RADIO TEST REPORT

Test Report No.: 10059465S-A

Applicant	:	**Sony Corporation**
Type of Equipment	:	**AV Center**
Model No.	:	**XAV-712HD**
FCC ID	:	**AK8XAV712**
Test regulation	:	**FCC Part15 Subpart C: 2013**
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.
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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: August 30 to September 14, 2013

Tested by: S. Takano

Shinichi Takano
Engineer of WiSE Japan,
UL Verification Service

Approved by : T. Imamura

Toyokazu Imamura
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".

RTL02610

REVISION HISTORY

Original Test Report No.: 10059465S-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	10059465S-A	October 2, 2013	-	-

Contents

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SECTION 1: Customer information

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

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

2.1 Identification of E.U.T.

Type of Equipment	:	AV Center
Model Number	:	XAV-712HD
Serial Number	:	Refer to 4.2 of this report.
Rating	:	DC12V (car battery)
Country of Mass-production	:	Thailand
Condition of EUT	:	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Receipt Date of Sample	:	August 21, 2013
Modification of EUT	:	No modification by the test lab.

2.2 Product description

Model: XAV-712HD (referred to as the EUT in this report) is an AV Center.

Clock frequency(ies) in the system	:	36.48MHz, 32.000MHz, 30.000MHz, 27.000MHz, 24.000MHz, 11.2896MHz, 10.000MHz, 6.000MHz, 32.768kHz, 28.224MHz

Bluetooth specification:

Equipment type	:	Transceiver
Frequency of operation	:	2402-2480MHz
Bandwidth & channel spacing	:	79MHz & 1MHz
Type of modulation	:	FHSS
Operation temperature range	:	-20 to +60 deg.C.
Antenna type	:	(MITSUBISHI) AMD0302-ST01 SMD
Antenna connector type	:	None
Antenna gain	:	-7.6dBi (Peak)
ITU code	:	F1D, G1D

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

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

SECTION 3: Test specification, procedures & results

3.1 Test specification

Test specification : FCC Part 15 Subpart C: 2013, final revised on June 11, 2013 and effective July 11, 2013
Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.209 Radiated emission limits, general requirements
Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz

The EUT has been tested for compliance with FCC Part 15 Subpart B. Refer to the test report: 10059465S-C.

3.2 Procedures & Results

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
Conducted emission	ANSI C63.4:2009 7. AC powerline conducted emission measurements	FCC 15.207	-	N/A *1)	-	-
Carrier frequency separation	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(1)	Conducted	N/A		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	*See data.	Complied
Dwell time	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (a)(1)(iii)	Conducted	N/A		Complied
Maximum peak output power	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (b)(1)	Conducted	N/A		Complied
Band edge compliance & Spurious emission	FCC Public Notice DA 00-705 & ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.247 (d) 15.209	Conducted/ Radiated	N/A	4.3 dB Freq.: 4804.000 MHz Polarization: Vertical Detection: Average Mode: Tx 2402MHz, DH5	Complied

Note: UL Japan's Work Procedures No. 13-EM-W0420 and 13-EM-W0422
*1) The test is not applicable since the EUT has no AC mains.

3.3 Addition to standard

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

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

3.4 Uncertainty

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

Item	Frequency range	No.1 SAC*1/SR*2 (±)	No.2 SAC/SR (±)	No.3 SAC/SR (±)
Radiated emission (Measurement distance: 3m)	9kHz-30MHz	3.7 dB	3.7 dB	3.6 dB
	30MHz-300MHz	4.8 dB	5.0 dB	4.8 dB
	300MHz-1GHz	5.0 dB	5.0 dB	4.8 dB
	1GHz-15GHz	4.9 dB	4.9 dB	4.9 dB
Radiated emission (Measurement distance: 1m)	15GHz-18GHz	5.7 dB	5.6 dB	5.6 dB
	18GHz-40GHz	5.2 dB	4.3 dB	4.3 dB

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

The data listed in this report meets the limits unless the uncertainty is taken into consideration.

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

3.5 Test location

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

	FCC Registration No.	IC Registration No.	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
☐ No.1 semi-anechoic chamber	697847	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☐ No.2 semi-anechoic chamber	697847	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☒ No.3 semi-anechoic chamber	697847	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
☐ No.4 semi-anechoic chamber	-	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
☐ No.1 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
☐ No.2 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
☐ No.3 shielded room	-	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
☐ No.4 shielded room	-	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
☐ No.5 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
☒ No.6 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-

3.6 Test setup, Data of test & Test instruments

Refer to APPENDIX 1 to 3.

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

4.1 Operating mode

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

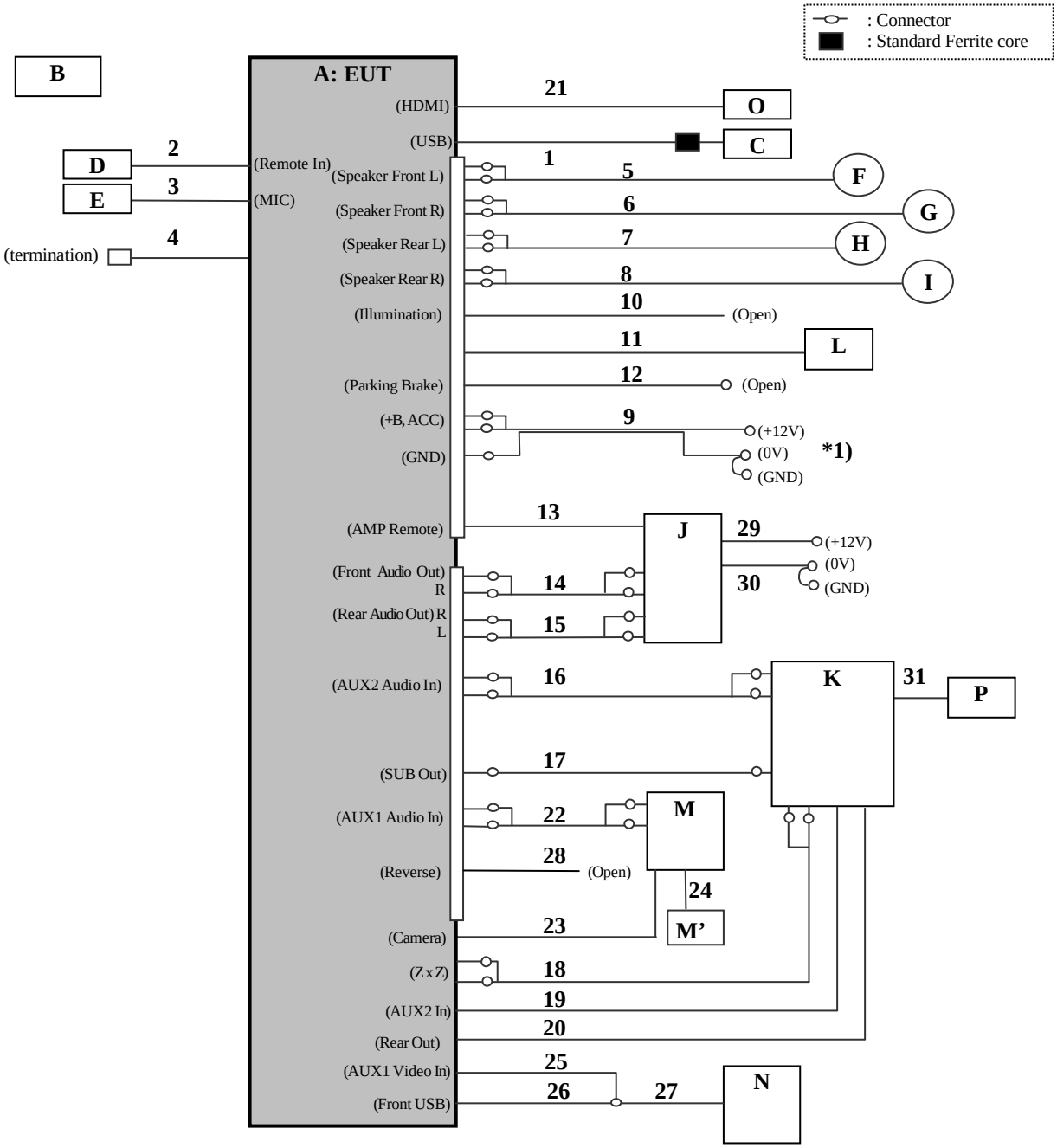
*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload (except Dwell time test).

*Remarks: Test was not performed at AFH mode, because the decrease of number of channel (min: 20ch) at AFH mode does not affect the output power and bandwidth of the EUT.
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.

Software: CSR Blue Suite BlueTest Ver.1.24
CSR Blue Suite BtCli Ver.1.24 (Inquiry mode only)
Power Settings: BDR = 44
EDR = 48

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

4.2 Configuration and peripherals



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

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

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	AV Center	XAV-712HD	*2)	Sony	EUT
B	Remote Commander	RM-X271	-	Sony	-
C	USB Memory	SDK-USM4GL(B)	10615MEDB	Sony	-
D	Wired Remote Controller	RM-X4S	-	Sony	-
E	MIC	-	-	Sony	-
F	Speaker 1	XS-J1620	-	Sony	-
G	Speaker 2	XS-J1620	-	Sony	-
H	Speaker 3	XS-F1023	-	Sony	-
I	Speaker 4	XS-F1023	-	Sony	-
J	Stereo Power Amplifier	XM-2042	-	Sony	-
K	Connection Box	XA-124	3509579	Sony	-
L	SIRIUS XM CONNECT VEHICLE TUNER	SXV100	1113	SIRIUS	-
M	Color Video Camera	CCD-MC100	1007356	Sony	-
M'					
N	iPod touch	A1288	9C90590L201	Apple	-
O	Smart Phone	ISW11SC	SSCAA087243	Samsung	-
P	LCD Monitor	XVM-F65	3509383	Sony	-

*2) 36: Antenna port conducted tests, 35: Radiated emission tests

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	USB	1.5	Shielded	Shielded	-
2	REMOTE IN	1.9	Shielded	Shielded	-
3	MIC	4.0	Shielded	Shielded	-
4	FM antenna	3.0	Shielded	Shielded	-
5	Speaker (1)	0.15+4.0	Unshielded	Unshielded	-
6	Speaker (2)	0.15+4.0	Unshielded	Unshielded	-
7	Speaker (3)	0.15+2.0	Unshielded	Unshielded	-
8	Speaker (4)	0.15+2.0	Unshielded	Unshielded	-
9	DC Power	0.15+2.2	Unshielded	Unshielded	-
10	Illumination	0.15+1.0	Unshielded	Unshielded	-
11	Signal	5.0	Shielded	Shielded	-
12	Parking brake	2.0	Unshielded	Unshielded	-
13	AMP Remote	0.15+1.6	Unshielded	Unshielded	-
14	RCA (Front Audio Out)	0.1+1.0	Shielded	Shielded	-
15	RCA (Rear Audio Out)	0.1+2.0	Shielded	Shielded	-
16	RCA (AUX2 Audio In)	0.1+1.2	Shielded	Shielded	-
17	RCA (SUB Out)	0.1+2.0	Shielded	Shielded	-
18	RCA (Z x Z)	1.4	Shielded	Shielded	-
19	RCA (AUX2 Video in)	1.2	Shielded	Shielded	-
20	RCA (Rear Out)	1.4	Shielded	Shielded	-
21	HDMI	0.15+1.0	Shielded	Shielded	-
22	RCA (AUX1 Audio In)	0.1+1.4	Shielded	Shielded	-
23	RCA (Camera)	1.4	Shielded	Shielded	-
24	Camera	2.0	Shielded	Shielded	-
25	RCA (AUX1 Video In)	1.5	Shielded	Shielded	-
26	USB (Front)	1.0	Shielded	Shielded	-
27	iPod	0.8	Shielded	Shielded	-
28	Reverse	0.1+1.0	Unshielded	Unshielded	-
29	DC Power (+)	2.0	Unshielded	Unshielded	-
30	DC Power (-)	2.0	Unshielded	Unshielded	-
31	LCD Monitor	3.0	Shielded	Shielded	-

SECTION 5: Carrier frequency separation

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

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

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

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

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

SECTION 7: Number of hopping frequency

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

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

SECTION 8: Dwell time

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

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

SECTION 9: Maximum peak output power

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

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

SECTION 10: Spurious emissions (Antenna port conducted)

Test procedure
The Out of Band Emissions was measured with a spectrum analyzer connected to the antenna port.
In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating,
the radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.
In the frequency range below 30MHz, RBW was narrowed to separate the noise contents.
Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart. (9kHz-150kHz:RBW=200Hz, 150kHz-30MHz:RBW=10kHz)

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

SECTION 11: Radiated emission

11.1 Operating environment

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

11.2 Test configuration

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

11.3 Test conditions

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

11.4 Test procedure

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

The radiated emission measurements were made with the following detection.

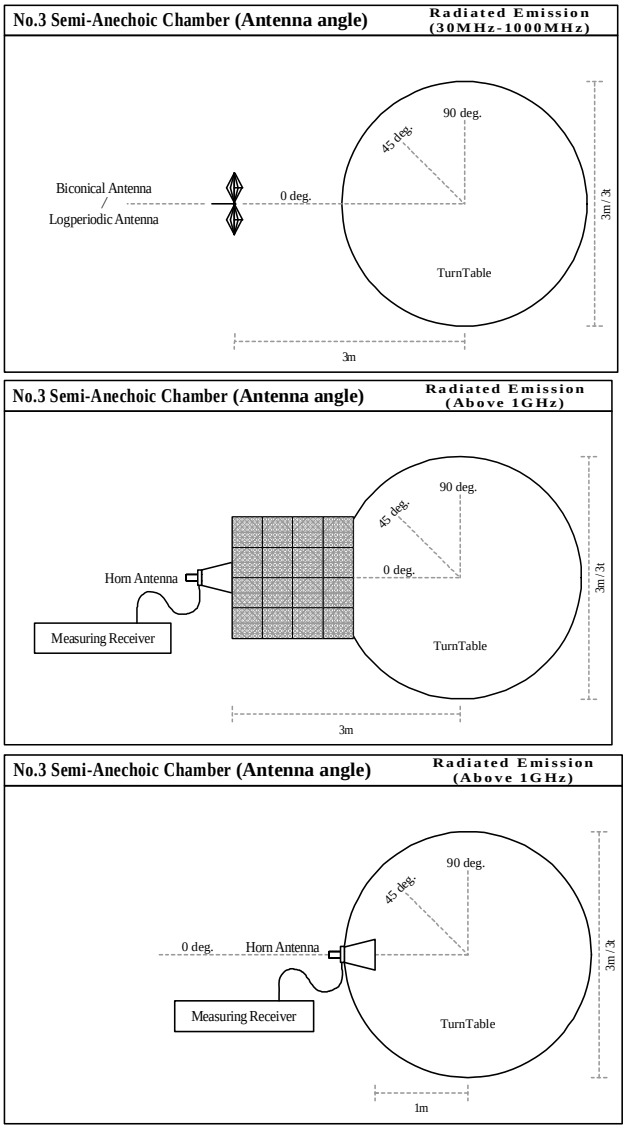
Frequency		30 - 1000MHz	1 - 25GHz		20dBc
Detection Type	:	Quasi-Peak	Peak	* Average	Peak
IF Bandwidth	:	120kHz	RBW:1MHz VBW:3MHz	RBW:1MHz VBW:10Hz	RBW: 100kHz VBW: 300kHz

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

The carrier level and noise levels were confirmed at mounting angle of 0 to 45 deg. based on the product specification to see the position of maximum noise, and the test was made at the position that has the maximum noise.

Antenna polarization \ Test item	Carrier	Spurious emission (Below 1GHz)	Spurious emission (1-15GHz)	Spurious emission (Above 15GHz)
Horizontal	45 deg.	45 deg.	45 deg.	0 deg.
Vertical	0 deg.	45 deg.	0 deg.	0 deg.

Figure 1. Antenna angle



11.5 Band edge

Band edge level at 2390MHz and 2483.5MHz is below the limits of FCC 15.209 and band edge level at 2400MHz is below the 20dBc. Refer to the data.

11.6 Results

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

Refer to APPENDIX 1.

