

FCC PART 15 SUBPART C
EMI MEASUREMENT AND TEST REPORT


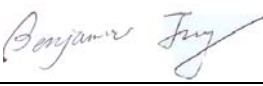
For

High Tech Computer, Corp.

23, Hsin-Hua Rd.,
Taoyuan, 330 Taiwan

FCC ID: NM8VOYAGER

2003-08-21

This Report Concerns: <input checked="" type="checkbox"/> Original Report	Equipment Type: Bluetooth Smartphone
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Report No.: R0307173	
Test Date: 2003-07-29	
Reviewed By: Ming Jing / 	
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1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

The *High Tech Computer, Corp.*'s product, model no.:SV10A/SV10B or the "EUT" as referred to this report is a bluetooth smartphone which is measured approximately 4.75"L x 1.9"W x 0.9"H. The difference between SV10A and SV10B is the material of the bezel. The bezel of SV10A contains matallic and the bezel of SV10B is plastic material.

* *The test data gathered are from typical production samples provided by the manufacturer.*

1.2 Objective

This type approval report is prepared on behalf of *High Tech Computer, Corp.* in accordance with Part 2, Subpart J, Part 15, Subparts A and C of the Federal Communication Commissions rules.

The objective of the manufacturer is to demonstrate compliance with following FCC15.247 rules for the bluetooth transmitter:

- Maximum Peak Output Power
- Hopping Channel Separation
- Number of Hopping Frequency Used
- 20 dB Bandwidth
- Dwell Time on Each Channel
- 100 kHz Bandwidth of Band Edge
- Conducted Emission
- Spurious Emission
- Radiated Emission
- Antenna Requirement
- RF Exposure Limit

1.3 Related Submittal(s)/Grant(s)

No Related Submittals.

1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-1992, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All radiated and conducted emissions measurement was performed at BACL. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

1.5 Test Facility

The Open Area Test site used by BACL to collect radiated and conducted emission measurement data is located in the back parking lot of the building at 230 Commercial Street, Sunnyvale, California, USA.

Test site at BACL has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-1992.

The Federal Communications Commission and Voluntary Control Council for Interference has the reports on file and is listed under FCC file 31040/SIT 1300F2 and VCCI Registration No.: C-1298 and R-1234. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The scope of the accreditation covers the FCC Method - 47 CFR Part 15 - Digital Devices, CISPR 22: 1997: Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment test methods.

1.6 Test Equipment List

Manufacturer	Description	Model	Serial Number	Cal. Due Date
HP	Spectrum Analyzer	8568B	2517A01610	2003-10-30
HP	Spectrum Analyzer	8593A	29190A00242	2004-05-01
HP	Amplifier	8447E	1937A01054	2004-05-01
HP	Quasi-Peak Adapter	85650A	2521A00718	2004-05-01
Com-Power	Biconical Antenna	AB-100	14012	2004-05-01
Com-Power	Log Periodic Antenna	AL-100	16091	2004-05-01
Com-Power	Log Periodic Antenna	AB-900	15049	2004-05-01
Agilent	Spectrum Analyzer (9KHz – 40GHz)	8564E	08303	2004-08-01
Agilent	Spectrum Analyzer (9KHz – 50GHz)	8565EC	06042	2004-05-03
HP	Amplifier (1-26.5GHz)	8449B	3147A00400	2004-03-14
A.H.System	Horn Antenna (700MHz-18GHz)	SAS-200/571	261	2004-05-31

* **Statement of Traceability: Bay Area Compliance Laboratory Corp.** certifies that all calibration has been performed using suitable standards traceable to the NIST.

1.7 Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
DELL	Notebook PC	Latitude D600	37357573321	DOC
HP	Printer	2225C	N/A	DOC

1.8 External I/O Cabling List and Details

Cable Description	Length (M)	Port/From	To
Shielded Cable	1.0	EUT	Notebook PC
Shielded Printer	2.0	Parallel Port/Notebook PC	Printer

1.9 Power Supply Information

Manufacturer	Description	Model	Serial Number	FCC ID
DELTA	AC Adapter	ADP-10SB	SMW0322298719	DOC
PHIHONG	AC Adapter	PSC05R-050	EAF136V002987	DOC

1.10 Accessories Information

Manufacturer	Description	Model
HTC	USB Cradle	SV15
HTC	RS-232 Cradle	SV15
Eacotech	Earphone	TS168
HTC	USB Cable	N/A
HTC	RS-232 Cable	N/A
HTC	Pouch	N/A

2 - SYSTEM TEST CONFIGURATION

2.1 Justification

The host system was configured for testing in a typical fashion (as a normally used by a typical user).

