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: MCLT60H570

September 11, 2002

This Report Concerns:	**Equipment Type:**
☒ Original Report	WLAN/Modem Combo Card

Test Engineer:	Benjamin Jing
Report No.:	R0208222
Test Date:	August 26, 2002
Reviewed By:	Jeff Lee
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1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Applicant:	AMBIT Microsystems Corporation
Product:	WLAN/Modem Combo Card
Model Name:	T60H570
Dimension:	2.4"L x 1.7" M
FCC ID:	MCLT60H570
Peak Output Power:	Master Antenna: 15.93dBm (39.17mW)
	Accessory Antenna: 15.05dBm (31.99mW)
Frequency Range:	2412~2483.5MHz
Power Supply:	Fed by Notebook
Applicable Standard:	FCC Part 15 Subpart C

** The test data was good for test sample only. It may have deviation for other product 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:

- Maximum Peak Output Power
- 6 dB Bandwidth
- 100 kHz Bandwidth of Band Edge
- Peak Power Density
- 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 C63.4-2000, 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, Corp. 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: 2002, and AS/NZS CISPR 22: 2002: Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment test methods under NVLAP Lab Code 200167-0.

1.6 Test Equipment List

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	11/2/02
Com-Power	Biconical Antenna	AB-100	14012	11/2/02
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 Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
COMPAQ	Laptop	Liger PV-2	None	DOC
Compaq	AC/DC Adapter	PPP0009H	None	DOC

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 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, terminal.exe, provided by the customer, is started the Windows 98 terminal program under the Windows 98 operating system. Once loaded, the program sequentially exercises each system component.

2.3 Special Accessories

As shown in section 2.5, 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.

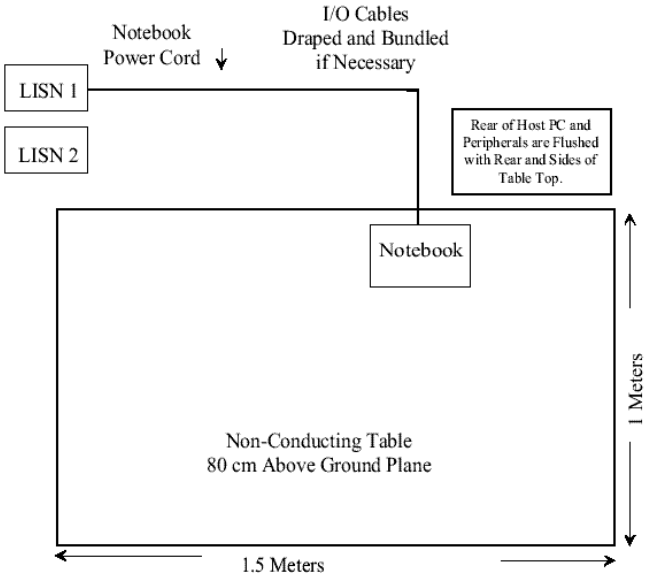
2.4 Schematics / Block Diagram

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 Test Setup Block Diagram



3 - SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT	REFERENCE
§ 2.1091	RF Safety Requirements	Compliant	Manual
§15.203	Antenna Requirement	Compliant	Section 11
§15.207 (a)	Conducted Emission	Compliant	Section 10
§15.247 (d)	Peak Power Spectral Density	Compliant	Section 8
§15.209 (a)	Radiated Emission	Compliant	Section 9
§15.209 (f)	Spurious Emission	Compliant	Section 7
§15.247 (a) (2)	6 dB 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 6

4 - MAXIMUM PEAK OUTPUT POWER

4.1 Standard Applicable

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

4.2 Measurement Procedure

1. The EUT was placed at 1.5m height turnaround table and in a position for normal use declared by the manufacturer.
2. The test antenna was oriented initially for vertical position with 3m away from EUT.
3. The output of the antenna was connected to the measuring receiver and the quasi-peak detector is used for the measurement.
4. The transmitter was turned on and the measuring receiver was tuned to the frequency of the transmitter under the testing.
5. The test antenna was raised and lowered through specified ranged of height until the maximum signal level was detected by the measuring receiver.
6. The transmitter was rotated through 360˚ in the horizontal plane until the maximum signal level was detected.
7. The transmitter was then replaced by a horn antenna which is a substitution antenna.
8. The substitution antenna was oriented for vertical polarization and then connected to a calibrated signal generator.
9. The input attenuator of measuring receiver was adjusted to increased the sensitivity.
10. The substitution antenna was raised and lowered to ensure the maximum signal level was detected.
11. The input signal to the substitution antenna was adjusted to the level to produce a level which was equal to the level noted while the transmitter radiated power was measured, corrected for the change of the input attenuator of the measuring receiver.
12. The input level to the substitution antenna was recorded as power level in dBm, corrected for any change of input attenuator of the measuring receiver.
13. The measurement was repeated with the test antenna and the substitution antenna oriented for horizontal polarization.
14. The measure of the radiated output power is the larger one of the two level recorded, at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.

