RADIO TEST REPORT

Test Report No.: 10106117S-A

Applicant	:	**Sony Corporation**
Type of Equipment	:	**Bluetooth Audio System**
Model No.	:	**MEX-N6050BT**
FCC ID	:	**AK8MEXN6050BT**
Test regulation	:	**FCC Part15 Subpart C: 2013**
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: November 26 to December 6, 2013

Tested by:

Makoto Hosaka
Engineer of WiSE Japan,
UL Verification Service

Approved by :

Toyokazu Imamura
Leader of WiSE Japan,
UL Verification Service

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REVISION HISTORY

Original Test Report No.: 10106117S-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	10106117S-A	December 26, 2013	-	-

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SECTION 1: Customer information

Company Name	:	Sony Corporation
Address	:	Sony City Osaki, 2-10-1 Osaki, Shinagawa-ku, Tokyo 141-8610 Japan
Telephone Number	:	+81 50 3750 7634
Facsimile Number	:	+81 50 3750 6574
Contact Person	:	Toshihiro Maeda

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

2.1 Identification of E.U.T.

Type of Equipment	:	Bluetooth Audio System
Model Number	:	MEX-N6050BT
Serial Number	:	Refer to 4.2 of this report.
Rating	:	DC12V (car battery)
Country of Mass-production	:	Thailand
Condition of EUT	:	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Receipt Date of Sample	:	November 22, 2013
Modification of EUT	:	No modification by the test lab.

2.2 Product description

Model: MEX-N6050BT (referred to as the EUT in this report) is a Bluetooth Audio System.

Clock frequency(ies) in the system	:	48.000MHz, 36.480MHz, 26.000MHz, 16.9344MHz, 13.333MHz, 32.768kHz, 30.000MHz

Bluetooth specification:

Equipment type	:	Transceiver
Frequency of operation	:	2402-2480MHz
Bandwidth & channel spacing	:	79MHz & 1MHz
Type of modulation	:	FHSS
Operation temperature range	:	-20 to +60 deg.C.
Antenna type	:	Meander Monopole
Antenna connector type	:	U-FL Type Interchangeability
Antenna gain	:	0.929dBi (Peak)
ITU code	:	F1D, G1D

FCC 15.31 (e)
The equipment provides the wireless transmitter with stable power supply (DC3.3V). Therefore, the equipment 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.

SECTION 3: Test specification, procedures & results

3.1 Test specification

Test specification	:	FCC Part 15 Subpart C: 2013, final revised on September 30, 2013 and effective October 30, 2013
Title	:	FCC 47CFR Part15 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 EUT has been tested for compliance with FCC Part 15 Subpart B. Refer to the test report 10106117S-C.

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	4.4dB Freq.: 47.992MHz Polarization: Vertical Detection: Quasi-Peak Mode: Tx 2402MHz, DH5 Freq.: 47.991MHz Polarization: Vertical Detection: Quasi-Peak Mode: Tx 2441MHz, DH5 Freq.: 47.987MHz Polarization: Vertical Detection: Quasi-Peak Mode: Tx 2480MHz, 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	3.7 dB	3.6 dB
	30MHz-300MHz	4.8 dB	5.0 dB	4.8 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	5.6 dB	5.6 dB
	18GHz-40GHz	5.2 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 report meets the limits unless the uncertainty is taken into consideration.

Antenna port conducted test

Power measurement uncertainty above 1GHz for this test was: (±) 1.5dB
Spurious emission (Conducted) measurement (below 1GHz) uncertainty for this test was: (±) 1.6dB
Spurious emission (Conducted) measurement (1G-3GHz) uncertainty for this test was: (±) 1.4dB
Spurious emission (Conducted) measurement (3G-18GHz) uncertainty for this test was: (±) 2.8dB
Spurious emission (Conducted) measurement (18G-26.5GHz) uncertainty for this test was: (±) 2.5dB
Bandwidth measurement uncertainty for this test was: (±) 5.4%

3.5 Test location

UL Japan, Inc. Shonan EMC Lab.
1-22-3, Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN
Telephone number : +81 463 50 6400
Facsimile number : +81 463 50 6401
JAB Accreditation No. : RTL02610

	FCC Registration No.	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	697847	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☐ No.2 semi-anechoic chamber	697847	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☒ No.3 semi-anechoic chamber	697847	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) / Inquiry, Payload: PRBS9	-
20dB bandwidth	Transmitting Hopping OFF (DH5 / 3-DH5) / Inquiry, Payload: PRBS9	2402MHz, 2441MHz, 2480MHz
Number of hopping frequency	Transmitting Hopping ON (DH5 / 3-DH5) / Inquiry, Payload: PRBS9	-
Dwell time	Transmitting (Hopping ON), Payload: PRBS9 - DH1, - DH3, - DH5 - 3-DH1, - 3-DH3, - 3-DH5	-
	-Inquiry	
Maximum peak output power	Transmitting Hopping OFF , Payload: PRBS9 - DH5, - 2-DH5, - 3-DH5	2402MHz, 2441MHz, 2480MHz
Band edge compliance & Spurious emission (Conducted)	Transmitting (DH5 / 3-DH5), Payload: PRBS9 -Hopping ON -Hopping OFF	Band edge compliance: 2402MHz, 2480MHz Spurious emission: 2402MHz, 2441MHz, 2480MHz
(Radiated)	Transmitting (DH5 / 3-DH5), Payload: PRBS9 -Hopping OFF	
99% occupied bandwidth	Transmitting (DH5 / 3-DH5), Payload: PRBS9 / Inquiry -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).

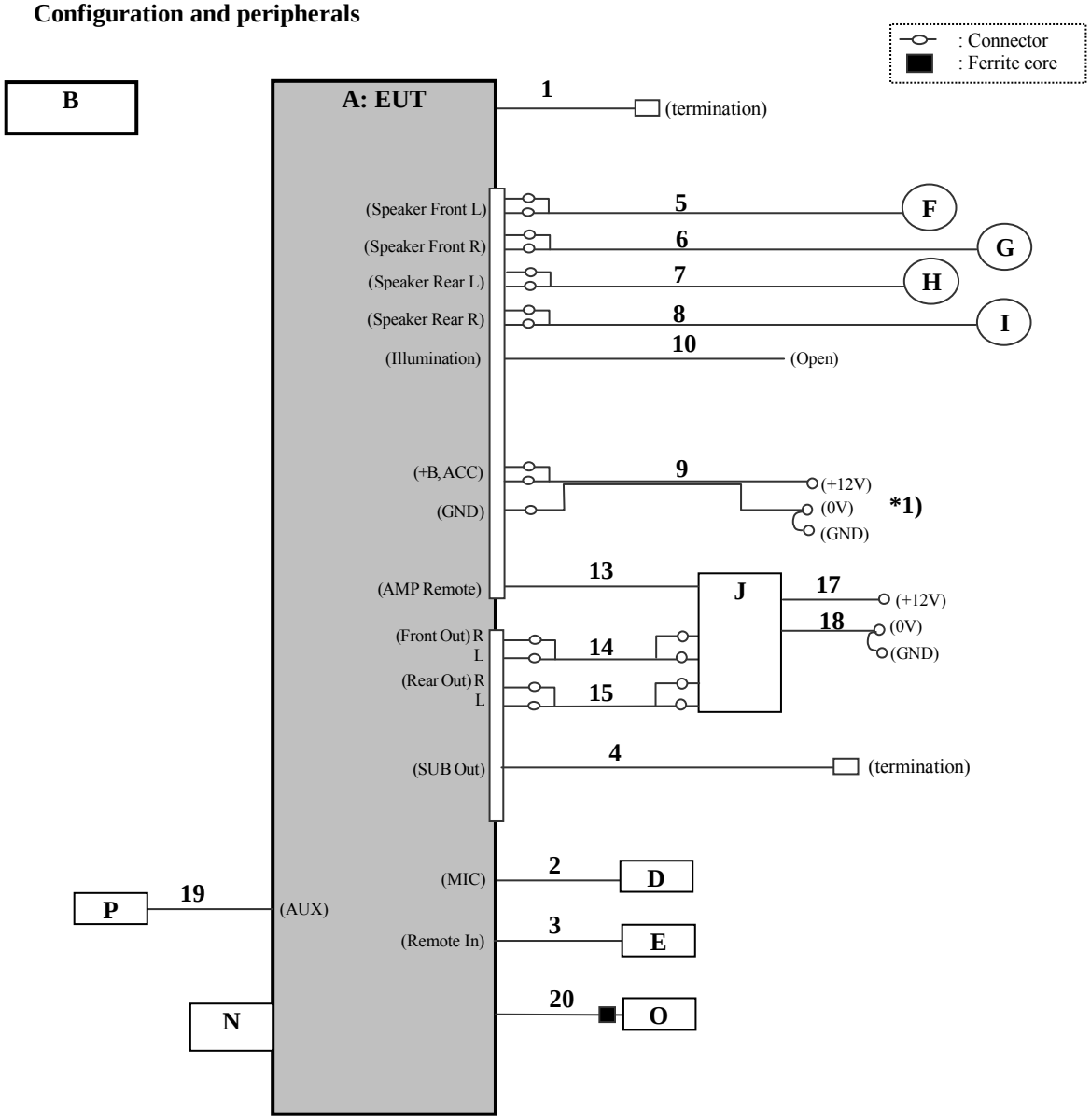
*Remarks: Test was not performed at AFH mode, because the decrease of number of channel (min: 20ch) at AFH mode does not affect the output power and bandwidth of the EUT.
The carrier separation may be less than 20 dB bandwidth, therefore 125mW power limit was applied to it.

Software: Blue Suite ver.2.5.0, BlueTest3 ver.2.5.0.93
BtCli ver.2.5.0.93 (Inquiry mode only)
Power Settings: BDR: Ext PA: 23, Int PA: 39
EDR: Ext PA: 73, Int PA: 48

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.

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

4.2 Configuration and peripherals



* Cabling and setup were taken into consideration and test data was taken under worse case conditions.

*1) DC power supply (Model No.: PAN35-10A) was used for DC 12V input.

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Bluetooth Audio System	MEX-N6050BT	*2)	Sony	EUT
B	Remote Commander	RM-X231	-	Sony	-
D	MIC	-	-	Sony	-
E	Wired Remote Controller	RM-X2S	-	Sony	-
F	Speaker 1	XS-GTF1338	-	Sony	-
G	Speaker 2	XS-GTF1338	-	Sony	-
H	Speaker 3	XS-GTF1338	-	Sony	-
I	Speaker 4	XS-GTF1338	-	Sony	-
J	Stereo Power Amplifier	XM-4S	-	Sony	-
N	USB Memory	USM4GL	-	Sony	-
O	USB Memory	USM4GL	-	Sony	-
P	Media Player	NWZ-A829	1000200	Sony	-

*2) 64: Antenna terminal conducted tests, 66: Radiated emission tests

List of cables used

No.	Name	Length (m)	Shield- Cable	Shield- Connector	Remarks
1	FM antenna	2.0	Shielded	Shielded	-
2	MIC	4.0	Shielded	Shielded	-
3	REMOTE IN	1.9	Shielded	Shielded	-
4	Audio OUT(SUB)	2.0+0.45	Shielded	Shielded	-
5	Speaker (1)	0.15+2.1	Unshielded	Unshielded	-
6	Speaker (2)	0.15+2.1	Unshielded	Unshielded	-
7	Speaker (3)	0.15+2.1	Unshielded	Unshielded	-
8	Speaker (4)	0.15+2.1	Unshielded	Unshielded	-
9	DC Power	0.15+1.0	Unshielded	Unshielded	-
10	Illumination	0.15+1.9	Unshielded	Unshielded	-
13	AMP Remote	0.15+1.6	Unshielded	Unshielded	-
14	RCA (Front Audio Out)	0.1+5.0	Shielded	Shielded	-
15	RCA (Rear Audio Out)	0.1+5.0	Shielded	Shielded	-
17	DC Power (+)	1.0	Unshielded	Unshielded	-
18	DC Power (-)	1.0	Unshielded	Unshielded	-
19	Audio	2.0	Shielded	Shielded	-
20	USB	1.5	Shielded	Shielded	-

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: Spurious emissions (Antenna port conducted)

Test procedure
The Out of Band Emissions was measured with a spectrum analyzer connected to the antenna port.
In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating,
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.

SECTION 11: Radiated emission

11.1 Operating environment

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

11.2 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.

11.3 Test conditions

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

11.4 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.

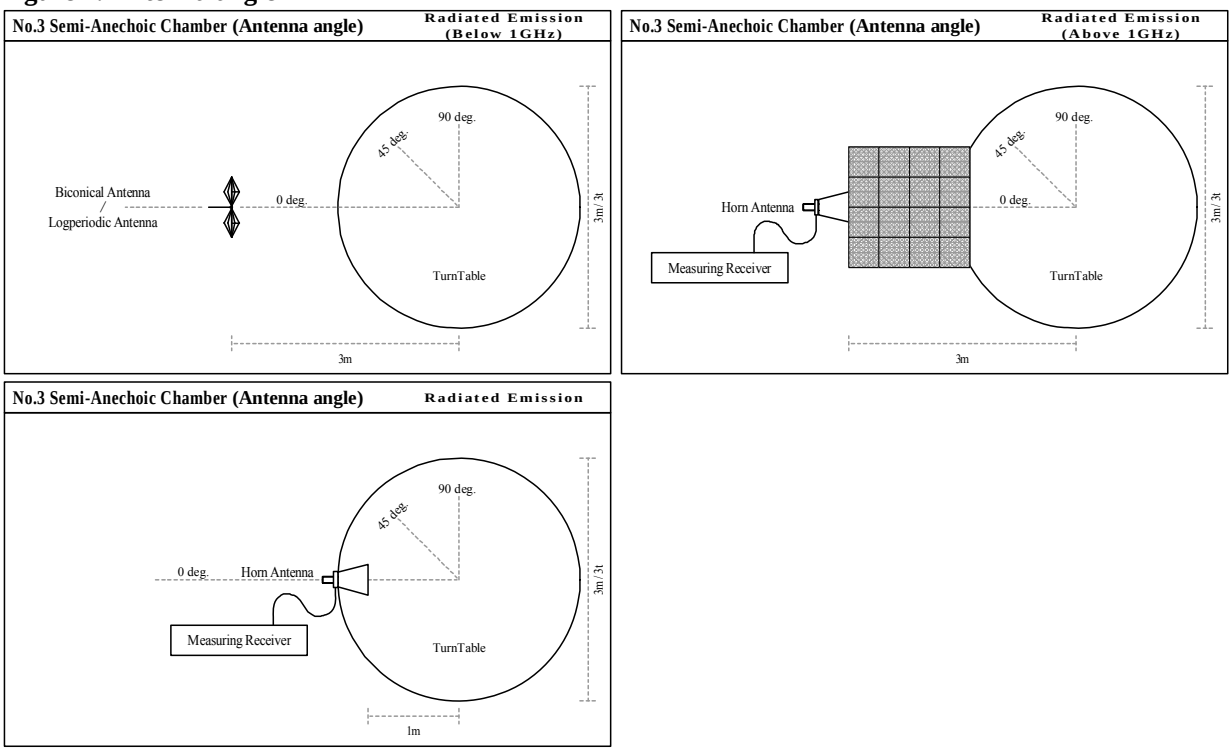
Frequency		30 - 1000MHz	1 - 25GHz	
Detection Type	:	Quasi-Peak	Peak	* Average
IF Bandwidth	:	120kHz	RBW:1MHz VBW:3MHz	RBW:1MHz VBW:10Hz

* 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 carrier level and noise levels were confirmed at mounting angle of 0 to +45 deg (lengthwise direction) and -45 to +45 deg (crosswise direction) based on the product specification to see the position of maximum noise, and the test was made at the position that has the maximum noise.

Antenna polarization \ Test item		Carrier	Spurious emission (Below 1GHz)	Spurious emission (1-15GHz)	Spurious emission (Above 15GHz)
Horizontal	Lengthwise	0 deg.	0 deg.	0 deg.	0 deg.
	Crosswise	0 deg.	0 deg.	0 deg.	0 deg.
Vertical	Lengthwise	0 deg.	0 deg.	0 deg.	0 deg.
	Crosswise	0 deg.	0 deg.	0 deg.	0 deg.

Figure 1. Antenna angle



11.5 Band edge

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

11.6 Results

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

Refer to APPENDIX 1.

