MEASUREMENT REPORT
of
2.4 GHz Wireless device

Applicant	**:**	Well Communication Corp.
Model No.	**:**	AWR-8210, AWR-8210B
EUT	**:**	ADSL Wireless Router
FCC ID	**:**	JCHAWR-8210
Report No.	**:**	W0115648

Tested by :

Training Research Co., Ltd.

TEL : 886-2-26461146 FAX : 886-2-26461778

No. 15, Lane 530, Pa-Lian RD., Sec. 1, Hsichih City, Taipei Hsien, 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 C Section 15.247.

Applicant	:	Well Communication Corp.
Applicant address	:	11F, No. 778, Chung Cheng Rd., Chung Ho City, Taipei Hsien, Taiwan, R.O.C.
EUT	:	ADSL Wireless Router
Model No.	:	AWR-8210, AWR-8210B
FCC ID	:	JCHAWR-8210
Report No.	:	W0115648
Test Date	:	September 18, 2003

Prepared by: Jason Yeh
Jason Yeh

Approved by: Jacob Lin
Jacob Lin

Tested by :

Training Research Co., Ltd.

TEL: 886-2-26461146 **FAX: 886-2-26461778**

No. 15, Lane 530, Pa-Lian RD., Sec. 1, Hsichih City, Taipei Hsien, Taiwan, R.O.C.

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Ⅰ. GENERAL

1.1 Introduction

The following measurement report is submitted on behalf of applicant in support that the *cable gateway* certification in accordance with Part 2 Subpart J and Part 15 Subpart A/B/C of the Commission's Rules and Regulations.

1.2 Description of EUT

The ADSL Wireless Router is passport to full internetworking and high-speed multimedia communications from your home or office to a corporate network or the Internet. With the ADSL Wireless Router connected to computer, and an account activated by network service provider, the ADSL Wireless Router provides a high-speed Digital Subscriber Line (DSL).

EUT	**:**	ADSL Wireless Router
Model No.	**:**	AWR-8210, AWR-8210B
Granted FCC ID	**:**	JCHAWR-8210
Frequency Range	**:**	2.412 GHz ~ 2.462GHz
Support Channel	**:**	11 Channels
Modulation Skill	**:**	DBPSK, DQPSK, CCK
Power Type	**:**	By the Power adaptor M/N: MW41-1200800A I/P: 120Vac, 60Hz O/P: 12Vac, 800mA
Power Cable	**:**	193 cm length, non-shielded.

***The input signal to the radio is received through either one of the antennas. The selection of the antenna is performed through the Diversity Switch. Only one of the antennas can transmit the signal, thus conducting all the tests with the main antenna.**

1.3 Description of Support Equipment

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

PC	**:**	**HP Brio 85xx 6/350**
Model No.	:	D6928A
Serial No.	:	SG91801432
FCC ID	:	Doc Approved
Power type	:	100 ~ 230VAC / 50 ~ 60Hz, 5A, Switching
Power cord	:	Non-shielded, 2.33m long, Plastic, No ferrite core
Monitor	**:**	**HP 15' Color Monitor**
Model No.	:	D2827A
Serial No.	:	KR91161719
FCC ID	:	C5F7NFCMC1518X
Power type	:	110 ~ 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
Keyboard	**:**	**HP**
Model No.	:	5219
Serial No.	:	BN31206351
FCC ID	:	E5XKB5209
Power type	:	By PC
Data cable	:	Shielded, 1.60m long
Mouse	**:**	**HP**
Model No.	:	MO42KOA
Serial No.	:	0306044011
FCC ID	:	DOC Approved
Power type	:	By PC
Power cord	:	Non-shielded, 1.88m long, No ferrite core
Wireless PC Card:		**LINKSYS**
Model No.	:	WPC11 ver.3
FCC ID	:	PKW-WPC11-V3
Canada Code	:	3839A12075

Printer	**:**	**HP**
Model No.	:	C2642A
Serial No.	:	SG69A196GV
FCC ID		:B94C2642X
Power type	:	220 VAC, 50Hz
Power cord	:	Non-shielded, 2m long, no ferrite core
Data cable	:	Shielded, 1.84m (1.7m) long, no ferrite core
USB Joystick	**:**	**Rockfire**
Model No.	:	QF-337uv
Serial No.	:	10600545
FCC ID	:	CE Approval
Power type	:	Powered by PC
Power cable	:	Shielded, 1.8m long, No ferrite bead data cable
PC	**:**	**HP Vectra VE**
Model No.	:	D6970A
Serial No.	:	SG53000707
FCC ID	:	Doc Approved
Power type	:	100 ~ 230VAC / 50 ~ 60Hz, 5A, Switching
Power cord	:	Non-shielded, 2.30m long, Plastic, No ferrite core
LAN Card	**:**	**D-Link**
Model No.	:	DFE-530TX
Serial No.	:	0050BAE32FF3, 0050BAE3158B
FCC ID	:	N/A, DoC Approved
Notebook PC	**:**	**ASUSTek Computer**
Model No.	:	AB00F
Serial No.	:	24NP016361
FCC ID	:	DoC Approved
BSMI	:	41016012
Power type	:	100 ~ 240VAC, 1A 50/60 Hz, Switching

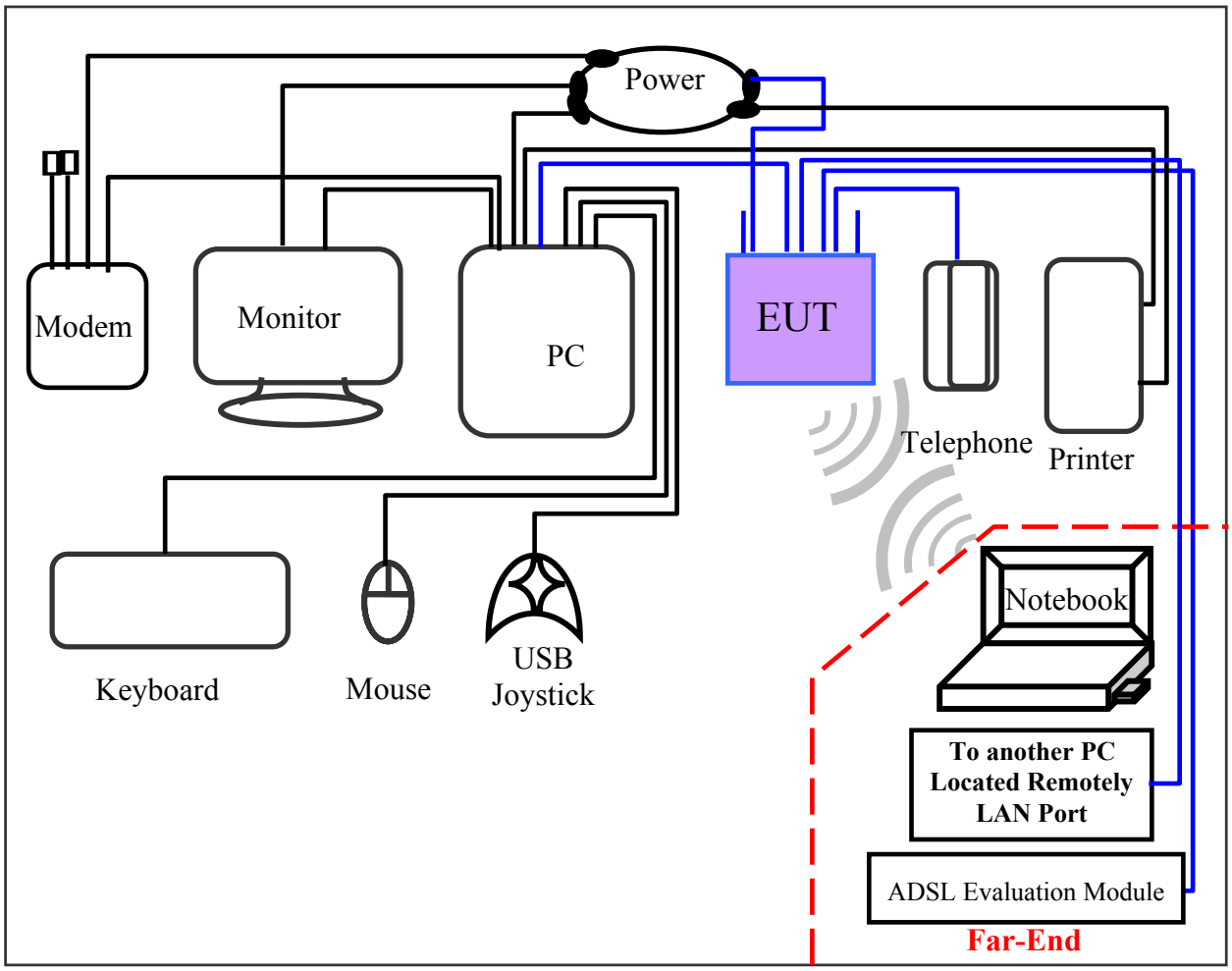
Adaptor of Notebook	**:**	**LITE-ON Electronics, Inc.**
Model No.	:	PA-1530-01
Serial No.	:	00151184
FCC ID	:	Doc Approved
Power cable	:	Non-shielded, 1.72m length, Plastic hood, No ferrite core (Between power adaptor and AC power source)
Power cable	:	Shielded, 1.48m length, Plastic hood, with ferrite core (Between power adaptor and notebook)

Telephone	**:**	**Shin-Kan-Sen**
Model No.	:	HTT-213
Serial No.	:	2111011508
FCC ID	:	N/A
BSMI	:	41016012
Power type	:	By ADSL Evaluation Module

ADSL Evaluation Module:TEXAS INSTRUMENTS

Model No.	:	99-7451-01
Serial No.	:	B079915
FCC ID	:	N/A
Power type	:	12Vdc

1.4 Configuration of System Under Test



(Conduction and Radiation for unintentional test)

The setting up procedure was in Appendix A.

Connections of PC:

*Serial Port --- via a 110cm shielded RS-232 cable to modem.

*Monitor Port --- a monitor with 1.5m length data cable.

*Keyboard port --- a keyboard with 1.50m length data cable.

*Mouse port --- a mouse with 1.50m length data cable.

*USB port A --- to EUT.

*USB port B --- a joystick with 1.80m long, shielded and no ferrite bead data cable.

*Printer port --- a printer with 1.80m length data cable.

(Each port on notebook is connected with suitable device)

Connections of EUT:

Network Everywhere Wireless Cable/DSL Router:

*RS-232 port --- via a 76 cm length data cable that terminated.

*LAN port --- via a 5.0m long, non-shielded, no ferrite core, RJ45 cable to the LAN port of PC Located Remotely .

*USB port --- via a 1.8m length shielded USB cable to the USB port A of PC.

*DSL jack--- via a 15m length RJ-11C cable to the ADSL Evaluation Module located remotely.

*PHONE jack --- via a 1.5m length RJ-11C cable to the Telephone.

*Power jack --- with a power adaptor.

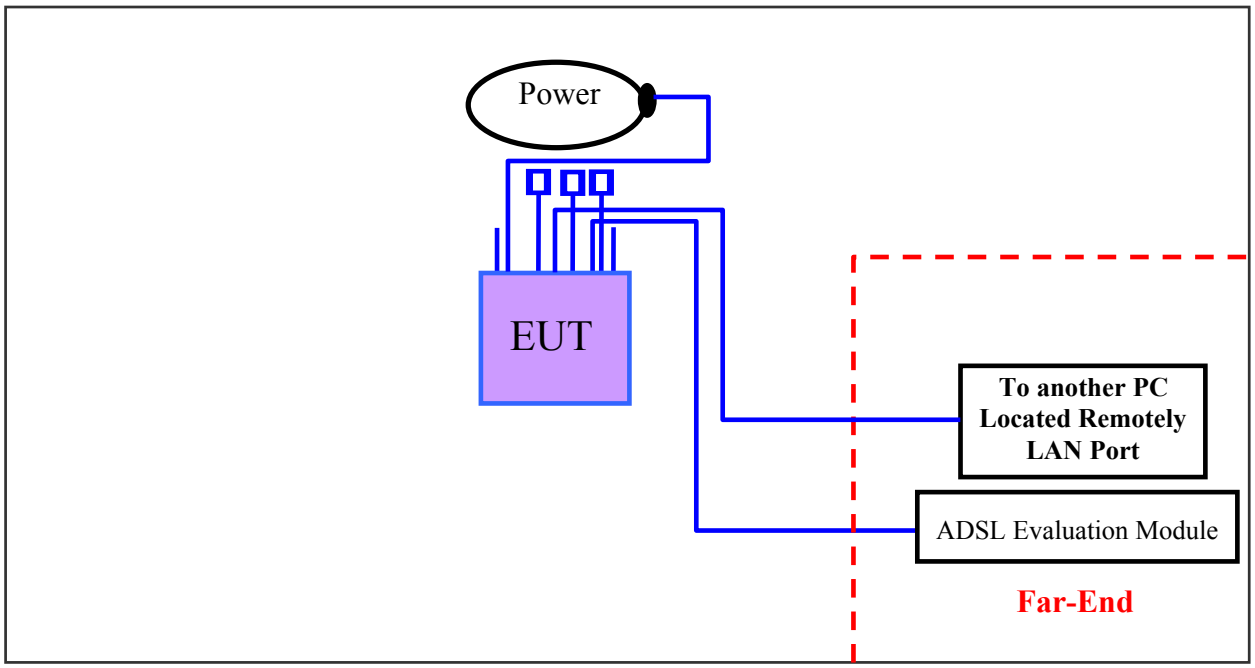
Power adaptor:

M/N: MW41-1200800A

I/P: 120Vac, 60Hz

O/P: 12Vac, 800mA

*Power cable of adaptor x 1 --- 193 cm length, non-shielded



(Conduction & Radiation of intentional test)

The setting up procedure was recorded in Appendix A.

