RADIO TEST REPORT

Test Report No.: 10446024S-B

Applicant	:	**PIONEER CORPORATION**
Type of Equipment	:	**Car Audio with Bluetooth**
Model No.	:	**NXF-1258**
FCC ID	:	**AJDK086**
Test regulation	:	**FCC Part 15 Subpart C: 2014**
Test result	:	**Complied**

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6. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.

Date of test: October 10 to 28, 2014

Tested by:
S. Takano
Shinichi Takano
Engineer
Consumer Technology Division

Approved by :
T. Imamura
Toyokazu Imamura
Leader
Consumer Technology Division

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

JAB Testing RTL02610

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REVISION HISTORY

Original Test Report No.: 10446024S-B

Revision	Test report No.	Date	Page revised	Contents
- (Original)	10446024S-B	November 17, 2014	-	-

Contents

Page

SECTION 1: Customer information

Company Name	:	PIONEER CORPORATION
Brand name	:	Pioneer
Address	:	25-1 Aza-Nishi-machi, Yamada, Kawagoe-shi, Saitama, 350-8555, JAPAN
Telephone Number	:	+81-49-228-6415
Facsimile Number	:	+81-49-228-6493
Contact Person	:	Tomoyuki Tanaka

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

2.1 Identification of E.U.T.

Type of Equipment	:	Car Audio with Bluetooth
Model No.	:	NXF-1258
Serial No.	:	Refer to 4.2 in this report.
Rating	:	DC 13.2V
Country of Mass-production	:	Japan
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.
Receipt Date of Sample	:	October 6, 2014

2.2 Product description

Model: NXF-1258 (referred to as the EUT in this report) is a Car Audio with Bluetooth.

Radio specification:
Bluetooth:

Equipment type	:	Transceiver
Frequency of operation	:	2402-2480MHz
Bandwidth & channel spacing	:	79MHz & 1MHz
Type of modulation	:	GFSK, π/4DQPSK, 8DPSK
Antenna type	:	Pattern inverted F
Antenna gain	:	-0.42dBi (max)
Antenna connector type	:	20279-001E-01
Operation temperature range	:	-20 to +65 deg.C.

Wireless LAN:

Equipment type	:	Transceiver
Frequency of operation	:	2412-2462MHz
Bandwidth & channel spacing	:	20MHz & 5MHz
Type of modulation	:	BPSK, QPSK, CCK, 16QAM, 64QAM
Antenna type	:	Pattern inverted F
Antenna gain	:	-0.53dBi (max)
Antenna connector type	:	20279-001E-01
Operation temperature range	:	-20 to +65 deg.C.

* For Wireless LAN part, refer to the test report: 10446024S-A.

FCC 15.31 (e)
The EUT provides stable voltage (DC3.3V) constantly to the wireless transmitter regardless of input voltage. Instead of a new battery, DC power supply was used for the test. That does not affect the test result, therefore the EUT complies with the requirement.

FCC 15.203
The equipment and its antenna comply with the requirement since the antenna is built in the equipment and it cannot be replaced by end users.

Clock frequency: 26MHz (crystal and oscillator)

SECTION 3: Test specification, procedures & results

3.1 Test specification

Test specification : FCC Part 15 Subpart C: 2014,
final revised on August 15, 2014 and effective October 14, 2014
Title : FCC 47CFR Part 15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.209 Radiated emission limits, general requirements
Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz

* The revision on August 15, 2014 does not affect the test specification applied to the EUT.

3.2 Procedures & Results

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
Conducted emission	ANSI C63.4:2009 7. AC powerline conducted emission measurements	FCC 15.207	-	N/A *1)	-	-
Carrier frequency separation	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(1)	Conducted	N/A	*See data.	Complied
20dB bandwidth	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(1)	Conducted	N/A		-
Number of hopping frequency	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(1)(iii)	Conducted	N/A		Complied
Dwell time	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(1)(iii)	Conducted	N/A		Complied
Maximum peak output power	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (b)(1)	Conducted	N/A		Complied
Band edge compliance & Spurious emission	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (d) 15.209	Conducted/ Radiated	N/A	7.3 dB Freq.: 5551.072MHz Detection: Average Polarization: Horizontal Mode: Tx 2441MHz, 3-DH5	Complied
Note: UL Japan's Work Procedures No. 13-EM-W0420 and 13-EM-W0422 *1) The test is not applicable since the EUT has no AC mains.						

3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99%)	ANSI C63.4:2009 13. Measurement of intentional radiators, RSS-Gen 4.6.1	-	Conducted	-	-
Note: UL Japan's Work Procedures No. 13-EM-W0420 and 13-EM-W0422					

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

3.4 Uncertainty

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

Item	Frequency range	No.1 SAC[*1]/SR[*2] (±)	No.2 SAC/SR (±)	No.3 SAC/SR (±)
Radiated emission (Measurement distance: 3m)	9kHz-30MHz	3.7 dB	3.5 dB	3.5 dB
	30MHz-300MHz	4.8 dB	4.9 dB	4.7 dB
	300MHz-1GHz	5.0 dB	5.0 dB	4.8 dB
	1GHz-15GHz	4.9 dB	4.9 dB	4.9 dB
Radiated emission (Measurement distance: 1m)	15GHz-18GHz	5.7 dB	5.7 dB	5.7 dB
	18GHz-40GHz	4.5 dB	4.3 dB	4.3 dB

*1: SAC=Semi-Anechoic Chamber
*2: SR= Shielded Room is applied besides radiated emission

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

Antenna port conducted test
Power Measurement uncertainty above 1GHz for this test was: (±) 0.68dB
Spurious emission (Conducted) measurement (below 1GHz) uncertainty for this test was: (±) 1.5dB
Spurious emission (Conducted) measurement (1G-3GHz) uncertainty for this test was: (±) 1.7dB
Bandwidth Measurement uncertainty for this test was: (±) 0.66%

3.5 Test location

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Facsimile number: +81 463 50 6401
JAB Accreditation No. : RTL02610

	IC Registration No.	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
☐ No.1 semi-anechoic chamber	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☒ No.2 semi-anechoic chamber	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☒ No.3 semi-anechoic chamber	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
☐ No.4 semi-anechoic chamber	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
☐ No.1 shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
☐ No.2 shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
☐ No.3 shielded room	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
☐ No.4 shielded room	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
☒ No.5 shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
☐ No.6 shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
☐ No.1 Measurement room	-	2.55 x 4.1 x 2.5	-	-

3.6 Test setup, Data of test & Test instruments

Refer to APPENDIX 1 to 3.

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

4.1 Operating mode

Test item	Operating mode	Tested frequency
Carrier frequency separation	Transmitting Hopping ON (DH5 / 3-DH5) Payload: PRBS9	-
20dB bandwidth	Transmitting Hopping OFF (DH5 / 3-DH5) Payload: PRBS9	2402MHz, 2441MHz, 2480MHz
Number of hopping frequency	Transmitting Hopping ON (DH5 / 3-DH5) Payload: PRBS9	-
Dwell time	Transmitting (Hopping ON), Payload: PRBS9 - DH1, - DH3, - DH5 - 3-DH1, - 3-DH3, - 3-DH5	-
Maximum peak output power	Transmitting Hopping OFF , Payload: PRBS9 - DH5, - 2-DH5, - 3-DH5	2402MHz, 2441MHz, 2480MHz
Band edge compliance, Spurious emission	Transmitting (DH5 / 3-DH5), Payload: PRBS9 -Hopping OFF	Band edge compliance: 2402MHz, 2480MHz Spurious emission: 2402MHz, 2441MHz, 2480MHz
99% occupied bandwidth	Transmitting (DH5 / 3-DH5), Payload: PRBS9 -Hopping ON -Hopping OFF	2402MHz, 2441MHz, 2480MHz

*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload (except Dwell time test).

*Remarks: Test was not performed at AFH mode, because the decrease of number of channel (min: 20ch) at AFH mode does not affect the output power and bandwidth of the EUT.
The carrier separation may be less than 20 dB bandwidth, therefore 125mW power limit was applied to it.

We removed 2-DH mode (2 Mb/s EDR: pi/4DQPSK) except power measurement by using 3-DH mode (3 Mb/s EDR: 8DPSK) as a representative.

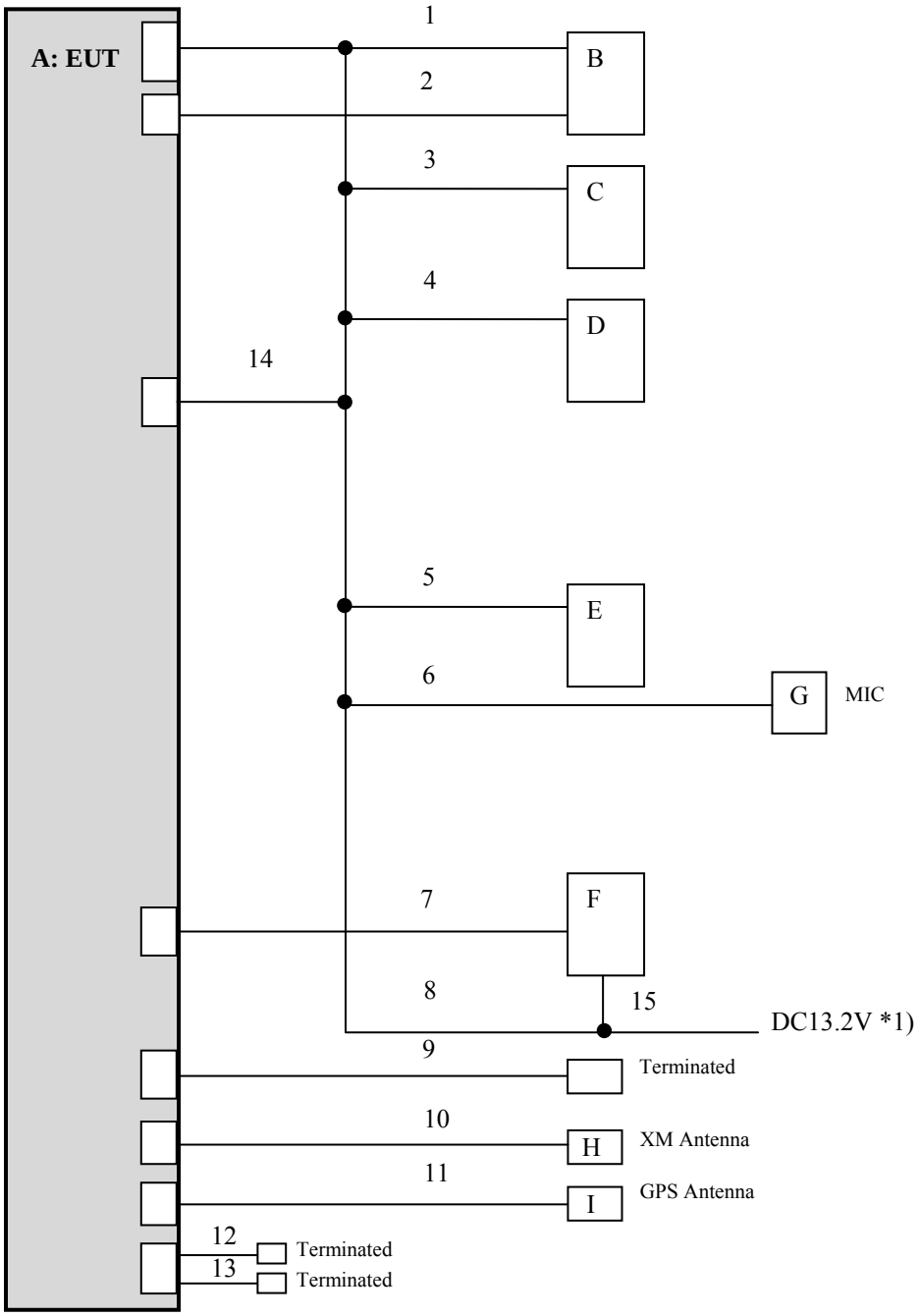
The EUT has no Inquiry mode.

EUT has the power settings by the software as follows;

Power settings	Sample for antenna port conducted test: BDR:Ext=0/Int:56, EDR: Ext:0/ Int 54 Sample for radiated test: BDR:Ext=0/Int:57, EDR: Ext:0/ Int 55
Software	CSR BlueTest3 ver 2.4.0.0

Justification: The system was configured in typical fashion (as customer would normally use it) for testing.

4.2 Configuration and peripherals



* Test data was taken under worse case conditions.

