



RADIO TEST REPORT

Test Report No. : 13163439S-G-R2

Applicant : Foster Electric Company, Limited
Type of EUT : Bluetooth Headphone
Model Number of EUT : KT001 WH 01
FCC ID : 2ASG7619755
Test regulation : FCC Part 15 Subpart C: 2020
Test Result : Complied (Refer to SECTION 3.2)

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
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6. This test report covers Radio technical requirements.
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 13163439S-G-R1. 13163439S-G-R1 is replaced with this report.

Date of test: June 17 to July 9, 2020

Representative test engineer:

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Leader
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CERTIFICATE 1266.03

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

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REVISION HISTORY

Original Test Report No.: 13163439S-G

Revision	Test report No.	Date	Page revised	Contents
- (Original)	13163439S-G	August 3, 2020	-	-
1	13163439S-G-R1	August 21, 2020	30	Correction of data: Length of transmission: 2DH5 2.497 → 2.947
			37,39,40,42,44,45	Addition of Comment: *1) Emission caused by carrier
2	13163439S-G-R2	August 26, 2020	6	Update of the description: From "FCC Part 15 final revised on May 26, 2020 and effective July 27, 2020 except 15.258" To "FCC Part 15 final revised on June 26, 2020 and effective July 27, 2020"

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	:	Foster Electric Company, Limited
Address	:	1-1-109, Tsutsujigaoka, Akishima City, Tokyo, 196-8550, Japan
Telephone Number	:	+81-42-546-2311
Facsimile Number	:	+81-42-546-2317
Contact Person	:	Hidehito Miho

The information provided from the customer is as follows;

- Applicant, Type of EUT, Model Number of EUT, FCC ID on the cover and other relevant pages
 - Operating/Test Mode(s) (Mode(s)) on all the relevant pages
 - SECTION 1: Customer information
 - SECTION 2: Equipment under test (EUT) other than the Receipt Date
 - SECTION 4: Operation of EUT during testing
- * The laboratory is exempted from liability of any test results affected from the above information in SECTION 2 and 4.

SECTION 2: Equipment under test (EUT)

2.1 Identification of EUT

Type of Equipment	:	Bluetooth Headphone
Model No.	:	KT001 WH 01
Serial No.	:	Refer to SECTION 4, SECTION 4.2
Rating	:	DC 3.2 V (DC 3.0 V - 3.7 V) (Battery) DC 5 V (USB)
Receipt Date of Sample (Information from test lab.)	:	June 16, 2020
Country of Mass-production	:	China
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: KT001 WH 01 (referred to as the EUT in this report) is a Bluetooth Headphone.

Radio Specification

Bluetooth

Radio Type	:	Transceiver
Frequency of Operation	:	2402 MHz - 2480 MHz
Modulation	:	GFSK, $\pi/4$ DQPSK
Antenna type	:	Monopole Antenna
Antenna Gain	:	4.84 dBi (MAX)
Operating Temperature	:	-15 deg. C to +55 deg.C
Clock frequency	:	26 MHz

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C
FCC Part 15 final revised on June 26, 2020 and effective July 27, 2020

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

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

3.2 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	9.1 dB 0.15000 MHz, QP, L1 (Tx, 2DH5, 2480 MHz, AC 240 V / 60 Hz)	Complied a)	-
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 b)	Conducted
20 dB Bandwidth	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: -	FCC: Section 15.247(a)(1) ISED: RSS-247 5.1 (a)		Complied b)	Conducted
Number of Hopping Frequency	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: -	FCC: Section 15.247(a)(1)(iii) ISED: RSS-247 5.1 (d)		Complied c)	Conducted
Dwell time	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: -	FCC: Section 15.247(a)(1)(iii) ISED: RSS-247 5.1 (d)		Complied d)	Conducted
Maximum Peak Output Power	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: RSS-Gen 6.12	FCC: Section 15.247(a)(b)(1) ISED: RSS-247 5.4 (b)		Complied e)	Conducted
Spurious Emission & Band Edge Compliance	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: RSS-Gen 6.13	FCC: Section 15.247(d) ISED: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	15.0 dB 2584.044 MHz, PK, Hori., Tx, DH5 2480 MHz	Complied f) / g)	Conducted/ Radiated (above 30 MHz) *1)
Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422. *1) Radiated test was selected over 30 MHz based on section 15.247(d). a) Refer to APPENDIX 1 (data of Conducted Emission) b) Refer to APPENDIX 1 (data of 20 dB Bandwidth, 99 %Occupied Bandwidth and Carrier Frequency Separation) c) Refer to APPENDIX 1 (data of Number of Hopping Frequency) d) Refer to APPENDIX 1 (data of Dwell time) e) Refer to APPENDIX 1 (data of Maximum Peak Output Power) f) Refer to APPENDIX 1 (data of Conducted Spurious Emission) g) Refer to APPENDIX 1 (data of Radiated Spurious Emission) Symbols: Complied The data of this test item has enough margin, more than the measurement uncertainty. Complied# The data of this test item meets the limits unless the measurement uncertainty is taken into consideration.					

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

FCC Part 15.31 (e)

This EUT provides the stable voltage constantly to RF Module 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.

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99 % Occupied Bandwidth	ISED: RSS-Gen 6.7	ISED: -	N/A	- b)	Conducted

b) Refer to APPENDIX 1 (data of 20 dB 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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 JAB Accreditation No. RTL02610

Test site	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
No.1 Semi-anechoic chamber	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.2 Semi-anechoic chamber	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.3 Semi-anechoic chamber	2973D-3	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.

SECTION 4: Operation of EUT during testing

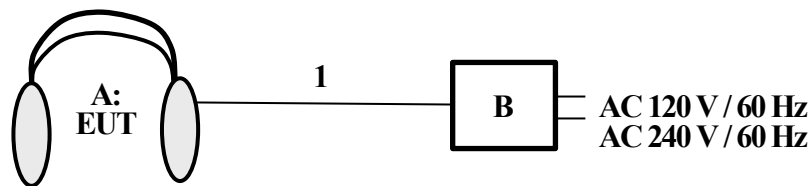
4.1 Operating Mode(s)

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

Details of Operating Mode(s)

Test Item	Mode	Tested frequency
Conducted Emission, Spurious Emission (Conducted/Radiated)	Tx (Hopping Off) DH5, 2DH5	2402 MHz 2441 MHz 2480 MHz
Carrier Frequency Separation	Tx (Hopping On) DH5, 2DH5	2402 MHz 2441 MHz 2480 MHz
20 dB Bandwidth	Tx (Hopping Off) DH5, 2DH5	2402 MHz 2441 MHz 2480 MHz
Number of Hopping Frequency	Tx (Hopping On) DH5, 2DH5	-
Dwell time	Tx (Hopping On), -DH1, DH3, DH5 -2DH1, 2DH3, 2DH5	-
Maximum Peak Output Power	Tx (Hopping Off) DH5, 2DH5	2402 MHz 2441 MHz 2480 MHz
Band Edge Compliance (Conducted)	Tx DH5, 2DH5 -Hopping On -Hopping Off	2402 MHz 2480 MHz
99 % Occupied Bandwidth	Tx DH5, 2DH5 -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) only * 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: Power target 0 dBm EDR: Power target 0 dBm Software: CSR BlueSuite BlueTest Version 2.6.9.1584 (Date: 2020.6.17, Storage location: Driven by connected PC) *This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product.		

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	Remark
A	Bluetooth Headphone	KT001 WH01	3 *1) 4 *2)	Foster Electric Company	EUT
B	AC Adapter	A1882	-	Apple	-

*1) Used for Antenna Terminal conducted test

*2) Used for Conducted Emission test and Radiated Emission test

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	USB Type C	1.3	Shielded	Shielded	-

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SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane.

The rear of tabletop was located 40 cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80 cm from any other grounded conducting surface. EUT was located 80 cm from a Line Impedance Stabilization Network (LISN) / Artificial mains Network (AMN) and excess AC cable was bundled in center.

For the tests on EUT itself (as a standalone equipment)

Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN / (AMN) to the input power source.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT via AC adapter in a Shielded Room.

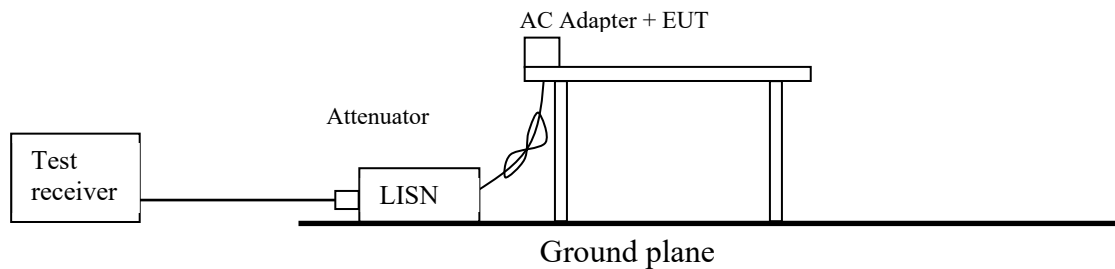
The EUT via AC adapter was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

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

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

Figure 1: Test Setup



SECTION 6: Radiated Spurious Emission

Test Procedure

[For below 1 GHz]

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

[For above 1 GHz]

EUT was placed on a urethane platform of nominal size, 0.5 m by 0.5 m, raised 1.5 m above the conducting ground plane.

The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with absorbent materials lined on a ground plane.

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

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

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

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

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

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

Test Antennas are used as below;

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

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

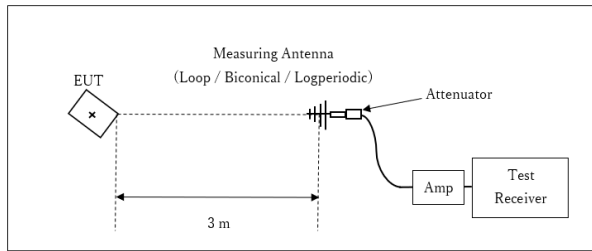
20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9 (ISED) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (ISED).

Frequency	Below 1 GHz	Above 1 GHz		20 dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV *1)	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	-	RBW: 100 kHz VBW: 300 kHz

*1) Measurement with Average detector was not performed. The limit for Average detector is applied to the measurement value with Peak detector used Duty cycle correction factor (DCCF).

Figure 2: Test Setup

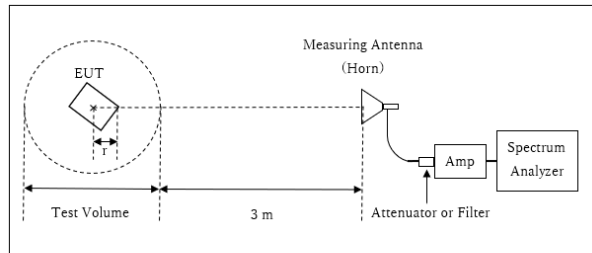
Below 1 GHz



× : 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: $20 \times \log (3.9 \text{ m} / 3.0 \text{ m}) = 2.28 \text{ dB}$

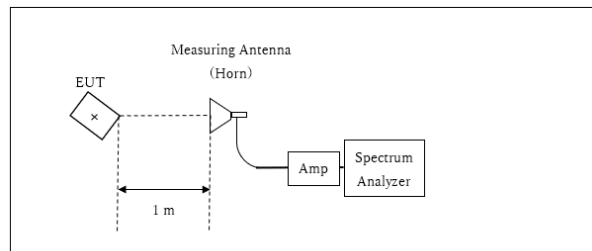
* Test Distance: $(3 + \text{Test Volume} / 2) - r = 3.9 \text{ m}$

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 X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

Test Antenna \ Frequency	Carrier	Spurious				
		30 MHz -1 GHz	1 GHz - 2.8 GHz	2.8 GHz -13 GHz	13 GHz -18 GHz	18 GHz -26.5 GHz
Horizontal	X	Z	X	Y	X	Z
Vertical	Z	Z	Z	Z	X	Y

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 7: Antenna Terminal Conducted Tests

Test Procedure

The tests were made with below setting connected to the antenna port.

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument used
20 dB Bandwidth	3 MHz	30 kHz	100 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99 % Occupied Bandwidth *1)	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Peak	Max Hold *1)	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) *4)	9 kHz to 150 kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150 kHz to 30 MHz	10 kHz	30 kHz				
	30 MHz to 25 GHz	100 kHz	300 kHz				
Conducted Spurious Emission Band Edge compliance	10 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer

*1) The measurement was performed with Max Hold since the duty cycle was not 100 %. Peak hold was applied as Worst-case measurement.
 *2) Reference data
 *3) In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.
 Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart.
 (9 kHz -150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 10 kHz)
 *4) The limits in CFR 47, Part 15, Subpart C, paragraph 15.209(a), are identical to those in RSS-Gen section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377 Ohms. For example, the measurement at frequency 9 kHz resulted in a level of 45.5 dBuV/m, which is equivalent to $45.5 - 51.5 = -6.0$ dBuA/m, which has the same margin, 3 dB, to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limit.

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

Conducted Emission

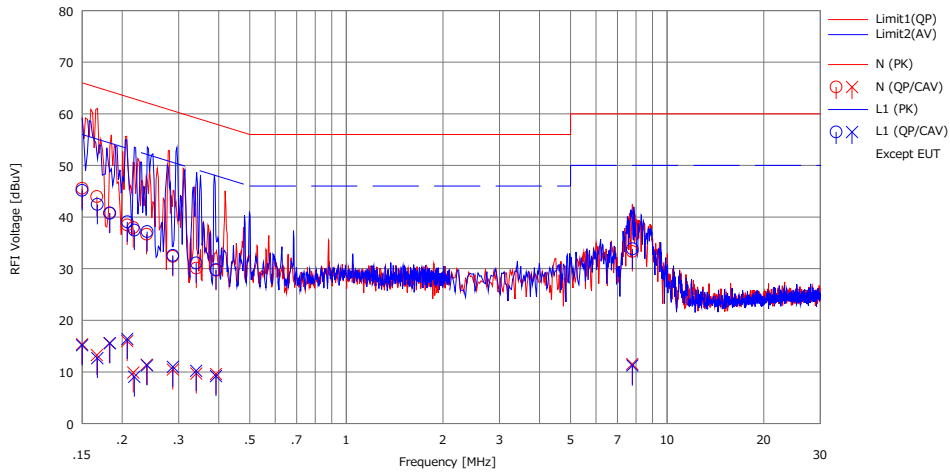
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date : 2020/07/08

Mode : Tx DH5 2402 MHz
Power : AC 120 V / 60 Hz
Temp./Humi. : 23 deg.C / 62 %RH

Limit : FCC_Part 15 Subpart C(15.207)

Engineer : Yasumasa Owaki



No.	Freq. [MHz]	Reading		C.Fac.	Results		Limit		Margin		Phase	Comment
		(QP) [dBuV]	(CAV) [dBuV]		(QP) [dBuV]	(CAV) [dBuV]	(QP) [dBuV]	(AV) [dBuV]	(QP) [dB]	(AV) [dB]		
1	0.15000	33.00	2.80	12.58	45.58	15.38	66.00	56.00	20.4	40.6	N	
2	0.16680	31.40	0.70	12.57	43.97	13.27	65.12	55.12	21.1	41.8	N	
3	0.18262	28.20	3.00	12.57	40.77	15.57	64.37	54.37	23.6	38.8	N	
4	0.20748	25.90	3.40	12.57	38.47	15.97	63.31	53.31	24.8	37.3	N	
5	0.21657	25.40	-2.70	12.57	37.97	9.87	62.95	52.95	24.9	43.0	N	
6	0.23839	24.10	-1.20	12.58	36.68	11.38	62.15	52.15	25.4	40.7	N	
7	0.28764	19.80	-2.10	12.57	32.37	10.47	60.59	50.59	28.2	40.1	N	
8	0.34059	17.50	-2.90	12.59	30.09	9.69	59.19	49.19	29.1	39.5	N	
9	0.39247	17.10	-3.00	12.58	29.68	9.58	58.01	48.01	28.3	38.4	N	
10	7.78710	20.00	-1.80	13.33	33.33	11.53	60.00	50.00	26.6	38.4	N	
11	0.15000	32.60	2.60	12.56	45.16	15.16	66.00	56.00	20.8	40.8	L1	
12	0.16730	29.90	0.10	12.56	42.46	12.66	65.09	55.09	22.6	42.4	L1	
13	0.18328	28.20	3.00	12.56	40.76	15.56	64.34	54.34	23.5	38.7	L1	
14	0.20752	26.50	3.80	12.57	39.07	16.37	63.30	53.30	24.2	36.9	L1	
15	0.21821	24.90	-3.50	12.57	37.47	9.07	62.89	52.89	25.4	43.8	L1	
16	0.23915	24.60	-1.30	12.57	37.17	11.27	62.13	52.13	24.9	40.8	L1	
17	0.28779	20.00	-1.60	12.58	32.58	10.98	60.59	50.59	28.0	39.6	L1	
18	0.34019	18.50	-2.40	12.61	31.11	10.21	59.20	49.20	28.0	38.9	L1	
19	0.39232	17.20	-3.40	12.60	29.80	9.20	58.01	48.01	28.2	38.8	L1	
20	7.79270	20.60	-2.00	13.23	33.83	11.23	60.00	50.00	26.1	38.7	L1	

Calculation: Result[dBuV]=Reading[dBuV]+C.Fac(LISN(AMN)+Cable+ATT)[dB]
LISN(AMN)=SL5-02

UL Japan, Inc.

Shonan EMC Lab.

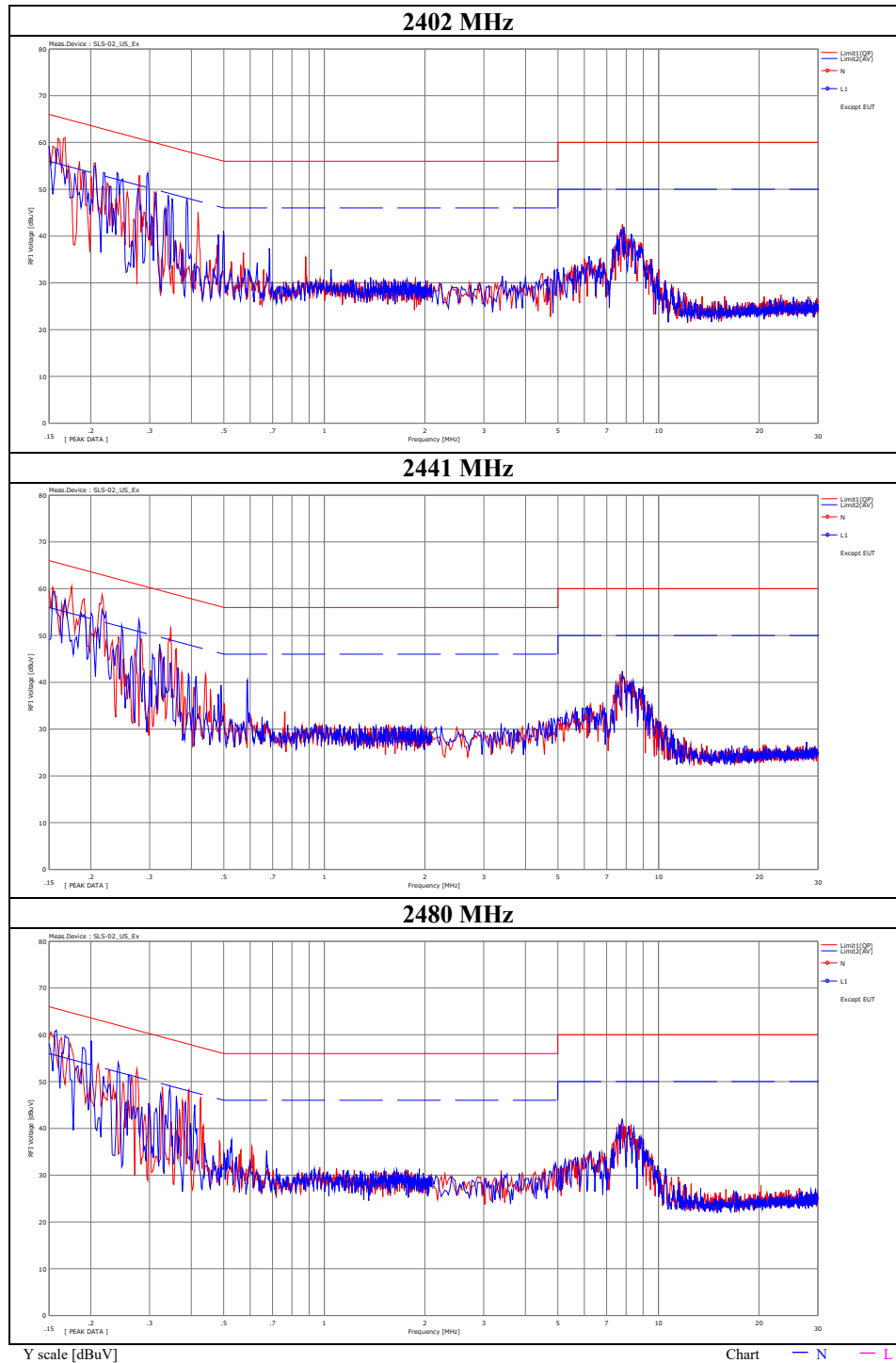
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Conducted Emission

Report No. 13163439S-G-R2
Test place Shonan EMC Lab. No.5 Shielded Room
Date July 8, 2020
Temperature / Humidity 23 deg. C / 62 % RH
Engineer Yasumasa Owaki
Mode Tx, Hopping Off, DH5, AC 120 V / 60 Hz



UL Japan, Inc.

