RADIO TEST REPORT

Test Report No. : 10936450H-B-R1

Applicant	:	**Murata Manufacturing Co., Ltd.**
Type of Equipment	:	**Communication Module**
Model No.	:	**LBEE5UW1FS**
FCC ID	:	**VPYLB1FS**
Test regulation	:	**FCC Part 15 Subpart C: 2015** *** 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)
7. This report is a revised version of 10936450H-B. 10936450H-B is replaced with this report.

Date of test: August 26 to September 3, 2015

Representative test engineer:
T. Noguchi
Takafumi Noguchi
Engineer
Consumer Technology Division

Approved by:
Takayuki Shimada
Engineer
Consumer Technology Division

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REVISION HISTORY

Original Test Report No.: 10936450H-B

Revision	Test report No.	Date	Page revised	Contents
- (Original)	10936450H-B	January 7, 2016	-	-
1	10936450H-B-R1	January 12, 2016	P.5	Correction of Power Supply (inner)
1	10936450H-B-R1	January 12, 2016	P.6	Correction of FCC Part 15.31 (e) sentence
1	10936450H-B-R1	January 12, 2016	P.6	Addition of details for Spurious Emission & Band Edge Compliance
1	10936450H-B-R1	January 12, 2016	P.10	Typing error: Antenna cable (0.01 m)→Antenna cable (0.1 m)

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SECTION 1: Customer information

Company Name	:	Murata Manufacturing Co., Ltd.
Address	:	1-10-1 Higashikotari, Nagaokakyo-shi, Kyoto 617-8555 Japan
Telephone Number	:	+81-75-955-6736
Facsimile Number	:	+81-75-955-6634
Contact Person	:	Motoo Hayashi

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

2.1 Identification of E.U.T.

Type of Equipment	:	Communication Module
Model No.	:	LBEE5UW1FS
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 3.3 V
Receipt Date of Sample	:	August 26, 2015
Country of Mass-production	:	Japan and China
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: LBEE5UW1FS (referred to as the EUT in this report) is a Communication Module.

General Specification

Clock frequency(ies) in the system	:	BT/WLAN-Ref: 37.4 MHz, LPO: 32.768 kHz, CPU: 26 MHz
Operating temperature	:	-10 deg. C to +50 deg. C

Radio Specification

WLAN (IEEE802.11b/g/n-20)

Equipment Type	Transceiver
Frequency of Operation	2412-2462MHz
Type of Modulation	DSSS, OFDM
Bandwidth & Channel spacing	20MHz & 5MHz
Method of frequency generation	Synthesizer
Power Supply (inner)	DC 1.2 V
Antenna Type	Pattern Antenna
Antenna Gain	+0.7 dBi: 55 mm cable +0.7 dBi: 58 mm cable -2.1 dBi: 100 mm cable

Bluetooth (Ver. 4.1 with EDR function)

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Type of Modulation	BT: FHSS (GFSK, π/4DQPSK, 8DPSK) LE: GFSK
Bandwidth & Channel spacing	BT: 1MHz & 1MHz LE: 2MHz & 2MHz
Method of frequency generation	Synthesizer
Power Supply (inner)	DC 1.2 V
Antenna Type	Pattern Antenna
Antenna Gain	+0.7 dBi: 55 mm cable +0.7 dBi: 58 mm cable -2.1 dBi: 100 mm cable

*This test report applies for Bluetooth part.

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part 15 Subpart C: 2015, final revised on November 23, 2015 *Some parts are effective on and after December 17, 2015 or December 23, 2015. The revision 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 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz

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** 29.9 dB, 0.15000 MHz, N **AV** 28.9 dB, 0.53422 MHz, L 0.51612 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	6.2 dB 4804.000 MHz, AV, Vert.	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)

This EUT provides stable voltage (DC 1.2 V) constantly to RF Module regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

The EUT has a unique antenna connector (Microwave Coaxial Connector (MM5829-2700) on the Module). Therefore the equipment complies with the requirement of Section 15.203/212.

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.

Test site (semi anechoic chamber)	Conducted emission Uncertainty (+/-)			
	No. 1	No. 2	No. 3	No. 4
150 kHz - 30 MHz	3.5 dB	3.5 dB	3.4 dB	3.5 dB

Test site (semi anechoic chamber)	Radiated emission Uncertainty (+/-)						
	Measurement distance: 3 m				1 m		0.5 m
	9 kHz - 30 MHz	30 MHz - 300 MHz	300 MHz - 1 GHz	1 GHz - 10 GHz	10 GHz - 18 GHz	18 GHz - 26.5 GHz	26.5 GHz - 40 GHz
No. 1	4.3 dB	5.1 dB	6.2 dB	5.5 dB	5.8 dB	5.8 dB	4.3 dB
No. 2	4.2 dB	5.1 dB	6.2 dB	5.4 dB	5.7 dB	5.9 dB	5.6 dB
No. 3	4.4 dB	5.1 dB	6.3 dB	5.2 dB	5.5 dB	5.8 dB	5.5 dB
No. 4	4.7 dB	5.3 dB	6.3 dB	5.3 dB	5.7 dB	5.9 dB	5.5 dB

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	
0.7 dB	1.5 dB	1.5 dB	1.7 dB	2.8 dB	2.8 dB	2.9 dB	2.6 dB

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 test report has enough margin, more than the site margin.

3.5 Test Location

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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

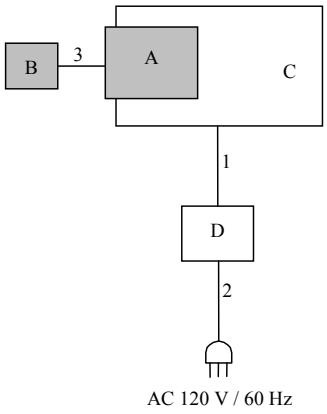
*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload length (except Dwell time test)
*2DH mode (2Mb/s EDR: pi/4DQPSK) was excluded for other tests than power measurement by using 3DH mode (3 Mb/s EDR: 8DPSK) as a representative.
* It is considered 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: 6 dBm
Software: MFG Tool v1.0 and Bluetooth Test Tool 1.8.9.3

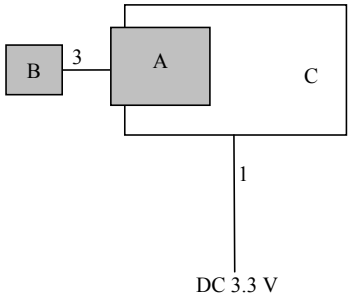
*This setting of software is the worst case.
Any conditions under the normal use do not exceed the condition of setting.
In addition, end users cannot change the settings of the output power of the product.

4.2 Configuration and peripherals

[Conducted emission test]



[Radiated emission test]



* 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	Communication Module	LBEE5UW1FS	00006EC53E: AT 00006EC5FB: RE	Murata Manufacturing Co., Ltd.	EUT
B	Antenna	Type1FU	001	Murata Manufacturing Co Ltd.	EUT
C	Jig Board	P2ML4233	-	Murata Manufacturing Co., Ltd.	-
D	DC Power Supply	PMC35-2A	13090501	KIKUSUI	-

AT: Antenna terminal conducted tests
RE: Spurious emission test

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	0.1: CE 1.8: RE	Unshielded	Unshielded	-
2	AC Cable	1.8	Unshielded	Unshielded	-
3	Antenna Cable	0.055 *1)	Shielded	Shielded	-

CE: Conducted emission test
RE: Radiated emission test
*1) After the comparison between Antenna cable (0.055 m) and Antenna cable (0.1 m), test was performed with the antenna cable that had worst case as a representative.

SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 0.5 m by 1.0 m, raised 0.8m 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 1GHz]
EUT was placed on a urethane platform of nominal size, 0.5 m by 1.0 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 1GHz]
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 300 MHz	300 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	3 m (below 10 GHz), 1 m*2) (above 10 GHz)		3 m (below 10 GHz), 1 m*2) (above 10 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 (3.0 m / 1.0 m) = 9.5 dB

- The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT (Module and Antenna) to see the position of maximum noise, and the test was made at the position that has the maximum noise.

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

Measurement range : 30 M - 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 *3)	-	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 *2)	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) 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)
*3) Reference data

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

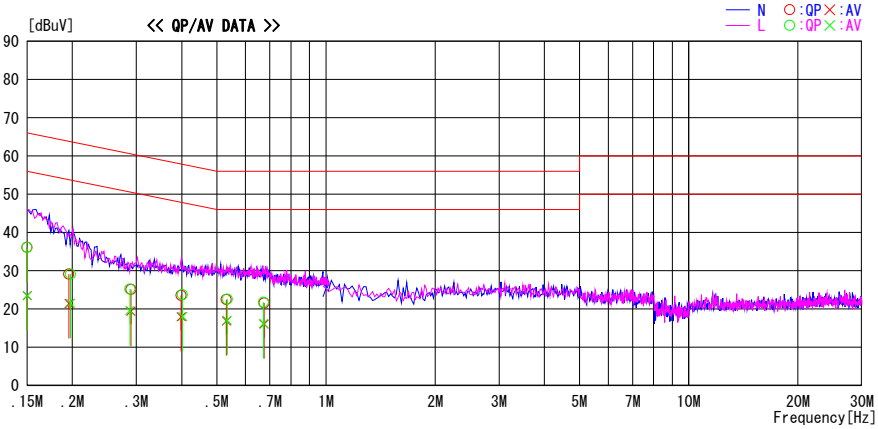
UL Japan, Inc. Ise EMC Lab. No.1 Semi Anechoic Chamber
Date : 2015/09/03

Report No. : 10936450H

Temp./Humi. : 24deg. C / 72% RH
Engineer : Takafumi Noguchi

Mode / Remarks : DH5 2441MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



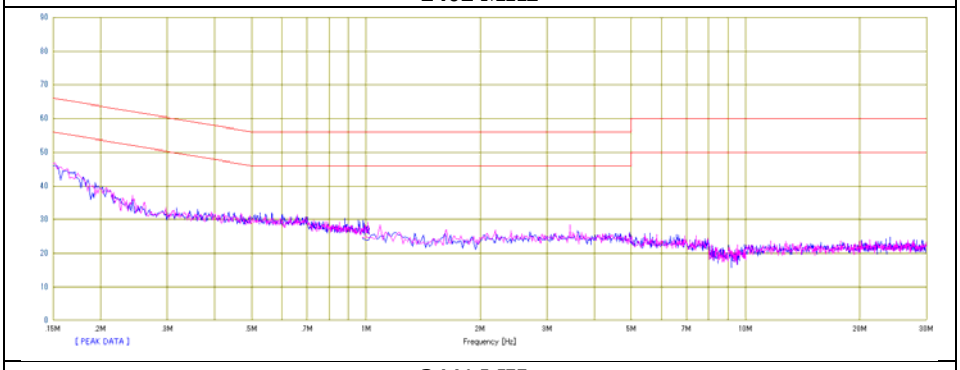
Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase	Comment
	QP	AV	Factor	QP	AV	QP	AV	QP	AV		
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0.15000	22.9	10.3	13.2	36.1	23.5	66.0	56.0	29.9	32.5	N	
0.19545	15.9	8.2	13.2	29.1	21.4	63.8	53.8	34.7	32.4	N	
0.28982	11.8	6.1	13.3	25.1	19.4	60.5	50.5	35.4	31.1	N	
0.39874	10.3	4.7	13.3	23.6	18.0	57.9	47.9	34.3	29.9	N	
0.53148	9.2	3.6	13.3	22.5	16.9	56.0	46.0	33.5	29.1	N	
0.67514	8.2	2.7	13.4	21.6	16.1	56.0	46.0	34.4	29.9	N	
0.15000	22.9	10.3	13.2	36.1	23.5	66.0	56.0	29.9	32.5	L	
0.19741	15.9	8.3	13.2	29.1	21.5	63.7	53.7	34.6	32.2	L	
0.28789	11.9	6.3	13.3	25.2	19.6	60.6	50.6	35.4	31.0	L	
0.40237	10.4	4.8	13.3	23.7	18.1	57.8	47.8	34.1	29.7	L	
0.53422	9.3	3.8	13.3	22.6	17.1	56.0	46.0	33.4	28.9	L	
0.67294	8.3	2.8	13.4	21.7	16.2	56.0	46.0	34.3	29.8	L	

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

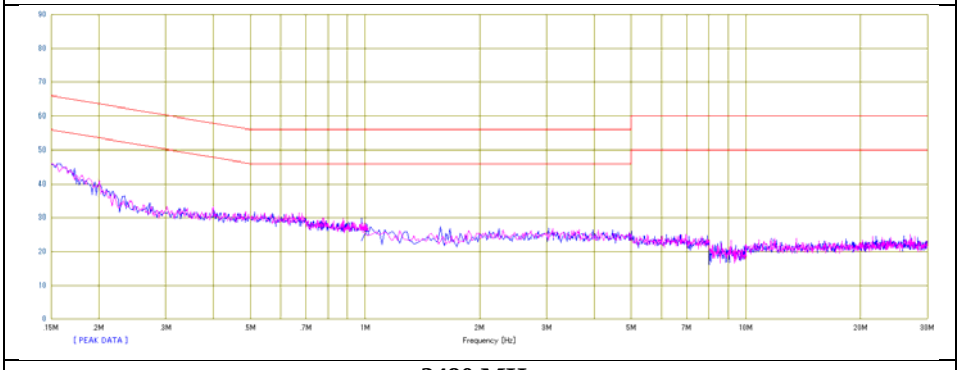
Conducted Emission

Test place	Ise EMC Lab. No.1 Semi Anechoic Chamber
Report No.	10936450H
Date	September 3, 2015
Temperature / Humidity	24 deg. C / 72 % RH
Engineer	Takafumi Noguchi
Mode	Tx, Hopping Off, DH5

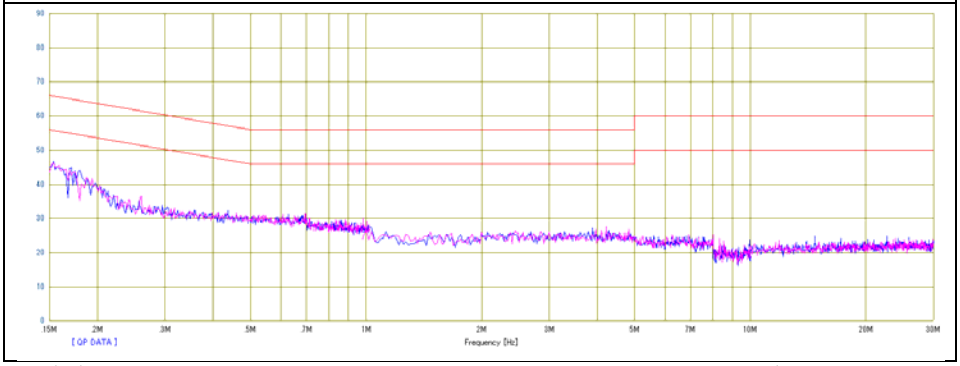
2402 MHz



2441 MHz



2480 MHz



Y scale [dBuV] Chart — N — L

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

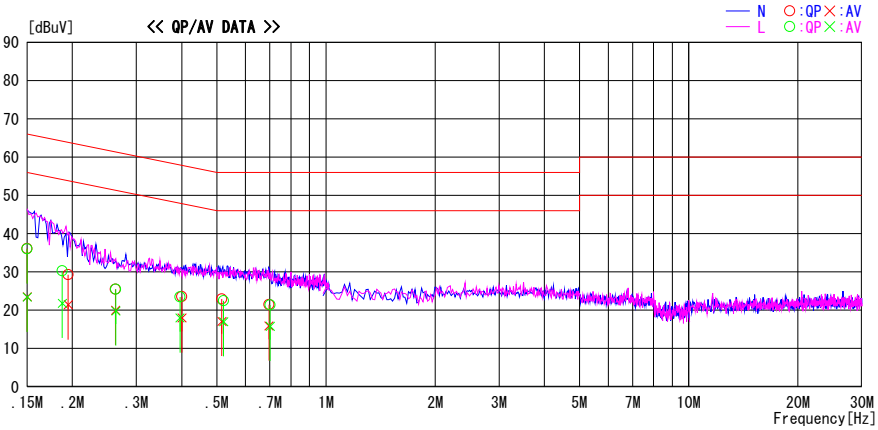
UL Japan, Inc. Ise EMC Lab. No.1 Semi Anechoic Chamber
Date : 2015/09/03

Report No. : 10936450H

Temp./Humi. : 24deg. C / 72% RH
Engineer : Takafumi Noguchi

Mode / Remarks : 3DH5 2480MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



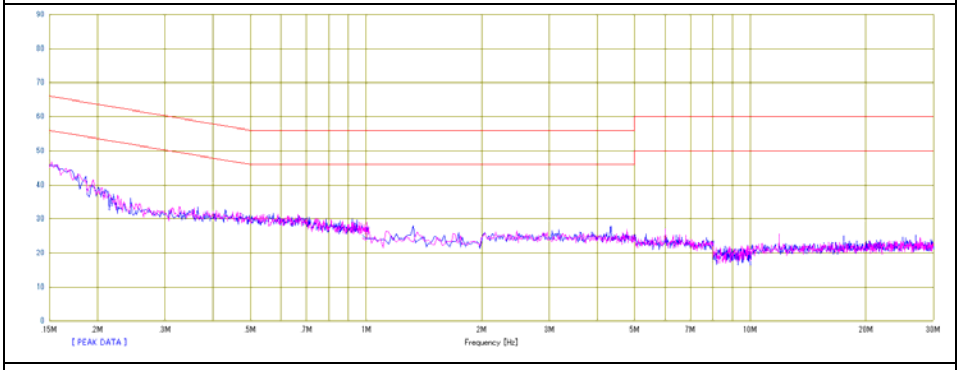
Frequency	Reading Level		Corr.	Results		Limit		Margin		Phase	Comment
	QP	AV	Factor	QP	AV	QP	AV	QP	AV		
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0.15000	22.9	10.3	13.2	36.1	23.5	66.0	56.0	29.9	32.5	N	
0.19457	16.1	8.2	13.2	29.3	21.4	63.8	53.8	34.5	32.4	N	
0.26292	12.2	6.7	13.3	25.5	20.0	61.3	51.3	35.8	31.3	N	
0.40068	10.3	4.7	13.3	23.6	18.0	57.8	47.8	34.2	29.8	N	
0.51612	9.6	3.8	13.3	22.9	17.1	56.0	46.0	33.1	28.9	N	
0.69617	8.1	2.5	13.4	21.5	15.9	56.0	46.0	34.5	30.1	N	
0.15000	22.8	10.2	13.2	36.0	23.4	66.0	56.0	30.0	32.6	L	
0.18746	17.1	8.6	13.2	30.3	21.8	64.1	54.1	33.8	32.3	L	
0.26336	12.2	6.5	13.3	25.5	19.8	61.3	51.3	35.8	31.5	L	
0.39584	10.2	4.7	13.3	23.5	18.0	57.9	47.9	34.4	29.9	L	
0.52184	9.2	3.7	13.3	22.5	17.0	56.0	46.0	33.5	29.0	L	
0.70191	8.0	2.4	13.4	21.4	15.8	56.0	46.0	34.6	30.2	L	

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

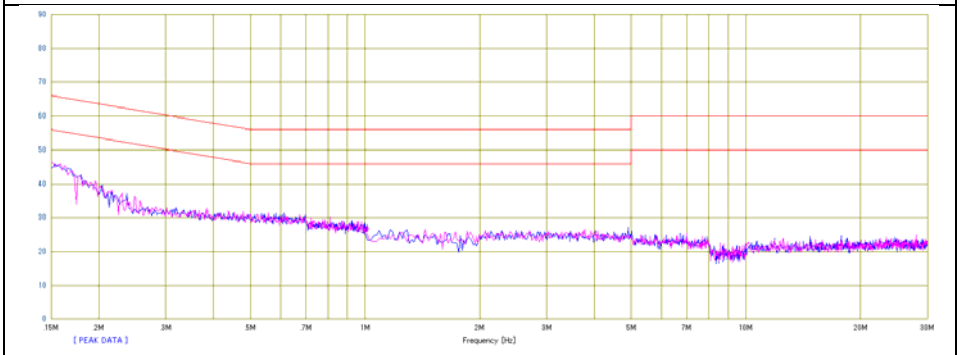
Conducted Emission

Test place	Ise EMC Lab. No.1 Semi Anechoic Chamber
Report No.	10936450H
Date	September 3, 2015
Temperature / Humidity	24 deg. C / 72 % RH
Engineer	Takafumi Noguchi
Mode	Tx, Hopping On, 3DH5

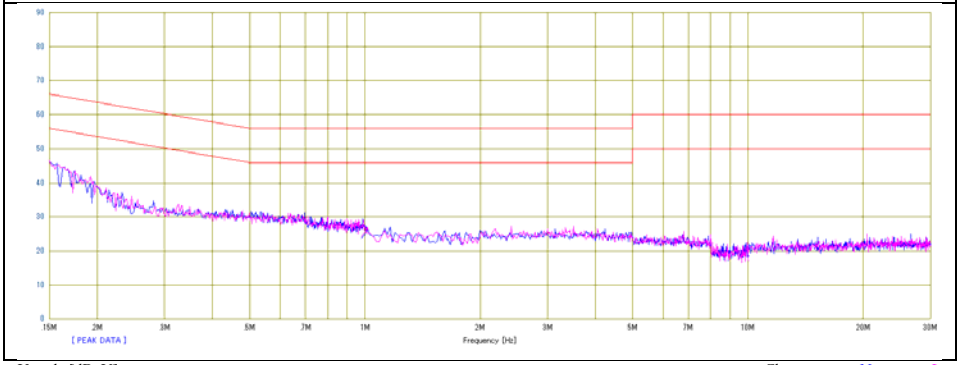
2402 MHz



2441 MHz



2480 MHz



Y scale [dBuV] Chart — N — L

20dB Bandwidth and Carrier Frequency Separation

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10936450H
Date	August 29, 2015
Temperature / Humidity	24 deg. C / 69 % RH
Engineer	Takafumi Noguchi
Mode	Tx DH5 / 3DH5

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.981	1.000	>= 0.654
DH5	2441.0	0.947	1.000	>= 0.631
DH5	2480.0	0.992	1.000	>= 0.661
3DH5	2402.0	1.340	1.003	>= 0.893
3DH5	2441.0	1.314	1.010	>= 0.876
3DH5	2480.0	1.313	1.010	>= 0.875

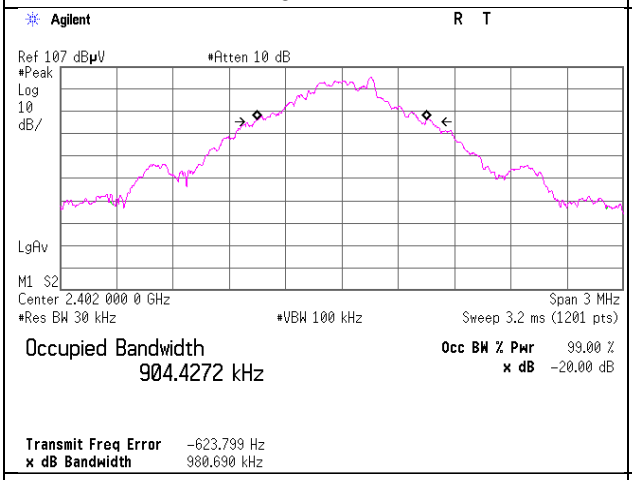
Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).
No limit applies to 20dB Bandwidth.

