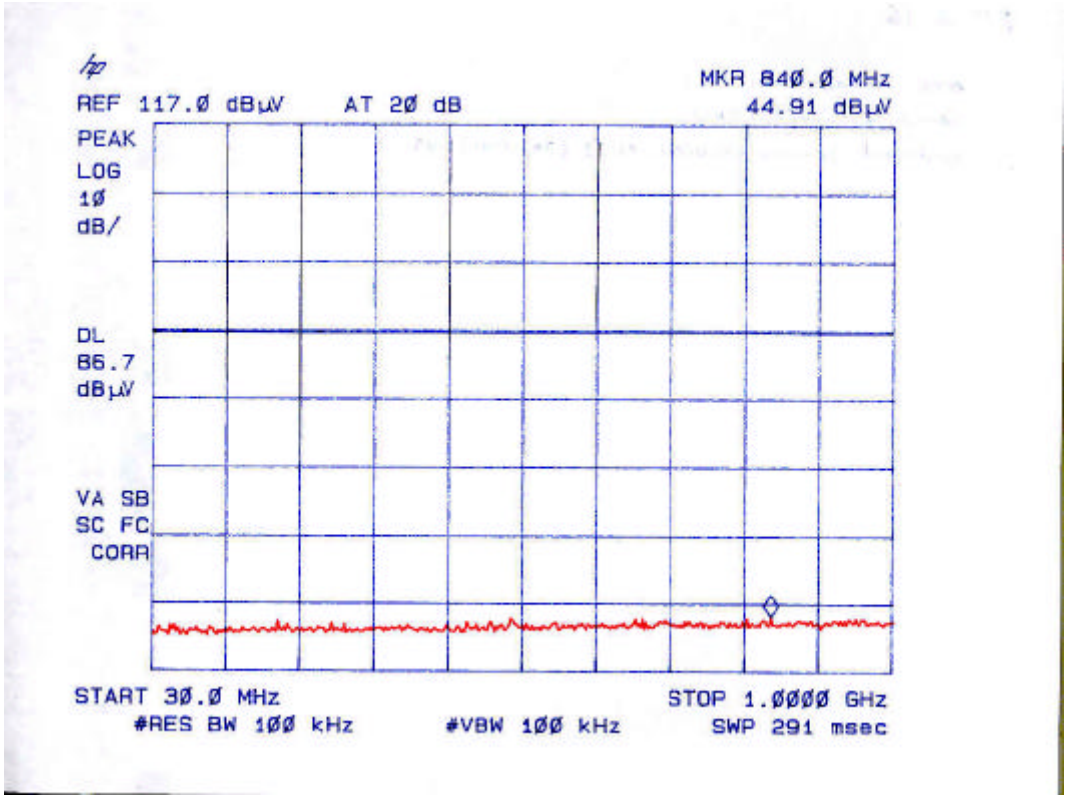
HIGH CHANNEL
CONDUCTED SPURIOUS EMISSIONS CH11 (30-1000MHz)



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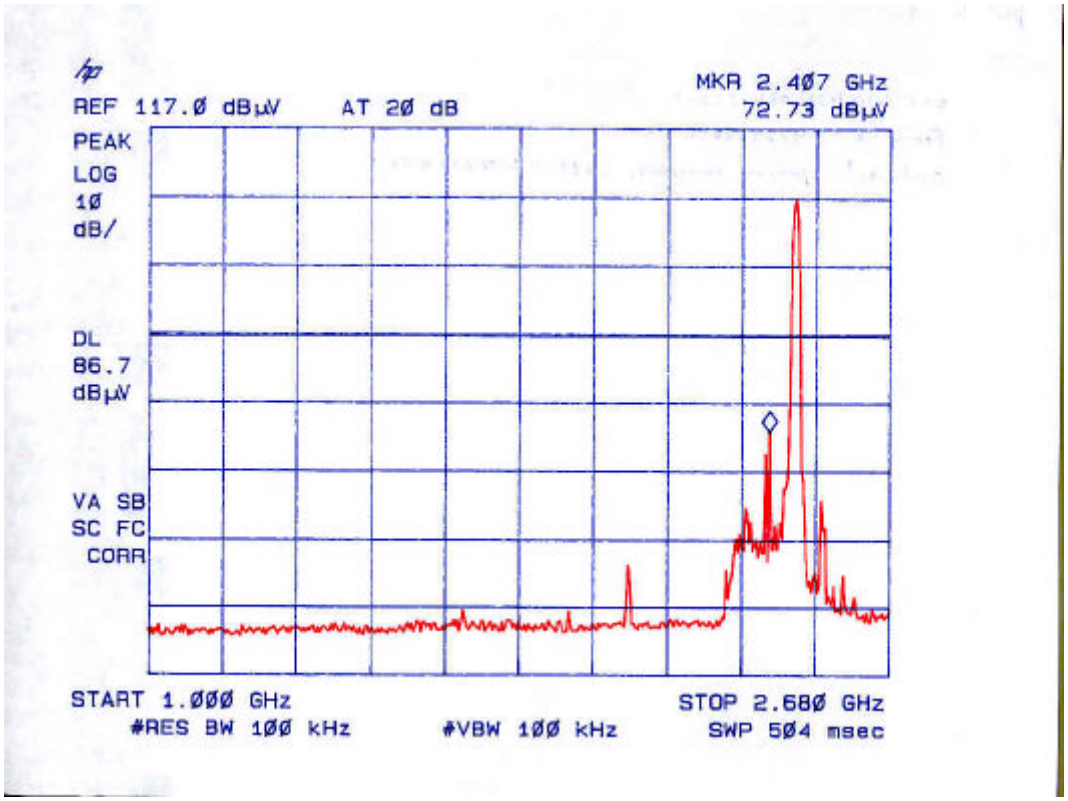
HIGH CHANNEL
CONDUCTED SPURIOUS EMISSIONS CH11 (1-2.68GHz)



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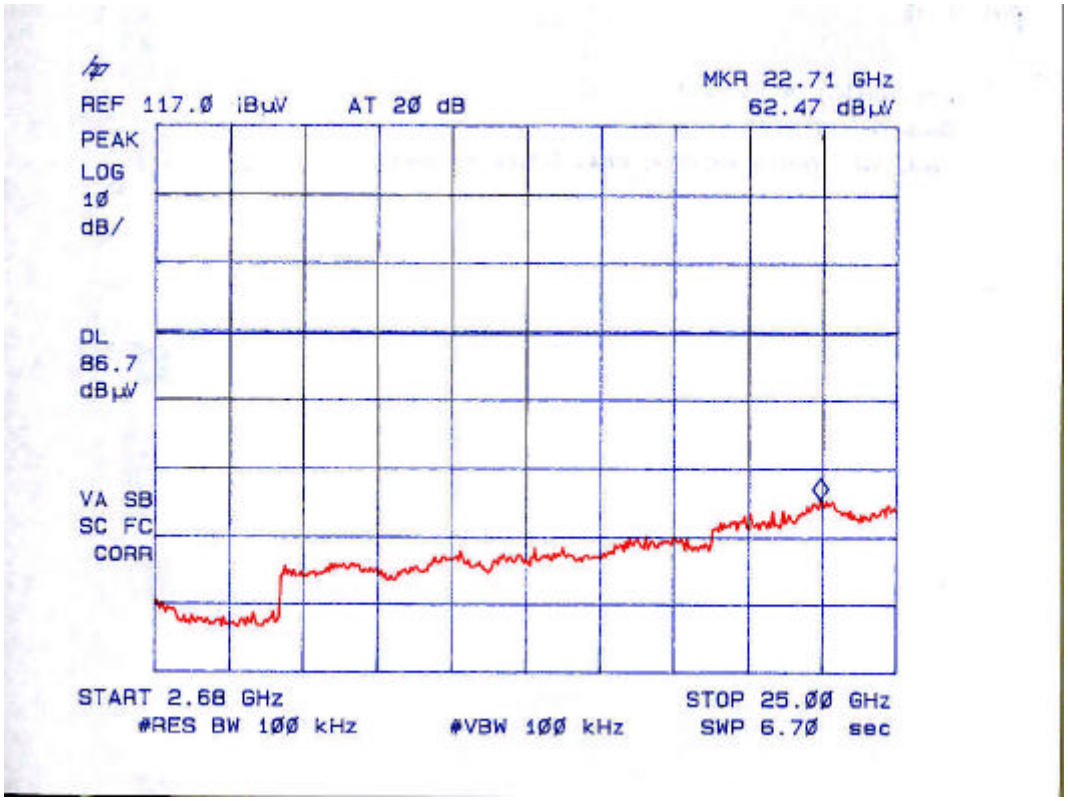
HIGH CHANNEL
CONDUCTED SPURIOUS EMISSIONS CH11 (2.68-25GHz)



