RADIO TEST REPORT

Test Report No. : 11500824H-B

Applicant	:	**Panasonic Corporation of North America**
Type of Equipment	:	**Body Worn Camera**
Model No.	:	**WV-TW370**
FCC ID	:	**ACJ9TAWV-TW370**
Test regulation	:	**FCC Part 15 Subpart C: 2016 (*Bluetooth part)**
Test Result	:	**Complied**

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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 above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
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)

Date of test: November 8 to 24, 2016

Representative test engineer:
K. Yamamoto
Koji Yamamoto
Engineer
Consumer Technology Division

Approved by:
T. Takayama
Tsubasa Takayama
Engineer
Consumer Technology Division

NVLAP TESTING
NVLAP LAB CODE: 200572-0

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.
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http://japan.ul.com/resources/emc_accredited/

REVISION HISTORY

Original Test Report No.: 11500824H-B

Revision	Test report No.	Date	Page revised	Contents
- (Original)	11500824H-B	December 27, 2016	-	-

UL Japan, Inc.
Ise EMC Lab.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
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SECTION 1: Customer information

Applicant

Company Name	:	Panasonic Corporation of North America
Address	:	Two Riverfront Plaza, Newark, NJ 07102-5490
Telephone Number	:	+1-201-348-7724
Facsimile Number	:	+1-201-392-4564
Contact Person	:	Vir Angelo Lontoc

Manufacturer

Company Name	:	Panasonic System Networks Co., Ltd.
Address	:	4-1-62, Minoshima, Hakata-ku, Fukuoka 812-8531, Japan
Telephone Number	:	+81-50-3380-1993
Facsimile Number	:	+81-50-3380-2002
Contact Person	:	Yukio Kaneko

*Remarks:
Panasonic Corporation of North America designates Panasonic System Networks Co., Ltd. as manufacturer of the product (Body Worn Camera).

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

2.1 Identification of E.U.T.

Type of Equipment	:	Body Worn Camera
Model No.	:	WV-TW370
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 3.7 V
Receipt Date of Sample	:	November 19, 2016
Country of Mass-production	:	Japan
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: WV-TW370 (referred to as the EUT in this report) is a Body Worn Camera.

Radio Specification

Radio Type	:	Transceiver
Power Supply (inner)	:	DC3.7V (POWER), DC1.8V (IO)
Clock frequency (crystal)	:	37.4 MHz

	IEEE802.11b	IEEE802.11g/n (20 M band)	IEEE802.11a/n/ac (20 M band)	IEEE802.11n/ac (40 M band)	IEEE802.11ac (80 M band)
Frequency of operation	2412 MHz to 2462 MHz *2)	2412 MHz to 2462 MHz *2)	5280 MHz to 5320 MHz 5500 MHz to 5580 MHz 5660 MHz to 5720 MHz 5745 MHz to 5825 MHz *2)	5310 MHz 5510 MHz 5550 MHz 5670 MHz 5710 MHz 5755 MHz *2) 5795 MHz *2)	5530 MHz 5690 MHz 5775 MHz *2)
Type of modulation	DSSS (CCK, DQPSK, DBPSK)	OFDM-CCK (64QAM, 16QAM, QPSK, BPSK)	OFDM (64QAM, 16QAM, QPSK, BPSK, 256QAM(IEEE802.11ac only))		
Channel spacing	5MHz		20MHz	40MHz	80MHz
Antenna type	Chip Antenna				
Antenna Connector type	-				
Antenna Gain	-1.85 dBi (2.4 GHz Band) 0.3 dBi (5 GHz Band)				

	Bluetooth Ver.4.1 with EDR function *1) / Bluetooth Low Energy
Frequency of operation	2402 MHz - 2480 MHz
Type of modulation	BT: FHSS (GFSK, π/4-DQPSK, 8-DPSK) LE: GFSK
Channel spacing	BT: 1 MHz LE: 2 MHz
Antenna type	Chip Antenna
Antenna Connector type	-
Antenna Gain	-1.85 dBi

*1) This test report applies to Bluetooth.
*2) AP mode has only these frequencies.
*Wireless LAN and Bluetooth do not transmit simultaneously.

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part 15 Subpart C FCC Part 15 final revised on November 14, 2016 and effective December 14, 2016
Title	:	FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators Section 15.207 Conducted limits Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz

* The revision on November 14, 2016, does not affect the test specification applied to the EUT.

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	**QP** 12.0 dB, 0.50160 MHz, N **AV** 6.7 dB, 0.50160 MHz, N	Complied	-
Carrier Frequency Separation	**FCC:** FCC Public Notice DA 00-705 **IC:** -	**FCC:** Section15.247(a)(1) **IC:** RSS-247 5.1 (2)	See data.	Complied	Conducted
20dB Bandwidth	**FCC:** FCC Public Notice DA 00-705 **IC:** -	**FCC:** Section15.247(a)(1) **IC:** RSS-247 5.1 (1)		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 (4)		Complied	Conducted
Dwell time	**FCC:** FCC Public Notice DA 00-705 **IC:** -	**FCC:** Section15.247(a)(1)(iii) **IC:** RSS-247 5.1 (4)		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 (2)		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	3.9 dB 891.00 MHz, QP, Horizontal	Complied	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).

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

FCC Part 15.31 (e)
The EUT is a battery-operated device and test was performed with the full-charged battery. 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	**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 $k = 2$.

Ise EMC Lab.

Antenna terminal test Uncertainty (+/-)							
Power meter		Conducted emission and Power density			Conducted emission		Channel power
Below 1 GHz	Above 1 GHz	Below 1 GHz	1 GHz -3 GHz	3 GHz -18 GHz	18 GHz -26.5 GHz	26.5 GHz -40 GHz	
0.9 dB	1.0 dB	1.4 dB	1.7 dB	2.8 dB	2.8 dB	2.9 dB	2.6 dB

Frequency range	Conducted emission using AMN(LISN) (+/-)
0.009 – 0.15MHz	3.5 dB
0.15 – 30MHz	3.0 dB

Test distance	Radiated emission (+/-) 9 kHz - 30 MHz
3m	3.8 dB
10m	3.7 dB

Polarity	Radiated emission (Below 1GHz)			
	(3 m*) (+/-)		(10 m*) (+/-)	
	30 – 200 MHz	200 – 1000MHz	30 – 200 MHz	200 – 1000MHz
Horizontal	5.0 dB	5.3 dB	5.0 dB	5.0 dB
Vertical	4.7 dB	5.9 dB	5.0 dB	5.1 dB

Radiated emission (Above 1GHz)				
(3 m*) (+/-)		(1 m*) (+/-)		(10 m*) (+/-)
1 – 6GHz	6 – 18GHz	10 – 26.5 GHz	26.5 – 40GHz	1 -18 GHz
5.2 dB	5.4 dB	5.5 dB	5.5 dB	5.4 dB

*Measurement distance

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

Radiated emission test
The data listed in this report meets the limits unless the uncertainty is taken into consideration.

3.5 Test Location

UL Japan, Inc. Ise EMC Lab. *NVLAP Lab. code: 200572-0
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone: +81 596 24 8999, Facsimile: +81 596 24 8124

Test site	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms	Maximum measurement distance
No.1 semi-anechoic chamber	2973C-1	19.2 x 11.2 x 7.7	7.0 x 6.0	No.1 Power source room	10 m
No.2 semi-anechoic chamber	2973C-2	7.5 x 5.8 x 5.2	4.0 x 4.0	-	3 m
No.3 semi-anechoic chamber	2973C-3	12.0 x 8.5 x 5.9	6.8 x 5.75	No.3 Preparation room	3 m
No.3 shielded room	-	4.0 x 6.0 x 2.7	N/A	-	-
No.4 semi-anechoic chamber	2973C-4	12.0 x 8.5 x 5.9	6.8 x 5.75	No.4 Preparation room	3 m
No.4 shielded room	-	4.0 x 6.0 x 2.7	N/A	-	-
No.5 semi-anechoic chamber	-	6.0 x 6.0 x 3.9	6.0 x 6.0	-	-
No.6 shielded room	-	4.0 x 4.5 x 2.7	4.0 x 4.5	-	-
No.6 measurement room	-	4.75 x 5.4 x 3.0	4.75 x 4.15	-	-
No.7 shielded room	-	4.7 x 7.5 x 2.7	4.7 x 7.5	-	-
No.8 measurement room	-	3.1 x 5.0 x 2.7	N/A	-	-
No.9 measurement room	-	8.8 x 4.6 x 2.8	2.4 x 2.4	-	-
No.11 measurement room	-	6.2 x 4.7 x 3.0	4.8 x 4.6	-	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 m x 2.0 m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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

4.1 Operating Mode(s)

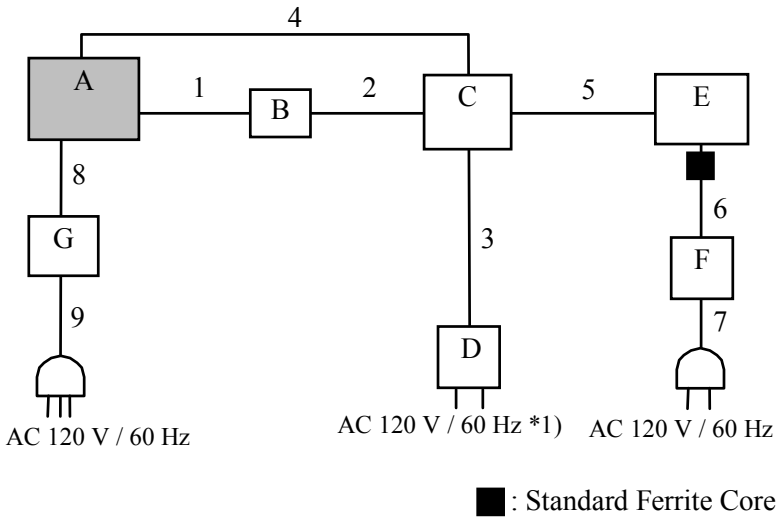
Bluetooth (BT): Transmitting (Tx), Payload: PRBS9

Details of Operating Mode(s)

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

*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload length (except Dwell time test)
*2DH mode (2Mb/s EDR: pi/4DQPSK) was excluded for other tests than power measurement by using 3DH mode (3 Mb/s EDR: 8DPSK) as a representative.
* It is considered that the non-tested packet type (e.g. inquiry) can be omitted as it is complied with above all test items based on Bluetooth Core specification.
*The power value of the EUT was set for testing as follows (setting value might be different from product specification value);
Power settings: EDR: -1 dBm
BDR: 5 dBm
Software: BLUETest3
*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.
*1) Conducted Emission test was performed on this port.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Body Worn Camera	WV-TW370	14	Panasonic System Networks Co., Ltd.	EUT
B	Jig	-	-	-	-
C	USB Hub	U2H-AN4S	6604382	ELECOM	-
D	AC Adapter	CS12F050200FJ	6607085	ELECOM	-
E	Laptop PC	T440	0814PB030VNE	Lenovo	-
F	AC Adapter	ADLX65NCC2A	11S36200284ZZ1004654HF	Lenovo	-
G	Monitor	ET-0037-N	ETN2B00760026	BenQ	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Flat Cable	0.12	Unshielded	Unshielded	-
2	USB Cable	1.50	Shielded	Shielded	-
3	DC Cable	1.50	Unshielded	Unshielded	-
4	USB Cable	1.00 for CE* 2.40 for RE*	Shielded	Shielded	-
5	USB Cable	1.50	Shielded	Shielded	-
6	DC Cable	1.80	Unshielded	Unshielded	-
7	AC Cable	1.00	Unshielded	Unshielded	-
8	HDMI Cable	2.00	Shielded	Shielded	-
9	AC Cable	2.10	Unshielded	Unshielded	-

*CE: Conducted emission test, RE: Radiated Emission test

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 with other peripherals (as a whole system)
I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30 cm to 40 cm long and were hanged at a 40 cm height to the ground plane. All unused 50 ohm connectors of the LISN (AMN) were resistivity terminated in 50 ohm when not connected to the measuring equipment.

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

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

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

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 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	4.5 m*2) (1 GHz – 10 GHz), 1 m*3) (10 GHz – 26.5 GHz)		4.5 m*2) (1 GHz – 10 GHz), 1 m*3) (10 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 x log (4.5 m/3.0 m) = 3.53 dB
*3) Distance Factor: 20 x log (1.0 m/3.0 m) = -9.5 dB

- 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.

The EUT has some clips and chargers as accessories (wearing tools).
The pre-check was conducted with each accessory (wearing tool), and the test was performed under the worst condition.

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

SECTION 7: Antenna Terminal Conducted Tests

Test Procedure

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

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument used
20dB Bandwidth	3 MHz	30 kHz	100 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth *1)	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak Average *2)	-	Power Meter (Sensor: 50MHz BW)
Carrier Frequency Separation	3 MHz	30 kHz	100 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Number of Hopping Frequency	30 MHz	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	9.1 kHz	27 kHz				
	30 MHz to 25 GHz	100 kHz	300 kHz				
Conducted Spurious Emission Band Edge compliance	10 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer

*1) Peak hold was applied as Worst-case measurement.
*2) Reference data
*3) In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.
Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart.
(9 kHz -150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 9.1 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

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

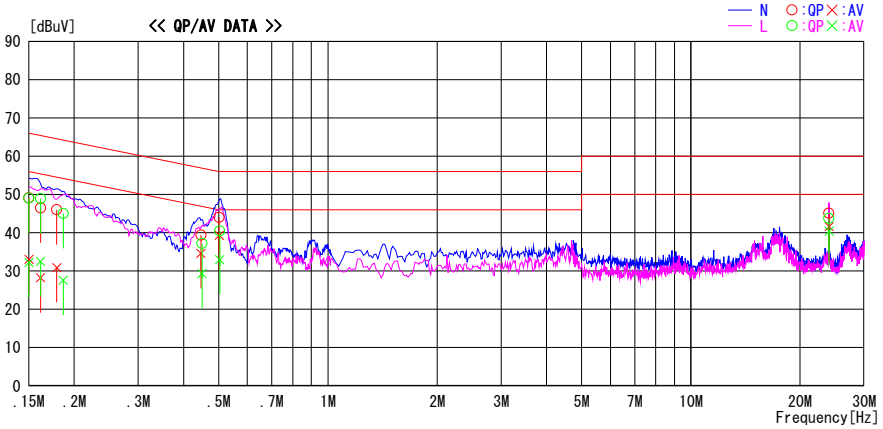
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2016/11/24

Report No. : 11500824H

Temp./Humi. : 25deg. C / 32% RH
Engineer : Tomoki Matsui

Mode / Remarks : Tx DH5 2441MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



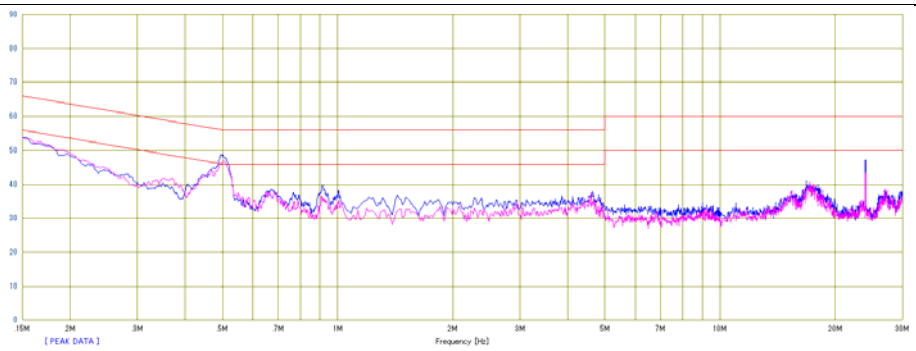
Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase	Comment
	QP	AV	Factor	QP	AV	QP	AV	QP	AV		
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0.15000	35.8	19.8	13.3	49.1	33.1	66.0	56.0	16.9	22.9	N	
0.15000	35.7	18.9	13.3	49.0	32.2	66.0	56.0	17.0	23.8	L	
0.16152	33.2	14.9	13.3	46.5	28.2	65.4	55.4	18.9	27.2	N	
0.16164	35.6	19.2	13.3	48.9	32.5	65.4	55.4	16.5	22.9	L	
0.17900	32.7	17.6	13.3	46.0	30.9	64.5	54.5	18.5	23.6	N	
0.18656	31.7	14.3	13.3	45.0	27.6	64.2	54.2	19.2	26.6	L	
0.44700	26.0	21.2	13.4	39.4	34.6	56.9	46.9	17.5	12.3	N	
0.44960	23.8	15.9	13.4	37.2	29.3	56.9	46.9	19.7	17.6	L	
0.50340	27.1	19.6	13.4	40.5	33.0	56.0	46.0	15.5	13.0	L	
0.50160	30.6	25.9	13.4	44.0	39.3	56.0	46.0	12.0	6.7	N	
24.00072	26.5	23.2	17.2	43.7	40.4	60.0	50.0	16.3	9.6	L	
24.00072	27.9	24.4	17.2	45.1	41.6	60.0	50.0	14.9	8.4	N	

CHART:WITH FACTOR,Peak hold data. CALCULATION:RESULT[dBuV]=READING[dBuV]+C.F[dB](LISN + ATTEN. + CABLE)
Except for the above table : adequate margin data below the limits.

