noise
Vert.	7323.000	PK	47.3	36.1	8.4	34.4	-	57.4	73.9	16.5	Floor noise
Vert.	9764.000	PK	46.3	39.2	9.6	34.9	-	60.2	73.9	13.7	Floor noise
Vert.	4882.000	AV	36.2	31.6	7.5	34.4	-	40.8	53.9	13.1	Floor noise
Vert.	7323.000	AV	34.1	36.1	8.4	34.4	-	44.2	53.9	9.7	Floor noise
Vert.	9764.000	AV	33.1	39.2	9.6	34.9	-	47.0	53.9	6.9	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 (3.7 m / 3.0 m) = 1.83 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission (PIFA Antenna BT1)

Report No.	13170804H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	January 20, 2020
Temperature / Humidity	22 deg. C / 30 % RH
Engineer	Koji Yamamoto
	(1 GHz -10 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz + Tx 11ax-40 5755MHz

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.	1621.482	PK	55.6	25.2	4.5	35.7	-	49.6	73.9	24.3	
Hori.	2365.286	PK	57.0	27.7	5.2	35.2	-	54.6	73.9	19.3	
Hori.	2483.500	PK	53.3	27.5	5.2	35.2	-	50.8	73.9	23.1	
Hori.	1621.482	AV	45.6	25.2	4.5	35.7	1.1	40.7	53.9	13.2	*2)
Hori.	2365.286	AV	47.1	27.7	5.2	35.2	1.1	45.8	53.9	8.1	*2)
Hori.	2483.500	AV	41.7	27.5	5.2	35.2	1.1	40.3	53.9	13.6	*1)
Vert.	1621.482	PK	54.9	25.2	4.5	35.7	-	48.9	73.9	25.0	
Vert.	2365.286	PK	50.3	27.7	5.2	35.2	-	47.9	73.9	26.0	
Vert.	2483.500	PK	53.4	27.5	5.2	35.2	-	50.9	73.9	23.0	
Vert.	1621.482	AV	45.0	25.2	4.5	35.7	1.1	40.1	53.9	13.8	*2)
Vert.	2365.286	AV	40.1	27.7	5.2	35.2	1.1	38.8	53.9	15.1	*2)
Vert.	2483.500	AV	41.6	27.5	5.2	35.2	1.1	40.2	53.9	13.7	*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).

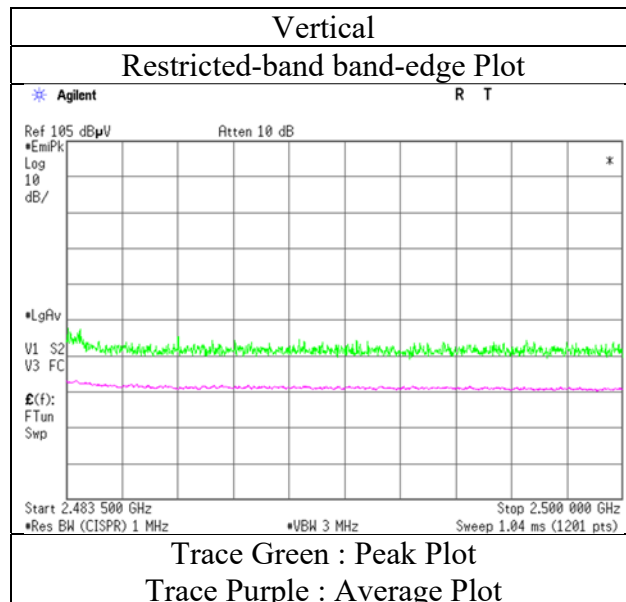
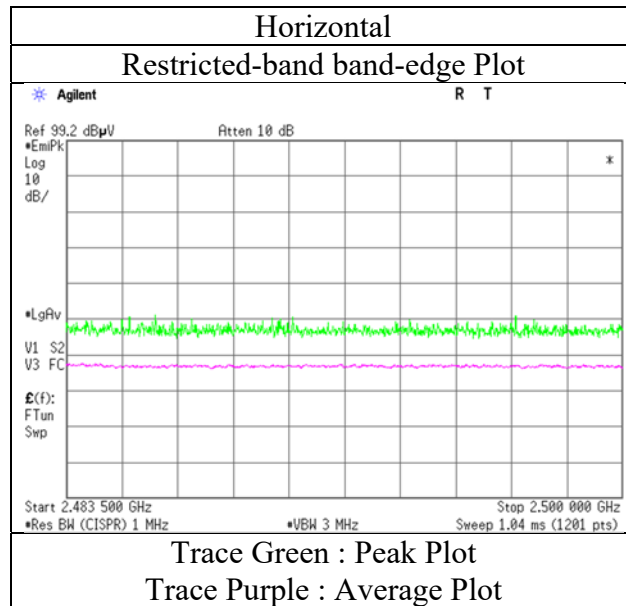
Distance factor: 1 GHz - 10 GHz $20\log(3.7\text{ m} / 3.0\text{ m}) = 1.83\text{ dB}$
10 GHz - 26.5 GHz $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

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

*2) Noise synchronized with duty of carrier frequency.

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

Report No.	13170804H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	January 20, 2020
Temperature / Humidity	22 deg. C / 30 % RH
Engineer	Koji Yamamoto (1 GHz -10 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz + Tx 11ax-40 5755MHz



* 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.

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Radiated Spurious Emission (IFA Antenna BT1)

Report No.	13170804H			
Test place	Ise EMC Lab.			
Semi Anechoic Chamber	No.3	No.3	No.3	No.3
Date	January 6, 2020	January 8, 2020	January 8, 2020	January 14, 2020
Temperature / Humidity	23 deg. C / 40 % RH	22 deg. C / 39 RH	23 deg. C / 35 % RH	21 deg. C / 24 % RH
Engineer	Takumi Shimada (1 GHz -10 GHz)	Junki Nagatomi (10 GHz -18 GHz)	Tomohisa Nakagawa (18 GHz - 26.5 GHz)	Takumi Shimada (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.	59.610	QP	22.5	8.0	7.5	32.2	-	5.8	40.0	34.2	
Hori.	62.620	QP	22.0	7.3	7.6	32.2	-	4.7	40.0	35.3	
Hori.	98.877	QP	21.5	10.1	8.1	32.2	-	7.5	43.5	36.0	
Hori.	364.412	QP	21.5	15.0	10.4	31.9	-	15.0	46.0	31.0	
Hori.	558.962	QP	20.7	18.1	11.7	32.0	-	18.5	46.0	27.5	
Hori.	959.999	QP	21.9	22.2	13.8	30.6	-	27.2	46.0	18.8	
Hori.	2390.000	PK	47.0	27.7	5.4	32.8	-	47.4	73.9	26.6	
Hori.	4804.000	PK	40.0	31.6	7.5	31.8	-	47.3	73.9	26.6	Floor noise
Hori.	7206.000	PK	41.5	36.0	8.9	32.7	-	53.7	73.9	20.2	Floor noise
Hori.	9608.000	PK	41.3	38.5	9.4	33.3	-	55.9	73.9	18.0	Floor noise
Hori.	2390.000	AV	34.3	27.7	5.4	32.8	1.1	35.8	53.9	18.1	*1)
Hori.	4804.000	AV	31.6	31.6	7.5	31.8	-	38.8	53.9	15.1	Floor noise
Hori.	7206.000	AV	32.2	36.0	8.9	32.7	-	44.4	53.9	9.5	Floor noise
Hori.	9608.000	AV	32.5	38.5	9.4	33.3	-	47.1	53.9	6.8	Floor noise
Vert.	59.465	QP	26.3	8.0	7.5	32.2	-	9.7	40.0	30.3	
Vert.	62.505	QP	25.7	7.3	7.6	32.2	-	8.4	40.0	31.6	
Vert.	99.021	QP	22.3	10.1	8.1	32.2	-	8.3	43.5	35.2	
Vert.	364.494	QP	21.0	15.0	10.4	31.9	-	14.5	46.0	31.5	
Vert.	558.852	QP	20.6	18.1	11.7	32.0	-	18.4	46.0	27.6	
Vert.	959.997	QP	20.8	22.2	13.8	30.6	-	26.1	46.0	19.9	
Vert.	2390.000	PK	48.7	27.7	5.4	32.8	-	49.1	73.9	24.8	
Vert.	4804.000	PK	40.2	31.6	7.5	31.8	-	47.5	73.9	26.4	Floor noise
Vert.	7206.000	PK	42.2	36.0	8.9	32.7	-	54.4	73.9	19.5	Floor noise
Vert.	9608.000	PK	42.7	38.5	9.4	33.3	-	57.3	73.9	16.6	Floor noise
Vert.	2390.000	AV	32.6	27.7	5.4	32.8	1.1	34.0	53.9	19.9	*1)
Vert.	4804.000	AV	31.3	31.6	7.5	31.8	-	38.6	53.9	15.3	Floor noise
Vert.	7206.000	AV	32.2	36.0	8.9	32.7	-	44.4	53.9	9.5	Floor noise
Vert.	9608.000	AV	32.6	38.5	9.4	33.3	-	47.2	53.9	6.7	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) 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	98.7	27.7	5.4	32.7	99.1	-	-	Carrier
Hori.	2400.000	PK	41.9	27.7	5.4	32.7	42.3	79.1	36.8	
Vert.	2402.000	PK	98.7	27.7	5.4	32.7	99.1	-	-	Carrier
Vert.	2400.000	PK	40.1	27.7	5.4	32.7	40.4	79.1	38.6	

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

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Ise EMC Lab.

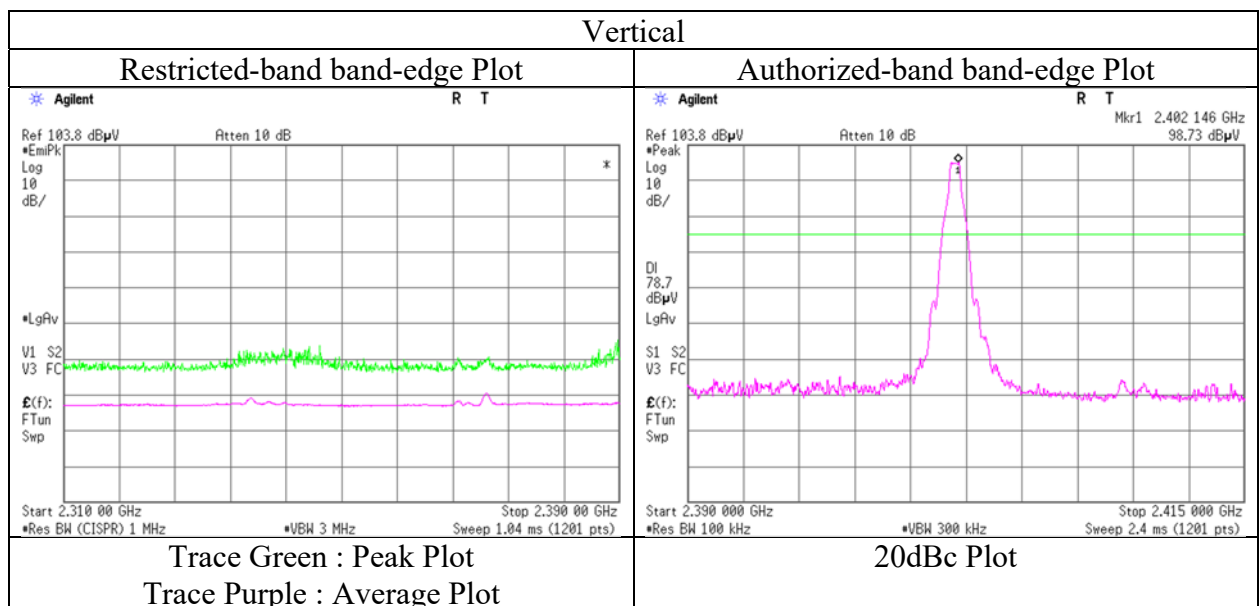
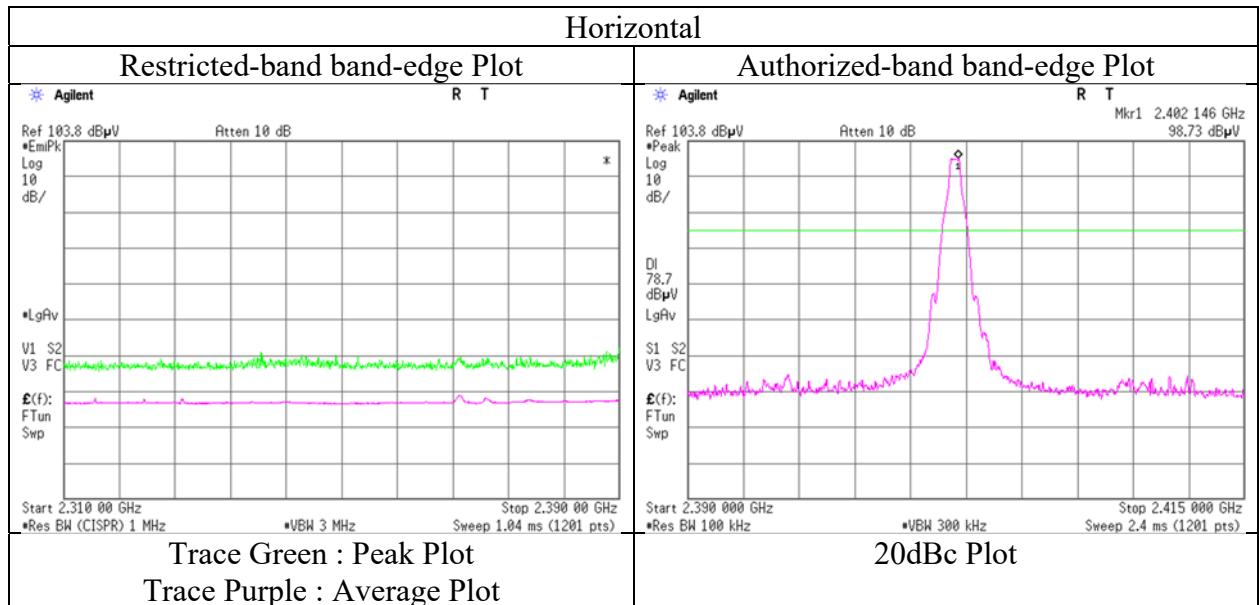
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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

Report No.	13170804H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 6, 2020
Temperature / Humidity	23 deg. C / 40 % RH
Engineer	Takumi Shimada (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.

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Radiated Spurious Emission (IFA Antenna BT1)

Report No. 13170804H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date January 6, 2020 No.3 January 8, 2020 No.3 January 8, 2020 No.3 January 14, 2020
Temperature / Humidity 23 deg. C / 40 % RH 22 deg. C / 39 RH 23 deg. C / 35 % RH 21 deg. C / 24 % RH
Engineer Takumi Shimada Junki Nagatomi Tomohisa Nakagawa Takumi Shimada
(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.	59.409	QP	22.4	8.0	7.5	32.2	-	5.8	40.0	34.2	
Hori.	62.993	QP	22.1	7.3	7.6	32.2	-	4.7	40.0	35.3	
Hori.	98.998	QP	21.7	10.1	8.1	32.2	-	7.7	43.5	35.8	
Hori.	328.863	QP	21.6	14.5	10.2	31.9	-	14.3	46.0	31.7	
Hori.	428.925	QP	20.4	16.2	10.9	32.0	-	15.5	46.0	30.5	
Hori.	959.932	QP	21.3	22.2	13.8	30.6	-	26.6	46.0	19.4	
Hori.	4882.000	PK	41.0	31.5	7.5	31.8	-	48.3	73.9	25.6	Floor noise
Hori.	7323.000	PK	41.5	36.2	8.9	32.7	-	53.8	73.9	20.1	Floor noise
Hori.	9764.000	PK	41.4	38.8	9.4	33.4	-	56.2	73.9	17.7	Floor noise
Hori.	4882.000	AV	31.3	31.5	7.5	31.8	-	38.6	53.9	15.3	Floor noise
Hori.	7323.000	AV	32.1	36.2	8.9	32.7	-	44.5	53.9	9.4	Floor noise
Hori.	9764.000	AV	32.7	38.8	9.4	33.4	-	47.5	53.9	6.4	Floor noise
Vert.	59.502	QP	26.0	8.0	7.5	32.2	-	9.4	40.0	30.7	
Vert.	62.863	QP	25.3	7.3	7.6	32.2	-	8.0	40.0	32.0	
Vert.	99.013	QP	22.5	10.1	8.1	32.2	-	8.5	43.5	35.0	
Vert.	328.863	QP	21.4	14.5	10.2	31.9	-	14.1	46.0	31.9	
Vert.	428.925	QP	20.3	16.2	10.9	32.0	-	15.4	46.0	30.6	
Vert.	959.924	QP	20.2	22.2	13.8	30.6	-	25.5	46.0	20.5	
Vert.	4882.000	PK	41.1	31.5	7.5	31.8	-	48.4	73.9	25.5	Floor noise
Vert.	7323.000	PK	42.3	36.2	8.9	32.7	-	54.7	73.9	19.3	Floor noise
Vert.	9764.000	PK	41.9	38.8	9.4	33.4	-	56.7	73.9	17.2	Floor noise
Vert.	4882.000	AV	31.4	31.5	7.5	31.8	-	38.6	53.9	15.3	Floor noise
Vert.	7323.000	AV	32.0	36.2	8.9	32.7	-	44.4	53.9	9.5	Floor noise
Vert.	9764.000	AV	32.6	38.8	9.4	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 (IFA Antenna BT1)

Report No.	13170804H			
Test place	Ise EMC Lab.			
Semi Anechoic Chamber	No.3	No.3	No.3	No.3
Date	January 6, 2020	January 8, 2020	January 8, 2020	January 14, 2020
Temperature / Humidity	23 deg. C / 40 % RH	22 deg. C / 39 RH	23 deg. C / 35 % RH	21 deg. C / 24 % RH
Engineer	Takumi Shimada (1 GHz -10 GHz)	Junki Nagatomi (10 GHz -18 GHz)	Tomohisa Nakagawa (18 GHz - 26.5 GHz)	Takumi Shimada (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.	59.049	QP	22.3	8.1	7.5	32.2	-	5.8	40.0	34.2	
Hori.	62.321	QP	22.1	7.3	7.6	32.2	-	4.8	40.0	35.2	
Hori.	99.293	QP	21.5	10.1	8.1	32.2	-	7.6	43.5	35.9	
Hori.	352.783	QP	21.4	15.0	10.4	31.9	-	14.9	46.0	31.2	
Hori.	558.285	QP	20.5	18.1	11.7	32.0	-	18.3	46.0	27.7	
Hori.	959.896	QP	21.4	22.2	13.8	30.6	-	26.7	46.0	19.3	
Hori.	2483.500	PK	44.0	27.5	5.5	32.7	-	44.3	73.9	29.6	
Hori.	4960.000	PK	40.6	31.6	7.5	31.8	-	47.8	73.9	26.1	Floor noise
Hori.	7440.000	PK	43.2	36.3	8.9	32.7	-	55.7	73.9	18.2	Floor noise
Hori.	9920.000	PK	42.6	38.9	9.4	33.4	-	57.5	73.9	16.4	Floor noise
Hori.	2483.500	AV	35.1	27.5	5.5	32.7	1.1	36.4	53.9	17.5	*1)
Hori.	4960.000	AV	31.4	31.6	7.5	31.8	-	38.7	53.9	15.2	Floor noise
Hori.	7440.000	AV	33.0	36.3	8.9	32.7	-	45.5	53.9	8.4	Floor noise
Hori.	9920.000	AV	32.6	38.9	9.4	33.4	-	47.4	53.9	6.5	Floor noise
Vert.	59.087	QP	25.8	8.1	7.5	32.2	-	9.3	40.0	30.7	
Vert.	62.300	QP	25.7	7.3	7.6	32.2	-	8.4	40.0	31.6	
Vert.	99.021	QP	22.3	10.1	8.1	32.2	-	8.3	43.5	35.2	
Vert.	352.888	QP	21.6	15.0	10.4	31.9	-	15.1	46.0	31.0	
Vert.	558.456	QP	20.6	18.1	11.7	32.0	-	18.4	46.0	27.6	
Vert.	959.889	QP	20.5	22.2	13.8	30.6	-	25.8	46.0	20.2	
Vert.	2483.500	PK	47.4	27.5	5.5	32.7	-	47.7	73.9	26.2	
Vert.	4960.000	PK	41.2	31.6	7.5	31.8	-	48.5	73.9	25.4	Floor noise
Vert.	7440.000	PK	42.0	36.3	8.9	32.7	-	54.4	73.9	19.5	Floor noise
Vert.	9920.000	PK	42.6	38.9	9.4	33.4	-	57.5	73.9	16.4	Floor noise
Vert.	2483.500	AV	36.6	27.5	5.5	32.7	1.1	38.0	53.9	15.9	*1)
Vert.	4960.000	AV	31.4	31.6	7.5	31.8	-	38.7	53.9	15.2	Floor noise
Vert.	7440.000	AV	33.2	36.3	8.9	32.7	-	45.7	53.9	8.2	Floor noise
Vert.	9920.000	AV	32.5	38.9	9.4	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) + Duty factor