Description of EUT and Auxiliary equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Car Audio with Bluetooth	NXF-1258	*2)	Pioneer	EUT
B	Display	86110-30330	329012561	DENSO	-
C	Remote Control Device	84780-30080	12Mar09 0248AA	DENSO	-
D	Steering Switch	-	-	-	-
E	Rear Camera	86790-30151	3YC02976	-	-
F	Amplifier	GM-4038ZT/WL (86280-53190)	TPJA000140WL	Pioneer	-
G	Microphone	-	-	-	-
H	XM Antenna	86760-48050-A0	-	-	-
I	GPS Antenna	86860-22090	-	AISIN	-

*1) DC power supply (Model No.: PAN35-10A) was used for DC 13.2V input.
*2) Antenna port conducted tests: NGPKTP0044US, Radiated emission tests: NGPKTP0012US

List of cables used

No.	Item	Length(m)	Shield (Cable)	Shield (Connector)	Remarks
1	Signal cable for Display	1.9	Unshielded	Unshielded	-
2	GVIF cable	1.9	Unshielded	Unshielded	-
3	Signal cable for Remote control	1.9	Unshielded	Unshielded	-
4	Signal cable for Steering Switch	2.0	Unshielded	Unshielded	-
5	Signal cable for Rear Camera	2.0	Unshielded	Unshielded	-
6	Signal cable for Microphone	4.0	Shielded	Shielded	-
7	Bus cable	2.0	Shielded	Shielded	-
8	DC power cable	3.1	Unshielded	Unshielded	-
9	USB cable	2.0	Shielded	Shielded	-
10	Antenna cable for XM	1.3	Shielded	Shielded	-
11	Antenna cable for GPS	1.7	Shielded	Shielded	-
12	HCI cable	3.3	Shielded	Shielded	-
13	HCI cable	3.3	Shielded	Shielded	-
14	Bus cable	1.6	Unshielded	Unshielded	-
15	Wire harness for amplifier	1.6	Unshielded	Unshielded	-

SECTION 5: Carrier frequency separation

Test procedure
The carrier frequency separation was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass
Refer to APPENDIX 1.

SECTION 6: 20dB bandwidth & Occupied bandwidth (99%)

Test procedure
The bandwidth was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass
Refer to APPENDIX 1.

SECTION 7: Number of hopping frequency

Test procedure
The Number of Hopping Frequency was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass
Refer to APPENDIX 1.

SECTION 8: Dwell time

Test procedure
The Dwell time was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass
Refer to APPENDIX 1.

SECTION 9: Maximum peak output power

Test procedure
The Maximum Peak Output Power was measured with a power meter connected to the antenna port.

Summary of the test results: Pass
Refer to APPENDIX 1.

SECTION 10: Radiated emission

10.1 Operating environment

Test room : See test data (APPENDIX 1)
Temperature : See test data (APPENDIX 1)
Humidity : See test data (APPENDIX 1)

10.2 Test configuration

EUT was placed on a platform of nominal size, 1.0m by 2.0m, raised 0.8m above the conducting ground plane. The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity. The rear of EUT, including its peripherals was aligned and flushed with rear of tabletop. I/O cables that were connected to the peripherals were bundled in center. They were folded back and for the forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane.
Photographs of the set up are shown in APPENDIX 3.

10.3 Test conditions

Frequency range : 30MHz - 25GHz
EUT position : Table top

10.4 Test procedure

The Radiated Electric Field Strength intensity has been measured on a semi-anechoic chamber with a ground plane and at a distance of 3m (below 15GHz) / 1m (above 15GHz) (Refer to Figure 1). Measurements were performed with quasi-peak, peak and average detector. The measuring antenna height was varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity. The measurements were performed for both vertical and horizontal antenna polarization.

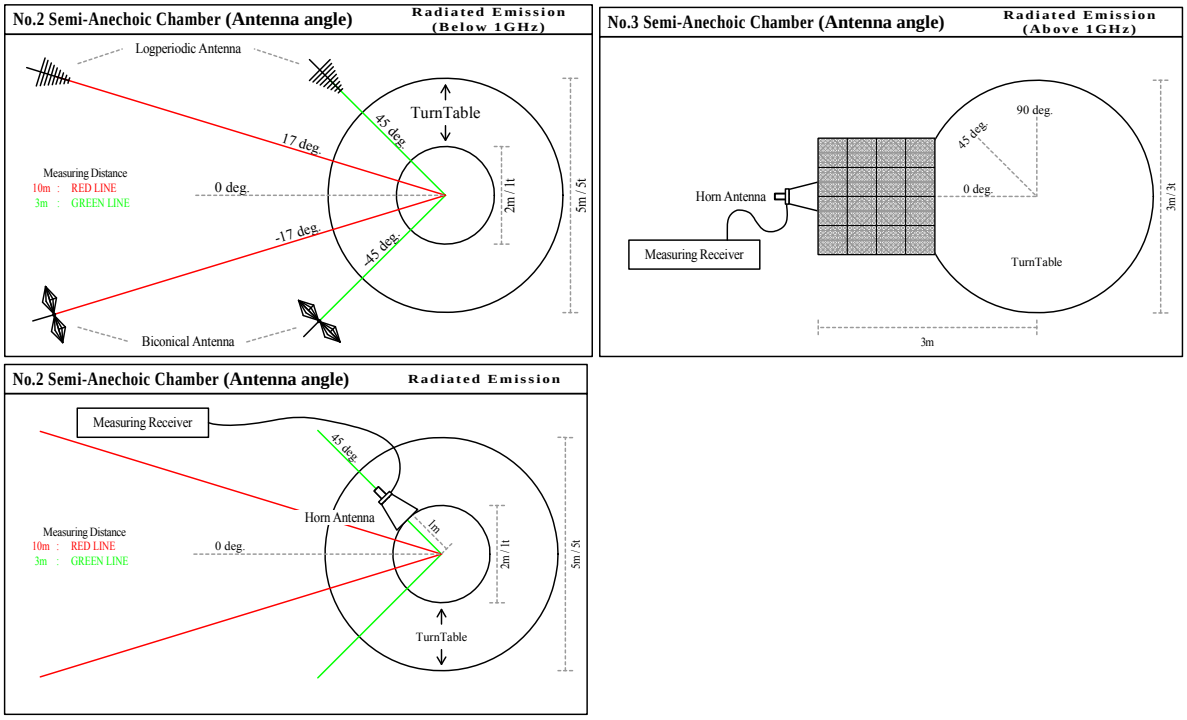
The radiated emission measurements were made with the following detection.

Frequency		30 - 1000MHz	1 - 25GHz		20dBc
Detection Type	:	Quasi-Peak	Peak	* Average	Peak
IF Bandwidth	:	120kHz	RBW:1MHz VBW:3MHz	RBW:1MHz VBW:10Hz	RBW: 100kHz VBW: 300kHz

* When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.
Although 00-705 accepts VBW=10Hz for AV measurements, confirmed that superfluous smoothing was not performed.

The EUT was set at 14.31 degree as normal position according to the EUT's specification.

Figure 1. Antenna angle



10.5 Band edge

Band edge level is below the limits of FCC 15.209. Refer to the data.

10.6 Results

Summary of the test results: Pass
*No noise was detected above the 5th order harmonics.

Refer to APPENDIX 1.

SECTION 11: Spurious emissions (Antenna port conducted)

Test procedure

The Out of Band Emissions was measured with a spectrum analyzer connected to the antenna port.
The radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.
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. (9kHz-150kHz:RBW=200Hz, 150kHz-30MHz:RBW=10kHz)

Summary of the test results: Pass
Refer to APPENDIX 1

Contents of APPENDIXES

APPENDIX 1: Data of Radio tests

20dB Bandwidth and Carrier Frequency Separation

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	October 10, 2014	
Temperature / Humidity	25 deg.C , 57 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, Bluetooth, BDR, PRBS9	

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency Separation [MHz]
DH5	2402.0	0.948	1.000	>= 0.632
DH5	2441.0	0.962	1.000	>= 0.641
DH5	2480.0	0.937	1.000	>= 0.625

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

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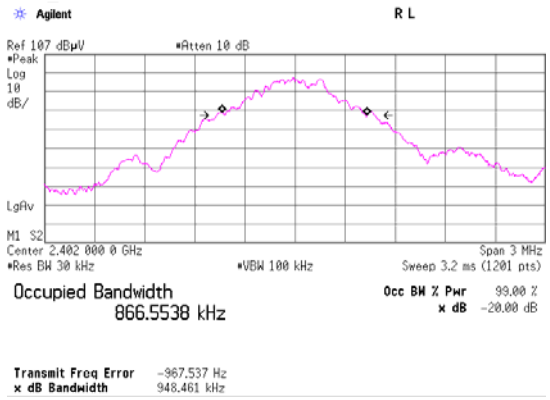
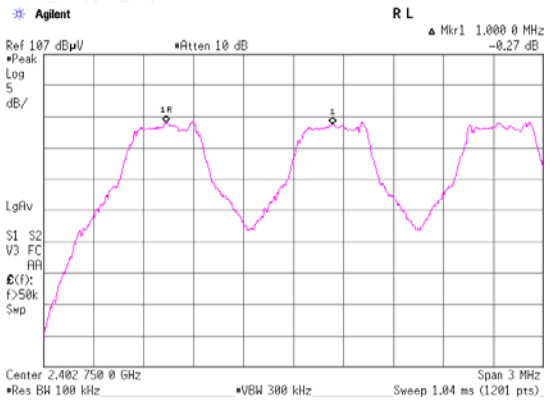
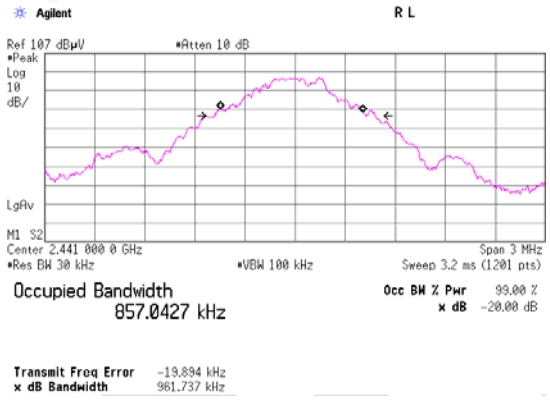
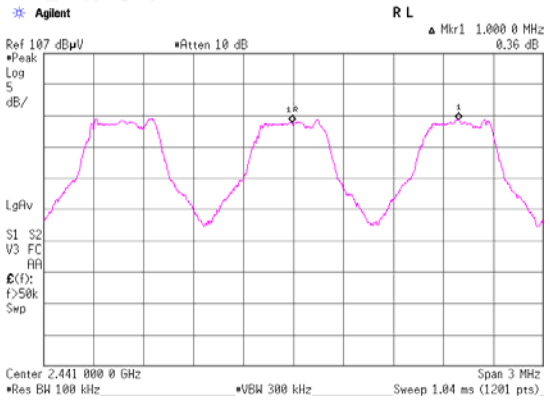
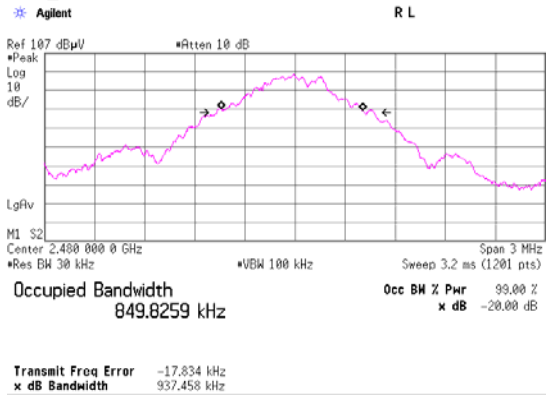
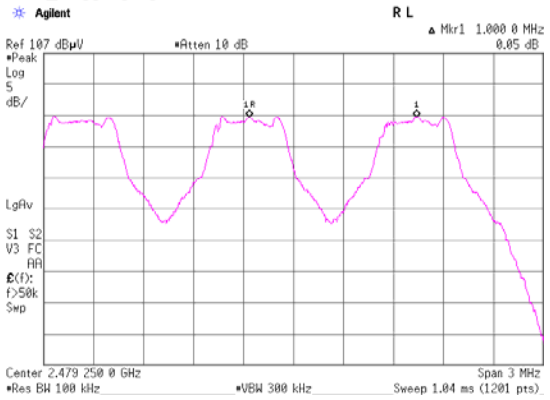
20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, BDR, PRBS9

20dB Bandwidth	Carrier Frequency Separation
Tx, 2402MHz	**Tx, 2402MHz**
	
Tx, 2441MHz	**Tx, 2441MHz**
	
Tx, 2480MHz	**Tx, 2480MHz**
	

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20dB Bandwidth and Carrier Frequency Separation

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	October 10, 2014	
Temperature / Humidity	25 deg.C , 57 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, Bluetooth, EDR, PRBS9	

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency Separation [MHz]
3-DH5	2402.0	1.278	1.000	>= 0.852
3-DH5	2441.0	1.263	1.000	>= 0.842
3-DH5	2480.0	1.262	1.000	>= 0.841

