FCC PART 15 SUBPART C

EMI MEASUREMENT AND TEST REPORT

For

AMBIT Microsystems Corporation

4-1, Ming Shen Street, Tu Chen Industrial District.
Tu Chen, Taipei Hsien 236, Taiwan, R.O.C.

FCC ID: MCLT60H42400

November 13, 2002

This Report Concerns:	**Equipment Type:**
☒ Class II Permissive Change	MiniPCI IIIB Wireless LAN Card

Test Engineer:	Benjamin Jing
Report No.:	R0210292
Test Date:	October 31, 2002
Reviewed By:	Jeff Lee
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1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

The *Ambit Microsystems Corporation*'s Model: *T60H424* or the "EUT" as referred to in this report is a MINIPCI IIIB Wireless LAN Card.

The EUT is complied with IEEE 802.11b 11 Mbps Standard. The WLAN application is implemented via a RF module. This RF module is developed for Wireless LAN application complied with IEEE 802.11b 11Mbps standard in ISM band. It can be used to provide a variety of low-cost wireless network interfaces to build your wireless connection via simply SMT procedure to speed the time to market. Three Intersil's chips are implemented in the RF module including ISL3985, HFA3783.

The EUT has the following functions:

- Compatible with IEEE 802.11b high rate standard to provide wireless Ethernet speeds of 11Mbps data rate
- Dynamic data rate switching with 11, 5.5, 2, and 1 Mbps
- Allows auto fallback data rate for optimized reliability, throughput and transmission range
- Supports wireless data encryption with 64/128-bit WEP standard for security
- Dual diversity antenna connectors supported for the multi-path environment
- Drivers supports Windows 95, 98, 98SE, NT, ME, 2000, Win XP.

** The test data in this test report was good for the test sample only. It may have deviation for other test samples.*

1.2 Objective

This type approval report is prepared on behalf of. *Ambit Microsystems Corporation* in accordance with Part 2, Subpart J, Part 15, Subparts A, B and C of the Federal Communication Commissions rules.

The objective of the manufacturer is to demonstrate compliance with FCC rules for Antenna Requirement, Conducted and Spurious Radiated Emission as a Class II Permissive Change.

1.3 Related Submittal(s)/Grant(s)

This Class II permissive change device was originally granted on 4/15/2002. Please refer to BACL report R0203066. The manufacturer did not make any modification on the EUT. Per marketing purpose, the device was installed in Compaq laptop and tested with the new antenna (Model: HTL008 P52, please refer to Appendix A for specification).

1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2000, 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 Bay Area Compliance Laboratory Corporation. 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 Bay Area Compliance Laboratory Corporation 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 Bay Area Compliance Laboratory Corporation 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 C63.4-2000.

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, Bay Area Compliance Laboratory Corporation is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (NVLAP). The scope of the accreditation covers the FCC Method - 47 CFR Part 15 - Digital Devices, IEC/CISPR 22: 1998, and AS/NZS 3548: Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment test methods under NVLAP Lab Code 200167-0.

1.6 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Due Date
HP	Spectrum Analyzer	8568B	2610A02165	12/6/02
HP	Spectrum Analyzer	8593B	2919A00242	12/20/02
HP	Amplifier	8349B	2644A02662	12/20/02
HP	Quasi-Peak Adapter	85650A	917059	12/6/02
HP	Amplifier	8447E	1937A01046	12/6/02
A.H. System	Horn Antenna	SAS0200/571	261	12/27/02
Com-Power	Log Periodic Antenna	AL-100	16005	11/2/03
Com-Power	Biconical Antenna	AB-100	14012	11/2/03
Solar Electronics	LISN	8012-50-R-24-BNC	968447	12/28/02
Com-Power	LISN	LI-200	12208	12/20/02
Com-Power	LISN	LI-200	12005	12/20/02
BACL	Data Entry Software	DES1	0001	12/20/02

*** Statement of Traceability: Bay Area Compliance Laboratory Corp.** certifies that all calibration has been performed using suitable standards traceable to the NATIONAL INSTITUTE of STANDARDS and TECHNOLOGY (NIST).

1.7 Host System Configuration List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
Compaq	AC Adapter	PPP012L	None	DoC
Compaq	Laptop	PC8672EAA	J291800P1058	DoC

1.8 Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
Compaq	Laptop	PC8672EAA	J291800P1058	DOC
Citizen	Printer	LSP-10	5047999-82	DLK66TLSP-10

1.9 External Cable List and Details

Manufacturer	Length (M)	From	To
Shielded Printer Cable	2.0	Parallel Port/Laptop	Printer

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. The test software, Prism Test Utility (Version 3.0.22), provided by the customer, is started the Windows 98 terminal program under the Windows 98 operating system.

Once loaded, the program sequentia lly exercises each system component, and the Prism Test Utility icon appears in the PC screen. By the icon, select the channel to be tested, set the mode as "Host BSS". After the setting, click the "Continuous TX" button for transmitting the RF power.

Repeat above steps for other channels to be tested.

2.3 Special Accessories

As shown in section 2.7, all interface cables used for compliance testing are shielded as normally supplied by INMAC and their respective support equipment manufacturers. The host pc and other peripherals featured shielded metal connectors.

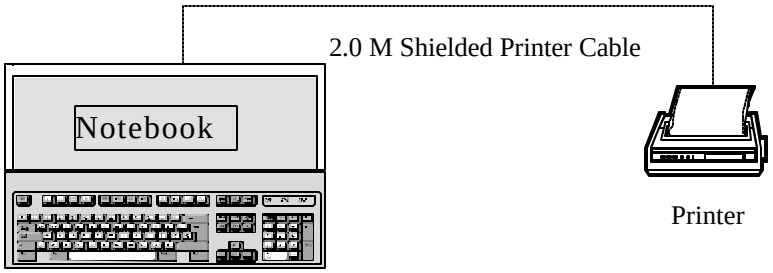
2.4 Schematics / Block Diagram

Please refer to Exhibit D.

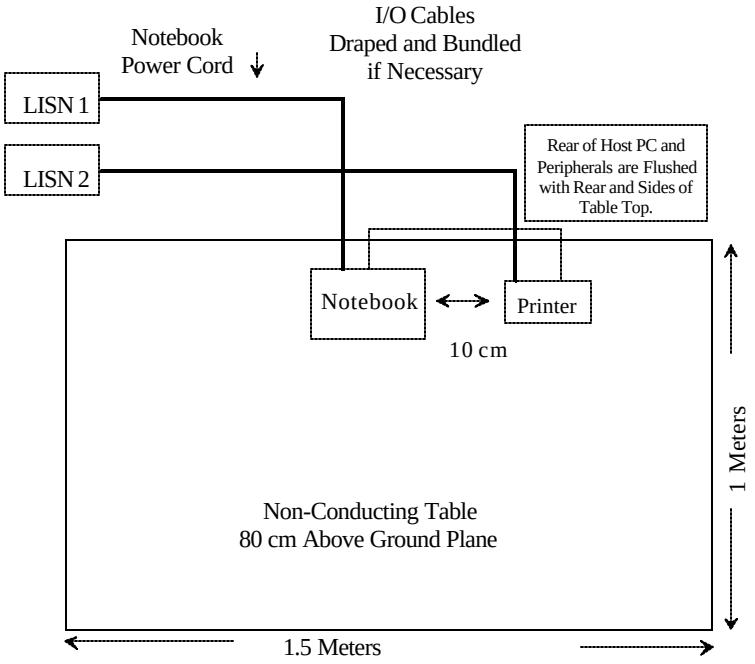
2.5 Equipment Modifications

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
§ 15.205	Restricted Bands	Compliant
§15.203	Antenna Requirement	Compliant
§15.207 (a)	Conducted Emission	Compliant
§15.209 (a)	Radiated Emission	Compliant
§15.209 (f)	Spurious Emission	Compliant
§15.247 (a) (2)	6 dB Bandwidth	Compliant
§15.247 (b) (2)	Peak Output Power	Compliant
§ 15.247 (c)	100 kHz Bandwidth of Frequency Band Edges	Compliant
§15.247 (d)	Peak Power Spectral Density	Compliant

Attestation: The testing was performed or supervised by BACL Corp. that the test measurements were made in accordance with the referred department standard(s); and that the radio equipment identified in this application has been subject to all the applicable test conditions specified in the department standards and all of the requirement standards have been met.

4 - PEAK OUTPUT POWER MEASUREMENT

4.1 Standard Applicable

According to §15.247(b) (2), for all direct sequence systems, the maximum peak output power of the intentional radiator shall not exceed 1 Watt.

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 power meter.

4.3 Measurement Result

Frequency (MHz)	Output Power in dBm	Output Power in W	Standard	Result
2412.00	13.74	0.024	≤ 1W	Compliant
2442.00	13.57	0.023	≤ 1W	Compliant
2472.00	12.32	0.017	≤ 1W	Compliant

4.4 Test Equipment

Manufacturer	Model No.	Serial No.	Calibration Due Date
Agilent	E4419b	GB40202891	4/8/03
Agilent	E4412a	US38486529	4/8/03

5 - SPURIOUS EMISSION

5.1 Standard Applicable

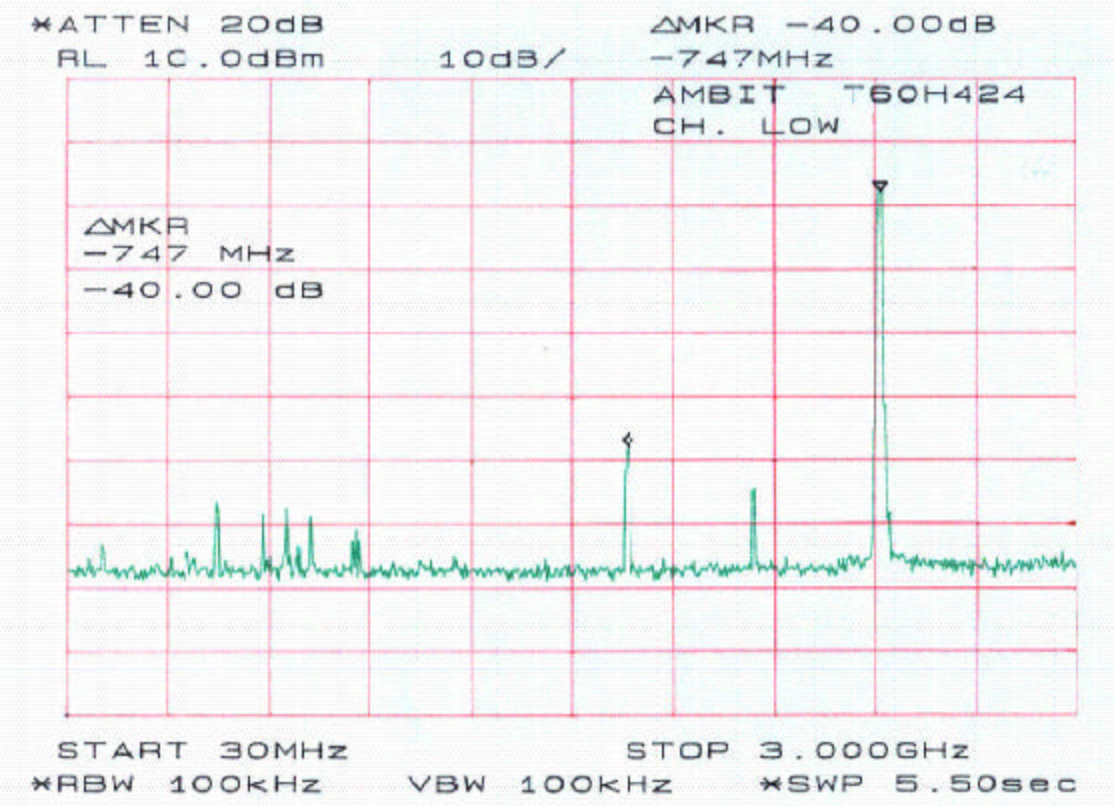
According to §15.209 (f) and §15.33(a), in some cases the emissions from an intentional radiator must be measured to beyond the tenth harmonic of the highest fundamental frequency designed to be emitted by the intentional radiator because of the incorporation f a digital device. If measurements above the tenth harmonic are so required, the radiated emissions above the tenth harmonic shall comply with the general radiated emission limits applicable to the incorporated digital device, as shown in §15.109 and as based on the frequency of the emission being measured, or, except for emissions contained in the restricted frequency bands shown in §15.205, the limit on spurious emissions specified for the intentional radiator, whichever is the higher limit.

