RADIO TEST REPORT

Test Report No.: 32EE0124-SH-01-A

Applicant	:	**PIONEER CORPORATION**
Type of Equipment	:	**CD RDS RECEIVER**
Model No.	:	**DEH-80PRS**
FCC ID	:	**AJDK047**
Test regulation	:	**FCC Part15 Subpart C: 2012**
Test result	:	**Complied**

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3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
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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: January 13 to 18, 2012

Tested by: S. Takano

Shinichi Takano
Engineer of WiSE Japan,
UL Verification Service

Approved by : I. Isozaki

Ichiro Isozaki
Leader of WiSE Japan,
UL Verification Service

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JAB Testing RTL02610

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REVISION HISTORY

Original Test Report No.: 32EE0124-SH-01-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	32EE0124-SH-01-A	February 7, 2012	-	-
1	32EE0124-SH-01-A	February 14, 2012	P1-2, 13, 50-51	Addition: - Comment about AV detection - Comment about pre-check for worst-case - Comment about emission in restricted bands

Contents

Page

SECTION 1: Customer information **4**

SECTION 2: Equipment under test (E.U.T.) **4**

SECTION 3: Test specification, procedures & results **6**

SECTION 4: Operation of E.U.T. during testing **9**

SECTION 5: Carrier frequency separation **12**

SECTION 6: 20dB bandwidth & Occupied bandwidth (99%) **12**

SECTION 7: Number of hopping frequency **12**

SECTION 8: Dwell time **12**

SECTION 9: Maximum peak output power **12**

SECTION 10: Spurious emissions (Antenna port conducted) **12**

SECTION 11: Radiated emission **13**

Contents of APPENDIXES **15**

APPENDIX 1: Data of radio tests **16**

APPENDIX 2: Test instruments **54**

APPENDIX 3: Photographs of test setup **55**

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	:	Makoto Kaieda

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

2.1 Identification of E.U.T.

Type of Equipment	:	CD RDS RECEIVER
Model No.	:	DEH-80PRS
Serial No.	:	See Section 4
Rating	:	DC 14.4V
Country of Mass-production	:	Thailand
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	:	January 13, 2012

2.2 Product description

Model: DEH-80PRS (referred to as the EUT in this report) is a CD RDS RECEIVER.

Clock Frequency:
SYSTEM MICRO: 20MHz, DSP: 16.9344MHz, MEDIA MICRO: 48MHz, GRILL MICRO: 16MHz,
Tuner: 36.48MHz (VCO: 2.5~3.3GHz) Bluetooth module OSC: 26MHz

Equipment type	:	Transceiver
Frequency of operation	:	2402-2480MHz
Bandwidth & channel spacing	:	1MHz
Type of modulation	:	GFSK, π/4DQPSK, 8DPSK
Antenna type	:	PWB Pattern antenna
Antenna gain with cable loss	:	-7.0dBi (max)
Antenna connector type	:	None
Operation temperature range	:	-10 to +60 deg.C.

FCC 15.31 (e)
The equipment provides the Bluetooth transmitter with stable power supply (DC1.8V and DC3.3V). Therefore, the equipment complies with the requirement.

FCC 15.203
The equipment and its antenna comply with this requirement since this 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: 2012, final revised on February 1, 2012
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 revision on February 1, 2012 does not affect the test specification applied to the EUT.
The EUT complies with FCC Part 15 Subpart B. The test is performed by the customer.

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)	-	N/A
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	7.0dB Freq.: 4090.558MHz Polarization: Horizontal Detection: Average Mode: Tx 2441MHz, 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	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	4.9 dB	5.1 dB	5.0 dB
	300MHz-1GHz	5.0 dB	5.2 dB	5.0 dB
	1GHz-15GHz	4.8 dB	4.8 dB	4.9 dB
Radiated emission (Measurement distance: 1m)	15GHz-18GHz	5.6 dB	5.6 dB	5.6 dB
	18GHz-40GHz	4.8 dB	4.3 dB	4.4 dB

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

Radiated emission test

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

Antenna port conducted test

Power measurement uncertainty above 1GHz for this test was: (±) 1.9dB
Spurious emission (Conducted) measurement (below 1GHz) uncertainty for this test was: (±) 1.8dB
Spurious emission (Conducted) measurement (1G-3GHz) uncertainty for this test was: (±) 2.3dB
Spurious emission (Conducted) measurement (3G-18GHz) uncertainty for this test was: (±) 3.6dB
Spurious emission (Conducted) measurement (18G-26.5GHz) uncertainty for this test was: (±) 4.0dB
Bandwidth measurement uncertainty for this test was: (±) 5.4%

3.5 Test location

UL Japan, Inc. Shonan EMC Lab.
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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 Full-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	-

3.6 Test setup, Data of EMI & 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 (DH5/3DH5)/Inquiry, Payload: PRBS9	-
20dB bandwidth	Transmitting Hopping OFF (DH5/3DH5)/Inquiry, Payload: PRBS9	2402MHz, 2441MHz, 2480MHz
Number of hopping frequency	Transmitting Hopping ON (DH5/3DH5)/Inquiry, Payload: PRBS9	-
Dwell time	Transmitting (Hopping ON), Payload: PRBS9 -DH1, -DH3, -DH5 -3DH1, -3DH3, -3DH5	-
	-Inquiry	
Maximum peak output power	Transmitting (Hopping OFF), Payload: PRBS9 -DH5, -2DH5, -3DH5	2402MHz, 2441MHz, 2480MHz
Band edge compliance & Spurious emission (Conducted)	Transmitting (DH5/3DH5), Payload: PRBS9 -Hopping ON -Hopping OFF	Band edge compliance: 2402MHz, 2480MHz Spurious emission:
(Radiated)	Transmitting (DH5/3DH5), Payload: PRBS9	2402MHz, 2441MHz, 2480MHz
99% occupied bandwidth	Transmitting (DH5/3DH5), Payload: PRBS9 -Hopping ON -Hopping OFF	2402MHz, 2441MHz, 2480MHz

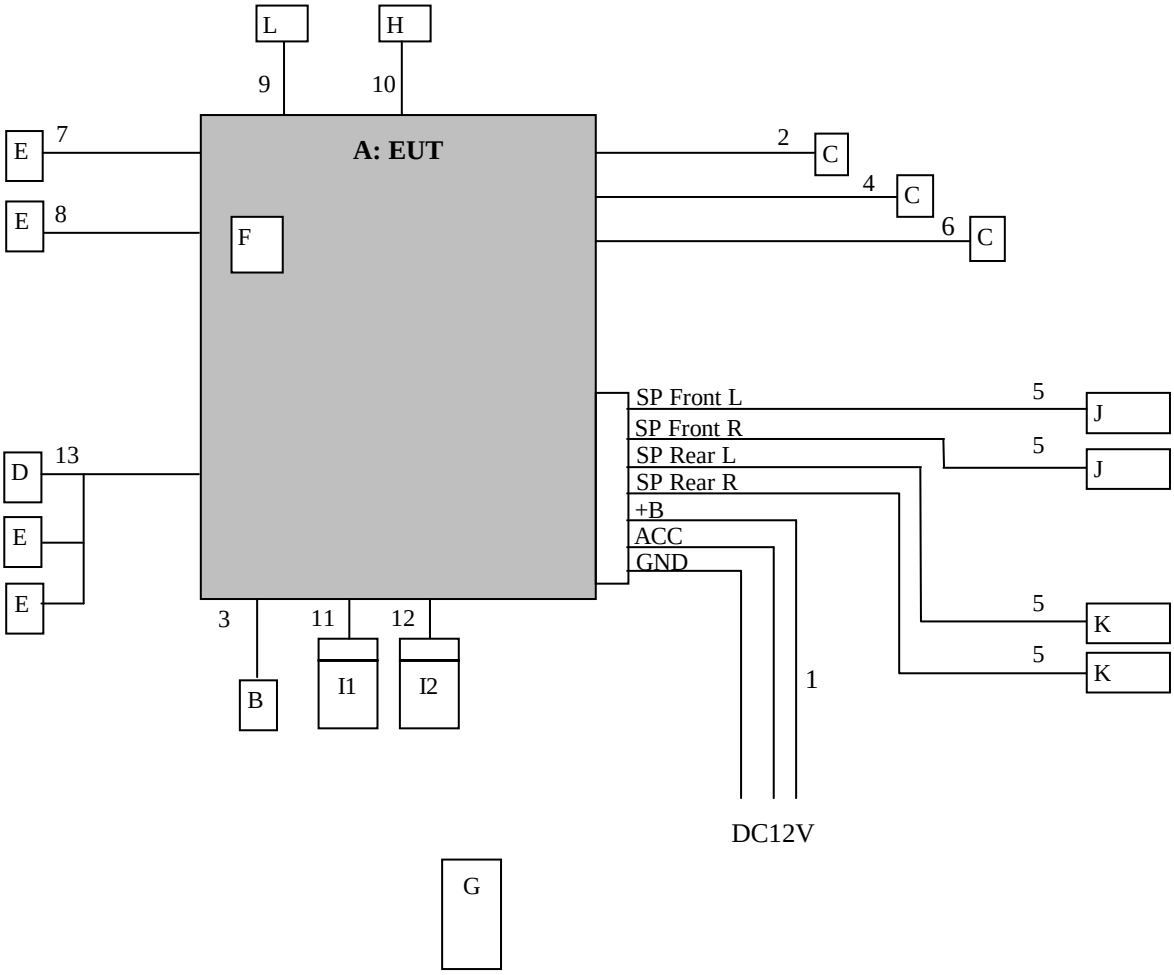
*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload (except Dwell time test).

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

*EUT has the power settings by the software as follows;
Power settings: 4
Software: CWW3775

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

4.2 Configuration of tested system



* Test data was taken under worse case conditions.

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	CD RDS RECEIVER	DEH-80PRS	KJTM000025UC *1) KJTM000026UC *2)	Pioneer	EUT
B	Terminal Resister (75ohm)	-	-	-	-
C	Terminal Resister (15kohm)	-	-	-	-
D	Terminal Resister (75ohm)	-	-	-	-
E	Terminal Resister (1kohm)	-	-	-	-
F	SDHC MEMORY CARD	MF-FSDH08GC6	-	ELECOM	-
G	Remote Controller	QXE1044	-	Pioneer	-
H	Wired Remote	RM-X2S	-	SONY	-
I1	USB Memory	RUF3-S16GS-BK	-	BUFFALO	-
I2	USB Memory	-	-	TDK	-
J	Terminal Resister (4ohm)	-	-	-	-
K	Speaker	TS-X350	-	Pioneer	-
L	Hands-Free Microphone	-	-	Pioneer	-

*1) Used for Antenna terminal conducted tests
*2) Used for Radiated emission tests

List of cables used

No.	Cable name	Length (m)	Shield		Remark
			Cable	Connector	
1	DC	2.2	Unshielded	Unshielded	Packaged with EUT
2	RCA	6.0	Unshielded	Unshielded	SW L / SW R
3	Antenna	0.4	Shielded	Shielded	-
4	RCA	6.0	Unshielded	Unshielded	FL / FR
5	Speaker	6.4	Unshielded	Unshielded	-
6	RCA	6.0	Unshielded	Unshielded	RL / RR
7	RCA	1.7	Unshielded	Unshielded	R
8	RCA	1.7	Unshielded	Unshielded	L
9	MIC	4.0	Shielded	Shielded	Packaged with EUT
10	Wired remote	1.9	Unshielded	Unshielded	W / R
11	USB extension	1.5	Shielded	Shielded	Packaged with EUT
12	USB extension	1.5	Shielded	Shielded	-
13	Quads mini Jack	3.0	Unshielded	Unshielded	AUX

*All cables used for the measurement are exclusive use or marketed.

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

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

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

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

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

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

SECTION 11: Radiated emission

11.1 Operating environment

The test was carried out in No. 3 Semi-Anechoic Chamber.

Temperature : See test data (APPENDIX)
Humidity : See test data (APPENDIX)

11.2 Test configuration

EUT was placed on a platform of nominal size, 1m by 1.5m, 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.
Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.
Photographs of the set up are shown in APPENDIX.

11.3 Test conditions

Frequency range : 30MHz to 25GHz
Test distance : 3m (below 15GHz) / 1m (above 15GHz)
EUT position : Table top

11.4 Test procedure

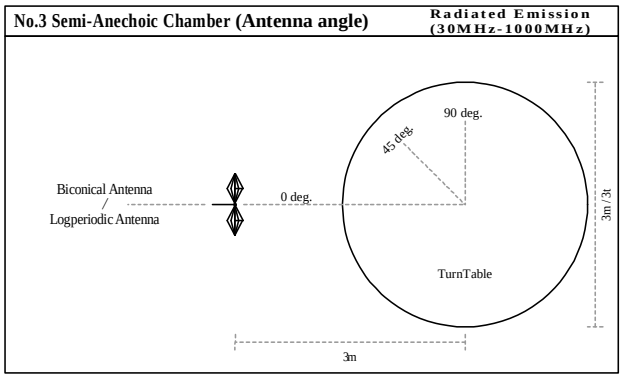
The Radiated Electric Field Strength intensity has been measured on a semi-anechoic chamber with a ground plane and at a distance of 3m (below 15GHz) / 1m (above 15GHz) (Refer to Figure 1). Measurements were performed with quasi-peak, peak and average detector. The measuring antenna height was varied 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 of the test receiver.

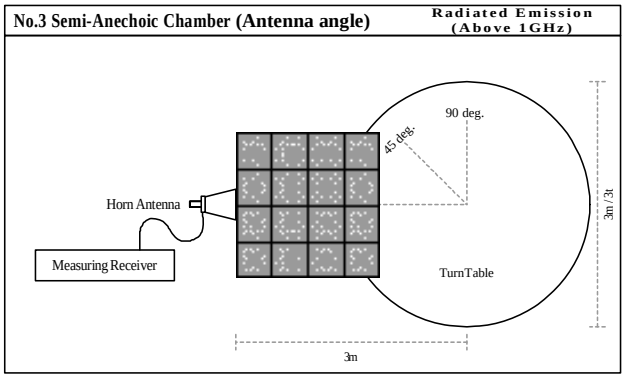
Frequency		30 - 1000MHz	1 - 25GHz	
Detection Type	:	Quasi-Peak	Peak	* Average
IF Bandwidth	:	120kHz	RBW:1MHz/VBW:3MHz	RBW:1MHz/VBW:10Hz

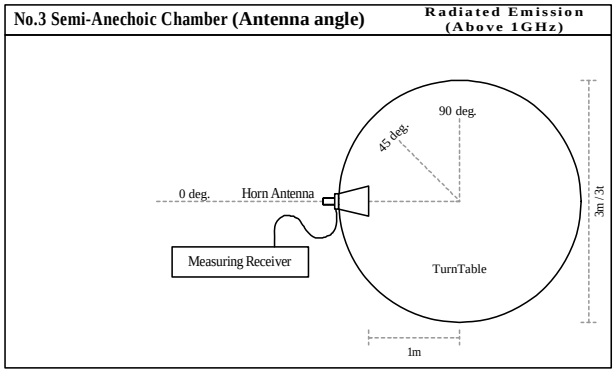
* When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.
Although 00-705 accepts VBW=10Hz for AV measurements, confirmed that superfluous smoothing was not performed.

The carrier level and noise levels were confirmed at angle of 0 to 60 deg. based on the product specification to see the position of maximum noise, and the test was made at the position (0 deg.) that has the maximum noise.

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

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
Radiated emission
Spurious emission (Antenna port conducted)
Occupied Bandwidth

APPENDIX 2: Test instruments

Test instruments

APPENDIX 3: Photographs of test setup

Radiated emission

20dB Bandwidth and Carrier Frequency Separation

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	January 13, 2012	
Temperature / Humidity	22deg.C , 28%RH	
Engineer	Shinichi Takano	
Mode	Tx, Bluetooth, BDR, PRBS9	

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency Separation [MHz]
DH5	2402.0	0.943	1.000	>= 0.628
DH5	2441.0	0.945	1.000	>= 0.630
DH5	2480.0	0.958	1.005	>= 0.638
Inquiry	2441.0	0.810	2.004	>= 0.540

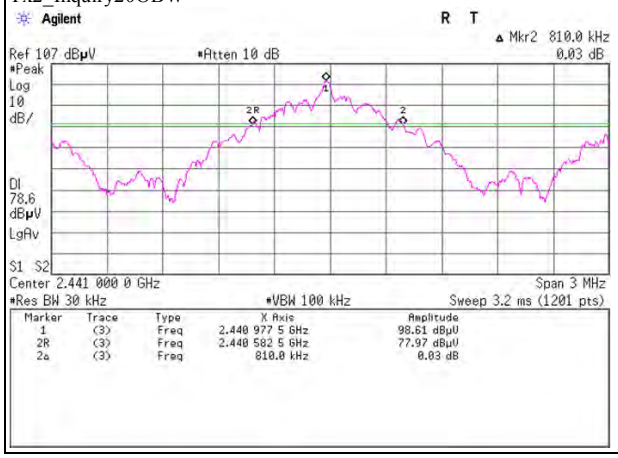
Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).
No limit applies to 20dB Bandwidth.

Inquiry

20dB Bandwidth

Tx, 2441MHz

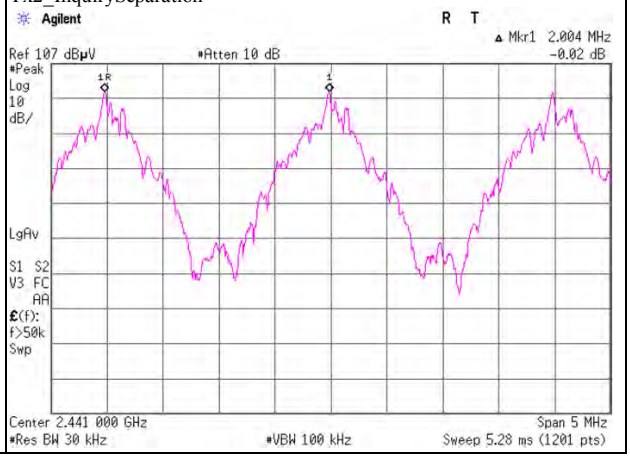
Tx2_Inquiry20OBW



Carrier Frequency Separation

Tx, 2441MHz

Tx2_InquirySeparation



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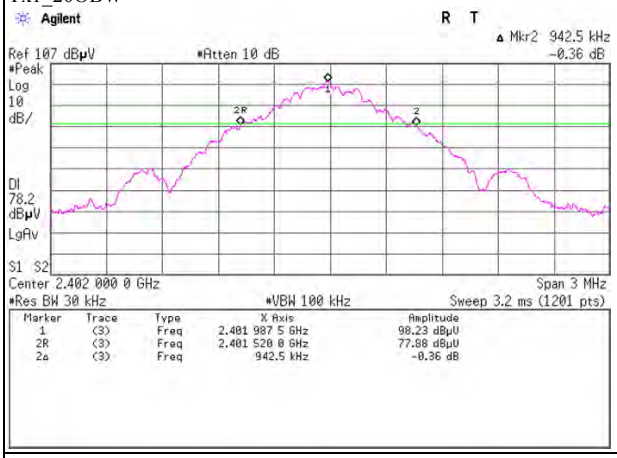
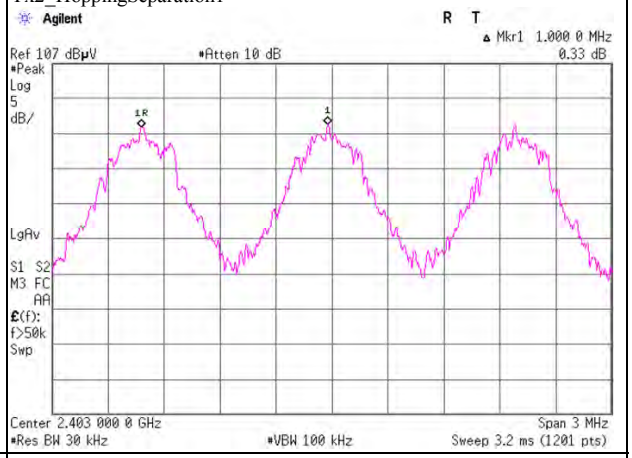
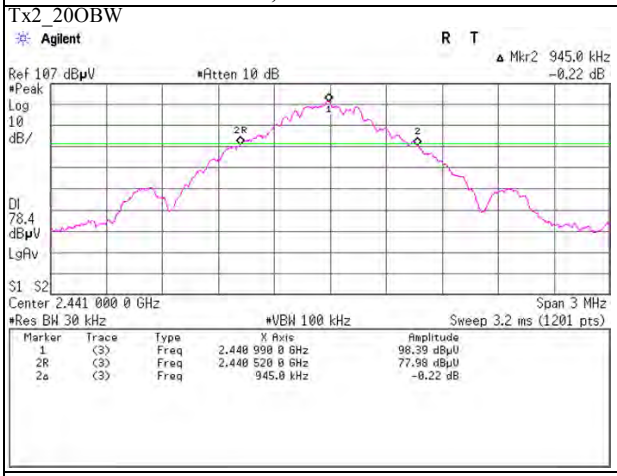
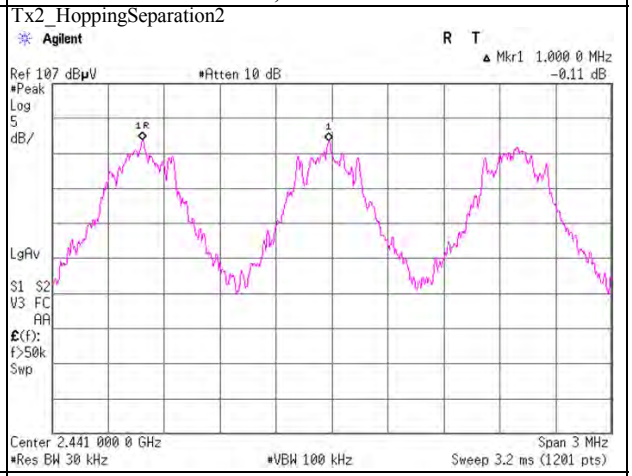
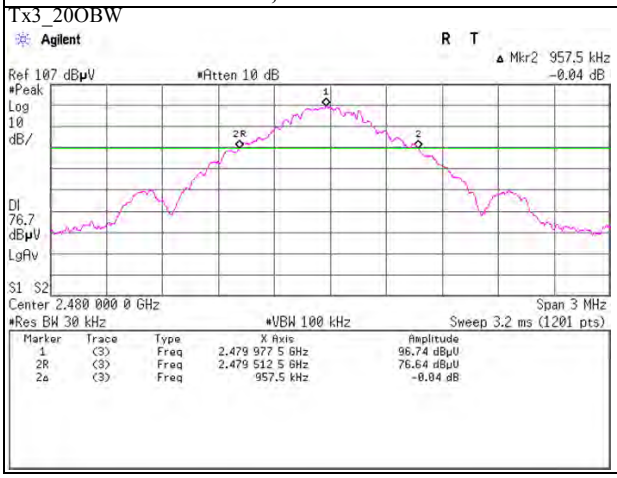
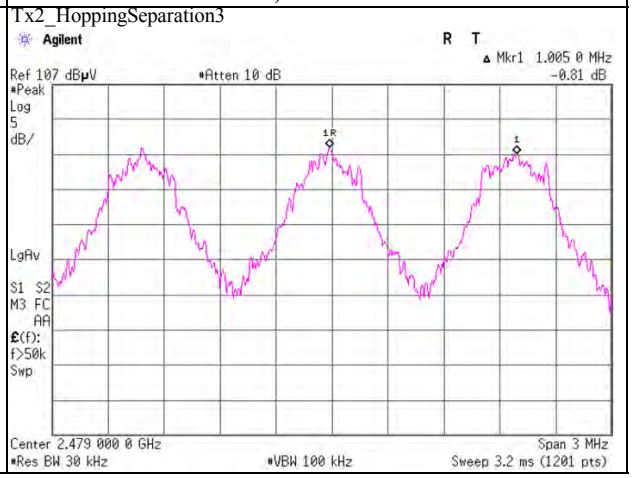
20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, BDR, PRBS9

