



RADIO TEST REPORT

Test Report No. : 12005583S-A-R1

Applicant : **Panasonic Corporation**
Type of Equipment : **Car Audio with Bluetooth**
Model No. : **AN1703**
FCC ID : **ACJ932AN1703**
Test regulation : **FCC Part 15 Subpart C: 2017**
Test Result : **Complied**

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
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. This report is a revised version of 12005583S-A. 12005583S-A is replaced with this report.

Date of test: February 3, October 28 and 29, 2017

Representative test engineer:

M. Hosaka

Makoto Hosaka
Engineer
Consumer Technology Division

Approved by:

S. Takano

Shinichi Takano
Engineer
Consumer Technology Division



JAB
Testing
RTL02610

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

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

CONTENTS	PAGE
SECTION 1: Customer information.....	4
SECTION 2: Equipment under test (E.U.T.).....	4
SECTION 3: Test specification, procedures & results.....	5
SECTION 4: Operation of E.U.T. during testing.....	8
SECTION 5: Radiated Spurious Emission	11
SECTION 6: Antenna Terminal Conducted Tests.....	12
APPENDIX 1: Test data	13
20dB Bandwidth and Carrier Frequency Separation.....	13
Number of Hopping Frequency	16
Dwell time.....	18
Maximum Peak Output Power	21
Average Output Power	22
Burst Rate Confirmation	23
Dwell time factor chart	24
Radiated Spurious Emission	25
Conducted Spurious Emission	36
Conducted Emission Band Edge compliance	42
99%Occupied Bandwidth	44
APPENDIX 2: Test instruments	46
APPENDIX 3: Photographs of test setup	47
Radiated Spurious Emission	47

SECTION 1: Customer information

Company Name : Panasonic Corporation
Address : 4261 Ikonobe-cho, Tsuzuki-ku, Yokohama-shi, Kanagawa 224-8520
Japan
Telephone Number : +81-50-3689-7099
Facsimile Number : +81-45-931-0806
Contact Person : Norikatsu Uchiyamada

SECTION 2: Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment : Car Audio with Bluetooth
Model No. : AN1703
Serial No. : Refer to Section 4, Clause 4.2
Rating : DC 12 V
Receipt Date of Sample : October 24, 2017
Country of Mass-production : Mexico
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: AN1703 (referred to as the EUT in this report) is a Car Audio with Bluetooth.

General Specification

Clock frequency (Maximum) : 36.4 MHz

Radio Specification

[Bluetooth]

Radio Type : Transceiver
Frequency of Operation : 2402 MHz - 2480 MHz
Modulation : FHSS
Power Supply (radio part input) : DC 3.3 V
Antenna type : Planar Reverse F Antenna
Antenna Gain : -2.2 dBi (MAX): Including cable loss

SECTION 3: Test specification, procedures & results

Test specification : FCC Part 15 Subpart C
FCC Part 15 final revised on November 2, 2017

* The revision on November 2, 2017, does not affect the test specification applied to the EUT.

Title : FCC 47CFR Part15 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

3.2 Procedures and results

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.10-2013 6. Standard test methods IC: RSS-Gen 8.8	FCC: Section 15.207 IC: RSS-Gen 8.8	N/A	N/A	N/A *1)
Carrier Frequency Separation	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1) IC: RSS-247 5.1 (b)	See data.	Complied	Conducted
20 dB Bandwidth	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1) IC: RSS-247 5.1 (a)		Complied	Conducted
Number of Hopping Frequency	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1)(iii) IC: RSS-247 5.1 (d)		Complied	Conducted
Dwell time	FCC: FCC Public Notice DA 00-705 IC: -	FCC: Section15.247(a)(1)(iii) IC: RSS-247 5.1 (d)		Complied	Conducted
Maximum Peak Output Power	FCC: FCC Public Notice DA 00-705 IC: RSS-Gen 6.12	FCC: Section15.247(a)(b)(1) IC: RSS-247 5.4 (b)		Complied	Conducted
Spurious Emission & Band Edge Compliance	FCC: FCC Public Notice DA 00-705 IC: RSS-Gen 6.13	FCC: Section15.247(d) IC: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	9.21 dB 201.727 MHz, QP, Vert., 3DH5 2402 MHz	Complied	Conducted/ Radiated (above 30 MHz) *2)

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

*1) The test is not applicable since the EUT has no AC mains.

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

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

FCC Part 15.31 (e)

The equipment provides the wireless transmitter with stable power supply (DC 3.3 V).

Instead of a new battery, DC power supply was used for the test. That does not affect the test result, therefore the EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

The equipment and its antenna comply with the requirement since the antenna is built in the equipment and it cannot be replaced by end users.

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

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99 % Occupied Bandwidth	IC: RSS-Gen 6.6	IC: -	N/A	-	Conducted

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

3.4 Uncertainty

EMI

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

Item	Frequency range	Uncertainty (+/-)		
		No. 1 SAC / SR	No. 2 SAC / SR	No. 3 SAC / SR
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.1 dB	3.1 dB	3.1 dB
	30 MHz-200 MHz	4.6 dB	4.4 dB	4.6 dB
	200 MHz-1 GHz	5.8 dB	5.7 dB	5.8 dB
	1 GHz-13 GHz	4.9 dB	4.9 dB	4.9 dB
Radiated emission (Measurement distance: 1 m)	13 GHz-18 GHz	4.6 dB	4.6 dB	4.6 dB
	18 GHz-40 GHz	4.9 dB	4.9 dB	4.9 dB

SAC=Semi-Anechoic Chamber

SR= Shielded Room is applied besides radiated emission

Antenna terminal test	Uncertainty (+/-)
Power Measurement above 1 GHz (Average Detector)_SPM-06	0.72 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-06	0.85 dB
Power Measurement above 1 GHz (Average Detector)_SPM-07	0.74 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-07	0.91 dB
Spurious emission (Conducted) below 1GHz	1.6 dB
Spurious emission (Conducted) 1 GHz-3 GHz	1.3 dB
Spurious emission (Conducted) 3 GHz-18 GHz	2.2 dB
Spurious emission (Conducted) 18 GHz-26.5 GHz	2.3 dB
Spurious emission (Conducted) 26.5 GHz-40 GHz	2.4 dB
Bandwidth Measurement	1.01 %
Duty cycle and Time Measurement	0.012 %

Radiated emission test

The data listed in this test report has enough margin, more than the site margin.

3.5 Test Location

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
JAB Accreditation No. RTL02610
FCC Test Firm Registration Number: 839876

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 E.U.T. during testing

4.1 Operating Mode(s)

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

Details of Operating Mode(s)

Test Item	Mode	Tested frequency
Spurious Emission (Conducted/Radiated)	Tx (Hopping Off) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
Carrier Frequency Separation	Tx (Hopping On) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
20dB Bandwidth	Tx (Hopping Off) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
Number of Hopping Frequency	Tx (Hopping On) DH5, 3DH5	-
Dwell time	Tx (Hopping On), -DH1, DH3, DH5 -3DH1, 3DH3, 3DH5	-
Maximum Peak Output Power	Tx (Hopping Off) DH5, 2DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
Band Edge Compliance (Conducted)	Tx DH5, 3DH5 -Hopping On -Hopping Off	2402 MHz 2480 MHz
99% Occupied Bandwidth	Tx DH5, 3DH5 -Hopping On -Hopping Off	2402 MHz 2441 MHz 2480 MHz
<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: 07.00.02.02 *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>		

UL Japan, Inc.

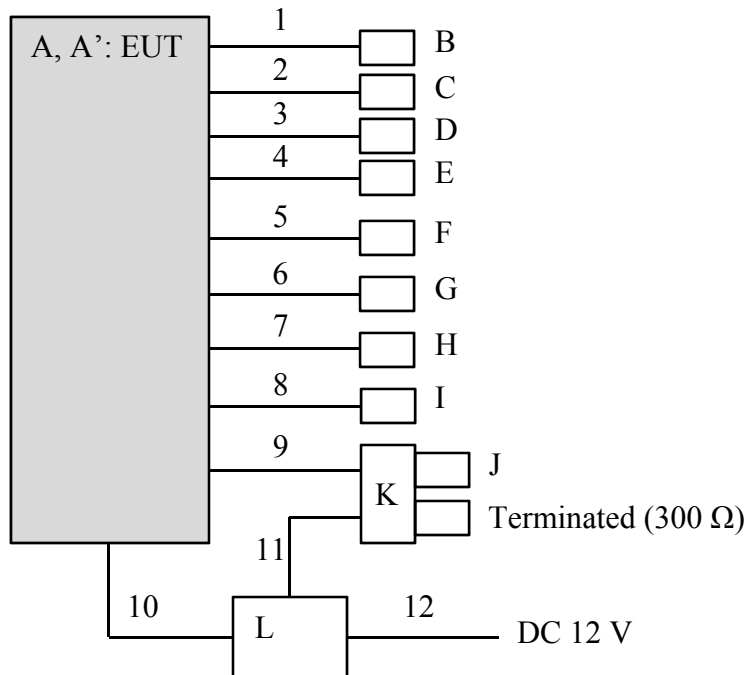
Shonan EMC Lab.

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

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	Car Audio with Bluetooth	AN1703	101051 *2)	Panasonic Corporation	EUT
A'	Car Audio with Bluetooth	AN1701(P02F)	15LDA-C3S278 *1), *3)	Panasonic Corporation	EUT
B	Speaker	KFC-RS160	-	KENWODD	-
C	Speaker	KFC-RS160	-	KENWODD	-
D	Speaker	KFC-RS160	-	KENWODD	-
E	Speaker	KFC-RS160	-	KENWODD	-
F	Glass AHT AMP	28231 5CA0A	No.2	Panasonic Corporation	-
G	Rear camera	28442 1MA0B (GP-K05603RD)	-	Panasonic Corporation	-
H	MIC	28336 BN 5AA0A 1Z	-	Panasonic Corporation	-
I	Remote controller	STRG-SW	-	Panasonic Corporation	-
J	USB memory	USM4GU	-	Sony	-
K	USB/Audio connector	284H3 5FA0A 690510125C	-	Panasonic Corporation	-
L	Power box (SW BOX ver.3)	-	-	Panasonic Corporation	-

*1) Used for Antenna Terminal conducted test

*2) Used for Radiated Emission test

*3) AN1703 is used for Radiated Emission test only since AN1701 (P02F) and AN1703 have same module. The modules have same specification about channel, bandwidth, power setting.

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Signal Cable	2.9 + 1.9	Unshielded	Unshielded	-
2	Signal Cable	2.9 + 1.9	Unshielded	Unshielded	-
3	Signal Cable	2.9 + 1.9	Unshielded	Unshielded	-
4	Signal Cable	2.9 + 1.9	Unshielded	Unshielded	-
5	Signal Cable	2.1	Unshielded	Unshielded	-
6	Signal Cable	1.0	Unshielded	Unshielded	-
7	Signal Cable	1.0	Unshielded	Unshielded	-
8	Signal Cable	1.5	Unshielded	Unshielded	-
9	Signal Cable	1.0	Unshielded	Unshielded	-
10	DC Cable	1.5	Unshielded	Unshielded	-
11	DC Cable	1.5	Unshielded	Unshielded	-
12	DC Cable	0.5, *4) 1.1 *5)	Unshielded	Unshielded	-

*4) Used for above 1 GHz of radiated emission test.

*5) Used for below 1 GHz of radiated emission test.

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

SECTION 5: Radiated Spurious Emission

Test Procedure

[For below 1 GHz]

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

[For above 1 GHz]

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

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

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 (IC) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (IC).

Frequency	Below 1 GHz	Above 1 GHz		20 dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	RBW: 1 MHz VBW: 10 Hz *1)	RBW: 100 kHz VBW: 300 kHz
Test Distance	3 m	(4-0.12) m*2) (1 GHz – 13 GHz), 1 m*3) (13 GHz – 26.5 GHz)		(4-0.12) m*2) (1 GHz – 13 GHz), 1 m*3) (13 GHz – 26.5 GHz)

*1) Although DA 00-705 accepts VBW = 10 Hz for AV measurements, it was confirmed that superfluous smoothing was not performed.

*2) Distance Factor: $20 \times \log((4-0.12) \text{ m}/3.0 \text{ m}) = 2.24 \text{ dB}$

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

The test was made on EUT at the normal use position. (EUT's angle is 30 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

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

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	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Sample	Max Hold *1)	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak Average *2)	-	Power Meter (Sensor: 50MHz BW)
Carrier Frequency Separation	3 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Number of Hopping Frequency	30 MHz	300 kHz	1 MHz	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) The measurement was performed with Max Hold since the duty cycle was not 100 %. *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.

Test data : **APPENDIX**
Test result : **Pass**

APPENDIX 1: Test data

20dB Bandwidth and Carrier Frequency Separation

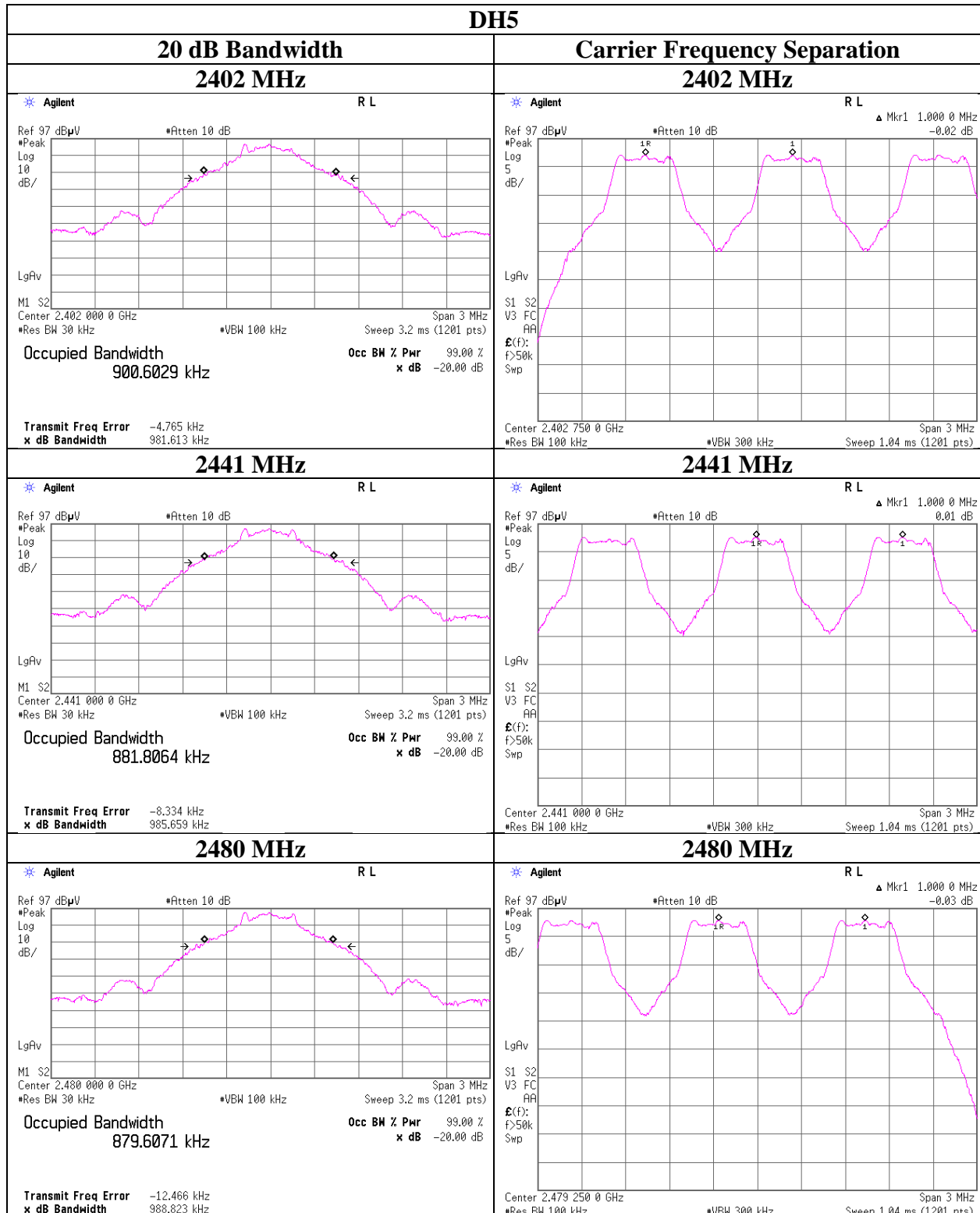
Test place Shonan EMC Lab. No.6 Shielded Room
Report No. 12005583S-A-R1
Date February 3, 2017
Temperature / Humidity 24 deg. C / 32 % RH
Engineer Hiroyuki Morikawa
Mode Tx, Hopping Off, DH5

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.982	1.000	≥ 0.654
DH5	2441.0	0.986	1.000	≥ 0.657
DH5	2480.0	0.989	1.000	≥ 0.659
3DH5	2402.0	1.301	1.000	≥ 0.867
3DH5	2441.0	1.296	1.000	≥ 0.864
3DH5	2480.0	1.286	1.000	≥ 0.857

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

No limit applies to 20dB Bandwidth.

