



**FCC CFR47 PART 15 CERTIFICATION  
CLASS II PERMISSIVE CHANGE**

**TEST REPORT**

**FOR**

**802.11b WIRELESS ACCESS POINT**

**MODEL: SP-01-00B-C-N-XX and RP-01-00B-C-N-XX**

**FCC ID: P9JWMR530-01-00BC**

**REPORT NUMBER: 02U1389-1**

**ISSUE DATE: JULY 22, 2002**

*Prepared for*

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## 1. TEST RESULT CERTIFICATION

**COMPANY NAME:** FHP WIRELESS INC.  
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SAN MATEO, CA 94402 USA

**CONTACT PERSON:** THOMAS BLAIS / DIRECTOR OF HARDWARE ENGINEER

**TELEPHONE NO:** (650) 655-4979

**EUT DESCRIPTION:** 802.11B WIRELESS ACCESS POINT

**MODEL NUMBER:** SP-01-00B-C-N-XX and RP-01-00B-C-N-XX

**DATE TESTED:** JULY 22, 2002

TYPE OF EQUIPMENT	INTENTIONAL RADIATOR
EQUIPMENT TYPE	2.4GHz TRANSCEIVER
MEASUREMENT PROCEDURE	ANSI 63.4 / 1992, TIA/EIA 603
PROCEDURE	CLASS II PERMISSIVE CHANGE
FCC RULE	CFR 47 PART 15 Subpart C

Compliance Certification Services, Inc. tested the above equipment for compliance with the requirement set forth in CFR 47, PART 15 Subpart C. The equipment in the configuration described in this report, shows the measured emission levels emanating from the equipment do not exceed the specified limit.

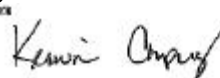
**Note:** This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document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

Approved & Released For CCS By:



THU CHAN  
SENIOR EMC ENGINEER  
COMPLIANCE CERTIFICATION SERVICES

Tested By:



KERWIN CORPUZ  
EMC ENGINEER  
COMPLIANCE CERTIFICATION SERVICES

## 2. EUT DESCRIPTION

The SmartPoint is a Direct Sequence Spread Spectrum 802.11b wireless access point with mesh routing capabilities. Unlike conventional access point deployments, which require a wired backbone, FHP's technology can be used to create large networks with wired connections to only a few of the access points. Units without wired connections will automatically detect other SmartPoints and wirelessly route data traffic through the optimal multihop path back to a wired SmartPoint. There are two antennas on the unit, for both transmit and receive diversity. Both antennas are identical externally mounted OMNI with 7.4 dBi gain for each antenna. Additional antenna is a OMNI with 1.5 dBi gain.

## 3. CLASS II PERMISSIVE CHANGE

The modified design removes the need to have the ferrite on the DC line. In addition, the new version of the product supports an 802.3af compliant P.O.E. (Power Over Ethernet) option which enables the unit to be alternately powered over the port marked LAN. The radio is the same unit that is marketed as the WMR530-01-00BC-C-N-XX device. The old model number (WMR530-01-00BC-C-N-XX) will become obsolete.

### Summary of Changes:

- Motherboard design modification: change inductor on DC line input circuit to larger value for improved DC line emissions performance.
- Motherboard design modification: changed the DC input circuit to accept 802.3af compliant Power Over Ethernet (P.O.E.) from RJ45 port marked "LAN".
- Changed the Product Model Number method to support optional routing software;  
Obsolete Model Number: WMR530-01-00BC-C-N-XX  
Replaced with Model Numbers: SP-01-00B-C-N-XX or RP-01-00B-C-N-XX

## 4. MODIFICATION

To comply with Class B digital device radiated emissions, added a ferrite core (FAIR-RITE, part number: 0444164181) with single turn to RJ45 of LAN connector.

## 5. TEST METHODOLOGY

Both conducted and radiated testing were performed according to the procedures documented on chapter 13 of ANSI C63.4 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057.

## 6. TEST FACILITY

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.

