



RADIO TEST REPORT

Test Report No. : 13218140S-B-R1

Applicant : PIONEER CORPORATION
Type of EUT : MULTIMEDIA NAVIGATION RECEIVER
Model Number of EUT : AVIC-W8600NEX
FCC ID : AJDK113
Test regulation : FCC Part 15 Subpart C: 2019
*Bluetooth BR/EDR part
Test Result : Complied (Refer to SECTION 3.2)

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It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
7. The all test items in this test report are conducted by UL Japan, Inc. Shonan EMC Lab.
8. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
9. The information provided from the customer for this report is identified in SECTION 1.
10. This report is a revised version of 13218140S-B. 13218140S-B is replaced with this report.

Date of test: January 10 to February 23, 2020

Representative test engineer:

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CERTIFICATE 1266.03

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

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REVISION HISTORY

Original Test Report No.: 13218140S-B

Revision	Test report No.	Date	Page revised	Contents
- (Original)	13218140S-B	March 5, 2020	-	-
1	13218140S-B-R1	March 11, 2020	P.5	Modification of Clock frequency(ies) in the system from: LPO clock for Bluetooth Wi-Fi module: 32.768 kHz to: LPO CLOCK GENERATOR for Bluetooth Wi-Fi module: 32.768 kHz
			P.7	Modification of Worst margin of Spurious Emission Restricted Band Edge from: 4.1 dB, 593.987 MHz, QP, Hori. Mode: Tx, 3DH5 2480 MHz with Tx 11n-20 (SISO) 5825 MHz to: 7.2 dB, 9608.000 MHz, AV, Hori. Mode: Tx, 3DH5 2402 MHz
			P.28	Modification of 20 dBc Data Sheet Horizontal Limit from: 70.95 to: 67.67 Vertical Limit from: 72.07 to: 69.79
			P.33	Modification of 20 dBc Sheet Horizontal Limit from: 70.23 to: 67.95 Vertical Limit from: 70.37 to: 68.09
			P.39 P.41 P.43 P.45	Modification of Distance factor from: 1 GHz - 13 GHz: $20\log(4 - 0.12) \text{ m} / 3.0 \text{ m} = 2.24 \text{ dB}$ to: 1 GHz - 13 GHz: $20\log(3.88 \text{ m} / 3.0 \text{ m}) = 2.24 \text{ dB}$

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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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SECTION 1: Customer information

Company Name : PIONEER CORPORATION
Address : 25-1, Yamada, Kawagoe-shi, Saitama, 350-8555, JAPAN
Telephone Number : +81-49-228-7681
Facsimile Number : +81-49-228-6172
Contact Person : Shigeru Yoshida

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 : MULTIMEDIA NAVIGATION RECEIVER
Model No. : AVIC-W8600NEX
Serial No. : Refer to SECTION 4.2
Rating : DC 14.4 V (DC 10.8 V to 15.1 V)
Receipt Date of Sample : December 27, 2019
(Information from test lab.)
Country of Mass-production : Thailand
Condition of EUT : Production 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: AVIC-W8600NEX (referred to as the EUT in this report) is a MULTIMEDIA NAVIGATION RECEIVER.

General Specification

Clock frequency(ies) in the system : LPO CLOCK GENERATOR for Bluetooth Wi-Fi module: 32.768 kHz
DC-DC CONVERTER: 1000 kHz/ 700.5 kHz/ 2.29 MHz/ 2.17 MHz/
767.25 kHz/ 699.05 kHz/ 767.25 kHz/ 699.05 kHz/ 436.907 kHz/
383.625 kHz/ 436.907 kHz/ 383.625 kHz
FM/AM TUNER: 9.216 MHz (VCO: 5.9904 GHz/ 6.2208 GHz)
TMC TUNER: 9.216 MHz (VCO: 5.9904 GHz/ 6.2208 GHz)
MAIN PROCESSER: 24 MHz/ 32.768 kHz/ 11.2896 MHz
SYSTEM MICRO COMPUTER: 3.93216 MHz
DVD DRIVER: 27 MHz/ 121.5 MHz/ 36.864 MHz/ 33.8688 MHz
LCD BACK LIGHT: 436.907 kHz/ 383.625 kHz
ELECTRONIC VOLUME: 18.432 MHz
FPGA: 14.7456 MHz
ECHO CANCELLER: 12.288 MHz
HDMI RECEIVER: 27 MHz
DISPLAY CONTROLLER: 32 MHz
VIDEO RECORDER: 32 MHz
MICRO COMPUTER: 10 MHz
WWR UNIT: 24 MHz
GPS: 26 MHz

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Radio Specification

Radio Type : Transceiver
Frequency of Operation : 2.4 GHz: 2402 MHz - 2480 MHz (Bluetooth BR/EDR)
2412 MHz - 2462 MHz (IEEE 802.11b/g/n)
U-NII-3: 5745 MHz - 5825 MHz (IEEE 802.11a/n-20)
5755 MHz - 5795 MHz (IEEE 802.11n/ac-40)
5775 MHz (IEEE 802.11ac-80)
Modulation : DSSS (IEEE 802.11b), OFDM (IEEE 802.11g/n/a/ac)
FHSS (Bluetooth BR/EDR)
Power Supply (inner) : DC 3.3 V/1.8 V
Antenna type : Monopole Antenna
Antenna Gain : 2.4 GHz: -8.0 dBi (Bluetooth BR/EDR)
-4.7 dBi (IEEE 802.11b/g/n)
5 GHz: -3.0 dBi
Operating Temperature : -10 deg. C to +60 deg. C

Information of the Factory

Factory Name : PIONEER MANUFACTURING (THAILAND) CO., LTD.
Address : Rojana Industrial Park, 1/31 Moo 5 Tambol Kanham Amphur U-Thai
Pranakornsriyutthaya 13210, Thailand

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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 customer has declared that the EUT has complies with FCC Part 15 Subpart B as SDoC.

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	N/A	- *1)
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 a)	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 a)	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 b)	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 c)	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 d)	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		7.2 dB 9608.000 MHz, AV, Hori. Mode: Tx, 3DH5 2402 MHz	Complied# e) / f)

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.

FCC Part 15.31 (e)

This EUT provides the stable voltage constantly to RF Part regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

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

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3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	ISED: 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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Item	Frequency range	Uncertainty (+/-)			
		No. 1 SAC / SR	No. 2 SAC / SR	No. 3 SAC / SR	No. 4,5,6,8 SR
Conducted emission (AC Mains) LISN	150 kHz-30 MHz	2.6 dB	2.6 dB	2.5 dB	2.6 dB
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.0 dB	3.0 dB	3.0 dB	-
	30 MHz-200 MHz	4.6 dB	4.6 dB	4.6 dB	-
	200 MHz-1 GHz	6.0 dB	6.0 dB	6.0 dB	-
	1 GHz-6 GHz	4.9 dB	4.9 dB	4.9 dB	-
	6 GHz-18 GHz	5.5 dB	5.5 dB	5.5 dB	-
	18 GHz-40 GHz	5.4 dB	5.4 dB	5.4 dB	-
Radiated emission (Measurement distance: 1 m)	1 GHz-18 GHz	5.8 dB	5.8 dB	5.8 dB	-
	18 GHz-40 GHz	5.7 dB	5.7 dB	5.7 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	0.98 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-06	1.75 dB
Power Measurement above 1 GHz (Average Detector)_SPM-07	0.89 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-07	1.12 dB
Power Measurement above 1 GHz (Average Detector)_SPM-13	1.06 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-13	1.24 dB
Spurious emission (Conducted) below 1GHz	0.9 dB
Spurious emission (Conducted) 1 GHz-3 GHz	0.9 dB
Spurious emission (Conducted) 3 GHz-18 GHz	2.9 dB
Spurious emission (Conducted) 18 GHz-26.5 GHz	2.6 dB
Spurious emission (Conducted) 26.5 GHz-40 GHz	2.0 dB
Bandwidth Measurement	0.07 %
Duty cycle and Time Measurement	0.262 %
Temperature	0.95 deg.C.
Voltage	0.83 %

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)	Tx (Hopping Off) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
Spurious Emission (Radiated)	Tx (Hopping Off) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
	Tx (Hopping Off) DH5, 3DH5 with 11n-20(SISO) Tx 5825 MHz	2402 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
<p>*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.</p> <p>*EUT has the power settings by the software as follows; Power settings: Fixed Software: SoC: Ver 1.000300 SYS: Ver 8.01 (Date: 2020.1.10 Storage location: EUT memory)</p> <p>Windows 7 Tera Term Version 4.98 (Date: 2020.1.10 Storage location: Driven by connected PC)</p> <p>*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.</p>		

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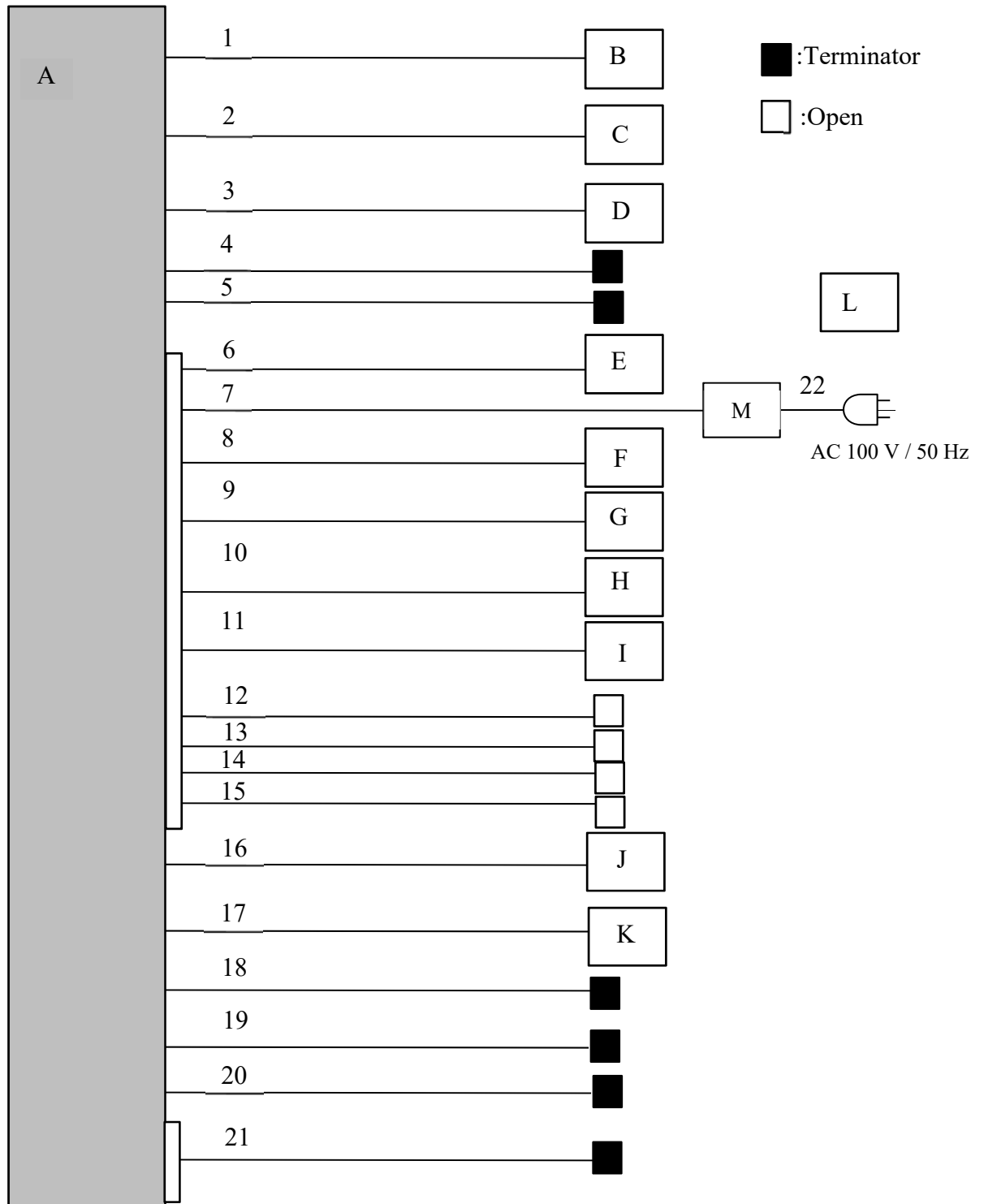
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4.2 Configuration and peripherals



* 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	MULTIMEDIA NAVIGATION RECEIVER	AVIC-W8600NEX	RFTM005855UC*1) RFTM004939UC*2)	Pioneer	EUT
B	GPS Antenna	-	-	-	-
C	USB Memory	SDK-USMGL(B)	-	SONY	-
D	USB Memory	SDK-USMGL(B)	-	SONY	-
E	Mic	-	-	-	-
F	Speaker	LV-002	-	L&V	-
G	Speaker	LV-002	-	L&V	-
H	Speaker	LV-002	-	L&V	-
I	Speaker	LV-002	-	L&V	-
J	Smartphone	SO-01C	-	Sony Ericsson	-
K	Vehicle Tuner	SXV200	-	SiriusXM	-
L	Remote control unit	CD-R33	-	Pioneer	-
M	Power Supply	PAN35-10A	ML002085	KIKUSUI	-

*1) Used for Antenna Terminal conducted test

*2) Used for Radiated Emission test

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	GPS Antenna	3.5	Shielded	Shielded	-
2	USB	1.5	Shielded	Shielded	-
3	USB	1.5	Shielded	Shielded	-
4	W/R	1.7	Shielded	Shielded	-
5	R. Audio Out	2.0	Shielded	Shielded	-
6	Mic	2.8	Unshielded	Unshielded	-
7	DC	0.4 + 2.3	Unshielded	Unshielded	-
8	Speaker	0.2 + 3.6	Unshielded	Unshielded	-
9	Speaker	0.2 + 3.6	Unshielded	Unshielded	-
10	Speaker	0.2 + 3.6	Unshielded	Unshielded	-
11	Speaker	0.2 + 3.6	Unshielded	Unshielded	-
12	Parking	2.0	Unshielded	Unshielded	-
13	REVERSE GEAR SIGNAL INPUT	0.2 + 1.0	Unshielded	Unshielded	-
14	SYSTEM REMOTE CONTROL	0.2 + 1.0	Unshielded	Unshielded	-
15	CAR SPEED SIGNAL INPUT	0.2 + 1.0	Unshielded	Unshielded	-
16	HDMI	2.0	Shielded	Shielded	-
17	Vehicle Tuner	0.65	Shielded	Shielded	-
18	FM Antenna	2.0	Shielded	Shielded	-
19	RGB Cable	2.0	Shielded	Shielded	Terminated
20	iDATA	1.0	Unshielded	Unshielded	-
21	AV input	1.6	Unshielded	Unshielded	24 pin
22	AC	1.0	Unshielded	Unshielded	-

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SECTION 5: Radiated Spurious Emission

Test Procedure

[For below 1 GHz]

EUT was placed on a urethane platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

[For above 1 GHz]

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

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

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

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

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

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

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

Test Antennas are used as below;

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

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

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

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

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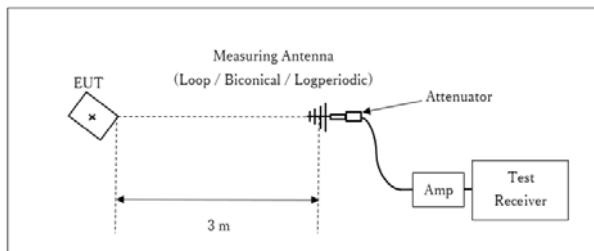
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Figure 2: Test Setup

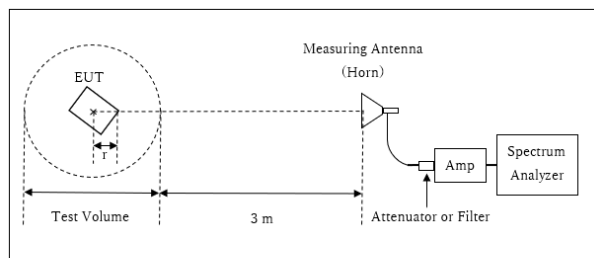
Below 1 GHz



× : Center of turn table

Test Distance: 3 m

1 GHz - 13 GHz

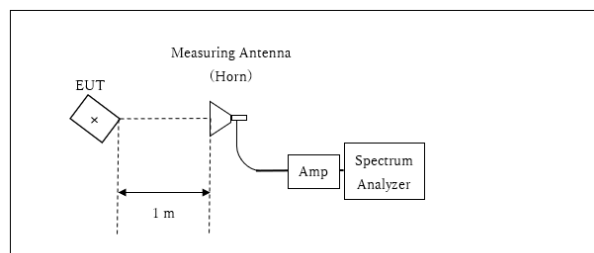


r : Radius of an outer periphery of EUT
× : Center of turn table

Distance Factor: $20 \times \log(3.88 \text{ m} / 3.0 \text{ m}) = 2.24 \text{ dB}$
* Test Distance: $(3 + \text{Test Volume} / 2) - r = 3.88 \text{ m}$

Test Volume : 2.0 m
(Test Volume has been calibrated based on CISPR 16-1-4.)
r = 0.12 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 angle of 0 to 30 deg. Based on the product specification to see the position of maximum noise, and the test was made at the position that has the maximum noise.

