RADIO TEST REPORT

Test Report No.: 32CE0306-SH-01-A

Applicant	:	**Alpine Electronics, Inc.**
Type of Equipment	:	**Bluetooth PWB**
Model No.	:	**ICS-X7 BT PWB**
FCC ID	:	**A269ZUA137**
Test regulation	:	**FCC Part15 Subpart C: 2012**
Test result	:	**Complied**

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by any agency of the Federal Government.
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 23 to 26, 2012

Tested by:

Makoto Hosaka
Engineer of WiSE Japan, UL
Verification Service

Approved by :

Ichiro Isozaki
Leader of WiSE Japan, UL
Verification Service

☐ The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.
☒ There is no testing item of "Non-accreditation".

JAB Testing RTL02610

UL Japan, Inc.
Shonan EMC Lab.
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Contents

SECTION 1: Customer information

Company Name	:	Alpine Electronics, Inc.
Address	:	20-1 Yoshima kogyo-danchi, Iwaki-shi, Fukushima, 970-1192 Japan
Telephone Number	:	+81-246-36-4111
Facsimile Number	:	+81-246-36-6090
Contact Person	:	Isamu Takaku

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

2.1 Identification of E.U.T.

Type of Equipment	:	Bluetooth PWB
Model Number	:	ICS-X7 BT PWB
Serial Number	:	Refer to Section 4.2
Rating	:	DC3.0-3.6V
Country of Mass-production	:	China
Condition of EUT	:	Production prototype, (Not for Sale: This sample is equivalent to mass-produced items.)
Receipt Date of Sample	:	December 27, 2011
Modification of EUT	:	The test lab did not make the modification to the EUT supplied from the customer to have it pass the tests.

2.2 Product description

Model: ICS-X7 BT PWB (referred to as the EUT in this report) is a Bluetooth PWB.

Clock frequency(ies) in the system : 26MHz, 13MHz

<Radio part>

Equipment type	:	Transceiver
Frequency of operation	:	2402-2480MHz
Bandwidth & channel spacing	:	79MHz & 1MHz
Type of modulation	:	FHSS (GFSK, π/4DQPSK, 8DPSK)
Antenna type	:	Pattern
Antenna gain with cable loss	:	-1.6 dBi
Antenna connector type	:	none
ITU code	:	F1D, G1D
Operation temperature range	:	-40 to +85 deg.C.

FCC 15.31 (e) / 212 (*15.212 = for module approval only)
Host device provides the Bluetooth Transceiver Module with stable power supply (DC3.3V), and the power is not changed when voltage of the device is varied. Therefore, the equipment complies power supply regulation.

FCC Part 15.203 / 212 (*15.212 = for module approval only)
The equipment does not have a coupling/ antenna connector. The antenna connector was attached for the testing. Therefore the equipment complies with the requirement of 15.203 and 15.212.

SECTION 3: Test specification, procedures & results

3.1 Test specification

Test specification : Test specification: FCC Part 15 Subpart C: 2012,
final revised on February 1, 2012

*The revision on February 1, 2012 does not affect the test specification applied to the EUT.

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.209 Radiated emission limits, general requirements
Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz

The EUT complies with FCC Part 15 Subpart B: 2012. The test has been 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 Section 15.207	-	N/A	N/A	N/A *1
Carrier frequency separation	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC Section15.247 (a)(1)	Conducted	N/A	*See data.	Complied
20dB bandwidth	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section15.247 (a)(1)	Conducted	N/A		Complied
Number of hopping frequency	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC Section15.247 (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 Section15.247 (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 Section15.247 (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 Section15.247 (d) Section15.209	Conducted/ Radiated	N/A	14.4dB (14646.000MHz, Peak, Horizontal, Tx 2441MHz, DH5) (14880.000MHz, Peak, Horizontal, Tx 2480MHz, DH5) (14880.000MHz, Peak, Vertical, Tx 2480MHz, 3DH5)	Complied

Note: UL Japan's EMI 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	-	N/A
Note: UL Japan's EMI 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)	30MHz-300MHz	4.9 dB	5.1 dB	5.0 dB
	300MHz-1GHz	5.0 dB	5.2 dB	5.0 dB
	1GHz-18GHz	4.8 dB	4.8 dB	4.9 dB
Radiated emission (Measurement distance: 1m)	1GHz-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 the site margin.

Power Measurement uncertainty above 1GHz for this test was: (±) 1.5dB
Conducted emissions, Power Density Measurement (1G-3GHz) uncertainty for this test was: (±) 2.3dB
Bandwidth Measurement uncertainty for this test was: (±) 5.4%

3.5 Test location

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JAB Accreditation No. : RTL02610

No.1/ No.2/ No.3 anechoic chamber has been fully described in a report submitted to FCC office, and accepted on April 17, 2009 (Registration No.: 697847).

	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	-

3.6 Test setup, Data of EMI & Test instruments

Refer to APPENDIX 3 to 3.

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

4.1 Operating mode

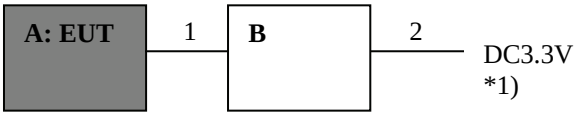
Test item	Operating mode	Tested frequency
Carrier frequency separation	Transmitting Hopping ON (DH5 / 3-DH5)/Inquiry, Payload: PRBS9	-
20dB bandwidth	Transmitting Hopping OFF (DH5 / 3-DH5) / Inquiry, Payload: PRBS9	2402MHz, 2441MHz, 2480MHz
Number of hopping frequency	Transmitting Hopping ON (DH5 / 3-DH5)/Inquiry,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

*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum packet type / 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 influence on the output power and bandwidth of the EUT.
However, the limit level 125mWof AFH mode was used for the test.

*EUT has the power settings by the software as follows;
Power settings: Fixed (The setting is not controlled by the software and it is equivalent to that of mass-produced ite
Software: HCITester2 (ver. 0.99ld)

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

4.2 Configuration of tested system



* Test data was taken under worse case conditions.

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID (Remarks)
A	Bluetooth PWB	ICS-X7 BT PWB	1 (Used for Radiated emission tests.) 2 (Used for Antenna terminal tests.)	Alpine Electronics, Inc.	-
B	Jig board	-	-	Alpine Electronics, Inc.	-

List of cables used

No.	Cable Name	Length (m)	Shield		Remark
			Cable	Connector	
1	Signal	0.1	Unshielded	Unshielded	-
2	DC	0.8	Unshielded	Unshielded	-

*1) DC power supply (Model No.: PAN35-10A) was used for DC 3.3V input.

SECTION 5: Radiated emission

5.1 Operating environment

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

5.2 Test configuration

EUT was placed on a platform of nominal size, 0.25m by 0.25m, raised 80cm above the conducting ground plane.
The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity.
The setup was not the one for a system which is specified in ANSI C63.4: 2009.
The rear of EUT, including its peripherals was aligned and flushed with center of tabletop.
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 3.

5.3 Test conditions

Frequency range : 30MHz to 26GHz
Test distance : 3m(below 15GHz) / 1m(above15GHz)
EUT position : Table top
EUT operation mode : Refer to SECTION 4.1

5.4 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	Below 1GHz	Above 1GHz		20dBc *2)
Instrument used	Test Receiver	Spectrum Analyzer		
Detector	Quasi-Peak	Peak	Average	Peak
IF Bandwidth	BW 120kHz	RBW: 1MHz VBW: 3MHz	RBW: 1MHz VBW: 10Hz *1)	RBW: 100kHz VBW: 300kHz

*1) When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.
Though 00-705 accepts VBW=10Hz for AV measurements, confirmed that superfluous smoothing was not performed.
*2) 20dBc was applied to the frequency over the limit of FCC 15.209 and outside the restricted band of FCC15.205.

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

Combinations of the worst case

	Worst position		
	Carrier, bandedge	Spurious 30MHz – 1GHz	Spurious 1GHz – 26GHz
Horizontal	X	X	Z
Vertical	Y	Y	Y

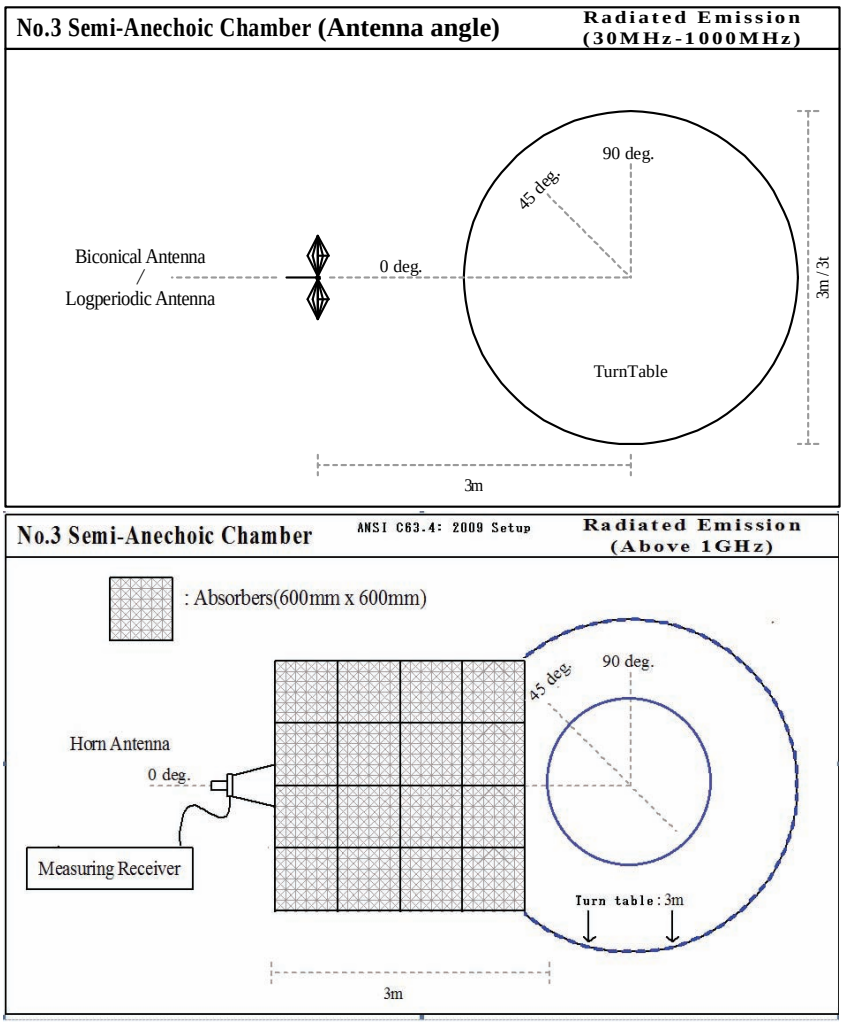


Figure 1. Antenna angle

5.5 Band edge

Band edge level at 2400MHz is less than 20dB of peak point of the carrier. Band edge level at 2390MHz and 2483.5MHz is below the limits of FCC 15.209. Refer to the data of Radiated emission.

5.6 Results

Summary of the test results : Pass
Refer to APPENDIX 1

SECTION 6: Out of band 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 7: 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 8: 20dB bandwidth & Occupied bandwidth (99%)

Test procedure
The bandwidth was measured with a spectrum analyzer connected to the antenna port.
The channel separation in Hopping mode and Inquiry mode was separated by 25kHz and 2/3 of the 20dB bandwidth.

Summary of the test results: Pass
Refer to APPENDIX 1

SECTION 9: 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 10: 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 11: 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

Contents of APPENDIXES

APPENDIX 1: Data of EMI test

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
Pre-check of worst position

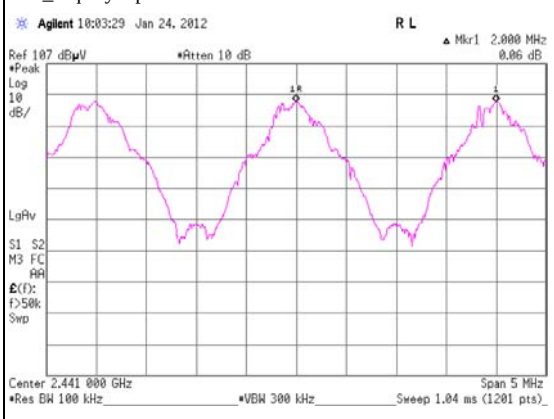
20dB Bandwidth and Carrier Frequency Separation

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	January 24, 2012	
Temperature / Humidity	21deg.C , 44%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	0.928	1.000	>= 0.619
DH5	2441.0	0.944	1.000	>= 0.629
DH5	2480.0	0.939	1.000	>= 0.626
Inquiry	2441.0	0.756	2.000	>= 0.504

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**
Tx2_Inquiry20OBW	Tx2_InquirySeparation



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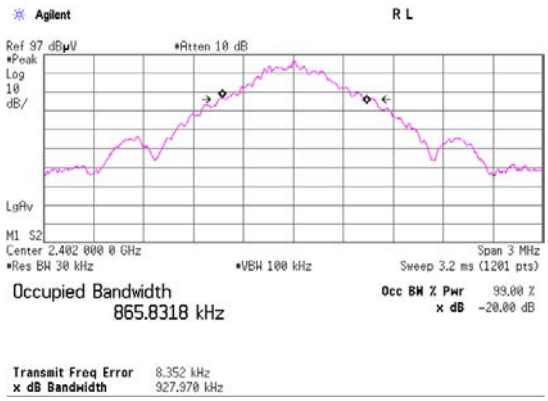
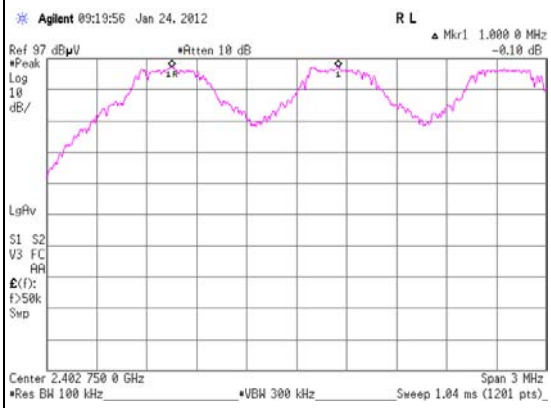
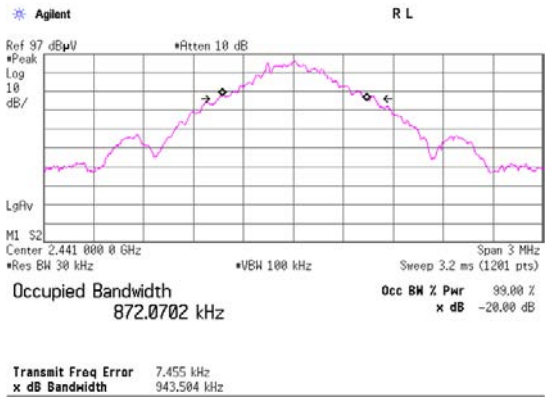
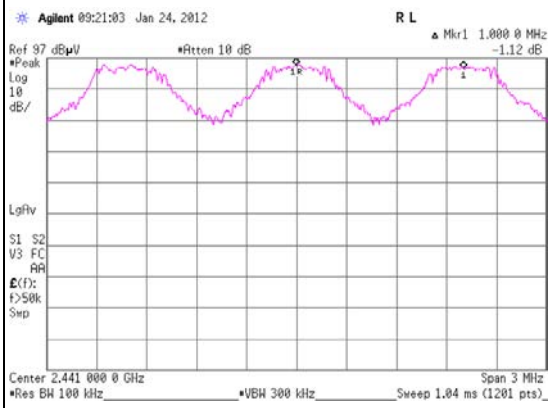
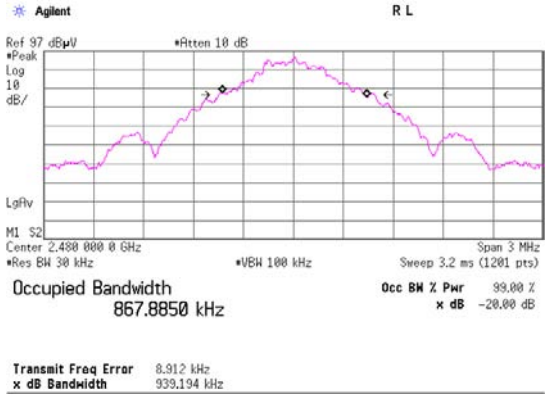
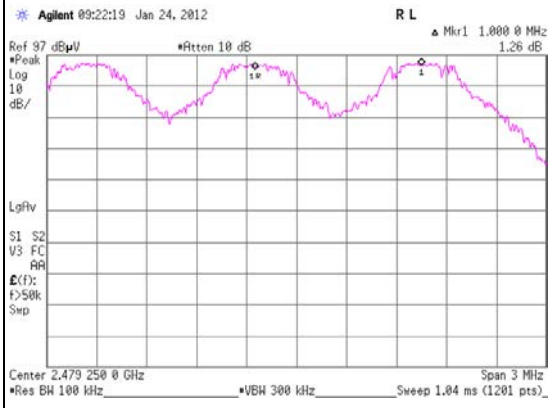
20dB Bandwidth and Carrier Frequency Separation

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 24, 2012	
Temperature / Humidity	21deg.C , 44%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	1.284	1.000	>= 0.856
3-DH5	2441.0	1.281	1.000	>= 0.854
3-DH5	2480.0	1.282	1.000	>= 0.855

