

FCC CFR47 PART 15 SUBPART C CERTIFICATION TEST REPORT

FOR

802.11 b/g MINI PCI CARD

MODEL NUMBER: J07H069.02

FCC ID: MCLJ07H06904

REPORT NUMBER: 03U1761-1

ISSUE DATE: FEBRUARY 21, 2003

Prepared for AMBIT MICROSYSTEMS, INC. 5F-1, 5 HSIN-AN ROAD, HSINCHU SCIENCE-BASED INDUSTRAIL PARK, TAIWAN, R.O.C.

> Prepared by COMPLIANCE CERTIFICATION SERVICES 561F MONTEREY ROAD, MORGAN HILL, CA 95037, USA TEL: (408) 463-0885 FAX: (408) 463-0888

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1. TEST RESULT CERTIFICATION

COMPANY NAME:	AMBIT MICROSYSTEMS 5F-1, 5 HSIN-AN ROAD, HSINCU SCIENCE BASED INDUSTRIAL PARK, TAIWAN, R.O.C
EUT DESCRIPTION:	802.11 B/G MINI PCI CARD
MODEL NAME:	J07H069.02
DATE TESTED:	DECEMBER 20, 2002 – FEBRUARY 21, 2003

APPLICABLE STANDARDS				
STANDARD	TEST RESULTS			
FCC PART 15 SUBPART C	NO NON-COMPLIANCE NOTED			

Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document.

Approved & Released For CCS By:

Tested By:

MH

MIKE HECKROTTE CHIEF ENGINEER COMPLIANCE CERTIFICATION SERVICES

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NEELESH RAJ EMC ENGINEER COMPLIANCE CERTIFICATION SERVICES

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2. EUT DESCRIPTION

The J07H069.04 card is an 802.11b/g Mini-PCI module. The module is compatible with the IEEE 802.11g draft standard, and meets the mechanical specifications of the Type IIIA Mini-PCI form factor. The operational frequency range is:

2412 to 2462 MHz

It is based upon an Atheros Communications AR5001 three-chipset reference design. The three chips include the AR5111 integrated 5GHz CMOS radio transceiver, the AR2111 5GHz/2.4GHz integrated up/down-converter, and the AR5212 MAC/baseband processor.

The rated conducted output power of the transmitter when operating in 802.11b CCK mode is 20.64dbm. The rated conducted output power of the transmitter when operating in 802.11g OFDM mode is 21.92dbm. The J07H069.04 Mini-PCI card was tested for modular approval with stamped metal, PIFA antennas.

Peak antenna gain is 4.96 dBi.

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3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, and 15.407.

4. FACILITIES AND ACCREDITATION 4.1. FACILITIES AND EQUIPMENT

The open area test sites and conducted measurement facilities used to collect the radiated data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

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4.2. TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	
Japan	VCCI	CISPR 22 Two OATS and one conducted Site	VCCI R-1014, R-619, C-640
Norway	NEMKO	EN50081-1, EN50081-2, EN50082-1, EN50082-2, IEC61000-6-1, IEC61000-6-2, EN50083-2, EN50091-2, EN50130-4, EN55011, EN55013, EN55014-1, EN55104, EN55015, EN61547, EN55022, EN55024, EN61000-3-2, EN61000-3-3, EN60945, EN61326-1	N _{ELA 117}
Norway	NEMKO	EN60601-1-2 and IEC 60601-1-2, the Collateral Standards for Electro-Medical Products. MDD, 93/42/EEC, AIMD 90/385/EEC	N _{ELA-171}
Taiwan	BSMI	CNS 13438	SL2-IN-E-1012
Canada	Industry Canada	RSS210 Low Power Transmitter and Receiver	Canada IC2324 A,B,C, and F

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5. CALIBRATION AND UNCERTAINTY 5.1. MEASURING INSTRUMENT CALIBRATION

The measurement instruments utilized to perform the tests documented in this report have been calibrated in accordance with the manufacturer's recommendations, and are traceable to national standards.

5.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Radiated	Emission
30MHz – 200 MHz	+/- 3.3dB
200MHz – 1000MHz	+4.5/-2.9dB
1000MHz - 2000MHz	+4.6/-2.2dB
Power Line Con	ducted Emission
150kHz – 30MHz	+/-2.9

Any results falling within the above values are deemed to be marginal.