Connections of EUT:

Network Everywhere Wireless Cable/DSL Router:

*RS-232 port --- via a 76 cm length data cable that terminated.

*LAN port --- via a 5.0m long, non-shielded, no ferrite core, RJ45 cable to the LAN port of PC Located Remotely.

*USB port --- with a 1.8m length shielded USB cable that terminated.

*DSL jack --- via a 15m length RJ-11C cable to the ADSL Evaluation Module located remotely.

*PHONE jack --- with a 1.5m length RJ-11C cable that terminated.

*Power jack --- with a power adaptor.

Power adaptor:

M/N: MW41-1200800A

I/P: 120Vac, 60Hz

O/P: 12Vac, 800mA

*Power cable of adaptor x 1 --- 193 cm length, non-shielded

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 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.

1.6 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 (above 1GHz) 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 radiated emissions measurements below 1 GHz were performed in an OATS located at Pa-Lian His-chih Training Research Co., Ltd.

No. 15, Lane 530, Pa-Lian RD., Sec. 1, Hsichih City, Taipei Hsien, Taiwan, R.O.C. (Registration No.: 91035) *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 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 computer. The ch01, ch06 and ch11 of EUT were all tested. The setting up procedure is recorded on Appendix A.

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

The EUT equipped with an Internet interface and should be operated with the computer. It was categorized to *Class B personal computers and peripherals* as cannot be operated stand-alone. The authorization requires Certification 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) we'd performed respectively. So in this test report we have "unintentional" and "intentional" setup and test. The "intentional test" was making the RF device to transmit continuously. The "unintentional test" was making the EUT as a usual status. (See Appendix A setup)

III. Section 15.203: Antenna requirement

The EUT has an integrated antenna permanently attached on the PCB. In addition, there is no external antenna or connector employed. The antenna requirement stated in Sect.15.203 is inapplicable to this EUT.
The antenna specification listed in the Appendix B of the test report.

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

4.1 Test Condition & Setup

The EUT was assembled on a wooden table, which is 80 centimeters high, was placed 40 centimeters from the back wall 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.

There are two test conditions applied in this test item, the test procedure description as the following:

1.EUT transmit only: (intentional test)
Using the LAN card install in Notebook and use 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 CH 1 was the worst case which was recorded.

2.EUT as a class B peripheral, see Appendix A.

4.2 List of Test Instruments

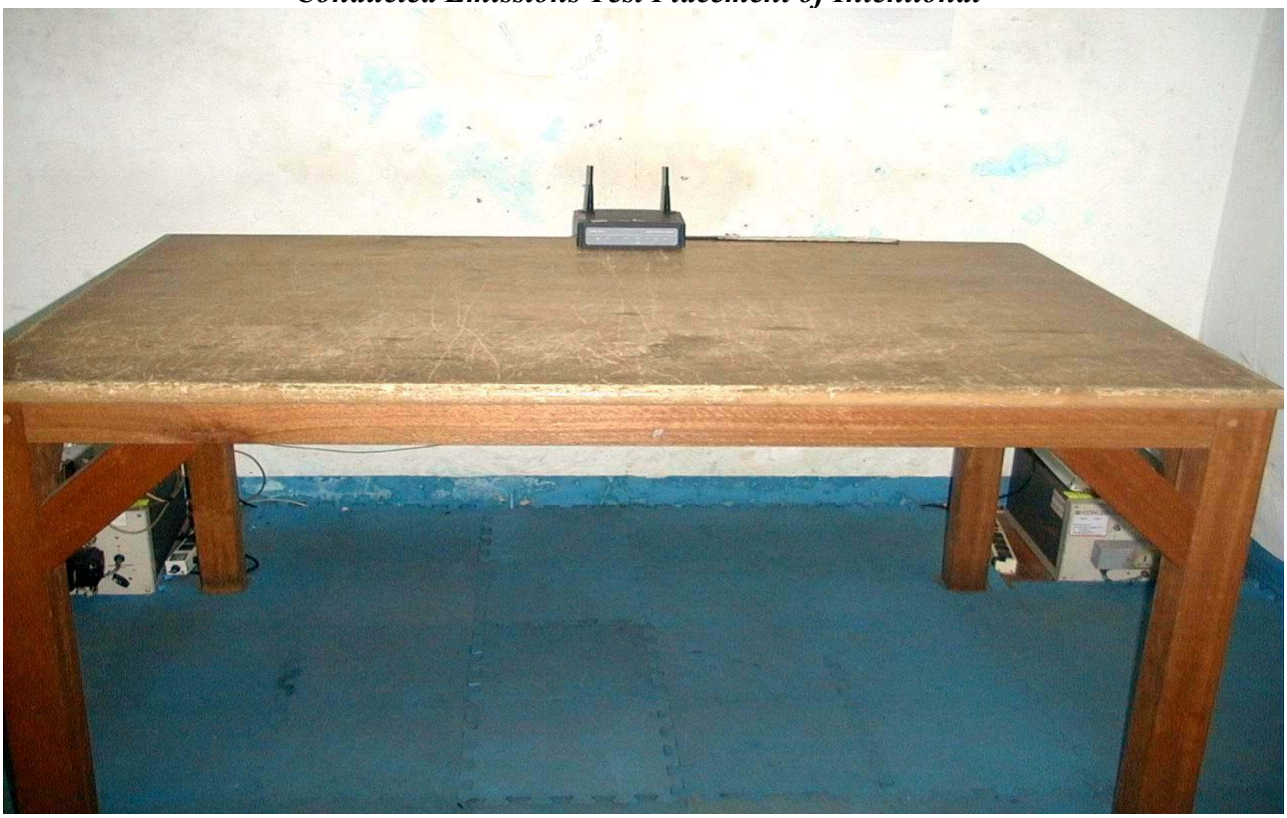
Instrument Name	Model No.	Brand	Serial No.	Last time	Next time
Receiver	SCR3102	SCHAFFNER	012	04/22/03	04/21/04
LISN (EUT)	3825/2	EMCO	9411-2284	07/21/03	07/20/04
LISN (Support E.)	3825/2	EMCO	9210-2007	09/03/03	09/02/04
Preamplifier	EQ3-006	TRC	- - - - - - - - -	05/29/03	05/28/04
Line switch box	EQ3-007	TRC	- - - - - - - - -	05/29/03	05/28/04

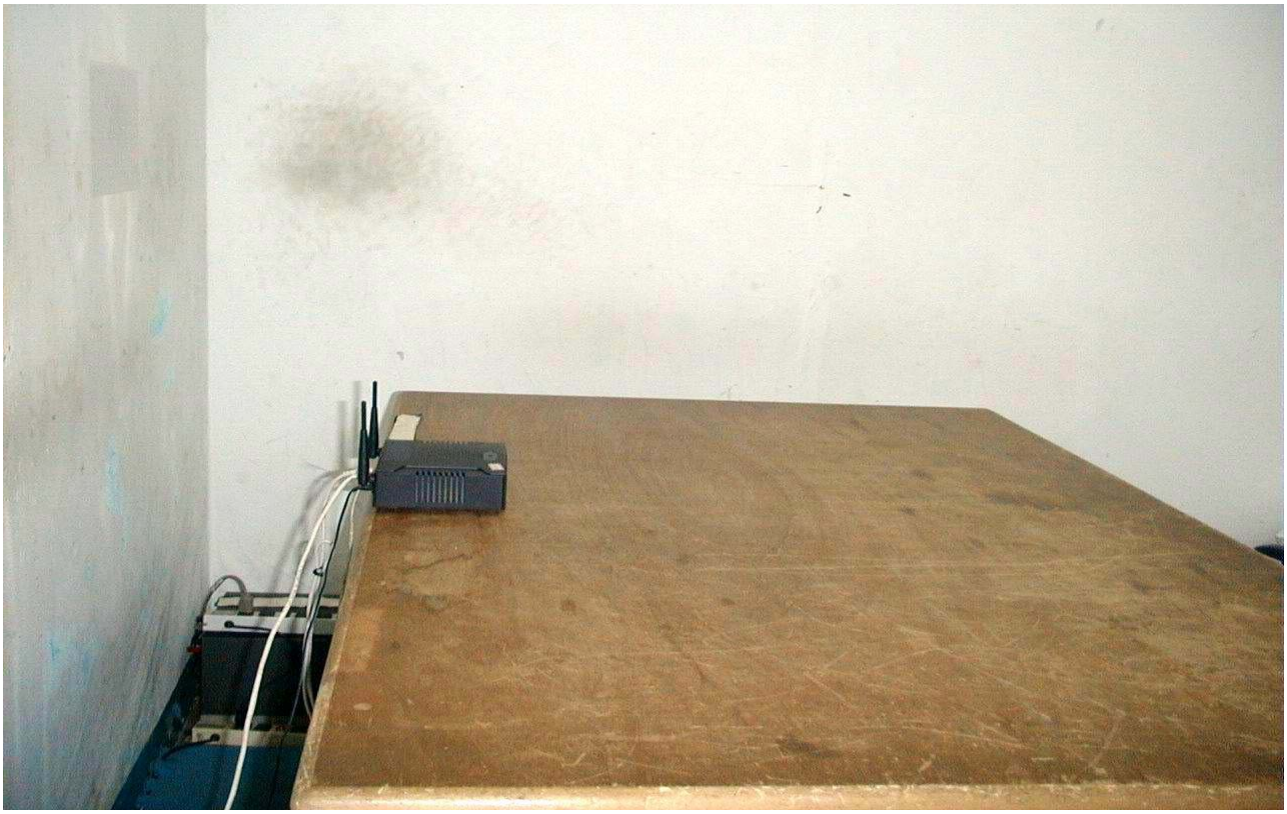
The level of confidence of 95% , the uncertainty of measurement of conducted emission is ± 2.02 dB .

4.3 Test configuration

Conducted Emissions Test Placement of Unintentional

Conducted Emissions Test Placement of Intentional





4.4 Test Result of Conducted Emissions

Test Mode: Intentional CH-1

Testing room : Temperature : 23 ° C Humidity : 61 % RH

Line 1

Frequency (KHz)	*READING AMPLITUDE*			*LIMIT*		*Margin (dB)*
	Peak (dBμV)	*Quasi-Peak (dBμV*	*Average (dBμV)*	*Quasi-Peak (dBμV)*	*Average (dBμV)*	
152.00	49.83	***.**	***.**	65.94	55.94	-6.11
322.00	44.99	***.**	***.**	61.09	51.09	-6.10
329.00	44.74	***.**	***.**	60.89	50.89	-6.15
340.00	44.83	***.**	***.**	60.57	50.57	-5.74
349.00	45.04	***.**	***.**	60.31	50.31	-5.28
361.00	44.62	***.**	***.**	59.97	49.97	-5.35
383.00	43.92	***.**	***.**	59.34	49.34	-5.42
394.00	44.15	***.**	***.**	59.03	49.03	-4.88
416.00	43.38	***.**	***.**	58.40	48.40	-5.02
441.00	42.26	***.**	***.**	57.69	47.69	-5.43

Line 2

Frequency (KHz)	*READING AMPLITUDE*			*LIMIT*		*Margin (dB)*
	Peak (dBμV)	*Quasi-Peak (dBμV*	*Average (dBμV)*	*Quasi-Peak (dBμV)*	*Average (dBμV)*	
324.00	48.98	***.**	***.**	61.03	51.03	-2.05
352.00	49.08	***.**	***.**	60.23	50.23	-1.15
371.00	48.67	***.**	***.**	59.69	49.69	-1.02
385.00	48.45	***.**	***.**	59.29	49.29	-0.83
408.00	48.06	***.**	***.**	58.63	48.63	-0.57
416.00	47.69	***.**	***.**	58.40	48.40	-0.71
427.00	47.48	***.**	***.**	58.09	48.09	-0.61
444.00	46.87	***.**	***.**	57.60	47.60	-0.73
455.00	46.33	***.**	***.**	57.29	47.29	-0.96
480.00	44.49	***.**	***.**	56.57	46.57	-2.09

*The reading amplitudes are all under limit.

