MEASUREMENT REPORT
of
WIRELESS ACCESS POINT

Applicant	**:**	UAT Inc.
Model No.	**:**	WL-3111
EUT	**:**	Wireless Access Point
FCC ID	**:**	PGCWL-3111
Report No.	**:**	U1215381

Test by :

Training Research Co., Ltd.

TEL：886-2-26935155 FAX：886-2-26934440

2, Lane 194, Huan-Ho Street, Hsichih, Taipei Hsien 221, Taiwan, R.O.C.

CERTIFICATION

We here by verify that:

The test data, data evaluation, test procedures and equipment configurations shown in this report were made mainly in accordance with the procedures given in ANSI C63.4 (1992) as a reference. All test were conducted by ***Training Research Co., Ltd.***, 2, Lane 194, Huan-Ho Street, Hsichih, Taipei Hsien 221, Taiwan, R.O.C. Also, we attest to the accuracy of each.

We further submit that the energy emitted by the sample EUT tested as described in the report is **in compliance with** the technical requirements set forth in the FCC Rules Part 15 Subpart C Section 15.247.

Applicant : UAT Inc.

Model No. : WL-3111

EUT : Wireless Access Point

FCC ID : PGCWL-3111

Report No. : U1215381

Test Date : August 17, 2001

Prepared by: Miro Chueh *Miro Chueh*

Approved by: Frank Tsai *Frank Tsai*

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Tables of Contents

Ⅰ. GENERAL

1.1 Introduction

The following measurement report is submitted on behalf of Applicant in support of a wireless access point certification in accordance with Part 2 Subpart J and Part 15 Subpart A and C of the Commission's Rules and Regulations.

1.2 Description of EUT

EUT	**:**	Wireless Access Point
Model No.	**:**	WL-3111
Granted FCC ID	**:**	PGCWL-3111
Frequency Range	**:**	2.412 GHz ~ 2.462GHz
Support Channel	**:**	11 Channel
Modulation Skill	**:**	DBPSK, DQPSK, CCK
Power Type	**:**	AC to DC Switching Adapter
		Input: 100 ~ 120Vac, 50/60Hz, 30VA
		Output: +5Vdc, 1.5A
Power Cable	**:**	Non-shielded, 188cm long, No bead
Data Cable	**:**	RJ45: Non-shielded, 10-meter , No ferrite bead
Applicant	**:**	UAT Inc.
		2F, No. 5, Alley 22, Lane 513, Jui Kuang Rd.,
		Nei Hu, Taipei 114, Taiwan

1.3 Description of Support Equipment

In order to construct the minimum testing, following equipment were used as the support units.

Notebook	**:**	**IBM Think Pad X20**
Type No.	:	2662-11T
Serial No.	:	FX-11922 00/09
FCC ID	:	Doc Approved
檢磁		:3892B565

AC Adaptor	**:**	**IBM**
Model No.	:	PA2450U
Serial No.	:	02K6654
FCC ID	:	Doc Approved
Power Core	:	Non-shielded, 180cm long, Plastic hoods, with ferrite bead
Power type	:	100 ~ 240VAC, 50 ~ 60Hz, 0.5A ~ 1.2A / 16Vdc, 4.5A

HUB	**:**	**Cameo Communications, Inc.**
Model No.	:	SOHO-SW16A
Serial No.	:	N/A
Power Type	:	Switch
FCC ID	:	N/A, DOC Approved
Power cord	:	Non-shielded, 1.95m long, Plastic, No ferrite core

USB Ethernet Lan	**:**	**Netgear**
Model No.	:	FA101
Serial No.	:	N/A
Power Type	:	By PC
FCC ID	:	N/A, DOC Approved

1.4 Configuration of System Under Test

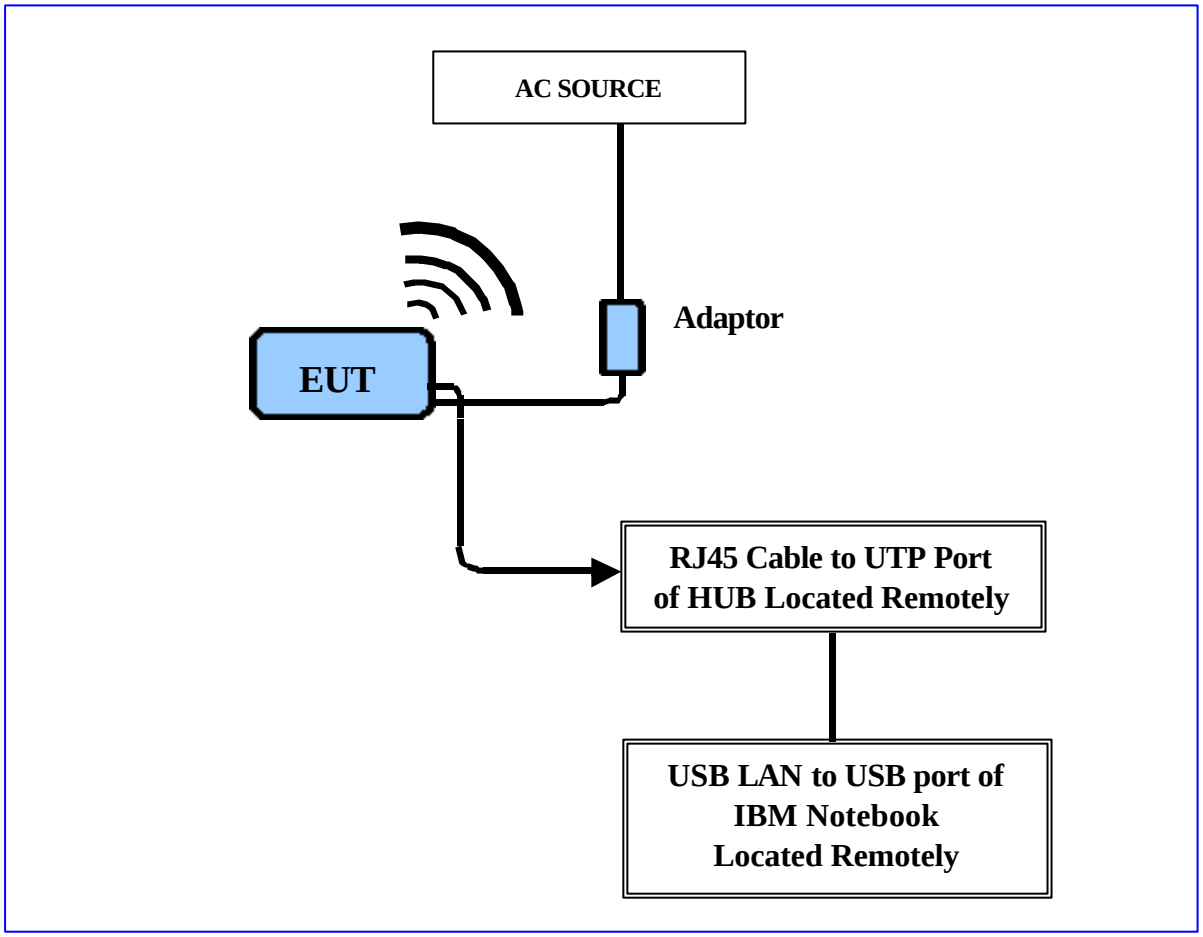


Fig. 1 Configuration of system under test

The tests below are run with the EUT transmitter set at high power in TDD mode. A USB LAN from a USB port of notebook computer to the Ethernet hub then UTP port of hub connected to UTP port of EUT by RJ45 cable. The EUT is needed to force selection of output power level and channel number by notebook computer.

The setting up procedure was recorded in Appendix A.

1.5 Verify the Frequency and Channel

Channel	Frequency (GHz)
1	2.412
2	2.417
3	2.422
4	2.427
5	2.432
6	2.437
7	2.442
8	2.447
9	2.452
10	2.457
11	2.462

Note:

1. This is for sure that all frequencies are in 2.412GHz to 2.462GHz.
2. Section 15.31(m): Measurements on intentional radiators or receivers shall be performed at three frequencies for operating frequency range over 10 MHz.
   (The locations of these frequencies one near the top, one near the middle and one near the bottom.)
3. After test, the EUT operating frequencies are in 2.412GHz to 2.462GHz. So all the items as followed in testing report are need to test these three frequencies:
   Top: Channel – 1; Middle: Channel - 6; Bottom: Channel - 11.

1.6 Test Procedure

All measurements contained in this report were performed mainly according to the techniques described in ANSI C63.4 (1992) and the pre-setup was written on Appendix A, the detail setup was written on each test item.

1.7 Location of the Test Site

The radiated emissions measurements required by the rules were performed on the **three-meter**, **Anechoic Chamber (Registration Number: 93906)** maintained by *Training Research Co., Ltd.* 1F., No. 2, Lane 194, Huan-Ho Street, Hsichih, Taipei Hsien 221, Taiwan, R.O.C. Complete description and measurement data have been placed on file with the commission. The conducted power line emissions tests and other test items were performed in a anechoic chamber also located at Training Research Co., Ltd.

No. 2, Lane 194, Huan-Ho Street, Hsichih, Taipei Hsien 221, Taiwan, R.O.C. *Training Research Co., Ltd.* is listed by the FCC as a facility available to do measurement work for others on a contract basis.

1.8 General Test Condition

The conditions under which the EUT operates were varied to determine their effect on the equipment's emission characteristics. The final configuration of the test system and the mode of operation used during these tests was chosen as that which produced the highest emission levels. However, only those conditions, which the EUT was considered likely to encounter in normal use were investigated.

In test, they were set in high power and continuously transmitting mode that controlled by notebook computer. The ch01, ch06 and ch11 of EUT were all tested. The setting up procedure is recorded on Appendix A.

Ⅱ. Section 15.207: Power Line Conducted Emissions for AC Powered Units

2.1 Test Condition & Setup

The power line conducted emission measurements were performed in an anechoic chamber. The EUT was assembled on a wooden table, which is 80 centimeters high, was placed 40 centimeters from the backwall and at least 1 meter from the sidewall.

Power was fed to the EUT from the public utility power grid through a line filter and Line Impedance Stabilization Networks (LISNs). The LISN housing, measuring instrumentation case, ground plane, etc., were electrically bonded together at the same RF potential. The Spectrum analyzer (or EMI receiver) was connected to the AC line through an isolation transformer. The 50-ohm output of the LISN was connected to the spectrum analyzer directly. Conducted emission levels were in the CISPER quasi-peak detection mode. The analyzer's 6 dB bandwidth was set to 9 KHz. No post-detector video filter was used.

The spectrum was scanned from 450 KHz to 30 MHz. The physical arrangement of the test system and associated cabling was varied (within the scope of arrangements likely to be encountered in actual use) to determine the effect on the unit's emanations in amplitude and frequency. All spurious emission frequencies were observed. The highest emission amplitudes relative to the appropriate limit were measured and have been recorded in paragraph 2.4.