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

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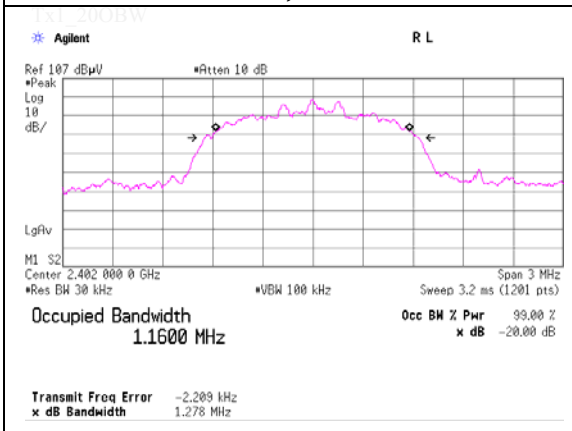
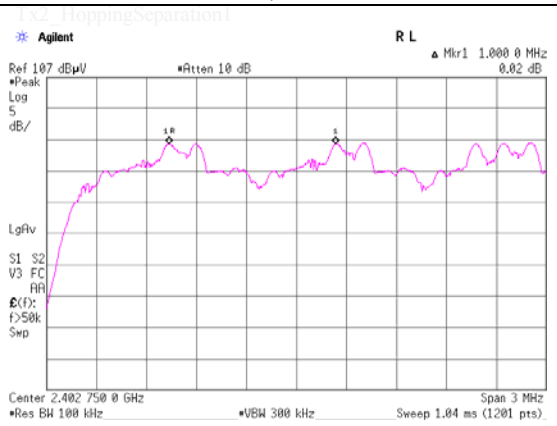
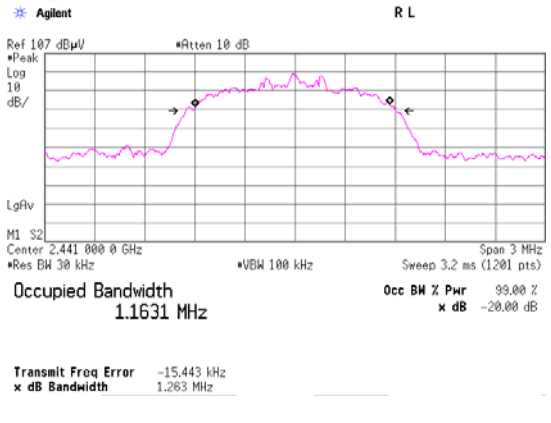
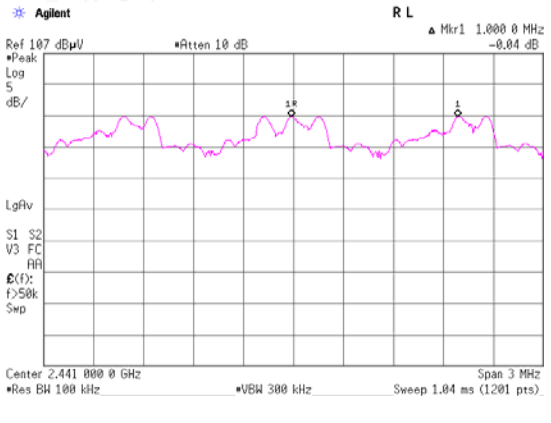
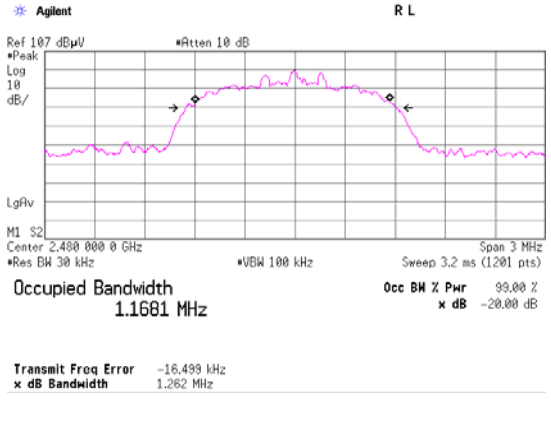
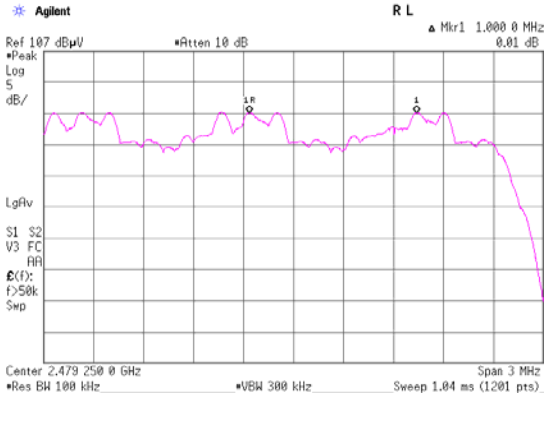
20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, EDR, PRBS9

20dB Bandwidth	Carrier Frequency Separation
Tx, 2402MHz	**Tx, 2402MHz**
	
Tx, 2441MHz	**Tx, 2441MHz**
	
Tx, 2480MHz	**Tx, 2480MHz**
	

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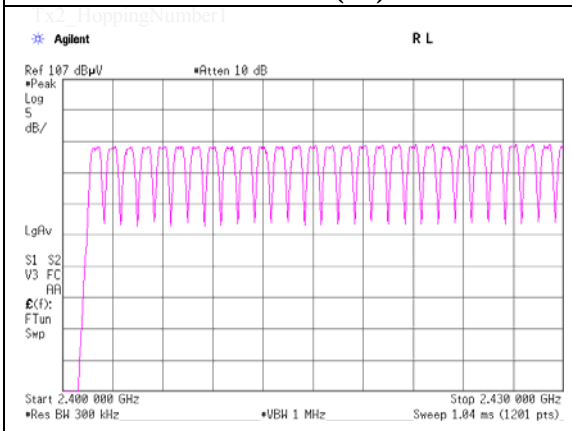
Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	October 10, 2014	
Temperature / Humidity	25 deg.C , 57 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, Bluetooth, BDR, PRBS9	

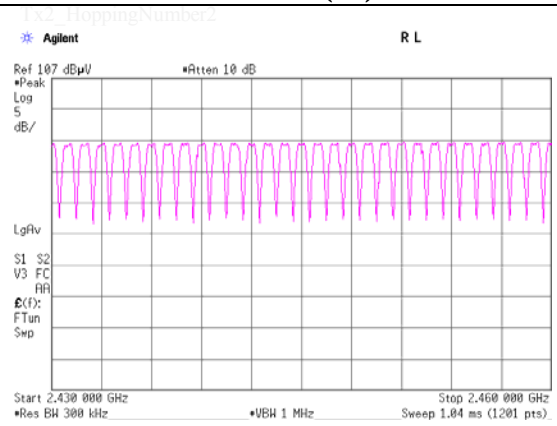
Mode	Number of Channel [times]	Limit [times]
DH5	79	>= 15

* 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.

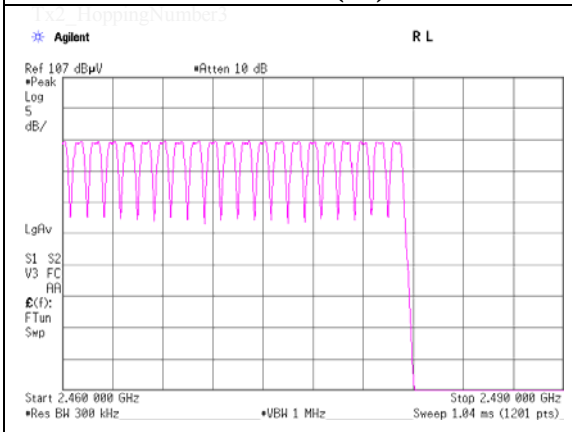
DH5 (1/3)

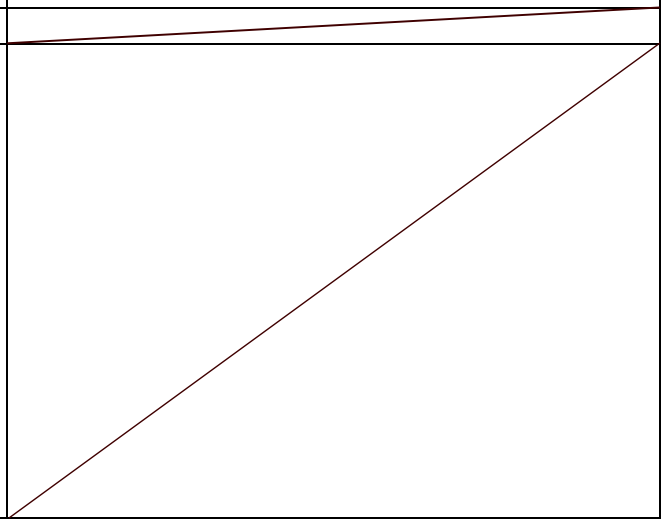


DH5 (2/3)



DH5 (3/3)





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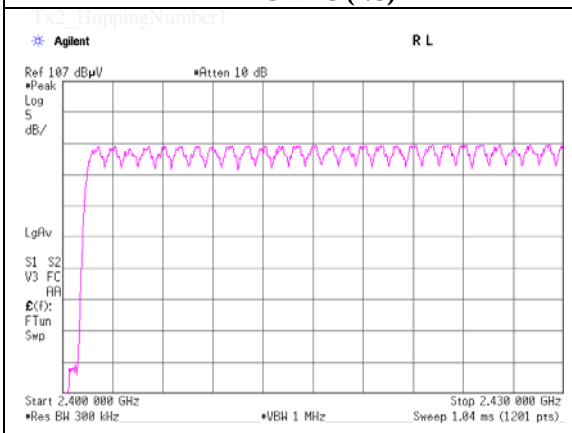
Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	October 10, 2014	
Temperature / Humidity	25 deg.C , 57 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, Bluetooth, EDR, PRBS9	

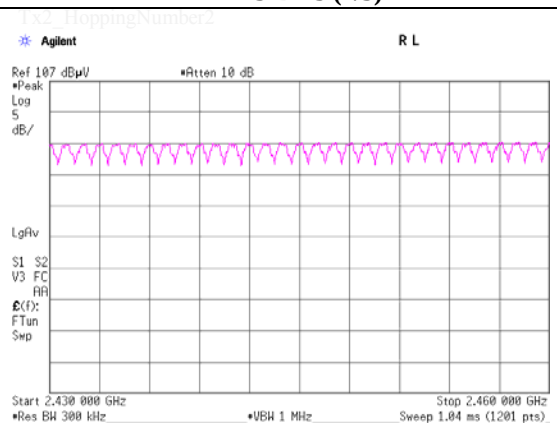
Mode	Number of Channel [times]	Limit [times]
3-DH5	79	>= 15

* 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.

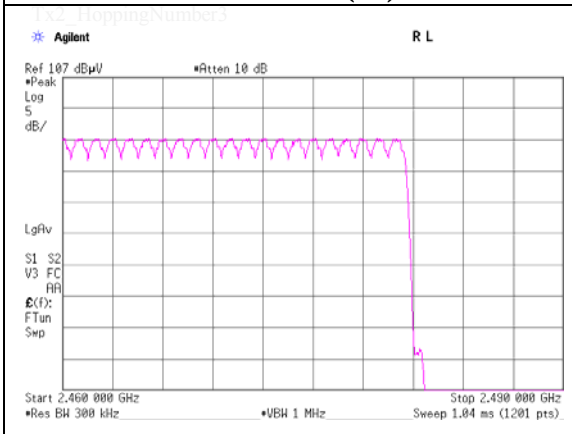
3-DH5 (1/3)

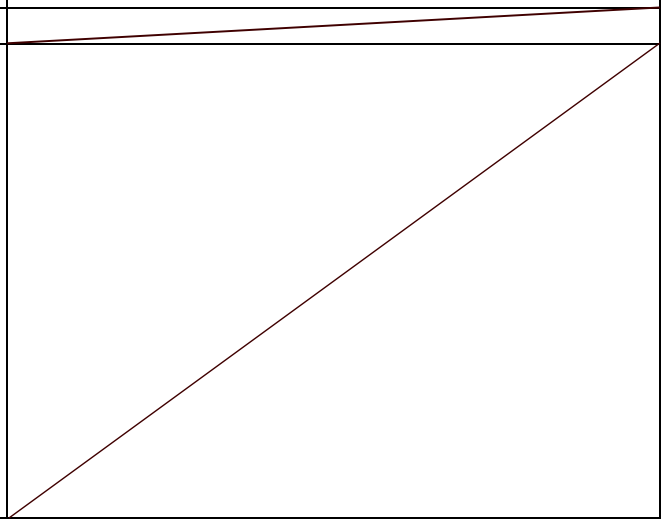


3-DH5 (2/3)



3-DH5 (3/3)





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Dwell Time

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	October 10, 2014	
Temperature / Humidity	25 deg.C , 57 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, Bluetooth, BDR, PRBS9	

Mode	Number of transmission in a 31.6 (79 Hopping x 0.4) second period			Length of transmission time [msec]	Result [msec]	Limit [msec]
DH1	51.0	/ 5.0 sec. x 31.6 sec. =	323 times	0.432	139	400
DH3	26.0	/ 5.0 sec. x 31.6 sec. =	165 times	1.689	279	400
DH5	17.0	/ 5.0 sec. x 31.6 sec. =	108 times	2.939	317	400

Sample Calculation

Result = Number of transmission x Length of transmition time

* 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 (DH1, DH3 or DH5). This is confirmed in the test report for N=79.

