



Test Report

Product Name	MEGA BOOK
Model No.	MS-1311,S300,MS-1715,MS-1715B,L745,MS-1716,MS-1716B, L740,MS-1057,MS-1057B,S262,S262B,SIM2060
FCC ID.	I4L-MD560B-4A3

Applicant	MICRO-STAR INTL Co., LTD.
Address	No. 69, Li-De St., Jung-He City, Taipei Hsien, Taiwan, R.O.C.

Date of Receipt	Nov. 03, 2006
Issued Date	Jan. 10, 2007
Report No.	06BL042-RF-US-P06V01

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: Jan. 10, 2007

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Applicant	MICRO-STAR INTL Co., LTD.
Address	No. 69, Li-De St., Jung-He City, Taipei Hsien, Taiwan, R.O.C.
Manufacturer	MICRO-STAR INTL Co., LTD.
Model No.	MS-1311,S300,MS-1715,MS-1715B,L745,MS-1716,MS-1716B,L740,MS-1057, MS-1057B,S262,S262B,SIM2060
FCC ID.	I4L-MD560B-4A3
Rated Voltage	AC 120V/60Hz
Working Voltage	AC 120V/60Hz
Trade Name	MSI
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2005 ANSI C63.4: 2003 CISPR 22: 2005
Test Result	Complied



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Documented By :

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0914

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Roy Wang

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	MEGA BOOK
Trade Name	MSI
FCC ID.	I4L-MD560B-4A3
Model No.	MS-1311,S300,MS-1715,MS-1715B,L745,MS-1716,MS-1716B,L740,MS-1057,MS-1057B,S262,S262B,SIM2060

Bluetooth Description

Frequency Range	2402 - 2480MHz
Type of Modulation	FHSS
Channel Number	79
Channel Control	Auto
Antenna Type	PIFA
Antenna Gain	-2.62dBi
Power Adapter	MFR: LI SHIN INTERATIONL ENTERPRISE CORP., M/N: LSE 0202C1990 Cable In: Shielded, 1.7m Cable Out: Shielded, 1.7m, one ferrite core bonded. Input: AC 100-240V, 50/60Hz, 1.5A Output: DC 19V, 4.74A

Bluetooth Antenna List

No.	Manufacturer	Part No.	Peak Gain
1	HIGH-TEK	Bluetooth-ANTENNA	-1.58 dBi for 2.45 GHz

Frequency of Each Channel of Bluetooth:

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 hop sets 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.

WLAN Description

Product Name	Intel PRO/Wireless 3945ABG Network Connection
Trade Name	Intel PRO/Wireless 3945ABG Network Connection
FCC ID.	PD9WM3945ABG
Model No.	WM3945ABG
Frequency Range	802.11a = 5745 – 5825 MHz 802.11b/g = 2412 – 2462MHz
Type of Modulation	DBPSK, DQPSK, CCK, OFDM
Channel Number	802.11a mode (5725-5850 MHz) = 5 802.11b mode (2400-2483.5 MHz) = 11 802.11g mode (2400-2483.5 MHz)= 11
Channel Control	Auto
Antenna Type	Hirose U.FL-R-SMT mates with cable connector U.FL-LP-066
Antenna Gain	Ethertronics Antenna @ 5 GHz = 5.00 dBi Ethertronics Antenna @ 2.4 GHz = 3.00 dBi
Power Supply	3.3VDC from computer MPCPI slot.

Frequency of Each Channel of 802.11b/g mode:

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

Frequency of Each Channel of 802.11a mode:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 149:	5745 MHz	Channel 153:	5765 MHz	Channel 157:	5785 MHz	Channel 161:	5805 MHz
Channel 165:	5825 MHz						

Intel wireless LAN adapters are engineered, manufactured, tested, and quality checked to ensure that they meet all necessary local and governmental regulatory agency requirements for the regions that they are designated and/or marked to ship into. Since wireless LANs are generally unlicensed devices that share spectrum with radars, satellites, and other licensed and unlicensed devices, it is sometimes necessary to dynamically detect, avoid, and limit usage to avoid interference with these devices. In many instances Intel is required to provide test data to prove regional and local compliance to regional and governmental regulations before certification or approval to use the product is granted. Intel's wireless LAN's EEPROM, firmware, and software driver are designed to carefully control parameters that affect radio operation and to ensure electromagnetic compliance (EMC). These parameters include, without limitation, RF power, spectrum usage, channel scanning, and human exposure.

For these reasons Intel cannot permit any manipulation by third parties of the software provided in binary format with the wireless WLAN adapters (e.g., the EEPROM and firmware). Furthermore, if you use any patches, utilities, or code with the Intel wireless LAN adapters that have been manipulated by an unauthorized party (i.e., patches, utilities, or code (including open source code modifications) which have not been validated by Intel), (i) you will be solely responsible for ensuring the regulatory compliance of the products, (ii) Intel will bear no liability, under any theory of liability for any issues associated with the modified products, including without limitation, claims under the warranty and/or issues arising from regulatory non-compliance, and (iii) Intel will not provide or be required to assist in providing support to any third parties for such modified products.

Note: Many regulatory agencies consider Wireless LAN adapters to be "modules", and accordingly, condition system-level regulatory approval upon receipt and review of test data documenting that the antennas and system configuration do not cause the EMC and radio operation to be non-compliant."

Remarks:

1. The EUT is a MEGA BOOK with a built-in 2.4GHz Bluetooth and WLAN transceiver.
2. The variation of model number is for different strategy of marketing.
3. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.247 for spread spectrum devices.
4. Regarding to the operation frequency band, the lowest, middle, and highest frequency are selected to perform the test.
5. Quietek verified constructions and functions, which are shown in the test report, in typical operation.
6. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

Test Mode	Mode 1: Transmitter
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Notes:

- 1) The 802.11b/g (2412-2462MHz) mode was used for normal link during the testing mode.
- 2) The I/O (input/output) ports on the EUT were fully connects the peripheral devices during the testing mode.

1.2. Operational Description

The EUT is a MEGA BOOK with built-in 2.4GHz Bluetooth transceiver and WLAN transceiver. The EUT also contains Camera, Consumer Infrared, Audio Port Connectors, IEEE 1394, 3 in 1 Card Reader, Express Card Slot, USB Port, Digital Panel Connector (DVI-I), PC Card Slot, S-Video Connector, TV-Tuner Connector, RJ-45 Connector and RJ-11 Connector.

The EUT 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. The Bluetooth signals are modulated by frequency hopping spread spectrum. The number of channels is 79 in 2402-2480MHz.

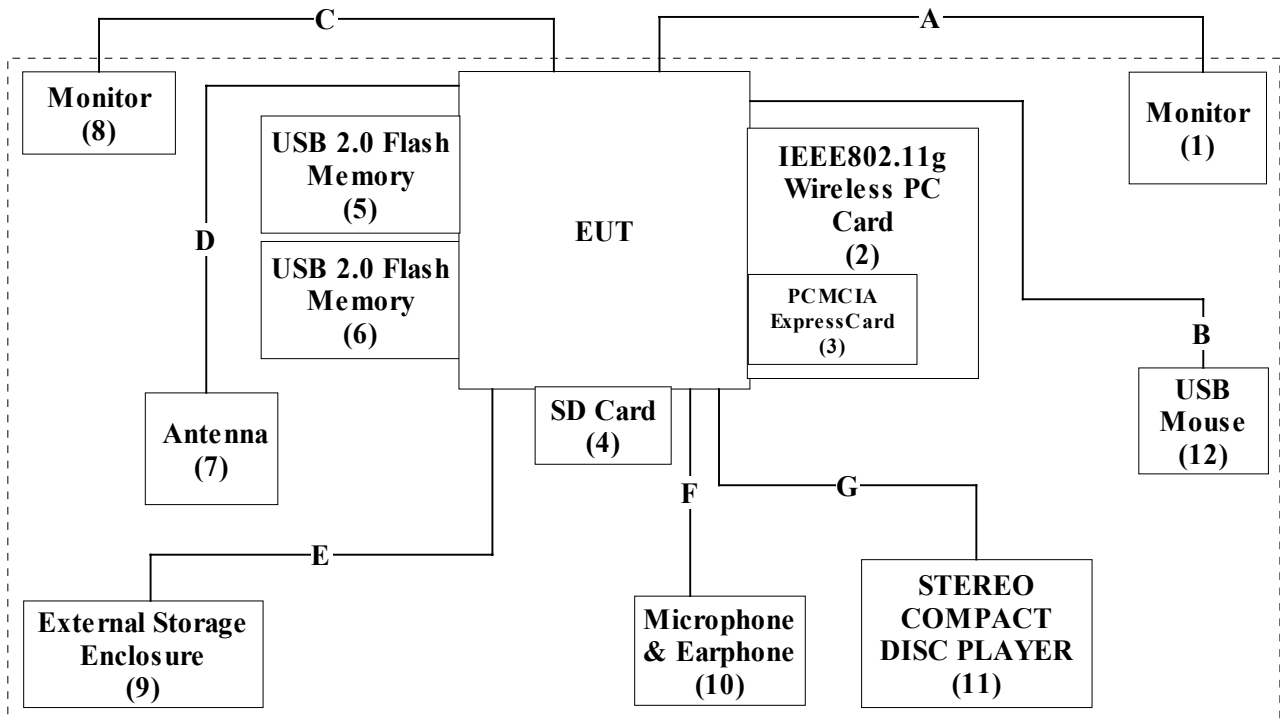
WLAN is a modular approval of the Intel PRO/Wireless 3945ABG Network Connection (MN: WM3945ABG, FCC ID: PD9WM3945ABG) which is an embedded 802.11a/b/g network adapter operating in the 2.4 GHz and 5 GHz spectrum. The number of channels is 11 in 2412-2462MHz at 802.11b mode and 802.11g mode. The number of channels is 5 in 5725-5825MHz at 802.11a mode.