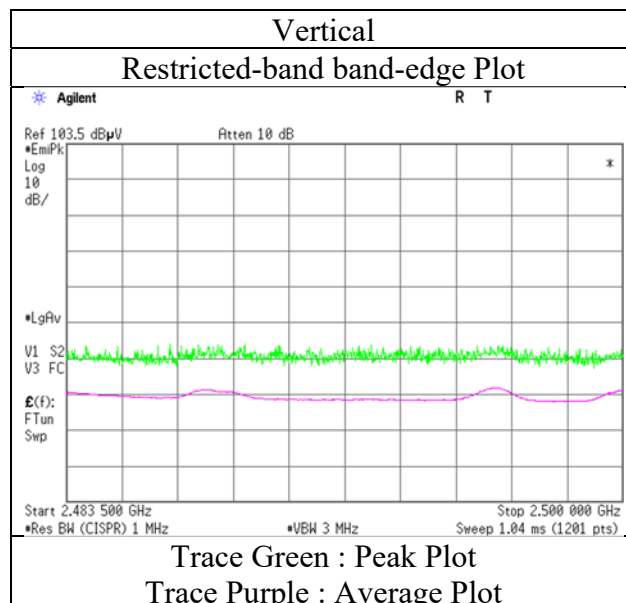
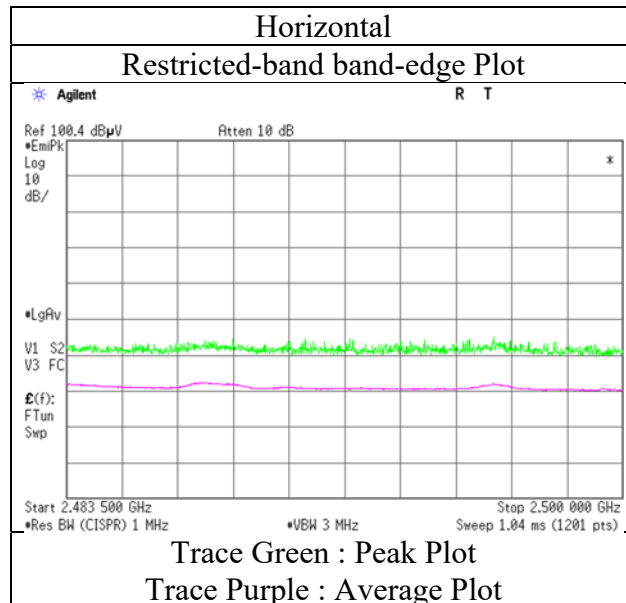
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

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) (IFA Antenna BT1)

Report No.	13170804H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 6, 2020
Temperature / Humidity	23 deg. C / 40 % RH
Engineer	Takumi Shimada (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.

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Radiated Spurious Emission (IFA Antenna BT1)

Report No. 13170804H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date January 6, 2020 No.3 January 8, 2020 No.3 January 8, 2020 No.3 January 14, 2020
Temperature / Humidity 23 deg. C / 40 % RH 22 deg. C / 39 RH 23 deg. C / 35 % RH 21 deg. C / 24 % RH
Engineer Takumi Shimada Junki Nagatomi Tomohisa Nakagawa Takumi Shimada
(1 GHz -10 GHz) (10 GHz -18 GHz) (18 GHz - 26.5 GHz) (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.	59.612	QP	22.4	8.0	7.5	32.2	-	5.7	40.0	34.3	
Hori.	62.559	QP	22.2	7.3	7.6	32.2	-	4.9	40.0	35.1	
Hori.	98.644	QP	21.6	10.0	8.1	32.2	-	7.5	43.5	36.0	
Hori.	353.672	QP	21.6	15.0	10.4	31.9	-	15.1	46.0	31.0	
Hori.	547.193	QP	20.4	17.8	11.6	32.0	-	17.8	46.0	28.2	
Hori.	959.916	QP	21.5	22.2	13.8	30.6	-	26.8	46.0	19.2	
Hori.	2390.000	PK	48.2	27.7	5.4	32.8	-	48.5	73.9	25.4	
Hori.	4804.000	PK	40.2	31.6	7.5	31.8	-	47.5	73.9	26.4	Floor noise
Hori.	7206.000	PK	41.2	36.0	8.9	32.7	-	53.4	73.9	20.5	Floor noise
Hori.	9608.000	PK	41.4	38.5	9.4	33.3	-	56.0	73.9	17.9	Floor noise
Hori.	2390.000	AV	32.5	27.7	5.4	32.8	1.1	34.0	53.9	20.0	*1)
Hori.	4804.000	AV	31.3	31.6	7.5	31.8	-	38.6	53.9	15.3	Floor noise
Hori.	7206.000	AV	31.9	36.0	8.9	32.7	-	44.2	53.9	9.8	Floor noise
Hori.	9608.000	AV	32.7	38.5	9.4	33.3	-	47.2	53.9	6.7	Floor noise
Vert.	59.607	QP	25.6	8.0	7.5	32.2	-	8.9	40.0	31.1	
Vert.	62.515	QP	25.3	7.3	7.6	32.2	-	8.0	40.0	32.0	
Vert.	98.661	QP	22.2	10.0	8.1	32.2	-	8.1	43.5	35.4	
Vert.	353.684	QP	21.4	15.0	10.4	31.9	-	14.9	46.0	31.1	
Vert.	547.122	QP	20.3	17.8	11.6	32.0	-	17.7	46.0	28.3	
Vert.	959.879	QP	20.3	22.2	13.8	30.6	-	25.6	46.0	20.4	
Vert.	2390.000	PK	53.9	27.7	5.4	32.8	-	54.2	73.9	19.7	
Vert.	4804.000	PK	41.4	31.6	7.5	31.8	-	48.6	73.9	25.3	Floor noise
Vert.	7206.000	PK	41.4	36.0	8.9	32.7	-	53.6	73.9	20.3	Floor noise
Vert.	9608.000	PK	41.4	38.5	9.4	33.3	-	56.0	73.9	18.0	Floor noise
Vert.	2390.000	AV	37.1	27.7	5.4	32.8	1.1	38.6	53.9	15.4	*1)
Vert.	4804.000	AV	31.3	31.6	7.5	31.8	-	38.6	53.9	15.3	Floor noise
Vert.	7206.000	AV	32.1	36.0	8.9	32.7	-	44.4	53.9	9.6	Floor noise
Vert.	9608.000	AV	32.6	38.5	9.4	33.3	-	47.2	53.9	6.7	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 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	96.2	27.7	5.4	32.7	96.5	-	-	Carrier
Hori.	2400.000	PK	46.5	27.7	5.4	32.7	46.9	76.5	29.6	
Vert.	2402.000	PK	97.9	27.7	5.4	32.7	98.3	-	-	Carrier
Vert.	2400.000	PK	47.9	27.7	5.4	32.7	48.3	78.3	30.0	

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

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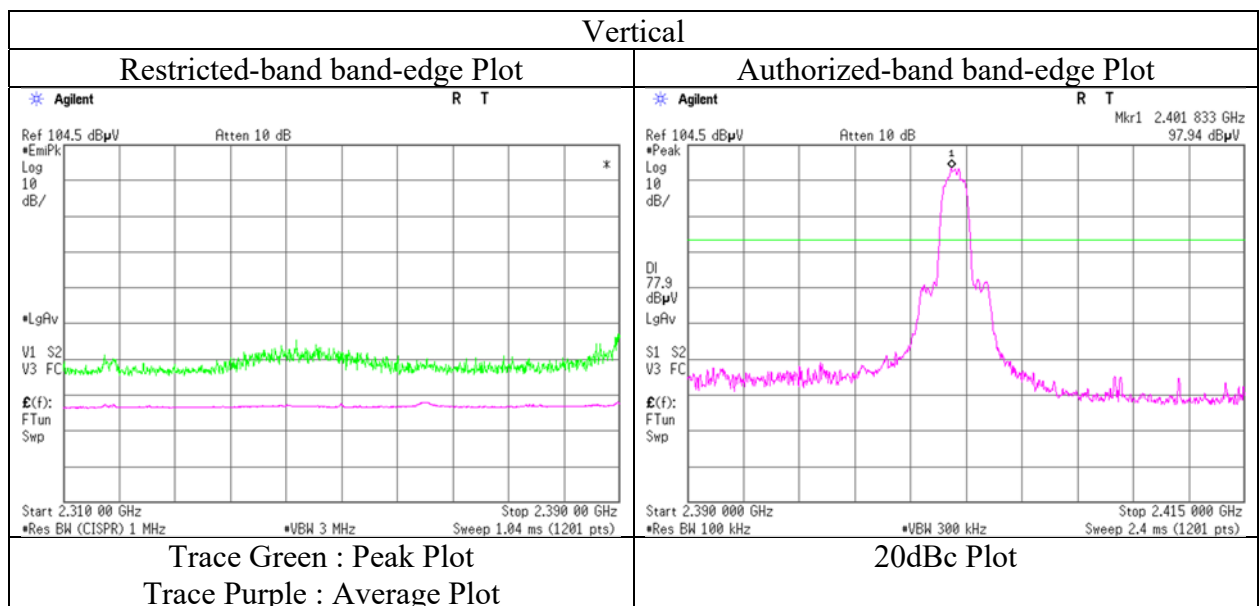
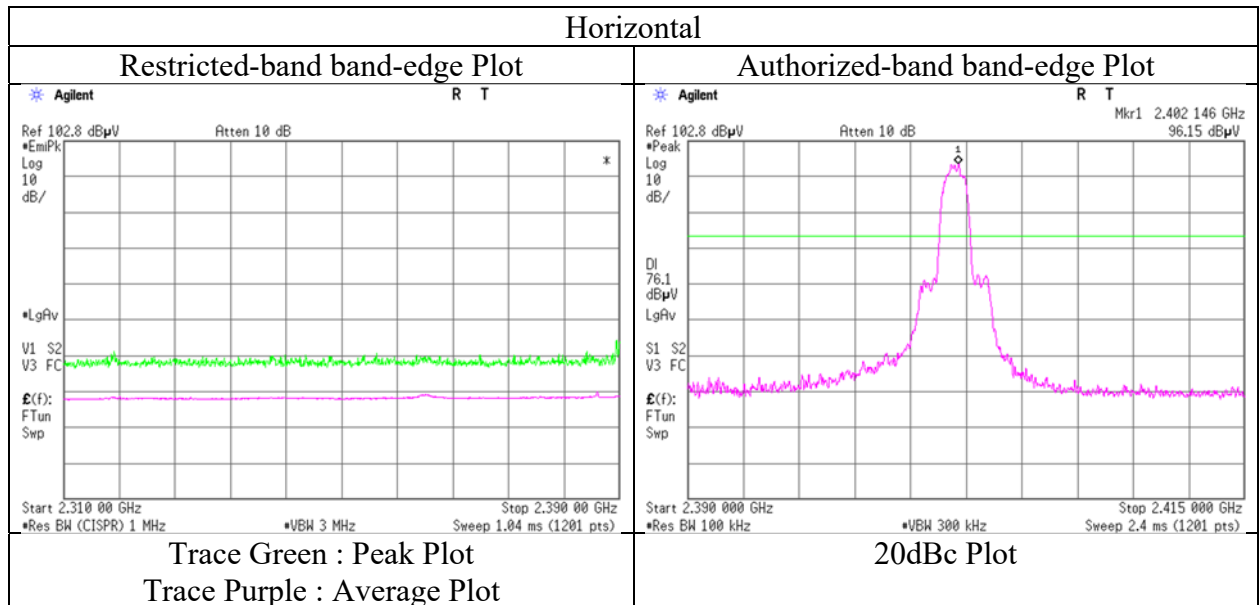
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Radiated Spurious Emission (Reference Plot for band-edge) (IFA Antenna BT1)

Report No.	13170804H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 6, 2020
Temperature / Humidity	23 deg. C / 40 % RH
Engineer	Takumi Shimada (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.

Ise EMC Lab.

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

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Radiated Spurious Emission (IFA Antenna BT1)

Report No. 13170804H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date January 6, 2020 No.3
Temperature / Humidity 23 deg. C / 40 % RH January 8, 2020 No.3
Engineer Takumi Shimada Junki Nagatomi January 8, 2020 No.3
(1 GHz -10 GHz) (10 GHz -18 GHz) (18 GHz - 26.5 GHz) January 14, 2020
Mode Tx, Hopping Off, 3DH5 2441 MHz Takumi Shimada
(Below 1 GHz)

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.	59.612	QP	22.4	8.0	7.5	32.2	-	5.7	40.0	34.3	
Hori.	62.559	QP	22.2	7.3	7.6	32.2	-	4.9	40.0	35.1	
Hori.	98.644	QP	21.6	10.0	8.1	32.2	-	7.5	43.5	36.0	
Hori.	352.069	QP	21.5	15.0	10.3	31.9	-	14.9	46.0	31.1	
Hori.	545.390	QP	20.3	17.8	11.6	32.0	-	17.7	46.0	28.3	
Hori.	960.003	QP	22.3	22.2	13.8	30.6	-	27.6	53.9	26.3	
Hori.	4882.000	PK	41.2	31.5	7.5	31.8	-	48.4	73.9	25.5	Floor noise
Hori.	7323.000	PK	42.1	36.2	8.9	32.7	-	54.5	73.9	19.4	Floor noise
Hori.	9764.000	PK	41.5	38.8	9.4	33.4	-	56.3	73.9	17.6	Floor noise
Hori.	4882.000	AV	31.4	31.5	7.5	31.8	-	38.6	53.9	15.3	Floor noise
Hori.	7323.000	AV	32.1	36.2	8.9	32.7	-	44.5	53.9	9.4	Floor noise
Hori.	9764.000	AV	32.7	38.8	9.4	33.4	-	47.5	53.9	6.4	Floor noise
Vert.	59.607	QP	25.6	8.0	7.5	32.2	-	8.9	40.0	31.1	
Vert.	62.515	QP	25.3	7.3	7.6	32.2	-	8.0	40.0	32.0	
Vert.	98.661	QP	22.2	10.0	8.1	32.2	-	8.1	43.5	35.4	
Vert.	352.069	QP	21.3	15.0	10.3	31.9	-	14.7	46.0	31.3	
Vert.	545.390	QP	20.4	17.8	11.6	32.0	-	17.8	46.0	28.2	
Vert.	959.992	QP	20.1	22.2	13.8	30.6	-	25.4	46.0	20.6	
Vert.	4882.000	PK	41.2	31.5	7.5	31.8	-	48.4	73.9	25.5	Floor noise
Vert.	7323.000	PK	42.2	36.2	8.9	32.7	-	54.5	73.9	19.4	Floor noise
Vert.	9764.000	PK	42.2	38.8	9.4	33.4	-	57.0	73.9	16.9	Floor noise
Vert.	4882.000	AV	31.4	31.5	7.5	31.8	-	38.7	53.9	15.3	Floor noise
Vert.	7323.000	AV	32.2	36.2	8.9	32.7	-	44.6	53.9	9.3	Floor noise
Vert.	9764.000	AV	32.7	38.8	9.4	33.4	-	47.5	53.9	6.4	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 (IFA Antenna BT1)

Report No.	13170804H			
Test place	Ise EMC Lab.			
Semi Anechoic Chamber	No.3	No.3	No.3	No.3
Date	January 6, 2020	January 8, 2020	January 8, 2020	January 14, 2020
Temperature / Humidity	23 deg. C / 40 % RH	22 deg. C / 39 RH	23 deg. C / 35 % RH	21 deg. C / 24 % RH
Engineer	Takumi Shimada (1 GHz -10 GHz)	Junki Nagatomi (10 GHz -18 GHz)	Tomohisa Nakagawa (18 GHz - 26.5 GHz)	Takumi Shimada (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.	59.071	QP	22.3	8.1	7.5	32.2	-	5.8	40.0	34.2	
Hori.	62.596	QP	22.4	7.3	7.6	32.2	-	5.1	40.0	34.9	
Hori.	99.184	QP	21.3	10.1	8.1	32.2	-	7.3	43.5	36.2	
Hori.	345.673	QP	21.4	15.0	10.3	31.9	-	14.7	46.0	31.3	
Hori.	546.564	QP	20.5	17.8	11.6	32.0	-	17.9	46.0	28.1	
Hori.	959.989	QP	22.4	22.2	13.8	30.6	-	27.7	46.0	18.3	
Hori.	2483.500	PK	51.1	27.5	5.5	32.7	-	51.3	73.9	22.6	
Hori.	4960.000	PK	41.2	31.6	7.5	31.8	-	48.5	73.9	25.4	Floor noise
Hori.	7440.000	PK	42.1	36.3	8.9	32.7	-	54.6	73.9	19.3	Floor noise
Hori.	9920.000	PK	42.6	38.9	9.4	33.4	-	57.5	73.9	16.4	Floor noise
Hori.	2483.500	AV	38.5	27.5	5.5	32.7	1.1	39.8	53.9	14.1	*1)
Hori.	4960.000	AV	31.5	31.6	7.5	31.8	-	38.8	53.9	15.1	Floor noise
Hori.	7440.000	AV	33.0	36.3	8.9	32.7	-	45.5	53.9	8.4	Floor noise
Hori.	9920.000	AV	32.6	38.9	9.4	33.4	-	47.5	53.9	6.4	Floor noise
Vert.	59.037	QP	25.2	8.1	7.5	32.2	-	8.7	40.0	31.3	
Vert.	62.532	QP	23.8	7.3	7.6	32.2	-	6.5	40.0	33.5	
Vert.	99.426	QP	22.5	10.2	8.1	32.2	-	8.6	43.5	34.9	
Vert.	345.293	QP	21.0	15.0	10.3	31.9	-	14.3	46.0	31.7	
Vert.	546.229	QP	20.4	17.8	11.6	32.0	-	17.8	46.0	28.2	
Vert.	959.998	QP	20.2	22.2	13.8	30.6	-	25.5	46.0	20.5	
Vert.	2483.500	PK	53.3	27.5	5.5	32.7	-	53.6	73.9	20.3	
Vert.	4960.000	PK	41.2	31.6	7.5	31.8	-	48.5	73.9	25.4	Floor noise
Vert.	7440.000	PK	42.0	36.3	8.9	32.7	-	54.5	73.9	19.4	Floor noise
Vert.	9920.000	PK	42.6	38.9	9.4	33.4	-	57.5	73.9	16.4	Floor noise
Vert.	2483.500	AV	41.3	27.5	5.5	32.7	1.1	42.7	53.9	11.3	*1)
Vert.	4960.000	AV	31.5	31.6	7.5	31.8	-	38.7	53.9	15.2	Floor noise
Vert.	7440.000	AV	33.0	36.3	8.9	32.7	-	45.5	53.9	8.4	Floor noise
Vert.	9920.000	AV	32.6	38.9	9.4	33.4	-	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).

