

FCC TEST REPORT

REPORT NO.: RF920624R02

MODEL NO.: WLL4030

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TESTED: Jun. 28 ~ Jul. 8, 2003

APPLICANT: ASKEY COMPUTER CORP.

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0528
ILAC MRA



Lab Code: 200102-0



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1. CERTIFICATION

PRODUCT : Mini- PCI CARD
BRAND NAME : Askey
MODEL NO. : WLL4030
APPLICANT : ASKEY COMPUTER CORP.
STANDARDS : 47 CFR Part 15, Subpart C (Section 15.247),
Subpart E (Section 15.407), ANSI C63.4-1992

We, **Advance Data Technology Corporation**, hereby certify that one sample of the designation has been tested in our facility from Jun. 28 ~ Jul. 8, 2003. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions herein specified.

PREPARED BY:

Landy Soong
Landy Soong

DATE:

Jul. 11, 2003

APPROVED BY:

Dr. Alan Lane
Dr. Alan Lane, JVF

DATE:

Jul. 11, 2003

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: 47 CFR Part 15, Subpart C			
Standard Section	Test Type and Limit	Result	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit Minimum passing margin is -16.20dBuV at 0.177MHz
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit: min. 500kHz	PASS	Meet the requirement of limit
15.247(b)	Maximum Peak Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit
15.247(c)	Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit Minimum passing margin is -7.2dBuV/m at 191.76MHz
15.247(d)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit
15.247(c)	Band Edge Measurement Limit: 20dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit



APPLIED STANDARD: 47 CFR Part 15, Subpart E			
Standard Section	Test Type	Result	REMARK
15.407(b)(5)	AC Power Conducted Emission	PASS	Meet the requirement of limit Minimum passing margin is -16.10dBuV at 0.17MHz
15.407(b/1/2/3)(b)(5)	Electric Field Strength Spurious Emissions, 30MHz ~ 40000MHz	PASS	Meet the requirement of limit Minimum passing margin is -2.0dBuV/m at 11604.00MHz
15.407(a/1/2/3)	Peak Transmit Power	PASS	Meet the requirement of limit
15.407(a)(6)	Peak Power Excursion	PASS	Meet the requirement of limit
15.407(a/1/2/3)	Peak Power Spectral Density	PASS	Meet the requirement of limit
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Mini- PCI CARD
MODEL NO.	WLL4030
POWER SUPPLY	3.3VDC from host equipment
MODULATION	BPSK, QPSK, CCK, OFDM
TRANSFER RATE	up to 54Mbps
FREQUENCY RANGE	802.11b and draft 802.11g: 2412~2462MHz 802.11a: 5.15~5.35GHz and 5.725~5.825GHz
NUMBER OF CHANNEL	802.11b and draft 802.11g: 11 802.11a: 12
CHANNEL SPACING	802.11b and draft 802.11g: 5MHz 802.11a: 20MHz
OUTPUT POWER	802.11b and draft 802.11g: 16.42dBm 802.11a: 18.42dBm
DATA CABLE	NA
ANTENNA TYPE	Printed Dipole / Patch Antenna
I/O PORTS	NA
ASSOCIATED DEVICES	NA

NOTE:

- The EUT operates in both the 5GHz and 2.4GHz Bands and compatibility with 802.11a and 802.11g technology.
- IEEE 802.11a, 802.11b, and Draft 802.11g Compliant.
- There are two types of antennas provided to this EUT, and diversity function is provided for the receiver mode. For 2.4GHz, antenna details:

Antenna Type		Antenna Gain (dBi)	
Main	Aux.	Main	Aux.
Patch	Dipole	3	3

For 5GHz, antenna details:

Antenna Type		Antenna Gain (dBi)	
Main	Aux.	Main	Aux.
Patch	Dipole	2.8	2.8

- For more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 DESCRIPTION OF TEST MODES

For 802.11b and draft 802.11g: Eleven channels are provided to this EUT.

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

NOTE:

1. Below 1GHz, the channel 1, 6, and 11 were pre-tested in chamber. The channel 11, worst case one, was chosen for final test.
2. Above 1GHz, the channel 1, 6, and 11 were tested individually.
3. Transfer rate of 11Mbps with CCK technique and 6Mbps with OFDM technique, the worst case, was chosen for final test.

For 802.11a: Twelve channels are provided to this EUT.

Channel	Frequency	Channel	Frequency
1	5180 MHz	7	5300 MHz
2	5200 MHz	8	5320 MHz
3	5220 MHz	9	5745 MHz
4	5240 MHz	10	5765 MHz
5	5260 MHz	11	5785 MHz
6	5280 MHz	12	5805 MHz

NOTE:

1. The EUT allows data rates of up to 54Mbps and was tested at 6Mbps data rate that produced the highest output power.
2. Channel 1, 4, 5, 8, 9 and 12 are the closest frequencies to the band edge, were chosen for final test.



3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a Mini- PCI CARD. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC 47 CFR Part 15, Subpart C. (15.247),
Subpart E (15.407). ANSI C63.4 : 1992**

All tests have been performed and recorded as per the above standards.

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.



3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK	Dell	PP01L	TW-09C748-12800-190-B220	FCC DoC
2	PRINTER	EPSON	LQ-300+	DCGY017096	FCC DoC Approved
3	MODEM	ACEEX	1414	980020569	IFAXDM1414

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	1.2m braid shielded wire, terminated with DB25 and Centronics connector via metallic frame, w/o core
3	1.2 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.

NOTE: All power cords of the above support units are non shielded (1.8m).



4. TEST TYPES AND RESULTS (FOR PART 802.11b & draft 802.11g)

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
 3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESCS 30	838251/021	Jan. 20, 2004
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH3-Z5	100218	Dec. 18, 2003
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	100219	Dec. 18, 2003
ROHDE & SCHWARZ Artificial Mains Network (for peripherals)	ESH3-Z5	100220	Dec. 18, 2003
ROHDE & SCHWARZ 4-wire ISN	ENY41	837032/016	Nov. 29 2003
ROHDE & SCHWARZ 2-wire ISN	ENY22	837497/016	Nov. 29 2003
Software	Cond-V2M3	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C10.01	May. 01, 2004
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010770	Mar. 24, 2004
SUHNER Terminator (For ROHDE & SCHWARZ LISN)	65BNC-5001	E1-010773	Apr. 06, 2004

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. “*”: These equipment are used for conducted telecom port test only (if tested).
 3. The test was performed in ADT Shielded Room No. 10.
 4. The VCCI Site Registration No. is C-1312.



