



Produkte
Products

Prüfbericht - Nr.: 10036907 001		Seite 1 von 37	
<i>Test Report No.:</i>		<i>Page 1 of 37</i>	
Auftraggeber:		Rayson Technology Co., Ltd.	
<i>Client:</i>		1F No. 9 R&D, II, Science-Based Industrial Park, Hsin-Chu, Taiwan	
Gegenstand der Prüfung: Bluetooth Limited module			
<i>Test item:</i>			
Bezeichnung:	BTM-22X	Serien-Nr.:	N/A
<i>Identification:</i>		<i>Serial No.:</i>	
Wareneingangs-Nr.:	TPE72546	Eingangsdatum:	2012/02/10
<i>Receipt No.:</i>		<i>Date of receipt:</i>	
Zustand des Prüfgegenstandes bei Anlieferung:		The sample is ok for testing and not damaged	
Condition of test item at delivery:			
Prüfört:	TÜV Rheinland Taiwan Ltd.		
<i>Testing location:</i>	11F., No.758, Sec. 4, Bade Rd., Songshan Dist., Taipei City 105 Taiwan FCC Registration No.: 365730		
Prüfgrundlage:	FCC CFR47 Part 15: Subpart C Section 15.247		
<i>Test specification:</i>			
Prüfergebnis:	Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n).		
<i>Test Result:</i>	<i>The test item passed the test specification(s).</i>		
Prüflaboratorium:	TÜV Rheinland Taiwan Ltd.		
<i>Testing Laboratory:</i>	11F., No.758, Sec. 4, Bade Rd., Songshan Dist., Taipei City 105, Taiwan, R.O.C.		
geprüft/ tested by:		kontrolliert/ reviewed by:	
			
2012-05-15	Arvin Ho/Section Manager	2012-05-15	Rene Charton/Senior Project Manager
Datum	Name/Stellung	Unterschrift	Datum
<i>Date</i>	<i>Name/Position</i>	<i>Signature</i>	<i>Date</i>
Sonstiges/ Other Aspects:			
Abkürzungen:	<i>P(ass) = entspricht Prüfgrundlage</i>	Abbreviations:	<i>P(ass) = passed</i>
	<i>F(ail) = entspricht nicht Prüfgrundlage</i>		<i>F(ail) = failed</i>
	<i>N/A = nicht anwendbar</i>		<i>N/A = not applicable</i>
	<i>N/T = nicht getestet</i>		<i>N/T = not tested</i>
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.			
<i>This test report relates to the a. m. test item. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.</i>			

TEST SUMMARY

5.1.1 ANTENNA REQUIREMENT*RESULT: Passed***5.1.2 PEAK OUTPUT POWER***RESULT: Passed***5.1.3 20DB BANDWIDTH***RESULT: Passed***5.1.4 CONDUCTED SPURIOUS EMISSIONS AND FREQUENCY BAND EDGE MEASURED IN 100KHZ BANDWIDTH***RESULT: Passed***5.1.5 SPURIOUS EMISSION***RESULT: Passed***5.1.6 FREQUENCY SEPARATION***RESULT: Passed***5.1.7 NUMBER OF HOPPING FREQUENCY***RESULT: Passed***5.1.8 TIME OF OCCUPANCY***RESULT: Passed***6.1.1 ELECTROMAGNETIC FIELDS***RESULT: Passed*

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1. General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix 1: Photo

(File:10036907APPENDIX1)

Appendix 2: Test Result of Radiated Emissions

(File:10036907APPENDIX2)

Test Specifications

The following standards were applied (in bold: product standards, otherwise: basic standards).

Table 1: Applied Standard and Test Levels

Radio
FCC CFR47 Part 15: Subpart C Section 15.247 DA 00-705 of March 30, 2000

2. Test Sites

2.1 Test Facilities

TUV Rheinland Taiwan Ltd.

11F. No.758, Sec. 4, Bade Rd., Songshan Dist.
 Taipei City 105
 Taiwan (R.O.C.)
 FCC Registration No.: 365730

2.2 List of Test and Measurement Instruments

Table 2: List of Test and Measurement Equipment

Kind of Equipment	Manufacturer	Type	S/N	Calibrated until
EMI Test Receiver	R&S	ESCI 7	1166.5950K07-100797-Pt	9-Nov-12
Bilog Antenna	TESEQ	CBL6111D	29802	1-Oct-12
Pre-Amplifier	HP	8447F	2805A03335	22-Dec-12
Spectrum Analyzer	R&S	FSV 40	100921	12-Oct-12
Horn Antenna (1GHz~18GHz)	COM-POWER	AHA118	701101	27-Dec-12
Horn Antenna (18GHz~25GHz)	COM-POWER	AH840	101031	1-Oct-12
Power meter	R&S	NRVD	100439	27-Mar-13
Power sensor	R&S	NRV-Z1	100013	27-Mar-13
Temp. & Humid. Chamber	Giant Force	GCT-099-40-S	MAF0103-007	13-May-13

2.3 Traceability

All measurement equipment calibrations are traceable to NML(Taiwan)/NIST(USA) or where calibration is performed outside Taiwan, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements are $\pm 3\text{dB}$.

Table 3: Emission Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-7}$
RF power, conducted	$\pm 1 \text{ dB}$
Adjacent channel power	$\pm 3 \text{ dB}$
Radiated emission of transmitter, valid up to 26 GHz	$\pm 6 \text{ dB}$
Radiated emission of receiver, valid up to 26 GHz	$\pm 6 \text{ dB}$
Temperature	$\pm 2 \text{ }^\circ\text{C}$
Humidity	$\pm 10 \%$

3. General Product Information

3.1 Product Function and Intended Use

Bluetooth Limited module.
For details refer to the User Guide, Data Sheet and Circuit Diagram.

3.2 Ratings and System Details

Table 4: Technical Specification of EUT

Technical Specification	Value
Kind of Equipment	Bluetooth Limited module
Brand Name	Rayson Technology Co., Ltd.
FCC ID	QWOBTM-22X
Type Designation	BTM-22X
Operating Frequency	2402 MHz ~ 2480 MHz
Channel Spacing	1 MHz
Channel number	79
Operation Voltage	3.3 V
Modulation	GFSK, $\pi/4$ QPSK, 8 DPSK
Antenna gain	1.0 dBi

Table 5: Frequency hopping information

Technical Specification	Description
Hopping Range	<p>Hereby we declare that the maximum frequency of this device is: 2402-2480MHz. This is according the Bluetooth Core Specification V2.1+EDR for devices which will be operated in the USA. This was checked during the Bluetooth Qualification tests (Test Case: TRM/CA/04).</p>
Hopping Sequence	<p>Example of a 79 hopping sequence in data mode:</p> <p>33,04,21,44,23,42,53,46,55,48,40,59,72,29,76,31,08,73,07,75,09,45,60,39,58,13,47,11,77,52,35,50,65,54,67,56,69,62,71,64, 7,25,27,66,57,70,74,61,78,63,10,41,05,43,15,44,64,68,02,70,06,01,51,03,55,05,03,66,53,49,36,47,</p>
Receiver input bandwidth	<p>The input bandwidth of the receiver is 1MHz. In every connection one Bluetooth device is the master and the other one is the slave. The master determines the hopping sequence. The slave follows this sequence. Both devices shift between RX and TX time slot according to the clock of the master.</p> <p>Additionally the type of connection is set up at the beginning of the connection. The master adapts its hopping frequency and its TX/RX timing according to the packet type of the connection. Also the slave of the connection will use these settings.</p> <p>Repeating of a packer has no influence on the hopping sequence. The hopping sequence generated by the master of the connection will be followed in any case.</p> <p>That means a repeated packet will not be send on the same frequency, it is send on the next frequency of the hopping sequence.</p>

3.3 Independent Operation Modes

The basic operation modes are:

- A. Transmitting
 - 1. Low channel
 - 2. Middle channel
 - 3. High channel
- B. Receiving
- C. Standby
- D. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.5 Submitted Documents

- Bill of Material
- PCB Layout
- Photo Document
- Technical Description
- Circuit Diagram
- Instruction Manual
- Rating Label

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

The equipment under test (EUT) was configured to measure its maximum power level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 4. All testing were performed according to the procedures in ANSI C63.10: 2009 and DA 00-705 of March 30, 2000.

IUT was controlled via the CSR Bluetest 3 with below parameter settings.

TX BDR power Int set to 13

TX EDR power Int set to 75

Max transmitter power set to 16

Full test was applied on all test modes, but only worst case was shown.

4.3 Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

Kind of Equipment	Manufacturer	Model Name	S/N
Laptop	MSI	MSI4532 (CX420MX)	CX420 MX-233TWK 1008000096

4.4 Countermeasures to achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Constructional Data Form or the Technical Construction File. No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test

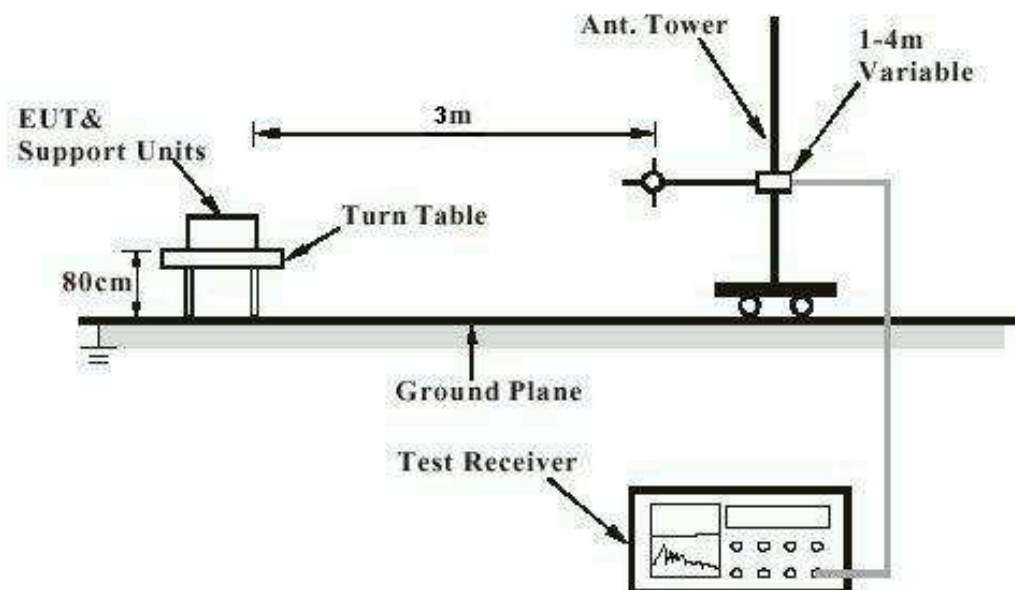


Diagram of Measurement Equipment Configuration for Mains Conduction Measurement

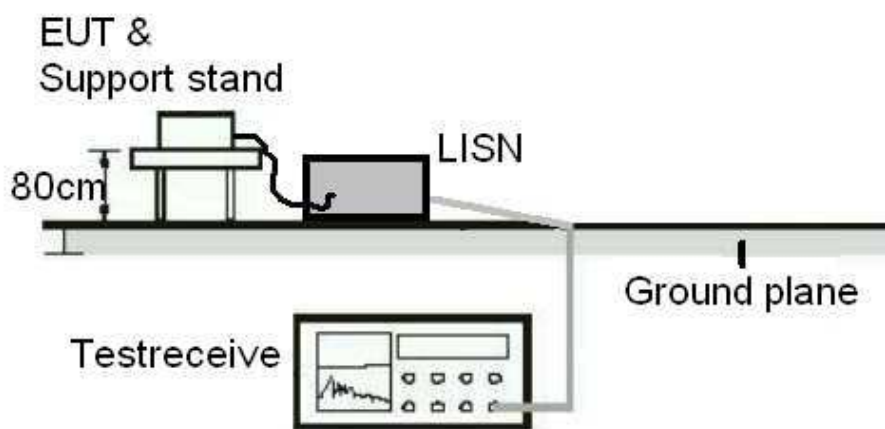
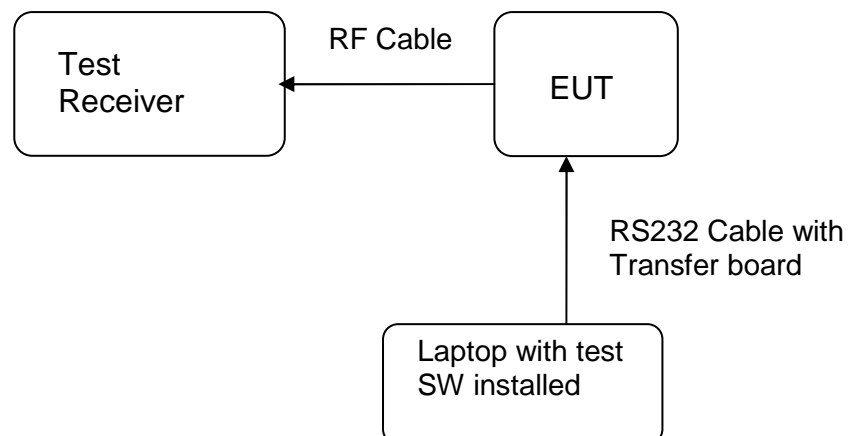


Diagram of Measurement Equipment Configuration for Conducted Transmitter Measurement



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT:**Passed**

Test date	:	April 27, 2012
Test standard	:	FCC Part 15.247(b)(4), Part 15.203
Limit	:	the use of antennas with directional gains that do not exceed 6 dBi

According to the manufacturer declaration, the EUT has an internal antenna with an directional gain of 1.0 dBi, and the antenna is a printed PCB trace with no possibility of replacement. Therefore, the EUT is considered to comply the provision.

Refer to EUT photo for details.

5.1.2 Peak Output Power

RESULT:
Passed

Test date : April 27, 2012
 Test standard : FCC Part 15.247(b)(1)
 Basic standard : DA 00-705 of March 30, 2000
 Limit : 1 Watt (EBW<1MHz) 0.125W (EBW>1MHz)
 Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High
 Operation Mode : A
 Ambient temperature : 22°C
 Relative humidity : 52%
 Atmospheric pressure : 102 kPa

Table 6: Test result of Peak Output Power, GFSK modulation

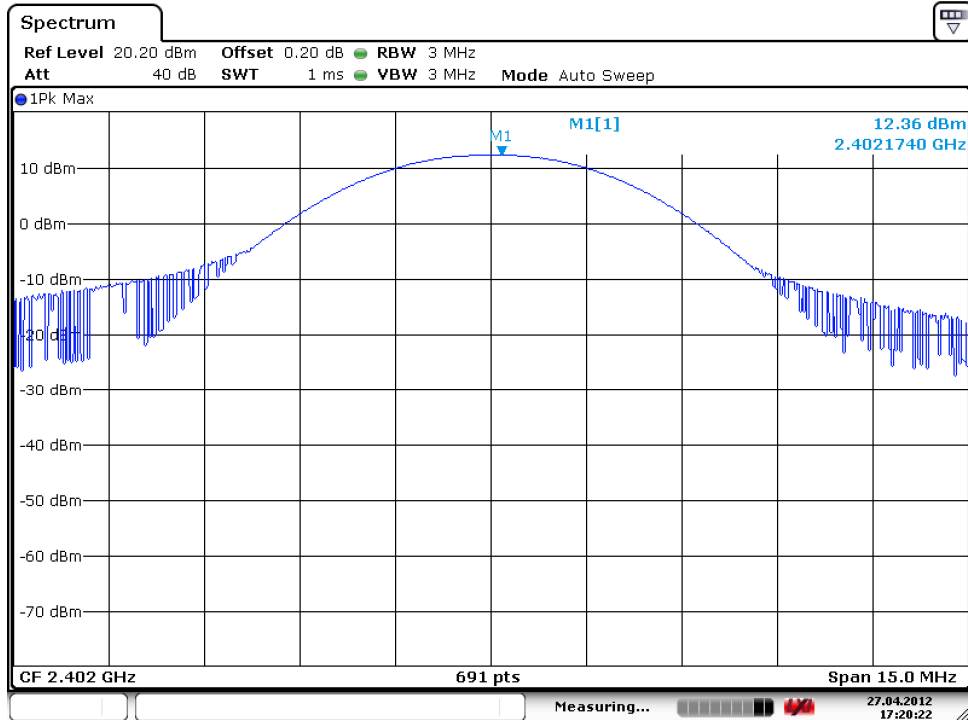
Channel	Channel Frequency (MHz)	Peak Output Power		Limit (W)
		(dBm)	(W)	
Low Channel	2402	12.36	0.0172	0.125
Middle Channel	2442	12.14	0.0164	0.125
High Channel	2480	12.13	0.0163	0.125

Table 7: Test result of Peak Output Power, 8DPSK modulation

Channel	Channel Frequency (MHz)	Peak Output Power		Limit (W)
		(dBm)	(W)	
Low Channel	2402	13.01	0.0200	0.125
Middle Channel	2442	12.75	0.0188	0.125
High Channel	2480	12.31	0.0170	0.125

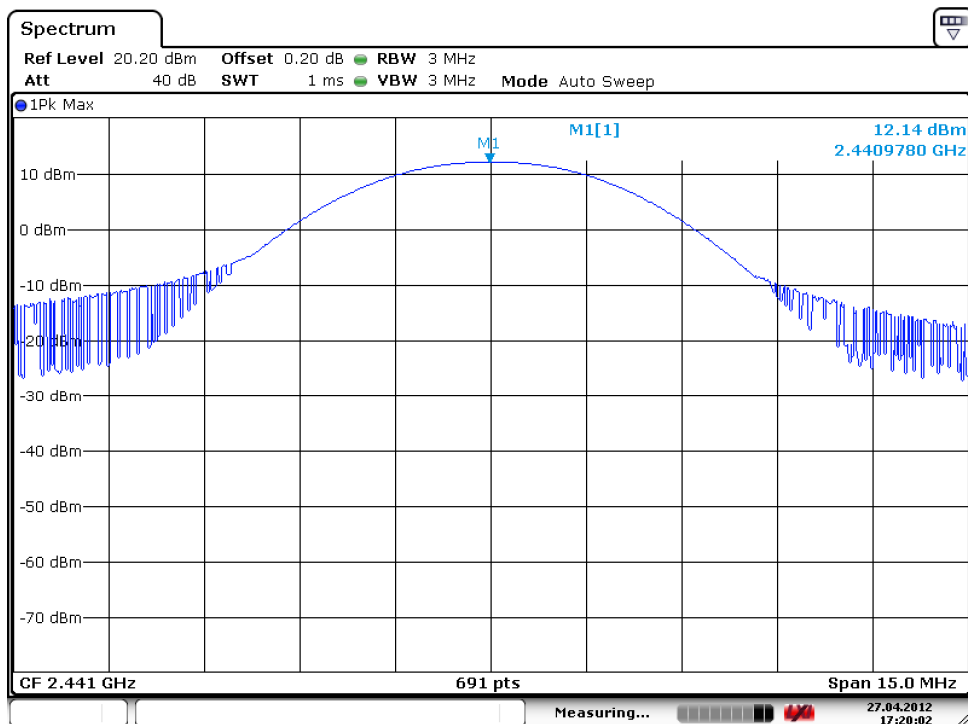
Test Plot of Peak Output Power, GFSK modulation

Low Channel

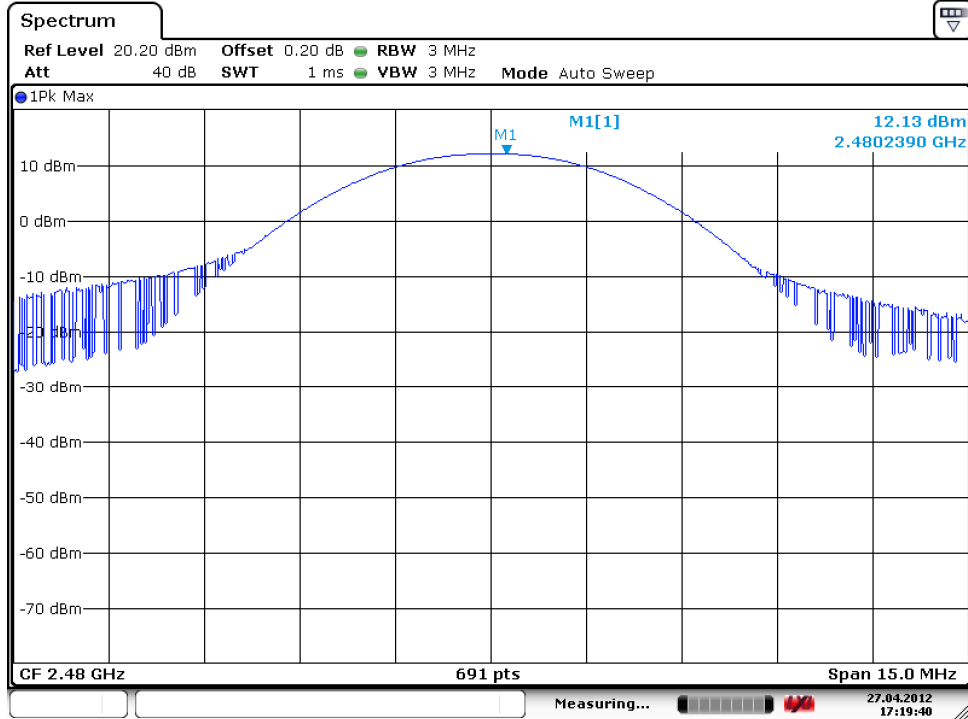


Date: 27.APR.2012 17:20:22

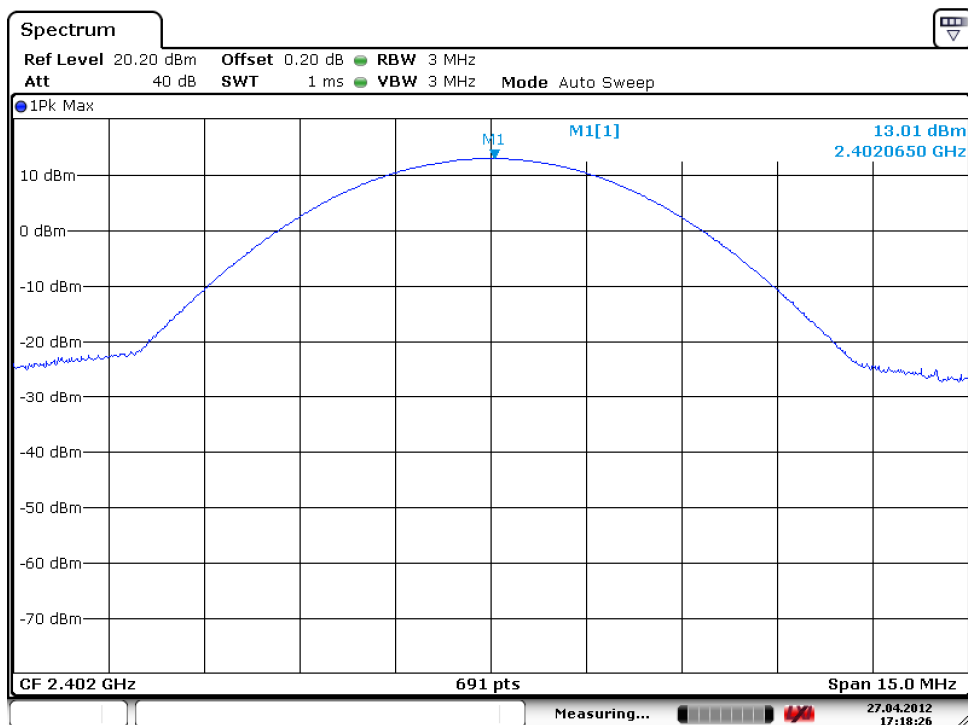
Middle Channel



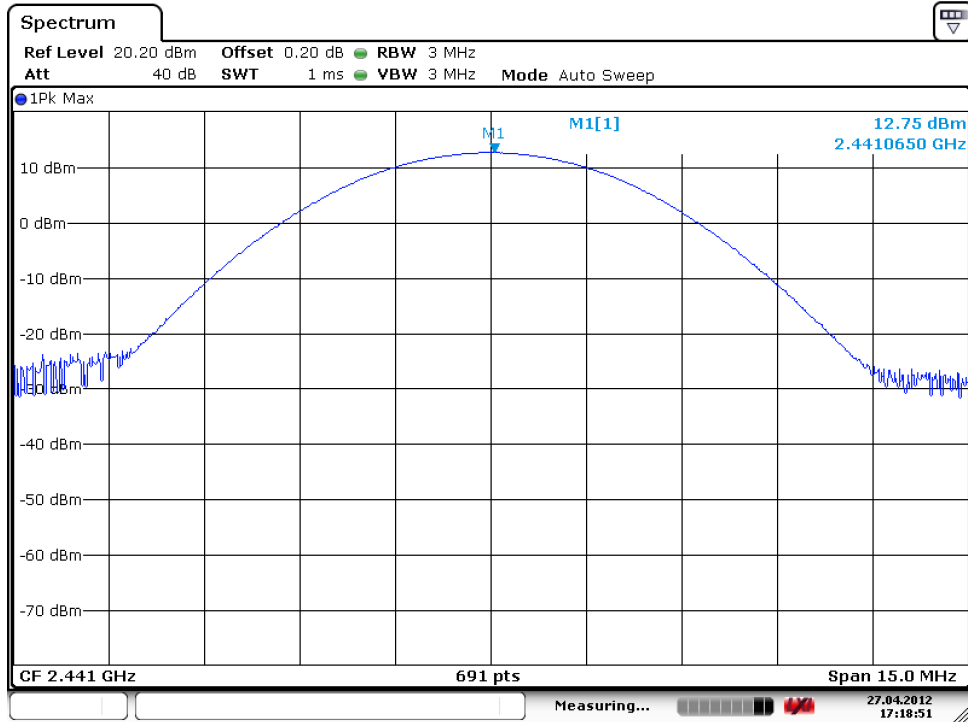
Date: 27.APR.2012 17:20:02

High Channel


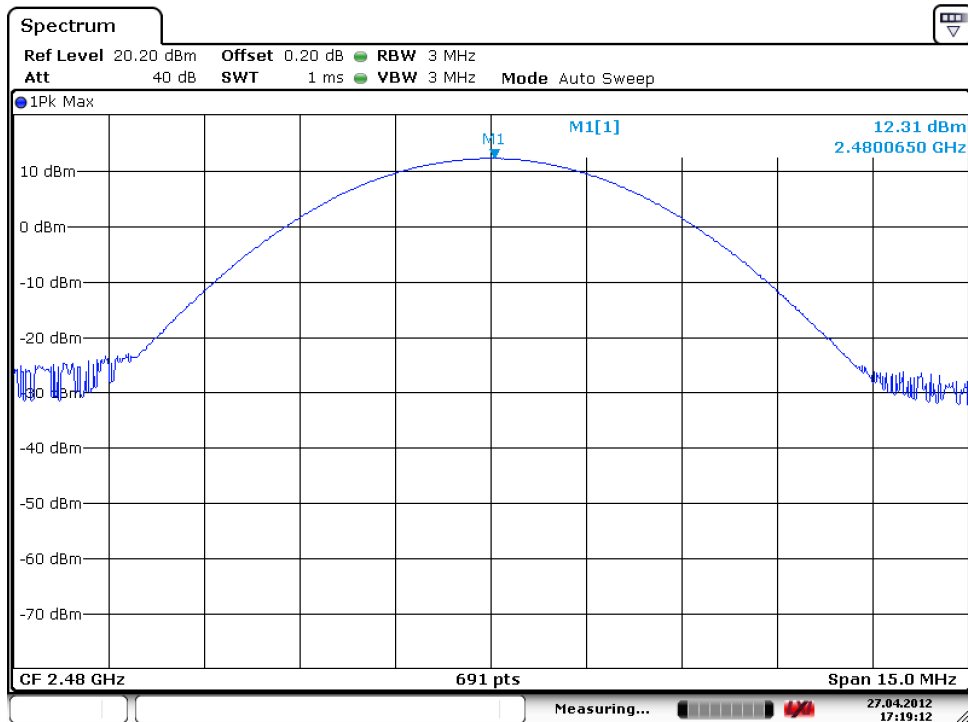
Date: 27.APR.2012 17:19:41

Test Plot of Peak Output Power, 8DPSK modulation
Low Channel


Date: 27.APR.2012 17:18:27

Middle Channel


Date: 27.APR.2012 17:18:51

High Channel


Date: 27.APR.2012 17:19:12

5.1.3 20dB Bandwidth

RESULT:
Passed

Date of testing : April. 2, 2012
 Test standard : FCC Part 15.247(a)(1)
 Basic standard : DA 00-705 of March 30, 2000
 Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High
 Operation Mode : A
 Ambient temperature : 24°C
 Relative humidity : 53%
 Atmospheric pressure : 102 kPa