20dB Bandwidth and Carrier Frequency Separation



UL Japan, Inc.

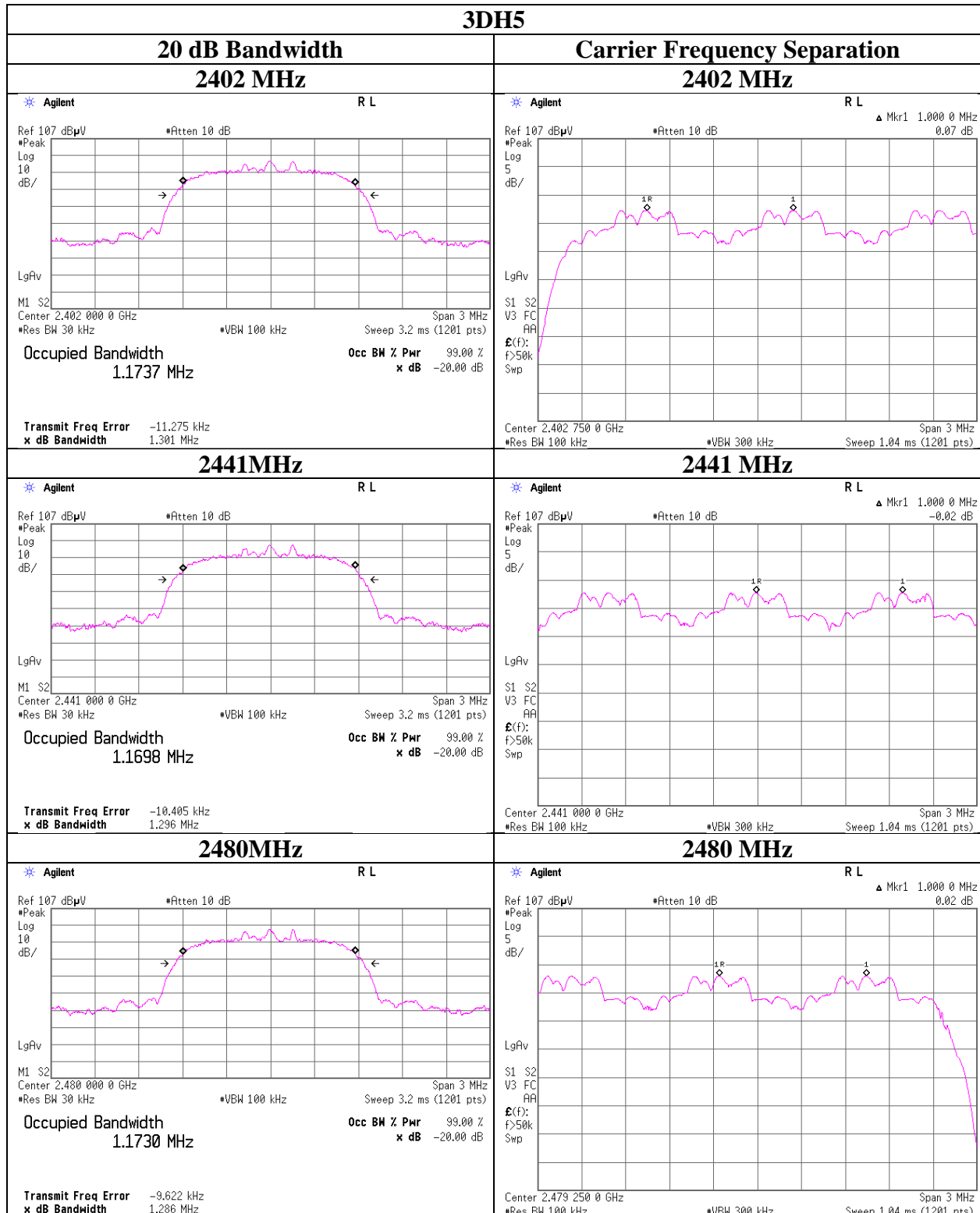
Shonan EMC Lab.

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

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

20dB Bandwidth and Carrier Frequency Separation



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

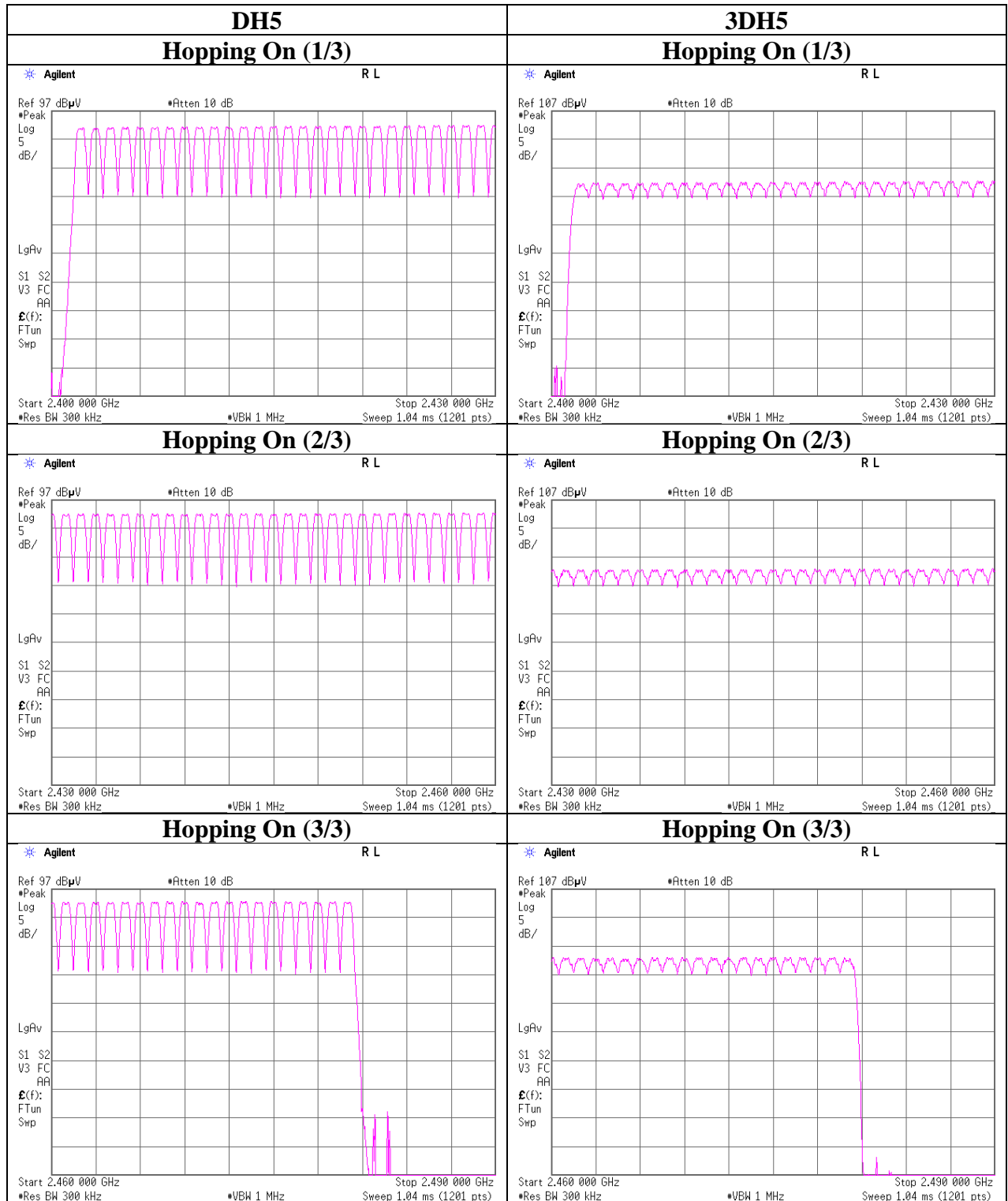
Number of Hopping Frequency

Test place Shonan EMC Lab. No.6 Shielded Room
Report No. 12005583S-A-R1
Date February 3, 2017
Temperature / Humidity 24 deg. C / 32 % RH
Engineer Hiroyuki Morikawa
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

Test place : Shonan EMC Lab. No.6 Shielded Room
Report No. : 12005583S-A-R1
Date : February 3, 2017
Temperature / Humidity : 24 deg. C / 32 % RH
Engineer : Hiroyuki Morikawa
Mode : Tx, Hopping On

Mode	Number of transmission in a 31.6(79 Hopping x 0.4) / 12.8 (32 Hopping x 0.4) second period				Length of transmission [msec]	Result [msec]	Limit [msec]
	51.4 times / 5 sec.	x	31.6 sec. =	325 times			
DH1	51.4 times / 5 sec.	x	31.6 sec. =	325 times	0.456	148	400
DH3	26.4 times / 5 sec.	x	31.6 sec. =	167 times	1.719	287	400
DH5	18.2 times / 5 sec.	x	31.6 sec. =	116 times	2.969	344	400
3DH1	51.6 times / 5 sec.	x	31.6 sec. =	327 times	0.457	149	400
3DH3	26.6 times / 5 sec.	x	31.6 sec. =	169 times	1.713	289	400
3DH5	17.6 times / 5 sec.	x	31.6 sec. =	112 times	2.960	332	400

Sample Calculation

Result = Number of transmission x Length of transmission

*Average data of 5 tests.(except Inquiry)

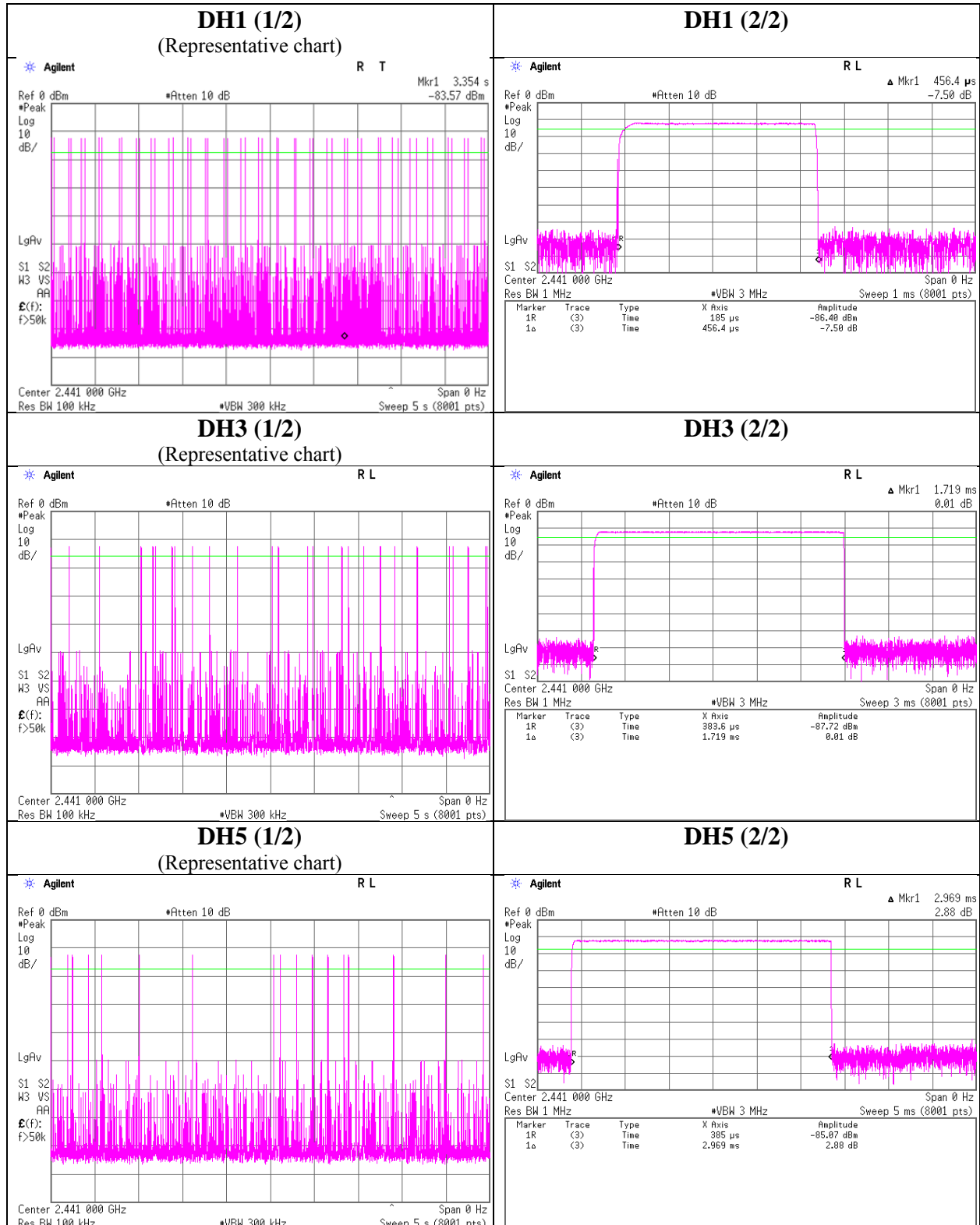
Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	52	50	52	51	52	51.4
DH3	27	27	25	28	25	26.4
DH5	17	23	17	16	18	18.2
3DH1	51	52	51	52	52	51.6
3DH3	27	26	25	28	27	26.6
3DH5	19	17	17	17	18	17.6

Sample Calculation

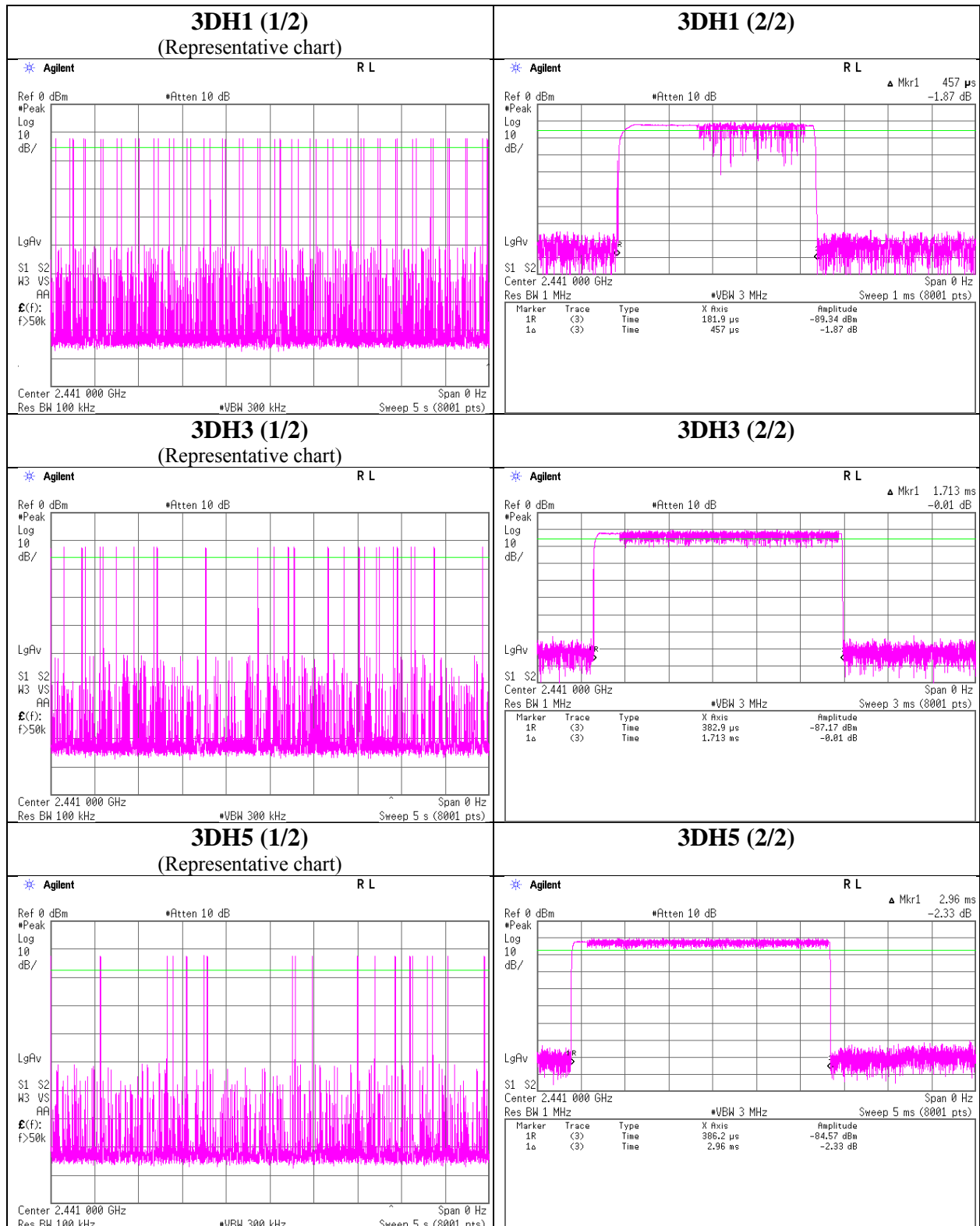
Average = Summation (Sampling 1 to 5) / 5