4.3 Test Equipment

Signal Generator
Manufacturer: HP
Model: 83650B
Calibration Due Date: 11/7/02

Horn Antenna
Manufacturer: ARA
Model: DRG-118/A
Calibration Due Date: 8/21/03

4.4 Measurement Result

Antenna	Frequency	Output Power in dBm	Output Power in mW	Standard	Result
Master	Low	15.60	36.31	≤ 1W	Compliant
Master	Middle	15.93	39.17	≤ 1W	Compliant
Master	High	15.43	34.91	≤ 1W	Compliant
Accessory	Low	15.05	31.99	≤ 1W	Compliant
Accessory	Middle	14.72	29.65	≤ 1W	Compliant
Accessory	High	14.25	29.61	≤ 1W	Compliant

5 - CHANNEL BANDWIDTH

5.1 Standard Applicable

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

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 Measurement Result

Antenna	Frequency	Measurement (MHz)	Standard (kHz)	Result
Master	Low	18.08	≥ 500	Compliant
Master	Middle	18.08	≥ 500	Compliant
Master	High	18.33	≥ 500	Compliant
Accessory	Low	18.00	≥ 500	Compliant
Accessory	Middle	18.08	≥ 500	Compliant
Accessory	High	18.42	≥ 500	Compliant

5.4 Plot of Channel Bandwidth

Please refer to the attached plots.

6 - 100 KHZ BANDWIDTH OF BAND EDGE

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.

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. 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.

6.3 Measurement Results

Antenna	Frequency	Measurement (dB)	Standard (dB)	Result
Master	Low	34.5	≥ 20	Compliant
Master	Middle	61.0	≥ 20	Compliant
Master	High	58.0	≥ 20	Compliant
Accessory	Low	36.2	≥ 20	Compliant
Accessory	Middle	62.5	≥ 20	Compliant
Accessory	High	58.2	≥ 20	Compliant

6.4 Plots of 100kHz Bandwidth of Band Edge

Please refer to the attached plots.

7- SPURIOUS EMISSION

7.1 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.

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 as shown in figure 4 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 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.

7.3 Measurement Results

Please refer to the attached plots.

8 - PEAK POWER SPECTRAL DENSITY

8.1 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.

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 was set 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. Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
4. Repeat above procedures until all frequencies measured were complete.

8.3 Measurement Results

Please refer to the attached plot(s).

9 - RADIATED EMISSION

9.1 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.

9.2 Test 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 EUT was installed in the laptop. The laptop notebook was placed on the center of the back edge on the test table. The modem was placed on the one side of the laptop while the printer was on the other side. The rear of the laptop and peripherals were placed flushed with the rear of the tabletop.

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 laptop was connected with 120Vac/60Hz power source.

9.3 Spectrum Analyzer Setup

According to FCC Rules, 47 CFR §15.33 (a) (1), the system was tested to 25000 MHz.

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

Start Frequency	30 MHz
Stop Frequency	25000 MHz
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

9.4 Test Procedure

For the radiated emissions test, both the laptop and all peripheral power cords were connected to the AC floor outlet since the power supply used in the laptop 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.

9.5 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

9.6 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:

Main Antenna, 30 to 25000MHz, 3 meters

-11.8 dBμV at 7239.70 MHz (Avg.) in the Vertical polarization at Low Channel
-10.6 dBμV at 7314.22 MHz (Avg.) in the Vertical polarization at Middle Channel
-10.9 dBμV at 4927.61.00 MHz (Avg.) in the Vertical polarization at High Channel

Accessory Antenna, 30 to 25000MHz, 3 meters

-13.3 dBμV at 7239.70 MHz (Avg.) in the Horizontal polarization at Low Channel
-13.5 dBμV at 7314.22 MHz (Avg.) in the Vertical polarization at Middle Channel
-12.8 dBμV at 7391.15.00 MHz (Avg.) in the Horizontal polarization at High Channel