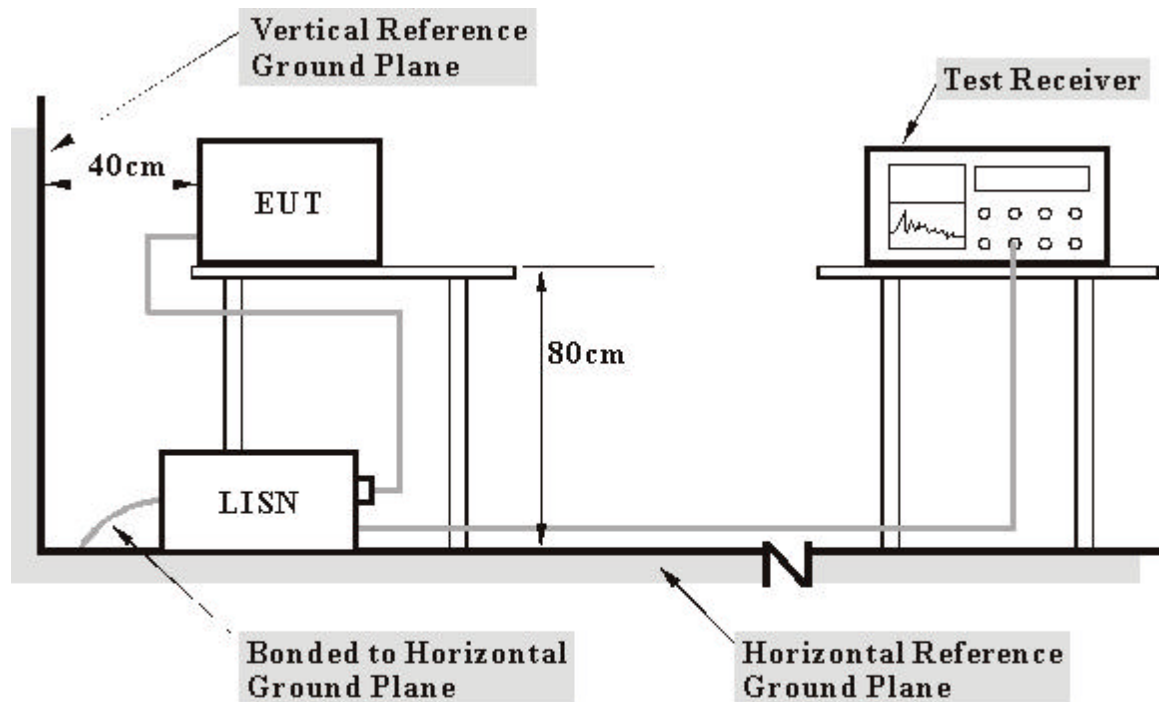
4.1.3 TEST PROCEDURES

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels over 10dB under the prescribed limits could not be reported

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



- Note:**
1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.1.6 EUT OPERATING CONDITIONS

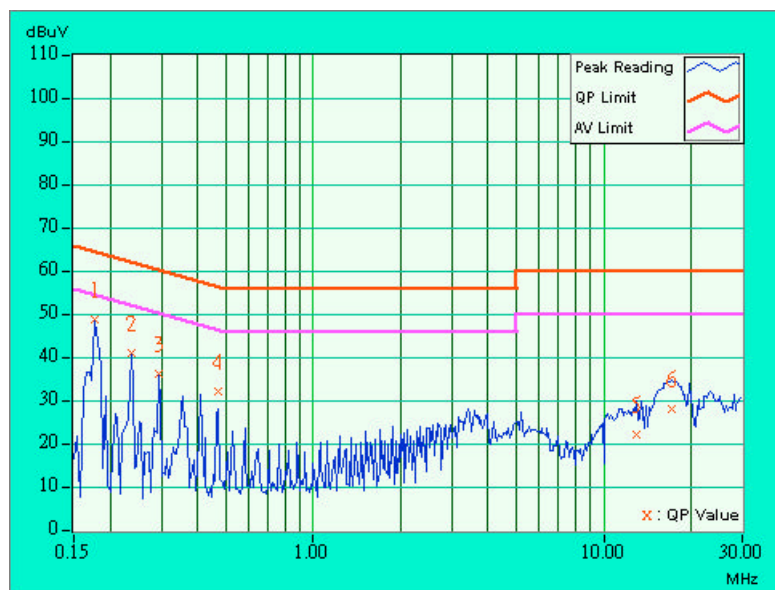
- a. Plug the EUT into the computer system placed on a testing table.
- b. The computer system ran a test program to enable EUT under transmission/receiving condition continuously at specific channel frequency.
- c. The computer system sent "H" messages to its screen.
- d. The computer system sent "H" messages to modem.
- e. The computer system sent "H" messages to printer, and the printer prints them on paper.

4.1.7 TEST RESULTS

EUT	Mini- PCI CARD	MODEL	WLL4030
MODE	Channel 1	6dB BANDWIDTH	9 kHz
TEST MODE	CCK & OFDM	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 991hPa	INPUT POWER (SYSTEM)	120Vac, 60Hz
TESTED BY	Gary Chang		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.177	0.06	48.19	-	48.25	-	64.61	54.61	-16.36	-
2	0.236	0.06	40.48	-	40.54	-	62.24	52.24	-21.70	-
3	0.295	0.06	35.77	-	35.83	-	60.40	50.40	-24.57	-
4	0.470	0.07	31.64	-	31.71	-	56.51	46.51	-24.80	-
5	12.961	0.50	21.48	-	21.98	-	60.00	50.00	-38.02	-
6	17.070	0.59	27.44	-	28.03	-	60.00	50.00	-31.97	-