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



Dwell time



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

Maximum Peak Output Power

Test place : Shonan EMC Lab. No.6 Shielded Room
Report No. : 12005583S-A-R1
Date : February 3, 2017
Temperature / Humidity : 24 deg. C / 32 % RH
Engineer : Hiroyuki Morikawa
Mode : Tx, Hopping Off

Mode	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
DH5	2402.0	-12.03	1.97	9.92	-0.14	0.97	20.96	125	21.10
DH5	2441.0	-11.64	1.98	9.92	0.26	1.06	20.96	125	20.70
DH5	2480.0	-11.45	1.99	9.92	0.46	1.11	20.96	125	20.50
2DH5	2402.0	-10.39	1.97	9.92	1.50	1.41	20.96	125	19.46
2DH5	2441.0	-9.97	1.98	9.92	1.93	1.56	20.96	125	19.03
2DH5	2480.0	-9.73	1.99	9.92	2.18	1.65	20.96	125	18.78
3DH5	2402.0	-9.89	1.97	9.92	2.00	1.58	20.96	125	18.96
3DH5	2441.0	-9.45	1.98	9.92	2.45	1.76	20.96	125	18.51
3DH5	2480.0	-9.27	1.99	9.92	2.64	1.84	20.96	125	18.32

Sample Calculation:

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

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

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

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

Average Output Power
(Reference data for RF Exposure)

Test place Shonan EMC Lab. No.6 Shielded Room
Report No. 12005583S-A-R1
Date February 3, 2017
Temperature / Humidity 24 deg. C / 32 % RH
Engineer Hiroyuki Morikawa
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	-13.81	1.97	9.92	-1.92	0.64	1.02	-0.90	0.81
DH5	2441.0	-13.32	1.98	9.92	-1.42	0.72	1.02	-0.40	0.91
DH5	2480.0	-13.10	1.99	9.92	-1.19	0.76	1.02	-0.17	0.96
2DH5	2402.0	-14.31	1.97	9.92	-2.42	0.57	1.03	-1.39	0.73
2DH5	2441.0	-13.81	1.98	9.92	-1.91	0.64	1.03	-0.88	0.82
2DH5	2480.0	-13.62	1.99	9.92	-1.71	0.67	1.03	-0.68	0.86
3DH5	2402.0	-14.31	1.97	9.92	-2.42	0.57	1.03	-1.39	0.73
3DH5	2441.0	-13.83	1.98	9.92	-1.93	0.64	1.03	-0.90	0.81
3DH5	2480.0	-13.61	1.99	9.92	-1.70	0.68	1.03	-0.67	0.86

Sample Calculation:

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

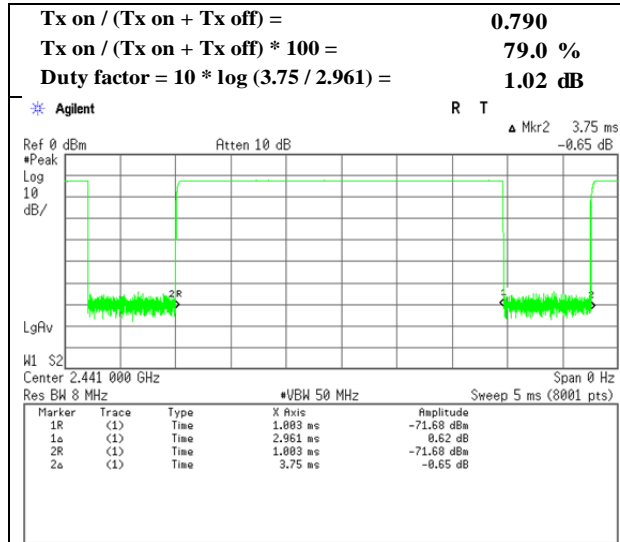
Result (Burst power average) = Time average + Duty factor

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

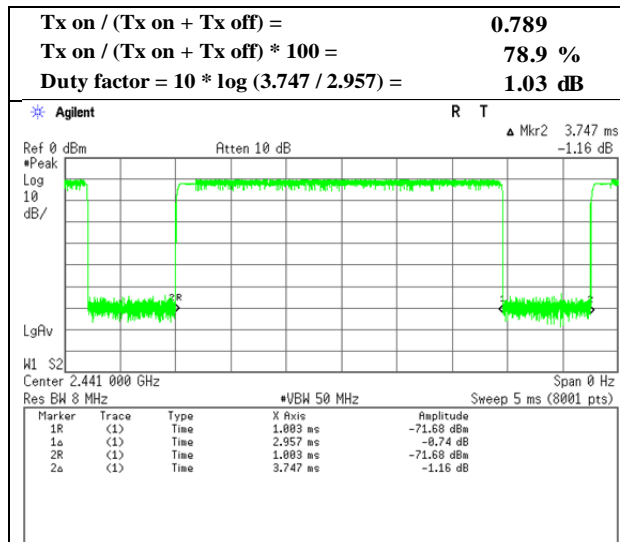
Burst Rate Confirmation

Test place	Shonan EMC Lab. No.6 Shielded Room
Report No.	12005583S-A-R1
Date	February 3, 2017
Temperature / Humidity	24 deg. C / 32 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx, Hopping Off

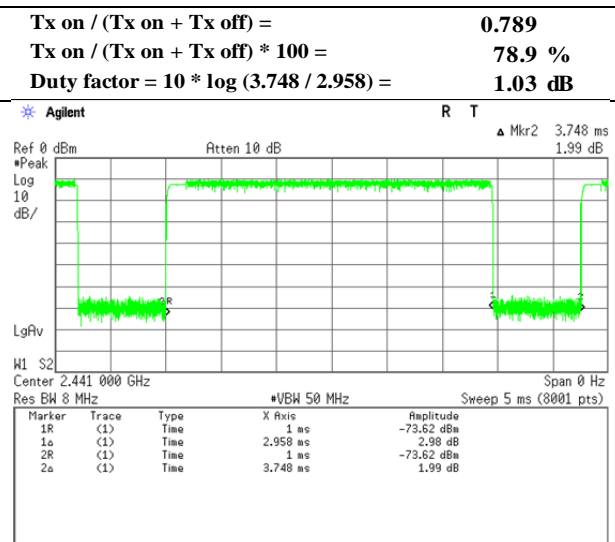
DH5



2DH5

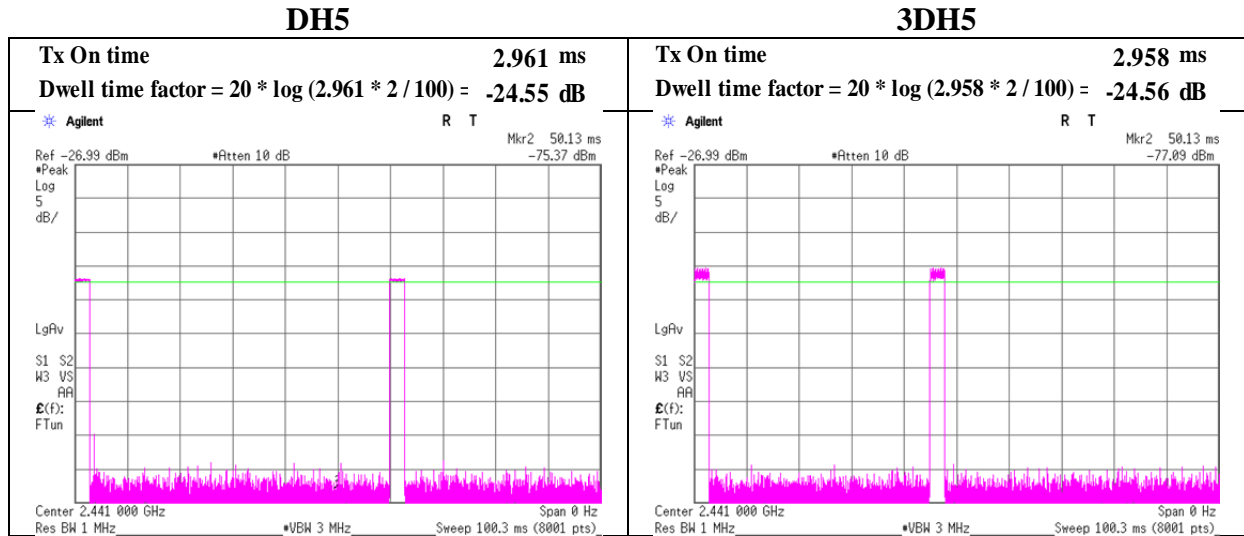


3DH5



Dwell time factor chart

Test place	Shonan EMC Lab. No.3 Semi Anechoic Chamber
Report No.	12005583S-A-R1
Date	October 28, 2017
Temperature / Humidity	23 deg. C / 46 % RH
Engineer	Makoto Hosaka
Mode	Tx, Hopping On



Radiated Spurious Emission

Report No. 12005583S-A-R1
Test place Shonan EMC Lab.
Semi Anechoic Chamber No.3 No.3
Date October 28, 2017 October 29, 2017
Temperature / Humidity 23 deg. C / 46 % RH 23 deg.C / 52 %RH
Engineer Makoto Hosaka Kenichi Adachi
(1 GHz -26.5 GHz) (below 1 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.	72.822	QP	43.09	6.21	7.18	32.10	0.00	24.38	40.00	15.62	254	307	
Hori.	104.343	QP	40.44	10.68	7.45	32.08	0.00	26.49	43.50	17.01	301	302	
Hori.	202.918	QP	45.99	11.42	8.17	31.99	0.00	33.59	43.50	9.91	167	47	
Hori.	242.223	QP	40.48	11.64	8.39	31.93	0.00	28.58	46.00	17.42	117	227	
Hori.	297.567	QP	34.42	13.31	8.71	31.92	0.00	24.52	46.00	21.48	100	125	
Hori.	706.294	QP	34.87	19.64	10.41	31.73	0.00	33.19	46.00	12.81	128	221	
Hori.	2390.000	PK	48.99	27.26	14.19	44.13	2.24	48.55	73.90	25.35	182	38	*1)
Hori.	4237.756	PK	51.97	30.13	6.40	44.25	2.24	46.49	73.90	27.41	152	130	
Hori.	4804.000	PK	48.31	31.40	6.58	44.45	2.24	44.08	73.90	29.82	100	0	
Hori.	7206.000	PK	56.07	36.56	8.06	43.99	2.24	58.94	73.90	14.96	249	294	
Hori.	9608.000	PK	48.86	38.61	9.13	43.83	2.24	55.01	73.90	18.89	100	0	
Hori.	12010.000	PK	49.54	39.30	10.46	43.36	2.24	58.18	73.90	15.72	100	0	
Hori.	4237.756	AV	46.89	30.13	6.40	44.25	2.24	41.41	53.90	12.49	152	130	
Vert.	72.675	QP	40.48	6.21	7.17	32.10	0.00	21.76	40.00	18.24	100	283	
Vert.	104.343	QP	40.55	10.68	7.45	32.08	0.00	26.60	43.50	16.90	100	144	
Vert.	201.755	QP	46.56	11.41	8.16	31.99	0.00	34.14	43.50	9.36	100	360	
Vert.	242.089	QP	31.21	11.64	8.39	31.93	0.00	19.31	46.00	26.69	100	114	
Vert.	298.525	QP	29.23	13.34	8.71	31.92	0.00	19.36	46.00	26.64	159	206	
Vert.	706.294	QP	31.22	19.64	10.41	31.73	0.00	29.54	46.00	16.46	100	289	
Vert.	2390.000	PK	48.54	27.26	14.19	44.13	2.24	48.10	73.90	25.80	279	69	*1)
Vert.	4237.756	PK	52.80	30.13	6.40	44.25	2.24	47.32	73.90	26.58	142	164	
Vert.	4804.000	PK	48.46	31.40	6.58	44.45	2.24	44.23	73.90	29.67	100	0	
Vert.	7206.000	PK	56.43	36.56	8.06	43.99	2.24	59.30	73.90	14.60	150	149	
Vert.	9608.000	PK	49.86	38.61	9.13	43.83	2.24	56.01	73.90	17.89	100	0	
Vert.	12010.000	PK	51.03	39.30	10.46	43.36	2.24	59.67	73.90	14.23	100	0	
Vert.	4237.756	AV	47.91	30.13	6.40	44.25	2.24	42.43	53.90	11.47	142	164	

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

Distance factor : 1 GHz - 13 GHz : 20log((4 - 0.12) 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).

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	AV	36.43	27.26	14.19	44.13	-24.55	2.24	11.44	53.90	42.46	*1)
Hori.	4804.000	AV	37.33	31.40	6.58	44.45	-24.55	2.24	8.55	53.90	45.35	
Hori.	7206.000	AV	49.96	36.56	8.06	43.99	-24.55	2.24	28.28	53.90	25.62	
Hori.	9608.000	AV	37.36	38.61	9.13	43.83	-24.55	2.24	18.96	53.90	34.94	
Hori.	12010.000	AV	37.68	39.30	10.46	43.36	-24.55	2.24	21.77	53.90	32.13	
Vert.	2390.000	AV	36.46	27.26	14.19	44.13	-24.55	2.24	11.47	53.90	42.43	*1)
Vert.	4804.000	AV	36.80	31.40	6.58	44.45	-24.55	2.24	8.02	53.90	45.88	
Vert.	7206.000	AV	51.39	36.56	8.06	43.99	-24.55	2.24	29.71	53.90	24.19	
Vert.	9608.000	AV	37.35	38.61	9.13	43.83	-24.55	2.24	18.95	53.90	34.95	
Vert.	12010.000	AV	37.53	39.30	10.46	43.36	-24.55	2.24	21.62	53.90	32.28	

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((4 - 0.12) m / 3.0 m) = 2.24 dB

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

Dwell (time) factor refer to "Dwell time factor Calculation chart" sheet.

*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	86.60	27.29	14.20	44.14	2.24	86.19	-	-	carrier
Hori.	2400.000	PK	45.93	27.29	14.19	44.14	2.24	45.51	66.19	20.7	
Vert.	2402.000	PK	87.42	27.29	14.20	44.14	2.24	87.01	-	-	carrier
Vert.	2400.000	PK	46.97	27.29	14.19	44.14	2.24	46.55	67.01	20.5	

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

Distance factor : 1 GHz - 13 GHz : 20log((4 - 0.12) 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.