20dB Bandwidth	Carrier Frequency Separation
Tx, 2402MHz	**Tx, 2402MHz**
Tx1_20OBW 	Tx2_HoppingSeparation1 
Tx, 2441MHz	**Tx, 2441MHz**
Tx2_20OBW 	Tx2_HoppingSeparation2 
Tx, 2480MHz	**Tx, 2480MHz**
Tx3_20OBW 	Tx2_HoppingSeparation3 

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20dB Bandwidth and Carrier Frequency Separation

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	January 13, 2012	
Temperature / Humidity	22deg.C , 28%RH	
Engineer	Shinichi Takano	
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	1.293	1.005	>= 0.862
3-DH5	2441.0	1.295	1.003	>= 0.863
3-DH5	2480.0	1.298	1.003	>= 0.865

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

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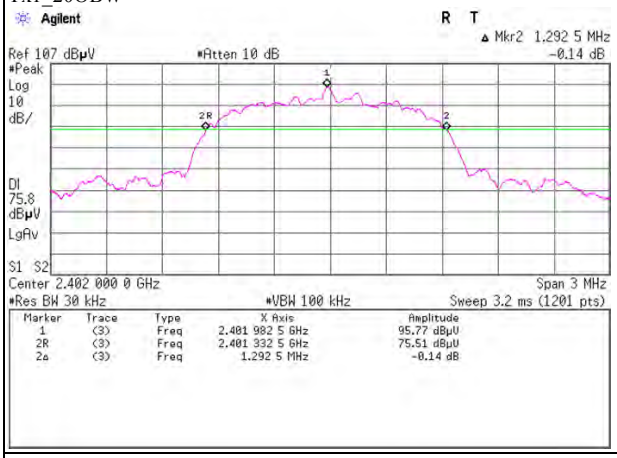
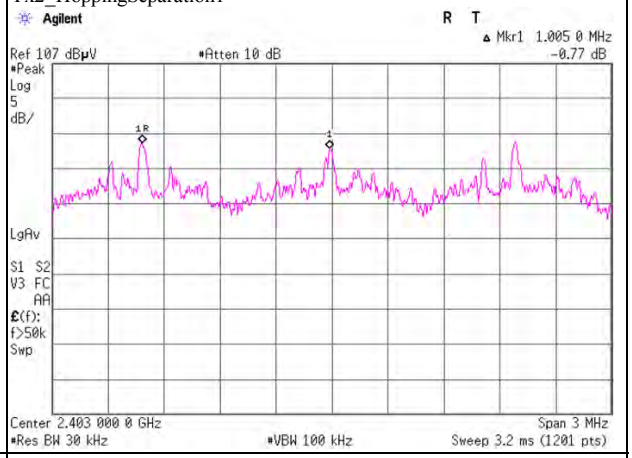
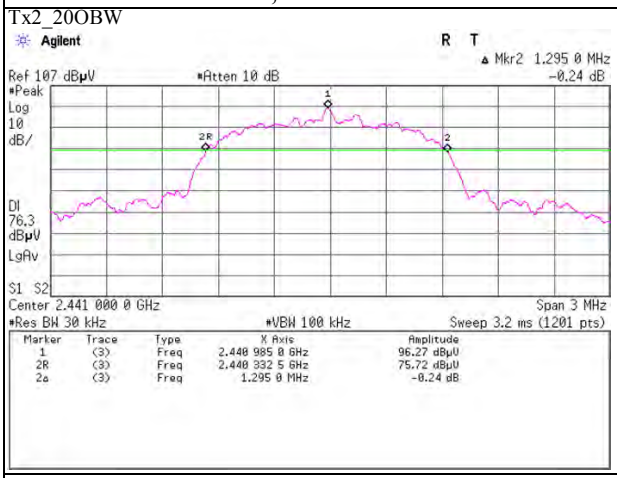
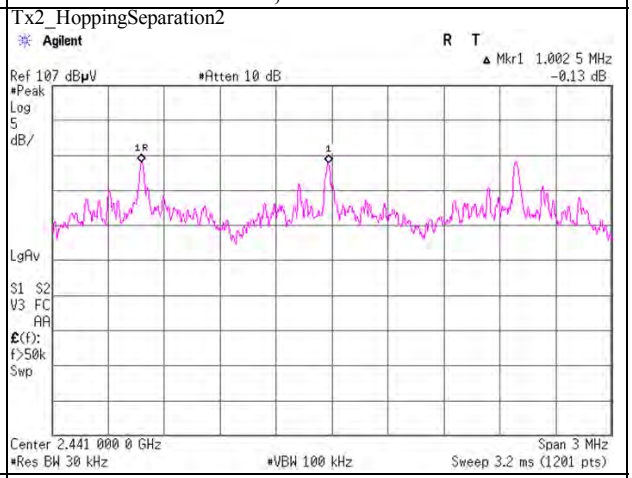
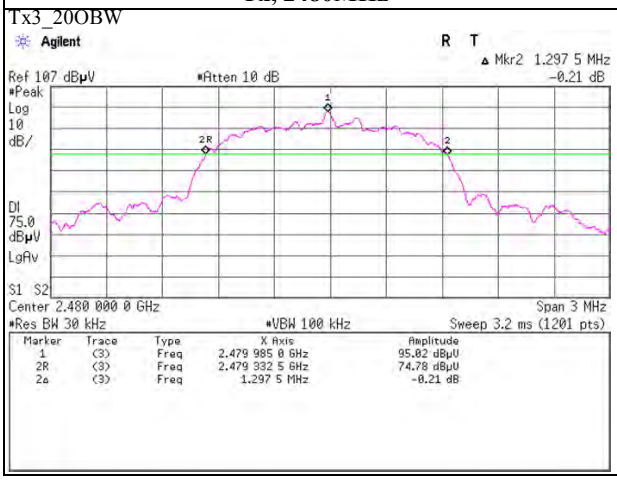
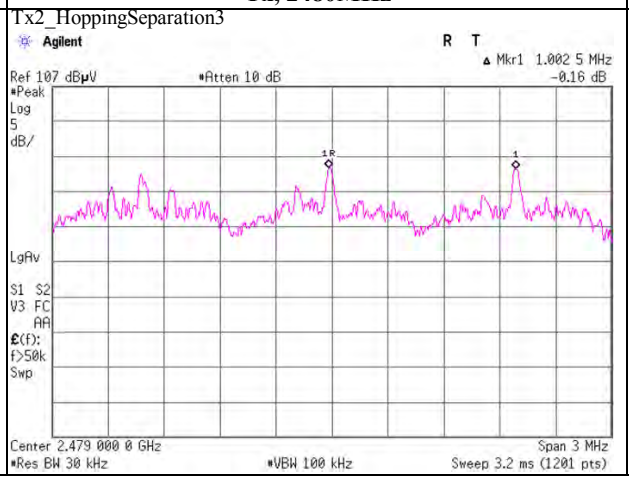
20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, EDR, PRBS9

20dB Bandwidth	Carrier Frequency Separation
Tx, 2402MHz	**Tx, 2402MHz**
Tx1_20OBW 	Tx2_HoppingSeparation1 
Tx, 2441MHz	**Tx, 2441MHz**
Tx2_20OBW 	Tx2_HoppingSeparation2 
Tx, 2480MHz	**Tx, 2480MHz**
Tx3_20OBW 	Tx2_HoppingSeparation3 

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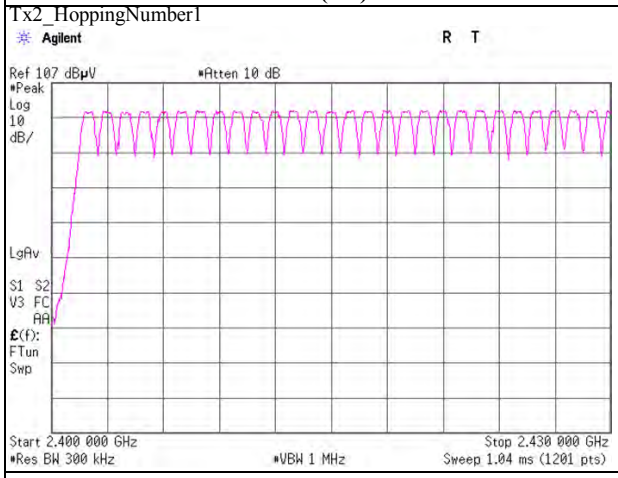
Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.
Date	January 13, 2012
Temperature / Humidity	22deg.C , 28%RH
Engineer	Shinichi Takano
Mode	Tx, Bluetooth, BDR, PRBS9

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

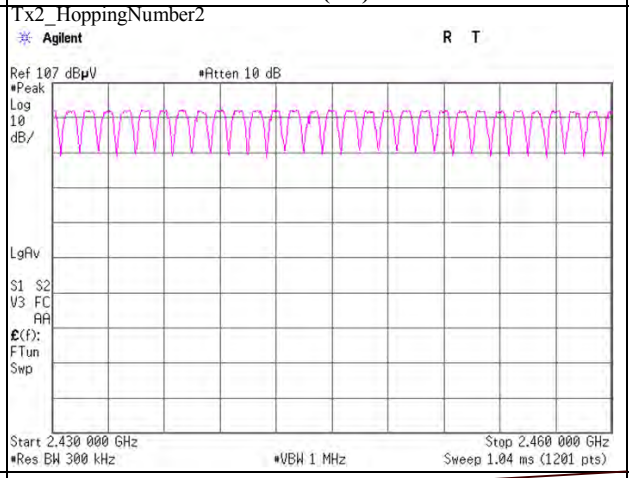
DH5 (1/3)

Tx2_HoppingNumber1



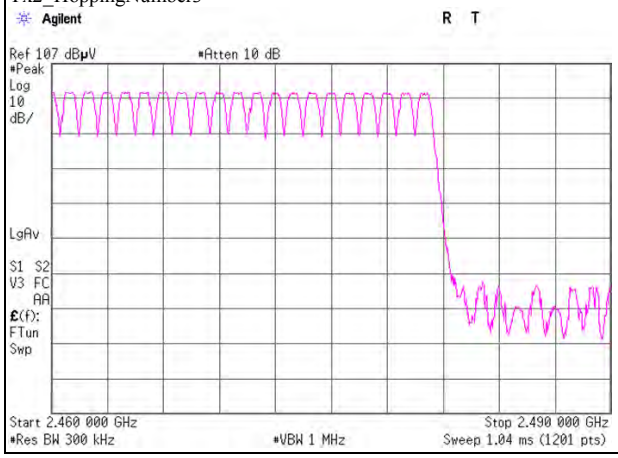
DH5 (2/3)

Tx2_HoppingNumber2



DH5 (3/3)

Tx2_HoppingNumber3



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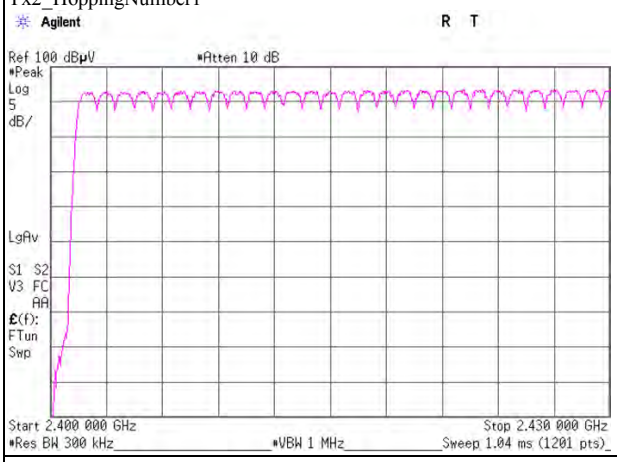
Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.
Date	January 13, 2012
Temperature / Humidity	22deg.C , 28%RH
Engineer	Shinichi Takano
Mode	Tx, Bluetooth, EDR, PRBS9

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

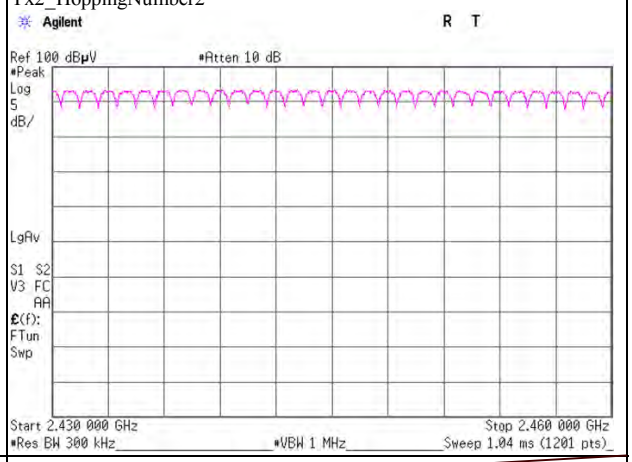
3-DH5 (1/3)

Tx2_HoppingNumber1



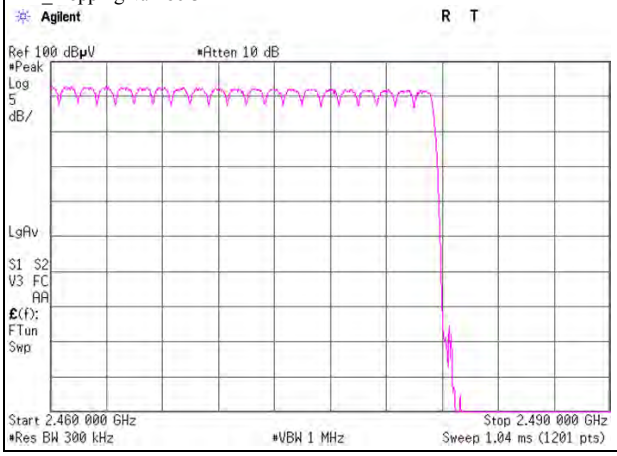
3-DH5 (2/3)

Tx2_HoppingNumber2



3-DH5 (3/3)

Tx2_HoppingNumber3



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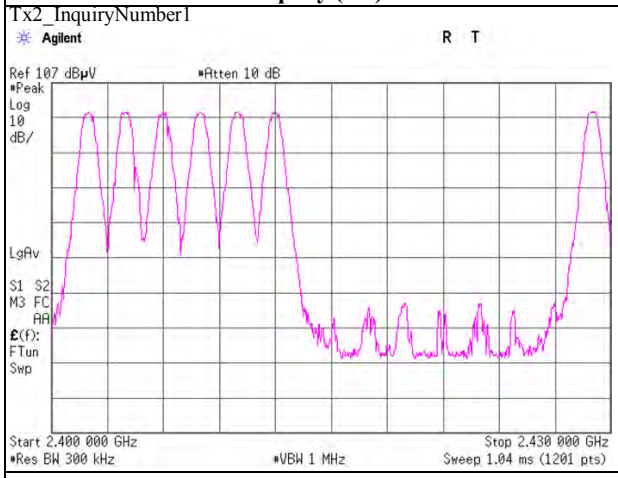
Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.
Date	January 13, 2012
Temperature / Humidity	22deg.C , 28%RH
Engineer	Shinichi Takano
Mode	Tx, Bluetooth, EDR, Inquiry

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

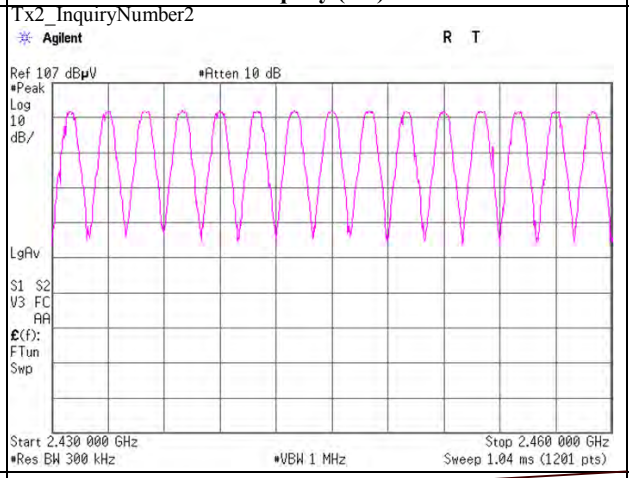
Inquiry (1/3)

Tx2_InquiryNumber1



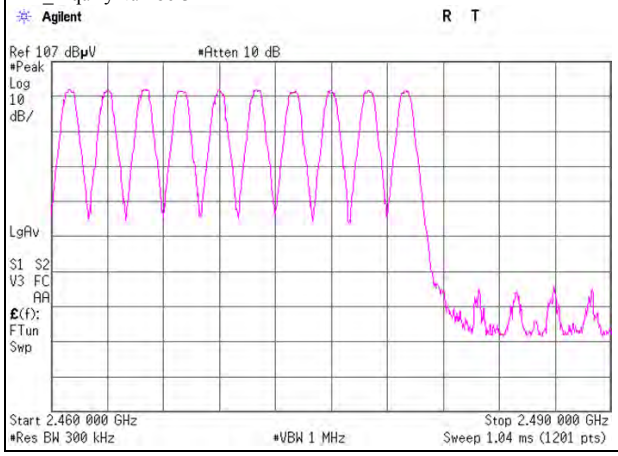
Inquiry (2/3)

Tx2_InquiryNumber2



Inquiry (3/3)

Tx2_InquiryNumber3



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Dwell Time

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	January 18, 2012	
Temperature / Humidity	22deg.C , 33%RH	
Engineer	Hikaru Shirsawa	
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	16.6	/ 5.0 sec.	x 31.6 sec.	= 105 times	0.394	41	400
DH3	18.8	/ 5.0 sec.	x 31.6 sec.	= 119 times	1.650	196	400
DH5	21.2	/ 5.0 sec.	x 31.6 sec.	= 134 times	2.898	388	400
Inquiry	100.0	/ 1.0 sec.	x 12.8 sec.	= 1280 times	0.097	124	400

Sample Calculation

Result = Number of transmission x Length of transmition time

*Average data of 5 tests.(except Inquiry)

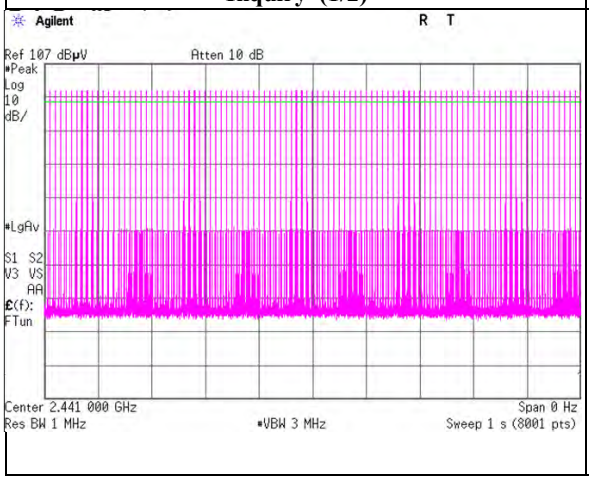
Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	16	16	21	11	19	16.6
DH3	16	19	20	19	20	18.8
DH5	21	26	21	20	18	21.2
Inquiry	100	100	100	100	100	100.0

Sample Calculation

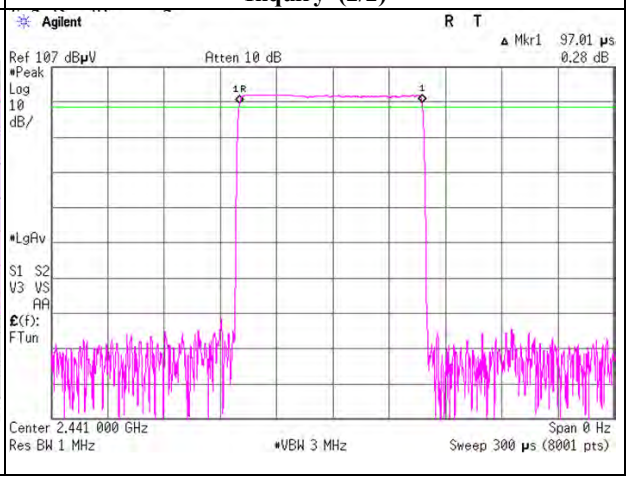
Average= Summation(Sampling 1 to 5) / 5

Inquiry

Inquiry (1/2)



Inquiry (2/2)



