

EMC TEST REPORT

Report No. : TS08030151-EME**Model No. : M01017****Issued Date : Apr. 24, 2008****Applicant: ACCO BRANDS Inc.**
333 Twin Dolphin Drive, Sixth Floor, Redwood Shores,
CA94065, USA**Test Method/
Standard: FCC Part 15 Subpart C Section §15.205, §15.207,**
§15.209, §15.247, DA 00-705 and ANSI C63.4/2003.**Test By: Intertek Testing Services Taiwan Ltd.**
No. 11, Lane 275, Ko-Nan 1 Street, Chia-Tung Li,
Shiang-Shan District, Hsinchu City, Taiwan

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Report Engineer



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Summary of Tests

Kensington® SlimBlade™ Bluetooth Presenter Mouse -Model: M01017
FCC ID: GV3M01017

Test	Reference	Results
20dB Bandwidth test	15.247(a)(1)	Pass
Carrier Frequency Separation test	15.247(a)(1)	Pass
Number of hopping frequencies test	15.247(a)(1)	Pass
Time of Occupancy (dwell time) test	15.247(a)(1)	Pass
Maximum Output Power test	15.247(b)	Pass
RF Antenna Conducted Spurious test	15.247(d)	Pass
Radiated Spurious Emission test	15.205, 15.209	Pass
Emission on the Band Edge test	15.247(d)	Pass
AC Power Line Conducted Emission test	15.207	Pass

1. General information

1.1 Identification of the EUT

Applicant:	Asia Pacific Microsystems, Inc.
Product:	 Kensington® SlimBlade™ Bluetooth Presenter Mouse
Model No.:	M01017
FCC ID.:	GV3M01017
Frequency Range:	2402MHz ~ 2480MHz
Channel Number:	79 channels
Frequency of Each Channel:	2402 + k MHz; k = 0-78
Type of Modulation:	GFSK
Power Supply:	DC 3V from Battery
Power Cord:	N/A
Sample Received:	Apr. 01, 2008
Test Date(s):	Apr. 09, 2008 ~ Apr. 18, 2008
Note 1:	This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.
Note 2:	When determining the test conclusion, the Measurement Uncertainty of test has been considered.

A FCC DoC report has been generated for the client.



1.2 Additional information about the EUT

The EUT is a  Kensington® SlimBlade™ Bluetooth Presenter Mouse and was defined as information technology equipment.

For more detail features, please refer to User's manual as file name “Installation guide.pdf”

1.3 Antenna description

The EUT uses a permanently connected antenna.

Antenna Gain : -3.49dBi max
Antenna Type : PCB Printed antenna
Connector Type : N/A

1.4 Peripherals equipment

Peripherals	Manufacturer	Product No.	Serial No.	FCC ID
Notebook PC	DELL	Latitude D610	JXWZK1S	FCC DoC Approved



2. Test specifications

2.1 Test standard

The EUT was performed according to the procedures in FCC Part 15 Subpart C Section § 15.205, §15.207, §15.209, §15.247, DA 00-705 and ANSI C63.4/2003.

The test of radiated measurements according to FCC Part15 Section 15.33(a) had been conducted and the field strength of this frequency band were all meet limit requirement, thus we evaluate the EUT pass the specified test.

2.2 Operation mode

The EUT was supplied with DC 3V from battery and it was running in Tx and RX mode control by program “Bluetool” program connect to Notebook PC com1 port.



2.3 Test equipment

Equipment	Brand	Frequency range	Model No.	Intertek ID No.	Next Cal. Date
EMI Test Receiver	Rohde & Schwarz	9kHz~2.75GHz	ESCS 30	EC1303	08/07/2008
Spectrum Analyzer	Rohde & Schwarz	9kHz~30GHz	FSP 30	EC1353	08/15/2008
Spectrum Analyzer	Rohde & Schwarz	20Hz~40GHz	FSEK 30	EC1365	12/27/2008
Horn Antenna	SCHWARZBECK	1GHz~18GHz	BBHA 9120 D	EC1371	03/04/2009
Horn Antenna	SCHWARZBECK	14GHz~40GHz	BBHA 9170	EC1351	08/08/2008
Bilog Antenna	SCHWARZBECK	25MHz~1.7GHz	VULB 9168	EC1347	08/16/2009
Pre-Amplifier	MITEQ	100MHz~26.5GHz	919981	EC1373	03/18/2009
Pre-Amplifier	MITEQ	26GHz~40GHz	828825	EC1374	01/08/2010
Wideband Peak Power Meter/ Sensor	Anritsu	100MHz~18GHz	ML2487A/ MA2491A	EC1396/ EC1396-1	11/15/2008
Controller	HDGmbH	N/A	HD 100	EP1317-1	N/A
Antenna Tower	HDGmbH	N/A	MA 240	EP1317-2	N/A
Turn Table	HDGmbH	N/A	DS 420S	EP1317-3	N/A
LISN	Rohde & Schwarz	9KHz~30MHz	ESH3-Z5	EC1344	03/30/2009

Note: The above equipments are within the valid calibration period.



3. 20dB Bandwidth test

3.1 Operating environment

Temperature: 25
Relative Humidity: 55 %
Atmospheric Pressure: 1023 hPa

3.2 Test setup & procedure

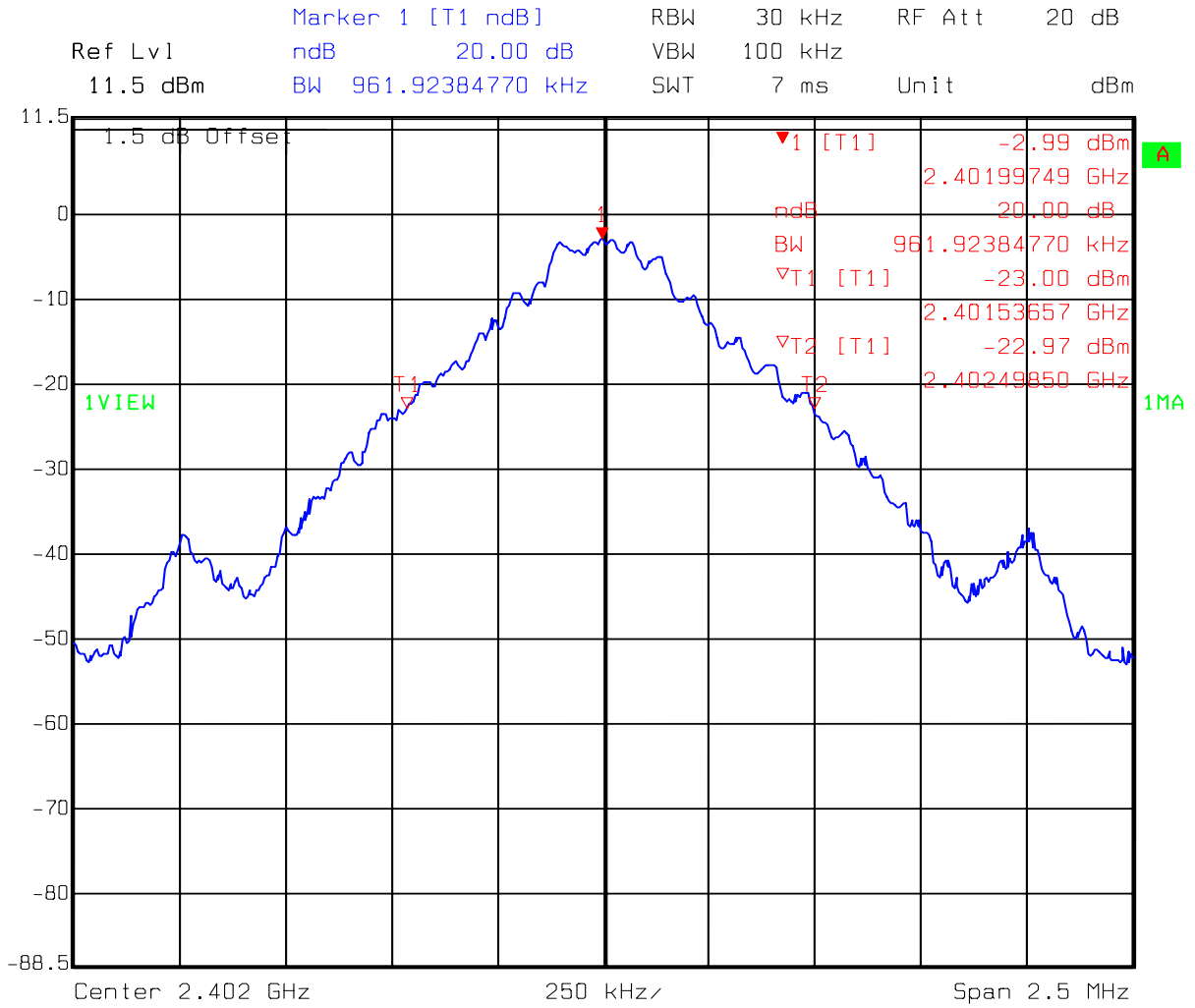
The test procedure was according to FCC measurement guidelines DA 00-705.

The 20dB bandwidth per FCC §15.247(a)(1) was measured using a 50 ohm spectrum analyzer with the resolutions bandwidth set at 100 kHz, the video bandwidth RBW, and the SPAN may equal to approximately 2 to 3 times the 20dB bandwidth. The test was performed at 3 channels (lowest, middle and highest channel). The maximum 20dB modulation bandwidth is in the following Table.

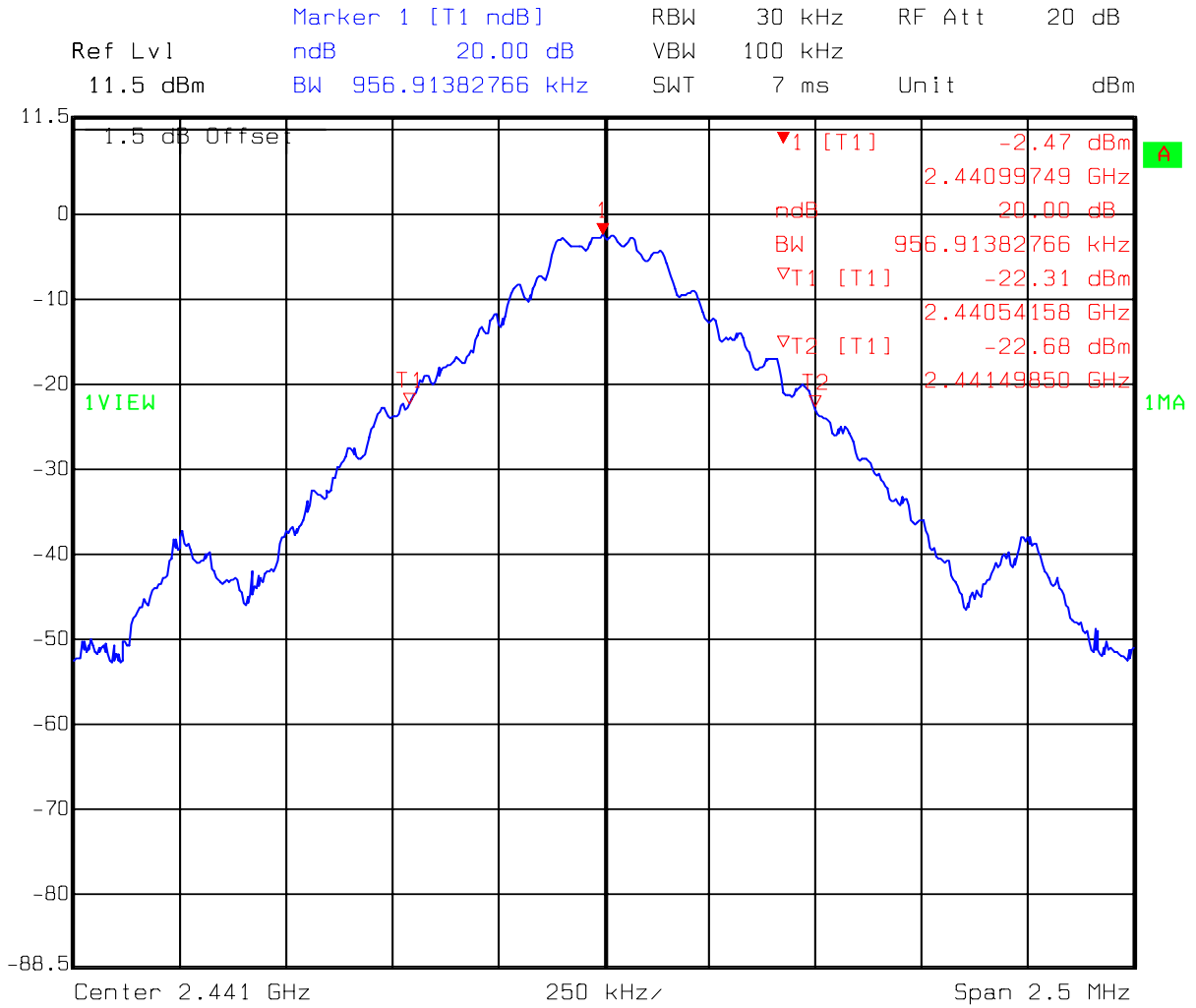
3.3 Measured data of modulated bandwidth test results