Shonan EMC Lab.

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

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Conducted Emission

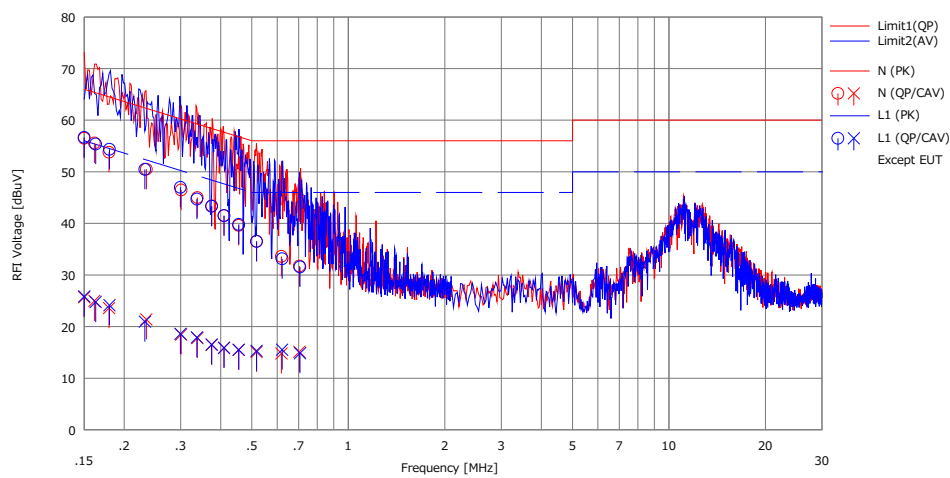
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date : 2020/07/09

Mode : Tx DH5 2480 MHz
Power : AC 240 V / 60 Hz
Temp./Humi. : 25 deg.C / 57 %RH

Limit : FCC_Part 15 Subpart C(15.207)

Engineer : Yasumasa Owaki



No.	Freq. [MHz]	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<CAV> [dBuV]		<QP> [dBuV]	<CAV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.15000	43.90	13.10	12.58	56.48	25.68	66.00	56.00	9.5	30.3	N	
2	0.16152	43.00	12.40	12.57	55.57	24.97	65.39	55.39	9.8	30.4	N	
3	0.17940	41.20	11.00	12.57	53.77	23.57	64.51	54.51	10.7	30.9	N	
4	0.23447	37.90	8.80	12.58	50.48	21.38	62.29	52.29	11.8	30.9	N	
5	0.30100	33.90	5.90	12.57	46.47	18.47	60.22	50.22	13.7	31.7	N	
6	0.33830	32.40	5.20	12.59	44.99	17.79	59.24	49.24	14.2	31.4	N	
7	0.37518	30.80	3.90	12.58	43.38	16.48	58.39	48.39	15.0	31.9	N	
8	0.40916	28.90	3.30	12.58	41.48	15.88	57.67	47.67	16.1	31.7	N	
9	0.45478	27.00	2.90	12.59	39.59	15.49	56.79	46.79	17.2	31.3	N	
10	0.51732	23.90	2.50	12.59	36.49	15.09	56.00	46.00	19.5	30.9	N	
11	0.61835	21.00	2.20	12.60	33.60	14.80	56.00	46.00	22.4	31.2	N	
12	0.70366	19.10	2.50	12.62	31.72	15.12	56.00	46.00	24.2	30.8	N	
13	0.15000	44.10	13.30	12.56	56.66	25.86	66.00	56.00	9.3	30.1	L1	
14	0.16290	42.80	12.20	12.56	55.36	24.76	65.31	55.31	9.9	30.5	L1	
15	0.17983	41.80	11.60	12.56	54.36	24.16	64.49	54.49	10.1	30.3	L1	
16	0.23193	37.90	8.40	12.57	50.47	20.97	62.38	52.38	11.9	31.4	L1	
17	0.29944	34.40	6.00	12.58	46.98	18.58	60.26	50.26	13.2	31.6	L1	
18	0.33708	32.10	5.30	12.60	44.70	17.90	59.27	49.27	14.5	31.3	L1	
19	0.37461	30.70	3.90	12.61	43.31	16.51	58.40	48.40	15.0	31.8	L1	
20	0.40963	28.90	3.30	12.60	41.50	15.90	57.66	47.66	16.1	31.7	L1	
21	0.45514	27.20	2.90	12.61	39.81	15.51	56.78	46.78	16.9	31.2	L1	
22	0.51746	23.90	2.70	12.61	36.51	15.31	56.00	46.00	19.4	30.6	L1	
23	0.62149	20.50	2.90	12.63	33.13	15.53	56.00	46.00	22.8	30.4	L1	
24	0.70660	18.90	2.20	12.64	31.54	14.84	56.00	46.00	24.4	31.1	L1	

Calculation: Result[dBuV]=Reading[dBuV]+C.Fac(LISN(AMN)+Cable+ATT)[dB]
LISN(AMN)=SLS-02

UL Japan, Inc.

Shonan EMC Lab.

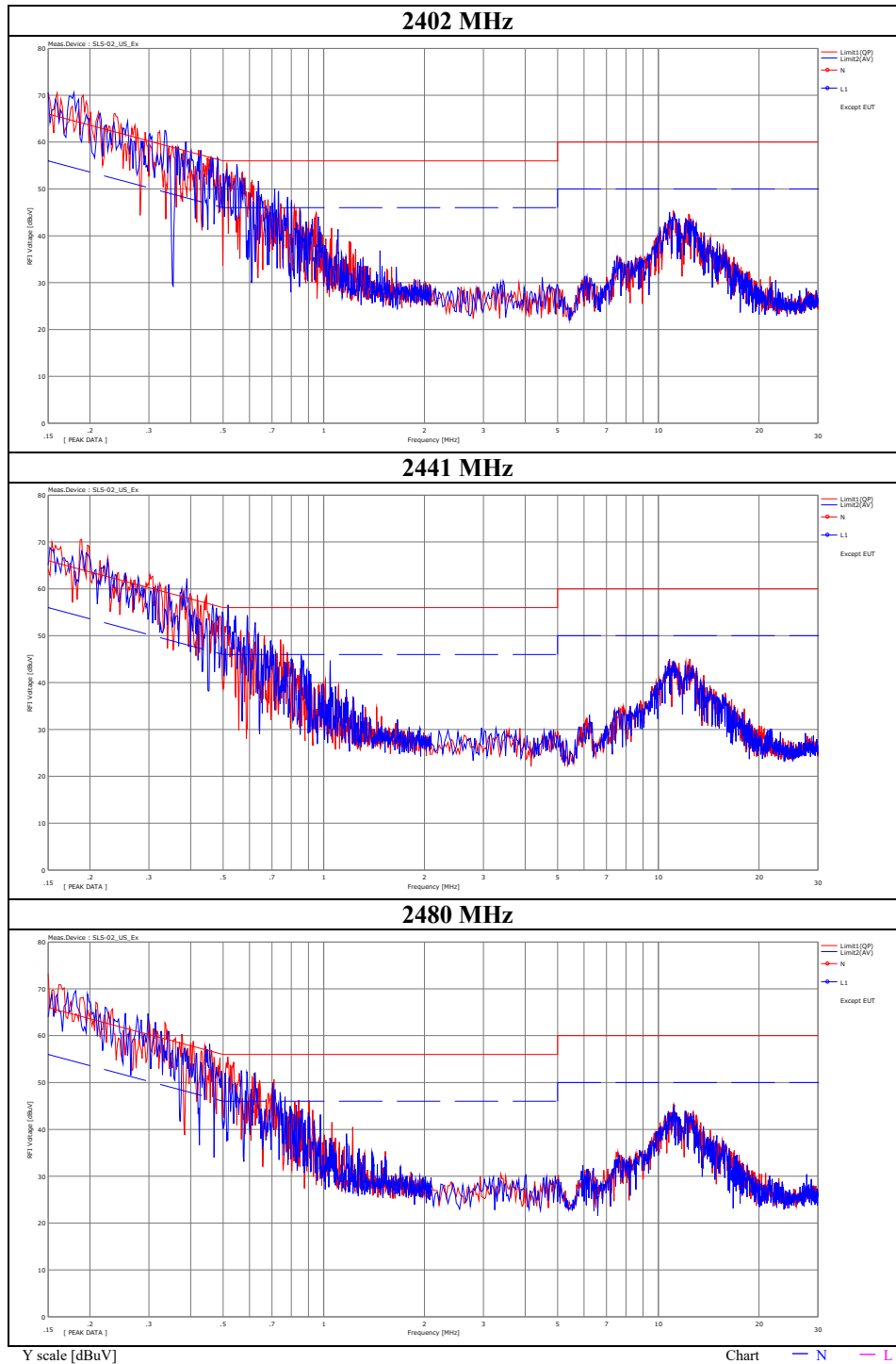
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Conducted Emission

Report No. 13163439S-G-R2
Test place Shonan EMC Lab. No.5 Shielded Room
Date July 9, 2020
Temperature / Humidity 25 deg. C / 57 % RH
Engineer Yasumasa Owaki
Mode Tx, Hopping Off, DH5, AC 240 V / 60 Hz



UL Japan, Inc.

Shonan EMC Lab.

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date : 2020/07/09

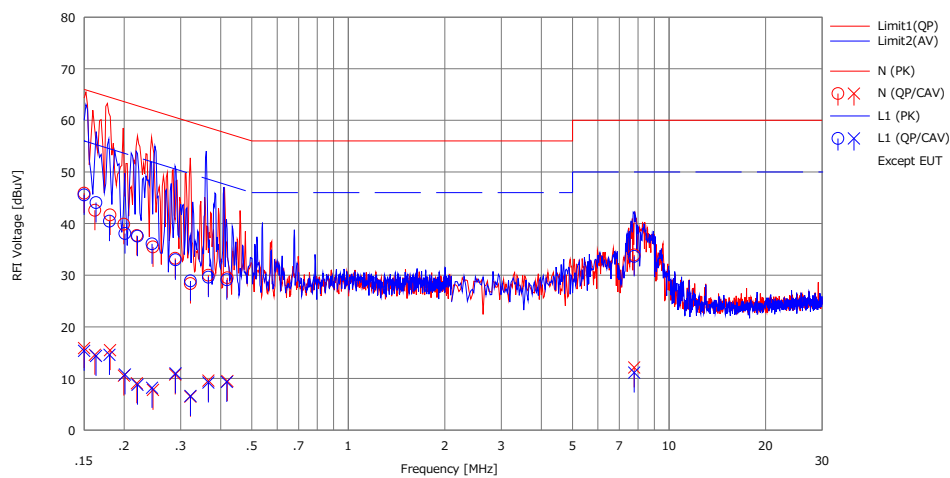
Mode : Tx 2DH5 2480 MHz

Power : AC 120 V / 60 Hz

Temp./Humi. : 23 deg.C / 62 %RH

Limit : FCC_Part 15 Subpart C(15.207)

Engineer : Yasumasa Owaki



No.	Freq. [MHz]	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		(QP) [dBuV]	(CAV) [dBuV]		(QP) [dBuV]	(CAV) [dBuV]	(QP) [dBuV]	(AV) [dBuV]	(QP) [dB]	(AV) [dB]		
1	0.15000	33.30	3.30	12.58	45.88	15.88	66.00	56.00	20.1	40.1	N	
2	0.16207	30.00	2.00	12.57	42.57	14.57	65.36	55.36	22.7	40.7	N	
3	0.18074	29.10	2.90	12.57	41.67	15.47	64.45	54.45	22.7	38.9	N	
4	0.19956	27.30	-2.00	12.56	39.86	10.56	63.63	53.63	23.7	43.0	N	
5	0.21908	25.10	-3.50	12.57	37.67	9.07	62.85	52.85	25.1	43.7	N	
6	0.24596	22.90	-4.80	12.58	35.48	7.78	61.89	51.89	26.4	44.1	N	
7	0.28863	20.70	-1.80	12.57	33.27	10.77	60.56	50.56	27.2	39.7	N	
8	0.32191	15.80	-6.10	12.58	28.38	6.48	59.66	49.66	31.2	43.1	N	
9	0.36620	17.40	-3.00	12.59	29.99	9.59	58.59	48.59	28.6	39.0	N	
10	0.41961	16.90	-3.10	12.59	29.49	9.49	57.46	47.46	27.9	37.9	N	
11	7.78885	20.60	-1.20	13.33	33.93	12.13	60.00	50.00	26.0	37.8	N	
12	0.15000	33.00	2.80	12.56	45.56	15.36	66.00	56.00	20.4	40.6	L1	
13	0.16347	31.50	1.80	12.56	44.06	14.36	65.29	55.29	21.2	40.9	L1	
14	0.17992	27.90	2.00	12.56	40.46	14.56	64.49	54.49	24.0	39.9	L1	
15	0.20114	25.50	-1.80	12.56	38.06	10.76	63.56	53.56	25.5	42.8	L1	
16	0.22008	25.00	-3.80	12.57	37.57	8.77	62.82	52.82	25.2	44.0	L1	
17	0.24444	23.50	-4.40	12.57	36.07	8.17	61.94	51.94	25.8	43.7	L1	
18	0.28909	20.40	-1.60	12.58	32.98	10.98	60.55	50.55	27.5	39.5	L1	
19	0.32211	16.30	-6.00	12.60	28.90	6.60	59.65	49.65	30.7	43.0	L1	
20	0.36625	17.00	-3.40	12.61	29.61	9.21	58.59	48.59	28.9	39.3	L1	
21	0.41816	16.50	-3.30	12.61	29.11	9.31	57.48	47.48	28.3	38.1	L1	
22	7.78720	20.40	-2.10	13.23	33.63	11.13	60.00	50.00	26.3	38.8	L1	

Calculation: Result[dBuV]=Reading[dBuV]+C.Fac(LISN(AMN)+Cable+ATT)[dB]
LISN(AMN)=SLS-02

UL Japan, Inc.

Shonan EMC Lab.

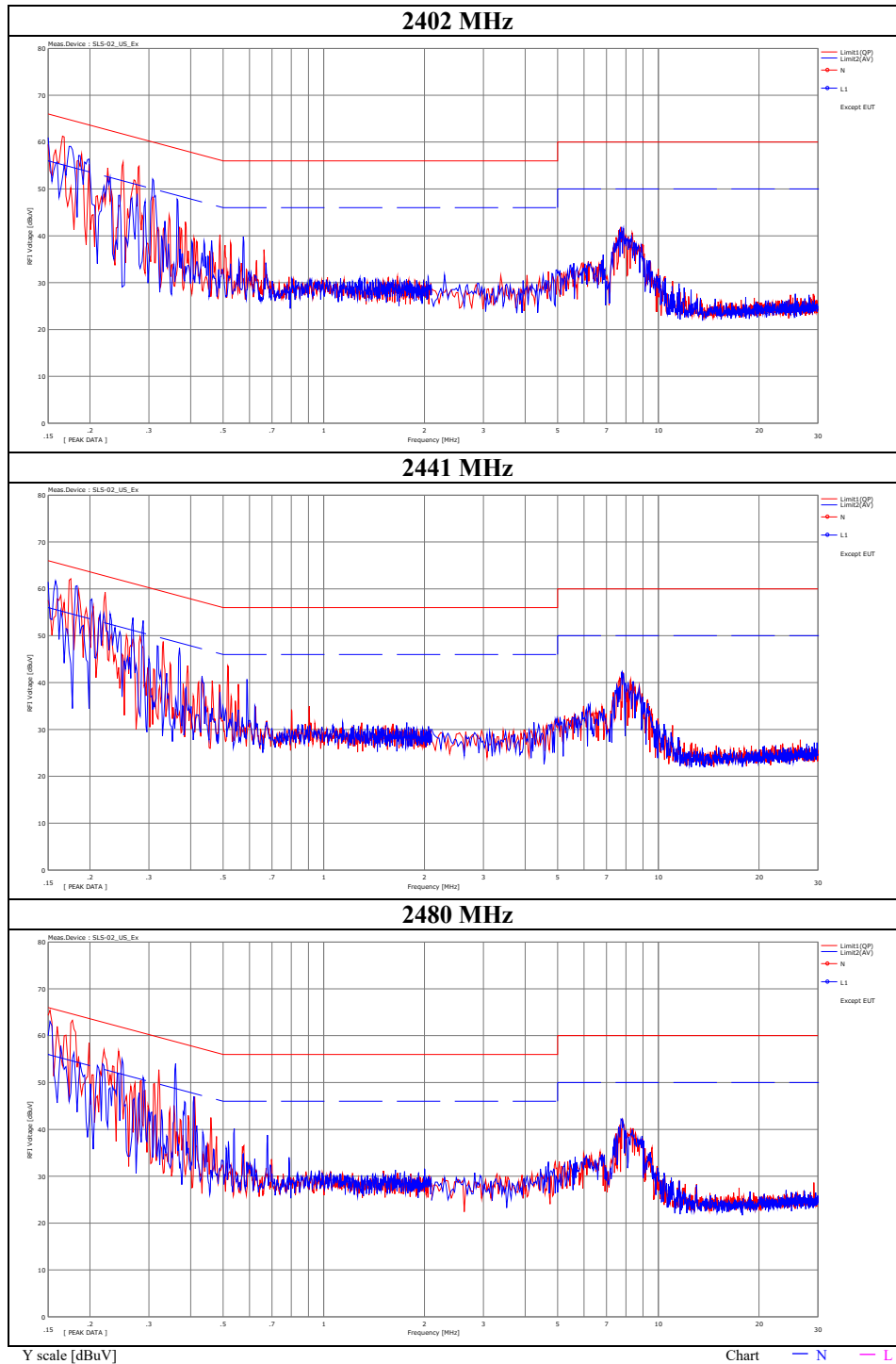
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Conducted Emission

Report No. 13163439S-G-R2
Test place Shonan EMC Lab. No.5 Shielded Room
Date July 8, 2020
Temperature / Humidity 23 deg. C / 62 % RH
Engineer Yasumasa Owaki
Mode Tx, Hopping Off, 2DH5, AC 120 V / 60 Hz



UL Japan, Inc.

Shonan EMC Lab.