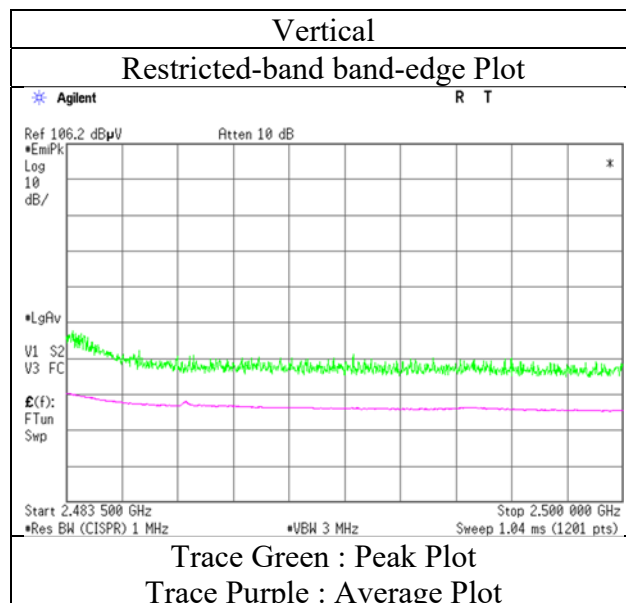
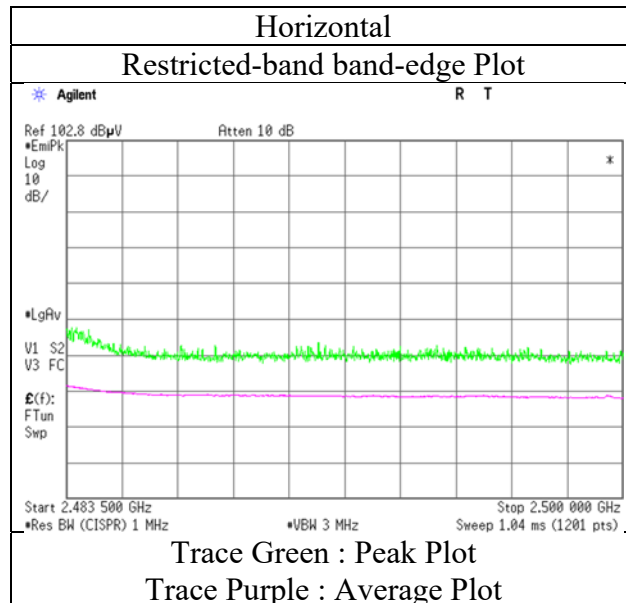
Distance factor: 1 GHz - 10 GHz 20log (3.95 m / 3.0 m) = 2.39 dB

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) (IFA Antenna BT1)

Report No.	13170804H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 6, 2020
Temperature / Humidity	23 deg. C / 40 % RH
Engineer	Takumi Shimada (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.

UL Japan, Inc.

Ise EMC Lab.

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Radiated Spurious Emission (IFA Antenna BT2)

Report No. 13170804H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date January 6, 2020 No.3 January 8, 2020 No.3 January 8, 2020 No.3 January 14, 2020
Temperature / Humidity 23 deg. C / 40 % RH 22 deg. C / 39 RH 23 deg. C / 35 % RH 21 deg. C / 24 % RH
Engineer Takumi Shimada Junki Nagatomi Tomohisa Nakagawa Takumi Shimada
(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.	59.553	QP	22.4	8.0	7.5	32.2	-	5.7	40.0	34.3	
Hori.	62.660	QP	22.0	7.3	7.6	32.2	-	4.7	40.0	35.3	
Hori.	92.391	QP	21.7	9.0	8.0	32.2	-	6.5	43.5	37.0	
Hori.	370.000	QP	21.1	15.1	10.5	31.9	-	14.7	46.0	31.3	
Hori.	547.498	QP	20.8	17.8	11.6	32.0	-	18.2	46.0	27.8	
Hori.	959.970	QP	20.0	22.2	13.8	30.6	-	25.3	46.0	20.7	
Hori.	2345.001	PK	45.1	27.8	5.4	32.8	-	45.5	73.9	28.4	
Hori.	2390.000	PK	45.9	27.7	5.4	32.8	-	46.3	73.9	27.6	
Hori.	4804.000	PK	31.3	31.6	7.5	31.8	-	38.6	73.9	35.3	Floor noise
Hori.	7206.000	PK	43.4	36.0	8.9	32.7	-	55.6	73.9	18.3	Floor noise
Hori.	9608.000	PK	41.4	38.5	9.4	33.3	-	56.0	73.9	17.9	Floor noise
Hori.	2345.001	AV	31.7	27.8	5.4	32.8	1.1	33.2	53.9	20.7	*2)
Hori.	2390.000	AV	32.2	27.7	5.4	32.8	1.1	33.6	53.9	20.3	*1)
Hori.	4804.000	AV	30.6	31.6	7.5	31.8	-	37.8	53.9	16.1	Floor noise
Hori.	7206.000	AV	32.0	36.0	8.9	32.7	-	44.2	53.9	9.7	Floor noise
Hori.	9608.000	AV	31.4	38.5	9.4	33.3	-	46.0	53.9	7.9	Floor noise
Vert.	59.672	QP	25.4	8.0	7.5	32.2	-	8.7	40.0	31.3	
Vert.	62.392	QP	25.8	7.3	7.6	32.2	-	8.5	40.0	31.5	
Vert.	92.573	QP	24.4	9.0	8.0	32.2	-	9.2	43.5	34.3	
Vert.	370.878	QP	20.9	15.1	10.5	31.9	-	14.5	46.0	31.5	
Vert.	547.498	QP	20.8	17.8	11.6	32.0	-	18.2	46.0	27.8	
Vert.	959.989	QP	19.6	22.2	13.8	30.6	-	24.9	46.0	21.1	
Vert.	2345.001	PK	47.2	27.8	5.4	32.8	-	47.6	73.9	26.3	
Vert.	2390.000	PK	48.8	27.7	5.4	32.8	-	49.2	73.9	24.7	
Vert.	4804.000	PK	40.6	31.6	7.5	31.8	-	47.8	73.9	26.1	Floor noise
Vert.	7206.000	PK	42.9	36.0	8.9	32.7	-	55.1	73.9	18.8	Floor noise
Vert.	9608.000	PK	41.7	38.5	9.4	33.3	-	56.3	73.9	17.6	Floor noise
Vert.	2345.001	AV	31.6	27.8	5.4	32.8	1.1	33.1	53.9	20.8	*2)
Vert.	2390.000	AV	34.8	27.7	5.4	32.8	1.1	36.2	53.9	17.7	*1)
Vert.	4804.000	AV	32.9	31.6	7.5	31.8	-	40.1	53.9	13.8	Floor noise
Vert.	7206.000	AV	34.0	36.0	8.9	32.7	-	46.2	53.9	7.7	Floor noise
Vert.	9608.000	AV	33.3	38.5	9.4	33.3	-	47.9	53.9	6.1	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.	2402.000	PK	95.3	27.7	5.4	32.7	95.7	-	-	Carrier
Hori.	2400.000	PK	38.9	27.7	5.4	32.7	39.3	75.7	36.4	
Vert.	2402.000	PK	94.3	27.7	5.4	32.7	94.7	-	-	Carrier
Vert.	2400.000	PK	38.4	27.7	5.4	32.7	38.8	74.7	35.9	

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

UL Japan, Inc.

Ise EMC Lab.

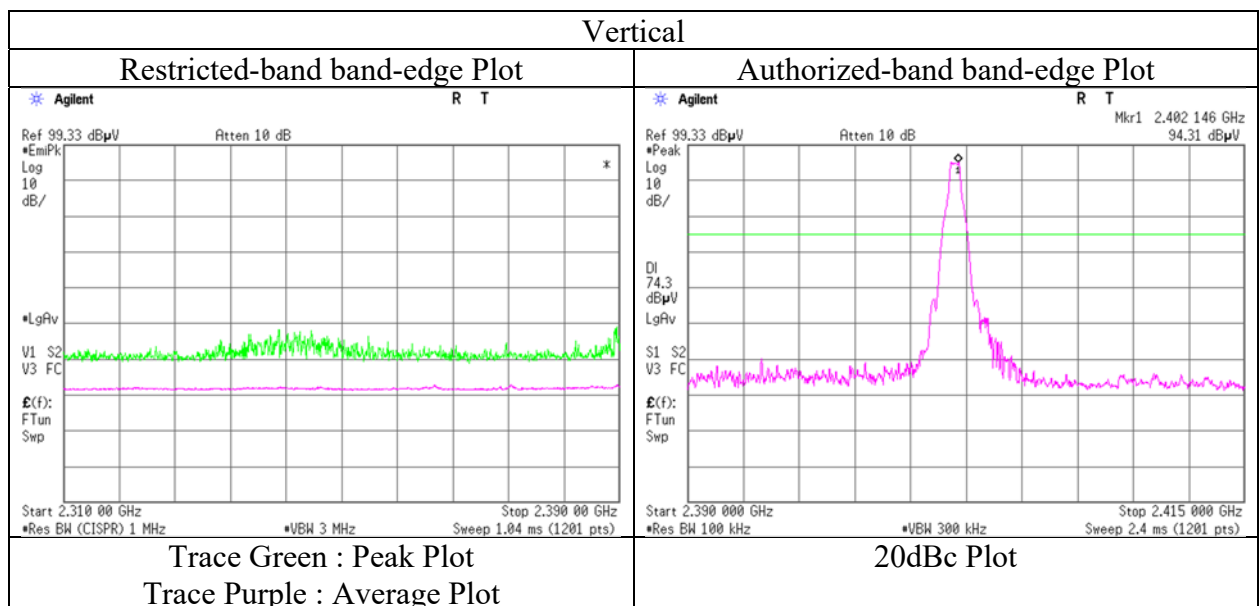
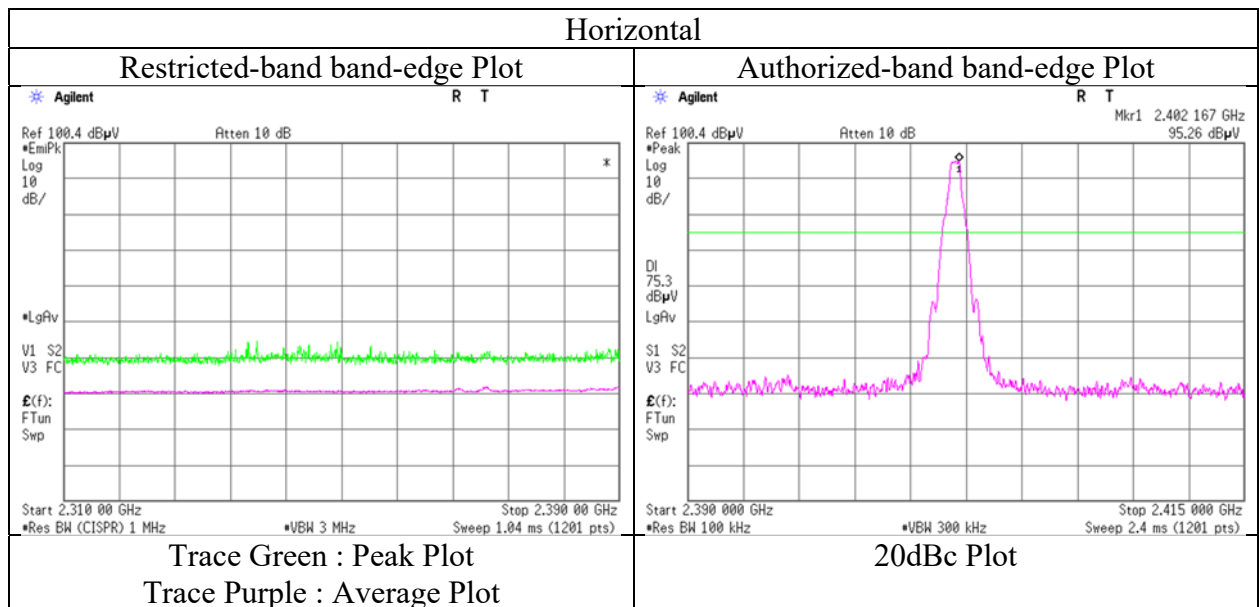
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Radiated Spurious Emission (Reference Plot for band-edge) (IFA Antenna BT2)

Report No.	13170804H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 6, 2020
Temperature / Humidity	23 deg. C / 32 % RH
Engineer	Tomohisa Nakagawa (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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Facsimile : +81 596 24 8124

Radiated Spurious Emission (IFA Antenna BT2)

Report No. 13170804H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date January 6, 2020 No.3 January 8, 2020 No.3 January 8, 2020 No.3 January 14, 2020
Temperature / Humidity 23 deg. C / 40 % RH 22 deg. C / 39 RH 23 deg. C / 35 % RH 21 deg. C / 24 % RH
Engineer Takumi Shimada Junki Nagatomi Tomohisa Nakagawa Takumi Shimada
(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.	58.073	QP	22.5	8.4	7.5	32.2	-	6.2	40.0	33.8	
Hori.	63.031	QP	22.2	7.2	7.6	32.2	-	4.8	40.0	35.2	
Hori.	92.901	QP	21.6	9.0	8.0	32.2	-	6.5	43.5	37.0	
Hori.	356.485	QP	21.2	15.0	10.4	31.9	-	14.7	46.0	31.3	
Hori.	557.475	QP	20.4	18.1	11.7	32.0	-	18.1	46.0	27.9	
Hori.	959.958	QP	20.2	22.2	13.8	30.6	-	25.5	46.0	20.5	
Hori.	2540.000	PK	47.3	27.5	5.5	32.7	-	47.6	73.9	26.3	
Hori.	4882.000	PK	42.1	31.5	7.5	31.8	-	49.4	73.9	24.5	Floor noise
Hori.	7323.000	PK	42.2	36.2	8.9	32.7	-	54.6	73.9	19.3	Floor noise
Hori.	9764.000	PK	42.0	38.8	9.4	33.4	-	56.9	73.9	17.1	Floor noise
Hori.	2540.000	AV	40.2	27.5	5.5	32.7	1.1	41.7	53.9	12.2	*1)
Hori.	4882.000	AV	31.5	31.5	7.5	31.8	-	38.8	53.9	15.1	Floor noise
Hori.	7323.000	AV	32.4	36.2	8.9	32.7	-	44.7	53.9	9.2	Floor noise
Hori.	9764.000	AV	32.9	38.8	9.4	33.4	-	47.7	53.9	6.2	Floor noise
Vert.	58.033	QP	23.9	8.4	7.5	32.2	-	7.6	40.0	32.4	
Vert.	62.584	QP	25.7	7.3	7.6	32.2	-	8.4	40.0	31.6	
Vert.	92.965	QP	24.3	9.1	8.0	32.2	-	9.2	43.5	34.3	
Vert.	356.561	QP	21.0	15.0	10.4	31.9	-	14.5	46.0	31.5	
Vert.	557.777	QP	20.6	18.1	11.7	32.0	-	18.4	46.0	27.7	
Vert.	959.899	QP	19.8	22.2	13.8	30.6	-	25.1	46.0	20.9	
Vert.	2540.000	PK	47.6	27.5	5.5	32.7	-	47.9	73.9	26.0	
Vert.	4882.000	PK	40.8	31.5	7.5	31.8	-	48.1	73.9	25.8	Floor noise
Vert.	7323.000	PK	42.0	36.2	8.9	32.7	-	54.3	73.9	19.6	Floor noise
Vert.	9764.000	PK	42.3	38.8	9.4	33.4	-	57.1	73.9	16.8	Floor noise
Vert.	2540.000	AV	39.4	27.5	5.5	32.7	1.1	40.9	53.9	13.1	*1)
Vert.	4882.000	AV	31.5	31.5	7.5	31.8	-	38.7	53.9	15.2	Floor noise
Vert.	7323.000	AV	32.3	36.2	8.9	32.7	-	44.7	53.9	9.2	Floor noise
Vert.	9764.000	AV	32.8	38.8	9.4	33.4	-	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) Noise synchronized with duty of carrier frequency.

Radiated Spurious Emission (IFA Antenna BT2)

Report No. 13170804H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date January 6, 2020 No.3 January 8, 2020 No.3 January 8, 2020 No.3 January 14, 2020
Temperature / Humidity 23 deg. C / 40 % RH 22 deg. C / 39 RH 23 deg. C / 35 % RH 21 deg. C / 24 % RH
Engineer Takumi Shimada Junki Nagatomi Tomohisa Nakagawa Takumi Shimada
(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.	59.215	QP	22.3	8.1	7.5	32.2	-	5.7	40.0	34.3	
Hori.	62.343	QP	22.4	7.3	7.6	32.2	-	5.1	40.0	34.9	
Hori.	94.940	QP	21.1	9.3	8.0	32.2	-	6.3	43.5	37.2	
Hori.	369.188	QP	21.3	15.1	10.5	31.9	-	14.9	46.0	31.1	
Hori.	546.224	QP	20.3	17.8	11.6	32.0	-	17.7	46.0	28.3	
Hori.	959.997	QP	20.5	22.2	13.8	30.6	-	25.8	46.0	20.2	
Hori.	2483.500	PK	46.6	27.5	5.5	32.7	-	46.8	73.9	27.1	
Hori.	2487.500	PK	46.7	27.4	5.5	32.7	-	46.9	73.9	27.0	
Hori.	4960.000	PK	40.0	31.6	7.5	31.8	-	47.3	73.9	26.6	Floor noise
Hori.	7440.000	PK	42.8	36.3	8.9	32.7	-	55.3	73.9	18.6	Floor noise
Hori.	9920.000	PK	42.9	38.9	9.4	33.4	-	57.8	73.9	16.1	Floor noise
Hori.	2483.500	AV	36.5	27.5	5.5	32.7	1.1	37.9	53.9	16.0	*1)
Hori.	2487.500	AV	36.9	27.4	5.5	32.7	1.1	38.2	53.9	15.7	*2)
Hori.	4960.000	AV	31.6	31.6	7.5	31.8	-	38.9	53.9	15.0	Floor noise
Hori.	7440.000	AV	33.3	36.3	8.9	32.7	-	45.7	53.9	8.2	Floor noise
Hori.	9920.000	AV	32.5	38.9	9.4	33.4	-	47.4	53.9	6.5	Floor noise
Vert.	59.215	QP	23.7	8.1	7.5	32.2	-	7.1	40.0	32.9	
Vert.	62.343	QP	25.6	7.3	7.6	32.2	-	8.3	40.0	31.7	
Vert.	94.940	QP	24.4	9.3	8.0	32.2	-	9.6	43.5	33.9	
Vert.	369.188	QP	21.2	15.1	10.5	31.9	-	14.8	46.0	31.2	
Vert.	546.451	QP	20.5	17.8	11.6	32.0	-	17.9	46.0	28.1	
Vert.	959.995	QP	19.6	22.2	13.8	30.6	-	24.9	46.0	21.1	
Vert.	2483.500	PK	45.3	27.5	5.5	32.7	-	45.5	73.9	28.4	
Vert.	2487.500	PK	48.2	27.4	5.5	32.7	-	48.4	73.9	25.5	
Vert.	4960.000	PK	43.6	31.6	7.5	31.8	-	50.9	73.9	23.0	Floor noise
Vert.	7440.000	PK	43.2	36.3	8.9	32.7	-	55.7	73.9	18.3	Floor noise
Vert.	9920.000	PK	42.4	38.9	9.4	33.4	-	57.3	73.9	16.7	Floor noise
Vert.	2483.500	AV	36.0	27.5	5.5	32.7	1.1	37.4	53.9	16.5	*1)
Vert.	2487.500	AV	36.6	27.4	5.5	32.7	1.1	37.9	53.9	16.0	*2)
Vert.	4960.000	AV	31.7	31.6	7.5	31.8	-	39.0	53.9	15.0	Floor noise
Vert.	7440.000	AV	33.7	36.3	8.9	32.7	-	46.2	53.9	7.7	Floor noise
Vert.	9920.000	AV	33.0	38.9	9.4	33.4	-	47.9	53.9	6.1	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).

