



FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

UMPC

Model: UM700UV1

Trade Name: Arima

Issued to

**Arima Computer Corporation
No. 758, Sec. 4, Bade Road, Taipei, Taiwan**

Issued by



Compliance Certification Services Inc.
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1. TEST RESULT CERTIFICATION

Applicant: Arima Computer Corporation
No. 758, Sec. 4, Bade Road, Taipei, Taiwan

Equipment Under Test: UMPC

Trade Name: Arima

Model: UM700UV1

Date of Test: July 5 ~ November 8, 2007

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 15 Subpart C	No non-compliance noted

We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4: 2003 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.207, 15.209, 15.247.

The test results of this report relate only to the tested sample EUT identified in this report.

Approved by:

Rex Lai
Section Manager
Compliance Certification Services Inc.

Reviewed by:

Amanda Wu
Section Manager
Compliance Certification Services Inc.



2. EUT DESCRIPTION

Product	UMPC
Trade Name	Arima
Model Number	UM700UV1
Model Discrepancy	N/A
Power Supply	1. Power Adapter: LI SHIN INTERNATIONAL ENTERPRISE CORP. Model: 0225C1965 I/P: 100-240V, 50-60Hz, 1.7A O/P: 19V, 3.42A 2. Li-ion Battery: Model: U65039LG Rating: 7.4V, 3900mAh
Frequency Range	2402 ~ 2480 MHz
Transmit Power	4.84 dBm
Modulation Technique	GFSK for 1Mbps; $\pi/4$ -DQPSK for 2Mbps; 8DPSK for 3Mbps
Transmit Data Rate	1, 2, 3Mbps
Number of Channels	79 Channels
Antenna Specification	Gain: 2.20 dBi
Antenna Designation	Ethertronics Antenna

Remark:

1. The sample selected for test was production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for FCC ID: **ID4UM7008187B** filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.



3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, 15.207, 15.209 and 15.247.

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

3.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4.



3.4FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

- (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	(²)
13.36 - 13.41	322 - 335.4		

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

- (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.



3.5 DESCRIPTION OF TEST MODES

The EUT (model: UM700UV1) had been tested under operating condition.

Software used to control the EUT for staying in continuous transmitting mode was programmed.

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz and power line conducted emissions below 30MHz, which worst case was in normal link mode only.

The worst case data rate is determined as the data rate with highest output power.

The field strength of spurious emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis).

Following channels were selected for the for full testing only as listed below:

Tested Channel	Modulation Type	Packet Type	Date Rate	Axis
Low, Mid, High	GFSK	DH 5	1	X
Low, Mid, High	8DPSK	DH 5	3	X



4. INSTRUMENT CALIBRATION

4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

4.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

Remark: Each piece of equipment is scheduled for calibration once a year.

Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360131	01/30/2008
Power Meter	Agilent	E4416A	GB41291611	03/20/2008
Power Sensor	Agilent	E9327A	US40441097	06/07/2008

Open Area Test Site # 2				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	ADVANTEST	R3261A	N/A	N.C.R
EMI Test Receiver	R&S	ESVS10	834468/006	04/15/2008
Pre-Amplifier	HP	8447D	2944A08780	07/20/2008
Bilog Antenna	TESEQ	CBL 6112D	23189	07/06/2008
Turn Table	EMCO	2081-1.21	9709-1885	N.C.R.
Antenna Tower	EMCO	2075-2	9707-2060	N.C.R
Controller	EMCO	2090	9709-1256	N.C.R
RF Switch	ANRITSU	MP59B	M76890	N.C.R
Site NSA	CCS	N/A	N/A	08/10/2008
Test S/W	LabVIEW 6.1 (CCS OATS EMI SW V2.6)			

Remark: The measurement uncertainty is less than +/- 3.8880 dB, which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV.

Powerline Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver 9kHz-30MHz	Rohde & Schwarz	ESHS30	828144/003	10/30/2008
Two-Line V-Network 9kHz-30MHz	Schaffner	NNB41	03/10013	06/12/2008
LISN 10kHz-100MHz	EMCO	3825/2	9106-1809	04/01/2008
ISN 9kHz-30MHz	FCC	FCC-TLISN-T4	20167	09/14/2008
Test S/W	LABVIEW (V 6.1)			

Remark: The measurement uncertainty is less than +/- 2.81dB, which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV.



5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

☐ No.199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.

Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029

☒ No.11, Wugong 6th Rd., Wugu Industrial Park, Taipei Hsien 248, Taiwan

Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045

☒ No.81-1, Lane 210, Bade 2nd Rd., Luchu Hsiang, Taoyuan Hsien 338, Taiwan

Tel: 886-3-324-0332 / Fax: 886-3-324-5235

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

5.2 EQUIPMENT







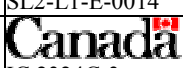
Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5.3 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	A2LA	EN 55011, EN 55014-1/2, CISPR 11, CISPR 14-1/2, EN 55022, EN 55015, CISPR 22, CISPR 15, AS/NZS 3548, VCCI V3 (2001), CFR 47, FCC Part 15/18, CNS 13783-1, CNS 13439, CNS 13438, CNS 13803, CNS 14115, EN 55024, IEC 801-2, IEC 801-3, IEC 801-4, IEC/EN 61000-3-2, IEC/EN 61000-3-3, IEC/EN 61000-4-2/3/4/5/6/8/11, EN 50081-1/ EN 61000-6-3, EN 50081-2/EN 61000-6-4, EN 50081-2/EN 61000-6-1: 2001	 TESTING CERT #0824.01
USA	FCC	3/10 meter Open Area Test Sites (93105, 90471) / 3M Semi Anechoic Chamber (965860) to perform FCC Part 15/18 measurements	 93105, 90471 965860
Japan	VCCI	3/10 meter Open Area Test Sites to perform conducted/radiated measurements	 R-393/1066/725/879 C-402/747/912
Norway	NEMKO	EN 50081-1/2, EN 50082-1/2, IEC 61000-6-1/2, EN 50091-2, EN 50130-4, EN 55011, EN 55013, EN 55014-1/2, EN 55015, EN 55022, EN 55024, EN 61000-3-2/3, EN 61326-1, IEC 61000-4-2/3/4/5/6/8/11, EN 60601-1-2, EN 300 328, EN 300 422-2, EN 301 419-1, EN 301 489-01/03/07/08/09/17, EN 301 419-2/3, EN 300 454-2, EN 301 357-2	 ELA 124a ELA 124b ELA 124c
Taiwan	TAF	EN 300 328, EN 300 220-1, EN 300 220-2, EN 300 220-3, 47 CFR FCC Part 15 Subpart C, EN 61000-3-2, EN 61000-3-3, CNS 13439, CNS 13783-1, CNS 14115, CNS 13438, AS/NZS CISPR 22, CNS 13022-1, IEC 61000-4-2/3/4/5/6/8/11, CNS 13022-2/3	 Testing Laboratory 0363
Taiwan	BSMI	CNS 13438, CNS 13783-1, CNS 13439, CNS 14115	 SL2-IS-E-0014 SL2-IN-E-0014 SL2-A1-E-0014 SL2-R1-E-0014 SL2-R2-E-0014 SL2-L1-E-0014
Canada	Industry Canada	3/10 meter Open Area Test Sites (IC 2324C-3, IC 2324C-5) / 3M Semi Anechoic Chamber (IC 6106)	 IC 2324C-3 IC 2324C-5 IC 6106

* No part of this report may be used to claim or imply product endorsement by A2LA or any agency of the US Government.



6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.

6.2 SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
1.	LCD Monitor	DELL	2407WFPb	CN-0FC255-46633-675-22TJS	FCC DOC	Shielded, 1.8m with two cores	Unshielded, 1.8m
2.	USB Keyboard	DELL	Sk-8115	N/A	FCC DOC	Shielded, 1.8m	N/A
3.	USB Mouse	DELL	MO56UO	408031121	FCC DOC	Shielded, 1.8m	N/A
4.	Multimedia Earphone	Labtec	Axis-301	N/A	FCC DOC	Unshielded, 1.8m	N/A
5.	Notebook PC (Remote)	DELL	PP05L	2464936188	FCC DOC	N/A	N/A

Remark:

1. *All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*
2. *Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*



7. FCC PART 15.247 REQUIREMENTS

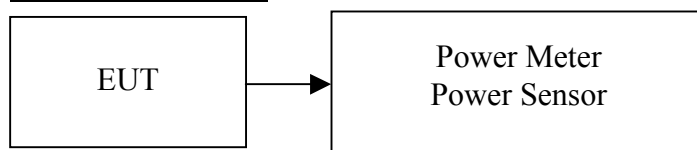
7.1 PEAK POWER

LIMIT

The maximum peak output power of the intentional radiator shall not exceed the following:

1. According to §15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.
2. According to §15.247(b)(3), for systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 Watt.
3. According to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Test Configuration



TEST PROCEDURE

The transmitter output is connected to the Power Meter. The Power Meter is set to the peak power detection.



TEST RESULTS

No non-compliance noted

Test Data

For GFSK

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2402	3.46	0.022	0.125	PASS
Mid	2441	4.84	0.0030		PASS
High	2480	4.59	0.0029		PASS

For 8DPSK

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2402	3.61	0.0023	0.125	PASS
Mid	2441	4.54	0.0028		PASS
High	2480	4.68	0.0029		PASS

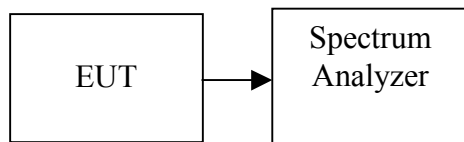


7.2 AVERAGE POWER

LIMIT

None; for reporting purposes only.

Test Configuration



TEST PROCEDURE

The transmitter output is connected to the Spectrum analyzer. The Spectrum analyzer is set to the average power detection.

TEST RESULTS

No non-compliance noted.

Test Data

For GFSK

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2402	2.65	0.0018
Mid	2441	3.13	0.0021
High	2480	3.32	0.0021

For 8DPSK

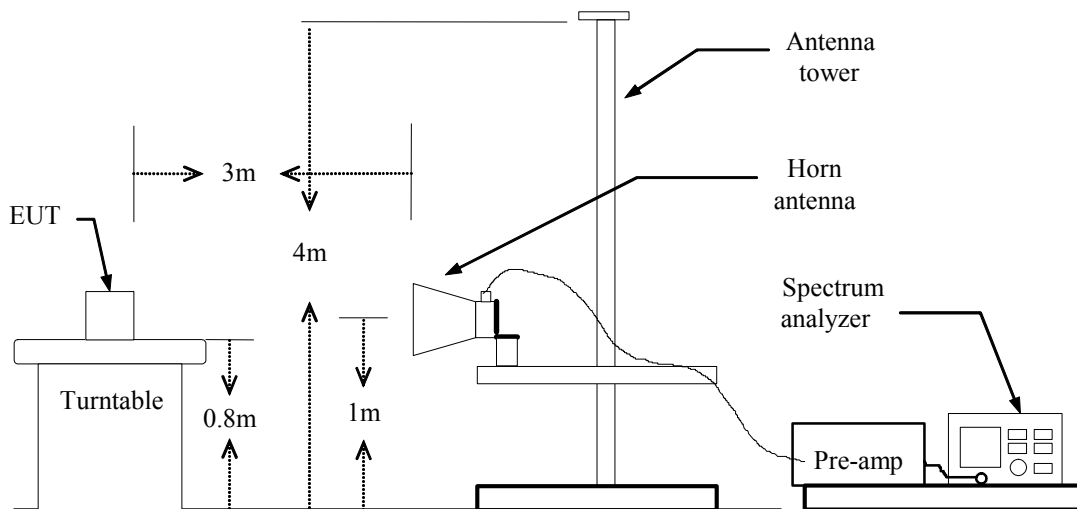
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2402	2.65	0.0018
Mid	2441	3.10	0.0020
High	2480	3.27	0.0021

7.3BAND EDGES MEASUREMENT

LIMIT

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).

Test Configuration



TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
 - (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
 - (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

TEST RESULTS

Refer to attach spectrum analyzer data chart.



For GFSK

Band Edges (CH Low)

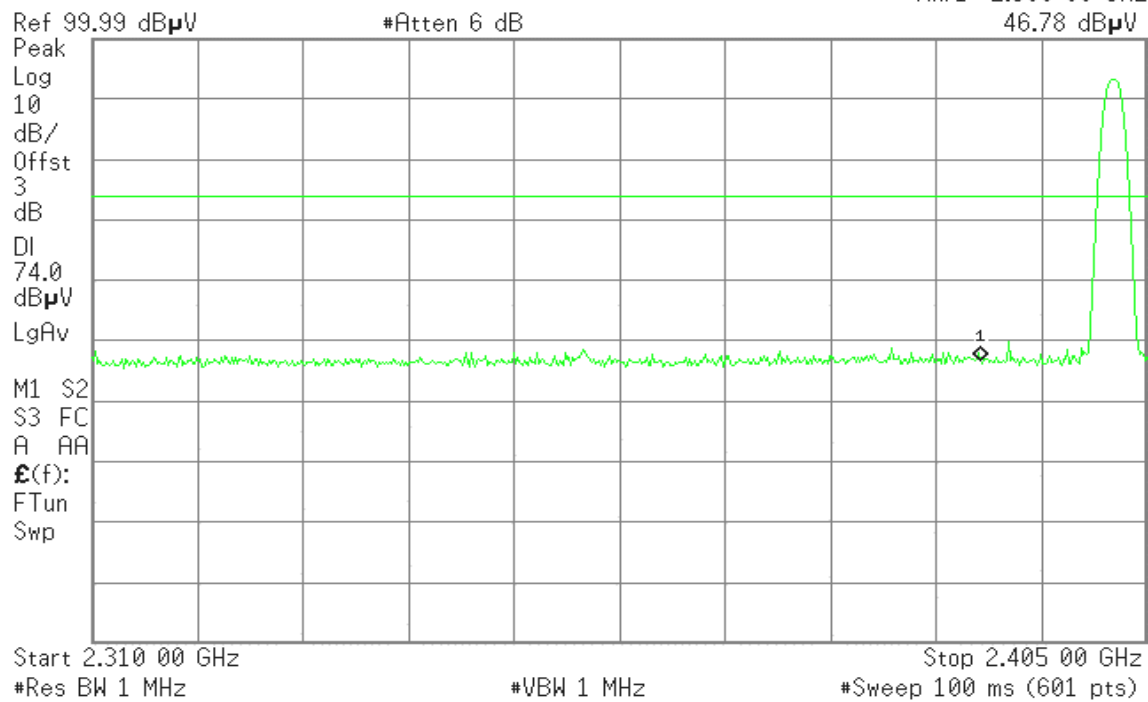
Detector mode: Peak

Polarity: Vertical

Agilent 16:03:03 Oct 31, 2007

R T

Mkr1 2.390 00 GHz
46.78 dB μ V



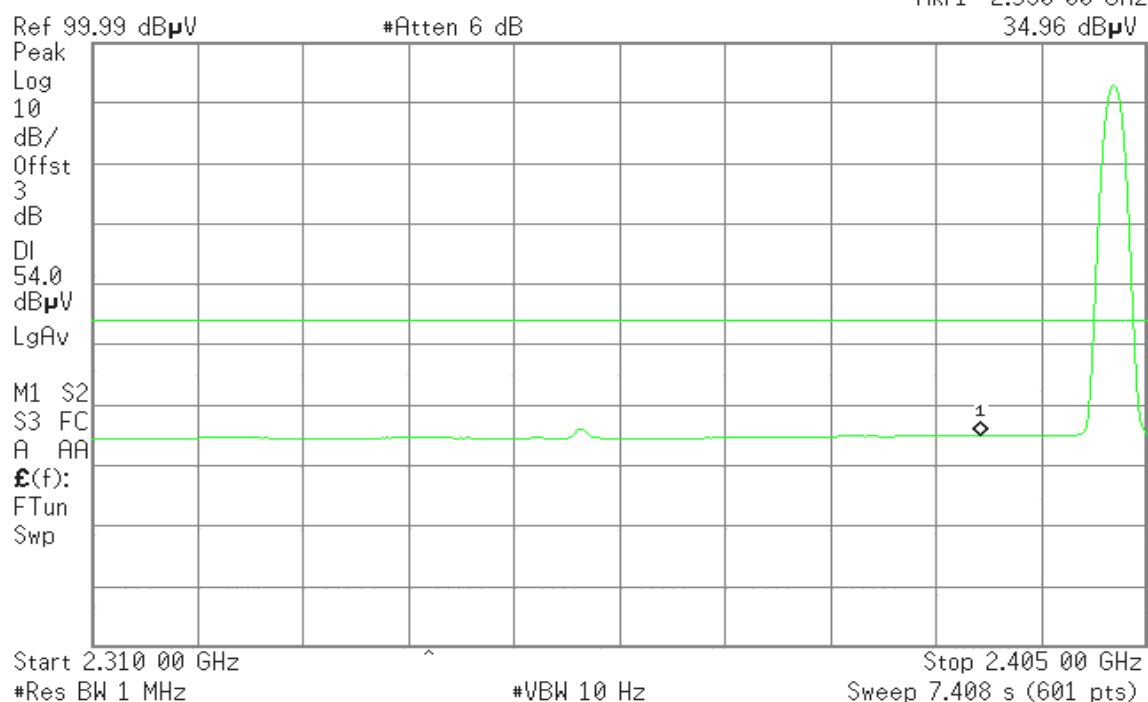
Detector mode: Average

Polarity: Vertical

Agilent 16:03:23 Oct 31, 2007

R T

Mkr1 2.390 00 GHz
34.96 dB μ V





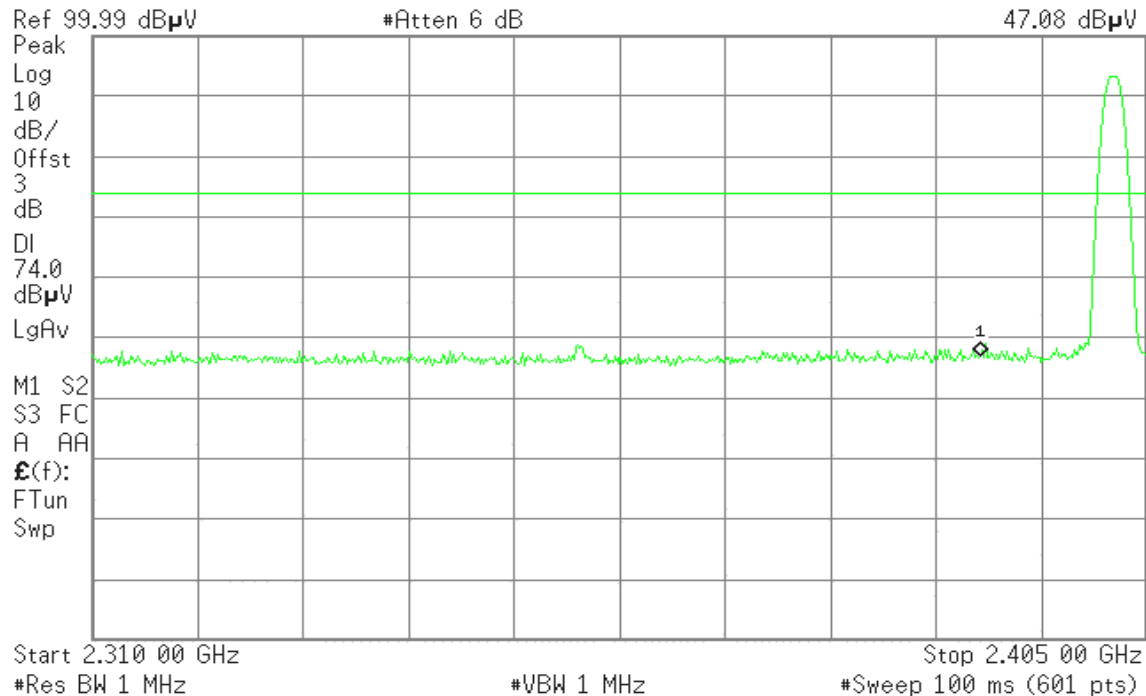
Detector mode: Peak

Polarity: Horizontal

Agilent 15:57:32 Oct 31, 2007

R T

Mkr1 2.390 00 GHz
47.08 dB μ V



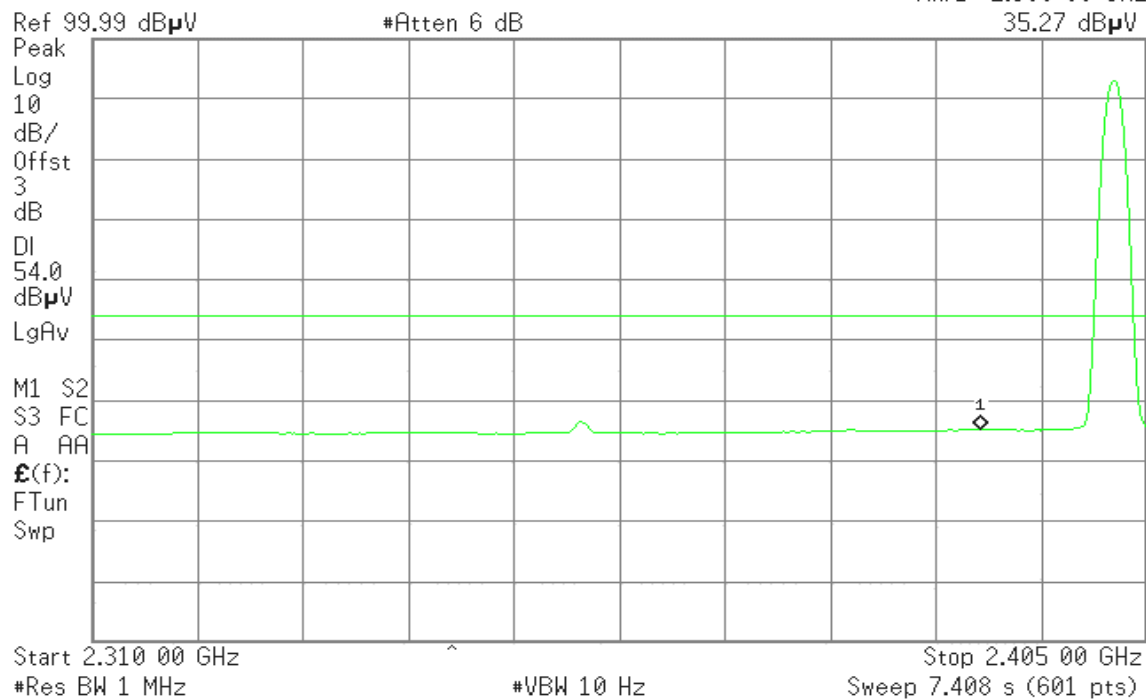
Detector mode: Average

Polarity: Horizontal

Agilent 15:57:15 Oct 31, 2007

R L

Mkr1 2.390 00 GHz
35.27 dB μ V





Band Edges (CH High)