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date : 2020/07/09

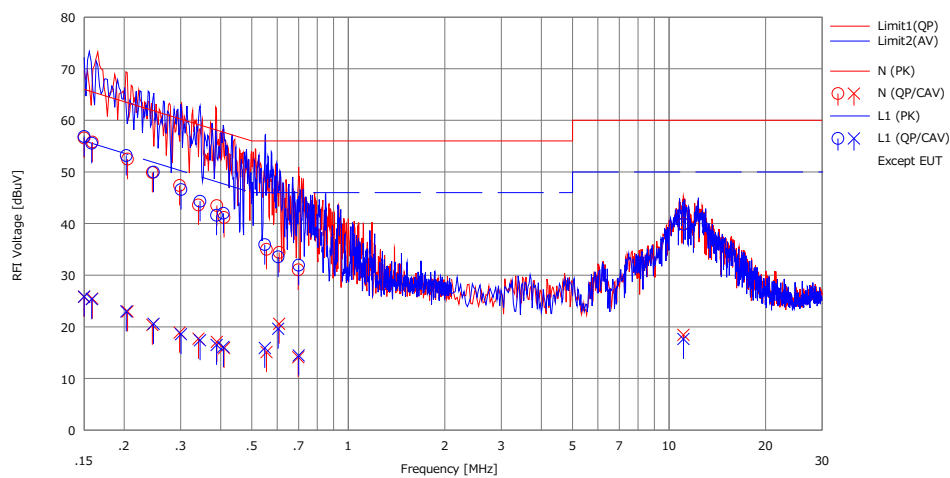
Mode : Tx 2DH5 2480 MHz

Power : AC 240 V / 60 Hz

Temp./Humi. : 25 deg.C / 57 %RH

Limit : FCC_Part 15 Subpart C(15.207)

Engineer : Yasumasa Owaki



No.	Freq. [MHz]	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		(QP) [dBuV]	(CAV) [dBuV]		(QP) [dBuV]	(CAV) [dBuV]	(QP) [dBuV]	(AV) [dBuV]	(QP) [dB]	(AV) [dB]		
1	0.15000	44.00	13.20	12.58	56.58	25.78	66.00	56.00	9.4	30.2	N	
2	0.15916	43.20	12.90	12.58	55.78	25.48	65.51	55.51	9.7	30.0	N	
3	0.20487	39.90	10.40	12.57	52.47	22.97	63.41	53.41	10.9	30.4	N	
4	0.24495	37.30	7.80	12.58	49.88	20.38	61.93	51.93	12.0	31.5	N	
5	0.29770	34.80	6.30	12.57	47.37	18.87	60.31	50.31	12.9	31.4	N	
6	0.34108	31.00	5.10	12.59	43.59	17.69	59.18	49.18	15.5	31.4	N	
7	0.38892	30.90	4.50	12.58	43.48	17.08	58.09	48.09	14.6	31.0	N	
8	0.40989	28.60	3.30	12.58	41.18	15.88	57.65	47.65	16.4	31.7	N	
9	0.55556	22.40	2.50	12.60	35.00	15.10	56.00	46.00	21.0	30.9	N	
10	0.60872	21.80	8.00	12.60	34.40	20.60	56.00	46.00	21.6	25.4	N	
11	0.69819	18.40	1.50	12.62	31.02	14.12	56.00	46.00	24.9	31.8	N	
12	1.10883	26.30	4.80	13.65	39.95	18.45	60.00	50.00	20.0	31.5	N	
13	0.15000	44.30	13.30	12.56	56.86	25.86	66.00	56.00	9.1	30.1	L1	
14	0.15854	43.00	12.80	12.56	55.56	25.36	65.54	55.54	9.9	30.1	L1	
15	0.20322	40.60	10.40	12.57	53.17	22.97	63.48	53.48	10.3	30.5	L1	
16	0.24702	37.40	8.00	12.57	49.97	20.57	61.86	51.86	11.8	31.2	L1	
17	0.30090	34.00	6.00	12.58	46.58	18.58	60.22	50.22	13.6	31.6	L1	
18	0.34488	31.70	4.80	12.61	44.31	17.41	59.08	49.08	14.7	31.6	L1	
19	0.38862	29.00	3.90	12.60	41.60	16.50	58.09	48.09	16.4	31.5	L1	
20	0.40784	29.40	3.50	12.60	42.00	16.10	57.69	47.69	15.6	31.5	L1	
21	0.54886	23.30	3.30	12.62	35.92	15.92	56.00	46.00	20.0	30.0	L1	
22	0.60432	20.90	7.00	12.63	33.53	19.63	56.00	46.00	22.4	26.3	L1	
23	0.70014	19.30	1.80	12.64	31.94	14.44	56.00	46.00	24.0	31.5	L1	
24	1.10883	26.40	4.20	13.46	39.86	17.66	60.00	50.00	20.1	32.3	L1	

Calculation: Result[dBuV]=Reading[dBuV]+C.Fac(LISN(AMN)+Cable+ATT)[dB]
LISN(AMN)=SLS-02

UL Japan, Inc.

Shonan EMC Lab.

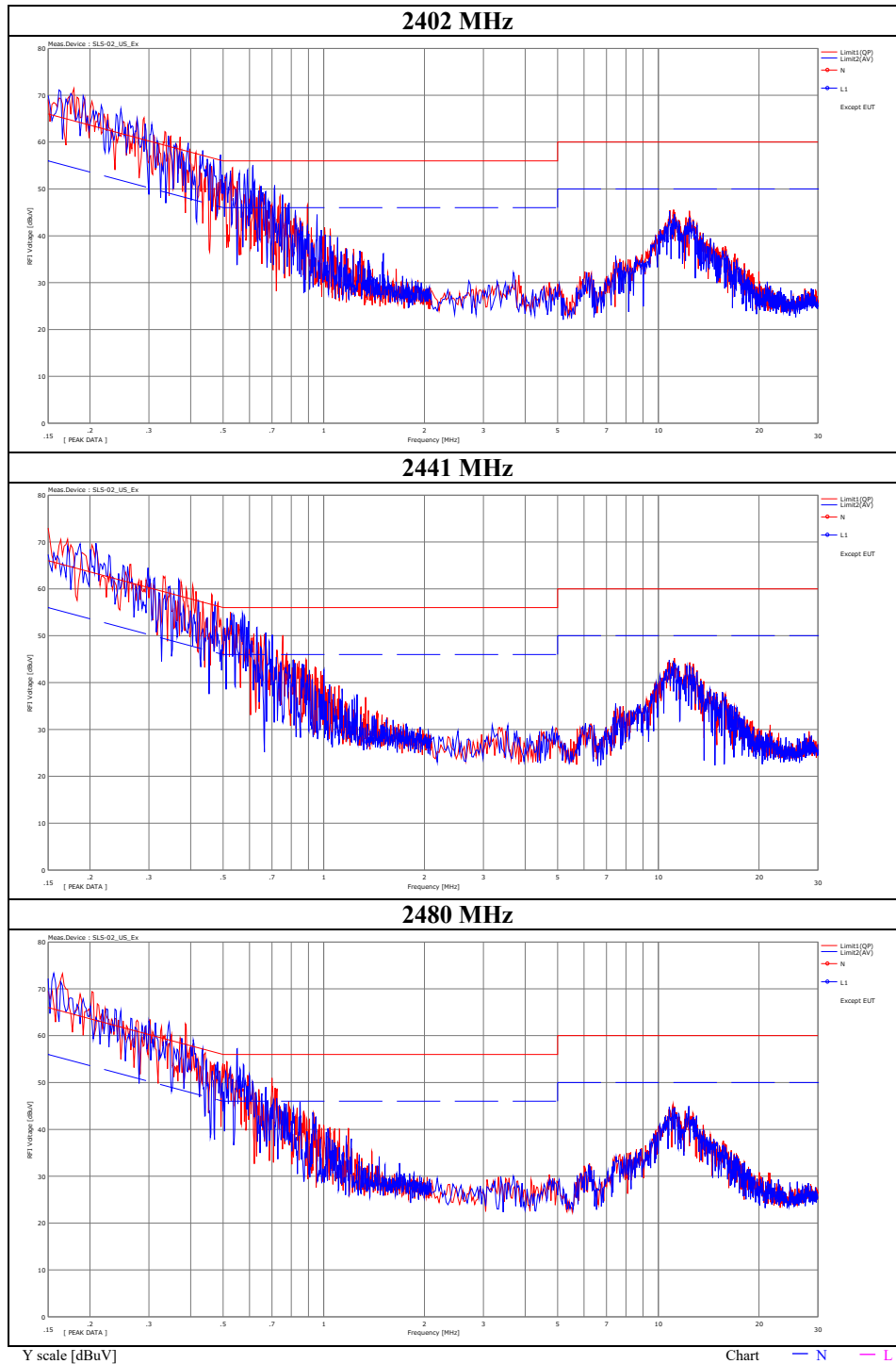
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Conducted Emission

Report No. 13163439S-G-R2
Test place Shonan EMC Lab. No.5 Shielded Room
Date July 9, 2020
Temperature / Humidity 25 deg. C / 57 % RH
Engineer Yasumasa Owaki
Mode Tx, Hopping Off, 2DH5, AC 240 V / 60 Hz



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

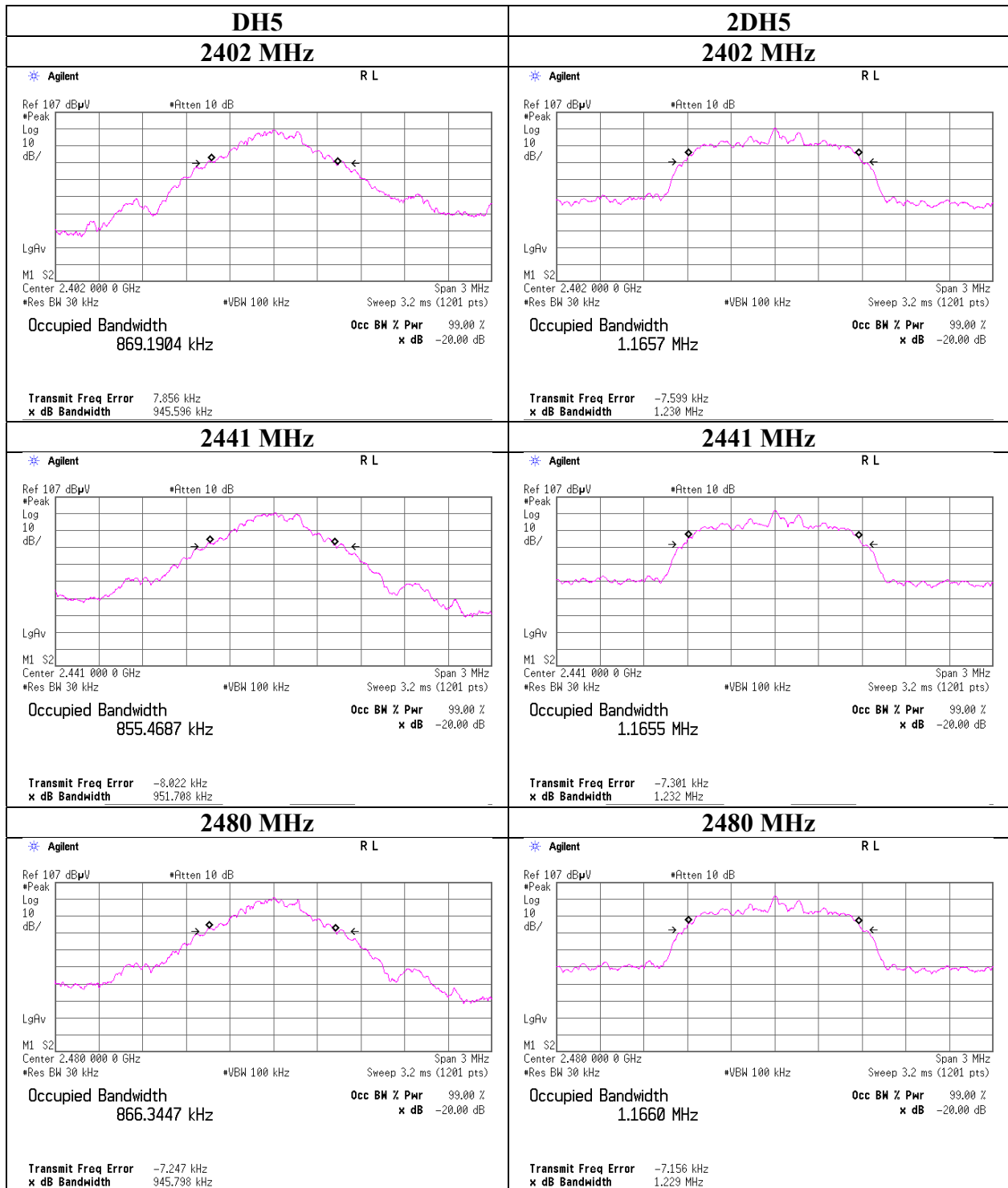
Report No.	13163439S-G-R2	
Test place	Shonan EMC Lab. No.1 Measurement Room	
Date	June 17, 2020	June 18, 2020
Temperature / Humidity	25 deg. C / 46 % RH	24 deg. C / 62 % RH
Engineer	Kenichi Adachi	Toshinori Yamada
Mode	Tx, Hopping Off, Tx, Hopping On	

Mode	Freq. [MHz]	20 dB Bandwidth [MHz]	99 % Occupied Bandwidth [kHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.946	869.2	1.000	≥ 0.630
DH5	2441.0	0.952	855.5	1.000	≥ 0.634
DH5	2480.0	0.946	866.3	1.000	≥ 0.631
DH5	Hopping On	80.830	78601.5	-	-
2DH5	2402.0	1.230	1165.7	1.000	≥ 0.820
2DH5	2441.0	1.232	1165.5	1.000	≥ 0.821
2DH5	2480.0	1.229	1166.0	1.000	≥ 0.820
2DH5	Hopping On	81.156	78713.6	-	-

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



UL Japan, Inc.

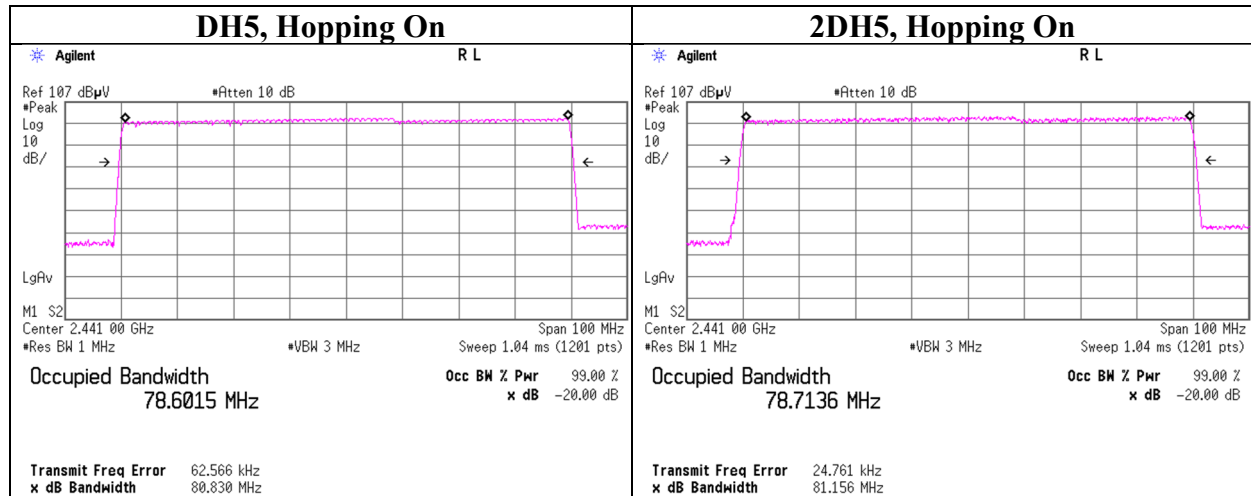
Shonan EMC Lab.

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

20 dB Bandwidth and 99 % Occupied Bandwidth



UL Japan, Inc.

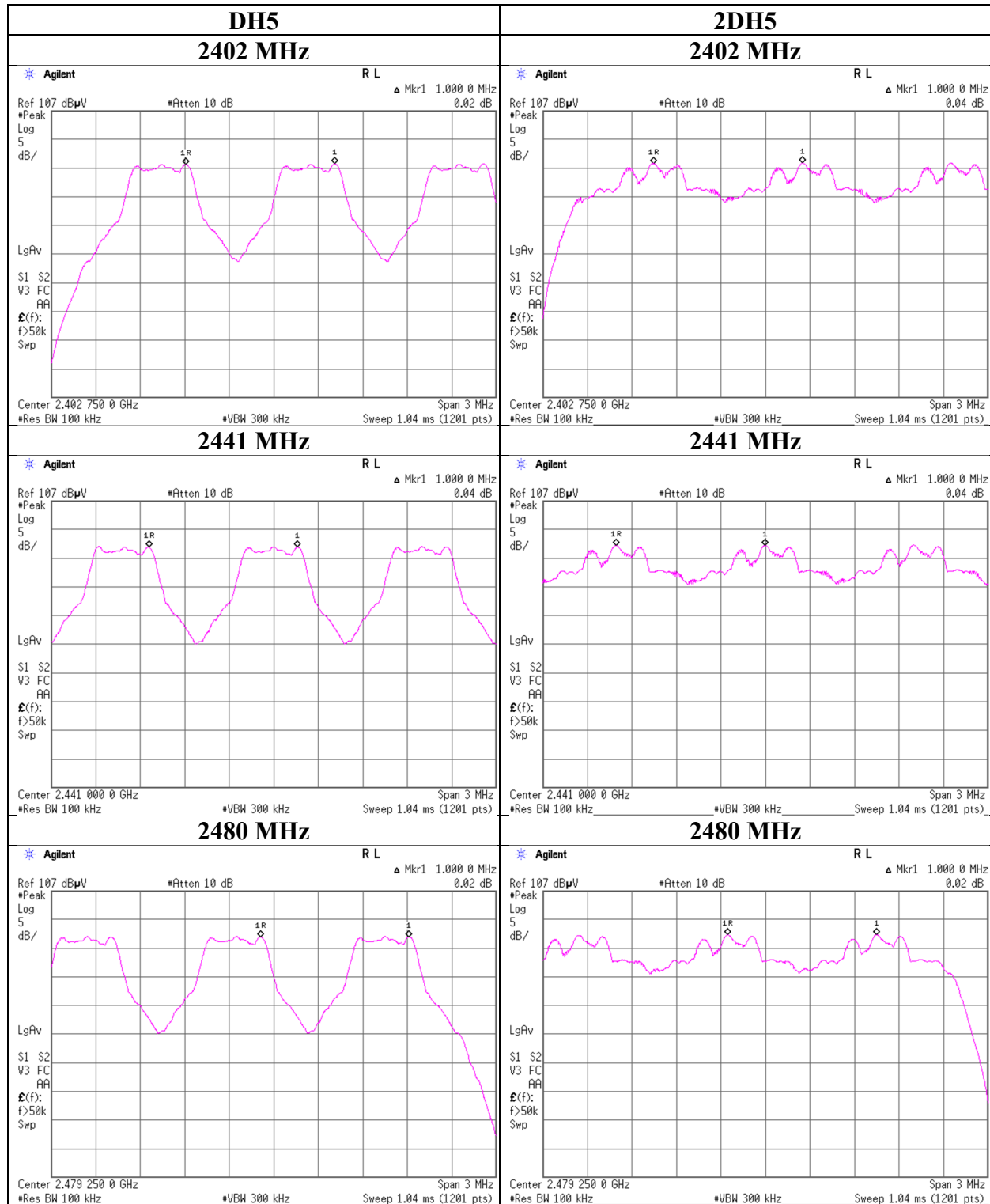
Shonan EMC Lab.

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Carrier Frequency Separation



UL Japan, Inc.

Shonan EMC Lab.