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

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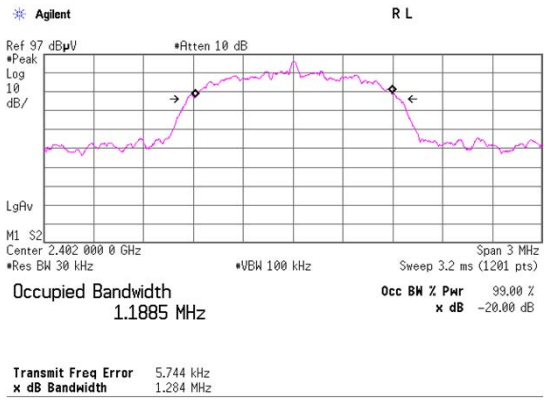
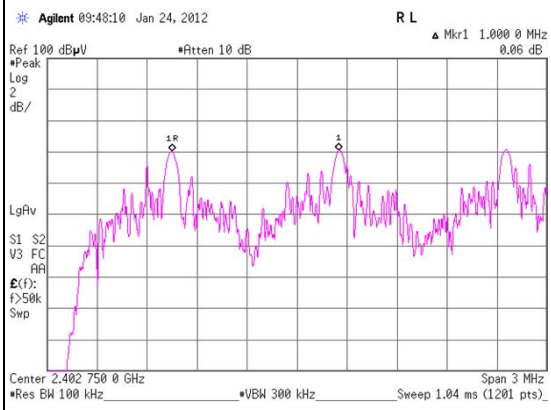
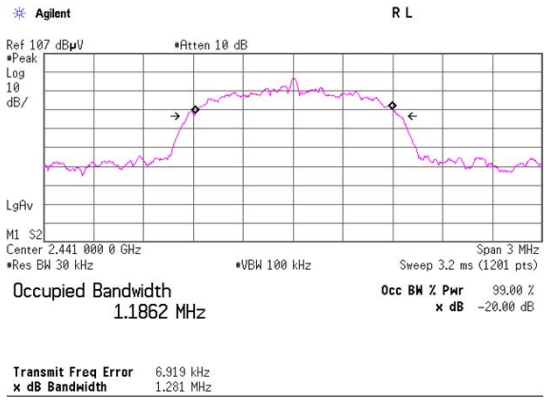
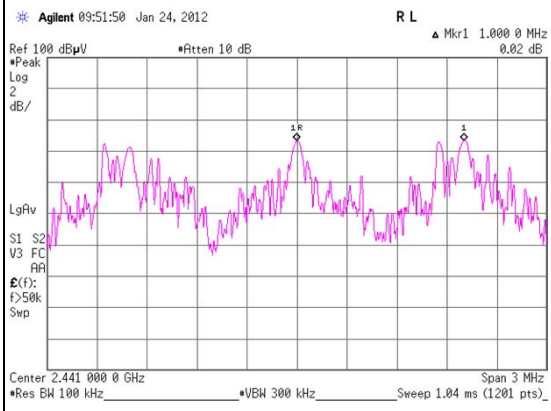
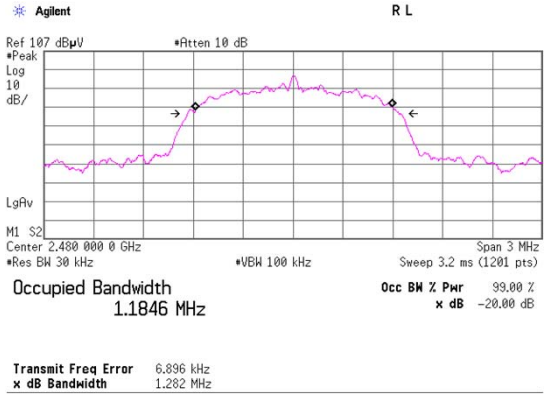
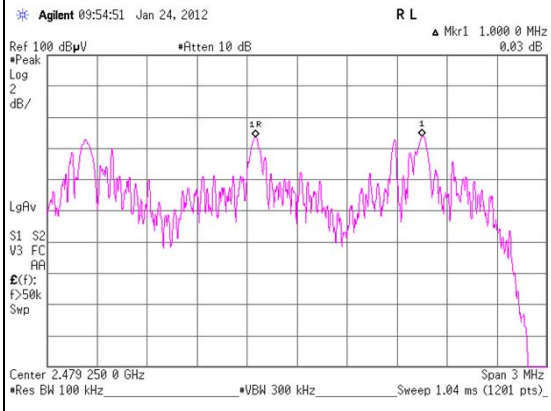
20dB Bandwidth and Carrier Frequency Separation

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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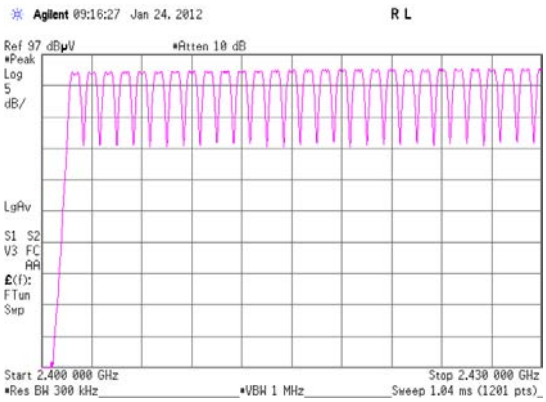
Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	January 24, 2012	
Temperature / Humidity	23deg.C , 46%RH	
Engineer	Makoto Hosaka	
Mode	Tx, Bluetooth, BDR, PRBS9	

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

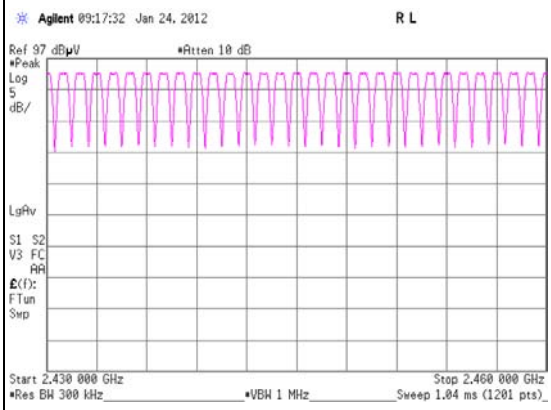
DH5 (1/3)

Tx2_HoppingNumber1



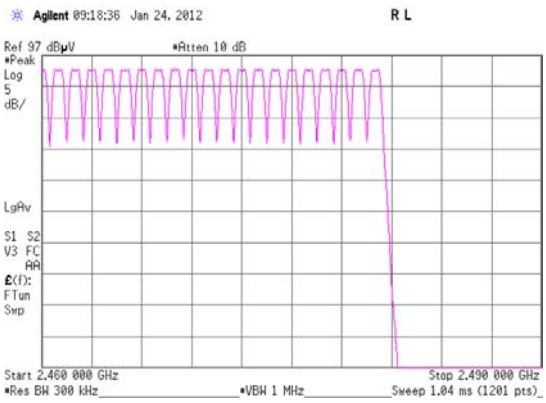
DH5 (2/3)

Tx2_HoppingNumber2



DH5 (3/3)

Tx2_HoppingNumber3



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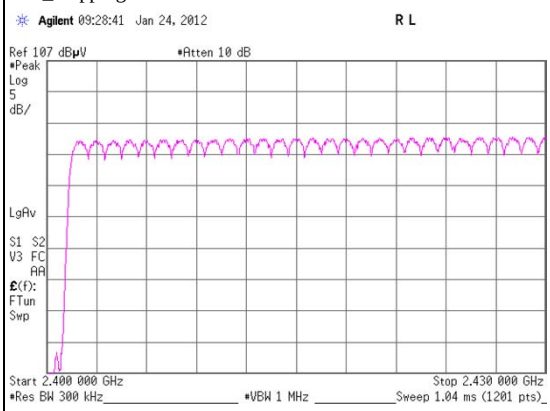
Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	January 24, 2012	
Temperature / Humidity	23deg.C , 46%RH	
Engineer	Makoto Hosaka	
Mode	Tx, Bluetooth, EDR, PRBS9	

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

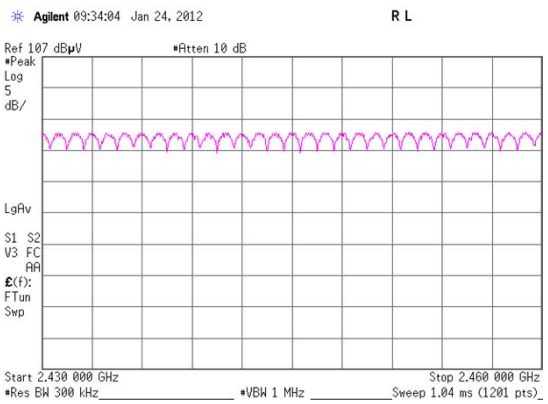
3-DH5 (1/3)

Tx2_HoppingNumber1



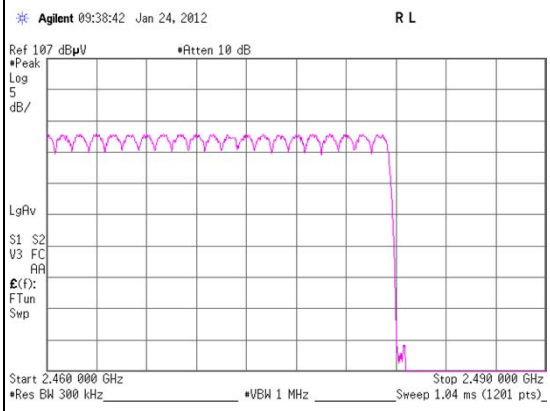
3-DH5 (2/3)

Tx2_HoppingNumber2



3-DH5 (3/3)

Tx2_HoppingNumber3



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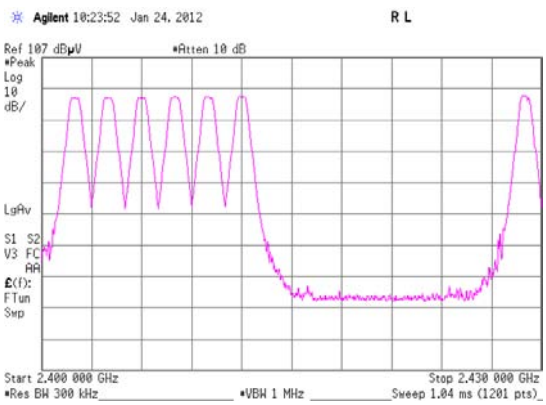
Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	January 24, 2012	
Temperature / Humidity	23deg.C , 46%RH	
Engineer	Makoto Hosaka	
Mode	Tx, Bluetooth, Inquiry	

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

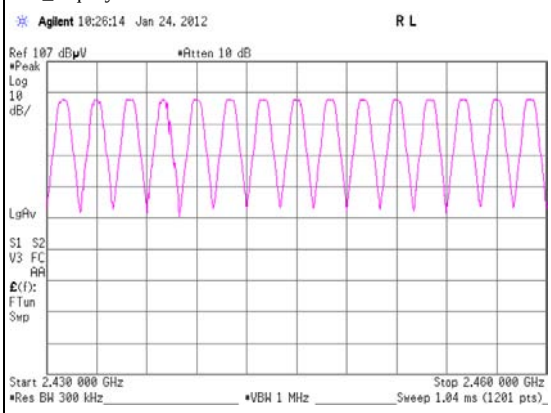
Inquiry (1/3)

Tx2_InquiryNumber1



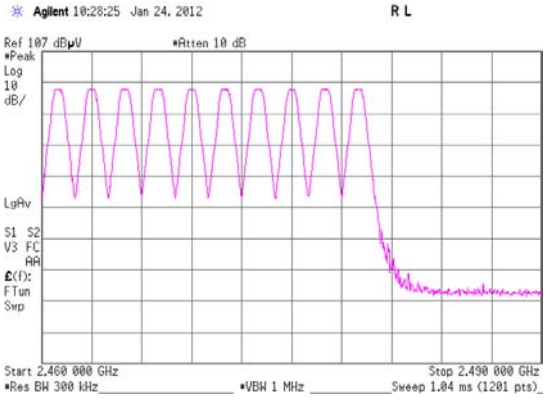
Inquiry (2/3)

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 24, 2012	
Temperature / Humidity	23deg.C , 46%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	49.6 / 5.0 sec. x 31.6 sec. = 314 times	0.444	139	400
DH3	25.8 / 5.0 sec. x 31.6 sec. = 164 times	1.688	277	400
DH5	15.8 / 5.0 sec. x 31.6 sec. = 100 times	2.944	294	400
Inquiry	50.0 / 0.5 sec. x 12.8 sec. = 1280 times	0.134	172	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	50	49	49	50	50	49.6
DH3	26	25	27	24	27	25.8
DH5	10	19	17	14	19	15.8
Inquiry	50	-	-	-	-	50.0

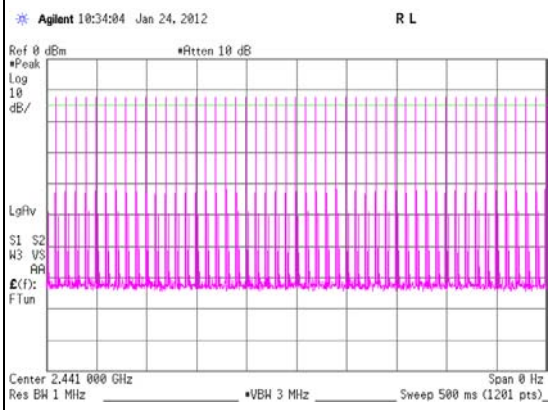
Sample Calculation

Average= Summation(Sampling 1 to 5) / 5

Inquiry

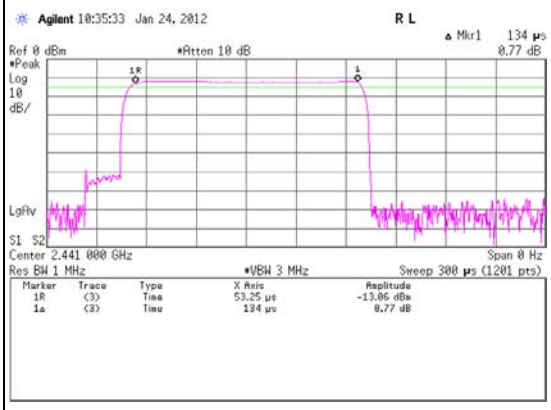
Inquiry (1/2)

Tx2_DwellInquiry1



Inquiry (2/2)

Tx2_DwellInquiry2



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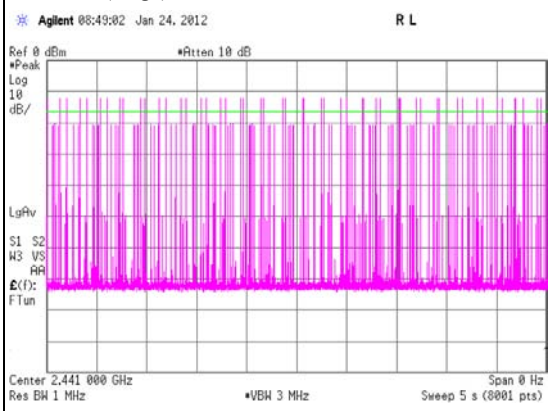
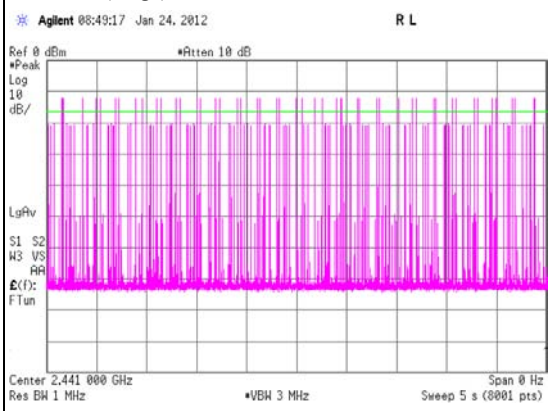
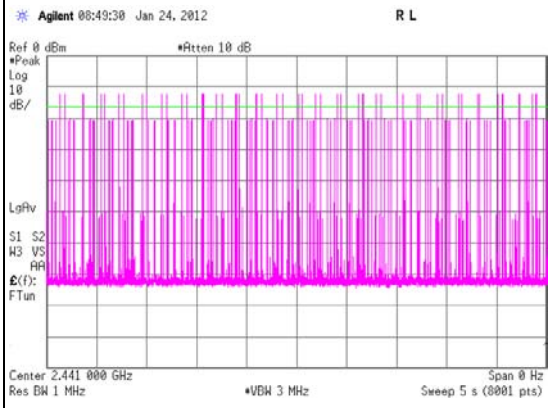
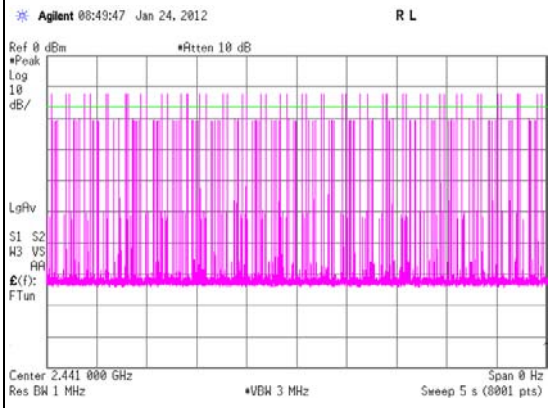
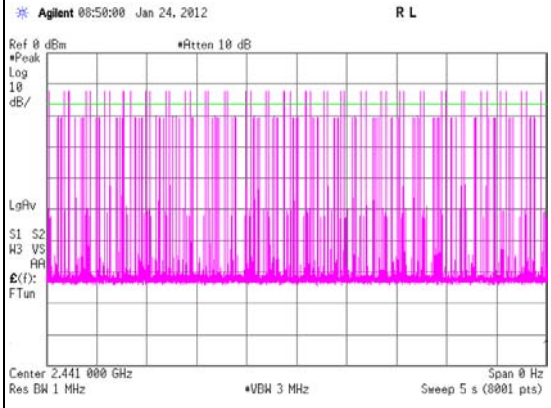
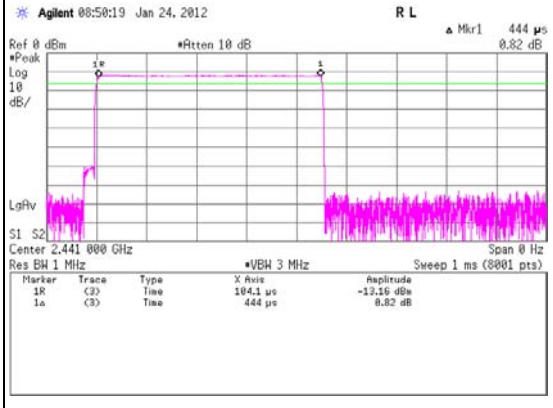
Dwell time

