



Test Report

Product Name	Juno ST
Model No.	69991-XX (X can be 0-9)
FCC ID	JUP69991

Applicant	Trimble Navigation Limited.
Address	935 Stewart Drive PO Box 3642 Sunnyvale, CA 94088-3642 United States

Date of Receipt	Feb. 15, 2007
Issued Date	March 20, 2007
Report No.	072L108-RFUSP05V01

The test results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of Quietek Corporation.

This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

Test Report Certification

Issued Date: March 20, 2007

Report No.: 072L108-RFUSP05V01



Accredited by NIST (NVLAP)
NVLAP Lab Code: 200533-0

Product Name	Juno ST
Applicant	Trimble Navigation Limited.
Address	935 Stewart Drive PO Box 3642 Sunnyvale, CA 94088-3642 United States
Manufacturer	LITE-ON TECHNOLOGY CORPORATION
Model No.	69991-XX (X can be 0-9)
Rated Voltage	AC 120V/60Hz
Working Voltage	AC 120V/60Hz
Trade Name	Trimble
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2006 ANSI C63.4: 2003
Test Result	Complied



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Tested By : Dino Chen
(Engineer / Dino Chen)



Approved By : Gene Chang
(President / Gene Chang)

0914

TABLE OF CONTENTS

Description	Page
1. GENERAL INFORMATION	5
1.1. EUT Description.....	5
1.2. Operational Description	6
1.3. Tested System Details.....	7
1.4. Configuration of Test System	7
1.5. EUT Exercise Software	8
1.6. Test Facility	9
2. Conducted Emission.....	10
2.1. Test Equipment.....	10
2.2. Test Setup	10
2.3. Limits	10
2.4. Test Procedure	11
2.5. Uncertainty	11
2.6. Test Result of Conducted Emission.....	12
3. Peak Power Output	16
3.1. Test Equipment.....	16
3.2. Test Setup	16
3.3. Limits	16
3.4. Uncertainty	16
3.5. Test Result of Peak Power Output.....	17
4. Radiated Emission.....	19
4.1. Test Equipment.....	19
4.2. Test Setup	20
4.3. Limits	20
4.4. Test Procedure	21
4.5. Uncertainty	21
4.6. Test Result of Radiated Emission.....	22
5. Band Edge	30

5.1.	Test Equipment	30
5.2.	Test Setup	30
5.3.	Limits	31
5.4.	Test Procedure	31
5.5.	Uncertainty	31
5.6.	Test Result of Band Edge	32
6.	Occupied Bandwidth	41
6.1.	Test Equipment	41
6.2.	Test Setup	41
6.3.	Limits	41
6.4.	Uncertainty	41
6.5.	Test Result of Occupied Bandwidth	42
7.	Power Density	48
7.1.	Test Equipment	48
7.2.	Test Setup	48
7.3.	Limits	48
7.4.	Uncertainty	48
7.5.	Test Result of Power Density	49
8.	EMI Reduction Method During Compliance Testing	55

Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Juno ST
Trade Name	Trimble
Model No.	69991-XX (X can be 0-9)
FCC ID.	JUP69991
Frequency Range	2412 – 2462MHz
Number of Channels	11
Data Speed	IEEE 802.11b – 1, 2, 5.5, 11Mbps IEEE 802.11g – 6, 9, 12, 18, 24, 36 48, 54Mbps
Type of Modulation	DSSS/ OFDM
Antenna Type	PIFA
Antenna Gain	Refer to the table “Antenna List”
Channel Control	Auto
Power Adapter	Deloitte, AD7112B Input: AC 100-240V, 50-60Hz 0.25A Output: DC 5V-1A Cable out: Shielded, 1.5m

Antenna List

No.	Manufacturer	Part No.	Peak Gain
1	Wha YU	C759-520022-A	1.16 dBi in 2.4 GHz

Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 1:	2412 MHz	Channel 5:	2432 MHz	Channel 9:	2452 MHz
Channel 2:	2417 MHz	Channel 6:	2437 MHz	Channel 10:	2457 MHz
Channel 3:	2422 MHz	Channel 7:	2442 MHz	Channel 11:	2462 MHz
Channel 4:	2427 MHz	Channel 8:	2447 MHz		

Note:

1. The EUT is a Juno ST with a built-in 2.4GHz WLAN transceiver.
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
3. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report. (802.11b is 11Mbps and 802.11g is 54Mbps)
4. These tests are conducted on a sample for the purpose of demonstrating compliance of 802.11b/g transmitter with Part 15 Subpart C Paragraph 15.247 of spread spectrum devices
5. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

1.2. Operational Description

The EUT is a Juno ST with a built-in 2.4GHz transceiver. There are 11 channels in 2412 – 2462MHz. The channels are separated by 5MHz. This device supports the data rates of 1, 2, 5.5, 11Mbps in 802.11b mode and 6, 9, 12, 18, 24, 36, 48, 54Mbps in 802.11g mode. The signals are modulated by DSSS in 802.11b mode and OFDM in 802.11g mode. The antenna type is PIFA.

Test Mode	Mode 1: Transmitter 802.11b
	Mode 2: Transmitter 802.11g

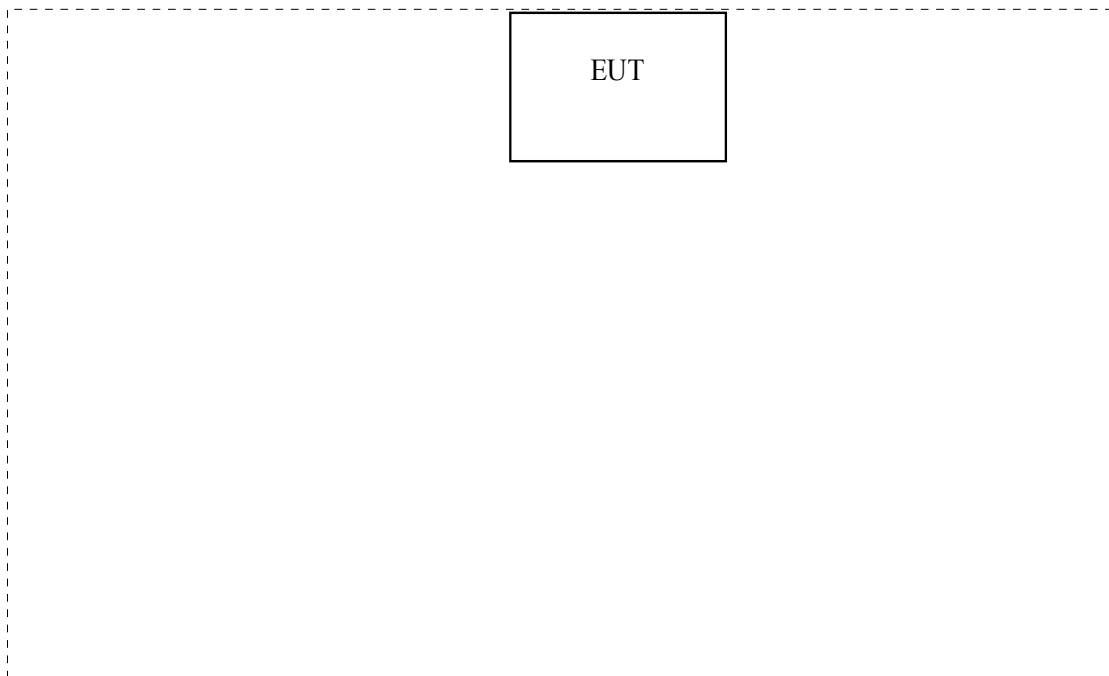
1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

	Product	Manufacturer	Model No.	Serial No.	FCC ID	Power Cord
1.	N/A	N/A	N/A	N/A	N/A	N/A

	Signal Cable Type	Signal cable Description
A.	N/A	N/A

1.4. Configuration of Test System



1.5. EUT Exercise Software

- (1) Setup the EUT as shown in section 1.4
- (2) Power on the EUT.
- (3) Execute FCCTest.exe
- (4) Configure the test mode, the test channel, and the data rate.
- (5) Click on “Start” to transmit continuously.
- (6) Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

Site Description: File on
 Federal Communications Commission
 FCC Engineering Laboratory
 7435 Oakland Mills Road
 Columbia, MD 21046
 Reference 31040/SIT1300F2



Accreditation on NVLAP
 NVLAP Lab Code: 200533-0



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 TEL: 886-2-8601-3788 / FAX : 886-2-8601-3789
 E-Mail : service@quietek.com



2. Conducted Emission

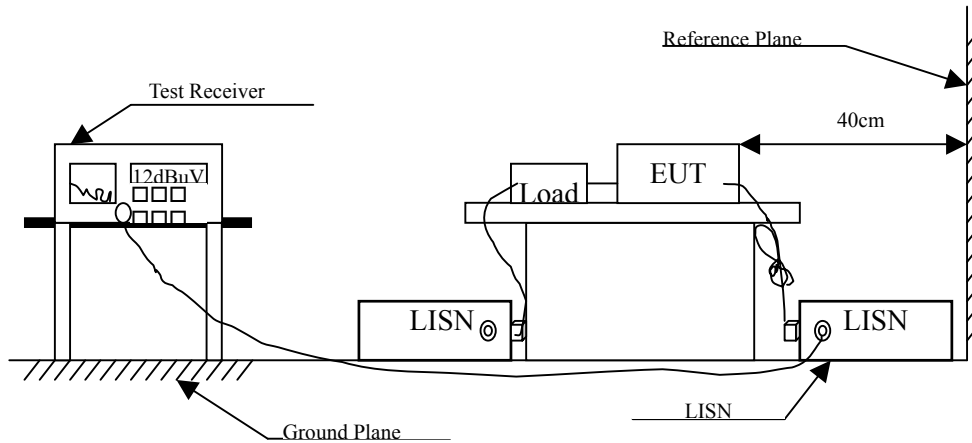
2.1. Test Equipment

The following test equipment are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 2006	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2006	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2006	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	May, 2006	
5	No.1 Shielded Room			N/A	

Note: All instruments are calibrated every one year.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit		
Frequency MHz	Limits	
	uV	dBuV
0.15 - 0.50	66-56 _(註)	56-46 _(註)
0.50-5.0	56	46
5.0 - 30	60	50