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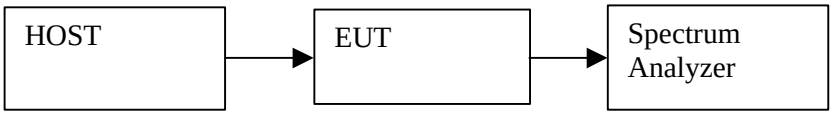
10.4. PEAK POWER SPECTRAL DENSITY

TEST SETUP

Detector Function Setting of Test Receiver

Frequency Range (MHz)	Detector Function	Resolution Bandwidth	Video Bandwidth
Above 1000	☒ Peak	☒ 3 kHz	☒ 10 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 10 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 LOW, MID, HIGH channels

CHANNEL	FREQ (MHz)	RESULT (dBm)
LOW	2412	-14.6
MIDDLE	2437	-15.2
HIGH	2462	-15.2

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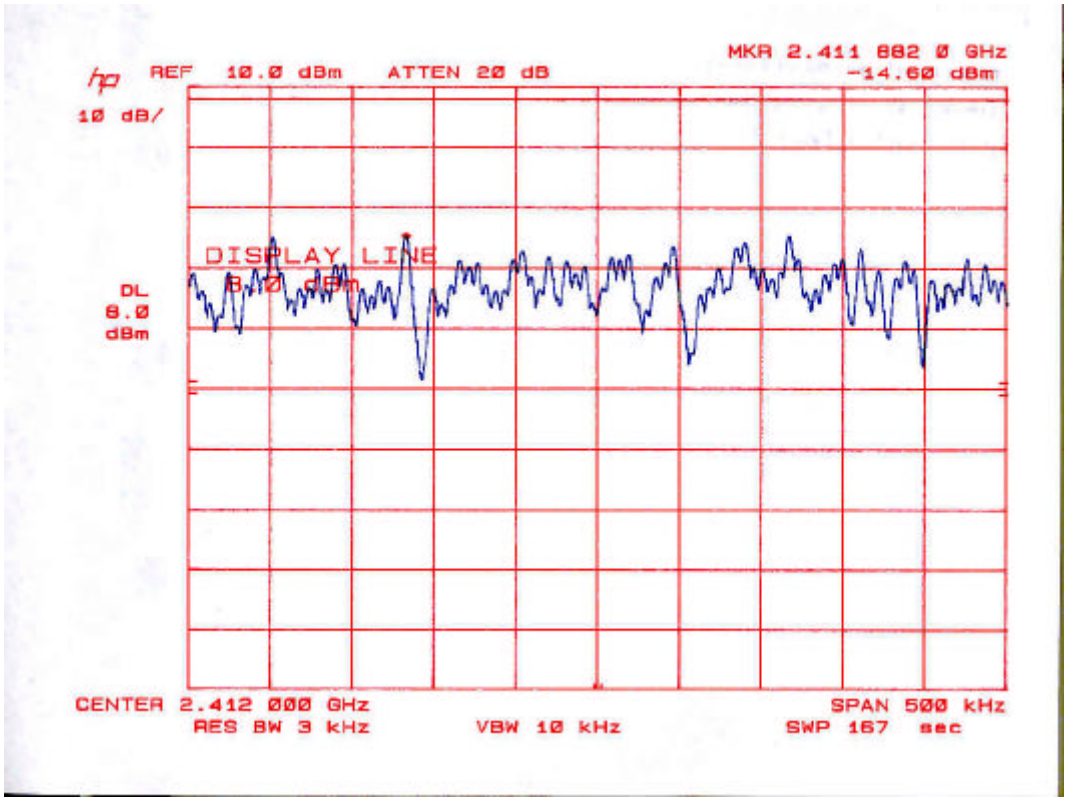
LOW CHANNEL
PSD CH1



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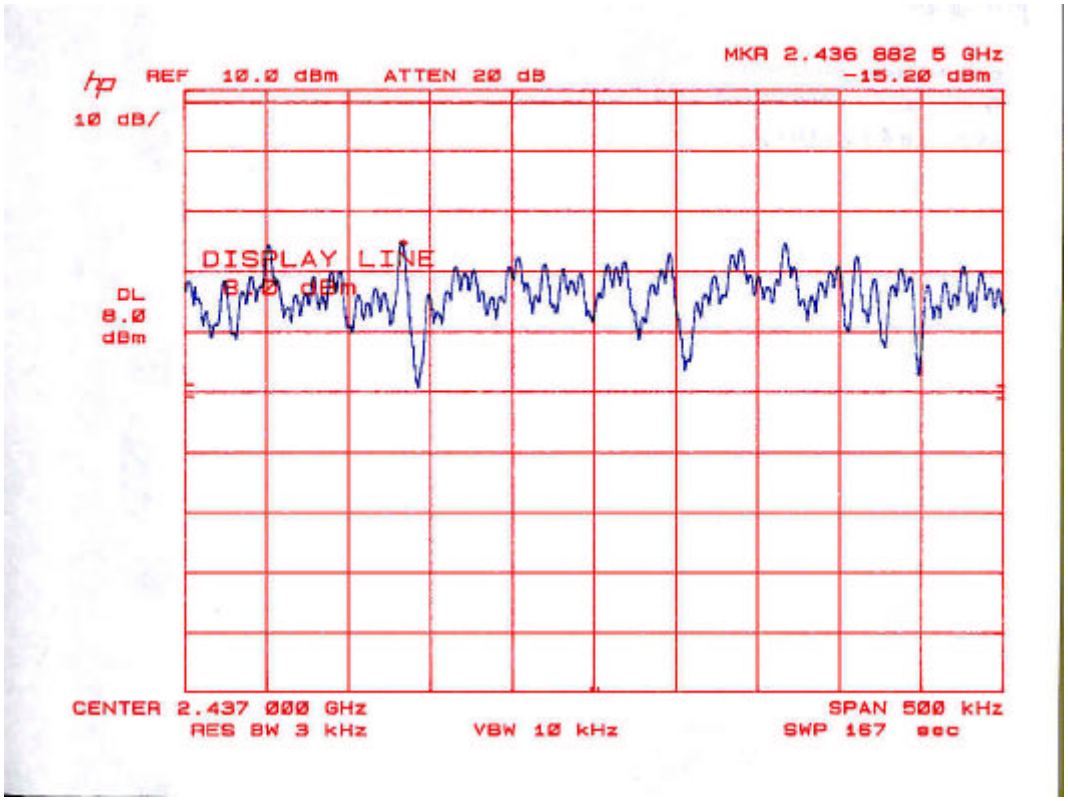
MIDDLE CHANNEL
PSD CH6