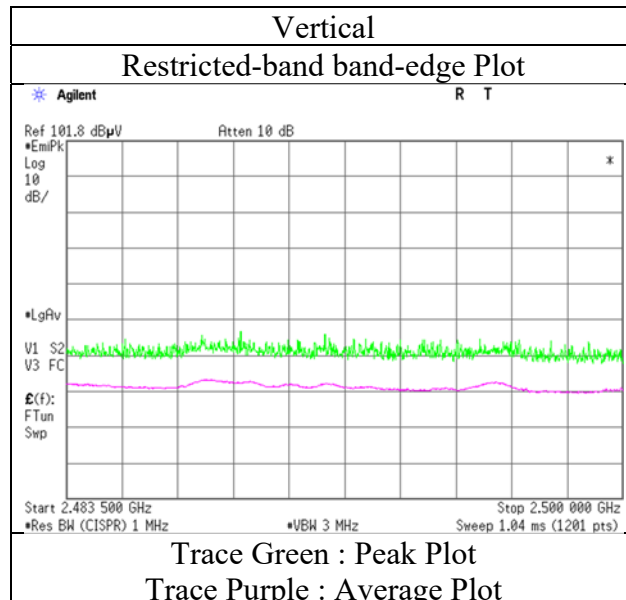
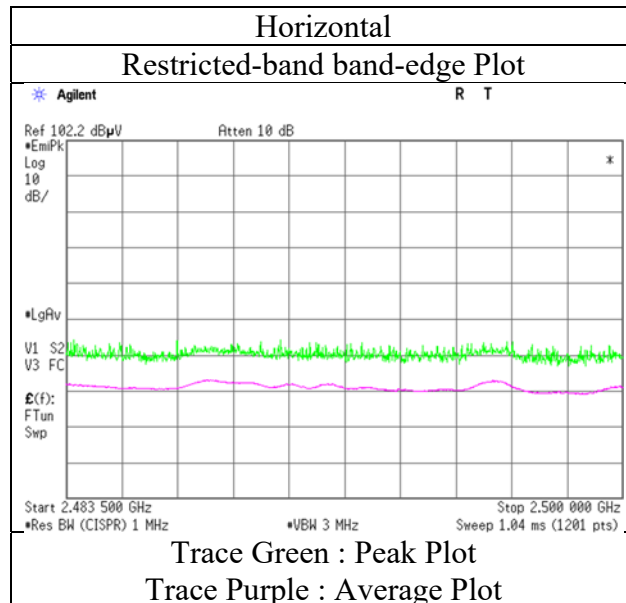
Distance factor: 1 GHz - 10 GHz $20\log(3.95\text{ m} / 3.0\text{ m}) = 2.39\text{ dB}$
10 GHz - 26.5 GHz $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

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

*2) Noise synchronized with duty of carrier frequency.

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

Report No.	13170804H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 6, 2020
Temperature / Humidity	23 deg. C / 43 % RH
Engineer	Tomohisa Nakagawa (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 (IFA Antenna BT2)

Report No. 13170804H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date January 6, 2020 No.3 January 8, 2020 No.3 January 8, 2020 No.3 January 14, 2020
Temperature / Humidity 23 deg. C / 40 % RH 22 deg. C / 39 RH 23 deg. C / 35 % RH 21 deg. C / 24 % RH
Engineer Takumi Shimada Junki Nagatomi Tomohisa Nakagawa Takumi Shimada
(1 GHz -10 GHz) (10 GHz -18 GHz) (18 GHz - 26.5 GHz) (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.	59.854	QP	22.2	7.9	7.5	32.2	-	5.5	40.0	34.5	
Hori.	62.996	QP	21.7	7.3	7.6	32.2	-	4.3	40.0	35.7	
Hori.	99.444	QP	21.6	10.2	8.1	32.2	-	7.7	43.5	35.8	
Hori.	369.242	QP	21.5	15.1	10.5	31.9	-	15.1	46.0	30.9	
Hori.	548.682	QP	20.1	17.8	11.6	32.0	-	17.6	46.0	28.4	
Hori.	960.356	QP	20.4	22.2	13.8	30.6	-	25.7	53.9	28.2	
Hori.	2345.100	PK	45.1	27.8	5.4	32.8	-	45.4	73.9	28.5	
Hori.	2390.000	PK	45.0	27.7	5.4	32.8	-	45.3	73.9	28.6	
Hori.	4804.000	PK	42.4	31.6	7.5	31.8	-	49.7	73.9	24.2	Floor noise
Hori.	7206.000	PK	42.2	36.0	8.9	32.7	-	54.4	73.9	19.5	Floor noise
Hori.	9608.000	PK	42.1	38.5	9.4	33.3	-	56.6	73.9	17.3	Floor noise
Hori.	2345.100	AV	31.4	27.8	5.4	32.8	1.1	32.8	53.9	21.1	*2)
Hori.	2390.000	AV	31.7	27.7	5.4	32.8	1.1	33.1	53.9	20.8	*1)
Hori.	4804.000	AV	31.2	31.6	7.5	31.8	-	38.4	53.9	15.5	Floor noise
Hori.	7206.000	AV	32.1	36.0	8.9	32.7	-	44.3	53.9	9.6	Floor noise
Hori.	9608.000	AV	31.4	38.5	9.4	33.3	-	45.9	53.9	8.0	Floor noise
Vert.	59.868	QP	24.8	7.9	7.5	32.2	-	8.1	40.0	31.9	
Vert.	62.862	QP	24.7	7.3	7.6	32.2	-	7.4	40.0	32.6	
Vert.	99.444	QP	23.7	10.2	8.1	32.2	-	9.8	43.5	33.7	
Vert.	369.242	QP	21.3	15.1	10.5	31.9	-	14.9	46.0	31.1	
Vert.	548.682	QP	20.3	17.8	11.6	32.0	-	17.8	46.0	28.2	
Vert.	960.356	QP	19.7	22.2	13.8	30.6	-	25.0	53.9	28.9	
Vert.	2345.100	PK	48.6	27.8	5.4	32.8	-	48.9	73.9	25.0	
Vert.	2390.000	PK	47.0	27.7	5.4	32.8	-	47.3	73.9	26.6	
Vert.	4804.000	PK	41.7	31.6	7.5	31.8	-	49.0	73.9	24.9	Floor noise
Vert.	7206.000	PK	42.1	36.0	8.9	32.7	-	54.3	73.9	19.6	Floor noise
Vert.	9608.000	PK	41.9	38.5	9.4	33.3	-	56.5	73.9	17.4	Floor noise
Vert.	2345.100	AV	34.8	27.8	5.4	32.8	1.1	36.3	53.9	17.7	*2)
Vert.	2390.000	AV	35.1	27.7	5.4	32.8	1.1	36.5	53.9	17.4	*1)
Vert.	4804.000	AV	31.6	31.6	7.5	31.8	-	38.8	53.9	15.1	Floor noise
Vert.	7206.000	AV	31.8	36.0	8.9	32.7	-	44.0	53.9	9.9	Floor noise
Vert.	9608.000	AV	31.2	38.5	9.4	33.3	-	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.	2402.000	PK	95.7	27.7	5.4	32.7	96.1	-	-	Carrier
Hori.	2400.000	PK	46.7	27.7	5.4	32.7	47.1	76.1	29.0	
Vert.	2402.000	PK	96.5	27.7	5.4	32.7	96.9	-	-	Carrier
Vert.	2400.000	PK	47.5	27.7	5.4	32.7	47.9	76.9	29.0	

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

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Ise EMC Lab.

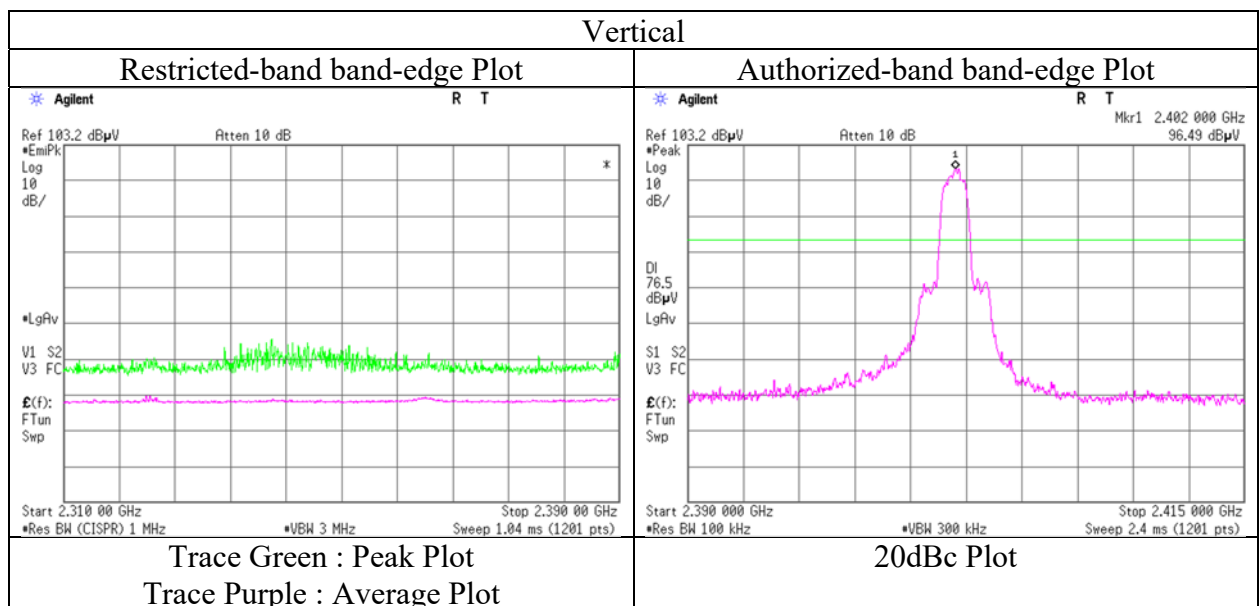
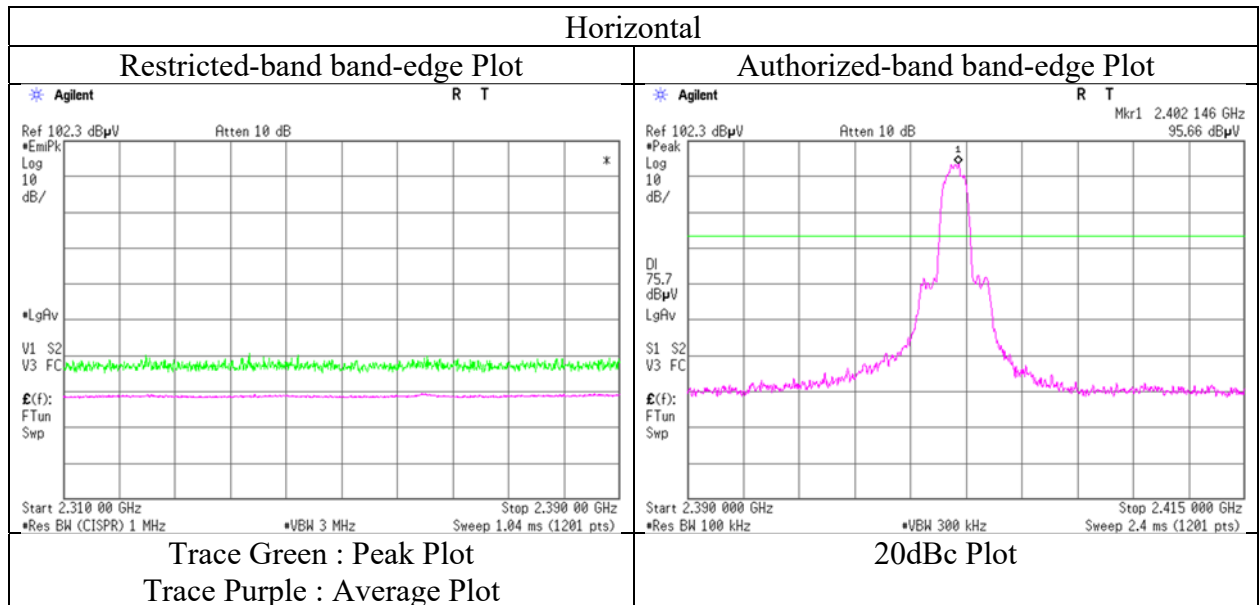
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Radiated Spurious Emission (Reference Plot for band-edge) (IFA Antenna BT2)

Report No.	13170804H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 6, 2020
Temperature / Humidity	23 deg. C / 43 % 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.

Ise EMC Lab.

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Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Radiated Spurious Emission (IFA Antenna BT2)

Report No.	13170804H			
Test place	Ise EMC Lab.			
Semi Anechoic Chamber	No.3	No.3	No.3	No.3
Date	January 6, 2020	January 8, 2020	January 8, 2020	January 14, 2020
Temperature / Humidity	23 deg. C / 40 % RH	22 deg. C / 39 RH	23 deg. C / 35 % RH	21 deg. C / 24 % RH
Engineer	Takumi Shimada (1 GHz -10 GHz)	Junki Nagatomi (10 GHz -18 GHz)	Tomohisa Nakagawa (18 GHz - 26.5 GHz)	Takumi Shimada (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.	59.314	QP	22.1	8.1	7.5	32.2	-	5.5	40.0	34.5	
Hori.	62.864	QP	21.5	7.3	7.6	32.2	-	4.2	40.0	35.8	
Hori.	98.525	QP	21.4	10.0	8.1	32.2	-	7.3	43.5	36.2	
Hori.	369.826	QP	22.1	15.1	10.5	31.9	-	15.7	46.0	30.3	
Hori.	548.542	QP	20.3	17.8	11.6	32.0	-	17.8	46.0	28.2	
Hori.	959.979	QP	20.5	22.2	13.8	30.6	-	25.8	46.0	20.2	
Hori.	4882.000	PK	41.3	31.5	7.5	31.8	-	48.5	73.9	25.4	Floor noise
Hori.	7323.000	PK	41.8	36.2	8.9	32.7	-	54.2	73.9	19.7	Floor noise
Hori.	9764.000	PK	41.7	38.8	9.4	33.4	-	56.5	73.9	17.4	Floor noise
Hori.	4882.000	AV	31.9	31.5	7.5	31.8	-	39.2	53.9	14.7	Floor noise
Hori.	7323.000	AV	32.7	36.2	8.9	32.7	-	45.0	53.9	8.9	Floor noise
Hori.	9764.000	AV	32.7	38.8	9.4	33.4	-	47.5	53.9	6.4	Floor noise
Vert.	59.752	QP	24.8	7.9	7.5	32.2	-	8.1	40.0	31.9	
Vert.	62.836	QP	24.4	7.3	7.6	32.2	-	7.1	40.0	32.9	
Vert.	98.523	QP	23.1	10.0	8.1	32.2	-	9.0	43.5	34.5	
Vert.	369.799	QP	21.5	15.1	10.5	31.9	-	15.1	46.0	30.9	
Vert.	548.517	QP	20.2	17.8	11.6	32.0	-	17.7	46.0	28.3	
Vert.	959.985	QP	19.6	22.2	13.8	30.6	-	24.9	46.0	21.1	
Vert.	4882.000	PK	41.2	31.5	7.5	31.8	-	48.5	73.9	25.4	Floor noise
Vert.	7323.000	PK	41.8	36.2	8.9	32.7	-	54.1	73.9	19.8	Floor noise
Vert.	9764.000	PK	41.7	38.8	9.4	33.4	-	56.5	73.9	17.4	Floor noise
Vert.	4882.000	AV	31.6	31.5	7.5	31.8	-	38.8	53.9	15.1	Floor noise
Vert.	7323.000	AV	32.7	36.2	8.9	32.7	-	45.1	53.9	8.8	Floor noise
Vert.	9764.000	AV	32.6	38.8	9.4	33.4	-	47.5	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 (IFA Antenna BT2)

Report No. 13170804H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.3
Date January 6, 2020 No.3 January 8, 2020 No.3 January 8, 2020 No.3 January 14, 2020
Temperature / Humidity 23 deg. C / 40 % RH 22 deg. C / 39 RH 23 deg. C / 35 % RH 21 deg. C / 24 % RH
Engineer Takumi Shimada Junki Nagatomi Tomohisa Nakagawa Takumi Shimada
(1 GHz -10 GHz) (10 GHz -18 GHz) (18 GHz - 26.5 GHz) (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.	59.773	QP	22.0	7.9	7.5	32.2	-	5.3	40.0	34.7	
Hori.	62.981	QP	21.6	7.3	7.6	32.2	-	4.2	40.0	35.8	
Hori.	92.900	QP	21.6	9.0	8.0	32.2	-	6.5	43.5	37.0	
Hori.	367.145	QP	22.4	15.0	10.5	31.9	-	15.9	46.0	30.1	
Hori.	546.507	QP	20.1	17.8	11.6	32.0	-	17.5	46.0	28.5	
Hori.	959.976	QP	20.3	22.2	13.8	30.6	-	25.6	46.0	20.4	
Hori.	2483.500	PK	52.0	27.5	5.5	32.7	-	52.3	73.9	21.7	
Hori.	4960.000	PK	41.6	31.6	7.5	31.8	-	48.9	73.9	25.0	Floor noise
Hori.	7440.000	PK	42.6	36.3	8.9	32.7	-	55.1	73.9	18.9	Floor noise
Hori.	9920.000	PK	42.0	38.9	9.4	33.4	-	56.9	73.9	17.0	Floor noise
Hori.	2483.500	AV	34.6	27.5	5.5	32.7	1.1	35.9	53.9	18.0	*1)
Hori.	4960.000	AV	31.7	31.6	7.5	31.8	-	39.0	53.9	14.9	Floor noise
Hori.	7440.000	AV	32.2	36.3	8.9	32.7	-	44.7	53.9	9.2	Floor noise
Hori.	9920.000	AV	32.7	38.9	9.4	33.4	-	47.6	53.9	6.3	Floor noise
Vert.	59.756	QP	24.7	7.9	7.5	32.2	-	8.0	40.0	32.0	
Vert.	62.955	QP	24.3	7.3	7.6	32.2	-	7.0	40.0	33.1	
Vert.	92.918	QP	23.4	9.1	8.0	32.2	-	8.3	43.5	35.2	
Vert.	367.129	QP	21.6	15.0	10.5	31.9	-	15.1	46.0	30.9	
Vert.	546.546	QP	20.3	17.8	11.6	32.0	-	17.7	46.0	28.3	
Vert.	959.914	QP	19.5	22.2	13.8	30.6	-	24.8	46.0	21.2	
Vert.	2483.500	PK	50.1	27.5	5.5	32.7	-	50.3	73.9	23.6	
Vert.	4960.000	PK	41.5	31.6	7.5	31.8	-	48.7	73.9	25.2	Floor noise
Vert.	7440.000	PK	42.5	36.3	8.9	32.7	-	55.0	73.9	19.0	Floor noise
Vert.	9920.000	PK	42.7	38.9	9.4	33.4	-	57.6	73.9	16.3	Floor noise
Vert.	2483.500	AV	42.2	27.5	5.5	32.7	1.1	43.6	53.9	10.3	*1)
Vert.	4960.000	AV	32.8	31.6	7.5	31.8	-	40.1	53.9	13.8	Floor noise
Vert.	7440.000	AV	34.2	36.3	8.9	32.7	-	46.7	53.9	7.2	Floor noise
Vert.	9920.000	AV	33.0	38.9	9.4	33.4	-	47.9	53.9	6.0	Floor noise

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

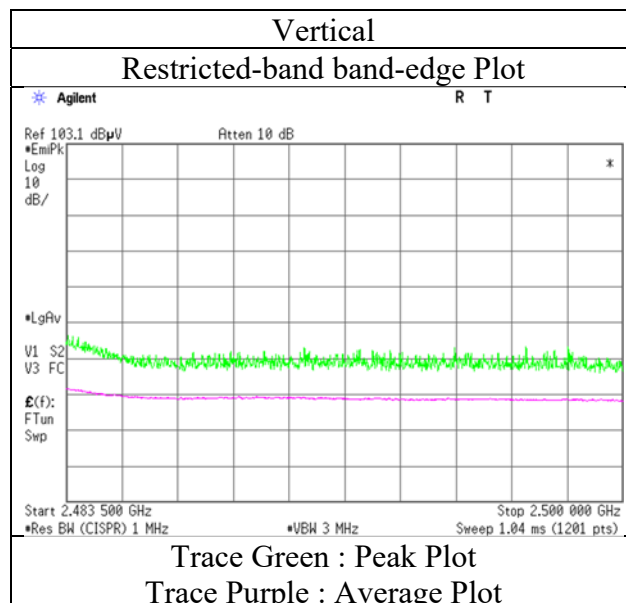
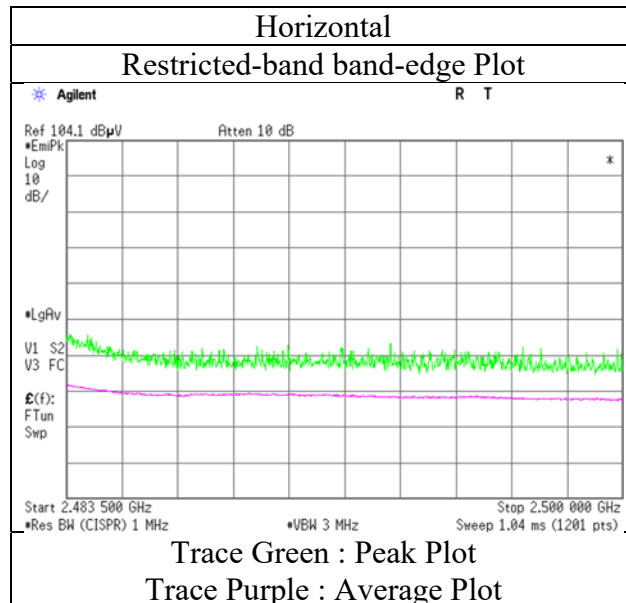
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

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)

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

Report No.	13170804H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.3
Date	January 6, 2020
Temperature / Humidity	23 deg. C / 43 % 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 (IFA Antenna BT1)

Report No.	13170804H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	January 20, 2020
Temperature / Humidity	22 deg. C / 30 % RH
Engineer	Koji Yamamoto
	(1 GHz -10 GHz)
Mode	Tx, Hopping Off, 3DH5 2402 MHz + Tx 11ax-40 5755MHz

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	50.5	27.6	5.1	35.2	-	47.9	73.9	26.0	
Hori.	2390.000	AV	38.7	27.6	5.1	35.2	1.1	37.2	53.9	16.7	*1)
Vert.	2390.000	PK	56.7	27.6	5.1	35.2	-	54.1	73.9	19.8	
Vert.	2390.000	AV	40.6	27.6	5.1	35.2	1.1	39.1	53.9	14.8	*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 $20\log(3.7\text{ m} / 3.0\text{ m}) = 1.83\text{ dB}$
 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	98.6	27.6	5.1	35.2	96.0	-	-	Carrier
Hori	2400.000	PK	49.1	27.6	5.1	35.2	46.4	76.0	29.5	
Vert	2402.000	PK	99.1	27.6	5.1	35.2	96.5	-	-	Carrier
Vert	2400.000	PK	49.6	27.6	5.1	35.2	47.0	76.5	29.5	

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

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Ise EMC Lab.