Tx, Bluetooth, BDR, PRBS9

DH1 - in 5sec.(1/5)	DH1 - in 5sec.(2/5)
Tx2_Dwell(irregu)11	Tx2_Dwell(irregu)12
	
DH1 - in 5sec.(3/5)	**DH1 - in 5sec.(4/5)**
Tx2_Dwell(irregu)13	Tx2_Dwell(irregu)14
	
DH1 - in 5sec.(5/5)	**DH1 - 1pulse**
Tx2_Dwell(irregu)15	Tx2_Dwell(irregu)16
	

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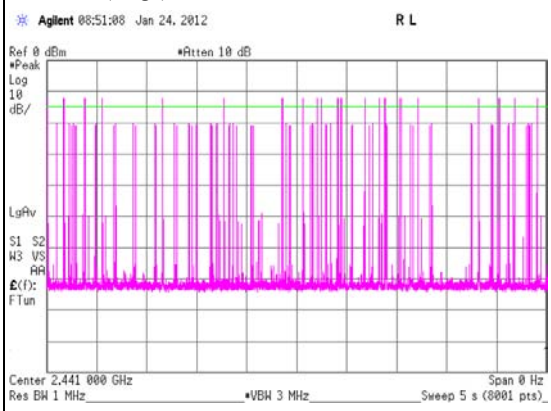
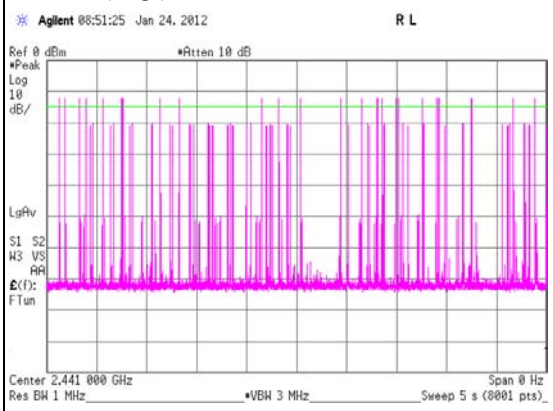
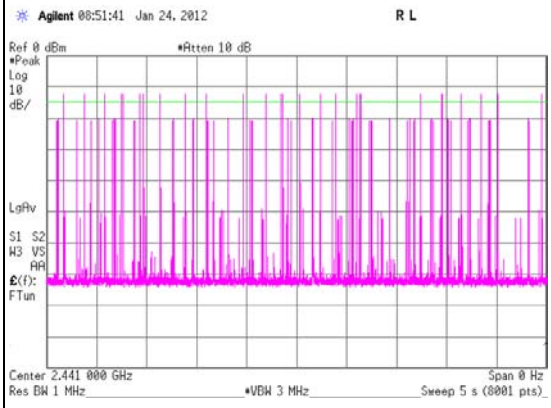
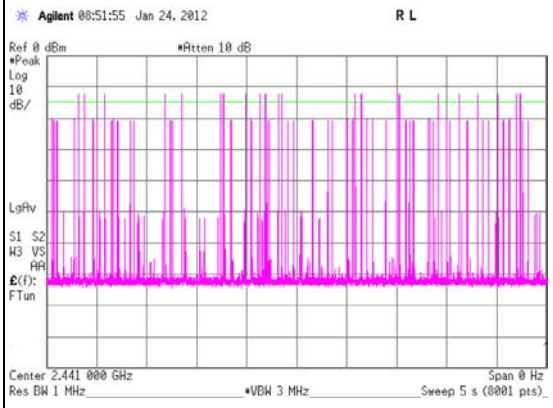
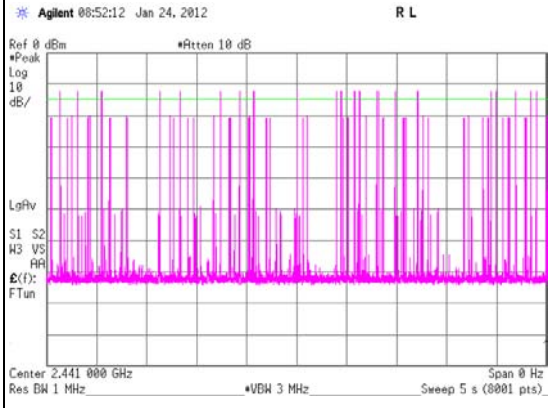
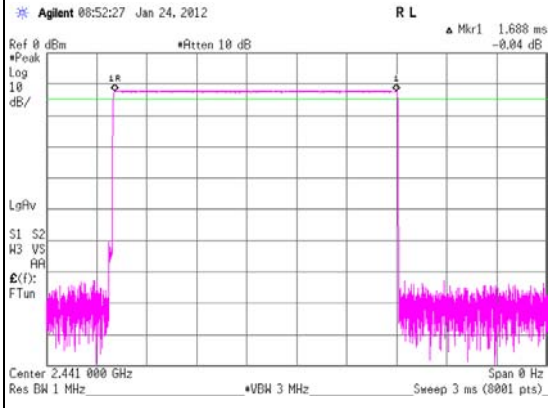
Dwell time

Tx, Bluetooth, BDR, PRBS9

DH3 - in 5sec.(1/5)	DH3 - in 5sec.(2/5)
Tx2_Dwell(irregu)21 	Tx2_Dwell(irregu)22 
DH3 - in 5sec.(3/5)	**DH3 - in 5sec.(4/5)**
Tx2_Dwell(irregu)23 	Tx2_Dwell(irregu)24 
DH3 - in 5sec.(5/5)	**DH3 - 1pulse**
Tx2_Dwell(irregu)25 	Tx2_Dwell(irregu)26 

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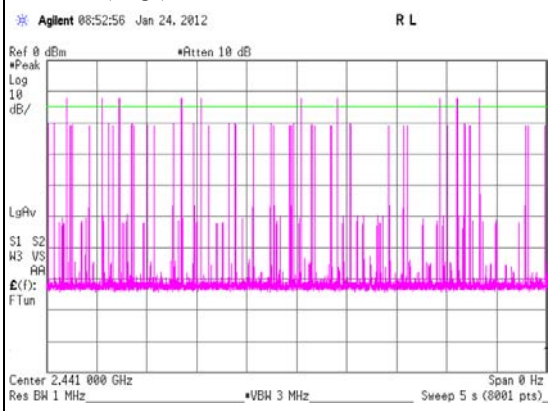
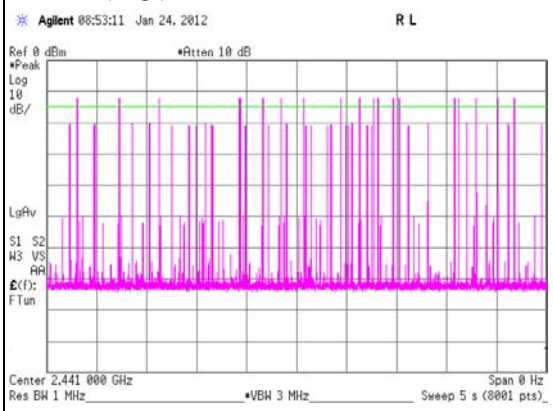
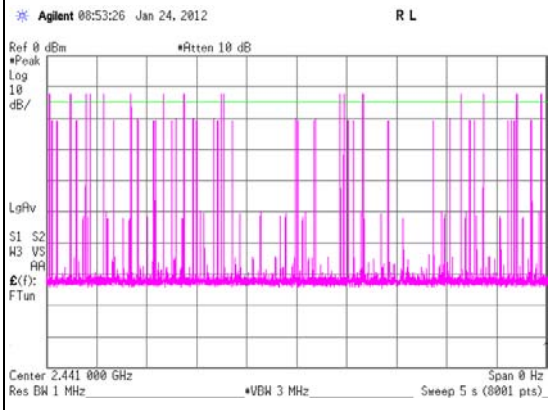
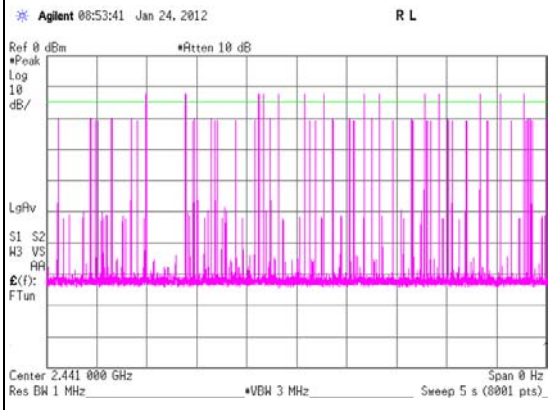
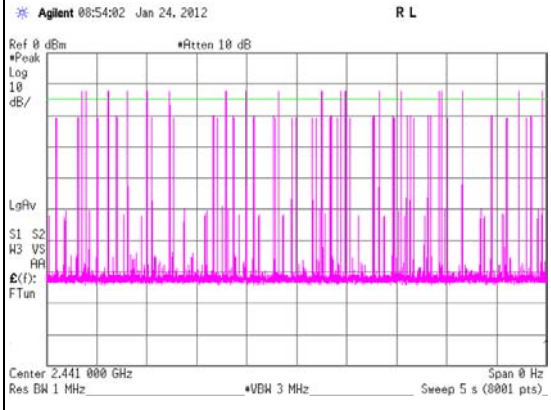
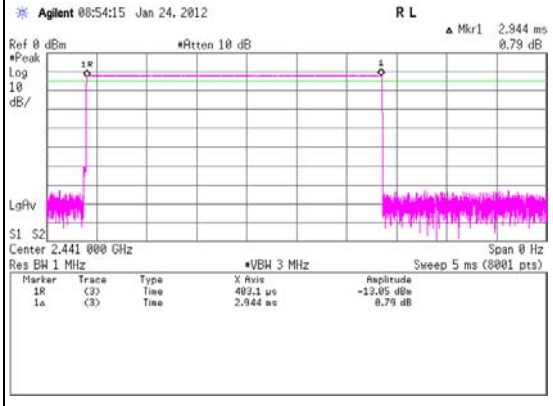
Dwell time

Tx, Bluetooth, BDR, PRBS9

DH5 - in 5sec.(1/5)	DH5 - in 5sec.(2/5)
Tx2_Dwell(irregu)31 	Tx2_Dwell(irregu)32 
DH5 - in 5sec.(3/5)	**DH5 - in 5sec.(4/5)**
Tx2_Dwell(irregu)33 	Tx2_Dwell(irregu)34 
DH5 - in 5sec.(5/5)	**DH5 - 1pulse**
Tx2_Dwell(irregu)35 	Tx2_Dwell(irregu)36 

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Dwell Time

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	January 26, 2012	
Temperature / Humidity	23deg.C , 46%RH	
Engineer	Makoto Hosaka	
Mode	Tx, Bluetooth, EDR, PRBS9	

Mode	Number of transmission in a 31.6 (79 Hopping x 0.4) second period	Length of transmission time [msec]	Result [msec]	Limit [msec]
3-DH1	50.0 / 5.0 sec. x 31.6 sec. = 316 times	0.438	138	400
3-DH3	22.4 / 5.0 sec. x 31.6 sec. = 142 times	1.687	240	400
3-DH5	15.2 / 5.0 sec. x 31.6 sec. = 97 times	2.941	285	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	50	50	51	49	50	50.0
3-DH3	20	22	25	22	23	22.4
3-DH5	16	17	20	14	9	15.2

Sample Calculation

Average= Summation(Sampling 1 to 5) / 5

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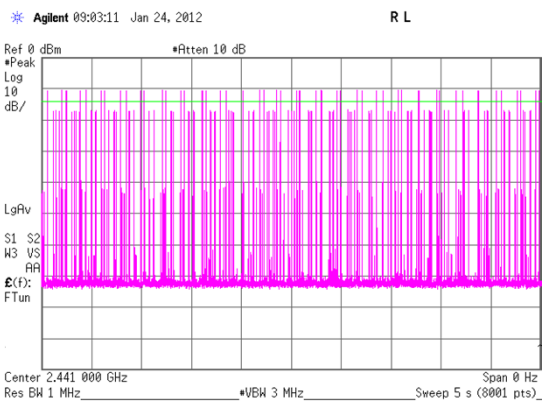
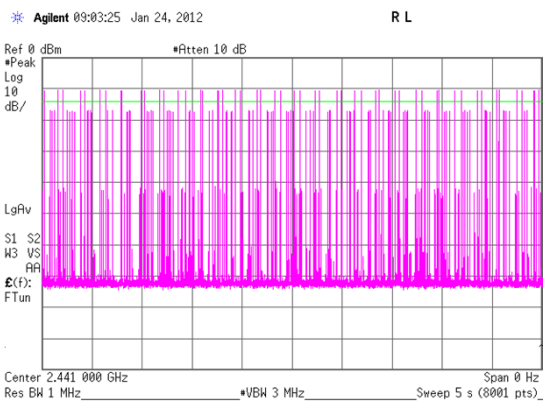
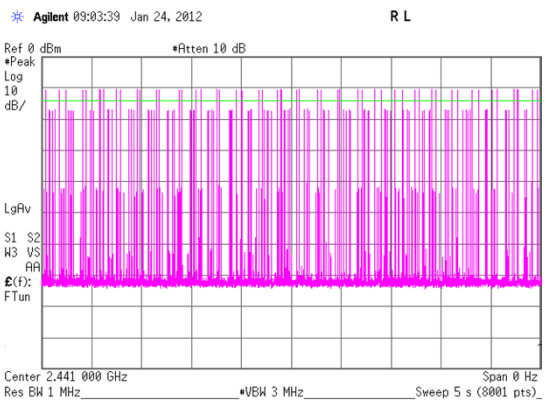
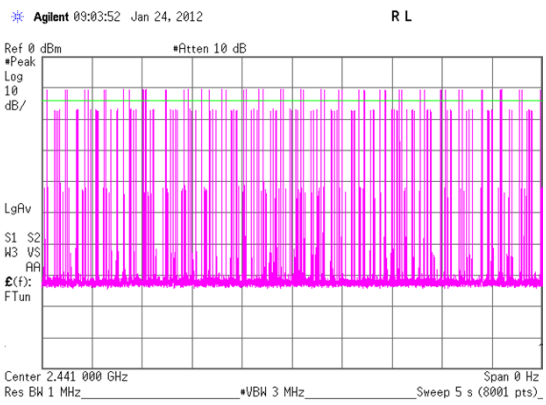
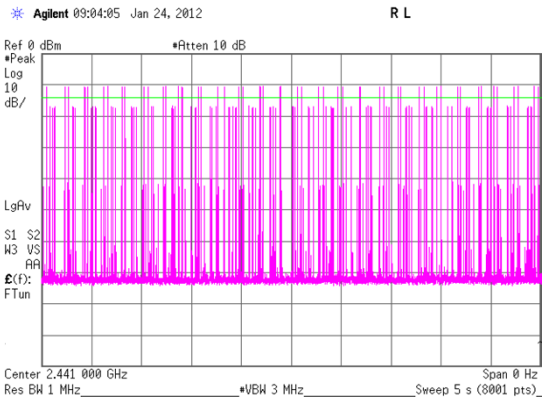
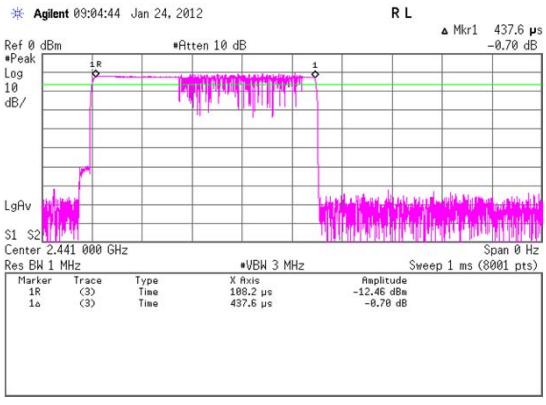
Dwell time

Tx, Bluetooth, EDR, PRBS9

3-DH1 - in 5sec.(1/5)	3-DH1 - in 5sec.(2/5)
Tx2_Dwell(irregu)11	Tx2_Dwell(irregu)12
	
3-DH1 - in 5sec.(3/5)	**3-DH1 - in 5sec.(4/5)**
Tx2_Dwell(irregu)13	Tx2_Dwell(irregu)14
	