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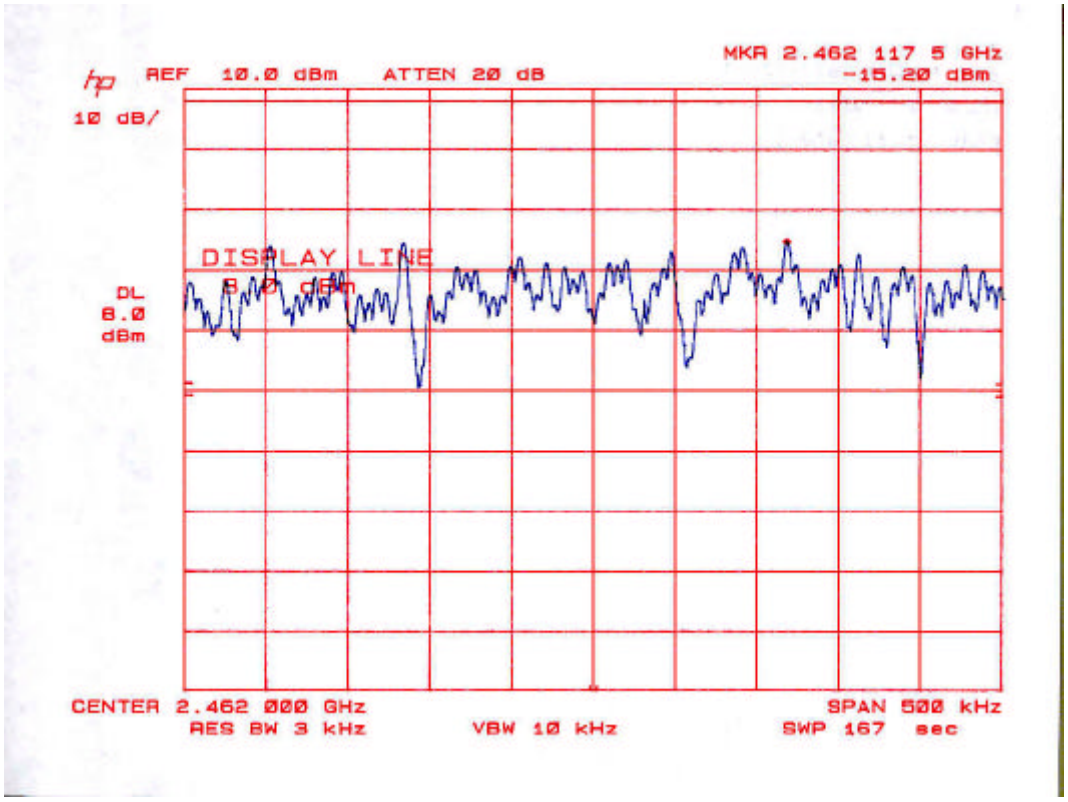
HIGH CHANNEL
PSD CH11



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10.5. RADIATED EMISSION

10.5.1. RADIATED EMISSION, BANDEDGES & 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

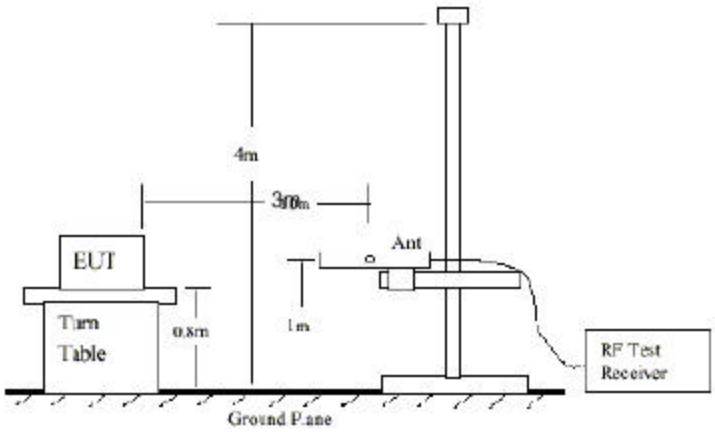

Fig 1: Radiated Emission Measurement 30 to 1000 MHz

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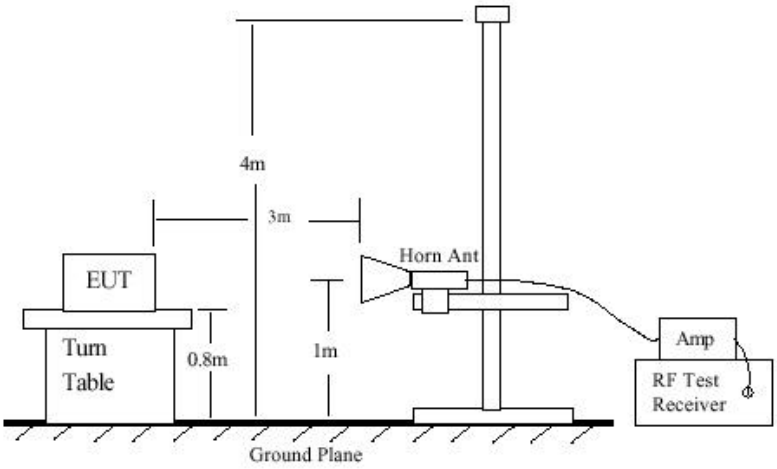

Fig 2: Radiated Emission Above 1000 MHz

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

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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

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 #:	02U1399-1
Report #:	020703C1
Date& Time:	07/03/02 11:58 AM
Test Engr:	Thanh Nguyen

Company:	OTC WIRELESS< INC.
EUT Description:	2.4GHz 802.11b Radio Outdoor Package. Model # AirEZY2411-BT-9
Test Configuration :	EUT, DC Injector
Type of Test:	FCC Part 15, Class B
Mode of Operation:	Rx

<< 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)
440.00	51.40	16.50	3.18	27.59	43.49	46.00	-2.51	3mV	180.00	1.00	P
572.00	49.00	18.59	3.74	28.08	43.26	46.00	-2.74	3mV	180.00	1.00	P
616.00	48.00	19.24	3.92	28.10	43.05	46.00	-2.95	3mV	180.00	1.00	P
528.00	48.50	18.26	3.57	28.00	42.32	46.00	-3.68	3mV	180.00	1.00	P
748.50	43.60	21.32	4.40	27.93	41.40	46.00	-4.60	3mV	180.00	1.00	P
132.00	50.50	13.06	1.50	27.19	37.86	43.50	-5.64	3mV	180.00	1.00	P

No non-compliance noted. See data below.

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07/03/02 FCC Measurement
Compliance Certification Services, Morgan Hill Open Field Site

Equipment for 1-22 GHz
HP8593EM Analyzer
Miteq NSP2600-44 Preamp
EMCO 3115 Antenna
Cable: 13.0 feet
FCC Measurement

Average Measurements:
1 MHz Resolution Bandwidth
10Hz Video Bandwidth

Peak Measurements:
1MHz Resolution Bandwidth
1MHz Video Bandwidth

EUT S/N:
Fundemental 2.412GHZ TX Signal

f	Dist	Read Peak	Read Avg.	AF	CL	Amp	D Corr	HPF	Peak	Avg	Peak Lim	Avg Lim	Peak Mar	Avg Mar	Notes
GHz	feet	dBuV	dBuV	dB/m	dB	dB	dB		dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	
2.412	3.3	81.5	63.4	27.9	3.3	0.0	-9.5	0.0	103.2	85.1					
2.412	3.3	75.5	60.2	27.9	3.3	0.0	-9.5	0.0	97.2	81.9					
4.824	3.3	41.8	40.0	32.6	5.0	-27.0	-9.5	1.0	43.8	42.0	74.0	54.0	-30.2	-12.0	Noise Floor
7.236	3.3	46.4	42.1	36.6	6.3	-41.2	-9.5	1.0	39.6	35.3	74.0	54.0	-34.4	-18.7	Noise Floor
9.640	3.3	46.4	41.0	37.3	7.4	-39.3	-9.5	1.0	43.3	37.9	74.0	54.0	-30.7	-16.1	Noise Floor
12.060	3.3	47.1	41.0	39.0	8.2	-40.1	-9.5	1.0	45.8	39.7	74.0	54.0	-28.2	-14.3	Noise Floor
14.470	3.3	49.9	41.0	39.0	9.1	-40.0	-9.5	1.0	____	____	____	____	____	____	____
16.880	3.3	50.0		____	____	____	-9.5	____	____	____	____	____	____	____	____
19.296	3.3	51.2		____	____	____	-9.5	____	____	____	____	____	____	____	____
21.708	3.3	51.8		____	____	____	-9.5	____	____	____	____	____	____	____	____
24.122	3.3	52.8		32.2	14.2	-44.3	-9.5	1.0	46.4	-6.4	74.0	54.0	-27.6	-60.4	Noise Floor

* No other emissions were found within 20dB under the FCC limits up to 10 Harmonics.

