



Test Report

Product Name	Juno ST
Model No.	69991-XX (X can be 0-9)
IC ID.	1756A-69991

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-RFCAP06V01

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.

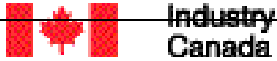
This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

Test Report Certification

Issued Date: March 20, 2007

Report No.: 072L108-RFCAP06V01



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)
IC ID.	1756A-69991
Rated Voltage	AC 120V/60Hz
Working Voltage	AC 120V/60Hz
Trade Name	Trimble
Applicable Standard	RSS-210 Issue 6, Annex 8 (Sep. 2005) ANSI C63.4: 2003
Test Result	Complied 

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

Documented By : Rita Huang

(Engineering Adm. Specialist /
Rita Huang)

Tested By : Dino Chen

(Engineer / D i n o C h e n)

Approved By : Gene Chang

(President / Gene Chang)

TABLE OF CONTENTS

Description	Page
1. GENERAL INFORMATION	5
1.1. EUT Description.....	5
1.2. Operational Description.....	7
1.3. Tested System Details.....	8
1.4. Configuration of Tested System	8
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.....	11
2.4. Test Procedure	11
2.5. Uncertainty	11
2.6. Test Result of Conducted Emission.....	12
3. PEAK POWER OUTPUT	14
3.1. Test Equipment.....	14
3.2. Test Setup	14
3.3. Limit	14
3.4. Uncertainty	14
3.5. Test Result of Peak Power Output.....	15
4. RADIATED EMISSION	16
4.1. Test Equipment.....	16
4.2. Test Setup	17
4.3. Limits.....	17
4.4. Test Procedure	18
4.5. Uncertainty	18
4.6. Test Result of Radiated Emission.....	19
5. BAND EDGE	23
5.1. Test Equipment.....	23
5.2. Test Setup	23
5.3. Limit	24
5.4. Test Procedure	24
5.5. Uncertainty	24
5.6. Test Result of Band Edge	25
6. CHANNEL NUMBER.....	29
6.1. Test Equipment.....	29

6.2.	Test Setup	29
6.3.	Limit	29
6.4.	Uncertainty	29
6.5.	Test Result of Channel Number.....	30
7.	CHANNEL SEPARATION.....	32
7.1.	Test Equipment	32
7.2.	Test Setup	32
7.3.	Limit	32
7.4.	Uncertainty	32
7.5.	Test Result of Channel Separation.....	33
8.	DWELL TIME.....	34
8.1.	Test Equipment	34
8.2.	Test Setup	34
8.3.	Limit	34
8.4.	Uncertainty	34
8.5.	Test Result of Dwell Time.....	35
9.	OCCUPIED BANDWIDTH	37
9.1.	Test Equipment	37
9.2.	Test Setup	37
9.3.	Limits.....	37
9.4.	Uncertainty	37
9.5.	Test Result of Occupied Bandwidth	38
10.	EMI REDUCTION METHOD DURING COMPLIANCE TESTING	41

Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Juno ST
Trade Name	Trimble
IC ID.	1756A-69991
Model No.	69991-XX (X can be 0-9)
Frequency Range	2402 - 2480MHz
Number of Channels	79
Type of Modulation	FHSS
Antenna type	PIFA
Channel Control	Auto
Antenna Gain	Refer to the table "Antenna List"
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	C759-520021-A	1.6 dBi in 2.4 GHz

Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 00:	2402 MHz	Channel 20:	2422 MHz	Channel 40:	2442 MHz	Channel 60:	2462 MHz
Channel 01:	2403 MHz	Channel 21:	2423 MHz	Channel 41:	2443 MHz	Channel 61:	2463 MHz
Channel 02:	2404 MHz	Channel 22:	2424 MHz	Channel 42:	2444 MHz	Channel 62:	2464 MHz
Channel 03:	2405 MHz	Channel 23:	2425 MHz	Channel 43:	2445 MHz	Channel 63:	2465 MHz
Channel 04:	2406 MHz	Channel 24:	2426 MHz	Channel 44:	2446 MHz	Channel 64:	2466 MHz
Channel 05:	2407 MHz	Channel 25:	2427 MHz	Channel 45:	2447 MHz	Channel 65:	2467 MHz
Channel 06:	2408 MHz	Channel 26:	2428 MHz	Channel 46:	2448 MHz	Channel 66:	2468 MHz
Channel 07:	2409 MHz	Channel 27:	2429 MHz	Channel 47:	2449 MHz	Channel 67:	2469 MHz
Channel 08:	2410 MHz	Channel 28:	2430 MHz	Channel 48:	2450 MHz	Channel 68:	2470 MHz
Channel 09:	2411 MHz	Channel 29:	2431 MHz	Channel 49:	2451 MHz	Channel 69:	2471 MHz
Channel 10:	2412 MHz	Channel 30:	2432 MHz	Channel 50:	2452 MHz	Channel 70:	2472 MHz
Channel 11:	2413 MHz	Channel 31:	2433 MHz	Channel 51:	2453 MHz	Channel 71:	2473 MHz
Channel 12:	2414 MHz	Channel 32:	2434 MHz	Channel 52:	2454 MHz	Channel 72:	2474 MHz
Channel 13:	2415 MHz	Channel 33:	2435 MHz	Channel 53:	2455 MHz	Channel 73:	2475 MHz
Channel 14:	2416 MHz	Channel 34:	2436 MHz	Channel 54:	2456 MHz	Channel 74:	2476 MHz
Channel 15:	2417 MHz	Channel 35:	2437 MHz	Channel 55:	2457 MHz	Channel 75:	2477 MHz
Channel 16:	2418 MHz	Channel 36:	2438 MHz	Channel 56:	2458 MHz	Channel 76:	2478 MHz
Channel 17:	2419 MHz	Channel 37:	2439 MHz	Channel 57:	2459 MHz	Channel 77:	2479 MHz
Channel 18:	2420 MHz	Channel 38:	2440 MHz	Channel 58:	2460 MHz	Channel 78:	2480 MHz
Channel 19:	2421 MHz	Channel 39:	2441 MHz	Channel 59:	2461 MHz		

The system receivers have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals

Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. The transmitter is presented with a continuous data stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its 79 channels and over the minimum number of hopping channels (75 channels).

The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

Note:

1. This device is a Juno ST with a built-in 2.4GHz Bluetooth transceiver.
2. These tests were conducted on a sample for the purpose of demonstrating compliance of Bluetooth receiver with RSS-210 Issue 6 Annex 8 for frequency hopping devices.
3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
4. QuieTek verified among construction and function in typical operation.

1.2. Operational Description

The EUT is a Juno ST with a built-in 2.4GHz Bluetooth transceiver. The number of the channels is 79. The device adapts the frequency hopping spread spectrum modulation. The antenna is connector-type and provides diversity function to improve the receiving function.

This device provides wireless technology that revolutionizes personal connectivity. It is the solution for the seamless integration of Bluetooth technology into personal computer enabling short-range wireless connections between desktop/laptop computers, Bluetooth-enabled peripherals, and portable handheld devices.

Test Mode	Mode 1: Transmitter
-----------	---------------------

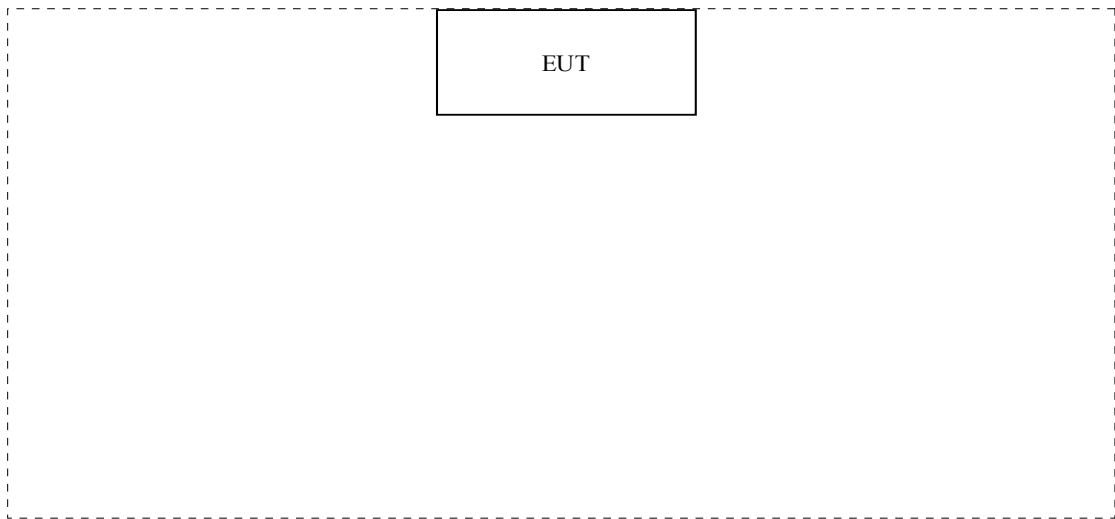
1.3. Tested System Details

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.	Power Cord
(1)	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 Tested System



1.5. EUT Exercise Software

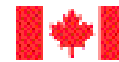
- (1) Setup the EUT as shown in section 1.4
- (2) Power on the EUT.
- (3) Execute AutoRun(BCM2045).exe
- (4) Configure the test channel and the packet type.
- (5) Click on “Start” to transmit continuously.
- (6) Verify that the EUT works properly.