Channel	Frequency (MHz)	Bandwidth (kHz)
0	2402.000	961.924
39	2441.000	956.914
78	2480.000	956.914

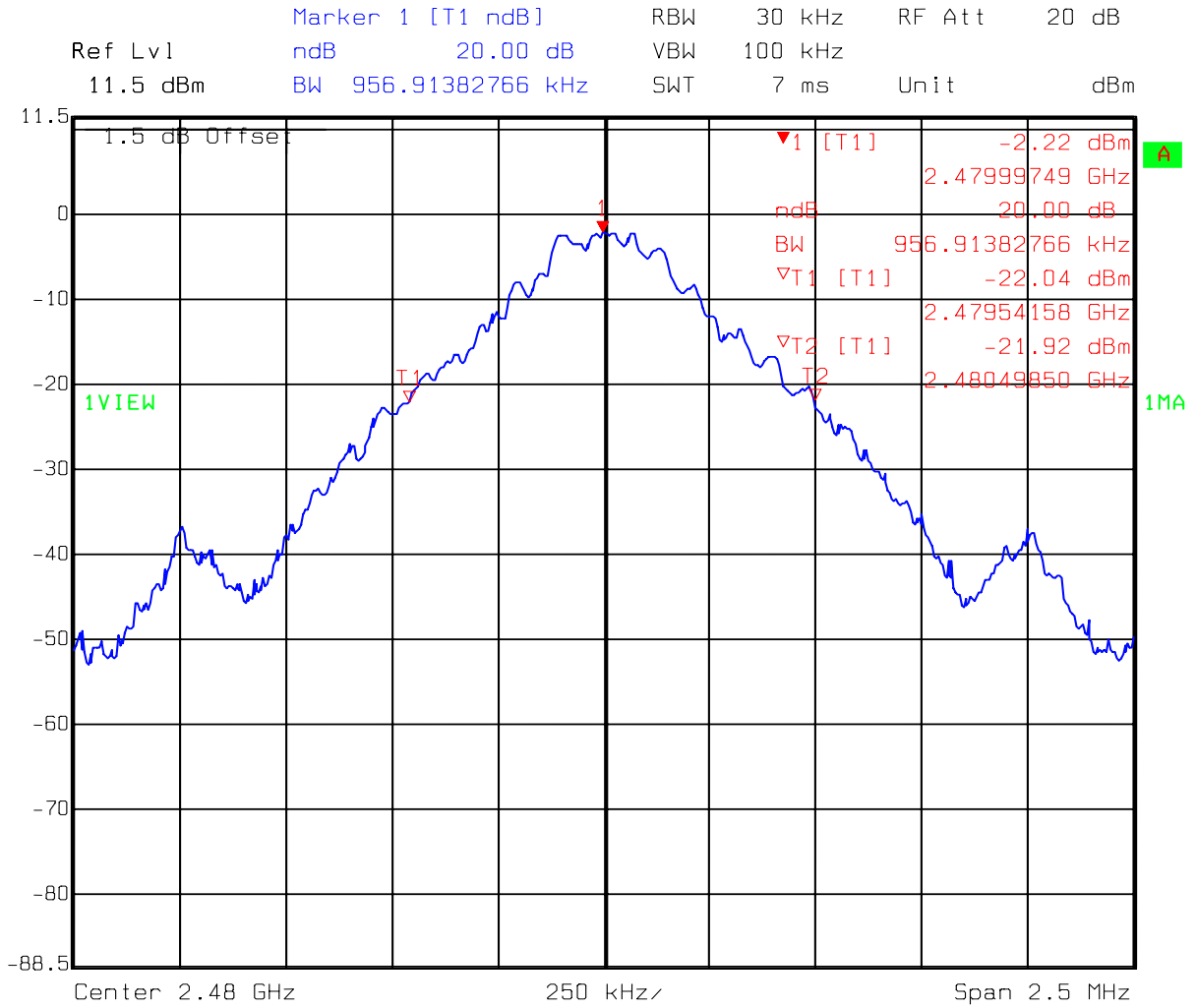
Please see the plot below.



Title: 20dB Bandwidth
 Comment A: CH 0 at Bluetooth mode
 Date: 09.APR.2008 11:52:37



Title: 20dB Bandwidth
 Comment A: CH 39 at Bluetooth mode
 Date: 09.APR.2008 11:55:31



Title: 20dB Bandwidth
 Comment A: CH 78 at Bluetooth mode
 Date: 09.APR.2008 11:58:34



4. Carrier Frequency Separation test

4.1 Operating environment

Temperature: 25
Relative Humidity: 55 %
Atmospheric Pressure: 1023 hPa

4.2 Test setup & procedure

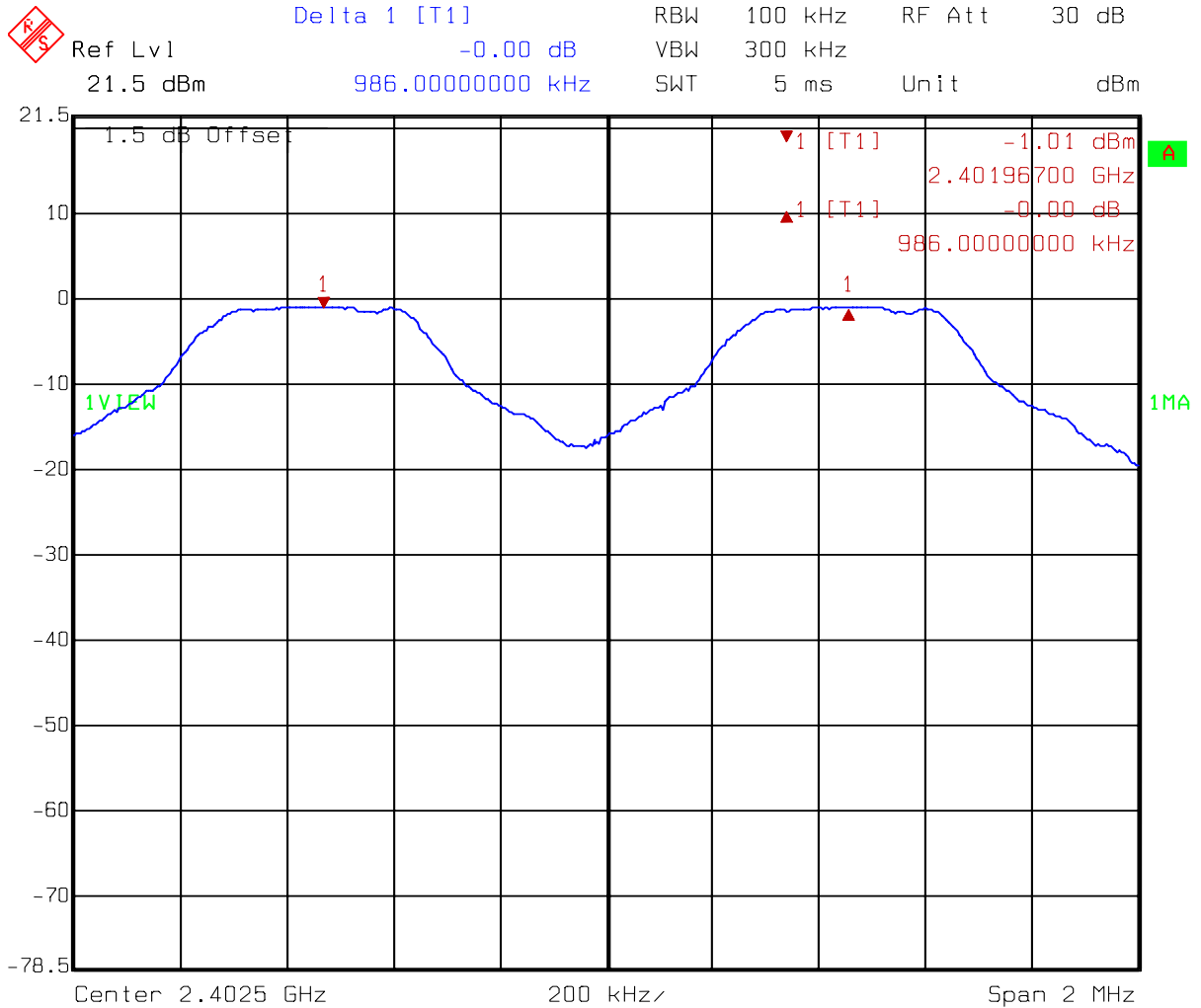
The test procedure was according to FCC measurement guidelines DA 00-705.

The carrier frequency separation per FCC §15.247(a)(1) was measured using a 50 ohm spectrum analyzer with the resolutions bandwidth set at 1 % of the span, the video bandwidth RBW, and the SPAN was wide enough to capture the peaks of two adjacent channels. The carrier frequency separation result is in the following Table.

4.3 Measured data of Carrier Frequency Separation test result

Channel	Frequency (MHz)	Measurement Frequency separation (kHz)
0	2402	986.000
1	2403	

Please see the plot below.



Title: Carrier freq. separation
 Comment A: at Bluetooth mode
 Date: 17.APR.2008 17:16:33



5. Number of hopping frequencies test

5.1 Operating environment

Temperature: 25
Relative Humidity: 55 %
Atmospheric Pressure: 1023 hPa

5.2 Test setup & procedure

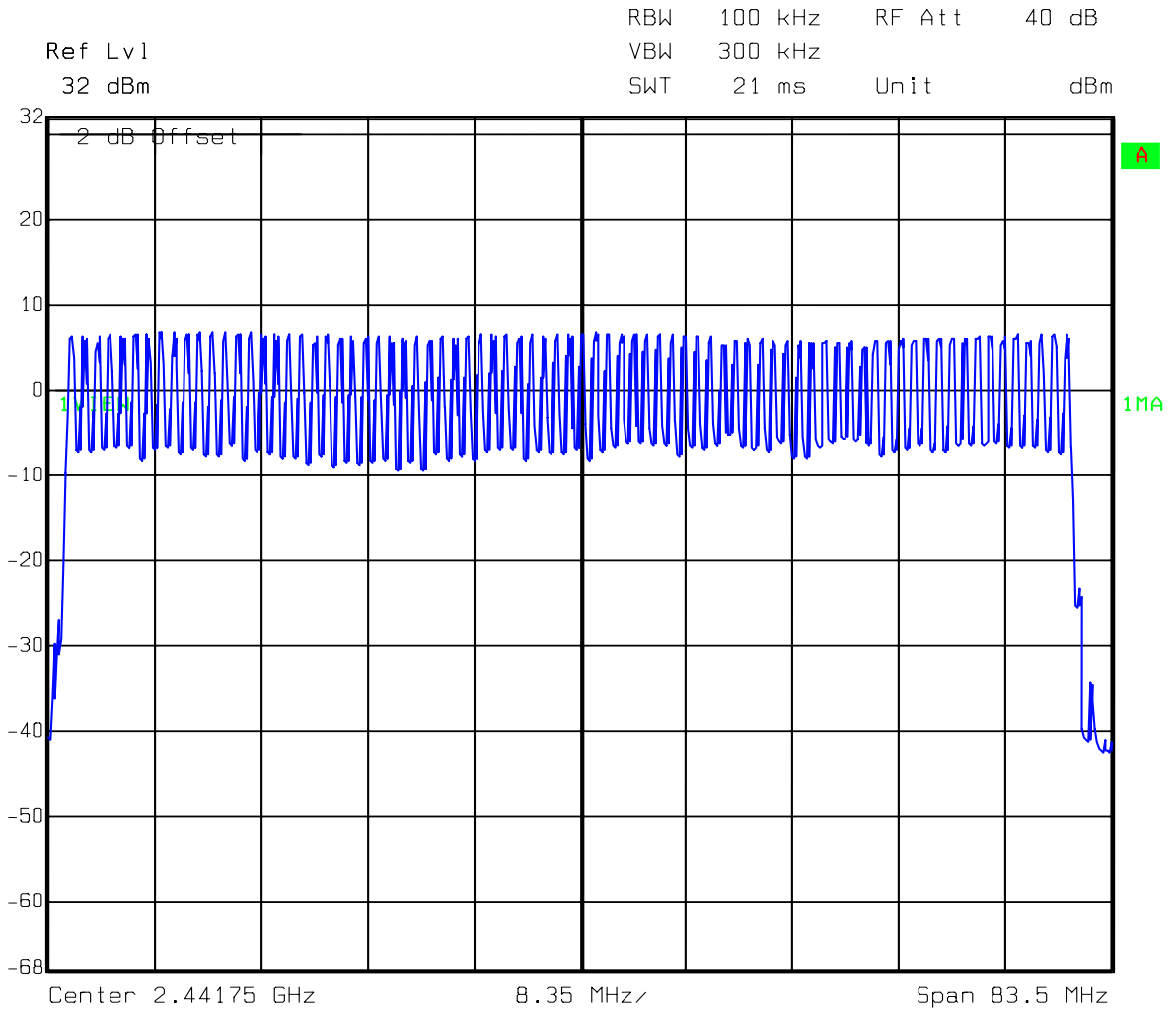
The test procedure was according to FCC measurement guidelines DA 00-705.