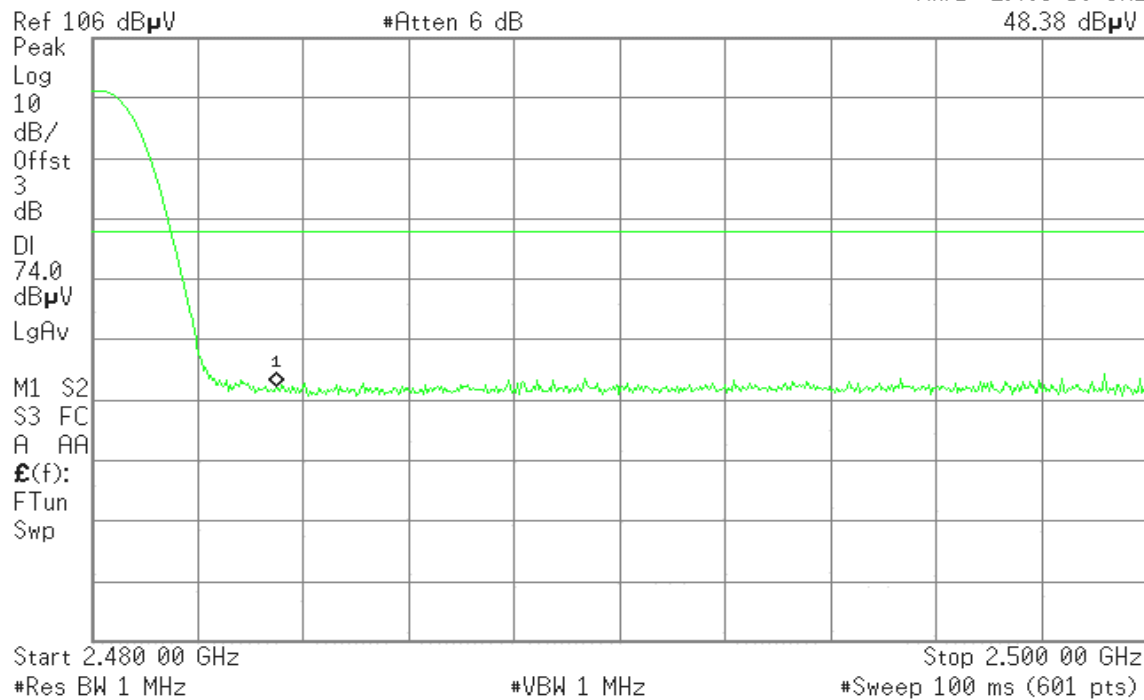
Detector mode: Peak

Polarity: Vertical

Agilent 16:45:10 Oct 31, 2007

R T

Mkr1 2.483 50 GHz
48.38 dB μ V



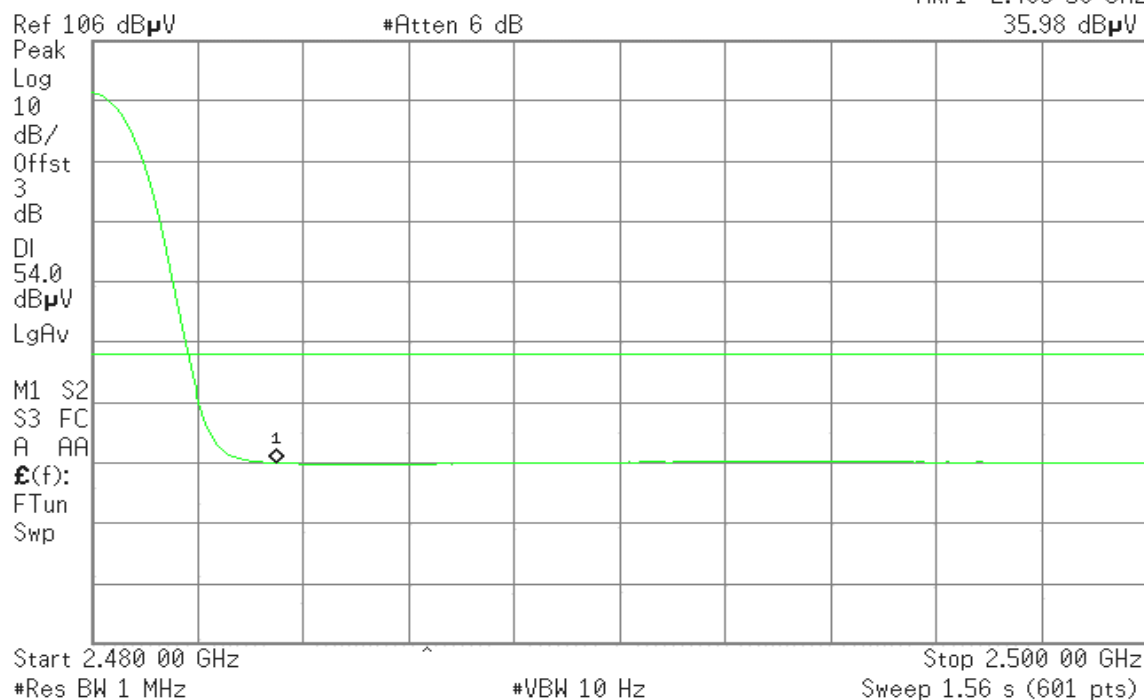
Detector mode: Average

Polarity: Vertical

Agilent 16:44:54 Oct 31, 2007

R T

Mkr1 2.483 50 GHz
35.98 dB μ V





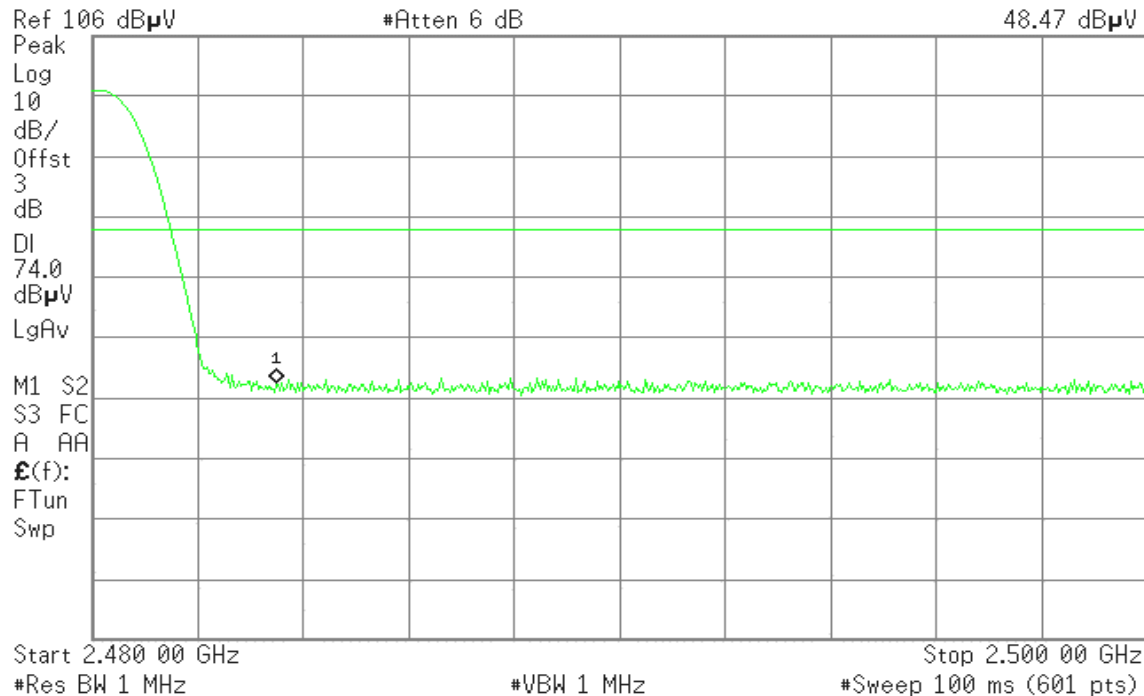
Detector mode: Peak

Polarity: Horizontal

Agilent 16:57:52 Oct 31, 2007

R T

Mkr1 2.483 50 GHz
48.47 dB μ V



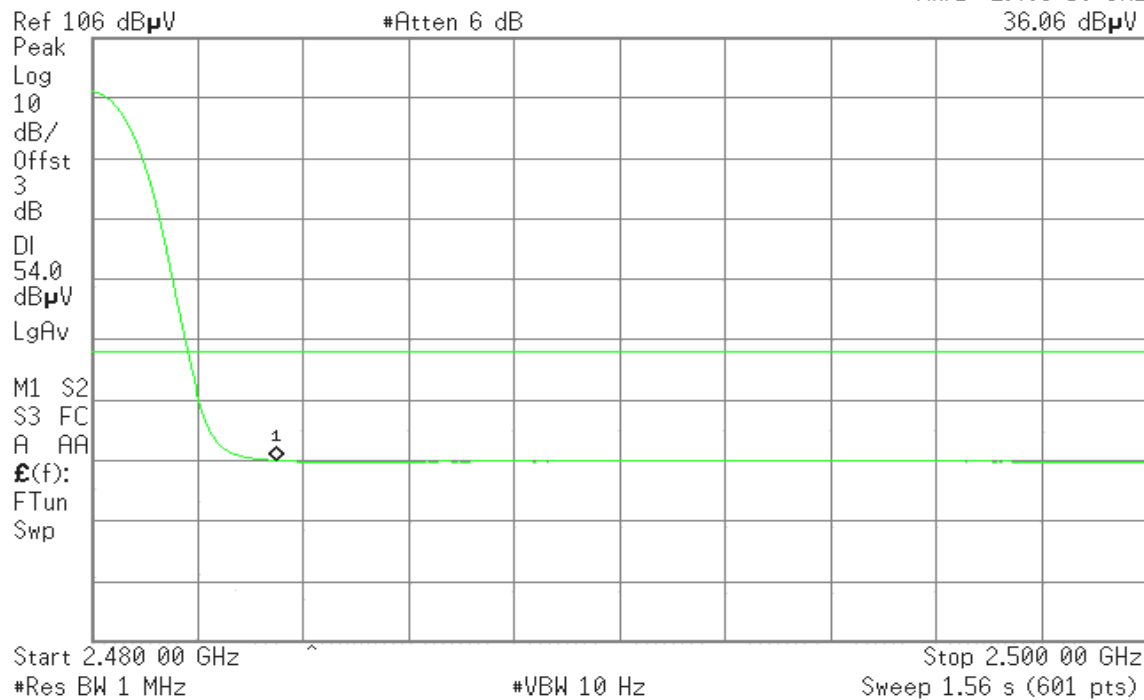
Detector mode: Average

Polarity: Horizontal

Agilent 16:57:37 Oct 31, 2007

R T

Mkr1 2.483 50 GHz
36.06 dB μ V





For 8DPSK

Band Edges (CH Low)

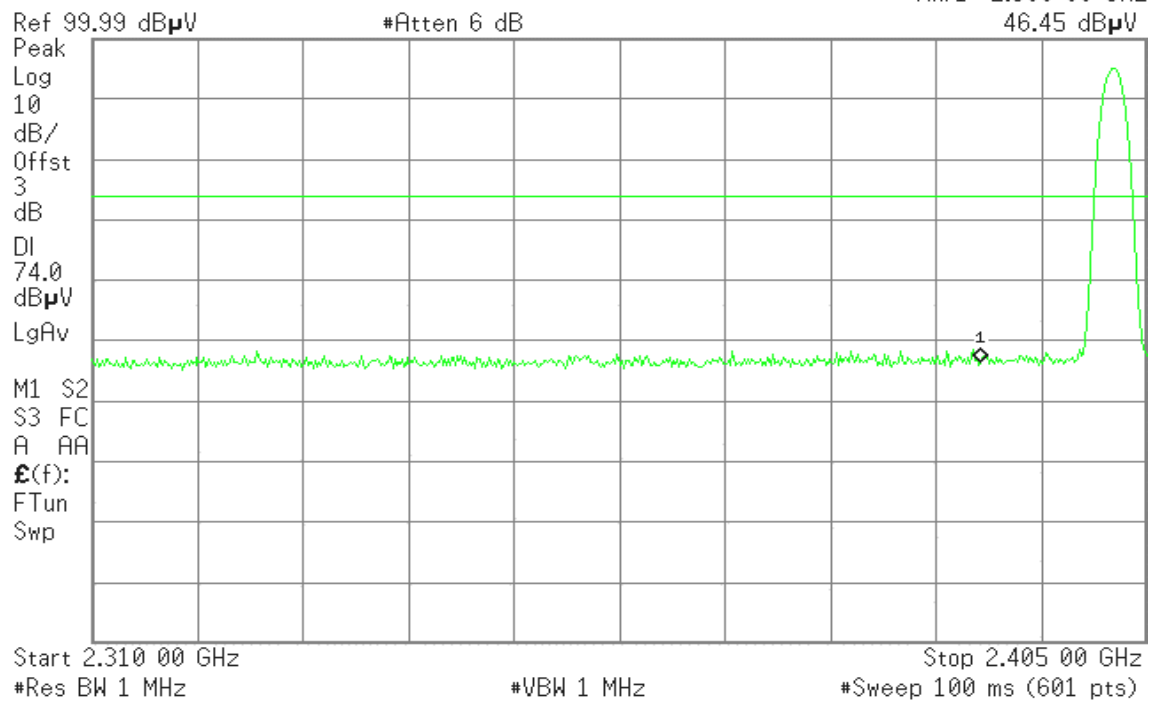
Detector mode: Peak

Polarity: Vertical

Agilent 16:02:23 Oct 31, 2007

R T

Mkr1 2.390 00 GHz
46.45 dB μ V



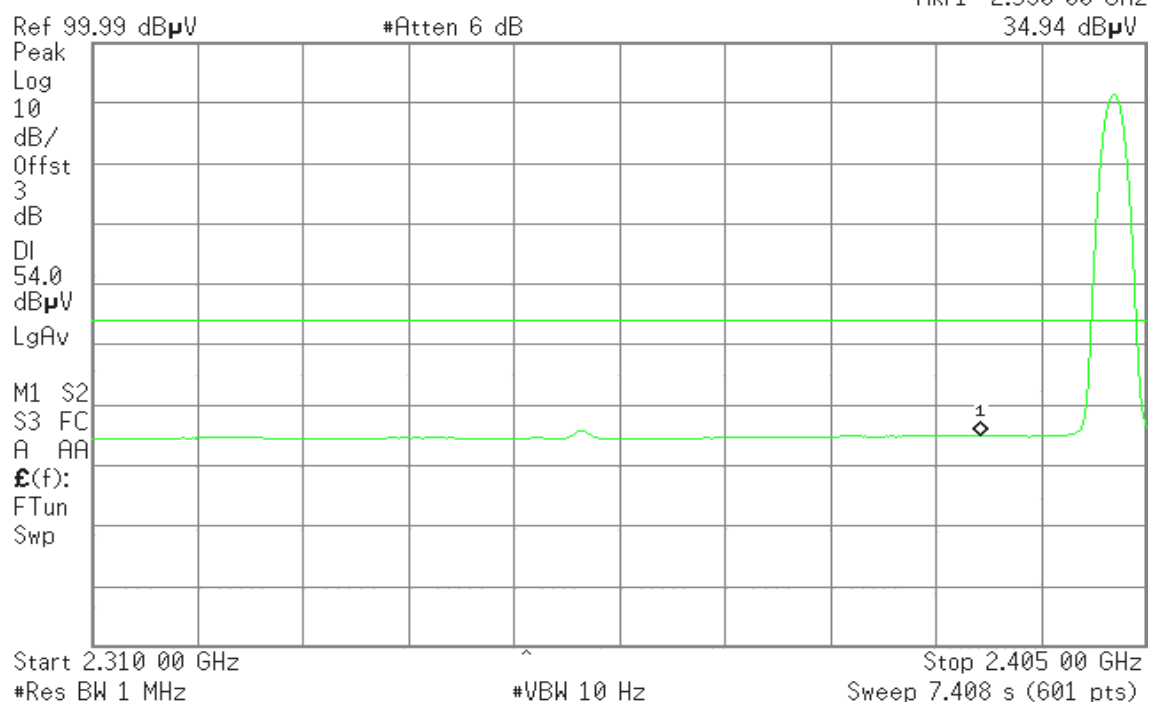
Detector mode: Average

Polarity: Vertical

Agilent 16:02:07 Oct 31, 2007

R T

Mkr1 2.390 00 GHz
34.94 dB μ V





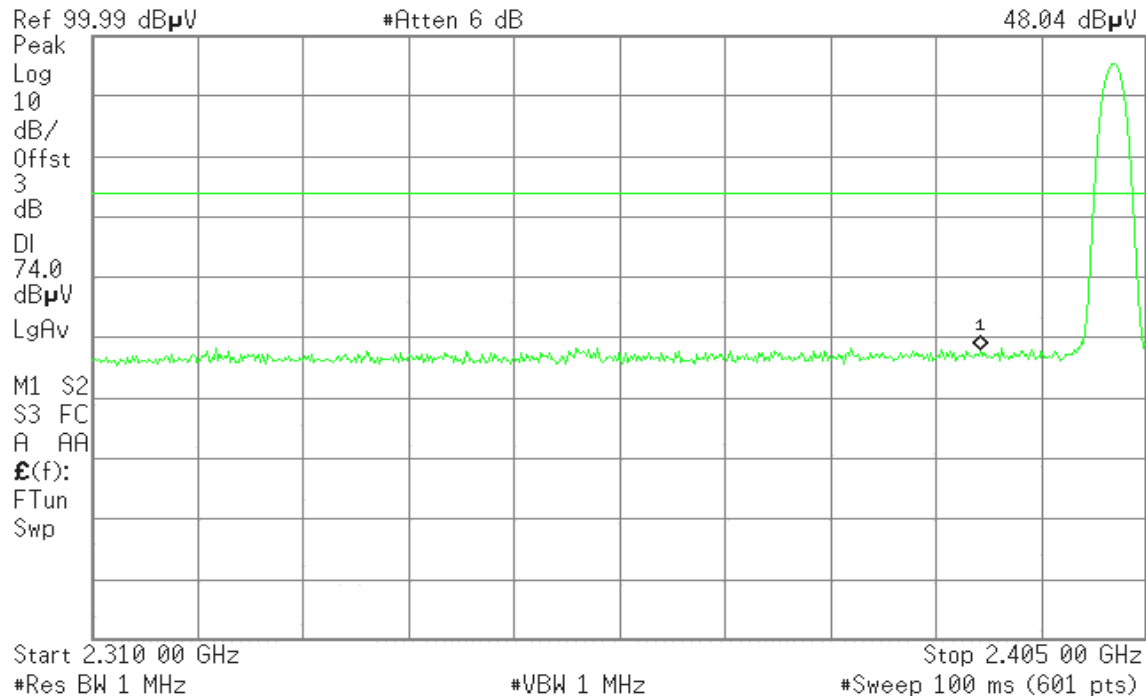
Detector mode: Peak

Polarity: Horizontal

Agilent 15:58:52 Oct 31, 2007

R T

Mkr1 2.390 00 GHz
48.04 dB μ V



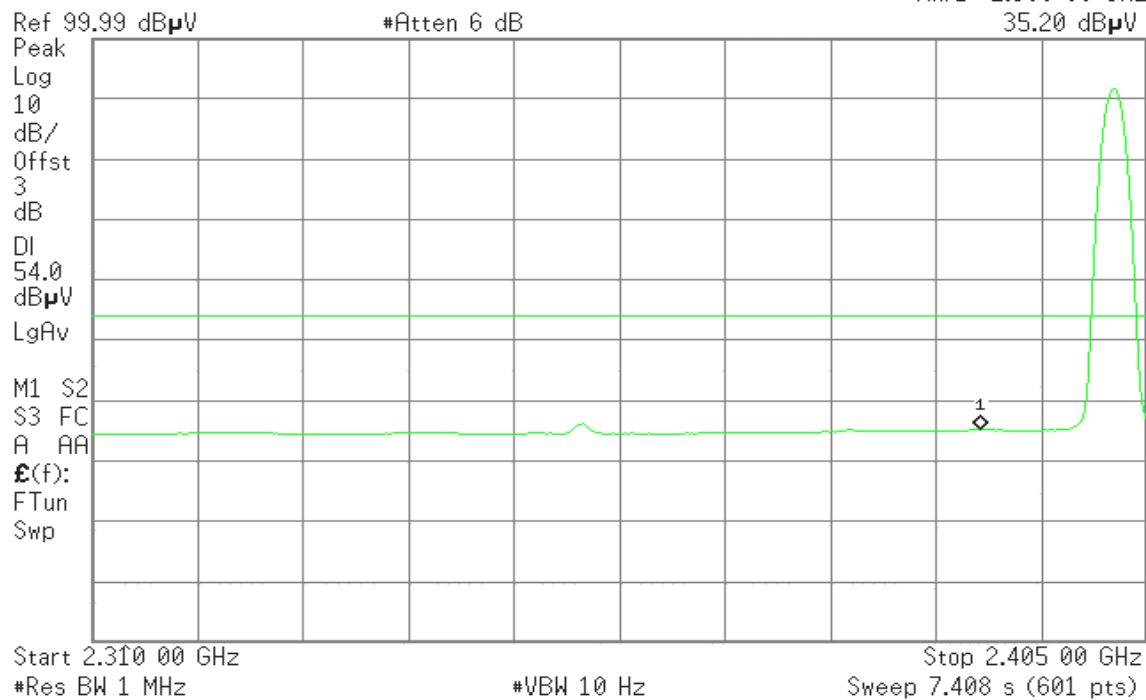
Detector mode: Average

Polarity: Horizontal

Agilent 15:59:06 Oct 31, 2007

R L

Mkr1 2.390 00 GHz
35.20 dB μ V





Band Edges (CH High)