Contents of APPENDIXES

APPENDIX 1: Data of Radio tests

20dB bandwidth and Carrier frequency separation
Number of hopping frequency
Dwell time
Maximum peak output power
Spurious emission (Antenna port conducted)
Radiated emission
Occupied bandwidth

APPENDIX 2: Test instruments

Test instruments

APPENDIX 3: Photographs of test setup

Radiated emission

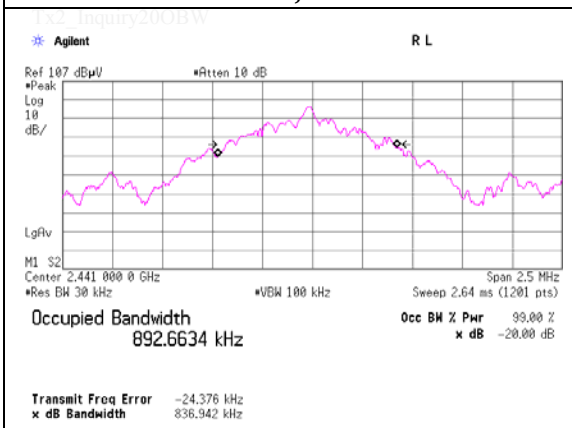
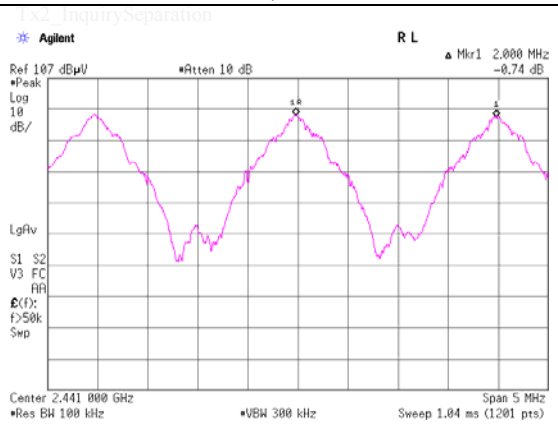
APPENDIX 1: Data of Radio tests

20dB Bandwidth and Carrier Frequency Separation

Test place	UL Japan, Inc. Shonan EMC Lab.	No.1 Measurement Room
Date	November 26, 2013	
Temperature / Humidity	23 deg.C , 51 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, Bluetooth, BDR, PRBS9	

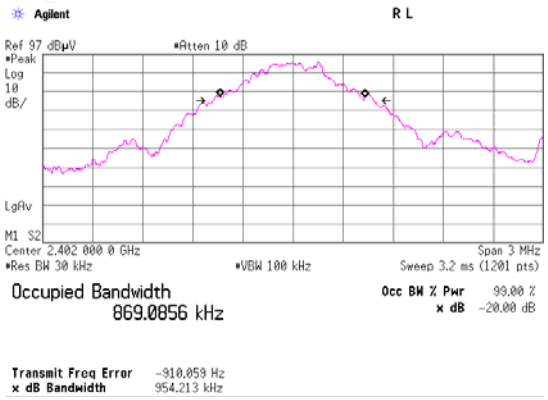
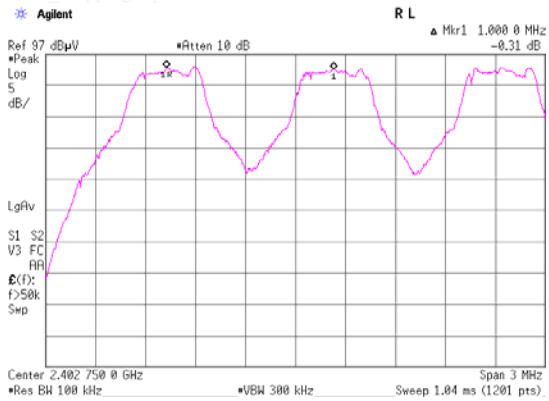
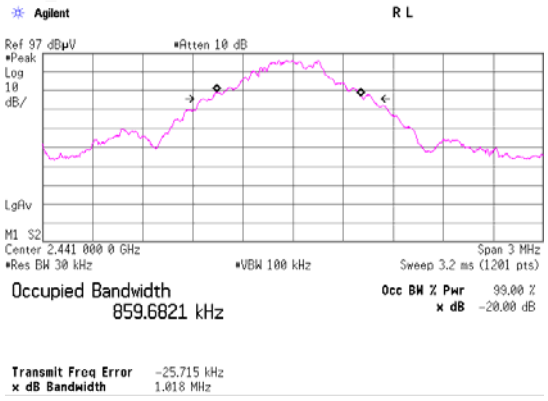
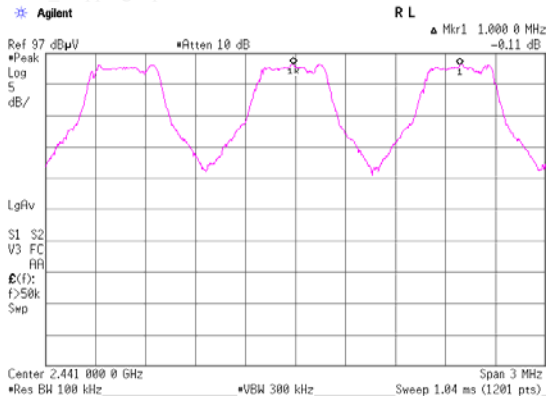
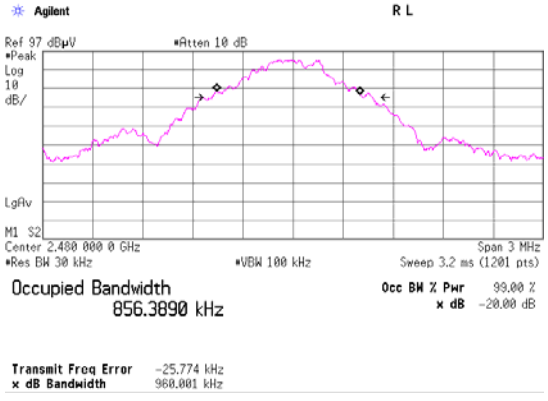
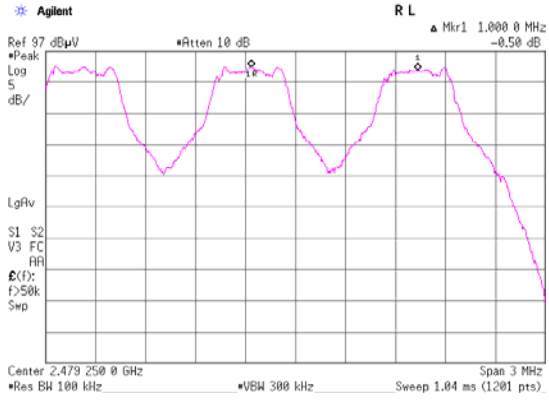
Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency Separation [MHz]
DH5	2402.0	0.954	1.000	>= 0.636
DH5	2441.0	1.018	1.000	>= 0.679
DH5	2480.0	0.960	1.000	>= 0.640
Inquiry	2441.0	0.837	2.000	>= 0.558

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

Inquiry	
20dB Bandwidth	**Carrier Frequency Separation**
Tx, 2441MHz	**Tx, 2441MHz**
	

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

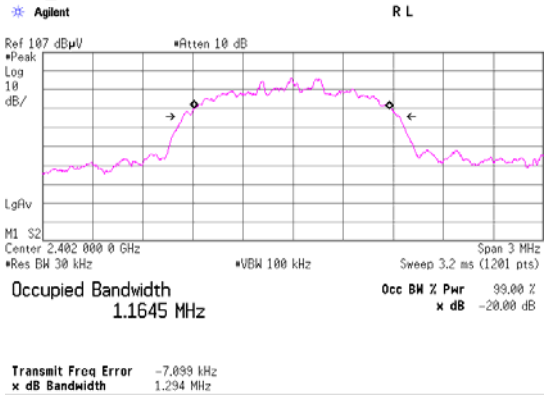
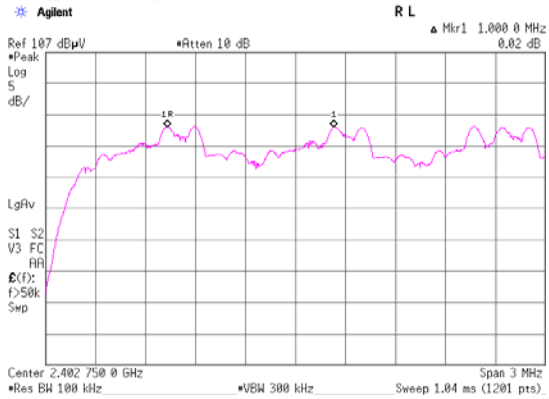
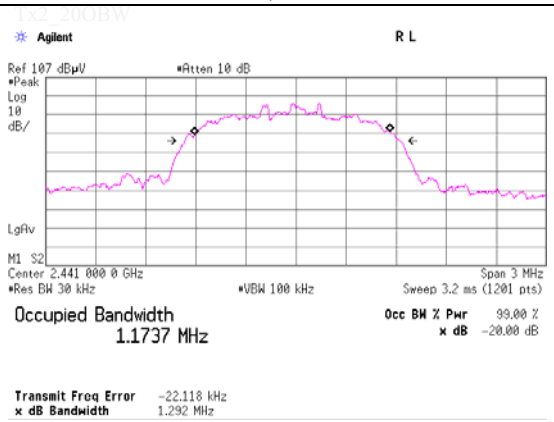
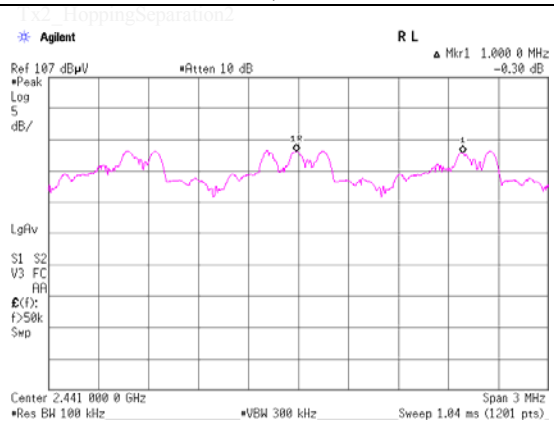
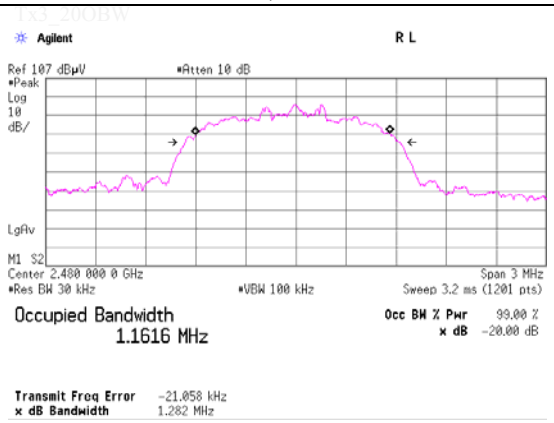
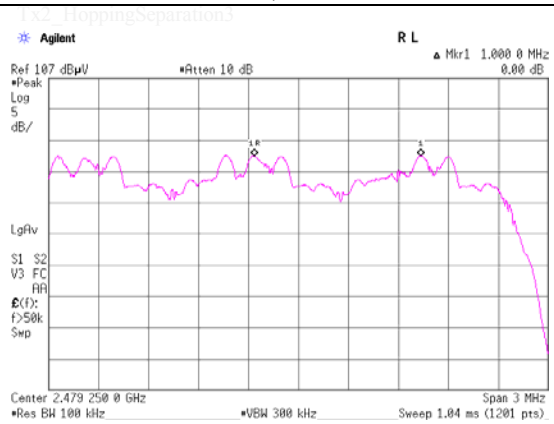
Test place	UL Japan, Inc. Shonan EMC Lab.	No.1 Measurement Room
Date	November 26, 2013	
Temperature / Humidity	23 deg.C , 51 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, Bluetooth, EDR, PRBS9	

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency Separation [MHz]
3-DH5	2402.0	1.294	1.000	>= 0.862
3-DH5	2441.0	1.292	1.000	>= 0.861
3-DH5	2480.0	1.282	1.000	>= 0.854

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

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**
	

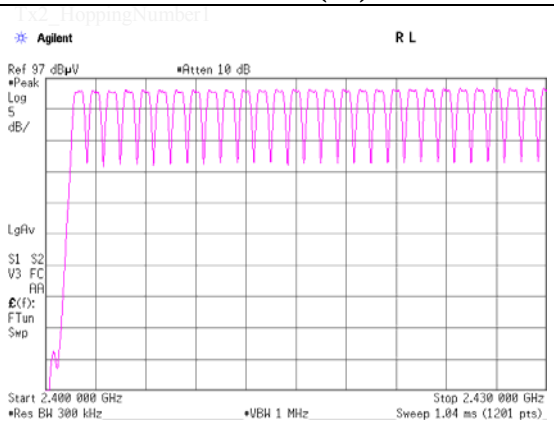
Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.1 Measurement Room
Date	November 26, 2013	
Temperature / Humidity	23 deg.C , 51 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, Bluetooth, BDR, PRBS9	

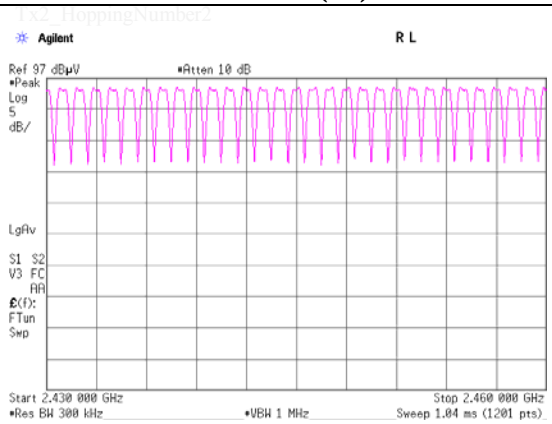
Mode	Number of Channel [times]	Limit [times]
DH5	79	>= 15

* 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.

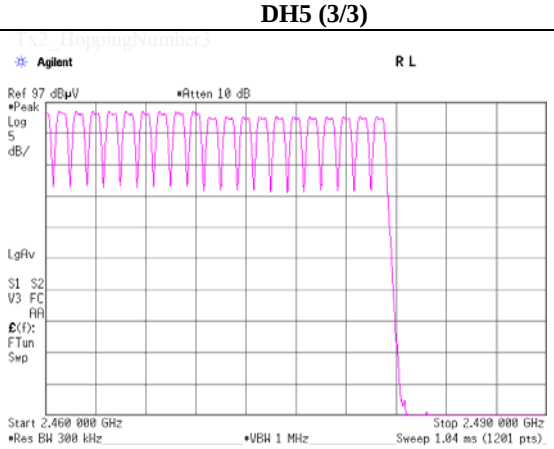
DH5 (1/3)



DH5 (2/3)



DH5 (3/3)



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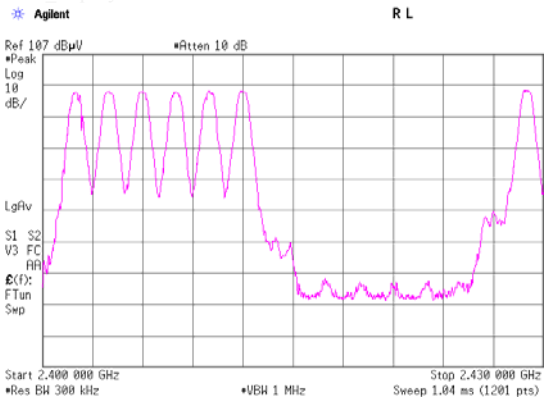
Number of Hopping Frequency

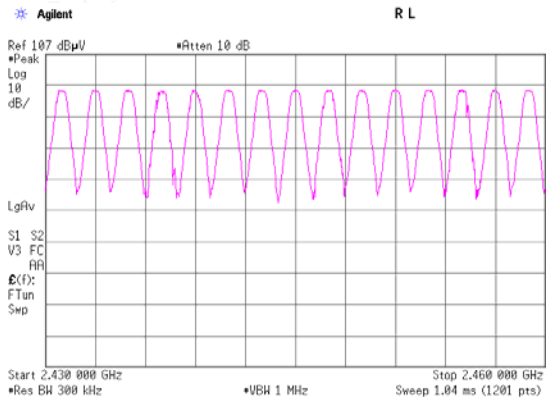
Test place	UL Japan, Inc. Shonan EMC Lab.	No.1 Measurement Room
Date	November 26, 2013	
Temperature / Humidity	23 deg.C , 51 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, Bluetooth, Inquiry	

Mode	Number of Channel [times]	Limit [times]
Inquiry	32	>= 15

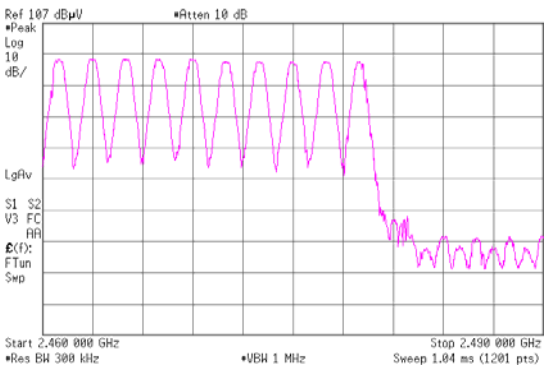
Inquiry (1/3)



Inquiry (2/3)



Inquiry (3/3)



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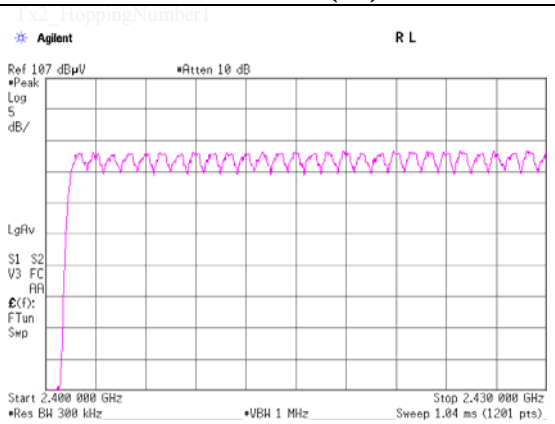
Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.1 Measurement Room
Date	November 26, 2013	
Temperature / Humidity	23 deg.C , 51 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, Bluetooth, EDR, PRBS9	

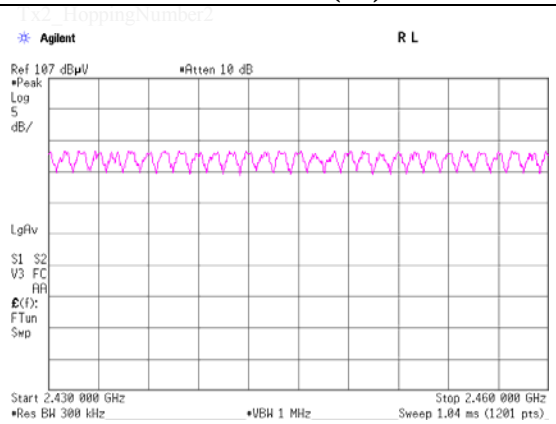
Mode	Number of Channel [times]	Limit [times]
3-DH5	79	>= 15

* 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.