5.2 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. Placed the EUT on a bench. 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 transmitting 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.

5.3 Measurement Data

Please refer to the appending for more information.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10dB/
ΔMKR -40.00dB
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-40.00 dB
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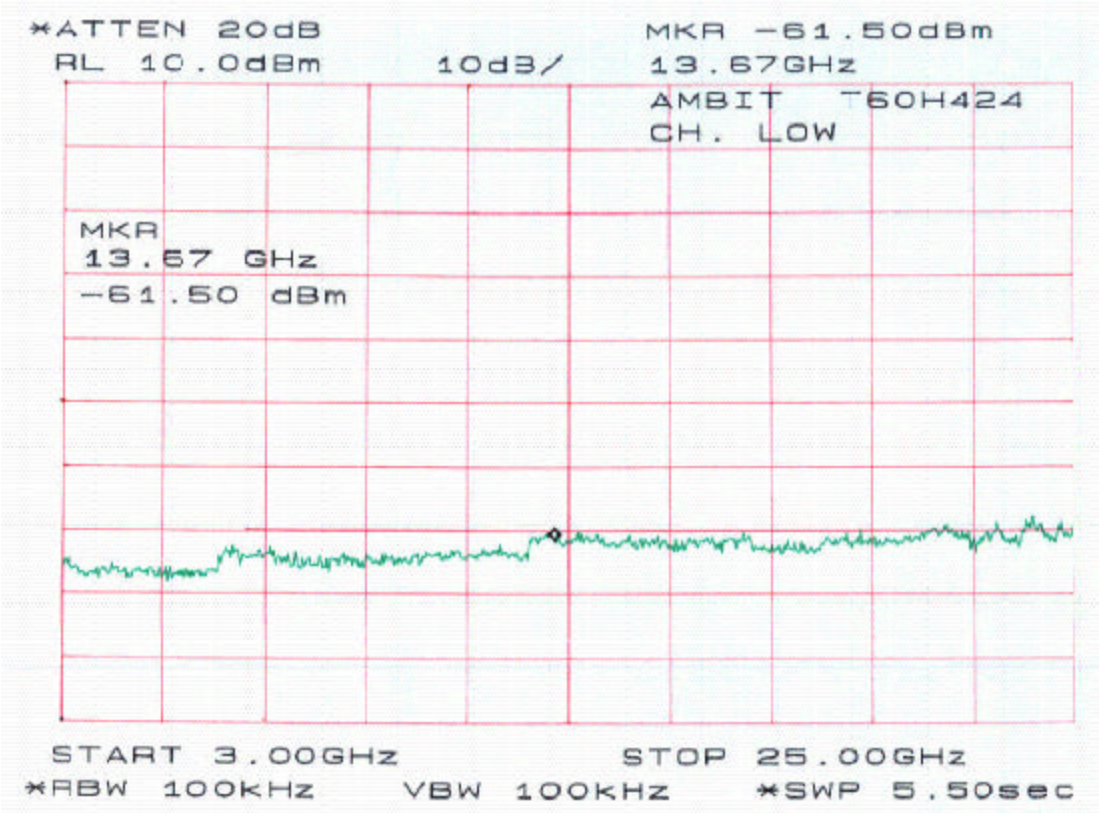
STOP 3.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 5.50sec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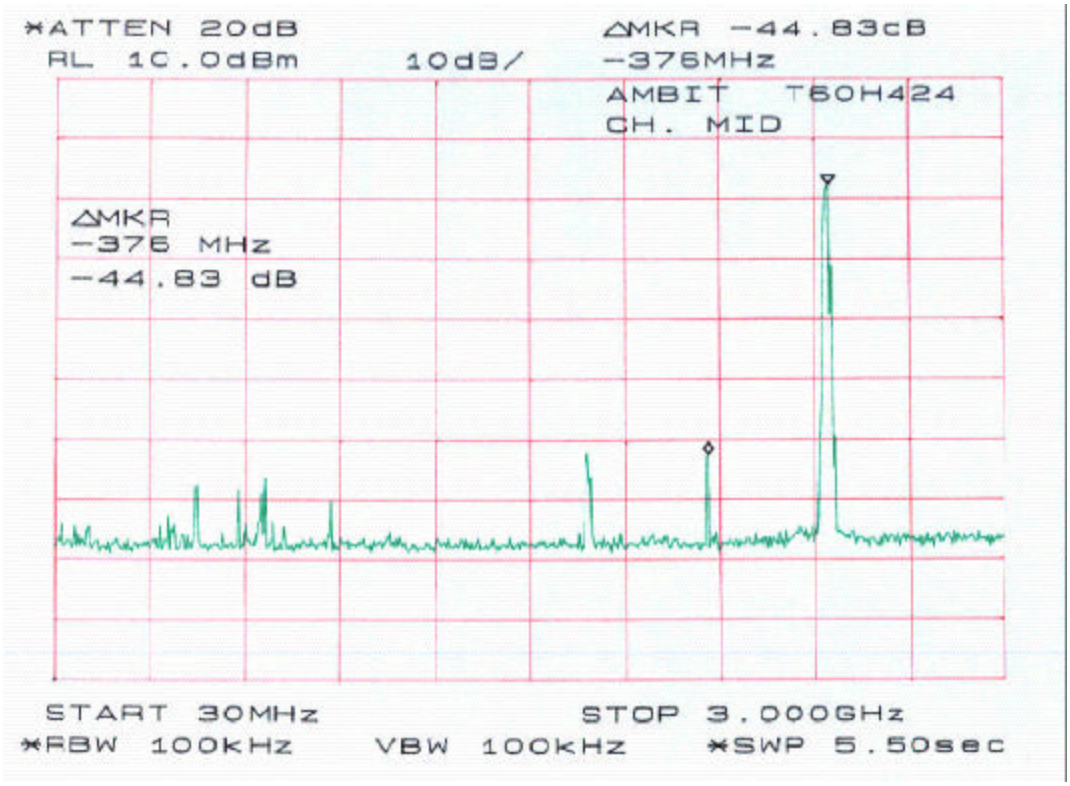
VBW 100kHz
*SWP 5.50sec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STOP 3.000GHz
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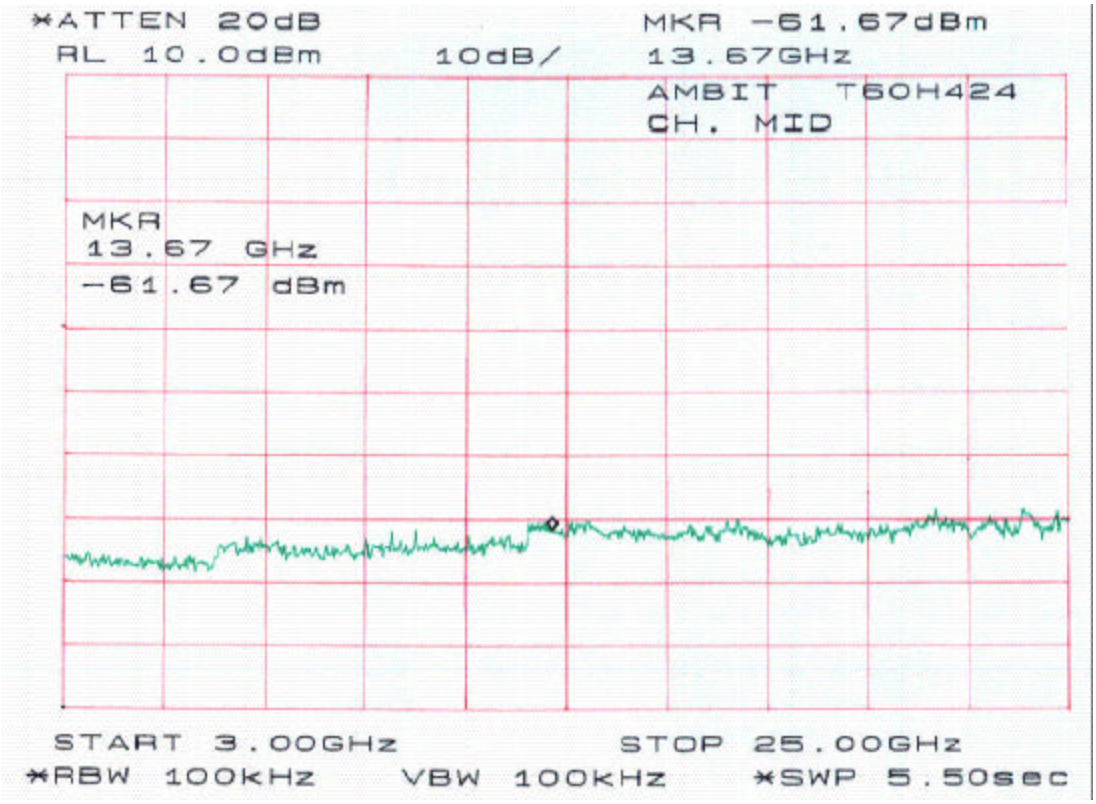
VBW 100kHz
*SWP 5.50sec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CH. MID
MKR
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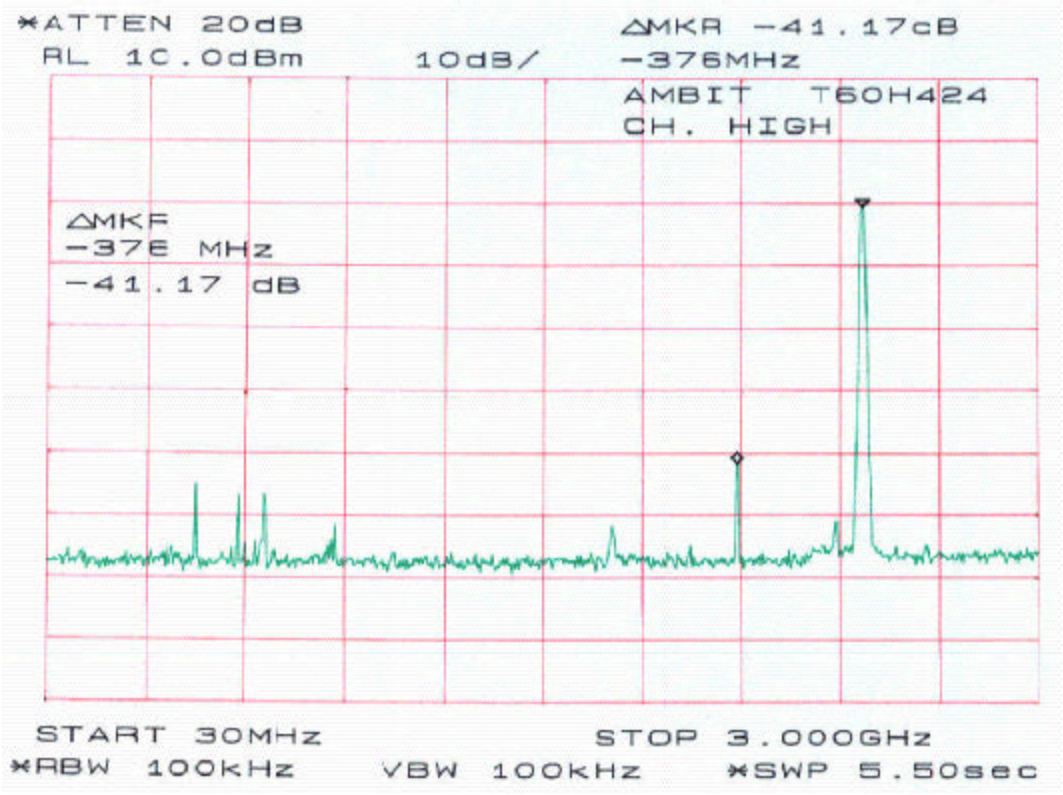
-61.67 dBm
START 3.00GHz
STOP 25.00GHz
*RBW 100kHz
VBW 100kHz
*SWP 5.50sec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10dB/
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-376MHz
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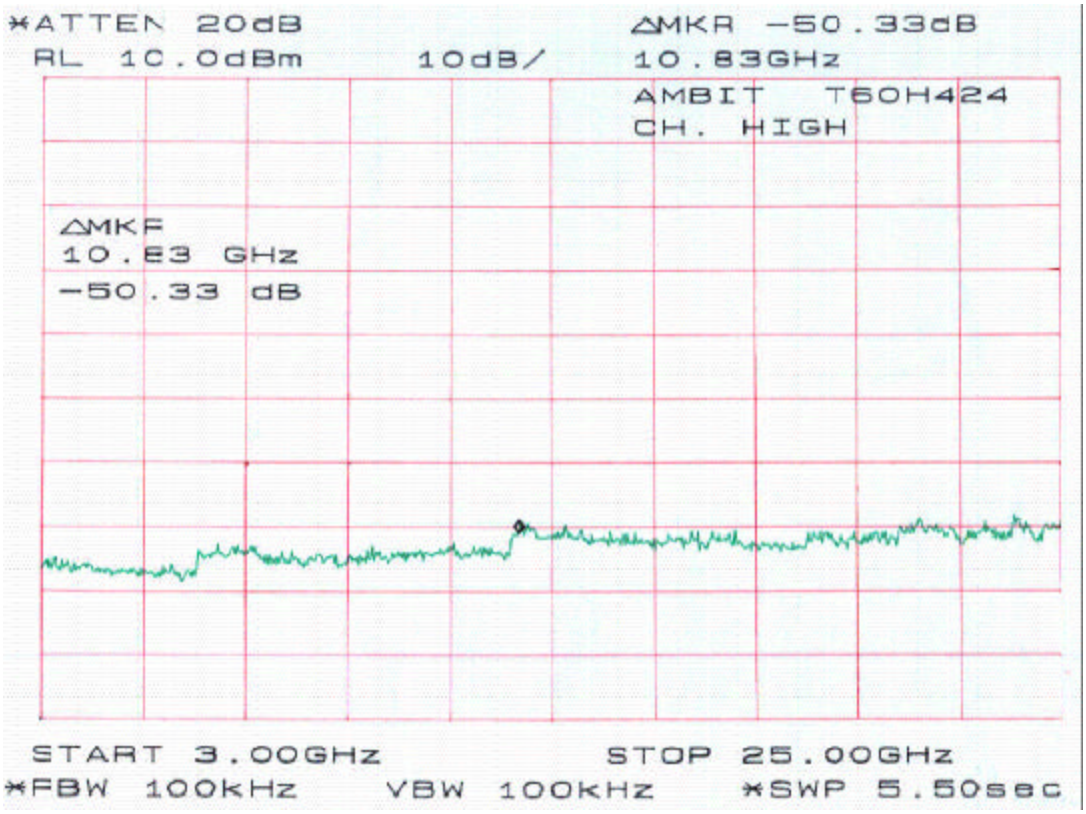
CH. HIGH
ΔMKF
-376 MHz
-41.17 dB
START 30MHz
STOP 3.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 5.50sec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10dB/
ΔMKR -50.33dB
10.83GHz
AMBIT T60H424
CH. HIGH
ΔMKF
10.83 GHz
-50.33 dB
START 3.00GHz
STOP 25.00GHz
*FBW 100kHz
VBW 100kHz
*SWP 5.50sec