The EUT was tested in the normal (native) operating mode to represent *worst*-case results during the final qualification test.

2.2 EUT Exercise Software

The EUT exercising program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use.

2.3 Special Accessories

As shown in section 2.7, all interface cables used for compliance testing are shielded as normally supplied by their respective support equipment manufacturers.

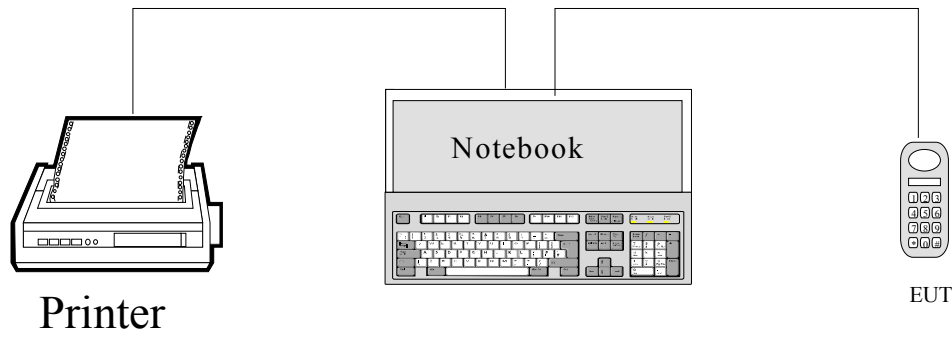
2.4 Schematics / Block Diagram

Please refer to Exhibit D.

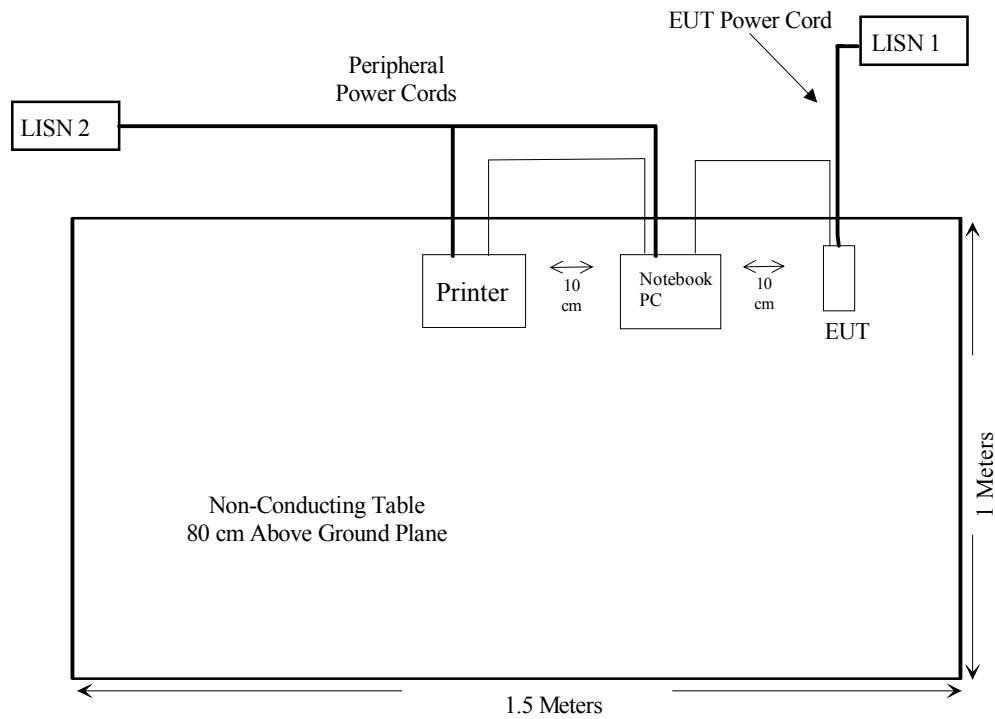
2.5 Equipment Modifications

No modifications were made by BACL Corporation to ensure the EUT to comply with the applicable limits and requirements.

