



RADIO TEST REPORT

Test Report No. : 12990291S-A

Applicant : Sony Corporation, Japan and Sony Group Companies
Type of Equipment : AV RECEIVER
Model No. : XAV-AX5500
FCC ID : AK8XAVAX5500
Test regulation : FCC Part 15 Subpart C: 2019
Test Result : Complied (Refer to SECTION 3.2)

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8. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
9. The information provided from the customer for this report is identified in SECTION 1.

Date of test: August 5 to 8, 2019

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CERTIFICATE 1266.03

- ☐ The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.
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Reference: Abbreviations

AC	Alternating Current	QP	Quasi-Peak
AFH	Adaptive Frequency Hopping	QPSK	Quadri-Phase Shift Keying
AM	Amplitude Modulation	RBW	Resolution Band Width
Amp, AMP	Amplifier	RDS	Radio Data System
Ant, ANT	Antenna	RE	Transmitter unwanted emissions in the spurious domain and Receiver spurious emissions (Radiated) test
AP	Access Point	RE (directive)	Radio Equipment
AT	Antenna Terminal conducted test	RF	Radio Frequency
Atten., ATT	Attenuator	RMS	Root Mean Square
AV	Average	Rx	Receiving
BPSK	Binary Phase-Shift Keying	SA, S/A	Spectrum Analyzer
BR	Bluetooth Basic Rate	SG	Signal Generator
BT	Bluetooth	SVSWR	Site-Voltage Standing Wave Ratio
BT LE	Bluetooth Low Energy	TR	Test Receiver
BW	BandWidth	Tx	Transmitting
Cal Int	Calibration Interval	VBW	Video BandWidth
CCK	Complementary Code Keying	Vert.	Vertical
Ch., CH	Channel	WLAN	Wireless LAN
CW	Continuous Wave		
DBPSK	Differential BPSK	EN	European Norm
DC	Direct Current	EU	European Union
DQPSK	Differential QPSK	IEEE	Institute of Electrical and Electronics Engineers
DSSS	Direct Sequence Spread Spectrum	ILAC	International Laboratory Accreditation Conference
EDR	Enhanced Data Rate	MRA	Mutual Recognition Arrangement
EIRP, e.i.r.p.	Equivalent Isotropically Radiated Power	NIST	National Institute of Standards and Technology
EMC	ElectroMagnetic Compatibility		
EMI	ElectroMagnetic Interference		
ERP, e.r.p.	Effective Radiated Power		
EUT	Equipment Under Test		
Fac.	Factor		
FHSS	Frequency Hopping Spread Spectrum		
FM	Frequency Modulation		
Freq.	Frequency	A2LA	The American Association for Laboratory Accreditation
GFSK	Gaussian Frequency-Shift Keying		
GNSS	Global Navigation Satellite System		
GPS	Global Positioning System		
Hori.	Horizontal		
IF	Intermediate Frequency		
LIMS	Laboratory Information Management System		
MCS	Modulation and Coding Scheme		
NS	No signal detect.		
NSA	Normalized Site Attenuation		
OBW	Occupied Band Width		
OFDM	Orthogonal Frequency Division Multiplexing		
P/M	Power meter		
PCB	Printed Circuit Board		
PER	Packet Error Rate		
PHY	Physical Layer		
PK	Peak		
PN	Protocol Number		
PRBS	Pseudo-Random Bit Sequence		
PSD	Power Spectral Density		
QAM	Quadrature Amplitude Modulation		

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SECTION 1: Customer information

Company Name	:	Sony Corporation, Japan and Sony Group Companies
Address	:	700/402 Moo. 7, Amata City Chonburi Industrial Estate, Don Hua Roh, Muang Chonburi, Chonburi 20000, Thailand
Telephone Number	:	+66 38 214900 17 Ext : 1932
Contact Person	:	Jumroen Phaoenchoke

The information provided from the customer is as follows;

- Applicant, Type of Equipment, Model No., 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 (E.U.T.)
- SECTION 4: Operation of E.U.T. 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 (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment	:	AV RECEIVER
Model No.	:	XAV-AX5500
Serial No.	:	Refer to SECTION 4.2
Rating	:	DC 12 V
Receipt Date of Sample (Information from test lab.)	:	August 5, 2019
Country of Mass-production	:	Thailand
Condition of EUT	:	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT	:	No Modification by the test lab.

2.2 Product Description

Model: XAV-AX5500 (referred to as the EUT in this report) is an AV RECEIVER.

Radio Specification

Bluetooth (BDR / EDR function)

Radio Type	:	Transceiver
Frequency of Operation	:	2402 MHz - 2480 MHz
Modulation	:	FHSS, GFSK, $\pi/4$ -DQPSK, 8DPSK
Antenna type	:	Meander Monopole antenna
Antenna Gain	:	-0.63 dBi
Clock frequency	:	26 MHz (Crystal)

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C
 FCC Part 15 final revised on July 19, 2019 and effective August 19, 2019 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 on July 19, 2019, does not affect the test specification applied to the EUT.

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

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	-	N/A	*1)
Carrier Frequency Separation	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: -	FCC: Section 15.247(a)(1) ISED: RSS-247 5.1 (b)	See data.	Complied a)	Conducted
20dB Bandwidth	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: -	FCC: Section 15.247(a)(1) ISED: RSS-247 5.1 (a)		Complied a)	Conducted
Number of Hopping Frequency	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: -	FCC: Section 15.247(a)(1)(iii) ISED: RSS-247 5.1 (d)		Complied b)	Conducted
Dwell time	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: -	FCC: Section 15.247(a)(1)(iii) ISED: RSS-247 5.1 (d)		Complied c)	Conducted
Maximum Peak Output Power	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: RSS-Gen 6.12	FCC: Section 15.247(a)(b)(1) ISED: RSS-247 5.4 (b)		Complied d)	Conducted
Spurious Emission & Band Edge Compliance	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: RSS-Gen 6.13	FCC: Section 15.247(d) ISED: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	3.2 dB 490.947 MHz, QP, Hori. Mode: Tx DH5_2402 MHz 3.2 dB 490.945 MHz, QP, Hori. Mode: Tx DH5_2441 MHz 3.2 dB 490.945 MHz, QP, Hori. Mode: Tx DH5_2480 MHz 3.2 dB 490.946 MHz, QP, Hori. Mode: Tx 3DH5_2402 MHz	Complied e) / f)	Conducted/ Radiated (above 30 MHz) *2)

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

*1) The test is not applicable since the EUT does not have AC power ports.

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

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

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

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

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

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

f) 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 EUT provides stable voltage constantly to the wireless transmitter regardless of input voltage. Instead of a new battery, DC power supply was used for the test. That does not affect the test result, therefore the EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

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

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	RSS-Gen 6.7	ISED: -	N/A	Complied a)	Conducted
Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422. 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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Item	Frequency range	Uncertainty (+/-)			
		No. 1 SAC / SR	No. 2 SAC / SR	No. 3 SAC / SR	No. 4 SAC / SR
Conducted emission (AC Mains) LISN	150 kHz-30 MHz	2.9 dB	2.8 dB	2.9 dB	2.9 dB
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.0 dB	3.0 dB	3.1 dB	-
	30 MHz-200 MHz	4.6 dB	4.6 dB	4.7 dB	-
	200 MHz-1 GHz	6.0 dB	6.0 dB	6.1 dB	-
	1 GHz-6 GHz	4.8 dB	4.8 dB	4.8 dB	-
	6 GHz-18 GHz	5.4 dB	5.4 dB	5.4 dB	-
	18 GHz-40 GHz	5.6 dB	5.6 dB	5.6 dB	-
Radiated emission (Measurement distance: 1 m)	1 GHz-18 GHz	5.7 dB	5.7 dB	5.7 dB	-
	18 GHz-40 GHz	5.9 dB	5.9 dB	5.9 dB	-

SAC=Semi-Anechoic Chamber

SR= Shielded Room is applied besides radiated emission

Antenna terminal test	Uncertainty (+/-)
Power Measurement above 1 GHz (Average Detector)_SPM-06	0.81 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-06	1.53 dB
Power Measurement above 1 GHz (Average Detector)_SPM-07	0.95 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-07	1.21 dB
Power Measurement above 1 GHz (Average Detector)_SPM-13	0.90 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-13	1.04 dB
Spurious emission (Conducted) below 1GHz	1.8 dB
Spurious emission (Conducted) 1 GHz-3 GHz	1.7 dB
Spurious emission (Conducted) 3 GHz-18 GHz	2.3 dB
Spurious emission (Conducted) 18 GHz-26.5 GHz	2.4 dB
Spurious emission (Conducted) 26.5 GHz-40 GHz	2.4 dB
Bandwidth Measurement	0.61 %
Duty cycle and Time Measurement	0.012 %

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3.5 Test Location

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A2LA Certificate Number: 1266.03 (FCC Test Firm Registration Number: 626366, ISED Lab Company Number: 2973D)

Test site	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
No.1 Semi-anechoic chamber	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.2 Semi-anechoic chamber	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.3 Semi-anechoic chamber	12.7 x 7.7 x 5.35	12.7 x 7.7	5 m
No.4 Semi-anechoic chamber	8.1 x 5.1 x 3.55	8.1 x 5.1	-
No.1 Shielded room	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.2 Shielded room	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.3 Shielded room	6.3 x 4.7 x 2.7	6.3 x 4.7	-
No.4 Shielded room	4.4 x 4.7 x 2.7	4.4 x 4.7	-
No.5 Shielded room	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.6 Shielded room	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.8 shielded room	3.45 x 5.5 x 2.4	3.45 x 5.5	-
No.1 Measurement room	2.55 x 4.1 x 2.5	-	-

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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SECTION 4: Operation of E.U.T. during testing

4.1 Operating Mode(s)

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

Details of Operating Mode(s)

Test Item	Mode	Tested frequency
Spurious Emission (Conducted/Radiated)	Tx (Hopping Off) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
Carrier Frequency Separation	Tx (Hopping On) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
20dB Bandwidth	Tx (Hopping Off) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
Number of Hopping Frequency	Tx (Hopping On) DH5, 3DH5	-
Dwell time	Tx (Hopping On), -DH1, DH3, DH5 -3DH1, 3DH3, 3DH5	-
Maximum Peak Output Power	Tx (Hopping Off) DH5, 2DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
Band Edge Compliance (Conducted)	Tx DH5, 3DH5 -Hopping On -Hopping Off	2402 MHz 2480 MHz
99% Occupied Bandwidth	Tx DH5, 3DH5 -Hopping On -Hopping Off	2402 MHz 2441 MHz 2480 MHz
*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload length (except Dwell time test) *2DH mode (2Mb/s EDR: pi/4DQPSK) was excluded for other tests than power measurement by using 3DH mode (3 Mb/s EDR: 8DPSK) as a representative. * It is considered that the non-tested packet type (e.g. inquiry) can be omitted as it is complied with above all the test items based on Bluetooth Core specification. *EUT has the power settings by the software as follows; Power settings: BDR: Ext.=23, Int.=39 EDR: Ext.=73, Int.=48 Software: CSR BlueSuite BlueTest Version 2.5.8 *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.		

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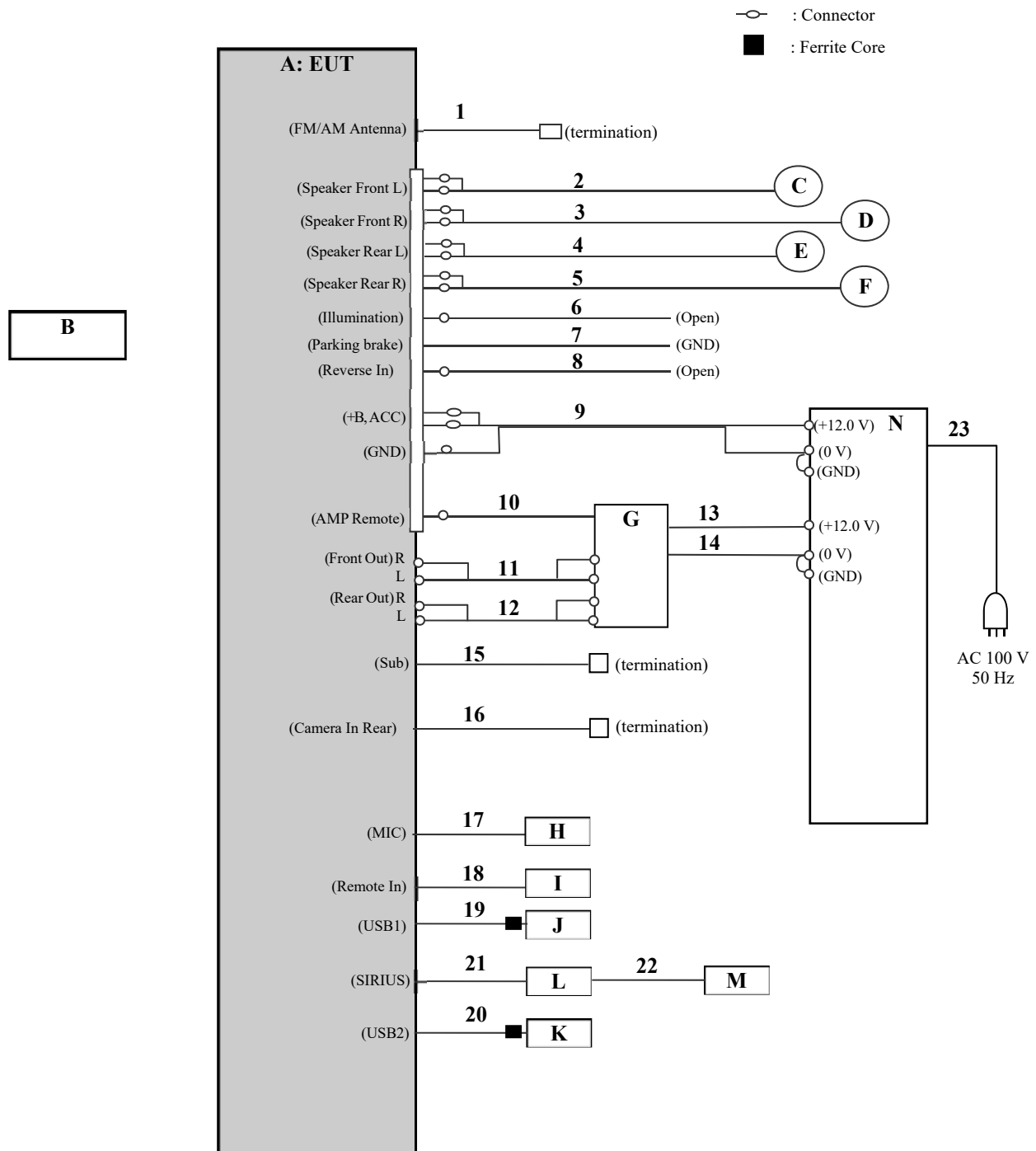
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4.2 Configuration and peripherals



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

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	AV RECEIVER	XAV-AX5500	017 *1) 018 *2)	Sony	EUT
B	Remote Commander	RM-X170	-	Sony	-
C	Speaker 1	IS-10	-	Sony	-
D	Speaker 2	IS-10	-	Sony	-
E	Speaker 3	XS-GTF1625R	-	Sony	-
F	Speaker 4	XS-GTF1625R	-	Sony	-
G	Stereo Power Amplifier	XM-4S-020	-	Sony	-
H	Microphone	-	-	Sony	-
I	Remote Controller	RM-X4S	-	Sony	-
J	USB Memory	SDK-USM4GU	-	Sony	-
K	USB Memory	SDK-USM4GU	-	Sony	-
L	SIRIUS XM Connect Vehicle Tuner	SXV300	1627	XM Network	-
M	Vehicle Satellite Radio Antenna	NGVA3	1624A	XM Network	-
N	DC Power Supply	PAN35-10A	NA000955	Kikusui Corp.	-

*1) Used for Radiated emissions tests.