## 7. ACCREDITATION AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code: 200065-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government. In addition, the test facilities are listed with Federal Communications Commission (reference no: 31040/SIT (1300B3) and 31040/SIT (1300F2))

## 7.1. Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
USA	NVLAP*	FCC Part 15, CISPR 22, AS/NZS 3548, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11, CNS 13438	 200065-0
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	 1300
Japan	VCCI	CISPR 22 Two OATS and one conducted Site	 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	 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	 ELA-171
Taiwan	BSMI	CNS 13438	 SL2-IN-E-1012
Canada	Industry Canada	RSS210 Low Power Transmitter and Receiver	 IC2324 A,B,C, and F

\*No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government

## 8. CALIBRATION AND UNCERTAINTY

### 8.1. Measuring Instrument Calibration

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

### 8.2. 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 Conducted Emission	
150kHz – 30MHz	+/-2.9

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

### 8.3. Test and Measurement Equipment

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

TEST AND MEASUREMENT EQUIPMENT LIST				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due Date
Spectrum Analyzer	HP	8566B	3014A06685	6/1/03
Spectrum Display	HP	85662A	3026A19146	6/1/03
Quasi-Peak Detector	HP	85650A	3145A01654	6/1/03
Preamplifier	HP	8447D	2944A06589	8/10/02
Bilog Antenna	Chase	CBL6112B	2586	8/2/02
Line Filter	Lindgren	LMF-3489	497	N.C.R.
LISN	Fisher Custom Communication	LISN-50/250-25-2	2023	8/2/02
EMI Test Receiver	Rohde & Schwarz	ESHS 20	827129/006	4/17/03

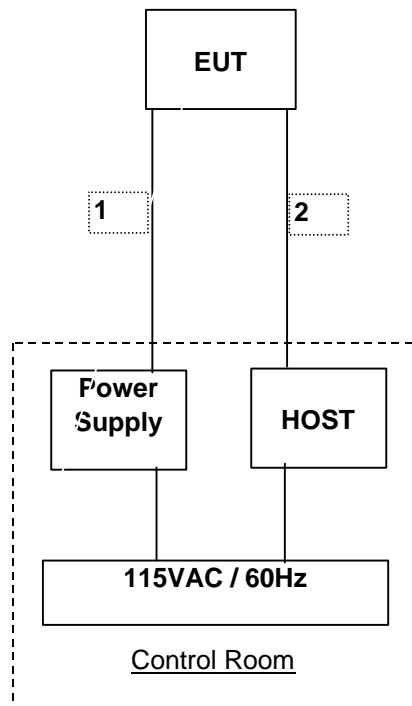
## 9. SUPPORT EQUIPMENT / EUT SETUP

The following peripheral support equipment was utilized to operate the equipment under test:

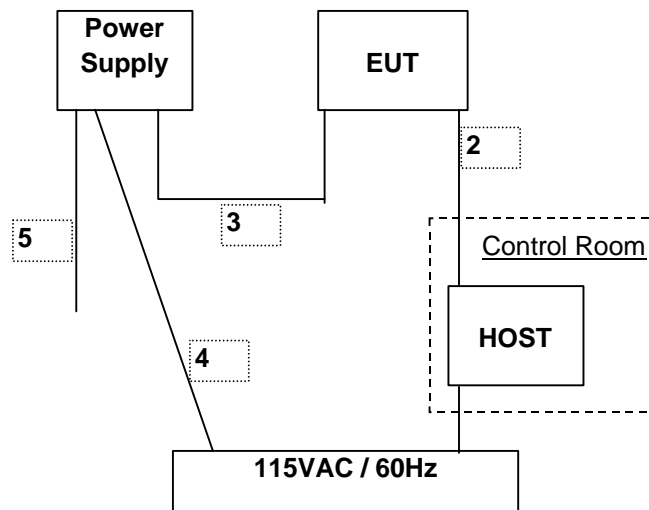
PERIPHERAL SUPPORT EQUIPMENT LIST				
Device Type	Manufacturer	Model	Serial Number	FCC ID
PC	HP	Vectra VE C/266	US82209952	DoC
Power Supply	3COM	P/N: 61-0127-000	CCS N 01644	N/A