There is a test condition apply in this test item, the test procedure description as the following:

1. EUT transmit only:
   Using the USB lan to USB port of Notebook PC and software to control the EUT through ethernet hub. Then making access to the mode of continuous transmission and set testing channel. Three channels were tested, one in the top (CH01), one in the middle (CH06) and the other in bottom (CH11).
2. Idle state (Rx mode)

The setting up procedure is recorded on Appendix A.

2.2 List of Test Instruments

Instrument Name	Model No.	Brand	Serial No.	Last time	Next time
EMI Receiver	8546A	H P	3520A00242	06/29/01	06/29/02
RF Filter Section	85460A	H P	3448A00217	06/29/01	06/29/02
LISN (EUT)	LISN-01	TRC	9912-03,04	12/09/00	12/09/01
LISN (Support E.)	LISN-01	TRC	9912-05	01/04/01	01/04/02
Switch/Control Unit (< 30MHz)	3488A	HP	N/A	11/20/00	11/20/01
Auto Switch Box (< 30MHz)	ASB-01	TRC	9904-01	11/20/00	11/20/01

2.3 Test configuration

Conducted Emissions Test Placement

2.4 Test Result of Conducted Emissions

EUT station transmit only

The following table shows a summary of the highest emissions of power line conducted emissions on the HOT and NATURAL conductors of the EUT power cord.

Table 1 Power Line Conducted Emissions (Channel 1)

Power Connected Emissions				*FCC Class B*	
Conductor	*Frequency (KHz)*	*Peak Amplitude (dB μV)*	*QP Amplitude (dB μV)*	*Limit (dB μV)*	*Margin (dB)*
Line 1	601.00	46.63	---	48.00	-1.37
	1027.00	45.78	---	48.00	-2.22
	1448.00	43.56	---	48.00	-4.44
	1507.00	43.98	---	48.00	-4.02
	1747.00	44.14	---	48.00	-3.86
	1909.00	47.88	---	48.00	-0.12
	2030.00	43.54	---	48.00	-4.46
	2090.00	44.25	---	48.00	-3.75
	2160.00	46.38	---	48.00	-1.62
	2830.00	43.92	---	48.00	-4.08
Line 2	586.00	47.49	---	48.00	-0.51
	749.00	44.96	---	48.00	-3.04
	1015.00	47.44	---	48.00	-0.56
	1307.00	44.87	---	48.00	-3.13
	1458.00	46.15	---	48.00	-1.85
	1758.00	44.95	---	48.00	-3.05
	1896.00	48.33	40.46	48.00	-7.54
	2090.00	45.33	---	48.00	-2.67
	2190.00	48.32	40.32	48.00	-7.68
	2790.00	44.69	---	48.00	-3.31

NOTE:

1. Margin = Peak Amplitude - Limit
2. A "+" sign in the margin column means the emission is OVER the Class B Limit and "–" sign of means UNDER the Class B limit

Table 2 Power Line Conducted Emissions (Channel 6)

Power Connected Emissions				*FCC Class B*	
Conductor	***Frequency (KHz)***	***Peak Amplitude (dB μV)***	***QP Amplitude (dB μV)***	***Limit (dB μV)***	***Margin (dB)***
Line 1	590.00	45.98	---	48.00	-2.02
	862.00	43.95	---	48.00	-4.05
	1015.00	45.70	---	48.00	-2.30
	1458.00	44.18	---	48.00	-3.82
	1736.00	45.18	---	48.00	-2.82
	1896.00	48.05	40.43	48.00	-7.57
	1935.00	47.50	---	48.00	-0.50
	2010.00	44.24	---	48.00	-3.76
	2150.00	48.71	40.72	48.00	-7.28
	2830.00	44.61	---	48.00	-3.39
Line 2	590.00	47.33	---	48.00	-0.67
	1015.00	47.47	---	48.00	-0.53
	1055.00	47.49	---	48.00	-0.51
	1299.00	45.09	---	48.00	-2.91
	1458.00	46.25	---	48.00	-1.75
	1507.00	45.69	---	48.00	-2.31
	1736.00	45.35	---	48.00	-2.65
	1909.00	49.21	40.74	48.00	-7.26
	2070.00	45.03	---	48.00	-2.97
	2180.00	49.55	40.38	48.00	-7.62

****The reading amplitudes are all under limit.***

Table 3 Power Line Conducted Emissions (Channel 11)

Power Connected Emissions				*FCC Class B*	
Conductor	***Frequency (KHz)***	***Peak Amplitude (dB μV)***	***QP Amplitude (dB μV)***	***Limit (dB μV)***	***Margin (dB)***
Line 1	601.00	46.68	---	48.00	-1.32
	874.00	43.69	---	48.00	-4.31
	1021.00	45.51	---	48.00	-2.49
	1048.00	45.09	---	48.00	-2.91
	1468.00	44.81	---	48.00	-3.19
	1507.00	43.89	---	48.00	-4.11
	1758.00	44.74	---	48.00	-3.26
	1909.00	48.22	41.24	48.00	-6.76
	1948.00	47.24	---	48.00	-0.76
	2190.00	47.76	---	48.00	-0.24
Line 2	601.00	47.55	---	48.00	-0.45
	749.00	44.95	---	48.00	-3.05
	1048.00	47.08	---	48.00	-0.92
	1207.00	44.93	---	48.00	-3.07
	1478.00	46.36	---	48.00	-1.64
	1516.00	45.18	---	48.00	-2.82
	1922.00	49.44	41.08	48.00	-6.92
	1974.00	47.47	---	48.00	-0.53
	2100.00	45.19	---	48.00	-2.81
	2190.00	49.06	40.09	48.00	-7.91

****The reading amplitudes are all under limit.***

Table 4 Power Line Conducted Emissions (Standby mode)

Power Connected Emissions				*FCC Class B*	
Conductor	***Frequency (KHz)***	***Peak Amplitude (dB μV)***	***QP Amplitude (dB μV)***	***Limit (dB μV)***	***Margin (dB)***
Line 1	628.00	46.63	---	48.00	-1.37
	793.00	44.66	---	48.00	-3.34
	1084.00	45.56	---	48.00	-2.44
	1266.00	42.94	---	48.00	-5.06
	1555.00	45.53	---	48.00	-2.47
	1747.00	45.34	---	48.00	-2.66
	1847.00	45.25	---	48.00	-2.75
	2010.00	48.34	40.75	48.00	-7.25
	2470.00	43.24	---	48.00	-4.76
	2680.00	44.03	---	48.00	-3.97
Line 2	620.00	47.81	---	48.00	-0.19
	637.00	47.95	---	48.00	-0.05
	788.00	46.27	---	48.00	-1.73
	1091.00	47.87	---	48.00	-0.13
	1274.00	45.04	---	48.00	-2.96
	1545.00	46.57	---	48.00	-1.43
	1747.00	45.94	---	48.00	-2.06
	1847.00	45.39	---	48.00	-2.61
	2000.00	50.38	40.85	48.00	-7.15
	2310.00	44.60	---	48.00	-3.40

****The reading amplitudes are all under limit.***

Ⅲ. Section 15.247(a)(2): Bandwidth for Direct Sequence System.

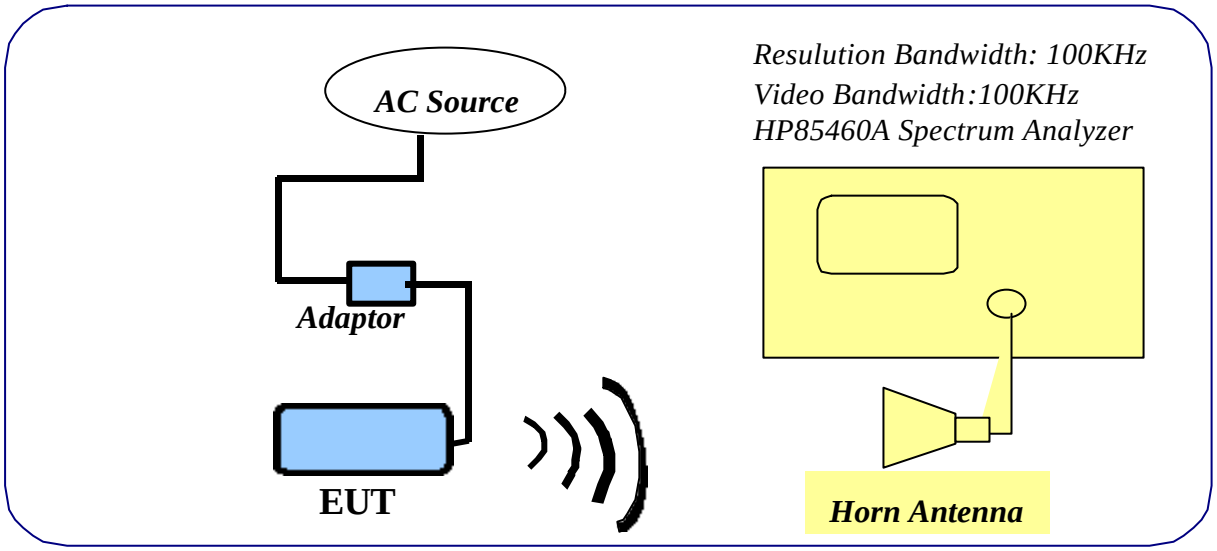
3.1 Test Condition & Setup

The transmitter bandwidth measurements were performed in an anechoic chamber. The EUT was placed on a wooded table, which is 0.8 meters height. The EUT was set to transmit continuously. Various channels were also investigated to find the maximum occupied bandwidth. The minimum 6 dB bandwidth shall be at least 500 KHz.

Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 KHz. Set the span>> RBW. The detector function was set to peak and hold mode to clearly observe the components.

Setting up procedure is written on Appendix A.

3.2 Test Instruments Configuration



P.S.: A USB lan to USB port from notebook computer to control the EUT at maximal power output and channel Number.