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REPORT NO: 03U1761-1

EUT: 802.11 b/g MINI PCI CARD

DATE: FEBRUARY 21, 2003 FCC ID: MCLJ07H06904

5.3. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST	Γ AND MEASUREMI	ENT EQUIPMENT L	IST	
Name of Equipment	Manufacturer	Model	Serial	Calibration
			Number	Due Date
Spectrum Analyzer	HP	8566B	3014A06685	6/1/03
Spectrum Display	HP	85662A	2152A03066	6/1/03
Quasi-Peak Detector	HP	85650A	3145A01654	6/1/03
Preamplifier	HP	8447D	2944A06833	8/22/03
Log Periodic Antenna	EMCO	3146	9107-3163	3/30/03
Biconical Antenna	Eaton	94455-1	1197	3/30/03
Spectrum Analyzer	HP	8564E	3943A01643	7/22/03
Spectrum Analyzer	HP	8593EM	3710A00205	6/11/03
Preamplifier (1 - 26.5GHz)	HP	8449B	3008A00369	6/30/03
Preamplifier (1 - 26.5GHz)	Miteq	NSP10023988	646456	4/26/03
Horn Antenna (1 - 18GHz)	EMCO	3115	6717	2/4/04
Horn Antenna (1 - 18GHz)	EMCO	3115	6739	2/4/04
Horn Antenna (18 – 26.5GHz)	ARA	MWH 1826/B	1013	11/7/03
High Pass Filter (4.57GHz)	FSY Microwave	FM-4570-9SS	003	N.C.R.
High Pass Filter (7.600GHz)	FSY Microwave	FM-7600	N/A	N.C.R
Harmonic Mixer	HP	11970A	3008A04190	10/14/05
Spectrum Analyzer	HP	E4404B	ID 963805	3/25/03
PSA Series Spectrum Analyzer	Aglient	E4446A	US42070220	1/13/04
PSA Series Spectrum Analyzer	Aglient	E4440A	US42221737	9/24/03

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6. SETUP OF EQUIPMENT UNDER TEST

SETUP INFORMATION FOR TRANSMITTER TESTS

SUPPORT EQUIPMENT

	PERIPHERAL SUPPORT EQUIPMENT LIST				
Device Type	Manufacturer	Model	Serial Number	FCC ID	
Laptop	TOSHIBA	51212942PU	N/A	N/A	
AC Adapter	TOSHIBA	PA3048U-1ACA	002A04650556	N/A	

I/O CABLES

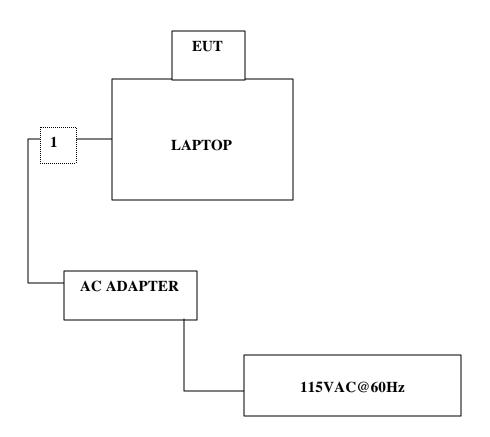
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	PWR	1	¹ / ₄ DC PWR	Unshielded	1.86 m	

TEST SETUP

The EUT was operated from the PCMCIA slot of the laptop via a PCMCIA extender. The antennas are external.

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SETUP DIAGRAM FOR TRANSMITTER TESTS



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SETUP INFORMATION FOR DIGITAL DEVICE TESTS

SUPPORT EQUIPMENT

	PERIPHERA	AL SUPPORT EQU	IPMENT LIST	
Device Type	Manufacturer	Model	Serial Number	FCC ID
LAPTOP	GENERIC H2	MS2111	8141T01S0315100014	N/A
AC ADAPTER	LITE ON ELEC.	PA-1900-05	230001790E	N/A
MODEM	ACEEX	1414	9013538	IFAXDM1414
PRINTER	HP	2225C	2541S41679	BS46XU2225C