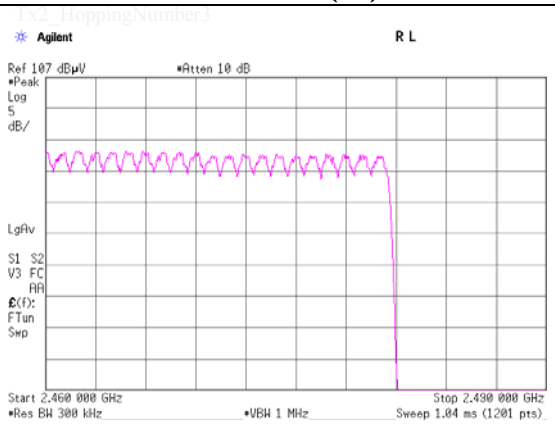
3-DH5 (1/3)



3-DH5 (2/3)



3-DH5 (3/3)



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Dwell Time

Test place	UL Japan, Inc. Shonan EMC Lab.	No.1 Measurement Room
Date	November 26, 2013	
Temperature / Humidity	23 deg.C , 51 %RH	
Engineer	Makoto Hosaka	
Mode	Tx, Bluetooth, BDR, PRBS9	

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 time [msec]	Result [msec]	Limit [msec]
DH1	51.0 / 5.0 sec. x 31.6 sec. = 323 times	0.413	133	400
DH3	26.0 / 5.0 sec. x 31.6 sec. = 165 times	1.670	276	400
DH5	17.0 / 5.0 sec. x 31.6 sec. = 108 times	2.918	315	400
Inquiry	100.0 / 1.0 sec. x 12.8 sec. = 1280 times	0.114	146	400

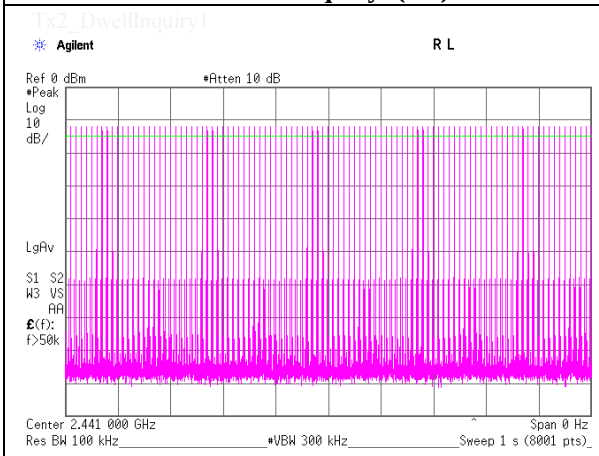
Sample Calculation

Result = Number of transmission x Length of transmition time

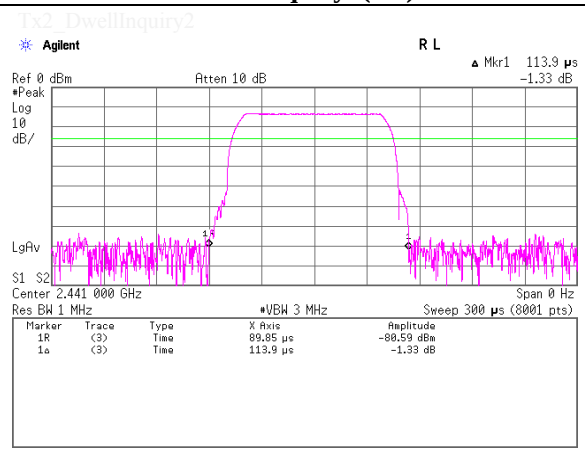
* This device complies with the Bluetooth protocol for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in N x 0.4s, where N is the number of channels being used in the hopping sequence (20 ≤ N ≤ 79), is always less than 0.4s regardless of packet size (DH1, DH3 or DH5). This is confirmed in the test report for N=79.

Inquiry

Inquiry (1/2)

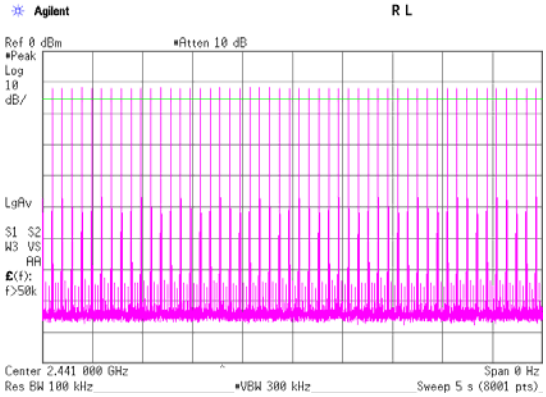
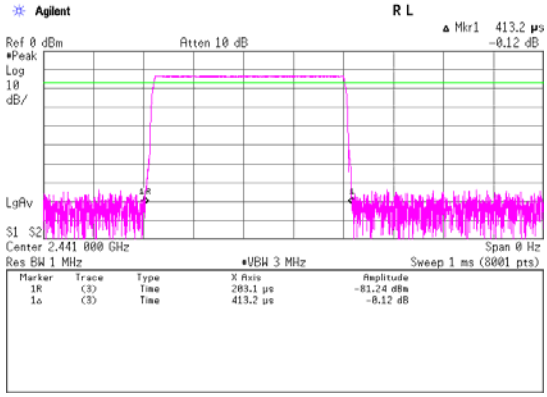
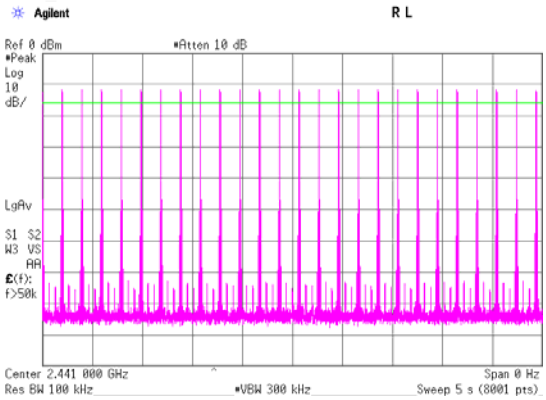
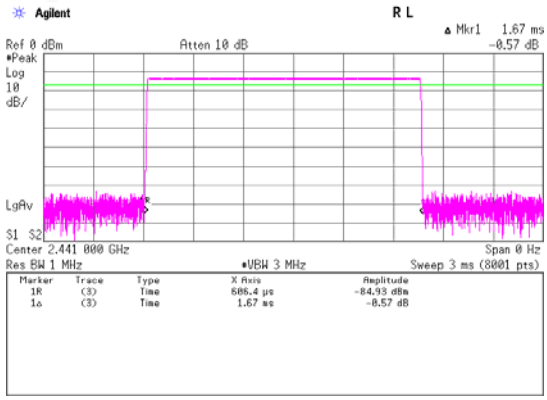
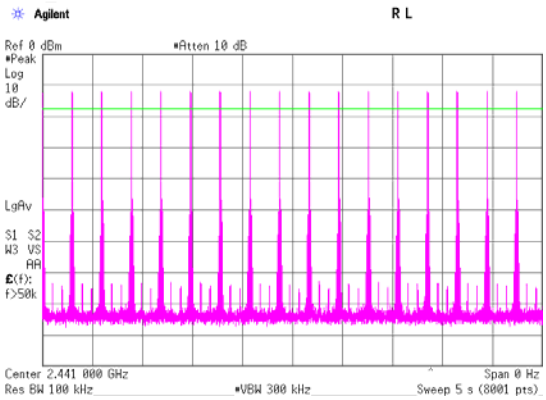
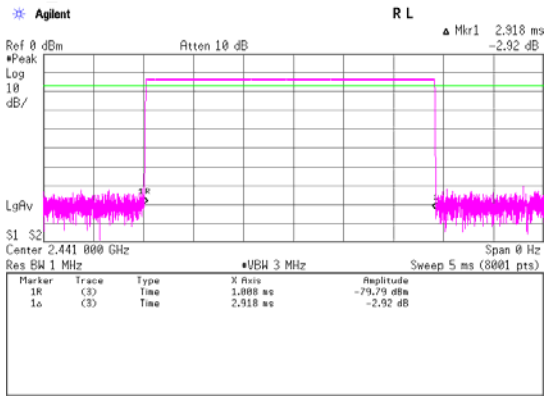


Inquiry (2/2)



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.1 Measurement Room
Date	November 26, 2013	
Temperature / Humidity	23 deg.C , 51 %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	0.431	139	400
3-DH3	26.0	/ 5.0 sec.	x	31.6 sec.	= 165 times	1.682	278	400
3-DH5	17.0	/ 5.0 sec.	x	31.6 sec.	= 108 times	2.931	317	400

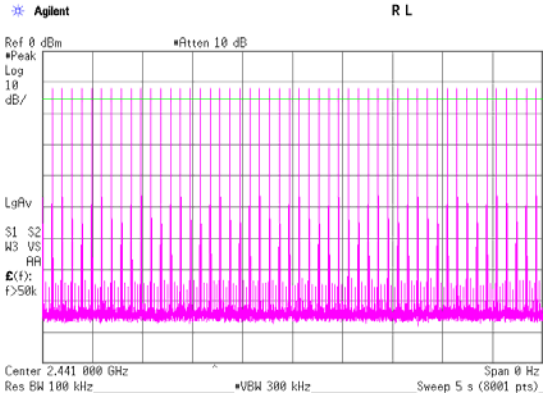
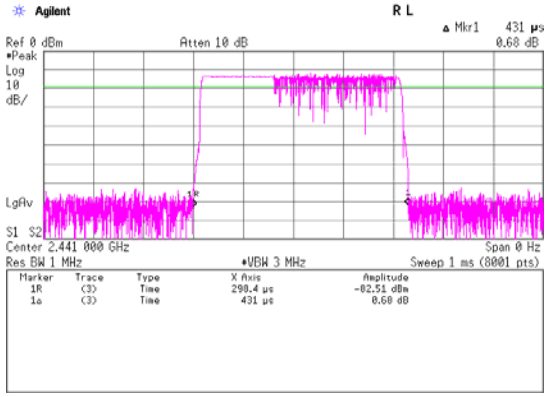
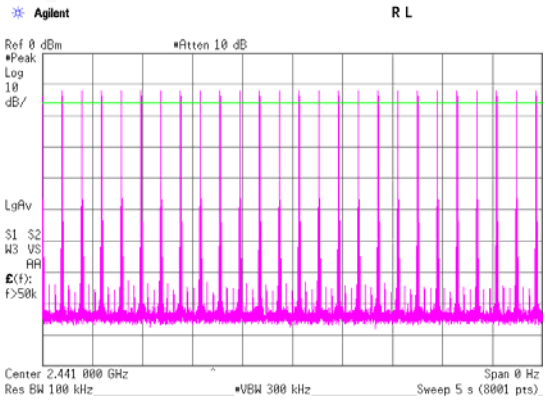
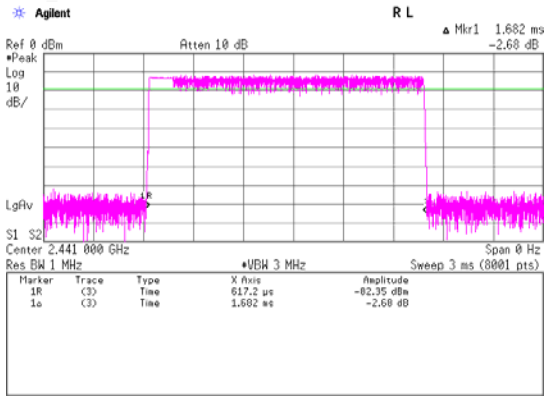
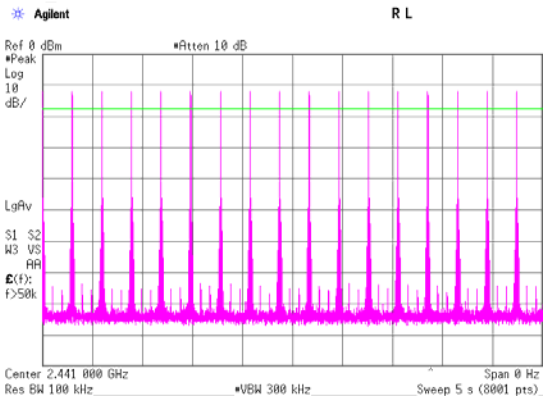
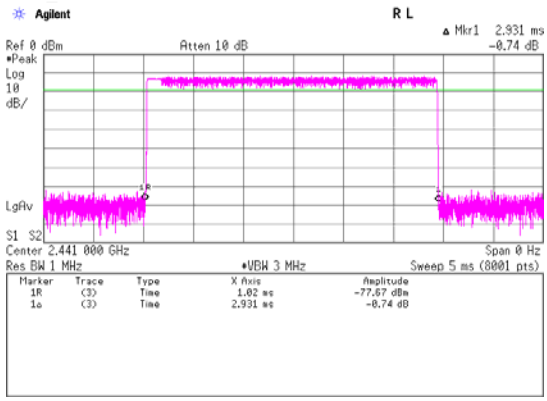
Sample Calculation

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

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)**
	

Maximum Peak Conducted Output Power (Conducted)

Test place	UL Japan, Inc. Shonan EMC Lab. No.1 Measurement Room
Date	November 26, 2013
Temperature / Humidity	23 deg.C , 51 %RH
Engineer	Makoto Hosaka
Mode	Tx, Bluetooth

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

	Freq. [MHz]	P/M (Peak) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Result [mW]	Limit [dBm]	Limit [mW]	Margin [dB]
DH5	2402.0	-11.67	1.10	10.02	-0.55	0.88	20.97	125	21.52
DH5	2441.0	-11.33	1.14	10.03	-0.16	0.96	20.97	125	21.13
DH5	2480.0	-12.19	1.19	10.04	-0.96	0.80	20.97	125	21.93
2-DH5	2402.0	-10.50	1.10	10.02	0.62	1.15	20.97	125	20.35
2-DH5	2441.0	-10.19	1.14	10.03	0.98	1.25	20.97	125	19.99
2-DH5	2480.0	-10.96	1.19	10.04	0.27	1.06	20.97	125	20.70
3-DH5	2402.0	-10.12	1.10	10.02	1.00	1.26	20.97	125	19.97
3-DH5	2441.0	-9.73	1.14	10.03	1.44	1.39	20.97	125	19.53
3-DH5	2480.0	-10.52	1.19	10.04	0.71	1.18	20.97	125	20.26

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

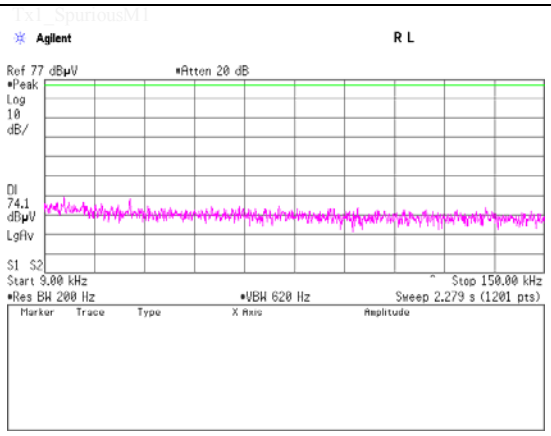
Test place: UL Japan, Inc. Shonan EMC Lab. No.1 Mesurement room
Date: November 26, 2013
Temperature / Humidity: 23deg.C , 51%RH
Engineer: Makoto Hosaka

Spurious emission (Conducted)

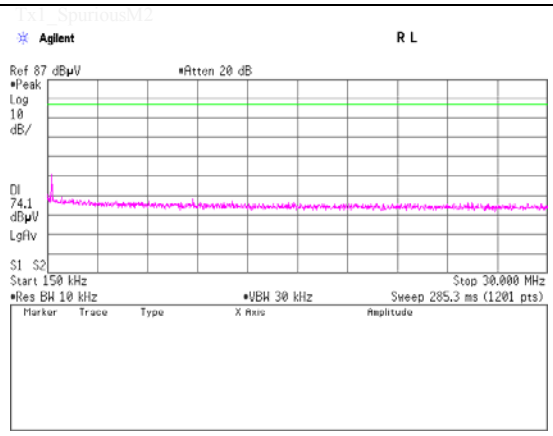
Tx, Bluetooth, BDR, PRBS9

Tx, 2402MHz (below 1GHz)

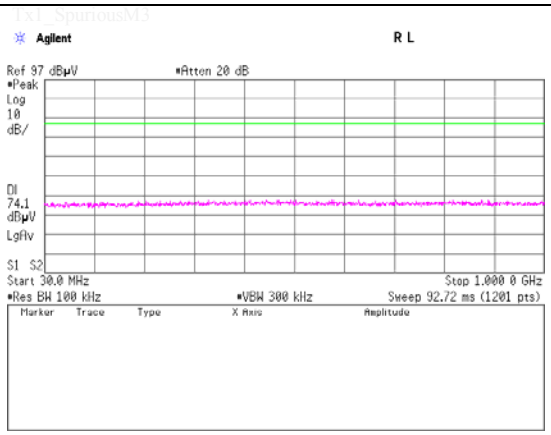
9kHz - 150kHz



150kHz - 30MHz



30MHz - 1GHz



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Telephone : +81 463 50 6400
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Test place: UL Japan, Inc. Shonan EMC Lab. No.1 Mesurement room
Date: November 26, 2013
Temperature / Humidity: 23deg.C , 51%RH
Engineer: Makoto Hosaka