Table 8: Test result of 20dB Bandwidth, GFSK modulation

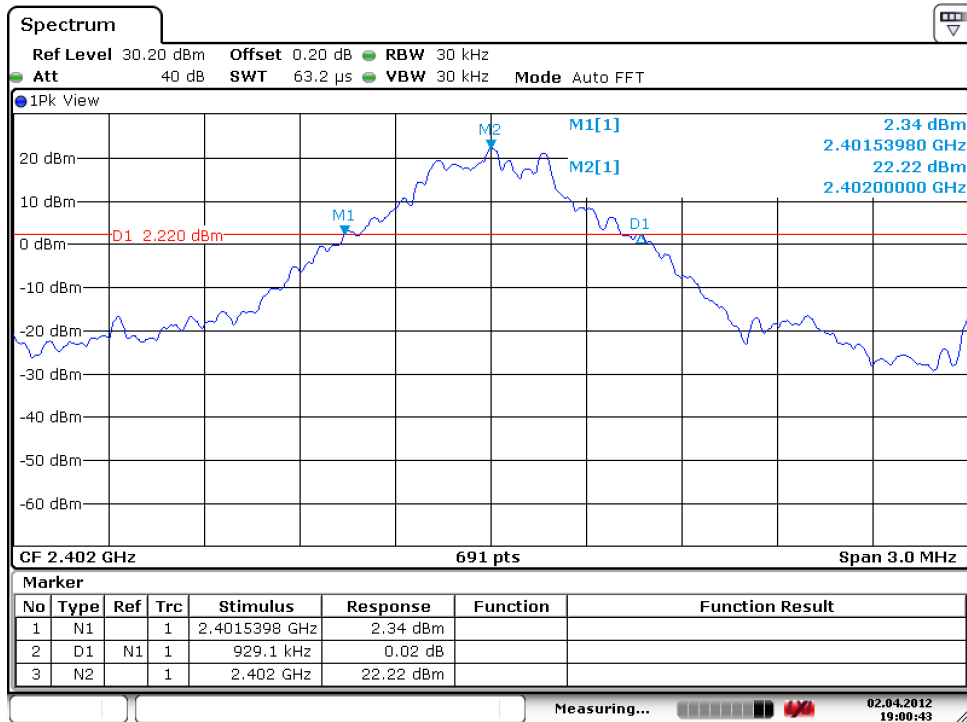
Channel	Channel Frequency (MHz)	20dB Bandwidth (kHz)	Limit (MHz)	Result
Low Channel	2402	929.1	/	Pass
Mid Channel	2441	929.1	/	Pass
High Channel	2480	929.1	/	Pass

Table 9: Test result of 20dB Bandwidth, 8DPSK modulation

Channel	Channel Frequency (MHz)	20dB Bandwidth (kHz)	Limit (MHz)	Result
Low Channel	2402	1250.4	/	Pass
Mid Channel	2441	1298.1	/	Pass
High Channel	2480	1293.8	/	Pass

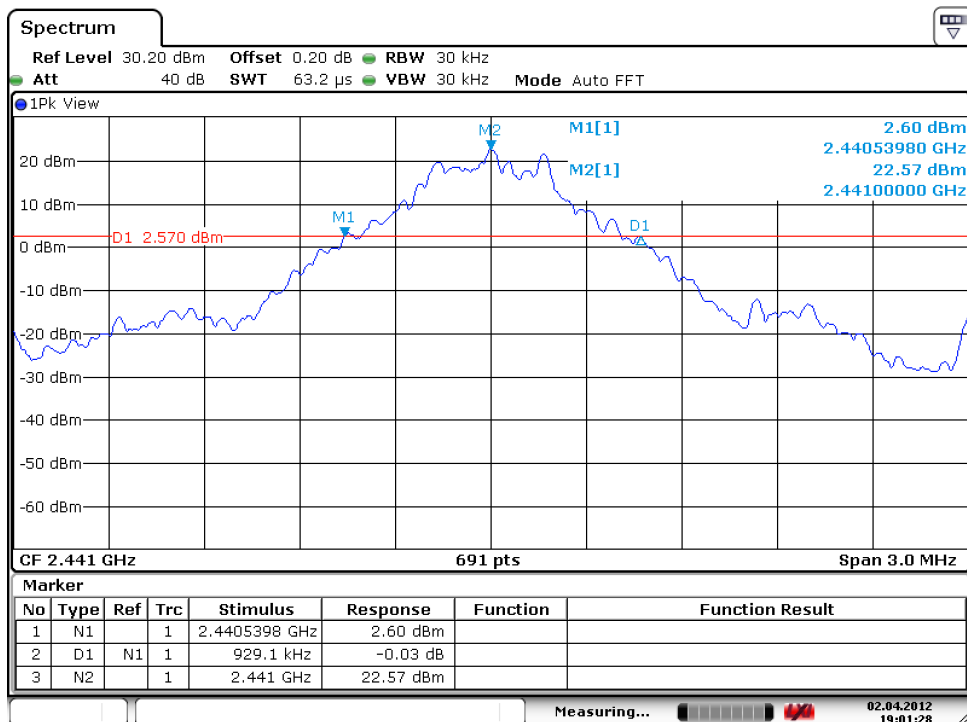
Test Plot of 20dB Bandwidth, GFSK modulation

Low Channel

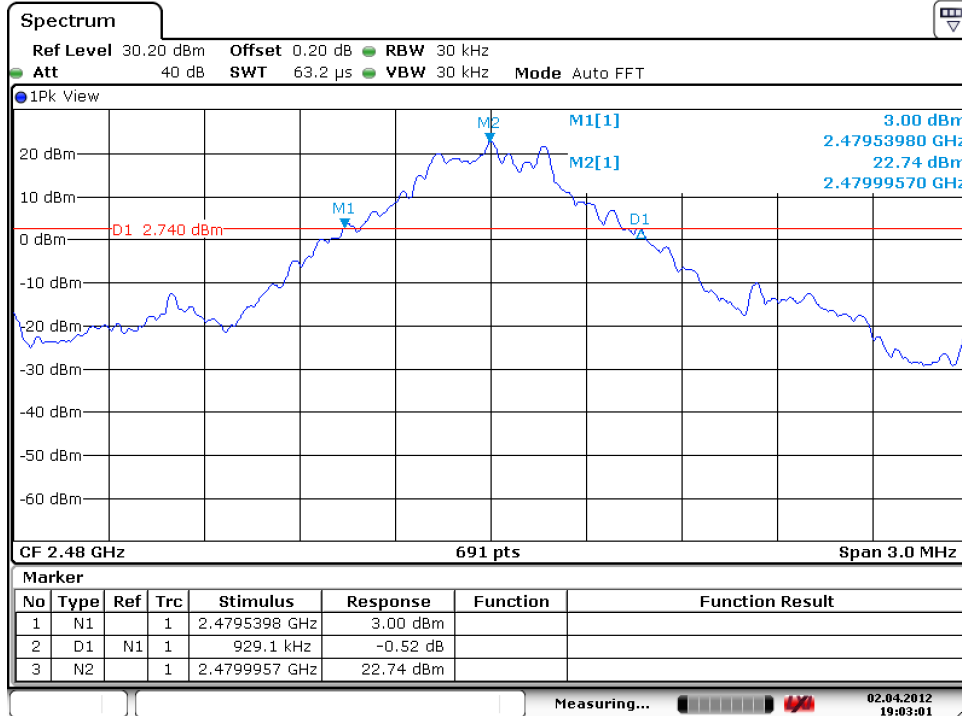


Date: 2.APR.2012 19:00:43

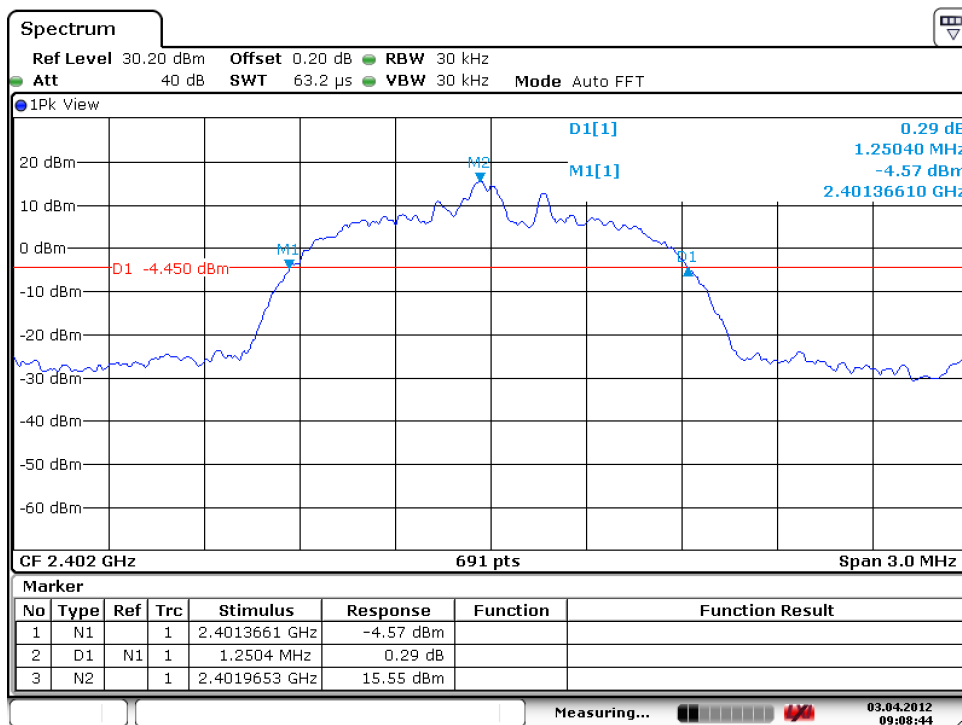
Middle Channel



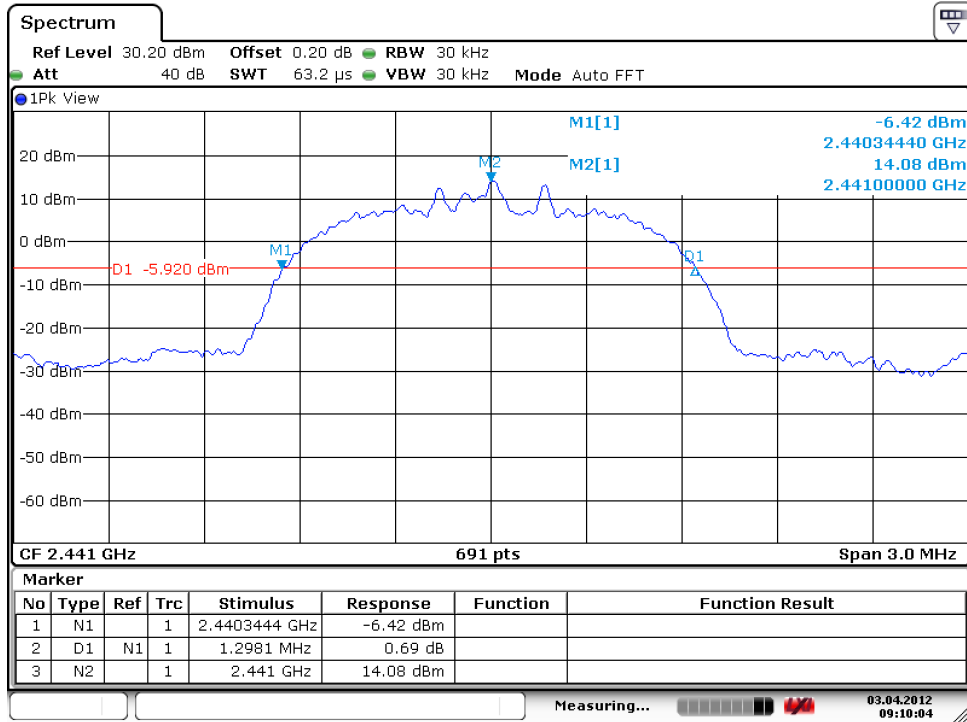
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High Channel


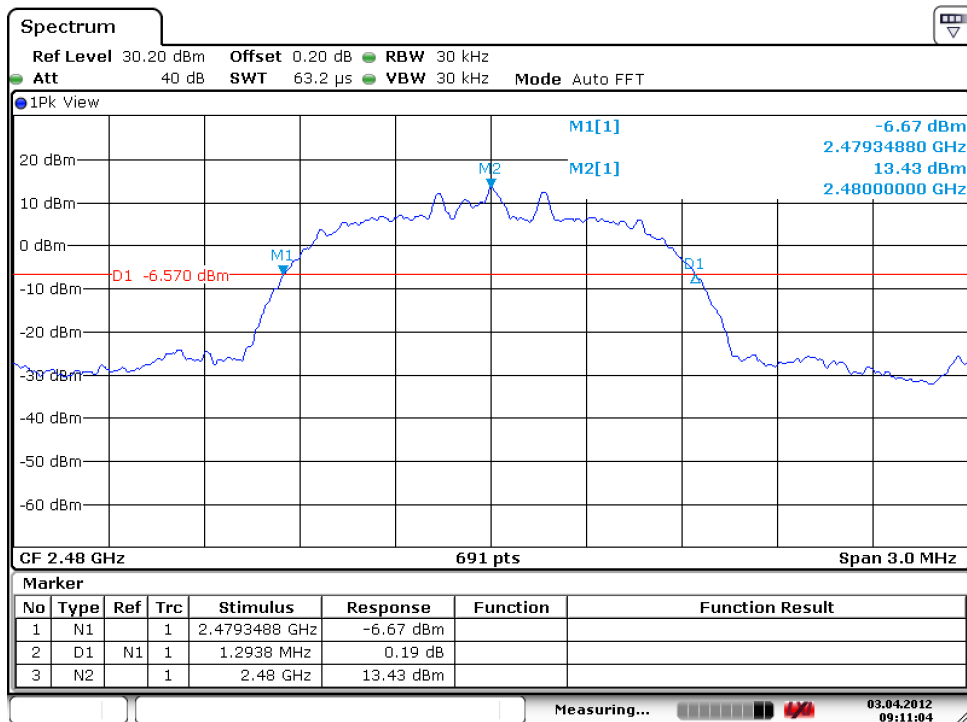
Date: 2.APR.2012 19:03:01

Test Plot of 20dB Bandwidth, 8DPSK modulation
Low Channel


Date: 3.APR.2012 09:08:44

Middle Channel


Date: 3.APR.2012 09:10:05

High Channel


Date: 3.APR.2012 09:11:04

5.1.4 Conducted spurious emissions and Frequency Band Edge measured in 100kHz Bandwidth

RESULT:**Passed**

Date of testing : April 2, 2012
Test standard : FCC part 15.247(d)
Basic standard : DA 00-705 of March 30, 2000
Limit : 20dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power)
Kind of test site : Shielded room

Test setup

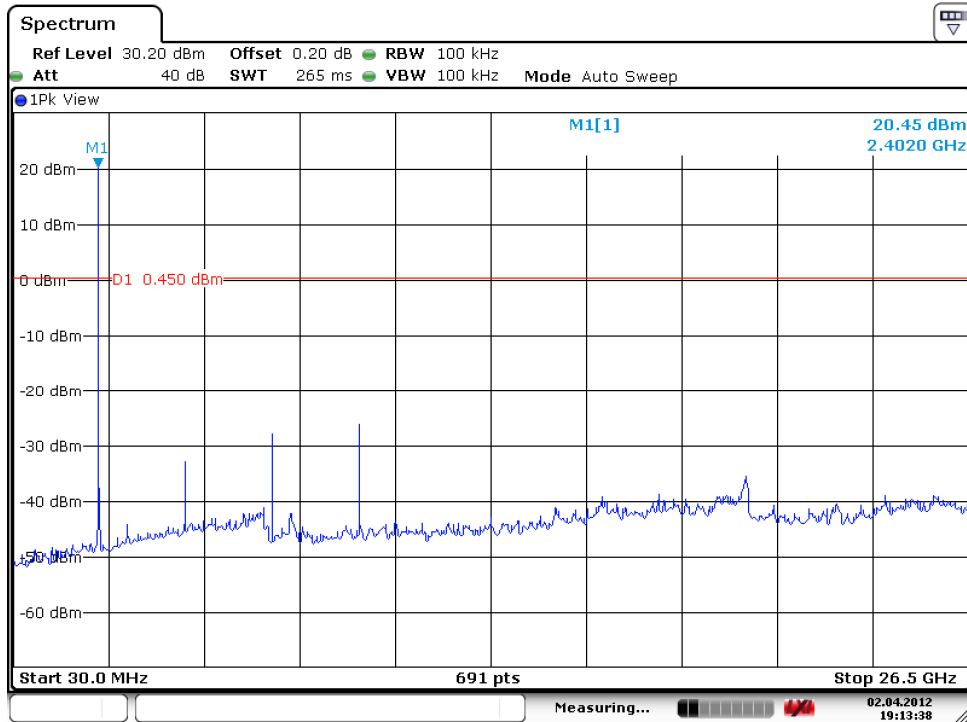
Test Channel : Low/ High
Operation mode : A
Ambient temperature : 22°C
Relative humidity : 52%
Atmospheric pressure : 102 kPa

All emissions are more than 20dB below fundamental, details refer to following test plot, and compliance is achieved as well.

Due to the small size of the product and that there are no inductive components of significant size, 9kHz to 30MHz frequency range is not tested based on technical judgment.

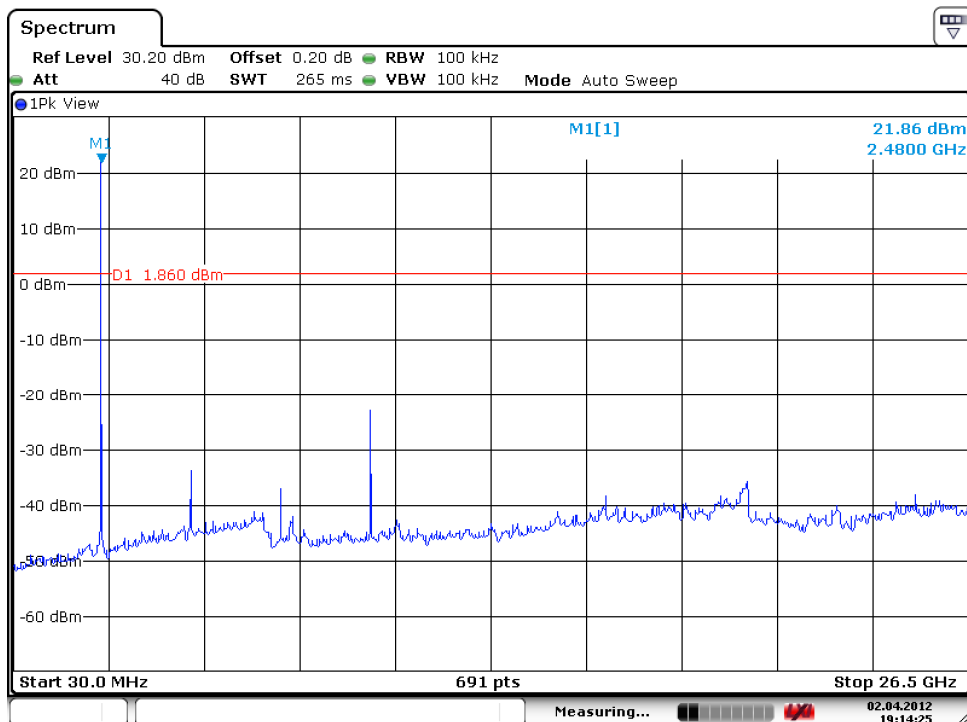
Test Plot of 100kHz Conducted Emissions, GFSK modulation