*2) Used for Antenna terminal conducted tests

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	FM antenna	1.0	Shielded	Shielded	-
2	Speaker (1)	0.15+2.4	Unshielded	Unshielded	-
3	Speaker (2)	0.15+2.4	Unshielded	Unshielded	-
4	Speaker (3)	0.15+1.9	Unshielded	Unshielded	-
5	Speaker (4)	0.15+1.9	Unshielded	Unshielded	-
6	Illumination	0.15+1.0	Unshielded	Unshielded	-
7	Parking	2.0	Unshielded	Unshielded	-
8	Reverse In	0.15+1.0	Unshielded	Unshielded	-
9	DC Power	0.15+1.3	Unshielded	Unshielded	-
10	AMP Remote	0.15+1.4	Unshielded	Unshielded	-
11	RCA (Front Audio Out)	5.1	Shielded	Shielded	-
12	RCA (Rear Audio Out)	5.2	Shielded	Shielded	-
13	DC Power (+)	1.1+1.5	Unshielded	Unshielded	-
14	DC Power (-)	1.1+1.5	Unshielded	Unshielded	-
15	RCA (Sub Audio Out)	1.2	Shielded	Shielded	-
16	RCA (Rear Camera)	3.0	Shielded	Shielded	-
17	Microphone	3.5	Shielded	Shielded	-
18	REMOTE IN	0.15+1.1	Shielded	Shielded	-
19	USB	0.1+1.3	Shielded	Shielded	-
20	USB	0.1+1.3	Shielded	Shielded	-
21	Tuner	0.6	Shielded	Shielded	-
22	Radio Antenna	7.1	Shielded	Shielded	-
23	AC	1.9	Unshielded	Unshielded	-

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SECTION 5: Radiated Spurious Emission

Test Procedure

[For below 1 GHz]

EUT was placed on a platform of nominal size, 1.0 m by 2.0 m, raised 0.8 m above the conducting ground plane. The table is made of expanded polystyrol and expanded polypropylene and the table top is covered with polycarbonate. That has very low permittivity. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

[For above 1 GHz]

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

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

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

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

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

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

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

Test Antennas are used as below;

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

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

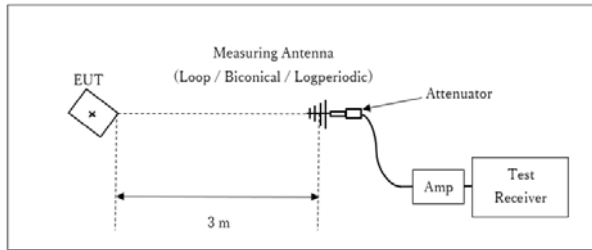
20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9 (ISED) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (ISED).

Frequency	Below 1 GHz	Above 1 GHz		20 dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV *1)	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	RBW: 1 MHz VBW: 1/T (T: burst length, refer to Burst rate confirmation sheet) Detector: Peak	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

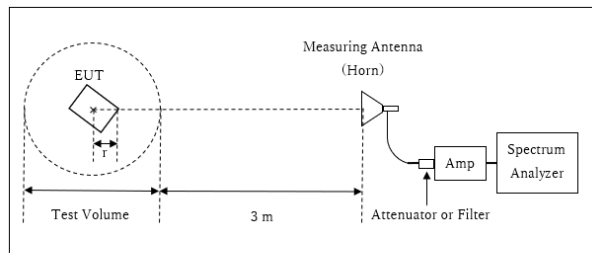
Below 1 GHz



× : Center of turn table

Test Distance: 3 m

1 GHz - 13 GHz



r : Radius of an outer periphery of EUT

× : Center of turn table

Distance Factor: $20 \times \log (3.9 \text{ m} / 3.0 \text{ m}) = 2.27 \text{ dB}$

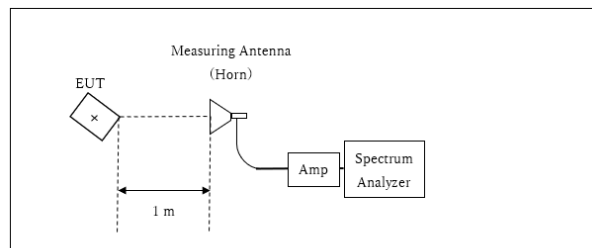
* Test Distance: $(3 + \text{Test Volume} / 2) - r = 3.9 \text{ m}$

Test Volume : 2.0 m

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

r = 0.1 m

13 GHz - 26.5 GHz



× : Center of turn table

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

*Test Distance: 1 m

- The carrier level and noise levels were confirmed at each position of 0 deg. and 30 deg. of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

Antenna polarization	Carrier	Spurious (Below 1 GHz)	Spurious (1 GHz - 2.8 GHz)	Spurious (2.8 GHz - 13 GHz)	Spurious (13 GHz - 18 GHz)	Spurious (18 GHz - 26.5 GHz)
Horizontal	0 deg.	0 deg.	0 deg.	0 deg.	0 deg.	0 deg.
Vertical	30 deg.	0 deg.	30 deg.	30 deg.	0 deg.	0 deg.

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

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SECTION 6: 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: 160 MHz BW)
Carrier Frequency Separation	3 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Number of Hopping Frequency	30 MHz	100 kHz	300 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)	9 kHz to 150 kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150 kHz to 30 MHz	10 kHz	30 kHz				
	30 MHz to 25 GHz	100 kHz	300 kHz				
Conducted Spurious Emission Band Edge compliance	10 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer

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

*2) Reference data

*3) In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.

Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart.

(9 kHz -150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 10 kHz)

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

Test data : APPENDIX

Test result : Pass

APPENDIX 1: Test data

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

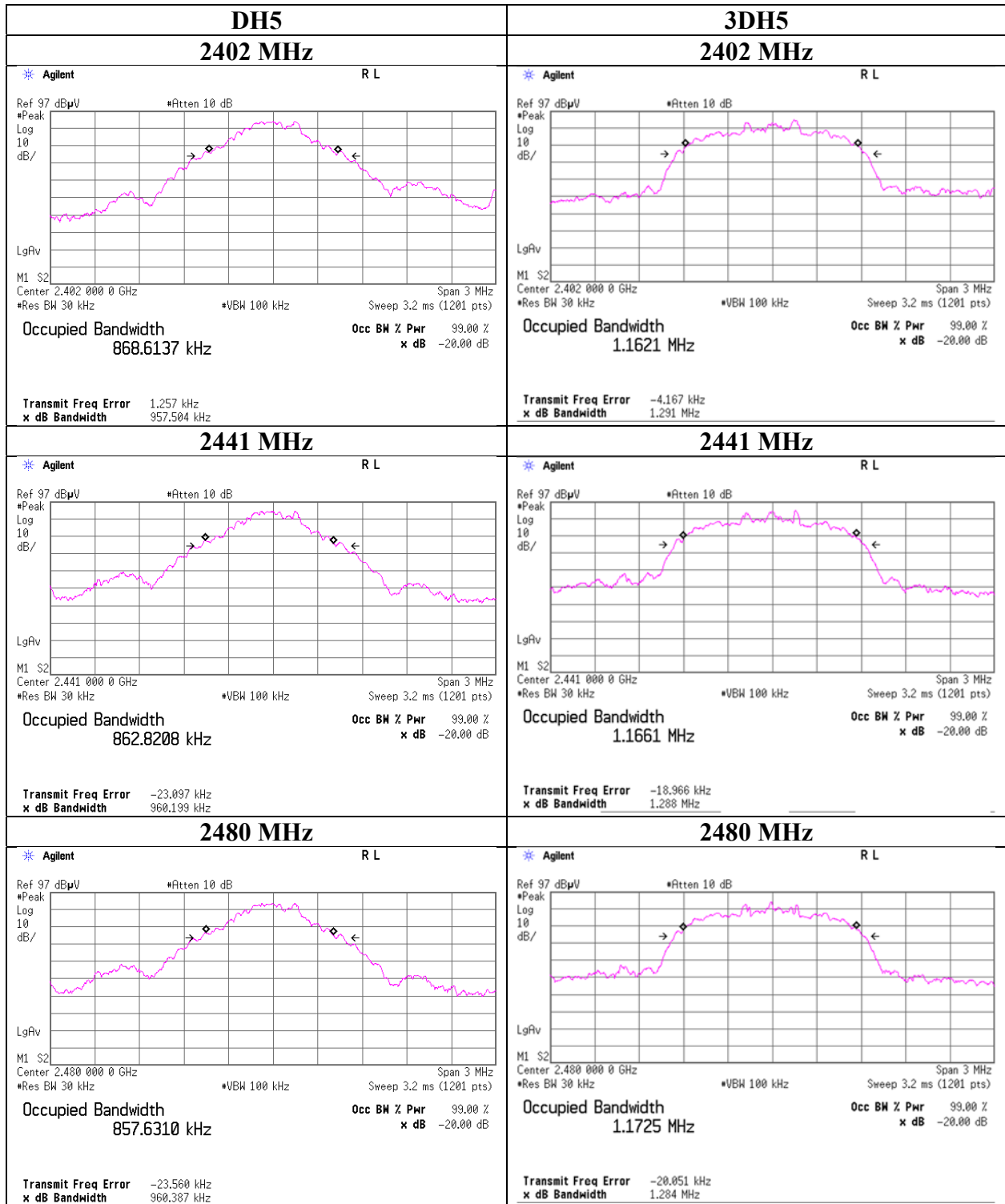
Report No. 12990291S-A
Test place Shonan EMC Lab. No.5 Shielded Room
Date August 8, 2019
Temperature / Humidity 25 deg. C / 53 % RH
Engineer Kazuya Noda
Mode Tx, Hopping Off, Tx, Hopping On

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	868.6137	1.000	>= 0.638
DH5	2441.0	0.960	862.8208	1.000	>= 0.640
DH5	2480.0	0.960	857.6310	1.000	>= 0.640
DH5	Hopping On	-	78553.6000	-	-
3DH5	2402.0	1.291	1162.1000	1.000	>= 0.860
3DH5	2441.0	1.288	1166.1000	1.000	>= 0.859
3DH5	2480.0	1.284	1172.5000	1.000	>= 0.856
3DH5	Hopping On	-	78659.2000	-	-

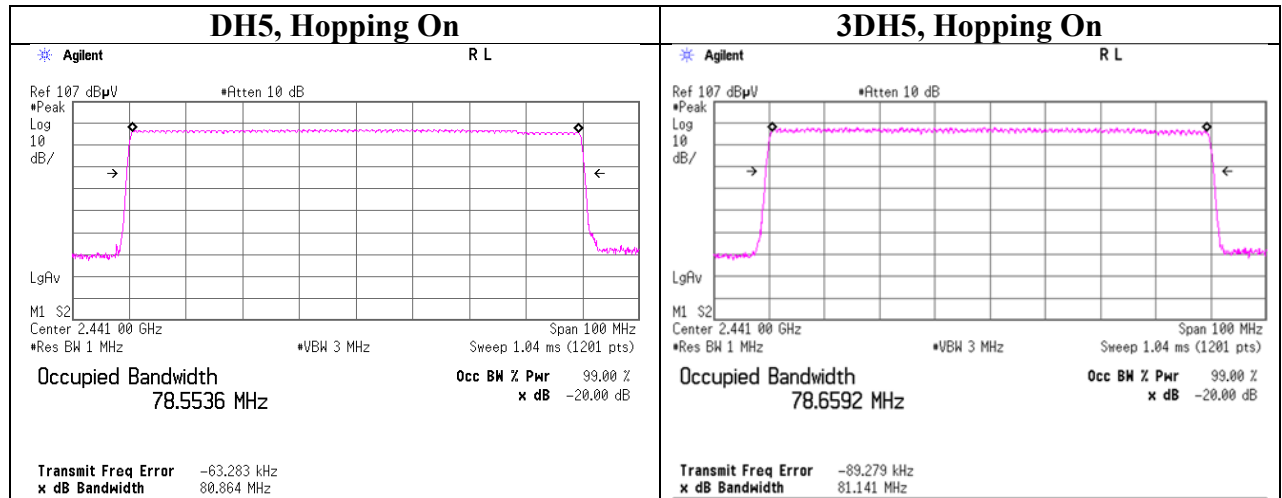
Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).

No limit applies to 20dB Bandwidth.

20dB Bandwidth and 99% Occupied Bandwidth



20dB Bandwidth and 99% Occupied Bandwidth



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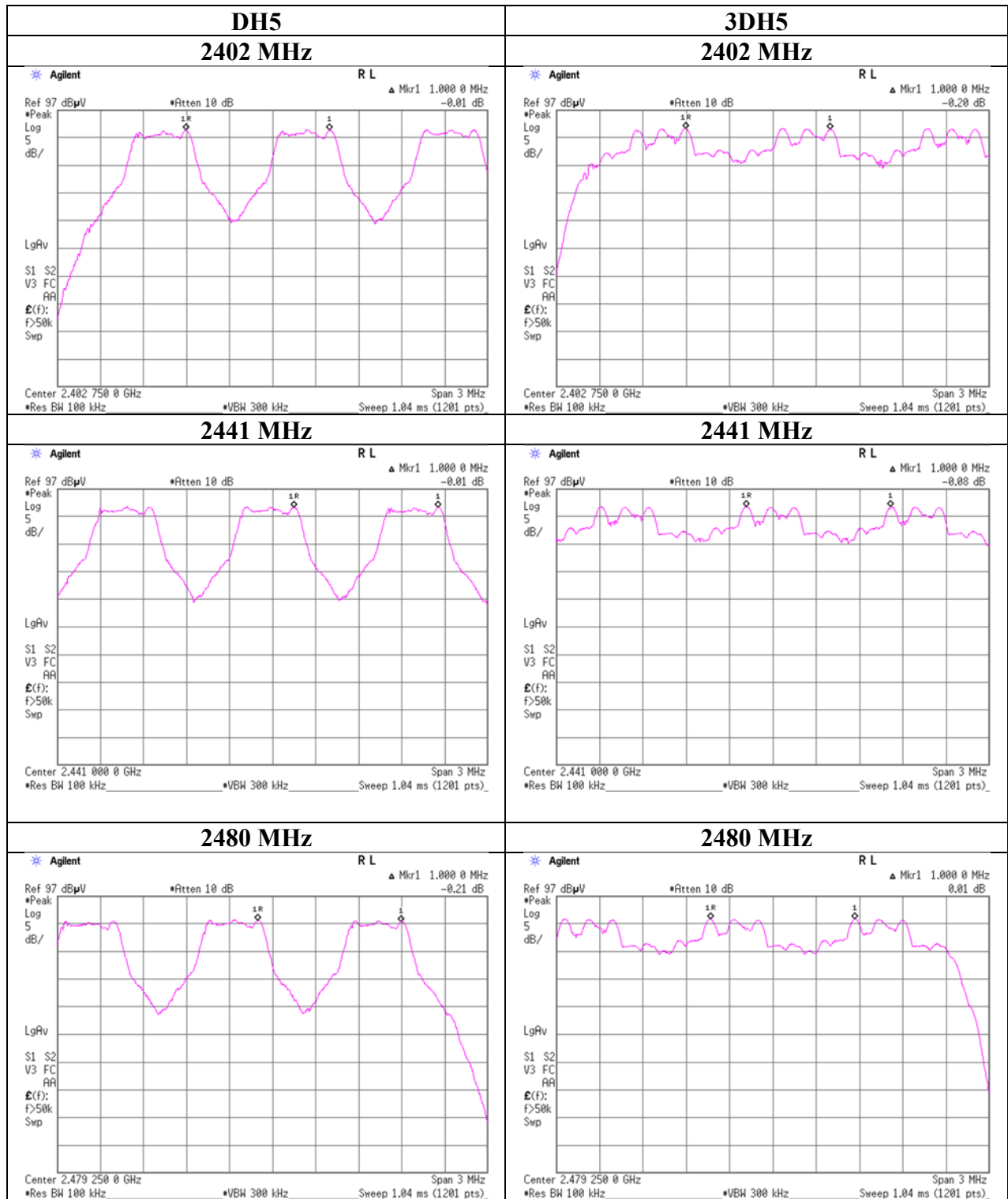
Shonan EMC Lab.