9.7 Radiated Emission Test Data

Main Antenna, 30 to 25000MHz, 3 meter

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											
7239.70	31.5	45	1.0	V	35.1	5.6	30.0	42.2	54	-11.8	AVG
7239.70	30.6	180	1.0	H	35.1	5.6	30.0	41.3	54	-12.7	AVG
4826.05	33.4	180	1.0	H	32.5	4.9	30.0	40.8	54	-13.2	AVG
4826.05	31.2	45	1.0	V	32.5	4.9	30.0	38.6	54	-15.4	AVG
Middle Channel											
7314.22	32.7	90	1.0	V	35.1	5.6	30.0	43.4	54	-10.6	AVG
4877.22	35.2	135	1.0	H	32.5	4.9	30.0	42.6	54	-11.4	AVG
7314.22	30.00	135	1.0	H	35.1	5.6	30.0	40.7	54	-13.3	AVG
4877.22	33.3	90	1.0	V	32.5	4.9	30.0	40.7	54	-13.3	AVG
High Channel											
4927.61	35.7	45	1.5	V	32.5	4.9	30.0	43.1	54	-10.9	AVG
7391.15	31.9	45	1.5	V	35.1	5.6	30.0	42.6	54	-11.4	AVG
4927.61	33.3	180	1.4	H	32.5	4.9	30.0	40.7	54	-13.3	AVG
7391.15	29.50	180	1.4	H	35.1	5.6	30.0	40.2	54	-13.8	AVG

Accessory Antenna, 30 to 25000MHz, 3 meters

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											
7239.70	30.0	90	1.8	H	35.1	5.6	30.0	40.7	54	-13.3	AVG
4826.05	33.3	90	1.8	H	32.5	4.9	30.0	40.7	54	-13.3	AVG
4826.05	32.6	225	1.2	V	32.5	4.9	30.0	40.0	54	-14.0	AVG
7239.70	29.1	225	1.2	V	35.1	5.6	30.0	39.8	54	-14.2	AVG
Middle Channel											
7314.22	29.8	225	1.2	V	35.1	5.6	30.0	40.5	54	-13.5	AVG
7314.22	28.40	135	1.3	H	35.1	5.6	30.0	39.1	54	-14.9	AVG
4877.22	31.5	225	1.2	V	32.5	4.9	30.0	38.9	54	-15.1	AVG
4877.22	30.2	135	1.3	H	32.5	4.9	30.0	37.6	54	-16.4	AVG
High Channel											
7391.15	30.5	270	1.5	H	35.1	5.6	30.0	41.2	54	-12.8	AVG
7391.15	29.80	260	1.3	V	35.1	5.6	30.0	40.5	54	-13.5	AVG
4927.61	32.2	30	1.5	H	32.5	4.9	30.0	39.6	54	-14.4	AVG
4927.61	31.6	60	1.3	V	32.5	4.9	30.0	39.0	54	-15.0	AVG
Unintentional Emission, 30 to 1000MHz											
314.12	43.2	45	1.5	H	15.9	3.7	26.0	36.8	46	-9.2	/
271.23	42.2	30	1.0	H	13.9	5.2	25.0	36.3	46	-9.7	/
176.00	40.8	180	1.5	V	13.4	3.9	25.0	33.1	43.5	-10.4	/
260.04	42.2	160	1.0	H	13.3	4.9	25.0	35.4	46	-10.6	/
114.79	44.7	315	1.0	V	11.7	1.3	25.0	32.7	43.5	-10.8	/
253.14	42.5	180	1.0	H	13.1	3.0	25.0	33.6	46	-12.4	/
132.00	41.3	225	1.0	V	12.6	2.0	25.0	30.9	43.5	-12.6	/
220.00	39.8	135	1.5	H	12.1	3.9	25.0	30.8	46	-15.2	/
89.20	40.6	360	2.0	V	9.7	2.2	25.0	27.5	43.5	-16.0	/

10 - CONDUCTED EMISSION

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, 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 ±2.4 dB.

10.2 Test Setup

The conducted 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 B limits.

The EUT was installed in the laptop. The laptop notebook was placed on the center of the back edge on the test table. The modem was placed on the one side of the laptop while the printer was on the other side. The rear of the laptop and peripherals were placed flushed with the rear of the tabletop.

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 laptop was connected with 120Vac/60Hz power source.

10.3 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

10.4 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**".