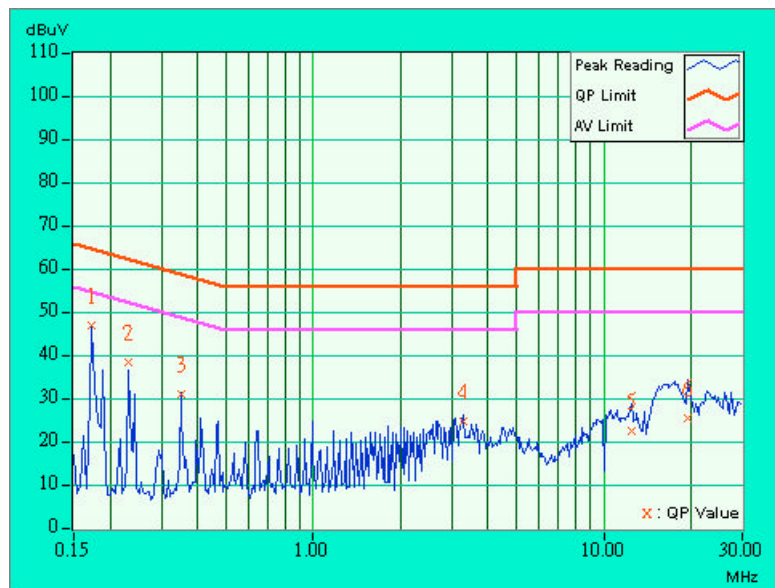
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



EUT	Mini- PCI CARD	MODEL	WLL4030
MODE	Channel 1	6dB BANDWIDTH	9 kHz
TEST MODE	CCK & OFDM	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 991hPa	INPUT POWER (SYSTEM)	120Vac, 60Hz
TESTED BY	Gary Chang		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.173	0.05	46.50	-	46.55	-	64.79	54.79	-18.24	-
2	0.232	0.05	37.89	-	37.94	-	62.38	52.38	-24.44	-
3	0.349	0.05	30.42	-	30.47	-	58.98	48.98	-28.51	-
4	3.281	0.20	24.26	-	24.46	-	56.00	46.00	-31.54	-
5	12.488	0.44	22.04	-	22.48	-	60.00	50.00	-37.52	-
6	19.461	0.51	24.96	-	25.47	-	60.00	50.00	-34.53	-

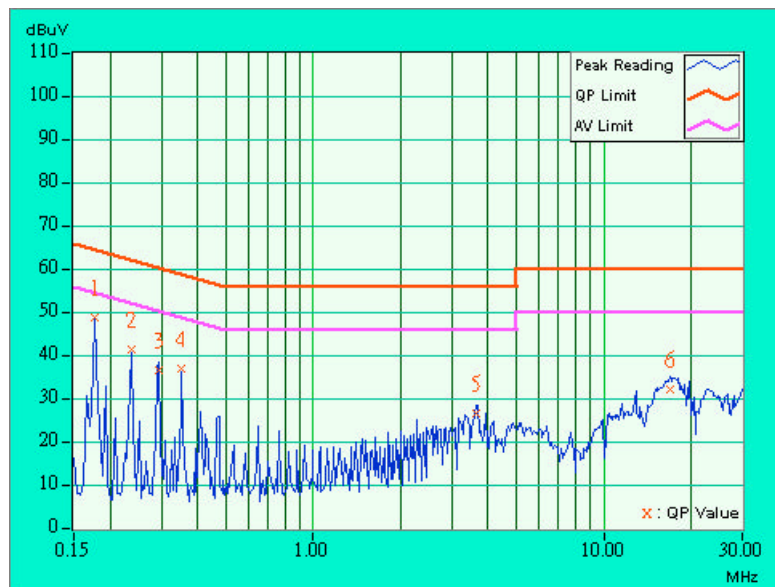
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



EUT	Mini- PCI CARD	MODEL	WLL4030
MODE	Channel 6	6dB BANDWIDTH	9 kHz
TEST MODE	CCK & OFDM	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 991hPa	INPUT POWER (SYSTEM)	120Vac, 60Hz
TESTED BY	Gary Chang		

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.177	0.06	48.35	-	48.41	-	64.61	54.61	-16.20	-
2	0.236	0.06	40.95	-	41.01	-	62.24	52.24	-21.23	-
3	0.295	0.06	36.20	-	36.26	-	60.40	50.40	-24.14	-
4	0.353	0.06	36.37	-	36.43	-	58.89	48.89	-22.46	-
5	3.637	0.21	26.05	-	26.26	-	56.00	46.00	-29.74	-
6	16.887	0.59	31.76	-	32.35	-	60.00	50.00	-27.65	-

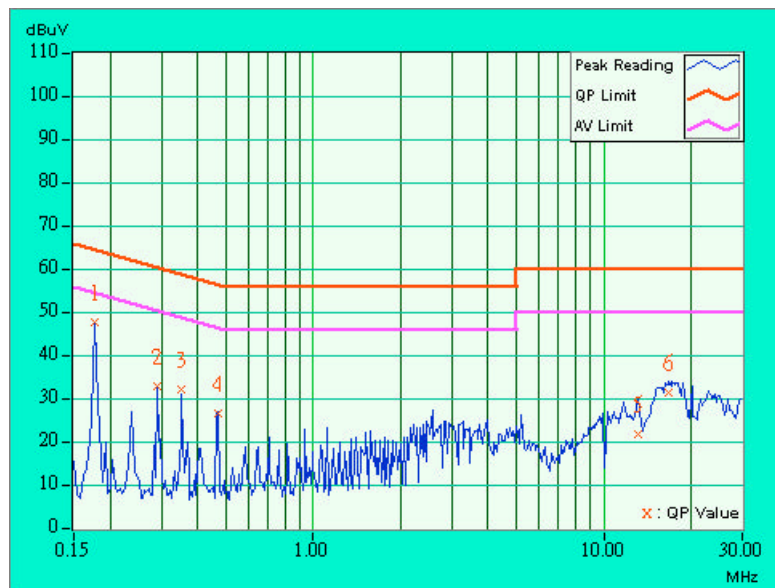
- REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



EUT	Mini- PCI CARD	MODEL	WLL4030
MODE	Channel 6	6dB BANDWIDTH	9 kHz
TEST MODE	CCK & OFDM	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 991hPa	INPUT POWER (SYSTEM)	120Vac, 60Hz
TESTED BY	Gary Chang		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.177	0.05	47.31	-	47.36	-	64.61	54.61	-17.25	-
2	0.291	0.05	32.48	-	32.53	-	60.51	50.51	-27.98	-
3	0.353	0.05	31.56	-	31.61	-	58.89	48.89	-27.28	-
4	0.470	0.06	26.34	-	26.40	-	56.51	46.51	-30.11	-
5	13.195	0.45	21.30	-	21.75	-	60.00	50.00	-38.25	-
6	16.820	0.50	31.00	-	31.50	-	60.00	50.00	-28.50	-

