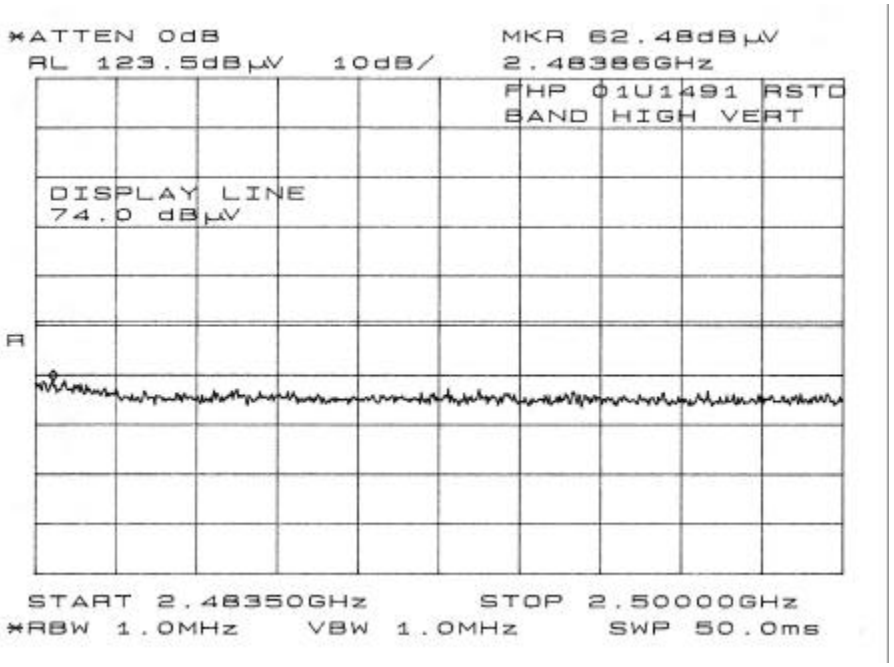
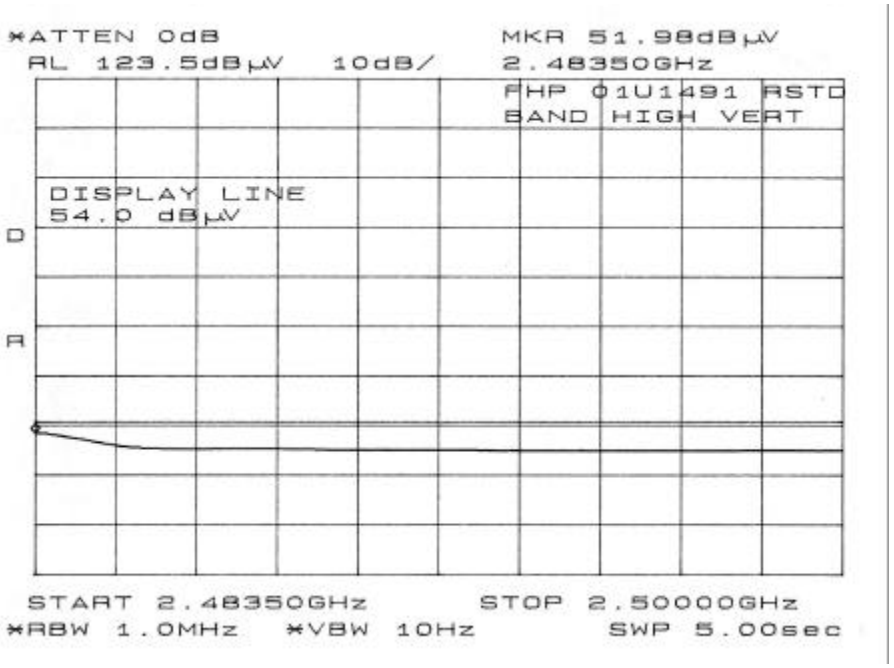
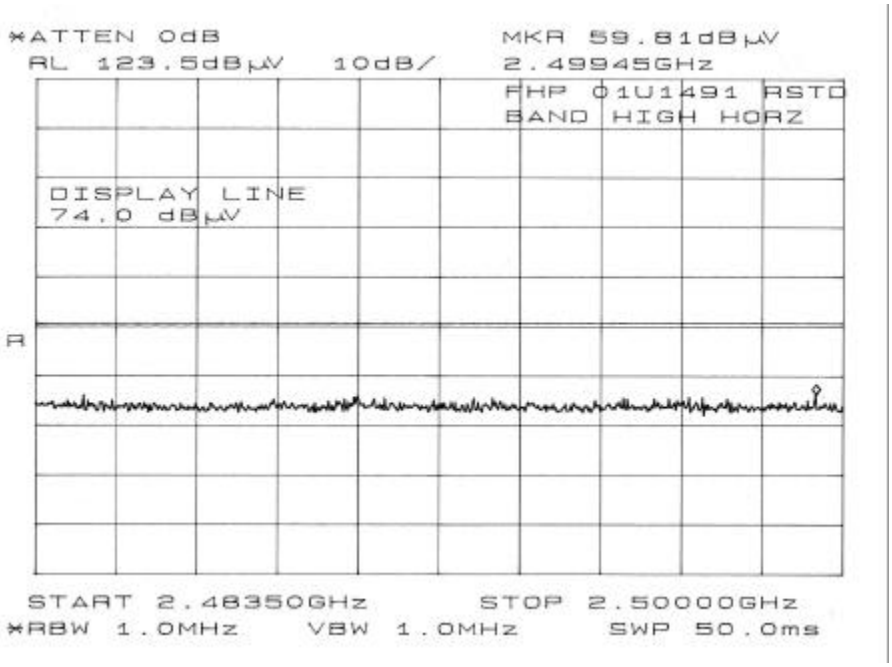
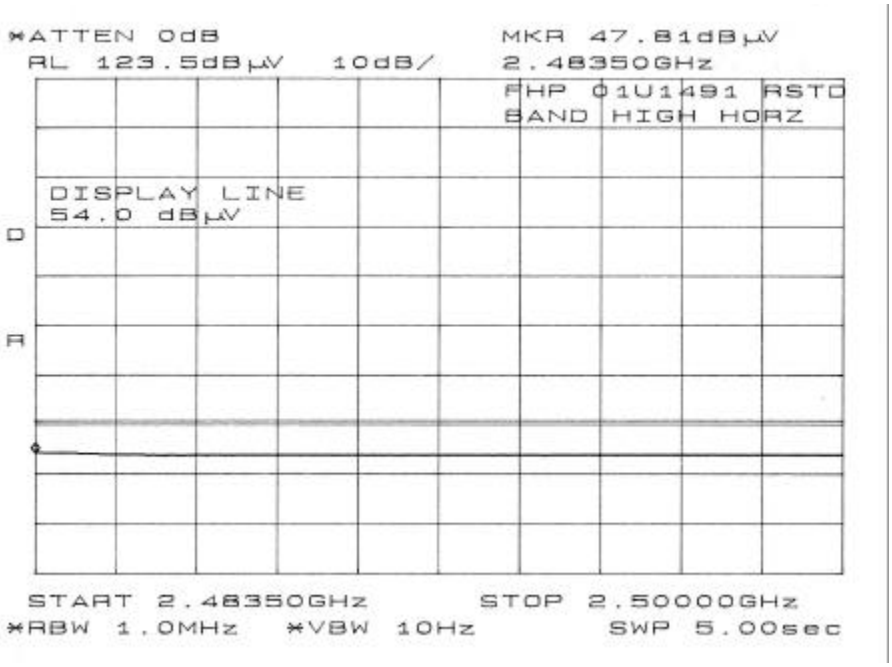








12 dBi PATCH ANTENNA - SPURIOUS RADIATED EMISSIONS

Compliance Certification Services A-Site 8/29/02 Mike H

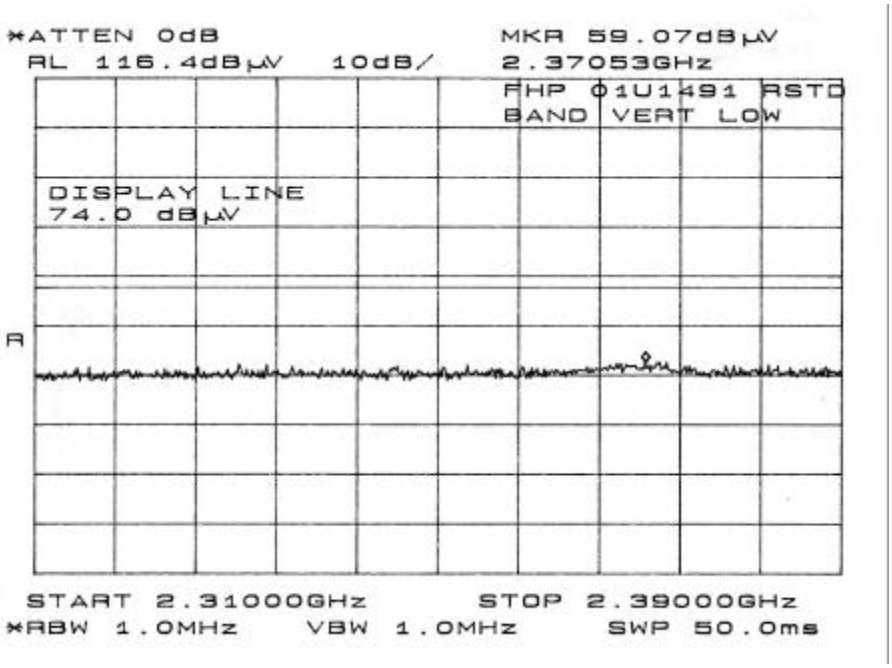
Radiated Emissions FHP with 12 dBi Patch Antenna, No Diversity
FCC 15.247 Mode: Transmitting