Contents of APPENDIXES

APPENDIX 1: Data of Radio tests

20dB Bandwidth and Carrier Frequency Separation

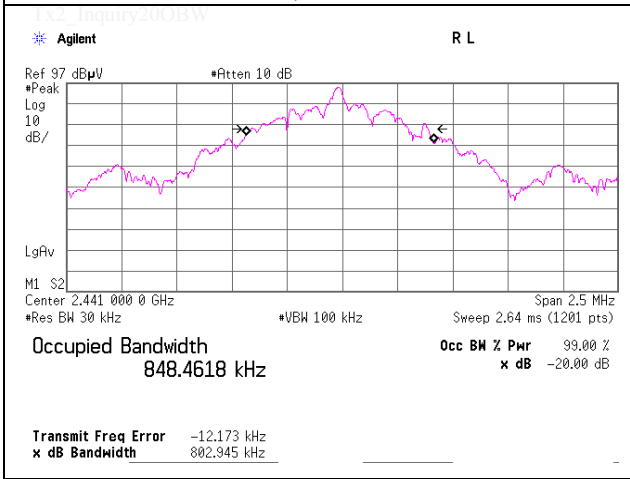
Test place	UL Japan, Inc. Shonan EMC Lab.	No.6 Shielded Room
Date	August 30, 2013	
Temperature / Humidity	24 deg.C , 45 %RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, Bluetooth, BDR, PRBS9	

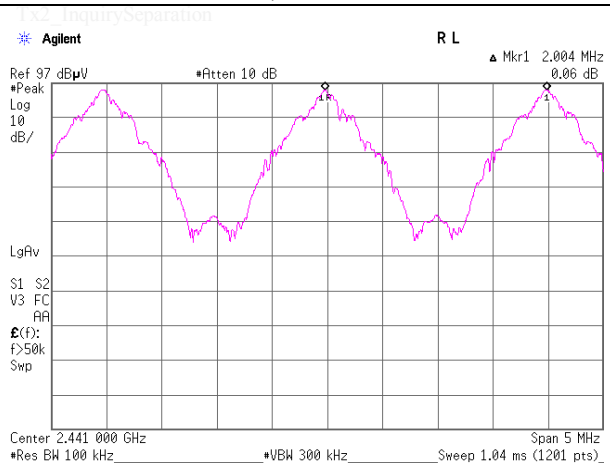
Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency Separation [MHz]
DH5	2402.0	0.960	1.005	>= 0.640
DH5	2441.0	0.929	1.003	>= 0.619
DH5	2480.0	0.926	1.005	>= 0.618
Inquiry	2441.0	0.803	2.004	>= 0.535

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





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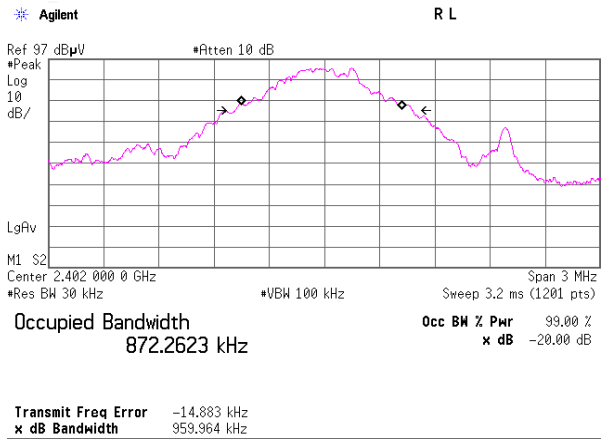
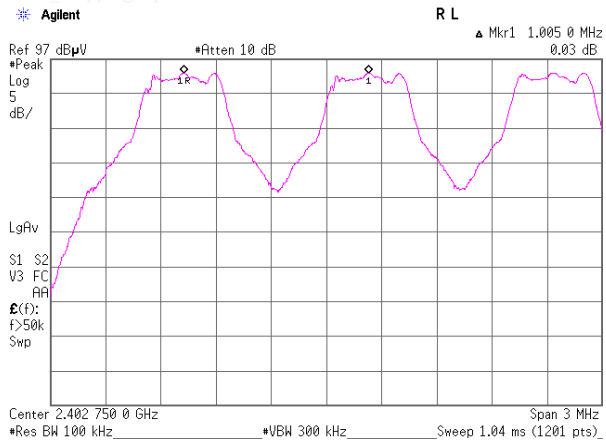
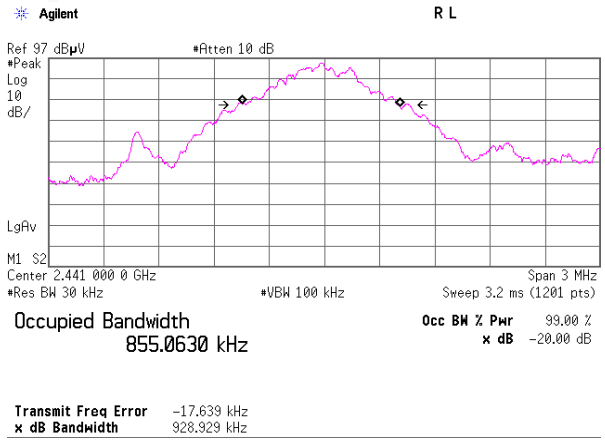
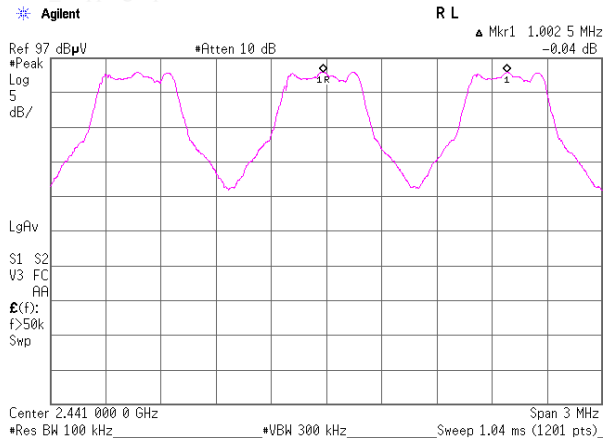
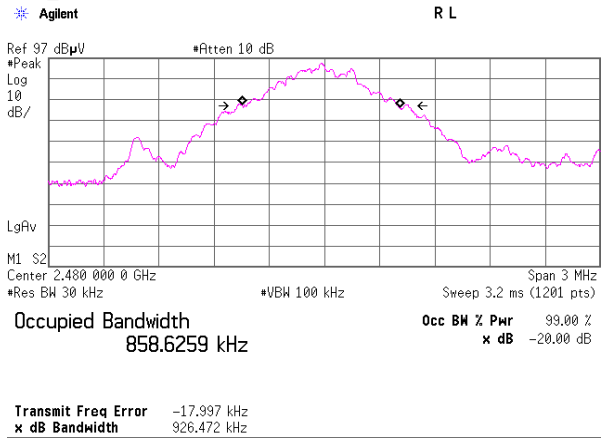
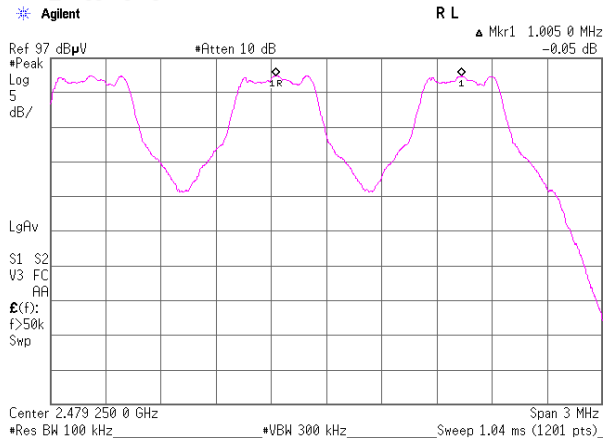
20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, BDR, PRBS9

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

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Facsimile : +81 463 50 6401

20dB Bandwidth and Carrier Frequency Separation

Test place	UL Japan, Inc. Shonan EMC Lab.	No.6 Shielded Room
Date	August 30, 2013	
Temperature / Humidity	24 deg.C , 45 %RH	
Engineer	Hikaru Shirasawa	
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	1.272	1.000	>= 0.848
3-DH5	2441.0	1.256	1.000	>= 0.838
3-DH5	2480.0	1.256	1.005	>= 0.837

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

Tx2_Inquiry20OBW Tx2_InquirySeparation

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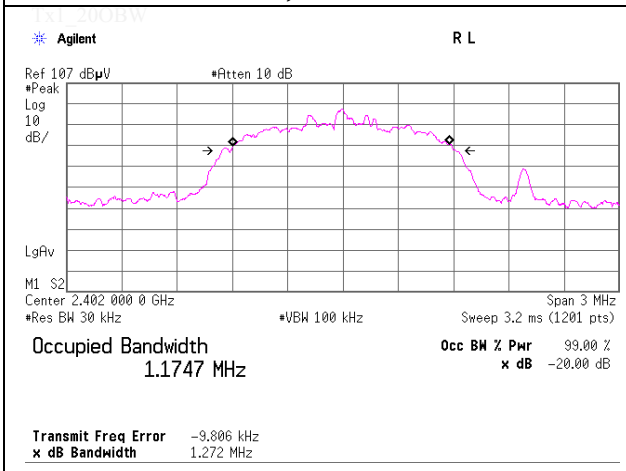
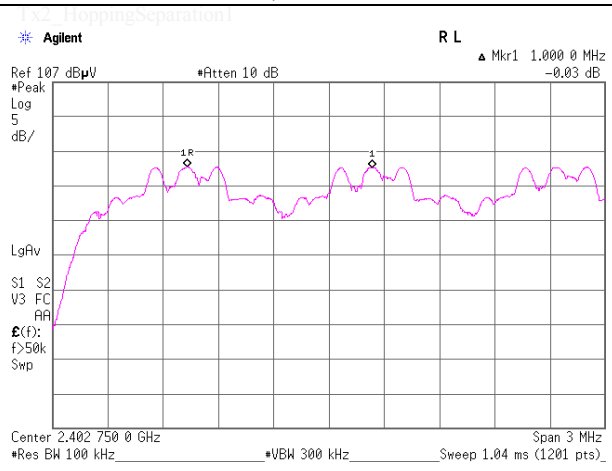
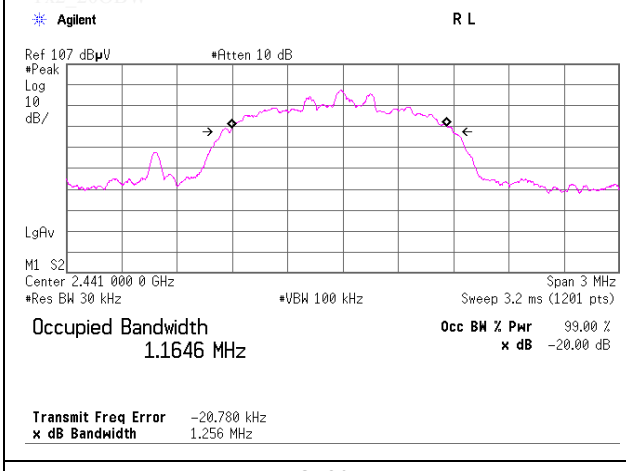
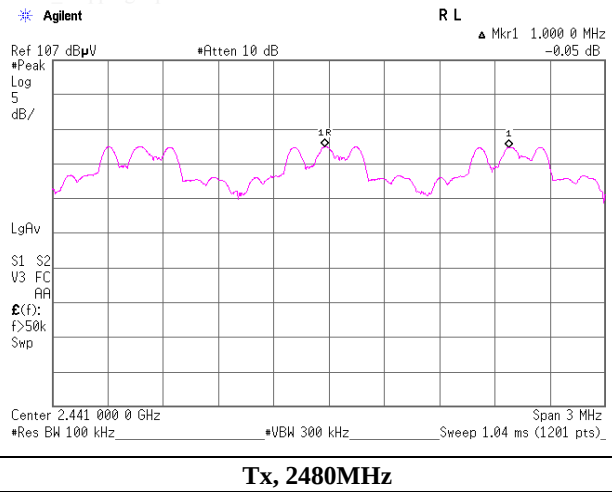
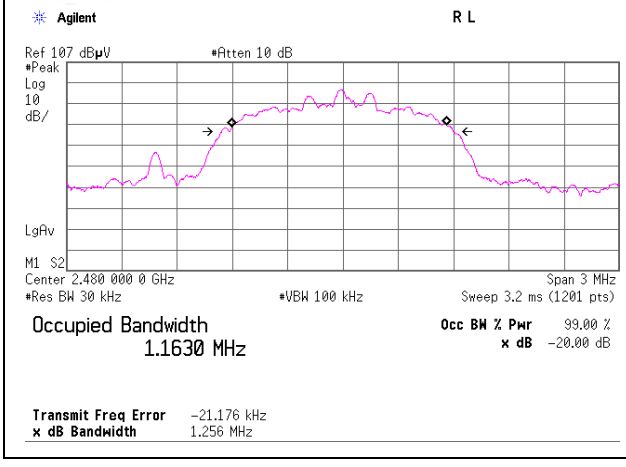
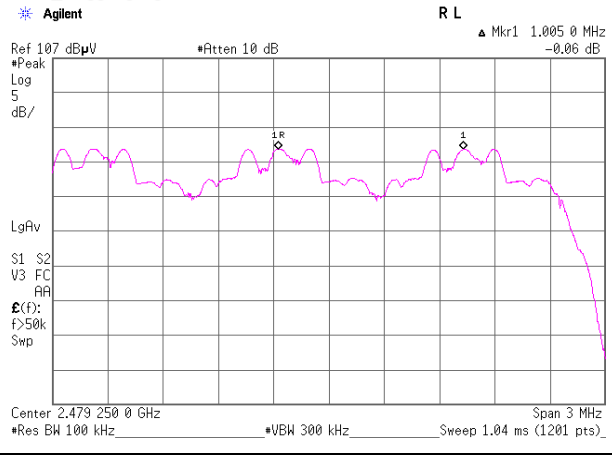
20dB Bandwidth and Carrier Frequency Separation

Tx, Bluetooth, EDR, PRBS9

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

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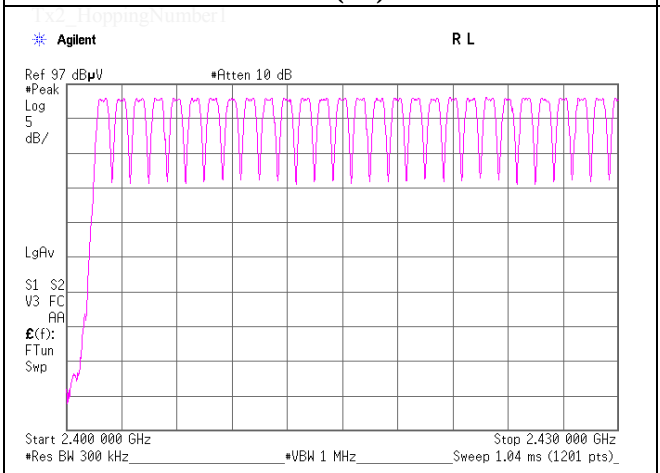
Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.6 Shielded Room
Date	August 30, 2013	
Temperature / Humidity	24 deg.C , 45 %RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, Bluetooth, BDR, PRBS9	

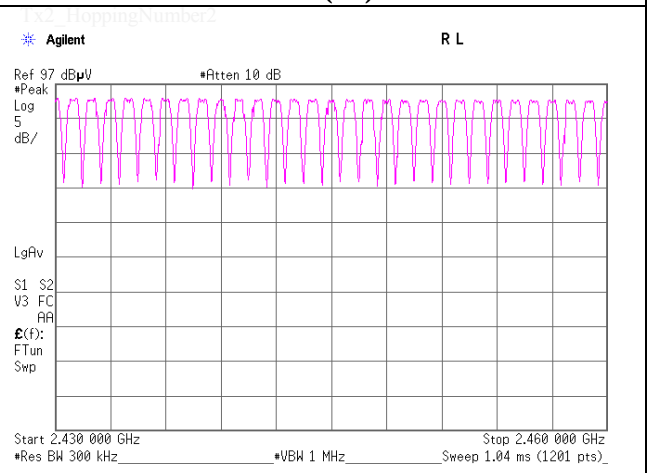
Mode	Number of Channel [times]	Limit [times]
DH5	79	>= 15

* Test was not performed at AFH mode whose number of hopping channel is 20 channels because this Bluetooth radio is in compliance of Bluetooth Specification.

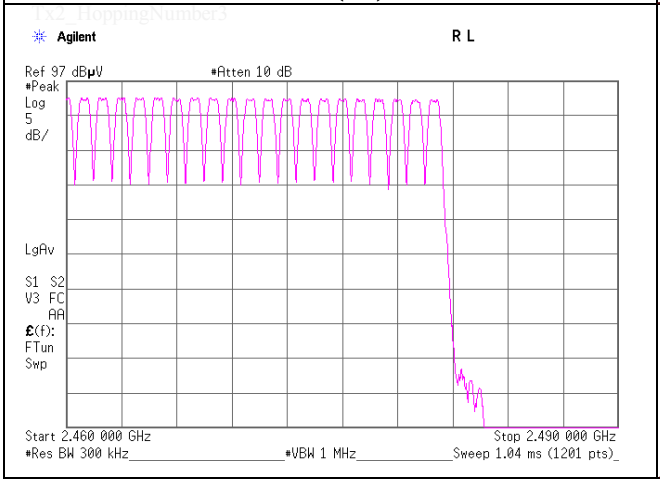
DH5 (1/3)



DH5 (2/3)



DH5 (3/3)



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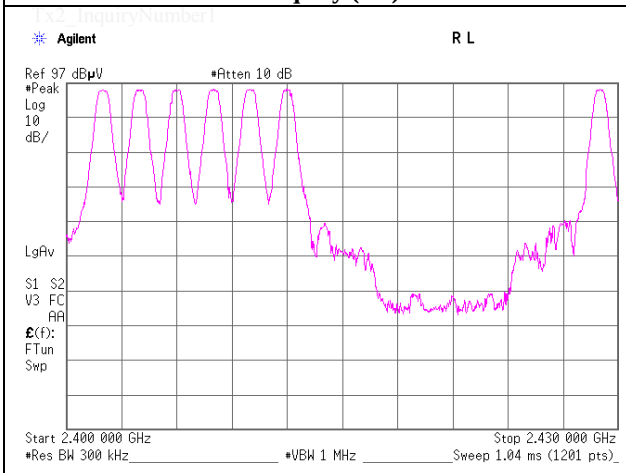
Number of Hopping Frequency

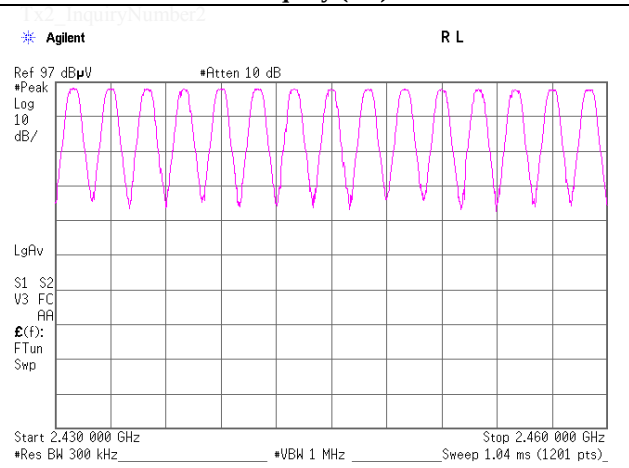
Test place	UL Japan, Inc. Shonan EMC Lab.	No.6 Shielded Room
Date	August 30, 2013	
Temperature / Humidity	24 deg.C , 45 %RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, Bluetooth, Inquiry	

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

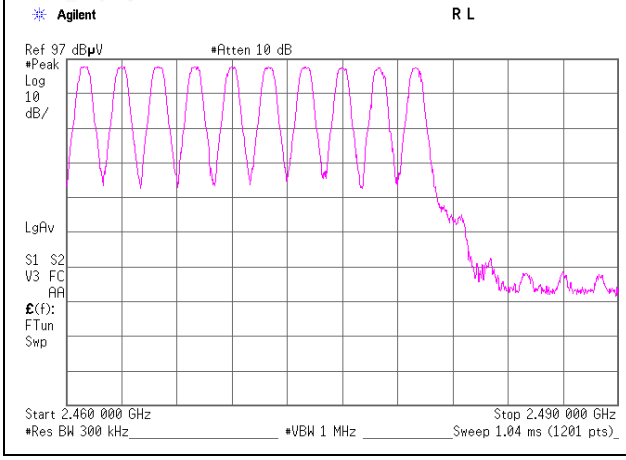
Inquiry (1/3)