Low Channel



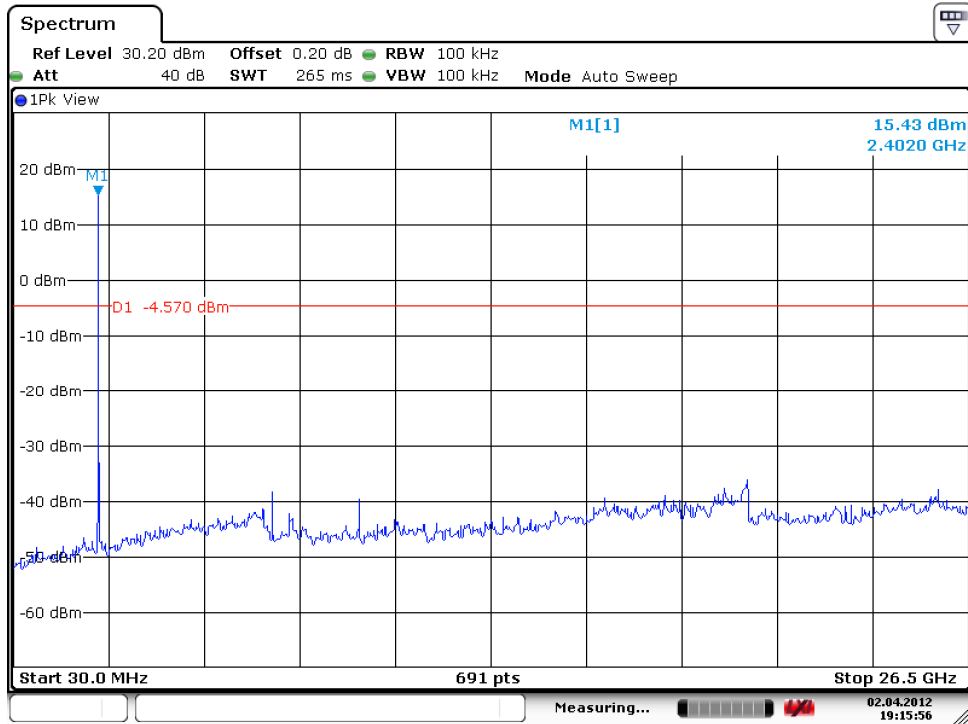
Date: 2.APR.2012 19:13:38

High Channel



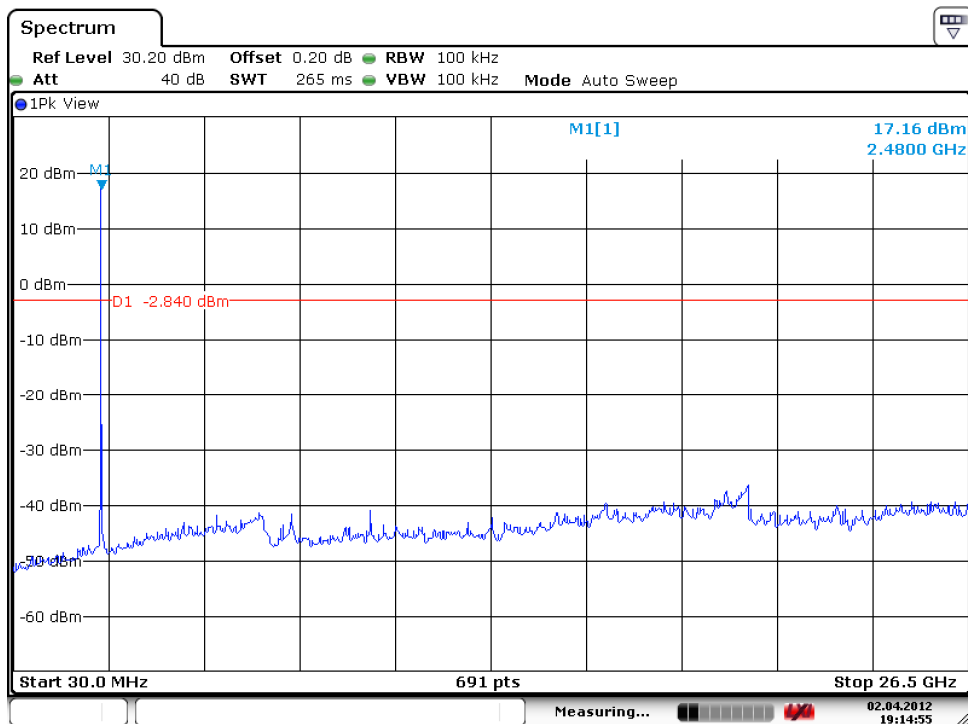
Date: 2.APR.2012 19:14:25

Test Plot of 100kHz Conducted Emissions, 8DPSK modulation Low Channel



Date: 2.APR.2012 19:15:56

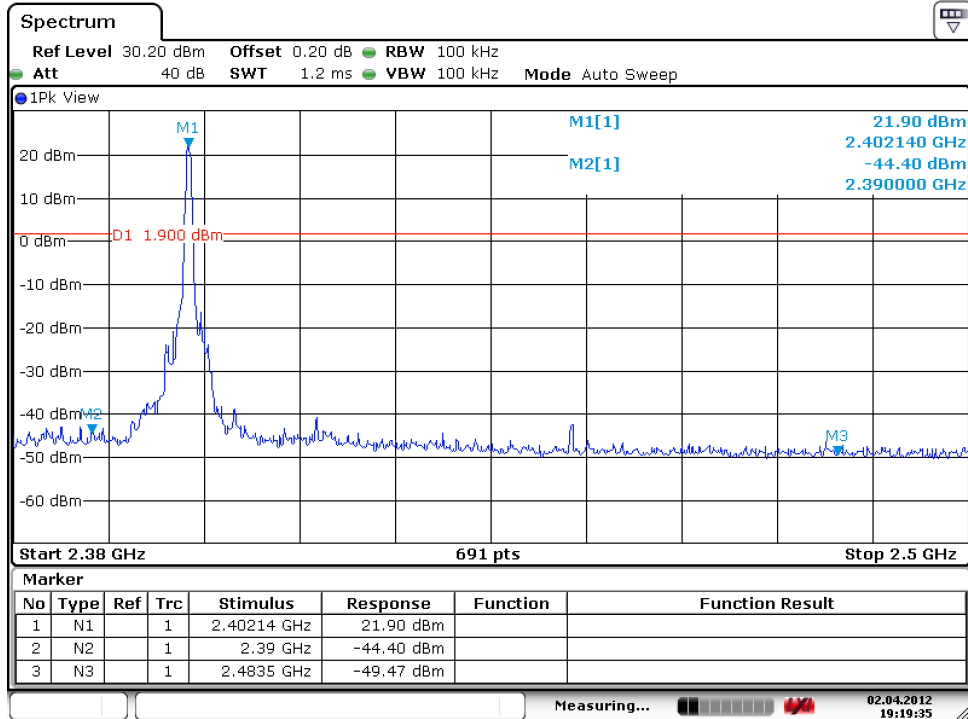
High Channel



Date: 2.APR.2012 19:14:55

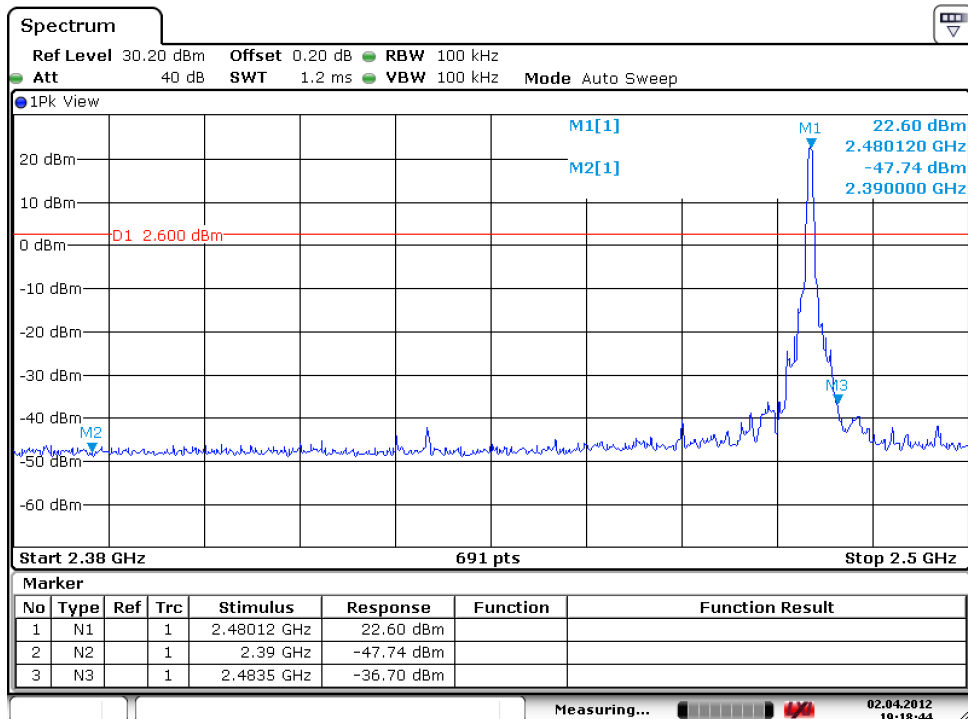
Test Plot of 100kHz Bandwidth of Frequency Band Edge, GFSK modulation

Low Channel



Date: 2.APR.2012 19:19:35

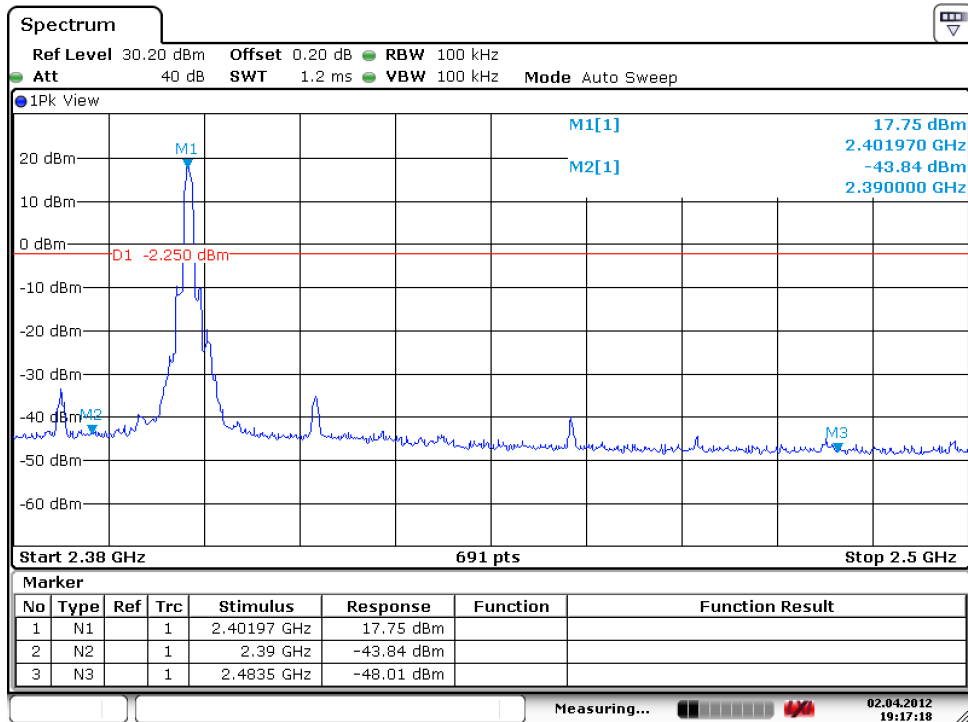
High Channel



Date: 2.APR.2012 19:18:44

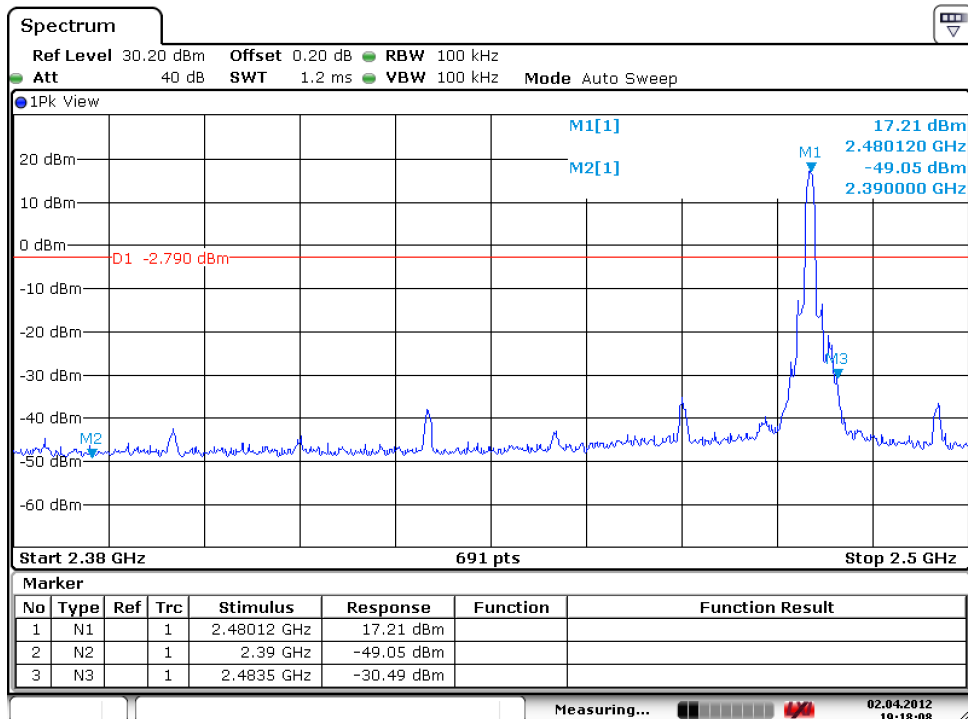
Test Plot of 100kHz Bandwidth of Frequency Band Edge, 8DPSK modulation

Low Channel



Date: 2.APR.2012 19:17:18

High Channel



Date: 2.APR.2012 19:18:08

5.1.5 Spurious Emission

RESULT:**Passed**

Date of testing	:	April 27, 2012
Test standard	:	FCC part 15.247(d), FCC 15.205, FCC 15.209, RSS-210 2.2, RSS-210 A8.5 and RSS-Gen 7.2.1
Basic standard	:	ANSI C63.10: 2009
Limits	:	Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a), must comply with the radiated emission limits specified in FCC 15.209(a). Emission radiated outside the specified frequency bands must comply with the radiated emission limits specified in FCC 15.209(a) and FCC 15.249(a).
Kind of test site	:	3m Semi-Anechoic Chamber

Test setup

Test Channel	:	Low/ Middle/ High
Operation mode	:	A, C
Ambient temperature	:	24°C
Relative humidity	:	56%
Atmospheric pressure	:	102 kPa

Remark: Testing was carried out within frequency range 30MHz to the tenth harmonic. For details refer to Appendix 2. The Radiated Emissions testing was performed in the X, Y and Z axis orientation. The X Axis orientation is the worst-case and recorded in this test report. Due to the small size of the product and that there are no inductive components of significant size, 9kHz to 30MHz frequency range is not tested based on technical judgment.

5.1.6 Frequency Separation

RESULT:
Passed

Date of testing : April 2, 2012
 Test standard : FCC part 15.247(a)(1)
 Basic standard : DA 00-705 of March 30, 2000
 Limit : $\geq 25\text{kHz}$ or $2/3$ of 20dB bandwidth, whichever is greater

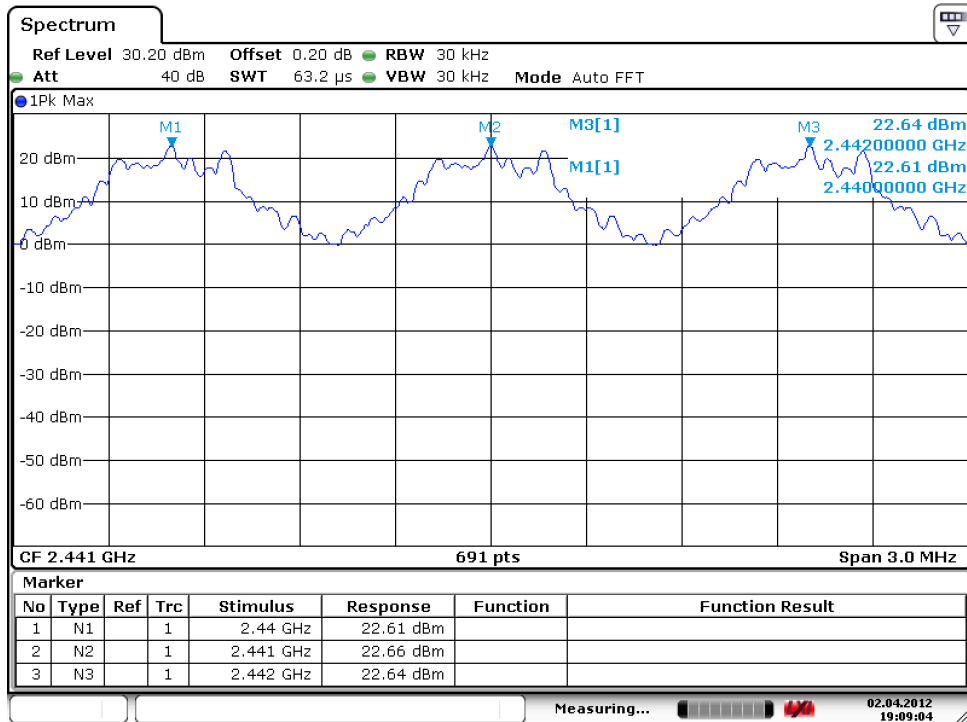
Test setup

Test Channel : Low/ Middle/ High
 Operation Mode : A
 Ambient temperature : 24°C
 Relative humidity : 53%
 Atmospheric pressure : 102 kPa

Table 10: Test result of Frequency Separation

Channel	Channel Frequency (MHz)	Measured Channel Separation (MHz)	Limit (kHz)	Result
Record Channel	2441	1	$\geq 25\text{kHz}$ or $2/3$ of 20dB bandwidth	Pass
Record Channel adj 1	2440			
Record Channel adj 2	2442			

Test Plot of Frequency Separation



Date: 2.APR.2012 19:09:04

5.1.7 Number of hopping frequency

RESULT:**Passed**

Date of testing : April 2, 2012
Test standard : FCC part 15.247(a)(1)(iii)
Basic standard : DA 00-705 of March 30, 2000
Limits : ≥ 15 non-overlapping channels
Kind of test site : Shield room

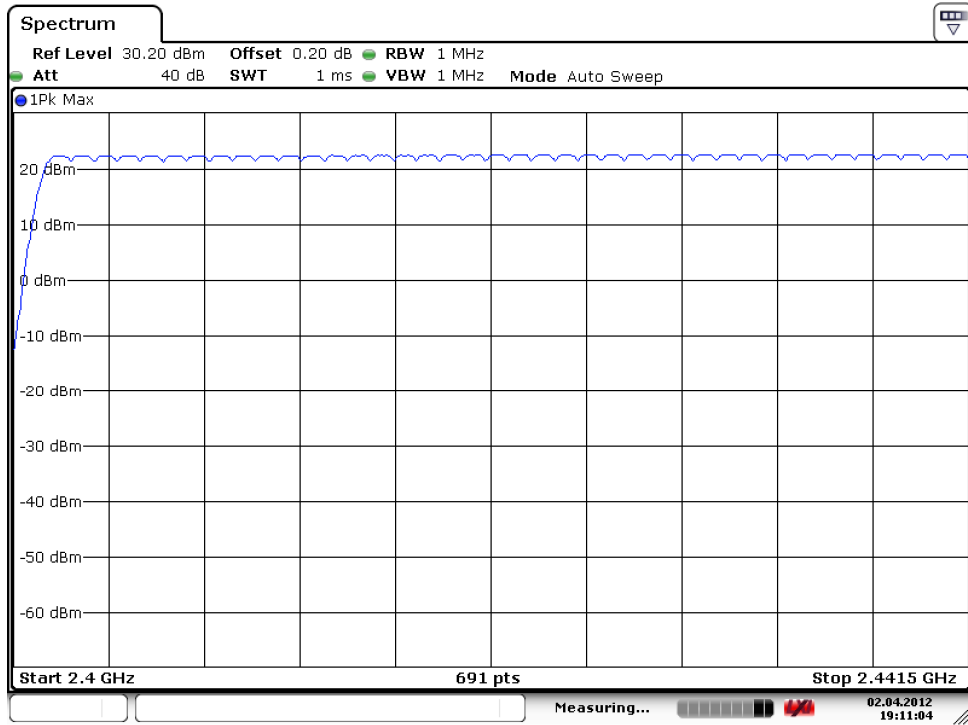
Test setup

Test Channel : Low/ Middle/ High
Operation Mode : A
Ambient temperature : 24°C
Relative humidity : 53%
Atmospheric pressure : 102 kPa

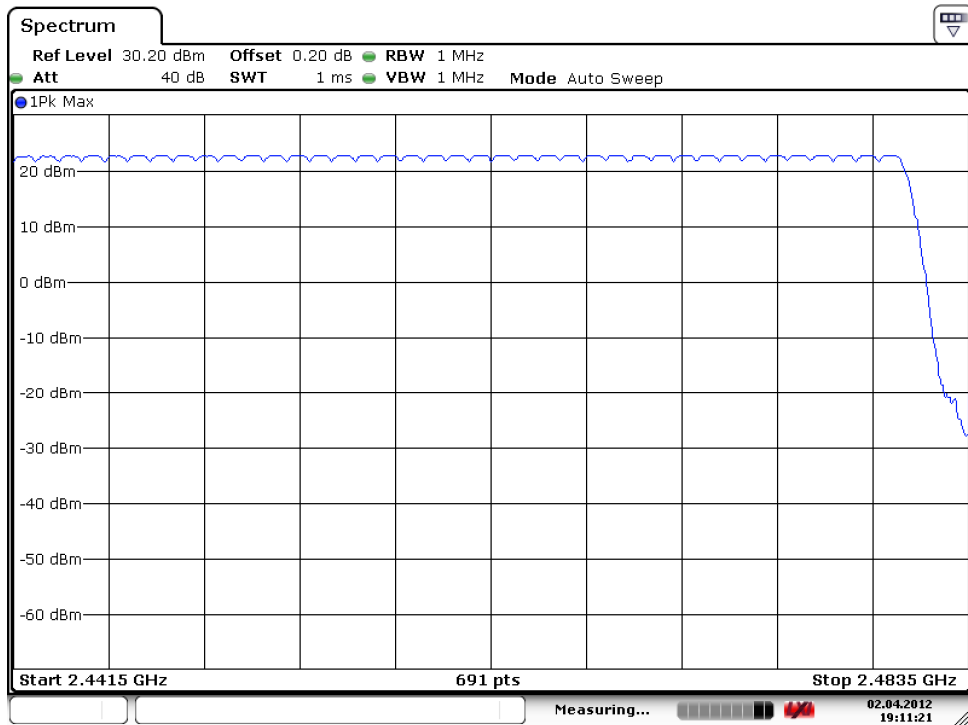
Table 11: Test result of Number of hopping frequency

Frequency Range	Measured Quantity of Hopping Channel	Limit	Result
<u>2400</u> to <u>2483.5</u> MHz	79	≥ 15	Pass

Test Plot of Number of hopping frequencies



Date: 2.APR.2012 19:11:04



Date: 2.APR.2012 19:11:21

5.1.8 Time of Occupancy

RESULT:
Passed

Date of testing : April 2, 2012
 Test standard : FCC part 15.247(a)(1)(iii)
 Basic standard : DA 00-705 of March 30, 2000
 Limits : 0.4s
 Kind of test site : Shield room

Test setup

Test Channel : Low/ Middle/ High
 Operation Mode : A
 Ambient temperature : 24°C
 Relative humidity : 53%
 Atmospheric pressure : 102 kPa

Table 12: Test result of Time of Occupancy

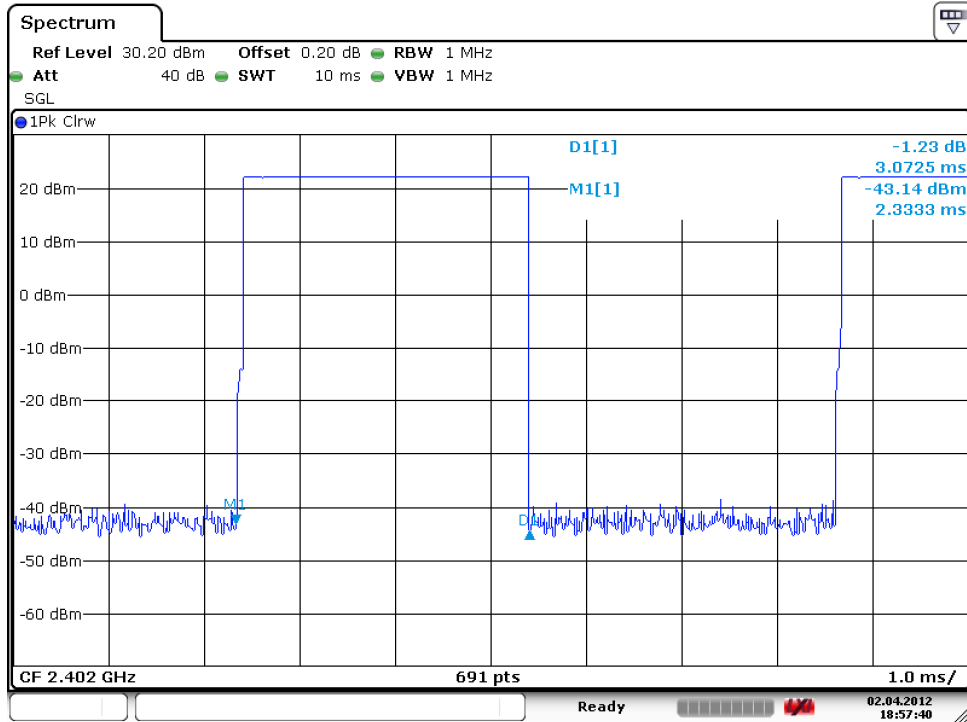
Data Mode	Captured Burst (s)	Dwell time (s)	Limit (s)	Result
DH5 (GFSK)	0.0031	0.3277	0.4	Pass
3DH5 (8DPSK)	0.0031	0.3277	0.4	Pass

Note:

Dwell time = Pulse width x (Hopping rate / Number of channels) x Period

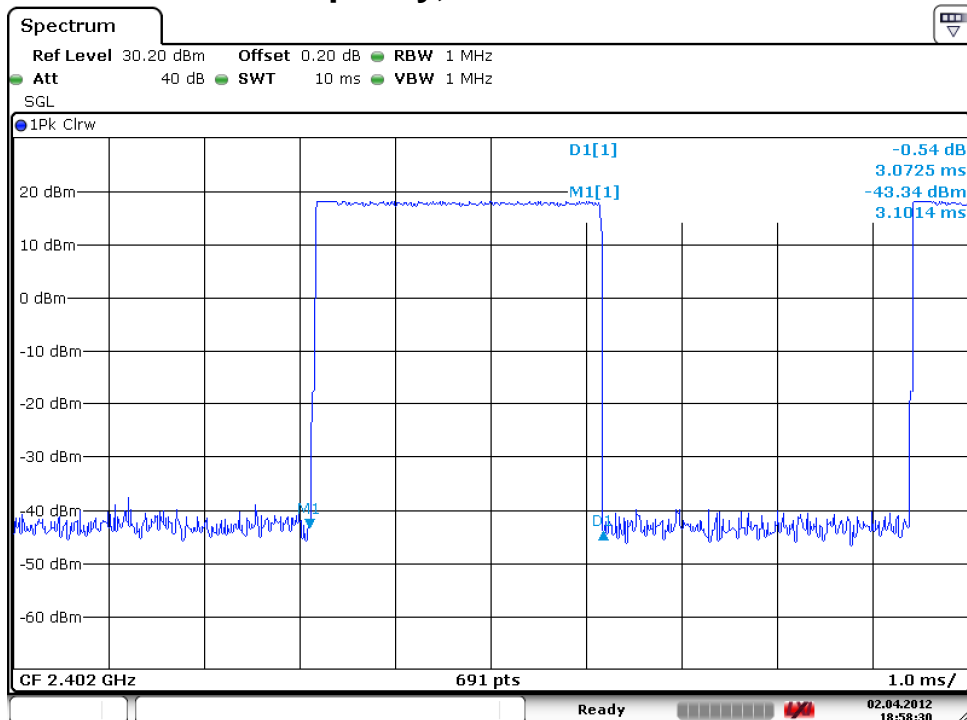
Period = 0.4 (seconds/ channel) x 79 (channel) = 31.6 seconds

Test Plot of Time of Occupancy, GFSK modulation



Date: 2.APR.2012 18:57:40

Test Plot of Time of Occupancy, 8DPSK modulation



Date: 2.APR.2012 18:58:30

6. Safety Human exposure

6.1 Radio Frequency Exposure Compliance

6.1.1 Electromagnetic Fields

RESULT:**Passed**

Test standard : FCC KDB Publication 447498

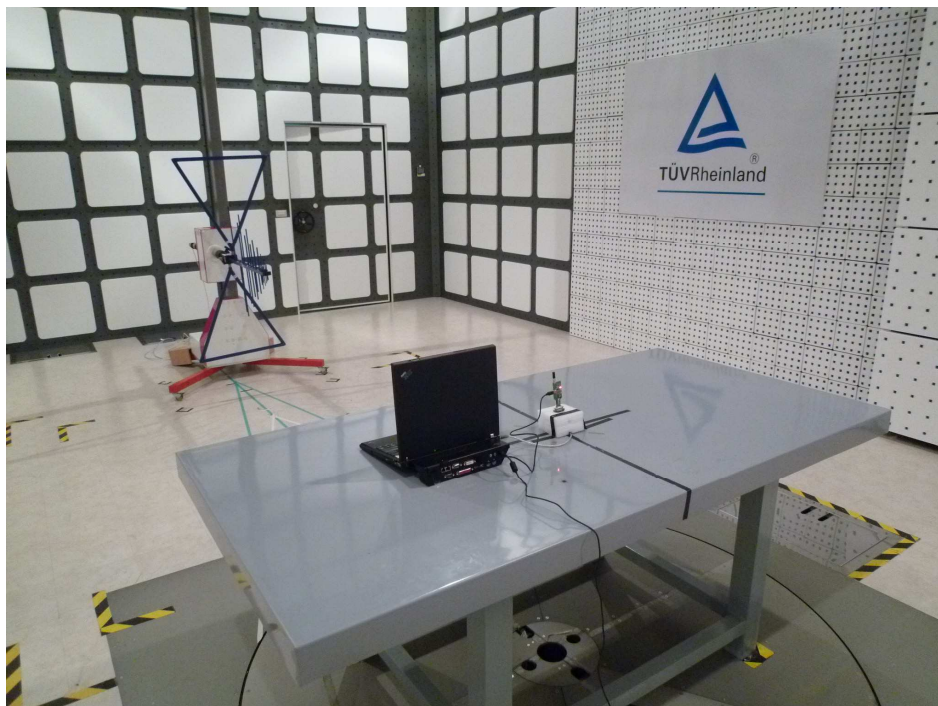
Since maximum peak output power of the transmitter is $<60/f(\text{GHz})\text{mW}$, i.e. $19.9986\text{mW} < 25(=60/2.4)\text{mW}$, hence the EUT is excluded from SAR evaluation according to FCC KDB publication 447498 D01: Mobile Portable RF Exposure.