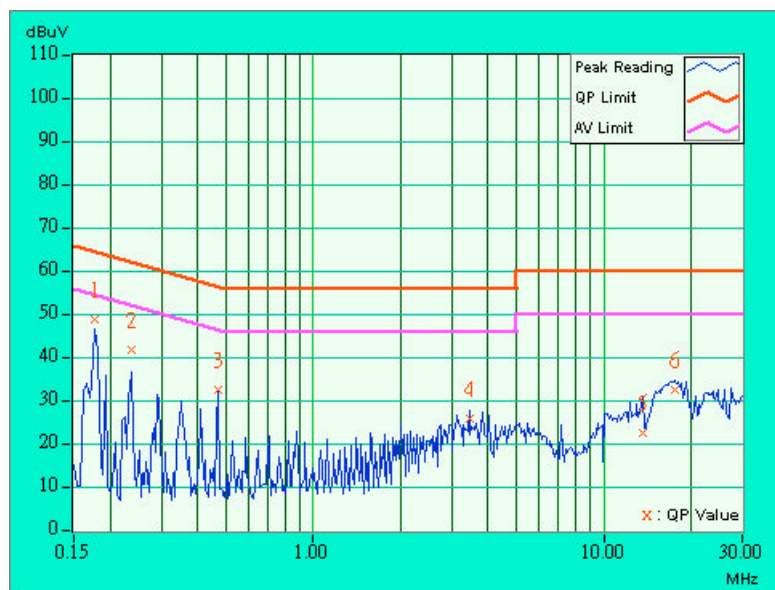
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



EUT	Mini- PCI CARD	MODEL	WLL4030
MODE	Channel 11	6dB BANDWIDTH	9 kHz
TEST MODE	CCK & OFDM	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 991hPa	INPUT POWER (SYSTEM)	120Vac, 60Hz
TESTED BY	Gary Chang		

No	Freq.	Corr.	Reading Value		Emission Level		Limit		Margin	
	[MHz]	Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.177	0.06	48.29	-	48.35	-	64.61	54.61	-16.26	-
2	0.236	0.06	41.11	-	41.17	-	62.24	52.24	-21.07	-
3	0.470	0.07	32.02	-	32.09	-	56.51	46.51	-24.42	-
4	3.461	0.21	25.19	-	25.40	-	56.00	46.00	-30.60	-
5	13.672	0.52	21.86	-	22.38	-	60.00	50.00	-37.62	-
6	17.543	0.60	31.97	-	32.57	-	60.00	50.00	-27.43	-

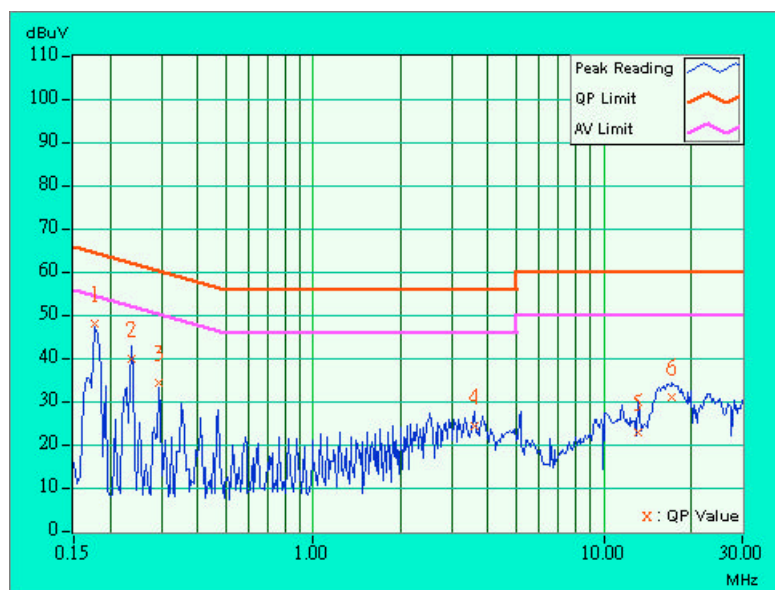
- REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



EUT	Mini- PCI CARD	MODEL	WLL4030
MODE	Channel 11	6dB BANDWIDTH	9 kHz
TEST MODE	CCK & OFDM	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	25deg. C, 60%RH, 991hPa	INPUT POWER (SYSTEM)	120Vac, 60Hz
TESTED BY	Gary Chang		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.177	0.05	47.55	-	47.60	-	64.61	54.61	-17.01	-
2	0.236	0.05	39.40	-	39.45	-	62.24	52.24	-22.79	-
3	0.295	0.05	33.92	-	33.97	-	60.40	50.40	-26.43	-
4	3.578	0.20	24.02	-	24.22	-	56.00	46.00	-31.78	-
5	13.148	0.45	22.48	-	22.93	-	60.00	50.00	-37.07	-
6	17.258	0.50	30.53	-	31.03	-	60.00	50.00	-28.97	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.





4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequencies (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
* HP Spectrum Analyzer	8590L	3544A01176	Jun. 10, 2004
* HP Preamplifier	8447D	2944A08485	May. 01, 2004
* HP Preamplifier	8449B	3008A01201	Dec. 01, 2003
* HP Preamplifier	8449B	3008A01292	Aug. 07, 2003
ROHDE & SCHWARZ TEST RECEIVER	ESI7	838496/016	Feb. 23, 2004
* ROHDE & SCHWARZ TEST RECEIVER	ESMI	839013/007 839379/002	Feb. 13, 2004
SCHAFFNER Tunable Dipole Antenna	VHBA 9123	459	Nov. 22, 2003
SCHWARZBECK Tunable Dipole Antenna	UHA 9105	977	
* CHASE BILOG Antenna	CBL6112A	2221	Aug. 2, 2003
* SCHWARZBECK Horn Antenna	BBHA9120-D1	D130	Jun 30, 2004
* EMCO Horn Antenna	3115	9312-4192	Mar. 23 2004
* EMCO Turn Table	1060	1115	NA
* CHANCE Tower	CM-AT40	CM-A010	NA
* Software	ADT_Radiate d V5.14	NA	NA
* ANRITSU RF Switches	MP59B	M35046	Jan. 05. 2004
* TIMES RF cable	LMR-600	CABLE-ST5-01	Jan. 05. 2004

NOTE: 1. The measurement uncertainty is less than +/- 3.0dB, which is calculated as per the NAMAS document NIS81.