Antenna polarization	Carrier	Spurious (30 MHz - 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
20 dB Bandwidth	3 MHz	30 kHz	100 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99 % Occupied Bandwidth *1)	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak Average *2)	-	Power Meter (Sensor: 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

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APPENDIX 1: Test data

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

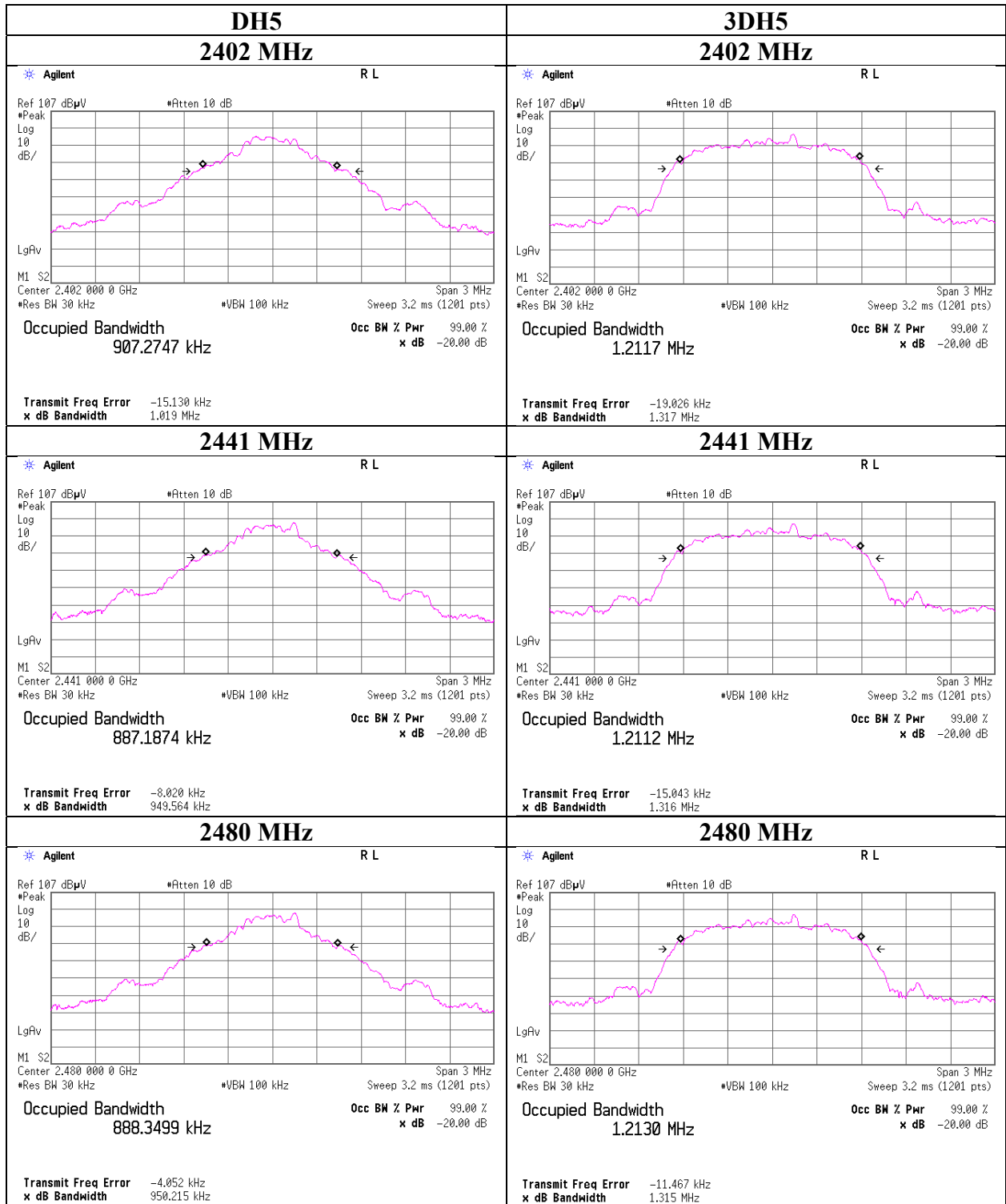
Report No. 13218140S-B-R1
Test place Shonan EMC Lab. No.3 Shielded Room
Date February 2, 2020
Temperature / Humidity 20 deg. C / 32 % RH
Engineer Takahiro Kawakami
Mode Tx

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	99% Occupied Bandwidth [kHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	1.019	907.275	1.000	≥ 0.679
DH5	2441.0	0.950	887.187	1.000	≥ 0.633
DH5	2480.0	0.950	888.350	1.000	≥ 0.633
DH5	Hopping On	-	78605.4	-	-
3DH5	2402.0	1.317	1211.7	1.000	≥ 0.878
3DH5	2441.0	1.316	1211.2	1.000	≥ 0.878
3DH5	2480.0	1.315	1213.0	1.000	≥ 0.876
3DH5	Hopping On	-	78709.5	-	-

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

No limit applies to 20 dB Bandwidth.

20 dB Bandwidth and 99 % Occupied Bandwidth



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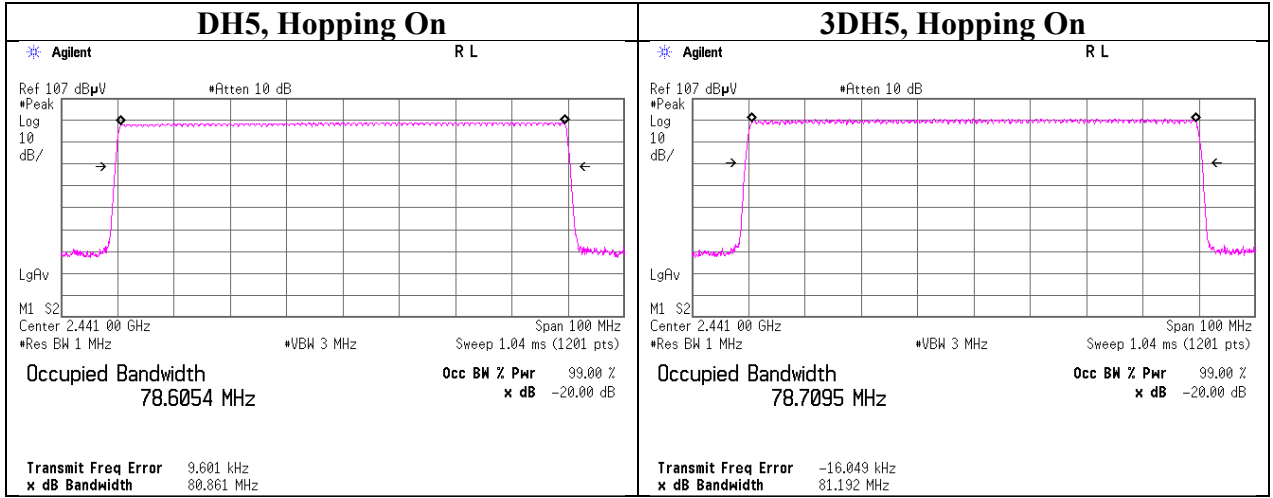
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20 dB Bandwidth and 99 % Occupied Bandwidth



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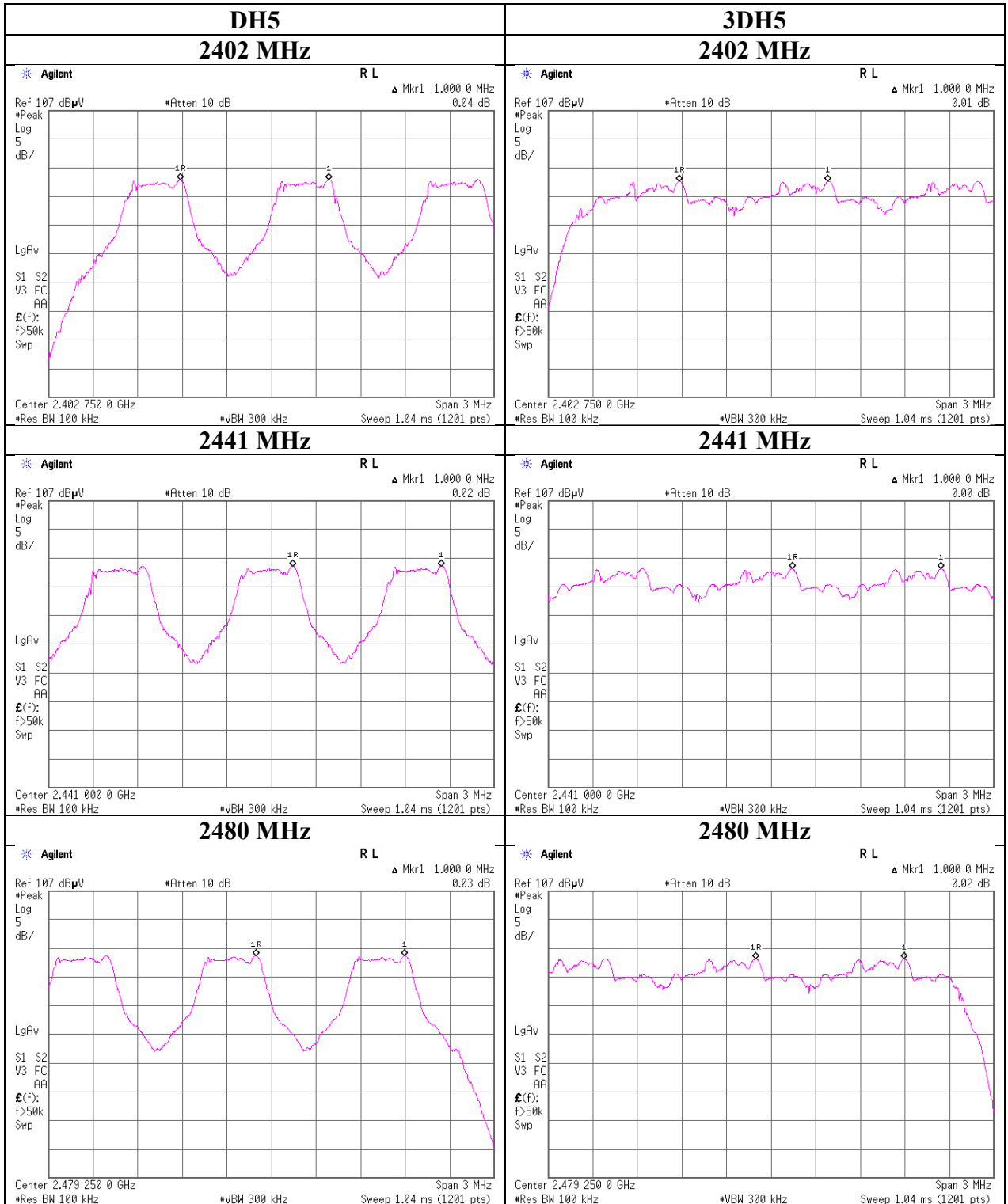
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Carrier Frequency Separation



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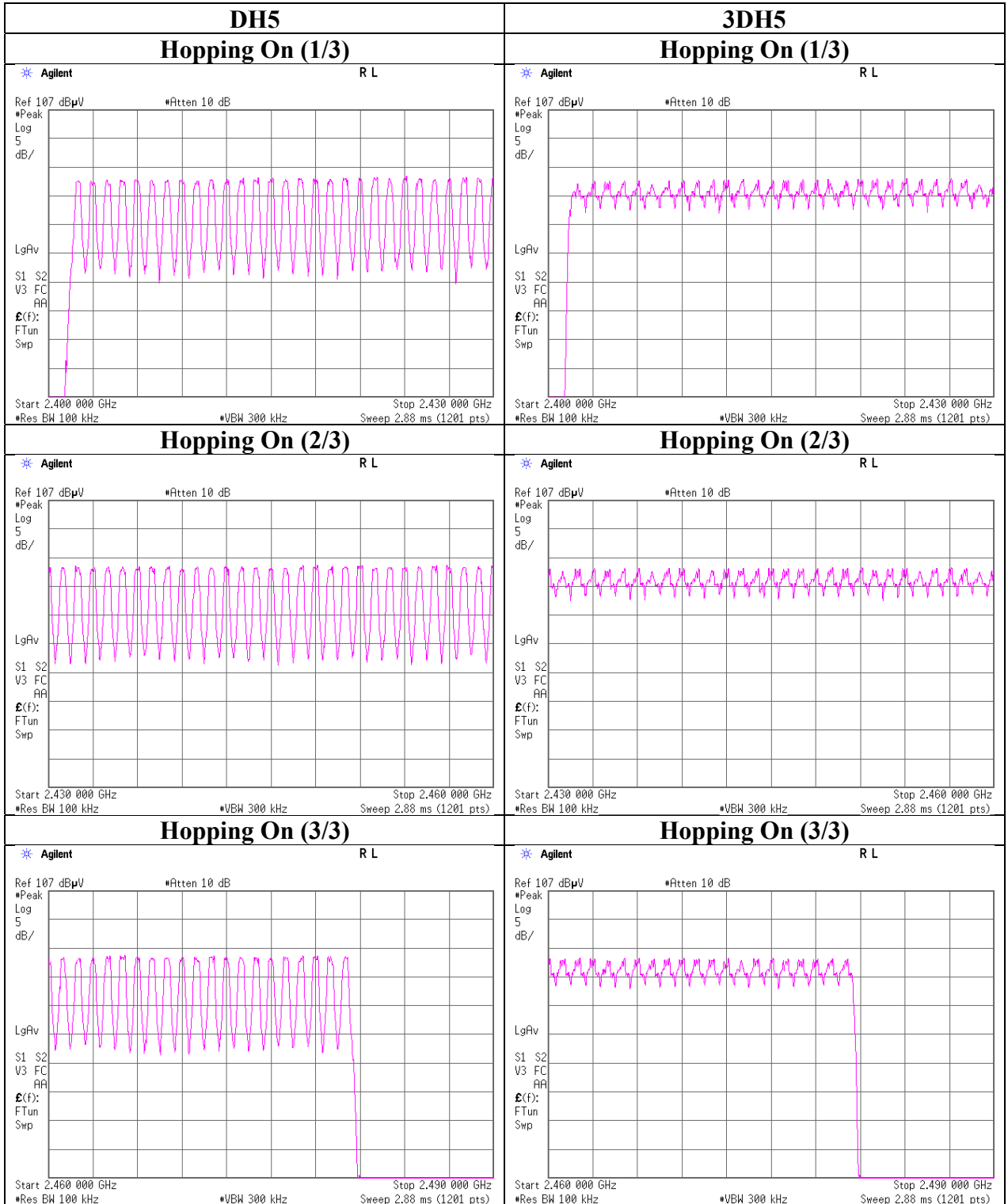
Number of Hopping Frequency

Report No. 13218140S-B-R1
Test place Shonan EMC Lab. No.3 Shielded Room
Date February 2, 2020
Temperature / Humidity 20 deg. C / 32 % RH
Engineer Takahiro Kawakami
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



Dwell time

Report No. 13218140S-B-R1
Test place Shonan EMC Lab. No.3 Shielded Room
Date February 2, 2020
Temperature / Humidity 20 deg. C / 32 % RH
Engineer Takahiro Kawakami
Mode Tx, Hopping On

Mode	Number of transmission in a 31.6(79 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	0.421	133	400
DH3	25.6 times / 5 sec. x 31.6 sec. = 162 times	1.678	272	400
DH5	19.2 times / 5 sec. x 31.6 sec. = 122 times	2.926	357	400
3DH1	50.4 times / 5 sec. x 31.6 sec. = 319 times	0.428	136	400
3DH3	25.6 times / 5 sec. x 31.6 sec. = 162 times	1.679	272	400
3DH5	20.6 times / 5 sec. x 31.6 sec. = 131 times	2.930	384	400

Sample Calculation

Result = Number of transmission x Length of transmission

*Average data of 5 tests.(except Inquiry)

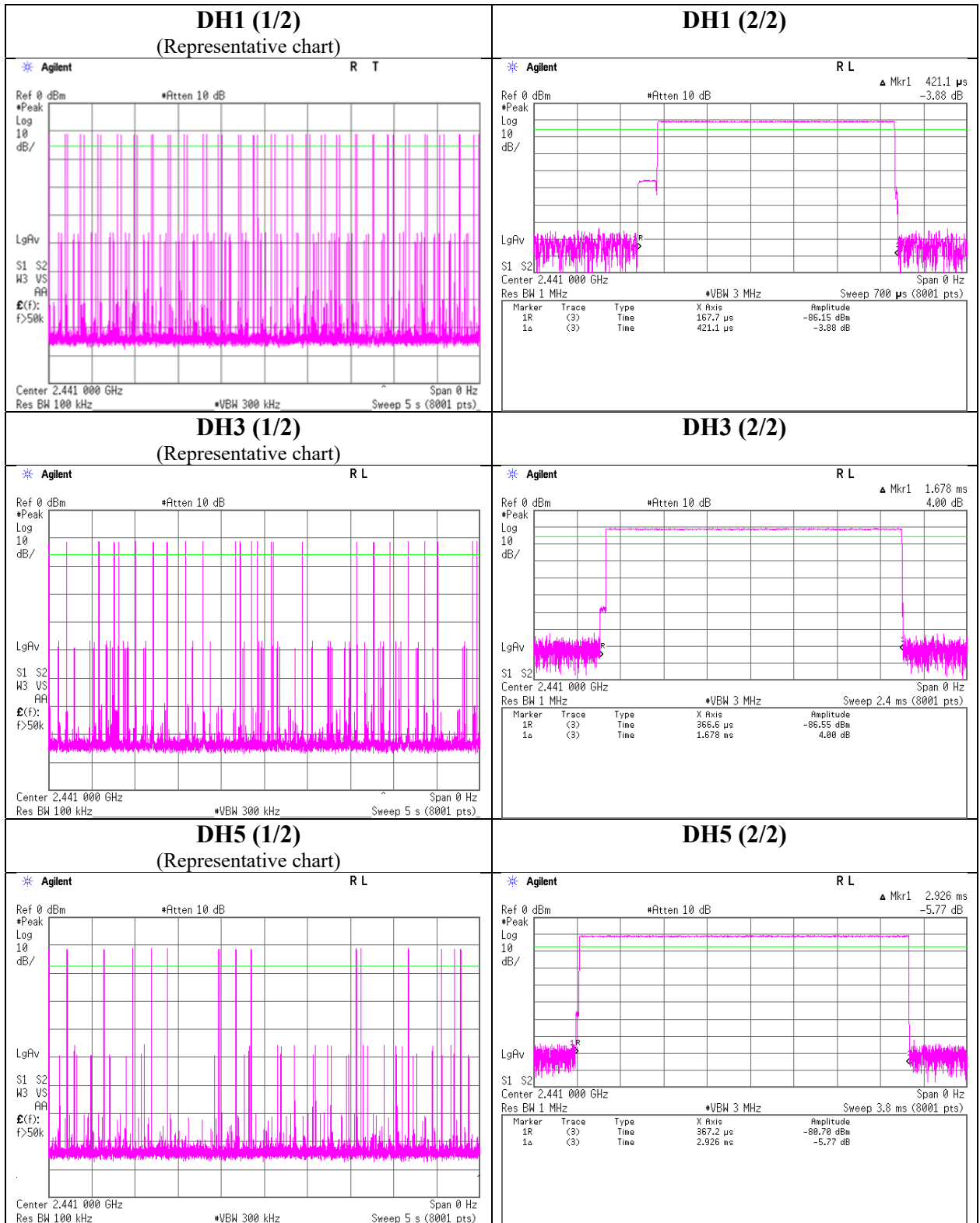
Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	49	50	50	50	51	50
DH3	25	25	25	28	25	25.6
DH5	16	19	19	18	24	19.2
3DH1	50	51	50	50	51	50.4
3DH3	24	27	25	28	24	25.6
3DH5	20	23	20	23	17	20.6

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 $N = 79$.