The number of hopping frequencies per FCC §15.247(a)(1) was measured using a 50 ohm spectrum analyzer with the resolutions bandwidth set at 1 % of the span, the video bandwidth RBW, and the SPAN was the frequency band of operation. The carrier frequency separation result is in the following Table.

5.3 Measured data of number of hopping frequencies test result

Frequency Range (MHz)	Total hopping channels
2400 ~ 2483.5	79

Please see the plot below.



Title: Number of hopping freq.
Comment A: CH 0 at Bluetooth mode
Date: 07.APR.2008 17:09:32



6. Time of Occupancy (dwell time) test

6.1 Operating environment

Temperature: 25
Relative Humidity: 55 %
Atmospheric Pressure: 1023 hPa

6.2 Test setup & procedure

The test procedure was according to FCC measurement guidelines DA 00-705.

The time of occupancy (dwell time) per FCC §15.247(a)(1) was measured using a 50 ohm spectrum analyzer with the resolutions bandwidth set at 1MHz, the video bandwidth RBW, and the zero span function of spectrum analyzer was enable. The EUT has its hopping function enable.

The system makes worst case 1600 hops per second or 1 time slot has a length of 625µs with 79 channels.

Time of occupancy (dwell time) for DH1

$$\begin{aligned} \text{Dwell time} &= 366.7 \mu\text{s} * 1600 * 1/2 * 1/\text{s} / 79 * 31.6\text{s} \\ &= 117.344 \text{ ms (in a 31.6s period)} \end{aligned}$$

Time of occupancy (dwell time) for DH3

$$\begin{aligned} \text{Dwell time} &= 1.617 \text{ ms} * 1600 * 1/4 * 1/\text{s} / 79 * 31.6\text{s} \\ &= 253.72 \text{ ms (in a 31.6s period)} \end{aligned}$$

Time of occupancy (dwell time) for DH5

$$\begin{aligned} \text{Dwell time} &= 2.867 \text{ ms} * 1600 * 1/6 * 1/\text{s} / 79 * 31.6\text{s} \\ &= 305.81 \text{ ms (in a 31.6s period)} \end{aligned}$$

Please see the plot below.

Test Mode: DH1

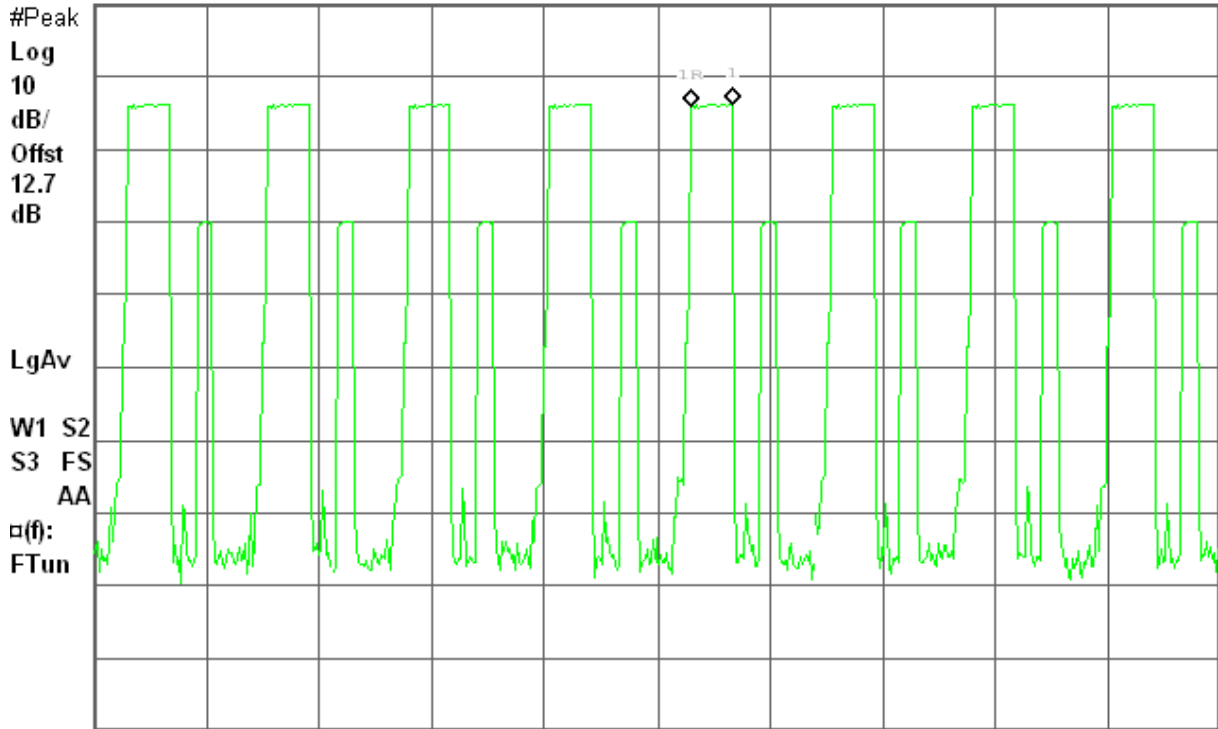
Agilent 12:49:02 Apr 23, 2008

R T

Δ Mkr1 366.7 μs
0.07 dB

Ref 12.74 dBm

Atten 10 dB



Center 2.402 000 GHz

Span 0 Hz

Res BW 1 MHz

#VBW 1 MHz

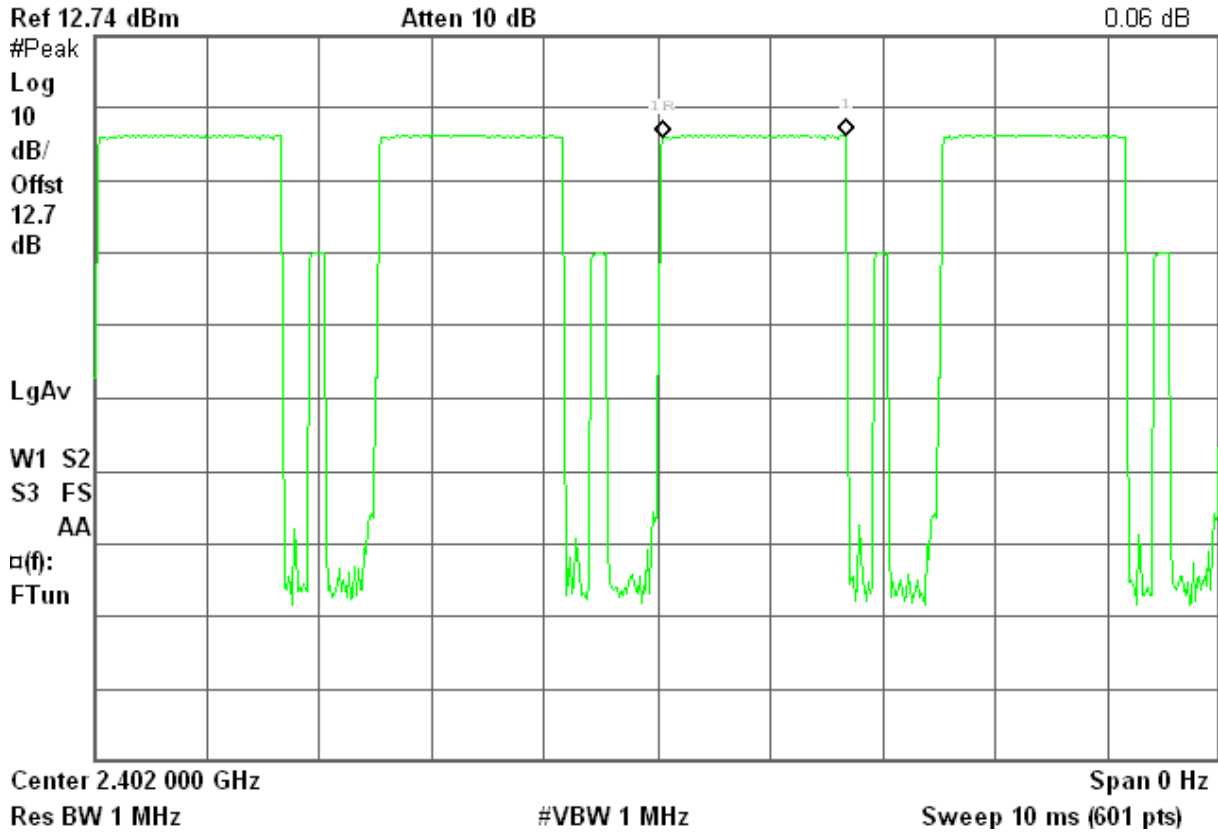
Sweep 10 ms (601 pts)

Test Mode: DH3

Agilent 12:49:29 Apr 23, 2008

R T

Δ Mkr1 1.617 ms
0.06 dB

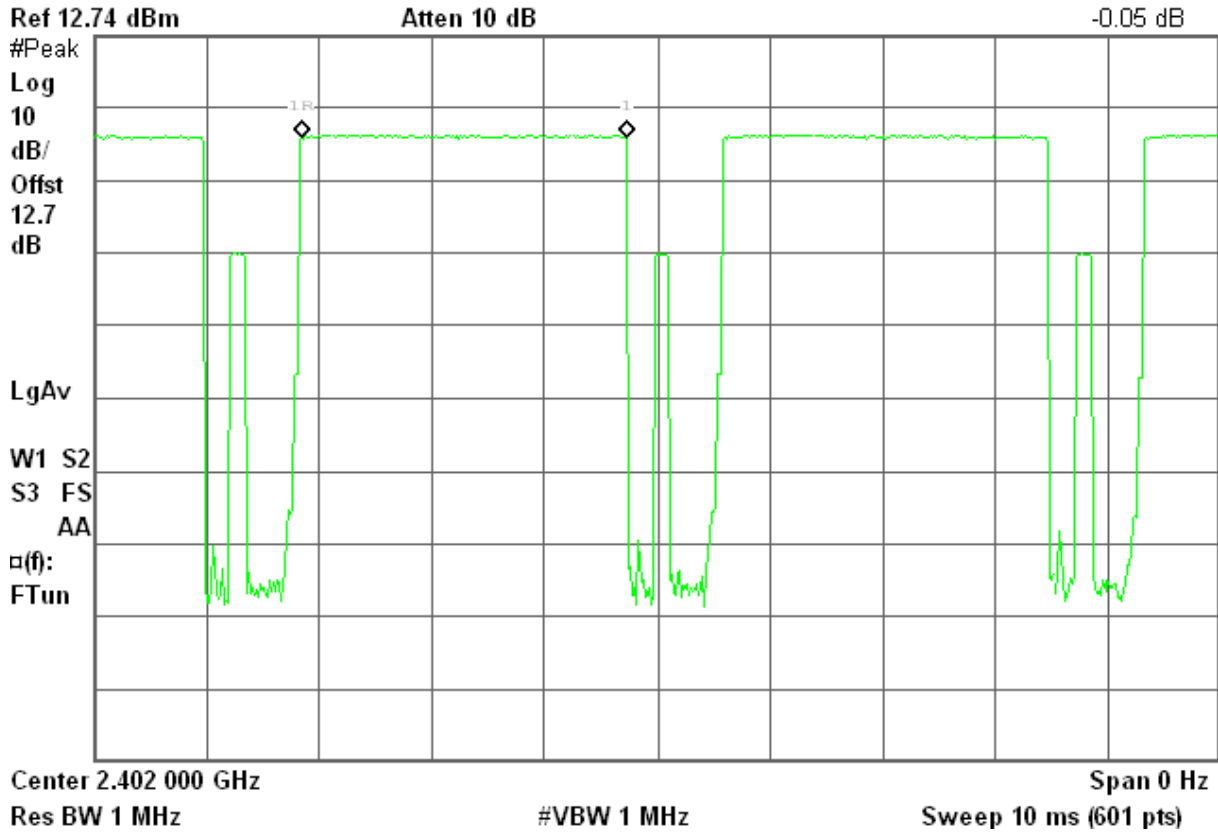


Test Mode: DH5

Agilent 12:48:28 Apr 23, 2008

R T

Δ Mkr1 2.867 ms
-0.05 dB





7. Maximum Output Power test

7.1 Operating environment

Temperature: 25
Relative Humidity: 50 %
Atmospheric Pressure: 1022 hPa

7.2 Test setup & procedure

The test procedure was according to FCC measurement guidelines DA 00-705.