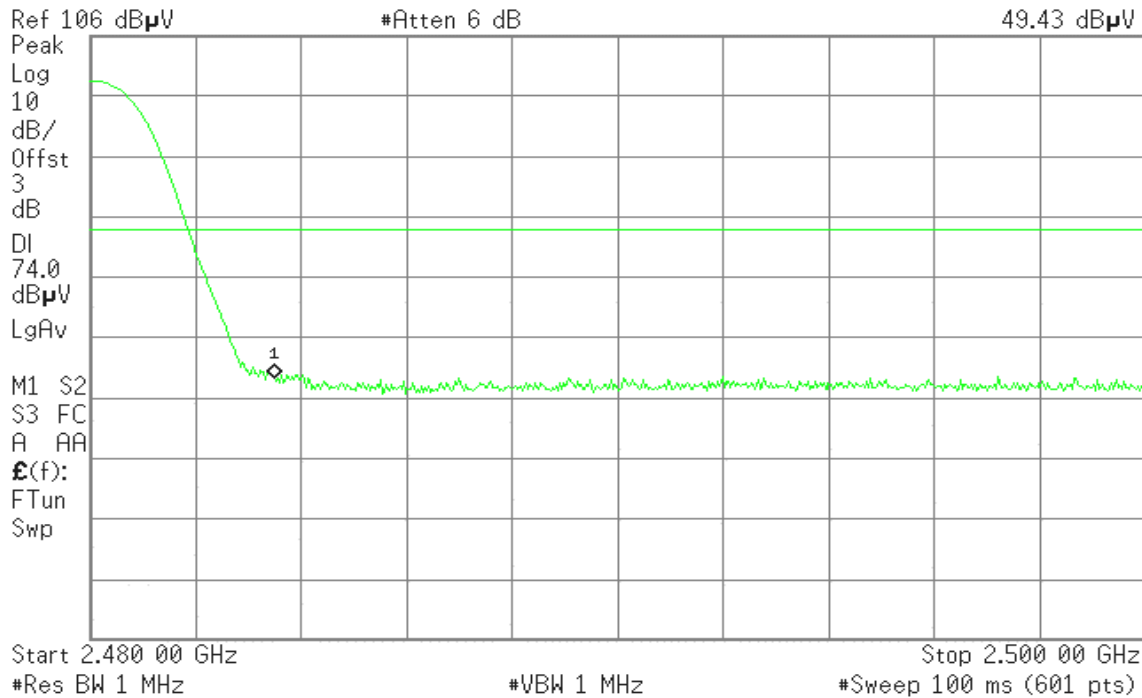
Detector mode: Peak

Polarity: Vertical

Agilent 16:45:47 Oct 31, 2007

R T

Mkr1 2.483 50 GHz
49.43 dB μ V



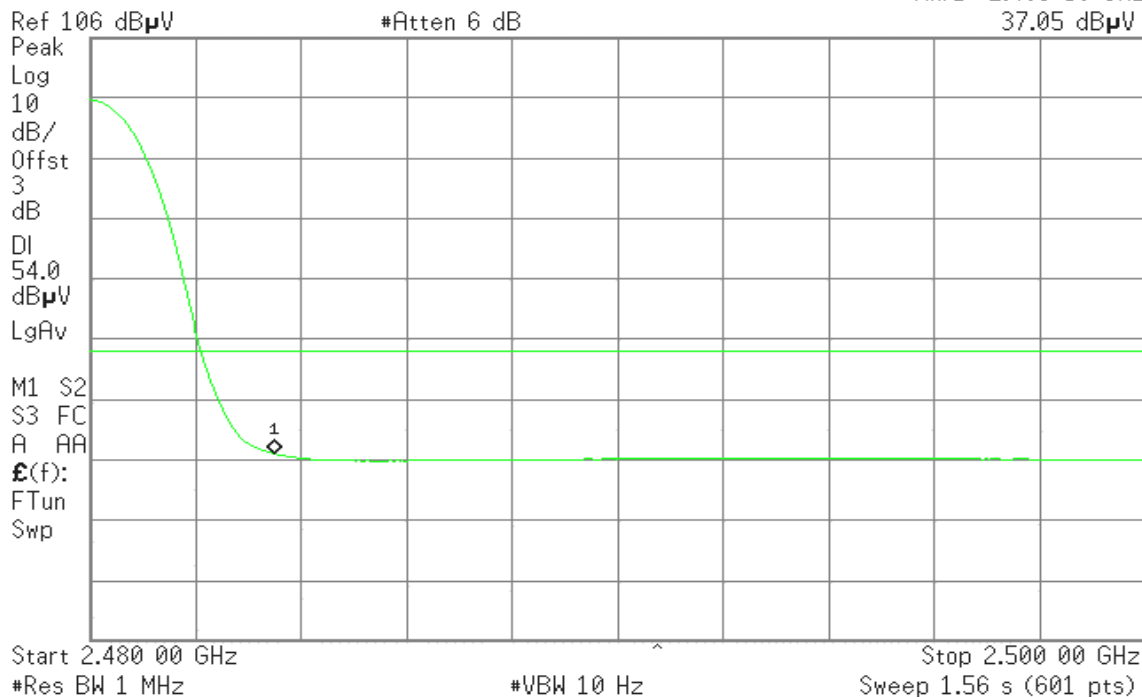
Detector mode: Average

Polarity: Vertical

Agilent 16:46:09 Oct 31, 2007

R T

Mkr1 2.483 50 GHz
37.05 dB μ V





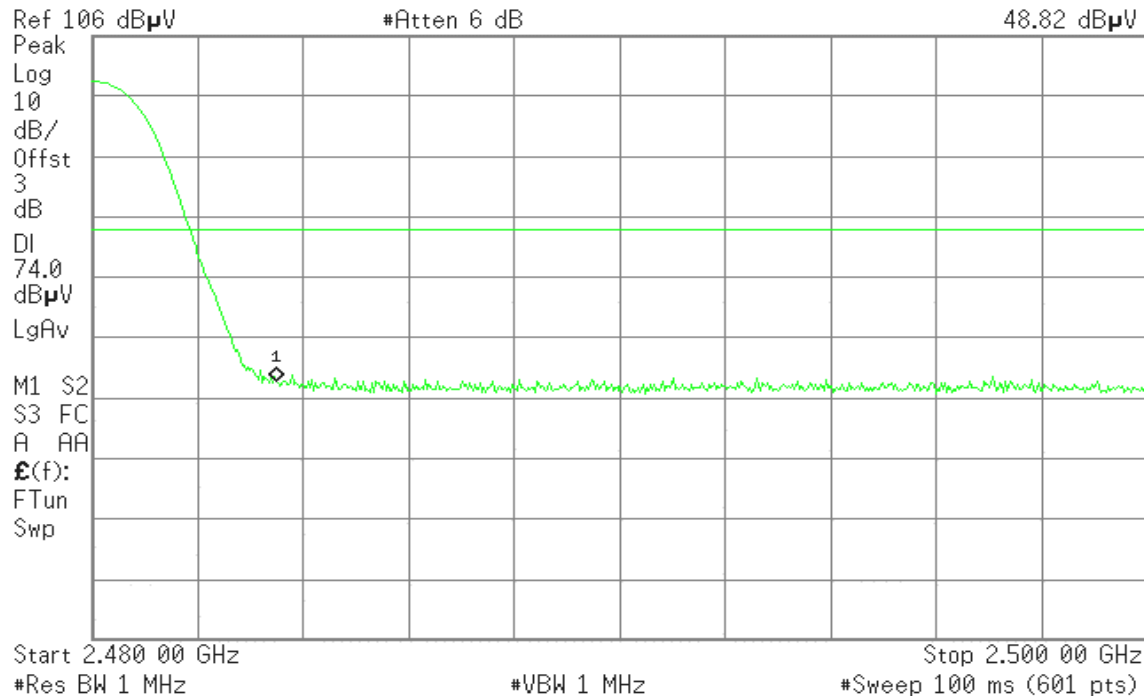
Detector mode: Peak

Polarity: Horizontal

Agilent 16:58:35 Oct 31, 2007

R T

Mkr1 2.483 50 GHz
48.82 dB μ V



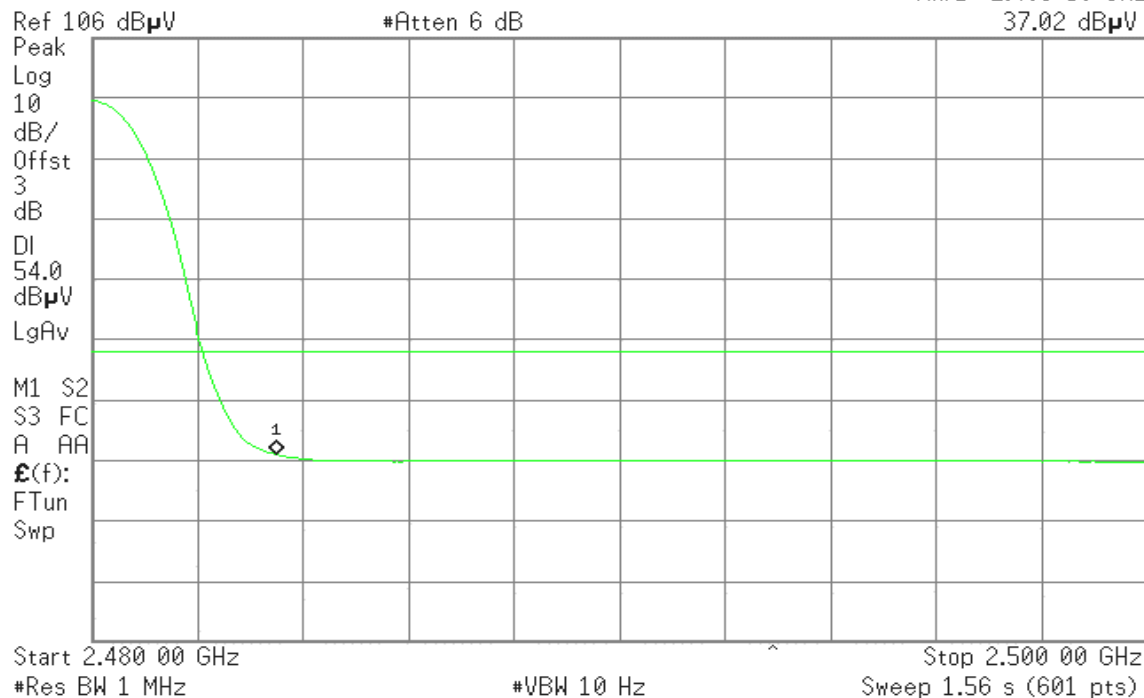
Detector mode: Average

Polarity: Horizontal

Agilent 16:58:51 Oct 31, 2007

R T

Mkr1 2.483 50 GHz
37.02 dB μ V



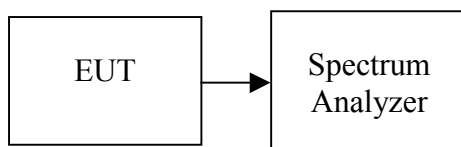


7.4 PEAK POWER SPECTRAL DENSITY

LIMIT

1. According to §15.247(e), for digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.
2. According to §15.247(f), the digital modulation operation of the hybrid system, with the frequency hopping turned off, shall comply with the power density requirements of paragraph (d) of this section.

Test Configuration



TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 3kHz, VBW = 10kHz, Span = 300kHz, Sweep=100s
4. Record the max. reading.
5. Repeat the above procedure until the measurements for all frequencies are completed.

TEST RESULTS

No non-compliance noted

Test Data

For GFSK

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2402	-8.41	8.00	PASS
Mid	2441	-8.03		PASS
High	2480	-7.86		PASS

For 8DPSK

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2402	-14.10	8.00	PASS
Mid	2441	-13.60		PASS
High	2480	-13.39		PASS



Test Plot

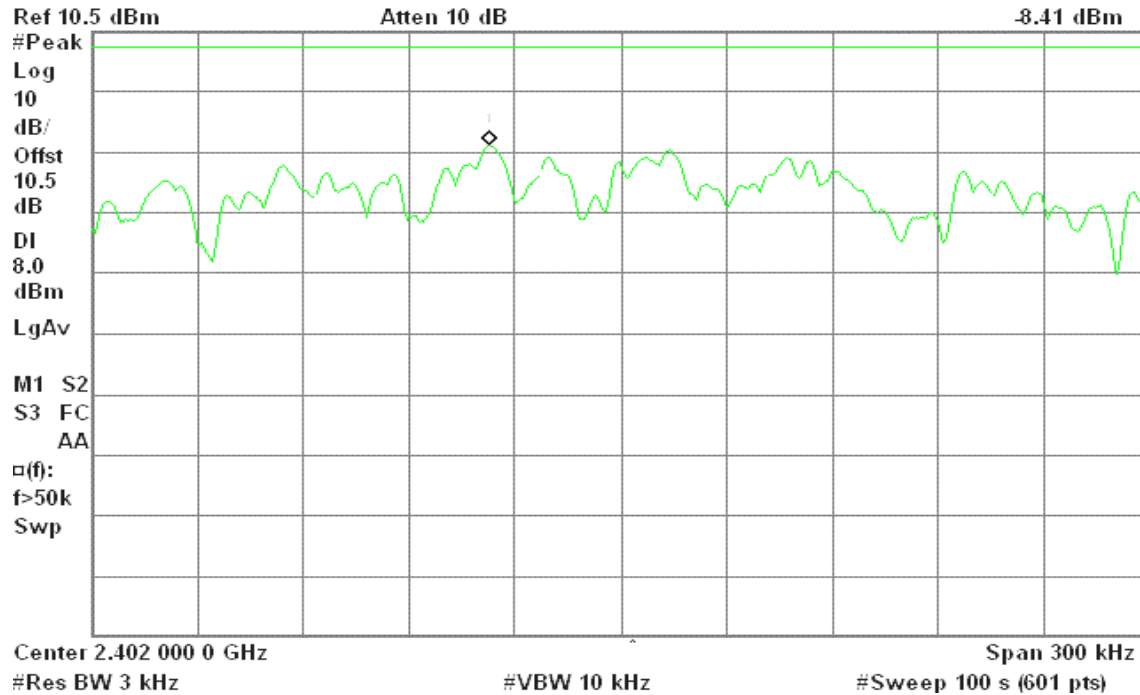
For GFSK

PPSD (CH Low)

Agilent 15:52:48 Oct 30, 2007

R T

Mkr1 2.401 962 9 GHz

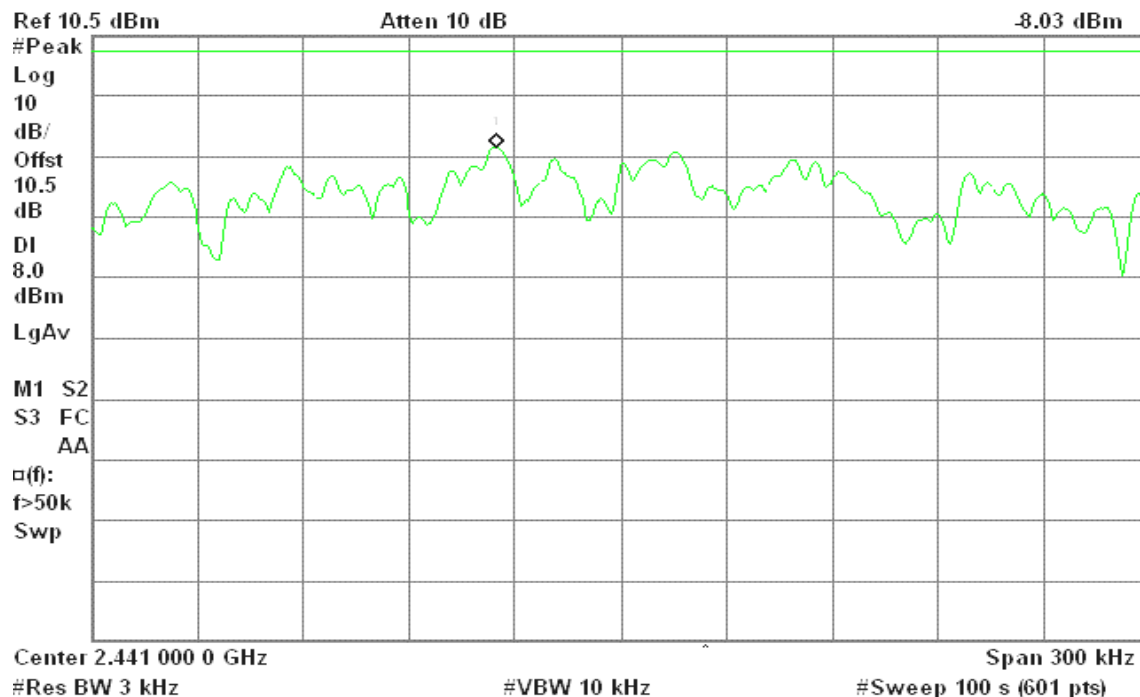


PPSD (CH Mid)

Agilent 15:56:26 Oct 30, 2007

R T

Mkr1 2.440 964 9 GHz





PPSD (CH High)

* Agilent 15:59:07 Oct 30, 2007

R T

Mkr1 2.479 966 8 GHz

-7.86 dBm

Ref 10.5 dBm

Atten 10 dB

#Peak

Log

10

dB/

Offst

10.5

dB

DI

8.0

dBm

LgAv

M1 S2

S3 FC

AA

□(f):

f>50k

Swp

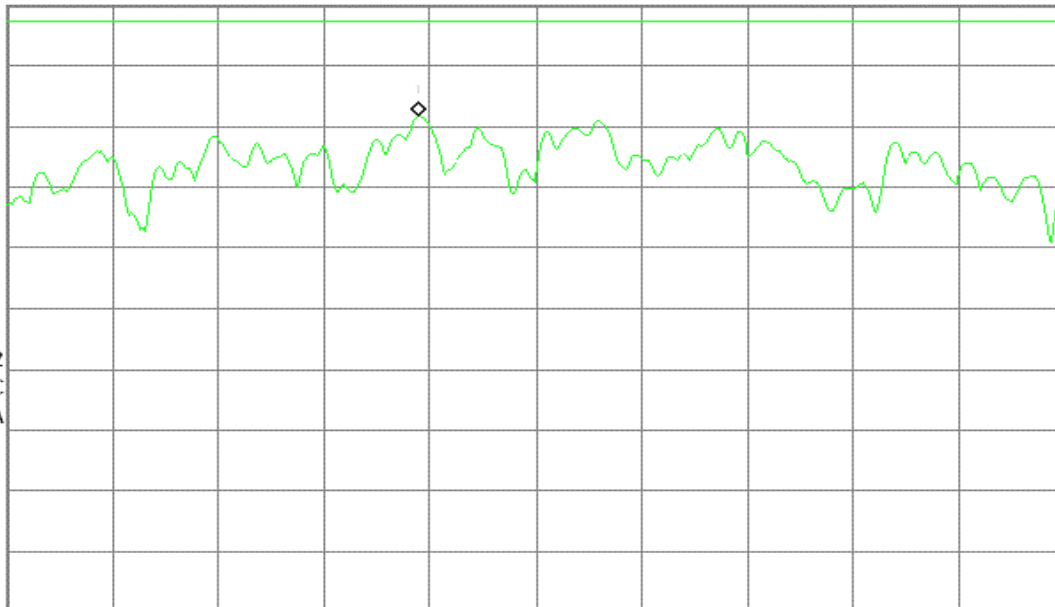
Center 2.480 000 0 GHz

#Res BW 3 kHz

#VBW 10 kHz

Span 300 kHz

#Sweep 100 s (601 pts)