Test Mode: Intentional CH-6

Testing room : Temperature : 23 ° C Humidity : 61 % RH

Line 1

Frequency (KHz)	*READING AMPLITUDE*			*LIMIT*		*Margin (dB)*
	Peak (dBμV)	*Quasi-Peak (dBμV*	*Average (dBμV)*	*Quasi-Peak (dBμV)*	*Average (dBμV)*	
335.00	45.09	***.**	***.**	60.71	50.71	-5.63
349.00	44.55	***.**	***.**	60.31	50.31	-5.77
364.00	44.48	***.**	***.**	59.89	49.89	-5.41
373.00	44.45	***.**	***.**	59.63	49.63	-5.18
392.00	44.20	***.**	***.**	59.09	49.09	-4.89
405.00	43.66	***.**	***.**	58.71	48.71	-5.05
414.00	43.17	***.**	***.**	58.46	48.46	-5.28
427.00	42.80	***.**	***.**	58.09	48.09	-5.29
444.00	41.94	***.**	***.**	57.60	47.60	-5.66
455.00	41.38	***.**	***.**	57.29	47.29	-5.90

Line 2

Frequency (KHz)	*READING AMPLITUDE*			*LIMIT*		*Margin (dB)*
	Peak (dBμV)	*Quasi-Peak (dBμV*	*Average (dBμV)*	*Quasi-Peak (dBμV)*	*Average (dBμV)*	
338.00	48.96	***.**	***.**	60.63	50.63	-1.67
359.00	48.65	***.**	***.**	60.03	50.03	-1.38
383.00	48.05	***.**	***.**	59.34	49.34	-1.29
394.00	48.09	***.**	***.**	59.03	49.03	-0.94
408.00	47.85	***.**	***.**	58.63	48.63	-0.78
416.00	47.62	***.**	***.**	58.40	48.40	-0.78
430.00	47.25	***.**	***.**	58.00	48.00	-0.75
438.00	46.96	***.**	***.**	57.77	47.77	-0.81
455.00	45.99	***.**	***.**	57.29	47.29	-1.30
473.00	44.63	***.**	***.**	56.77	46.77	-2.15

*The reading amplitudes are all under limit.

Test Mode: Intentional CH-11

Testing room : Temperature : 23 ° C Humidity : 61 % RH

Line 1

Frequency (KHz)	*READING AMPLITUDE*			*LIMIT*		*Margin (dB)*
	Peak (dBμV)	*Quasi-Peak (dBμV*	*Average (dBμV)*	*Quasi-Peak (dBμV)*	*Average (dBμV)*	
225.00	47.50	***.**	***.**	63.86	53.86	-6.36
251.00	46.75	***.**	***.**	63.11	53.11	-6.36
302.00	45.48	***.**	***.**	61.66	51.66	-6.17
320.00	44.83	***.**	***.**	61.14	51.14	-6.32
352.00	44.55	***.**	***.**	60.23	50.23	-5.68
361.00	43.54	***.**	***.**	59.97	49.97	-6.43
383.00	44.24	***.**	***.**	59.34	49.34	-5.10
403.00	43.82	***.**	***.**	58.77	48.77	-4.95
416.00	43.19	***.**	***.**	58.40	48.40	-5.21
433.00	42.51	***.**	***.**	57.91	47.91	-5.41

Line 2

Frequency (KHz)	*READING AMPLITUDE*			*LIMIT*		*Margin (dB)*
	Peak (dBμV)	*Quasi-Peak (dBμV*	*Average (dBμV)*	*Quasi-Peak (dBμV)*	*Average (dBμV)*	
289.00	48.76	***.**	***.**	62.03	52.03	-3.27
302.00	48.99	***.**	***.**	61.66	51.66	-2.66
329.00	48.88	***.**	***.**	60.89	50.89	-2.00
352.00	48.96	***.**	***.**	60.23	50.23	-1.27
378.00	48.36	***.**	***.**	59.49	49.49	-1.12
385.00	48.40	***.**	***.**	59.29	49.29	-0.88
400.00	47.87	***.**	***.**	58.86	48.86	-0.99
411.00	47.88	***.**	***.**	58.54	48.54	-0.66
452.00	46.03	***.**	***.**	57.37	47.37	-1.34
470.00	45.29	***.**	***.**	56.86	46.86	-1.57

*The reading amplitudes are all under limit.

Test Mode: Unintentional 100 x 100 Mbps

Testing room : Temperature : 23 ° C Humidity : 61 % RH

Line 1

Frequency (KHz)	*READING AMPLITUDE*			*LIMIT*		*Margin (dB)*
	Peak (dBμV)	*Quasi-Peak (dBμV*	*Average (dBμV)*	*Quasi-Peak (dBμV)*	*Average (dBμV)*	
157.00	48.68	***.**	***.**	65.80	55.80	-7.12
302.00	45.01	***.**	***.**	61.66	51.66	-6.64
308.00	44.81	***.**	***.**	61.49	51.49	-6.68
316.00	46.93	***.**	***.**	61.26	51.26	-4.33
333.00	45.20	***.**	***.**	60.77	50.77	-5.57
345.00	44.62	***.**	***.**	60.43	50.43	-5.81
357.00	44.62	***.**	***.**	60.09	50.09	-5.47
368.00	44.24	***.**	***.**	59.77	49.77	-5.53
390.00	42.60	***.**	***.**	59.14	49.14	-6.54
400.00	41.74	***.**	***.**	58.86	48.86	-7.12

Line 2

Frequency (KHz)	*READING AMPLITUDE*			*LIMIT*		*Margin (dB)*
	Peak (dBμV)	*Quasi-Peak (dBμV*	*Average (dBμV)*	*Quasi-Peak (dBμV)*	*Average (dBμV)*	
153.00	45.80	***.**	***.**	65.91	55.91	-10.12
156.00	45.37	***.**	***.**	65.83	55.83	-10.46
312.00	42.74	***.**	***.**	61.37	51.37	-8.63
322.00	41.14	***.**	***.**	61.09	51.09	-9.94
333.00	40.60	***.**	***.**	60.77	50.77	-10.18
345.00	40.03	***.**	***.**	60.43	50.43	-10.40
352.00	39.76	***.**	***.**	60.23	50.23	-10.47
368.00	39.33	***.**	***.**	59.77	49.77	-10.44
390.00	38.87	***.**	***.**	59.14	49.14	-10.28
403.00	38.51	***.**	***.**	58.77	48.77	-10.26

*The reading amplitudes are all under limit.

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

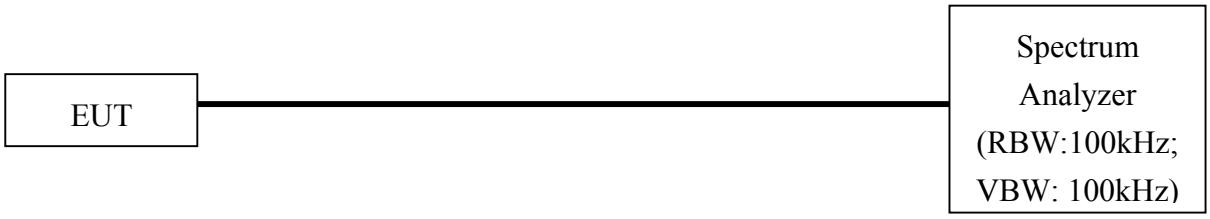
Based on the Section 2.1, *Direct Sequence System* is a spread spectrum system in which the carrier has been modulated by a high speed spreading code and an information data stream. The high speed code sequence dominates the "modulating function" and is the direct cause of the wide spreading of the transmitted signal. In attachment, 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



Test Configuration of Bandwidth for Direct Sequence System

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	8592A	H P	3003AD1401	01/01/03	12/31/04

6.4 Test Result of Bandwidth

Bandwidth of Channel 1

Bandwidth : 9.16 MHz

The min. 6 dB BW at least : 500 KHz

Bandwidth of Channel 6

Bandwidth : 9.84 MHz

The min. 6 dB BW at least : 500 KHz

Bandwidth of Channel 11

Bandwidth : 9.20 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. According to the guidance, we'd made the measurement with the spectrum analyzer's resolution bandwidth *(RBW)=100kHz, (VBW)=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