3-DH1 - in 5sec.(5/5)	**3-DH1 - 1pulse**
Tx2_Dwell(irregu)15	Tx2_Dwell(irregu)16
	

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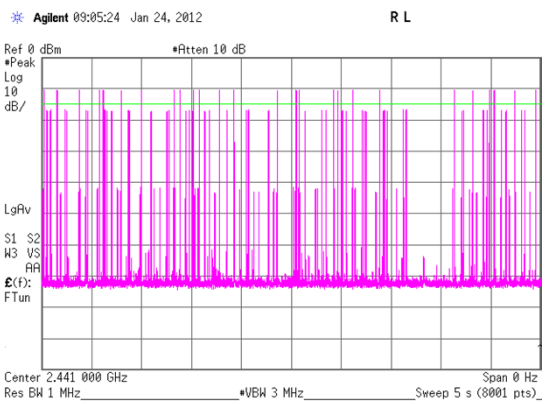
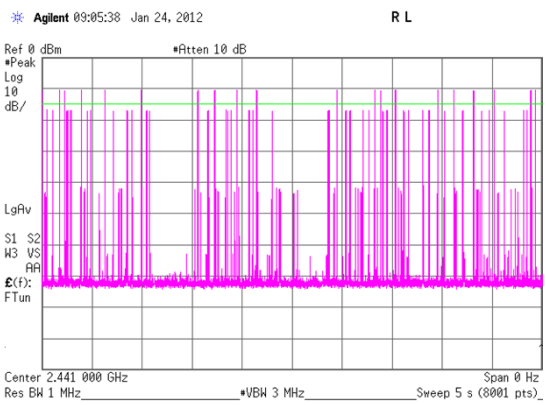
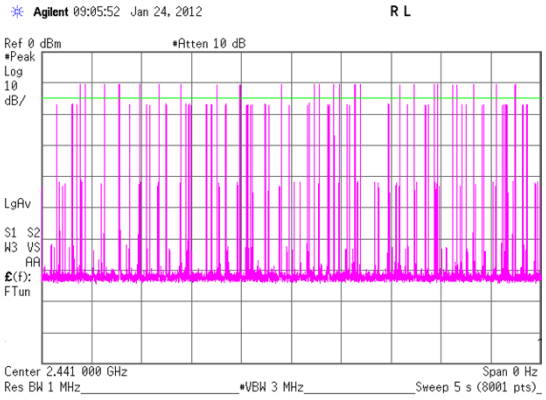
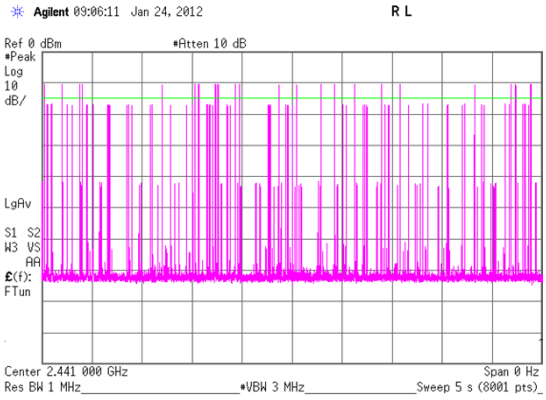
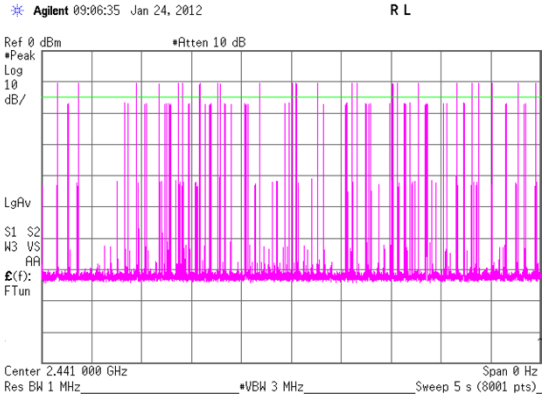
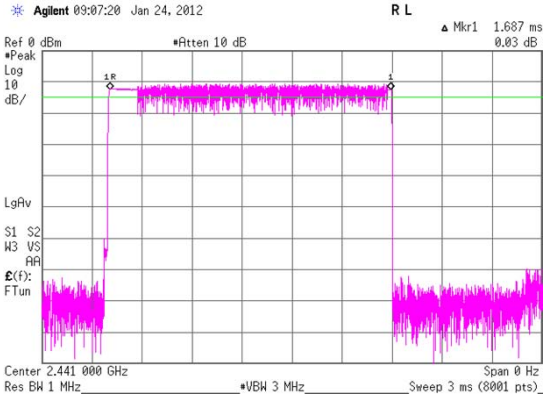
Dwell time

Tx, Bluetooth, EDR, PRBS9

3-DH3 - in 5sec.(1/5)	3-DH3 - in 5sec.(2/5)
Tx2_Dwell(irregu)21	Tx2_Dwell(irregu)22
	
3-DH3 - in 5sec.(3/5)	**3-DH3 - in 5sec.(4/5)**
Tx2_Dwell(irregu)23	Tx2_Dwell(irregu)24
	
3-DH3 - in 5sec.(5/5)	**3-DH3 - 1pulse**
Tx2_Dwell(irregu)25	Tx2_Dwell(irregu)26
	

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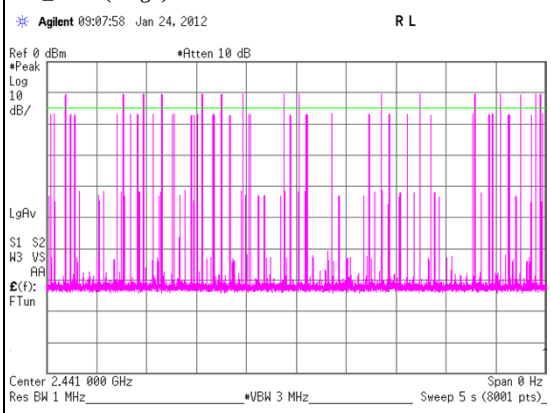
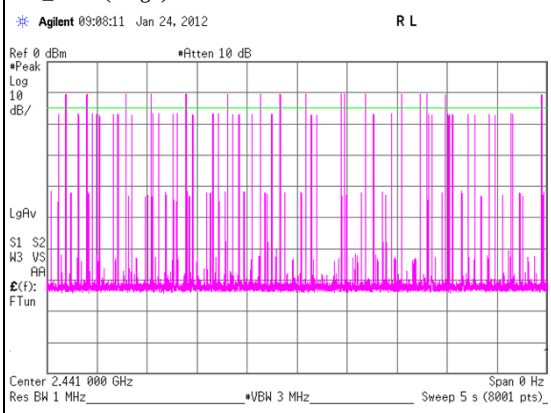
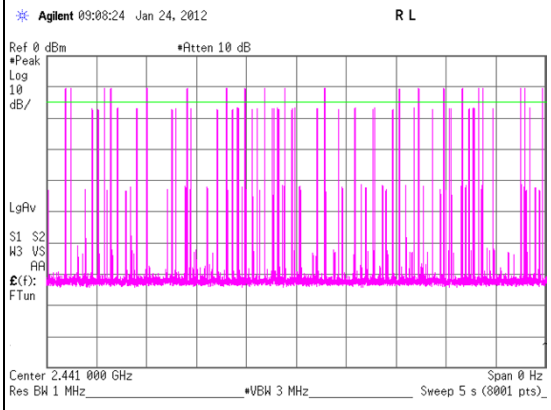
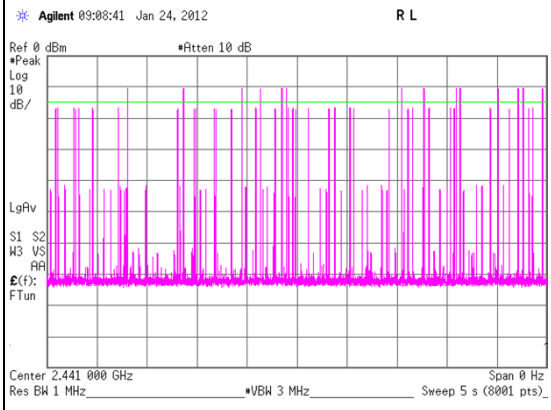
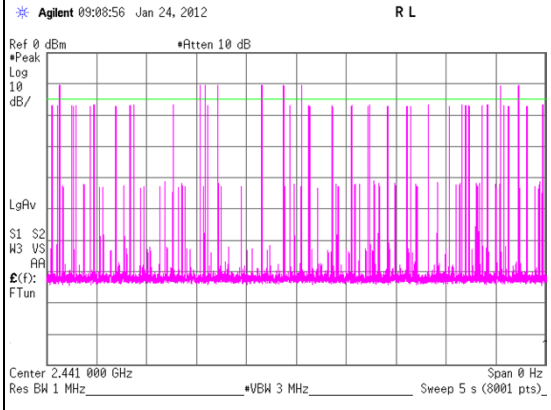
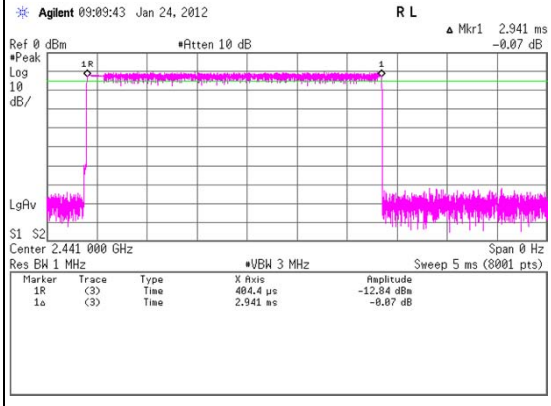
Dwell time

Tx, Bluetooth, EDR, PRBS9

3-DH5 - in 5sec.(1/5)	3-DH5 - in 5sec.(2/5)
Tx2_Dwell(irregu)31 	Tx2_Dwell(irregu)32 
3-DH5 - in 5sec.(3/5)	**3-DH5 - in 5sec.(4/5)**
Tx2_Dwell(irregu)33 	Tx2_Dwell(irregu)34 
3-DH5 - in 5sec.(5/5)	**3-DH5 - 1pulse**
Tx2_Dwell(irregu)35 	Tx2_Dwell(irregu)36 

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Peak Output Power (Conducted)

Test place	UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date	January 23, 2012
Temperature / Humidity	21deg.C , 44%RH
Engineer	Makoto Hosaka
Mode	Tx, Bluetooth

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

	Freq.	P/M (Peak) Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
DH5	2402.0	-13.27	2.00	9.68	-1.59	0.69	20.97	125	22.56
DH5	2441.0	-12.67	2.00	9.68	-0.99	0.80	20.97	125	21.96
DH5	2480.0	-12.92	2.03	9.68	-1.21	0.76	20.97	125	22.18
2-DH5	2402.0	-11.74	2.00	9.68	-0.06	0.99	20.97	125	21.03
2-DH5	2441.0	-11.13	2.00	9.68	0.55	1.14	20.97	125	20.42
2-DH5	2480.0	-11.33	2.03	9.68	0.38	1.09	20.97	125	20.59
3-DH5	2402.0	-11.40	2.00	9.68	0.28	1.07	20.97	125	20.69
3-DH5	2441.0	-10.74	2.00	9.68	0.94	1.24	20.97	125	20.03
3-DH5	2480.0	-11.01	2.03	9.68	0.70	1.17	20.97	125	20.27

Sample Calculation:
Result = Reading + Cable Loss + Atten. Loss

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Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.	No.3 Semi Anechoic Chamber
Date	January 25, 2012	January 24, 2012
Temperature / Humidity	22deg.C , 22%RH	24deg.C , 26%RH
Engineer	Kenichi Adachi	Kenichi Adachi
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.	119.561	QP	32.0	12.7	7.4	32.1		20.0	43.5	23.5	157	243	X
Hori.	189.489	QP	31.2	15.9	7.9	32.0		23.0	43.5	20.5	172	107	X
Hori.	346.900	QP	22.9	15.1	8.9	31.9		15.0	46.0	31.0	100	0	X, noise floor level
Hori.	416.001	QP	28.7	16.6	9.2	31.9		22.6	46.0	23.4	100	101	X
Hori.	2390.000	PK	46.5	27.2	13.8	41.1		46.4	73.9	27.5	100	298	X
Hori.	4804.000	PK	47.9	31.1	5.9	41.1		43.8	73.9	30.1	108	359	Z
Hori.	7206.000	PK	45.8	36.5	7.4	41.3		48.4	73.9	25.5	100	0	Z, noise floor level
Hori.	14412.000	PK	46.8	41.6	11.1	40.7		58.8	73.9	15.1	100	0	Z, noise floor level
Hori.	24020.000	PK	46.8	40.2	-2.1	47.2		37.7	73.9	36.2	100	0	Z, noise floor level
Vert.	119.612	QP	33.9	12.7	7.4	32.1		21.9	43.5	21.6	100	181	Y
Vert.	182.081	QP	30.7	15.9	7.8	32.0		22.4	43.5	21.1	100	352	Y
Vert.	346.900	QP	22.9	15.1	8.9	31.9		15.0	46.0	31.0	100	0	Y, noise floor level
Vert.	416.001	QP	26.2	16.6	9.2	31.9		20.1	46.0	25.9	120	259	Y
Vert.	2390.000	PK	46.5	27.2	13.8	41.1		46.4	73.9	27.5	113	127	Y
Vert.	4804.000	PK	48.4	31.1	5.9	41.1		44.3	73.9	29.6	102	2	Y
Vert.	7206.000	PK	45.7	36.5	7.4	41.3		48.3	73.9	25.6	100	0	Y, noise floor level
Vert.	14412.000	PK	46.9	41.6	11.1	40.7		58.9	73.9	**15.0**	100	0	Y, noise floor level
Vert.	24020.000	PK	46.7	40.2	-2.1	47.2		37.6	73.9	36.3	100	0	Y, noise floor level

(* PK: Peak, AV: Average, QP: Quasi-Peak) (AV: RBW 1MHz, VBW 10Hz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell time factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	2390.000	AV	35.2	27.2	13.8	41.1	-24.6	10.5	53.9	43.4	100	298	X
Hori.	4804.000	AV	39.8	31.1	5.9	41.1	-24.6	11.1	53.9	42.8	108	359	Z
Hori.	7206.000	AV	33.9	36.5	7.4	41.3	-24.6	11.9	53.9	42.0	100	0	Z, noise floor level
Hori.	14412.000	AV	34.6	41.6	11.1	40.7	-24.6	22.0	53.9	31.9	100	0	Z, noise floor level
Hori.	24020.000	AV	34.5	40.2	-2.1	47.2	-24.6	0.8	53.9	53.1	100	0	Z, noise floor level
Vert.	2390.000	AV	35.3	27.2	13.8	41.1	-24.6	10.6	53.9	43.3	113	127	Y
Vert.	4804.000	AV	39.9	31.1	5.9	41.1	-24.6	11.2	53.9	42.7	102	2	Y
Vert.	7206.000	AV	33.8	36.5	7.4	41.3	-24.6	11.8	53.9	42.1	100	0	Y, noise floor level
Vert.	14412.000	AV	34.6	41.6	11.1	40.7	-24.6	22.0	53.9	31.9	100	0	Y, noise floor level
Vert.	24020.000	AV	34.4	40.2	-2.1	47.2	-24.6	0.7	53.9	53.2	100	0	Y, noise floor level

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier) + Dwell time factor (refer to "Dwell time factor Calculation")

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

*The 10th harmonic was not seen so the result was its base noise level.

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

20dBc Data Sheet (RBW 100kHz, VBW 300kHz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]		Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	91.7	27.3	13.8	41.1		91.7	-	-	Carrier
Hori.	2400.000	PK	37.4	27.3	13.8	41.1		37.4	71.7	34.3	
Vert.	2402.000	PK	89.9	27.3	13.8	41.1		89.9	-	-	Carrier
Vert.	2400.000	PK	37.1	27.3	13.8	41.1		37.1	69.9	32.8	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amprifie

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Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.	No.3 Semi Anechoic Chamber
Date	January 25, 2012	January 24, 2012
Temperature / Humidity	22deg.C , 22%RH	24deg.C , 26%RH
Engineer	Kenichi Adachi	Kenichi Adachi
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.	119.574	QP	31.8	12.7	7.4	32.1		19.8	43.5	23.7	161	237	X
Hori.	189.479	QP	31.5	15.9	7.9	32.0		23.3	43.5	20.2	169	110	X
Hori.	416.001	QP	28.6	16.6	9.2	31.9		22.5	46.0	23.5	100	109	X
Hori.	4882.000	PK	48.0	31.2	5.9	40.9		44.2	73.9	29.7	109	2	Z
Hori.	7323.000	PK	46.2	36.8	7.5	41.4		49.1	73.9	24.8	100	0	Z, noise floor level
Hori.	14646.000	PK	47.2	41.5	11.2	40.4		59.5	73.9	**14.4**	100	0	Z, noise floor level
Hori.	24410.000	PK	47.4	40.2	-2.0	47.3		38.3	73.9	35.6	100	0	Z, noise floor level
Vert.	119.574	QP	33.8	12.7	7.4	32.1		21.8	43.5	21.7	100	184	Y
Vert.	182.089	QP	30.2	15.9	7.8	32.0		21.9	43.5	21.6	100	357	Y
Vert.	416.001	QP	26.1	16.6	9.2	31.9		20.0	46.0	26.0	114	262	Y
Vert.	4882.000	PK	48.2	31.2	5.9	40.9		44.4	73.9	29.5	103	0	Y
Vert.	7323.000	PK	46.1	36.8	7.5	41.4		49.0	73.9	24.9	100	0	Y, noise floor level
Vert.	14646.000	PK	47.1	41.5	11.2	40.4		59.4	73.9	14.5	100	0	Y, noise floor level
Vert.	24410.000	PK	47.5	40.2	-2.0	47.3		38.4	73.9	35.5	100	0	Y, noise floor level

(* PK: Peak, AV: Average, QP: Quasi-Peak) (AV: RBW 1MHz, VBW 10Hz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell time factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	4882.000	AV	39.9	31.2	5.9	40.9	-24.6	11.5	53.9	42.4	109	2	Z
Hori.	7323.000	AV	34.1	36.8	7.5	41.4	-24.6	12.4	53.9	41.5	100	0	Z, noise floor level
Hori.	14646.000	AV	34.6	41.5	11.2	40.4	-24.6	22.3	53.9	31.6	100	0	Z, noise floor level
Hori.	24410.000	AV	35.7	40.2	-2.0	47.3	-24.6	2.0	53.9	51.9	100	0	Z, noise floor level
Vert.	4882.000	AV	40.0	31.2	5.9	40.9	-24.6	11.6	53.9	42.3	103	0	Y
Vert.	7323.000	AV	34.0	36.8	7.5	41.4	-24.6	12.3	53.9	41.6	100	0	Y, noise floor level
Vert.	14646.000	AV	34.5	41.5	11.2	40.4	-24.6	22.2	53.9	31.7	100	0	Y, noise floor level
Vert.	24410.000	AV	35.8	40.2	-2.0	47.3	-24.6	2.1	53.9	51.8	100	0	Y, noise floor level

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier) + Dwell time factor (refer to "Dwell time factor Calculation")

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

*The 10th harmonic was not seen so the result was its base noise level.