### RADIATED EMISSION SETUP



### AC LINE CONDUCTED EMISSION SETUP



**I/O CABLES**

<b>TEST I / O CABLES</b>								
<b>Cable No</b>	<b>I/O Port</b>	<b># of I/O Port</b>	<b>Connector Type</b>	<b>Type of Cable</b>	<b>Cable Length</b>	<b>Data Traffic</b>	<b>Bundled</b>	<b>Remark</b>
1	LAN	1	RJ45	Un-Shielded	30m	No	No	Ferrite Core on cable
2	Management	1	RJ45	Un-Shielded	30m	Yes	No	N/A
3	LAN	1	RJ45	Un-Shielded	1m	No	No	Ferrite Core on cable
4	AC/DC	1	DC type	Un-Shielded	2m	No	Yes	N/A
5	HUB	1	RJ45	Un-Shielded	2m	No	No	N/A

## 10. APPLICABLE RULES

### §15.207- CONDUCTED LIMITS

(a) For an intentional radiator which 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 450 kHz to 30 MHz shall not exceed 250 microvolts. Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals.

FCC 15.207		
FREQUENCY RANGE	FIELD STRENGTH (Microvolts)	FIELD STRENGTH (dBuV)/QP
450kHz-30MHz	250	48

*Spec limit: As specified above.*

*Test result: No non-compliance noted.*

## **§15.209- RADIATED EMISSION LIMITS; GENERAL REQUIREMENTS**

(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 (MHz)	Field Strength (micro volts/meter)	Measurement Distance (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.

### FCC PART 15.209

MEASURING DISTANCE OF 3 METER		
FREQUENCY RANGE (MHz)	FIELD STRENGTH (Microvolts/m)	FIELD STRENGTH (dBuV/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

***Spec limit: As specified above.***

***Test result: No non-compliance noted.***

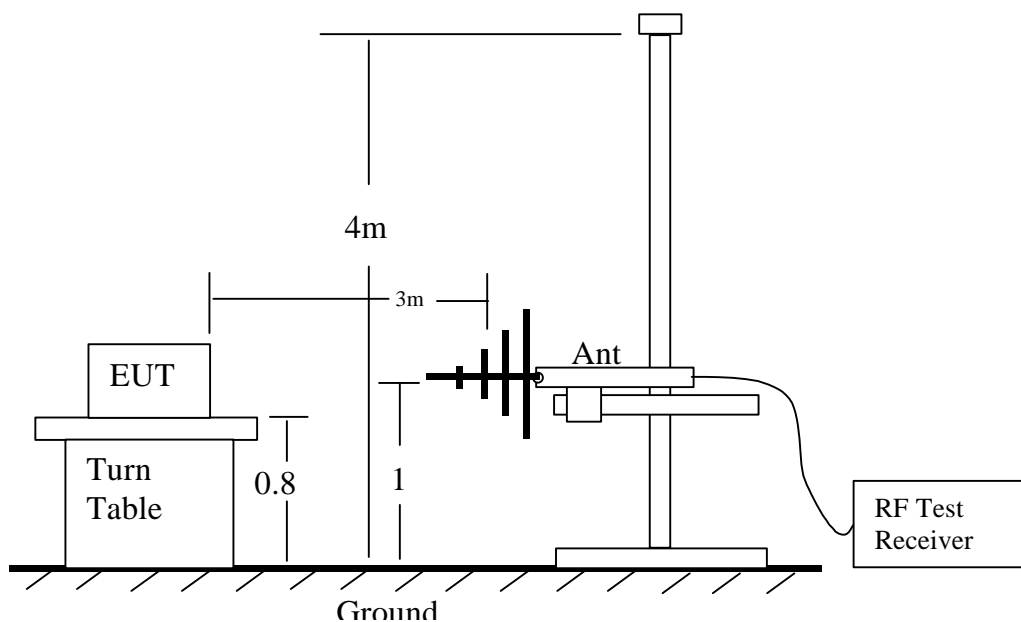
## 11. TEST SETUP, PROCEDURE AND RESULT

### 11.1. RADIATED EMISSION

#### TEST SETUP

Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
30 to 1000	<input checked="" type="checkbox"/> Peak	<input checked="" type="checkbox"/> 100 KHz	<input checked="" type="checkbox"/> 100 KHz
	<input checked="" type="checkbox"/> Quasi Peak	<input checked="" type="checkbox"/> 1 MHz	<input checked="" type="checkbox"/> 1 MHz
Above 1000	<input checked="" type="checkbox"/> Peak	<input checked="" type="checkbox"/> 1 MHz	<input checked="" type="checkbox"/> 1 MHz
	<input checked="" type="checkbox"/> Average	<input checked="" type="checkbox"/> 1 MHz	<input checked="" type="checkbox"/> 10 Hz