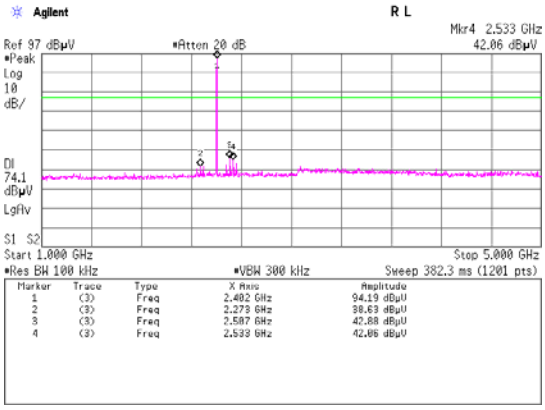
Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2402MHz (above 1GHz)

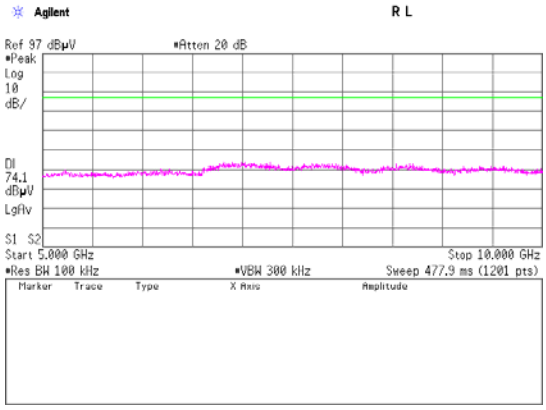
1GHz - 5GHz

Tx1_SpuriousG1



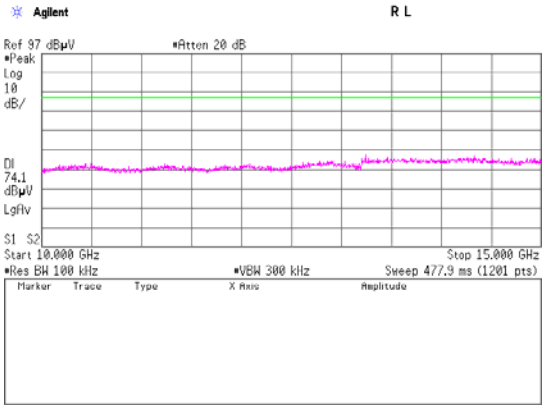
5GHz - 10GHz

Tx1_SpuriousG2



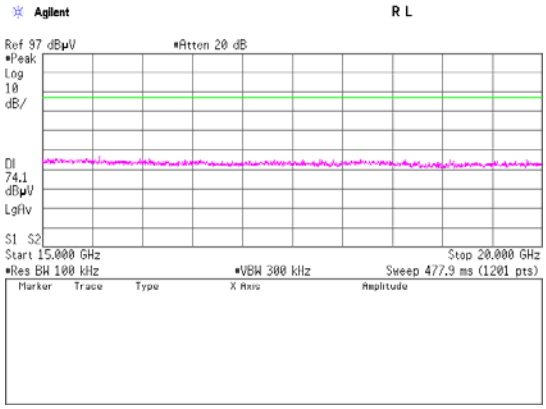
10GHz - 15GHz

Tx1_SpuriousG3



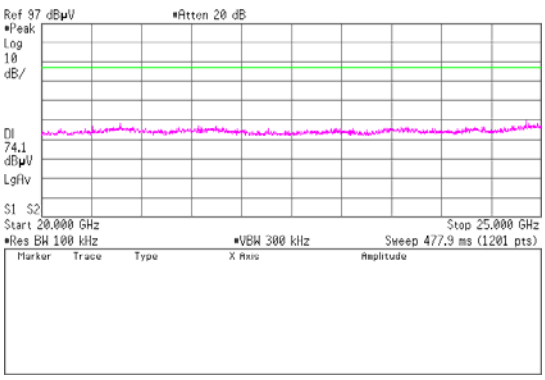
15GHz - 20GHz

Tx1_SpuriousG4



20GHz - 25GHz

Tx1_SpuriousG5



Tx1_SpuriousG6

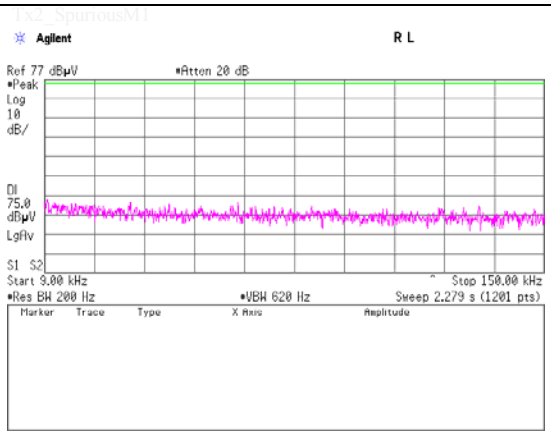
Test place: UL Japan, Inc. Shonan EMC Lab. No.1 Mesurement room
Date: November 26, 2013
Temperature / Humidity: 23deg.C , 51%RH
Engineer: Makoto Hosaka

Spurious emission (Conducted)

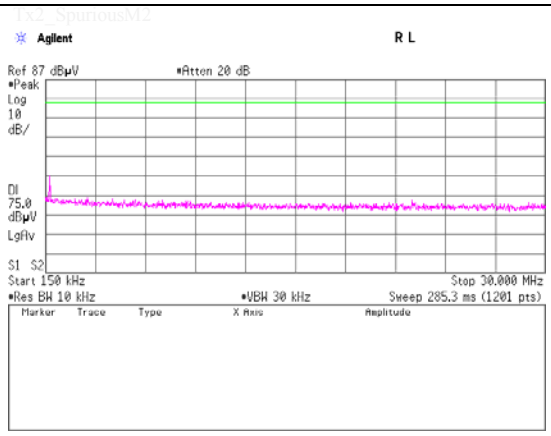
Tx, Bluetooth, BDR, PRBS9

Tx, 2441MHz (below 1GHz)

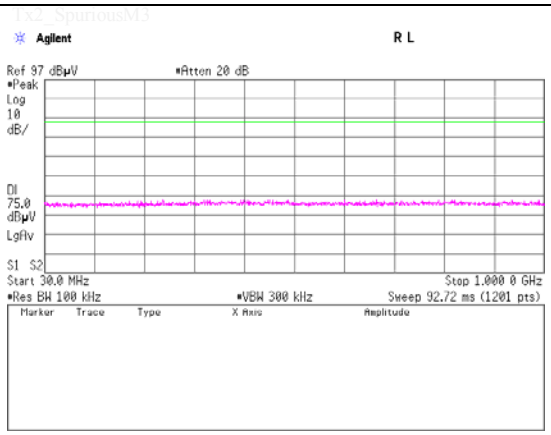
9kHz - 150kHz



150kHz - 30MHz



30MHz - 1GHz



Test place: UL Japan, Inc. Shonan EMC Lab. No.1 Mesurement room
Date: November 26, 2013
Temperature / Humidity: 23deg.C , 51%RH
Engineer: Makoto Hosaka

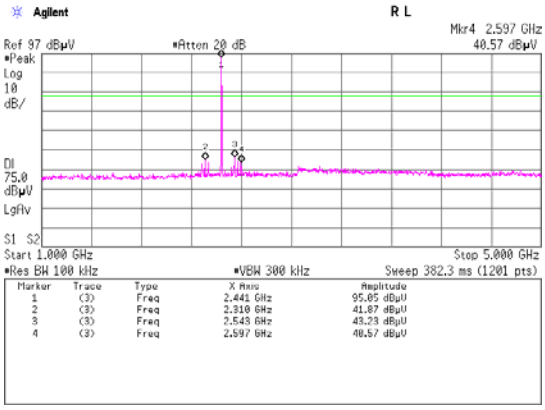
Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2441MHz (above 1GHz)

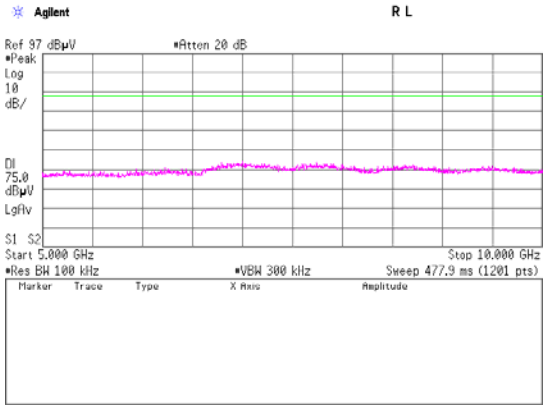
1GHz - 5GHz

Tx2_SpuriousG1



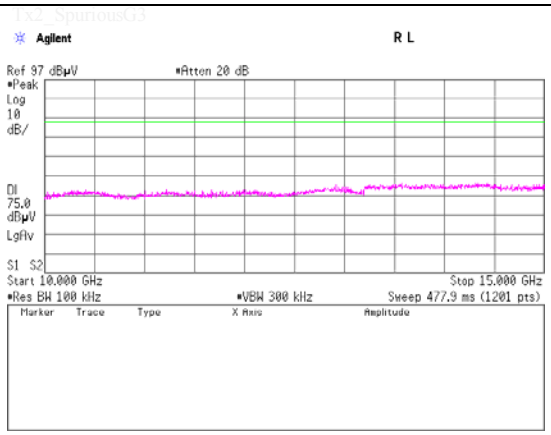
5GHz - 10GHz

Tx2_SpuriousG2



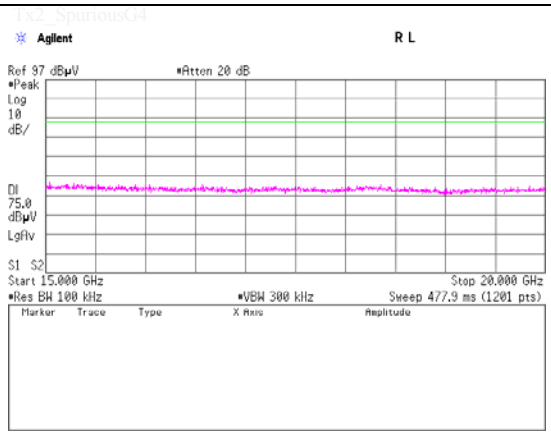
10GHz - 15GHz

Tx2_SpuriousG3



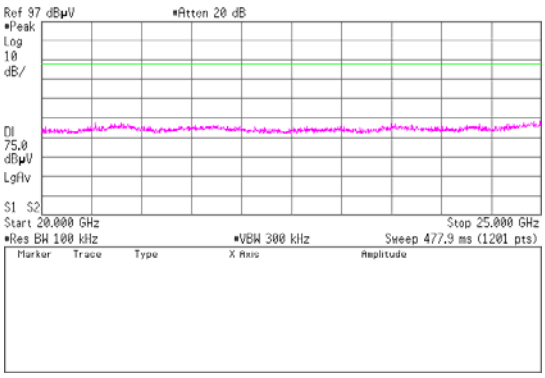
15GHz - 20GHz

Tx2_SpuriousG4



20GHz - 25GHz

Tx2_SpuriousG5



Tx2_SpuriousG6

UL Japan, Inc.
Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN
Telephone : +81 463 50 6400
Facsimile : +81 463 50 6401

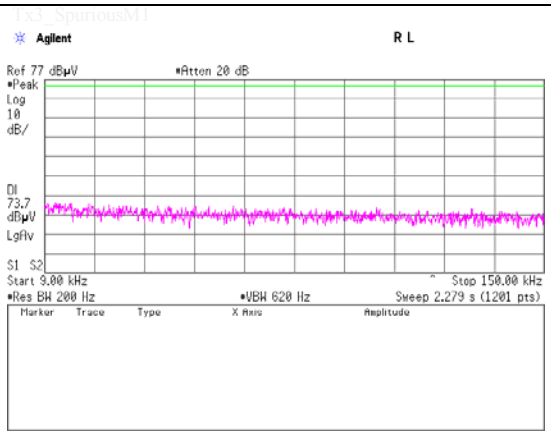
Test place: UL Japan, Inc. Shonan EMC Lab. No.1 Mesurement room
Date: November 26, 2013
Temperature / Humidity: 23deg.C , 51%RH
Engineer: Makoto Hosaka

Spurious emission (Conducted)

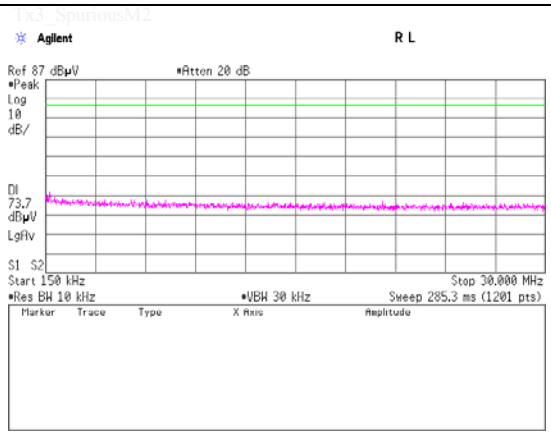
Tx, Bluetooth, BDR, PRBS9

Tx, 2480MHz (below 1GHz)

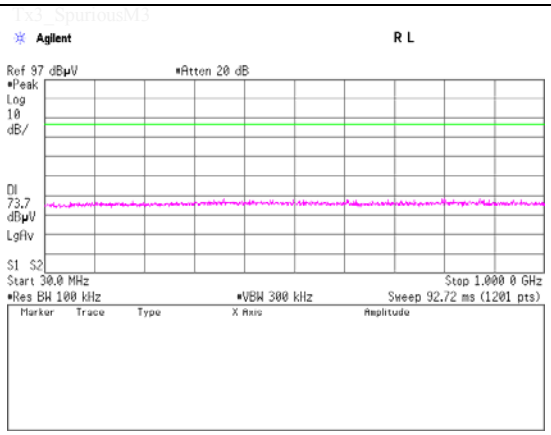
9kHz - 150kHz



150kHz - 30MHz



30MHz - 1GHz



UL Japan, Inc.
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1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN
Telephone : +81 463 50 6400
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Test place: UL Japan, Inc. Shonan EMC Lab. No.1 Mesurement room
Date: November 26, 2013
Temperature / Humidity: 23deg.C , 51%RH
Engineer: Makoto Hosaka

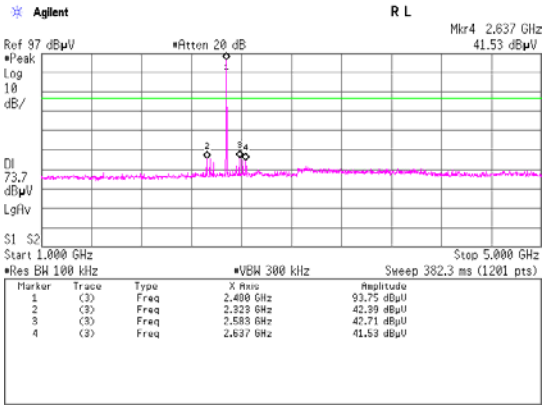
Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2480MHz (above 1GHz)

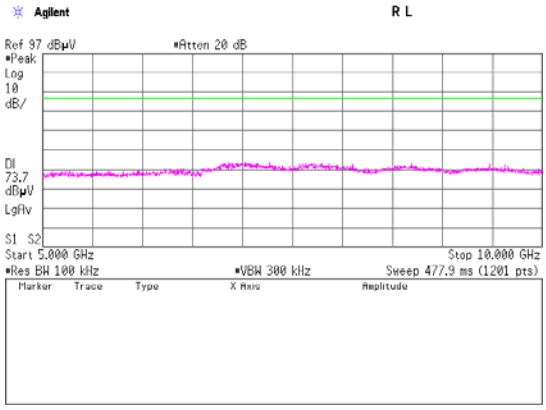
1GHz - 5GHz

Tx3_SpuriousG1



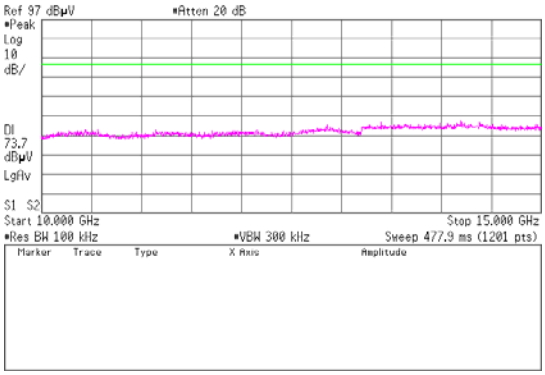
5GHz - 10GHz

Tx3_SpuriousG2



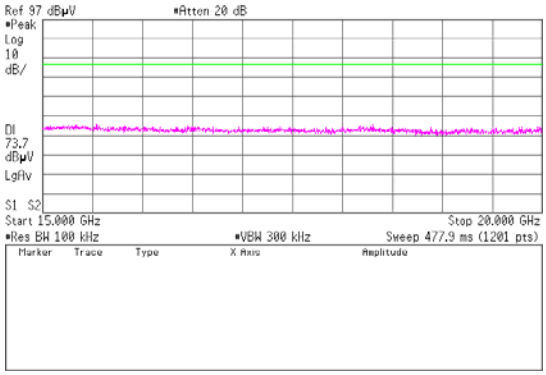
10GHz - 15GHz

Tx3_SpuriousG3



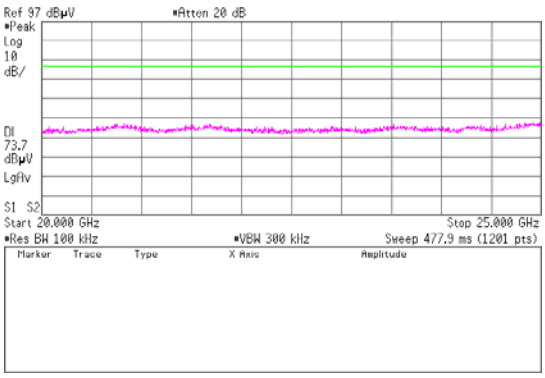
15GHz - 20GHz

Tx3_SpuriousG4



20GHz - 25GHz

Tx3_SpuriousG5



Tx3_SpuriousG6

UL Japan, Inc.
Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN
Telephone : +81 463 50 6400
Facsimile : +81 463 50 6401