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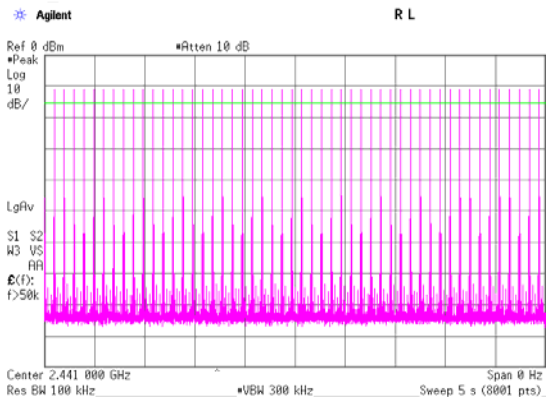
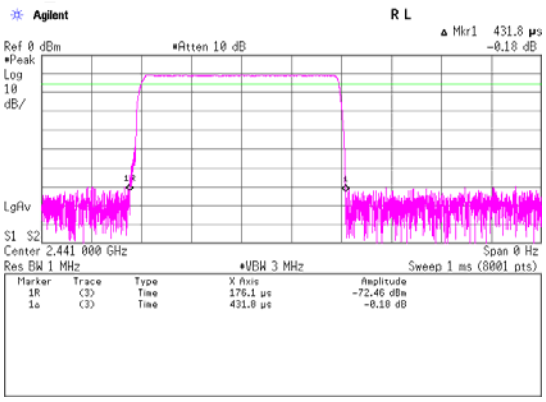
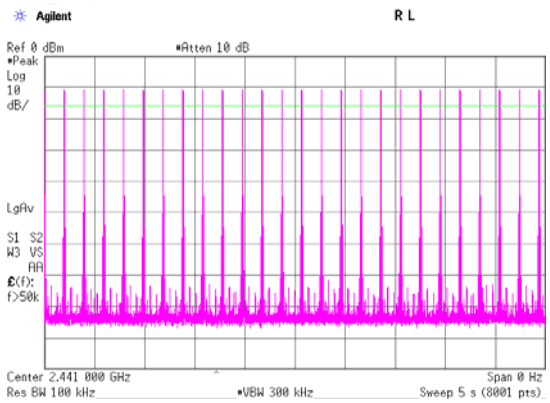
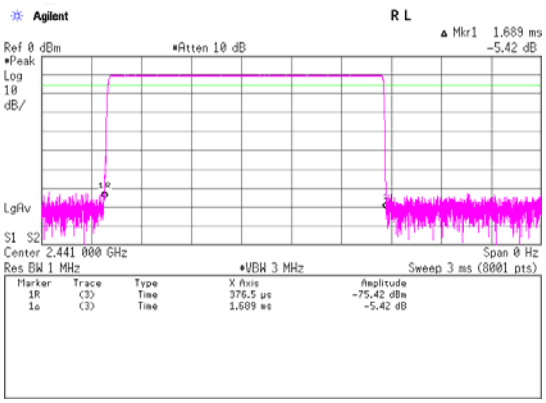
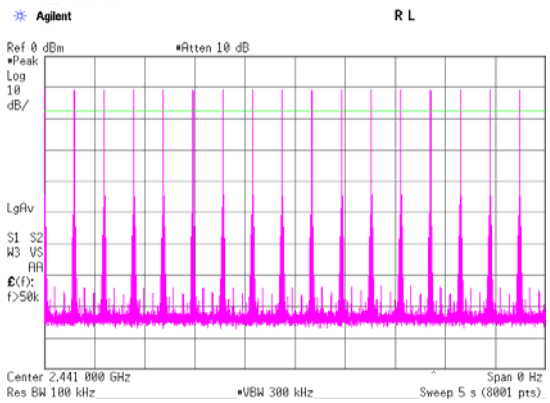
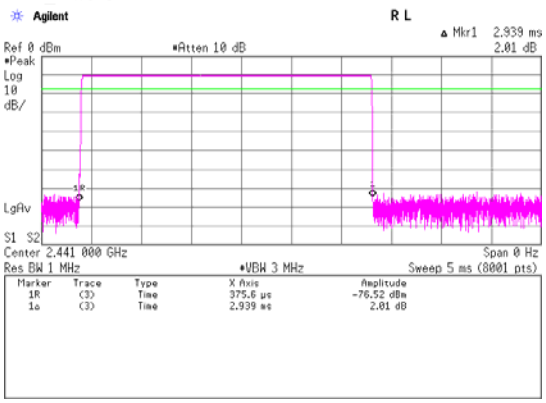
Dwell time

Tx, Bluetooth, BDR, PRBS9

DH1 (1/2)	DH1 (2/2)
	
DH3 (1/2)	**DH3 (2/2)**
	
DH5 (1/2)	**DH5 (2/2)**
	

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Dwell Time

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	October 10, 2014	
Temperature / Humidity	25 deg.C , 57 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, Bluetooth, EDR, PRBS9	

Mode	Number of transmission in a 31.6 (79 Hopping x 0.4) second				Length of transmission time [msec]	Result [msec]	Limit [msec]
3-DH1	51.0	/ 5.0 sec. x	31.6 sec. =	323 times	0.446	144	400
3-DH3	26.0	/ 5.0 sec. x	31.6 sec. =	165 times	1.696	280	400
3-DH5	17.0	/ 5.0 sec. x	31.6 sec. =	108 times	2.942	318	400

Sample Calculation

Result = Number of transmission x Length of transmition time

* 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 (3-DH1, 3-DH3 or 3-DH5). This is confirmed in the test report for N=79.

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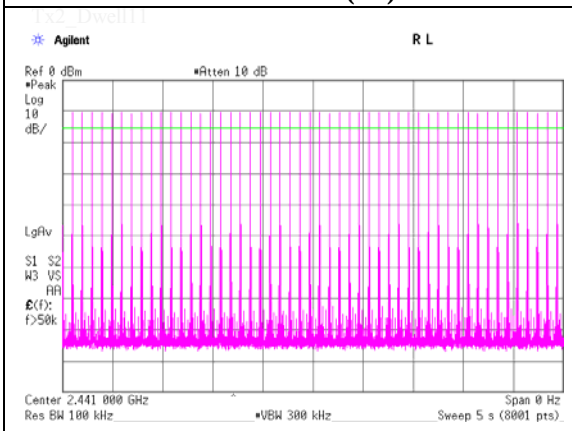
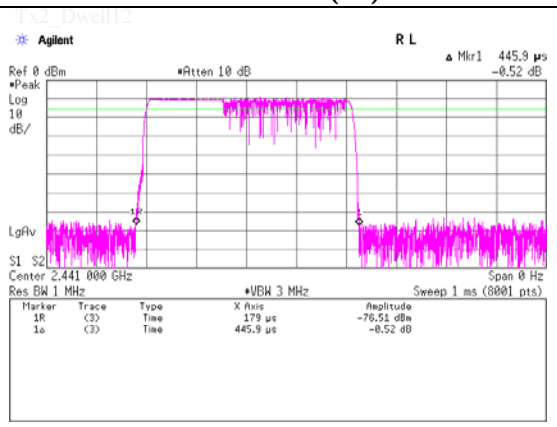
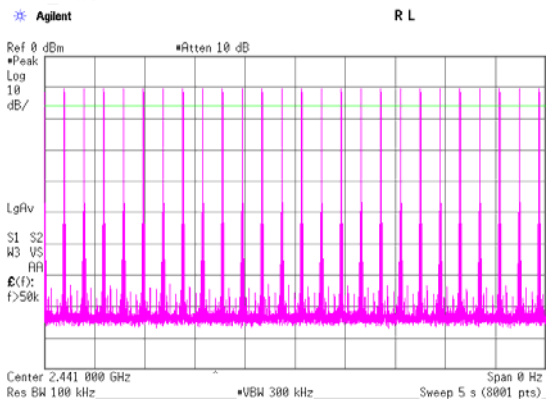
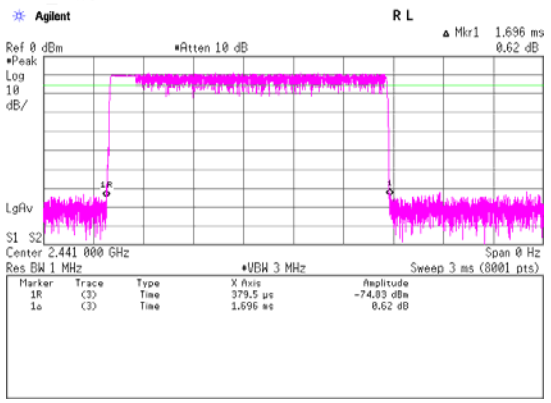
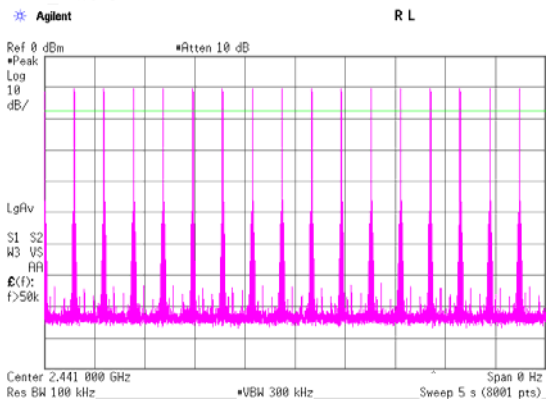
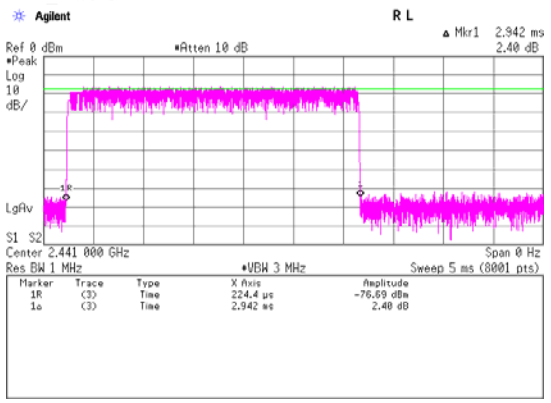
Dwell time

Tx, Bluetooth, EDR, PRBS9

3-DH1 (1/2)	3-DH1 (2/2)
	
3-DH3 (1/2)	**3-DH3 (2/2)**
	
3-DH5 (1/2)	**3-DH5 (2/2)**
	

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Maximum Peak Conducted Output Power (Conducted)

Test place	UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date	October 10, 2014
Temperature / Humidity	25 deg.C , 57 %RH
Engineer	Makoto Hosaka
Mode	Tx, Bluetooth

(* P/M: Power Meter with power sensor)

	Freq.	P/M (Peak) Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
DH5	2402.0	-10.82	1.48	9.90	0.56	1.14	20.97	125	20.41
DH5	2441.0	-10.42	1.49	9.90	0.97	1.25	20.97	125	20.00
DH5	2480.0	-10.25	1.50	9.90	1.15	1.30	20.97	125	19.82
2-DH5	2402.0	-9.68	1.48	9.90	1.70	1.48	20.97	125	19.27
2-DH5	2441.0	-9.08	1.49	9.90	2.31	1.70	20.97	125	18.66
2-DH5	2480.0	-8.86	1.50	9.90	2.54	1.79	20.97	125	18.43
3-DH5	2402.0	-9.38	1.48	9.90	2.00	1.58	20.97	125	18.97
3-DH5	2441.0	-8.79	1.49	9.90	2.60	1.82	20.97	125	18.37
3-DH5	2480.0	-8.48	1.50	9.90	2.92	1.96	20.97	125	18.05

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

Maximum Conducted Output Average Power (Reference data)

Test place	UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date	October 10, 2014
Temperature / Humidity	25 deg.C , 57 %RH
Engineer	Makoto Hosaka
Mode	Tx, Bluetooth

(* P/M: Power Meter with power sensor, Ave.:Average)

	Freq.	P/M (Ave.) Reading	Cable Loss	Atten. Loss	Result	
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]
DH5	2402.0	-12.38	1.48	9.90	-1.00	0.79
DH5	2441.0	-11.92	1.49	9.90	-0.53	0.89
DH5	2480.0	-11.71	1.50	9.90	-0.31	0.93
2-DH5	2402.0	-13.24	1.48	9.90	-1.86	0.65
2-DH5	2441.0	-12.61	1.49	9.90	-1.22	0.76
2-DH5	2480.0	-12.34	1.50	9.90	-0.94	0.81
3-DH5	2402.0	-13.25	1.48	9.90	-1.87	0.65
3-DH5	2441.0	-12.63	1.49	9.90	-1.24	0.75
3-DH5	2480.0	-12.36	1.50	9.90	-0.96	0.80

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

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Radiated Emission

Test place	No.2 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	October 27, 2014	October 28, 2014
Temperature / Humidity	25 deg.C, 50 %RH	24 deg.C, 39 %RH
Engineer	Shinichi Takano	Shinichi Takano
Mode	Tx, 2402 MHz	
	Tx, Bluetooth, BDR, PRBS9	