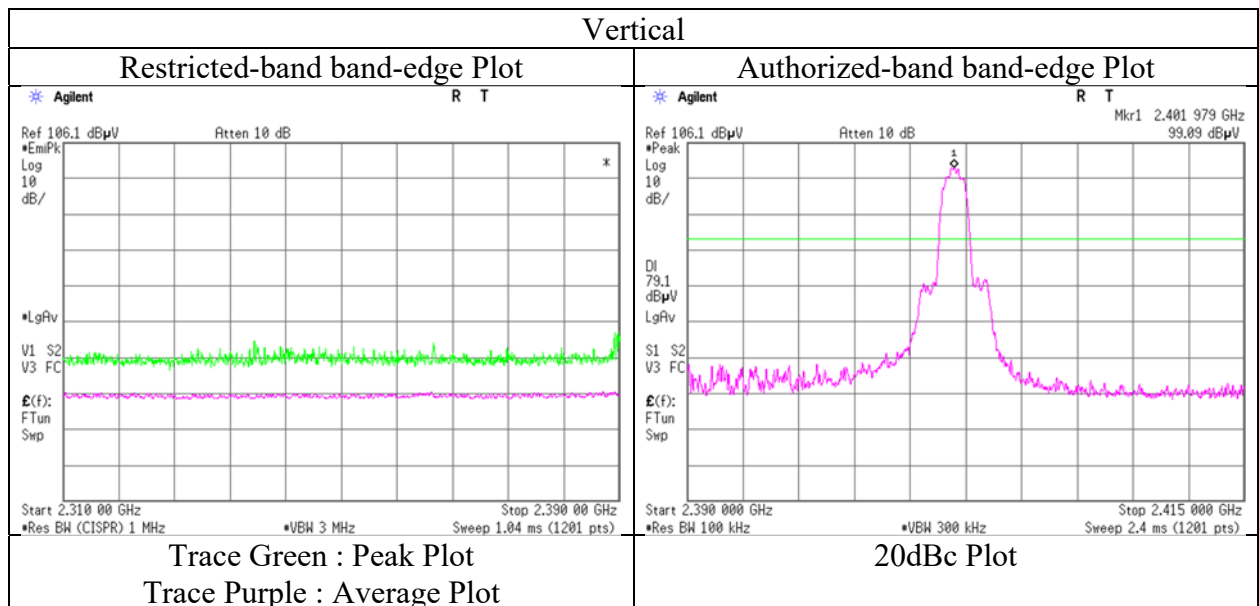
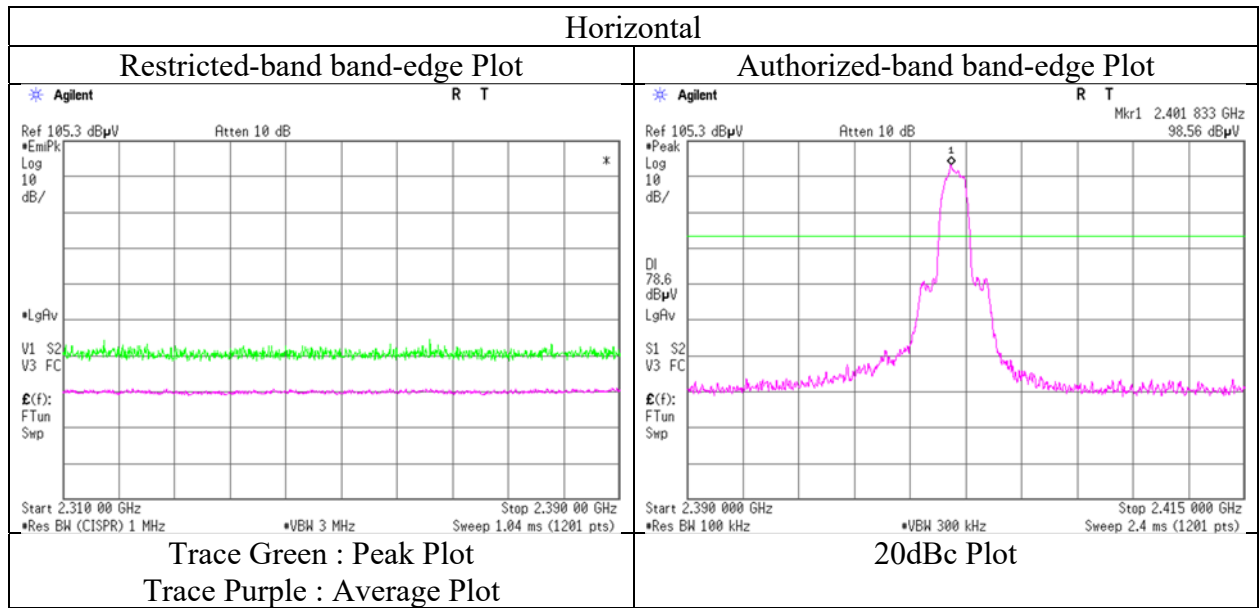
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Radiated Spurious Emission (Reference Plot for band-edge) (IFA Antenna BT1)

Report No.	13170804H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	January 20, 2020
Temperature / Humidity	22 deg. C /30 % RH
Engineer	Koji Yamamoto (1 GHz -10 GHz)
Mode	Tx, Hopping Off, 3DH5 2402 MHz + Tx 11ax-40 5755MHz



* 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 (IFA Antenna BT1)

Report No. 13170804H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.2
Date January 20, 2020 No.2 January 21, 2020 No.2 January 22, 2020
Temperature / Humidity 22 deg. C / 30 % RH 22 deg. C / 30 % RH 21 deg. C / 41 % RH
Engineer Koji Yamamoto Koji Yamamoto Takumi Shimada
(1 GHz -10 GHz) (10 GHz -26.5 GHz) (Below 1 GHz)
Mode Tx, Hopping Off, 3DH5 2441 MHz + Tx 11ax-40 5755MHz

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.	34.078	QP	26.3	17.1	7.1	30.5	-	20.1	40.0	20.0	
Hori.	52.457	QP	25.1	10.4	7.4	30.4	-	12.5	40.0	27.5	
Hori.	120.774	QP	24.2	13.0	8.2	30.1	-	15.3	43.5	28.2	
Hori.	362.707	QP	23.6	15.0	10.3	29.5	-	19.4	46.0	26.6	
Hori.	503.542	QP	23.7	17.5	11.1	30.0	-	22.2	46.0	23.8	
Hori.	969.627	QP	22.1	22.2	13.2	27.9	-	29.6	54.0	24.4	
Hori.	4882.000	PK	46.6	31.6	7.4	34.4	-	51.0	73.9	22.9	Floor noise
Hori.	7323.000	PK	46.3	36.1	8.3	34.4	-	56.3	73.9	17.6	Floor noise
Hori.	9764.000	PK	46.3	39.2	9.4	34.9	-	60.0	73.9	13.9	Floor noise
Hori.	4882.000	AV	36.4	31.6	7.4	34.4	-	40.9	53.9	13.0	Floor noise
Hori.	7323.000	AV	34.1	36.1	8.3	34.4	-	44.1	53.9	9.8	Floor noise
Hori.	9764.000	AV	33.4	39.2	9.4	34.9	-	47.1	53.9	6.8	Floor noise
Vert.	34.078	QP	31.5	17.1	7.1	30.5	-	25.3	40.0	14.8	
Vert.	52.457	QP	31.3	10.4	7.4	30.4	-	18.7	40.0	21.3	
Vert.	120.774	QP	24.6	13.0	8.2	30.1	-	15.7	43.5	27.8	
Vert.	362.707	QP	25.2	15.0	10.3	29.5	-	21.0	46.0	25.0	
Vert.	503.542	QP	23.9	17.5	11.1	30.0	-	22.4	46.0	23.6	
Vert.	969.627	QP	22.1	22.2	13.2	27.9	-	29.6	54.0	24.4	
Vert.	4882.000	PK	48.2	31.6	7.4	34.4	-	52.7	73.9	21.2	Floor noise
Vert.	7323.000	PK	47.1	36.1	8.3	34.4	-	57.1	73.9	16.8	Floor noise
Vert.	9764.000	PK	46.6	39.2	9.4	34.9	-	60.3	73.9	13.6	Floor noise
Vert.	4882.000	AV	36.4	31.6	7.4	34.4	-	40.9	53.9	13.0	Floor noise
Vert.	7323.000	AV	34.2	36.1	8.3	34.4	-	44.2	53.9	9.7	Floor noise
Vert.	9764.000	AV	33.2	39.2	9.4	34.9	-	46.9	53.9	7.0	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 (3.7 m / 3.0 m) = 1.83 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission (IFA Antenna BT1)

Report No.	13170804H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	January 20, 2020
Temperature / Humidity	22 deg. C /30 % RH
Engineer	Koji Yamamoto
	(1 GHz -10 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz + Tx 11ax-40 5755MHz

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	55.2	27.5	5.1	35.2	-	52.6	73.9	21.3	
Hori.	2483.500	AV	43.1	27.5	5.1	35.2	1.1	41.6	53.9	12.3	*1)
Vert.	2483.500	PK	55.4	27.5	5.1	35.2	-	52.8	73.9	21.1	
Vert.	2483.500	AV	43.0	27.5	5.1	35.2	1.1	41.5	53.9	12.4	*1)

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

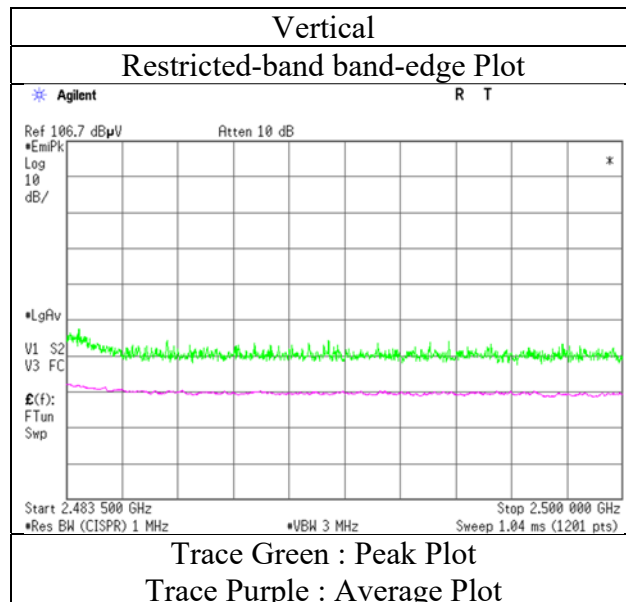
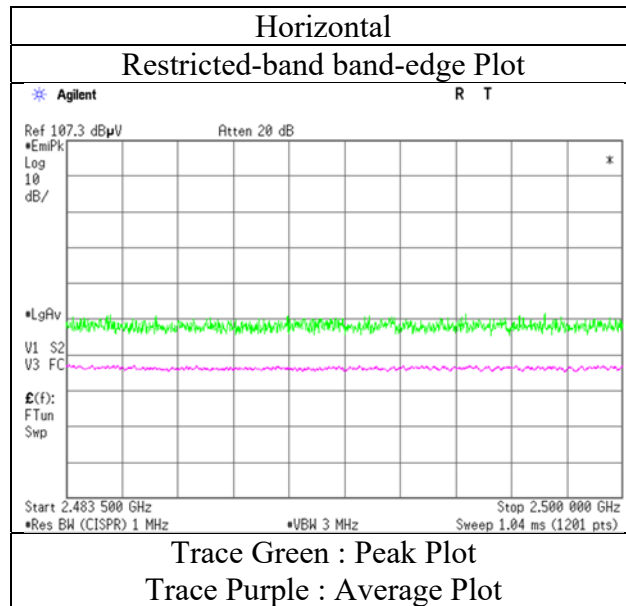
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz $20\log(3.7\text{ m} / 3.0\text{ m}) = 1.83\text{ dB}$
 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) (IFA Antenna BT1)

Report No.	13170804H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	January 20, 2020
Temperature / Humidity	22 deg. C / 30 % RH
Engineer	Koji Yamamoto (1 GHz -10 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz + Tx 11ax-40 5755MHz



* 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.

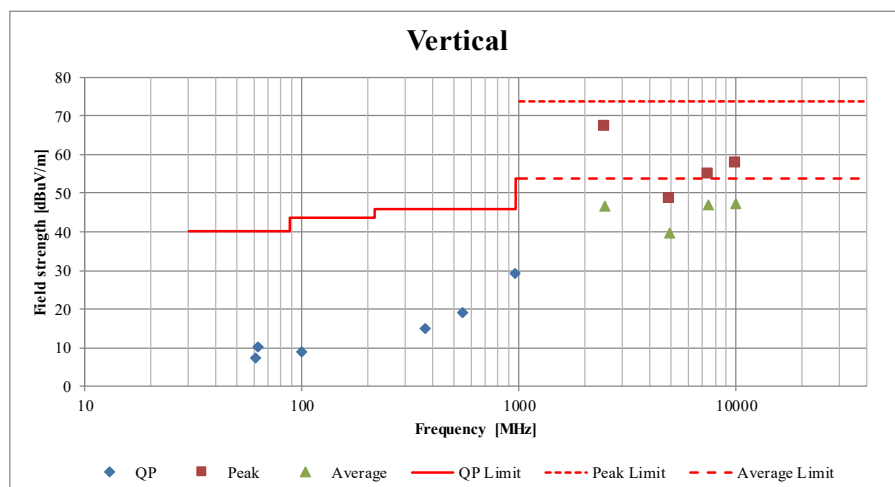
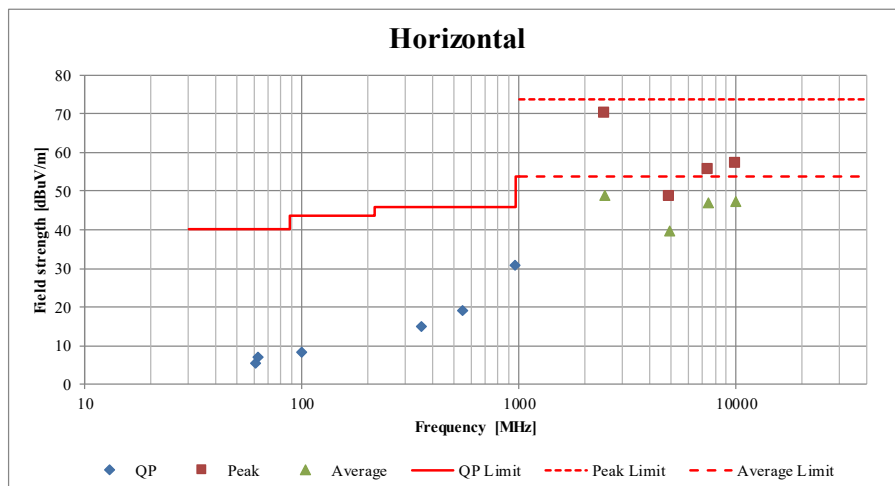
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Radiated Spurious Emission (Plot data, Worst case)

Report No.	13170804H			
Test place	Ise EMC Lab.			
Semi Anechoic Chamber	No.3	No.3	No.3	No.3
Date	December 22, 2019	January 8, 2020	January 9, 2020	January 14, 2020
Temperature / Humidity	23 deg. C / 43 % RH	23 deg. C / 35 % RH	22 deg. C / 34 % RH	22 deg. C / 30 % RH
Engineer	Akihiko Maeda (1 GHz - 10 GHz)	Tomohisa Nakagawa (10 GHz - 18 GHz)	Junki Nagatomi (18 GHz - 26.5 GHz)	Junki Nagatomi (Below 1 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz (PIFA Antenna BT1)			

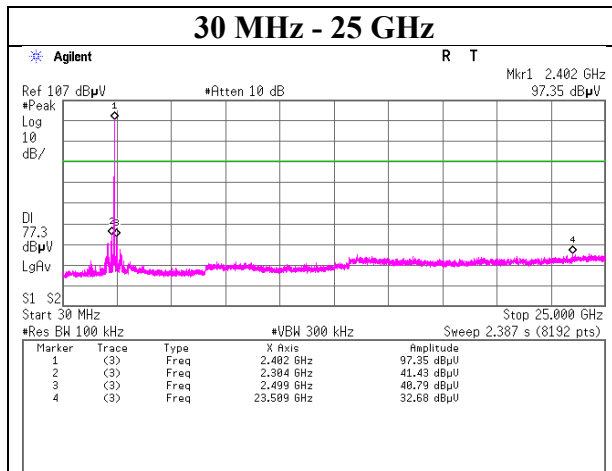
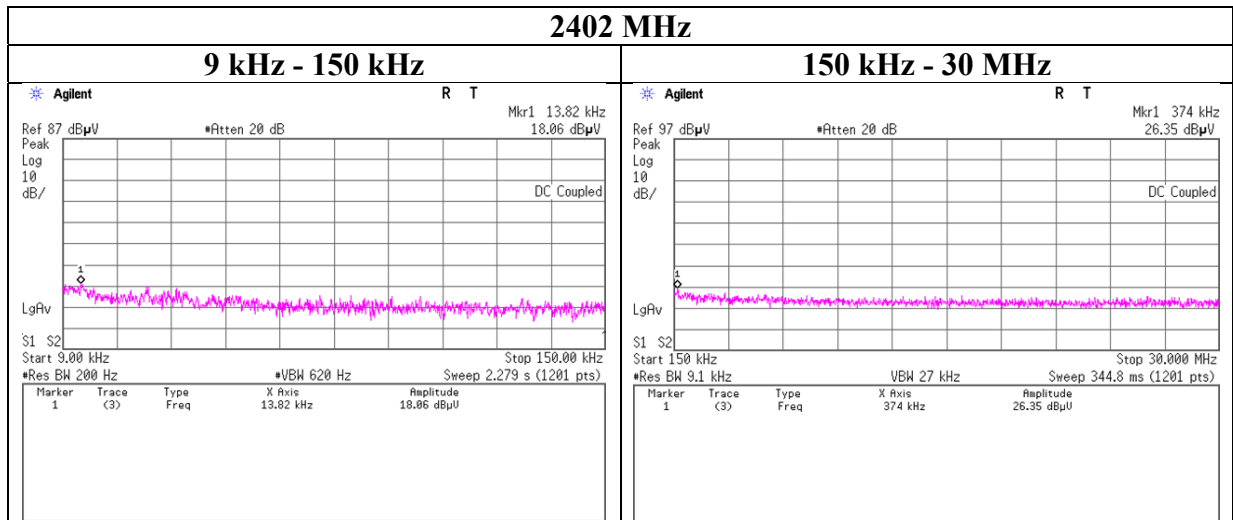