2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Uncertainty

± 2.26 dB

2.6. Test Result of Conducted Emission

Product : Juno ST
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 1: Transmitter 802.11b (2437MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
LINE 1					
Quasi-Peak					
0.205	0.202	39.490	39.692	-24.737	64.429
0.255	0.205	35.170	35.375	-27.625	63.000
0.435	0.216	30.410	30.626	-27.231	57.857
0.947	0.232	31.840	32.072	-23.928	56.000
3.837	0.341	30.600	30.941	-25.059	56.000
12.127	0.741	30.280	31.021	-28.979	60.000
Average					
0.205	0.202	24.430	24.632	-29.797	54.429
0.255	0.205	20.760	20.965	-32.035	53.000
0.435	0.216	18.340	18.556	-29.301	47.857
0.947	0.232	17.980	18.212	-27.788	46.000
3.837	0.341	19.670	20.011	-25.989	46.000
12.127	0.741	21.050	21.791	-28.209	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Juno ST
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 1: Transmitter 802.11b (2437MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
LINE 2					
Quasi-Peak					
0.197	0.202	40.660	40.862	-23.795	64.657
0.451	0.216	34.380	34.596	-22.804	57.400
0.783	0.230	26.670	26.900	-29.100	56.000
2.513	0.293	23.280	23.573	-32.427	56.000
3.611	0.338	25.350	25.688	-30.312	56.000
12.568	0.667	25.030	25.697	-34.303	60.000
Average					
0.197	0.202	24.670	24.872	-29.785	54.657
0.451	0.216	23.160	23.376	-24.024	47.400
0.783	0.230	17.850	18.080	-27.920	46.000
2.513	0.293	14.280	14.573	-31.427	46.000
3.611	0.338	17.370	17.708	-28.292	46.000
12.568	0.667	18.000	18.667	-31.333	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Juno ST
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 2: Transmitter 802.11g (2437MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
LINE 1					
Quasi-Peak					
0.189	0.202	39.180	39.382	-25.504	64.886
0.443	0.216	31.700	31.916	-25.713	57.629
0.947	0.232	32.000	32.232	-23.768	56.000
2.490	0.293	30.200	30.493	-25.507	56.000
3.670	0.338	32.350	32.688	-23.312	56.000
11.947	0.731	29.890	30.621	-29.379	60.000
Average					
0.189	0.202	21.940	22.142	-32.744	54.886
0.443	0.216	21.590	21.806	-25.823	47.629
0.947	0.232	16.790	17.022	-28.978	46.000
2.490	0.293	15.950	16.243	-29.757	46.000
3.670	0.338	18.630	18.968	-27.032	46.000
11.947	0.731	20.460	21.191	-28.809	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Juno ST
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 2: Transmitter 802.11g (2437MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
LINE 2					
Quasi-Peak					
0.255	0.203	36.620	36.823	-26.177	63.000
0.463	0.216	34.470	34.686	-22.371	57.057
0.752	0.230	25.930	26.160	-29.840	56.000
2.377	0.291	24.680	24.971	-31.029	56.000
12.951	0.693	24.890	25.583	-34.417	60.000
17.017	0.787	23.200	23.987	-36.013	60.000
Average					
0.255	0.203	21.090	21.293	-31.707	53.000
0.463	0.216	19.970	20.186	-26.871	47.057
0.752	0.230	10.650	10.880	-35.120	46.000
2.377	0.291	13.230	13.521	-32.479	46.000
12.951	0.693	17.210	17.903	-32.097	50.000
17.017	0.787	16.120	16.907	-33.093	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

3. Peak Power Output

3.1. Test Equipment

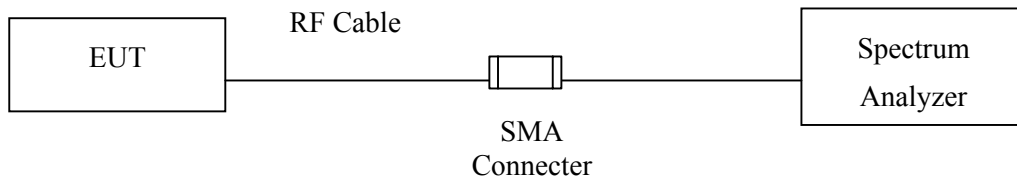
The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2006
X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2006

Note: 1. All instruments are calibrated every one year.
 2. The test instruments marked by "X" are used to measure the final test results.

3.2. Test Setup

Conducted Measurement



3.3. Limits

The maximum peak power shall be less 1 Watt.

3.4. Uncertainty

± 1.27 dB

3.5. Test Result of Peak Power Output

Product : Juno ST
 Test Item : Peak Power Output Data
 Test Site : No.3 OATS

Measurement Results:

EUT operating in 2.4GHz Band
 Normal mode

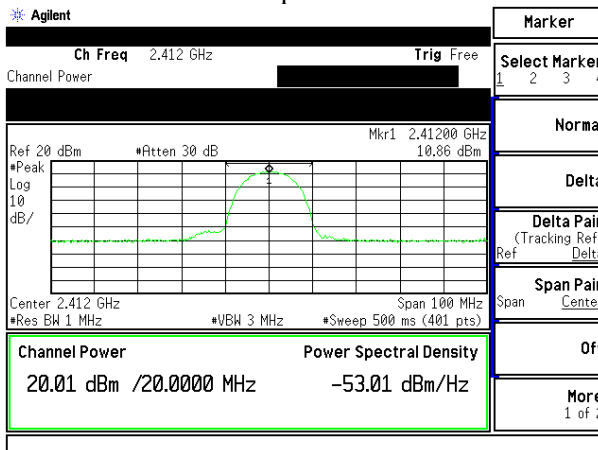
Frequency (MHz)	Peak Power Output (dBm)											
	For different Data Rate (Mbps)											
	1	2	5.5	11	6	9	12	18	24	36	48	54
2412	17.77	18.01	18.71	20.01	18.98	19.83	18.93	19.86	19.89	19.93	20.00	20.14
2437	16.73	16.83	17.99	18.84	18.27	18.01	19.82	19.92	19.23	19.58	19.90	19.99
2462	16.22	16.37	17.58	18.48	17.69	17.35	18.87	18.82	18.57	18.74	18.84	18.99

Test Mode : Mode 1: Transmitter 802.11b

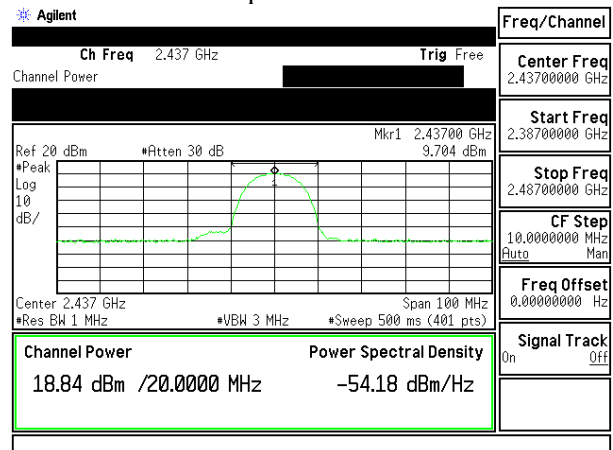
Data Speed: 11Mbps

Channel No.	Frequency (MHz)	Measurement	Required Limit	Result
1	2412.00	20.01dBm	1 Watt= 30 dBm	Pass
6	2437.00	18.84dBm	1 Watt= 30 dBm	Pass
11	2462.00	18.48dBm	1 Watt= 30 dBm	Pass

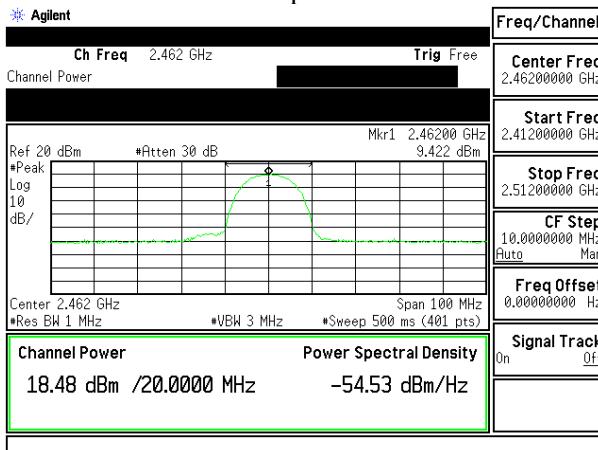
11Mbps-CH01



11Mbps-CH06



11Mbps-CH11

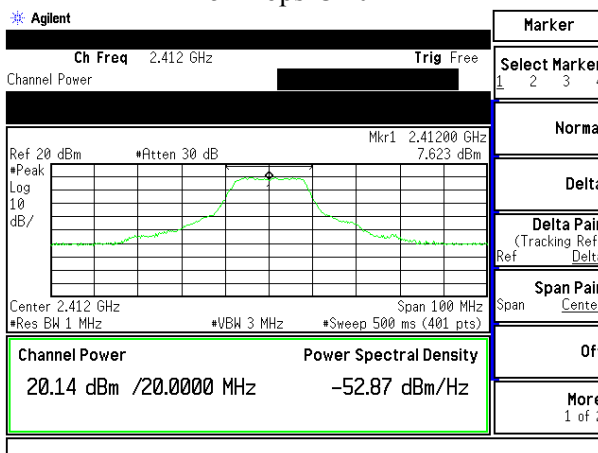


Product : Juno ST
 Test Item : Peak Power Output Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter 802.11g

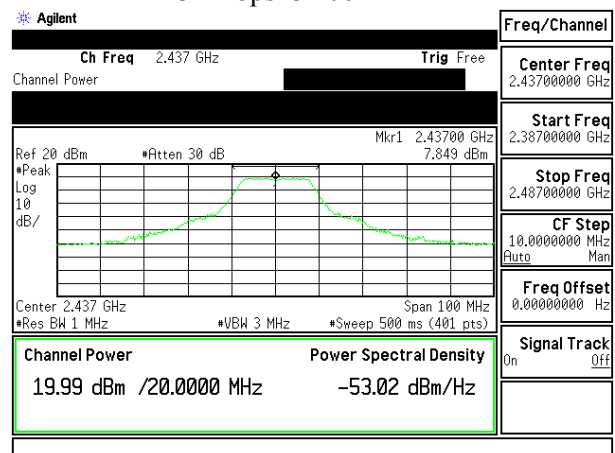
Data Speed: 54Mbps

Channel No.	Frequency (MHz)	Measurement	Required Limit	Result
1	2412.00	20.14dBm	1 Watt= 30 dBm	Pass
6	2437.00	19.99dBm	1 Watt= 30 dBm	Pass
11	2462.00	18.99dBm	1 Watt= 30 dBm	Pass

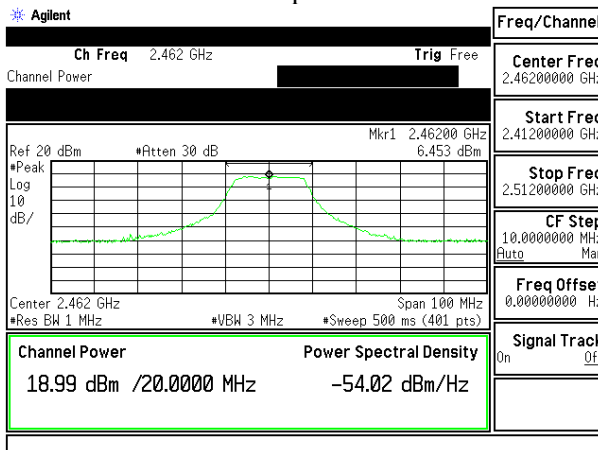
54Mbps-CH01



54Mbps-CH06



54Mbps-CH11



4. Radiated Emission

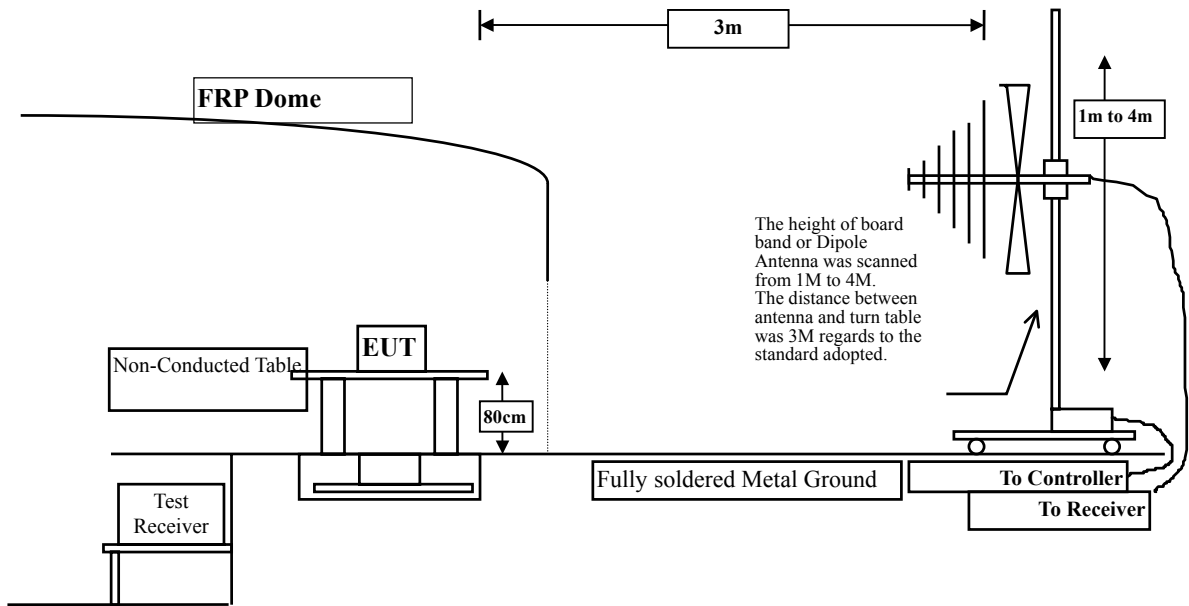
4.1. Test Equipment

The following test equipment are used during the radiated emission test:

Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Site # 1	Test Receiver	R & S	ESCS 30 / 825442/14	May, 2006
	Spectrum Analyzer	Advantest	R3261C / 71720140	May, 2006
	Pre-Amplifier	HP	8447D/3307A01812	May, 2006
	Bilog Antenna	Chase	CBL6112B / 12452	Sep., 2006
	Horn Antenna	EM	EM6917 / 103325	May, 2006
Site # 2	Test Receiver	R & S	ESCS 30 / 825442/17	May, 2006
	Spectrum Analyzer	Advantest	R3261C / 71720609	May, 2006
	Pre-Amplifier	HP	8447D/3307A01814	May, 2006
	Bilog Antenna	Chase	CBL6112B / 2455	Sep., 2006
	Horn Antenna	EM	EM6917 / 103325	May, 2006
Site # 3	X Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2006
	X Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2006
	X Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2006
	X Horn Antenna	Schwarzbeck	BBHA9120D / 305, 306	July, 2006
	X Horn Antenna	Schwarzbeck	BBHA9170 / 208, 209	July, 2006
	X Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2006
	X Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2006
X Pre-Amplifier	HP	8449B / 3008A01123	July, 2006	

- Note:
1. All instruments are calibrated every one year.
 2. The test instruments marked by "X" are used to measure the final test results.

4.2. Test Setup



4.3. Limits

➤ General Radiated Emission Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209(a) Limits		
Frequency MHz	uV/m @3m	dBuV/m@3m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

- Remarks :
1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
 2. In the Above Table, the tighter limit applies at the band edges.
 3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

4.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4: 2003 on radiated measurement.

The additional latch filter below 1GHz was used to measure the level of harmonics radiated emission during field strength of harmonics measurement.

The bandwidth below 1GHz setting on the field strength meter is 120 kHz, above 1GHz are 1 MHz. The frequency range from 30MHz to 10th harmonics is checked.

4.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

4.6. Test Result of Radiated Emission

Product : Juno ST
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11b (2412MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4824.000	2.927	53.781	56.707	-17.263	74.000
7236.000	9.472	37.031	46.502	-27.468	74.000
9648.000	10.512	36.728	47.240	-26.730	74.000
Average Detector:					
4824.000	2.927	41.357	44.283	-9.687	54.00
Vertical					
Peak Detector:					
4824.000	2.927	54.046	56.972	-16.998	74.000
7236.000	9.472	36.805	46.276	-27.694	74.000
9648.000	10.512	36.761	47.273	-26.697	74.000
Average Detector:					
4824.000	2.927	41.227	44.153	-9.817	54.00

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz ◦
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz ◦
4. Emission Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Juno ST
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11b (2437 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4874.000	3.037	54.499	57.535	-16.435	74.000
7311.000	9.557	37.587	47.144	-26.826	74.000
9748.000	10.600	36.096	46.696	-27.274	74.000
Average					
Detector:					
4874.000	3.037	42.199	45.235	-8.735	54.00
Vertical					
Peak Detector:					
4874.000	3.037	56.736	59.772	-14.198	74.000
7311.000	9.557	36.763	46.320	-27.650	74.000
9748.000	10.600	37.201	47.801	-26.169	74.000
Average					
Detector:					
4874.000	3.037	44.309	47.345	-6.625	54.00

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz °
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz °
4. Emission Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Juno ST
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11b (2462 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4924.000	3.154	54.286	57.440	-16.530	74.000
7386.000	9.627	36.735	46.362	-27.608	74.000
9848.000	10.686	35.404	46.090	-27.880	74.000
Average Detector:					
4924.000	3.154	42.499	45.653	-8.317	54.00
Vertical					
Peak Detector:					
4924.000	3.154	56.405	59.559	-14.411	74.000
7386.000	9.627	36.147	45.774	-28.196	74.000
9848.000	10.686	36.153	46.839	-27.131	74.000
Average Detector:					
4924.000	3.154	43.097	46.251	-7.719	54.00

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz °
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz °
4. Emission Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Juno ST
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter 802.11g (2412MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4824.000	2.927	49.903	52.829	-21.141	74.000
7236.000	9.472	37.111	46.582	-27.388	74.000
9648.000	10.512	36.944	47.456	-26.514	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4824.000	2.927	50.150	53.076	-20.894	74.000
7236.000	9.472	36.313	45.784	-28.186	74.000
9648.000	10.512	36.306	46.818	-27.152	74.000
Average Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz °
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz °
4. Emission Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Juno ST
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter 802.11g (2437 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4874.000	3.037	49.230	52.266	-21.704	74.000
7311.000	9.557	36.264	45.821	-28.149	74.000
9748.000	10.600	36.028	46.628	-27.342	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4874.000	3.037	51.632	54.668	-19.302	74.000
7311.000	9.557	36.994	46.551	-27.419	74.000
9748.000	10.600	36.614	47.214	-26.756	74.000
Average Detector:					
4874.000	3.037	41.395	44.431	-9.539	54.00

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz ◦
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz ◦
4. Emission Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Juno ST
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter 802.11g (2462 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4924.000	3.154	48.834	51.988	-21.982	74.000
7386.000	9.627	36.290	45.917	-28.053	74.000
9848.000	10.686	35.548	46.234	-27.736	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4924.000	3.154	51.879	55.033	-18.937	74.000
7386.000	9.627	36.390	46.017	-27.953	74.000
9848.000	10.686	36.463	47.149	-26.821	74.000
Average Detector:					
4924.000	3.154	42.239	45.393	-8.577	54.00

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz °
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz °
4. Emission Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Juno ST
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11b (2437 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
61.525	6.541	21.855	28.396	-11.604	40.000
151.250	11.593	25.589	37.182	-6.318	43.500
294.325	13.921	10.676	24.597	-21.403	46.000
476.200	18.910	7.951	26.861	-19.139	46.000
544.100	19.945	6.672	26.617	-19.383	46.000
607.150	20.225	7.189	27.414	-18.586	46.000
Vertical					
88.200	8.976	12.588	21.564	-21.936	43.500
151.250	10.473	17.336	27.809	-15.691	43.500
180.350	9.686	11.855	21.541	-21.959	43.500
228.850	11.151	9.989	21.140	-24.860	46.000
342.825	14.667	9.140	23.806	-22.194	46.000
619.275	21.591	6.564	28.155	-17.845	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. “█” means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The radiated emissions below 1GHz of the lowest, middle, highest frequency are pretested. Only the worst case is shown on the report.

Product : Juno ST
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter 802.11g (2437 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
143.975	11.972	21.215	33.187	-10.313	43.500
156.100	11.251	19.286	30.537	-12.963	43.500
168.225	10.202	14.228	24.430	-19.070	43.500
294.325	13.921	10.169	24.090	-21.910	46.000
544.100	19.945	6.909	26.854	-19.146	46.000
607.150	20.225	7.851	28.076	-17.924	46.000
Vertical					
49.400	8.137	15.450	23.587	-16.413	40.000
85.775	8.909	10.721	19.630	-20.370	40.000
143.975	11.111	13.888	24.999	-18.501	43.500
177.925	9.627	11.278	20.905	-22.595	43.500
536.825	19.723	4.872	24.595	-21.405	46.000
619.275	21.591	5.916	27.507	-18.493	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. "█" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The radiated emissions below 1GHz of the lowest, middle, highest frequency are pretested. Only the worst case is shown on the report.

5. Band Edge

5.1. Test Equipment

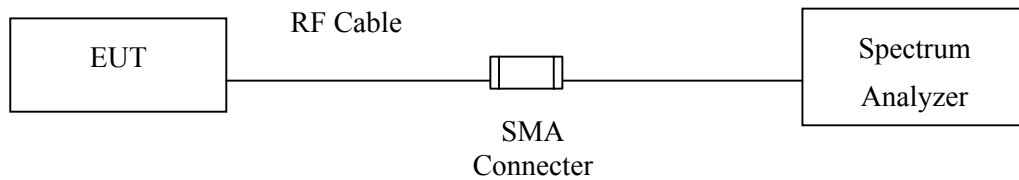
The following test equipments are used during the band edge tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2006
X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2006
X	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2006
X	Horn Antenna	Schwarzbeck	BBHA9120D / 305, 306	July, 2006
X	Horn Antenna	Schwarzbeck	BBHA9170 / 208, 209	July, 2006
X	Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2006
X	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2006
X	Pre-Amplifier	HP	8449B / 3008A01123	July, 2006

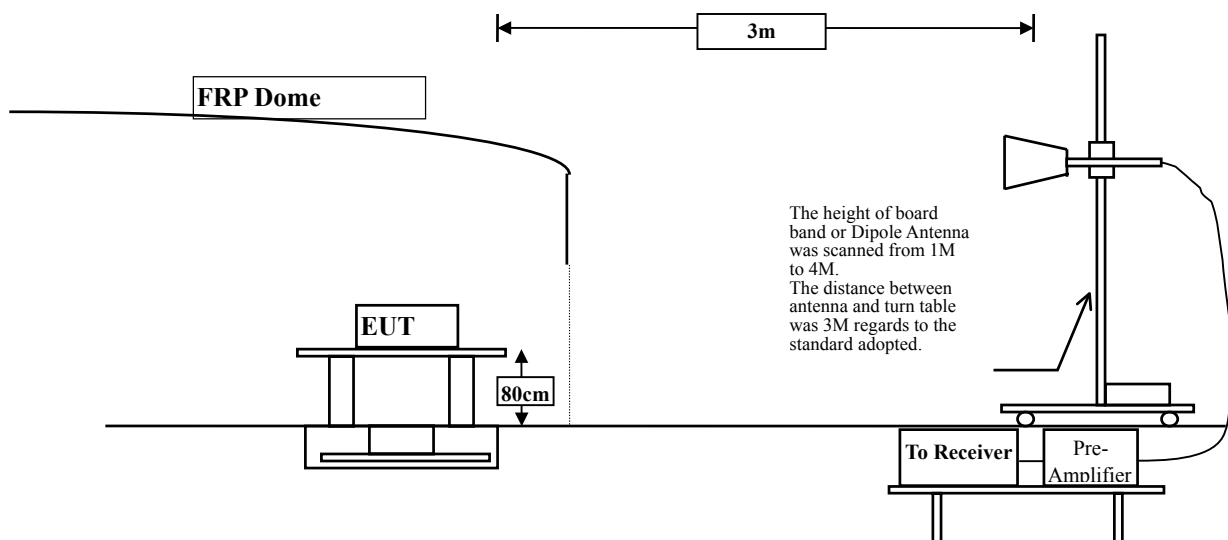
- Note:
1. All instruments are calibrated every one year.
 2. The test instruments marked by "X" are used to measure the final test results.

5.2. Test Setup

RF Conducted Measurement:



RF Radiated Measurement:



5.3. Limits

In any 100 kHz 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. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

5.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4: 2003 on radiated measurement.

The bandwidth below 1GHz setting on the field strength meter is 120 kHz, above 1GHz are 1 MHz.