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Carrier Frequency Separation



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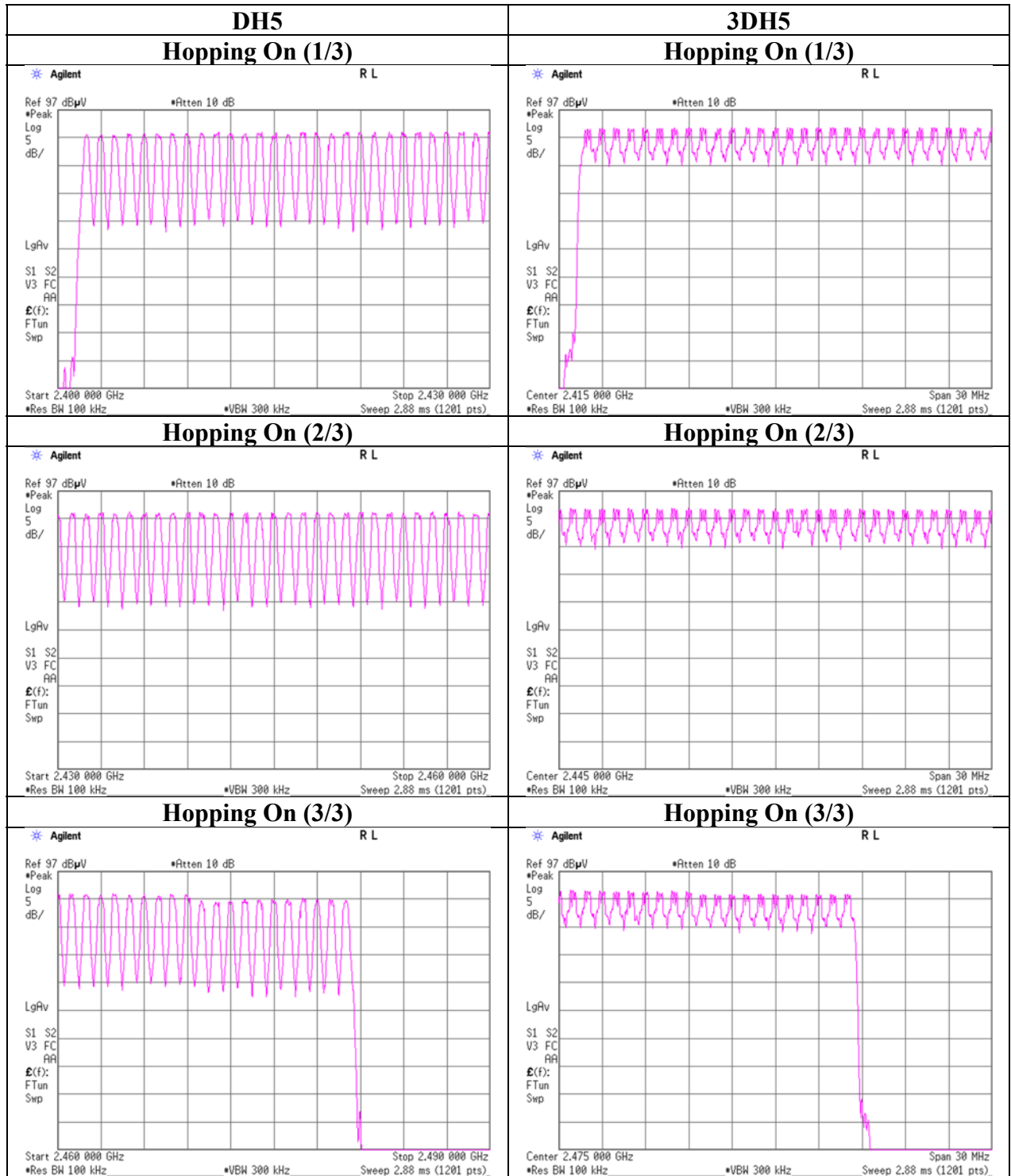
Number of Hopping Frequency

Report No. 12990291S-A
Test place Shonan EMC Lab. No.5 Shielded Room
Date August 8, 2019
Temperature / Humidity 25 deg. C / 53 % RH
Engineer Kazuya Noda
Mode Tx, Hopping On

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



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Dwell time

Report No.	12990291S-A
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	August 8, 2019
Temperature / Humidity	25 deg. C / 53 % RH
Engineer	Kazuya Noda
Mode	Tx, Hopping On

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	51.0 times	/	5 sec. x	31.6 sec. = 323 times	0.416	135	400
DH3	26.0 times	/	5 sec. x	31.6 sec. = 165 times	1.675	276	400
DH5	17.0 times	/	5 sec. x	31.6 sec. = 108 times	2.920	315	400
3DH1	51.0 times	/	5 sec. x	31.6 sec. = 323 times	0.436	141	400
3DH3	26.0 times	/	5 sec. x	31.6 sec. = 165 times	1.696	280	400
3DH5	17.0 times	/	5 sec. x	31.6 sec. = 108 times	2.948	318	400

Sample Calculation

Result = Number of transmission x Length of transmission

*Average data of 5 tests.(except Inquiry)

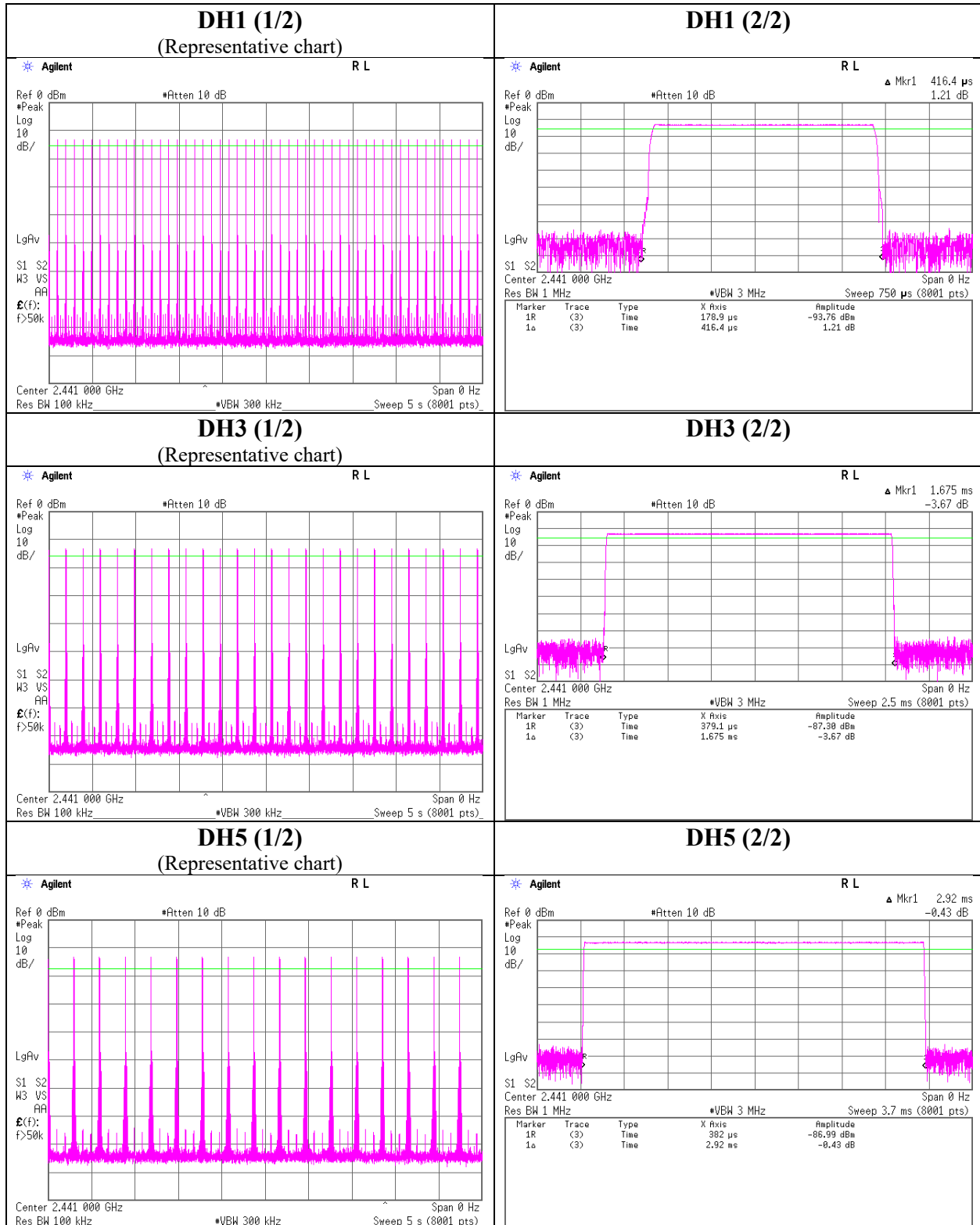
Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	51	51	51	51	51	51
DH3	26	26	26	26	26	26
DH5	17	17	17	17	17	17
3DH1	51	51	51	51	51	51
3DH3	26	26	26	26	26	26
3DH5	17	17	17	17	17	17

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 $N = 79$.

Dwell time



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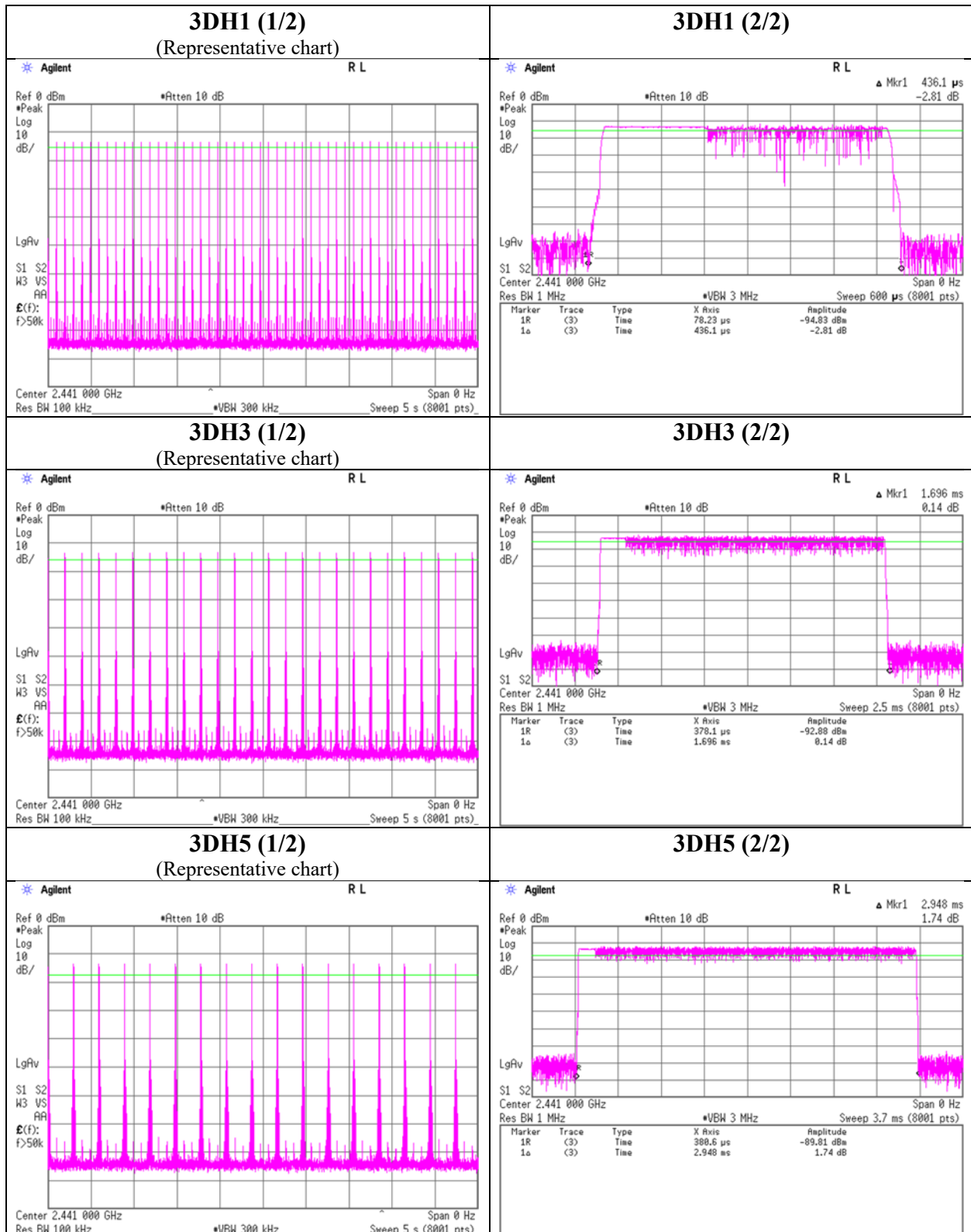
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Dwell time



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Shonan EMC Lab.

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Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Maximum Peak Output Power

Report No. 12990291S-A
Test place Shonan EMC Lab. No.5 Shielded Room
Date August 8, 2019
Temperature / Humidity 25 deg. C / 53 % RH
Engineer Kazuya Noda
Mode Tx, Hopping Off

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Conducted Power					e.i.r.p. for RSS-247					
					Result		Limit		Margin [dB]	Antenna Gain [dBi]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]			[dBm]	[mW]	[dBm]	[mW]	
DH5	2402.0	-13.02	1.84	9.89	-1.29	0.74	20.96	125	22.25	-0.63	-1.92	0.64	36.02	4000	37.94
DH5	2441.0	-12.64	1.86	9.89	-0.89	0.81	20.96	125	21.85	-0.63	-1.52	0.70	36.02	4000	37.54
DH5	2480.0	-13.50	1.88	9.89	-1.73	0.67	20.96	125	22.69	-0.63	-2.36	0.58	36.02	4000	38.38
2DH5	2402.0	-11.84	1.84	9.89	-0.11	0.97	20.96	125	21.07	-0.63	-0.74	0.84	36.02	4000	36.76
2DH5	2441.0	-11.56	1.86	9.89	0.19	1.04	20.96	125	20.77	-0.63	-0.44	0.90	36.02	4000	36.46
2DH5	2480.0	-12.42	1.88	9.89	-0.65	0.86	20.96	125	21.61	-0.63	-1.28	0.74	36.02	4000	37.30
3DH5	2402.0	-11.37	1.84	9.89	0.36	1.09	20.96	125	20.60	-0.63	-0.27	0.94	36.02	4000	36.29
3DH5	2441.0	-11.18	1.86	9.89	0.57	1.14	20.96	125	20.39	-0.63	-0.06	0.99	36.02	4000	36.08
3DH5	2480.0	-12.16	1.88	9.89	-0.39	0.91	20.96	125	21.35	-0.63	-1.02	0.79	36.02	4000	37.04

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.	12990291S-A
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	August 8, 2019
Temperature / Humidity	25 deg. C / 53 % RH
Engineer	Kazuya Noda
Mode	Tx, Hopping Off

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result (Time average)		Duty factor [dB]	Result (Burst power average)	
					[dBm]	[mW]		[dBm]	[mW]
DH5	2402.0	-14.98	1.84	9.89	-3.25	0.47	1.08	-2.17	0.61
DH5	2441.0	-14.55	1.86	9.89	-2.80	0.52	1.08	-1.72	0.67
DH5	2480.0	-15.66	1.88	9.89	-3.89	0.41	1.08	-2.81	0.52
2DH5	2402.0	-15.97	1.84	9.89	-4.24	0.38	1.05	-3.19	0.48
2DH5	2441.0	-15.54	1.86	9.89	-3.79	0.42	1.05	-2.74	0.53
2DH5	2480.0	-16.51	1.88	9.89	-4.74	0.34	1.05	-3.69	0.43
3DH5	2402.0	-15.83	1.84	9.89	-4.10	0.39	1.05	-3.05	0.50
3DH5	2441.0	-15.46	1.86	9.89	-3.71	0.43	1.05	-2.66	0.54
3DH5	2480.0	-16.43	1.88	9.89	-4.66	0.34	1.05	-3.61	0.44

Sample Calculation:

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

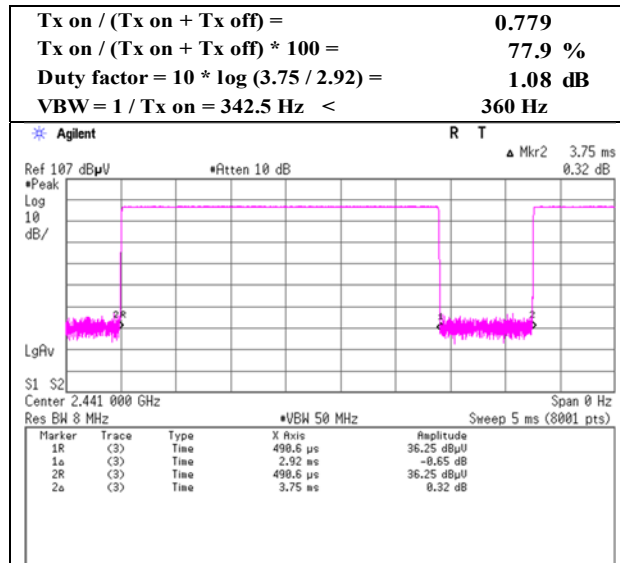
Result (Burst power average) = Time average + Duty factor

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

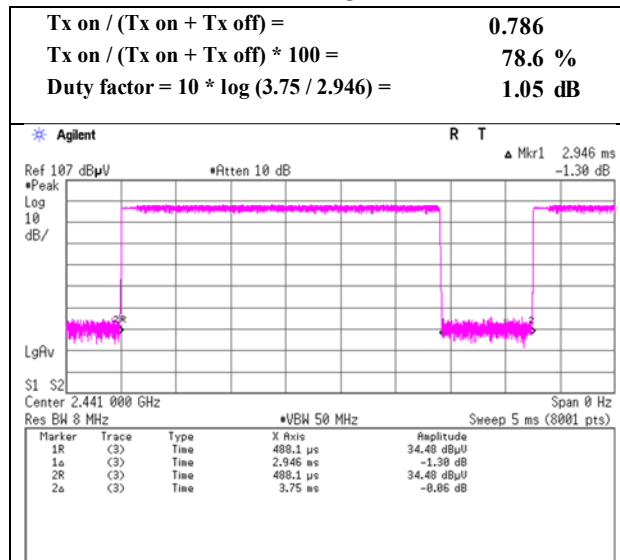
Burst Rate Confirmation

Report No. 12990291S-A
Test place Shonan EMC Lab. No.5 Shielded Room
Date August 8, 2019
Temperature / Humidity 25 deg. C / 53 % RH
Engineer Kazuya Noda
Mode Tx, Hopping Off