For 8DPSK

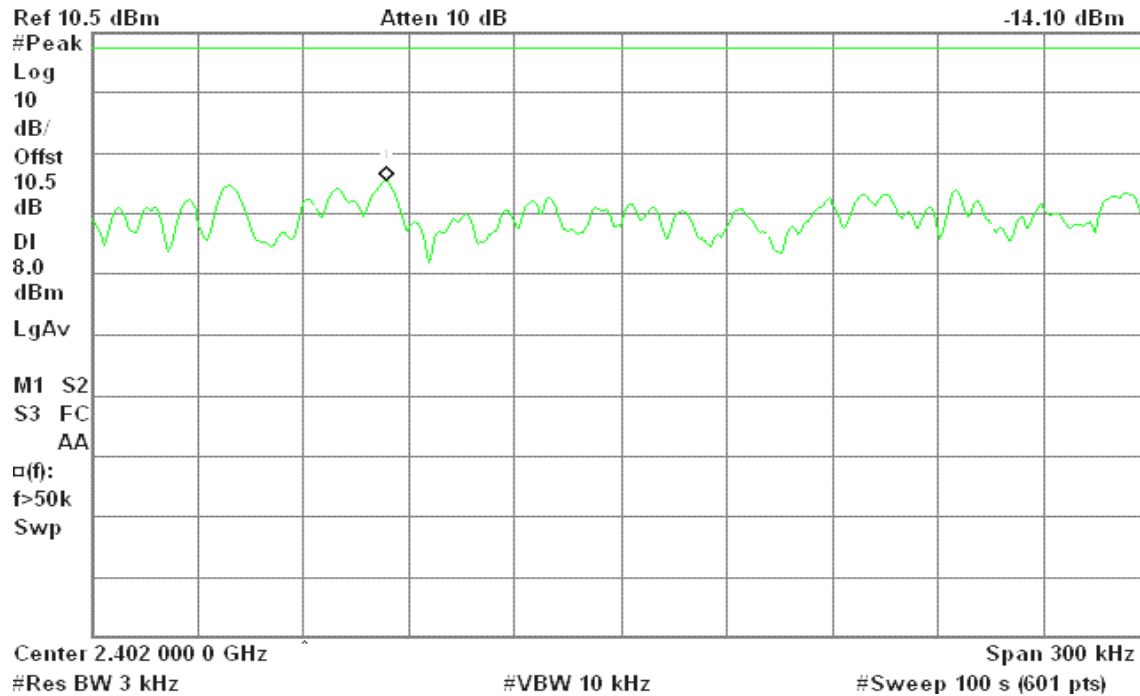
PPSD (CH Low)

Agilent 16:21:02 Oct 30, 2007

R T

Mkr1 2.401 933 4 GHz

-14.10 dBm



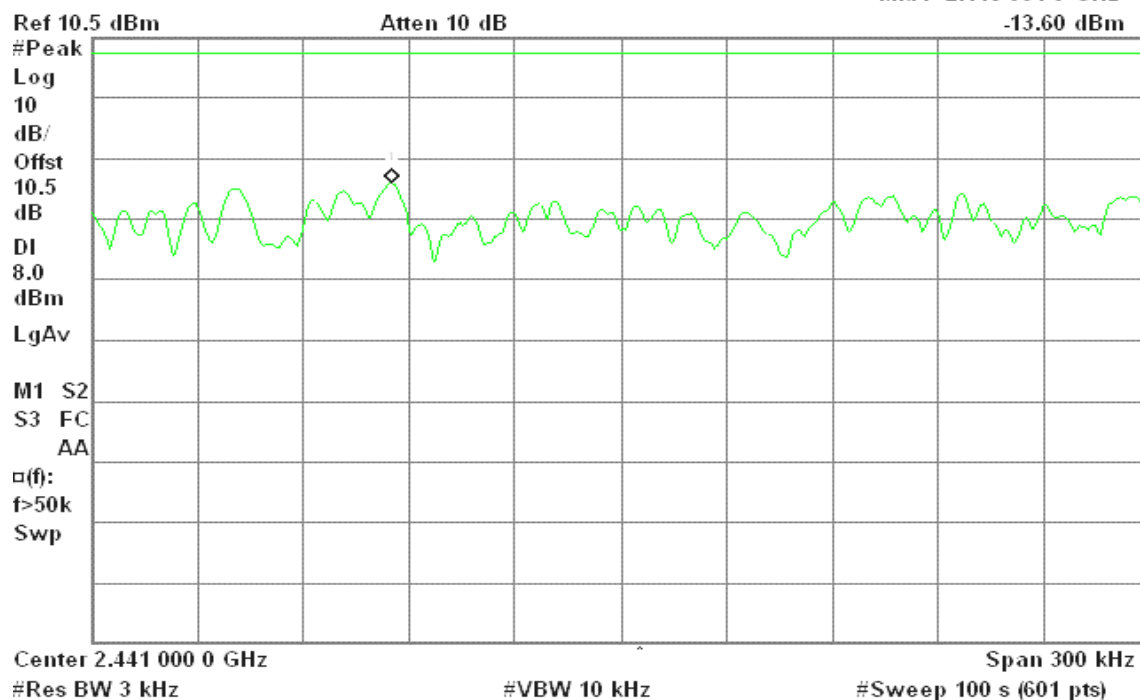
PPSD (CH Mid)

Agilent 16:24:09 Oct 30, 2007

R T

Mkr1 2.440 934 9 GHz

-13.60 dBm





PPSD (CH High)

Agilent 16:26:42 Oct 30, 2007

R T

Mkr1 2.479 937 1 GHz

-13.39 dBm

Ref 10.5 dBm

Atten 10 dB

#Peak

Log

10

dB/

Offst

10.5

dB

D1

8.0

dBm

LgAv

M1 S2

S3 FC

AA

□(f):

f>50k

Swp

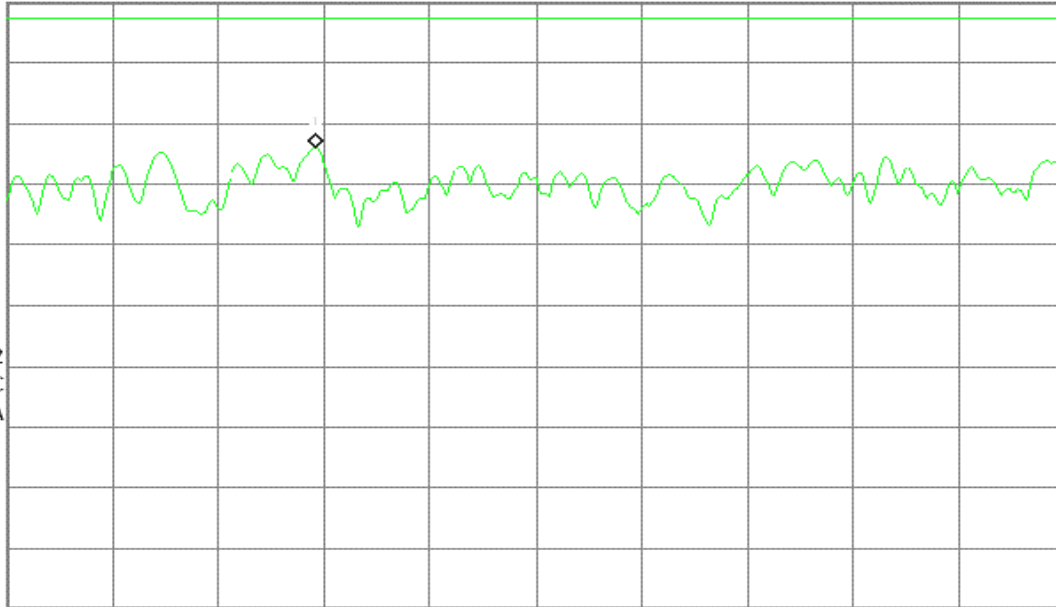
Center 2.480 000 0 GHz

#Res BW 3 kHz

#VBW 10 kHz

Span 300 kHz

#Sweep 100 s (601 pts)



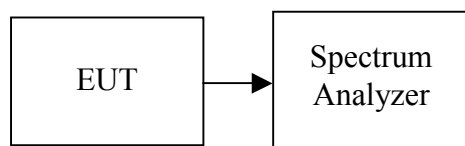


7.5 FREQUENCY SEPARATION

LIMIT

According to §15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

Test Configuration



TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = middle of hopping channel.
4. Set the spectrum analyzer as RBW = 10kHz, VBW = 30kHz, Span = 1.5MHz, Sweep = auto.
5. Max hold, mark 3 peaks of hopping channel and record the 3 peaks frequency.

TEST RESULTS

No non-compliance noted

Test Data

For GFSK

Channel Separation (MHz)	two-thirds of the 20 dB bandwidth (kHz)	Channel Separation Limit	Result
1.00	616	two-thirds of the 20 dB bandwidth	Pass

For 8DPSK

Channel Separation (MHz)	two-thirds of the 20 dB bandwidth (kHz)	Channel Separation Limit	Result
1.00	908.67	two-thirds of the 20 dB bandwidth	Pass

**For GFSK****Test Plot****Measurement of Channel Separation**

* Agilent 16:04:10 Oct 30, 2007

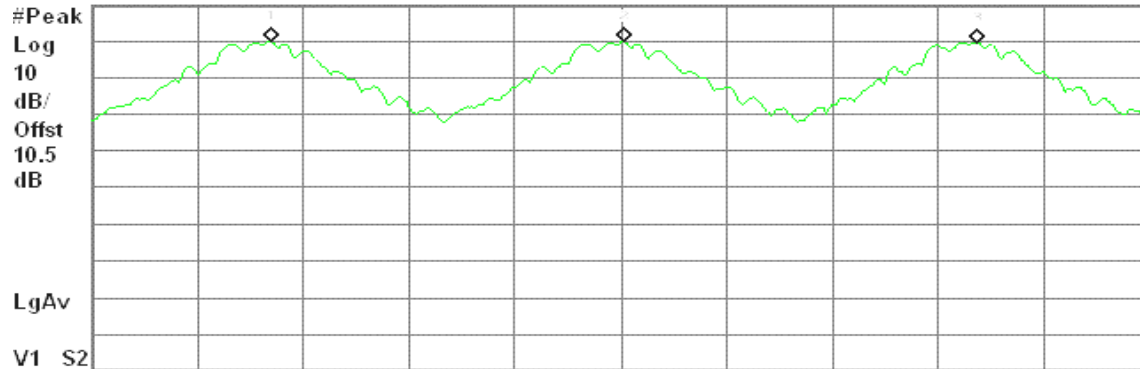
R T

Mkr3 2.442 010 GHz

0.32 dBm

Ref 10.5 dBm

Atten 10 dB



Center 2.441 000 GHz

Span 3 MHz

#Res BW 30 kHz

#VBW 100 kHz

Sweep 3.2 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.440 010 GHz	0.44 dBm
2	(1)	Freq	2.441 010 GHz	0.42 dBm
3	(1)	Freq	2.442 010 GHz	0.32 dBm

Measurement of 20dB Bandwidth

* Agilent 14:11:49 Oct 26, 2007

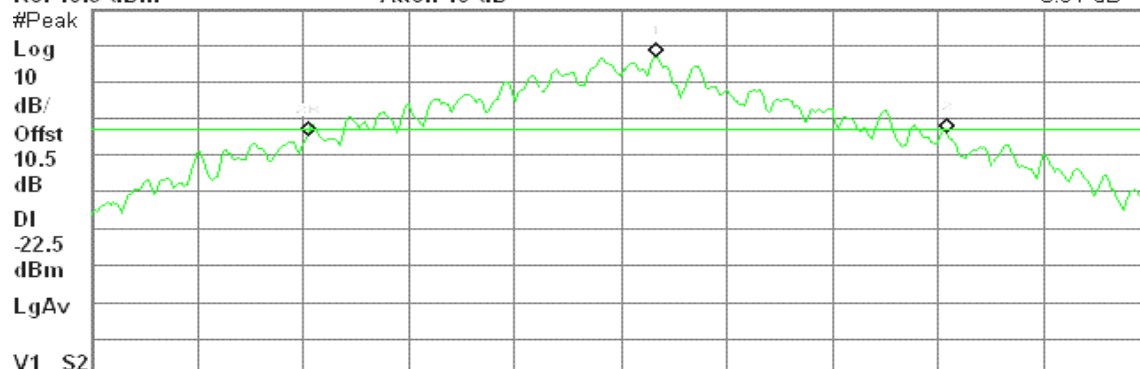
R T

Δ Mkr2 924 kHz

0.91 dB

Ref 10.5 dBm

Atten 10 dB



Center 2.480 000 GHz

Span 1.5 MHz

#Res BW 10 kHz

#VBW 30 kHz

Sweep 14.36 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.480 051 GHz	-2.47 dBm
2R	(1)	Freq	2.479 543 GHz	-24.01 dBm
2Δ	(1)	Freq	924 kHz	0.91 dB



For 8DPSK

Measurement of Channel Separation

Agilent 16:36:33 Oct 30, 2007

R T

Mkr1 2.441 120 GHz

-3.28 dBm

Ref 10.5 dBm

Atten 10 dB

#Peak

Log

10

dB/

Offst

10.5

dB

LgAv

M1 S2

S3 FC

AA

□(f):

f>50k

Swp

Center 2.441 000 GHz

#Res BW 30 kHz

#VBW 100 kHz

Span 3 MHz

Sweep 3.2 ms (601 pts)

Measurement of 20dB Bandwidth

Agilent 16:16:06 Oct 30, 2007

R T

Δ Mkr2 1.363 MHz

-0.22 dB

Ref 10.5 dBm

Atten 10 dB

#Peak

Log

10

dB/

Offst

10.5

dB

DI

-27.6

dBm

LgAv

V1 S2

Center 2.480 000 GHz

#Res BW 10 kHz

#VBW 30 kHz

Span 1.5 MHz

Sweep 14.36 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.479 936 GHz	-7.56 dBm
2R	(1)	Freq	2.479 316 GHz	-28.28 dBm
2Δ	(1)	Freq	1.363 MHz	-0.22 dB

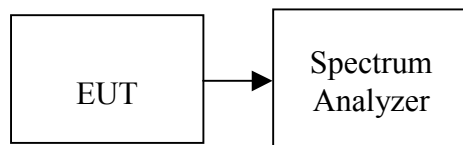


7.6 NUMBER OF HOPPING FREQUENCY

LIMIT

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz bands shall use at least 15 hopping frequencies.

Test Configuration



TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set spectrum analyzer Start=2400MHz, Stop = 2441.5MHz, Sweep = auto and Start=2441.5MHz, Stop = 2483.5MHz, Sweep = auto.
4. Set the spectrum analyzer as RBW, VBW=510kHz.
5. Max hold, view and count how many channel in the band.