**Radiated Emission 30 – 2000 MHz**

### **TEST PROCEDURE**

1. The EUT was placed on the turntable 0.8 meter above ground in 3 meter open area test site.
2. Set the resolution bandwidth to 100KHz in the test receiver and select Peak function to scan the frequency below 1 GHz.
3. Shift the interference-receiving antenna located in antenna tower upwards and downwards between 1 and 4 meters above ground and find out the local peak emission on frequency domain.
4. Locate the interference-receiving antenna at the position where the local peak reach the maximum emission.
5. Rotate the turntable and stop at the angle where the measurement device has maximum reading.
6. Shift the interference-receiving antenna again to detect the maximum emission of the local peak.
7. If the reading of the local peak under Peak function is lower than limit by 6dB, then Quasi Peak detection is not needed and this reading should be recorded. And if it is higher than Peak limit, then the test is fail. Others, switch the receiver to Quasi Peak function, set the resolution bandwidth to 100kHz and repeat the procedures (3)~(6). If the reading is lower than limit, this reading should be recorded, otherwise, the test is fail.
8. Set the resolution and video bandwidth of the spectrum analyzer to 1MHz and repeat procedures (3)~(6) for frequency band from 1 GHz to 2 GHz.
9. If the reading for the local peak is lower than the Average limit, no further testing is needed in this local peak and this reading should be recorded. If it is higher than Average limit but lower than Peak limit, then set the resolution bandwidth to 1MHz and video bandwidth to 10Hz. Repeat procedures (3)~(6). If the maximum reading is lower than Average limit, then this reading should be recorded. If it is higher, then the test is fail.

### **RESULT**

*NOTE: spot check EUT's position of X, Y, and Z axis, worst case is Y axis position.*

*No non-compliance noted. See data below.*



FCC, VCCI, CISPR, CE, AUSTEL, NZ  
UL, CSA, TUV, BSMI, DHHS, NVLAP

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**Project #:** 02U1389-1  
**Report #:** 020722B1  
**Date & Time:** 07/22/02 12:06 PM  
**Test Engr:** KERWIN CORPUZ

**Company:** FHP WIRELESS, INC.  
**EUT Description:** 802.11b Access Point (M/N: WMR530-01-00BC-C-N-XX)  
**Test Configuration :** EUT only  
**Type of Test:** FCC 15.209  
**Mode of Operation:** PINGING (DC power over ethernet)

[<< Main Sheet](#)

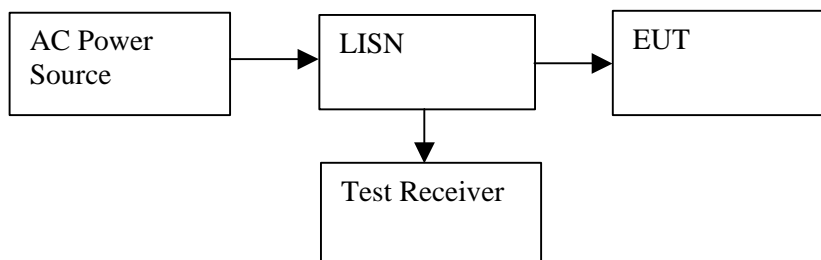
Freq.	Reading	AF	Closs	Pre-amp	Level	Limit	Margin	Pol	Az	Height	Mark
(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	FCC_B	(dB)	(H/V)	(Deg)	(Meter)	(P/Q/A)
233.32	58.40	11.02	3.24	28.99	43.67	46.00	-2.33	3mV	10.00	1.00	P
233.32	57.40	11.02	3.24	28.99	42.67	46.00	-3.33	3mH	315.00	1.50	P
1399.90	43.20	24.52	9.76	26.81	50.67	54.00	-3.33	3mH	225.00	1.50	P
1199.90	46.20	22.92	8.97	27.72	50.37	54.00	-3.63	3mV	180.00	1.00	P
1166.60	46.00	22.66	8.80	27.83	49.63	54.00	-4.37	3mV	180.00	1.00	P
1266.70	43.80	23.43	9.23	27.50	48.96	54.00	-5.04	3mV	180.00	1.00	P
6 Worst Data											