Test Configuration of Bandwidth for Direct Sequence System

3.3 List of Test Instruments

Instrument Name	Model No.	Brand	Serial No.	Last time	Next time
EMI Receiver	8546A	H P	3520A00242	10/18/00	10/18/01
RF Filter Section	85460A	H P	3448A00217	10/18/00	10/18/01
Horn Antenna	3115	EMCO	9704 – 5178	08/15/01	08/15/02

3.4 Test Result of Bandwidth

Bandwidth of Channel 1

Bandwidth	:	8.88 MHz
The min. 6 dB BW at least	:	500 KHz

Bandwidth of Channel 6

Bandwidth	:	8.88 MHz
The min. 6 dB BW at least	:	500 KHz

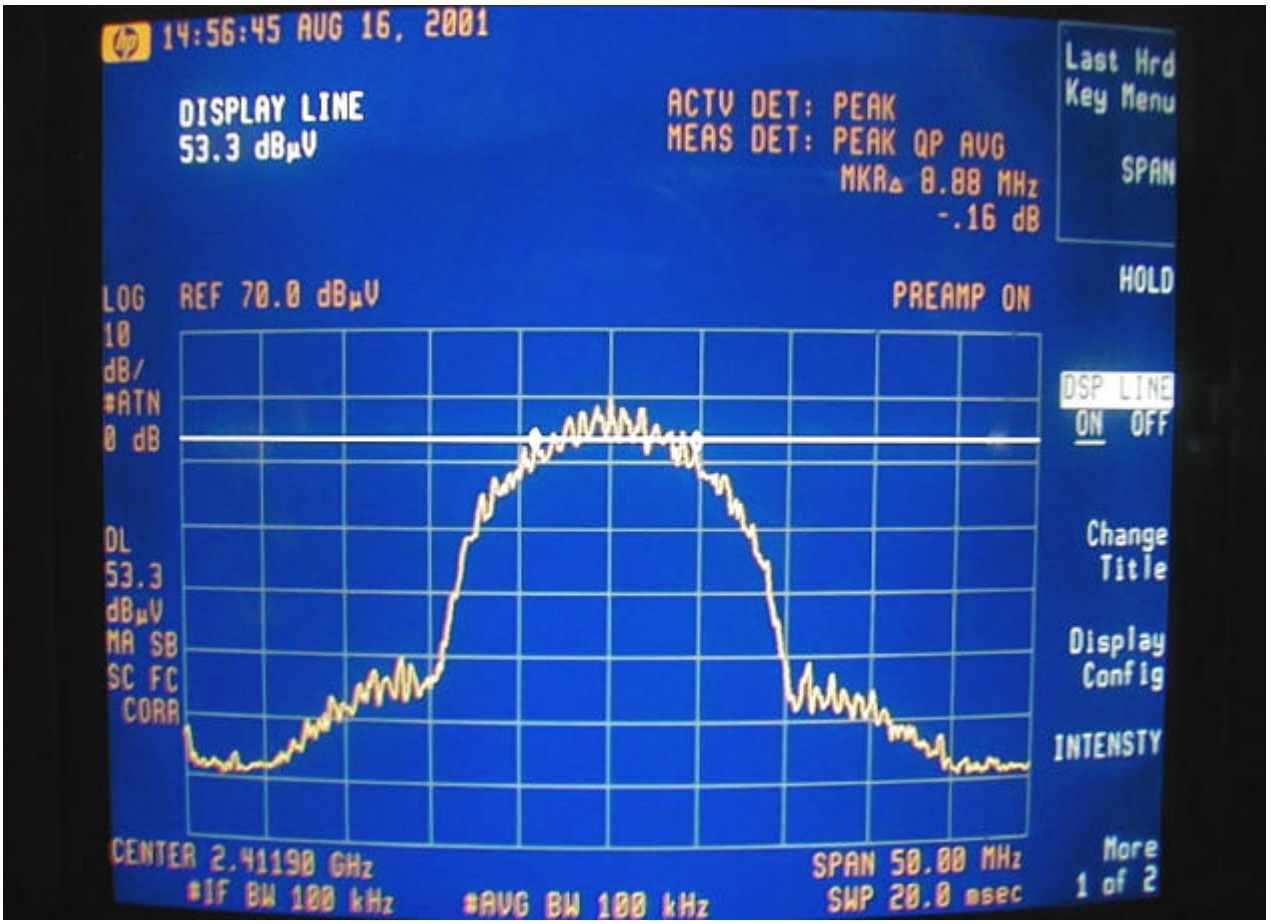
Bandwidth of Channel 11

Bandwidth	:	8.88 MHz
The min. 6 dB BW at least	:	500 KHz

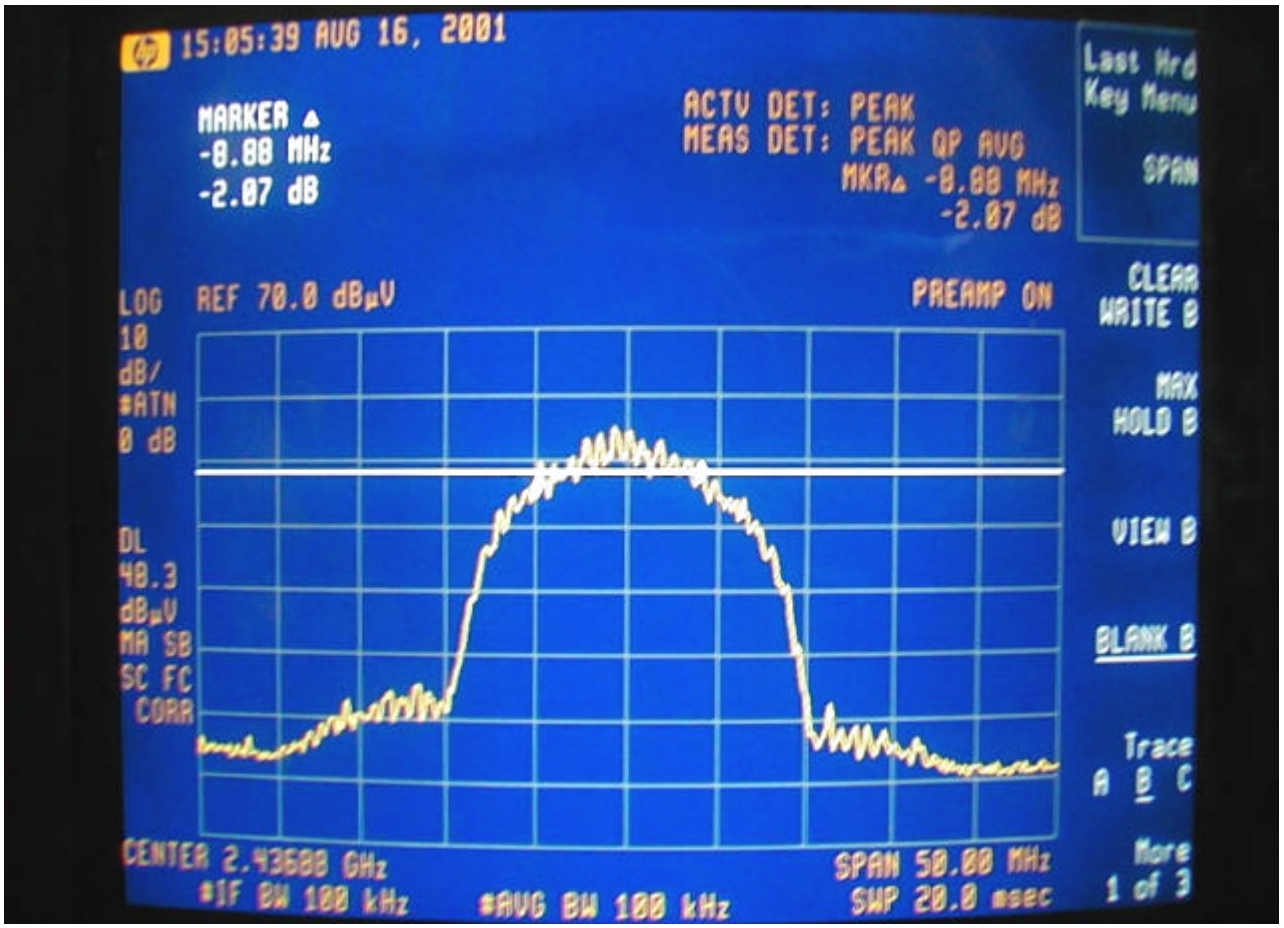
Note:

1. The data in the above table are summarizing the following attachment spectrum analyzer hard copy.
2. The attachments follow page.

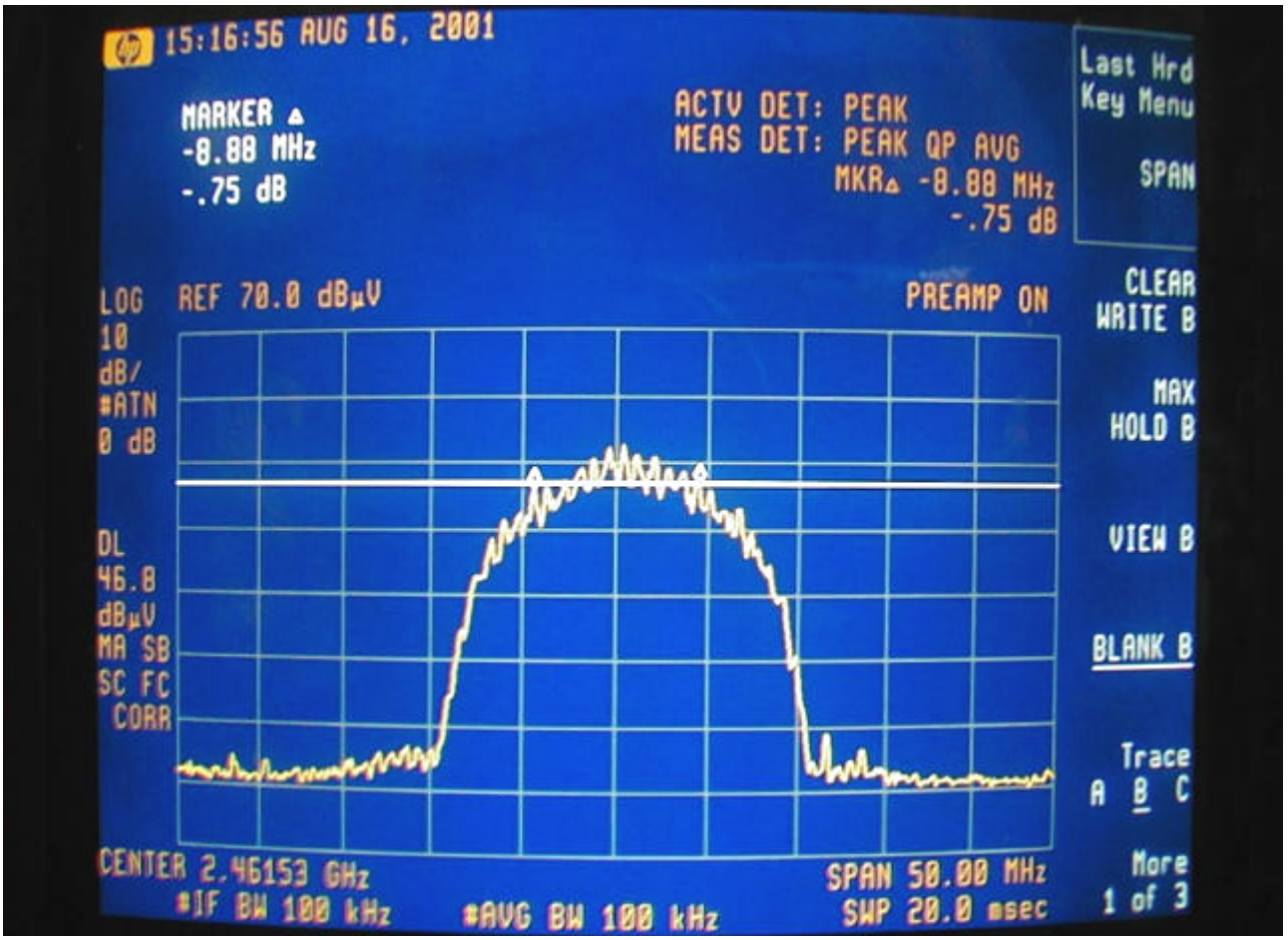
Bandwidth of Channel 1: 8.88 MHz



Bandwidth of Channel 6: 8.88 MHz



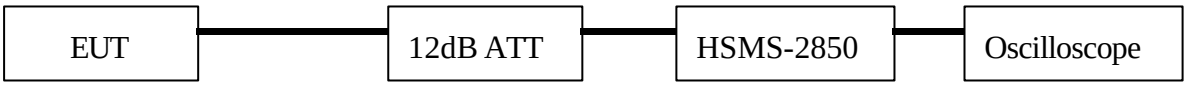
Bandwidth of Channel 11: 8.88 MHz



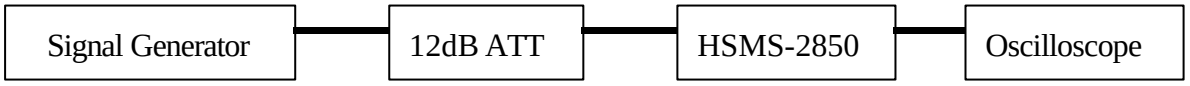
Ⅳ. Section 15.247(B): Power Output

4.1 Test Condition & Setup

A:



B:



1. The output of the transmitter thought 12dB attenuator and terminated by Schottkey Detector Diode (Hewlett- Packard HSMS-2850)
2. The output of the Shocttkey Diode Detector connected to the vertical channel of an oscilloscope. The observed trace of the oscilloscope shall be recorded as "A".
3. The combination of the diode detector and the oscilloscope capable of faithfully reproducing the envelop peaks and the duty cycle of the transmitter output signal.
4. 4.The transmitter replaced by a signal generator. The output frequency of the signal made equal to the center of the frequency range occupied by the transmitter and unmodulated.
5. The output of the signal generator raised to reach the peak of trace "A" and then replace the 12 dB attenuator and Schottkey Detector Diode by power meter, measure the signal generator output level record as XmW.
6. The signal generator output level XmW is the transmitter output peak power. Recording the following.

4.2 List of Test Instruments

Instrument Name	Model No.	Brand	Serial No.	Last time	Next time
Oscilloscope	54600A	H P		10/18/00	10/18/01
Signal Generator	83711A	H P	3429A00434	10/18/00	10/18/01
Shocttkey Diode	HSMS-2850	H P			
Attenuator	MCL BW-S6W2	Mini-Circuits			

4.3 Test Result

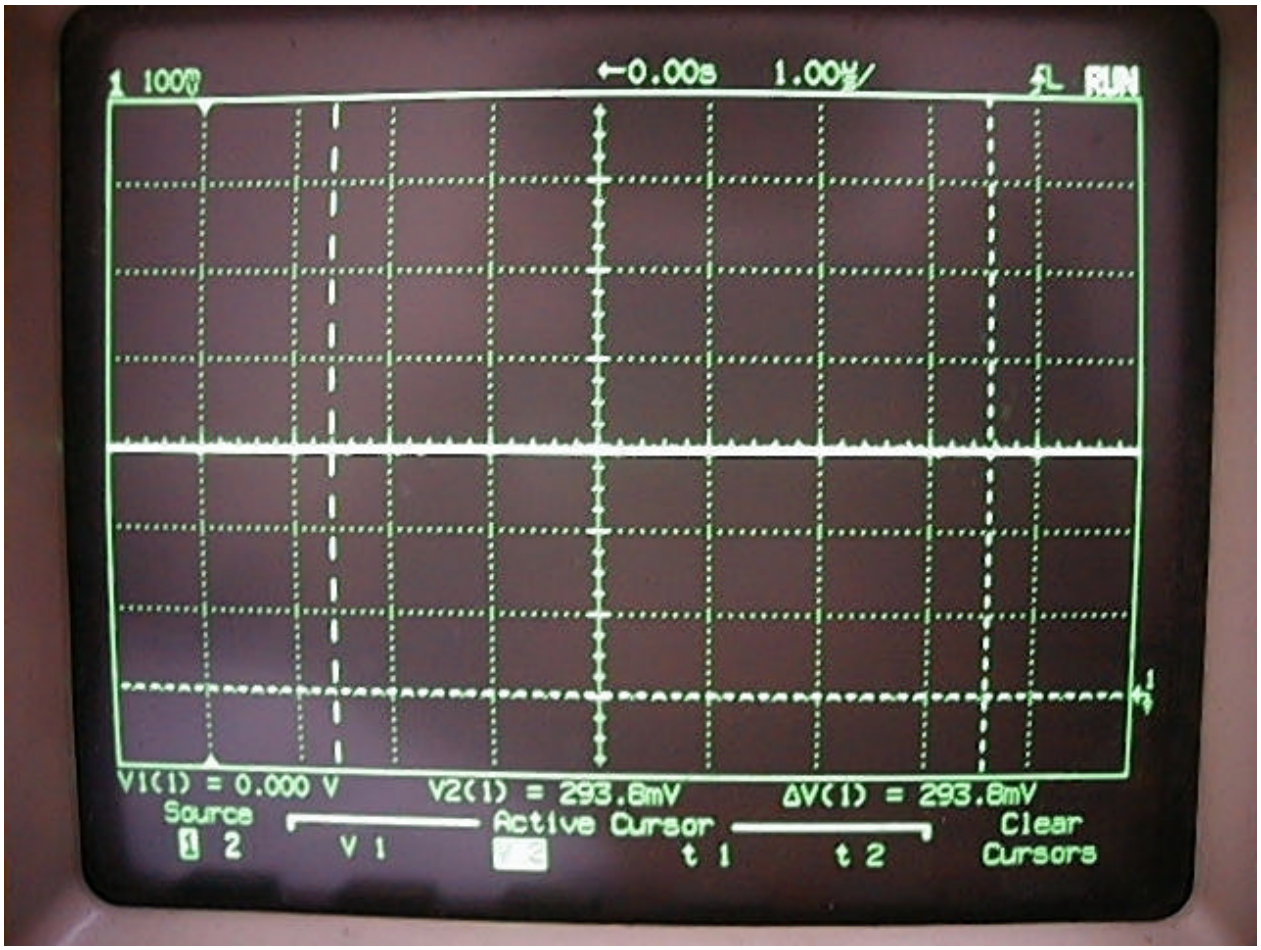
Channel	Output peak power (mW)
CH1	10.568
CH6	8.035
CH11	6.823

Oscilloscope set in Autostore mode use data V function measure the Peak Output Voltage.

CH 1

Adjust CW Signal Generator output level until the same data V Voltage is reaching.

<u>CH 1</u>



Ⅴ. Section 15.247 (C)(2): Spurious Emissions (Radiated)

5.1 Test Condition & Setup

The EUT was placed in an anechoic chamber and scanned at 3-meter distance to determine its emission characteristics. The physical arrangement of the EUT was varied (within the scope of arrangements likely to be encountered in actual use) to determine the effect on the unit's emanations in amplitude, directivity, and frequency. The exact system configuration, which produced the highest emissions was noted so it could be reproduced later during the final tests. This was done to ensure that the final measurements would demonstrate the worst-case interference potential of the EUT.

Final radiation measurements were made on a three-meter, anechoic chamber. The EUT system was placed on a nonconductive turntable, which is 0.8 meters height, top surface 1.0 x 1.5 meter.

The spectrum was examined from 30 MHz to 1000 MHz using an Hewlett Packard 85460A EMI Receiver, Schaffner whole range Bi-Log antenna (Model No.: CBL6141A) is used to measure frequency from 30 MHz to 1GHz.The final test is used the spectrum HP 85460A and spectrum was examined from 1GHz to 18GHz using an Hewlett Packard 8564E Spectrum Analyzer, EMCO Horn Antenna (Model 3115) for 1G ~ 18GHz.

At each frequency, the EUT was rotated 360 degrees, and the antenna was raised and lowered from one to four meters to find the maximum emission levels. Measurements were taken using both horizontal and vertical antenna polarization.

Appropriate preamplifiers were used for improving sensitivity and precautions were taken to avoid overloading or desensitizing the spectrum analyzer. There are two spectrum analyzers use on this testing, HP 85460A for frequency 30MHz to 1000MHz, and 8564E for frequency 1GHz to 18GHz. No post-detector video filters were used in the test. The spectrum analyzer's 6dB bandwidth was set to 120KHz (spectrum was examined from 30 MHz to 1000 MHz), the spectrum analyzer's 6 dB bandwidth was set to 1 MHz (spectrum was examined from 1GHz to 18GHz) and the analyzer was operated in the maximum hold mode. There is a test condition apply in this test item, the test procedure description as the following:

EUT transmit only:

Using the USB lan to USB port of Notebook PC and software to control the EUT through Ethernet hub. Then making access to the mode of continuous transmission. Three channels is tested, one in the top (CH01), one in the middle (CH06) and the other in bottom (CH11).

With the transmitter operating from a AC source and using the internal of EUT, radiates spurious emissions falling within the restricted bands of 15.209 were measured at operating frequencies corresponding to low, mid and high channels in the 2400 ~ 2483.5 MHz band.

The actual field intensity in decibels referenced to 1 microvolt per meter (dBμV/m) is determined by algebraically adding the measured reading in dBμV, the antenna factor (dB), and cable loss (dB) at the appropriate frequency.

For frequency between 30MHz to 1000MHz

FIa (dBuV/m) = FIr (dBμV) – Correction Factors

FIa : Actual Field Intensity

FIr : Reading of the Field Intensity

Correction Factors = Antenna Factor + Cable Loss – Amplifier Gain

For frequency between 1 GHz to 18 GHz

FIa (dBμV/m) = FIr (dBμV) + Correction Factor

FIa : Actual Field Intensity

FIr : Reading of the Field Intensity

Correction Factors = Antenna Factor + Cable Loss – Amplifier Gain

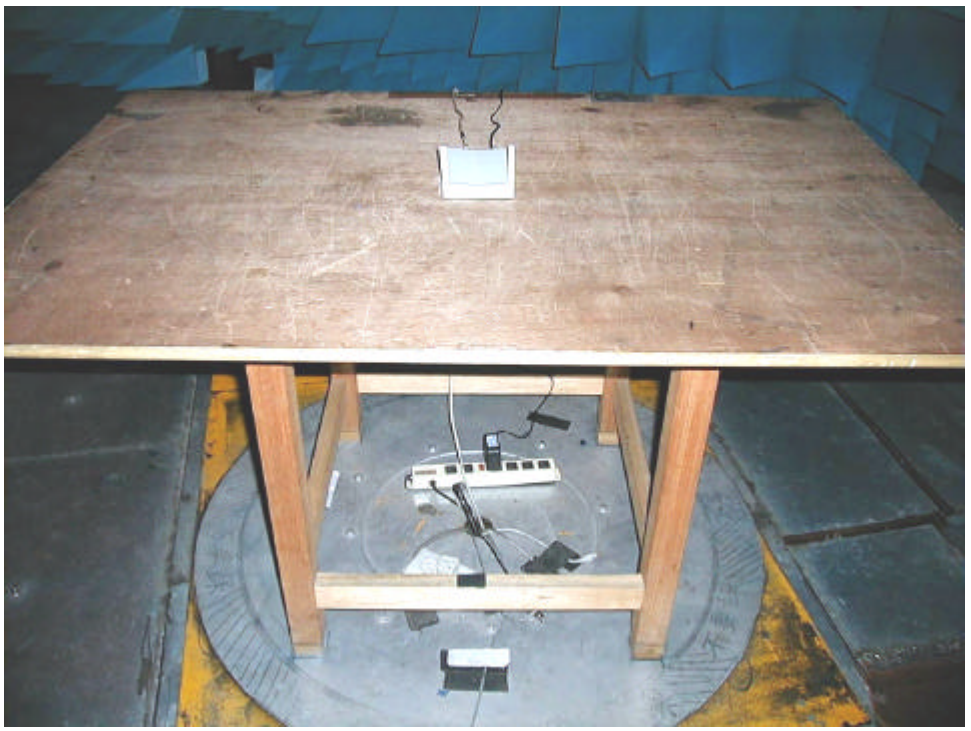
The setting up procedure is recorded on Appendix A.