5.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

5.6. Test Result of Band Edge

Product : Juno ST
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11b (11Mbps)

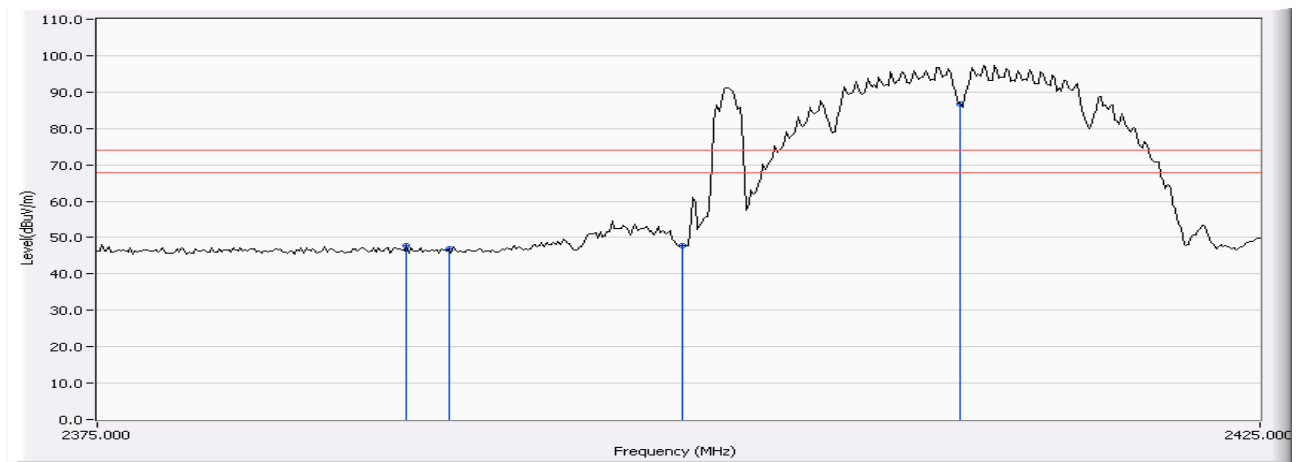
RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
1 (Horizontal)	<2400	>20	Pass

RF Radiated Measurement (Horizontal):

Channel	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
1 (Peak)	2388.200	-2.411	50.191	47.780	74.00	54.00	Pass
1 (Average)	--	--	--	--	74.00	54.00	Pass

Figure Channel 1: Horizontal (Peak)



Note:
 RBW=1MHz, VBW=1MHz, Sweep Time=500ms.

Product : Juno ST
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11b (11Mbps)

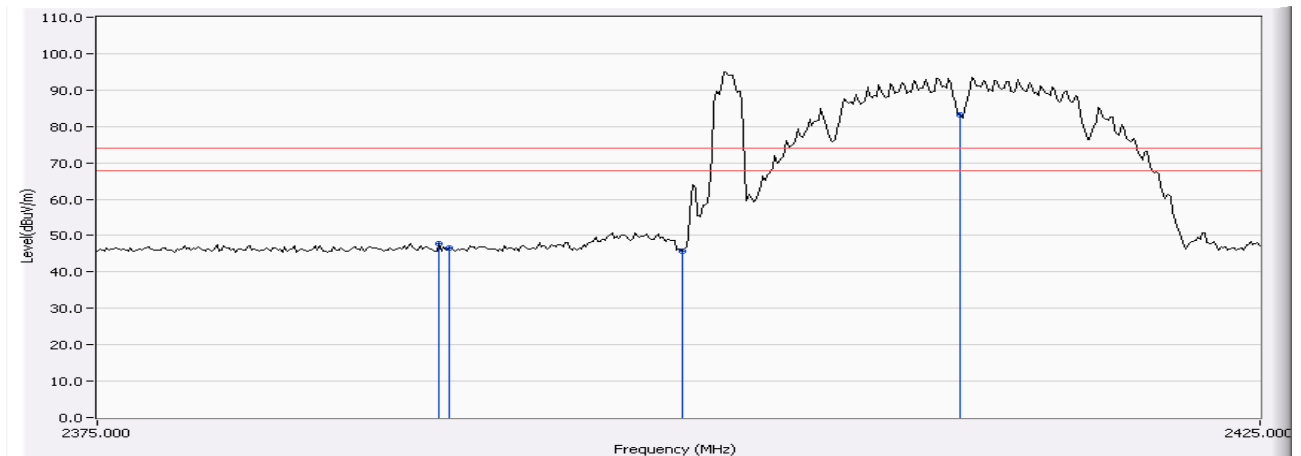
RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
1 (Vertical)	<2400	>20	Pass

RF Radiated Measurement (Vertical):

Channel	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
1 (Peak)	2389.600	-2.406	50.065	47.659	74.00	54.00	Pass
1 (Average)	--	--	--	--	74.00	54.00	Pass

Figure Channel 1: Vertical (Peak)



Note:

RBW=1MHz, VBW=1MHz, Sweep Time=500ms.

Product : Juno ST
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11b (11Mbps)

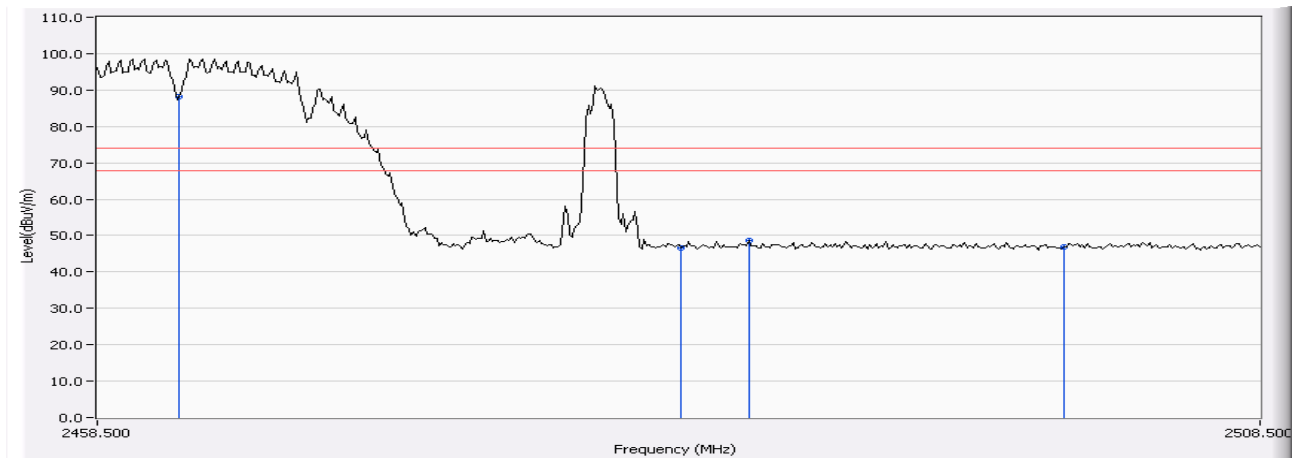
RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
11 (Horizontal)	>2483.5	>20	Pass

RF Radiated Measurement (Horizontal):

Channel	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
11(Peak)	2486.400	-1.979	50.578	48.599	74.00	54.00	Pass
11(Average)	--	--	--	--	74.00	54.00	Pass

Figure Channel 11: Horizontal (Peak)



Note:

RBW=1MHz, VBW=1MHz, Sweep Time=500ms

Product : Juno ST
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11b (11Mbps)

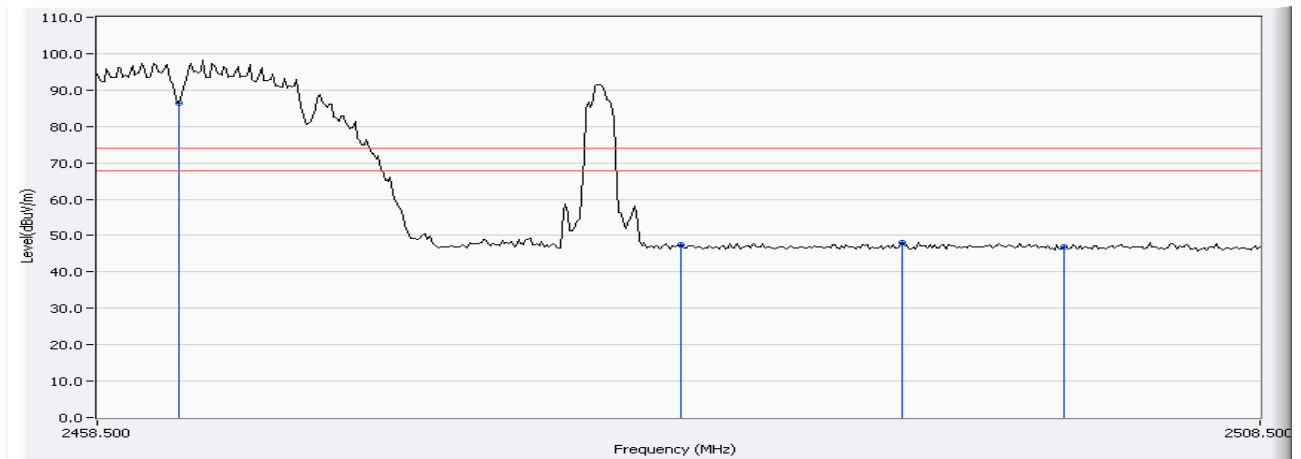
RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
11 (Vertical)	>2483.5	>20	Pass

RF Radiated Measurement (Vertical):

Channel	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
11(Peak)	2493.000	-1.958	49.883	47.925	74.00	54.00	Pass
11(Average)	--	--	--	--	74.00	54.00	Pass

Figure Channel 11: (Vertical) (Peak)



Note:

RBW=1MHz, VBW=1MHz, Sweep Time=500ms.

Product : Juno ST
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter 802.11g (54Mbps)

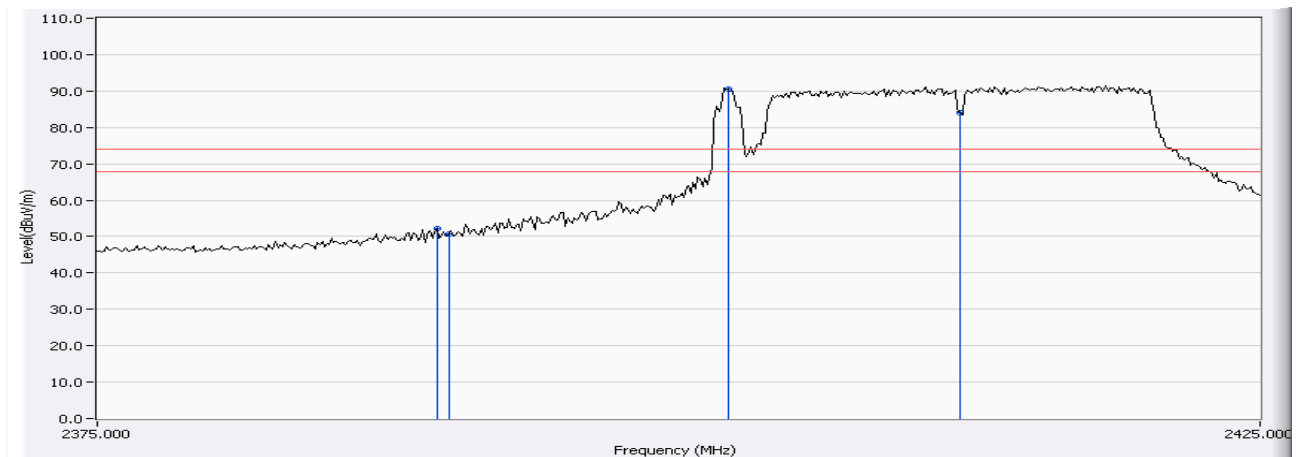
RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
1 (Horizontal)	<2400	>20	Pass

RF Radiated Measurement (Horizontal):

Channel	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
1 (Peak)	2389.500	-2.406	54.746	52.340	74.00	54.00	Pass
1 (Average)	--	--	--	--	74.00	54.00	Pass

Figure Channel 1: Horizontal (Peak)



Note:

RBW=1MHz, VBW=1MHz, Sweep Time=500ms.