1.3. Test 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 Monitor	SONY	PVM-14M2U	2111376	DoC	Non-Shielded, 1.8m
2 IEEE802.11g Wireless PC Card	Lanead	LD-WL54G/CB	N/A	DoC	--
3 PCMCIA ExpressCard	SIIG	CE-E01012- S1	CGY 1622X0008	DoC	--
4 SD Card	Kingston	94112-929 .A00	N/A	DoC	--
5 USB 2.0 Flash Memory	TOSHIBA	Trans Memory II 1 GB	N/A	DoC	--
6 USB 2.0 Flash Memory	TOSHIBA	Trans Memory II 1 GB	N/A	DoC	--
7 Antenna	MSI	N/A	N/A	DoC	--
8 Monitor	CHI MEI	A170E1-09	3UC120955SA1249	DoC	Non-Shielded, 1.8m
9 External Storage Enclosure	MACPOWER	Laureate Super 800	N/A	DoC	--
10 Microphone & Earphone	Ronald	MOE060	N/A	DoC	--
11 STEREO COMPACT DISC PLAYER	MIZDA	CD-11	N/A	DoC	--
12 USB Mouse	Logitech	M-UB55	--	DoC	--

1.4. Configuration of Test System



Signal Cable Type		Signal cable Description
A	S-Video Cable	Shielded, 1.8m
B	USB Mouse Cable-short	Non-Shielded, 3m
C	DVI Cable	Non-Shielded, 3m
D	Antenna Cable	Non-Shielded, 1.2m
E	1394 Cable	Shielded, 0.8m
F	Microphone & Earphone Cable	Non-Shielded, 1.7m
G	Speaker Cable	Non-Shielded, 1.2m

1.5. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4.
- (2) Execute the BlueTest (v1.9.1) program on the notebook.
- (3) Configure the test channel and the packet type.
- (4) Press “OK” to start the continuous transmission.
- (5) Verify the EUT operation 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:

January 24, 2005 File on
 Federal Communications Commission
 Laboratory Division
 7435 Oakland Mills Road
 Columbia, MD 21046
 Registration Number: 365520



Accredited by CNLA
 Accreditation Number: 1313
 Effective through: September 27, 2007



Accredited by NVLAP
 NVLAP Lab Code: 200347-0
 Effective through: September 30, 2006



Site Name: Quietek Corporation

Site Address: No.75-1, Wang-Yeh Valley, Yung-Hsing,
 Chiung-Lin, Hsin-Chu County,
 Taiwan, R.O.C.
 TEL : 886-3-592-8858 / FAX : 886-3-592-8859
 E-Mail : service@quietek.com

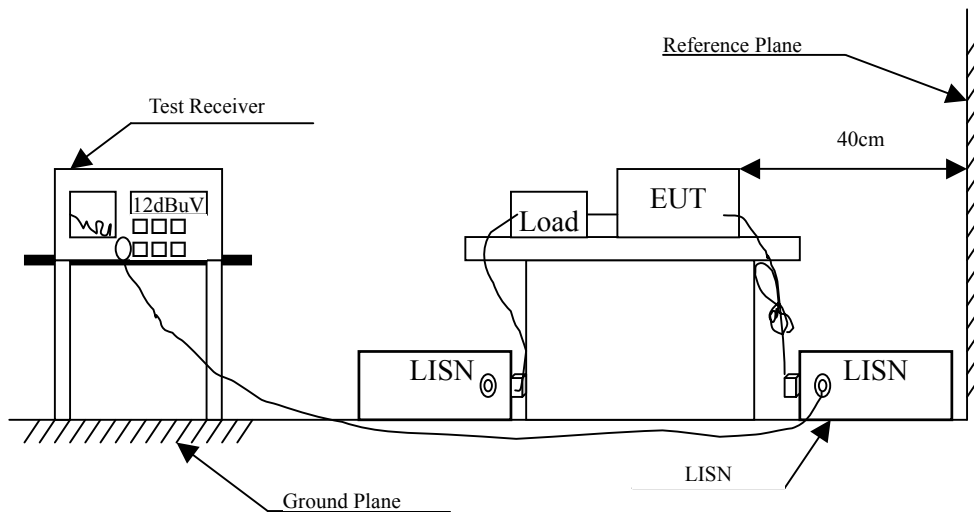
2. Conducted Emission

2.1. Test Equipment

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/825442/018	Sep., 2006	
2	Artificial Mains Network	R & S	ENV4200/848411/10	Feb., 2006	Peripherals
3	LISN	R & S	ESH3-Z5/825562/002	Feb., 2006	EUT
4	Pulse Limiter	R & S	ESH3-Z2/357.8810.5	Feb., 2006	
5	No.2 Shielded Room			N/A	

Note: All equipments 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	
	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 refers 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 invested 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 : MEGA BOOK
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 1: Transmitter (Channel 39)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
Quasi-Peak					
0.177	0.246	51.030	51.276	-13.953	65.229
0.240	0.260	50.540	50.800	-12.629	63.429
0.298	0.277	49.020	49.297	-12.474	61.771
1.912	0.580	42.860	43.440	-12.560	56.000
3.884	0.830	41.910	42.740	-13.260	56.000
13.267	1.550	39.990	41.540	-18.460	60.000
Average					
0.177	0.246	43.600	43.846	-11.383	55.229
0.240	0.260	42.060	42.320	-11.109	53.429
0.298	0.277	41.690	41.967	-9.804	51.771
1.912	0.580	34.780	35.360	-10.640	46.000
3.884	0.830	28.450	29.280	-16.720	46.000
13.267	1.550	25.880	27.430	-22.570	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 : MEGA BOOK
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 1: Transmitter (Channel 39)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
Quasi-Peak					
0.181	0.147	50.070	50.217	-14.897	65.114
0.240	0.160	51.320	51.480	-11.949	63.429
0.420	0.200	50.870	51.070	-7.216	58.286
1.849	0.280	43.050	43.330	-12.670	56.000
3.759	0.420	41.990	42.410	-13.590	56.000
10.927	0.750	39.860	40.610	-19.390	60.000
Average					
0.181	0.147	42.120	42.267	-12.847	55.114
0.240	0.160	42.370	42.530	-10.899	53.429
0.420	0.200	43.250	43.450	-4.836	48.286
1.849	0.280	38.970	39.250	-6.750	46.000
3.759	0.420	30.720	31.140	-14.860	46.000
10.927	0.750	30.240	30.990	-19.010	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.

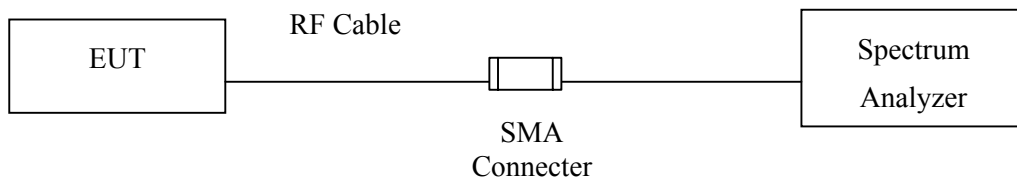
3. Peak Power Output

3.1. Test Equipment

Item	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.
1	Power Meter	Agilent	E4416A / GB41291630	May, 2006
2	Power Sensor	Agilent	E9323A / US40411166	Apr., 2006
3	No.1 OATS			Sep., 2006

Note: 1. All equipments are calibrated every one year.
 2. 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.

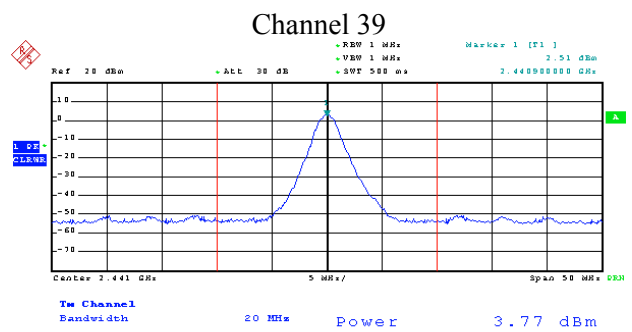
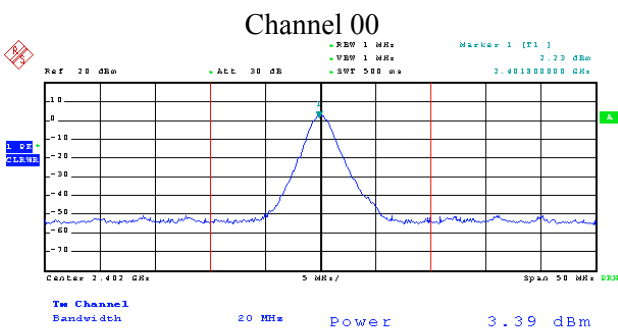
3.4. Uncertainty

± 1.27 dB

3.5. Test Result of Peak Power Output

Product : MEGA BOOK
 Test Item : Peak Power Output
 Test Site : No.1 OATS
 Test Mode : Mode 1: Transmitter

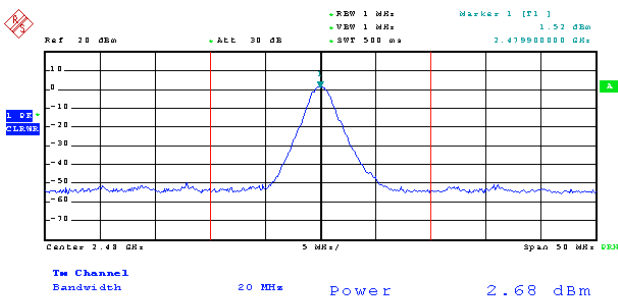
Channel No.	Frequency (MHz)	Measurement	Required Limit	Result
Channel 00	2402.00	3.39dBm	1 Watt= 30 dBm	Pass
Channel 39	2441.00	3.77dBm	1 Watt= 30 dBm	Pass
Channel 78	2480.00	2.68dBm	1 Watt= 30 dBm	Pass



Date: 20.NOV.2006 19:07:16

Date: 20.NOV.2006 19:20:36

Channel 78



Date: 20.NOV.2006 19:22:20

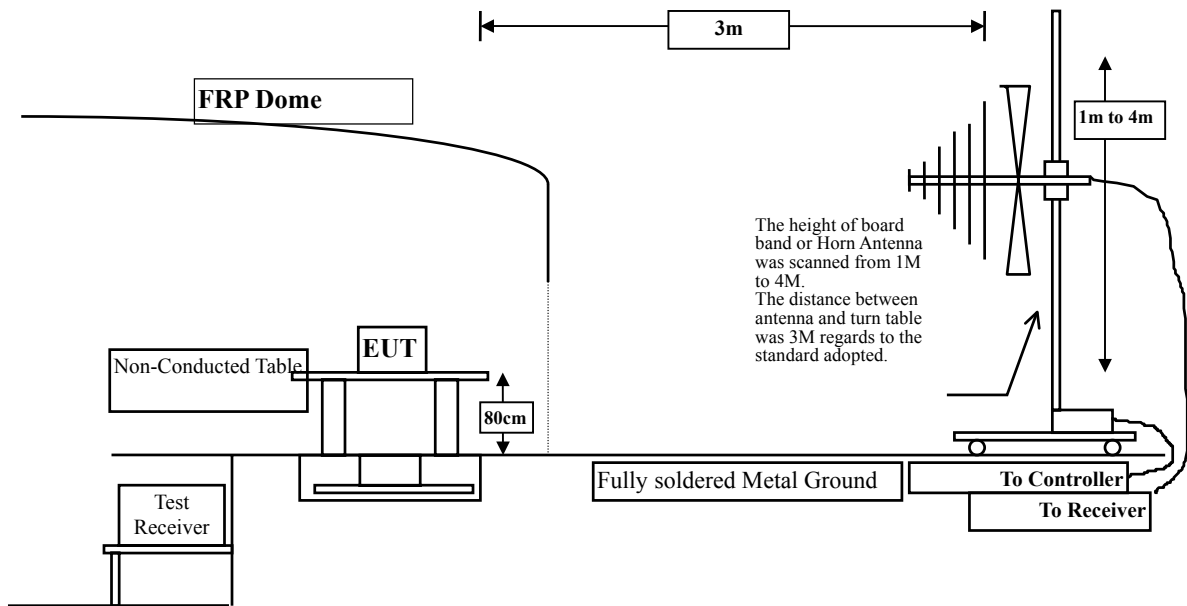
4. Radiated Emission

4.1. Test Equipment

Item		Equipment	Manufacturer	Model No. / Serial No.	Last Cal.
1	X	Test Receiver	R & S	ESCS 30 / 825442/014	Jun., 2006
2		Spectrum Analyzer	Advantest	R3162 / 91700283	N/A
3		Pre-Amplifier	Advantest	BB525C / N/A	N/A
4	X	Bilog Antenna	Schaffner	CBL6112B / 2673	Sep., 2006
5	X	Spectrum Analyzer	R & S	FSP40 / 100005	Aug., 2006
6	X	Pre-Amplifier	HP	8449B / 3008A01123	Feb., 2006
7	X	Horn Antenna	Schwarzbeck	BBHA 9120D / BBHA9120D312	Jul., 2006
8		No.3 OATS			Sep., 2006