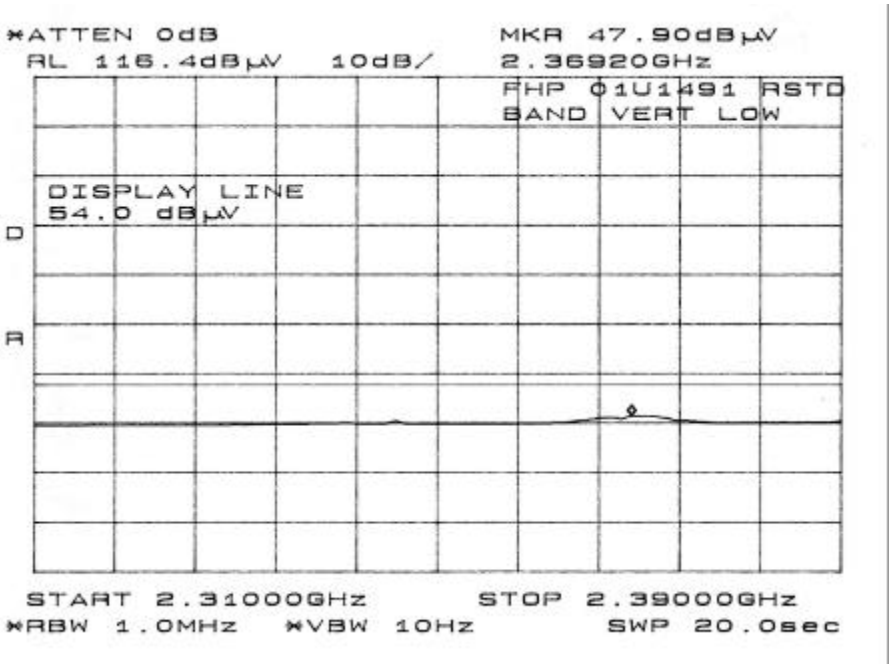
Specification Distance: 3 meters

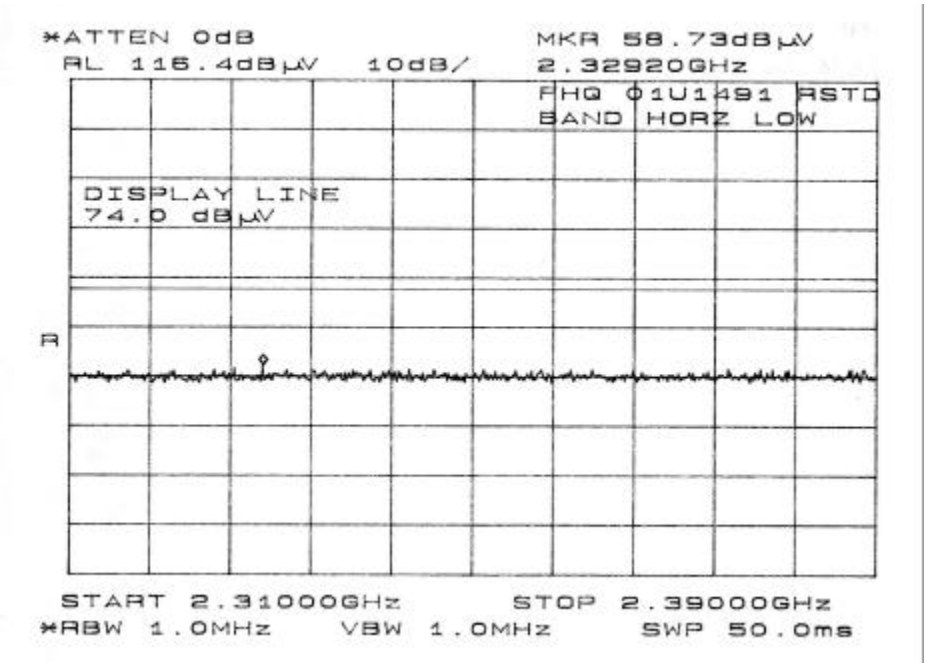
Freq MHz	Pol V/H	Det	SA dBuV	AF dB/m	Dist m	Dist dB	Preamp dB	Cable / HPF dB	Field dBuV/m	Limit dBuV/m	Margin dB
4075.5	V	Peak	47.17	33.2	1.5	-6.0	34.8	10.1	49.65	74	-24.35
4075.5	V	Avg	42.17	33.2	1.5	-6.0	34.8	10.1	44.65	54	-9.35
4075.5	H	Peak	44	33.2	1.5	-6.0	34.8	10.1	46.48	74	-27.52
4075.5	H	Avg	37	33.2	1.5	-6.0	34.8	10.1	39.48	54	-14.52
4125.5	V	Peak	42.17	33.2	1.5	-6.0	34.8	10.1	44.65	74	-29.35
4125.5	V	Avg	31.58	33.2	1.5	-6.0	34.8	10.1	34.06	54	-19.94
4125.5	H	Peak	41.83	33.2	1.5	-6.0	34.8	10.1	44.31	74	-29.69
4125.5	H	Avg	29.5	33.2	1.5	-6.0	34.8	10.1	31.98	54	-22.02
4175.5	V	Peak	41.17	33.2	1.5	-6.0	34.8	10.1	43.65	74	-30.35
4175.5	V	Avg	29	33.2	1.5	-6.0	34.8	10.1	31.48	54	-22.52

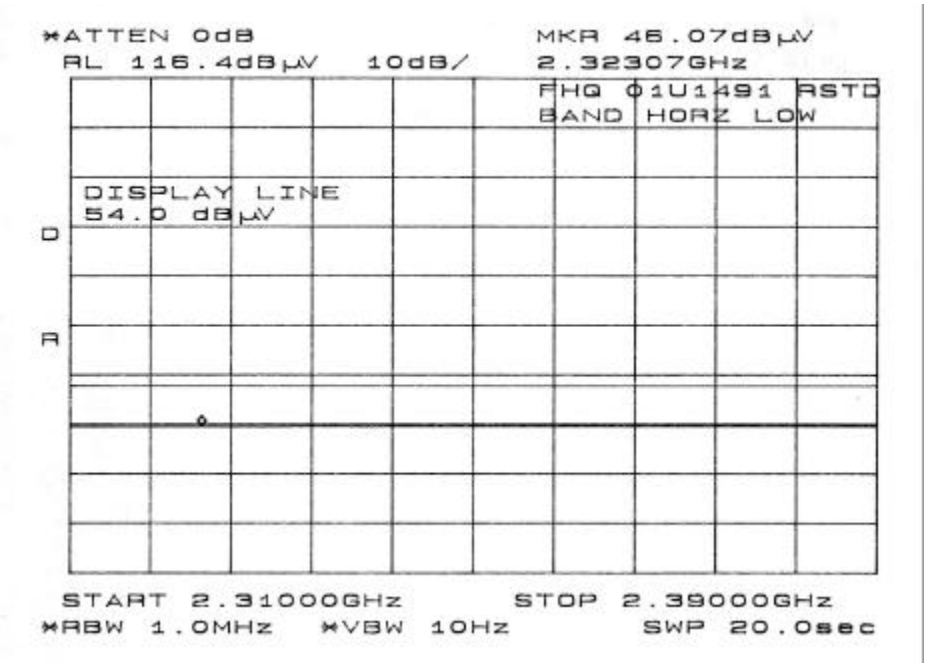
Note: All other readings were at system noise floor.