I/O CABLES

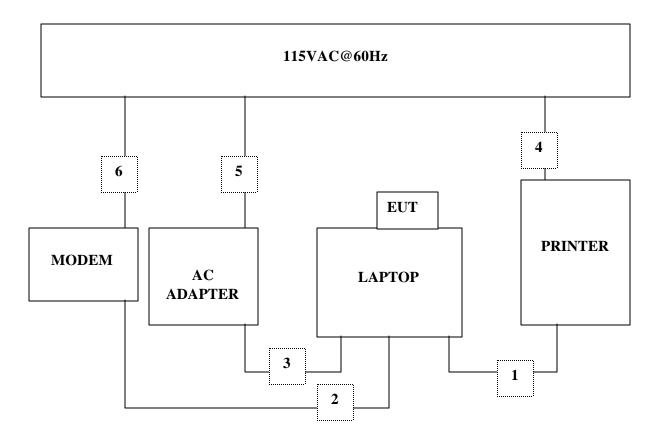
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
		Ports				
1	PARALLEL	1	DB-25	SHIELDED	1.86M	N/A
2	SERIAL	1	DB-9	SHIELDED	1.86M	N/A
3	PWR	1	¹ /4" DC PWR	UNSHIELDED	1.86M	N/A
4	PWR	1	AC PWR	UNSHIELDED	1.86M	N/A
5	PWR	1	AC PWR	UNSHIELDED	1.86M	N/A
6	PWR	1	AC PWR	UNSHIELDED	1.86M	N/A

TEST SETUP

The EUT was operated from the PCMCIA slot of the laptop via a PCMCIA extender. The antennas are external.

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SETUP DIAGRAM FOR DIGITAL DEVICE TESTS



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7. APPLICABLE RULES

<u>§15.247 (a)- BANDWIDTH</u>

(2) For direct sequence systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

<u>§15.247 (b)- POWER OUTPUT</u>

The maximum peak output power of the intentional radiator shall not exceed the following:

(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz , and 5725-5850 MHz bands: 1 watt.

(4) Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

§15.247 (b)- RADIO FREQUENCY EXPOSURE

(5) 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 levels in excess of the Commission's guidelines. See \$1.1307(b)(1) of this chapter.

§15.247 (c)- SPURIOUS EMISSIONS

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. 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 §15.205(c)).

§15.247 (d)- PEAK POWER SPECTRAL DENSITY

(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.

(f) The direct sequence operating of the hybrid system, with the frequency hopping operation turned off, shall comply with the power density requirements of paragraph (d) of this section.

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§15.205- RESTRICTED BANDS OF OPERATIONS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz. ^{2} Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

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§15.207- CONDUCTED LIMITS

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

Decreases with the logarithm of the frequency.

§15.209- RADIATED EMISSION LIMITS

(a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

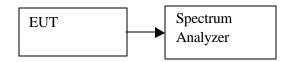
Frequency	Field Strength	Measurement Distance
(MHz)	(microvolts/meter)	(meters)
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

(b) In the emission table above, the tighter limit applies at the band edges.

8. TEST SETUP, PROCEDURE AND RESULT8.1. 6 dB BANDWIDTH

TEST SETUP



TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 100 kHz. The sweep time is coupled.

RESULTS

No non-compliance noted:

2.4 GHz Band (b)

Channel	Frequency	В	Limit	Margin
	(MHz)	(kHz)	(kHz)	(kHz)
Low	2412	12000	500	11500
Middle	2437	12050	500	11550
High	2462	12050	500	11550

2.4 GHz Normal Band (g)

Channel	Frequency	В	Limit	Margin						
	(MHz)	(kHz)	(kHz)	(kHz)						
Low	2412	16600	500	16100						
Middle	2437	16400	500	15900						
High	2462	16600	500	16100						

2.4 GHz Turbo Band (g)

	Ċ,			
Channel	Frequency	В	Limit	Margin
	(MHz)	(kHz)	(kHz)	(kHz)
Middle	2437	36250	500	35750

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6 DB BANDWIDTH (2.4 GHZ b BAND)

Compa	ny Name:				Project No.:	ct No.: Time & Date			
AMBIT	MICROSYS	STEMS			1:49:25	1:49:25 PM February 04, 2003			
REF 15	.00 dBm	ATTE	N 20 dB	i i		∆MKR 12.0	00000 MHz	0.27dE	3
PEAK LOG 10 dB/			por port	man	mm m	wanter	any a		
DL 1.8 dBn	J. M.	MAN.	V					My	Ny.
RL OFFST									
11.6 dE	3								
CENTER	2,41200 0	3Hz					SPAN 20	 N 00000 N	1Hz
ccs	RES BW 1	00 KHz			VID BW 100 KH	+z	pilital		00 msec
Test It	em: 6DB B/	ANDWID	гH						
Descrip	ption: B/G (CARD							

