RADIO TEST REPORT

Test Report No. : 31HE0196-HO-B-R1

Applicant	**:**	**NEC CASIO Mobile Communications, Ltd.**
Type of Equipment	**:**	**Digital Portable Cellular Telephone**
Model No.	**:**	**KMP7N4Y1-1A**
FCC ID	**:**	**A98-PUL1905**
Test regulation	**:**	**FCC Part 15 Subpart C: 2010**
Test Result	**:**	**Complied**

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
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.
7. This FCC ID: A98-PUL1905 is electrically identical to the previously certified FCC ID: A98-TBP4266.
8. This report is a revised version of 31HE0196-HO-B. 31HE0196-HO-B is replaced with this report.

Date of test: December 24, 2010 to January 31, 2011

Representative test engineer:

Akio Hayashi
Engineer of WiSE Japan,
UL Verification Service

Approved by :

Go Ishiwata
Assistant Manager 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

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SECTION 1: Customer information

Company Name	:	NEC CASIO Mobile Communications, Ltd.
Address	:	1753 Shimonumabe, Nakahara-ku, Kawasaki, Kanagawa 211-8666 Japan
Telephone Number	:	+81-44-455-8045
Facsimile Number	:	+81-44-455-8025
Contact Person	:	Kazuhiro Kurihara

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

2.1 Identification of E.U.T.

Type of Equipment	:	Digital Portable Cellular Telephone
Model No.	:	KMP7N4Y1-1A
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 3.8V
Receipt Date of Sample	:	December 23, 2010
Country of Mass-production	:	Japan
Condition of EUT	:	Production prototype
Modification of EUT	:	No Modification by the test lab

2.2 Product description

Model No: KMP7N4Y1-1A, (referred to as the EUT in this report), is the Digital Portable Cellular Telephone.

Radio Specification

Bluetooth module of the product (FCC ID: A98-PUL1905):

Bluetooth (Ver.2.1 + EDR)

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Other Clock Frequency	19.2MHz
Type of Modulation	FHSS
Bandwidth & Channel spacing	1MHz & 1MHz
Antenna Connector Type	Integrated antenna

. The hopping sequence is pseudorandom
. All channels are used equally on average
. The receiver input bandwidth equals the transmit bandwidth
. The receiver hops in sequence with the transmit signal

In accordance with the Bluetooth Industry Standard, the system is designed to comply with all of the regulation in Section 15.247 when the transmitter is presented with a continuous data (or information) system.

In accordance with the Bluetooth Industry Standard, the system does not coordinate it channels selection/hopping sequence with other frequency hopping systems for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters.

Other radio Specification

WLAN (IEEE802.11b/g/n (SISO/HT20))

Equipment Type	Transceiver
Frequency of Operation	2412-2462MHz
Other Clock Frequency	19.2MHz
Type of Modulation	DSSS, OFDM
Antenna Connector Type	Integrated antenna

GSM

Equipment Type	Transceiver
Frequency of Operation	[Up Link] GSM850: 824 – 849MHz PCS: 1850 – 1910MHz [Down Link] GSM850: 869 – 894MHz PCS: 1930 – 1990MHz
Other Clock Frequency	19.2MHz
Type of Modulation	GMSK
Channel spacing	200kHz
Antenna Connector Type	Integrated antenna

W-CDMA

Equipment Type	Transceiver
Frequency of Operation	[Up Link] Band V: 824 – 849MHz [Down Link] Band V: 869 – 894MHz
Other Clock Frequency	19.2MHz
Type of Modulation	HPSK
Channel spacing	5MHz
Antenna Connector Type	Integrated antenna

GPS

Equipment Type	Receiver
Receiver Type	Direct Downconversion
Frequency of Operation	1575.42MHz
Other Clock Frequency	19.2MHz
Antenna Connector Type	Integrated antenna

RFID

Equipment Type	Transceiver
Frequency of Operation	13.56MHz
Type of Modulation	ASK
Antenna Connector Type	Integrated antenna

*This test report applies for Bluetooth.

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part 15 Subpart C: 2010, final revised on December 6, 2010 and effective January 5, 2011
Title	:	FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators Section 15.207 Conducted limits Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz

*The revision on December 6, 2010 does not affect the test specification applied to the EUT.

3.2 Procedures and results

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
Conducted Emission	**FCC:** ANSI C63.4:2003 7. AC powerline conducted emission measurements	**FCC:** Section 15.207	**[QP]** 21.7dB, 0.16911MHz, N, Bluetooth Tx, 3DH5, 2441MHz **[AV]** 26.0dB, 0.16911MHz, N, Bluetooth Tx, 3DH5, 2441MHz	Complied	-
Carrier Frequency Separation	**FCC:** FCC Public Notice DA 00-705	**FCC:** Section15.247(a)(1)	See data.	Complied	Conducted
20dB Bandwidth	**FCC:** FCC Public Notice DA 00-705	**FCC:** Section15.247(a)(1)		Complied	Conducted
Number of Hopping Frequency	**FCC:** FCC Public Notice DA 00-705	**FCC:** Section15.247(a)(1)(iii)		Complied	Conducted
Dwell time	**FCC:** FCC Public Notice DA 00-705	**FCC:** Section15.247(a)(1)(iii)		Complied	Conducted
Maximum Peak Output Power	**FCC:** FCC Public Notice DA 00-705	**FCC:** Section15.247(a)(b)(1)		Complied	Conducted
Spurious Emission & Band Edge Compliance	**FCC:** FCC Public Notice DA 00-705	**FCC:** Section15.247(d)	9.4dB 12205.00MHz, AV, Vert. Bluetooth Tx, 3DH5, 2441MHz	Complied	Conducted/ Radiated
Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.					

* In case any questions arise about test procedure, ANSI C63.4: 2003 is also referred.

FCC 15.31 (e)
This EUT provides stable voltage (DC2.9V, 2.2V, 1.8V and 1.35V) constantly to RF Part regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement
It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	**IC:** RSS-Gen 4.6.1	**IC:** RSS-Gen 4.6.1	N/A	N/A	Conducted

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 (±)
Conducted emission (AC Mains) AMN/LISN	150kHz-30MHz	3.0 dB	2.7 dB	3.1 dB
Radiated emission (Measurement distance: 3m)	30MHz-300MHz	4.7 dB	4.5 dB	4.7 dB
	300MHz-1GHz	4.5 dB	4.6 dB	4.6 dB
	1GHz-13GHz	3.9 dB	3.9 dB	4.0 dB
Radiated emission (Measurement distance: 1m)	13GHz-18GHz	4.8 dB	4.8 dB	4.8 dB
	18GHz-25GHz	4.4 dB	4.2 dB	4.2 dB

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

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

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

Antenna port conducted test
Power Measurement uncertainty above 1GHz for this test was: (±) 0.8dB
Conducted emissions Measurement (below 1GHz) uncertainty for this test was: (±) 1.1dB
Conducted emissions Measurement (1G-3GHz) uncertainty for this test was: (±) 1.2dB
Conducted emissions Measurement (3G-18GHz) uncertainty for this test was: (±) 2.9dB
Conducted emissions Measurement (18G-26.5GHz) uncertainty for this test was: (±) 3.4dB
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 Full-anechoic chamber	-	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
☐ No.1 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
☐ No.2 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
☒ No.3 shielded room	-	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
☐ No.4 shielded room	-	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
☒ No.5 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
☐ No.6 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-

3.6 Test set up, Data of EMI, and Test instruments

Refer to APPENDIX.

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

4.1 Operating Mode(s)

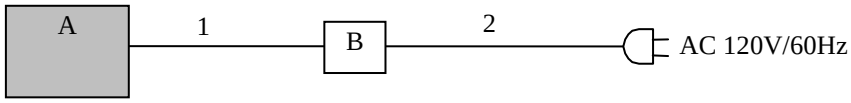
Bluetooth (BT): Transmitting (Tx), Payload: PRBS9
Inquiry

Details of Operating Mode(s)

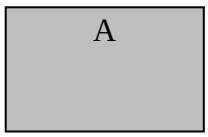
Test Item	Mode	Tested frequency
Conducted Emission, Spurious Emission (Conducted/Radiated)	Tx (Hopping off) DH5, 3DH5	2402MHz 2441MHz 2480MHz
Carrier Frequency Separation	Tx (Hopping on) DH5, 3DH5 Inquiry	2402MHz 2441MHz 2480MHz
20dB Bandwidth	Tx (Hopping off) DH5, 3DH5 Inquiry	2402MHz 2441MHz 2480MHz
Number of Hopping Frequency	Tx (Hopping on) DH5, 3DH5 Inquiry	-
Dwell time	Tx (Hopping on), -DH1, DH3, DH5 -3DH1, 3DH3, 3DH5 Inquiry	-
Maximum Peak Output Power	Tx (Hopping off) DH5, 3DH5 Inquiry	2402MHz 2441MHz 2480MHz
Band Edge Compliance (Conducted)	Tx DH5, 3DH5 -Hopping on -Hopping off	2402MHz 2480MHz
99% Occupied Bandwidth	Tx DH5, 3DH5 -Hopping on -Hopping off	2402MHz 2441MHz 2480MHz

4.2 Configuration and peripherals

[Conducted emission]



[Other tests]



* Setup was taken into consideration and test data was taken under worse case conditions.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remark
A	Digital Portable Cellular Telephone	KMP7N4Y1-1A	004401200620017 *1) 004401200620033 *2) 004401200620355 *3)	NEC CASIO Mobile Communications, Ltd.	EUT
B	AC Adaptor	MAS-BH0008-A002	QLA	MITSUMI	-

*1) Used for Conducted Emission tests.
*2) Used for Antenna Terminal tests.
*3) Used for Radiated Emission tests.

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	DC Cable	1.6	Shielded	Shielded	-
2	AC Cable	0.6	Unshielded	Unshielded	-

SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane.
The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity.
The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from a Line Impedance Stabilization Network (LISN)/ Artificial mains Network (AMN) and excess AC cable was bundled in center.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Shielded Room.
The EUT was connected to a LISN (AMN).
An overview sweep with peak detection has been performed.

The test results and limit are rounded off to one decimal place, so some differences might be observed.

Detector **: QP and AV**
Measurement range **: 0.15-30MHz**
Test data **: APPENDIX**
Test result **: Pass**

SECTION 6: Radiated Spurious Emission

Test Procedure

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane.
The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity.
The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.
The height of the measuring antenna varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.
The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer.
The measurements were made with the following detector function of the test receiver and the Spectrum analyzer (in linear mode).
The test was made with the detector (RBW/VBW) in the following table.
When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

Test Antennas are used as below;

Frequency	30MHz to 300MHz	300MHz to 1GHz	Above 1GHz
Antenna Type	Biconical	Logperiodic	Horn

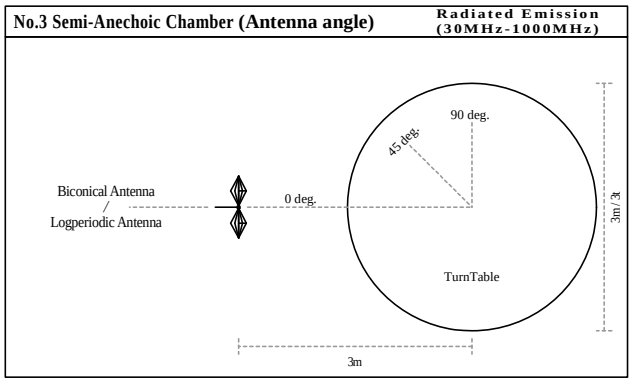
Frequency	Below 1GHz	Above 1GHz	
Instrument used	Test Receiver	Spectrum Analyzer	
Detector	QP	PK	AV
IF Bandwidth	BW 120kHz(T/R)	RBW: 1MHz VBW: 3MHz	RBW: 1MHz VBW: See Data *1)
Test Distance	3m	3m (below 13GHz), 1m*3) (above 13GHz),	

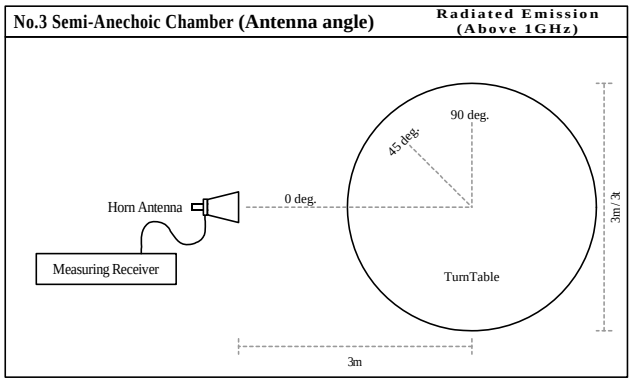
*1) Used for the band edge of the carrier and the harmonics that can be measured. The VBW is based on the inverse of the duty cycle (see Appendix).

- 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.

The test results and limit are rounded off to one decimal place, so some differences might be observed.

Measurement range : 30M-25GHz
Test data : APPENDIX
Test result : Pass





SECTION 7: Antenna Terminal Conducted Tests

Test Procedure

The tests were made with below setting connected to the antenna port.

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument used
20dB Bandwidth	3MHz	30kHz	100kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth	Enough width to display 20dB Bandwidth	1 to 3% of Span	Three times of RBW	Auto	Sample	Max Hold	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak	-	Power Meter (Sensor: 50MHz BW)
Carrier Frequency Separation	5MHz or 3MHz	51kHz or 30kHz	160kHz or 100kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Number of Hopping Frequency	30MHz	300kHz	1MHz	Auto	Peak	Max Hold	Spectrum Analyzer
Dwell Time	Zero Span	1MHz	3MHz	As necessary capture the entire dwell time per hopping channel	Peak	Max Hold	Spectrum Analyzer
Conducted Spurious Emission	Less or equal to 5GHz (Range: 30MHz-25GHz)	100kHz	300kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Conducted Spurious Emission Band Edge compliance	20MHz	100kHz	300kHz	Auto	Peak	Max Hold	Spectrum Analyzer

The test results and limit are rounded off to two decimals place, so some differences might be observed.

Test data : APPENDIX
Test result : Pass

APPENDIX 1: Photographs of test setup

APPENDIX 2: Test data

DATA OF CONDUCTED EMISSION TEST

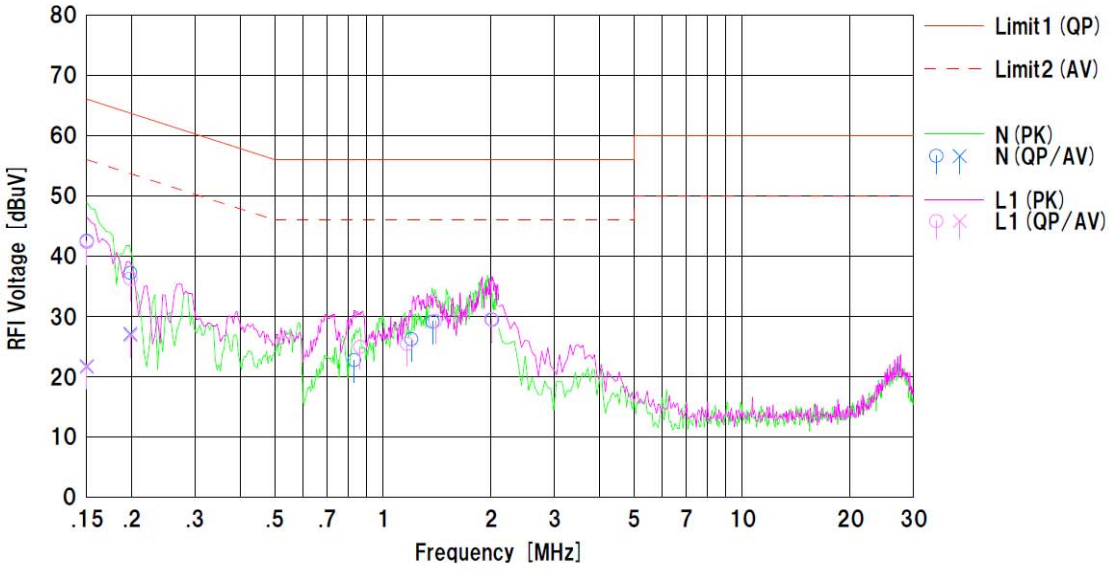
UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2011/01/05

Mode : Bluetooth, Tx, DH5, 2402MHz
Report No. : 31HE0196-HO
Power : AC120V/60Hz (AC adaptor)
Temp./Humi. : 20deg.C./23%

Remarks : UE + Battery + AC Adaptor

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Yohsuke Matsuzawa



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	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	29.9	9.0	12.6	42.5	21.6	66.0	56.0	23.5	34.4	N	
2	0.19831	24.6	14.5	12.6	37.2	27.1	63.6	53.6	26.4	26.5	N	
3	0.83387	10.1	---	12.6	22.7	---	56.0	46.0	33.3	---	N	
4	1.20150	13.6	---	12.6	26.2	---	56.0	46.0	29.8	---	N	
5	1.37705	16.5	---	12.6	29.1	---	56.0	46.0	26.9	---	N	
6	2.01672	16.7	---	12.7	29.4	---	56.0	46.0	26.6	---	N	
7	0.15000	29.7	9.2	12.6	42.3	21.8	66.0	56.0	23.7	34.2	L1	
8	0.19841	23.6	14.2	12.6	36.2	26.8	63.6	53.6	27.4	26.8	L1	
9	0.86446	12.3	---	12.6	24.9	---	56.0	46.0	31.1	---	L1	
10	1.16993	12.8	---	12.6	25.4	---	56.0	46.0	30.6	---	L1	
11	1.40050	16.6	---	12.6	29.2	---	56.0	46.0	26.8	---	L1	
12	2.00621	16.8	---	12.7	29.5	---	56.0	46.0	26.5	---	L1	

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN+Cable+Att) [dB]

DATA OF CONDUCTED EMISSION TEST

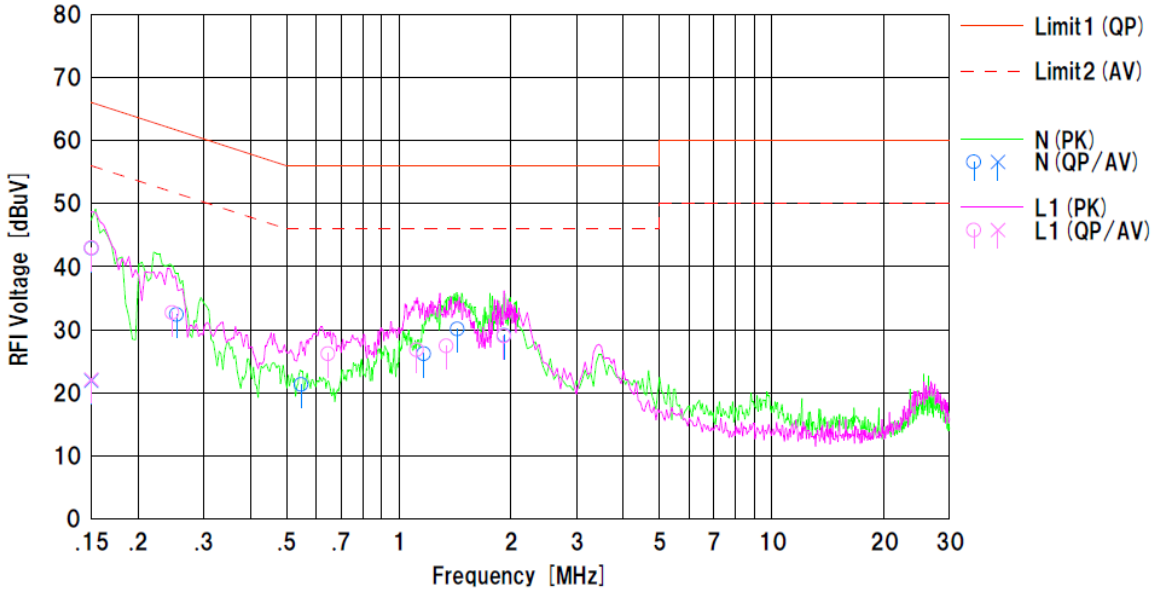
UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2011/01/05

Mode : Bluetooth, Tx, DH5, 2441MHz
Report No. : 31HE0196-HO
Power : AC120V/60Hz (AC adaptor)
Temp./Humi. : 20deg.C./23%

Remarks : UE + Battery + AC Adaptor

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Yohsuke Matsuzawa



No.	Freq.	Reading <QP>	Reading <AV>	C.Fac	Results <QP>	Results <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Phase	Comment
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	30.3	9.3	12.6	42.9	21.9	66.0	56.0	23.1	34.1	N	
2	0.25346	19.8	---	12.6	32.4	---	61.6	51.6	29.2	---	N	
3	0.54746	8.7	---	12.6	21.3	---	56.0	46.0	34.7	---	N	
4	1.16750	13.6	---	12.6	26.2	---	56.0	46.0	29.8	---	N	
5	1.43530	17.5	---	12.6	30.1	---	56.0	46.0	25.9	---	N	
6	1.91633	16.4	---	12.7	29.1	---	56.0	46.0	26.9	---	N	
7	0.15000	30.4	9.5	12.6	43.0	22.1	66.0	56.0	23.0	33.9	L1	
8	0.24675	20.1	---	12.6	32.7	---	61.8	51.8	29.1	---	L1	
9	0.64595	13.6	---	12.6	26.2	---	56.0	46.0	29.8	---	L1	
10	1.11710	14.2	---	12.6	26.8	---	56.0	46.0	29.2	---	L1	
11	1.34071	14.8	---	12.6	27.4	---	56.0	46.0	28.6	---	L1	
12	1.91340	16.3	---	12.7	29.0	---	56.0	46.0	27.0	---	L1	

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN+Cable+Att) [dB]