2.6 Configuration of Test System



2.7 Test Setup Block Diagram



3 - SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT	REFERENCE
§ 2.1093	RF Safety Requirements	Compliant	Section 14
§15.203	Antenna Requirement	Compliant	Section 13
§15.207 (a)	Conducted Emission	Compliant	Section 12
§ 15.205	Restricted Bands	Compliant	Section 11
§15.247 (a) (1) (i)	Number of Hopping Frequencies Used	Compliant	Section 6
§15.209	Radiated Emission	Compliant	Section 11
§15.209, §15.33 (a)	Spurious Emission at Antenna Port	Compliant	Section 10
§15.247 (a) (1)	Hopping Channel Separation	Compliant	Section 7
§15.247 (a) (1) (i)	Dwell Time of Each Frequency within a 10 Second Period of time (0.4 x Number of Channel)	Compliant	Section 9
§15.247 (a) (1)	Channel Bandwidth	Compliant	Section 5
§15.247 (b) (2)	Maximum Peak Output Power	Compliant	Section 4
§ 15.247 (c)	100 kHz Bandwidth of Frequency Band Edge	Compliant	Section 8
§ 15.247 (g)	Full and complete compliance with applicable requirements for FHSS. Compliance with the definition of frequency hopping system, distribute transmission over minimum number of hopping channel	Compliant	Technical Manual
§ 15.247 (h)	Limitation on avoidance on hopping on occupied channel	Compliant	Technical Manual

4 - MAXIMUM PEAK OUTPUT POWER

4.1 Standard Applicable

According to §15.247(b) (1), for frequency hopping systems operating in the 2400-2483.5MHz band at least 75 hopping channels: 1 watt. For other frequency hopping systems in the 2400-2483.5 band: 0.125W.

4.2 Measurement Procedure

1. Place the EUT on the turntable and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

4.3 Test Equipment

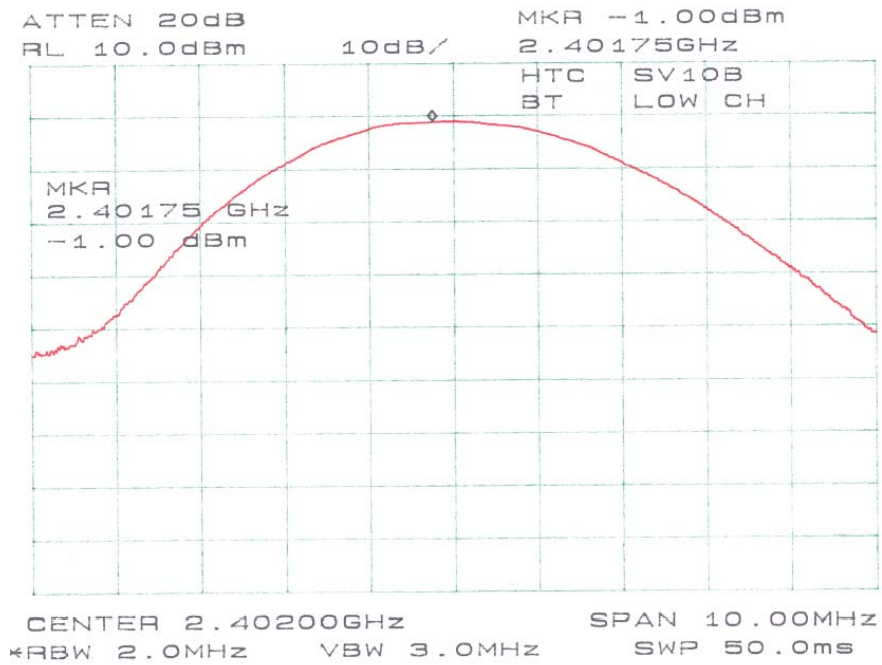
Manufacturer	Model No.	Description	Calibration Due Date
Agilent	8564E	Spectrum Analyzer	2004-08-01