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	30-65
Barometric pressure (mbar)	860-1060	950-1000

Site Description: File on
 Certification and Engineering Bureau
 3701 Carling Ave., Building 94
 P.O. Box 11490, Station "H"
 Ottawa, Ontario
 K2H 8S2
 File No.: 46405-4075
 Submission: 10315



**Industry
 Canada**

Site Name: Quietek Corporation
 Site Address: No. 5-22, Ruei-Shu Valley, Ruei-Ping Tsuen,
 Lin-Kou Shiang, Taipei,
 Taiwan, R.O.C.
 TEL: 886-2-8601-3788 / FAX : 886-2-8601-3789
 E-Mail : service@quietek.com

2. Conducted Emission

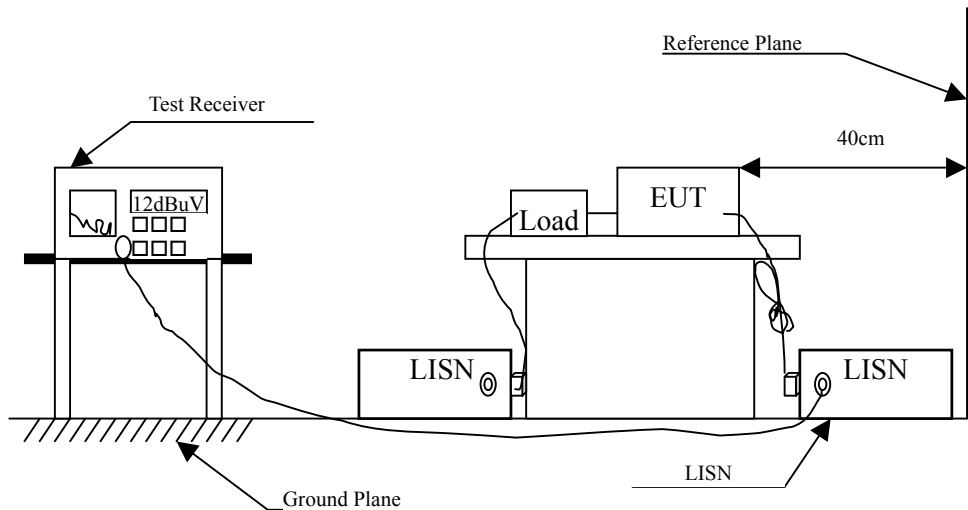
2.1. Test Equipment

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

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal.	Remark
1	EMI Test Receiver	R&S	ESCS 30/100367	Aug., 2006	
2	LISN	R&S	ESH3-Z5/836679/023	July, 2006	EUT
3	LISN	R&S	ESH3-Z5/836679/017	Feb., 2007	Peripherals
4	Pulse Limiter	R&S	ESH3-Z2/357.8810.52	Sep, 2006	
5	No.7 Shielded Room			N/A	

Note: All instruments are calibrated every one year.

2.2. Test Setup



2.3. Limits

RSS-Gen Issue 1 Section 7.2.2 Limits		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks: In the above table, the tighter limit applies at the band edges.

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 of 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 (2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
LINE 1					
Quasi-Peak					
0.259	0.206	36.180	36.386	-26.500	62.886
0.548	0.217	23.170	23.387	-32.613	56.000
1.029	0.234	28.730	28.964	-27.036	56.000
2.353	0.291	28.010	28.301	-27.699	56.000
4.834	0.394	24.680	25.074	-30.926	56.000
11.791	0.727	28.510	29.237	-30.763	60.000
Average					
0.259	0.206	21.810	22.016	-30.870	52.886
0.548	0.217	8.620	8.837	-37.163	46.000
1.029	0.234	16.290	16.524	-29.476	46.000
2.353	0.291	16.680	16.971	-29.029	46.000
4.834	0.394	13.560	13.954	-32.046	46.000
11.791	0.727	19.970	20.697	-29.303	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 (2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
LINE 2					
Quasi-Peak					
0.181	0.202	35.810	36.012	-29.102	65.114
0.259	0.203	37.730	37.933	-24.953	62.886
0.455	0.216	34.530	34.746	-22.540	57.286
0.822	0.230	24.860	25.090	-30.910	56.000
3.666	0.338	24.630	24.968	-31.032	56.000
11.599	0.615	23.250	23.865	-36.135	60.000
Average					
0.181	0.202	17.690	17.892	-37.222	55.114
0.259	0.203	22.780	22.983	-29.903	52.886
0.455	0.216	23.280	23.496	-23.790	47.286
0.822	0.230	14.650	14.880	-31.120	46.000
3.666	0.338	14.750	15.088	-30.912	46.000
11.599	0.615	17.190	17.805	-32.195	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

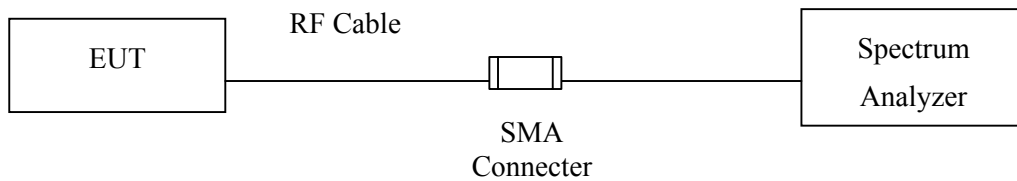
3.1. Test Equipment

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

3.2. Test Setup



3.3. Limit

The maximum peak power shall be less 1Watt.

3.4. Uncertainty

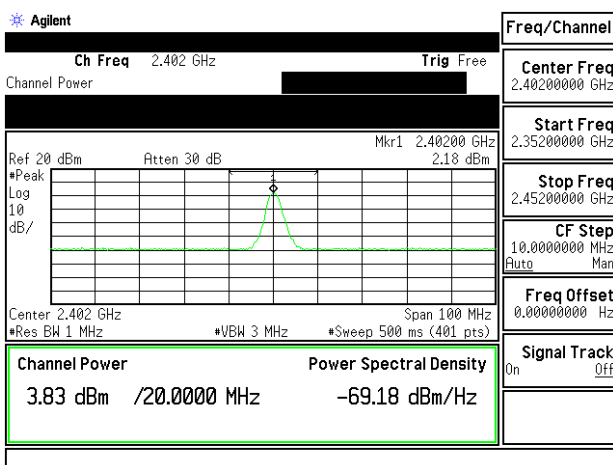
± 1.27 dB

3.5. Test Result of Peak Power Output

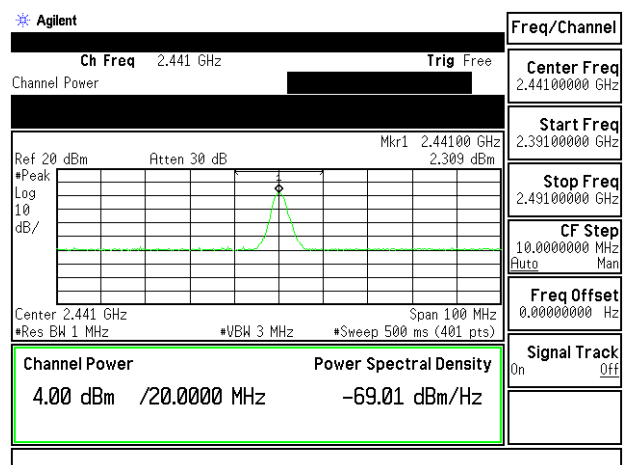
Product : Juno ST
 Test Item : Peak Power Output
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter

Channel No.	Frequency (MHz)	Measurement	Required Limit	Result
Channel 00	2402.00	3.83dBm	1 Watt= 30 dBm	Pass
Channel 39	2441.00	4.00dBm	1 Watt= 30 dBm	Pass
Channel 78	2480.00	3.84dBm	1 Watt= 30 dBm	Pass