7. Photographs of the Test Set-Up

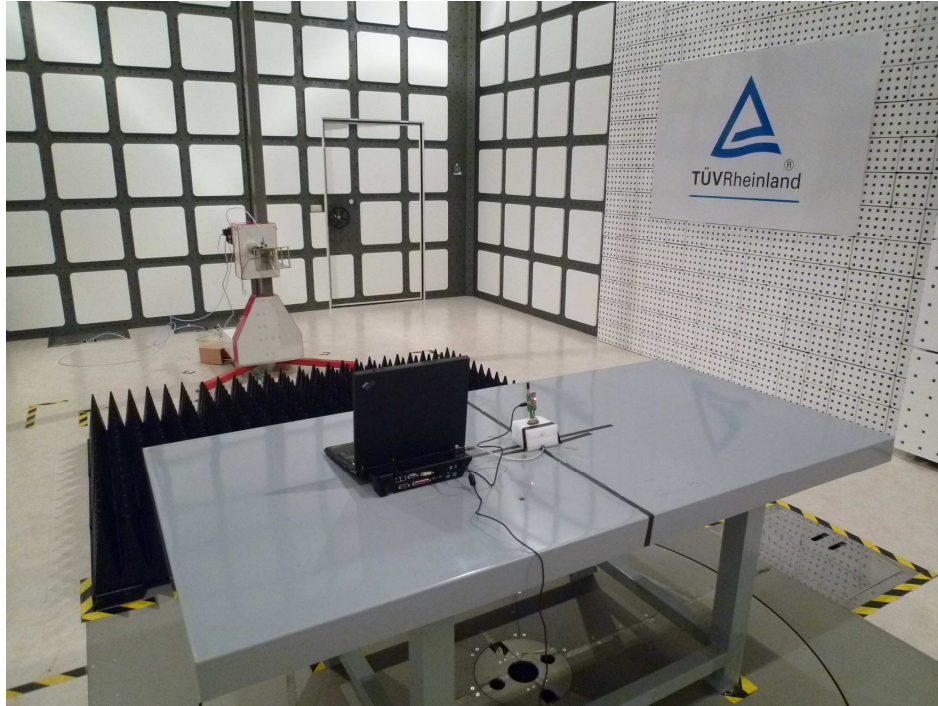
Photograph 1: Set-up for Spurious Emissions (Front View)



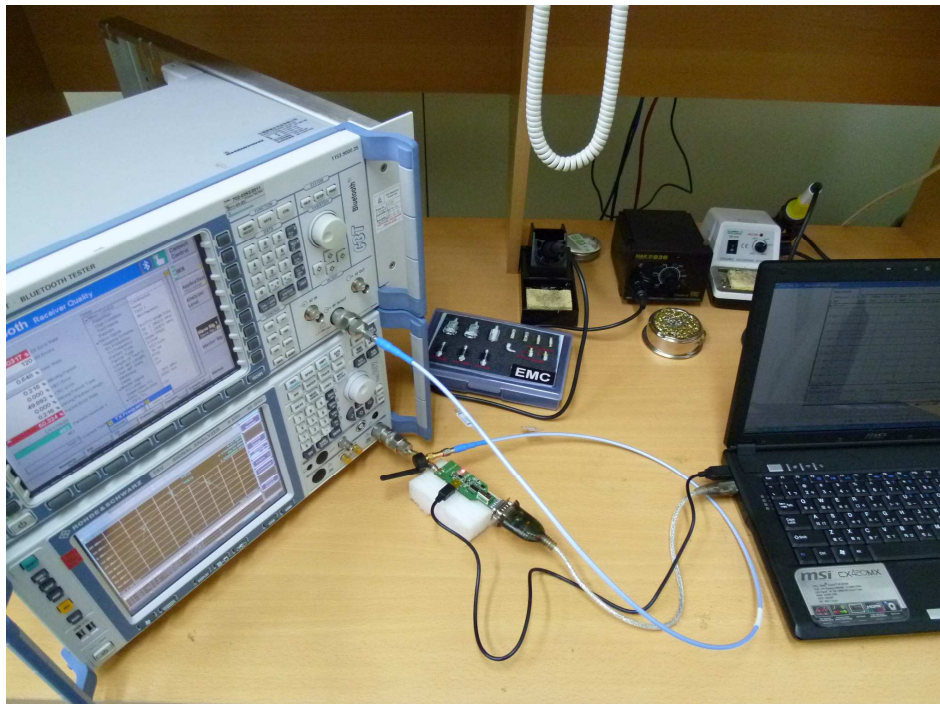
Photograph 2: Set-up for Spurious Emissions (Back View 1)



Photograph 3: Set-up for Spurious Emissions (Back View 2)



Photograph 4: Set-up for Conducted testing



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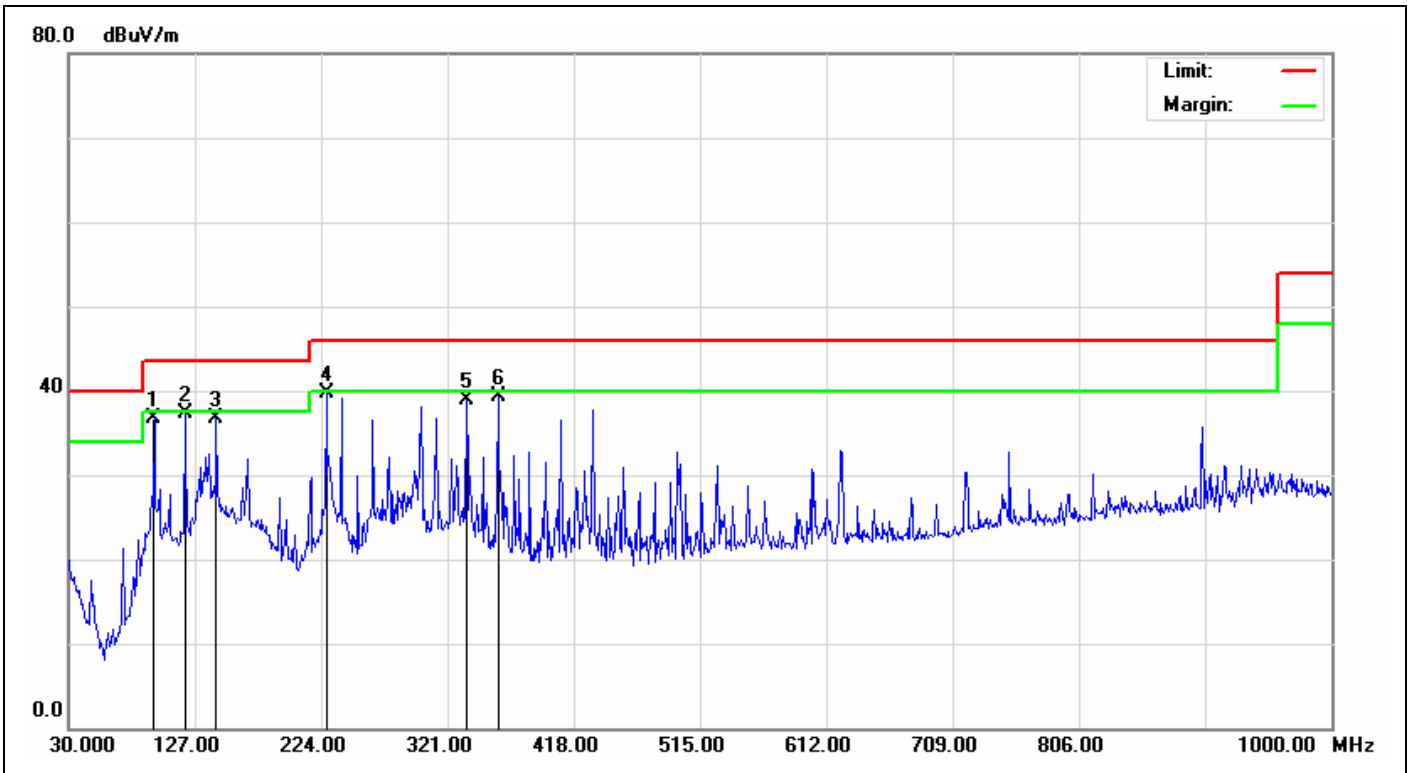
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Test Report No.10036907 001

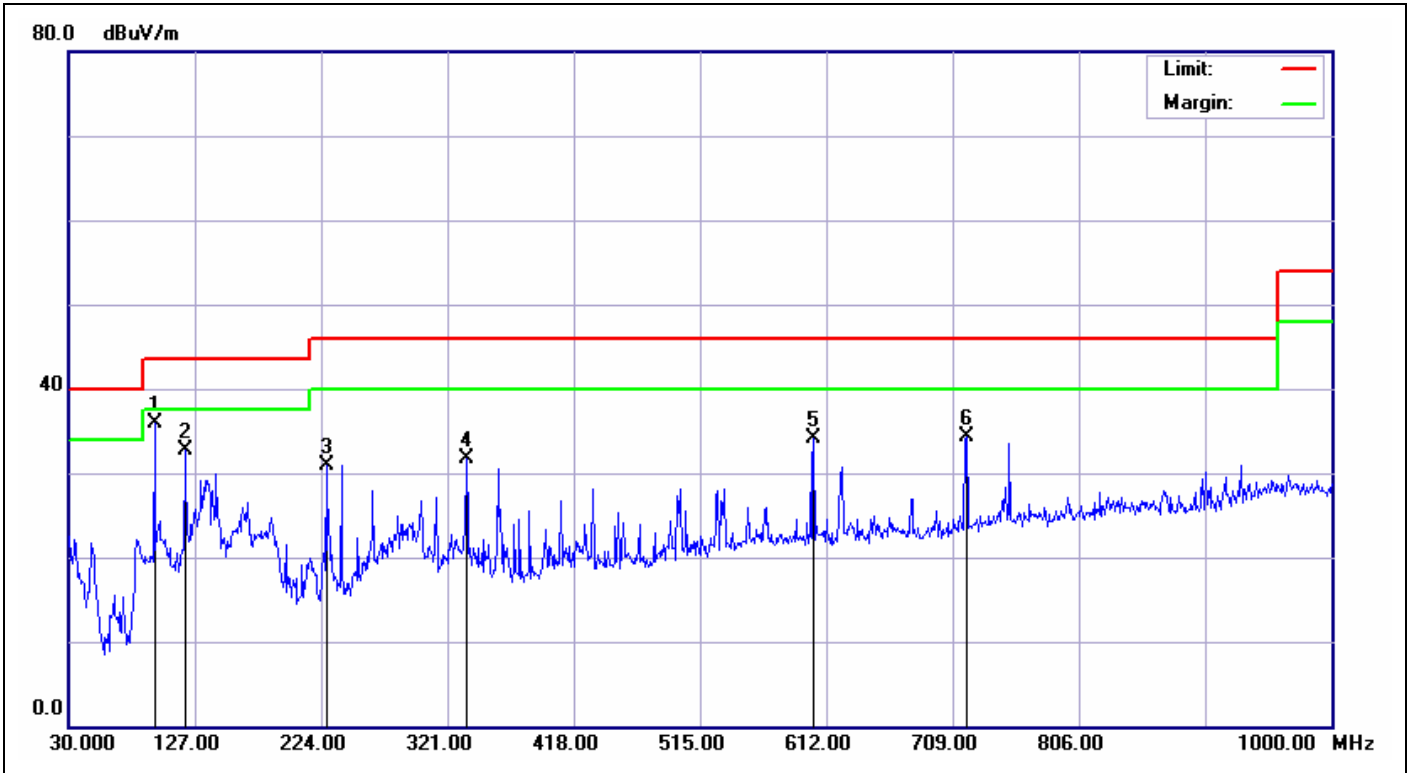
Appendix 2: Test Result of Radiated Emissions and
Radiated Band Edge

(File: 10036907Appendix2)



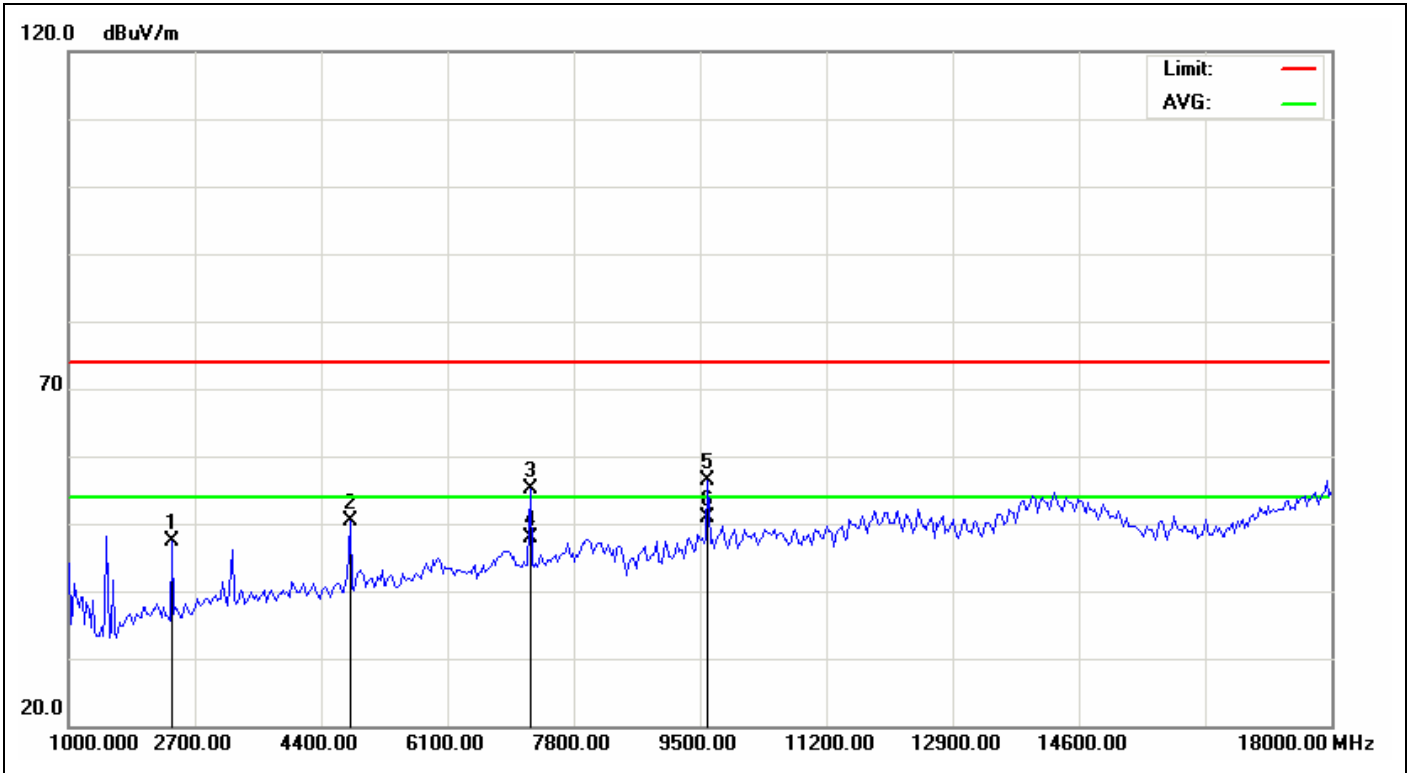
Service No.:	113154843	Test Distance:	3m
Test Standard:	FCC Class B 3M Radiation	Ant. Polarization:	Horizontal
Test item:	Radiation Emission	Test Time:	2012/4/17 PM 03:59:27
Applicant:	Rayson	Test Rating:	AC 120V/60Hz
Product:	BT Module	Temp.(°C)/Hum.(%):	20(°C)/60%
Model No.:	BTM-22X	Test Engineer:	Hugo Chang
Test Mode:	BT 2441 TX		
Remark:			

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (°)	Remark
1	95.9599	-16.36	53.01	36.65	43.50	-6.85	QP	300	197	
2	119.2400	-14.14	51.35	37.21	43.50	-6.29	QP	300	54	
3	143.4900	-13.75	50.46	36.71	43.50	-6.79	QP	200	57	
4	227.8800	-14.99	54.66	39.67	46.00	-6.33	QP	200	123	
5	335.5500	-10.50	49.46	38.96	46.00	-7.04	QP	100	25	
6	359.8000	-9.94	49.30	39.36	46.00	-6.64	QP	100	41	



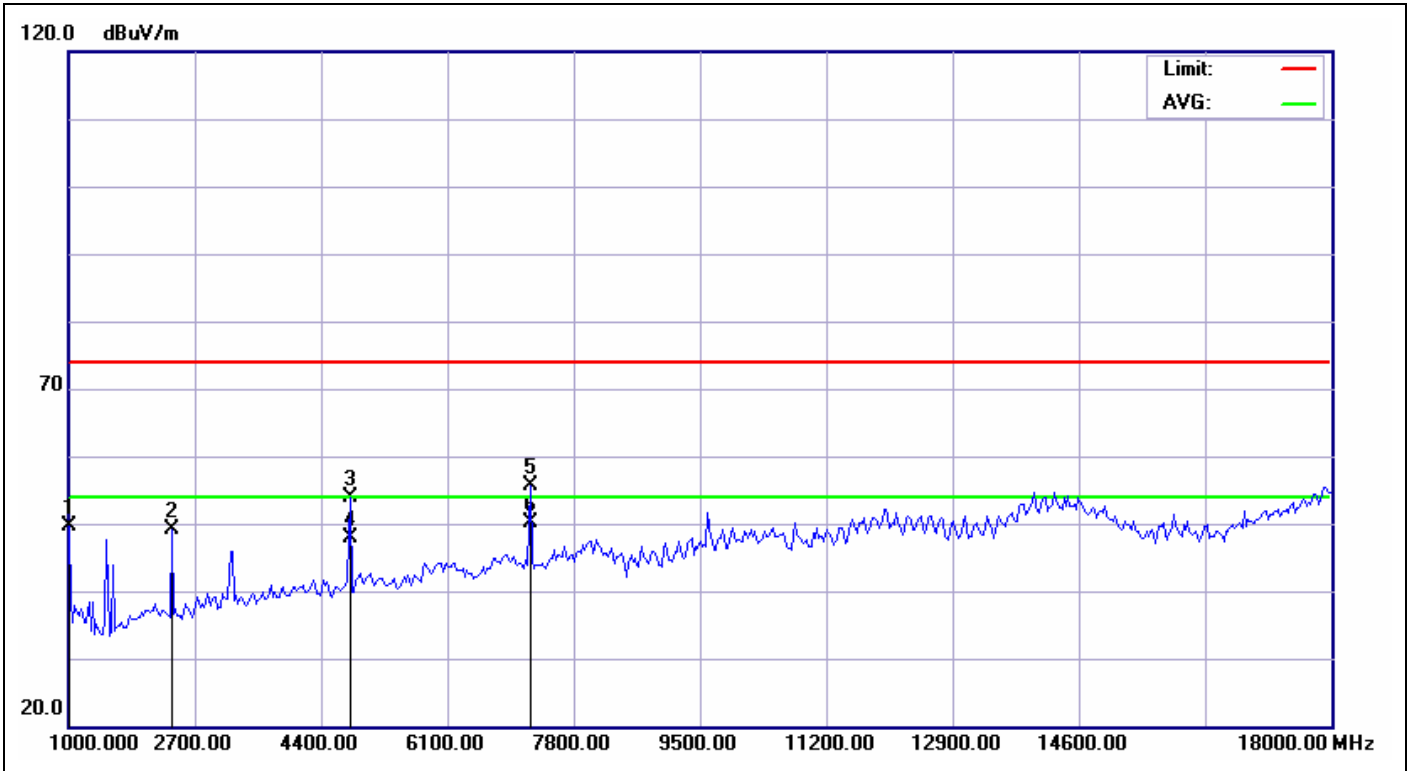
Service No.:	113154843	Test Distance:	3m
Test Standard:	FCC Class B 3M Radiation	Ant. Polarization:	Vertical
Test item:	Radiation Emission	Test Time:	2012/4/17 PM 04:04:26
Applicant:	Rayson	Test Rating:	AC 120V/60Hz
Product:	BT Module	Temp.(°C)/Hum.(%):	20(°C)/60%
Model No.:	BTM-22X	Test Engineer:	Hugo Chang
Test Mode:	BT 2441 TX		
Remark:			

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (°)	Remark
1	95.9600	-16.36	52.22	35.86	43.50	-7.64	QP	300	123	
2	119.2400	-14.14	46.79	32.65	43.50	-10.85	QP	200	124	
3	227.8800	-14.99	45.81	30.82	46.00	-15.18	QP	200	217	
4	335.5500	-10.50	42.24	31.74	46.00	-14.26	QP	100	73	
5	602.3000	-5.84	39.87	34.03	46.00	-11.97	QP	100	106	
6	719.6700	-4.30	38.54	34.24	46.00	-11.76	QP	100	266	



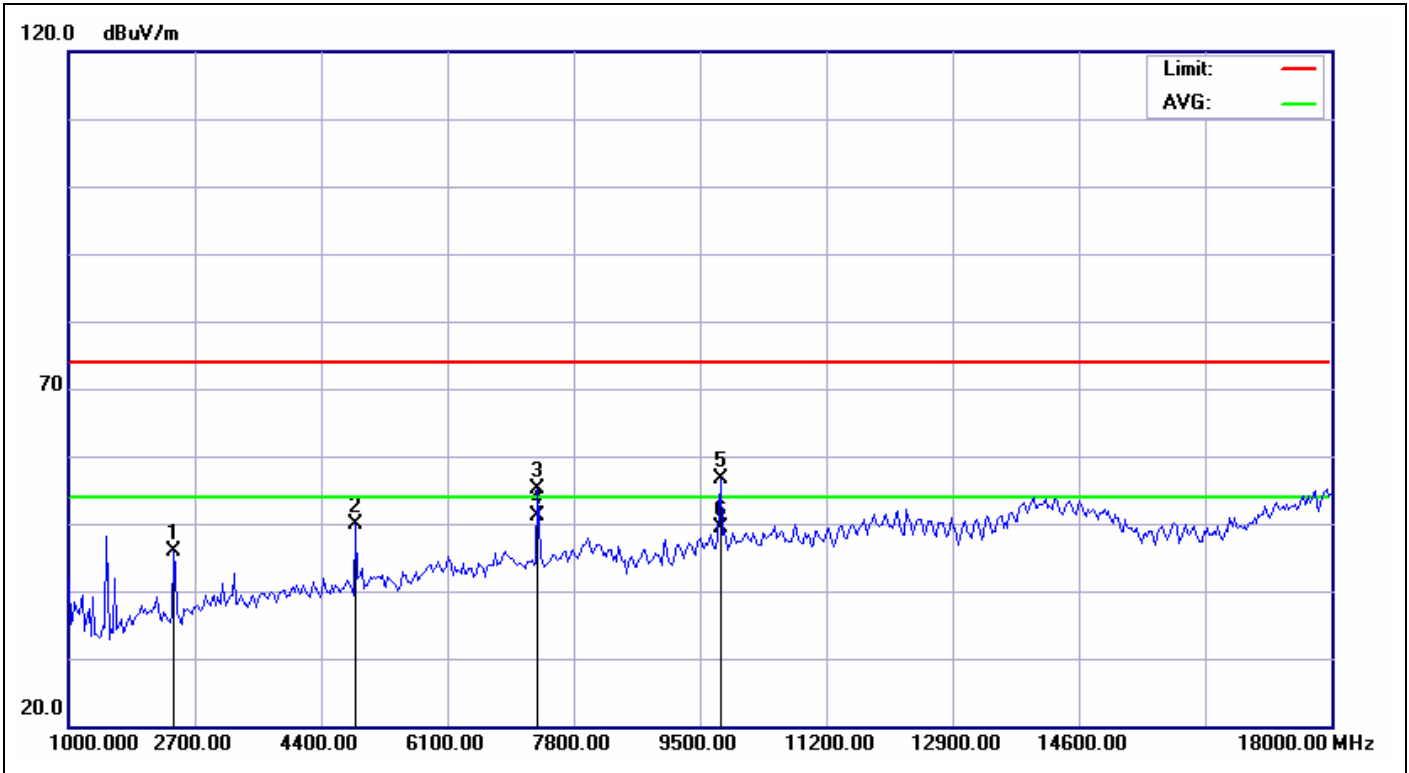
Service No.:	113154843	Test Distance:	3m
Test Standard:	FCC above 1G PEAK	Ant. Polarization:	Horizontal
Test item:	Radiation Emission	Test Time:	2012/4/27 AM 11:49:29
Applicant:	Rayson	Test Rating:	AC 120V/60Hz
Product:	BT Module	Temp.(°C)/Hum.(%):	22(°C)/60%
Model No.:	BTM-22X	Test Engineer:	Hugo Chang
Test Mode:	BT 2402		
Remark:			

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (°)	Remark
1	2389.423	8.07	39.34	47.41	74.00	-26.59	peak			TX
2	4786.859	13.07	37.23	50.30	74.00	-23.70	peak			
3	7211.538	18.84	36.33	55.17	74.00	-18.83	peak			
4	7211.538	18.84	29.05	47.89	54.00	-6.11	AVG			
5	9608.974	21.11	35.17	56.28	74.00	-17.72	peak			
6	9608.974	21.11	29.75	50.86	54.00	-3.14	AVG			