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	170.405	QP	32.8	15.7	8.7	31.8	25.4	43.5	18.1	300	7	
Hori.	219.097	QP	38.3	16.6	9.0	31.8	32.1	46.0	13.9	147	80	
Hori.	481.084	QP	44.0	17.1	7.5	31.7	36.9	46.0	9.1	100	47	
Hori.	518.096	QP	41.2	17.6	7.7	31.7	34.8	46.0	11.2	100	44	
Hori.	1198.473	PK	62.4	24.1	12.4	40.9	58.0	73.9	15.9	100	210	
Hori.	2390.000	PK	45.5	26.4	13.6	41.1	44.4	73.9	29.5	192	35	
Hori.	2400.000	PK	47.2	26.4	13.6	41.1	46.1	73.9	27.8	192	35	
Hori.	4440.817	PK	51.2	29.4	5.9	40.2	46.3	73.9	27.6	102	191	
Hori.	4804.000	PK	45.9	30.6	6.0	39.8	42.7	73.9	31.2	137	257	
Hori.	5551.032	PK	51.1	31.7	6.3	38.8	50.3	73.9	23.6	108	213	
Hori.	7206.000	PK	44.9	36.6	7.1	40.2	48.4	73.9	25.5	100	0	
Hori.	9608.000	PK	43.6	38.5	8.2	40.1	50.2	73.9	23.7	100	0	
Hori.	12010.000	PK	45.2	39.5	9.3	39.6	54.4	73.9	19.5	100	0	
Hori.	1198.473	AV	43.7	24.1	12.4	40.9	39.3	53.9	14.6	100	210	
Hori.	2390.000	AV	32.4	26.4	13.6	41.1	31.3	53.9	22.6	192	35	
Hori.	2400.000	AV	33.1	26.4	13.6	41.1	32.0	53.9	21.9	192	35	
Hori.	4440.817	AV	47.1	29.4	5.9	40.2	42.2	53.9	11.7	102	191	
Hori.	4804.000	AV	35.7	30.6	6.0	39.8	32.5	53.9	21.4	137	257	
Hori.	5551.032	AV	46.5	31.7	6.3	38.8	45.7	53.9	**8.2**	108	213	
Hori.	7206.000	AV	33.6	36.6	7.1	40.2	37.1	53.9	16.8	100	0	
Hori.	9608.000	AV	32.9	38.5	8.2	40.1	39.5	53.9	14.4	100	0	
Hori.	12010.000	AV	33.3	39.5	9.3	39.6	42.5	53.9	11.4	100	0	
Vert.	170.407	QP	32.1	15.7	8.7	31.8	24.7	43.5	18.8	100	355	
Vert.	407.080	QP	43.3	16.3	7.1	31.7	35.0	46.0	11.0	159	240	
Vert.	592.107	QP	41.8	18.9	8.1	31.6	37.2	46.0	8.8	100	240	
Vert.	1197.637	PK	58.0	24.1	12.4	40.9	53.6	73.9	20.3	100	359	
Vert.	2390.000	PK	44.8	26.4	13.6	41.1	43.7	73.9	30.2	135	357	
Vert.	2400.000	PK	47.8	26.4	13.6	41.1	46.7	73.9	27.2	135	357	
Vert.	4440.808	PK	53.5	29.4	5.9	40.2	48.6	73.9	25.3	105	184	
Vert.	4804.000	PK	45.0	30.6	6.0	39.8	41.8	73.9	32.1	100	321	
Vert.	5551.022	PK	49.8	31.7	6.3	38.8	49.0	73.9	24.9	107	191	
Vert.	7206.000	PK	44.5	36.6	7.1	40.2	48.0	73.9	25.9	100	0	
Vert.	9608.000	PK	43.9	38.5	8.2	40.1	50.5	73.9	23.4	100	0	
Vert.	12010.000	PK	44.7	39.5	9.3	39.6	53.9	73.9	20.0	100	0	
Vert.	1197.637	AV	41.2	24.1	12.4	40.9	36.8	53.9	17.1	100	359	
Vert.	2390.000	AV	32.5	26.4	13.6	41.1	31.4	53.9	22.5	135	357	
Vert.	2400.000	AV	33.5	26.4	13.6	41.1	32.4	53.9	21.5	135	357	
Vert.	4440.808	AV	49.2	29.4	5.9	40.2	44.3	53.9	9.6	105	184	
Vert.	4804.000	AV	34.5	30.6	6.0	39.8	31.3	53.9	22.6	100	321	
Vert.	5551.022	AV	45.4	31.7	6.3	38.8	44.6	53.9	9.3	107	191	
Vert.	7206.000	AV	33.6	36.6	7.1	40.2	37.1	53.9	16.8	100	0	
Vert.	9608.000	AV	32.5	38.5	8.2	40.1	39.1	53.9	14.8	100	0	
Vert.	12010.000	AV	33.4	39.5	9.3	39.6	42.6	53.9	11.3	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place	No.2 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	October 27, 2014	October 28, 2014
Temperature / Humidity	25 deg.C, 50 %RH	24 deg.C, 39 %RH
Engineer	Shinichi Takano	Shinichi Takano
Mode	Tx, 2441 MHz	
	Tx, Bluetooth, BDR, PRBS9	

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	219.085	QP	37.3	16.6	9.0	31.8	31.1	46.0	14.9	150	84	
Hori.	444.076	QP	40.8	16.7	7.4	31.7	33.2	46.0	12.8	100	2	
Hori.	481.087	QP	42.4	17.1	7.5	31.7	35.3	46.0	10.7	100	228	
Hori.	518.089	QP	40.8	17.6	7.7	31.7	34.4	46.0	11.6	100	50	
Hori.	1197.124	PK	63.0	24.1	12.4	40.9	58.6	73.9	15.3	100	210	
Hori.	4440.818	PK	51.6	29.4	5.9	40.2	46.7	73.9	27.2	103	191	
Hori.	4882.000	PK	45.4	30.9	6.0	39.7	42.6	73.9	31.3	123	258	
Hori.	5551.007	PK	50.5	31.7	6.3	38.8	49.7	73.9	24.2	106	213	
Hori.	7323.000	PK	46.1	36.8	7.1	40.3	49.7	73.9	24.2	100	0	
Hori.	9764.000	PK	43.8	38.6	8.1	40.0	50.5	73.9	23.4	100	0	
Hori.	12205.000	PK	44.5	39.4	9.4	39.8	53.5	73.9	20.4	100	0	
Hori.	1197.124	AV	44.2	24.1	12.4	40.9	39.8	53.9	14.1	100	210	
Hori.	4440.818	AV	47.0	29.4	5.9	40.2	42.1	53.9	11.8	103	191	
Hori.	4882.000	AV	35.3	30.9	6.0	39.7	32.5	53.9	21.4	123	258	
Hori.	5551.007	AV	46.3	31.7	6.3	38.8	45.5	53.9	**8.4**	106	213	
Hori.	7323.000	AV	34.2	36.8	7.1	40.3	37.8	53.9	16.1	100	0	
Hori.	9764.000	AV	33.0	38.6	8.1	40.0	39.7	53.9	14.2	100	0	
Hori.	12205.000	AV	32.9	39.4	9.4	39.8	41.9	53.9	12.0	100	0	
Vert.	170.401	QP	33.5	15.7	8.7	31.8	26.1	43.5	17.4	100	223	
Vert.	407.075	QP	43.6	16.3	7.1	31.7	35.3	46.0	10.7	152	310	
Vert.	592.102	QP	41.1	18.9	8.1	31.6	36.5	46.0	9.5	100	243	
Vert.	1197.937	PK	58.2	24.1	12.4	40.9	53.8	73.9	20.1	100	359	
Vert.	4440.822	PK	54.7	29.4	5.9	40.2	49.8	73.9	24.1	111	183	
Vert.	4882.000	PK	45.6	30.9	6.0	39.7	42.8	73.9	31.1	176	17	
Vert.	5551.021	PK	50.2	31.7	6.3	38.8	49.4	73.9	24.5	105	191	
Vert.	7323.000	PK	45.2	36.8	7.1	40.3	48.8	73.9	25.1	100	0	
Vert.	9764.000	PK	43.6	38.6	8.1	40.0	50.3	73.9	23.6	100	0	
Vert.	12205.000	PK	44.9	39.4	9.4	39.8	53.9	73.9	20.0	100	0	
Vert.	1197.937	AV	40.8	24.1	12.4	40.9	36.4	53.9	17.5	100	359	
Vert.	4440.822	AV	49.4	29.4	5.9	40.2	44.5	53.9	9.4	111	183	
Vert.	4882.000	AV	36.4	30.9	6.0	39.7	33.6	53.9	20.3	176	17	
Vert.	5551.021	AV	45.2	31.7	6.3	38.8	44.4	53.9	9.5	105	191	
Vert.	7323.000	AV	34.2	36.8	7.1	40.3	37.8	53.9	16.1	100	0	
Vert.	9764.000	AV	33.0	38.6	8.1	40.0	39.7	53.9	14.2	100	0	
Vert.	12205.000	AV	33.0	39.4	9.4	39.8	42.0	53.9	11.9	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place	No.2 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	October 27, 2014	October 28, 2014
Temperature / Humidity	25 deg.C, 50 %RH	24 deg.C, 39 %RH
Engineer	Shinichi Takano	Shinichi Takano
Mode	Tx, 2480 MHz	
	Tx, Bluetooth, BDR, PRBS9	

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	219.090	QP	37.5	16.6	9.0	31.8	31.3	46.0	14.7	150	94	
Hori.	444.074	QP	40.3	16.7	7.4	31.7	32.7	46.0	13.3	100	357	
Hori.	481.086	QP	43.1	17.1	7.5	31.7	36.0	46.0	10.0	100	50	
Hori.	518.092	QP	40.7	17.6	7.7	31.7	34.3	46.0	11.7	100	45	
Hori.	1198.693	PK	61.8	24.1	12.4	40.9	57.4	73.9	16.5	100	212	
Hori.	2483.500	PK	45.5	26.6	13.6	41.1	44.6	73.9	29.3	221	34	
Hori.	4440.809	PK	50.3	29.4	5.9	40.2	45.4	73.9	28.5	103	193	
Hori.	4960.000	PK	45.1	31.2	6.0	39.6	42.7	73.9	31.2	100	257	
Hori.	5551.029	PK	50.7	31.7	6.3	38.8	49.9	73.9	24.0	110	211	
Hori.	7440.000	PK	45.3	37.0	7.2	40.4	49.1	73.9	24.8	100	0	
Hori.	9920.000	PK	44.5	38.6	8.1	39.9	51.3	73.9	22.6	100	0	
Hori.	12400.000	PK	45.4	39.3	9.4	40.0	54.1	73.9	19.8	100	0	
Hori.	1198.693	AV	43.2	24.1	12.4	40.9	38.8	53.9	15.1	100	212	
Hori.	2483.500	AV	34.6	26.6	13.6	41.1	33.7	53.9	20.2	221	34	
Hori.	4440.809	AV	47.3	29.4	5.9	40.2	42.4	53.9	11.5	103	193	
Hori.	4960.000	AV	34.0	31.2	6.0	39.6	31.6	53.9	22.3	100	257	
Hori.	5551.029	AV	46.0	31.7	6.3	38.8	45.2	53.9	**8.7**	110	211	
Hori.	7440.000	AV	34.1	37.0	7.2	40.4	37.9	53.9	16.0	100	0	
Hori.	9920.000	AV	33.1	38.6	8.1	39.9	39.9	53.9	14.0	100	0	
Hori.	12400.000	AV	33.6	39.3	9.4	40.0	42.3	53.9	11.6	100	0	
Vert.	170.405	QP	33.3	15.7	8.7	31.8	25.9	43.5	17.6	100	359	
Vert.	407.073	QP	43.6	16.3	7.1	31.7	35.3	46.0	10.7	162	316	
Vert.	481.086	QP	39.6	17.1	7.5	31.7	32.5	46.0	13.5	100	311	
Vert.	592.108	QP	41.2	18.9	8.1	31.6	36.6	46.0	9.4	100	241	
Vert.	1199.127	PK	58.2	24.1	12.4	40.9	53.8	73.9	20.1	100	359	
Vert.	2483.500	PK	45.2	26.6	13.6	41.1	44.3	73.9	29.6	132	359	
Vert.	4440.812	PK	54.3	29.4	5.9	40.2	49.4	73.9	24.5	104	187	
Vert.	4960.000	PK	45.7	31.2	6.0	39.6	43.3	73.9	30.6	196	13	
Vert.	5551.038	PK	50.4	31.7	6.3	38.8	49.6	73.9	24.3	107	189	
Vert.	7440.000	PK	45.2	37.0	7.2	40.4	49.0	73.9	24.9	100	0	
Vert.	9920.000	PK	45.0	38.6	8.1	39.9	51.8	73.9	22.1	100	0	
Vert.	12400.000	PK	45.1	39.3	9.4	40.0	53.8	73.9	20.1	100	0	
Vert.	1199.127	AV	40.5	24.1	12.4	40.9	36.1	53.9	17.8	100	359	
Vert.	2483.500	AV	34.6	26.6	13.6	41.1	33.7	53.9	20.2	132	359	
Vert.	4440.812	AV	49.0	29.4	5.9	40.2	44.1	53.9	9.8	104	187	
Vert.	4960.000	AV	36.1	31.2	6.0	39.6	33.7	53.9	20.2	196	13	
Vert.	5551.038	AV	45.2	31.7	6.3	38.8	44.4	53.9	9.5	107	189	
Vert.	7440.000	AV	34.1	37.0	7.2	40.4	37.9	53.9	16.0	100	0	
Vert.	9920.000	AV	33.0	38.6	8.1	39.9	39.8	53.9	14.1	100	0	
Vert.	12400.000	AV	33.5	39.3	9.4	40.0	42.2	53.9	11.7	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place	No.2 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	October 27, 2014	October 28, 2014
Temperature / Humidity	25 deg.C, 50 %RH	24 deg.C, 39 %RH
Engineer	Shinichi Takano	Shinichi Takano
Mode	Tx, 2402 MHz	
	Tx, Bluetooth, EDR, PRBS9	

