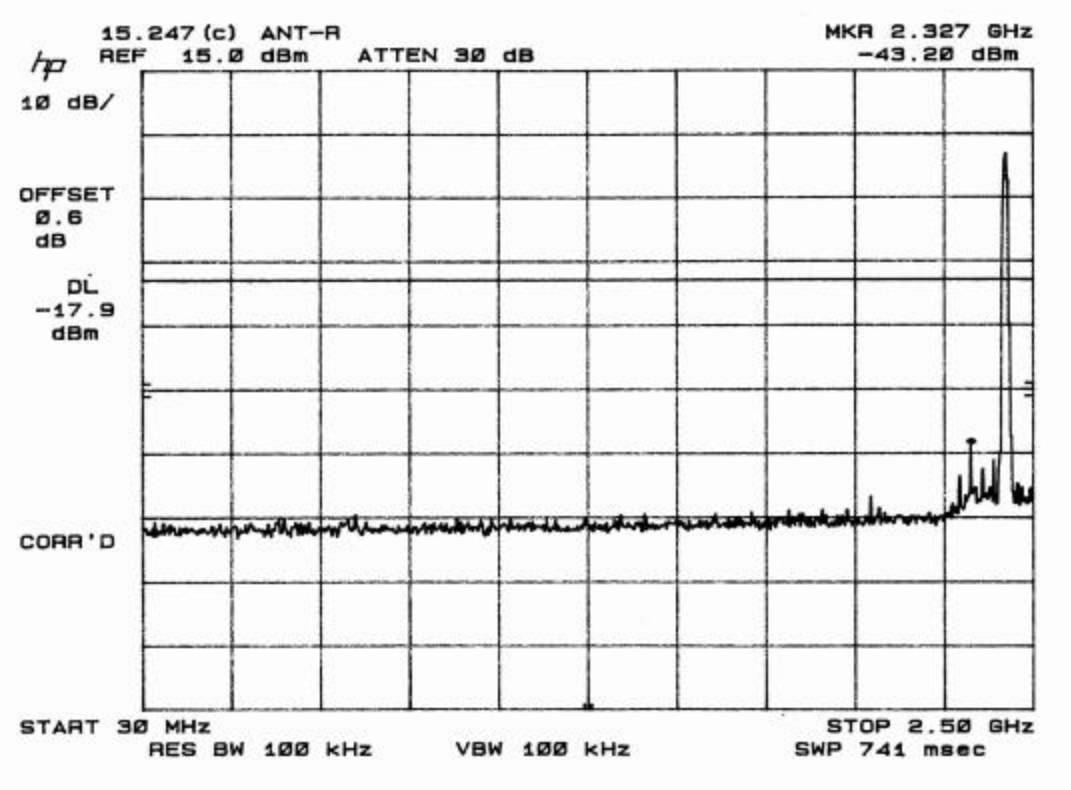
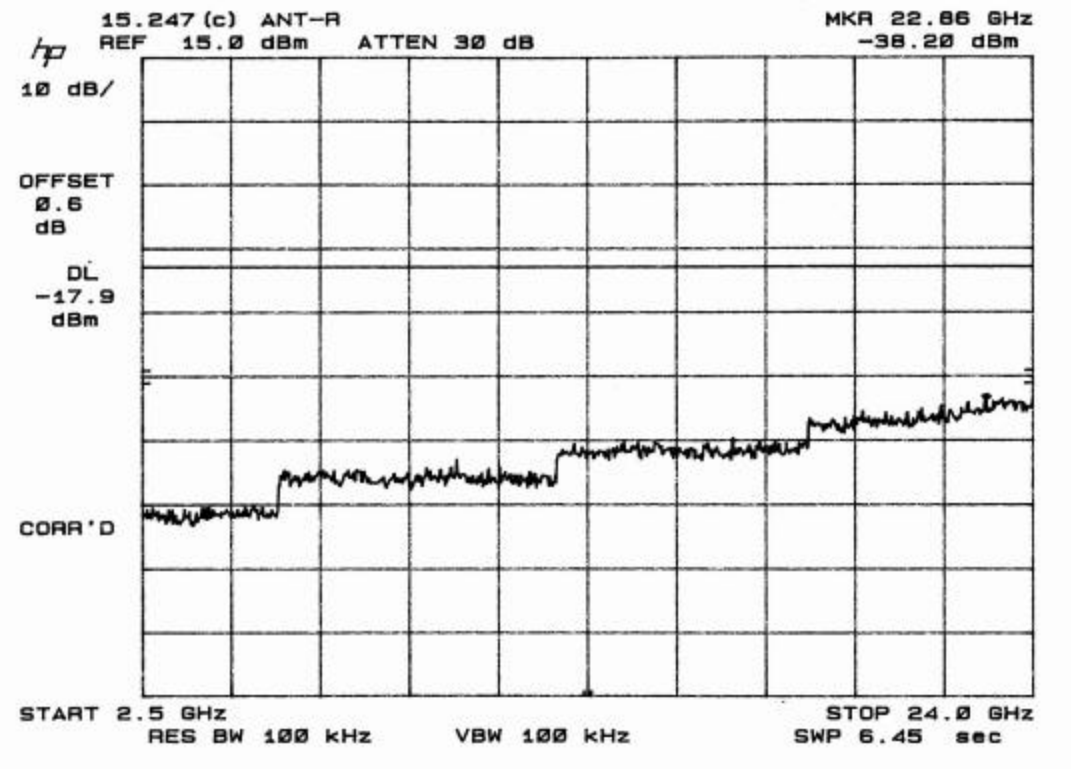
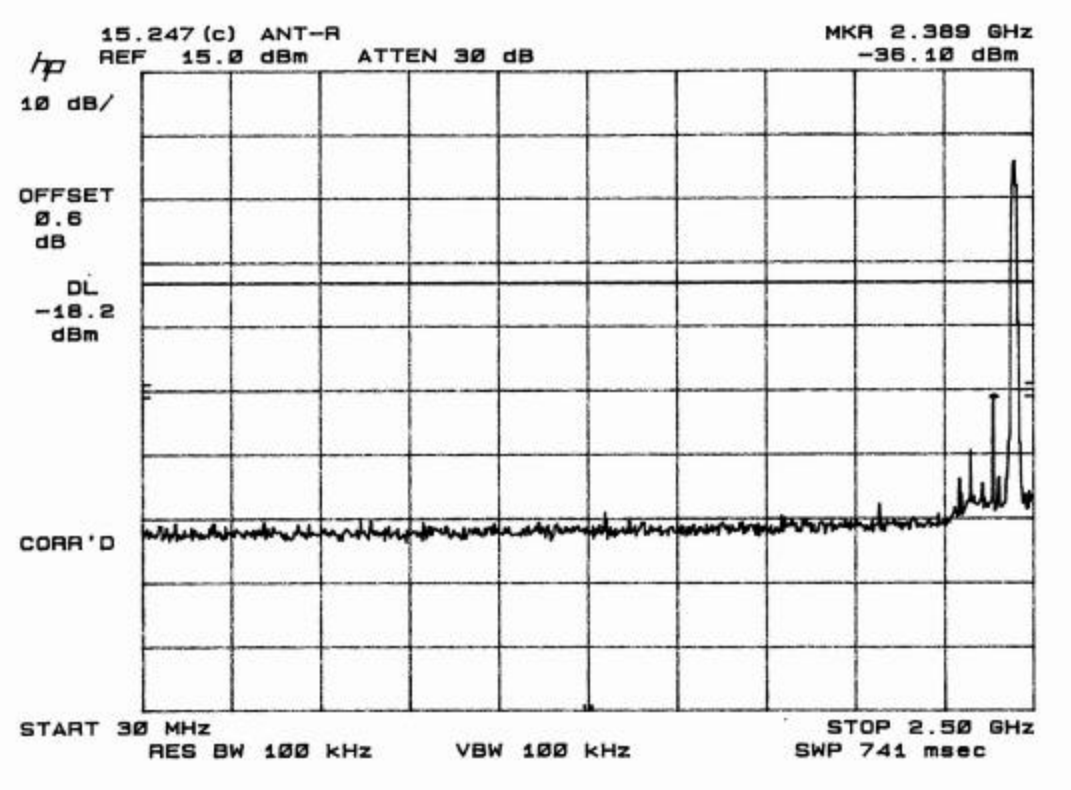
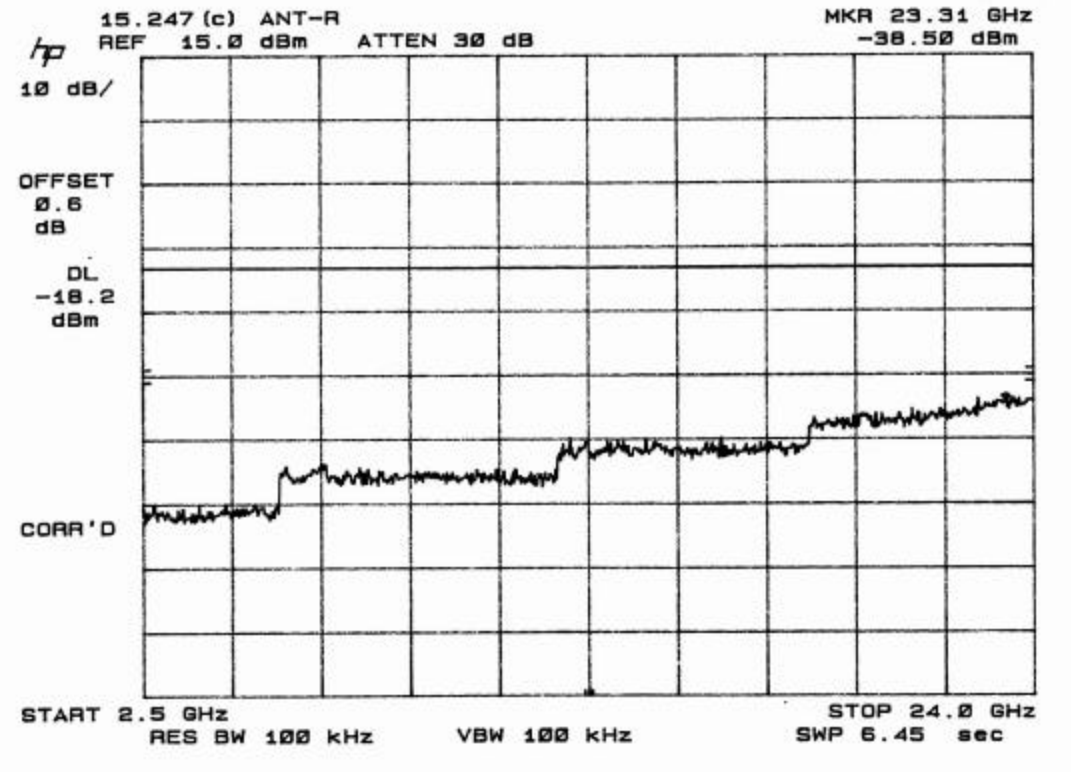
ANTENNA-R MID CHANNEL