2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

3. "*" = These equipment are used for the final measurement.

4. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.

5. The test was performed in ADT Open Site No. 5.

6. The VCCI Site Registration No. is R-1039.



4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using the quasi-peak method or average method as specified and then reported in Data sheet peak mode and QP mode.

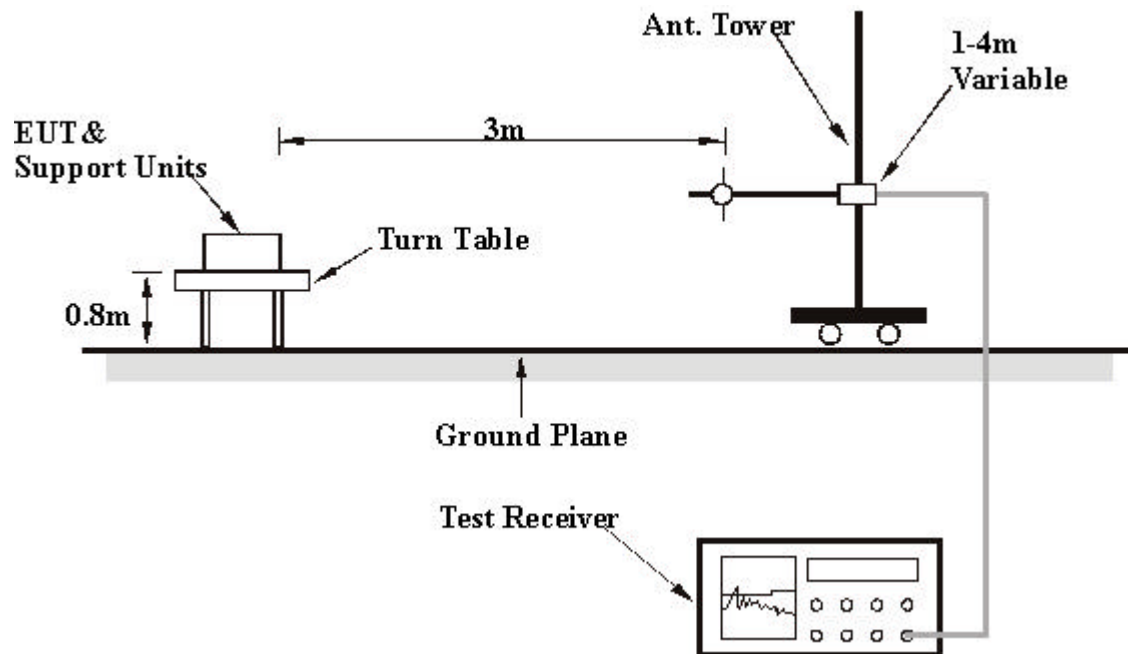
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 300 Hz for Average detection (AV) at frequency above 1GHz.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation

4.2.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

4.2.7 TEST RESULTS

EUT	Mini- PCI CARD	MODEL	WLL4030
MODE	Channel 11	FREQUENCY RANGE	Below 1000 MHz
TEST MODE	CCK & OFDM	INPUT POWER (SYSTEM)	120Vac, 60Hz
ENVIRONMENTAL CONDITIONS	30deg. C, 60%RH, 991hPa	DETECTOR FUNCTION	Peak(PK) Average (AV)
TESTED BY	Hardaway Lee		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 10 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	191.76	36.3 QP	43.50	-7.20	1.43 H	181	25.50	10.80
2	256.98	30.5 QP	46.00	-15.50	1.00 H	114	14.10	16.50
3	384.03	28.8 QP	46.00	-17.20	1.39 H	104	10.20	18.70
4	417.81	30.5 QP	46.00	-15.50	1.54 H	185	11.10	19.40
5	513.23	32.2 QP	46.00	-13.80	1.27 H	68	11.00	21.20
6	545.10	29.5 QP	46.00	-16.50	1.27 H	23	8.40	21.10
7	576.51	32.9 QP	46.00	-13.10	1.34 H	119	11.00	21.90
8	672.31	38.1 QP	46.00	-7.90	1.41 H	147	15.20	22.90
9	736.59	31.4 QP	46.00	-14.60	1.41 H	196	7.60	23.80
10	833.92	29.1 QP	46.00	-16.90	1.50 H	225	4.10	25.00
11	863.89	33.0 QP	46.00	-13.00	1.69 H	244	7.90	25.10

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	160.29	26.7 QP	43.50	-16.80	1.22 V	27	15.90	10.80
2	191.79	27.2 QP	43.50	-16.30	1.15 V	65	16.40	10.80
3	223.79	18.1 QP	46.00	-27.90	1.30 V	86	5.00	13.20
4	288.05	26.9 QP	46.00	-19.10	1.30 V	156	10.30	16.60
5	417.78	30.2 QP	46.00	-15.80	1.45 V	201	10.90	19.40
6	420.93	27.6 QP	46.00	-18.40	1.20 V	70	8.20	19.40
7	516.08	30.2 QP	46.00	-15.80	1.00 V	200	9.10	21.20
8	577.14	32.0 QP	46.00	-14.00	1.14 V	134	10.10	22.00
9	580.27	24.1 QP	46.00	-21.90	1.47 V	212	2.00	22.10
10	677.24	27.6 QP	46.00	-18.40	1.20 V	130	4.70	22.90
11	703.00	38.4 QP	46.00	-7.60	1.10 V	146	15.30	23.10

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.