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

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07/03/02 FCC Measurement
Compliance Certification Services, Morgan Hill Open Field Site

Equipment for 1-22 GHz
HP8593EM Analyzer
Miteq NSP2600-44 Preamp
EMCO 3115 Antenna
Cable: 13.0 feet
FCC Measurement

Average Measurements:
1 MHz Resolution Bandwidth
10Hz Video Bandwidth

Peak Measurements:
1MHz Resolution Bandwidth
1MHz Video Bandwidth

EUT S/N:
Fundemental 2.437GHZ TX Signal

f	Dist	Read Peak	Read Avg.	AF	CL	Amp	D Corr	HPF	Peak	Avg	Peak Lim	Avg Lim	Peak Mar	Avg Mar	Notes
GHz	feet	dBuV	dBuV	dB/m	dB	dB	dB		dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	
2.437	3.3	81.3	63.1	27.9	3.3	0.0	-9.5	0.0	103.1	84.9					
2.437	3.3	75.2	61.0	27.9	3.3	0.0	-9.5	0.0	97.0	82.8					
4.874	3.3	42.3	40.0	32.7	5.0	-27.0	-9.5	1.0	44.5	42.2	74.0	54.0	-29.5	-11.8	Noise Floor
7.311	3.3	45.7	41.2	36.7	6.3	-41.1	-9.5	1.0	39.1	34.6	74.0	54.0	-34.9	-19.4	Noise Floor
9.748	3.3	46.1	41.3	37.5	7.4	-39.3	-9.5	1.0	43.2	38.4	74.0	54.0	-30.8	-15.6	Noise Floor
12.185	3.3	47.2	40.0	39.1	8.3	-40.2	-9.5	1.0	45.9	38.7	74.0	54.0	-28.1	-15.3	Noise Floor
14.622	3.3	51.3	42.3	39.0	9.1	-40.0	-9.5	1.0	____	____	____	____	____	____	____
17.059	3.3	50.3		____	____	____	-9.5	____	____	____	____	____	____	____	____
19.496	3.3	51.3		____	____	____	-9.5	____	____	____	____	____	____	____	____
21.933	3.3	51.8		____	____	____	-9.5	____	____	____	____	____	____	____	____
24.370	3.3	52.8		32.4	14.4	-44.3	-9.5	1.0	46.8	-6.0	74.0	54.0	-27.2	-60.0	Noise Floor

* No other emissions were found within 20dB under the FCC limits up to 10 Harmonics.

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

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07/03/02 FCC Measurement
Compliance Certification Services, Morgan Hill Open Field Site

Equipment for 1-22 GHz
HP8593EM Analyzer
Miteq NSP2600-44 Preamp
EMCO 3115 Antenna
Cable: 13.0 feet
FCC Measurement

Average Measurements:
1 MHz Resolution Bandwidth
10Hz Video Bandwidth

Peak Measurements:
1MHz Resolution Bandwidth
1MHz Video Bandwidth

EUT S/N:
Fundemental 2.462 GHZ TX Signal

f GHz	Dist feet	Read Peak dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Peak Lim dBuV/m	Avg Lim dBuV/m	Peak Mar dB	Avg Mar dB	Notes
2.462	3.3	82.1	64.1	27.9	3.4	0.0	-9.5	0.0	103.9	85.9					
2.462	3.3	76.3	62.0	27.9	3.4	0.0	-9.5	0.0	98.1	83.8					
4.924	3.3	43.6	41.3	32.8	5.0	-27.0	-9.5	1.0	45.9	43.6	74.0	54.0	-28.1	-10.4	Noise Floor
7.386	3.3	45.2	41.6	36.9	6.4	-41.0	-9.5	1.0	38.9	35.3	74.0	54.0	-35.1	-18.7	Noise Floor
9.848	3.3	46.1	42.1	37.7	7.5	-39.3	-9.5	1.0	43.4	39.4	74.0	54.0	-30.6	-14.6	Noise Floor
12.310	3.3	47.5	43.1	39.2	8.3	-40.3	-9.5	1.0	46.3	41.9	74.0	54.0	-27.7	-12.1	Noise Floor
14.772	3.3	52.1	44.0	39.0	9.1	-40.0	-9.5	1.0	____	____	____	____	____	____	____
17.234	3.3	51.2		____	____	____	-9.5	____	____	____	____	____	____	____	____
19.696	3.3	51.3		____	____	____	-9.5	____	____	____	____	____	____	____	____
22.158	3.3	52.3		____	____	____	-9.5	____	____	____	____	____	____	____	____
24.620	3.3	51.6		32.6	14.5	-44.3	-9.5	1.0	45.9	-5.7	74.0	54.0	-28.1	-59.7	Noise Floor

* No other emissions were found within 20dB under the FCC limits up to 10 Harmonics.

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

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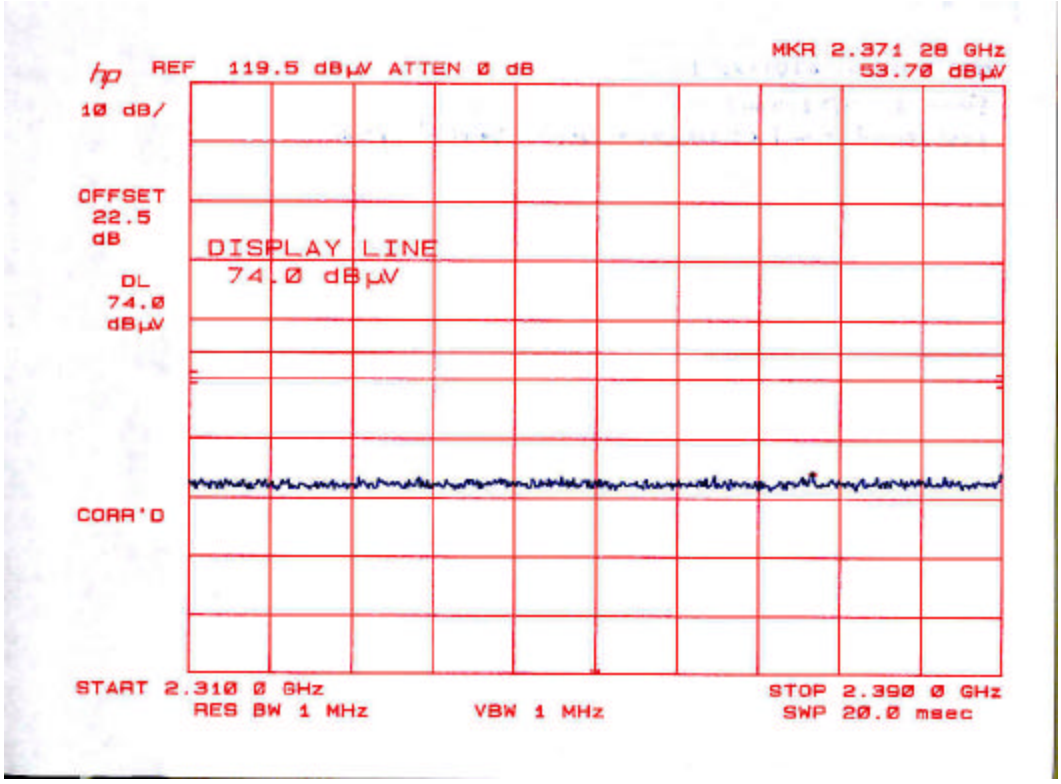
RESTRICTED BANDS: 2310 – 2390 MHz and 2483.5 – 2500 MHz