5.2 List of Test Instruments

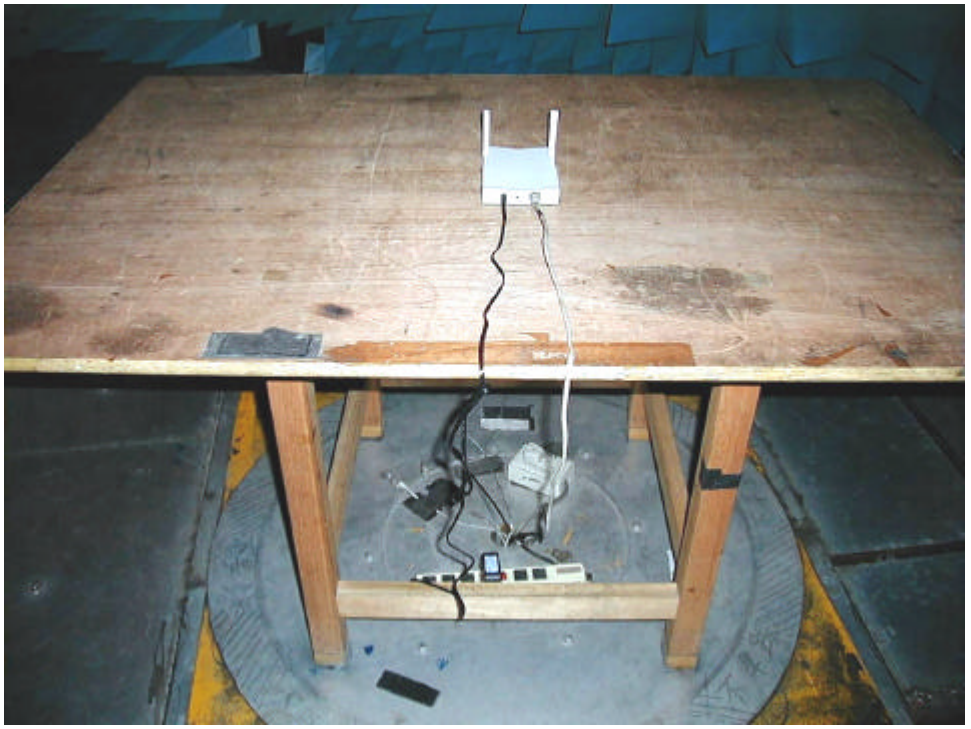
Instrument Name	Model No.	Brand	Serial No.	Last time	Next time
EMI Receiver	8546A	H P	3520A00242	06/29/01	06/29/02
RF Filter Section	85460A	H P	3448A00217	06/29/01	06/29/02
Bi-log Antenna	CBL6141A	Schaffner	4206	03/09/01	03/09/02
Switch/Control Unit (> 30MHz)	3488A	HP	N/A	11/20/00	11/20/01
Auto Switch Box (> 30MHz)	ASB-01	TRC	9904-01	11/20/00	11/20/01
Spectrum Analyzer	8564E	HP	US36433002	08/01/01	08/01/02
Microwave Preamplifier	83051A	HP	3232A00347	08/01/01	08/01/02
Horn Antenna	3115	EMCO	9704 – 5178	08/01/01	08/01/02
Anechoic Chamber (cable calibrated together)				05/20/01	05/20/02

5.3 Test Instruments Configuration

Front View of the Test Configuration



Rear View of the Test Configuration



The test configuration for frequency between 1GHz to 18GHz is same as above.

5.4 Test Result of Spurious Radiated Emissions

EUT's transmit only

The highest peak values of radiated emissions form the EUT at various antenna heights, antenna polarizations, EUT orientation, etc. are recorded on the following.

FCC ID : PGCWL-3111
EUT : Wireless LAN Access Point

Test Conditions: Testing room : Temperature : 26 ° C Humidity : 73 % RH
Testing site : Temperature : 31 ° C Humidity : 75 % RH

Table 5 Radiated Emissions for 30MHz 1GHz [CH 1, Horizontal]

Radiated Emission				*Correction Factors*	*Corrected Amplitude*	*FCC Class B (3 m)*	
Frequency (MHz)	*Amplitude (dBmV/m)*	*Ant. H. (m)*	*Table (°)*	*(dB)*	*(dBmV/m)*	*Limit (dBmV/m)*	*Margin (dB)*
159.992	19.89	1.00	116	-14.26	34.15	43.50	-9.35
199.989	15.85	1.00	121	-13.40	29.25	43.50	-14.25
224.987	17.95	1.00	117	-15.87	33.82	46.00	-12.18
249.986	20.36	1.00	122	-15.49	35.85	46.00	-10.15
299.982	19.06	1.00	100	-16.58	35.64	46.00	-10.36
319.981	19.66	1.00	87	-17.17	36.83	46.00	-9.17

Note:

1. Margin = Corrected Amplitude – Limit.
2. Peak Amplitude – Correction Factors = Corrected Amplitude

Table 6 Radiated Emissions For 30MHz 1GHz [CH 1, Vertical]

Radiated Emission				*Correction Factors*	*Corrected Amplitude*	*FCC Class B (3 m)*	
Frequency (MHz)	*Amplitude (dBmV/m)*	*Ant. H. (m)*	*Table (°)*	*(dB)*	*(dBmV/m)*	*Limit (dBmV/m)*	*Margin (dB)*
44.001	15.28	1.00	9	-17.40	32.68	40.00	-7.32
199.989	12.85	1.00	26	-13.64	26.49	43.50	-17.01
224.988	13.68	1.00	1	-15.29	28.97	46.00	-17.03
299.983	14.13	1.00	25	-17.53	31.66	46.00	-14.34
319.982	18.21	1.00	31	-17.90	36.11	46.00	-9.89
561.003	5.20	1.00	97	-24.06	29.26	46.00	-16.74

Table 7 Open Field Radiated Emissions For 1GHz 18GHz [Channel 1, Horizontal]

Radiated Emission				*Correction Factors*	*Corrected Amplitude*		*FCC Class B (3 m)*	
Frequency (GHz)	*Amplitude (dBm V/m)*	*Ant. H. (m)*	*Table (°)*	*(dB)*	*Peak*	*Average*	*Limit (dBm V/m)*	*Margin (dB)*
*4.070	42.66	1.00	331	3.91	46.57	---	54.00	-7.43
*6.100	39.51	1.00	54	9.72	49.23	---	54.00	-4.77
*8.140	36.85	1.00	241	9.72	46.57	---	54.00	-7.43
10.180	34.35	1.00	250	9.72	44.07	---	54.00	-9.93

Note:

1. Margin = Corrected - Limit.
2. Peak Amplitude + Correction Factor = Corrected
3. The " * " means restricted bands.
4. **Above emissions of 11GHz, they are all under the limits more than twenty-dB in Test Site.**

Table 8 Open Field Radiated Emissions For 1GHz 18GHz [Channel 1, Vertical]

Radiated Emission				Correction Factors	Corrected Amplitude		FCC Class B (3 m)	
Frequency (GHz)	Amplitude (dBμV/m)	Ant. H. (m)	Table (°)	(dB)	Peak	Average	Limit (dBμV/m)	Margin (dB)
*4.070	43.82	1.00	45	3.91	47.73	---	54.00	-5.23
*4.810	28.68	1.00	168	9.72	38.40	---	54.00	-14.06
*6.100	41.85	1.00	159	9.72	51.57	---	54.00	-12.56
7.230	36.68	1.00	254	9.72	46.40	---	54.00	-15.06
*8.140	41.18	1.00	310	9.72	50.90	---	54.00	-9.39
9.640	34.01	1.00	155	9.72	43.73	---	54.00	-10.27
10.180	37.18	1.00	97	9.72	46.90	---	54.00	-7.10

Table 9 Radiated Emissions for 30MHz 1GHz [CH 6, Horizontal]

Radiated Emission				*Correction Factors*	*Corrected Amplitude*	*FCC Class B (3 m)*	
Frequency (MHz)	*Amplitude (dBmV/m)*	*Ant. H. (m)*	*Table (°)*	*(dB)*	*(dBmV/m)*	*Limit (dBmV/m)*	*Margin (dB)*
159.992	19.25	1.01	73	-14.26	33.51	43.50	-9.99
199.989	16.83	1.08	114	-13.40	30.23	43.50	-13.27
224.987	17.98	1.01	121	-15.87	33.85	46.00	-12.15
249.986	20.38	1.05	122	-15.49	35.87	46.00	-10.13
299.982	19.12	1.01	100	-16.58	35.70	46.00	-10.30
319.981	19.96	1.01	87	-17.17	37.13	46.00	-8.87

Table 10 Radiated Emissions for 30MHz 1GHz [CH 6, Vertical]

Radiated Emission				*Correction Factors*	*Corrected Amplitude*	*FCC Class B (3 m)*	
Frequency (MHz)	*Amplitude (dBmV/m)*	*Ant. H. (m)*	*Table (°)*	*(dB)*	*(dBmV/m)*	*Limit (dBmV/m)*	*Margin (dB)*
44.001	15.35	1.00	30	-17.40	32.75	40.00	-7.25
199.989	11.76	1.00	26	-13.64	25.40	43.50	-18.10
224.988	13.82	1.00	2	-15.29	29.11	46.00	-16.89
299.983	14.04	1.00	17	-17.53	31.57	46.00	-14.43
319.982	17.73	1.00	38	-17.90	35.63	46.00	-10.37
561.003	5.20	1.00	95	-24.06	29.26	46.00	-16.74

Table 11 Open Field Radiated Emissions for 1GHz 18GHz [Channel 6, Horizontal]