4.4 Measurement Result

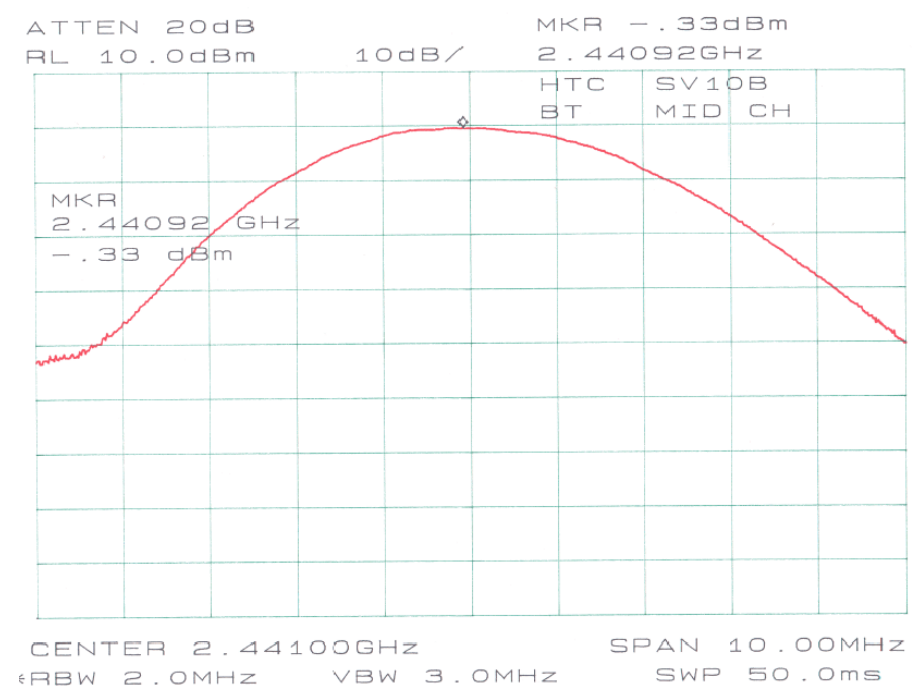
Frequency	Output Power (dBm)	Cable Lost (dBm)	Output Power (W)	Standard	Result
Low	-1.00	1.0	0.001	$\leq 1W$	Compliant
Middle	-0.33	1.0	0.0012	$\leq 1W$	Compliant
High	-1.33	1.0	0.0009	$\leq 1W$	Compliant

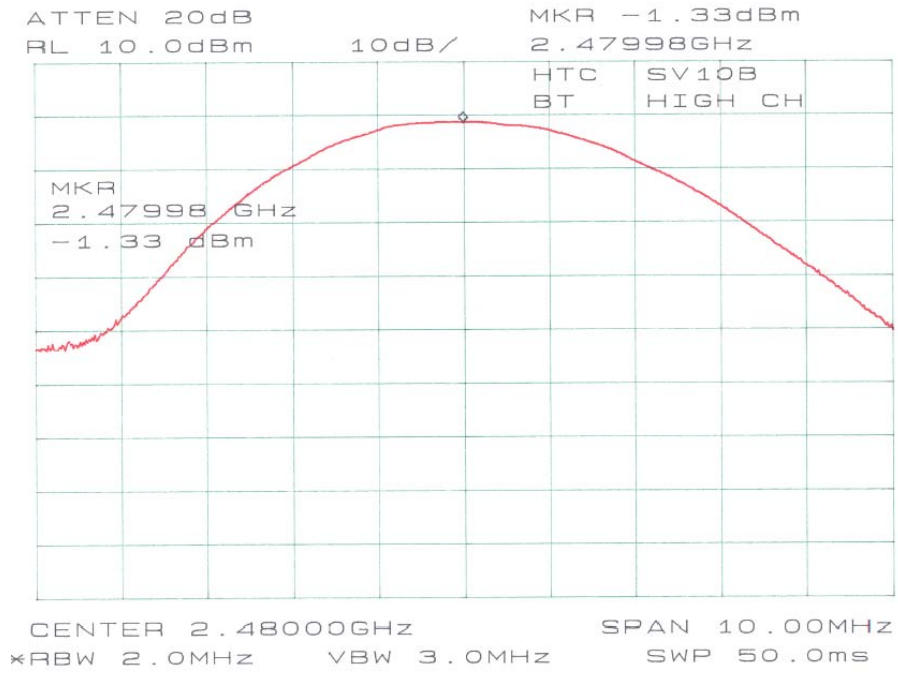
4.5 Plots of Maximum Peak Output Power

Please refer to following plots.