20dB Bandwidth and Carrier Frequency Separation

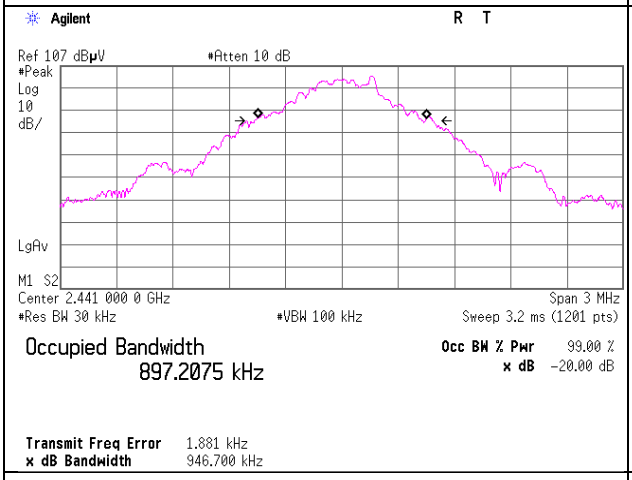
DH5

20 dB Bandwidth

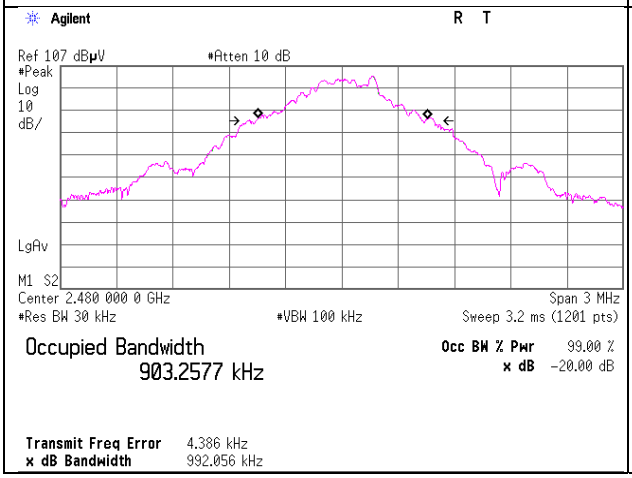
2402 MHz



2441 MHz

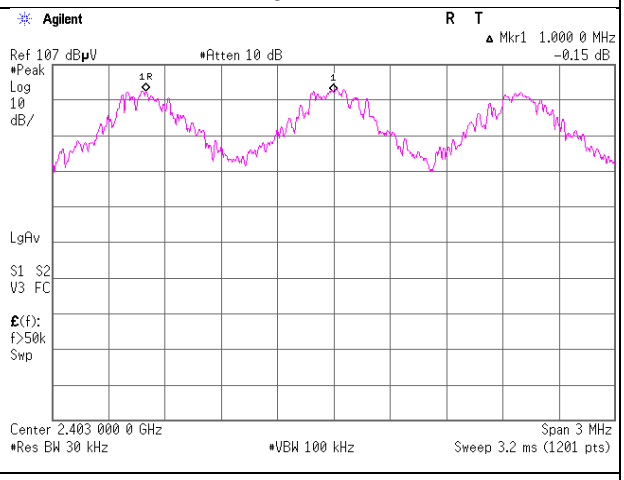


2480 MHz

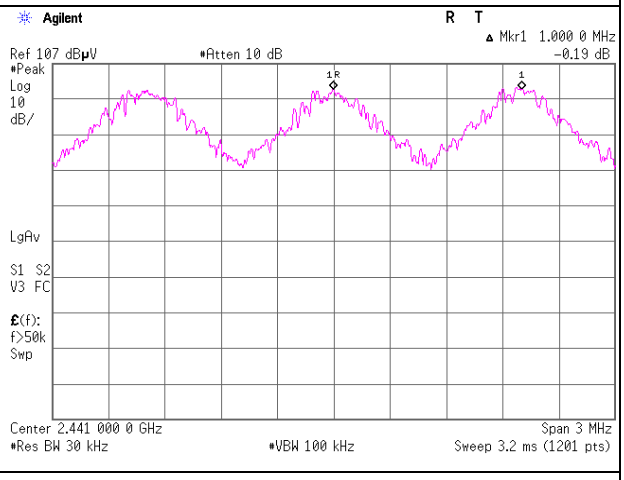


Carrier Frequency Separation

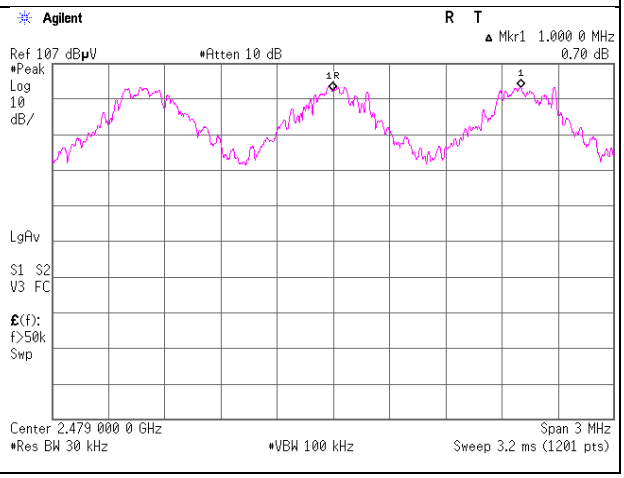
2402 MHz



2441 MHz



2480 MHz

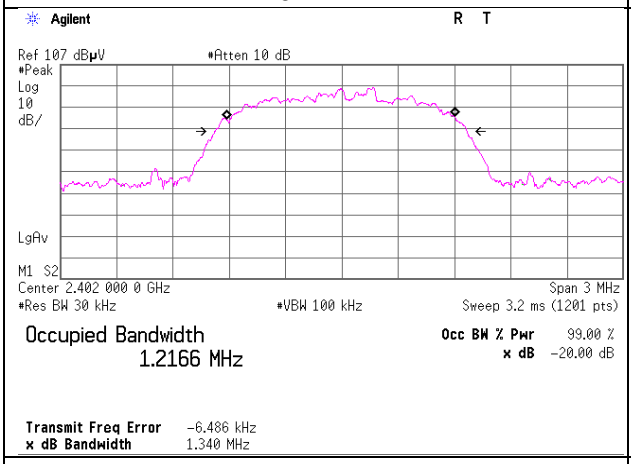


20dB Bandwidth and Carrier Frequency Separation

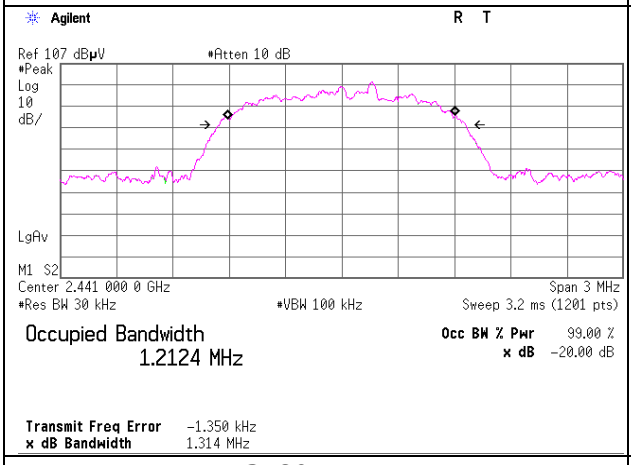
3DH5

20 dB Bandwidth

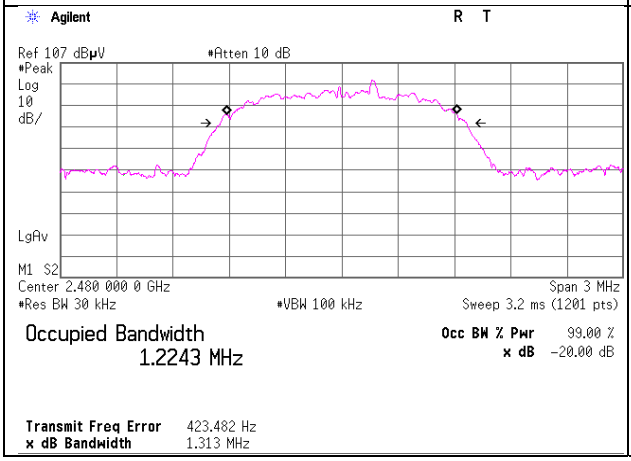
2402 MHz



2441 MHz

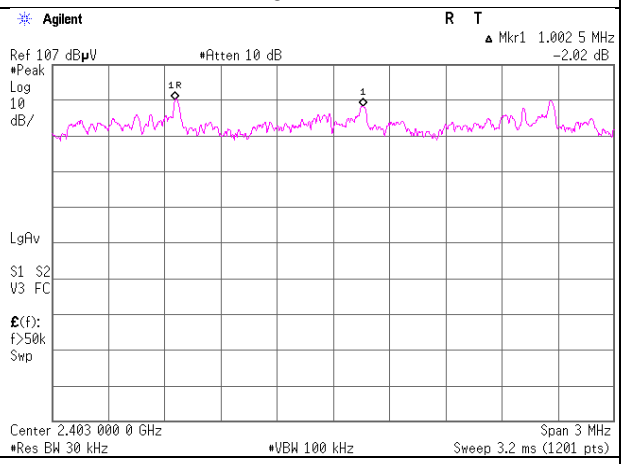


2480 MHz

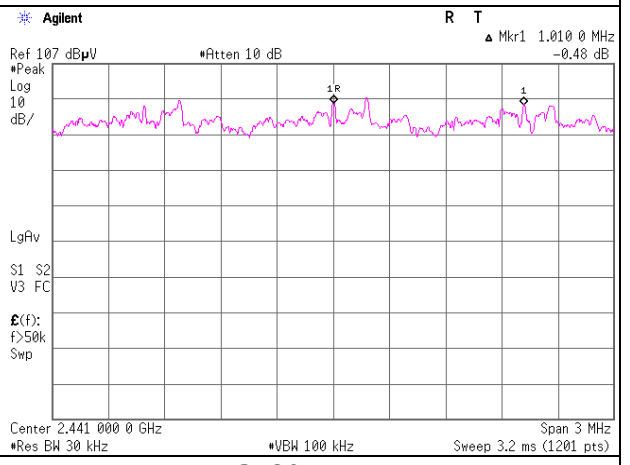


Carrier Frequency Separation

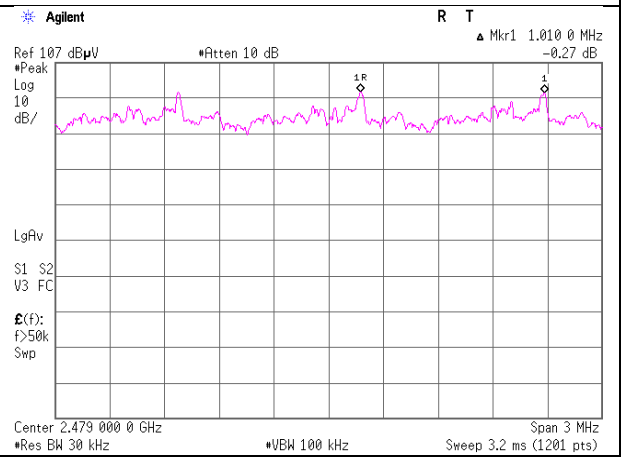
2402 MHz



2441 MHz



2480 MHz



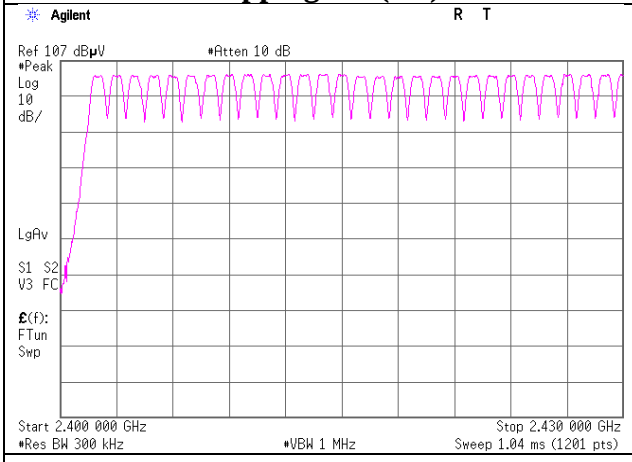
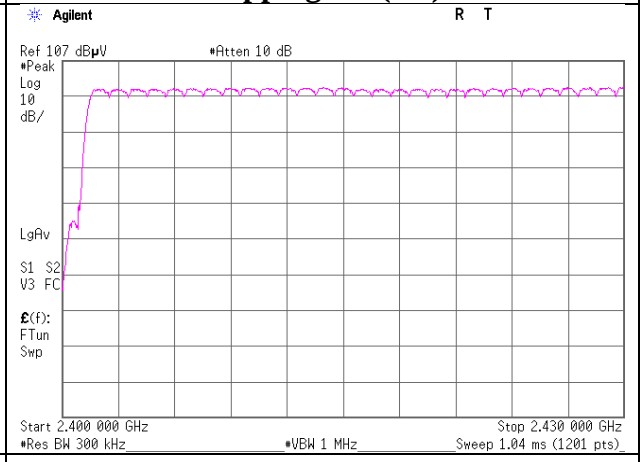
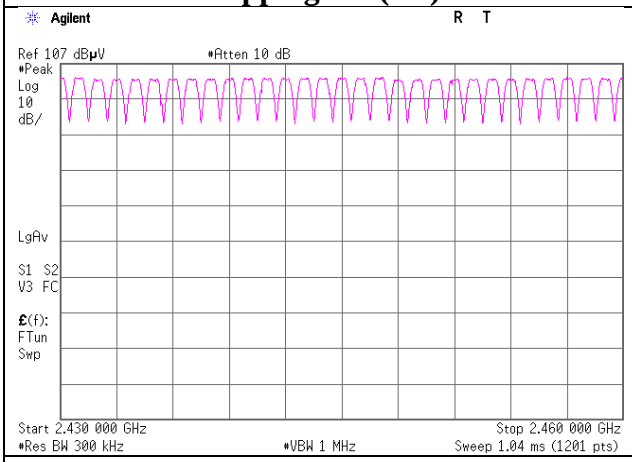
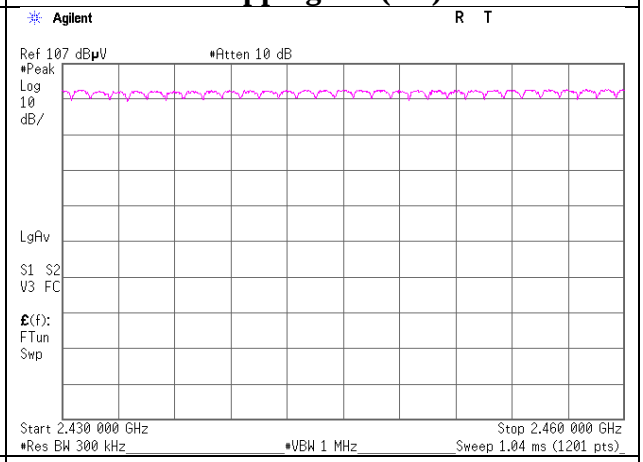
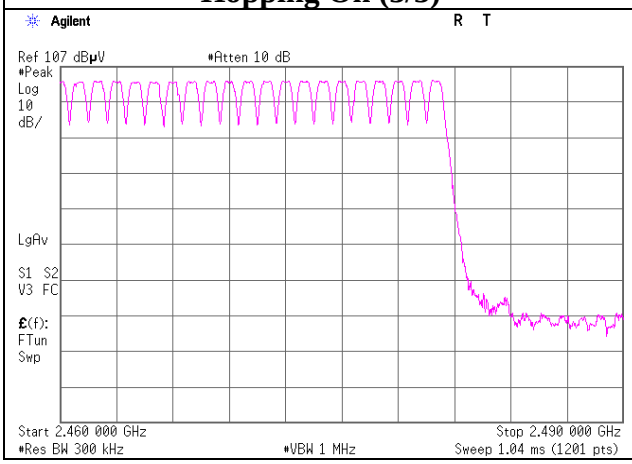
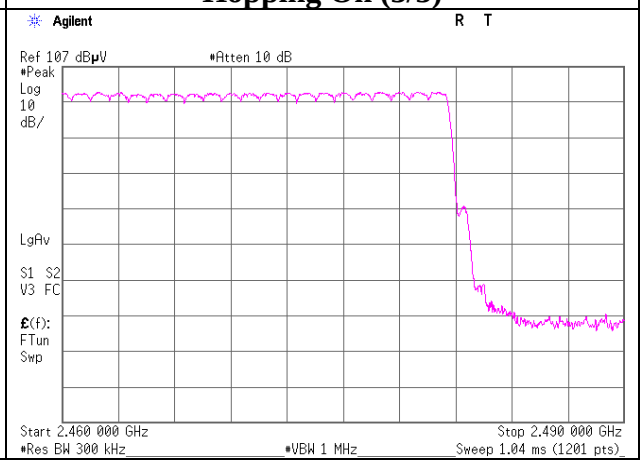
Number of Hopping Frequency

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10936450H
Date	August 29, 2015
Temperature / Humidity	24 deg. C / 69 % RH
Engineer	Takafumi Noguchi
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.11 Measurement Room
Report No.	10936450H
Date	August 29, 2015
Temperature / Humidity	24 deg. C / 69 % RH
Engineer	Takafumi Noguchi
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	49.4 times / 5 sec. x 31.6 sec. = 313 times	0.427	134	400
DH3	23.2 times / 5 sec. x 31.6 sec. = 147 times	1.698	250	400
DH5	16.6 times / 5 sec. x 31.6 sec. = 105 times	2.933	308	400
3DH1	50.2 times / 5 sec. x 31.6 sec. = 318 times	0.430	137	400
3DH3	25.8 times / 5 sec. x 31.6 sec. = 164 times	1.688	277	400
3DH5	18.2 times / 5 sec. x 31.6 sec. = 116 times	2.960	343	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	50	48	50	50	49	49.4
DH3	22	20	26	25	23	23.2
DH5	14	16	16	20	17	16.6
3DH1	49	51	50	51	50	50.2
3DH3	28	27	23	27	24	25.8
3DH5	21	17	14	18	21	18.2

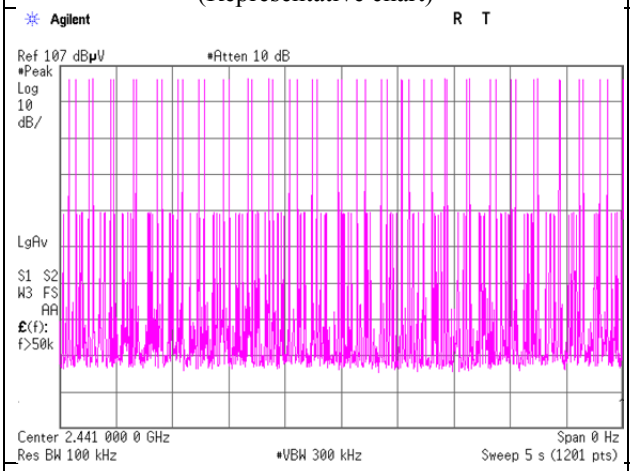
Sample Calculation
Average = Summation (Sampling 1 to 5) / 5

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.

