MEASUREMENT REPORT of WIRELESS LAN COMPACTFLASH CARD

Applicant : Universal Scientific Industrial Co., Ltd.

Model No. : CF114100

EUT : USI 802.11b CompactFlash Card

FCC ID : IXMCF1141000

Report No. : U1315674

Tested by :

Training Research Co., Ltd.

TEL : 886-2-26935155 FAX : 886-2-26934440

255, Nanyang Street, Shijr, 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.***, 255, Nanyang Street, Shijr, 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 B (Declaration of Conformity) and C Section 15.247.

Applicant	**:**	Universal Scientific Industrial Co., Ltd.
Model No.	**:**	CF114100
EUT	**:**	USI 802.11b CompactFlash Card
FCC ID	**:**	IXMCF1141000
Report No.	**:**	U1315674
Test Date	**:**	July 17, 2003

Prepared by: *Jack Tsai*

Approved by: *Frank Tsai*

Tested by :

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No. 255, Nanyang Street, Shijr, Taipei Hsien 221, Taiwan, R.O.C.

Federal Communications Commission
Declaration of Conformity
(DoC)

For the Following Equipment:

Product name : USI 802.11b CompactFlach Card

Model name : CF114100

Trade name : USI

Is herewith confirmed and found to comply with the requirements of CFR 47 part15 Subpart B - Unintentional Radiators regulation. The results of electromagnetic mission evaluation are shown in the report number: U1315674

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation

Manufacturer	*USA local representative*
Company name: Universal Scientific Industrial Co., Ltd.	To be determined
Computer address: 135, Lane 351, Taiping Rd., Sect.1, Tsao Tuen, Nantou, Taiwan	
ZIP / Postal code 542	
Contact person:	
Title:	
Internet e-mail address:	
Tel / Fax:	

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Ⅰ. GENERAL

1.1 Introduction

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

1.2 Description of EUT

EUT	**:**	USI 802.11b CompactFlash Card
Model No.	**:**	CF114100
FCC ID	**:**	IXMCF1141000
Frequency Range	**:**	2.412 GHz ~ 2.462GHz
Support Channel	**:**	11 Channel
Modulation Skill	**:**	DBPSK, DQPSK, CCK
Interface	**:**	CompactFlash Type II
Power Type	**:**	By CompactFlash slot of the client' s device

1.3 Setting up Procedure

1 The EUT inserted into the PCMCIA slot of the notebook computer through a CF-PCMCIA adapter. Using the PCMCIA port of Notebook Computer and software to control the wireless LAN CompactFlash card.

2 Use the software that is given by the customer and operated in the windows to control the EUT's.

3 Set different channel being tested and repeat the procedures above.
(a) Radiated for intentional test:
making EUT to the mode of continuous transmission
(b) Conducted and Radiated for unintentional test:
making EUT to the linking (Rx/Tx) mode with far support equipments

1.4 Description of Support Equipment

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

Notebook#1	**:**	**IBM COMPUTER INC.**
Type No.	:	08N1180
Serial No.	:	11SO8K6451ZFX0820AJOLB
FCC ID	:	DoC Approved
AC Adaptor	:	ASTEC INC. (China)
Model No.	:	02K6654
Serial No.	:	11SO2K6654Z1Z0Z40325LE
FCC ID	:	DoC Approved
Power Core	:	Non-shielded, Plastic hoods, with ferrite bead
Power type	:	100 ~ 240VAC, 50 ~ 60Hz, 1.2A-0.5A / 16VDC, 4.5A

Notebook#2	**:**	**ASUSTeK Computer Inc.**
Type No.	:	A1390CCD
Serial No.	:	2404690182
FCC ID	:	DoC Approved
AC Adaptor	**:**	**LITE-ON ELECTRONICS, INC.**
Model No.	:	PA-1530-01
Serial No.	:	00153468
FCC ID	:	DoC Approved
Power Core	:	Shielded, Plastic hoods, w/o ferrite bead
Power type	:	100 ~ 240VAC, 50~ 60Hz, 1.5A / 19VDC, 2.64A

Monitor	**:**	**HP 15' Color Monitor**
Model No.	:	D2827A
Serial No.	:	KR91161717
FCC ID	:	C5F7NFCMC1518X
檢磁	:	3872B039
Power type	:	100 ~ 240 VAC / 50 ~ 60 Hz, Switching
Power cord	:	Shielded, 1.83m long, No ferrite core
Data cable	:	Shielded, 1.46m long, with two ferrite cores

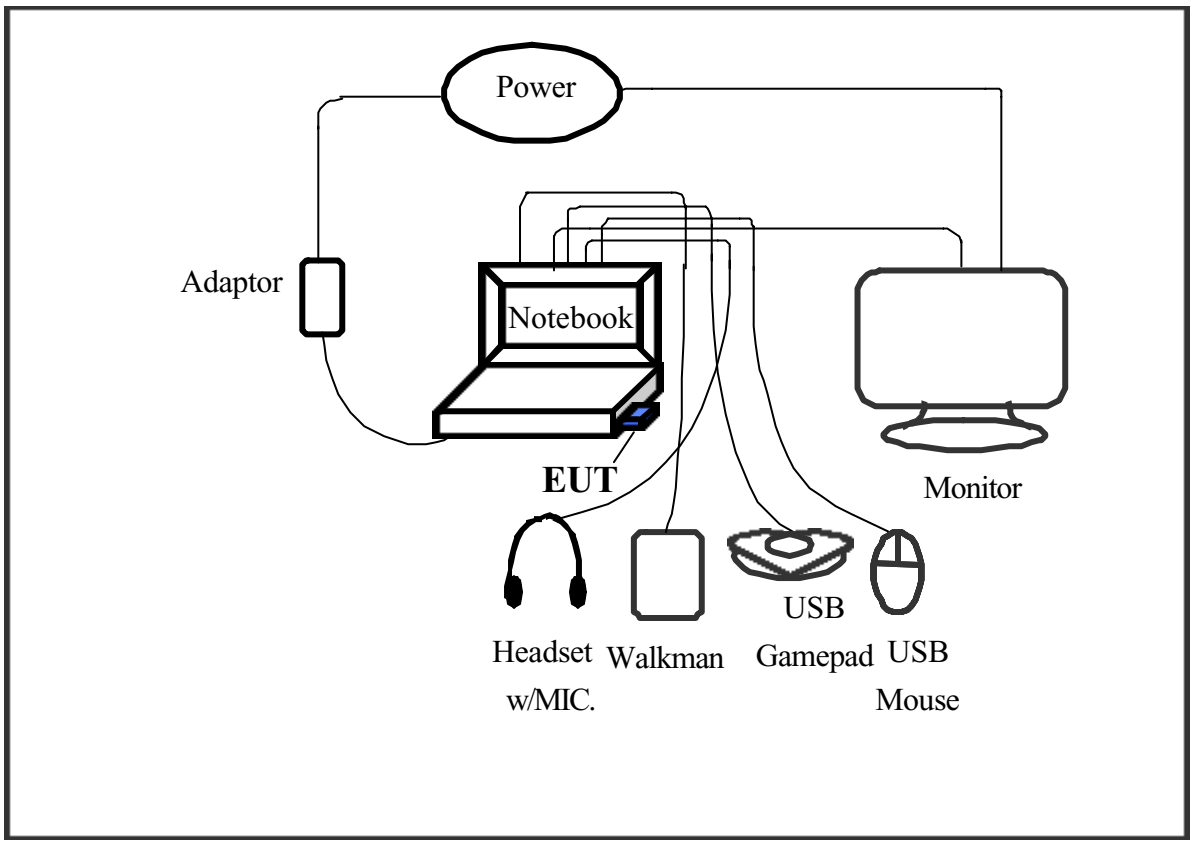
Walkman	**:**	**Aiwa**
Model No.	:	PR-4550
Power type	:	2 X AA batteries