ws 2003-7-29





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5 - CHANNEL BANDWIDTH

5.1 Standard Applicable

According to §15.247(a)(1), frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

5.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

5.3 Test Equipment

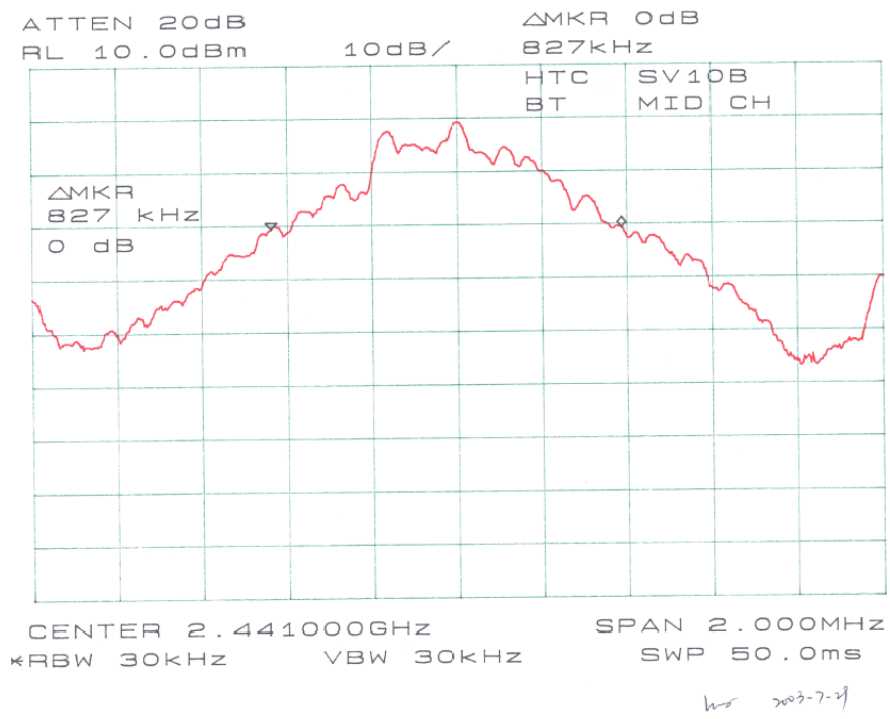
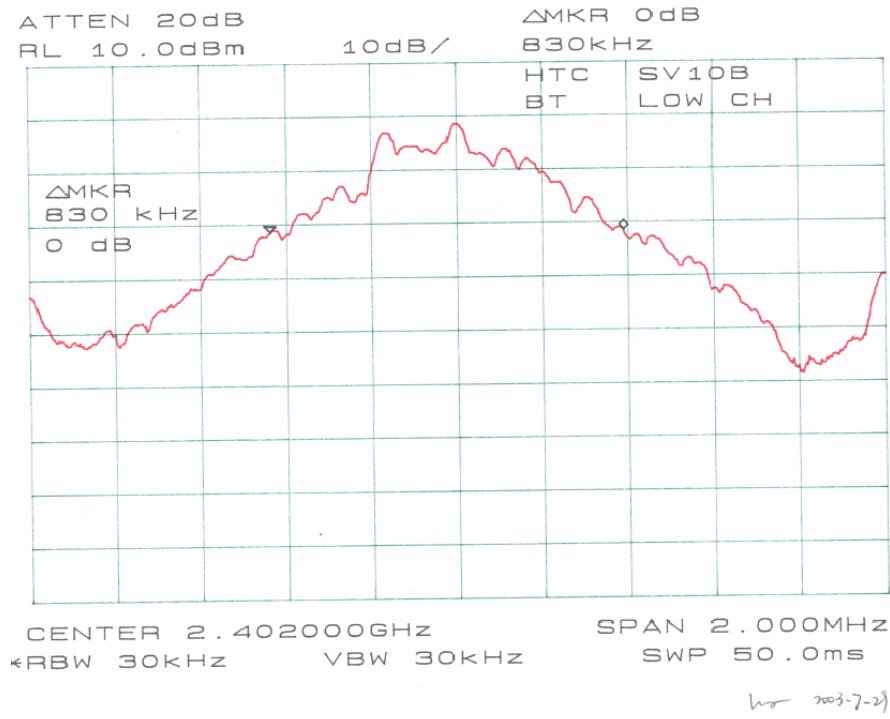
Manufacturer	Model No.	Description	Calibration Due Date
Agilent	8564E	Spectrum Analyzer	2004-08-01