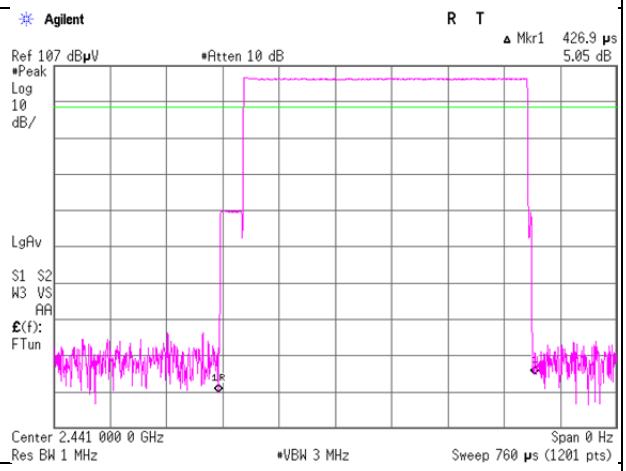
Dwell time

DH1 (1/2)

(Representative chart)

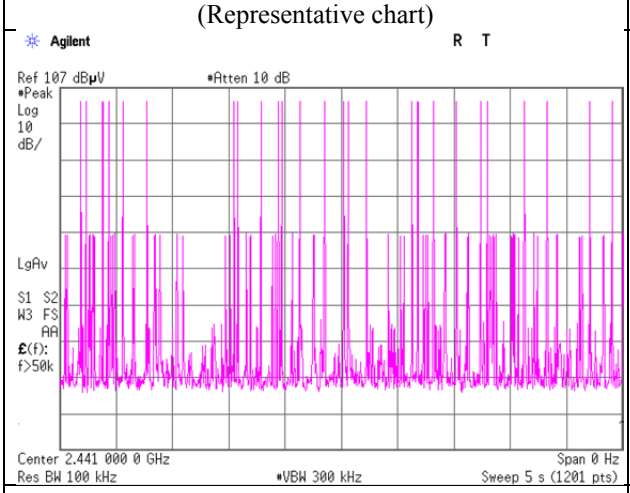


DH1 (2/2)

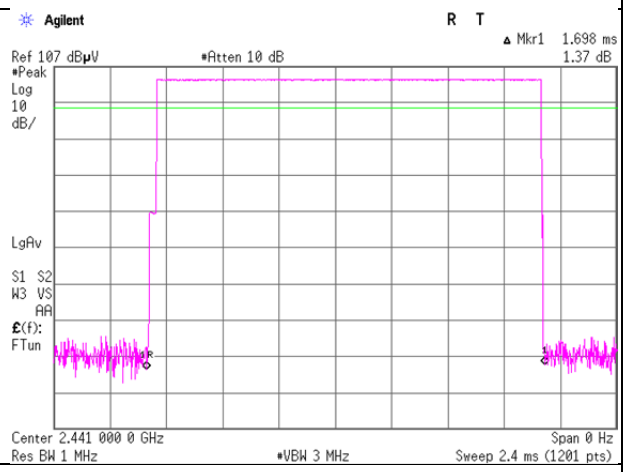


DH3 (1/2)

(Representative chart)

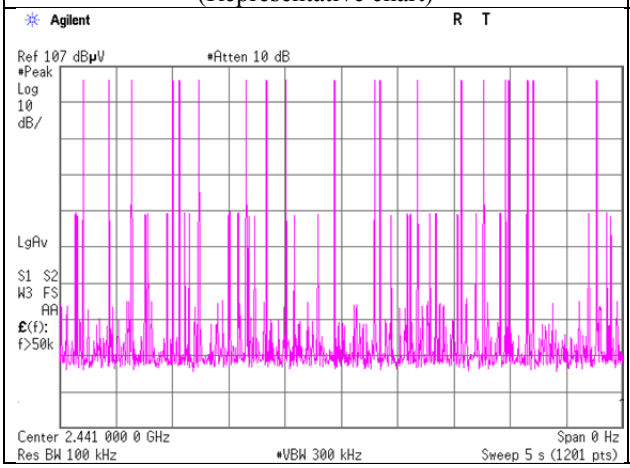


DH3 (2/2)

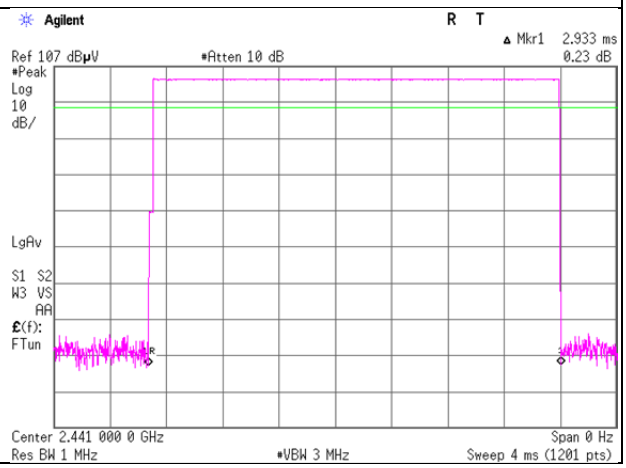


DH5 (1/2)

(Representative chart)



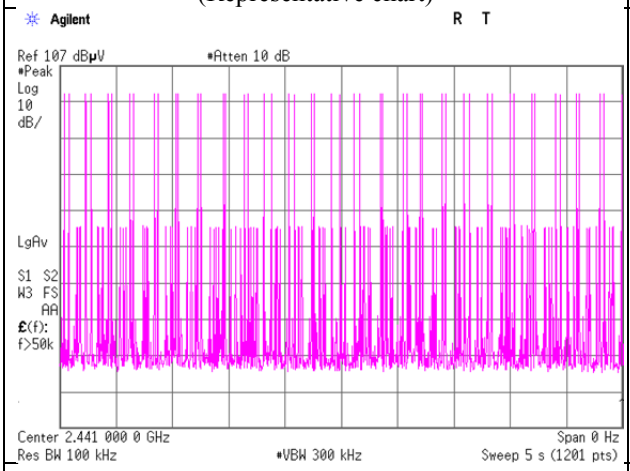
DH5 (2/2)



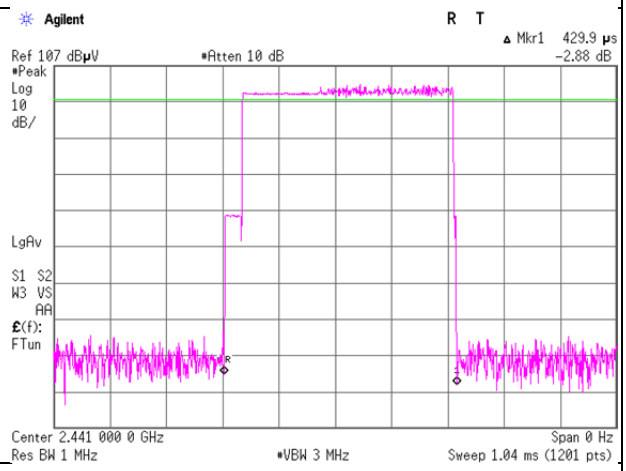
Dwell time

3DH1 (1/2)

(Representative chart)

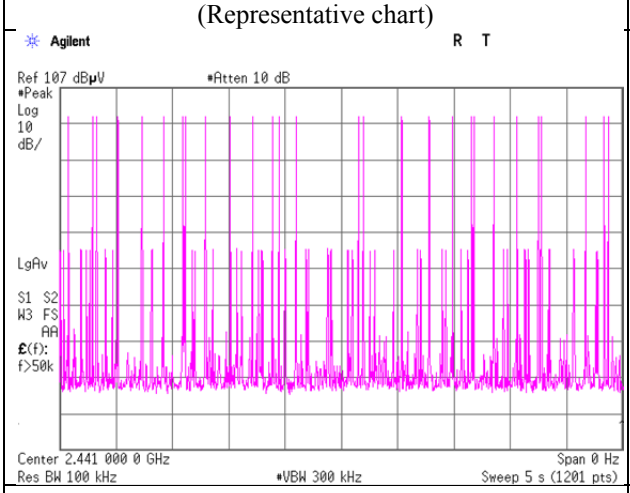


3DH1 (2/2)

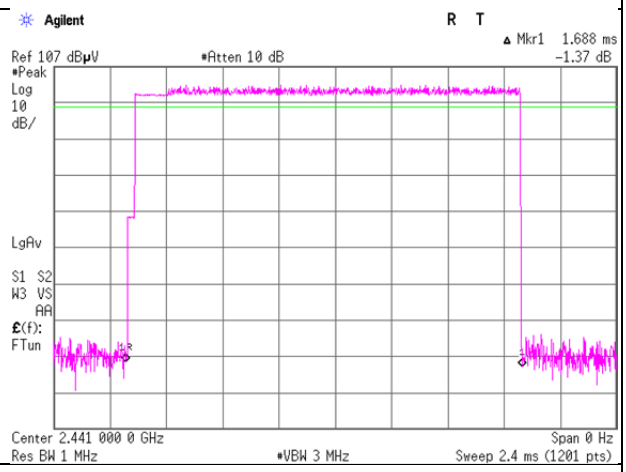


3DH3 (1/2)

(Representative chart)

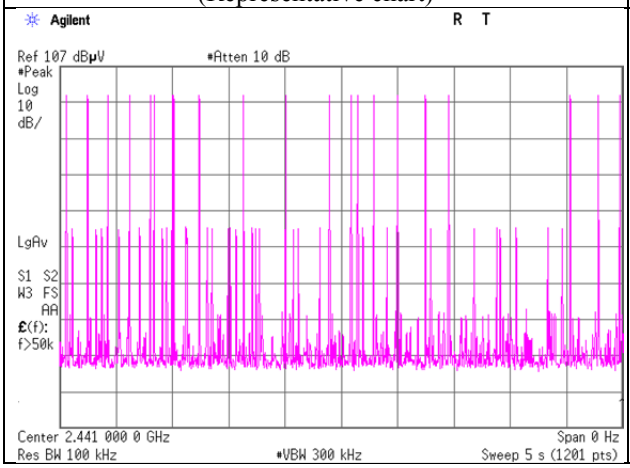


3DH3 (2/2)

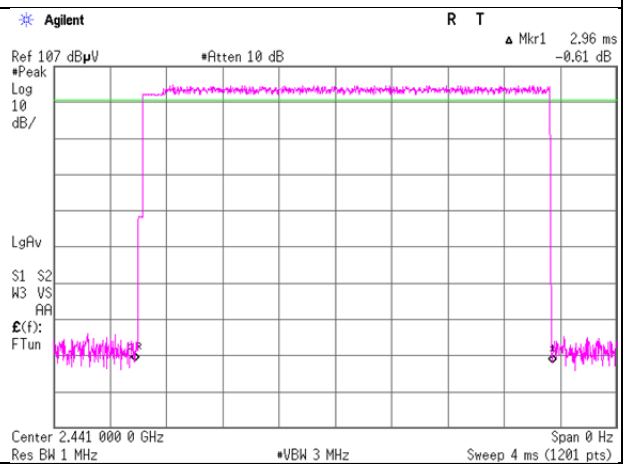


3DH5 (1/2)

(Representative chart)



3DH5 (2/2)



Maximum Peak Output Power

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10936450H
Date	August 26, 2015
Temperature / Humidity	23 deg. C / 63 % RH
Engineer	Koji Yamamoto
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	-2.99	0.65	10.06	7.72	5.92	20.96	125	13.24
DH5	2441.0	-2.69	0.65	10.06	8.02	6.34	20.96	125	12.94
DH5	2480.0	-2.88	0.65	10.06	7.83	6.07	20.96	125	13.13
2DH5	2402.0	-4.70	0.65	10.06	6.01	3.99	20.96	125	14.95
2DH5	2441.0	-4.31	0.65	10.06	6.40	4.37	20.96	125	14.56
2DH5	2480.0	-3.78	0.65	10.06	6.93	4.93	20.96	125	14.03
3DH5	2402.0	-4.33	0.65	10.06	6.38	4.35	20.96	125	14.58
3DH5	2441.0	-3.69	0.65	10.06	7.02	5.04	20.96	125	13.94
3DH5	2480.0	-3.21	0.65	10.06	7.50	5.62	20.96	125	13.46

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

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.11 Measurement Room
Report No.	10936450H
Date	August 26, 2015
Temperature / Humidity	23 deg. C / 63 % RH
Engineer	Koji Yamamoto
Mode	Tx, Hopping Off

Mode	Freq.	Reading	Cable Loss	Atten. Loss	Result (Frame power)	
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
DH5	2402.0	-4.31	0.65	10.06	6.40	4.37
DH5	2441.0	-3.71	0.65	10.06	7.00	5.01
DH5	2480.0	-4.27	0.65	10.06	6.44	4.41
2DH5	2402.0	-8.39	0.65	10.06	2.32	1.71
2DH5	2441.0	-8.02	0.65	10.06	2.69	1.86
2DH5	2480.0	-7.37	0.65	10.06	3.34	2.16
3DH5	2402.0	-8.31	0.65	10.06	2.40	1.74
3DH5	2441.0	-7.38	0.65	10.06	3.33	2.15
3DH5	2480.0	-6.95	0.65	10.06	3.76	2.38

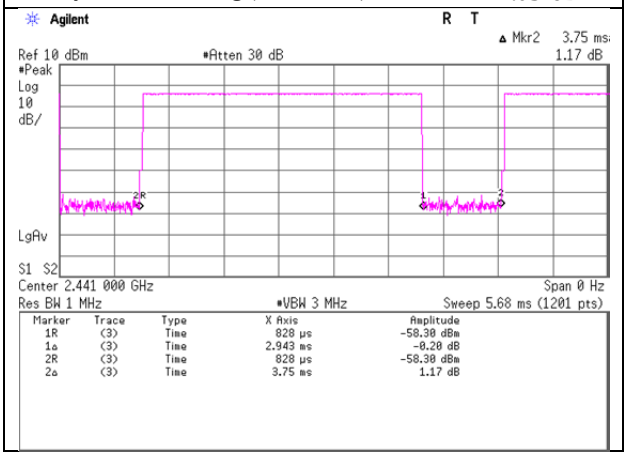
Sample Calculation:
Result (Frame power) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss

Burst Rate Confirmation

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10936450H
Date	August 26, 2015
Temperature / Humidity	23 deg. C / 63 % RH
Engineer	Koji Yamamoto
Mode	Tx, Hopping Off

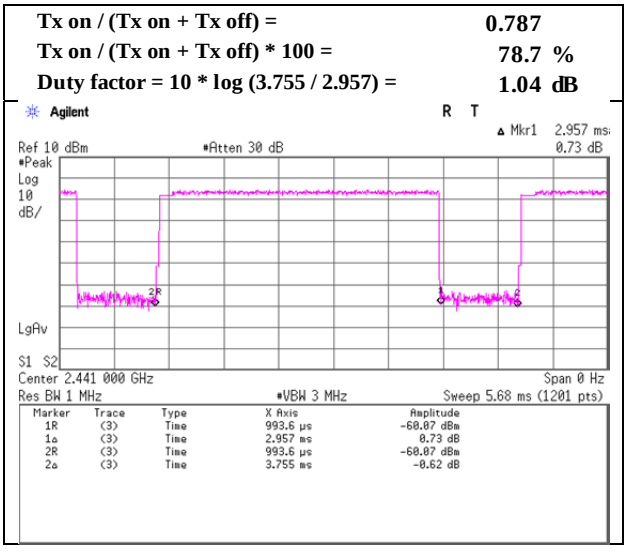
DH5

Tx on / (Tx on + Tx off) = 0.785
Tx on / (Tx on + Tx off) * 100 = 78.5 %
Duty factor = 10 * log (3.75 / 2.943) = 1.05 dB



3DH5

Tx on / (Tx on + Tx off) = 0.787
Tx on / (Tx on + Tx off) * 100 = 78.7 %
Duty factor = 10 * log (3.755 / 2.957) = 1.04 dB



Radiated Spurious Emission

Test place	Ise EMC Lab. No.1 Semi Anechoic Chamber		
Report No.	10936450H		
Date	August 28, 2015	August 28, 2015	September 2, 2015
Temperature / Humidity	22 deg. C / 65 % RH	23 deg. C / 65 % RH	23 deg. C / 72 % RH
Engineer	Takafumi Noguchi (1-10GHz)	Koji Yamamoto (10-26.5GHz)	Takafumi Noguchi (Below 1GHz)
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	87.360	QP	30.2	7.9	8.3	38.8	7.6	40.0	32.4	
Hori	540.001	QP	37.9	18.6	12.2	38.1	30.6	46.0	15.4	
Hori	600.000	QP	39.1	19.5	12.5	38.1	33.0	46.0	13.0	
Hori	660.000	QP	32.3	20.1	12.9	38.1	27.2	46.0	18.8	
Hori	720.003	QP	37.8	20.7	13.2	38.2	33.5	46.0	12.5	
Hori	840.002	QP	41.2	21.9	13.8	38.1	38.8	46.0	7.2	
Hori	2390.000	PK	48.2	26.8	3.5	36.1	42.4	73.9	31.5	
Hori	4804.000	PK	48.3	31.8	5.7	35.6	50.2	73.9	23.7	
Hori	7206.000	PK	44.5	36.1	7.2	35.6	52.2	73.9	21.7	Floor Noise
Hori	9608.000	PK	44.5	38.6	7.8	36.3	54.6	73.9	19.3	Floor Noise
Hori	2390.000	AV	35.9	26.8	3.5	36.1	30.1	53.9	23.8	
Hori	4804.000	AV	40.4	31.8	5.7	35.6	42.3	53.9	11.6	
Hori	7206.000	AV	32.4	36.1	7.2	35.6	40.1	53.9	13.8	Floor Noise
Hori	9608.000	AV	32.4	38.6	7.8	36.3	42.5	53.9	11.4	Floor Noise
Vert	87.360	QP	45.5	7.9	8.3	38.8	22.9	40.0	17.1	
Vert	540.001	QP	37.3	18.6	12.2	38.1	30.0	46.0	16.0	
Vert	600.000	QP	40.3	19.5	12.5	38.1	34.2	46.0	11.8	
Vert	660.000	QP	35.7	20.1	12.9	38.1	30.6	46.0	15.4	
Vert	720.003	QP	34.3	20.7	13.2	38.2	30.0	46.0	16.0	
Vert	840.002	QP	37.8	21.9	13.8	38.1	35.4	46.0	10.6	
Vert	2390.000	PK	47.5	26.8	3.5	36.1	41.7	73.9	32.2	
Vert	4804.000	PK	50.7	31.8	5.7	35.6	52.6	73.9	21.3	
Vert	7206.000	PK	44.6	36.1	7.2	35.6	52.3	73.9	21.6	Floor Noise
Vert	9608.000	PK	44.6	38.6	7.8	36.3	54.7	73.9	19.2	Floor Noise
Vert	2390.000	AV	35.8	26.8	3.5	36.1	30.0	53.9	23.9	
Vert	4804.000	AV	43.9	31.8	5.7	35.6	45.8	53.9	8.1	
Vert	7206.000	AV	32.5	36.1	7.2	35.6	40.2	53.9	13.7	Floor Noise
Vert	9608.000	AV	32.6	38.6	7.8	36.3	42.7	53.9	11.2	Floor Noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
Distance factor: 10 GHz - 26.5 GHz 20log (3.0 m / 1.0 m) = 9.5 dB