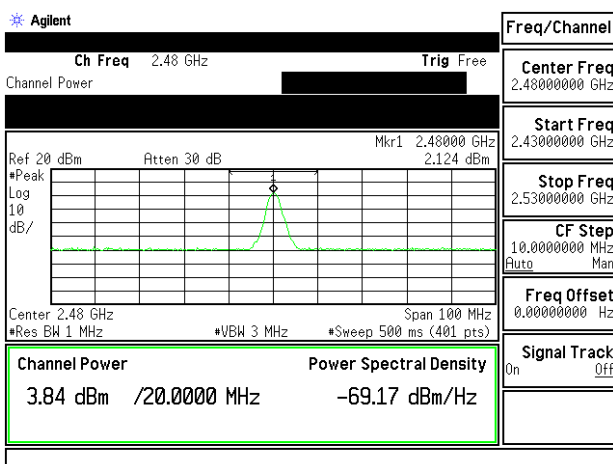
Channel 00



Channel 39



Channel 78



4. Radiated Emission

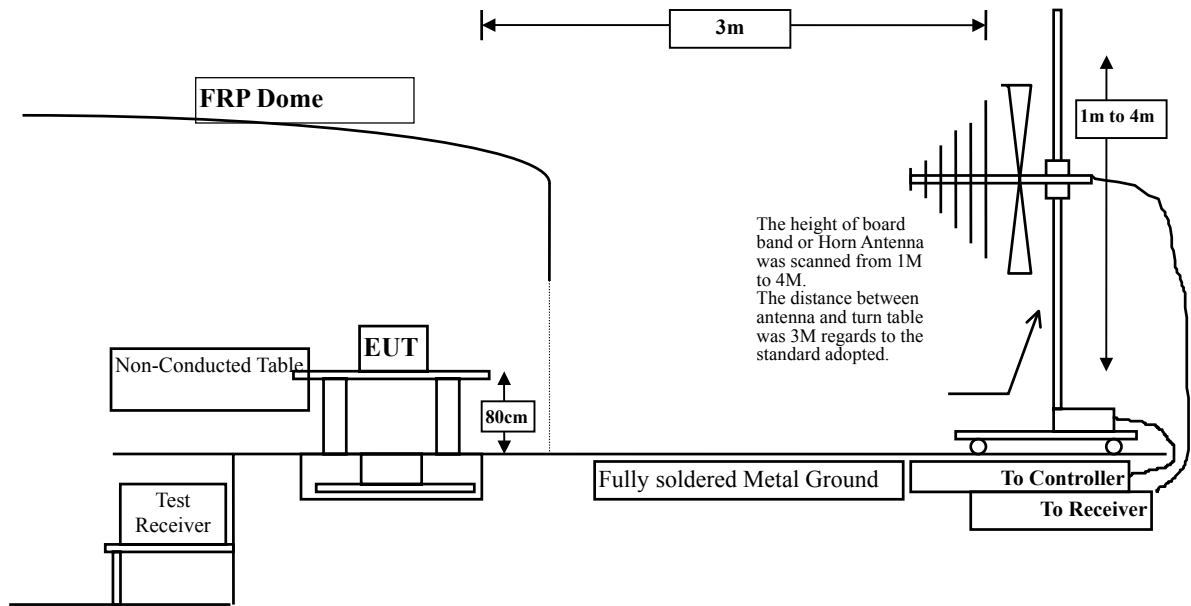
4.1. Test Equipment

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

Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
<input type="checkbox"/> Site # 1	Test Receiver	R & S	ESVS 10 / 834468/003	May, 2006
	Spectrum Analyzer	Advantest	R3162/ 00803480	May, 2006
	Pre-Amplifier	Advantest	BB525C/ 3307A01812	May, 2006
	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	Sep., 2005
<input type="checkbox"/> Site # 2	Test Receiver	R & S	ESCS 30 / 836858 / 022	May, 2006
	Spectrum Analyzer	Advantest	R3162 / 100803466	May, 2006
	Pre-Amplifier	Advantest	BB525C/3307A01814	May, 2006
	Bilog Antenna	SCHAFFNER	CBL6112B / 2705	May, 2006
	Horn Antenna	ETS	3115 / 0005-6160	Sep., 2006
	Pre-Amplifier	QTK	QTK-AMP-01/ 0001	May, 2006
<input checked="" type="checkbox"/> Site # 3	Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2006
	Spectrum Analyzer	HP	E4407B / US39440758	May, 2006
	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2006
	Horn Antenna	Schwarzbeck	BBHA9120D / 305, 306	July, 2006
	Horn Antenna	Schwarzbeck	BBHA9170 / 208, 209	July, 2006
	Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2006
	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2006
	Pre-Amplifier	HP	8449B / 3008A01123	July, 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.

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 Section 2.6, whichever is the lesser attenuation.

RSS-210 Issue 6 Section 2.6		
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
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2402MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4804.000	2.888	38.326	41.213	-32.757	74.000
7206.000	9.442	36.169	45.610	-28.360	74.000
9608.000	10.484	36.730	47.214	-26.756	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4804.000	2.888	37.779	40.666	-33.304	74.000
7206.000	9.442	41.061	50.502	-23.468	74.000
9608.000	10.484	36.468	46.952	-27.018	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
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4882.000	3.056	38.226	41.282	-32.688	74.000
7323.000	9.570	39.071	48.640	-25.330	74.000
9764.000	10.614	38.326	48.940	-25.030	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4882.000	3.056	38.066	41.122	-32.848	74.000
7323.000	9.570	41.251	50.820	-23.150	74.000
9764.000	10.614	36.557	47.171	-26.799	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
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2480MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4960.000	3.237	38.170	41.407	-32.563	74.000
7440.000	9.689	36.977	46.665	-27.305	74.000
9920.000	10.742	38.200	48.941	-25.029	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4960.000	3.237	37.707	40.944	-33.026	74.000
7440.000	9.689	37.982	47.670	-26.300	74.000
9920.000	10.742	36.988	47.729	-26.241	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 : General Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
42.125	13.519	6.429	19.948	-20.052	40.000
143.975	11.972	12.869	24.841	-18.659	43.500
156.100	11.251	20.043	31.294	-12.206	43.500
168.225	10.202	16.285	26.487	-17.013	43.500
219.150	9.866	9.881	19.747	-26.253	46.000
294.325	13.921	9.539	23.460	-22.540	46.000
Vertical					
49.400	8.137	12.003	20.140	-19.860	40.000
87.775	9.031	11.240	20.271	-19.729	40.000
151.250	10.473	12.060	22.533	-20.967	43.500
316.150	14.037	7.895	21.932	-24.068	46.000
461.650	18.489	2.726	21.215	-24.785	46.000
619.275	21.591	6.089	27.680	-18.320	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:

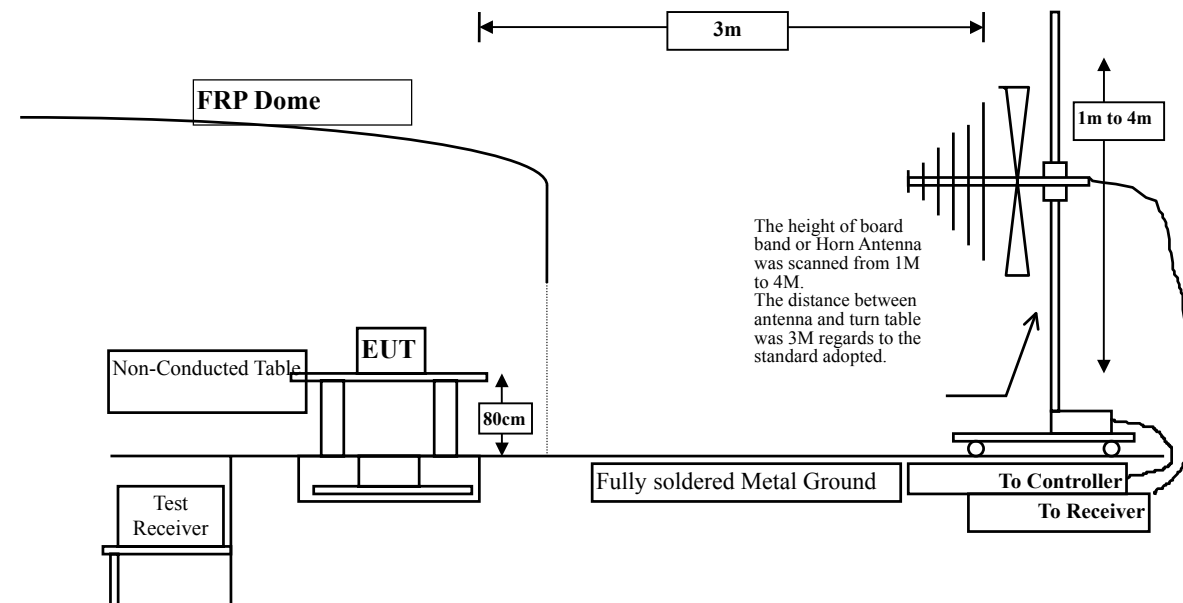
	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2006
X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2006
X	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2006
X	Horn Antenna	Schwarzbeck	BBHA9120D / 305, 306	July, 2006
X	Horn Antenna	Schwarzbeck	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

Test Site Site 3

- Note:
1. All equipments 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 Radiated Measurement:



5.3. Limit

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 2.6 is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 2.6, must also comply with the radiated emission limits specified in Section 2.6.