DATA OF CONDUCTED EMISSION TEST

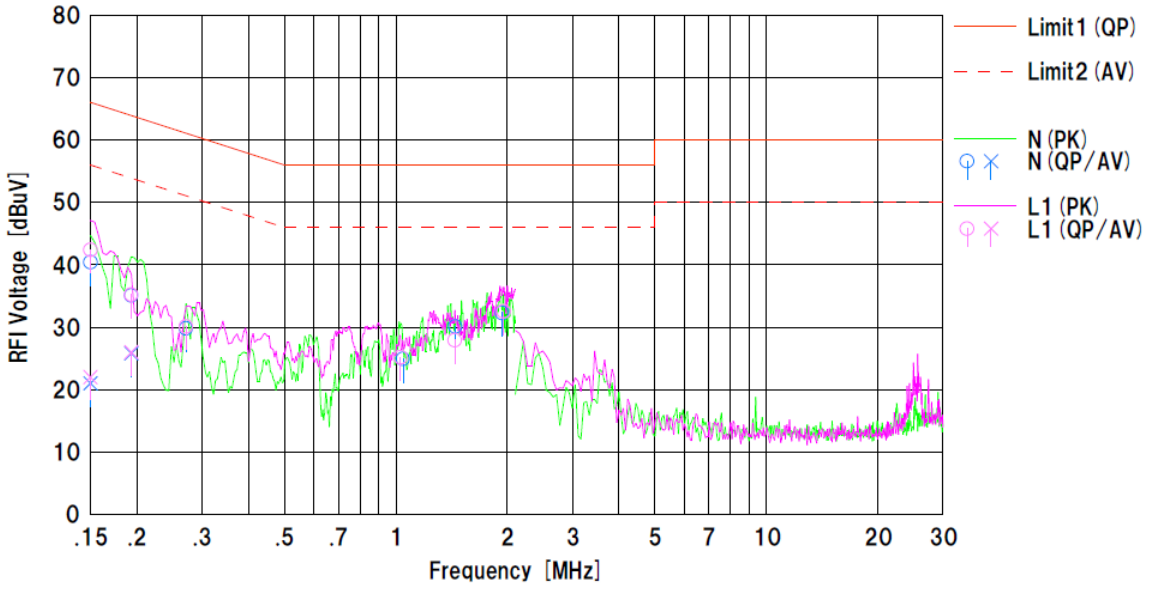
UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2011/01/05

Mode : Bluetooth, Tx, DH5, 2480MHz
Report No. : 31HE0196-HO
Power : AC120V/60Hz (AC adaptor)
Temp./Humi. : 20deg.C./23%

Remarks : UE + Battery + AC Adaptor

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Yohsuke Matsuzawa



No.	Freq.	Reading <QP>	Reading <AV>	C.Fac	Results <QP>	Results <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Phase	Comment
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	27.8	8.4	12.6	40.4	21.0	66.0	56.0	25.6	35.0	N	
2	0.19299	22.5	13.2	12.6	35.1	25.8	63.9	53.9	28.8	28.1	N	
3	0.27114	17.2	---	12.6	29.8	---	61.0	51.0	31.2	---	N	
4	1.04534	12.3	---	12.6	24.9	---	56.0	46.0	31.1	---	N	
5	1.44749	17.5	---	12.6	30.1	---	56.0	46.0	25.9	---	N	
6	1.93486	19.6	---	12.7	32.3	---	56.0	46.0	23.7	---	N	
7	0.15000	29.8	9.4	12.6	42.4	22.0	66.0	56.0	23.6	34.0	L1	
8	0.19299	22.6	13.4	12.6	35.2	26.0	63.9	53.9	28.7	27.9	L1	
9	0.27114	17.5	---	12.6	30.1	---	61.0	51.0	30.9	---	L1	
10	1.03071	12.6	---	12.6	25.2	---	56.0	46.0	30.8	---	L1	
11	1.44318	15.3	---	12.6	27.9	---	56.0	46.0	28.1	---	L1	
12	1.95540	19.8	---	12.7	32.5	---	56.0	46.0	23.5	---	L1	

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN+Cable+Att) [dB]

DATA OF CONDUCTED EMISSION TEST

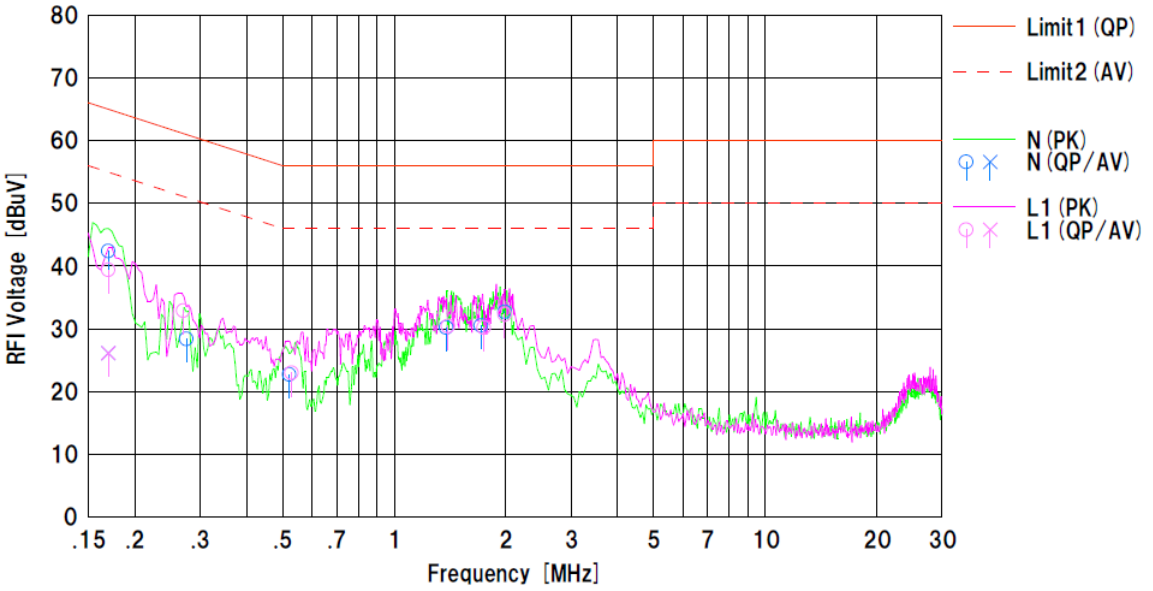
UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2011/01/05

Mode : Bluetooth, Tx, 3DH5, 2402MHz
Report No. : 31HE0196-HO
Power : AC120V/60Hz (AC adaptor)
Temp./Humi. : 20deg.C./23%

Remarks : UE + Battery + AC Adaptor

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Yohsuke Matsuzawa



No.	Freq.	Reading <QP>	Reading <AV>	C.Fac	Results <QP>	Results <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Phase	Comment
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.16954	29.8	13.5	12.6	42.4	26.1	64.9	54.9	22.5	28.8	N	
2	0.27505	15.8	---	12.6	28.4	---	60.9	50.9	32.5	---	N	
3	0.52124	10.1	---	12.6	22.7	---	56.0	46.0	33.3	---	N	
4	1.38149	17.6	---	12.6	30.2	---	56.0	46.0	25.8	---	N	
5	1.71473	17.9	---	12.6	30.5	---	56.0	46.0	25.5	---	N	
6	1.98667	20.0	---	12.7	32.7	---	56.0	46.0	23.3	---	N	
7	0.16954	26.8	13.5	12.6	39.4	26.1	64.9	54.9	25.5	28.8	L1	
8	0.26985	20.3	---	12.6	32.9	---	61.1	51.1	28.2	---	L1	
9	0.52872	10.4	---	12.6	23.0	---	56.0	46.0	33.0	---	L1	
10	1.39672	17.8	---	12.6	30.4	---	56.0	46.0	25.6	---	L1	
11	1.74439	17.6	---	12.6	30.2	---	56.0	46.0	25.8	---	L1	
12	1.98667	19.6	---	12.7	32.3	---	56.0	46.0	23.7	---	L1	

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN+Cable+Att) [dB]

DATA OF CONDUCTED EMISSION TEST

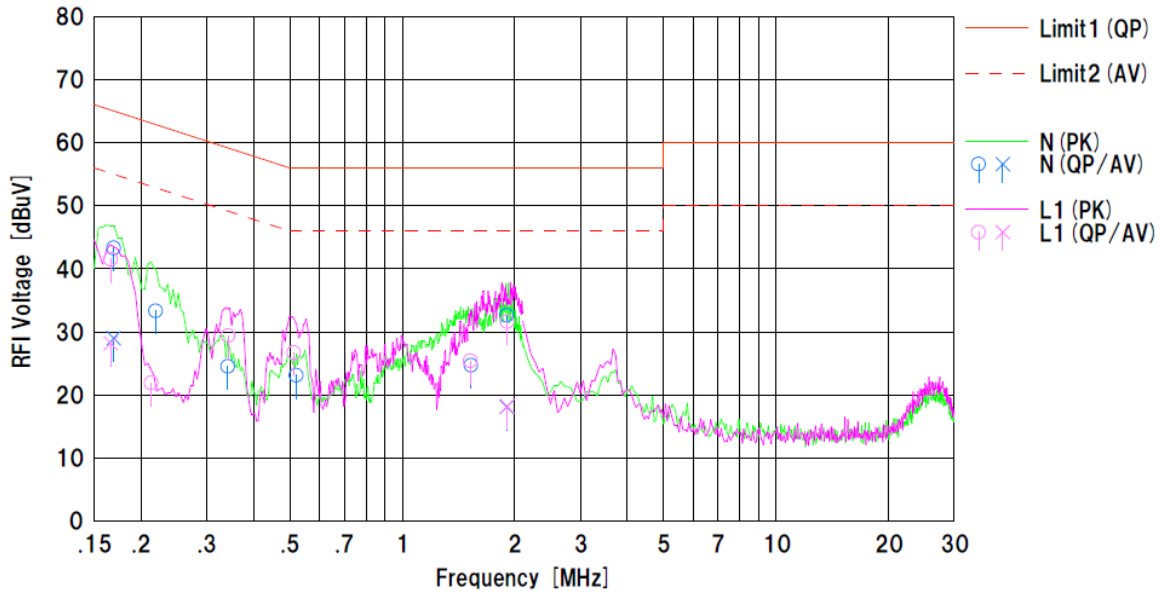
UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2011/01/05

Mode : Bluetooth, Tx, 3DH5, 2441MHz
Report No. : 31HE0196-HO
Power : AC120V/60Hz (AC adaptor)
Temp./Humi. : 20deg.C./23%

Remarks : UE + Battery + AC Adaptor

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Yohsuke Matsuzawa



No.	Freq.	Reading <QP>	Reading <AV>	C.Fac	Results <QP>	Results <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Phase	Comment
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.16911	30.7	16.4	12.6	43.3	29.0	65.0	55.0	21.7	26.0	N	
2	0.21891	20.7	---	12.6	33.3	---	62.8	52.8	29.5	---	N	
3	0.34152	11.9	---	12.6	24.5	---	59.1	49.1	34.6	---	N	
4	0.52033	10.5	---	12.6	23.1	---	56.0	46.0	32.9	---	N	
5	1.52755	12.1	---	12.6	24.7	---	56.0	46.0	31.3	---	N	
6	1.90352	19.9	5.4	12.7	32.6	18.1	56.0	46.0	23.4	27.9	N	
7	0.16590	28.9	15.6	12.6	41.5	28.2	65.1	55.1	23.6	26.9	L1	
8	0.21300	9.3	---	12.6	21.9	---	63.0	53.0	41.1	---	L1	
9	0.34212	16.8	---	12.6	29.4	---	59.1	49.1	29.7	---	L1	
10	0.51311	14.1	---	12.6	26.7	---	56.0	46.0	29.3	---	L1	
11	1.52174	12.8	---	12.6	25.4	---	56.0	46.0	30.6	---	L1	
12	1.90943	18.9	5.5	12.7	31.6	18.2	56.0	46.0	24.4	27.8	L1	

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN+Cable+Att) [dB]

DATA OF CONDUCTED EMISSION TEST

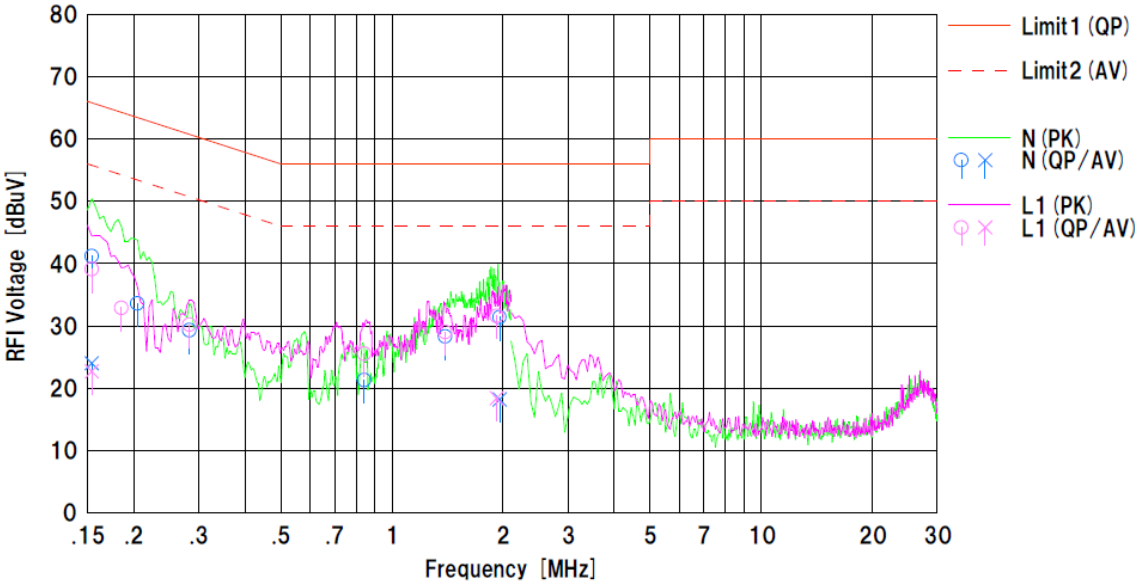
UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2011/01/05

Mode : Bluetooth, Tx, 3DH5, 2480MHz
Report No. : 31HE0196-HO
Power : AC120V/60Hz (AC adaptor)
Temp./Humi. : 20deg.C./23%

Remarks : UE + Battery + AC Adaptor

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Yohsuke Matsuzawa



No.	Freq.	Reading <QP>	Reading <AV>	C.Fac	Results <QP>	Results <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Phase	Comment
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15391	28.6	11.4	12.6	41.2	24.0	65.7	55.7	24.5	31.7	N	
2	0.20454	21.0	---	12.6	33.6	---	63.4	53.4	29.8	---	N	
3	0.28287	16.7	---	12.6	29.3	---	60.7	50.7	31.4	---	N	
4	0.84168	8.7	---	12.6	21.3	---	56.0	46.0	34.7	---	N	
5	1.39430	15.7	---	12.6	28.3	---	56.0	46.0	27.7	---	N	
6	1.95754	18.7	5.5	12.7	31.4	18.2	56.0	46.0	24.6	27.8	N	
7	0.15391	26.5	10.1	12.6	39.1	22.7	65.7	55.7	26.6	33.0	L1	
8	0.18500	20.3	---	12.6	32.9	---	64.2	54.2	31.3	---	L1	
9	0.28287	17.6	---	12.6	30.2	---	60.7	50.7	30.5	---	L1	
10	0.84168	12.9	---	12.6	25.5	---	56.0	46.0	30.5	---	L1	
11	1.39300	16.4	---	12.6	29.0	---	56.0	46.0	27.0	---	L1	
12	1.92146	18.9	5.7	12.7	31.6	18.4	56.0	46.0	24.4	27.6	L1	

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN+Cable+Att) [dB]

20dB Bandwidth and Carrier Frequency Separation

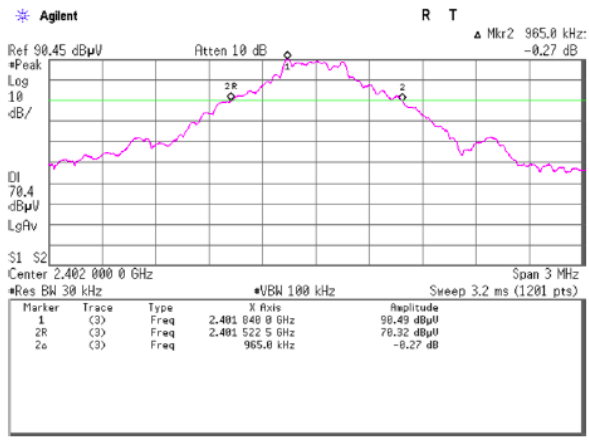
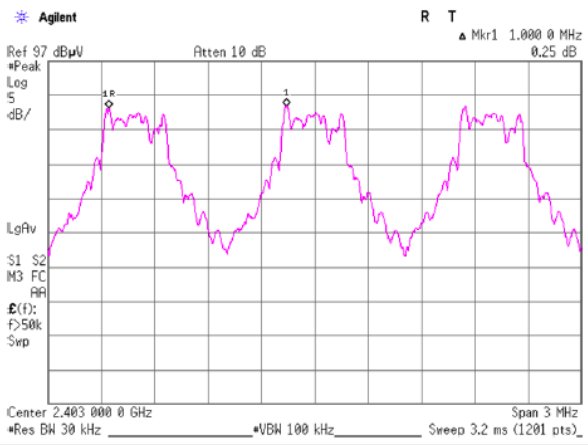
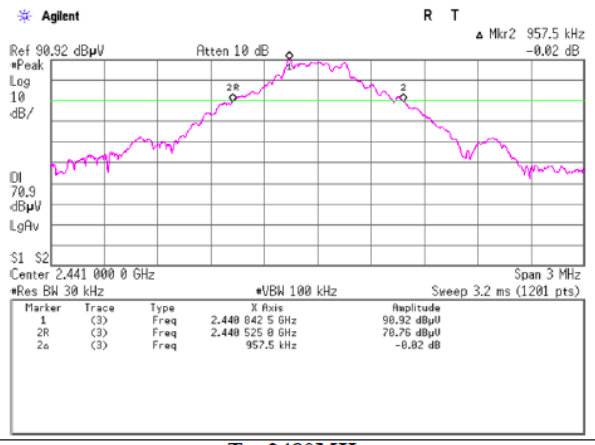
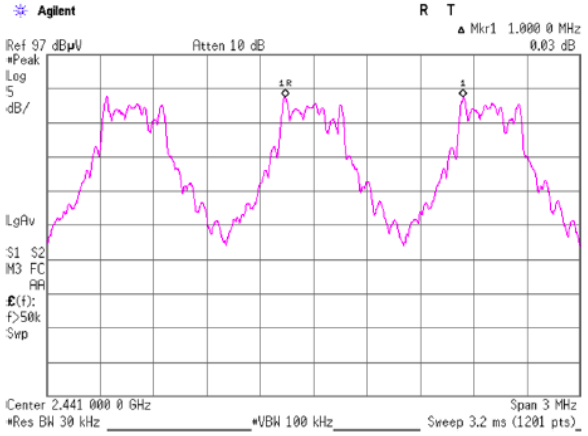
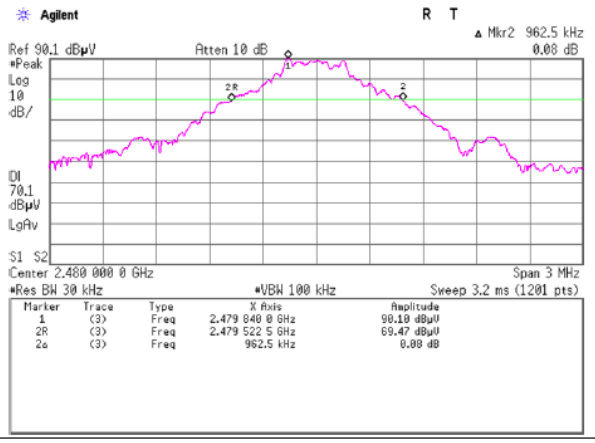
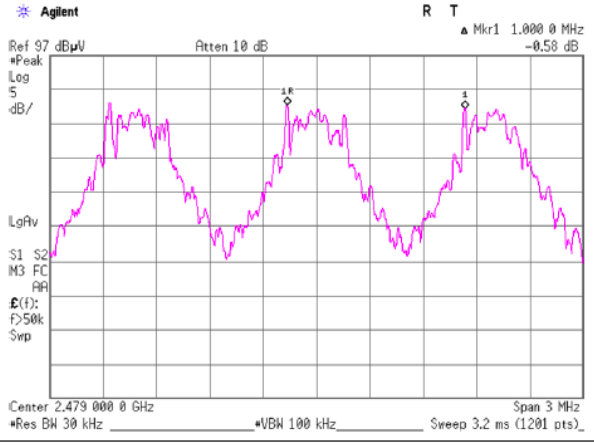
Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	2010/12/27	2010/12/28
Temperature / Humidity	25deg.C. , 35%	25deg.C. , 32%
Engineer	Akio Hayashi	Akio Hayashi
Mode	(DH5, 3DH5)	(Inquiry mode)

Mode	Freq. [MHz]	20dB Bandwidth [MHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency Separation [MHz]
DH5	2402.0	0.965	1.000	>= 0.643
DH5	2441.0	0.957	1.000	>= 0.638
DH5	2480.0	0.962	1.000	>= 0.641
3DH5	2402.0	1.287	1.000	>= 0.858
3DH5	2441.0	1.290	1.000	>= 0.860
3DH5	2480.0	1.292	1.000	>= 0.861
Inquiry	2441.0	0.847	2.000	>= 0.565