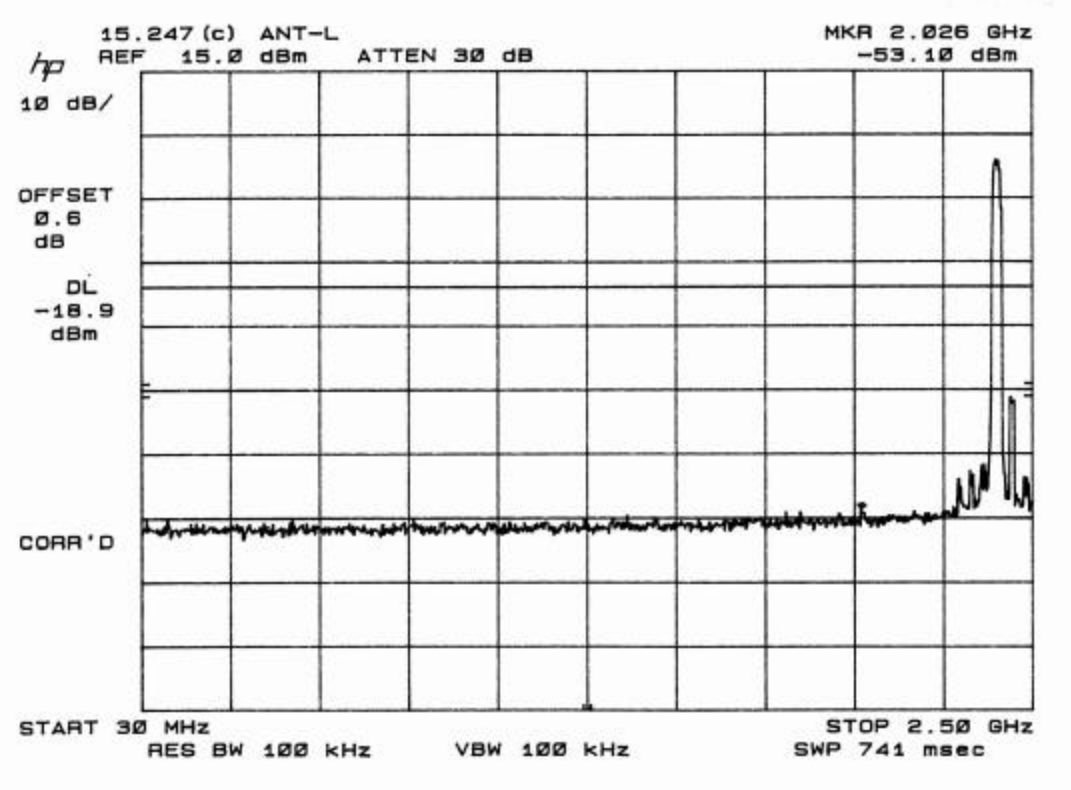


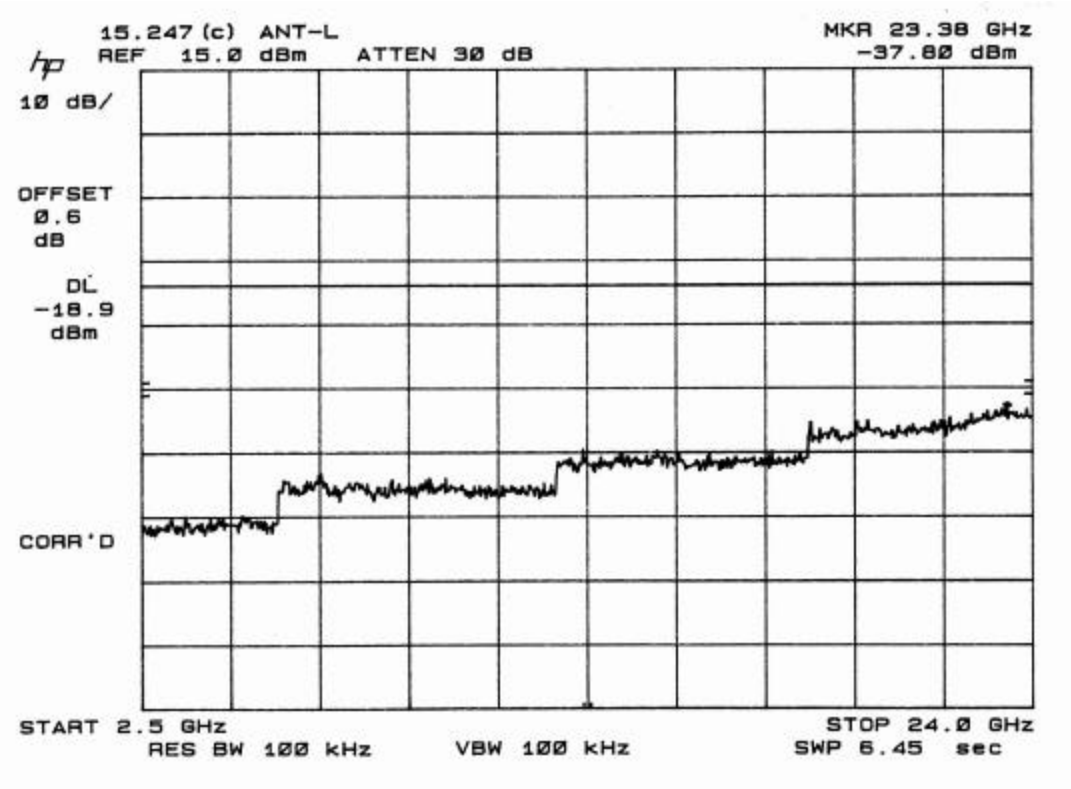
ANTENNA-R HIGH CHANNEL



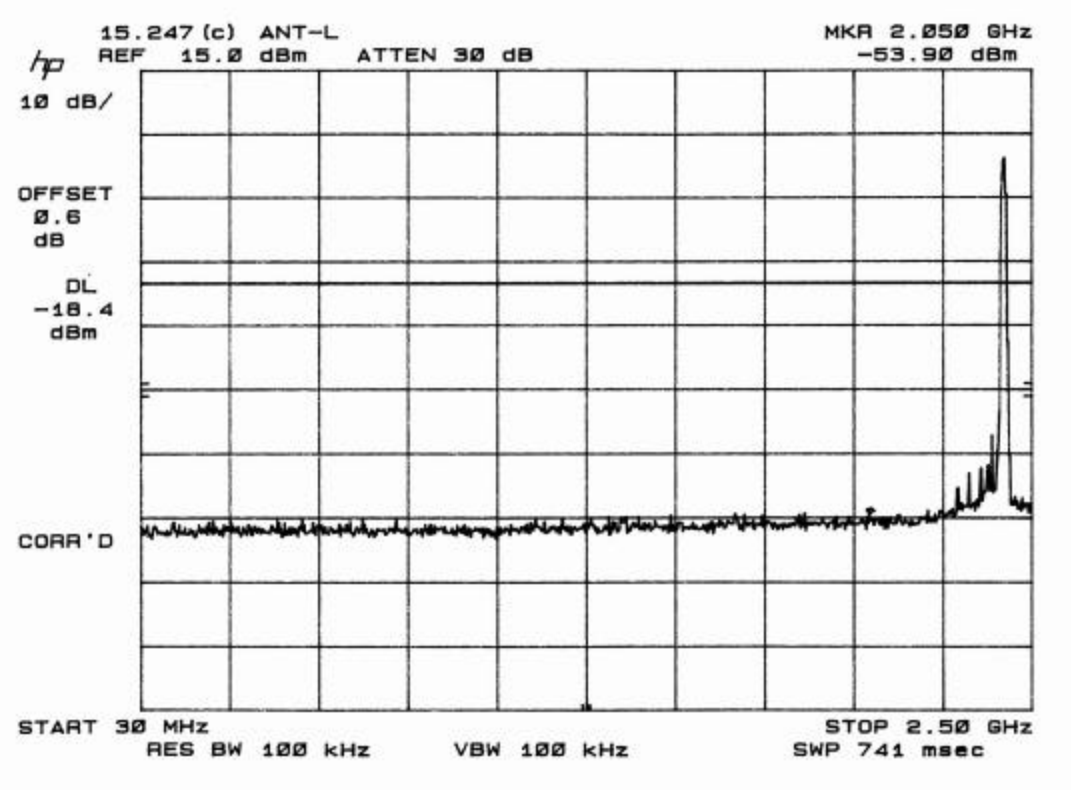


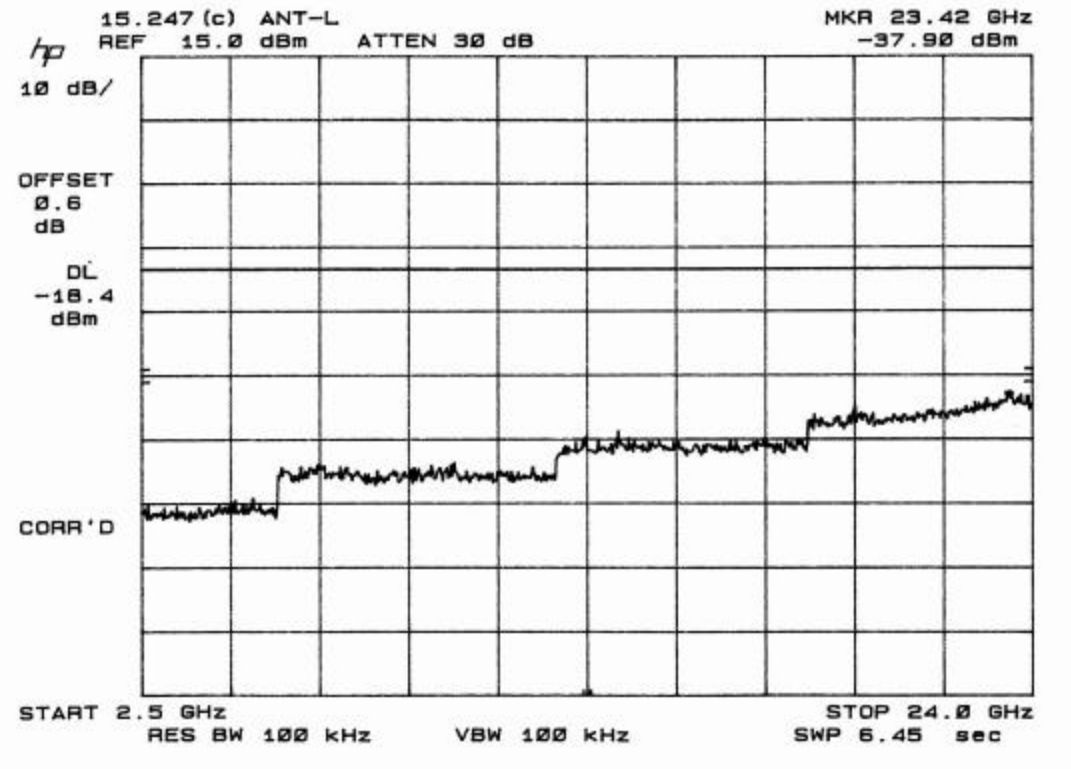
ANTENNA-L LOW CHANNEL



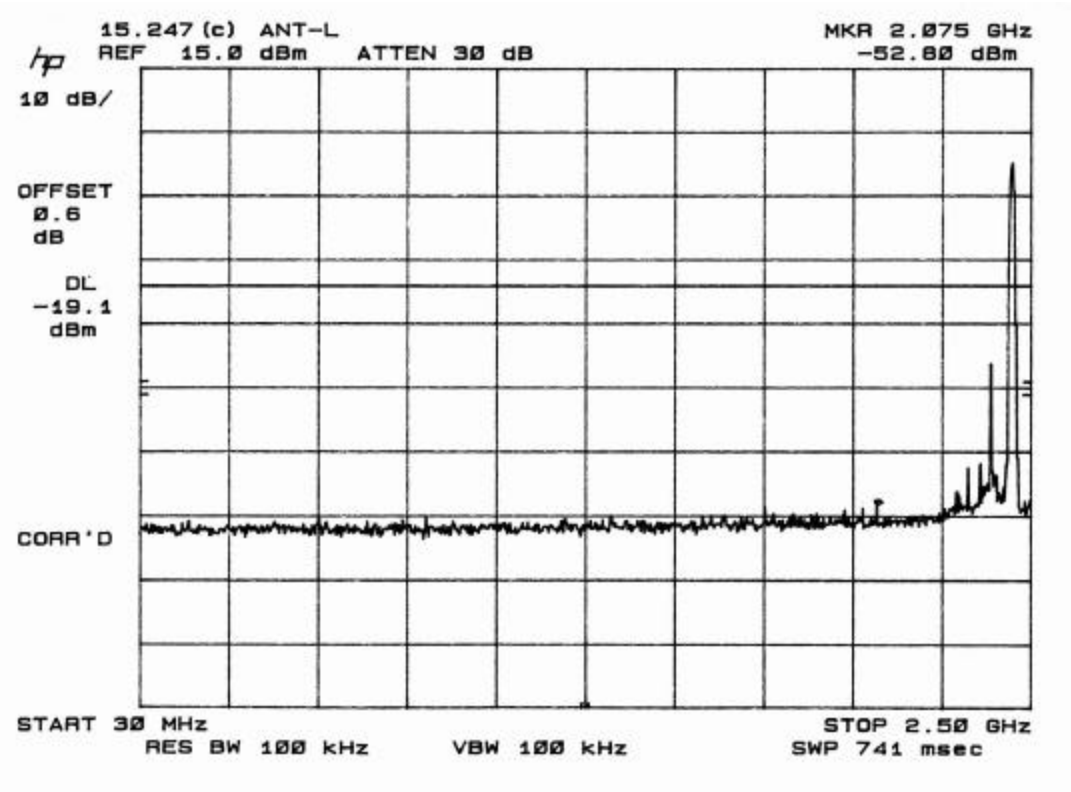


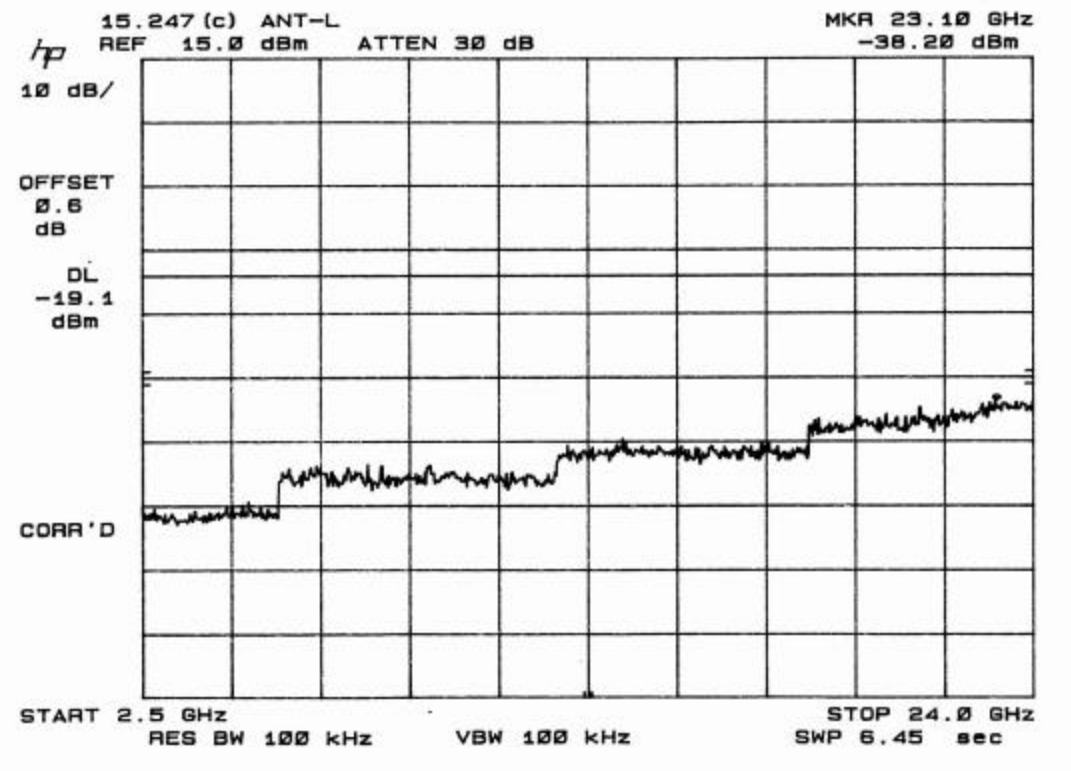
ANTENNA-L MID CHANNEL





ANTENNA-L HIGH CHANNEL



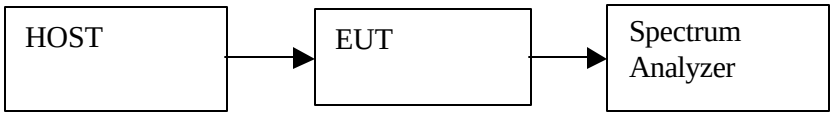


9.4. PEAK POWER SPECTRAL DENSITY

TEST SETUP

Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
Above 1000	☒ Peak	☒ 3 kHz	☒ 3 kHz