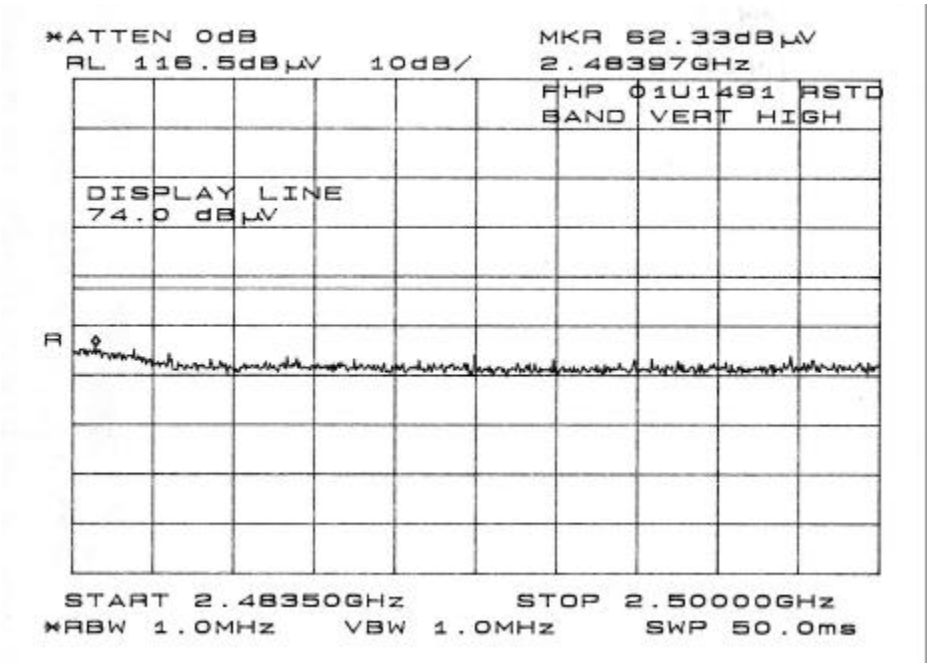
7.4 dBi OMNI ANTENNAS - RESTRICTED BAND RADIATED EMISSIONS

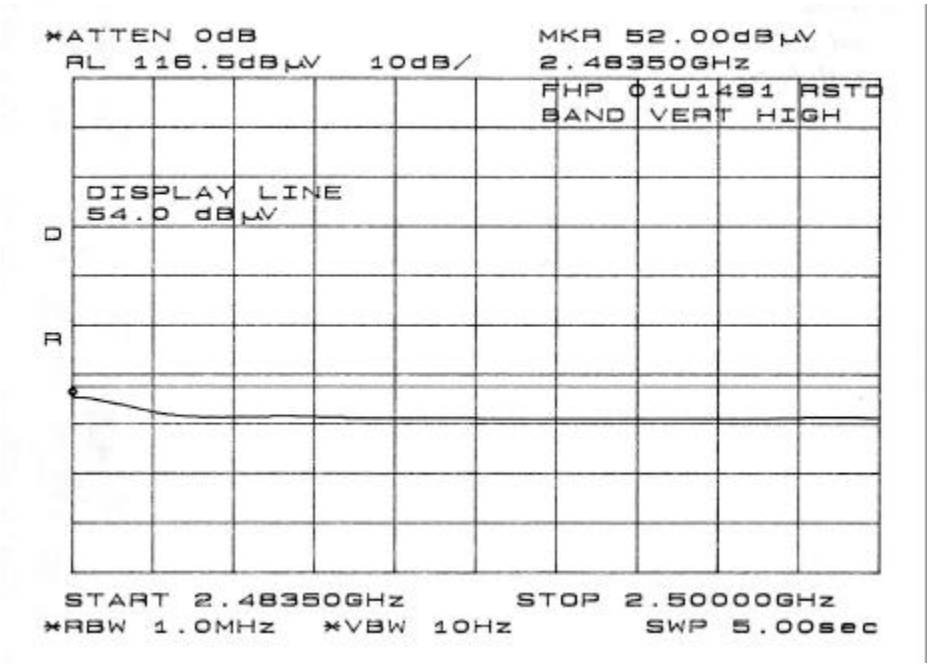


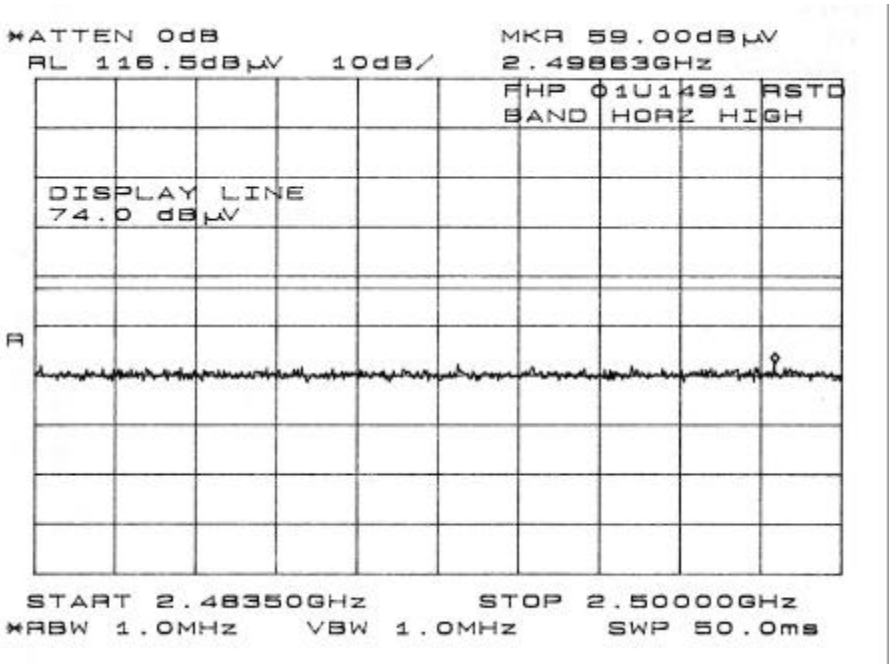


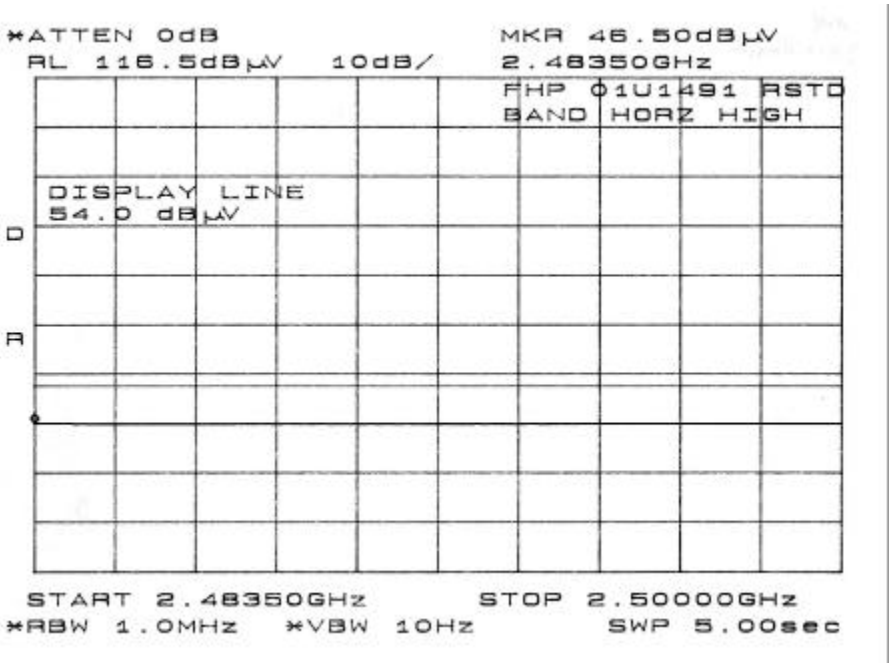












7.4 dBi OMNI ANTENNAS - SPURIOUS RADIATED EMISSIONS

Compliance Certification Services A-Site 8/30/02 Mike H

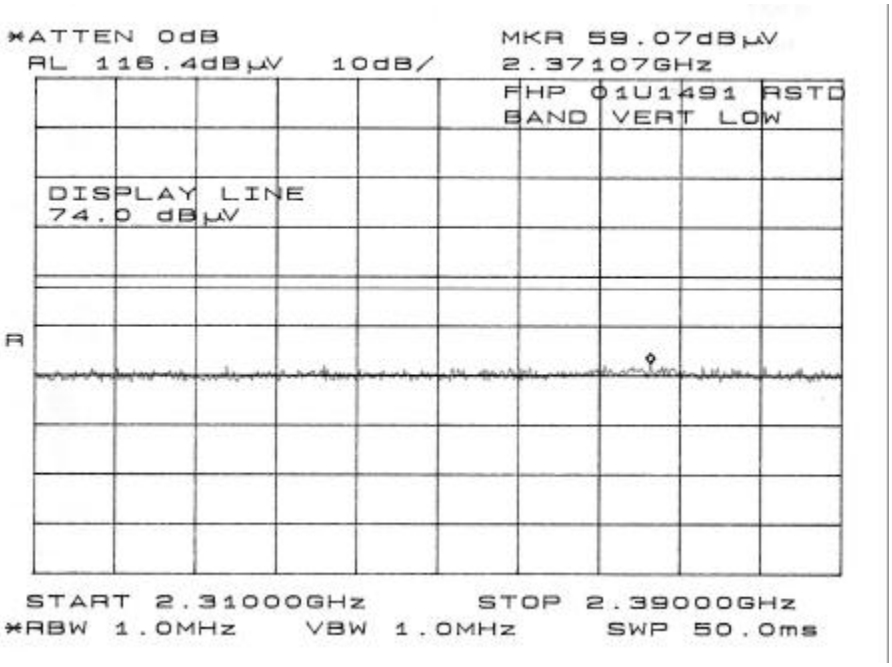
Radiated Emissions FHP with 7.4 dBi Omni Antennas, Rx Diversity
FCC 15.247 Mode: Transmitting