The power output per FCC §15.247(b) was measured on the EUT using a 50 ohm SMA cable connected to peak power meter via power sensor. Power was read directly and cable loss correction (1.5 dB) was added to the reading to obtain power at the EUT antenna terminals. The test was performed at 3 channels (lowest, middle and highest channel).

7.3 Measured data of Maximum Output Power test results

Channel	Freq. (MHz)	C.L. (dB)	Reading (dBm)	Conducted Peak Output Power		Limit (W)
				(dBm)	(mW)	
0 (lowest)	2402	1.5	-0.99	0.51	1.1246	1
39 (middle)	2441	1.5	-0.90	0.60	1.1482	1
78 (highest)	2480	1.5	-2.98	-1.48	0.7112	1

Remark:

Conducted Peak Output Power = Reading + C.L.



8. RF Antenna Conducted Spurious test

8.1 Operating environment

Temperature: 25
Relative Humidity: 58 %

8.2 Test setup & procedure

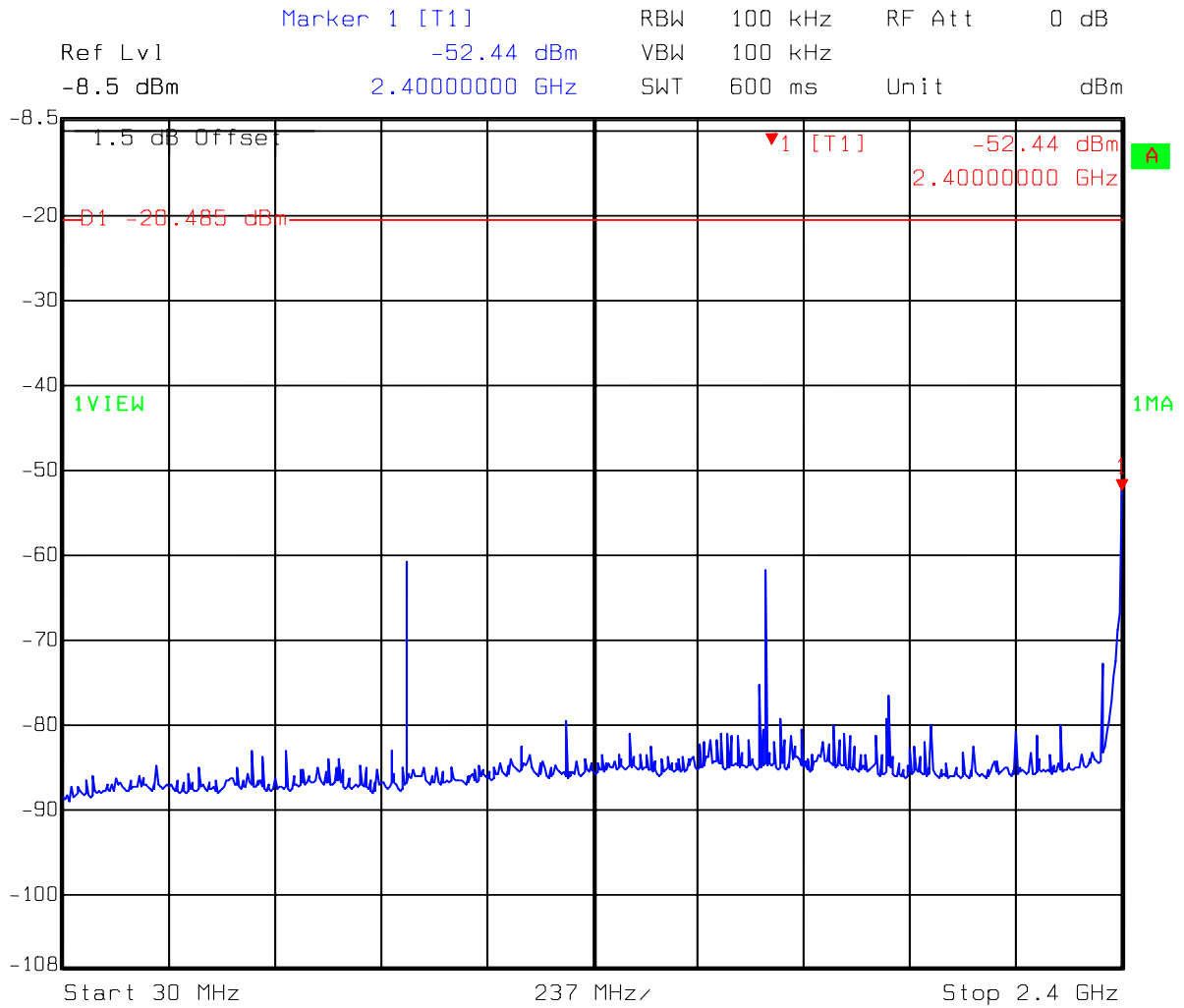
The test procedure was according to FCC measurement guidelines DA 00-705.

The measurements were performed from 30MHz to 25GHz RF antenna conducted per FCC 15.247 (c) was measured from the EUT antenna port using a 50ohm spectrum analyzer with the resolution bandwidth set at 100 kHz, and the video bandwidth set at 100 kHz.

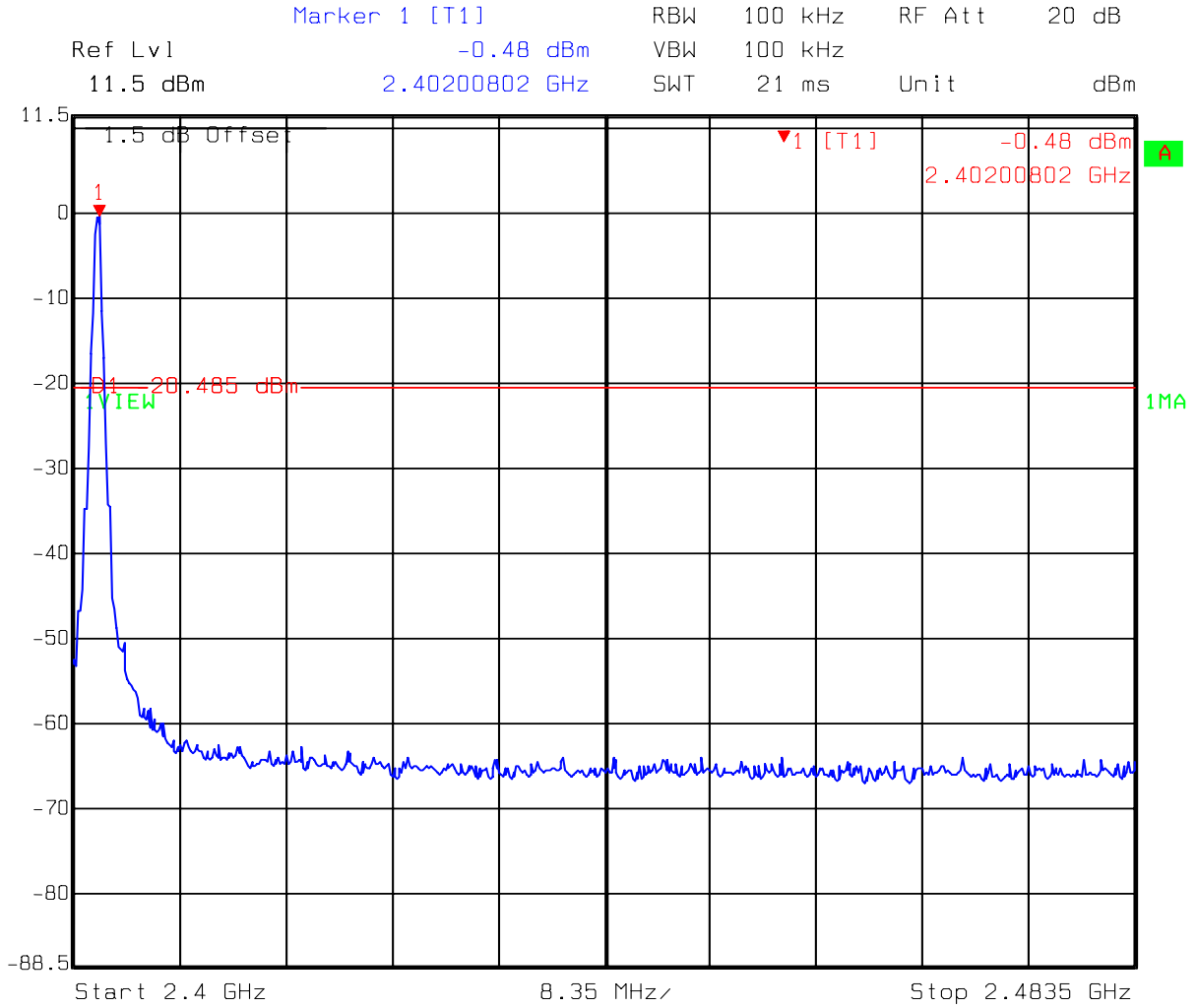
Harmonics and spurious noise must be at least 20dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW. The table below is the results from the highest emission for each channel within the authorized band. This table was used to determine the spurious limits for each channel.

8.3 Measured data of the highest RF Antenna Conducted Spurious test result

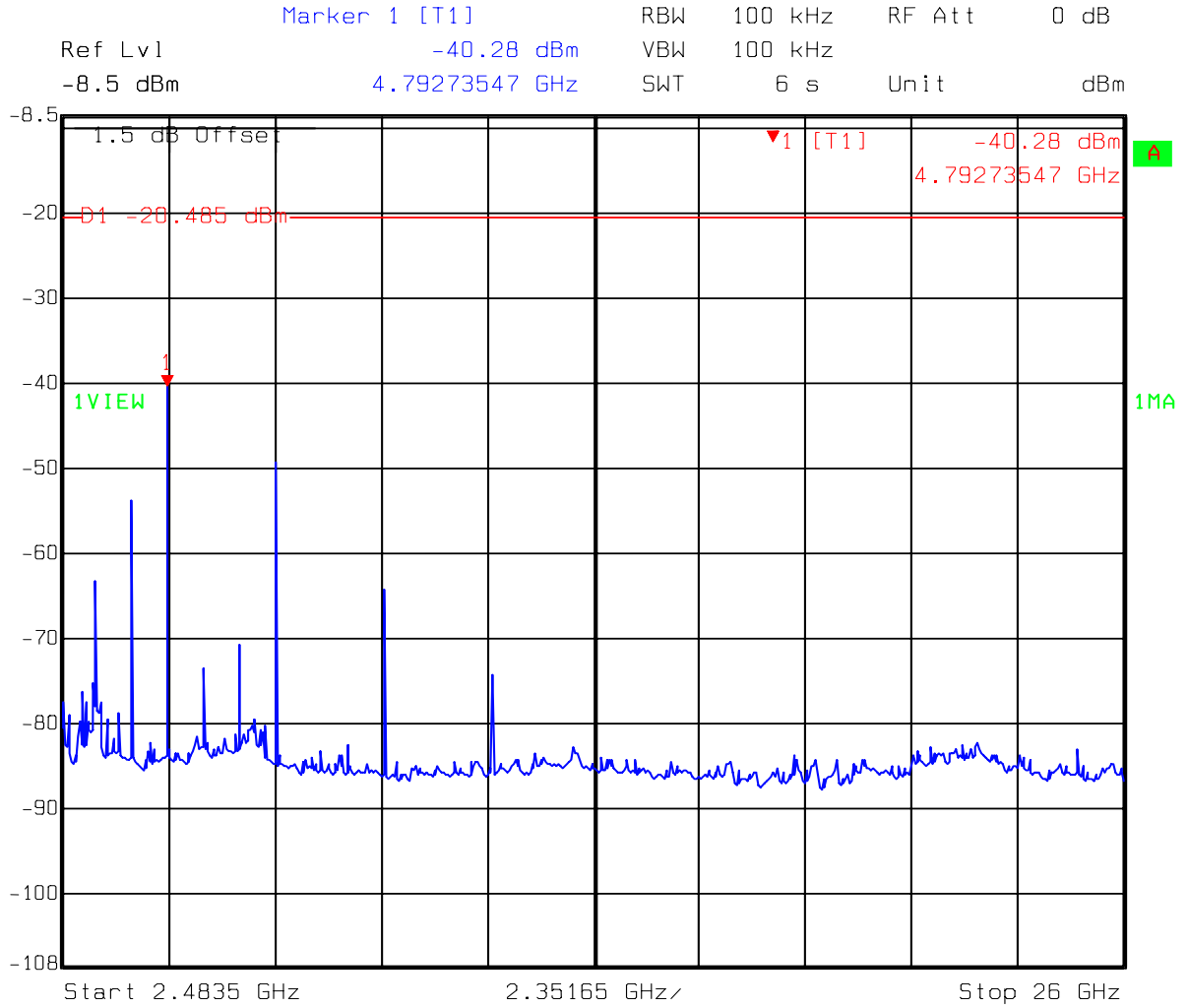
The test results please see the plot below.