Dwell time



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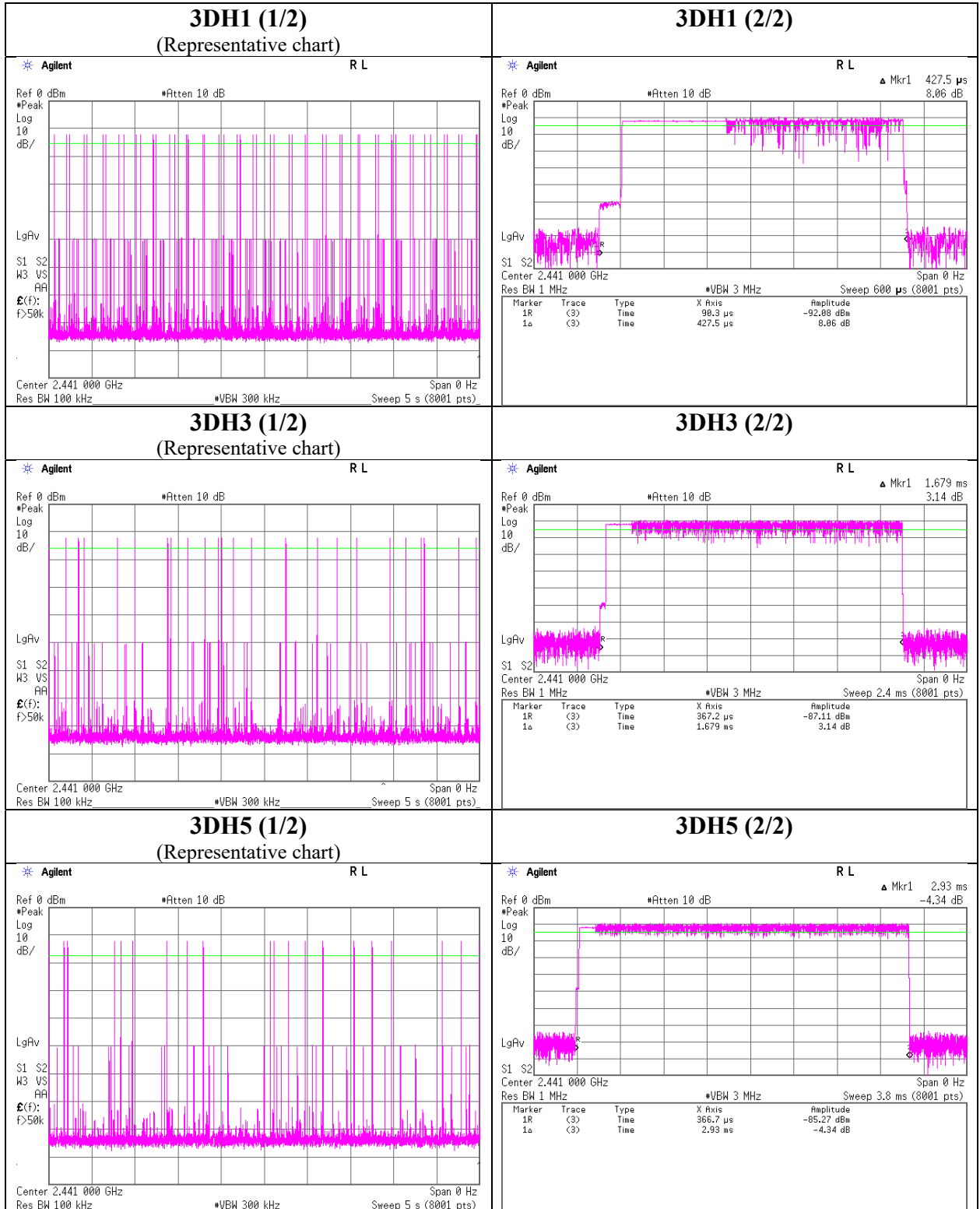
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Dwell time



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Maximum Peak Output Power

Report No. 13218140S-B-R1
Test place Shonan EMC Lab. No.3 Shielded Room
Date February 2, 2020
Temperature / Humidity 20 deg. C / 32 % RH
Engineer Takahiro Kawakami
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	-11.41	1.68	9.82	0.09	1.02	20.96	125	20.87	-8.00	-7.91	0.16	36.02	4000	43.93	
DH5	2441.0	-10.73	1.69	9.82	0.78	1.20	20.96	125	20.18	-8.00	-7.22	0.19	36.02	4000	43.24	
DH5	2480.0	-10.68	1.70	9.82	0.84	1.21	20.96	125	20.12	-8.00	-7.16	0.19	36.02	4000	43.18	
2DH5	2402.0	-8.12	1.68	9.82	3.38	2.18	20.96	125	17.58	-8.00	-4.62	0.35	36.02	4000	40.64	
2DH5	2441.0	-7.56	1.69	9.82	3.95	2.48	20.96	125	17.01	-8.00	-4.05	0.39	36.02	4000	40.07	
2DH5	2480.0	-7.50	1.70	9.82	4.02	2.52	20.96	125	16.94	-8.00	-3.98	0.40	36.02	4000	40.00	
3DH5	2402.0	-7.98	1.68	9.82	3.52	2.25	20.96	125	17.44	-8.00	-4.48	0.36	36.02	4000	40.50	
3DH5	2441.0	-7.41	1.69	9.82	4.10	2.57	20.96	125	16.86	-8.00	-3.90	0.41	36.02	4000	39.92	
3DH5	2480.0	-7.44	1.70	9.82	4.08	2.56	20.96	125	16.88	-8.00	-3.92	0.41	36.02	4000	39.94	

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.

However, the limit level 125mW of AFH mode was used for the test.

Average Output Power
(Reference data for RF Exposure)

Report No. 13218140S-B-R1
Test place Shonan EMC Lab. No.3 Shielded Room
Date February 2, 2020
Temperature / Humidity 20 deg. C / 32 % RH
Engineer Takahiro Kawakami
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	-13.21	1.68	9.82	-1.71	0.67	1.08	-0.63	0.86
DH5	2441.0	-12.52	1.69	9.82	-1.01	0.79	1.08	0.07	1.02
DH5	2480.0	-12.41	1.70	9.82	-0.89	0.81	1.08	0.19	1.04
2DH5	2402.0	-12.12	1.68	9.82	-0.62	0.87	1.12	0.50	1.12
2DH5	2441.0	-11.46	1.69	9.82	0.05	1.01	1.12	1.17	1.31
2DH5	2480.0	-11.36	1.70	9.82	0.16	1.04	1.12	1.28	1.34
3DH5	2402.0	-12.06	1.68	9.82	-0.56	0.88	1.11	0.55	1.14
3DH5	2441.0	-11.42	1.69	9.82	0.09	1.02	1.11	1.20	1.32
3DH5	2480.0	-11.32	1.70	9.82	0.20	1.05	1.11	1.31	1.35

Sample Calculation:

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

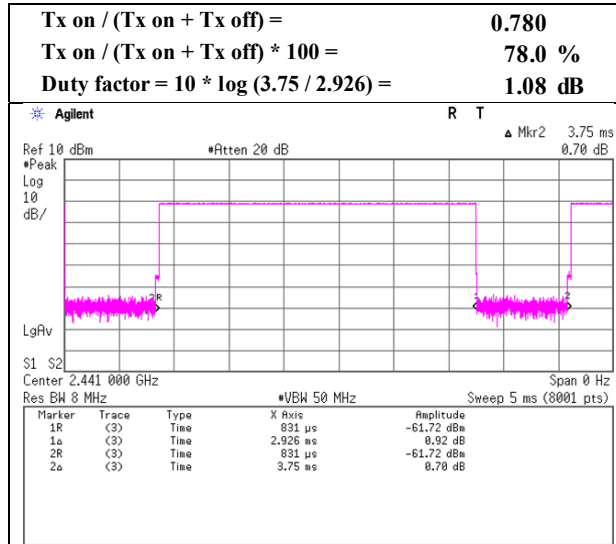
Result (Burst power average) = Time average + Duty factor

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

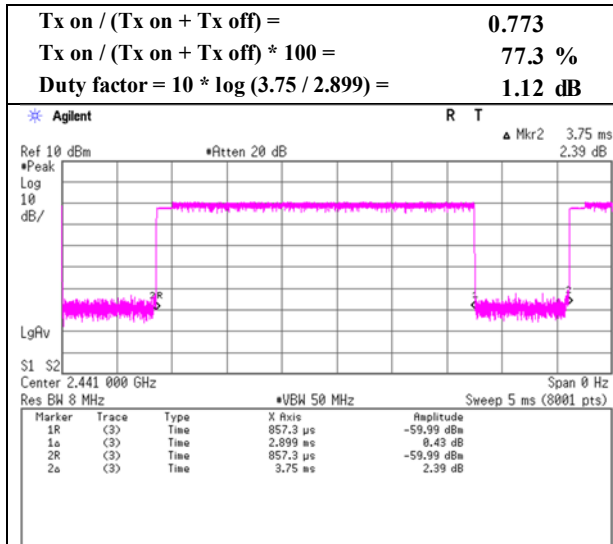
Burst Rate Confirmation

Report No. 13218140S-B-R1
Test place Shonan EMC Lab. No.5 Shielded Room
Date February 8, 2020
Temperature / Humidity 25 deg. C / 46 % RH
Engineer Makoto Hosaka
Mode Tx, Hopping Off

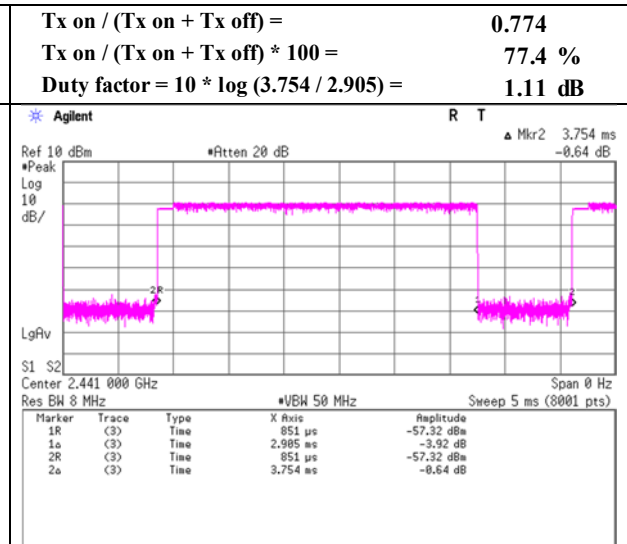
DH5



2DH5



3DH5



Radiated Spurious Emission

Report No.	13218140S-B-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.3	No.1	No.2
Date	January 15, 2020	January 10, 2020	January 14, 2020
Temperature / Humidity	20 deg. C / 33 % RH	20 deg. C / 33 % RH	20 deg. C / 42 % RH
Engineer	Hirosasa Sato	Toshinori Yamada	Toshinori Yamada
	(30 MHz -1 GHz)	(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.	82.098	QP	46.00	6.56	7.61	32.16	0.00	28.01	40.00	11.9	226	276	
Hori.	332.636	QP	45.20	14.27	8.97	31.97	0.00	36.47	46.00	9.5	100	234	
Hori.	350.998	QP	44.90	14.80	9.07	31.94	0.00	36.83	46.00	9.1	100	229	
Hori.	391.496	QP	44.70	15.21	9.22	31.96	0.00	37.17	46.00	8.8	100	317	
Hori.	404.995	QP	44.20	15.56	9.28	31.97	0.00	37.07	46.00	8.9	109	296	
Hori.	593.990	QP	37.60	18.83	9.97	31.94	0.00	34.46	46.00	11.5	100	180	
Hori.	960.278	QP	38.70	21.68	11.20	30.56	0.00	41.02	53.90	12.8	106	52	
Hori.	2111.959	PK	50.39	27.40	14.31	39.51	2.24	54.83	73.90	19.1	145	202	
Hori.	2390.000	PK	45.19	28.31	14.57	39.59	2.24	50.72	73.90	23.2	161	240	
Hori.	4804.000	PK	45.51	31.60	7.22	39.75	2.24	46.82	73.90	27.1	150	0	
Hori.	7206.000	PK	45.10	37.15	8.96	39.53	2.24	53.92	73.90	20.0	150	0	
Hori.	9608.000	PK	46.41	38.53	10.48	39.67	2.24	57.99	73.90	15.9	150	0	
Hori.	2111.959	AV	41.37	27.40	14.31	39.51	2.24	45.81	53.90	8.1	145	202	VBW: 10 Hz
Hori.	2390.000	AV	33.71	28.31	14.57	39.59	2.24	39.24	53.90	14.7	161	240	VBW: 360 Hz, *1)
Hori.	4804.000	AV	33.67	31.60	7.22	39.75	2.24	34.98	53.90	18.9	150	0	VBW: 360 Hz
Hori.	7206.000	AV	33.70	37.15	8.96	39.53	2.24	42.52	53.90	11.4	150	0	VBW: 360 Hz
Hori.	9608.000	AV	35.03	38.53	10.48	39.67	2.24	46.61	53.90	7.3	150	0	VBW: 360 Hz
Vert.	197.999	QP	32.00	16.35	7.90	32.07	0.00	24.18	43.50	19.3	100	245	
Vert.	593.988	QP	35.00	18.83	9.97	31.94	0.00	31.86	46.00	14.1	114	342	
Vert.	2112.022	PK	49.70	27.40	14.31	39.51	2.24	54.14	73.90	19.8	185	171	
Vert.	2390.000	PK	45.14	28.31	14.57	39.59	2.24	50.67	73.90	23.2	158	216	
Vert.	4804.000	PK	45.37	31.60	7.22	39.75	2.24	46.68	73.90	27.2	150	0	
Vert.	7206.000	PK	44.90	37.15	8.96	39.53	2.24	53.72	73.90	20.2	150	0	
Vert.	9608.000	PK	46.31	38.53	10.48	39.67	2.24	57.89	73.90	16.0	150	0	
Vert.	2112.022	AV	40.40	27.40	14.31	39.51	2.24	44.84	53.90	9.1	185	171	VBW: 10 Hz
Vert.	2390.000	AV	33.73	28.31	14.57	39.59	2.24	39.26	53.90	14.6	158	216	VBW: 360 Hz, *1)
Vert.	4804.000	AV	33.67	31.60	7.22	39.75	2.24	34.98	53.90	18.9	150	0	VBW: 360 Hz
Vert.	7206.000	AV	33.80	37.15	8.96	39.53	2.24	42.62	53.90	11.3	150	0	VBW: 360 Hz
Vert.	9608.000	AV	34.87	38.53	10.48	39.67	2.24	46.45	53.90	7.4	150	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(3.88 m / 3.0 m) = 2.24 dB

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

*1) Out of band emission (Leakage power).

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	83.16	28.28	14.58	39.59	2.24	88.67	-	-	Carrier
Hori.	2400.000	PK	36.26	28.29	14.58	39.59	2.24	41.78	68.67	26.9	
Vert.	2402.000	PK	84.28	28.28	14.58	39.59	2.24	89.79	-	-	Carrier
Vert.	2400.000	PK	36.10	28.29	14.58	39.59	2.24	41.62	69.79	28.2	

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

Distance factor : 1 GHz - 13 GHz : 20log(3.88 m / 3.0 m) = 2.24 dB

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

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Shonan EMC Lab.

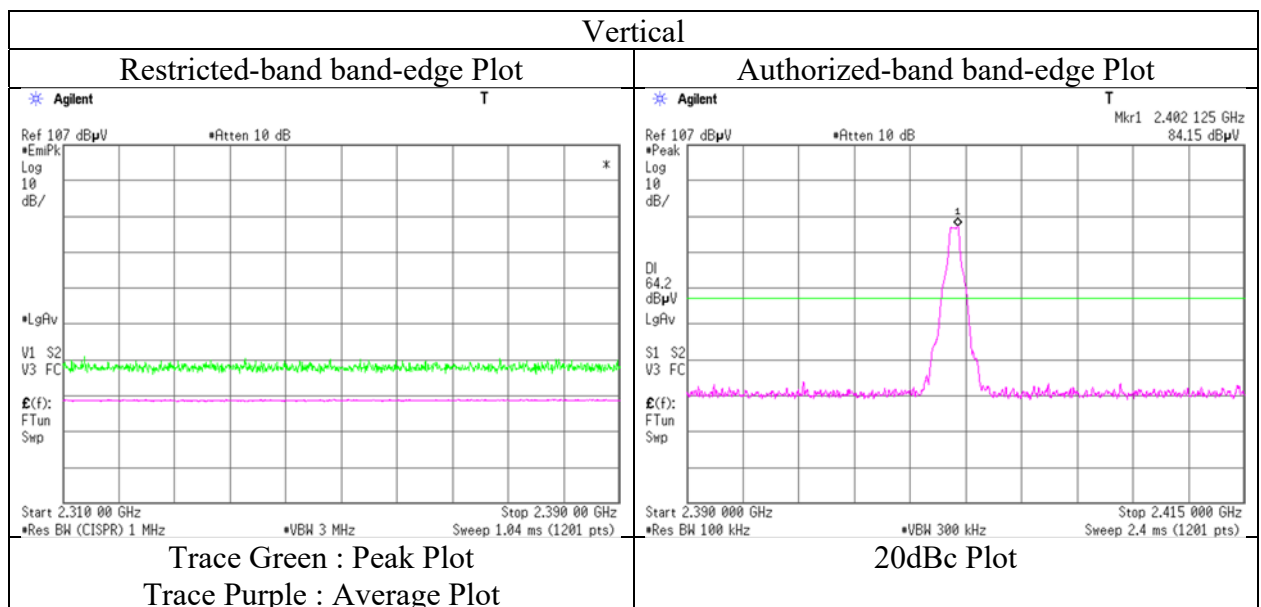
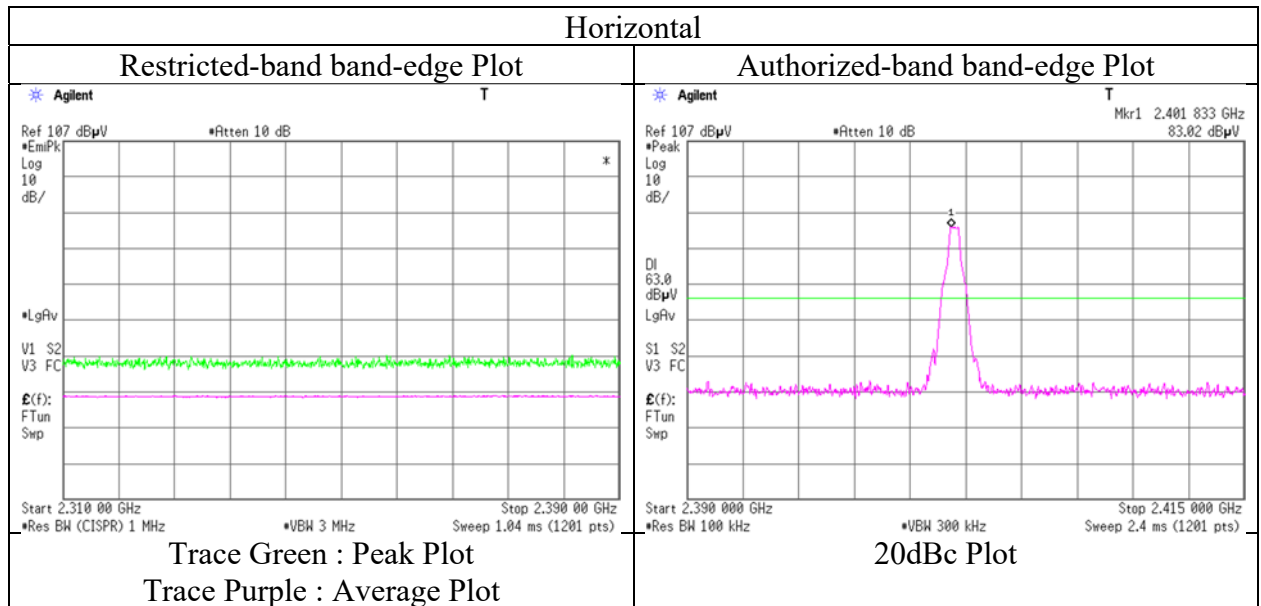
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	13218140S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.1
Date	January 10, 2020
Temperature / Humidity	20 deg. C / 33 % RH
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.