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
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2402MHz)

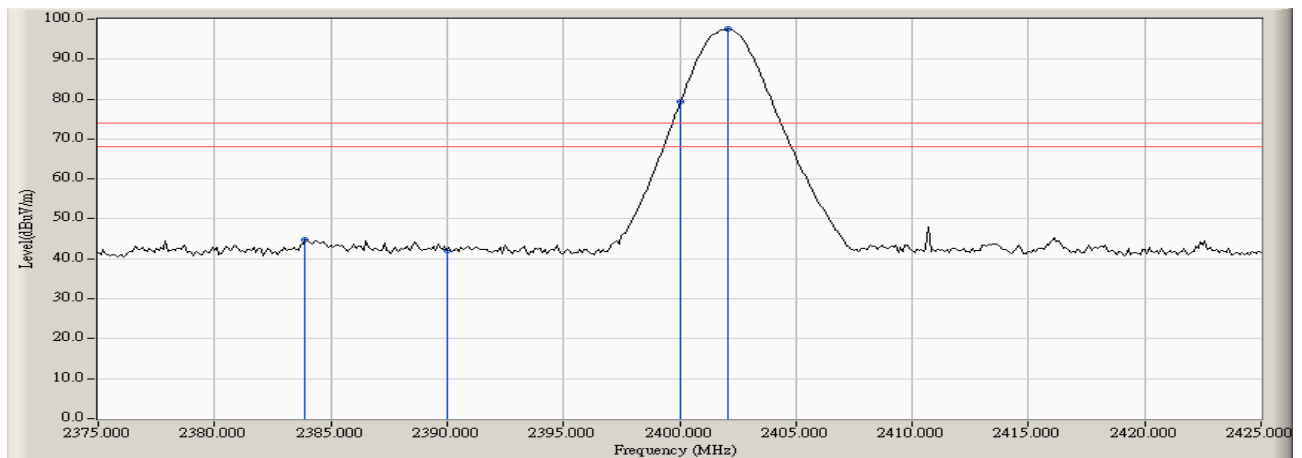
RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
00	<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
00 (Peak)	2383.900	-1.425	46.147	44.722	74.00	54.00	Pass
00 (Average)	--	--	--	--	74.00	54.00	Pass

Figure Channel 00: (Horizontal)



Note:

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

Product : Juno ST
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2402MHz)

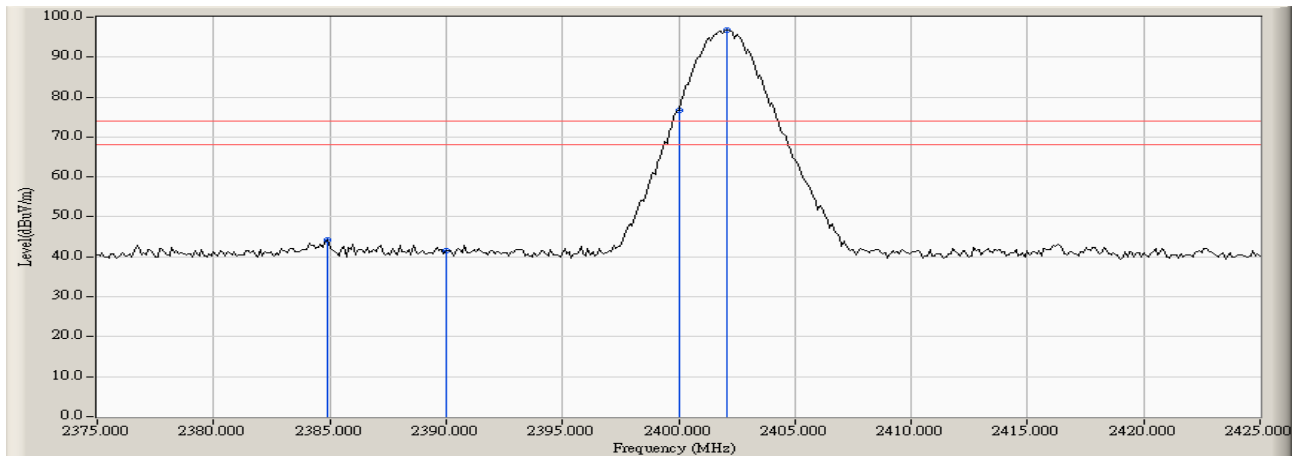
RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
00	<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
00 (Peak)	2384.900	-1.423	45.569	44.146	74.00	54.00	Pass
00(Average)	--	--	--	--	74.00	54.00	Pass

Figure Channel 00: (Vertical)



Note:

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

Product : Juno ST
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2480MHz)

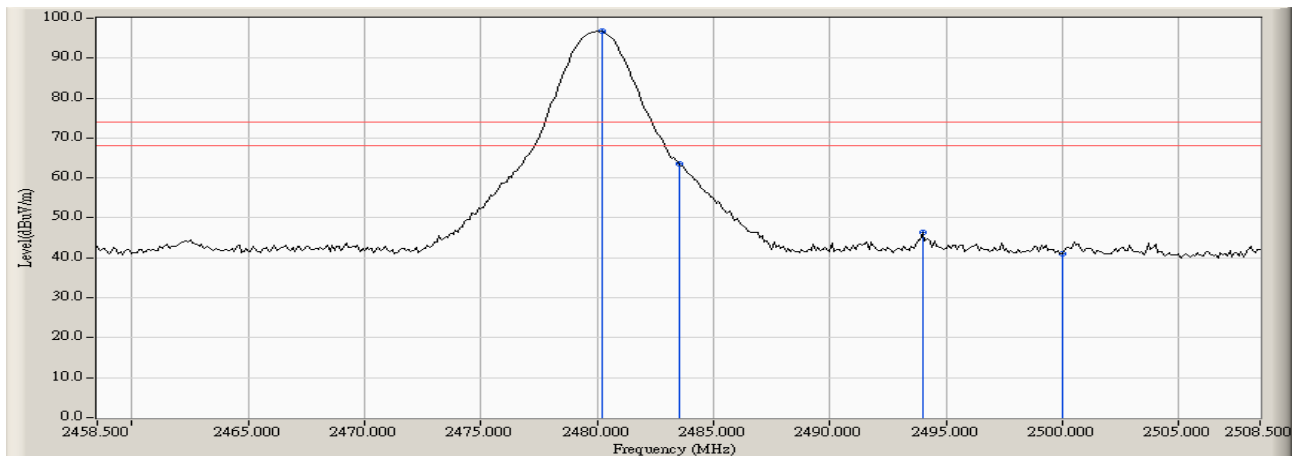
RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
78	>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
78(Peak)	2494.000	-1.006	47.401	46.395	74.00	54.00	Pass
78(Average)	--	--	--	--	74.00	54.00	Pass

Figure Channel 78: (Horizontal)



Note:

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

Product : Juno ST
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2480MHz)

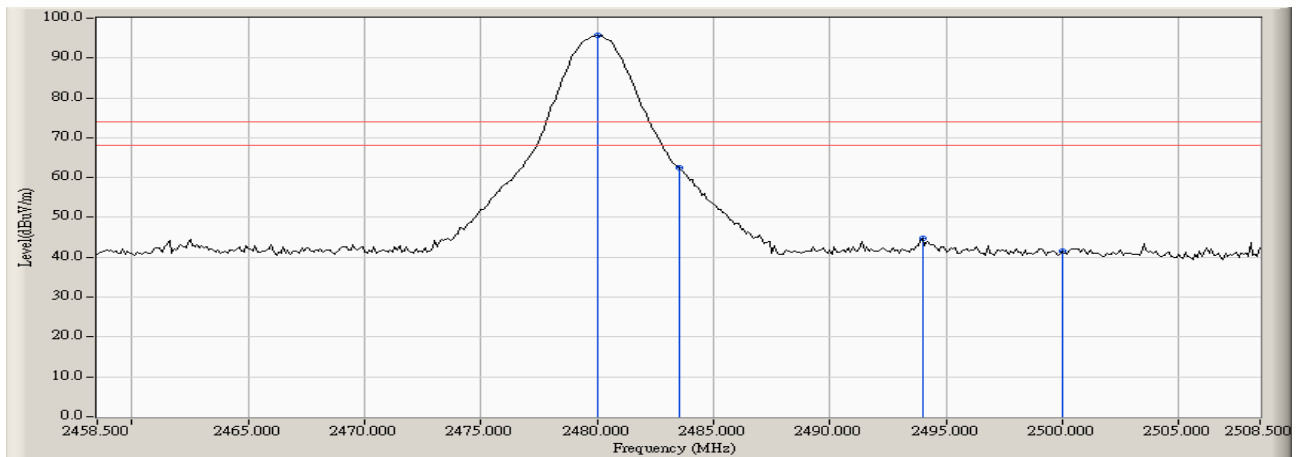
RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
78	>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
78(Peak)	2494.000	-1.006	45.730	44.724	74.00	54.00	Pass
78(Average)	--	--	--	--	74.00	54.00	Pass

Figure Channel 78: (Vertical)



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. Channel Number

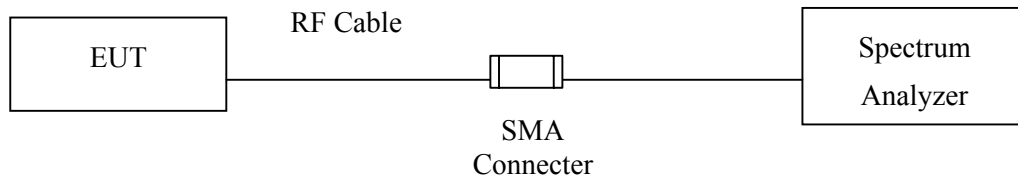
6.1. Test Equipment

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 equipments 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. Limit

Frequency hopping systems operating in the 2400-2483.5 MHz bands shall use at least 75 hopping frequencies.