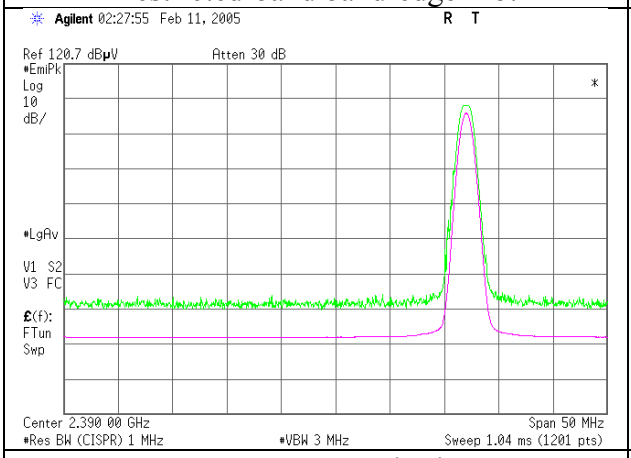
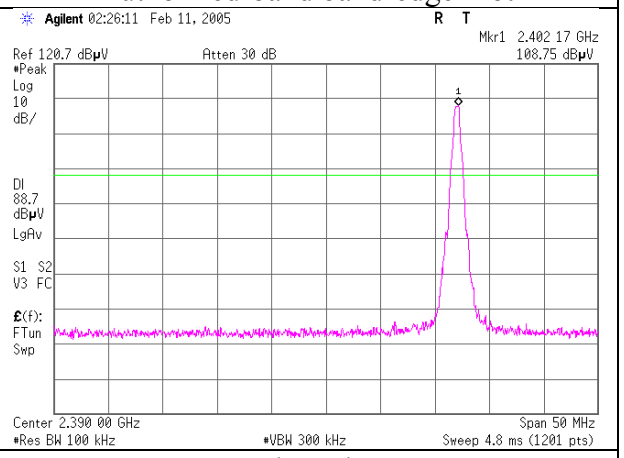
20dBc Data Sheet

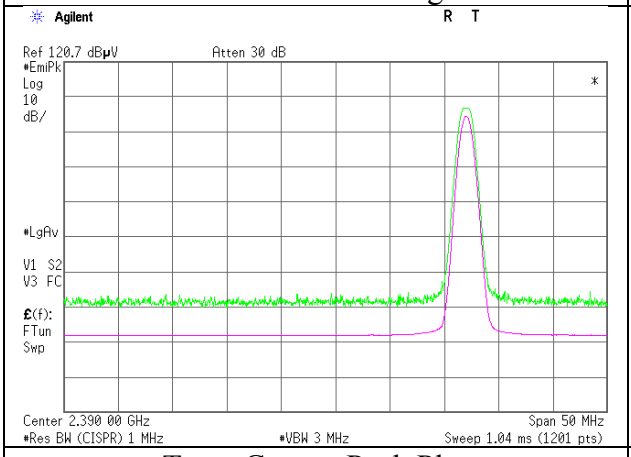
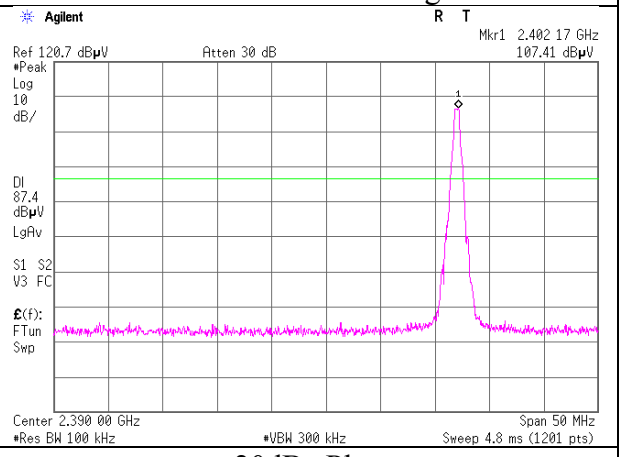
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2402.000	PK	108.8	26.8	3.5	36.1	103.0	-	-	Carrier
Hori	2400.000	PK	49.5	26.8	3.5	36.1	43.7	83.0	39.3	
Vert	2402.000	PK	107.4	26.8	3.5	36.1	101.6	-	-	Carrier
Vert	2400.000	PK	47.8	26.8	3.5	36.1	42.0	81.6	39.6	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amprifier)

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.1 Semi Anechoic Chamber
Report No.	10936450H
Date	August 28, 2015
Temperature / Humidity	22 deg. C / 65 % RH
Engineer	Takafumi Noguchi (1-10GHz)
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.1 Semi Anechoic Chamber		
Report No.	10936450H		
Date	August 28, 2015	August 28, 2015	September 2, 2015
Temperature / Humidity	22 deg. C / 65 % RH	23 deg. C / 65 % RH	23 deg. C / 72 % RH
Engineer	Takafumi Noguchi (1-10GHz)	Koji Yamamoto (10-26.5GHz)	Takafumi Noguchi (Below 1GHz)
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	87.360	QP	30.0	7.9	8.3	38.8	7.4	40.0	32.6	
Hori	540.001	QP	38.0	18.6	12.2	38.1	30.7	46.0	15.3	
Hori	600.000	QP	39.5	19.5	12.5	38.1	33.4	46.0	12.6	
Hori	660.000	QP	32.8	20.1	12.9	38.1	27.7	46.0	18.3	
Hori	720.003	QP	37.5	20.7	13.2	38.2	33.2	46.0	12.8	
Hori	840.002	QP	41.2	21.9	13.8	38.1	38.8	46.0	7.2	
Hori	4882.000	PK	49.8	32.0	5.8	35.6	52.0	73.9	21.9	
Hori	7323.000	PK	44.3	36.1	7.1	35.6	51.9	73.9	22.0	Floor Noise
Hori	9764.000	PK	45.1	38.6	7.8	36.3	55.2	73.9	18.7	Floor Noise
Hori	4882.000	AV	40.6	32.0	5.8	35.6	42.8	53.9	11.1	
Hori	7323.000	AV	31.4	36.1	7.1	35.6	39.0	53.9	14.9	Floor Noise
Hori	9764.000	AV	32.6	38.6	7.8	36.3	42.7	53.9	11.2	Floor Noise
Vert	87.360	QP	45.4	7.9	8.3	38.8	22.8	40.0	17.2	
Vert	540.001	QP	37.3	18.6	12.2	38.1	30.0	46.0	16.0	
Vert	600.000	QP	40.4	19.5	12.5	38.1	34.3	46.0	11.7	
Vert	660.000	QP	35.5	20.1	12.9	38.1	30.4	46.0	15.6	
Vert	720.003	QP	34.5	20.7	13.2	38.2	30.2	46.0	15.8	
Vert	840.002	QP	37.7	21.9	13.8	38.1	35.3	46.0	10.7	
Vert	4882.000	PK	50.2	32.0	5.8	35.6	52.4	73.9	21.5	
Vert	7323.000	PK	44.2	36.1	7.1	35.6	51.8	73.9	22.1	Floor Noise
Vert	9764.000	PK	43.7	38.6	7.8	36.3	53.8	73.9	20.1	Floor Noise
Vert	4882.000	AV	43.8	32.0	5.8	35.6	46.0	53.9	7.9	
Vert	7323.000	AV	32.6	36.1	7.1	35.6	40.2	53.9	13.7	Floor Noise
Vert	9764.000	AV	33.1	38.6	7.8	36.3	43.2	53.9	10.7	Floor Noise

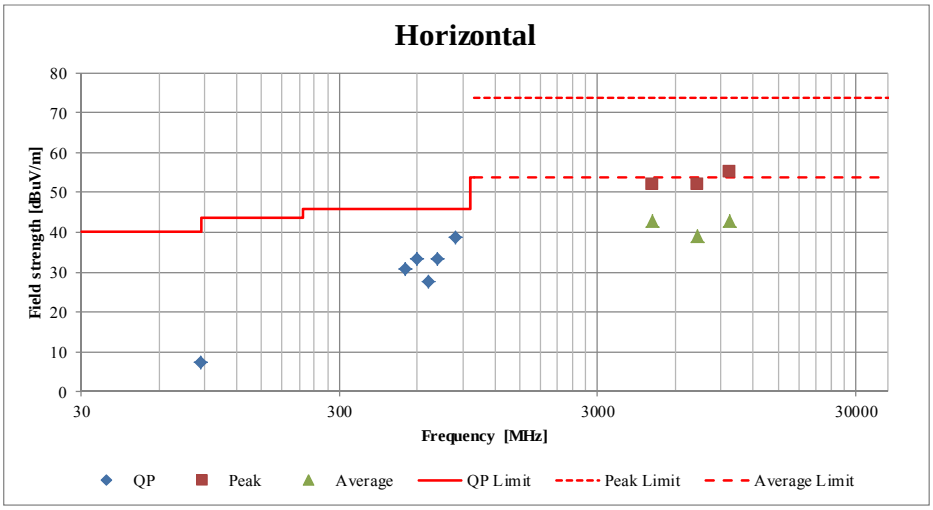
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier)

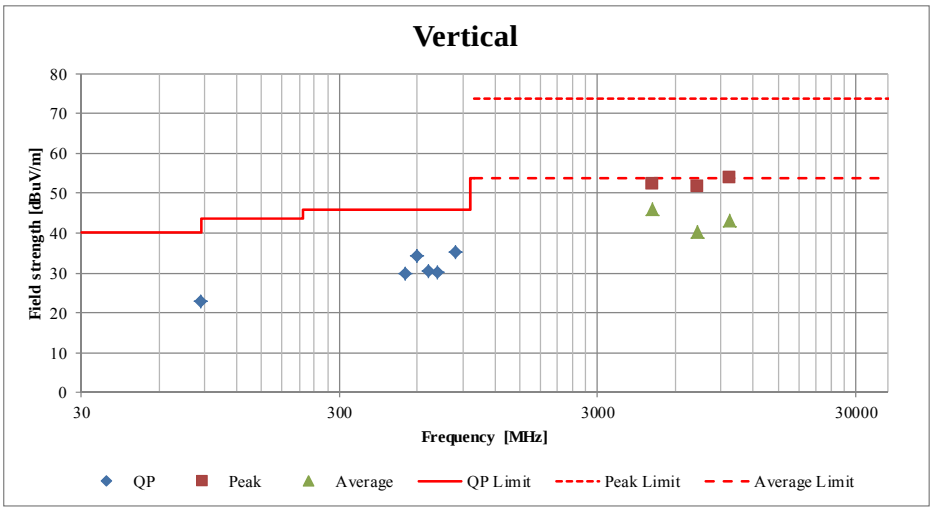
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

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

Radiated Spurious Emission
(Plot data, Worst case)

Test place	Ise EMC Lab. No.1 Semi Anechoic Chamber		
Report No.	10936450H		
Date	August 28, 2015	August 28, 2015	September 2, 2015
Temperature / Humidity	22 deg. C / 65 % RH	23 deg. C / 65 % RH	23 deg. C / 72 % RH
Engineer	Takafumi Noguchi (1-10GHz)	Koji Yamamoto (10-26.5GHz)	Takafumi Noguchi (Below 1GHz)
Mode	Tx, Hopping Off, DH5 2441 MHz		





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

Radiated Spurious Emission

Test place	Ise EMC Lab. No.1 Semi Anechoic Chamber		
Report No.	10936450H		
Date	August 28, 2015	August 28, 2015	September 2, 2015
Temperature / Humidity	22 deg. C / 65 % RH	23 deg. C / 65 % RH	23 deg. C / 72 % RH
Engineer	Takafumi Noguchi (1-10GHz)	Koji Yamamoto (10-26.5GHz)	Takafumi Noguchi (Below 1GHz)
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	87.360	QP	30.1	7.9	8.3	38.8	7.5	40.0	32.5	
Hori	540.001	QP	37.9	18.6	12.2	38.1	30.6	46.0	15.4	
Hori	600.000	QP	39.2	19.5	12.5	38.1	33.1	46.0	12.9	
Hori	660.000	QP	33.0	20.1	12.9	38.1	27.9	46.0	18.1	
Hori	720.003	QP	37.8	20.7	13.2	38.2	33.5	46.0	12.5	
Hori	840.002	QP	41.2	21.9	13.8	38.1	38.8	46.0	7.2	
Hori	2483.500	PK	56.6	26.9	3.5	36.1	50.9	73.9	23.0	
Hori	4960.000	PK	48.0	32.1	5.7	35.6	50.2	73.9	23.7	
Hori	7440.000	PK	44.0	36.1	7.1	35.6	51.6	73.9	22.3	Floor Noise
Hori	9920.000	PK	45.4	38.6	7.9	36.4	55.5	73.9	18.4	Floor Noise
Hori	2483.500	AV	43.6	26.9	3.5	36.1	37.9	53.9	16.0	
Hori	4960.000	AV	37.5	32.1	5.7	35.6	39.7	53.9	14.2	
Hori	7440.000	AV	33.5	36.1	7.1	35.6	41.1	53.9	12.8	Floor Noise
Hori	9920.000	AV	33.5	38.6	7.9	36.4	43.6	53.9	10.3	Floor Noise
Vert	87.360	QP	45.6	7.9	8.3	38.8	23.0	40.0	17.0	
Vert	540.001	QP	37.3	18.6	12.2	38.1	30.0	46.0	16.0	
Vert	600.000	QP	40.3	19.5	12.5	38.1	34.2	46.0	11.8	
Vert	660.000	QP	35.7	20.1	12.9	38.1	30.6	46.0	15.4	
Vert	720.003	QP	34.2	20.7	13.2	38.2	29.9	46.0	16.1	
Vert	840.002	QP	37.7	21.9	13.8	38.1	35.3	46.0	10.7	
Vert	2483.500	PK	55.5	26.9	3.5	36.1	49.8	73.9	24.1	
Vert	4960.000	PK	49.3	32.1	5.7	35.6	51.5	73.9	22.4	
Vert	7440.000	PK	44.4	36.1	7.1	35.6	52.0	73.9	21.9	Floor Noise
Vert	9920.000	PK	45.6	38.6	7.9	36.4	55.7	73.9	18.2	Floor Noise
Vert	2483.500	AV	41.7	26.9	3.5	36.1	36.0	53.9	17.9	
Vert	4960.000	AV	41.8	32.1	5.7	35.6	44.0	53.9	9.9	
Vert	7440.000	AV	32.3	36.1	7.1	35.6	39.9	53.9	14.0	Floor Noise
Vert	9920.000	AV	32.5	38.6	7.9	36.4	42.6	53.9	11.3	Floor Noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier)

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

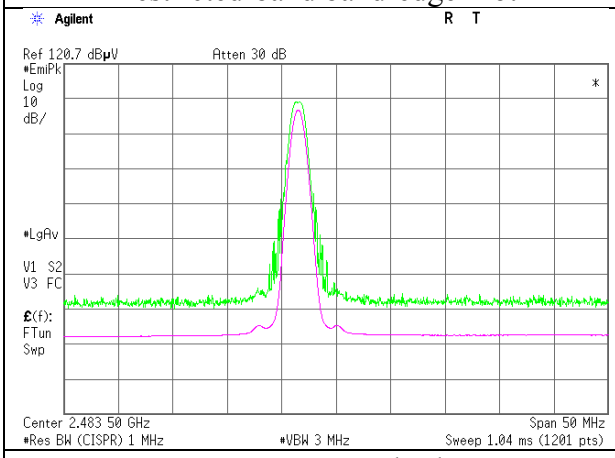
Distance factor: 10 GHz - 26.5 GHz 20log (3.0 m / 1. 0 m) = 9.5 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.1 Semi Anechoic Chamber
Report No.	10936450H
Date	August 28, 2015
Temperature / Humidity	22 deg. C / 65 % RH
Engineer	Takafumi Noguchi
	(1-10GHz)
Mode	Tx, Hopping Off, DH5 2480 MHz

Horizontal

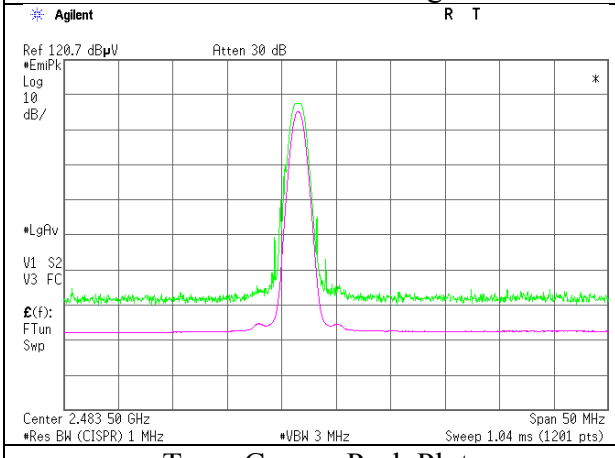
Restricted-band band-edge Plot



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.1 Semi Anechoic Chamber		
Report No.	10936450H		
Date	August 28, 2015	August 28, 2015	September 2, 2015
Temperature / Humidity	22 deg. C / 65 % RH	23 deg. C / 65 % RH	23 deg. C / 72 % RH
Engineer	Takafumi Noguchi (1-10GHz)	Koji Yamamoto (10-26.5GHz)	Takafumi Noguchi (Below 1GHz)
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	87.360	QP	30.0	7.9	8.3	38.8	7.4	40.0	32.6	
Hori	540.001	QP	38.0	18.6	12.2	38.1	30.7	46.0	15.3	
Hori	600.000	QP	39.5	19.5	12.5	38.1	33.4	46.0	12.6	
Hori	660.000	QP	33.0	20.1	12.9	38.1	27.9	46.0	18.1	
Hori	720.003	QP	37.4	20.7	13.2	38.2	33.1	46.0	12.9	
Hori	840.002	QP	41.2	21.9	13.8	38.1	38.8	46.0	7.2	
Hori	2390.000	PK	46.3	26.8	3.5	36.1	40.5	73.9	33.4	
Hori	4804.000	PK	49.5	31.8	5.7	35.6	51.4	73.9	22.5	
Hori	7206.000	PK	44.2	36.1	7.2	35.6	51.9	73.9	22.0	Floor Noise
Hori	9608.000	PK	44.4	38.6	7.8	36.3	54.5	73.9	19.4	Floor Noise
Hori	2390.000	AV	34.2	26.8	3.5	36.1	28.4	53.9	25.5	
Hori	4804.000	AV	40.0	31.8	5.7	35.6	41.9	53.9	12.0	
Hori	7206.000	AV	32.1	36.1	7.2	35.6	39.8	53.9	14.1	Floor Noise
Hori	9608.000	AV	32.3	38.6	7.8	36.3	42.4	53.9	11.5	Floor Noise
Vert	87.360	QP	45.5	7.9	8.3	38.8	22.9	40.0	17.1	
Vert	540.001	QP	37.3	18.6	12.2	38.1	30.0	46.0	16.0	
Vert	600.000	QP	40.4	19.5	12.5	38.1	34.3	46.0	11.7	
Vert	660.000	QP	35.5	20.1	12.9	38.1	30.4	46.0	15.6	
Vert	720.003	QP	34.4	20.7	13.2	38.2	30.1	46.0	15.9	
Vert	840.002	QP	37.7	21.9	13.8	38.1	35.3	46.0	10.7	
Vert	2390.000	PK	47.9	26.8	3.5	36.1	42.1	73.9	31.8	
Vert	4804.000	PK	54.2	31.8	5.7	35.6	56.1	73.9	17.8	
Vert	7206.000	PK	44.5	36.1	7.2	35.6	52.2	73.9	21.7	Floor Noise
Vert	9608.000	PK	44.7	38.6	7.8	36.3	54.8	73.9	19.1	Floor Noise
Vert	2390.000	AV	35.4	26.8	3.5	36.1	29.6	53.9	24.3	
Vert	4804.000	AV	45.9	31.8	5.7	35.6	47.8	53.9	6.2	
Vert	7206.000	AV	32.4	36.1	7.2	35.6	40.1	53.9	13.8	Floor Noise
Vert	9608.000	AV	32.5	38.6	7.8	36.3	42.6	53.9	11.3	Floor Noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier)