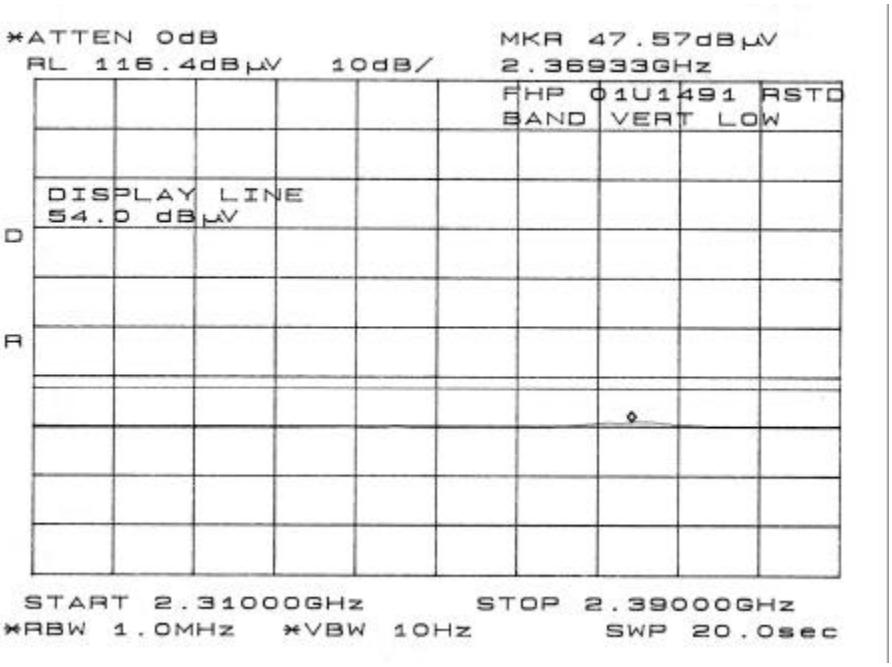
Specification Distance: 3 meters

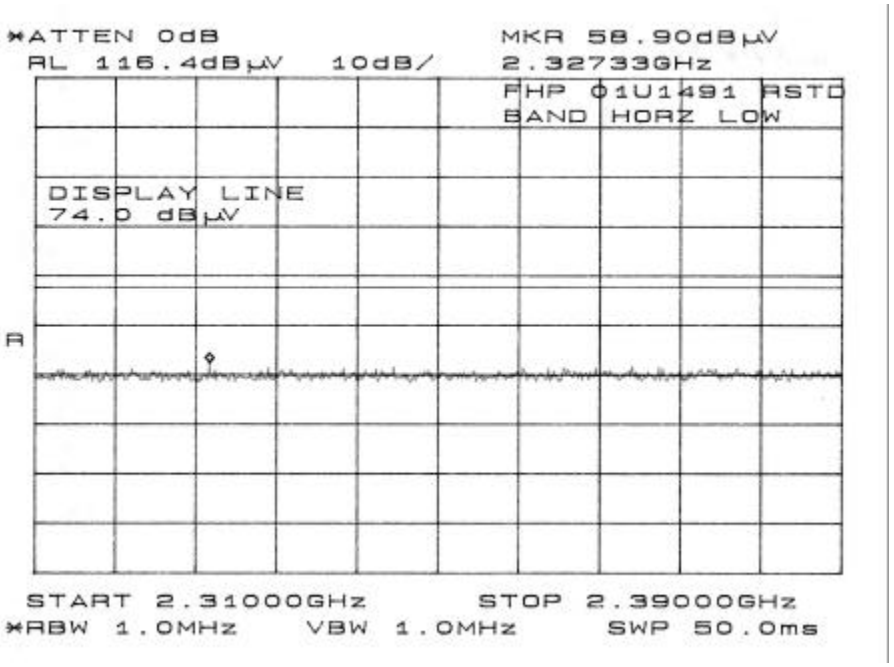
Freq MHz	Pol V/H	Det	SA dBuV	AF dB/m	Dist m	Dist dB	Preamp dB	Cable / HPF dB	Field dBuV/m	Limit dBuV/m	Margin dB
4075.5	V	Peak	48.23	33.2	1.5	-6.0	34.8	10.1	50.71	74	-23.29
4075.5	V	Avg	44	33.2	1.5	-6.0	34.8	10.1	46.48	54	-7.52
4075.5	H	Peak	44.47	33.2	1.5	-6.0	34.8	10.1	46.95	74	-27.05
4075.5	H	Avg	36.47	33.2	1.5	-6.0	34.8	10.1	38.95	54	-15.05
4824	V	Peak	46.53	33.9	1.5	-6.0	34.5	7	46.91	74	-27.09
4824	V	Avg	39.37	33.9	1.5	-6.0	34.5	7	39.75	54	-14.25
4824	H	Peak	42.17	33.9	1.5	-6.0	34.5	7	42.55	74	-31.45
4824	H	Avg	30.23	33.9	1.5	-6.0	34.5	7	30.61	54	-23.39
4125.5	V	Peak	43.9	33.2	1.5	-6.0	34.8	10.1	46.38	74	-27.62
4125.5	V	Avg	37.03	33.2	1.5	-6.0	34.8	10.1	39.51	54	-14.49
4125.5	H	Peak	41.73	33.2	1.5	-6.0	34.8	10.1	44.21	74	-29.79
4125.5	H	Avg	29.2	33.2	1.5	-6.0	34.8	10.1	31.68	54	-22.32
4874	V	Peak	46.87	34	1.5	-6.0	34.5	6.4	46.75	74	-27.25
4874	V	Avg	39.63	34	1.5	-6.0	34.5	6.4	39.51	54	-14.49
4874	H	Peak	42.33	34	1.5	-6.0	34.5	6.4	42.21	74	-31.79
4874	H	Avg	30.9	34	1.5	-6.0	34.5	6.4	30.78	54	-23.22
4924	V	Peak	46.9	34.2	1.5	-6.0	34.5	6.3	46.88	74	-27.12
4924	V	Avg	39.3	34.2	1.5	-6.0	34.5	6.3	39.28	54	-14.72
4924	H	Peak	41.93	34.2	1.5	-6.0	34.5	6.3	41.91	74	-32.09
4924	H	Avg	30.03	34.2	1.5	-6.0	34.5	6.3	30.01	54	-23.99

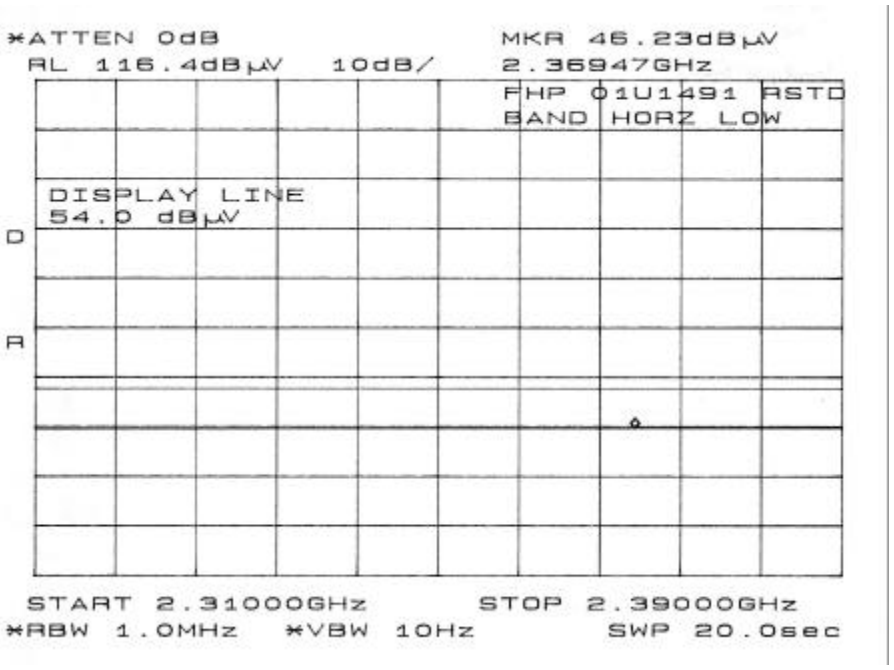
Note: All other readings were at system noise floor.