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

Conducted Spurious Emission

Report No.	13170804H
Test place	Ise EMC Lab. No.3 Measurement Room
Date	December 19, 2019
Temperature / Humidity	24 deg. C / 32 % RH
Engineer	Takafumi Noguchi
Mode	Tx, Hopping Off, DH5

BT1



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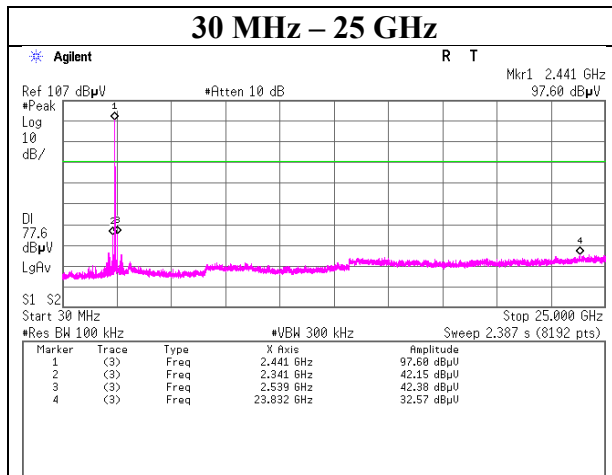
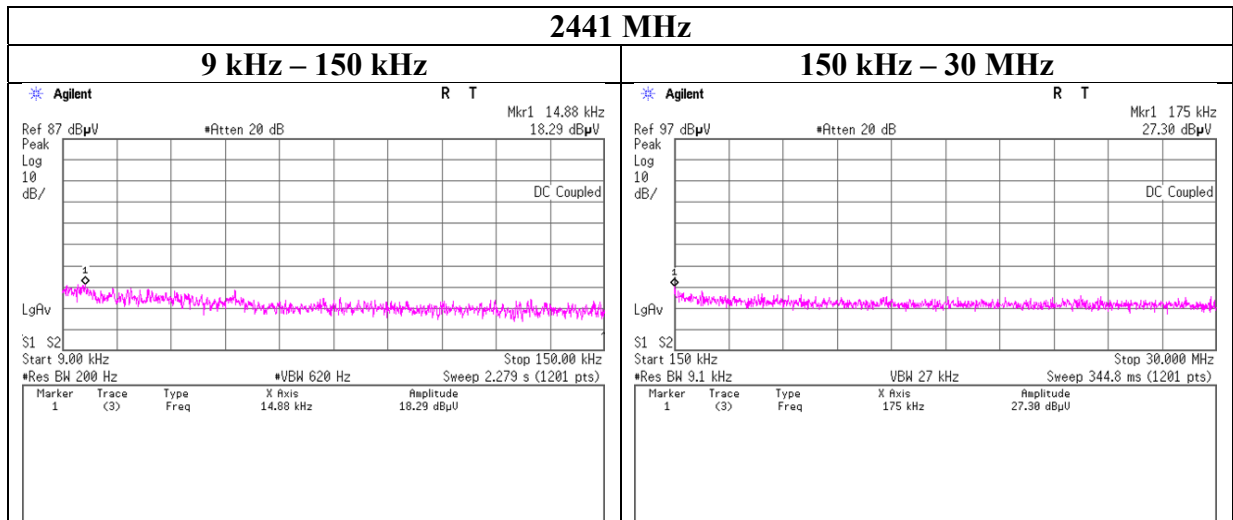
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Conducted Spurious Emission

Report No.	13170804H
Test place	Ise EMC Lab. No.3 Measurement Room
Date	December 19, 2019
Temperature / Humidity	24 deg. C / 32 % RH
Engineer	Takafumi Noguchi
Mode	Tx, Hopping Off, DH5

BT1



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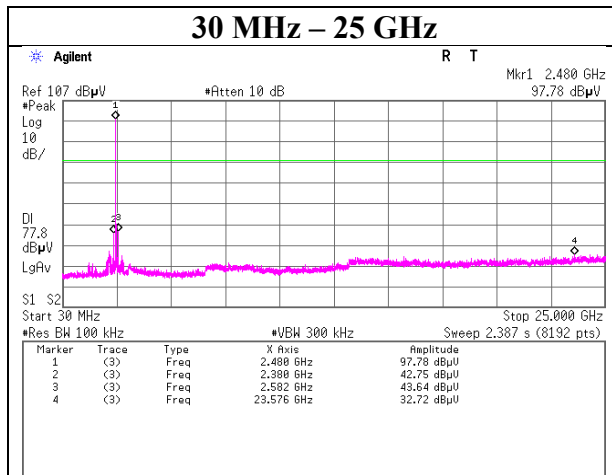
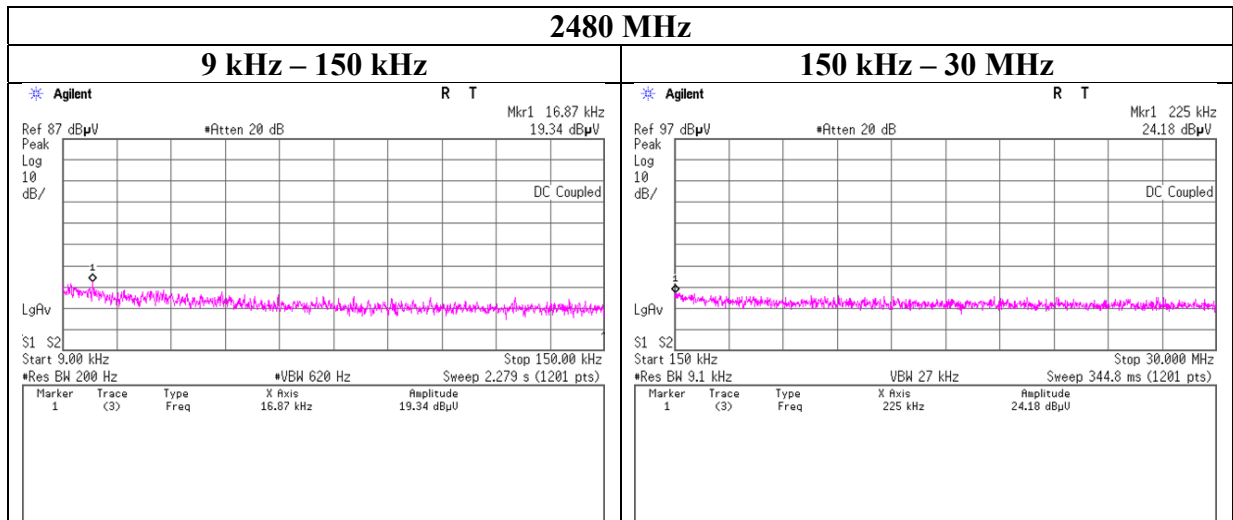
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Report No.	13170804H
Test place	Ise EMC Lab. No.3 Measurement Room
Date	December 19, 2019
Temperature / Humidity	24 deg. C / 32 % RH
Engineer	Takafumi Noguchi
Mode	Tx, Hopping Off, DH5

BT1



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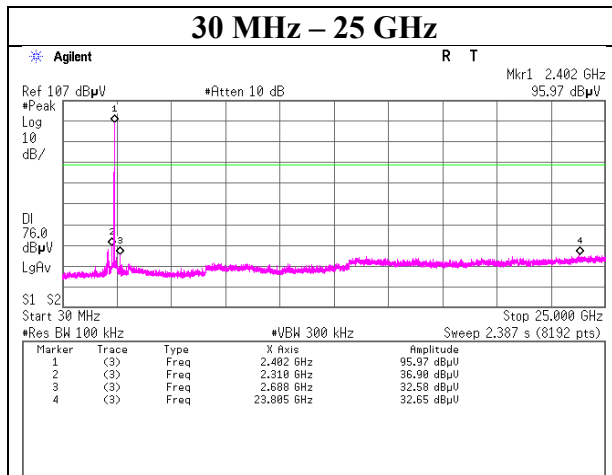
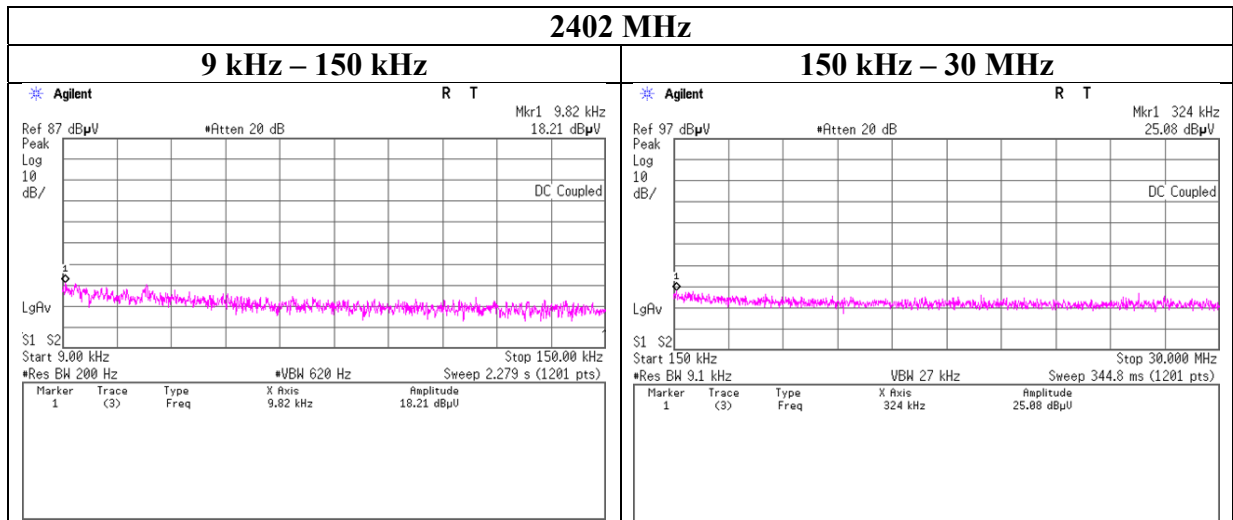
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Report No.	13170804H
Test place	Ise EMC Lab. No.3 Measurement Room
Date	December 19, 2019
Temperature / Humidity	24 deg. C / 32 % RH
Engineer	Takafumi Noguchi
Mode	Tx, Hopping On, 3DH5

BT1



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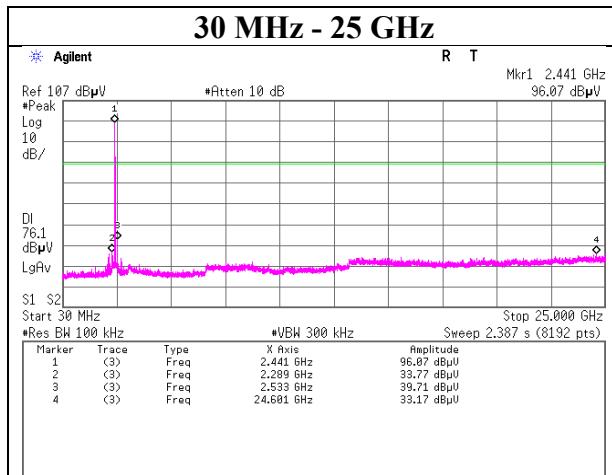
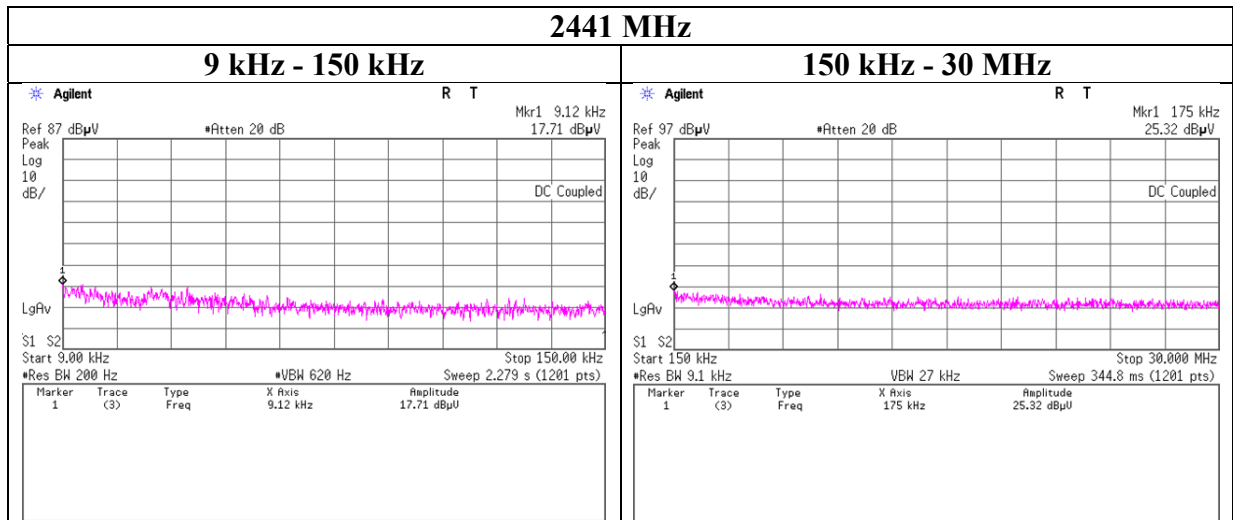
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Report No. 13170804H
Test place Ise EMC Lab. No.3 Measurement Room
Date December 19, 2019
Temperature / Humidity 24 deg. C / 32 % RH
Engineer Takafumi Noguchi
Mode Tx, Hopping Off, 3DH5

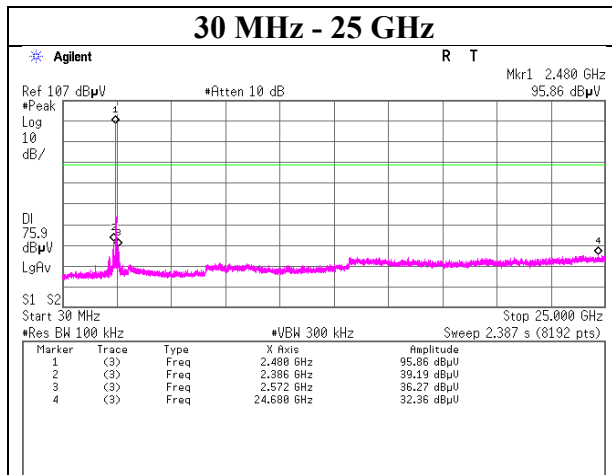
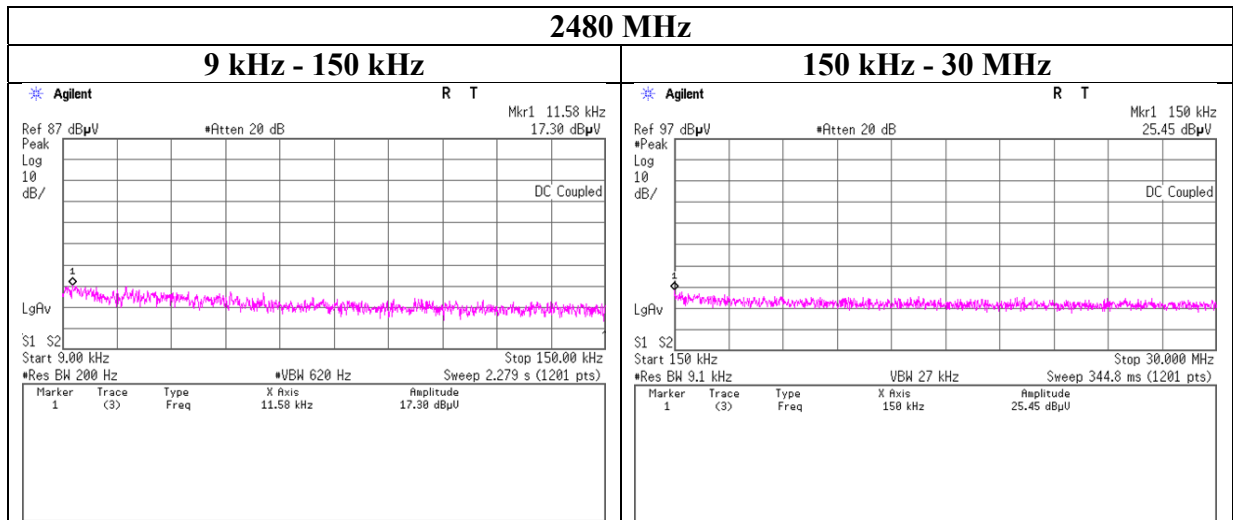
BT1



Conducted Spurious Emission

Report No.	13170804H
Test place	Ise EMC Lab. No.3 Measurement Room
Date	December 19, 2019
Temperature / Humidity	24 deg. C / 32 % RH
Engineer	Takafumi Noguchi
Mode	Tx, Hopping Off, 3DH5

BT1



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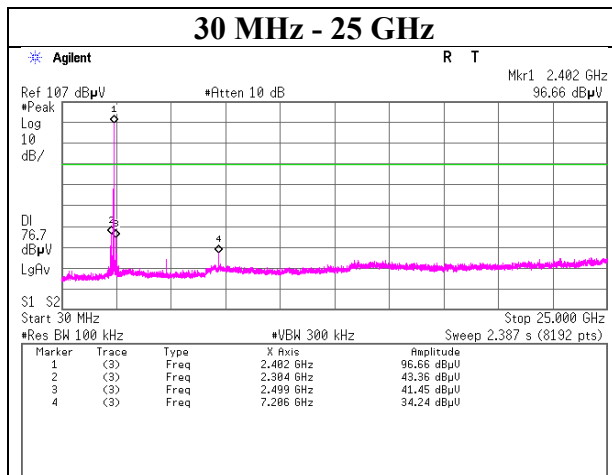
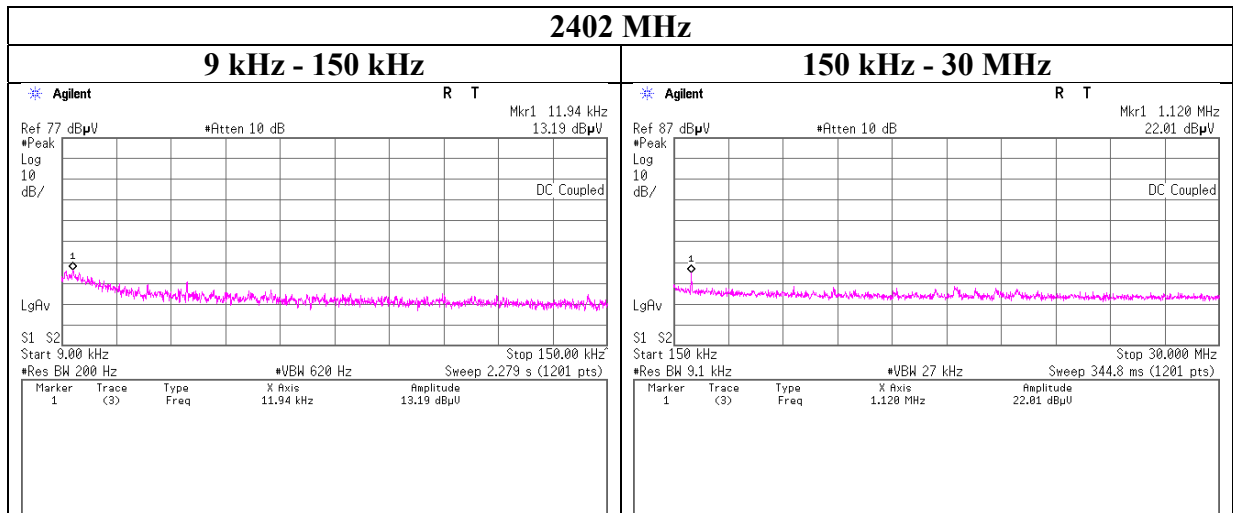
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Report No. 13170804H
Test place Ise EMC Lab. No.3 Measurement Room
Date December 25, 2019
Temperature / Humidity 22 deg. C / 36 % RH
Engineer Koji Yamamoto
Mode Tx, Hopping Off, DH5