Bandwidth : 17.16 MHz

The min. 20 dB BW atle ast: 500 KHz

Bandwidth of Channel 6

Bandwidth : 17.08 MHz

The min. 20 dB BW at least: 500 KHz

Bandwidth of Channel 11

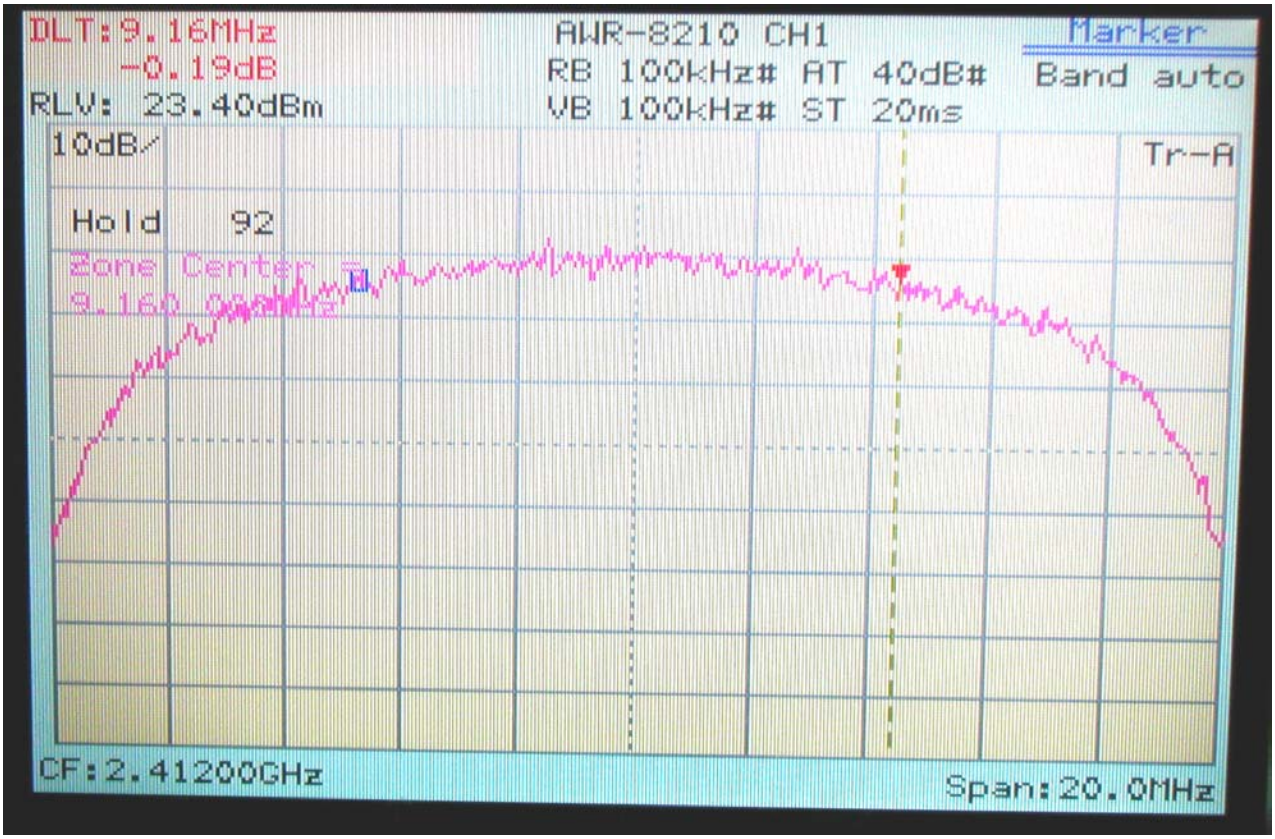
Bandwidth : 17.16 MHz

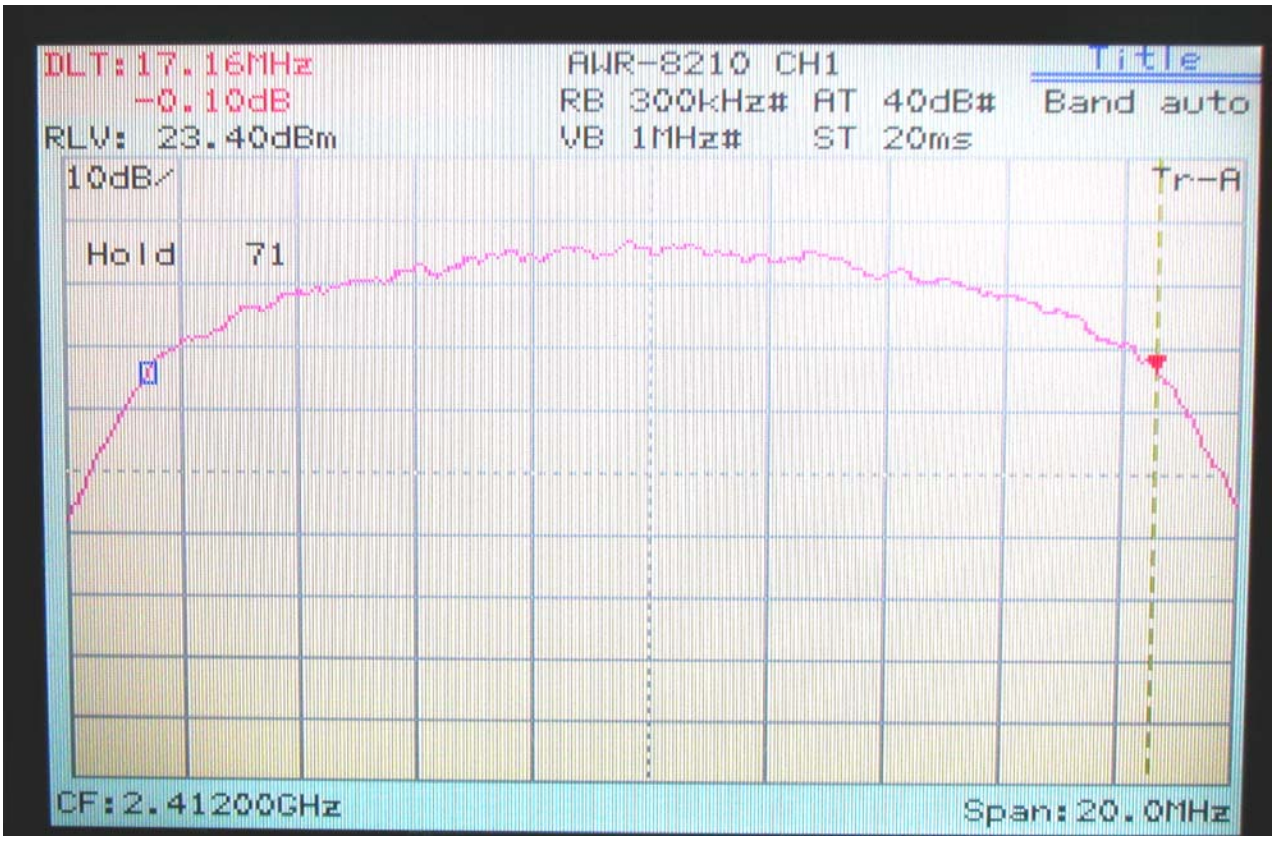
The min. 20 dB BW at least: 500 KHz

Note:

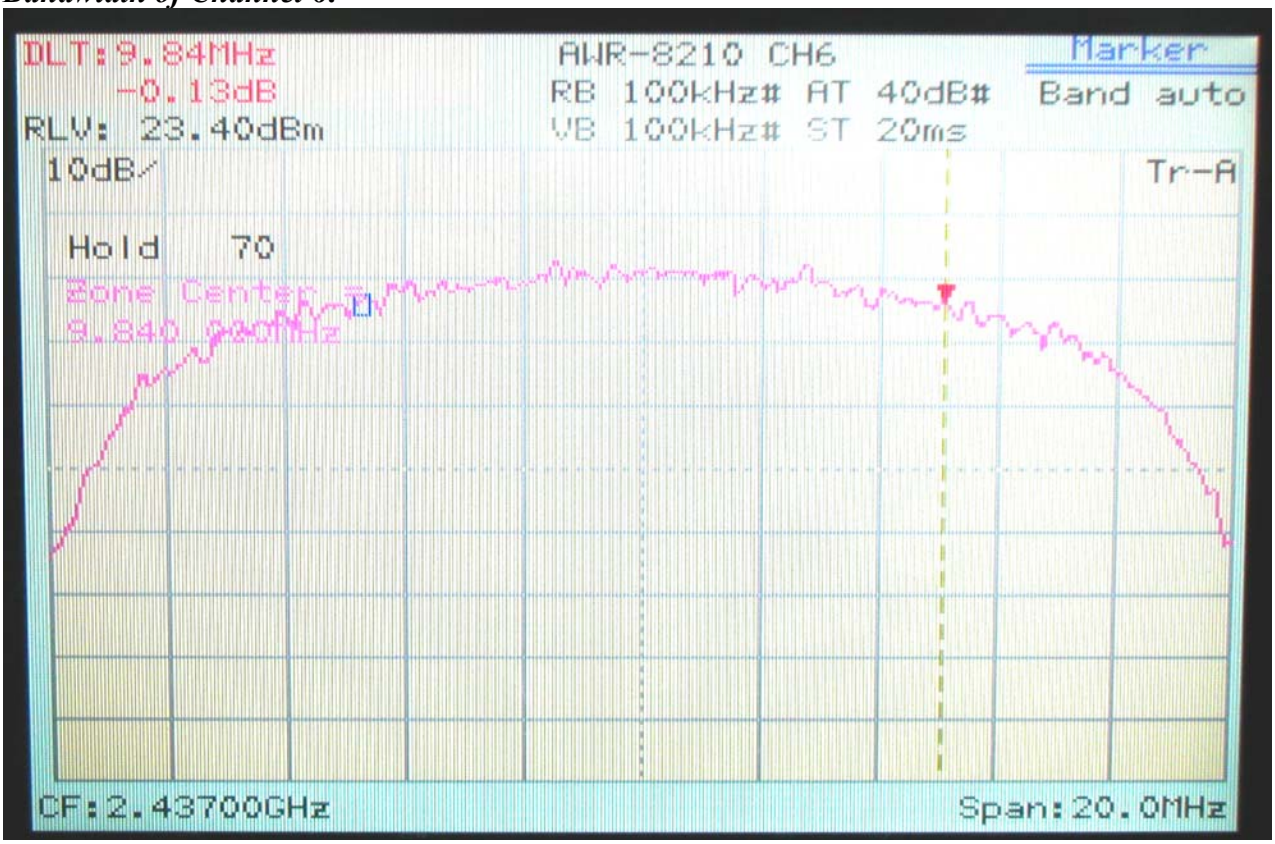
1. The data in the above table are summarizing the following attachment spectrum analyzer hard copy. According to the guidance, we'd made the measurement with the spectrum analyzer's resolution bandwidth *(RBW)=300kHz, (VBW)=1MHz* and set the *span>>RBW*. The results show the measured 6dB bandwidth comply with the minimum 500kHz requirement.
2. The attachments show these on the following pages.

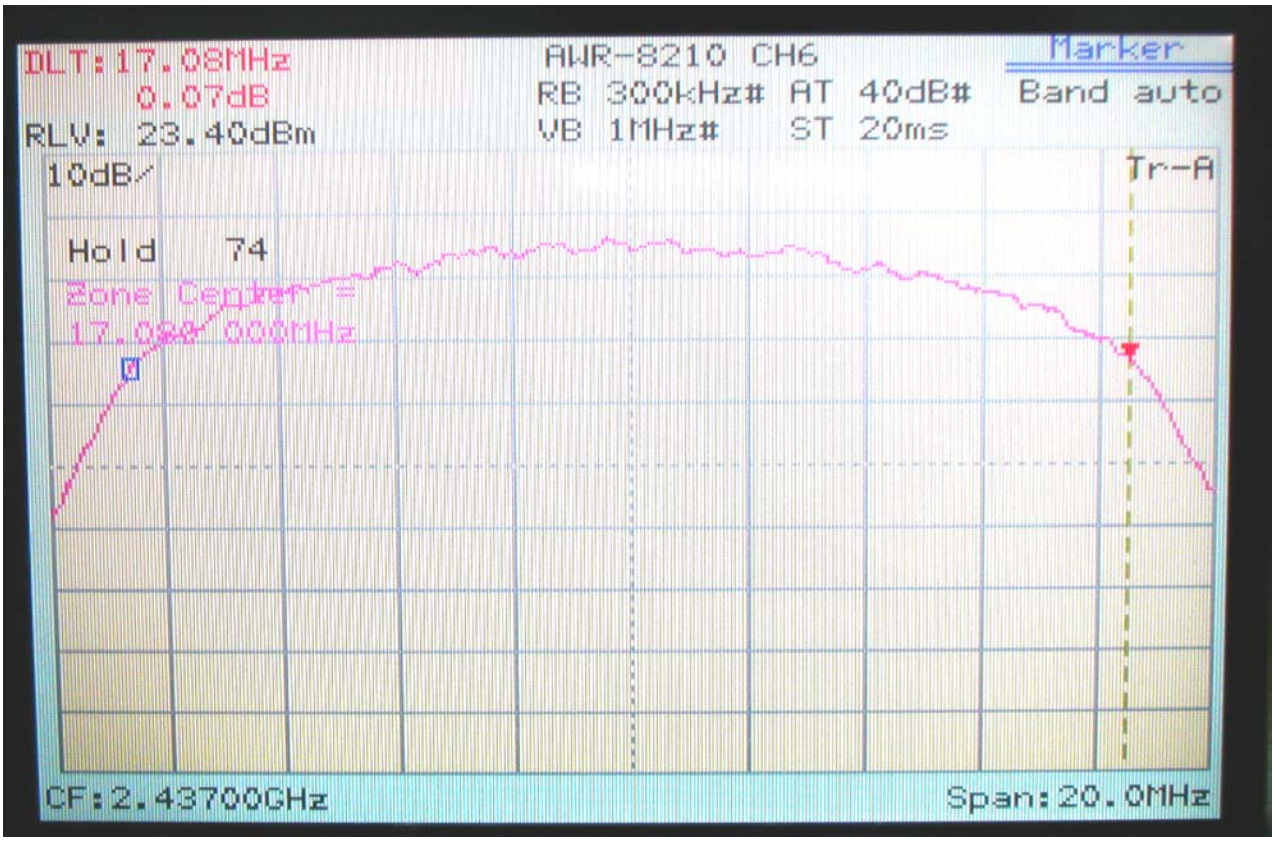
Bandwidth of Channel 1:



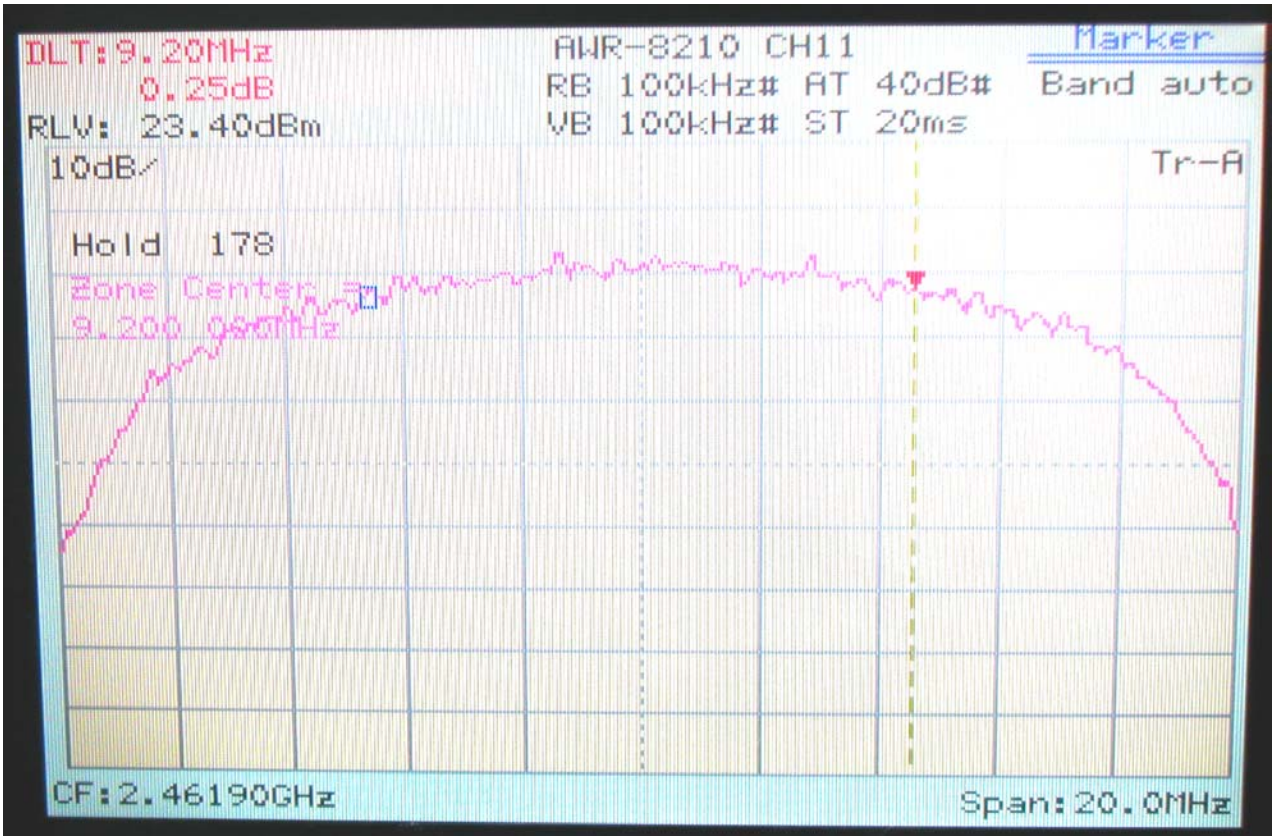


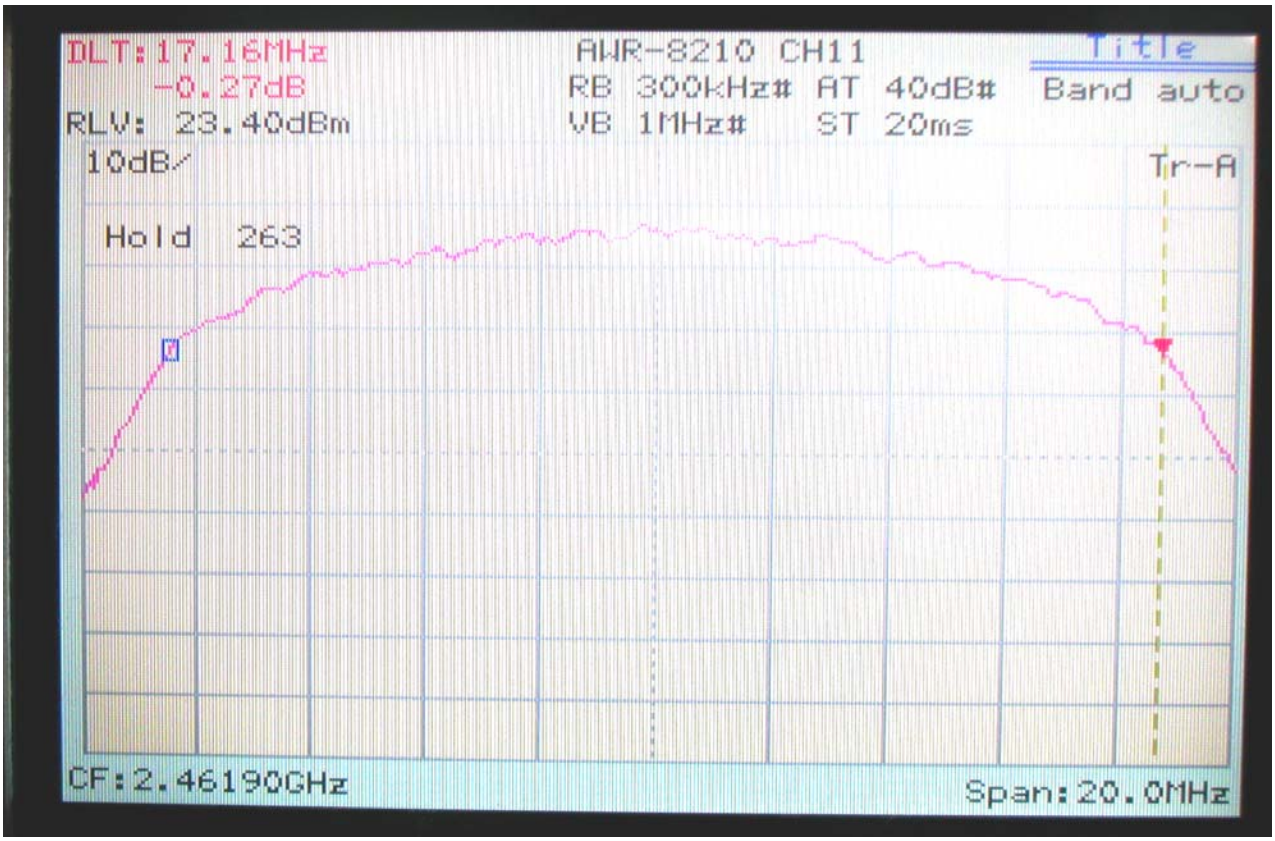
Bandwidth of Channel 6:





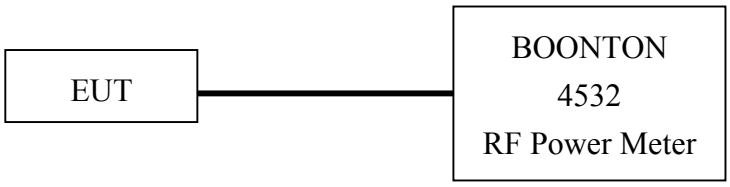
Bandwidth of Channel 11:





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 tests. 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	DTS Limit	Output peak power	
	dBm	dBm	mW	dBm	mW
CH 1	16.628	0.7	100	17.328	54.050
CH 6	16.497	0.7	100	17.197	52.444
CH 11	16.772	0.7	100	17.472	55.872

Note:
The limit is vary according to the equipment class, listed below:
1. Digital Transmission System (DTS): 100mW
2. Spread Spectrum Transmitter (DSS): 1W

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 (below 1 GHz) was made at an OATS. The EUT system was placed on a nonconductive turntable, which is 0.8 meters height, top surface 1.0 x 1.5 meter.

The receiver was examined from 30 MHz to 1000 MHz using the Receiver (SCHAFFNER) and Bi-Log antenna (Model No.: CBL6141A). Above 1 GHz test was using the 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. The receiver's 6dB bandwidth was set to 120KHz and the QP data recorded, 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:

Making access to the mode of continuous transmission by the software in the computer via the LAN port. 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 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.

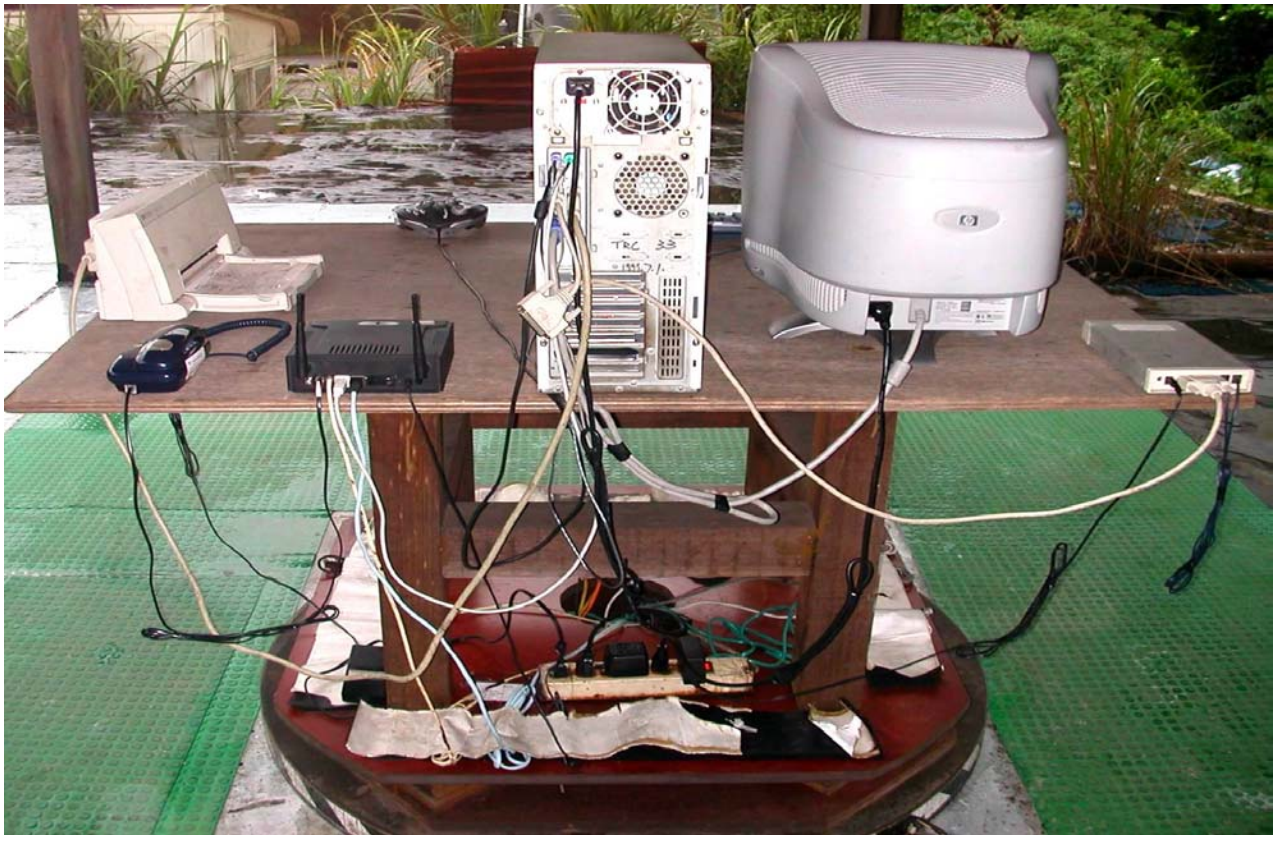
8.2 List of Test Instruments

Instrument Name	Model No.	Brand	Serial No.	Last time	Next time
Receiver	SCR3102	SCHAFFNER	012	04/22/03	04/21/04
Antenna	CBL6141A	SCHAFFNER	4188	05/29/03	05/28/04
Open test side (Antenna, Amplify, cable calibrated together)				05/29/03	05/29/04
Spectrum Analyzer	8564E	HP	US36433002	11/03/02	11/03/03
Microwave Preamplifier	83051A	HP	3232A00347	08/01/03	07/31/04
Horn Antenna	3115	EMCO	9704 – 5178	12/27/02	12/27/03

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

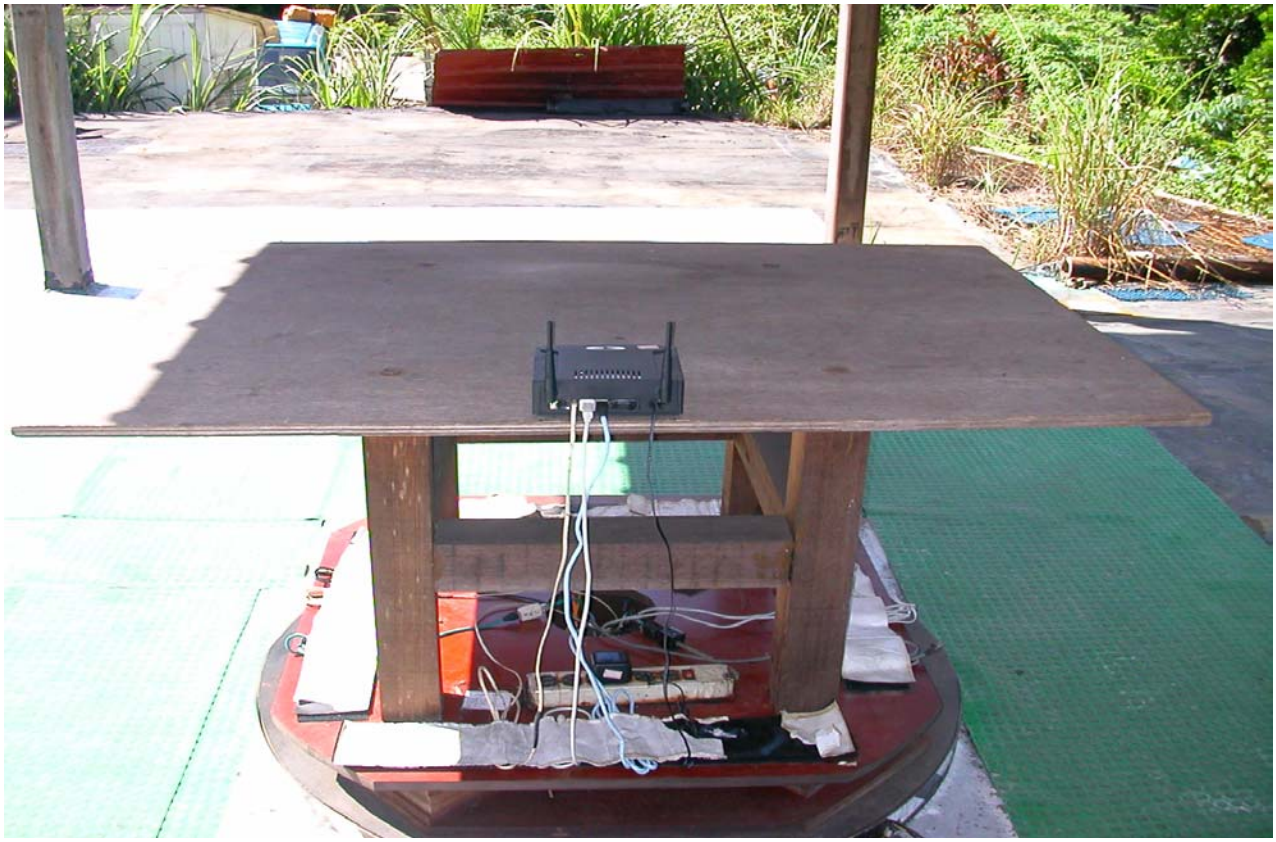
8.3 Test Instruments Configuration

Front View of the Test Configuration of **Unintentional**



Rear View of the Test Configuration **Unintentional**

Front View of the Test Configuration of **Intentional**



Rear View of the Test Configuration **Intentional**

8.4 Test Result of Spurious Radiated Emissions

Worst case : Intentional test (CH1)