Radiated Emission				*Correction Factors*	*Corrected Amplitude*		*FCC Class B (3 m)*	
Frequency (GHz)	*Amplitude (dBm V/m)*	*Ant. H. (m)*	*Table (°)*	*(dB)*	*Peak*	*Average*	*Limit (dBm V/m)*	*Margin (dB)*
*4.120	42.66	1.00	297	3.91	46.57	---	54.00	-7.43
*6.173	41.56	1.00	41	9.72	51.28	---	54.00	-2.72
*8.253	39.21	1.00	99	9.72	48.93	---	54.00	-5.07
10.320	33.85	1.00	241	9.72	43.57	---	54.00	-10.43

Table 12 Open Field Radiated Emissions for 1GHz 18GHz [Channel 6, Vertical]

Radiated Emission				Correction Factors	Corrected Amplitude		FCC Class B (3 m)	
Frequency (GHz)	Amplitude (dBμV/m)	Ant. H. (m)	Table (°)	(dB)	Peak	Average	Limit (dBμV/m)	Margin (dB)
*4.120	46.32	1.00	224	3.91	50.23	---	54.00	-3.77
*4.867	27.35	1.00	197	9.72	37.07	---	54.00	-16.93
*6.173	42.85	1.00	48	9.72	52.57	---	54.00	-1.43
*7.320	33.85	1.00	328	9.72	43.57	---	54.00	-10.43
*8.253	42.35	1.00	162	9.72	52.07	---	54.00	-1.93
9.747	32.85	1.00	256	9.72	42.57	---	54.00	-11.43
10.320	37.18	1.00	271	9.72	46.90	---	54.00	-7.10

Table 13 Radiated Emissions for 30MHz 1GHz [CH11, Horizontal]

Radiated Emission				*Correction Factors*	*Corrected Amplitude*	*FCC Class B (3 m)*	
Frequency (MHz)	*Amplitude (dBmV/m)*	*Ant. H. (m)*	*Table (°)*	*(dB)*	*(dBmV/m)*	*Limit (dBmV/m)*	*Margin (dB)*
159.992	20.73	1.00	132	-14.26	34.99	43.50	-8.51
199.989	16.85	1.00	116	-13.40	30.25	43.50	-13.25
224.987	18.37	1.00	118	-15.87	34.24	46.00	-11.76
249.986	20.24	1.00	122	-15.49	35.73	46.00	-10.27
299.982	19.22	1.00	100	-16.58	35.80	46.00	-10.20
319.981	20.47	1.00	87	-17.17	37.64	46.00	-8.36

Table 14 Radiated Emissions for 30MHz 1GHz [CH 11, Vertical]

Radiated Emission				*Correction Factors*	*Corrected Amplitude*	*FCC Class B (3 m)*	
Frequency (MHz)	*Amplitude (dBmV/m)*	*Ant. H. (m)*	*Table (°)*	*(dB)*	*(dBmV/m)*	*Limit (dBmV/m)*	*Margin (dB)*
44.001	15.26	1.00	4	-17.40	32.66	40.00	-7.34
199.989	12.78	1.00	4	-13.64	26.42	43.50	-17.08
224.988	14.58	1.00	48	-15.29	29.87	46.00	-16.13
299.983	15.80	1.00	19	-17.53	33.33	46.00	-12.67
319.982	17.73	1.00	36	-17.90	35.63	46.00	-10.37
561.003	5.20	1.00	96	-24.06	29.26	46.00	-16.74

Table 15 Open Field Radiated Emissions For 1GHz 18GHz [Channel 6, Horizontal]

Radiated Emission				Correction Factors	Corrected Amplitude		FCC Class B (3 m)	
Frequency (GHz)	Amplitude (dBμV/m)	Ant. H. (m)	Table (°)	(dB)	Peak	Average	Limit (dBμV/m)	Margin (dB)
*4.163	42.32	1.00	59	3.91	46.23	---	54.00	-7.77
*6.252	42.18	1.00	189	9.72	51.90	---	54.00	-2.10
*8.352	41.85	1.00	142	9.72	51.57	---	54.00	-2.43
10.440	31.01	1.00	237	9.72	40.73	---	54.00	-13.27

Table 16 Open Field Radiated Emissions For 1GHz 18GHz [Channel 6, Vertical]

Radiated Emission				Correction Factors	Corrected Amplitude		FCC Class B (3 m)	
Frequency (GHz)	Amplitude (dBμV/m)	Ant. H. (m)	Table (°)	(dB)	Peak	Average	Limit (dBμV/m)	Margin (dB)
*4.163	44.67	1.00	164	3.91	48.58	---	54.00	-5.42
*4.922	23.53	1.00	129	9.72	33.25	---	54.00	-20.75
*6.252	41.70	1.00	27	9.72	51.42	---	54.00	-2.58
*7.383	29.53	1.00	309	9.72	39.25	---	54.00	-14.75
*8.352	41.86	1.00	2	9.72	51.58	---	54.00	-2.42
9.803	27.20	1.00	114	9.72	36.92	---	54.00	-17.08
10.440	33.20	1.00	58	9.72	42.92	---	54.00	-11.08

Ⅵ. Section 15.247(d): Power Spectral Density

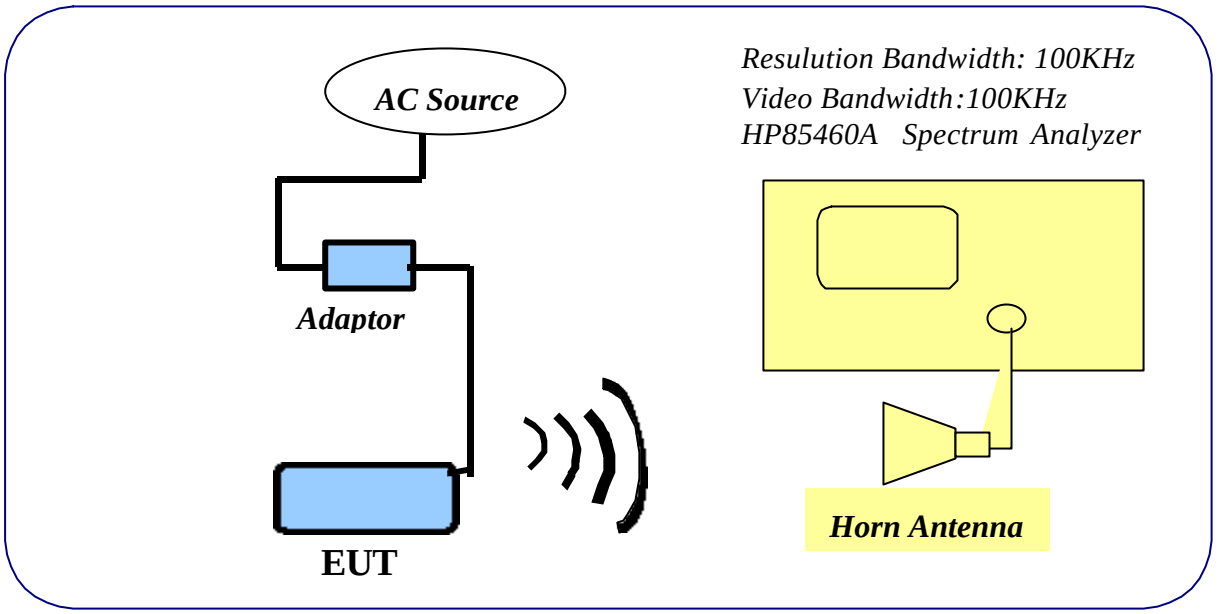
6.1 Test Condition & Setup

The tests below are running with the EUT transmitter set at high power in TDD mode .A mini-pci port from a notebook computer to the EUT. The EUT is needed to force selection of output power level and channel number. While testing, EUT was set to transmit continuously. A horn antenna was connected with the spectrum analyzer.

The EUT is tested in open field site. Put EUT on the middle of a wooden table. Set spectrum analyzer RBW = 3 KHz, VBW > RBW (e.g. VBW = 10 KHz), Span = 2 MHz. Turn around the table to find maximum emission. Then set the Span = 300 KHz and sweep time = 100 sec. Peak the maximum emission again. The peak level measured must be no greater than + 8dBm.

The setting up procedure is recorded on Appendix A.

6.2 Test Instruments Configuration



P.S.A USB LAN to USB port from notebook computer to control the EUT at maximal power output and channel Number.

Test Configuration of Power Spectral Density

6.3 List of Test Instruments

Instrument Name	Model No.	Brand	Serial No.	Last time	Next time
EMI Receiver	8546A	H P	3520A00242	10/18/00	10/18/01
RF Filter Section	85460A	H P	3448A00217	10/18/00	10/18/01
Horn Antenna	3115	EMCO	9704 – 5178	08/15/00	08/15/01

6.4 Test Result of Power spectral density

The following table shows a summary of the highest power out of UT.

FCC ID : PGCWL-3111

Channel	*Frequency (GHz)*	*Ppr (dBuV)*	*CF (dB)*	*Ppq (dBm)*	*Limit (dB)*	*Margin (dB)*
CH 01	2.411	45.25	35.60	-14.38	8.00	-22.38
CH 06	2.438	39.64	35.60	-19.99	8.00	-27.99
CH 11	2.462	38.21	35.60	-21.42	8.00	-29.42

Note:

1. The attachment follow by this page and there is no page number.
2. Ppr: spectrum read power density (using peak search mode), CF: correct factor, Ppq: actual peak power density in the spread spectrum band.
3. Ppq = Ppr + CF
4. Effective Radiation Power (E.R.P.) = $(E\ d)^2 / 30G$

"E" is the measured maximum field strength in V/m utilizing the maximum hold mode RBW (3KHz)

"G" is the numeric gain of the transmitting antenna over an isotropic radiator (1.00).

"d" is the distance in meters from which the field strength was measured (3M).