Headset with Mic:		**MIC**
Model No.	:	MIC-03
Power type	:	Power by computer
Data Cable	:	Non-shielded, 1.6m length, No ferrite core

USB Gamepad	**:**	**Padix**
Model No.	:	QF-606U
Serial No.	:	None
FCC ID	:	DoC Approval
Power type	:	Powered by PC
Power Cable	:	Shielded, 1.5m long, No ferrite bead data cable

USB Mouse	**:**	**Logitech**
Model No.	:	M-BA47
Serial No.	:	LZE92250027
FCC ID	:	DoC Approved
檢磁	:	4872A220
Power type	:	Powered by Computer
Power Cable	:	Shielded, 1.5m long, Plastic hoods, No ferrite bead

1.5 Configuration of System Under Test



The tests below are carried out the EUT transmitter set at high power in TDD mode. The EUT was inserted into the PCMCIA slot of notebook computer through a CF-PCMCIA adapter. The EUT is needed to force selection of output power level and channel number.

The setting up procedure was recorded in <<1.3 Test setup procedure> >.

Notebook:

*DC IN Jack --- an external power adaptor

*VGA Port --- a monitor

*USB A Port --- a gamepad

*USB B Port --- a mouse (USB)

*MIC. Jack --- a Walkman

*SPK. Jack --- a Headset w/ microphone

(Each port on notebook is connected with suitable device)

1.6 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 confirming 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.

1.7 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 <1.3 Test setup Procedure>, the detail setup was written on each test item.

1.8 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. 255, Nanyang Street, Shijr, 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. 255, Nanyang Street, Shijr, 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.

1.9 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 were 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 <1.3 Test setup procedure>.

II. Section 15.101(a): Equipment authorization of unintentional radiators

The EUT equipped with a PCMCIA interface (after adapting the CF-PCMCIA adapter) and should be operated with the notebook computer (or device equipped with CF slot like PDA …etc.). It was categorized to *Class B personal computers and peripherals* as cannot be operated stand-alone. The authorization requires **Declaration of Conformity (DoC)** and the items required such as Sect.15.107 (Conducted limits) and Sect.15.109 (Radiated emission limits) is same as Sect.15.207 and 15.247(C).

III. Section 15.203: Antenna requirement

The EUT has an integrated antenna permanently attached on the PCB, which inside the housing. In addition, there is no external antenna or connector employed. The antenna requirement stated in Sect.15.203 is inapplicable to this EUT.

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

4.1 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 150 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 4.3

There is a test condition apply in this test item, the test procedure description as the following:
EUT transmit only:
Using the PCMCIA slot of notebook computer and software to control the EUT. Then making access to the mode of continuous transmission and setting the testing channel. Three channels were tested, one in the top (CH01), one in the middle (CH06) and the other in bottom (CH11). The setting up procedure is recorded on <<1.3 Test setup procedure> >.

4.2 List of Test Instruments

Instrument Name	Model No.	Brand	Serial No.	Last time	Next time
Spectrum analyzer	8594EM	H P	3710A00279	12/26/02	12/26/03
Pre-selector (>30MHz)	AMP-01	TRC	REP-001	10/20/02	10/20/03
LISN (EUT)	TRC-LISN-01	TRC	LISN-01	09/03/02	09/03/03
LISN (Support E.)	LISN-01	TRC	9912-05	07/15/02	07/15/03
Auto Switch Box (< 30MHz)	ASB-01	TRC	9904-01	11/20/02	11/20/03

The level of confidence of 95%, the uncertainty of measurement of conducted emission is ± 2.02dB.

4.3 Test configuration (*Conducted Emissions Test Placement)*

4.4 Test Result of Conducted Emissions

EUT transmit only

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

Table 1 Power Line Conducted Emissions (Channel 1, Transmitter Mode)

Power Connected Emissions					*Class B*		
Conductor	*Frequency (KHz)*	*Peak (dBμV)*	*QP (dBμV)*	*Average (dBμV)*	*QP-limit (dBμV)*	*AVG-limit (dBμV)*	*Margin (dB)*
Line 1	182.000	47.59	---	---	65.09	55.09	-7.50
	203.000	48.73	---	---	64.49	54.49	-5.76
	370.000	38.93	---	---	59.71	49.71	-10.78
	456.000	38.24	---	---	57.26	47.26	-9.02
	911.000	32.70	---	---	56.00	46.00	-13.30
	1176.000	32.58	---	---	56.00	46.00	-13.42
	1503.000	32.37	---	---	56.00	46.00	-13.63
	1977.000	32.32	---	---	56.00	46.00	-13.68
	4131.000	29.11	---	---	56.00	46.00	-16.89
	5000.000	28.57	---	---	60.00	50.00	-21.43
Line 2	177.000	49.05	---	---	65.23	55.23	-6.18
	203.000	50.03	---	---	64.49	54.49	-4.46
	274.000	38.49	---	---	62.46	52.46	-13.97
	363.000	39.88	---	---	59.91	49.91	-10.03
	456.000	37.45	---	---	57.26	47.26	-9.81
	954.000	34.94	---	---	56.00	46.00	-11.06
	1518.000	34.84	---	---	56.00	46.00	-11.16
	3936.000	32.01	---	---	56.00	46.00	-13.99
	5180.000	30.28	---	---	60.00	50.00	-19.72

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, Transmitter Mode)

Power Connected Emissions					*Class B*		
Conductor	*Frequency (KHz)*	*Peak (dBμV)*	*QP (dBμV)*	*Average (dBμV)*	*QP-limit (dBμV)*	*AVG-limit (dBμV)*	*Margin (dB)*
Line 1	203.000	48.82	---	---	64.49	54.49	-5.67
	300.000	37.55	---	---	61.71	51.71	-14.16
	377.000	39.30	---	---	59.51	49.51	-10.21
	456.000	36.67	---	---	57.26	47.26	-10.59
	494.000	34.82	---	---	56.17	46.17	-11.35
	598.000	32.77	---	---	56.00	46.00	-13.23
	945.000	32.58	---	---	56.00	46.00	-13.42
	1269.000	32.98	---	---	56.00	46.00	-13.02
	1661.000	32.37	---	---	56.00	46.00	-13.63
	2029.000	32.07	---	---	56.00	46.00	-13.93
Line 2	185.000	47.66	---	---	65.00	55.00	-7.34
	205.000	49.40	---	---	64.43	54.43	-5.03
	398.000	39.14	---	---	58.91	48.91	-9.77
	475.000	36.91	---	---	56.71	46.71	-9.80
	802.000	34.70	---	---	56.00	46.00	-11.30
	1006.000	34.70	---	---	56.00	46.00	-11.30
	1598.000	35.63	---	---	56.00	46.00	-10.37
	2222.000	34.27	---	---	56.00	46.00	-11.73
	3606.000	31.78	---	---	56.00	46.00	-14.22
	5000.000	30.47	---	---	60.00	50.00	-19.53

The reading amplitudes are all under limit.