Product : Juno ST
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter 802.11g (54Mbps)

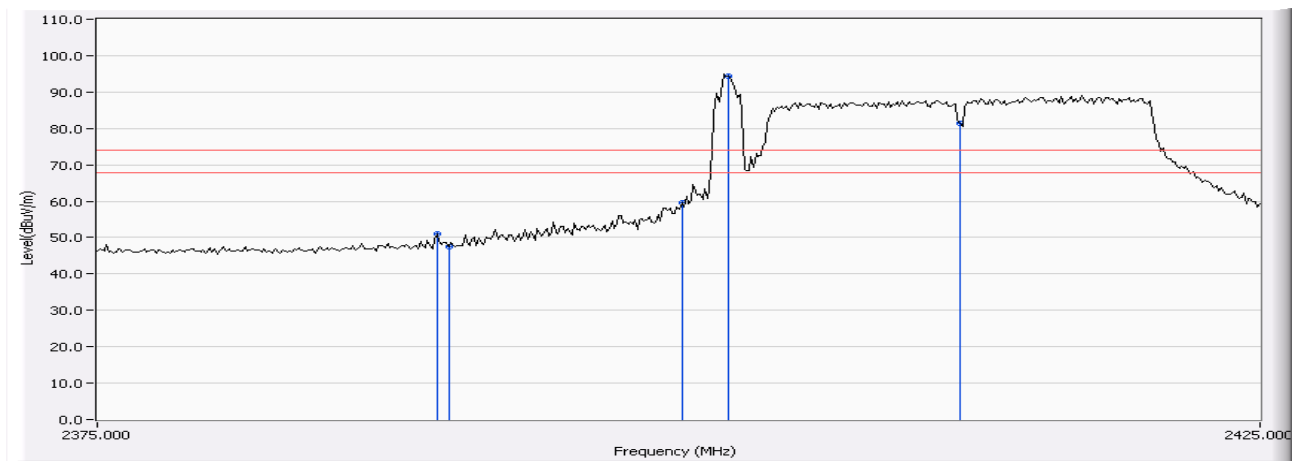
RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
1 (Vertical)	<2400	>20	Pass

RF Radiated Measurement (Vertical):

Channel	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
1 (Peak)	2389.500	-2.406	53.392	50.986	74.00	54.00	Pass
1 (Average)	--	--	--	--	74.00	54.00	Pass

Figure Channel 1: Vertical (Peak)



Note:
 RBW=1MHz, VBW=1MHz, Sweep Time=500ms.

Product : Juno ST
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter 802.11g (54Mbps)

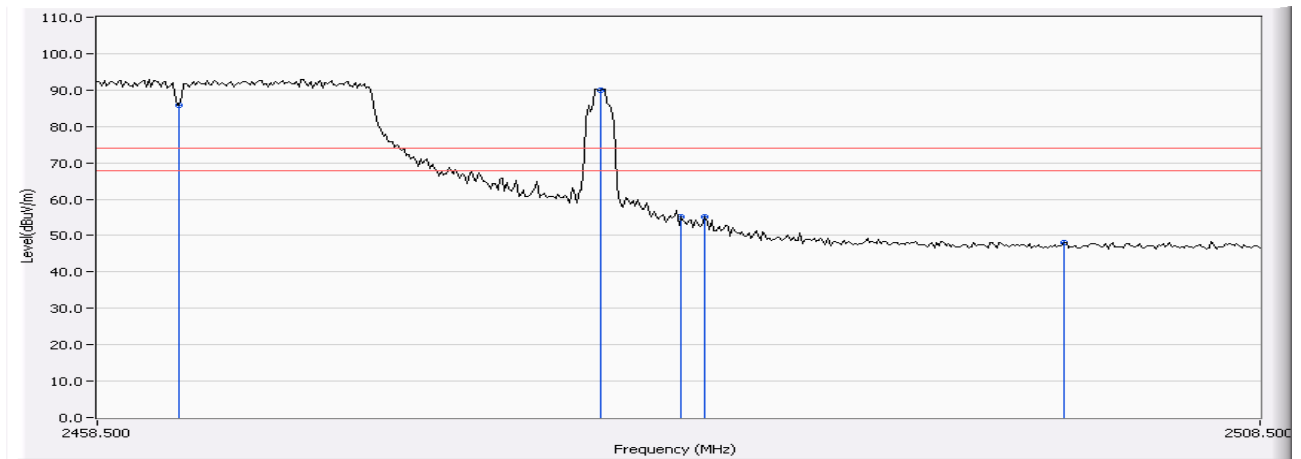
RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
11 (Horizontal)	>2483.5	>20	Pass

RF Radiated Measurement (Horizontal):

Channel	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
11(Peak)	2484.500	-1.984	57.046	55.062	74.00	54.00	Pass
11(Average)	2484.500	-1.984	41.059	39.075	74.00	54.00	Pass

Figure Channel 11: Horizontal (Peak)

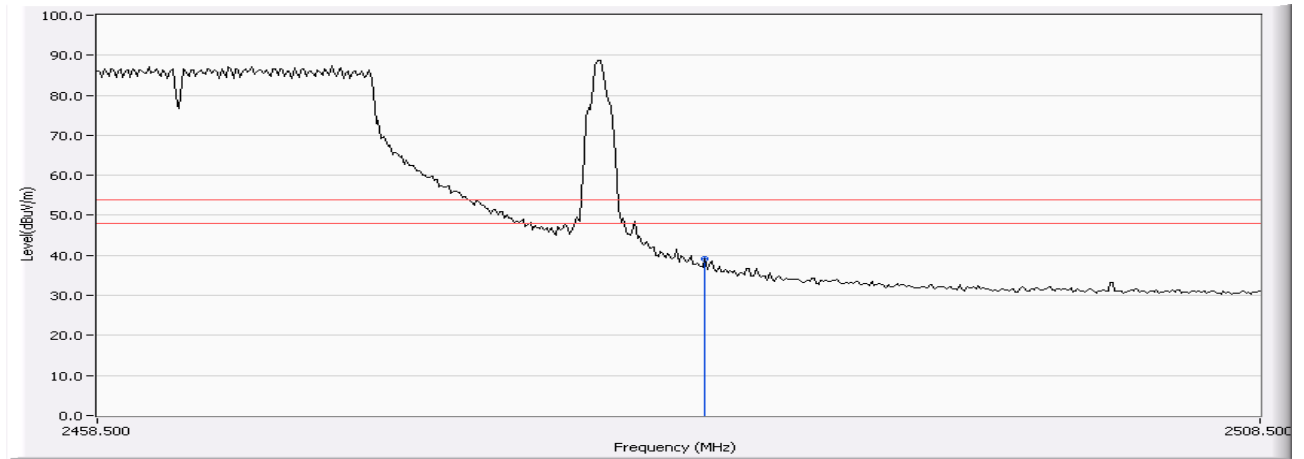


Note:

RBW=1MHz, VBW=1MHz, Sweep Time=500ms

Figure Channel 11:

Horizontal (Average)



Note:
RBW=1MHz, VBW=300Hz, Sweep Time=500ms

Product : Juno ST
 Test Item : Band Edge Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter 802.11g (54Mbps)

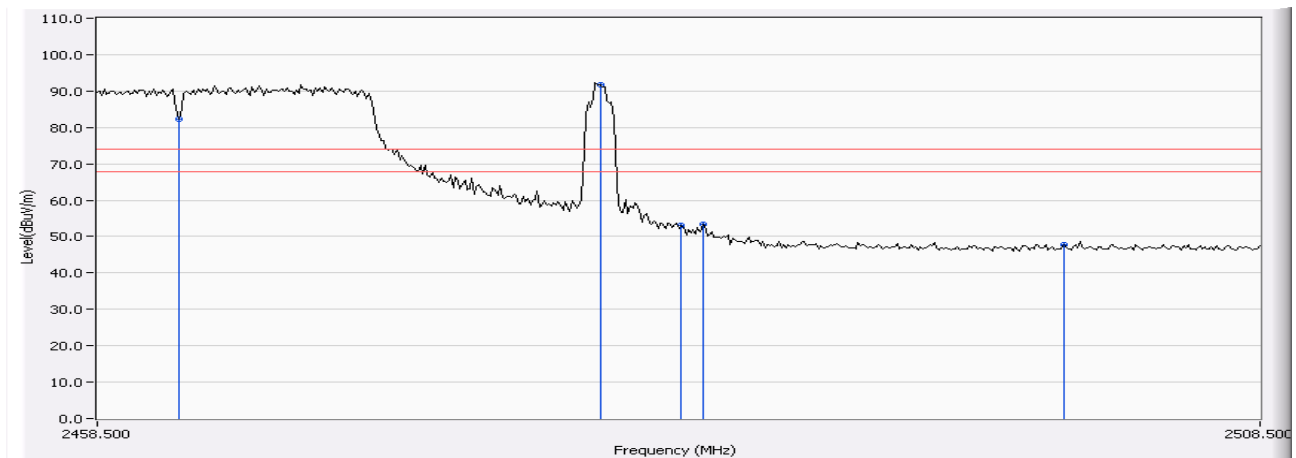
RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
11 (Vertical)	>2483.5	>20	Pass

RF Radiated Measurement (Vertical):

Channel	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
11(Peak)	2484.400	-1.984	55.428	53.444	74.00	54.00	Pass
11(Average)	--	--	--	--	74.00	54.00	Pass

Figure Channel 11: (Vertical) (Peak)



Note:

RBW=1MHz, VBW=1MHz, Sweep Time=500ms.

Note: The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

6. Occupied Bandwidth

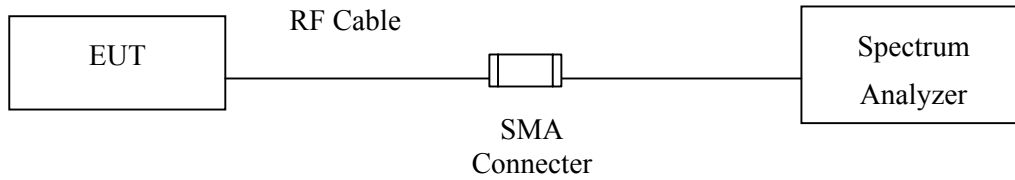
6.1. Test Equipment

The following test equipments are used during the radiated emission tests:

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2006
X Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2006

- Note:
1. All instruments are calibrated every one year.
 2. The test instruments marked by “X” are used to measure the final test results.

6.2. Test Setup



6.3. Limits

The minimum bandwidth shall be at least 500kHz.