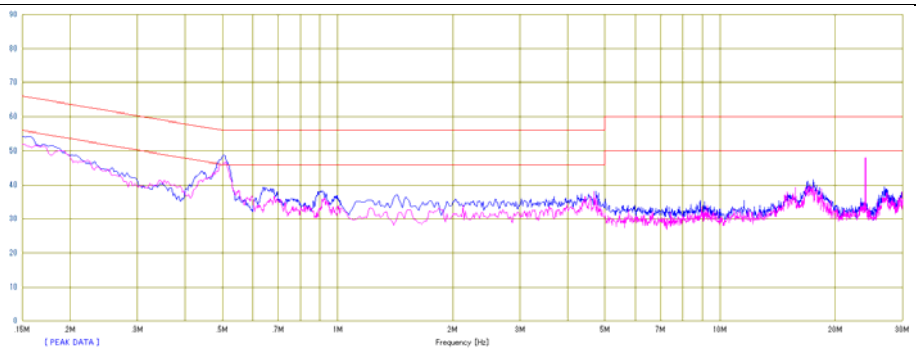
Conducted Emission

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11500824H
Date	November 24, 2016
Temperature / Humidity	25 deg. C / 32 % RH
Engineer	Tomoki Matsui
Mode	Tx, Hopping Off, DH5

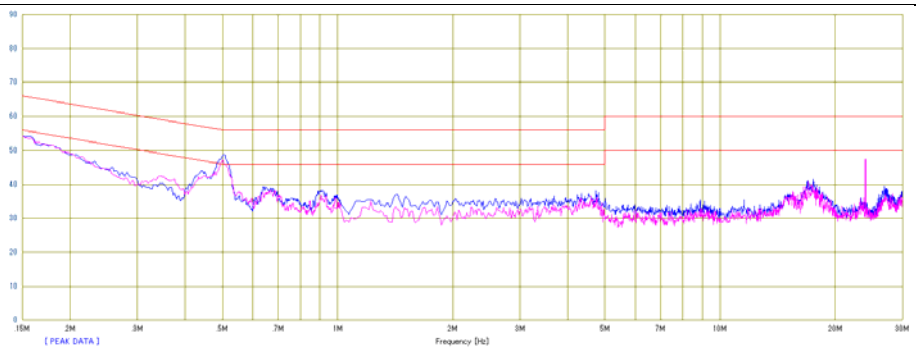
2402 MHz



2441 MHz



2480 MHz



Y scale [dBuV] Chart — N — L

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

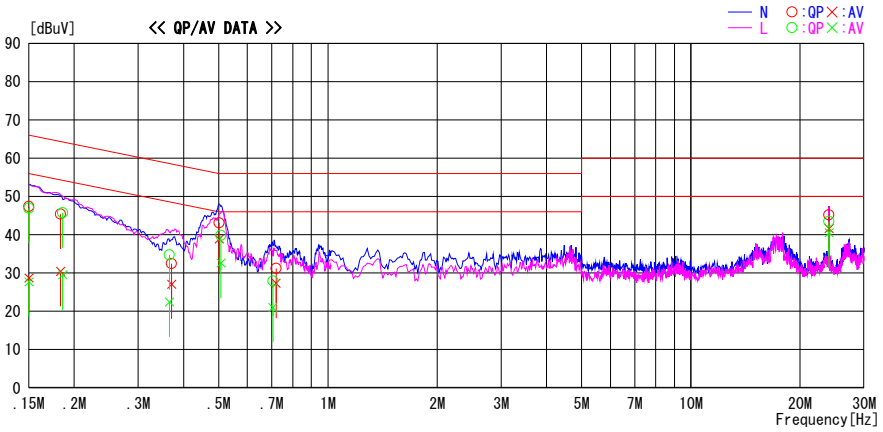
UL Japan, Inc. Ise EMC Lab. No.3 Semi Anechoic Chamber
Date : 2016/11/24

Report No. : 11500824H

Temp./Humi. : 25deg. C / 32% RH
Engineer : Tomoki Matsui

Mode / Remarks : Tx 3DH5 2441MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



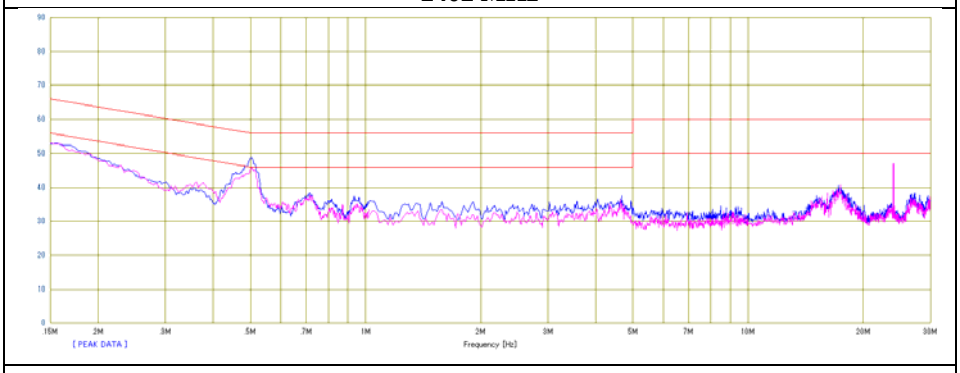
Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase	Comment
	QP	AV	Factor	QP	AV	QP	AV	QP	AV		
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0.15000	34.1	15.4	13.3	47.4	28.7	66.0	56.0	18.6	27.3	N	
0.15000	33.6	14.4	13.3	46.9	27.7	66.0	56.0	19.1	28.3	L	
0.18335	32.1	17.1	13.3	45.4	30.4	64.3	54.3	18.9	23.9	N	
0.18590	32.4	16.2	13.3	45.7	29.5	64.2	54.2	18.5	24.7	L	
0.37060	19.1	13.7	13.4	32.5	27.1	58.5	48.5	26.0	21.4	N	
0.36580	21.3	9.0	13.4	34.7	22.4	58.6	48.6	23.9	26.2	L	
0.50160	29.7	25.5	13.4	43.1	38.9	56.0	46.0	12.9	7.1	N	
0.50740	26.4	19.2	13.4	39.8	32.6	56.0	46.0	16.2	13.4	L	
0.71960	17.8	13.9	13.4	31.2	27.3	56.0	46.0	24.8	18.7	N	
0.70520	14.5	7.6	13.4	27.9	21.0	56.0	46.0	28.1	25.0	L	
24.00088	28.0	24.4	17.2	45.2	41.6	60.0	50.0	14.8	8.4	N	
24.00088	26.3	23.3	17.2	43.5	40.5	60.0	50.0	16.5	9.5	L	

CHART:WITH FACTOR,Peak hold data. CALCULATION:RESULT[dBuV]=READING[dBuV]+C.F[dB](LISN + ATTEN. + CABLE)
Except for the above table : adequate margin data below the limits.

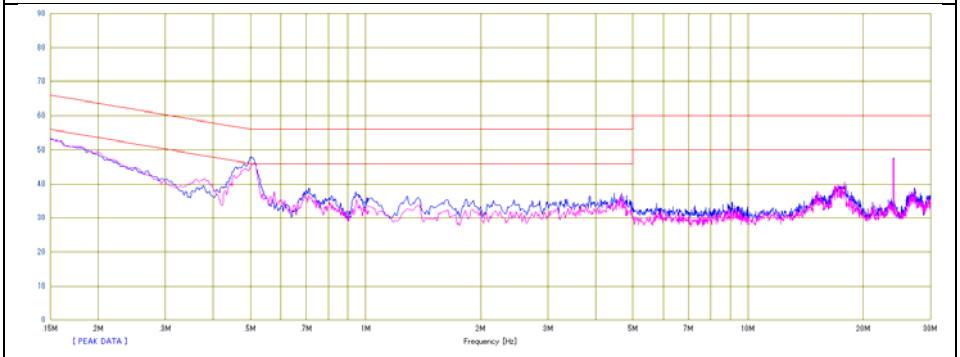
Conducted Emission

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11500824H
Date	November 24, 2016
Temperature / Humidity	25 deg. C / 32 % RH
Engineer	Tomoki Matsui
Mode	Tx, Hopping Off, 3DH5

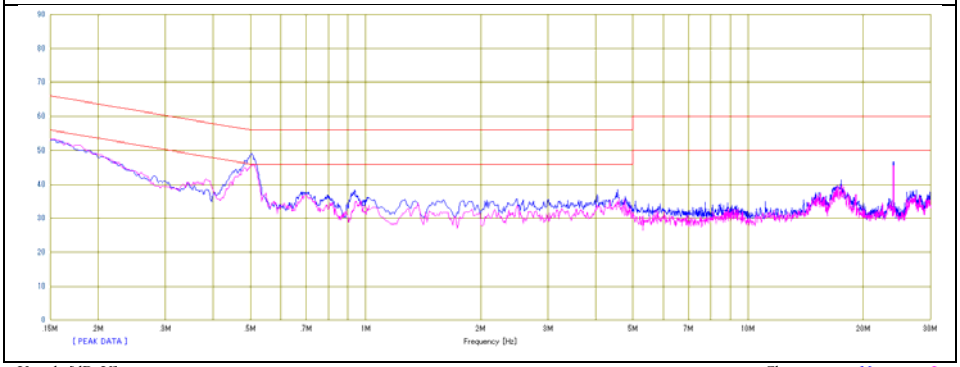
2402 MHz



2441 MHz



2480 MHz



Y scale [dBuV] Chart — N — L

20dB Bandwidth and Carrier Frequency Separation

Test place	Ise EMC Lab. No.3 Measurement Room
Report No.	11500824H
Date	November 9, 2016
Temperature / Humidity	23 deg. C / 38 % RH
Engineer	Koji Yamamoto
Mode	Tx (Hopping on/off) DH5/3DH5

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	1.025	1.000	>= 0.683
DH5	2441.0	1.033	1.005	>= 0.689
DH5	2480.0	1.034	1.015	>= 0.689
3DH5	2402.0	1.340	1.000	>= 0.893
3DH5	2441.0	1.290	1.165	>= 0.860
3DH5	2480.0	1.317	1.020	>= 0.878

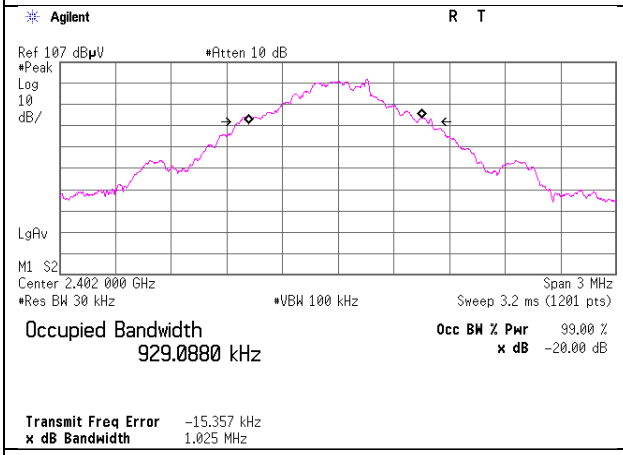
Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).
No limit applies to 20dB Bandwidth.