Table 3 Power Line Conducted Emissions (Channel 11, Transmitter Mode)

Power Connected Emissions					Class B		
Conductor	*Frequency (KHz)*	*Peak (dBμV)*	*QP (dBμV)*	*Average (dBμV)*	*QP-limit (dBμV)*	*AVG-limit (dBμV)*	*Margin (dB)*
Line 1	201.000	50.60	---	---	64.54	54.54	-3.94
	308.000	38.40	---	---	61.49	51.49	-13.09
	409.000	39.83	---	---	58.60	48.60	-8.77
	456.000	37.11	---	---	57.26	47.26	-10.15
	509.000	35.45	---	---	56.00	46.00	-10.55
	598.000	32.37	---	---	56.00	46.00	-13.63
	824.000	32.88	---	---	56.00	46.00	-13.12
	1017.000	33.54	---	---	56.00	46.00	-12.46
	1308.000	33.28	---	---	56.00	46.00	-12.72
	1661.000	34.08	---	---	56.00	46.00	-11.92
Line 2	206.000	49.05	---	---	64.40	54.40	-5.35
	308.000	38.49	---	---	61.49	51.49	-13.00
	405.000	40.98	---	---	58.71	48.71	-7.73
	592.000	34.06	---	---	56.00	46.00	-11.94
	832.000	35.24	---	---	56.00	46.00	-10.76
	1038.000	35.47	---	---	56.00	46.00	-10.53
	1333.000	35.42	---	---	56.00	46.00	-10.58
	1645.000	34.91	---	---	56.00	46.00	-11.09
	2610.000	33.00	---	---	56.00	46.00	-13.00
	5000.000	30.95	---	---	60.00	50.00	-19.05

The reading amplitudes are all under limit.

V. Section 15.247 (a): Technical description of the EUT

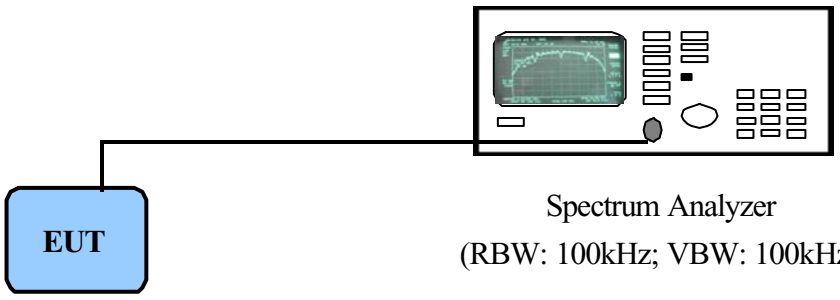
Based on the Section 2.1, *Direct Sequence System* is a spread spectrum system in which the carrier has been modulated by a high speed spreading code and an information data stream. The high speed code sequence dominates the "modulating function" and is the direct cause of the wide spreading of the transmitted signal. In the Exhibit H, operational description demonstrates the operation principles of the Baseband processor employed by the EUT, shows that which is a complete DSSS baseband processor and meets the definition of the Direct sequence spread spectrum system.

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

6.1 Test Condition & Setup

The transmitter bandwidth measurements were performed by the contact manner. The EUT was set to transmit continuously, also various channels were investigated to find the maximum occupied bandwidth.. The output of the EUT was connected to the spectrum analyzer. The bandwidth of the fundamental frequency is observed by the spectrum analyzer with 100kHz RBW and 100kHz VBW.

6.2 Test Instruments Configuration



P.S.: Notebook computer to control the EUT at maximal power output and channel Number and set antenna kit

6.3 List of Test Instruments

Instrument Name	Model No.	Brand	Serial No.	Last time	Next time
Spectrum Analyzer	MS2665C	ANRITSU	6200175476	09/11/02	09/11/03