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

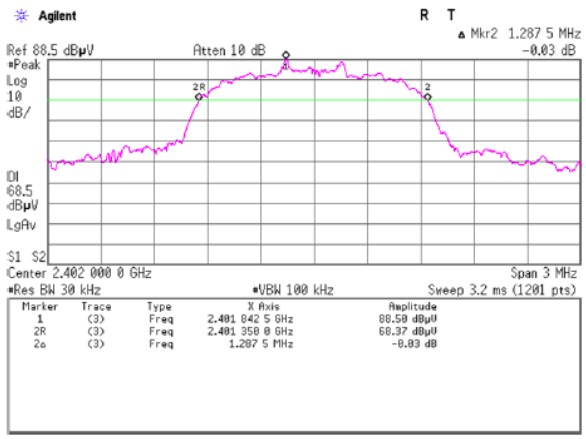
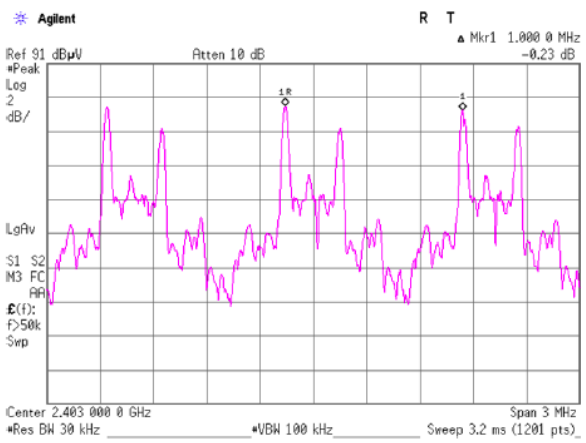
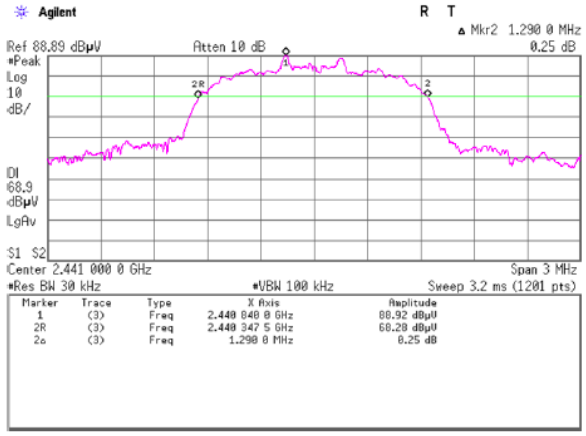
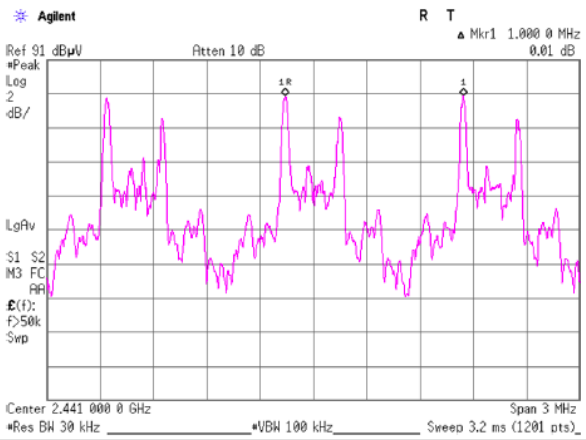
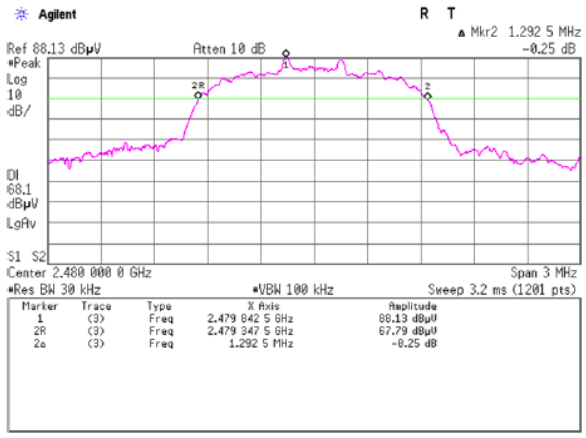
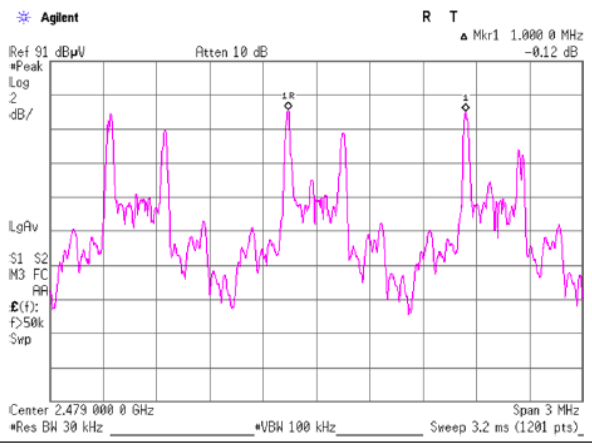
20dB Bandwidth and Carrier Frequency Separation

DH5

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

20dB Bandwidth and Carrier Frequency Separation

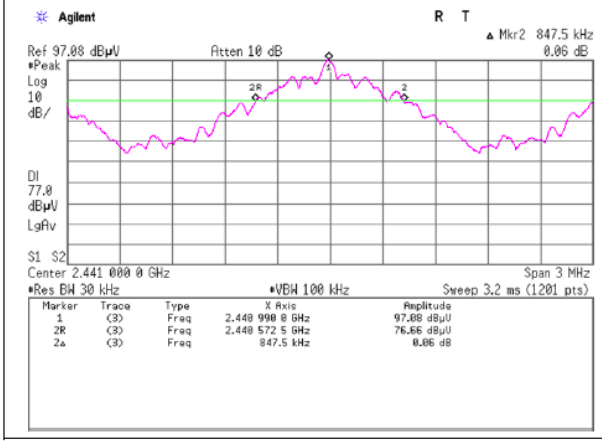
3-DH5

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

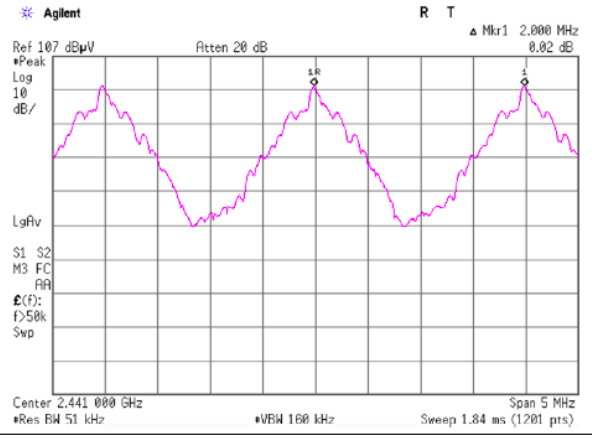
20dB Bandwidth and Carrier Frequency Separation

Inquiry

20dB Bandwidth



Carrier Frequency Separation

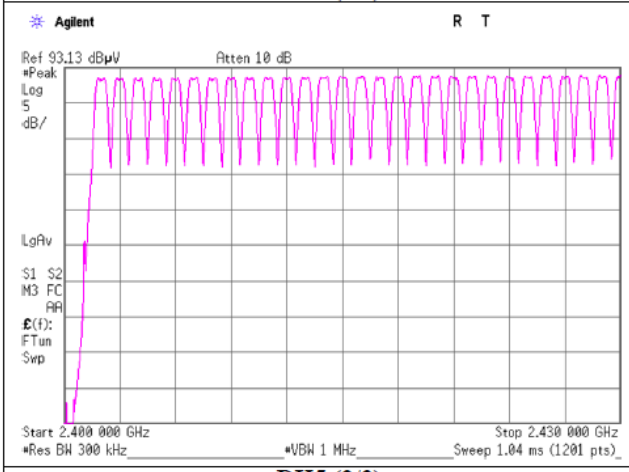
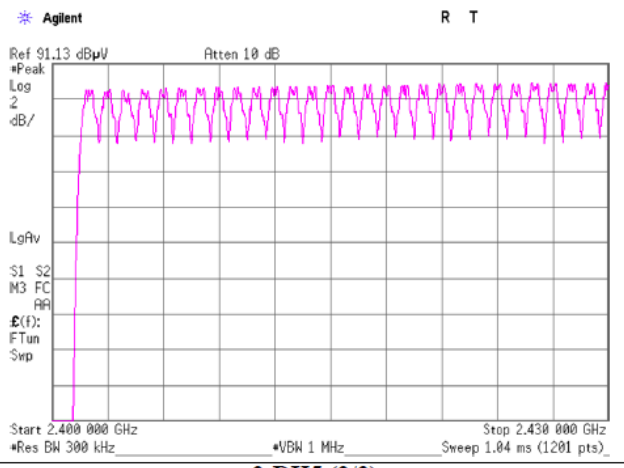
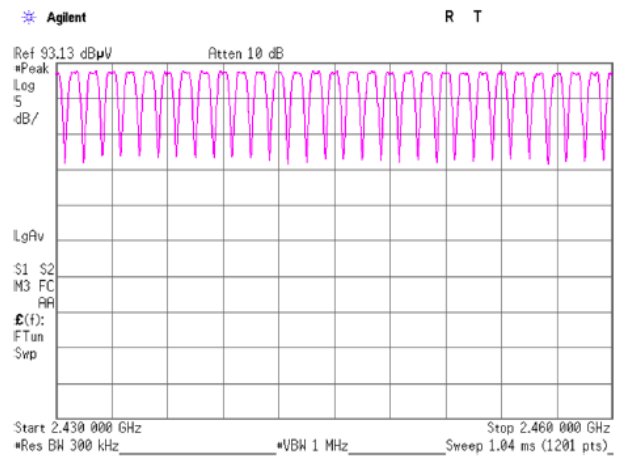
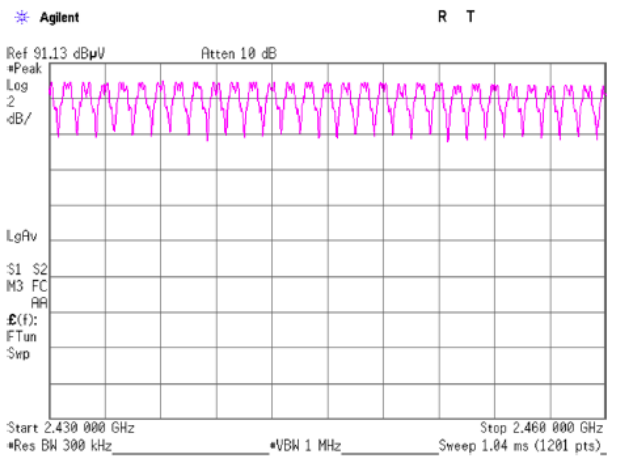
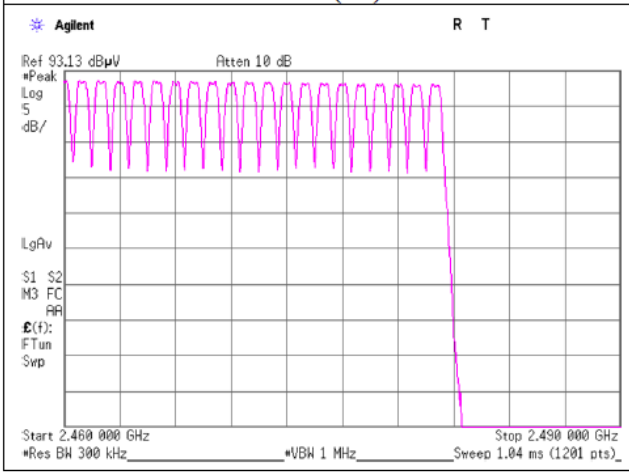
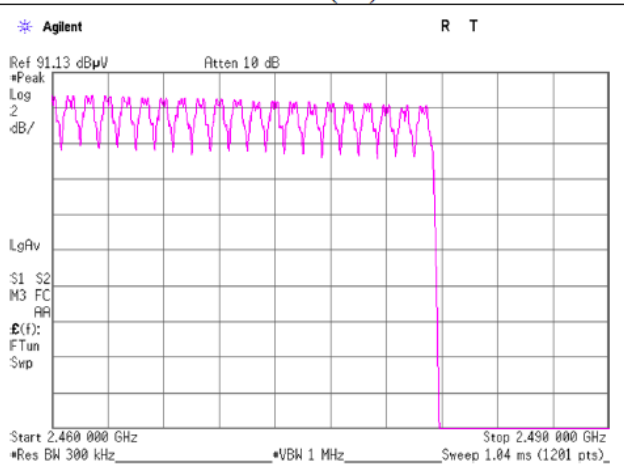


Number of Hopping Frequency (Conducted)

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	2010/12/27	2010/12/28
Temperature / Humidity	25deg.C. , 35%	25deg.C. , 32%
Engineer	Akio Hayashi	Akio Hayashi
Mode	(DH5, 3-DH5)	(Inquiry)

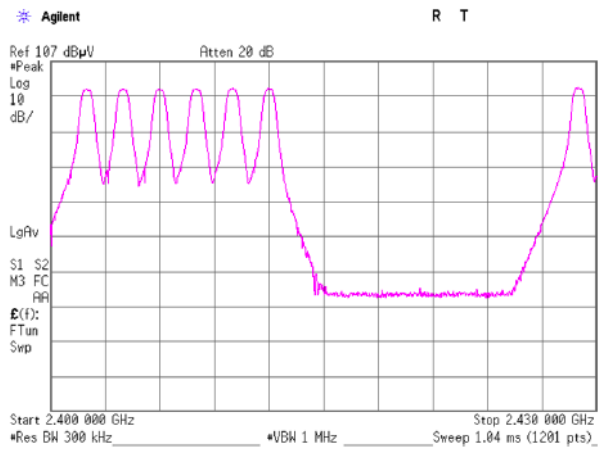
Mode	Number of Channel [times]	Limit [times]
DH5	79	>=15
3-DH5	79	>=15
Inquiry	32	>=15

Number of Hopping Frequency

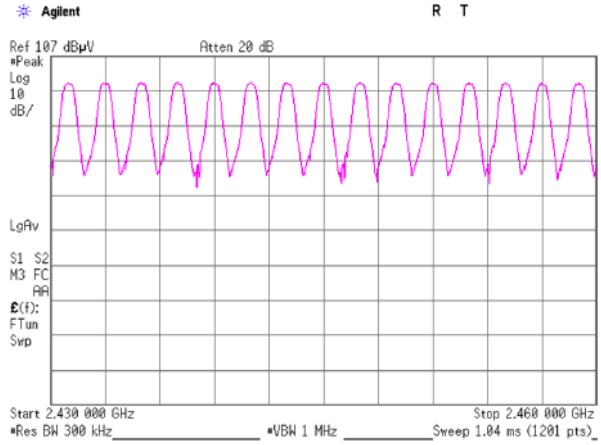
DH5 (1/3)	3-DH5 (1/3)
	
DH5 (2/3)	**3-DH5 (2/3)**
	
DH5 (3/3)	**3-DH5 (3/3)**
	

Number of Hopping Frequency

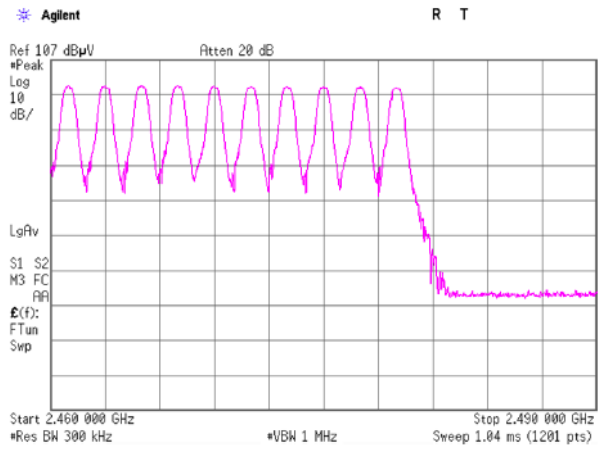
Inquiry (1/3)



Inquiry (2/3)



Inquiry (3/3)



Dwell Time (Conducted)

Test place	UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date	2010/12/29
Temperature / Humidity	22deg.C. , 33%
Engineer	Akio Hayashi
Mode	Tx

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	50.2 times / 5 sec. x 31.6 sec. = 318 times	0.383	122	400
DH3	26.8 times / 5 sec. x 31.6 sec. = 170 times	1.642	279	400
DH5	17.4 times / 5 sec. x 31.6 sec. = 110 times	2.894	318	400
3DH1	50.2 times / 5 sec. x 31.6 sec. = 318 times	1.073	341	400
3DH3	26.2 times / 5 sec. x 31.6 sec. = 166 times	1.641	272	400
3DH5	18.8 times / 5 sec. x 31.6 sec. = 119 times	2.898	345	400
Inquiry	100.0 times / 1 sec. x 12.8 sec. = 1280 times	0.103	132	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	51	49	50	51	50	50.2
DH3	29	27	27	27	24	26.8
DH5	18	18	14	18	19	17.4
3DH1	50	51	49	51	50	50.2
3DH3	25	26	28	24	28	26.2
3DH5	20	19	18	18	19	18.8

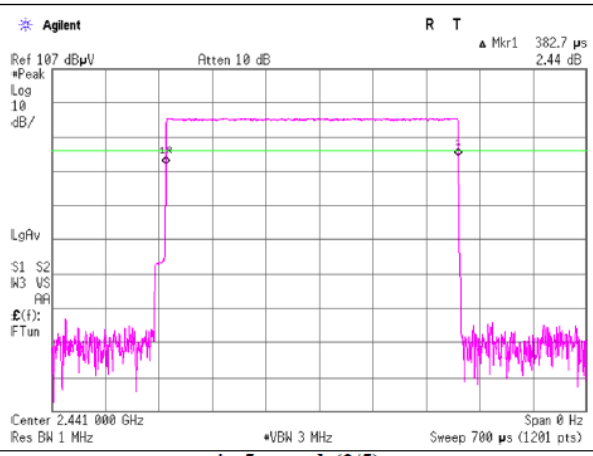
Sample Calculation

Average= Summation(Sampling 1 to 5) / 5

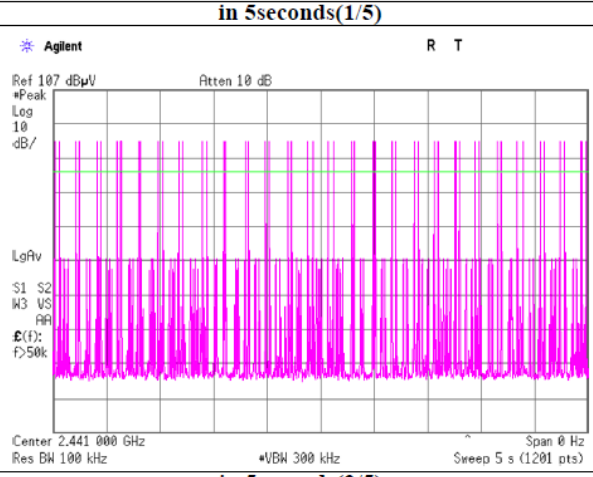
Dwell time

DH1

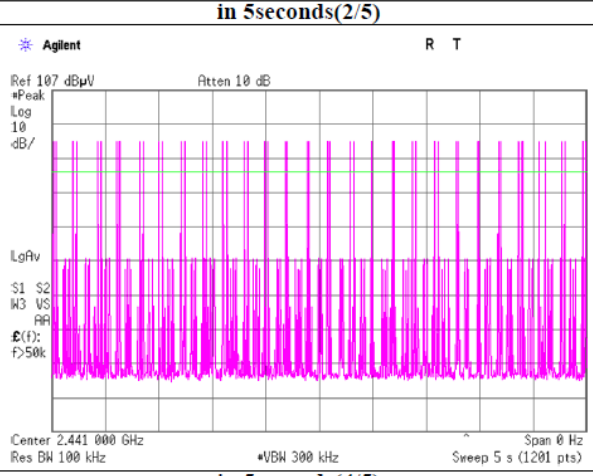
On Time



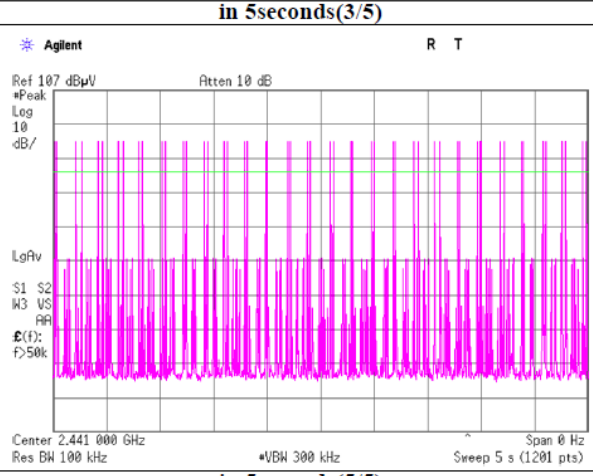
in 5seconds(1/5)



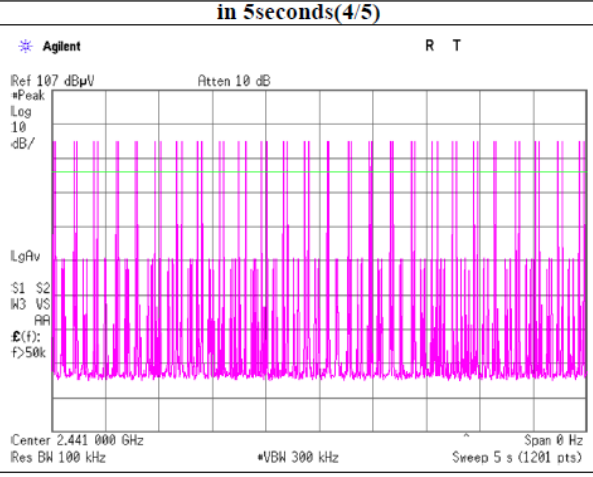
in 5seconds(2/5)