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Facsimile : +81 463 50 6401

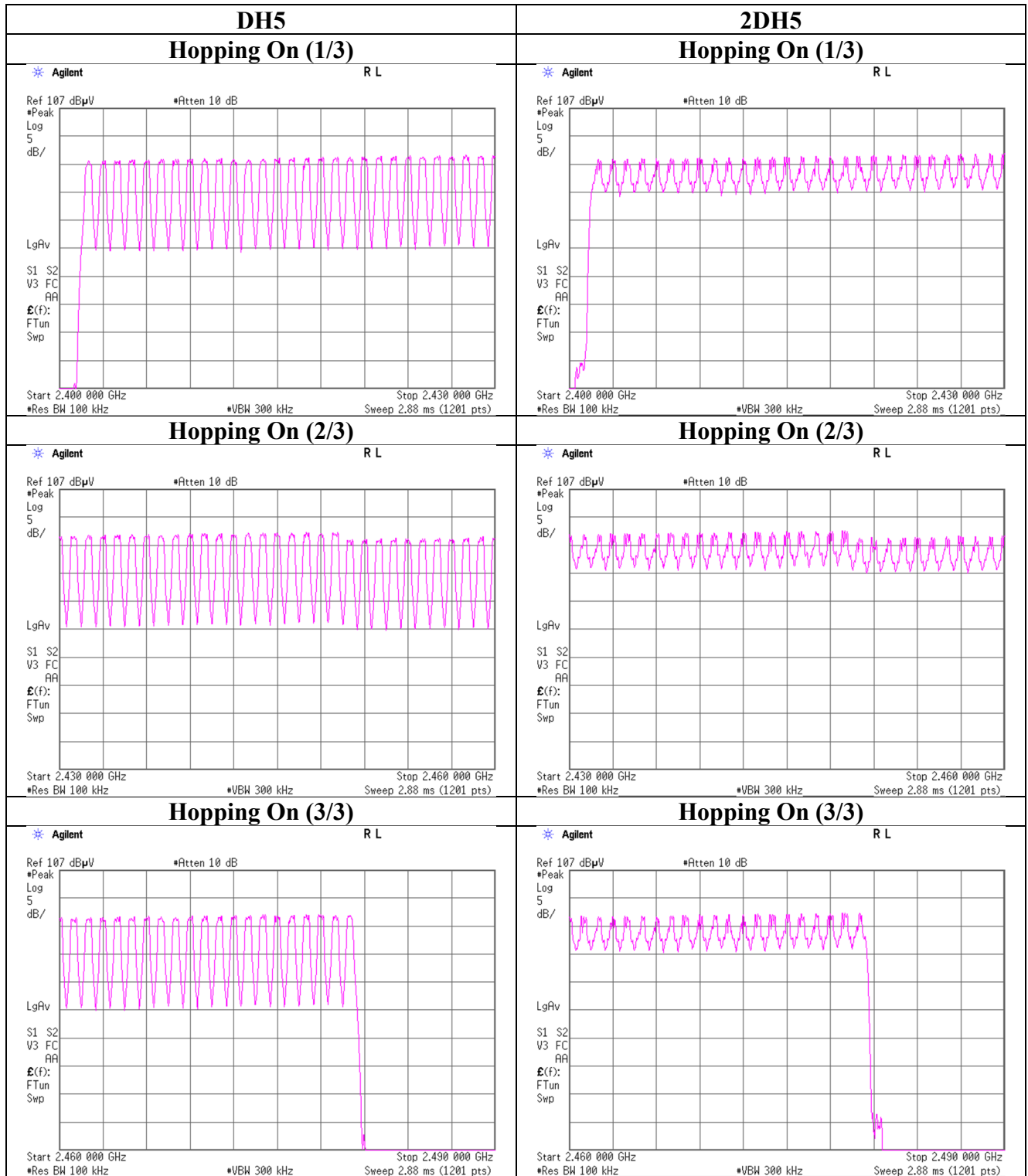
Number of Hopping Frequency

Report No. 13163439S-G-R2
Test place Shonan EMC Lab. No.1 Measurement Room
Date June 18, 2020
Temperature / Humidity 24 deg. C / 62 % RH
Engineer Toshinori Yamada
Mode Tx, Hopping On

Mode	Number of channel [channels]	Limit [channels]
DH5	79	≥ 15
2DH5	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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Shonan EMC Lab.

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Dwell time

Report No.	13163439S-G-R2
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	June 18, 2020
Temperature / Humidity	24 deg. C / 62 % RH
Engineer	Toshinori Yamada
Mode	Tx, Hopping On

Mode	Number of transmission in a 31.6 (79 Hopping x 0.4) s period				Length of transmission [ms]	Result [ms]	Limit [ms]
DH1	51.0 times /	5 s x	31.6 s =	323 times	0.433	140	400
DH3	26.0 times /	5 s x	31.6 s =	165 times	1.688	279	400
DH5	17.0 times /	5 s x	31.6 s =	108 times	2.935	317	400
2DH1	51.0 times /	5 s x	31.6 s =	323 times	0.446	144	400
2DH3	26.0 times /	5 s x	31.6 s =	165 times	1.700	281	400
2DH5	17.0 times /	5 s x	31.6 s =	108 times	2.947	318	400

Sample Calculation

Result = Number of transmission x Length of transmission

*Average data of 5 tests.(except Inquiry)

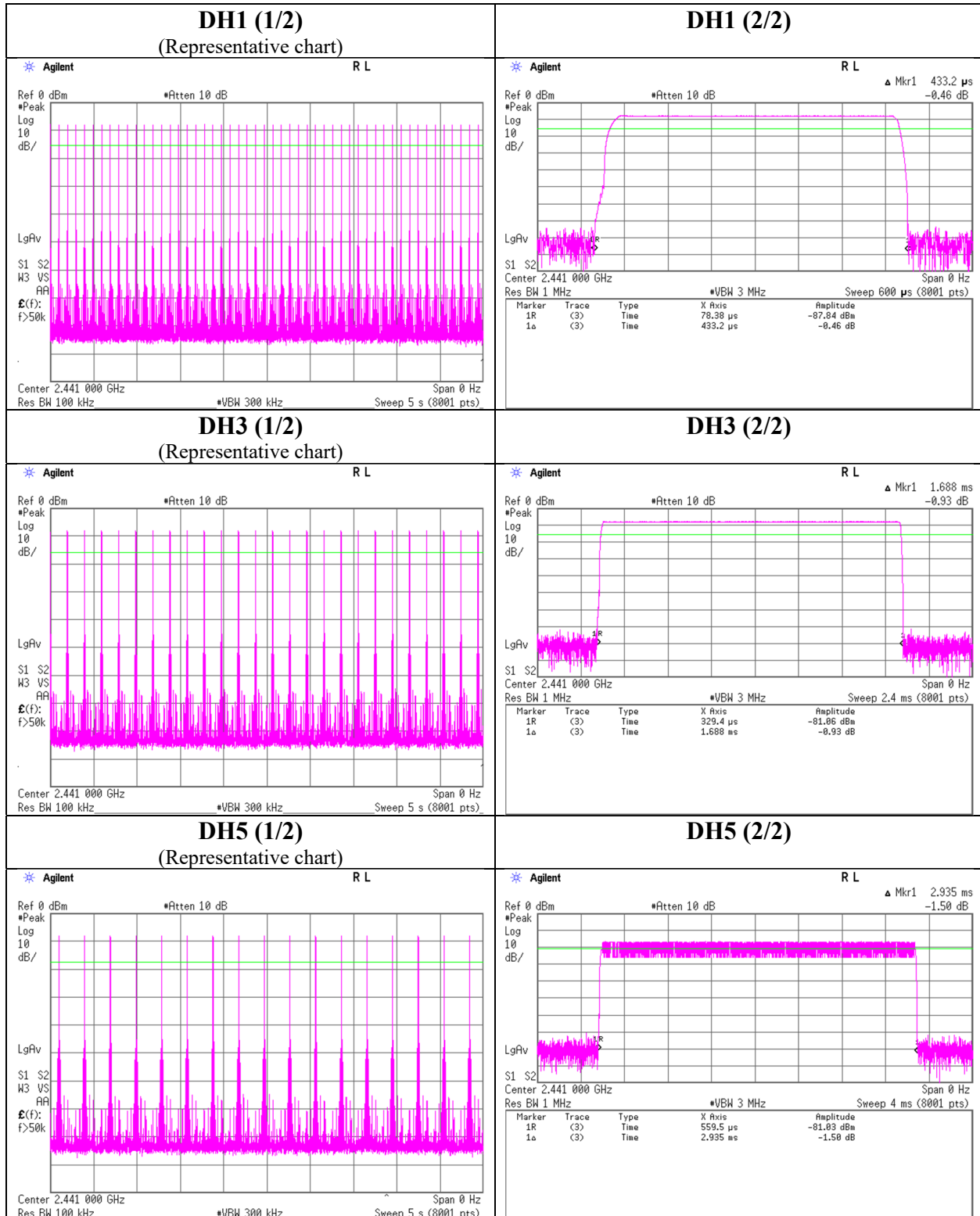
Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	51	51	51	51	51	51
DH3	26	26	26	26	26	26
DH5	17	17	17	17	17	17
2DH1	51	51	51	51	51	51
2DH3	26	26	26	26	26	26
2DH5	17	17	17	17	17	17

Sample Calculation

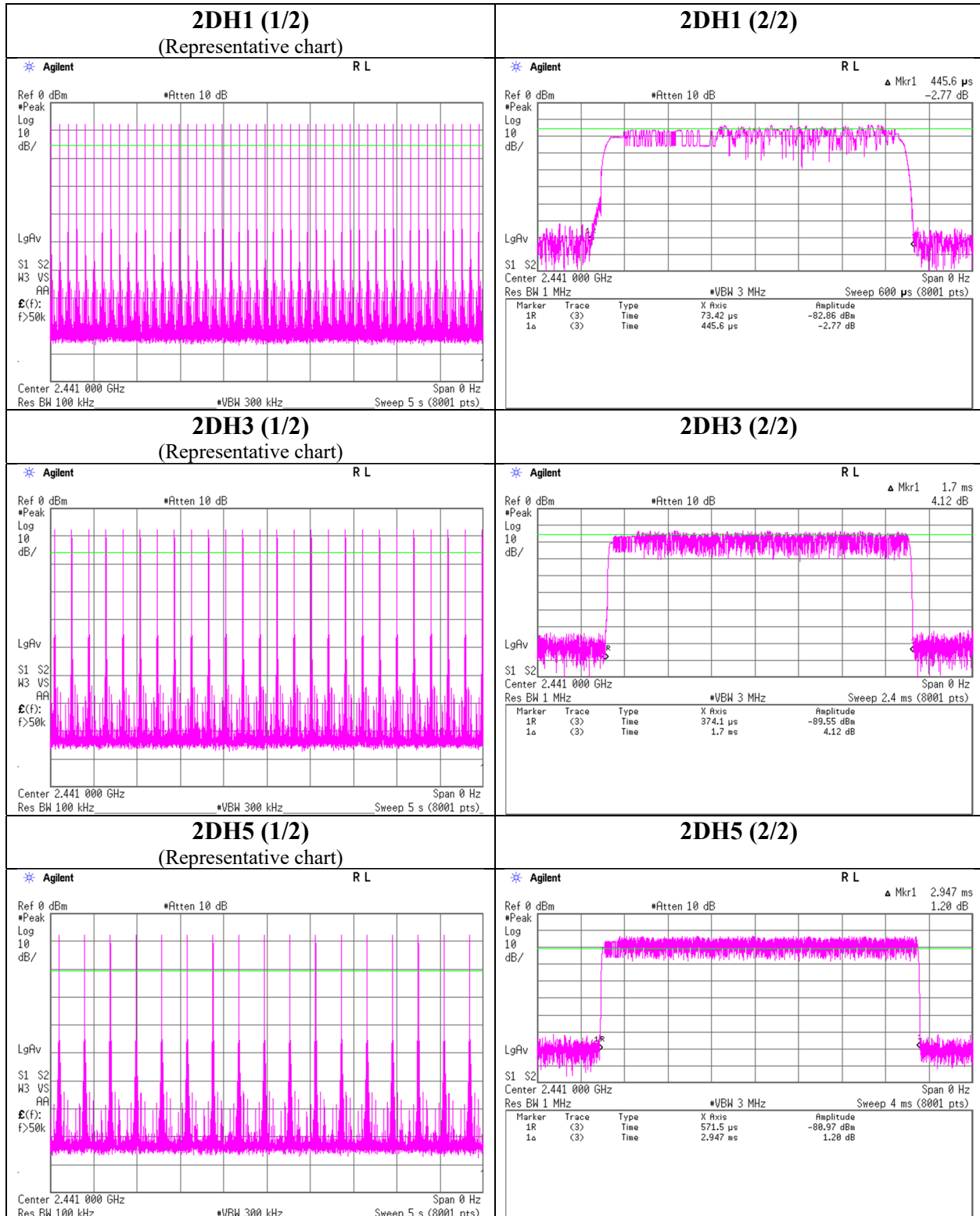
Average = Summation (Sampling 1 to 5) / 5

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

Dwell time



Dwell time



UL Japan, Inc.

Shonan EMC Lab.

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Maximum Peak Output Power

Report No. 13163439S-G-R2
Test place Shonan EMC Lab. No.1 Measurement Room
Date June 17, 2020
Temperature / Humidity 25 deg. C / 46 % RH
Engineer Kenichi Adachi
Mode Tx, Hopping Off

					Conducted Power					e.i.r.p. for RSS-247					
Mode	Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin	Antenna Gain	Result		Limit		Margin
	[MHz]	[dBm]	[dB]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]		[dB]	[dBm]	[mW]	[dBm]	
DH5	2402.0	-8.74	1.47	9.63	2.36	1.72	20.96	125	18.60	4.84	7.20	5.25	36.02	4000	28.82
DH5	2441.0	-7.53	1.49	9.63	3.59	2.29	20.96	125	17.37	4.84	8.43	6.97	36.02	4000	27.59
DH5	2480.0	-7.42	1.50	9.63	3.71	2.35	20.96	125	17.25	4.84	8.55	7.16	36.02	4000	27.47
2DH5	2402.0	-7.61	1.47	9.63	3.49	2.23	20.96	125	17.47	4.84	8.33	6.81	36.02	4000	27.69
2DH5	2441.0	-6.28	1.49	9.63	4.84	3.05	20.96	125	16.12	4.84	9.68	9.29	36.02	4000	26.34
2DH5	2480.0	-6.25	1.50	9.63	4.88	3.08	20.96	125	16.08	4.84	9.72	9.38	36.02	4000	26.30

Sample Calculation:

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

e.i.r.p. Result = Conducted Power Result + Antenna Gain

Test was not performed at AFH mode, because the decrease of number of channel (min: 20 ch) at AFH mode does not influence on the output power and bandwidth of the EUT.

As this device had AFH mode and frequency separation could not meet the requirement of over 20 dB BW without 2/3 relaxation, 125 mW power limit was applied to it.

Average Output Power
(Reference data for RF Exposure)

Report No. 13163439S-G-R2
Test place Shonan EMC Lab. No.1 Measurement Room
Date June 17, 2020
Temperature / Humidity 25 deg. C / 46 % RH
Engineer Kenichi Adachi
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	-10.43	1.47	9.63	0.67	1.17	1.06	1.73	1.49
DH5	2441.0	-9.05	1.49	9.63	2.07	1.61	1.06	3.13	2.06
DH5	2480.0	-8.98	1.50	9.63	2.15	1.64	1.06	3.21	2.09
2DH5	2402.0	-11.24	1.47	9.63	-0.14	0.97	1.05	0.91	1.23
2DH5	2441.0	-9.82	1.49	9.63	1.30	1.35	1.05	2.35	1.72
2DH5	2480.0	-9.78	1.50	9.63	1.35	1.36	1.05	2.40	1.74

Sample Calculation:

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

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

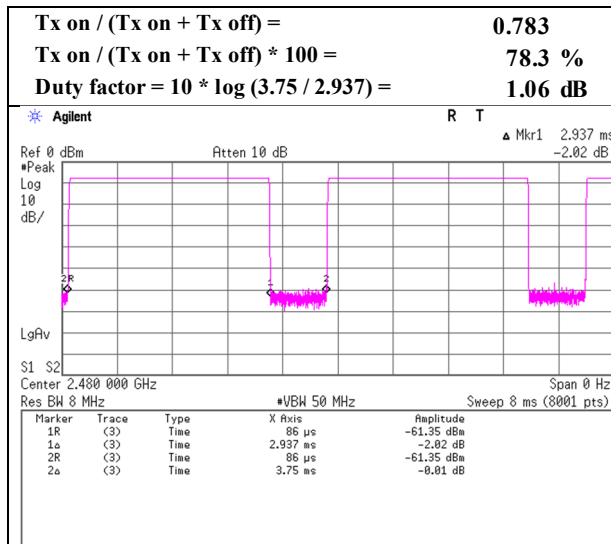
*The equipment and cables were not used for factor 0 dB of the data sheets.

Burst Rate Confirmation

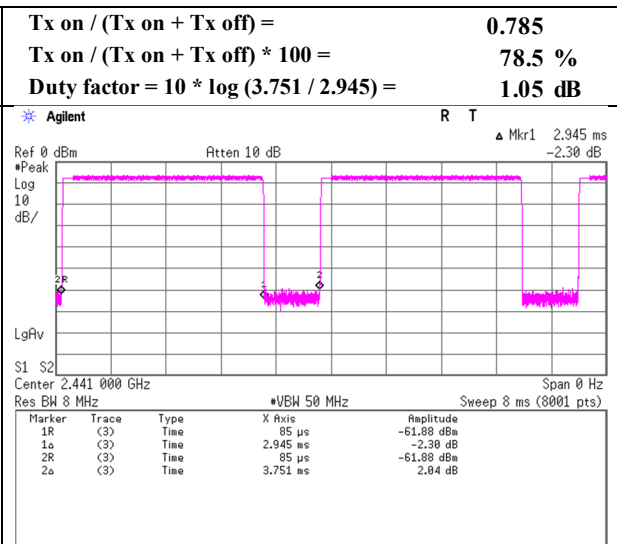
(for Average output power)

Report No. 13163439S-G-R2
Test place Shonan EMC Lab. No.1 Measurement Room
Date June 17, 2020
Temperature / Humidity 25 deg. C / 46 % RH
Engineer Kenichi Adachi
Mode Tx, Hopping Off

DH5



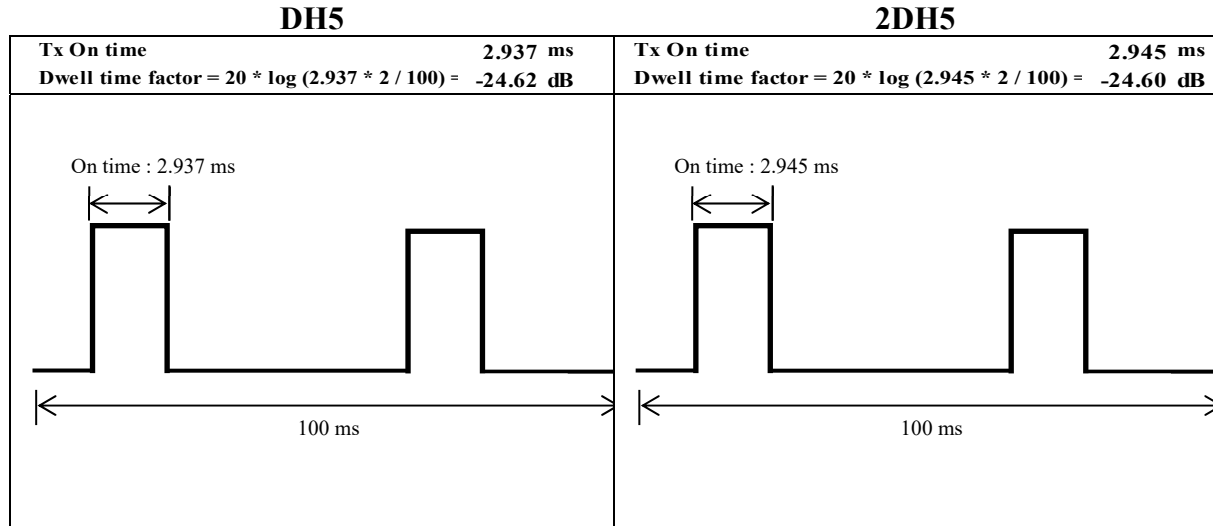
2DH5



Duty cycle correction factor
(for Spurious emissions)

The information provided from the customer.

Worst 100 ms (reference chart)



A hopping channel might be occupied 2 times within 100 ms. As for Tx On time, refer to “Burst Rate Confirmation”.