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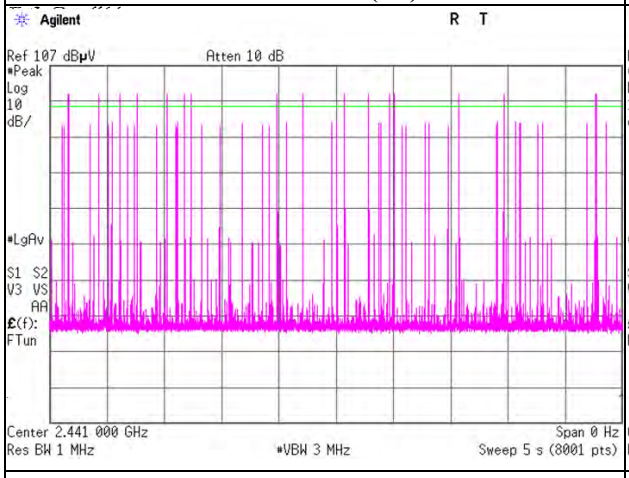
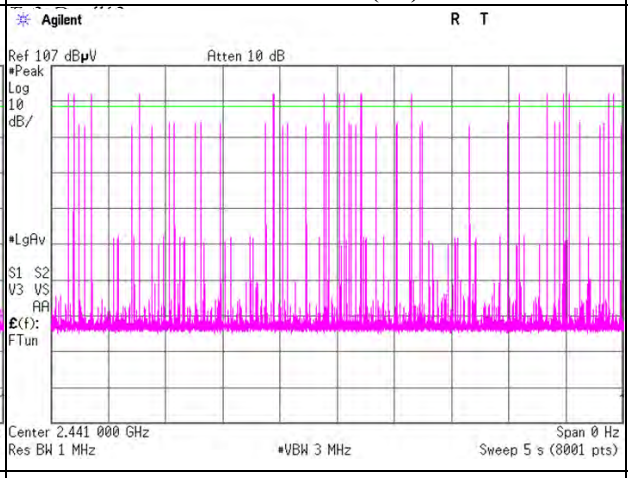
Dwell time

Tx, Bluetooth, BDR, PRBS9

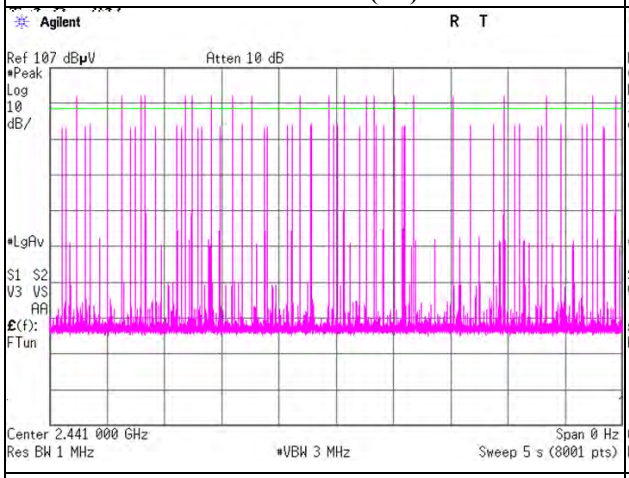
DH1 - in 5sec. (1/5)



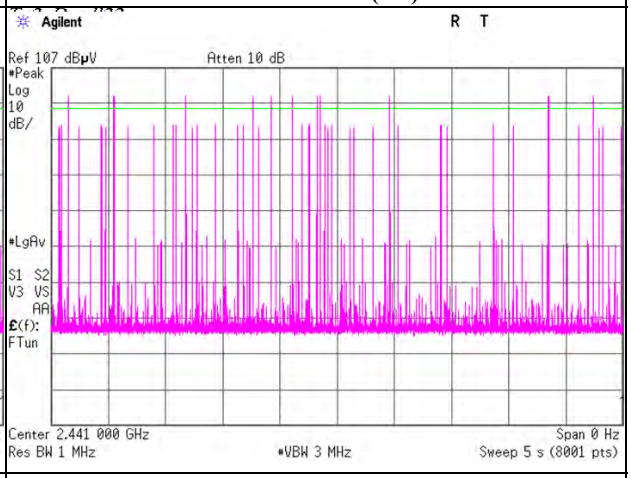
DH1 - in 5sec. (2/5)



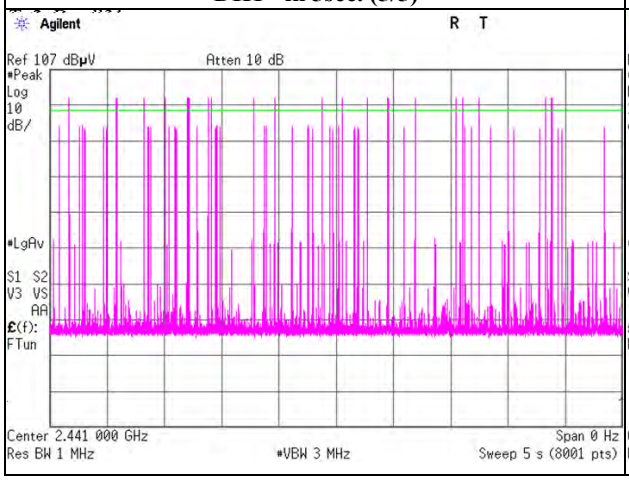
DH1 - in 5sec. (3/5)



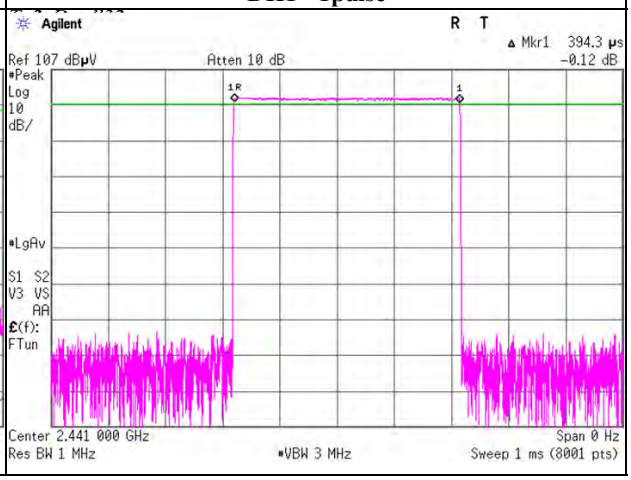
DH1 - in 5sec. (4/5)



DH1 - in 5sec. (5/5)



DH1 - 1pulse



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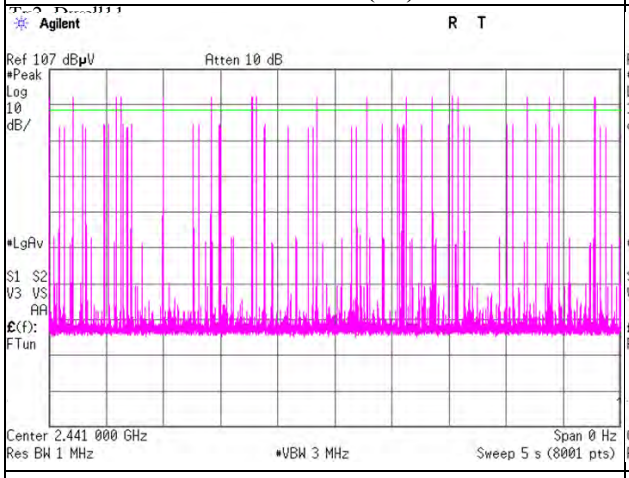
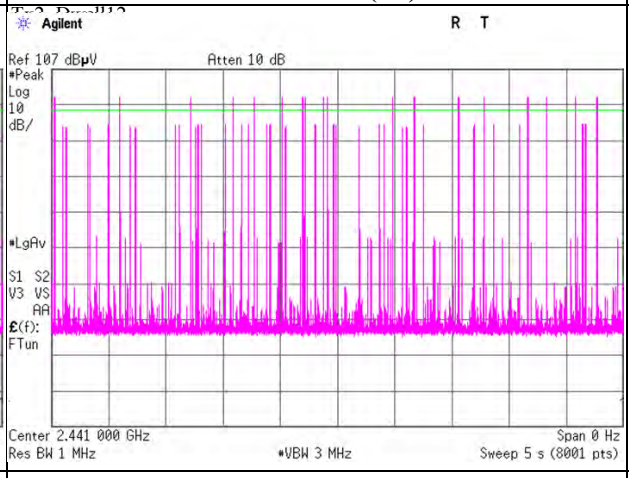
Dwell time

Tx, Bluetooth, BDR, PRBS9

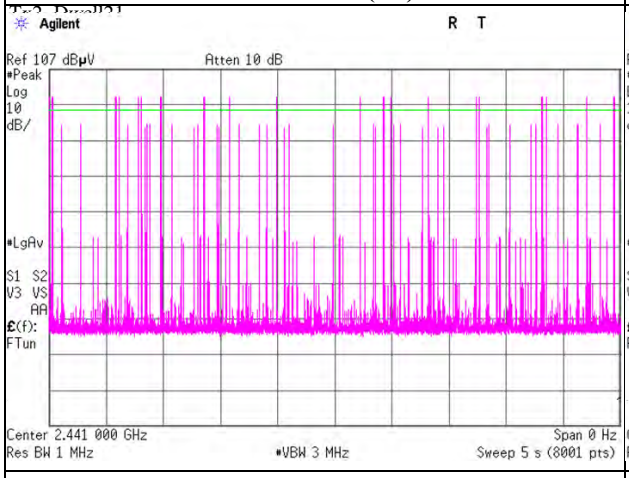
DH3- in 5sec. (1/5)



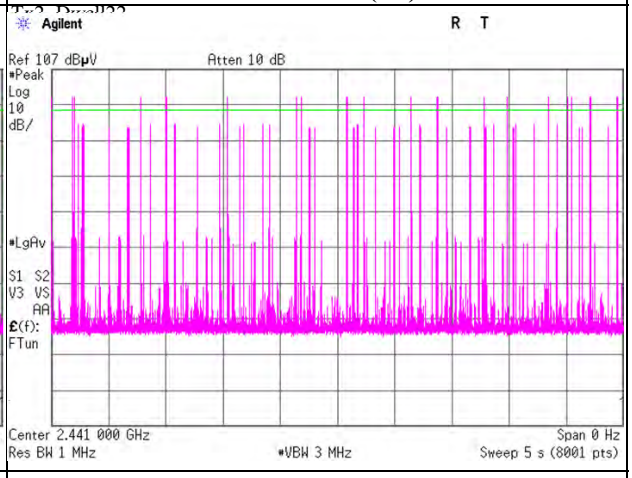
DH3- in 5sec. (2/5)



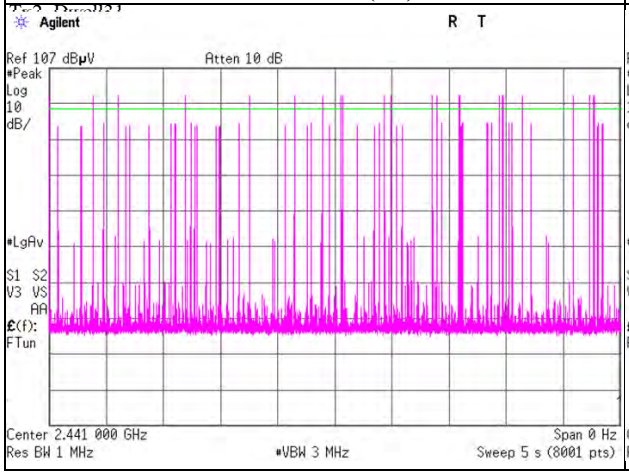
DH3- in 5sec. (3/5)



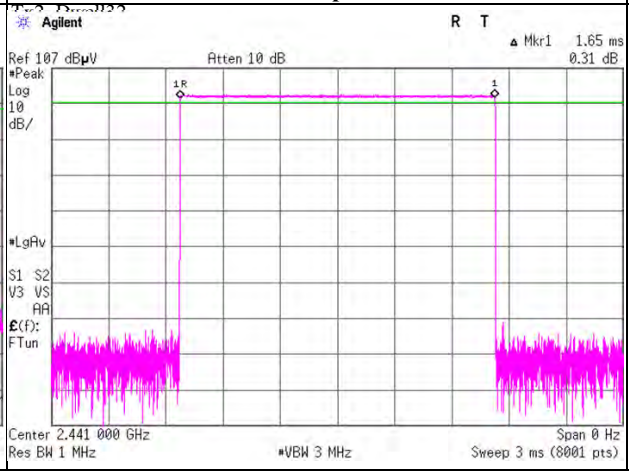
DH3- in 5sec. (4/5)



DH3- in 5sec. (5/5)



DH3 - 1pulse



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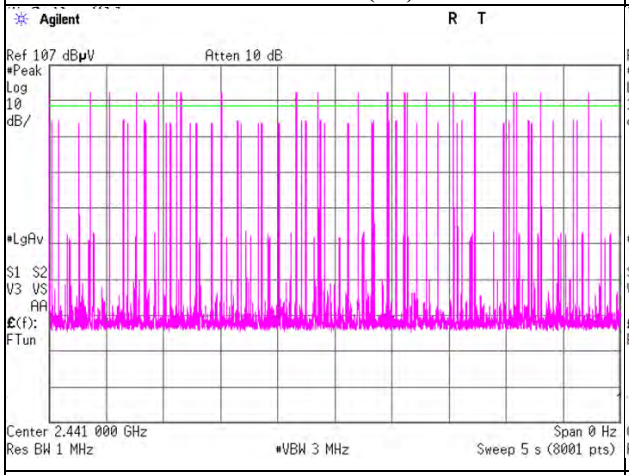
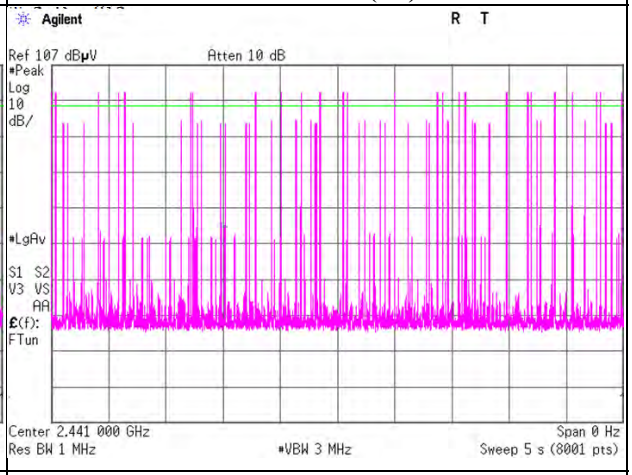
Dwell time

Tx, Bluetooth, BDR, PRBS9

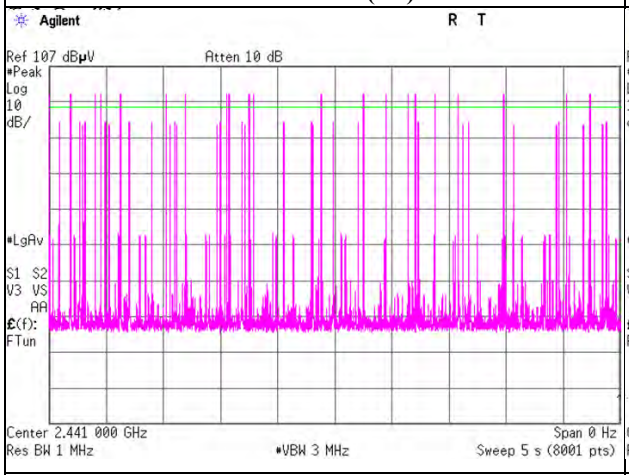
DH5- in 5sec. (1/5)



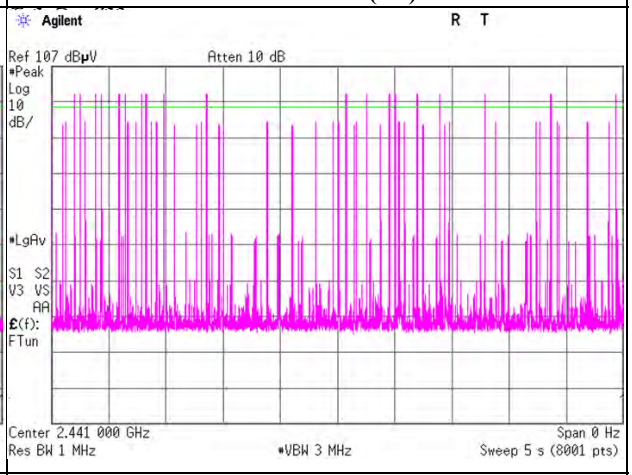
DH5- in 5sec. (2/5)



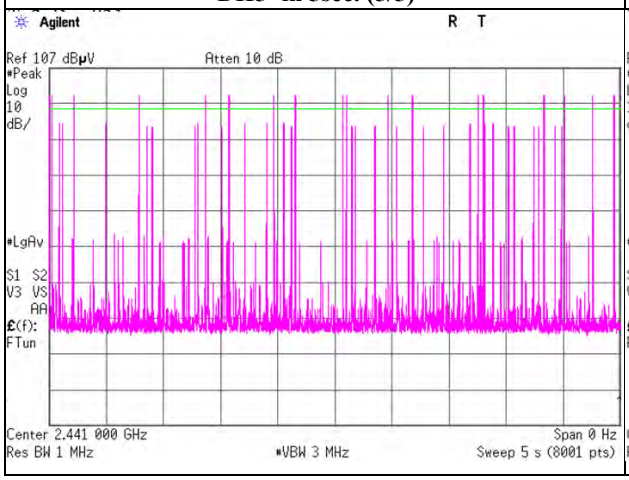
DH5- in 5sec. (3/5)



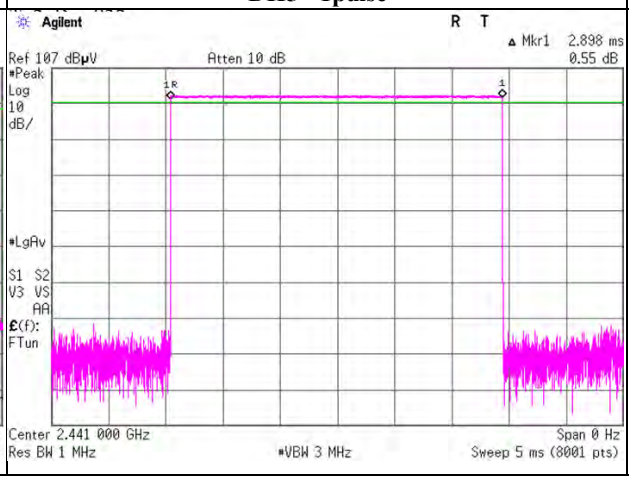
DH5- in 5sec. (4/5)



DH5- in 5sec. (5/5)



DH5 - 1pulse



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Dwell Time

Test place	UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date	January 18, 2012
Temperature / Humidity	22deg.C , 33%RH
Engineer	Hikaru Shirasawa
Mode	Tx, Bluetooth, EDR, 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]
3-DH1	20.2	/ 5.0 sec.	x 31.6 sec.	= 128 times	0.405	52	400
3-DH3	21.4	/ 5.0 sec.	x 31.6 sec.	= 136 times	1.655	225	400
3-DH5	20.6	/ 5.0 sec.	x 31.6 sec.	= 131 times	2.906	381	400

Sample Calculation

Result = Number of transmission x Length of transmition time

*Average data of 5 tests.(except Inquiry)

Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
3-DH1	26	21	19	18	17	20.2
3-DH3	17	22	22	23	23	21.4
3-DH5	20	17	20	23	23	20.6

Sample Calculation

Average= Summation(Sampling 1 to 5) / 5

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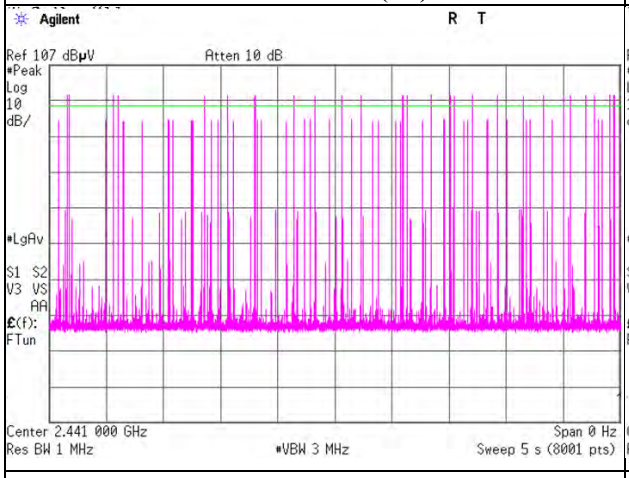
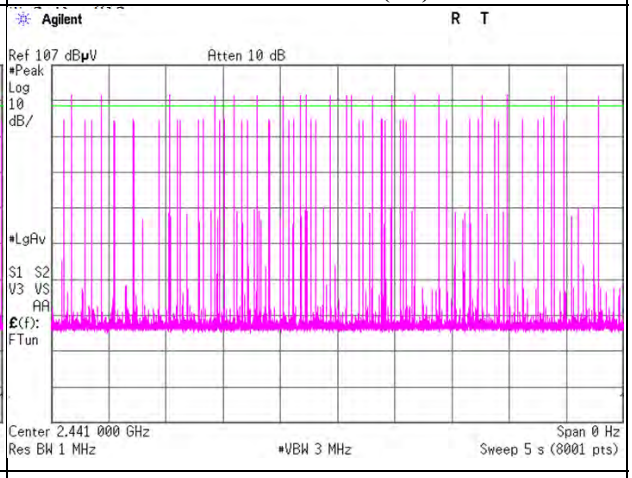
Dwell time

Tx, Bluetooth, EDR, PRBS9

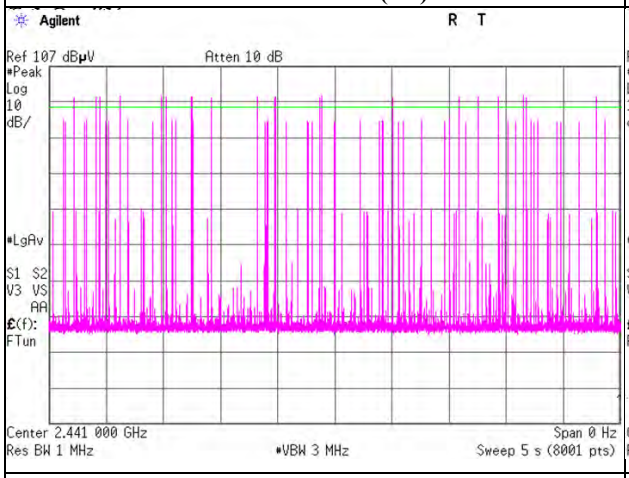
3-DH1 - in 5sec. (1/5)