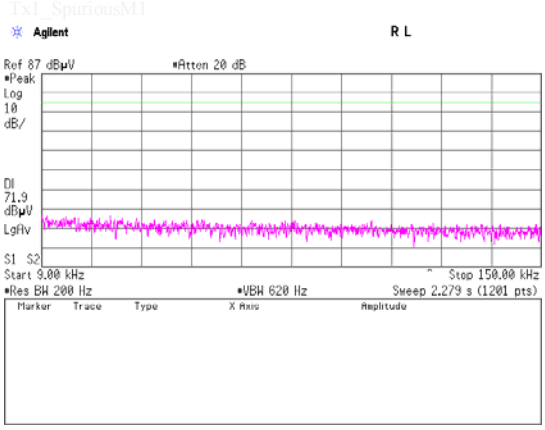
Test place: UL Japan, Inc. Shonan EMC Lab. No.1 Mesurement room
Date: November 26, 2013
Temperature / Humidity: 23deg.C , 51%RH
Engineer: Makoto Hosaka

Spurious emission (Conducted)

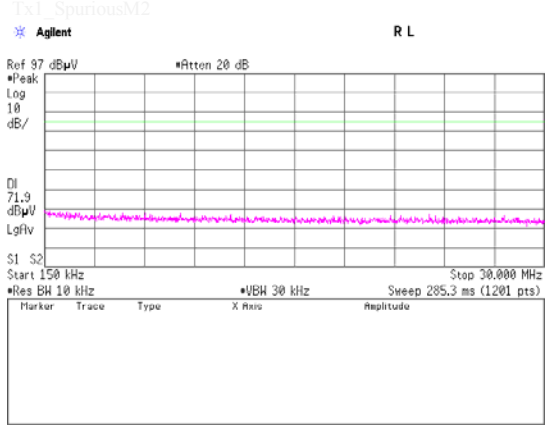
Tx, Bluetooth, EDR, PRBS9

Tx, 2402MHz (below 1GHz)

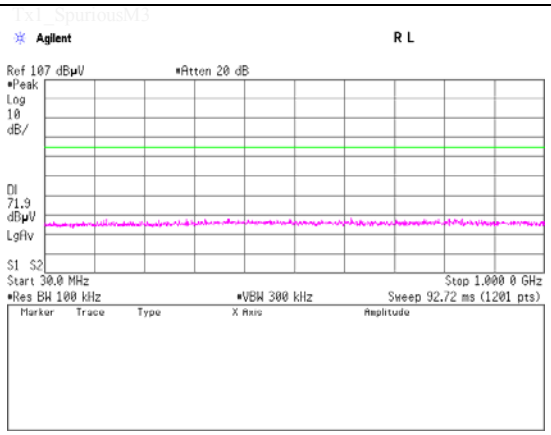
9kHz - 150kHz



150kHz - 30MHz



30MHz - 1GHz



Test place: UL Japan, Inc. Shonan EMC Lab. No.1 Mesurement room
Date: November 26, 2013
Temperature / Humidity: 23deg.C , 51%RH
Engineer: Makoto Hosaka

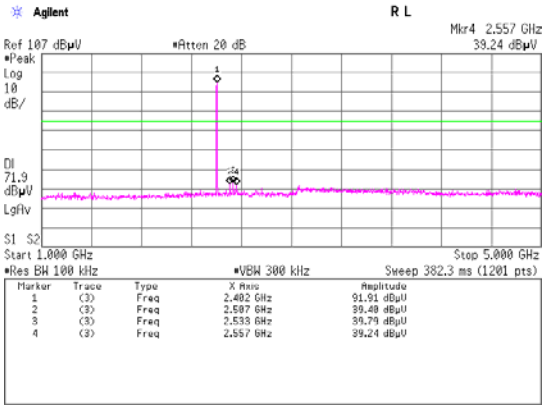
Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2402MHz (above 1GHz)

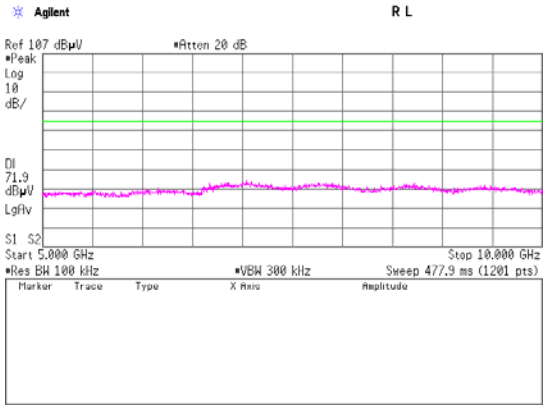
1GHz - 5GHz

Tx1_SpuriousG1



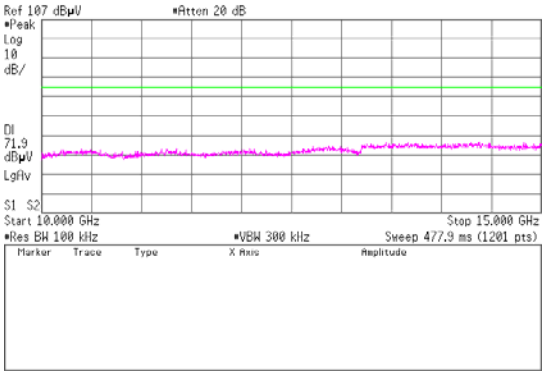
5GHz - 10GHz

Tx1_SpuriousG2



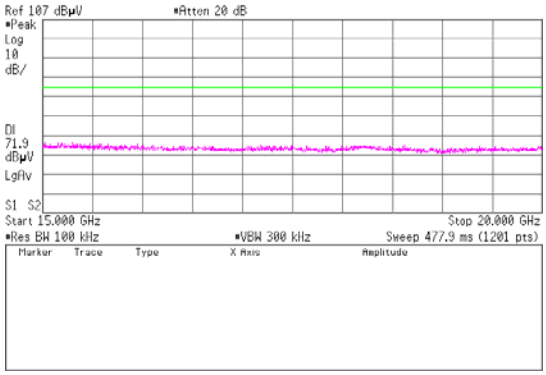
10GHz - 15GHz

Tx1_SpuriousG3



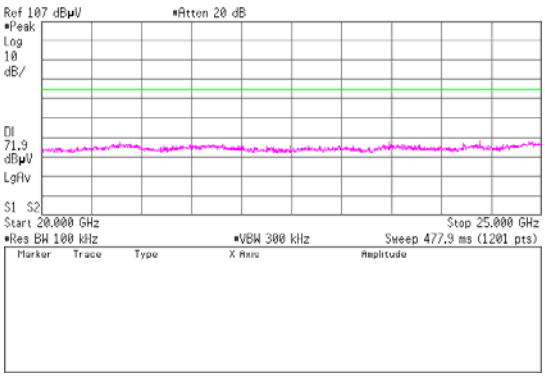
15GHz - 20GHz

Tx1_SpuriousG4



20GHz - 25GHz

Tx1_SpuriousG5



Tx1_SpuriousG6

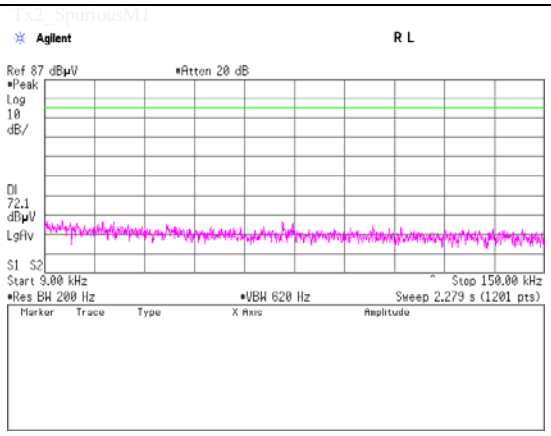
Test place: UL Japan, Inc. Shonan EMC Lab. No.1 Mesurement room
Date: November 26, 2013
Temperature / Humidity: 23deg.C , 51%RH
Engineer: Makoto Hosaka

Spurious emission (Conducted)

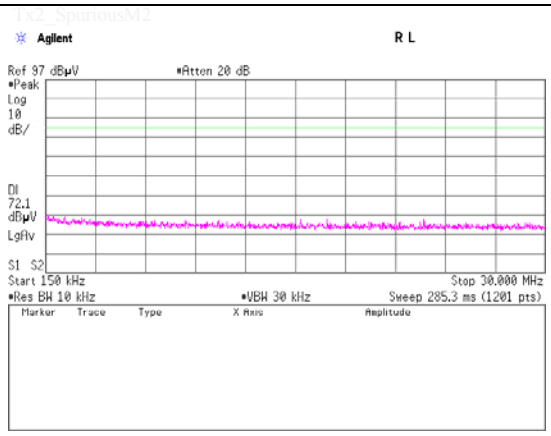
Tx, Bluetooth, EDR, PRBS9

Tx, 2441MHz (below 1GHz)

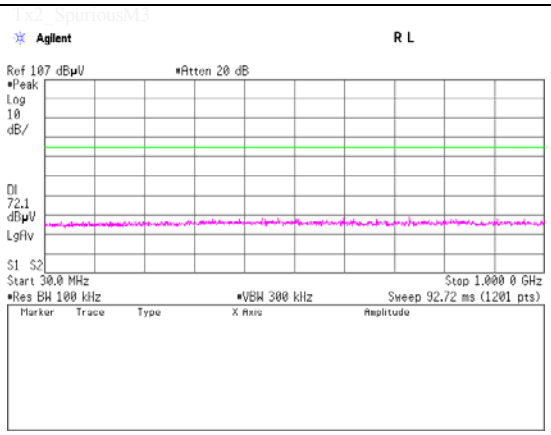
9kHz - 150kHz



150kHz - 30MHz



30MHz - 1GHz



Test place: UL Japan, Inc. Shonan EMC Lab. No.1 Mesurement room
Date: November 26, 2013
Temperature / Humidity: 23deg.C , 51%RH
Engineer: Makoto Hosaka

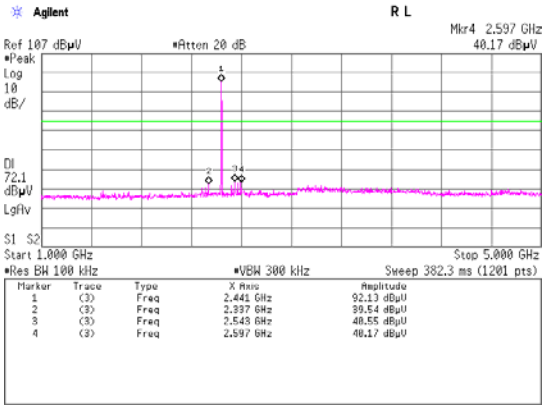
Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2441MHz (above 1GHz)

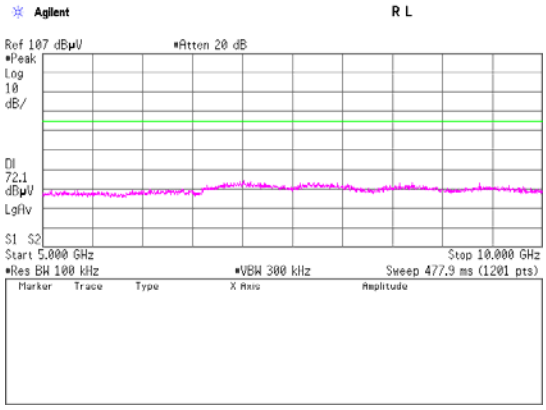
1GHz - 5GHz

Tx2_SpuriousG1



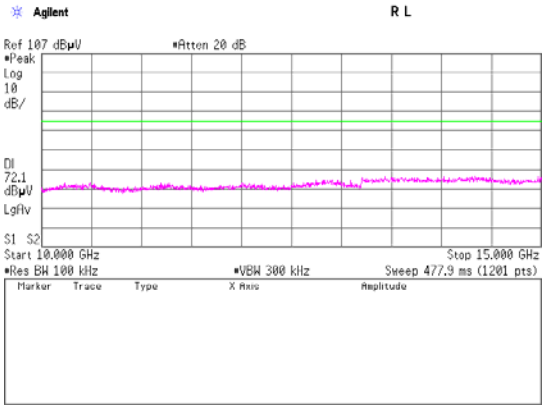
5GHz - 10GHz

Tx2_SpuriousG2



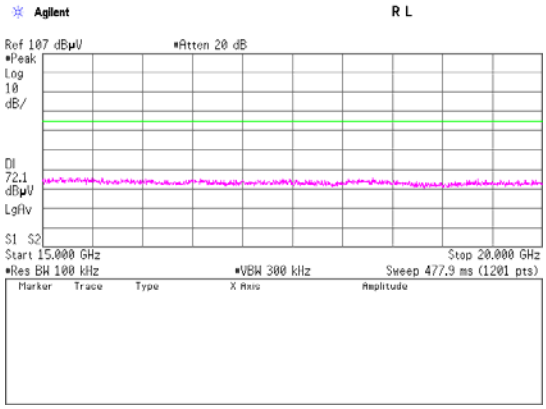
10GHz - 15GHz

Tx2_SpuriousG3



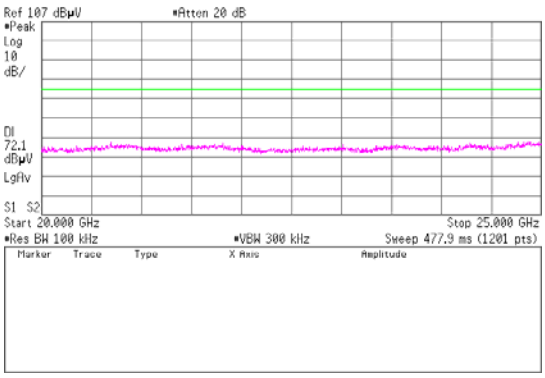
15GHz - 20GHz

Tx2_SpuriousG4



20GHz - 25GHz

Tx2_SpuriousG5



Tx2_SpuriousG6

UL Japan, Inc.
Shonan EMC Lab.
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.1 Mesurement room
Date: November 26, 2013
Temperature / Humidity: 23deg.C , 51%RH
Engineer: Makoto Hosaka

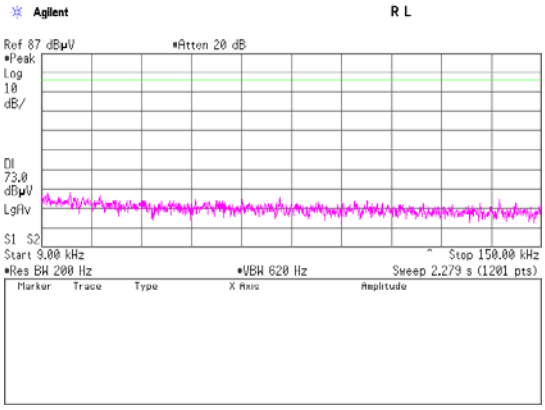
Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2480MHz (below 1GHz)

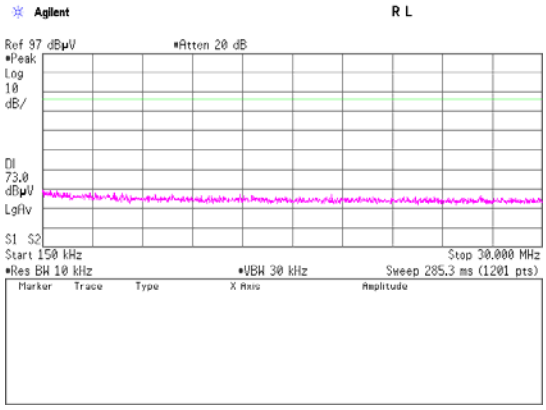
9kHz - 150kHz

Tx3_SpuriousM1



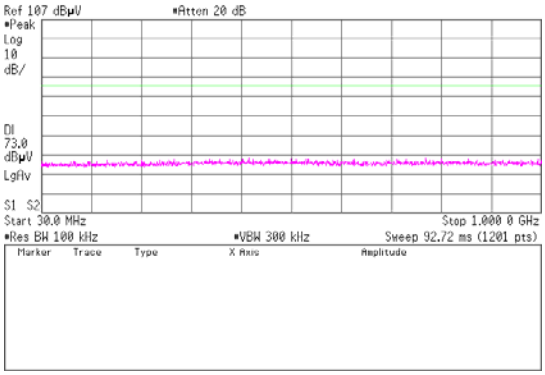
150kHz - 30MHz

Tx3_SpuriousM2



30MHz - 1GHz

Tx3_SpuriousM3



UL Japan, Inc.
Shonan EMC Lab.
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Test place: UL Japan, Inc. Shonan EMC Lab. No.1 Mesurement room
Date: November 26, 2013
Temperature / Humidity: 23deg.C , 51%RH
Engineer: Makoto Hosaka