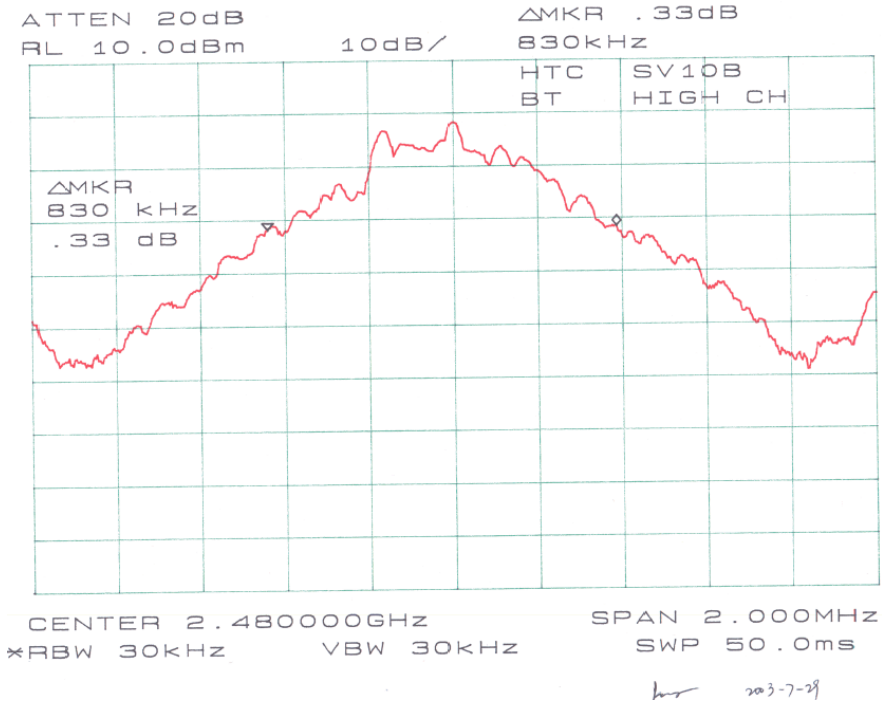
5.4 Measurement Result

Frequency	Measurement (kHz)	Standard	Result
Low	830	≤ 1MHz	Compliant
Middle	827	≤ 1MHz	Compliant
High	830	≤ 1MHz	Compliant

5.6 Plot of Channel Bandwidth

Please refer to following plots.





6 - NUMBER OF HOPPING FREQUENCY USED

6.1 Standard Applicable

According to §15.247(a)(1)(i), frequency hopping systems operating in the 902-928Mhz band: if the 20 dB bandwidth of the hopping channel is 250kHz or greater, the system shall use at least 25 hopping frequencies.

6.2 Measurement Procedure

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Position the EUT on the bench without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set the SA on Max-Hold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
4. Set the SA on View mode and then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

6.3 Test Equipment

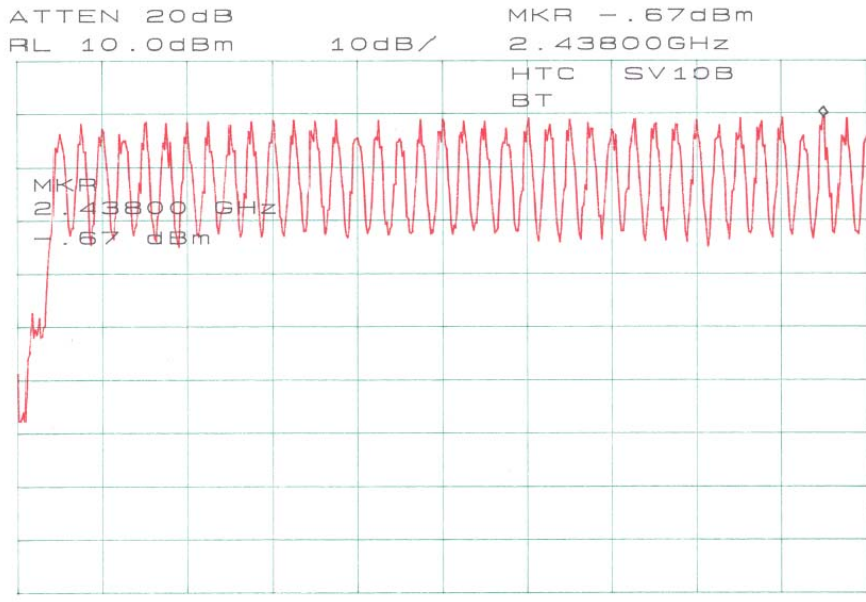
Manufacturer	Model No.	Description	Calibration Due Date
Agilent	8564E	Spectrum Analyzer	2004-08-01