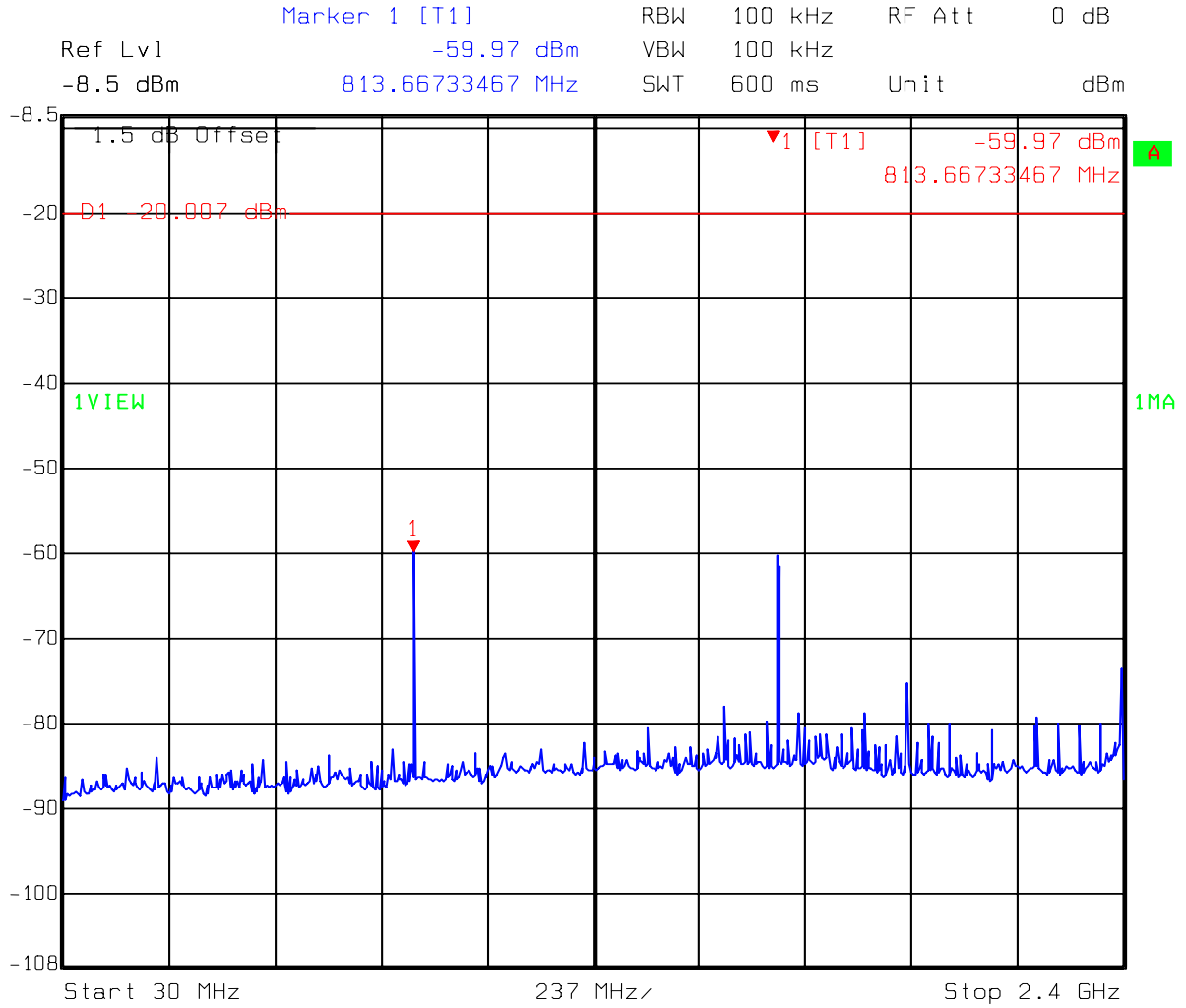
Title: Spurious
Comment A: CH 0 at Bluetooth mode 30MHz~2400MHz
Date: 09.APR.2008 11:53:25



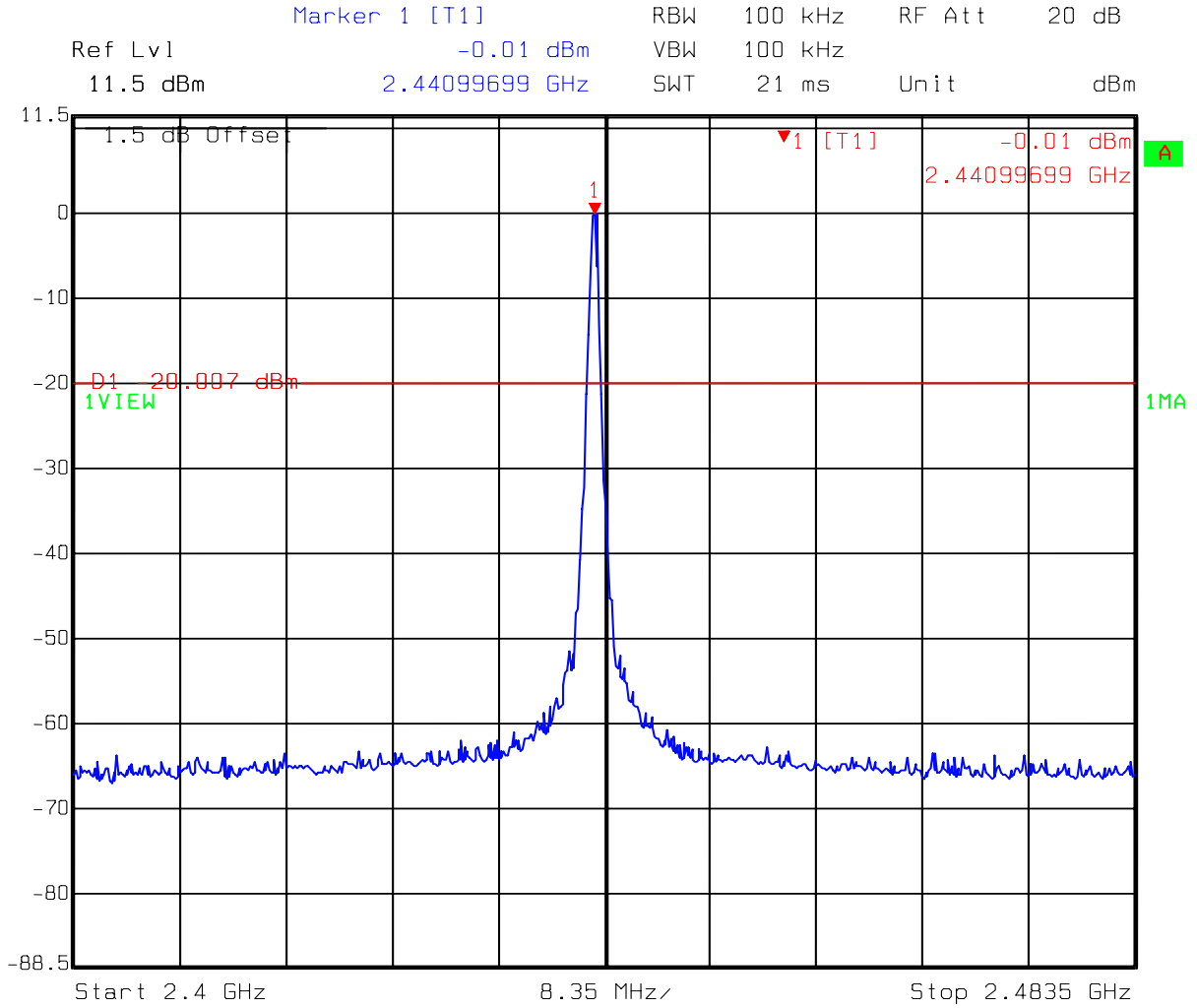
Title: Spurious
Comment A: CH 0 at Bluetooth mode 2400MHz~2483.5MHz
Date: 09.APR.2008 11:53:04



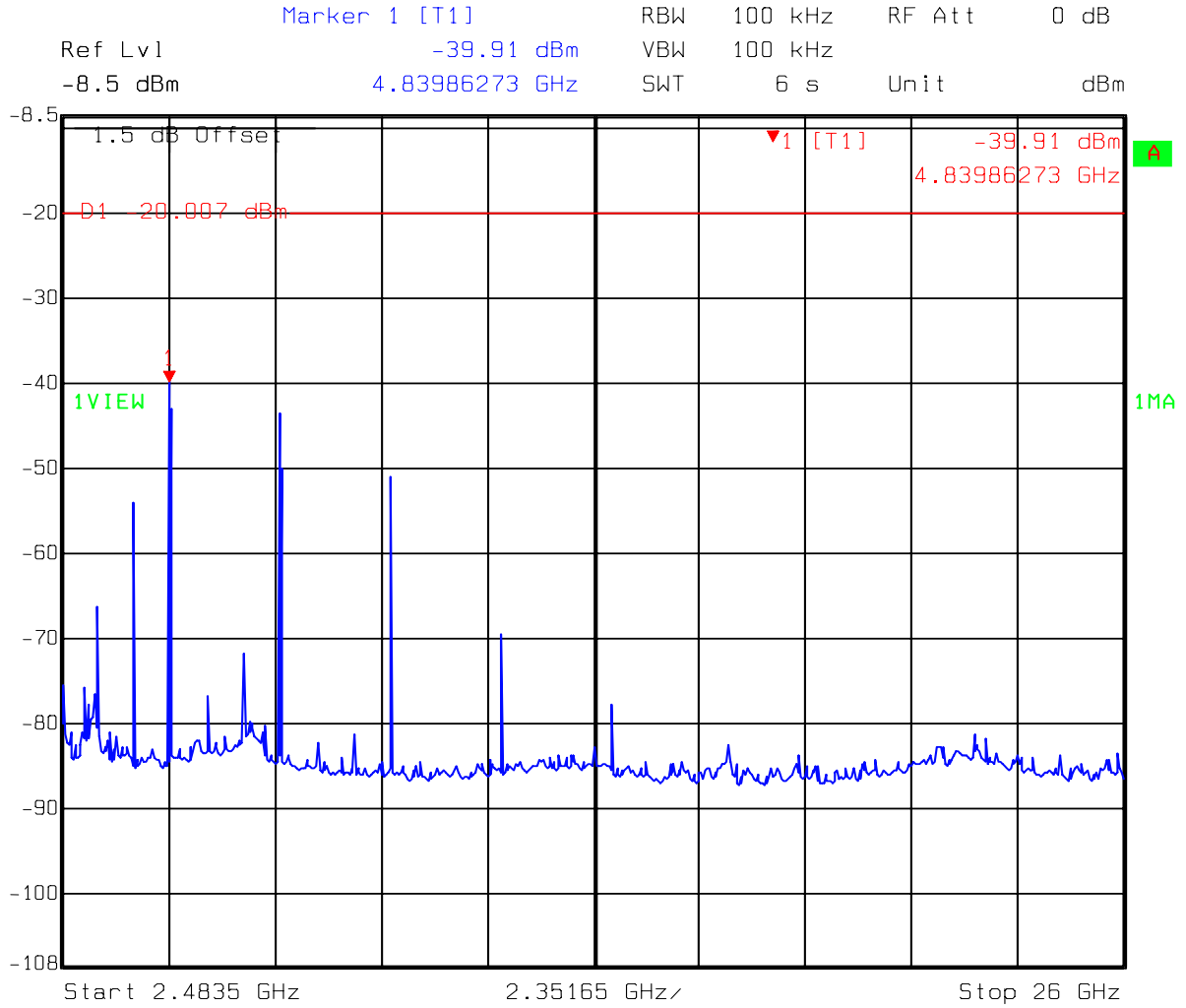
Title: Spurious
Comment A: CH 0 at Bluetooth mode 2483.5MHz~26000MHz
Date: 09.APR.2008 11:53:53