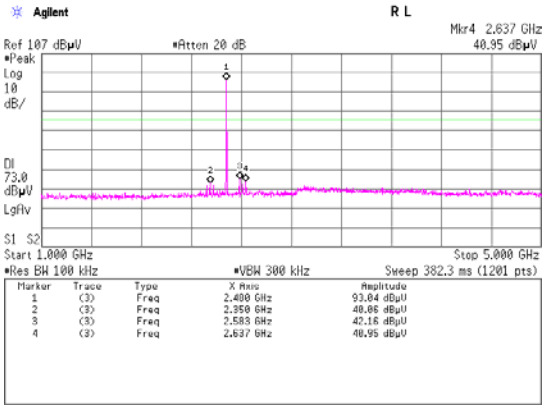
Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2480MHz (above 1GHz)

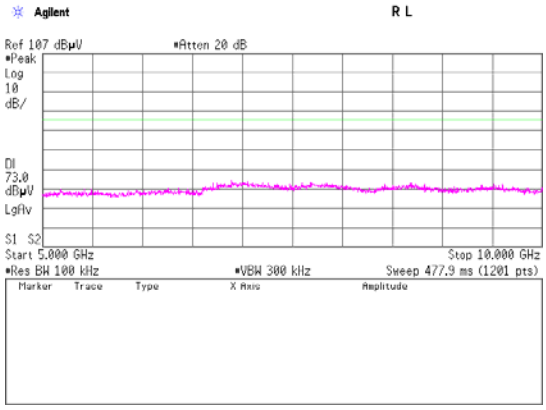
1GHz - 5GHz

Tx3_SpuriousG1



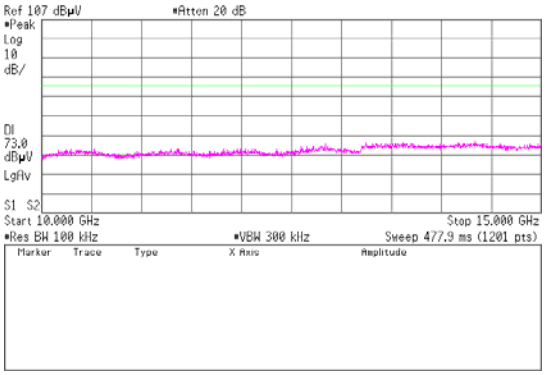
5GHz - 10GHz

Tx3_SpuriousG2



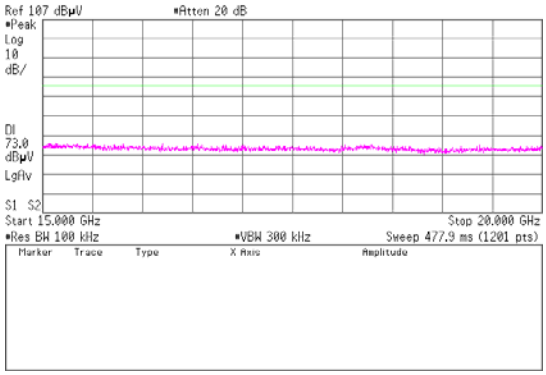
10GHz - 15GHz

Tx3_SpuriousG3



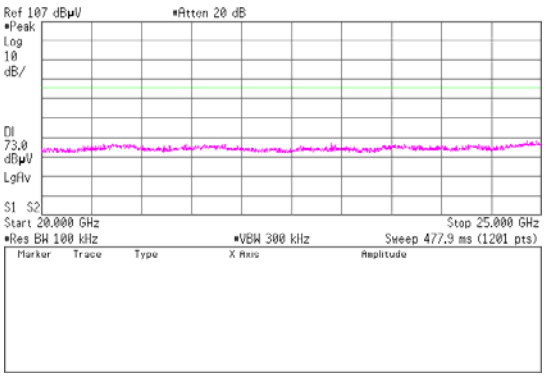
15GHz - 20GHz

Tx3_SpuriousG4



20GHz - 25GHz

Tx3_SpuriousG5



Tx3_SpuriousG6

UL Japan, Inc.
Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN
Telephone : +81 463 50 6400
Facsimile : +81 463 50 6401

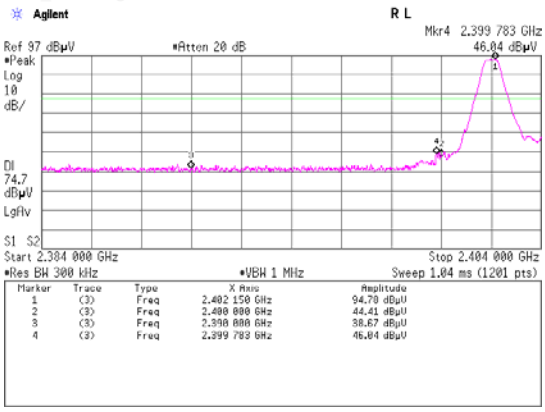
Test place: UL Japan, Inc. Shonan EMC Lab. No.1 Mesurement room
Date: November 26, 2013
Temperature / Humidity: 23deg.C , 51%RH
Engineer: Makoto Hosaka

Spurious emission (Conducted)

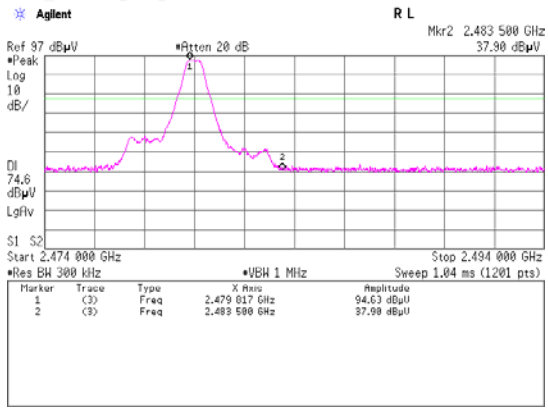
Band Edge compliance

Tx, Bluetooth, BDR, PRBS9

Tx, 2402MHz

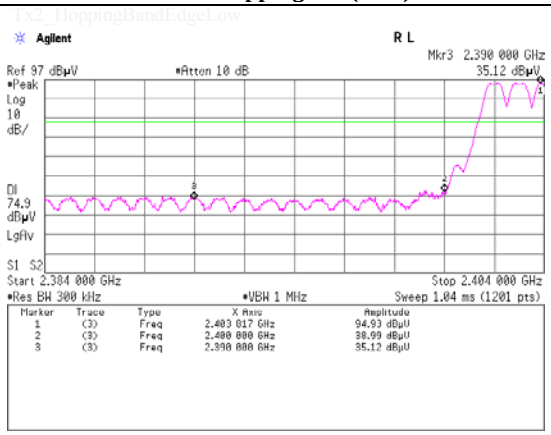


Tx, 2480MHz

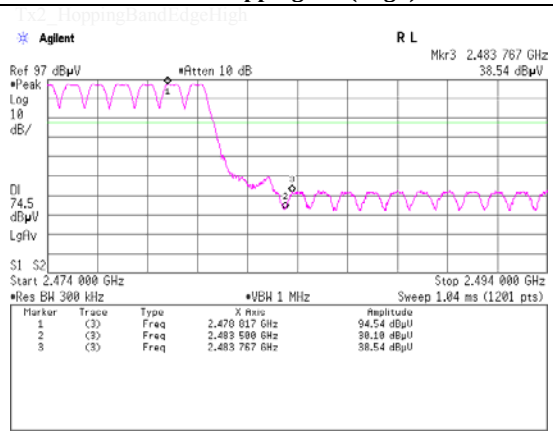


Tx, Bluetooth, BDR, PRBS9

Hopping On (Low)



Hopping On (High)



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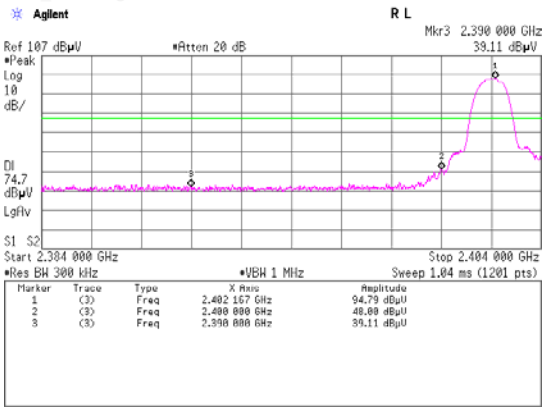
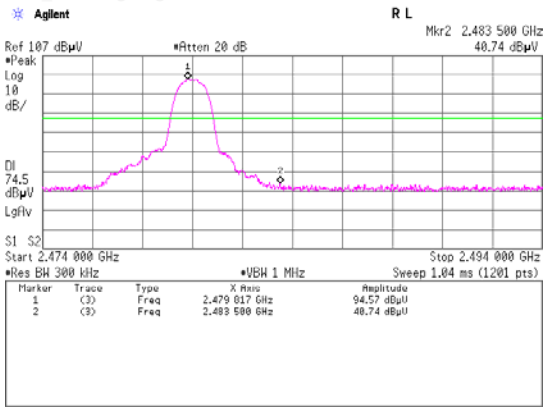
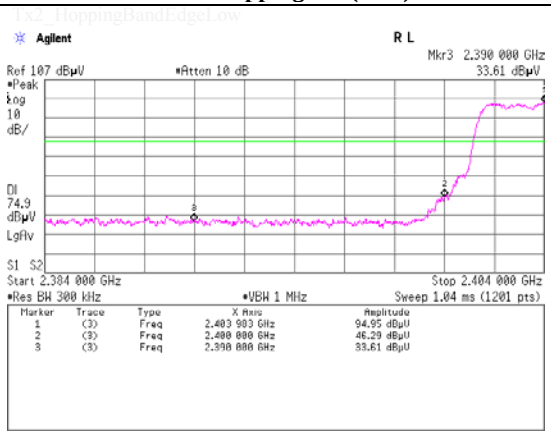
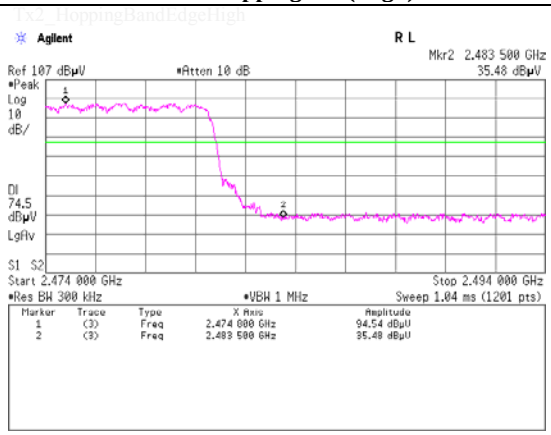
Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN
Telephone : +81 463 50 6400
Facsimile : +81 463 50 6401

Test place: UL Japan, Inc. Shonan EMC Lab. No.1 Mesurement room
Date: November 26, 2013
Temperature / Humidity: 23deg.C , 51%RH
Engineer: Makoto Hosaka

Spurious emission (Conducted)

Band Edge compliance

Tx, Bluetooth, EDR, PRBS9	
Tx, 2402MHz	**Tx, 2480MHz**
	

Tx, Bluetooth, EDR, PRBS9	
Hopping On (Low)	**Hopping On (High)**
	

UL Japan, Inc.
Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa 259-1220 JAPAN
Telephone : +81 463 50 6400
Facsimile : +81 463 50 6401

Radiated Emission

Test place	No.3 Semi Anechoic Chamber	
Date	December 5, 2013	December 6, 2013
Temperature / Humidity	24 deg.C, 31 %RH	23 deg.C, 33 %RH
Engineer	Hikaru Shirasawa	
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.	76.584	QP	46.8	6.3	7.0	32.1	28.0	40.0	12.0	238	240	
Hori.	121.634	QP	42.3	13.2	7.4	32.1	30.8	43.5	12.7	293	278	
Hori.	401.320	QP	39.4	16.4	9.0	32.0	32.8	46.0	13.2	100	92	
Hori.	960.000	QP	36.8	22.1	11.0	30.5	39.4	46.0	6.6	100	330	
Hori.	1920.000	PK	50.0	26.5	14.2	41.2	49.5	73.9	24.4	100	283	
Hori.	2273.000	PK	47.1	26.7	14.6	41.2	47.2	73.9	26.7	100	170	
Hori.	2390.000	PK	44.6	26.8	14.7	41.1	45.0	73.9	28.9	100	97	
Hori.	2399.783	PK	44.2	26.8	14.7	41.1	44.6	73.9	29.3	100	97	
Hori.	2400.000	PK	45.1	26.8	14.7	41.1	45.5	73.9	28.4	100	97	
Hori.	2507.000	PK	46.8	26.9	14.9	41.0	47.6	73.9	26.3	100	188	
Hori.	2533.000	PK	46.7	27.0	14.9	41.1	47.5	73.9	26.4	100	0	
Hori.	4804.000	PK	49.3	30.9	7.9	41.2	46.9	73.9	27.0	100	267	
Hori.	7206.000	PK	48.2	37.1	9.1	41.0	53.4	73.9	20.5	100	0	
Hori.	9608.000	PK	45.0	38.6	10.2	38.9	54.9	73.9	19.0	100	0	
Hori.	12010.000	PK	49.0	39.6	11.2	39.1	60.7	73.9	13.2	100	0	
Hori.	1920.000	AV	41.6	26.5	14.2	41.2	41.1	53.9	12.8	100	283	
Hori.	2273.000	AV	34.6	26.7	14.6	41.2	34.7	53.9	19.2	100	170	
Hori.	2390.000	AV	34.6	26.8	14.7	41.1	35.0	53.9	18.9	100	97	
Hori.	2399.783	AV	35.0	26.8	14.7	41.1	35.4	53.9	18.5	100	97	
Hori.	2400.000	AV	35.2	26.8	14.7	41.1	35.6	53.9	18.3	100	97	
Hori.	2507.000	AV	34.6	26.9	14.9	41.0	35.4	53.9	18.5	100	188	
Hori.	2533.000	AV	34.6	27.0	14.9	41.1	35.4	53.9	18.5	100	0	
Hori.	4804.000	AV	39.2	30.9	7.9	41.2	36.8	53.9	17.1	100	267	
Hori.	7206.000	AV	36.1	37.1	9.1	41.0	41.3	53.9	12.6	100	0	
Hori.	9608.000	AV	33.5	38.6	10.2	38.9	43.4	53.9	10.5	100	0	
Hori.	12010.000	AV	35.0	39.6	11.2	39.1	46.7	53.9	7.2	100	0	
Vert.	47.992	QP	49.6	11.5	6.7	32.2	35.6	40.0	**4.4**	100	101	
Vert.	50.803	QP	41.5	10.5	6.8	32.2	26.6	40.0	13.4	100	112	
Vert.	130.658	QP	43.1	13.8	7.5	32.1	32.3	43.5	11.2	100	156	
Vert.	176.615	QP	38.6	15.8	7.8	32.1	30.1	43.5	13.4	100	133	
Vert.	1919.983	PK	48.6	26.5	14.2	41.2	48.1	73.9	25.8	139	218	
Vert.	2273.000	PK	46.7	26.7	14.6	41.2	46.8	73.9	27.1	100	226	
Vert.	2390.000	PK	46.5	26.8	14.7	41.1	46.9	73.9	27.0	100	168	
Vert.	2399.783	PK	45.3	26.8	14.7	41.1	45.7	73.9	28.2	100	168	
Vert.	2400.000	PK	44.0	26.8	14.7	41.1	44.4	73.9	29.5	100	168	
Vert.	2507.000	PK	47.2	26.9	14.9	41.0	48.0	73.9	25.9	114	188	
Vert.	2533.000	PK	46.8	27.0	14.9	41.1	47.6	73.9	26.3	100	0	
Vert.	4804.000	PK	50.6	30.9	7.9	41.2	48.2	73.9	25.7	100	159	
Vert.	7206.000	PK	48.6	37.1	9.1	41.0	53.8	73.9	20.1	115	343	
Vert.	9608.000	PK	44.8	38.6	10.2	38.9	54.7	73.9	19.2	100	0	
Vert.	12010.000	PK	48.0	39.6	11.2	39.1	59.7	73.9	14.2	100	0	
Vert.	1919.983	AV	37.6	26.5	14.2	41.2	37.1	53.9	16.8	139	218	
Vert.	2273.000	AV	34.6	26.7	14.6	41.2	34.7	53.9	19.2	100	226	
Vert.	2390.000	AV	34.6	26.8	14.7	41.1	35.0	53.9	18.9	100	168	
Vert.	2399.783	AV	35.0	26.8	14.7	41.1	35.4	53.9	18.5	100	168	
Vert.	2400.000	AV	35.2	26.8	14.7	41.1	35.6	53.9	18.3	100	168	
Vert.	2507.000	AV	36.2	26.9	14.9	41.0	37.0	53.9	16.9	114	188	
Vert.	2533.000	AV	34.4	27.0	14.9	41.1	35.2	53.9	18.7	100	0	
Vert.	4804.000	AV	40.3	30.9	7.9	41.2	37.9	53.9	16.0	100	159	
Vert.	7206.000	AV	37.8	37.1	9.1	41.0	43.0	53.9	10.9	115	343	
Vert.	9608.000	AV	33.5	38.6	10.2	38.9	43.4	53.9	10.5	100	0	
Vert.	12010.000	AV	34.8	39.6	11.2	39.1	46.5	53.9	7.4	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).