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DATE: FEBRUARY 21, 2003 FCC ID: MCLJ07H06904

Compa	iny Name:	-			Project No.:	Time & D	Date		
AMBIT	MICROSYS	TEMS				1:52:22	2 PM Febru	ary 04, 2	003
REF 15	.00 dBm	ATTEN	1 20 dB	1		AMKR 1	2.05000 MH	lz -0.03	dB
PEAK LOG 10 dB/			AAA	, n Jun	my m	man	May		
DL 1.7 dBn	n w	M	V		V		V	work	255
RL OFFST	5								
11.6 dE			-						
CENTER	2.43700 G	Hz		_		1	SPAN 2	0.00000	MHz
ccs	RES BW 10	00 KHz			VID BW 100 K	Hz	S	WP 20.0	000 msec
Test It	tem: 6DB BA	NDWIDT	H						
Descri	ption: B/G C	ARD							

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DATE: FEBRUARY 21, 2003 FCC ID: MCLJ07H06904

Compan	y Name:				Project No.:	T	me & Da	te		
AMBIT	MICROSYS	TEMS			1	1	1:54:11	PM Febru	ary 04, 2	2003
REF 15.(00 dBm	ATTEN	20 dB	1		Δ	MKR 12.0	05000 MH	lz 0.090	B
PEAK LOG 10 dB/			pr.	m	un	-	An	ng	Res	
DL 0.9 dBm	m	M	V-					V		any.
RL OFFST										
11.6 dB										
CENTER	2,46200 G	Hz						SPAN 2	0.00000	MHz
ccs	RES BW 10	00 KHz			VID BW 100	KHz	Ť.	S	WP 20.0	0000 msec
Test Ite	m: 6DB BA	NDWIDTH	4							
Descrip	tion: B/G C	ARD								

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6 DB BANDWIDTH (2.4 GHZ g BAND, NORMAL MODE)

Compan	ompany Name:				Project No.:				
AMBIT N	ICROSYS	TEMS				3:10:33 PM February 04, 2003			
REF 15.0	0 dBm	ATTEN	20 dB	1		AMKR 1	∆MKR 16.60000 MHz -0.21dB		
PEAK LOG 10 dB/		Aunto	mmm	hend	Murthman junt	Amilan	ilmentur	whent	
DL -2,2 dBm	ind				V				how
RL OFFST									
11.6 dB									
CENTER	2,41200 0	Hz	-	_			SPAN 2	0.000001	MHz
CCS	RES BW 1	00 KHz	1		VID BW 100 KH	łz	SWP 20	0.0000 ms	ec
Test Ite	m: 6DB BA	NDWIDT	4				44		
Descript	tion: B/G C	CARD							

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DATE: FEBRUARY 21, 2003 FCC ID: MCLJ07H06904

Company N	lame:	-		Projec	t No.:	Time & Date			
AMBIT MIC	ROSYS	TEMS		_		PM Febru	uary 04, 2003		
REF 15.00 c	:Bm	ATTEN	20 dB	1		∆MKR 16	.40000 MH	lz 0.54c	В
PEAK LOG 10 dB/		when the		rentrante	man part	hick have to	Innte	yangan da	
M	annal				V		1		think
DL 1,7 dBm									
RL OFFST									
11.6 dB									
CENTER 2.4	13700 G	Hz			1		SPAN 2	0.00000	MHz
CCS RES	S BW 10	00 KHz	1	VID BV	V 100 KH	z	SWP 20	0.0000 m	sec
Test Item:	6DB BA	NDWIDTH	4				40		
Description	B/G C	ARD							

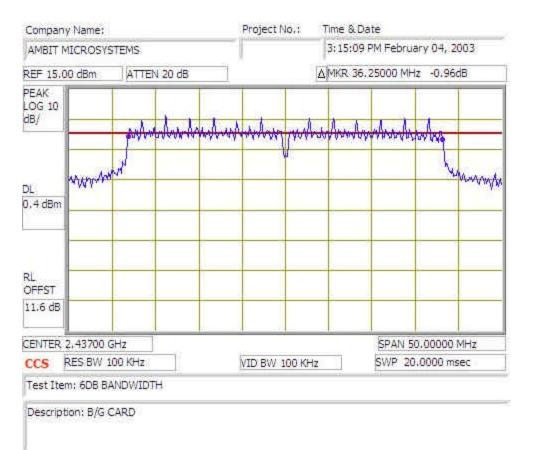
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DATE: FEBRUARY 21, 2003 FCC ID: MCLJ07H06904

3:17:02 PM February 04, 2003
monomentered
"MALY
SPAN 20.00000 MHz
Hz SWP 20.0000 msec

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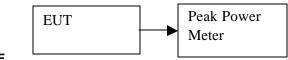
6 DB BANDWIDTH (2.4 GHZ g BAND, TURBO MODE)



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PEAK POWER 8.2.