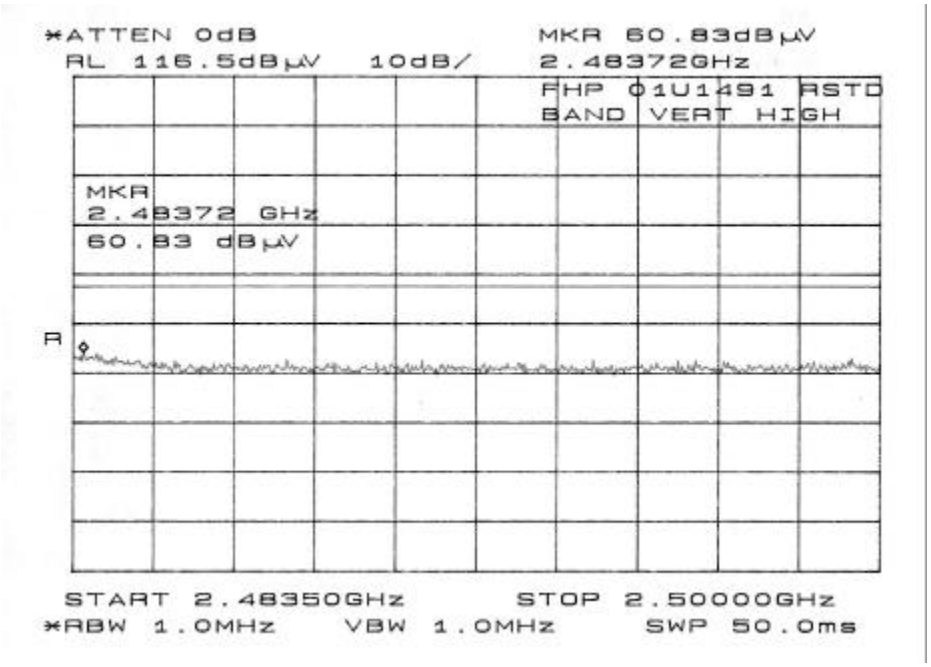
7 dBi OMNI ANTENNAS WITH COUNTERPOISE GROUND PLANES - RESTRICTED BAND RADIATED EMISSIONS

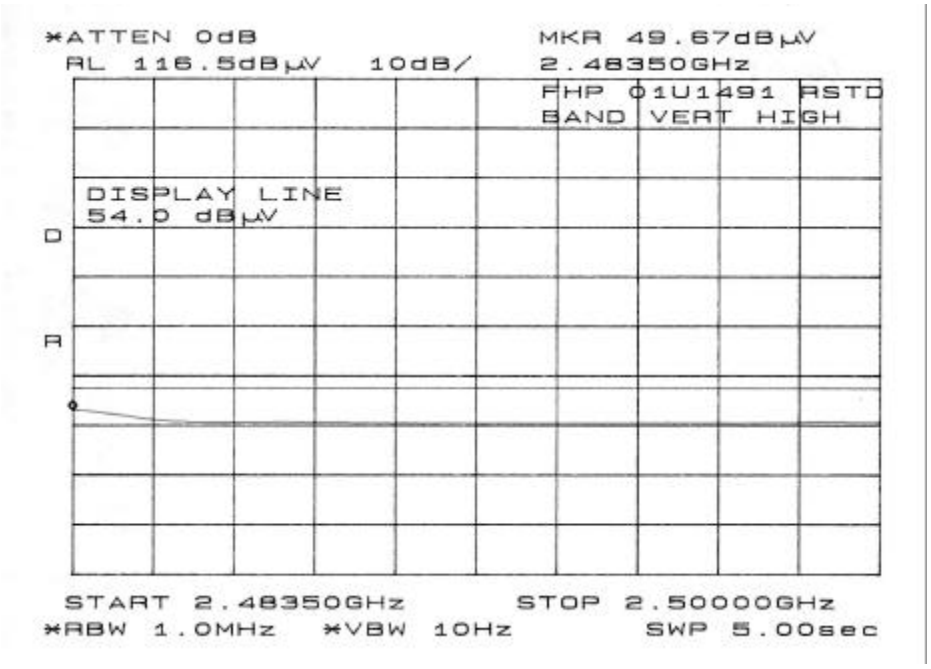


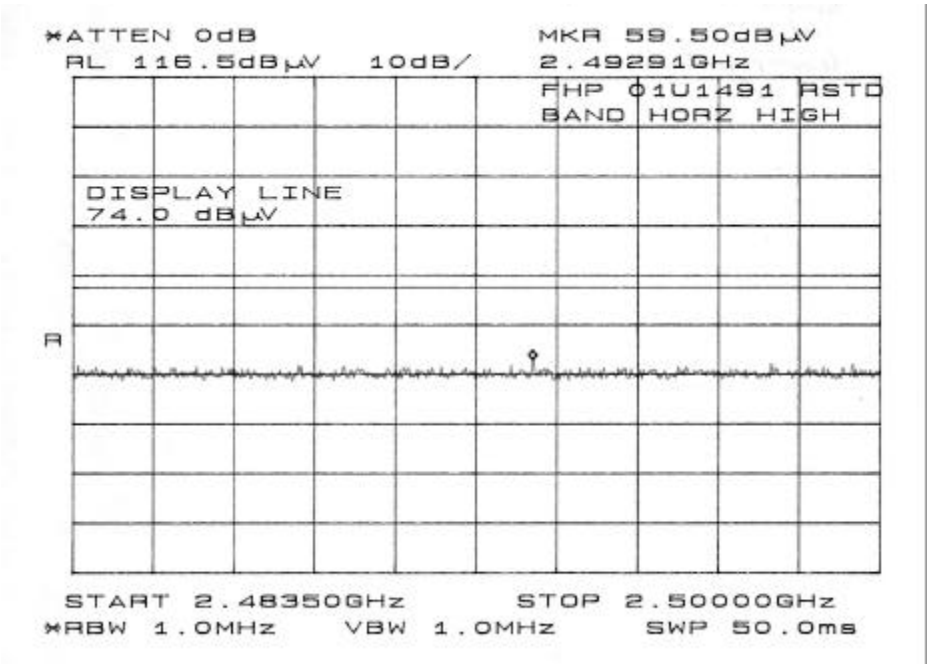


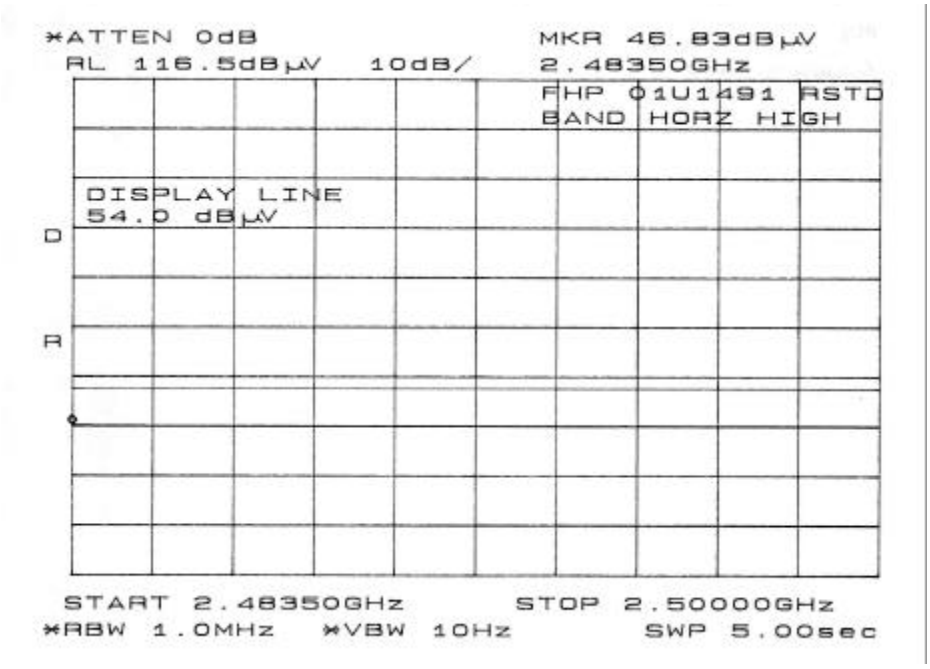












7 dBi OMNI ANTENNAS WITH COUNTERPOISE GROUND PLANES - SPURIOUS RADIATED EMISSIONS

Compliance Certification Services A-Site 8/30/02 Mike H

Radiated Emissions FHP with 7.0 dBi Counterpoise Omni Antennas, Rx Diversity
FCC 15.247 Mode: Transmitting