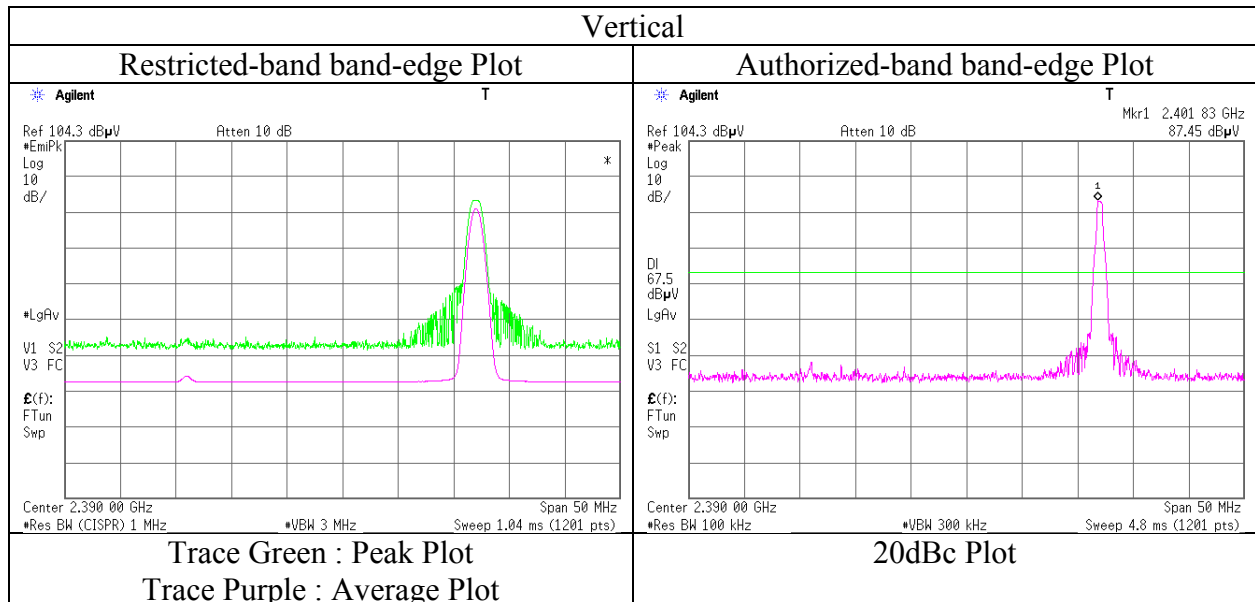
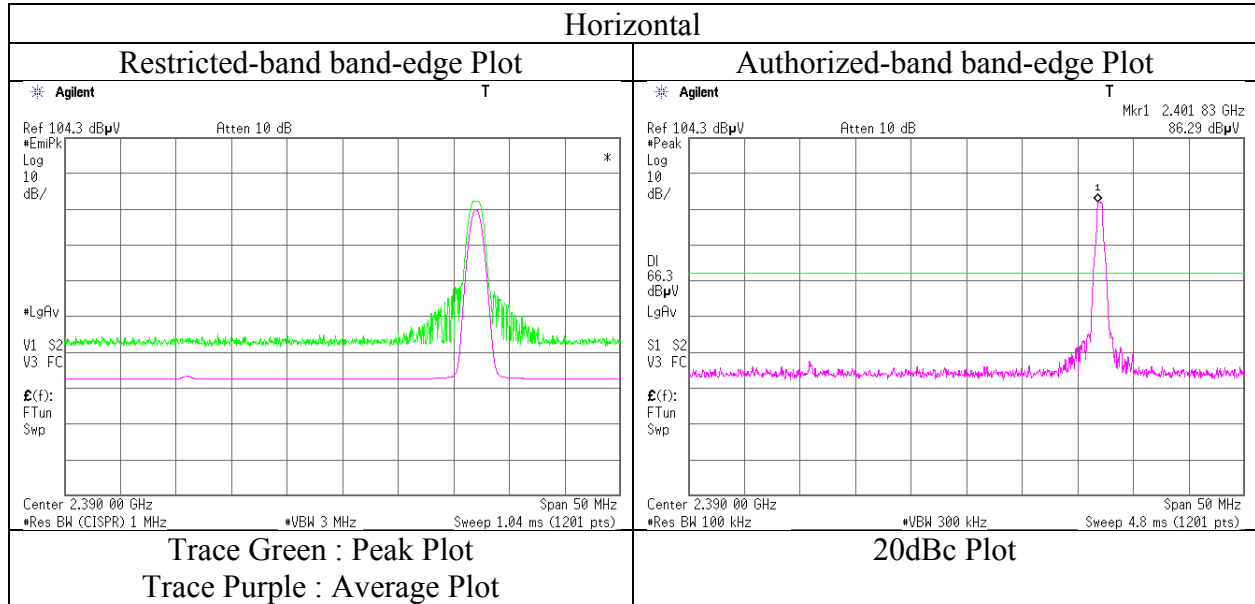
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12005583S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	October 28, 2017
Temperature / Humidity	23 deg. C / 46 % RH
Engineer	Makoto Hosaka
Mode	Tx, Hopping Off, DH5 2402 MHz



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

Radiated Spurious Emission

Report No. 12005583S-A-R1
Test place Shonan EMC Lab.
Semi Anechoic Chamber No.3 No.3
Date October 28, 2017 October 29, 2017
Temperature / Humidity 23 deg. C / 46 % RH 23 deg.C / 52 % RH
Engineer Makoto Hosaka Kenichi Adachi
(1 GHz -26.5 GHz) (below 1 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.	72.812	QP	42.98	6.21	7.18	32.10	0.00	24.27	40.00	15.73	252	297	
Hori.	104.344	QP	40.97	10.68	7.45	32.08	0.00	27.02	43.50	16.48	298	301	
Hori.	202.917	QP	44.83	11.42	8.17	31.99	0.00	32.43	43.50	11.07	165	46	
Hori.	242.222	QP	40.38	11.64	8.39	31.93	0.00	28.48	46.00	17.52	118	229	
Hori.	297.564	QP	33.99	13.31	8.71	31.92	0.00	24.09	46.00	21.91	100	128	
Hori.	706.292	QP	35.34	19.64	10.41	31.73	0.00	33.66	46.00	12.34	125	222	
Hori.	4237.756	PK	51.40	30.13	6.40	44.25	2.24	45.92	73.90	27.98	152	130	
Hori.	4882.000	PK	48.39	31.62	6.62	44.48	2.24	44.39	73.90	29.51	100	0	
Hori.	7323.000	PK	55.08	36.77	8.06	44.03	2.24	58.12	73.90	15.78	176	311	
Hori.	9764.000	PK	48.55	38.80	9.15	43.85	2.24	54.89	73.90	19.01	100	0	
Hori.	12205.000	PK	47.32	39.28	10.39	43.36	2.24	55.87	73.90	18.03	100	0	
Hori.	4237.756	AV	46.90	30.13	6.40	44.25	2.24	41.42	53.90	12.48	152	130	
Vert.	72.678	QP	40.73	6.21	7.17	32.10	0.00	22.01	40.00	17.99	100	278	
Vert.	104.324	QP	40.54	10.67	7.45	32.08	0.00	26.58	43.50	16.92	100	144	
Vert.	201.753	QP	46.66	11.41	8.16	31.99	0.00	34.24	43.50	9.26	100	0	
Vert.	242.092	QP	30.97	11.64	8.39	31.93	0.00	19.07	46.00	26.93	100	116	
Vert.	298.528	QP	29.39	13.34	8.71	31.92	0.00	19.52	46.00	26.48	157	205	
Vert.	706.292	QP	31.48	19.64	10.41	31.73	0.00	29.80	46.00	16.20	100	287	
Vert.	4237.756	PK	52.67	30.13	6.40	44.25	2.24	47.19	73.90	26.71	142	168	
Vert.	4882.000	PK	48.63	31.62	6.62	44.48	2.24	44.63	73.90	29.27	100	0	
Vert.	7323.000	PK	56.15	36.77	8.06	44.03	2.24	59.19	73.90	14.71	145	150	
Vert.	9764.000	PK	47.96	38.80	9.15	43.85	2.24	54.30	73.90	19.60	100	0	
Vert.	12205.000	PK	47.32	39.28	10.39	43.36	2.24	55.87	73.90	18.03	100	0	
Vert.	4237.756	AV	47.68	30.13	6.40	44.25	2.24	42.20	53.90	11.70	142	168	

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

Distance factor : 1 GHz - 13 GHz : $20\log((4 - 0.12) \text{ m} / 3.0 \text{ m}) = 2.24 \text{ dB}$

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).

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant. Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4882.000	AV	36.77	31.62	6.62	44.48	-24.55	2.24	8.22	53.90	45.68	
Hori.	7323.000	AV	49.73	36.77	8.06	44.03	-24.55	2.24	28.22	53.90	25.68	
Hori.	9764.000	AV	36.02	38.80	9.15	43.85	-24.55	2.24	17.81	53.90	36.09	
Hori.	12205.000	AV	35.72	39.28	10.39	43.36	-24.55	2.24	19.72	53.90	34.18	
Vert.	4882.000	AV	36.81	31.62	6.62	44.48	-24.55	2.24	8.26	53.90	45.64	
Vert.	7323.000	AV	52.10	36.77	8.06	44.03	-24.55	2.24	30.59	53.90	23.31	
Vert.	9764.000	AV	36.18	38.80	9.15	43.85	-24.55	2.24	17.97	53.90	35.93	
Vert.	12205.000	AV	35.53	39.28	10.39	43.36	-24.55	2.24	19.53	53.90	34.37	

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 : $20\log((4 - 0.12) \text{ m} / 3.0 \text{ m}) = 2.24 \text{ dB}$

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

Dwell (time) factor refer to "Dwell time factor Calculation chart" sheet.

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

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

Radiated Spurious Emission

Report No. 12005583S-A-R1
Test place Shonan EMC Lab.
Semi Anechoic Chamber No.3 No.3
Date October 28, 2017 October 29, 2017
Temperature / Humidity 23 deg. C / 46 % RH 23 deg.C / 52 % RH
Engineer Makoto Hosaka Kenichi Adachi
(1 GHz -26.5 GHz) (below 1 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.	72.811	QP	42.88	6.21	7.18	32.10	0.00	24.17	40.00	15.83	255	301	
Hori.	104.348	QP	40.83	10.68	7.45	32.08	0.00	26.88	43.50	16.62	299	304	
Hori.	202.943	QP	45.78	11.42	8.17	31.99	0.00	33.38	43.50	10.12	165	43	
Hori.	242.221	QP	40.21	11.64	8.39	31.93	0.00	28.31	46.00	17.69	115	229	
Hori.	297.566	QP	33.89	13.31	8.71	31.92	0.00	23.99	46.00	22.01	100	124	
Hori.	706.293	QP	35.41	19.64	10.41	31.73	0.00	33.73	46.00	12.27	126	226	
Hori.	2483.500	PK	56.57	27.55	14.29	44.16	2.24	56.49	73.90	17.41	151	102	*1)
Hori.	4237.756	PK	52.43	30.13	6.40	44.25	2.24	46.95	73.90	26.95	150	130	
Hori.	4960.000	PK	47.97	31.83	6.65	44.51	2.24	44.18	73.90	29.72	100	0	
Hori.	7440.000	PK	51.35	36.97	8.06	44.08	2.24	54.54	73.90	19.36	197	44	
Hori.	9920.000	PK	47.09	38.98	9.15	43.87	2.24	53.59	73.90	20.31	100	0	
Hori.	12400.000	PK	46.44	39.26	10.33	43.36	2.24	54.91	73.90	18.99	100	0	
Hori.	4237.756	AV	46.73	30.13	6.40	44.25	2.24	41.25	53.90	12.65	150	130	
Vert.	72.680	QP	40.44	6.21	7.17	32.10	0.00	21.72	40.00	18.28	100	284	
Vert.	104.348	QP	40.12	10.68	7.45	32.08	0.00	26.17	43.50	17.33	100	146	
Vert.	201.647	QP	46.45	11.41	8.16	31.99	0.00	34.03	43.50	9.47	100	360	
Vert.	242.093	QP	31.17	11.64	8.39	31.93	0.00	19.27	46.00	26.73	100	116	
Vert.	298.521	QP	28.97	13.34	8.71	31.92	0.00	19.10	46.00	26.90	162	209	
Vert.	706.293	QP	31.14	19.64	10.41	31.73	0.00	29.46	46.00	16.54	100	286	
Vert.	2483.500	PK	58.57	27.55	14.29	44.16	2.24	58.49	73.90	15.41	152	185	*1)
Vert.	4237.756	PK	52.18	30.13	6.40	44.25	2.24	46.70	73.90	27.20	143	164	
Vert.	4960.000	PK	48.37	31.83	6.65	44.51	2.24	44.58	73.90	29.32	100	0	
Vert.	7440.000	PK	53.12	36.97	8.06	44.08	2.24	56.31	73.90	17.59	129	28	
Vert.	9920.000	PK	47.63	38.98	9.15	43.87	2.24	54.13	73.90	19.77	100	0	
Vert.	12400.000	PK	46.77	39.26	10.33	43.36	2.24	55.24	73.90	18.66	100	0	
Vert.	4237.756	AV	47.65	30.13	6.40	44.25	2.24	42.17	53.90	11.73	143	164	

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

Distance factor : 1 GHz - 13 GHz : 20log((4 - 0.12) 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).

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	36.70	27.55	14.29	44.16	-24.55	2.24	12.07	53.90	41.83	*1)
Hori.	4960.000	AV	36.66	31.83	6.65	44.51	-24.55	2.24	8.32	53.90	45.58	
Hori.	7440.000	AV	45.34	36.97	8.06	44.08	-24.55	2.24	23.98	53.90	29.92	
Hori.	9920.000	AV	35.14	38.98	9.15	43.87	-24.55	2.24	17.09	53.90	36.81	
Hori.	12400.000	AV	34.47	39.26	10.33	43.36	-24.55	2.24	18.39	53.90	35.51	
Vert.	2483.500	AV	36.90	27.55	14.29	44.16	-24.55	2.24	12.27	53.90	41.63	*1)
Vert.	4960.000	AV	36.69	31.83	6.65	44.51	-24.55	2.24	8.35	53.90	45.55	
Vert.	7440.000	AV	47.97	36.97	8.06	44.08	-24.55	2.24	26.61	53.90	27.29	
Vert.	9920.000	AV	35.19	38.98	9.15	43.87	-24.55	2.24	17.14	53.90	36.76	
Vert.	12400.000	AV	34.42	39.26	10.33	43.36	-24.55	2.24	18.34	53.90	35.56	

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((4 - 0.12) m / 3.0 m) = 2.24 dB

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

Dwell (time) factor refer to "Dwell time factor Calculation chart" sheet.

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

UL Japan, Inc.

Shonan EMC Lab.

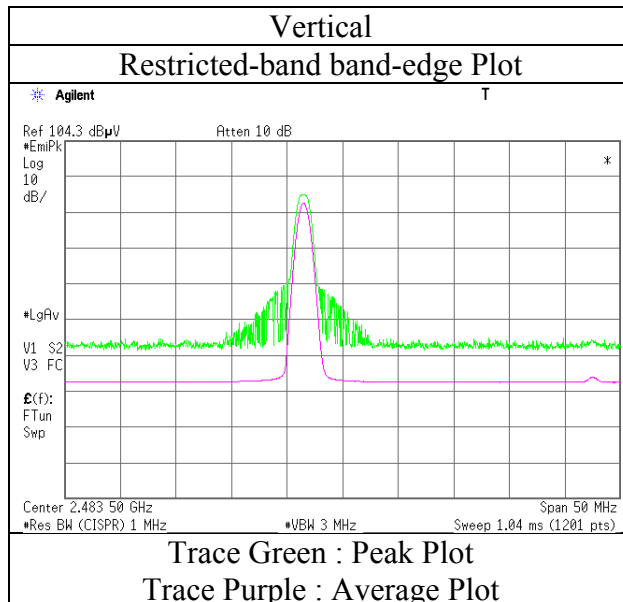
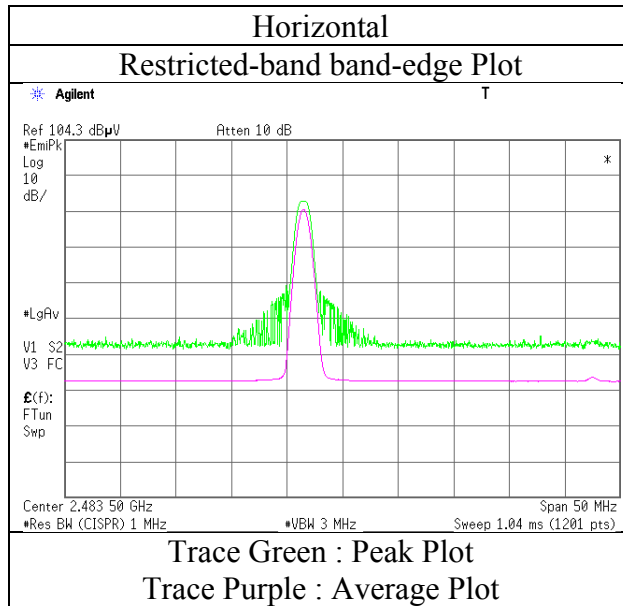
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No. 12005583S-A-R1
Test place Shonan EMC Lab.
Semi Anechoic Chamber No.3
Date October 28, 2017
Temperature / Humidity 23 deg. C / 46 % RH
Engineer Makoto Hosaka
Mode Tx, Hopping Off, DH5 2480 MHz



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

Radiated Spurious Emission

Report No. 12005583S-A-R1
Test place Shonan EMC Lab.
Semi Anechoic Chamber No.3 No.3
Date October 28, 2017 October 29, 2017
Temperature / Humidity 23 deg. C / 46 % RH 23 deg.C / 52 % RH
Engineer Makoto Hosaka Kenichi Adachi
(1 GHz -26.5 GHz) (below 1 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.	72.834	QP	43.06	6.21	7.18	32.10	0.00	24.35	40.00	15.65	258	303	
Hori.	104.348	QP	40.13	10.68	7.45	32.08	0.00	26.18	43.50	17.32	295	301	
Hori.	202.921	QP	45.65	11.42	8.17	31.99	0.00	33.25	43.50	10.25	165	45	
Hori.	242.216	QP	40.12	11.64	8.39	31.93	0.00	28.22	46.00	17.78	114	222	
Hori.	297.583	QP	33.97	13.31	8.71	31.92	0.00	24.07	46.00	21.93	100	123	
Hori.	706.295	QP	34.32	19.64	10.41	31.73	0.00	32.64	46.00	13.36	123	222	
Hori.	2390.000	PK	49.26	27.26	14.19	44.13	2.24	48.82	73.90	25.08	183	36	*1)
Hori.	4237.756	PK	53.16	30.13	6.40	44.25	2.24	47.68	73.90	26.22	147	128	
Hori.	4804.000	PK	48.97	31.40	6.58	44.45	2.24	44.74	73.90	29.16	100	0	
Hori.	7206.000	PK	54.03	36.56	8.06	43.99	2.24	56.90	73.90	17.00	147	291	
Hori.	9608.000	PK	48.70	38.61	9.13	43.83	2.24	54.85	73.90	19.05	100	0	
Hori.	12010.000	PK	49.08	39.30	10.46	43.36	2.24	57.72	73.90	16.18	100	0	
Hori.	4237.756	AV	46.71	30.13	6.40	44.25	2.24	41.23	53.90	12.67	147	128	
Vert.	72.683	QP	40.22	6.21	7.17	32.10	0.00	21.50	40.00	18.50	100	281	
Vert.	104.348	QP	40.33	10.68	7.45	32.08	0.00	26.38	43.50	17.12	100	146	
Vert.	201.727	QP	46.71	11.41	8.16	31.99	0.00	34.29	43.50	9.21	100	0	
Vert.	242.092	QP	31.09	11.64	8.39	31.93	0.00	19.19	46.00	26.81	100	115	
Vert.	298.518	QP	29.02	13.34	8.71	31.92	0.00	19.15	46.00	26.85	161	208	
Vert.	706.295	QP	31.21	19.64	10.41	31.73	0.00	29.53	46.00	16.47	100	291	
Vert.	2390.000	PK	48.51	27.26	14.19	44.13	2.24	48.07	73.90	25.83	151	24	*1)
Vert.	4237.756	PK	52.40	30.13	6.40	44.25	2.24	46.92	73.90	26.98	142	163	
Vert.	4804.000	PK	49.53	31.40	6.58	44.45	2.24	45.30	73.90	28.60	100	0	
Vert.	7206.000	PK	56.68	36.56	8.06	43.99	2.24	59.55	73.90	14.35	140	216	
Vert.	9608.000	PK	49.65	38.61	9.13	43.83	2.24	55.80	73.90	18.10	100	0	
Vert.	12010.000	PK	49.50	39.30	10.46	43.36	2.24	58.14	73.90	15.76	100	0	
Vert.	4237.756	AV	47.67	30.13	6.40	44.25	2.24	42.19	53.90	11.71	142	163	

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

Distance factor : 1 GHz - 13 GHz : 20log((4 - 0.12) 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).