TEST SETUP



TEST PROCEDURE

The transmitter output is connected to the power meter. The power meter is set to read peak power.

LIMIT

The maximum antenna gain = 4.96 dBi, therefore the limit is 30 dBm.

RESULTS

No non-compliance noted:

The cable assembly insertion loss of 11.6 dB (including 10 dB pad and 1.6 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

2.4 GHz b Band

Channel	Frequency	Peak Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	20.64	30	-9.36
Middle	2437	20.35	30	-9.65
High	2462	19.46	30	-10.54

2.4 GHz g Band Normal Mode

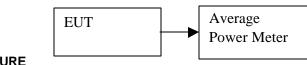
Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	21.36	30	-8.64
Middle	2437	21.92	30	-8.08
High	2462	21.25	30	-8.75

2.4 GHz g Band Turbo Mode

Channel	Frequency	Peak Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Middle	2437	21.64	30	-8.36

REPORT NO: 03U1761-1 EUT: 802.11 b/g MINI PCI CARD 8.3. **AVERAGE POWER**

TEST SETUP



TEST PROCEDURE

The transmitter output is connected to the power meter. The power meter is set to read average power.

<u>LIMIT</u>

None, reporting only.

RESULTS

No non-compliance noted:

The cable assembly insertion loss of 11.6 dB (including 10 dB pad and 1.6 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

2.4 GHz b Band

Channel	Frequency (MHz)	Average Power (dBm)
Low	2412	18.00
Middle	2437	17.84
High	2462	17.23

2.4 GHz g Band Normal Mode

Channel	Frequency	Average Power
	(MHz)	(dBm)
Low	2412	15.28
Middle	2437	17.84
High	2462	14.32

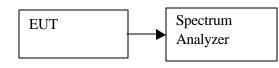
2.4 GHz g Band Turbo Mode

Channel	Frequency	Average Power
	(MHz)	(dBm)
Middle	2437	18

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8.4. PEAK POWER SPECTRAL DENSITY

TEST SETUP



TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer, the maximum level in a 3 kHz bandwidth is measured with the spectrum analyzer using RBW = 3 kHz and VBW \geq 3KHz, sweep time = span / 3 kHz, and video averaging is turned off. The PPSD is the highest level found across the emission in any 3 kHz band.

RESULTS

No non-compliance noted:

2.4 GHz b Band

Channel	Frequency	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	-4.05	8	-12.05
Middle	2437	-4.25	8	-12.25
High	2462	-4.60	8	-12.60

2.4 GHz g Band Normal Mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-9.14	8	-17.14
Middle	2437	-5.80	8	-13.8
High	2462	-9.12	8	-17.12

2.4 GHz g Band Turbo Mode

Channel	Frequency	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Middle	2437	-10.85	8	-18.85

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PPSD (2.4 GHZ b BAND)

Compa	ny Name:				Project No.:	Time & D	Date	ate		
AMBIT	MICROSYST	TEMS				2:56:0	2:56:05 PM February 04, 2003			
REF 15	.00 dBm	ATTE	1 20 dB	Ť		MKR 2,41120 GHz -4,05 dBm				
PEAK LOG 10 dB/				-						
	www		mm	muhanya	unning	www	home	munuh	m	
DL										
1										
RL OFFST										
11.6 dB			-							
SENTER	2,41115 G	Hz					SPAN 3	100,00000) KHz	
CCS	RES BW 31	(Hz			VID BW 10 KH		SWP 1	00.00 sec	8	
Test It	em: PEAK P	OWER S	PECTRAL	DENSI	TY.		40.000			
Descrip	otion: B/G C	ARD								