6.4. Uncertainty

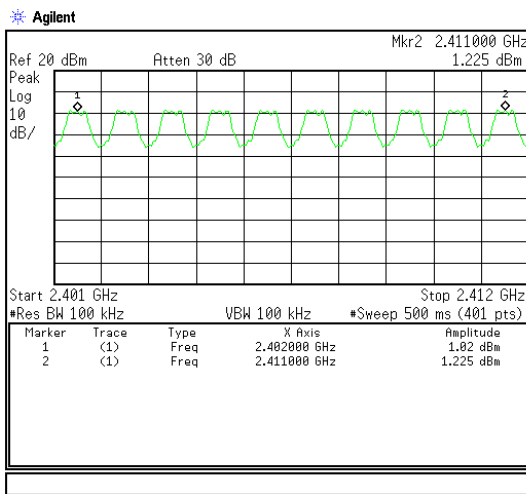
N/A

6.5. Test Result of Channel Number

Product : Juno ST
 Test Item : Channel Number
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter

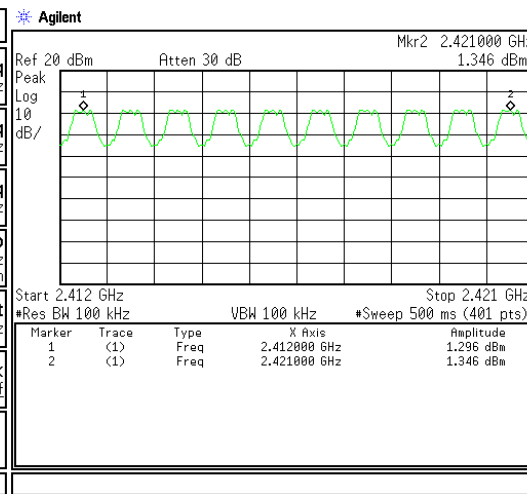
Frequency Range (MHz)	Measurement (Hopping Channel)	Required Limit (Hopping Channel)	Result
2402 ~ 2480	79	>75	Pass

2402-2411MHz



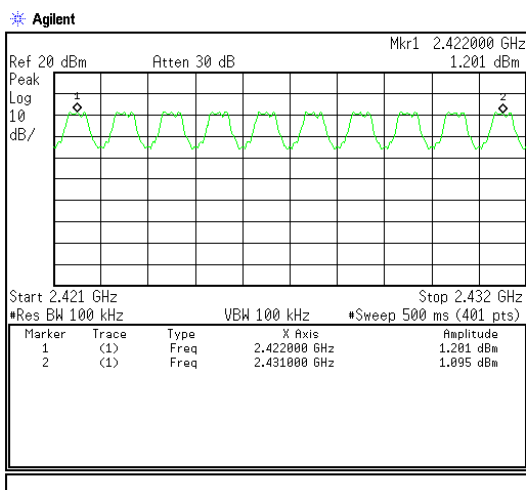
Freq/Channel	
Center Freq	2.40650000 GHz
Start Freq	2.40150000 GHz
Stop Freq	2.41150000 GHz
CF Step	1.00000000 MHz
Freq Offset	0.00000000 Hz
Signal Track	On

2412-2421MHz



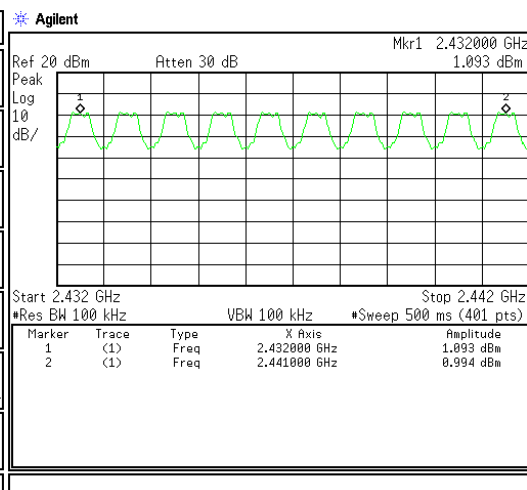
Freq/Channel	
Center Freq	2.41650000 GHz
Start Freq	2.41150000 GHz
Stop Freq	2.42150000 GHz
CF Step	1.00000000 MHz
Freq Offset	0.00000000 Hz
Signal Track	On

2422-2431MHz



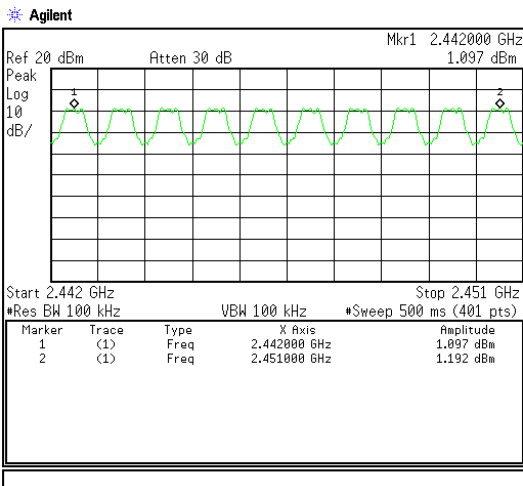
Freq/Channel	
Center Freq	2.42650000 GHz
Start Freq	2.42150000 GHz
Stop Freq	2.43150000 GHz
CF Step	1.00000000 MHz
Freq Offset	0.00000000 Hz
Signal Track	On

2432-2441MHz



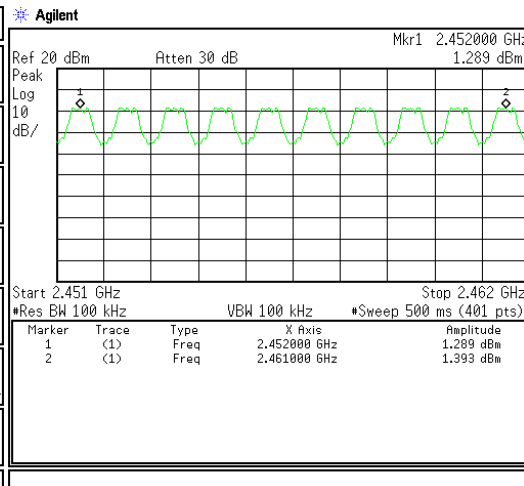
Marker	
Select Marker	1 2 3 4
Normal	
Delta	
Delta Pair (Tracking Ref)	Ref Delta
Span Pair	Span Center
Off	
More	1 of 2

2442-2451MHz



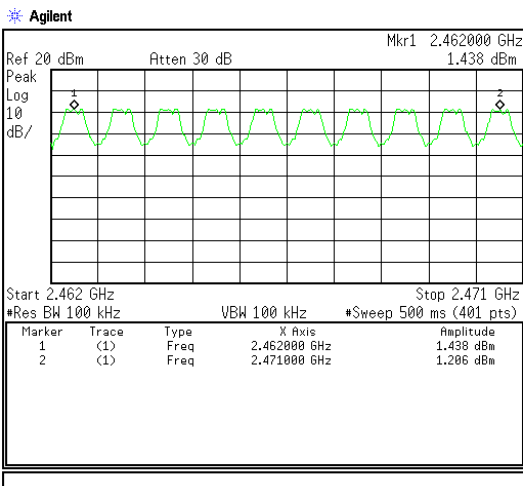
Freq/Channel
Center Freq 2.44650000 GHz
Start Freq 2.44150000 GHz
Stop Freq 2.45150000 GHz
CF Step 1.00000000 MHz Auto Man
Freq Offset 0.00000000 Hz
Signal Track On Off

2452-2461MHz



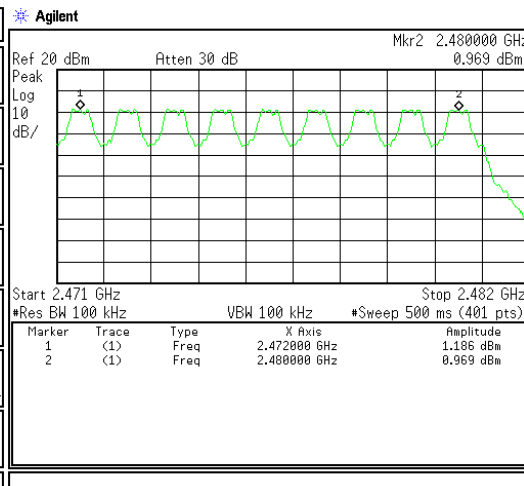
Freq/Channel
Center Freq 2.45650000 GHz
Start Freq 2.45150000 GHz
Stop Freq 2.46150000 GHz
CF Step 1.00000000 MHz Auto Man
Freq Offset 0.00000000 Hz
Signal Track On Off

2462-2471MHz



Freq/Channel
Center Freq 2.46650000 GHz
Start Freq 2.46150000 GHz
Stop Freq 2.47150000 GHz
CF Step 1.00000000 MHz Auto Man
Freq Offset 0.00000000 Hz
Signal Track On Off

2472-2481MHz



Marker
Select Marker 1 2 3 4
Normal
Delta
Delta Pair (Tracking Ref) Ref Delta
Span Pair Span Center
Off
More 1 of 2

7. Channel Separation

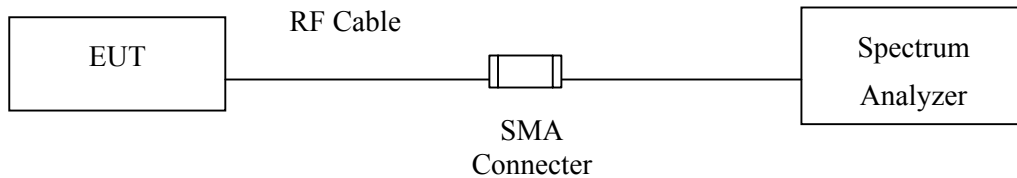
7.1. Test Equipment

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 mark by “X” are used to measure the final test results.