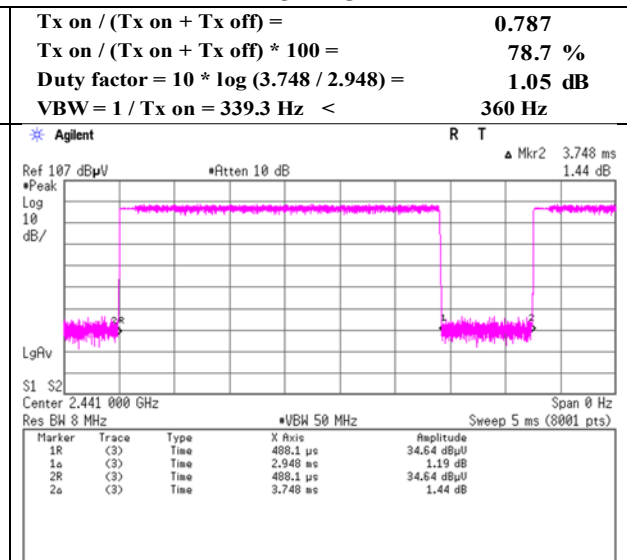
DH5



2DH5



3DH5



Radiated Spurious Emission

Report No.	12990291S-A		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.2	No.3	No.2
Date	August 6, 2019	August 5, 2019	August 6, 2019
Temperature / Humidity	23 deg. C / 60 % RH	24 deg. C / 51 % RH	23 deg. C / 60 % RH
Engineer	Makoto Hosaka	Kazuya Noda	Makoto Hosaka
	(30 MHz -1000 MHz)	(1 GHz -13 GHz)	(13 GHz – 26.5 GHz)
Mode	Tx, Hopping Off, DH5 2402 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	132.423	QP	42.30	14.05	8.32	31.85	0.00	32.82	43.50	10.6	255	26	
Hori.	134.128	QP	44.00	14.11	8.36	31.85	0.00	34.62	43.50	8.8	252	21	
Hori.	144.459	QP	40.00	14.57	8.61	31.84	0.00	31.34	43.50	12.1	214	341	
Hori.	423.229	QP	44.70	16.10	7.71	31.66	0.00	36.85	46.00	9.1	100	166	
Hori.	457.088	QP	44.60	16.77	7.92	31.65	0.00	37.64	46.00	8.3	101	315	
Hori.	490.947	QP	48.80	17.56	8.04	31.63	0.00	42.77	46.00	3.2	100	284	
Hori.	495.010	QP	43.80	17.64	8.05	31.62	0.00	37.87	46.00	8.1	100	290	
Hori.	2390.000	PK	47.46	28.33	14.15	41.59	2.27	50.62	73.90	23.2	143	128	
Hori.	4804.000	PK	51.74	31.62	6.44	42.88	2.27	49.19	73.90	24.7	157	123	
Hori.	7206.000	PK	48.67	37.23	7.87	42.92	2.27	53.12	73.90	20.7	100	0	
Hori.	9608.000	PK	48.58	38.84	9.17	43.17	2.27	55.69	73.90	18.2	100	0	
Hori.	2390.000	AV	35.51	28.33	14.15	41.59	2.27	38.67	53.90	15.2	143	128	VBW: 360 Hz
Hori.	4804.000	AV	43.24	31.62	6.44	42.88	2.27	40.69	53.90	13.2	157	123	VBW: 360 Hz
Hori.	7206.000	AV	36.98	37.23	7.87	42.92	2.27	41.43	53.90	12.4	100	0	VBW: 360 Hz
Hori.	9608.000	AV	36.95	38.84	9.17	43.17	2.27	44.06	53.90	9.8	100	0	VBW: 360 Hz
Vert.	134.149	QP	38.10	14.11	8.36	31.85	0.00	28.72	43.50	14.7	240	12	
Vert.	2390.000	PK	48.04	28.33	14.15	41.59	2.27	51.20	73.90	22.7	196	354	
Vert.	4804.000	PK	54.29	31.62	6.44	42.88	2.27	51.74	73.90	22.1	224	204	
Vert.	7206.000	PK	48.61	37.23	7.87	42.92	2.27	53.06	73.90	20.8	100	0	
Vert.	9608.000	PK	48.96	38.84	9.17	43.17	2.27	56.07	73.90	17.8	100	0	
Vert.	2390.000	AV	35.57	28.33	14.15	41.59	2.27	38.73	53.90	15.1	196	354	VBW: 360 Hz
Vert.	4804.000	AV	46.72	31.62	6.44	42.88	2.27	44.17	53.90	9.7	224	204	VBW: 360 Hz
Vert.	7206.000	AV	37.12	37.23	7.87	42.92	2.27	41.57	53.90	12.3	100	0	VBW: 360 Hz
Vert.	9608.000	AV	37.07	38.84	9.17	43.17	2.27	44.18	53.90	9.7	100	0	VBW: 360 Hz

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.27\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

* These results have sufficient margin without taking account Dwell time factor.

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	85.97	28.31	14.16	41.60	2.27	89.11	-	-	Carrier
Hori.	2400.000	PK	40.13	28.31	14.15	41.60	2.27	43.26	69.11	25.8	
Vert.	2402.000	PK	89.01	28.31	14.16	41.60	2.27	92.15	-	-	Carrier
Vert.	2400.000	PK	40.31	28.31	14.15	41.60	2.27	43.44	72.15	28.7	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.27\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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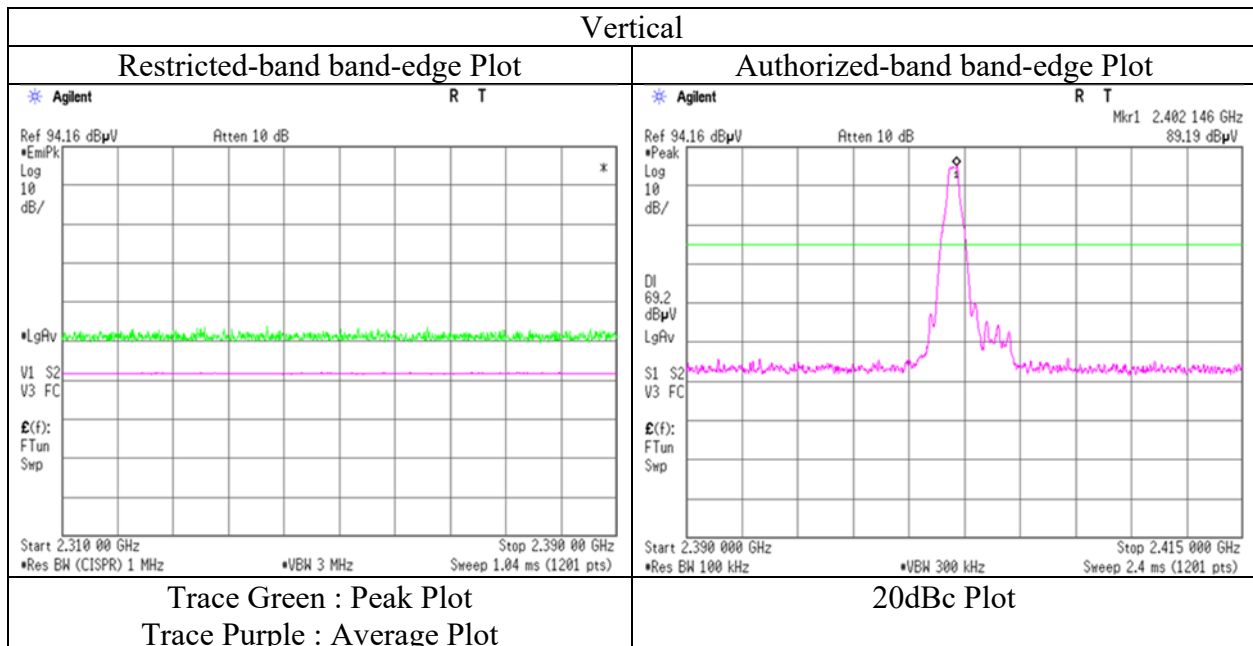
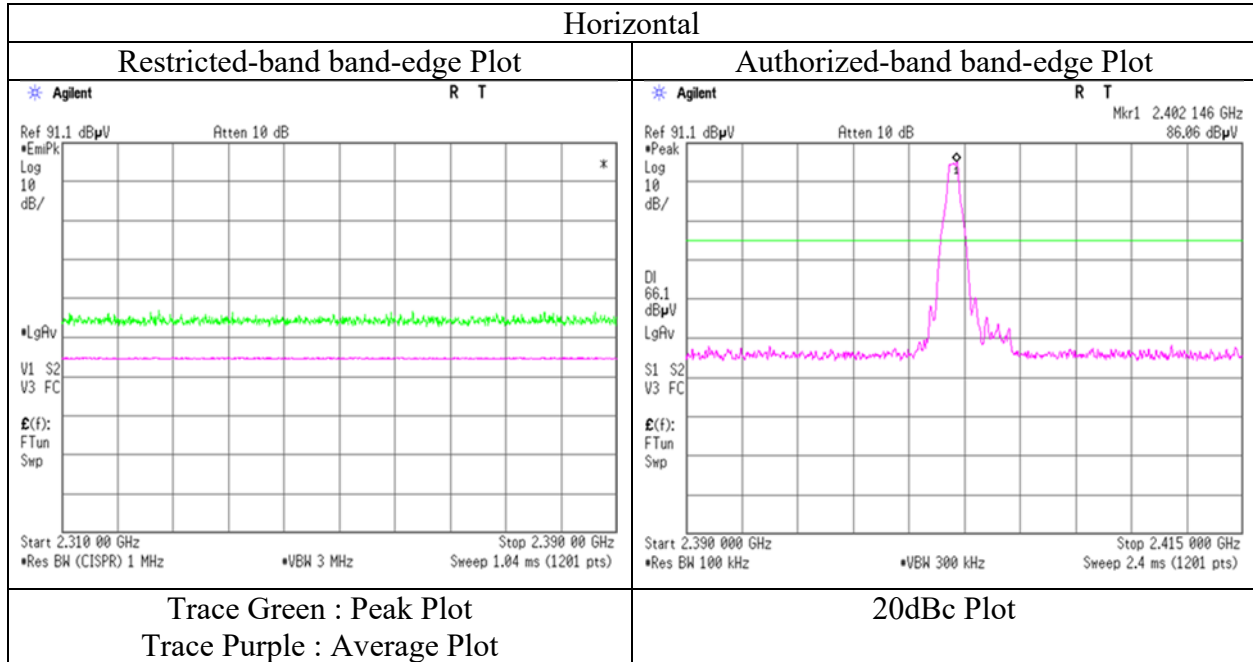
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	12990291S-A	No.3	No.2
Test place	Shonan EMC Lab.	August 5, 2019	August 6, 2019
Semi Anechoic Chamber	No.2	24 deg. C / 51 % RH	23 deg. C / 60 % RH
Date	August 6, 2019	Kazuya Noda	Makoto Hosaka
Temperature / Humidity	23 deg. C / 60 % RH	(1 GHz - 13 GHz)	(13 GHz - 26.5 GHz)
Engineer	Makoto Hosaka		
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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1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

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Radiated Spurious Emission

Report No.	12990291S-A		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.2	No.3	No.2
Date	August 6, 2019	August 5, 2019	August 6, 2019
Temperature / Humidity	23 deg. C / 60 % RH	24 deg. C / 51 % RH	23 deg. C / 60 % RH
Engineer	Makoto Hosaka	Kazuya Noda	Makoto Hosaka
	(30 MHz -1000 MHz)	(1 GHz -13 GHz)	(13 GHz – 26.5 GHz)
Mode	Tx, Hopping Off, DH5 2441 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	130.687	QP	41.80	13.84	8.27	31.86	0.00	32.05	43.50	11.4	270	27	
Hori.	132.402	QP	41.60	14.04	8.32	31.85	0.00	32.11	43.50	11.3	237	23	
Hori.	423.228	QP	44.70	16.10	7.71	31.66	0.00	36.85	46.00	9.1	100	167	
Hori.	457.084	QP	44.50	16.77	7.92	31.65	0.00	37.54	46.00	8.4	100	317	
Hori.	490.945	QP	48.80	17.56	8.04	31.63	0.00	42.77	46.00	3.2	100	285	
Hori.	495.018	QP	44.00	17.64	8.05	31.62	0.00	38.07	46.00	7.9	100	287	
Hori.	4882.000	PK	50.82	31.71	6.49	42.89	2.27	48.40	73.90	25.5	158	132	
Hori.	7323.000	PK	48.27	37.39	7.96	43.15	2.27	52.74	73.90	21.1	100	0	
Hori.	9764.000	PK	48.19	39.34	9.22	43.01	2.27	56.01	73.90	17.8	100	0	
Hori.	4882.000	AV	41.34	31.71	6.49	42.89	2.27	38.92	53.90	14.9	158	132	VBW: 360 Hz
Hori.	7323.000	AV	36.98	37.39	7.96	43.15	2.27	41.45	53.90	12.4	100	0	VBW: 360 Hz
Hori.	9764.000	AV	36.61	39.34	9.22	43.01	2.27	44.43	53.90	9.4	100	0	VBW: 360 Hz
Vert.	142.714	QP	38.00	14.57	8.58	31.85	0.00	29.30	43.50	14.2	100	256	
Vert.	144.445	QP	40.00	14.57	8.61	31.84	0.00	31.34	43.50	12.1	100	287	
Vert.	4882.000	PK	54.84	31.71	6.49	42.89	2.27	52.42	73.90	21.4	193	202	
Vert.	7323.000	PK	48.43	37.39	7.96	43.15	2.27	52.90	73.90	21.0	100	0	
Vert.	9764.000	PK	48.39	39.34	9.22	43.01	2.27	56.21	73.90	17.6	100	0	
Vert.	4882.000	AV	47.73	31.71	6.49	42.89	2.27	45.31	53.90	8.5	193	202	VBW: 360 Hz
Vert.	7323.000	AV	37.50	37.39	7.96	43.15	2.27	41.97	53.90	11.9	100	0	VBW: 360 Hz
Vert.	9764.000	AV	37.23	39.34	9.22	43.01	2.27	45.05	53.90	8.8	100	0	VBW: 360 Hz

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.27\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

* These results have sufficient margin without taking account Dwell time factor.

UL Japan, Inc.

Shonan EMC Lab.