Radiated Emission

Test place	No.3 Semi Anechoic Chamber	
Date	December 5, 2013	December 6, 2013
Temperature / Humidity	24 deg.C, 31 %RH	23 deg.C, 33 %RH
Engineer	Hikaru Shirasawa	
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.	76.562	QP	47.6	6.3	7.0	32.1	28.8	40.0	11.2	236	276	
Hori.	120.699	QP	44.0	13.1	7.4	32.1	32.4	43.5	11.1	285	84	
Hori.	401.318	QP	38.4	16.4	9.0	32.0	31.8	46.0	14.2	100	124	
Hori.	960.000	QP	37.0	22.1	11.0	30.5	39.6	46.0	6.4	100	265	
Hori.	1920.022	PK	50.2	26.5	14.2	41.2	49.7	73.9	24.2	100	287	
Hori.	2310.000	PK	47.3	26.8	14.6	41.1	47.6	73.9	26.3	100	31	
Hori.	2543.000	PK	47.1	27.0	15.0	41.1	48.0	73.9	25.9	119	144	
Hori.	2597.000	PK	47.0	27.1	15.0	41.1	48.0	73.9	25.9	100	167	
Hori.	4882.000	PK	49.2	31.4	7.9	41.1	47.4	73.9	26.5	100	343	
Hori.	7323.000	PK	47.2	37.2	9.1	41.1	52.4	73.9	21.5	100	0	
Hori.	9764.000	PK	45.2	38.8	10.1	38.8	55.3	73.9	18.6	100	0	
Hori.	12205.000	PK	45.3	39.6	11.3	39.1	57.1	73.9	16.8	100	0	
Hori.	1920.022	AV	41.1	26.5	14.2	41.2	40.6	53.9	13.3	100	287	
Hori.	2310.000	AV	36.7	26.8	14.6	41.1	37.0	53.9	16.9	100	31	
Hori.	2543.000	AV	37.0	27.0	15.0	41.1	37.9	53.9	16.0	119	144	
Hori.	2597.000	AV	36.5	27.1	15.0	41.1	37.5	53.9	16.4	100	167	
Hori.	4882.000	AV	39.1	31.4	7.9	41.1	37.3	53.9	16.6	100	343	
Hori.	7323.000	AV	35.4	37.2	9.1	41.1	40.6	53.9	13.3	100	0	
Hori.	9764.000	AV	33.0	38.8	10.1	38.8	43.1	53.9	10.8	100	0	
Hori.	12205.000	AV	33.7	39.6	11.3	39.1	45.5	53.9	8.4	100	0	
Vert.	47.991	QP	49.6	11.5	6.7	32.2	35.6	40.0	**4.4**	100	106	
Vert.	50.809	QP	41.6	10.5	6.8	32.2	26.7	40.0	13.3	100	120	
Vert.	138.716	QP	41.5	14.3	7.5	32.1	31.2	43.5	12.3	100	181	
Vert.	159.424	QP	39.6	14.8	7.7	32.1	30.0	43.5	13.5	100	182	
Vert.	1920.022	PK	48.1	26.5	14.2	41.2	47.6	73.9	26.3	100	320	
Vert.	2310.000	PK	47.7	26.8	14.6	41.1	48.0	73.9	25.9	100	1	
Vert.	2543.000	PK	46.7	27.0	15.0	41.1	47.6	73.9	26.3	100	220	
Vert.	2597.000	PK	46.4	27.1	15.0	41.1	47.4	73.9	26.5	141	232	
Vert.	4882.000	PK	49.5	31.4	7.9	41.1	47.7	73.9	26.2	100	143	
Vert.	7323.000	PK	47.3	37.2	9.1	41.1	52.5	73.9	21.4	100	0	
Vert.	9764.000	PK	45.0	38.8	10.1	38.8	55.1	73.9	18.8	100	0	
Vert.	12205.000	PK	45.6	39.6	11.3	39.1	57.4	73.9	16.5	100	0	
Vert.	1920.022	AV	38.0	26.5	14.2	41.2	37.5	53.9	16.4	100	320	
Vert.	2310.000	AV	38.0	26.8	14.6	41.1	38.3	53.9	15.6	100	1	
Vert.	2543.000	AV	35.8	27.0	15.0	41.1	36.7	53.9	17.2	100	220	
Vert.	2597.000	AV	35.4	27.1	15.0	41.1	36.4	53.9	17.5	141	232	
Vert.	4882.000	AV	40.3	31.4	7.9	41.1	38.5	53.9	15.4	100	143	
Vert.	7323.000	AV	35.5	37.2	9.1	41.1	40.7	53.9	13.2	100	0	
Vert.	9764.000	AV	33.0	38.8	10.1	38.8	43.1	53.9	10.8	100	0	
Vert.	12205.000	AV	33.8	39.6	11.3	39.1	45.6	53.9	8.3	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).

Radiated Emission

Test place	No.3 Semi Anechoic Chamber	
Date	December 5, 2013	December 6, 2013
Temperature / Humidity	24 deg.C, 31 %RH	23 deg.C, 33 %RH
Engineer	Hikaru Shirasawa	
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.	76.554	QP	47.4	6.3	7.0	32.1	28.6	40.0	11.4	255	264	
Hori.	120.678	QP	43.8	13.1	7.4	32.1	32.2	43.5	11.3	287	101	
Hori.	401.324	QP	39.4	16.4	9.0	32.0	32.8	46.0	13.2	100	123	
Hori.	960.000	QP	36.6	22.1	11.0	30.5	39.2	46.0	6.8	100	270	
Hori.	1920.000	PK	50.4	26.5	14.2	41.2	49.9	73.9	24.0	107	318	
Hori.	2323.000	PK	46.7	26.8	14.6	41.1	47.0	73.9	26.9	100	0	
Hori.	2483.500	PK	45.0	26.9	14.8	41.0	45.7	73.9	28.2	113	65	
Hori.	2583.000	PK	49.4	27.1	15.0	41.1	50.4	73.9	23.5	100	67	
Hori.	2637.000	PK	48.2	27.2	15.0	41.2	49.2	73.9	24.7	112	146	
Hori.	4960.000	PK	47.8	31.8	7.8	41.1	46.3	73.9	27.6	100	342	
Hori.	7440.000	PK	46.2	37.4	9.3	41.1	51.8	73.9	22.1	100	0	
Hori.	9920.000	PK	43.6	38.9	10.1	38.8	53.8	73.9	20.1	100	0	
Hori.	12400.000	PK	44.4	39.7	11.4	39.1	56.4	73.9	17.5	100	0	
Hori.	1920.000	AV	42.6	26.5	14.2	41.2	42.1	53.9	11.8	107	318	
Hori.	2323.000	AV	35.6	26.8	14.6	41.1	35.9	53.9	18.0	100	0	
Hori.	2483.500	AV	34.8	26.9	14.8	41.0	35.5	53.9	18.4	113	65	
Hori.	2583.000	AV	39.5	27.1	15.0	41.1	40.5	53.9	13.4	100	67	
Hori.	2637.000	AV	36.7	27.2	15.0	41.2	37.7	53.9	16.2	112	146	
Hori.	4960.000	AV	38.5	31.8	7.8	41.1	37.0	53.9	16.9	100	342	
Hori.	7440.000	AV	35.2	37.4	9.3	41.1	40.8	53.9	13.1	100	0	
Hori.	9920.000	AV	32.0	38.9	10.1	38.8	42.2	53.9	11.7	100	0	
Hori.	12400.000	AV	32.4	39.7	11.4	39.1	44.4	53.9	9.5	100	0	
Vert.	47.988	QP	49.5	11.5	6.7	32.2	35.5	40.0	**4.5**	100	109	
Vert.	50.804	QP	41.7	10.5	6.8	32.2	26.8	40.0	13.2	100	120	
Vert.	139.590	QP	41.7	14.3	7.5	32.1	31.4	43.5	12.1	101	207	
Vert.	172.912	QP	40.0	15.6	7.8	32.1	31.3	43.5	12.2	100	235	
Vert.	1920.000	PK	47.5	26.5	14.2	41.2	47.0	73.9	26.9	100	0	
Vert.	2323.000	PK	47.8	26.8	14.6	41.1	48.1	73.9	25.8	100	358	
Vert.	2483.500	PK	44.6	26.9	14.8	41.0	45.3	73.9	28.6	100	176	
Vert.	2583.000	PK	47.6	27.1	15.0	41.1	48.6	73.9	25.3	100	169	
Vert.	2637.000	PK	47.4	27.2	15.0	41.2	48.4	73.9	25.5	100	330	
Vert.	4960.000	PK	48.8	31.8	7.8	41.1	47.3	73.9	26.6	100	149	
Vert.	7440.000	PK	46.0	37.4	9.3	41.1	51.6	73.9	22.3	100	0	
Vert.	9920.000	PK	43.5	38.9	10.1	38.8	53.7	73.9	20.2	100	0	
Vert.	12400.000	PK	44.3	39.7	11.4	39.1	56.3	73.9	17.6	100	0	
Vert.	1920.000	AV	37.0	26.5	14.2	41.2	36.5	53.9	17.4	100	0	
Vert.	2323.000	AV	37.6	26.8	14.6	41.1	37.9	53.9	16.0	100	358	
Vert.	2483.500	AV	34.7	26.9	14.8	41.0	35.4	53.9	18.5	100	176	
Vert.	2583.000	AV	36.5	27.1	15.0	41.1	37.5	53.9	16.4	100	169	
Vert.	2637.000	AV	36.4	27.2	15.0	41.2	37.4	53.9	16.5	100	330	
Vert.	4960.000	AV	39.6	31.8	7.8	41.1	38.1	53.9	15.8	100	149	
Vert.	7440.000	AV	35.2	37.4	9.3	41.1	40.8	53.9	13.1	100	0	
Vert.	9920.000	AV	32.0	38.9	10.1	38.8	42.2	53.9	11.7	100	0	
Vert.	12400.000	AV	32.5	39.7	11.4	39.1	44.5	53.9	9.4	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)

Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

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

Radiated Emission

Test place	No.3 Semi Anechoic Chamber	
Date	December 5, 2013	December 6, 2013
Temperature / Humidity	24 deg.C, 31 %RH	23 deg.C, 33 %RH
Engineer	Hikaru Shirasawa	
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.	76.549	QP	47.3	6.3	7.0	32.1	28.5	40.0	11.5	253	281	
Hori.	118.876	QP	44.0	12.9	7.4	32.1	32.2	43.5	11.3	318	265	
Hori.	401.324	QP	39.5	16.4	9.0	32.0	32.9	46.0	13.1	100	121	
Hori.	960.000	QP	36.7	22.1	11.0	30.5	39.3	46.0	6.7	100	263	
Hori.	1920.000	PK	50.2	26.5	14.2	41.2	49.7	73.9	24.2	147	278	
Hori.	2390.000	PK	44.3	26.8	14.7	41.1	44.7	73.9	29.2	134	191	
Hori.	2400.000	PK	47.2	26.8	14.7	41.1	47.6	73.9	26.3	134	191	
Hori.	2507.000	PK	46.7	26.9	14.9	41.0	47.5	73.9	26.4	100	0	
Hori.	2533.000	PK	46.6	27.0	14.9	41.1	47.4	73.9	26.5	100	145	
Hori.	2557.000	PK	46.3	27.0	15.0	41.1	47.2	73.9	26.7	100	179	
Hori.	4804.000	PK	49.7	30.9	7.9	41.2	47.3	73.9	26.6	100	273	
Hori.	7206.000	PK	47.7	37.1	9.1	41.0	52.9	73.9	21.0	100	0	
Hori.	9608.000	PK	44.6	38.6	10.2	38.9	54.5	73.9	19.4	100	0	
Hori.	12010.000	PK	48.8	39.6	11.2	39.1	60.5	73.9	13.4	100	0	
Hori.	1920.000	AV	42.1	26.5	14.2	41.2	41.6	53.9	12.3	147	278	
Hori.	2390.000	AV	34.7	26.8	14.7	41.1	35.1	53.9	18.8	134	191	
Hori.	2400.000	AV	37.0	26.8	14.7	41.1	37.4	53.9	16.5	134	191	
Hori.	2507.000	AV	35.1	26.9	14.9	41.0	35.9	53.9	18.0	100	0	
Hori.	2533.000	AV	35.4	27.0	14.9	41.1	36.2	53.9	17.7	100	145	
Hori.	2557.000	AV	35.3	27.0	15.0	41.1	36.2	53.9	17.7	100	179	
Hori.	4804.000	AV	36.3	30.9	7.9	41.2	33.9	53.9	20.0	100	273	
Hori.	7206.000	AV	36.1	37.1	9.1	41.0	41.3	53.9	12.6	100	0	
Hori.	9608.000	AV	33.6	38.6	10.2	38.9	43.5	53.9	10.4	100	0	
Hori.	12010.000	AV	35.0	39.6	11.2	39.1	46.7	53.9	7.2	100	0	
Vert.	47.828	QP	49.4	11.6	6.7	32.2	35.5	40.0	**4.5**	100	125	
Vert.	50.807	QP	41.4	10.5	6.8	32.2	26.5	40.0	13.5	100	163	
Vert.	138.685	QP	41.5	14.3	7.5	32.1	31.2	43.5	12.3	100	219	
Vert.	156.693	QP	41.0	14.8	7.7	32.1	31.4	43.5	12.1	100	170	
Vert.	1920.000	PK	47.7	26.5	14.2	41.2	47.2	73.9	26.7	100	56	
Vert.	2390.000	PK	44.5	26.8	14.7	41.1	44.9	73.9	29.0	124	304	
Vert.	2400.000	PK	49.1	26.8	14.7	41.1	49.5	73.9	24.4	124	304	
Vert.	2507.000	PK	47.8	26.9	14.9	41.0	48.6	73.9	25.3	100	0	
Vert.	2533.000	PK	46.8	27.0	14.9	41.1	47.6	73.9	26.3	100	0	
Vert.	2557.000	PK	46.3	27.0	15.0	41.1	47.2	73.9	26.7	100	0	
Vert.	4804.000	PK	49.3	30.9	7.9	41.2	46.9	73.9	27.0	100	184	
Vert.	7206.000	PK	48.5	37.1	9.1	41.0	53.7	73.9	20.2	100	0	
Vert.	9608.000	PK	45.0	38.6	10.2	38.9	54.9	73.9	19.0	100	0	
Vert.	12010.000	PK	48.1	39.6	11.2	39.1	59.8	73.9	14.1	100	0	
Vert.	1920.000	AV	36.3	26.5	14.2	41.2	35.8	53.9	18.1	100	56	
Vert.	2390.000	AV	34.6	26.8	14.7	41.1	35.0	53.9	18.9	124	304	
Vert.	2400.000	AV	37.4	26.8	14.7	41.1	37.8	53.9	16.1	124	304	
Vert.	2507.000	AV	35.0	26.9	14.9	41.0	35.8	53.9	18.1	100	0	
Vert.	2533.000	AV	34.8	27.0	14.9	41.1	35.6	53.9	18.3	100	0	
Vert.	2557.000	AV	34.6	27.0	15.0	41.1	35.5	53.9	18.4	100	0	
Vert.	4804.000	AV	38.4	30.9	7.9	41.2	36.0	53.9	17.9	100	184	
Vert.	7206.000	AV	36.0	37.1	9.1	41.0	41.2	53.9	12.7	100	0	
Vert.	9608.000	AV	33.5	38.6	10.2	38.9	43.4	53.9	10.5	100	0	
Vert.	12010.000	AV	34.7	39.6	11.2	39.1	46.4	53.9	7.5	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).

Radiated Emission

Test place	No.3 Semi Anechoic Chamber	
Date	December 5, 2013	December 6, 2013
Temperature / Humidity	24 deg.C, 31 %RH	23 deg.C, 33 %RH
Engineer	Hikaru Shirasawa	
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.	76.545	QP	47.3	6.3	7.0	32.1	28.5	40.0	11.5	251	279	
Hori.	120.674	QP	44.0	13.1	7.4	32.1	32.4	43.5	11.1	270	86	
Hori.	401.314	QP	39.5	16.4	9.0	32.0	32.9	46.0	13.1	100	134	
Hori.	960.000	QP	36.6	22.1	11.0	30.5	39.2	46.0	6.8	100	265	
Hori.	1920.000	PK	51.2	26.5	14.2	41.2	50.7	73.9	23.2	100	322	
Hori.	2337.000	PK	47.0	26.8	14.6	41.1	47.3	73.9	26.6	100	0	
Hori.	2543.000	PK	46.4	27.0	15.0	41.1	47.3	73.9	26.6	100	159	
Hori.	2597.000	PK	46.5	27.1	15.0	41.1	47.5	73.9	26.4	100	81	
Hori.	4882.000	PK	48.2	31.4	7.9	41.1	46.4	73.9	27.5	100	67	
Hori.	7323.000	PK	47.2	37.2	9.1	41.1	52.4	73.9	21.5	100	0	
Hori.	9764.000	PK	45.1	38.8	10.1	38.8	55.2	73.9	18.7	100	0	
Hori.	12205.000	PK	45.4	39.6	11.3	39.1	57.2	73.9	16.7	100	0	
Hori.	1920.000	AV	42.2	26.5	14.2	41.2	41.7	53.9	12.2	100	322	
Hori.	2337.000	AV	34.7	26.8	14.6	41.1	35.0	53.9	18.9	100	0	
Hori.	2543.000	AV	35.2	27.0	15.0	41.1	36.1	53.9	17.8	100	159	
Hori.	2597.000	AV	35.7	27.1	15.0	41.1	36.7	53.9	17.2	100	81	
Hori.	4882.000	AV	38.0	31.4	7.9	41.1	36.2	53.9	17.7	100	67	
Hori.	7323.000	AV	35.3	37.2	9.1	41.1	40.5	53.9	13.4	100	0	
Hori.	9764.000	AV	33.0	38.8	10.1	38.8	43.1	53.9	10.8	100	0	
Hori.	12205.000	AV	33.6	39.6	11.3	39.1	45.4	53.9	8.5	100	0	
Vert.	47.986	QP	49.5	11.5	6.7	32.2	35.5	40.0	**4.5**	100	84	
Vert.	50.812	QP	41.5	10.5	6.8	32.2	26.6	40.0	13.4	100	124	
Vert.	138.679	QP	41.6	14.3	7.5	32.1	31.3	43.5	12.2	100	210	
Vert.	170.198	QP	40.3	15.4	7.7	32.1	31.3	43.5	12.2	100	237	
Vert.	1920.000	PK	46.8	26.5	14.2	41.2	46.3	73.9	27.6	100	158	
Vert.	2337.000	PK	47.0	26.8	14.6	41.1	47.3	73.9	26.6	100	345	
Vert.	2543.000	PK	47.0	27.0	15.0	41.1	47.9	73.9	26.0	100	0	
Vert.	2597.000	PK	46.5	27.1	15.0	41.1	47.5	73.9	26.4	100	0	
Vert.	4882.000	PK	48.4	31.4	7.9	41.1	46.6	73.9	27.3	100	161	
Vert.	7323.000	PK	47.5	37.2	9.1	41.1	52.7	73.9	21.2	100	0	
Vert.	9764.000	PK	45.0	38.8	10.1	38.8	55.1	73.9	18.8	100	0	
Vert.	12205.000	PK	45.5	39.6	11.3	39.1	57.3	73.9	16.6	100	0	
Vert.	1920.000	AV	36.3	26.5	14.2	41.2	35.8	53.9	18.1	100	158	
Vert.	2337.000	AV	36.3	26.8	14.6	41.1	36.6	53.9	17.3	100	345	
Vert.	2543.000	AV	34.7	27.0	15.0	41.1	35.6	53.9	18.3	100	0	
Vert.	2597.000	AV	34.6	27.1	15.0	41.1	35.6	53.9	18.3	100	0	
Vert.	4882.000	AV	38.8	31.4	7.9	41.1	37.0	53.9	16.9	100	161	
Vert.	7323.000	AV	35.6	37.2	9.1	41.1	40.8	53.9	13.1	100	0	
Vert.	9764.000	AV	33.1	38.8	10.1	38.8	43.2	53.9	10.7	100	0	
Vert.	12205.000	AV	33.8	39.6	11.3	39.1	45.6	53.9	8.3	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)
Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).