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	219.043	QP	37.7	16.6	9.0	31.8	31.5	46.0	14.5	153	86	
Hori.	444.080	QP	40.0	16.7	7.4	31.7	32.4	46.0	13.6	100	2	
Hori.	481.091	QP	43.3	17.1	7.5	31.7	36.2	46.0	9.8	100	42	
Hori.	518.096	QP	40.7	17.6	7.7	31.7	34.3	46.0	11.7	100	42	
Hori.	1198.169	PK	60.9	24.1	12.4	40.9	56.5	73.9	17.4	100	213	
Hori.	2390.000	PK	46.3	26.4	13.6	41.1	45.2	73.9	28.7	189	35	
Hori.	2400.000	PK	52.7	26.4	13.6	41.1	51.6	73.9	22.3	189	35	
Hori.	4440.826	PK	51.7	29.4	5.9	40.2	46.8	73.9	27.1	104	191	
Hori.	4804.000	PK	45.3	30.6	6.0	39.8	42.1	73.9	31.8	135	257	
Hori.	5551.016	PK	50.2	31.7	6.3	38.8	49.4	73.9	24.5	110	214	
Hori.	7206.000	PK	44.1	36.6	7.1	40.2	47.6	73.9	26.3	100	0	
Hori.	9608.000	PK	43.3	38.5	8.2	40.1	49.9	73.9	24.0	100	0	
Hori.	12010.000	PK	45.0	39.5	9.3	39.6	54.2	73.9	19.7	100	0	
Hori.	1198.169	AV	43.1	24.1	12.4	40.9	38.7	53.9	15.2	100	213	
Hori.	2390.000	AV	33.7	26.4	13.6	41.1	32.6	53.9	21.3	189	35	
Hori.	2400.000	AV	38.4	26.4	13.6	41.1	37.3	53.9	16.6	189	35	
Hori.	4440.826	AV	47.3	29.4	5.9	40.2	42.4	53.9	11.5	104	191	
Hori.	4804.000	AV	33.9	30.6	6.0	39.8	30.7	53.9	23.2	135	257	
Hori.	5551.016	AV	46.1	31.7	6.3	38.8	45.3	53.9	**8.6**	110	214	
Hori.	7206.000	AV	33.3	36.6	7.1	40.2	36.8	53.9	17.1	100	0	
Hori.	9608.000	AV	32.2	38.5	8.2	40.1	38.8	53.9	15.1	100	0	
Hori.	12010.000	AV	33.0	39.5	9.3	39.6	42.2	53.9	11.7	100	0	
Vert.	170.383	QP	33.4	15.7	8.7	31.8	26.0	43.5	17.5	100	354	
Vert.	481.088	QP	39.3	17.1	7.5	31.7	32.2	46.0	13.8	100	309	
Vert.	592.108	QP	41.0	18.9	8.1	31.6	36.4	46.0	9.6	100	240	
Vert.	1197.983	PK	57.0	24.1	12.4	40.9	52.6	73.9	21.3	100	359	
Vert.	2390.000	PK	47.4	26.4	13.6	41.1	46.3	73.9	27.6	133	355	
Vert.	2400.000	PK	54.4	26.4	13.6	41.1	53.3	73.9	20.6	133	355	
Vert.	4440.825	PK	54.2	29.4	5.9	40.2	49.3	73.9	24.6	105	183	
Vert.	4804.000	PK	44.3	30.6	6.0	39.8	41.1	73.9	32.8	100	321	
Vert.	5551.011	PK	50.2	31.7	6.3	38.8	49.4	73.9	24.5	109	190	
Vert.	7206.000	PK	45.3	36.6	7.1	40.2	48.8	73.9	25.1	100	0	
Vert.	9608.000	PK	44.0	38.5	8.2	40.1	50.6	73.9	23.3	100	0	
Vert.	12010.000	PK	44.8	39.5	9.3	39.6	54.0	73.9	19.9	100	0	
Vert.	1197.983	AV	40.4	24.1	12.4	40.9	36.0	53.9	17.9	100	359	
Vert.	2390.000	AV	37.8	26.4	13.6	41.1	36.7	53.9	17.2	133	355	
Vert.	2400.000	AV	40.0	26.4	13.6	41.1	38.9	53.9	15.0	133	355	
Vert.	4440.825	AV	49.0	29.4	5.9	40.2	44.1	53.9	9.8	105	183	
Vert.	4804.000	AV	33.5	30.6	6.0	39.8	30.3	53.9	23.6	100	321	
Vert.	5551.011	AV	45.0	31.7	6.3	38.8	44.2	53.9	9.7	109	190	
Vert.	7206.000	AV	33.4	36.6	7.1	40.2	36.9	53.9	17.0	100	0	
Vert.	9608.000	AV	32.6	38.5	8.2	40.1	39.2	53.9	14.7	100	0	
Vert.	12010.000	AV	33.3	39.5	9.3	39.6	42.5	53.9	11.4	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place	No.2 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	October 27, 2014	October 28, 2014
Temperature / Humidity	25 deg.C, 50 %RH	24 deg.C, 39 %RH
Engineer	Shinichi Takano	Shinichi Takano
Mode	Tx, 2441 MHz	
	Tx, Bluetooth, EDR, PRBS9	

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	219.092	QP	37.6	16.6	9.0	31.8	31.4	46.0	14.6	150	76	
Hori.	444.074	QP	39.2	16.7	7.4	31.7	31.6	46.0	14.4	100	2	
Hori.	481.091	QP	43.3	17.1	7.5	31.7	36.2	46.0	9.8	100	48	
Hori.	518.091	QP	40.9	17.6	7.7	31.7	34.5	46.0	11.5	100	45	
Hori.	1197.510	PK	61.8	24.1	12.4	40.9	57.4	73.9	16.5	100	211	
Hori.	4440.806	PK	54.2	29.4	5.9	40.2	49.3	73.9	24.6	103	202	
Hori.	4882.000	PK	46.2	30.9	6.0	39.7	43.4	73.9	30.5	100	179	
Hori.	5551.072	PK	52.2	31.7	6.3	38.8	51.4	73.9	22.5	106	213	
Hori.	7323.000	PK	45.2	36.8	7.1	40.3	48.8	73.9	25.1	100	0	
Hori.	9764.000	PK	43.7	38.6	8.1	40.0	50.4	73.9	23.5	100	0	
Hori.	12205.000	PK	44.4	39.4	9.4	39.8	53.4	73.9	20.5	100	0	
Hori.	1197.510	AV	42.9	24.1	12.4	40.9	38.5	53.9	15.4	100	211	
Hori.	4440.806	AV	48.9	29.4	5.9	40.2	44.0	53.9	9.9	103	202	
Hori.	4882.000	AV	33.8	30.9	6.0	39.7	31.0	53.9	22.9	100	179	
Hori.	5551.072	AV	47.4	31.7	6.3	38.8	46.6	53.9	**7.3**	106	213	
Hori.	7323.000	AV	34.0	36.8	7.1	40.3	37.6	53.9	16.3	100	0	
Hori.	9764.000	AV	32.8	38.6	8.1	40.0	39.5	53.9	14.4	100	0	
Hori.	12205.000	AV	33.5	39.4	9.4	39.8	42.5	53.9	11.4	100	0	
Vert.	170.406	QP	32.9	15.7	8.7	31.8	25.5	43.5	18.0	100	352	
Vert.	480.904	QP	39.5	17.1	7.5	31.7	32.4	46.0	13.6	100	297	
Vert.	592.103	QP	41.2	18.9	8.1	31.6	36.6	46.0	9.4	100	236	
Vert.	1197.721	PK	57.0	24.1	12.4	40.9	52.6	73.9	21.3	100	350	
Vert.	4440.805	PK	52.3	29.4	5.9	40.2	47.4	73.9	26.5	124	150	
Vert.	4882.000	PK	45.6	30.9	6.0	39.7	42.8	73.9	31.1	196	18	
Vert.	5551.076	PK	49.6	31.7	6.3	38.8	48.8	73.9	25.1	108	191	
Vert.	7323.000	PK	45.1	36.8	7.1	40.3	48.7	73.9	25.2	100	0	
Vert.	9764.000	PK	44.3	38.6	8.1	40.0	51.0	73.9	22.9	100	0	
Vert.	12205.000	PK	45.4	39.4	9.4	39.8	54.4	73.9	19.5	100	0	
Vert.	1197.721	AV	41.0	24.1	12.4	40.9	36.6	53.9	17.3	100	350	
Vert.	4440.805	AV	48.6	29.4	5.9	40.2	43.7	53.9	10.2	124	150	
Vert.	4882.000	AV	34.5	30.9	6.0	39.7	31.7	53.9	22.2	196	18	
Vert.	5551.076	AV	44.9	31.7	6.3	38.8	44.1	53.9	9.8	108	191	
Vert.	7323.000	AV	34.0	36.8	7.1	40.3	37.6	53.9	16.3	100	0	
Vert.	9764.000	AV	32.6	38.6	8.1	40.0	39.3	53.9	14.6	100	0	
Vert.	12205.000	AV	33.5	39.4	9.4	39.8	42.5	53.9	11.4	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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Radiated Emission

Test place	No.2 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	October 27, 2014	October 28, 2014
Temperature / Humidity	25 deg.C, 50 %RH	24 deg.C, 39 %RH
Engineer	Shinichi Takano	Shinichi Takano
Mode	Tx, 2480 MHz	
	Tx, Bluetooth, EDR, PRBS9	

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	219.090	QP	38.4	16.6	9.0	31.8	32.2	46.0	13.8	150	67	
Hori.	444.076	QP	40.6	16.7	7.4	31.7	33.0	46.0	13.0	100	277	
Hori.	481.091	QP	43.5	17.1	7.5	31.7	36.4	46.0	9.6	100	45	
Hori.	518.088	QP	40.8	17.6	7.7	31.7	34.4	46.0	11.6	100	47	
Hori.	1198.042	PK	62.3	24.1	12.4	40.9	57.9	73.9	16.0	100	214	
Hori.	2483.500	PK	46.0	26.6	13.6	41.1	45.1	73.9	28.8	100	33	
Hori.	4440.813	PK	53.2	29.4	5.9	40.2	48.3	73.9	25.6	105	204	
Hori.	4960.000	PK	44.4	31.2	6.0	39.6	42.0	73.9	31.9	100	201	
Hori.	5551.079	PK	51.4	31.7	6.3	38.8	50.6	73.9	23.3	108	215	
Hori.	7440.000	PK	44.9	37.0	7.2	40.4	48.7	73.9	25.2	100	0	
Hori.	9920.000	PK	45.3	38.6	8.1	39.9	52.1	73.9	21.8	100	0	
Hori.	12400.000	PK	44.9	39.3	9.4	40.0	53.6	73.9	20.3	100	0	
Hori.	1198.042	AV	43.5	24.1	12.4	40.9	39.1	53.9	14.8	100	214	
Hori.	2483.500	AV	34.3	26.6	13.6	41.1	33.4	53.9	20.5	100	33	
Hori.	4440.813	AV	48.3	29.4	5.9	40.2	43.4	53.9	10.5	105	204	
Hori.	4960.000	AV	33.3	31.2	6.0	39.6	30.9	53.9	23.0	100	201	
Hori.	5551.079	AV	46.9	31.7	6.3	38.8	46.1	53.9	**7.8**	108	215	
Hori.	7440.000	AV	34.1	37.0	7.2	40.4	37.9	53.9	16.0	100	0	
Hori.	9920.000	AV	33.3	38.6	8.1	39.9	40.1	53.9	13.8	100	0	
Hori.	12400.000	AV	33.7	39.3	9.4	40.0	42.4	53.9	11.5	100	0	
Vert.	170.406	QP	31.5	15.7	8.7	31.8	24.1	43.5	19.4	100	355	
Vert.	481.082	QP	39.7	17.1	7.5	31.7	32.6	46.0	13.4	100	310	
Vert.	592.112	QP	41.1	18.9	8.1	31.6	36.5	46.0	9.5	100	236	
Vert.	1197.639	PK	56.7	24.1	12.4	40.9	52.3	73.9	21.6	100	359	
Vert.	2483.500	PK	45.9	26.6	13.6	41.1	45.0	73.9	28.9	133	359	
Vert.	4440.814	PK	51.8	29.4	5.9	40.2	46.9	73.9	27.0	123	153	
Vert.	4960.000	PK	45.7	31.2	6.0	39.6	43.3	73.9	30.6	196	15	
Vert.	5551.083	PK	49.0	31.7	6.3	38.8	48.2	73.9	25.7	104	194	
Vert.	7440.000	PK	45.6	37.0	7.2	40.4	49.4	73.9	24.5	100	0	
Vert.	9920.000	PK	45.1	38.6	8.1	39.9	51.9	73.9	22.0	100	0	
Vert.	12400.000	PK	45.4	39.3	9.4	40.0	54.1	73.9	19.8	100	0	
Vert.	1197.639	AV	40.4	24.1	12.4	40.9	36.0	53.9	17.9	100	359	
Vert.	2483.500	AV	34.2	26.6	13.6	41.1	33.3	53.9	20.6	133	359	
Vert.	4440.814	AV	44.3	29.4	5.9	40.2	39.4	53.9	14.5	123	153	
Vert.	4960.000	AV	34.6	31.2	6.0	39.6	32.2	53.9	21.7	196	15	
Vert.	5551.083	AV	44.3	31.7	6.3	38.8	43.5	53.9	10.4	104	194	
Vert.	7440.000	AV	34.2	37.0	7.2	40.4	38.0	53.9	15.9	100	0	
Vert.	9920.000	AV	33.3	38.6	8.1	39.9	40.1	53.9	13.8	100	0	
Vert.	12400.000	AV	33.7	39.3	9.4	40.0	42.4	53.9	11.5	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18GHz)-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN
Telephone : +81 463 50 6400
Facsimile : +81 463 50 6401