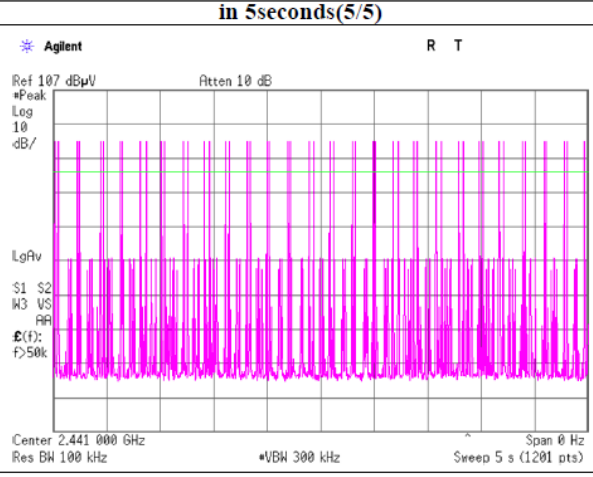
in 5seconds(3/5)



in 5seconds(4/5)



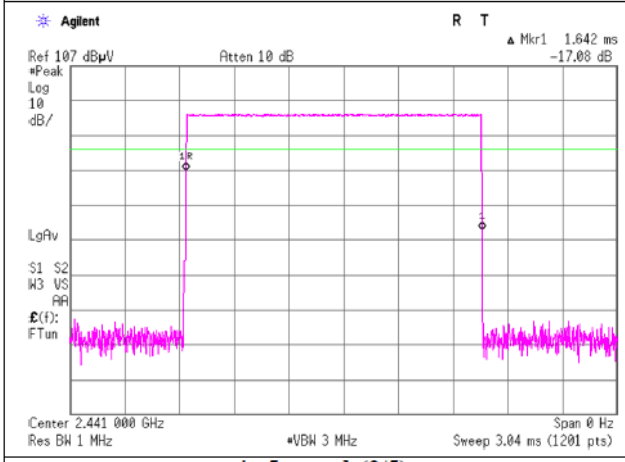
in 5seconds(5/5)



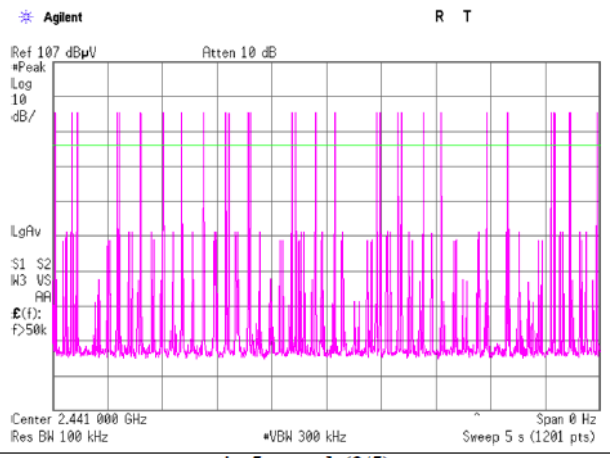
Dwell time

DH3

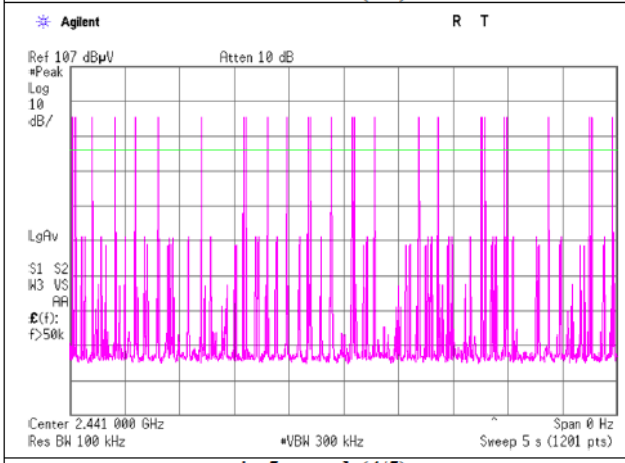
On Time



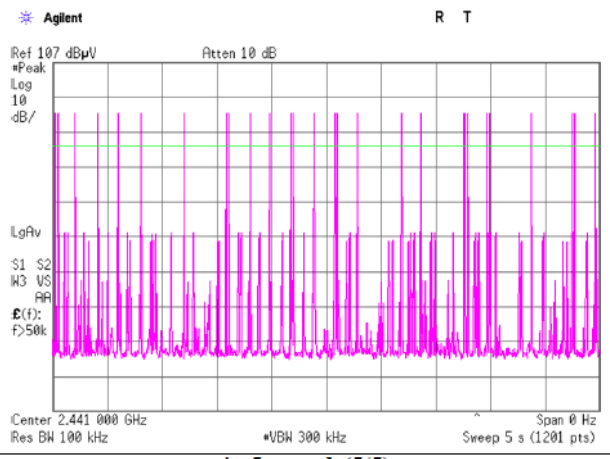
in 5seconds(1/5)



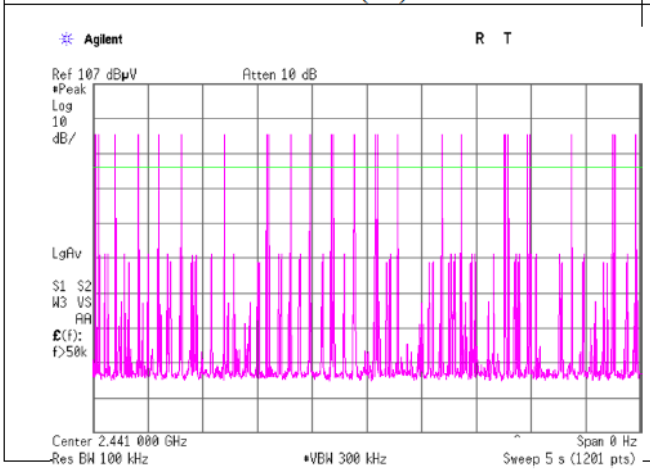
in 5seconds(2/5)



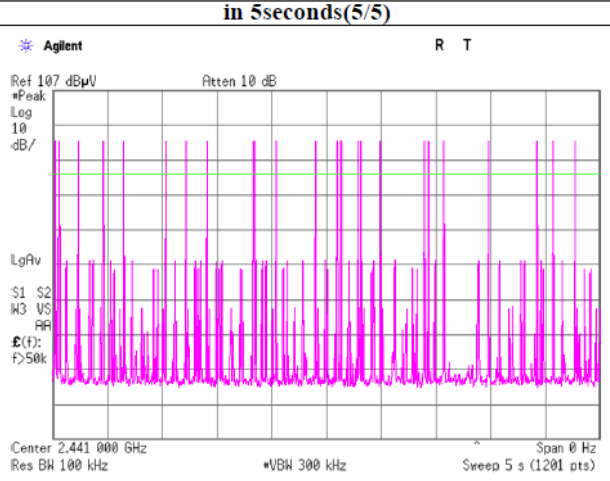
in 5seconds(3/5)



in 5seconds(4/5)



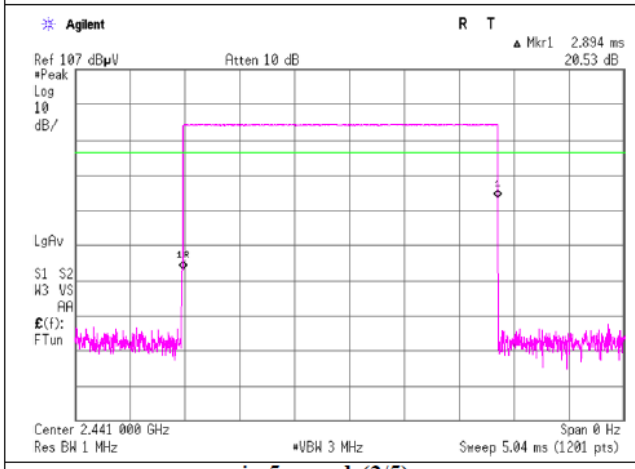
in 5seconds(5/5)



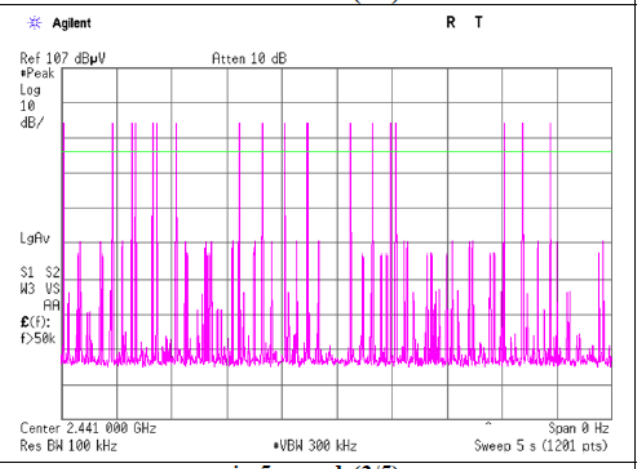
Dwell time

DH5

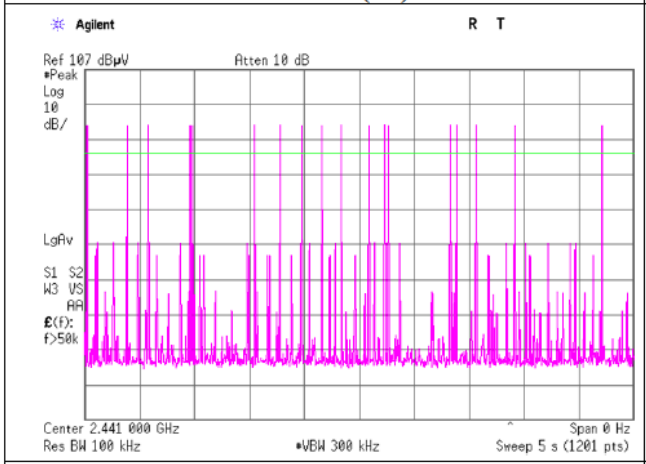
On Time



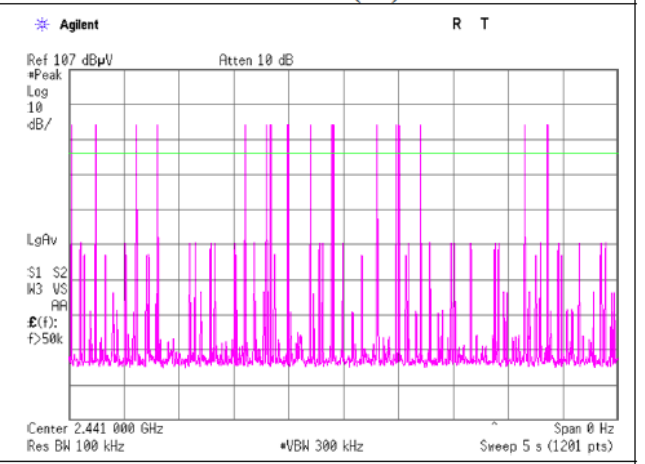
in 5seconds(1/5)



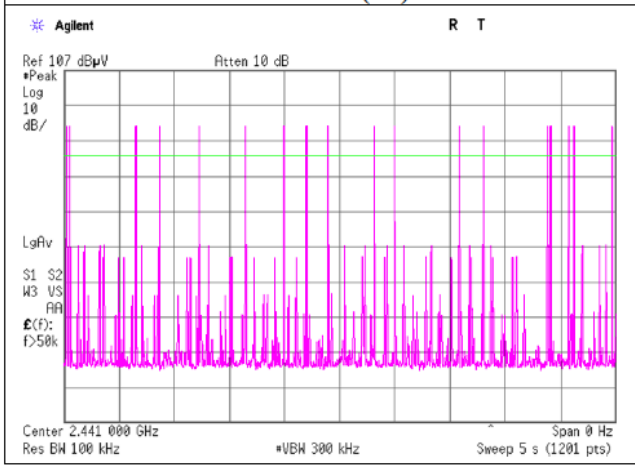
in 5seconds(2/5)



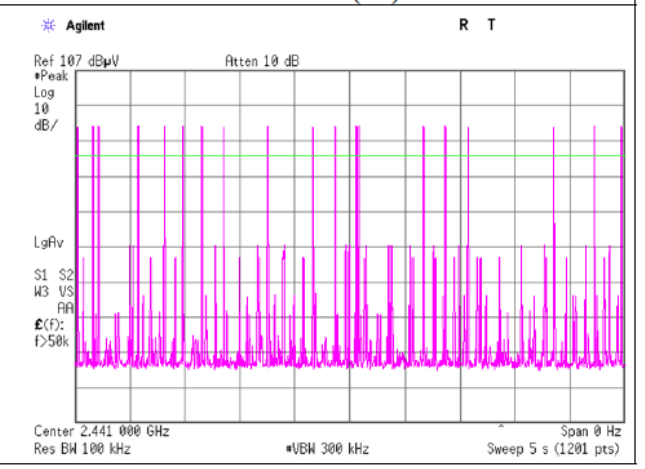
in 5seconds(3/5)



in 5seconds(4/5)



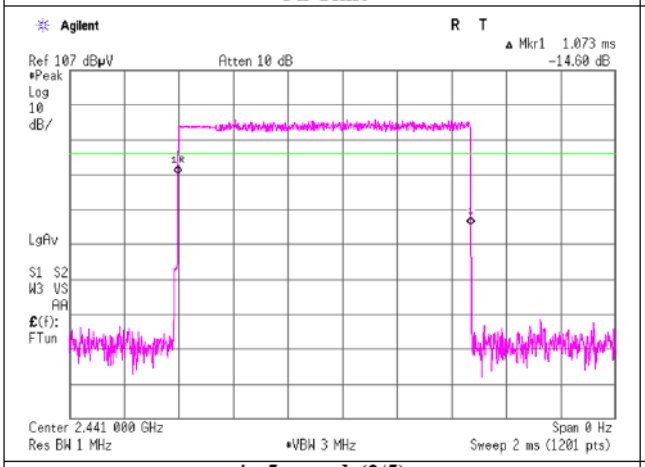
in 5seconds(5/5)



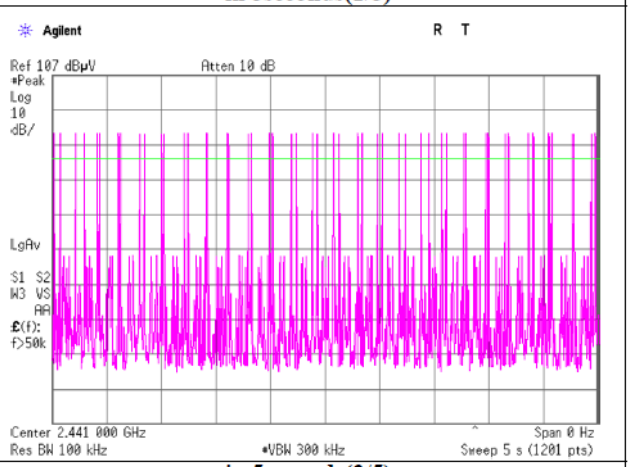
Dwell time

3-DH1

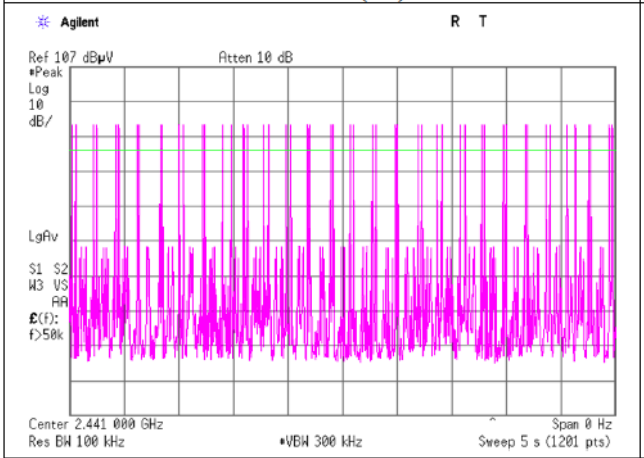
On Time



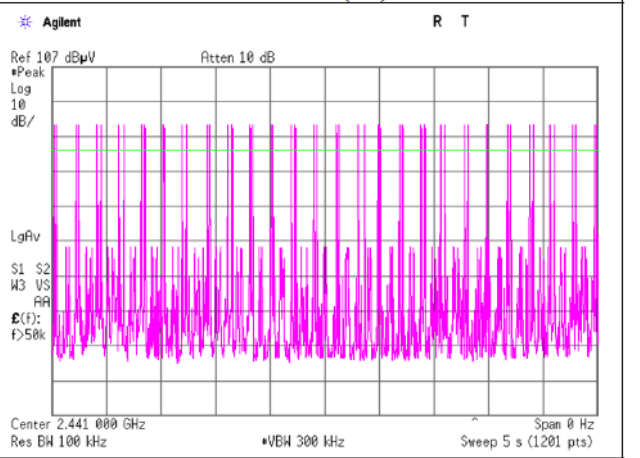
in 5seconds(1/5)



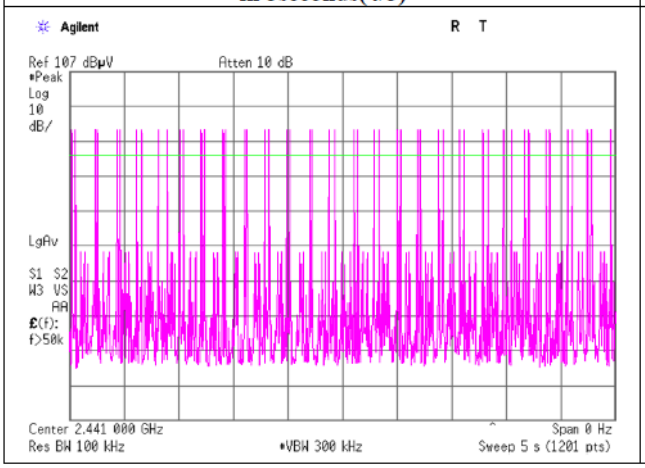
in 5seconds(2/5)



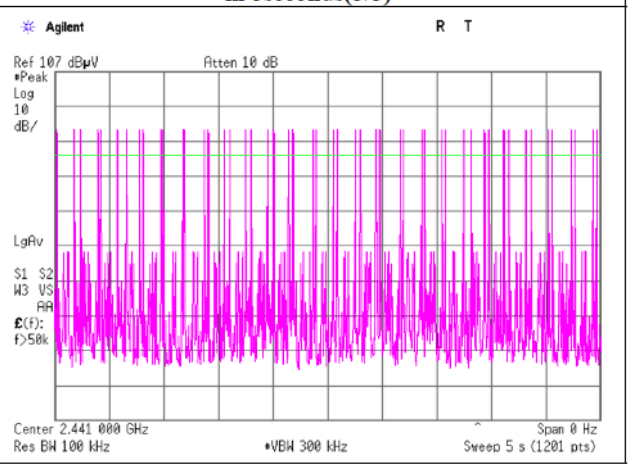
in 5seconds(3/5)



in 5seconds(4/5)



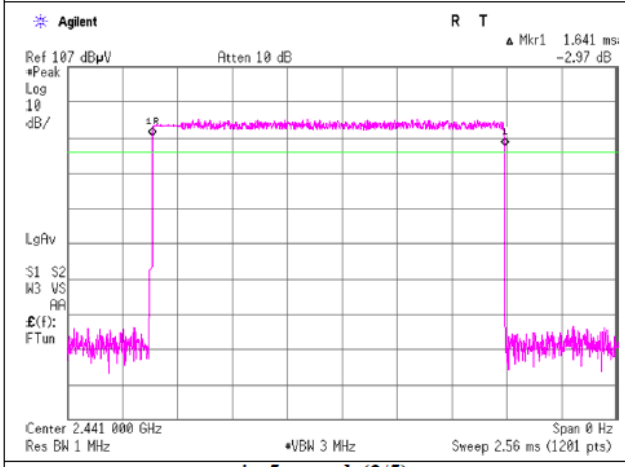
in 5seconds(5/5)



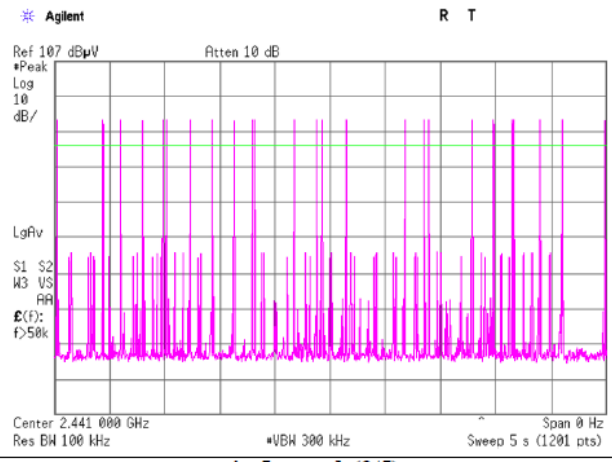
Dwell time

3-DH3

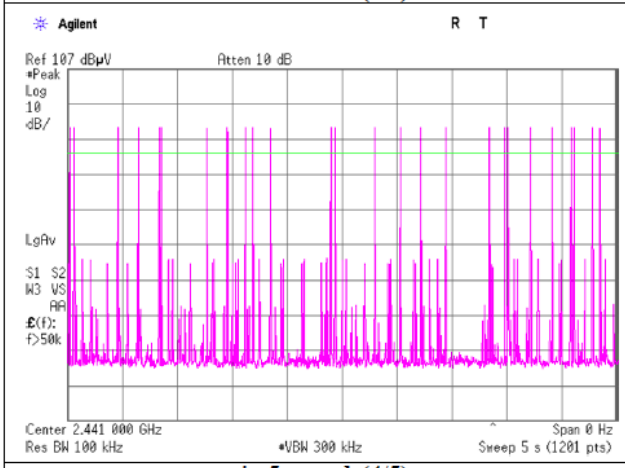
On Time



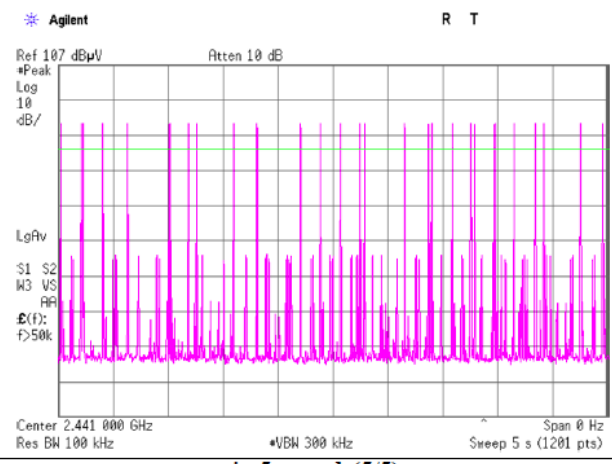
in 5seconds(1/5)