Radiated Spurious Emission

Report No. 13163439S-G-R2
Test place Shonan EMC Lab.
Semi Anechoic Chamber 3 3 3
Date June 25, 2020 June 24, 2020 June 25, 2020
Temperature / Humidity 25 deg. C / 65 % RH 24 deg. C / 62 % RH 25 deg. C / 65 % RH
Engineer Takahiro Kawakami Takahiro Kawakami Takahiro Kawakami
(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.	178.664	QP	21.10	15.95	7.79	32.06	0.00	12.78	43.5	30.7	191	0	
Hori.	395.999	QP	27.12	15.62	8.97	31.93	0.00	19.78	46.0	26.2	222	242	
Hori.	601.324	QP	21.23	19.33	9.80	31.94	0.00	18.42	46.0	27.5	150	3	
Hori.	2370.138	PK	48.83	28.39	14.19	41.66	2.28	52.03	73.9	21.8	177	142	
Hori.	2390.000	PK	47.40	28.33	14.22	41.66	2.28	50.57	73.9	23.3	177	142	
Hori.	2506.055	PK	54.27	28.22	14.32	41.70	2.28	57.39	73.9	16.5	177	152	
Hori.	4804.000	PK	52.58	31.62	6.82	42.92	2.28	50.38	73.9	23.5	110	303	
Hori.	7206.000	PK	48.51	37.23	8.38	43.39	2.28	53.01	73.9	20.8	150	0	
Hori.	9608.000	PK	48.44	38.84	9.53	43.14	2.28	55.95	73.9	17.9	150	0	
Hori.	19219.090	PK	46.93	40.44	13.74	48.26	-9.54	43.31	73.9	30.5	122	32	
Vert.	51.999	QP	33.20	10.50	6.76	32.16	0.00	18.30	40.0	21.7	100	233	
Vert.	59.993	QP	33.12	8.15	6.53	32.16	0.00	15.64	40.0	24.3	100	359	
Vert.	63.998	QP	29.10	7.42	6.47	32.15	0.00	10.84	40.0	29.1	100	343	
Vert.	337.682	QP	21.57	14.74	8.73	31.94	0.00	13.10	46.0	32.9	150	1	
Vert.	2370.133	PK	48.58	28.39	14.19	41.66	2.28	51.78	73.9	22.1	120	130	
Vert.	2390.000	PK	47.32	28.33	14.22	41.66	2.28	50.49	73.9	23.4	120	130	
Vert.	2506.055	PK	53.30	28.22	14.32	41.70	2.28	56.42	73.9	17.4	195	238	
Vert.	4804.000	PK	53.02	31.62	6.82	42.92	2.28	50.82	73.9	23.0	117	244	
Vert.	7206.000	PK	48.72	37.23	8.38	43.39	2.28	53.22	73.9	20.6	150	0	
Vert.	9608.000	PK	48.47	38.84	9.53	43.14	2.28	55.98	73.9	17.9	150	0	
Vert.	19218.970	PK	47.41	40.44	13.74	48.26	-9.54	43.79	73.9	30.1	158	121	

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

Distance factor : 1 GHz - 13 GHz : 20log(3.90 m / 3.0 m) = 2.28 dB

13 GHz - 26.5 GHz : 20log(1.0 m / 3.0 m) = -9.54 dB

Peak measurement value with Duty cycle correction factor(DCCF)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	DCCF [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2370.138	PK	48.83	28.39	14.19	41.66	-24.62	2.28	27.41	53.9	26.4	*1)
Hori.	2390.000	PK	47.40	28.33	14.22	41.66	-24.62	2.28	25.95	53.9	27.9	
Hori.	2506.055	PK	54.27	28.22	14.32	41.70	-24.62	2.28	32.77	53.9	21.1	*1)
Hori.	4804.000	PK	52.58	31.62	6.82	42.92	-24.62	2.28	25.76	53.9	28.1	
Hori.	7206.000	PK	48.51	37.23	8.38	43.39	-24.62	2.28	28.39	53.9	25.5	
Hori.	9608.000	PK	48.44	38.84	9.53	43.14	-24.62	2.28	31.33	53.9	22.5	
Hori.	19219.090	PK	46.93	40.44	13.74	48.26	-24.62	-9.54	18.69	53.9	35.2	
Vert.	2370.133	PK	48.58	28.39	14.19	41.66	-24.62	2.28	27.16	53.9	26.7	*1)
Vert.	2390.000	PK	47.32	28.33	14.22	41.66	-24.62	2.28	25.87	53.9	28.0	
Vert.	2506.055	PK	53.30	28.22	14.32	41.70	-24.62	2.28	31.80	53.9	22.1	*1)
Vert.	4804.000	PK	53.02	31.62	6.82	42.92	-24.62	2.28	26.20	53.9	27.7	
Vert.	7206.000	PK	48.72	37.23	8.38	43.39	-24.62	2.28	28.60	53.9	25.3	
Vert.	9608.000	PK	48.47	38.84	9.53	43.14	-24.62	2.28	31.36	53.9	22.5	
Vert.	19218.970	PK	47.41	40.44	13.74	48.26	-24.62	-9.54	19.17	53.9	34.7	

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

Distance factor : 1 GHz - 13 GHz : 20log(3.90 m / 3.0 m) = 2.28 dB

13 GHz - 26.5 GHz : 20log(1.0 m / 3.0 m) = -9.54 dB

Duty cycle correction factor(DCCF) refer to "Duty cycle correction factor" sheet.

*1) Emission caused by carrier

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	95.08	28.31	14.23	41.67	2.28	98.23	-	-	Carrier
Hori.	2400.000	PK	42.50	28.31	14.22	41.67	2.28	45.64	78.23	32.5	
Vert.	2402.000	PK	94.58	28.31	14.23	41.67	2.28	97.73	-	-	Carrier
Vert.	2400.000	PK	42.59	28.31	14.22	41.67	2.28	45.73	77.73	32.0	

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

Distance factor : 1 GHz - 13 GHz : 20log(3.90 m / 3.0 m) = 2.28 dB

13 GHz - 26.5 GHz : 20log(1.0 m / 3.0 m) = -9.54 dB

UL Japan, Inc.

Shonan EMC Lab.

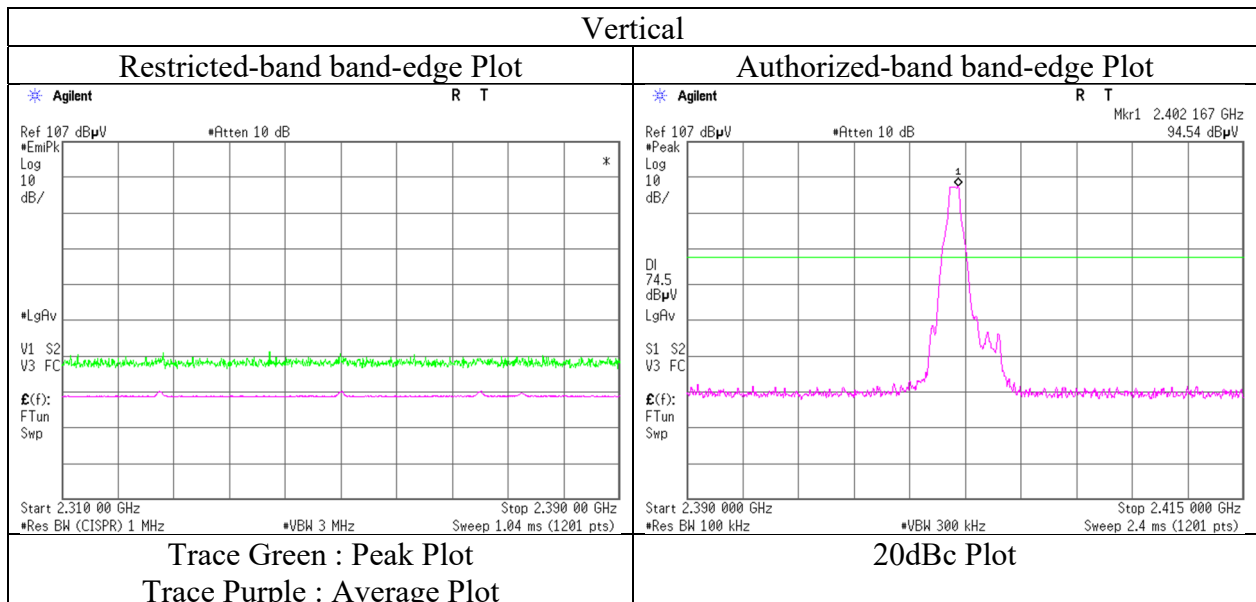
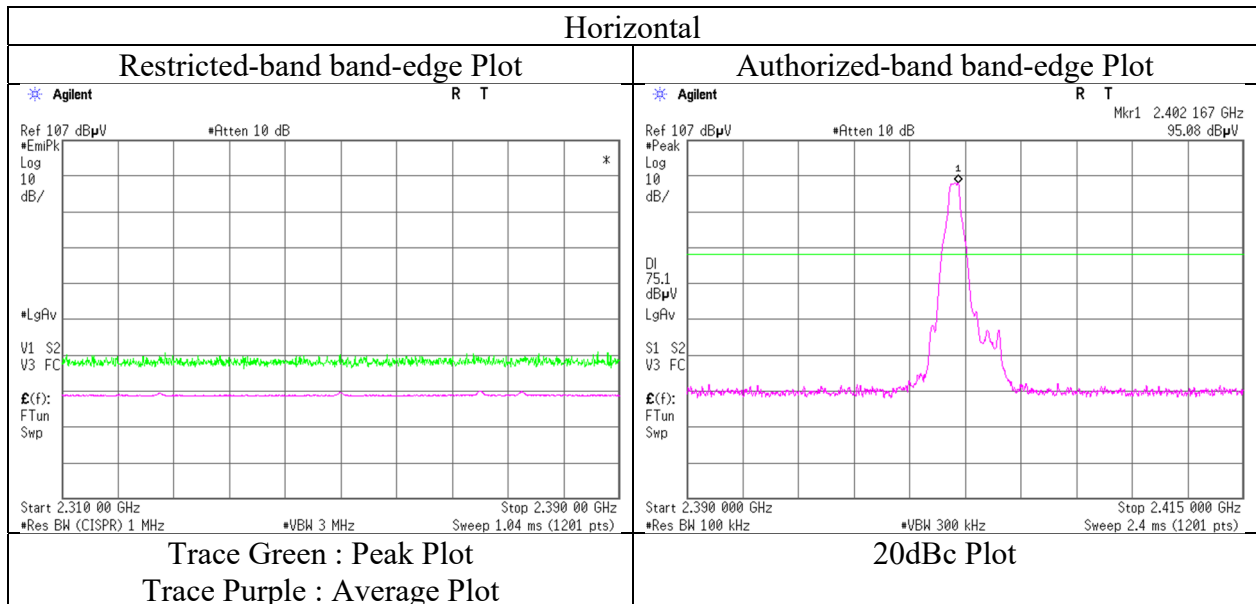
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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13163439S-G-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	June 24, 2020
Temperature / Humidity	24 deg. C / 62 % RH
Engineer	Takahiro Kawakami
	(1 GHz -13 GHz)
Mode	Tx, Hopping Off, DH5 2402 MHz



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

Radiated Spurious Emission

Report No. 13163439S-G-R2
Test place Shonan EMC Lab.
Semi Anechoic Chamber 3 3 3
Date June 25, 2020 June 24, 2020 June 25, 2020
Temperature / Humidity 25 deg. C / 65 % RH 24 deg. C / 62 % RH 25 deg. C / 65 % RH
Engineer Takahiro Kawakami Takahiro Kawakami Takahiro Kawakami
(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.	351.995	QP	26.30	15.06	8.80	31.93	0.00	18.23	46.0	27.7	100	124	
Hori.	396.000	QP	27.72	15.62	8.97	31.93	0.00	20.38	46.0	25.6	100	150	
Hori.	2545.017	PK	54.65	28.21	14.36	41.71	2.28	57.79	73.9	16.1	151	147	
Hori.	4882.000	PK	53.47	31.71	6.87	42.93	2.28	51.40	73.9	22.5	160	124	
Hori.	7323.000	PK	47.85	37.39	8.45	43.49	2.28	52.48	73.9	21.4	150	0	
Hori.	9764.000	PK	48.82	39.34	9.64	42.96	2.28	57.12	73.9	16.7	150	0	
Hori.	19524.950	PK	46.87	40.45	13.85	48.01	-9.54	43.62	73.9	30.2	119	32	
Vert.	51.999	QP	32.19	10.50	6.76	32.16	0.00	17.29	40.0	22.7	100	81	
Vert.	59.995	QP	33.67	8.15	6.53	32.16	0.00	16.19	40.0	23.8	100	330	
Vert.	63.999	QP	29.61	7.42	6.47	32.15	0.00	11.35	40.0	28.6	100	28	
Vert.	114.729	QP	23.08	12.45	7.20	32.12	0.00	10.61	43.5	32.8	102	104	
Vert.	323.998	QP	25.46	14.29	8.65	31.95	0.00	16.45	46.0	29.5	100	91	
Vert.	2545.008	PK	53.46	28.21	14.36	41.71	2.28	56.60	73.9	17.3	109	141	
Vert.	4882.000	PK	53.62	31.71	6.87	42.93	2.28	51.55	73.9	22.3	100	244	
Vert.	7323.000	PK	47.31	37.39	8.45	43.49	2.28	51.94	73.9	21.9	150	0	
Vert.	9764.000	PK	48.00	39.34	9.64	42.96	2.28	56.30	73.9	17.6	150	0	
Vert.	19524.980	PK	47.88	40.45	13.85	48.01	-9.54	44.63	73.9	29.2	151	120	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.90\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

13 GHz - 26.5 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Peak measurement value with Duty cycle correction factor(DCCF)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	DCCF [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2545.017	PK	54.65	28.21	14.36	41.71	-24.62	2.28	33.17	53.9	20.7	*1)
Hori.	4882.000	PK	53.47	31.71	6.87	42.93	-24.62	2.28	26.78	53.9	27.1	
Hori.	7323.000	PK	47.85	37.39	8.45	43.49	-24.62	2.28	27.86	53.9	26.0	
Hori.	9764.000	PK	48.82	39.34	9.64	42.96	-24.62	2.28	32.50	53.9	21.4	
Hori.	19524.950	PK	46.87	40.45	13.85	48.01	-24.62	-9.54	19.00	53.9	34.9	
Vert.	2545.008	PK	53.46	28.21	14.36	41.71	-24.62	2.28	31.98	53.9	21.9	*1)
Vert.	4882.000	PK	53.62	31.71	6.87	42.93	-24.62	2.28	26.93	53.9	26.9	
Vert.	7323.000	PK	47.31	37.39	8.45	43.49	-24.62	2.28	27.32	53.9	26.5	
Vert.	9764.000	PK	48.00	39.34	9.64	42.96	-24.62	2.28	31.68	53.9	22.2	
Vert.	19524.980	PK	47.88	40.45	13.85	48.01	-24.62	-9.54	20.01	53.9	33.8	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.90\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

13 GHz - 26.5 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Duty cycle correction factor(DCCF) refer to "Duty cycle correction factor" sheet.

*1) Emission caused by carrier

Radiated Spurious Emission

Report No. 13163439S-G-R2
Test place Shonan EMC Lab.
Semi Anechoic Chamber 3 3 3
Date June 25, 2020 June 24, 2020 June 25, 2020
Temperature / Humidity 25 deg. C / 65 % RH 24 deg. C / 62 % RH 25 deg. C / 65 % RH
Engineer Takahiro Kawakami Takahiro Kawakami Takahiro Kawakami
(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.	367.995	QP	27.36	15.07	8.86	31.93	0.00	19.36	46.0	26.6	102	154	
Hori.	403.997	QP	26.60	15.83	9.02	31.93	0.00	19.52	46.0	26.4	100	191	
Hori.	2483.500	PK	47.82	28.24	14.31	41.69	2.28	50.96	73.9	22.9	166	185	
Hori.	2584.044	PK	55.69	28.25	14.40	41.72	2.28	58.90	73.9	15.0	121	196	
Hori.	4960.000	PK	52.93	31.96	6.94	42.94	2.28	51.17	73.9	22.7	105	139	
Hori.	7440.000	PK	48.34	37.56	8.52	43.60	2.28	53.10	73.9	20.8	150	0	
Hori.	9920.000	PK	47.64	39.18	9.73	42.78	2.28	56.05	73.9	17.8	150	0	
Hori.	19837.010	PK	47.75	40.41	13.97	47.57	-9.54	45.02	73.9	28.8	117	32	
Vert.	52.000	QP	32.00	10.50	6.76	32.16	0.00	17.10	40.0	22.9	100	26	
Vert.	60.006	QP	33.39	8.14	6.53	32.16	0.00	15.90	40.0	24.1	100	352	
Vert.	63.990	QP	26.67	7.42	6.47	32.15	0.00	8.41	40.0	31.5	100	72	
Vert.	115.985	QP	23.40	12.62	7.21	32.12	0.00	11.11	43.5	32.3	100	133	
Vert.	240.002	QP	28.30	11.57	8.20	32.00	0.00	16.07	46.0	29.9	100	48	
Vert.	2483.500	PK	47.94	28.24	14.31	41.69	2.28	51.08	73.9	22.8	266	236	
Vert.	2584.032	PK	54.02	28.25	14.40	41.72	2.28	57.23	73.9	16.7	134	115	
Vert.	4960.000	PK	53.23	31.96	6.94	42.94	2.28	51.47	73.9	22.4	147	224	
Vert.	7440.000	PK	48.70	37.56	8.52	43.60	2.28	53.46	73.9	20.4	150	0	
Vert.	9920.000	PK	48.86	39.18	9.73	42.78	2.28	57.27	73.9	16.6	150	0	
Vert.	19837.020	PK	47.40	40.41	13.97	47.57	-9.54	44.67	73.9	29.2	152	124	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.90\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

13 GHz - 26.5 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Peak measurement value with Duty cycle correction factor(DCCF)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	DCCF [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	PK	47.82	28.24	14.31	41.69	-24.62	2.28	26.34	53.9	27.5	
Hori.	2584.044	PK	55.69	28.25	14.40	41.72	-24.62	2.28	34.28	53.9	19.6	*1)
Hori.	4960.000	PK	52.93	31.96	6.94	42.94	-24.62	2.28	26.55	53.9	27.3	
Hori.	7440.000	PK	48.34	37.56	8.52	43.60	-24.62	2.28	28.48	53.9	25.4	
Hori.	9920.000	PK	47.64	39.18	9.73	42.78	-24.62	2.28	31.43	53.9	22.4	
Hori.	19837.010	PK	47.75	40.41	13.97	47.57	-24.62	-9.54	20.40	53.9	33.5	
Vert.	2483.500	PK	47.94	28.24	14.31	41.69	-24.62	2.28	26.46	53.9	27.4	
Vert.	2584.032	PK	54.02	28.25	14.40	41.72	-24.62	2.28	32.61	53.9	21.2	*1)
Vert.	4960.000	PK	53.23	31.96	6.94	42.94	-24.62	2.28	26.85	53.9	27.0	
Vert.	7440.000	PK	48.70	37.56	8.52	43.60	-24.62	2.28	28.84	53.9	25.0	
Vert.	9920.000	PK	48.86	39.18	9.73	42.78	-24.62	2.28	32.65	53.9	21.2	
Vert.	19837.020	PK	47.40	40.41	13.97	47.57	-24.62	-9.54	20.05	53.9	33.8	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.90\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

13 GHz - 26.5 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Duty cycle correction factor(DCCF) refer to "Duty cycle correction factor" sheet.

*1) Emission caused by carrier

UL Japan, Inc.

Shonan EMC Lab.

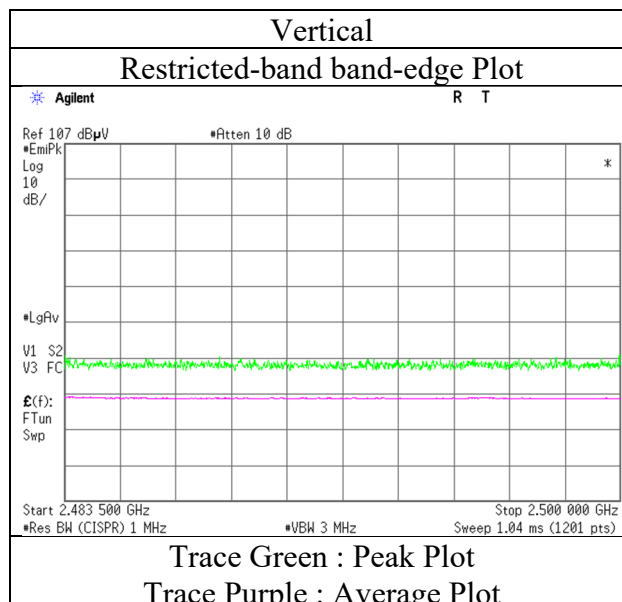
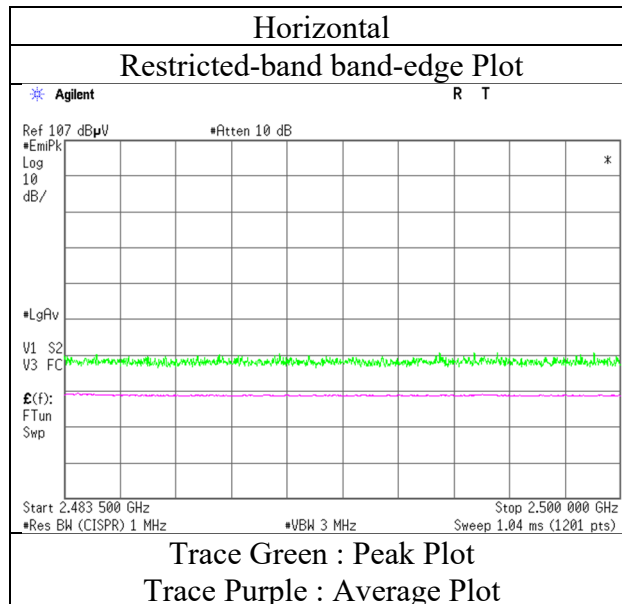
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

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Radiated Spurious Emission (Reference Plot for band-edge)

Report No.	13163439S-G-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	June 24, 2020
Temperature / Humidity	24 deg. C / 62 % RH
Engineer	Takahiro Kawakami
	(1 GHz -13 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.