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

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Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.		No.3 Semi Anechoic Chamber
Date	January 25, 2012	January 24, 2012	
Temperature / Humidity	22deg.C , 22%RH	24deg.C , 26%RH	
Engineer	Kenichi Adachi	Kenichi Adachi	
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.	119.578	QP	31.9	12.7	7.4	32.1		19.9	43.5	23.6	164	239	X
Hori.	189.491	QP	31.5	15.9	7.9	32.0		23.3	43.5	20.2	171	109	X
Hori.	416.001	QP	28.5	16.6	9.2	31.9		22.4	46.0	23.6	100	113	X
Hori.	2483.500	PK	46.5	27.5	13.8	41.1		46.7	73.9	27.2	100	303	X, noise floor level
Hori.	2484.003	PK	46.4	27.5	13.8	41.1		46.6	73.9	27.3	100	303	X, noise floor level
Hori.	4960.000	PK	47.9	31.4	5.9	40.8		44.4	73.9	29.5	107	2	Z
Hori.	7440.000	PK	45.5	37.0	7.5	41.5		48.5	73.9	25.4	100	0	Z, noise floor level
Hori.	14880.000	PK	46.8	41.5	11.0	39.8		59.5	73.9	**14.4**	100	0	Z, noise floor level
Hori.	24800.000	PK	47.8	40.2	-1.8	47.1		39.1	73.9	34.8	100	0	Z, noise floor level
Vert.	119.578	QP	33.7	12.7	7.4	32.1		21.7	43.5	21.8	100	198	Y
Vert.	182.091	QP	30.4	15.9	7.8	32.0		22.1	43.5	21.4	100	354	Y
Vert.	416.001	QP	26.0	16.6	9.2	31.9		19.9	46.0	26.1	108	263	Y
Vert.	2483.500	PK	46.6	27.5	13.8	41.1		46.8	73.9	27.1	115	131	Y, noise floor level
Vert.	2484.003	PK	46.5	27.5	13.8	41.1		46.7	73.9	27.2	115	131	Y, noise floor level
Vert.	4960.000	PK	48.5	31.4	5.9	40.8		45.0	73.9	28.9	103	358	Y
Vert.	7440.000	PK	45.6	37.0	7.5	41.5		48.6	73.9	25.3	100	0	Y, noise floor level
Vert.	14880.000	PK	46.7	41.5	11.0	39.8		59.4	73.9	14.5	100	0	Y, noise floor level
Vert.	24800.000	PK	47.7	40.2	-1.8	47.1		39.0	73.9	34.9	100	0	Y, noise floor level

(* PK: Peak, AV: Average, QP: Quasi-Peak) (AV: RBW 1MHz, VBW 10Hz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell time factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	2483.500	AV	34.9	27.5	13.8	41.1	-24.6	10.5	53.9	43.4	100	303	X, noise floor level
Hori.	2484.003	AV	34.9	27.5	13.8	41.1	-24.6	10.5	53.9	43.4	100	303	X, noise floor level
Hori.	4960.000	AV	39.9	31.4	5.9	40.8	-24.6	11.8	73.9	62.1	107	2	Z
Hori.	7440.000	AV	34.0	37.0	7.5	41.5	-24.6	12.4	53.9	41.5	100	0	Z, noise floor level
Hori.	14880.000	AV	34.3	41.5	11.0	39.8	-24.6	22.4	53.9	31.5	100	0	Z, noise floor level
Hori.	24800.000	AV	36.3	40.2	-1.8	47.1	-24.6	3.0	53.9	50.9	100	0	Z, noise floor level
Vert.	2483.500	AV	35.0	27.5	13.8	41.1	-24.6	10.6	53.9	43.3	115	131	Y, noise floor level
Vert.	2484.003	AV	35.0	27.5	13.8	41.1	-24.6	10.6	53.9	43.3	115	131	Y, noise floor level
Vert.	4960.000	AV	40.0	31.4	5.9	40.8	-24.6	11.9	53.9	42.0	103	358	Y
Vert.	7440.000	AV	34.1	37.0	7.5	41.5	-24.6	12.5	53.9	41.4	100	0	Y, noise floor level
Vert.	14880.000	AV	34.2	41.5	11.0	39.8	-24.6	22.3	53.9	31.6	100	0	Y, noise floor level
Vert.	24800.000	AV	36.2	40.2	-1.8	47.1	-24.6	2.9	53.9	51.0	100	0	Y, noise floor level

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier) + Dwell time factor (refer to "Dwell time factor Calculation")

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

*The 10th harmonic was not seen so the result was its base noise level.

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

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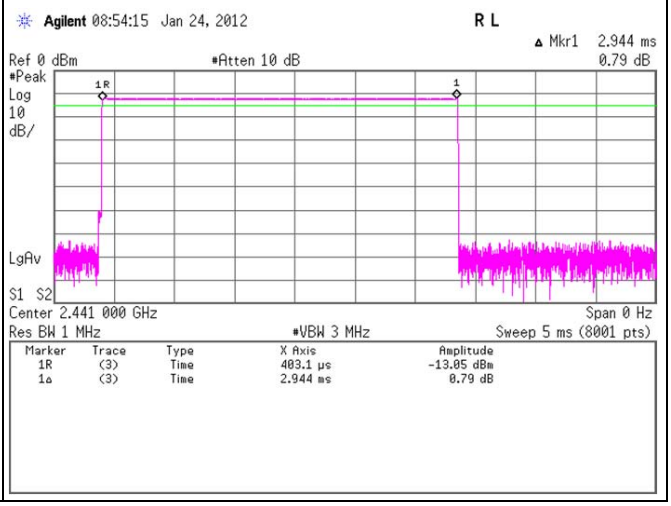
Dwell time factor Calculation chart

Dwell time factor Calculation	
Tx, Bluetooth, BDR, PRBS9	
Worst 100ms **Dwell time factor =20log((2.944 x 2)/100) = -24.6dB**	**1cycle On time :** **2.944ms**
	

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Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.		No.3 Semi Anechoic Chamber
Date	January 25, 2012	January 24, 2012	
Temperature / Humidity	22deg.C , 22%RH	24deg.C , 26%RH	
Engineer	Kenichi Adachi	Kenichi Adachi	
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.	119.593	QP	31.8	12.7	7.4	32.1		19.8	43.5	23.7	159	244	X
Hori.	189.394	QP	31.3	15.9	7.9	32.0		23.1	43.5	20.4	167	106	X
Hori.	416.001	QP	28.5	16.6	9.2	31.9		22.4	46.0	23.6	100	103	X
Hori.	2390.000	PK	46.3	27.2	13.8	41.1		46.2	73.9	27.7	100	296	X, noise floor level
Hori.	4802.000	PK	47.5	31.1	5.9	41.1		43.4	73.9	30.5	110	0	Z
Hori.	7206.000	PK	45.9	36.5	7.4	41.3		48.5	73.9	25.4	100	0	Z, noise floor level
Hori.	14412.000	PK	46.9	41.6	11.1	40.7		58.9	73.9	15.0	100	0	Z, noise floor level
Hori.	24020.000	PK	46.6	40.2	-2.1	47.2		37.5	73.9	36.4	100	0	Z, noise floor level
Vert.	119.593	QP	33.8	12.7	7.4	32.1		21.8	43.5	21.7	100	182	Y
Vert.	182.079	QP	30.5	15.9	7.8	32.0		22.2	43.5	21.3	100	356	Y
Vert.	416.001	QP	26.1	16.6	9.2	31.9		20.0	46.0	26.0	107	265	Y
Vert.	2390.000	PK	46.4	27.2	13.8	41.1		46.3	73.9	27.6	112	137	Y, noise floor level
Vert.	4804.000	PK	47.6	31.1	5.9	41.1		43.5	73.9	30.4	105	0	Y
Vert.	7206.000	PK	45.8	36.5	7.4	41.3		48.4	73.9	25.5	100	0	Y, noise floor level
Vert.	14412.000	PK	47.0	41.6	11.1	40.7		59.0	73.9	**14.9**	100	0	Y, noise floor level
Vert.	24020.000	PK	46.7	40.2	-2.1	47.2		37.6	73.9	36.3	100	0	Y, noise floor level

(* PK: Peak, AV: Average, QP: Quasi-Peak) (AV: RBW 1MHz, VBW 10Hz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell time factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	2390.000	AV	35.1	27.2	13.8	41.1	-24.6	10.4	53.9	43.5	100	296	X, noise floor level
Hori.	4802.000	AV	39.3	31.1	5.9	41.1	-24.6	10.6	53.9	43.3	110	0	Z
Hori.	7206.000	AV	34.0	36.5	7.4	41.3	-24.6	12.0	53.9	41.9	100	0	Z, noise floor level
Hori.	14412.000	AV	34.7	41.6	11.1	40.7	-24.6	22.1	53.9	31.8	100	0	Z, noise floor level
Hori.	24020.000	AV	34.4	40.2	-2.1	47.2	-24.6	0.7	53.9	53.2	100	0	Z, noise floor level
Vert.	2390.000	AV	34.6	27.2	13.8	41.1	-24.6	9.9	53.9	44.0	112	137	Y, noise floor level
Vert.	4804.000	AV	39.5	31.1	5.9	41.1	-24.6	10.8	53.9	43.1	105	0	Y
Vert.	7206.000	AV	33.9	36.5	7.4	41.3	-24.6	11.9	53.9	42.0	100	0	Y, noise floor level
Vert.	14412.000	AV	34.8	41.6	11.1	40.7	-24.6	22.2	53.9	31.7	100	0	Y, noise floor level
Vert.	24020.000	AV	34.4	40.2	-2.1	47.2	-24.6	0.7	53.9	53.2	100	0	Y, noise floor level

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier) + Dwell time factor (refer to "Dwell time factor Calculation")

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

*The 10th harmonic was not seen so the result was its base noise level.

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

20dBc Data Sheet (RBW 100kHz, VBW 300kHz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]		Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	91.3	27.3	13.8	41.1		91.3	-	-	Carrier
Hori.	2400.000	PK	43.1	27.3	13.8	41.1		43.1	71.3	28.2	
Vert.	2402.000	PK	90.9	27.3	13.8	41.1		90.9	-	-	Carrier
Vert.	2400.000	PK	42.9	27.3	13.8	41.1		42.9	70.9	28.0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 13GHz)) - Gain(Amprifier)

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Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.	No.3 Semi Anechoic Chamber
Date	January 25, 2012	January 24, 2012
Temperature / Humidity	22deg.C , 22%RH	24deg.C , 26%RH
Engineer	Kenichi Adachi	Kenichi Adachi
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.	119.603	QP	31.9	12.7	7.4	32.1		19.9	43.5	23.6	163	238	X
Hori.	189.469	QP	31.4	15.9	7.9	32.0		23.2	43.5	20.3	168	104	X
Hori.	416.001	QP	28.6	16.6	9.2	31.9		22.5	46.0	23.5	100	108	X
Hori.	4882.000	PK	47.8	31.2	5.9	40.9		44.0	73.9	29.9	111	0	Z
Hori.	7323.000	PK	46.3	36.8	7.5	41.4		49.2	73.9	24.7	100	0	Z, noise floor level
Hori.	14646.000	PK	47.0	41.5	11.2	40.4		59.3	73.9	14.6	100	0	Z, noise floor level
Hori.	24410.000	PK	47.4	40.2	-2.0	47.3		38.3	73.9	35.6	100	0	Z, noise floor level
Vert.	119.603	QP	33.9	12.7	7.4	32.1		21.9	43.5	21.6	100	189	Y
Vert.	182.086	QP	30.6	15.9	7.8	32.0		22.3	43.5	21.2	100	355	Y
Vert.	416.001	QP	26.2	16.6	9.2	31.9		20.1	46.0	25.9	110	258	Y
Vert.	4882.000	PK	47.9	31.2	5.9	40.9		44.1	73.9	29.8	105	0	Y
Vert.	7323.000	PK	46.2	36.8	7.5	41.4		49.1	73.9	24.8	100	0	Y, noise floor level
Vert.	14646.000	PK	47.1	41.5	11.2	40.4		59.4	73.9	**14.5**	100	0	Y, noise floor level
Vert.	24410.000	PK	47.3	40.2	-2.0	47.3		38.2	73.9	35.7	100	0	Y, noise floor level

(* PK: Peak, AV: Average, QP: Quasi-Peak) (AV: RBW 1MHz, VBW 10Hz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell time factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	4882.000	AV	39.5	31.2	5.9	40.9	-24.6	11.1	53.9	42.8	111	0	Z
Hori.	7323.000	AV	34.2	36.8	7.5	41.4	-24.6	12.5	53.9	41.4	100	0	Z, noise floor level
Hori.	14646.000	AV	34.5	41.5	11.2	40.4	-24.6	22.2	53.9	31.7	100	0	Z, noise floor level
Hori.	24410.000	AV	35.8	40.2	-2.0	47.3	-24.6	2.1	53.9	51.8	100	0	Z, noise floor level
Vert.	4882.000	AV	39.7	31.2	5.9	40.9	-24.6	11.3	53.9	42.6	105	0	Y
Vert.	7323.000	AV	34.1	36.8	7.5	41.4	-24.6	12.4	53.9	41.5	100	0	Y, noise floor level
Vert.	14646.000	AV	34.6	41.5	11.2	40.4	-24.6	22.3	53.9	31.6	100	0	Y, noise floor level
Vert.	24410.000	AV	35.7	40.2	-2.0	47.3	-24.6	2.0	53.9	51.9	100	0	Y, noise floor level

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier) + Dwell time factor (refer to "Dwell time factor Calculation")

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

*The 10th harmonic was not seen so the result was its base noise level.

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

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Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.		No.3 Semi Anechoic Chamber
Date	January 25, 2012	January 24, 2012	
Temperature / Humidity	22deg.C , 22%RH	24deg.C , 26%RH	
Engineer	Kenichi Adachi	Kenichi Adachi	
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.	119.589	QP	31.8	12.7	7.4	32.1		19.8	43.5	23.7	158	232	X
Hori.	189.473	QP	31.5	15.9	7.9	32.0		23.3	43.5	20.2	168	106	X
Hori.	416.001	QP	28.7	16.6	9.2	31.9		22.6	46.0	23.4	100	111	X
Hori.	2483.500	PK	46.8	27.5	13.8	41.1		47.0	73.9	26.9	100	298	X, noise floor level
Hori.	2484.003	PK	46.7	27.5	13.8	41.1		46.9	73.9	27.0	100	298	X, noise floor level
Hori.	4960.000	PK	47.6	31.4	5.9	40.8		44.1	73.9	29.8	110	0	Z
Hori.	7440.000	PK	45.7	37.0	7.5	41.5		48.7	73.9	25.2	100	0	Z, noise floor level
Hori.	14880.000	PK	46.7	41.5	11.0	39.8		59.4	73.9	14.5	100	0	Z, noise floor level
Hori.	24800.000	PK	47.7	40.2	-1.8	47.1		39.0	73.9	34.9	100	0	Z, noise floor level
Vert.	119.589	QP	33.8	12.7	7.4	32.1		21.8	43.5	21.7	100	188	Y
Vert.	182.085	QP	30.7	15.9	7.8	32.0		22.4	43.5	21.1	100	356	Y
Vert.	416.001	QP	26.1	16.6	9.2	31.9		20.0	46.0	26.0	112	259	Y
Vert.	2483.500	PK	46.7	27.5	13.8	41.1		46.9	73.9	27.0	114	135	Y, noise floor level
Vert.	2484.003	PK	46.7	27.5	13.8	41.1		46.9	73.9	27.0	114	135	Y
Vert.	4960.000	PK	47.9	31.4	5.9	40.8		44.4	73.9	29.5	102	0	Y
Vert.	7440.000	PK	45.6	37.0	7.5	41.5		48.6	73.9	25.3	100	0	Y, noise floor level
Vert.	14880.000	PK	46.8	41.5	11.0	39.8		59.5	73.9	**14.4**	100	0	Y, noise floor level
Vert.	24800.000	PK	47.6	40.2	-1.8	47.1		38.9	73.9	35.0	100	0	Y, noise floor level

(* PK: Peak, AV: Average, QP: Quasi-Peak) (AV: RBW 1MHz, VBW 10Hz)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Dwell time factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	2483.500	AV	35.1	27.5	13.8	41.1	-24.6	10.7	53.9	43.2	100	298	X, noise floor level
Hori.	2484.003	AV	35.1	27.5	13.8	41.1	-24.6	10.7	53.9	43.2	100	298	X, noise floor level
Hori.	4960.000	AV	39.4	31.4	5.9	40.8	-24.6	11.3	53.9	42.6	110	0	Z
Hori.	7440.000	AV	34.1	37.0	7.5	41.5	-24.6	12.5	53.9	41.4	100	0	Z, noise floor level
Hori.	14880.000	AV	34.3	41.5	11.0	39.8	-24.6	22.4	53.9	31.5	100	0	Z, noise floor level
Hori.	24800.000	AV	36.2	40.2	-1.8	47.1	-24.6	2.9	53.9	51.0	100	0	Z, noise floor level
Vert.	2483.500	AV	35.0	27.5	13.8	41.1	-24.6	10.6	53.9	43.3	114	135	Y, noise floor level
Vert.	2484.003	AV	35.0	27.5	13.8	41.1	-24.6	10.6	53.9	43.3	114	135	Y, noise floor level
Vert.	4960.000	AV	39.6	31.4	5.9	40.8	-24.6	11.5	53.9	42.4	102	0	Y
Vert.	7440.000	AV	34.0	37.0	7.5	41.5	-24.6	12.4	53.9	41.5	100	0	Y, noise floor level
Vert.	14880.000	AV	34.4	41.5	11.0	39.8	-24.6	22.5	53.9	31.4	100	0	Y, noise floor level
Vert.	24800.000	AV	36.1	40.2	-1.8	47.1	-24.6	2.8	53.9	51.1	100	0	Y, noise floor level

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 15GHz)) - Gain(Amprifier) + Dwell time factor (refer to "Dwell time factor Calculation")