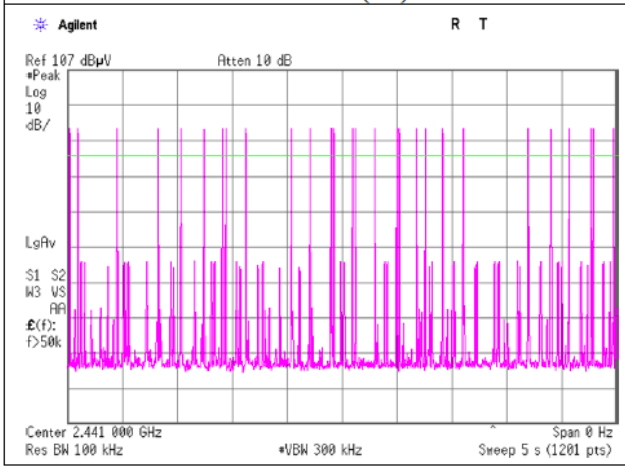
in 5seconds(2/5)



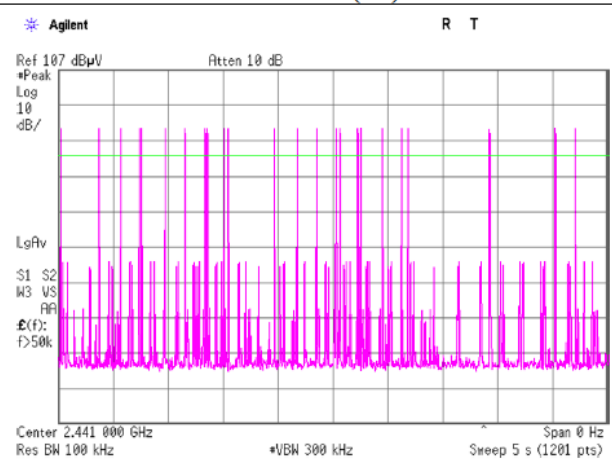
in 5seconds(3/5)



in 5seconds(4/5)



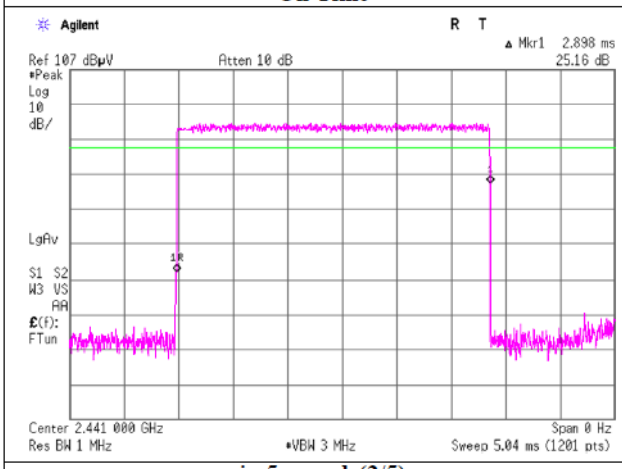
in 5seconds(5/5)



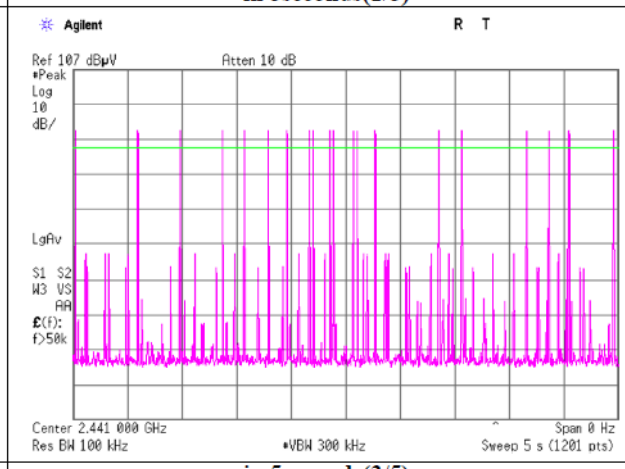
Dwell time

3-DH5

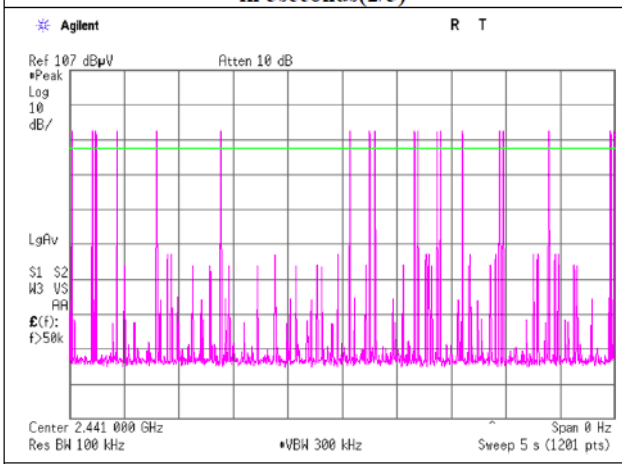
On Time



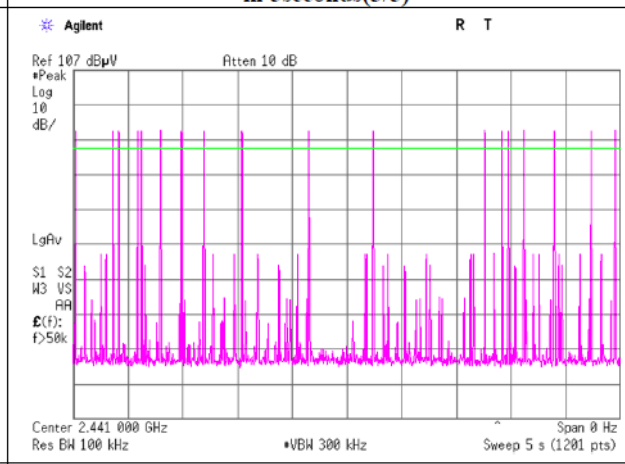
in 5seconds(1/5)



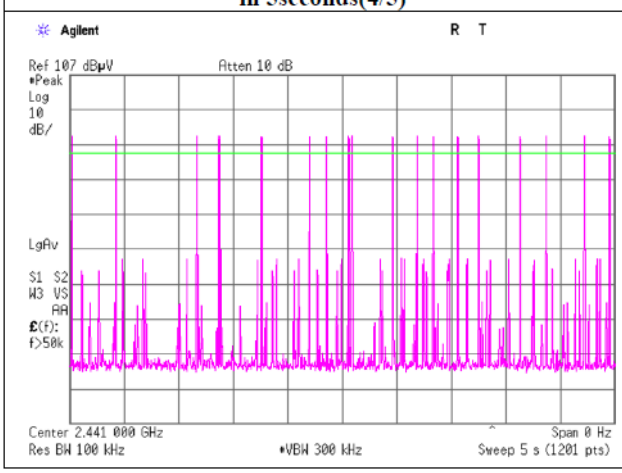
in 5seconds(2/5)



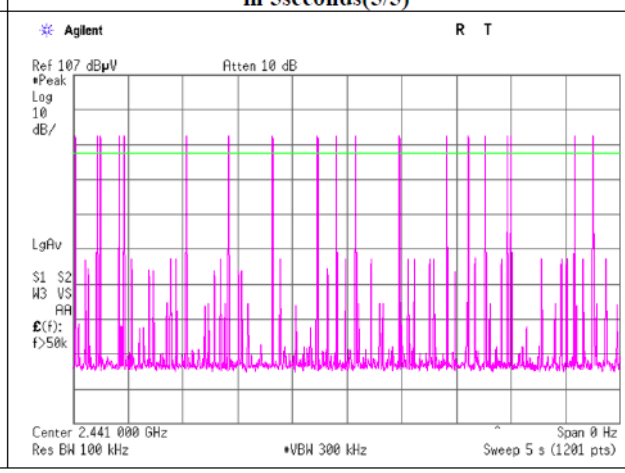
in 5seconds(3/5)



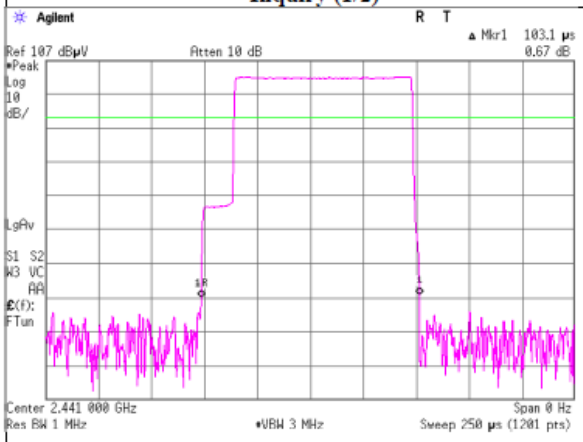
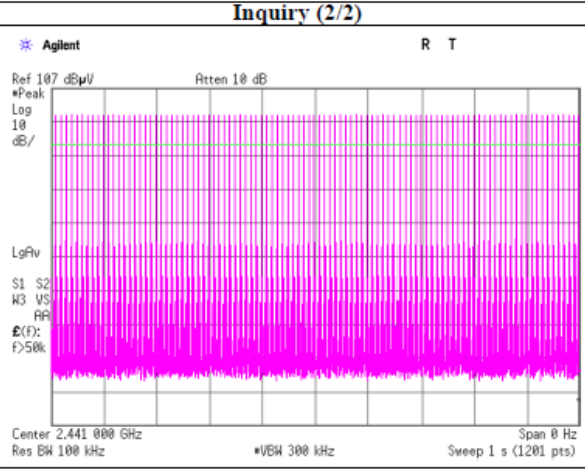
in 5seconds(4/5)



in 5seconds(5/5)



Dwell time

Inquiry (1/2)	Inquiry (2/2)
	

Peak Output Power (Conducted)

Test place UL Japan, Inc. Shonan EMC Lab. No.5 Shielded Room
Date 2010/12/27
Temperature / Humidity 25deg.C. , 35%
Engineer Akio Hayashi
Mode Tx,

BDR (DH5)

Ch	Freq.	P/M (PK) Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
Low	2402.0	-5.15	1.29	0.00	-3.86	0.41	20.97	125	24.83
Mid	2441.0	-4.75	1.30	0.00	-3.45	0.45	20.97	125	24.42
High	2480.0	-5.50	1.31	0.00	-4.19	0.38	20.97	125	25.16

EDR (2-DH5)

Ch	Freq.	P/M (PK) Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
Low	2402.0	-5.30	1.29	0.00	-4.01	0.40	20.97	125	24.98
Mid	2441.0	-4.75	1.30	0.00	-3.45	0.45	20.97	125	24.42
High	2480.0	-5.69	1.31	0.00	-4.38	0.36	20.97	125	25.35

EDR (3-DH5)

Ch	Freq.	P/M (PK) Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
Low	2402.0	-5.34	1.29	0.00	-4.05	0.39	20.97	125	25.02
Mid	2441.0	-4.89	1.30	0.00	-3.59	0.44	20.97	125	24.56
High	2480.0	-5.68	1.31	0.00	-4.37	0.37	20.97	125	25.34

Sample Calculation:
Result = Reading + Cable Loss + Atten. Loss
* In the above table, factor 0.0dB represents no use of Atten. and/or Filter.
*The test result is rounded off to one or two decimal places, so some differences might be observed.

Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	2011/1/28	2011/1/31
Temperature / Humidity	21deg.C. , 28%	20deg.C. , 29%
Engineer	Yasumasa Owaki (1-2.8GHz)	Hikaru Shirasawa (30M-1GHz, 2.8-26GHz)
Mode	Tx, 2402 MHz Bluetooth, DH5,	

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.	280.52	QP	21.9	18.4	8.3	32.0	16.6	46.0	29.4	150	0	
Hori.	838.68	QP	22.4	20.4	10.5	31.4	21.9	46.0	24.1	150	0	
Hori.	2390.00	PK	47.3	27.5	13.3	40.2	47.9	73.9	26.0	100	301	
Hori.	2400.00	PK	61.1	27.5	13.3	40.2	61.7	73.9	12.2	115	301	
Hori.	4804.00	PK	47.9	31.5	5.6	40.1	44.9	73.9	29.0	100	0	
Hori.	7206.00	PK	47.6	36.4	6.8	38.3	52.5	73.9	21.4	100	0	
Hori.	9608.00	PK	45.7	37.9	8.0	37.3	54.3	73.9	19.6	100	0	
Hori.	12010.00	PK	46.1	39.4	9.2	38.4	56.3	73.9	17.6	100	0	
Hori.	2390.00	AV	34.5	27.5	13.3	40.2	35.1	53.9	18.8	100	301	VBW=270Hz
Hori.	2400.00	AV	37.9	27.5	13.3	40.2	38.5	53.9	15.4	115	301	VBW=270Hz
Hori.	4804.00	AV	34.3	31.5	5.6	40.1	31.3	53.9	22.6	100	0	VBW=270Hz
Hori.	7206.00	AV	35.1	36.4	6.8	38.3	40.0	53.9	13.9	100	0	VBW=270Hz
Hori.	9608.00	AV	33.4	37.9	8.0	37.3	42.0	53.9	11.9	100	0	VBW=270Hz
Hori.	12010.00	AV	34.1	39.4	9.2	38.4	44.3	53.9	9.6	100	0	VBW=270Hz
Vert.	280.52	QP	21.9	18.4	8.3	32.0	16.6	46.0	29.4	100	0	
Vert.	838.68	QP	22.4	20.4	10.5	31.4	21.9	46.0	24.1	100	0	
Vert.	2390.00	PK	46.7	27.5	13.3	40.2	47.3	73.9	26.6	100	91	
Vert.	2400.00	PK	60.2	27.5	13.3	40.2	60.8	73.9	13.1	100	91	
Vert.	4804.00	PK	46.2	31.5	5.6	40.1	43.2	73.9	30.7	100	0	
Vert.	7206.00	PK	47.4	36.4	6.8	38.3	52.3	73.9	21.6	100	0	
Vert.	9608.00	PK	45.5	37.9	8.0	37.3	54.1	73.9	19.8	100	0	
Vert.	12010.00	PK	46.0	39.4	9.2	38.4	56.2	73.9	17.7	100	0	
Vert.	2390.00	AV	35.5	27.5	13.3	40.2	36.1	53.9	17.8	100	91	VBW=270Hz
Vert.	2400.00	AV	37.2	27.5	13.3	40.2	37.8	53.9	16.1	100	91	VBW=270Hz
Vert.	4804.00	AV	34.3	31.5	5.6	40.1	31.3	53.9	22.6	100	0	VBW=270Hz
Vert.	7206.00	AV	35.1	36.4	6.8	38.3	40.0	53.9	13.9	100	0	VBW=270Hz
Vert.	9608.00	AV	33.4	37.9	8.0	37.3	42.0	53.9	11.9	100	0	VBW=270Hz
Vert.	12010.00	AV	34.1	39.4	9.2	38.4	44.3	53.9	9.6	100	0	VBW=270Hz

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

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

Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.	
	No.3 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	2011/1/28	2011/1/31
Temperature / Humidity	21deg.C. , 28%	20deg.C. , 29%
Engineer	Yasumasa Owaki	Hikaru Shirasawa
	(1-2.8GHz)	(30M-1GHz, 2.8-26GHz)
Mode	Tx, 2441 MHz	
	Bluetooth, DH5,	

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.	280.52	QP	22.1	18.4	8.3	32.0	16.8	46.0	29.2	150	0	
Hori.	838.68	QP	22.1	20.4	10.5	31.4	21.6	46.0	24.4	150	0	
Hori.	4882.00	PK	46.5	31.7	5.7	40.0	43.9	73.9	30.0	100	0	
Hori.	7323.00	PK	48.3	36.7	6.9	38.5	53.4	73.9	20.5	100	0	
Hori.	9764.00	PK	45.8	38.2	8.0	37.4	54.6	73.9	19.3	100	0	
Hori.	12205.00	PK	46.0	39.2	9.2	38.1	56.3	73.9	17.6	100	0	
Hori.	4882.00	AV	34.2	31.7	5.7	40.0	31.6	53.9	22.3	100	0	VBW=270Hz
Hori.	7323.00	AV	34.9	36.7	6.9	38.5	40.0	53.9	13.9	100	0	VBW=270Hz
Hori.	9764.00	AV	33.5	38.2	8.0	37.4	42.3	53.9	11.6	100	0	VBW=270Hz
Hori.	12205.00	AV	34.1	39.2	9.2	38.1	44.4	53.9	9.5	100	0	VBW=270Hz
Vert.	280.52	QP	22.1	18.4	8.3	32.0	16.8	46.0	29.2	100	0	
Vert.	838.68	QP	22.5	20.4	10.5	31.4	22.0	46.0	24.0	100	0	
Vert.	4882.00	PK	46.7	31.7	5.7	40.0	44.1	73.9	29.8	100	0	
Vert.	7323.00	PK	47.3	36.7	6.9	38.5	52.4	73.9	21.5	100	0	
Vert.	9764.00	PK	46.2	38.2	8.0	37.4	55.0	73.9	18.9	100	0	
Vert.	12205.00	PK	46.8	39.2	9.2	38.1	57.1	73.9	16.8	100	0	
Vert.	4882.00	AV	34.3	31.7	5.7	40.0	31.7	53.9	22.2	100	0	VBW=270Hz
Vert.	7323.00	AV	34.9	36.7	6.9	38.5	40.0	53.9	13.9	100	0	VBW=270Hz
Vert.	9764.00	AV	33.5	38.2	8.0	37.4	42.3	53.9	11.6	100	0	VBW=270Hz
Vert.	12205.00	AV	34.1	39.2	9.2	38.1	44.4	53.9	9.5	100	0	VBW=270Hz

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

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

Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	2011/1/28	2011/1/31
Temperature / Humidity	21deg.C. , 28%	20deg.C. , 29%
Engineer	Yasumasa Owaki (1-2.8GHz)	Hikaru Shirasawa (30M-1GHz, 2.8-26GHz)
Mode	Tx, 2480 MHz Bluetooth, DH5,	

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.	280.52	QP	21.6	18.4	8.3	32.0	16.3	46.0	29.7	150	0	
Hori.	838.68	QP	22.2	20.4	10.5	31.4	21.7	46.0	24.3	150	0	
Hori.	2483.50	PK	47.1	27.6	13.3	40.1	47.9	73.9	26.0	115	0	
Hori.	4960.00	PK	46.5	31.9	5.7	40.0	44.1	73.9	29.8	100	0	
Hori.	7440.00	PK	47.5	36.9	6.9	38.7	52.6	73.9	21.3	100	0	
Hori.	9920.00	PK	45.2	38.4	8.1	37.5	54.2	73.9	19.7	100	0	
Hori.	12400.00	PK	46.4	39.1	9.3	37.9	56.9	73.9	17.0	100	0	
Hori.	2483.50	AV	34.9	27.6	13.3	40.1	35.7	53.9	18.2	115	0	VBW=270Hz
Hori.	4960.00	AV	34.5	31.9	5.7	40.0	32.1	53.9	21.8	100	0	VBW=270Hz
Hori.	7440.00	AV	34.9	36.9	6.9	38.7	40.0	53.9	13.9	100	0	VBW=270Hz
Hori.	9920.00	AV	33.3	38.4	8.1	37.5	42.3	53.9	11.6	100	0	VBW=270Hz
Hori.	12400.00	AV	33.6	39.1	9.3	37.9	44.1	53.9	9.8	100	0	VBW=270Hz
Vert.	280.52	QP	21.7	18.4	8.3	32.0	16.4	46.0	29.6	100	0	
Vert.	838.68	QP	22.1	20.4	10.5	31.4	21.6	46.0	24.4	100	0	
Vert.	2483.50	PK	46.4	27.6	13.3	40.1	47.2	73.9	26.7	100	88	
Vert.	4960.00	PK	47.5	31.9	5.7	40.0	45.1	73.9	28.8	100	0	
Vert.	7440.00	PK	47.5	36.9	6.9	38.7	52.6	73.9	21.3	100	0	
Vert.	9920.00	PK	45.7	38.4	8.1	37.5	54.7	73.9	19.2	100	0	
Vert.	12400.00	PK	46.6	39.1	9.3	37.9	57.1	73.9	16.8	100	0	
Vert.	2483.50	AV	34.7	27.6	13.3	40.1	35.5	53.9	18.4	100	88	VBW=270Hz
Vert.	4960.00	AV	34.4	31.9	5.7	40.0	32.0	53.9	21.9	100	0	VBW=270Hz
Vert.	7440.00	AV	35.0	36.9	6.9	38.7	40.1	53.9	13.8	100	0	VBW=270Hz
Vert.	9920.00	AV	33.4	38.4	8.1	37.5	42.4	53.9	11.5	100	0	VBW=270Hz
Vert.	12400.00	AV	33.8	39.1	9.3	37.9	44.3	53.9	9.6	100	0	VBW=270Hz

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

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

Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.	
	No.3 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	2011/1/28	2011/1/31
Temperature / Humidity	21deg.C. , 28%	20deg.C. , 29%
Engineer	Yasumasa Owaki	Hikaru Shirasawa
	(1-2.8GHz)	(30M-1GHz, 2.8-26GHz)
Mode	Tx, 2402 MHz	
	Bluetooth, 3-DH5,	