RESTRICTED BAND 2310-2390MHz, VERTICAL, PEAK



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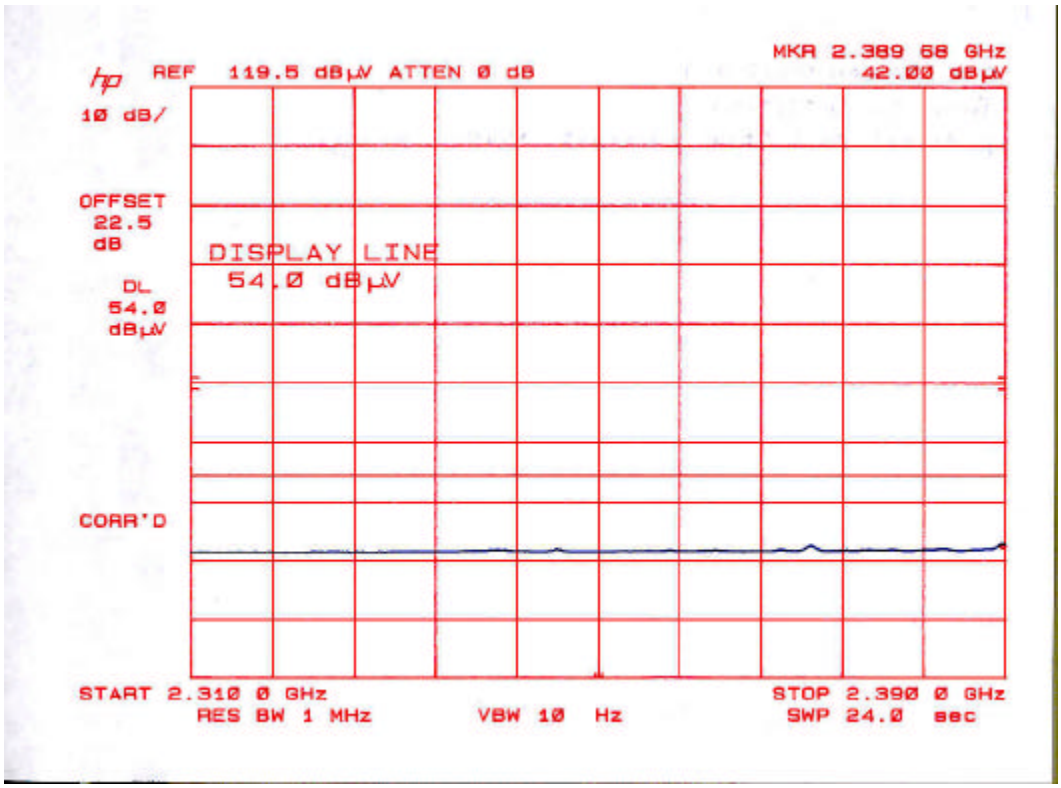
RESTRICTED BAND 2310-2390MHz, VERTICAL, AVERAGE



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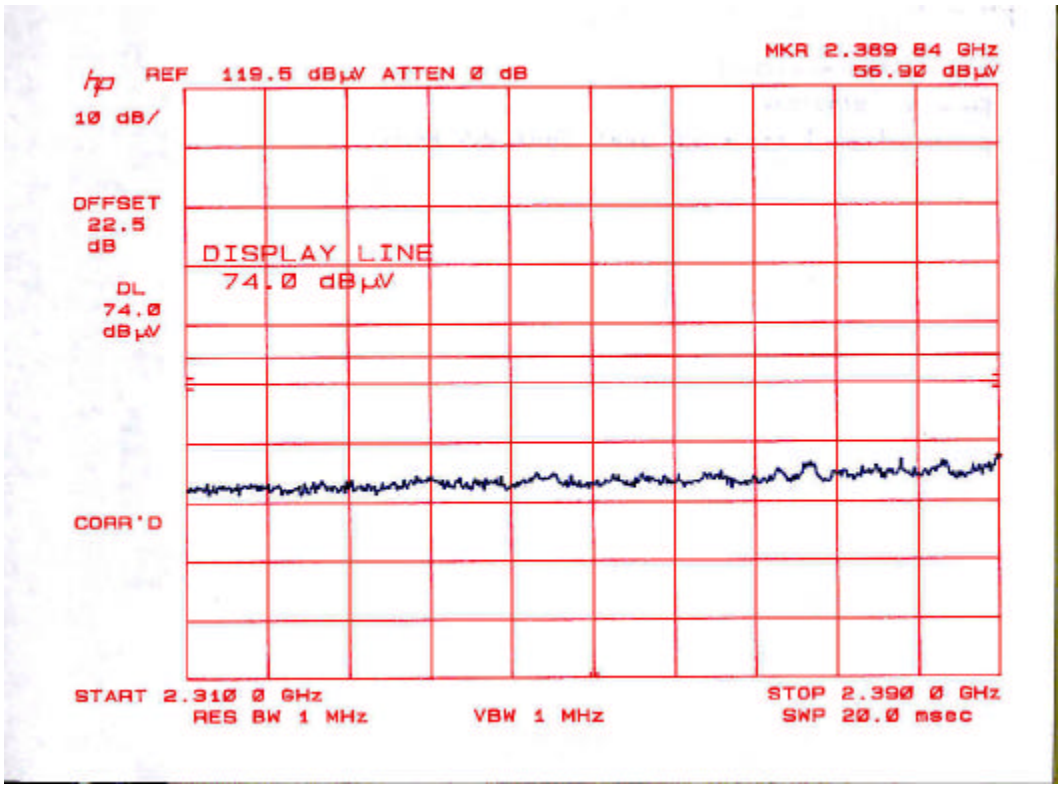
RESTRICTED BAND 2310-2390MHZ, HORIZONTAL, PEAK



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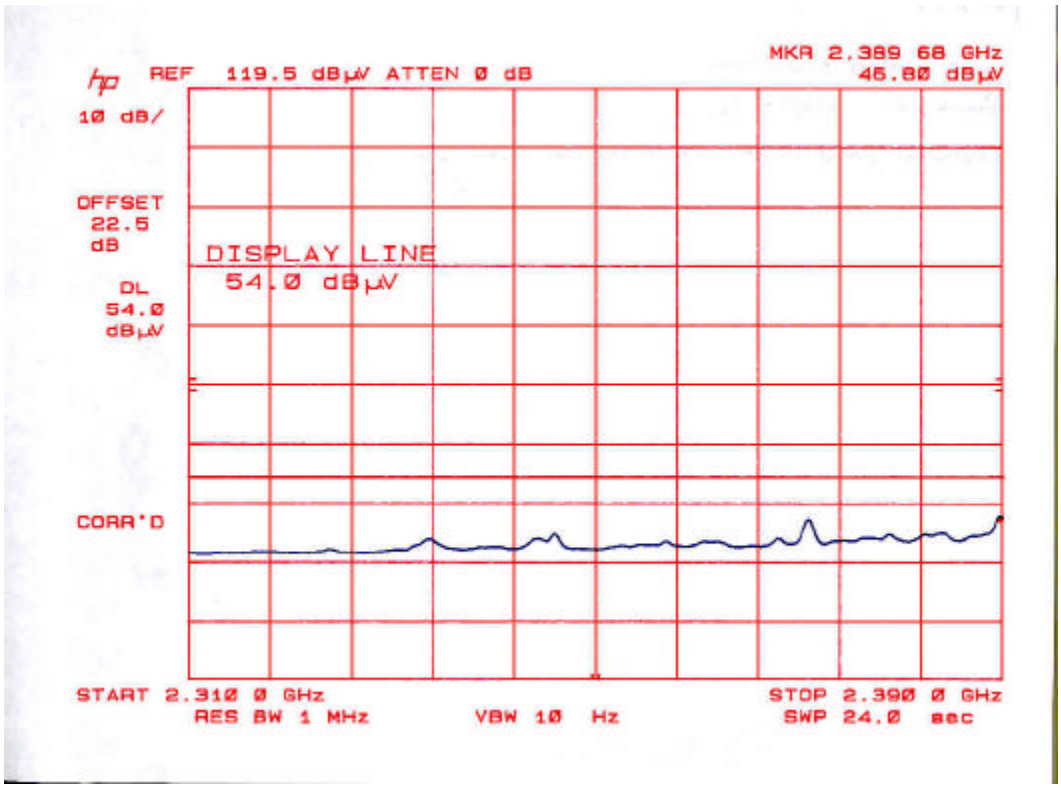
RESTRICTED BAND 2310-2390MHZ, HORIZONTAL, AVERAGE