20dB Bandwidth and Carrier Frequency Separation

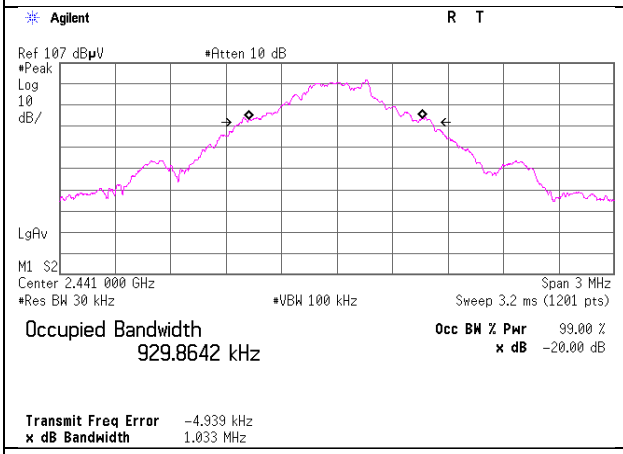
DH5

20 dB Bandwidth

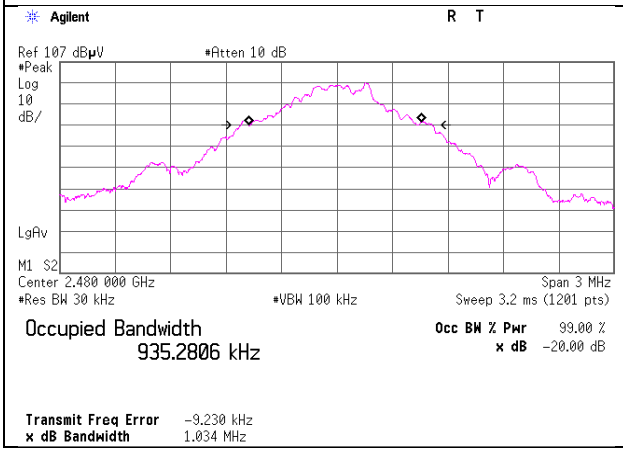
2402 MHz



2441 MHz

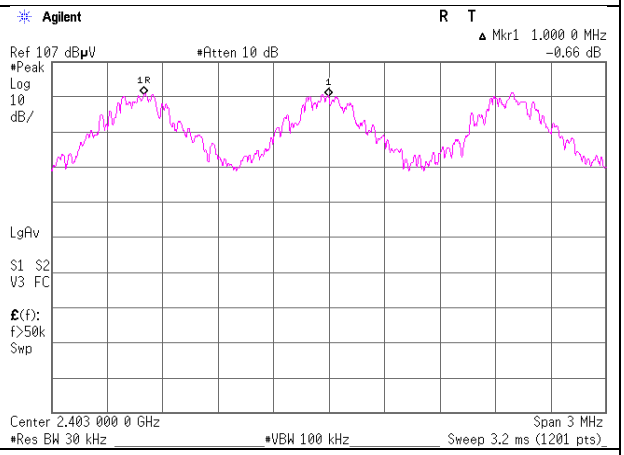


2480 MHz

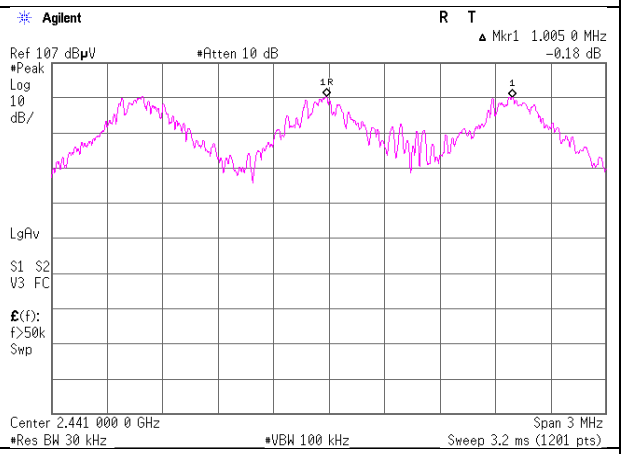


Carrier Frequency Separation

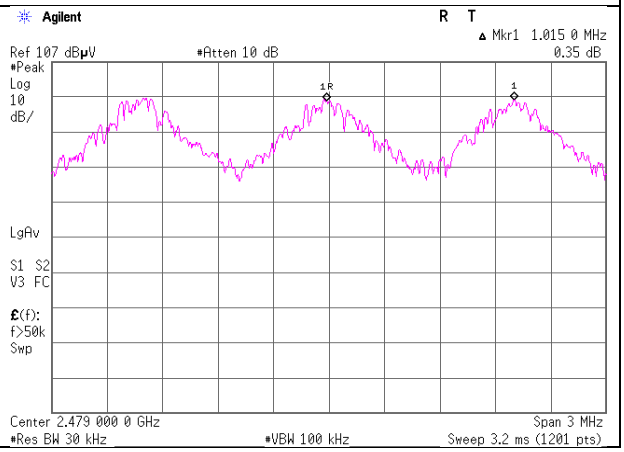
2402 MHz



2441 MHz



2480 MHz

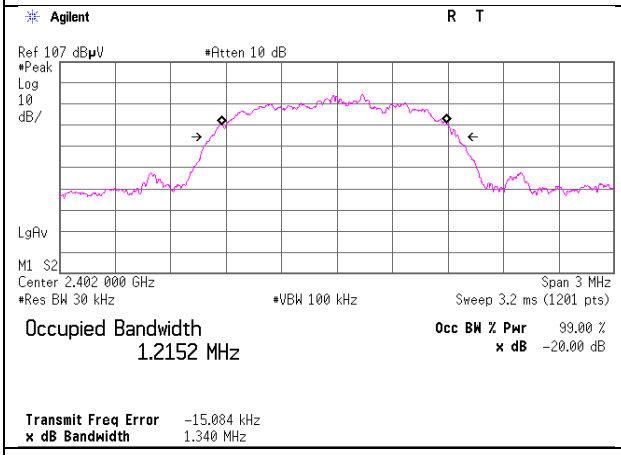


20dB Bandwidth and Carrier Frequency Separation

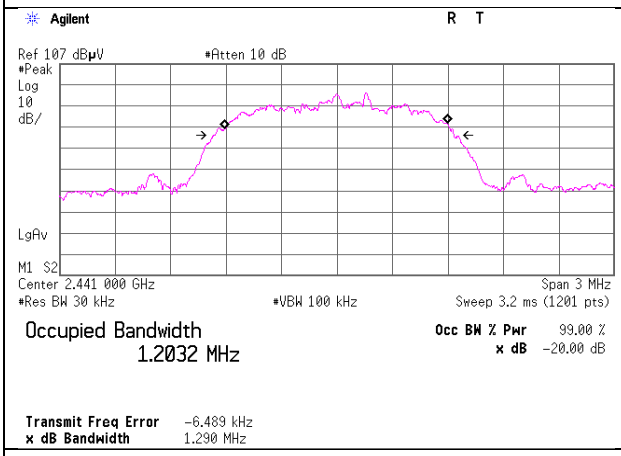
3DH5

20 dB Bandwidth

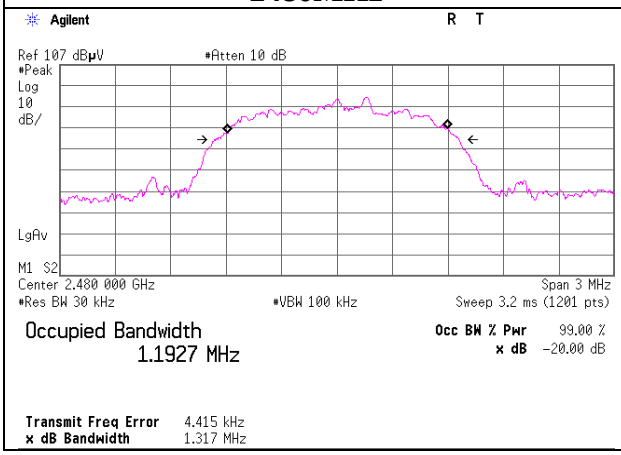
2402 MHz



2441MHz

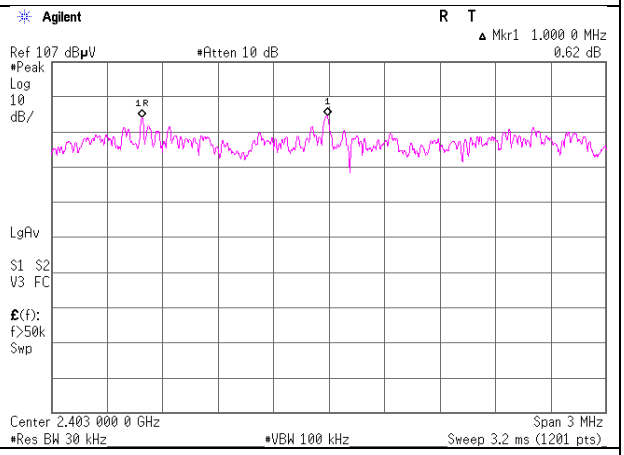


2480MHz

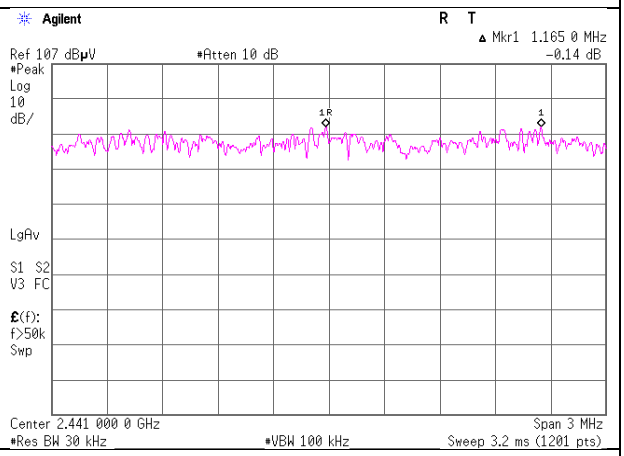


Carrier Frequency Separation

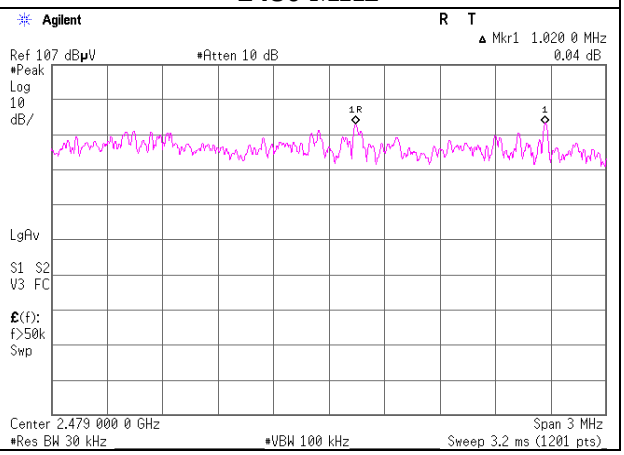
2402 MHz



2441 MHz



2480 MHz



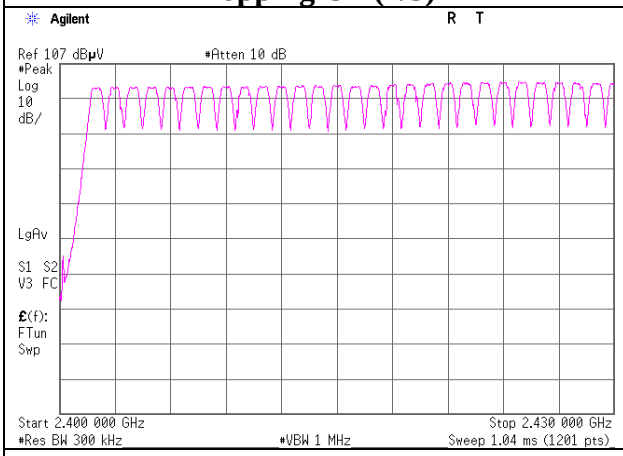
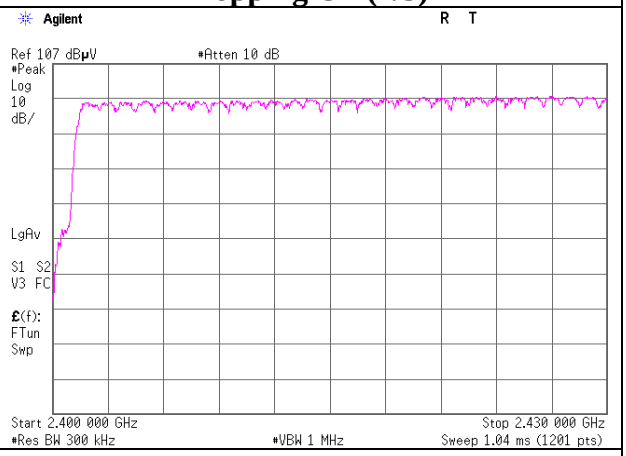
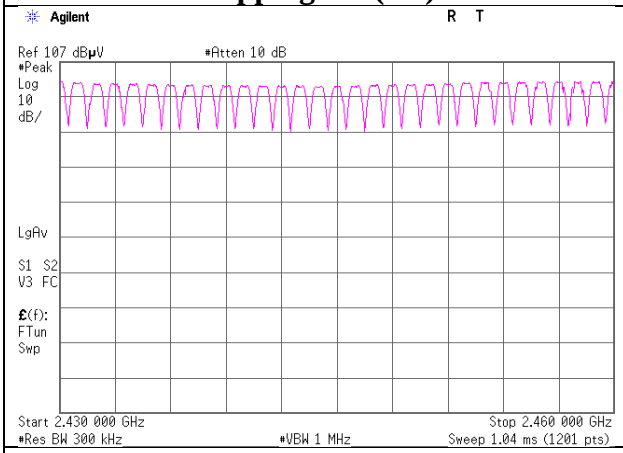
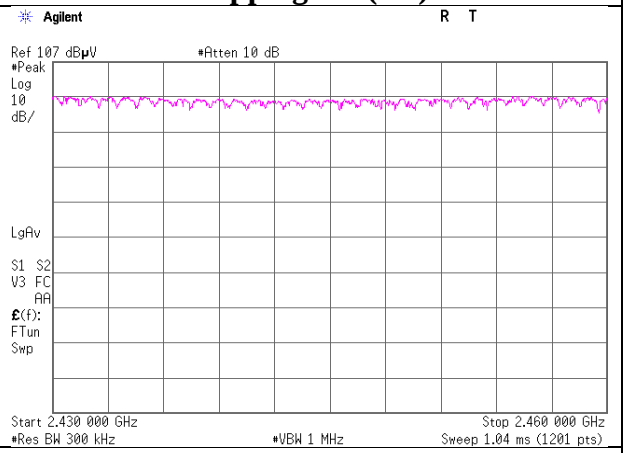
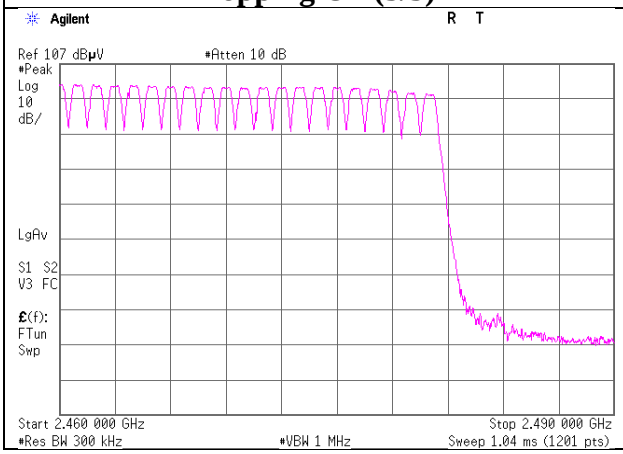
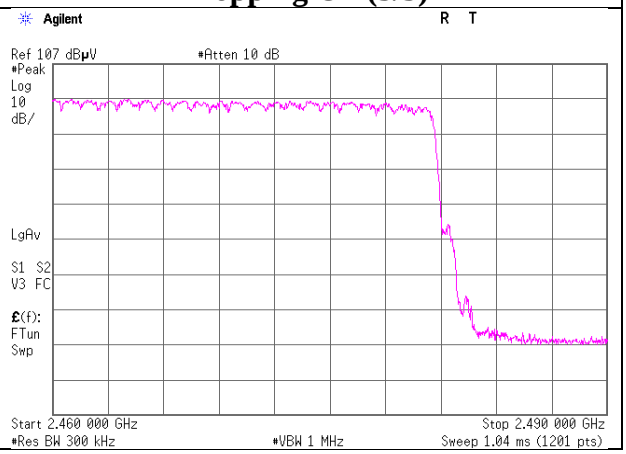
Number of Hopping Frequency

Test place	Ise EMC Lab. No.3 Measurement Room
Report No.	11500824H
Date	November 9, 2016
Temperature / Humidity	23 deg. C / 38 % RH
Engineer	Koji Yamamoto
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

DH5	3DH5
Hopping On (1/3)	**Hopping On (1/3)**
	
Hopping On (2/3)	**Hopping On (2/3)**
	
Hopping On (3/3)	**Hopping On (3/3)**
	

Dwell time

Test place	Ise EMC Lab. No.3 Measurement Room
Report No.	11500824H
Date	November 10, 2016
Temperature / Humidity	20 deg. C / 48 % RH
Engineer	Ryota Yamanaka
Mode	Tx, Hopping On

Mode	Number of transmission in a 31.6(79 Hopping x 0.4) / 12.8 (32 Hopping x 0.4) second period	Length of transmission [msec]	Result [msec]	Limit [msec]
DH1	52.0 times / 5 sec. x 31.6 sec. = 329 times	0.426	140	400
DH3	29.2 times / 5 sec. x 31.6 sec. = 185 times	1.685	312	400
DH5	20.8 times / 5 sec. x 31.6 sec. = 132 times	2.940	388	400
3DH1	52.0 times / 5 sec. x 31.6 sec. = 329 times	0.432	142	400
3DH3	29.6 times / 5 sec. x 31.6 sec. = 188 times	1.692	318	400
3DH5	20.2 times / 5 sec. x 31.6 sec. = 128 times	2.957	378	400

Sample Calculation
Result = Number of transmission x Length of transmission

*Average data of 5 tests.(except Inquiry)

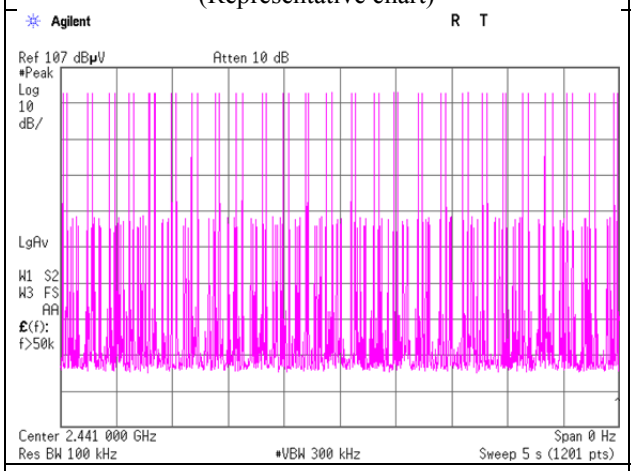
Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	52	52	52	52	52	52
DH3	30	29	29	30	28	29.2
DH5	23	19	23	19	20	20.8
3DH1	52	52	52	52	52	52
3DH3	30	29	29	30	30	29.6
3DH5	23	18	19	21	20	20.2

Sample Calculation
Average = Summation (Sampling 1 to 5) / 5

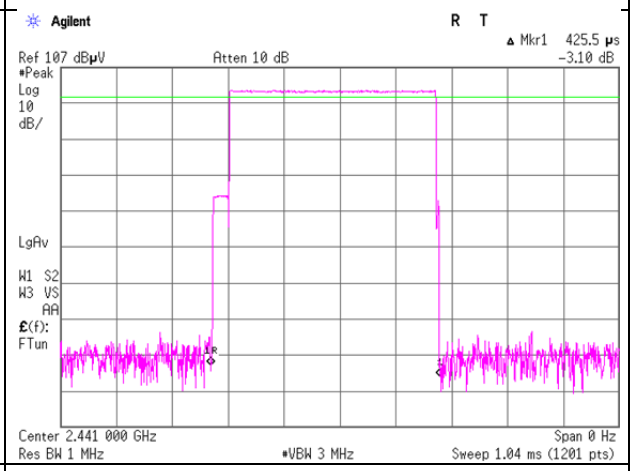
This device complies with the Bluetooth protocol for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in N x 0.4s, where N is the number of channels being used in the hopping sequence ($20 \leq N \leq 79$), is always less than 0.4s regardless of packet size. This is confirmed in the test report for N = 79.

Dwell time

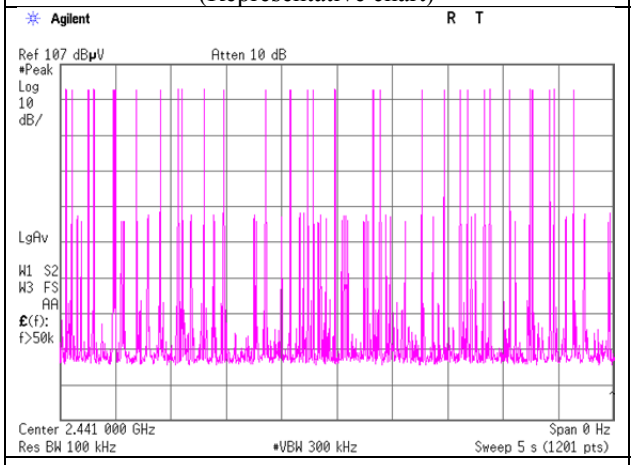
DH1 (1/2)
(Representative chart)



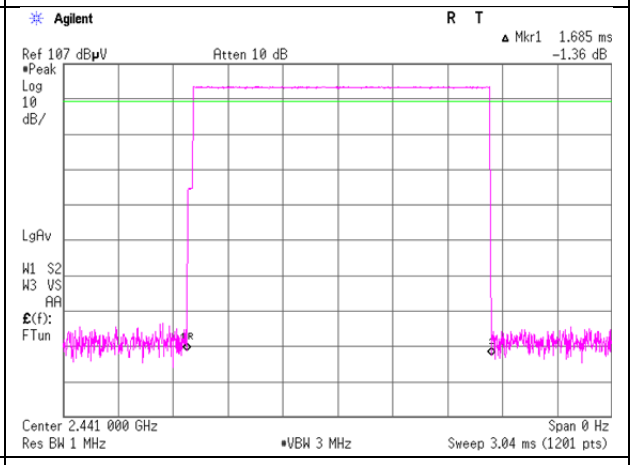
DH1 (2/2)



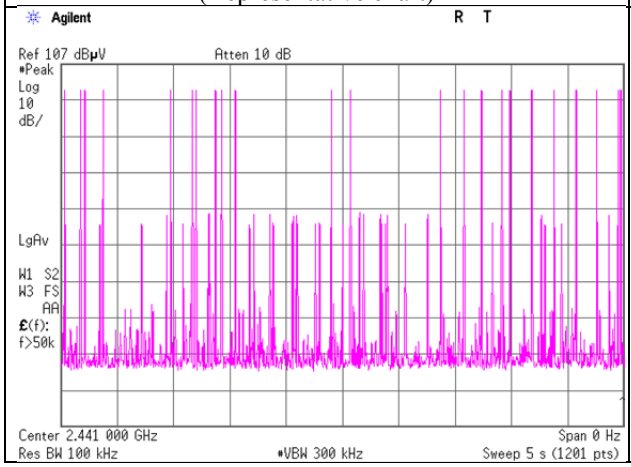
DH3 (1/2)
(Representative chart)