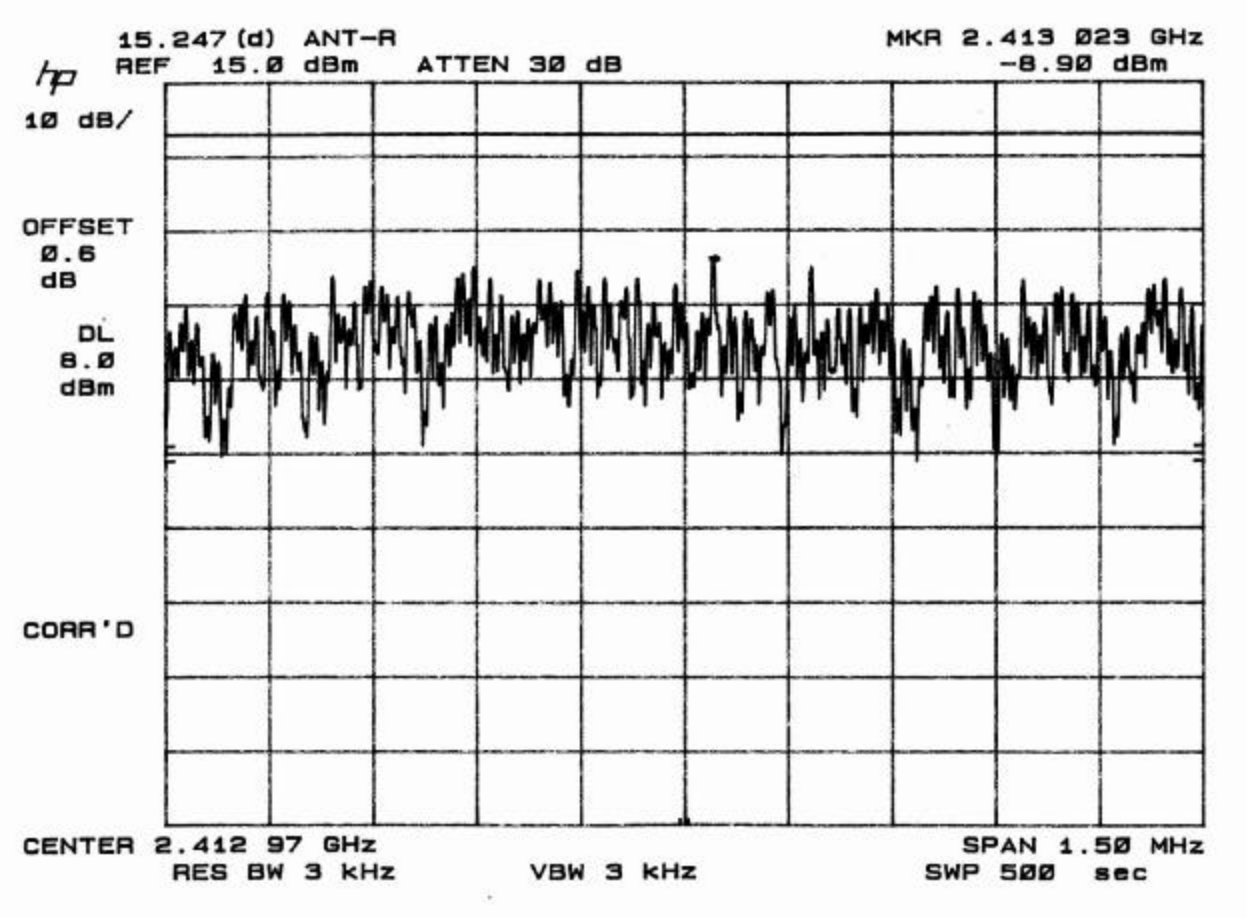
TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3 kHz RBW and 3 kHz VBW, set sweep time=span/3kHz. The power spectral density was measured and recorded. The sweep time is allowed to be longer than span/3KHz for a full response of the mixer in the spectrum analyzer.

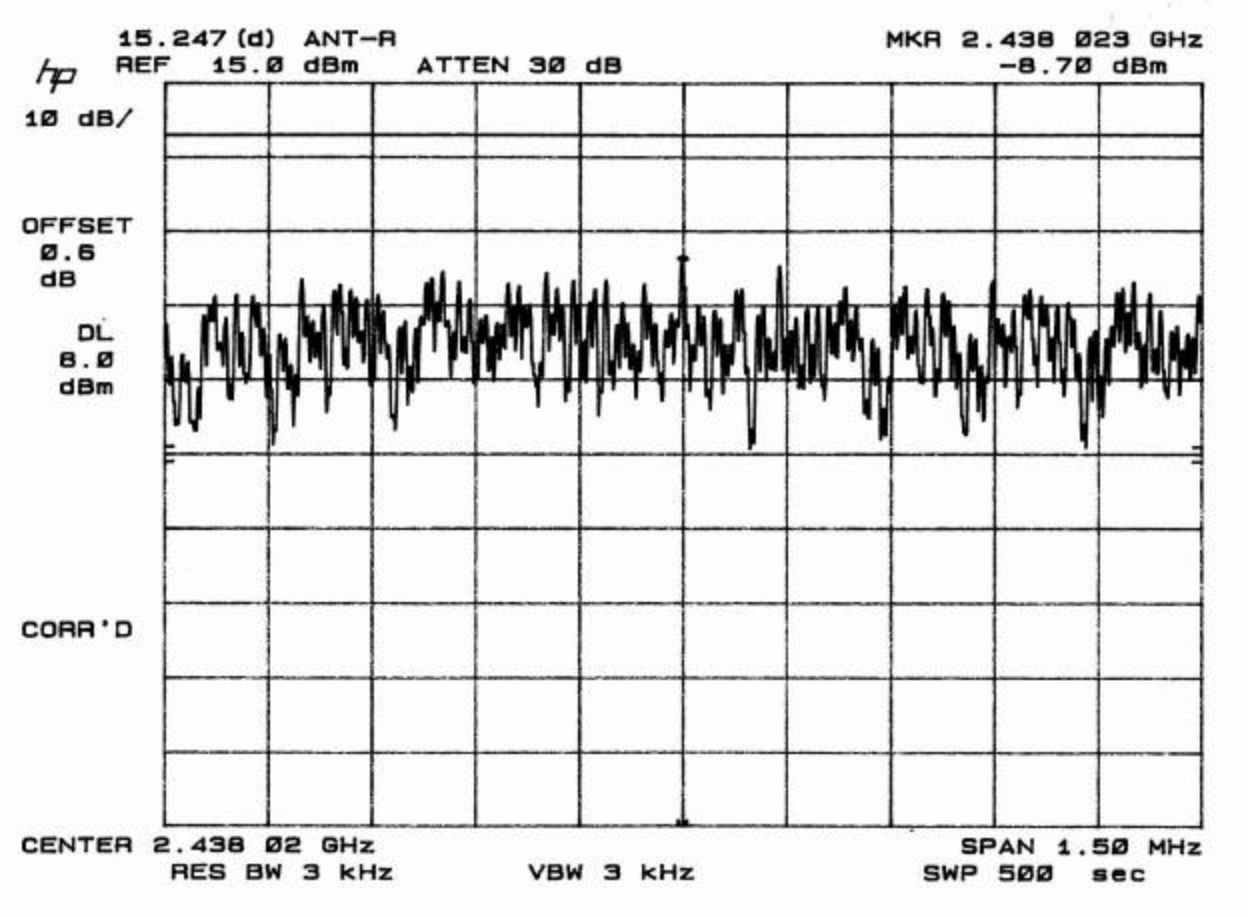
Result:

No non-compliance noted. See below plots for ANTENNA-R and L; LOW, MID, HIGH channels