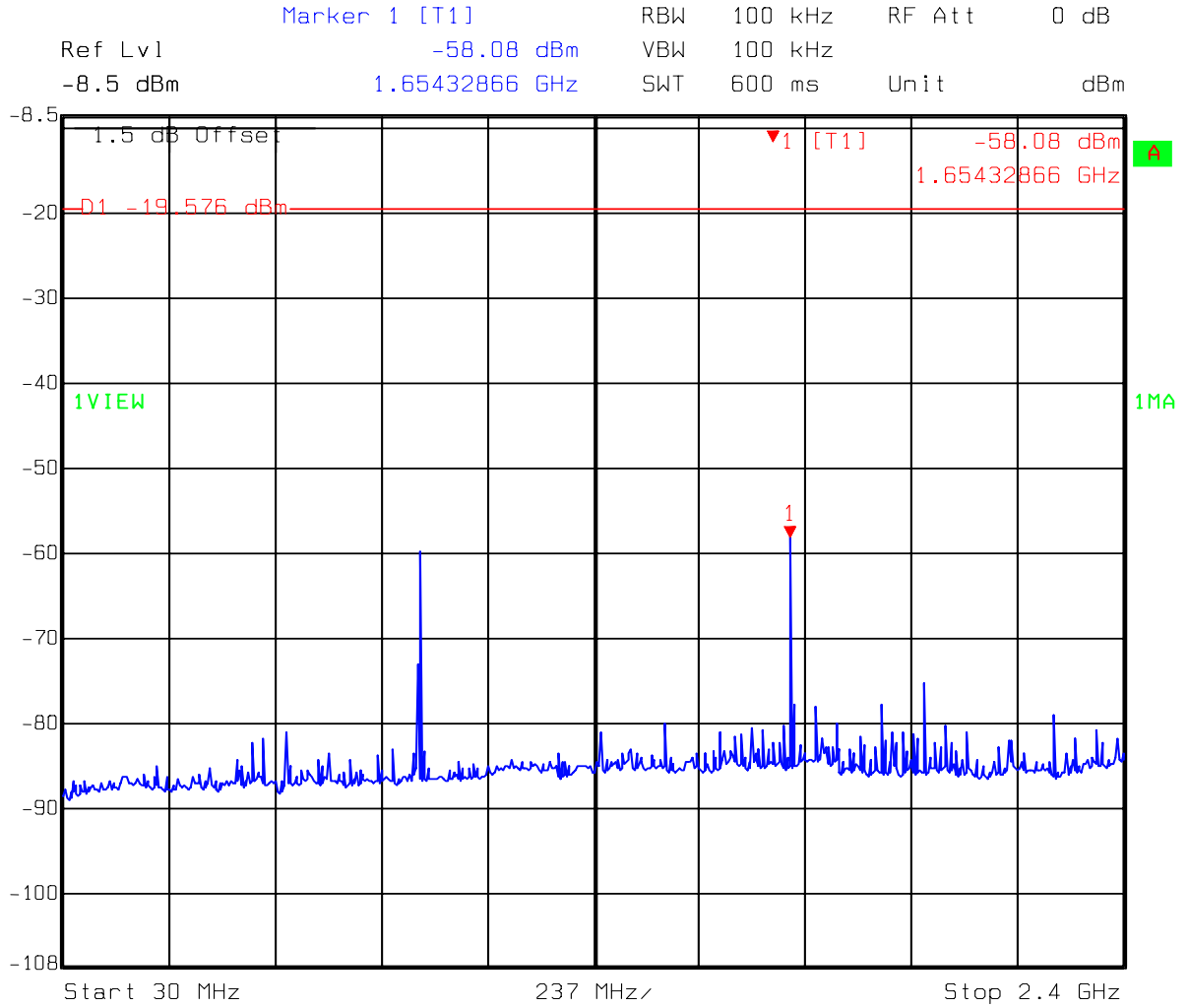
Title: Spurious
Comment A: CH 39 at Bluetooth mode 30MHz~2400MHz
Date: 09.APR.2008 11:56:19



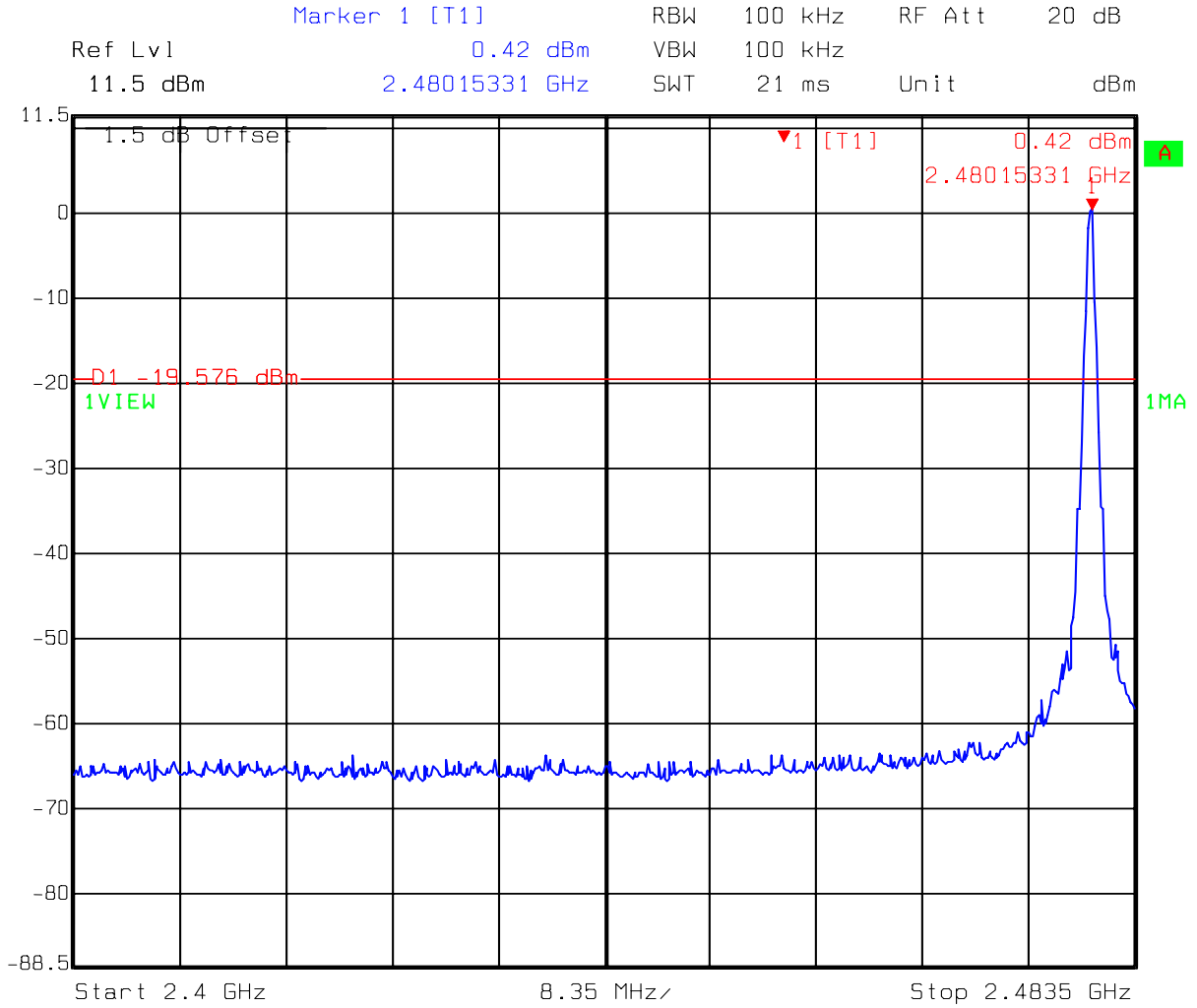
Title: Spurious
Comment A: CH 39 at Bluetooth mode 2400MHz~2483.5MHz
Date: 09.APR.2008 11:55:58



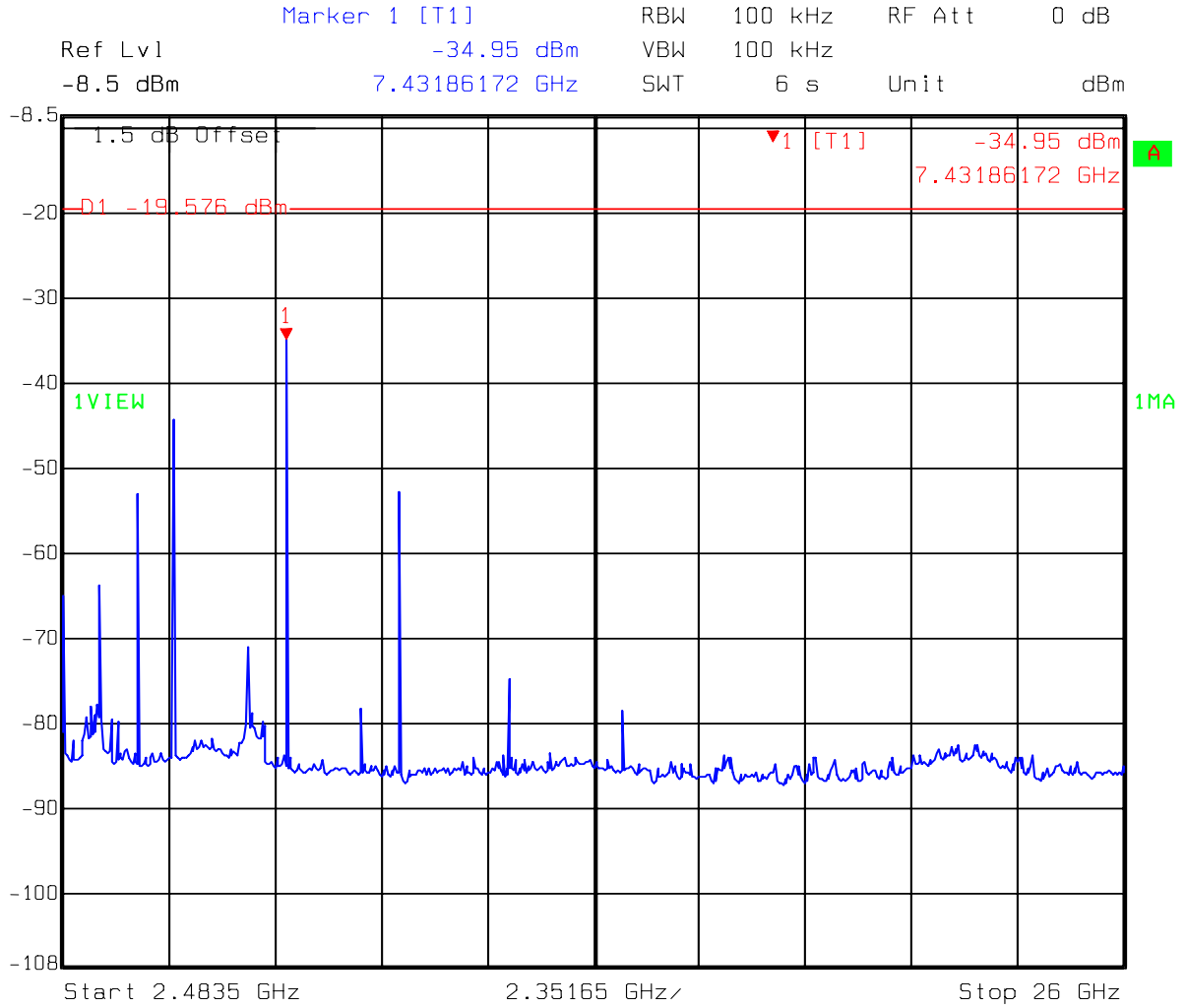
Title: Spurious
 Comment A: CH 39 at Bluetooth mode 2483.5MHz~26000MHz
 Date: 09.APR.2008 11:56:46



Title: Spurious
Comment A: CH 78 at Bluetooth mode 30MHz~2400MHz
Date: 09.APR.2008 11:59:22



Title: Spurious
Comment A: CH 78 at Bluetooth mode 2400MHz~2483.5MHz
Date: 09.APR.2008 11:59:01



Title: Spurious
Comment A: CH 78 at Bluetooth mode 2483.5MHz~26000MHz
Date: 09.APR.2008 11:59:49