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2390.000	AV	36.42	27.26	14.19	44.13	-24.56	2.24	11.42	53.90	42.48	*1)
Hori.	4804.000	AV	36.82	31.40	6.58	44.45	-24.56	2.24	8.03	53.90	45.87	
Hori.	7206.000	AV	47.57	36.56	8.06	43.99	-24.56	2.24	25.88	53.90	28.02	
Hori.	9608.000	AV	37.34	38.61	9.13	43.83	-24.56	2.24	18.93	53.90	34.97	
Hori.	12010.000	AV	37.67	39.30	10.46	43.36	-24.56	2.24	21.75	53.90	32.15	
Vert.	2390.000	AV	36.43	27.26	14.19	44.13	-24.56	2.24	11.43	53.90	42.47	*1)
Vert.	4804.000	AV	36.86	31.40	6.58	44.45	-24.56	2.24	8.07	53.90	45.83	
Vert.	7206.000	AV	49.35	36.56	8.06	43.99	-24.56	2.24	27.66	53.90	26.24	
Vert.	9608.000	AV	37.36	38.61	9.13	43.83	-24.56	2.24	18.95	53.90	34.95	
Vert.	12010.000	AV	37.63	39.30	10.46	43.36	-24.56	2.24	21.71	53.90	32.19	

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((4 - 0.12) m / 3.0 m) = 2.24 dB

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

Dwell (time) factor refer to "Dwell time factor Calculation chart" sheet.

*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	86.72	27.29	14.20	44.14	2.24	86.31	-	-	carrier
Hori.	2400.000	PK	45.69	27.29	14.19	44.14	2.24	45.27	66.31	21.0	
Vert.	2402.000	PK	86.29	27.29	14.20	44.14	2.24	85.88	-	-	carrier
Vert.	2400.000	PK	45.45	27.29	14.19	44.14	2.24	45.03	65.88	20.9	

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

Distance factor : 1 GHz - 13 GHz : 20log((4 - 0.12) 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.

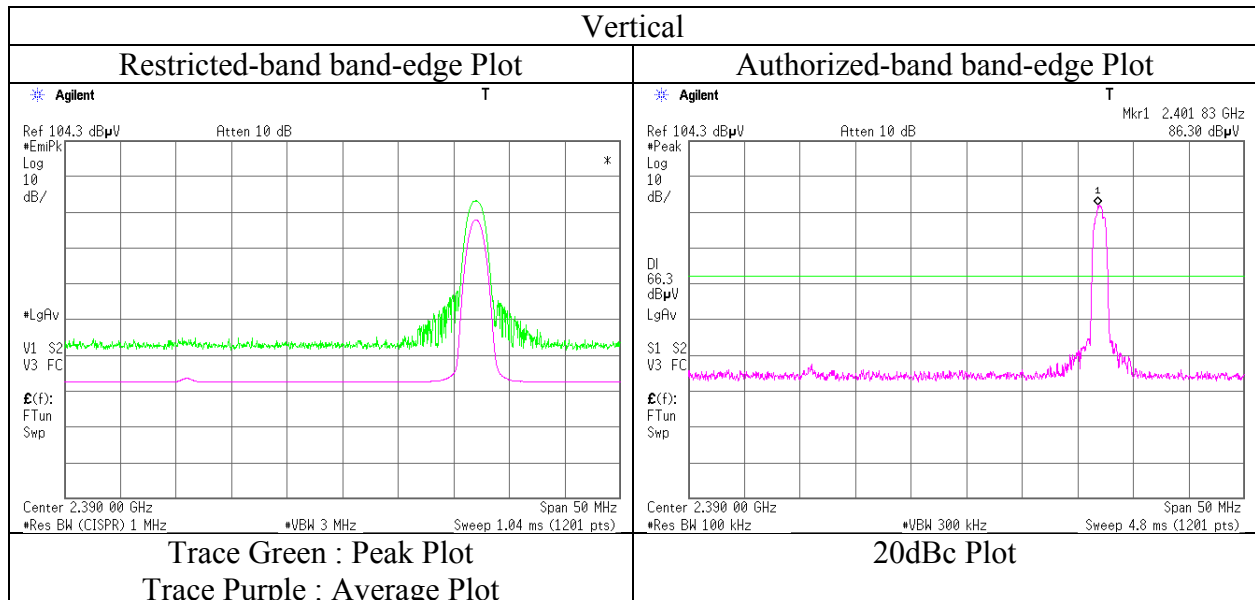
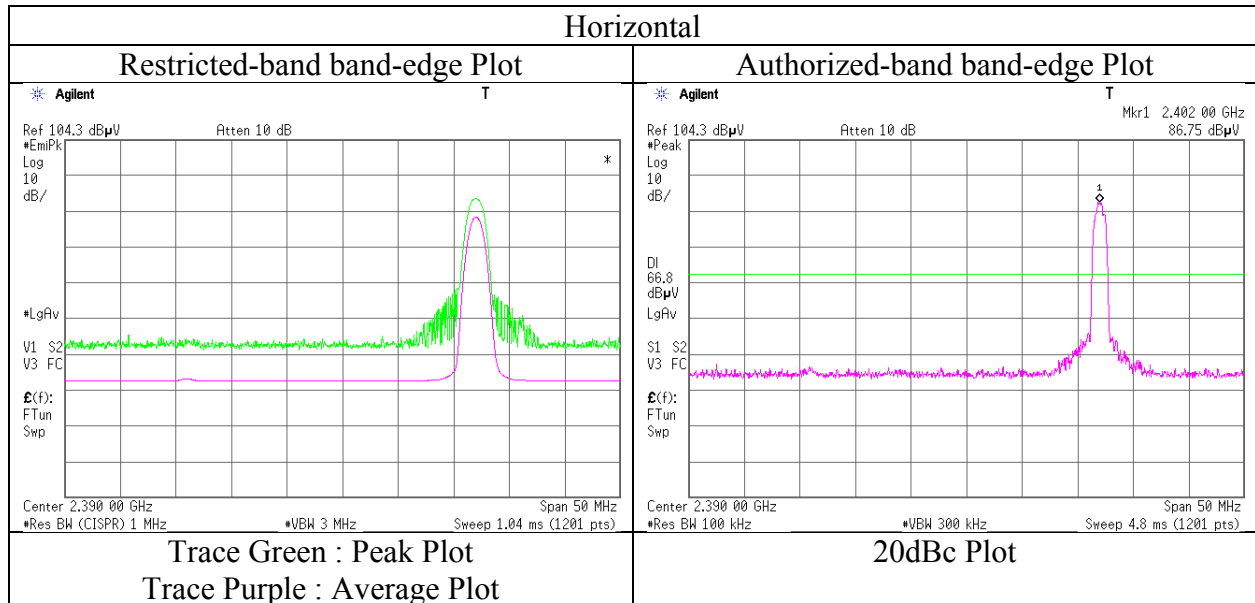
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No. 12005583S-A-R1
Test place Shonan EMC Lab.
Semi Anechoic Chamber No.3
Date October 28, 2017
Temperature / Humidity 23 deg. C / 46 % RH
Engineer Makoto Hosaka
Mode Tx, Hopping Off, 3DH5 2402 MHz



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

Radiated Spurious Emission

Report No. 12005583S-A-R1
Test place Shonan EMC Lab.
Semi Anechoic Chamber No.3 No.3
Date October 28, 2017 October 29, 2017
Temperature / Humidity 23 deg. C / 46 % RH 23 deg.C / 52 % RH
Engineer Makoto Hosaka Kenichi Adachi
(1 GHz -26.5 GHz) (below 1 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.	72.817	QP	42.78	6.21	7.18	32.10	0.00	24.07	40.00	15.93	253	301	
Hori.	104.336	QP	40.26	10.68	7.45	32.08	0.00	26.31	43.50	17.19	302	286	
Hori.	202.910	QP	45.67	11.42	8.17	31.99	0.00	33.27	43.50	10.23	169	45	
Hori.	242.224	QP	40.22	11.64	8.39	31.93	0.00	28.32	46.00	17.68	116	231	
Hori.	297.578	QP	34.01	13.31	8.71	31.92	0.00	24.11	46.00	21.89	100	124	
Hori.	706.291	QP	34.54	19.64	10.41	31.73	0.00	32.86	46.00	13.14	126	226	
Hori.	4237.756	PK	51.87	30.13	6.40	44.25	2.24	46.39	73.90	27.51	152	129	
Hori.	4882.000	PK	49.25	31.62	6.62	44.48	2.24	45.25	73.90	28.65	100	0	
Hori.	7323.000	PK	54.62	36.77	8.06	44.03	2.24	57.66	73.90	16.24	175	307	
Hori.	9764.000	PK	47.74	38.80	9.15	43.85	2.24	54.08	73.90	19.82	100	0	
Hori.	12205.000	PK	47.63	39.28	10.39	43.36	2.24	56.18	73.90	17.72	100	0	
Hori.	4237.756	AV	46.93	30.13	6.40	44.25	2.24	41.45	53.90	12.45	152	129	
Vert.	72.735	QP	40.37	6.21	7.17	32.10	0.00	21.65	40.00	18.35	100	285	
Vert.	104.057	QP	40.51	10.63	7.46	32.08	0.00	26.52	43.50	16.98	100	142	
Vert.	201.697	QP	46.33	11.41	8.16	31.99	0.00	33.91	43.50	9.59	100	360	
Vert.	242.081	QP	31.02	11.64	8.39	31.93	0.00	19.12	46.00	26.88	100	117	
Vert.	298.569	QP	29.46	13.34	8.71	31.92	0.00	19.59	46.00	26.41	162	208	
Vert.	706.291	QP	30.96	19.64	10.41	31.73	0.00	29.28	46.00	16.72	100	283	
Vert.	4237.756	PK	52.59	30.13	6.40	44.25	2.24	47.11	73.90	26.79	139	165	
Vert.	4882.000	PK	48.26	31.62	6.62	44.48	2.24	44.26	73.90	29.64	100	0	
Vert.	7323.000	PK	56.72	36.77	8.06	44.03	2.24	59.76	73.90	14.14	147	149	
Vert.	9764.000	PK	48.26	38.80	9.15	43.85	2.24	54.60	73.90	19.30	100	0	
Vert.	12205.000	PK	48.09	39.28	10.39	43.36	2.24	56.64	73.90	17.26	100	0	
Vert.	4237.756	AV	47.49	30.13	6.40	44.25	2.24	42.01	53.90	11.89	139	165	

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

Distance factor : 1 GHz - 13 GHz : $20\log((4 - 0.12) \text{ m} / 3.0 \text{ m}) = 2.24 \text{ dB}$

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).

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	4882.000	AV	36.91	31.62	6.62	44.48	-24.56	2.24	8.35	53.90	45.55	
Hori.	7323.000	AV	48.09	36.77	8.06	44.03	-24.56	2.24	26.57	53.90	27.33	
Hori.	9764.000	AV	36.17	38.80	9.15	43.85	-24.56	2.24	17.95	53.90	35.95	
Hori.	12205.000	AV	35.79	39.28	10.39	43.36	-24.56	2.24	19.78	53.90	34.12	
Vert.	4882.000	AV	36.83	31.62	6.62	44.48	-24.56	2.24	8.27	53.90	45.63	
Vert.	7323.000	AV	50.12	36.77	8.06	44.03	-24.56	2.24	28.60	53.90	25.30	
Vert.	9764.000	AV	36.11	38.80	9.15	43.85	-24.56	2.24	17.89	53.90	36.01	
Vert.	12205.000	AV	35.62	39.28	10.39	43.36	-24.56	2.24	19.61	53.90	34.29	

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 : $20\log((4 - 0.12) \text{ m} / 3.0 \text{ m}) = 2.24 \text{ dB}$

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

Dwell (time) factor refer to "Dwell time factor Calculation chart" sheet.

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

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

Radiated Spurious Emission

Report No. 12005583S-A-R1
Test place Shonan EMC Lab.
Semi Anechoic Chamber No.3 No.3
Date October 28, 2017 October 29, 2017
Temperature / Humidity 23 deg. C / 46 % RH 23 deg.C / 52 % RH
Engineer Makoto Hosaka Kenichi Adachi
(1 GHz -26.5 GHz) (below 1 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.	72.792	QP	42.45	6.21	7.18	32.10	0.00	23.74	40.00	16.26	257	305	
Hori.	104.136	QP	40.28	10.65	7.46	32.08	0.00	26.31	43.50	17.19	299	303	
Hori.	202.917	QP	45.45	11.42	8.17	31.99	0.00	33.05	43.50	10.45	163	53	
Hori.	242.412	QP	40.12	11.64	8.40	31.93	0.00	28.23	46.00	17.77	118	225	
Hori.	297.569	QP	33.89	13.31	8.71	31.92	0.00	23.99	46.00	22.01	100	129	
Hori.	706.296	QP	35.46	19.64	10.41	31.73	0.00	33.78	46.00	12.22	129	223	
Hori.	2483.500	PK	56.73	27.55	14.29	44.16	2.24	56.65	73.90	17.25	155	101	*1)
Hori.	4237.756	PK	52.25	30.13	6.40	44.25	2.24	46.77	73.90	27.13	152	129	
Hori.	4960.000	PK	48.38	31.83	6.65	44.51	2.24	44.59	73.90	29.31	100	0	
Hori.	7440.000	PK	52.61	36.97	8.06	44.08	2.24	55.80	73.90	18.10	196	44	
Hori.	9920.000	PK	47.28	38.98	9.15	43.87	2.24	53.78	73.90	20.12	100	0	
Hori.	12400.000	PK	46.48	39.26	10.33	43.36	2.24	54.95	73.90	18.95	100	0	
Hori.	4237.756	AV	46.96	30.13	6.40	44.25	2.24	41.48	53.90	12.42	152	129	
Vert.	72.679	QP	40.23	6.21	7.17	32.10	0.00	21.51	40.00	18.49	100	279	
Vert.	104.363	QP	40.68	10.68	7.45	32.08	0.00	26.73	43.50	16.77	100	114	
Vert.	201.762	QP	46.33	11.41	8.16	31.99	0.00	33.91	43.50	9.59	100	0	
Vert.	237.524	QP	31.25	11.61	8.37	31.94	0.00	19.29	46.00	26.71	100	115	
Vert.	298.517	QP	29.36	13.34	8.71	31.92	0.00	19.49	46.00	26.51	157	207	
Vert.	706.296	QP	31.55	19.64	10.41	31.73	0.00	29.87	46.00	16.13	100	290	
Vert.	2483.500	PK	58.52	27.55	14.29	44.16	2.24	58.44	73.90	15.46	152	183	*1)
Vert.	4237.756	PK	52.67	30.13	6.40	44.25	2.24	47.19	73.90	26.71	141	164	
Vert.	4960.000	PK	49.45	31.83	6.65	44.51	2.24	45.66	73.90	28.24	100	0	
Vert.	7440.000	PK	54.39	36.97	8.06	44.08	2.24	57.58	73.90	16.32	130	26	
Vert.	9920.000	PK	46.94	38.98	9.15	43.87	2.24	53.44	73.90	20.46	100	0	
Vert.	12400.000	PK	45.98	39.26	10.33	43.36	2.24	54.45	73.90	19.45	100	0	
Vert.	4237.756	AV	47.56	30.13	6.40	44.25	2.24	42.08	53.90	11.82	141	164	

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

Distance factor : 1 GHz - 13 GHz : $20\log((4 - 0.12) \text{ m} / 3.0 \text{ m}) = 2.24 \text{ dB}$

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).