- Note:
1. All equipments are calibrated every one year.
 2. Test equipments 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 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 : MEGA BOOK
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Channel 00)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit (Peak) dBuV/m	Limit (Average) dBuV/m
Horizontal						
Peak Detector:						
3249.320	-0.368	44.987	44.620	-29.380	74.000	
4803.960	3.594	43.920	47.514	-26.486	74.000	
4873.990	4.087	46.803	50.890	-23.110	74.000	
7206.010	8.691	33.650	42.341	-31.659	74.000	
7311.190	8.845	41.365	50.210	-23.790	74.000	
9607.887	12.690	32.680	45.370	-28.630	74.000	
9747.960	13.133	50.837	63.970	-10.030	74.000	
12010.110	11.031	32.520	43.552	-30.448	74.000	
12185.000	18.996	36.214	55.210	-18.790	74.000	
Average Detector:						
9747.960	13.133	28.667	41.800	-12.200		54.000
12185.000	18.996	22.304	41.300	-12.700		54.000

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit (Peak) dBuV/m	Limit (Average) dBuV/m
Vertical						
Peak Detector:						
3249.320	-0.368	46.717	46.350	-27.650	74.000	
4803.900	1.812	43.530	45.341	-28.659	74.000	
4873.990	2.434	51.907	54.340	-19.660	74.000	
7205.880	8.634	34.110	42.744	-31.256	74.000	
7311.190	8.845	42.825	51.670	-22.330	74.000	
9607.990	14.677	33.510	48.187	-25.813	74.000	
9747.960	15.133	46.407	61.540	-12.460	74.000	
12009.960	16.608	31.530	48.137	-25.863	74.000	
12185.000	19.390	36.750	56.140	-17.860	74.000	
Average Detector:						
4873.990	2.434	40.367	42.800	-11.200		54.000
9747.960	15.133	27.067	42.200	-11.800		54.000
12185.000	19.390	21.810	41.200	-12.800		54.000

Note:

1. The reading levels below 1GHz and above 1GHz are quasi-peak values and peak/average values, respectively.
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 : MEGA BOOK
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Channel 39)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit (Peak) dBuV/m	Limit (Average) dBuV/m
Horizontal						
Peak Detector:						
3249.320	-0.368	43.287	42.920	-31.080	74.000	
4873.990	4.087	45.203	49.290	-24.710	74.000	
4882.110	4.144	40.570	44.713	-29.287	74.000	
7311.190	8.845	40.765	49.610	-24.390	74.000	
7323.088	8.859	34.220	43.079	-30.921	74.000	
9747.960	13.133	48.337	61.470	-12.530	74.000	
9764.110	13.218	33.690	46.908	-27.092	74.000	
12185.000	18.996	37.914	56.910	-17.090	74.000	
12205.010	18.109	32.750	50.859	-23.141	74.000	
Average Detector:						
9747.960	13.133	28.267	41.400	-12.600		54.000
12185.000	18.996	22.824	41.820	-12.180		54.000

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit (Peak) dBuV/m	Limit (Average) dBuV/m
Vertical						
Peak Detector:						
3249.320	-0.368	45.917	45.550	-28.450	74.000	
4873.990	2.434	50.207	52.640	-21.360	74.000	
4882.088	2.504	41.700	44.204	-29.796	74.000	
7311.190	8.845	43.225	52.070	-21.930	74.000	
7322.987	8.859	35.940	44.799	-29.201	74.000	
9747.960	15.133	47.707	62.840	-11.160	74.000	
9764.130	15.218	33.850	49.068	-24.932	74.000	
12185.000	19.390	34.250	53.640	-20.360	74.000	
12205.060	19.566	32.400	51.967	-22.033	74.000	
Average Detector:						
9747.960	15.133	27.027	42.160	-11.840		54.000
12185.000	19.390	22.410	41.800	-12.200		54.000

Note:

1. The reading levels below 1GHz and above 1GHz are quasi-peak values and peak/average values, respectively.
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 : MEGA BOOK
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Channel 78)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit (Peak) dBuV/m	Limit (Average) dBuV/m
Horizontal						
Peak Detector:						
3249.320	-0.368	45.087	44.720	-29.280	74.000	
4873.990	4.087	46.803	50.890	-23.110	74.000	
4960.040	4.399	38.210	42.610	-31.390	74.000	
7311.190	8.845	43.165	52.010	-21.990	74.000	
7440.060	9.017	34.800	43.817	-30.183	74.000	
9747.960	13.133	50.337	63.470	-10.530	74.000	
9920.040	14.540	32.640	47.180	-26.820	74.000	
12185.000	18.996	36.014	55.010	-18.990	74.000	
12400.200	20.680	31.500	52.180	-21.820	74.000	
Average Detector:						
9747.960	13.133	27.967	41.100	-12.900		54.000
12185.000	18.996	22.904	41.900	-12.100		54.000

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit (Peak) dBuV/m	Limit (Average) dBuV/m
Vertical						
Peak Detector:						
3249.320	-0.368	45.967	45.600	-28.400	74.000	
4873.990	2.434	50.767	53.200	-20.800	74.000	
4959.960	2.918	43.680	46.598	-27.402	74.000	
7311.190	8.845	44.035	52.880	-21.120	74.000	
7440.260	9.016	35.830	44.847	-29.153	74.000	
9747.960	15.133	47.447	62.580	-11.420	74.000	
9919.890	15.340	33.730	49.070	-24.930	74.000	
12185.000	19.390	33.510	52.900	-21.100	74.000	
12400.040	16.165	31.450	47.616	-26.384	74.000	
Average Detector:						
4873.990	2.434	39.667	42.100	-11.900		54.000
9747.960	15.133	26.467	41.600	-12.400		54.000

Note:

1. Reading levels below 1GHz and above 1GHz are quasi-peak values and peak/average values, respectively.
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 : MEGA BOOK
 Test Item : General Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter (Channel 39)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
64.020	-14.246	43.766	29.520	-10.480	40.000
136.030	-13.719	46.699	32.980	-10.520	43.500
166.520	-15.388	52.168	36.780	-6.720	43.500
176.886	-14.973	49.000	34.027	-9.473	43.500
199.270	-14.584	44.264	29.680	-13.820	43.500
237.857	-10.350	46.800	36.450	-9.550	46.000
240.010	-9.844	40.464	30.620	-15.380	46.000
336.030	-7.472	45.752	38.280	-7.720	46.000
375.020	-4.700	42.990	38.290	-7.710	46.000
397.214	1.149	37.200	38.349	-7.651	46.000
496.986	-1.799	45.800	44.001	-1.999	46.000
526.086	1.324	35.400	36.724	-9.276	46.000
783.829	4.074	32.800	36.874	-9.126	46.000

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Vertical					
61.260	-7.036	41.926	34.890	-5.110	40.000
120.040	-4.227	41.107	36.880	-6.620	43.500
147.630	-3.996	40.976	36.980	-6.520	43.500
176.886	-8.338	45.400	37.063	-6.437	43.500
200.443	-2.998	41.200	38.201	-5.299	43.500
216.010	-5.992	42.543	36.550	-9.450	46.000
280.020	-10.929	44.159	33.230	-12.770	46.000
336.020	-3.796	39.086	35.290	-10.710	46.000
384.010	-0.571	37.460	36.890	-9.110	46.000
412.457	-0.141	34.200	34.059	-11.941	46.000
496.986	-3.226	42.200	38.974	-7.026	46.000
696.529	0.518	31.800	32.319	-13.681	46.000
779.671	5.772	30.600	36.371	-9.629	46.000

Note:

1. The reading levels below 1GHz are quasi-peak values.
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

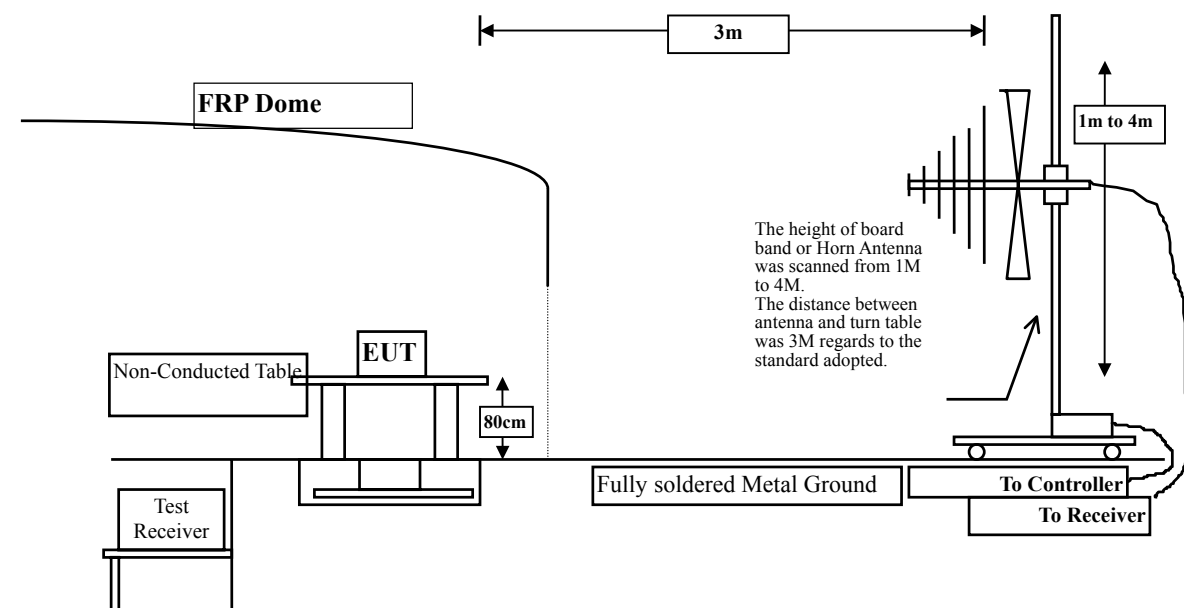
5.1. Test Equipment

RF Conducted Measurement:				
Item	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.
1	Spectrum Analyzer	R & S	FSP / 100561	Mar., 2006
2	No.1 OATS			Sep., 2006
RF Radiated Measurement:				
Item	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.
1	X Spectrum Analyzer	R & S	FSP40 / 100005	Aug., 2006
2	X Pre-Amplifier	HP	8449B / 3008A01123	Feb., 2006
3	Loop Antenna	R & S	HFH2-Z2 / 833799/004	Sep., 2006
4	BiconiLog Antenna	Schwarzbeck	VULB 9166 / 1061	Sep., 2006
5	Bilog Antenna	Chase	CBL6112B / 2455	Sep., 2006
6	X Horn Antenna	Schwarzbeck	BBHA 9120D / BBHA9120D312	Sep., 2006
7	No.1 OATS			Sep., 2006