TEST RESULTS

No non-compliance noted

Test Data

For GFSK

Result (No. of CH)	Limit (No. of CH)	Result
79	>15	PASS

For 8DPSK

Result (No. of CH)	Limit (No. of CH)	Result
79	>15	PASS



For GFSK

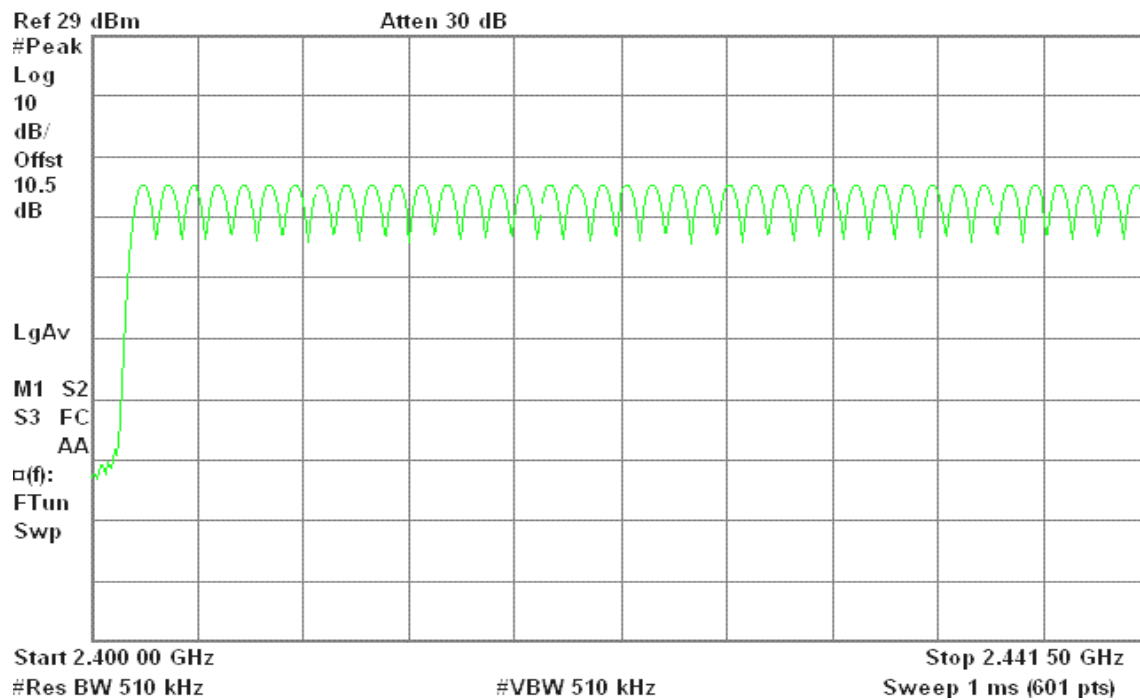
Test Plot

Channel Number

2.4 GHz – 2.4415 GHz

* Agilent 10:25:09 Jul 5, 2007

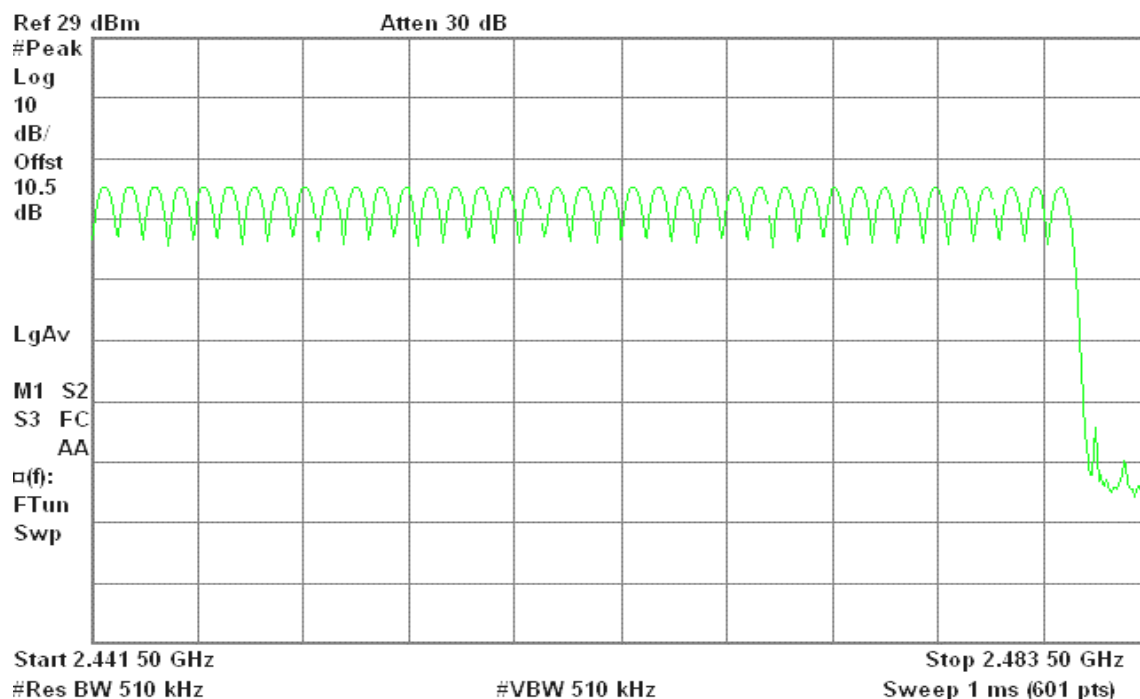
R T



2.4415 GHz – 2.4835 GHz

* Agilent 10:25:43 Jul 5, 2007

R T





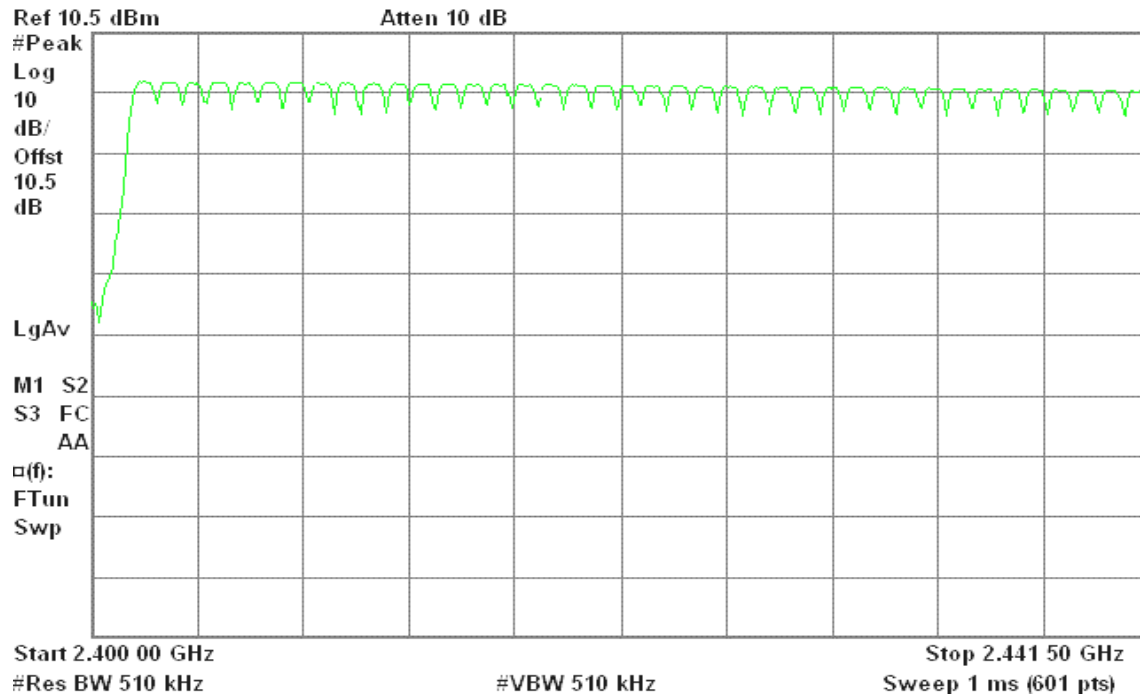
For 8DPSK

Channel Number

2.4 GHz – 2.4415 GHz

* Agilent 15:09:40 Oct 9, 2007

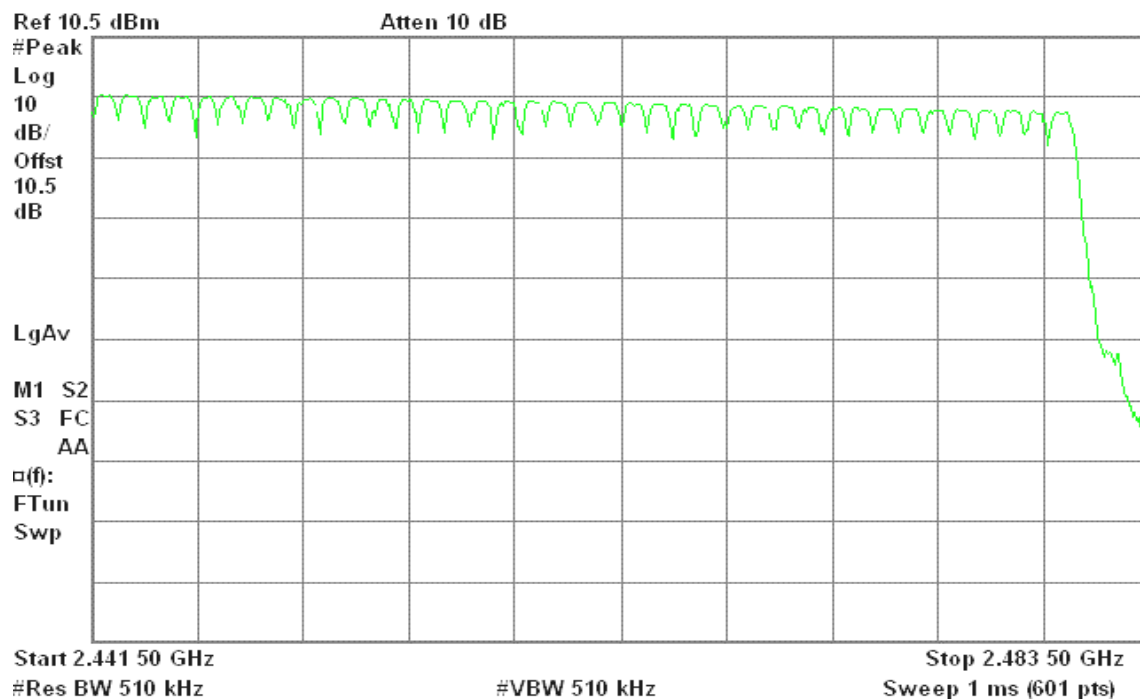
R T



2.4415 GHz – 2.4835 GHz

* Agilent 15:10:15 Oct 9, 2007

R T



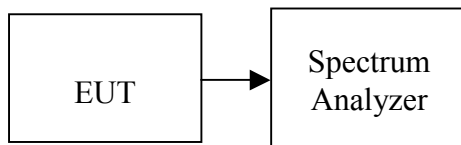


7.7 TIME OF OCCUPANCY (DWELL TIME)

LIMIT

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz bands. The average time of occupancy on any channels shall not greater than 0.4 s within a period 0.4 s multiplied by the number of hopping channels employed.

Test Configuration



TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW, VBW=1MHz, Span = 0Hz, Sweep = auto.
5. Repeat above procedures until all frequency measured were complete.

TEST RESULTS

No non-compliance noted.

**Test Data****For GFSK****DH 1**CH Low: $0.418 * (1600/2)/79 * 31.60 = 133.76$ (ms)CH Mid: $0.418 * (1600/2)/79 * 31.60 = 133.76$ (ms)CH High: $0.418 * (1600/2)/79 * 31.60 = 133.76$ (ms)

CH	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
Low	0.418	133.76	31.60	400.00	PASS
Mid	0.418	133.76	31.60		PASS
High	0.418	133.76	31.60		PASS

DH 3CH Low: $1.672 * (1600/4)/79 * 31.60 = 267.52$ (ms)CH Mid: $1.672 * (1600/4)/79 * 31.60 = 267.52$ (ms)CH High: $1.672 * (1600/4)/79 * 31.60 = 267.52$ (ms)

CH	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
Low	1.672	267.52	31.60	400.00	PASS
Mid	1.672	267.52	31.60		PASS
High	1.672	267.52	31.60		PASS

DH 5CH Low: $2.926 * (1600/6)/79 * 31.60 = 312.11$ (ms)CH Mid: $2.912 * (1600/6)/79 * 31.60 = 310.61$ (ms)CH High: $2.912 * (1600/6)/79 * 31.60 = 310.61$ (ms)

CH	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
Low	2.926	312.11	31.60	400.00	PASS
Mid	2.912	310.61	31.60		PASS
High	2.912	310.61	31.60		PASS

**For 8DPSK****DH 1**CH Low: $0.412 * (1600/2)/79 * 31.60 = 131.84$ (ms)CH Mid: $0.412 * (1600/2)/79 * 31.60 = 131.84$ (ms)CH High: $0.412 * (1600/2)/79 * 31.60 = 131.84$ (ms)

CH	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
Low	0.412	131.84	31.60	400.00	PASS
Mid	0.412	131.84	31.60		PASS
High	0.412	131.84	31.60		PASS

DH 3CH Low: $1.675 * (1600/4)/79 * 31.60 = 268.00$ (ms)CH Mid: $1.675 * (1600/4)/79 * 31.60 = 268.00$ (ms)CH High: $1.662 * (1600/4)/79 * 31.60 = 265.92$ (ms)

CH	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
Low	1.675	268.00	31.60	400.00	PASS
Mid	1.675	268.00	31.60		PASS
High	1.662	265.92	31.60		PASS

DH 5CH Low: $2.925 * (1600/6)/79 * 31.60 = 312.00$ (ms)CH Mid: $2.925 * (1600/6)/79 * 31.60 = 312.00$ (ms)CH High: $2.911 * (1600/6)/79 * 31.60 = 310.51$ (ms)

CH	Pulse Time (ms)	Total of Dwell (ms)	Period Time (s)	Limit (ms)	Result
Low	2.925	312.00	31.60	400.00	PASS
Mid	2.925	312.00	31.60		PASS
High	2.911	310.51	31.60		PASS



Test Plot

For GFSK

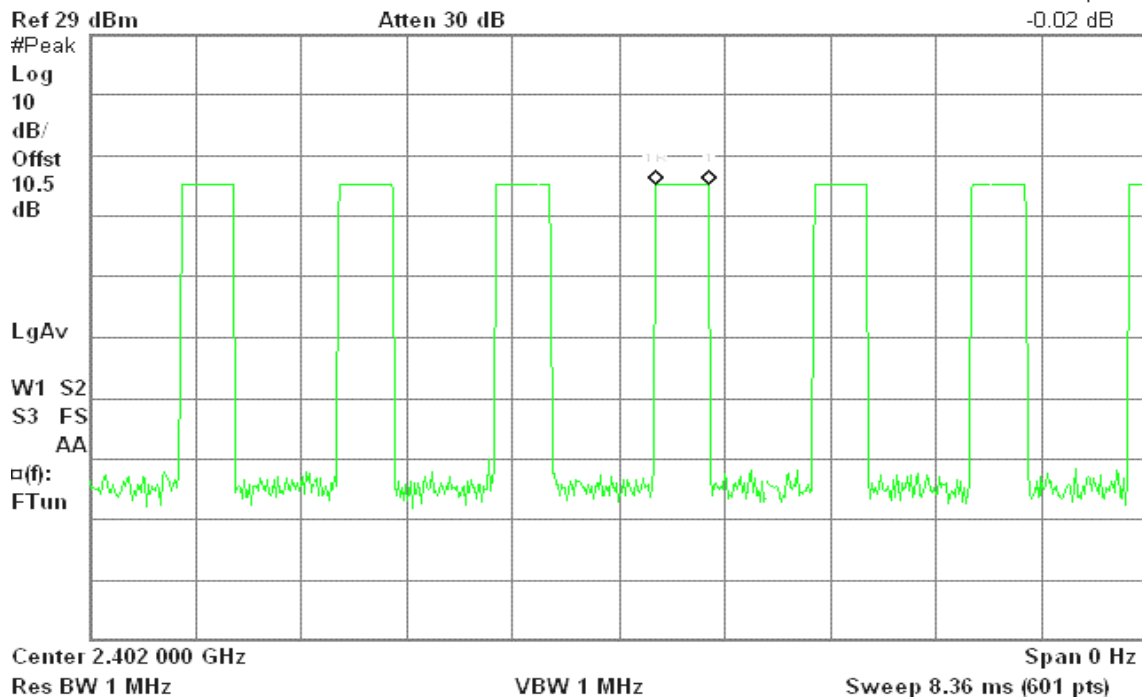
DH 1

(CH Low)

Agilent 10:12:26 Jul 5, 2007

R T

Δ Mkr1 418 μ s
-0.02 dB

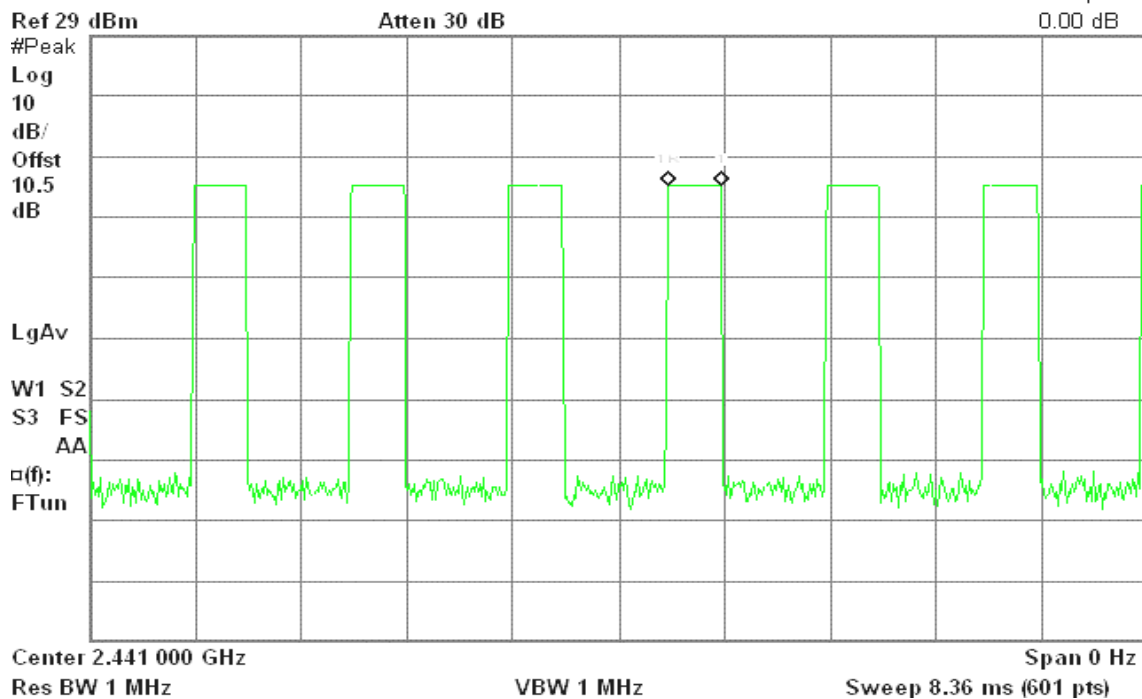


(CH Mid)

Agilent 10:15:36 Jul 5, 2007

R T

Δ Mkr1 418 μ s
0.00 dB



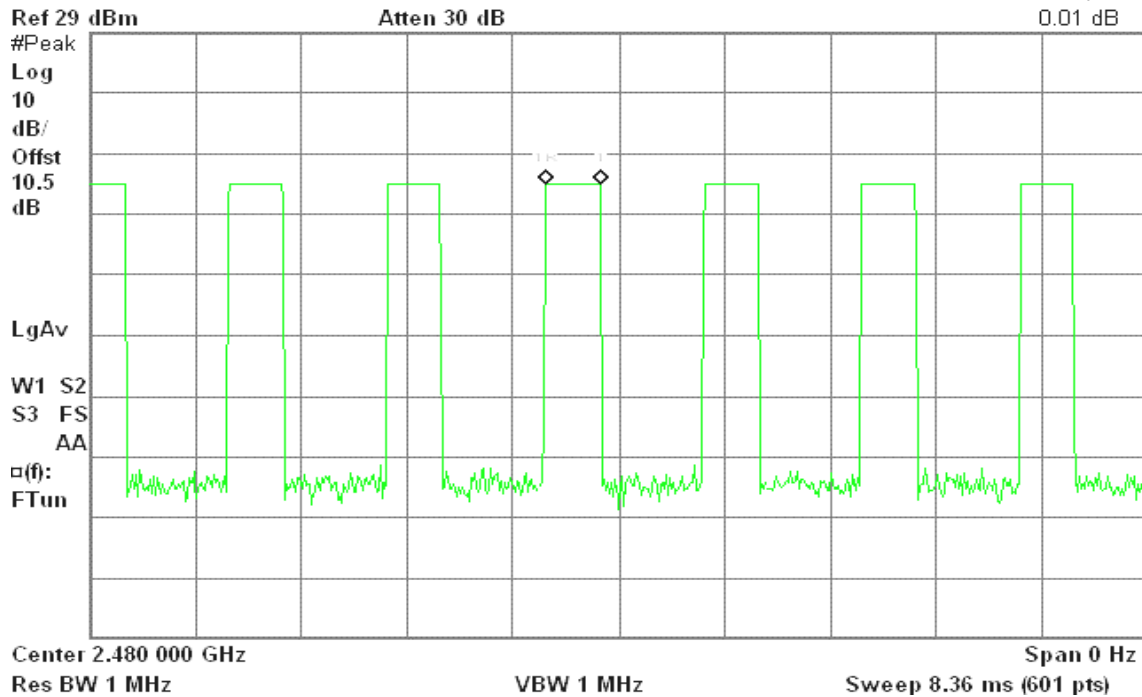


(CH High)

Agilent 10:22:40 Jul 5, 2007

R T

Δ Mkr1 418 μ s
0.01 dB



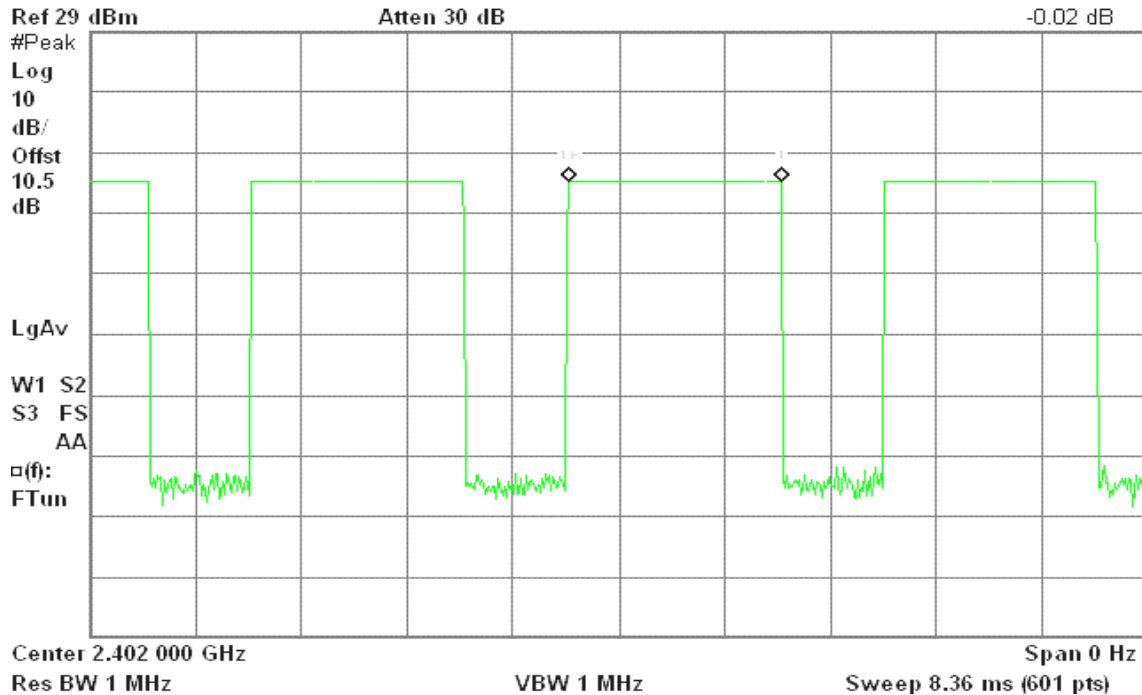
DH 3

(CH Low)

Agilent 10:12:59 Jul 5, 2007

R T

Δ Mkr1 1.672 ms
-0.02 dB



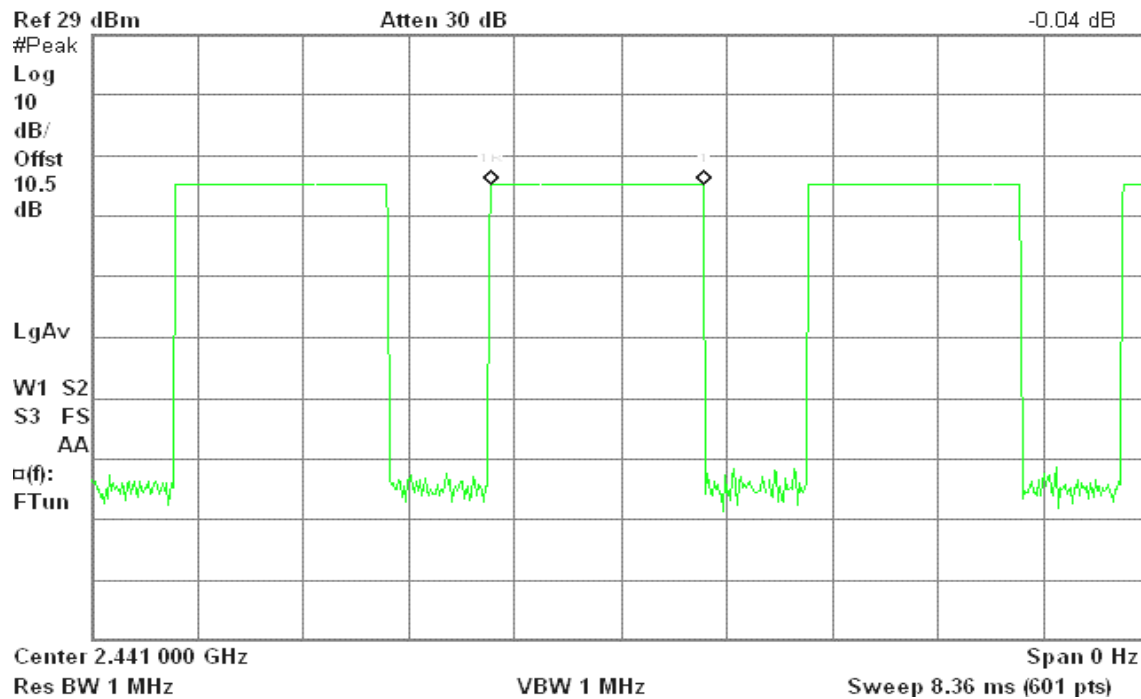


(CH Mid)

Agilent 10:16:03 Jul 5, 2007

R T

Δ Mkr1 1.672 ms
-0.04 dB

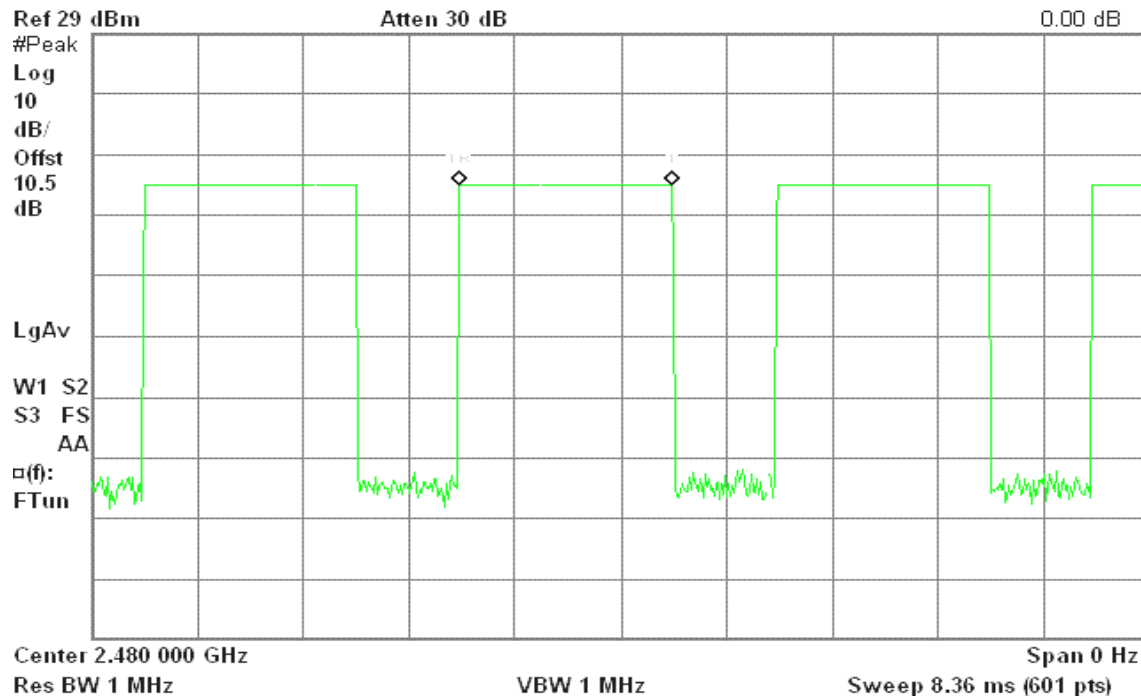


(CH High)