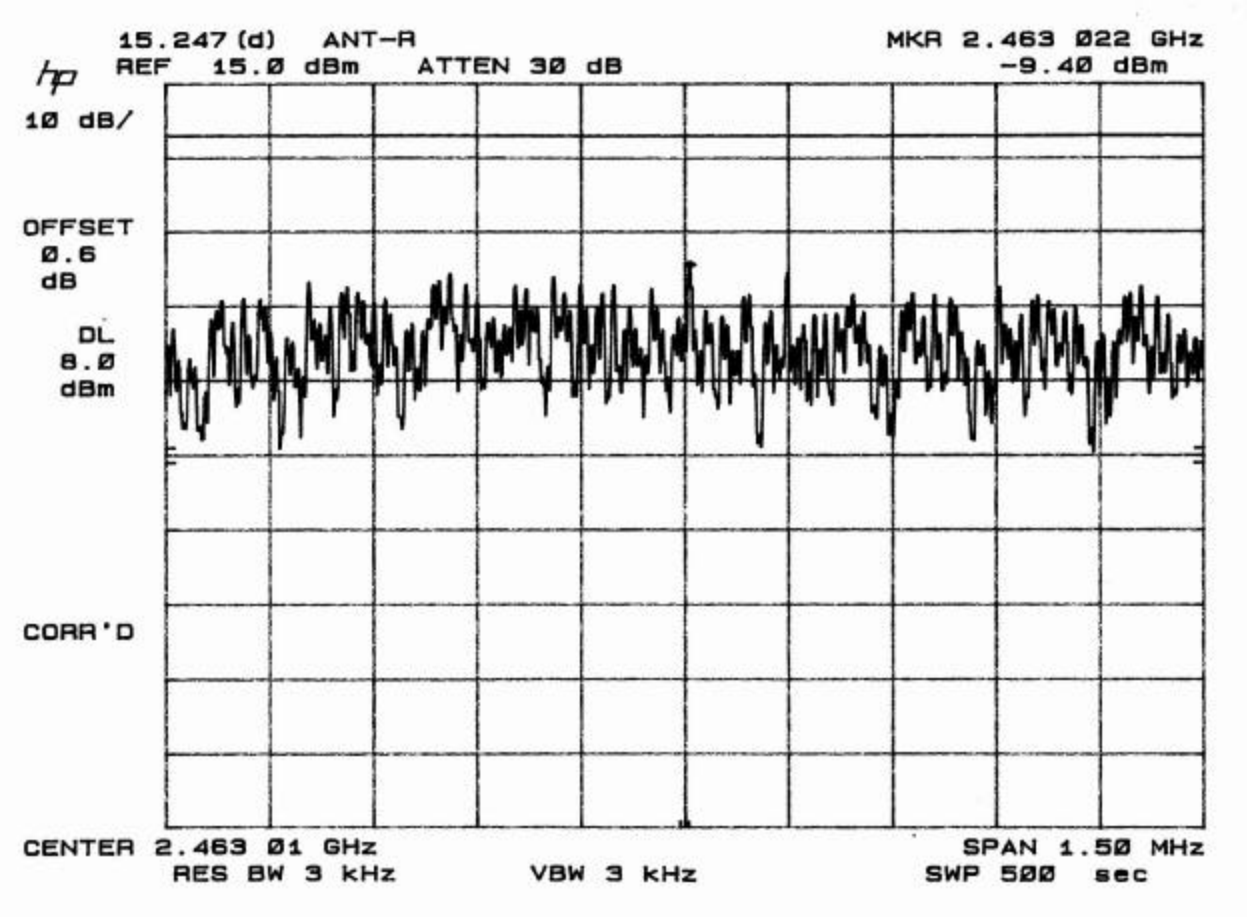
ANETNNA-R LOW CHANNEL



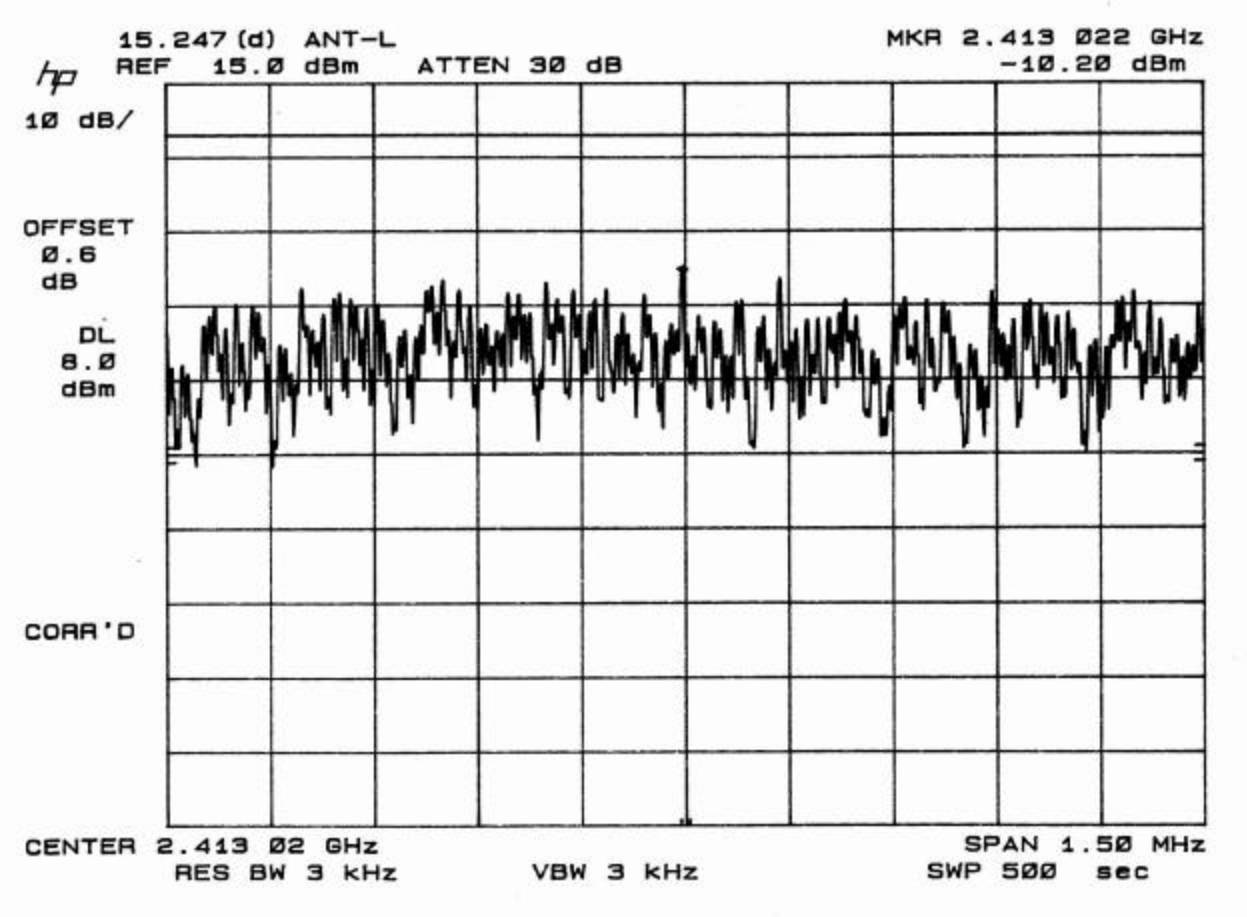
ANTENNA-R MID CHANNEL



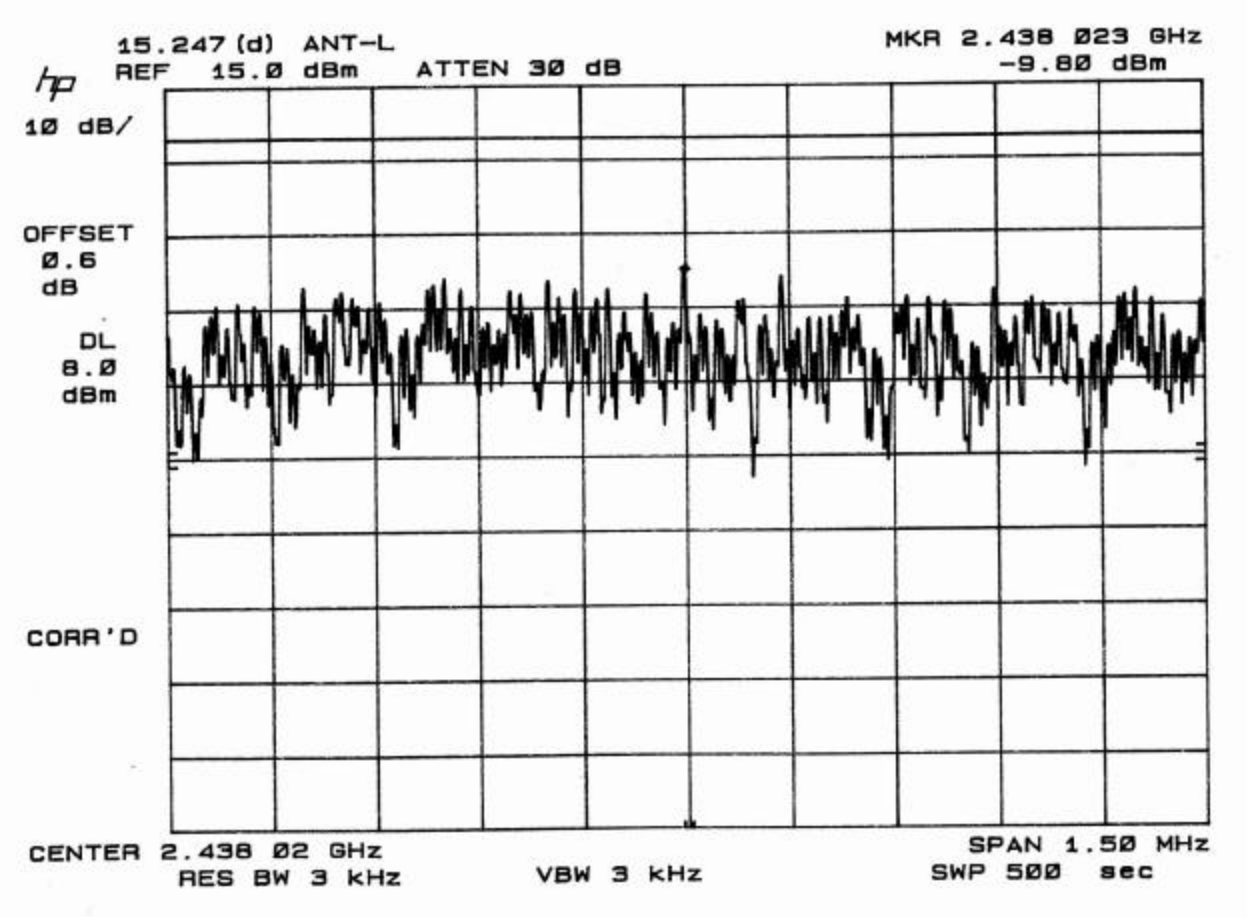
ANTENNA-R HIGH CHANNEL



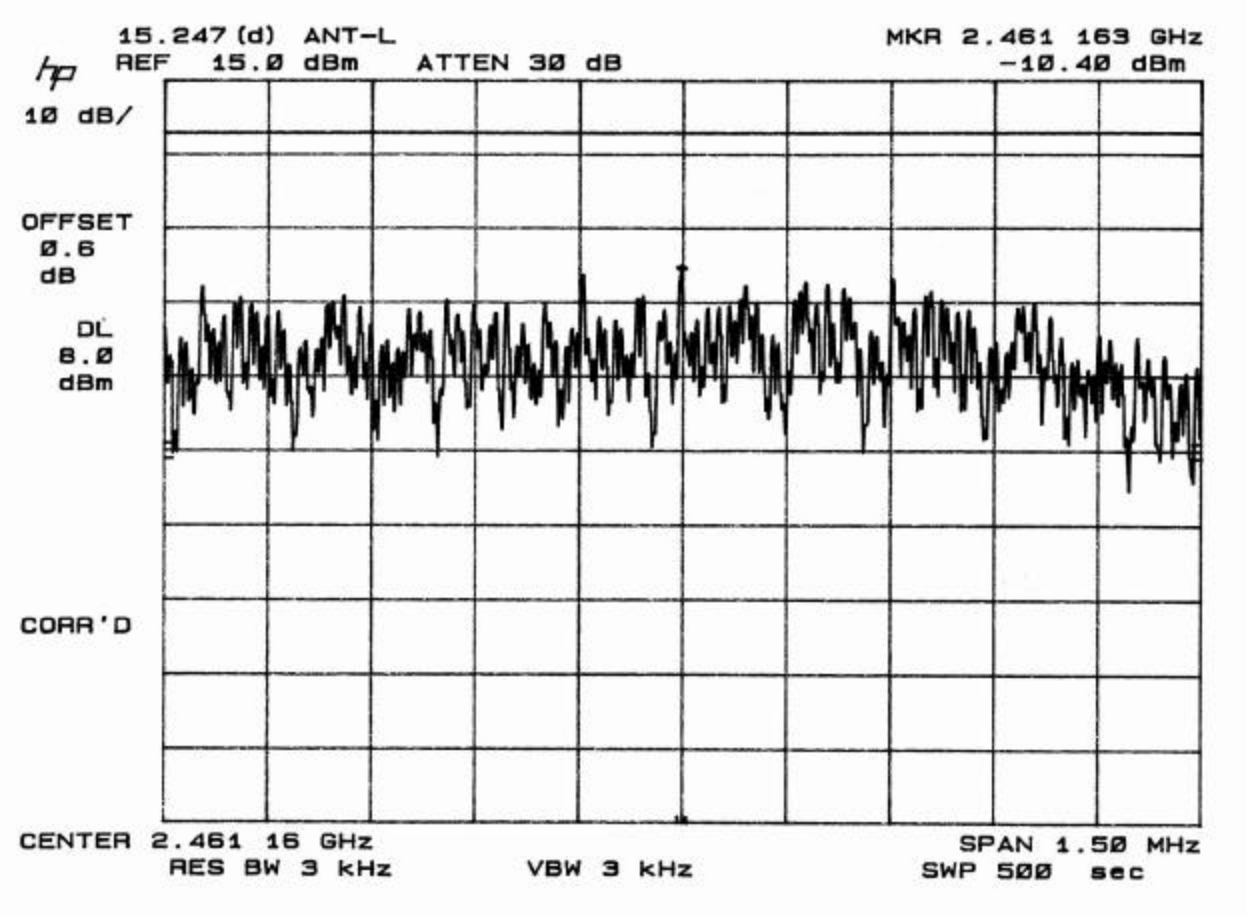
ANTENNA-L LOW CHANNEL



ANTENNA-L MID CHANNEL



ANTENNA-L HIGH CHANNEL



9.5. PROCESSING GAIN

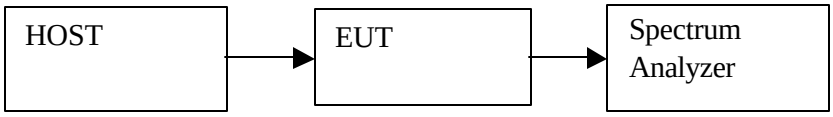
PROCESSING GAIN IS NOT REQUIRED.

9.6. RESTRICTED BAND EDGE MEASUREMENT

TEST SETUP

Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
Above 1000	☒ Peak ☐ Average	☒ 100 KHz ☐ 1 MHz	☒ 100 KHz ☐ 10 Hz



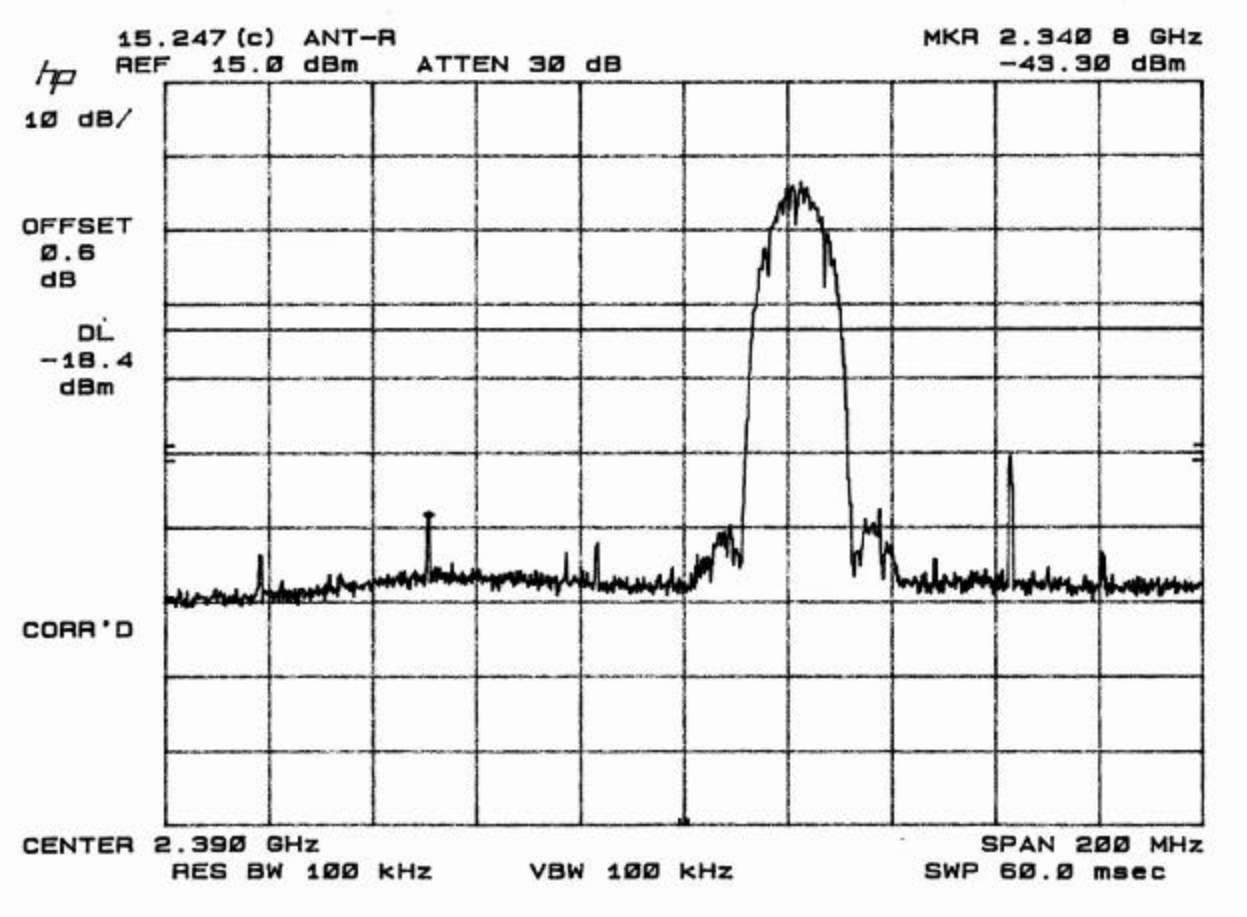
TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer; the lower and upper band edge of the EUT is investigated. The resolutions and video bandwidth were set to 100kHz.