- Note:
1. All equipments are calibrated every one year.
 2. The test equipments 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 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 : MEGA BOOK
 Test Item : Band Edge
 Test Site : No.1 OATS
 Test Mode : Mode 1: Transmitter (Channel 00)

RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
00	<2400	>20	Pass

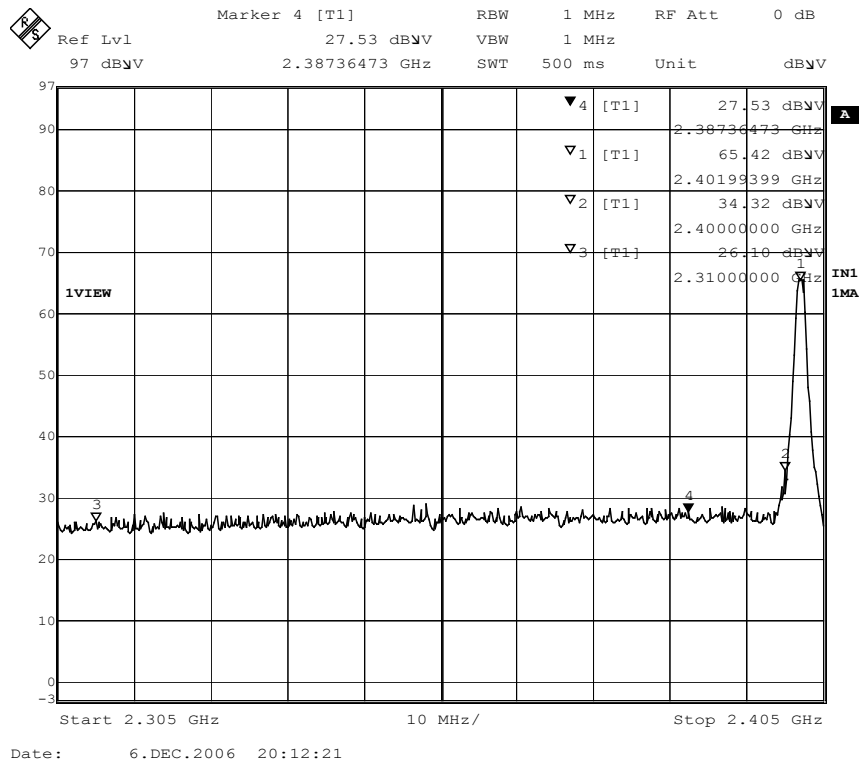
RF Radiated Measurement (Peak Detector):

RBW: 1MHz, VBW: 1MHz

Channel No.	Frequency (MHz)	Reading Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	PreAMP (dB)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
00(Horizontal)	2387.360	27.530	22.867	4.506	0.000	54.903	74.00	54	Pass

Figure Channel 00:

Horizontal (Peak)



Note:

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

Product : MEGA BOOK
 Test Item : Band Edge
 Test Site : No.1 OATS
 Test Mode : Mode 1: Transmitter (Channel 00)

RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
00	<2400	>20	Pass

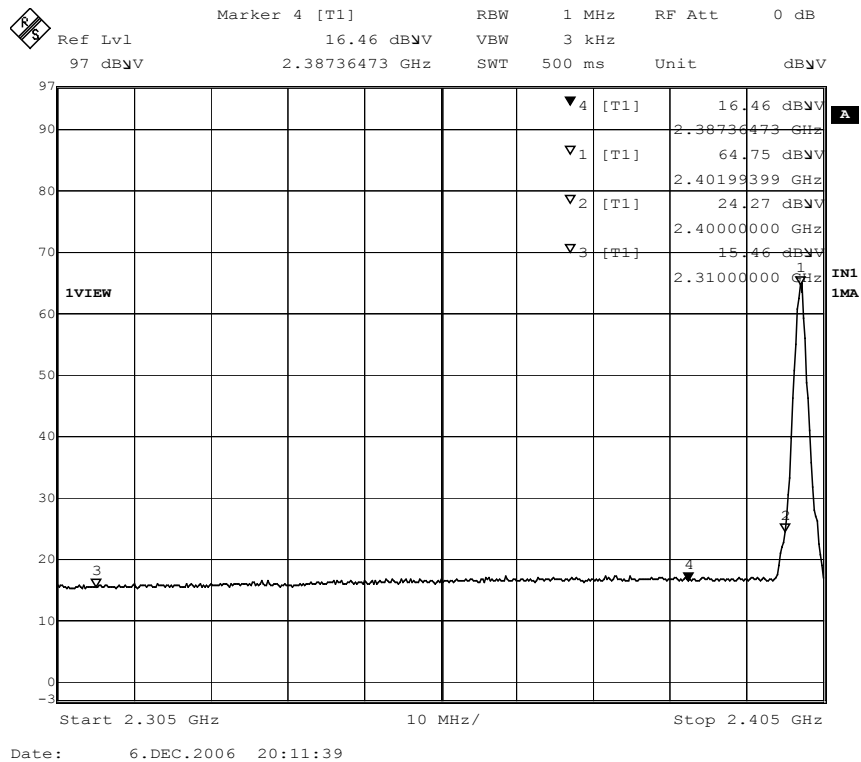
RF Radiated Measurement (Average Detector):

RBW: 1MHz, VBW: 1MHz

Channel No.	Frequency (MHz)	Reading Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	PreAMP (dB)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
00(Horizontal)	2387.360	16.460	24.467	4.506	0.000	45.433	74.00	54.00	Pass

Figure Channel 00:

Horizontal (Average)



Note:

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

Product : MEGA BOOK
 Test Item : Band Edge
 Test Site : No.1 OATS
 Test Mode : Mode 1: Transmitter (Channel 00)

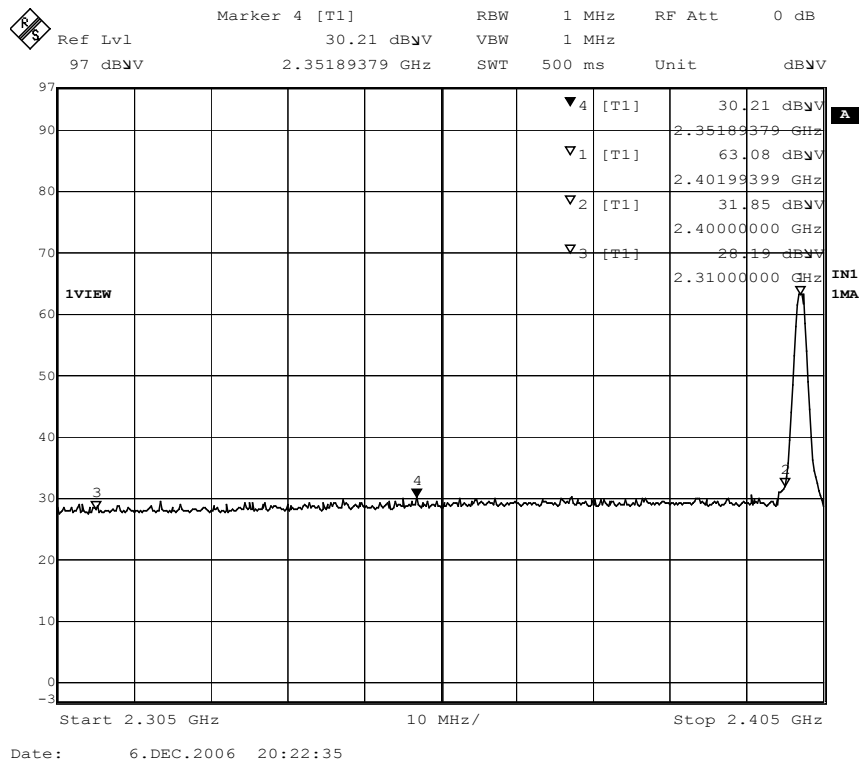
RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
00	<2400	>20	Pass

RF Radiated Measurement: (Peak Detector)

RBW: 1MHz, VBW: 10Hz									
Channel No.	Frequency (MHz)	Reading Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	PreAMP (dB)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
00(Vertical)	2351.890	30.210	22.756	4.480	0.000	57.447	74.00	54.00	Pass

Figure Channel 00: Vertical (Peak)



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

Product : MEGA BOOK
 Test Item : Band Edge
 Test Site : No.1 OATS
 Test Mode : Mode 1: Transmitter (Channel 00)

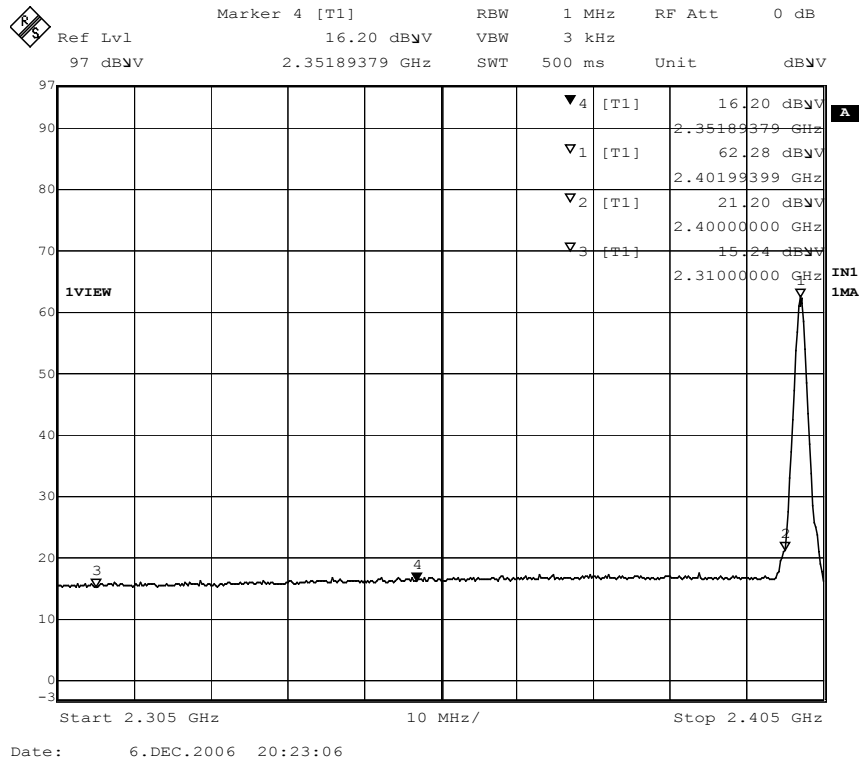
RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
00	<2400	>20	Pass

RF Radiated Measurement: (Average Detector)

RBW: 1MHz, VBW: 10Hz									
Channel No.	Frequency (MHz)	Reading Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	PreAMP (dB)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
00(Vertical)	2351.890	16.200	24.356	4.480	0.000	45.037	74.00	54.00	Pass

Figure Channel 00: Vertical (Average)



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

Product : MEGA BOOK
 Test Item : Band Edge
 Test Site : No.1 OATS
 Test Mode : Mode 1: Transmitter (Channel 78)

RF Radiated Measurement:

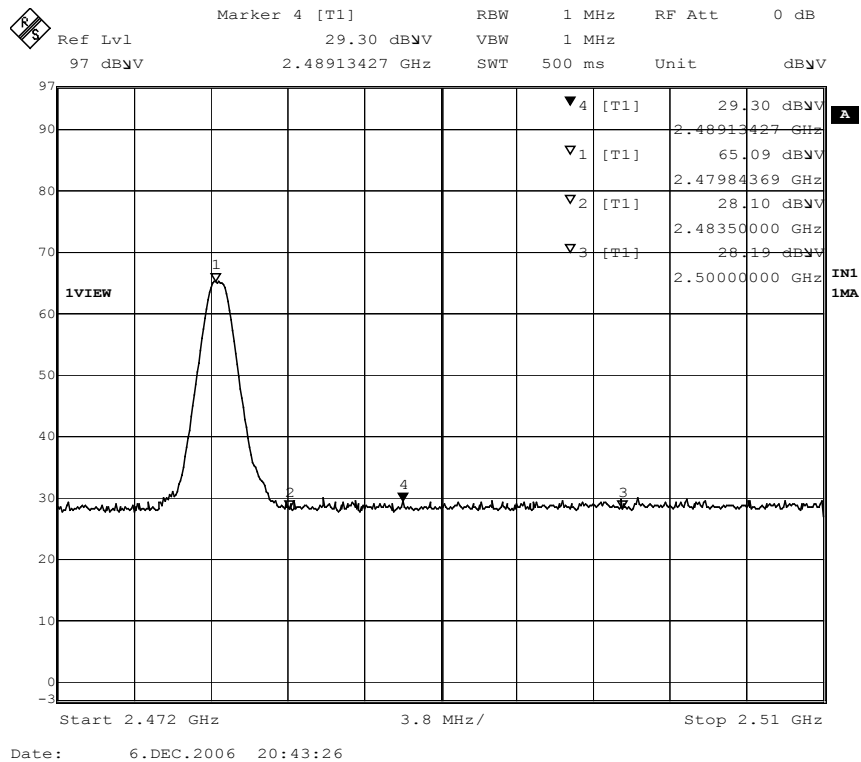
Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
78	>2480	>20	Pass

RF Radiated Measurement (Peak Detector):

RBW: 1MHz, VBW: 1MHz

Channel No.	Frequency (MHz)	Reading Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	PreAMP (dB)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
78(Horizontal)	2489.130	29.300	24.734	4.576	0.000	58.610	74.00	54.00	Pass

Figure Channel 78: Horizontal (Peak)



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

Product : MEGA BOOK
 Test Item : Band Edge
 Test Site : No.1 OATS
 Test Mode : Mode 1: Transmitter (Channel 78)

RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
78	>2480	>20	Pass

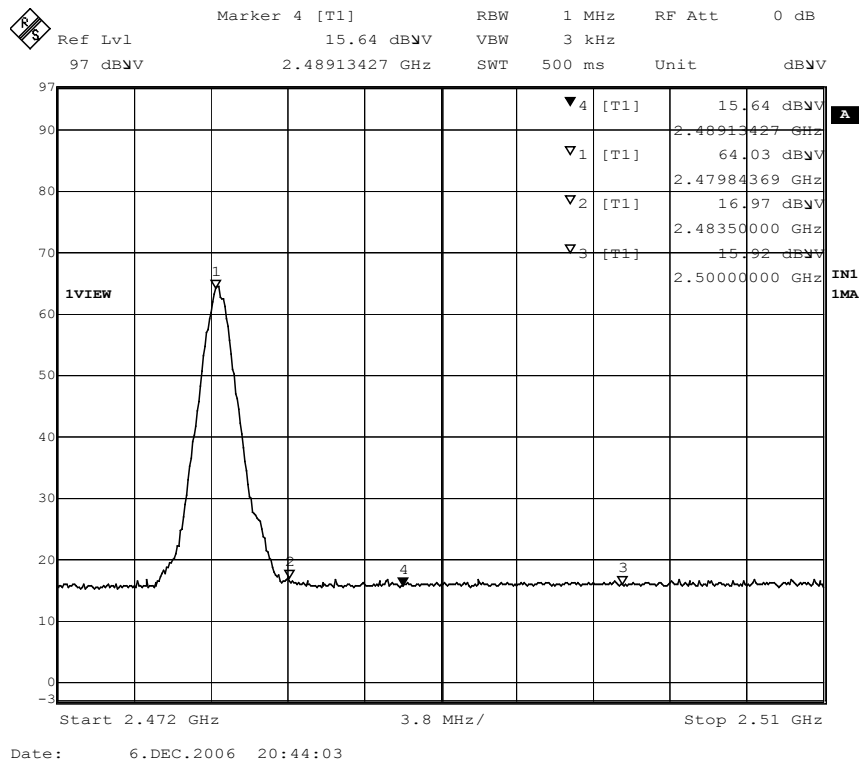
RF Radiated Measurement (Peak Detector):

RBW: 1MHz, VBW: 1MHz

Channel No.	Frequency (MHz)	Reading Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	PreAMP (dB)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
78(Horizontal)	2489.130	15.640	24.734	4.576	0.000	44.950	74.00	54.00	Pass

Figure Channel 78:

Horizontal (Average)



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.

Product : MEGA BOOK
 Test Item : Band Edge
 Test Site : No.1 OATS
 Test Mode : Mode 1: Transmitter (Channel 78)

RF Radiated Measurement:

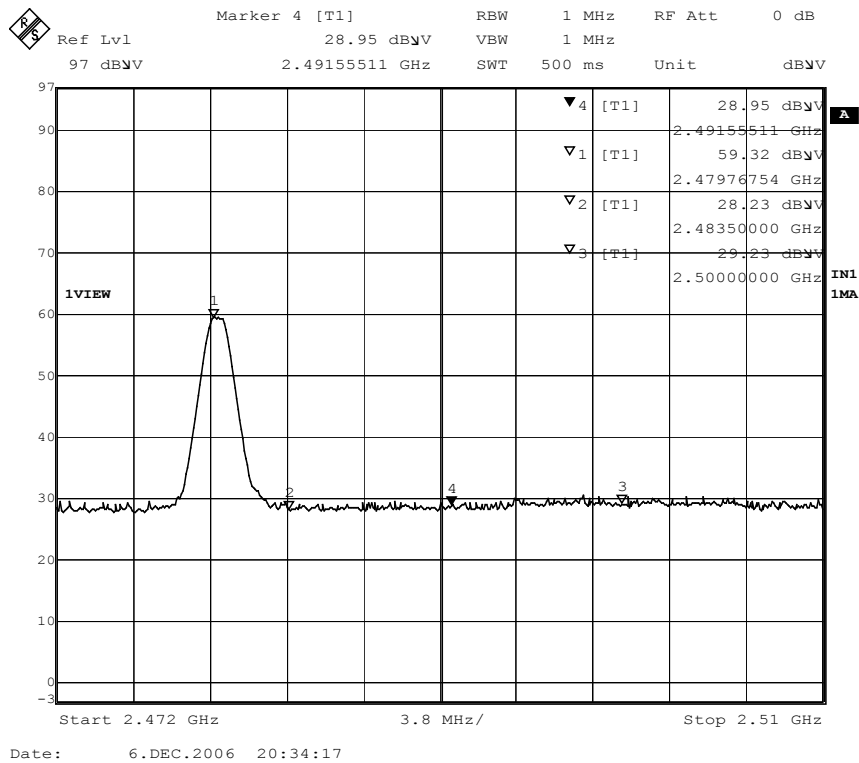
Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
78	>2480	>20	Pass

RF Radiated Measurement: (Peak Detector)

RBW: 1MHz, VBW: 10Hz

Channel No.	Frequency (MHz)	Reading Level (dBUV)	Antenna Factor (dB/m)	Cable Loss (dB)	PreAMP (dB)	Emission Level (dBUV/m)	Peak Limit (dBUV/m)	Average Limit (dBUV/m)	Result
78(Vertical)	2491.560	28.950	23.140	4.577	0.000	56.667	74.00	54.00	Pass

Figure Channel 78: Vertical (Peak)



Note:

1. RBW=1MHz, VBW=3kHz, Sweep Time=500ms
2. VBW Justification: Ton (on time of a pulse)=400us, VBW >= 1/Ton=2.5kHz

Product : MEGA BOOK
 Test Item : Band Edge
 Test Site : No.1 OATS
 Test Mode : Mode 1: Transmitter (Channel 78)

RF Radiated Measurement:

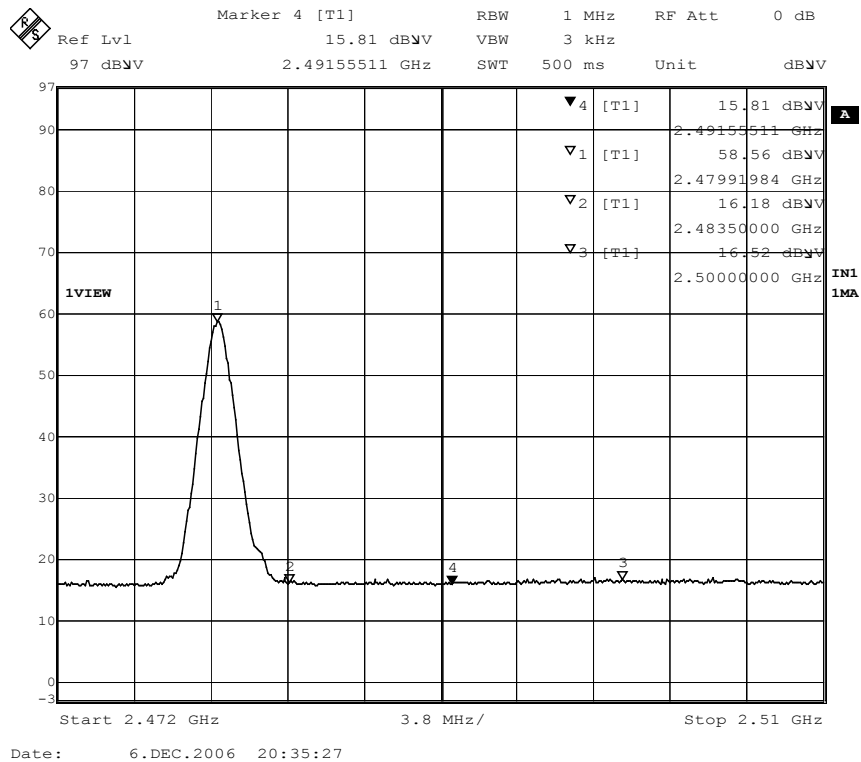
Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
78	>2480	>20	Pass

RF Radiated Measurement: (Average Detector)

RBW: 1MHz, VBW: 10Hz

Channel No.	Frequency (MHz)	Reading Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	PreAMP (dB)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
78(Vertical)	2491.560	15.810	23.140	4.577	0.000	43.527	74.00	54.00	Pass

Figure Channel 78: Vertical (Average)



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.

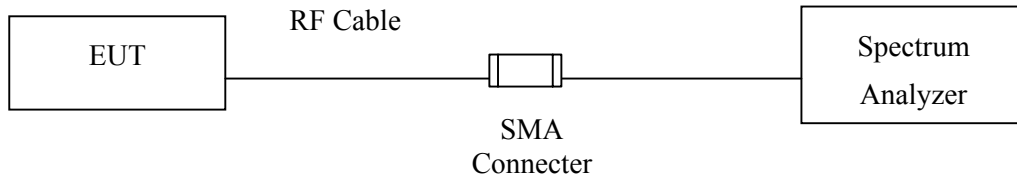
6. Channel Number

6.1. Test Equipment

Item	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.
1	Spectrum Analyzer	R & S	FSP / 100561	Mar., 2006
2	No.1 OATS			Sep., 2006

Note: 1. All equipments are calibrated every one year.
 2. The test equipments 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.