Agilent 10:21:55 Jul 5, 2007

R T

Δ Mkr1 1.672 ms
0.00 dB





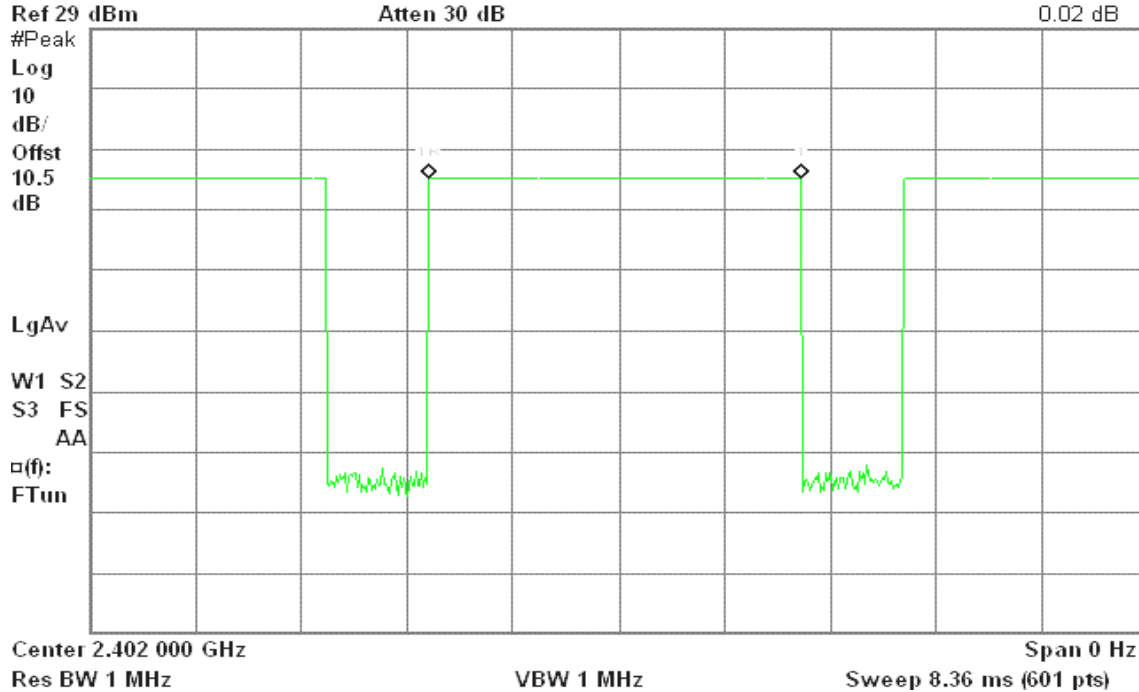
DH 5

(CH Low)

Agilent 10:13:25 Jul 5, 2007

R T

Δ Mkr1 2.926 ms
0.02 dB

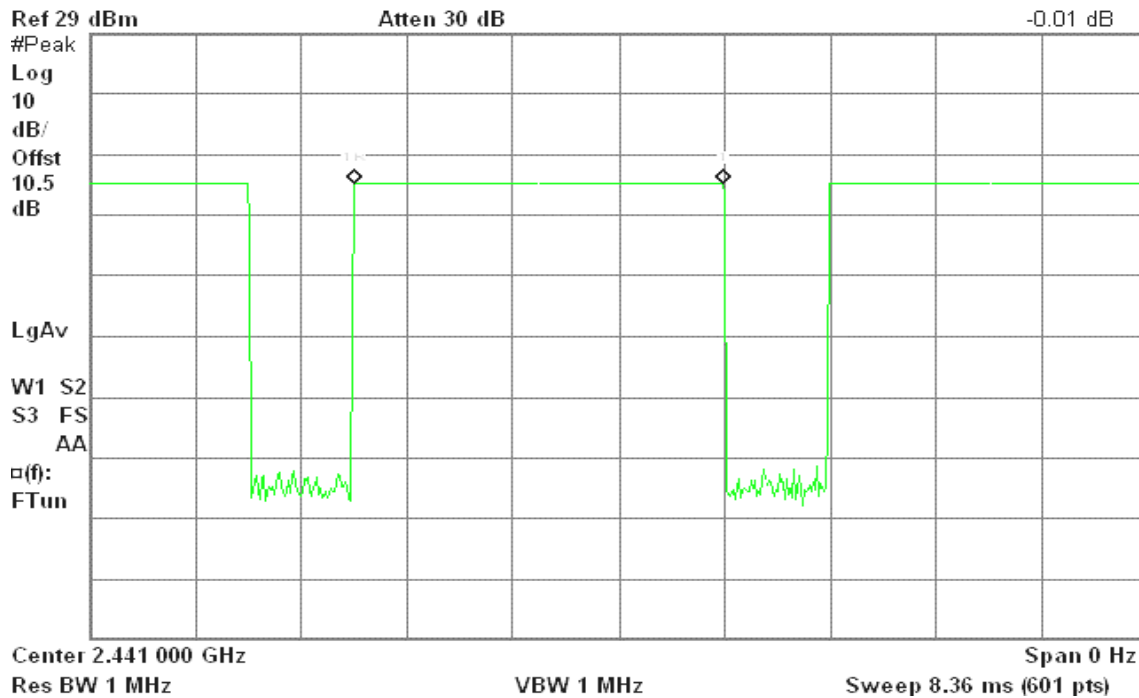


(CH Mid)

Agilent 10:16:22 Jul 5, 2007

R T

Δ Mkr1 2.912 ms
-0.01 dB



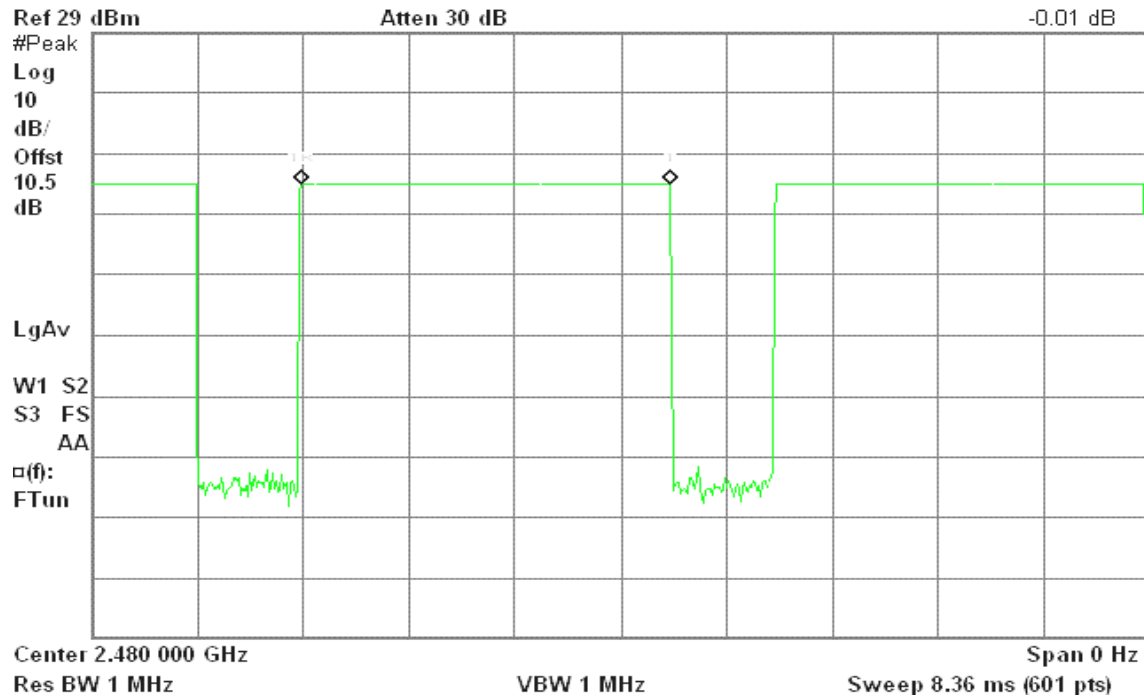


(CH High)

Agilent 10:21:21 Jul 5, 2007

R T

Δ Mkr1 2.912 ms
-0.01 dB





For 8DPSK

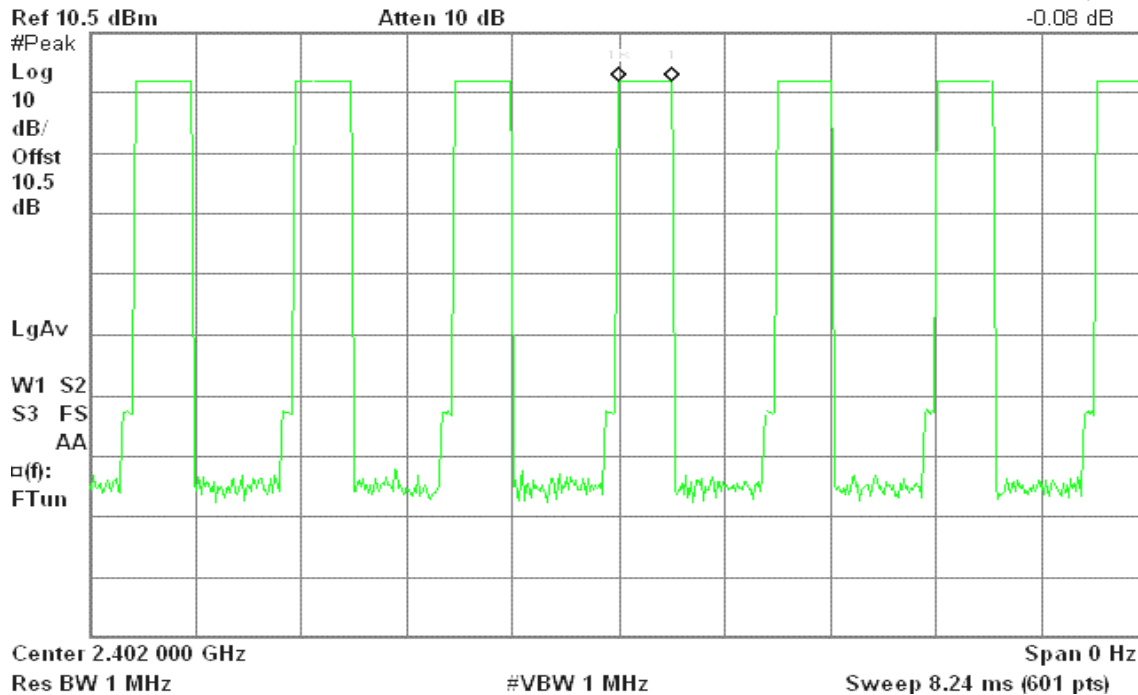
DH 1

(CH Low)

Agilent 14:58:41 Oct 9, 2007

R T

Δ Mkr1 412 μs
-0.08 dB

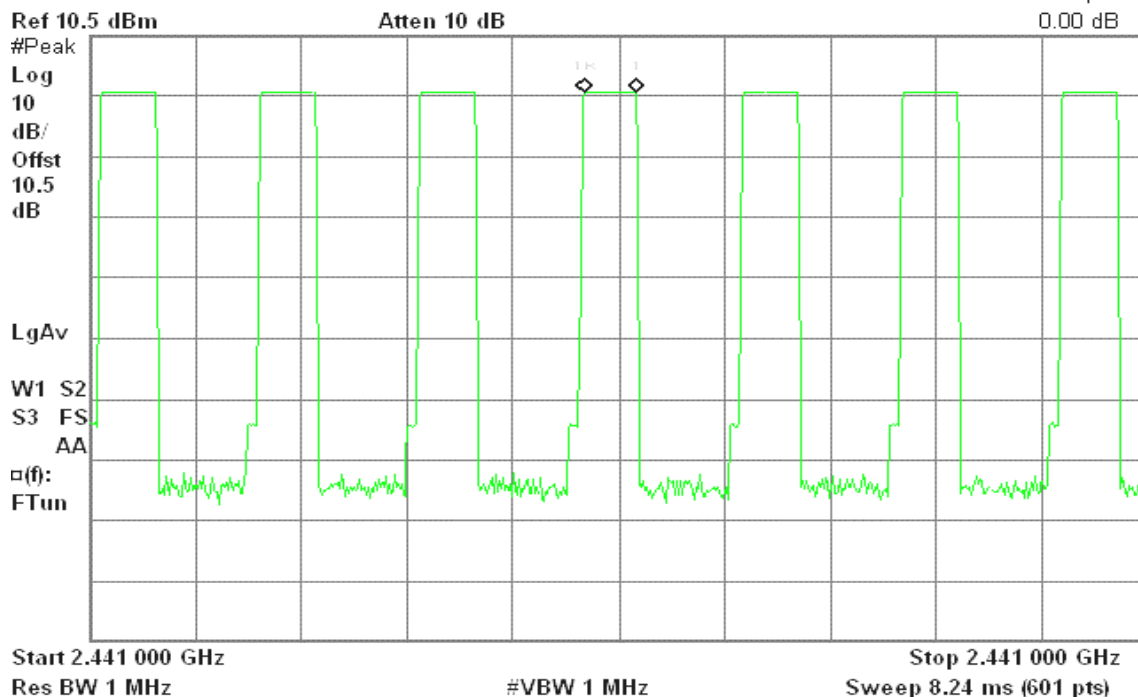


(CH Mid)

Agilent 14:59:17 Oct 9, 2007

R T

Δ Mkr1 412 μs
0.00 dB



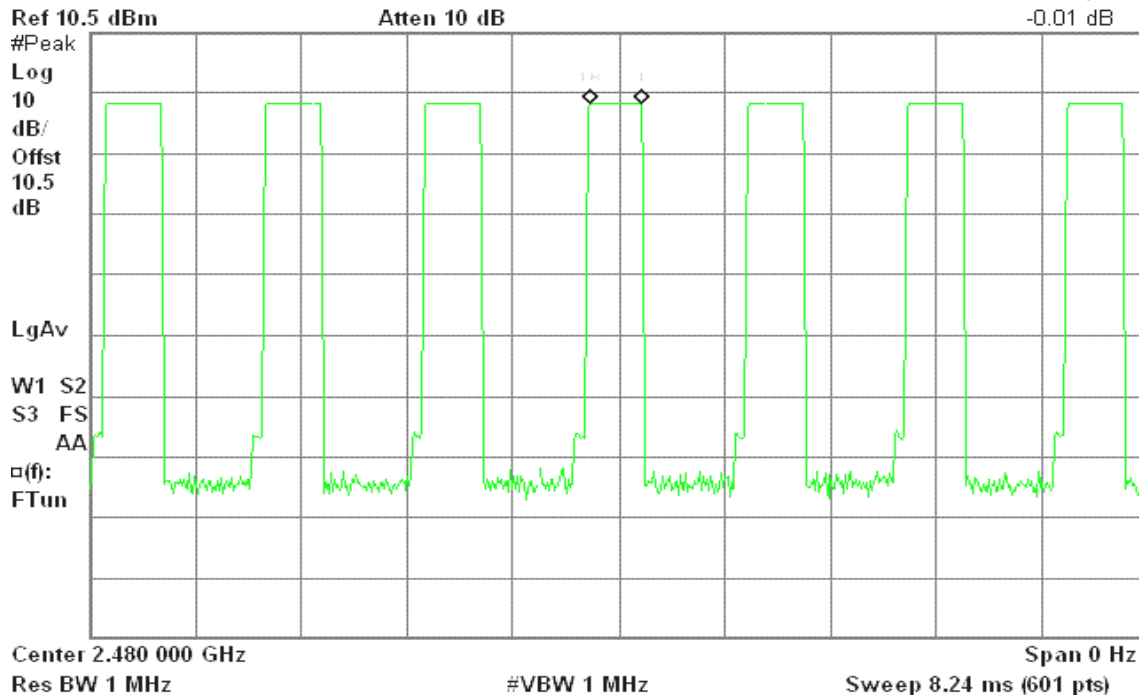


(CH High)

Agilent 15:00:47 Oct 9, 2007

R T

Δ Mkr1 412 μ s
-0.01 dB



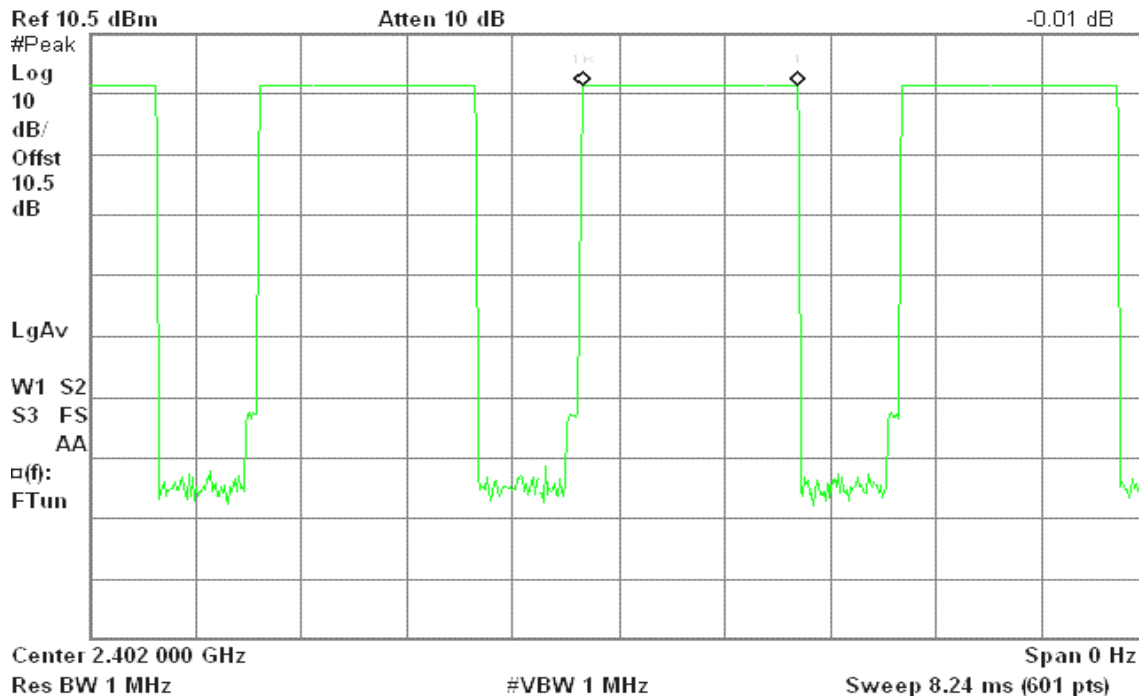
DH 3

(CH Low)

Agilent 15:03:47 Oct 9, 2007

R T

Δ Mkr1 1.675 ms
-0.01 dB



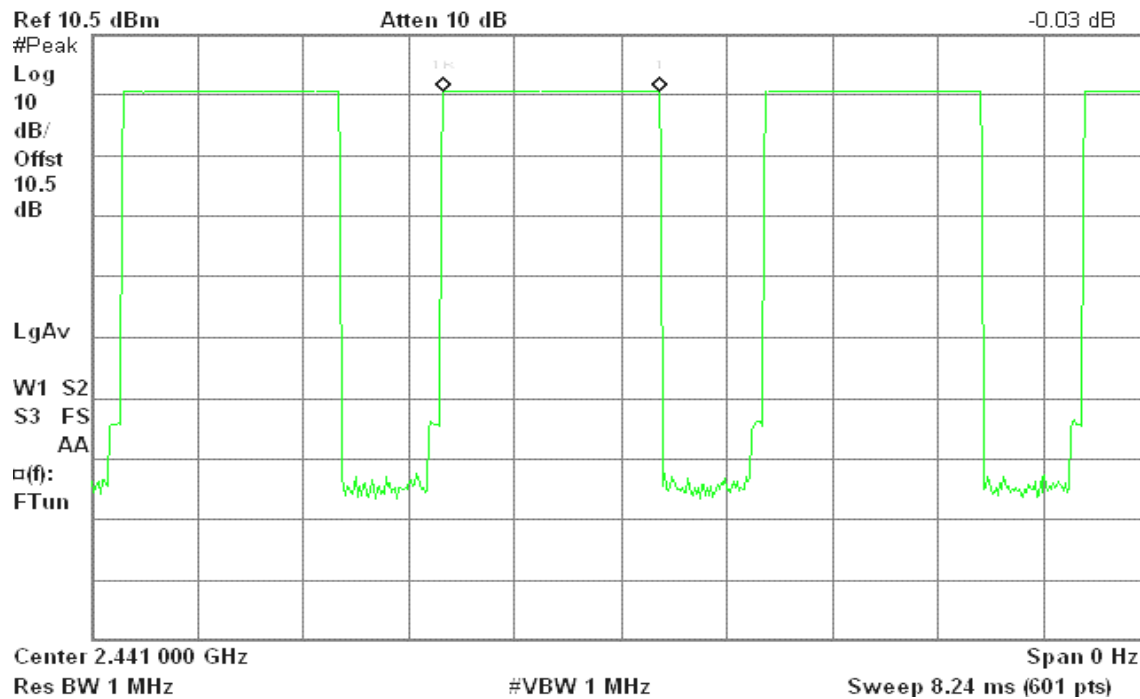


(CH Mid)