## 11.2. POWER LINE CONDUCTED EMISSION

### TEST SETUP

Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
450 KHz to 30 MHz	<input type="checkbox"/> Peak <input checked="" type="checkbox"/> Quasi Peak	<input checked="" type="checkbox"/> 10 KHz	<input checked="" type="checkbox"/> 10 KHz



### TEST PROCEDURE

1. The EUT was placed on a wooden table 80 cm above the horizontal ground plane and 40 cm away from the vertical ground plane. The EUT was set to transmit / receive in a continuous mode.
2. Conducted disturbance was measured between the phase lead and the ground, and between the neutral lead and the ground. The frequency 0.450 - 30 MHz was investigated.

### RESULT

No non-compliance noted. See Line Conduction plot

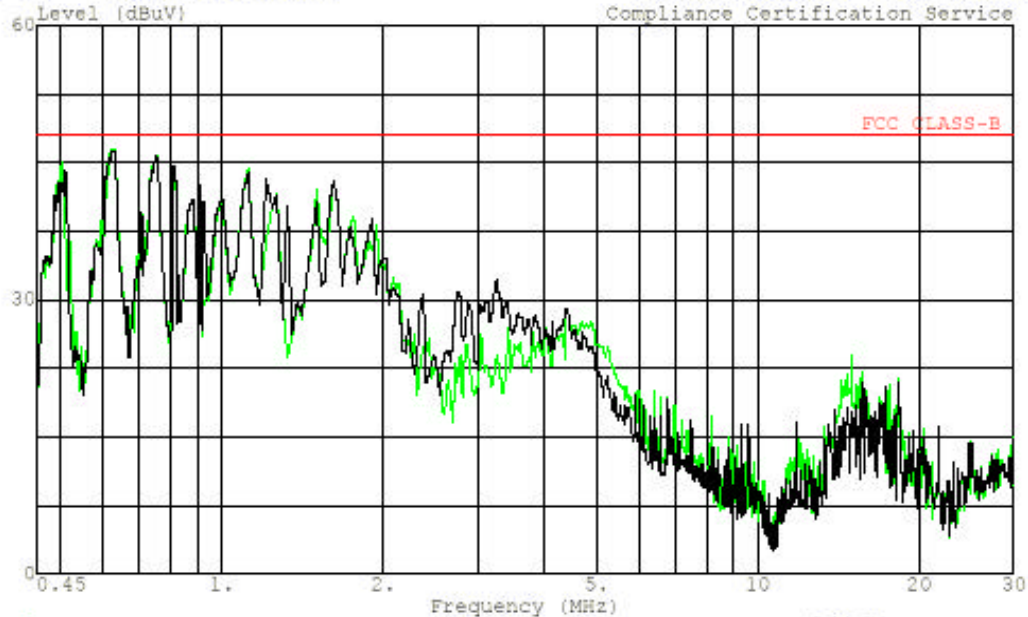
CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	FCC_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.50	--	45.14	--	0.00	48.00	--	-2.86	--	L1
0.63	--	46.56	--	0.00	48.00	--	-1.44	--	L1
0.75	--	45.76	--	0.00	48.00	--	-2.24	--	L1
0.51	--	44.10	--	0.00	48.00	--	-3.90	--	L2
0.63	--	46.34	--	0.00	48.00	--	-1.66	--	L2
0.75	--	45.72	--	0.00	48.00	--	-2.28	--	L2
6 Worst Data									





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Data#: 12 File#: 02U13892.EMI Date: 07-22-2002 Time: 19:08:57