7.2. Test Setup



7.3. Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

7.4. Uncertainty

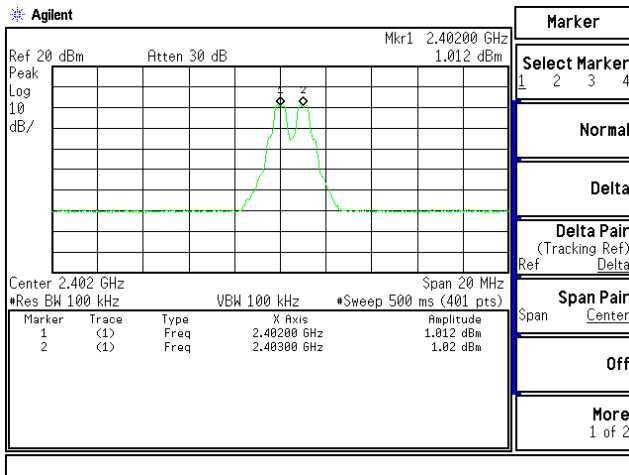
± 150Hz

7.5. Test Result of Channel Separation

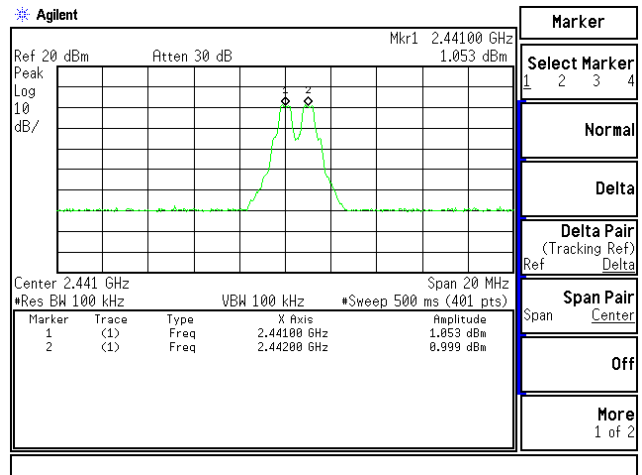
Product : Juno ST
 Test Item : Channel Separation
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter

Frequency (MHz)	Measurement Level (MHz)	Required Limit	Result
2402	1.00	>25 kHz or 2/3 * 20 dB BW	Pass
2441	1.00	>25 kHz or 2/3 * 20 dB BW	Pass
2480	1.00	>25 kHz or 2/3 * 20 dB BW	Pass

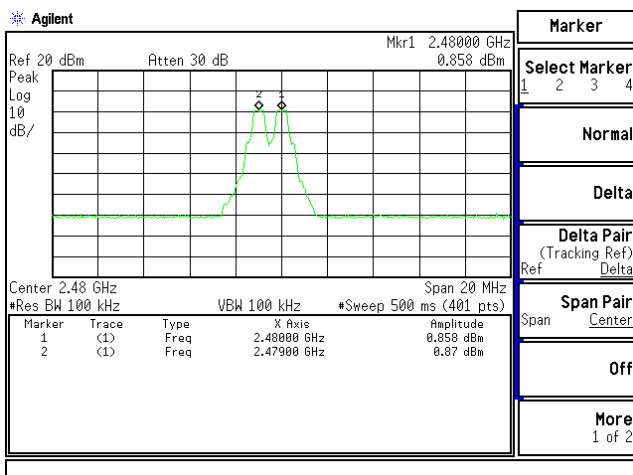
Channel 00 2402MHz



Channel 39 2441MHz



Channel 78 2480 MHz



8. Dwell Time

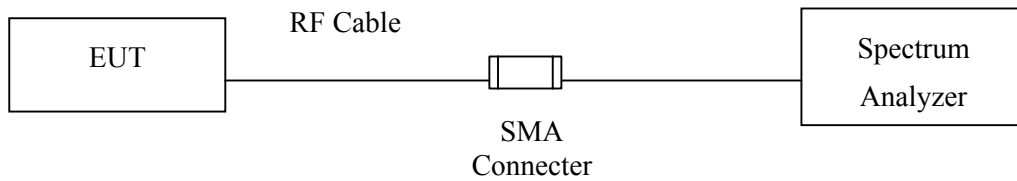
8.1. Test Equipment

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.

8.2. Test Setup



8.3. Limit

The dwell time shall be the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

8.4. Uncertainty

± 25msec

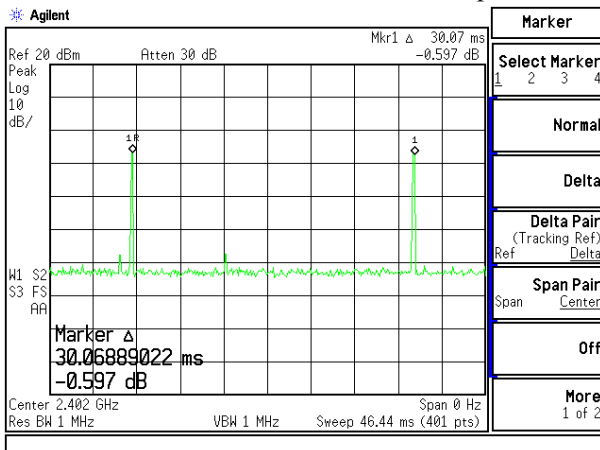
8.5. Test Result of Dwell Time

Product : Juno ST
 Test Item : Dwell Time
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Channel 00,39,78 –DH5)

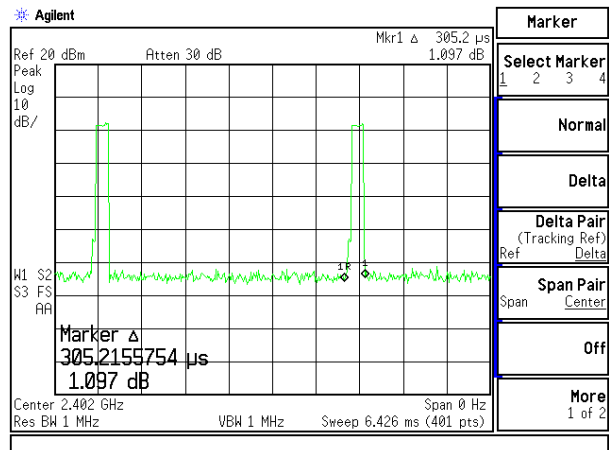
Channel No.	Frequency (MHz)	Time Interval between hops (ms)	Transmission Time (us)	Dwell Time (ms)	Limit (ms)	Result
00	2402	30.068	305.2155	320.7665891	400	Pass
39	2441	29.9527	362.8421	382.7972223	400	Pass
78	2480	30.0689	303.1809	318.6187869	400	Pass

Note: Dwell Time = 79 * 400 / Time Interval Between Hops * Transmission Time / 1000