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Radiated Spurious Emission

Report No.	12990291S-A		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.2	No.3	No.2
Date	August 6, 2019	August 5, 2019	August 6, 2019
Temperature / Humidity	23 deg. C / 60 % RH	24 deg. C / 51 % RH	23 deg. C / 60 % RH
Engineer	Makoto Hosaka	Kazuya Noda	Makoto Hosaka
	(30 MHz -1000 MHz)	(1 GHz -13 GHz)	(13 GHz – 26.5 GHz)
Mode	Tx, Hopping Off, DH5 2480 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	130.682	QP	41.80	13.84	8.27	31.86	0.00	32.05	43.50	11.4	272	28	
Hori.	132.402	QP	41.50	14.04	8.32	31.85	0.00	32.01	43.50	11.4	238	22	
Hori.	146.157	QP	39.50	14.65	8.65	31.84	0.00	30.96	43.50	12.5	223	353	
Hori.	423.228	QP	44.80	16.10	7.71	31.66	0.00	36.95	46.00	9.0	100	172	
Hori.	457.086	QP	44.80	16.77	7.92	31.65	0.00	37.84	46.00	8.1	100	316	
Hori.	490.945	QP	48.80	17.56	8.04	31.63	0.00	42.77	46.00	3.2	100	284	
Hori.	495.014	QP	43.70	17.64	8.05	31.62	0.00	37.77	46.00	8.2	100	284	
Hori.	2483.500	PK	47.89	28.24	14.23	41.62	2.27	51.01	73.90	22.8	162	138	
Hori.	2584.000	PK	48.96	28.25	14.32	41.66	2.27	52.14	73.90	21.7	159	241	
Hori.	2636.000	PK	49.03	28.29	14.35	41.68	2.27	52.26	73.90	21.6	157	240	
Hori.	4960.000	PK	52.53	31.96	6.54	42.91	2.27	50.39	73.90	23.5	152	131	
Hori.	7440.000	PK	48.83	37.56	8.03	43.38	2.27	53.31	73.90	20.5	100	0	
Hori.	9920.000	PK	47.59	39.18	9.26	42.84	2.27	55.46	73.90	18.4	100	0	
Hori.	2483.500	AV	35.77	28.24	14.23	41.62	2.27	38.89	53.90	15.0	162	138	VBW: 360 Hz
Hori.	2584.000	AV	39.36	28.25	14.32	41.66	2.27	42.54	53.90	11.3	159	241	VBW: 360 Hz
Hori.	2636.000	AV	39.43	28.29	14.35	41.68	2.27	42.66	53.90	11.2	157	240	VBW: 360 Hz
Hori.	4960.000	AV	40.29	31.96	6.54	42.91	2.27	38.15	53.90	15.7	152	131	VBW: 360 Hz
Hori.	7440.000	AV	37.51	37.56	8.03	43.38	2.27	41.99	53.90	11.9	100	0	VBW: 360 Hz
Hori.	9920.000	AV	36.60	39.18	9.26	42.84	2.27	44.47	53.90	9.4	100	0	VBW: 360 Hz
Vert.	144.436	QP	40.50	14.57	8.61	31.84	0.00	31.84	43.50	11.6	100	288	
Vert.	2483.500	PK	47.46	28.24	14.23	41.62	2.27	50.58	73.90	23.3	110	349	
Vert.	2584.000	PK	50.32	28.25	14.32	41.66	2.27	53.50	73.90	20.4	153	340	
Vert.	2636.000	PK	49.89	28.29	14.35	41.68	2.27	53.12	73.90	20.7	141	339	
Vert.	4960.000	PK	52.76	31.96	6.54	42.91	2.27	50.62	73.90	23.2	156	201	
Vert.	7440.000	PK	48.95	37.56	8.03	43.38	2.27	53.43	73.90	20.4	100	0	
Vert.	9920.000	PK	48.24	39.18	9.26	42.84	2.27	56.11	73.90	17.7	100	0	
Vert.	2483.500	AV	35.82	28.24	14.23	41.62	2.27	38.94	53.90	14.9	110	349	VBW: 360 Hz
Vert.	2584.000	AV	41.33	28.25	14.32	41.66	2.27	44.51	53.90	9.3	153	340	VBW: 360 Hz
Vert.	2636.000	AV	40.86	28.29	14.35	41.68	2.27	44.09	53.90	9.8	141	339	VBW: 360 Hz
Vert.	4960.000	AV	43.88	31.96	6.54	42.91	2.27	41.74	53.90	12.1	156	201	VBW: 360 Hz
Vert.	7440.000	AV	37.52	37.56	8.03	43.38	2.27	42.00	53.90	11.9	100	0	VBW: 360 Hz
Vert.	9920.000	AV	36.66	39.18	9.26	42.84	2.27	44.53	53.90	9.3	100	0	VBW: 360 Hz

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

Distance factor : 1 GHz - 13 GHz : 20log (3.9 m / 3.0 m) = 2.27 dB

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

* These results have sufficient margin without taking account Dwell time factor.

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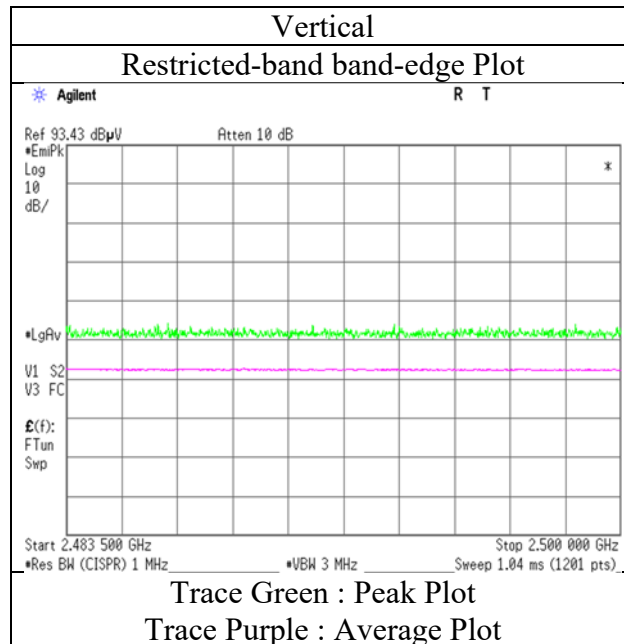
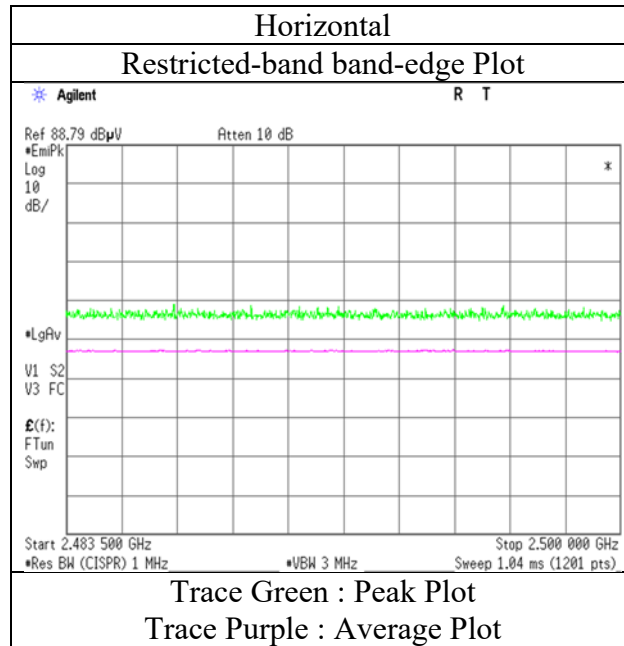
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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	12990291S-A		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.2	No.3	No.2
Date	August 6, 2019	August 5, 2019	August 6, 2019
Temperature / Humidity	23 deg. C / 60 % RH	24 deg. C / 51 % RH	23 deg. C / 60 % RH
Engineer	Makoto Hosaka	Kazuya Noda	Makoto Hosaka
	(30 MHz -1000 MHz)	(1 GHz -13 GHz)	(13 GHz – 26.5 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

Report No.	12990291S-A		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.2	No.3	No.2
Date	August 6, 2019	August 5, 2019	August 6, 2019
Temperature / Humidity	23 deg. C / 60 % RH	24 deg. C / 51 % RH	23 deg. C / 60 % RH
Engineer	Makoto Hosaka	Kazuya Noda	Makoto Hosaka
	(30 MHz -1000 MHz)	(1 GHz -13 GHz)	(13 GHz – 26.5 GHz)
Mode	Tx, Hopping Off, 3DH5 2402 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	130.697	QP	42.00	13.84	8.27	31.86	0.00	32.25	43.50	11.2	238	22	
Hori.	132.420	QP	41.50	14.05	8.32	31.85	0.00	32.02	43.50	11.4	256	18	
Hori.	146.185	QP	39.70	14.66	8.65	31.84	0.00	31.17	43.50	12.3	209	342	
Hori.	423.228	QP	45.30	16.10	7.71	31.66	0.00	37.45	46.00	8.5	100	320	
Hori.	457.085	QP	44.80	16.77	7.92	31.65	0.00	37.84	46.00	8.1	100	320	
Hori.	490.946	QP	48.80	17.56	8.04	31.63	0.00	42.77	46.00	3.2	100	287	
Hori.	495.020	QP	44.30	17.64	8.05	31.62	0.00	38.37	46.00	7.6	100	260	
Hori.	2390.000	PK	47.66	28.33	14.15	41.59	2.27	50.82	73.90	23.0	123	128	
Hori.	4804.000	PK	50.72	31.62	6.44	42.88	2.27	48.17	73.90	25.7	147	113	
Hori.	7206.000	PK	48.23	37.23	7.87	42.92	2.27	52.68	73.90	21.2	100	0	
Hori.	9608.000	PK	49.12	38.84	9.17	43.17	2.27	56.23	73.90	17.6	100	0	
Hori.	2390.000	AV	35.61	28.33	14.15	41.59	2.27	38.77	53.90	15.1	123	128	VBW: 360 Hz
Hori.	4804.000	AV	39.97	31.62	6.44	42.88	2.27	37.42	53.90	16.4	147	113	VBW: 360 Hz
Hori.	7206.000	AV	37.65	37.23	7.87	42.92	2.27	42.10	53.90	11.8	100	0	VBW: 360 Hz
Hori.	9608.000	AV	37.67	38.84	9.17	43.17	2.27	44.78	53.90	9.1	100	0	VBW: 360 Hz
Vert.	144.466	QP	41.10	14.57	8.61	31.84	0.00	32.44	43.50	11.0	100	290	
Vert.	2390.000	PK	48.06	28.33	14.15	41.59	2.27	51.22	73.90	22.6	151	356	
Vert.	4804.000	PK	52.83	31.62	6.44	42.88	2.27	50.28	73.90	23.6	259	182	
Vert.	7206.000	PK	48.99	37.23	7.87	42.92	2.27	53.44	73.90	20.4	100	0	
Vert.	9608.000	PK	49.21	38.84	9.17	43.17	2.27	56.32	73.90	17.5	100	0	
Vert.	2390.000	AV	35.66	28.33	14.15	41.59	2.27	38.82	53.90	15.0	151	356	VBW: 360 Hz
Vert.	4804.000	AV	42.92	31.62	6.44	42.88	2.27	40.37	53.90	13.5	259	182	VBW: 360 Hz
Vert.	7206.000	AV	37.69	37.23	7.87	42.92	2.27	42.14	53.90	11.7	100	0	VBW: 360 Hz
Vert.	9608.000	AV	37.62	38.84	9.17	43.17	2.27	44.73	53.90	9.1	100	0	VBW: 360 Hz

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.27\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

* These results have sufficient margin without taking account Dwell time factor.

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	86.55	28.31	14.16	41.60	2.27	89.69	-	-	Carrier
Hori.	2400.000	PK	41.58	28.31	14.15	41.60	2.27	44.71	69.69	24.9	
Vert.	2402.000	PK	90.32	28.31	14.16	41.60	2.27	93.46	-	-	Carrier
Vert.	2400.000	PK	42.83	28.31	14.15	41.60	2.27	45.96	73.46	27.5	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.27\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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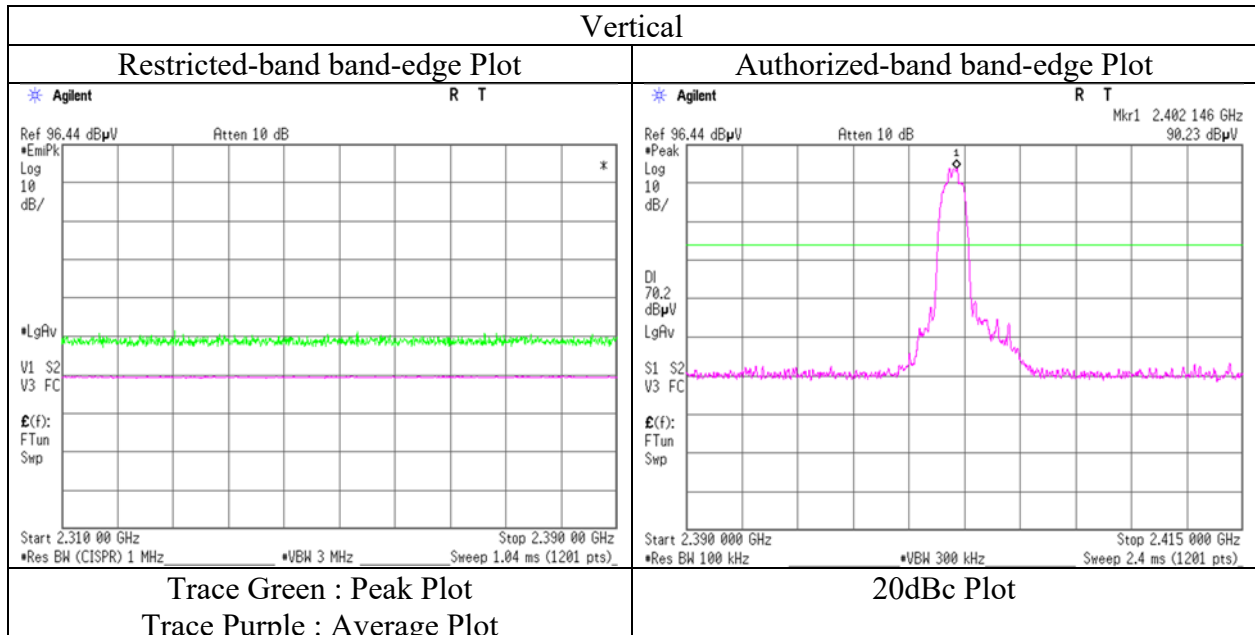
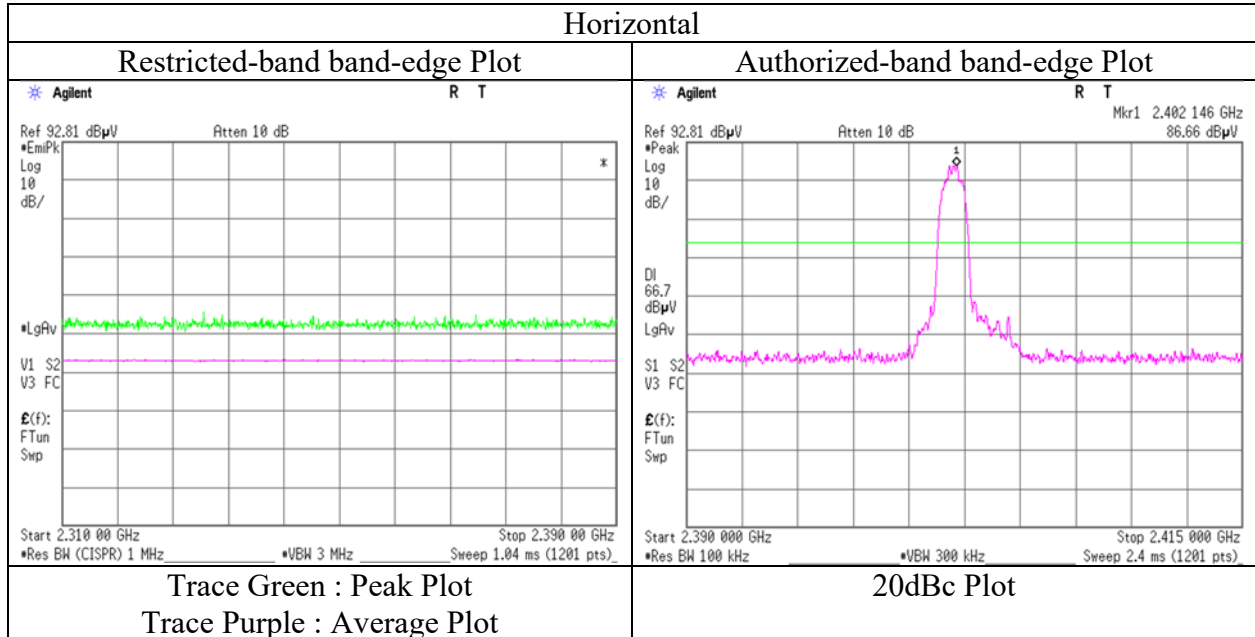
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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	12990291S-A	No.3	No.2
Test place	Shonan EMC Lab.	August 5, 2019	August 6, 2019
Semi Anechoic Chamber	No.2	24 deg. C / 51 % RH	23 deg. C / 60 % RH
Date	August 6, 2019	Kazuya Noda	Makoto Hosaka
Temperature / Humidity	23 deg. C / 60 % RH	(1 GHz - 13 GHz)	(13 GHz - 26.5 GHz)
Engineer	Makoto Hosaka	(30 MHz - 1000 MHz)	
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

Report No.	12990291S-A		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.2	No.3	No.2
Date	August 6, 2019	August 5, 2019	August 6, 2019
Temperature / Humidity	23 deg. C / 60 % RH	24 deg. C / 51 % RH	23 deg. C / 60 % RH
Engineer	Makoto Hosaka	Kazuya Noda	Makoto Hosaka
	(30 MHz -1000 MHz)	(1 GHz -13 GHz)	(13 GHz – 26.5 GHz)
Mode	Tx, Hopping Off, 3DH5 2441 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	130.730	QP	41.80	13.84	8.27	31.86	0.00	32.05	43.50	11.4	240	23	
Hori.	132.450	QP	41.70	14.05	8.32	31.85	0.00	32.22	43.50	11.2	155	20	
Hori.	146.183	QP	40.00	14.66	8.65	31.84	0.00	31.47	43.50	12.0	210	343	
Hori.	423.224	QP	45.50	16.10	7.71	31.66	0.00	37.65	46.00	8.3	100	321	
Hori.	457.088	QP	45.00	16.77	7.92	31.65	0.00	38.04	46.00	7.9	100	320	
Hori.	490.947	QP	48.60	17.56	8.04	31.63	0.00	42.57	46.00	3.4	100	288	
Hori.	495.014	QP	44.60	17.64	8.05	31.62	0.00	38.67	46.00	7.3	100	290	
Hori.	4882.000	PK	50.65	31.71	6.49	42.89	2.27	48.23	73.90	25.6	155	115	
Hori.	7323.000	PK	48.42	37.39	7.96	43.15	2.27	52.89	73.90	21.0	100	0	
Hori.	9764.000	PK	48.43	39.34	9.22	43.01	2.27	56.25	73.90	17.6	100	0	
Hori.	4882.000	AV	39.76	31.71	6.49	42.89	2.27	37.34	53.90	16.5	155	115	VBW: 360 Hz
Hori.	7323.000	AV	37.38	37.39	7.96	43.15	2.27	41.85	53.90	12.0	100	0	VBW: 360 Hz
Hori.	9764.000	AV	37.06	39.34	9.22	43.01	2.27	44.88	53.90	9.0	100	0	VBW: 360 Hz
Vert.	144.469	QP	41.50	14.57	8.61	31.84	0.00	32.84	43.50	10.6	100	289	
Vert.	4882.000	PK	50.94	31.71	6.49	42.89	2.27	48.52	73.90	25.3	166	206	
Vert.	7323.000	PK	48.86	37.39	7.96	43.15	2.27	53.33	73.90	20.5	100	0	
Vert.	9764.000	PK	48.31	39.34	9.22	43.01	2.27	56.13	73.90	17.7	100	0	
Vert.	4882.000	AV	39.44	31.71	6.49	42.89	2.27	37.02	53.90	16.8	166	206	VBW: 360 Hz
Vert.	7323.000	AV	36.02	37.39	7.96	43.15	2.27	40.49	53.90	13.4	100	0	VBW: 360 Hz
Vert.	9764.000	AV	35.72	39.34	9.22	43.01	2.27	43.54	53.90	10.3	100	0	VBW: 360 Hz

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.27\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

* These results have sufficient margin without taking account Dwell time factor.