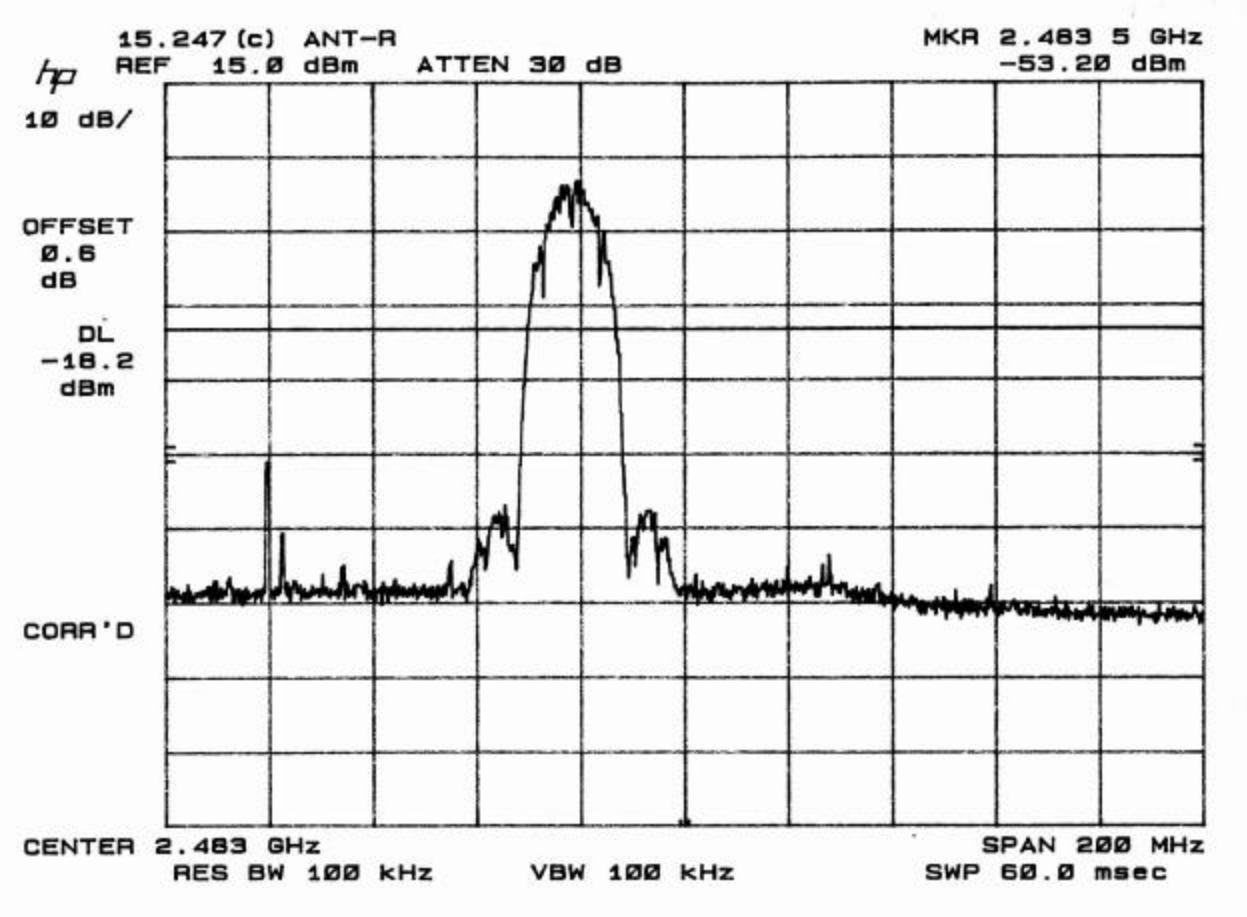
RESULT

No non-compliance noted. See below plots for ANTENNA-R and L; LOW and HIGH channels

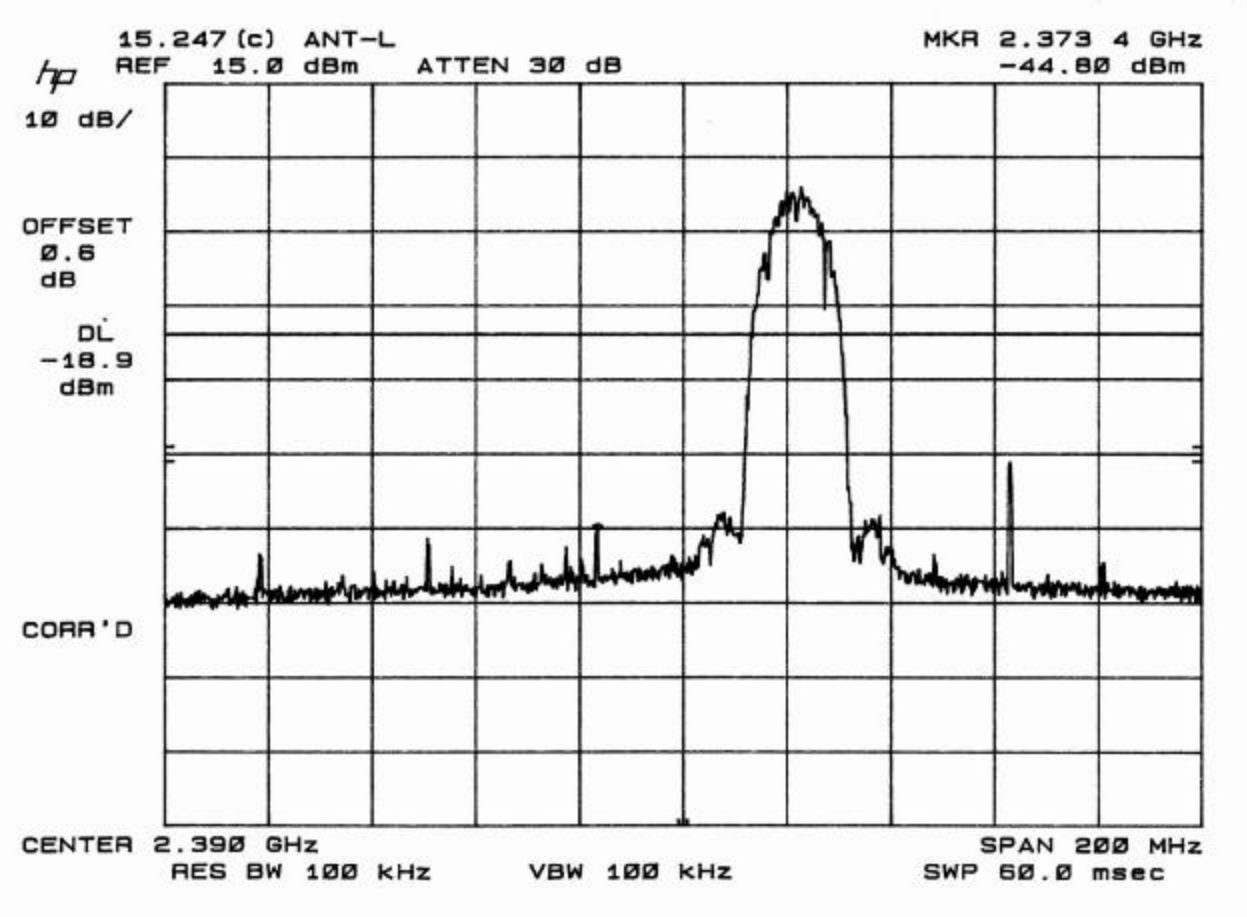
BANDEDGE @ ANTENNA-R LOW CHANNEL



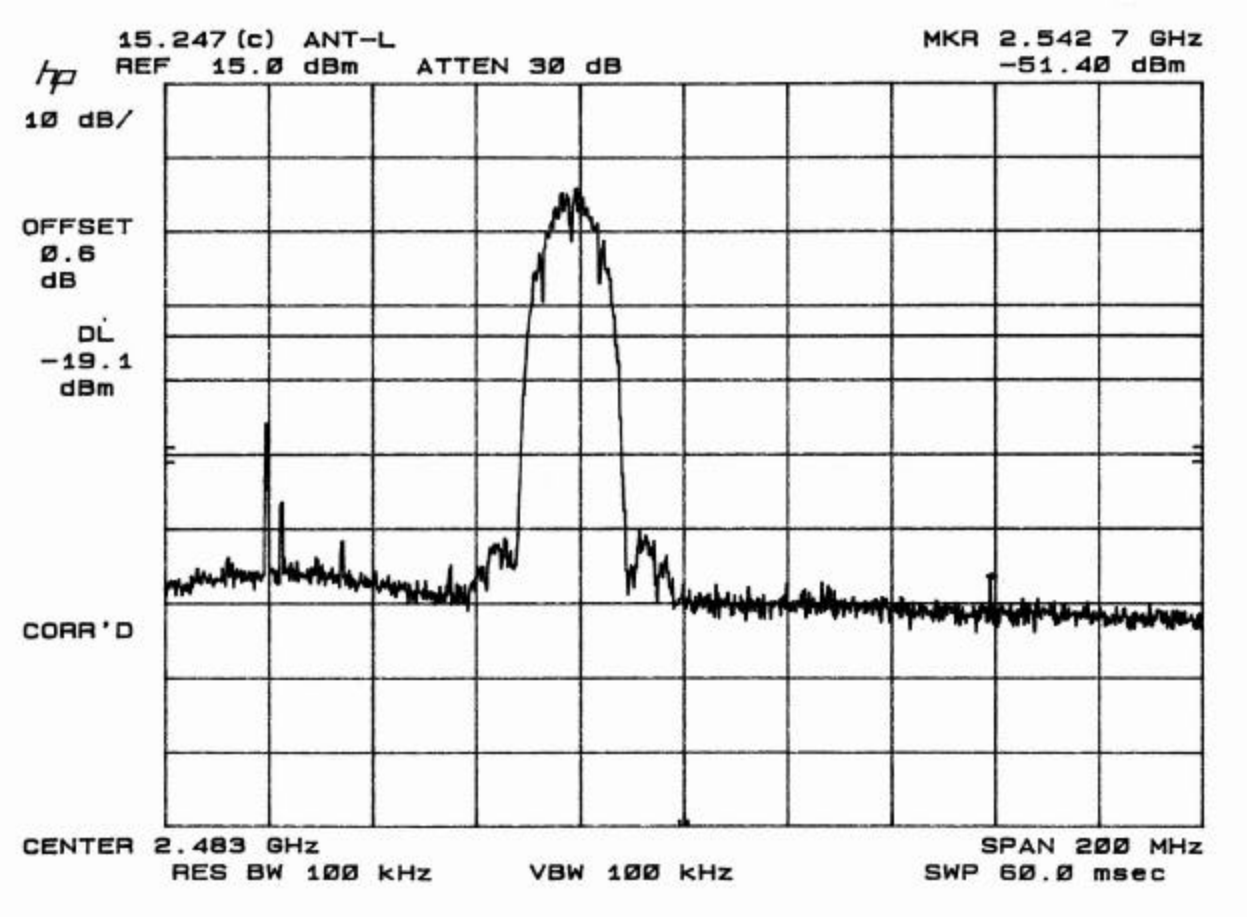
BANDEDGE @ ANTENNA-R HIGH CHANNEL



BANDEDGE @ ANTENNA-L LOW CHANNEL



BANDEDGE @ ANTENNA-L HIGH CHANNEL



9.7. RADIATED EMISSION

9.7.1. RADIATED EMISSION AND RESTRICTED BANDS

TEST SETUP

Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
30 to 1000	☒ Peak ☒ Quasi Peak	☒ 100 KHz ☒ 1 MHz	☒ 100 KHz ☒ 1 MHz
Above 1000	☒ Peak ☒ Average	☒ 1 MHz ☒ 1 MHz	☒ 1 MHz ☒ 10 Hz

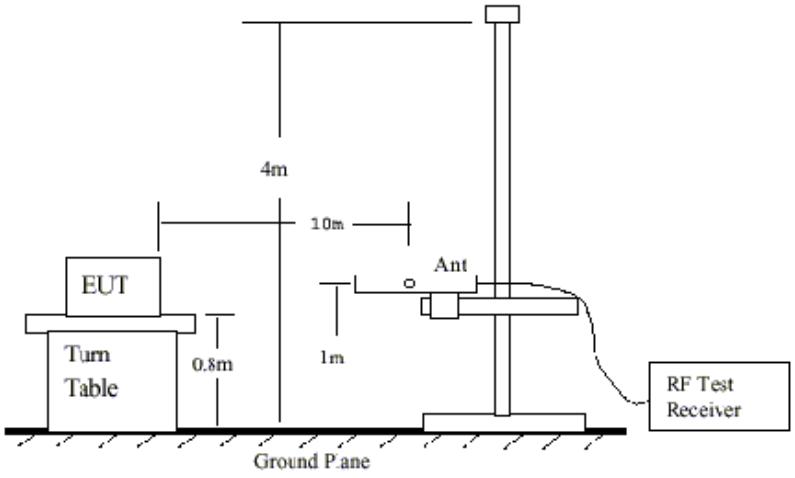


Fig 1: Radiated Emission Measurement 30 to 1000 MHz

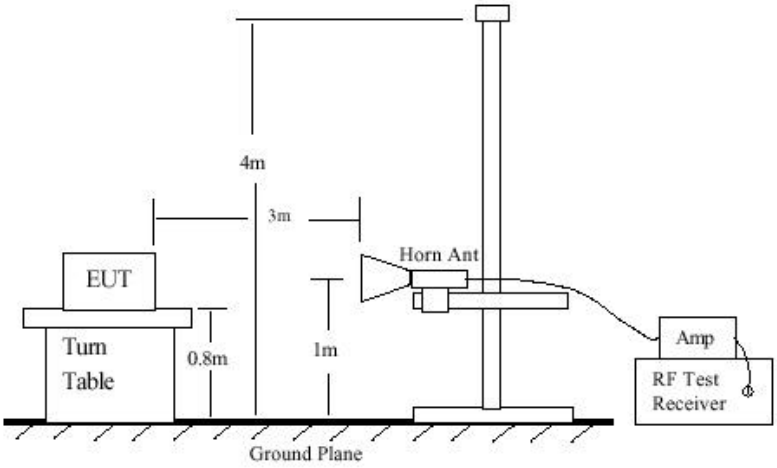


Fig 2: Radiated Emission Above 1000 MHz

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 10 times carrier frequency.
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. This include 30 MHz and up to 10th harmonic of fundamental.

No non-compliance noted. See data below.