6.4 Test Result of Bandwidth

Bandwidth of Channel 1

Bandwidth (802.11b)	:	12.16 MHz
The min. 6dB BW at least	:	500 KHz

Bandwidth of Channel 6

Bandwidth (802.11b)	:	12.12 MHz
The min. 6dB BW at least	:	500 KHz

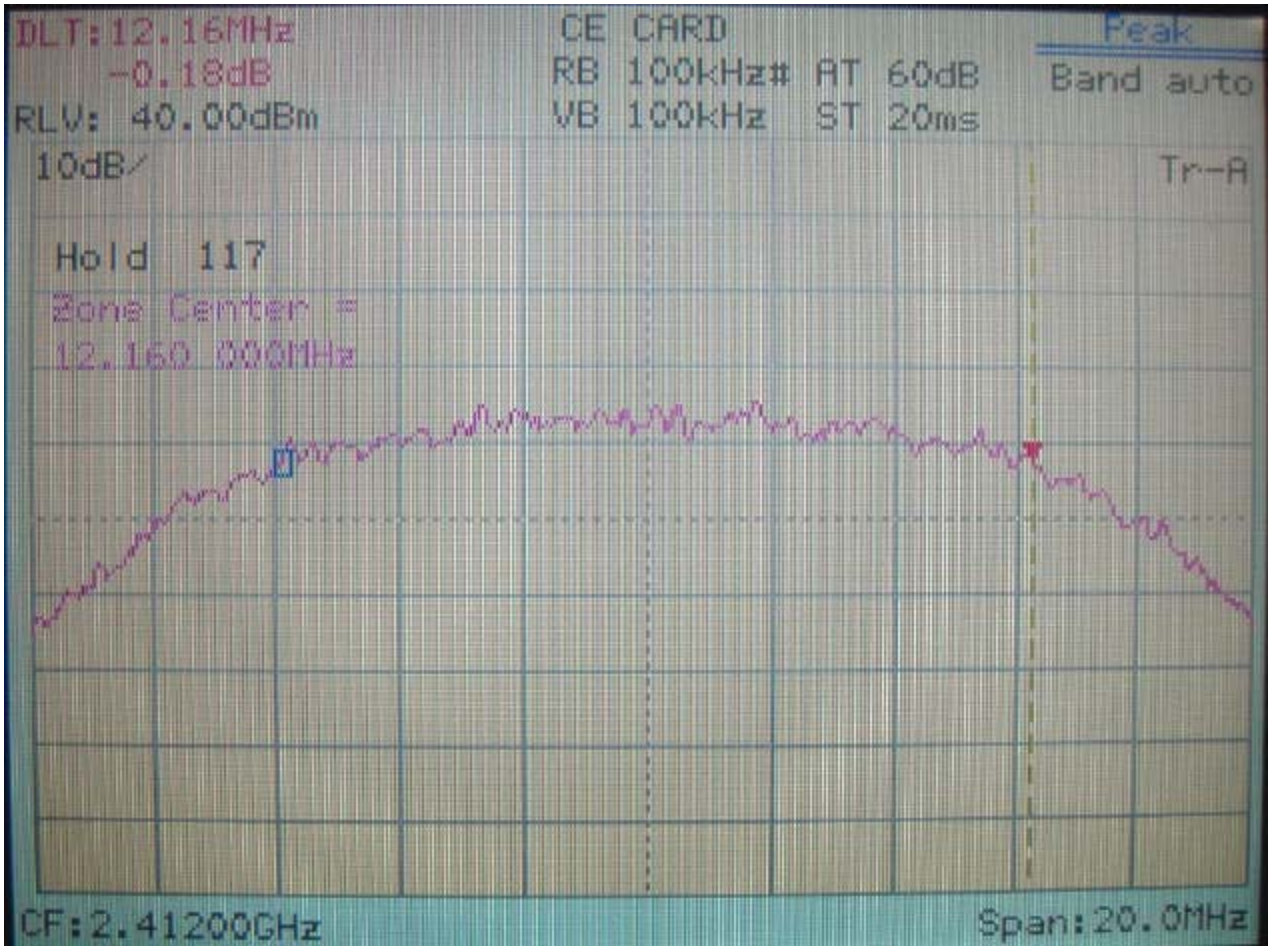
Bandwidth of Channel 11

Bandwidth (802.11b)	:	12.16 MHz
The min. 6dB BW at least	:	500 KHz

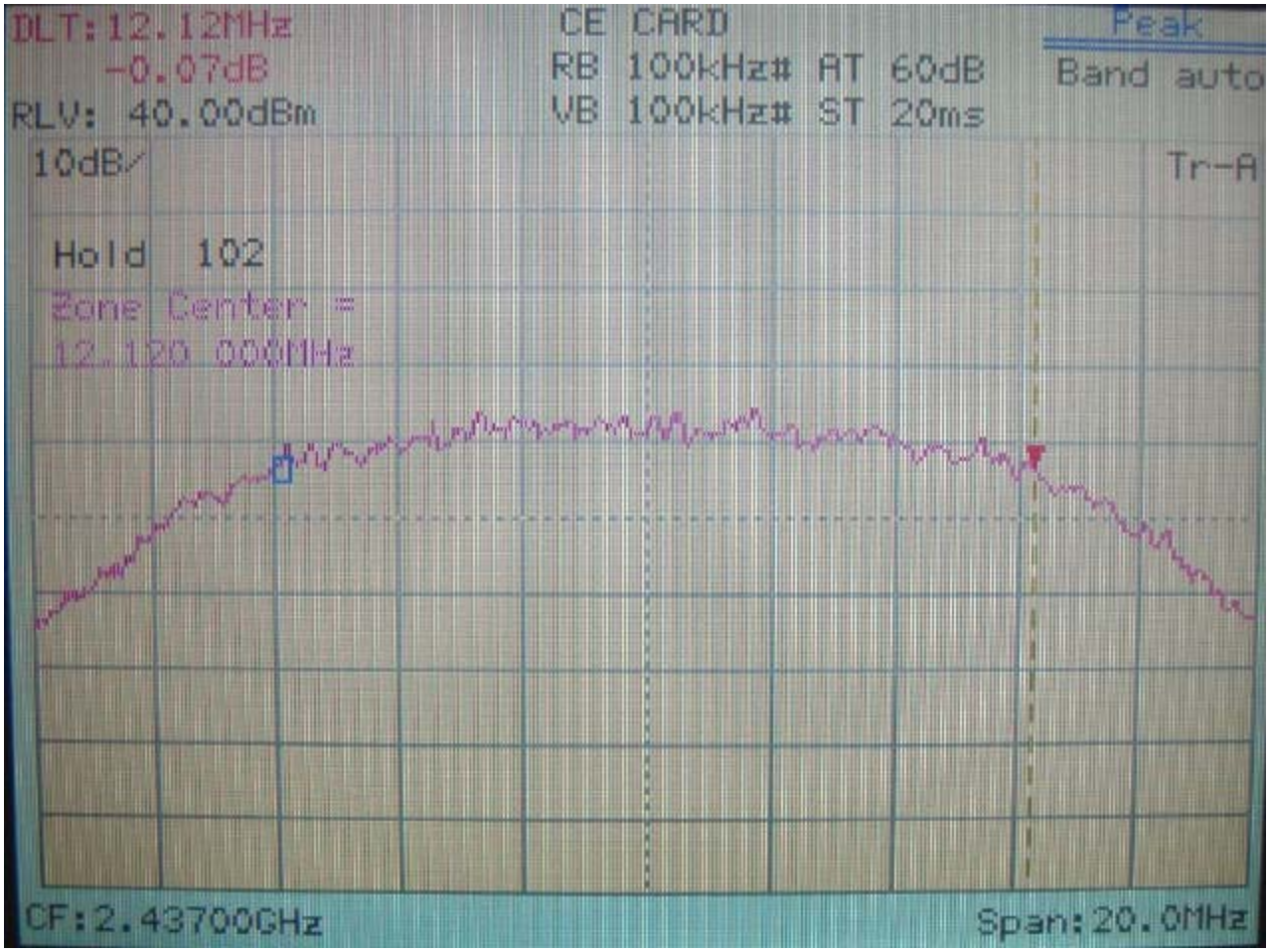
Note:

1. The data in the above table are summarizing the following attachment spectrum analyzer hard copy. According to the guidance, we' d made the measurement with the spectrum analyzer' s resolution bandwidth *(RBW)=100kHz* and set the *span>>RBW*. The results show the measured 6dB bandwidth comply with the minimum 500kHz requirement.
2. The attachments show these on the following pages.

Bandwidth of Channel 1: 12.16 MHz



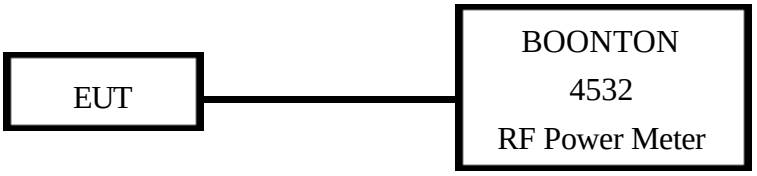
Bandwidth of Channel 6: 12.12 MHz



Bandwidth of Channel 11: 12.16 MHz

VII. Section 15.247(b): Power Output

7.1 Test Condition & Setup



1. The output of the transmitter is connected to the BOONTON RF Power Meter.
2. The calibration is performed before every test. The values of the output power of the EUT will shown in the dBm directly are the transmitter output peak power. Recording as follows.

7.2 List of Test Instruments

Instrument Name	Model No.	Brand	Serial No.
RF Power Meter	4532	BOONTON	117501

7.3 Test Result

Formula:

Signal generator + |Cable loss| = Output peak power

Channel	**Signal Generator**	**Cable Loss**	**Output peak power**	
	dBm	**dBm**	**dBm**	**mW**
CH 01	15.52	0.70	16.22	41.88
CH 06	15.48	0.70	16.18	41.50
CH 11	15.50	0.70	16.20	41.69

VIII. Section 15.247 (C): Spurious Emissions (Radiated)

8.1 Test Condition & Setup

We' d performed the test by the *radiated emission* skill: The EUT was placed in an anechoic chamber, and set the EUT transmitting continuously 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. For the measurement above 1GHz, according to the guidance we' d set the spectrum analyzer' s 6dB bandwidth RBW to 1MHz.

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 EMI Receiver, CHASE whole range Bi-log antenna (Model No.: CBL 6141A) is used to measure frequency from 30 MHz to 1GHz. The final test is used the HP 85460A spectrum and 8564E spectrum was examined from 1GHz to 25GHz using an Hewlett Packard Spectrum Analyzer, EMCO/CMT Horn Antenna (Model 3115 / RA42-K-F-4B-C) for 1G - 25GHz.