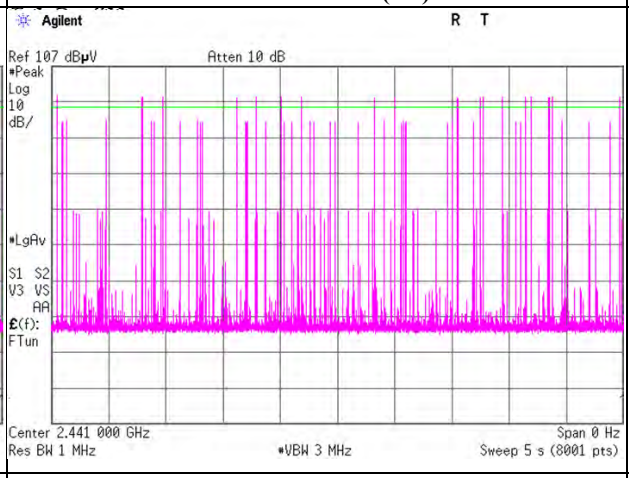
3-DH1 - in 5sec. (2/5)



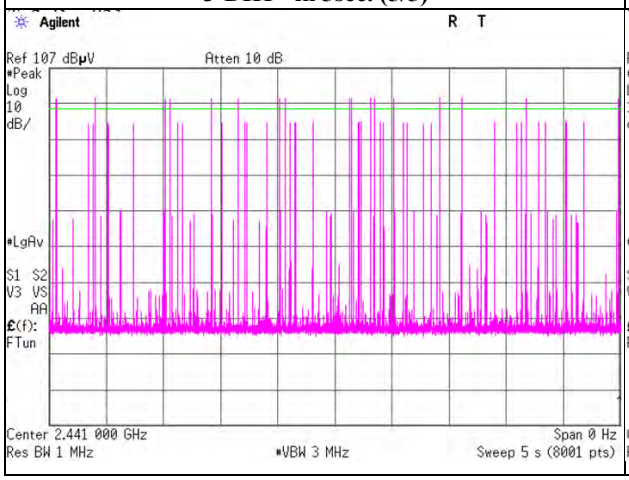
3-DH1 - in 5sec. (3/5)



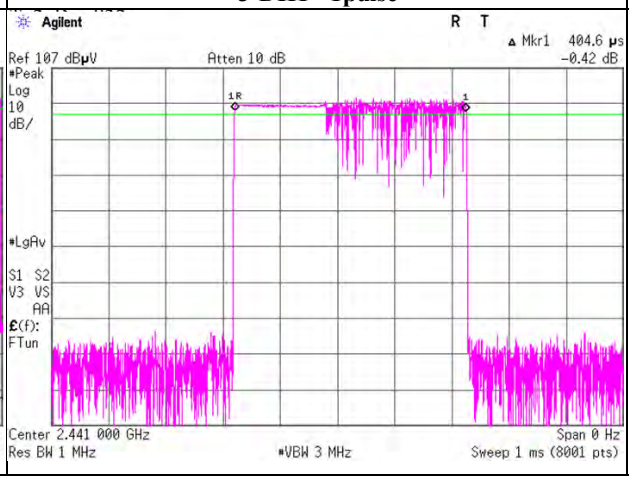
3-DH1 - in 5sec. (4/5)



3-DH1 - in 5sec. (5/5)



3-DH1 - 1pulse



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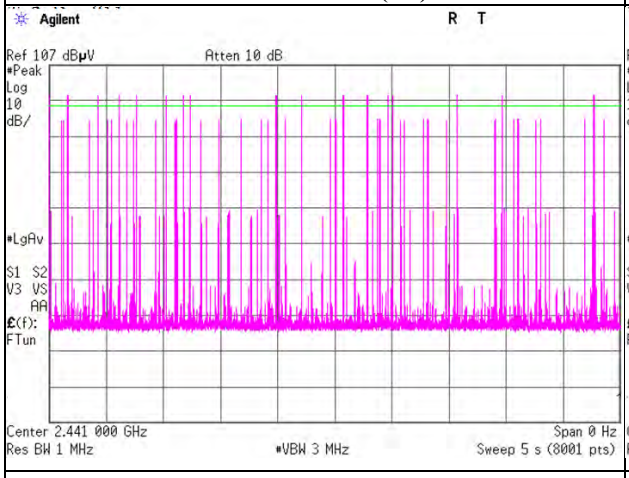
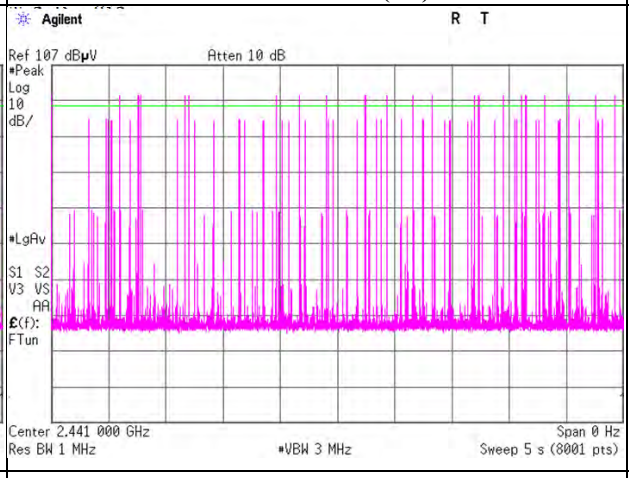
Dwell time

Tx, Bluetooth, EDR, PRBS9

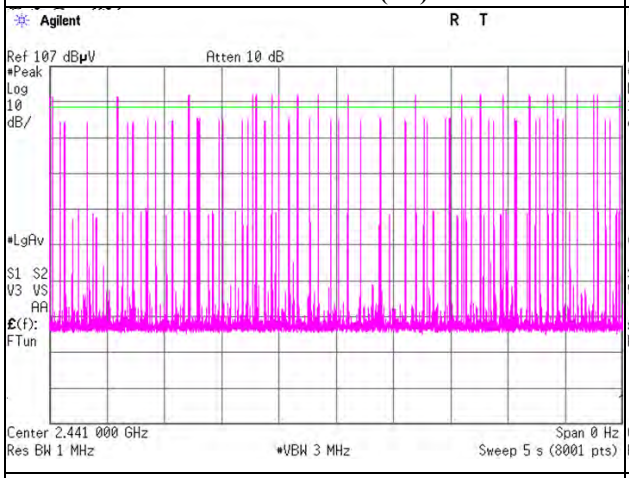
3-DH3 - in 5sec. (1/5)



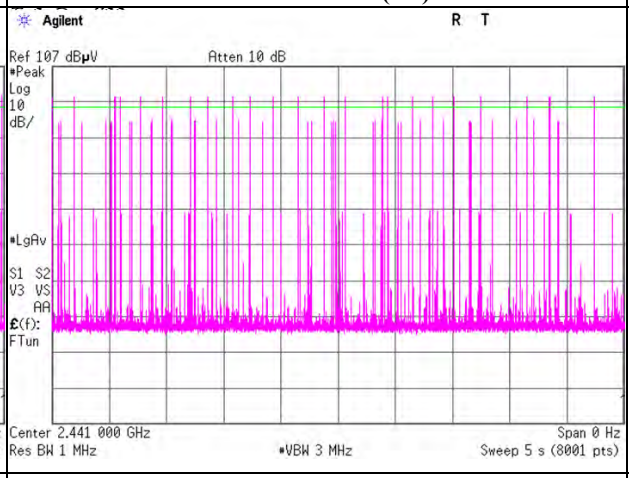
3-DH3 - in 5sec. (2/5)



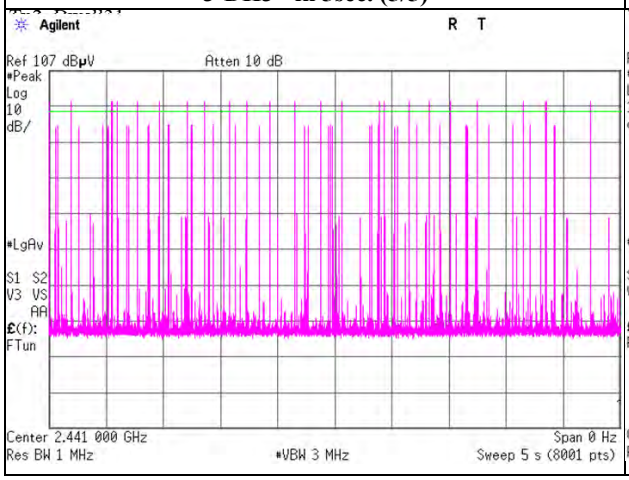
3-DH3 - in 5sec. (3/5)



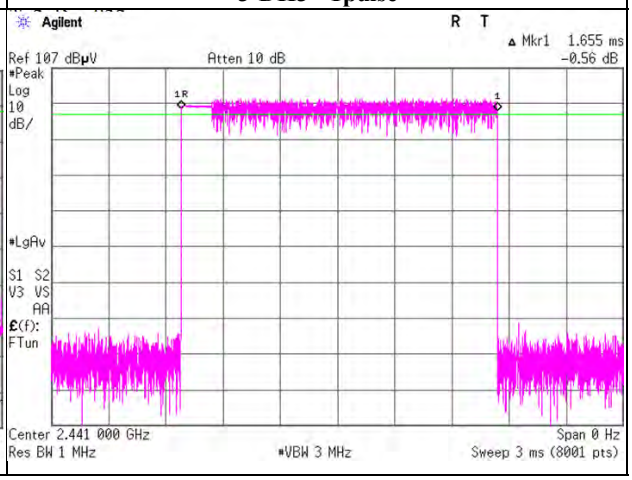
3-DH3 - in 5sec. (4/5)



3-DH3 - in 5sec. (5/5)



3-DH3 - 1pulse



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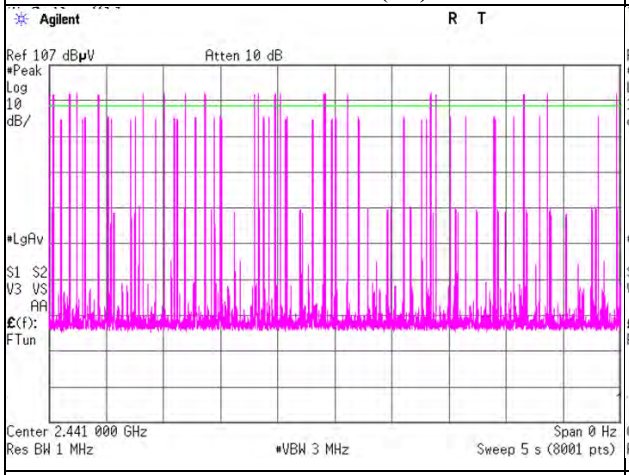
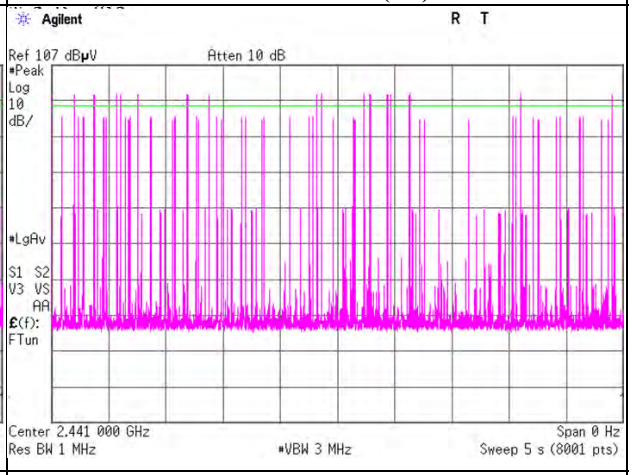
Dwell time

Tx, Bluetooth, EDR, PRBS9

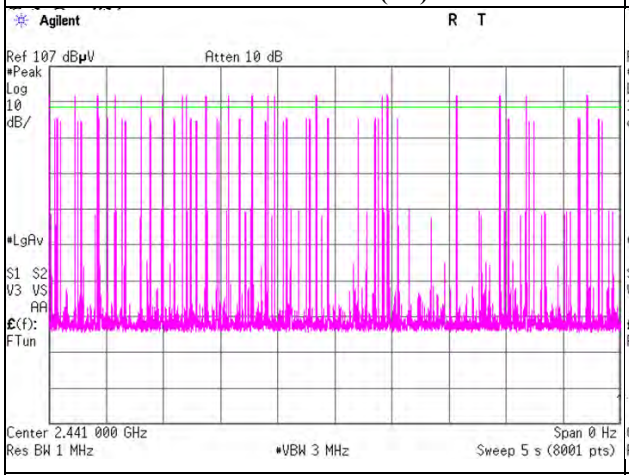
3-DH5 - in 5sec. (1/5)



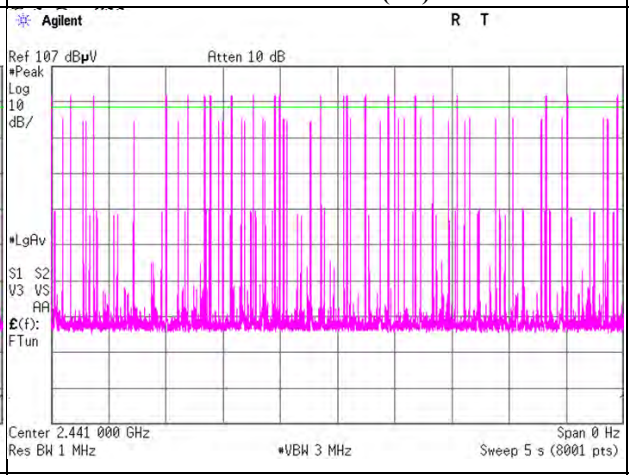
3-DH5 - in 5sec. (2/5)



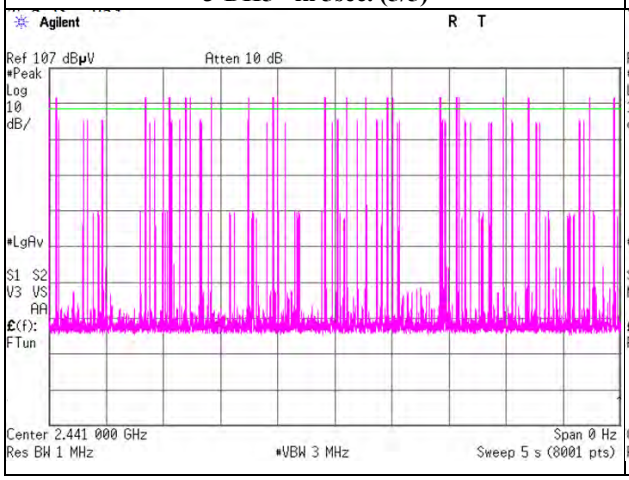
3-DH5 - in 5sec. (3/5)



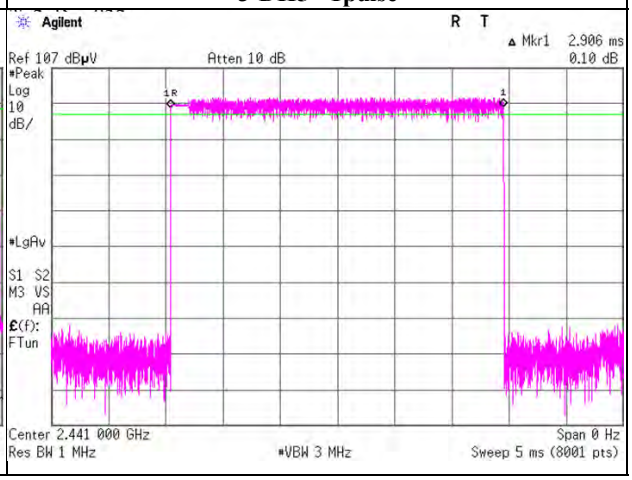
3-DH5 - in 5sec. (4/5)



3-DH5 - in 5sec. (5/5)



3-DH5 - 1pulse



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Peak Output Power (Conducted)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	January 18, 2012	
Temperature / Humidity	22deg.C , 33%RH	
Engineer	Hikaru Shirsawa	
Mode	Tx, Bluetooth, BDR (Worst: DH5)	

(* 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	-8.12	2.13	9.57	3.58	2.28	20.97	125	17.39
DH5	2441.0	-7.72	2.14	9.57	3.99	2.51	20.97	125	16.98
DH5	2480.0	-8.33	2.15	9.57	3.39	2.18	20.97	125	17.58
2-DH5	2402.0	-8.64	2.13	9.57	3.06	2.02	20.97	125	17.91
2-DH5	2441.0	-8.26	2.14	9.57	3.45	2.21	20.97	125	17.52
2-DH5	2480.0	-9.37	2.15	9.57	2.35	1.72	20.97	125	18.62
3-DH5	2402.0	-8.67	2.13	9.57	3.03	2.01	20.97	125	17.94
3-DH5	2441.0	-8.28	2.14	9.57	3.43	2.20	20.97	125	17.54
3-DH5	2480.0	-8.96	2.15	9.57	2.76	1.89	20.97	125	18.21

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

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Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.	No.3 Semi Anechoic Chamber
Date	January 17, 2012	January 18, 2012
Temperature / Humidity	24deg.C , 21%RH	23deg.C , 20%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.	230.866	QP	35.3	16.7	8.2	32.0	28.2	46.0	17.8	210	279	PK:VBW 3MHz
Hori.	320.010	QP	44.1	14.4	8.8	31.9	35.4	46.0	10.6	118	58	AV:VBW 10Hz
Hori.	448.010	QP	40.3	17.0	9.4	31.9	34.8	46.0	11.2	100	297	
Hori.	512.022	QP	35.7	17.9	9.5	31.9	31.2	46.0	14.8	100	223	
Hori.	2376.020	PK	45.9	27.2	13.8	41.1	45.8	73.9	28.1	109	358	
Hori.	2390.000	PK	47.1	27.2	13.8	41.1	47.0	73.9	26.9	109	358	
Hori.	2400.000	PK	47.1	27.3	13.8	41.1	47.1	73.9	26.8	109	358	
Hori.	2428.052	PK	46.9	27.3	13.8	41.1	46.9	73.9	27.0	109	358	
Hori.	4090.484	PK	55.8	30.1	5.6	41.7	49.8	73.9	24.1	100	231	
Hori.	4804.000	PK	48.9	31.1	5.9	41.1	44.8	73.9	29.1	107	72	
Hori.	7206.000	PK	46.6	36.5	7.4	41.3	49.2	73.9	24.7	100	0	
Hori.	9608.000	PK	44.6	38.2	8.6	38.8	52.6	73.9	21.3	100	0	
Hori.	12010.000	PK	45.6	39.3	10.2	39.2	55.9	73.9	18.0	100	0	
Hori.	2376.020	AV	35.9	27.2	13.8	41.1	35.8	53.9	18.1	109	358	
Hori.	2390.000	AV	35.3	27.2	13.8	41.1	35.2	53.9	18.7	109	358	
Hori.	2400.000	AV	35.6	27.3	13.8	41.1	35.6	53.9	18.3	109	358	
Hori.	2428.052	AV	35.2	27.3	13.8	41.1	35.2	53.9	18.7	109	358	
Hori.	4090.484	AV	52.8	30.1	5.6	41.7	46.8	53.9	7.1	100	231	
Hori.	4804.000	AV	39.9	31.1	5.9	41.1	35.8	53.9	18.1	107	72	
Hori.	7206.000	AV	36.9	36.5	7.4	41.3	39.5	53.9	14.4	100	0	
Hori.	9608.000	AV	34.1	38.2	8.6	38.8	42.1	53.9	11.8	100	0	
Hori.	12010.000	AV	35.7	39.3	10.2	39.2	46.0	53.9	7.9	100	0	
Vert.	244.801	QP	33.4	17.0	8.3	32.0	26.7	46.0	19.3	100	338	
Vert.	2376.011	PK	46.7	27.2	13.8	41.1	46.6	73.9	27.3	100	20	
Vert.	2390.000	PK	46.3	27.2	13.8	41.1	46.2	73.9	27.7	100	20	
Vert.	2400.000	PK	46.9	27.3	13.8	41.1	46.9	73.9	27.0	100	20	
Vert.	2428.060	PK	46.1	27.3	13.8	41.1	46.1	73.9	27.8	100	20	
Vert.	4090.345	PK	55.2	30.1	5.6	41.7	49.2	73.9	24.7	119	152	
Vert.	4804.000	PK	50.0	31.1	5.9	41.1	45.9	73.9	28.0	104	350	
Vert.	7206.000	PK	47.0	36.5	7.4	41.3	49.6	73.9	24.3	100	0	
Vert.	9608.000	PK	44.7	38.2	8.6	38.8	52.7	73.9	21.2	100	0	
Vert.	12010.000	PK	46.1	39.3	10.2	39.2	56.4	73.9	17.5	100	0	
Vert.	2376.011	AV	35.8	27.2	13.8	41.1	35.7	53.9	18.2	100	20	
Vert.	2390.000	AV	35.3	27.2	13.8	41.1	35.2	53.9	18.7	100	20	
Vert.	2400.000	AV	35.5	27.3	13.8	41.1	35.5	53.9	18.4	100	20	
Vert.	2428.060	AV	36.0	27.3	13.8	41.1	36.0	53.9	17.9	100	20	
Vert.	4090.345	AV	51.8	30.1	5.6	41.7	45.8	53.9	8.1	119	152	
Vert.	4804.000	AV	40.9	31.1	5.9	41.1	36.8	53.9	17.1	104	350	
Vert.	7206.000	AV	37.0	36.5	7.4	41.3	39.6	53.9	14.3	100	0	
Vert.	9608.000	AV	34.5	38.2	8.6	38.8	42.5	53.9	11.4	100	0	
Vert.	12010.000	AV	35.8	39.3	10.2	39.2	46.1	53.9	7.8	100	0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter)) - Gain(Amprifier)