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

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

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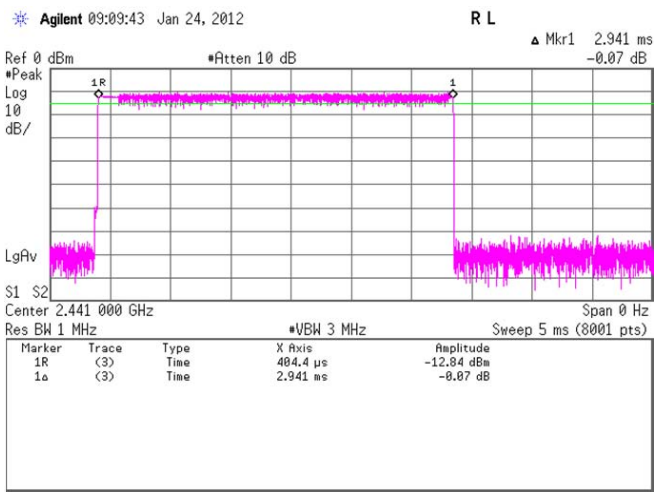
Dwell time factor Calculation chart

Dwell time factor Calculation	
Tx, Bluetooth, EDR, PRBS9	
Worst 100ms **Dwell time factor =20log((2.941 x 2)/100) = -24.61dB**	**1cycle On time :** **2.941ms**
Tx2_duty2	

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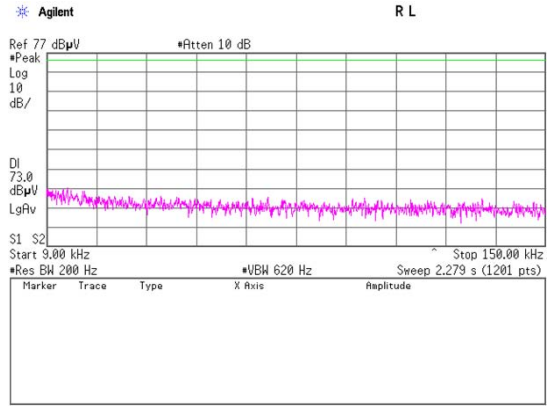
Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2402MHz (1/2)

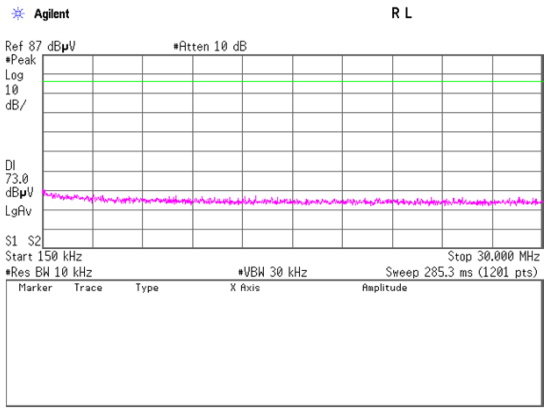
9kHz - 150kHz

Tx1_SpuriousM1



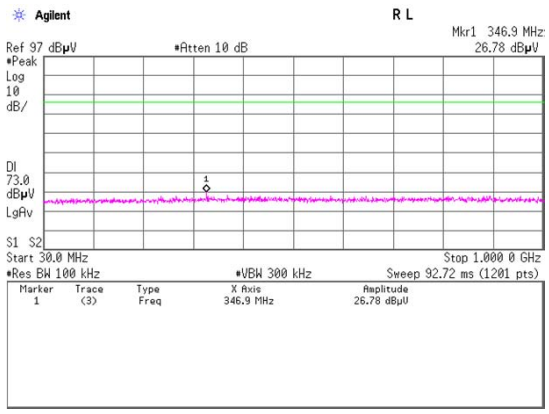
150kHz - 30MHz

Tx1_SpuriousM2



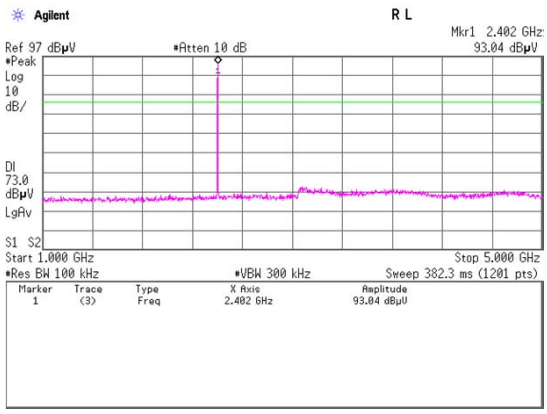
30MHz - 1GHz

Tx1_SpuriousM3



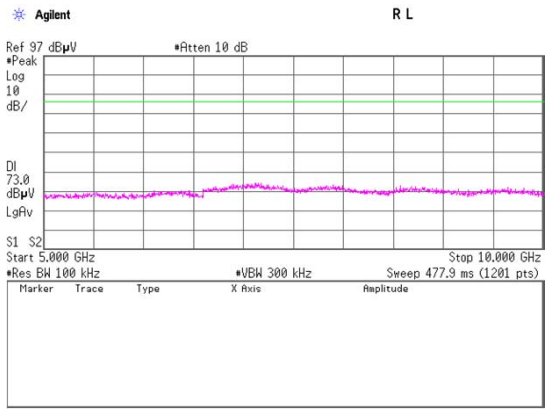
1GHz - 5GHz

Tx1_SpuriousG1



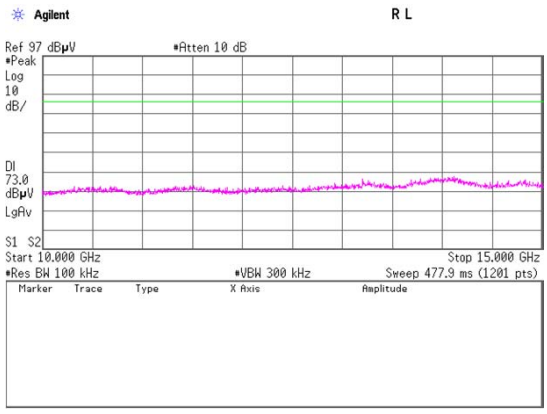
5GHz - 10GHz

Tx1_SpuriousG2



10GHz - 15GHz

Tx1_SpuriousG3



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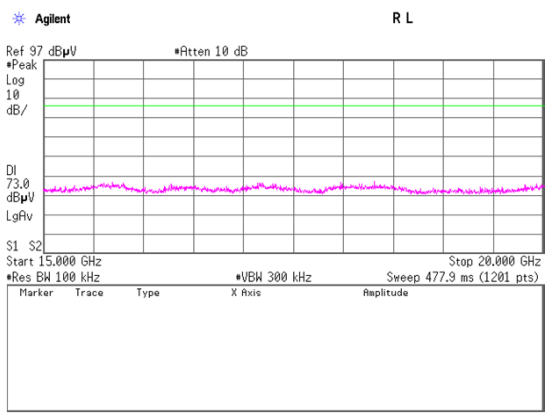
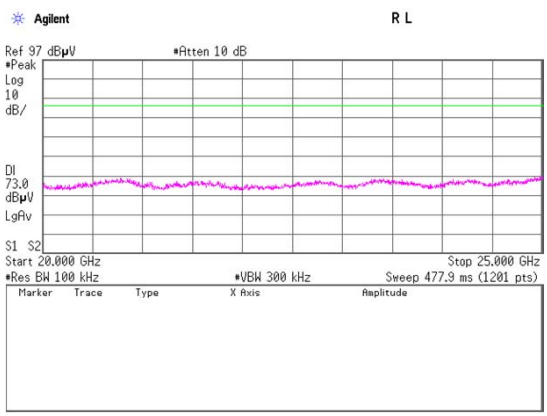
Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

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

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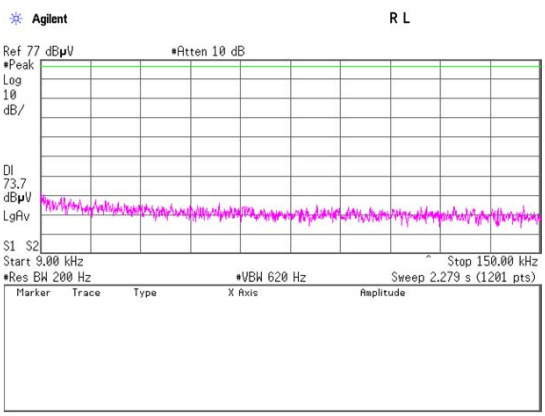
Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2441MHz (1/2)

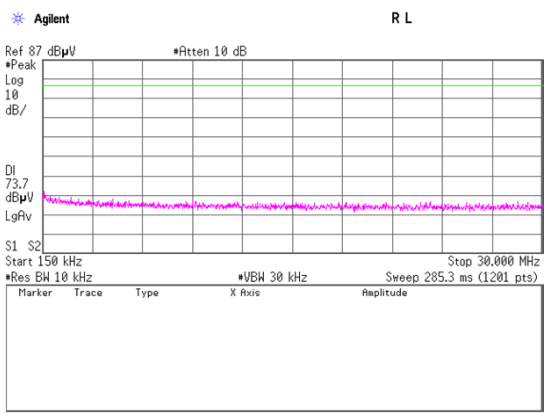
9kHz - 150kHz

Tx2_SpuriousM1



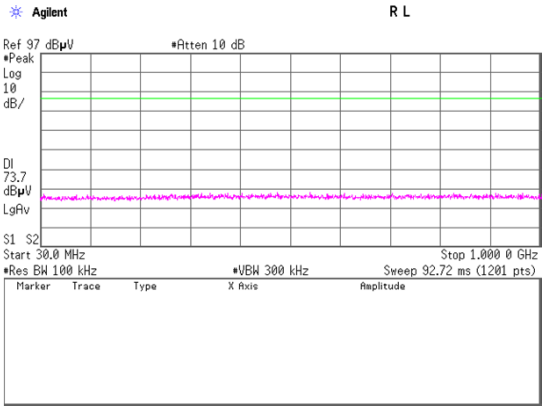
150kHz - 30MHz

Tx2_SpuriousM2



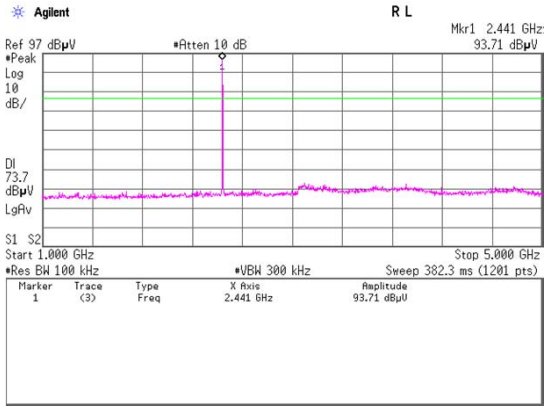
30MHz - 1GHz

Tx2_SpuriousM3



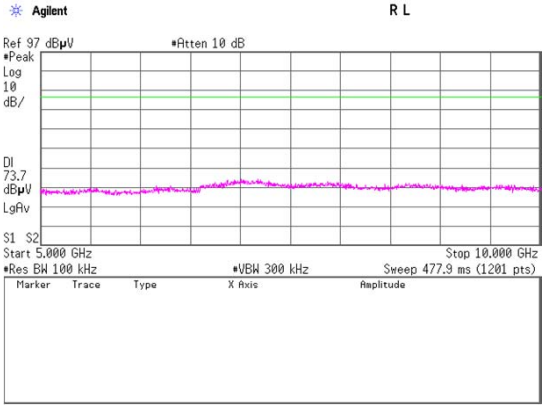
1GHz - 5GHz

Tx2_SpuriousG1



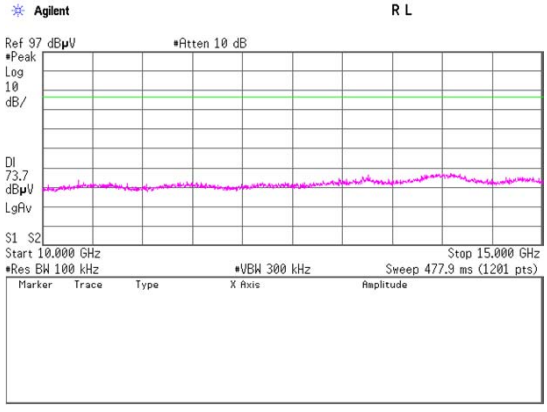
5GHz - 10GHz

Tx2_SpuriousG2



10GHz - 15GHz

Tx2_SpuriousG3



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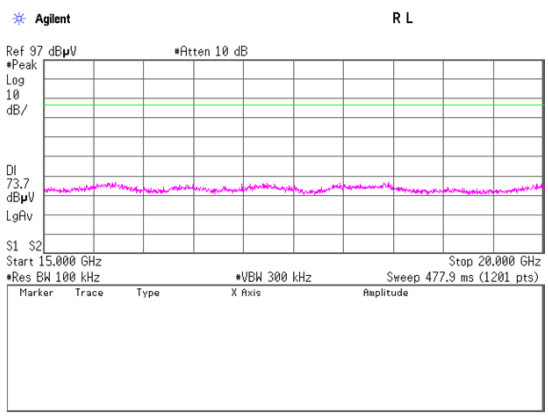
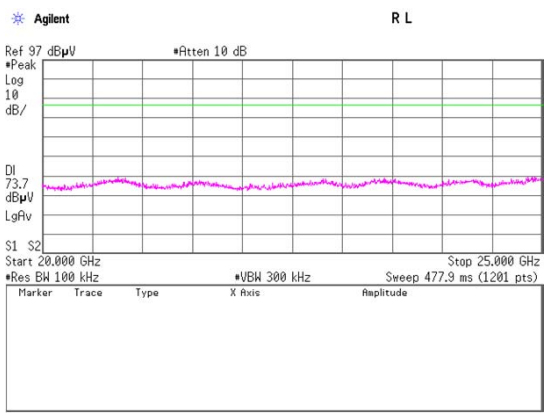
Spurious emission (Conducted)

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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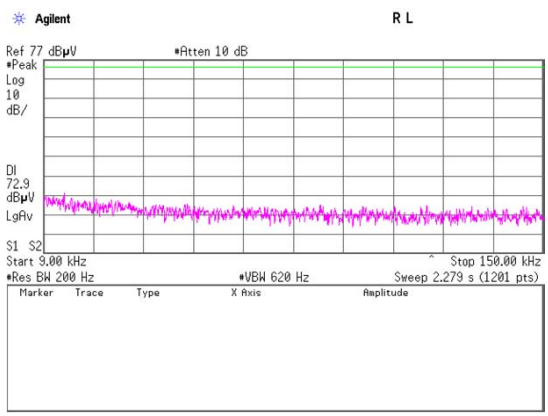
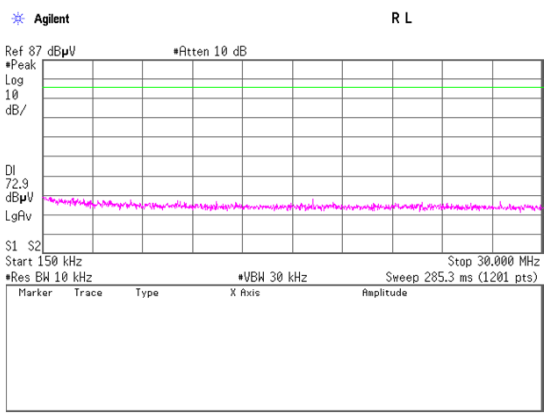
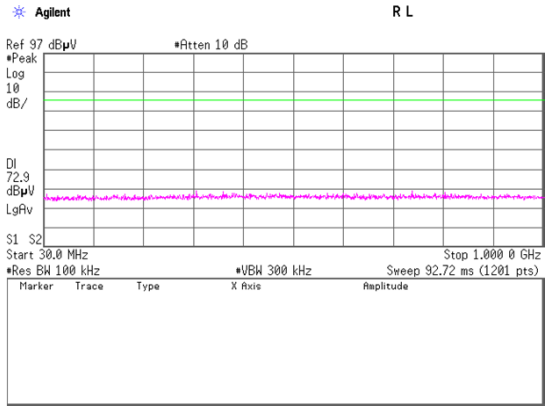
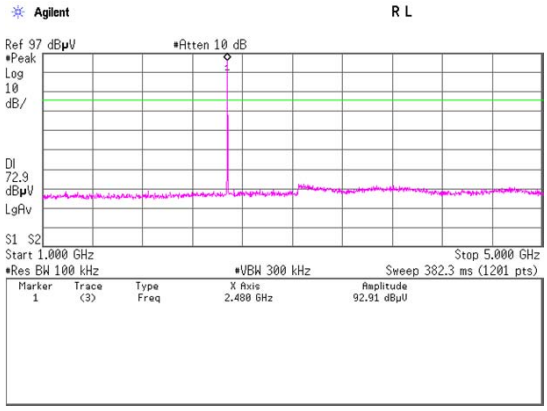
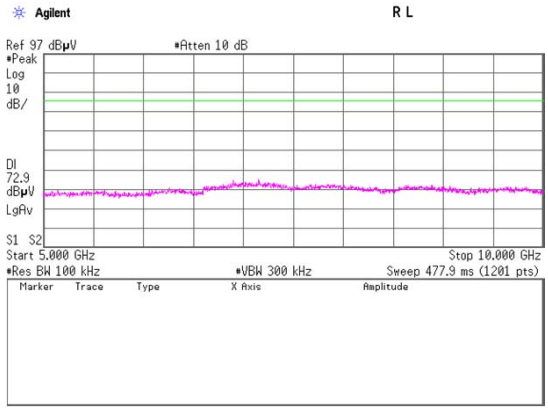
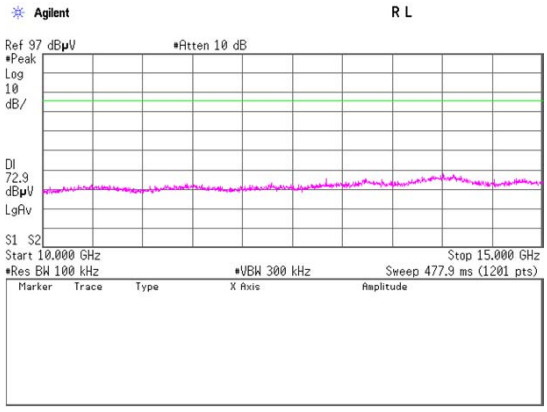
Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2480MHz (1/2)