6 - PEAK POWER SPECTRAL DENSITY

6.1 Standard Applicable

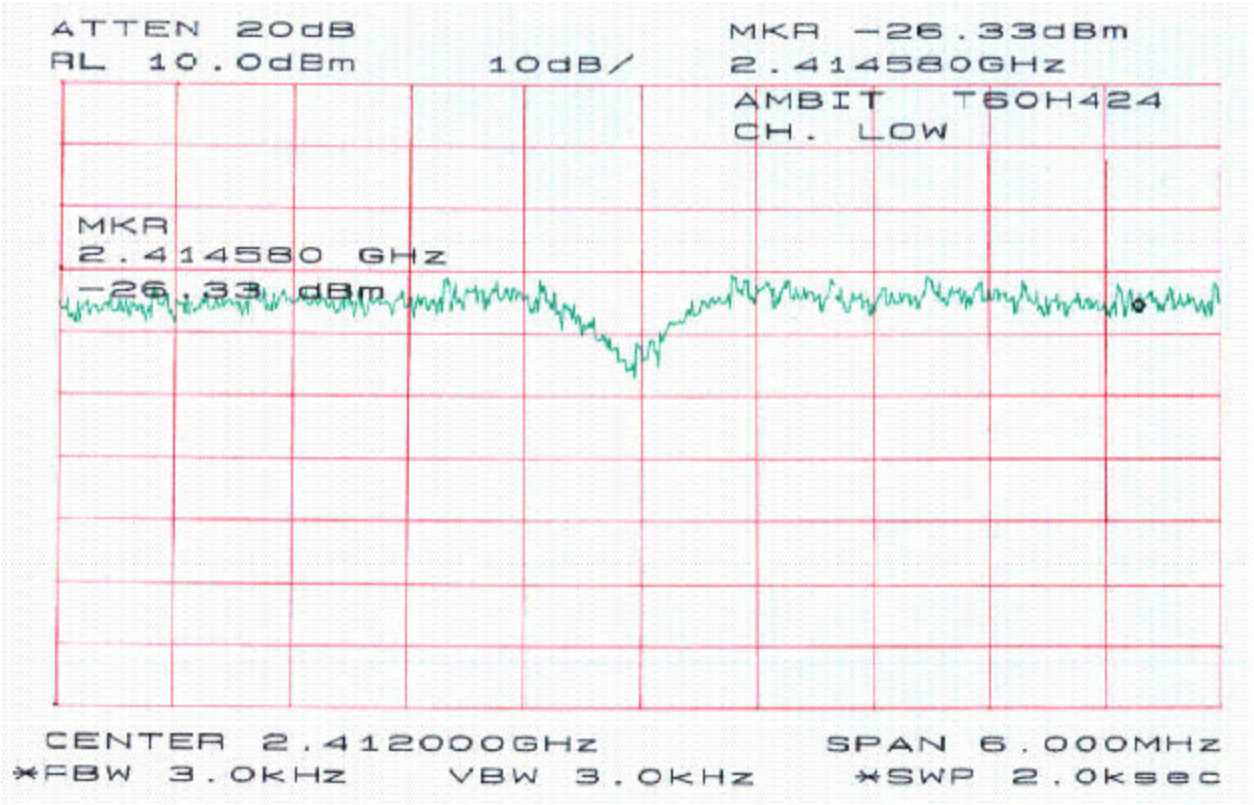
According to §15.247 (d), for direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

6.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Placed the EUT on a bench. 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. Adjust the center frequency of SA on any frequency be measured and set SA to 6MHz span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
4. Repeat above procedures until all frequencies measured were complete.

6.3 Test Results

Please refer to the attached plot(s).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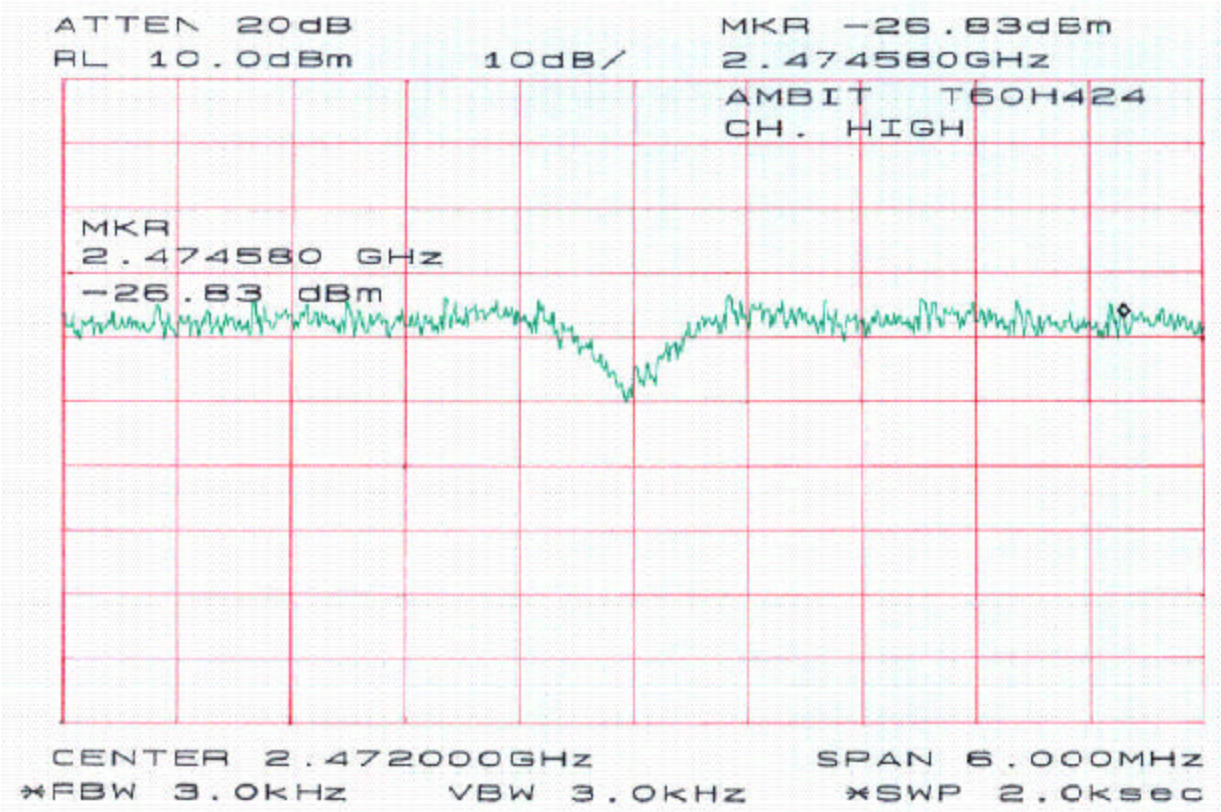
10dB/
MKR -26.33dBm
2.414580GHz
AMBIT T60H424
CH. LOW
MKR
2.414580 GHz
-26.33 dBm
CENTER 2.412000GHz
SPAN 6.000MHz
*FBW 3.0kHz
VBW 3.0kHz
*SWP 2.0ksec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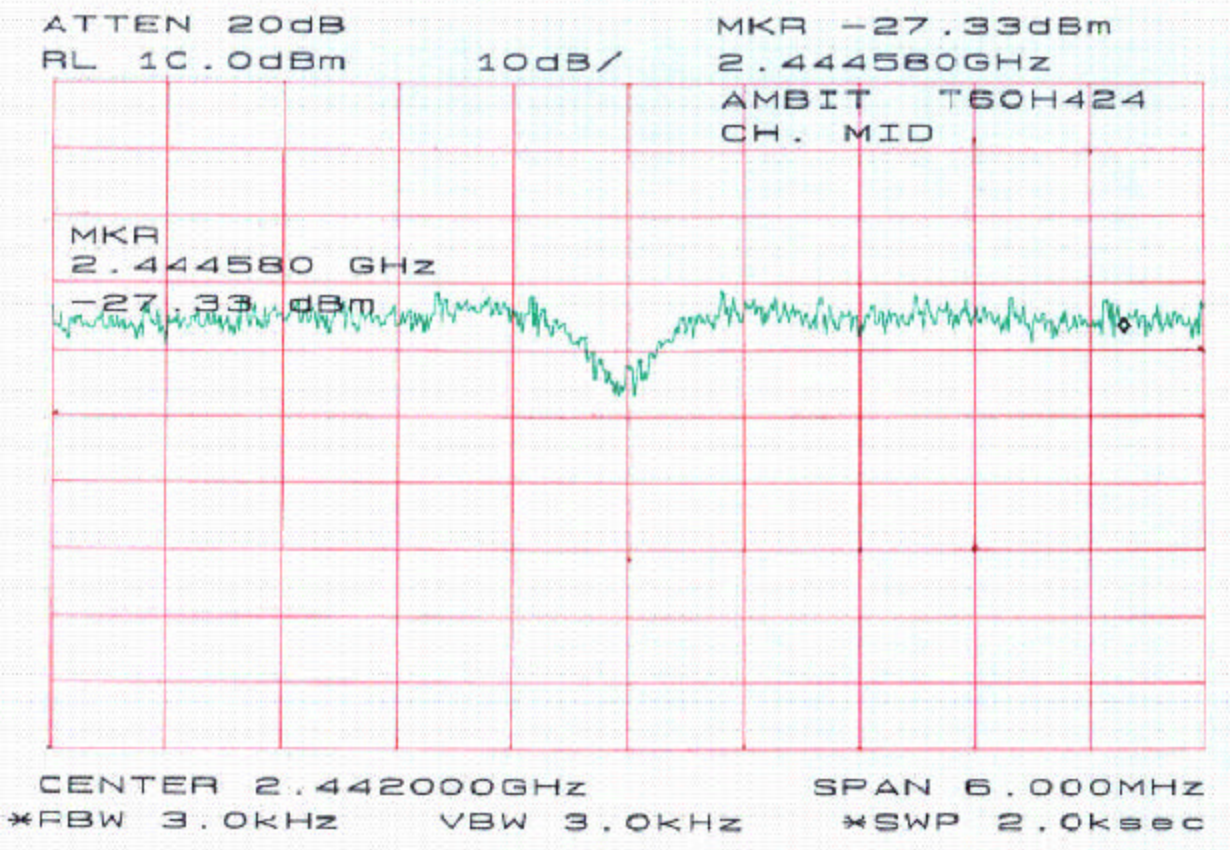
RL 10.0dBm
10dB/
MKR -26.83dBm
2.474580GHz
AMBIT T60H424
CH. HIGH
MKR
2.474580 GHz
-26.83 dBm
CENTER 2.472000GHz
SPAN 6.000MHz
*FBW 3.0kHz
VBW 3.0kHz
*SWP 2.0ksec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10dB/
MKR -27.33dBm
2.444580GHz
AMBIT T60H424
CH. MID
MKR
2.444580 GHz
-27.33 dBm
CENTER 2.442000GHz
SPAN 6.000MHz
*RBW 3.0kHz
VBW 3.0kHz
*SWP 2.0ksec