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

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Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.	No.3 Semi Anechoic Chamber
Date	January 17, 2012	January 18, 2012
Temperature / Humidity	24deg.C , 21%RH	23deg.C , 20%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.	230.854	QP	35.5	16.7	8.2	32.0	28.4	46.0	17.6	155	282	PK:VBW 3MHz
Hori.	320.014	QP	43.8	14.4	8.8	31.9	35.1	46.0	10.9	116	61	AV:VBW 10Hz
Hori.	448.013	QP	40.2	17.0	9.4	31.9	34.7	46.0	11.3	100	299	
Hori.	512.016	QP	35.3	17.9	9.5	31.9	30.8	46.0	15.2	100	224	
Hori.	2412.890	PK	46.2	27.3	13.8	41.1	46.2	73.9	27.7	112	359	
Hori.	2467.243	PK	45.6	27.4	13.8	41.1	45.7	73.9	28.2	112	359	
Hori.	4090.558	PK	55.6	30.1	5.6	41.7	49.6	73.9	24.3	100	231	
Hori.	4882.000	PK	47.8	31.2	5.9	40.9	44.0	73.9	29.9	106	76	
Hori.	7323.000	PK	47.1	36.8	7.5	41.4	50.0	73.9	23.9	100	0	
Hori.	9764.000	PK	44.9	38.5	8.6	38.8	53.2	73.9	20.7	100	0	
Hori.	12205.000	PK	46.5	39.3	10.2	39.2	56.8	73.9	17.1	100	0	
Hori.	2412.890	AV	35.7	27.3	13.8	41.1	35.7	53.9	18.2	112	359	
Hori.	2467.243	AV	35.8	27.4	13.8	41.1	35.9	53.9	18.0	112	359	
Hori.	4090.558	AV	52.9	30.1	5.6	41.7	46.9	53.9	7.0	100	231	
Hori.	4882.000	AV	38.8	31.2	5.9	40.9	35.0	53.9	18.9	106	76	
Hori.	7323.000	AV	36.3	36.8	7.5	41.4	39.2	53.9	14.7	100	0	
Hori.	9764.000	AV	34.2	38.5	8.6	38.8	42.5	53.9	11.4	100	0	
Hori.	12205.000	AV	35.1	39.3	10.2	39.2	45.4	53.9	8.5	100	0	
Vert.	244.878	QP	33.3	17.0	8.3	32.0	26.6	46.0	19.4	100	343	
Vert.	2413.380	PK	46.3	27.3	13.8	41.1	46.3	73.9	27.6	100	29	
Vert.	2467.150	PK	46.6	27.4	13.8	41.1	46.7	73.9	27.2	100	29	
Vert.	4090.642	PK	52.1	30.1	5.6	41.7	46.1	73.9	27.8	109	144	
Vert.	4882.000	PK	47.3	31.2	5.9	40.9	43.5	73.9	30.4	100	351	
Vert.	7323.000	PK	47.5	36.8	7.5	41.4	50.4	73.9	23.5	100	0	
Vert.	9764.000	PK	45.6	38.5	8.6	38.8	53.9	73.9	20.0	100	0	
Vert.	12205.000	PK	45.3	39.3	10.2	39.2	55.6	73.9	18.3	100	0	
Vert.	2413.380	AV	35.7	27.3	13.8	41.1	35.7	53.9	18.2	100	29	
Vert.	2467.150	AV	36.0	27.4	13.8	41.1	36.1	53.9	17.8	100	29	
Vert.	4090.642	AV	47.8	30.1	5.6	41.7	41.8	53.9	12.1	109	144	
Vert.	4882.000	AV	37.9	31.2	5.9	40.9	34.1	53.9	19.8	100	351	
Vert.	7323.000	AV	36.2	36.8	7.5	41.4	39.1	53.9	14.8	100	0	
Vert.	9764.000	AV	34.2	38.5	8.6	38.8	42.5	53.9	11.4	100	0	
Vert.	12205.000	AV	35.1	39.3	10.2	39.2	45.4	53.9	8.5	100	0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter)) - Gain(Amprifier)

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

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Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.		No.3 Semi Anechoic Chamber
Date	January 17, 2012	January 18, 2012	
Temperature / Humidity	24deg.C , 21%RH	23deg.C , 20%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.	230.881	QP	35.1	16.7	8.2	32.0	28.0	46.0	18.0	147	285	PK:VBW 3MHz
Hori.	320.008	QP	44.0	14.4	8.8	31.9	35.3	46.0	10.7	106	60	AV:VBW 10Hz
Hori.	448.011	QP	40.0	17.0	9.4	31.9	34.5	46.0	11.5	100	300	
Hori.	512.017	QP	35.1	17.9	9.5	31.9	30.6	46.0	15.4	107	230	
Hori.	2453.995	PK	45.9	27.4	13.8	41.1	46.0	73.9	27.9	108	349	
Hori.	2483.500	PK	46.3	27.5	13.8	41.1	46.5	73.9	27.4	108	349	
Hori.	2506.160	PK	46.1	27.5	14.0	41.1	46.5	73.9	27.4	108	349	
Hori.	4090.742	PK	55.4	30.1	5.6	41.7	49.4	73.9	24.5	100	231	
Hori.	4960.000	PK	45.9	31.4	5.9	40.8	42.4	73.9	31.5	100	77	
Hori.	7440.000	PK	46.5	37.0	7.5	41.5	49.5	73.9	24.4	100	0	
Hori.	9920.000	PK	43.7	38.8	8.6	38.8	52.3	73.9	21.6	100	0	
Hori.	12400.000	PK	45.4	39.4	10.1	39.2	55.7	73.9	18.2	100	0	
Hori.	2453.995	AV	35.8	27.4	13.8	41.1	35.9	53.9	18.0	108	349	
Hori.	2483.500	AV	35.8	27.5	13.8	41.1	36.0	53.9	17.9	108	349	
Hori.	2506.160	AV	35.8	27.5	14.0	41.1	36.2	53.9	17.7	108	349	
Hori.	4090.742	AV	52.8	30.1	5.6	41.7	46.8	53.9	7.1	100	231	
Hori.	4960.000	AV	35.8	31.4	5.9	40.8	32.3	53.9	21.6	100	77	
Hori.	7440.000	AV	36.1	37.0	7.5	41.5	39.1	53.9	14.8	100	0	
Hori.	9920.000	AV	33.5	38.8	8.6	38.8	42.1	53.9	11.8	100	0	
Hori.	12400.000	AV	33.8	39.4	10.1	39.2	44.1	53.9	9.8	100	0	
Vert.	244.887	QP	32.9	17.0	8.3	32.0	26.2	46.0	19.8	100	336	
Vert.	2453.955	PK	46.8	27.4	13.8	41.1	46.9	73.9	27.0	100	33	
Vert.	2483.500	PK	46.0	27.5	13.8	41.1	46.2	73.9	27.7	100	33	
Vert.	2505.880	PK	46.0	27.5	14.0	41.1	46.4	73.9	27.5	100	33	
Vert.	4090.759	PK	54.3	30.1	5.6	41.7	48.3	73.9	25.6	119	152	
Vert.	4960.000	PK	46.9	31.4	5.9	40.8	43.4	73.9	30.5	100	347	
Vert.	7440.000	PK	47.4	37.0	7.5	41.5	50.4	73.9	23.5	100	0	
Vert.	9920.000	PK	43.9	38.8	8.6	38.8	52.5	73.9	21.4	100	0	
Vert.	12400.000	PK	45.2	39.4	10.1	39.2	55.5	73.9	18.4	100	0	
Vert.	2453.955	AV	36.2	27.4	13.8	41.1	36.3	53.9	17.6	100	33	
Vert.	2483.500	AV	35.8	27.5	13.8	41.1	36.0	53.9	17.9	100	33	
Vert.	2505.880	AV	35.9	27.5	14.0	41.1	36.3	53.9	17.6	100	33	
Vert.	4090.759	AV	51.1	30.1	5.6	41.7	45.1	53.9	8.8	119	152	
Vert.	4960.000	AV	36.0	31.4	5.9	40.8	32.5	53.9	21.4	100	347	
Vert.	7440.000	AV	35.9	37.0	7.5	41.5	38.9	53.9	15.0	100	0	
Vert.	9920.000	AV	33.1	38.8	8.6	38.8	41.7	53.9	12.2	100	0	
Vert.	12400.000	AV	33.8	39.4	10.1	39.2	44.1	53.9	9.8	100	0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter)) - Gain(Amprifier)

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

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Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.		No.3 Semi Anechoic Chamber
Date	January 17, 2012	January 18, 2012	
Temperature / Humidity	24deg.C , 21%RH	23deg.C , 20%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.	230.984	QP	35.1	16.7	8.2	32.0	28.0	46.0	18.0	150	273	PK:VBW 3MHz
Hori.	320.008	QP	43.9	14.4	8.8	31.9	35.2	46.0	10.8	104	57	AV:VBW 10Hz
Hori.	448.013	QP	40.4	17.0	9.4	31.9	34.9	46.0	11.1	100	297	
Hori.	512.017	QP	35.6	17.9	9.5	31.9	31.1	46.0	14.9	100	229	
Hori.	2376.245	PK	46.3	27.2	13.8	41.1	46.2	73.9	27.7	116	357	
Hori.	2390.000	PK	46.0	27.2	13.8	41.1	45.9	73.9	28.0	116	357	
Hori.	2400.000	PK	48.0	27.3	13.8	41.1	48.0	73.9	25.9	116	357	
Hori.	2428.023	PK	46.8	27.3	13.8	41.1	46.8	73.9	27.1	116	357	
Hori.	4090.833	PK	54.8	30.1	5.6	41.7	48.8	73.9	25.1	100	232	
Hori.	4804.000	PK	46.6	31.1	5.9	41.1	42.5	73.9	31.4	110	73	
Hori.	7206.000	PK	47.5	36.5	7.4	41.3	50.1	73.9	23.8	100	0	
Hori.	9608.000	PK	44.8	38.2	8.6	38.8	52.8	73.9	21.1	100	0	
Hori.	12010.000	PK	45.9	39.3	10.2	39.2	56.2	73.9	17.7	100	0	
Hori.	2376.245	AV	35.8	27.2	13.8	41.1	35.7	53.9	18.2	116	357	
Hori.	2390.000	AV	35.8	27.2	13.8	41.1	35.7	53.9	18.2	116	357	
Hori.	2400.000	AV	36.3	27.3	13.8	41.1	36.3	53.9	17.6	116	357	
Hori.	2428.023	AV	35.9	27.3	13.8	41.1	35.9	53.9	18.0	116	357	
Hori.	4090.833	AV	52.2	30.1	5.6	41.7	46.2	53.9	7.7	100	232	
Hori.	4804.000	AV	37.4	31.1	5.9	41.1	33.3	53.9	20.6	110	73	
Hori.	7206.000	AV	36.3	36.5	7.4	41.3	38.9	53.9	15.0	100	0	
Hori.	9608.000	AV	33.8	38.2	8.6	38.8	41.8	53.9	12.1	100	0	
Hori.	12010.000	AV	35.1	39.3	10.2	39.2	45.4	53.9	8.5	100	0	
Vert.	244.905	QP	32.8	17.0	8.3	32.0	26.1	46.0	19.9	100	339	
Vert.	2375.940	PK	46.6	27.2	13.8	41.1	46.5	73.9	27.4	100	22	
Vert.	2390.000	PK	46.0	27.2	13.8	41.1	45.9	73.9	28.0	100	22	
Vert.	2400.000	PK	50.1	27.3	13.8	41.1	50.1	73.9	23.8	100	22	
Vert.	2428.040	PK	46.6	27.3	13.8	41.1	46.6	73.9	27.3	100	22	
Vert.	4090.816	PK	53.1	30.1	5.6	41.7	47.1	73.9	26.8	100	226	
Vert.	4804.000	PK	48.7	31.1	5.9	41.1	44.6	73.9	29.3	100	350	
Vert.	7206.000	PK	47.4	36.5	7.4	41.3	50.0	73.9	23.9	100	0	
Vert.	9608.000	PK	44.4	38.2	8.6	38.8	52.4	73.9	21.5	100	0	
Vert.	12010.000	PK	46.0	39.3	10.2	39.2	56.3	73.9	17.6	100	0	
Vert.	2375.940	AV	35.8	27.2	13.8	41.1	35.7	53.9	18.2	100	22	
Vert.	2390.000	AV	35.8	27.2	13.8	41.1	35.7	53.9	18.2	100	22	
Vert.	2400.000	AV	36.6	27.3	13.8	41.1	36.6	53.9	17.3	100	22	
Vert.	2428.040	AV	35.9	27.3	13.8	41.1	35.9	53.9	18.0	100	22	
Vert.	4090.816	AV	48.4	30.1	5.6	41.7	42.4	53.9	11.5	100	226	
Vert.	4804.000	AV	37.9	31.1	5.9	41.1	33.8	53.9	20.1	100	350	
Vert.	7206.000	AV	36.3	36.5	7.4	41.3	38.9	53.9	15.0	100	0	
Vert.	9608.000	AV	33.7	38.2	8.6	38.8	41.7	53.9	12.2	100	0	
Vert.	12010.000	AV	35.0	39.3	10.2	39.2	45.3	53.9	8.6	100	0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter)) - Gain(Amprifier)

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

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Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.	No.3 Semi Anechoic Chamber
Date	January 17, 2012	January 18, 2012
Temperature / Humidity	24deg.C , 21%RH	23deg.C , 20%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.	230.898	QP	35.5	16.7	8.2	32.0	28.4	46.0	17.6	151	280	PK:VBW 3MHz
Hori.	320.012	QP	43.5	14.4	8.8	31.9	34.8	46.0	11.2	114	64	AV:VBW 10Hz
Hori.	448.014	QP	40.3	17.0	9.4	31.9	34.8	46.0	11.2	100	297	
Hori.	512.014	QP	35.7	17.9	9.5	31.9	31.2	46.0	14.8	100	222	
Hori.	2413.007	PK	46.5	27.3	13.8	41.1	46.5	73.9	27.4	111	359	
Hori.	2467.335	PK	47.0	27.4	13.8	41.1	47.1	73.9	26.8	111	359	
Hori.	4090.852	PK	54.9	30.1	5.6	41.7	48.9	73.9	25.0	100	231	
Hori.	4882.000	PK	47.7	31.2	5.9	40.9	43.9	73.9	30.0	104	76	
Hori.	7323.000	PK	46.4	36.8	7.5	41.4	49.3	73.9	24.6	100	0	
Hori.	9764.000	PK	44.6	38.5	8.6	38.8	52.9	73.9	21.0	100	0	
Hori.	12205.000	PK	45.7	39.3	10.2	39.2	56.0	73.9	17.9	100	0	
Hori.	2413.007	AV	35.7	27.3	13.8	41.1	35.7	53.9	18.2	111	359	
Hori.	2467.335	AV	35.8	27.4	13.8	41.1	35.9	53.9	18.0	111	359	
Hori.	4090.852	AV	52.4	30.1	5.6	41.7	46.4	53.9	7.5	100	231	
Hori.	4882.000	AV	36.9	31.2	5.9	40.9	33.1	53.9	20.8	104	76	
Hori.	7323.000	AV	36.3	36.8	7.5	41.4	39.2	53.9	14.7	100	0	
Hori.	9764.000	AV	34.2	38.5	8.6	38.8	42.5	53.9	11.4	100	0	
Hori.	12205.000	AV	35.2	39.3	10.2	39.2	45.5	53.9	8.4	100	0	
Vert.	244.851	QP	33.1	17.0	8.3	32.0	26.4	46.0	19.6	100	338	
Vert.	2413.110	PK	46.0	27.3	13.8	41.1	46.0	73.9	27.9	100	29	
Vert.	2467.095	PK	47.1	27.4	13.8	41.1	47.2	73.9	26.7	100	29	
Vert.	4090.918	PK	53.9	30.1	5.6	41.7	47.9	73.9	26.0	119	152	
Vert.	4882.000	PK	47.0	31.2	5.9	40.9	43.2	73.9	30.7	100	350	
Vert.	7323.000	PK	46.3	36.8	7.5	41.4	49.2	73.9	24.7	100	0	
Vert.	9764.000	PK	44.4	38.5	8.6	38.8	52.7	73.9	21.2	100	0	
Vert.	12205.000	PK	45.7	39.3	10.2	39.2	56.0	73.9	17.9	100	0	
Vert.	2413.110	AV	35.9	27.3	13.8	41.1	35.9	53.9	18.0	100	29	
Vert.	2467.095	AV	35.9	27.4	13.8	41.1	36.0	53.9	17.9	100	29	
Vert.	4090.918	AV	50.8	30.1	5.6	41.7	44.8	53.9	9.1	119	152	
Vert.	4882.000	AV	36.5	31.2	5.9	40.9	32.7	53.9	21.2	100	350	
Vert.	7323.000	AV	36.2	36.8	7.5	41.4	39.1	53.9	14.8	100	0	
Vert.	9764.000	AV	34.2	38.5	8.6	38.8	42.5	53.9	11.4	100	0	
Vert.	12205.000	AV	35.1	39.3	10.2	39.2	45.4	53.9	8.5	100	0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter)) - Gain(Amprifier)

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

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Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.		No.3 Semi Anechoic Chamber
Date	January 17, 2012	January 18, 2012	
Temperature / Humidity	24deg.C , 21%RH	23deg.C , 20%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.	230.862	QP	35.8	16.7	8.2	32.0	28.7	46.0	17.3	156	275	PK:VBW 3MHz
Hori.	320.011	QP	43.5	14.4	8.8	31.9	34.8	46.0	11.2	118	56	AV:VBW 10Hz
Hori.	448.009	QP	40.5	17.0	9.4	31.9	35.0	46.0	11.0	100	299	
Hori.	512.014	QP	35.8	17.9	9.5	31.9	31.3	46.0	14.7	100	223	
Hori.	2454.040	PK	46.3	27.4	13.8	41.1	46.4	73.9	27.5	109	359	
Hori.	2483.500	PK	46.6	27.5	13.8	41.1	46.8	73.9	27.1	109	359	
Hori.	2506.174	PK	47.0	27.5	14.0	41.1	47.4	73.9	26.5	109	359	
Hori.	4090.915	PK	55.1	30.1	5.6	41.7	49.1	73.9	24.8	100	231	
Hori.	4960.000	PK	45.7	31.4	5.9	40.8	42.2	73.9	31.7	100	71	
Hori.	7440.000	PK	47.2	37.0	7.5	41.5	50.2	73.9	23.7	100	0	
Hori.	9920.000	PK	44.0	38.8	8.6	38.8	52.6	73.9	21.3	100	0	
Hori.	12400.000	PK	44.7	39.4	10.1	39.2	55.0	73.9	18.9	100	0	
Hori.	2454.040	AV	35.8	27.4	13.8	41.1	35.9	53.9	18.0	109	359	
Hori.	2483.500	AV	35.9	27.5	13.8	41.1	36.1	53.9	17.8	109	359	
Hori.	2506.174	AV	35.8	27.5	14.0	41.1	36.2	53.9	17.7	109	359	
Hori.	4090.915	AV	52.3	30.1	5.6	41.7	46.3	53.9	7.6	100	231	
Hori.	4960.000	AV	35.7	31.4	5.9	40.8	32.2	53.9	21.7	100	71	
Hori.	7440.000	AV	36.1	37.0	7.5	41.5	39.1	53.9	14.8	100	0	
Hori.	9920.000	AV	33.5	38.8	8.6	38.8	42.1	53.9	11.8	100	0	
Hori.	12400.000	AV	34.0	39.4	10.1	39.2	44.3	53.9	9.6	100	0	
Vert.	244.891	QP	33.4	17.0	8.3	32.0	26.7	46.0	19.3	100	343	
Vert.	2454.035	PK	46.5	27.4	13.8	41.1	46.6	73.9	27.3	100	35	
Vert.	2483.500	PK	46.5	27.5	13.8	41.1	46.7	73.9	27.2	100	35	
Vert.	2506.309	PK	45.9	27.5	14.0	41.1	46.3	73.9	27.6	100	35	
Vert.	4090.969	PK	54.0	30.1	5.6	41.7	48.0	73.9	25.9	120	151	
Vert.	4960.000	PK	46.3	31.4	5.9	40.8	42.8	73.9	31.1	100	347	
Vert.	7440.000	PK	47.7	37.0	7.5	41.5	50.7	73.9	23.2	100	0	
Vert.	9920.000	PK	43.8	38.8	8.6	38.8	52.4	73.9	21.5	100	0	
Vert.	12400.000	PK	45.5	39.4	10.1	39.2	55.8	73.9	18.1	100	0	
Vert.	2454.035	AV	35.9	27.4	13.8	41.1	36.0	53.9	17.9	100	35	
Vert.	2483.500	AV	35.9	27.5	13.8	41.1	36.1	53.9	17.8	100	35	
Vert.	2506.309	AV	35.8	27.5	14.0	41.1	36.2	53.9	17.7	100	35	
Vert.	4090.969	AV	50.5	30.1	5.6	41.7	44.5	53.9	9.4	120	151	
Vert.	4960.000	AV	35.9	31.4	5.9	40.8	32.4	53.9	21.5	100	347	
Vert.	7440.000	AV	36.4	37.0	7.5	41.5	39.4	53.9	14.5	100	0	
Vert.	9920.000	AV	33.7	38.8	8.6	38.8	42.3	53.9	11.6	100	0	
Vert.	12400.000	AV	35.4	39.4	10.1	39.2	45.7	53.9	8.2	100	0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter)) - Gain(Amprifier)