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 25GHz. 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 25GHz) 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:

Using the PCMCIA interface of Notebook computer and software to control the EUT through Ethernet hub. Then making access to the mode of continuous transmission. Three channels were 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 upper, middle and bottom 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. Since the EUT was set to transmit continuously, no *duty cycle* is present.

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 1GHz to 25GHz

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

8.2 List of Test Instruments

Instrument Name	Model No.	Brand	Serial No.	Last time	Next time
Spectrum analyzer	8594EM	H P	3710A00279	12/26/02	12/26/03
Pre-selector (>30MHz)	AMP-01	TRC	REP-001	10/20/02	10/20/03
Bi-log Antenna	CBL 6141A	CHASE	4206	05/27/03	05/27/04
Switch/Control Unit (>30MHz)	3488A	HP	N/A	11/20/02	11/20/03
Auto Switch Box (>30MHz)	ASB-01	TRC	9904-01	11/20/02	11/20/03
Spectrum Analyzer	8564E	HP	US36433002	08/01/02	08/01/03
Microwave Preamplifier	83051A	HP	3232A00347	08/01/02	08/01/03
Horn Antenna	3115	EMCO	9704 – 5178	08/01/02	08/01/03
Horn Antenna	RA42-K-F-4B-C	CMT	961505-003	02/01/03	02/01/04
Anechoic Chamber (cable calibrated together)				05/20/03	05/20/04

The level of confidence of 95% , the uncertainty of measurement of radiated emission is ± 3.44dB.

8.3 Test Instruments Configuration

Front View of the Test Configuration

Rear View of the Test Configuration

The test configuration for frequency between 1GHz to 25GHz is same as above.

8.4 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.

Test Conditions: Temperature : 25 ° C Humidity : 73 % RH

Table 5 Radiated Emissions for 30MHz 1GHz [Antenna polarity Horizontal]

Radiated Emission				*Correction Factors*	*Corrected Amplitude*	*Class B (3 m)*	
Frequency (MHz)	*Amplitude (dBμV/m)*	*Ant. H. (m)*	*Table (°)*	*(dB)*	*(dBμV/m)*	*Limit (dBμV/m)*	*Margin (dB)*
202.17	30.94	1.00	119	-2.68	28.26	43.50	-15.24
243.40	34.24	1.00	246	-2.74	31.50	46.00	-14.50
301.60	33.32	1.00	300	-2.33	30.99	46.00	-15.01
375.56	30.58	1.00	293	-0.44	30.14	46.00	-15.86
558.65	24.11	1.00	185	7.19	31.30	46.00	-14.70
860.56	22.24	1.00	142	15.76	38.00	46.00	-8.00

Table 6 Radiated Emissions for 30MHz 1GHz [Antenna polarity Vertical]

Radiated Emission				*Correction Factors*	*Corrected Amplitude*	*Class B (3 m)*	
Frequency (MHz)	*Amplitude (dBμV/m)*	*Ant. H. (m)*	*Table (°)*	*(dB)*	*(dBμV/m)*	*Limit (dBμV/m)*	*Margin (dB)*
122.15	30.15	1.00	300	-1.35	28.80	43.50	-14.70
146.40	26.98	1.00	269	-2.05	24.93	43.50	-18.57
202.17	28.24	1.00	86	-2.68	25.56	43.50	-17.94
375.56	30.40	1.00	334	-0.44	29.96	46.00	-16.04
402.24	27.45	1.00	330	0.54	27.99	46.00	-18.01
558.65	25.25	1.00	303	7.19	32.44	46.00	-13.56

Note:

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

Table 7 Channel 1, 1GHz to 25GHz [Antenna polarity Horizontal]

Radiated Emission				Corrected Amplitude (dBμV/m)		Class B (3m)		
Frequency (MHz)	Ant. H. (m)	Table (°)	Correction Factors (dB)	Peak	Average	Limit (dBμV/m) Peak	Ave.	Margin (dB)
4834.95	1.00	11	-24.16	57.27	36.90	74.00	53.96	-17.06
7248.25	1.00	298	-17.91	52.18	---	74.00	53.96	-1.78
7656.03	1.00	331	-15.35	59.24	35.33	74.00	53.96	-18.63
12065.87	1.00	59	-16.66	49.91	---	74.00	53.96	-4.05
16891.29	1.00	109	-13.61	56.45	36.55	74.00	53.96	-17.41

Table 8 Channel 1, 1GHz to 25GHz [Antenna polarity Vertical]

Radiated Emission				Corrected Amplitude (dBμV/m)		Class B (3m)		
Frequency (MHz)	Ant. H. (m)	Table (°)	Correction Factors (dB)	Peak	Average	Limit (dBμV/m) Peak	Ave.	Margin (dB)
4830.34	1.00	82	-24.19	57.83	47.16	74.00	53.96	-6.80
7248.25	1.00	114	-17.91	50.11	---	74.00	53.96	-3.85
9655.47	1.00	60	-15.35	55.15	31.18	74.00	53.96	-22.78
12065.87	1.00	173	-16.66	51.32	---	74.00	53.96	-2.64
16890.75	1.00	339	-13.61	52.71	---	74.00	53.96	-1.25

Note:

1. Margin = Corrected - Limit.
2. The EUT utilizes a *permanently attached antenna*. In addition the spurious RF radiated emissions levels do comply with the *20dBc limit* both at its bandedges and other spurious emissions.
3. As stated in Section 15.35(b), for any frequencies above 1000MHz, radiated limits shown are based upon the use of measurement instrumentation employing an average detector function. As the results of our test, the peak amplitudes are already below the FCC limit. Thus the average amplitudes of the rest are omitted.

Table 9 Channel 6, 1GHz to 25GHz [Antenna polarity Horizontal]

Radiated Emission				Corrected Amplitude (dBμV/m)		Class B (3m) Limit (dBμV/m)		Margin (dB)
Frequency (MHz)	Ant. H. (m)	Table (°)	Correction Factors (dB)	Peak	Average	Peak	Ave.	
4880.50	1.00	226	-23.90	58.13	44.89	74.00	53.96	-9.07
7317.12	1.00	107	-17.65	49.77	---	74.00	53.96	-4.19
9756.31	1.00	33	-15.16	58.40	38.00	74.00	53.96	-15.96
12192.75	1.00	94	-16.65	51.05	---	74.00	53.96	-2.91
19060.63	1.00	138	-12.43	54.40	33.75	74.00	53.96	-20.21

Table 10 Channel 6, 1GHz to 25GHz [Antenna polarity Vertical]

Radiated Emission				Corrected Amplitude (dBμV/m)		Class B (3m) Limit (dBμV/m)		Margin (dB)
Frequency (MHz)	Ant. H. (m)	Table (°)	Correction Factors (dB)	Peak	Average	Peak	Ave.	
4880.58	1.00	89	-23.90	55.53	42.45	74.00	53.96	-11.51
7317.12	1.00	177	-17.65	49.60	---	74.00	53.96	-4.36
9756.27	1.00	164	-15.16	55.88	29.89	74.00	53.96	-24.07
12193.87	1.00	289	-16.65	53.32	31.16	74.00	53.96	-22.80
14636.00	1.00	307	-17.05	46.95	---	74.00	53.96	-7.01

Table 11 Channel 11, 1GHz to 25GHz [Antenna polarity Horizontal]