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

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

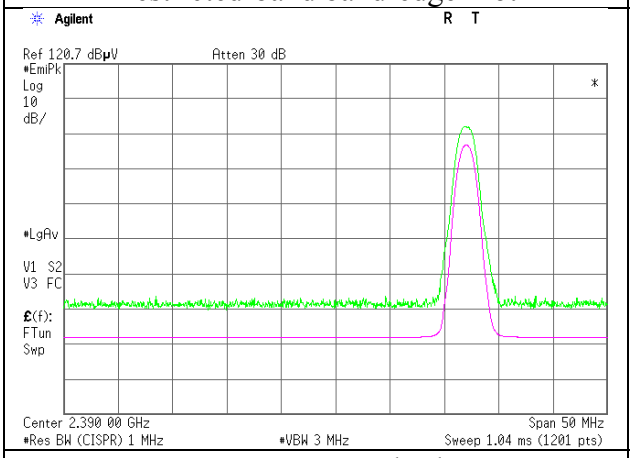
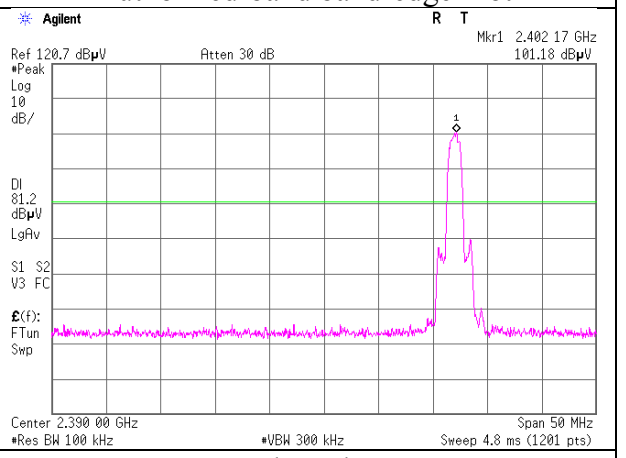
20dBc Data Sheet

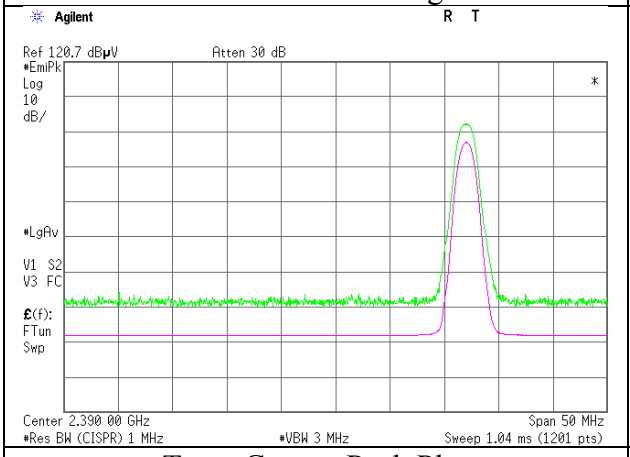
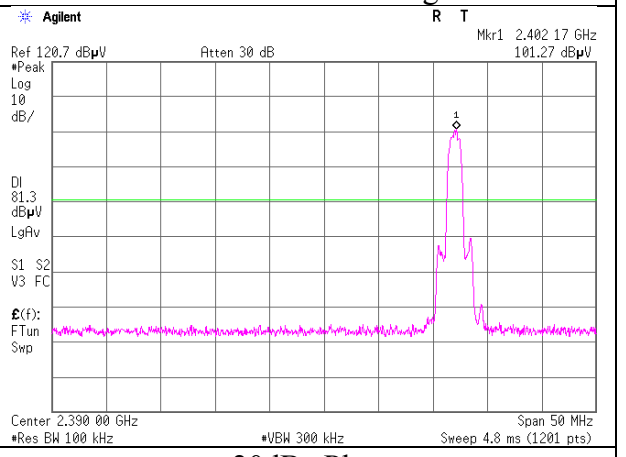
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	2402.000	PK	101.2	26.8	3.5	36.1	95.4	-	-	Carrier
Hori	2400.000	PK	45.1	26.8	3.5	36.1	39.3	75.4	36.1	
Vert	2402.000	PK	101.3	26.8	3.5	36.1	95.5	-	-	Carrier
Vert	2400.000	PK	45.1	26.8	3.5	36.1	39.3	75.5	36.2	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amprifier)

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.1 Semi Anechoic Chamber
Report No.	10936450H
Date	August 28, 2015
Temperature / Humidity	22 deg. C / 65 % RH
Engineer	Takafumi Noguchi (1-10GHz)
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.1 Semi Anechoic Chamber		
Report No.	10936450H		
Date	August 28, 2015	August 28, 2015	September 2, 2015
Temperature / Humidity	22 deg. C / 65 % RH	23 deg. C / 65 % RH	23 deg. C / 72 % RH
Engineer	Takafumi Noguchi (1-10GHz)	Koji Yamamoto (10-26.5GHz)	Takafumi Noguchi (Below 1GHz)
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	87.360	QP	29.9	7.9	8.3	38.8	7.3	40.0	32.7	
Hori	540.001	QP	37.9	18.6	12.2	38.1	30.6	46.0	15.4	
Hori	600.000	QP	39.6	19.5	12.5	38.1	33.5	46.0	12.5	
Hori	660.000	QP	33.1	20.1	12.9	38.1	28.0	46.0	18.0	
Hori	720.003	QP	37.5	20.7	13.2	38.2	33.2	46.0	12.8	
Hori	840.002	QP	41.1	21.9	13.8	38.1	38.7	46.0	7.3	
Hori	4882.000	PK	50.1	32.0	5.8	35.6	52.3	73.9	21.6	
Hori	7323.000	PK	44.2	36.1	7.1	35.6	51.8	73.9	22.1	Floor Noise
Hori	9764.000	PK	44.4	38.6	7.8	36.3	54.5	73.9	19.4	Floor Noise
Hori	4882.000	AV	40.9	32.0	5.8	35.6	43.1	53.9	10.8	
Hori	7323.000	AV	31.1	36.1	7.1	35.6	38.7	53.9	15.2	Floor Noise
Hori	9764.000	AV	32.7	38.6	7.8	36.3	42.8	53.9	11.1	Floor Noise
Vert	87.360	QP	45.3	7.9	8.3	38.8	22.7	40.0	17.3	
Vert	540.001	QP	37.3	18.6	12.2	38.1	30.0	46.0	16.0	
Vert	600.000	QP	40.5	19.5	12.5	38.1	34.4	46.0	11.6	
Vert	660.000	QP	35.4	20.1	12.9	38.1	30.3	46.0	15.7	
Vert	720.003	QP	34.4	20.7	13.2	38.2	30.1	46.0	15.9	
Vert	840.002	QP	37.8	21.9	13.8	38.1	35.4	46.0	10.6	
Vert	4882.000	PK	49.2	32.0	5.8	35.6	51.4	73.9	22.5	
Vert	7323.000	PK	44.1	36.1	7.1	35.6	51.7	73.9	22.2	Floor Noise
Vert	9764.000	PK	43.9	38.6	7.8	36.3	54.0	73.9	19.9	Floor Noise
Vert	4882.000	AV	40.2	32.0	5.8	35.6	42.4	53.9	11.5	
Vert	7323.000	AV	32.8	36.1	7.1	35.6	40.4	53.9	13.5	Floor Noise
Vert	9764.000	AV	33.2	38.6	7.8	36.3	43.3	53.9	10.6	Floor Noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
Distance factor: 10 GHz - 26.5 GHz 20log (3.0 m / 1.0 m) = 9.5dB

Radiated Spurious Emission

Test place	Ise EMC Lab. No.1 Semi Anechoic Chamber		
Report No.	10936450H		
Date	August 28, 2015	August 28, 2015	September 2, 2015
Temperature / Humidity	22 deg. C / 65 % RH	23 deg. C / 65 % RH	23 deg. C / 72 % RH
Engineer	Takafumi Noguchi (1-10GHz)	Koji Yamamoto (10-26.5GHz)	Takafumi Noguchi (Below 1GHz)
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	87.360	QP	29.7	7.9	8.3	38.8	7.1	40.0	32.9	
Hori	540.001	QP	37.8	18.6	12.2	38.1	30.5	46.0	15.5	
Hori	600.000	QP	39.7	19.5	12.5	38.1	33.6	46.0	12.4	
Hori	660.000	QP	33.2	20.1	12.9	38.1	28.1	46.0	17.9	
Hori	720.003	QP	37.6	20.7	13.2	38.2	33.3	46.0	12.7	
Hori	840.002	QP	41.2	21.9	13.8	38.1	38.8	46.0	7.2	
Hori	2483.500	PK	50.1	26.9	3.5	36.1	44.4	73.9	29.6	
Hori	4960.000	PK	46.5	32.1	5.7	35.6	48.7	73.9	25.2	
Hori	7440.000	PK	44.2	36.1	7.1	35.6	51.8	73.9	22.1	Floor Noise
Hori	9920.000	PK	45.1	38.6	7.9	36.4	55.2	73.9	18.7	Floor Noise
Hori	2483.500	AV	36.6	26.9	3.5	36.1	30.9	53.9	23.0	
Hori	4960.000	AV	34.9	32.1	5.7	35.6	37.1	53.9	16.8	
Hori	7440.000	AV	33.2	36.1	7.1	35.6	40.8	53.9	13.1	Floor Noise
Hori	9920.000	AV	33.8	38.6	7.9	36.4	43.9	53.9	10.0	Floor Noise
Vert	87.360	QP	45.3	7.9	8.3	38.8	22.7	40.0	17.3	
Vert	540.001	QP	37.4	18.6	12.2	38.1	30.1	46.0	15.9	
Vert	600.000	QP	40.4	19.5	12.5	38.1	34.3	46.0	11.7	
Vert	660.000	QP	35.3	20.1	12.9	38.1	30.2	46.0	15.8	
Vert	720.003	QP	34.4	20.7	13.2	38.2	30.1	46.0	15.9	
Vert	840.002	QP	40.8	21.9	13.8	38.1	38.4	46.0	7.6	
Vert	2483.500	PK	48.7	26.9	3.5	36.1	43.0	73.9	30.9	
Vert	4960.000	PK	48.8	32.1	5.7	35.6	51.0	73.9	22.9	
Vert	7440.000	PK	44.3	36.1	7.1	35.6	51.9	73.9	22.0	Floor Noise
Vert	9920.000	PK	45.1	38.6	7.9	36.4	55.2	73.9	18.7	Floor Noise
Vert	2483.500	AV	36.1	26.9	3.5	36.1	30.4	53.9	23.5	
Vert	4960.000	AV	38.8	32.1	5.7	35.6	41.0	53.9	13.0	
Vert	7440.000	AV	32.4	36.1	7.1	35.6	40.0	53.9	13.9	Floor Noise
Vert	9920.000	AV	32.4	38.6	7.9	36.4	42.5	53.9	11.4	Floor Noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10 GHz)) - Gain(Amplifier)

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

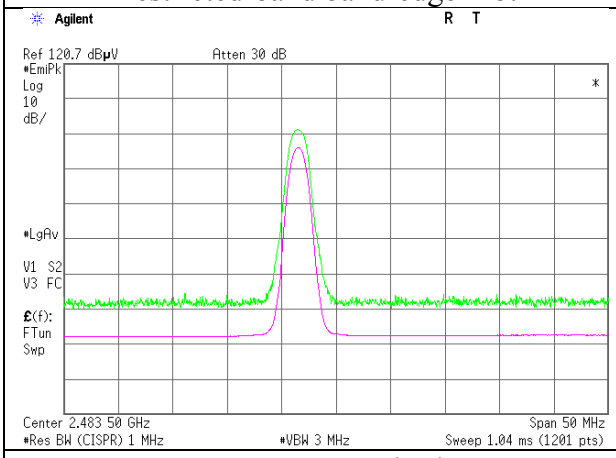
Distance factor: 10 GHz - 26.5 GHz 20log (3.0 m / 1.0 m) = 9.5dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Test place	Ise EMC Lab. No.1 Semi Anechoic Chamber
Report No.	10936450H
Date	August 28, 2015
Temperature / Humidity	22 deg. C / 65 % RH
Engineer	Takafumi Noguchi
	(1-10GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz

Horizontal

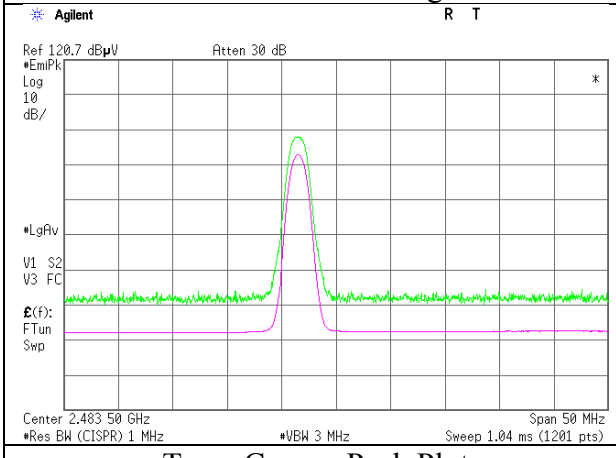
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

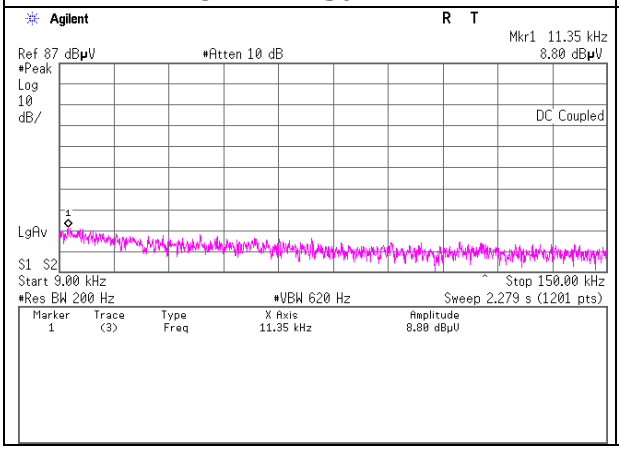
* Final result of restricted band edge was shown in tabular data.

Conducted Spurious Emission

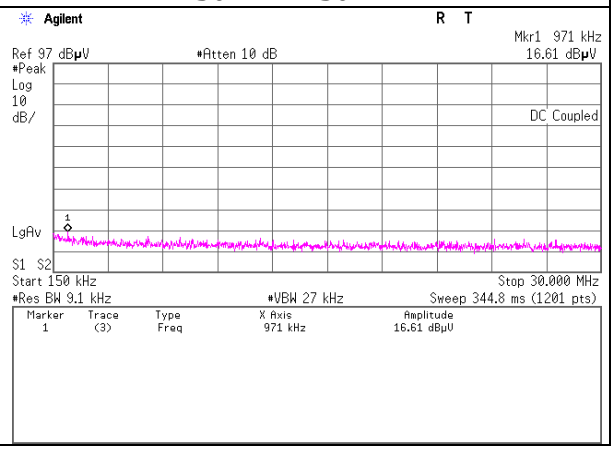
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10936450H
Date	August 29, 2015
Temperature / Humidity	24 deg. C / 69 % RH
Engineer	Takafumi Noguchi
Mode	Tx, Hopping Off, DH5

2402 MHz

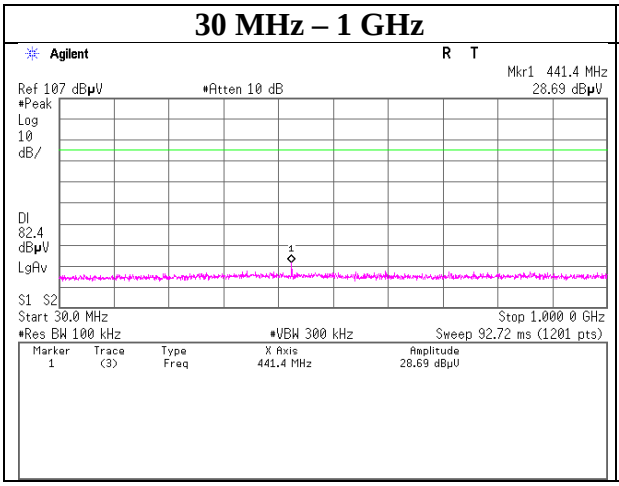
9 kHz - 150 kHz



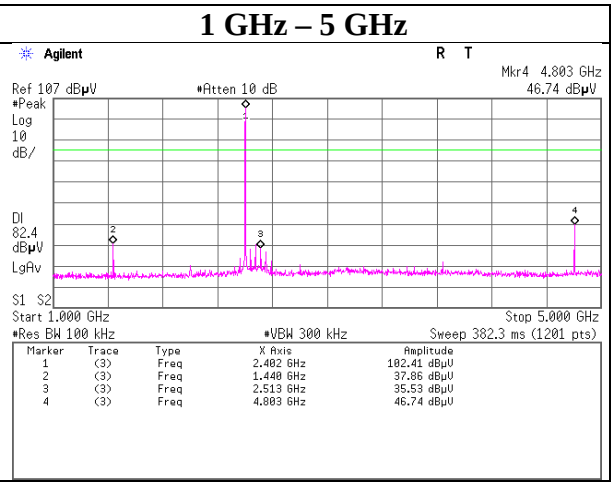
150 kHz - 30 MHz



30 MHz – 1 GHz



1 GHz – 5 GHz

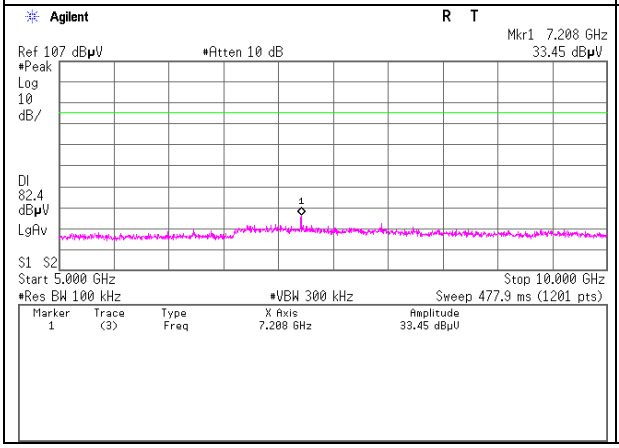


Conducted Spurious Emission

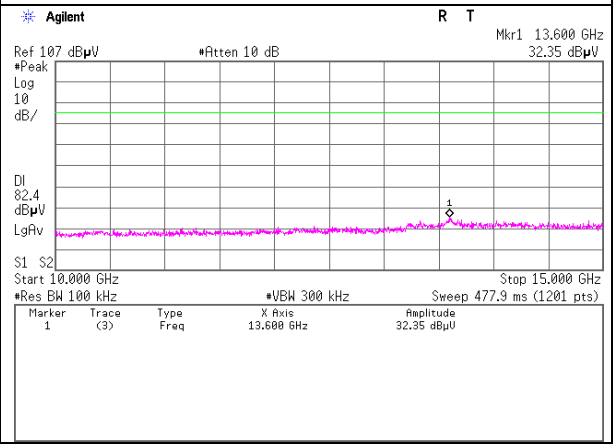
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10936450H
Date	August 29, 2015
Temperature / Humidity	24 deg. C / 69 % RH
Engineer	Takafumi Noguchi
Mode	Tx, Hopping Off, DH5