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

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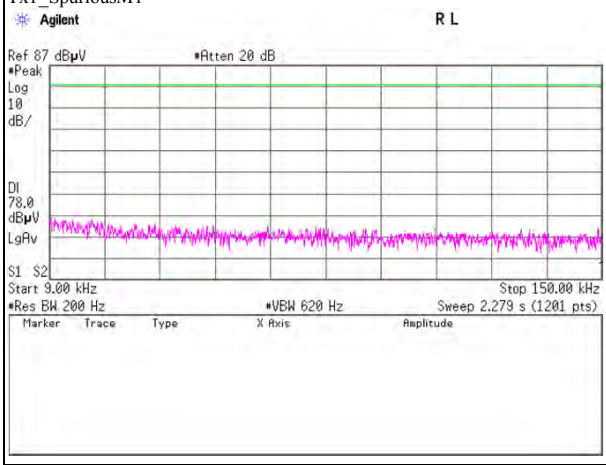
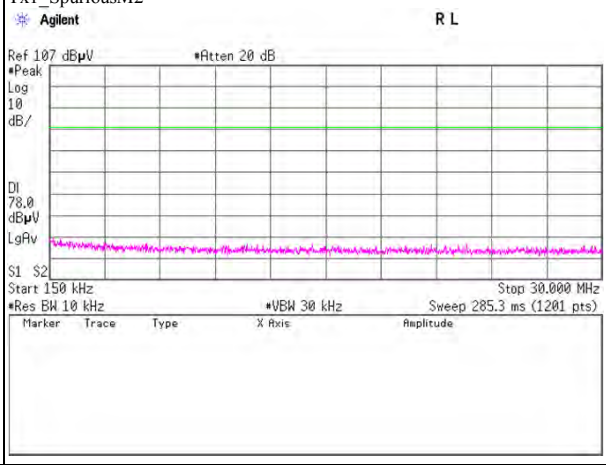
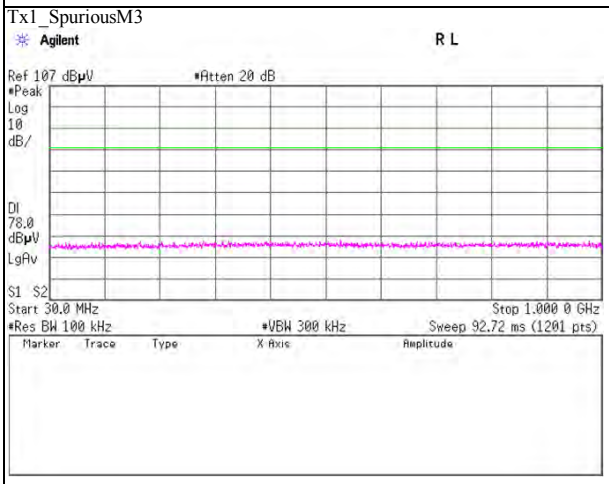
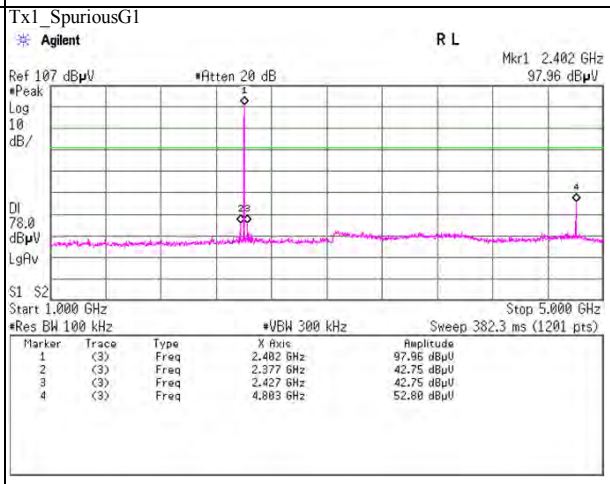
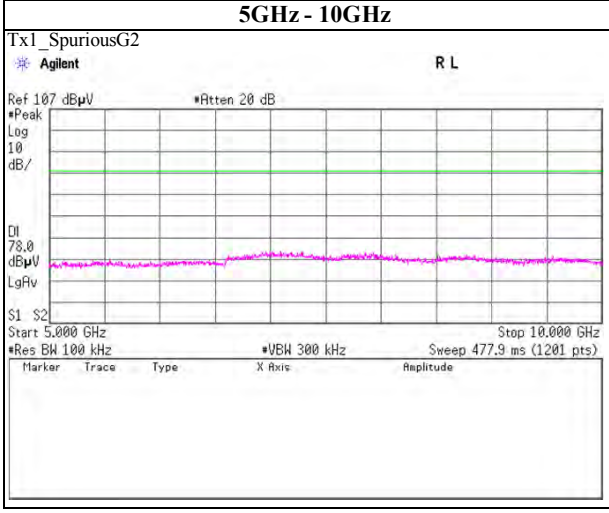
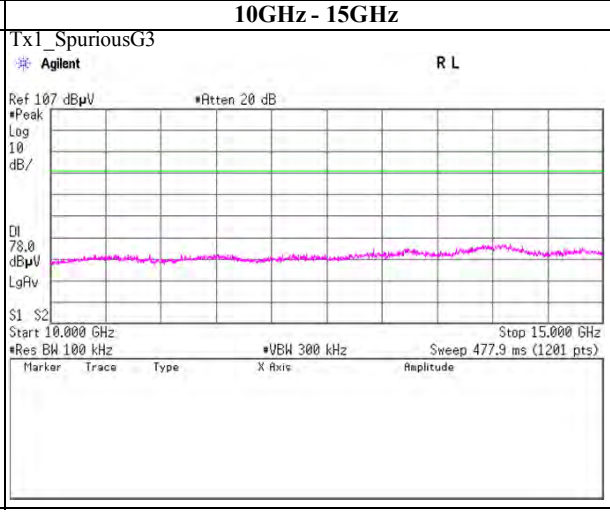
Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2402MHz (1/2)

9kHz - 150kHz	150kHz - 30MHz
Tx1_SpuriousM1	Tx1_SpuriousM2
	
30MHz - 1GHz	**1GHz - 5GHz**
Tx1_SpuriousM3	Tx1_SpuriousG1
	
5GHz - 10GHz	**10GHz - 15GHz**
Tx1_SpuriousG2	Tx1_SpuriousG3
	

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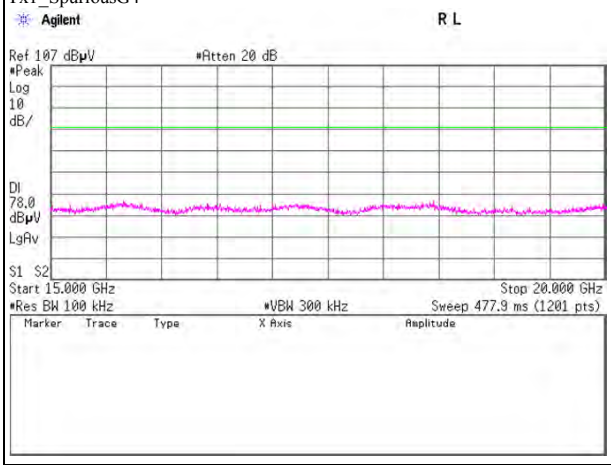
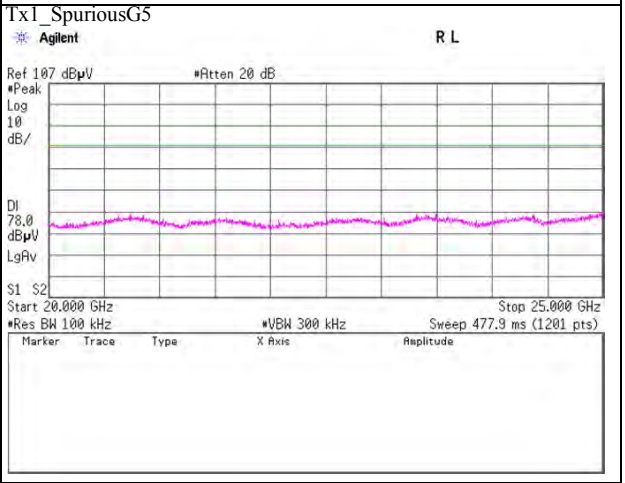
Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2402MHz (2/2)	
15GHz - 20GHz	**20GHz - 25GHz**
Tx1_SpuriousG4 	Tx1_SpuriousG5 
Tx1_SpuriousG6	Tx1_SpuriousG7
Tx1_SpuriousG8	

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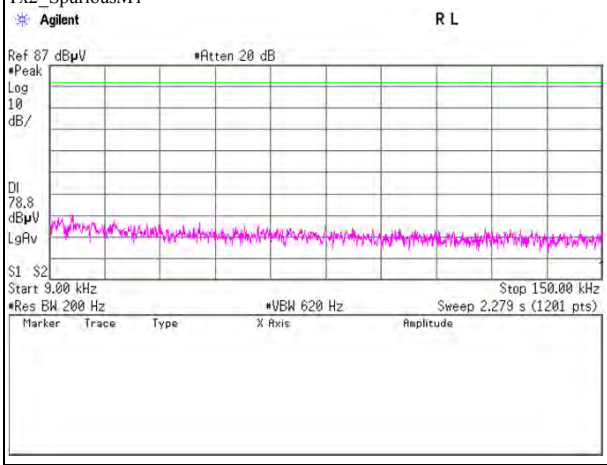
Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2441MHz (1/2)

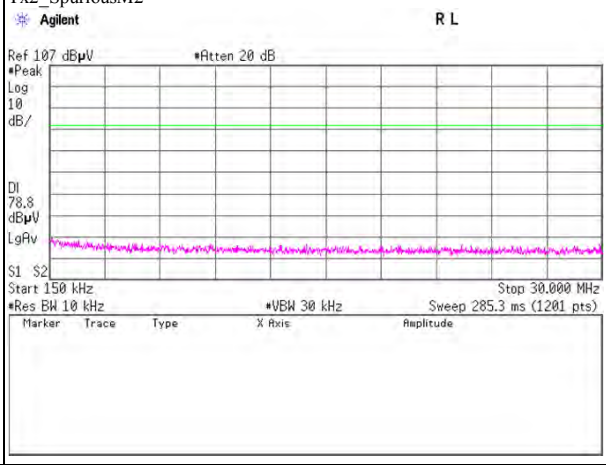
9kHz - 150kHz

Tx2_SpuriousM1



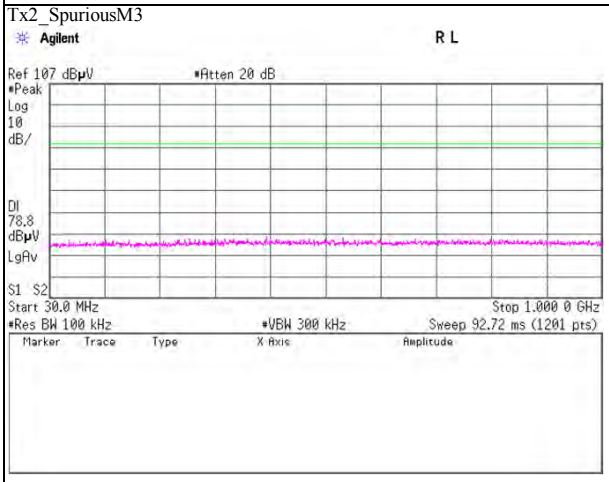
150kHz - 30MHz

Tx2_SpuriousM2



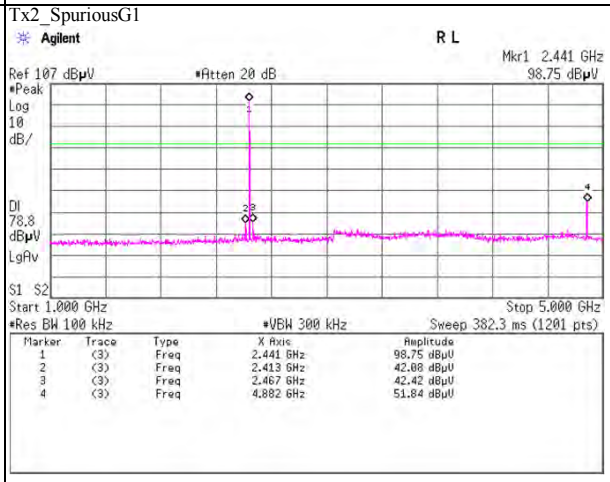
30MHz - 1GHz

Tx2_SpuriousM3



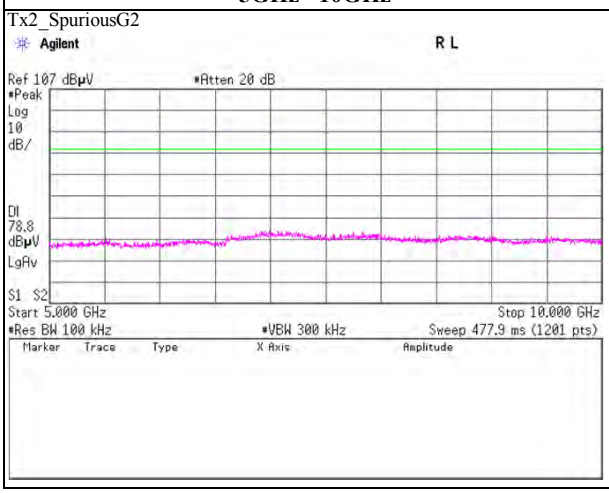
1GHz - 5GHz

Tx2_SpuriousG1



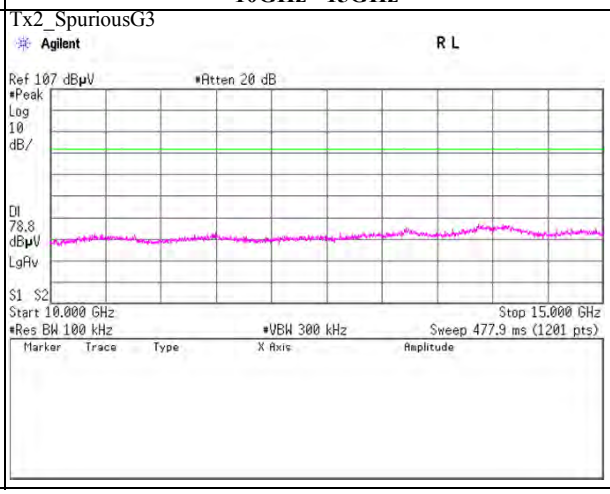
5GHz - 10GHz

Tx2_SpuriousG2



10GHz - 15GHz

Tx2_SpuriousG3



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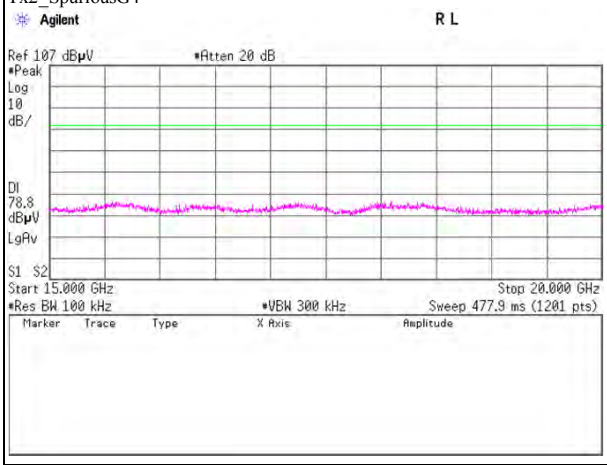
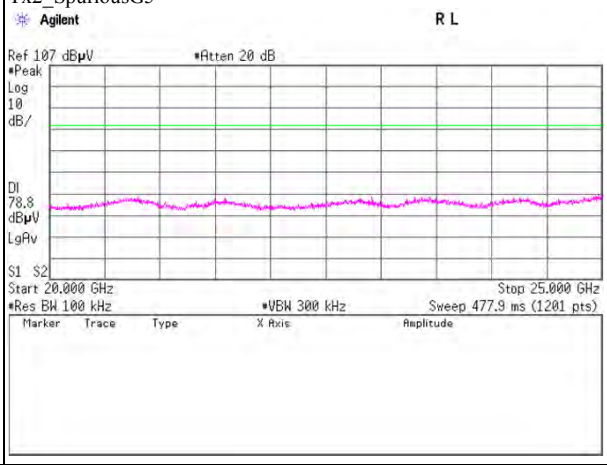
Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2441MHz (2/2)	
15GHz - 20GHz	**20GHz - 25GHz**
Tx2_SpuriousG4 	Tx2_SpuriousG5 
Tx2_SpuriousG6	Tx2_SpuriousG7
Tx2_SpuriousG8	

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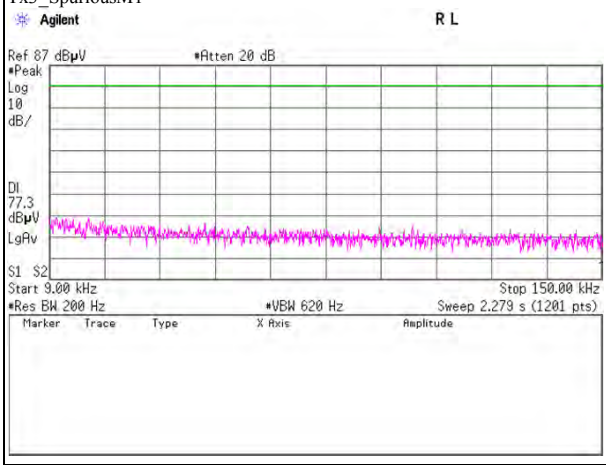
Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2480MHz (1/2)

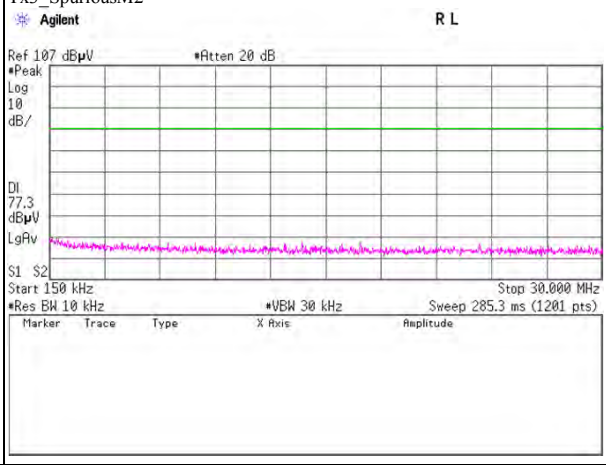
9kHz - 150kHz

Tx3_SpuriousM1



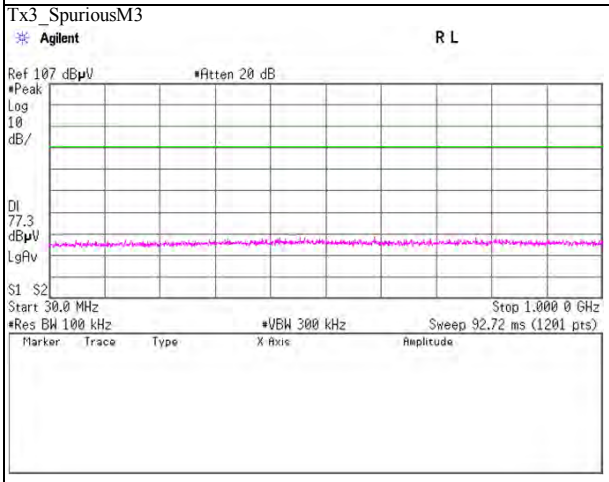
150kHz - 30MHz

Tx3_SpuriousM2



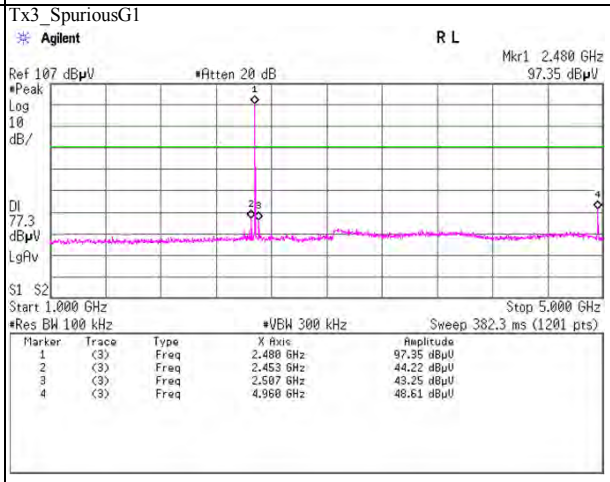
30MHz - 1GHz

Tx3_SpuriousM3



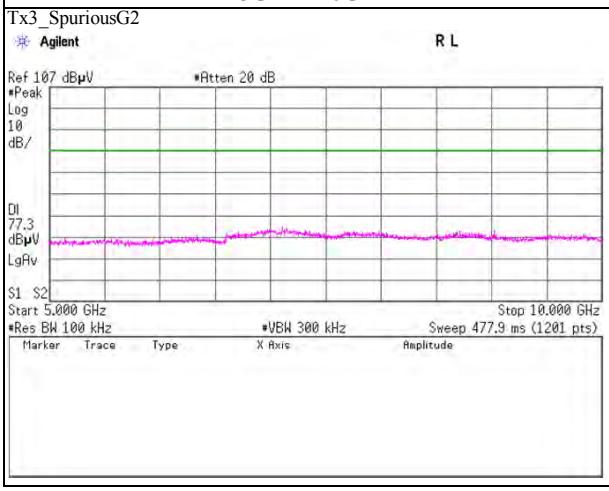
1GHz - 5GHz

Tx3_SpuriousG1



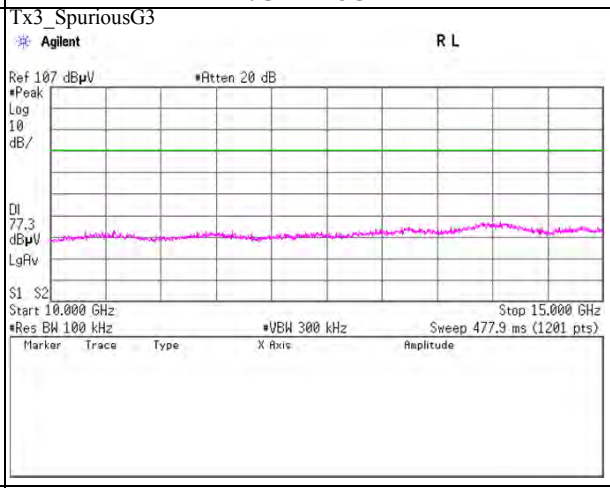
5GHz - 10GHz

Tx3_SpuriousG2



10GHz - 15GHz

Tx3_SpuriousG3



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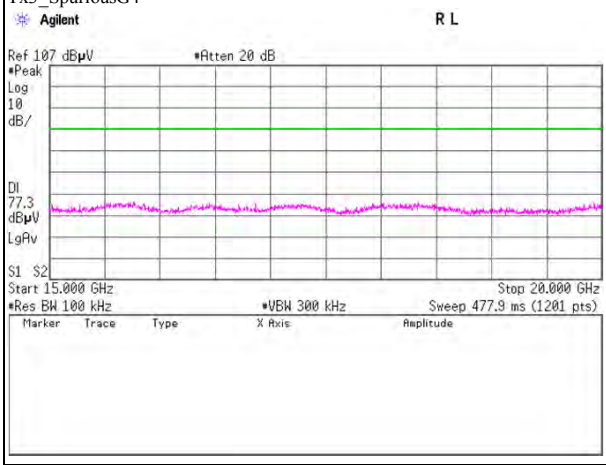
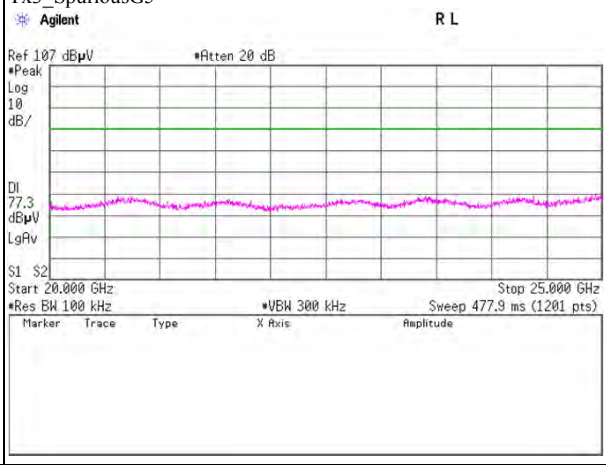
Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2480MHz (2/2)	
15GHz - 20GHz	**20GHz - 25GHz**
Tx3_SpuriousG4 	Tx3_SpuriousG5 
Tx3_SpuriousG6	Tx3_SpuriousG7
Tx3_SpuriousG8	