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Company Name:			Project No.:	Time & E	Time & Date				
MICROSYS	TEMS				2:09:10	2:09: 10 PM February 04, 2003 MKR 2,43748 GHz -4,25 dBm			
.00 dBm	ATTEN	20 dB	1		MKR 2.				
man	www	mar	wind	whom	m	~~~~~	num	m	
			-						
3								-	
2,43750 G	Hz					SPAN 3	100,00000) KHz	
RES BW 31	KHz			VID BW 10 KHz	25 ()	s	WP 100.	00 sec	
مربع بحجري اللي		PECTRAL	. DENSI		E	S	WP 100.	00 sec	
	MICROSYS	MICROSYSTEMS	MICROSYSTEMS	MICROSYSTEMS	MICROSYSTEMS	MICROSYSTEMS 2:09:10 .00 dBm ATTEN 20 dB MKR 2.	MICROSYSTEMS 2:09: 10 PM Febru .00 dBm ATTEN 20 dB MKR 2.43748 GHz	MICROSYSTEMS. 2:09: 10 PM February 04, 2 MKR 2.43748 GHz -4.25 d MKR 2.43748 GHz -4.25 d MKR 2.43748 GHz -4.25 d MKR 2.43750 GHz -4.25 d SPAN 300.00000 RES BW 3 KHz VID BW 10 KHz SWP 100.	

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Compa	Company Name:				Project No.	1	Time & Date				
AMBIT	MICROSYS	TEMS		-			2:14:27	PM Febru	ary 04, 2	003	
REF 15	.00 dBm	ATTEN 20 dB MKR 2,41126 GHz -4,60 dB				Bm					
PEAK LOG 10 dB/											
	mun	min	monution	mo	mah	r.m	m	iman	and	m	
DL											
RL OFFST											
11.6 dE	3									-	
CENTER	R 2,41115 G	Hz						SPAN 3	00,00000) KHz	
CCS	RES BW 3	KHz		N	VID BW 101	KHz	Ĩ.	S	WP 100.	00 sec	
providence of	tem: PEAK P	() (and the second s	PECTRAL DE	NSITY				-			
Descri	ption: B/G C	ARD									

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PPSD (2.4 GHZ g BAND, NORMAL MODE)

Compa	Company Name:				Project No	o,:	Time & Date			
AMBIT	MICROSYST	TEMS		-	1		3:28:53	PM Februa	ary 04, 2	003
REF 15.	00 dBm	ATTEN	20 dB	1		MKR 2.4	2,41481 GHz -9,14 dBm			
PEAK LOG 10 dB/				-						
DL.	mm	inn	m	n	um	n	min	margh	n	horm
RL OFFST										
11.6 dB										-
SENTER	2,41485 G	Hz						SPAN 3	00,0000) KHz
ccs	RES BW 31	(Hz	1		VID BW 10	KHz	10	SWP 10	0.00 sec	1
Test Ib	em: PEAK P	OWER SPI	ECTRAL DE	ENSIT	TY.			241		
Descrip	otion: B/G C	ARD								

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		Project No.:	Time & Date				
EMS			3:34:22 PM February 04, 2003				
ATTEN 20) dB		MKR 2.4	MKR 2.43224 GHz -5.80 dBm			
Ann	~~~~	mm	n	nn	hun	rown	
łz				SPAN 3	00,00000) KHz	
Hz	17	VID BW 10 KHz	9. Ú	SWP 10	0.00 sec	6	
				EMS 3:34:22 ATTEN 20 dB MKR 2.4	EMS 3:34:22 PM Febru ATTEN 20 dB MKR 2.43224 GHz	EMS 3:34:22 PM February 04, 20 ATTEN 20 dB MKR 2,43224 GHz -5.80 d MKR 2,4324 GHz </td	

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Company Name: AMBIT MICROSYSTEMS REF 15.00 dBm ATTEN 20 dB					Project No.:	Time & D	Time & Date				
					F CONSCIENCES	3:22:57	3:22:57 PM February 04, 2003				
						MKR 2.4	16347 GHz	-9,12 d	Bm		
PEAK LOG 10 dB/											
DL	Andres	www.	Am	m	u.m.	mmu	mm	malan			
RL OFFST											
11.6 dB			-						-		
CENTER	2,46355 G	Hz					SPAN 3	00,00000) KHz		
CCC	RES BW 3	KHz			VID BW 10 KH	SWP 100.00 sec					

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PPSD (2.4 GHZ g BAND, TURBO MODE)

Company Name: AMBIT MICROSYSTEMS					And a second		Time & Da	Time & Date			
							3:40:50 PM February 04, 2003				
REF 15.	00 dBm	ATTE	V 20 dB	1			MKR 2,43410 GHz -10.85 dBm				
PEAK LOG 10 dB/											
DL	www	www	-	and the	m	in the second	-	nn	m	mmy	
RL OFFST											
11.6 dB											
CENTER	2,43398 G	Hz		-	4 (4	-		SPAN 3	00,00000) KHz	
CCS RES BW 3 KHz					VID BW 10 KHz			SWP 100.00 sec			
Test Ite	m: PEAK P	OWER S	PECTRAL	DENSIT	TY.			341			
	m: PEAK P tion: B/G C		PECTRAL	DENSIT	Υ.						