Agilent 15:03:06 Oct 9, 2007

R T

Δ Mkr1 1.675 ms
-0.03 dB

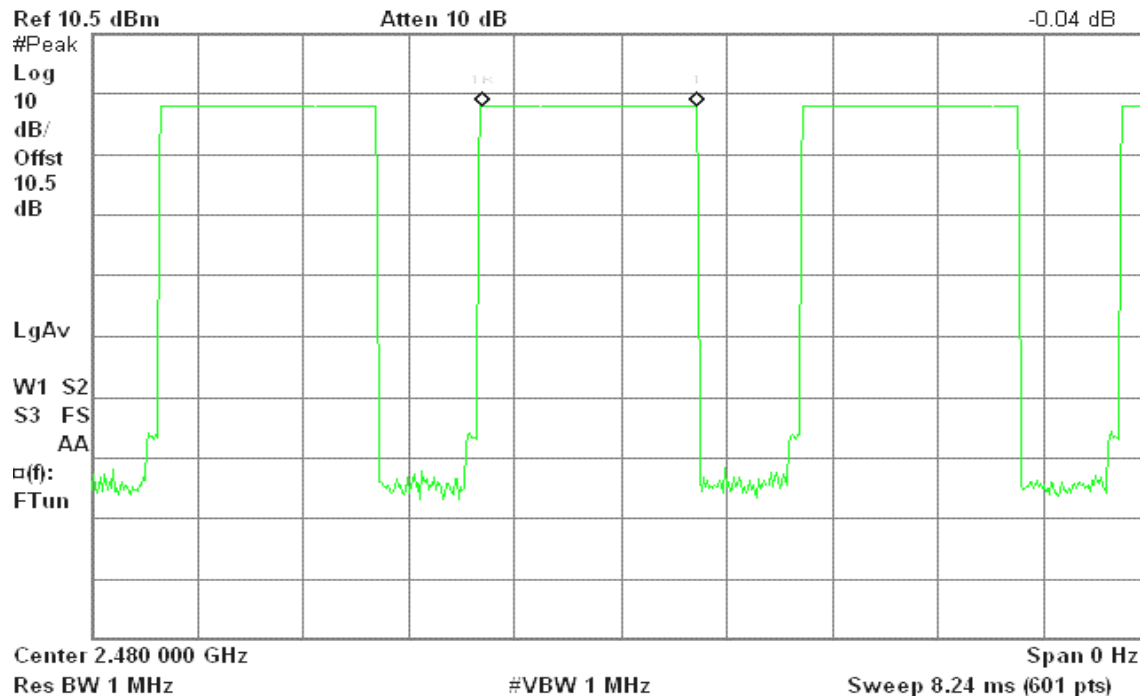


(CH High)

Agilent 15:02:24 Oct 9, 2007

R T

Δ Mkr1 1.662 ms
-0.04 dB





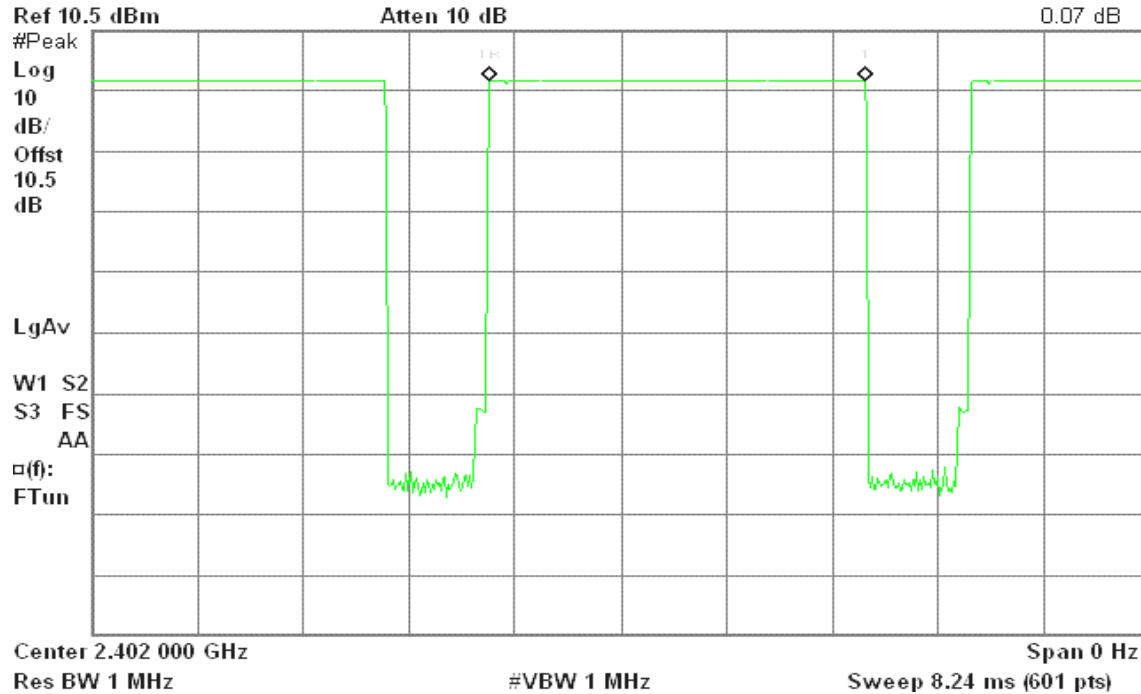
DH 5

(CH Low)

Agilent 15:06:07 Oct 9, 2007

R T

Δ Mkr1 2.925 ms
0.07 dB

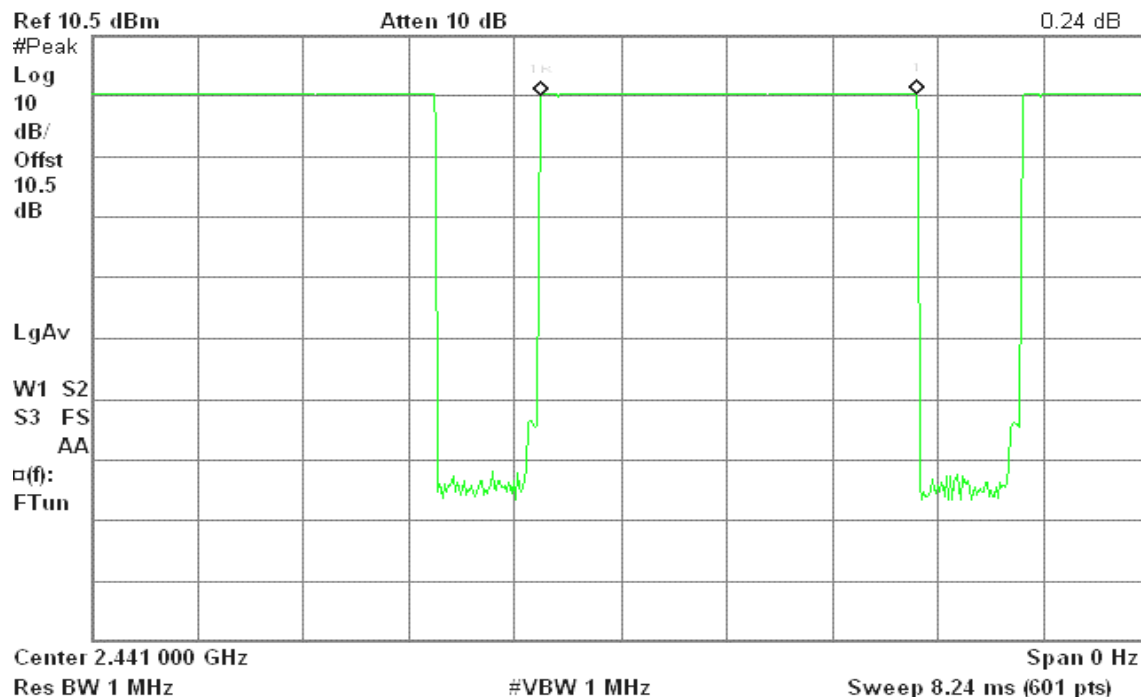


(CH Mid)

Agilent 15:06:50 Oct 9, 2007

R T

Δ Mkr1 2.925 ms
0.24 dB





(CH High)

Agilent 15:07:46 Oct 9, 2007

R T

Δ Mkr1 2.911 ms
-0.05 dB

Ref 10.5 dBm

Atten 10 dB

#Peak

Log

10

dB/

Offset

10.5

dB

LgAv

W1 S2

S3 FS

AA

□(f):

FTun

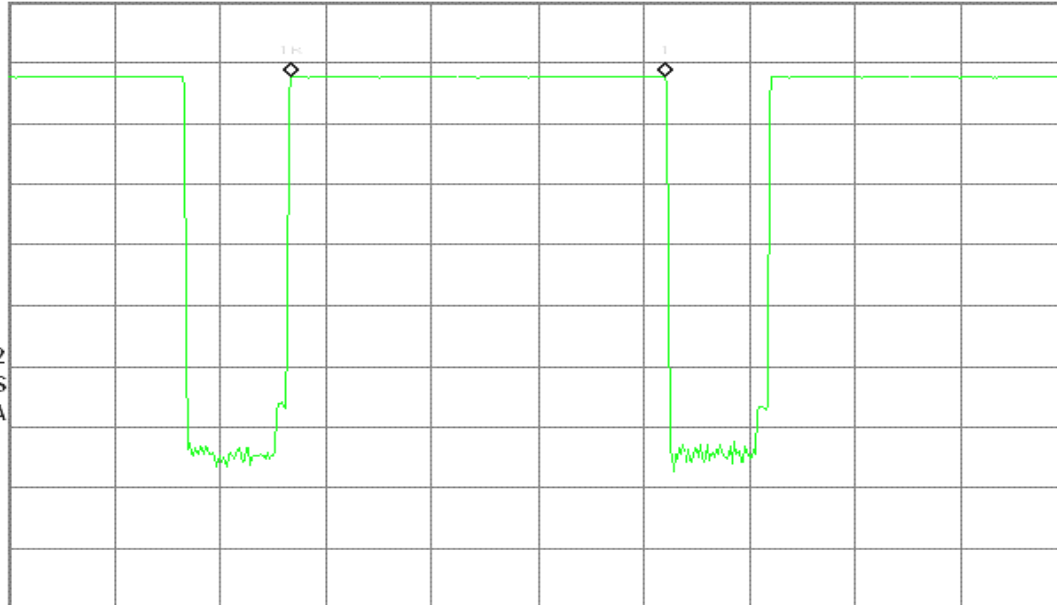
Center 2.480 000 GHz

Res BW 1 MHz

#VBW 1 MHz

Span 0 Hz

Sweep 8.24 ms (601 pts)





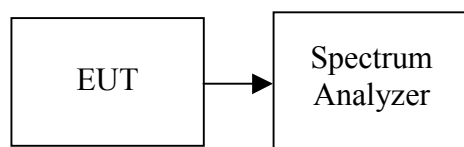
7.8 SPURIOUS EMISSIONS

7.8.1 Conducted Measurement

LIMIT

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).

Test Configuration



TEST PROCEDURE

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 100 kHz.

Measurements are made over the 30MHz to 26GHz range with the transmitter set to the lowest, middle, and highest channels.

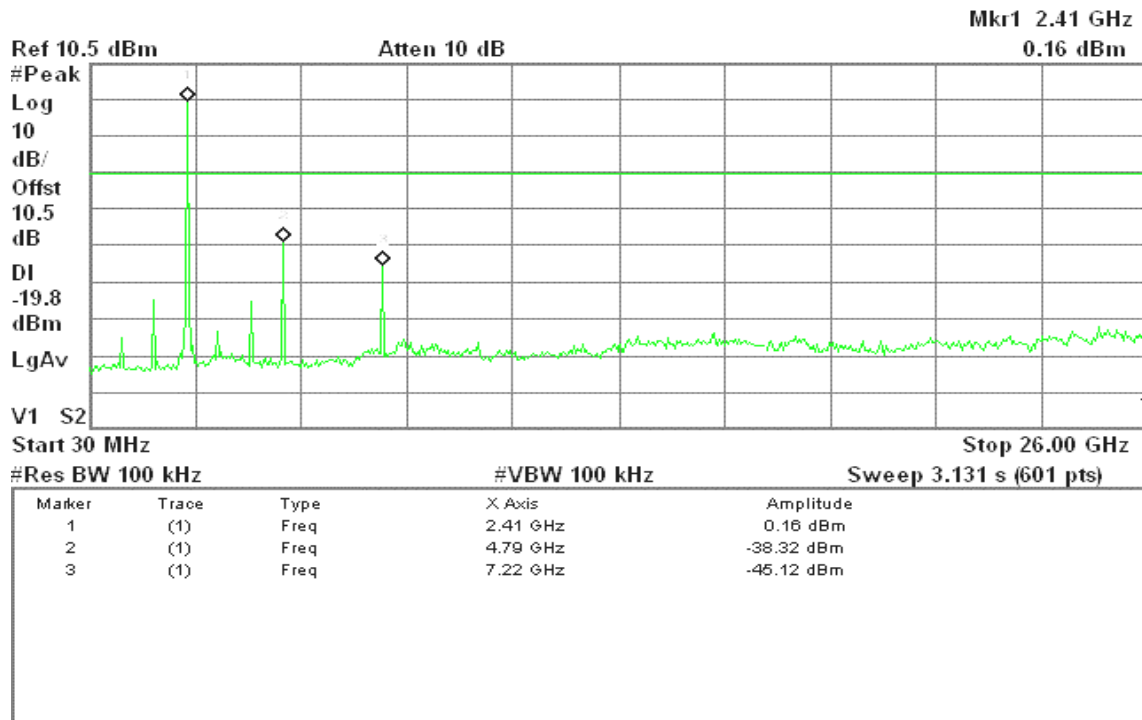
TEST RESULTS

No non-compliance noted

**Test Plot****For GFSK****CH Low**

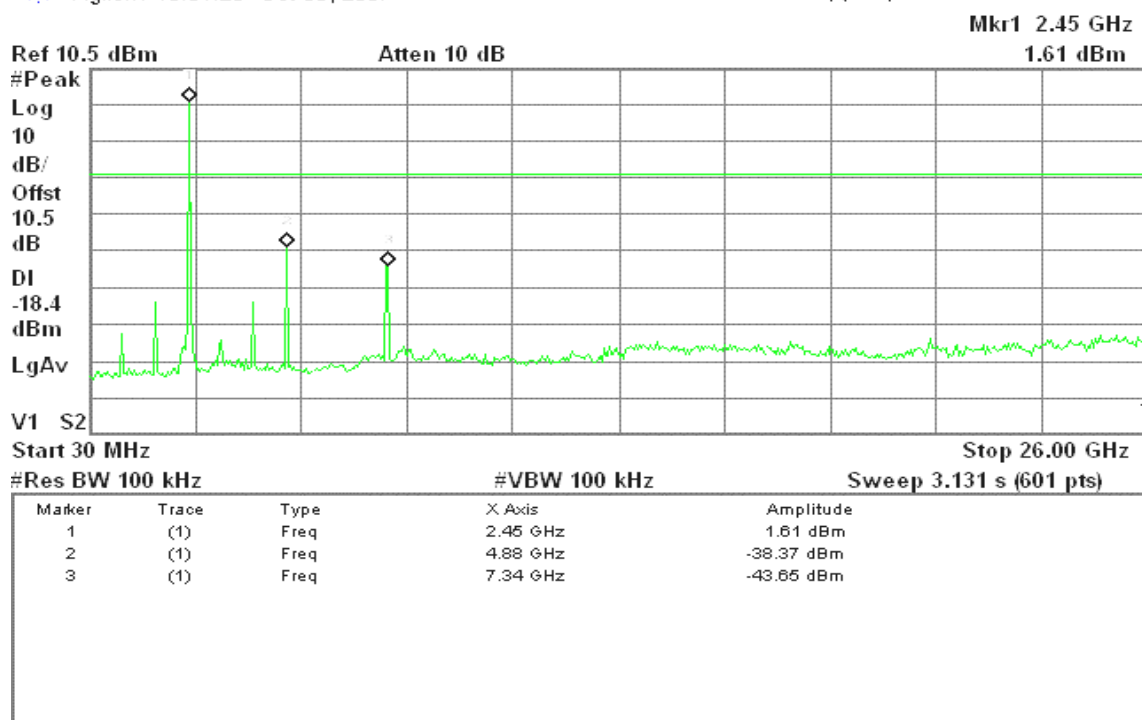
* Agilent 16:02:07 Oct 30, 2007

R T

**CH Mid**

* Agilent 16:01:25 Oct 30, 2007

R T





CH High

Agilent 16:00:20 Oct 30, 2007

R T

Mkr3 7.43 GHz
-43.76 dBm

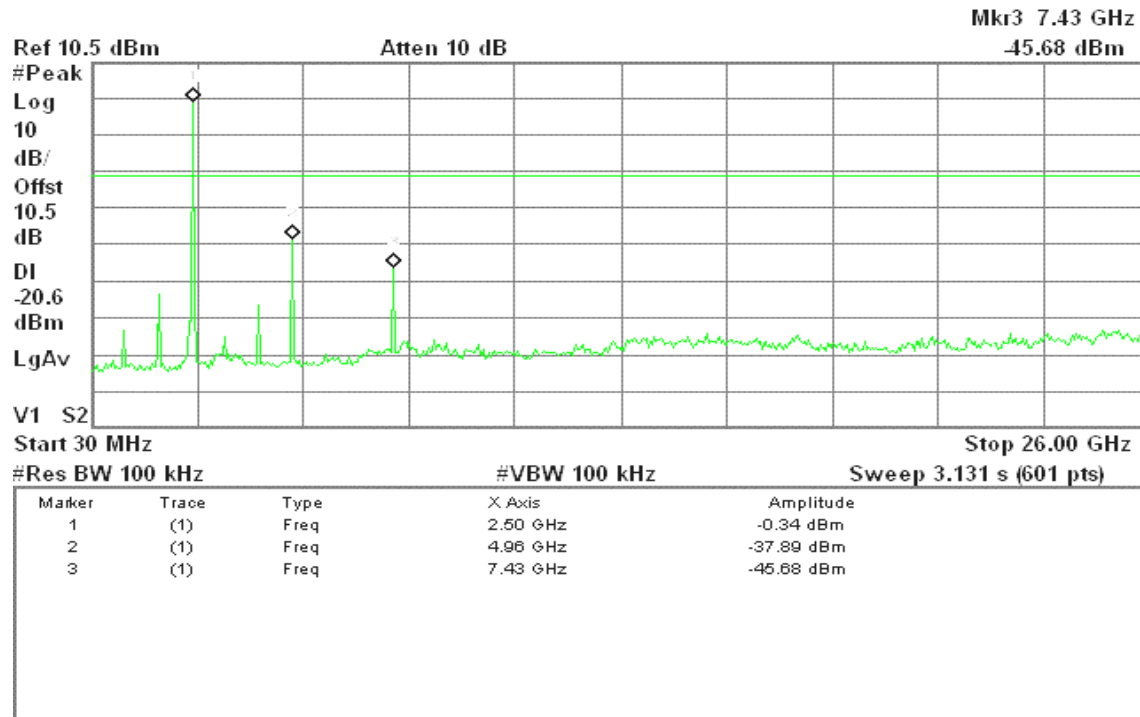


#Res BW 100 kHz		#VBW 100 kHz		Sweep 3.131 s (601 pts)
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.50 GHz	1.80 dBm
2	(1)	Freq	4.96 GHz	-35.56 dBm
3	(1)	Freq	7.43 GHz	-43.76 dBm