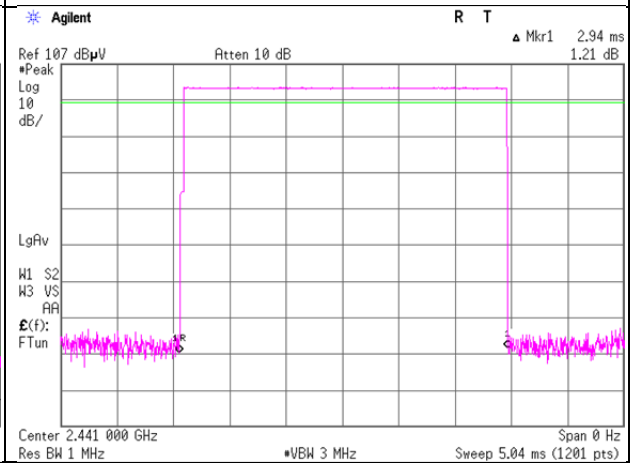
DH3 (2/2)



DH5 (1/2)
(Representative chart)

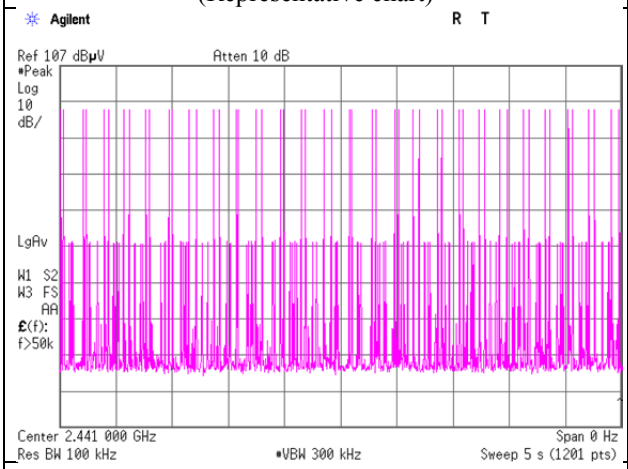


DH5 (2/2)

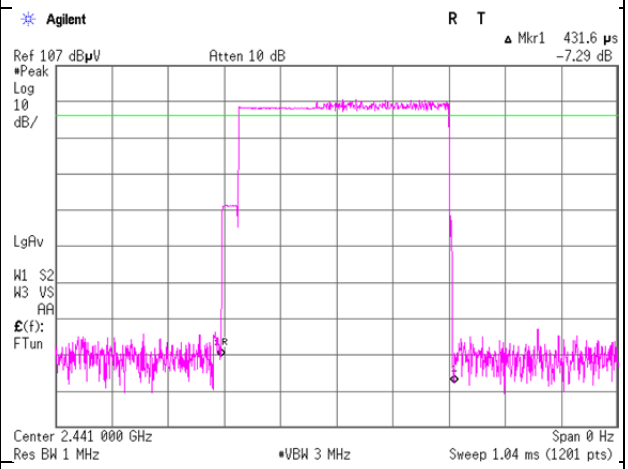


Dwell time

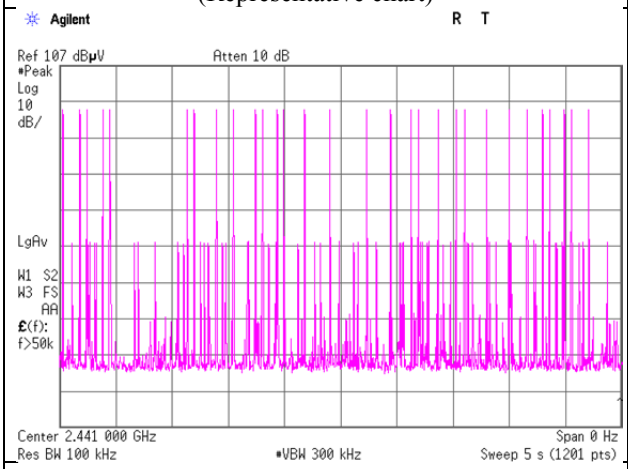
3DH1 (1/2)
(Representative chart)



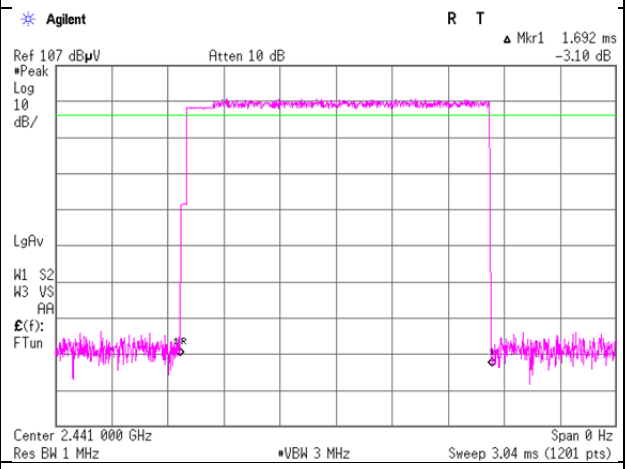
3DH1 (2/2)



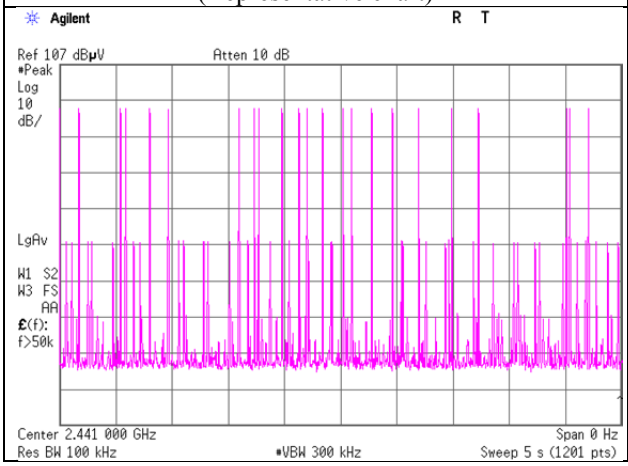
3DH3 (1/2)
(Representative chart)



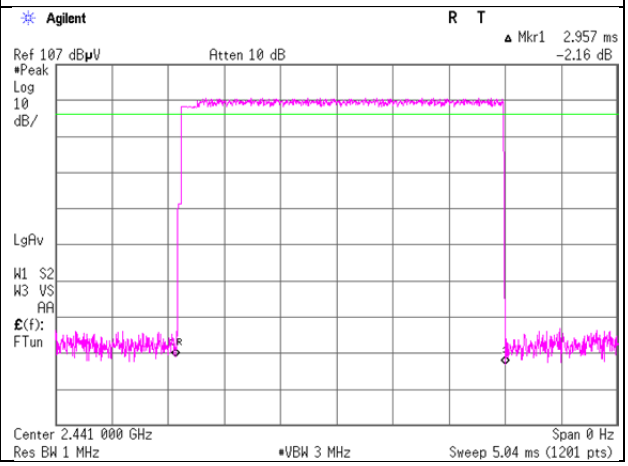
3DH3 (2/2)



3DH5 (1/2)
(Representative chart)



3DH5 (2/2)



Maximum Peak Output Power

Test place	Ise EMC Lab. No.3 Measurement Room
Report No.	11500824H
Date	November 8, 2016
Temperature / Humidity	22 deg. C / 58 % RH
Engineer	Ryota Yamanaka
Mode	Tx, Hopping Off

Mode	Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
DH5	2402.0	-6.47	1.12	10.06	4.71	2.96	20.96	125	16.25
DH5	2441.0	-6.52	1.13	10.06	4.67	2.93	20.96	125	16.29
DH5	2480.0	-8.18	1.14	10.06	3.02	2.00	20.96	125	17.94
2DH5	2402.0	-9.90	1.12	10.06	1.28	1.34	20.96	125	19.68
2DH5	2441.0	-9.27	1.13	10.06	1.92	1.56	20.96	125	19.04
2DH5	2480.0	-11.22	1.14	10.06	-0.02	1.00	20.96	125	20.98
3DH5	2402.0	-9.84	1.12	10.06	1.34	1.36	20.96	125	19.62
3DH5	2441.0	-9.19	1.13	10.06	2.00	1.58	20.96	125	18.96
3DH5	2480.0	-11.03	1.14	10.06	0.17	1.04	20.96	125	20.79

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	Ise EMC Lab. No.3 Measurement Room
Report No.	11500824H
Date	November 8, 2016
Temperature / Humidity	22 deg. C / 58 % RH
Engineer	Ryota Yamanaka
Mode	Tx, Hopping Off

Mode	Freq.	Reading	Cable Loss	Atten. Loss	Result (Time average)		Duty factor	Result (Burst power average)	
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dB]	[dBm]	[mW]
DH5	2402.0	-7.88	1.12	10.06	3.30	2.14	1.08	4.38	2.74
DH5	2441.0	-7.86	1.13	10.06	3.33	2.15	1.08	4.41	2.76
DH5	2480.0	-9.69	1.14	10.06	1.51	1.42	1.08	2.59	1.82
2DH5	2402.0	-13.66	1.12	10.06	-2.48	0.56	1.08	-1.40	0.72
2DH5	2441.0	-13.06	1.13	10.06	-1.87	0.65	1.08	-0.79	0.83
2DH5	2480.0	-14.90	1.14	10.06	-3.70	0.43	1.08	-2.62	0.55
3DH5	2402.0	-13.65	1.12	10.06	-2.47	0.57	1.06	-1.41	0.72
3DH5	2441.0	-12.96	1.13	10.06	-1.77	0.67	1.06	-0.71	0.85
3DH5	2480.0	-14.89	1.14	10.06	-3.69	0.43	1.06	-2.63	0.55

Sample Calculation:
Result (Time average) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss
Result (Burst power average) = Time average + Duty factor

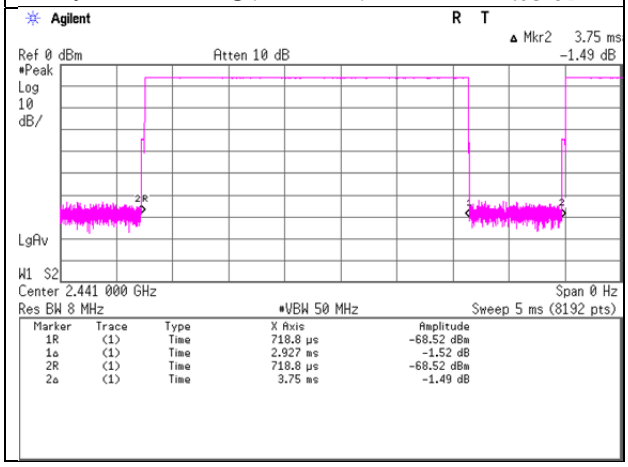
*The equipment and cables were not used for factor 0 dB of the data sheets.

Burst Rate Confirmation

Test place	Ise EMC Lab. No.3 Measurement Room
Report No.	11500824H
Date	November 10, 2016
Temperature / Humidity	20 deg. C / 48 % RH
Engineer	Ryota Yamanaka
Mode	Tx, Hopping On

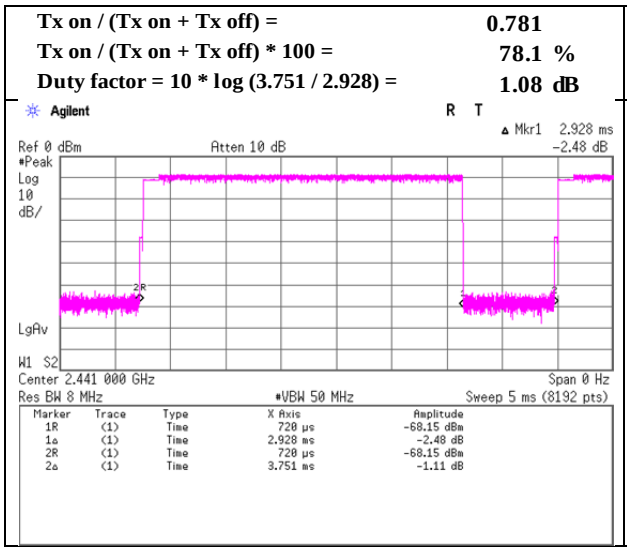
DH5

Tx on / (Tx on + Tx off) = 0.781
Tx on / (Tx on + Tx off) * 100 = 78.1 %
Duty factor = 10 * log (3.75 / 2.927) = 1.08 dB



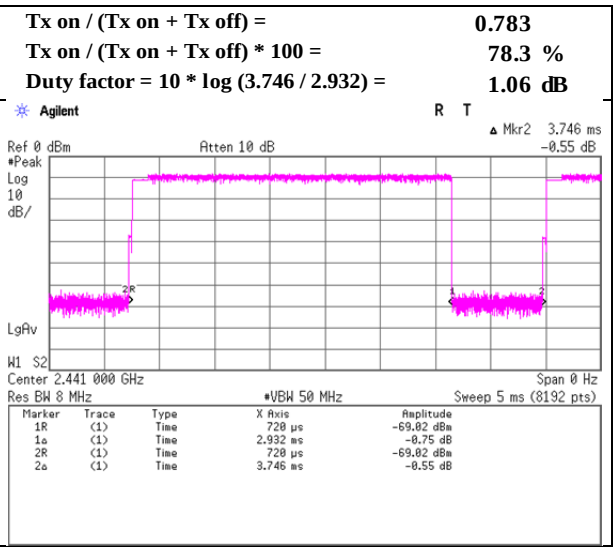
2DH5

Tx on / (Tx on + Tx off) = 0.781
Tx on / (Tx on + Tx off) * 100 = 78.1 %
Duty factor = 10 * log (3.751 / 2.928) = 1.08 dB



3DH5

Tx on / (Tx on + Tx off) = 0.783
Tx on / (Tx on + Tx off) * 100 = 78.3 %
Duty factor = 10 * log (3.746 / 2.932) = 1.06 dB



Radiated Spurious Emission

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	11500824H		
Date	November 20, 2016	November 23, 2016	November 24, 2016
Temperature / Humidity	24 deg. C / 56 % RH	21deg. C / 47 % RH	25 deg. C / 32 % RH
Engineer	Shinichi Miyazono (1 GHz - 10 GHz)	Keisuke Kawamura (Above 10 GHz)	Shinichi Miyazono (Below 1 GHz)
Mode	Tx, Hopping Off, DH5 2402 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	150.000	QP	39.1	15.1	8.6	32.1	30.7	43.5	12.8	
Hori	199.999	QP	39.5	16.4	9.1	32.1	32.9	43.5	10.6	
Hori	215.999	QP	49.1	11.8	9.2	32.0	38.1	43.5	5.4	
Hori	250.000	QP	51.3	12.5	9.5	32.0	41.3	46.0	4.7	
Hori	350.000	QP	48.0	14.6	10.3	31.9	41.0	46.0	5.0	
Hori	891.000	QP	36.9	22.0	13.4	31.0	41.3	46.0	4.7	
Hori	2390.000	PK	41.9	26.7	6.9	32.7	42.8	73.9	31.1	
Hori	4804.000	PK	40.2	31.0	9.1	31.8	48.5	73.9	25.4	Floor noise
Hori	7206.000	PK	41.6	35.7	10.4	32.6	55.1	73.9	18.8	Floor noise
Hori	9608.000	PK	40.3	37.2	11.0	33.2	55.3	73.9	18.6	Floor noise
Hori	2390.000	AV	30.9	26.7	6.9	32.7	31.8	53.9	22.1	*1)
Hori	4804.000	AV	27.7	31.0	9.1	31.8	36.0	53.9	17.9	Floor noise
Hori	7206.000	AV	29.1	35.7	10.4	32.6	42.6	53.9	11.3	Floor noise
Hori	9608.000	AV	28.5	37.2	11.0	33.2	43.5	53.9	10.4	Floor noise
Vert	100.006	QP	45.1	10.0	8.1	32.2	31.0	43.5	12.5	
Vert	108.001	QP	44.5	11.2	8.2	32.2	31.7	43.5	11.8	
Vert	150.000	QP	38.8	15.1	8.6	32.1	30.4	43.5	13.1	
Vert	220.658	QP	50.3	11.9	9.3	32.0	39.5	46.0	6.5	
Vert	350.000	QP	46.9	14.6	10.3	31.9	39.9	46.0	6.1	
Vert	891.000	QP	36.0	22.0	13.4	31.0	40.4	46.0	5.6	
Vert	2390.000	PK	41.3	26.7	6.9	32.7	42.2	73.9	31.7	
Vert	4804.000	PK	40.2	31.0	9.1	31.8	48.5	73.9	25.4	Floor noise
Vert	7206.000	PK	41.6	35.7	10.4	32.6	55.1	73.9	18.8	Floor noise
Vert	9608.000	PK	40.3	37.2	11.0	33.2	55.3	73.9	18.6	Floor noise
Vert	2390.000	AV	29.3	26.7	6.9	32.7	30.2	53.9	23.7	*1)
Vert	4804.000	AV	27.7	31.0	9.1	31.8	36.0	53.9	17.9	Floor noise
Vert	7206.000	AV	29.1	35.7	10.4	32.6	42.6	53.9	11.3	Floor noise
Vert	9608.000	AV	28.5	37.2	11.0	33.2	43.5	53.9	10.4	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log (4.5 m / 3.0 m) = 3.53 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