Radiated Spurious Emission

Report No. 13163439S-G-R2
Test place Shonan EMC Lab.
Semi Anechoic Chamber 3 3 3
Date June 26, 2020 June 24, 2020 June 25, 2020
Temperature / Humidity 24 deg. C / 55 % RH 24 deg. C / 62 % RH 25 deg. C / 65 % RH
Engineer Takahiro Kawakami Takahiro Kawakami Takahiro Kawakami
(30 MHz -1 GHz) (1 GHz -13 GHz) (13 GHz -26.5 GHz)
Mode Tx, Hopping Off, 2DH5 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.	128.007	QP	27.40	13.70	7.34	32.11	0.00	16.33	43.5	27.1	203	304	
Hori.	2370.133	PK	48.56	28.39	14.19	41.66	2.28	51.76	73.9	22.1	216	153	
Hori.	2390.000	PK	47.93	28.33	14.22	41.66	2.28	51.10	73.9	22.8	216	153	
Hori.	2505.945	PK	53.25	28.22	14.32	41.70	2.28	56.37	73.9	17.5	214	166	
Hori.	4804.000	PK	49.49	31.62	6.82	42.92	2.28	47.29	73.9	26.6	154	298	
Hori.	7206.000	PK	48.10	37.23	8.38	43.39	2.28	52.60	73.9	21.3	150	0	
Hori.	9608.000	PK	47.90	38.84	9.53	43.14	2.28	55.41	73.9	18.4	150	0	
Hori.	19212.990	PK	46.90	40.44	13.74	48.26	-9.54	43.28	73.9	30.6	117	33	
Vert.	51.994	QP	30.21	10.50	6.76	32.16	0.00	15.31	40.0	24.6	100	359	
Vert.	59.995	QP	35.29	8.15	6.53	32.16	0.00	17.81	40.0	22.1	100	140	
Vert.	64.007	QP	31.65	7.42	6.47	32.15	0.00	13.39	40.0	26.6	100	323	
Vert.	304.001	QP	24.50	13.58	8.55	31.96	0.00	14.67	46.0	31.3	100	338	
Vert.	332.000	QP	27.00	14.57	8.70	31.94	0.00	18.33	46.0	27.6	100	138	
Vert.	476.003	QP	27.40	17.15	9.32	31.93	0.00	21.94	46.0	24.0	100	149	
Vert.	2370.000	PK	48.65	28.39	14.19	41.66	2.28	51.85	73.9	22.0	120	238	
Vert.	2390.000	PK	47.92	28.33	14.22	41.66	2.28	51.09	73.9	22.8	120	238	
Vert.	2506.035	PK	52.08	28.22	14.32	41.70	2.28	55.20	73.9	18.7	136	232	
Vert.	4804.000	PK	48.64	31.62	6.82	42.92	2.28	46.44	73.9	27.4	165	248	
Vert.	7206.000	PK	48.71	37.23	8.38	43.39	2.28	53.21	73.9	20.6	150	0	
Vert.	9608.000	PK	49.49	38.84	9.53	43.14	2.28	57.00	73.9	16.9	150	0	
Vert.	19212.990	PK	46.99	40.44	13.74	48.26	-9.54	43.37	73.9	30.5	169	125	

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

Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 dB

13 GHz - 26.5 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Peak measurement value with Duty cycle correction factor(DCCF)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	DCCF [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2370.133	PK	48.56	28.39	14.19	41.66	-24.60	2.28	27.16	53.9	26.7	*1)
Hori.	2390.000	PK	47.93	28.33	14.22	41.66	-24.60	2.28	26.50	53.9	27.4	
Hori.	2505.945	PK	53.25	28.22	14.32	41.70	-24.60	2.28	31.77	53.9	22.1	*1)
Hori.	4804.000	PK	49.49	31.62	6.82	42.92	-24.60	2.28	22.69	53.9	31.2	
Hori.	7206.000	PK	48.10	37.23	8.38	43.39	-24.60	2.28	28.00	53.9	25.9	
Hori.	9608.000	PK	47.90	38.84	9.53	43.14	-24.60	2.28	30.81	53.9	23.0	
Hori.	19212.990	PK	46.90	40.44	13.74	48.26	-24.60	-9.54	18.68	53.9	35.2	
Vert.	2370.000	PK	48.65	28.39	14.19	41.66	-24.60	2.28	27.25	53.9	26.6	*1)
Vert.	2390.000	PK	47.92	28.33	14.22	41.66	-24.60	2.28	26.49	53.9	27.4	
Vert.	2506.035	PK	52.08	28.22	14.32	41.70	-24.60	2.28	30.60	53.9	23.3	*1)
Vert.	4804.000	PK	48.64	31.62	6.82	42.92	-24.60	2.28	21.84	53.9	32.0	
Vert.	7206.000	PK	48.71	37.23	8.38	43.39	-24.60	2.28	28.61	53.9	25.2	
Vert.	9608.000	PK	49.49	38.84	9.53	43.14	-24.60	2.28	32.40	53.9	21.5	
Vert.	19212.990	PK	46.99	40.44	13.74	48.26	-24.60	-9.54	18.77	53.9	35.1	

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

Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 dB

13 GHz - 26.5 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Duty cycle correction factor(DCCF) refer to "Duty cycle correction factor" sheet.

*1) Emission caused by carrier

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	94.12	28.31	14.23	41.67	2.28	97.27	-	-	Carrier
Hori.	2400.000	PK	49.36	28.31	14.22	41.67	2.28	52.50	77.27	24.7	
Vert.	2402.000	PK	95.10	28.31	14.23	41.67	2.28	98.25	-	-	Carrier
Vert.	2400.000	PK	49.41	28.31	14.22	41.67	2.28	52.55	78.25	25.7	

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

Distance factor : 1 GHz - 13 GHz : 20log (3.90 m / 3.0 m) = 2.28 dB

13 GHz - 26.5 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

UL Japan, Inc.

Shonan EMC Lab.

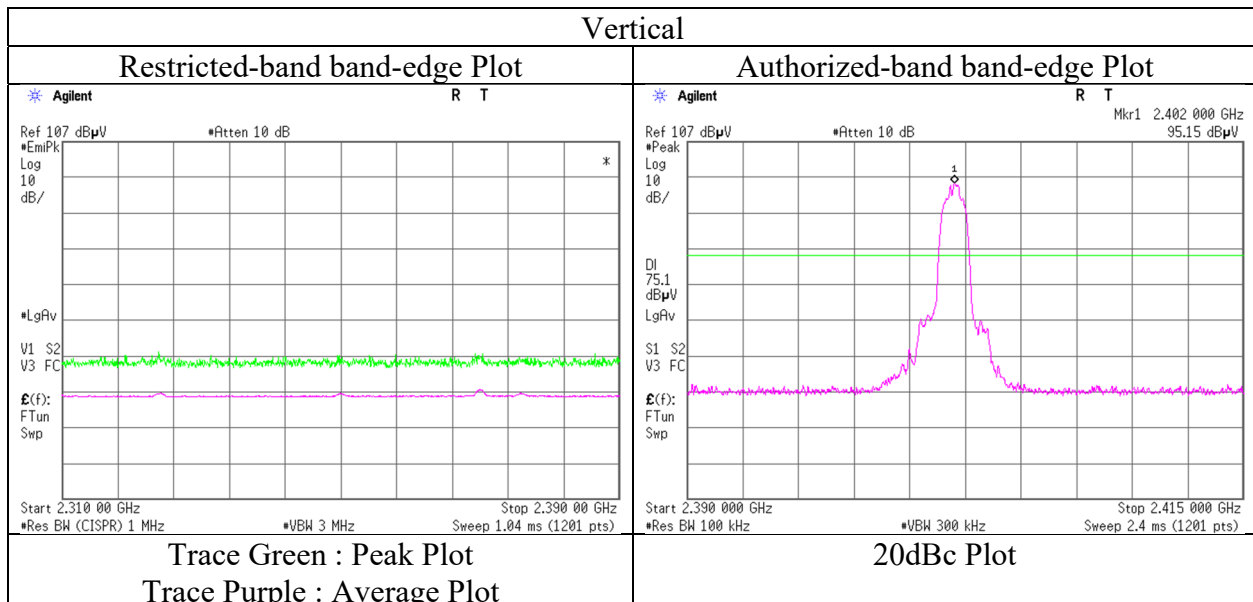
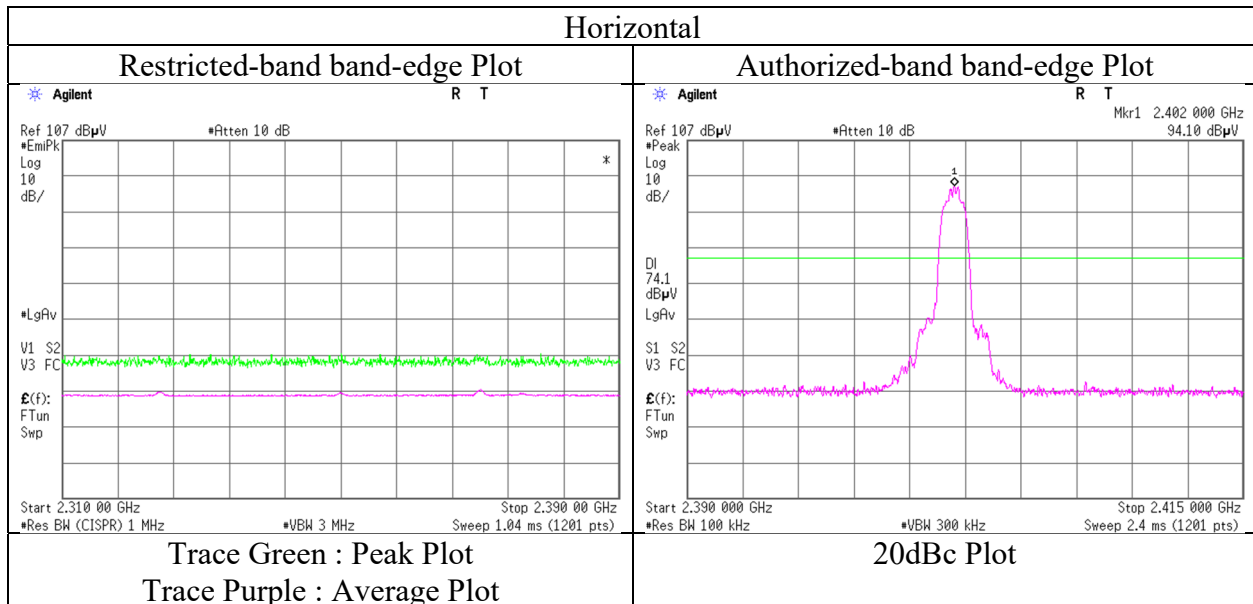
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

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Facsimile : +81 463 50 6401

Radiated Spurious Emission (Reference Plot for band-edge)

Report No. 13163439S-G-R2
Test place Shonan EMC Lab.
Semi Anechoic Chamber 3
Date June 24, 2020
Temperature / Humidity 24 deg. C / 62 % RH
Engineer Takahiro Kawakami
(1 GHz -13 GHz)
Mode Tx, Hopping Off, 2DH5 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. 13163439S-G-R2
Test place Shonan EMC Lab.
Semi Anechoic Chamber 3 3 3
Date June 26, 2020 June 24, 2020 June 25, 2020
Temperature / Humidity 24 deg. C / 55 % RH 24 deg. C / 62 % RH 25 deg. C / 65 % RH
Engineer Takahiro Kawakami Takahiro Kawakami Takahiro Kawakami
(30 MHz -1 GHz) (1 GHz -13 GHz) (13 GHz -26.5 GHz)
Mode Tx, Hopping Off, 2DH5 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.	128.003	QP	27.75	13.70	7.34	32.11	0.00	16.68	43.5	26.8	208	318	
Hori.	412.000	QP	28.20	15.98	9.06	31.94	0.00	21.30	46.0	24.7	100	236	
Hori.	2545.025	PK	51.71	28.21	14.36	41.71	2.28	54.85	73.9	19.0	134	135	
Hori.	4882.000	PK	50.79	31.71	6.87	42.93	2.28	48.72	73.9	25.1	203	108	
Hori.	7323.000	PK	48.28	37.39	8.45	43.49	2.28	52.91	73.9	20.9	150	0	
Hori.	9764.000	PK	48.70	39.34	9.64	42.96	2.28	57.00	73.9	16.9	150	0	
Hori.	19524.980	PK	47.28	40.45	13.85	48.01	-9.54	44.03	73.9	29.8	120	31	
Vert.	51.996	QP	30.03	10.50	6.76	32.16	0.00	15.13	40.0	24.8	100	20	
Vert.	59.992	QP	35.47	8.15	6.53	32.16	0.00	17.99	40.0	22.0	100	359	
Vert.	64.004	QP	31.68	7.42	6.47	32.15	0.00	13.42	40.0	26.5	100	350	
Vert.	114.726	QP	22.30	12.45	7.20	32.12	0.00	9.83	43.5	33.6	100	0	
Vert.	440.005	QP	28.00	16.25	9.18	31.94	0.00	21.49	46.0	24.5	103	168	
Vert.	2545.030	PK	52.46	28.21	14.36	41.71	2.28	55.60	73.9	18.3	152	134	
Vert.	4882.000	PK	50.12	31.71	6.87	42.93	2.28	48.05	73.9	25.8	159	226	
Vert.	7323.000	PK	48.67	37.39	8.45	43.49	2.28	53.30	73.9	20.6	150	0	
Vert.	9764.000	PK	49.16	39.34	9.64	42.96	2.28	57.46	73.9	16.4	150	0	
Vert.	19524.980	PK	47.84	40.45	13.85	48.01	-9.54	44.59	73.9	29.3	175	126	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.90\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

13 GHz - 26.5 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Peak measurement value with Duty cycle correction factor(DCCF)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	DCCF [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2545.025	PK	51.71	28.21	14.36	41.71	-24.60	2.28	30.25	53.9	23.6	*1)
Hori.	4882.000	PK	50.79	31.71	6.87	42.93	-24.60	2.28	24.12	53.9	29.7	
Hori.	7323.000	PK	48.28	37.39	8.45	43.49	-24.60	2.28	28.31	53.9	25.5	
Hori.	9764.000	PK	48.70	39.34	9.64	42.96	-24.60	2.28	32.40	53.9	21.5	
Hori.	19524.980	PK	47.28	40.45	13.85	48.01	-24.60	-9.54	19.43	53.9	34.4	
Vert.	2545.030	PK	52.46	28.21	14.36	41.71	-24.60	2.28	31.00	53.9	22.9	*1)
Vert.	4882.000	PK	50.12	31.71	6.87	42.93	-24.60	2.28	23.45	53.9	30.4	
Vert.	7323.000	PK	48.67	37.39	8.45	43.49	-24.60	2.28	28.70	53.9	25.2	
Vert.	9764.000	PK	49.16	39.34	9.64	42.96	-24.60	2.28	32.86	53.9	21.0	
Vert.	19524.980	PK	47.84	40.45	13.85	48.01	-24.60	-9.54	19.99	53.9	33.9	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.90\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

13 GHz - 26.5 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Duty cycle correction factor(DCCF) refer to "Duty cycle correction factor" sheet.

*1) Emission caused by carrier

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. 13163439S-G-R2
Test place Shonan EMC Lab.
Semi Anechoic Chamber 3 3 3
Date June 26, 2020 June 24, 2020 June 25, 2020
Temperature / Humidity 24 deg. C / 55 % RH 24 deg. C / 62 % RH 25 deg. C / 65 % RH
Engineer Takahiro Kawakami Takahiro Kawakami Takahiro Kawakami
(30 MHz -1 GHz) (1 GHz -13 GHz) (13 GHz -26.5 GHz)
Mode Tx, Hopping Off, 2DH5 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.	128.001	QP	28.34	13.70	7.34	32.11	0.00	17.27	43.5	26.2	238	147	
Hori.	323.999	QP	29.68	14.29	8.65	31.95	0.00	20.67	46.0	25.3	100	252	
Hori.	424.002	QP	28.90	16.05	9.11	31.94	0.00	22.12	46.0	23.8	100	258	
Hori.	2483.500	PK	47.72	28.24	14.31	41.69	2.28	50.86	73.9	23.0	178	160	
Hori.	2584.235	PK	52.85	28.25	14.40	41.72	2.28	56.06	73.9	17.8	160	144	
Hori.	4960.000	PK	49.43	31.96	6.94	42.94	2.28	47.67	73.9	26.2	133	138	
Hori.	7440.000	PK	47.49	37.56	8.52	43.60	2.28	52.25	73.9	21.6	150	0	
Hori.	9920.000	PK	48.95	39.18	9.73	42.78	2.28	57.36	73.9	16.5	150	0	
Hori.	19837.030	PK	46.43	40.41	13.97	47.57	-9.54	43.70	73.9	30.2	100	57	
Vert.	51.999	QP	30.11	10.50	6.76	32.16	0.00	15.21	40.0	24.7	100	209	
Vert.	59.995	QP	34.80	8.15	6.53	32.16	0.00	17.32	40.0	22.6	100	310	
Vert.	64.001	QP	31.21	7.42	6.47	32.15	0.00	12.95	40.0	27.0	100	73	
Vert.	128.000	QP	26.80	13.70	7.34	32.11	0.00	15.73	43.5	27.7	100	93	
Vert.	2483.500	PK	47.79	28.24	14.31	41.69	2.28	50.93	73.9	22.9	227	235	
Vert.	2584.035	PK	54.30	28.25	14.40	41.72	2.28	57.51	73.9	16.3	224	260	
Vert.	4960.000	PK	52.26	31.96	6.94	42.94	2.28	50.50	73.9	23.4	100	243	
Vert.	7440.000	PK	48.35	37.56	8.52	43.60	2.28	53.11	73.9	20.7	150	0	
Vert.	9920.000	PK	48.51	39.18	9.73	42.78	2.28	56.92	73.9	16.9	150	0	
Vert.	19837.010	PK	47.20	40.41	13.97	47.57	-9.54	44.47	73.9	29.4	175	126	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.90\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

13 GHz - 26.5 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Peak measurement value with Duty cycle correction factor(DCCF)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	DCCF [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	PK	47.72	28.24	14.31	41.69	-24.60	2.28	26.26	53.9	27.6	
Hori.	2584.235	PK	52.85	28.25	14.40	41.72	-24.60	2.28	31.46	53.9	22.4	*1)
Hori.	4960.000	PK	49.43	31.96	6.94	42.94	-24.60	2.28	23.07	53.9	30.8	
Hori.	7440.000	PK	47.49	37.56	8.52	43.60	-24.60	2.28	27.65	53.9	26.2	
Hori.	9920.000	PK	48.95	39.18	9.73	42.78	-24.60	2.28	32.76	53.9	21.1	
Hori.	19837.030	PK	46.43	40.41	13.97	47.57	-24.60	-9.54	19.10	53.9	34.8	
Vert.	2483.500	PK	47.79	28.24	14.31	41.69	-24.60	2.28	26.33	53.9	27.5	
Vert.	2584.035	PK	54.30	28.25	14.40	41.72	-24.60	2.28	32.91	53.9	20.9	*1)
Vert.	4960.000	PK	52.26	31.96	6.94	42.94	-24.60	2.28	25.90	53.9	28.0	
Vert.	7440.000	PK	48.35	37.56	8.52	43.60	-24.60	2.28	28.51	53.9	25.3	
Vert.	9920.000	PK	48.51	39.18	9.73	42.78	-24.60	2.28	32.32	53.9	21.5	
Vert.	19837.010	PK	47.20	40.41	13.97	47.57	-24.60	-9.54	19.87	53.9	34.0	

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

Distance factor : 1 GHz - 13 GHz : $20\log(3.90\text{ m} / 3.0\text{ m}) = 2.28\text{ dB}$

13 GHz - 26.5 GHz : $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.54\text{ dB}$

Duty cycle correction factor(DCCF) refer to "Duty cycle correction factor" sheet.