Dwell time factor relaxation

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell Factor [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2483.500	AV	36.74	27.55	14.29	44.16	-24.56	2.24	12.10	53.90	41.80	*1)
Hori.	4960.000	AV	36.72	31.83	6.65	44.51	-24.56	2.24	8.37	53.90	45.53	
Hori.	7440.000	AV	43.75	36.97	8.06	44.08	-24.56	2.24	22.38	53.90	31.52	
Hori.	9920.000	AV	35.27	38.98	9.15	43.87	-24.56	2.24	17.21	53.90	36.69	
Hori.	12400.000	AV	34.50	39.26	10.33	43.36	-24.56	2.24	18.41	53.90	35.49	
Vert.	2483.500	AV	36.90	27.55	14.29	44.16	-24.56	2.24	12.26	53.90	41.64	*1)
Vert.	4960.000	AV	36.74	31.83	6.65	44.51	-24.56	2.24	8.39	53.90	45.51	
Vert.	7440.000	AV	46.39	36.97	8.06	44.08	-24.56	2.24	25.02	53.90	28.88	
Vert.	9920.000	AV	35.24	38.98	9.15	43.87	-24.56	2.24	17.18	53.90	36.72	
Vert.	12400.000	AV	34.40	39.26	10.33	43.36	-24.56	2.24	18.31	53.90	35.59	

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 : $20\log((4 - 0.12) \text{ m} / 3.0 \text{ m}) = 2.24 \text{ dB}$

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

Dwell (time) factor refer to "Dwell time factor Calculation chart" sheet.

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

UL Japan, Inc.

Shonan EMC Lab.

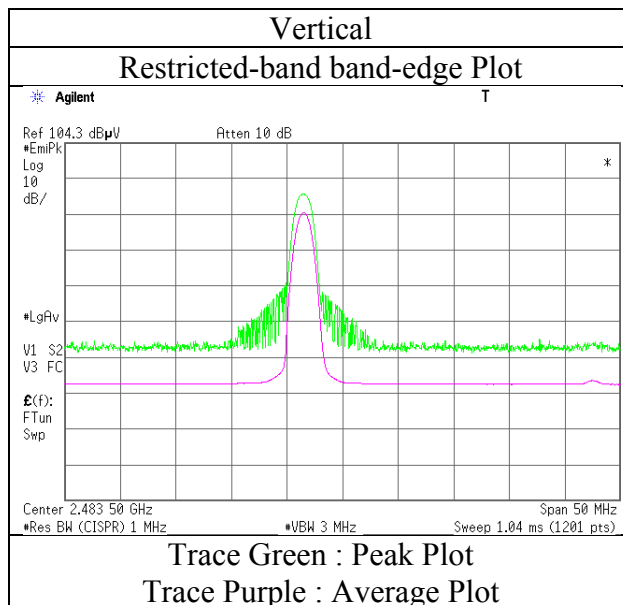
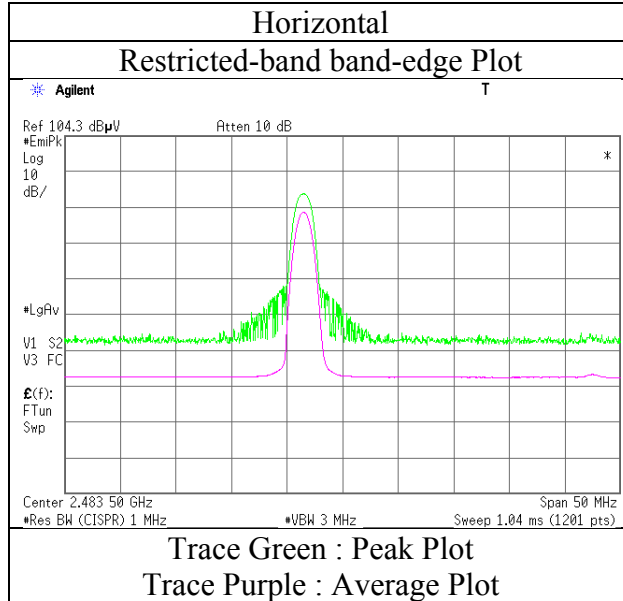
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

Radiated Spurious Emission
(Reference Plot for band-edge)

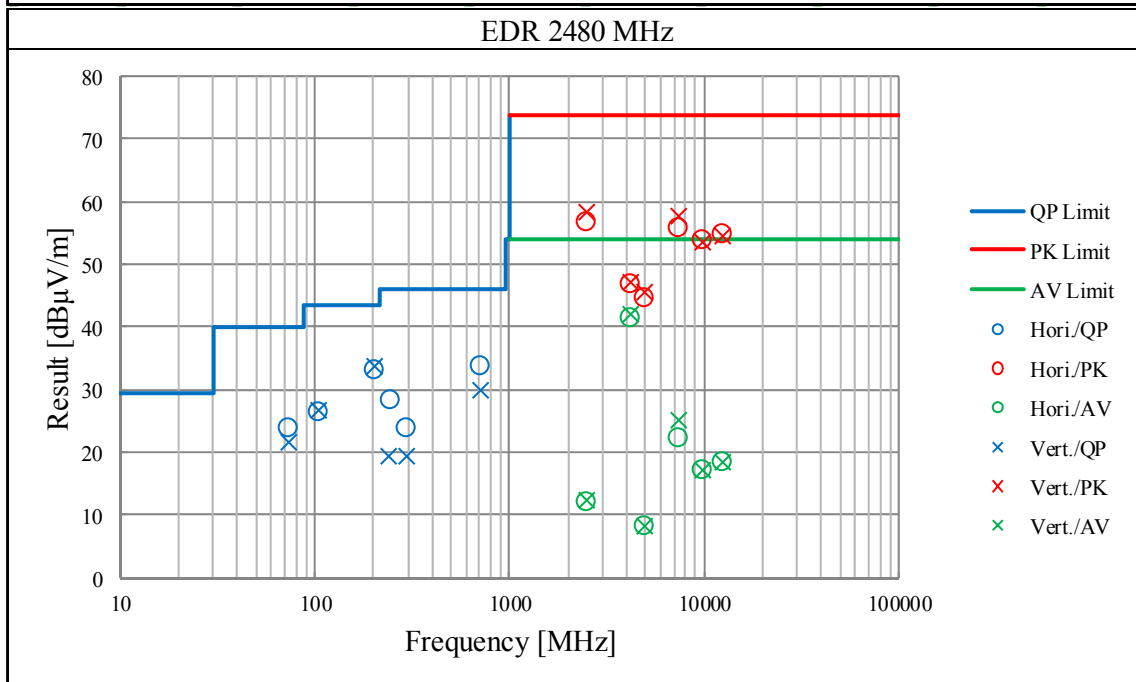
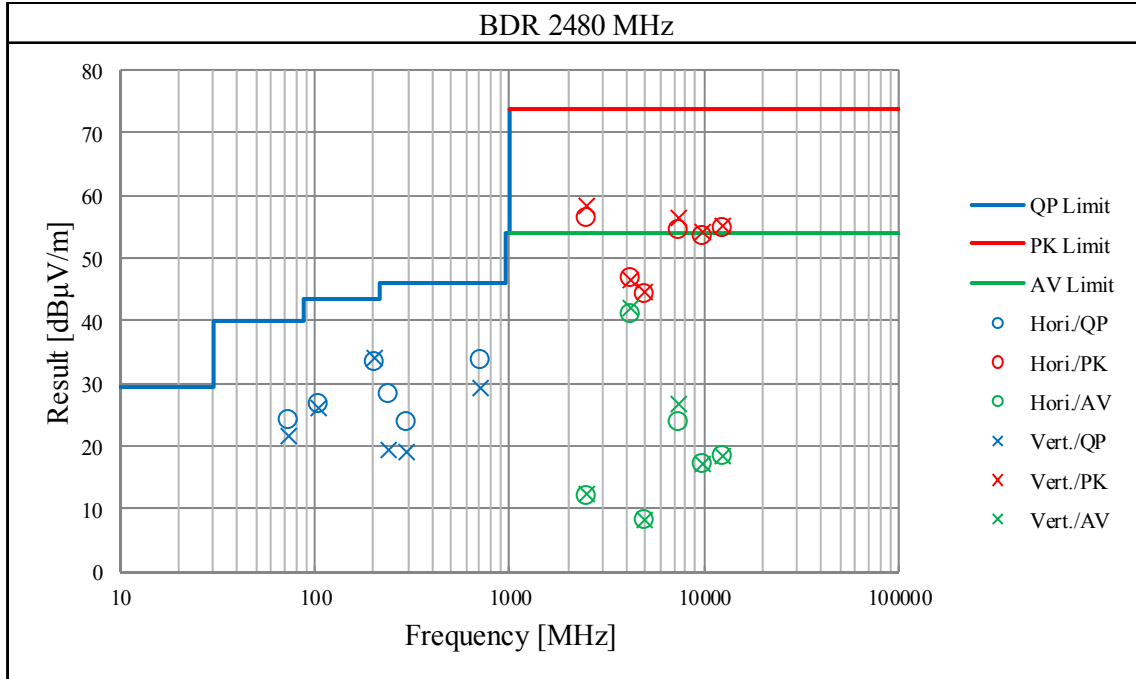
Report No.	12005583S-A-R1	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.3	No.3
Date	October 28, 2017	October 29, 2017
Temperature / Humidity	23 deg. C / 46 % RH	23 deg. C / 52 %
Engineer	Makoto Hosaka (1 GHz -26.5 GHz)	Kenichi Adachi (below 1 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz	



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

Radiated Spurious Emission
(Plot data, Worst case)

Report No.	12005583S-A-R1	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.3	No.3
Date	October 28, 2017	October 29, 2017
Temperature / Humidity	23 deg. C / 46 % RH	23 deg.C / 52 %
Engineer	Makoto Hosaka	Kenichi Adachi
	(1 GHz -26.5 GHz)	(below 1 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz	

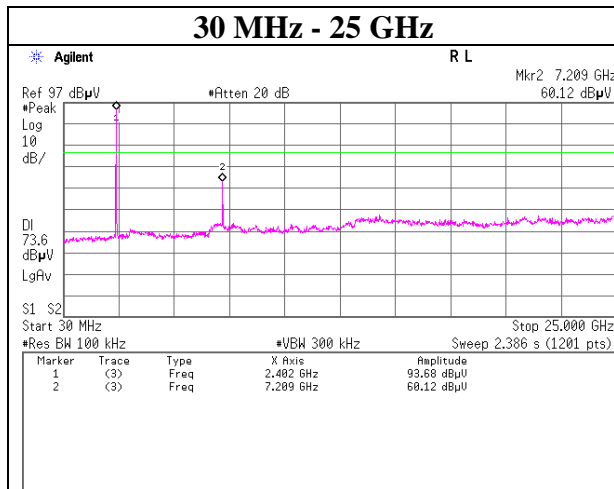
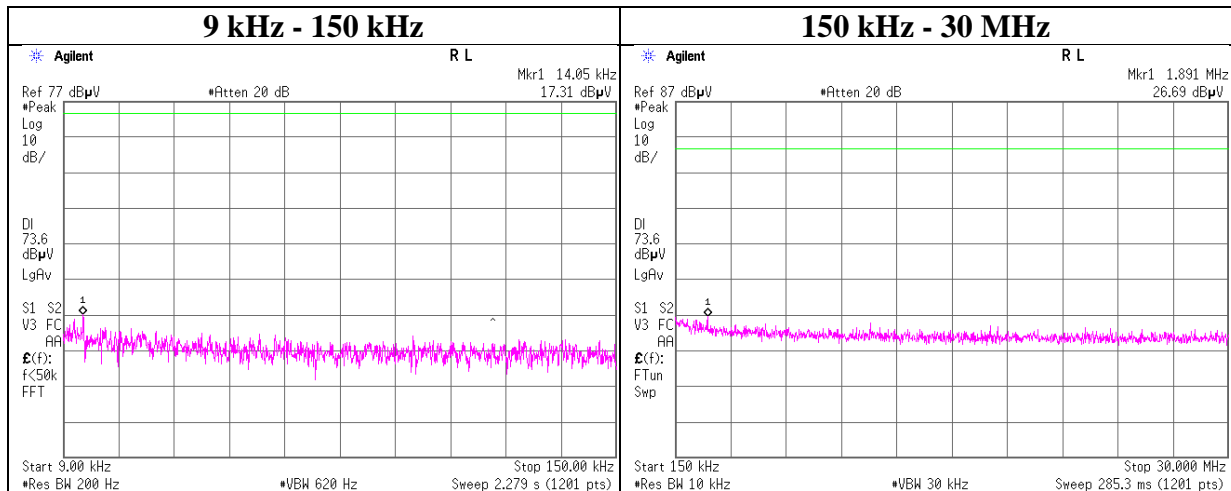


*These plots data contains sufficient number to show the trend of characteristic features for EUT.

Conducted Spurious Emission

Test place	Shonan EMC Lab. No.6 Shielded Room
Report No.	12005583S-A-R1
Date	February 3, 2017
Temperature / Humidity	24 deg. C / 32 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx, Hopping Off, DH5

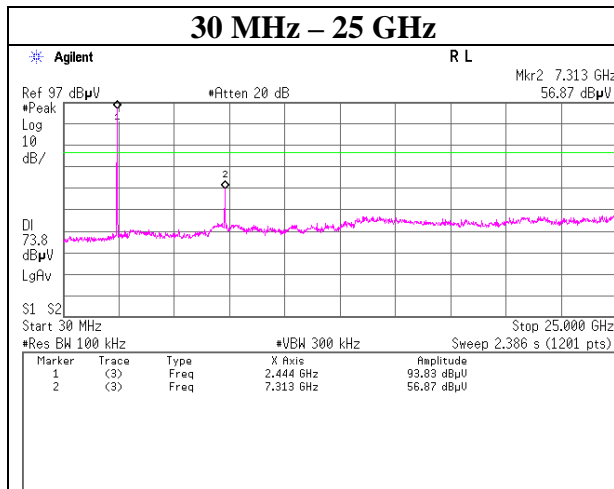
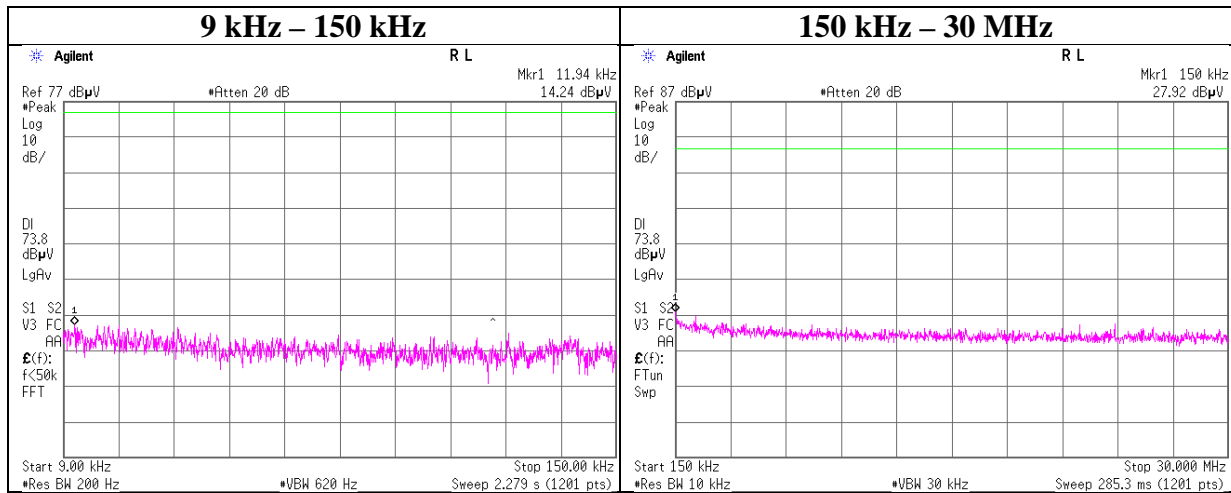
2402 MHz