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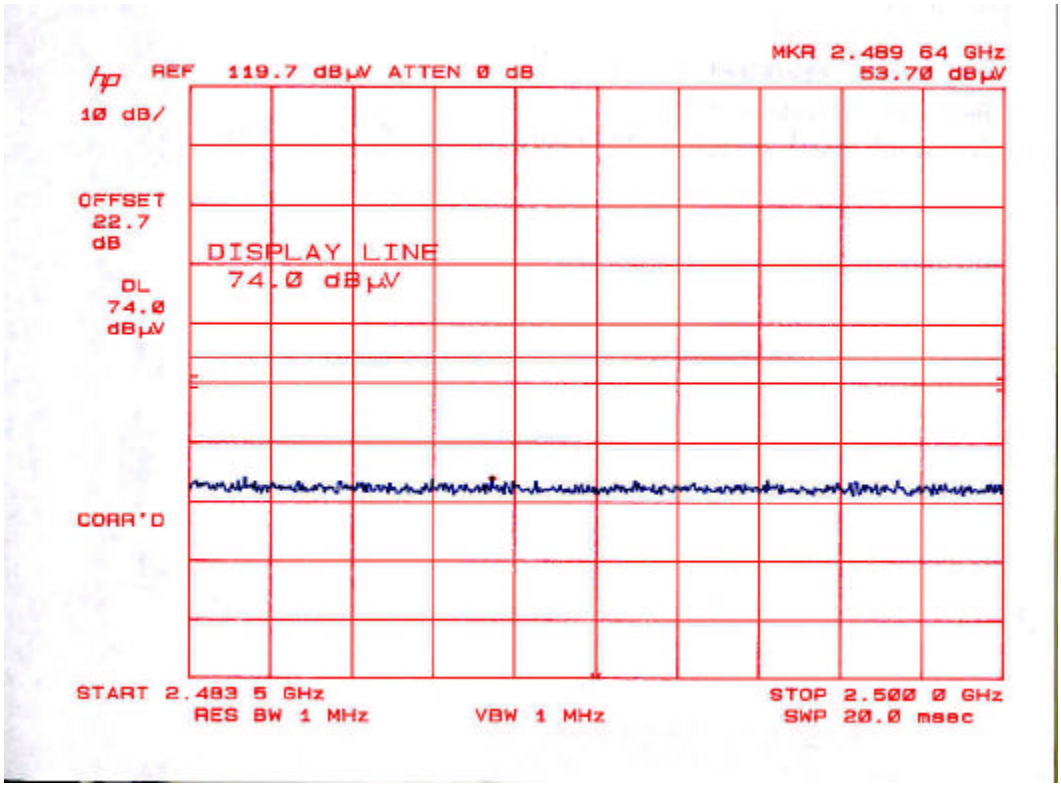
RESTRICTED BAND 2483.5-2500MHZ, VERTICAL, PEAK (CH11)



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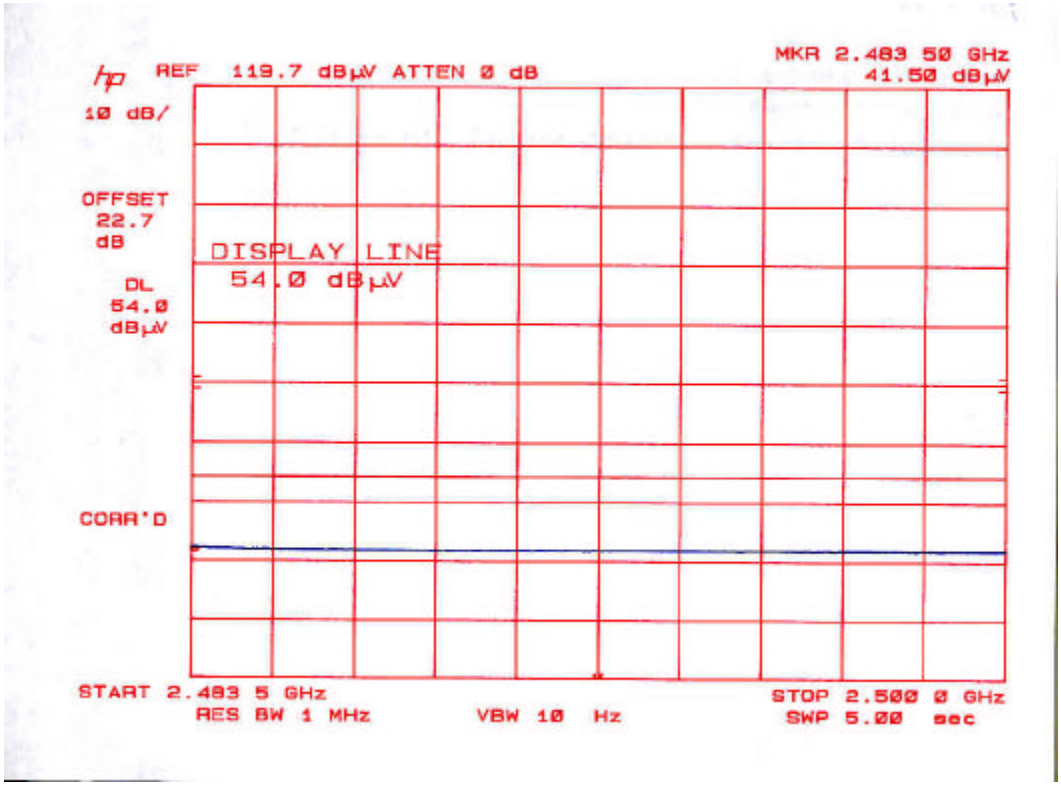
RESTRICTED BAND 2483.5-2500MHZ, VERTICAL, AVERAGE (CH11)



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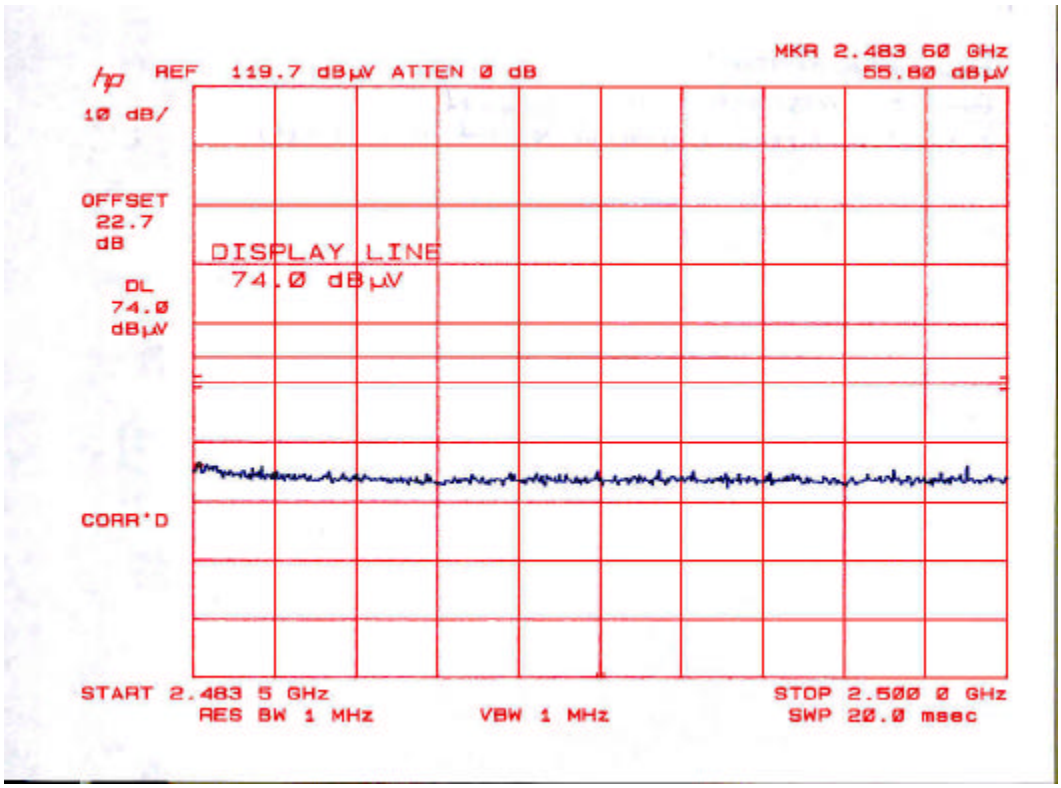
RESTRICTED BAND 2483.5-2500MHZ, HORIZONTAL, PEAK (CH11)