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 #:	02U1263-1
Report #:	020426B1
Date& Time:	04/26/02 3:05 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 with 7.4 dBi
Type of Test:	FCC 15.209
Mode of Operation:	PINGING and RX MODE

<< 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)
227.59	58.10	10.63	3.20	29.01	42.91	46.00	-3.09	3mH	225.00	1.00	P
227.59	56.40	10.63	3.20	29.01	41.21	46.00	-4.79	3mV	315.00	1.00	P
650.28	45.20	18.77	6.21	29.62	40.56	46.00	-5.44	3mV	180.00	1.00	P
260.11	53.60	12.31	3.46	28.90	40.47	46.00	-5.53	3mH	170.00	1.00	P
292.62	51.60	12.84	3.72	28.83	39.33	46.00	-6.67	3mH	270.00	1.00	P
487.71	46.30	17.14	5.16	29.71	38.89	46.00	-7.11	3mH	200.00	1.30	P
6 Worst Data											

COMPLIANCE CERTIFICATION SERVICES, INC.

Radiated Emissions 04/29/02
FCC 15.205 Kerwin Corpuz
B-site (1.5 Meter)

FHP Wireless Inc.
802.11b Wireless Meshed Router "SmartPoint" (M/N: WMR530-01-00BC-C-N-XX)

fo = 2412 MHz (low channel) ***TX mode with ANTENNA R / OMNI 7.4 dBi***

FREQ (MHz)	READING (dBuV)		AF (dB)	CL (dB)	AMP (dB)	DIST (dB)	HPF (dB)	TOTAL (dBuV/m)		LIMIT (dBuV/m)		MARGIN (dB)	
	Pk	Avg						Pk	Avg	Pk	Avg	Pk	Avg
4824V	50.8	44	33.4	4	36.1	6	1	47.1	40.3	74	54	-26.9	-13.7
4824H	46.3	36.8	33.4	4	36.1	6	1	42.6	33.1	74	54	-31.4	-20.9
7236*	44.6	34.5	37	5	36.4	6	1	45.2	35.1	74	54	-28.8	-18.9
9648V	50.1	42.9	38.4	5.9	35.5	6	1	53.9	46.7	74	54	-20.1	-7.3
9648H	48.9	41.5	38.4	5.9	35.5	6	1	52.7	45.3	74	54	-21.3	-8.7
12060*	47.6	36	39.3	6.5	36.3	6	1	52.1	40.5	74	54	-21.9	-13.5
14472*	49.9	38.9	41.2	7.5	38	6	1	55.6	44.6	74	54	-18.4	-9.4
16884*	50	39	41.5	8.5	38.9	6	1	56.1	45.1	74	54	-17.9	-8.9
19296*	52.8	42.8	31.9	9.4	39.3	6	1	49.8	39.8	74	54	-24.2	-14.2
21708*	53.1	42.8	32.5	10.2	38.1	6	1	52.7	42.4	74	54	-21.3	-11.6
24120*	53	41.6	32.5	10.9	39.4	6	1	52	40.6	74	54	-22	-13.4

fo = 2437 MHz (mid channel) ***TX mode with ANTENNA R / OMNI 7.4 dBi***

FREQ (MHz)	READING (dBuV)		AF (dB)	CL (dB)	AMP (dB)	DIST (dB)	HPF (dB)	TOTAL (dBuV/m)		LIMIT (dBuV/m)		MARGIN (dB)	
	Pk	Avg						Pk	Avg	Pk	Avg	Pk	Avg
4874V	53.1	47.6	33.4	4	36.1	6	1	49.4	43.9	74	54	-24.6	-10.1
4874H	47.6	40.4	33.4	4	36.1	6	1	43.9	36.7	74	54	-30.1	-17.3
7311*	44.6	34.5	37	5	36.4	6	1	45.2	35.1	74	54	-28.8	-18.9
9748V	51.2	46.6	38.4	5.9	35.5	6	1	55	50.4	74	54	-19	-3.6
9748H	47.5	40	38.4	5.9	35.5	6	1	51.3	43.8	74	54	-22.7	-10.2
12185*	47.6	36	39.3	6.5	36.3	6	1	52.1	40.5	74	54	-21.9	-13.5
14622*	49.9	38.9	41.2	7.5	38	6	1	55.6	44.6	74	54	-18.4	-9.4
17059*	50	39	41.5	8.5	38.9	6	1	56.1	45.1	74	54	-17.9	-8.9
19496*	52.8	42.8	31.9	9.4	39.3	6	1	49.8	39.8	74	54	-24.2	-14.2
21933*	53.1	42.8	32.5	10.2	38.1	6	1	52.7	42.4	74	54	-21.3	-11.6
24370*	53	41.6	32.5	10.9	39.4	6	1	52	40.6	74	54	-22	-13.4

fo = 2462 MHz (high channel) ***TX mode with ANTENNA R / OMNI 7.4 dBi***

FREQ (MHz)	READING (dBuV)		AF (dB)	CL (dB)	AMP (dB)	DIST (dB)	HPF (dB)	TOTAL (dBuV/m)		LIMIT (dBuV/m)		MARGIN (dB)	
	Pk	**Avg**						**Pk**	**Avg**	**Pk**	**Avg**	**Pk**	**Avg**
4924V	55	51.1	33.4	4	36.1	6	1	51.3	47.4	74	54	-22.7	-6.6
4924H	47.7	40.9	33.4	4	36.1	6	1	44	37.2	74	54	-30	-16.8
7386*	44.6	34.5	37	5	36.4	6	1	45.2	35.1	74	54	-28.8	-18.9
9848V	50.3	46.1	38.4	5.9	35.5	6	1	54.1	49.9	74	54	-19.9	-4.1
9848H	47.3	40.6	38.4	5.9	35.5	6	1	51.1	44.4	74	54	-22.9	-9.6
12310*	47.6	36	39.3	6.5	36.3	6	1	52.1	40.5	74	54	-21.9	-13.5
14772*	49.9	38.9	41.2	7.5	38	6	1	55.6	44.6	74	54	-18.4	-9.4
17234*	50	39	41.5	8.5	38.9	6	1	56.1	45.1	74	54	-17.9	-8.9
19696*	52.8	42.8	31.9	9.4	39.3	6	1	49.8	39.8	74	54	-24.2	-14.2
22158*	53.1	42.8	32.5	10.2	38.1	6	1	52.7	42.4	74	54	-21.3	-11.6
24620*	53	41.6	32.5	10.9	39.4	6	1	52	40.6	74	54	-22	-13.4

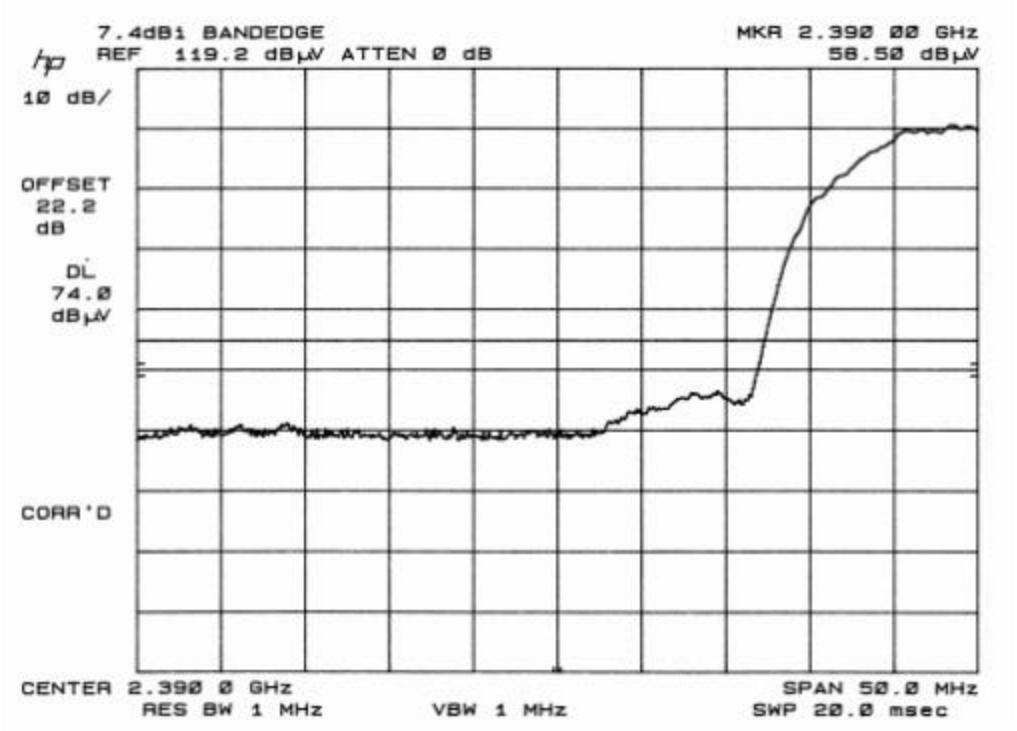
Spot check ANTENNA L and emissions are worst at ANTENNA R.
NOTE: * Measured noise floor (worse case vertical), horizontal (H) and vertical (V)
DIST: extrapolate reading from 3m specification distance to 1.5m measurement distance = **-6.0dB**
AF: Antenna Factor
AMP: Pre-amp gain
CL: SMA cable loss (13ft)
HPF: FSY High pass filter insertion loss (4.57GHz; S/N:003)

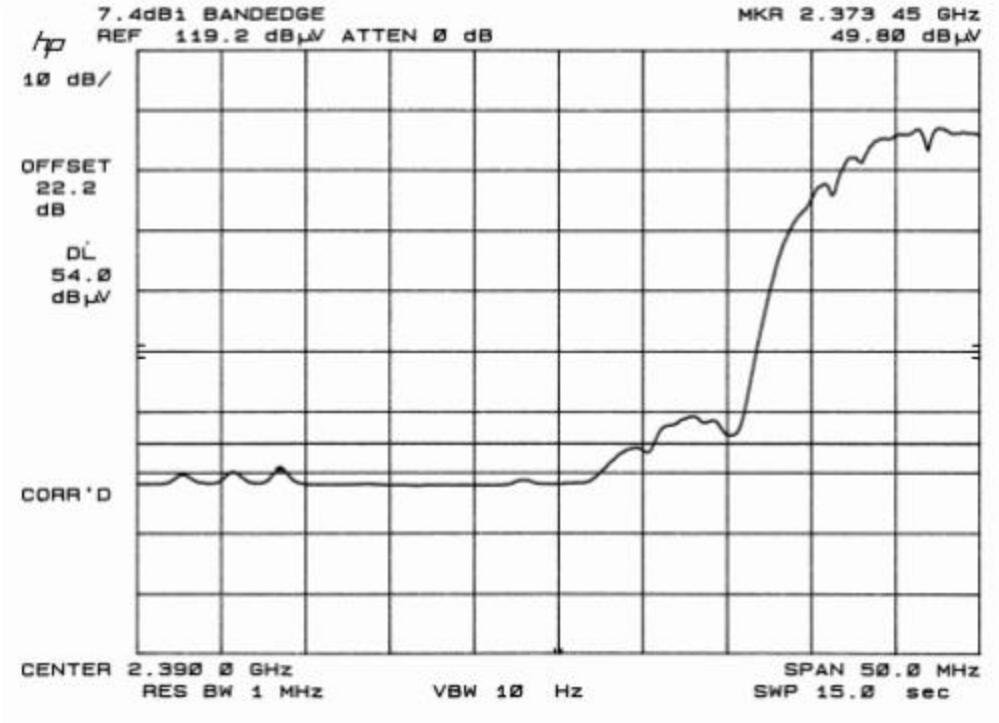
ANALYZER SETTINGS	**RES BW**	**AVG BW**
Peak(Pk):	**1MHz**	**1MHz**
Average(Avg):	**1MHz**	**10Hz**

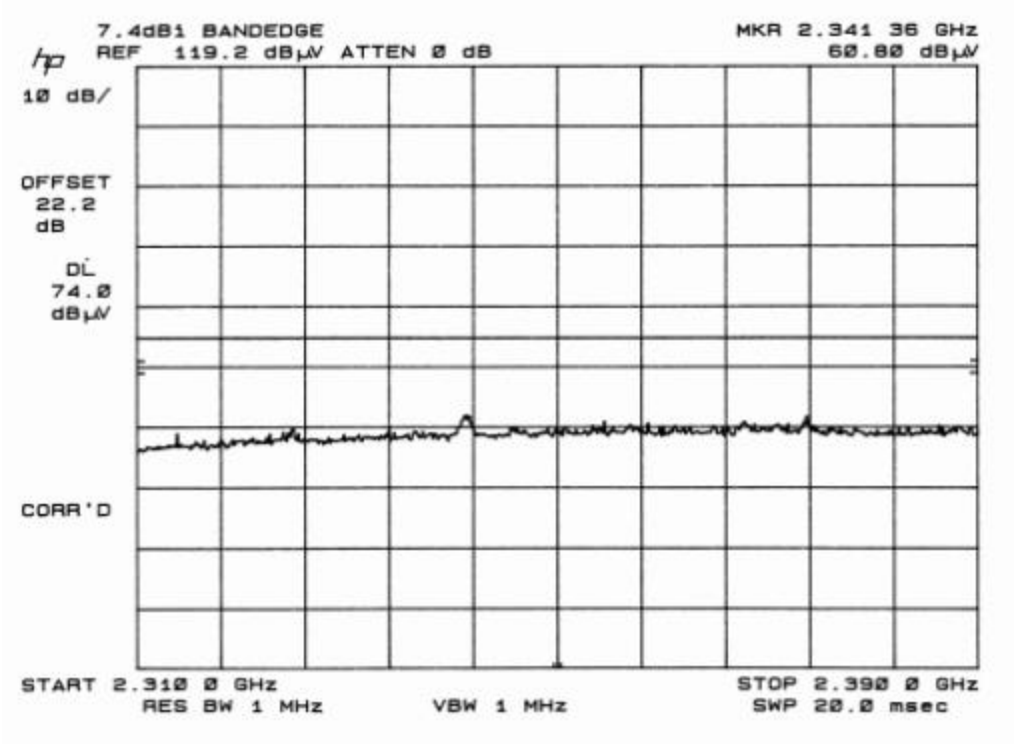
RESTRICTED BANDEDGE: 2310 – 2390 MHz and 2483.5 – 2500 MHz