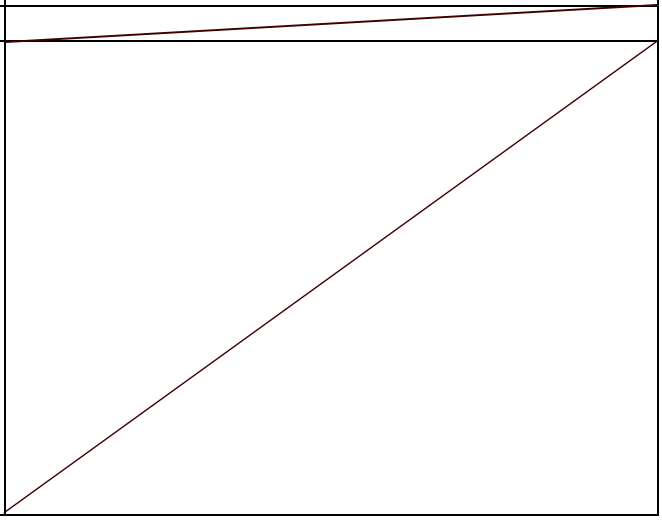


Inquiry (2/3)



Inquiry (3/3)





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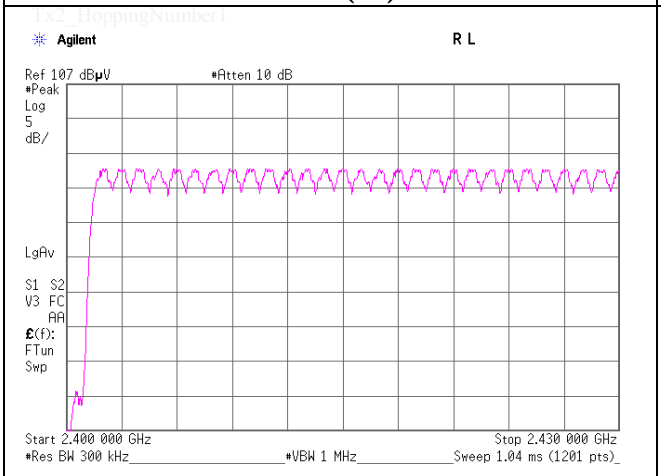
Number of Hopping Frequency

Test place	UL Japan, Inc. Shonan EMC Lab.	No.6 Shielded Room
Date	August 30, 2013	
Temperature / Humidity	24 deg.C , 45 %RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, Bluetooth, EDR, PRBS9	

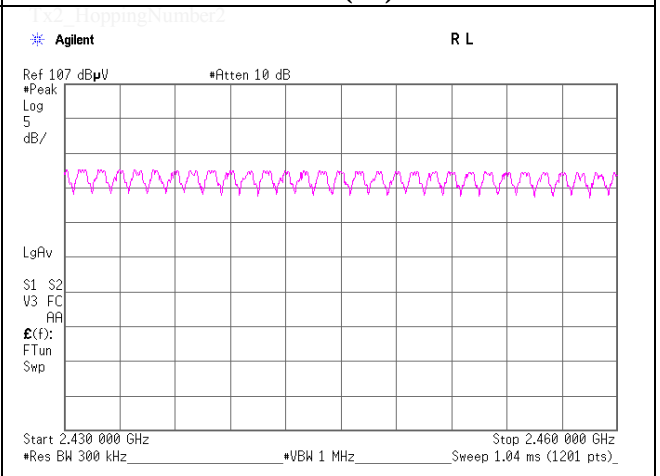
Mode	Number of Channel [times]	Limit [times]
3-DH5	79	>= 15

* Test was not performed at AFH mode whose number of hopping channel is 20 channels because this Bluetooth radio is in compliance of Bluetooth Specification.

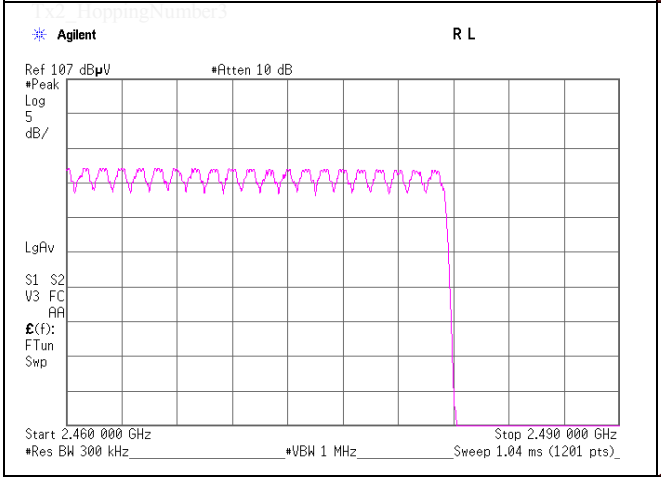
3-DH5 (1/3)



3-DH5 (2/3)



3-DH5 (3/3)



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Dwell Time

Test place	UL Japan, Inc. Shonan EMC Lab.	No.6 Shielded Room
Date	August 30, 2013	
Temperature / Humidity	24 deg.C , 45 %RH	
Engineer	Hikaru Shirasawa	
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	50.0 / 5.0 sec. x 31.6 sec. = 316 times	0.410	130	400
DH3	26.0 / 5.0 sec. x 31.6 sec. = 165 times	1.666	275	400
DH5	17.0 / 5.0 sec. x 31.6 sec. = 108 times	2.914	315	400
Inquiry	100.0 / 1.0 sec. x 12.8 sec. = 1280 times	0.112	143	400

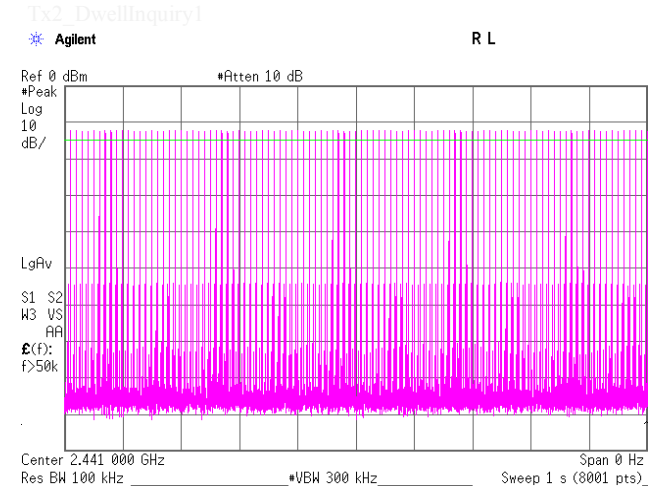
Sample Calculation

Result = Number of transmission x Length of transmition time

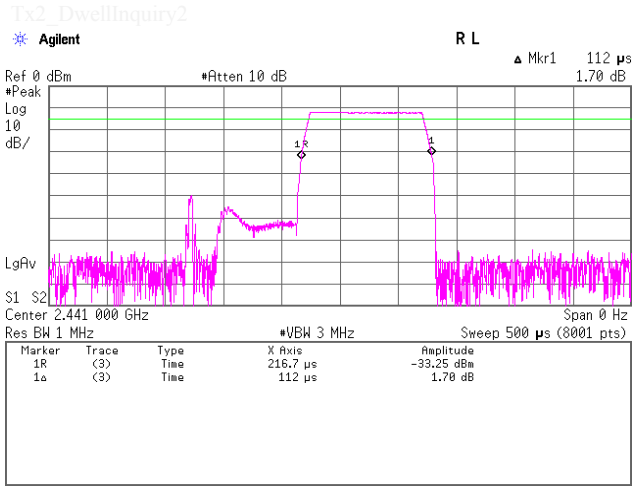
* This device complies with the Bluetooth protocol for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in N x 0.4s, where N is the number of channels being used in the hopping sequence (20 ≤ N ≤ 79), is always less than 0.4s regardless of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

Inquiry

Inquiry (1/2)



Inquiry (2/2)



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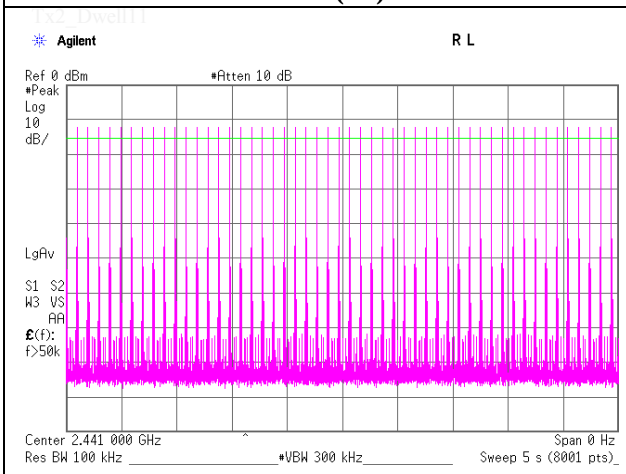
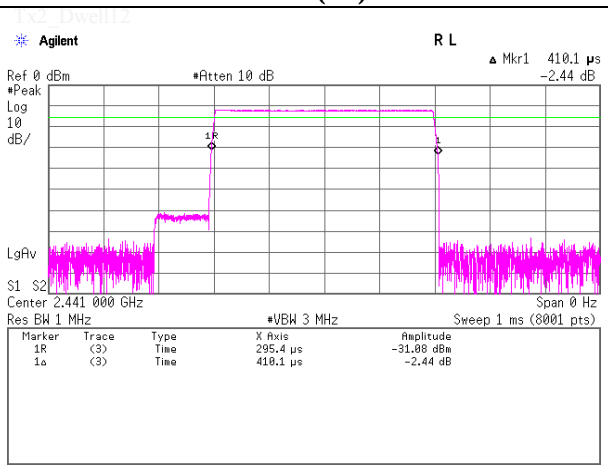
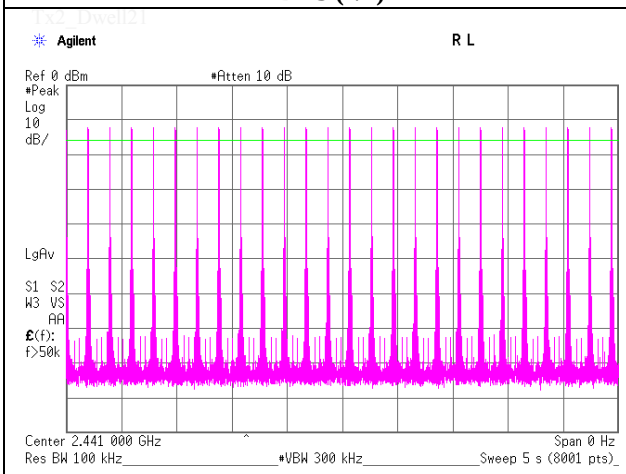
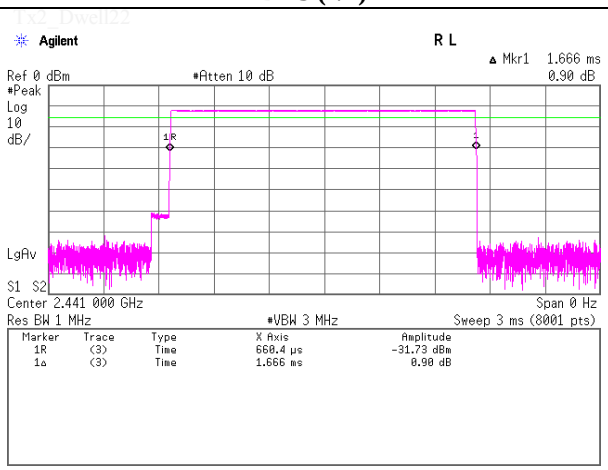
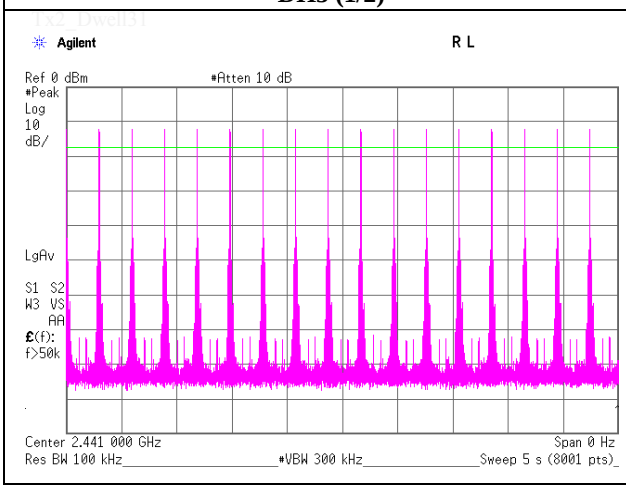
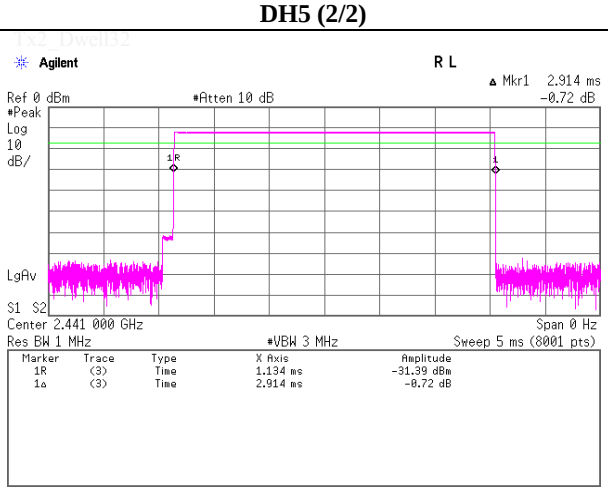
Dwell time

Tx, Bluetooth, BDR, PRBS9

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

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Dwell Time

Test place	UL Japan, Inc. Shonan EMC Lab.	No.6 Shielded Room
Date	August 30, 2013	
Temperature / Humidity	24 deg.C , 45 %RH	
Engineer	Hikaru Shirasawa	
Mode	Tx, Bluetooth, EDR, PRBS9	

Mode	Number of transmission in a 31.6 (79 Hopping x 0.4) second	Length of transmission time [msec]	Result [msec]	Limit [msec]
3-DH1	50.0 / 5.0 sec. x 31.6 sec. = 316 times	0.427	135	400
3-DH3	26.0 / 5.0 sec. x 31.6 sec. = 165 times	1.678	277	400
3-DH5	17.0 / 5.0 sec. x 31.6 sec. = 108 times	2.929	316	400

Sample Calculation

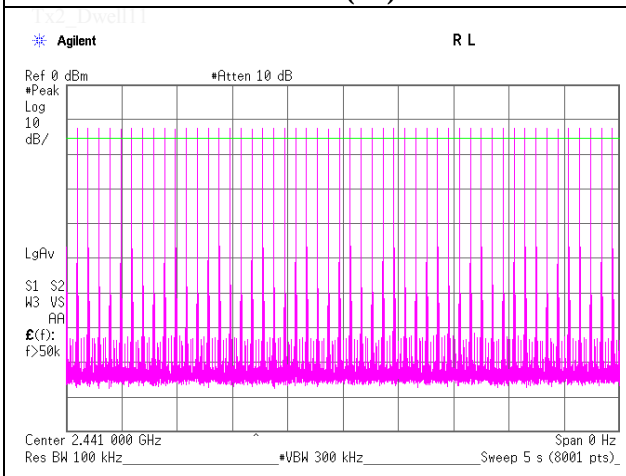
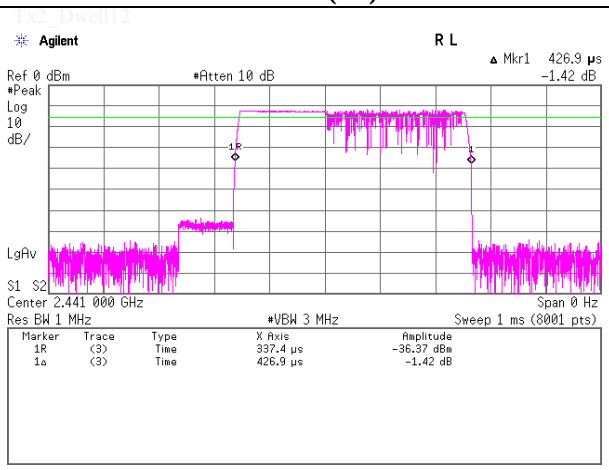
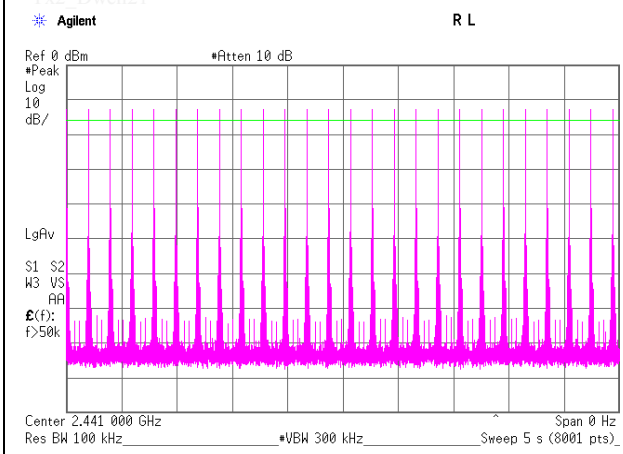
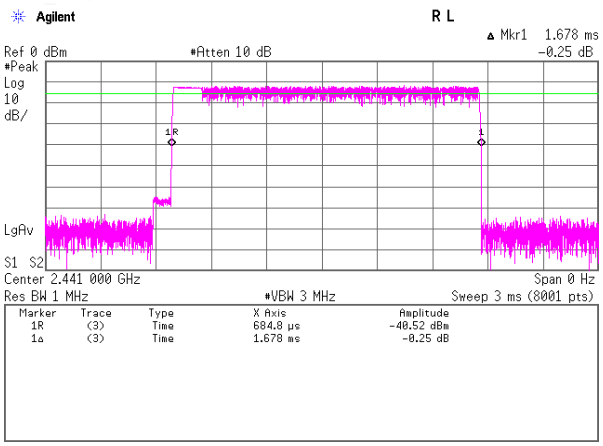
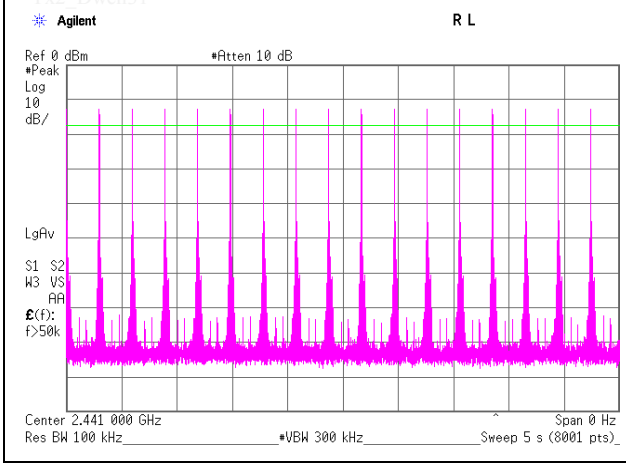
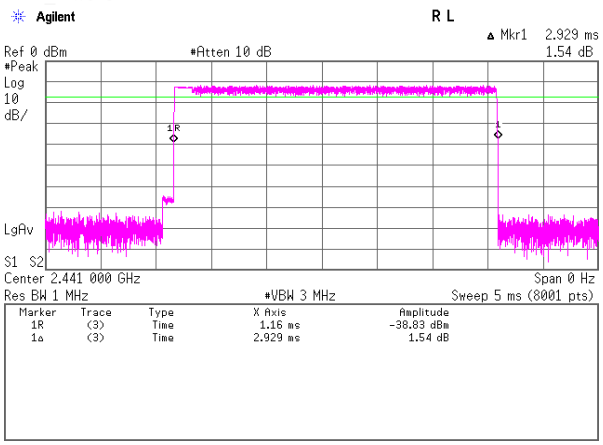
Result = Number of transmission x Length of transmition time

* This device complies with the Bluetooth protocol for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in N x 0.4s, where N is the number of channels being used in the hopping sequence ($20 \leq N \leq 79$), is always less than 0.4s regardless of packet size (3-DH1, 3-DH3 or 3-DH5). This is confirmed in the test report for N=79.