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Radiated Spurious Emission

Report No.	12990291S-A		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.2	No.3	No.2
Date	August 6, 2019	August 5, 2019	August 6, 2019
Temperature / Humidity	23 deg. C / 60 % RH	24 deg. C / 51 % RH	23 deg. C / 60 % RH
Engineer	Makoto Hosaka (30 MHz -1000 MHz)	Kazuya Noda (1 GHz -13 GHz)	Makoto Hosaka (13 GHz – 26.5 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz		

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	132.411	QP	42.30	14.04	8.32	31.85	0.00	32.81	43.50	10.6	243	23	
Hori.	134.135	QP	40.80	14.11	8.36	31.85	0.00	31.42	43.50	12.0	253	20	
Hori.	146.169	QP	39.10	14.65	8.65	31.84	0.00	30.56	43.50	12.9	211	340	
Hori.	423.229	QP	46.00	16.10	7.71	31.66	0.00	38.15	46.00	7.8	100	174	
Hori.	457.086	QP	45.00	16.77	7.92	31.65	0.00	38.04	46.00	7.9	100	320	
Hori.	490.943	QP	48.50	17.56	8.04	31.63	0.00	42.47	46.00	3.5	100	287	
Hori.	495.005	QP	44.00	17.64	8.05	31.62	0.00	38.07	46.00	7.9	100	261	
Hori.	2483.500	PK	48.14	28.24	14.23	41.62	2.27	51.26	73.90	22.6	155	137	
Hori.	2584.000	PK	48.41	28.25	14.32	41.66	2.27	51.59	73.90	22.3	171	246	
Hori.	2636.000	PK	47.93	28.29	14.35	41.68	2.27	51.16	73.90	22.7	164	245	
Hori.	4960.000	PK	50.88	31.96	6.54	42.91	2.27	48.74	73.90	25.1	152	131	
Hori.	7440.000	PK	48.85	37.56	8.03	43.38	2.27	53.33	73.90	20.5	100	0	
Hori.	9920.000	PK	47.62	39.18	9.26	42.84	2.27	55.49	73.90	18.4	100	0	
Hori.	2483.500	AV	35.61	28.24	14.23	41.62	2.27	38.73	53.90	15.1	155	137	VBW: 360 Hz
Hori.	2584.000	AV	37.18	28.25	14.32	41.66	2.27	40.36	53.90	13.5	171	246	VBW: 360 Hz
Hori.	2636.000	AV	36.91	28.29	14.35	41.68	2.27	40.14	53.90	13.7	164	245	VBW: 360 Hz
Hori.	4960.000	AV	39.91	31.96	6.54	42.91	2.27	37.77	53.90	16.1	152	131	VBW: 360 Hz
Hori.	7440.000	AV	37.55	37.56	8.03	43.38	2.27	42.03	53.90	11.8	100	0	VBW: 360 Hz
Hori.	9920.000	AV	36.61	39.18	9.26	42.84	2.27	44.48	53.90	9.4	100	0	VBW: 360 Hz
Vert.	144.465	QP	40.60	14.57	8.61	31.84	0.00	31.94	43.50	11.5	100	293	
Vert.	2483.500	PK	48.31	28.24	14.23	41.62	2.27	51.43	73.90	22.4	123	350	
Vert.	2584.000	PK	49.12	28.25	14.32	41.66	2.27	52.30	73.90	21.6	153	242	
Vert.	2636.000	PK	49.84	28.29	14.35	41.68	2.27	53.07	73.90	20.8	151	335	
Vert.	4960.000	PK	51.43	31.96	6.54	42.91	2.27	49.29	73.90	24.6	157	201	
Vert.	7440.000	PK	48.76	37.56	8.03	43.38	2.27	53.24	73.90	20.6	100	0	
Vert.	9920.000	PK	47.93	39.18	9.26	42.84	2.27	55.80	73.90	18.1	100	0	
Vert.	2483.500	AV	35.77	28.24	14.23	41.62	2.27	38.89	53.90	15.0	123	350	VBW: 360 Hz
Vert.	2584.000	AV	39.62	28.25	14.32	41.66	2.27	42.80	53.90	11.1	153	242	VBW: 360 Hz
Vert.	2636.000	AV	39.97	28.29	14.35	41.68	2.27	43.20	53.90	10.7	151	335	VBW: 360 Hz
Vert.	4960.000	AV	41.59	31.96	6.54	42.91	2.27	39.45	53.90	14.4	157	201	VBW: 360 Hz
Vert.	7440.000	AV	37.54	37.56	8.03	43.38	2.27	42.02	53.90	11.8	100	0	VBW: 360 Hz
Vert.	9920.000	AV	36.71	39.18	9.26	42.84	2.27	44.58	53.90	9.3	100	0	VBW: 360 Hz

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

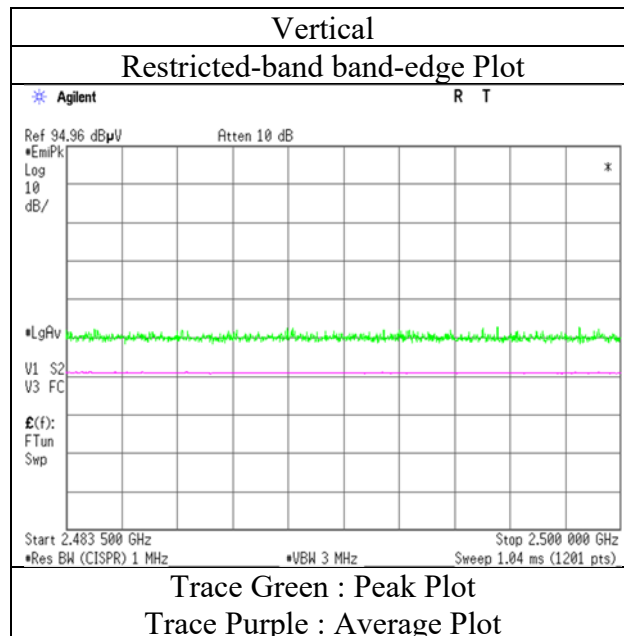
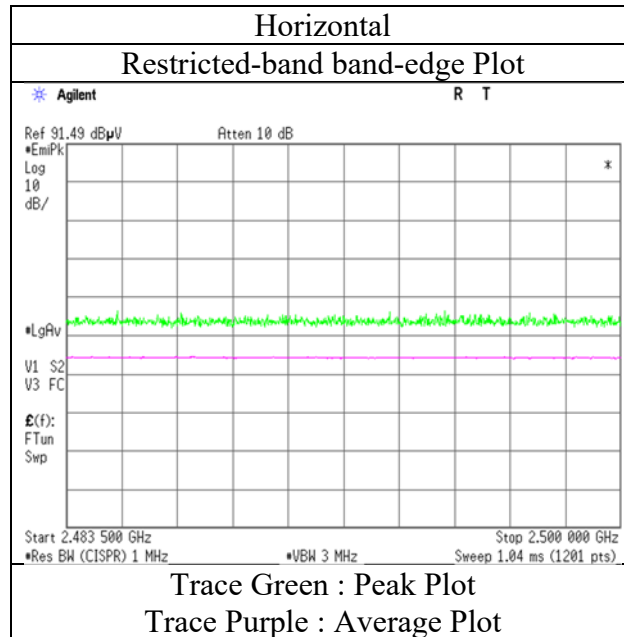
Distance factor : 1 GHz - 13 GHz : $20\log(3.9\text{ m} / 3.0\text{ m}) = 2.27\text{ dB}$

13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

* These results have sufficient margin without taking account Dwell time factor.

Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	12990291S-A		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.2	No.3	No.2
Date	August 6, 2019	August 5, 2019	August 6, 2019
Temperature / Humidity	23 deg. C / 60 % RH	24 deg. C / 51 % RH	23 deg. C / 60 % RH
Engineer	Makoto Hosaka	Kazuya Noda	Makoto Hosaka
	(30 MHz -1000 MHz)	(1 GHz -13 GHz)	(13 GHz – 26.5 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz		

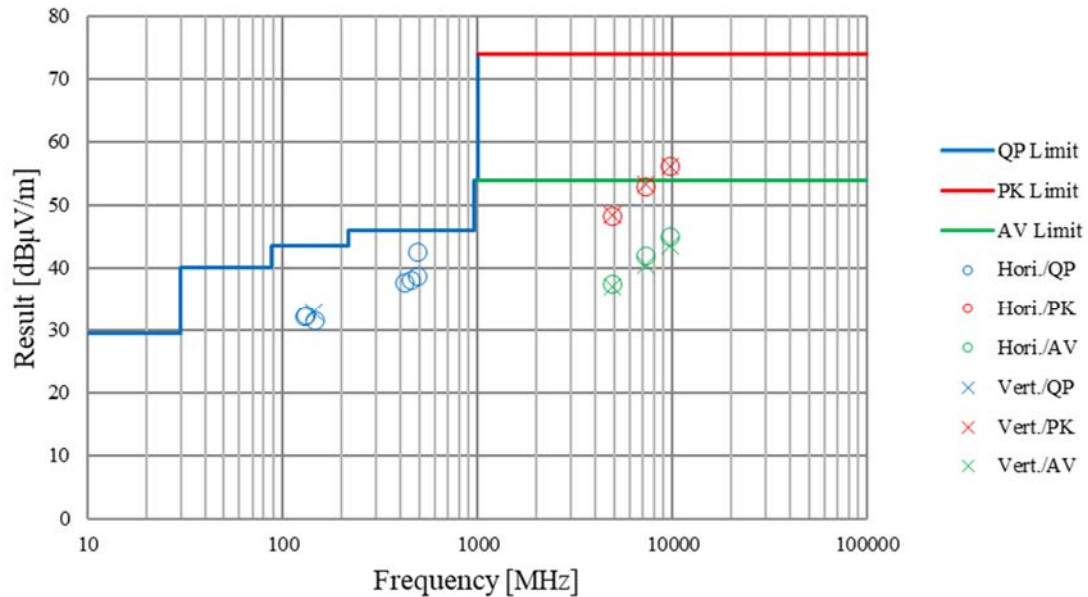


* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.

Final result of restricted band edge was shown in tabular data.

Radiated Spurious Emission
(Plot data, Worst case)

Report No.	12990291S-A		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.2	No.3	No.2
Date	August 6, 2019	August 5, 2019	August 6, 2019
Temperature / Humidity	23 deg. C / 60 % RH	24 deg. C / 51 % RH	23 deg. C / 60 % RH
Engineer	Makoto Hosaka	Kazuya Noda	Makoto Hosaka
	(30 MHz -1000 MHz)	(1 GHz -13 GHz)	(13 GHz – 26.5 GHz)
Mode	Tx, Hopping Off, 3DH5 2441 MHz		

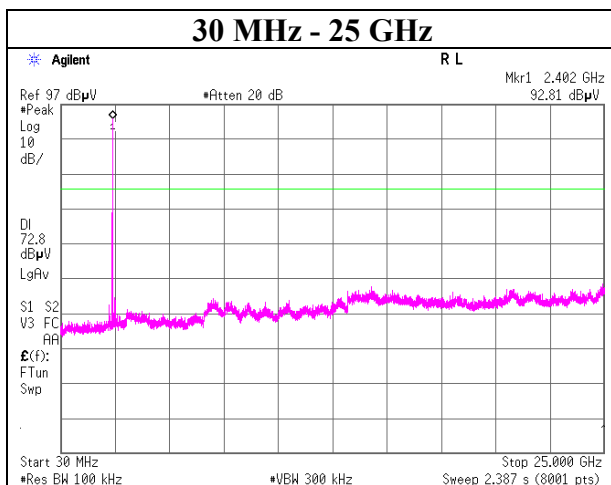
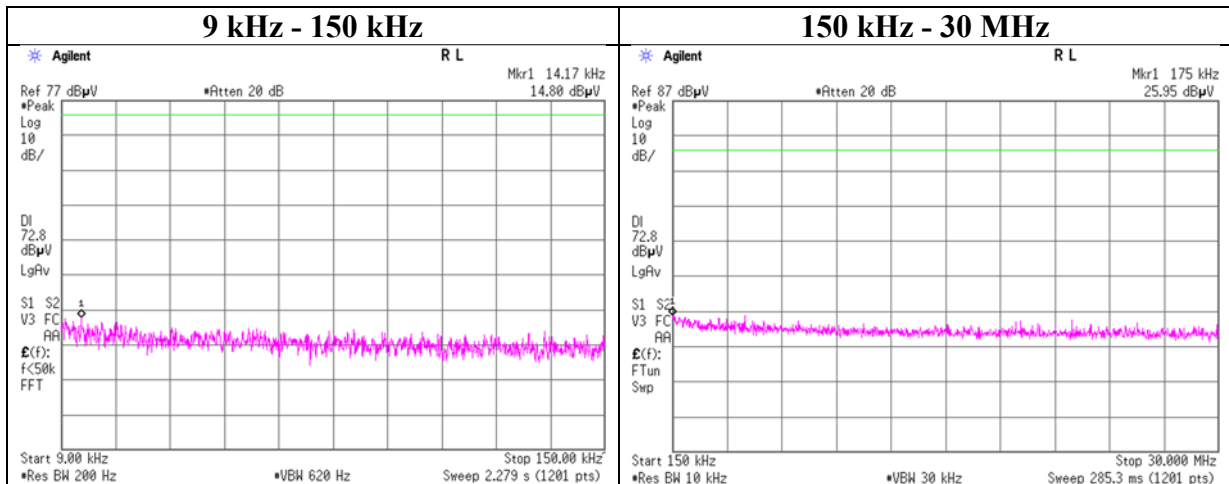


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

Conducted Spurious Emission

Report No. 12990291S-A
Test place Shonan EMC Lab. No.5 Shielded Room
Date August 8, 2019
Temperature / Humidity 25 deg. C / 53 % RH
Engineer Kazuya Noda
Mode Tx, Hopping Off, DH5