Radiated Emission				Corrected Amplitude (dBμV/m)		Class B (3m)		
Frequency (MHz)	Ant. H. (m)	Table (°)	Correction Factors (dB)	Peak	Average	Limit (dBμV/m) Peak	Ave.	Margin (dB)
4924.00	1.00	56	-23.74	54.26	42.53	74.00	53.96	-11.43
7400.50	1.00	176	-16.87	49.78	---	74.00	53.96	-4.18
9855.97	1.00	224	-15.16	57.38	33.27	74.00	53.96	-20.69
12316.00	1.00	309	-16.66	52.67	---	74.00	53.96	-1.29
17242.37	1.00	44	-12.12	51.01	---	74.00	53.96	-2.95

Table 12 Channel 11, 1GHz to 25GHz [Antenna polarity Vertical]

Radiated Emission				Corrected Amplitude (dBμV/m)		Class B (3m)		
Frequency (MHz)	Ant. H. (m)	Table (°)	Correction Factors (dB)	Peak	Average	Limit (dBμV/m) Peak	Ave.	Margin (dB)
4931.87	1.00	50	-23.72	51.98	---	74.00	53.96	-1.98
7396.87	1.00	331	-16.90	50.01	---	74.00	53.96	-3.95
9855.64	1.00	29	-15.15	55.14	26.94	74.00	53.96	-27.02
12316.78	1.00	106	-16.66	54.37	32.87	74.00	53.96	-21.09

8.5 Test Result of the Bandedge

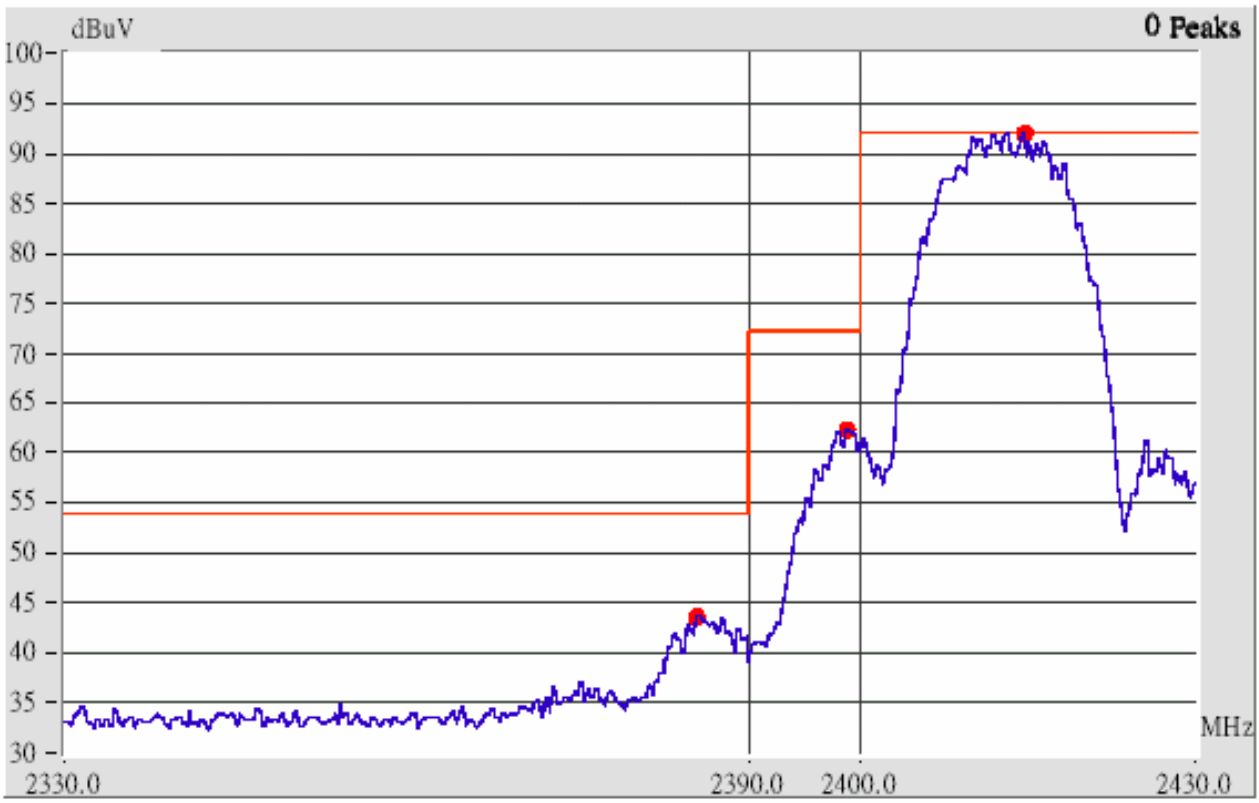
If any 100 kHz bandwidth outside these frequency bands, the radio frequency power that is produced by the modulation products of the spreading sequence, the information sequence and the carrier frequency shall be either *at least 20 dB below that in any 100 kHz bandwidth within the band that contains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

We perform this section by the *radiated manner*, the RBW is set to 100kHz and VBW>RBW. We' d made the observation *up to 10th harmonics and the criterion is all the harmonic/spurious emissions must be 20dB below the highest emission level measured.* If the emissions fall in the restricted bands stated in the Part15.205(a) must also *comply with the radiated emission limits specified in Part15.209(a). (Peak mode: RBW=VBW=1MHz, Average mode: RBW=1MHz; VBW=10Hz)*

The following pages show our observations referring to the channel 1 and 11 respectively.

Test Condition & Setup: same as < 8.1 >

Channel 1



This is the hard copy of our bandedge measurement generated by our bandedge testing program. The plot shown above is the bandedge of channel 1.

1. The lobe left by the fundamental side is already 20dB below the highest emission level.
2. The emissions recorded in the restricted band is do comply with the Part 15.209(a) – as below.

Radiated Emission					*Corrected Amplitude (dBμV/m)*		*FCC Class B (3m)*		
Frequency (MHz)	*Ant. P.*	*Ant. H. (m)*	*Table (°)*	*Factors (dB)*	*Peak*	*Average*	*Limit (dBμV/m) Peak*	*Ave.*	*Margin (dB)*
2385.97	Hor	1.00	95	3.12	51.63	---	74.00	53.96	-2.33
2390.06	Hor	1.00	166	3.13	48.30	---	74.00	53.96	-5.66
2385.77	Ver	1.00	247	3.12	46.17	---	74.00	53.96	-7.79
2390.06	Ver	1.00	334	3.13	40.68	---	74.00	53.96	-13.28

Channel 11

This is the hard copy of our bandedge measurement generated by our bandedge testing program. The plot shown above is the bandedge of channel 11.