6.4 Measurement Procedure

Measurement	Standard	Result
79	25	Compliant

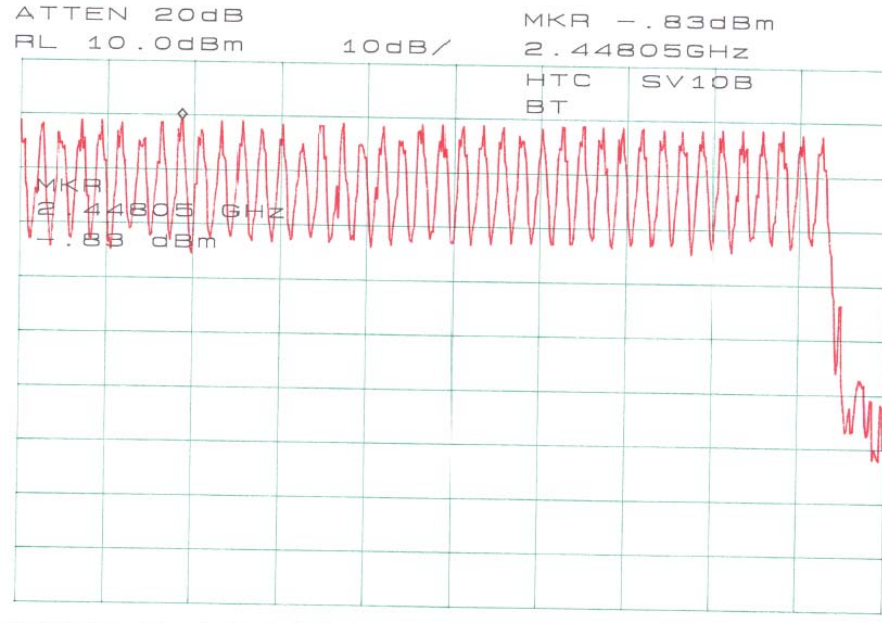
6.5 Plots of Number of Hopping Frequency

Please refer to the attached plots.



START 2.40000GHz STOP 2.44000GHz
RBW 30kHz VBW 30kHz SWP 120ms

by 2003-7-29



START 2.44000GHz STOP 2.48350GHz
RBW 30kHz VBW 30kHz SWP 130ms

by 2003-7-29

7 - HOPPING CHANNEL SEPARATION

7.1 Standard Applicable

According to §15.247(a)(1), frequency hopping system 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. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies.

7.2 Measurement Procedure

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Position the EUT on a bench without connection to measurement instrument Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range.
3. By using the Max-Hold function record the separation of two adjacent channels.
4. Measure the frequency difference of these two adjacent channels by SA MARK function, and then plot the result on SA screen.
5. Repeat above procedures until all frequencies measured were complete.

7.3 Test Equipment

Manufacturer	Model No.	Description	Calibration Due Date
Agilent	8564E	Spectrum Analyzer	2004-08-01

7.4 Measurement Results

Frequency	Measurement (kHz)	Result
Low	1003	Compliant
Middle	1003	Compliant
High	1003	Compliant

7.5 Plots of Hopping Channel Separation

Please refer to the following plots.

8 - 100 KHZ BANDWIDTH OF BAND EDGES

8.1 Standard Applicable

According to §15.247(c), 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 §15.209(a) is not required.

8.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

8.3 Test Equipment

Manufacturer	Model No.	Description	Calibration Due Date
Agilent	8564E	Spectrum Analyzer	2004-08-01

8.4 Measurement Results

Please refer the following plots.