9kHz - 150kHz	150kHz - 30MHz
Tx3_SpuriousM1	Tx3_SpuriousM2
	
30MHz - 1GHz	**1GHz - 5GHz**
Tx3_SpuriousM3	Tx3_SpuriousG1
	
5GHz - 10GHz	**10GHz - 15GHz**
Tx3_SpuriousG2	Tx3_SpuriousG3
	

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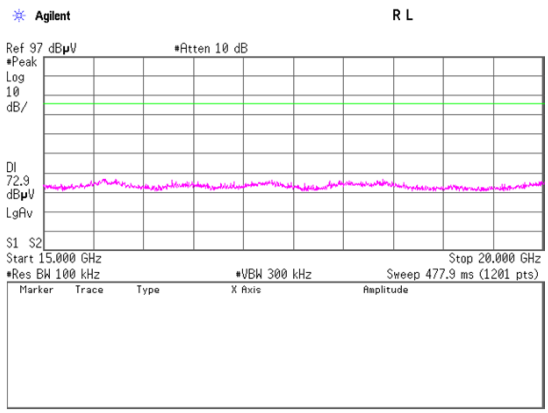
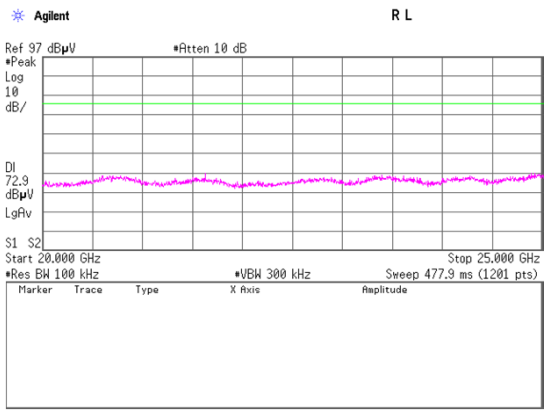
Spurious emission (Conducted)

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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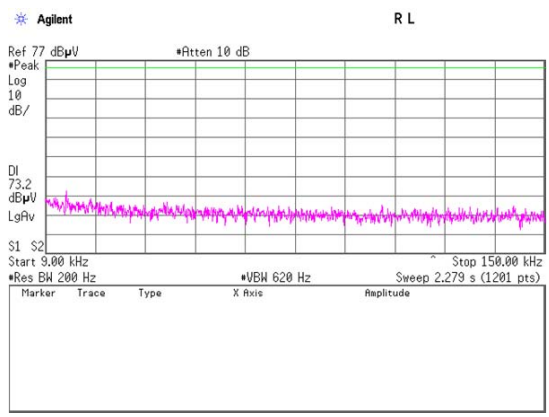
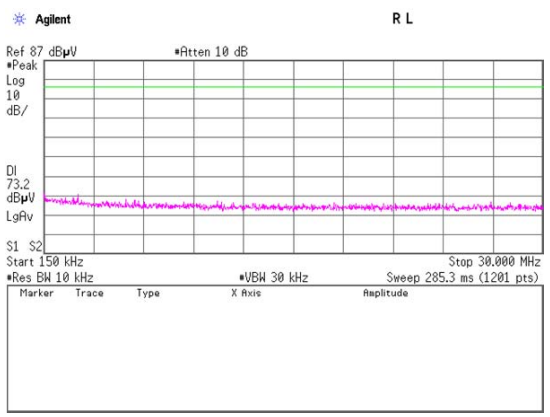
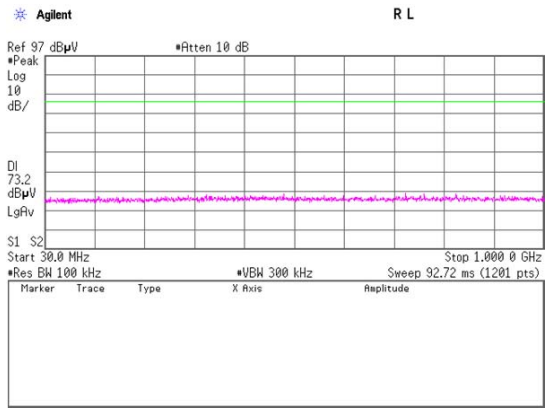
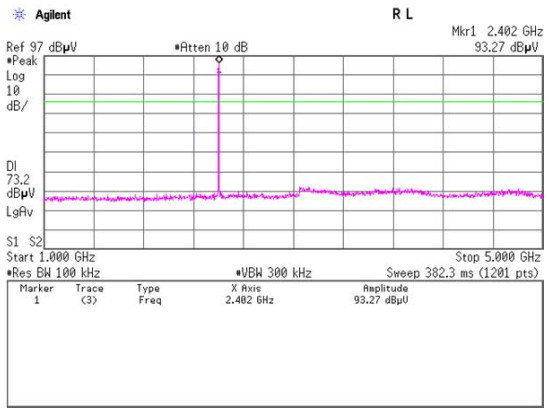
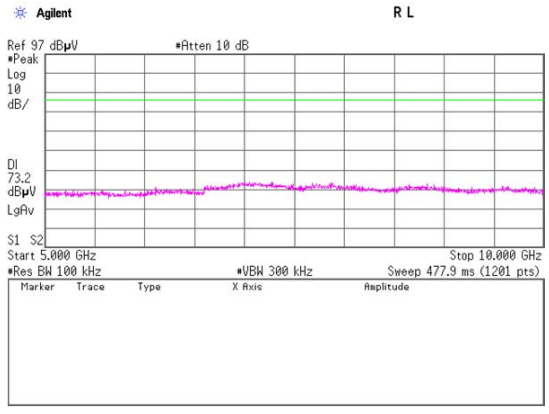
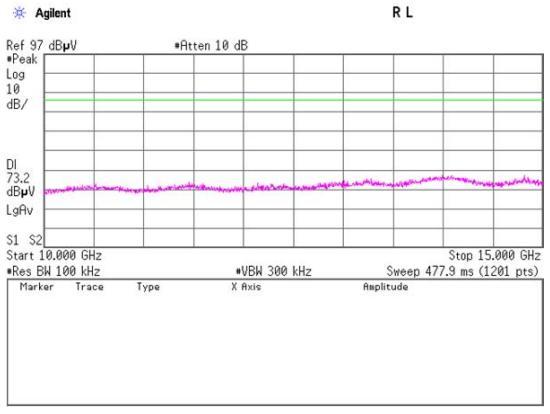
Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2402MHz (1/2)

9kHz - 150kHz	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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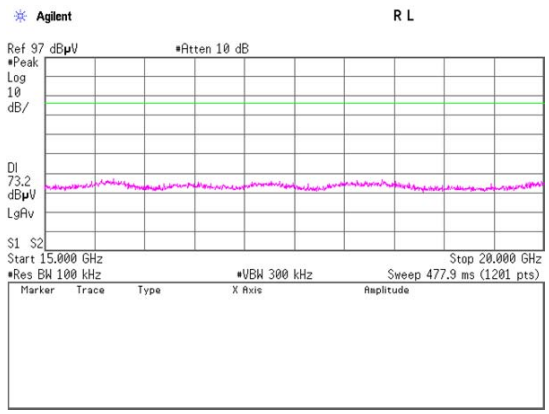
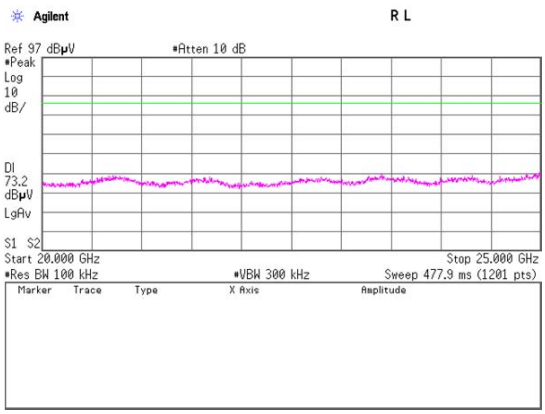
Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

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

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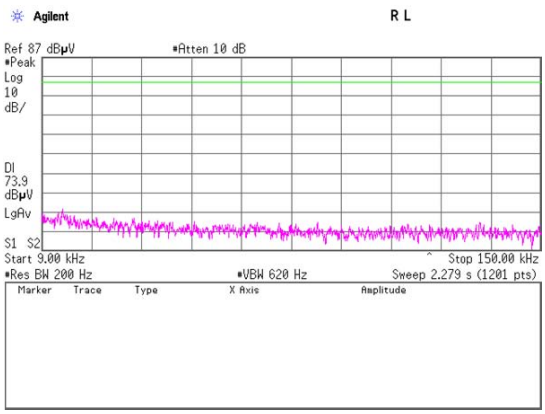
Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2441MHz (1/2)

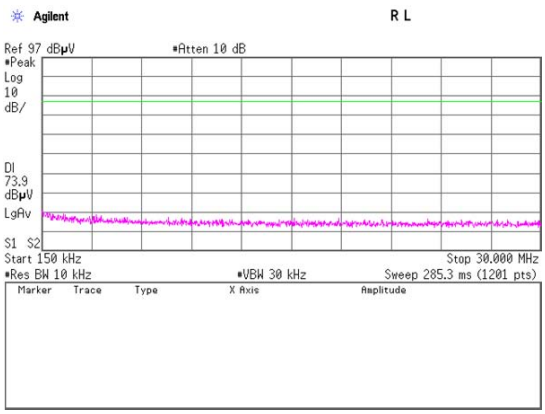
9kHz - 150kHz

Tx2_SpuriousM1



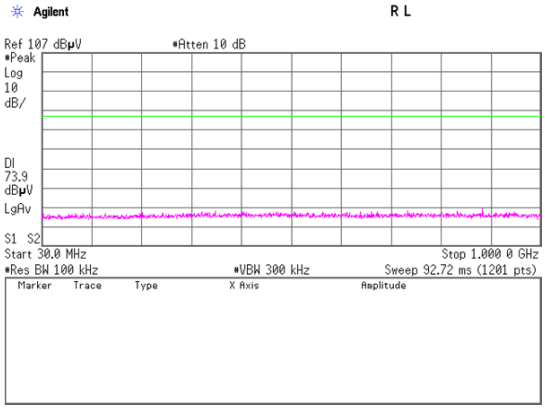
150kHz - 30MHz

Tx2_SpuriousM2



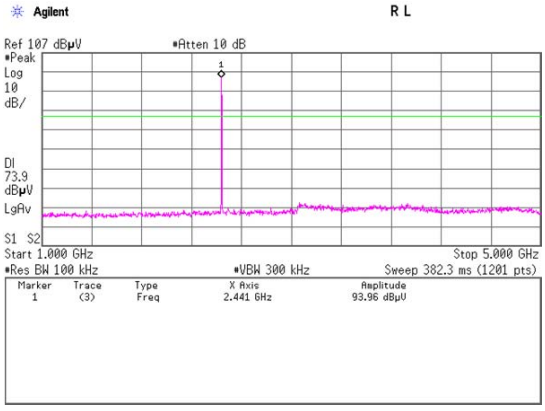
30MHz - 1GHz

Tx2_SpuriousM3



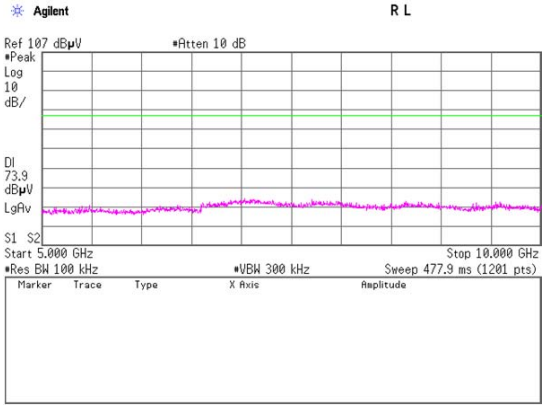
1GHz - 5GHz

Tx2_SpuriousG1



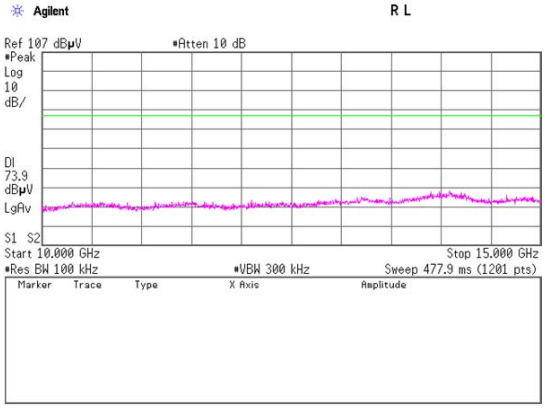
5GHz - 10GHz

Tx2_SpuriousG2



10GHz - 15GHz

Tx2_SpuriousG3



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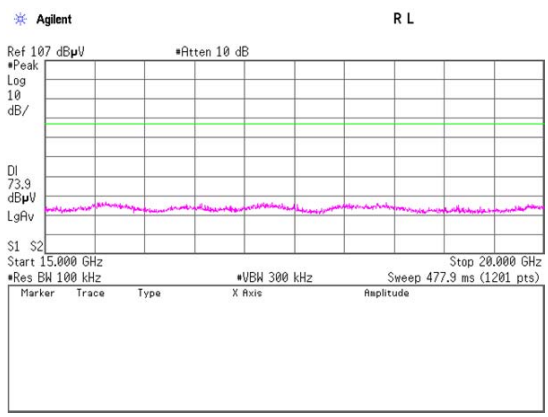
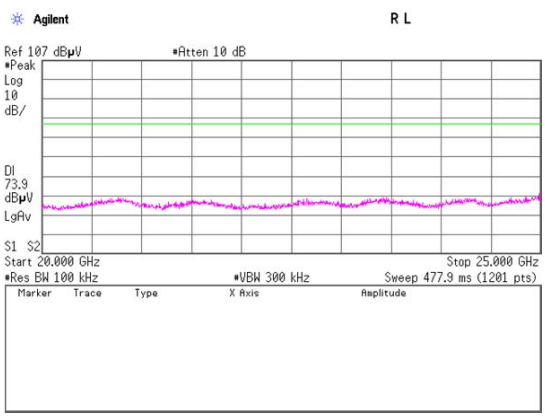
Spurious emission (Conducted)

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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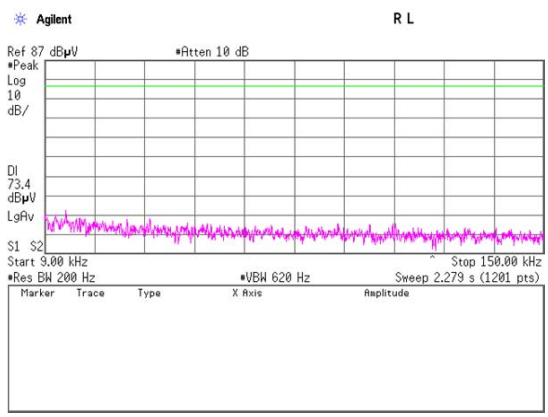
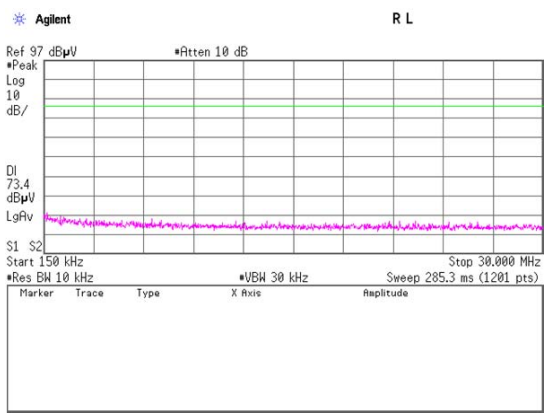
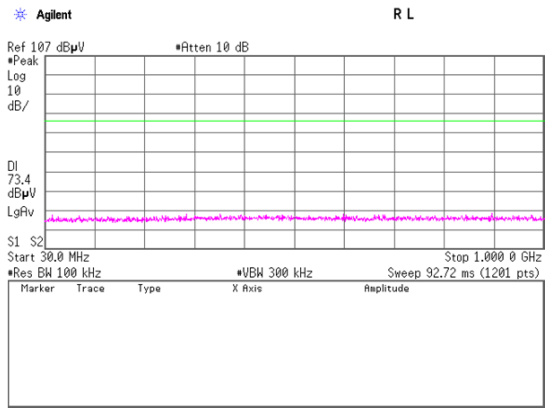
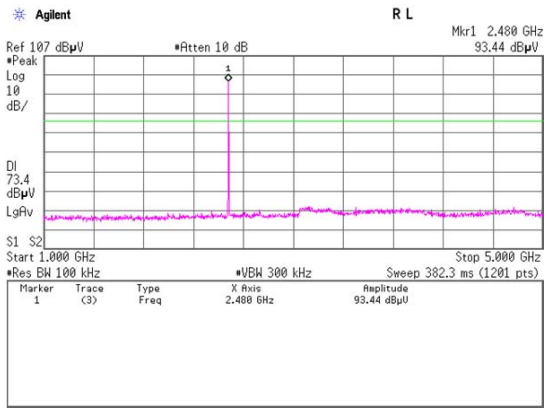
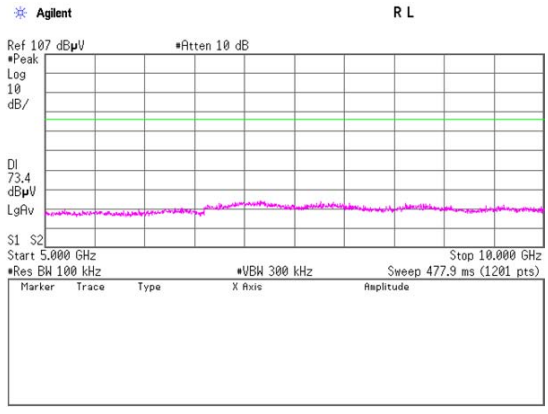
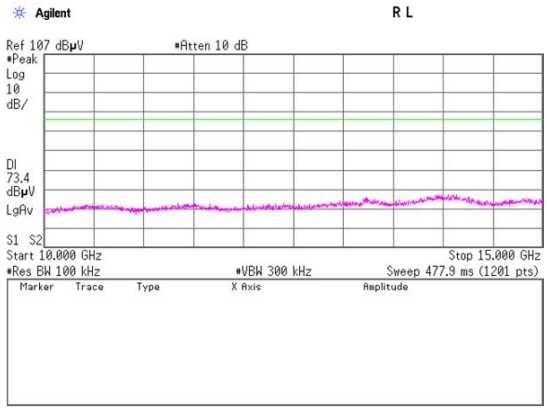
Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2480MHz (1/2)