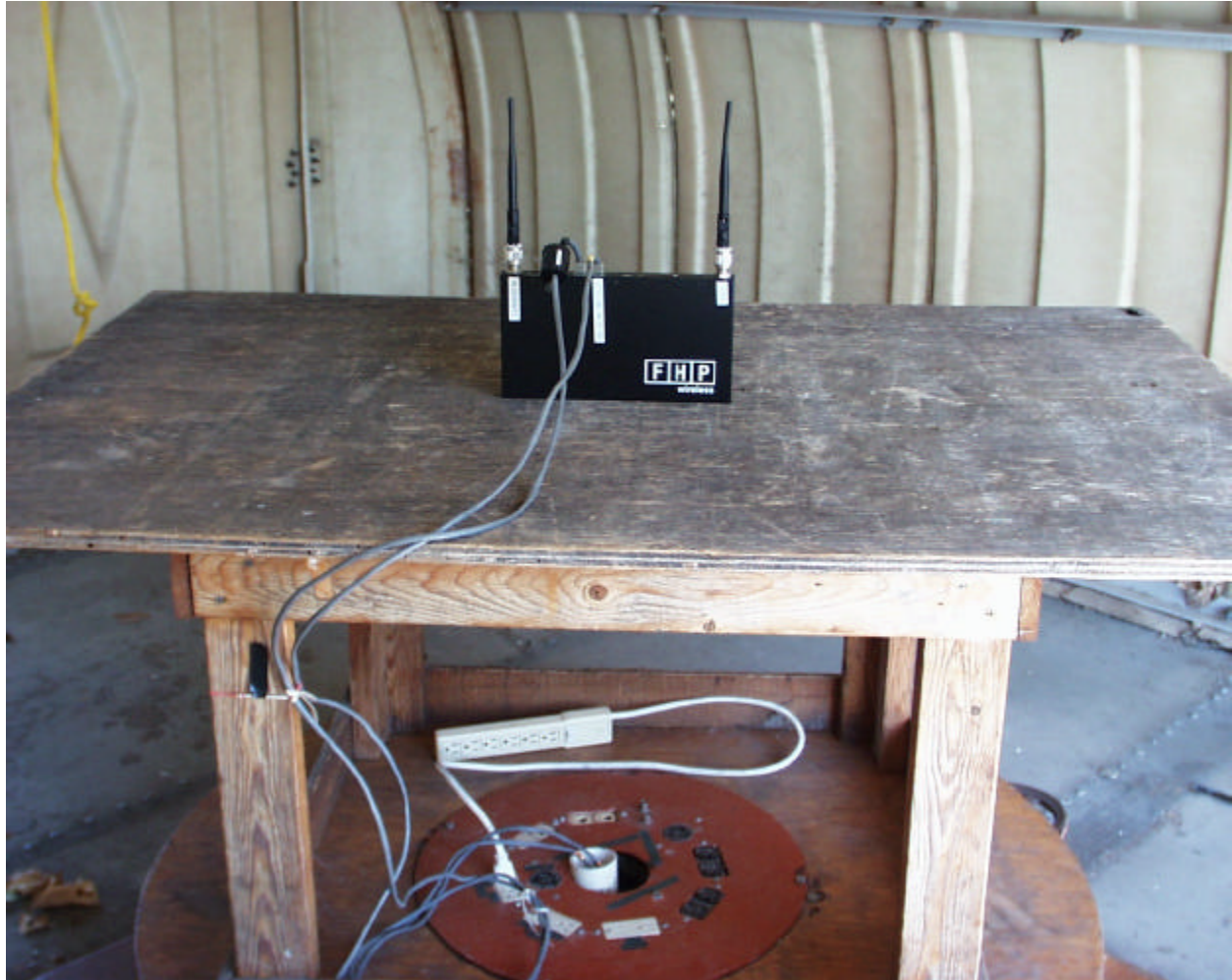


Trace: 5  
Project # : 02U1389-1  
Test Engineer: Kerwin Corpuz  
Company : FHP WIRELESS, INC.  
EUT : 802.11b Access Point  
Model: WMR530-01-00BC-C-N-XX  
Test Config : EUT/3COM Power Supply  
Type of Test : FCC 15.207  
Mode of Op. : PINGING (DC power over ethernet)  
QUASI-PEAK: L1 (green), L2 (black)  
115Vac, 60Hz

### 11.3. SETUP PHOTOS

#### Radiated Emission @ worst position, Y axis

Front side



**Back side**





### **AC Conducted Emission Measurement**

**Front side**



**Back side**



**END OF REPORT**