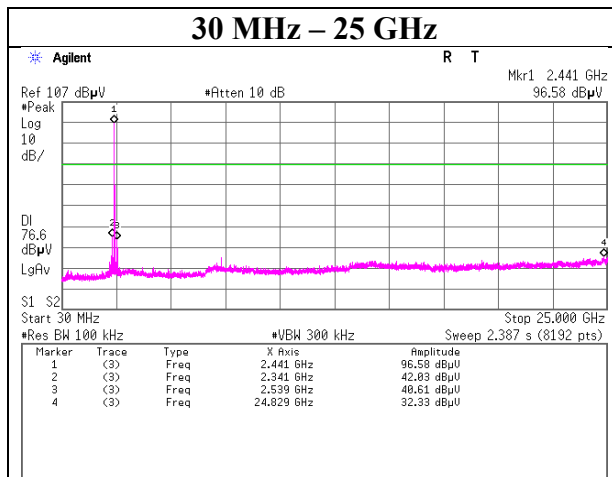
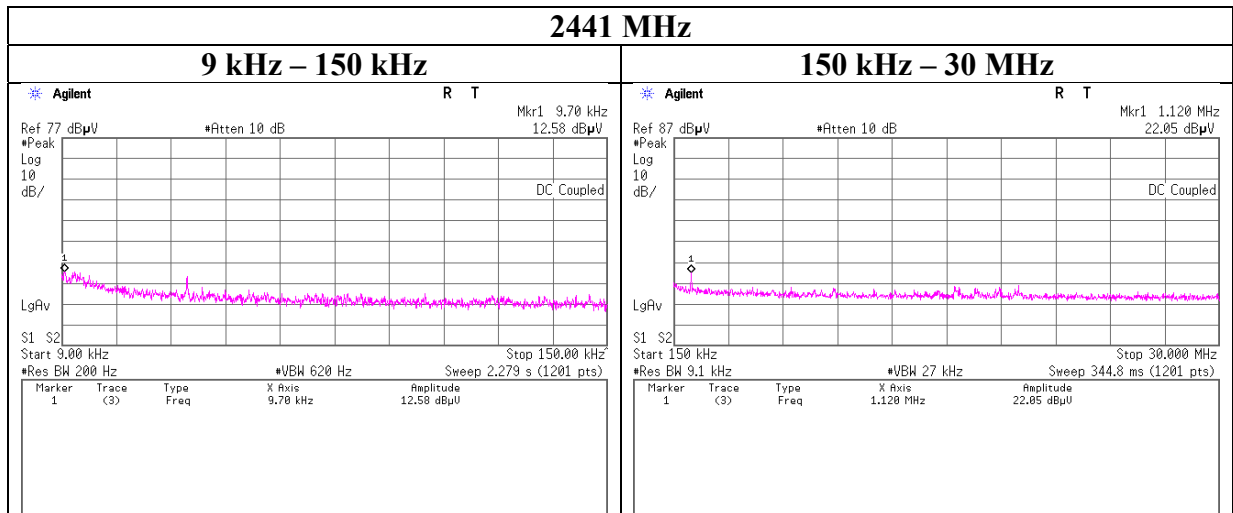
BT2



Conducted Spurious Emission

Report No.	13170804H
Test place	Ise EMC Lab. No.3 Measurement Room
Date	December 25, 2019
Temperature / Humidity	22 deg. C / 36 % RH
Engineer	Koji Yamamoto
Mode	Tx, Hopping Off, DH5

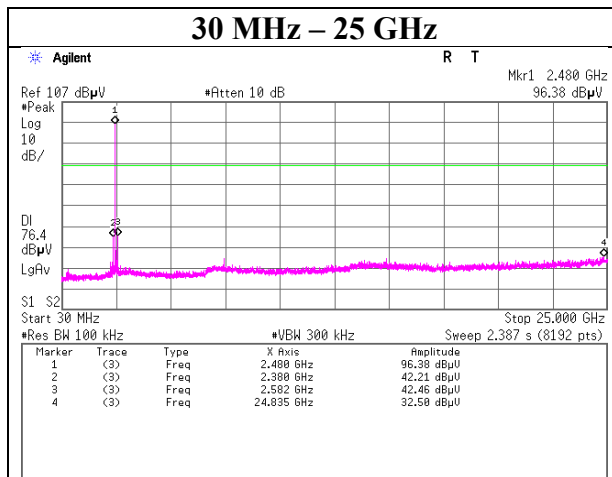
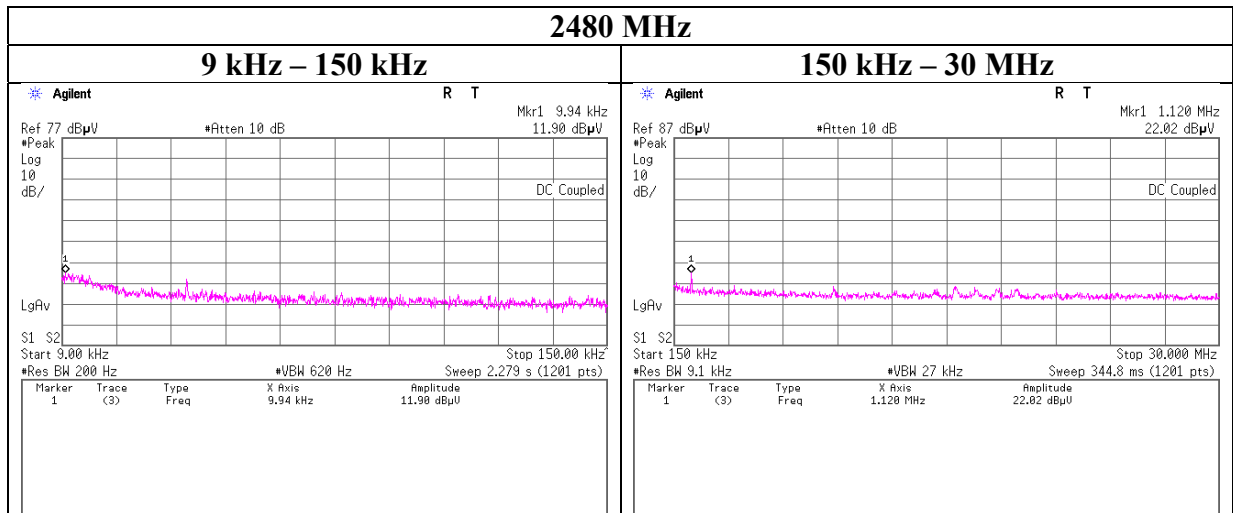
BT2



Conducted Spurious Emission

Report No.	13170804H
Test place	Ise EMC Lab. No.3 Measurement Room
Date	December 25, 2019
Temperature / Humidity	22 deg. C / 36 % RH
Engineer	Koji Yamamoto
Mode	Tx, Hopping Off, DH5

BT2



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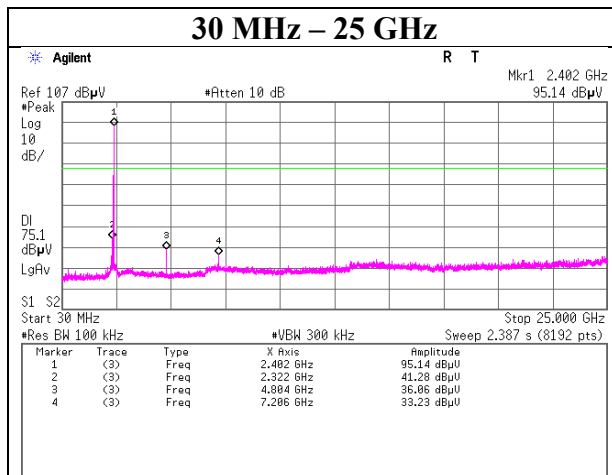
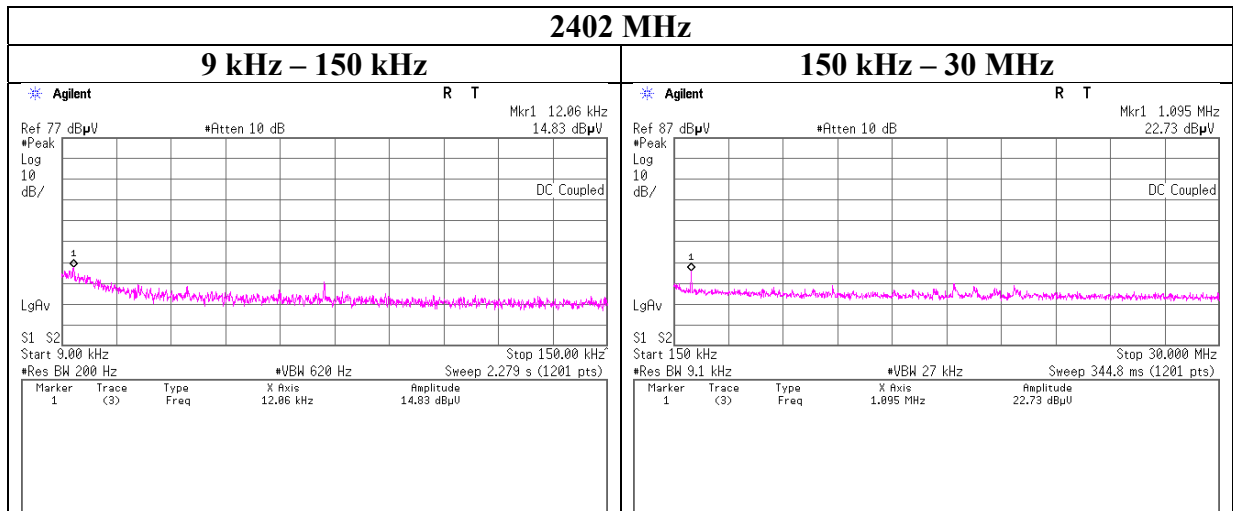
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Report No.	13170804H
Test place	Ise EMC Lab. No.3 Measurement Room
Date	December 25, 2019
Temperature / Humidity	22 deg. C / 36 % RH
Engineer	Koji Yamamoto
Mode	Tx, Hopping Off, 3DH5

BT2



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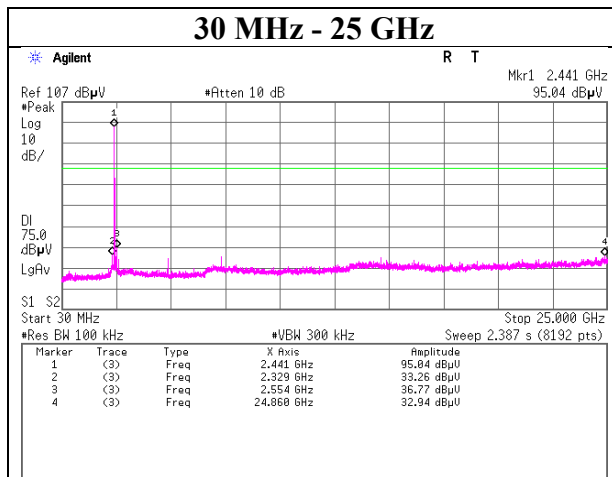
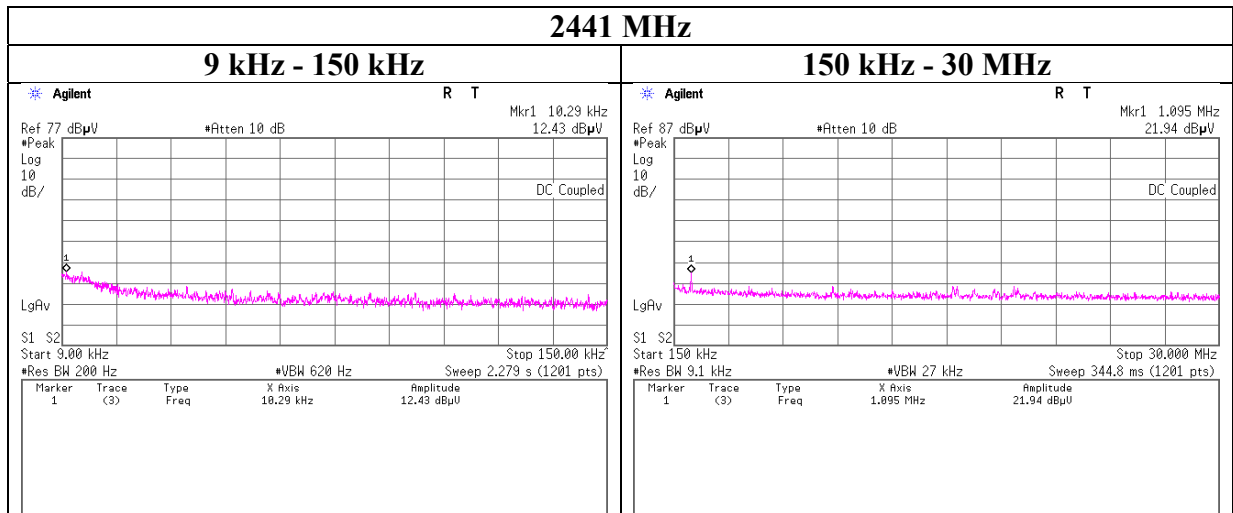
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Conducted Spurious Emission

Report No.	13170804H
Test place	Ise EMC Lab. No.3 Measurement Room
Date	December 25, 2019
Temperature / Humidity	22 deg. C / 36 % RH
Engineer	Koji Yamamoto
Mode	Tx, Hopping Off, 3DH5

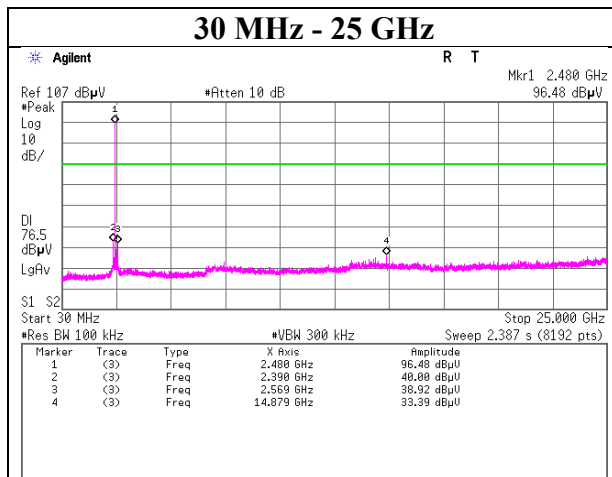
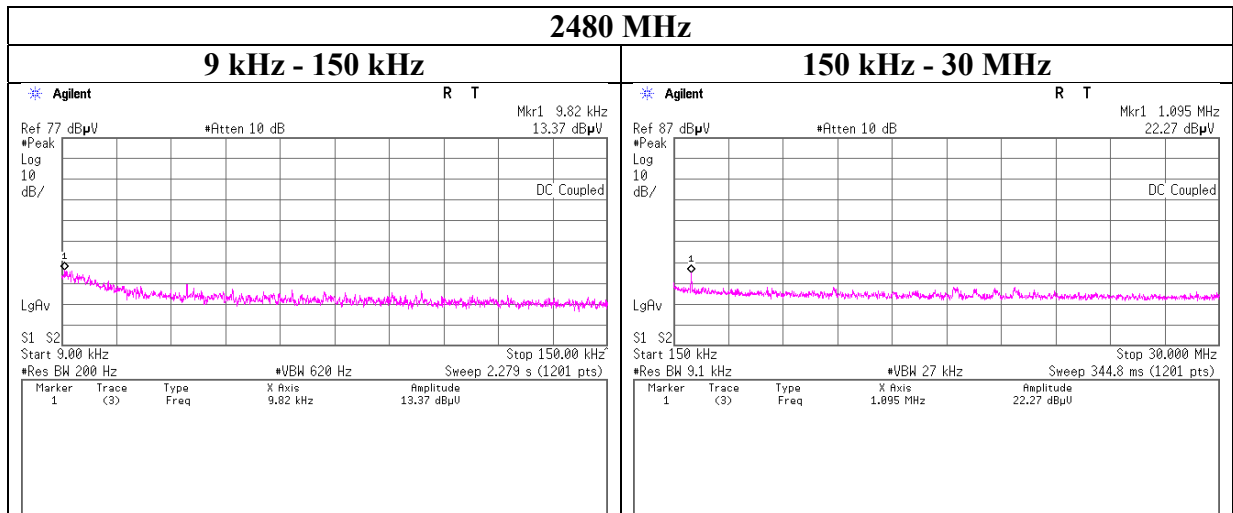
BT2



Conducted Spurious Emission

Report No.	13170804H
Test place	Ise EMC Lab. No.3 Measurement Room
Date	December 25, 2019
Temperature / Humidity	22 deg. C / 36 % RH
Engineer	Koji Yamamoto
Mode	Tx, Hopping Off, 3DH5

BT2



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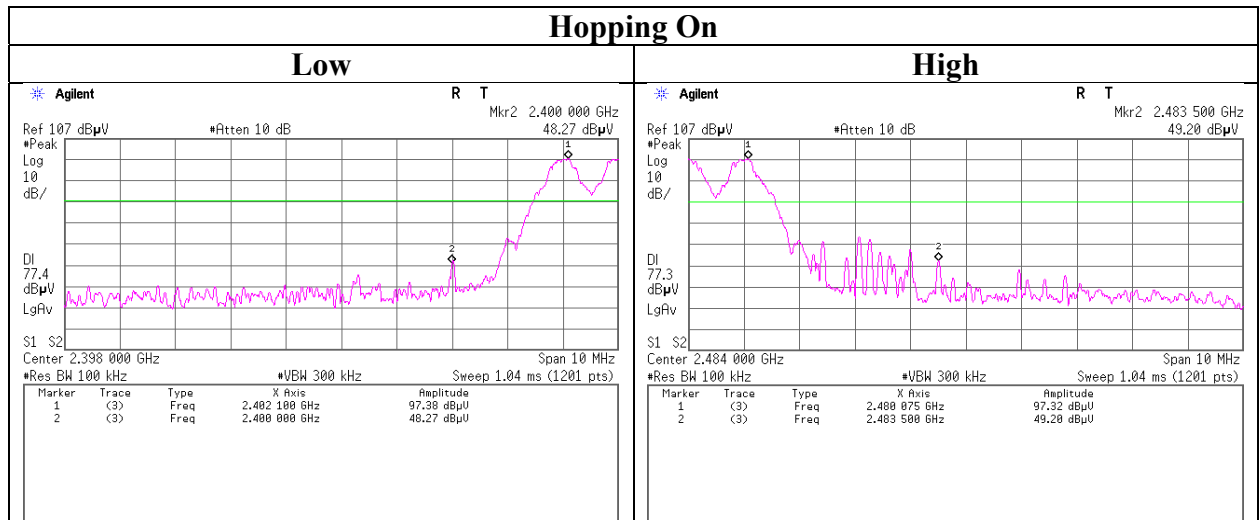
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

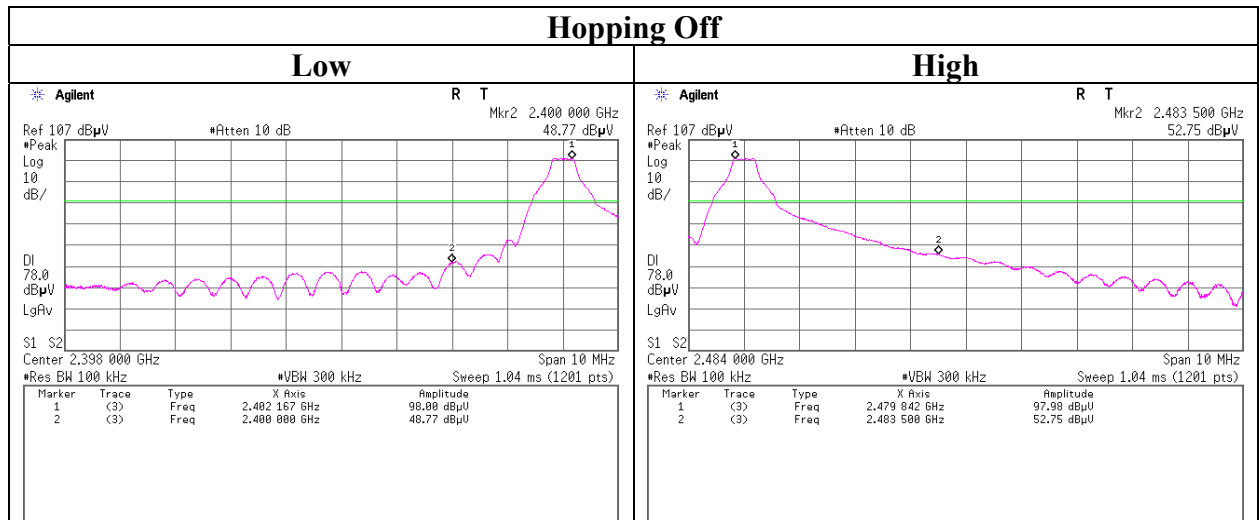
Conducted Emission Band Edge compliance

Report No. 13170804H
Test place Ise EMC Lab. No.3 Measurement Room
Date December 19, 2019
Temperature / Humidity 24 deg. C / 32 % RH
Engineer Takafumi Noguchi
Mode Tx DH5