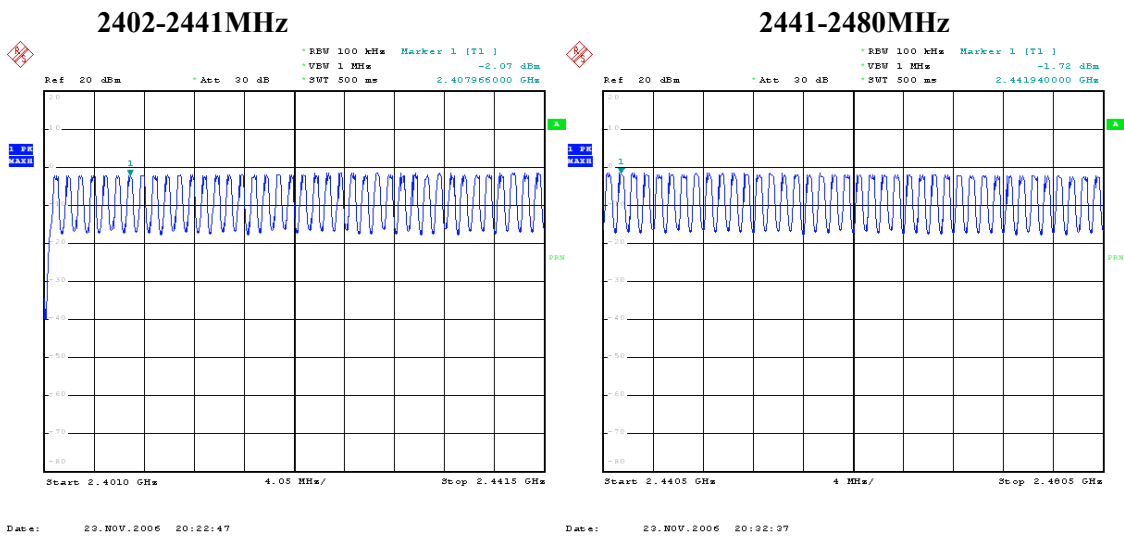
6.4. Uncertainty

N/A

6.5. Test Result of Channel Number

Product : MEGA BOOK
 Test Item : Channel Number
 Test Site : No.1 OATS
 Test Mode : Mode 1: Transmitter

Frequency Range (MHz)	Measurement (Hopping Channel)	Required Limit (Hopping Channel)	Result
2402 ~ 2480	79	>15	Pass



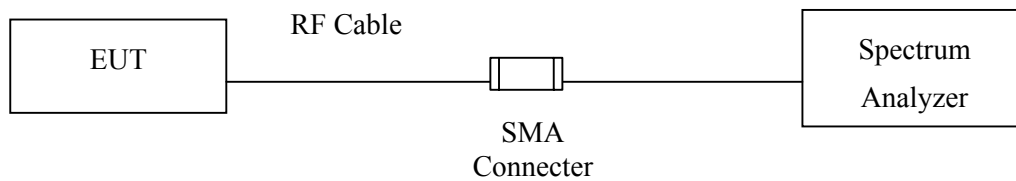
7. Channel Separation

7.1. Test Equipment

Item	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.
1	Spectrum Analyzer	R & S	FSP / 100561	Mar., 2006
2	No.1 OATS			Sep., 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. 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. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125mW.

7.4. Uncertainty

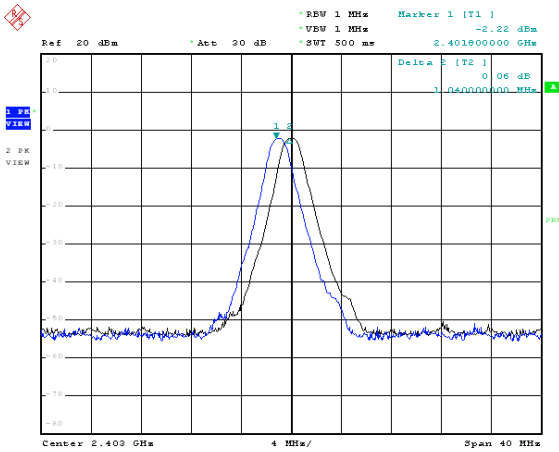
± 150Hz

7.5. Test Result of Channel Separation

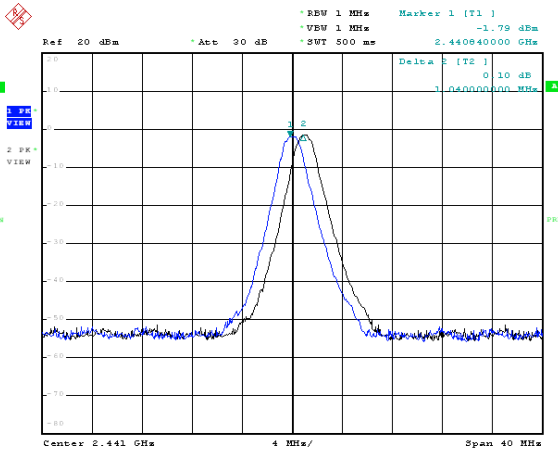
Product : MEGA BOOK
 Test Item : Channel Separation
 Test Site : No.1 OATS
 Test Mode : Mode 1: Transmitter

Frequency (MHz)	Measurement Level (MHz)	Required Limit	Result
2402	1.040	>25 kHz or 2/3 * 20 dB BW	Pass
2441	1.040	>25 kHz or 2/3 * 20 dB BW	Pass
2480	1.100	>25 kHz or 2/3 * 20 dB BW	Pass

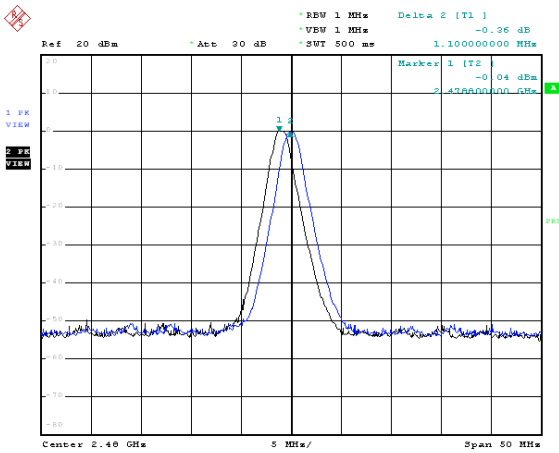
Channel 00 2402MHz



Channel 39 2441MHz



Channel 78 2480 MHz



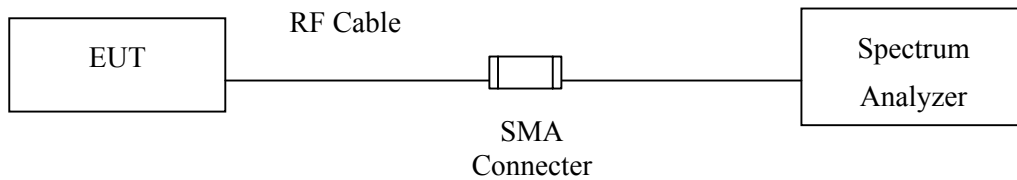
8. Dwell Time

8.1. Test Equipment

Item	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.
1	Spectrum Analyzer	R & S	FSP / 100561	Mar., 2006
2	No.1 OATS			Sep., 2006

Note: 1. All equipments are calibrated every one year.
 2. The test equipments marked "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

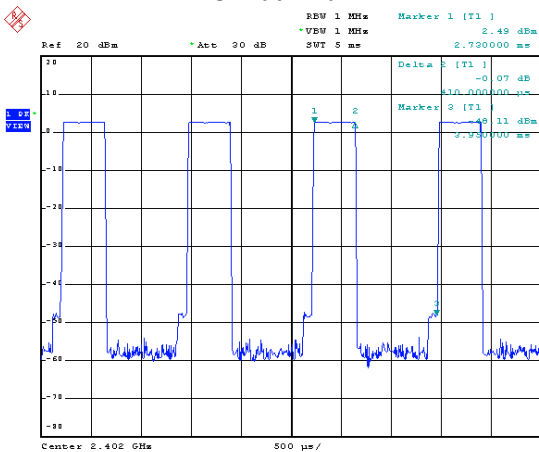
± 25msec

8.5. Test Result of Dwell Time

Product : MEGA BOOK
 Test Item : Dwell Time
 Test Site : No.1 OATS
 Test Mode : Mode 1: Transmitter (Channel 00,39,78 –DH1)

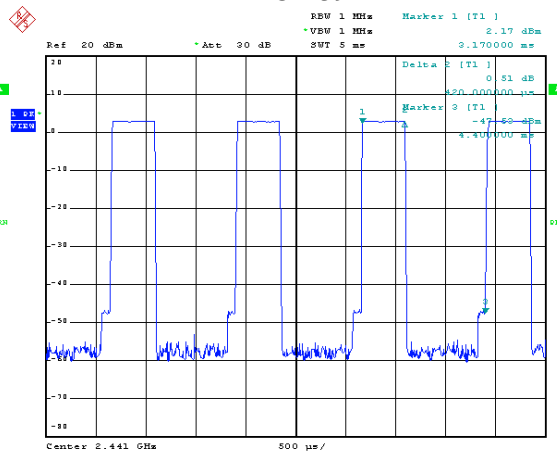
Channel (MHz)	Measurement Level (sec)	Required Limit (sec.)	Result
CH 00 2402	0.131	< 0.4	Pass
CH 39 2441	0.1344	< 0.4	Pass
CH 78 2480	0.131	< 0.4	Pass

CH 00 2402MHz



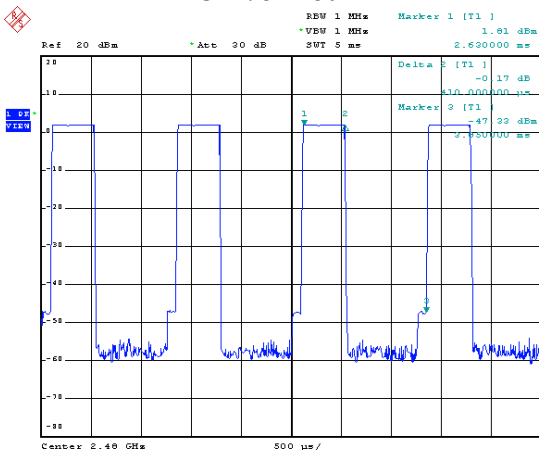
Date: 24.NOV.2006 14:49:50

CH 39 2441MHz



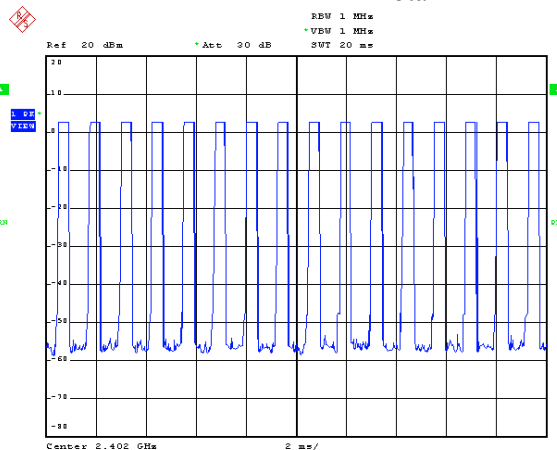
Date: 24.NOV.2006 14:55:01

CH 78 2480MHz



Date: 24.NOV.2006 15:04:06

Total



Date: 24.NOV.2006 14:47:02

Note: Dwell time = time slot length * hop rate / number of hopping channels * period

Occupancy Time of Frequency Hopping System

Test Time Period: $0.4 * 79 = 31.6\text{sec}$, Hopping Times Within 1sec: $16/20\text{msec} = 0.8\text{ hops/msec}$.