7 - 6 DB BANDWIDTH

7.1 Standard Applicable

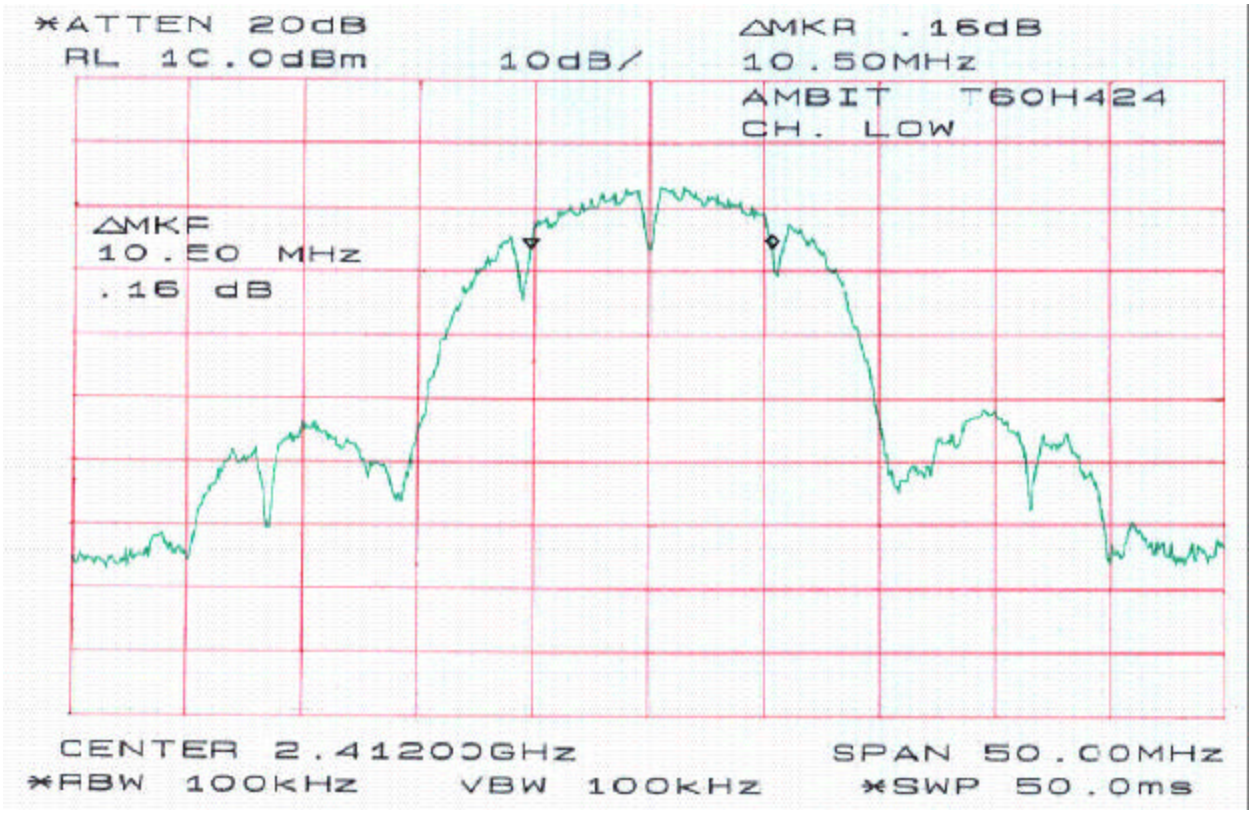
According to §15.247(a)(2), for direct sequence systems, the minimum 6dB bandwidth shall be at least 500 kHz.

7.2 Measurement Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Placed the EUT on a bench. 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 6 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

7.3 Measurement Data

Please refer to appending plot for more information.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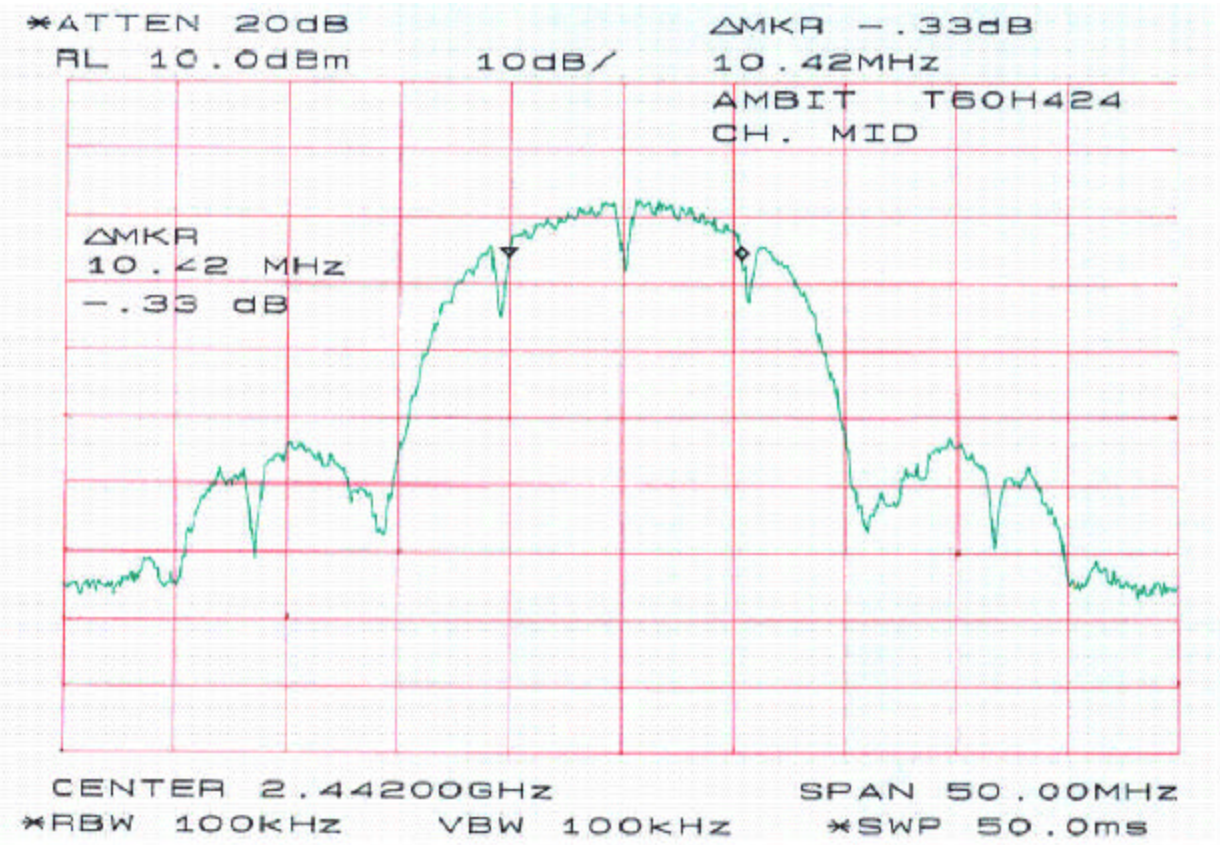
10dB/
ΔMKR .16dB
10.50MHz
AMBIT T60H424
CH. LOW
ΔMKF
10.50 MHz
.16 dB
CENTER 2.412000GHz
SPAN 50.00MHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0ms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10.42 MHz
-.33 dB
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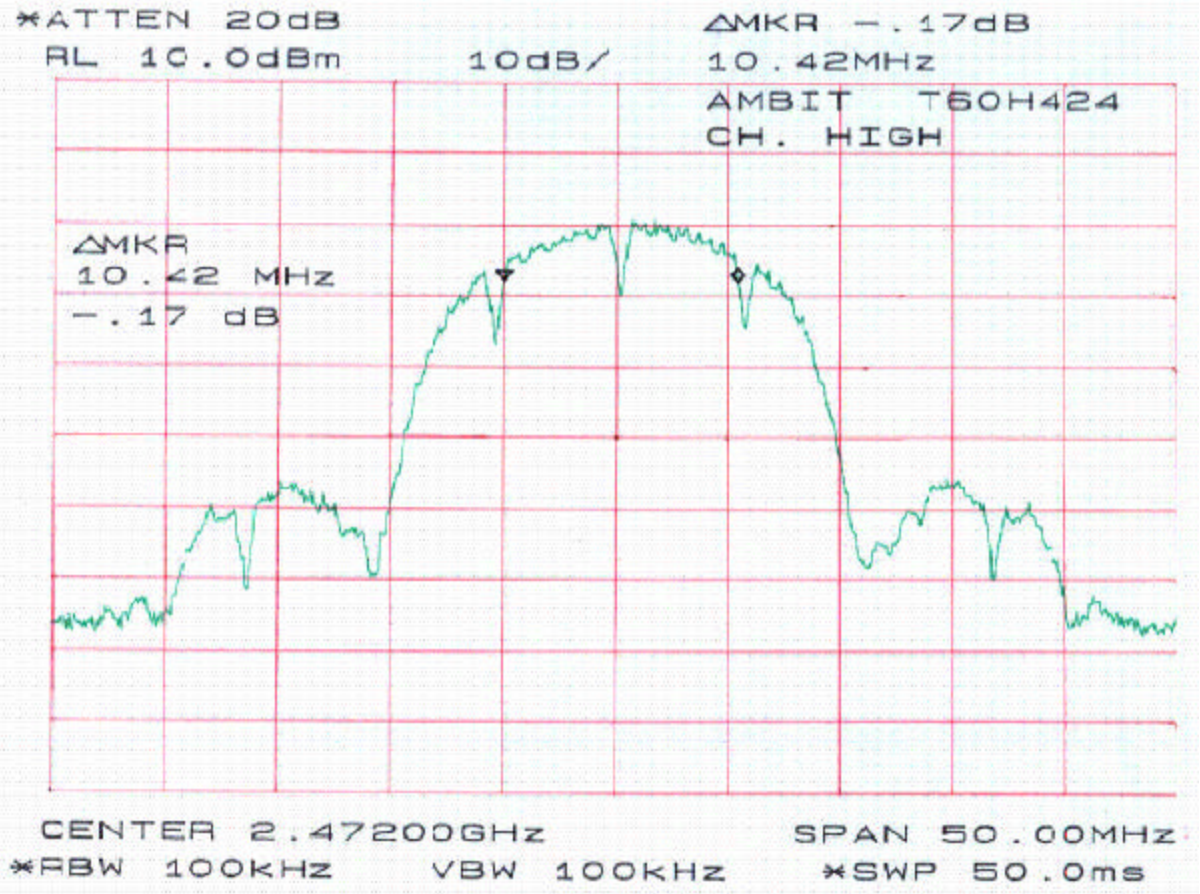
SPAN 50.00MHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0ms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ΔMKR
10.42 MHz
-.17 dB
CENTER 2.472000GHz
SPAN 50.00MHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0ms