BT1



BT1



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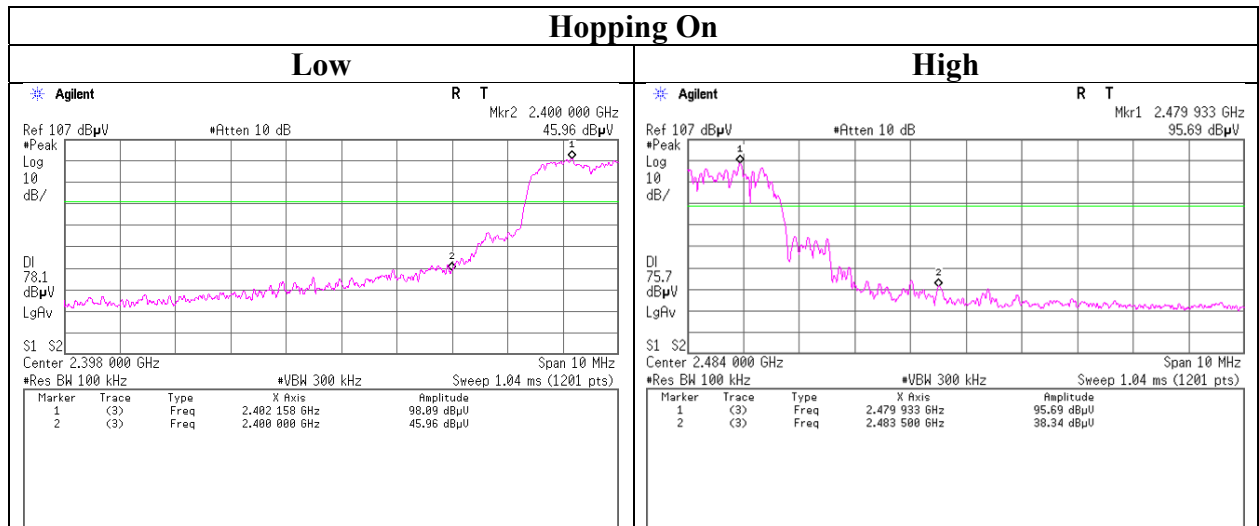
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

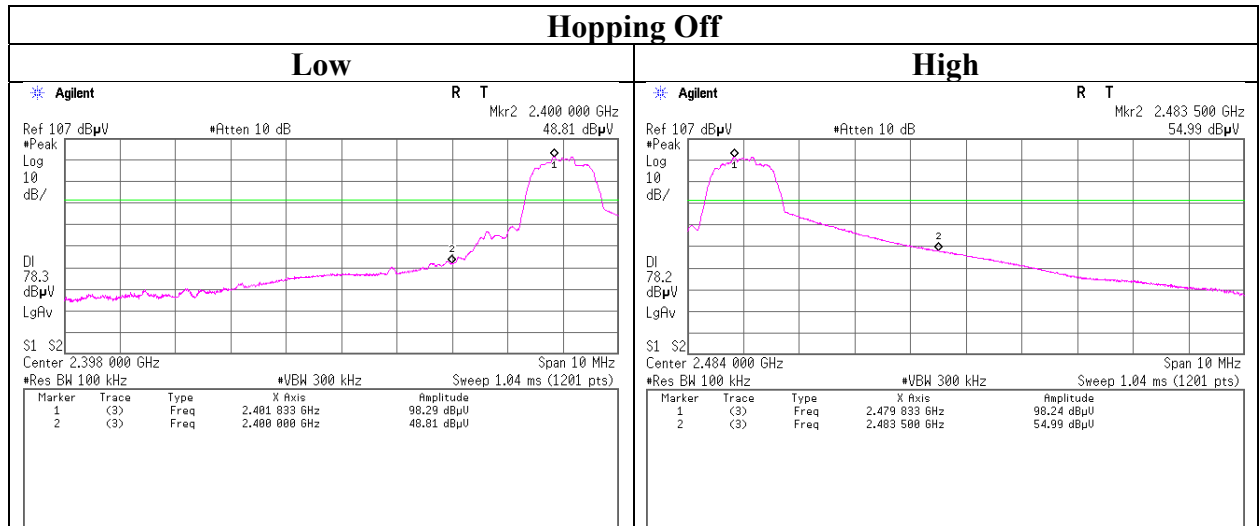
Conducted Emission Band Edge compliance

Report No.	13170804H
Test place	Ise EMC Lab. No.3 Measurement Room
Date	December 19, 2019
Temperature / Humidity	24 deg. C / 32 % RH
Engineer	Takafumi Noguchi
Mode	Tx 3DH5

BT1



BT1



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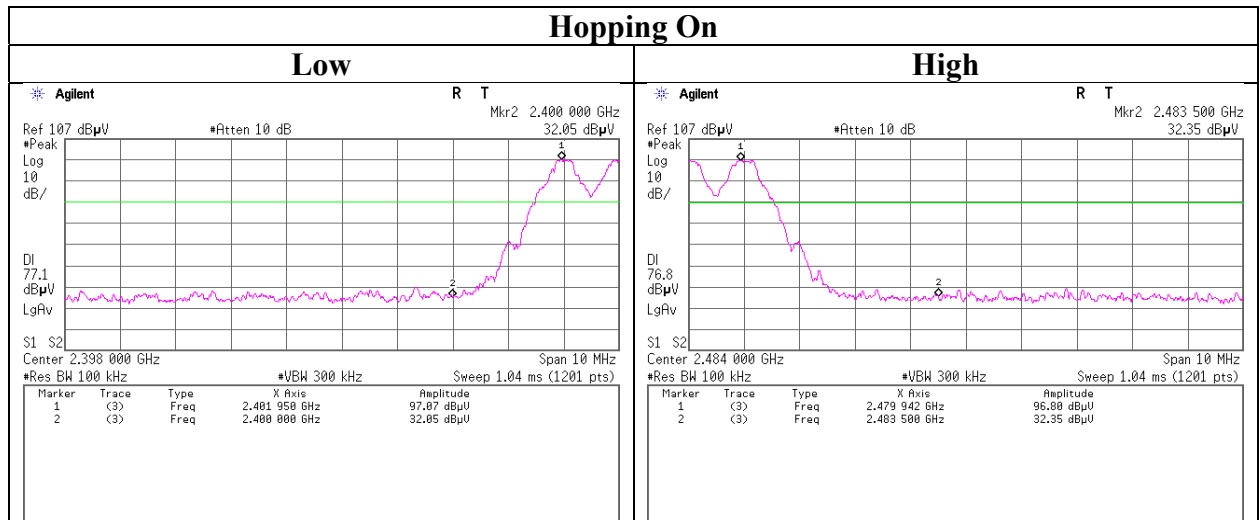
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

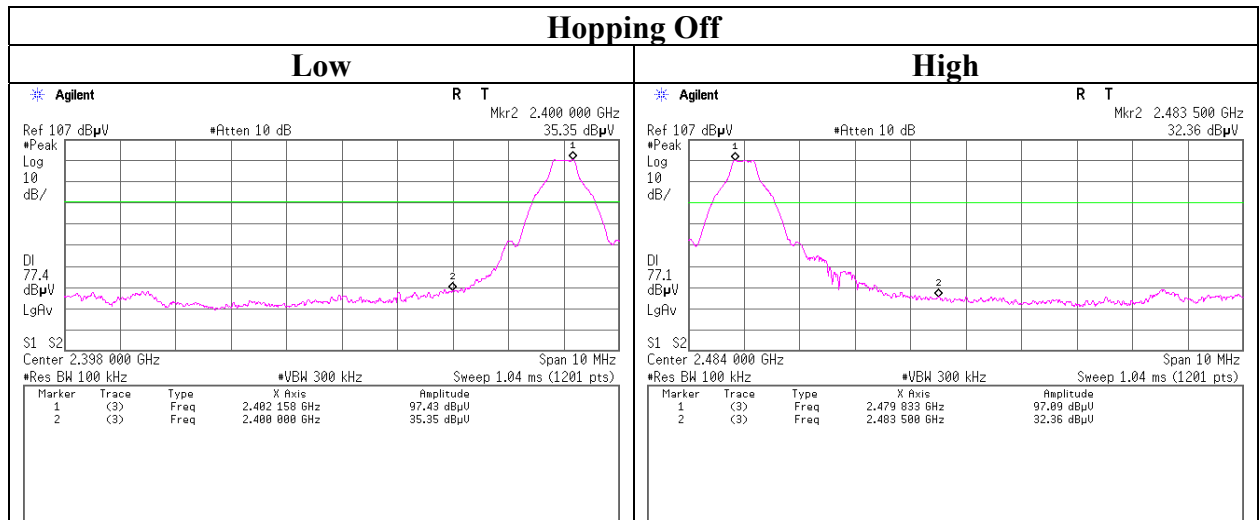
Conducted Emission Band Edge compliance

Report No.	13170804H
Test place	Ise EMC Lab. No.3 Measurement Room
Date	December 25, 2019
Temperature / Humidity	22 deg. C / 36 % RH
Engineer	Koji Yamamoto
Mode	Tx DH5

BT2



BT2



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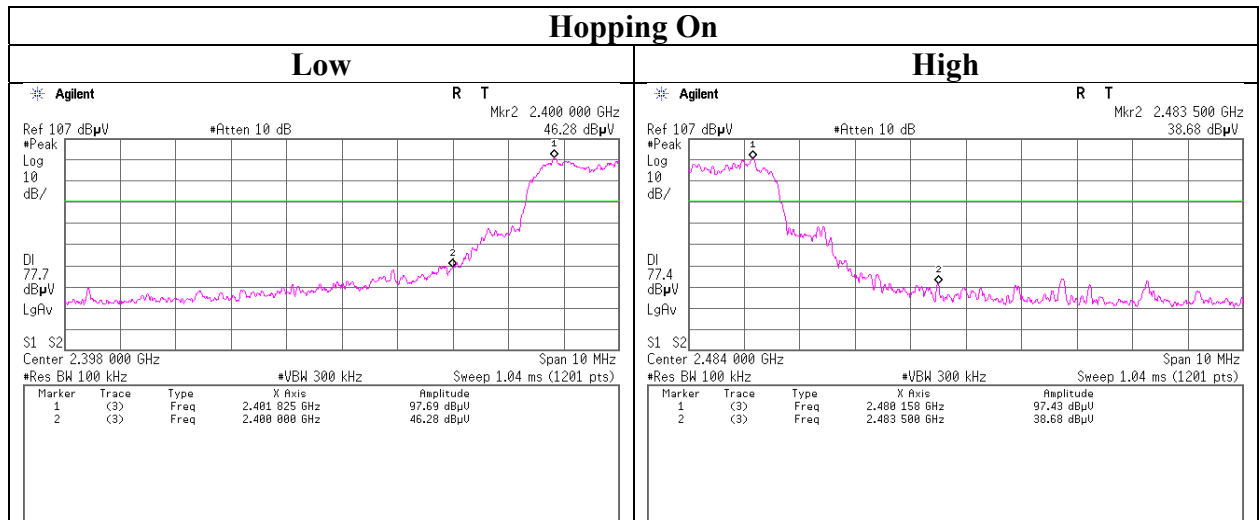
Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

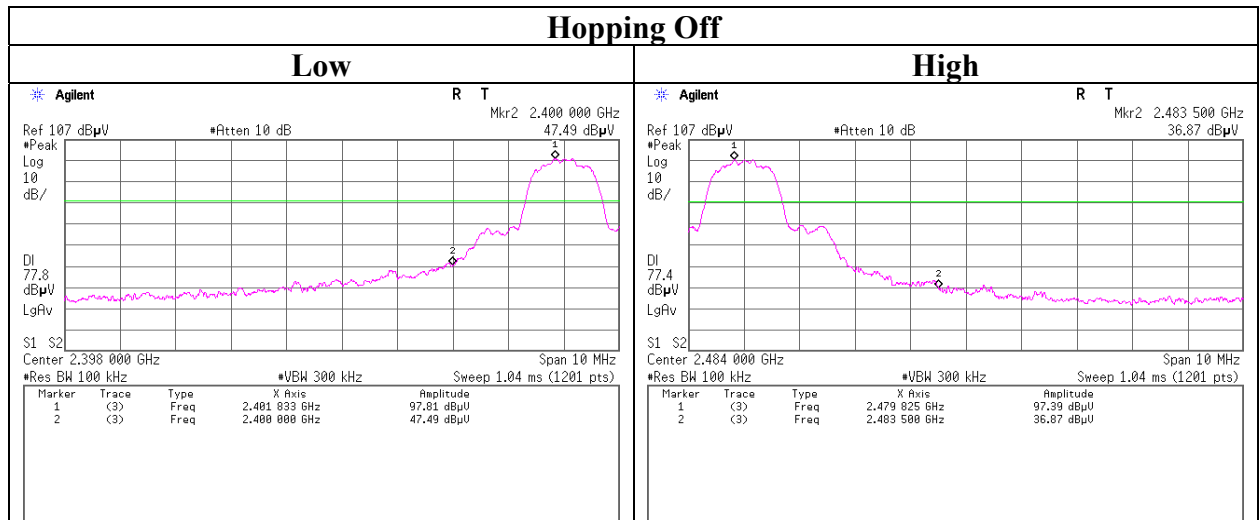
Conducted Emission Band Edge compliance

Report No.	13170804H
Test place	Ise EMC Lab. No.3 Measurement Room
Date	December 25, 2019
Temperature / Humidity	22 deg. C / 36 % RH
Engineer	Koji Yamamoto
Mode	Tx 3DH5

BT2



BT2



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APPENDIX 2: Test instruments

Test Instruments (1/2)

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Due Date	Cal Int
RE/CE	141532	DIGITAL HiTESTER	HIOKI	3805	51201197	01/06/2020	01/31/2021	12
RE/CE	141152	EMI measurement program	TSJ	TEPTO-DV	-	-	-	-
RE/CE/AT	141554	Thermo-Hygrometer	Not Indicated or Known	CTH-180	1301	01/11/2019	01/31/2020	12
RE	141232	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	001	09/11/2019	09/30/2020	12
RE	141507	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	09/26/2019	09/30/2020	12
RE	142013	AC3_Semi Anechoic Chamber(SVSWR)	TDK	Semi Anechoic Chamber 3m	DA-10005	04/08/2019	04/30/2021	24
RE	141580	MicroWave System Amplifier	Keysight Technologies Inc	83017A	MY39500779	03/05/2019	03/31/2020	12
RE	177964	Microwave Cable	Junkosha INC.	MMX221	1901S329(1m)/1902S579(5m)	03/05/2019	03/31/2020	12
RE/CE	142008	AC3_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	06/26/2018	06/30/2020	24
RE/CE	141899	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY46180655	08/07/2019	08/31/2020	12
RE/CE	142183	Measure	KOMELON	KMC-36	-	-	-	-
AT	141226	Microwave Cable	Junkosha	MMX221-00500DMS DMS	1502S304	03/05/2019	03/31/2020	12
AT	141327	Coaxial Cable	UL Japan	-	-	02/27/2019	02/29/2020	12
AT	141855	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY46187750	11/19/2019	11/30/2020	12
AT	141812	Power Meter	Keysight Technologies Inc	8990B	MY51000271	08/02/2019	08/31/2020	12
AT	141842	Power sensor	Keysight Technologies Inc	N1923A	MY54070003	08/02/2019	08/31/2020	12
AT	141835	Power sensor	Keysight Technologies Inc	N1923A	MY54070004	08/02/2019	08/31/2020	12
AT	141156	Attenuator(10dB)	Weinschel Corp	2	BL1173	11/07/2019	11/30/2020	12
AT	141420	Attenuator	Weinschel Associates	WA56-10	56100307	05/17/2019	05/31/2020	12
AT	141419	Attenuator	Weinschel Associates	WA56-10	56100305	05/17/2019	05/31/2020	12
AT	141900	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY46185823	11/20/2019	11/30/2020	12
AT	141414	Microwave Cable	Junkosha	MWX221	1207S407	08/06/2019	08/31/2020	12
CE	141357	LISN(AMN)	Schwarzbeck	NSLK8127	8127-729	07/05/2019	07/31/2020	12
CE	141216	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W/SFM14/sucoform141-PE/421-010	-/00640	07/02/2019	07/31/2020	12
CE	141247	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	12/02/2019	12/31/2020	12
CE	146754	Test Receiver	Rohde & Schwarz	ESCI	100299	10/08/2019	10/31/2020	12

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Test Instruments (2/2)

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Due Date	Cal Int
RE	141513	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170306	10/08/2019	10/31/2020	12
RE	141582	Pre Amplifier	SONOMA INSTRUMENT	310	260834	02/08/2019	02/29/2020	12
RE	141949	Test Receiver	Rohde & Schwarz	ESCI	100767	08/02/2019	08/31/2020	12
RE	142314	Attenuator	Pasternack	PE7390-6	D/C 1504	06/11/2019	06/30/2020	12
RE	141266	Logperiodic Antenna(200-1000M Hz)	Schwarzbeck	VUSLP9111B	9111B-191	08/24/2019	08/31/2020	12
RE	141323	Coaxial cable	UL Japan	-	-	07/02/2019	07/31/2020	12
RE	141424	Biconical Antenna	Schwarzbeck	VHA9103+BBA9106	1915	08/24/2019	08/31/2020	12
RE	141427	Biconical Antenna	Schwarzbeck	VHA9103B+BBA9106	8031	08/23/2019	08/31/2020	12
RE	142004	AC2_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	06/29/2018	06/30/2020	24
RE	142006	AC2_Semi Anechoic Chamber(SVSWR)	TDK	Semi Anechoic Chamber 3m	DA-06902	04/01/2019	04/30/2021	24
RE	141542	Digital Tester	Fluke Corporation	FLUKE 26-3	78030611	08/20/2019	08/31/2020	12
RE	141296	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	002	09/11/2019	09/30/2020	12
RE	141579	Pre Amplifier	Keysight Technologies Inc	8449B	3008A02142	01/21/2020	01/31/2020	12
RE	141512	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	09/03/2019	09/30/2020	12
RE	141392	Microwave Cable	Junkosha	MWX221	1604S253(1 m) / 1608S087(5 m)	08/06/2019	08/31/2020	12
RE	141503	Horn Antenna 18-26.5GHz	EMCO	3160-09	1265	10/08/2019	10/31/2020	12
RE	141885	Spectrum Analyzer	Keysight Technologies Inc	E4448A	US44300523	11/21/2019	11/30/2020	12
RE	141902	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY46187105	10/09/2019	10/31/2020	12
RE	141279	Microwave Cable	Junkosha	MMX221-00500DMS DMS	1502S303	03/05/2019	03/31/2020	12
RE	141578	Pre Amplifier	Keysight Technologies Inc	8447D	2944A10845	09/06/2019	09/30/2020	12
RE	141317	Coaxial Cable	Fujikura/Agilent	-	-	09/03/2019	09/30/2020	12
RE	141203	Attenuator(6dB)	Weinschel Corp	2	BK7970	11/07/2019	11/30/2020	12
RE	141265	Logperiodic Antenna(200-1000M Hz)	Schwarzbeck	VUSLP9111B	9111B-190	08/23/2019	08/31/2020	12
RE	192300	Thermo-Hygrometer	Not Indicated or Known	CTH-201	0013	12/19/2019	12/31/2020	12

*Hyphens for Last Calibration Date, Calibration Due 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.

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

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

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

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