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

20dBc Data Sheet

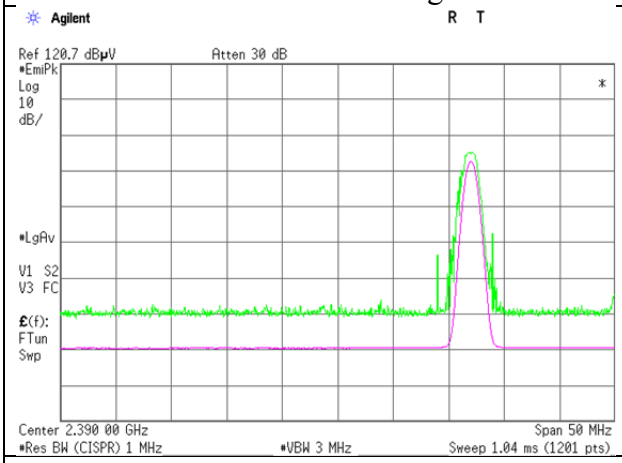
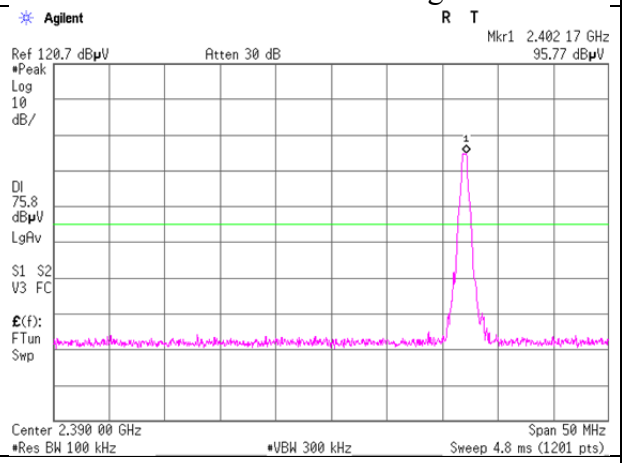
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2402.000	PK	95.8	26.7	6.9	32.7	96.7	-	-	Carrier
Hori	2400.000	PK	37.9	26.7	6.9	32.7	38.8	76.7	37.9	
Vert	2402.000	PK	96.0	26.7	6.9	32.7	96.9	-	-	Carrier
Vert	2400.000	PK	37.9	26.7	6.9	32.7	38.8	76.9	38.1	

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

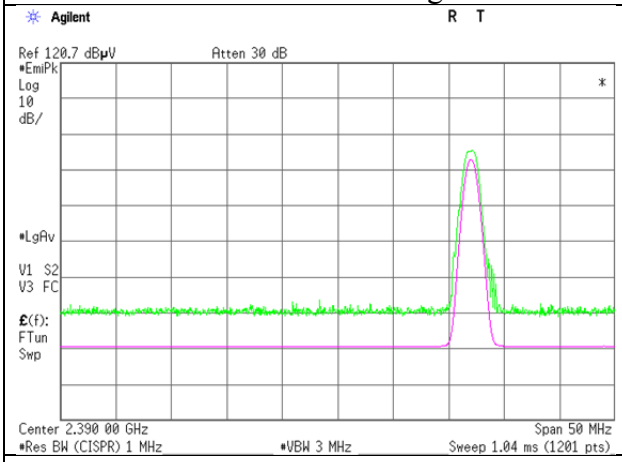
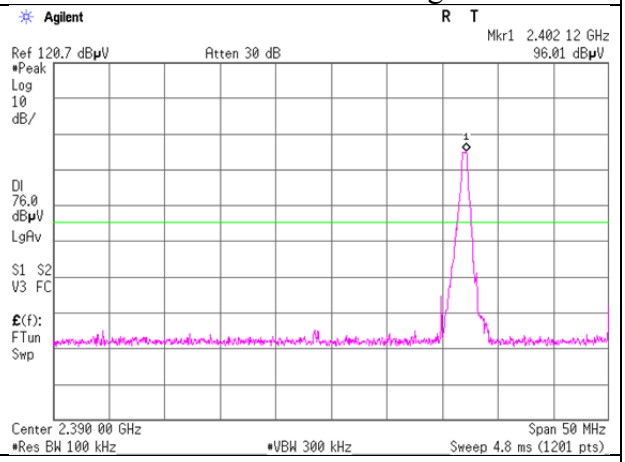
Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11500824H
Date	November 20, 2016
Temperature / Humidity	24 deg. C / 56 % RH
Engineer	Shinichi Miyazono
	(1 GHz - 10 GHz)
Mode	Tx, Hopping Off, DH5 2402 MHz

Horizontal

Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20dBc Plot

Vertical

Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20dBc Plot

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

Radiated Spurious Emission

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	11500824H		
Date	November 20, 2016	November 23, 2016	November 24, 2016
Temperature / Humidity	24 deg. C / 56 % RH	21deg. C / 47 % RH	25 deg. C / 32 % RH
Engineer	Shinichi Miyazono (1 GHz - 10 GHz)	Keisuke Kawamura (Above 10 GHz)	Shinichi Miyazono (Below 1 GHz)
Mode	Tx, Hopping Off, DH5 2441 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	150.000	QP	38.9	15.1	8.6	32.1	30.5	43.5	13.0	
Hori	199.999	QP	39.5	16.4	9.1	32.1	32.9	43.5	10.6	
Hori	215.999	QP	48.3	11.8	9.2	32.0	37.3	43.5	6.2	
Hori	250.000	QP	49.9	12.5	9.5	32.0	39.9	46.0	6.1	
Hori	350.000	QP	45.7	14.6	10.3	31.9	38.7	46.0	7.3	
Hori	891.000	QP	37.7	22.0	13.4	31.0	42.1	46.0	3.9	
Hori	4882.000	PK	40.6	31.3	9.1	31.7	49.3	73.9	24.6	Floor noise
Hori	7323.000	PK	40.9	35.6	10.3	32.6	54.2	73.9	19.7	Floor noise
Hori	9764.000	PK	40.2	37.2	11.0	33.3	55.1	73.9	18.8	Floor noise
Hori	4882.000	AV	27.5	31.3	9.1	31.7	36.2	53.9	17.7	Floor noise
Hori	7323.000	AV	29.0	35.6	10.3	32.6	42.3	53.9	11.6	Floor noise
Hori	9764.000	AV	28.6	37.2	11.0	33.3	43.5	53.9	10.4	Floor noise
Vert	95.276	QP	47.5	9.3	8.0	32.2	32.6	43.5	10.9	
Vert	111.160	QP	47.5	11.6	8.2	32.2	35.1	43.5	8.4	
Vert	215.999	QP	49.5	11.8	9.2	32.0	38.5	43.5	5.0	
Vert	250.000	QP	48.7	12.5	9.5	32.0	38.7	46.0	7.3	
Vert	350.000	QP	46.3	14.6	10.3	31.9	39.3	46.0	6.7	
Vert	891.000	QP	37.0	22.0	13.4	31.0	41.4	46.0	4.6	
Vert	4882.000	PK	40.6	31.3	9.1	31.7	49.3	73.9	24.6	Floor noise
Vert	7323.000	PK	40.9	35.6	10.3	32.6	54.2	73.9	19.7	Floor noise
Vert	9764.000	PK	40.2	37.2	11.0	33.3	55.1	73.9	18.8	Floor noise
Vert	4882.000	AV	27.5	31.3	9.1	31.7	36.2	53.9	17.7	Floor noise
Vert	7323.000	AV	29.0	35.6	10.3	32.6	42.3	53.9	11.6	Floor noise
Vert	9764.000	AV	28.6	37.2	11.0	33.3	43.5	53.9	10.4	Floor noise

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

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

Distance factor: 1 GHz - 10 GHz 20log (4.5 m / 3.0 m) = 3.53 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	11500824H		
Date	November 20, 2016	November 23, 2016	November 24, 2016
Temperature / Humidity	24 deg. C / 56 % RH	21deg. C / 47 % RH	25 deg. C / 32 % RH
Engineer	Shinichi Miyazono (1 GHz - 10 GHz)	Keisuke Kawamura (Above 10 GHz)	Shinichi Miyazono (Below 1 GHz)
Mode	Tx, Hopping Off, DH5 2480 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	150.000	QP	39.3	15.1	8.6	32.1	30.9	43.5	12.6	
Hori	199.999	QP	39.2	16.4	9.1	32.1	32.6	43.5	10.9	
Hori	215.999	QP	48.4	11.8	9.2	32.0	37.4	43.5	6.1	
Hori	250.000	QP	50.0	12.5	9.5	32.0	40.0	46.0	6.0	
Hori	350.000	QP	45.8	14.6	10.3	31.9	38.8	46.0	7.2	
Hori	891.000	QP	37.5	22.0	13.4	31.0	41.9	46.0	4.1	
Hori	2483.500	PK	43.4	26.8	7.0	32.6	44.6	73.9	29.3	
Hori	4960.000	PK	39.3	31.5	9.1	31.7	48.2	73.9	25.7	Floor noise
Hori	7440.000	PK	40.9	35.5	10.4	32.7	54.1	73.9	19.8	Floor noise
Hori	9920.000	PK	40.5	37.2	11.1	33.4	55.4	73.9	18.5	Floor noise
Hori	2483.500	AV	30.1	26.8	7.0	32.6	31.3	53.9	22.6	*1)
Hori	4960.000	AV	27.4	31.5	9.1	31.7	36.3	53.9	17.6	Floor noise
Hori	7440.000	AV	28.7	35.5	10.4	32.7	41.9	53.9	12.0	Floor noise
Hori	9920.000	AV	28.6	37.2	11.1	33.4	43.5	53.9	10.4	Floor noise
Vert	99.996	QP	45.7	9.9	8.0	32.2	31.4	43.5	12.1	
Vert	111.178	QP	47.4	11.6	8.2	32.2	35.0	43.5	8.5	
Vert	215.999	QP	49.5	11.8	9.2	32.0	38.5	43.5	5.0	
Vert	250.000	QP	48.8	12.5	9.5	32.0	38.8	46.0	7.2	
Vert	350.000	QP	46.5	14.6	10.3	31.9	39.5	46.0	6.5	
Vert	891.000	QP	36.9	22.0	13.4	31.0	41.3	46.0	4.7	
Vert	2483.500	PK	42.3	26.8	7.0	32.6	43.5	73.9	30.4	
Vert	4960.000	PK	39.3	31.5	9.1	31.7	48.2	73.9	25.7	Floor noise
Vert	7440.000	PK	40.9	35.5	10.4	32.7	54.1	73.9	19.8	Floor noise
Vert	9920.000	PK	40.5	37.2	11.1	33.4	55.4	73.9	18.5	Floor noise
Vert	2483.500	AV	30.1	26.8	7.0	32.6	31.3	53.9	22.6	*1)
Vert	4960.000	AV	27.4	31.5	9.1	31.7	36.3	53.9	17.6	Floor noise
Vert	7440.000	AV	28.7	35.5	10.4	32.7	41.9	53.9	12.0	Floor noise
Vert	9920.000	AV	28.6	37.2	11.1	33.4	43.5	53.9	10.4	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log (4.5 m / 3.0 m) = 3.53 dB
10 GHz - 40 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

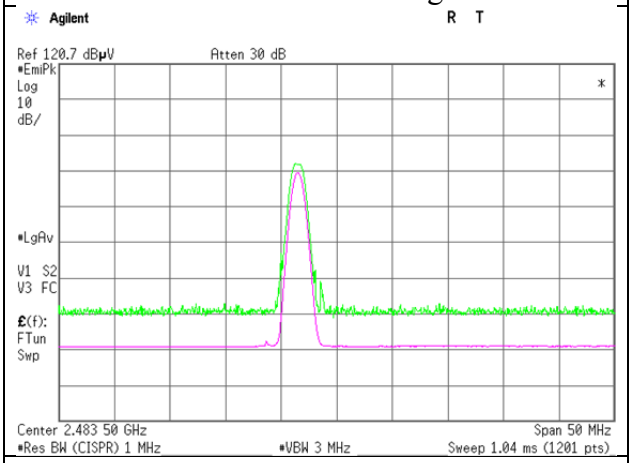
*1) Not Out of Band emission(Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11500824H
Date	November 20, 2016
Temperature / Humidity	24 deg. C / 56 % RH
Engineer	Shinichi Miyazono
	(1 GHz - 10 GHz)
Mode	Tx, Hopping Off, DH5 2480 MHz

Horizontal

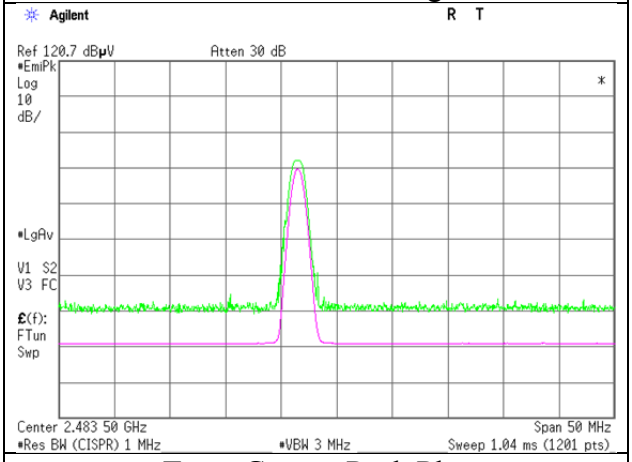
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

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

Radiated Spurious Emission

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	11500824H		
Date	November 20, 2016	November 23, 2016	November 24, 2016
Temperature / Humidity	24 deg. C / 56 % RH	21deg. C / 47 % RH	25 deg. C / 32 % RH
Engineer	Shinichi Miyazono (1 GHz - 10 GHz)	Keisuke Kawamura (Above 10 GHz)	Shinichi Miyazono (Below 1 GHz)
Mode	Tx, Hopping Off, 3DH5 2402 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	150.000	QP	39.0	15.1	8.6	32.1	30.6	43.5	12.9	
Hori	199.999	QP	39.2	16.4	9.1	32.1	32.6	43.5	10.9	
Hori	215.999	QP	48.4	11.8	9.2	32.0	37.4	43.5	6.1	
Hori	250.000	QP	49.8	12.5	9.5	32.0	39.8	46.0	6.2	
Hori	350.000	QP	45.7	14.6	10.3	31.9	38.7	46.0	7.3	
Hori	891.000	QP	37.5	22.0	13.4	31.0	41.9	46.0	4.1	
Hori	2390.000	PK	41.1	26.7	6.9	32.7	42.0	73.9	31.9	
Hori	4804.000	PK	40.2	31.0	9.1	31.8	48.5	73.9	25.4	Floor noise
Hori	7206.000	PK	41.6	35.7	10.4	32.6	55.1	73.9	18.8	Floor noise
Hori	9608.000	PK	40.3	37.2	11.0	33.2	55.3	73.9	18.6	Floor noise
Hori	2390.000	AV	29.2	26.7	6.9	32.7	30.1	53.9	23.8	*1)
Hori	4804.000	AV	27.7	31.0	9.1	31.8	36.0	53.9	17.9	Floor noise
Hori	7206.000	AV	29.1	35.7	10.4	32.6	42.6	53.9	11.3	Floor noise
Hori	9608.000	AV	28.5	37.2	11.0	33.2	43.5	53.9	10.4	Floor noise
Vert	95.292	QP	46.5	9.3	8.0	32.2	31.6	43.5	11.9	
Vert	109.736	QP	47.0	11.4	8.2	32.2	34.4	43.5	9.1	
Vert	215.999	QP	49.6	11.8	9.2	32.0	38.6	43.5	4.9	
Vert	250.000	QP	48.2	12.5	9.5	32.0	38.2	46.0	7.8	
Vert	350.000	QP	46.3	14.6	10.3	31.9	39.3	46.0	6.7	
Vert	891.000	QP	37.0	22.0	13.4	31.0	41.4	46.0	4.6	
Vert	2390.000	PK	41.3	26.7	6.9	32.7	42.2	73.9	31.7	
Vert	4804.000	PK	40.2	31.0	9.1	31.8	48.5	73.9	25.4	Floor noise
Vert	7206.000	PK	41.6	35.7	10.4	32.6	55.1	73.9	18.8	Floor noise
Vert	9608.000	PK	40.3	37.2	11.0	33.2	55.3	73.9	18.6	Floor noise
Vert	2390.000	AV	29.1	26.7	6.9	32.7	30.0	53.9	23.9	*1)
Vert	4804.000	AV	27.7	31.0	9.1	31.8	36.0	53.9	17.9	Floor noise
Vert	7206.000	AV	29.1	35.7	10.4	32.6	42.6	53.9	11.3	Floor noise
Vert	9608.000	AV	28.5	37.2	11.0	33.2	43.5	53.9	10.4	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log (4.5 m / 3.0 m) = 3.53 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

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

20dBc Data Sheet

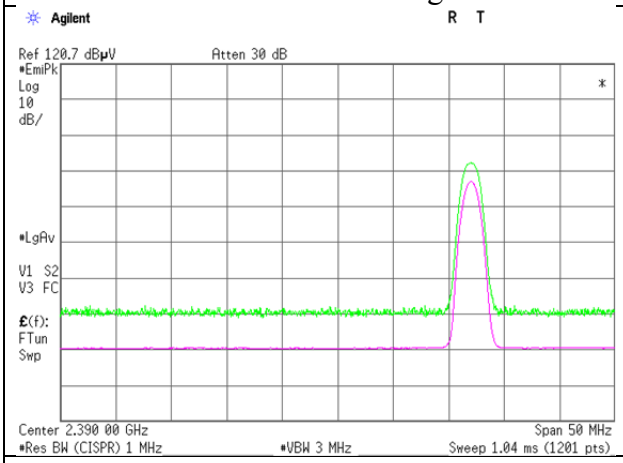
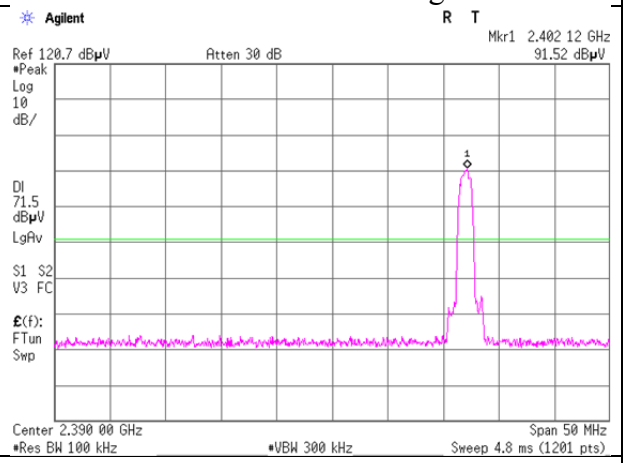
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2402.000	PK	91.5	26.7	6.9	32.7	92.4	-	-	Carrier
Hori	2400.000	PK	38.7	26.7	6.9	32.7	39.6	72.4	32.8	
Vert	2402.000	PK	89.3	26.7	6.9	32.7	90.2	-	-	Carrier
Vert	2400.000	PK	36.7	26.7	6.9	32.7	37.6	70.2	32.6	