Tx2_DwellInquiry1 Tx2_DwellInquiry2

Dwell time

Tx, Bluetooth, EDR, PRBS9

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

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Maximum Peak Conducted Output Power (Conducted)

Test place	UL Japan, Inc. Shonan EMC Lab. No.6 Shielded Room
Date	August 30, 2013
Temperature / Humidity	24 deg.C , 45 %RH
Engineer	Hikaru Shirasawa
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	-11.38	1.95	9.62	0.19	1.04	20.97	125	20.78
DH5	2441.0	-11.49	1.96	9.63	0.10	1.02	20.97	125	20.87
DH5	2480.0	-12.07	1.98	9.63	-0.46	0.90	20.97	125	21.43
2-DH5	2402.0	-10.62	1.95	9.62	0.95	1.24	20.97	125	20.02
2-DH5	2441.0	-11.01	1.96	9.63	0.58	1.14	20.97	125	20.39
2-DH5	2480.0	-11.63	1.98	9.63	-0.02	1.00	20.97	125	20.99
3-DH5	2402.0	-10.61	1.95	9.62	0.96	1.25	20.97	125	20.01
3-DH5	2441.0	-10.93	1.96	9.63	0.66	1.16	20.97	125	20.31
3-DH5	2480.0	-11.61	1.98	9.63	0.00	1.00	20.97	125	20.97

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

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	
Date	September 10, 2013	September 14, 2013
Temperature / Humidity	24 deg.C, 61 %RH	24 deg.C, 58 %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.	263.996	QP	40.0	17.8	8.3	32.0	34.1	46.0	11.9	134	111	
Hori.	428.977	QP	41.4	16.6	9.2	31.9	35.3	46.0	10.7	100	100	
Hori.	461.988	QP	43.2	17.0	9.3	31.9	37.6	46.0	8.4	100	117	
Hori.	2390.000	PK	42.3	26.8	14.7	41.1	42.7	73.9	31.2	174	3	
Hori.	4804.000	PK	54.6	30.9	7.5	41.2	51.8	73.9	22.1	152	96	
Hori.	7206.000	PK	46.9	37.1	9.1	41.0	52.1	73.9	21.8	100	0	
Hori.	9608.000	PK	43.7	38.6	10.2	38.9	53.6	73.9	20.3	100	0	
Hori.	12010.000	PK	44.2	39.6	11.5	39.1	56.2	73.9	17.7	100	0	
Hori.	2390.000	AV	34.5	26.8	14.7	41.1	34.9	53.9	19.0	174	3	
Hori.	4804.000	AV	47.2	30.9	7.5	41.2	44.4	53.9	9.5	152	96	
Hori.	7206.000	AV	35.5	37.1	9.1	41.0	40.7	53.9	13.2	100	0	
Hori.	9608.000	AV	32.2	38.6	10.2	38.9	42.1	53.9	11.8	100	0	
Hori.	12010.000	AV	33.2	39.6	11.5	39.1	45.2	53.9	8.7	100	0	
Vert.	428.981	QP	43.4	16.6	9.2	31.9	37.3	46.0	8.7	133	177	
Vert.	461.988	QP	42.2	17.0	9.3	31.9	36.6	46.0	9.4	127	164	
Vert.	560.968	QP	35.8	18.3	9.7	32.0	31.8	46.0	14.2	100	177	
Vert.	2390.000	PK	44.8	26.8	14.7	41.1	45.2	73.9	28.7	151	22	
Vert.	4804.000	PK	57.3	30.9	7.5	41.2	54.5	73.9	19.4	110	127	
Vert.	7206.000	PK	44.2	37.1	9.1	41.0	49.4	73.9	24.5	100	0	
Vert.	9608.000	PK	43.3	38.6	10.2	38.9	53.2	73.9	20.7	100	0	
Vert.	12010.000	PK	45.4	39.6	11.5	39.1	57.4	73.9	16.5	100	0	
Vert.	2390.000	AV	34.2	26.8	14.7	41.1	34.6	53.9	19.3	151	22	
Vert.	4804.000	AV	52.4	30.9	7.5	41.2	49.6	53.9	**4.3**	110	127	
Vert.	7206.000	AV	33.2	37.1	9.1	41.0	38.4	53.9	15.5	100	0	
Vert.	9608.000	AV	31.8	38.6	10.2	38.9	41.7	53.9	12.2	100	0	
Vert.	12010.000	AV	33.2	39.6	11.5	39.1	45.2	53.9	8.7	100	0	

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

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	83.2	26.8	14.7	41.1	83.6	-	-	
Hori.	2399.492	PK	40.5	26.8	14.7	41.1	40.9	63.6	22.7	
Hori.	2400.000	PK	40.2	26.8	14.7	41.1	40.6	63.6	23.0	
Vert.	2402.000	PK	85.2	26.8	14.7	41.1	85.6	-	-	
Vert.	2399.492	PK	42.4	26.8	14.7	41.1	42.8	65.6	22.8	
Vert.	2400.000	PK	44.1	26.8	14.7	41.1	44.5	65.6	21.1	

Result = Reading + Ant.Fac. + Loss(Cable+Attenuator+Filter) - Gain(Amplifier)

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

Test place	No.3 Semi Anechoic Chamber	
Date	September 10, 2013	September 14, 2013
Temperature / Humidity	24 deg.C, 61 %RH	24 deg.C, 58 %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.	263.994	QP	40.2	17.8	8.3	32.0	34.3	46.0	11.7	135	113	
Hori.	428.987	QP	41.0	16.6	9.2	31.9	34.9	46.0	11.1	100	96	
Hori.	461.989	QP	42.8	17.0	9.3	31.9	37.2	46.0	8.8	100	120	
Hori.	4882.000	PK	53.4	31.4	7.5	41.1	51.2	73.9	22.7	101	118	
Hori.	7323.000	PK	46.2	37.2	9.0	41.1	51.3	73.9	22.6	100	0	
Hori.	9764.000	PK	43.4	38.8	10.1	38.8	53.5	73.9	20.4	100	0	
Hori.	12205.000	PK	44.2	39.6	11.4	39.1	56.1	73.9	17.8	100	0	
Hori.	4882.000	AV	49.6	31.4	7.5	41.1	47.4	53.9	**6.5**	101	118	
Hori.	7323.000	AV	35.6	37.2	9.0	41.1	40.7	53.9	13.2	100	0	
Hori.	9764.000	AV	32.4	38.8	10.1	38.8	42.5	53.9	11.4	100	0	
Hori.	12205.000	AV	32.2	39.6	11.4	39.1	44.1	53.9	9.8	100	0	
Vert.	428.987	QP	43.7	16.6	9.2	31.9	37.6	46.0	8.4	130	176	
Vert.	461.983	QP	41.9	17.0	9.3	31.9	36.3	46.0	9.7	128	165	
Vert.	560.996	QP	36.3	18.3	9.7	32.0	32.3	46.0	13.7	100	180	
Vert.	4882.000	PK	53.3	31.4	7.5	41.1	51.1	73.9	22.8	166	124	
Vert.	7323.000	PK	46.1	37.2	9.0	41.1	51.2	73.9	22.7	100	0	
Vert.	9764.000	PK	43.2	38.8	10.1	38.8	53.3	73.9	20.6	100	0	
Vert.	12205.000	PK	44.5	39.6	11.4	39.1	56.4	73.9	17.5	100	0	
Vert.	4882.000	AV	48.7	31.4	7.5	41.1	46.5	53.9	7.4	166	124	
Vert.	7323.000	AV	35.5	37.2	9.0	41.1	40.6	53.9	13.3	100	0	
Vert.	9764.000	AV	32.3	38.8	10.1	38.8	42.4	53.9	11.5	100	0	
Vert.	12205.000	AV	32.6	39.6	11.4	39.1	44.5	53.9	9.4	100	0	

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

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	
Date	September 10, 2013	September 14, 2013
Temperature / Humidity	24 deg.C, 61 %RH	24 deg.C, 58 %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.	263.998	QP	40.3	17.8	8.3	32.0	34.4	46.0	11.6	138	111	
Hori.	428.984	QP	40.9	16.6	9.2	31.9	34.8	46.0	11.2	100	99	
Hori.	461.988	QP	42.8	17.0	9.3	31.9	37.2	46.0	8.8	100	119	
Hori.	2483.500	PK	43.0	26.9	14.8	41.0	43.7	73.9	30.2	133	165	
Hori.	4960.000	PK	49.8	31.8	7.5	41.1	48.0	73.9	25.9	100	120	
Hori.	7440.000	PK	46.3	37.4	9.0	41.1	51.6	73.9	22.3	100	0	
Hori.	9920.000	PK	43.4	38.9	10.0	38.8	53.5	73.9	20.4	100	0	
Hori.	12400.000	PK	43.0	39.7	11.3	39.1	54.9	73.9	19.0	100	0	
Hori.	2483.500	AV	34.2	26.9	14.8	41.0	34.9	53.9	19.0	133	165	
Hori.	4960.000	AV	40.2	31.8	7.5	41.1	38.4	53.9	15.5	100	120	
Hori.	7440.000	AV	35.4	37.4	9.0	41.1	40.7	53.9	13.2	100	0	
Hori.	9920.000	AV	31.9	38.9	10.0	38.8	42.0	53.9	11.9	100	0	
Hori.	12400.000	AV	32.5	39.7	11.3	39.1	44.4	53.9	9.5	100	0	
Vert.	428.990	QP	44.3	16.6	9.2	31.9	38.2	46.0	**7.8**	128	173	
Vert.	461.986	QP	41.8	17.0	9.3	31.9	36.2	46.0	9.8	120	159	
Vert.	560.983	QP	36.0	18.3	9.7	32.0	32.0	46.0	14.0	100	182	
Vert.	2483.500	PK	43.4	26.9	14.8	41.0	44.1	73.9	29.8	100	23	
Vert.	4960.000	PK	46.9	31.8	7.5	41.1	45.1	73.9	28.8	100	31	
Vert.	7440.000	PK	46.7	37.4	9.0	41.1	52.0	73.9	21.9	100	0	
Vert.	9920.000	PK	43.7	38.9	10.0	38.8	53.8	73.9	20.1	100	0	
Vert.	12400.000	PK	43.5	39.7	11.3	39.1	55.4	73.9	18.5	100	0	
Vert.	2483.500	AV	34.5	26.9	14.8	41.0	35.2	53.9	18.7	100	23	
Vert.	4960.000	AV	37.3	31.8	7.5	41.1	35.5	53.9	18.4	100	31	
Vert.	7440.000	AV	35.3	37.4	9.0	41.1	40.6	53.9	13.3	100	0	
Vert.	9920.000	AV	31.8	38.9	10.0	38.8	41.9	53.9	12.0	100	0	
Vert.	12400.000	AV	32.3	39.7	11.3	39.1	44.2	53.9	9.7	100	0	

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

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	
Date	September 10, 2013	September 14, 2013
Temperature / Humidity	24 deg.C, 61 %RH	24 deg.C, 58 %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.	263.998	QP	40.2	17.8	8.3	32.0	34.3	46.0	11.7	134	109	
Hori.	428.990	QP	41.0	16.6	9.2	31.9	34.9	46.0	11.1	100	98	
Hori.	461.984	QP	42.6	17.0	9.3	31.9	37.0	46.0	9.0	100	119	
Hori.	2390.000	PK	42.1	26.8	14.7	41.1	42.5	73.9	31.4	101	38	
Hori.	4804.000	PK	48.9	30.9	7.5	41.2	46.1	73.9	27.8	112	68	
Hori.	7206.000	PK	47.6	37.1	9.1	41.0	52.8	73.9	21.1	100	0	
Hori.	9608.000	PK	43.4	38.6	10.2	38.9	53.3	73.9	20.6	100	0	
Hori.	12010.000	PK	43.6	39.6	11.5	39.1	55.6	73.9	18.3	100	0	
Hori.	2390.000	AV	34.7	26.8	14.7	41.1	35.1	53.9	18.8	101	38	
Hori.	4804.000	AV	39.4	30.9	7.5	41.2	36.6	53.9	17.3	112	68	
Hori.	7206.000	AV	35.4	37.1	9.1	41.0	40.6	53.9	13.3	100	0	
Hori.	9608.000	AV	31.8	38.6	10.2	38.9	41.7	53.9	12.2	100	0	
Hori.	12010.000	AV	33.5	39.6	11.5	39.1	45.5	53.9	8.4	100	0	
Vert.	428.978	QP	43.5	16.6	9.2	31.9	37.4	46.0	8.6	128	175	
Vert.	461.990	QP	41.9	17.0	9.3	31.9	36.3	46.0	9.7	124	165	
Vert.	560.970	QP	35.8	18.3	9.7	32.0	31.8	46.0	14.2	100	181	
Vert.	2390.000	PK	44.2	26.8	14.7	41.1	44.6	73.9	29.3	130	26	
Vert.	4804.000	PK	50.8	30.9	7.5	41.2	48.0	73.9	25.9	101	25	
Vert.	7206.000	PK	44.4	37.1	9.1	41.0	49.6	73.9	24.3	100	0	
Vert.	9608.000	PK	43.6	38.6	10.2	38.9	53.5	73.9	20.4	100	0	
Vert.	12010.000	PK	45.7	39.6	11.5	39.1	57.7	73.9	16.2	100	0	
Vert.	2390.000	AV	34.5	26.8	14.7	41.1	34.9	53.9	19.0	130	26	
Vert.	4804.000	AV	41.4	30.9	7.5	41.2	38.6	53.9	15.3	101	25	
Vert.	7206.000	AV	33.7	37.1	9.1	41.0	38.9	53.9	15.0	100	0	
Vert.	9608.000	AV	31.8	38.6	10.2	38.9	41.7	53.9	12.2	100	0	
Vert.	12010.000	AV	33.7	39.6	11.5	39.1	45.7	53.9	**8.2**	100	0	

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

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

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	79.8	26.8	14.7	41.1	80.2	-	-	
Hori.	2399.615	PK	34.9	26.8	14.7	41.1	35.3	60.2	24.9	
Hori.	2400.000	PK	37.6	26.8	14.7	41.1	38.0	60.2	22.2	
Vert.	2402.000	PK	84.7	26.8	14.7	41.1	85.1	-	-	
Vert.	2399.615	PK	39.7	26.8	14.7	41.1	40.1	65.1	25.0	
Vert.	2400.000	PK	40.5	26.8	14.7	41.1	40.9	65.1	24.2	

Result = Reading + Ant.Fac. + Loss(Cable+Attenuator+Filter) - Gain(Amplifier)

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	
Date	September 10, 2013	September 14, 2013
Temperature / Humidity	24 deg.C, 61 %RH	24 deg.C, 58 %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.	263.998	QP	40.2	17.8	8.3	32.0	34.3	46.0	11.7	135	113	
Hori.	428.982	QP	40.7	16.6	9.2	31.9	34.6	46.0	11.4	100	97	
Hori.	461.984	QP	42.8	17.0	9.3	31.9	37.2	46.0	8.8	100	119	
Hori.	4882.000	PK	47.1	31.4	7.5	41.1	44.9	73.9	29.0	127	103	
Hori.	7323.000	PK	46.5	37.2	9.0	41.1	51.6	73.9	22.3	100	0	
Hori.	9764.000	PK	43.7	38.8	10.1	38.8	53.8	73.9	20.1	100	0	
Hori.	12205.000	PK	44.8	39.6	11.4	39.1	56.7	73.9	17.2	100	0	
Hori.	4882.000	AV	36.8	31.4	7.5	41.1	34.6	53.9	19.3	127	103	
Hori.	7323.000	AV	35.4	37.2	9.0	41.1	40.5	53.9	13.4	100	0	
Hori.	9764.000	AV	32.5	38.8	10.1	38.8	42.6	53.9	11.3	100	0	
Hori.	12205.000	AV	32.3	39.6	11.4	39.1	44.2	53.9	9.7	100	0	
Vert.	428.980	QP	43.6	16.6	9.2	31.9	37.5	46.0	**8.5**	135	170	
Vert.	461.988	QP	42.0	17.0	9.3	31.9	36.4	46.0	9.6	123	167	
Vert.	560.974	QP	36.0	18.3	9.7	32.0	32.0	46.0	14.0	100	182	
Vert.	4882.000	PK	48.3	31.4	7.5	41.1	46.1	73.9	27.8	157	127	
Vert.	7323.000	PK	46.4	37.2	9.0	41.1	51.5	73.9	22.4	100	0	
Vert.	9764.000	PK	43.0	38.8	10.1	38.8	53.1	73.9	20.8	100	0	
Vert.	12205.000	PK	44.3	39.6	11.4	39.1	56.2	73.9	17.7	100	0	
Vert.	4882.000	AV	37.6	31.4	7.5	41.1	35.4	53.9	18.5	157	127	
Vert.	7323.000	AV	35.4	37.2	9.0	41.1	40.5	53.9	13.4	100	0	
Vert.	9764.000	AV	32.2	38.8	10.1	38.8	42.3	53.9	11.6	100	0	
Vert.	12205.000	AV	32.3	39.6	11.4	39.1	44.2	53.9	9.7	100	0	