Conducted Spurious Emission

Test place	Shonan EMC Lab. No.6 Shielded Room
Report No.	12005583S-A-R1
Date	February 3, 2017
Temperature / Humidity	24 deg. C / 32 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx, Hopping Off, DH5

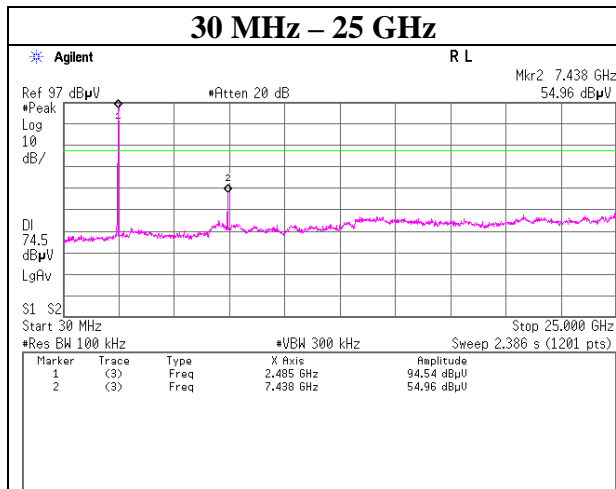
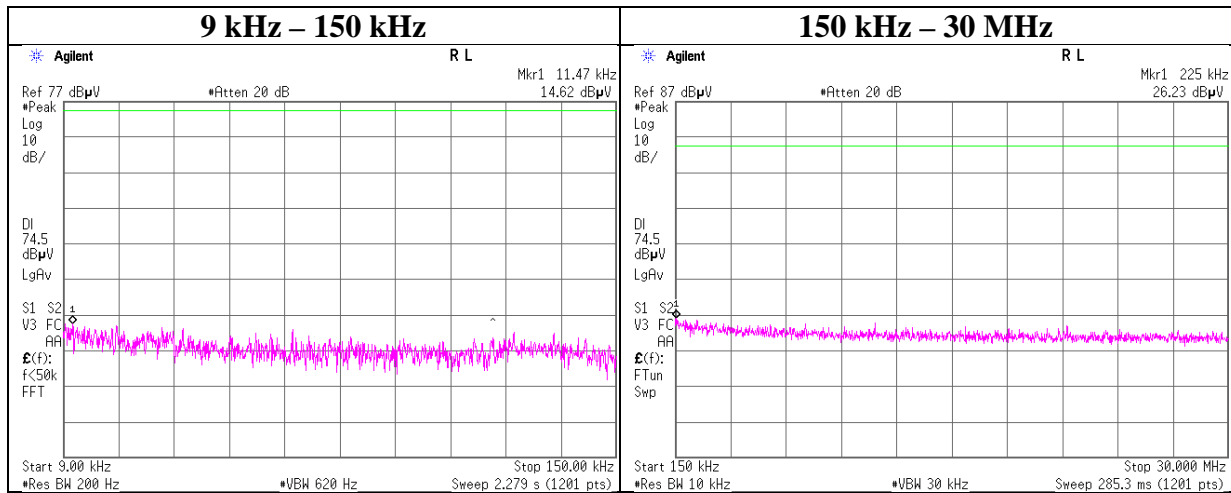
2441 MHz



Conducted Spurious Emission

Test place	Shonan EMC Lab. No.6 Shielded Room
Report No.	12005583S-A-R1
Date	February 3, 2017
Temperature / Humidity	24 deg. C / 32 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx, Hopping Off, DH5

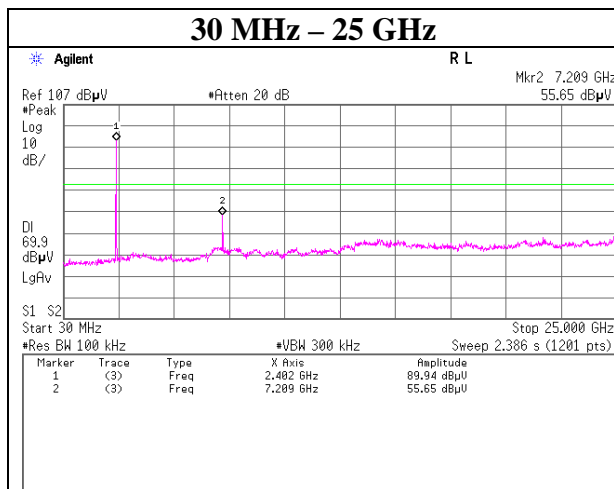
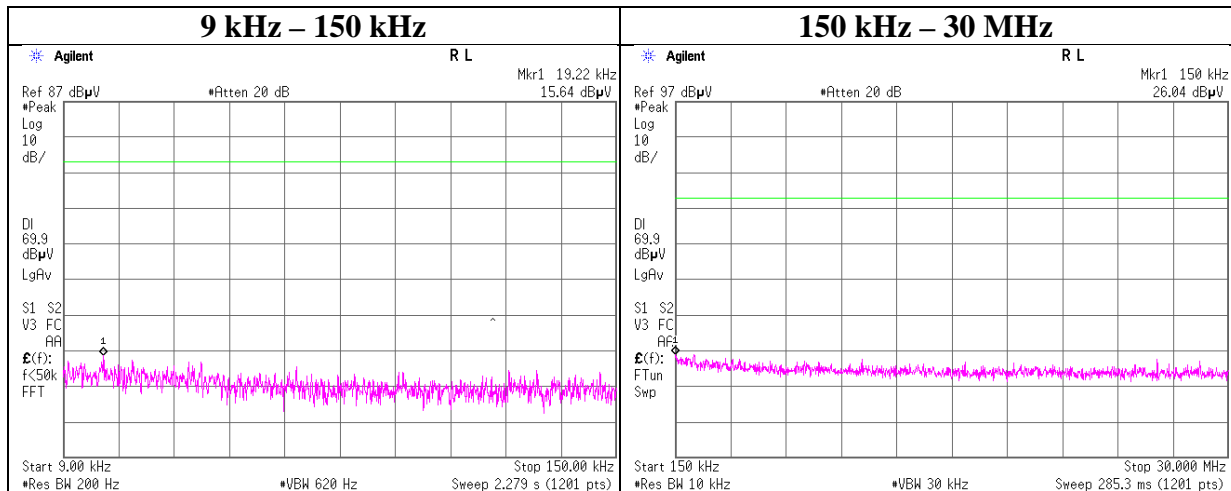
2480 MHz



Conducted Spurious Emission

Test place	Shonan EMC Lab. No.6 Shielded Room
Report No.	12005583S-A-R1
Date	February 3, 2017
Temperature / Humidity	24 deg. C / 32 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx, Hopping Off, DH5

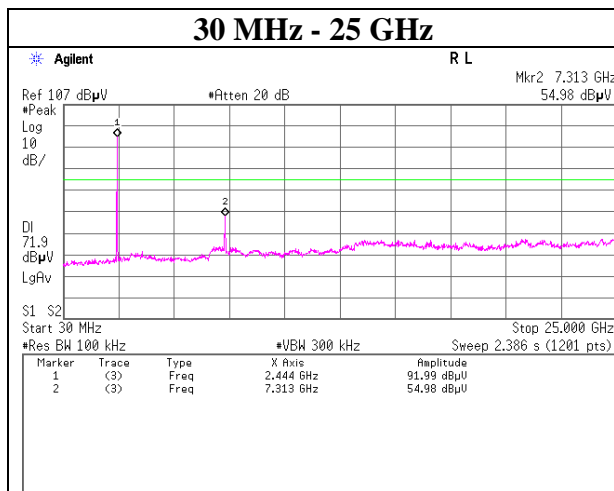
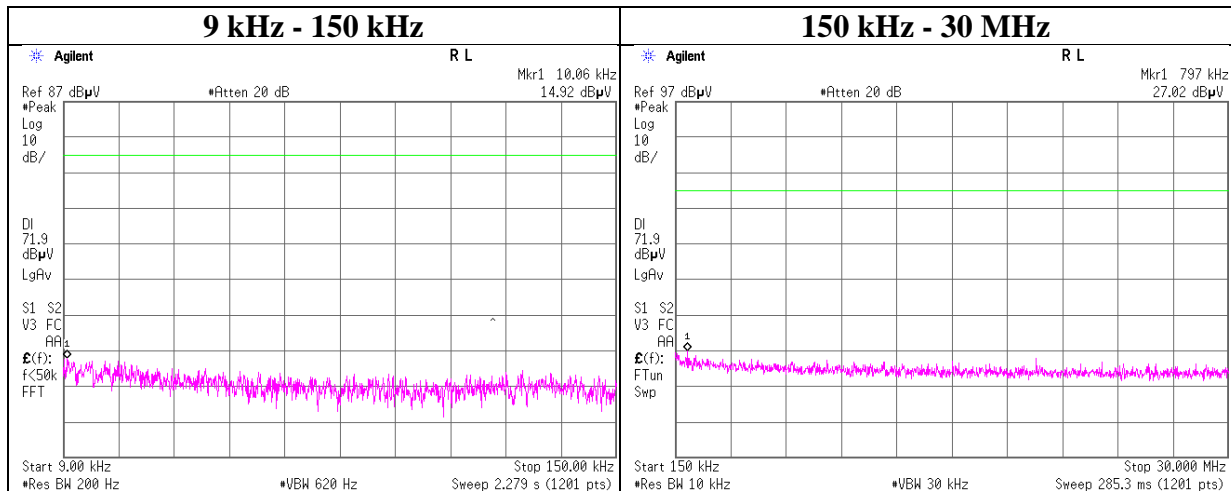
2402 MHz



Conducted Spurious Emission

Test place	Shonan EMC Lab. No.6 Shielded Room
Report No.	12005583S-A-R1
Date	February 3, 2017
Temperature / Humidity	24 deg. C / 32 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx, Hopping Off, 3DH5

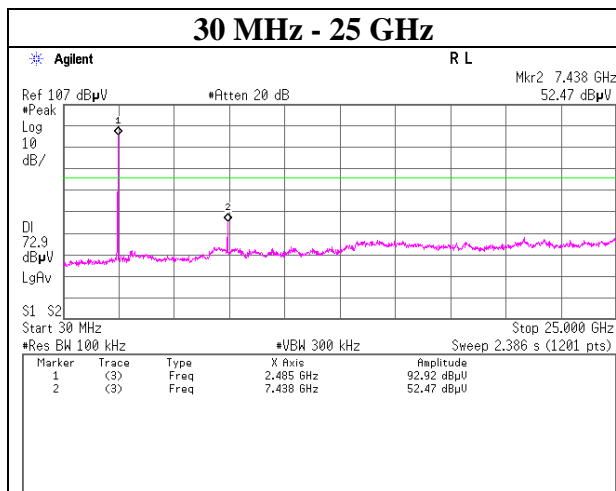
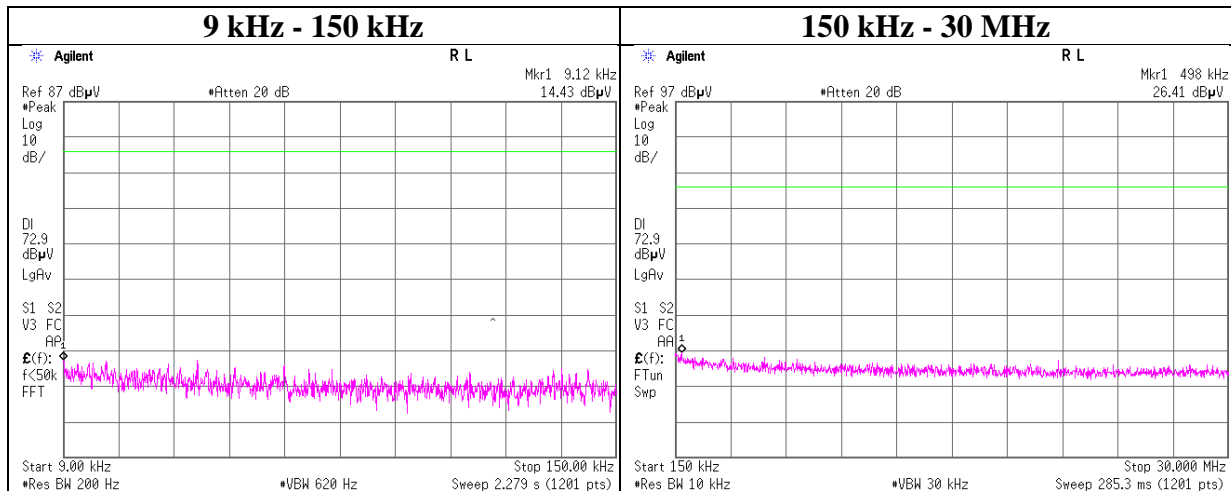
2441 MHz



Conducted Spurious Emission

Test place	Shonan EMC Lab. No.6 Shielded Room
Report No.	12005583S-A-R1
Date	February 3, 2017
Temperature / Humidity	24 deg. C / 32 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx, Hopping Off, 3DH5

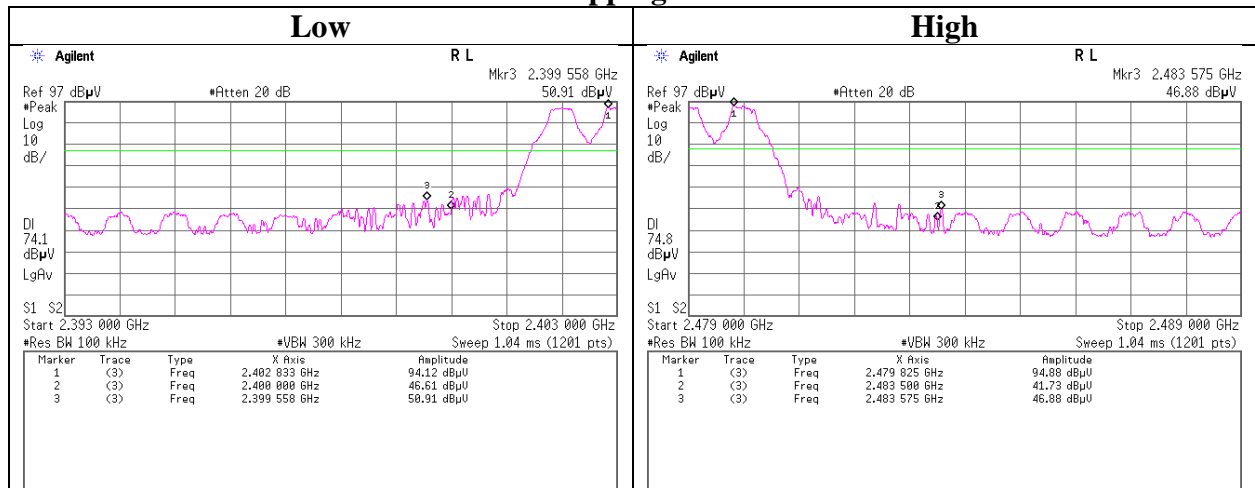
2480 MHz



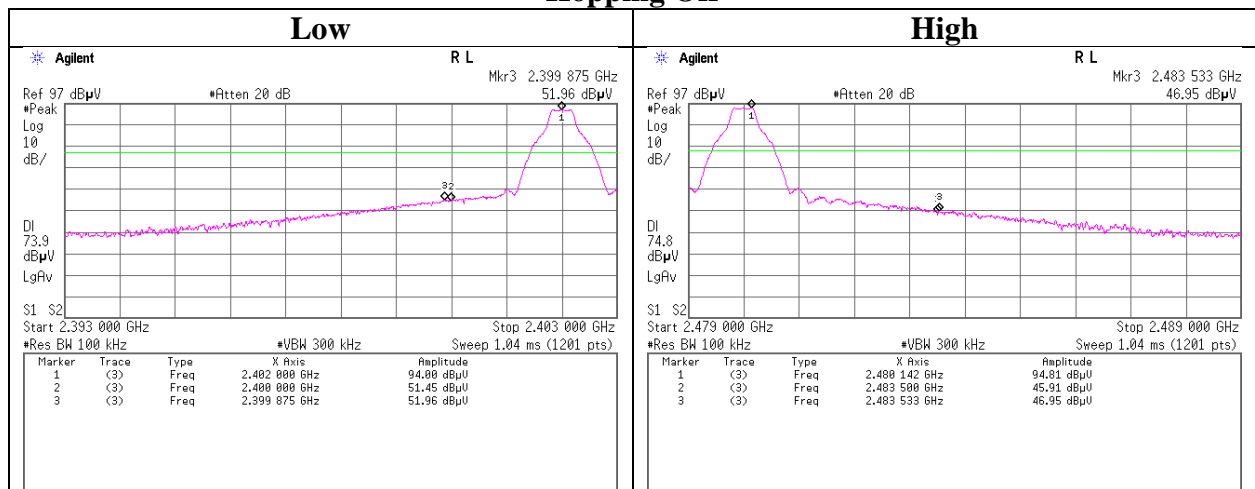
Conducted Emission Band Edge compliance

Test place	Shonan EMC Lab. No.6 Shielded Room
Report No.	12005583S-A-R1
Date	February 3, 2017
Temperature / Humidity	24 deg. C / 32 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx DH5

Hopping On



Hopping Off



UL Japan, Inc.