**For 8DPSK****CH Low**

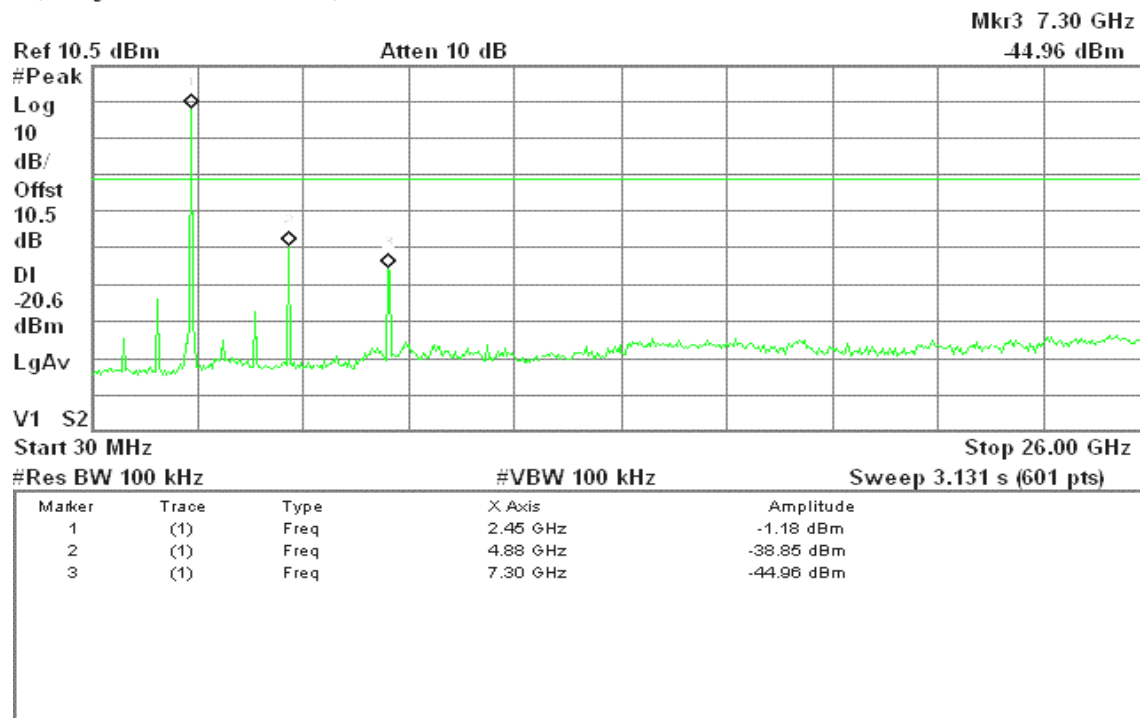
* Agilent 16:30:03 Oct 30, 2007

R T

**CH Mid**

* Agilent 16:29:17 Oct 30, 2007

R T



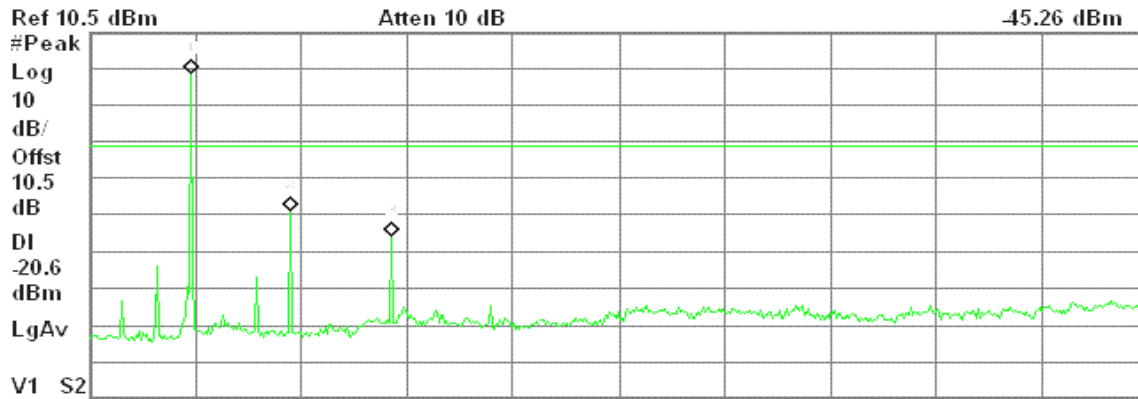


CH High

Agilent 16:28:26 Oct 30, 2007

R T

Mkr3 7.43 GHz
-45.26 dBm



Start 30 MHz		#Res BW 100 kHz		#VBW 100 kHz	Stop 26.00 GHz
					Sweep 3.131 s (601 pts)
Marker	Trace	Type	X Axis	Amplitude	
1	(1)	Freq	2.50 GHz	-0.61 dBm	
2	(1)	Freq	4.96 GHz	-38.24 dBm	
3	(1)	Freq	7.43 GHz	-45.26 dBm	



7.8.2 Radiated Emissions

LIMIT

1. According to §15.209(a), except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

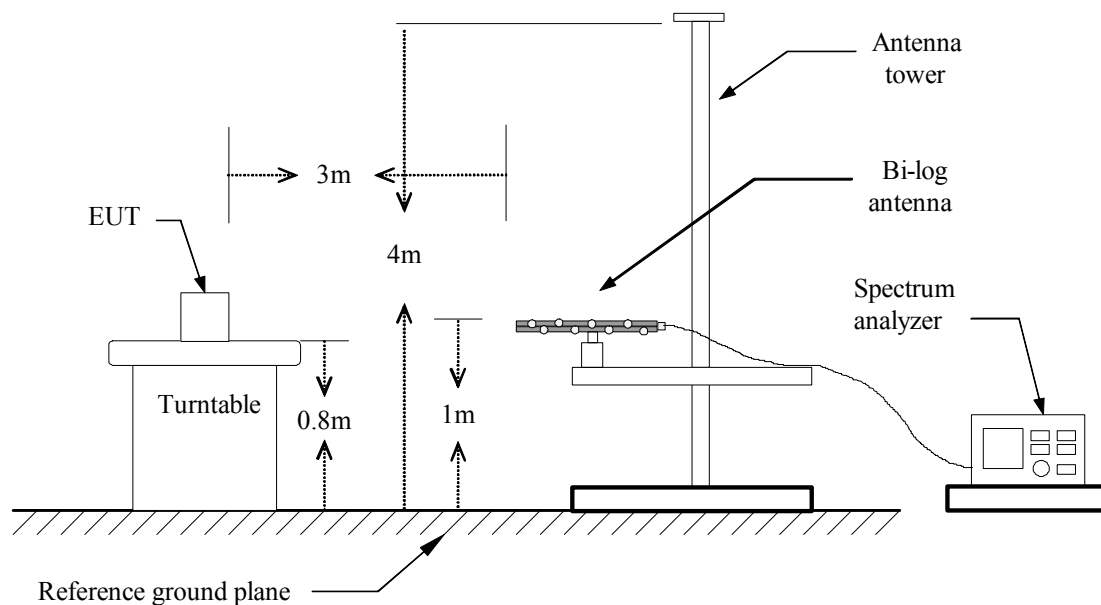
Remark: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

2. In the emission table above, the tighter limit applies at the band edges.

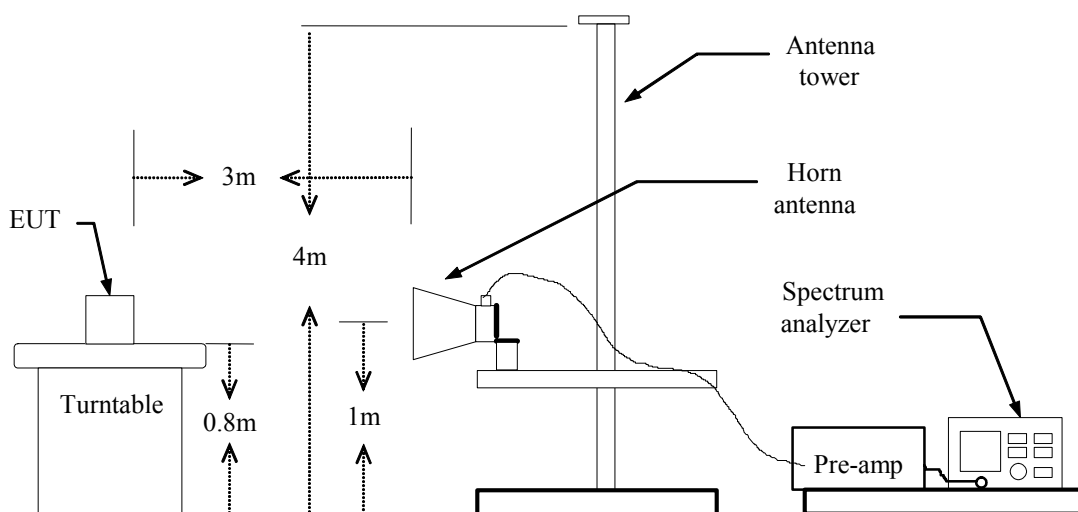
Frequency (MHz)	Field Strength ($\mu\text{V/m}$ at 3-meter)	Field Strength (dB $\mu\text{V/m}$ at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Test Configuration

Below 1 GHz



Above 1 GHz





TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:
Below 1GHz:
RBW=100kHz / VBW=300kHz / Sweep=AUTO
Above 1GHz:
(a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
(b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
7. Repeat above procedures until the measurements for all frequencies are complete.



TEST RESULTS

No non-compliance noted

Below 1 GHz

Operation Mode: Normal Link

Test Date: October 31, 2007

Temperature: 25°C

Tested by: Steven Young

Humidity: 55% RH

Polarity: Ver. / Hor.

Frequency (MHz)	Ant.Pol. (H/V)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
30.00	V	39.46	-4.65	34.81	40.00	-5.19	QP
594.22	V	37.91	-6.21	31.70	46.00	-14.30	QP
649.18	V	42.73	-5.22	37.51	46.00	-8.49	QP
702.53	V	37.17	-4.89	32.27	46.00	-13.73	QP
757.50	V	40.08	-3.87	36.21	46.00	-9.79	QP
796.30	V	41.93	-3.18	38.75	46.00	-7.25	QP
86.58	H	54.60	-19.26	35.34	40.00	-4.66	QP
270.88	H	45.57	-12.80	32.77	46.00	-13.23	QP
649.18	H	36.07	-5.22	30.85	46.00	-15.15	QP
757.50	H	39.14	-3.87	35.27	46.00	-10.73	QP
796.30	H	39.77	-3.18	36.59	46.00	-9.41	QP
864.20	H	35.73	-2.50	33.23	46.00	-12.77	QP

Remark:

- 1. Measuring frequencies from 30 MHz to the 1GHz.*
- 2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.*
- 3. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit.*
- 4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
- 5. Margin (dB) = Remark result (dBuV/m) – Quasi-peak limit (dBuV/m).*

**Above 1 GHz****For GFSK****Operation Mode:** TX / CH Low**Test Date:** October 31, 2007**Temperature:** 25°C**Tested by:** Steven Young**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant.Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
1513.33	V	53.34	---	-9.84	43.49	---	74.00	54.00	-10.51	Peak
4800.00	V	48.73	---	0.53	49.26	---	74.00	54.00	-4.74	Peak
N/A										
1686.67	H	52.70	---	-8.12	44.58	---	74.00	54.00	-9.42	Peak
4800.00	H	47.40	---	0.53	47.93	---	74.00	54.00	-6.07	Peak
N/A										

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** TX / CH Mid**Test Date:** October 31, 2007**Temperature:** 25°C**Tested by:** Steven Young**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
1873.33	V	53.29	---	-6.26	47.02	---	74.00	54.00	-6.98	Peak
4883.33	V	54.86	51.69	0.61	55.47	52.30	74.00	54.00	-1.70	AVG
N/A										
1973.33	H	52.84	---	-5.27	47.57	---	74.00	54.00	-6.43	Peak
4883.33	H	51.21	---	0.61	51.83	---	74.00	54.00	-2.17	Peak
N/A										

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** TX / CH High**Test Date:** October 31, 2007**Temperature:** 25°C**Tested by:** Steven Young**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
1136.67	V	54.68	---	-10.57	44.12	---	74.00	54.00	-9.88	Peak
4958.33	V	51.21	---	0.68	51.89	---	74.00	54.00	-2.11	Peak
N/A										
1216.67	H	53.41	---	-10.44	42.98	---	74.00	54.00	-11.02	Peak
4958.33	H	56.50	51.67	0.68	57.18	52.35	74.00	54.00	-1.65	AVG
N/A										

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**For 8DPSK****Operation Mode:** TX / CH Low**Test Date:** October 31, 2007**Temperature:** 25°C**Tested by:** Steven Young**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant.Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
1653.33	V	53.11	---	-8.45	44.66	---	74.00	54.00	-9.34	Peak
4808.33	V	49.62	---	0.54	50.16	---	74.00	54.00	-3.84	Peak
N/A										
1746.67	H	52.82	---	-7.52	45.30	---	74.00	54.00	-8.70	Peak
4800.00	H	47.86	---	0.53	48.39	---	74.00	54.00	-5.61	Peak
N/A										

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser; with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** TX / CH Mid**Test Date:** October 31, 2007**Temperature:** 25°C**Tested by:** Steven Young**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant.Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
1713.33	V	52.55	---	-7.85	44.70	---	74.00	54.00	-9.30	Peak
4883.33	V	53.87	50.24	0.61	54.48	50.85	74.00	54.00	-3.15	AVG
N/A										
1790.00	H	52.80	---	-7.09	45.70	---	74.00	54.00	-8.30	Peak
4883.33	H	51.24	---	0.61	51.85	---	74.00	54.00	-2.15	Peak
N/A										

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** TX / CH High**Test Date:** October 31, 2007**Temperature:** 25°C**Tested by:** Steven Young**Humidity:** 55 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Ant. Pol. (H/V)	Reading (Peak) (dBuV)	Reading (Average) (dBuV)	Correction Factor (dB/m)	Result (Peak) (dBuV/m)	Result (Average) (dBuV/m)	Limit (Peak) (dBuV/m)	Limit (Average) (dBuV/m)	Margin (dB)	Remark
1986.67	V	51.90	---	-5.14	46.76	---	74.00	54.00	-7.24	Peak
4958.33	V	50.98	---	0.68	51.67	---	74.00	54.00	-2.33	Peak
7441.67	V	48.11	---	3.16	51.27	---	74.00	54.00	-2.73	Peak
N/A										
1383.33	H	53.16	---	-10.16	43.00	---	74.00	54.00	-11.00	Peak
4958.33	H	51.26	---	0.68	51.95	---	74.00	54.00	-2.05	Peak
N/A										

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin > 20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).



7.9 POWERLINE CONDUCTED EMISSIONS

LIMIT

According to §15.207(a), except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

* Decreases with the logarithm of the frequency.

Test Configuration

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.

TEST PROCEDURE

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

**TEST RESULTS**

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Test Data**Operation Mode:** Normal Link**Test Date:** November 8, 2007**Temperature:** 25°C**Tested by:** Wolf Huang**Humidity:** 55% RH

Freq. (MHz)	QP Reading (dBuV)	AV Reading (dBuV)	Corr. factor (dB)	QP Result (dBuV)	AV Result (dBuV)	QP Limit (dBuV)	AV Limit (dBuV)	QP Margin (dB)	AV Margin (dB)	Note
0.211	38.400	30.320	0.106	38.506	30.426	63.166	53.166	-24.660	-22.740	L1
0.277	28.950	22.450	0.082	29.032	22.532	60.905	50.905	-31.874	-28.374	L1
0.496	36.650	29.410	0.001	36.651	29.411	56.067	46.067	-19.415	-16.655	L1
0.781	29.840	22.940	0.000	29.840	22.940	56.000	46.000	-26.160	-23.060	L1
1.057	28.740	22.950	0.001	28.741	22.951	56.000	46.000	-27.259	-23.049	L1
24.399	25.280	22.340	0.607	25.887	22.947	60.000	50.000	-34.113	-27.053	L1
0.211	37.960	30.800	0.106	38.066	30.906	63.166	53.166	-25.100	-22.260	L2
0.281	30.320	24.880	0.080	30.400	24.960	60.786	50.786	-30.386	-25.826	L2
0.496	34.800	28.400	0.001	34.801	28.401	56.067	46.067	-21.265	-17.665	L2
0.781	30.530	22.770	0.000	30.530	22.770	56.000	46.000	-25.470	-23.230	L2
1.065	27.870	22.390	0.001	27.871	22.391	56.000	46.000	-28.129	-23.609	L2
22.710	25.910	22.940	0.563	26.473	23.503	60.000	50.000	-33.527	-26.497	L2

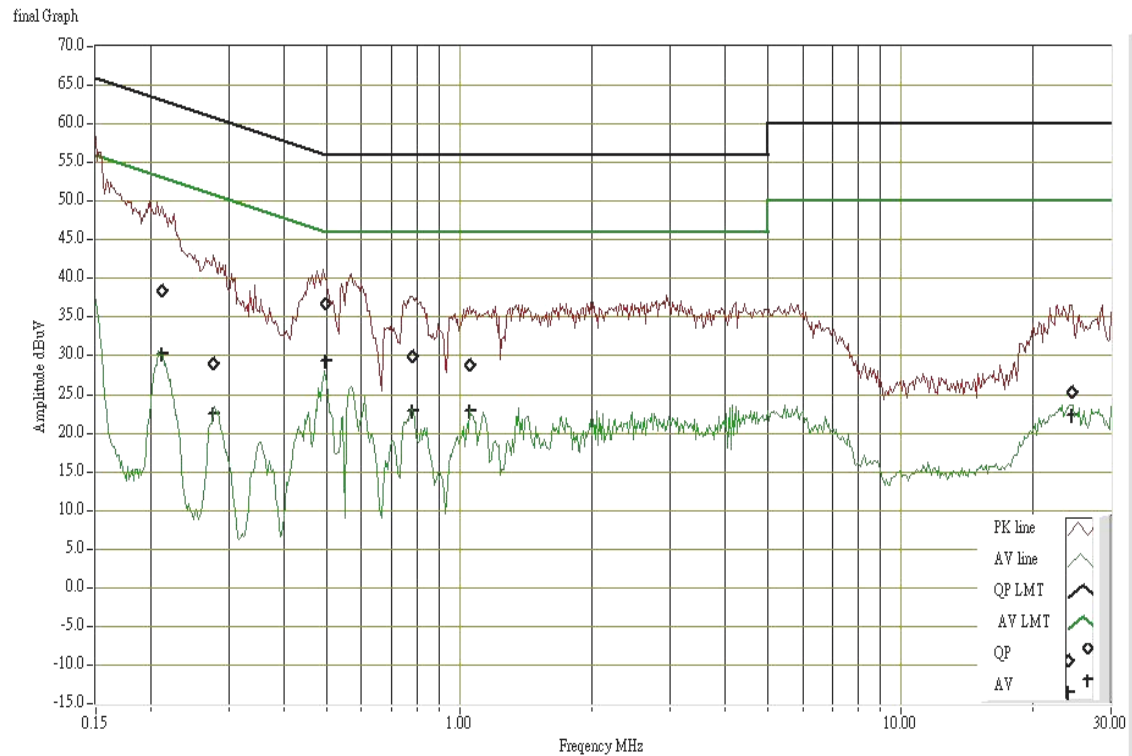
Remark:

1. Measuring frequencies from 0.15 MHz to 30MHz.
2. The emissions measured in frequency range from 0.15 MHz to 30MHz were made with an instrument using Quasi-peak detector and average detector.
3. The IF bandwidth of SPA between 0.15MHz and 30MHz was 10kHz; the IF bandwidth of Test Receiver between 0.15MHz and 30MHz was 9kHz;
4. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)

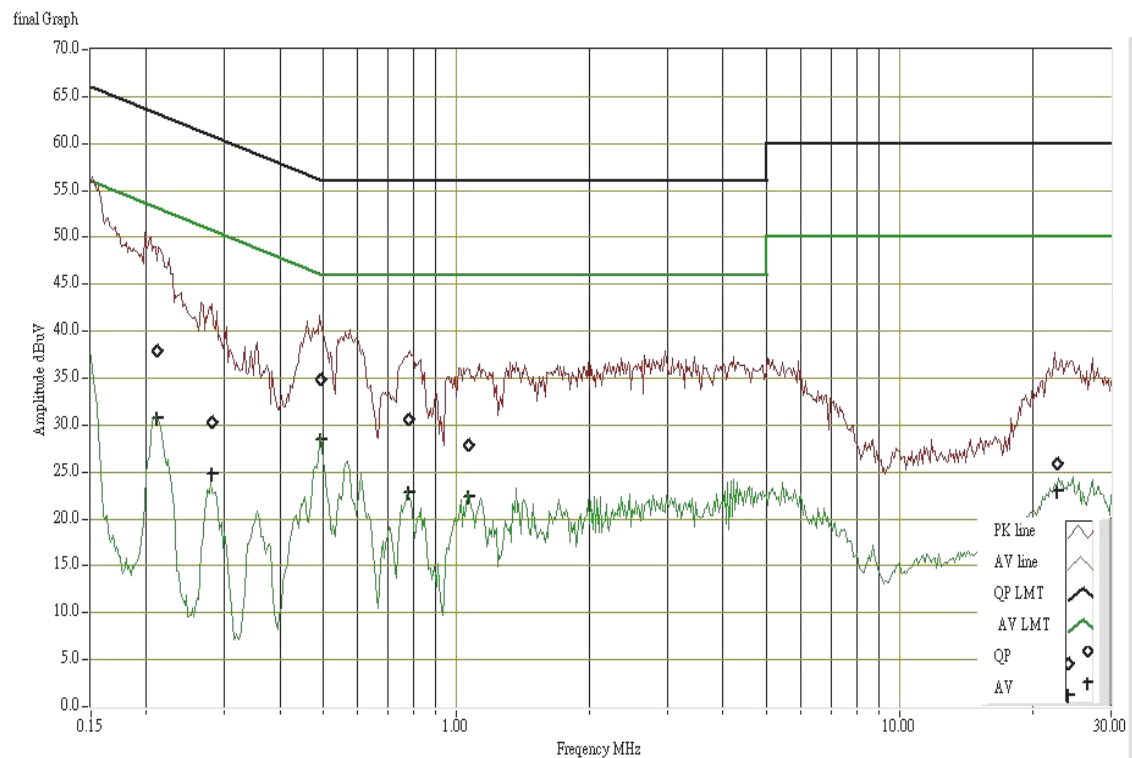


Test Plots

Conducted emissions (Line 1)



Conducted emissions (Line 2)





APPENDIX I RADIO FREQUENCY EXPOSURE

LIMIT

According to §15.247(i), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See § 1.1307(b)(1) of this chapter.

EUT Specification

EUT	UMPC
Frequency band (Operating)	<input type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz <input type="checkbox"/> WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz <input type="checkbox"/> WLAN: 5.745GHz ~ 5.825GHz <input checked="" type="checkbox"/> Others: <u>Bluetooth: 2.402GHz ~ 2.480GHz</u>
Device category	<input checked="" type="checkbox"/> Portable (<20cm separation) <input type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others _____
Exposure classification	<input type="checkbox"/> Occupational/Controlled exposure ($S = 5mW/cm^2$) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure ($S = 1mW/cm^2$)
Antenna diversity	<input checked="" type="checkbox"/> Single antenna <input type="checkbox"/> Multiple antennas <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input type="checkbox"/> Tx/Rx diversity
Max. output power	4.84dBm (3.05 mW)
Antenna gain (Max)	2.20 dBi (Numeric gain: 1.66)
Evaluation applied	<input type="checkbox"/> MPE Evaluation <input checked="" type="checkbox"/> SAR Evaluation* <input type="checkbox"/> N/A
Remark: 1. The maximum output power is <u>4.84 (3.05mW) at 2441MHz</u> (with <u>1.66 numeric antenna gain.</u>) 2. DTS device is not subject to routine RF evaluation; MPE estimate is used to justify the compliance.	

TEST RESULTS

No non-compliance noted.

Remark: Please refer to the separated SAR report.