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

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Radiated Emission

Test place	No.3 Semi Anechoic Chamber	
Date	September 10, 2013	September 14, 2013
Temperature / Humidity	24 deg.C, 61 %RH	24 deg.C, 58 %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.	263.999	QP	40.2	17.8	8.3	32.0	34.3	46.0	11.7	137	114	
Hori.	428.974	QP	41.1	16.6	9.2	31.9	35.0	46.0	11.0	100	97	
Hori.	461.990	QP	42.6	17.0	9.3	31.9	37.0	46.0	9.0	100	119	
Hori.	2483.500	PK	43.0	26.9	14.8	41.0	43.7	73.9	30.2	133	165	
Hori.	4960.000	PK	46.3	31.8	7.5	41.1	44.5	73.9	29.4	100	110	
Hori.	7440.000	PK	46.8	37.4	9.0	41.1	52.1	73.9	21.8	100	0	
Hori.	9920.000	PK	43.3	38.9	10.0	38.8	53.4	73.9	20.5	100	0	
Hori.	12400.000	PK	43.8	39.7	11.3	39.1	55.7	73.9	18.2	100	0	
Hori.	2483.500	AV	34.2	26.9	14.8	41.0	34.9	53.9	19.0	133	165	
Hori.	4960.000	AV	36.5	31.8	7.5	41.1	34.7	53.9	19.2	100	110	
Hori.	7440.000	AV	3.8	37.4	9.0	41.1	9.1	53.9	44.8	100	0	
Hori.	9920.000	AV	32.0	38.9	10.0	38.8	42.1	53.9	11.8	100	0	
Hori.	12400.000	AV	32.2	39.7	11.3	39.1	44.1	53.9	9.8	100	0	
Vert.	428.982	QP	44.1	16.6	9.2	31.9	38.0	46.0	**8.0**	123	172	
Vert.	461.988	QP	41.5	17.0	9.3	31.9	35.9	46.0	10.1	123	159	
Vert.	560.976	QP	36.1	18.3	9.7	32.0	32.1	46.0	13.9	100	181	
Vert.	2483.500	PK	42.2	26.9	14.8	41.0	42.9	73.9	31.0	100	28	
Vert.	4960.000	PK	44.9	31.8	7.5	41.1	43.1	73.9	30.8	100	28	
Vert.	7440.000	PK	46.5	37.4	9.0	41.1	51.8	73.9	22.1	100	0	
Vert.	9920.000	PK	43.2	38.9	10.0	38.8	53.3	73.9	20.6	100	0	
Vert.	12400.000	PK	43.8	39.7	11.3	39.1	55.7	73.9	18.2	100	0	
Vert.	2483.500	AV	34.8	26.9	14.8	41.0	35.5	53.9	18.4	100	28	
Vert.	4960.000	AV	36.4	31.8	7.5	41.1	34.6	53.9	19.3	100	28	
Vert.	7440.000	AV	35.1	37.4	9.0	41.1	40.4	53.9	13.5	100	0	
Vert.	9920.000	AV	32.5	38.9	10.0	38.8	42.6	53.9	11.3	100	0	
Vert.	12400.000	AV	32.7	39.7	11.3	39.1	44.6	53.9	9.3	100	0	

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

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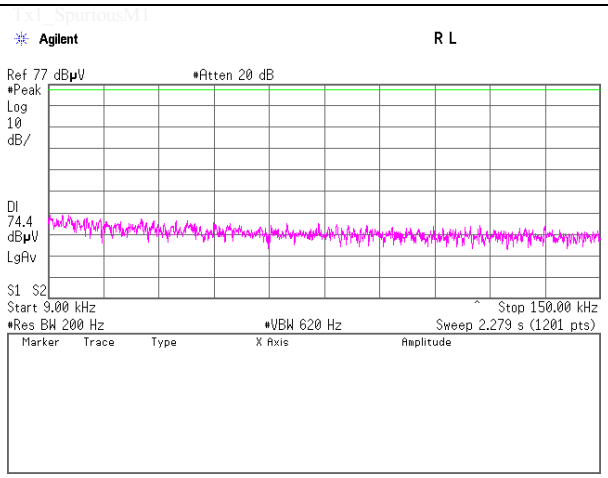
Spurious emission (Conducted)

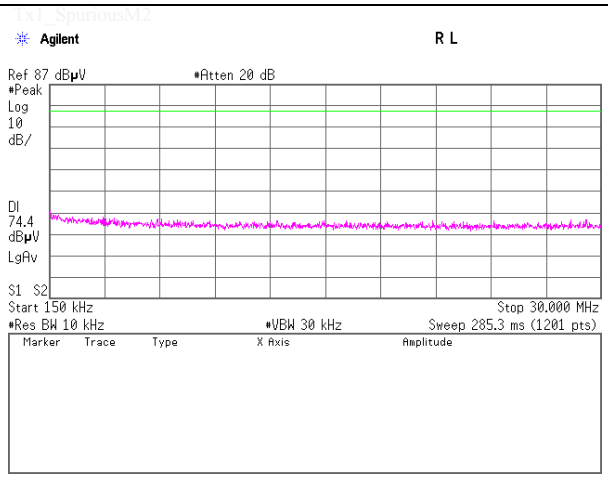
Tx, Bluetooth, BDR, PRBS9

Tx, 2402MHz (below 1GHz)

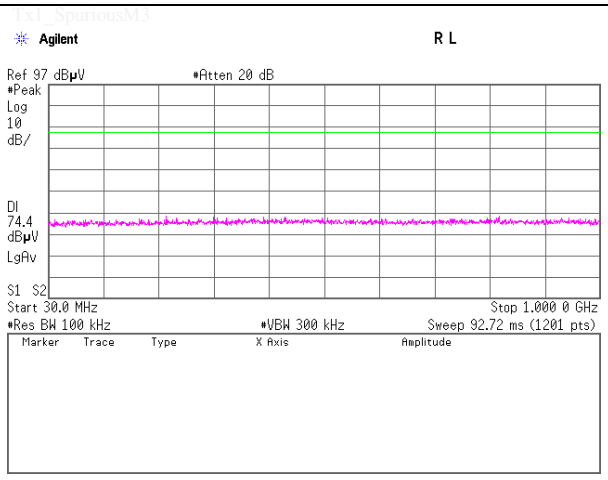
9kHz - 150kHz



150kHz - 30MHz



30MHz - 1GHz



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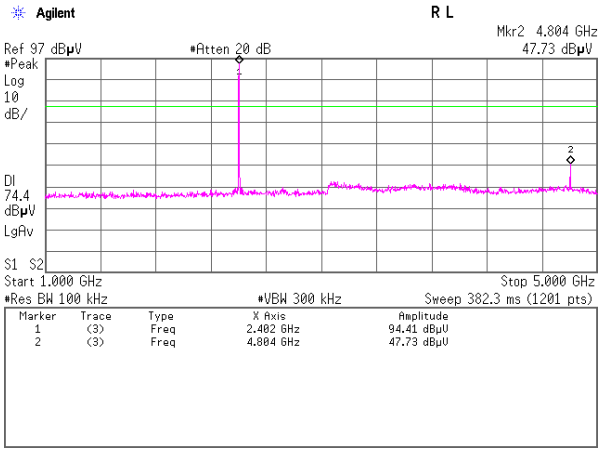
Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2402MHz (above 1GHz)

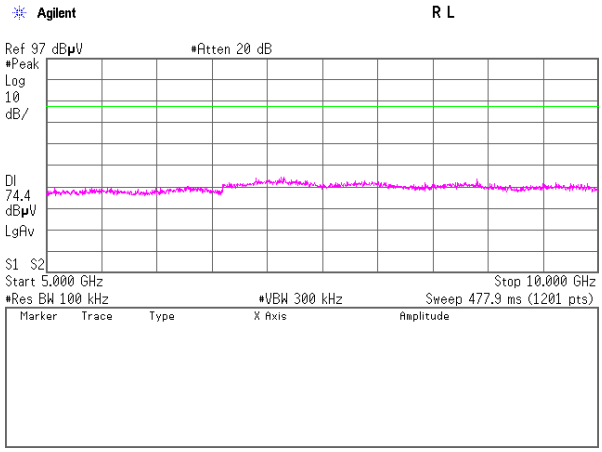
1GHz - 5GHz

Tx1_SpuriousG1



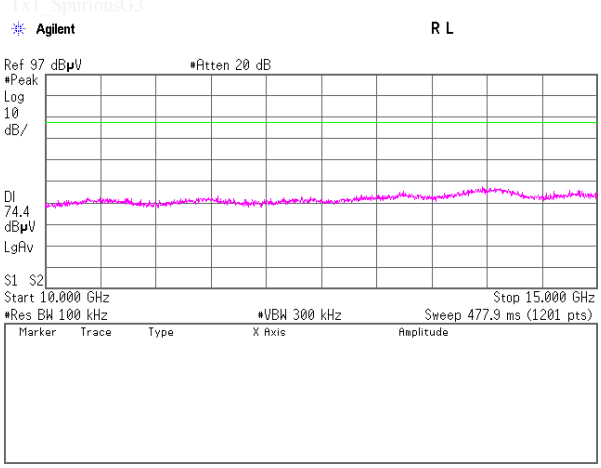
5GHz - 10GHz

Tx1_SpuriousG2



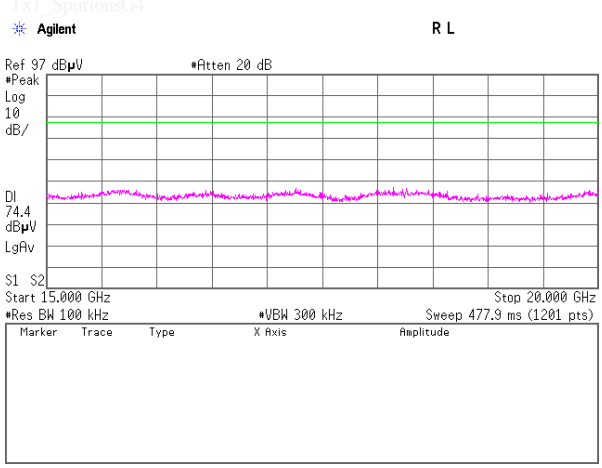
10GHz - 15GHz

Tx1_SpuriousG3



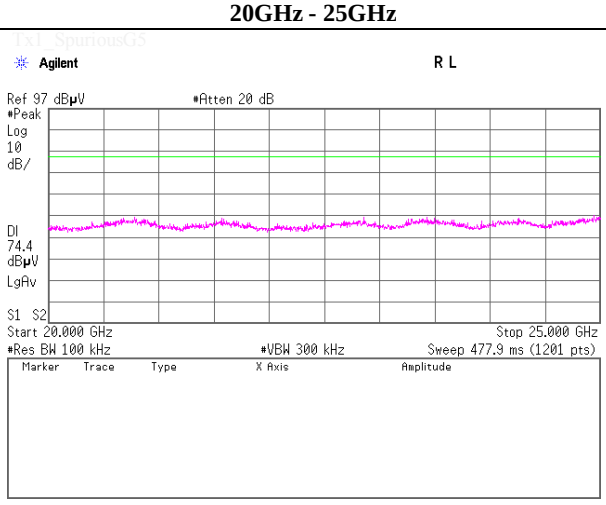
15GHz - 20GHz

Tx1_SpuriousG4



20GHz - 25GHz

Tx1_SpuriousG5



Tx1_SpuriousG6

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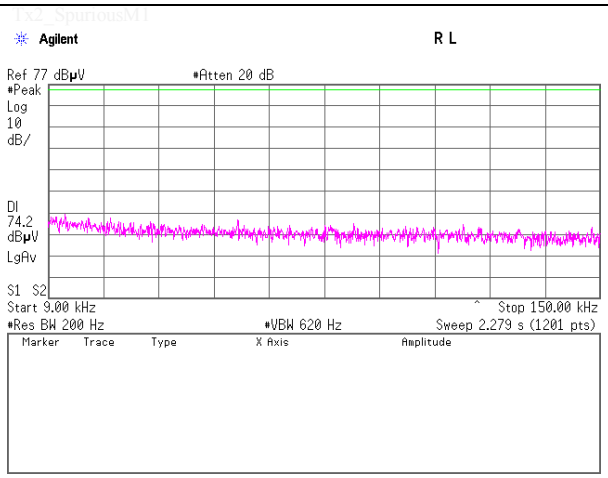
Spurious emission (Conducted)

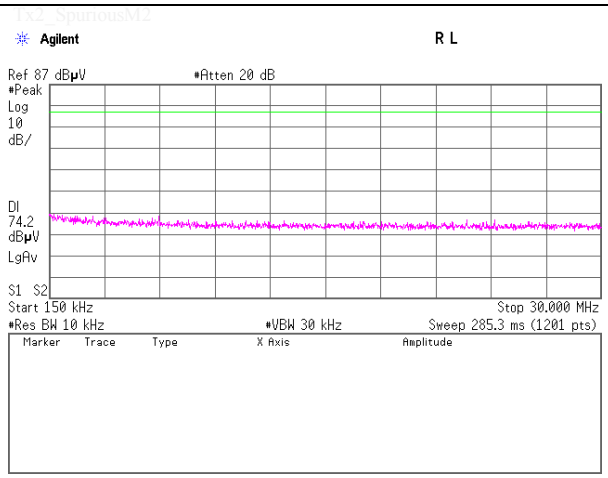
Tx, Bluetooth, BDR, PRBS9

Tx, 2441MHz (below 1GHz)

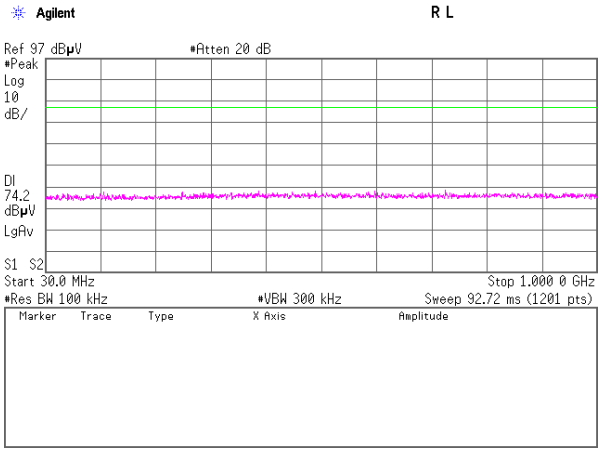
9kHz - 150kHz



150kHz - 30MHz



30MHz - 1GHz



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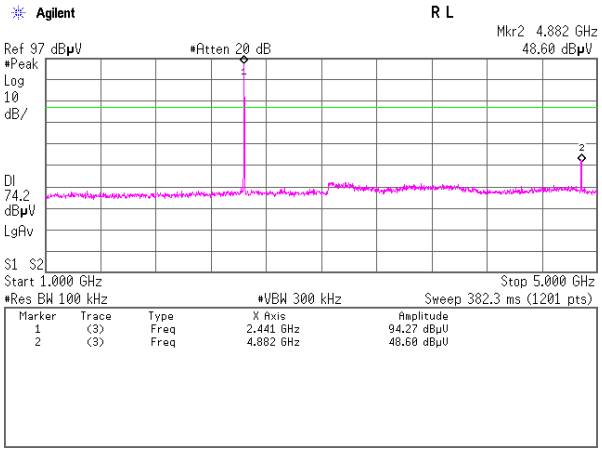
Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2441MHz (above 1GHz)