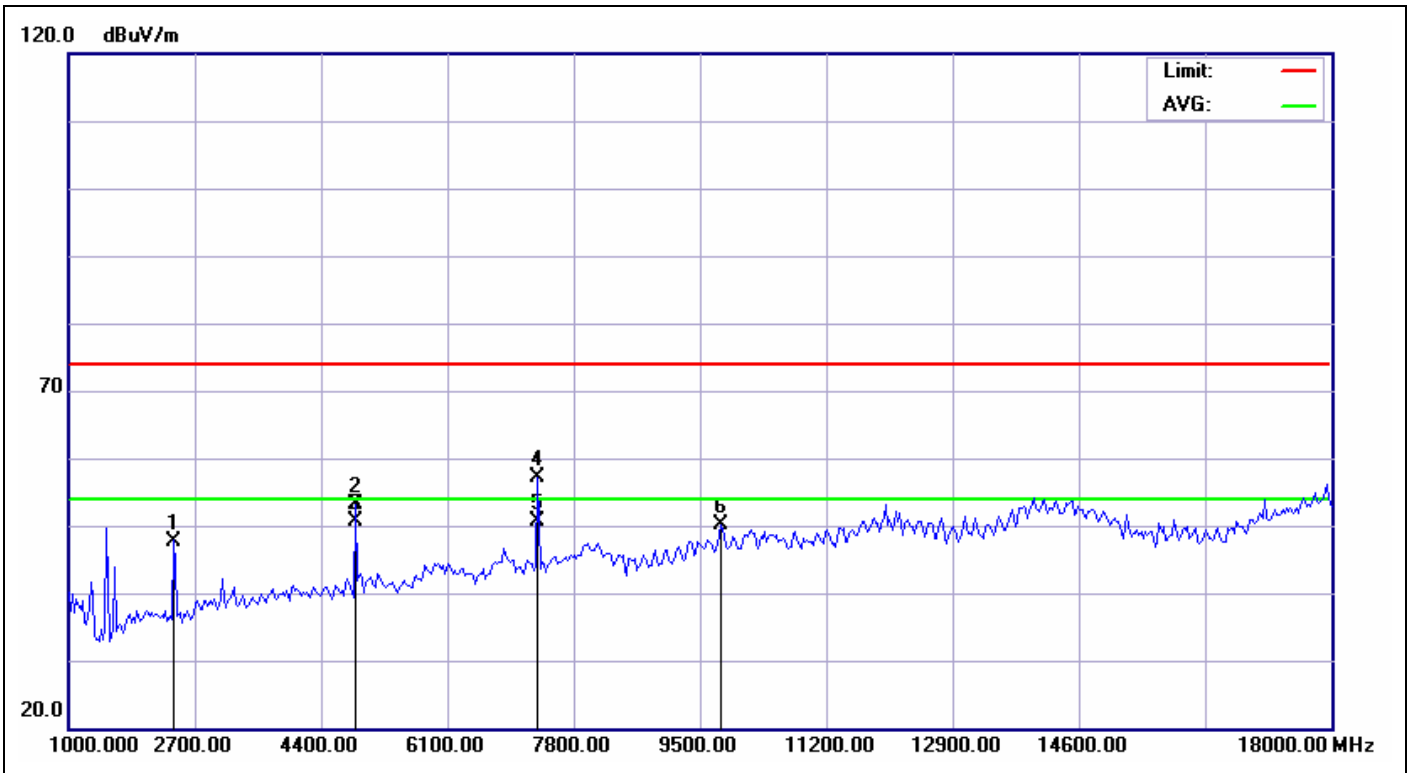
Service No.:	113154843	Test Distance:	3m
Test Standard:	FCC above 1G PEAK	Ant. Polarization:	Vertical
Test item:	Radiation Emission	Test Time:	2012/4/27 AM 11:59:37
Applicant:	Rayson	Test Rating:	AC 120V/60Hz
Product:	BT Module	Temp.(°C)/Hum.(%):	22(°C)/60%
Model No.:	BTM-22X	Test Engineer:	Hugo Chang
Test Mode:	BT 2402		
Remark:			

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (°)	Remark
1	1000.0000	3.35	46.30	49.65	74.00	-24.35	peak			
2	2389.423	8.07	40.96	49.03	74.00	-24.97	peak			TX
3	4786.859	13.07	40.76	53.83	74.00	-20.17	peak			
4	4786.859	13.07	34.93	48.00	54.00	-6.00	AVG			
5	7211.538	18.84	36.71	55.55	74.00	-18.45	peak			
6	7211.538	18.84	31.19	50.03	54.00	-3.97	AVG			



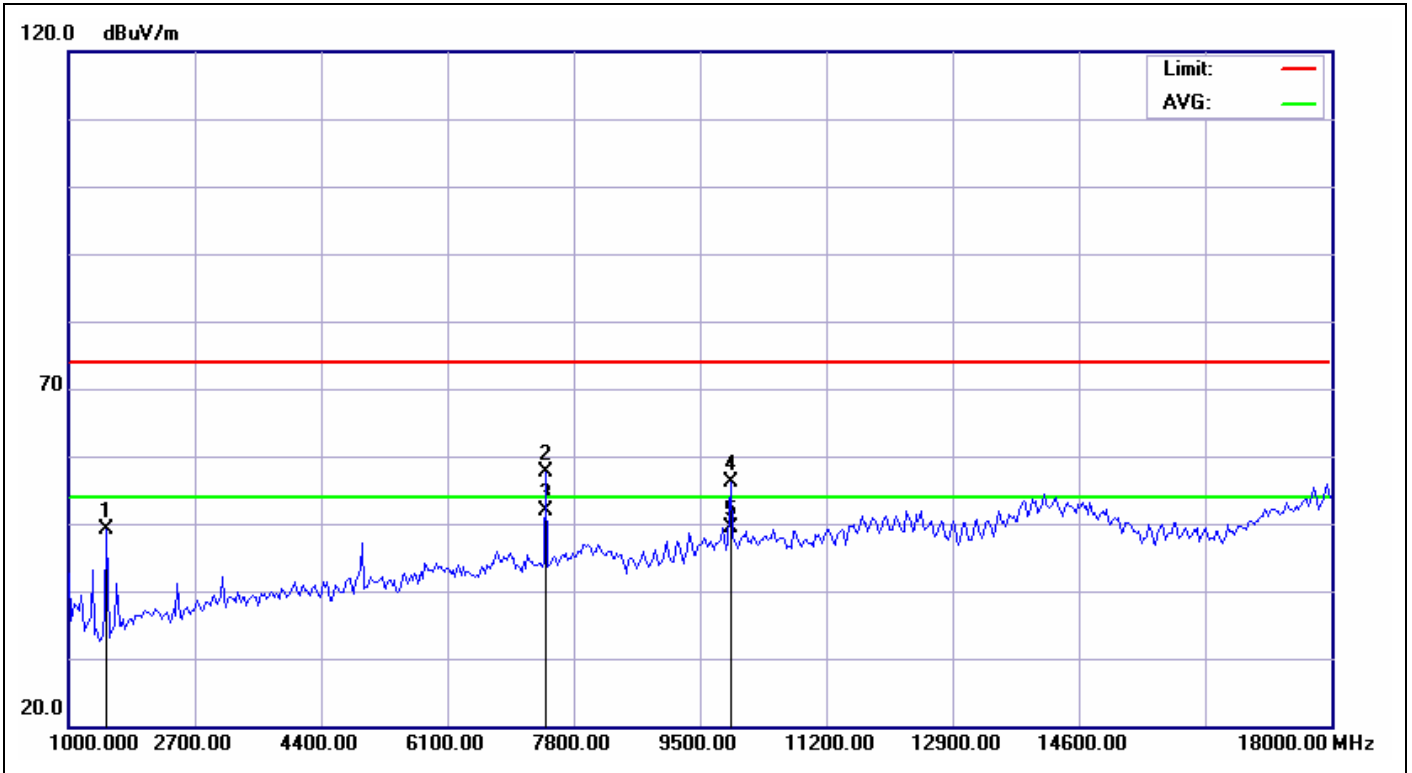
Service No.:	113154843	Test Distance:	3m
Test Standard:	FCC above 1G PEAK	Ant. Polarization:	Horizontal
Test item:	Radiation Emission	Test Time:	2012/4/27 PM 01:12:24
Applicant:	Rayson	Test Rating:	AC 120V/60Hz
Product:	BT Module	Temp.(°C)/Hum.(%):	22(°C)/60%
Model No.:	BTM-22X	Test Engineer:	Hugo Chang
Test Mode:	BT 2441		
Remark:			

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (°)	Remark
1	2416.667	8.11	37.66	45.77	74.00	-28.23	peak			TX
2	4868.590	13.34	36.55	49.89	74.00	-24.11	peak			
3	7320.513	18.97	36.16	55.13	74.00	-18.87	peak			
4	7320.513	18.97	32.15	51.12	54.00	-2.88	AVG			
5	9772.436	21.44	35.12	56.56	74.00	-17.44	peak			
6	9772.436	21.44	28.05	49.49	54.00	-4.51	AVG			



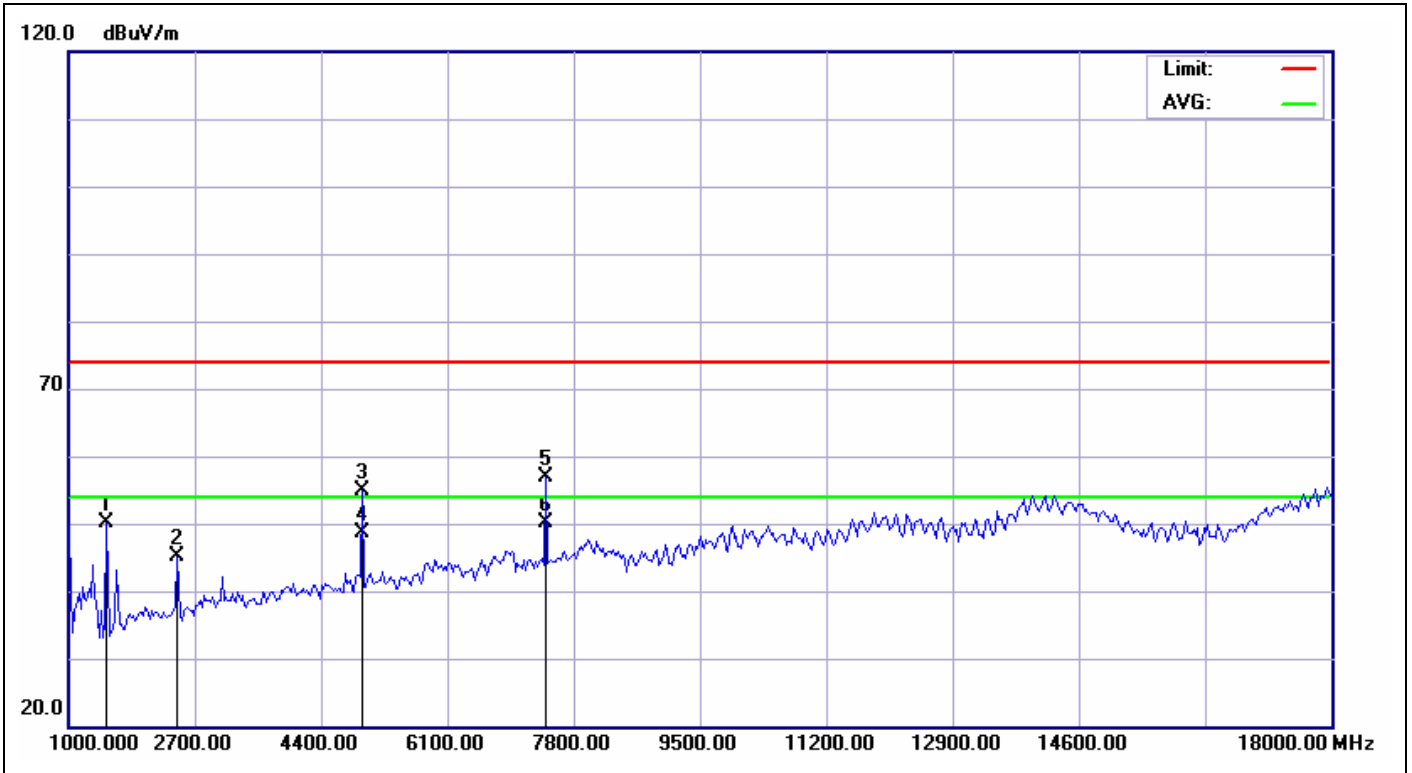
Service No.:	113154843	Test Distance:	3m
Test Standard:	FCC above 1G PEAK	Ant. Polarization:	Vertical
Test item:	Radiation Emission	Test Time:	2012/4/27 PM 01:21:02
Applicant:	Rayson	Test Rating:	AC 120V/60Hz
Product:	BT Module	Temp.(°C)/Hum.(%):	22(°C)/60%
Model No.:	BTM-22X	Test Engineer:	Hugo Chang
Test Mode:	BT 2441		
Remark:			

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (°)	Remark
1	2416.667	8.11	39.64	47.75	74.00	-26.25	peak			
2	4868.590	13.34	39.84	53.18	74.00	-20.82	peak			
3	4868.590	13.34	37.32	50.66	54.00	-3.34	AVG			
4	7320.513	18.97	38.16	57.13	74.00	-16.87	peak			
5	7320.513	18.97	31.76	50.73	54.00	-3.27	AVG			
6	9772.436	21.44	28.58	50.02	74.00	-23.98	peak			



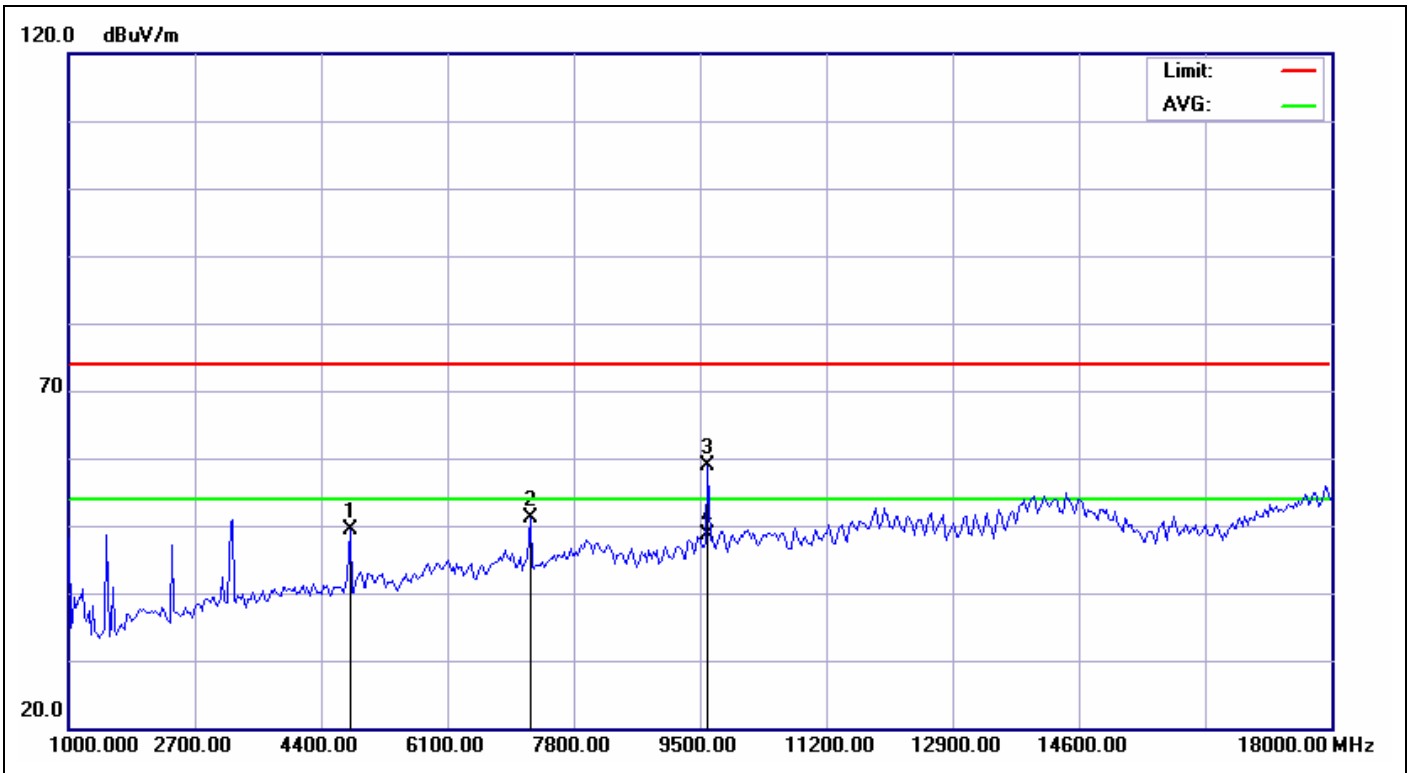
Service No.:	113154843	Test Distance:	3m
Test Standard:	FCC above 1G PEAK	Ant. Polarization:	Horizontal
Test item:	Radiation Emission	Test Time:	2012/4/27 PM 01:30:57
Applicant:	Rayson	Test Rating:	AC 120V/60Hz
Product:	BT Module	Temp.(°C)/Hum.(%):	22(°C)/60%
Model No.:	BTM-22X	Test Engineer:	Hugo Chang
Test Mode:	BT 2480		
Remark:			

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (°)	Remark
1	1517.628	3.94	45.15	49.09	74.00	-24.91	peak			
2	7429.487	19.09	38.51	57.60	74.00	-16.40	peak			
3	7429.487	19.09	32.81	51.90	54.00	-2.10	AVG			
4	9908.654	21.72	34.52	56.24	74.00	-17.76	peak			
5	9908.654	21.72	27.74	49.46	54.00	-4.54	AVG			



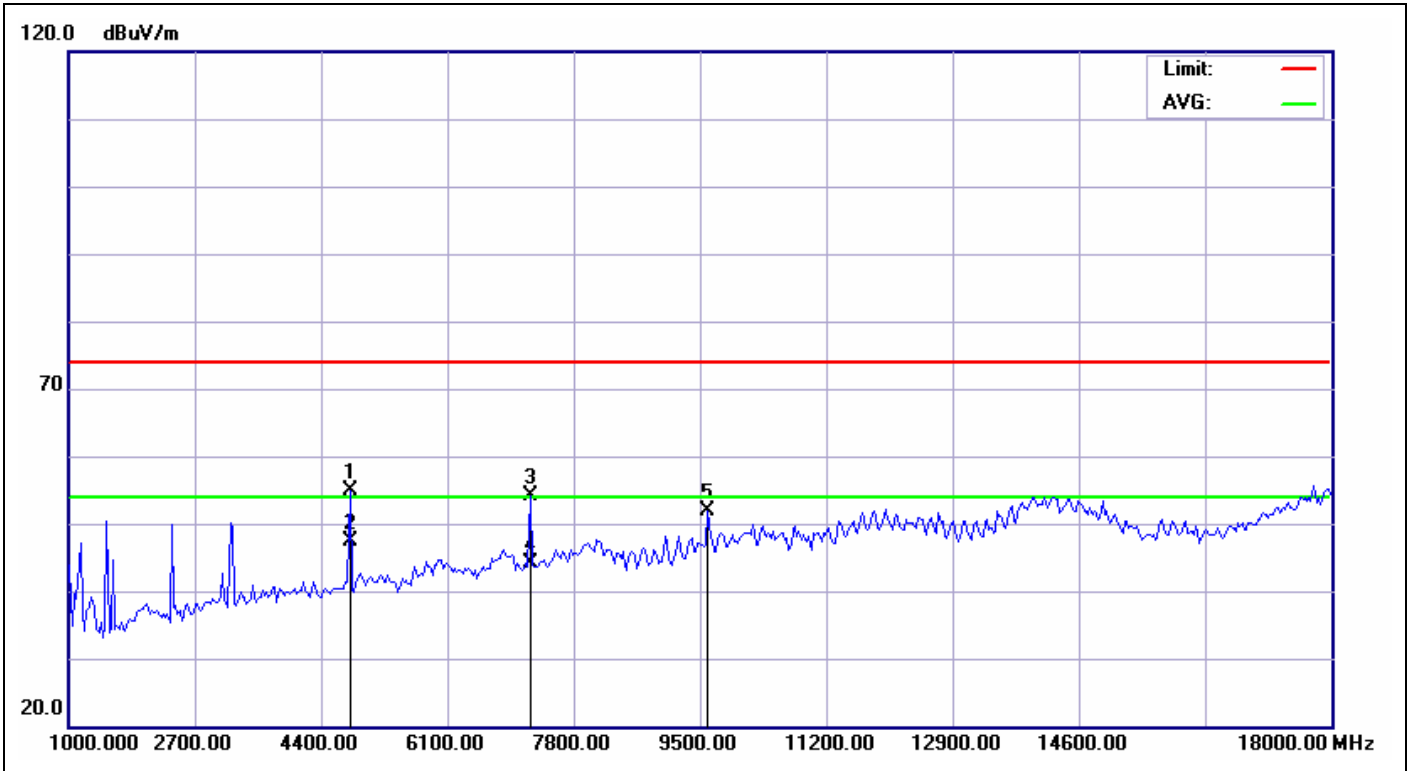
Service No.:	113154843	Test Distance:	3m
Test Standard:	FCC above 1G PEAK	Ant. Polarization:	Vertical
Test item:	Radiation Emission	Test Time:	2012/4/27 PM 02:05:13
Applicant:	Rayson	Test Rating:	AC 120V/60Hz
Product:	BT Module	Temp.(°C)/Hum.(%):	22(°C)/60%
Model No.:	BTM-22X	Test Engineer:	Hugo Chang
Test Mode:	BT 2480		
Remark:			

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (°)	Remark
1	1517.628	3.94	46.27	50.21	74.00	-23.79	peak			
2	2471.154	8.21	37.01	45.22	74.00	-28.78	peak			
3	4950.320	13.60	41.28	54.88	74.00	-19.12	peak			
4	4950.321	13.60	35.10	48.70	54.00	-5.30	AVG			
5	7429.487	19.09	37.76	56.85	74.00	-17.15	peak			
6	7429.487	19.09	30.96	50.05	54.00	-3.95	AVG			



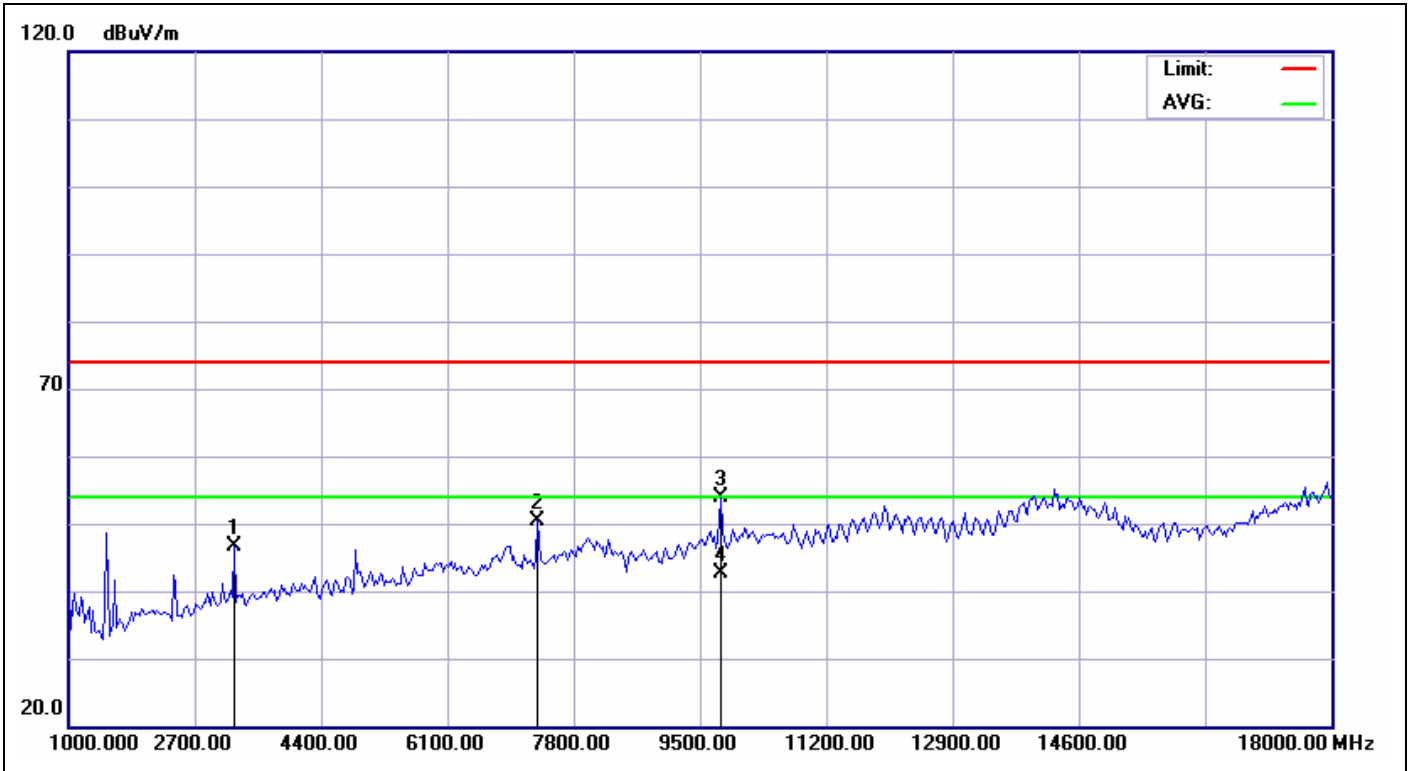
Service No.:	113154843	Test Distance:	3m
Test Standard:	FCC above 1G PEAK	Ant. Polarization:	Horizontal
Test item:	Radiation Emission	Test Time:	2012/4/27 PM 02:18:40
Applicant:	Rayson	Test Rating:	AC 120V/60Hz
Product:	BT Module	Temp.(°C)/Hum.(%):	22(°C)/60%
Model No.:	BTM-22X	Test Engineer:	Hugo Chang
Test Mode:	EDR 2402		
Remark:			

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (°)	Remark
1	4786.859	13.07	36.27	49.34	74.00	-24.66	peak			
2	7211.538	18.84	32.27	51.11	74.00	-22.89	peak			
3	9608.974	21.11	37.84	58.95	74.00	-15.05	peak			
4	9608.974	21.11	27.59	48.70	54.00	-5.30	AVG			