9. Radiated Emission test

9.1 Operating environment

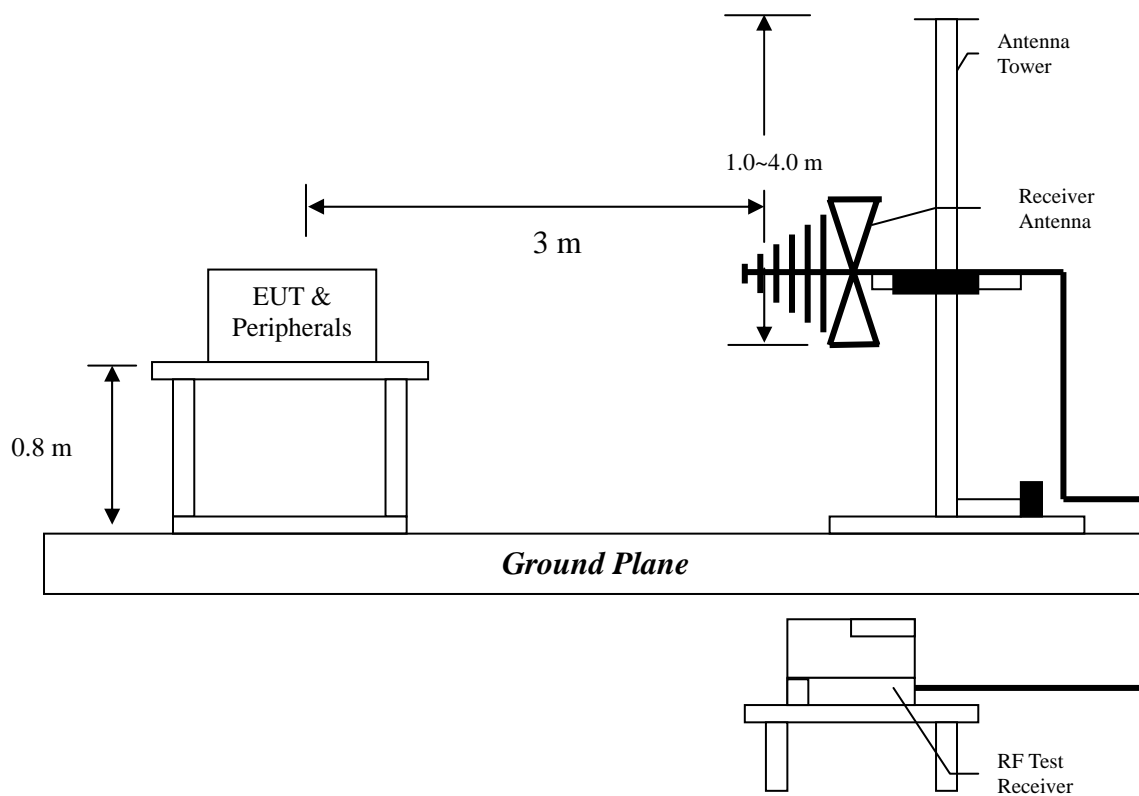
Temperature: 23
Relative Humidity: 53 %
Atmospheric Pressure: 1023 hPa

9.2 Test setup & procedure

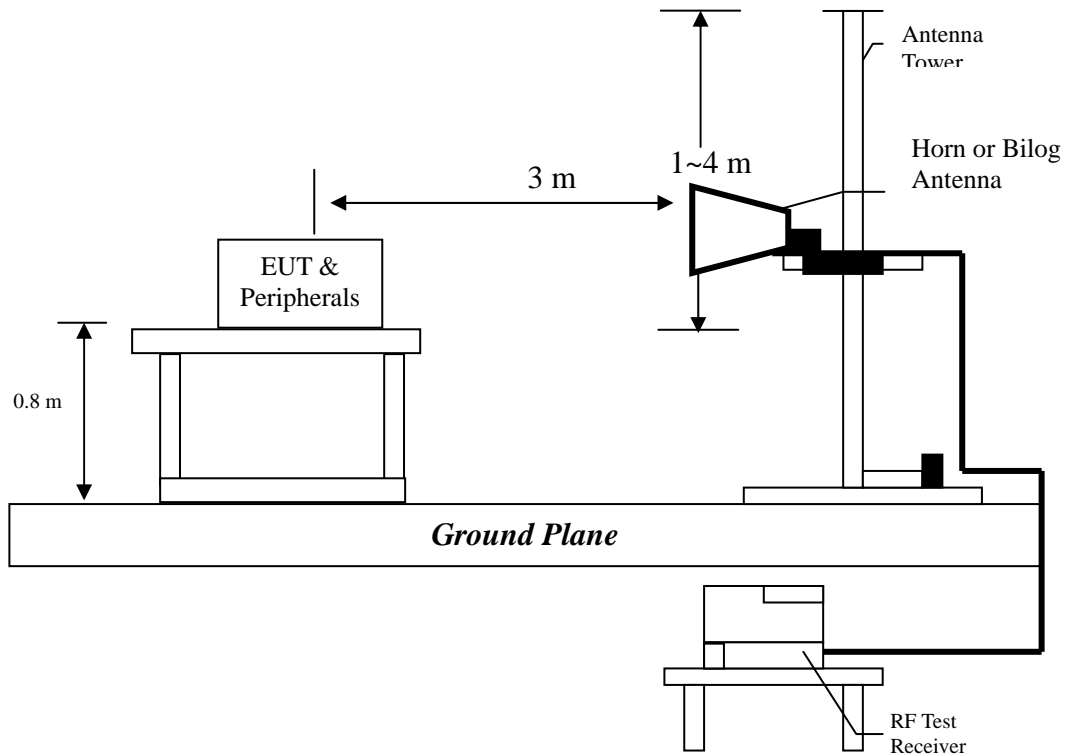
The test procedure was according to FCC measurement guidelines DA 00-705 and ANSI C63.4/2003.

The Diagram below shows the test setup, which is utilized to make these measurements.

The frequency spectrum from 30MHz to 1000MHz was investigated.



The frequency spectrum from over 1GHz was investigated.



Radiated emission measurements were performed from 30MHz to 25GHz. Spectrum Analyzer Resolution Bandwidth is 100kHz or greater for frequencies 30MHz to 1GHz, 1MHz – for frequencies above 1GHz.

The EUT for testing is arranged on a wooden turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meters and down to 1 meter.

The measurement for radiated emission will be done at the distance of three meters unless the signal level is too low to measure at that distance. In the case of the reading under noise floor, a pre-amplifier is used and/or the test is conducted at a closer distance. And then all readings are extrapolated back to the equivalent 3 meter reading using inverse scaling with distance.

The EUT configuration please refer to the “Spurious set-up photo.pdf”.

9.3 Emission limits

The spurious Emission shall test through the 10th harmonic. 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).

Frequency (MHz)	Limits (dB μ V/m@3m)
30-88	40
88-216	43.5
216-960	46
Above 960	54

Remark:

1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

Uncertainty was calculated in accordance with NAMAS NIS 81.
Expanded uncertainty (k=2) of radiated emission measurement is 4.98 dB.

9.4 Radiated spurious emission test data

9.4.1 Measurement results: frequencies equal to or less than 1 GHz

The test was performed on EUT under continuously transmitting mode. Channel 0, 39, 78 were verified. The worst case occurred at Tx channel 39.

EUT : M01017
 Worst Case : Tx at channel 39

Antenna Polariz. (V/H)	Freq. (MHz)	Receiver Detector	Corr. Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
V	165.800	QP	15.70	9.06	24.76	43.50	-18.74
V	199.750	QP	12.00	10.17	22.17	43.50	-21.33
V	365.620	QP	15.06	7.69	22.75	46.00	-23.25
V	527.610	QP	19.46	8.00	27.46	46.00	-18.54
V	626.550	QP	21.53	7.23	28.76	46.00	-17.24
V	689.600	QP	22.33	7.25	29.58	46.00	-16.43
H	42.610	QP	14.20	7.81	22.01	40.00	-17.99
H	115.360	QP	10.54	10.50	21.04	43.50	-22.47
H	364.650	QP	15.48	9.03	24.51	46.00	-21.50
H	528.580	QP	19.65	8.16	27.81	46.00	-18.19
H	696.390	QP	22.48	7.67	30.15	46.00	-15.85
H	789.510	QP	23.52	7.97	31.49	46.00	-14.51

Remark:

1. Corr. Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Corr. Factor

9.4.2 Measurement results: frequency above 1GHz

EUT : M01017
 Test Condition : Tx at channel 0

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
4804.00	PK	V	36.07	37.77	41.27	42.97	54	-11.03
4804.00	PK	H	36.07	37.77	41.34	43.04	54	-10.96

Remark: 1. Correction Factor = Antenna Factor + Cable Loss
 2. Corrected Level = Reading + Correction Factor – Preamp. Gain

EUT : M01017
 Test Condition : Tx at channel 39

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
4882.00	PK	V	36.07	37.77	43.88	45.58	54	-8.42
4882.00	PK	H	36.07	37.77	43.80	45.50	54	-8.50

Remark: 1. Correction Factor = Antenna Factor + Cable Loss
 2. Corrected Level = Reading + Correction Factor – Preamp. Gain

EUT : M01017
 Test Condition : Tx at channel 78

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
4960.00	PK	V	36.07	37.77	45.18	46.88	54	-7.12
4960.00	PK	H	36.07	37.77	41.70	43.40	54	-10.60

Remark: 1. Correction Factor = Antenna Factor + Cable Loss
 2. Corrected Level = Reading + Correction Factor – Preamp. Gain



10. Emission on the band edge §FCC 15.247(C)

In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator 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.

10.1 Test setup & procedure

Please refer to the clause 9.2 of this report.

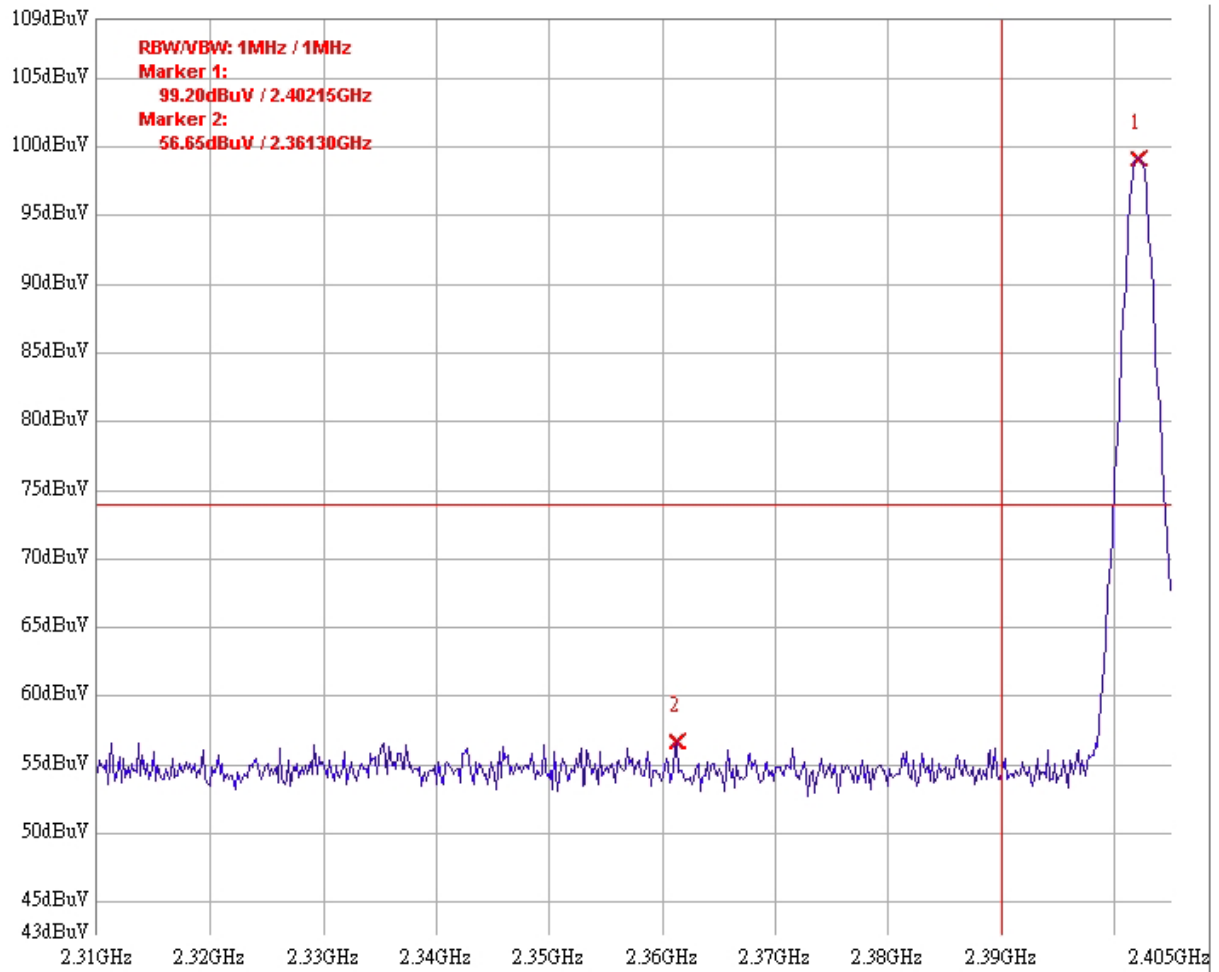


10.2 Test Result

Channel	Measurement Freq.Band (MHz)	Detector	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
0 (lowest)	2310-2390	PK	56.65	74	-17.35
		AV	45.16	54	-8.84
78 (highest)	2483.5-2500	PK	57.28	74	-16.72
		AV	53.06	54	-0.94