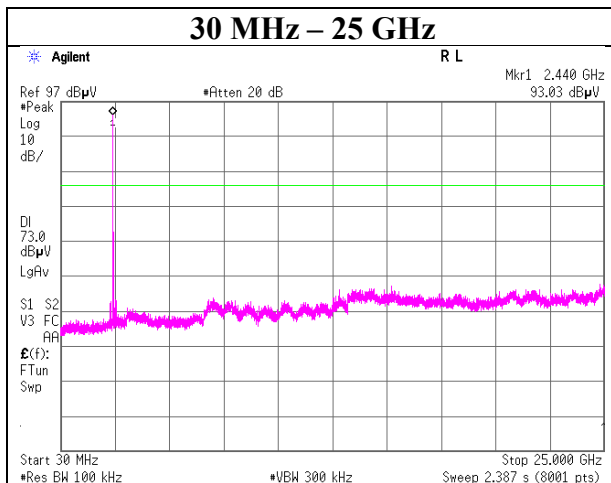
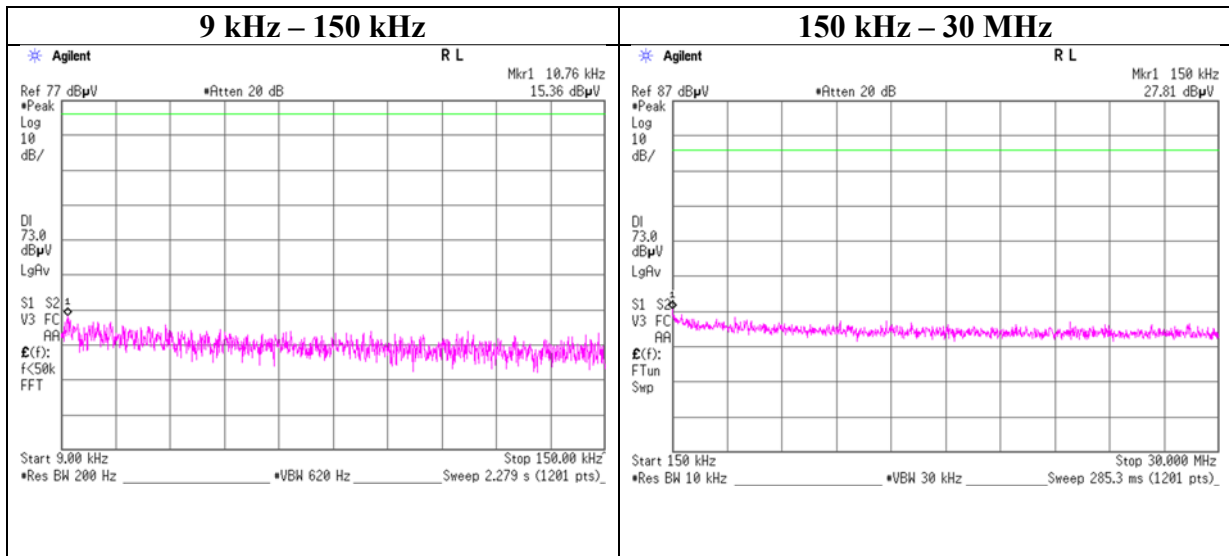
2402 MHz



Conducted Spurious Emission

Report No. 12990291S-A
Test place Shonan EMC Lab. No.5 Shielded Room
Date August 8, 2019
Temperature / Humidity 25 deg. C / 53 % RH
Engineer Kazuya Noda
Mode Tx, Hopping Off, DH5

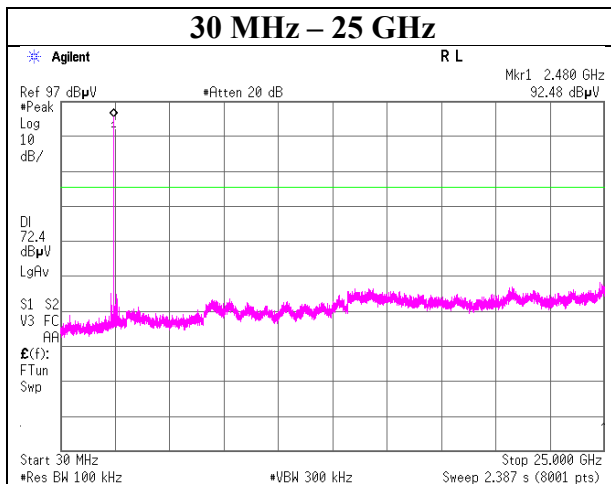
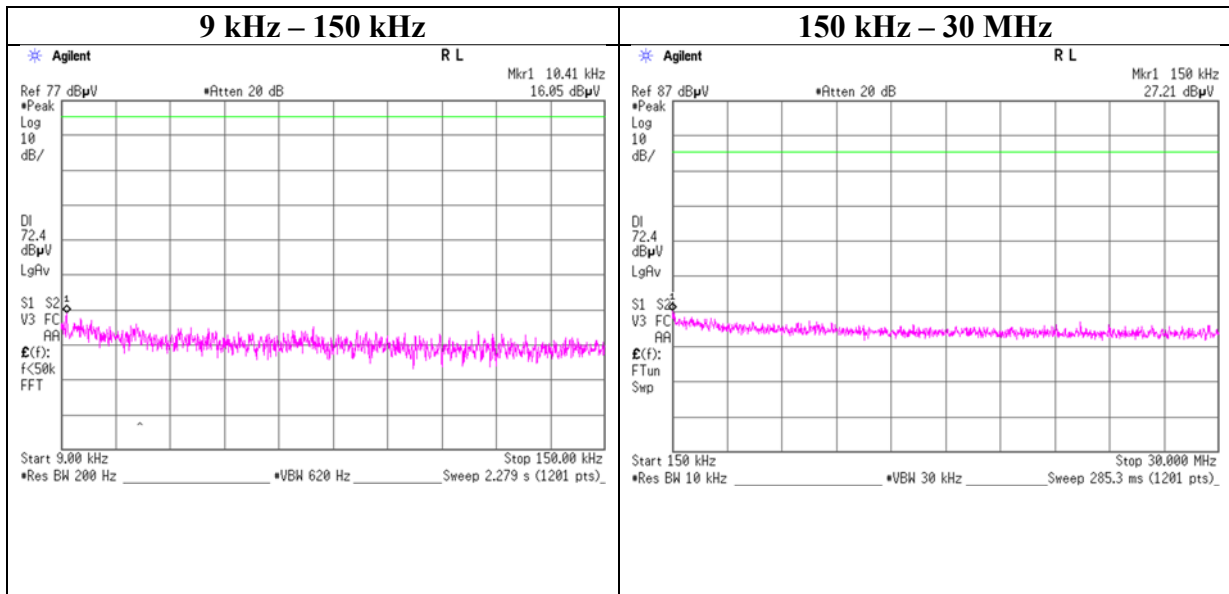
2441 MHz



Conducted Spurious Emission

Report No. 12990291S-A
Test place Shonan EMC Lab. No.5 Shielded Room
Date August 8, 2019
Temperature / Humidity 25 deg. C / 53 % RH
Engineer Kazuya Noda
Mode Tx, Hopping Off, DH5

2480 MHz



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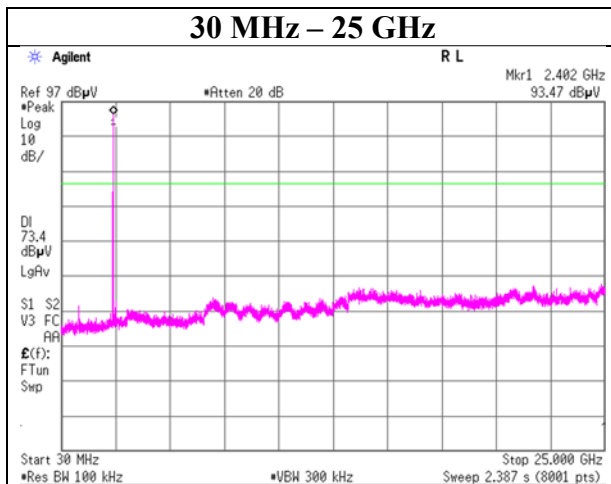
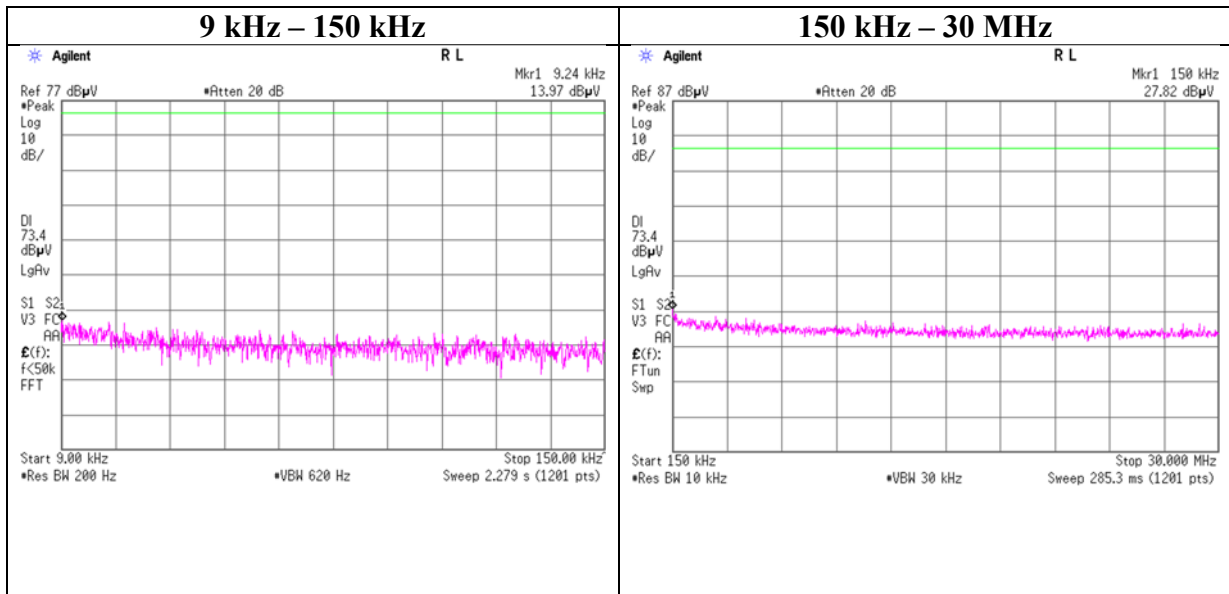
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Conducted Spurious Emission

Report No. 12990291S-A
Test place Shonan EMC Lab. No.5 Shielded Room
Date August 8, 2019
Temperature / Humidity 25 deg. C / 53 % RH
Engineer Kazuya Noda
Mode Tx, Hopping Off, 3DH5

2402 MHz



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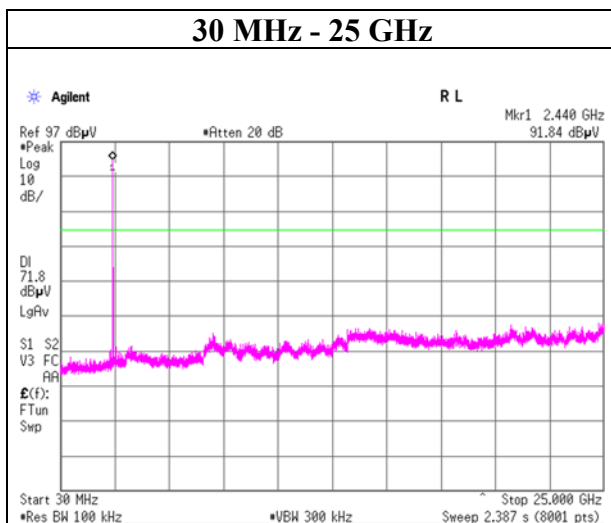
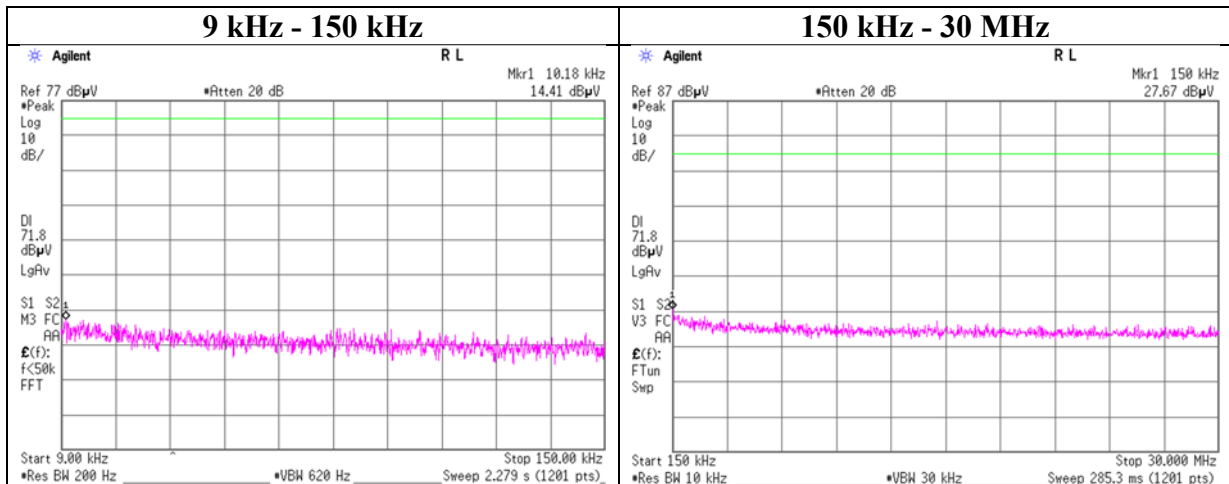
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Conducted Spurious Emission

Report No. 12990291S-A
Test place Shonan EMC Lab. No.5 Shielded Room
Date August 8, 2019
Temperature / Humidity 25 deg. C / 53 % RH
Engineer Kazuya Noda
Mode Tx, Hopping Off, 3DH5

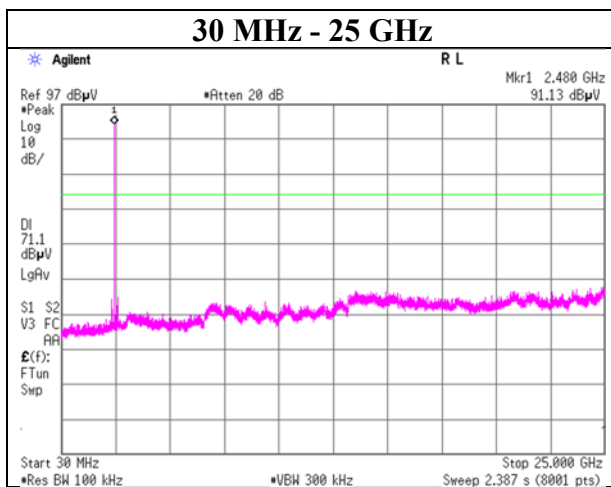
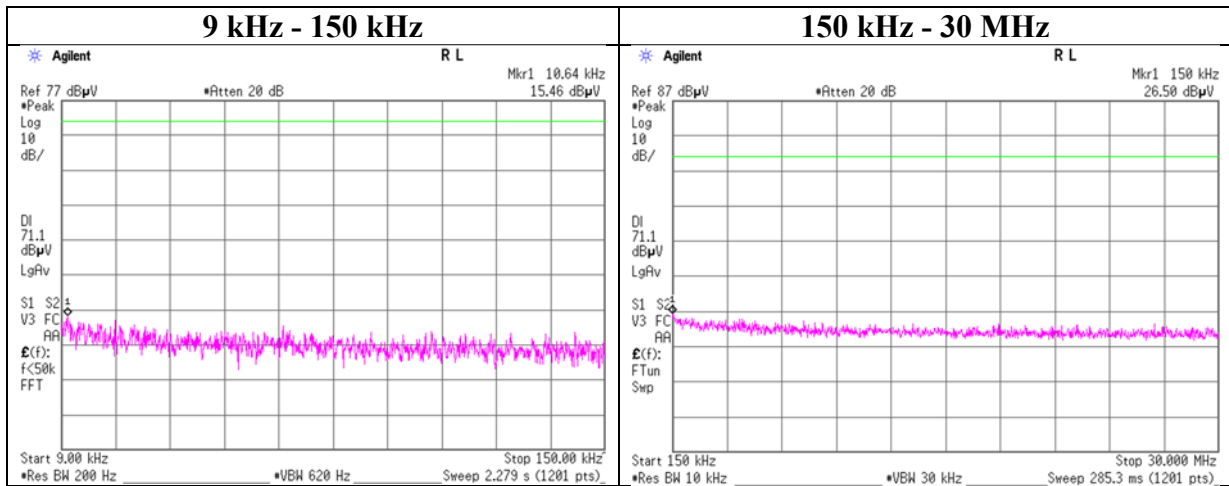
2441 MHz



Conducted Spurious Emission

Report No. 12990291S-A
Test place Shonan EMC Lab. No.5 Shielded Room
Date August 8, 2019
Temperature / Humidity 25 deg. C / 53 % RH
Engineer Kazuya Noda
Mode Tx, Hopping Off, 3DH5