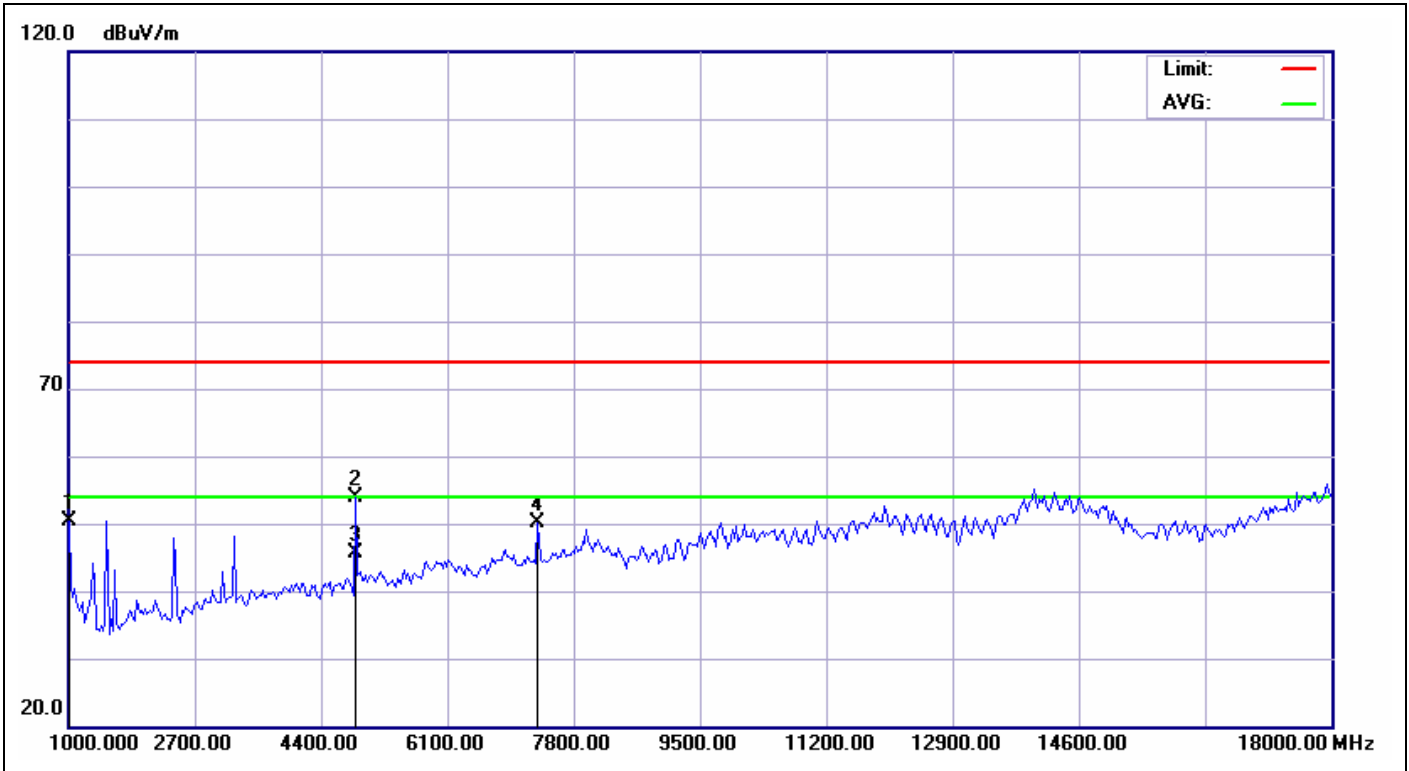
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Test Standard:	FCC above 1G PEAK	Ant. Polarization:	Vertical
Test item:	Radiation Emission	Test Time:	2012/4/27 PM 02:24:59
Applicant:	Rayson	Test Rating:	AC 120V/60Hz
Product:	BT Module	Temp.(°C)/Hum.(%):	22(°C)/60%
Model No.:	BTM-22X	Test Engineer:	Hugo Chang
Test Mode:	EDR 2402		
Remark:			

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (°)	Remark
1	4786.859	13.07	41.83	54.90	74.00	-19.10	peak			
2	4786.859	13.07	34.23	47.30	54.00	-6.70	AVG			
3	7211.538	18.84	35.20	54.04	74.00	-19.96	peak			
4	7211.538	18.84	25.24	44.08	54.00	-9.92	AVG			
5	9608.974	21.11	30.66	51.77	74.00	-22.23	peak			



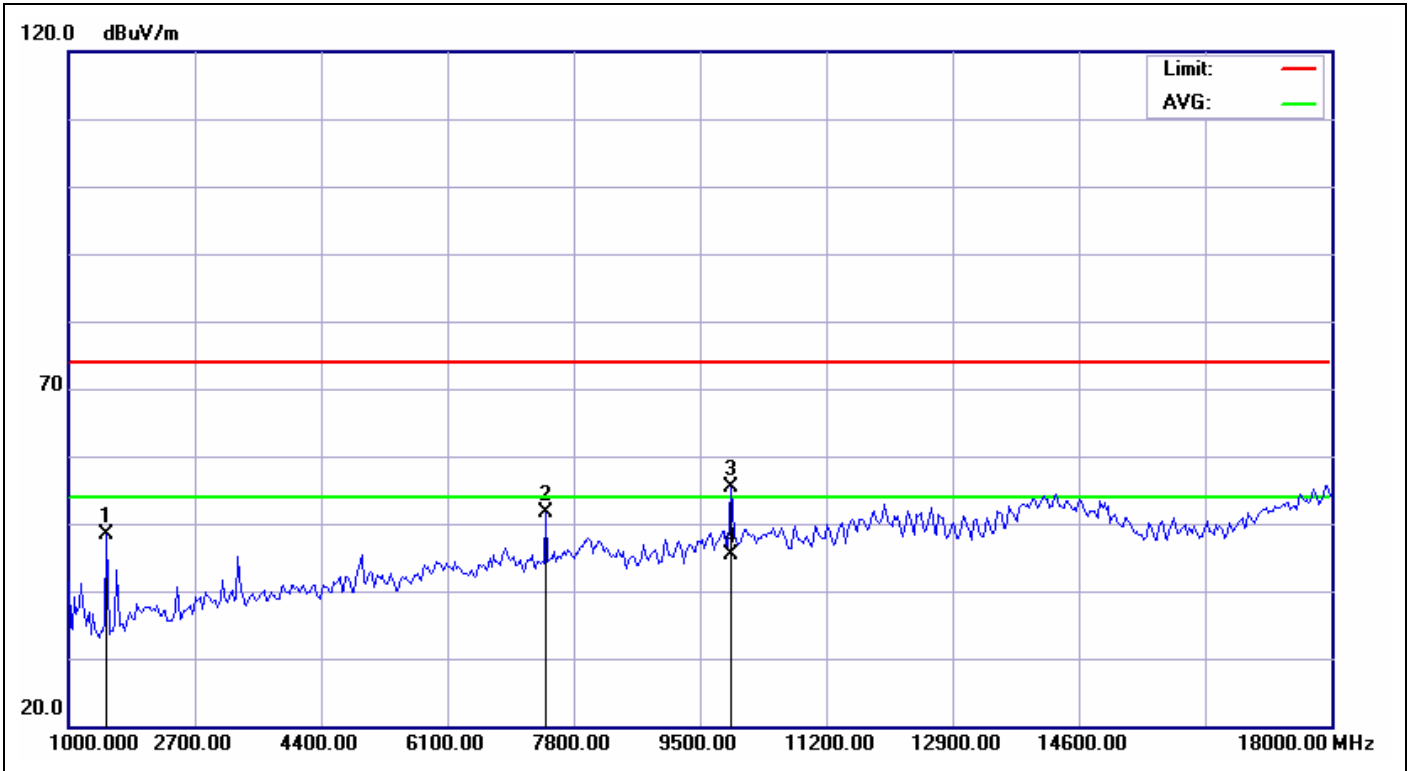
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Test Standard:	FCC above 1G PEAK	Ant. Polarization:	Horizontal
Test item:	Radiation Emission	Test Time:	2012/4/27 PM 02:34:35
Applicant:	Rayson	Test Rating:	AC 120V/60Hz
Product:	BT Module	Temp.(°C)/Hum.(%):	22(°C)/60%
Model No.:	BTM-22X	Test Engineer:	Hugo Chang
Test Mode:	EDR 2441		
Remark:			

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (°)	Remark
1	3233.974	10.10	36.51	46.61	74.00	-27.39	peak			
2	7320.513	18.97	31.40	50.37	74.00	-23.63	peak			
3	9772.436	21.44	32.40	53.84	74.00	-20.16	peak			
4	9772.436	21.44	21.12	42.56	54.00	-11.44	AVG			



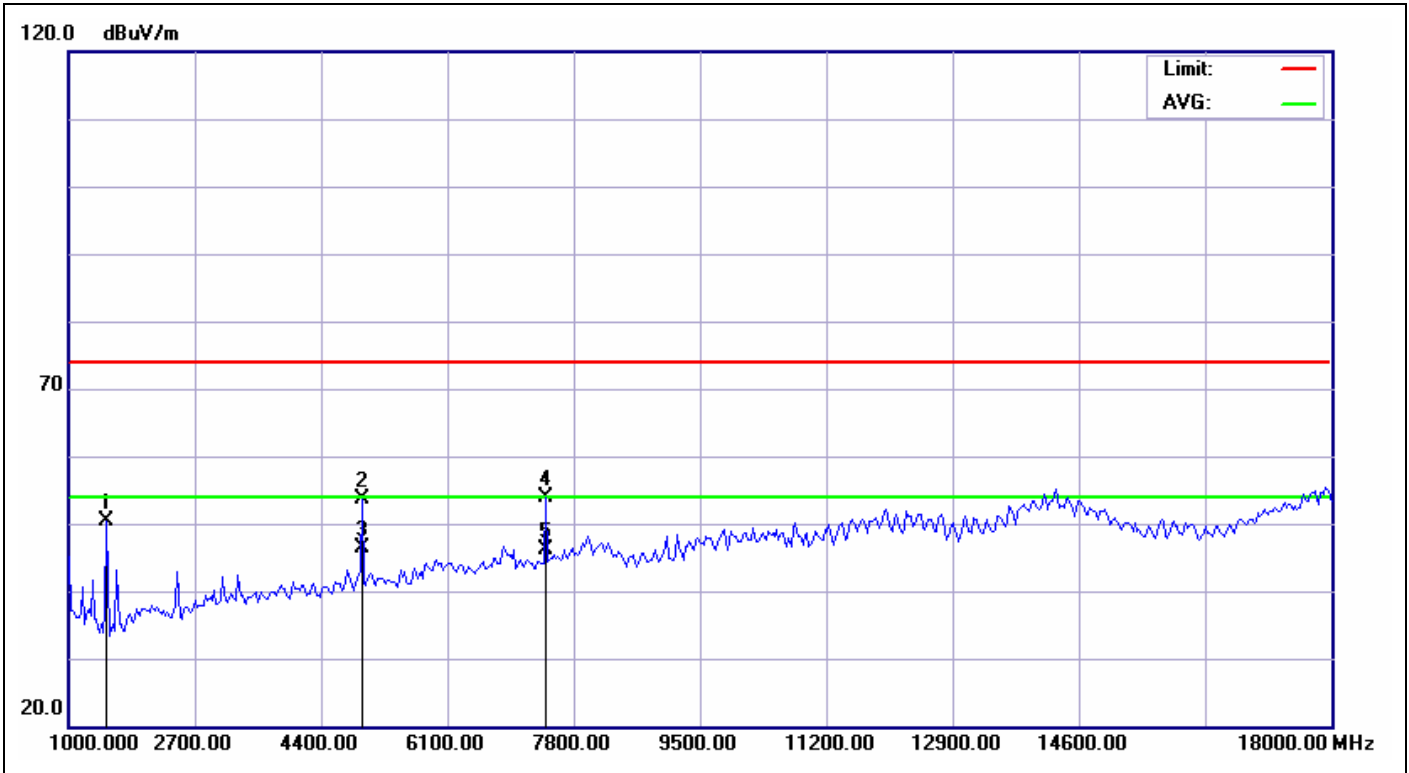
Service No.:	113154843	Test Distance:	3m
Test Standard:	FCC above 1G PEAK	Ant. Polarization:	Vertical
Test item:	Radiation Emission	Test Time:	2012/4/27 PM 02:40:44
Applicant:	Rayson	Test Rating:	AC 120V/60Hz
Product:	BT Module	Temp.(°C)/Hum.(%):	22(°C)/60%
Model No.:	BTM-22X	Test Engineer:	Hugo Chang
Test Mode:	EDR 2441		
Remark:			

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (°)	Remark
1	1000.0000	3.35	47.08	50.43	74.00	-23.57	peak			
2	4868.590	13.34	40.49	53.83	74.00	-20.17	peak			
3	4868.590	13.34	32.38	45.72	54.00	-8.28	AVG			
4	7320.513	18.97	31.22	50.19	74.00	-23.81	peak			



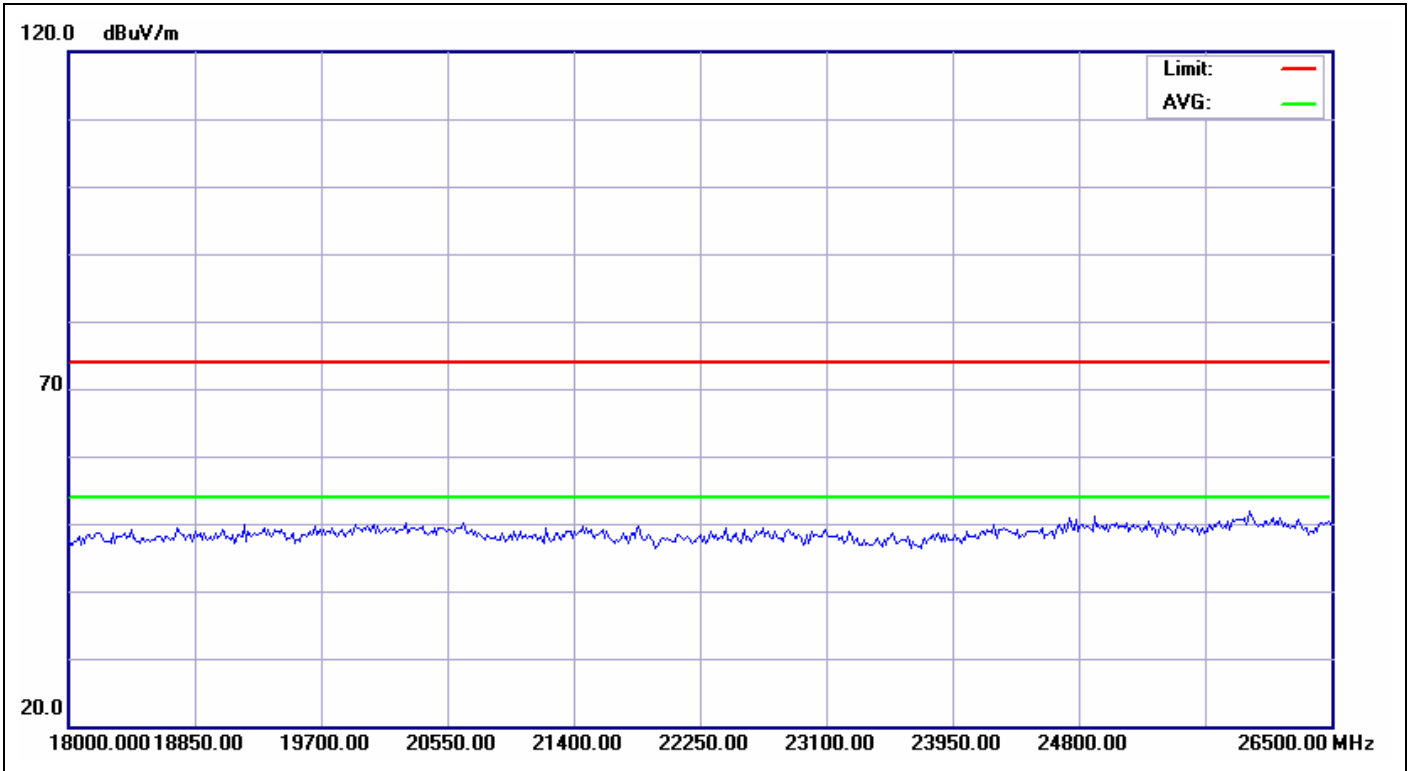
Service No.:	113154843	Test Distance:	3m
Test Standard:	FCC above 1G PEAK	Ant. Polarization:	Horizontal
Test item:	Radiation Emission	Test Time:	2012/4/27 PM 02:47:41
Applicant:	Rayson	Test Rating:	AC 120V/60Hz
Product:	BT Module	Temp.(°C)/Hum.(%):	22(°C)/60%
Model No.:	BTM-22X	Test Engineer:	Hugo Chang
Test Mode:	EDR 2480		
Remark:			

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (°)	Remark
1	1517.628	3.94	44.54	48.48	74.00	-25.52	peak			
2	7429.487	19.09	32.48	51.57	74.00	-22.43	peak			
3	9908.654	21.72	33.60	55.32	74.00	-18.68	peak			
4	9908.654	21.72	23.61	45.33	54.00	-8.67	AVG			

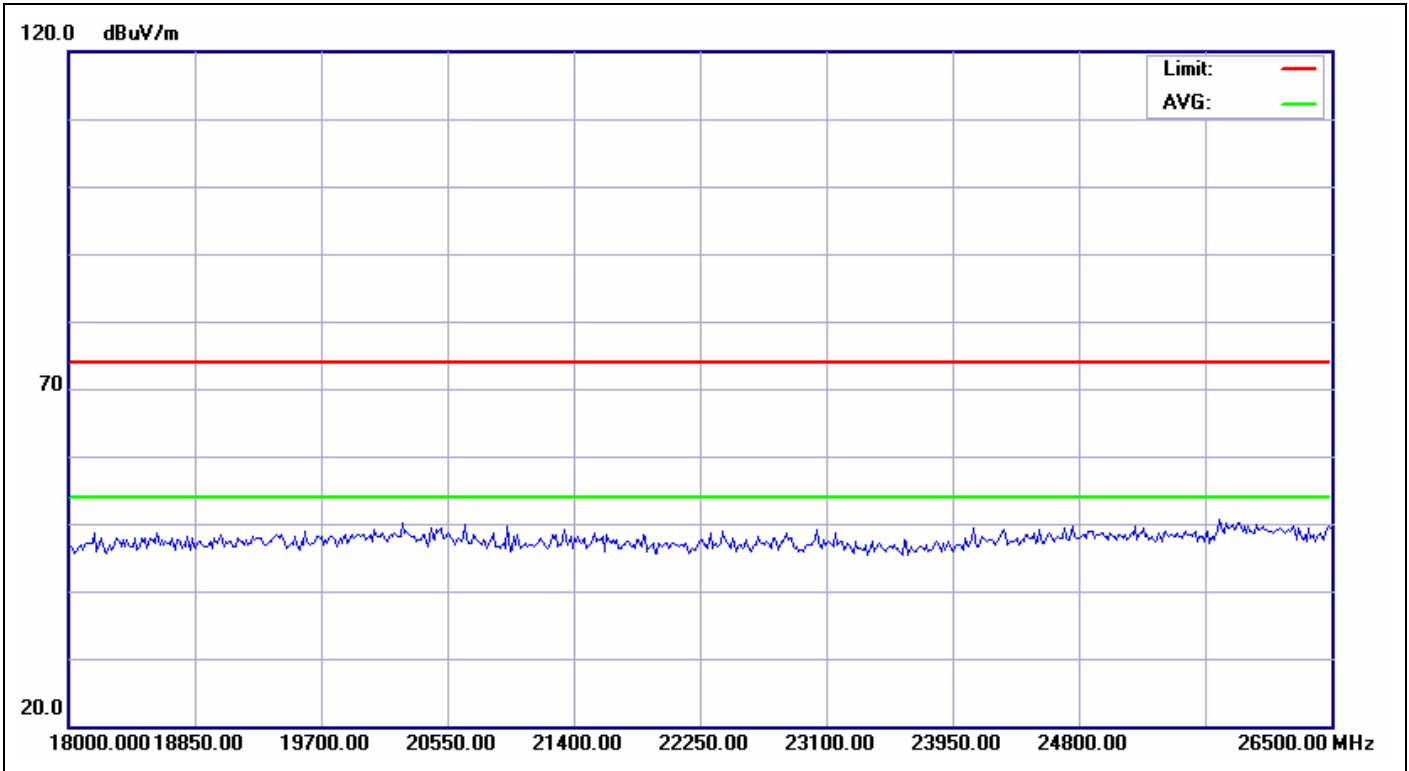


Service No.:	113154843	Test Distance:	3m
Test Standard:	FCC above 1G PEAK	Ant. Polarization:	Vertical
Test item:	Radiation Emission	Test Time:	2012/4/27 PM 02:53:01
Applicant:	Rayson	Test Rating:	AC 120V/60Hz
Product:	BT Module	Temp.(°C)/Hum.(%):	22(°C)/60%
Model No.:	BTM-22X	Test Engineer:	Hugo Chang
Test Mode:	EDR 2480		
Remark:			

No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.	Height (cm)	Azimuth (°)	Remark
1	1517.628	3.94	46.33	50.27	74.00	-23.73	peak			
2	4950.321	13.60	40.06	53.66	74.00	-20.34	peak			
3	4950.321	13.60	32.69	46.29	54.00	-7.71	AVG			
4	7429.487	19.09	34.82	53.91	74.00	-20.09	peak			
5	7429.487	19.09	26.94	46.03	54.00	-7.97	AVG			



Service No.:	113154843	Test Distance:	3m
Test Standard:	FCC above 1G PEAK	Ant. Polarization:	Horizontal
Test item:	Radiation Emission	Test Time:	2012/4/27 PM 04:26:50
Applicant:	Rayson	Test Rating:	AC 120V/60Hz
Product:	BT Module	Temp.(°C)/Hum.(%):	22(°C)/60%
Model No.:	BTM-22X	Test Engineer:	Hugo Chang
Test Mode:	BT 2402		
Remark:			



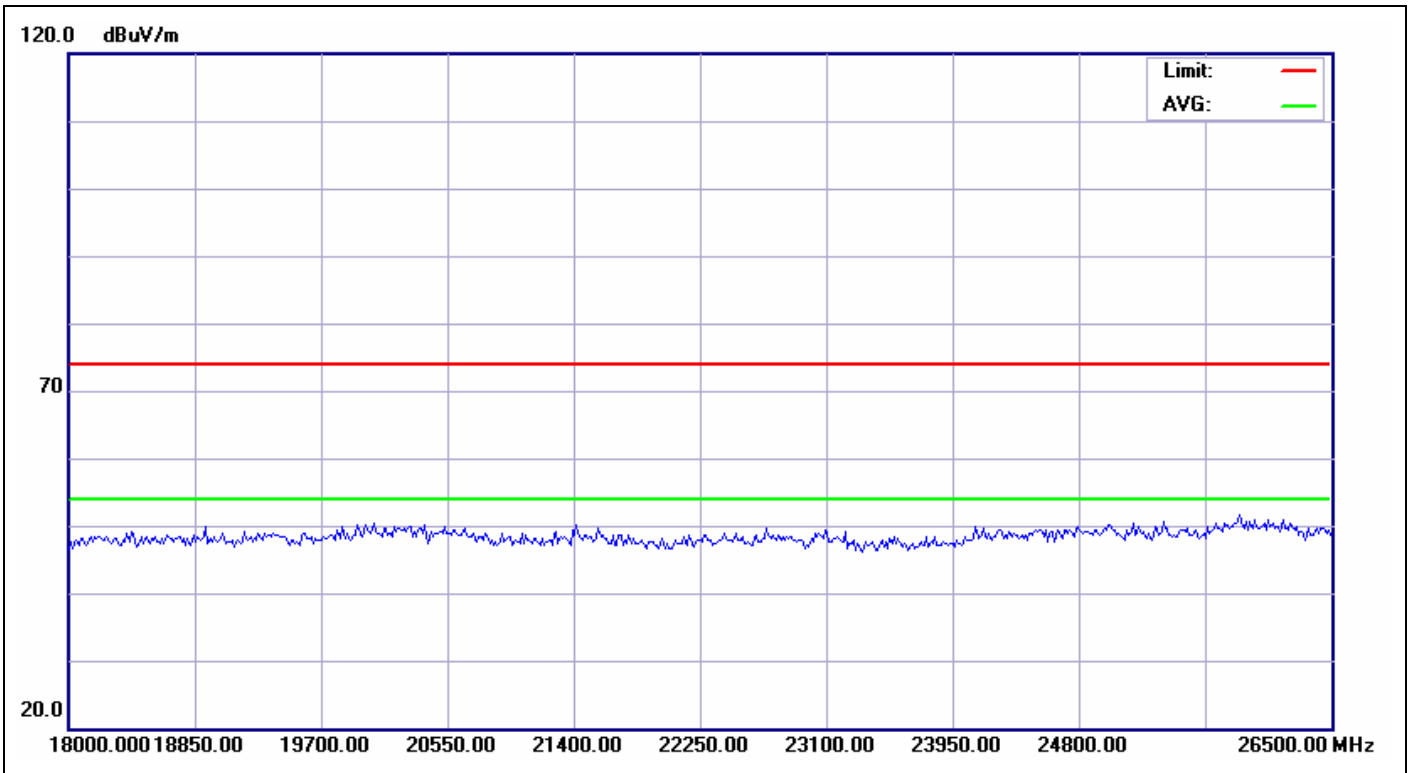
Service No.:	113154843	Test Distance:	3m
Test Standard:	FCC above 1G PEAK	Ant. Polarization:	Vertical
Test item:	Radiation Emission	Test Time:	2012/4/27 PM 04:28:45
Applicant:	Rayson	Test Rating:	AC 120V/60Hz
Product:	BT Module	Temp.(°C)/Hum.(%):	22(°C)/60%
Model No.:	BTM-22X	Test Engineer:	Hugo Chang
Test Mode:	BT 2402		
Remark:			



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Service No.: 113154843

Test Standard: FCC above 1G PEAK

Test item: Radiation Emission

Applicant: Rayson

Product: BT Module

Model No.: BTM-22X

Test Mode: BT 2441

Remark:

Test Distance: 3m

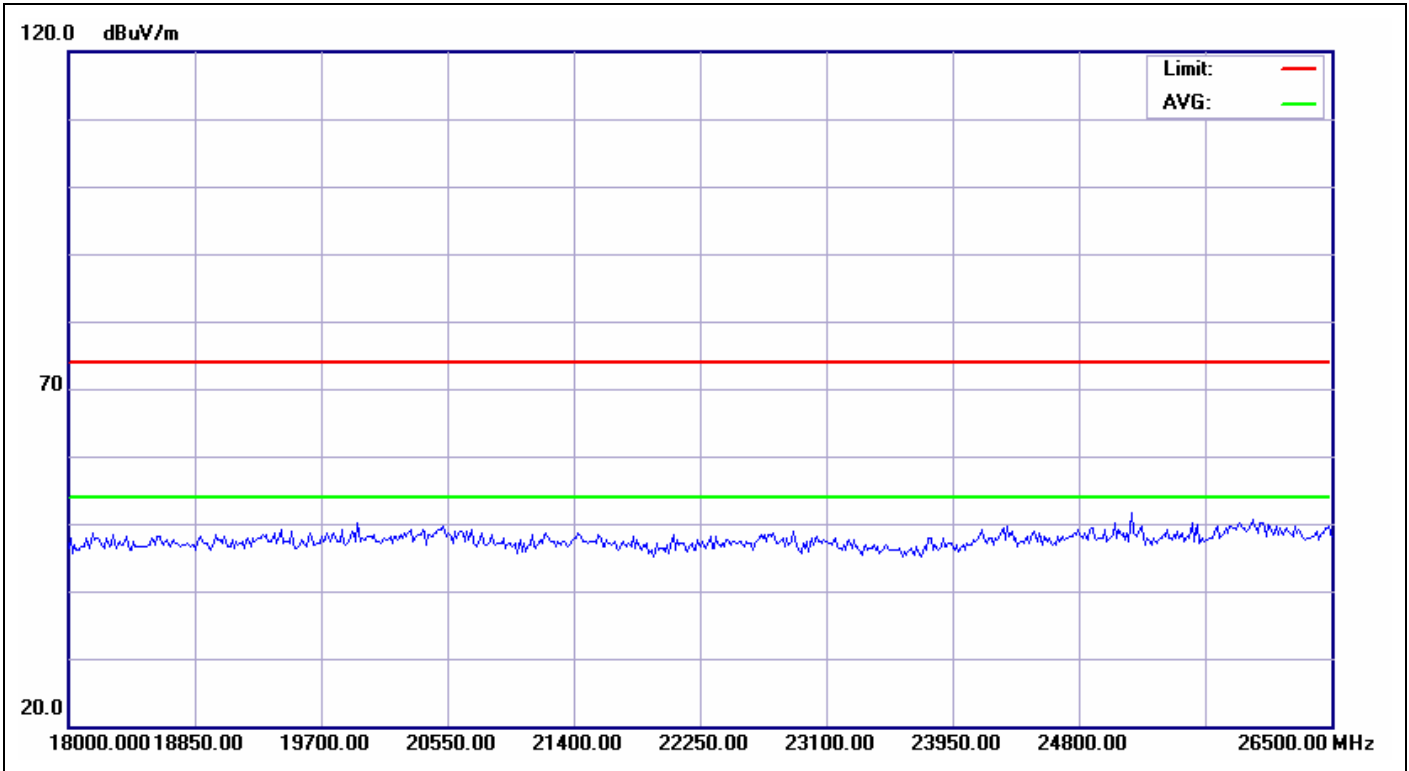
Ant. Polarization: Horizontal

Test Time: 2012/4/27 PM 04:29:56

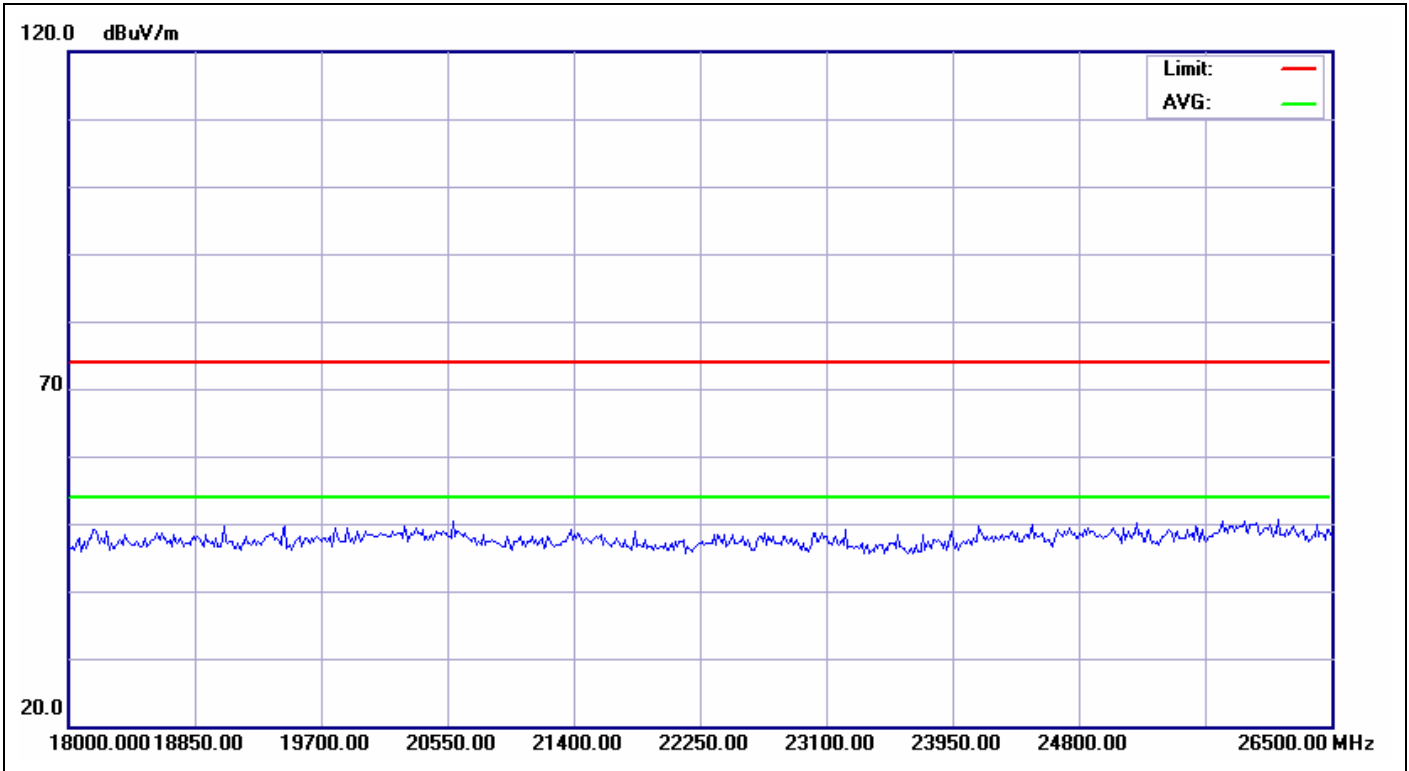
Test Rating: AC 120V/60Hz

Temp.(°C)/Hum.(%): 22(°C)/60%

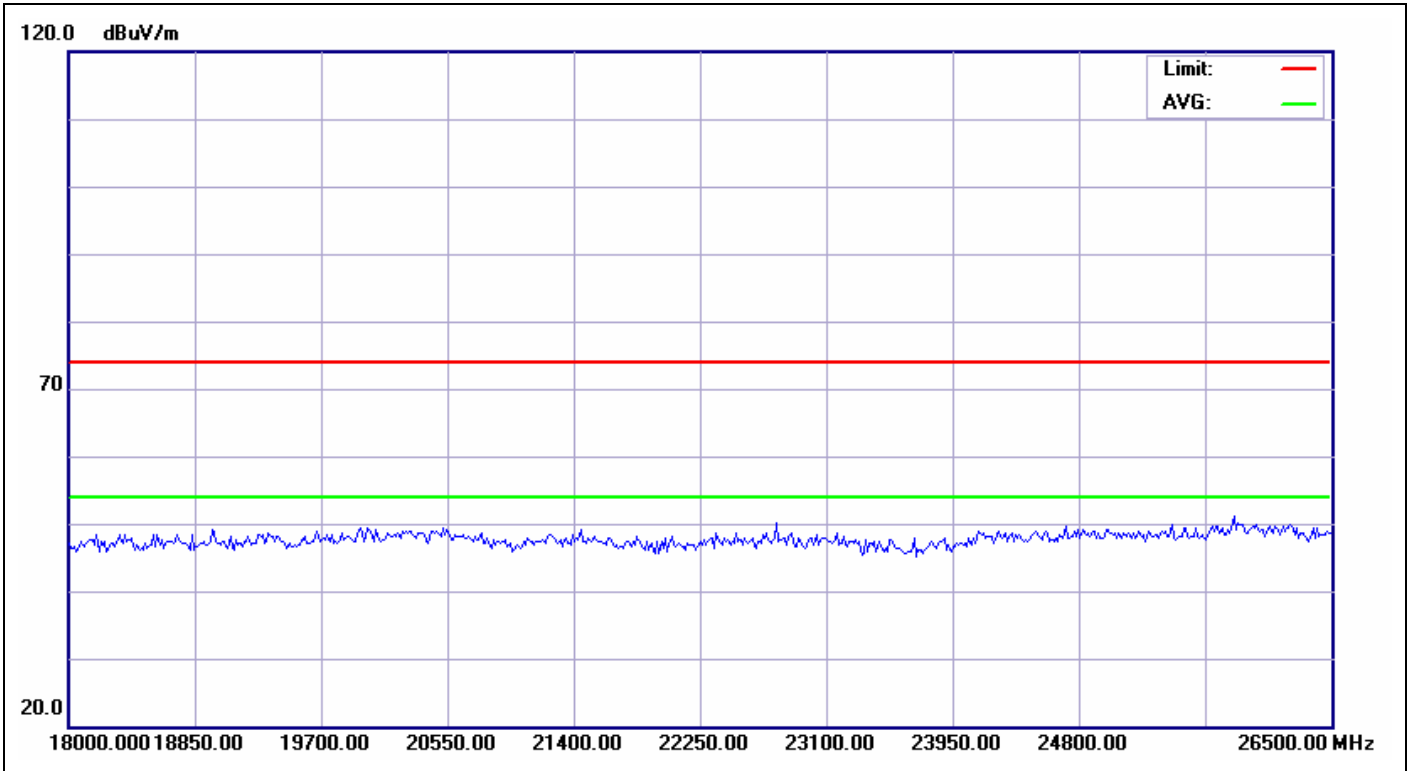
Test Engineer: Hugo Chang



Service No.:	113154843	Test Distance:	3m
Test Standard:	FCC above 1G PEAK	Ant. Polarization:	Vertical
Test item:	Radiation Emission	Test Time:	2012/4/27 PM 04:30:24
Applicant:	Rayson	Test Rating:	AC 120V/60Hz
Product:	BT Module	Temp.(°C)/Hum.(%):	22(°C)/60%
Model No.:	BTM-22X	Test Engineer:	Hugo Chang
Test Mode:	BT 2441		
Remark:			



Service No.:	113154843	Test Distance:	3m
Test Standard:	FCC above 1G PEAK	Ant. Polarization:	Horizontal
Test item:	Radiation Emission	Test Time:	2012/4/27 PM 04:31:11
Applicant:	Rayson	Test Rating:	AC 120V/60Hz
Product:	BT Module	Temp.(°C)/Hum.(%):	22(°C)/60%
Model No.:	BTM-22X	Test Engineer:	Hugo Chang
Test Mode:	BT 2480		
Remark:			



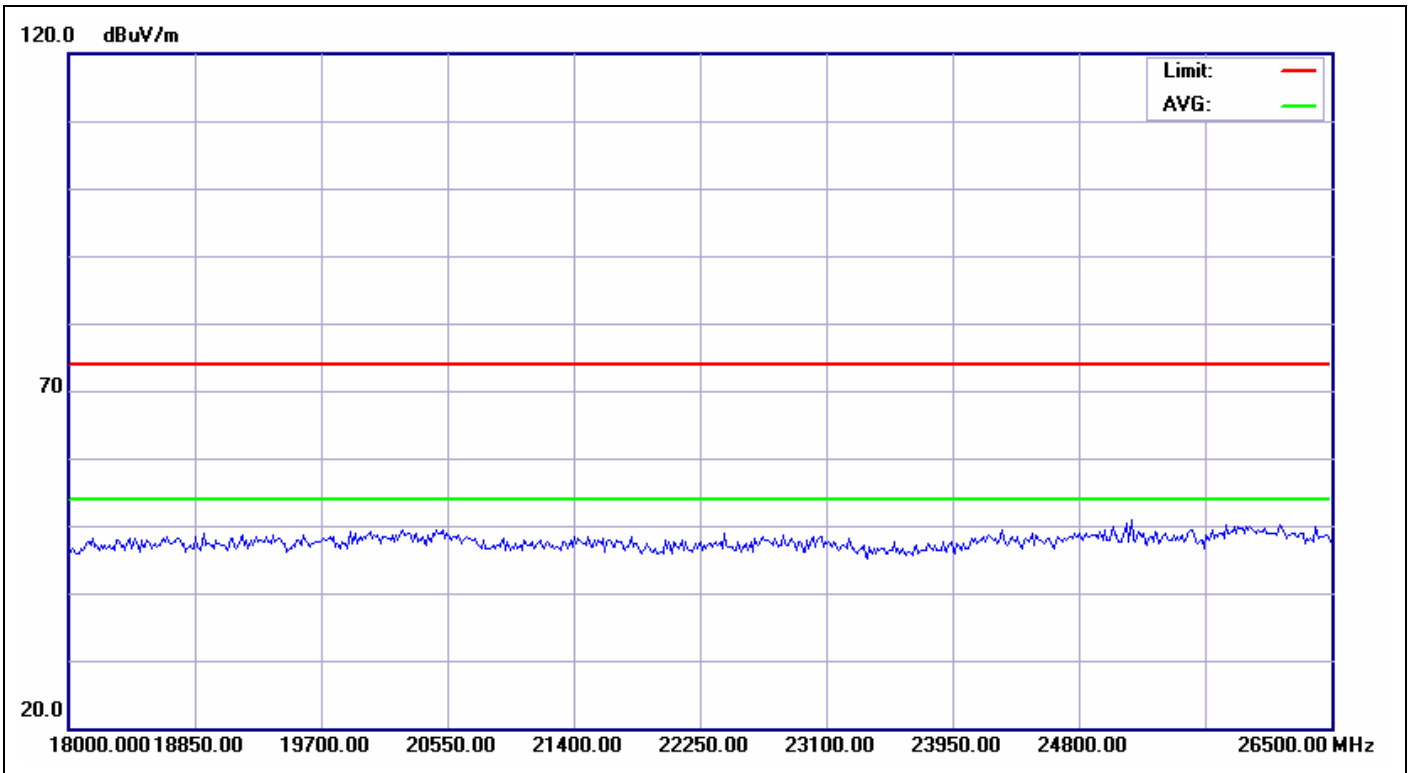
Service No.:	113154843	Test Distance:	3m
Test Standard:	FCC above 1G PEAK	Ant. Polarization:	Vertical
Test item:	Radiation Emission	Test Time:	2012/4/27 PM 04:31:41
Applicant:	Rayson	Test Rating:	AC 120V/60Hz
Product:	BT Module	Temp.(°C)/Hum.(%):	22(°C)/60%
Model No.:	BTM-22X	Test Engineer:	Hugo Chang
Test Mode:	BT 2480		
Remark:			



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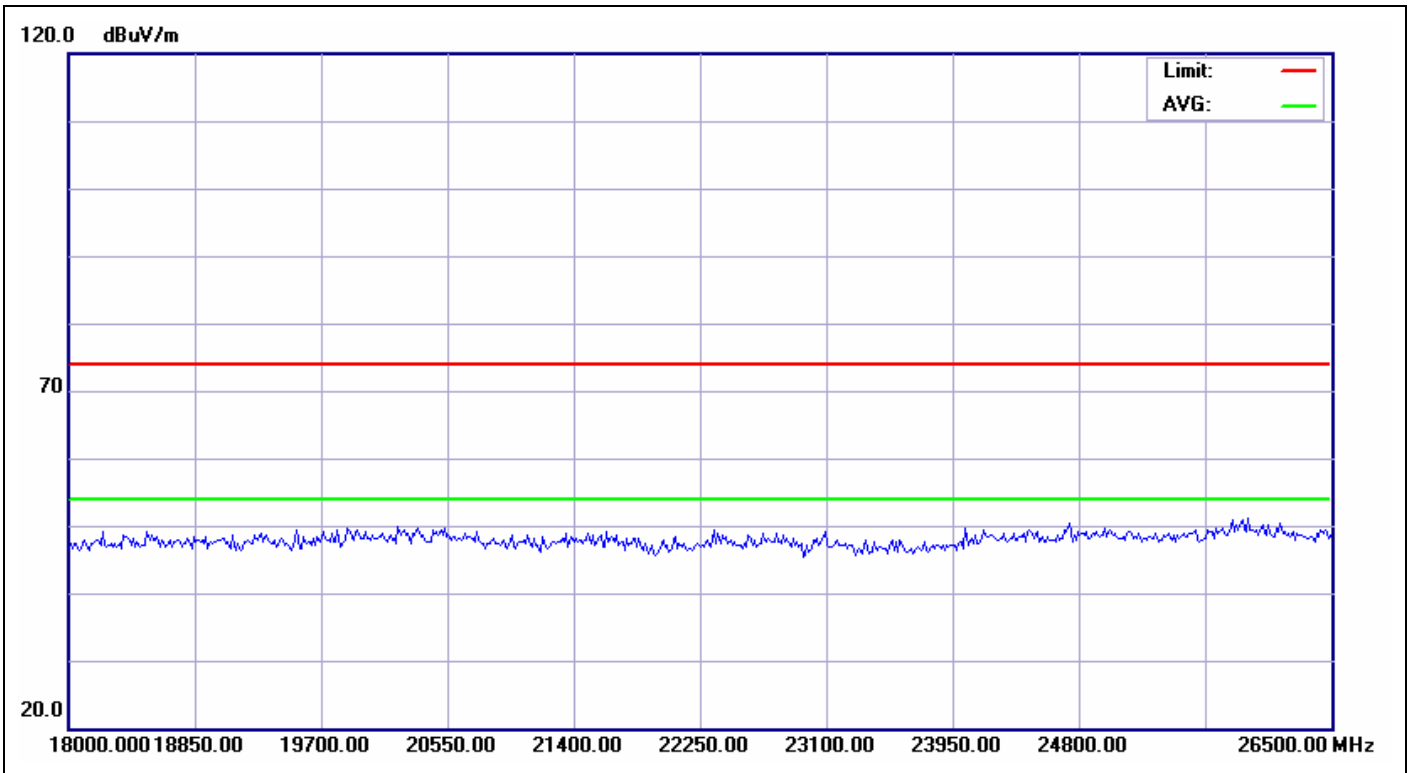
Service No.:	113154843	Test Distance:	3m
Test Standard:	FCC above 1G PEAK	Ant. Polarization:	Horizontal
Test item:	Radiation Emission	Test Time:	2012/4/27 PM 04:32:15
Applicant:	Rayson	Test Rating:	AC 120V/60Hz
Product:	BT Module	Temp.(°C)/Hum.(%):	22(°C)/60%
Model No.:	BTM-22X	Test Engineer:	Hugo Chang
Test Mode:	EDR 2402		
Remark:			



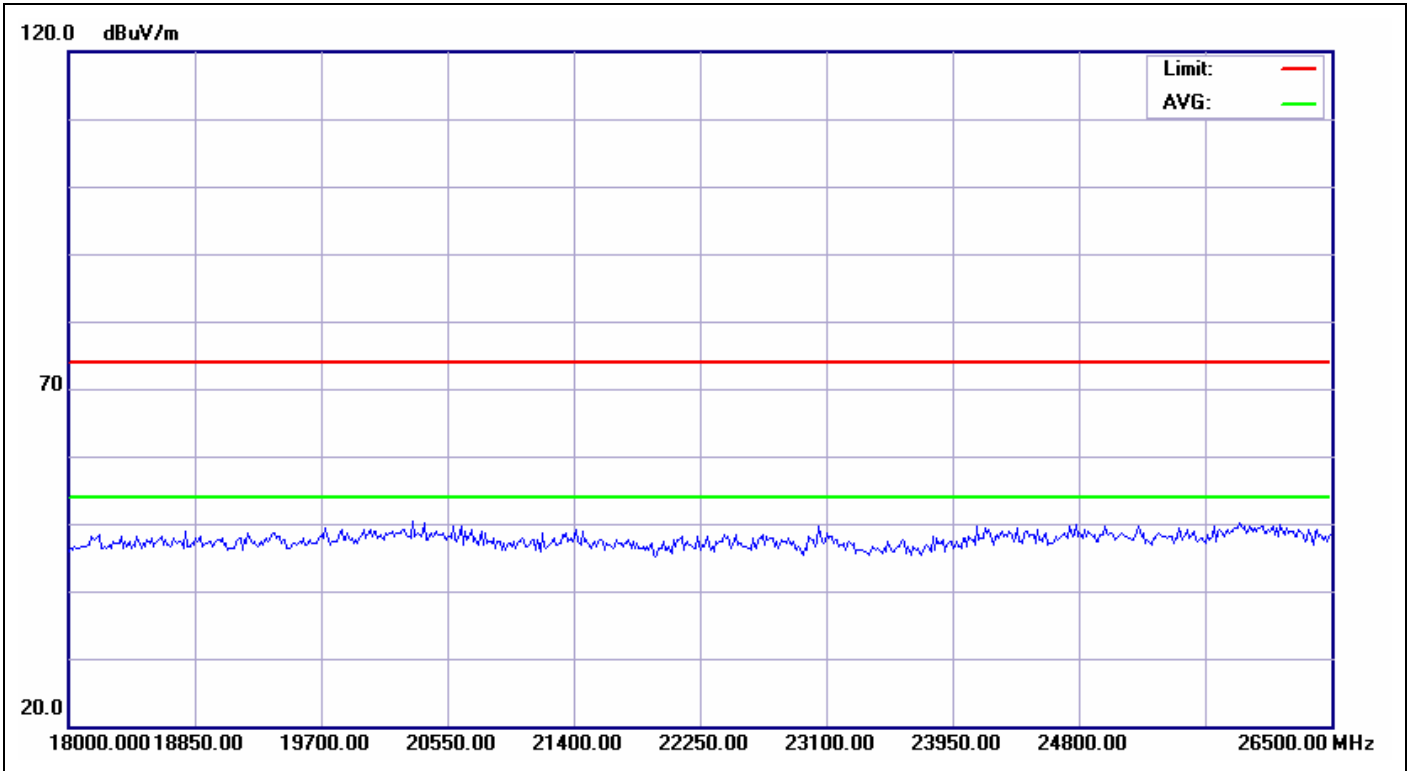
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Service No.:	113154843	Test Distance:	3m
Test Standard:	FCC above 1G PEAK	Ant. Polarization:	Vertical
Test item:	Radiation Emission	Test Time:	2012/4/27 PM 04:32:54
Applicant:	Rayson	Test Rating:	AC 120V/60Hz
Product:	BT Module	Temp.(°C)/Hum.(%):	22(°C)/60%
Model No.:	BTM-22X	Test Engineer:	Hugo Chang
Test Mode:	EDR 2402		
Remark:			



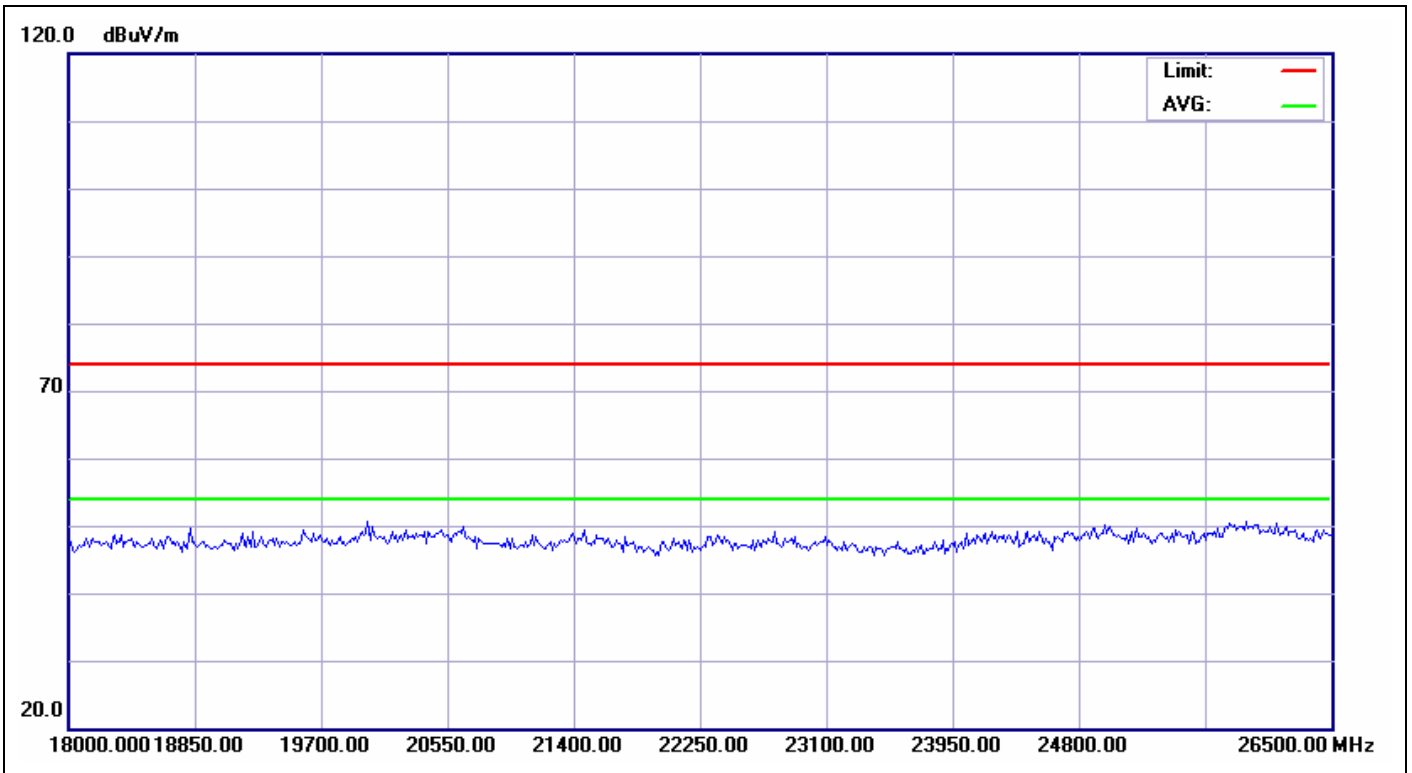
Service No.:	113154843	Test Distance:	3m
Test Standard:	FCC above 1G PEAK	Ant. Polarization:	Horizontal
Test item:	Radiation Emission	Test Time:	2012/4/27 PM 04:33:39
Applicant:	Rayson	Test Rating:	AC 120V/60Hz
Product:	BT Module	Temp.(°C)/Hum.(%):	22(°C)/60%
Model No.:	BTM-22X	Test Engineer:	Hugo Chang
Test Mode:	EDR 2441		
Remark:			