*1) Emission caused by carrier

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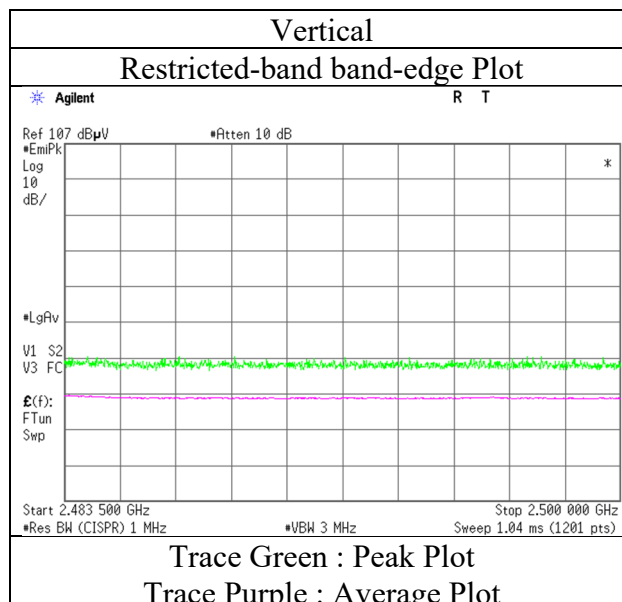
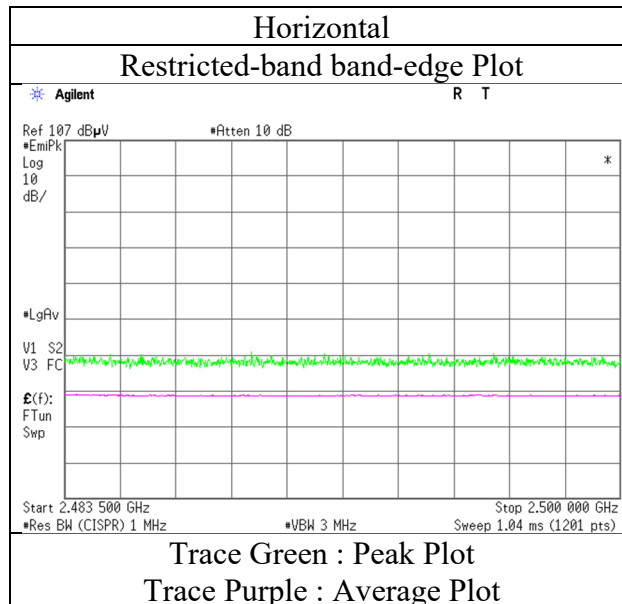
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Radiated Spurious Emission (Reference Plot for band-edge)

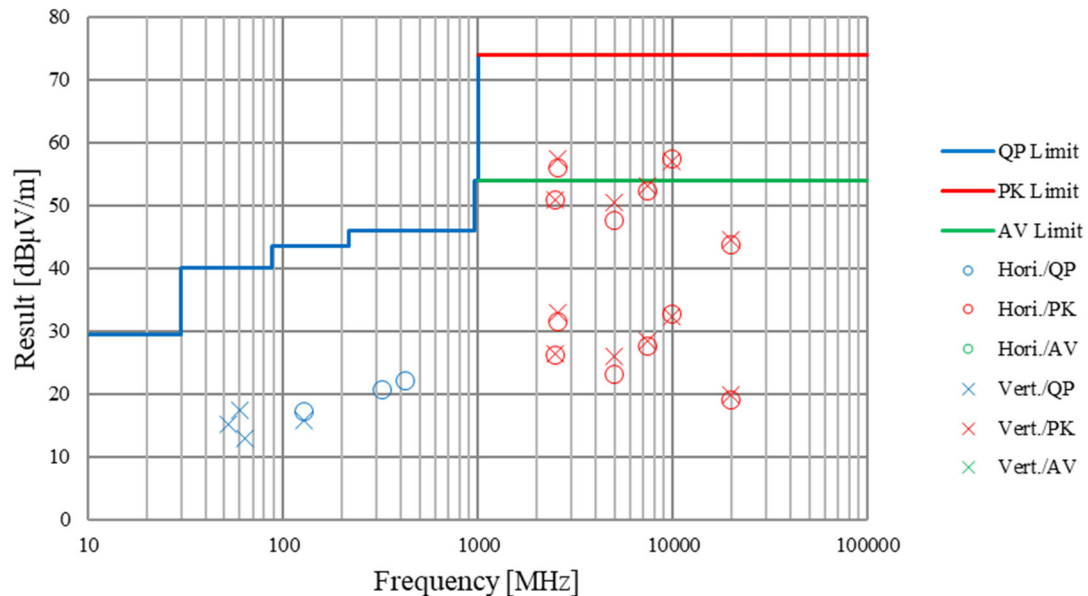
Report No.	13163439S-G-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	3
Date	June 24, 2020
Temperature / Humidity	24 deg. C / 62 % RH
Engineer	Takahiro Kawakami
	(1 GHz -13 GHz)
Mode	Tx, Hopping Off, 2DH5 2480 MHz



* 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.	13163439S-G-R2		
Test place	Shonan EMC Lab.		
Semi Anechoic Chamber	3	3	3
Date	June 26, 2020	June 24, 2020	June 25, 2020
Temperature / Humidity	24 deg. C / 55 % RH	24 deg. C / 62 % RH	25 deg. C / 65 % RH
Engineer	Takahiro Kawakami	Takahiro Kawakami	Takahiro Kawakami
	(30 MHz -1 GHz)	(1 GHz -13 GHz)	(13 GHz -26.5 GHz)
Mode	Tx, Hopping Off, 2DH5 2480 MHz		

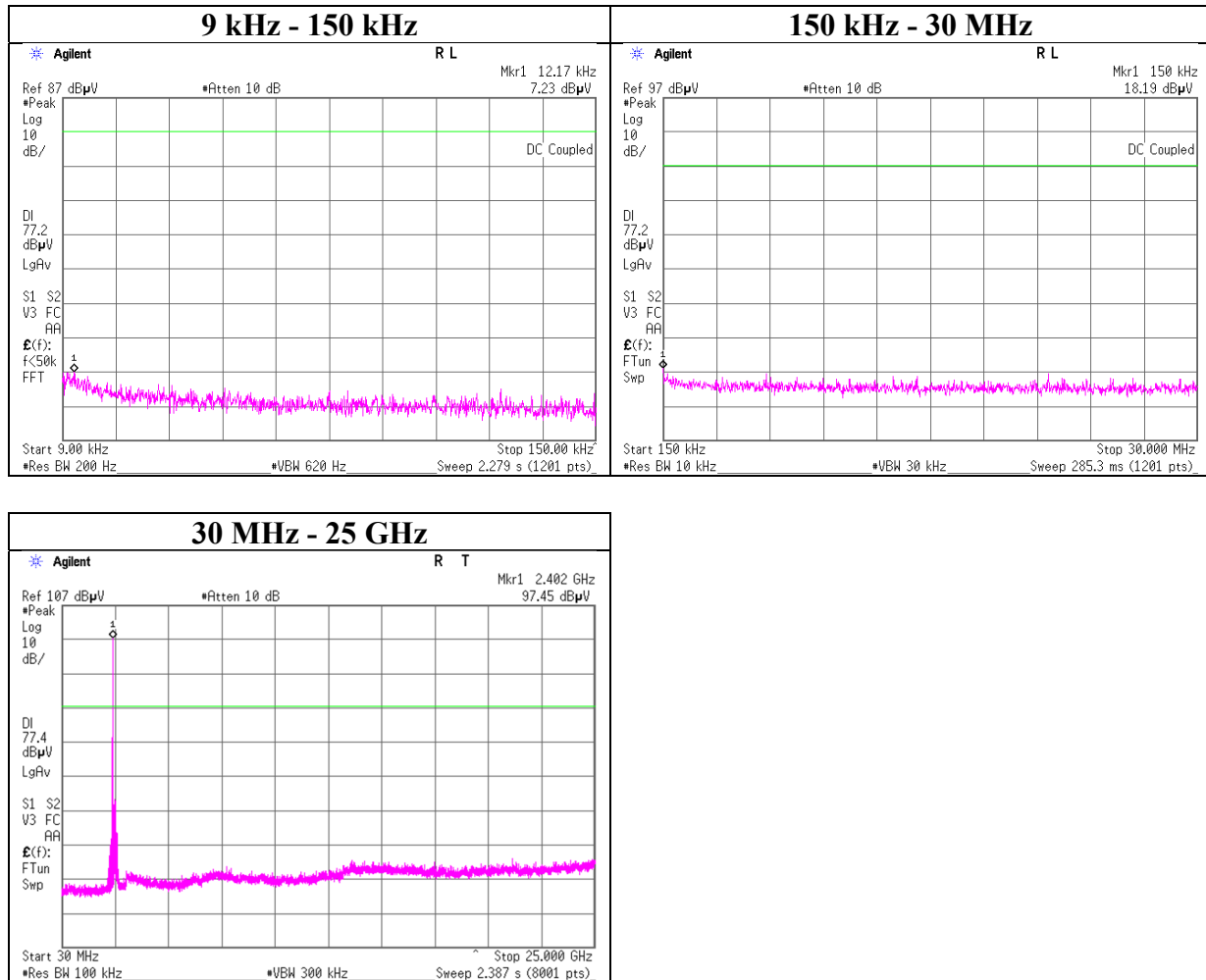


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

Conducted Spurious Emission

Report No. 13163439S-G-R2
Test place Shonan EMC Lab. No.1 Measurement Room
Date June 17, 2020
Temperature / Humidity 25 deg. C / 46 % RH
Engineer Kenichi Adachi
Mode Tx, Hopping Off, DH5

2402 MHz



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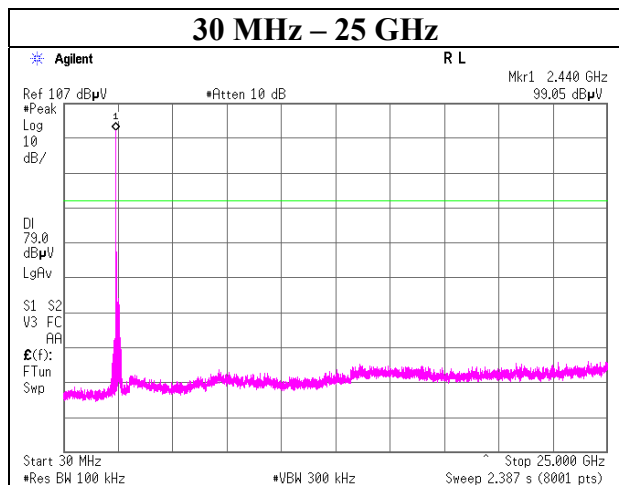
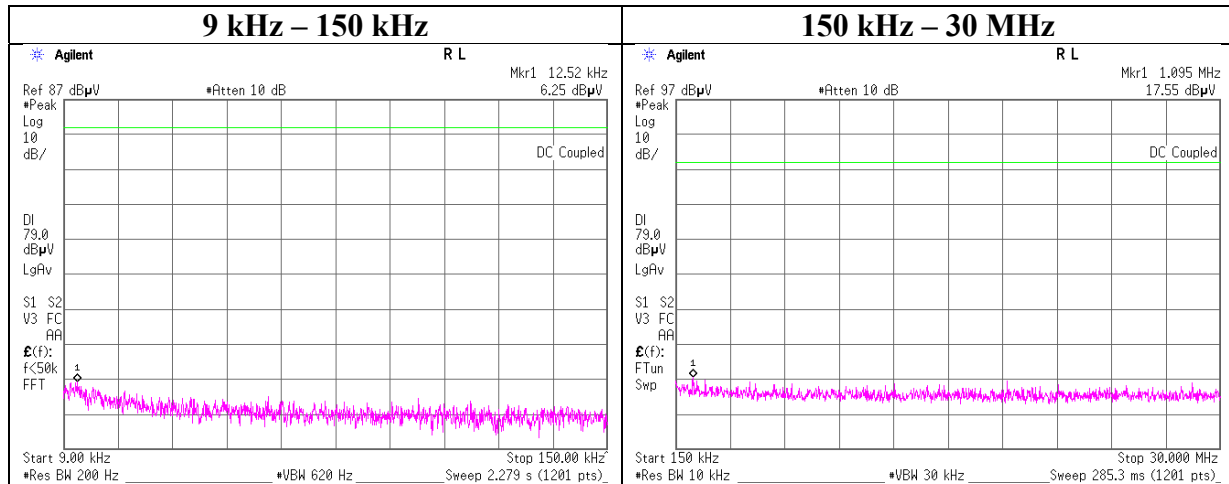
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Conducted Spurious Emission

Report No. 13163439S-G-R2
Test place Shonan EMC Lab. No.1 Measurement Room
Date June 17, 2020
Temperature / Humidity 25 deg. C / 46 % RH
Engineer Kenichi Adachi
Mode Tx, Hopping Off, DH5

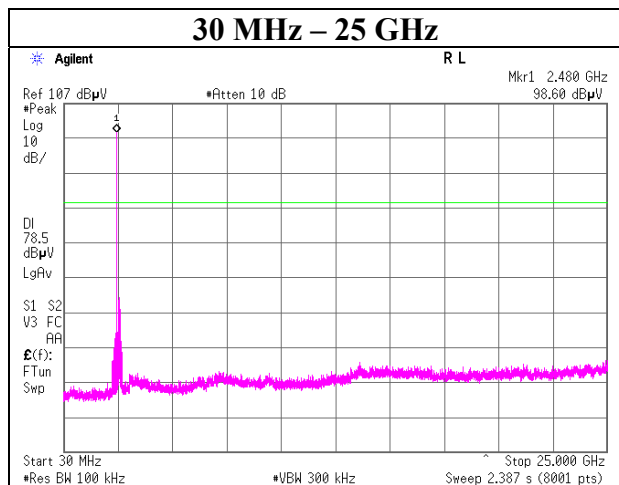
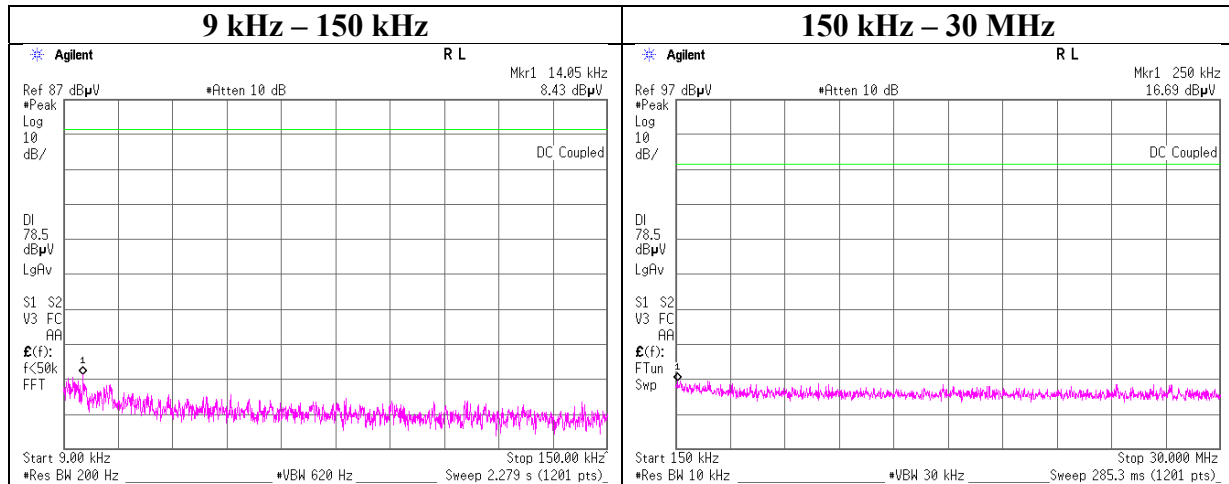
2441 MHz



Conducted Spurious Emission

Report No. 13163439S-G-R2
Test place Shonan EMC Lab. No.1 Measurement Room
Date June 17, 2020
Temperature / Humidity 25 deg. C / 46 % RH
Engineer Kenichi Adachi
Mode Tx, Hopping Off, DH5

2480 MHz



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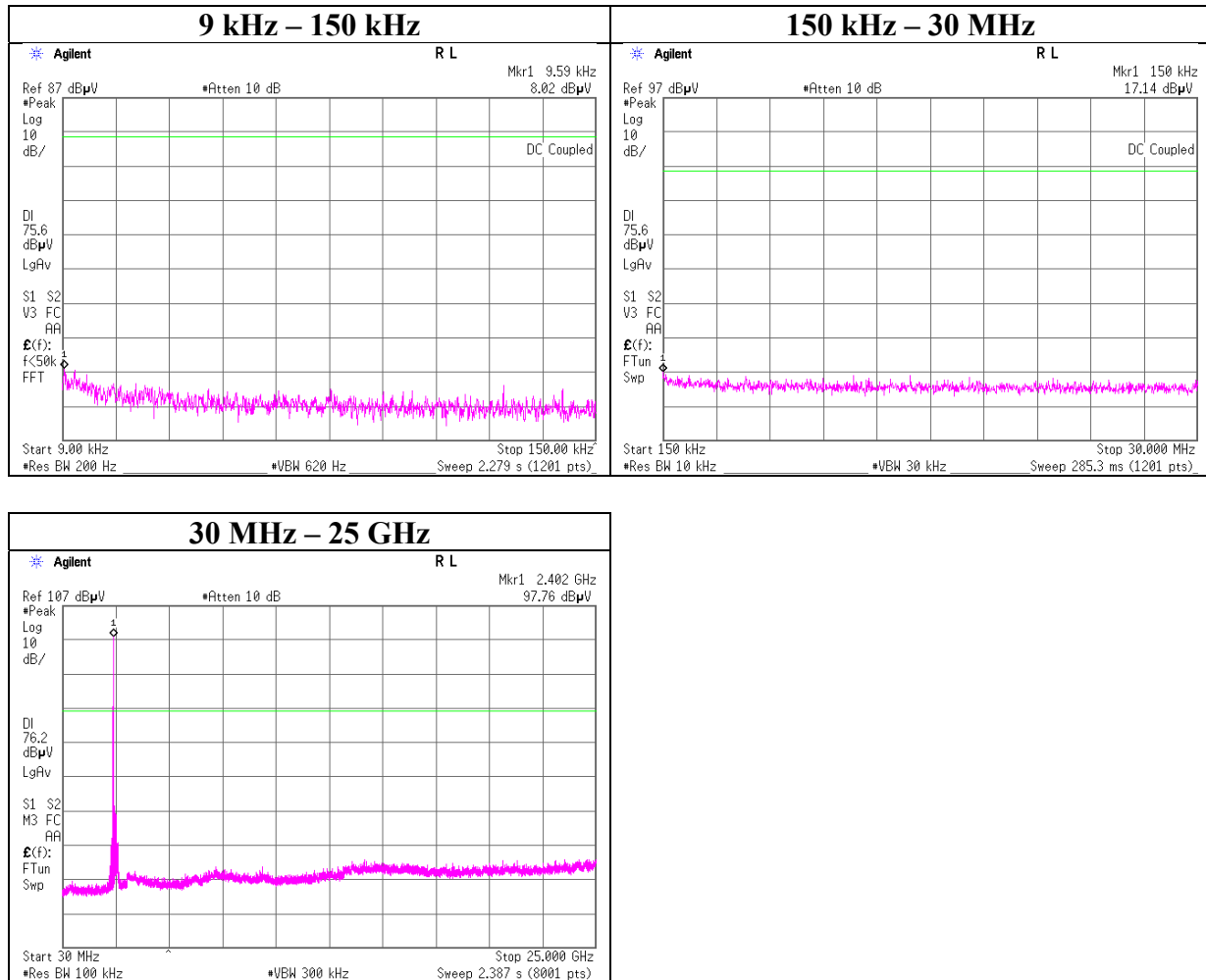
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Conducted Spurious Emission

Report No. 13163439S-G-R2
Test place Shonan EMC Lab. No.1 Measurement Room
Date June 17, 2020
Temperature / Humidity 25 deg. C / 46 % RH
Engineer Kenichi Adachi
Mode Tx, Hopping On, 2DH5