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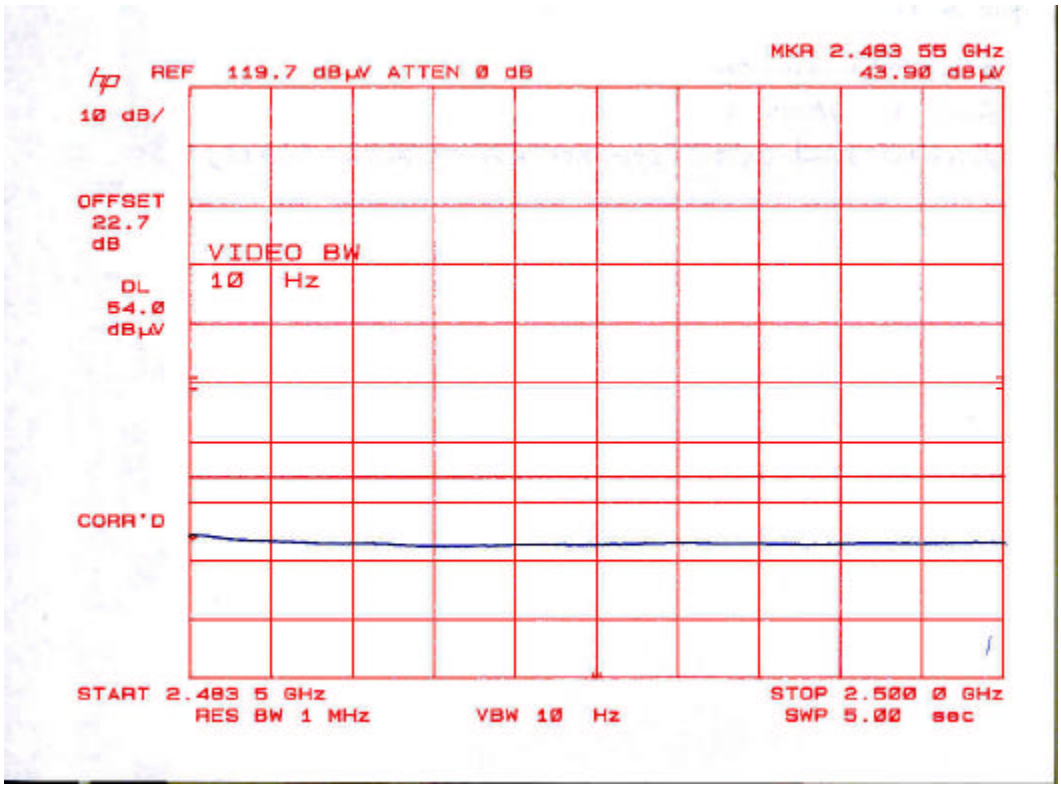
RESTRICTED BAND 2483.5-2500MHZ, HORIZONTAL, AVERAGE (CH11)



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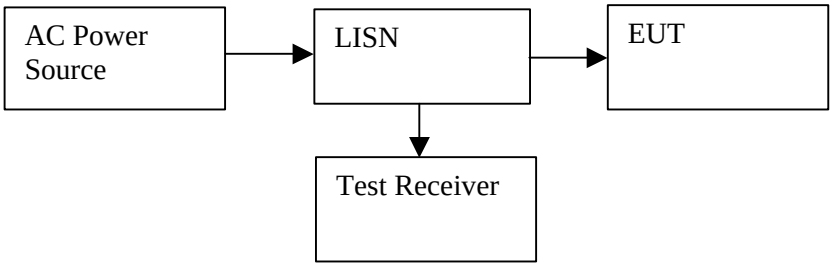
10.6. POWER LINE CONDUCTED EMISSION

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	☒ 10 KHz	☒ 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
0.45	34.83	--	--	0.00	48.00	--	-13.17	--	L1
0.70	33.30	--	--	0.00	48.00	--	-14.70	--	L1
0.92	30.95	--	--	0.00	48.00	--	-17.05	--	L1
0.45	33.94	--	--	0.00	48.00	--	-14.06	--	L2
0.69	32.51	--	--	0.00	48.00	--	-15.49	--	L2
0.93	31.49	--	--	0.00	48.00	--	-16.51	--	L2
6 Worst Data									

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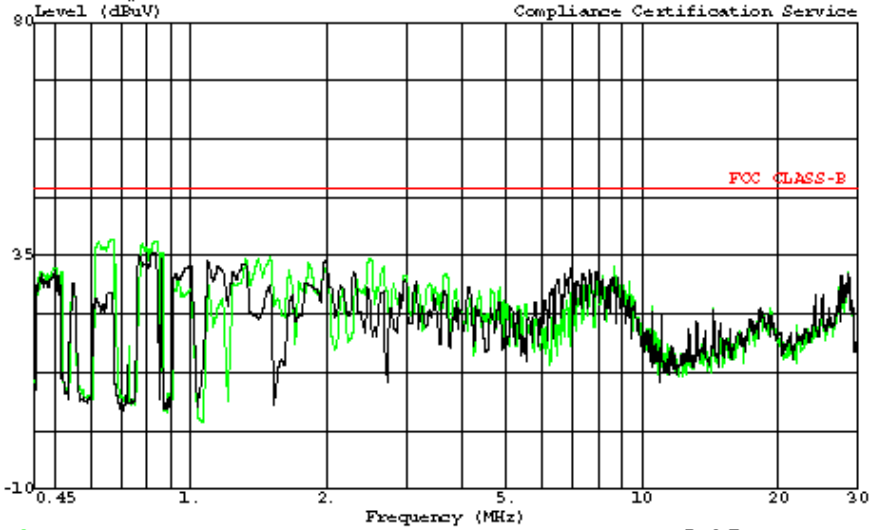
561F Monterey Road,
San Jose, CA 95037 USA
Tel: (408) 463-0885
Fax: (408) 463-0888

Data#: 7 File#: 020703M.EMI Date: 07-03-2002 Time: 11:05:36
Compliance Certification Service



Trace: 2 Ref Trace:
Project # : 02U1399-1
Test Engineer: Thanh Nguyen
Company : OTC Wireless, INC.
EUT : 2.4GHz 802.11b Radio Outdoor Package
: Interface, Model: Air EZY2411-BT-9
Test Config : EUT, Laptop, Printer, USB Mouse
Type of Test : FCC Class B
Mode of Op. : EUT at RCV mode.
: L1: (Black), L2 : (Green)
: 115VAc, 60Hz

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit		Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
25.25	38.38	--	--	0.00	48.00	--	-9.62	--	L1
18.82	37.95	--	--	0.00	48.00	--	-10.05	--	L1
6.26	37.03	--	--	0.00	48.00	--	-10.97	--	L1
18.69	40.29	--	--	0.00	48.00	--	-7.71	--	L2
26.26	39.61	--	--	0.00	48.00	--	-8.39	--	L2
11.76	37.72	--	--	0.00	48.00	--	-10.28	--	L2

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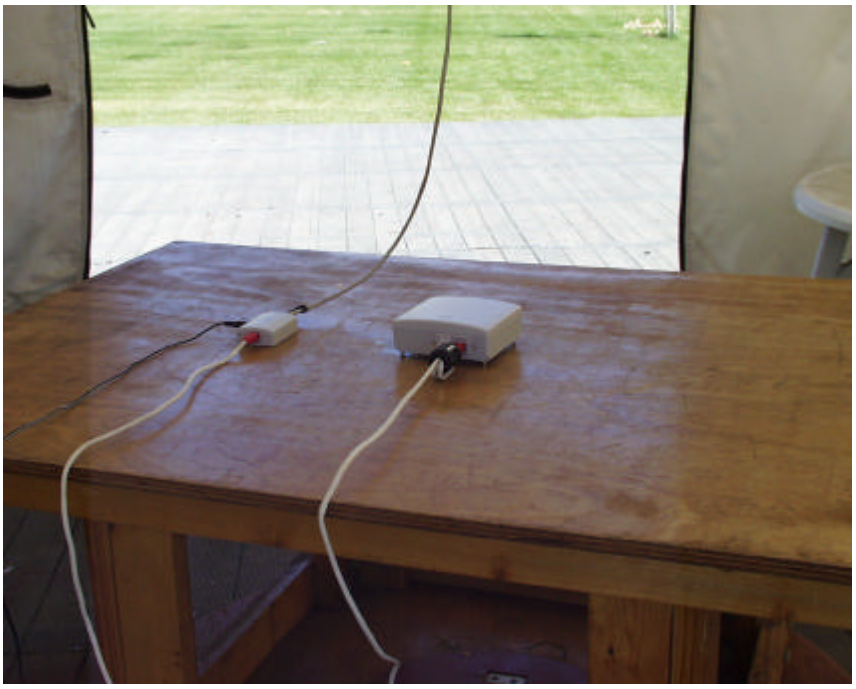
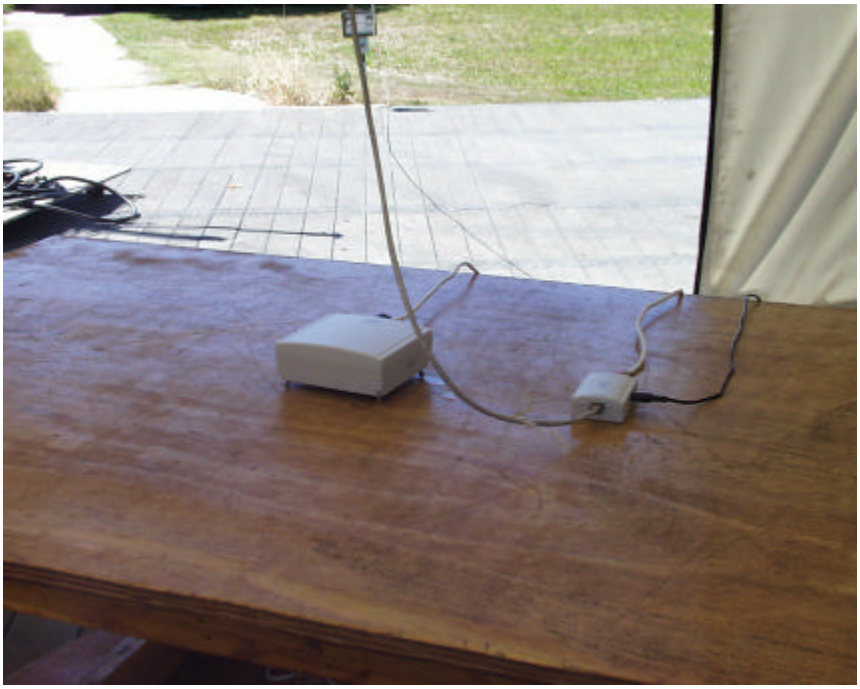
10.7. SETUP PHOTOS