Specification Distance: 3 meters

Freq MHz	Pol V/H	Det	SA dBuV	AF dB/m	Dist m	Dist dB	Preamp dB	Cable / HPF dB	Field dBuV/m	Limit dBuV/m	Margin dB
4075.5	V	Peak	46.27	33.2	1.5	-6.0	34.8	10.1	48.75	74	-25.25
4075.5	V	Avg	38.53	33.2	1.5	-6.0	34.8	10.1	41.01	54	-12.99
4075.5	H	Peak	43.53	33.2	1.5	-6.0	34.8	10.1	46.01	74	-27.99
4075.5	H	Avg	31.47	33.2	1.5	-6.0	34.8	10.1	33.95	54	-20.05
4824	V	Peak	43.43	33.9	1.5	-6.0	34.5	7	43.81	74	-30.19
4824	V	Avg	33.03	33.9	1.5	-6.0	34.5	7	33.41	54	-20.59
4125.5	V	Peak	43.03	33.2	1.5	-6.0	34.8	10.1	45.51	74	-28.49
4125.5	V	Avg	33.57	33.2	1.5	-6.0	34.8	10.1	36.05	54	-17.95
4125.5	H	Peak	42.17	33.2	1.5	-6.0	34.8	10.1	44.65	74	-29.35
4125.5	H	Avg	30.77	33.2	1.5	-6.0	34.8	10.1	33.25	54	-20.75
4874	V	Peak	43.7	34	1.5	-6.0	34.5	6.4	43.58	74	-30.42
4874	V	Avg	32.17	34	1.5	-6.0	34.5	6.4	32.05	54	-21.95
4924	V	Peak	42.87	34.2	1.5	-6.0	34.5	6.3	42.85	74	-31.15
4924	V	Avg	32.67	34.2	1.5	-6.0	34.5	6.3	32.65	54	-21.35

Note: All other readings were at system noise floor.

8.7.3. DIGITAL DEVICE TEST RESULTS

DIGITAL DEVICE RADIATED EMISSIONS WITH SELF-CONTAINED POWER

COMPLIANCE Certification Services

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

561F MONTEREY ROAD, SAN JOSE, CA 95037-9001
PHONE: (408) 463-0885 FAX: (408) 463-0888

Project #: 01U1491
Report #: 020831A1
Date& Time: 08/31/02 9:49 AM
Test Engr: Mike Heckrotte

Company: FHP WIRELESS
EUT Description: SmartPoint Wireless Router (Outdoor Unit)
Test Configuration : EUT with Diversity Omni Antennas
Type of Test: FCC Radiated
Mode of Operation: Pinging Ethernet

<< Main Sheet

Freq. (MHz)	Reading (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)	Mark (P/Q/A)
166.67	45.30	16.46	2.01	27.36	36.42	43.50	-7.08	3mV	0.00	1.00	P
233.33	50.50	11.19	2.43	27.10	37.01	46.00	-8.99	3mV	0.00	1.00	P
233.33	48.80	11.19	2.43	27.10	35.31	46.00	-10.69	3mH	0.00	1.00	P
600.00	38.20	19.04	4.06	28.56	32.74	46.00	-13.26	3mV	0.00	1.00	P
600.00	37.60	19.04	4.06	28.56	32.14	46.00	-13.86	3mH	0.00	1.00	P
633.33	35.00	19.83	4.17	28.57	30.42	46.00	-15.58	3mH	0.00	1.00	P
6 Worst Data											

DIGITAL DEVICE RADIATED EMISSIONS WITH POWER OVER ETHERNET

COMPLIANCE Certification Services

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

561F MONTEREY ROAD, SAN JOSE, CA 95037-9001
PHONE: (408) 463-0885 FAX: (408) 463-0888

Project #: 01U1491
Report #: 020831A2
Date& Time: 08/31/02 3:28 PM
Test Engr: Mike Heckrotte

Company: FHP WIRELESS
EUT Description: SmartPoint Wireless Router (Outdoor unit)
Test Configuration : EUT/Power Over Ethernet/laptop
Type of Test: FCC Radiated
Mode of Operation: Pinging Ethernet

<< Main Sheet

Freq. (MHz)	Reading (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)	Mark (P/Q/A)
233.33	53.10	11.19	2.43	27.10	39.61	46.00	-6.39	3mV	0.00	1.00	P
166.67	43.70	16.46	2.01	27.36	34.82	43.50	-8.68	3mV	0.00	1.00	P
233.33	50.10	11.19	2.43	27.10	36.61	46.00	-9.39	3mH	0.00	1.00	P
400.00	41.90	15.62	3.25	27.81	32.96	46.00	-13.04	3mV	0.00	1.00	P
500.00	38.60	17.97	3.68	28.40	31.85	46.00	-14.15	3mV	0.00	1.00	P
266.67	41.30	12.79	2.62	27.05	29.66	46.00	-16.34	3mV	0.00	1.00	P
6 Worst Data											

8.8. POWER LINE CONDUCTED EMISSIONS

TEST SETUP

The EUT is mounted on a metal antenna mast and configured as a floor-standing device in accordance with ANSI C63.4/1992. The base of the antenna mast is set directly on the ground plane to simulate typical installation guidelines which require the mast to be grounded for lightning protection. The base of the antenna mast is placed 80 cm from the LISN.

The EUT is set to continuously transmit ethernet packet. In the self-contained power configuration an Ethernet-to-fiber-optic converter within the EUT housing receives the Ethernet packets and in the power over Ethernet configuration the laptop is connected to receive the ethernet packets.

TEST PROCEDURE

The resolution bandwidth is set to 10 kHz for peak detection , quasi-peak detection and average detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

No non-compliance noted:

Self-Contained Power

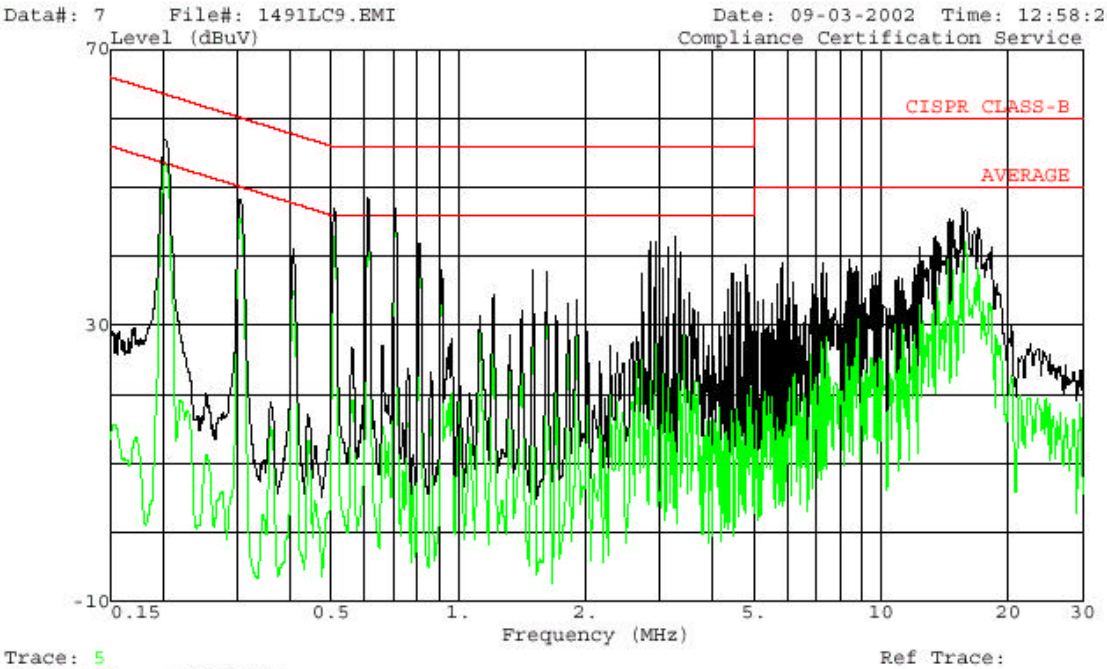
CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	EN_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.20	--	56.84	53.33	0.00	64.49	54.49	-7.65	-1.16	L1
0.21	--	53.88	50.30	0.00	64.40	54.40	-10.52	-4.10	L2
0.51	--	46.92	42.92	0.00	56.00	46.00	-9.08	-3.08	L1
0.61	--	48.50	44.57	0.00	56.00	46.00	-7.50	-1.43	L1
0.67	--	44.84	41.54	0.00	56.00	46.00	-11.16	-4.46	L2
0.71	--	47.04	44.36	0.00	56.00	46.00	-8.96	-1.64	L1
6 Worst Data									

Power Over Ethernet

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	EN_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.20	--	46.34	--	0.00	64.46	54.46	-18.12	-8.12	L1
0.21	--	47.62	--	0.00	64.43	54.43	-16.81	-6.81	L2
0.51	--	43.24	--	0.00	56.00	46.00	-12.76	-2.76	L1
0.51	--	43.28	--	0.00	56.00	46.00	-12.72	-2.72	L2
0.92	--	42.68	--	0.00	56.00	46.00	-13.32	-3.32	L1
0.93	--	43.04	--	0.00	56.00	46.00	-12.96	-2.96	L2
6 Worst Data									