Radiated Spurious Emission

Report No.	13218140S-B-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.3	No.1	No.2
Date	January 15, 2020	January 10, 2020	January 14, 2020
Temperature / Humidity	20 deg. C / 33 % RH	20 deg. C / 33 % RH	20 deg. C / 42 % RH
Engineer	Hiromasato Sato	Toshinori Yamada	Toshinori Yamada
	(30 MHz -1 GHz)	(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.	82.865	QP	47.70	6.70	7.61	32.16	0.00	29.85	40.00	10.1	212	288	
Hori.	332.636	QP	44.70	14.27	8.97	31.97	0.00	35.97	46.00	10.0	110	257	
Hori.	350.996	QP	42.70	14.80	9.07	31.94	0.00	34.63	46.00	11.3	100	225	
Hori.	391.494	QP	35.50	15.21	9.22	31.96	0.00	27.97	46.00	18.0	100	320	
Hori.	404.994	QP	43.40	15.56	9.28	31.97	0.00	36.27	46.00	9.7	100	316	
Hori.	593.992	QP	37.70	18.83	9.97	31.94	0.00	34.56	46.00	11.4	100	179	
Hori.	960.264	QP	39.00	21.68	11.20	30.56	0.00	41.32	53.90	12.5	100	22	
Hori.	2111.936	PK	52.93	27.40	14.31	39.51	2.24	57.37	73.90	16.5	156	199	
Hori.	4882.000	PK	44.83	31.66	7.28	39.74	2.24	46.27	73.90	27.6	150	0	
Hori.	7323.000	PK	44.09	37.24	9.07	39.60	2.24	53.04	73.90	20.9	150	0	
Hori.	9764.000	PK	45.70	39.13	10.46	39.48	2.24	58.05	73.90	15.9	150	0	
Hori.	2111.936	AV	42.09	27.40	14.31	39.51	2.24	46.53	53.90	7.4	156	199	VBW: 10 Hz
Hori.	4882.000	AV	33.58	31.66	7.28	39.74	2.24	35.02	53.90	18.9	150	0	VBW: 360 Hz
Hori.	7323.000	AV	32.99	37.24	9.07	39.60	2.24	41.94	53.90	12.0	150	0	VBW: 360 Hz
Hori.	9764.000	AV	33.74	39.13	10.46	39.48	2.24	46.09	53.90	7.8	150	0	VBW: 360 Hz
Vert.	82.864	QP	41.60	6.70	7.61	32.16	0.00	23.75	40.00	16.2	100	64	
Vert.	809.991	QP	35.00	20.40	10.74	31.57	0.00	34.57	46.00	11.4	127	351	
Vert.	2111.948	PK	49.46	27.40	14.31	39.51	2.24	53.90	73.90	20.0	183	170	
Vert.	4882.000	PK	45.44	31.66	7.28	39.74	2.24	46.88	73.90	27.0	150	0	
Vert.	7323.000	PK	44.60	37.24	9.07	39.60	2.24	53.55	73.90	20.4	150	0	
Vert.	9764.000	PK	45.66	39.13	10.46	39.48	2.24	58.01	73.90	15.9	150	0	
Vert.	2111.948	AV	39.82	27.40	14.31	39.51	2.24	44.26	53.90	9.6	183	170	VBW: 10 Hz
Vert.	4882.000	AV	33.63	31.66	7.28	39.74	2.24	35.07	53.90	18.8	150	0	VBW: 360 Hz
Vert.	7323.000	AV	32.89	37.24	9.07	39.60	2.24	41.84	53.90	12.1	150	0	VBW: 360 Hz
Vert.	9764.000	AV	33.68	39.13	10.46	39.48	2.24	46.03	53.90	7.9	150	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(3.88 m / 3.0 m) = 2.24 dB

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

UL Japan, Inc.

Shonan EMC Lab.

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Radiated Spurious Emission

Report No.	13218140S-B-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.3	No.1	No.2
Date	January 15, 2020	January 10, 2020	January 14, 2020
Temperature / Humidity	20 deg. C / 33 % RH	20 deg. C / 33 % RH	20 deg. C / 42 % RH
Engineer	Hirosasa Sato	Toshinori Yamada	Toshinori Yamada
	(30 MHz -1 GHz)	(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.	82.865	QP	47.90	6.70	7.61	32.16	0.00	30.05	40.00	9.9	229	276	
Hori.	332.637	QP	45.70	14.27	8.97	31.97	0.00	36.97	46.00	9.0	108	267	
Hori.	404.995	QP	44.20	15.56	9.28	31.97	0.00	37.07	46.00	8.9	110	296	
Hori.	458.996	QP	40.50	16.43	9.50	31.96	0.00	34.47	46.00	11.5	100	99	
Hori.	960.273	QP	39.30	21.68	11.20	30.56	0.00	41.62	53.90	12.2	110	53	
Hori.	2111.957	PK	50.94	27.40	14.31	39.51	2.24	55.38	73.90	18.5	149	203	
Hori.	2483.500	PK	44.98	28.16	14.66	39.62	2.24	50.42	73.90	23.5	152	213	
Hori.	4960.000	PK	44.32	31.83	7.34	39.72	2.24	46.01	73.90	27.9	150	0	
Hori.	7440.000	PK	44.64	37.38	9.16	39.68	2.24	53.74	73.90	20.2	150	0	
Hori.	9920.000	PK	44.12	39.17	10.44	39.28	2.24	56.69	73.90	17.2	150	0	
Hori.	2111.957	AV	41.13	27.40	14.31	39.51	2.24	45.57	53.90	8.3	149	203	VBW: 10 Hz
Hori.	2483.500	AV	33.97	28.16	14.66	39.62	2.24	39.41	53.90	14.5	152	213	VBW: 360 Hz, *1)
Hori.	4960.000	AV	33.49	31.83	7.34	39.72	2.24	35.18	53.90	18.7	150	0	VBW: 360 Hz
Hori.	7440.000	AV	33.14	37.38	9.16	39.68	2.24	42.24	53.90	11.7	150	0	VBW: 360 Hz
Hori.	9920.000	AV	32.54	39.17	10.44	39.28	2.24	45.11	53.90	8.8	150	0	VBW: 360 Hz
Vert.	82.868	QP	41.40	6.70	7.61	32.16	0.00	23.55	40.00	16.4	114	40	
Vert.	809.991	QP	34.40	20.40	10.74	31.57	0.00	33.97	46.00	12.0	132	352	
Vert.	890.985	QP	30.50	21.60	10.99	31.14	0.00	31.95	46.00	14.0	100	339	
Vert.	904.484	QP	31.20	21.53	11.02	31.05	0.00	32.70	46.00	13.3	100	329	
Vert.	2111.948	PK	48.81	27.40	14.31	39.51	2.24	53.25	73.90	20.7	172	176	
Vert.	2483.500	PK	45.94	28.16	14.66	39.62	2.24	51.38	73.90	22.5	110	214	
Vert.	4960.000	PK	45.48	31.83	7.34	39.72	2.24	47.17	73.90	26.7	150	0	
Vert.	7440.000	PK	44.99	37.38	9.16	39.68	2.24	54.09	73.90	19.8	150	0	
Vert.	9920.000	PK	44.01	39.17	10.44	39.28	2.24	56.58	73.90	17.3	150	0	
Vert.	2111.948	AV	39.86	27.40	14.31	39.51	2.24	44.30	53.90	9.6	172	176	VBW: 10 Hz
Vert.	2483.500	AV	34.07	28.16	14.66	39.62	2.24	39.51	53.90	14.4	110	214	VBW: 360 Hz, *1)
Vert.	4960.000	AV	33.55	31.83	7.34	39.72	2.24	35.24	53.90	18.7	150	0	VBW: 360 Hz
Vert.	7440.000	AV	32.99	37.38	9.16	39.68	2.24	42.09	53.90	11.8	150	0	VBW: 360 Hz
Vert.	9920.000	AV	32.53	39.17	10.44	39.28	2.24	45.10	53.90	8.8	150	0	VBW: 360 Hz

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

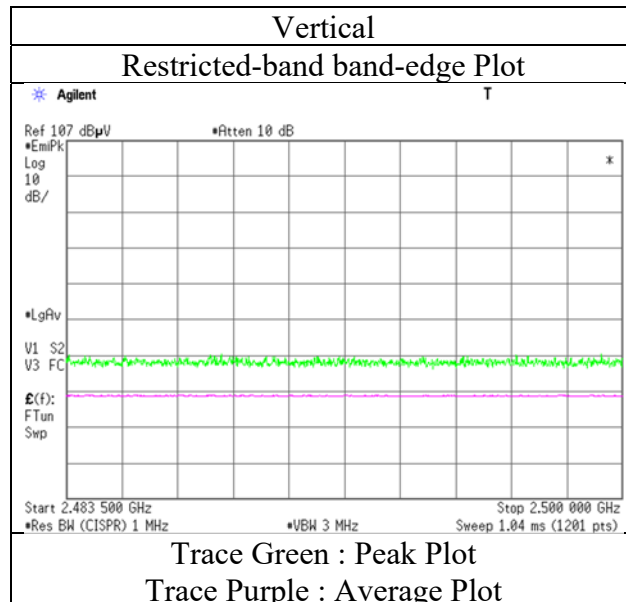
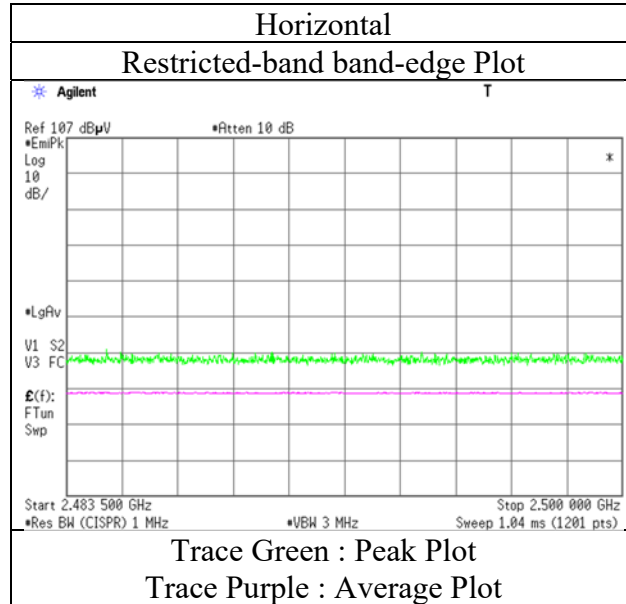
Distance factor : 1 GHz - 13 GHz : 20log(3.88 m / 3.0 m) = 2.24 dB

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

*1) Out of band emission (Leakage power).

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	13218140S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.1
Date	January 10, 2020
Temperature / Humidity	20 deg. C / 33 % RH
Engineer	Makoto Hosaka
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.

Radiated Spurious Emission

Report No.	13218140S-B-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.3	No.1	No.2
Date	January 15, 2020	January 10, 2020	January 14, 2020
Temperature / Humidity	20 deg. C / 33 % RH	20 deg. C / 33 % RH	20 deg. C / 42 % RH
Engineer	Hirosasa Sato	Toshinori Yamada	Toshinori Yamada
	(30 MHz -1 GHz)	(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.	82.863	QP	47.70	6.70	7.61	32.16	0.00	29.85	40.00	10.1	225	279	
Hori.	332.633	QP	43.60	14.27	8.97	31.97	0.00	34.87	46.00	11.1	100	228	
Hori.	350.995	QP	42.00	14.80	9.07	31.94	0.00	33.93	46.00	12.0	100	224	
Hori.	404.994	QP	43.00	15.56	9.28	31.97	0.00	35.87	46.00	10.1	100	292	
Hori.	499.492	QP	32.90	17.48	9.62	31.94	0.00	28.06	46.00	17.9	100	340	
Hori.	512.992	QP	37.60	17.47	9.67	31.95	0.00	32.79	46.00	13.2	100	295	
Hori.	813.365	QP	33.50	20.42	10.75	31.55	0.00	33.12	46.00	12.8	116	163	
Hori.	960.260	QP	39.60	21.68	11.20	30.56	0.00	41.92	53.90	11.9	100	22	
Hori.	2111.719	PK	49.75	27.40	14.31	39.51	2.24	54.19	73.90	19.7	152	201	
Hori.	2390.000	PK	45.87	28.31	14.57	39.59	2.24	51.40	73.90	22.5	193	221	
Hori.	4804.000	PK	45.96	31.60	7.22	39.75	2.24	47.27	73.90	26.6	150	0	
Hori.	7206.000	PK	46.42	37.15	8.96	39.53	2.24	55.24	73.90	18.7	150	0	
Hori.	9608.000	PK	47.20	38.53	10.48	39.67	2.24	58.78	73.90	15.1	150	0	
Hori.	2111.719	AV	40.73	27.40	14.31	39.51	2.24	45.17	53.90	8.7	152	201	VBW: 10 Hz
Hori.	2390.000	AV	33.69	28.31	14.57	39.59	2.24	39.22	53.90	14.7	193	221	VBW: 360 Hz, *1)
Hori.	4804.000	AV	33.69	31.60	7.22	39.75	2.24	35.00	53.90	18.9	150	0	VBW: 360 Hz
Hori.	7206.000	AV	33.81	37.15	8.96	39.53	2.24	42.63	53.90	11.3	150	0	VBW: 360 Hz
Hori.	9608.000	AV	35.11	38.53	10.48	39.67	2.24	46.69	53.90	7.2	150	0	VBW: 360 Hz
Vert.	82.865	QP	41.50	6.70	7.61	32.16	0.00	23.65	40.00	16.3	117	79	
Vert.	813.365	QP	32.70	20.42	10.75	31.55	0.00	32.32	46.00	13.6	113	354	
Vert.	2111.933	PK	49.45	27.40	14.31	39.51	2.24	53.89	73.90	20.0	184	170	
Vert.	2390.000	PK	45.50	28.31	14.57	39.59	2.24	51.03	73.90	22.9	154	218	
Vert.	4804.000	PK	45.30	31.60	7.22	39.75	2.24	46.61	73.90	27.3	150	0	
Vert.	7206.000	PK	45.00	37.15	8.96	39.53	2.24	53.82	73.90	20.1	150	0	
Vert.	9608.000	PK	46.50	38.53	10.48	39.67	2.24	58.08	73.90	15.8	150	0	
Vert.	2111.933	AV	40.92	27.40	14.31	39.51	2.24	45.36	53.90	8.5	184	170	VBW: 10 Hz
Vert.	2390.000	AV	33.71	28.31	14.57	39.59	2.24	39.24	53.90	14.7	154	218	VBW: 360 Hz, *1)
Vert.	4804.000	AV	33.59	31.60	7.22	39.75	2.24	34.90	53.90	19.0	150	0	VBW: 360 Hz
Vert.	7206.000	AV	33.79	37.15	8.96	39.53	2.24	42.61	53.90	11.3	150	0	VBW: 360 Hz
Vert.	9608.000	AV	34.93	38.53	10.48	39.67	2.24	46.51	53.90	7.4	150	0	VBW: 360 Hz

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

Distance factor : 1 GHz - 13 GHz : 20log(3.88 m / 3.0 m) = 2.24 dB

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

*1) Out of band emission (Leakage power).

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	82.44	28.28	14.58	39.59	2.24	87.95	-	-	Carrier
Hori.	2400.000	PK	36.87	28.29	14.58	39.59	2.24	42.39	67.95	25.6	
Vert.	2402.000	PK	82.58	28.28	14.58	39.59	2.24	88.09	-	-	Carrier
Vert.	2400.000	PK	36.99	28.29	14.58	39.59	2.24	42.51	68.09	25.6	

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

Distance factor : 1 GHz - 13 GHz : 20log(3.88 m / 3.0 m) = 2.24 dB

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

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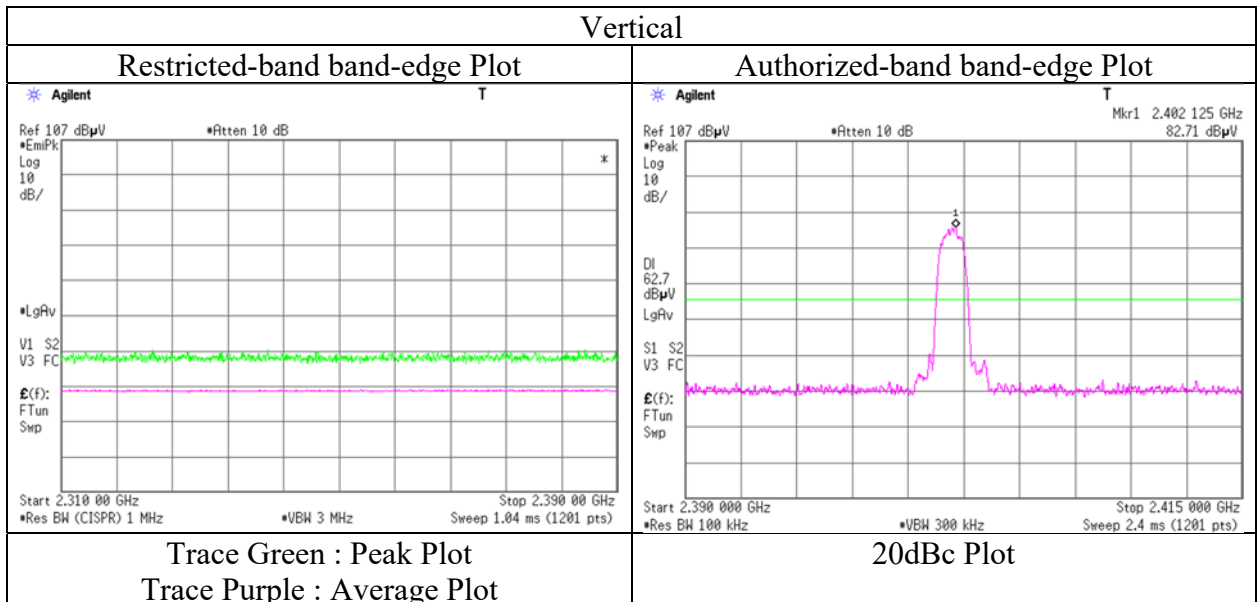
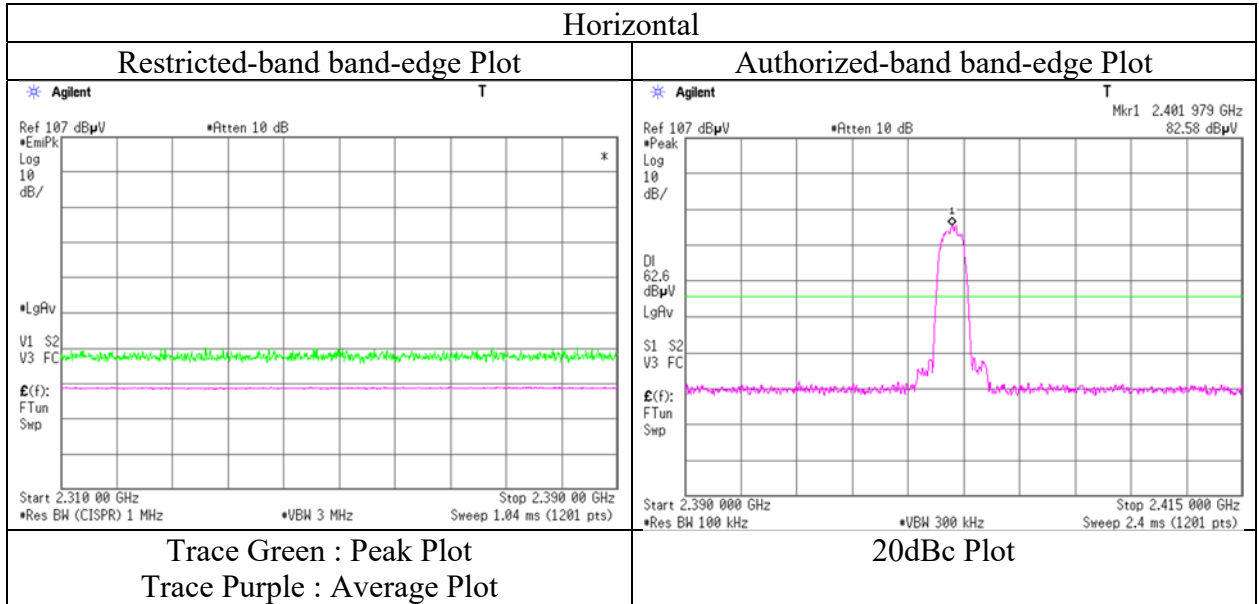
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Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	13218140S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.1
Date	January 10, 2020
Temperature / Humidity	20 deg. C / 33 % RH
Engineer	Makoto Hosaka
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.