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8.5. MAXIMUM PERMISSIBLE EXPOSURE

CALCULATIONS

Given

 $E = \sqrt{(30 * P * G)} / d$

and

 $S = E^{2}/3770$

where

E = Field Strength in Volts / meter

P = Power in Watts

G = Numeric antenna gain

d = distance in meters

S = Power Density in milliwatts / square centimeter

Combining equations and rearranging the terms to express the distance as a function of the remaining variables yields:

 $d = \sqrt{((30 * P * G) / (3770 * S))}$

Changing to units of mW and cm, using:

 $P\left(mW\right)=P\left(W\right)$ / 1000 and

d(cm) = 100 * d(m)

yields

$$d = 100 * \sqrt{((30 * (P / 1000) * G) / (3770 * S))}$$

$$d = 0.282 * \sqrt{(P * G / S)}$$

where

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REPORT NO: 03U1761-1 EUT: 802.11 b/g MINI PCI CARD Substituting the logarithmic form of power and gain using:

 $P(mW) = 10 \wedge (P(dBm) / 10)$ and

G (numeric) =
$$10 \land (G (dBi) / 10)$$

yields

 $d = 0.282 * 10 \wedge ((P + G) / 20) / \sqrt{S}$

Equation (1)

where

d = MPE safe distance in cm

P = Power in dBm

G = Antenna Gain in dBi

 $S = Power Density Limit in mW / cm^2$

RESULTS

No non-compliance noted:

MAXIMUM PERMISSIBLE EXPOSURE (2.4 GHZ b BAND)

EUT output power = 20.64 dBmAntenna Gain = 4.96 dBiS = $1.0 \text{ mW} / \text{cm}^2$ from 1.1310 Table 1

Substituting these parameters into Equation (1) above:

MPE Safe Distance = 5.37 cm

MAXIMUM PERMISSIBLE EXPOSURE (2.4 GHZ g BAND)

EUT output power = 21.92 dBmAntenna Gain = 4.96 dBiS = $1.0 \text{ mW} / \text{cm}^2 \text{ from } 1.1310 \text{ Table } 1$

Substituting these parameters into Equation (1) above:

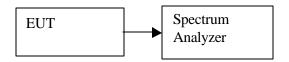
MPE Safe Distance = 6.23 cm

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8.6. SPURIOUS EMISSIONS

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

TEST SETUP



TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 100 kHz.

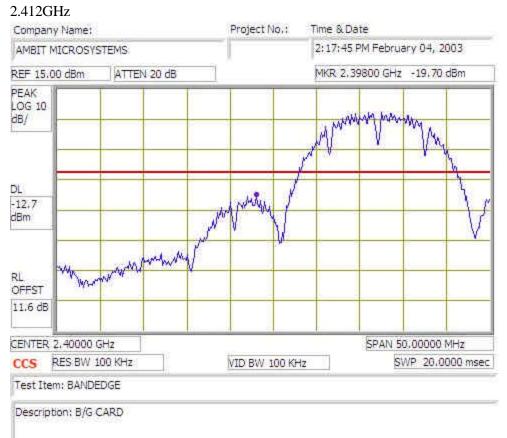
Measurements are made over the 30 MHz to 26.5 GHz range with the transmitter set to the lowest, middle, and highest channels within the 2.4 GHz band.