Example: the Max Radiation Emission = 45.25 + (35.60) = 80.85 dBμV/m

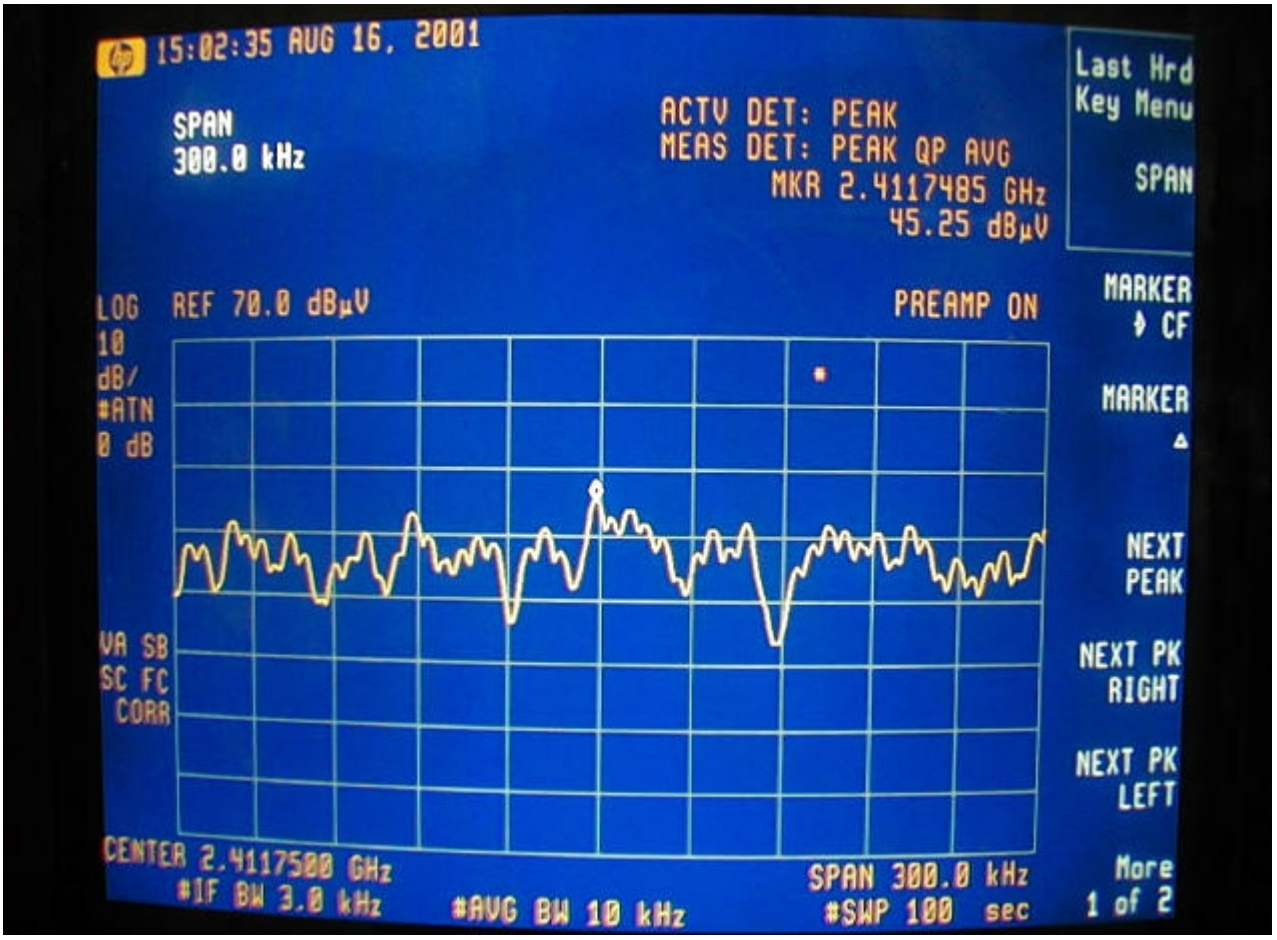
$10^{(80.85/20)} \times 10^{-6} = 0.011028$ V

E.R.P. = $(0.011028 \times 3)^2 / 30 = 0.036486$ mW

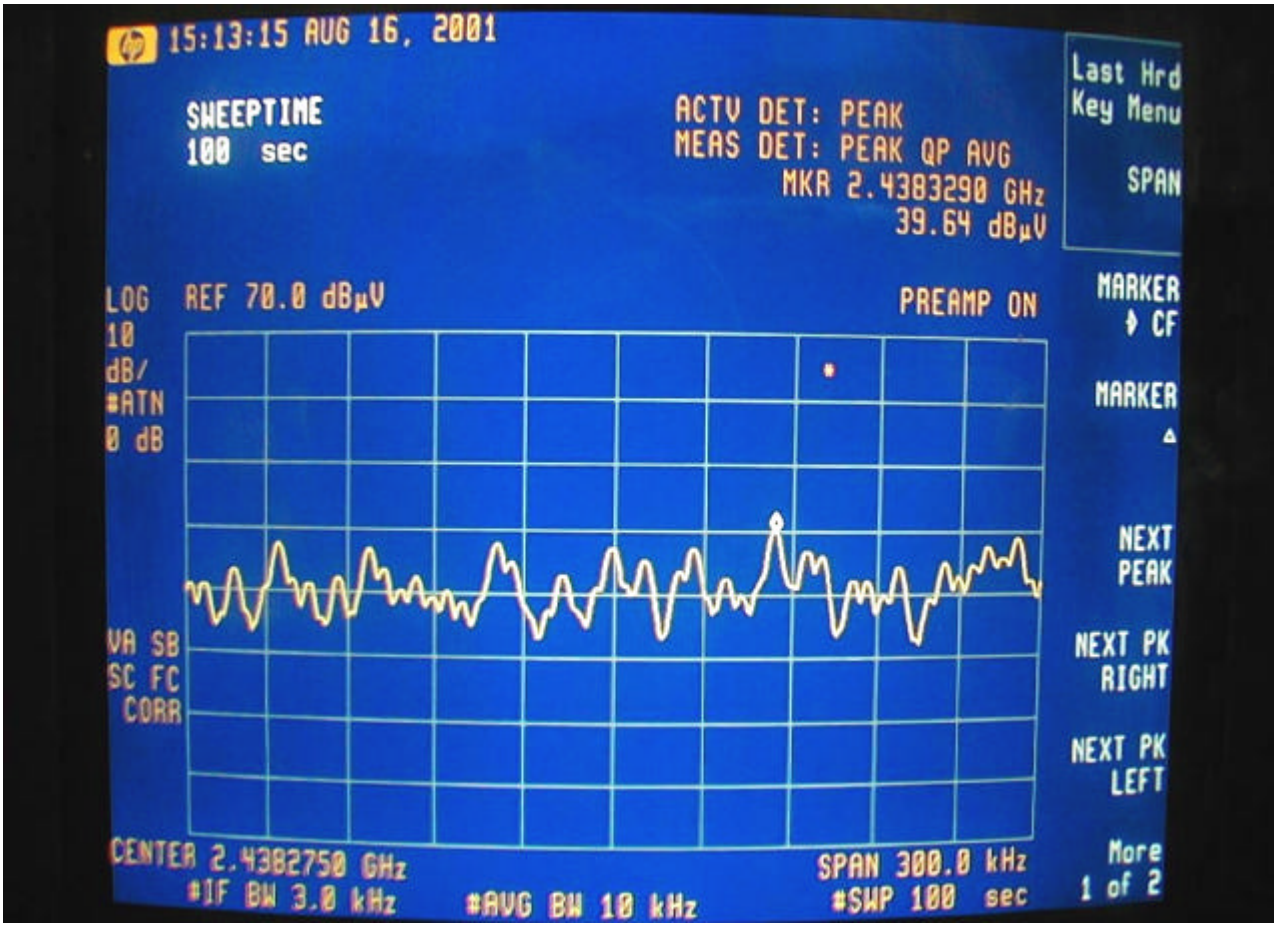
= 10 x log (0.036486 mW/1mW)

= -14.38 dBm

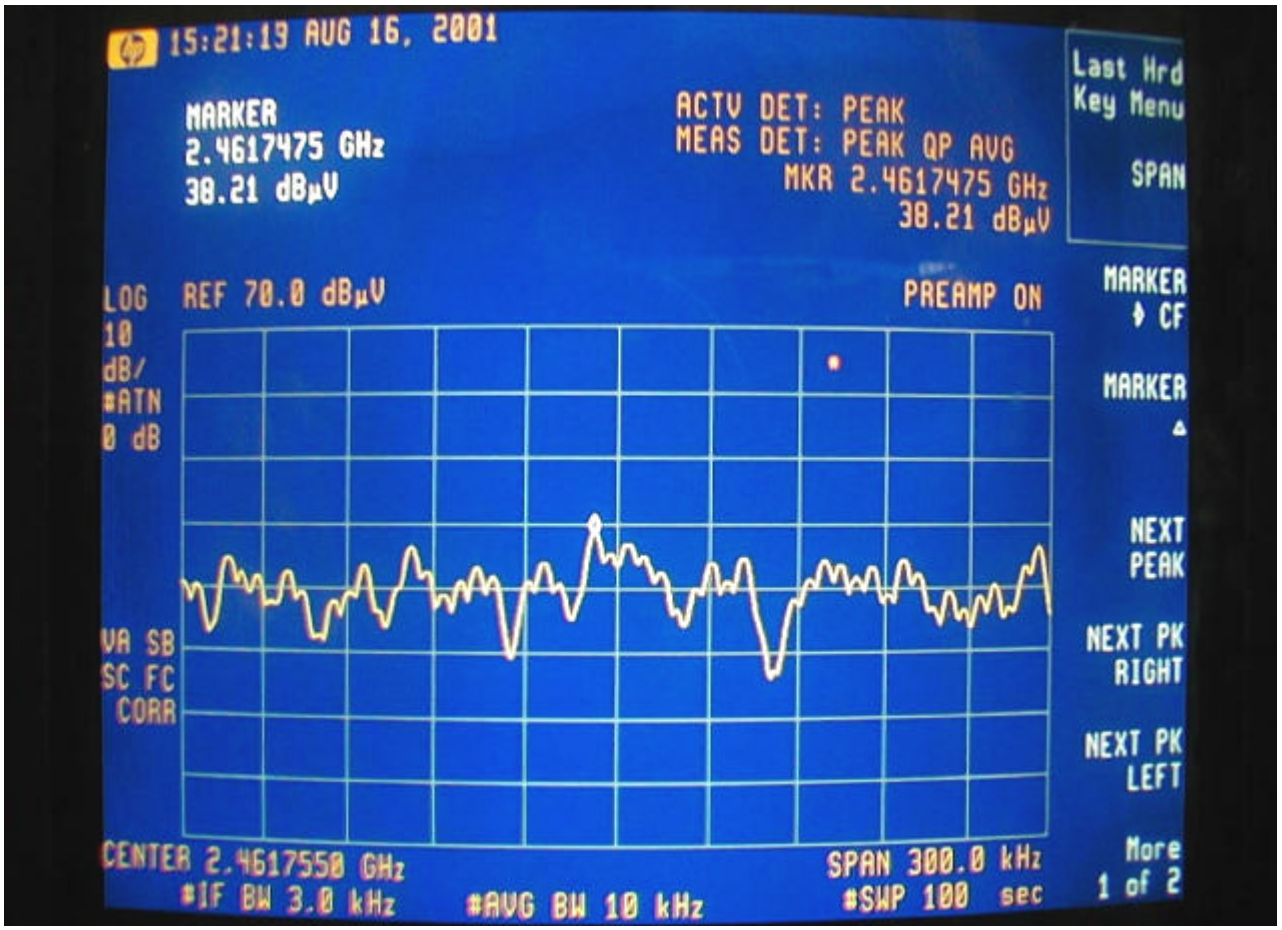
Channel 01


15:02:35 AUG 16, 2001
SPAN
300.0 kHz
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.4117485 GHz
45.25 dBµV
Last Hrd Key Menu
SPAN
LOG
10
dB/
#ATN
0 dB
REF 70.0 dBµV
PREAMP ON
MARKER → CF
MARKER Δ
NEXT PEAK
NEXT PK RIGHT
NEXT PK LEFT
More 1 of 2
VA SB
SC FC
CORR
CENTER 2.4117500 GHz
#IF BW 3.0 kHz
#AVG BW 10 kHz
SPAN 300.0 kHz
#SWP 100 sec