EUT	Mini- PCI CARD	MODEL	WLL4030
MODE	Channel 1	FREQUENCY RANGE	Above 1000 MHz
TEST MODE	CCK	INPUT POWER (SYSTEM)	120Vac, 60Hz
ENVIRONMENTAL CONDITIONS	30deg. C, 60%RH, 991hPa	DETECTOR FUNCTION	Peak(PK) Average (AV)
TESTED BY	Hardaway Lee		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2412.00	110.1 PK			1.99 H	120	80.50	29.70
1	*2412.00	101.6 AV			1.99 H	120	71.90	29.70
2	4824.00	51.7 PK	74.00	-22.30	1.32 H	200	16.50	35.30
2	4824.00	36.1 AV	54.00	-17.90	1.32 H	200	0.90	35.30

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2412.00	104.4 PK			1.00 V	191	74.80	29.70
1	*2412.00	95.7 AV			1.00 V	191	66.00	29.70
2	4824.00	50.0 PK	74.00	-24.00	1.44 V	45	14.70	35.30

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. The limit value is defined as per 15.247
 6. “ * “ : Fundamental frequency



EUT	Mini- PCI CARD	MODEL	WLL4030
MODE	Channel 6	FREQUENCY RANGE	Above 1000 MHz
TEST MODE	CCK	INPUT POWER (SYSTEM)	120Vac, 60Hz
ENVIRONMENTAL CONDITIONS	30deg. C, 60%RH, 991hPa	DETECTOR FUNCTION	Peak(PK) Average (AV)
TESTED BY	Hardaway Lee		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	112.5 PK			1.00 H	120	82.80	29.70
1	*2437.00	103.1 AV			1.00 H	120	73.40	29.70
2	4874.00	52.6 PK	74.00	-21.40	1.59 H	244	17.20	35.50
2	4874.00	38.5 AV	54.00	-15.50	1.59 H	244	3.00	35.50

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	107.6 PK			1.19 V	155	77.80	29.70
1	*2437.00	98.8 AV			1.19 V	155	69.10	29.70
2	4874.00	52.4 PK	74.00	-21.60	1.84 V	44	16.90	35.50
2	4874.00	37.2 AV	54.00	-16.80	1.84 V	44	1.70	35.50

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. The limit value is defined as per 15.247
 6. “ * ” : Fundamental frequency



EUT	Mini- PCI CARD	MODEL	WLL4030
MODE	Channel 11	FREQUENCY RANGE	Above 1000 MHz
TEST MODE	CCK	INPUT POWER (SYSTEM)	120Vac, 60Hz
ENVIRONMENTAL CONDITIONS	30deg. C, 60%RH, 991hPa	DETECTOR FUNCTION	Peak(PK) Average (AV)
TESTED BY	Hardaway Lee		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	113.0 PK			1.18 H	177	83.20	29.80
1	*2462.00	103.7 AV			1.18 H	177	73.80	29.80
2	4924.00	55.8 PK	74.00	-18.20	2.04 H	99	20.10	35.70
2	4924.00	36.6 AV	54.00	-17.40	2.04 H	99	0.90	35.70

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	109.2 PK			1.22 V	13	79.40	29.80
1	*2462.00	99.8 AV			1.22 V	13	70.00	29.80
2	4924.00	58.3 PK	74.00	-15.70	1.63 V	299	22.60	35.70
2	4924.00	39.1 AV	54.00	-14.90	1.63 V	299	3.40	35.70

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. The limit value is defined as per 15.247
 6. “ * ” : Fundamental frequency



EUT	Mini- PCI CARD	MODEL	WLL4030
MODE	Channel 1	FREQUENCY RANGE	Above 1000 MHz
TEST MODE	OFDM	INPUT POWER (SYSTEM)	120Vac, 60Hz
ENVIRONMENTAL CONDITIONS	30deg. C, 60%RH, 991hPa	DETECTOR FUNCTION	Peak(PK) Average (AV)
TESTED BY	Hardaway Lee		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2412.00	107.2 PK			1.34 H	199	77.60	29.70
1	*2412.00	97.7 AV			1.34 H	199	68.00	29.70
2	4824.00	49.7 PK	74.00	-24.30	1.28 H	99	14.50	35.30

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2412.00	96.5 PK			1.80 V	100	66.80	29.70
1	*2412.00	86.1 AV			1.80 V	100	56.40	29.70
2	4824.00	50.5 PK	74.00	-23.50	1.48 V	222	15.30	35.30

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. The limit value is defined as per 15.247
 6. " * " : Fundamental frequency



EUT	Mini- PCI CARD	MODEL	WLL4030
MODE	Channel 6	FREQUENCY RANGE	Above 1000 MHz
TEST MODE	OFDM	INPUT POWER (SYSTEM)	120Vac, 60Hz
ENVIRONMENTAL CONDITIONS	30deg. C, 60%RH, 991hPa	DETECTOR FUNCTION	Peak(PK) Average (AV)
TESTED BY	Hardaway Lee		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	105.6 PK			1.34 H	199	75.90	29.70
1	*2437.00	94.5 AV			1.34 H	199	64.70	29.70
2	4873.00	47.3 PK	74.00	-26.70	1.68 H	22	11.80	35.50

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	103.5 PK			1.22 V	158	73.70	29.70
1	*2437.00	92.9 AV			1.22 V	158	63.20	29.70
2	4873.00	50.8 PK	74.00	-23.20	1.68 V	222	15.30	35.50

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. The limit value is defined as per 15.247
 6. " * " : Fundamental frequency

EUT	Mini- PCI CARD	MODEL	WLL4030
MODE	Channel 11	FREQUENCY RANGE	Above 1000 MHz
TEST MODE	OFDM	INPUT POWER (SYSTEM)	120Vac, 60Hz
ENVIRONMENTAL CONDITIONS	30deg. C, 60%RH, 991hPa	DETECTOR FUNCTION	Peak(PK) Average (AV)
TESTED BY	Hardaway Lee		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	108.6 PK			1.01 H	77	78.80	29.80
1	*2462.00	97.9 AV			1.01 H	77	68.10	29.80
2	4924.00	51.8 PK	74.00	-22.20	1.18 H	177	16.10	35.70

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	104.8 PK			1.18 V	113	75.00	29.80
1	*2462.00	93.4 AV			1.18 V	113	63.60	29.80
2	4924.00	50.9 PK	74.00	-23.10	1.31 V	215	15.20	35.70

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. The limit value is defined as per 15.247
 6. " * " : Fundamental frequency

4.3 6dB BANDWIDTH MEASUREMENT

4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	July 24, 2003

4.3.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100kHz RBW and 100kHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation

4.3.5 TEST SETUP



4.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

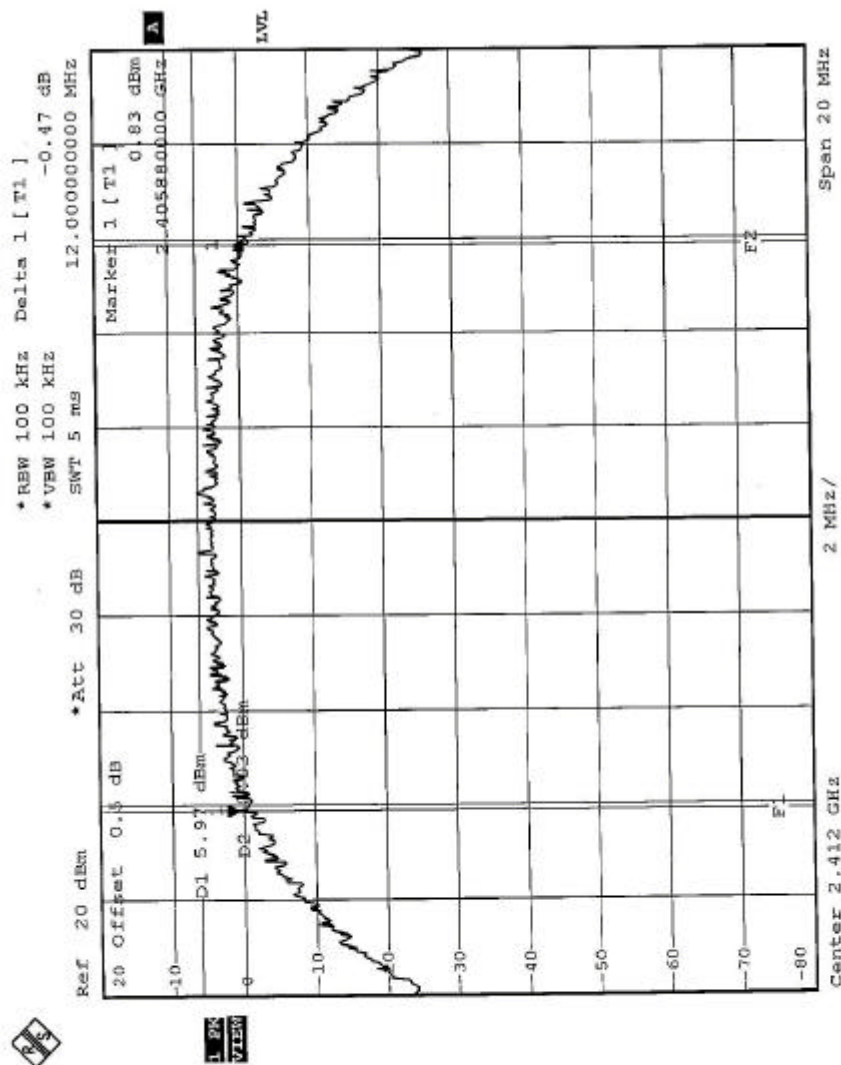


4.3.7 TEST RESULTS (CCK)

EUT	Mini- PCI CARD	MODEL	WLL4030
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	27deg. C, 57%RH, 991hPa
TEST MODE	CCK	TESTED BY	Steven Lu

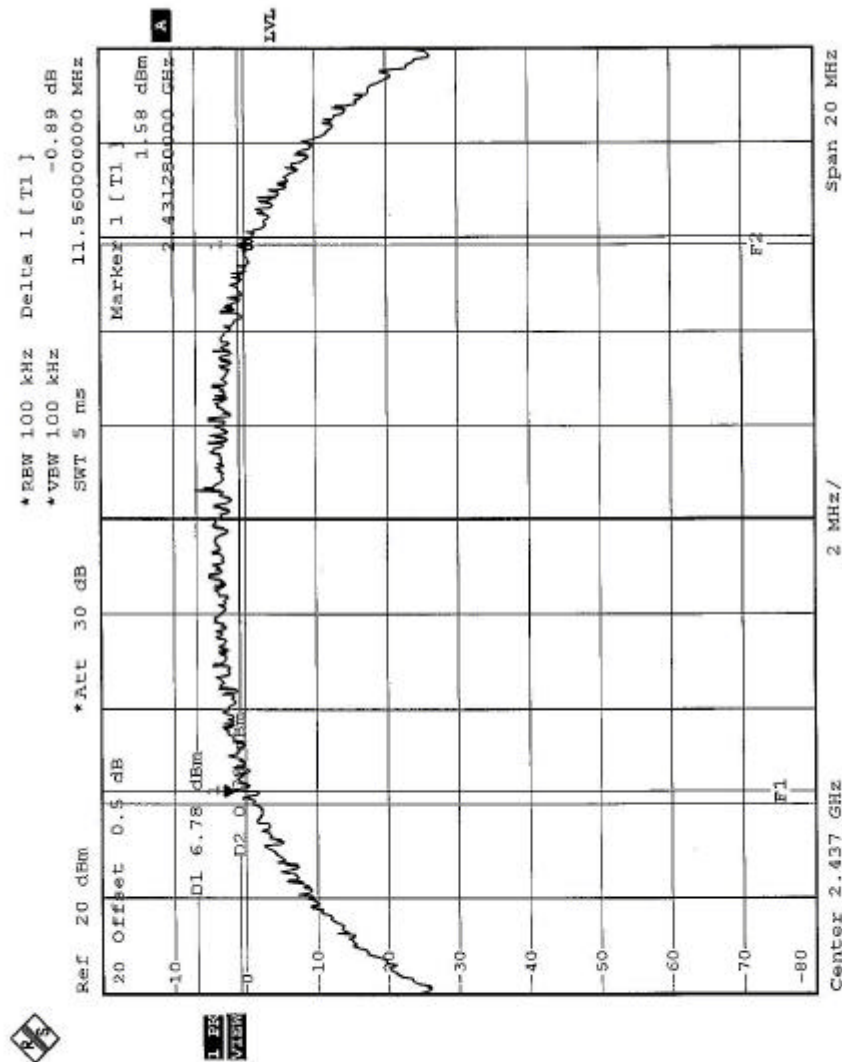
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	12.00	0.5	PASS
6	2437	11.56	0.5	PASS
11	2462	11.20	0.5	PASS