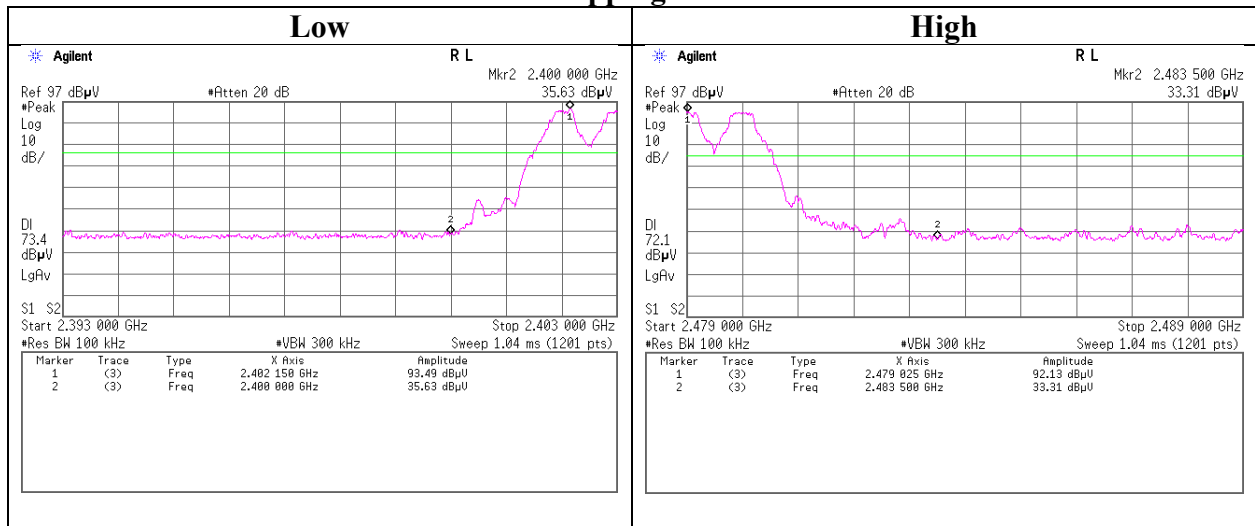
2480 MHz



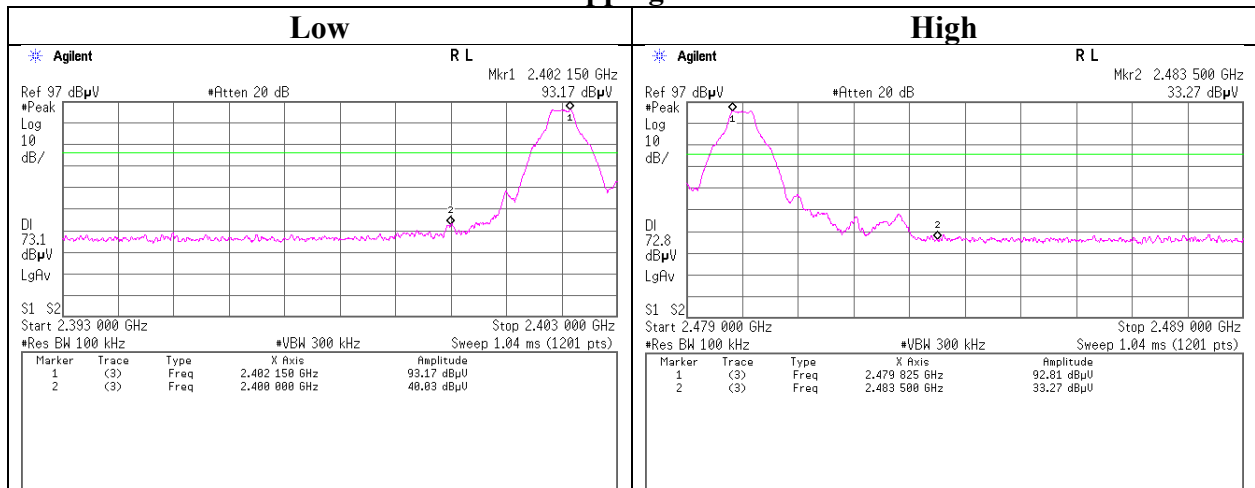
Conducted Emission Band Edge compliance

Report No. 12990291S-A
Test place Shonan EMC Lab. No.5 Shielded Room
Date August 8, 2019
Temperature / Humidity 25 deg. C / 53 % RH
Engineer Kazuya Noda
Mode Tx DH5

Hopping On



Hopping Off



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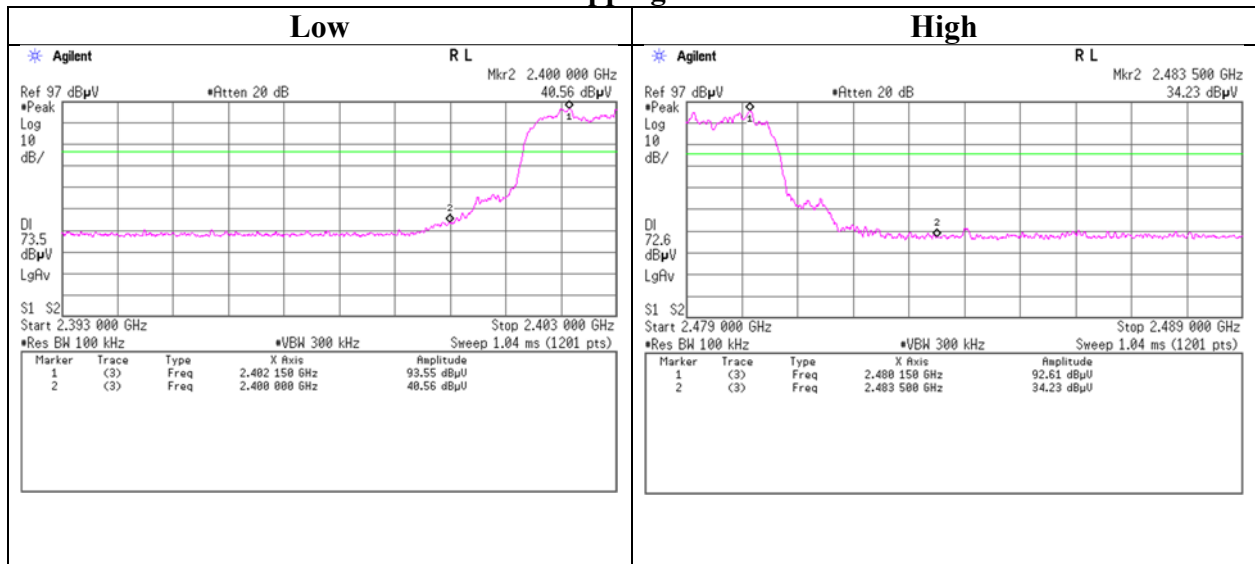
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

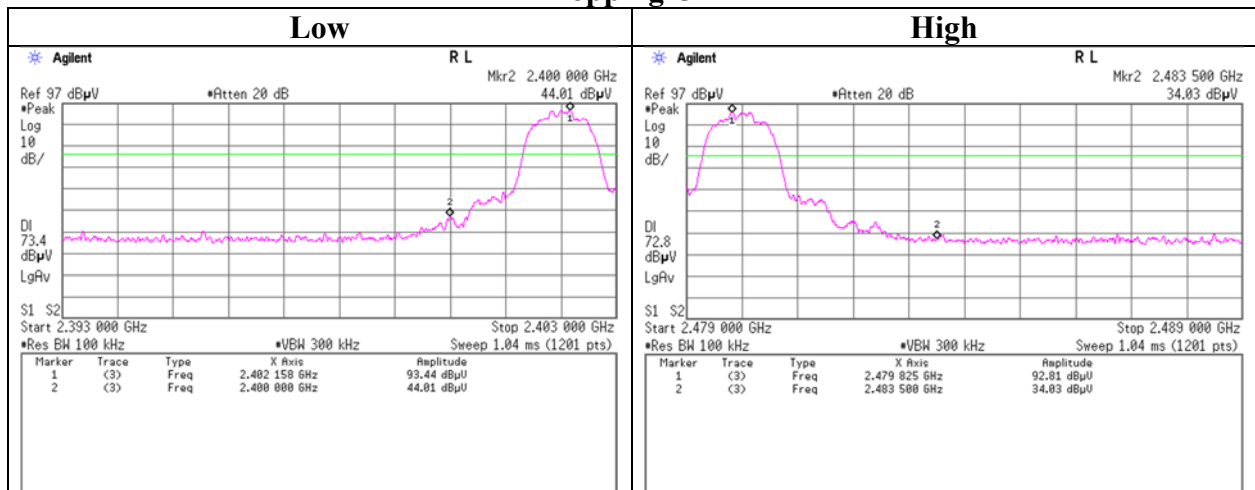
Conducted Emission Band Edge compliance

Report No.	12990291S-A
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	August 8, 2019
Temperature / Humidity	25 deg. C / 53 % RH
Engineer	Kazuya Noda
Mode	Tx 3DH5

Hopping On



Hopping Off



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APPENDIX 2: Test instruments

Test Instruments (1 / 2)

Local ID	Test Name	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Due Date	Calibration Interval (Month)
KTS-07	AT	145111	Digital Tester	SANWA	PC500	7019232	2018/10/17	2019/10/31	12
SAT10-16	AT	160494	Attenuator	Weinschel Corp.	54A-10	83406	2018/12/6	2019/12/30	12
SCC-G32	AT	145183	Coaxial Cable	Junkosha	MWX241-02000KMSK MS	OCT-09-13-005	2018/11/25	2019/11/30	12
SOS-09	AT	146318	Humidity Indicator	A&D	AD-5681	4061484	2018/12/5	2019/12/31	12
SPM-07	AT	146247	Power Meter	AGILENT	8990B	MY510027 2	2019/7/16	2020/7/31	12
SPSS-04	AT	146310	Power sensor	AGILENT	N1923A	MY532600 9	2019/7/16	2020/7/31	12
SSA-02	AT	145800	Spectrum Analyzer	AGILENT	E4448A	MY482501 06	2019/4/4	2020/4/30	12
COTS-SEMI-5	RE	170932	EMI Software	TSJ	TEPTO-DV3(RE,CE, ME,PE)	-	-	-	-
KJM-02	RE	146432	Measure	TAJIMA	GL19-55	-	-	-	-
KSA-08	RE	145089	Spectrum Analyzer	AGILENT	E4446A	MY461805 25	2018/10/7	2019/10/31	12
SAEC-02(NSA)	RE	145563	Semi-Anechoic Chamber	TDK	SAEC-02(NSA)	2	2019/4/4	2020/4/30	12
SAEC-02(SVSWR)	RE	145598	Semi-Anechoic Chamber	TDK	SAEC-02(SVSWR)	2	2019/5/9	2020/5/31	12
SAEC-03(SVSWR)	RE	145566	Semi-Anechoic Chamber	TDK	SAEC-03(SVSWR)	3	2019/5/3	2020/5/31	12
KTS-07	AT	145111	Digital Tester	SANWA	PC500	7019232	2018/10/17	2019/10/31	12
SAT10-16	AT	160494	Attenuator	Weinschel Corp.	54A-10	83406	2018/12/6	2019/12/30	12
SCC-G32	AT	145183	Coaxial Cable	Junkosha	MWX241-02000KMSK MS	OCT-09-13-005	2018/11/25	2019/11/30	12
SOS-09	AT	146318	Humidity Indicator	A&D	AD-5681	4061484	2018/12/5	2019/12/31	12
SPM-07	AT	146247	Power Meter	AGILENT	8990B	MY510027 2	2019/7/16	2020/7/31	12
SPSS-04	AT	146310	Power sensor	AGILENT	N1923A	MY532600 9	2019/7/16	2020/7/31	12
SSA-02	AT	145800	Spectrum Analyzer	AGILENT	E4448A	MY482501 06	2019/4/4	2020/4/30	12
COTS-SEMI-5	RE	170932	EMI Software	TSJ	TEPTO-DV3(RE,CE, ME,PE)	-	-	-	-
KJM-02	RE	146432	Measure	TAJIMA	GL19-55	-	-	-	-
KSA-08	RE	145089	Spectrum Analyzer	AGILENT	E4446A	MY461805 25	2018/10/7	2019/10/31	12
SAEC-02(NSA)	RE	145563	Semi-Anechoic Chamber	TDK	SAEC-02(NSA)	2	2019/4/4	2020/4/30	12
SAEC-02(SVSWR)	RE	145598	Semi-Anechoic Chamber	TDK	SAEC-02(SVSWR)	2	2019/5/9	2020/5/31	12
SAEC-03(SVSWR)	RE	145566	Semi-Anechoic Chamber	TDK	SAEC-03(SVSWR)	3	2019/5/3	2020/5/31	12
SAF-02	RE	145004	Pre Amplifier	SONOMA	310N	290212	2019/2/5	2020/2/29	12
SAF-05	RE	145128	Pre Amplifier	Toyo Corporation	TPA0118-36	1440490	2019/7/12	2020/7/31	12
SAF-06	RE	145005	Pre Amplifier	Toyo Corporation	TPA0118-36	1440491	2019/2/8	2020/2/29	12

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Test Instruments (2 / 2)

Local ID	Test Name	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Due Date	Calibration Interval (Month)
SAF-08	RE	145007	Pre Amplifier	Toyo Corporation	HAP18-26W	19	2019/3/5	2020/3/31	12
SAT10-06	RE	145137	Attenuator	AGILENT	8493C-010	74865	2018/11/25	2019/11/30	12
SAT3-11	RE	150921	Attenuator	JFW	50HF-003N	-	2019/1/25	2020/1/31	12
SAT6-14	RE	167095	Attenuator	JFW	50HF-006N	-	2019/2/5	2020/2/29	12
SBA-02	RE	145022	Biconical Antenna	Schwarzbeck	BBA9106	91032665	2019/4/1	2020/4/30	12
SCC-B1/B3/B5/B7/B8/B13/SRSE-02	RE	144975	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/TOYO	8D2W/12DSF A/141PE/141PE/141PE/141P	-/0901-270(RF Selector)	2019/4/19	2020/4/30	12
SCC-B2/B4/B6/B7/B8/B13/SRSE-02	RE	144976	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/TOYO	8D2W/12DSF A/141PE/141PE/141PE/141P	-/0901-270(RF Selector)	2019/4/19	2020/4/30	12
SCC-G05	RE	145039	Coaxial Cable	Junkosha	J12J102207-00	APR-30-15-037	2019/1/25	2020/1/31	12
SCC-G40	RE	166491	Coaxial Cable	Junkosha	MWX221-01000NFSN MS/B	1612S005	2019/1/25	2020/1/31	12
SCC-G43	RE	156380	Coaxial Cable	HUBER+SUNER	SUCOFLEX_104 E	SN MY 13406/4E	2019/7/3	2020/7/31	12
SCC-G45	RE	168301	Coaxial Cable	HUBER+SUNER	SUCOFLEX 102 E	800137/2E A	2019/3/26	2020/3/31	12
SCC-G56	RE	179539	Coaxial Cable	Huber+Suhner	SUCOFLEX 104	803289/4	2019/5/16	2020/5/31	12
SCC-G57	RE	179540	Coaxial Cable	Huber+Suhner	SUCOFLEX 102	802815/2	2019/5/16	2020/5/31	12
SCC-G58	RE	183047	Coaxial Cable	HUBER+SUNER	SUCOFLEX 104	800287/4A	2019/7/23	2020/7/31	12
SFL-18	RE	145305	Highpass Filter	MICRO-TRONICS	HPM50111	119	2019/4/16	2020/4/30	12
SHA-02	RE	145384	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-726	2019/6/26	2020/6/30	12
SHA-03	RE	145501	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	2019/6/26	2020/6/30	12
SHA-04	RE	145512	Horn Antenna	ETS LINDGREN	Sep-60	LM3640	2019/6/26	2020/6/30	12
SJM-09	RE	145336	Measure	PROMART	SEN1935	-	-	-	-
SLA-06	RE	145528	Logperiodic Antenna	Schwarzbeck	VUSLP9111B	195	2019/4/1	2020/4/30	12
SOS-03	RE	146317	Humidity Indicator	A&D	AD-5681	4063325	2018/10/25	2019/10/31	12
SOS-05	RE	146293	Humidity Indicator	A&D	AD-5681	4062518	2018/10/25	2019/10/31	12
STR-07	RE	146209	Test Receiver	Rohde & Schwarz	ESU26	100484	2018/9/26	2019/9/30	12
STS-02	RE	145793	Digital Hitester	HIOKI	3805-50	80997819	2019/4/2	2020/4/30	12
STS-03	RE	146210	Digital Hitester	HIOKI	3805-50	80997823	2018/10/16	2019/10/31	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: RE: Radiated Emission test
AT: Antenna Terminal Conducted test

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