2402 MHz

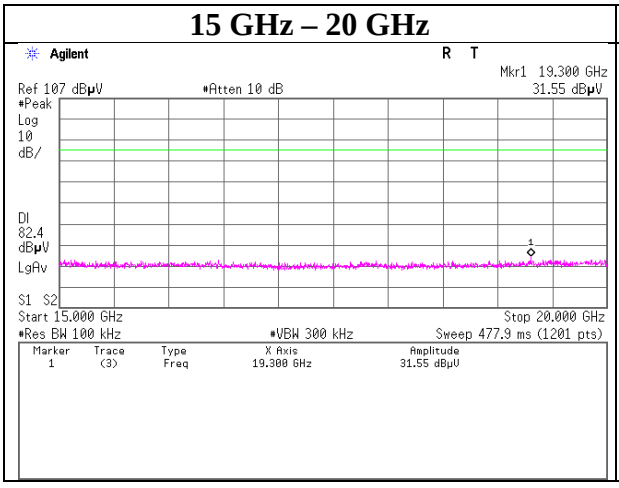
5 GHz – 10 GHz



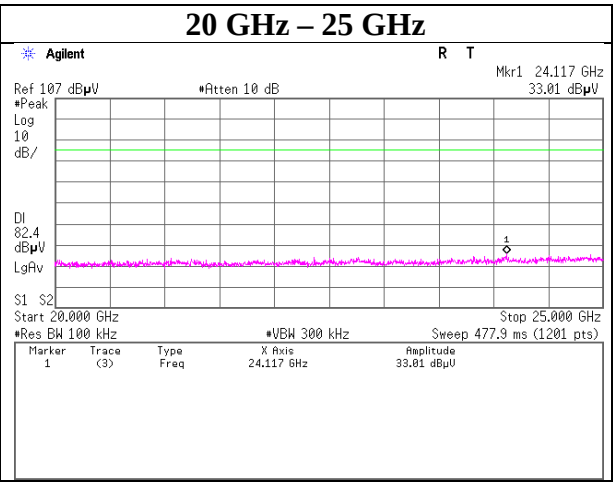
10 GHz - 15 GHz



15 GHz – 20 GHz



20 GHz – 25 GHz

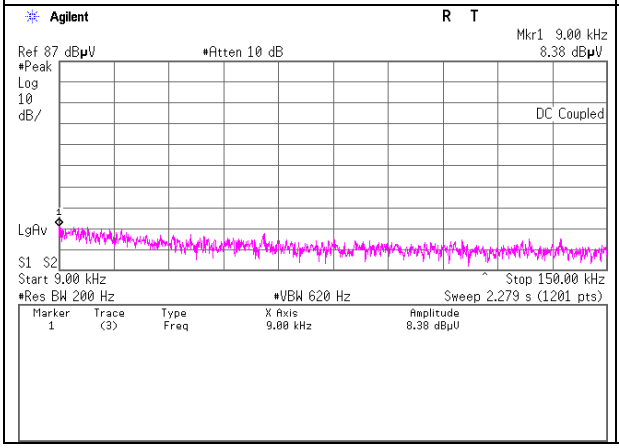


Conducted Spurious Emission

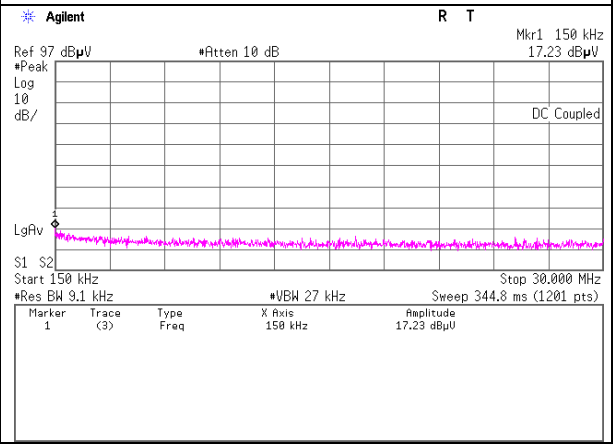
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10936450H
Date	August 29, 2015
Temperature / Humidity	24 deg. C / 69 % RH
Engineer	Takafumi Noguchi
Mode	Tx, Hopping Off, DH5

2441 MHz

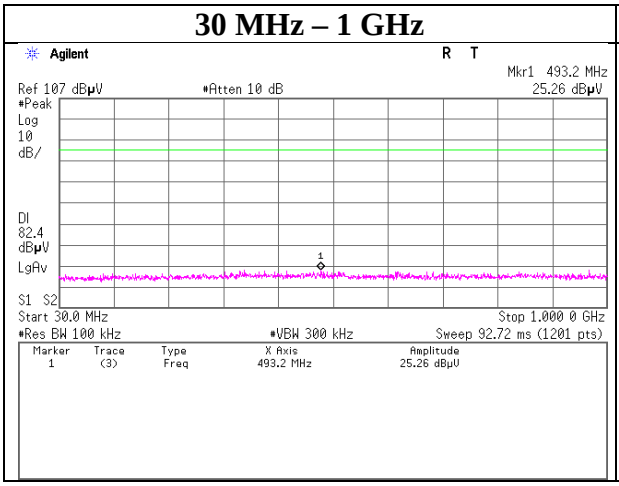
9 kHz - 150 kHz



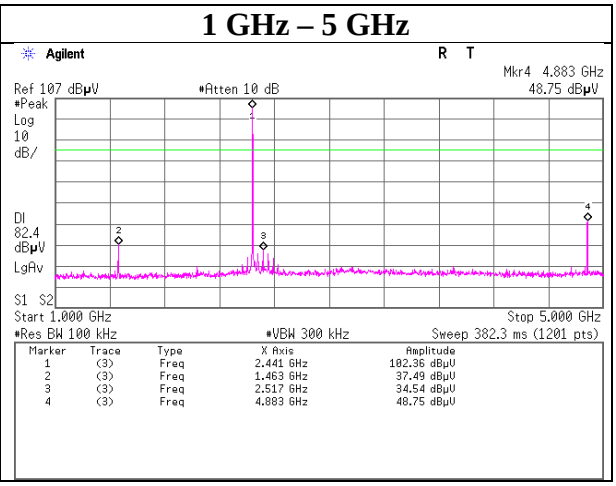
150 kHz - 30 MHz



30 MHz – 1 GHz



1 GHz – 5 GHz

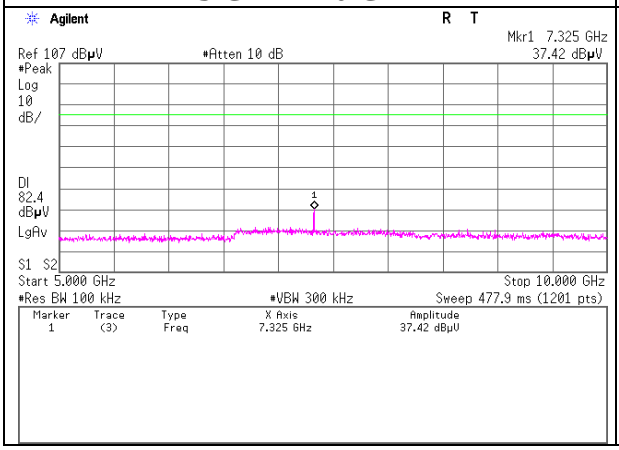


Conducted Spurious Emission

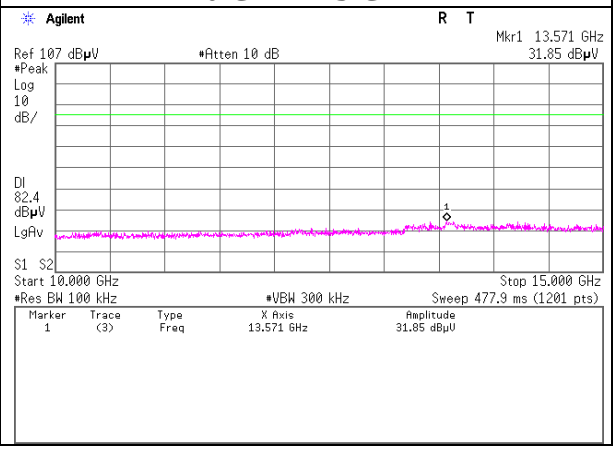
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10936450H
Date	August 29, 2015
Temperature / Humidity	24 deg. C / 69 % RH
Engineer	Takafumi Noguchi
Mode	Tx, Hopping Off, DH5

2441 MHz

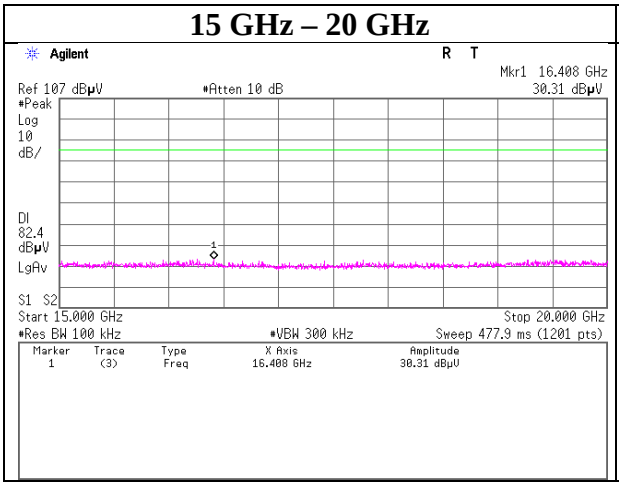
5 GHz – 10 GHz



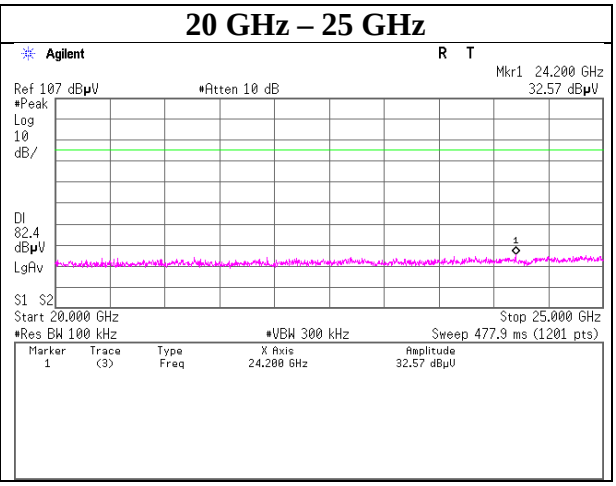
10 GHz - 15 GHz



15 GHz – 20 GHz



20 GHz – 25 GHz

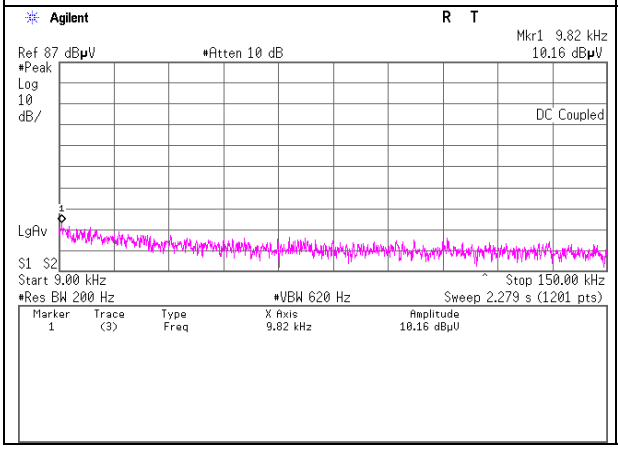


Conducted Spurious Emission

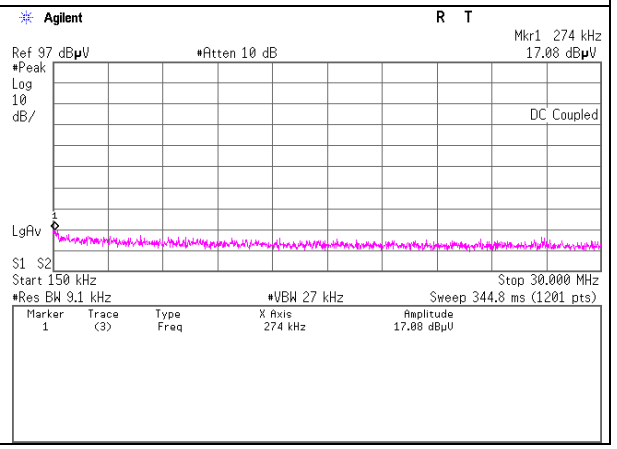
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10936450H
Date	August 29, 2015
Temperature / Humidity	24 deg. C / 69 % RH
Engineer	Takafumi Noguchi
Mode	Tx, Hopping Off, DH5

2480 MHz

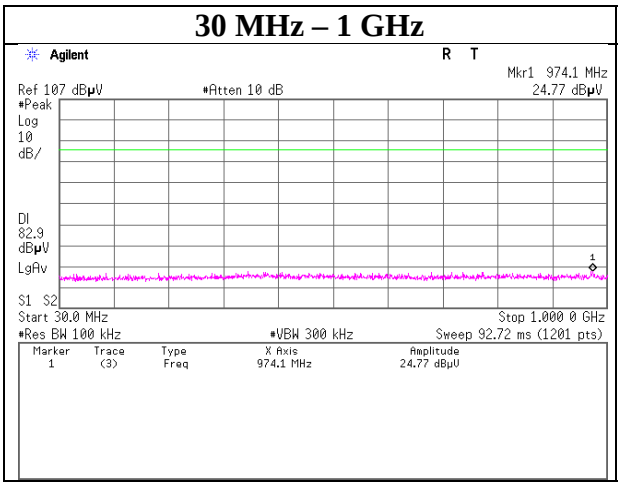
9 kHz – 150 kHz



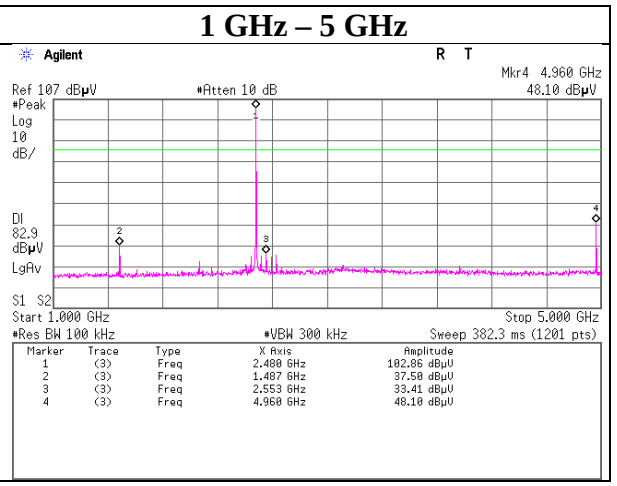
150 kHz – 30 MHz



30 MHz – 1 GHz



1 GHz – 5 GHz

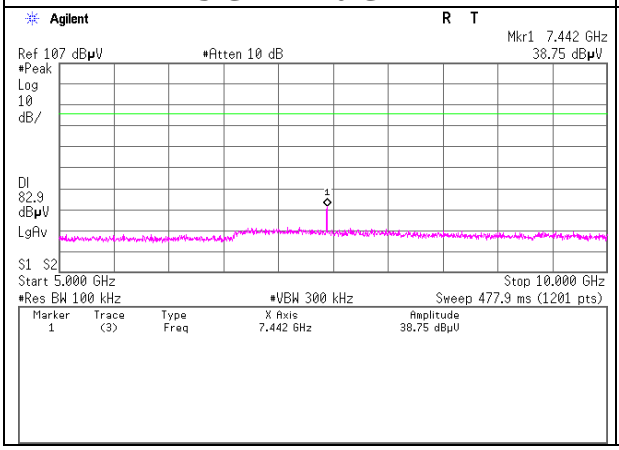


Conducted Spurious Emission

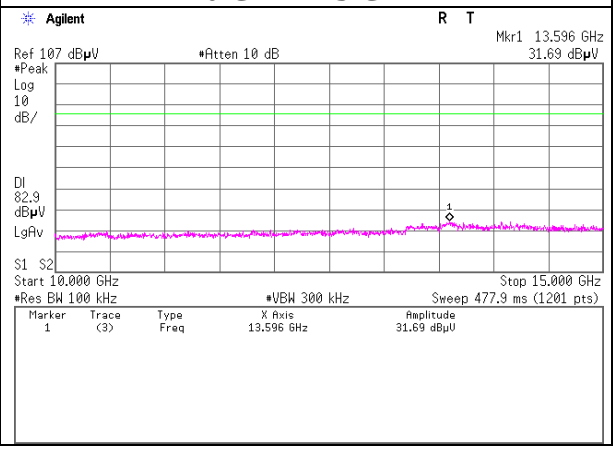
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10936450H
Date	August 29, 2015
Temperature / Humidity	24 deg. C / 69 % RH
Engineer	Takafumi Noguchi
Mode	Tx, Hopping Off, DH5

2480 MHz

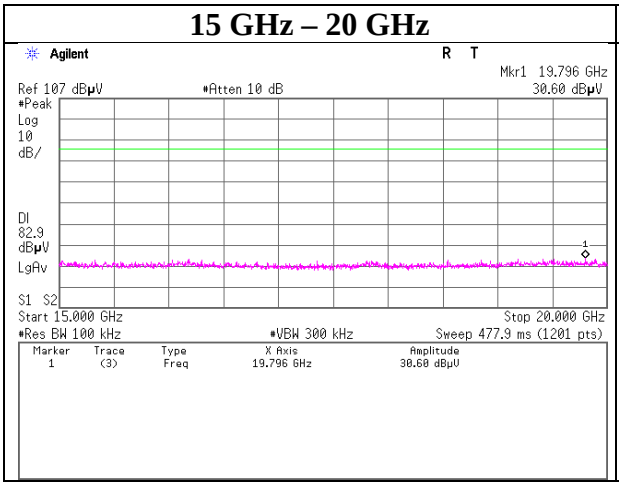
5 GHz – 10 GHz



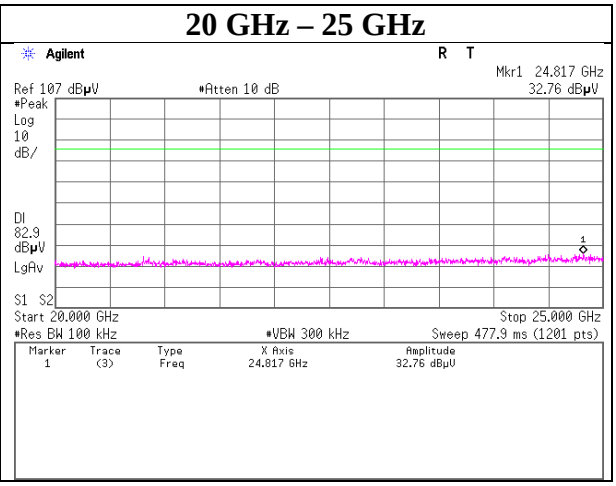
10 GHz - 15 GHz



15 GHz – 20 GHz



20 GHz – 25 GHz

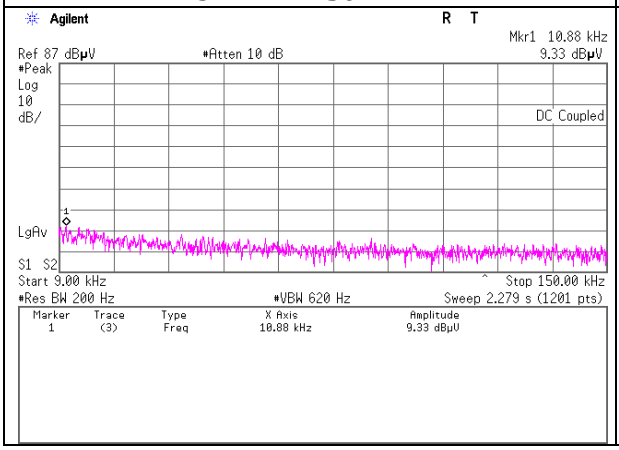


Conducted Spurious Emission

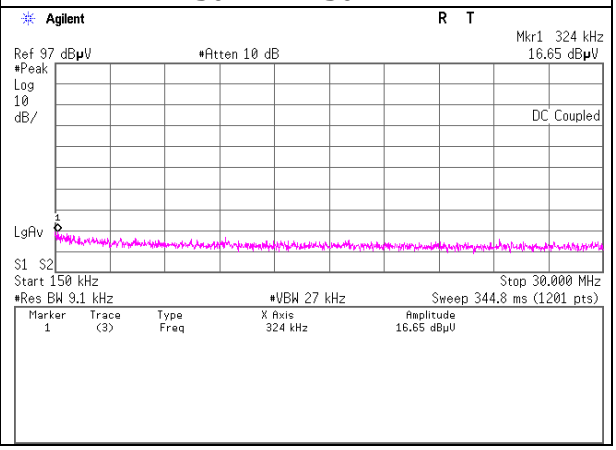
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10936450H
Date	August 29, 2015
Temperature / Humidity	24 deg. C / 69 % RH
Engineer	Takafumi Noguchi
Mode	Tx, Hopping Off, 3DH5