Shonan EMC Lab.

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

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Radiated Spurious Emission

Report No.	13218140S-B-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.3	No.1	No.2
Date	January 15, 2020	January 10, 2020	January 14, 2020
Temperature / Humidity	20 deg. C / 33 % RH	20 deg. C / 33 % RH	20 deg. C / 42 % RH
Engineer	Hirosasa Sato	Toshinori Yamada	Toshinori Yamada
	(30 MHz -1 GHz)	(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.	197.998	QP	37.30	16.35	7.90	32.07	0.00	29.48	43.50	14.0	172	312	
Hori.	332.634	QP	43.50	14.27	8.97	31.97	0.00	34.77	46.00	11.2	100	226	
Hori.	350.994	QP	42.50	14.80	9.07	31.94	0.00	34.43	46.00	11.5	100	223	
Hori.	364.496	QP	41.70	14.88	9.12	31.95	0.00	33.75	46.00	12.2	100	226	
Hori.	391.493	QP	43.00	15.21	9.22	31.96	0.00	35.47	46.00	10.5	100	303	
Hori.	404.995	QP	43.00	15.56	9.28	31.97	0.00	35.87	46.00	10.1	100	291	
Hori.	593.989	QP	37.10	18.83	9.97	31.94	0.00	33.96	46.00	12.0	100	177	
Hori.	960.263	QP	40.10	21.68	11.20	30.56	0.00	42.42	53.90	11.4	109	53	
Hori.	2111.964	PK	49.79	27.40	14.31	39.51	2.24	54.23	73.90	19.7	151	202	
Hori.	4882.000	PK	44.87	31.66	7.28	39.74	2.24	46.31	73.90	27.6	150	0	
Hori.	7323.000	PK	44.22	37.24	9.07	39.60	2.24	53.17	73.90	20.7	150	0	
Hori.	9764.000	PK	44.73	39.13	10.46	39.48	2.24	57.08	73.90	16.8	150	0	
Hori.	2111.964	AV	41.34	27.40	14.31	39.51	2.24	45.78	53.90	8.1	151	202	VBW: 10 Hz
Hori.	4882.000	AV	33.55	31.66	7.28	39.74	2.24	34.99	53.90	18.9	150	0	VBW: 360 Hz
Hori.	7323.000	AV	32.86	37.24	9.07	39.60	2.24	41.81	53.90	12.1	150	0	VBW: 360 Hz
Hori.	9764.000	AV	33.63	39.13	10.46	39.48	2.24	45.98	53.90	7.9	150	0	VBW: 360 Hz
Vert.	38.584	QP	30.80	15.20	6.63	32.19	0.00	20.44	40.00	19.5	100	197	
Vert.	836.988	QP	32.50	20.76	10.83	31.44	0.00	32.65	46.00	13.3	100	2	
Vert.	2111.903	PK	49.79	27.40	14.31	39.51	2.24	54.23	73.90	19.7	174	168	
Vert.	4882.000	PK	45.05	31.66	7.28	39.74	2.24	46.49	73.90	27.4	150	0	
Vert.	7323.000	PK	43.94	37.24	9.07	39.60	2.24	52.89	73.90	21.0	150	0	
Vert.	9764.000	PK	44.83	39.13	10.46	39.48	2.24	57.18	73.90	16.7	150	0	
Vert.	2111.903	AV	39.84	27.40	14.31	39.51	2.24	44.28	53.90	9.6	174	168	VBW: 10 Hz
Vert.	4882.000	AV	33.48	31.66	7.28	39.74	2.24	34.92	53.90	19.0	150	0	VBW: 360 Hz
Vert.	7323.000	AV	32.82	37.24	9.07	39.60	2.24	41.77	53.90	12.1	150	0	VBW: 360 Hz
Vert.	9764.000	AV	33.63	39.13	10.46	39.48	2.24	45.98	53.90	7.9	150	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 : $20\log(3.88\text{ m} / 3.0\text{ m}) = 2.24\text{ dB}$

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

UL Japan, Inc.

Shonan EMC Lab.

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Radiated Spurious Emission

Report No.	13218140S-B-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.3	No.1	No.2
Date	January 15, 2020	January 10, 2020	January 14, 2020
Temperature / Humidity	20 deg. C / 33 % RH	20 deg. C / 33 % RH	20 deg. C / 42 % RH
Engineer	Hirosasa Sato	Toshinori Yamada	Toshinori Yamada
	(30 MHz -1 GHz)	(1 GHz -13 GHz)	(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.	81.330	QP	44.70	6.45	7.60	32.16	0.00	26.59	40.00	13.4	224	271	
Hori.	332.637	QP	44.30	14.27	8.97	31.97	0.00	35.57	46.00	10.4	100	258	
Hori.	350.999	QP	43.30	14.80	9.07	31.94	0.00	35.23	46.00	10.7	100	227	
Hori.	364.493	QP	42.80	14.88	9.12	31.95	0.00	34.85	46.00	11.1	100	222	
Hori.	391.493	QP	43.40	15.21	9.22	31.96	0.00	35.87	46.00	10.1	100	304	
Hori.	404.995	QP	43.50	15.56	9.28	31.97	0.00	36.37	46.00	9.6	103	294	
Hori.	458.996	QP	40.40	16.43	9.50	31.96	0.00	34.37	46.00	11.6	100	134	
Hori.	960.280	QP	39.90	21.68	11.20	30.56	0.00	42.22	53.90	11.6	104	52	
Hori.	2111.995	PK	50.80	27.40	14.31	39.51	2.24	55.24	73.90	18.7	175	181	
Hori.	2483.500	PK	45.76	28.16	14.66	39.62	2.24	51.20	73.90	22.7	154	212	
Hori.	4960.000	PK	45.38	31.83	7.34	39.72	2.24	47.07	73.90	26.8	150	0	
Hori.	7440.000	PK	44.44	37.38	9.16	39.68	2.24	53.54	73.90	20.4	150	0	
Hori.	9920.000	PK	44.40	39.17	10.44	39.28	2.24	56.97	73.90	16.9	150	0	
Hori.	2111.995	AV	41.87	27.40	14.31	39.51	2.24	46.31	53.90	7.6	175	181	VBW: 10 Hz
Hori.	2483.500	AV	33.86	28.16	14.66	39.62	2.24	39.30	53.90	14.6	154	212	VBW: 360 Hz, *1)
Hori.	4960.000	AV	33.46	31.83	7.34	39.72	2.24	35.15	53.90	18.8	150	0	VBW: 360 Hz
Hori.	7440.000	AV	32.95	37.38	9.16	39.68	2.24	42.05	53.90	11.9	150	0	VBW: 360 Hz
Hori.	9920.000	AV	32.37	39.17	10.44	39.28	2.24	44.94	53.90	9.0	150	0	VBW: 360 Hz
Vert.	38.564	QP	30.90	15.21	6.63	32.19	0.00	20.55	40.00	19.4	100	186	
Vert.	836.987	QP	32.60	20.76	10.83	31.44	0.00	32.75	46.00	13.2	100	357	
Vert.	2111.948	PK	50.75	27.40	14.31	39.51	2.24	55.19	73.90	18.7	178	182	
Vert.	2483.500	PK	46.06	28.16	14.66	39.62	2.24	51.50	73.90	22.4	107	215	
Vert.	4960.000	PK	45.34	31.83	7.34	39.72	2.24	47.03	73.90	26.9	150	0	
Vert.	7440.000	PK	45.27	37.38	9.16	39.68	2.24	54.37	73.90	19.5	150	0	
Vert.	9920.000	PK	44.32	39.17	10.44	39.28	2.24	56.89	73.90	17.0	150	0	
Vert.	2111.948	AV	41.40	27.40	14.31	39.51	2.24	45.84	53.90	8.1	178	182	VBW: 10 Hz
Vert.	2483.500	AV	33.83	28.16	14.66	39.62	2.24	39.27	53.90	14.6	107	215	VBW: 360 Hz, *1)
Vert.	4960.000	AV	33.45	31.83	7.34	39.72	2.24	35.14	53.90	18.8	150	0	VBW: 360 Hz
Vert.	7440.000	AV	33.17	37.38	9.16	39.68	2.24	42.27	53.90	11.6	150	0	VBW: 360 Hz
Vert.	9920.000	AV	32.57	39.17	10.44	39.28	2.24	45.14	53.90	8.8	150	0	VBW: 360 Hz

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

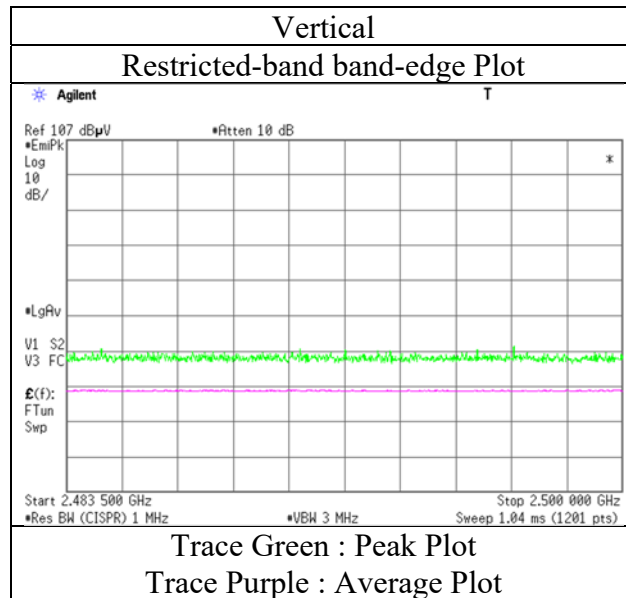
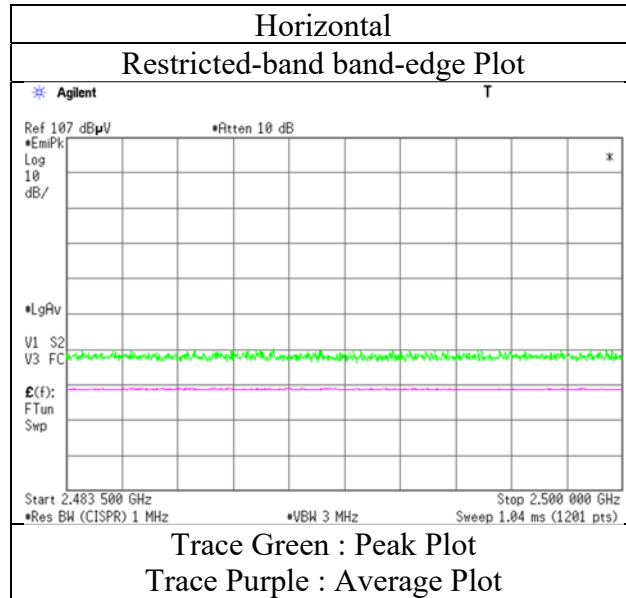
Distance factor : 1 GHz - 13 GHz : $20\log(3.88\text{ m} / 3.0\text{ m}) = 2.24\text{ dB}$

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

*1) Out of band emission (Leakage power).

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No. 13218140S-B-R1
Test place Shonan EMC Lab.
Semi Anechoic Chamber No.1
Date January 10, 2020
Temperature / Humidity 20 deg. C / 33 % RH
Engineer Makoto Hosaka
Mode Tx, Hopping Off, 3DH5 2480 MHz

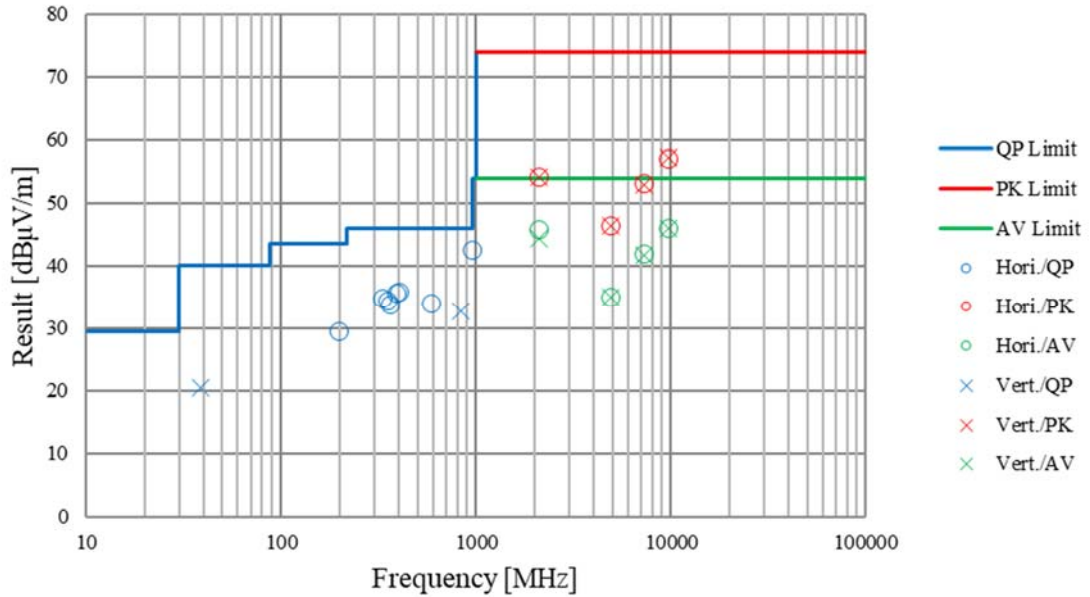


* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.

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

Radiated Spurious Emission
(Plot data, Worst case)

Report No.	13218140S-B-R1		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	No.3	No.1	No.2
Date	January 15, 2020	January 10, 2020	January 14, 2020
Temperature / Humidity	20 deg. C / 33 % RH	20 deg. C / 33 % RH	20 deg. C / 42 % RH
Engineer	Hiromasa Sato (30 MHz -1 GHz)	Toshinori Yamada (1 GHz -13 GHz)	Toshinori Yamada (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.

Radiated Spurious Emission

Report No. 13218140S-B-R1
Test place Shonan EMC Lab.
Semi Anechoic Chamber No.3
Date February 21, 2020
Temperature / Humidity 22 deg. C / 33 % RH
Engineer Takahiro Kawakami
(1 GHz -2.8 GHz)
Mode Tx, Hopping Off, DH5 2402 MHz with Tx 11n-20 (SISO) 5825 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.	2111.906	PK	49.14	27.55	13.85	41.50	2.24	51.28	73.90	22.6	120	358	
Hori.	2390.000	PK	47.75	28.33	14.11	41.59	2.24	50.84	73.90	23.1	159	252	
Hori.	2111.906	AV	39.53	27.55	13.85	41.50	2.24	41.67	53.90	12.2	120	358	VBW:10 Hz
Hori.	2390.000	AV	35.46	28.33	14.11	41.59	2.24	38.55	53.90	15.4	159	252	VBW:360 Hz, *1)
Vert.	2111.906	PK	48.45	27.55	13.85	41.50	2.24	50.59	73.90	23.3	134	23	
Vert.	2390.000	PK	48.04	28.33	14.11	41.59	2.24	51.13	73.90	22.8	158	218	
Vert.	2111.906	AV	39.11	27.55	13.85	41.50	2.24	41.25	53.90	12.7	134	23	VBW:10 Hz
Vert.	2390.000	AV	35.59	28.33	14.11	41.59	2.24	38.68	53.90	15.2	158	218	VBW:360 Hz, *1)

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.88\text{ m} / 3.0\text{ m}) = 2.24\text{ dB}$

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

*1) Out of band emission (Leakage power).

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	83.62	28.31	14.12	41.60	2.24	86.69	-	-	Carrier
Hori.	2400.000	PK	38.80	28.31	14.11	41.60	2.24	41.86	66.69	24.8	
Vert.	2402.000	PK	83.55	28.31	14.12	41.60	2.24	86.62	-	-	Carrier
Vert.	2400.000	PK	39.37	28.31	14.11	41.60	2.24	42.43	66.62	24.2	

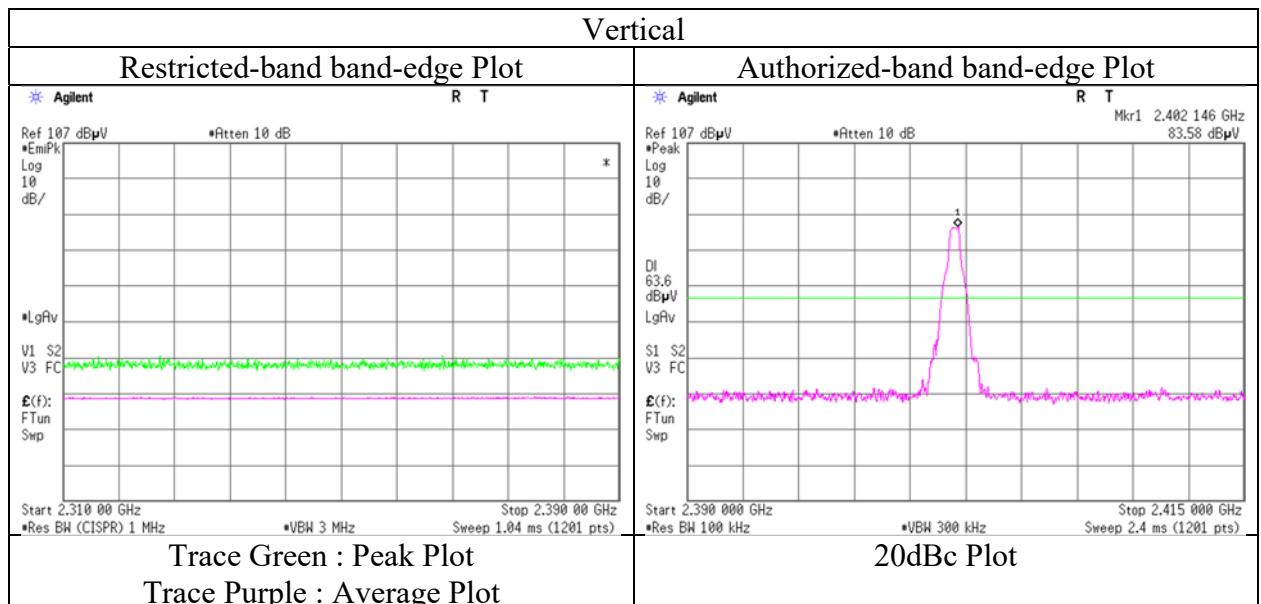
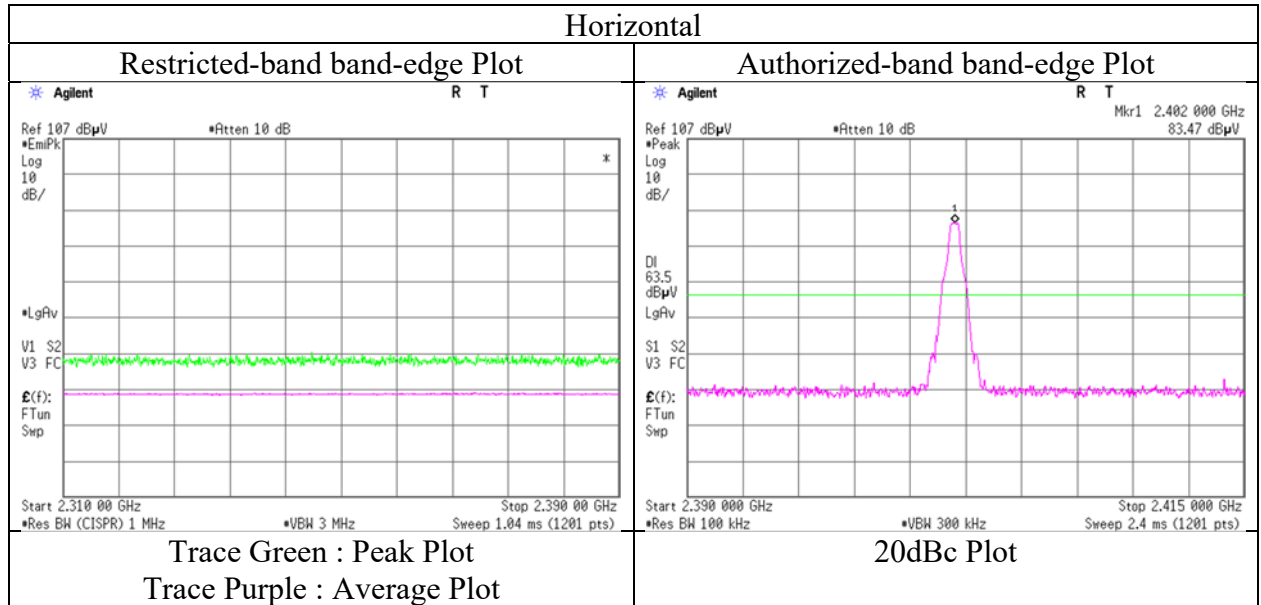
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : $20\log(3.88\text{ m} / 3.0\text{ m}) = 2.24\text{ dB}$