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.	293.51	QP	22.1	18.9	8.4	32.0	17.4	46.0	28.6	200	0	
Hori.	960.00	QP	22.8	21.3	10.9	30.5	24.5	46.0	21.5	150	0	
Hori.	2390.00	PK	46.6	27.5	13.3	40.2	47.2	73.9	26.7	118	183	
Hori.	2400.00	PK	59.7	27.5	13.3	40.2	60.3	73.9	13.6	118	183	
Hori.	4804.00	PK	46.4	31.5	5.6	40.1	43.4	73.9	30.5	100	0	
Hori.	7206.00	PK	47.3	36.4	6.8	38.3	52.2	73.9	21.7	100	0	
Hori.	9608.00	PK	45.9	37.9	8.0	37.3	54.5	73.9	19.4	100	0	
Hori.	12010.00	PK	46.1	39.4	9.2	38.4	56.3	73.9	17.6	100	0	
Hori.	2390.00	AV	34.5	27.5	13.3	40.2	35.1	53.9	18.8	118	183	VBW=270Hz
Hori.	2400.00	AV	38.5	27.5	13.3	40.2	39.1	53.9	14.8	118	183	VBW=270Hz
Hori.	4804.00	AV	34.4	31.5	5.6	40.1	31.4	53.9	22.5	100	0	VBW=270Hz
Hori.	7206.00	AV	35.1	36.4	6.8	38.3	40.0	53.9	13.9	100	0	VBW=270Hz
Hori.	9608.00	AV	33.4	37.9	8.0	37.3	42.0	53.9	11.9	100	0	VBW=270Hz
Hori.	12010.00	AV	34.0	39.4	9.2	38.4	44.2	53.9	9.7	100	0	VBW=270Hz
Vert.	293.51	QP	22.1	18.9	8.4	32.0	17.4	46.0	28.6	100	0	
Vert.	960.00	QP	22.8	21.3	10.9	30.5	24.5	46.0	21.5	100	0	
Vert.	2390.00	PK	46.1	27.5	13.3	40.2	46.7	73.9	27.2	100	325	
Vert.	2400.00	PK	57.2	27.5	13.3	40.2	57.8	73.9	16.1	100	325	
Vert.	4804.00	PK	46.9	31.5	5.6	40.1	43.9	73.9	30.0	100	0	
Vert.	7206.00	PK	48.4	36.4	6.8	38.3	53.3	73.9	20.6	100	0	
Vert.	9608.00	PK	45.2	37.9	8.0	37.3	53.8	73.9	20.1	100	0	
Vert.	12010.00	PK	46.5	39.4	9.2	38.4	56.7	73.9	17.2	100	0	
Vert.	2390.00	AV	34.2	27.5	13.3	40.2	34.8	53.9	19.1	100	325	VBW=270Hz
Vert.	2400.00	AV	36.9	27.5	13.3	40.2	37.5	53.9	16.4	100	325	VBW=270Hz
Vert.	4804.00	AV	34.3	31.5	5.6	40.1	31.3	53.9	22.6	100	0	VBW=270Hz
Vert.	7206.00	AV	35.0	36.4	6.8	38.3	39.9	53.9	14.0	100	0	VBW=270Hz
Vert.	9608.00	AV	33.3	37.9	8.0	37.3	41.9	53.9	12.0	100	0	VBW=270Hz
Vert.	12010.00	AV	33.5	39.4	9.2	38.4	43.7	53.9	10.2	100	0	VBW=270Hz

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

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

Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab. No.3 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	2011/1/28	2011/1/31
Temperature / Humidity	21deg.C. , 28%	20deg.C. , 29%
Engineer	Yasumasa Owaki (1-2.8GHz)	Hikaru Shirasawa (30M-1GHz, 2.8-26GHz)
Mode	Tx, 2441 MHz Bluetooth, 3-DH5,	

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.	293.51	QP	22.1	18.9	8.4	32.0	17.4	46.0	28.6	200	0	
Hori.	960.00	QP	22.8	21.3	10.9	30.5	24.5	46.0	21.5	150	0	
Hori.	4882.00	PK	47.6	31.7	5.7	40.0	45.0	73.9	28.9	100	0	
Hori.	7323.00	PK	47.1	36.7	6.9	38.5	52.2	73.9	21.7	100	0	
Hori.	9764.00	PK	45.3	38.2	8.0	37.4	54.1	73.9	19.8	100	0	
Hori.	12205.00	PK	46.8	39.2	9.2	38.1	57.1	73.9	16.8	100	0	
Hori.	4882.00	AV	34.3	31.7	5.7	40.0	31.7	53.9	22.2	100	0	VBW=270Hz
Hori.	7323.00	AV	34.9	36.7	6.9	38.5	40.0	53.9	13.9	100	0	VBW=270Hz
Hori.	9764.00	AV	33.5	38.2	8.0	37.4	42.3	53.9	11.6	100	0	VBW=270Hz
Hori.	12205.00	AV	34.1	39.2	9.2	38.1	44.4	53.9	9.5	100	0	VBW=270Hz
Vert.	293.51	QP	22.1	18.9	8.4	32.0	17.4	46.0	28.6	100	0	
Vert.	960.00	QP	22.8	21.3	10.9	30.5	24.5	46.0	21.5	100	0	
Vert.	4882.00	PK	46.2	31.7	5.7	40.0	43.6	73.9	30.3	100	0	
Vert.	7323.00	PK	47.7	36.7	6.9	38.5	52.8	73.9	21.1	100	0	
Vert.	9764.00	PK	45.8	38.2	8.0	37.4	54.6	73.9	19.3	100	0	
Vert.	12205.00	PK	46.3	39.2	9.2	38.1	56.6	73.9	17.3	100	0	
Vert.	4882.00	AV	34.3	31.7	5.7	40.0	31.7	53.9	22.2	100	0	VBW=270Hz
Vert.	7323.00	AV	34.8	36.7	6.9	38.5	39.9	53.9	14.0	100	0	VBW=270Hz
Vert.	9764.00	AV	33.4	38.2	8.0	37.4	42.2	53.9	11.7	100	0	VBW=270Hz
Vert.	12205.00	AV	34.2	39.2	9.2	38.1	44.5	53.9	9.4	100	0	VBW=270Hz

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

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

Radiated Emission

Test place	UL Japan, Inc. Shonan EMC Lab.	
	No.3 Semi Anechoic Chamber	No.3 Semi Anechoic Chamber
Date	2011/1/28	2011/1/31
Temperature / Humidity	21deg.C. , 28%	20deg.C. , 29%
Engineer	Yasumasa Owaki	Hikaru Shirasawa
	(1-2.8GHz)	(30M-1GHz, 2.8-26GHz)
Mode	Tx, 2480 MHz	
	Bluetooth, 3-DH5,	

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.	293.51	QP	22.1	18.9	8.4	32.0	17.4	46.0	28.6	200	0	
Hori.	960.00	QP	22.8	21.3	10.9	30.5	24.5	46.0	21.5	150	0	
Hori.	2483.50	PK	46.7	27.6	13.3	40.1	47.5	73.9	26.4	113	172	
Hori.	4960.00	PK	46.7	31.9	5.7	40.0	44.3	73.9	29.6	100	0	
Hori.	7440.00	PK	46.9	36.9	6.9	38.7	52.0	73.9	21.9	100	0	
Hori.	9920.00	PK	45.9	38.4	8.1	37.5	54.9	73.9	19.0	100	0	
Hori.	12400.00	PK	46.0	39.1	9.3	37.9	56.5	73.9	17.4	100	0	
Hori.	2483.50	AV	34.9	27.6	13.3	40.1	35.7	53.9	18.2	113	172	VBW=270Hz
Hori.	4960.00	AV	34.4	31.9	5.7	40.0	32.0	53.9	21.9	100	0	VBW=270Hz
Hori.	7440.00	AV	34.9	36.9	6.9	38.7	40.0	53.9	13.9	100	0	VBW=270Hz
Hori.	9920.00	AV	33.2	38.4	8.1	37.5	42.2	53.9	11.7	100	0	VBW=270Hz
Hori.	12400.00	AV	33.6	39.1	9.3	37.9	44.1	53.9	9.8	100	0	VBW=270Hz
Vert.	293.51	QP	22.1	18.9	8.4	32.0	17.4	46.0	28.6	100	0	
Vert.	960.00	QP	22.7	21.3	10.9	30.5	24.4	46.0	21.6	100	0	
Vert.	2483.50	PK	47.3	27.6	13.3	40.1	48.1	73.9	25.8	100	87	
Vert.	4960.00	PK	46.9	31.9	5.7	40.0	44.5	73.9	29.4	100	0	
Vert.	7440.00	PK	47.0	36.9	6.9	38.7	52.1	73.9	21.8	100	0	
Vert.	9920.00	PK	45.3	38.4	8.1	37.5	54.3	73.9	19.6	100	0	
Vert.	12400.00	PK	46.8	39.1	9.3	37.9	57.3	73.9	16.6	100	0	
Vert.	2483.50	AV	34.7	27.6	13.3	40.1	35.5	53.9	18.4	100	87	VBW=270Hz
Vert.	4960.00	AV	34.4	31.9	5.7	40.0	32.0	53.9	21.9	100	0	VBW=270Hz
Vert.	7440.00	AV	35.0	36.9	6.9	38.7	40.1	53.9	13.8	100	0	VBW=270Hz
Vert.	9920.00	AV	33.2	38.4	8.1	37.5	42.2	53.9	11.7	100	0	VBW=270Hz
Vert.	12400.00	AV	33.6	39.1	9.3	37.9	44.1	53.9	9.8	100	0	VBW=270Hz

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

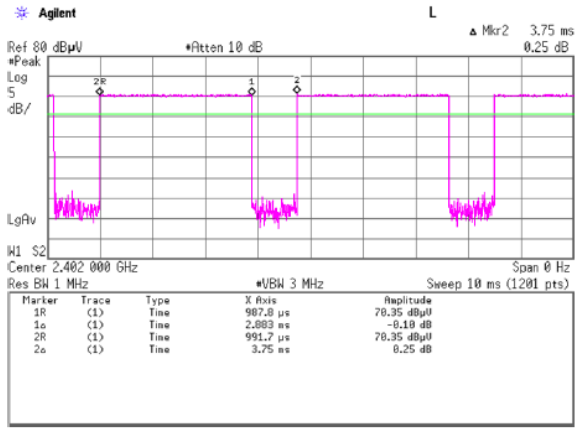
*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB).

Spurious emission (Radiated)

DH5,

VBW (AV) Calculation

VBW: 1/x = 266Hz<270Hz
x: (Tx on+Tx off) =3.75ms

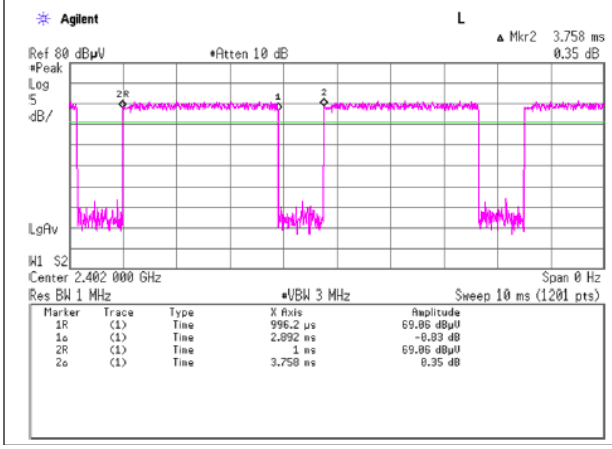


Spurious emission (Radiated)

3-DH5,

VBW (AV) Calculation

VBW: 1/x = 266Hz<270Hz
x: (Tx on+Tx off) =3.758ms

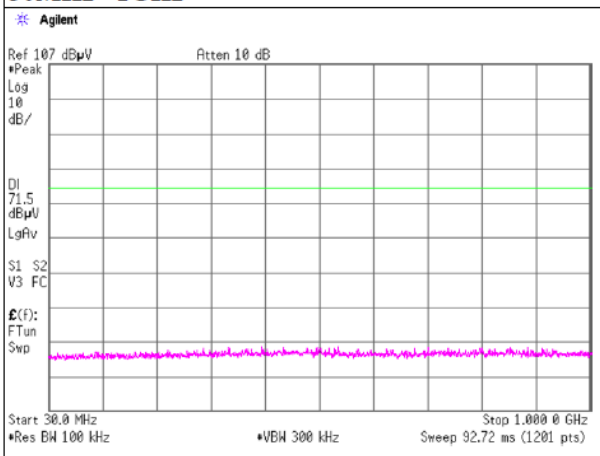


Spurious emission (Conducted)

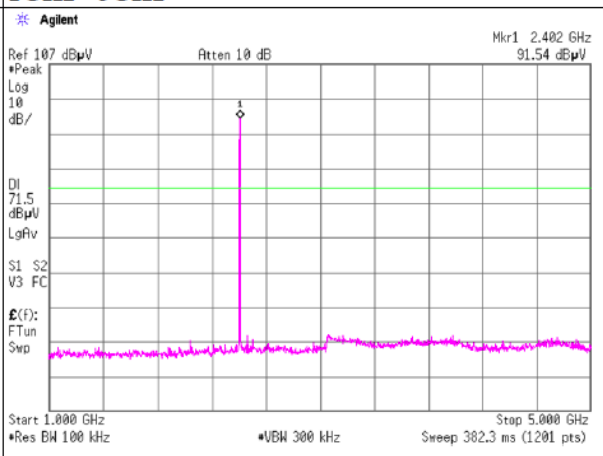
DH5,

Tx, 2402MHz

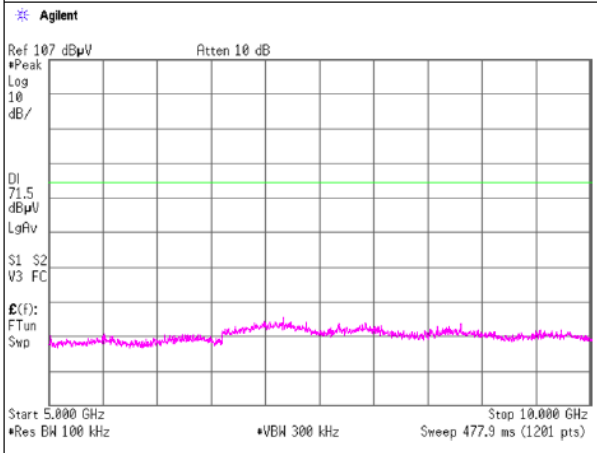
30MHz - 1GHz



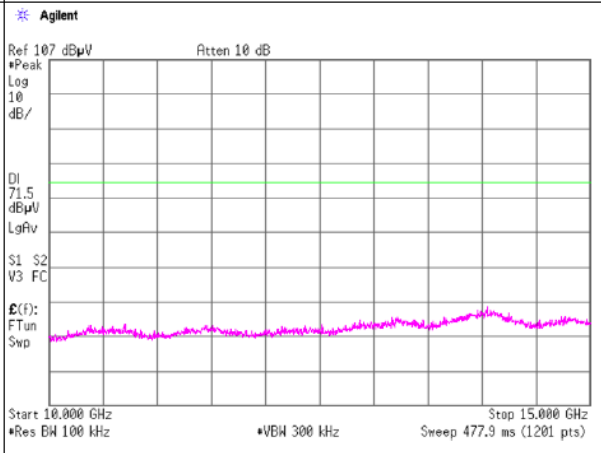
1GHz - 5GHz



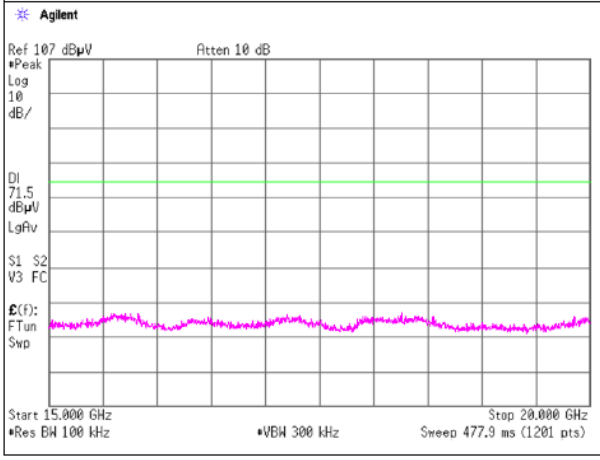
5GHz - 10GHz



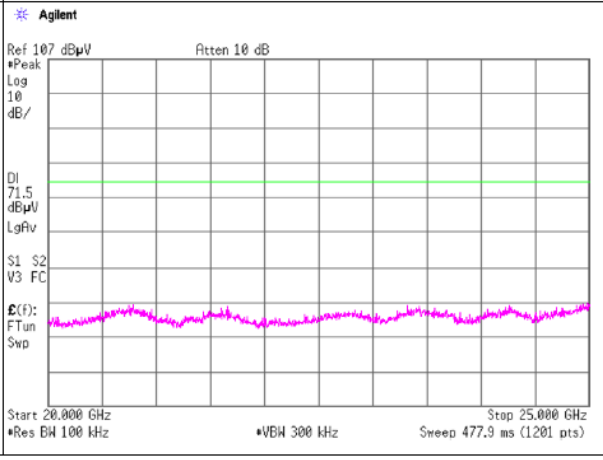
10GHz - 15GHz



15GHz - 20GHz



20GHz - 25GHz

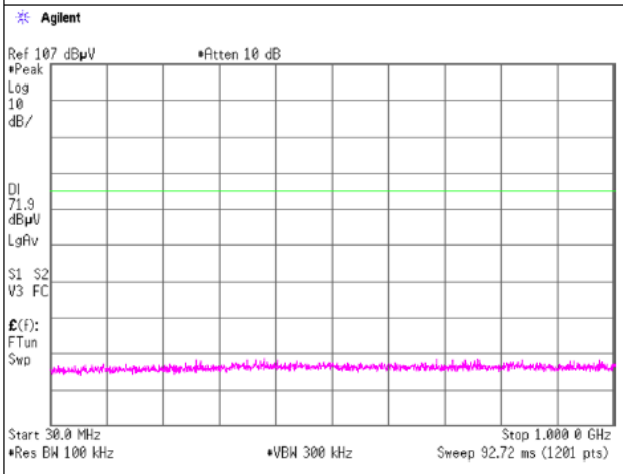


Spurious emission (Conducted)

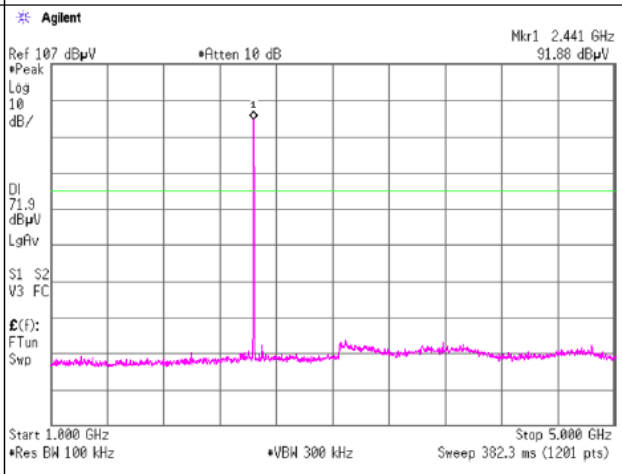
DH5,

Tx, 2441MHz

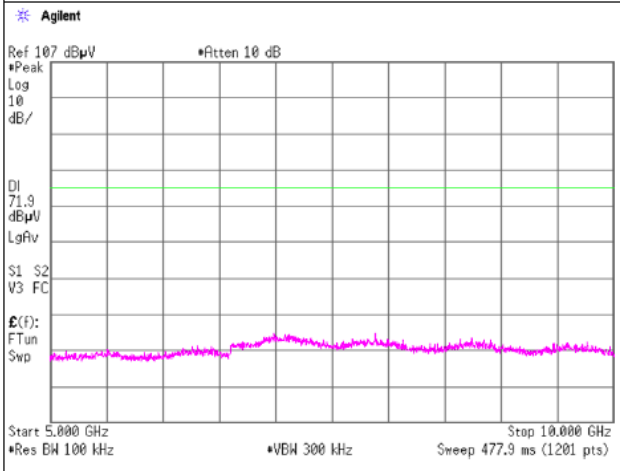
30MHz - 1GHz



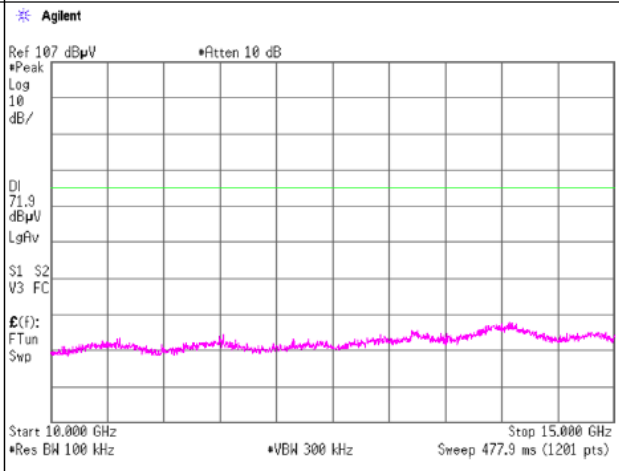
1GHz - 5GHz



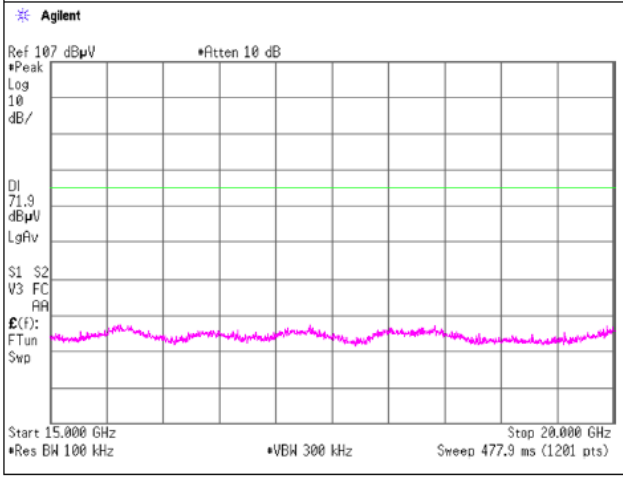
5GHz - 10GHz



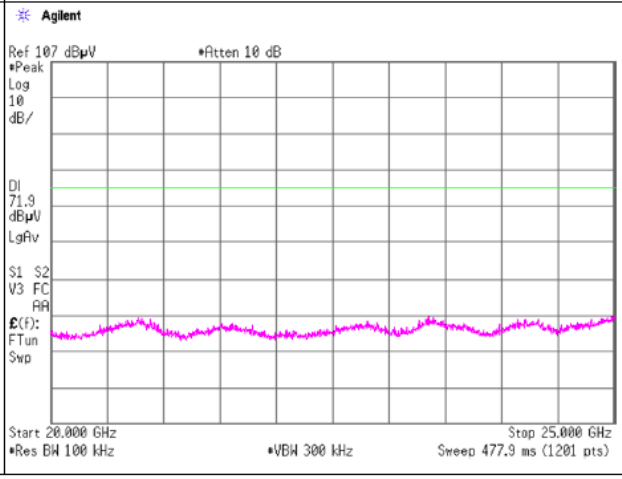
10GHz - 15GHz



15GHz - 20GHz



20GHz - 25GHz

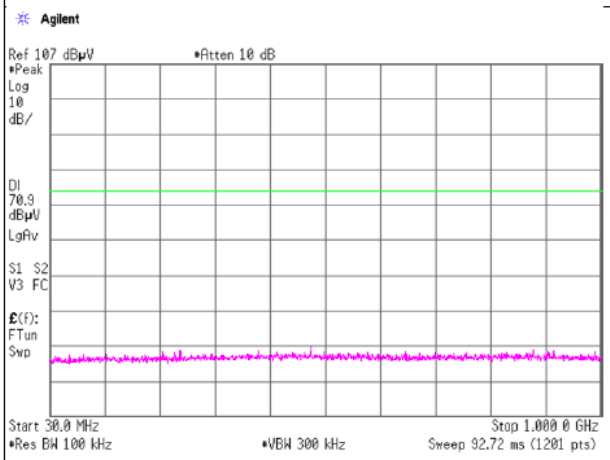


Spurious emission (Conducted)