10.5 Summary of Test Results

According to the data in section 12.6, the EUT complied with the FCC Conducted margin for a Class B device, with the *worst* margin reading of:

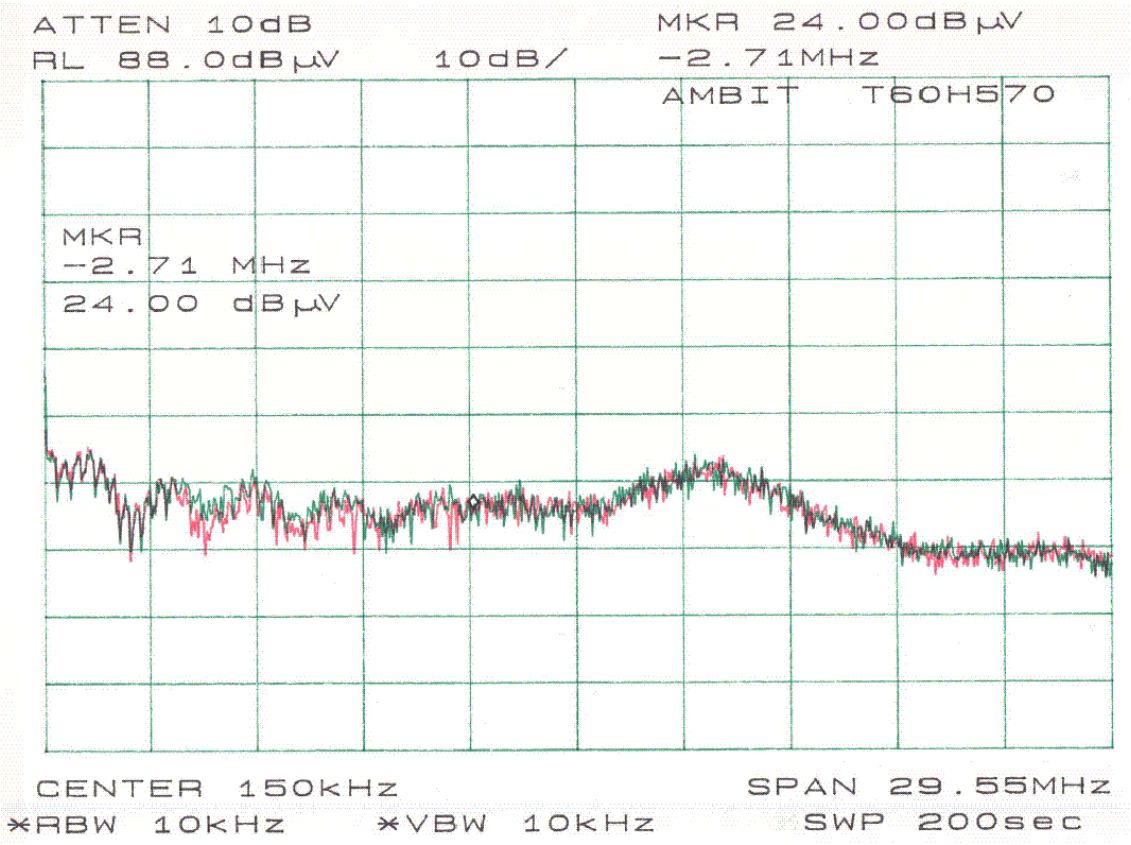
-14.4 dBμV at 0.49 MHz in the Neutral mode

10.6 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
0.49	33.6	QP	Neutral	48	-14.4
1.44	32.9	QP	Neutral	48	-15.1
18.26	32.6	QP	Line	48	-15.4
0.53	32.5	QP	Line	48	-15.5
19.15	31.7	QP	Neutral	48	-16.3
6.02	30.9	QP	Line	48	-17.1

10.7 Plot of Conducted Emissions Test Data

Plot(s) of Conducted Emissions Test Data is presented in the following page as reference.



11 - ANTENNA REQUIREMENT

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.

The directional gain of antenna used for transmitting is 2 dBi by default, and the antenna connector is designed with permanent attachment and no consideration of replacement. Please see EUT photo for details.

Detailed antenna information was attached hereinafter.

12 - RF EXPOSURE

According to §15.247(b)(4) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

According to §1.1310 and §2.1093 RF exposure is calculated.

Limits for Maximum Permissive Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minute)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-15000	/	/	1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

MPE Prediction

Predication of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$S = PG/4\pi R^2$

Where: S = power density
P = power input to antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal: 15.93 (dBm)
Maximum peak output power at antenna input terminal: 39.17(mW)
Antenna Gain (typical): 2 (dBi)
Maximum antenna gain: 1.58 (numeric)
Prediction distance: 20 (cm)
Predication frequency: 2400 (MHz)
MPE limit for uncontrolled exposure at prediction frequency: 1 (mW/cm^2)
Power density at predication frequency: 0.0123 (mW/cm^2)
Maximum allowable antenna gain: 64.13(dBm)
Maximum allowable antenna gain: 18(dBi)

Measurement Result

The predicted power density level at 20 cm is 0.0123mW/cm². This is below the uncontrolled exposure limit of 1mW/cm² at 2400 MHz.

This radio is intended to be installed in laptop PC only and is thus classed as mobile equipment.