The highest peak values of radiated emissions form the EUT at various antenna heights, antenna polarizations, EUT orientation, etc. are recorded on the following.(the unintentional test also has been verified which was better)

Test Conditions:

Testing room : Temperature : 20 ° C Humidity : 62 % RH

Table 1 Radiated Emissions [Horizontal]

Radiated Emission				*Correction Factors*	*Corrected Amplitude*	*FCC Class B (3 m)*	
Frequency (MHz)	*Amplitude (dBμV/m)*	*Ant. H. (m)*	*Table ( )*	*(dB)*	*(dBμV/m)*	*Limit (dBμV/m)*	*Margin (dB)*
225.0630	35.57	2.50	218	-2.45	33.12	46.02	-12.90
250.0550	37.39	0.97	210	-1.80	35.59	46.02	-10.43
375.0800	29.55	0.97	289	3.15	32.70	46.02	-13.32
480.0250	26.90	0.97	279	6.32	33.22	46.02	-12.80
500.0600	28.86	0.97	305	6.80	35.66	46.02	-10.36
600.0180	23.73	2.50	289	9.80	33.53	46.02	-12.49
750.0150	20.95	0.97	189	14.30	35.25	46.02	-10.77

Note:

1.Margin = Amplitude – limit, *if margin is minus means under limit.*

2.Corrected Amplitude = Reading Amplitude + Correction Factors

3.Correction factor = Antenna factor + (Cable Loss – Amplitude gain)

Table 2 Radiated Emissions For 30MHz ～ 1GHz [Vertical]

Radiated Emission				*Correction Factors*	*Corrected Amplitude*	*FCC Class B (3 m)*	
Frequency (MHz)	*Amplitude (dBμV/m)*	*Ant. H. (m)*	*Table ( )*	*(dB)*	*(dBμV/m)*	*Limit (dBμV/m)*	*Margin (dB)*
120.0050	33.88	1.00	351	-5.00	28.88	43.52	-14.64
132.0000	39.17	3.99	107	-4.40	34.77	43.52	-8.75
200.0050	31.74	2.50	330	-3.90	27.84	43.52	-15.68
240.0050	34.71	1.00	155	-2.50	32.21	46.02	-13.81
250.0550	36.11	1.00	321	-1.80	34.31	46.02	-11.71
375.0800	32.34	1.00	287	3.15	35.49	46.02	-10.53
500.0600	29.18	1.00	321	6.80	35.98	46.02	-10.04
750.0150	20.21	1.00	45	14.30	34.51	46.02	-11.51

Note:

1.Margin = Amplitude – limit, *if margin is minus means under limit.*

2.Corrected Amplitude = Reading Amplitude + Correction Factors

3.Correction factor = Antenna factor + (Cable Loss – Amplitude gain)

Table 3 Radiated Emissions [Channel 1 Horizontal]

Radiated Emission				Correction Factors	Corrected Amplitude	FCC Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV/m)	Ant. H. (m)	Table ( )	(dB)	(dBμV/m)	Limit (dBμV/m)	Margin (dB)
7227.71 PK	38.28 PK	1.00	36	10.04	48.32	53.96	-5.64
9650.42 PK	38.27 PK	1.00	186	11.47	49.74	53.96	-4.22
17782.50 PK	34.79 PK	1.00	353	19.17	53.44	53.96	-0.52

Table 4 Radiated Emissions [Channel 6 Horizontal]

Radiated Emission				Correction Factors	Corrected Amplitude	FCC Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV/m)	Ant. H. (m)	Table ( )	(dB)	(dBμV/m)	Limit (dBμV/m)	Margin (dB)
7306.25 PK	37.60 PK	1.00	178	10.29	47.89	53.96	-6.07
9747.08 PK	38.60 PK	1.00	187	11.89	50.49	53.96	-3.47
17804.47 PK	34.97 PK	1.00	292	19.26	54.23	74.00	-19.77
17804.47 AV	22.44 AV	1.00	292	19.26	41.70	53.96	-12.26

Table 5 Radiated Emissions [Channel 11 Horizontal]

Radiated Emission				Correction Factors	Corrected Amplitude	FCC Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV/m)	Ant. H. (m)	Table ( )	(dB)	(dBμV/m)	Limit (dBμV/m)	Margin (dB)
7390.83 PK	38.44 PK	1.00	35	10.41	48.85	53.96	-5.11
9849.79 PK	38.44 PK	1.00	192	11.93	50.37	53.96	-3.59

Note:

1. Margin = Amplitude – limit, *if margin is minus means under limit.*
2. Corrected Amplitude = Reading Amplitude + Correction Factors
3. Correction factor = Antenna factor + (Cable Loss – Amplitude gain)

Table 6 Radiated Emissions [Channel 1 Vertical]

Radiated Emission				Correction Factors	Corrected Amplitude	FCC Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV/m)	Ant. H. (m)	Table ( )	(dB)	(dBμV/m)	Limit (dBμV/m)	Margin (dB)
7243.74 PK	39.27 PK	1.00	12	10.13	49.40	53.96	-4.56
9650.42 PK	40.11 PK	1.00	267	11.47	51.58	53.96	-2.38

Table 7 Radiated Emissions [Channel 6 Vertical]

Radiated Emission				Correction Factors	Corrected Amplitude	FCC Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV/m)	Ant. H. (m)	Table ( )	(dB)	(dBμV/m)	Limit (dBμV/m)	Margin (dB)
2277.08 PK	37.00 PK	1.00	40	2.76	39.76	53.96	-14.20
2595.83 PK	40.33 PK	1.00	185	3.63	43.96	53.96	-10.00
7303.39 PK	44.43 PK	1.00	83	10.28	54.71	74.00	-19.29
7303.39 AV	38.77 AV	1.00	83	10.28	49.05	53.96	-4.91
9753.12 PK	39.11 PK	1.00	144	11.90	51.01	53.96	-2.95

Table 8 Radiated Emissions [Channel 11 Vertical]

Radiated Emission				Correction Factors	Corrected Amplitude	FCC Class B (3 m)	
Frequency (MHz)	Amplitude (dBμV/m)	Ant. H. (m)	Table ( )	(dB)	(dBμV/m)	Limit (dBμV/m)	Margin (dB)
2304.17 PK	41.50 PK	1.00	332	2.85	44.35	53.96	-9.61
2620.83 PK	37.83 PK	1.00	308	3.66	41.49	53.96	-12.47
7379.12 PK	45.61 PK	1.00	156	10.43	56.04	74.00	-17.96
7379.12 AV	39.61 AV	1.00	156	10.43	50.04	53.96	-3.92
9849.79 PK	38.28 PK	1.00	43	11.93	50.21	53.96	-3.75

Note:

1. Margin = Amplitude – limit, *if margin is minus means under limit.*
2. Corrected Amplitude = Reading Amplitude + Correction Factors
3. Correction factor = Antenna factor + (Cable Loss – Amplitude gain)

8.5 Test Result of the Bandedge

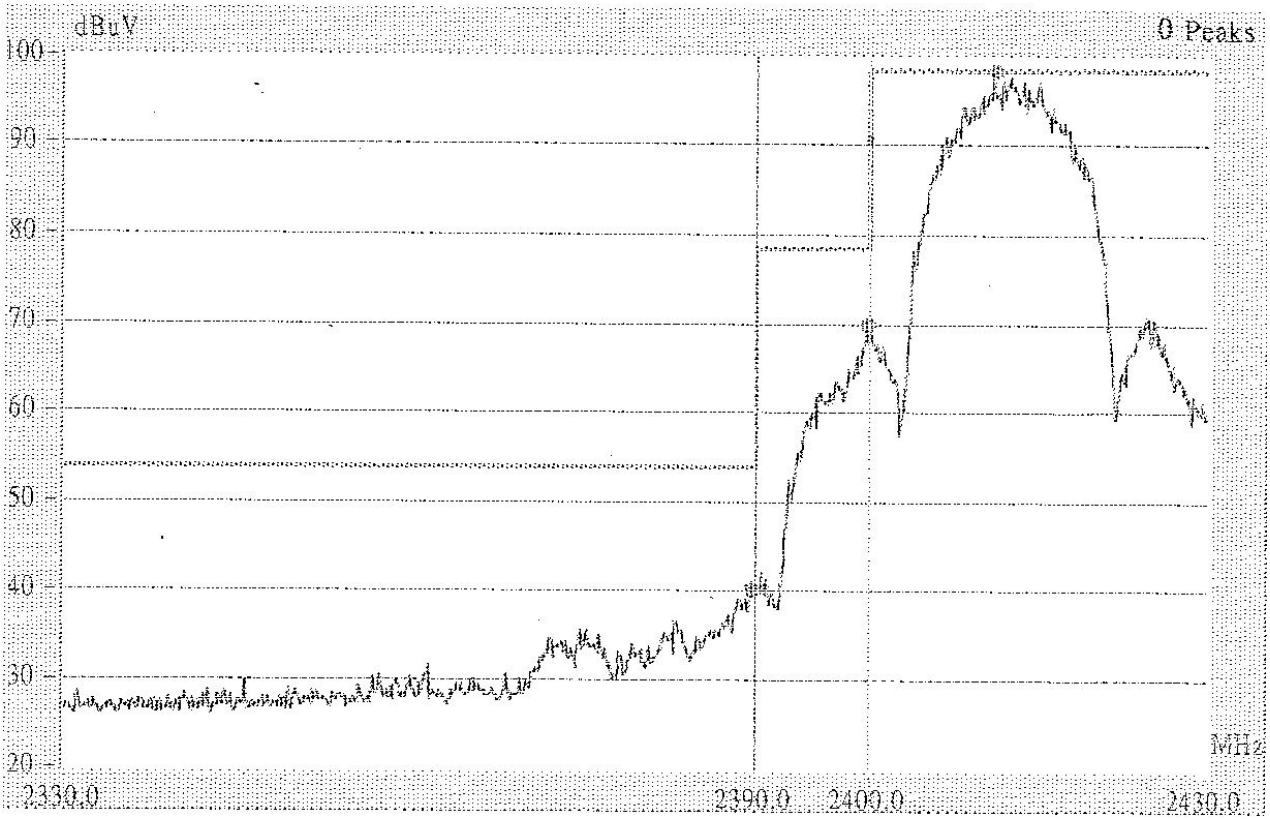
If any 100 kHz bandwidth outside these frequency bands, the radio frequency power that is produced by the modulation products of the spreading sequence, the information sequence and the carrier frequency shall be either *at least 20 dB below that in any 100 kHz bandwidth within the band that contains 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 *conducted* 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 Part 15.205(a) must also *comply with the radiated emission limits specified in Part 15.209(a).*