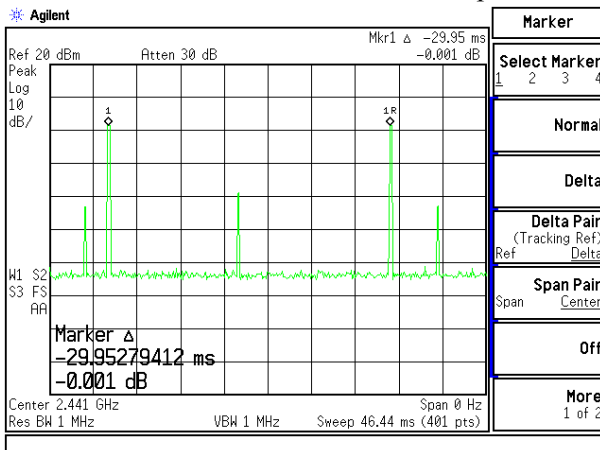
CH 2402MHz Time Interval between hops



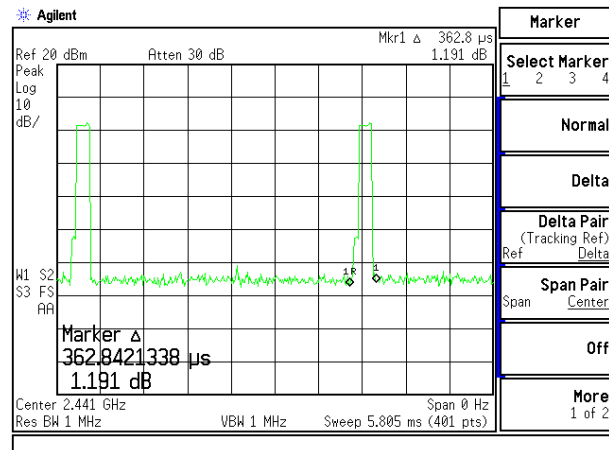
Transmission Time



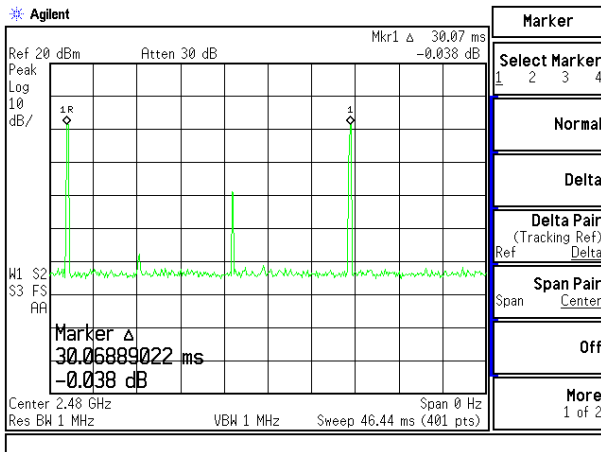
CH 2441MHz Time Interval between hops



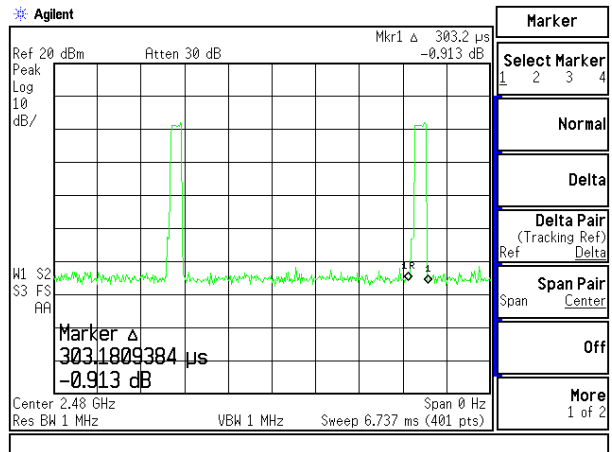
Transmission Time



CH 2480MHz Time Interval between hops



Transmission Time



Note:

The dwell times of the packet type of DH1, DH3, and DH3 are tested. Only the worst case is shown on the report.

9. Occupied Bandwidth

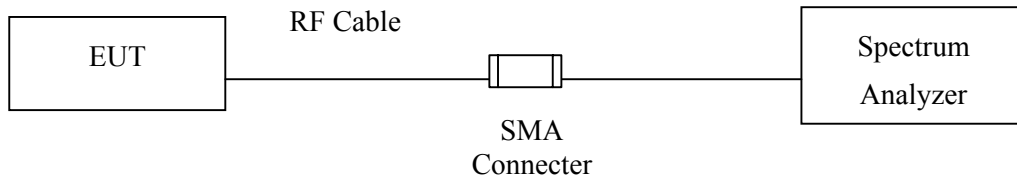
9.1. Test Equipment

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.

9.2. Test Setup



9.3. Limits

N/A

9.4. Uncertainty

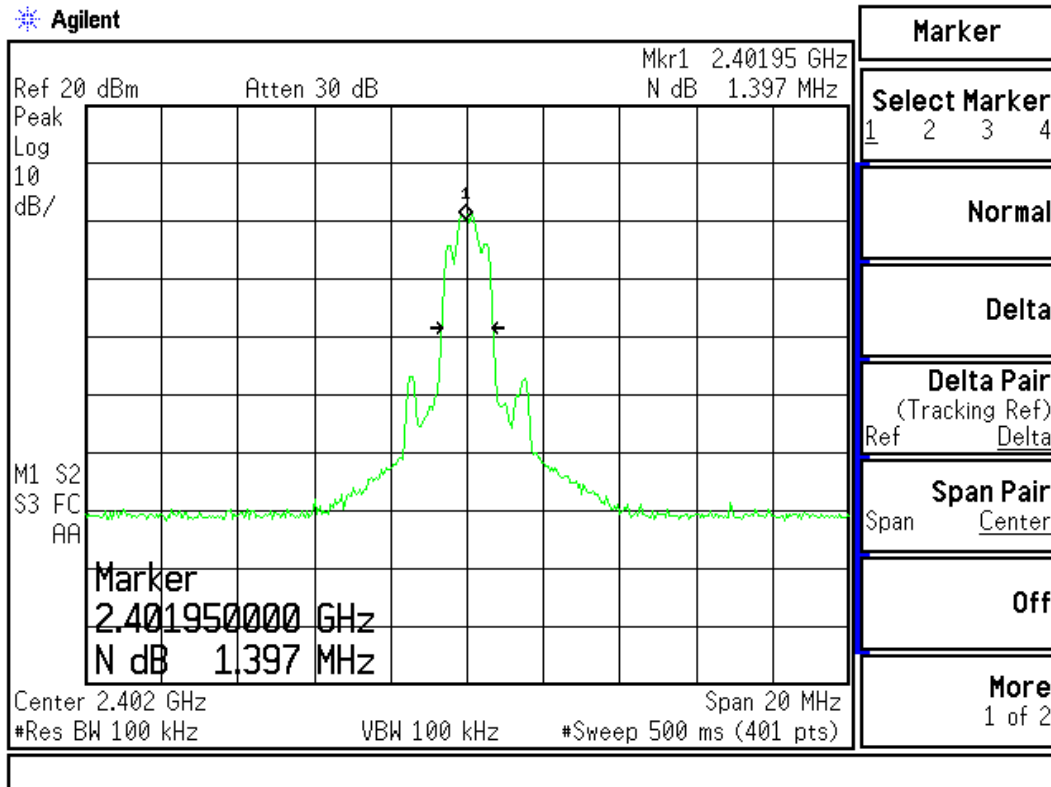
± 150Hz

9.5. Test Result of Occupied Bandwidth

Product : Juno ST
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2402MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	1397	--	Pass

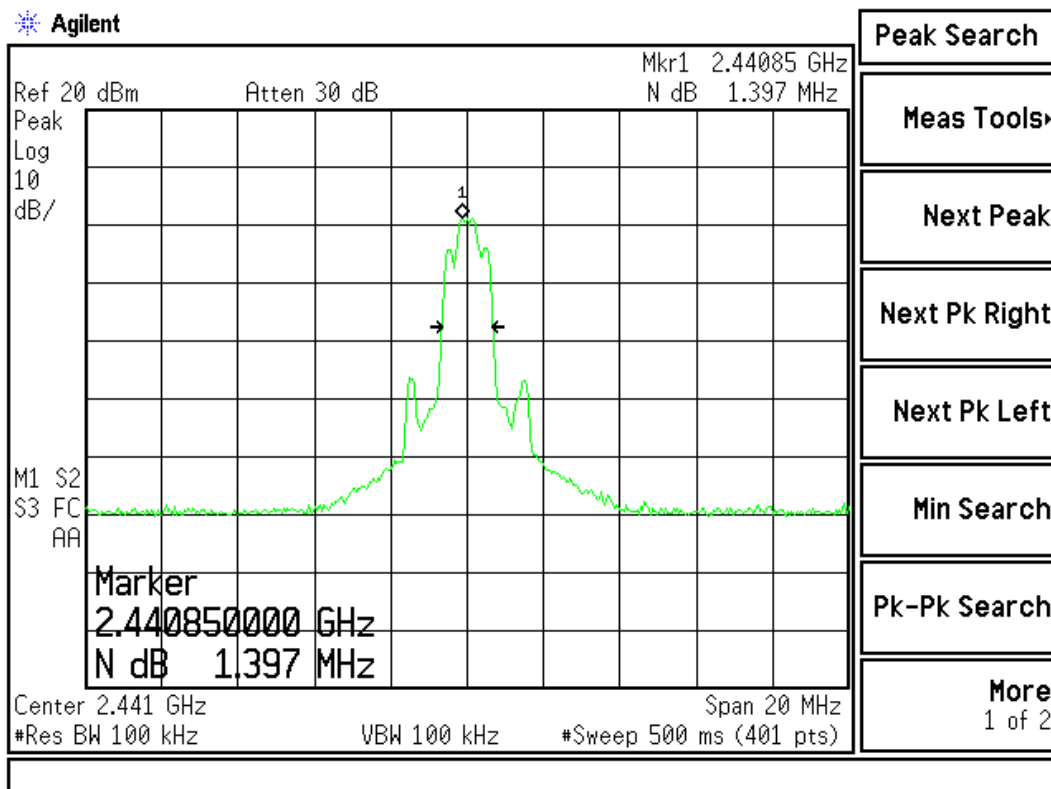
Figure Channel 00:



Product : Juno ST
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2441MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
39	2441	1397	--	Pass

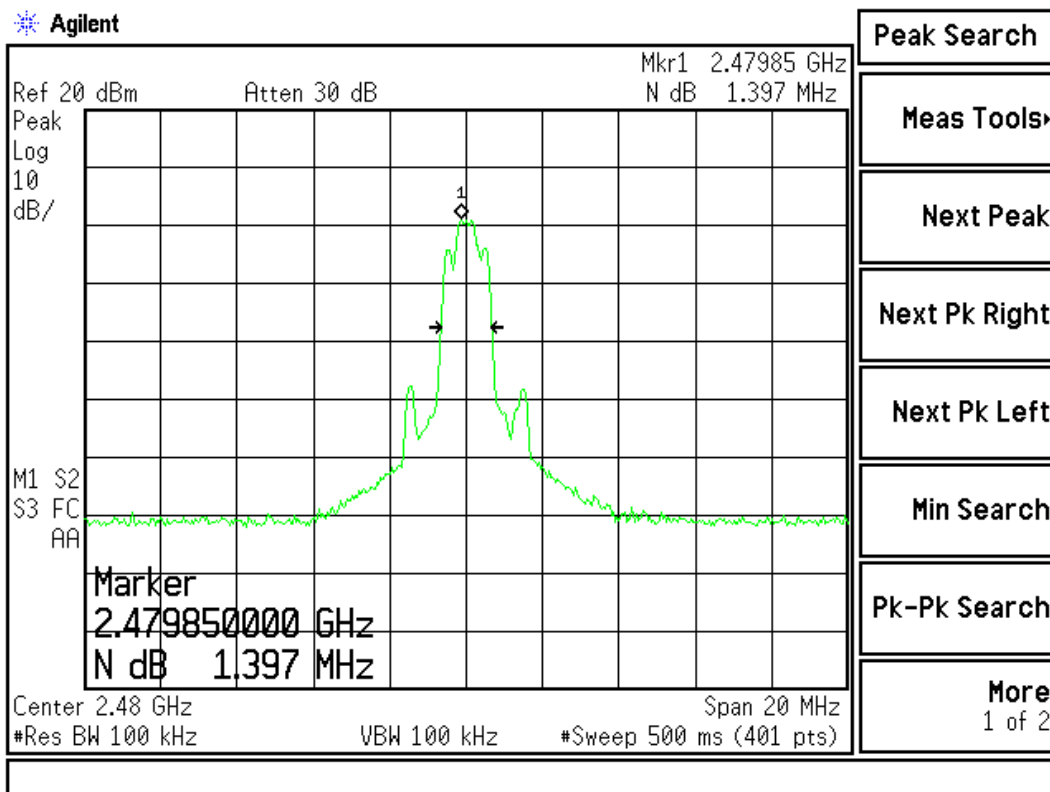
Figure Channel 39:



Product : Juno ST
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (2480MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
78	2480	1397	--	Pass

Figure Channel 78:



10. EMI Reduction Method During Compliance Testing

No modification was made during testing.

Attachment 1: EUT Test Photographs

Attachment 1: EUT Test Setup Photographs

Front View of Conducted Test



Back View of Conducted Test



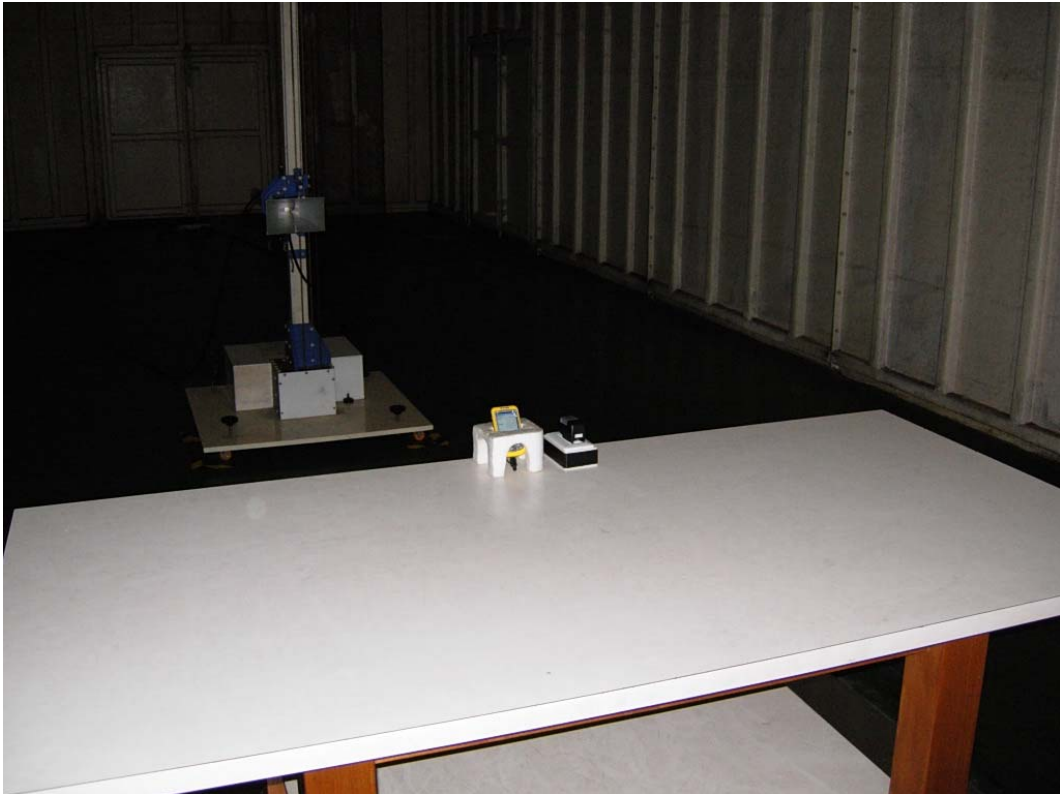
Front View of Radiated Test



Back View of Radiated Test



Front View of Radiated Test (Horn)



Back View of Radiated Test (Horn)



Attachment 2: EUT Detailed Photographs

Attachment 2 : EUT Detailed Photographs

(1) EUT Photo



(2) EUT Photo



(3) EUT Photo



(4) EUT Photo



(5) EUT Photo



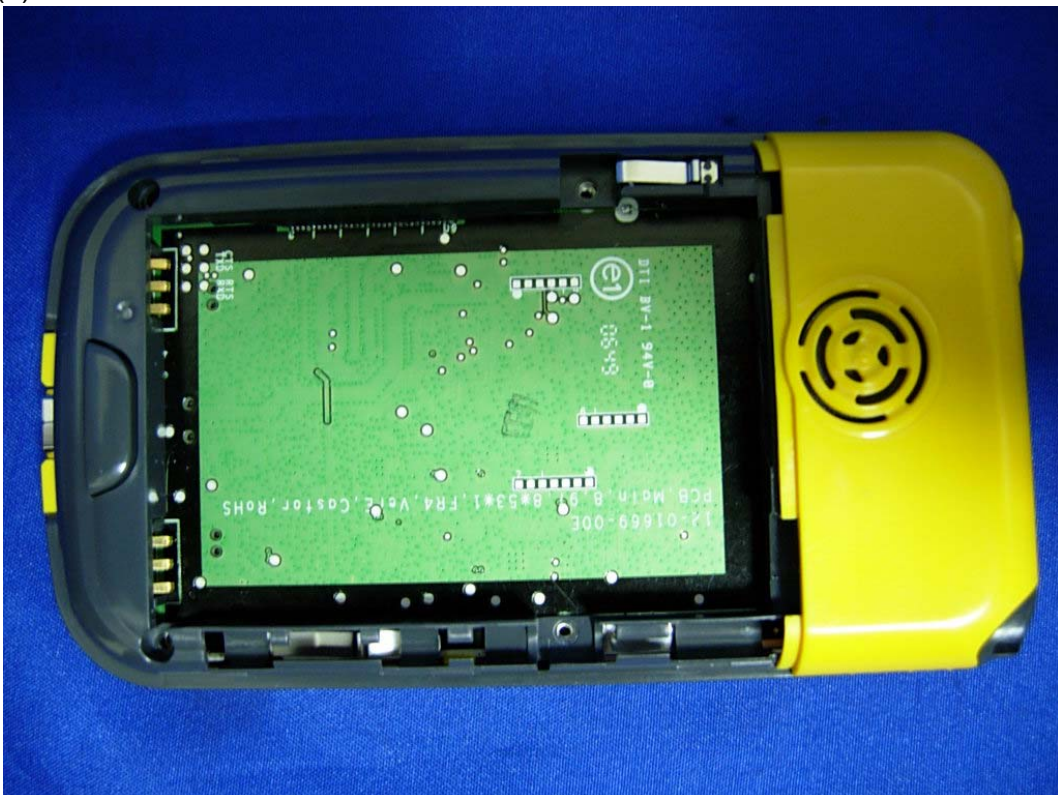
(6) EUT Photo



(7) EUT Photo



(8) EUT Photo



(9) EUT Photo



(10) EUT Photo