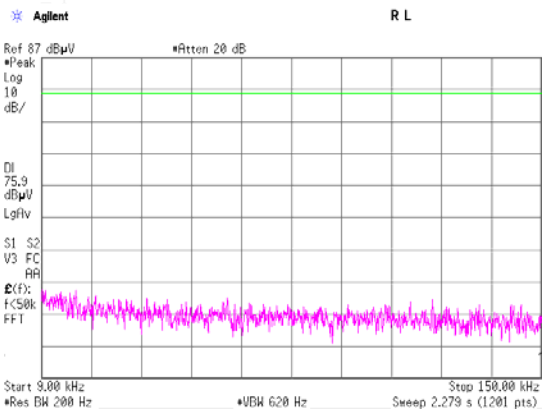
Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	October 10, 2014	
Temperature / Humidity	25 deg.C , 57 %RH	
Engineer	Makoto Hosaka	

Spurious emission (Conducted)

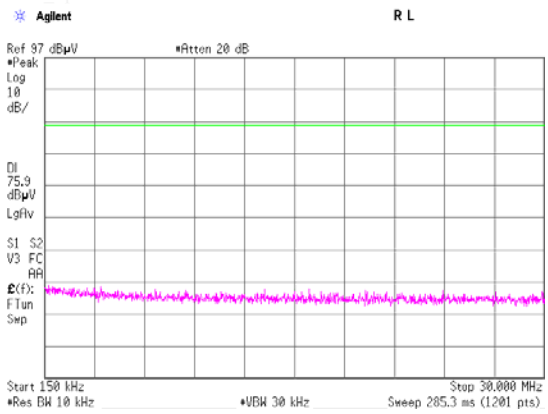
Tx, Bluetooth, BDR, PRBS9

Tx, 2402MHz (below 30MHz)

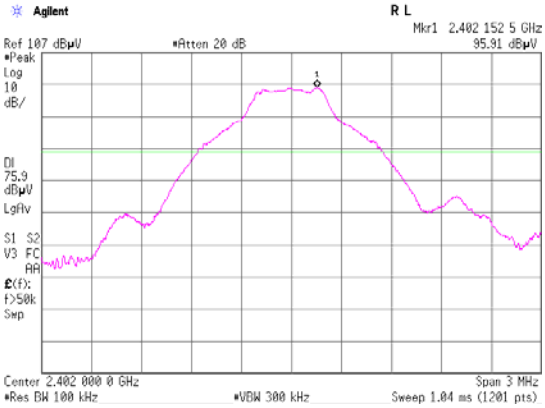
9kHz - 150kHz



150kHz - 30MHz



Carrier, 20dBc Limit



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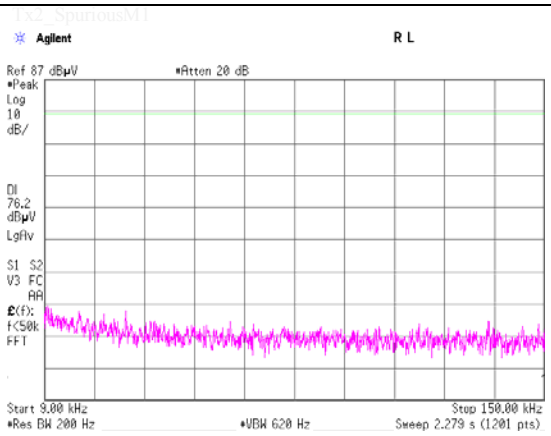
Engineer	Makoto Hosaka	

Spurious emission (Conducted)

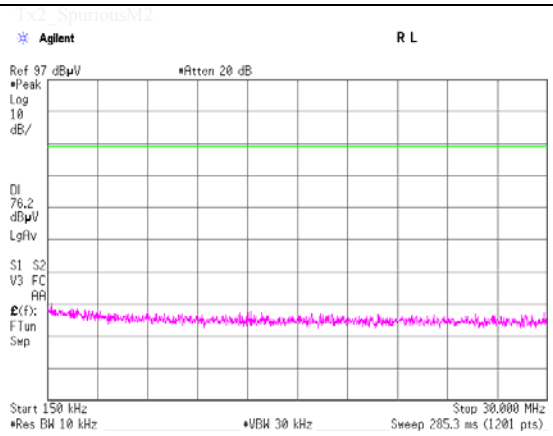
Tx, Bluetooth, BDR, PRBS9

Tx, 2441MHz (below 30MHz)

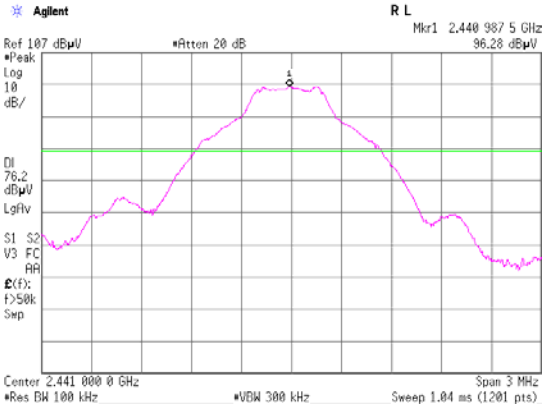
9kHz - 150kHz



150kHz - 30MHz



Carrier, 20dBc Limit



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Date	October 10, 2014	
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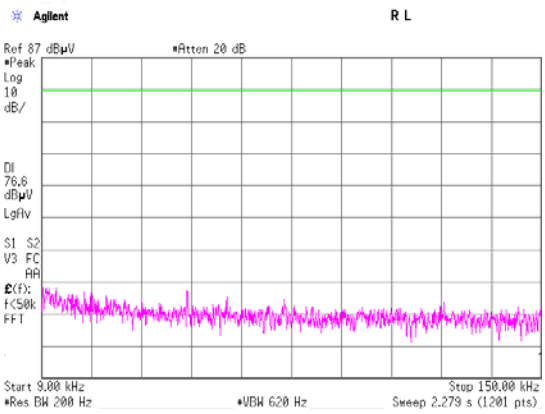
Engineer	Makoto Hosaka	

Spurious emission (Conducted)

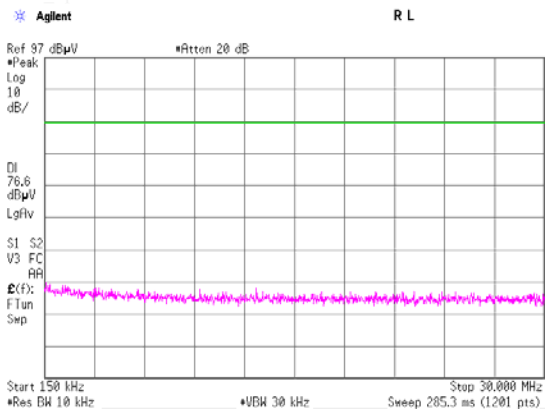
Tx, Bluetooth, BDR, PRBS9

Tx, 2480MHz (below 30MHz)

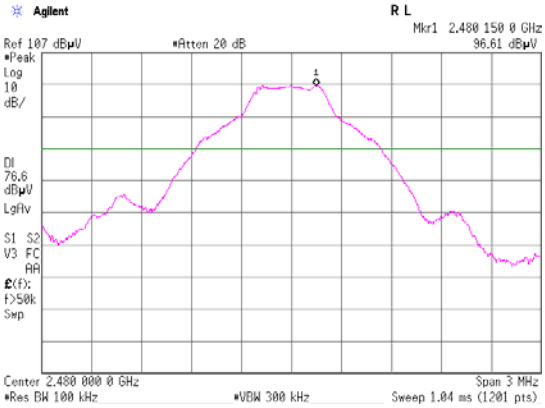
9kHz - 150kHz



150kHz - 30MHz



Carrier, 20dBc Limit



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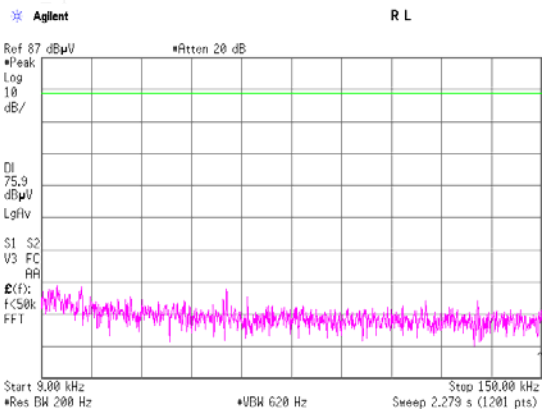
Spurious emission (Conducted)

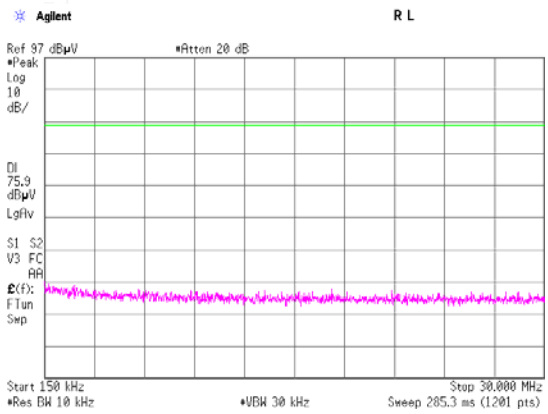
Tx, Bluetooth, EDR, PRBS9

Tx, 2402MHz (below 30MHz)

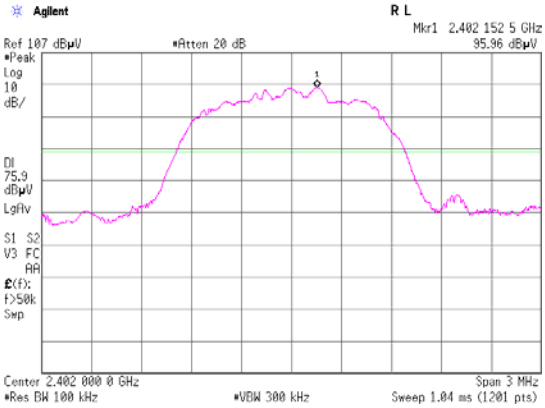
9kHz - 150kHz



150kHz - 30MHz



Carrier, 20dBc Limit



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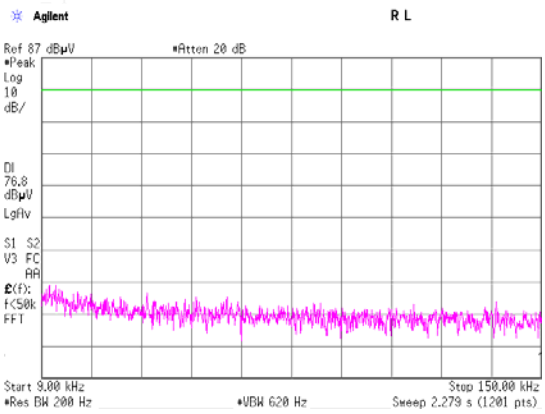
Engineer	Makoto Hosaka	

Spurious emission (Conducted)

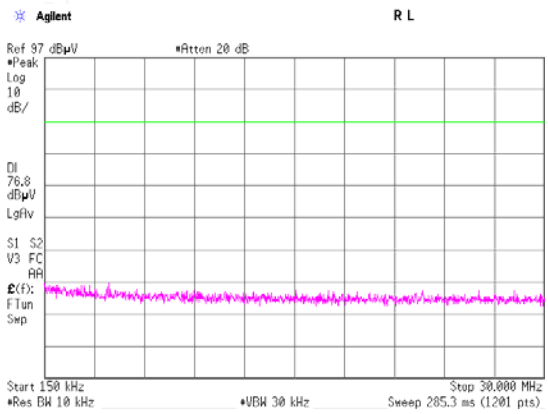
Tx, Bluetooth, EDR, PRBS9

Tx, 2441MHz (below 30MHz)