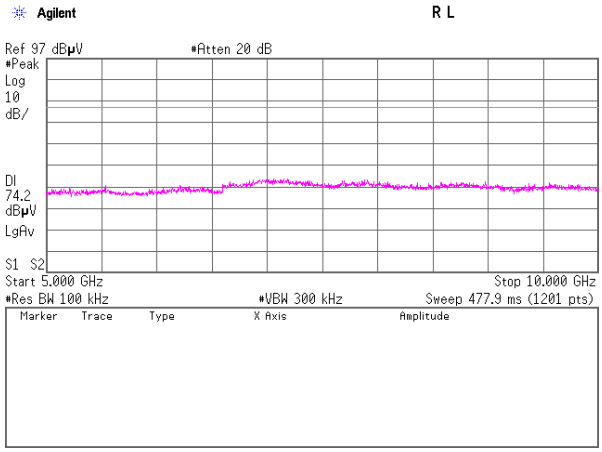
1GHz - 5GHz

Tx2_SpuriousG1



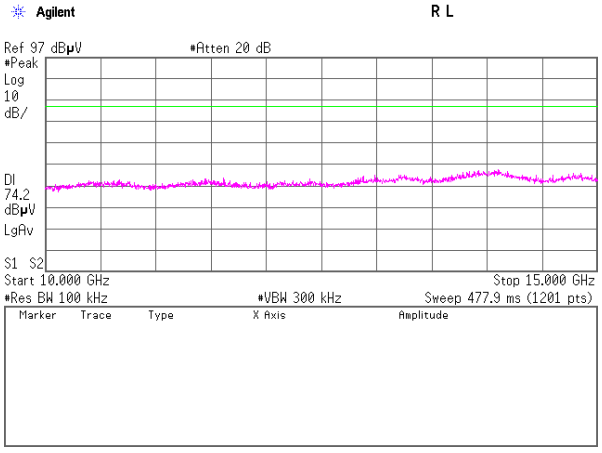
5GHz - 10GHz

Tx2_SpuriousG2



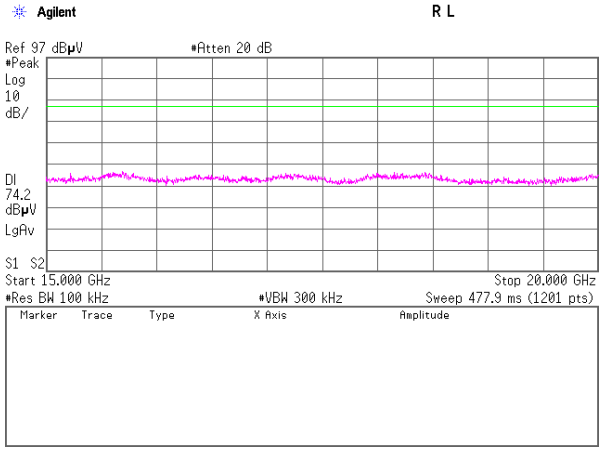
10GHz - 15GHz

Tx2_SpuriousG3



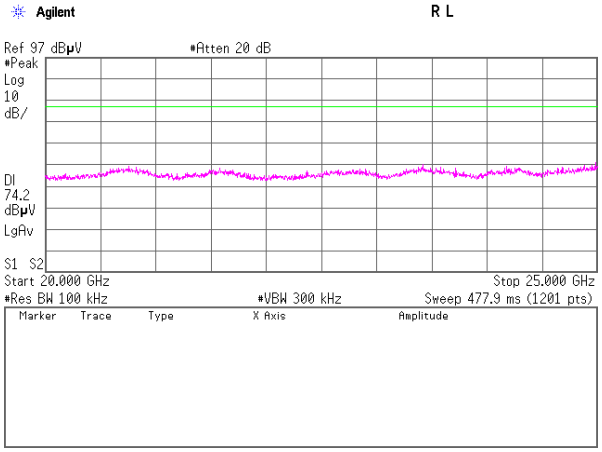
15GHz - 20GHz

Tx2_SpuriousG4



20GHz - 25GHz

Tx2_SpuriousG5



Tx2_SpuriousG6

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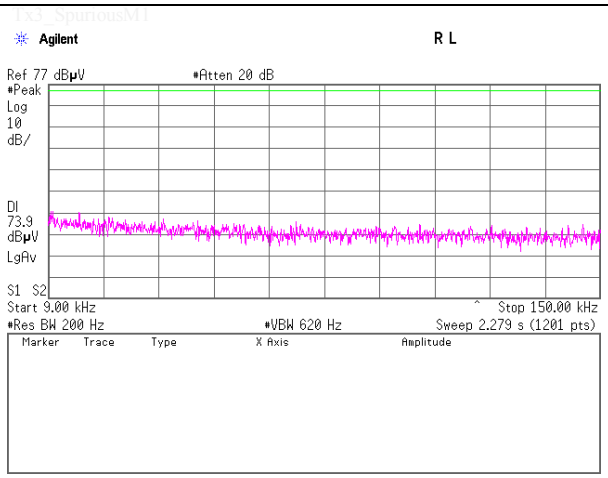
Spurious emission (Conducted)

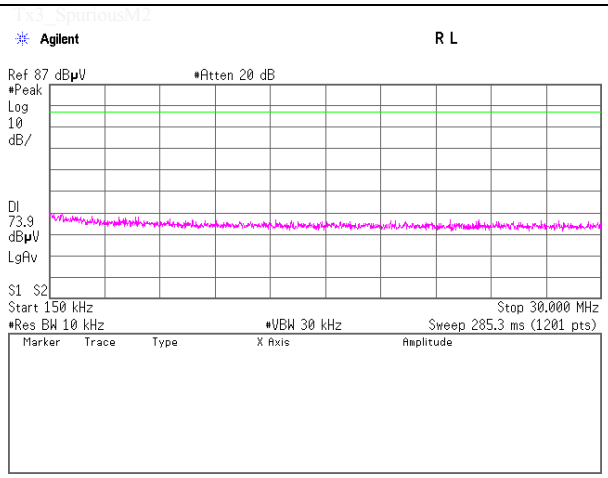
Tx, Bluetooth, BDR, PRBS9

Tx, 2480MHz (below 1GHz)

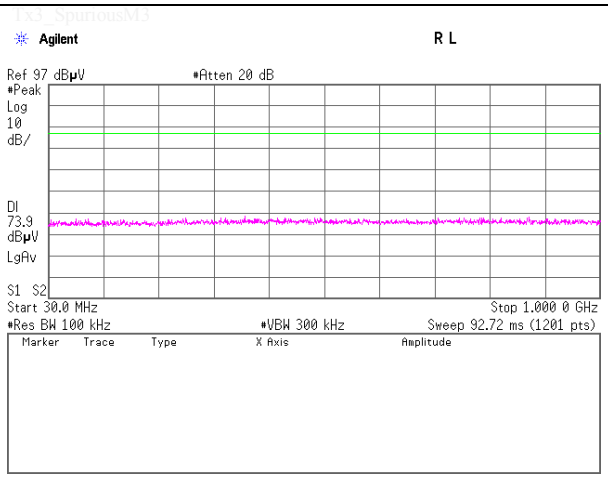
9kHz - 150kHz



150kHz - 30MHz



30MHz - 1GHz



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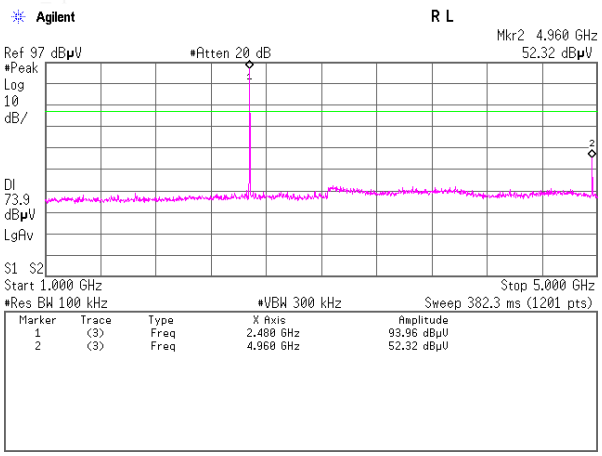
Spurious emission (Conducted)

Tx, Bluetooth, BDR, PRBS9

Tx, 2480MHz (above 1GHz)

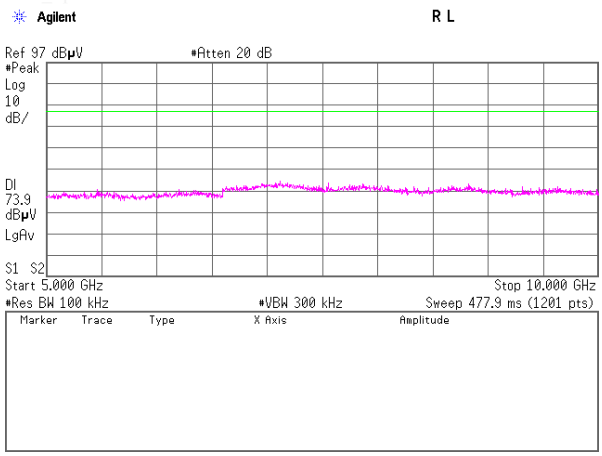
1GHz - 5GHz

Tx3_SpuriousG1



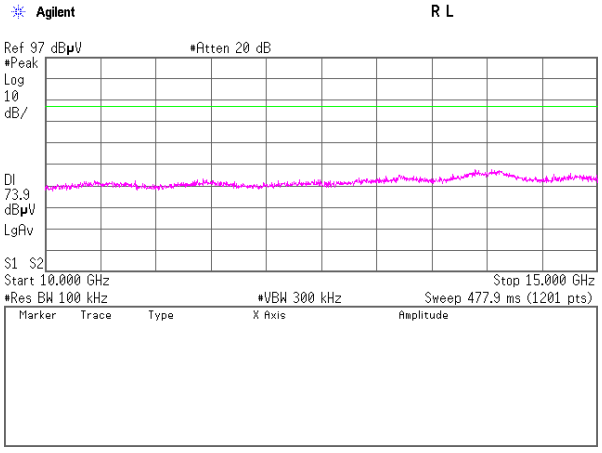
5GHz - 10GHz

Tx3_SpuriousG2



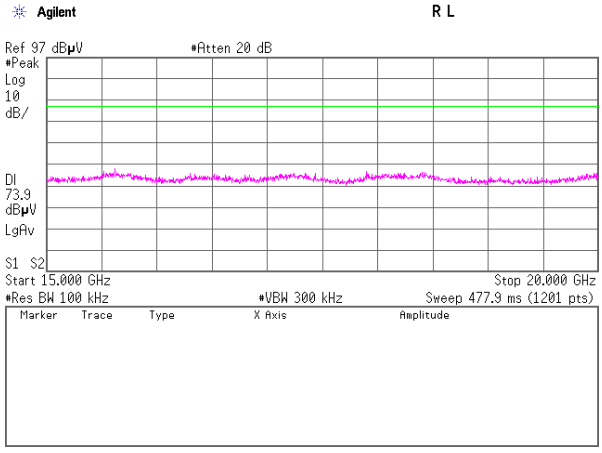
10GHz - 15GHz

Tx3_SpuriousG3



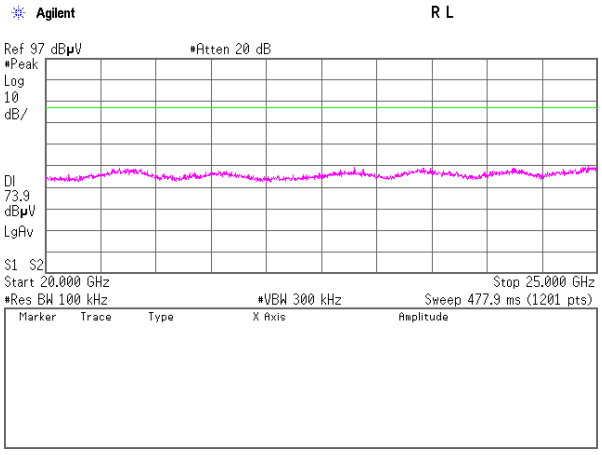
15GHz - 20GHz

Tx3_SpuriousG4



20GHz - 25GHz

Tx3_SpuriousG5



Tx3_SpuriousG6

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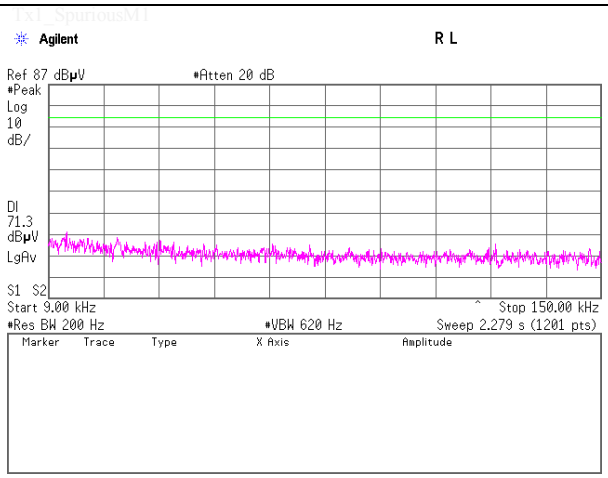
Spurious emission (Conducted)

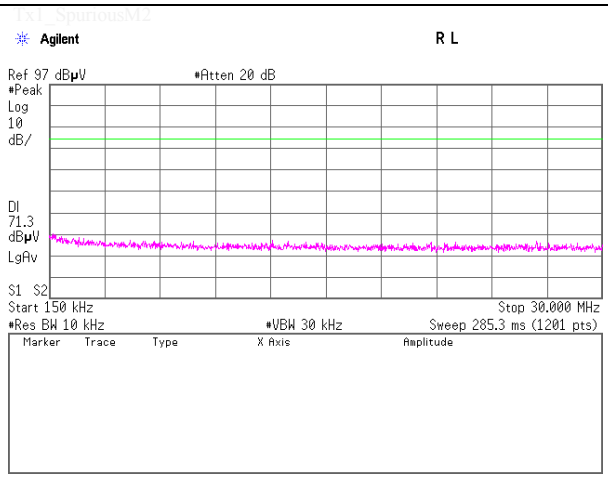
Tx, Bluetooth, EDR, PRBS9

Tx, 2402MHz (below 1GHz)

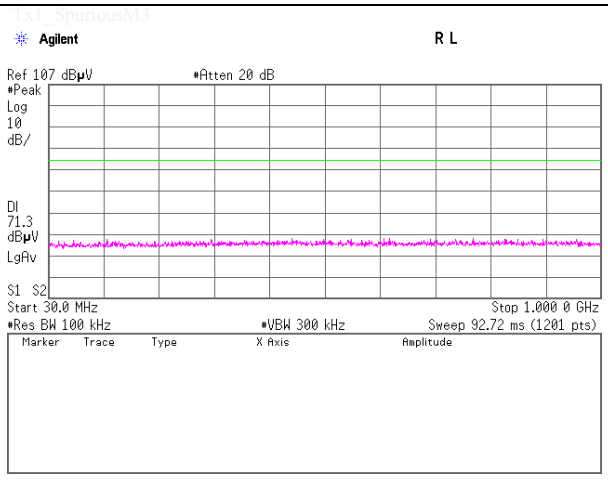
9kHz - 150kHz



150kHz - 30MHz



30MHz - 1GHz



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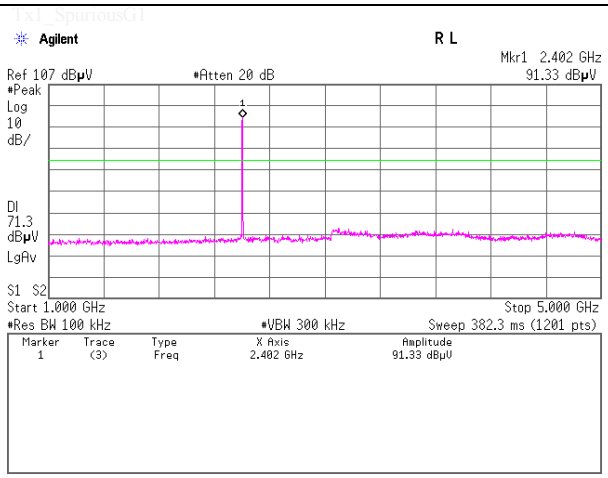
Spurious emission (Conducted)

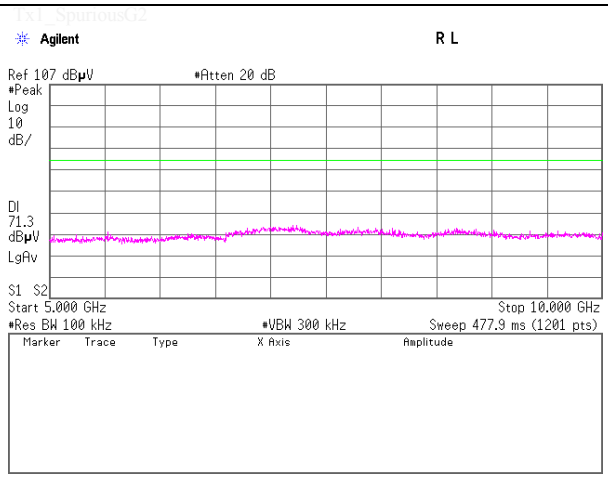
Tx, Bluetooth, EDR, PRBS9

Tx, 2402MHz (above 1GHz)

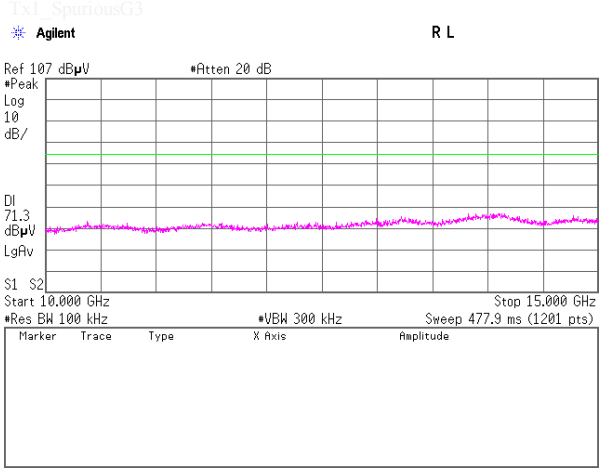
1GHz - 5GHz



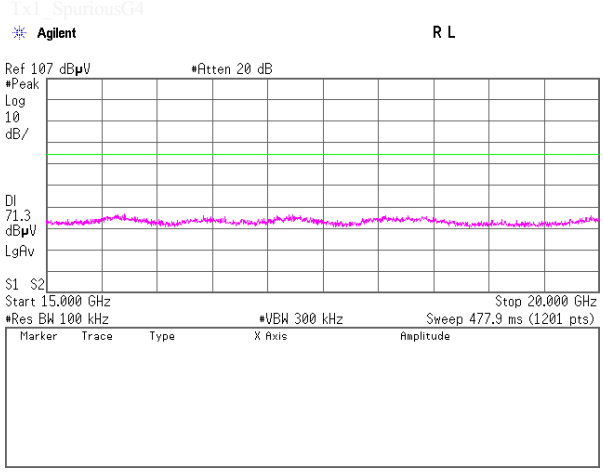
5GHz - 10GHz



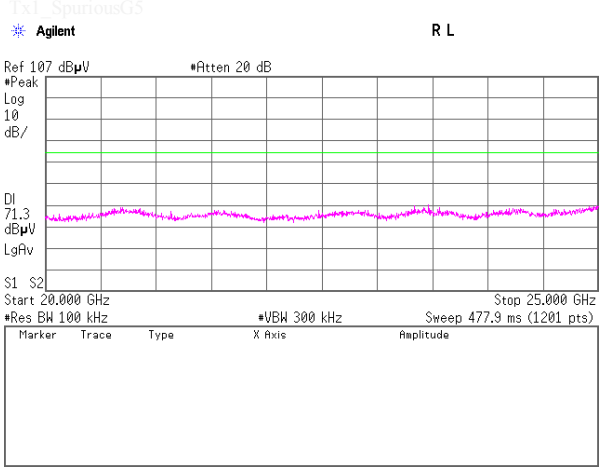
10GHz - 15GHz



15GHz - 20GHz



20GHz - 25GHz



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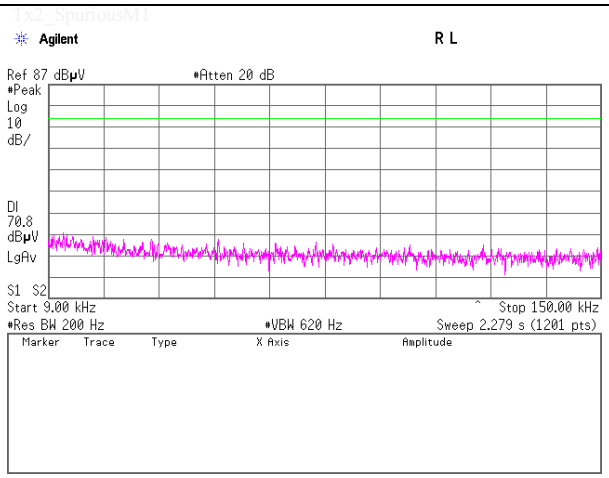
Spurious emission (Conducted)