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Service No.: 113154843

Test Standard: FCC above 1G PEAK

Test item: Radiation Emission

Applicant: Rayson

Product: BT Module

Model No.: BTM-22X

Test Mode: EDR 2441

Remark:

Test Distance: 3m

Ant. Polarization: Vertical

Test Time: 2012/4/27 PM 04:34:12

Test Rating: AC 120V/60Hz

Temp.(°C)/Hum.(%): 22(°C)/60%

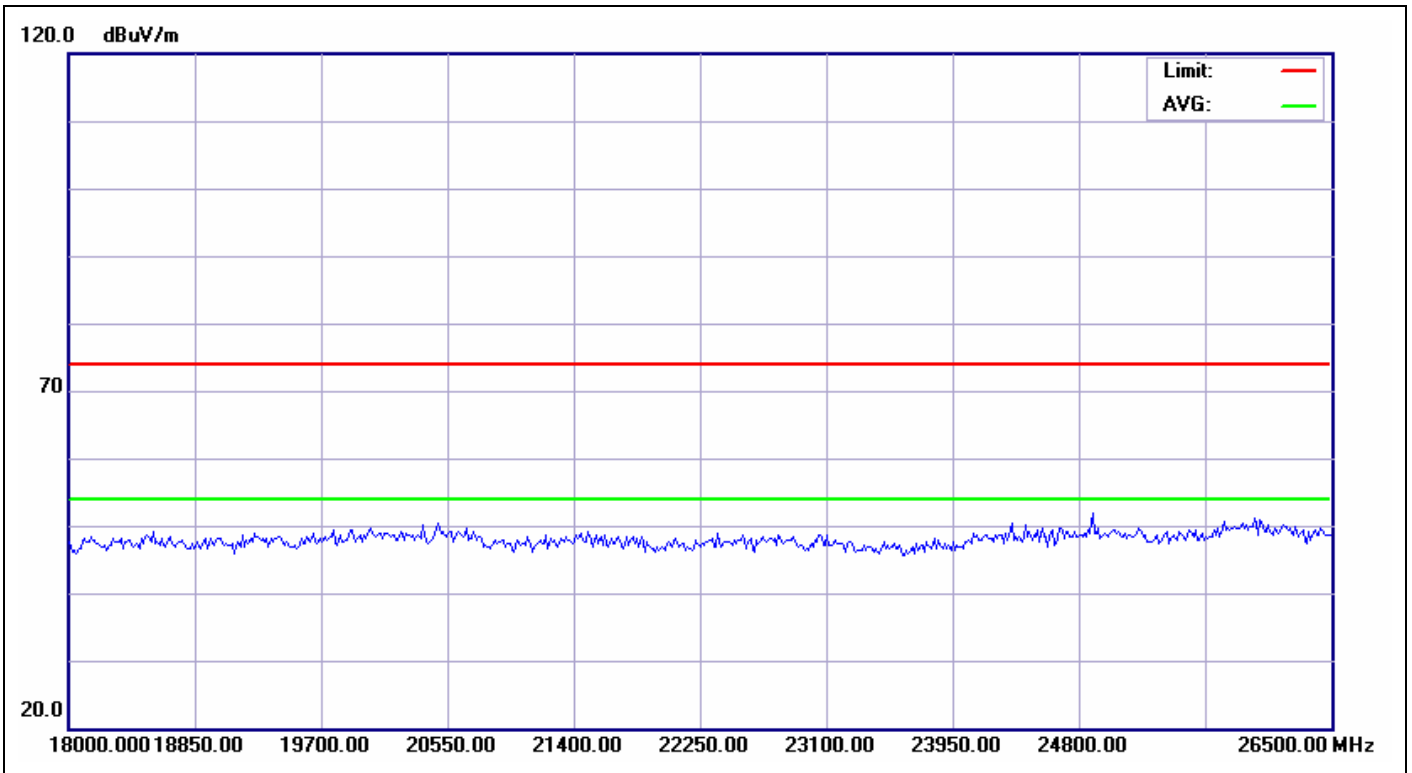
Test Engineer: Hugo Chang



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Service No.: 113154843

Test Standard: FCC above 1G PEAK

Test item: Radiation Emission

Applicant: Rayson

Product: BT Module

Model No.: BTM-22X

Test Mode: EDR 2480

Remark:

Test Distance: 3m

Ant. Polarization: Horizontal

Test Time: 2012/4/27 PM 04:35:04

Test Rating: AC 120V/60Hz

Temp.(°C)/Hum.(%): 22(°C)/60%

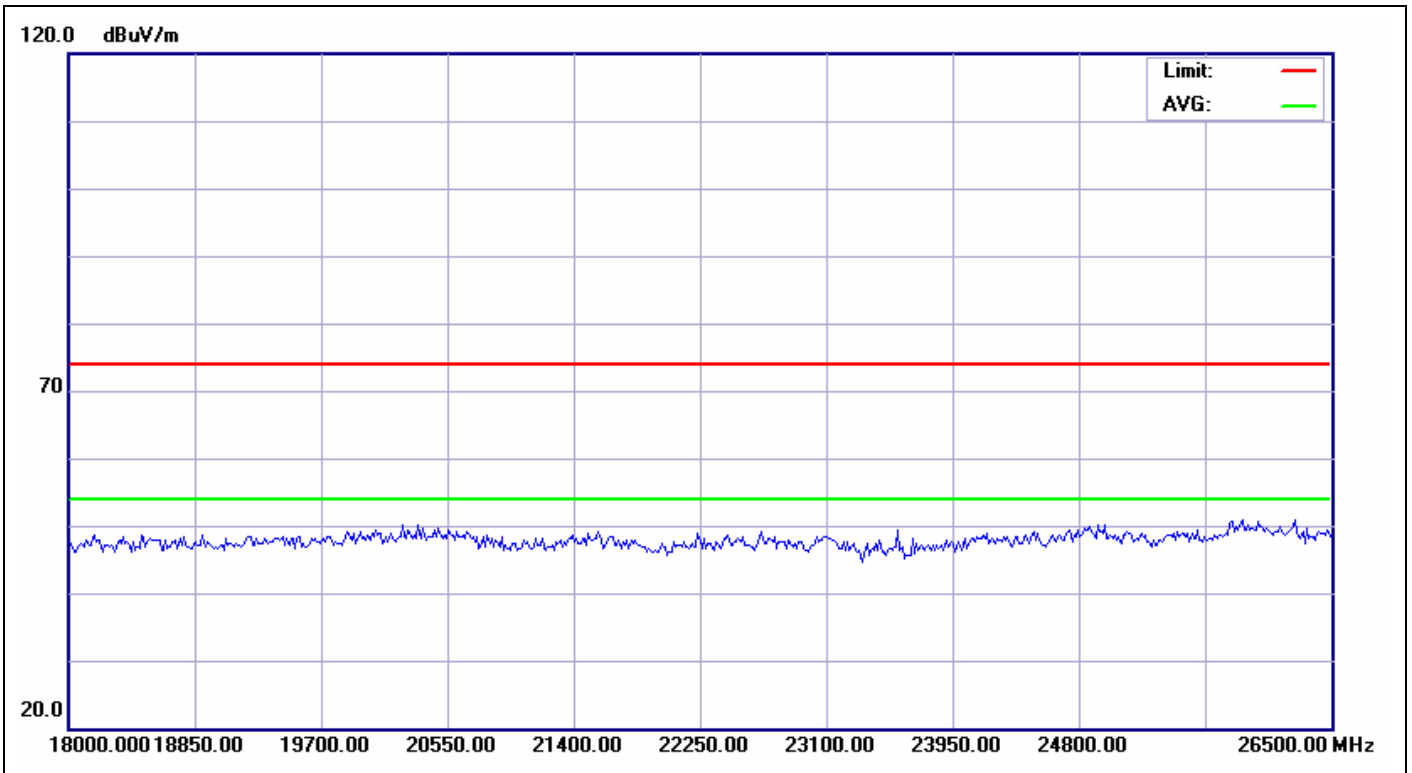
Test Engineer: Hugo Chang



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Service No.: 113154843

Test Standard: FCC above 1G PEAK

Test item: Radiation Emission

Applicant: Rayson

Product: BT Module

Model No.: BTM-22X

Test Mode: EDR 2480

Remark:

Test Distance: 3m

Ant. Polarization: Vertical

Test Time: 2012/4/27 PM 04:35:43

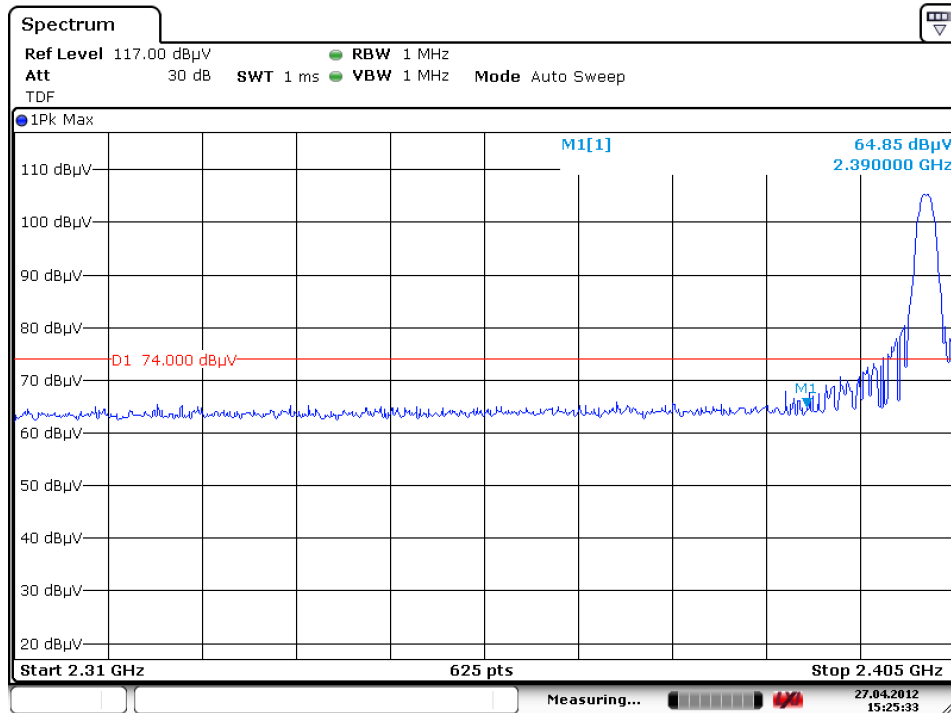
Test Rating: AC 120V/60Hz

Temp.(°C)/Hum.(%): 22(°C)/60%

Test Engineer: Hugo Chang

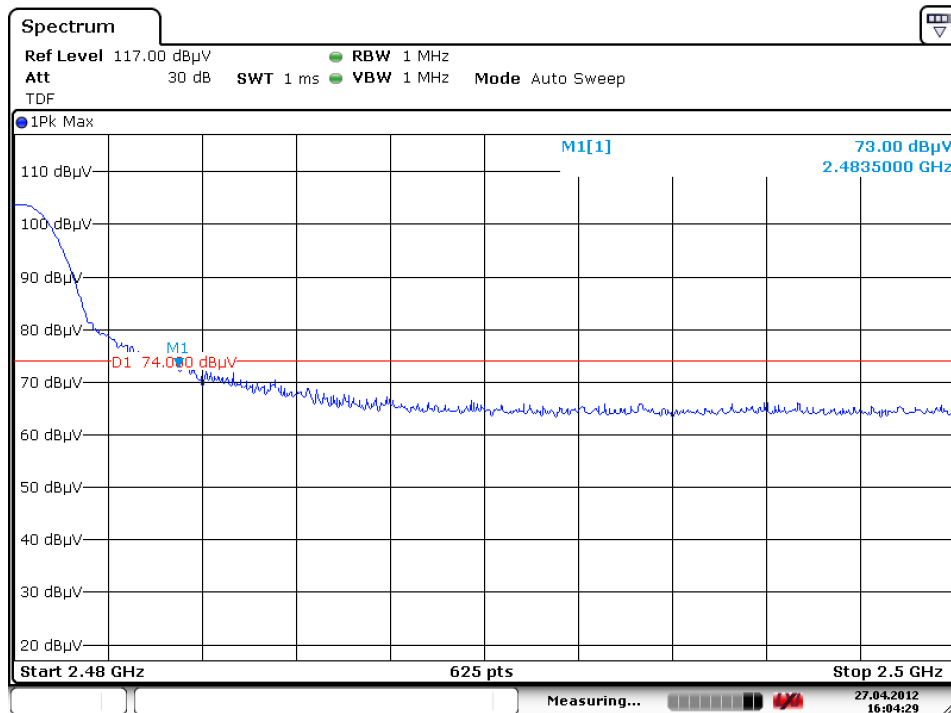
Radiated Bandedge (GFSK)

Low Channel (H)



Date: 27.APR.2012 15:25:33

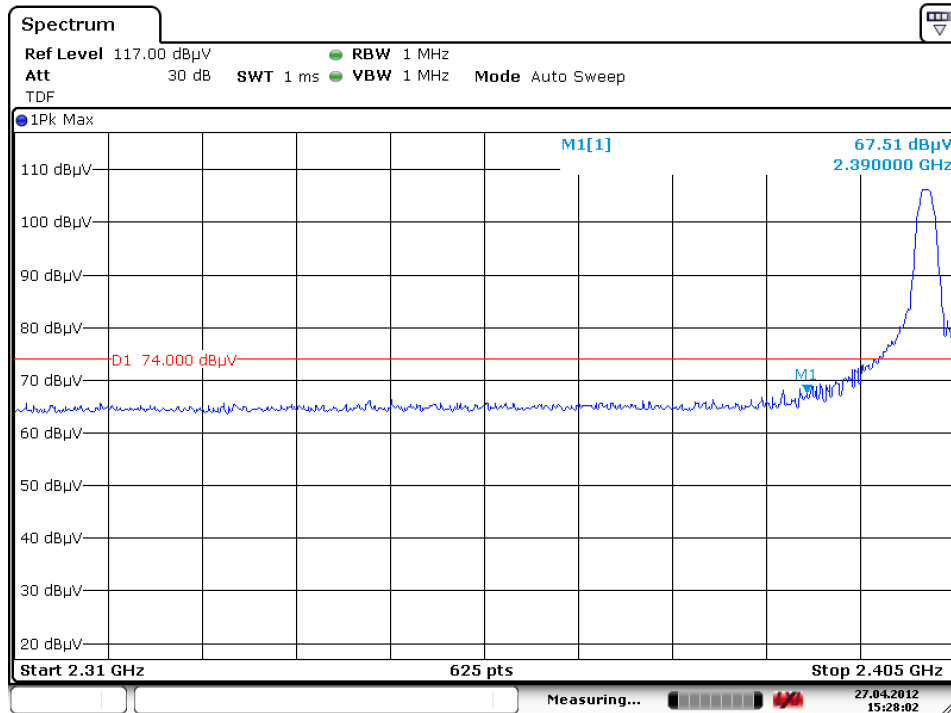
High Channel (H)



Date: 27.APR.2012 16:04:29

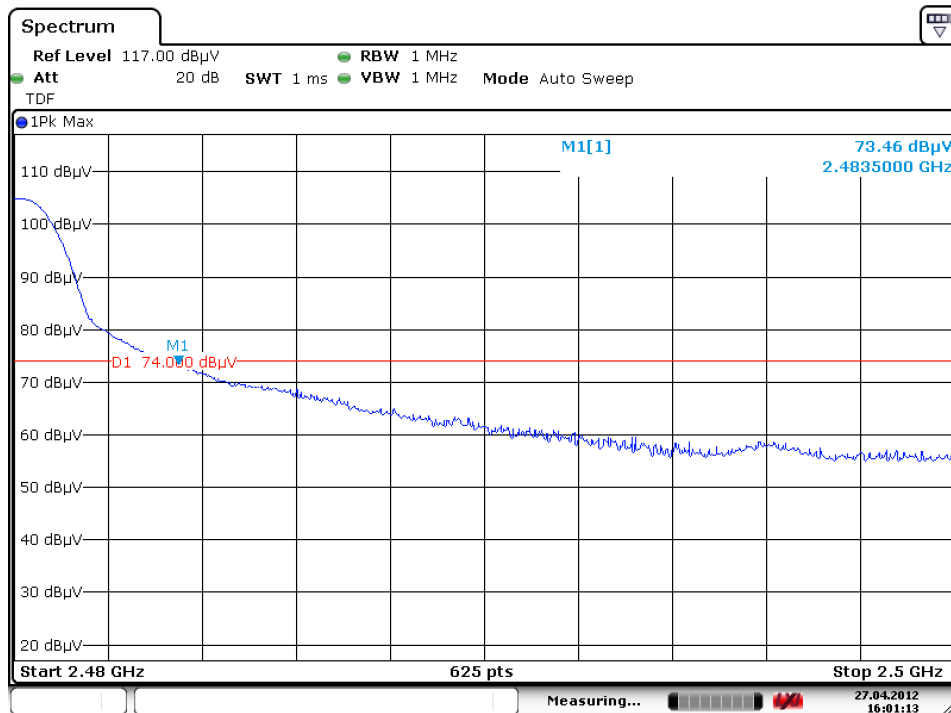
Radiated Bandedge (GFSK)

Low Channel (V)



Date: 27.APR.2012 15:28:02

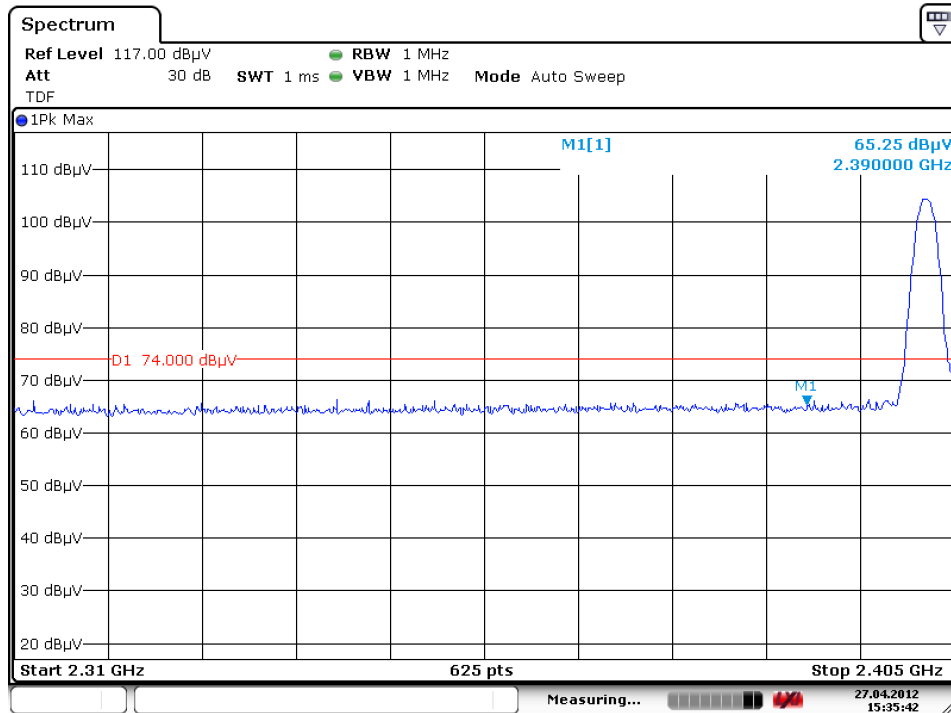
High Channel (V)



Date: 27.APR.2012 16:01:13

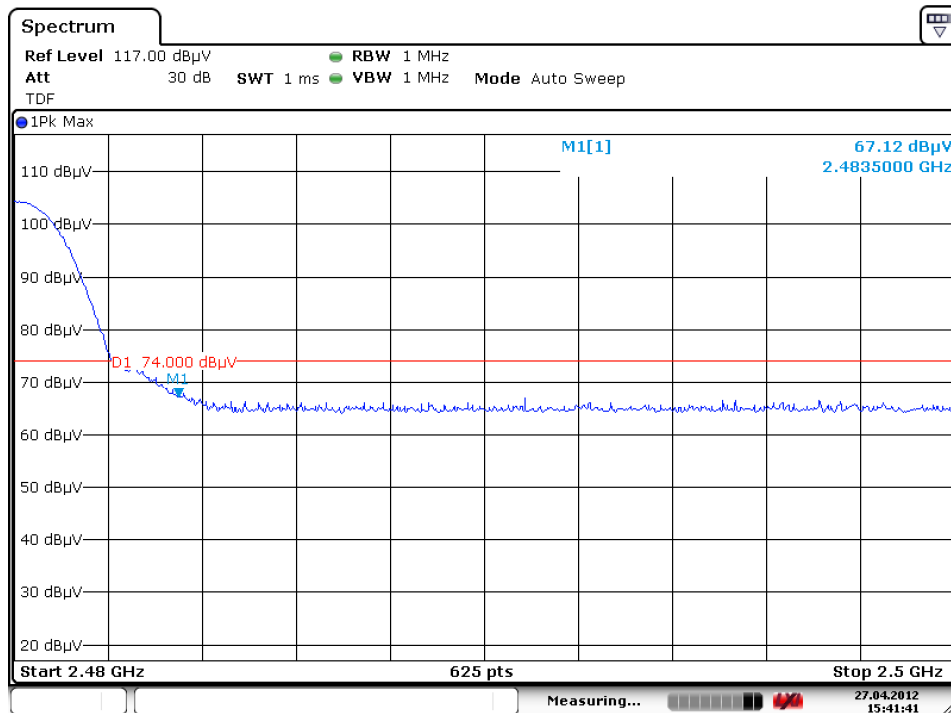
Radiated Bandedge (PSK)

Low Channel (H)



Date: 27.APR.2012 15:35:42

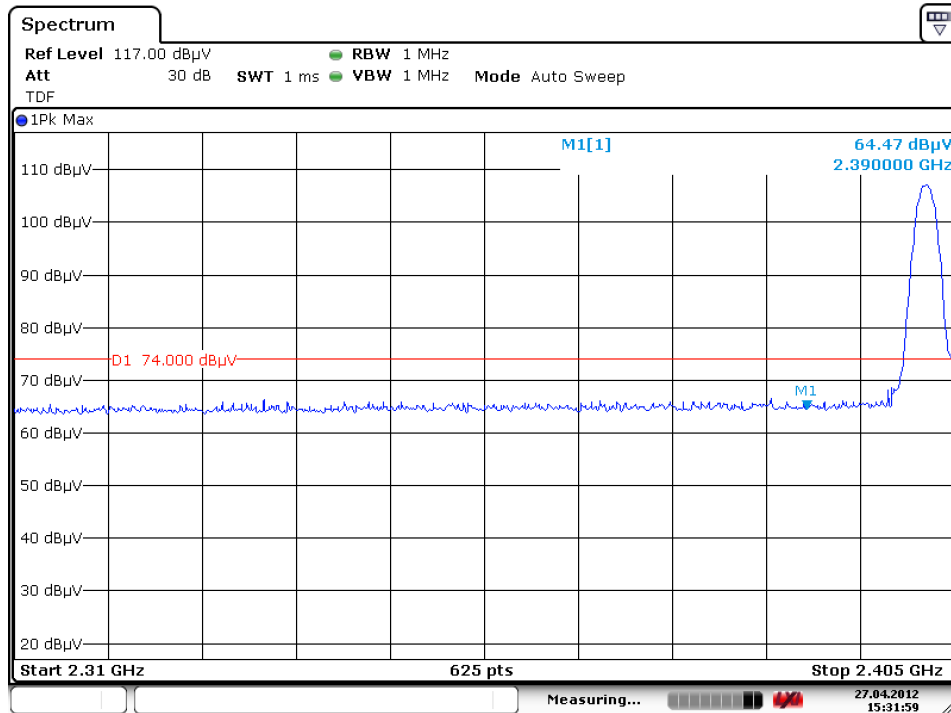
High Channel (H)



Date: 27.APR.2012 15:41:41

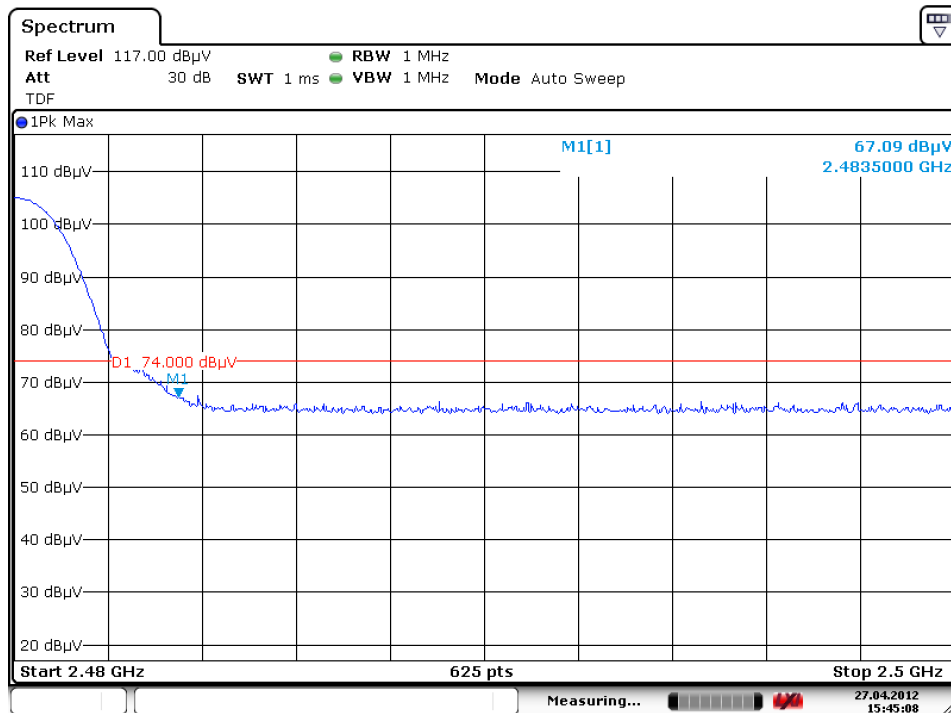
Radiated Bandedge (PSK)

Low Channel (V)



Date: 27.APR.2012 15:32:00

High Channel (V)



Date: 27.APR.2012 15:45:08