1. The lobe right by the fundamental side is already 20dB below the highest emission level.
2. The emissions recorded in the restricted band is do comply with the Part 15.209(a) – as below

Radiated Emission					***Corrected Amplitude (dBμV/m)***		***FCC Class B (3m)***		
Frequency (MHz)	***Ant. P.***	***Ant. H. (m)***	***Table (°)***	***Factors (dB)***	***Peak***	***Average***	***Limit (dBμV/m)***		***Margin (dB)***
							Peak	***Ave.***	
2483.50	Hor	1.00	98	3.45	51.54	---	74.00	53.96	-2.42
2488.79	Hor	1.00	44	3.46	53.17	44.10	74.00	53.96	-9.86
2483.50	Ver	1.00	173	3.45	42.62	---	74.00	53.96	-11.34
2488.82	Ver	1.00	260	3.46	44.59	---	74.00	53.96	-9.37

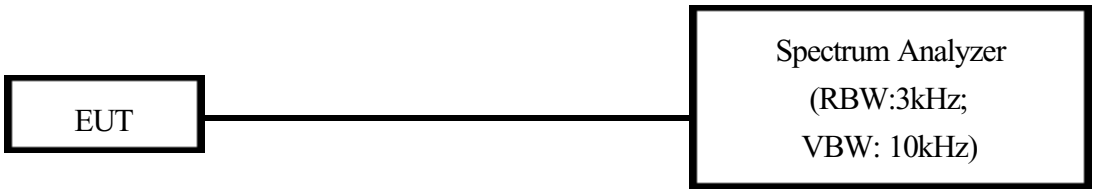
IX. Section 15.247(d): Power Spectral Density

9.1 Test Condition & Setup

The tests below are running with the EUT transmitter set at high power in TDD mode .A LAN port from a notebook computer connect to the EUT. The EUT is needed to force selection of output power level and channel number. While testing, the EUT was set to transmit continuously and to be tested by the contact manner with the spectrum analyzer.

The attachments below show our observation.

9.2 Test Instruments Configuration



9.3 List of Test Instruments

Instrument Name	Model No.	Brand	Serial No.	Last time	Next time
Spectrum Analyzer	MS2665C	ANRITSU	6200175476	09/11/02	09/11/03

9.4 Test Result of Power spectral density

The following table shows a summary of the test results of the Power Spectral Density.

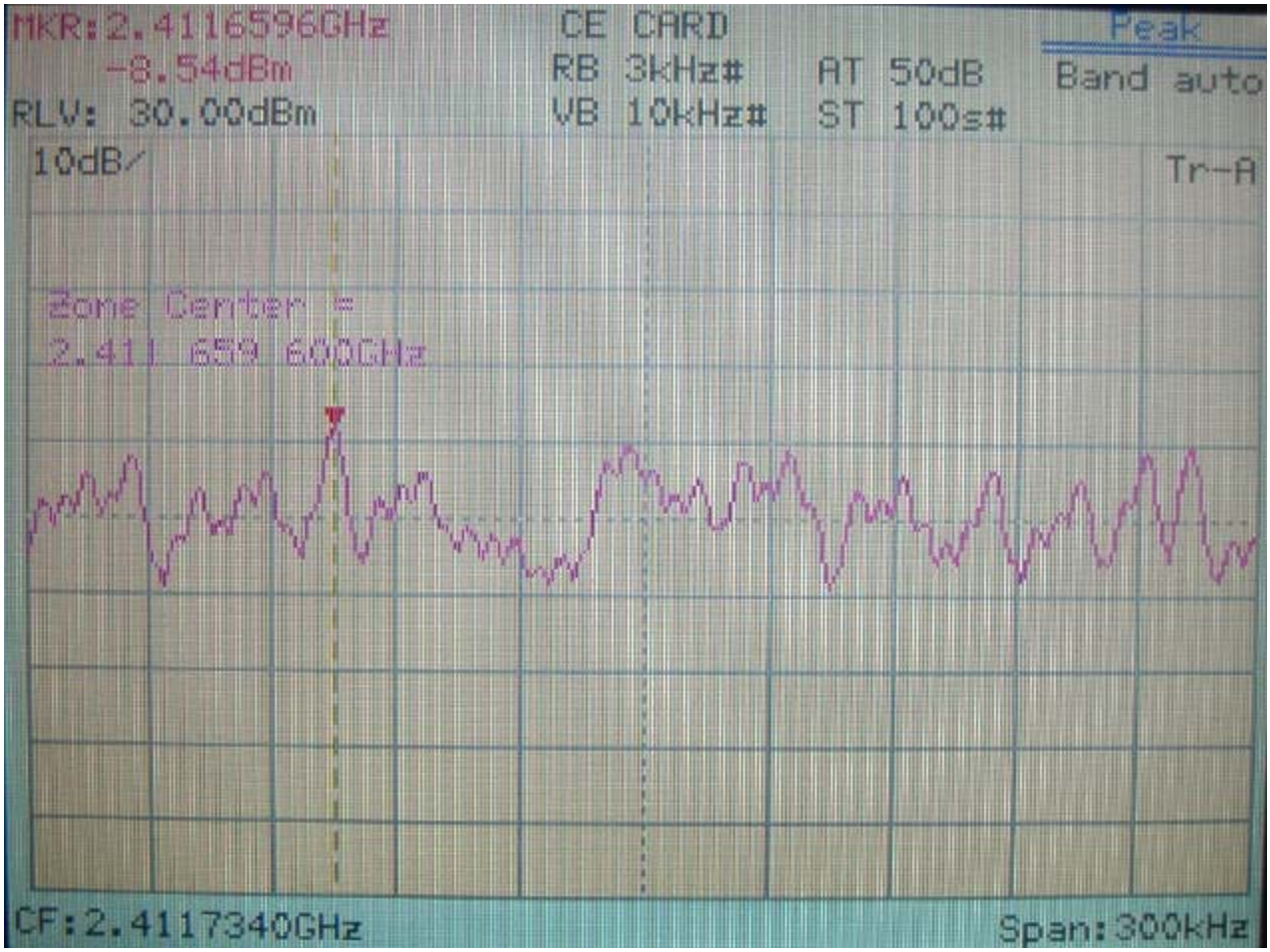
Channel	*Frequency (GHz)*	*Ppr (dBuV)*	*Cable Loss (dB)*	*Ppq (dBm)*	*Limit (dB)*	*Margin (dB)*
CH 01	2.412	-8.54	0.70	-7.84	8.00	-15.84
CH 06	2.437	-10.12	0.70	-9.42	8.00	-17.42
CH 11	2.462	-10.13	0.70	-9.43	8.00	-17.43

Note:

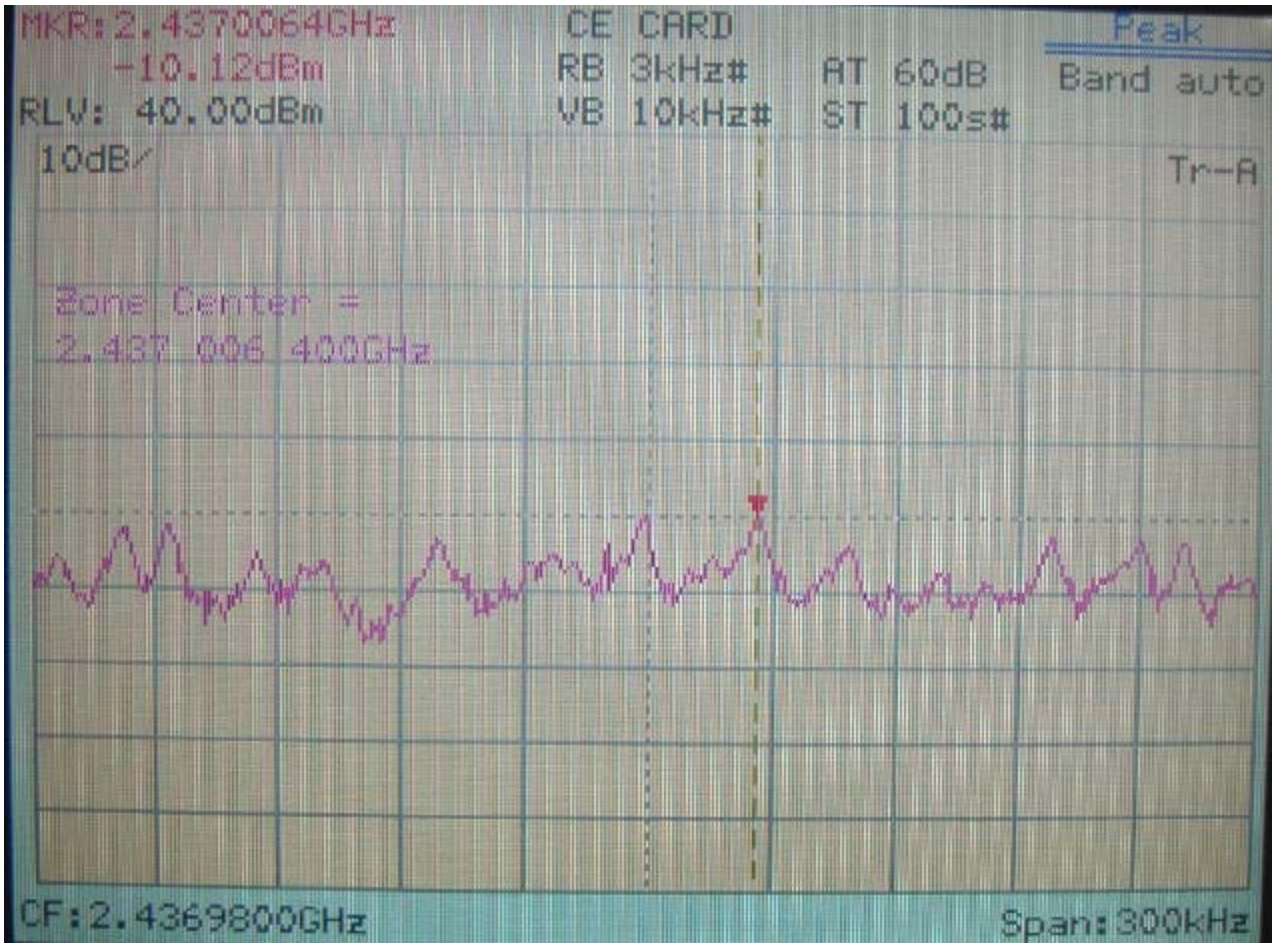
1. The attachment follow by this page and there is no page number.
2. Ppr: spectrum read power density (using peak search mode),

   Ppq: actual peak power density in the spread spectrum band.
3. Ppq = Ppr + |Cable Loss|

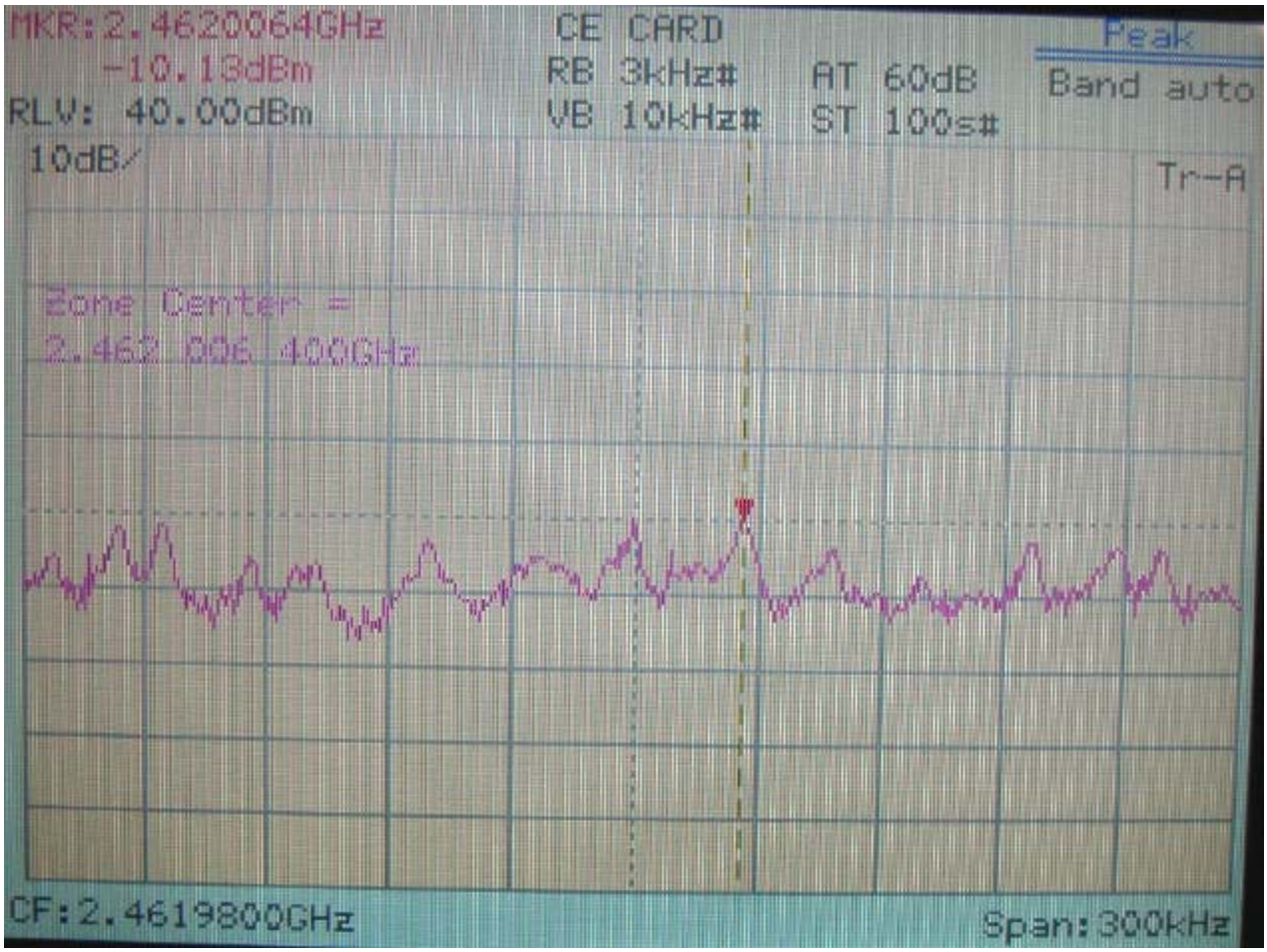
Channel 01


MKR:2.4116596GHz
-8.54dBm
RLV: 30.00dBm
CE CARD
RB 3kHz#
VB 10kHz#
AT 50dB
ST 100s#
Peak
Band auto
10dB/
Tr-A
Zone Center =
2.411 659 600GHz
CF:2.4117340GHz
Span:300kHz

Channel 06


MKR:2.4370064GHz
-10.12dBm
RLV: 40.00dBm
10dB/
CE CARD
RB 3kHz#
VB 10kHz#
AT 60dB
ST 100s#
Peak
Band auto
Tr-A
Zone Center =
2.437 006 400GHz
CF:2.4369800GHz
Span:800kHz

Channel 11


MKR:2.4620064GHz
-10.13dBm
RLV: 40.00dBm
CE CARD
RB 3kHz#
VB 10kHz#
AT 60dB
ST 100s#
Peak
Band auto
10dB/
Tr-A
Zone Center =
2.462 006 400GHz
CF:2.4619800GHz
Span:300kHz