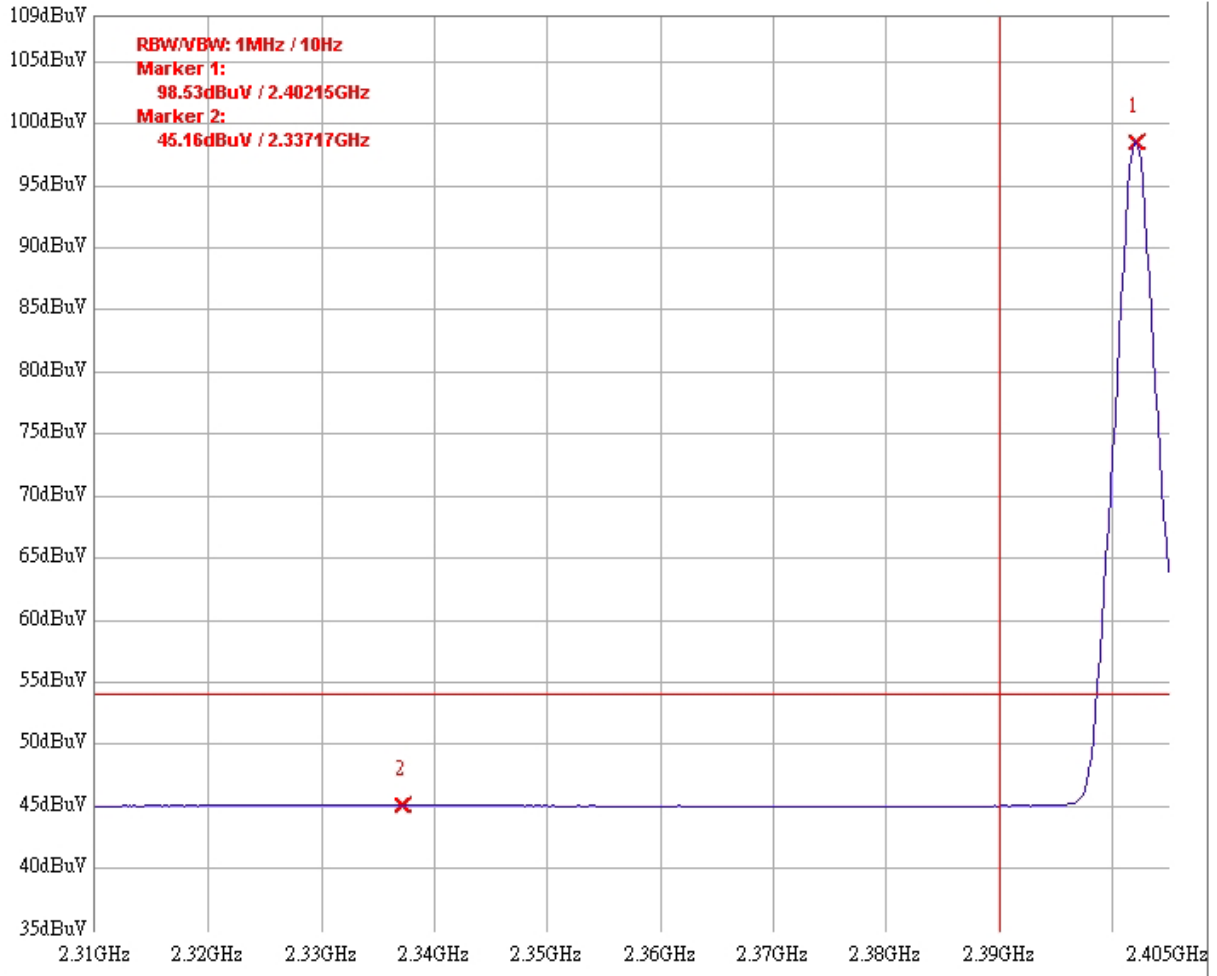
10.2.1 Band-edge

Test Mode: Tx at channel 0 PK



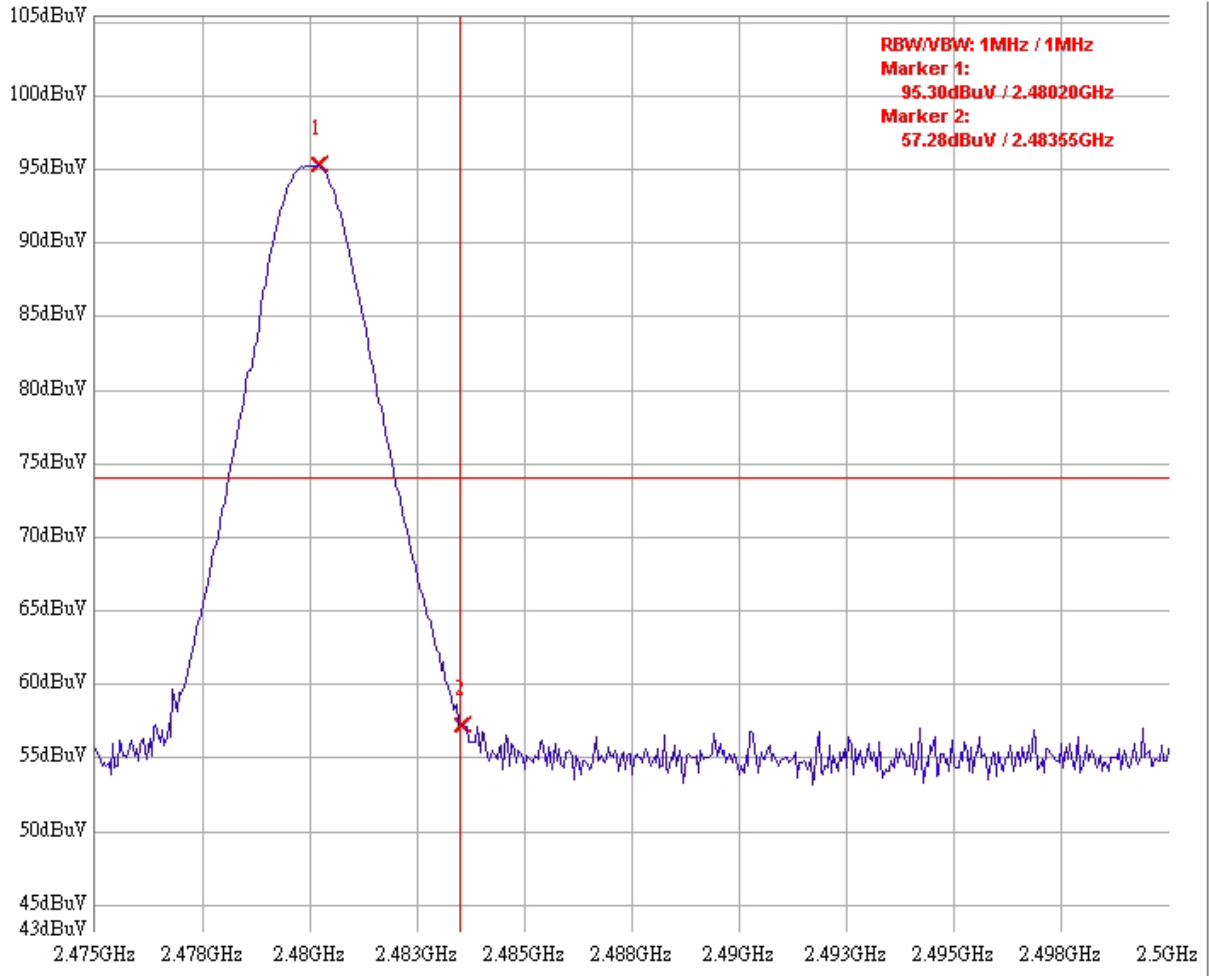
bandedge
M01017
GFSK ch0
PK

Test Mode: Tx at channel 0 AV



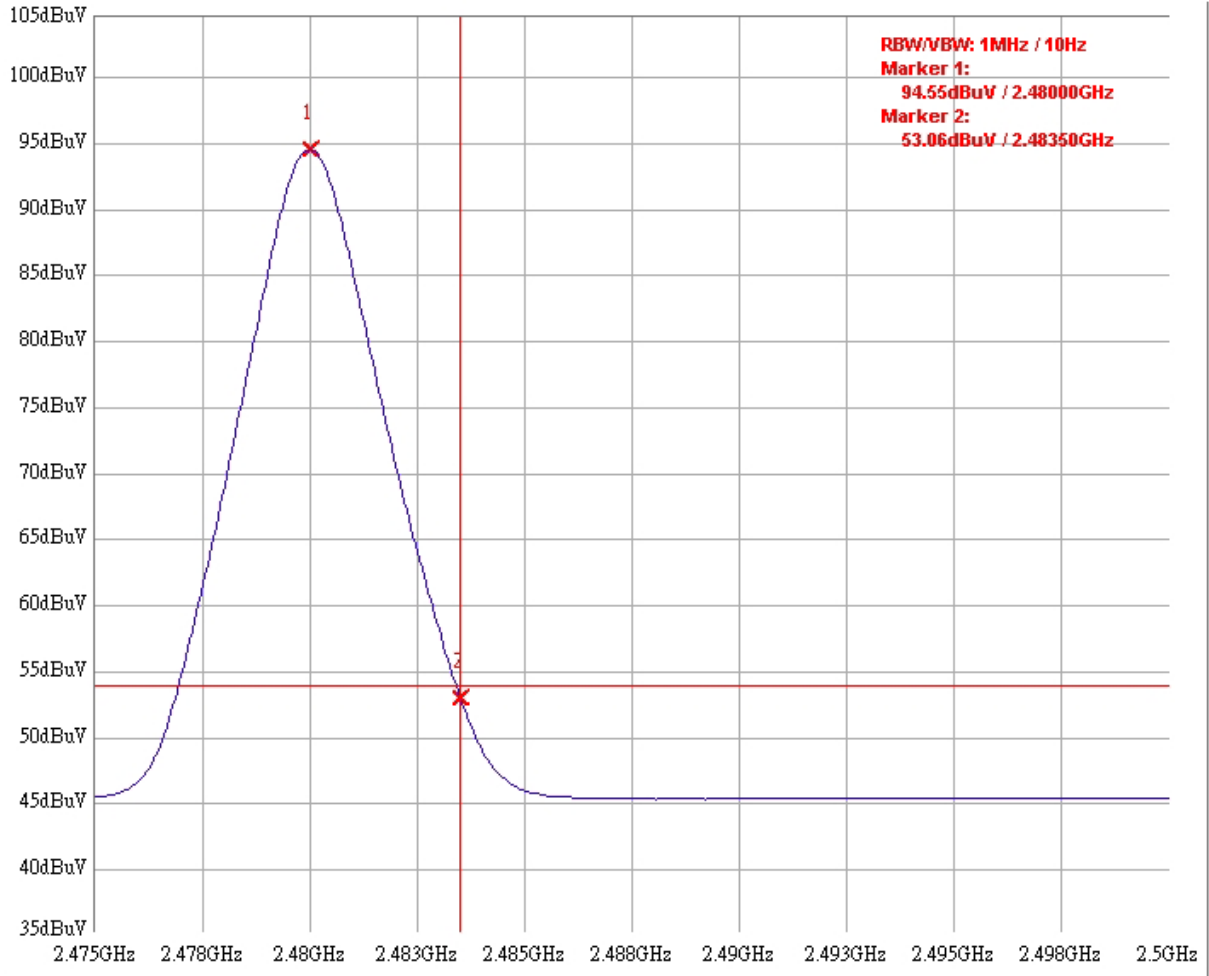
bandedge
M01017
GFSK ch0
AV

Test Mode: Tx at channel 78 PK



bandedge
M01017
GFSK ch78
PK

Test Mode: Tx at channel 78 AV



bandedge
M01017
GFSK ch78
AV