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

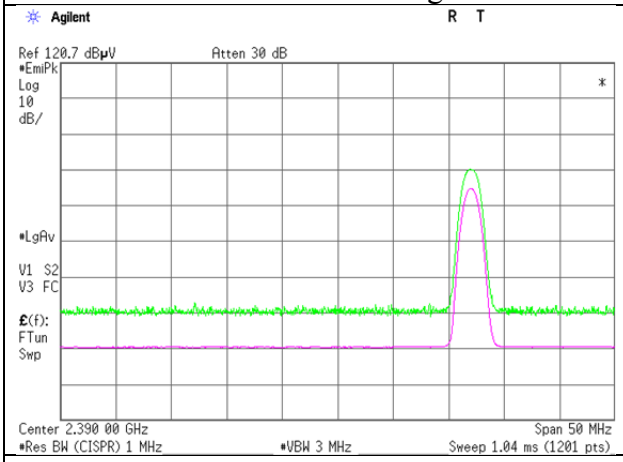
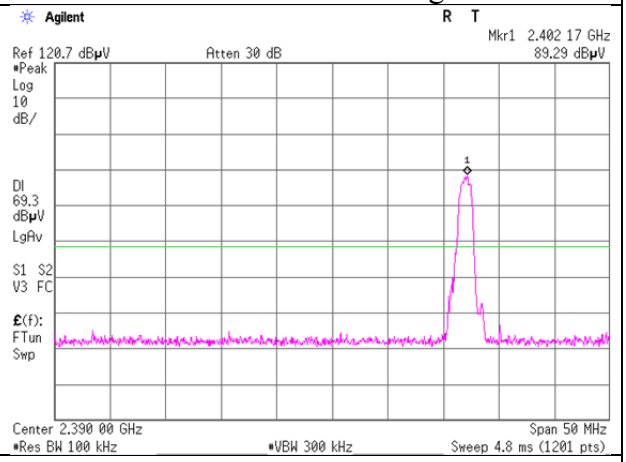
Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11500824H
Date	November 20, 2016
Temperature / Humidity	24 deg. C / 56 % RH
Engineer	Shinichi Miyazono
	(1 GHz - 10 GHz)
Mode	Tx, Hopping Off, 3DH5 2402 MHz

Horizontal

Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20dBc Plot

Vertical

Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20dBc Plot

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

Radiated Spurious Emission

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	11500824H		
Date	November 20, 2016	November 23, 2016	November 24, 2016
Temperature / Humidity	24 deg. C / 56 % RH	21deg. C / 47 % RH	25 deg. C / 32 % RH
Engineer	Shinichi Miyazono (1 GHz - 10 GHz)	Keisuke Kawamura (Above 10 GHz)	Shinichi Miyazono (Below 1 GHz)
Mode	Tx, Hopping Off, 3DH5 2441 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	150.000	QP	39.1	15.1	8.6	32.1	30.7	43.5	12.8	
Hori	199.999	QP	39.2	16.4	9.1	32.1	32.6	43.5	10.9	
Hori	215.999	QP	48.4	11.8	9.2	32.0	37.4	43.5	6.1	
Hori	250.000	QP	49.9	12.5	9.5	32.0	39.9	46.0	6.1	
Hori	350.000	QP	45.7	14.6	10.3	31.9	38.7	46.0	7.3	
Hori	891.000	QP	37.6	22.0	13.4	31.0	42.0	46.0	4.0	
Hori	4882.000	PK	40.6	31.3	9.1	31.7	49.3	73.9	24.6	Floor noise
Hori	7323.000	PK	40.9	35.6	10.3	32.6	54.2	73.9	19.7	Floor noise
Hori	9764.000	PK	40.2	37.2	11.0	33.3	55.1	73.9	18.8	Floor noise
Hori	4882.000	AV	27.5	31.3	9.1	31.7	36.2	53.9	17.7	Floor noise
Hori	7323.000	AV	29.0	35.6	10.3	32.6	42.3	53.9	11.6	Floor noise
Hori	9764.000	AV	28.6	37.2	11.0	33.3	43.5	53.9	10.4	Floor noise
Vert	96.746	QP	44.8	9.5	8.0	32.2	30.1	43.5	13.4	
Vert	111.180	QP	46.8	11.6	8.2	32.2	34.4	43.5	9.1	
Vert	215.999	QP	49.4	11.8	9.2	32.0	38.4	43.5	5.1	
Vert	250.000	QP	48.7	12.5	9.5	32.0	38.7	46.0	7.3	
Vert	350.000	QP	46.3	14.6	10.3	31.9	39.3	46.0	6.7	
Vert	891.000	QP	36.9	22.0	13.4	31.0	41.3	46.0	4.7	
Vert	4882.000	PK	40.6	31.3	9.1	31.7	49.3	73.9	24.6	Floor noise
Vert	7323.000	PK	40.9	35.6	10.3	32.6	54.2	73.9	19.7	Floor noise
Vert	9764.000	PK	40.2	37.2	11.0	33.3	55.1	73.9	18.8	Floor noise
Vert	4882.000	AV	27.5	31.3	9.1	31.7	36.2	53.9	17.7	Floor noise
Vert	7323.000	AV	29.0	35.6	10.3	32.6	42.3	53.9	11.6	Floor noise
Vert	9764.000	AV	28.6	37.2	11.0	33.3	43.5	53.9	10.4	Floor noise

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

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

Distance factor: 1 GHz - 10 GHz 20log (4.5 m / 3.0 m) = 3.53 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

Radiated Spurious Emission

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	11500824H		
Date	November 20, 2016	November 23, 2016	November 24, 2016
Temperature / Humidity	24 deg. C / 56 % RH	21deg. C / 47 % RH	25 deg. C / 32 % RH
Engineer	Shinichi Miyazono (1 GHz - 10 GHz)	Keisuke Kawamura (Above 10 GHz)	Shinichi Miyazono (Below 1 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	150.000	QP	38.6	15.1	8.6	32.1	30.2	43.5	13.3	
Hori	199.999	QP	39.0	16.4	9.1	32.1	32.4	43.5	11.1	
Hori	215.999	QP	48.2	11.8	9.2	32.0	37.2	43.5	6.3	
Hori	250.000	QP	49.7	12.5	9.5	32.0	39.7	46.0	6.3	
Hori	350.000	QP	45.7	14.6	10.3	31.9	38.7	46.0	7.3	
Hori	891.000	QP	37.6	22.0	13.4	31.0	42.0	46.0	4.0	
Hori	2483.500	PK	41.6	26.8	7.0	32.6	42.8	73.9	31.1	
Hori	4960.000	PK	39.3	31.5	9.1	31.7	48.2	73.9	25.7	Floor noise
Hori	7440.000	PK	40.9	35.5	10.4	32.7	54.1	73.9	19.8	Floor noise
Hori	9920.000	PK	40.5	37.2	11.1	33.4	55.4	73.9	18.5	Floor noise
Hori	2483.500	AV	29.4	26.8	7.0	32.6	30.6	53.9	23.3	*1)
Hori	4960.000	AV	27.4	31.5	9.1	31.7	36.3	53.9	17.6	Floor noise
Hori	7440.000	AV	28.7	35.5	10.4	32.7	41.9	53.9	12.0	Floor noise
Hori	9920.000	AV	28.6	37.2	11.1	33.4	43.5	53.9	10.4	Floor noise
Vert	96.730	QP	47.0	9.5	8.0	32.2	32.3	43.5	11.2	
Vert	109.733	QP	47.5	11.4	8.2	32.2	34.9	43.5	8.6	
Vert	215.999	QP	49.3	11.8	9.2	32.0	38.3	43.5	5.2	
Vert	250.000	QP	47.1	12.5	9.5	32.0	37.1	46.0	8.9	
Vert	350.000	QP	46.4	14.6	10.3	31.9	39.4	46.0	6.6	
Vert	891.000	QP	37.0	22.0	13.4	31.0	41.4	46.0	4.6	
Vert	2483.500	PK	41.6	26.8	7.0	32.6	42.8	73.9	31.1	
Vert	4960.000	PK	39.3	31.5	9.1	31.7	48.2	73.9	25.7	Floor noise
Vert	7440.000	PK	40.9	35.5	10.4	32.7	54.1	73.9	19.8	Floor noise
Vert	9920.000	PK	40.5	37.2	11.1	33.4	55.4	73.9	18.5	Floor noise
Vert	2483.500	AV	29.4	26.8	7.0	32.6	30.6	53.9	23.3	*1)
Vert	4960.000	AV	27.4	31.5	9.1	31.7	36.3	53.9	17.6	Floor noise
Vert	7440.000	AV	28.7	35.5	10.4	32.7	41.9	53.9	12.0	Floor noise
Vert	9920.000	AV	28.6	37.2	11.1	33.4	43.5	53.9	10.4	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log (4.5 m / 3.0 m) = 3.53 dB
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

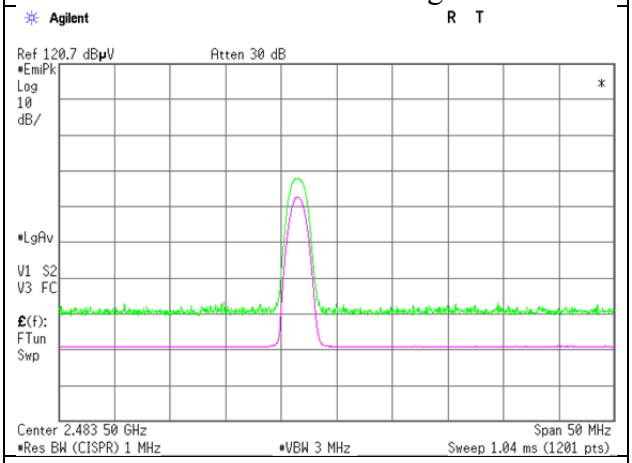
*1) Not Out of Band emission(Leakage Power)

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber
Report No.	11500824H
Date	November 20, 2016
Temperature / Humidity	24 deg. C / 56 % RH
Engineer	Shinichi Miyazono
	(1 GHz - 10 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz

Horizontal

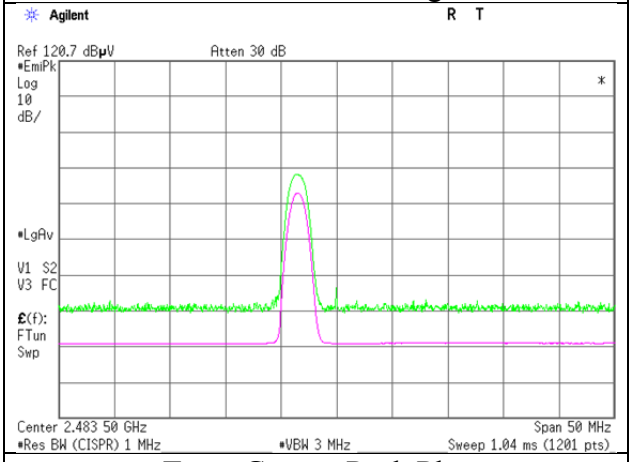
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot

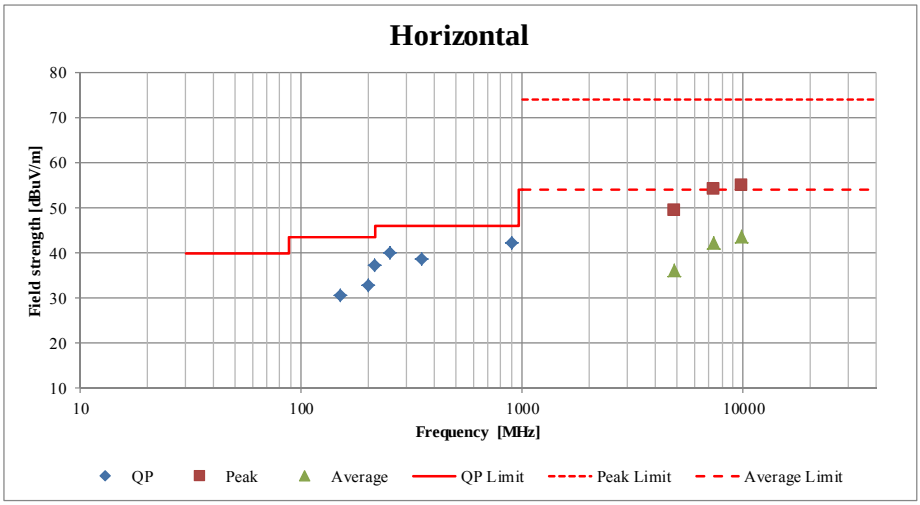


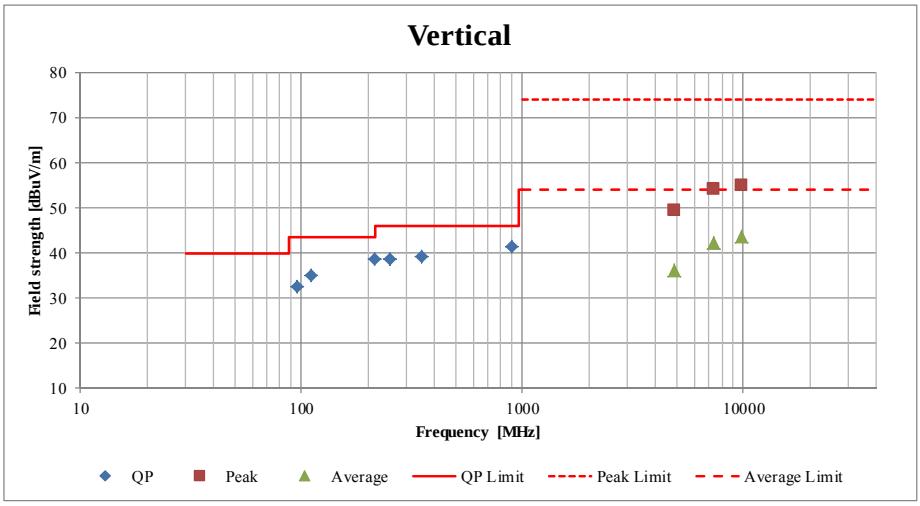
Trace Green : Peak Plot
Trace Purple : Average Plot

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

Radiated Spurious Emission
(Plot data, Worst case)

Test place	Ise EMC Lab. No.3 Semi Anechoic Chamber		
Report No.	11500824H		
Date	November 20, 2016	November 23, 2016	November 24, 2016
Temperature / Humidity	24 deg. C / 56 % RH	21deg. C / 47 % RH	25 deg. C / 32 % RH
Engineer	Shinichi Miyazono (1 GHz - 10 GHz)	Keisuke Kawamura (Above 10 GHz)	Shinichi Miyazono (Below 1 GHz)
Mode	Tx, Hopping Off, DH5 2402 MHz		





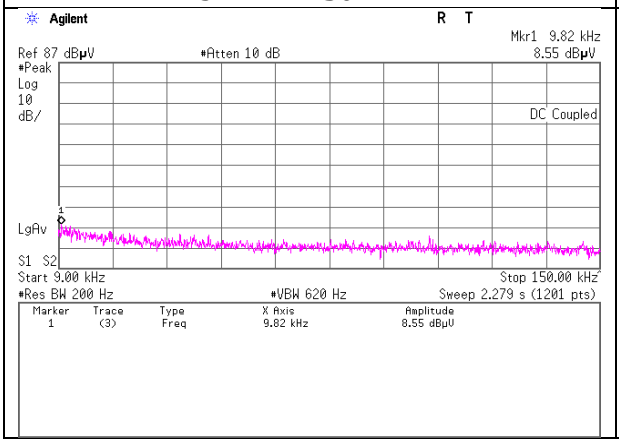
*These plots data contains sufficient number to show the trend of characteristic features for EUT.