2402 MHz

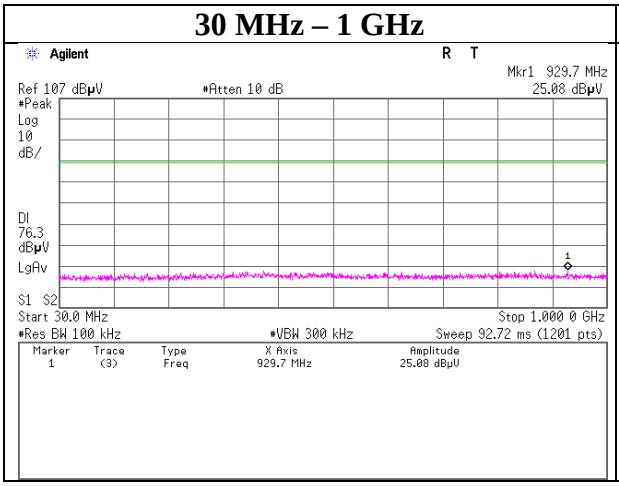
9 kHz – 150 kHz



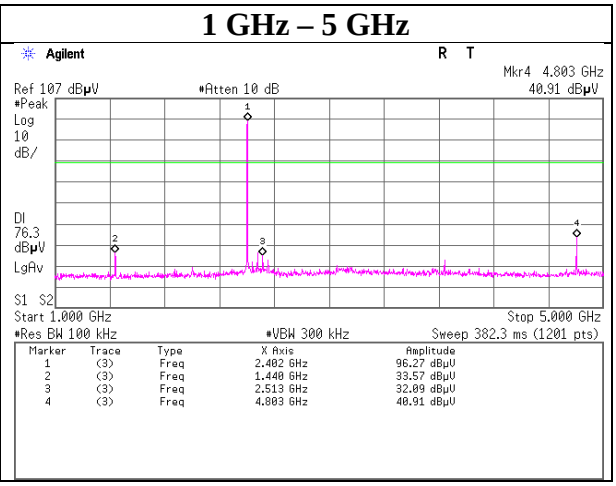
150 kHz – 30 MHz



30 MHz – 1 GHz



1 GHz – 5 GHz

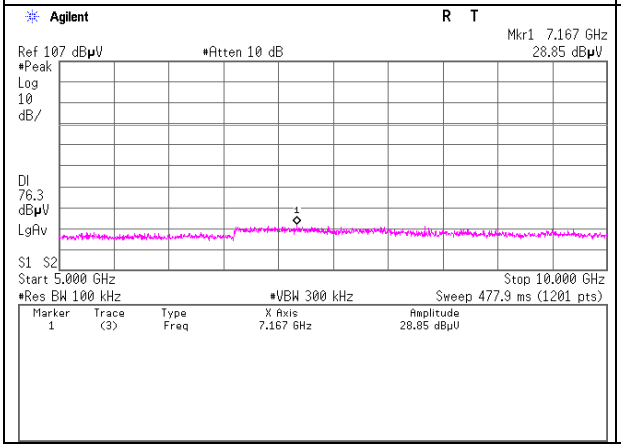


Conducted Spurious Emission

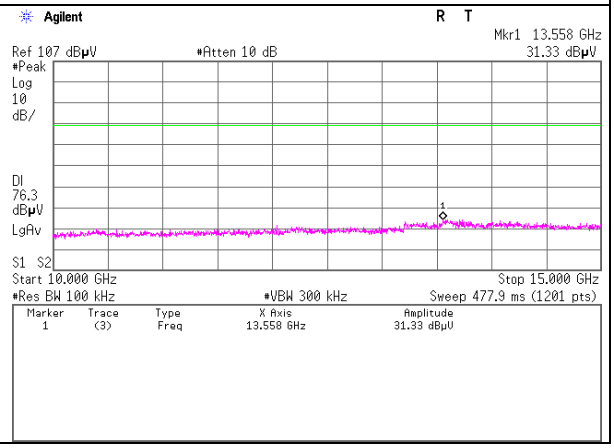
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10936450H
Date	August 29, 2015
Temperature / Humidity	24 deg. C / 69 % RH
Engineer	Takafumi Noguchi
Mode	Tx, Hopping Off, 3DH5

2402 MHz

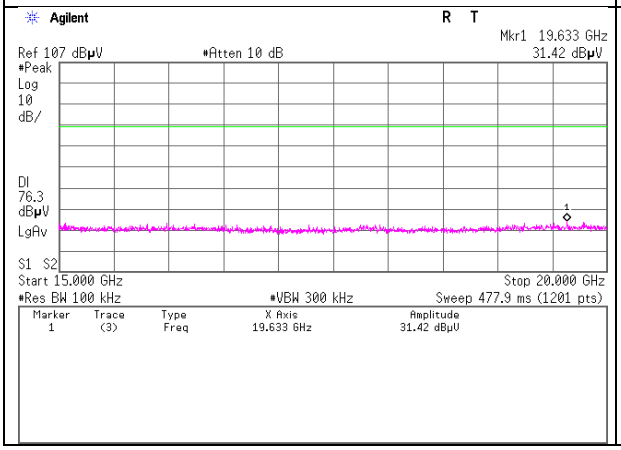
5 GHz – 10 GHz



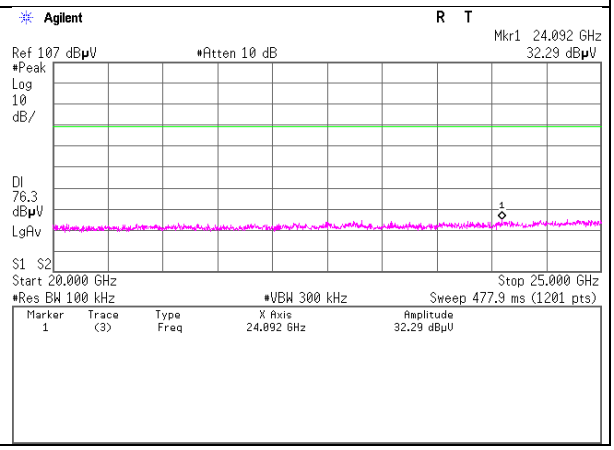
10 GHz - 15 GHz



15 GHz – 20 GHz



20 GHz – 25 GHz

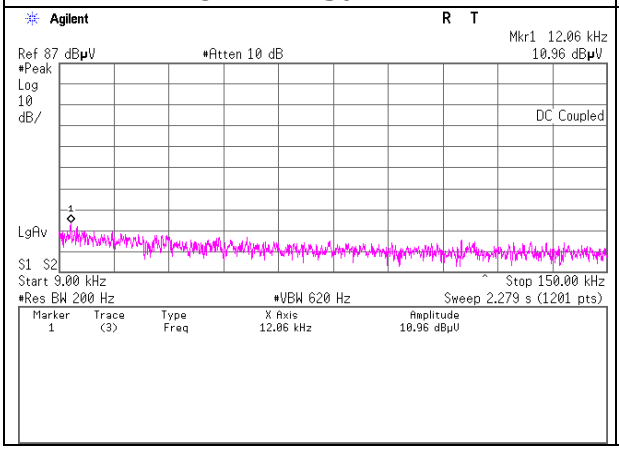


Conducted Spurious Emission

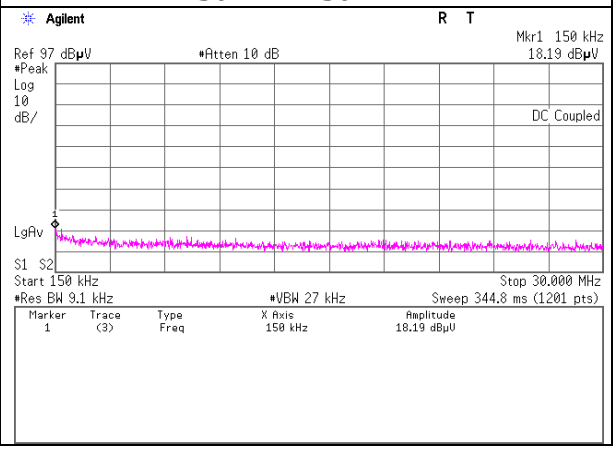
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10936450H
Date	August 29, 2015
Temperature / Humidity	24 deg. C / 69 % RH
Engineer	Takafumi Noguchi
Mode	Tx, Hopping Off, 3DH5

2441 MHz

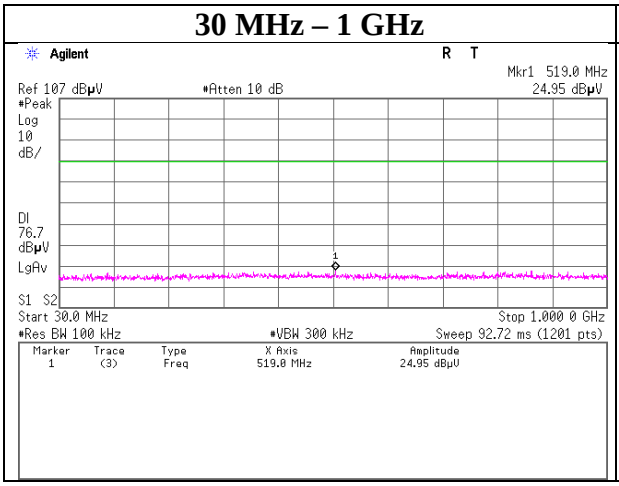
9 kHz - 150 kHz



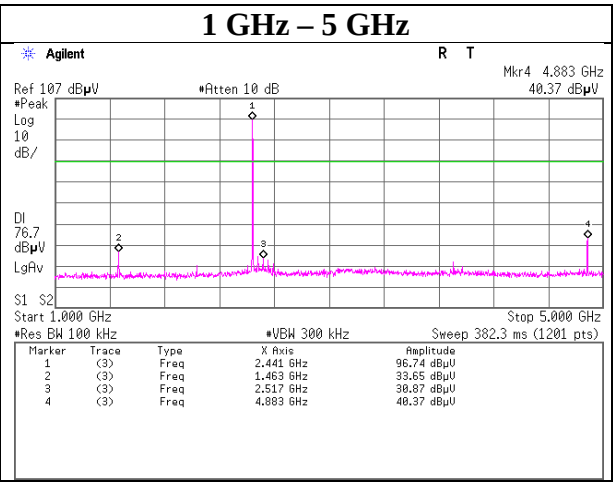
150 kHz - 30 MHz



30 MHz – 1 GHz



1 GHz – 5 GHz

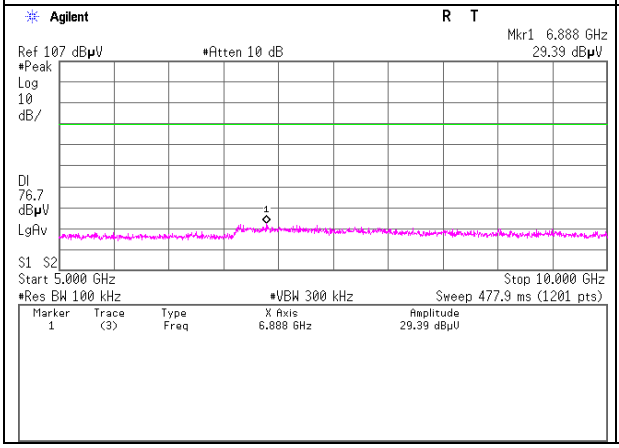


Conducted Spurious Emission

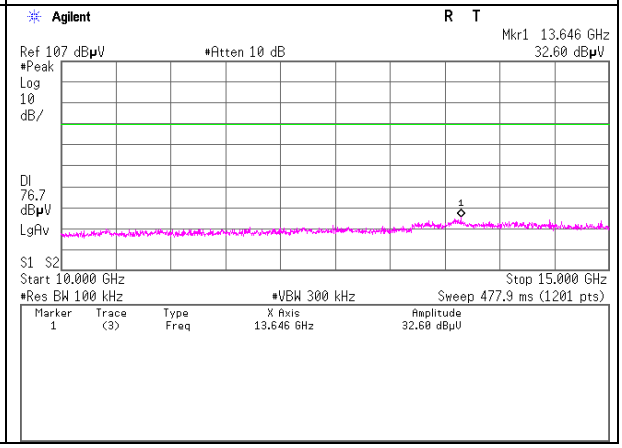
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10936450H
Date	August 29, 2015
Temperature / Humidity	24 deg. C / 69 % RH
Engineer	Takafumi Noguchi
Mode	Tx, Hopping Off, 3DH5

2441 MHz

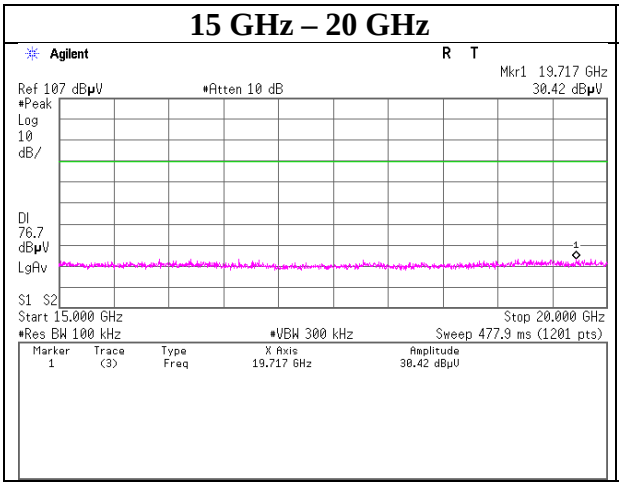
5 GHz – 10 GHz



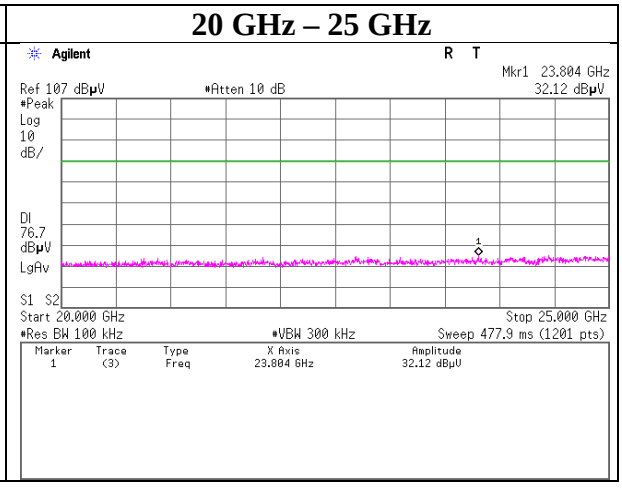
10 GHz - 15 GHz



15 GHz – 20 GHz



20 GHz – 25 GHz

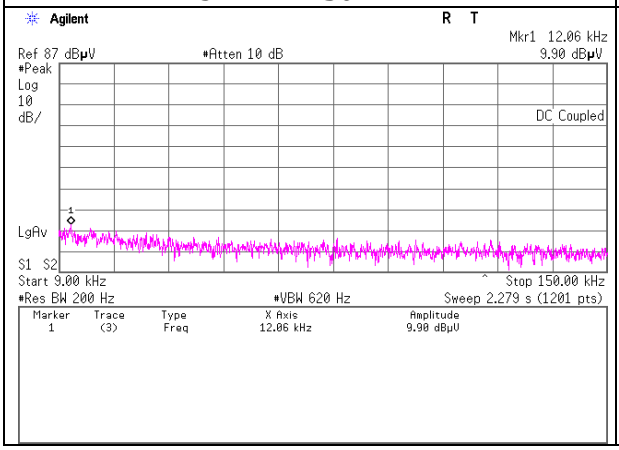


Conducted Spurious Emission

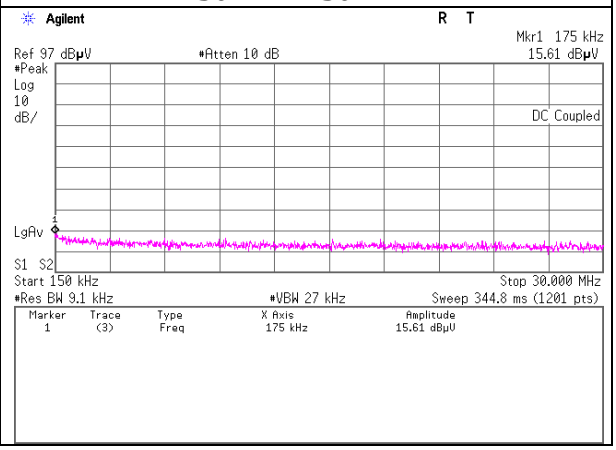
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10936450H
Date	August 29, 2015
Temperature / Humidity	24 deg. C / 69 % RH
Engineer	Takafumi Noguchi
Mode	Tx, Hopping Off, 3DH5

2480 MHz

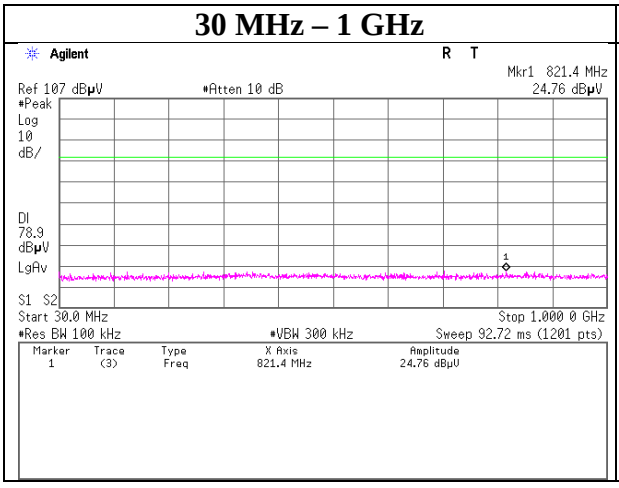
9 kHz - 150 kHz



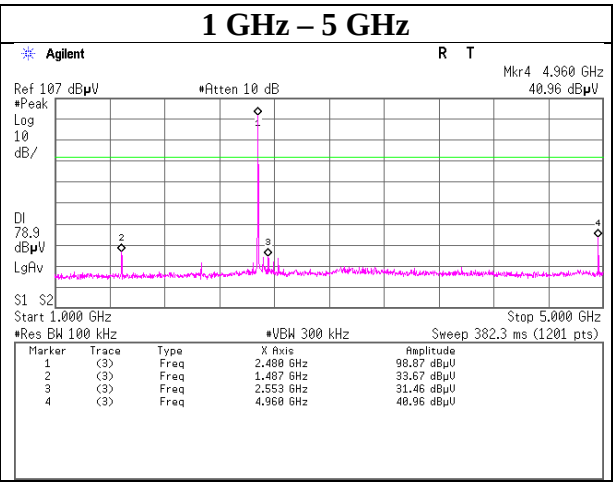
150 kHz - 30 MHz



30 MHz – 1 GHz



1 GHz – 5 GHz

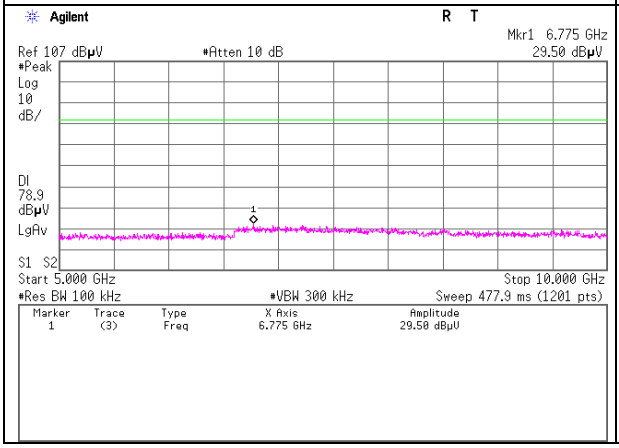


Conducted Spurious Emission

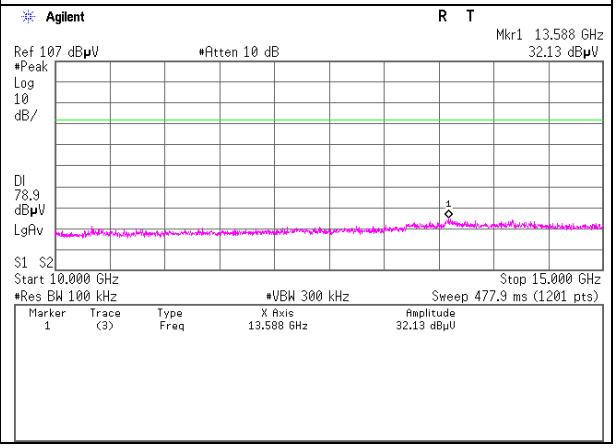
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10936450H
Date	August 29, 2015
Temperature / Humidity	24 deg. C / 69 % RH
Engineer	Takafumi Noguchi
Mode	Tx, Hopping Off, 3DH5