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

Radiated Spurious Emission

Report No.	13218140S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	February 21, 2020
Temperature / Humidity	22 deg. C / 33 % RH
Engineer	Takahiro Kawakami
Mode	Tx, Hopping Off, DH5 2402 MHz with Tx 11n-20 (SISO) 5825 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. 13218140S-B-R1
Test place Shonan EMC Lab.
Semi Anechoic Chamber No.3
Date February 21, 2020
Temperature / Humidity 22 deg. C / 33 % RH
Engineer Takahiro Kawakami
(1 GHz -2.8 GHz)
Mode Tx, Hopping Off, DH5 2480 MHz with Tx 11n-20 (SISO) 5825 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.	2111.949	PK	48.77	27.55	13.85	41.50	2.24	50.91	73.90	23.0	129	215	
Hori.	2483.500	PK	47.61	28.24	14.20	41.62	2.24	50.67	73.90	23.2	157	215	
Hori.	2111.949	AV	39.51	27.55	13.85	41.50	2.24	41.65	53.90	12.3	129	215	VBW:10 Hz
Hori.	2483.500	AV	35.45	28.24	14.20	41.62	2.24	38.51	53.90	15.4	157	215	VBW:360 Hz, *1)
Vert.	2111.949	PK	49.05	27.55	13.85	41.50	2.24	51.19	73.90	22.7	183	340	
Vert.	2483.500	PK	47.60	28.24	14.20	41.62	2.24	50.66	73.90	23.2	173	133	
Vert.	2111.949	AV	39.62	27.55	13.85	41.50	2.24	41.76	53.90	12.1	183	340	VBW:10 Hz
Vert.	2483.500	AV	35.55	28.24	14.20	41.62	2.24	38.61	53.90	15.3	173	133	VBW:360 Hz, *1)

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : $20\log(3.88\text{ m} / 3.0\text{ m}) = 2.24\text{ dB}$
13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

*1) Out of band emission (Leakage power).

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Shonan EMC Lab.

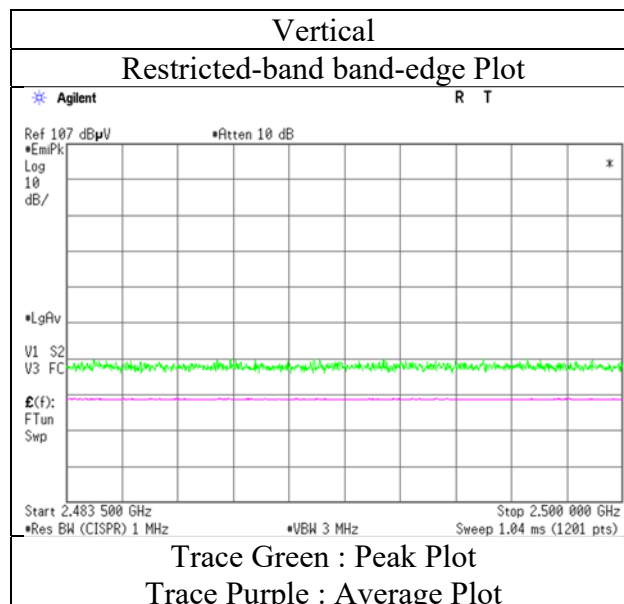
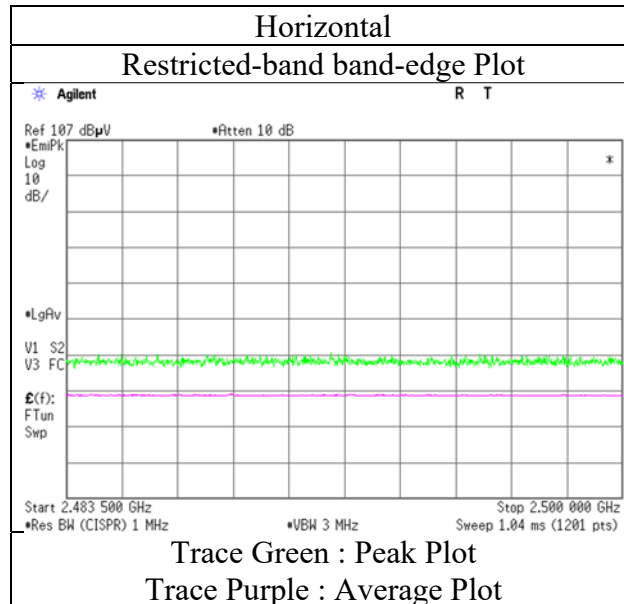
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

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Radiated Spurious Emission

Report No.	13218140S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	February 21, 2020
Temperature / Humidity	22 deg. C / 33 % RH
Engineer	Takahiro Kawakami
Mode	Tx, Hopping Off, DH5 2480 MHz with Tx 11n-20 (SISO) 5825 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

Report No. 13218140S-B-R1
Test place Shonan EMC Lab.
Semi Anechoic Chamber No.3
Date February 21, 2020
Temperature / Humidity 22 deg. C / 33 % RH
Engineer Takahiro Kawakami
(1 GHz -2.8 GHz)
Mode Tx, Hopping Off, 3DH5 2402 MHz with Tx 11n-20 (SISO) 5825 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.	2112.003	PK	50.46	27.55	13.85	41.50	2.24	52.60	73.90	21.3	317	106	
Hori.	2390.000	PK	47.15	28.33	14.11	41.59	2.24	50.24	73.90	23.7	255	222	
Hori.	2112.003	AV	42.00	27.55	13.85	41.50	2.24	44.14	53.90	9.8	317	106	VBW:10 Hz
Hori.	2390.000	AV	35.55	28.33	14.11	41.59	2.24	38.64	53.90	15.3	255	222	VBW:360 Hz, *1)
Vert.	2112.003	PK	49.61	27.55	13.85	41.50	2.24	51.75	73.90	22.2	167	128	
Vert.	2390.000	PK	47.86	28.33	14.11	41.59	2.24	50.95	73.90	23.0	149	221	
Vert.	2112.003	AV	40.46	27.55	13.85	41.50	2.24	42.60	53.90	11.3	167	128	VBW:10 Hz
Vert.	2390.000	AV	35.48	28.33	14.11	41.59	2.24	38.57	53.90	15.3	149	221	VBW:360 Hz, *1)

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.88 m / 3.0 m) = 2.24 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

*1) Out of band emission (Leakage power).

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	87.46	28.31	14.12	41.60	2.24	90.53	-	-	Carrier
Hori.	2400.000	PK	38.86	28.31	14.11	41.60	2.24	41.92	70.53	28.6	
Vert.	2402.000	PK	85.21	28.31	14.12	41.60	2.24	88.28	-	-	Carrier
Vert.	2400.000	PK	38.22	28.31	14.11	41.60	2.24	41.28	68.28	27.0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amplifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.88 m / 3.0 m) = 2.24 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

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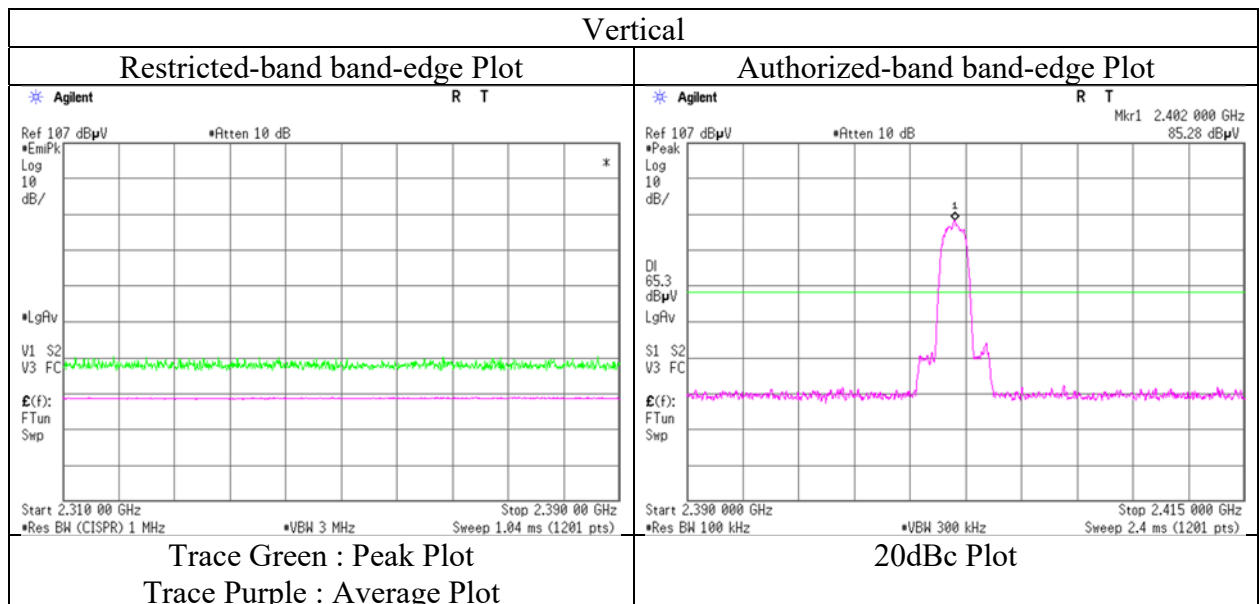
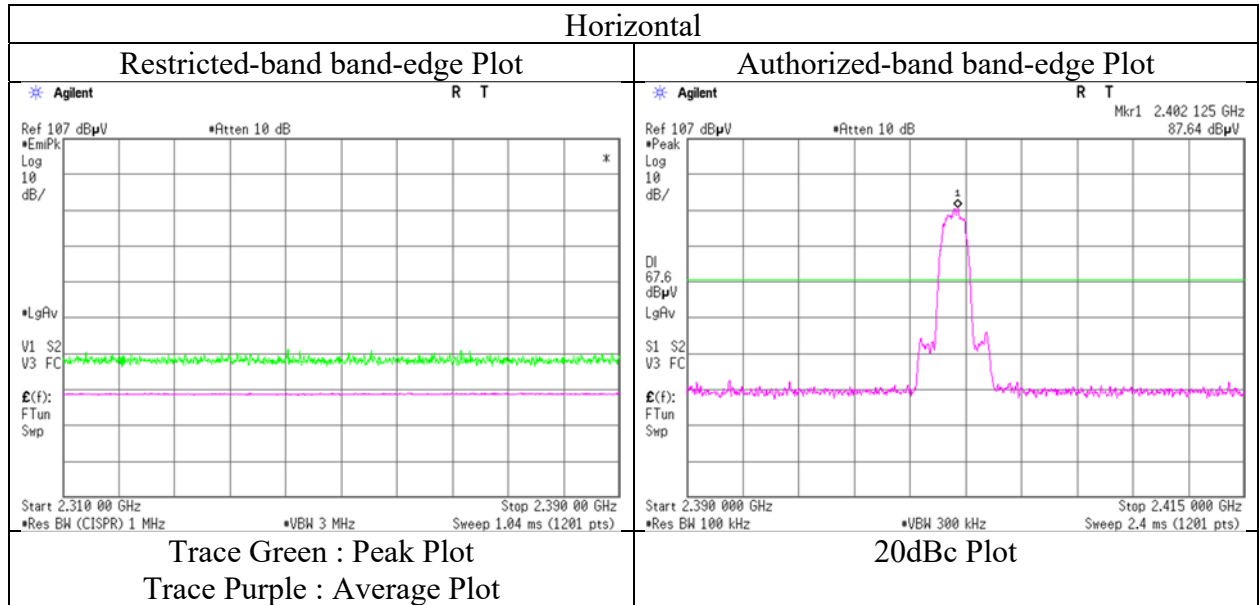
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

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Radiated Spurious Emission

Report No.	13218140S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	February 21, 2020
Temperature / Humidity	22 deg. C / 33 % RH
Engineer	Takahiro Kawakami
Mode	Tx, Hopping Off, 3DH5 2402 MHz with Tx 11n-20 (SISO) 5825 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.

Shonan EMC Lab.

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

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Radiated Spurious Emission

Report No.	13218140S-B-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	No.3	No.3	No.3	No.3
Date	February 23, 2020	February 21, 2020	February 22, 2020	February 23, 2020
Temperature / Humidity	22 deg. C / 34 % RH	22 deg. C / 33 % RH	22 deg. C / 33 % RH	22 deg. C / 34 % RH
Engineer	Kenichi Adachi	Takahiro Kawakami	Takahiro Kawakami	Kenichi Adachi
	(30 MHz - 1 GHz)	(1 GHz - 13 GHz)	(13 GHz - 18 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz with Tx 11n-20 (SISO) 5825 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.	147.454	QP	44.42	14.56	7.78	32.12	0.00	34.64	43.50	8.9	194	23	
Hori.	154.982	QP	43.08	14.85	7.88	32.12	0.00	33.69	43.50	9.8	193	24	
Hori.	168.793	QP	46.34	15.43	7.92	32.10	0.00	37.59	43.50	5.9	182	105	
Hori.	242.995	QP	49.86	11.40	8.37	32.02	0.00	37.61	46.00	8.4	119	218	
Hori.	332.633	QP	45.68	14.27	8.97	31.97	0.00	36.95	46.00	9.1	100	248	
Hori.	404.993	QP	47.94	15.56	9.28	31.97	0.00	40.81	46.00	5.2	100	354	
Hori.	593.987	QP	45.06	18.83	9.97	31.94	0.00	41.92	46.00	4.1	153	259	
Hori.	960.258	QP	40.12	21.68	11.20	30.56	0.00	42.44	53.90	11.5	100	91	
Hori.	2111.959	PK	49.02	27.55	13.85	41.50	2.24	51.16	73.90	22.7	133	1	
Hori.	2483.500	PK	47.29	28.24	14.20	41.62	2.24	50.35	73.90	23.6	159	214	
Hori.	4960.000	PK	47.69	31.96	16.56	42.91	2.24	55.54	73.90	18.4	150	0	
Hori.	7440.000	PK	47.94	37.56	8.10	43.38	2.24	52.46	73.90	21.4	150	0	
Hori.	9920.000	PK	47.17	39.18	9.14	42.84	2.24	54.89	73.90	19.0	150	0	
Hori.	2111.959	AV	39.05	27.55	13.85	41.50	2.24	41.19	53.90	12.7	133	1	VBW:10 Hz
Hori.	2483.500	AV	35.49	28.24	14.20	41.62	2.24	38.55	53.90	15.4	159	214	VBW:360 Hz, *1)
Hori.	4960.000	AV	35.98	31.96	16.56	42.91	2.24	43.83	53.90	10.1	150	0	VBW:360 Hz
Hori.	7440.000	AV	36.50	37.56	8.10	43.38	2.24	41.02	53.90	12.9	150	0	VBW:360 Hz
Hori.	9920.000	AV	36.48	39.18	9.14	42.84	2.24	44.20	53.90	9.7	150	0	VBW:360 Hz
Vert.	38.538	QP	43.34	15.22	6.63	32.19	0.00	33.00	40.00	7.0	100	177	
Vert.	168.793	QP	38.58	15.43	7.92	32.10	0.00	29.83	43.50	13.7	100	289	
Vert.	242.995	QP	41.16	11.40	8.37	32.02	0.00	28.91	46.00	17.1	100	273	
Vert.	332.633	QP	40.68	14.27	8.97	31.97	0.00	31.95	46.00	14.1	122	179	
Vert.	404.993	QP	43.53	15.56	9.28	31.97	0.00	36.40	46.00	9.6	121	159	
Vert.	593.987	QP	36.78	18.83	9.97	31.94	0.00	33.64	46.00	12.4	118	30	
Vert.	960.258	QP	35.08	21.68	11.20	30.56	0.00	37.40	53.90	16.5	100	222	
Vert.	2111.959	PK	49.26	27.55	13.85	41.50	2.24	51.40	73.90	22.5	143	21	
Vert.	2483.500	PK	47.61	28.24	14.20	41.62	2.24	50.67	73.90	23.2	144	144	
Vert.	4960.000	PK	47.79	31.96	16.56	42.91	2.24	55.64	73.90	18.3	150	0	
Vert.	7440.000	PK	48.42	37.56	8.10	43.38	2.24	52.94	73.90	21.0	150	0	
Vert.	9920.000	PK	47.86	39.18	9.14	42.84	2.24	55.58	73.90	18.3	150	0	
Vert.	2111.959	AV	39.45	27.55	13.85	41.50	2.24	41.59	53.90	12.3	143	21	VBW:10 Hz
Vert.	2483.500	AV	35.52	28.24	14.20	41.62	2.24	38.58	53.90	15.3	144	144	VBW:360 Hz, *1)
Vert.	4960.000	AV	36.18	31.96	16.56	42.91	2.24	44.03	53.90	9.9	150	0	VBW:360 Hz
Vert.	7440.000	AV	36.22	37.56	8.10	43.38	2.24	40.74	53.90	13.2	150	0	VBW:360 Hz
Vert.	9920.000	AV	36.46	39.18	9.14	42.84	2.24	44.18	53.90	9.7	150	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 : $20\log(3.88\text{ m} / 3.0\text{ m}) = 2.24\text{ dB}$
13 GHz - 40 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