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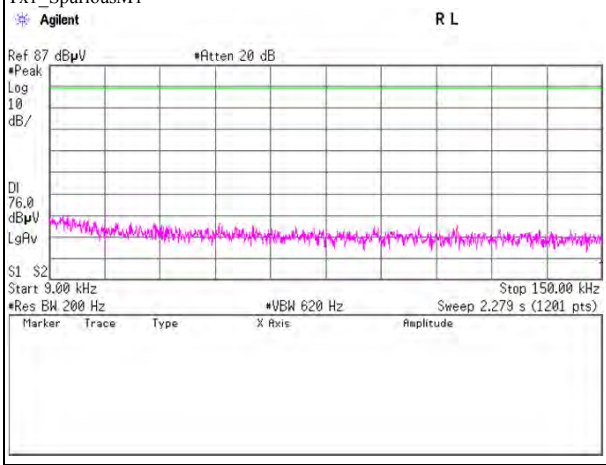
Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2402MHz (1/2)

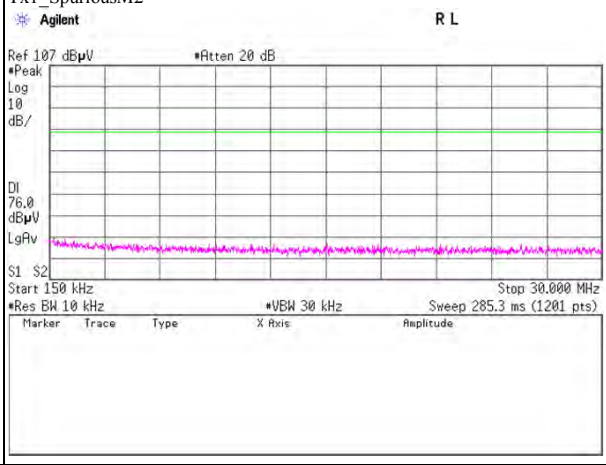
9kHz - 150kHz

Tx1_SpuriousM1



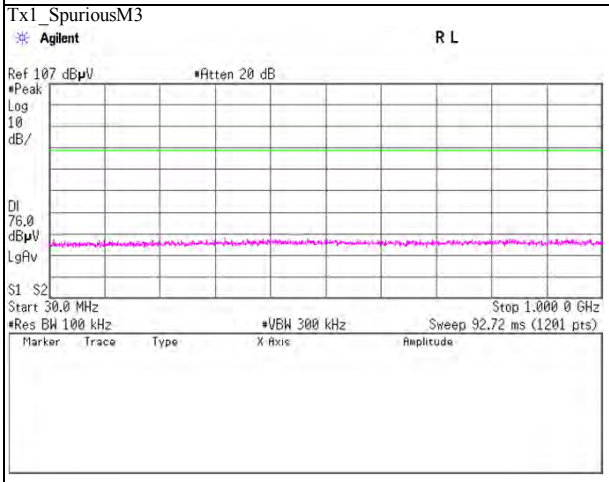
150kHz - 30MHz

Tx1_SpuriousM2



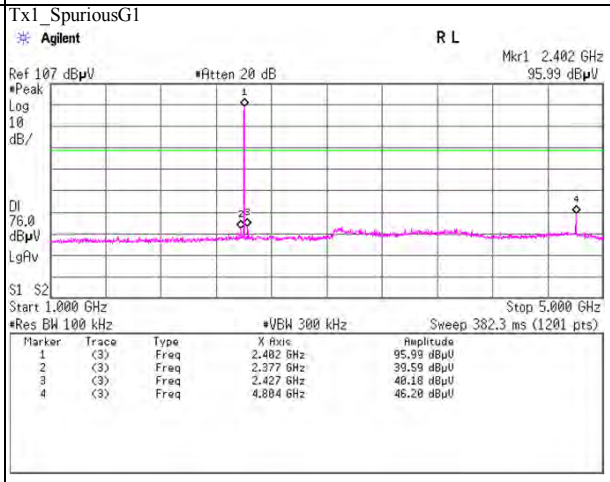
30MHz - 1GHz

Tx1_SpuriousM3



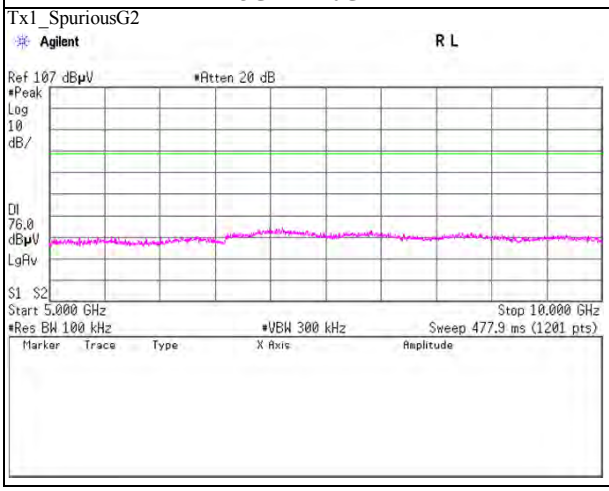
1GHz - 5GHz

Tx1_SpuriousG1



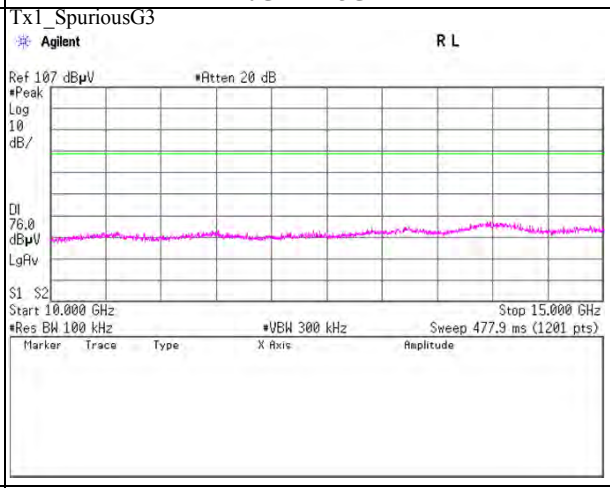
5GHz - 10GHz

Tx1_SpuriousG2



10GHz - 15GHz

Tx1_SpuriousG3



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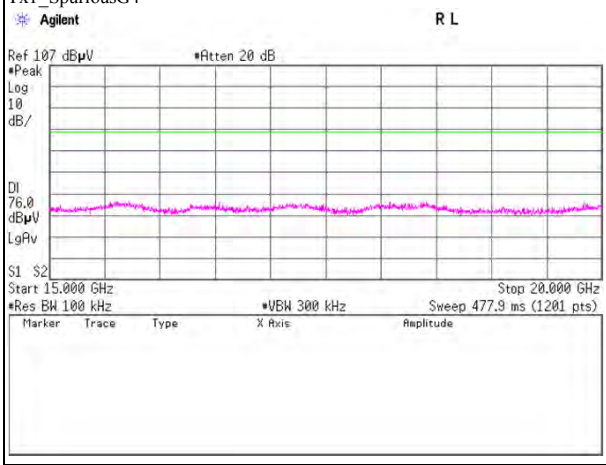
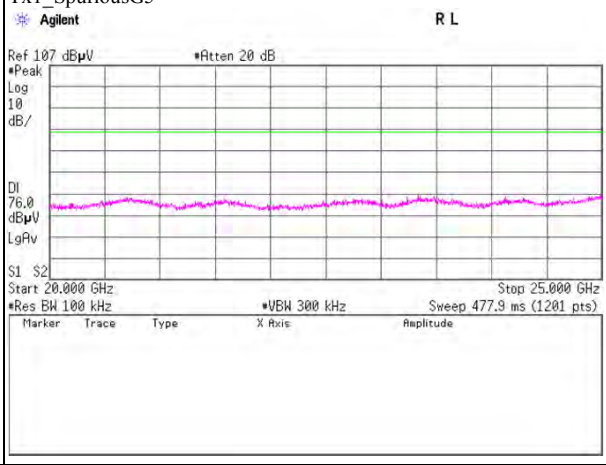
Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2402MHz (2/2)	
15GHz - 20GHz	**20GHz - 25GHz**
Tx1_SpuriousG4 	Tx1_SpuriousG5 
Tx1_SpuriousG6	Tx1_SpuriousG7
Tx1_SpuriousG8	

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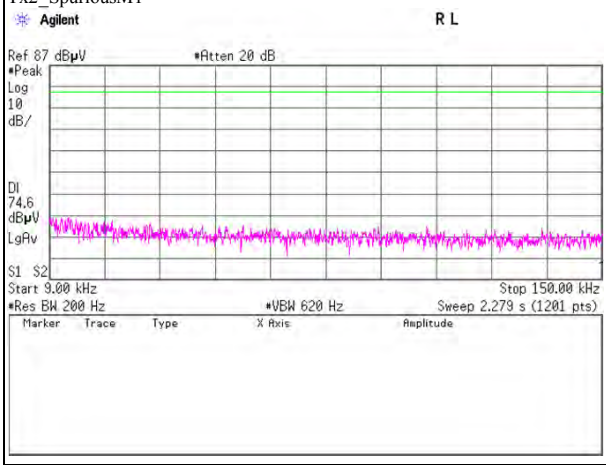
Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2441MHz (1/2)

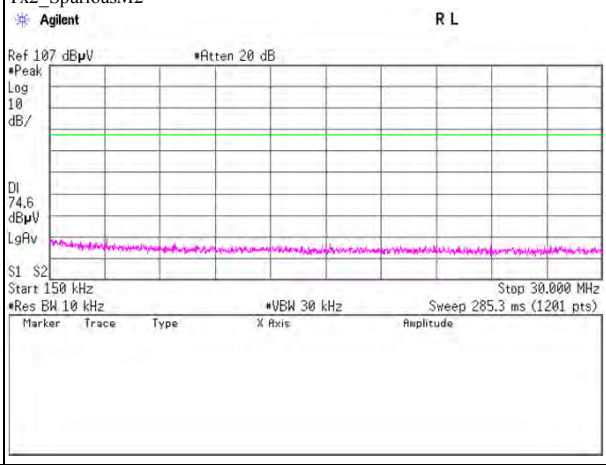
9kHz - 150kHz

Tx2_SpuriousM1



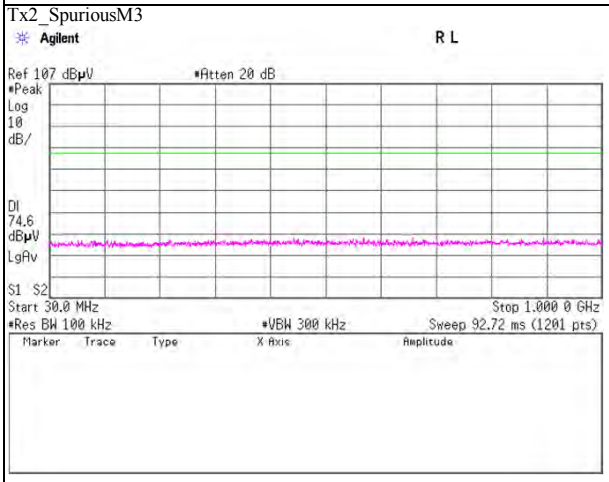
150kHz - 30MHz

Tx2_SpuriousM2



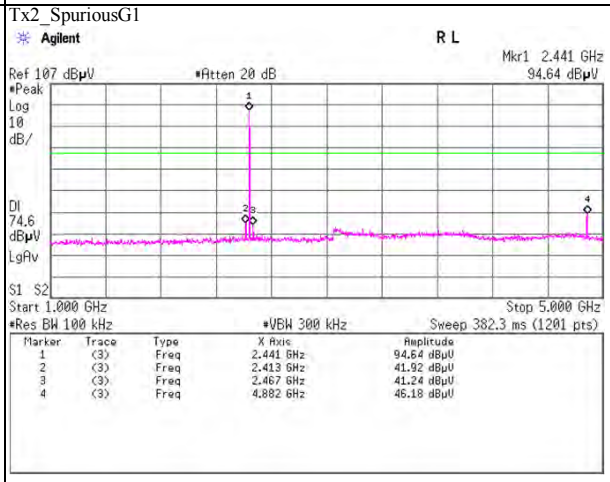
30MHz - 1GHz

Tx2_SpuriousM3



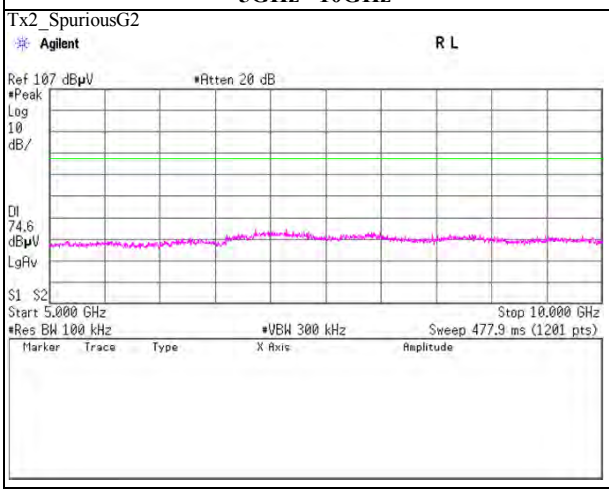
1GHz - 5GHz

Tx2_SpuriousG1



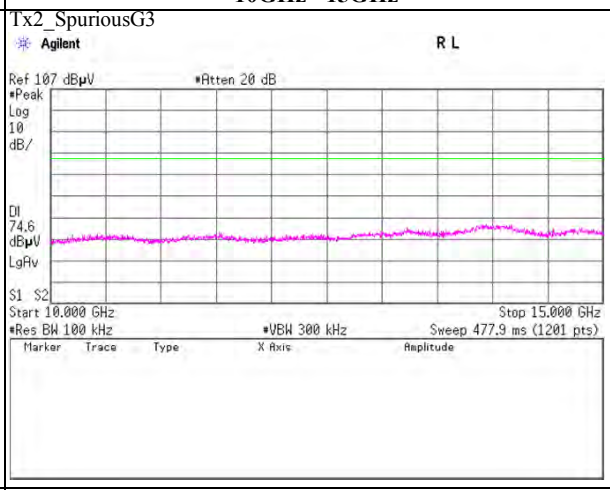
5GHz - 10GHz

Tx2_SpuriousG2



10GHz - 15GHz

Tx2_SpuriousG3



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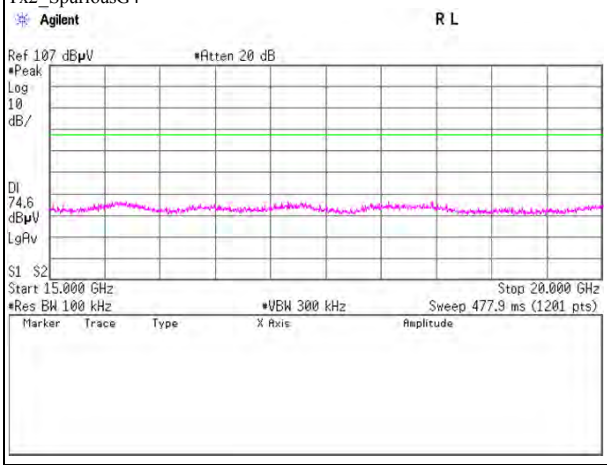
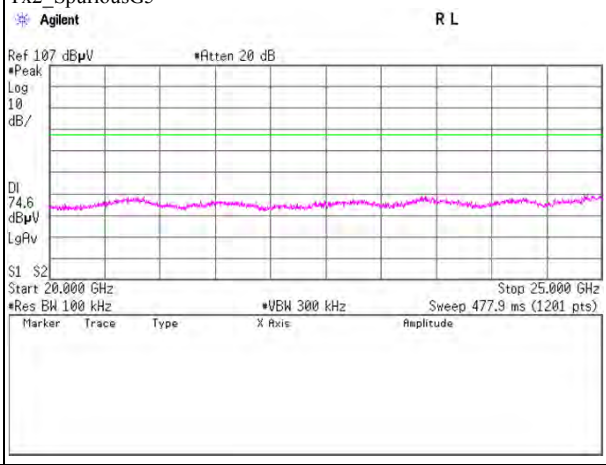
Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2441MHz (2/2)	
15GHz - 20GHz	**20GHz - 25GHz**
Tx2_SpuriousG4 	Tx2_SpuriousG5 
Tx2_SpuriousG6	Tx2_SpuriousG7
Tx2_SpuriousG8	

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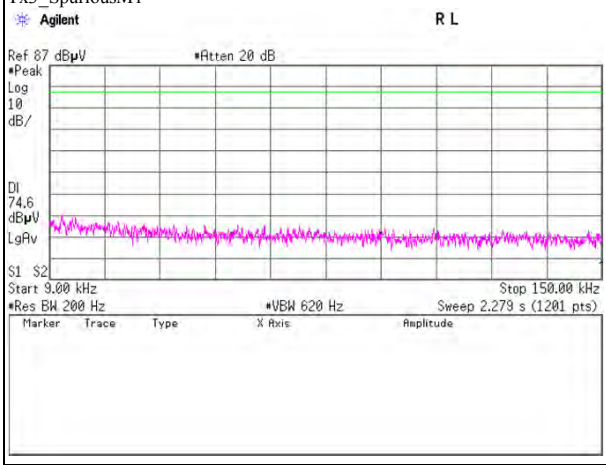
Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2480MHz (1/2)