2480 MHz

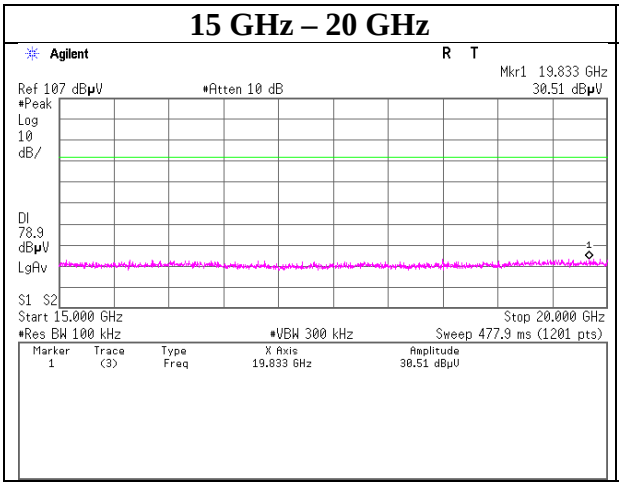
5 GHz – 10 GHz



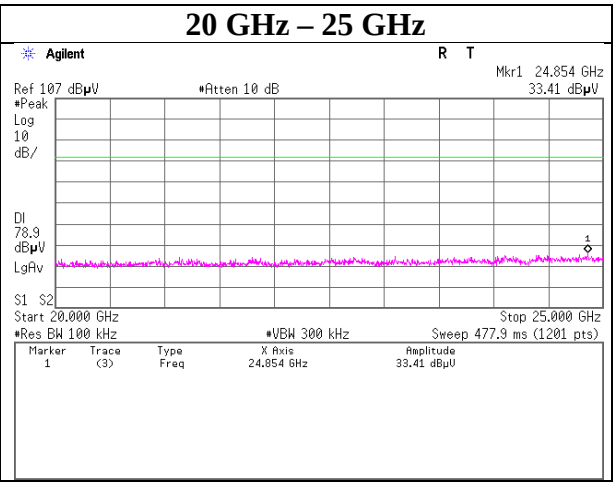
10 GHz - 15 GHz



15 GHz – 20 GHz



20 GHz – 25 GHz

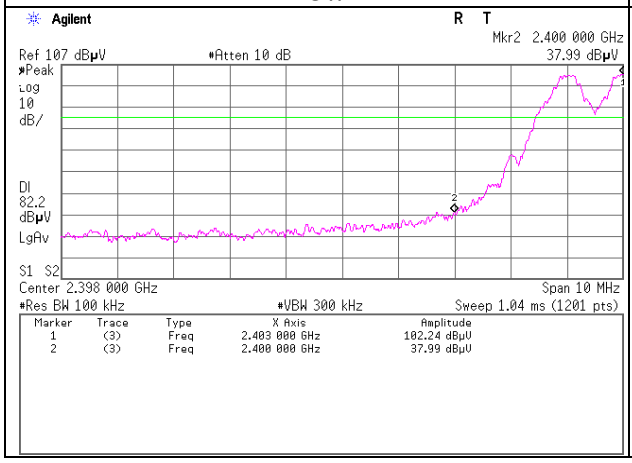


Conducted Emission Band Edge compliance

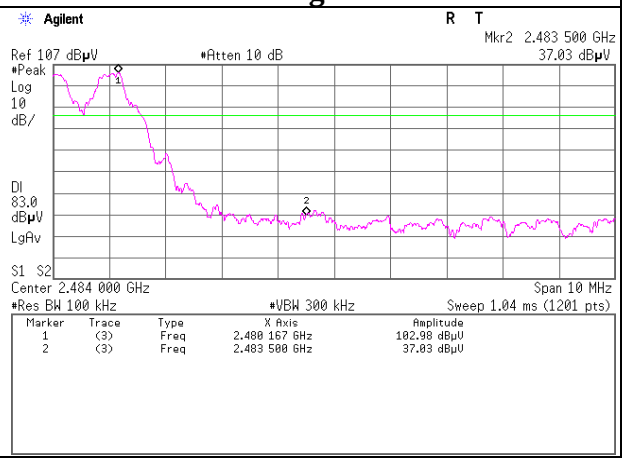
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10936450H
Date	August 29, 2015
Temperature / Humidity	24 deg. C / 69 % RH
Engineer	Takafumi Noguchi
Mode	Tx DH5

Hopping On

Low

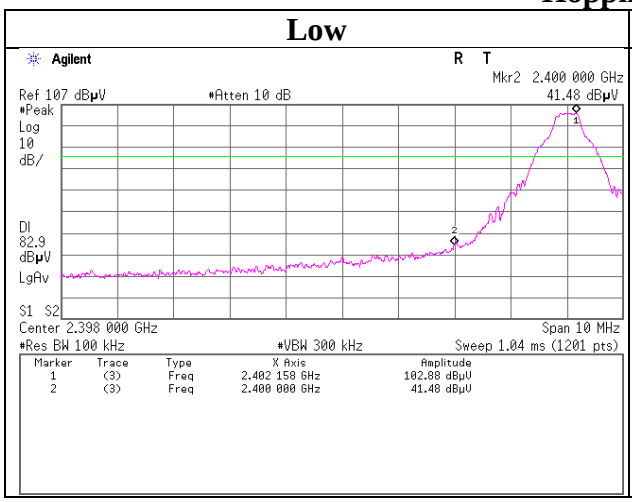


High

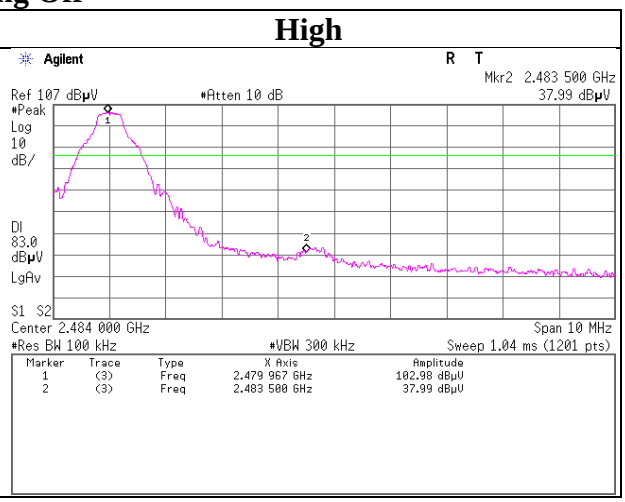


Hopping Off

Low



High

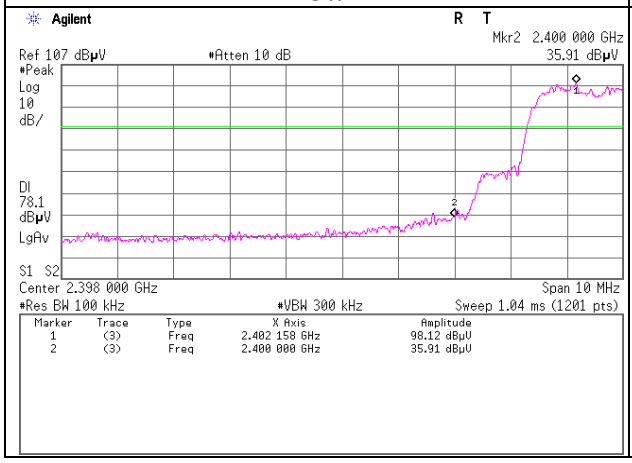


Conducted Emission Band Edge compliance

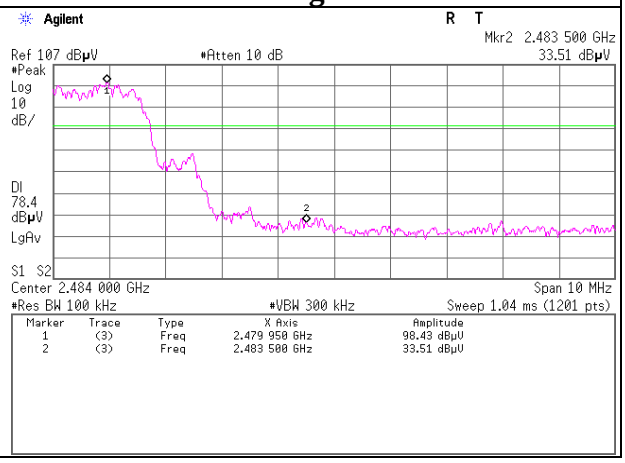
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10936450H
Date	August 29, 2015
Temperature / Humidity	24 deg. C / 69 % RH
Engineer	Takafumi Noguchi
Mode	Tx 3DH5

Hopping On

Low

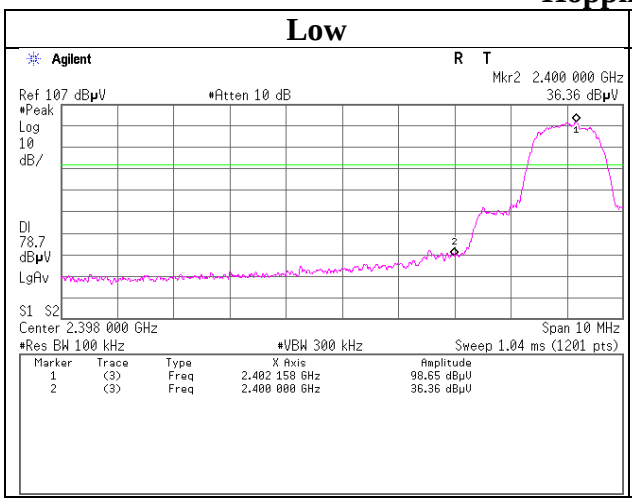


High

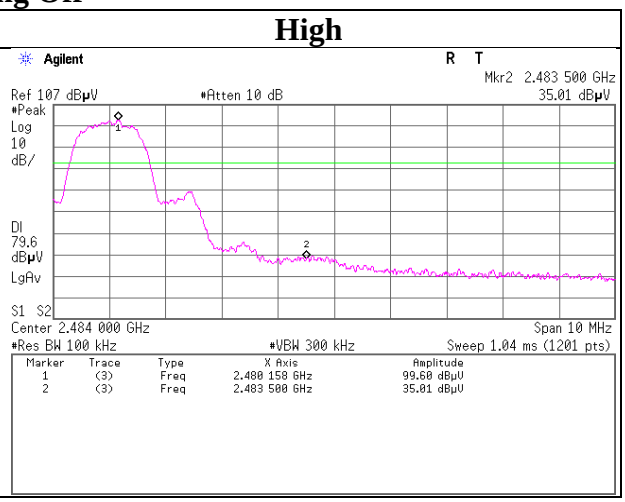


Hopping Off

Low



High

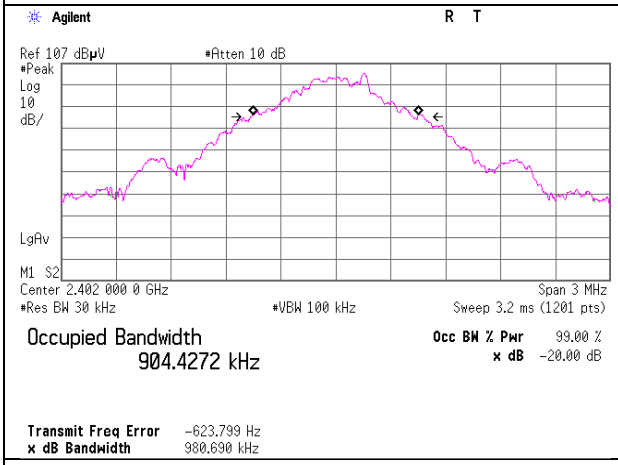


99% Occupied Bandwidth

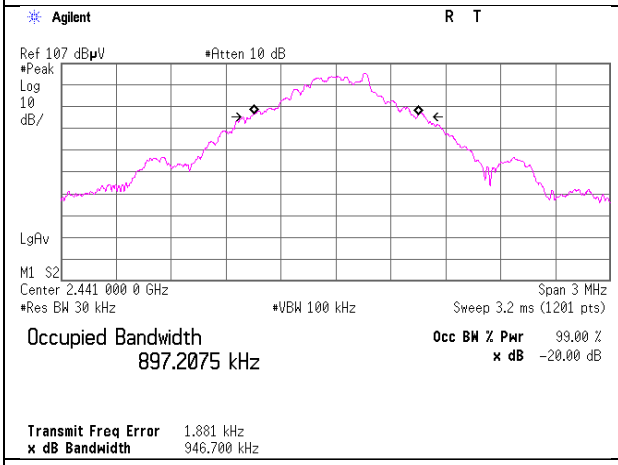
Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10936450H
Date	August 29, 2015
Temperature / Humidity	24 deg. C / 69 % RH
Engineer	Takafumi Noguchi
Mode	Tx Hopping Off

Hopping Off, DH5

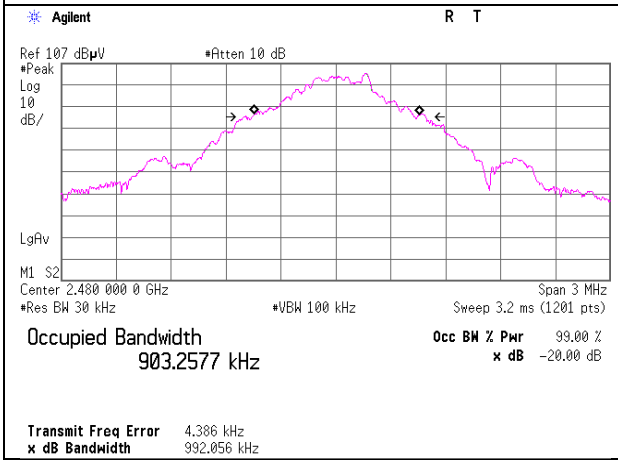
2402 MHz



2441 MHz

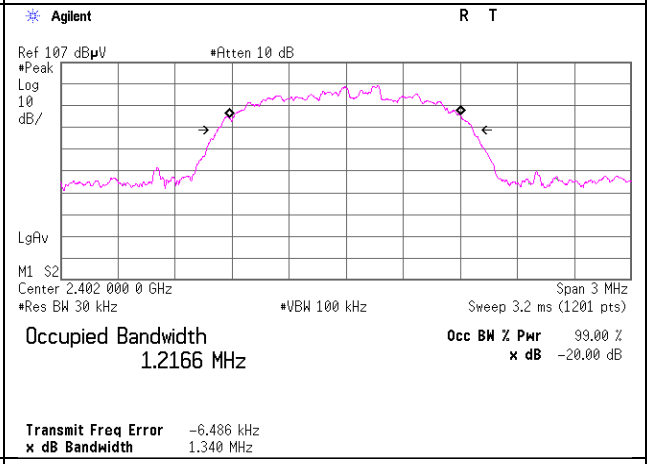


2480 MHz

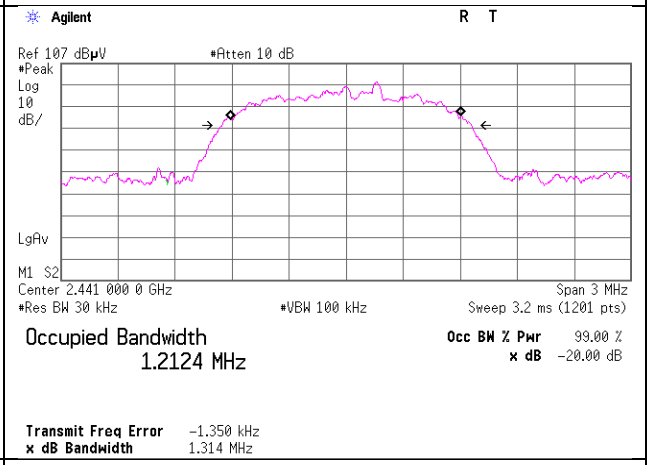


Hopping Off, 3DH5

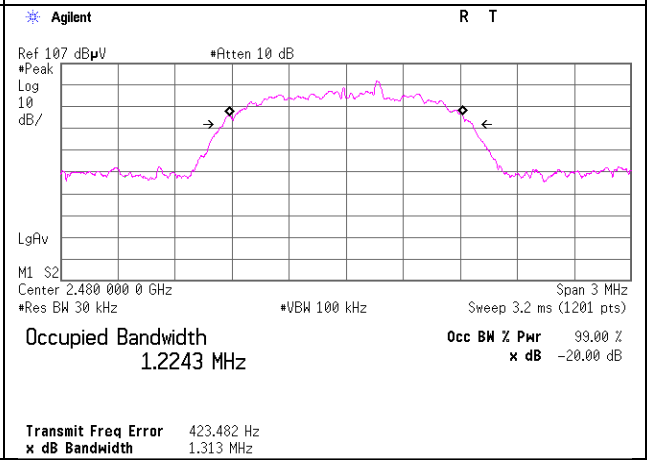
2402 MHz



2441 MHz



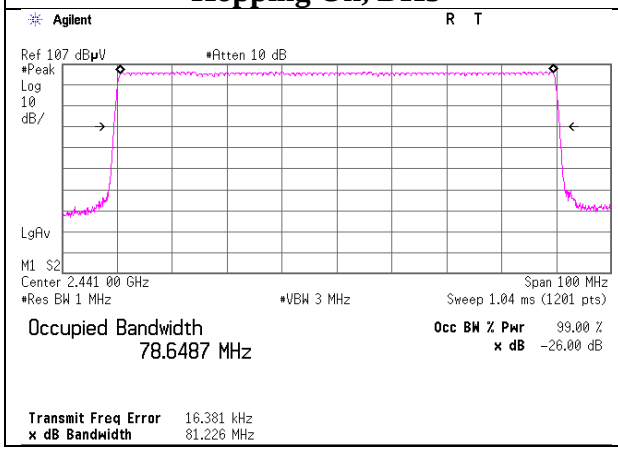
2480 MHz



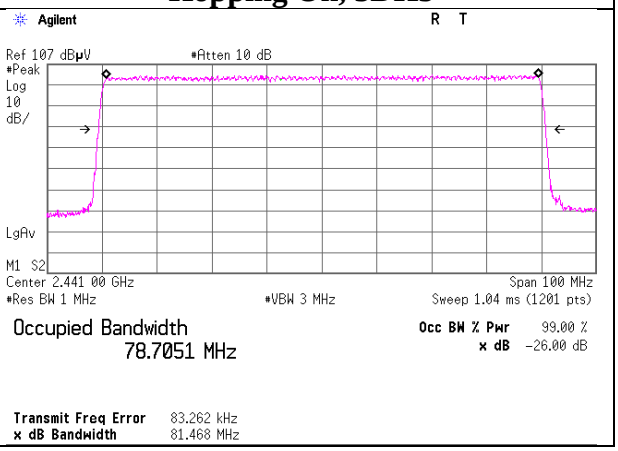
99% Occupied Bandwidth

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	10936450H
Date	August 29, 2015
Temperature / Humidity	24 deg. C / 69 % RH
Engineer	Takafumi Noguchi
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-19	Thermo-Hygrometer	Custom	CTH-201	0001	AT	2014/12/22 * 12
MMM-17	DIGIITAL HiTESTER	Hioki	3805	070900530	AT	2015/01/16 * 12
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	AT	2015/05/18 * 12
MPM-12	Power Meter	Anritsu	ML2495A	0825002	AT	2015/06/09 * 12
MPSE-17	Power sensor	Anritsu	MA2411B	0738285	AT	2015/06/09 * 12
MCC-144	Microwave Cable	Junkosha	MWX221	1207S407	AT	2015/08/06 * 12
MAT-20	Attenuator(10dB)(above 1GHz)	HIROSE ELECTRIC CO.,LTD.	AT-110	-	AT	2015/01/08 * 12
MCC-92	Microwave Cable 1G-40GHz	Suhner	SUCOFLEX102	30813/2	AT	2015/05/01 * 12
MAEC-01	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 10m	DA-06881	RE/CE	2014/09/01 * 12
MOS-27	Thermo-Hygrometer	CUSTOM	CTH-201	A08Q26	RE/CE	2015/01/13 * 12
MJM-21	Measure	KOMELON	KMC-36	-	RE/CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MHA-05	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	253	RE	2015/05/18 * 12
MPA-01	Pre Amplifier	Agilent	8449B	3008A01671	RE	2015/02/04 * 12
MCC-166	Microwave Cable	Junkosha	MWX221	1303S120(1m) / 1311S167(5m)	RE	2014/09/24 * 12
MMM-03	Digital Tester	Fluke	FLUKE 26-3	78030621	RE/CE	2015/08/19 * 12
MHF-25	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	001	RE	2014/09/22 * 12
MSA-13	Spectrum Analyzer	Agilent	E4440A	MY46185823	RE	2015/06/02 * 12
MHA-01	Horn Antenna 18-26.5GHz	EMCO	3160-09	1266	RE	2015/06/06 * 12
MTR-09	EMI Test Receiver	Rohde & Schwarz	ESU26	100412	RE/CE	2015/06/08 * 12
KBA-05	Biconical Antenna	Schwarzbeck	BBA9106	2513	RE	2014/11/22 * 12
KLA-04	Logperiodic Antenna	Schwarzbeck	USLP9143	361	RE	2014/11/22 * 12
MAT-08	Attenuator(6dB)	Weinschel Corp	2	BK7971	RE	2014/11/20 * 12
MCC-02	Coaxial Cable	Suhner/storm/Agilent/TSJ	-	-	RE	2014/09/12 * 12
MPA-19	Pre Amplifier	MITEQ	MLA-10K01-B01-35	1237616	RE	2015/02/03 * 12
MLS-25	LISN(AMN)	Schwarzbeck	NSLK8127	8127-731	CE	2015/07/17 * 12
MCC-03	Coaxial Cable	Fujikura/Suhner/TSJ	5D-2W(20m)/3D-2W(7.5m)/RG400u(1.5m)/RFM-E421(Switcher)	-/01068(Switcher)	CE	2014/09/12 * 12
MAT-64	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2015/01/29 * 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