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

Test Condition & Setup: same as 8.1

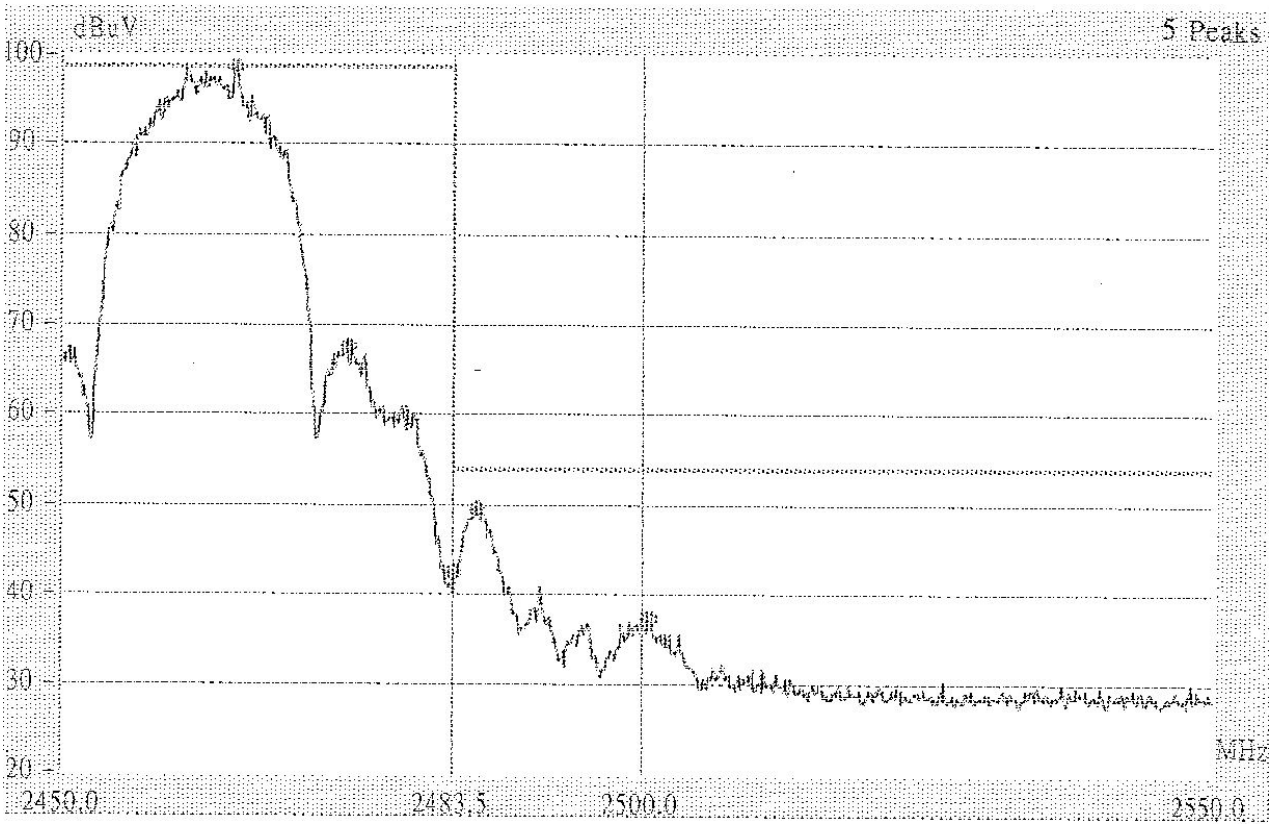
Channel 1



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

1. The lobe right by the fundamental side is already 20dB below the highest emission level.
2. The emissions recorded in the restricted band (<2400MHz) is do comply with the Part 15.209(a) – under the limited line marked in red color.

Channel 11



This is the hard copy of our bandedge measurement generated by our bandedge testing program. The picture 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 (>2483.5MHz) is do comply with the Part 15.209(a) – under the limited line marked in red color.

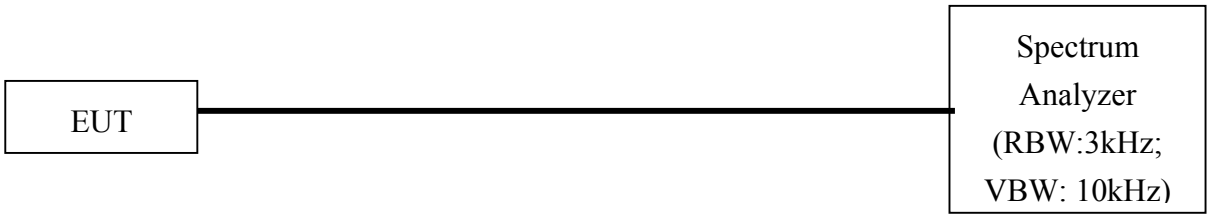
IX. Section 15.247(d): Power Spectral Density

9.1 Test Condition & Setup

The tests below are running with the EUT transmitter set at high power in TDD mode . 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



Test Configuration of Power Spectral Density

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

9.3 List of Test Instruments

Instrument Name	Model No.	Brand	Serial No.	Last time	Next time
Spectrum Analyzer	8594EM	H P	3619A00198	06/04/02	06/04/03

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 (dBm)*	*Cable Loss (dB)*	*Ppq (dBm)*	*Limit (dB)*	*Margin (dB)*
CH 01	2.4119	-9.73	1.80	-7.93	8.00	-15.93
CH 06	2.4369	-10.70	1.85	-8.85	8.00	-16.85
CH 11	2.4619	-11.72	1.93	-9.79	8.00	-17.79

Note:

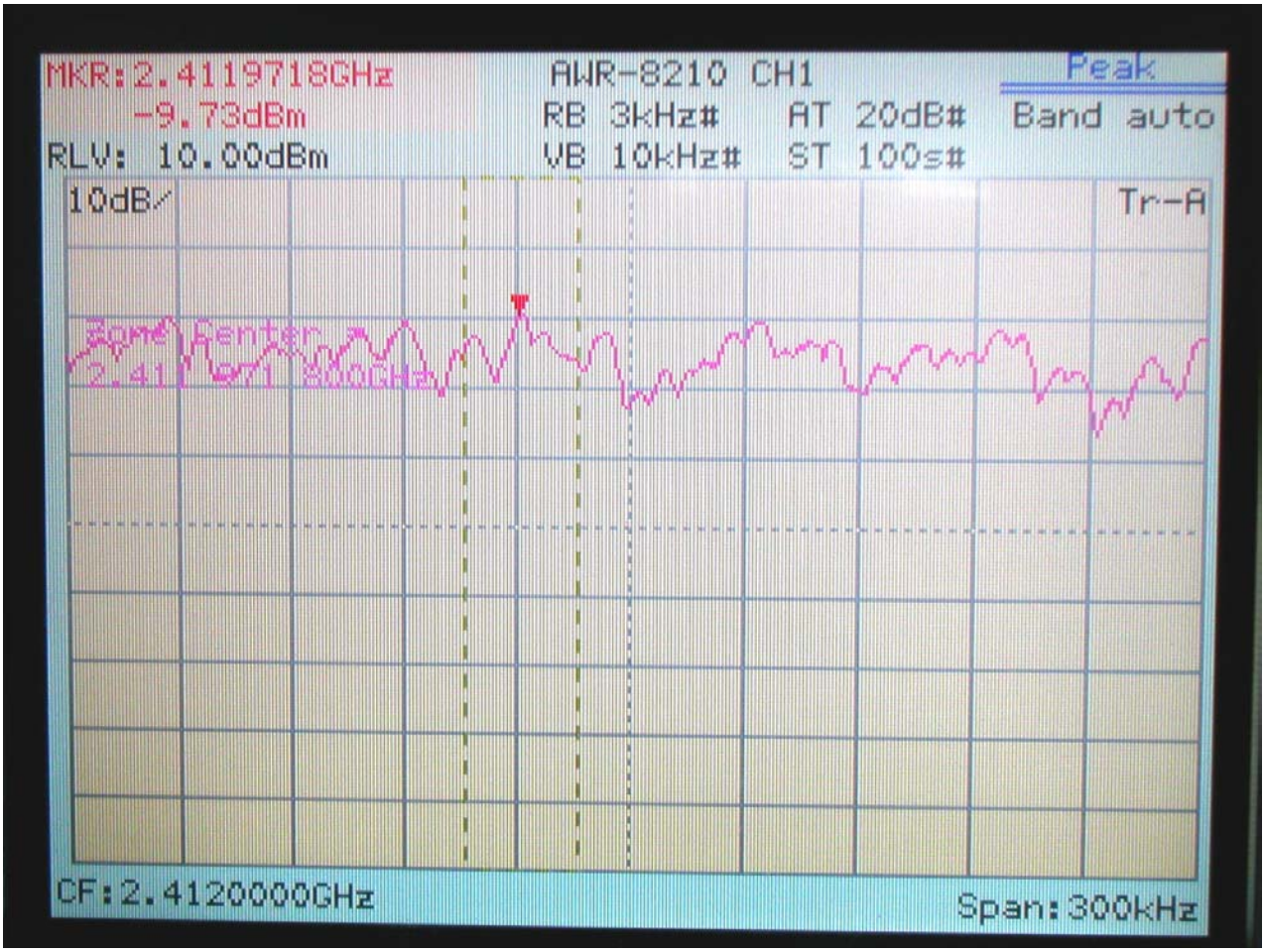
1.The attachment follow by this page and there is no page number.

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|

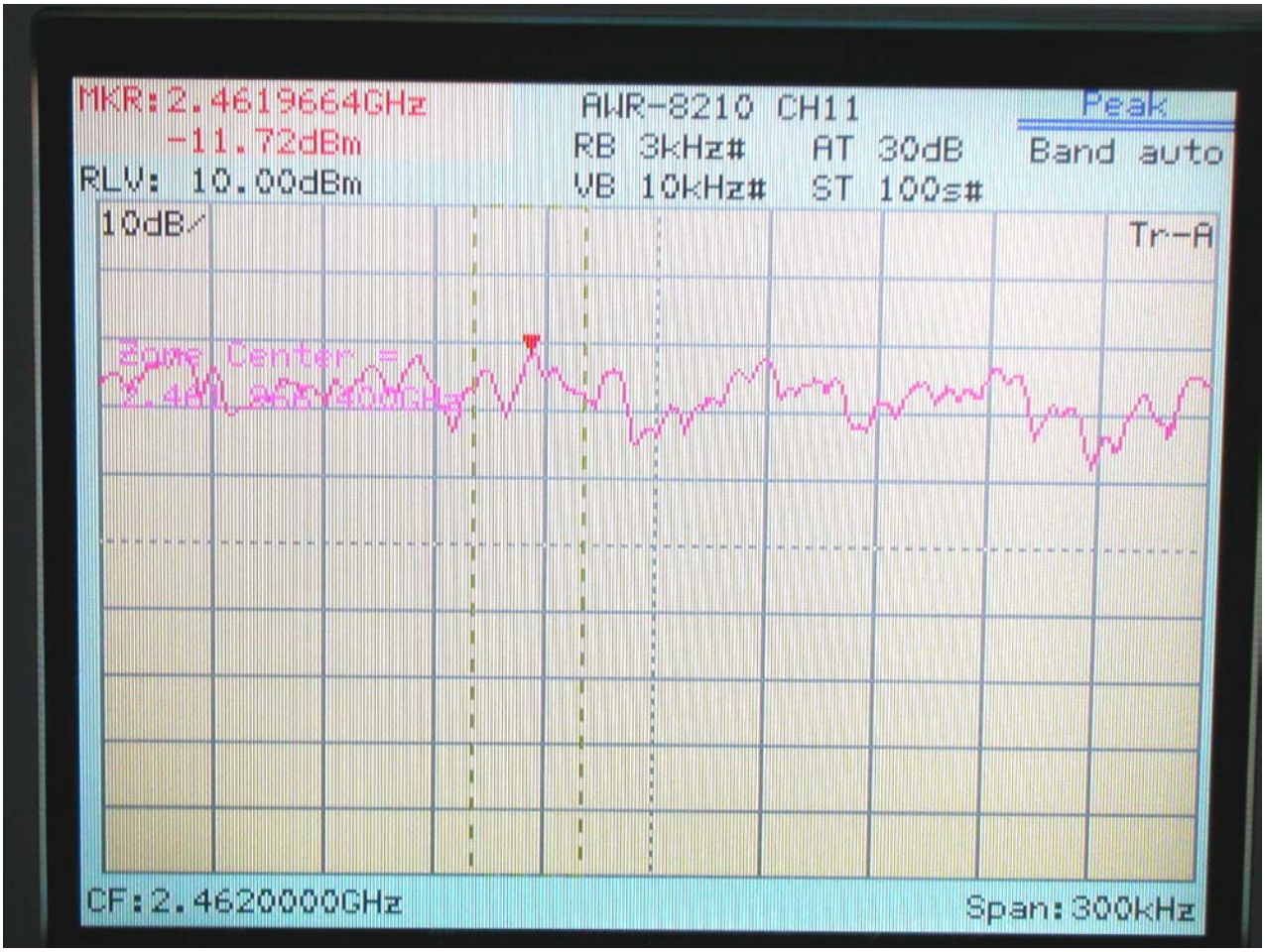
Channel 01


MKR:2.4119718GHz
-9.73dBm
RLV: 10.00dBm
AWR-8210 CH1
RB 3kHz#
VB 10kHz#
AT 20dB#
ST 100s#
Peak
Band auto
10dB/
Tr-A
Span
Center
2.41
CF:2.4120000GHz
Span:300kHz

Channel 06


MKR:2.4869688GHz
-10.70dBm
RLV: 10.00dBm
AWR-8210 CH6
RB 3kHz#
VB 10kHz#
AT 20dB#
ST 100s#
Title
Band auto
10dB/
Tr-A
CF:2.4870000GHz
Span:300kHz

Channel 11


MKR:2.4619664GHz
-11.72dBm
RLV: 10.00dBm
AWR-8210 CH11
RB 3kHz#
VB 10kHz#
AT 30dB
ST 100s#
Peak
Band auto
10dB/
Tr-A
Span Center =
CF:2.4620000GHz
Span:300kHz

Appendix A

Setting up Procedure

<A> Intentional test set up

1. Connect the EUT with the notebook computer through the LAN port. Using the LAN port of Notebook Computer and software to control the wireless gateway.

2. Use the software provided by the manufacturer and operated in the windows to control the EUT's continuous transmission.