8 -100 KHZ BANDWIDTH OF BAND EDGES MEASUREMENT

8.1 Standard Applicable

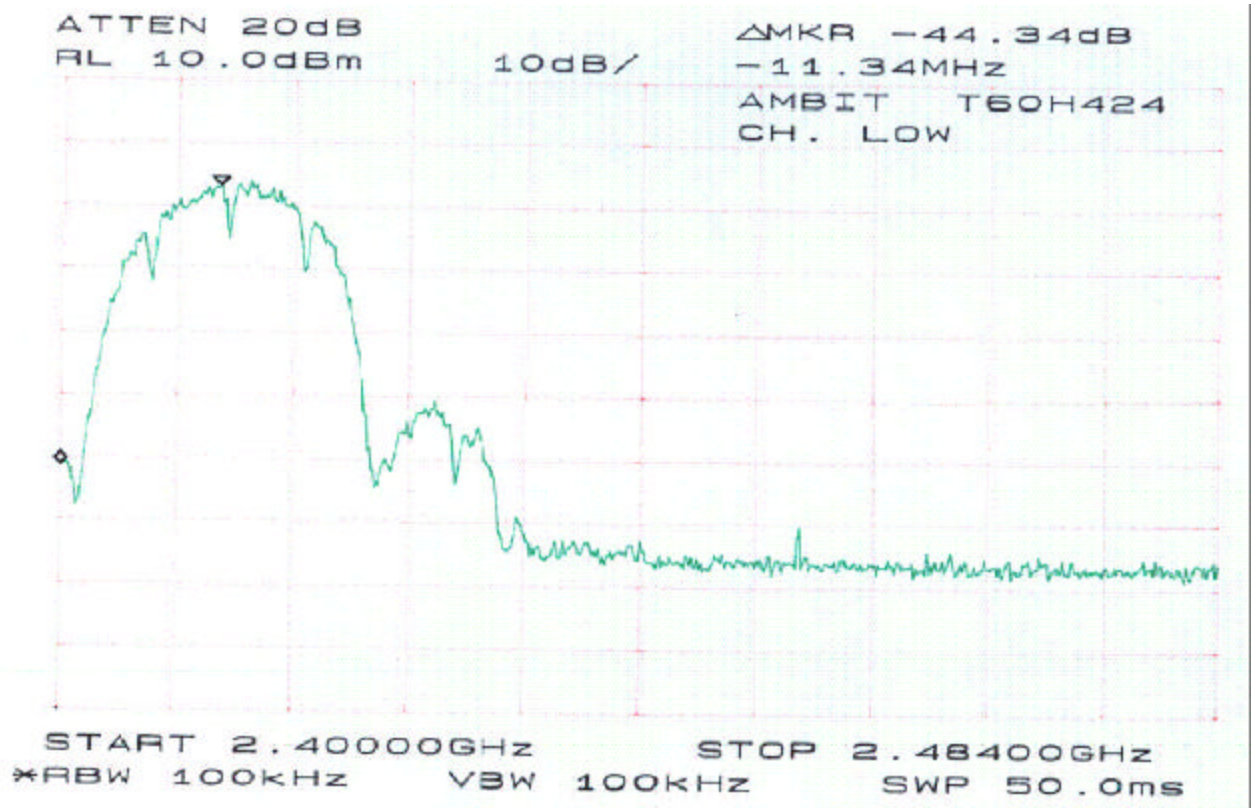
According to §15.247(c), in *any* 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) see §15.2057(c)).

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. Placed the EUT on a bench. 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 100 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 Results

Please refer to the appending plot for more information.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10dB/
ΔMKR -44.34dB
-11.34MHz
AMBIT T60H424
CH. LOW
START 2.40000GHz
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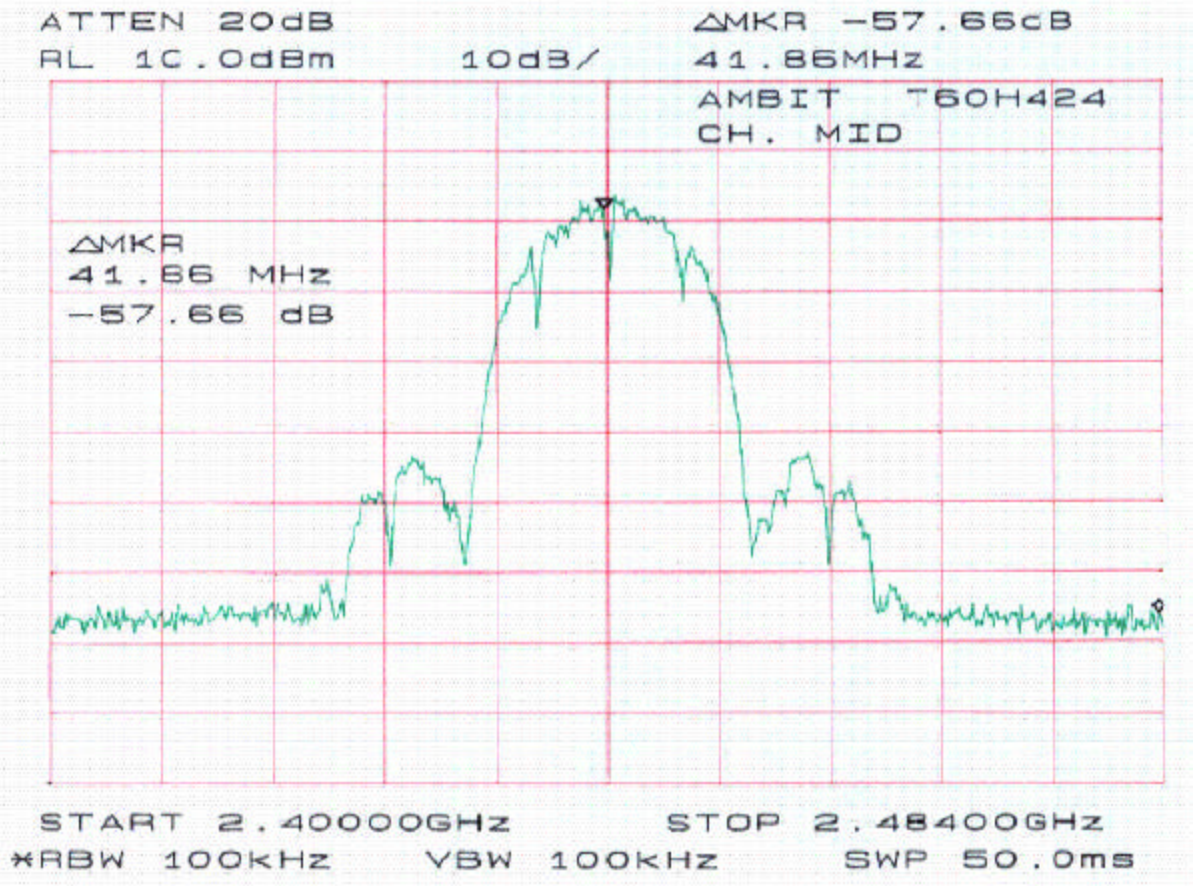
*RBW 100kHz
VBW 100kHz
SWP 50.0ms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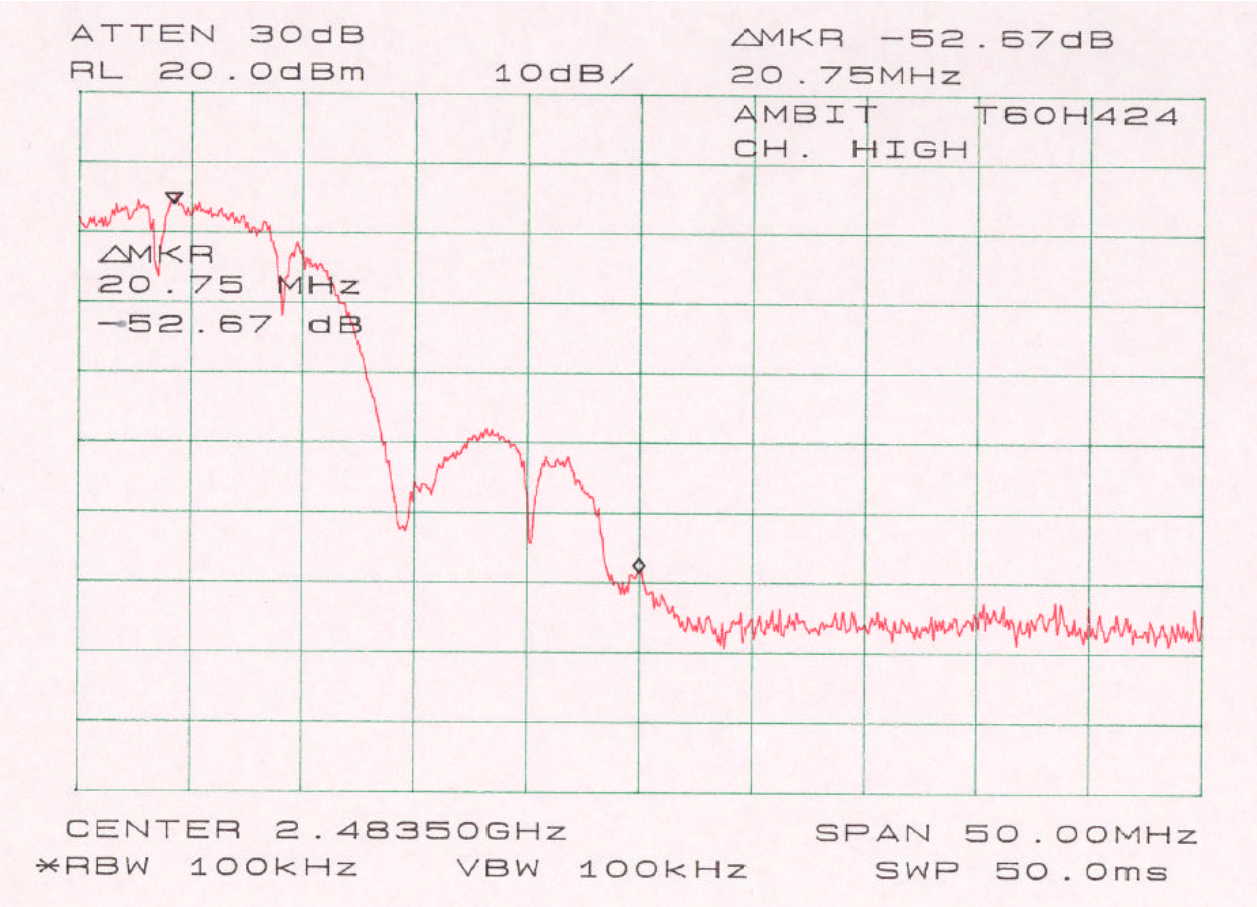
VBW 100kHz
SWP 50.0ms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10dB/
ΔMKR -52.67dB
20.75MHz
AMBIT T60H424
CH. HIGH
ΔMKR
20.75 MHz
-52.67 dB
CENTER 2.48350GHz
SPAN 50.00MHz
*RBW 100kHz
VBW 100kHz
SWP 50.0ms