A) 2402MHz The Maximum Occupancy Time Within 31.6sec: $410 \mu\text{s} * 800 / 79 * 31.6 = 131\text{msec}$ ◦

B) 2441MHz The Maximum Occupancy Time Within 31.6sec: $420 \mu\text{s} * 800 / 79 * 31.6 = 134.4\text{msec}$ ◦

C) 2480MHz The Maximum Occupancy Time Within 31.6sec: $410 \mu\text{s} * 800 / 79 * 31.6 = 131\text{msec}$ ◦

Test Result: The average occupancy times of the highest, middle and lowest channel are less than 0.4sec, and thus complies the standard.

PS: (1) From Bluetooth Specification, It Hops 1640 Times in 1sec. The Average Occupancy Time of Each 79 Channels is $1600/79$ Times, Therefore, We Calculate The Maximum Occupancy Time (worst care) As Below:

A) 2402Mhz The Occupancy Time of Each Pulse is 0.4msec, The Maximum Occupancy Time within 31.6sec is $0.4\text{msec} * 1640/79 * 31.6 = 289.056\text{msec}$

B) 2441MHz The Occupancy Time of Each Pulse is 0.4msec, The Maximum Occupancy Time within 31.6sec is $0.4\text{msec} * 1640/79 * 31.6 = 289.056\text{msec}$

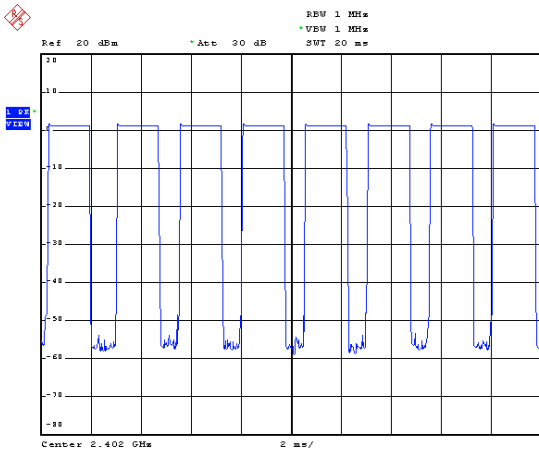
C) 2480MHz The Occupancy Time of Each Pulse is 0.4msec, The Maximum Occupancy Time within 31.6sec is $0.4\text{msec} * 1640/79 * 31.6 = 289.056\text{msec}$

Test Result: The average occupancy times of the highest, middle and lowest channel are less than 0.4sec, and thus complies the standard.

Product : MEGA BOOK
 Test Item : Dwell Time
 Test Site : No.1 OATS
 Test Mode : Mode 1: Transmitter (Channel 00,39,78 –DH3)

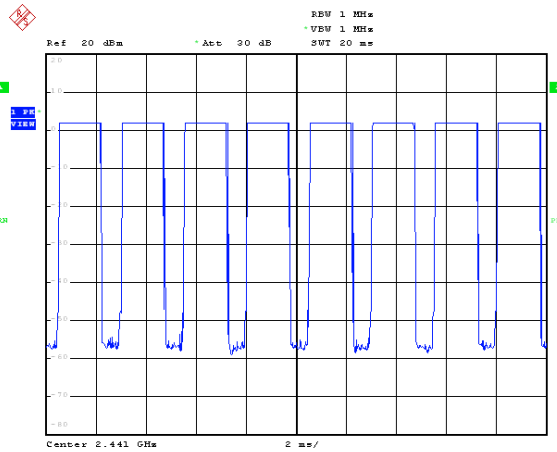
Channel (MHz)	Measurement Level (sec.)	Required Limit (sec.)	Result
CH 00 2402	0.2656	< 0.4	Pass
CH 39 2441	0.2672	< 0.4	Pass
CH 78 2480	0.2672	< 0.4	Pass

CH 00 2402MHz



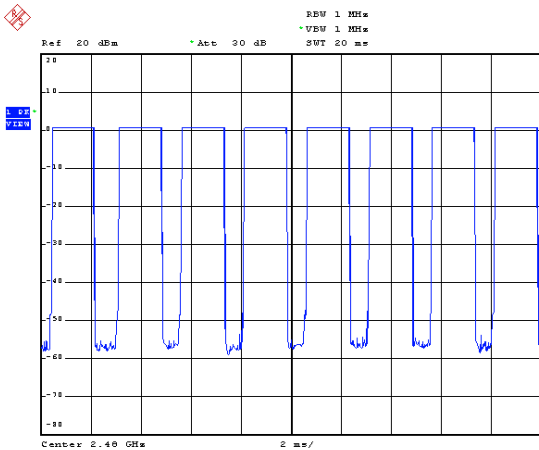
Date: 20.DEC.2006 19:02:11

CH 39 2441MHz



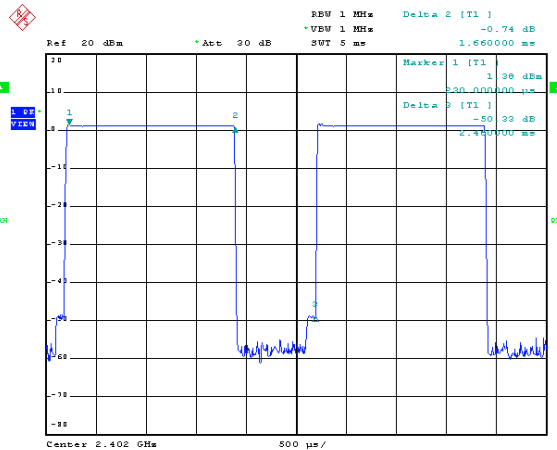
Date: 20.DEC.2006 18:55:21

CH 78 2480MHz



Date: 20.DEC.2006 19:18:53

Total



Date: 20.DEC.2006 19:06:14

Note: Dwell time = time slot length * hop rate / number of hopping channels * period

Occupancy Time of Frequency Hopping System

Test Time Period: $0.4 * 79 = 31.6\text{sec}$, Hopping Times Within 1sec: $8/20\text{msec} = 0.4\text{ hops/msec}$.

A) 2402MHz The Maximum Occupancy Time Within 31.6sec: $0.00166 * 400 / 79 * 31.6 = 0.2656\text{sec}$ °

B) 2441MHz The Maximum Occupancy Time Within 31.6sec: $0.00167 * 400 / 79 * 31.6 = 0.2672\text{sec}$ °

C) 2480MHz The Maximum Occupancy Time Within 31.6sec: $0.00167 * 400 / 79 * 31.6 = 0.2672\text{sec}$ °

Test Result: The average occupancy times of the highest, middle and lowest channel are less than 0.4sec, and thus complies the standard.

PS: (1) From Bluetooth Specification, It Hops 1640 Times in 1sec. The Average Occupancy Time of Each 79 Channels is $1600/79$ Times, Therefore, We Calculate The Maximum Occupancy Time (worst care) As Below:

A) 2402Mhz The Occupancy Time of Each Pulse is 0.4msec, The Maximum Occupancy Time within 31.6sec is $0.4\text{msec} * 1640/79 * 31.6 = 289.056\text{msec}$

B) 2441MHz The Occupancy Time of Each Pulse is 0.4msec, The Maximum Occupancy Time within 31.6sec is $0.4\text{msec} * 1640/79 * 31.6 = 289.056\text{msec}$

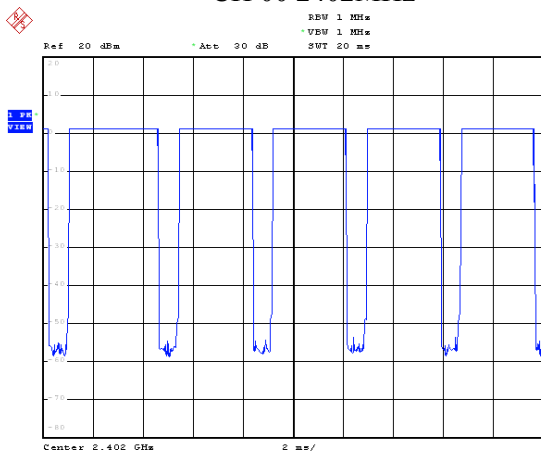
C) 2480MHz The Occupancy Time of Each Pulse is 0.4msec, The Maximum Occupancy Time within 31.6sec is $0.4\text{msec} * 1640/79 * 31.6 = 289.056\text{msec}$

Test Result: The average occupancy times of the highest, middle and lowest channel are less than 0.4sec, and thus complies the standard.

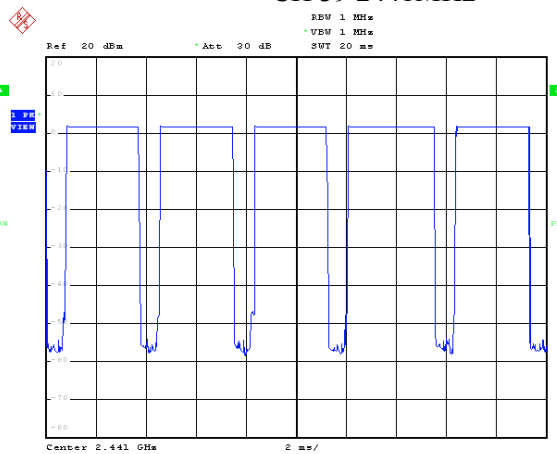
Product : MEGA BOOK
 Test Item : Dwell Time
 Test Site : No.1 OATS
 Test Mode : Mode 1: Transmitter (Channel 00,39,78 –DH5)

Channel (MHz)	Measurement Level (sec.)	Required Limit (sec.)	Result
CH 00 2402	0.293	< 0.4	Pass
CH 39 2441	0.293	< 0.4	Pass
CH 78 2480	0.3504	< 0.4	Pass

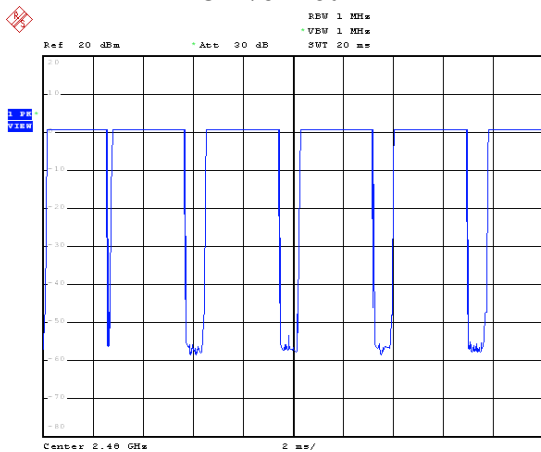
CH 00 2402MHz



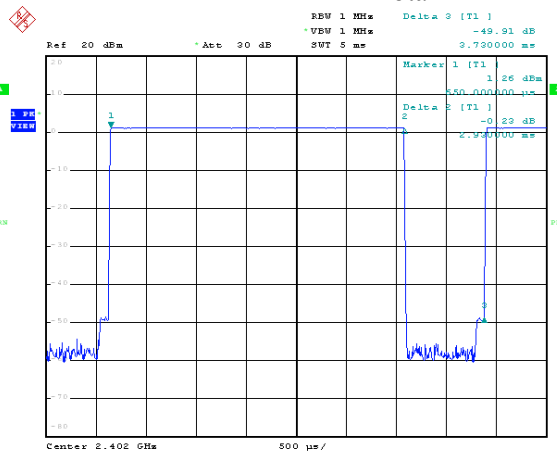
CH 39 2441MHz



CH 78 2480MHz



Total



Note: Dwell time = time slot length * hop rate / number of hopping channels * period

Occupancy Time of Frequency Hopping System

Test Time Period: $0.4 * 79 = 31.6\text{sec}$, Hopping Times Within 1sec: $5/20\text{msec} = 0.25\text{ hops/msec}$.