Radiated Emission below 1 GHz Measurement





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Conducted Emission Measurement

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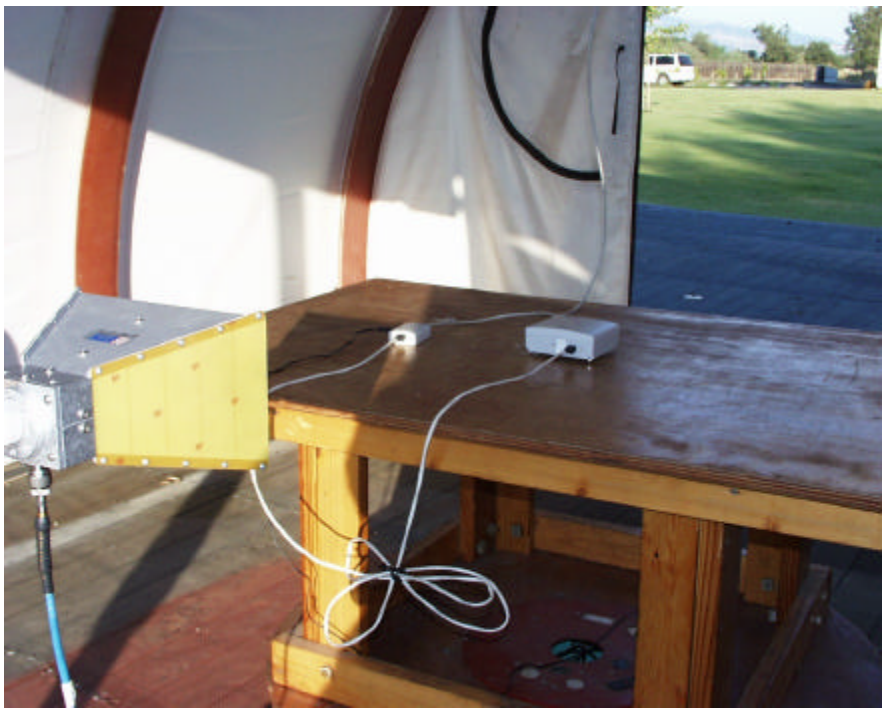
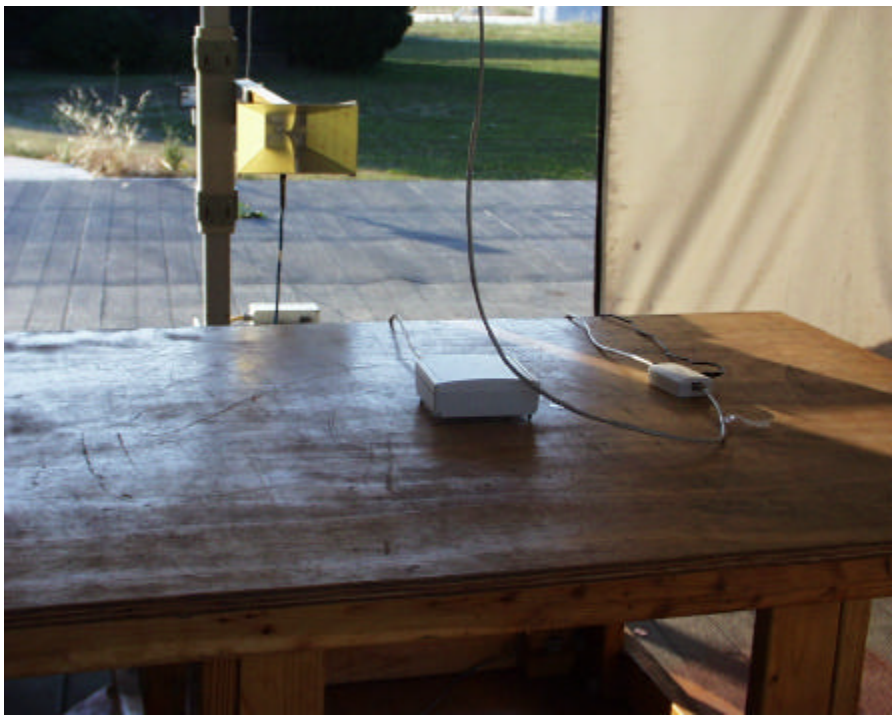
Radiated Emission above 1 GHz Measurement





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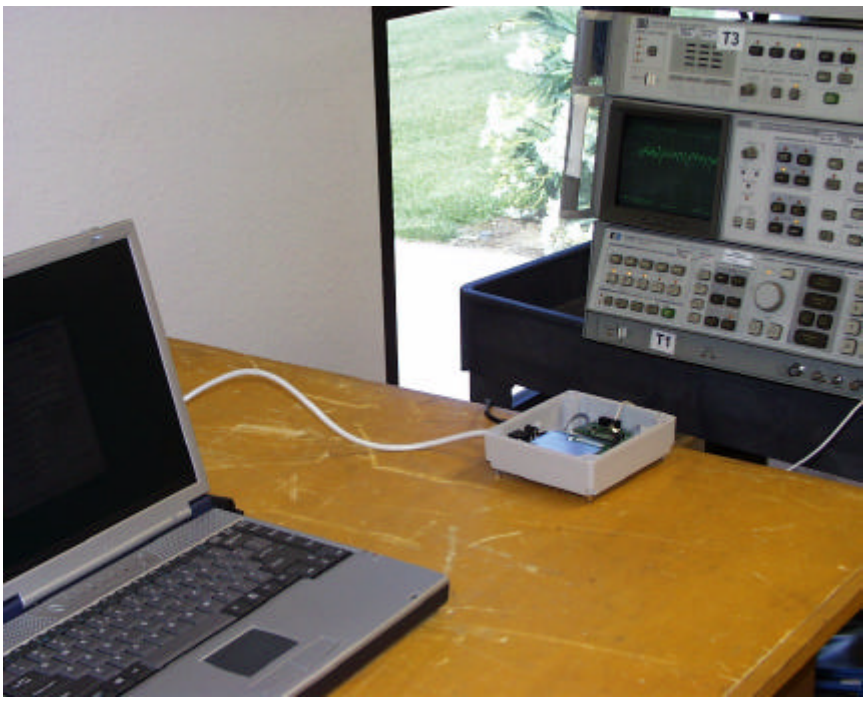
Antenna Port Terminal and Bandedges Measurements



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END OF REPORT

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