9 - ANTENNA REQUIREMENT

9.1 Standard Applicable

For intentional device, according to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to § 15.247 (1), if transmitting antennas of directional gain greater than 6 dBi are used the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

9.2 Antenna Connected Construction

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of the standard.

Please refer to the attached antenna information.

10 - SPURIOUS RADIATED EMISSIONS

10.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at BACL is $\pm$4.0 dB.

10.2 EUT Setup

The radiated emission tests were performed in the open area 3-meter test site, using the setup in accordance with the ANSI C63.4-2000. The specification used was the FCC 15 Subpart C limits.

The spacing between the peripherals was 10 centimeters.

External I/O cables were draped along the edge of the test table and bundle when necessary.

The notebook was connected with 110Vac/60Hz power source.

10.3 Spectrum Analyzer Setup

According to FCC Rules, 47 CFR §15.33 (a) (1), the system was tested to 26GHz.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Start Frequency	30 MHz
Stop Frequency	26GHz
Sweep Speed	Auto
IF Bandwidth	1 MHz
Video Bandwidth	1 MHz
Quasi-Peak Adapter Bandwidth	120 kHz
Quasi-Peak Adapter Mode	Normal
Resolution Bandwidth	1MHz

10.4 Test Procedure

For the radiated emissions test, the notebook and all support equipment power cords were connected to the AC floor outlet since the notebook power supply did not provide an accessory power outlet.

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dBµV of specification limits), and are distinguished with a "**Qp**" in the data table.

10.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dBμV means the emission is 7dBμV below the maximum limit for Subpart C. The equation for margin calculation is as follows:

Margin = Corr. Ampl. - Subpart C Limit

10.6 Summary of Test Results

According to the data in section 11.7, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.207 and 15.247, and had the worst margin of:

-6.3 dB at **2375.60 MHz** in the **Vertical** polarization, Low Channel, Port 1

-9.8 dB at **2326.90 MHz** in the **Vertical** polarization, Middle Channel, Port 1

-3.3 dB at **2487.10 MHz** in the **Vertical** polarization, High Channel, Port 1

-13.2 dB at **4824.20 MHz** in the **Horizontal** polarization, Low Channel Port 2

-12.1 dB at **4876.60 MHz** in the **Vertical** polarization, Middle Channel, Port 2

-13.2 dB at **4926.40 MHz** in the **Vertical** polarization, High Channel, Port 2

-3.6 dB at **246.10 MHz** in the **Horizontal** polarization, *unintentional emission*

Intentional Emission, 30MHz ~ 26 GHz, 3 Meters, Port 1

Indicated			Table	Antenna		Correction Factor			FCC 15 Subpart C		
Freqency	Ampl.	Direction	Height	Polar	Antenna	Cable Loss	Amp.	Corr. Ampl.	Limit	Margin	Mode
MHz	dBμV/m	Degree	Meter	H/V	dBμV/m	dBμV/m	dB	dBμV/m	dBμV/m	dB	
Low Channel											
2412.1	98.90	60	1.2	V	28.1	3.4	30.0	100.4			AVG
2412.1	93.7	150	1.0	H	28.1	3.4	30.0	95.2			AVG
2375.60	46.2	160	1.5	V	28.1	3.4	30.0	47.7	54	-6.3	AVG
2375.60	43.4	180	1.5	H	28.1	3.4	30.0	44.9	54	-9.2	AVG
4824.20	33.4	180	1.2	H	32.5	4.9	30.0	40.8	54	-13.2	AVG
4824.20	29.1	45	1.2	V	32.5	4.9	30.0	36.5	54	-17.5	AVG
2375.60	49.1	160	1.5	V	28.1	3.4	30.0	50.6	74	-23.5	PEAK
2375.60	46.5	180	1.5	H	28.1	3.4	30.0	48.0	74	-26.1	PEAK
4824.20	35.9	180	1.2	H	32.5	4.9	30.0	43.3	74	-30.7	PEAK
4824.20	35.9	180	1.2	H	32.5	4.9	30.0	43.3	74	-30.7	PEAK
7236.30	35.9	45	1.5	V	35.1	5.6	30.0	46.6	80.4	-33.8	AVG
4824.20	32.6	45	1.5	V	32.5	4.9	30.0	40.0	74	-34.0	PEAK
4824.20	32.6	45	1.5	V	32.5	4.9	30.0	40.0	74	-34.0	PEAK
7236.30	31.7	180	1.5	H	35.1	5.6	30.0	42.4	80.4	-38.0	AVG
9648.40	30.7	30	1.2	V	35.1	5.6	30.0	41.4	80.4	-39.0	AVG
9648.40	28.6	0	1.2	H	35.1	5.6	30.0	39.3	80.4	-41.1	AVG
Middle Channel											
2438.30	98.2	110	1.5	V	28.1	3.4	30.0	99.7			AVG
2438.30	97.9	135	1.2	H	28.1	3.4	30.0	99.4			AVG
2326.90	42.70	0	1.2	V	28.1	3.4	30.0	44.2	54	-9.8	AVG
7314.90	32.5	90	1.5	V	35.1	5.6	30.0	43.2	54	-10.8	AVG
4876.60	34.9	130	1.0	H	32.5	4.9	30.0	42.3	54	-11.7	AVG
7314.90	31.60	150	1.5	H	35.1	5.6	30.0	42.3	54	-11.7	AVG
2326.90	40.3	60	1.2	H	28.1	3.4	30.0	41.8	54	-12.3	AVG
4876.60	33.1	90	1.0	V	32.5	4.9	30.0	40.5	54	-13.5	AVG
2326.90	45.80	0	1.2	V	28.1	3.4	30.0	47.3	74	-26.8	PEAK
7314.90	34.8	90	1.2	V	35.1	5.6	30.0	45.5	74	-28.5	PEAK
4876.60	37.9	130	1.0	H	32.5	4.9	30.0	45.3	74	-28.7	PEAK
2326.90	43.7	60	1.2	H	28.1	3.4	30.0	45.2	74	-28.9	PEAK
7314.90	33.70	150	1.2	H	35.1	5.6	30.0	44.4	74	-29.6	PEAK
4876.60	35.8	90	1.0	V	32.5	4.9	30.0	43.2	74	-30.8	PEAK
9753.20	30.2	270	1.0	V	35.1	5.6	30.0	40.9	79.7	-38.8	AVG
9753.20	28.9	240	1.0	H	35.1	5.6	30.0	39.6	79.7	-40.1	AVG

High Channel											
2463.20	98.1	45	1.5	V	28.1	3.4	30.0	99.6			AVG
2463.20	95.4	120	1.4	H	28.1	3.4	30.0	96.9			AVG
2487.10	49.3	270	1.5	V	28.1	3.4	30.0	50.8	54	-3.3	AVG
2487.10	45.10	290	1.4	H	28.1	3.4	30.0	46.6	54	-7.5	AVG
7389.60	35.5	160	1.5	V	35.1	5.6	30.0	46.2	54	-7.8	AVG
4926.40	36.2	45	1.5	V	32.5	4.9	30.0	43.6	54	-10.4	AVG
4926.40	33.3	180	1.4	H	32.5	4.9	30.0	40.7	54	-13.3	AVG
7389.60	29.50	180	1.2	H	35.1	5.6	30.0	40.2	54	-13.8	AVG
2487.10	53.6	270	1.5	V	28.1	3.4	30.0	55.1	74	-19.0	PEAK
2487.10	48.70	290	1.4	H	28.1	3.4	30.0	50.2	74	-23.9	PEAK
7389.60	37.6	160	1.5	V	35.1	5.6	30.0	48.3	74	-25.7	PEAK
4926.40	38.4	45	1.5	V	32.5	4.9	30.0	45.8	74	-28.2	PEAK
7389.60	32.80	180	1.2	H	35.1	5.6	30.0	43.5	74	-30.5	PEAK
4926.40	35.9	180	1.4	H	32.5	4.9	30.0	43.3	74	-30.7	PEAK
9852.80	36.2	0	1.5	V	35.1	5.6	30.0	46.9	79.6	-32.7	AVG
9852.80	33.3	30	1.5	H	35.1	5.6	30.0	44.0	79.6	-35.6	AVG

Intentional Emission, 30MHz ~ 26 GHz, 3 Meters, Port 2

Indicated			Table	Antenna		Correction Factor			FCC 15 Subpart C		
Freqency	Ampl.	Direction	Height	Polar	Antenna	Cable Loss	Amp.	Corr. Ampl.	Limit	Margin	Mode
MHz	dBμV/m	Degree	Meter	H/V	dBμV/m	dBμV/m	dB	dBμV/m	dBμV/m	dB	
Low Channel											
2412.1	50.17	90	1.8	H	28.1	3.4	30.0	51.6			AVG
2412.1	50.7	225	1.2	V	28.1	3.4	30.0	52.2			AVG
4824.20	33.4	90	1.8	H	32.5	4.9	30.0	40.8	54	-13.2	AVG
4824.20	32.5	225	1.2	V	32.5	4.9	30.0	39.9	54	-14.1	AVG
4824.20	35.4	90	1.8	H	32.5	4.9	30.0	42.8	74	-31.2	PEAK
4824.20	34.1	225	1.2	V	32.5	4.9	30.0	41.5	74	-32.5	PEAK
Middle Channel											
2438.30	53.0	225	1.2	V	28.1	3.4	30.0	54.5			AVG
2438.30	48.8	135	1.5	H	28.1	3.4	30.0	50.3			AVG
4876.60	34.5	225	1.2	V	32.5	4.9	30.0	41.9	54	-12.1	AVG
4876.60	31.3	135	1.5	H	32.5	4.9	30.0	38.7	54	-15.3	AVG
4876.60	36.7	225	1.2	V	32.5	4.9	30.0	44.1	74	-29.9	PEAK
4876.60	33.4	135	1.5	H	32.5	4.9	30.0	40.8	74	-33.2	PEAK
High Channel											
2463.20	46.7	45	1.5	H	28.1	3.4	30.0	48.2			AVG
2463.20	48.2	0	1.3	V	28.1	3.4	30.0	49.7			AVG
4926.40	33.4	220	1.2	V	32.5	4.9	30.0	40.8	54	-13.2	AVG
4926.40	32.5	270	1.5	H	32.5	4.9	30.0	39.9	54	-14.1	AVG
4926.40	35.3	220	1.2	V	32.5	4.9	30.0	42.7	74	-31.3	PEAK
4926.40	34.6	270	1.5	H	32.5	4.9	30.0	42.0	74	-32.0	PEAK