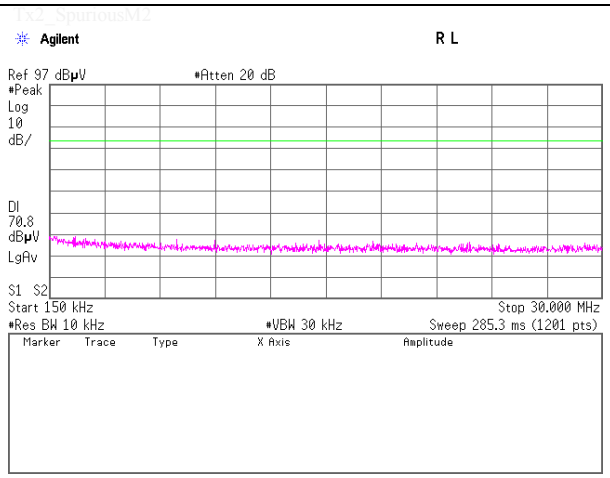
Tx, Bluetooth, EDR, PRBS9

Tx, 2441MHz (below 1GHz)

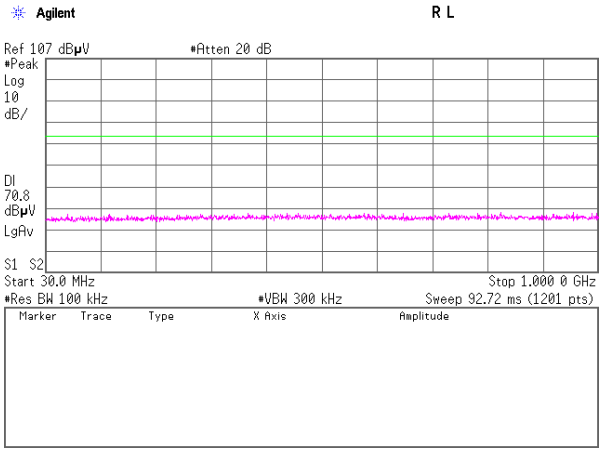
9kHz - 150kHz



150kHz - 30MHz



30MHz - 1GHz



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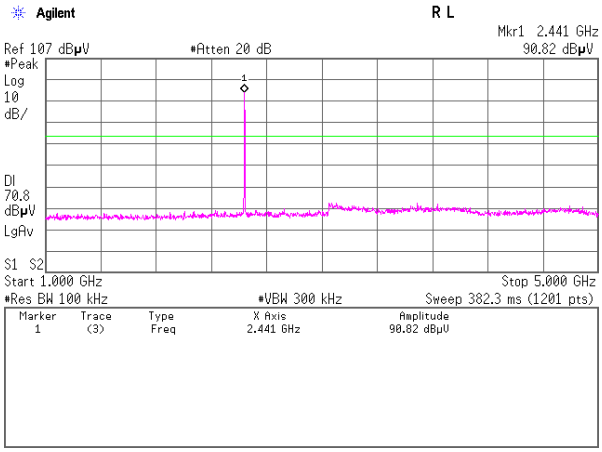
Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2441MHz (above 1GHz)

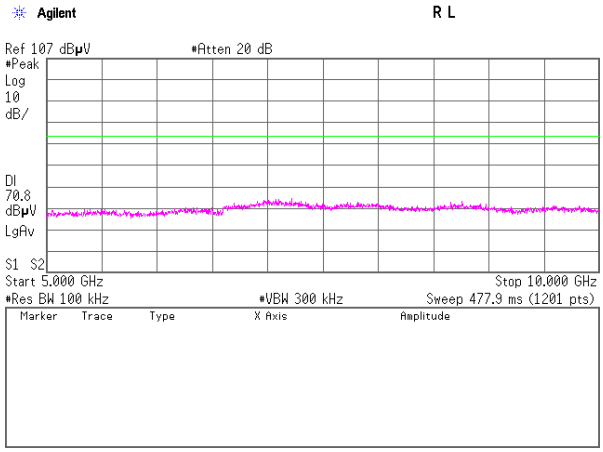
1GHz - 5GHz

Tx2_SpuriousG1



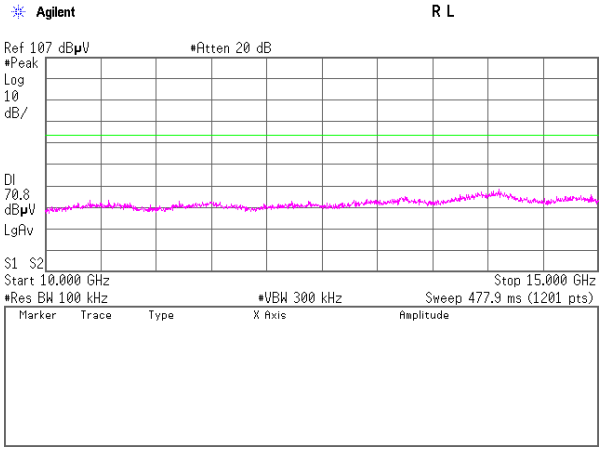
5GHz - 10GHz

Tx2_SpuriousG2



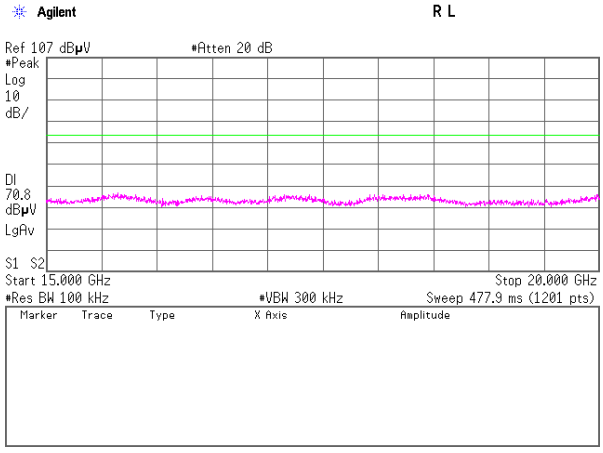
10GHz - 15GHz

Tx2_SpuriousG3



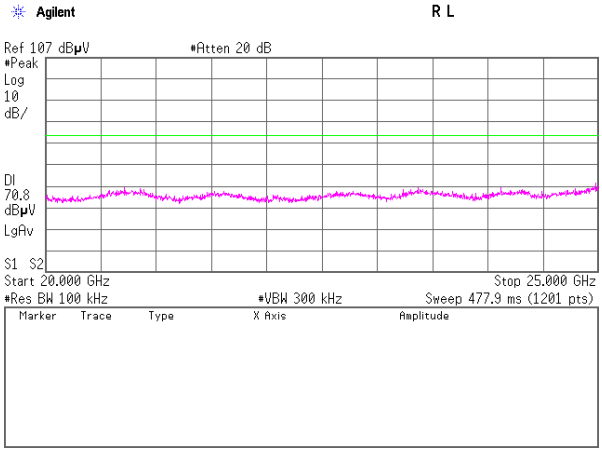
15GHz - 20GHz

Tx2_SpuriousG4



20GHz - 25GHz

Tx2_SpuriousG5



Tx2_SpuriousG6

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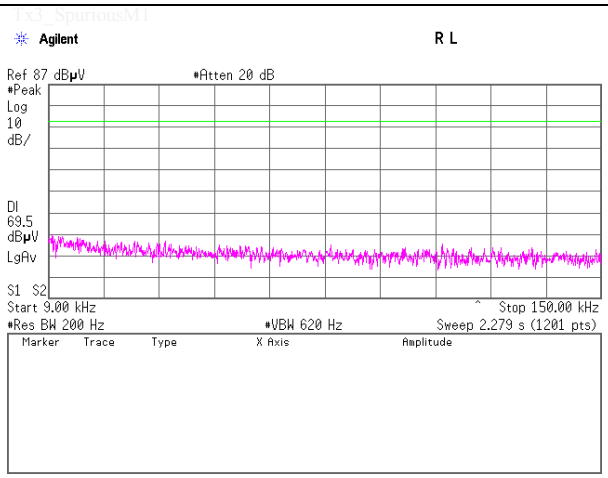
Spurious emission (Conducted)

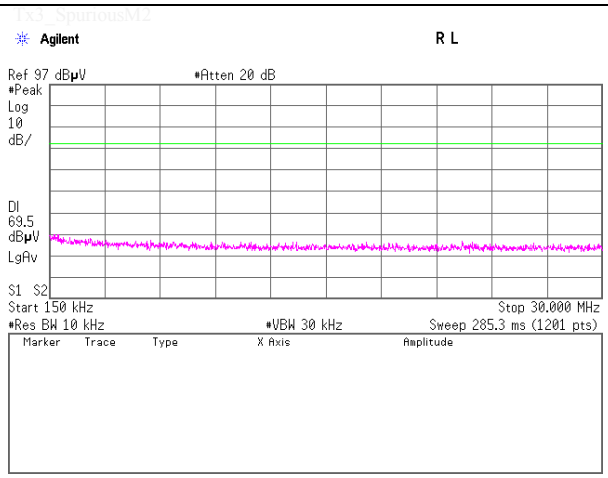
Tx, Bluetooth, EDR, PRBS9

Tx, 2480MHz (below 1GHz)

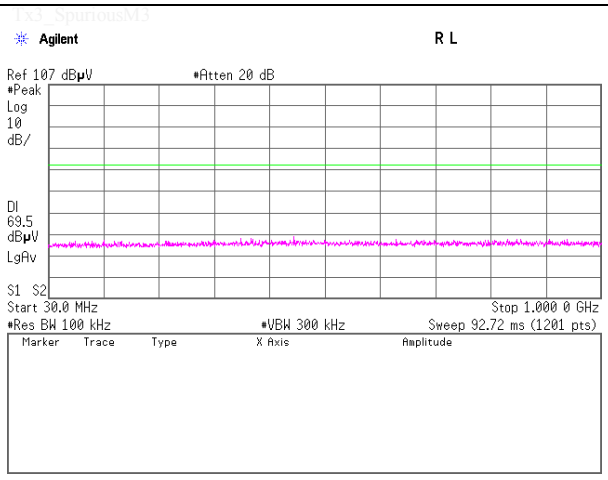
9kHz - 150kHz



150kHz - 30MHz



30MHz - 1GHz



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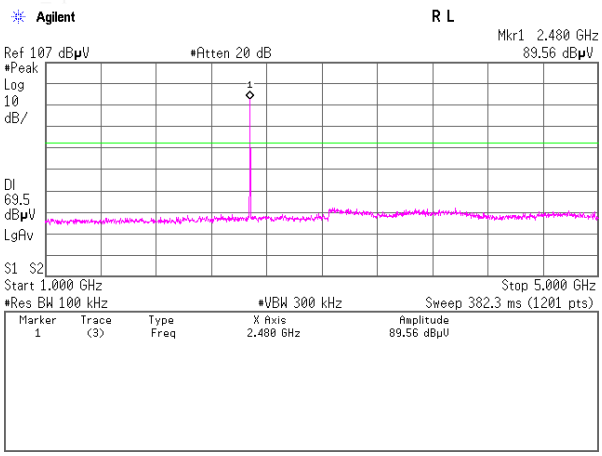
Spurious emission (Conducted)

Tx, Bluetooth, EDR, PRBS9

Tx, 2480MHz (above 1GHz)

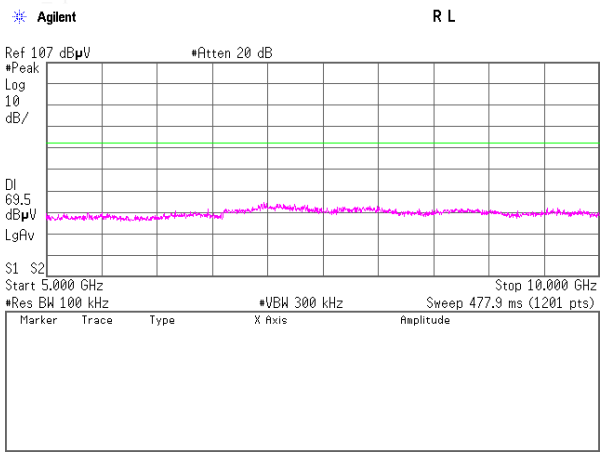
1GHz - 5GHz

Tx3_SpuriousG1



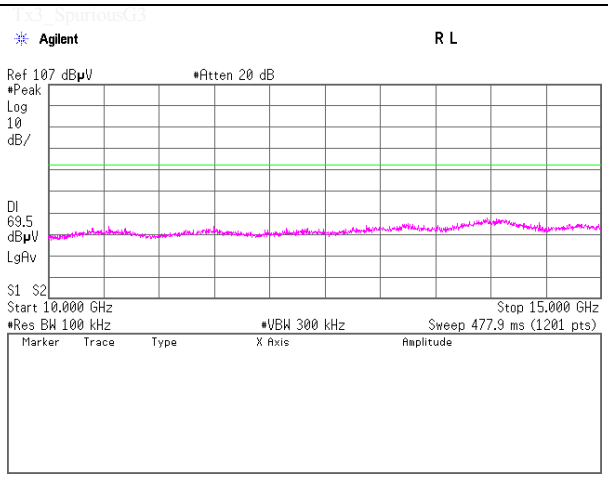
5GHz - 10GHz

Tx3_SpuriousG2



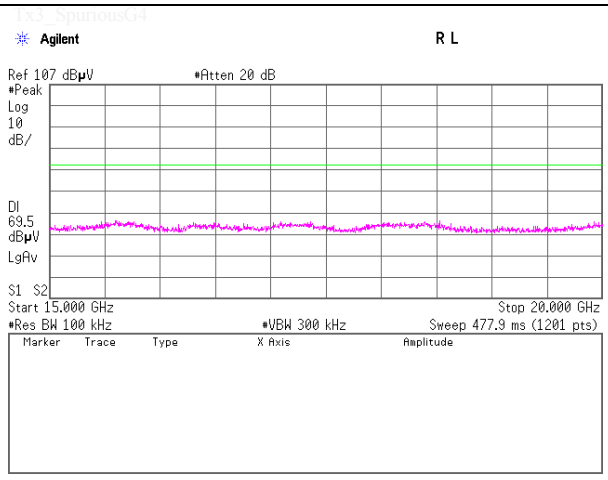
10GHz - 15GHz

Tx3_SpuriousG3



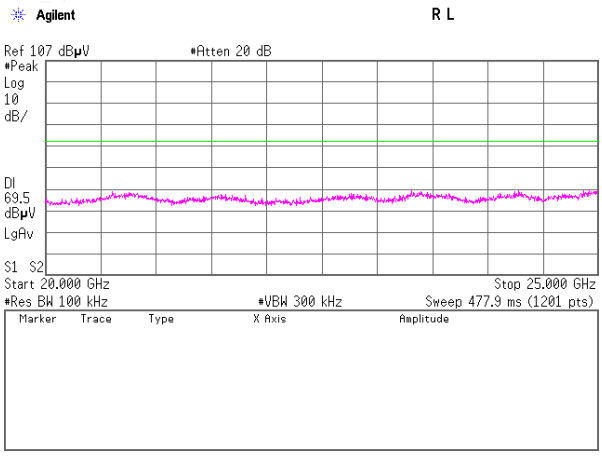
15GHz - 20GHz

Tx3_SpuriousG4



20GHz - 25GHz

Tx3_SpuriousG5



Tx3_SpuriousG6

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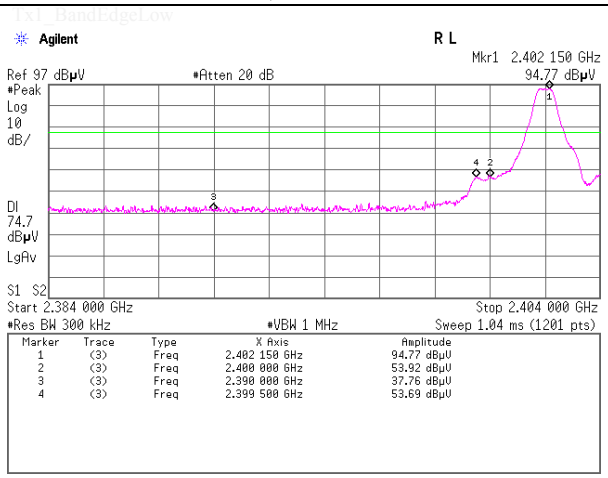
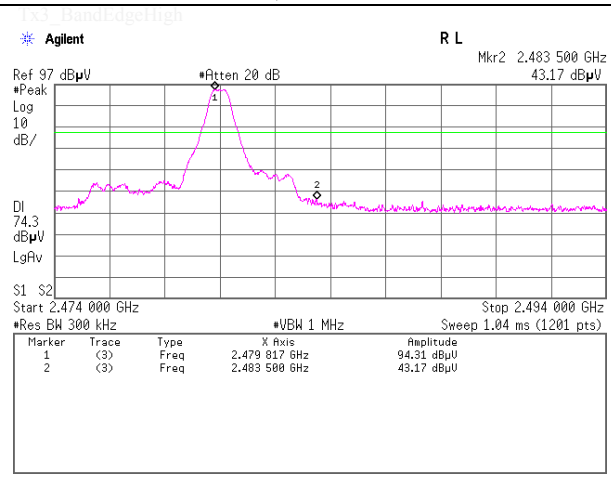
Spurious emission (Conducted)