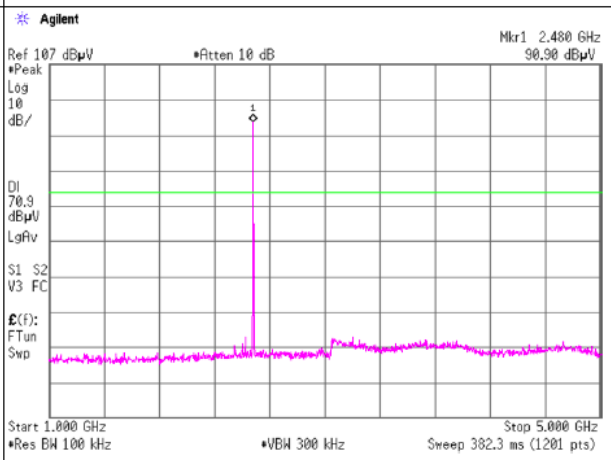
DH5,

Tx, 2480MHz

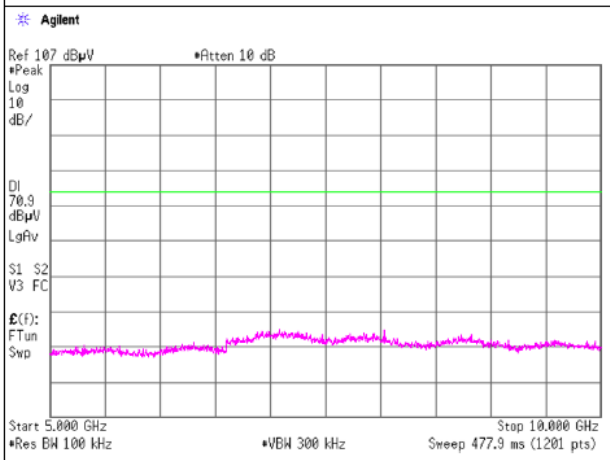
30MHz - 1GHz



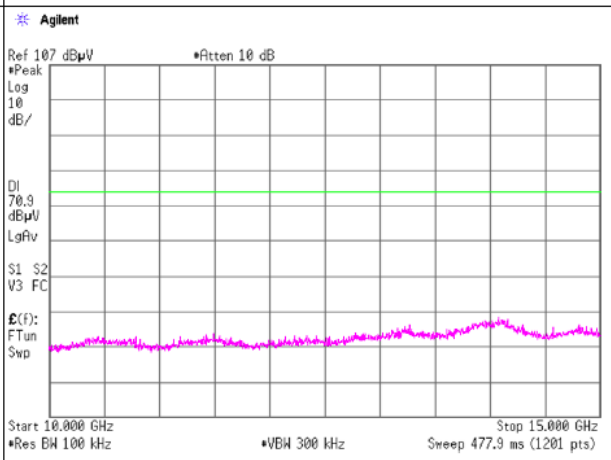
1GHz - 5GHz



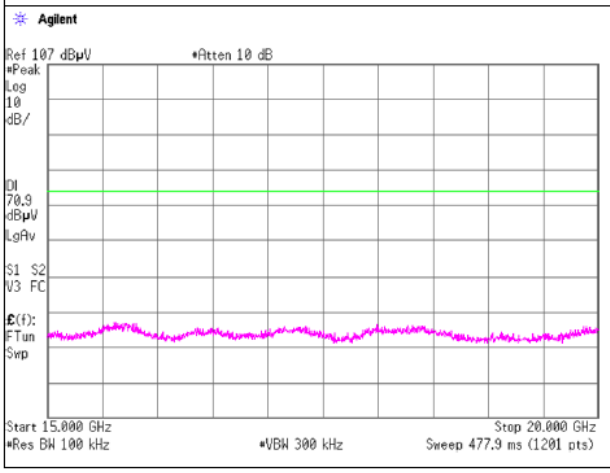
5GHz - 10GHz



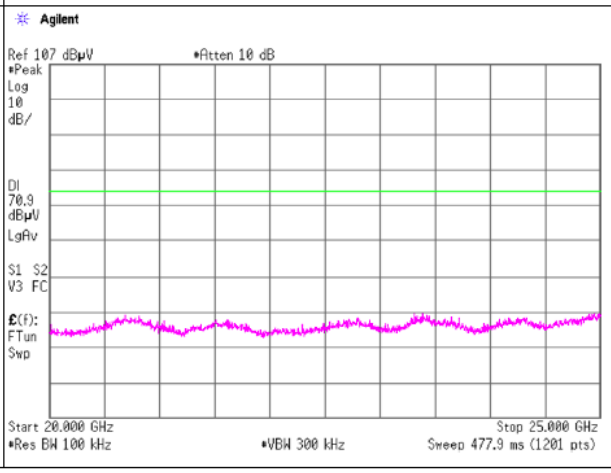
10GHz - 15GHz



15GHz - 20GHz



20GHz - 25GHz

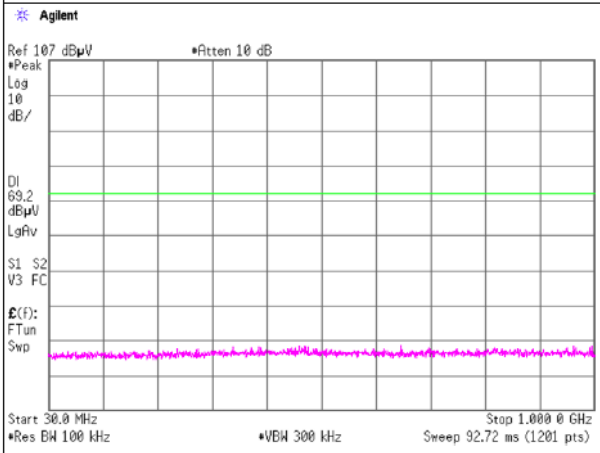


Spurious emission (Conducted)

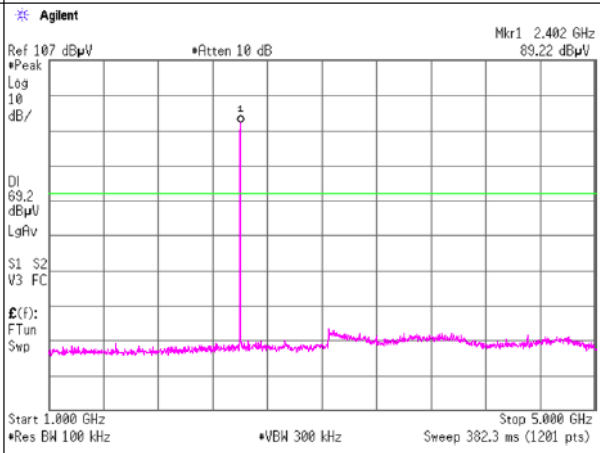
3-DH5,

Tx, 2402MHz

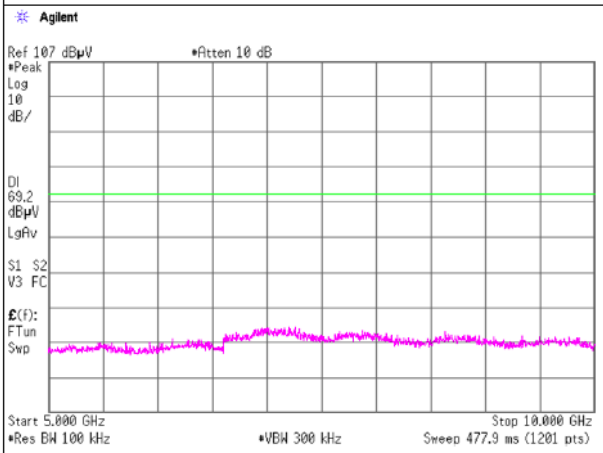
30MHz - 1GHz



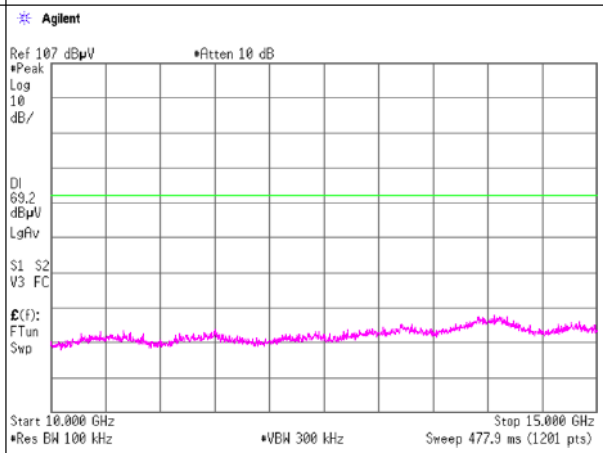
1GHz - 5GHz



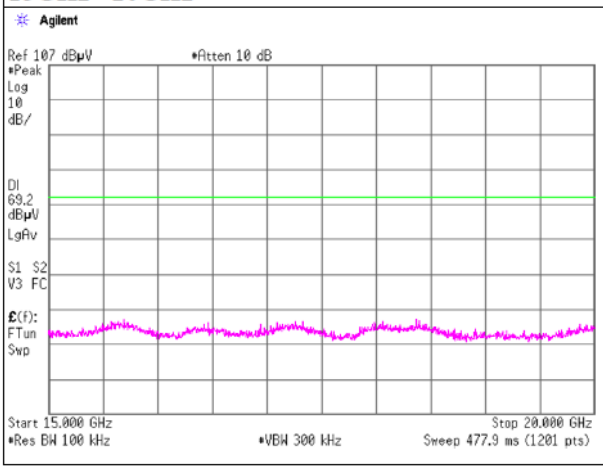
5GHz - 10GHz



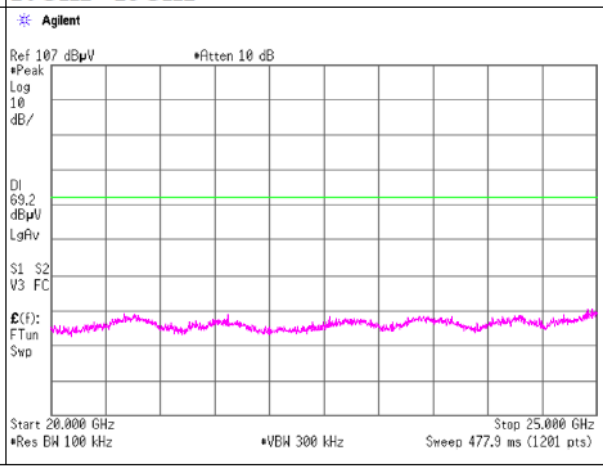
10GHz - 15GHz



15GHz - 20GHz



20GHz - 25GHz

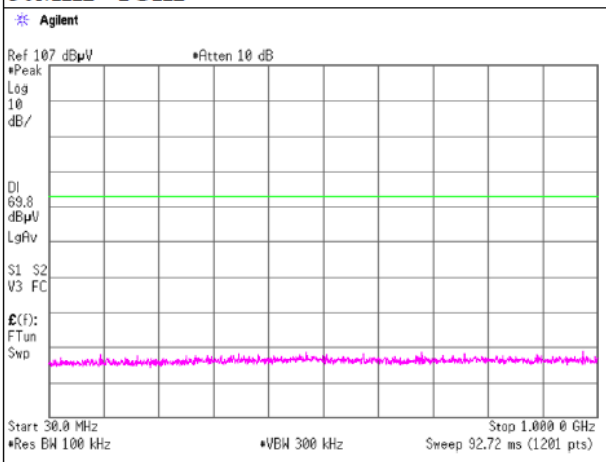


Spurious emission (Conducted)

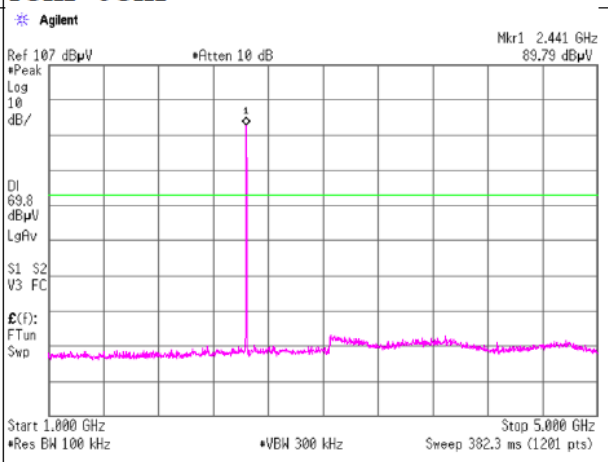
3-DH5,

Tx, 2441MHz

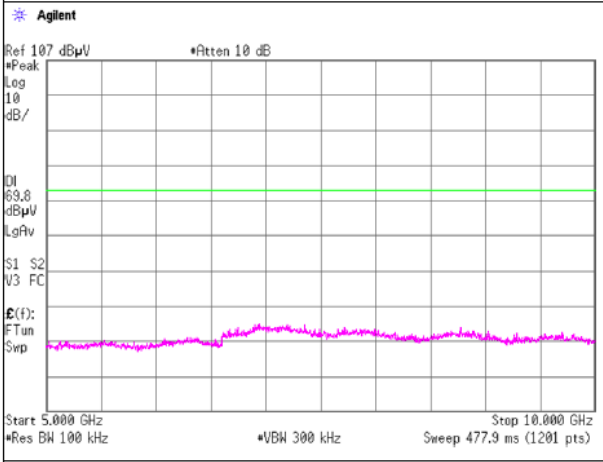
30MHz - 1GHz



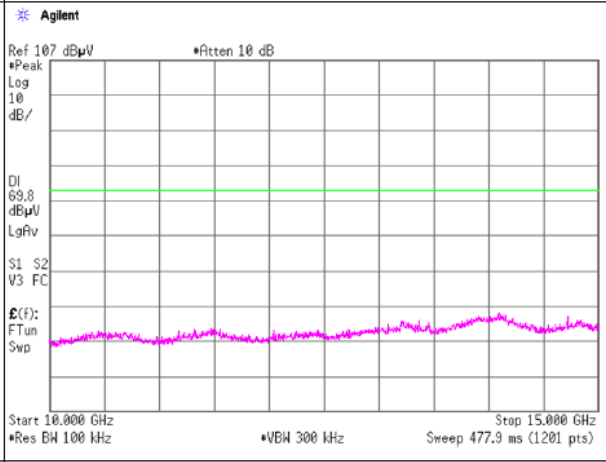
1GHz - 5GHz



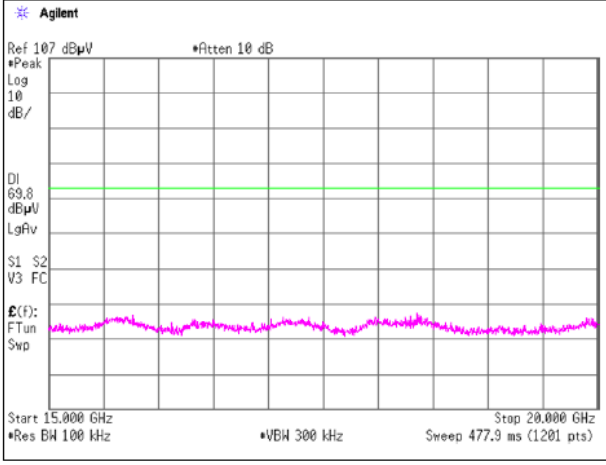
5GHz - 10GHz



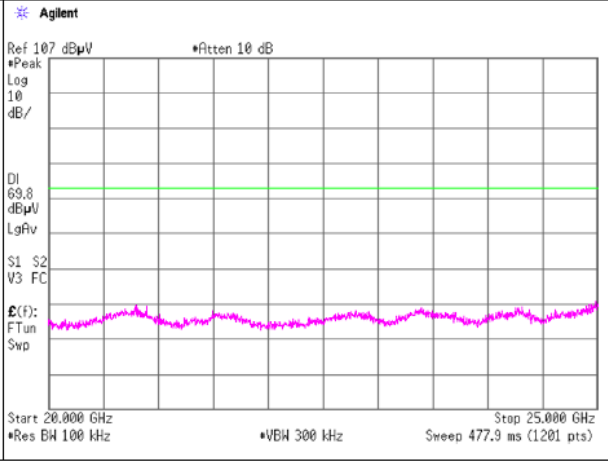
10GHz - 15GHz



15GHz - 20GHz



20GHz - 25GHz

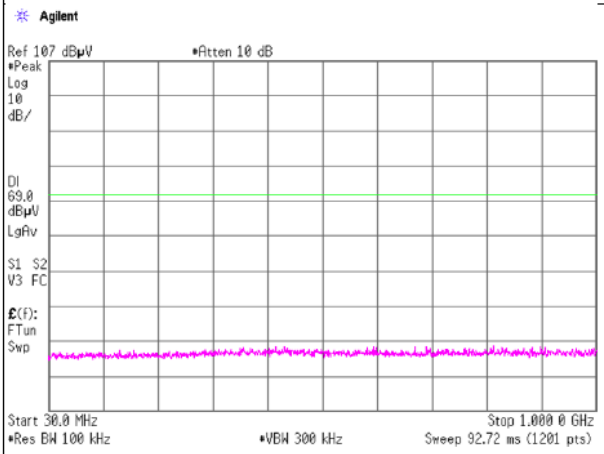


Spurious emission (Conducted)