Unintentional Emission, 30MHz to 1000 MHz, 3 Meters

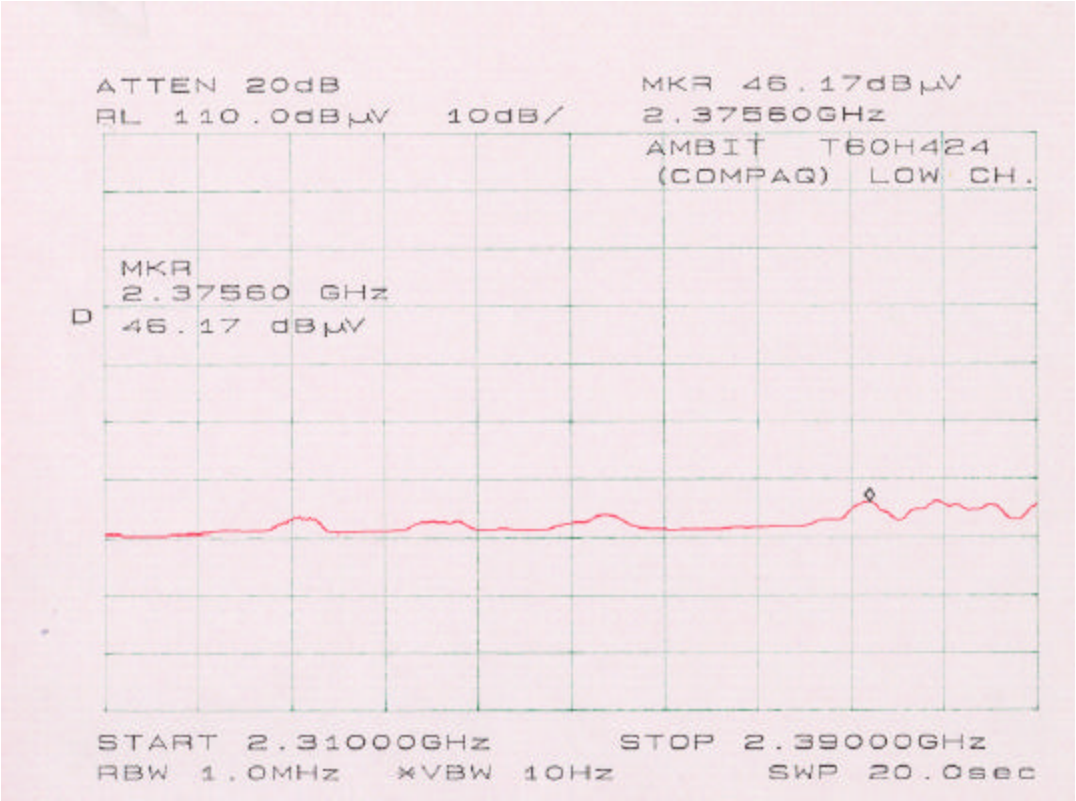
Indicated			Table	Antenna		Correction Factor			FCC 15 Subpart C	
Freqency	Ampl.	Direction	Height	Polar	Antenna	Cable Loss	Amp.	Corr. Ampl.	Limit	Margin
MHz	dBμV/m	Degree	Meter	H/V	dBμV/m	dBμV/m	dB	dBμV/m	dBμV/m	dB
246.10	51.4	130	1.2	H	13.8	2.2	25.0	42.4	46	-3.6
220.30	50.9	130	1.5	H	11.8	2.2	25.0	39.9	46	-6.1
659.99	40.8	310	1.5	H	20.6	2.8	25.0	39.2	46	-6.8
132.60	47.3	220	1.0	V	12.0	1.6	25.0	35.9	43.5	-7.6
308.40	44.2	280	1.2	H	14.4	2.3	25.0	35.9	46	-10.1
177.40	42.8	180	1.5	V	13.1	1.9	25.0	32.8	43.5	-10.7
395.77	41.4	45	1.2	H	16.4	2.5	25.0	35.3	46	-10.7
88.20	46.5	350	1.8	V	9.8	1.2	25.0	32.5	43.5	-11.0
150.06	40.9	310	1.2	V	12.7	1.7	25.0	30.3	43.5	-13.2

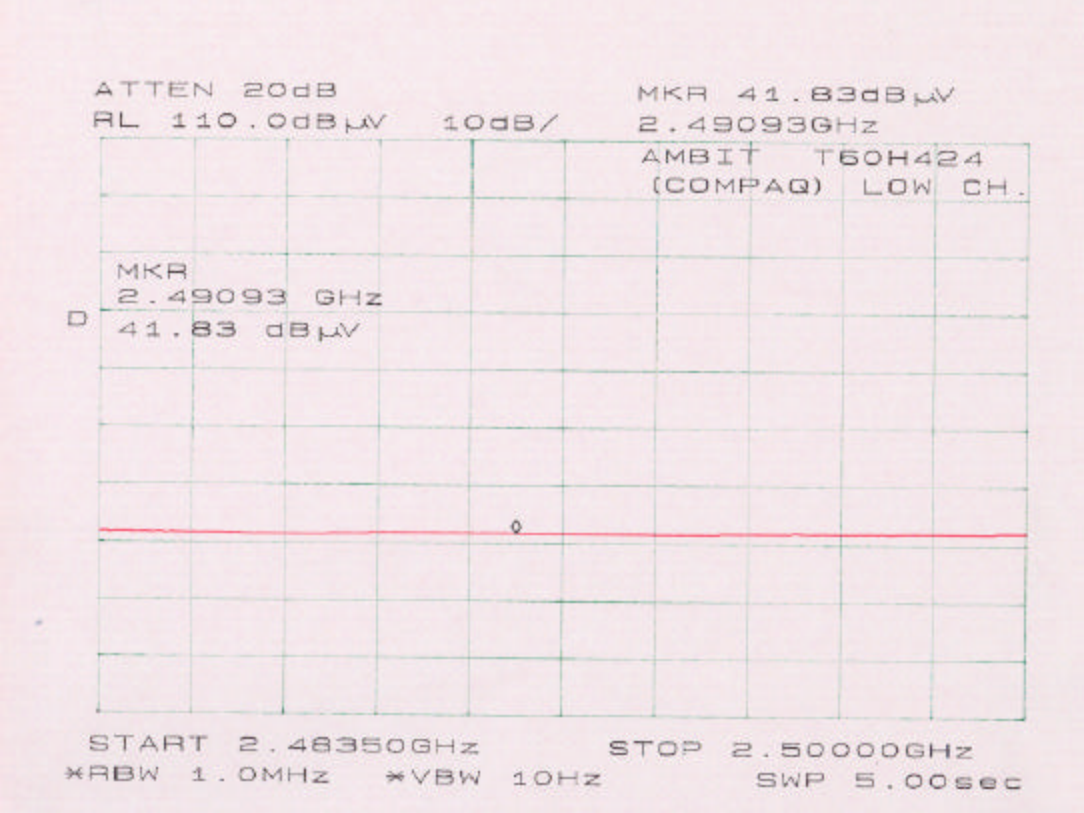
Note 1.

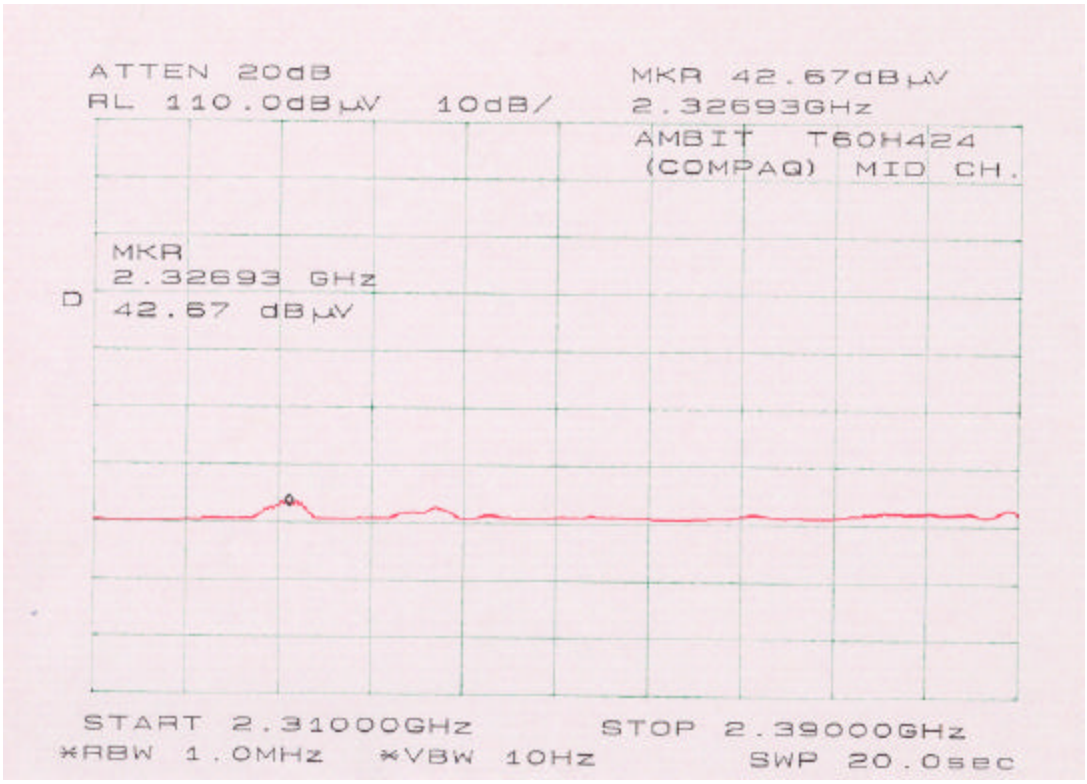
According to § 15.205, for this EUT only spurious emission are permitted in the restricted band 2310 – 2390 MHz and 2483.5 – 2500 MHz. The worst margin in the restricted bands is –3.3 dBuV/m at 2487.10 MHz. [Please refer to above data and plots below]