Shonan EMC Lab.

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

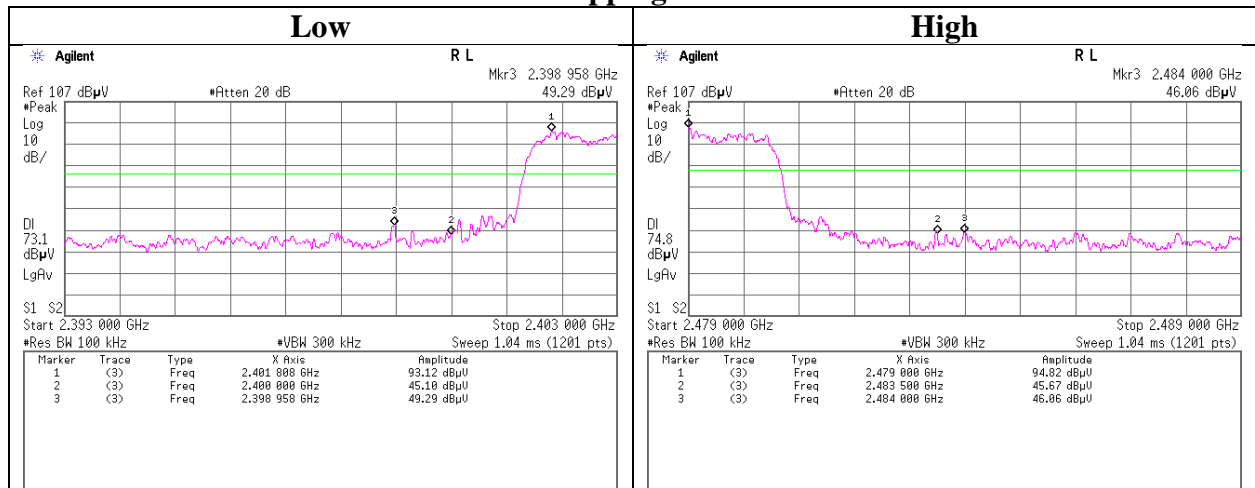
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

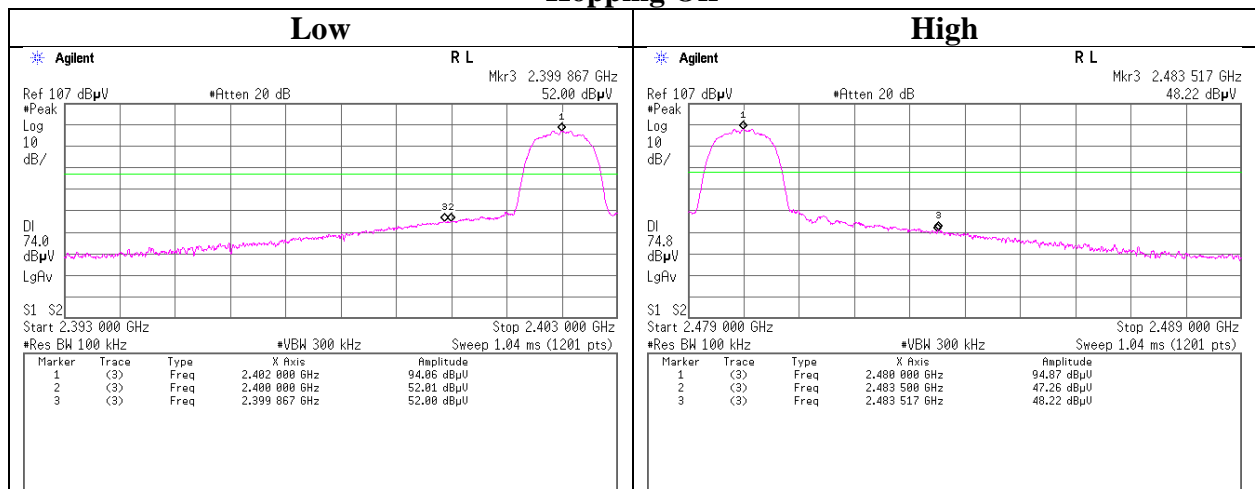
Conducted Emission Band Edge compliance

Test place	Shonan EMC Lab. No.6 Shielded Room
Report No.	12005583S-A-R1
Date	February 3, 2017
Temperature / Humidity	24 deg. C / 32 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx 3DH5

Hopping On



Hopping Off



UL Japan, Inc.

Shonan EMC Lab.

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

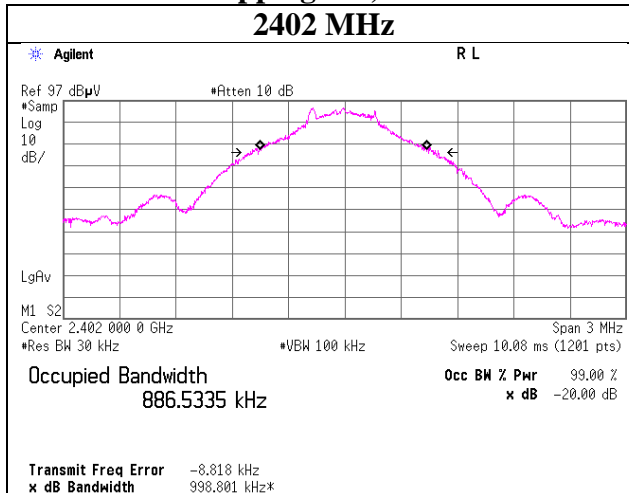
Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

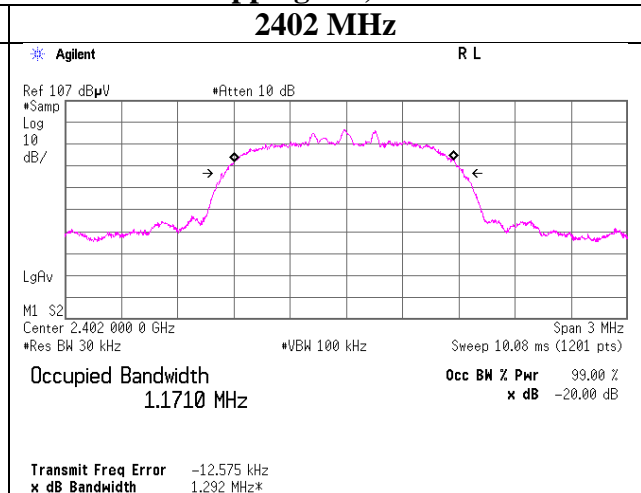
99% Occupied Bandwidth

Test place	Shonan EMC Lab. No.6 Shielded Room
Report No.	12005583S-A-R1
Date	February 3, 2017
Temperature / Humidity	24 deg. C / 32 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx Hopping Off

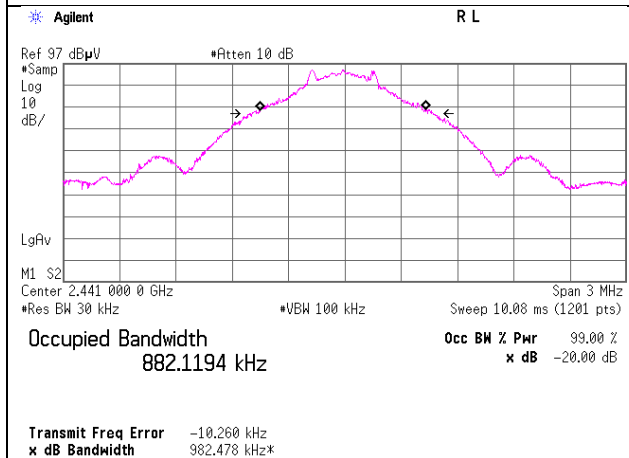
Hopping Off, DH5



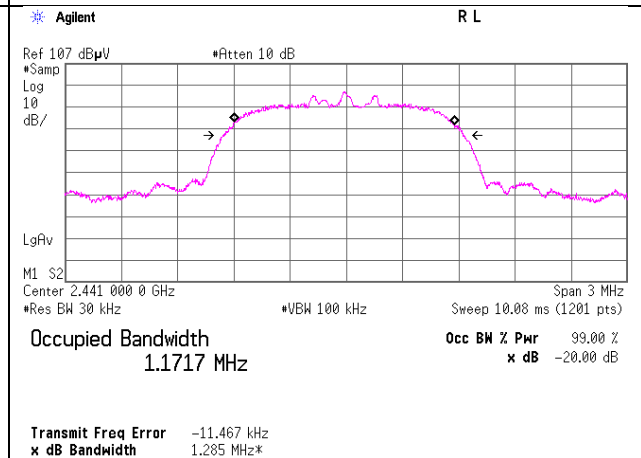
Hopping Off, 3DH5



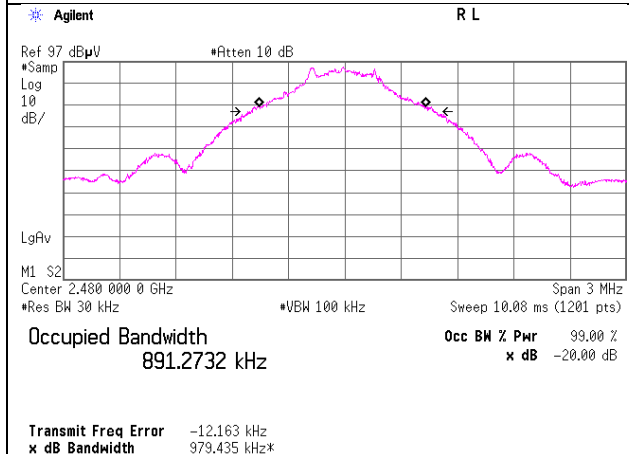
2441 MHz



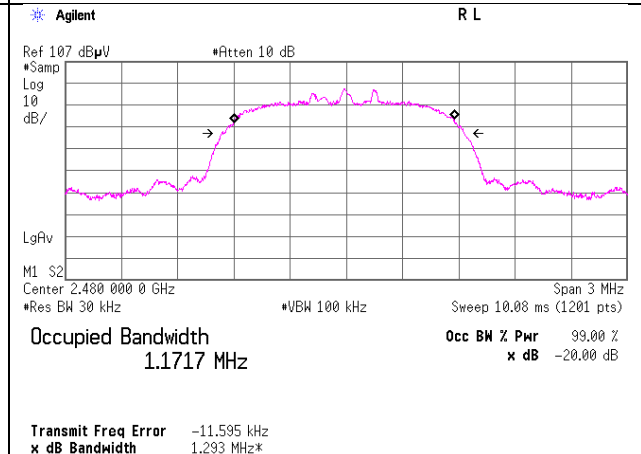
2441 MHz



2480 MHz



2480 MHz



UL Japan, Inc.

Shonan EMC Lab.

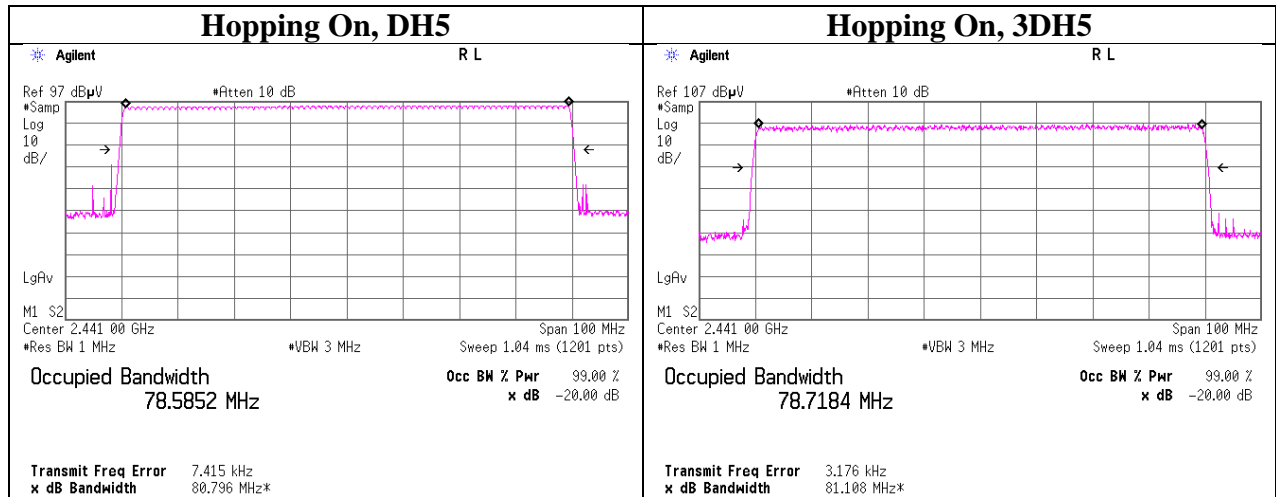
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN

Telephone : +81 463 50 6400

Facsimile : +81 463 50 6401

99% Occupied Bandwidth

Test place	Shonan EMC Lab. No.6 Shielded Room
Report No.	12005583S-A-R1
Date	February 3, 2017
Temperature / Humidity	24 deg. C / 32 % RH
Engineer	Hiroyuki Morikawa
Mode	Tx Hopping On



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

APPENDIX 2: Test instruments

Test equipment (1/2, for Antenna terminal conducted test)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	AT	2016/03/23 * 12 *1)
SPM-07	Power Meter	Agilent	8990B	MY5100272	AT	2016/04/04 * 12 *1)
SPSS-04	Power sensor	Agilent	N1923A	MY5326009	AT	2016/04/04 * 12 *1)
SCC-G13	Coaxial Cable	Suhner	SUCOFLEX 102	31599/2	AT	2016/03/23 * 12 *1)
SAT10-10	Attenuator	Weinschel Corp.	54A-10	37584	AT	2016/04/18 * 12 *1)
STS-06	Digital Hitester	Hioki	3805-50	080997830	AT	2016/03/22 * 12 *1)
SOS-10	Humidity Indicator	A&D	AD-5681	4064561	AT	2016/10/12 * 12 *1)

*1) This test equipment was used for the tests before the expiration date of the calibration.

Test equipment (2/2, for radiated emission test)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	2046104	RE	2017/09/22 * 12
SCC-G06	Coaxial Cable	Junkosha	J12J102207-00	MAY-23-16-091	RE	2017/06/13 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2017/05/08 * 12
SCC-G41	Coaxial Cable	Junkosha	MWX221-01000NF SNMS/B	1612S006	RE	2017/01/08 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2017/08/23 * 12
SAT10-05	Attenuator(above1GHz)	Agilent	8493C-010	74864	RE	2016/11/07 * 12
SFL-18	Highpass Filter	MICRO-TRONICS	HPM50111	119	RE	2017/04/20 * 12
SOS-06	Humidity Indicator	A&D	AD-5681	4062118	RE	2016/12/13 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	2017/03/07 * 12
SJM-02	Measure	KOMELON	KMC-36	-	RE	-
SAEC-03(SVSWR)	Semi-Anechoic Chamber	TDK	SAEC-03(SVSWR)	3	RE	2017/07/17 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RF,LF)	-	RE	-
STS-03	Digital Hitester	Hioki	3805-50	080997823	RE	2017/10/16 * 12
SHA-05	Horn Antenna	ETS LINDGREN	3160-09	LM4210	RE	2017/03/15 * 12
SAF-09	Pre Amplifier	TOYO Corporation	HAP18-26W	00000018	RE	2017/09/22 * 12
SCC-G20	Coaxial Cable	Junkosha	J12J102518-00	APR-15-15-003	RE	2017/04/20 * 12
SCC-G33	Coaxial Cable	Junkosha	MWX241-01000K MSKMS	-	RE	2017/04/20 * 12
SAJ-01	Antenna Tilt Jig	Intelligent System Engineering Co., Ltd	Antenna Tilt Jig	T-S001	RE	Pre Check
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2017/06/11 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2016/10/18 * 12
SLA-07	Logperiodic Antenna	Schwarzbeck	VUSLP9111B	196	RE	2017/01/26 * 12
SAT6-08	Attenuator	HIROSE ELECTRIC CO.,LTD.	AT-406(40)	-	RE	2017/08/24 * 12
SCC-C1/C2/C3/C4/C5/C10/SRSE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-271(RF Selector)	RE	2017/04/07 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2017/02/09 * 12
STR-08	Test Receiver	Rohde & Schwarz	ESW44	101581	RE	2016/11/08 * 12

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

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

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

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

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