6.4. Uncertainty

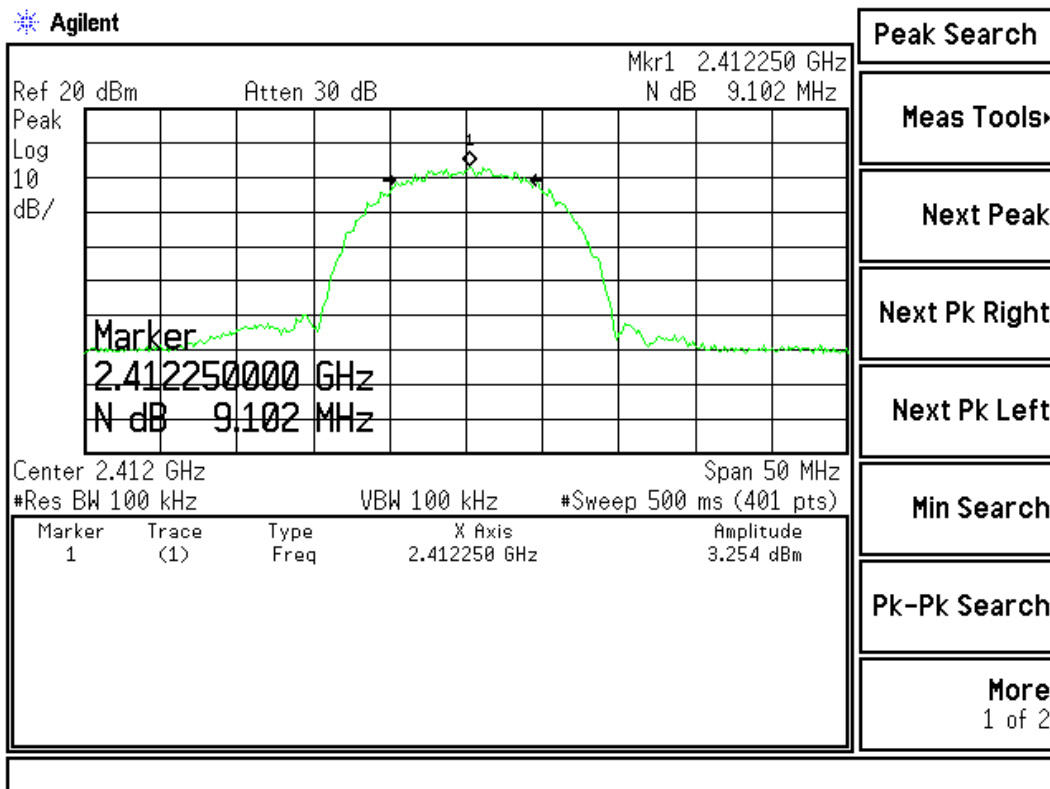
$\pm 150\text{Hz}$

6.5. Test Result of Occupied Bandwidth

Product : Juno ST
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11b (2412MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
1 (11Mbps)	2412.00	9102	>500	Pass

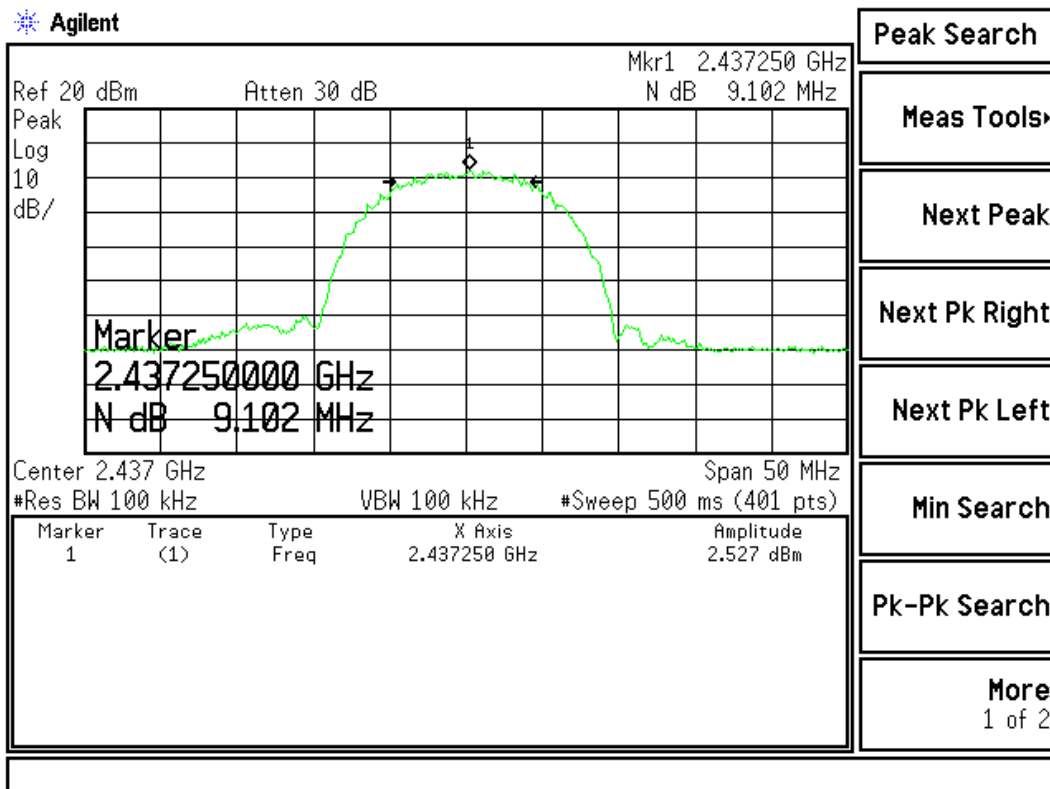
Figure Channel 1: 11Mbps



Product : Juno ST
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11b (2437MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
6 (11Mbps)	2437.00	9102	>500	Pass

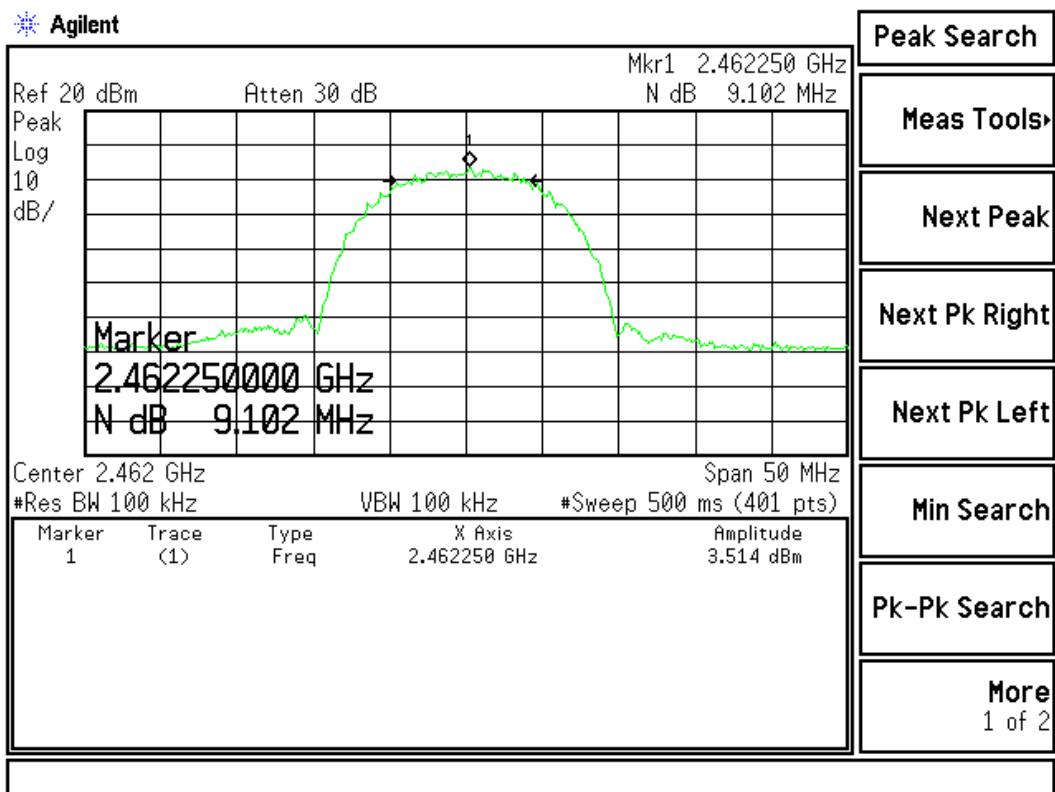
Figure Channel 6: 11Mbps



Product : Juno ST
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11b (2462MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
11 (11Mbps)	2462.00	9102	>500	Pass

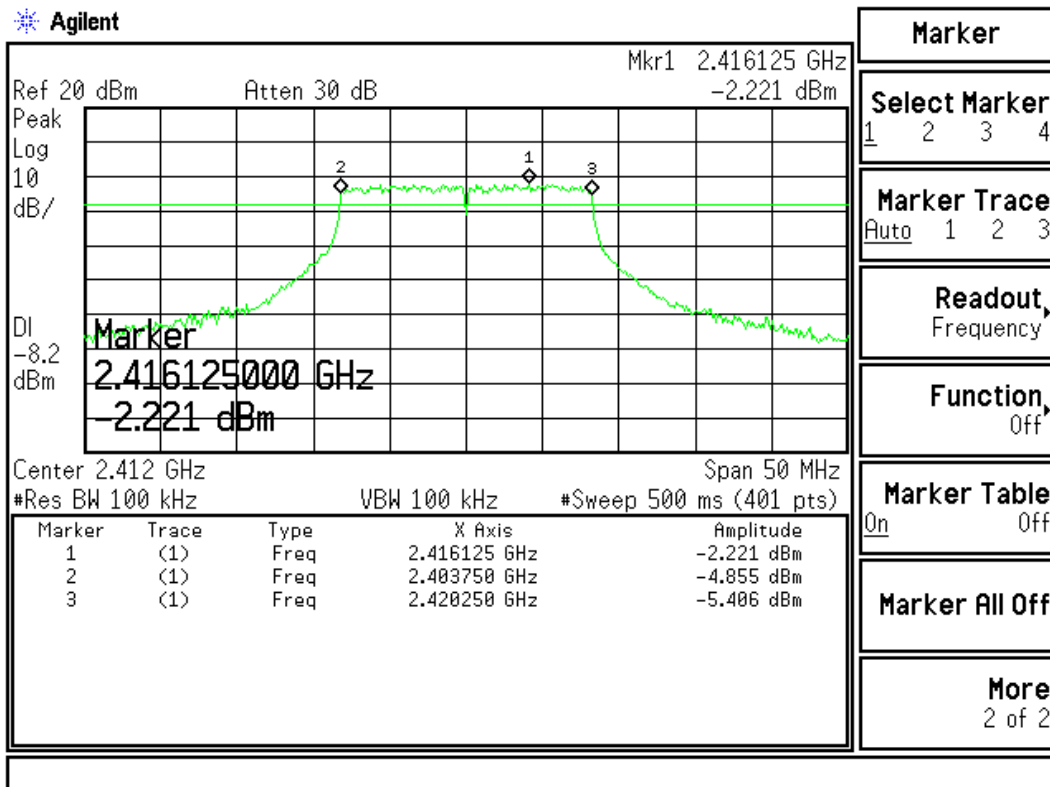
Figure Channel 11: 11Mbps



Product : Juno ST
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter 802.11g (2412MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
1 (54Mbps)	2412.00	16500	>500	Pass