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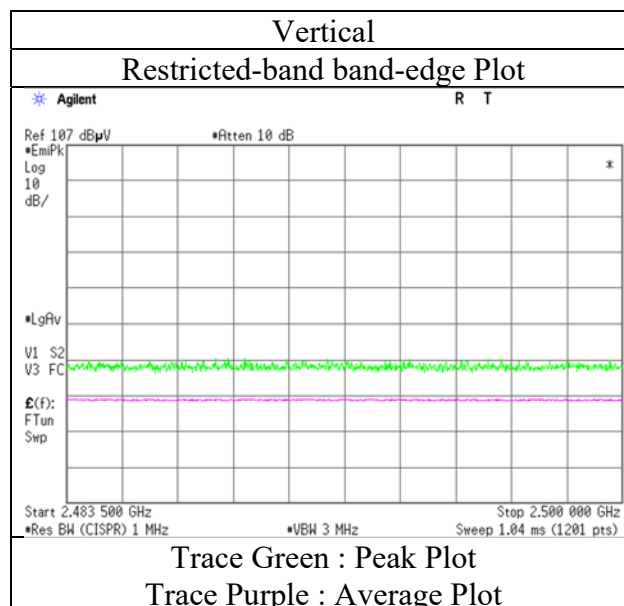
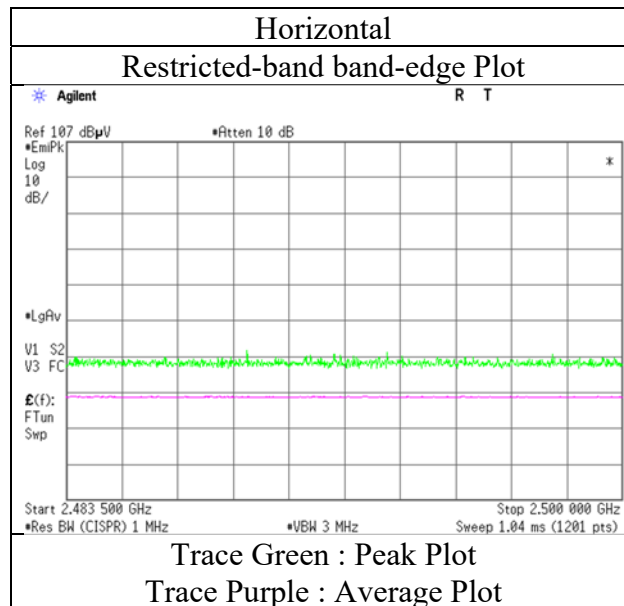
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Radiated Spurious Emission

Report No.	13218140S-B-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	February 21, 2020
Temperature / Humidity	22 deg. C / 33 % RH
Engineer	Takahiro Kawakami
Mode	Tx, Hopping Off, 3DH5 2480 MHz with Tx 11n-20 (SISO) 5825 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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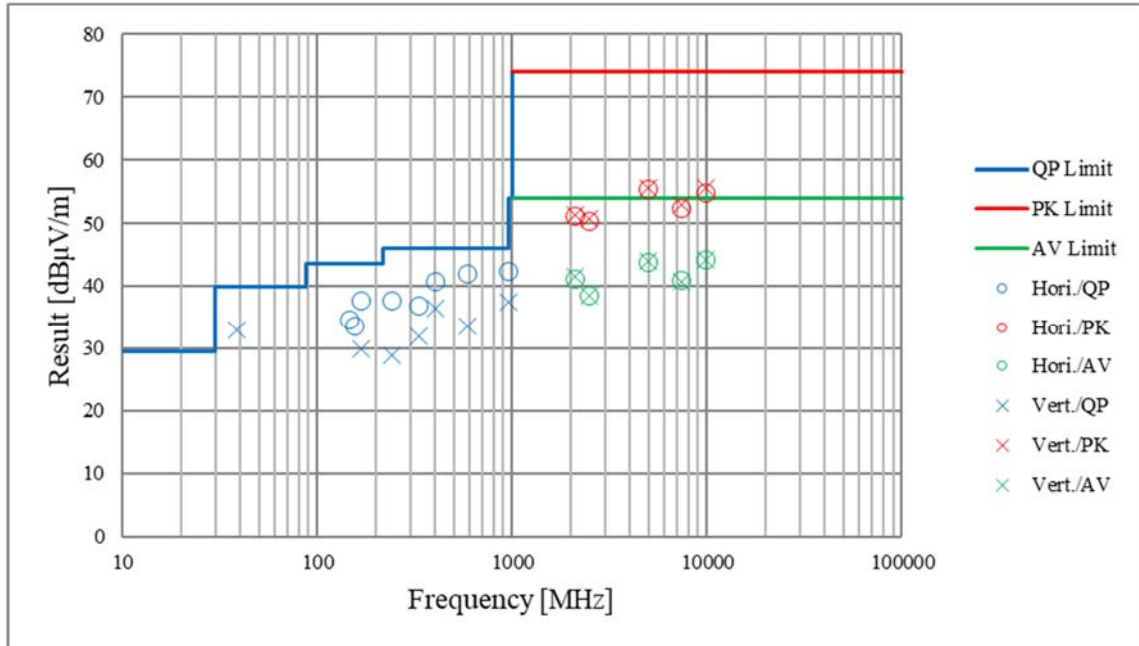
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Radiated Spurious Emission
(Plot data, Worst case)

Report No.	13218140S-B-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	No.3	No.3	No.3	No.3
Date	February 23, 2020	February 21, 2020	February 22, 2020	February 23, 2020
Temperature / Humidity	22 deg. C / 34 % RH	22 deg. C / 33 % RH	22 deg. C / 33 % RH	22 deg. C / 34 % RH
Engineer	Kenichi Adachi	Takahiro Kawakami	Takahiro Kawakami	Kenichi Adachi
	(30 MHz - 1 GHz)	(1 GHz - 13 GHz)	(13 GHz - 18 GHz)	(18 GHz - 26.5 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz with Tx 11n-20 (SISO) 5825 MHz			

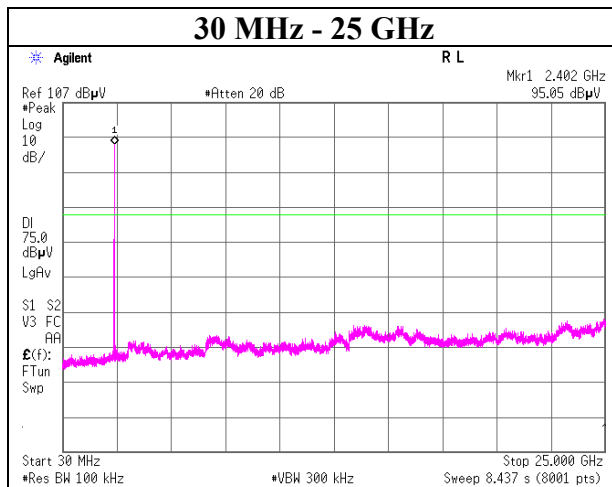
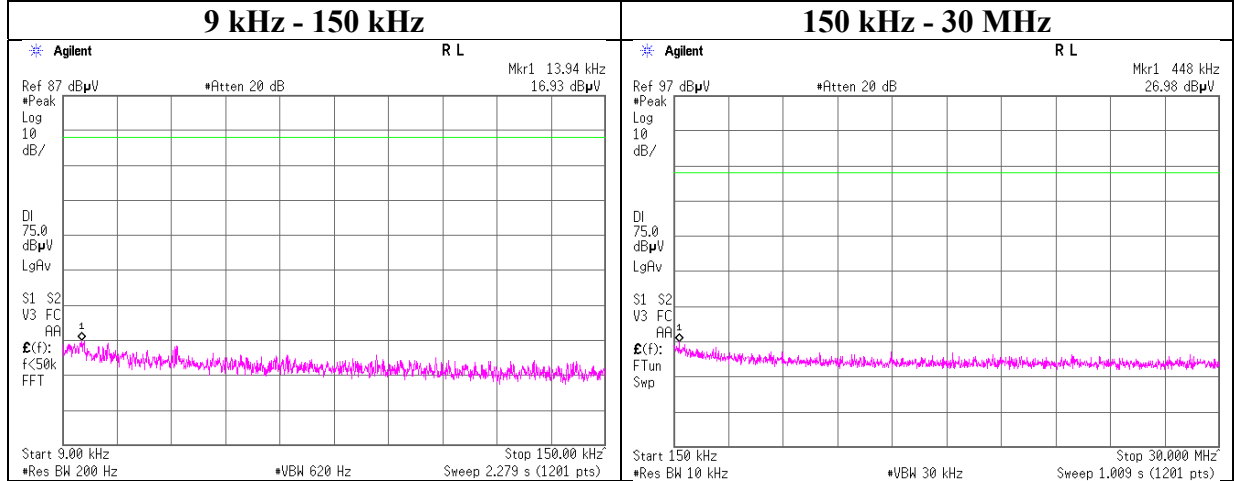


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

Conducted Spurious Emission

Report No. 13218140S-B-R1
 Test place Shonan EMC Lab. No.5 Shielded Room
 Date February 8, 2020
 Temperature / Humidity 25 deg. C / 46 % RH
 Engineer Makoto Hosaka
 Mode Tx, Hopping Off, DH5

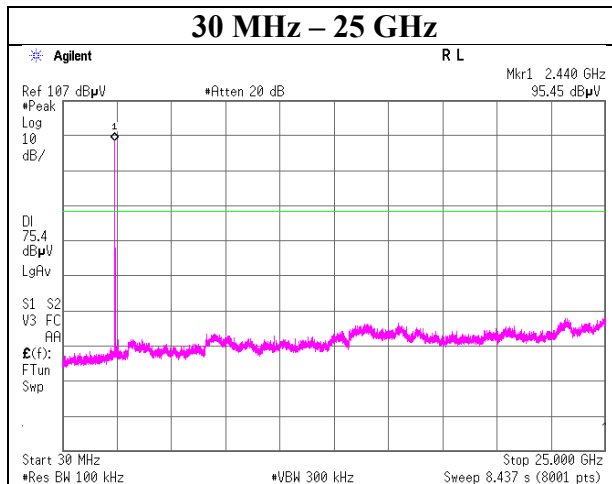
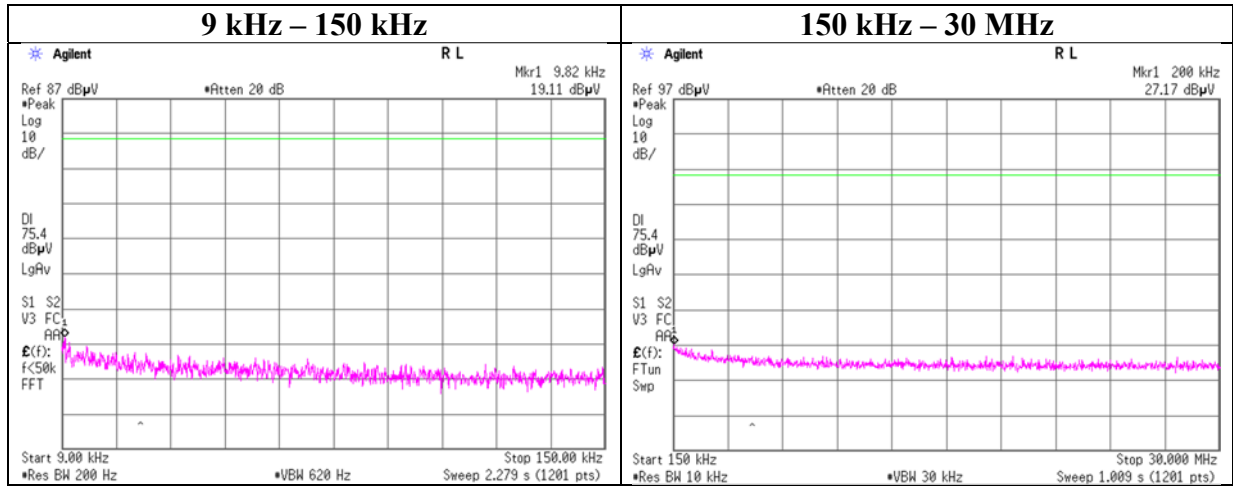
2402 MHz



Conducted Spurious Emission

Report No.	13218140S-B-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	February 8, 2020
Temperature / Humidity	25 deg. C / 46 % RH
Engineer	Makoto Hosaka
Mode	Tx, Hopping Off, DH5

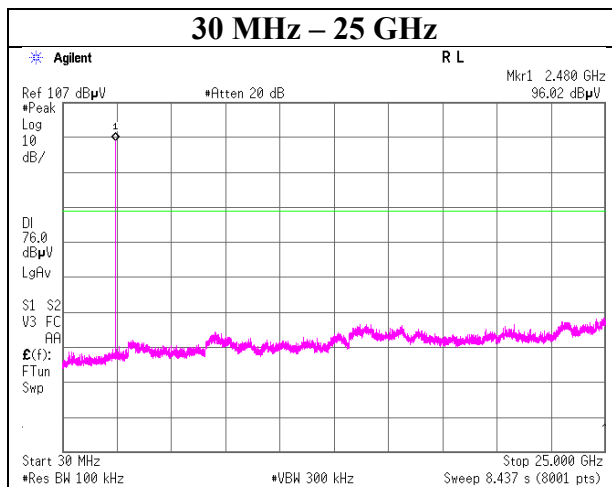
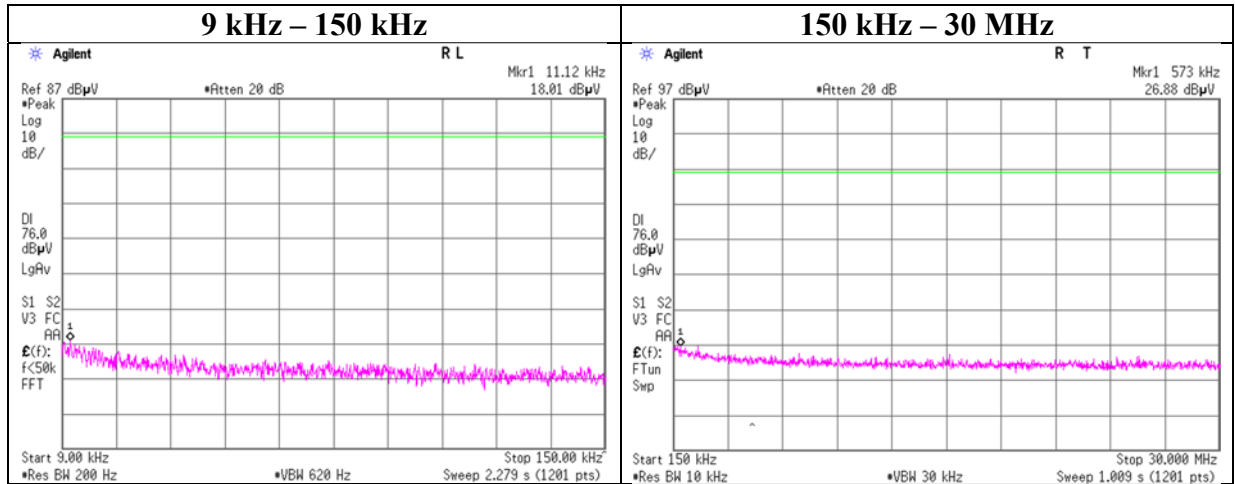
2441 MHz



Conducted Spurious Emission

Report No.	13218140S-B-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	February 8, 2020
Temperature / Humidity	25 deg. C / 46 % RH
Engineer	Makoto Hosaka
Mode	Tx, Hopping Off, DH5

2480 MHz



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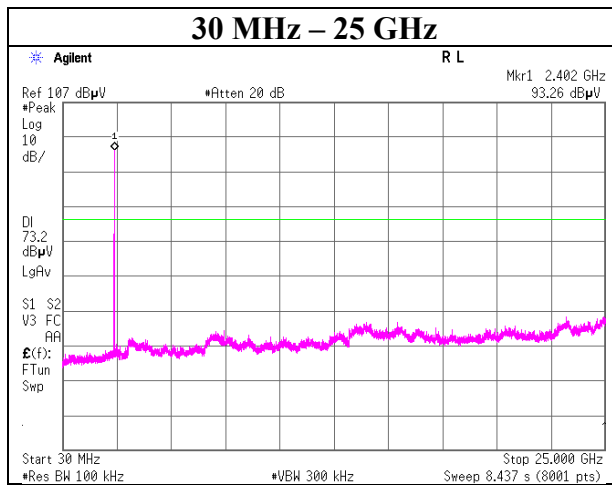
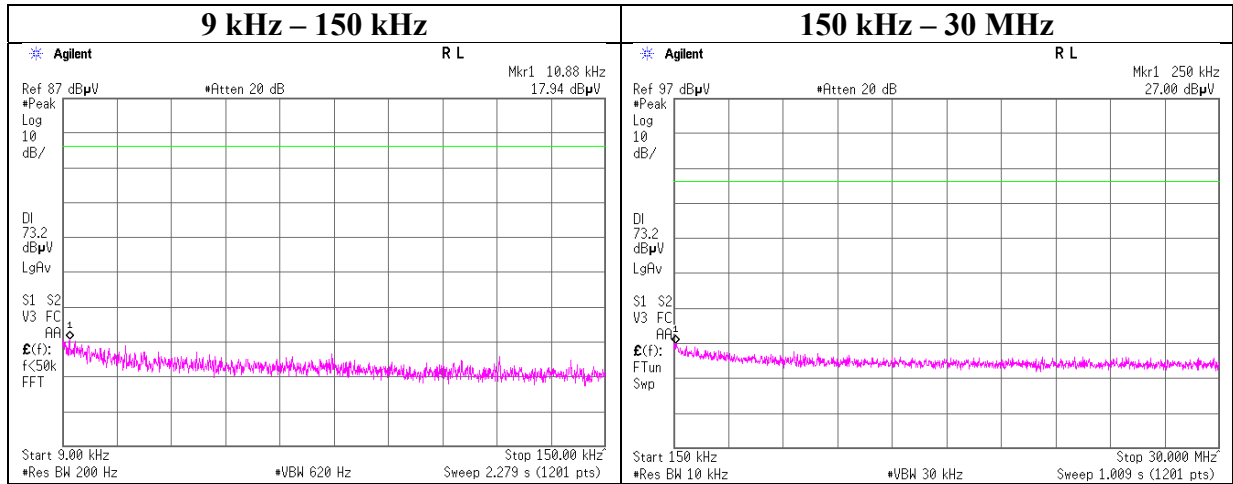
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Conducted Spurious Emission

Report No.	13218140S-B-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	February 8, 2020
Temperature / Humidity	25 deg. C / 46 % RH
Engineer	Makoto Hosaka
Mode	Tx, Hopping Off, 3DH5

2402 MHz



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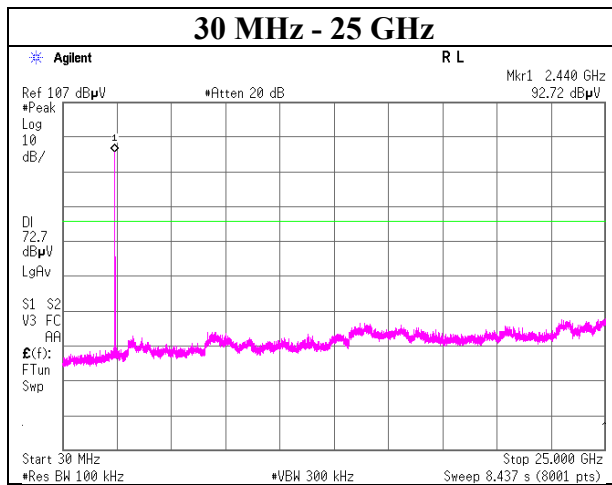
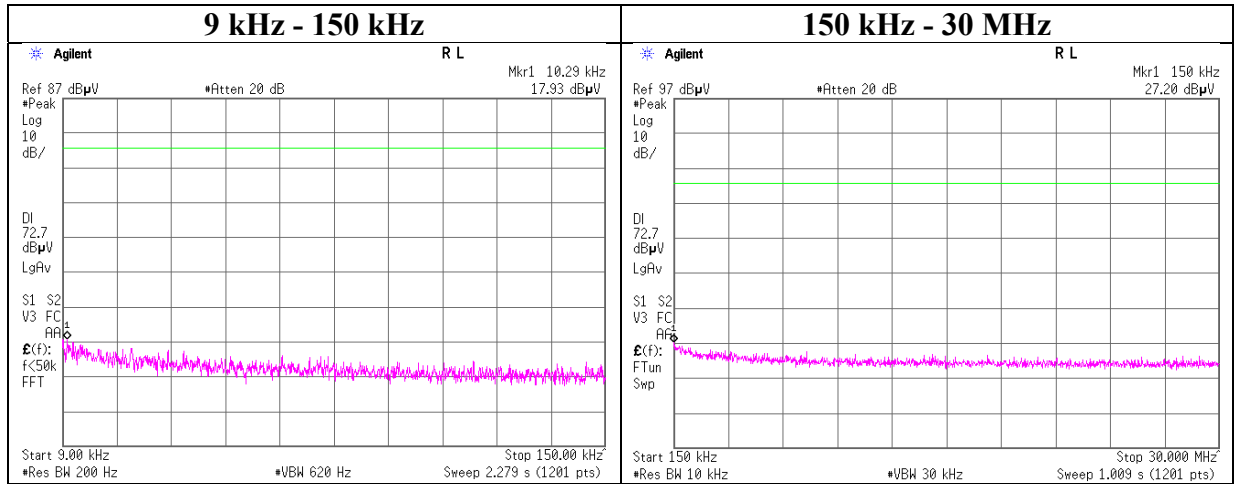
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Conducted Spurious Emission