Conducted Spurious Emission

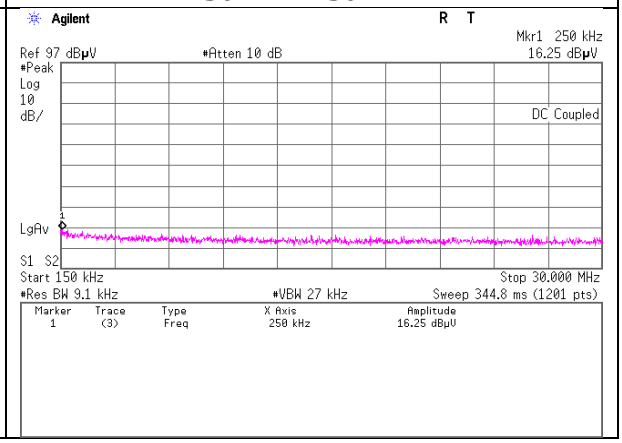
Test place	Ise EMC Lab. No.3 Measurement Room
Report No.	11500824H
Date	November 9, 2016
Temperature / Humidity	23 deg. C / 38 % RH
Engineer	Koji Yamamoto
Mode	Tx, Hopping Off, DH5

2402 MHz

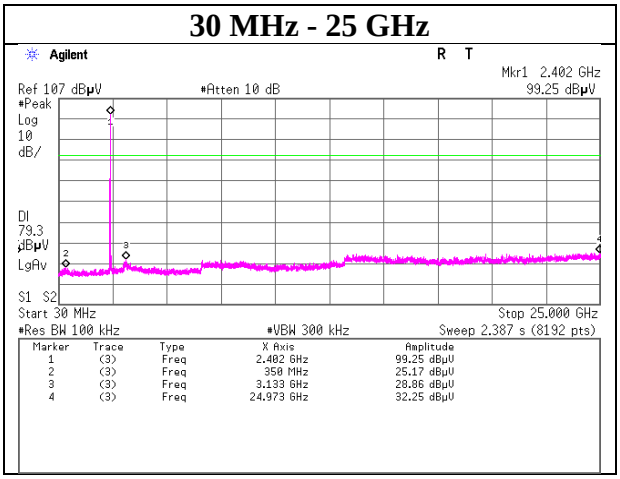
9 kHz - 150 kHz



150 kHz - 30 MHz



30 MHz - 25 GHz

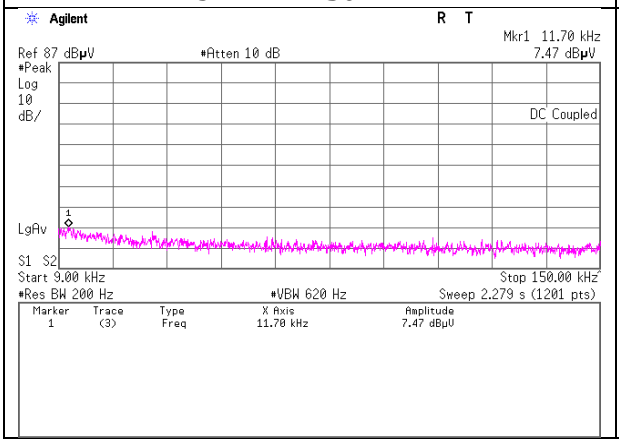


Conducted Spurious Emission

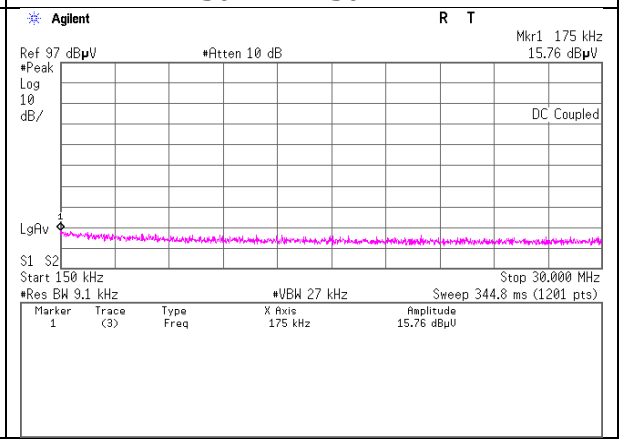
Test place	Ise EMC Lab. No.3 Measurement Room
Report No.	11500824H
Date	November 9, 2016
Temperature / Humidity	23 deg. C / 38 % RH
Engineer	Koji Yamamoto
Mode	Tx, Hopping Off, DH5

2441 MHz

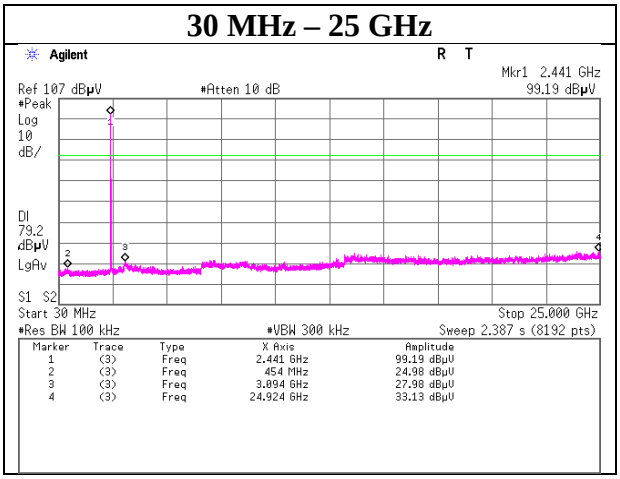
9 kHz – 150 kHz



150 kHz – 30 MHz



30 MHz – 25 GHz

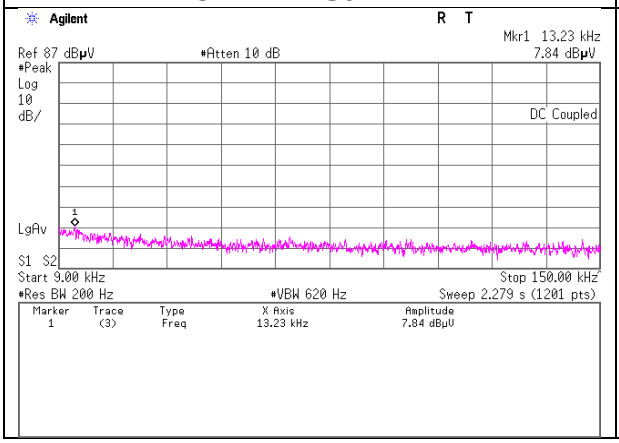


Conducted Spurious Emission

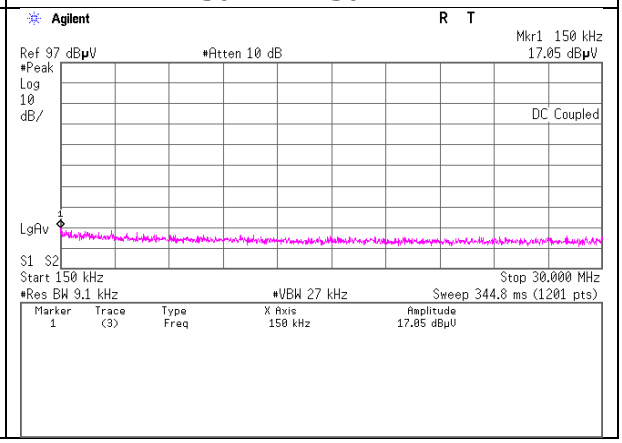
Test place	Ise EMC Lab. No.3 Measurement Room
Report No.	11500824H
Date	November 9, 2016
Temperature / Humidity	23 deg. C / 38 % RH
Engineer	Koji Yamamoto
Mode	Tx, Hopping Off, DH5

2480 MHz

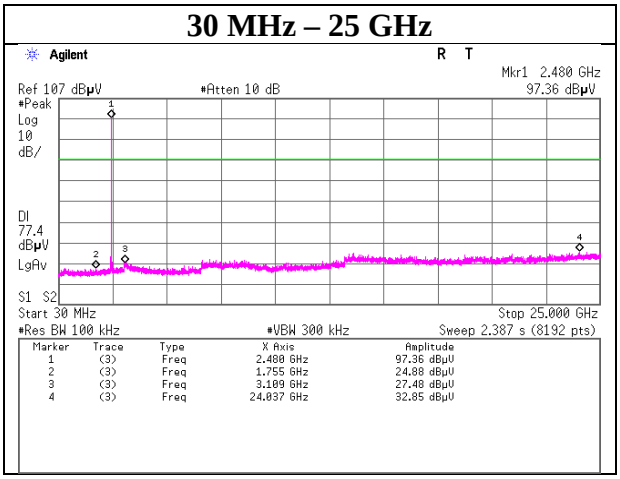
9 kHz – 150 kHz



150 kHz – 30 MHz



30 MHz – 25 GHz

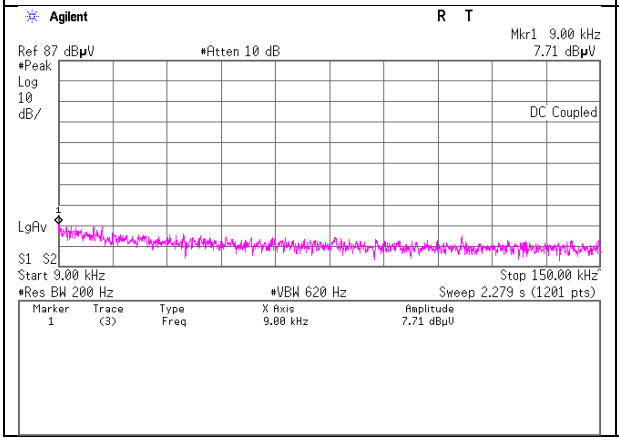


Conducted Spurious Emission

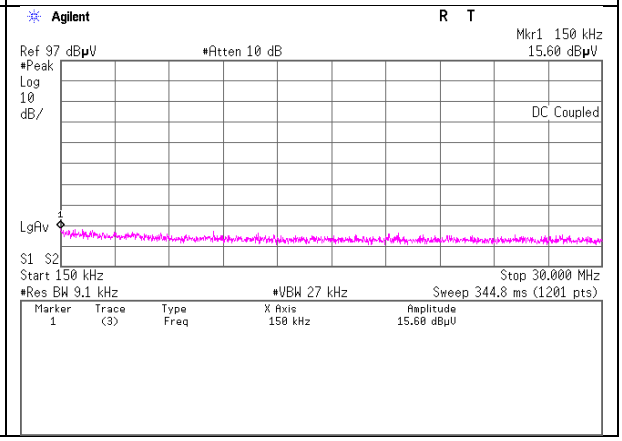
Test place	Ise EMC Lab. No.3 Measurement Room
Report No.	11500824H
Date	November 9, 2016
Temperature / Humidity	23 deg. C / 38 % RH
Engineer	Koji Yamamoto
Mode	Tx, Hopping Off, 3DH5

2402 MHz

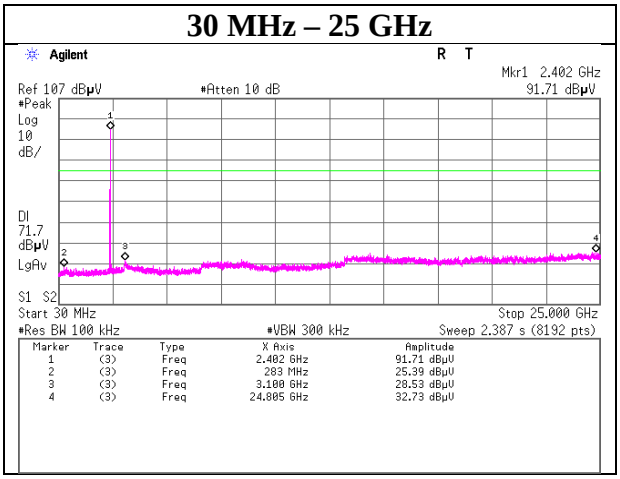
9 kHz – 150 kHz



150 kHz – 30 MHz



30 MHz – 25 GHz

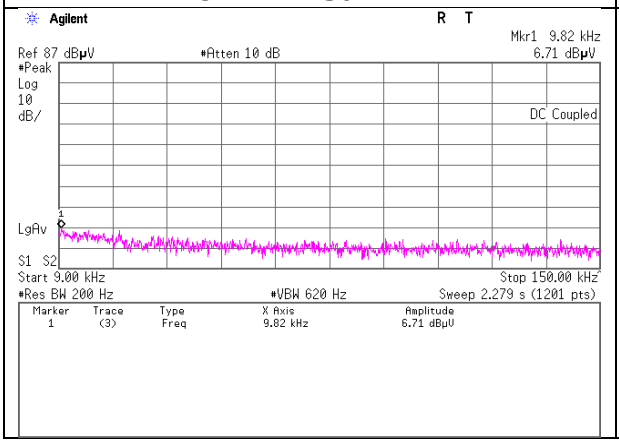


Conducted Spurious Emission

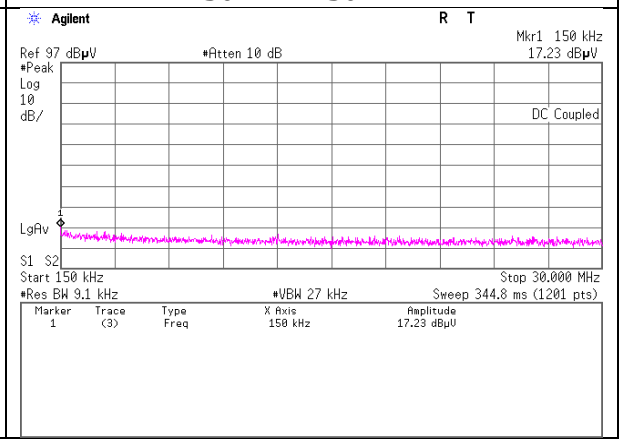
Test place	Ise EMC Lab. No.3 Measurement Room
Report No.	11500824H
Date	November 9, 2016
Temperature / Humidity	23 deg. C / 38 % RH
Engineer	Koji Yamamoto
Mode	Tx, Hopping Off, 3DH5

2441 MHz

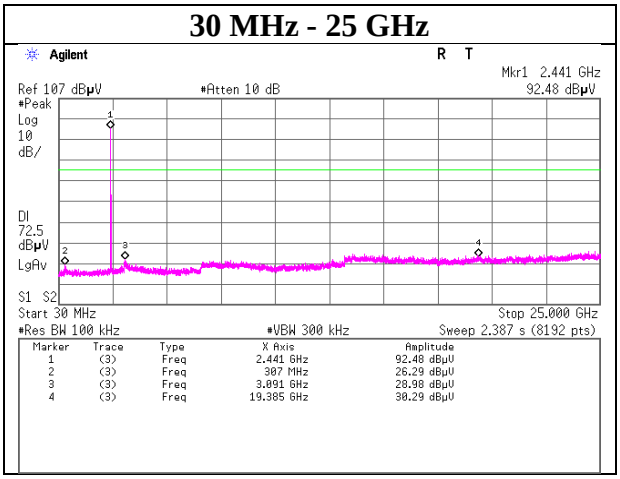
9 kHz - 150 kHz



150 kHz - 30 MHz



30 MHz - 25 GHz

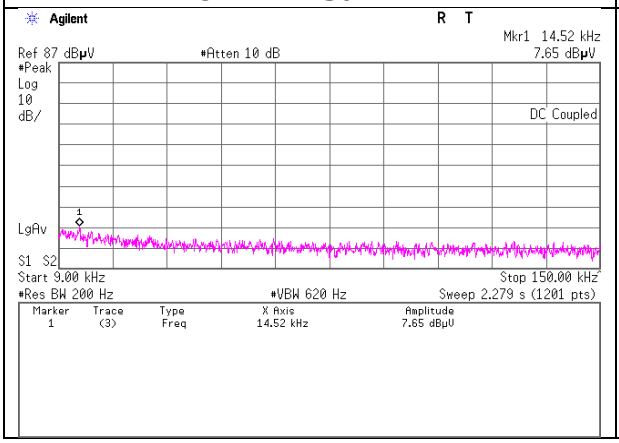


Conducted Spurious Emission

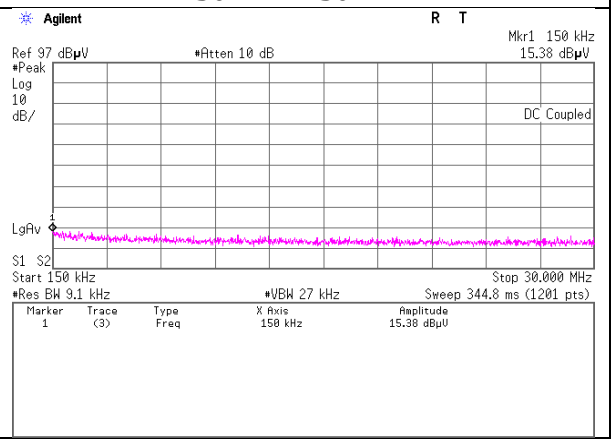
Test place	Ise EMC Lab. No.3 Measurement Room
Report No.	11500824H
Date	November 9, 2016
Temperature / Humidity	23 deg. C / 38 % RH
Engineer	Koji Yamamoto
Mode	Tx, Hopping Off, 3DH5