Radiated Emission

Test place	No.3 Semi Anechoic Chamber	
Date	December 5, 2013	December 6, 2013
Temperature / Humidity	24 deg.C, 31 %RH	23 deg.C, 33 %RH
Engineer	Hikaru Shirasawa	
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.	76.539	QP	47.2	6.3	7.0	32.1	28.4	40.0	11.6	222	283	
Hori.	120.669	QP	43.0	13.1	7.4	32.1	31.4	43.5	12.1	284	103	
Hori.	401.324	QP	39.5	16.4	9.0	32.0	32.9	46.0	13.1	100	141	
Hori.	960.000	QP	36.6	22.1	11.0	30.5	39.2	46.0	6.8	100	271	
Hori.	1920.000	PK	51.1	26.5	14.2	41.2	50.6	73.9	23.3	100	326	
Hori.	2350.000	PK	46.8	26.8	14.7	41.1	47.2	73.9	26.7	100	0	
Hori.	2483.500	PK	44.5	26.9	14.8	41.0	45.2	73.9	28.7	106	60	
Hori.	2583.000	PK	47.3	27.1	15.0	41.1	48.3	73.9	25.6	100	163	
Hori.	2637.000	PK	46.6	27.2	15.0	41.2	47.6	73.9	26.3	100	0	
Hori.	4960.000	PK	48.2	31.8	7.8	41.1	46.7	73.9	27.2	133	160	
Hori.	7440.000	PK	46.2	37.4	9.3	41.1	51.8	73.9	22.1	100	0	
Hori.	9920.000	PK	43.7	38.9	10.1	38.8	53.9	73.9	20.0	100	0	
Hori.	12400.000	PK	44.3	39.7	11.4	39.1	56.3	73.9	17.6	100	0	
Hori.	1920.000	AV	42.7	26.5	14.2	41.2	42.2	53.9	11.7	100	326	
Hori.	2350.000	AV	35.0	26.8	14.7	41.1	35.4	53.9	18.5	100	0	
Hori.	2483.500	AV	34.7	26.9	14.8	41.0	35.4	53.9	18.5	106	60	
Hori.	2583.000	AV	35.3	27.1	15.0	41.1	36.3	53.9	17.6	100	163	
Hori.	2637.000	AV	34.5	27.2	15.0	41.2	35.5	53.9	18.4	100	0	
Hori.	4960.000	AV	36.7	31.8	7.8	41.1	35.2	53.9	18.7	133	160	
Hori.	7440.000	AV	35.1	37.4	9.3	41.1	40.7	53.9	13.2	100	0	
Hori.	9920.000	AV	32.1	38.9	10.1	38.8	42.3	53.9	11.6	100	0	
Hori.	12400.000	AV	32.3	39.7	11.4	39.1	44.3	53.9	9.6	100	0	
Vert.	47.987	QP	49.6	11.5	6.7	32.2	35.6	40.0	**4.4**	100	105	
Vert.	50.810	QP	41.6	10.5	6.8	32.2	26.7	40.0	13.3	100	88	
Vert.	139.577	QP	41.7	14.3	7.5	32.1	31.4	43.5	12.1	100	217	
Vert.	174.705	QP	40.5	15.7	7.8	32.1	31.9	43.5	11.6	100	109	
Vert.	1920.000	PK	46.7	26.5	14.2	41.2	46.2	73.9	27.7	100	235	
Vert.	2350.000	PK	46.7	26.8	14.7	41.1	47.1	73.9	26.8	100	150	
Vert.	2483.500	PK	45.2	26.9	14.8	41.0	45.9	73.9	28.0	121	309	
Vert.	2583.000	PK	46.8	27.1	15.0	41.1	47.8	73.9	26.1	100	42	
Vert.	2637.000	PK	46.4	27.2	15.0	41.2	47.4	73.9	26.5	100	0	
Vert.	4960.000	PK	47.6	31.8	7.8	41.1	46.1	73.9	27.8	100	175	
Vert.	7440.000	PK	45.8	37.4	9.3	41.1	51.4	73.9	22.5	100	0	
Vert.	9920.000	PK	43.6	38.9	10.1	38.8	53.8	73.9	20.1	100	0	
Vert.	12400.000	PK	44.4	39.7	11.4	39.1	56.4	73.9	17.5	100	0	
Vert.	1920.000	AV	37.1	26.5	14.2	41.2	36.6	53.9	17.3	100	235	
Vert.	2350.000	AV	35.0	26.8	14.7	41.1	35.4	53.9	18.5	100	150	
Vert.	2483.500	AV	34.6	26.9	14.8	41.0	35.3	53.9	18.6	121	309	
Vert.	2583.000	AV	34.5	27.1	15.0	41.1	35.5	53.9	18.4	100	42	
Vert.	2637.000	AV	34.6	27.2	15.0	41.2	35.6	53.9	18.3	100	0	
Vert.	4960.000	AV	35.3	31.8	7.8	41.1	33.8	53.9	20.1	100	175	
Vert.	7440.000	AV	35.1	37.4	9.3	41.1	40.7	53.9	13.2	100	0	
Vert.	9920.000	AV	32.1	38.9	10.1	38.8	42.3	53.9	11.6	100	0	
Vert.	12400.000	AV	32.5	39.7	11.4	39.1	44.5	53.9	9.4	100	0	

Result = Reading + Ant.Fac. + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier)

Distance factor : 15GHz -40GHz : 20log(3.0m/1.0m)= 9.5dB

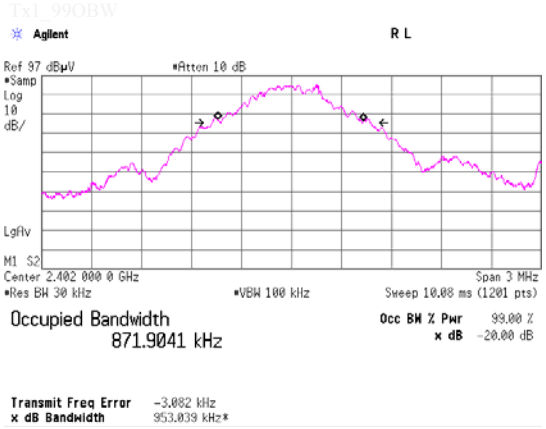
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).

Test place: UL Japan, Inc. Shonan EMC Lab. No.1 Mesurement room
Date: November 26, 2013
Temperature / Humidity: 23deg.C , 51%RH
Engineer: Makoto Hosaka

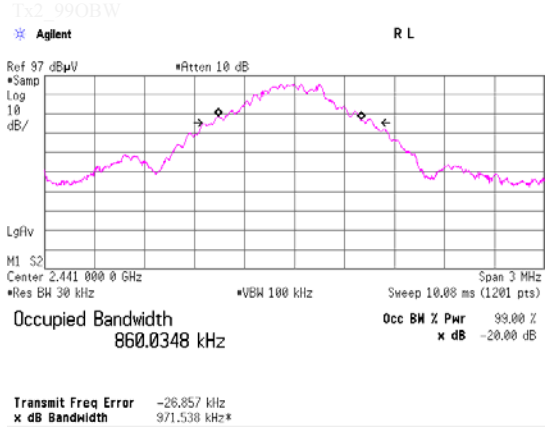
99% Occupied Bandwidth

Tx, Bluetooth, BDR, PRBS9

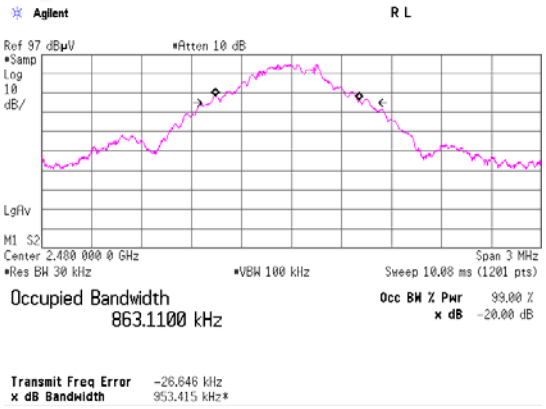
Tx, 2402MHz



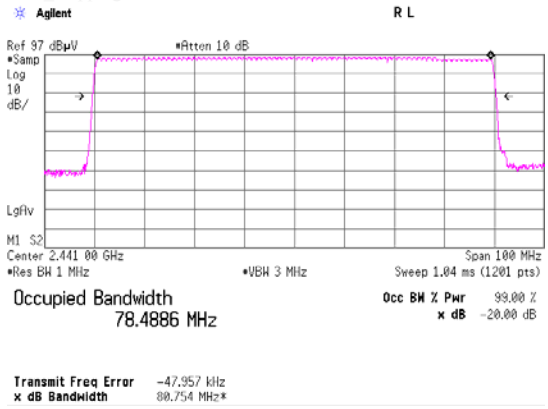
Tx, 2441MHz



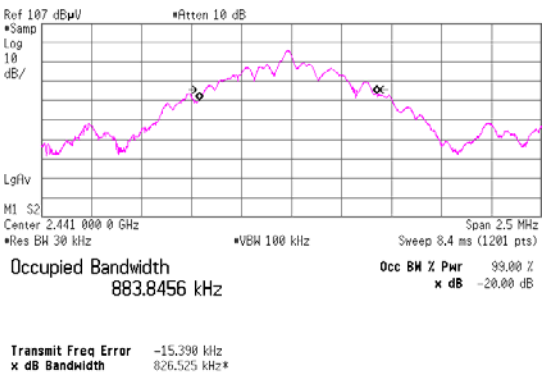
Tx, 2480MHz



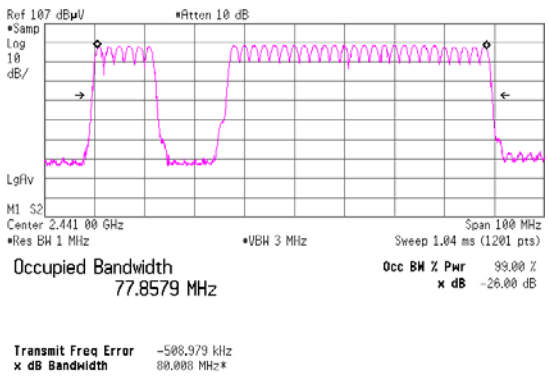
Tx, Hopping On



(Reference) Tx, Inquiry



(Reference) Tx, Inquiry, Hopping



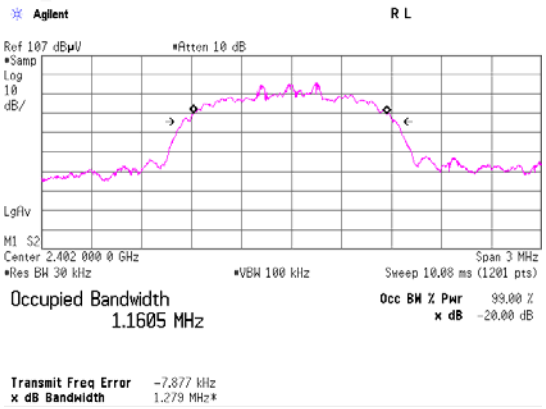
Test place: UL Japan, Inc. Shonan EMC Lab. No.1 Mesurement room
Date: November 26, 2013
Temperature / Humidity: 23deg.C , 51%RH
Engineer: Makoto Hosaka

99% Occupied Bandwidth

Tx, Bluetooth, EDR, PRBS9

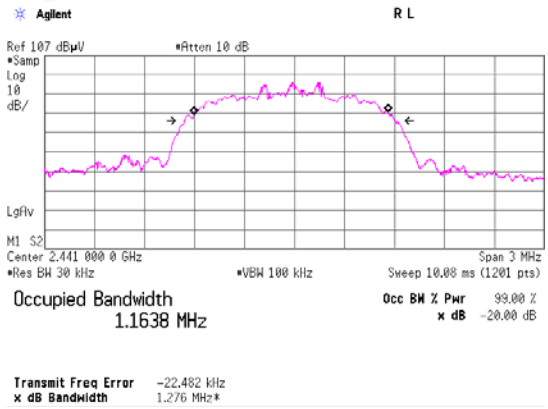
Tx, 2402MHz

Tx1_99OBW



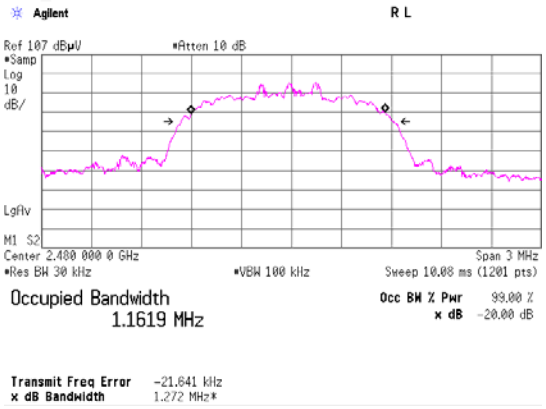
Tx, 2441MHz

Tx2_99OBW



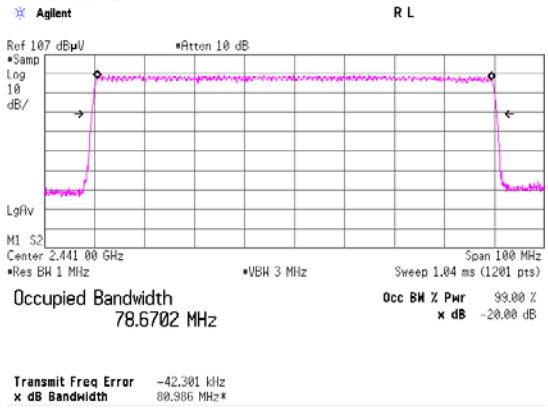
Tx, 2480MHz

Tx3_99OBW



Tx, Hopping On

Tx2_Hopping99OBW



Tx2_Inquiry99OBW

Tx2_InqHopping99OBW

APPENDIX 2
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2013/04/09 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2013/04/09 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	AT	2013/03/28 * 12
SAT10-11	Attenuator	Weinschel Corp.	54A-10	37588	AT	2013/04/09 * 12
SCC-G12	Coaxial Cable	Suhner	SUCOFLEX 102	30790/2	AT	2013/03/16 * 12
SOS-13	Humidity Indicator	Custom	CTH-202	Q.C.17	AT	2013/04/25 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2013/07/09 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2013/07/22 * 12
SCC-G03	Coaxial Cable	Suhner	SUCOFLEX 104A	46499/4A	RE	2013/04/11 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2013/05/22 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2013/08/19 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2013/02/27 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	2013/03/28 * 12
SJM-11	Measure	PROMART	SEN1935	-	RE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE, RFI,MF)	-	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
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2013/02/12 * 12
SAT6-06	Attenuator	JFW	50HF-006N	-	RE	2013/02/12 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2013/10/26 * 12
SCC-C1/C2/C3/C4/C5/C10/SRSE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-271(RF Selector)	RE	2013/04/03 * 12
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0901	RE	2013/10/26 * 12
STR-06	Test Receiver	Rohde & Schwarz	ESCI	101259	RE	2013/02/27 * 12
SHA-05	Horn Antenna	ETS LINDGREN	3160-09	LM4210	RE	2013/03/14 * 12
SAF-09	Pre Amplifier	TOYO Corporation	HAP18-26W	00000018	RE	2013/03/19 * 12
SCC-G18	Coaxial Cable	Suhner	SUCOFLEX 104A	46292/4A	RE	2013/03/16 * 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: Radiated emission ,
AT: Antenna terminal conducted