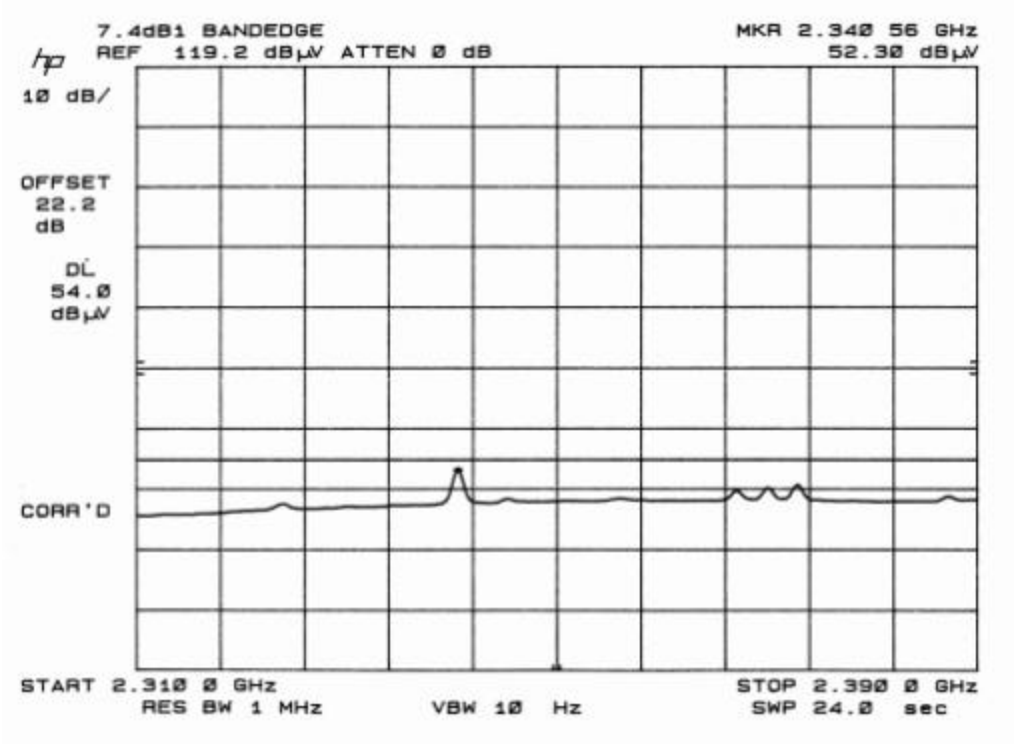
NOTE: SPOT CHECK ANTENNA-R & L, ANTENNA-R WORST CASE

BOTTOM BANDEDGE @ ANTENNA-R LOW CHANNEL

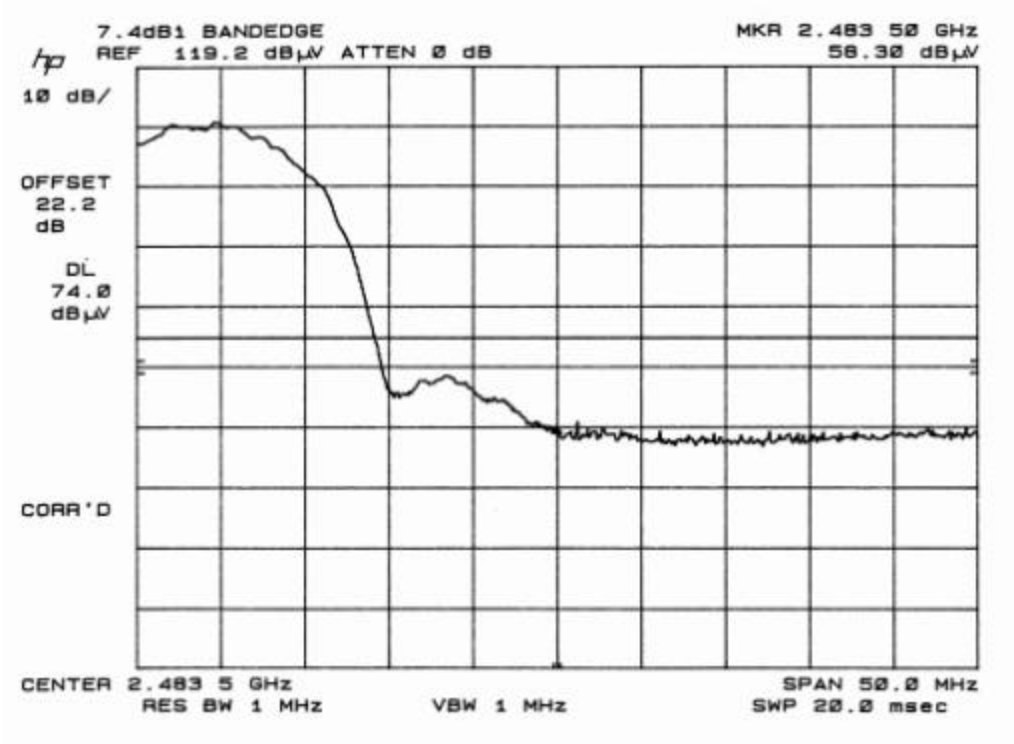


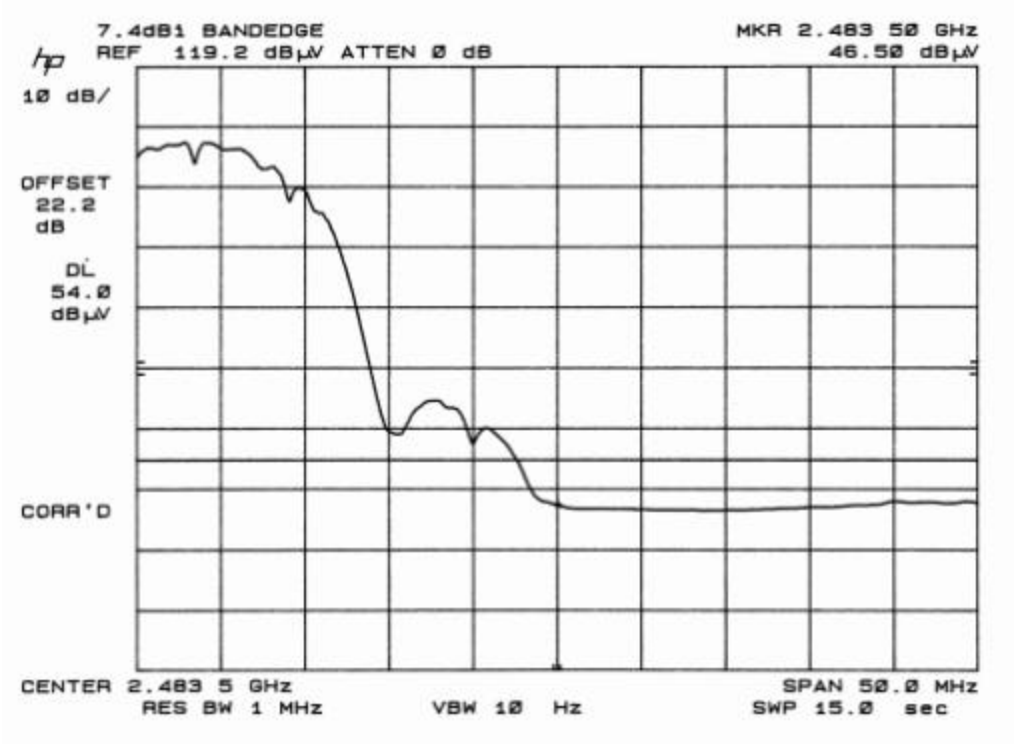






TOP BANDEDGE @ ANTENNA-R HIGH CHANNEL



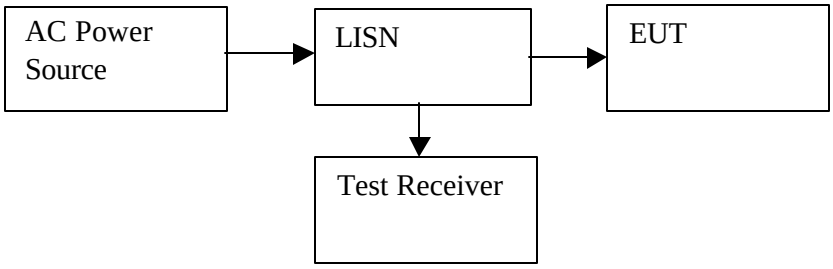


9.8. POWER LINE CONDUCTED EMISSION

TEST SETUP

Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
450 KHz to 30 MHz	☐ Peak ☒ Quasi Peak	☒ 9 KHz	☒ 9 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.

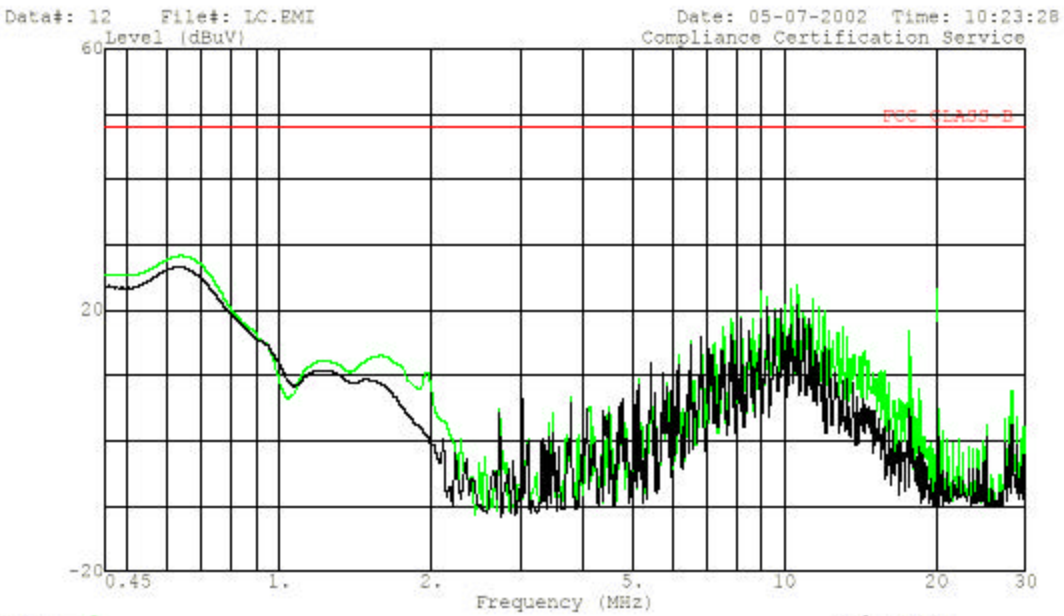
RESULT

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
0.51	--	25.46	--	0.00	48.00	--	-22.54	--	L1
0.64	--	28.33	--	0.00	48.00	--	-19.67	--	L1
0.69	--	27.53	--	0.00	48.00	--	-20.47	--	L1
0.53	--	23.75	--	0.00	48.00	--	-24.25	--	L2
0.62	--	26.59	--	0.00	48.00	--	-21.41	--	L2
0.67	--	26.06	--	0.00	48.00	--	-21.94	--	L2
6 Worst Data									

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



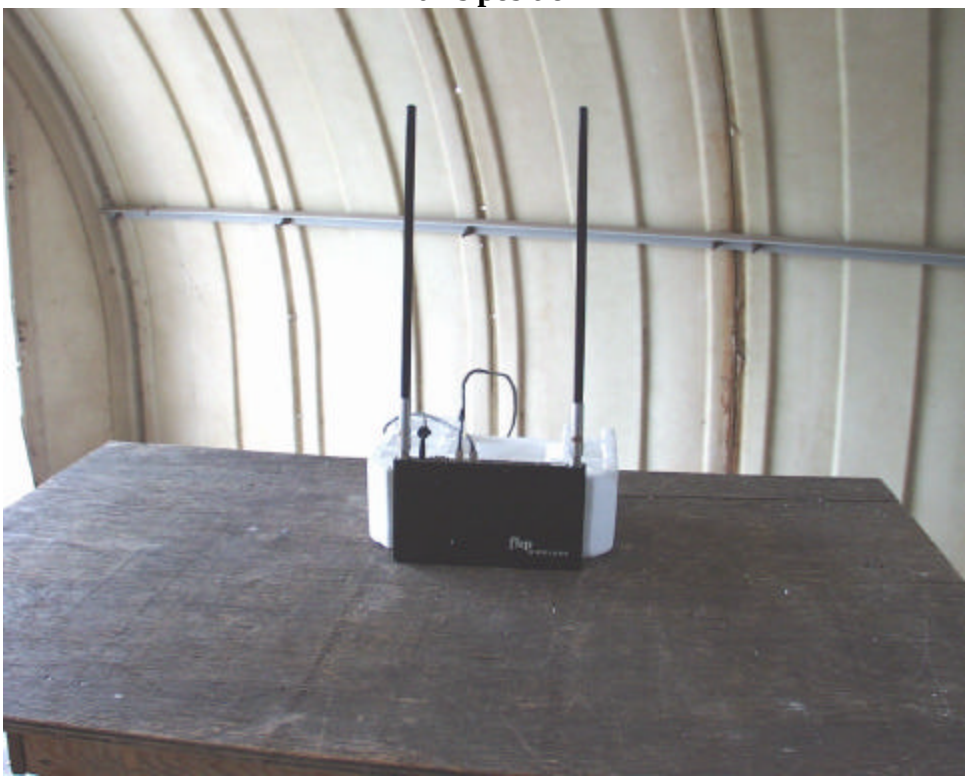
Trace: 5 Ref Trace:
Project # : 02U1263-1
Test Engineer: Kerwin Corpuz
Company : PHP Wireless, Inc.
EUT : 802.11b Access Point
: Model: IWR 1.0
Test Config : EUT with 7.4 dBi OMNI
Type of Test : FCC 15.207
Mode of Op. : Pinging and Rx mode
: QUASI-PEAK: L1(Green), L2 (Black)
: 115Vac, 60Hz