RESULTS

No non-compliance noted:

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CONDUCTED SPURIOUS EMISSIONS (2.4 GHZ b BAND)



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Company Name:					ject No.:	Time & Date			
AMBIT MICROSYSTEMS REF 15.00 dBm						2:19:53	PM Februa	ry 04, 2	003
					A		MKR 1.65900 GHz -37.62 dBm		
PEAK LOG 10 dB/	2							1	
DL -12,7 dBm									
RL OFFST 11.6 df		lim			nanutul	human	M	Am	harman
START	30.00000 M	Hz			<u></u>		STOP 2.	90000 G	iHz
CCS	RES BW 100 KHz				VID BW 100 KHz			WP 861.0000	
Test I	tem: SPURIC	OUS LOW							
Descri	ption: B/G C	ARD							

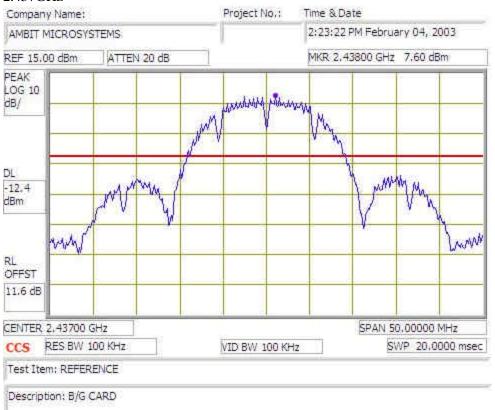
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Company Name: AMBIT MICROSYSTEMS					Project No.:	Time & Date					
						2:21:15	2:21:15 PM February 04, 2003				
REF 15	.00 dBm	ATTE	V 20 dB	1		MKR 22.	MKR 22.96000 GHz -34.54 dBm				
PEAK LOG 10 dB/											
DL -12,7 dBm											
RL OFFST 11.6 dE		m	Anna hao	and	nuthant	y warden war	produc	John Marine			
START 2.90000 GHz					STOP 26.50000 GHz						
CCS	RES BW 10	IO KHZ			VID BW 100 KH	z	S	WP 7.08	sec		
Test It	tem: SPURIO	US LOW	t								
Descri	ption: B/G C	ARD									

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Company Name:					Project No.:	Time & Date 2:25:12 PM February 04, 2003					
REF 15	.00 dBm	ATTE	V 20 dB	Ĩ		MKR 1	MKR 1.70900 GHz -37.08 dBm				
PEAK LOG 10 dB/								k			
DL -12.4 dBm											
RL OFFST 11.6 df		have	nham	Antor	an mark the second	<u> </u>	maria	A	mprocess		
START 30,00000 MHz			-		STOP 2.90000 GHz						
CCS	RES BW 100 KHz				VID BW 100 KHz SWP 861.0			.0000			
Test I	tem: SPURIC	OUS MID	DLE								
Descri	otion: B/G C	ARD									

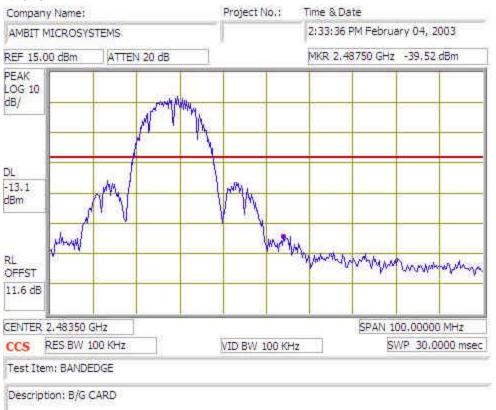
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Company Name: AMBIT MICROSYSTEMS					Project No.:	Time & Da	Time & Date				
						2:30:13	2:30:13 PM February 04, 2003				
REF 15.00 c	Bm	ATTEN	20 dB			MKR 23.	02000 GH	02000 GHz +34,79 dBm			
PEAK LOG 10 dB/											
DL -12.4 JBm											
RL OFFST	onolun		parane	mm	manaha	mm	Junanut		www.		
START 2.90	000 GHz	1					STOP 2	5.50000	GHz		
CCS RES	S BW 100	KHz			VID BW 100 KH	łz	SWP 7.08 sec				
Test Item: :			LE			-	-				

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Compa	ny Name:			Project No.:	Time & Da	Time & Date				
AMBIT	MICROSYS	TEMS		-	2:36:55	2:36:55 PM February 04, 2003				
REF 15	.00 dBm	ATTEN 2	0 dB	T	MKR 22.	96000 GHz	-33.98	dBm		
PEAK LOG 10 dB/										
DL -13.1 dBm										
RL OFFST 11.6 dE	Jump.	n financi	angunat	munham	unana	proved	and the second	Joen Constant		
START	2.90000 GH	z	1			STOP 26	.50000 G	Hz		
ccs	RES BW 10	00 KHz	11	VID BW 100 KH	z	SWP 7.08 sec				
Test It	em: SPURIC	US HIGH	-11							
Descrip	ption: B/G C	ARD								

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