9kHz - 150kHz	150kHz - 30MHz
Tx3_SpuriousM1	Tx3_SpuriousM2
	
30MHz - 1GHz	**1GHz - 5GHz**
Tx3_SpuriousM3	Tx3_SpuriousG1
	
5GHz - 10GHz	**10GHz - 15GHz**
Tx3_SpuriousG2	Tx3_SpuriousG3
	

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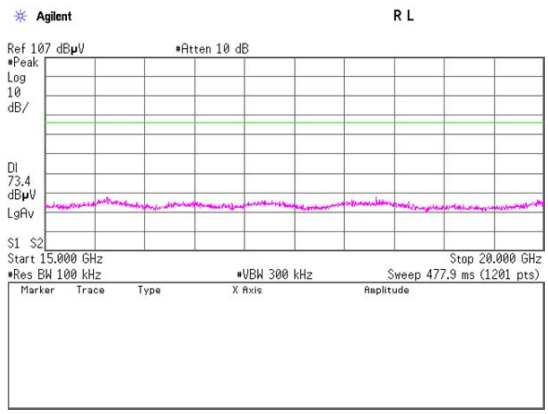
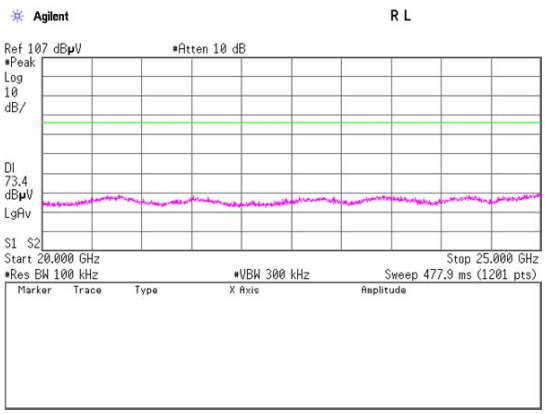
Spurious emission (Conducted)

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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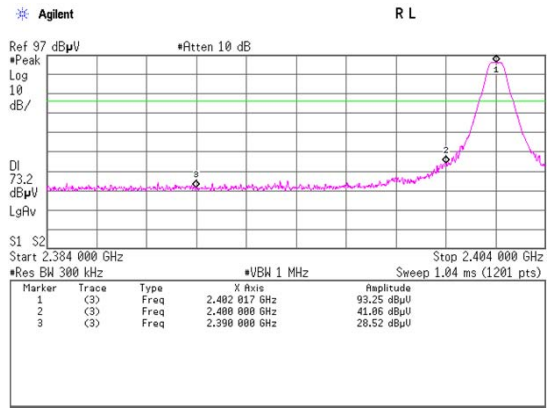
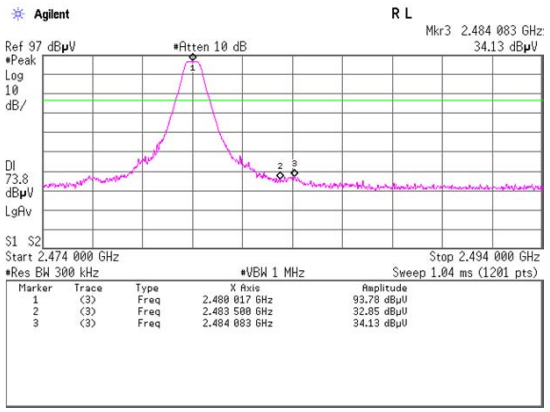
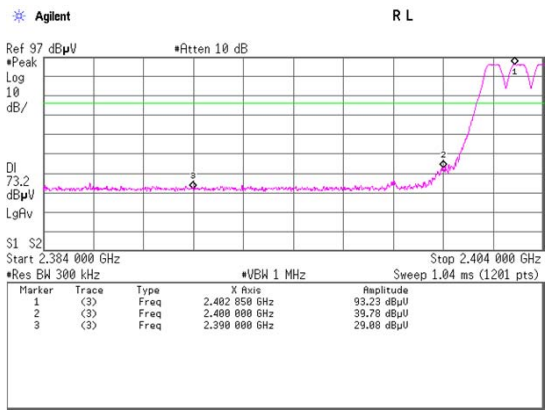
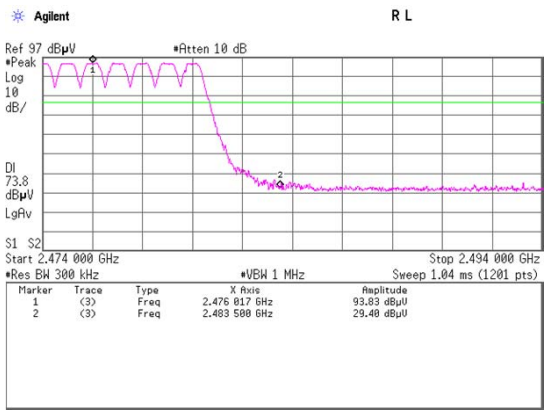
Spurious emission (Conducted)

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)**
Tx2_HoppingBandEdgeLow	Tx2_HoppingBandEdgeHigh
	

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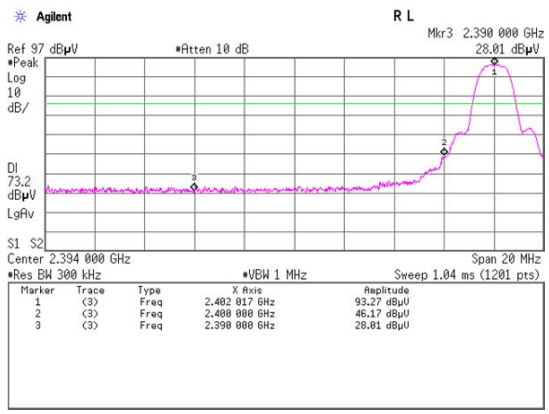
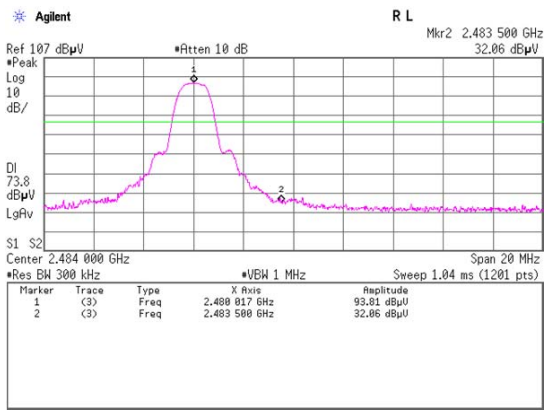
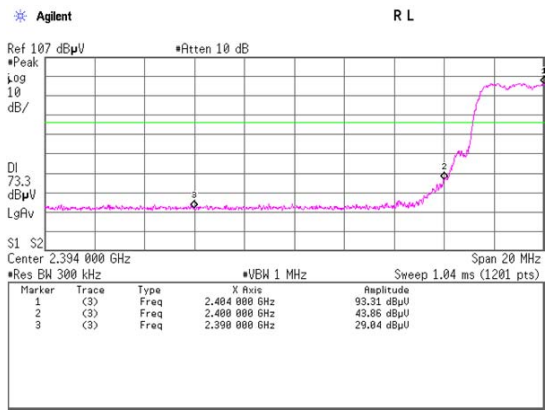
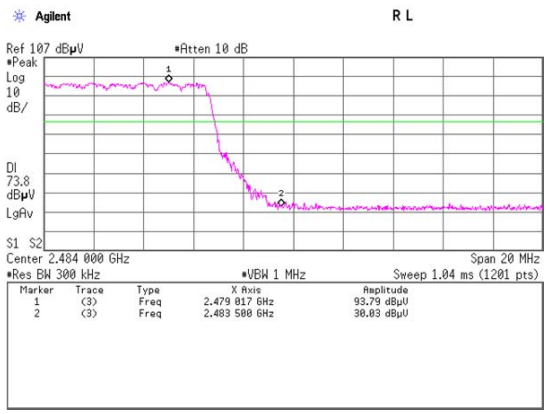
Spurious emission (Conducted)

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)**
Tx2_HoppingBandEdgeLow	Tx2_HoppingBandEdgeHigh
	

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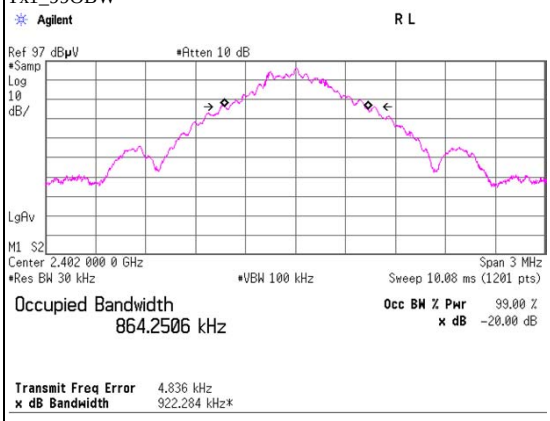
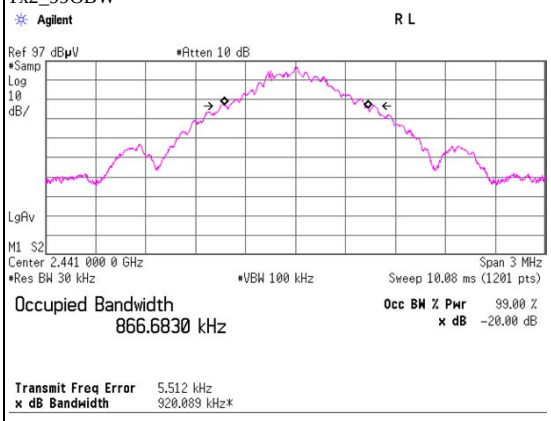
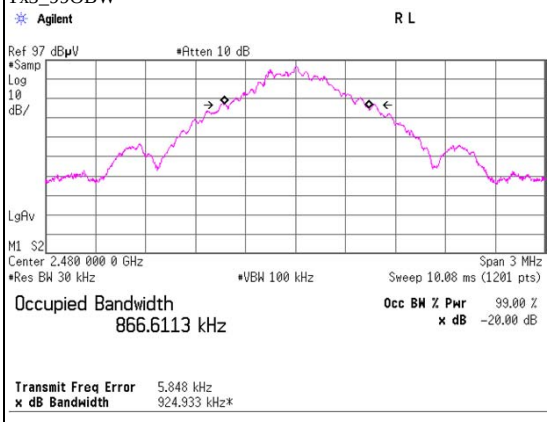
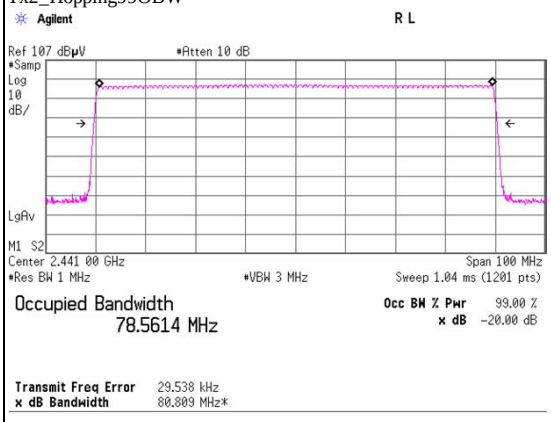
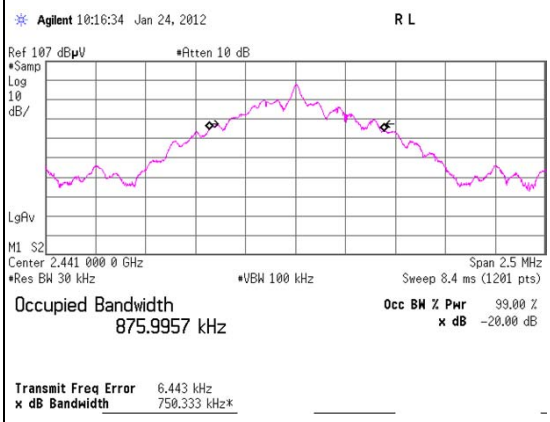
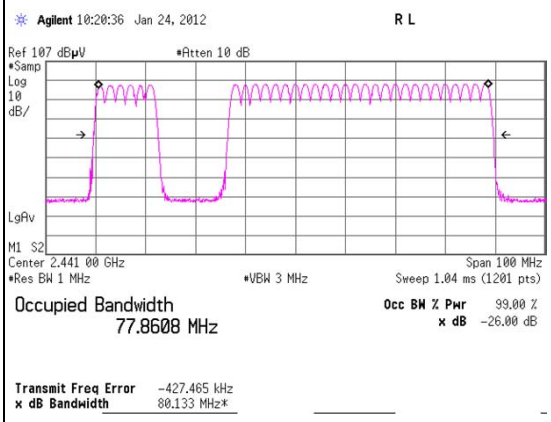
99% Occupied Bandwidth

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

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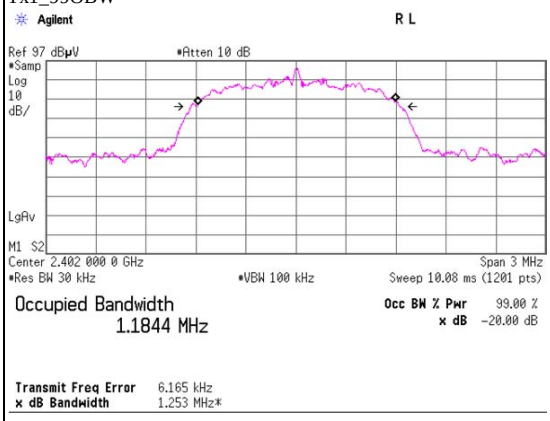
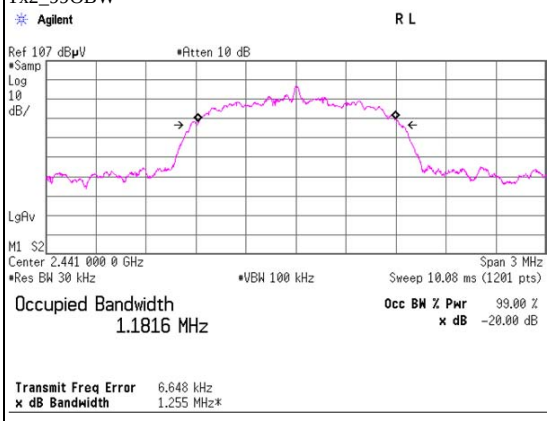
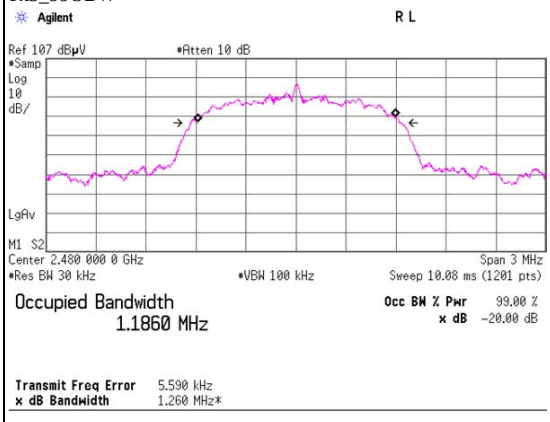
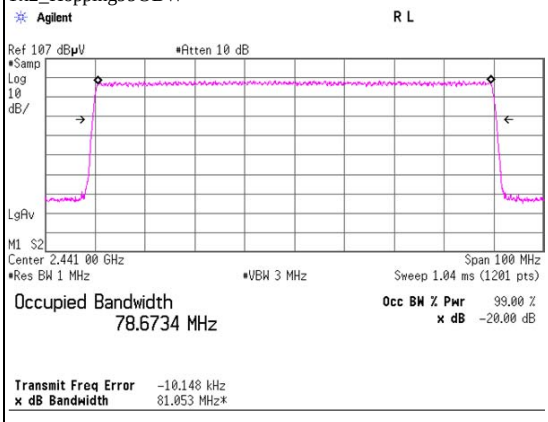
99% Occupied Bandwidth

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 2
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, RE	2011/12/05 * 12
SAT10-09	Attenuator	Weinschel Corp.	54A-10	W5692	AT	2011/11/09 * 12
SCC-G14	Coaxial Cable	Suhner	SUCOFLEX 102	31600/2	AT	2011/03/23 * 12
SCC-H5	Microwave cable	Hirose Electric	U.FL-2LP-066J1-A-(200)	-	AT	Pre Check
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2011/04/12 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2011/04/12 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2011/03/02 * 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
SAT10-05	Attenuator(above1GHz)	Agilent	8493C-010	74864	RE	2011/12/27 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2011/12/27 * 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
SJM-10	Measure	PROMART	SEN1935	-	RE	-
SAEC-03(SVSWR)	Semi-Anechoic Chamber	TDK	SAEC-03(SVSWR)	3	RE	2011/03/29 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFI,MF)	-	RE	-
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2011/03/15 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2011/03/16 * 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 :
RE: Radiated emission ,
AT: Antenna terminal disturbance voltage ,