2402 MHz



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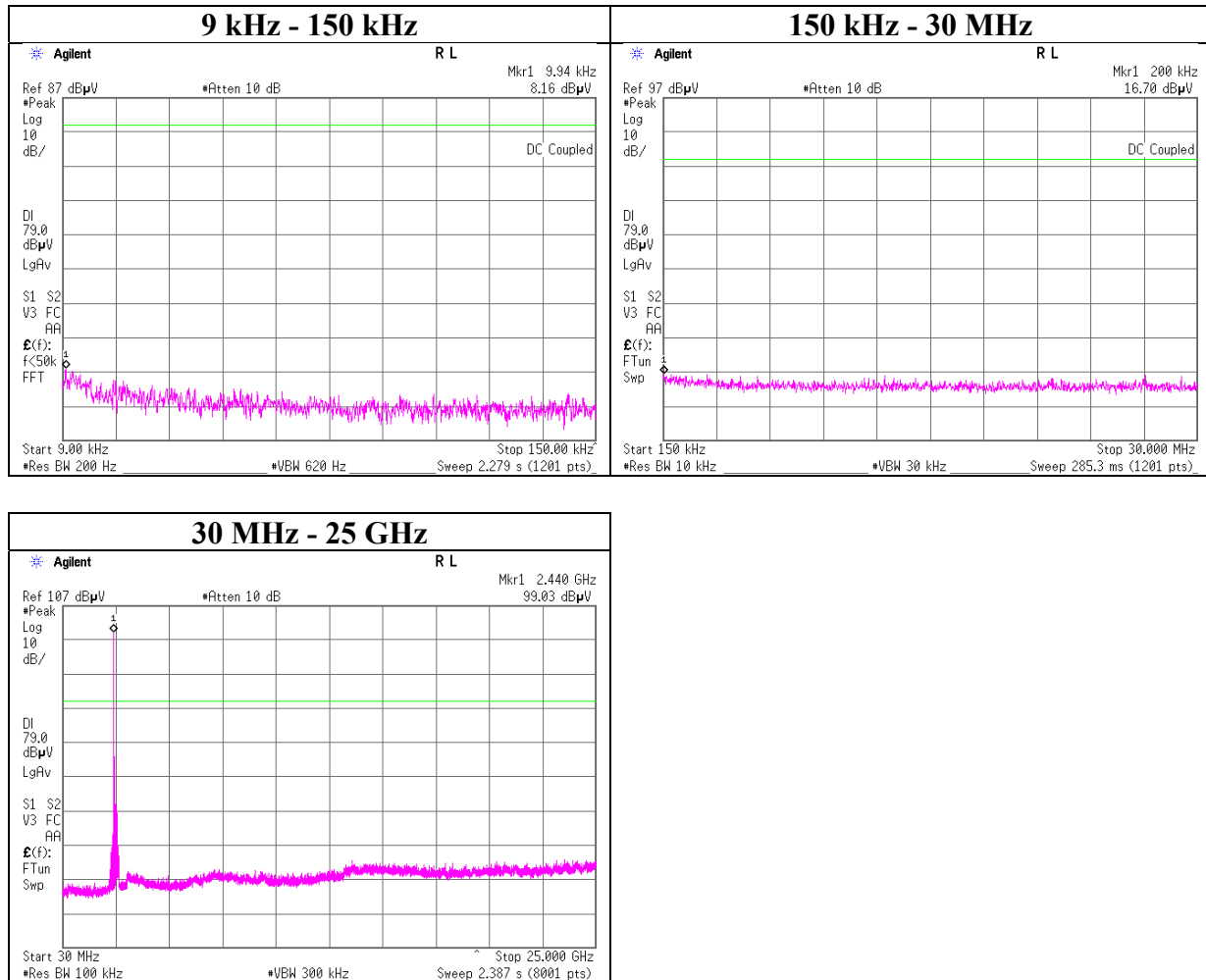
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Conducted Spurious Emission

Report No. 13163439S-G-R2
Test place Shonan EMC Lab. No.1 Measurement Room
Date June 17, 2020
Temperature / Humidity 25 deg. C / 46 % RH
Engineer Kenichi Adachi
Mode Tx, Hopping On, 2DH5

2441 MHz



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

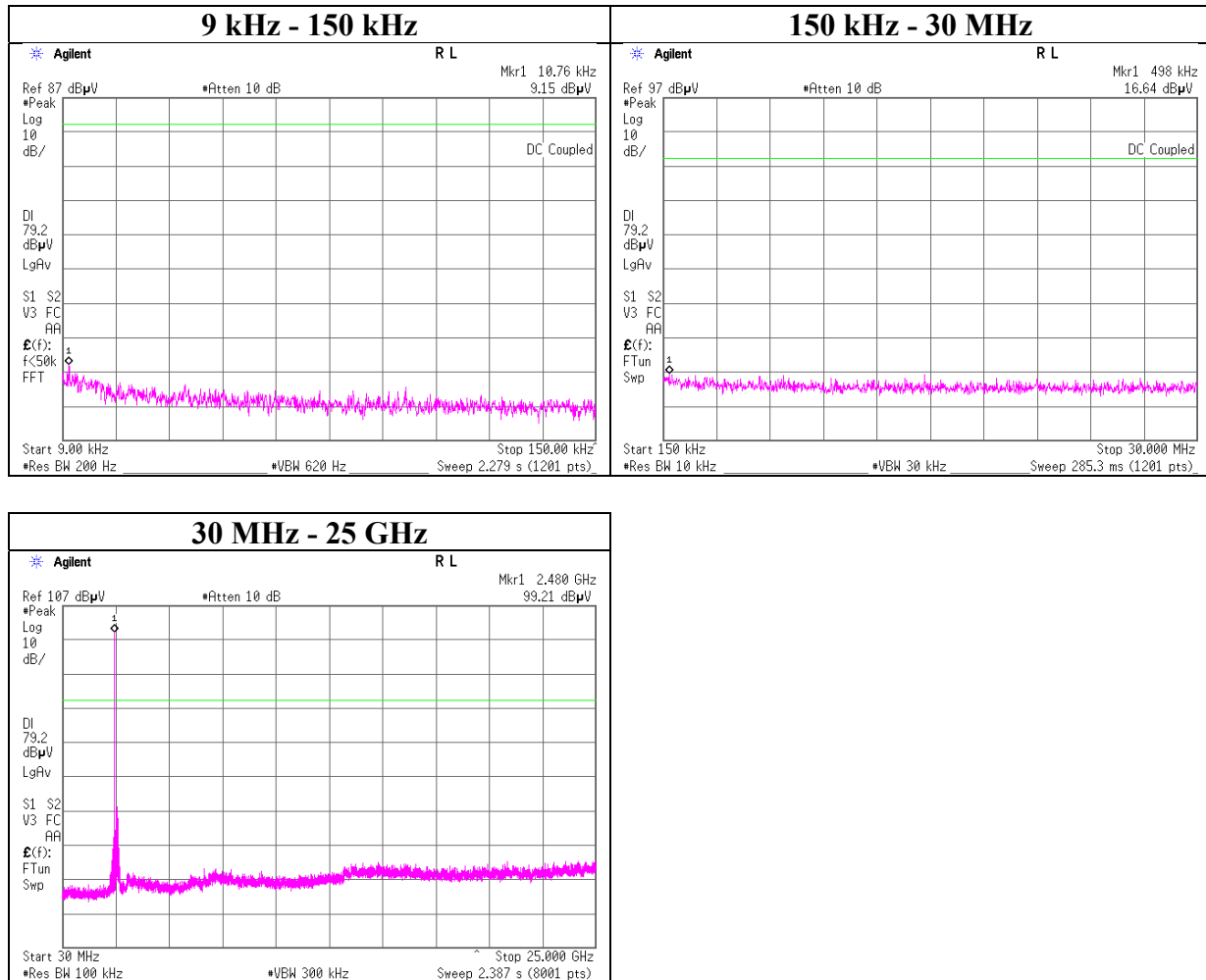
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Conducted Spurious Emission

Report No. 13163439S-G-R2
Test place Shonan EMC Lab. No.1 Measurement Room
Date June 17, 2020
Temperature / Humidity 25 deg. C / 46 % RH
Engineer Kenichi Adachi
Mode Tx, Hopping On, 2DH5

2480 MHz



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Shonan EMC Lab.

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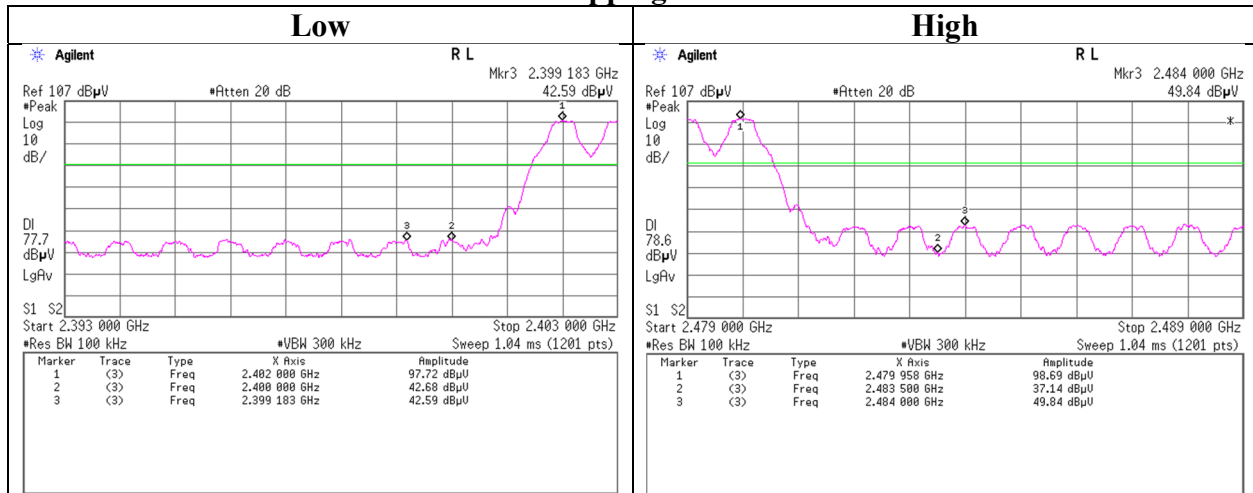
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

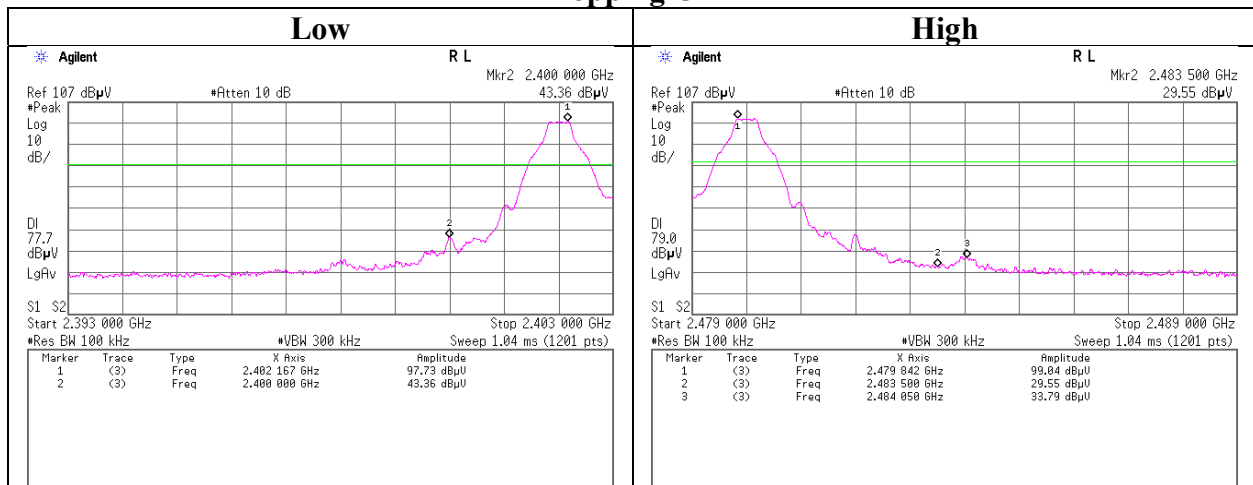
Conducted Emission Band Edge compliance

Report No. 13163439S-G-R2
Test place Shonan EMC Lab. No.1 Measurement Room
Date June 17, 2020 June 18, 2020
Temperature / Humidity 25 deg. C / 46 % RH 24 deg. C / 62 % RH
Engineer Kenichi Adachi Toshinori Yamada
Mode Tx DHS

Hopping On



Hopping Off



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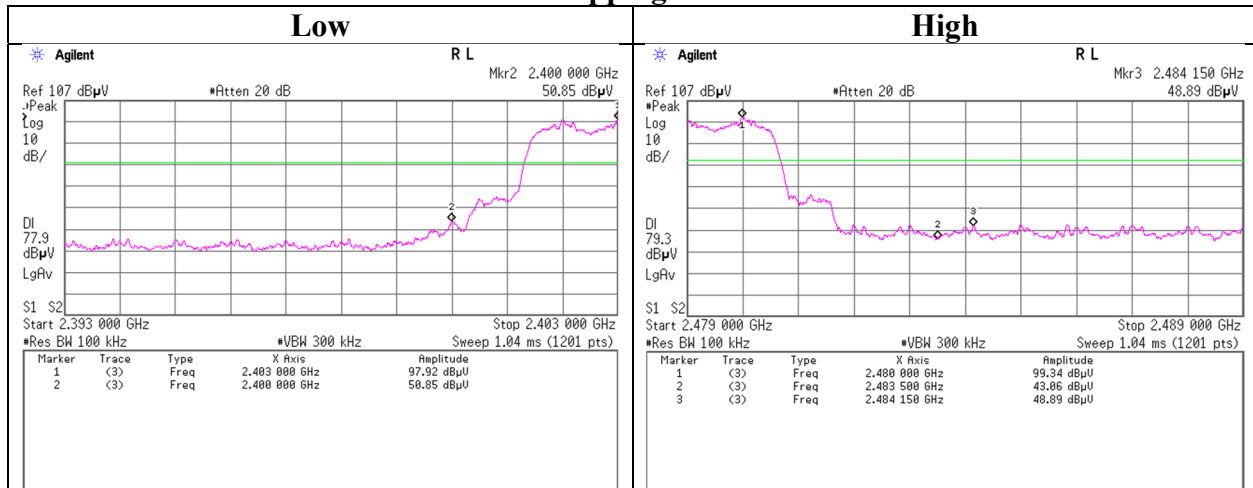
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

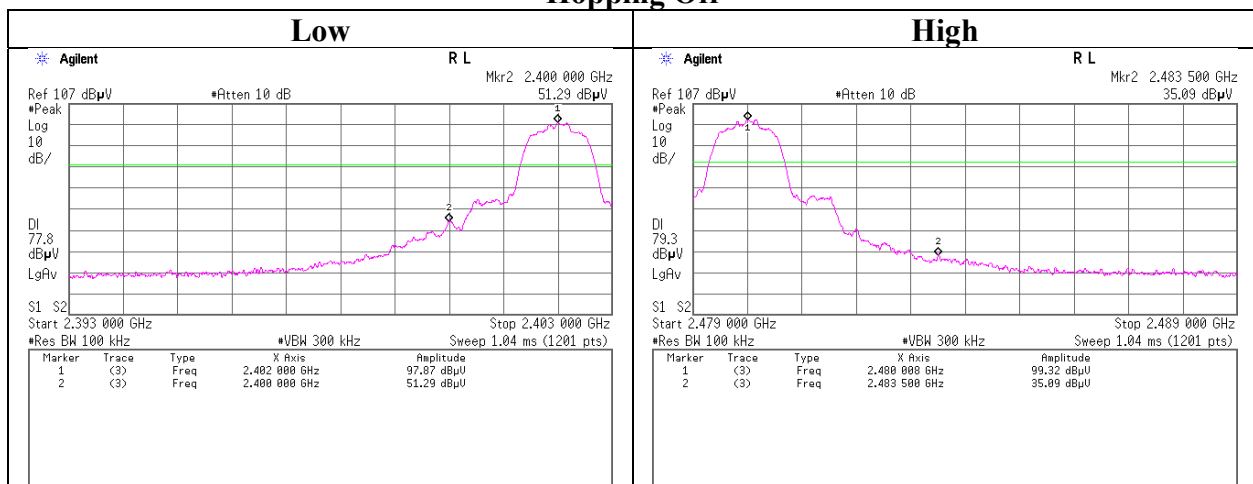
Conducted Emission Band Edge compliance

Report No. 13163439S-G-R2
Test place Shonan EMC Lab. No.1 Measurement Room
Date June 17, 2020
Temperature / Humidity 25 deg. C / 46 % RH
Engineer Kenichi Adachi
Mode Tx 2DH5

Hopping On



Hopping Off



APPENDIX 2: Test instruments

Test equipment (1/2)

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
AT	KTS-08	145095	Digital Tester	SANWA	PC500	7019224	2020/04/09	12
AT	SAT10-09	145132	Attenuator	Weinschel Corp.	54A-10	W5692	2019/11/05	12
AT	SCC-G14	145175	Coaxial Cable	Suhner	SUCOFLEX 102	31600/2	2019/12/12	12
AT	SOS-13	146321	Humidity Indicator	CUSTOM	CTH-202	Q.C.17	2019/12/19	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	SRENT-09	150461	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY46186392	2020/02/10	12
CE	KTS-07	145111	Digital Tester	SANWA	PC500	7019232	2019/10/01	12
CE	SAT3-13	150923	Attenuator	JFW	50HF-003N	-	2020/01/30	12
CE	SCC-05	145033	Coaxial Cable	Fujikura,HP,Mini-Circuits,Fujikura	5D2W	-	2020/04/17	12
CE	SJM-09	145336	Measure	PROMART	SEN1935	-	-	-
CE	SLS-02	145539	LISN	Rohde & Schwarz	ENV216	100512	2020/02/18	12
CE	SOS-27	191845	Humidity Indicator	CUSTOM	CTH-201	-	2019/12/12	12
CE	STR-06	146208	Test Receiver	Rohde & Schwarz	ESCI	101259	2020/04/01	12
CE,RE	COTS-SEMI-5	170932	EMI Software	TSJ (Techno Science Japan)	TEPTO-DV3 (RE,CE,ME,PE)	-	-	-

Test equipment (2/2)

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	SAEC-03(NSA)	145565	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	2020/04/12	12
RE	SAEC-03(SVSWR)	145566	Semi-Anechoic Chamber	TDK	SAEC-03(SVSWR)	3	2020/05/11	12
RE	SAF-03	145126	Pre Amplifier	SONOMA	310N	290213	2020/02/19	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	2020/03/03	12
RE	SAT10-05	145136	Attenuator(above1GHz)	Keysight Technologies Inc	8493C-010	74864	2019/11/06	12
RE	SAT6-13	167094	Attenuator	JFW	50HF-006N	-	2020/02/21	12
RE	SBA-03	145023	Biconical Antenna	Schwarzbeck Mess - Elektronik	BBA9106	91032666	2020/05/17	12
RE	SCC-C1/C2/C3/C4/C5/C10/SRSE-03	145171	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-271(RF Selector)	2020/04/12	12
RE	SCC-G15	145176	Coaxial Cable	Suhner	SUCOFLEX 102	32703/2	2020/03/04	12
RE	SCC-G40	166491	Coaxial Cable	Junkosha	MWX221-01000NFSNMS/B	1612S005	2020/01/08	12
RE	SCC-G43	156380	Coaxial Cable	HUBER+SUNER	SUCOFLEX_104_E	SN MY 13406/4E	2020/06/04	12
RE	SCC-G57	179540	Coaxial Cable	Huber+Suhner	SUCOFLEX 102	802815/2	2020/05/12	12
RE	SCC-G58	183047	Coaxial Cable	HUBER+SUNER	SUCOFLEX 104	800287/4A	2020/06/04	12
RE	SFL-02	145301	Highpass Filter	MICRO-TRONICS	HPM50111	51	2019/11/06	12
RE	SHA-03	145501	Horn Antenna	Schwarzbeck Mess - Elektronik	BBHA9120D	9120D-739	2020/06/15	12
RE	SHA-04	145512	Horn Antenna	ETS LINDGREN	3160-09	00094868	2020/06/15	12
RE	SLA-07	145529	Logperiodic Antenna	Schwarzbeck Mess - Elektronik	VUSLP9111B	196	2020/05/17	12
RE	SOS-05	146293	Humidity Indicator	A&D Company	AD-5681	4062518	2019/10/08	12
RE	SOS-23	191840	Humidity Indicator	CUSTOM	CTH-201	-	2019/12/12	12
RE	SSA-03	145801	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY48250152	2019/08/08	12
RE	STR-08	150463	Test Receiver	Rohde & Schwarz	ESW44	101581	2019/11/22	12
RE	STS-03	146210	Digital Hitester	Hioki	3805-50	80997823	2019/10/01	12
RE	KJM-02	146432	Measure	TAJIMA	GL19-55	-	-	-

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

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

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

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

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

UL Japan, Inc.

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