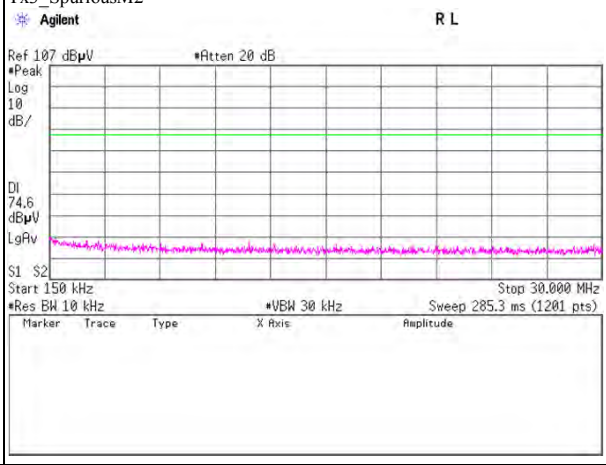
9kHz - 150kHz

Tx3_SpuriousM1



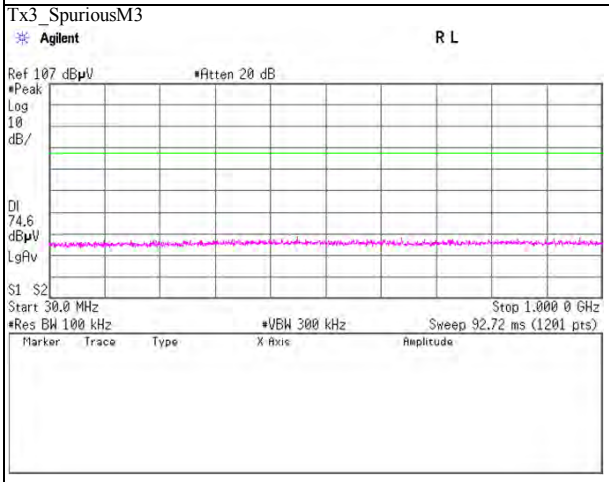
150kHz - 30MHz

Tx3_SpuriousM2



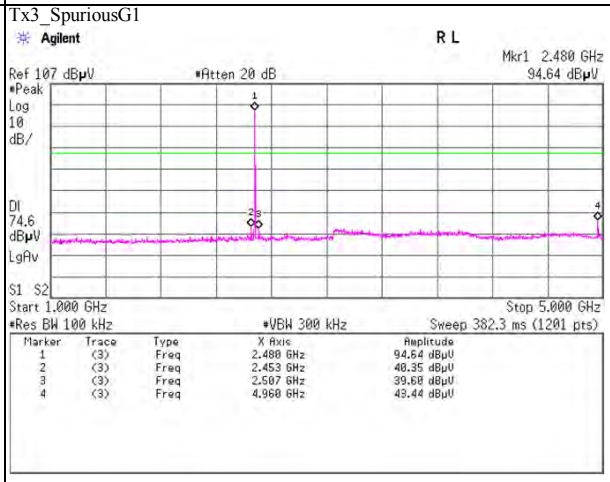
30MHz - 1GHz

Tx3_SpuriousM3



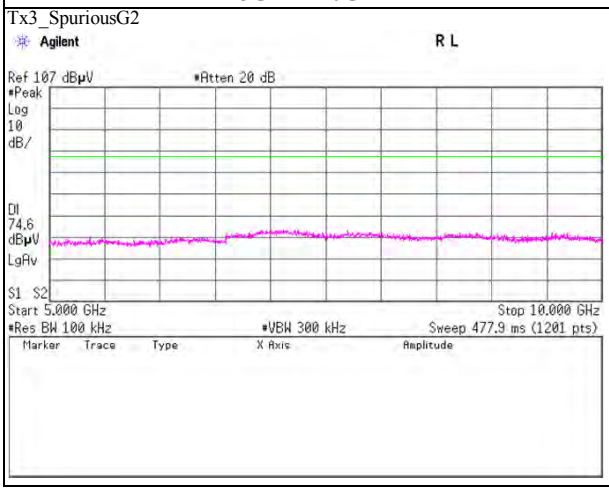
1GHz - 5GHz

Tx3_SpuriousG1



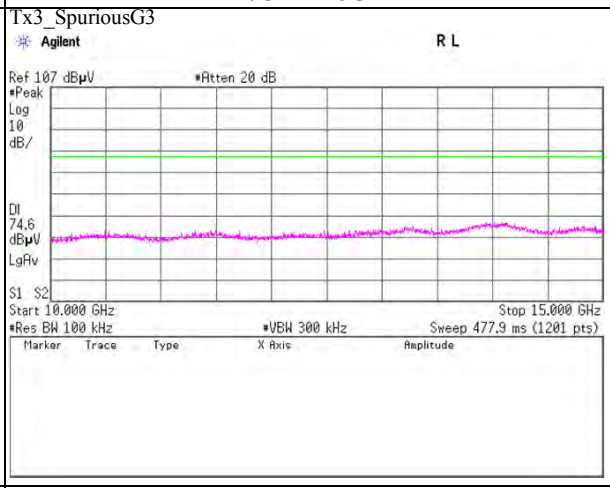
5GHz - 10GHz

Tx3_SpuriousG2



10GHz - 15GHz

Tx3_SpuriousG3



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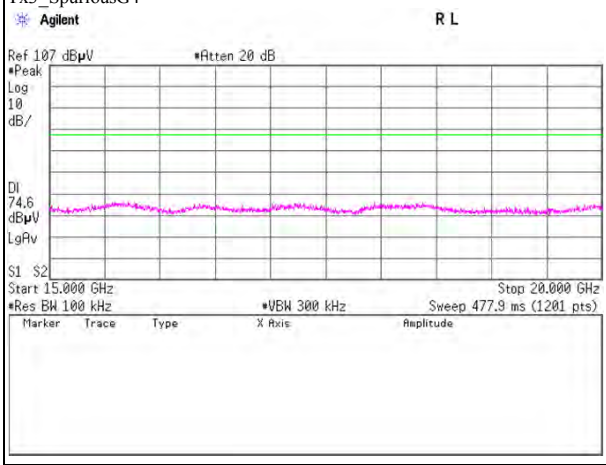
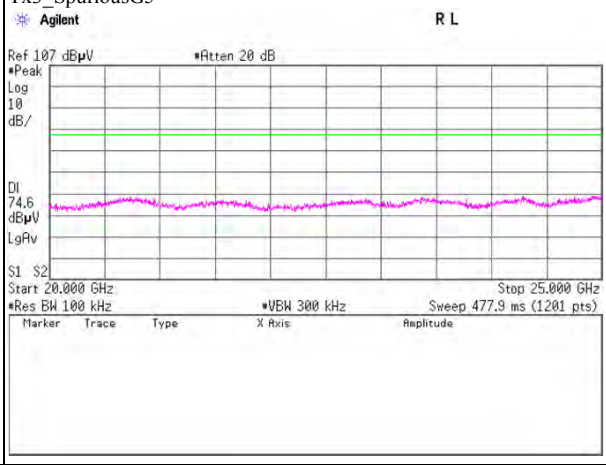
Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2480MHz (2/2)	
15GHz - 20GHz	**20GHz - 25GHz**
Tx3_SpuriousG4 	Tx3_SpuriousG5 
Tx3_SpuriousG6	Tx3_SpuriousG7
Tx3_SpuriousG8	

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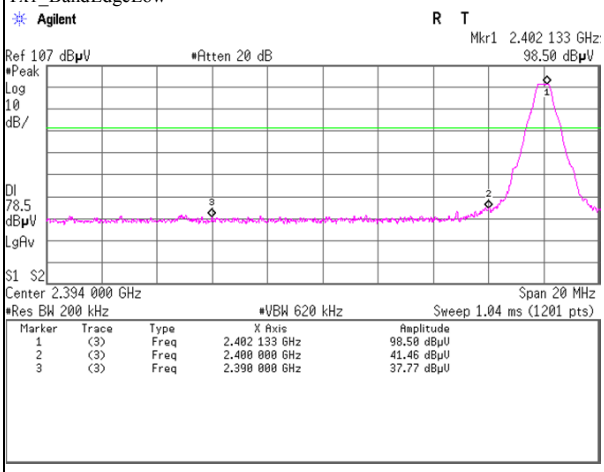
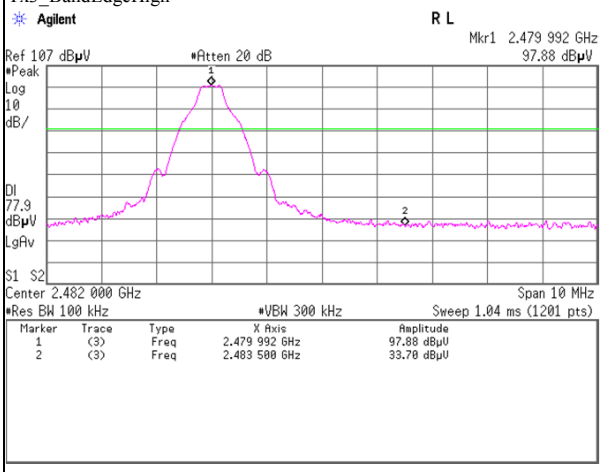
Spurious emission (Conducted)

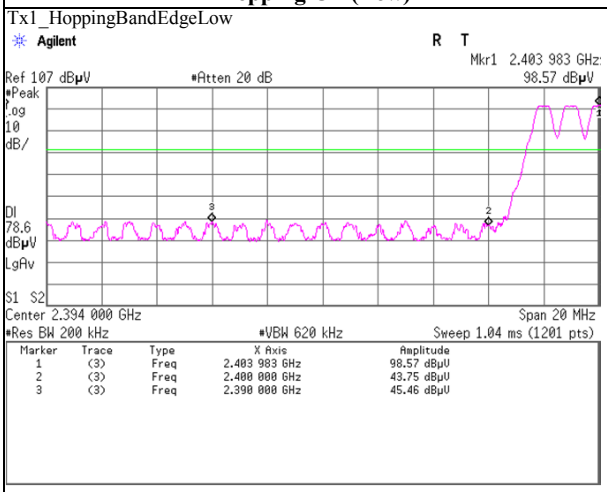
Band Edge compliance

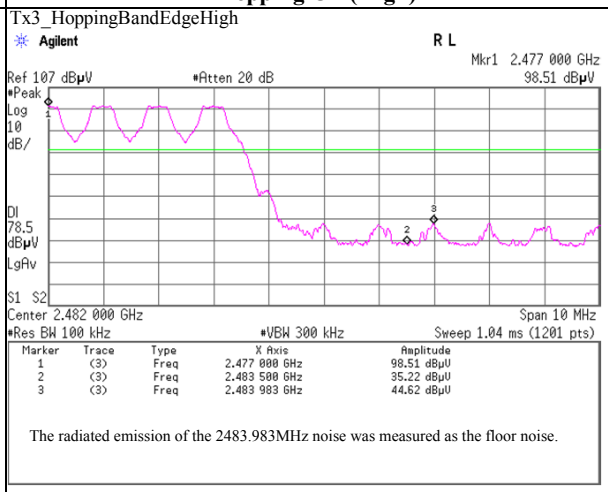
Tx, Bluetooth, BDR, PRBS9	
Tx, 2402MHz	**Tx, 2480MHz**
Tx1_BandEdgeLow	Tx3_BandEdgeHigh





Tx, Bluetooth, BDR, PRBS9	
Hopping On (Low)	**Hopping On (High)**
Tx1_HoppingBandEdgeLow	Tx3_HoppingBandEdgeHigh





The radiated emission of the 2483.983MHz noise was measured as the floor noise.

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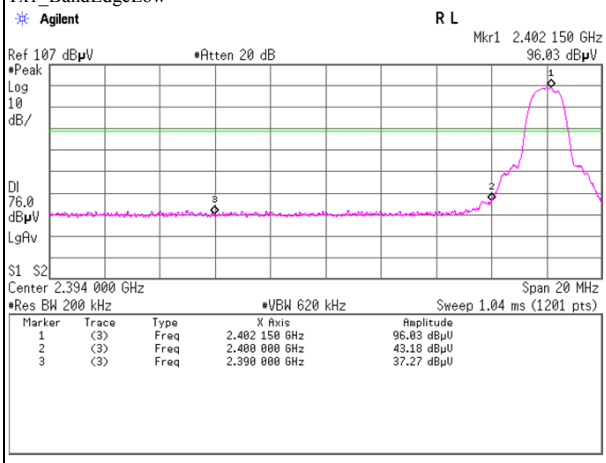
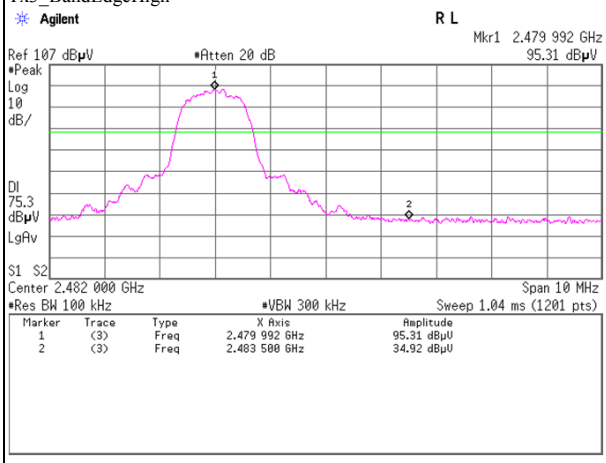
Spurious emission (Conducted)

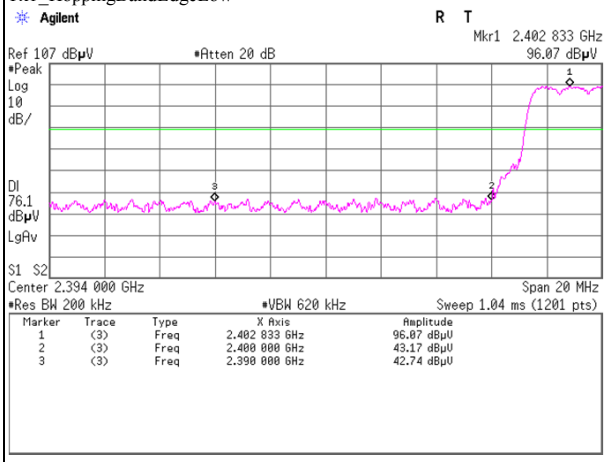
Band Edge compliance

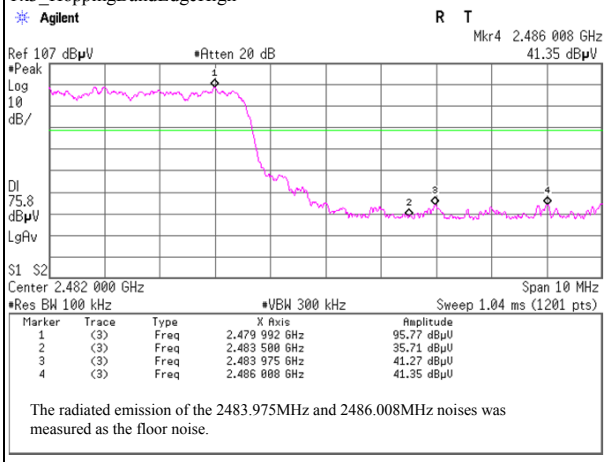
Tx, Bluetooth, EDR, PRBS9	
Tx, 2402MHz	**Tx, 2480MHz**
Tx1_BandEdgeLow	Tx3_BandEdgeHigh





Tx, Bluetooth, EDR, PRBS9	
Hopping On (Low)	**Hopping On (High)**
Tx1_HoppingBandEdgeLow	Tx3_HoppingBandEdgeHigh





The radiated emission of the 2483.975MHz and 2486.008MHz noises was measured as the floor noise.

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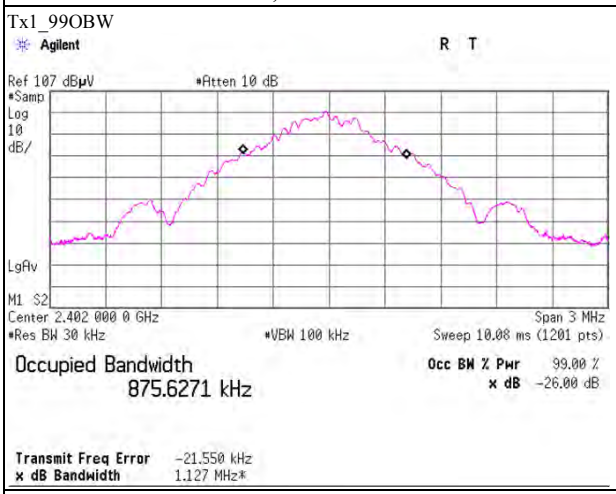
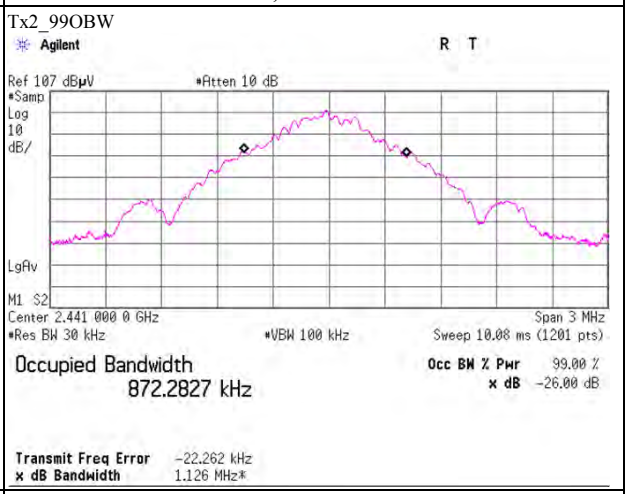
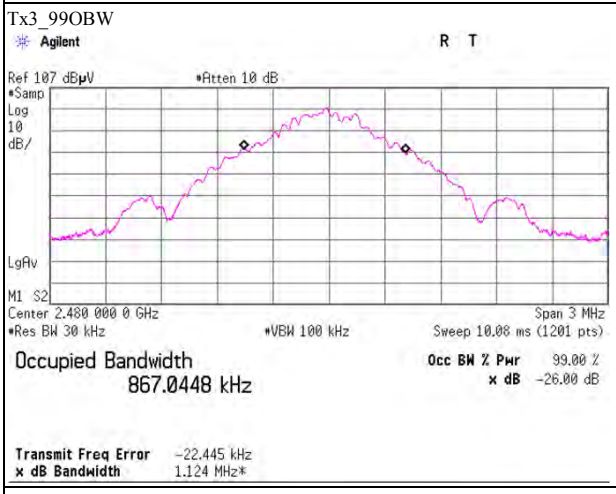
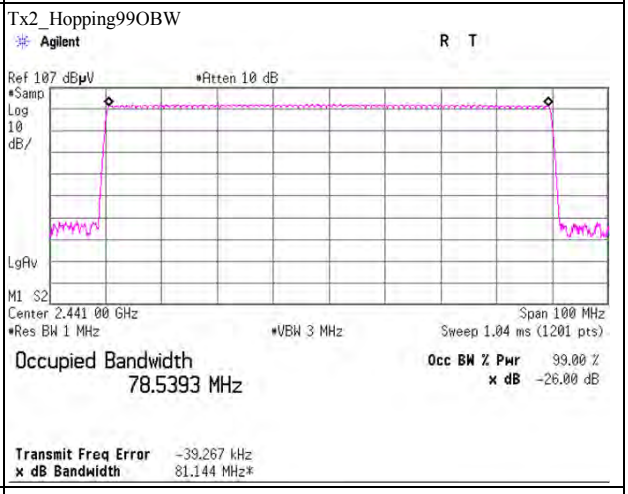
99% Occupied Bandwidth

Tx, Bluetooth, BDR, PRBS9	
Tx, 2402MHz	**Tx, 2441MHz**
Tx1_99OBW 	Tx2_99OBW 
Tx, 2480MHz	**Tx, Hopping On**
Tx3_99OBW 	Tx2_Hopping99OBW 

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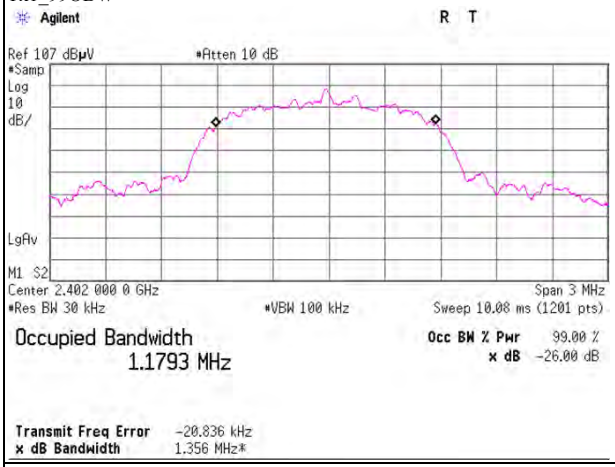
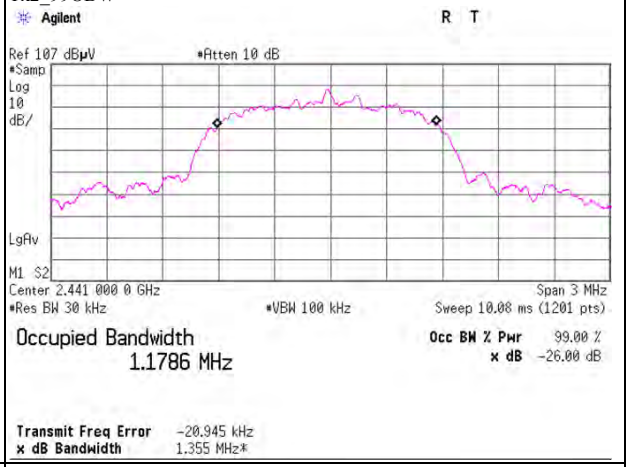
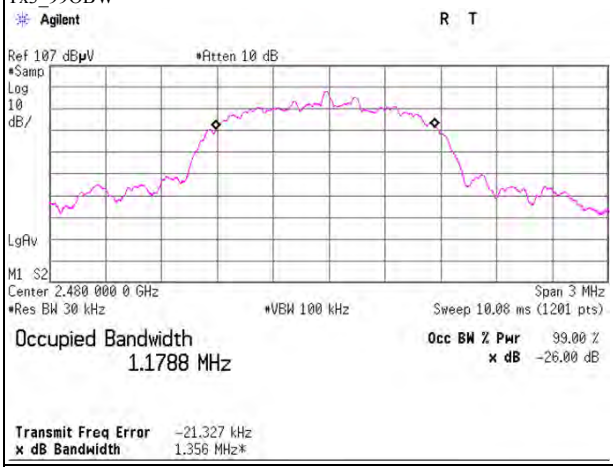
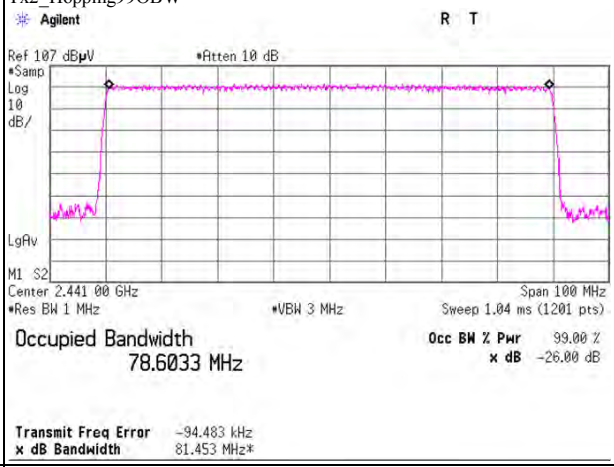
99% Occupied Bandwidth

Tx, Bluetooth, EDR, PRBS9	
Tx, 2402MHz	**Tx, 2441MHz**
Tx1_99OBW 	Tx2_99OBW 
Tx, 2480MHz	**Tx, Hopping On**
Tx3_99OBW 	Tx2_Hopping99OBW 

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APPENDIX
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	AT	2011/12/05 * 12
SCC-G12	Coaxial Cable	Suhner	SUCOFLEX 102	30790/2	AT	2011/03/23 * 12
SAT10-09	Attenuator	Weinschel Corp.	54A-10	W5692	AT	2011/11/09 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2011/03/02 * 12
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2011/04/12 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2011/04/12 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2011/07/19 * 12
SCC-G03	Coaxial Cable	Suhner	SUCOFLEX 104A	46499/4A	RE	2011/04/28 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2011/05/27 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2011/08/28 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2011/02/23 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	2011/03/07 * 12
SJM-10	Measure	PROMART	SEN1935	-	RE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE, RFI,MF)	-	RE	-
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2011/12/27 * 12
SAT10-06	Attenuator	Agilent	8493C-010	74865	RE	2011/12/27 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2011/03/16 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2011/03/15 * 12
SCC-G17	Coaxial Cable	Suhner	SUCOFLEX 104A	46291/4A	RE	2011/03/16 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2011/02/17 * 12
SAT6-03	Attenuator	JFW	50HF-006N	-	RE	2011/02/17 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2011/10/23 * 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	2011/04/28 * 12
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0901	RE	2011/10/23 * 12
STR-03	Test Receiver	Rohde & Schwarz	ESI40	100054/040	RE	2011/07/28 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2011/09/23 * 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 :
CE: Conducted emission ,
RE: Radiated emission ,
AT: Antenna terminal conducted tests