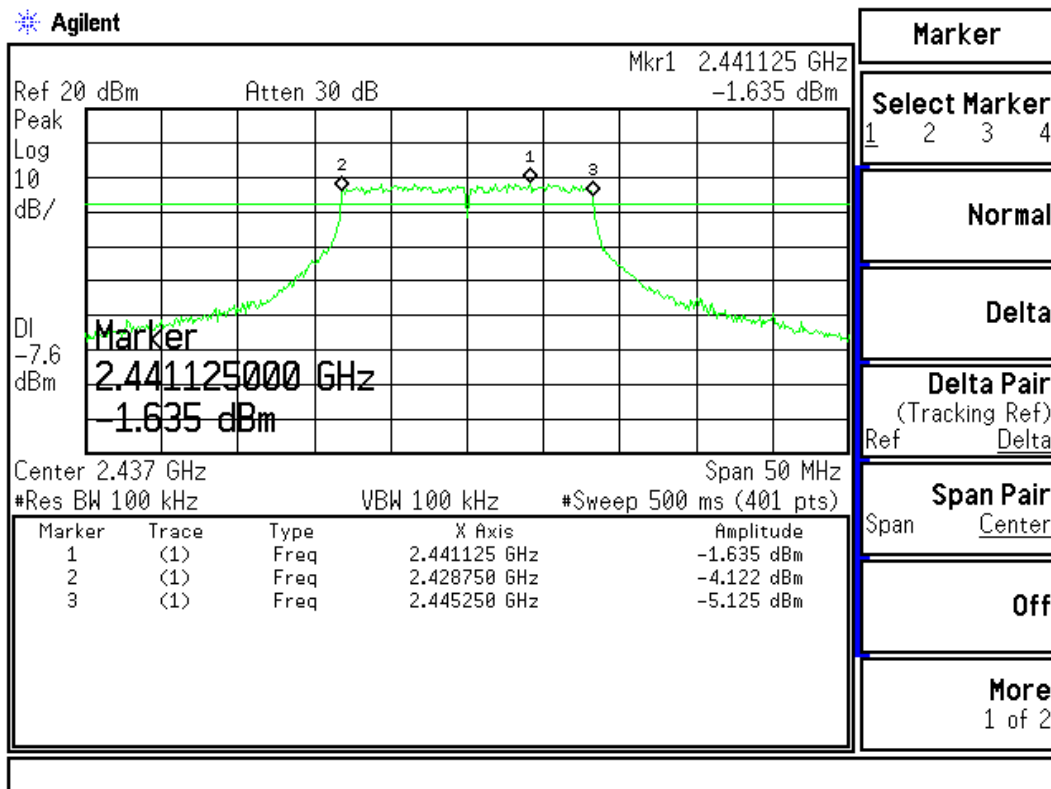
Figure Channel 1:



Product : Juno ST
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter 802.11g (2437MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
6 (54Mbps)	2437.00	16500	>500	Pass

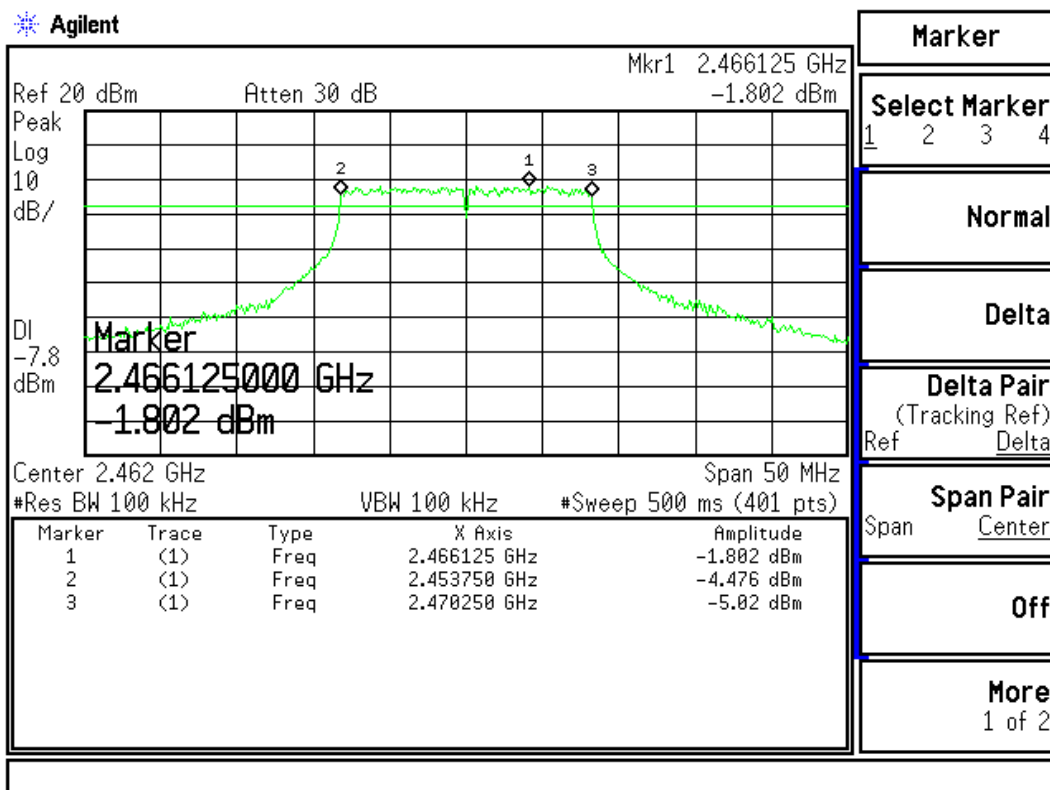
Figure Channel 6:



Product : Juno ST
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter 802.11g (2462MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
11 (54Mbps)	2462.00	16500	>500	Pass

Figure Channel 11:



7. Power Density

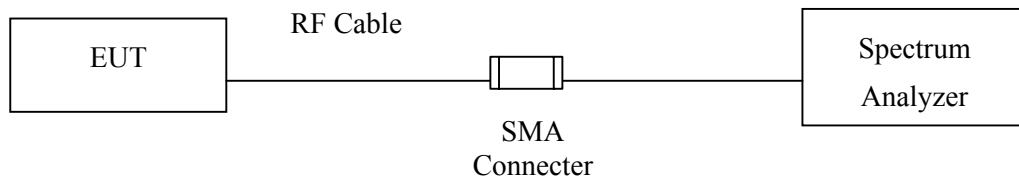
7.1. Test Equipment

The following test equipments are used during the radiated emission tests:

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2006
X Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2006

- Note:
1. All equipments are calibrated every one year.
 2. The test instruments marked by “X” are used to measure the final test results.

7.2. Test Setup



7.3. Limits

The transmitted power density averaged over any 1 second interval shall not be greater +8dBm in any 3kHz bandwidth.

7.4. Uncertainty

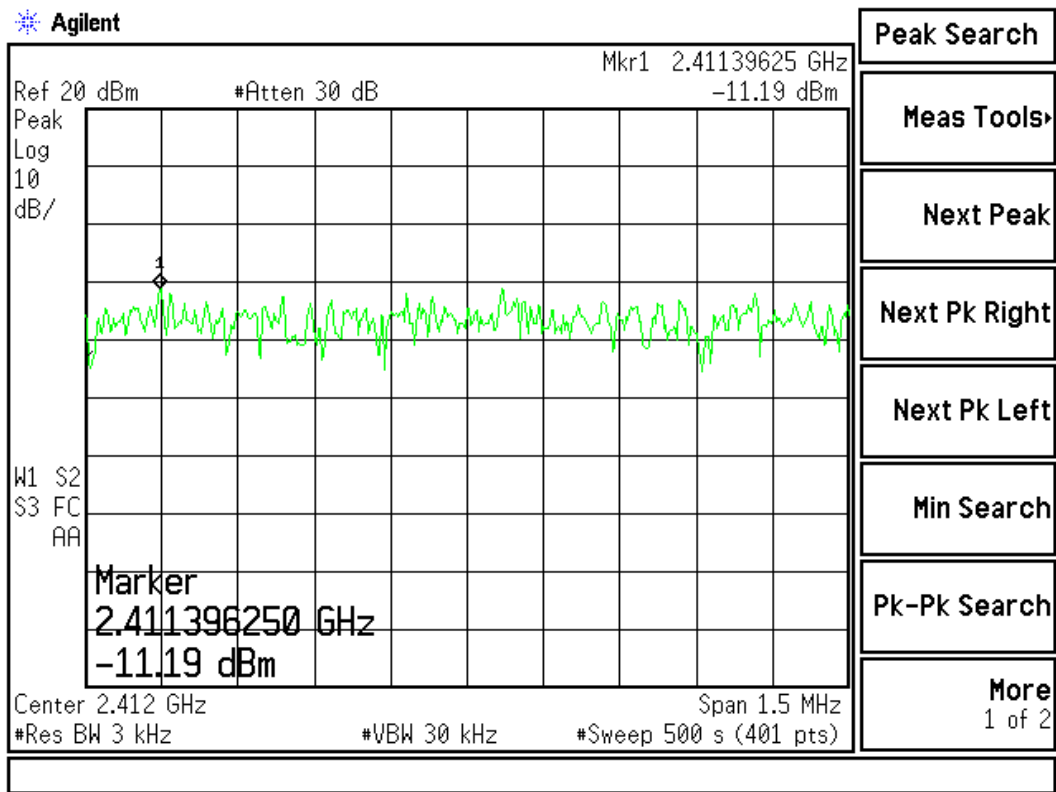
± 1.27 dB

7.5. Test Result of Power Density

Product : Juno ST
 Test Item : Power Density Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11b (2412MHz)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
1 (11Mbps)	2412.00	-11.19	< 10dBm	Pass

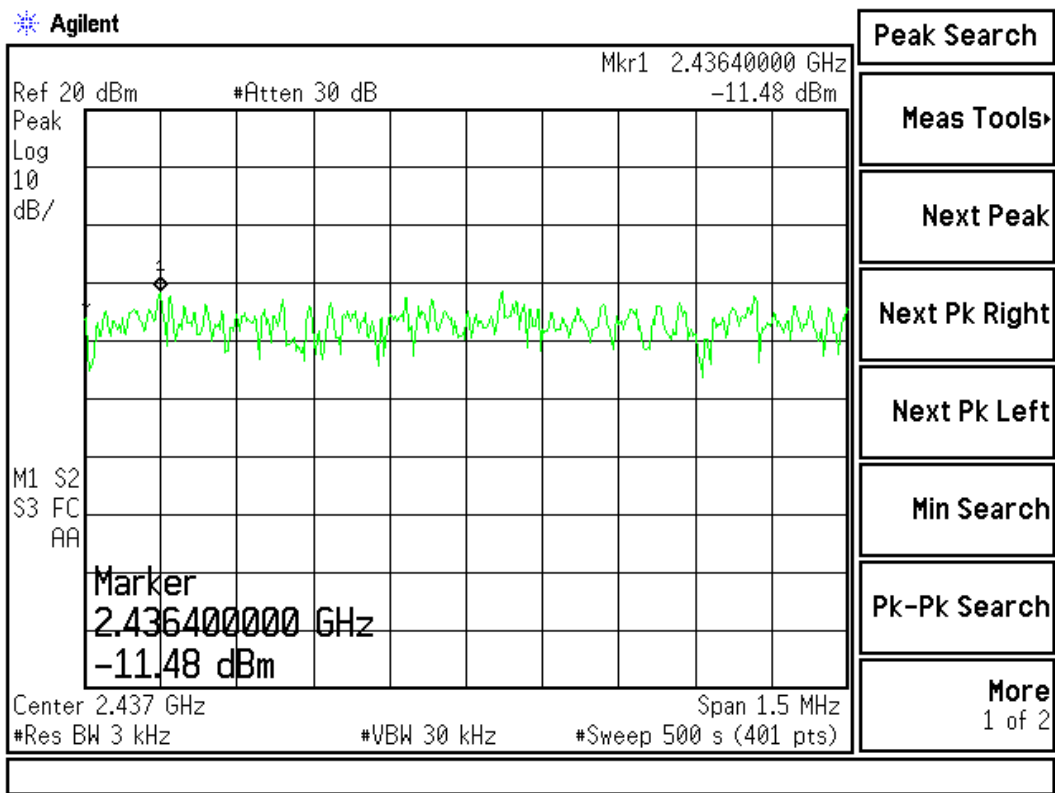
Figure Channel 1: 11Mbps



Product : Juno ST
 Test Item : Power Density Data
 Test Site : No.3OATS
 Test Mode : Mode 1: Transmitter 802.11b (2437MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
6 (11Mbps)	2437.000	-11.48	< 10dBm	Pass