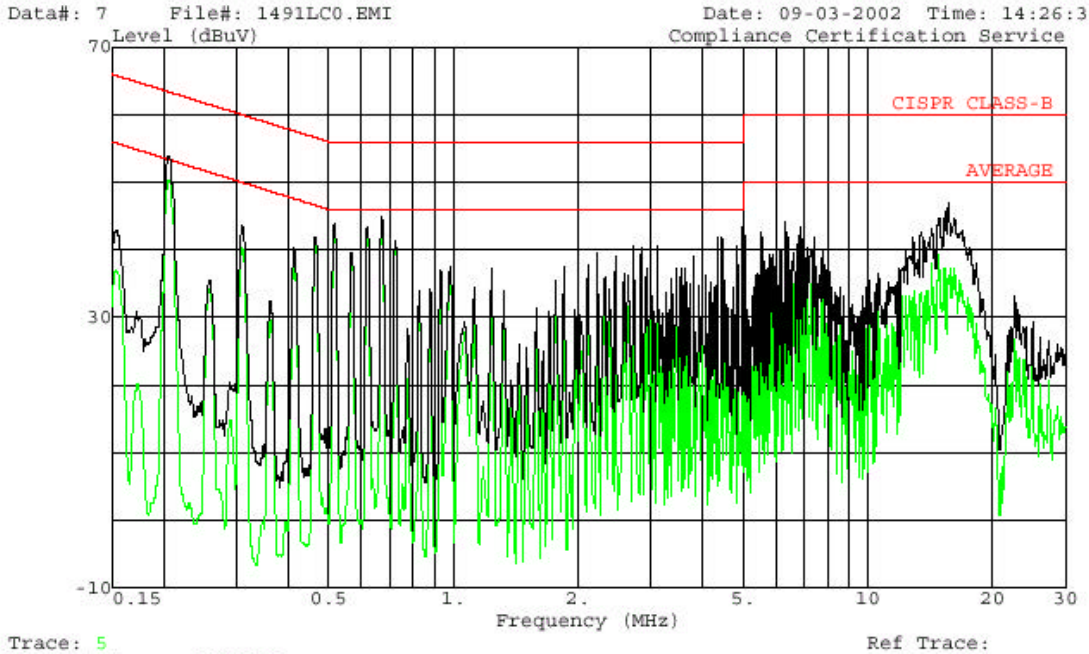
CONDUCTED EMISSIONS WITH SELF-CONTAINED POWER

561F Monterey Road,
San Jose, CA 95037 USA
Tel: (408) 463-0885
Fax: (408) 463-0888



Trace: 5 Ref Trace:
Project # : 01U1491
Test Engineer: Mike Heckrotte
Company : FHP WIRELESS
EUT : SmartPoint Wireless Router (Outdoor Unit
Test Config. : EUT/Self-Contained Power
: Pinging Ethernet
Mode of Op. :
: 115 VAC, 60 Hz
: L1: QP (Black), Average (Green)

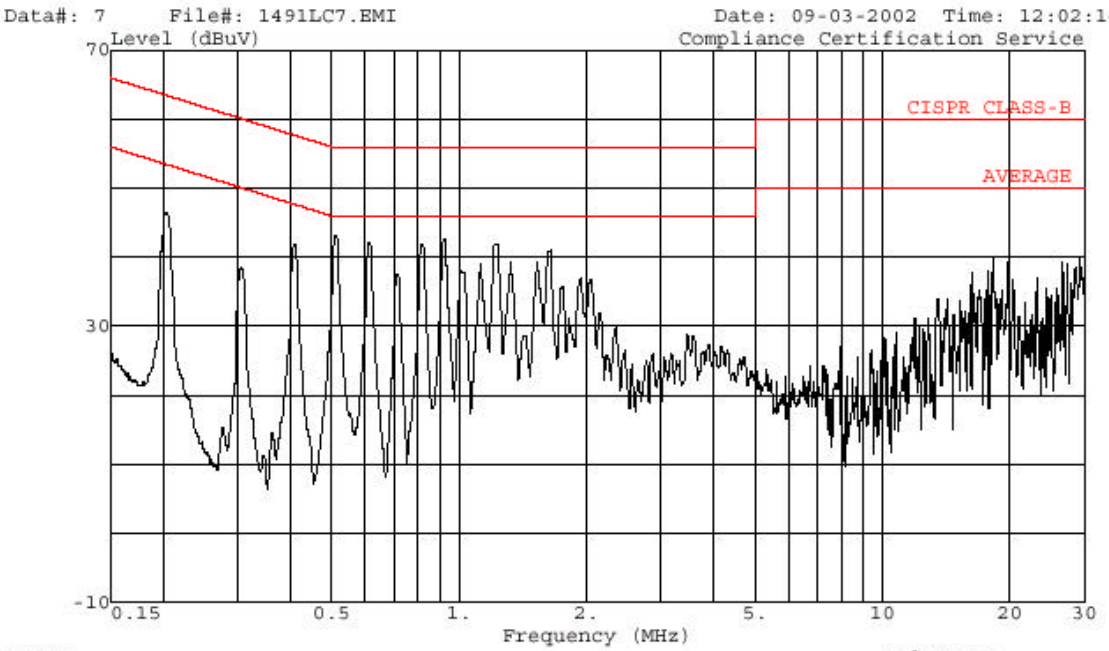
COMPLIANCE Engineering Services, Inc.
561F Monterey Road,
San Jose, CA 95037 USA
Tel: (408) 463-0885
Fax: (408) 463-0888



Trace: 5 Ref Trace:
Project # : 01U1491
Test Engineer: Mike Heckrotte
Company : FHP WIRELESS
EUT : SmartPoint Wireless Router (Outdoor Unit
Test Config. : EUT/Self-Contained Power
: Pinging Ethernet
Mode of Op. :
: 115 VAC, 60 Hz
: L2: QP (Black), Avg (Green)

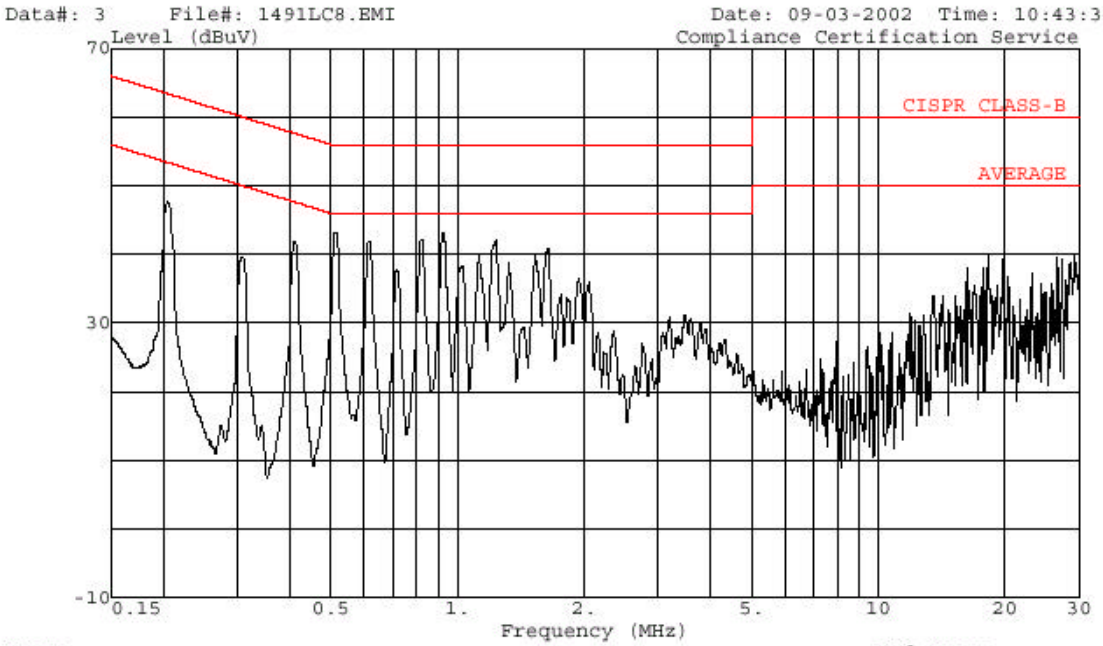
CONDUCTED EMISSIONS WITH POWER OVER ETHERNET

561F Monterey Road,
San Jose, CA 95037 USA
Tel: (408) 463-0885
Fax: (408) 463-0888



Trace: Ref Trace:
Project # : 01U1491
Test Engineer: Mike Heckrotte
Company : FHP WIRELESS
EUT : SmartPoint Wireless Router (Outdoor Unit
Test Config. : EUT/Power Over Ethernet/Laptop
: Pinging Ethernet
Mode of Op. :
: 115 VAC, 60 Hz
: QP: L1(Black)