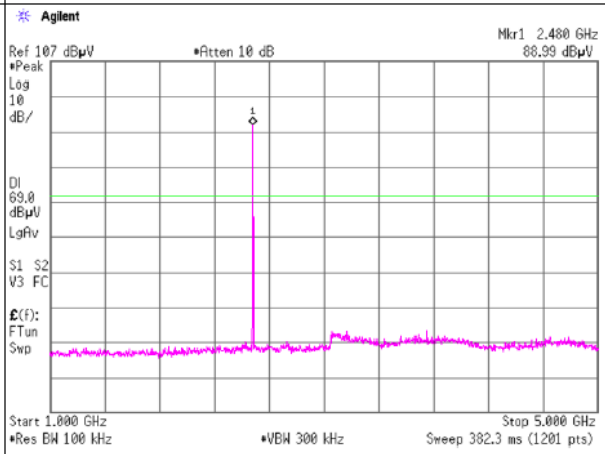
3-DH5,

Tx, 2480MHz

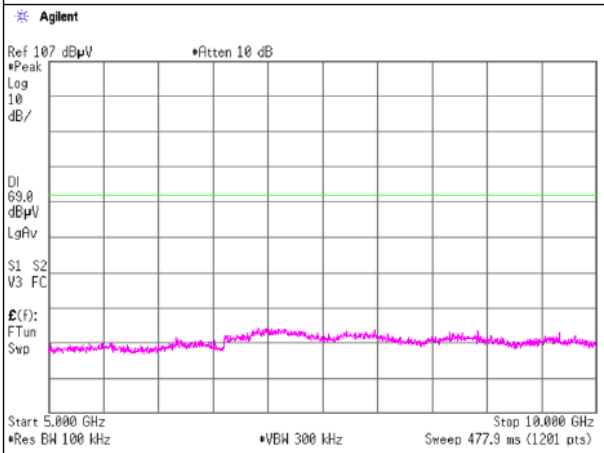
30MHz - 1GHz



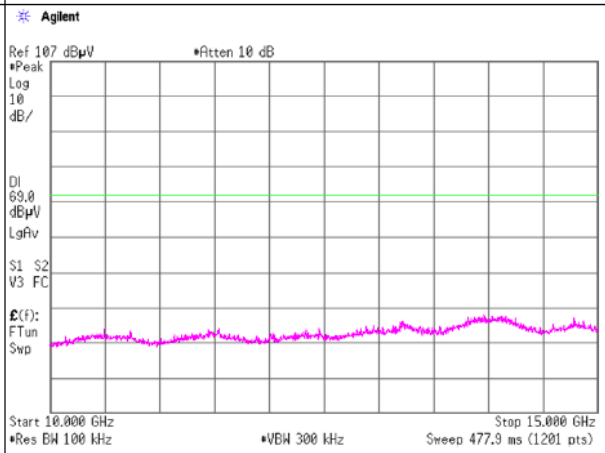
1GHz - 5GHz



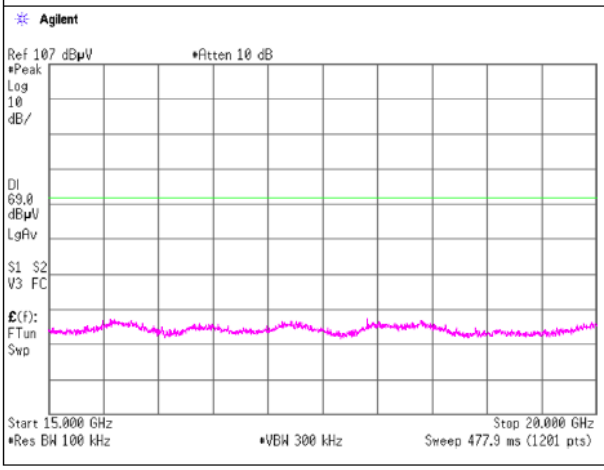
5GHz - 10GHz



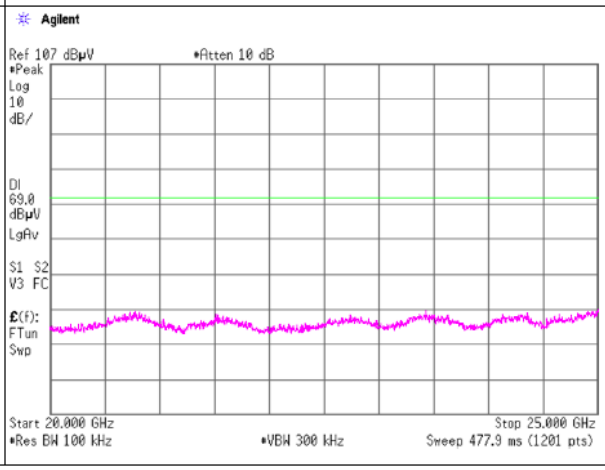
10GHz - 15GHz



15GHz - 20GHz



20GHz - 25GHz



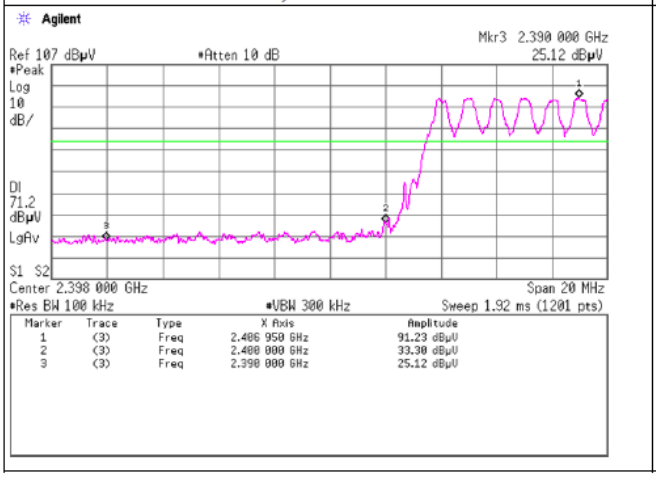
Spurious emission (Conducted)

Band Edge compliance

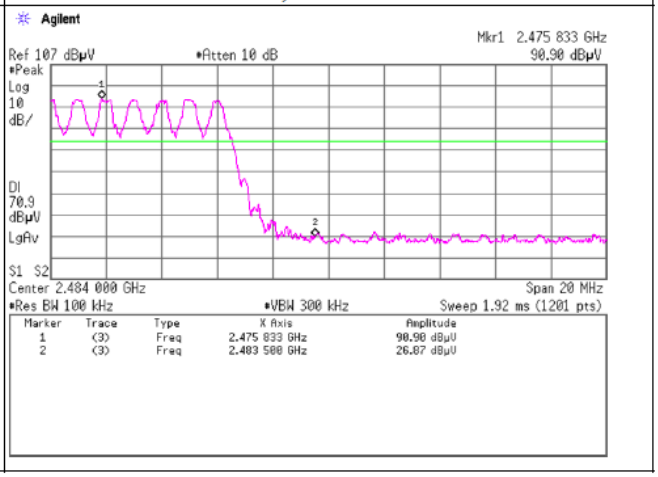
DH5,

Hopping ON

Tx, 2402MHz

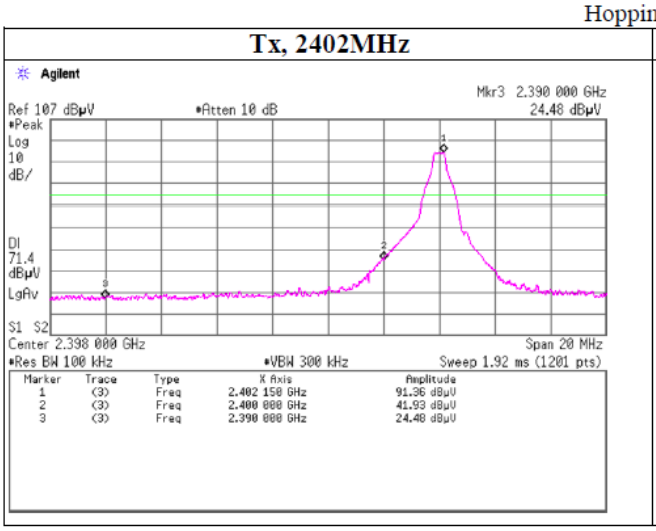


Tx, 2480MHz

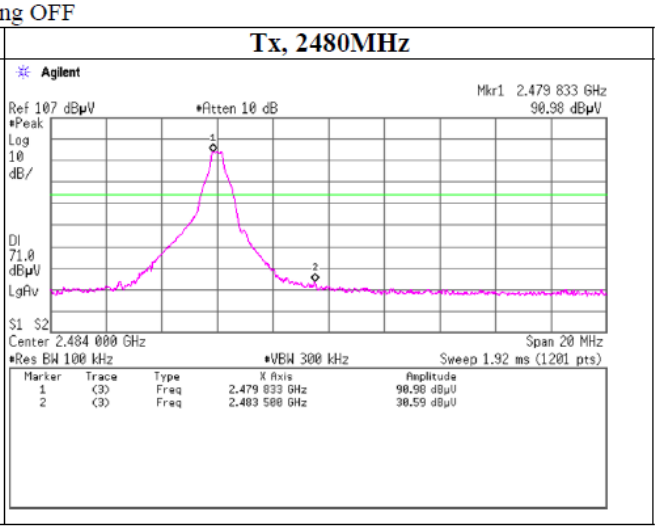


Hopping OFF

Tx, 2402MHz



Tx, 2480MHz



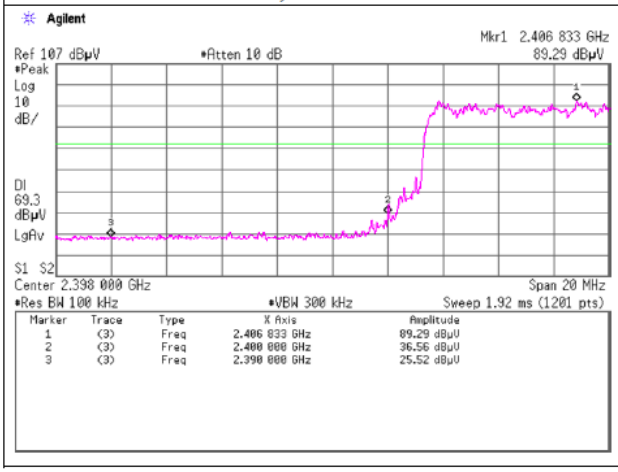
Spurious emission (Conducted)

Band Edge compliance

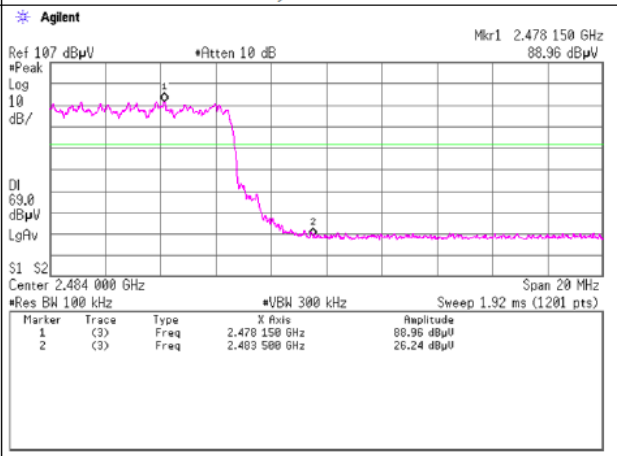
3-DH5,

Hopping ON

Tx, 2402MHz

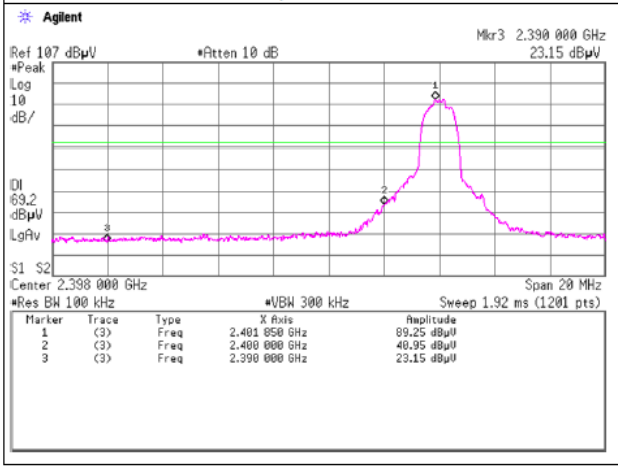


Tx, 2480MHz

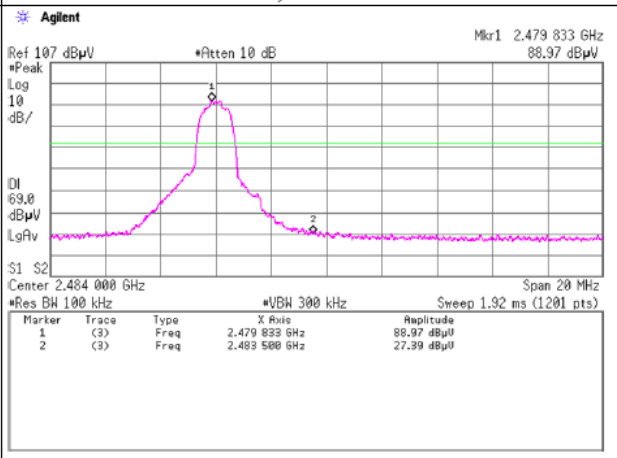


Hopping OFF

Tx, 2402MHz



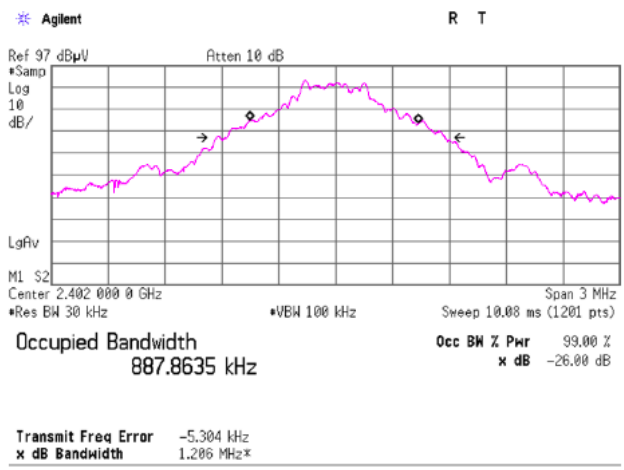
Tx, 2480MHz



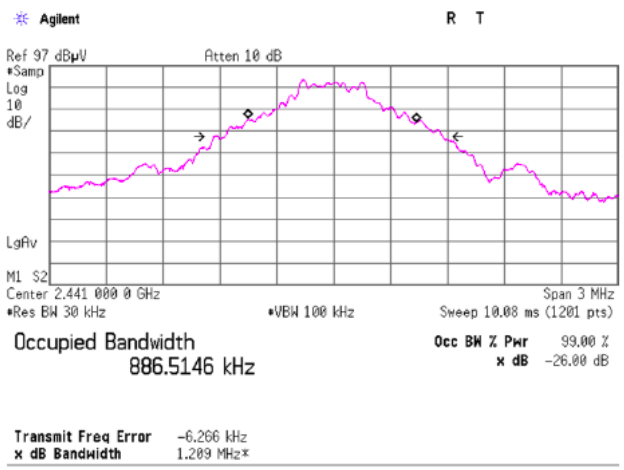
99% Occupied Bandwidth

DH5, Hopping Off

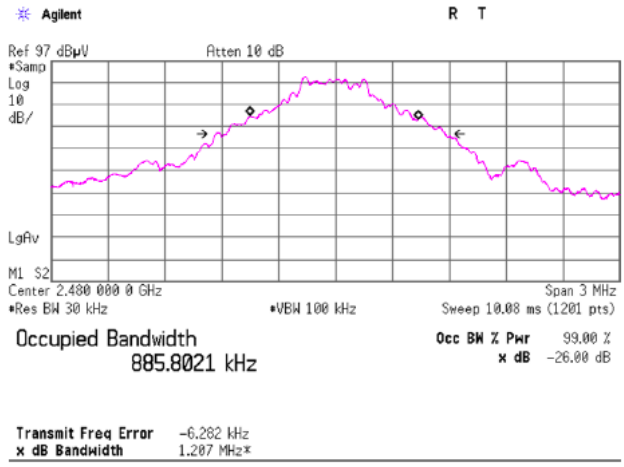
Tx, 2402MHz



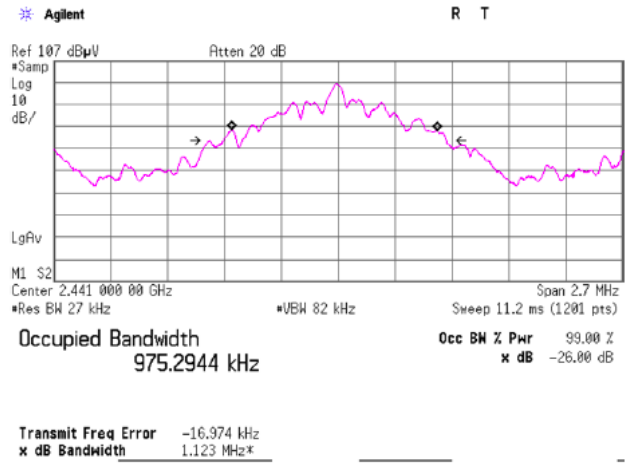
Tx, 2441MHz



Tx, 2480MHz

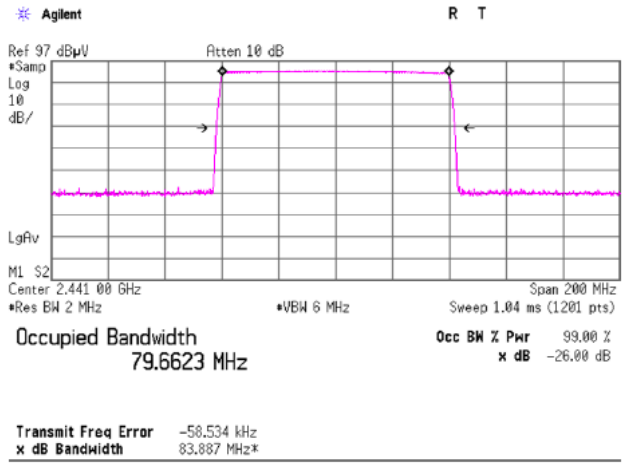


Inquiry (Mid ch.)



Hopping On

DH5

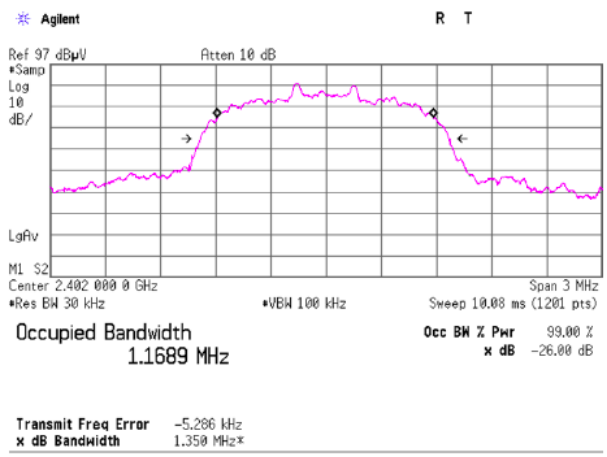


Inquiry

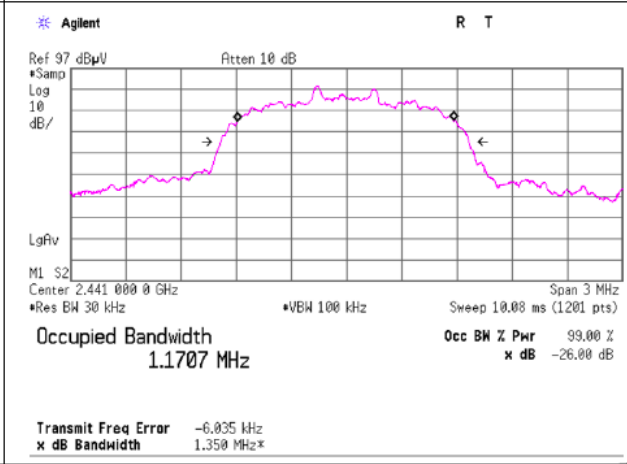
99% Occupied Bandwidth

3-DH5, Hopping Off

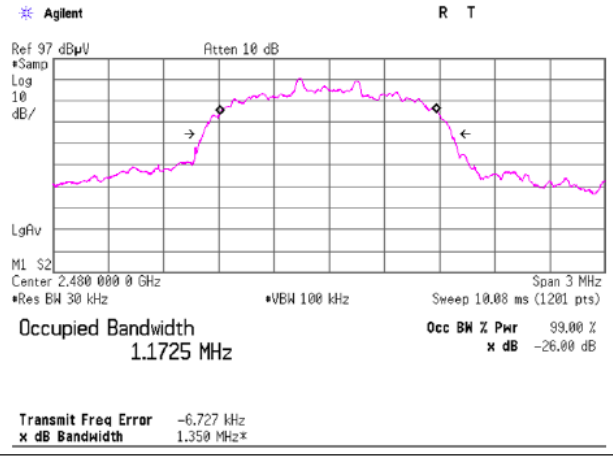
Tx, 2402MHz



Tx, 2441MHz

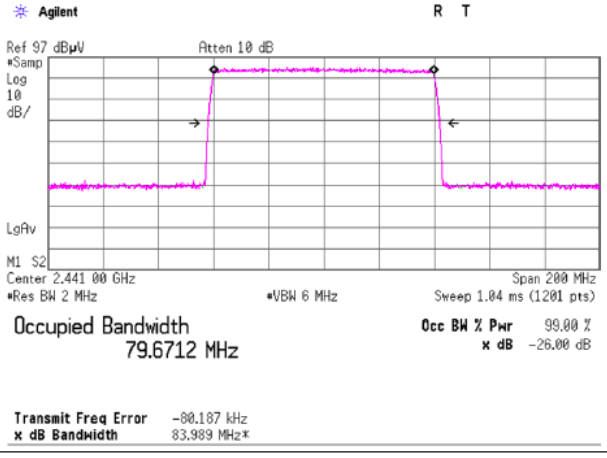


Tx, 2480MHz



Hopping On

3-DH5



APPENDIX 3: 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	2010/11/16 * 12
SAT10-06	Attenuator(above1GHz)	Agilent	8493C-010	74865	AT	2010/03/05 * 12
SCC-G14	Coaxial Cable	Suhner	SUCOFLEX 102	31600/2	AT	2010/03/09 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2010/02/17 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	AT	2010/06/22 * 12
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2010/04/01 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2010/04/01 * 12
SCC-C9/C10/SRSE-03	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/NS4906	-/0901-271(RF Selector)	CE	2010/04/02 * 12
SLS-05	LISN	Rohde & Schwarz	ENV216	100516	CE	2010/02/19 * 12
SAT3-06	Attenuator	JFW	50HF-003N	-	CE	2010/02/06 * 12
SOS-06	Humidity Indicator	A&D	AD-5681	4062118	CE	2010/02/17 * 12
STR-03	Test Receiver	Rohde & Schwarz	ESI40	100054/040	CE/RE	2010/07/21 * 12
SJM-10	Measure	PROMART	SEN1935	-	CE/RE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV	-	CE/RE	-
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2010/03/09 * 12
SCC-G03	Coaxial Cable	Suhner	SUCOFLEX 104A	46499/4A	RE	2010/04/16 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2010/05/27 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2010/08/17 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2010/02/09 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2010/12/15 * 12
SAT10-04	Attenuator(above1GHz)	Agilent	8493C-010	74863	RE	2010/12/15 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM3640	RE	2010/03/29 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2010/03/02 * 12
SCC-G17	Coaxial Cable	Suhner	SUCOFLEX 104A	46291/4A	RE	2010/03/02 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2010/02/06 * 12
SAT6-03	Attenuator	JFW	50HF-006N	-	RE	2010/02/06 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2010/10/15 * 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	2010/04/02 * 12
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0901	RE	2010/10/15 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2010/09/13 * 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 traceable calibrations . Each calibration is traceable to the national or international standards.

Test Item :
CE: Conducted emission,
RE: Radiated emission,
AT: Antenna terminal disturbance voltage