CH1



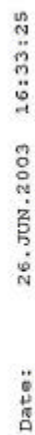
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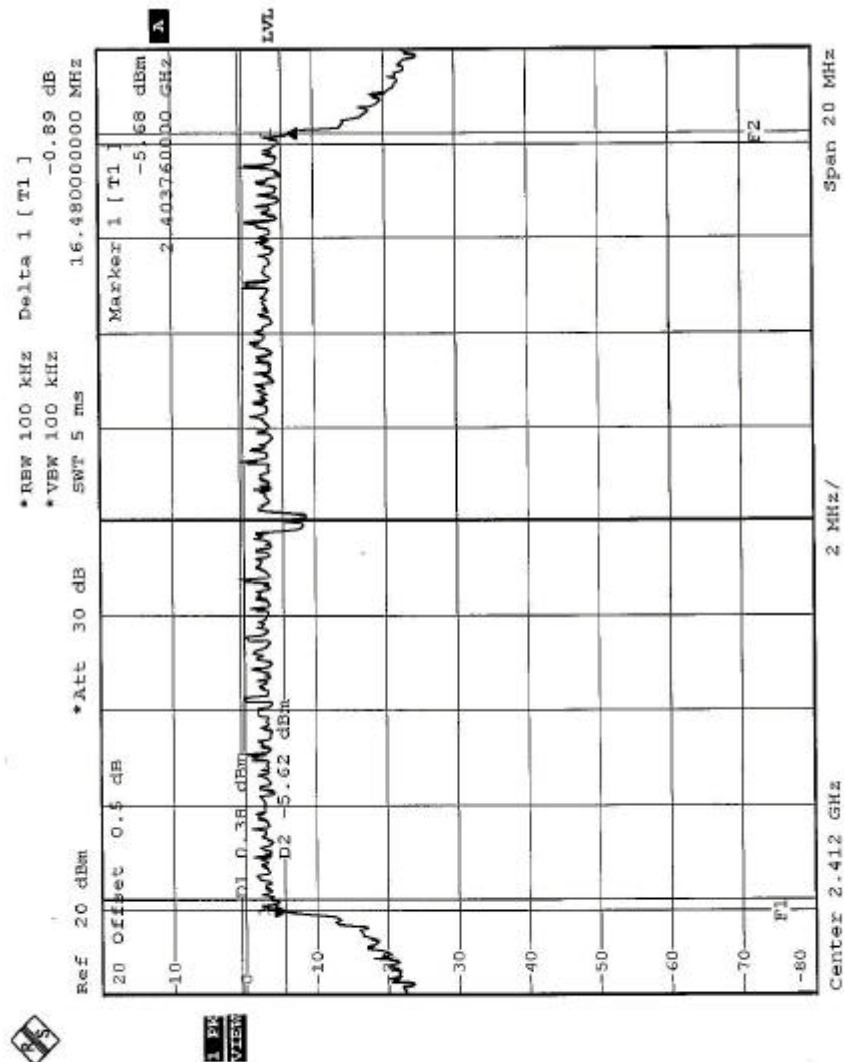


4.3.8 TEST RESULTS (OFDM)

EUT	Mini- PCI CARD	MODEL	WLL4030
INPUT POWER (SYSTEM)	120Vac, 60Hz	ENVIRONMENTAL CONDITIONS	24deg. C, 57%RH, 991hPa
TEST MODE	OFDM	TESTED BY	Steven Lu

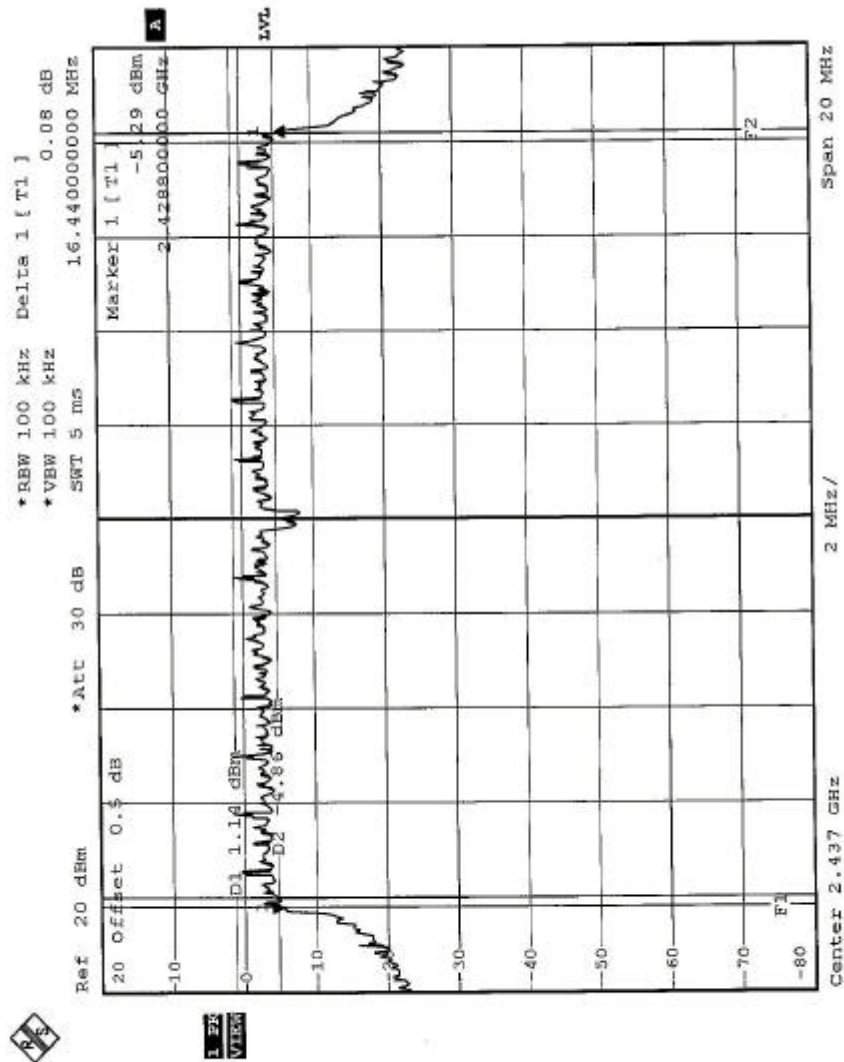
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	16.48	0.5	PASS
6	2437	16.44	0.5	PASS
11	2462	16.40	0.5	PASS

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