Channel 06


15:13:15 AUG 16, 2001
SWEEPTIME
100 sec
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.4383290 GHz
39.64 dBµV
Last Hrd Key Menu
SPAN
LOG
10
dB/
#ATN
0 dB
REF 70.0 dBµV
PREAMP ON
MARKER → CF
MARKER △
NEXT PEAK
NEXT PK RIGHT
NEXT PK LEFT
More 1 of 2
VA SB
SC FC
CORR
CENTER 2.4382750 GHz
#IF BW 3.0 kHz
#AVG BW 10 kHz
SPAN 300.0 kHz
#SWP 100 sec

Channel 11

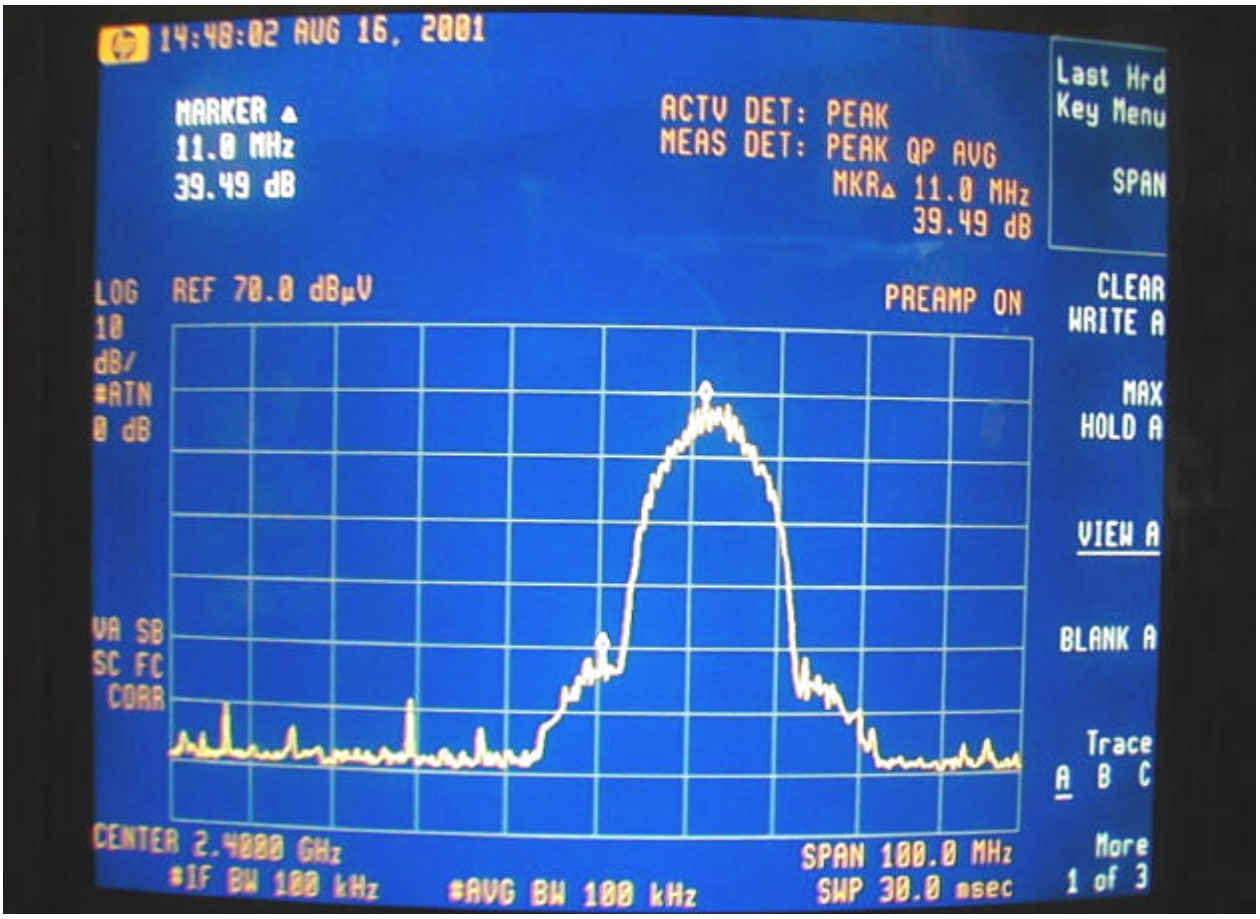

15:21:13 AUG 16, 2001
MARKER
2.4617475 GHz
38.21 dBµV
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR 2.4617475 GHz
38.21 dBµV
Last Hrd Key Menu
SPAN
LOG
10
dB/
#ATN
0 dB
REF 70.0 dBµV
PREAMP ON
MARKER → CF
MARKER Δ
NEXT PEAK
NEXT PK RIGHT
NEXT PK LEFT
More 1 of 2
VA SB
SC FC
CORR
CENTER 2.4617550 GHz
#IF BW 3.0 kHz
#AVG BW 10 kHz
SPAN 300.0 kHz
#SWP 100 sec

6.5 Required of Carrier frequency

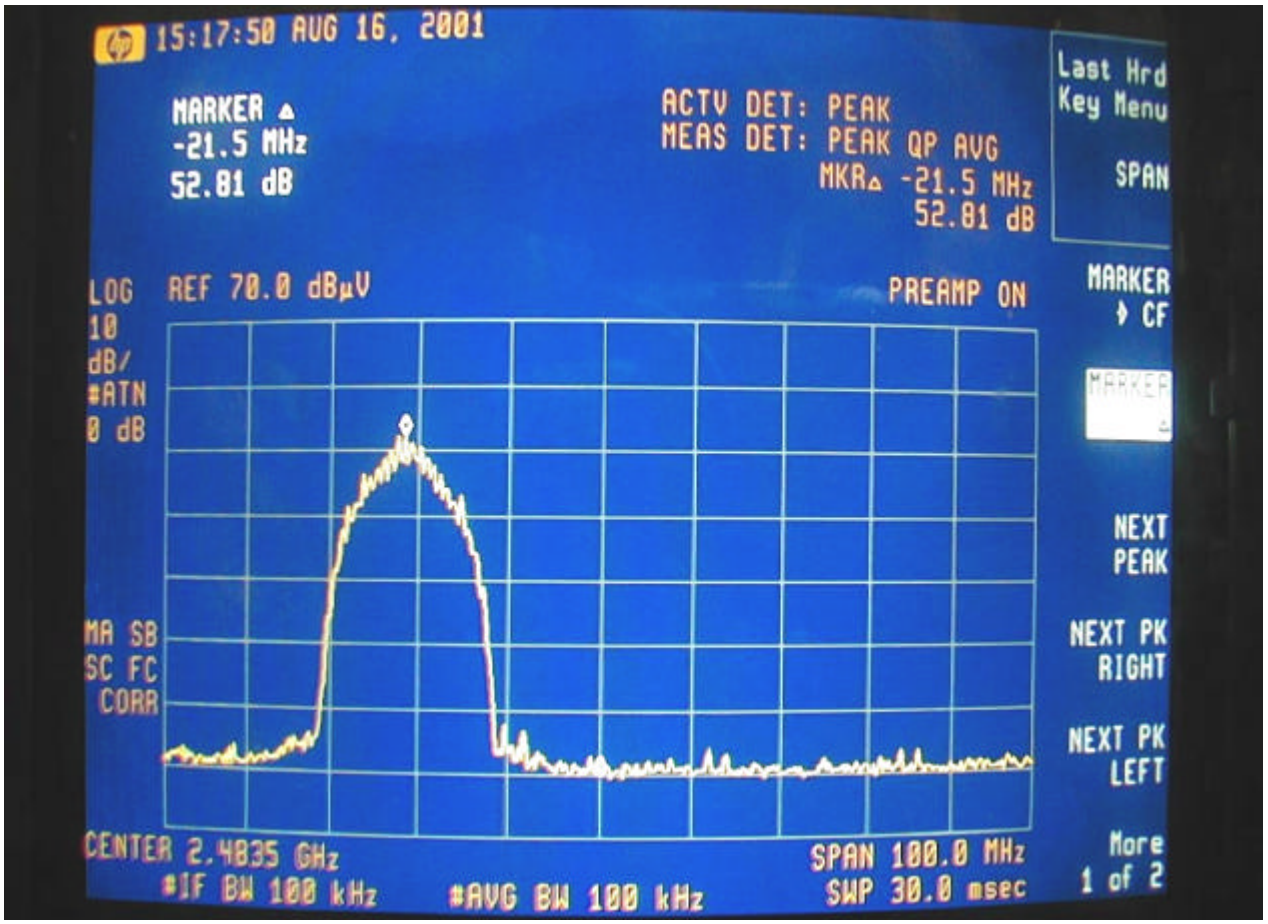
If any 100 kHz bandwidth outside these frequency bands, the radio frequency power that is produced by the modulation products of the spreading sequence, the information sequence and the carrier frequency shall be either at least 20 dB below that in any 100 kHz bandwidth within the band that contains the highest level of the desired power or shall not exceed the general levels specified id § 15.209(a), whichever results in the lesser attenuation.

Test Condition & Setup: same as 3.1

Channel 1


14:48:02 AUG 16, 2001
MARKER ▲
11.0 MHz
39.49 dB
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR▲ 11.0 MHz
39.49 dB
Last Hrd Key Menu
SPAN
LOG
10
dB/
#ATN
0 dB
REF 70.0 dBµV
PREAMP ON
CLEAR WRITE A
MAX HOLD A
VIEW A
BLANK A
VA SB
SC FC
CORR
Trace
A B C
CENTER 2.4000 GHz
#IF BW 100 kHz
#AVG BW 100 kHz
SPAN 100.0 MHz
SWP 30.0 msec
More
1 of 3

Channel 11


15:17:50 AUG 16, 2001
MARKER ▲
-21.5 MHz
52.81 dB
ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR▲ -21.5 MHz
52.81 dB
Last Hrd Key Menu
SPAN
LOG
10
dB/
#ATN
0 dB
REF 70.0 dBµV
PREAMP ON
MARKER → CF
NEXT PEAK
NEXT PK RIGHT
NEXT PK LEFT
More 1 of 2
MA SB
SC FC
CORR
CENTER 2.4835 GHz
#IF BW 100 kHz
#AVG BW 100 kHz
SPAN 100.0 MHz
SWP 30.0 msec

Appendix A

Setting up Procedure

1. The UTP port EUT connected to Ethernet HUB, which connect to USB port of notebook computer through USB LAN. Using the located remotely USB LAN to LAN port of notebook computer and software to control the EUT
2. Use the software that is given by the customer and operated in the windows or DOS to control the EUT's continuous transmission.
3. Then making access to the mode of continuous transmission and set testing channel.

Appendix B

Antenna Position

The antenna of the device is fixed outside of EUT, the user can not remove it freely without any tools from outside the device. This is comply with the FCC rules part 15.203