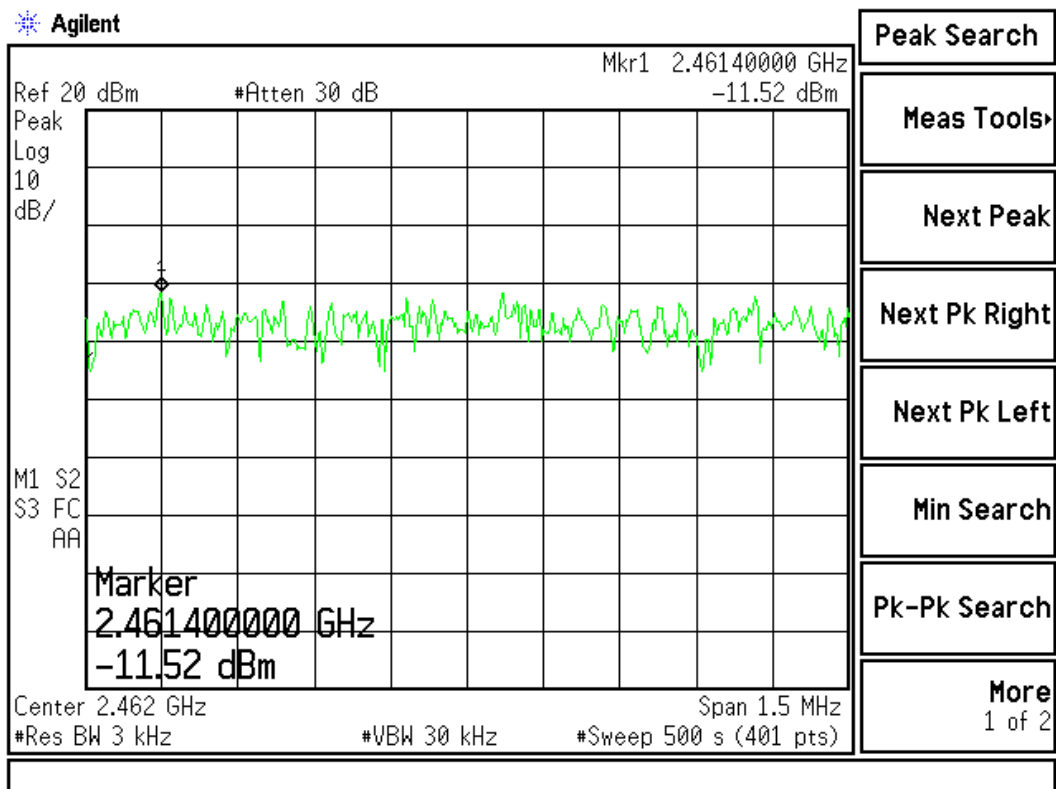
Figure Channel 6: 11Mbps



Product : Juno ST
 Test Item : Power Density Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter 802.11b (2462MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
11 (11Mbps)	2462.00	-11.52	< 10dBm	Pass

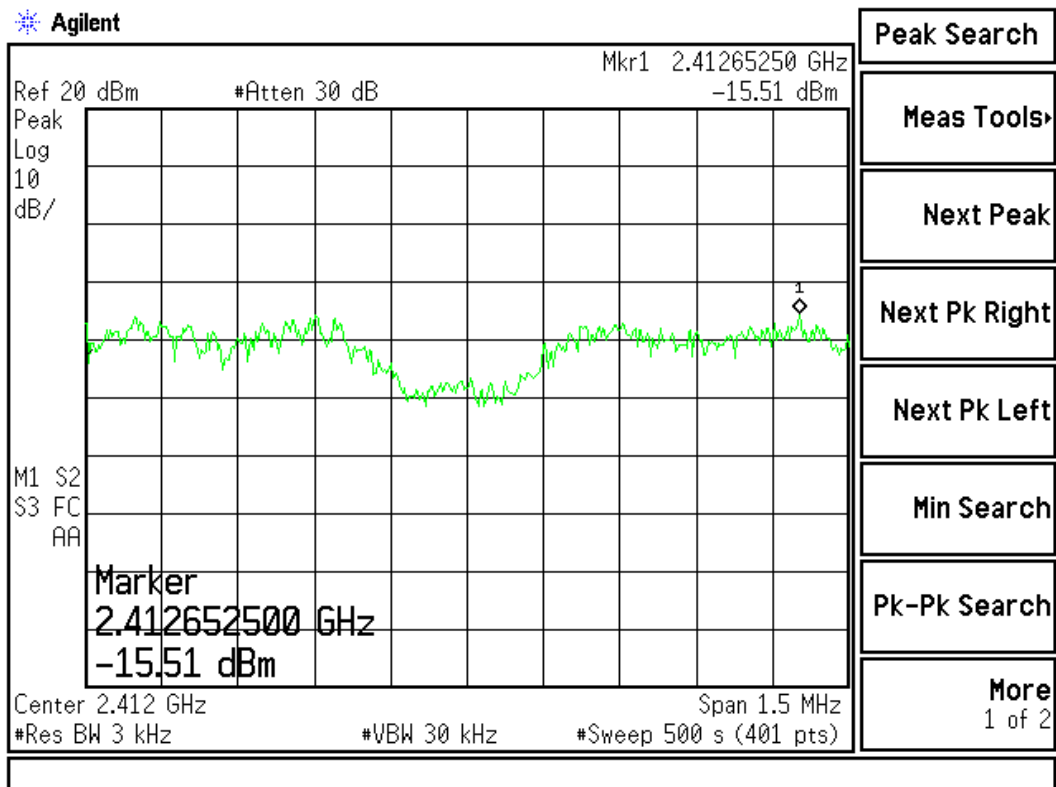
Figure Channel 11: 11Mbps



Product : Juno ST
 Test Item : Power Density Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter 802.11g (2412MHz)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
1 (54Mbps)	2412.00	-15.51	< 10dBm	Pass

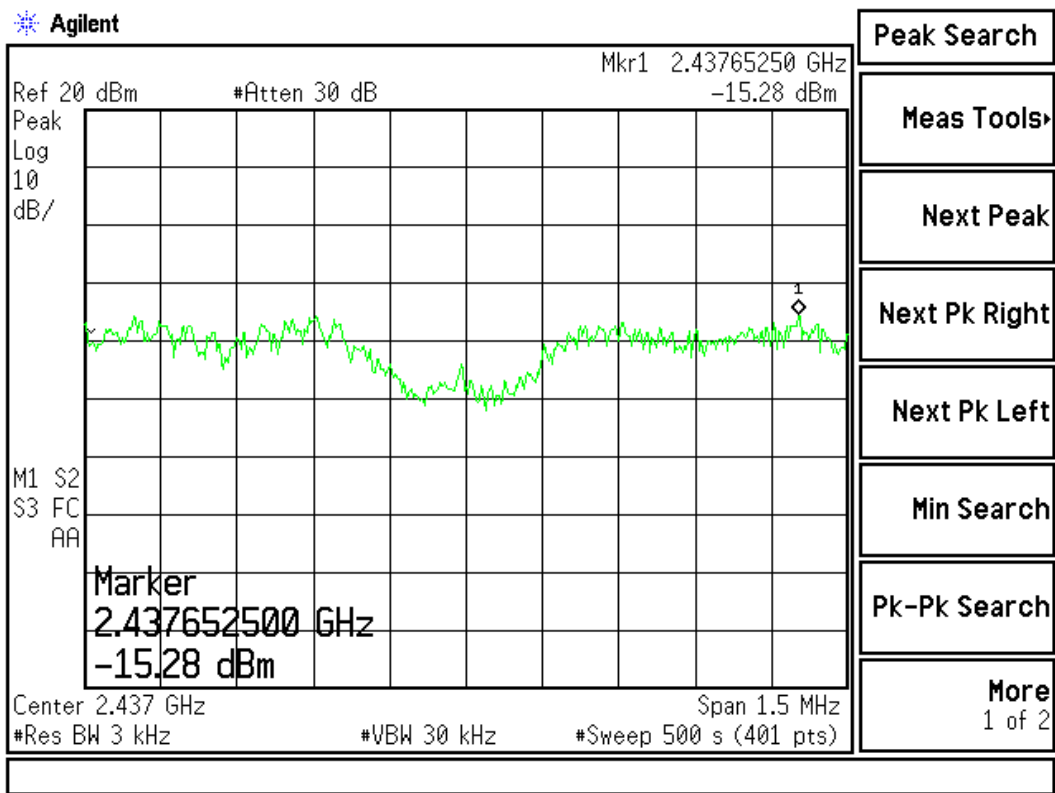
Figure Channel 1:



Product : Juno ST
 Test Item : Power Density Data
 Test Site : No.3OATS
 Test Mode : Mode 2: Transmitter 802.11g (2437MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
6 (54Mbps)	2437.000	-15.28	< 10dBm	Pass

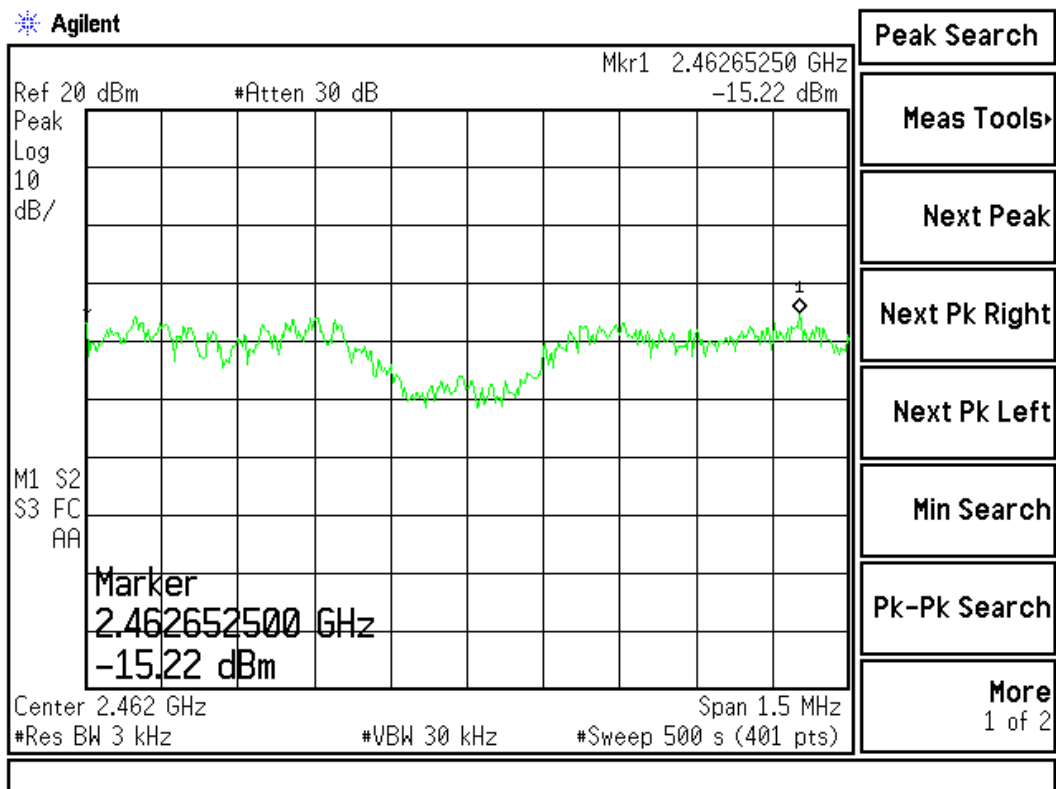
Figure Channel 6:



Product : Juno ST
 Test Item : Power Density Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter 802.11g (2462MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
11 (54Mbps)	2462.00	-15.22	< 10dBm	Pass

Figure Channel 11:



8. EMI Reduction Method During Compliance Testing

No modification was made during testing.