Report No.	13218140S-B-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	February 8, 2020
Temperature / Humidity	25 deg. C / 46 % RH
Engineer	Makoto Hosaka
Mode	Tx, Hopping Off, 3DH5

2441 MHz



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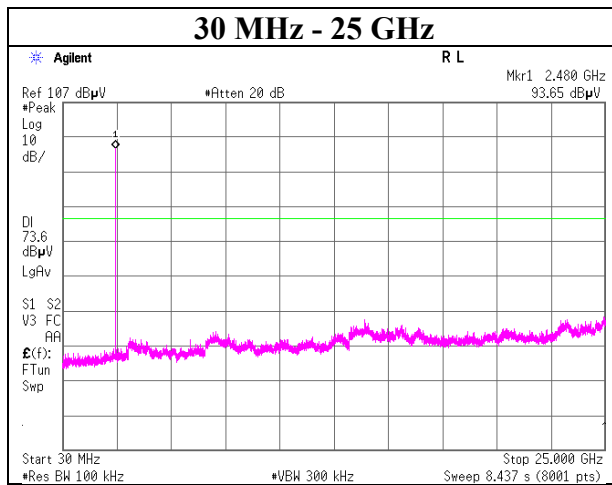
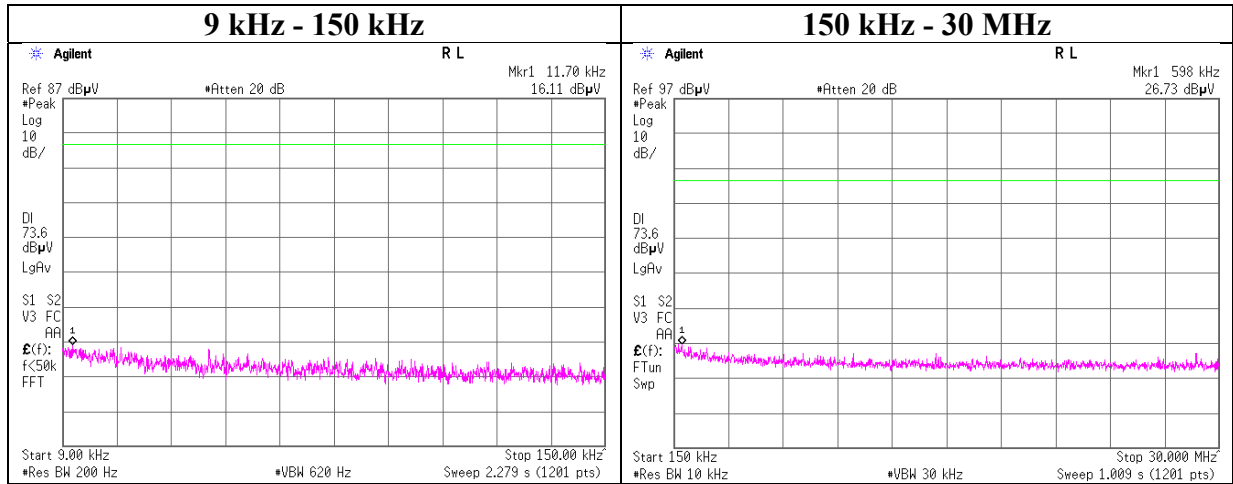
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Conducted Spurious Emission

Report No.	13218140S-B-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	February 8, 2020
Temperature / Humidity	25 deg. C / 46 % RH
Engineer	Makoto Hosaka
Mode	Tx, Hopping Off, 3DH5

2480 MHz



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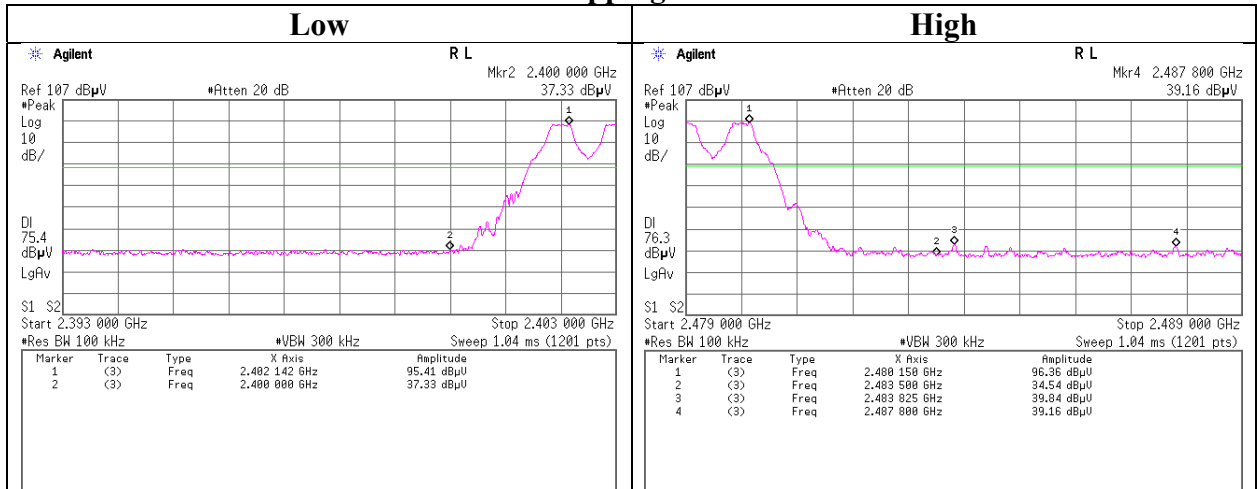
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

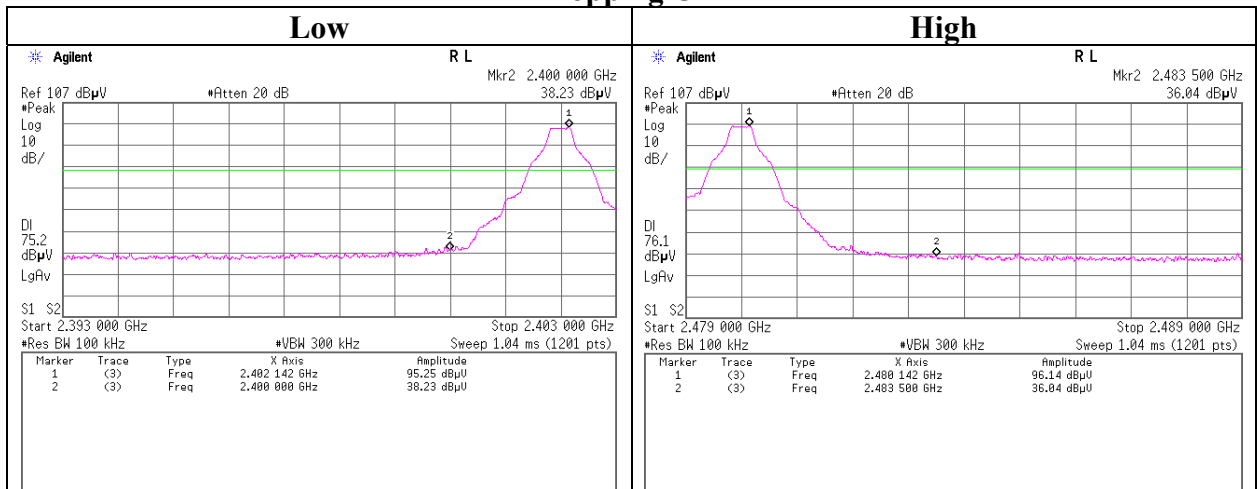
Conducted Emission Band Edge compliance

Report No. 13218140S-B-R1
 Test place Shonan EMC Lab. No.3 Shielded Room
 Date February 2, 2020
 Temperature / Humidity 20 deg. C / 32 % RH
 Engineer Takahiro Kawakami
 Mode Tx DH5

Hopping On



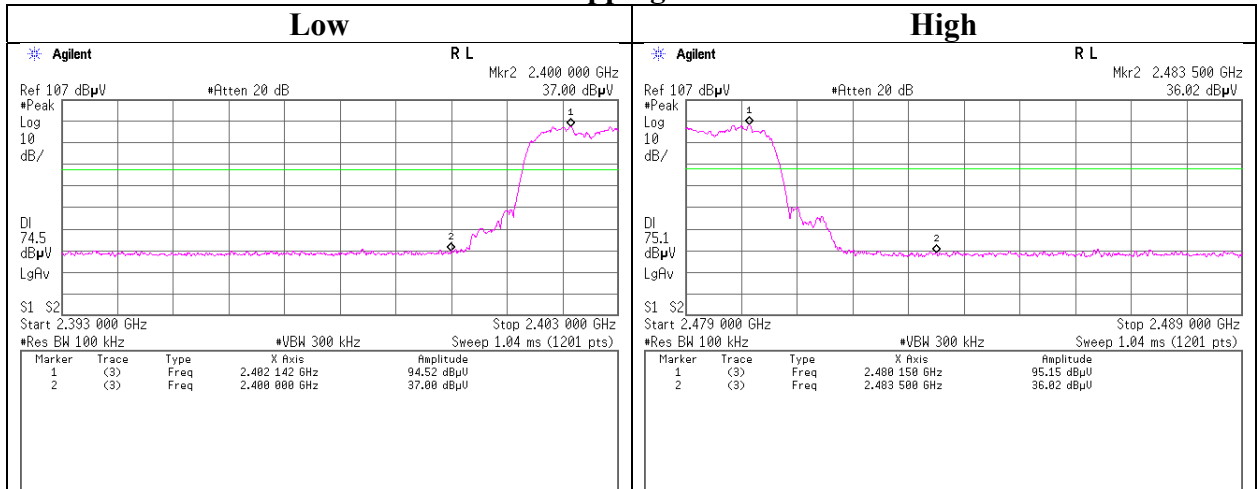
Hopping Off



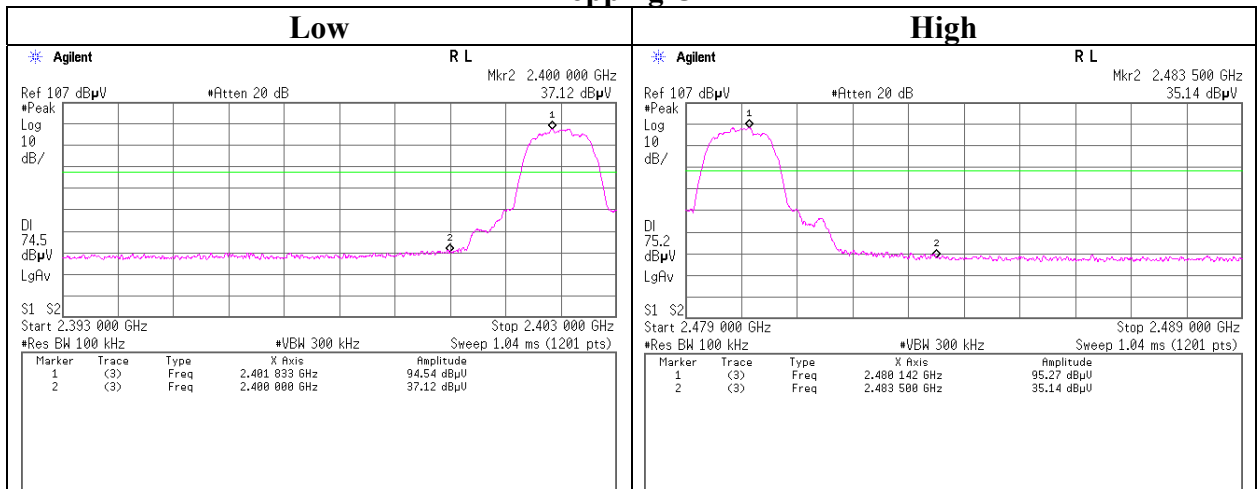
Conducted Emission Band Edge compliance

Report No. 13218140S-B-R1
 Test place Shonan EMC Lab. No.3 Shielded Room
 Date February 2, 2020
 Temperature / Humidity 20 deg. C / 32 % RH
 Engineer Takahiro Kawakami
 Mode Tx 3DH5

Hopping On



Hopping Off



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APPENDIX 2: Test instruments

Test Instruments [1/2]

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
AT	KTS-07	145111	Digital Tester	SANWA	PC500	7019232	2019/10/01	12
AT	SAT10-14	154591	Attenuator	Weinschel Corp.	54A-10	81595	2019/04/16	12
AT	SCC-G12	145040	Coaxial Cable	Suhner	SUCOFLEX 102	30790/2	2019/03/27	12
AT	SOS-24	191841	Humidity Indicator	CUSTOM	CTH-201	-	2019/12/12	12
AT	SOS-27	191845	Humidity Indicator	CUSTOM	CTH-201	-	2019/12/12	12
AT	SPM-13	169910	Power Meter	Keysight Technologies Inc	8990B	MY51000448	2020/01/28	12
AT	SPSS-06	169911	Power sensor	Keysight Technologies Inc	N1923A	MY57270004	2020/01/28	12
AT	STM-G10	171617	Terminator	Weinschel - API Technologies Corp	M1459A	92420	2019/07/04	12
AT	STM-G9	171616	Terminator	Weinschel - API Technologies Corp	M1459A	89025	2019/07/04	12
AT,RE	SSA-02	145800	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY48250106	2019/04/04	12
AT,RE	SSA-03	145801	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY48250152	2019/08/08	12
AT,RE	STS-03	146210	Digital Hitester	HIOKI	3805-50	80997823	2019/10/01	12
RE	COTS-SEMI-5	170932	EMI Software	TSJ	TEPTO-DV3(RE,CE,ME,PE)	-	-	-
RE	KJM-02	146432	Measure	TAJIMA	GL19-55	-	-	-
RE	KJM-09	145929	Measure	KOMELON	KMC-36	-	-	-
RE	SAEC-01(SVSWR)	145561	Semi-Anechoic Chamber	TDK	SAEC-01(SVSWR)	1	2019/05/07	12
RE	SAEC-02(SVSWR)	145598	Semi-Anechoic Chamber	TDK	SAEC-02(SVSWR)	2	2019/05/09	12
RE	SAEC-03(NSA)	145565	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	2019/04/08	12
RE	SAEC-03(SVSWR)	145566	Semi-Anechoic Chamber	TDK	SAEC-03(SVSWR)	3	2019/05/03	12
RE	SAF-03	145126	Pre Amplifier	SONOMA	310N	290213	2020/02/20	12
RE	SAF-04	145127	Pre Amplifier	Toyo Corporation	TPA0118-36	2072554	2019/06/04	12
RE	SAF-05	145128	Pre Amplifier	Toyo Corporation	TPA0118-36	1440490	2019/07/12	12
RE	SAF-06	145005	Pre Amplifier	Toyo Corporation	TPA0118-36	1440491	2020/02/20	12
RE	SAF-08	145007	Pre Amplifier	Toyo Corporation	HAP18-26W	19	2019/03/05	12
RE	SAT10-06	145137	Attenuator	Keysight Technologies Inc	8493C-010	74865	2019/11/06	12
RE	SAT6-13	167094	Attenuator	JFW	50HF-006N	-	2020/02/21	12
RE	SBA-03	145023	Biconical Antenna	Schwarzbeck	BBA9106	91032666	2019/05/07	12
RE	SCC-C1/C2/C3/C4/C5/C10/SRSE-03	145171	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/NS4906	-/0901-271(RF Selector)	2019/04/19	12

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Test Instruments [2/2]

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	SCC-G05	145039	Coaxial Cable	Junkosha	J12J102207-00	APR-30-15-037	2020/01/31	12
RE	SCC-G15	145176	Coaxial Cable	Suhner	SUCOFLEX 102	32703/2	2019/03/27	12
RE	SCC-G41	151617	Coaxial Cable	Junkosha	MWX221-01000NFSNMS/B	1612S006	2020/01/08	12
RE	SCC-G43	156380	Coaxial Cable	HUBER+SUNER	SUCOFLEX_104_E	SN MY 13406/4E	2019/07/03	12
RE	SCC-G45	168301	Coaxial Cable	HUBER+SUNER	SUCOFLEX 102 E	800137/2EA	2019/03/26	12
RE	SCC-G50	178573	Coaxial Cable	HUBER+SUNER	SUCOFLEX_104_E	MY13407/4E	2019/03/26	12
RE	SCC-G51	178572	Coaxial Cable	HUBER+SUNER	SUCOFLEX 104	800288 /4A	2019/03/26	12
RE	SCC-G56	179539	Coaxial Cable	Huber+Suhner	SUCOFLEX 104	803289/4	2019/05/16	12
RE	SCC-G57	179540	Coaxial Cable	Huber+Suhner	SUCOFLEX 102	802815/2	2019/05/16	12
RE	SCC-G58	183047	Coaxial Cable	HUBER+SUNER	SUCOFLEX 104	800287/4A	2019/07/23	12
RE	SFL-02	145301	Highpass Filter	MICRO-TRONICS	HPM50111	51	2019/11/06	12
RE	SFL-03	145377	Highpass Filter	MICRO-TRONICS	HPM50112	28	2019/11/06	12
RE	SFL-18	145305	Highpass Filter	MICRO-TRONICS	HPM50111	119	2019/04/16	12
RE	SHA-01	145383	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-725	2019/05/09	12
RE	SHA-02	145384	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-726	2019/06/26	12
RE	SHA-03	145501	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	2019/06/26	12
RE	SHA-04	145512	Horn Antenna	ETS LINDGREN	3160-09	00094868	2019/06/26	12
RE	SJM-09	145336	Measure	PROMART	SEN1935	-	-	-
RE	SLA-07	145529	Logperiodic Antenna	Schwarzbeck	VUSLP9111B	196	2019/05/07	12
RE	SOS-20	191837	Humidity Indicator	CUSTOM	CTH-201	-	2019/12/12	12
RE	SOS-21	191838	Humidity Indicator	CUSTOM	CTH-201	-	2019/12/12	12
RE	SOS-23	191840	Humidity Indicator	CUSTOM	CTH-201	-	2019/12/12	12
RE	STR-01	145790	Test Receiver	Rohde & Schwarz	ESU40	100093	2019/04/14	12
RE	STR-08	150463	Test Receiver	Rohde & Schwarz	ESW44	101581	2019/11/22	12
RE	STS-01	145792	Digital Hitester	HIOKI	3805-50	80997812	2019/10/01	12
RE	STS-02	145793	Digital Hitester	HIOKI	3805-50	80997819	2019/04/02	12

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

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

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

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

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

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