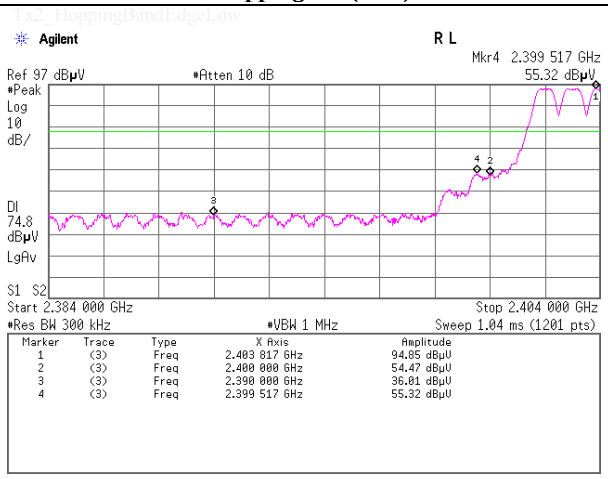
Band Edge compliance

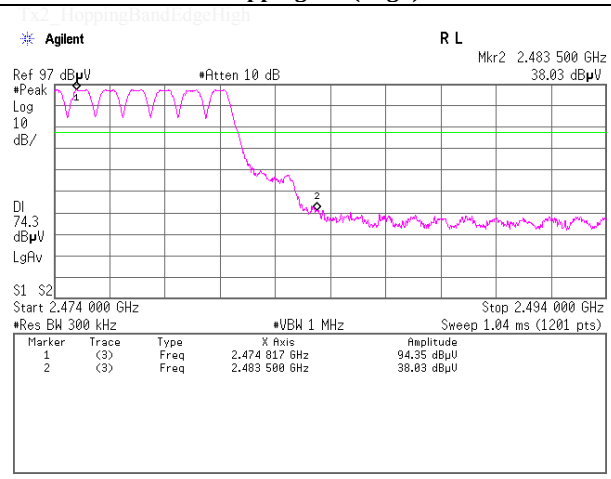
Tx, Bluetooth, BDR, PRBS9	
Tx, 2402MHz	**Tx, 2480MHz**





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





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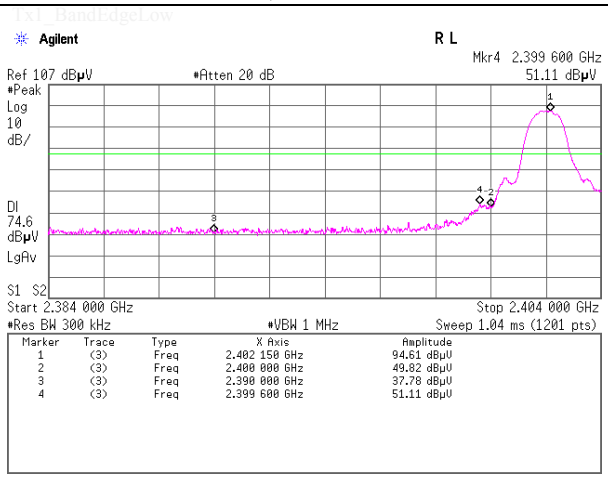
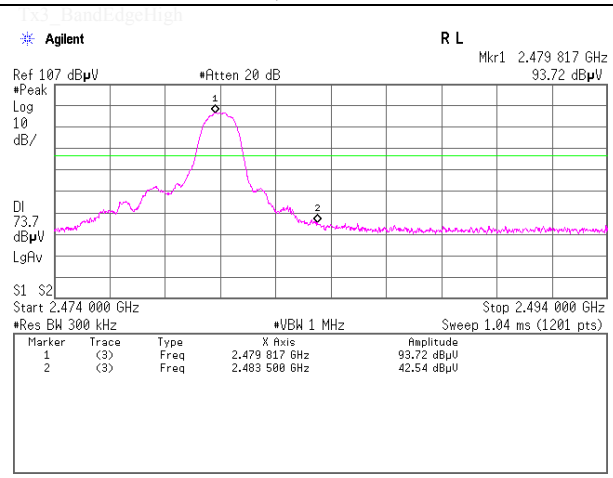
Spurious emission (Conducted)

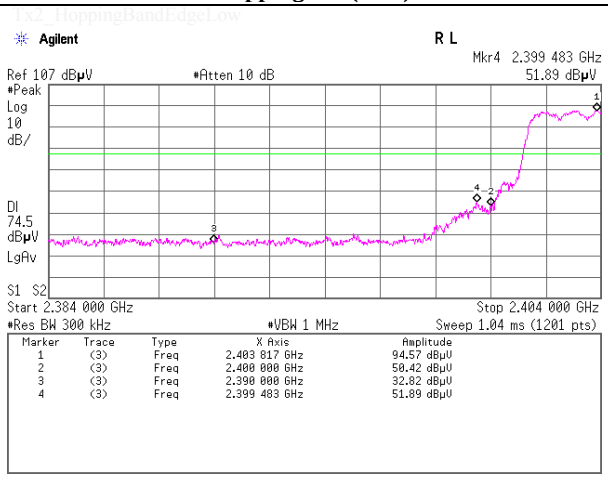
Band Edge compliance

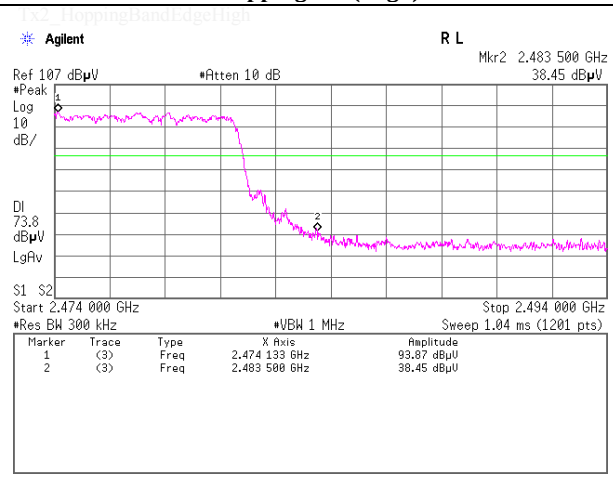
Tx, Bluetooth, EDR, PRBS9	
Tx, 2402MHz	**Tx, 2480MHz**





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





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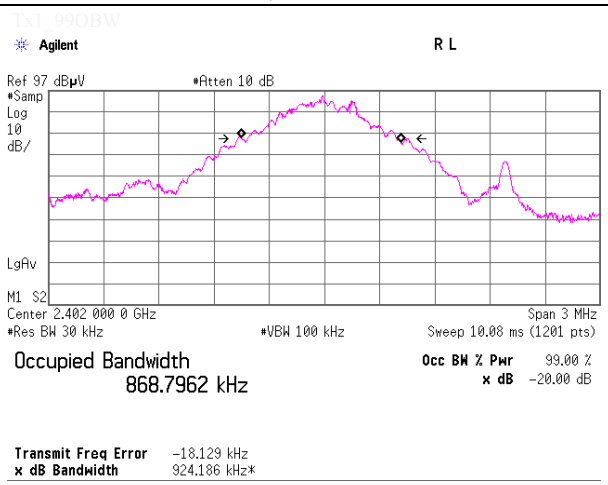
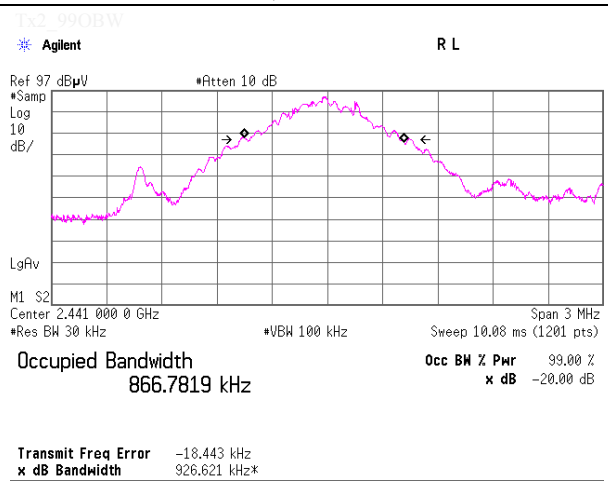
99% Occupied Bandwidth

Tx, Bluetooth, BDR, PRBS9

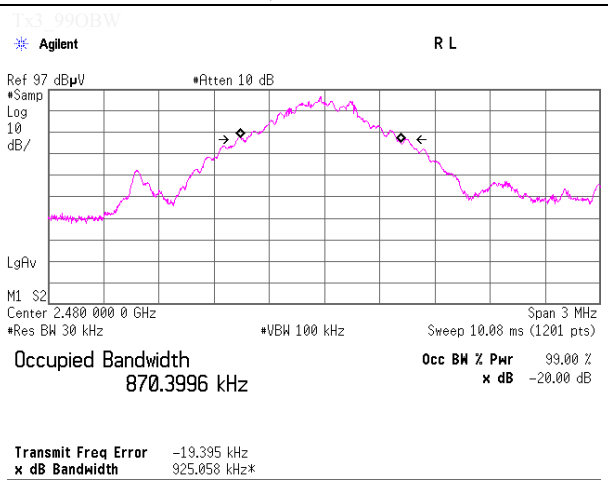
Tx, 2402MHz



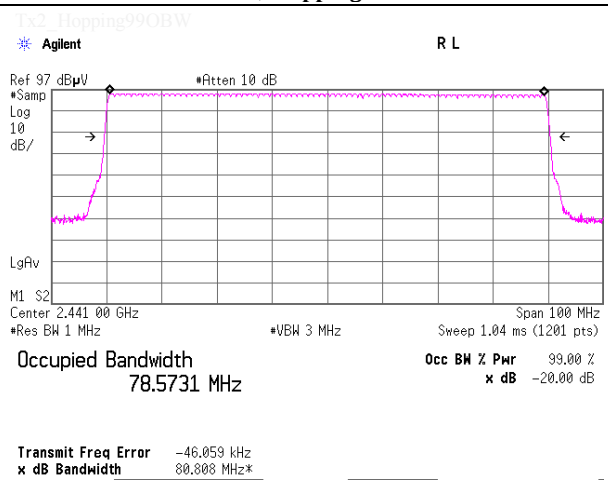
Tx, 2441MHz



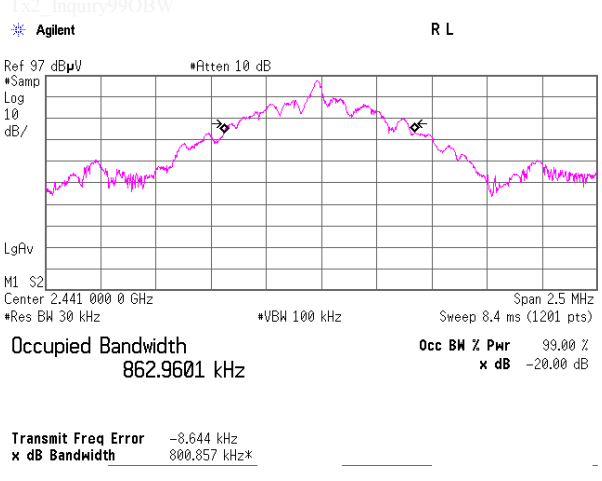
Tx, 2480MHz



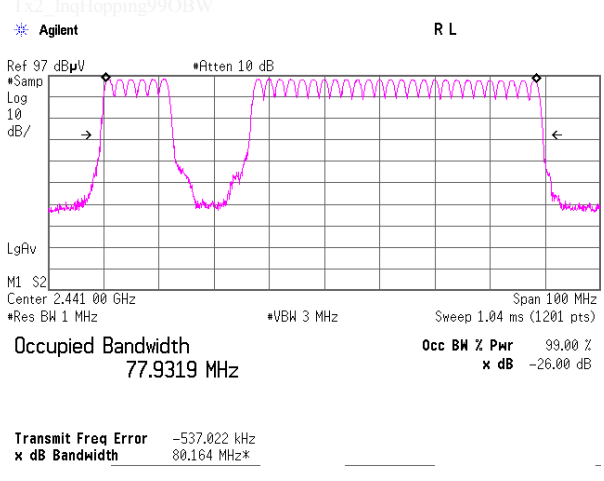
Tx, Hopping On



(Reference) Tx, Inquiry



(Reference) Tx, Inquiry, Hopping



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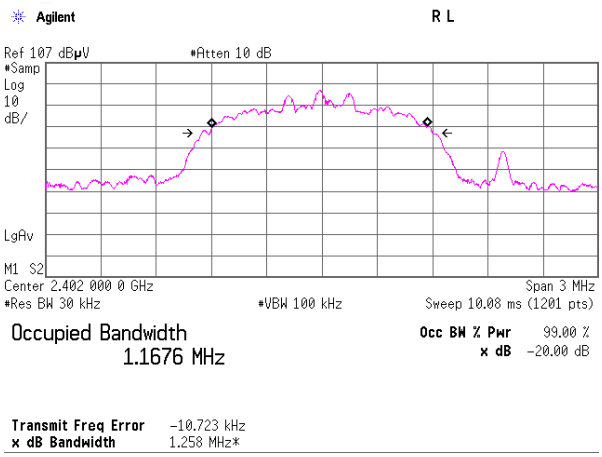
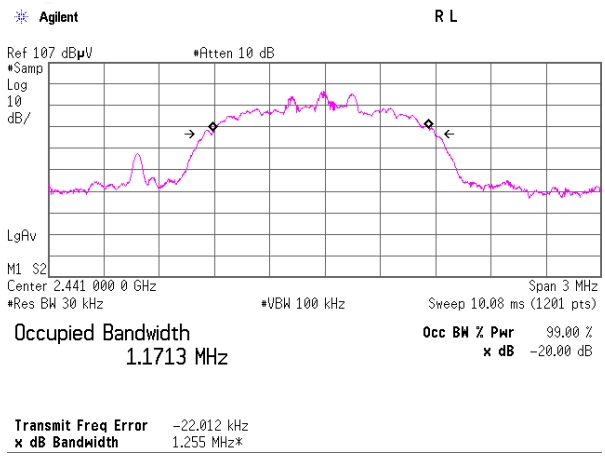
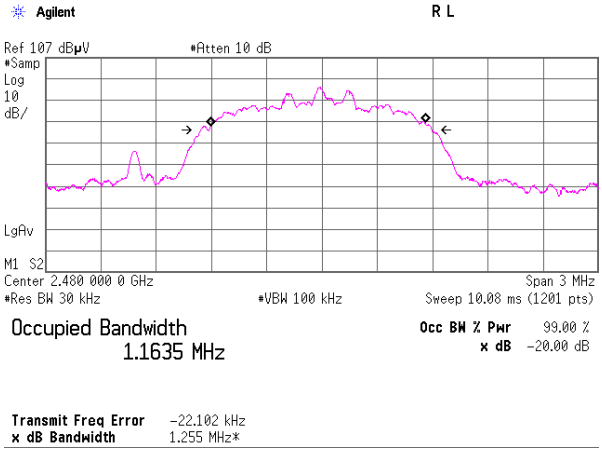
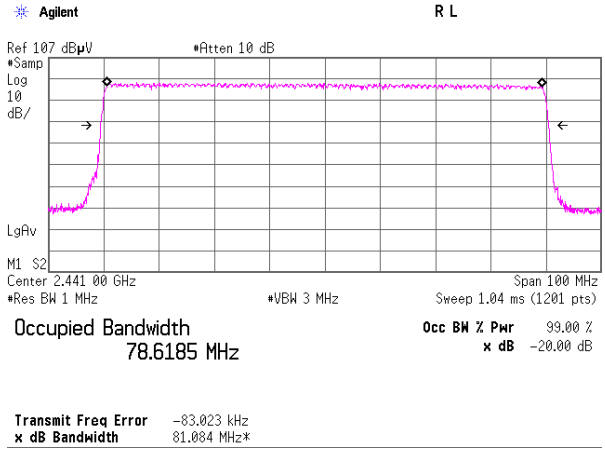
99% Occupied Bandwidth

Tx, Bluetooth, EDR, PRBS9	
Tx, 2402MHz	**Tx, 2441MHz**
	
Tx, 2480MHz	**Tx, Hopping On**
	

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APPENDIX 2
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2013/07/09 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2013/07/22 * 12
SCC-G03	Coaxial Cable	Suhner	SUCOFLEX 104A	46499/4A	RE	2013/04/11 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2013/05/22 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2013/08/19 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2013/02/27 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	2013/03/28 * 12
SJM-11	Measure	PROMART	SEN1935	-	RE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE, RFI,MF)	-	RE	-
SAT10-06	Attenuator	Agilent	8493C-010	74865	RE	2012/12/18 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2012/12/18 * 12
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	AT	2013/01/08 * 12
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2013/04/09 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2013/04/09 * 12
SAT10-09	Attenuator	Weinschel Corp.	54A-10	W5692	AT	2012/11/15 * 12
SCC-G30	Coaxial Cable	Junkosha	MWX241-02000KM SKMS	SEP-20-12-004	AT	2012/09/26 * 12
SOS-10	Humidity Indicator	A&D	AD-5681	4064561	AT	2013/02/27 * 12
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	RE	2013/03/04 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2013/03/14 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2013/03/19 * 12
SCC-G15	Coaxial Cable	Suhner	SUCOFLEX 102	32703/2	RE	2013/03/16 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2013/02/12 * 12
SAT6-06	Attenuator	JFW	50HF-006N	-	RE	2013/02/12 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2012/10/08 * 12
SCC-C1/C2/C3/C4/C5/C10/SRSE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-271(RF Selector)	RE	2013/04/03 * 12
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0901	RE	2012/10/08 * 12
STR-06	Test Receiver	Rohde & Schwarz	ESCI	101259	RE	2013/02/27 * 12

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

All equipment is calibrated with valid calibrations . Each measurement data is traceable to the national or international standards .
Test Item :
RE: Radiated emission ,
AT: Antenna terminal conducted test