9.9. SETUP PHOTOS

Radiated Emission below 1 GHz measurement

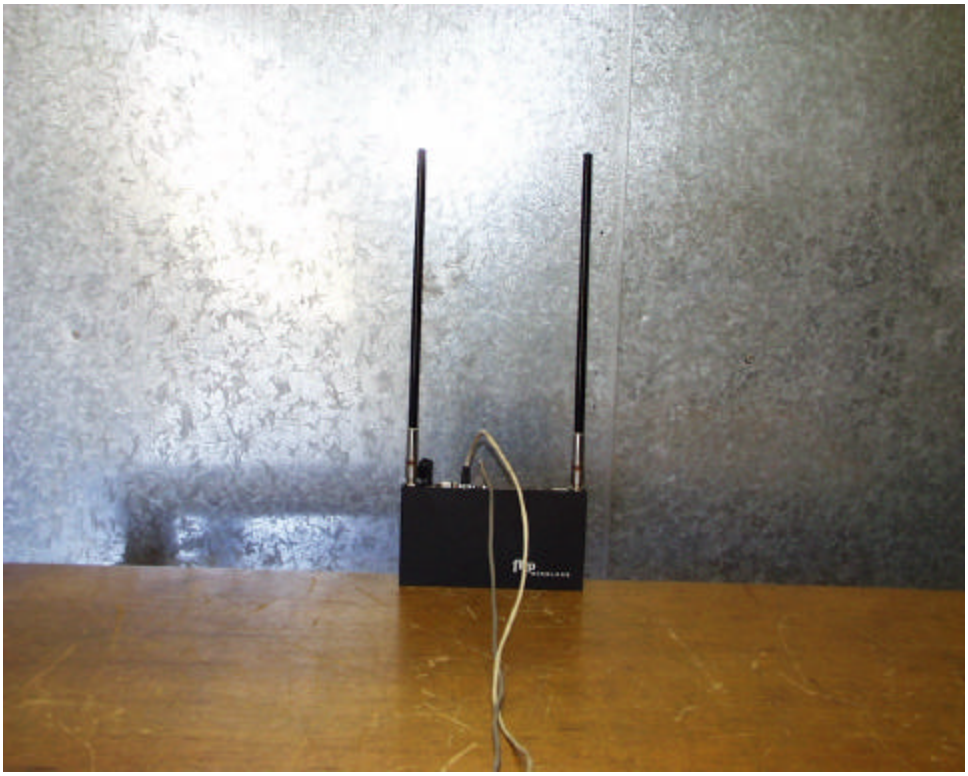
X axis position

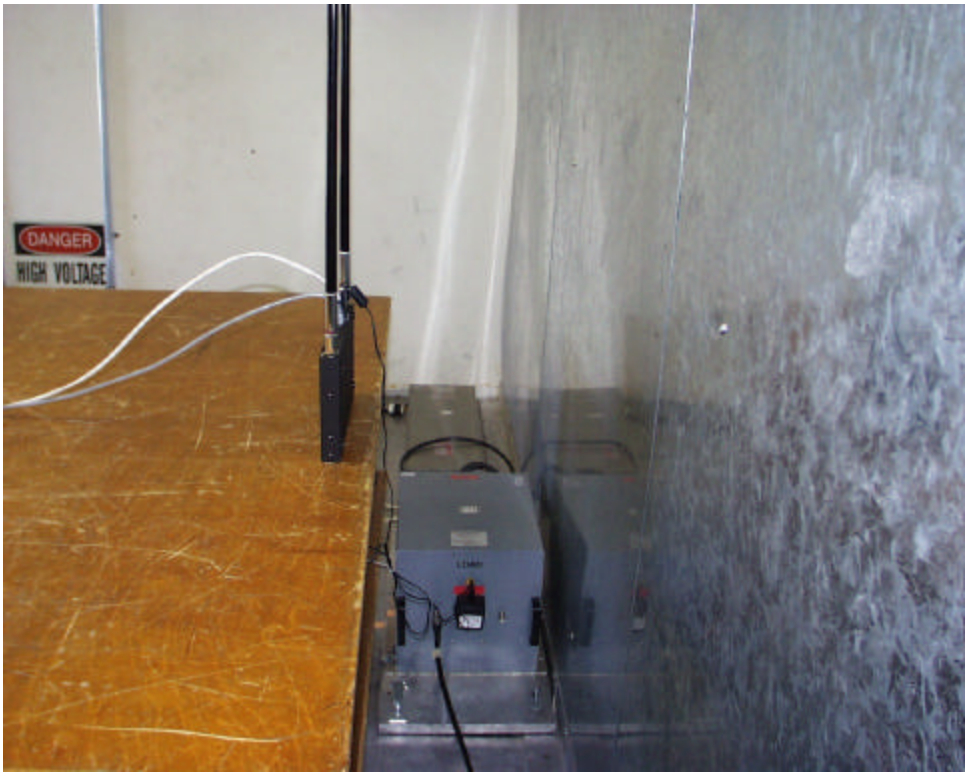
Y axis position



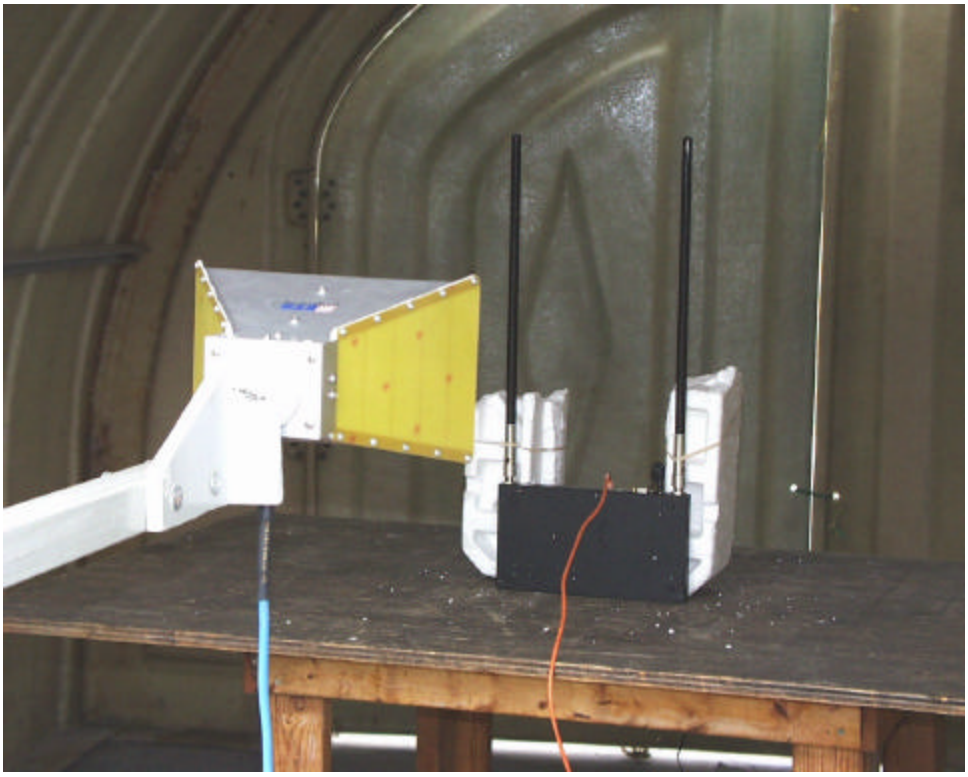
Z axis position

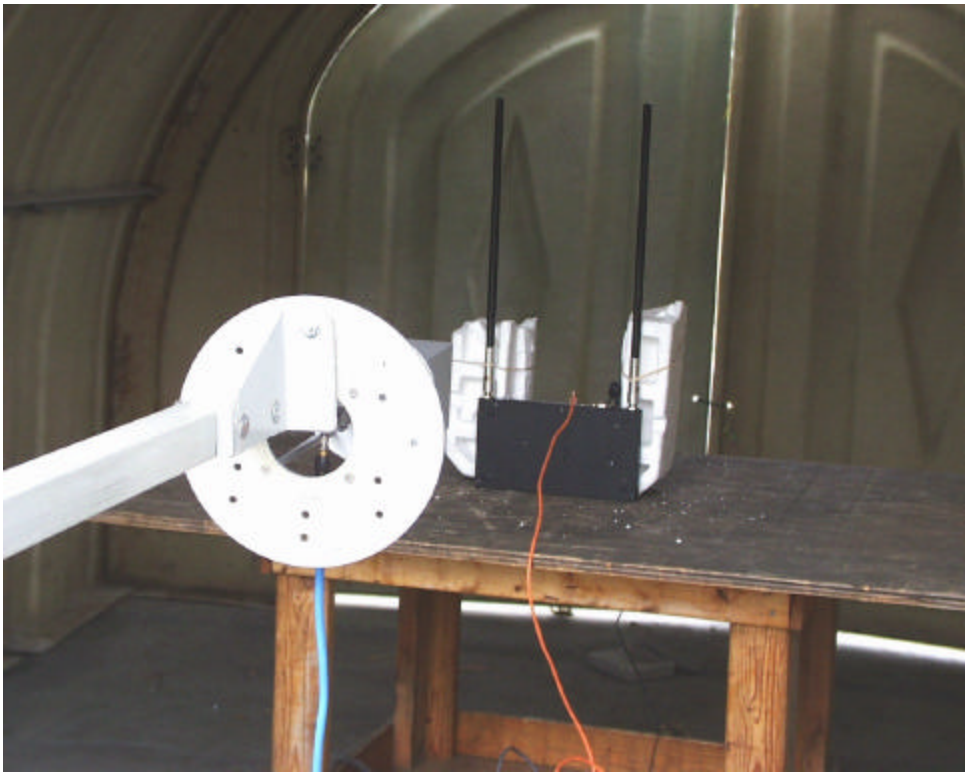
Conducted Emission Measurement



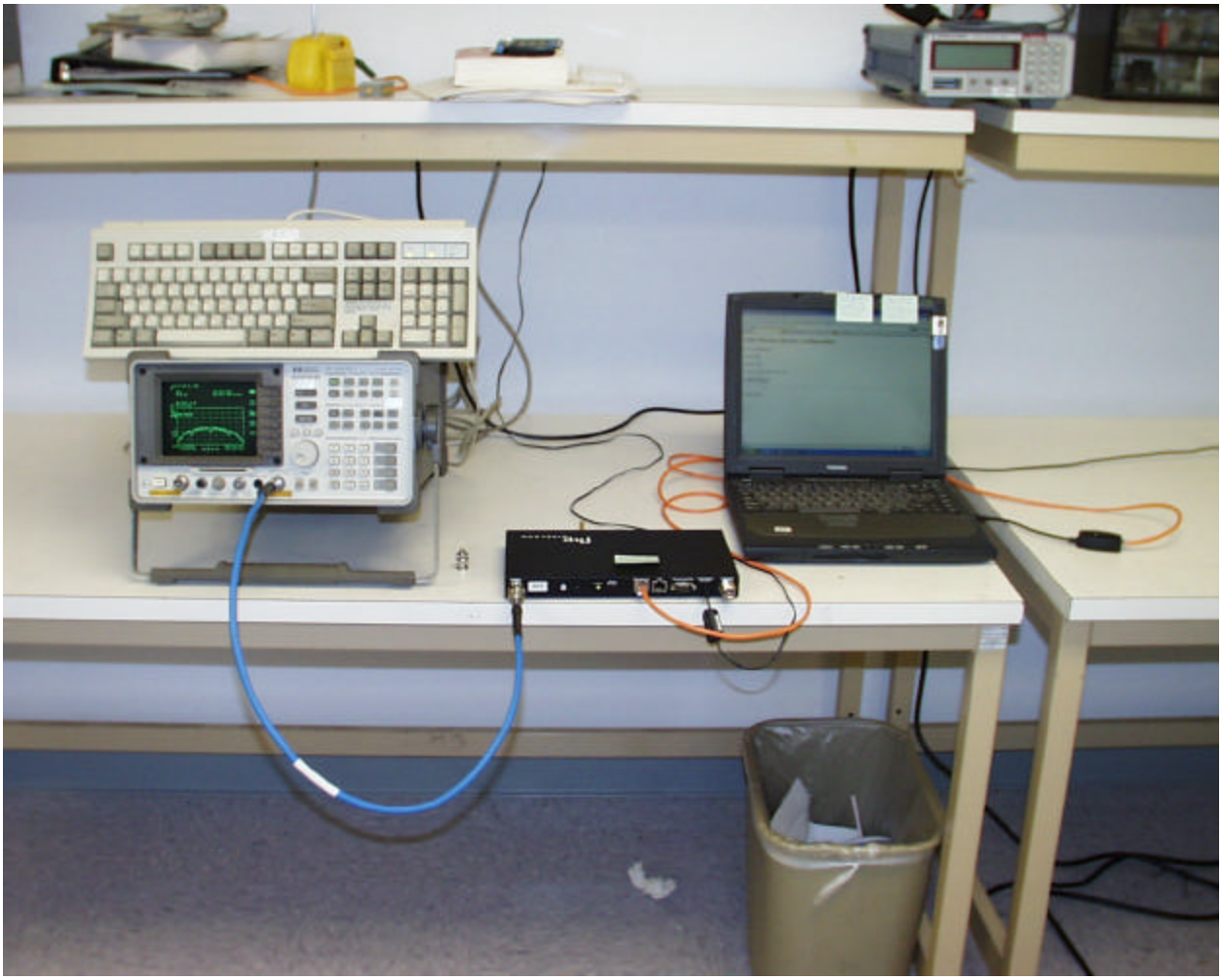


Radiated Emission above 1 GHz Measurement





Antenna Port Terminal Measurement



END OF REPORT