A) 2402MHz The Maximum Occupancy Time Within 31.6sec: $0.00293 * 250 / 79 * 31.6 = 0.293\text{sec}$ ◦

B) 2441MHz The Maximum Occupancy Time Within 31.6sec: $0.00293 * 250 / 79 * 31.6 = 0.293\text{sec}$ ◦

Test Time Period: $0.4 * 79 = 31.6\text{sec}$, Hopping Times Within 1sec: $6/20\text{msec} = 0.3\text{ hops/msec}$.

C) 2480MHz The Maximum Occupancy Time Within 31.6sec: $0.00292 * 300 / 79 * 31.6 = 0.3504\text{sec}$ ◦

Test Result: The average occupancy times of the highest, middle and lowest channel are less than 0.4sec, and thus complies the standard.

PS: (1) From Bluetooth Specification, It Hops 1640 Times in 1sec. The Average Occupancy Time of Each 79 Channels is $1600/79$ Times, Therefore, We Calculate The Maximum Occupancy Time (worst care) As Below:

A) 2402Mhz The Occupancy Time of Each Pulse is 0.4msec, The Maximum Occupancy Time within 31.6sec is $0.4\text{msec} * 1640/79 * 31.6 = 289.056\text{msec}$

B) 2441MHz The Occupancy Time of Each Pulse is 0.4msec, The Maximum Occupancy Time within 31.6sec is $0.4\text{msec} * 1640/79 * 31.6 = 289.056\text{msec}$

C) 2480MHz The Occupancy Time of Each Pulse is 0.4msec, The Maximum Occupancy Time within 31.6sec is $0.4\text{msec} * 1640/79 * 31.6 = 289.056\text{msec}$

Test Result: The average occupancy times of the highest, middle and lowest channel are less than 0.4sec, and thus complies the standard.

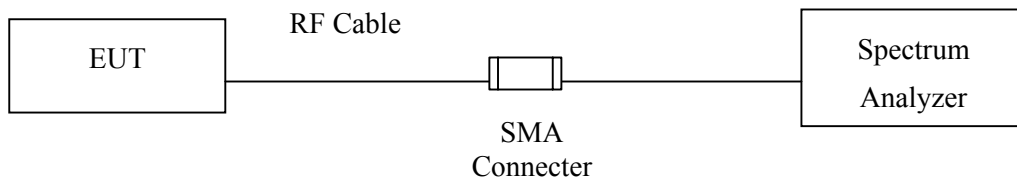
9. Occupied Bandwidth

9.1. Test Equipment

Item	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.
1	Spectrum Analyzer	R & S	FSP / 100561	Mar., 2006
2	No.1 OATS			Sep., 2006

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

9.2. Test Setup



9.3. Limits

N/A

9.4. Uncertainty

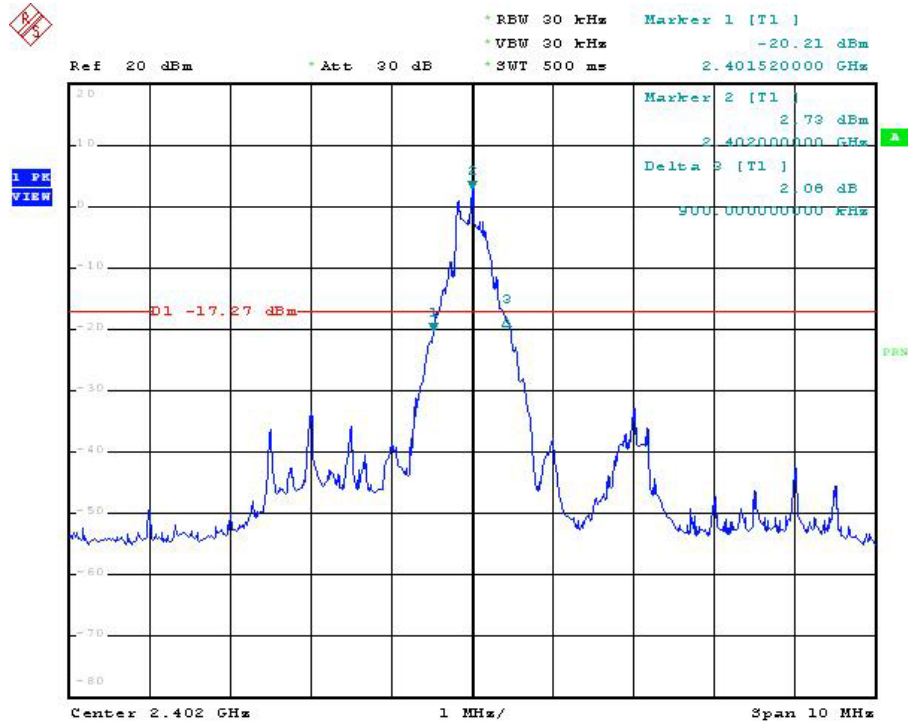
$\pm 150\text{Hz}$

9.5. Test Result of Occupied Bandwidth

Product : MEGA BOOK
 Test Item : Occupied Bandwidth Data
 Test Site : No.1 OATS
 Test Mode : Mode 1: Transmitter (2402MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	900	1000	Pass

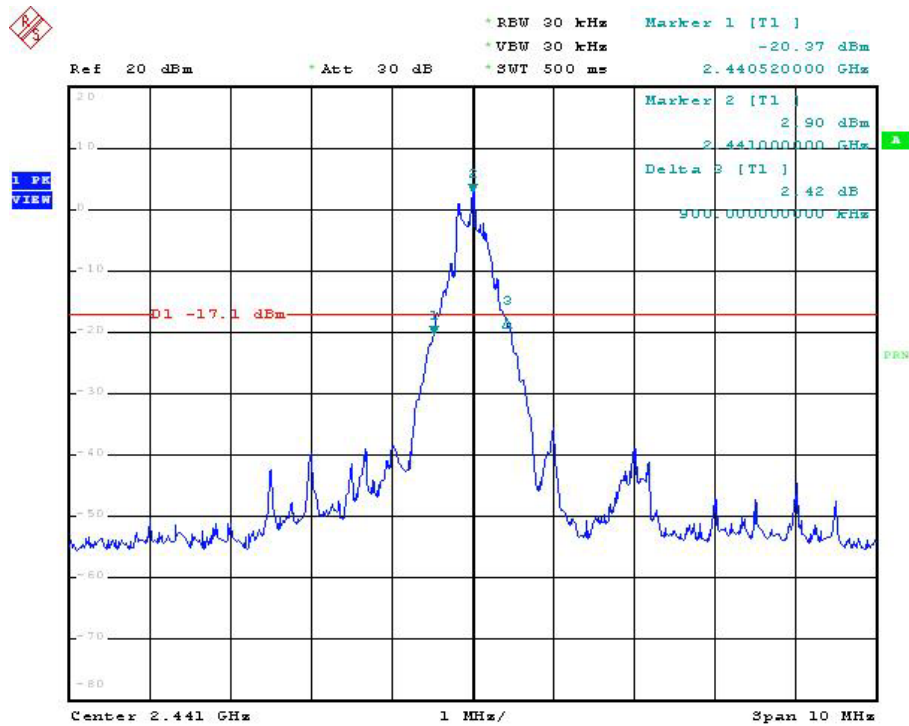
Figure Channel 00:



Product : MEGA BOOK
 Test Item : Occupied Bandwidth Data
 Test Site : No.1 OATS
 Test Mode : Mode 1: Transmitter (2441MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
39	2441	900	1000	Pass

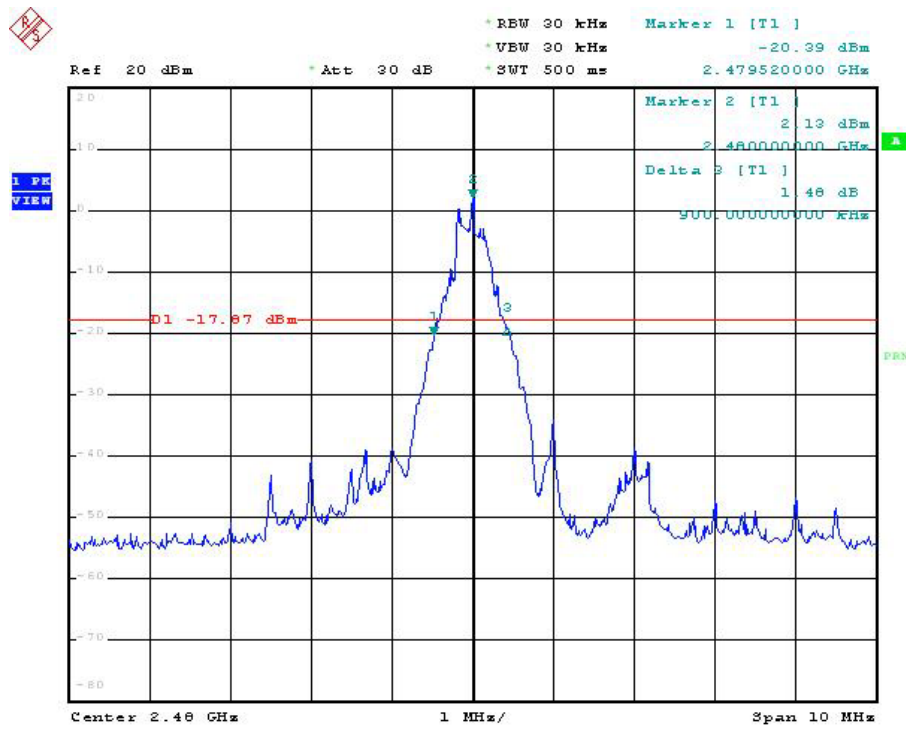
Figure Channel 39:



Product : MEGA BOOK
 Test Item : Occupied Bandwidth Data
 Test Site : No.1 OATS
 Test Mode : Mode 1: Transmitter (2480MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
78	2480	900	1000	Pass

Figure Channel 78:



10. EMI Reduction Method During Compliance Testing

No modification was made during testing.