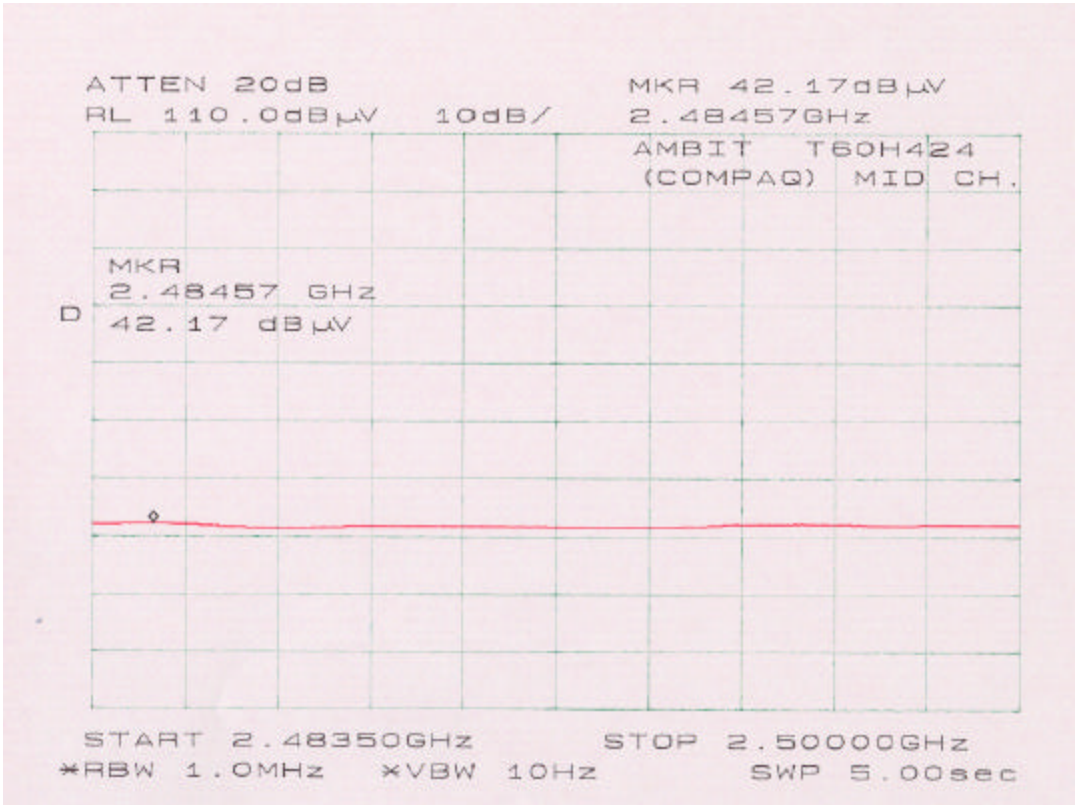
Note 2

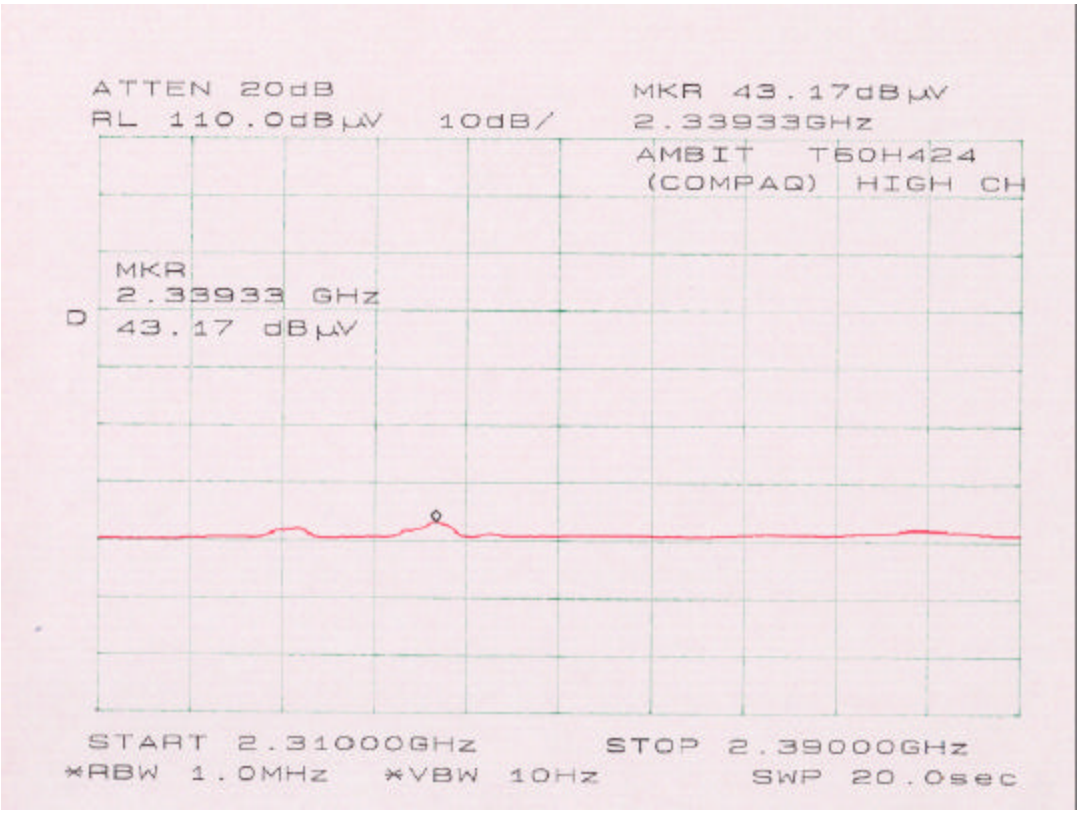
Spurious and harmonics above 10GHz for “port 1” and 5 GHz for “port 2” are too low to be detected.

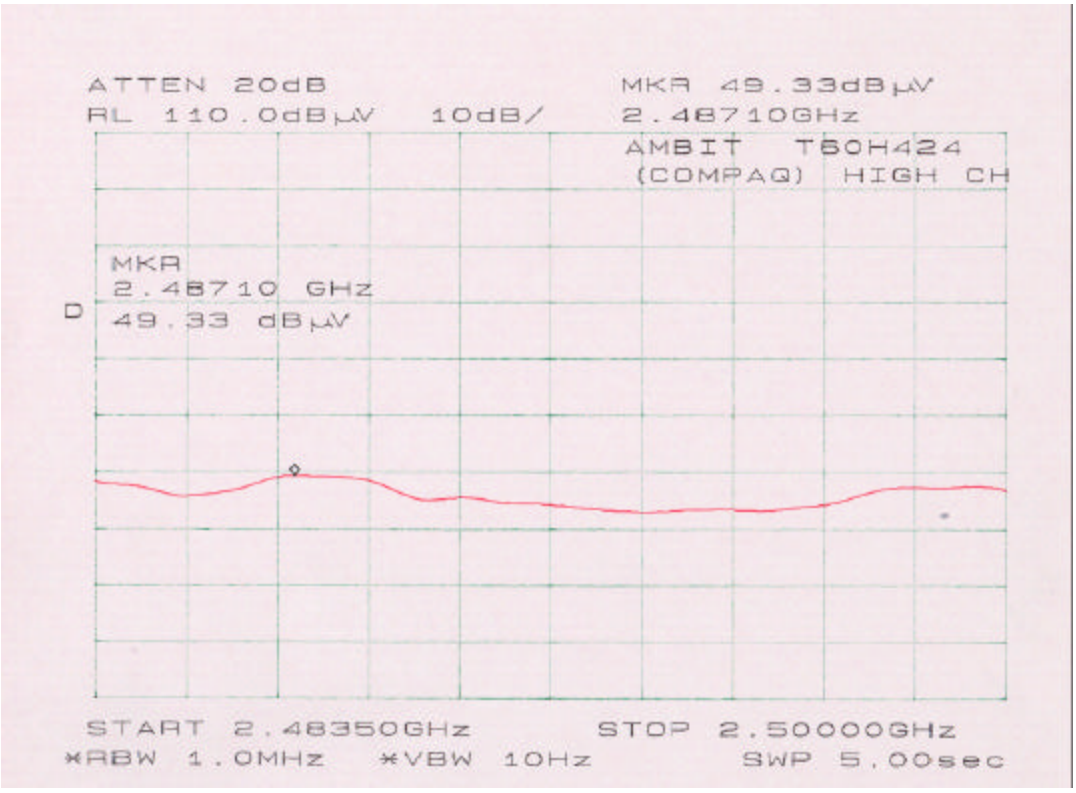

ATTEN 20dB
RL 110.0dBµV 10dB/
MKR 46.17dBµV
2.37560GHz
AMBIT T60H424
(COMPAQ) LOW CH.
MKR
2.37560 GHz
D
46.17 dBµV
START 2.31000GHz
STOP 2.39000GHz
RBW 1.0MHz *VBW 10Hz
SWP 20.0sec


ATTEN 20dB
RL 110.0dBµV 10dB/
MKR 41.83dBµV
2.49093GHz
AMBIT T60H424
(COMPAQ) LOW CH.
MKR
2.49093 GHz
D
41.83 dBµV
START 2.48350GHz
STOP 2.50000GHz
*RBW 1.0MHz *VBW 10Hz
SWP 5.00sec


ATTEN 20dB
RL 110.0dBµV 10dB/
MKR 42.67dBµV
2.32693GHz
AMBIT T60H424
(COMPAQ) MID CH.
MKR
2.32693 GHz
42.67 dBµV
D
START 2.31000GHz
STOP 2.39000GHz
*RBW 1.0MHz
*VBW 10Hz
SWP 20.0sec


ATTEN 20dB
RL 110.0dBµV 10dB/
MKR 42.17dBµV
2.48457GHz
AMBIT T60H424
(COMPAQ) MID CH.
MKR
2.48457 GHz
42.17 dBµV
D
START 2.48350GHz
STOP 2.50000GHz
*RBW 1.0MHz
*VBW 10Hz
SWP 5.00sec


ATTEN 20dB
RL 110.0dBµV 10dB/
MKR 43.17dBµV
2.33933GHz
AMBIT T60H424
(COMPAQ) HIGH CH
MKR
2.33933 GHz
43.17 dBµV
D
START 2.31000GHz
STOP 2.39000GHz
*RBW 1.0MHz
*VBW 10Hz
SWP 20.0sec


ATTEN 20dB
RL 110.0dBµV 10dB/
MKR 49.33dBµV
2.48710GHz
AMBIT T60H424
(COMPAQ) HIGH CH
MKR
2.48710 GHz
49.33 dBµV
D
START 2.48350GHz
STOP 2.50000GHz
*RBW 1.0MHz
*VBW 10Hz
SWP 5.00sec

11 - CONDUCTED EMISSIONS

11.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at BACL is $\pm$2.4 dB.

11.2 EUT Setup

The measurement was performed at the **O**pen **A**rea **T**est **S**ite, using the same setup per ANSI C63.4-2000 measurement procedure. The specification used was FCC 15 Subpart C limits.

The spacing between the peripherals was 10 centimeters.

External I/O cables were draped along the edge of the test table and bundle when necessary.

The host PC system was connected with 110Vac/60Hz power source.

11.3 Spectrum Analyzer Setup

The spectrum analyzer was set with the following configurations during the conduction test:

Start Frequency	450 kHz
Stop Frequency	30 MHz
Sweep Speed	Auto
IF Bandwidth	10 kHz
Video Bandwidth	10 kHz
Quasi-Peak Adapter Bandwidth	9 kHz
Quasi-Peak Adapter Mode	Normal

11.4 Test Procedure

During the conducted emission test, the power cord of the host system was connected to the auxiliary outlet of the first LISN.

Maximizing procedure was performed on the six (6) highest emissions of each modes tested to ensure EUT is compliant with all installation combination.

All data was recorded in the peak detection mode. Quasi-peak readings were only performed when an emission was found to be marginal (within -4 dBµV of specification limits). Quasi-peak readings are distinguished with a "**Qp**".

11.5 Summary of Test Results

The EUT complied with the FCC Conducted margin for a Class B device, with the *worst* margin reading of:

-1.5 dBµV at 0.740 MHz in the Neutral mode

11.6 Conducted Emissions Test Data

LINE CONDUCTED EMISSIONS				FCC CLASS B	
Frequency MHz	Amplitude dBµV	Detector Qp/Ave/Peak	Phase Line/Neutral	Limit dBµV	Margin dB
0.740	46.5	QP	Neutral	48	-1.5
0.770	46.1	QP	Line	48	-1.9
2.030	42.3	QP	Neutral	48	-5.7
0.460	40.5	QP	Line	48	-7.5
13.600	37.5	QP	Neutral	48	-10.5
12.760	36.2	QP	Line	48	-11.8

11.7 Plot of Conducted Emissions Test Data

Plot(s) of Conducted Emissions Test Data is presented hereinafter as reference.