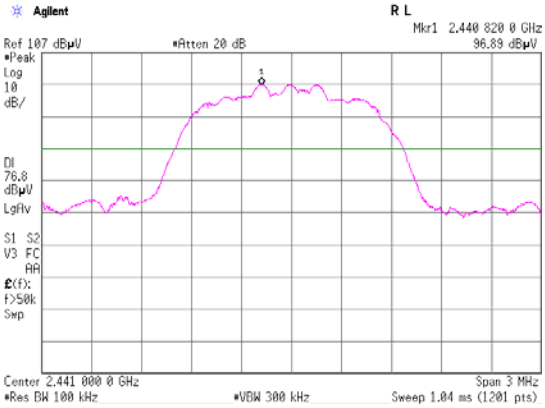
9kHz - 150kHz



150kHz - 30MHz



Carrier, 20dBc Limit



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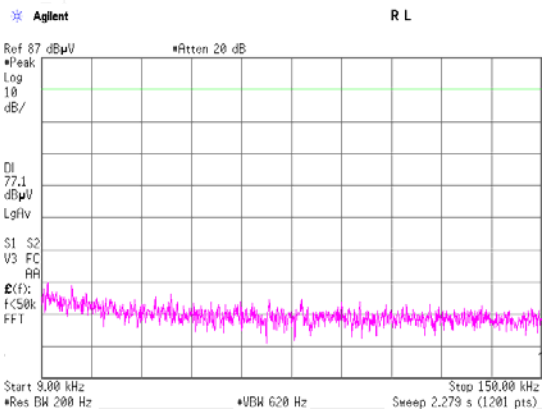
Engineer	Makoto Hosaka	

Spurious emission (Conducted)

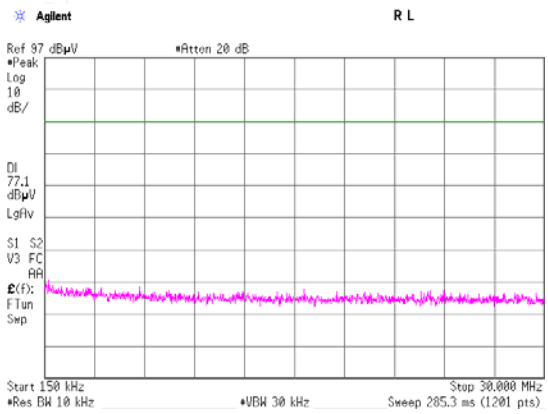
Tx, Bluetooth, EDR, PRBS9

Tx, 2480MHz (below 30MHz)

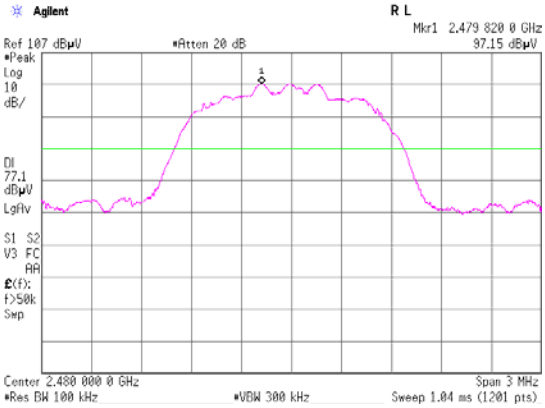
9kHz - 150kHz



150kHz - 30MHz



Carrier, 20dBc Limit



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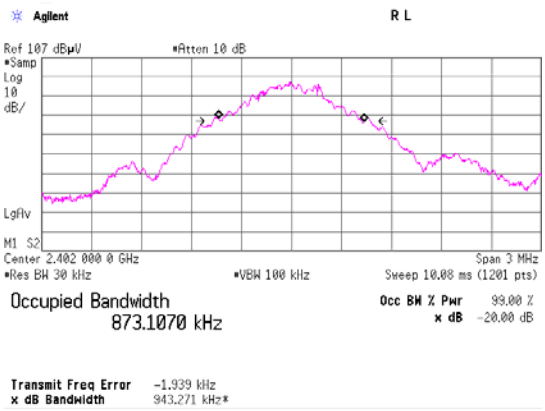
Date	October 10, 2014	
Temperature / Humidity	25 deg.C , 57 %RH	
Engineer	Makoto Hosaka	

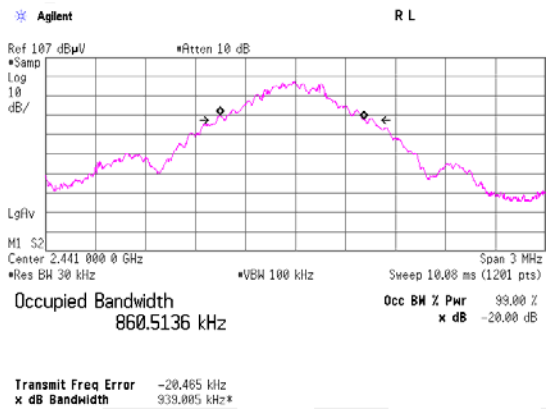
99% Occupied Bandwidth

Tx, Bluetooth, BDR, PRBS9

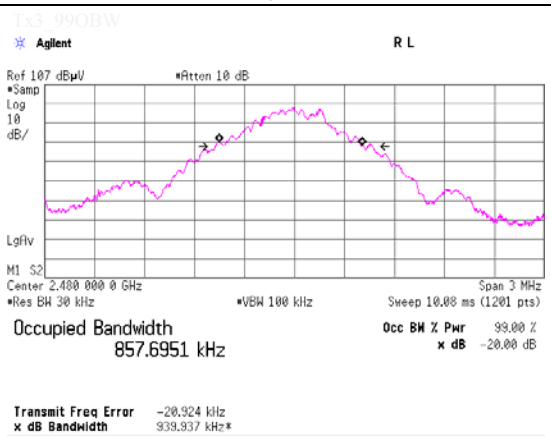
Tx, 2402MHz



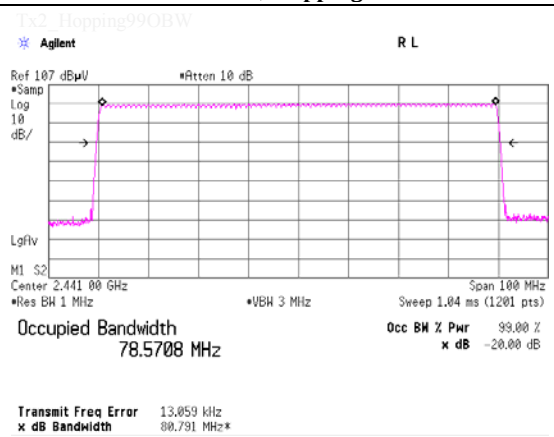
Tx, 2441MHz



Tx, 2480MHz



Tx, Hopping On



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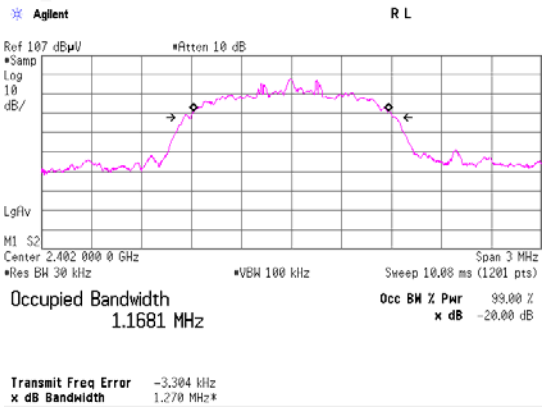
Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	October 10, 2014	
Temperature / Humidity	25 deg.C , 57 %RH	
Engineer	Makoto Hosaka	

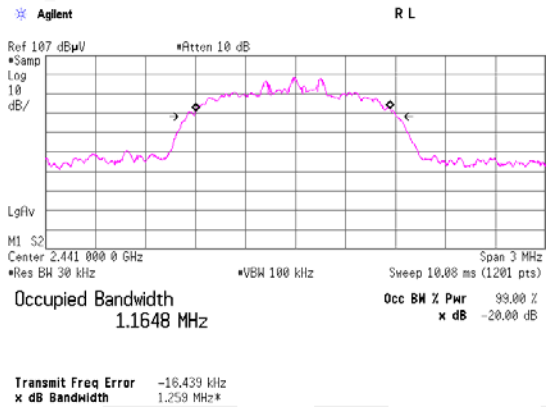
99% Occupied Bandwidth

Tx, Bluetooth, EDR, PRBS9

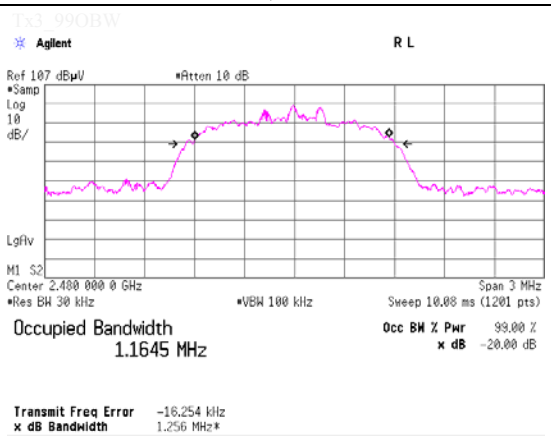
Tx, 2402MHz



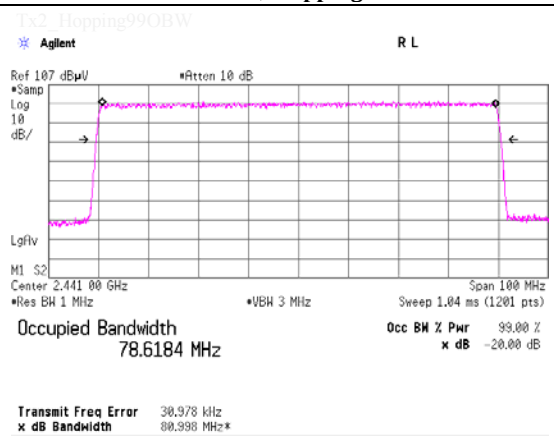
Tx, 2441MHz



Tx, 2480MHz



Tx, Hopping On



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APPENDIX 2
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	AT	2014/03/04 * 12
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2014/04/08 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2014/04/08 * 12
SAT10-10	Attenuator	Weinschel Corp.	54A-10	37584	AT	2014/04/22 * 12
SCC-G12	Coaxial Cable	Suhner	SUCOFLEX 102	30790/2	AT	2014/03/13 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2014/03/07 * 12
SAF-02	Pre Amplifier	SONOMA	310N	290212	RE	2014/02/17 * 12
SAT6-02	Attenuator	JFW	50HF-006N	-	RE	2014/02/17 * 12
KAT3-11	Attenuator	JFW IND. INC.	50HF-003N	-	RE	2014/08/27 * 12
SBA-02	Biconical Antenna	Schwarzbeck	BBA9106	91032665	RE	2013/11/24 * 12
SCC-B1/B3/B5/B7/B8/B13/SRSE-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	RE	2014/04/25 * 12
SCC-B2/B4/B6/B7/B8/B13/SRSE-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	RE	2014/04/25 * 12
SLA-02	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0893	RE	2013/11/24 * 12
SOS-03	Humidity Indicator	A&D	AD-5681	4063325	RE	2014/02/21 * 12
STR-07	Test Receiver	Rohde & Schwarz	ESU26	100484	RE	2014/09/03 * 12
SJM-14	Measure	ASKUL	-	-	RE	-
SAEC-02(NSA)	Semi-Anechoic Chamber	TDK	SAEC-02(NSA)	2	RE	2014/07/08 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFI,MF)	-	RE	-
SAF-05	Pre Amplifier	TOYO Corporation	TPA0118-36	1440490	RE	2013/11/22 * 12
SCC-G02	Coaxial Cable	Suhner	SUCOFLEX 104A	46498/4A	RE	2014/04/22 * 12
SCC-G22	Coaxial Cable	Suhner	SUCOFLEX 104	296199/4	RE	2014/05/15 * 12
SHA-02	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-726	RE	2014/08/12 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2014/03/15 * 12
SCC-G15	Coaxial Cable	Suhner	SUCOFLEX 102	32703/2	RE	2014/03/13 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2014/03/14 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2014/07/14 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2014/05/23 * 12
SCC-G04	Coaxial Cable	Junkosha	J12J102207-00	JUN-12-14-018	RE	2014/06/24 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2014/05/15 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2014/08/12 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2014/02/21 * 12
SJM-15	Measure	ASKUL	-	-	RE	-
SAT10-06	Attenuator	Agilent	8493C-010	74865	RE	2013/11/22 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2013/11/22 * 12

The expiration date of the calibration is the end of the expired month .
As for some calibrations performed after the tested dates , those test equipment have been controlled by means of an unbroken chains of calibrations .

All equipment is calibrated with valid calibrations . Each measurement data is traceable to the national or international standards.
Test Item :
RE: Out of Band Emission (Radiated)
AT: Antenna terminal conducted test