COMPLIANCE Engineering Services, Inc.
561F Monterey Road,
San Jose, CA 95037 USA
Tel: (408) 463-0885
Fax: (408) 463-0888



8.9. SETUP PHOTOS

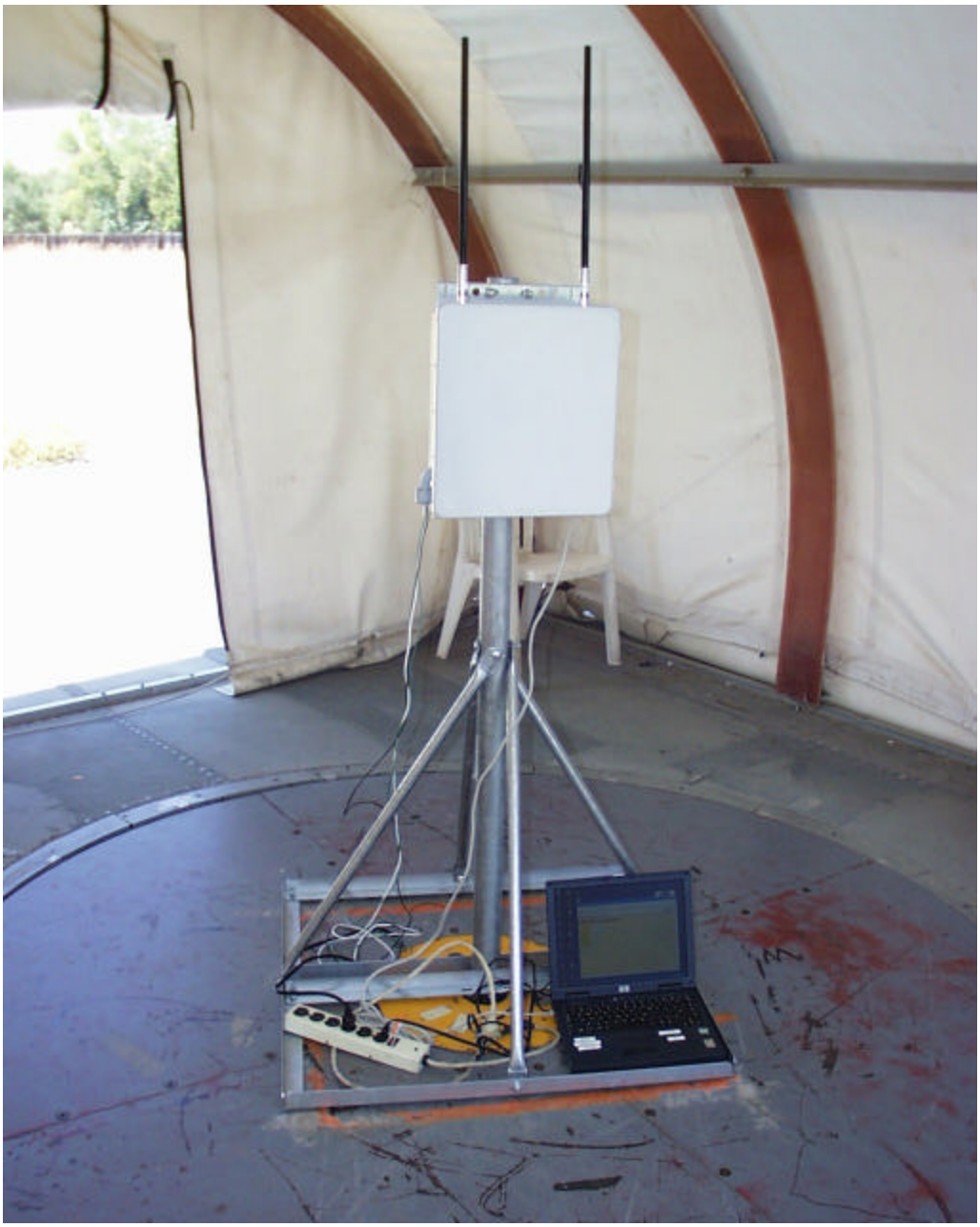
ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP

TRANSMITTER RADIATED RF MEASUREMENT SETUP FOR 15.0 dBi OMNI ANTENNA

TRANSMITTER RADIATED RF MEASUREMENT SETUP FOR 13.5 dBi YAGI ANTENNA

TRANSMITTER RADIATED RF MEASUREMENT SETUP FOR 12.0 dBi PATCH ANTENNA

TRANSMITTER RADIATED RF MEASUREMENT SETUP FOR 7.4 dBi OMNI ANTENNAS WITH RECEIVE DIVERSITY

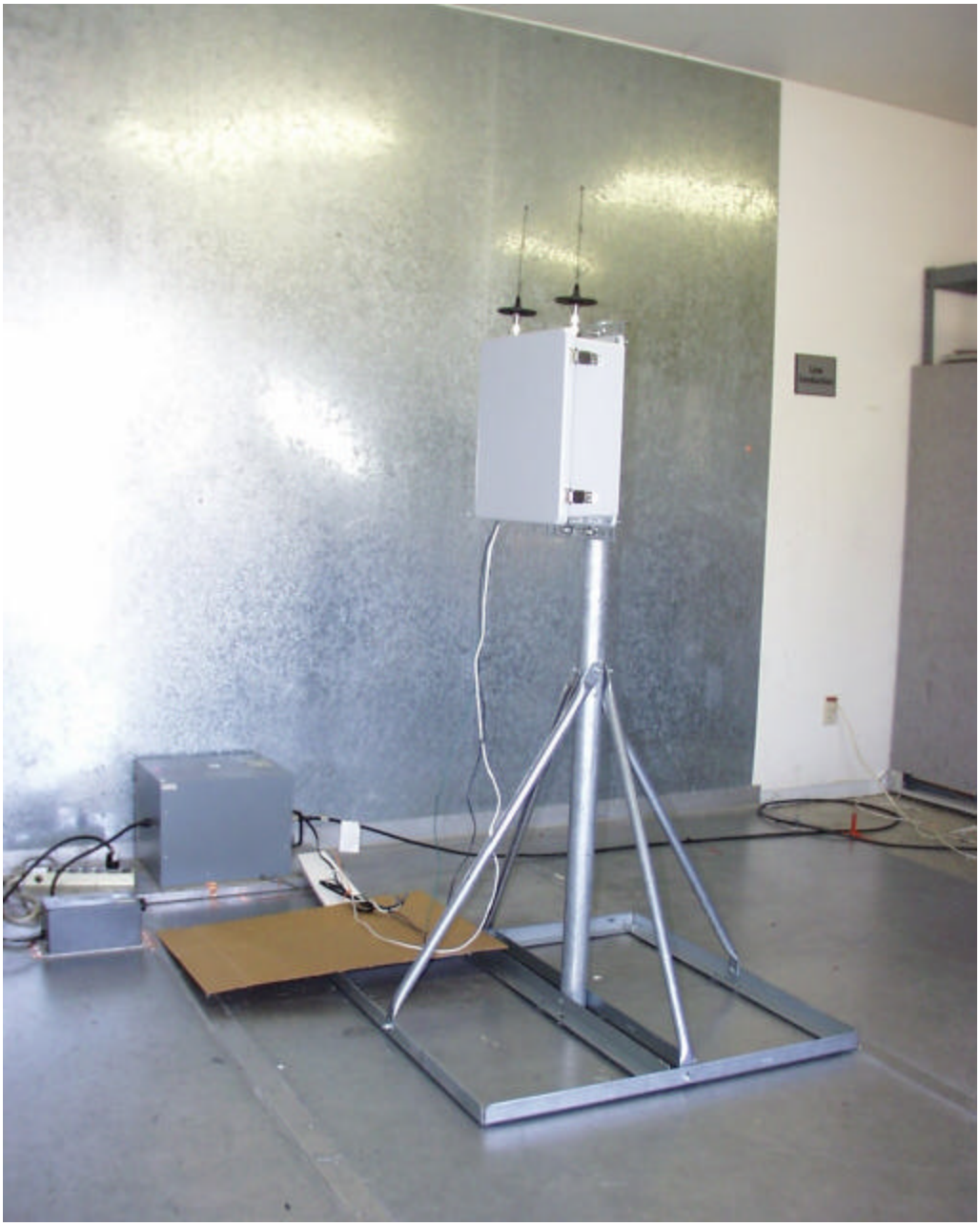


TRANSMITTER RADIATED RF MEASUREMENT SETUP FOR 7.0 dBi OMNI ANTENNAS WITH COUNTERPOISE GROUND PLANE AND RECEIVE DIVERSITY

DIGITAL DEVICE RADIATED EMISSIONS MEASUREMENT SETUP FOR SELF-CONTAINED POWER

DIGITAL DEVICE RADIATED EMISSIONS MEASUREMENT SETUP FOR POWER OVER ETHERNET

POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP FOR SELF-CONTAINED POWER



POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP FOR POWER OVER ETHERNET

END OF REPORT