2480 MHz

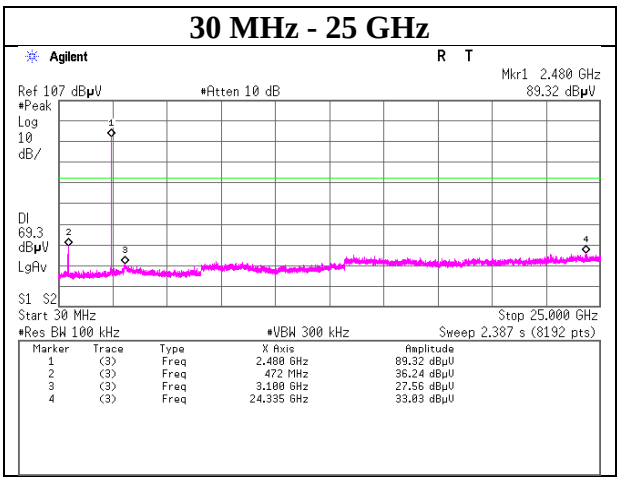
9 kHz - 150 kHz



150 kHz - 30 MHz



30 MHz - 25 GHz

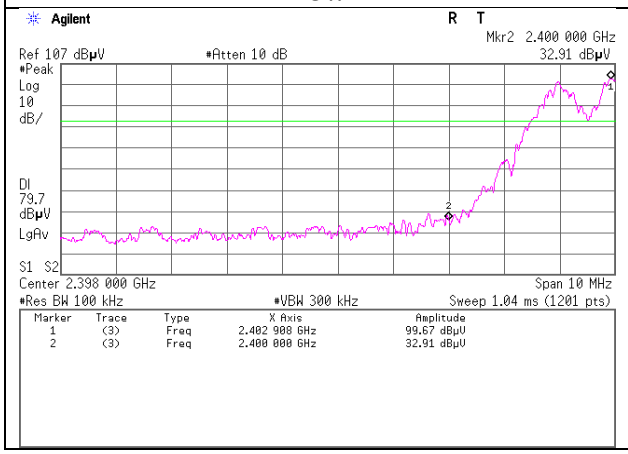


Conducted Emission Band Edge compliance

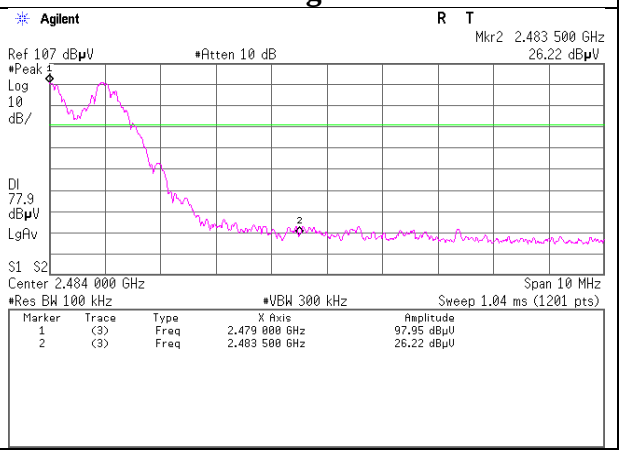
Test place	Ise EMC Lab. No.3 Measurement Room
Report No.	11500824H
Date	November 9, 2016
Temperature / Humidity	23 deg. C / 38 % RH
Engineer	Koji Yamamoto
Mode	Tx DH5

Hopping On

Low

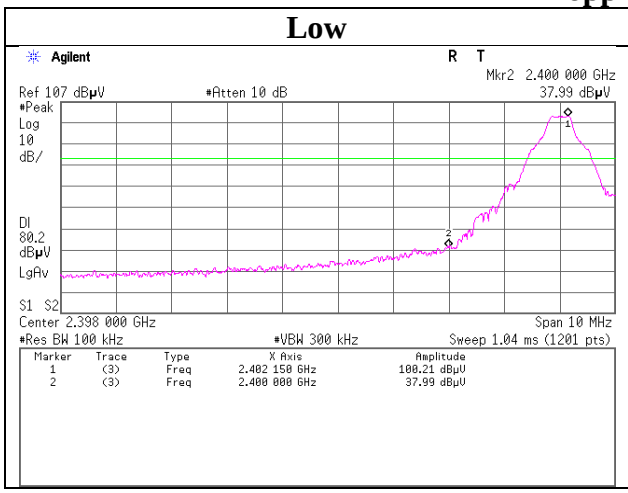


High

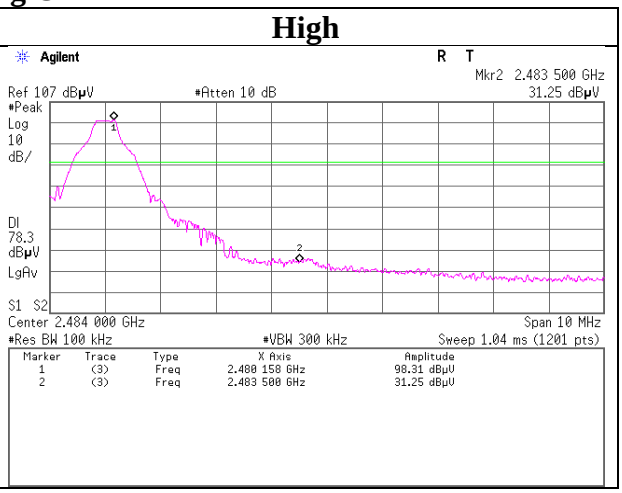


Hopping Off

Low



High

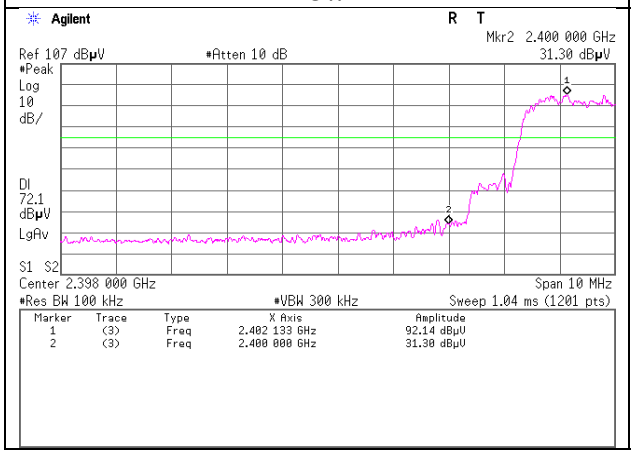


Conducted Emission Band Edge compliance

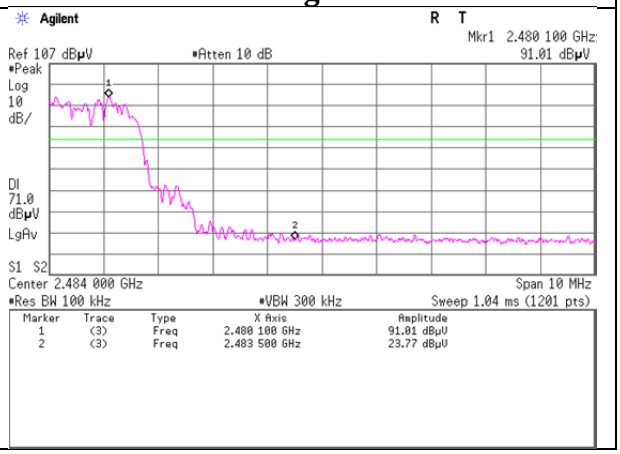
Test place	Ise EMC Lab. No.3 Measurement Room
Report No.	11500824H
Date	November 9, 2016
Temperature / Humidity	23 deg. C / 38 % RH
Engineer	Koji Yamamoto
Mode	Tx 3DH5

Hopping On

Low

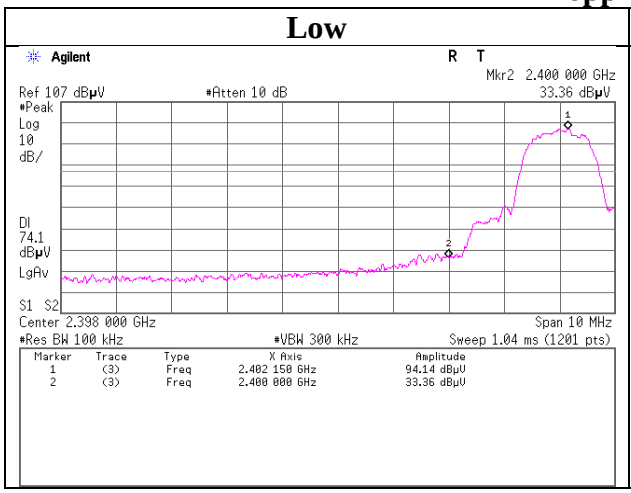


High

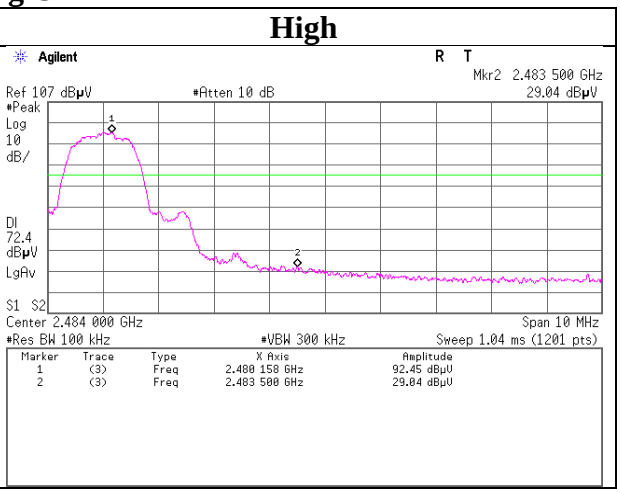


Hopping Off

Low



High

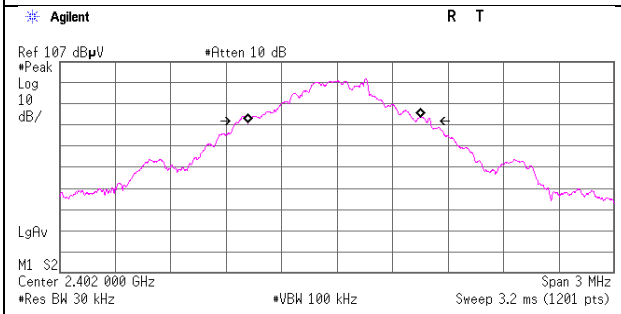


99%Occupied Bandwidth

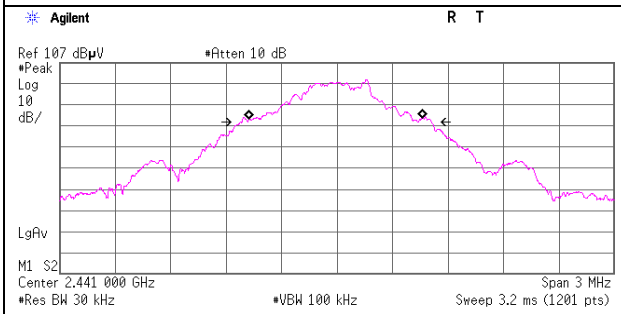
Test place	Ise EMC Lab. No.3 Measurement Room
Report No.	11500824H
Date	November 9, 2016
Temperature / Humidity	23 deg. C / 38 % RH
Engineer	Koji Yamamoto
Mode	Tx Hopping Off

Hopping Off, DH5

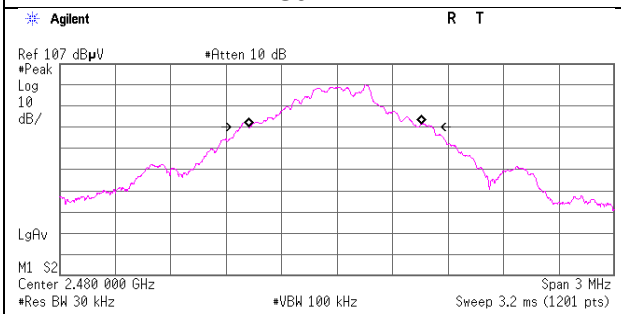
2402 MHz



2441 MHz

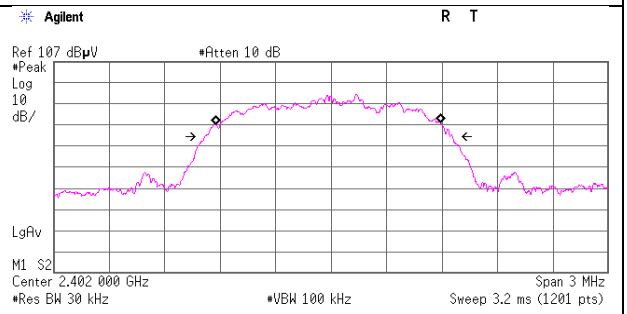


2480 MHz

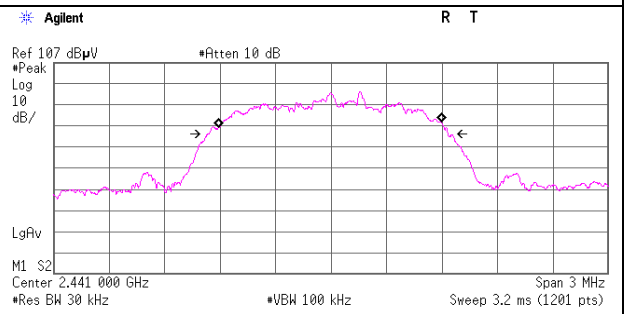


Hopping Off, 3DH5

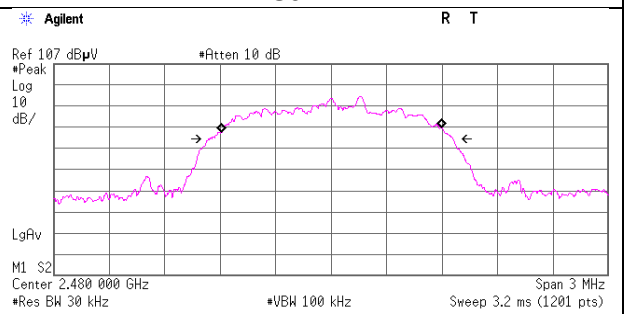
2402 MHz



2441 MHz



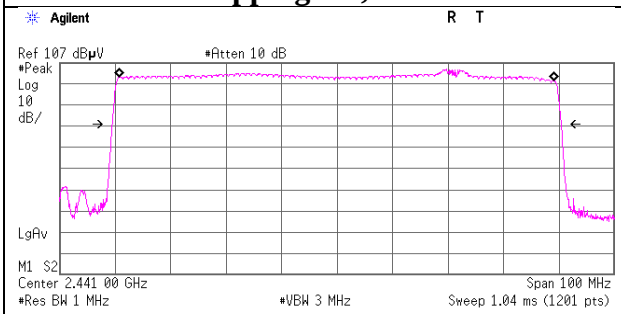
2480 MHz



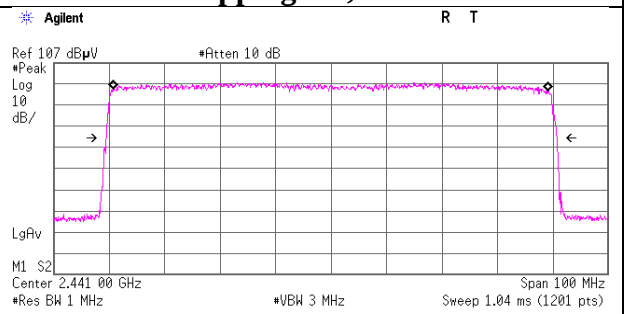
99% Occupied Bandwidth

Test place	Ise EMC Lab. No.3 Measurement Room
Report No.	11500824H
Date	November 9, 2016
Temperature / Humidity	23 deg. C / 38 % RH
Engineer	Koji Yamamoto
Mode	Tx Hopping On

Hopping On, DH5



Hopping On, 3DH5



APPENDIX 2: Test instruments

Test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MOS-29	Thermo-Hygrometer	Custom	CTH-201	2901	AT	2016/01/21 * 12
MRENT-130	Spectrum Analyzer	Agilent	E4440A	MY46187750	AT	2016/06/03 * 12
MPM-08	Power Meter	Anritsu	ML2495A	6K00003338	AT	2016/10/07 * 12
MPSE-11	Power sensor	Anritsu	MA2411B	011737	AT	2016/10/07 * 12
MAT-58	Attenuator(10dB)	Suhner	6810.19.A	-	AT	2016/01/18 * 12
MCC-171	Microwave Cable	Junkosha	MWX221	1409S494	AT	2016/03/11 * 12
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE/CE	2016/10/20 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	1301	RE/CE	2016/01/21 * 12
MJM-16	Measure	KOMELON	KMC-36	-	RE/CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MSA-16	Spectrum Analyzer	Agilent	E4440A	MY46186390	RE	2016/02/08 * 12
MHA-20	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	258	RE	2016/05/29 * 12
MCC-167	Microwave Cable	Junkosha	MWX221	1404S374(1m) / 1405S074(5m)	RE	2016/05/20 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2016/03/24 * 12
MMM-08	DIGITAL HiTESTER	Hioki	3805	051201197	RE	2016/01/13 * 12
MHF-25	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	001	RE	2016/09/21 * 12
MHA-16	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170306	RE	2016/05/29 * 12
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE/CE	2016/11/10 * 12
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE/CE	2016/09/15 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	1915	RE	2016/10/15 * 12
MLA-22	Logperiodic Antenna(200-1000MHz)	Schwarzbeck	VUSLP9111B	911B-191	RE	2016/01/30 * 12
MCC-51	Coaxial cable	UL Japan	-	-	RE	2016/07/26 * 12
MAT-70	Attenuator(6dB)	Agilent	8491A-006	MY52460153	RE	2016/04/05 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2016/03/24 * 12
MLS-23	LISN(AMN)	Schwarzbeck	NSLK8127	8127-729	CE(AE)	2016/07/07 * 12
MLS-24	LISN(AMN)	Schwarzbeck	NSLK8127	8127-730	CE(EUT)	2016/07/11 * 12
MTA-31	Terminator	TME	CT-01	-	CE	2016/01/12 * 12
MCC-112	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/SFM141(3m)/sucoform141-PE(1m)/421-010(1.5m)/RFM-E321(Switcher)	-/00640	CE	2016/07/26 * 12
MAT-66	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2016/01/14 * 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: CE: Conducted Emission test
RE: Radiated Emission test
AT: Antenna Terminal Conducted test