3. Then making access to the mode of continuous transmission and set the testing channel.

4. The conducted and Radiated spurious emissions were recorded only the worst cases data.

<B> Unintentional test set up

1. The internet port connected to the PC nearby and the LAN port connected to the PC located remotely. Set the PC transmitting and receiving data with 10M and 100M respectively. (100M test data recorded)

2. The DSL jack via a 15m length RJ-11C cable to the ADSL Evaluation Module located remotely.

3. The PHONE jack via a 1.5m length RJ-11C cable to the Telephone.

4. There was a Notebook which was with a PCMCIA WLAN Card located remotely to keep to communicate with the EUT.

Appendix B

Antenna Specification

1.Description:

The antenna is a flying lead swivel and 1/4 λ dipole antenna. It's useful for the ISM Band of 2.4~2.5 GHz.

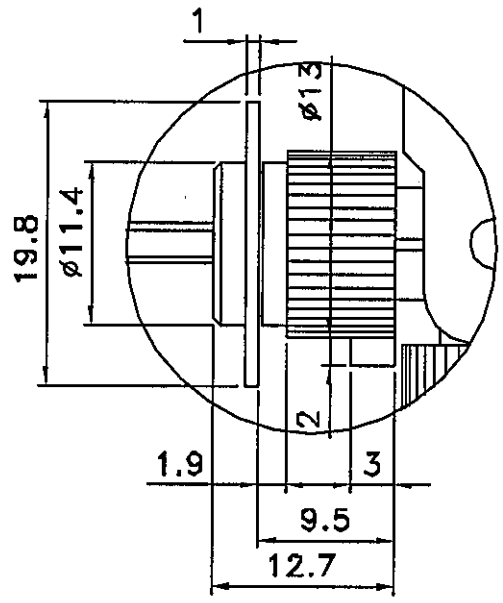
2. Electrical Properties

2-1 Frequency Range.....2.4~2.4835GHz
2-2 Impedance.....50 Ohms nominal
2-3 SWR.....≦2.0
2-4 Return Loss..... ≦-10 dB
2-5 Gain.....2 dBi
2-6 Polarization.....Vertical
2-7 Admitted Power.....1W
2-8 Electrical Wave..... 1/4 λ Dipole

3. Mechanical Properties :

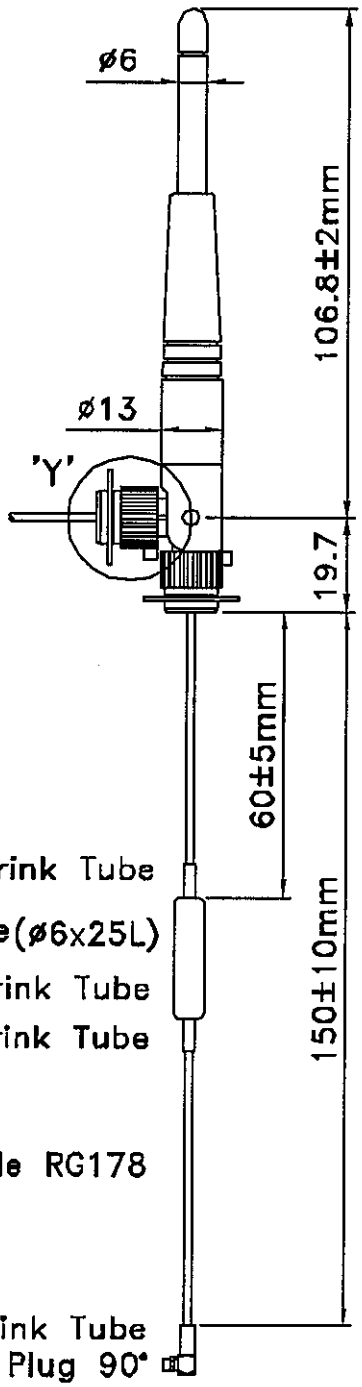
3-1 Connector.....MMCX Plug
3-2 Cable.....RG178
3-3 Core.....K5A
3-4 Antenna Cover.....Polyurethane
Antenna Base.....Polycarbonate
3-5 Rotating Test.....1.0 Kg-cm, After 2000 cycles with the rate of 30 cycles/minute(max.). It shall be possible to remain it's position.
3-6 Attachment Strength.....2.0 Kg-cm

工程／部品圖



Detail 'Y' 3:1

TOLERANCES:±0.1



TOLERANCES:	
X	± 1
X.X	± 0.5
X.XX	± 0.25
ANG.	± 2.0°

REV	DESCRIPTION			
		MATERIAL	MODEL: IWE-144C-288	
		FINISH	NAME: Swivel Antenna	
		UNIT: mm	PART No: IWE-144C-288	
		SCALE: 1/ 1.5	DESIGN	APPROVE
		DATE: 5/26/2003	Anna	

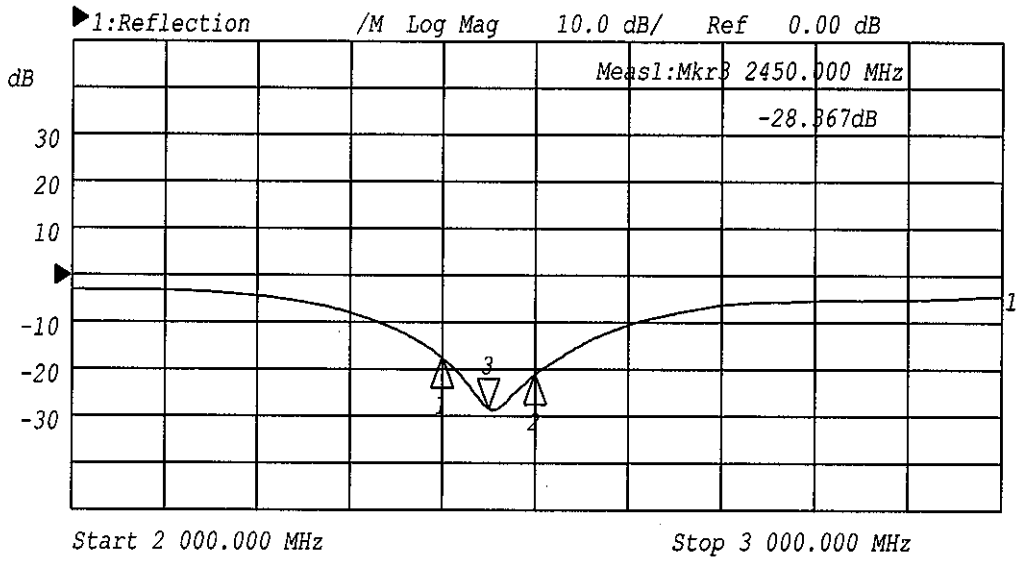
REV: 00

QP0502-01-02

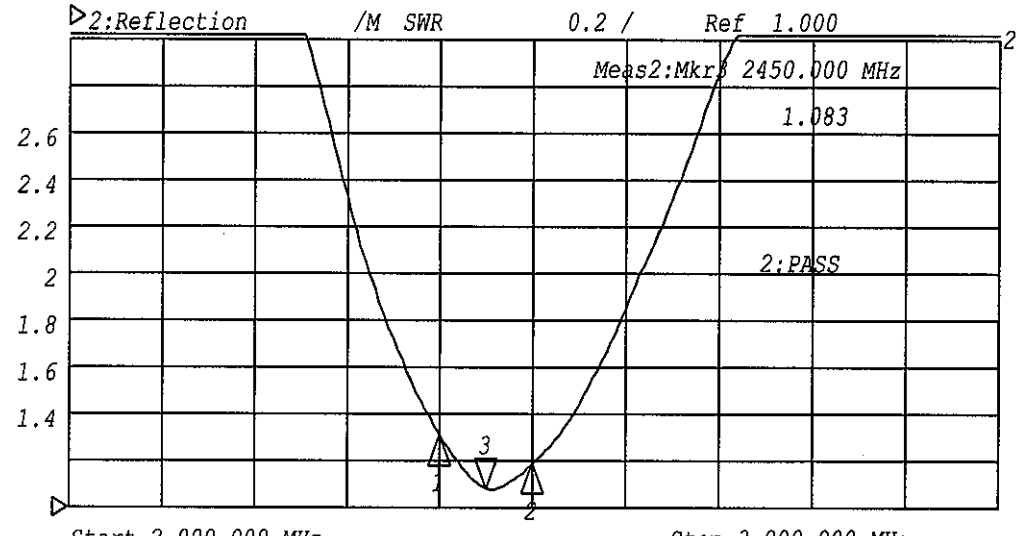
[redacted]

JOYMAX ELECTRONICS CO.,LTD.

Return Loss



SWR



1:Mkr (MHz)	dB	2:Mkr (MHz)	
1: 2400.0000	-17.538	1: 2400.0000	1.314
2: 2500.0000	-21.194	2: 2500.0000	1.186
3> 2450.0000	-28.367	3> 2450.0000	1.083

Model No. : **MMCX Plug** **Specifications**

1.Description:

The connector is a MMCX right angle plug crimp for RG 178 cable.

2. Electrical Properties

2-1 Impedance	50 Ohms
2-2 Frequency Range	0~6 GHz
2-3 SWR	1.30 (Max.)
2-4 Working Voltage	170 V rms (Max.)
2-5 Dielectric Withstanding Voltage	500 V rms (Min.)
2-6 Insulation Resistance	1000 Megohms
2-7 Contact Resistance	Center contact: 5.0 Milliohms (Max.) Outer contact: 2.5 Milliohms (Max.)
2-8 Insertion Loss	0.3 dB

3. Mechanical Properties :

3-1 Engagement Force	8 lbs. (Max.)
3-2 Disengagement Force	1.4 lbs. (Min.)
3-3 Contact Retention	2.0 lbs. (Min.) axial force
3-4 Durability	500 Cycles (Min.)

4. Environmental Ratings

4-1 Operating Temperature	−65℃ ~ +165℃
4-2 Thermal Shock	MIL-STD-202, Method 107, Condition C, Except −55℃ ~ +155℃
4-3 Corrosion	MIL-STD-202, Method 101, Condition B
4-4 Shock	MIL-STD-202, Method 213, Condition B
4-5 Vibration	MIL-STD-202, Method 204, Condition D
4-6 Moisture Resistance	MIL-STD-202, Method 106

5. Material Specifications

5-1 Body	Brass Per JIS H3250 C3604 BD, Gold Plated Per MIL-G-45204
5-2 Contact	Beryllium Copper Per QQ-C-530, Gold Plated Per MIL-G-45204
5-3 Insulator	PTFE Fluorocarbon Per ASTM D 1710
5-4 C-Ring	Beryllium Copper Per QQ-C-530, Gold Plated Per MIL-G-45204

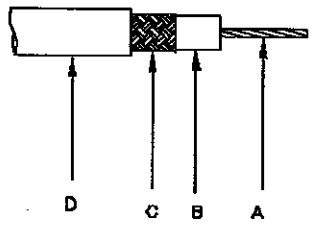
CORE-TECH Soft Ferrite Materials

**The other specification can be designed & produced also.*

¥Characteristics of materials

	Property	Applied Frequency Range	AC Initial Permeability	Curie Temperature	Specific Gravity	Relative Loss Factor	Relative Temp Coeft of initial Permeability
	Unit	MHz	±25%	°C	g/cm$_3$	x10$_6$(MHz)	x10$_6$/C° 20-70°C
NO	Symbol	F	μiac	Tc	d	tanδ/μiac	αμγ
1	C1B	0.3-7.0	200	180	4.8	<705 7.0	15-35
2	C3B	0.1-2.0	300	150	4.9	< 65 2.0	10-30
3	C8	0.3-7.0	200	250	4.7	<350 7.0	19-32
4	A4	0.1-1.5	400	190	4.5	<150 1.5	1.0-5.0
5	K5	0.1-1.0	1000	130	4.8	<280 10	2.0-5.0
⇨ 6	K5A	0.1-1.0	700	140	4.8	<250 1.0	0.0-7.0
7	K6	0.01-0.5	1500	100	4.7	< 75 0.5	0.0-3.0
8	L8B	0.5-20	55	300	4.5	<100 20	5.5-15
9	L8C	0.5-15	70	300	4.8	<250 15	5.5-15
10	L9	0.5-30	50	300	4.8	<280 30	25-65
11	L9D	1.0-50	55	300	4.8	<600 50	30-80
12	L11	3.0-80	25	350	4.5	<400 60	50-70
13	L12	5.0-100	35	300	4.7	<400 70	25-70
14	P1B	0.1-2.0	550	125	4.6	< 90 2.0	8.0-35
15	P1C	0.1-2.0	250	200	4.7	<110 2.0	3.0-10
16	P2	0.1-5.0	200	150	4.6	<100 5.0	25-65
17	P2D	0.1-3.0	300	150	4.5	< 60 2.0	10-30
18	P2M	0.1-4.0	225	150	4.6	< 90 4.0	10-40
19	P3	0.4-20	100	300	4.4	<160 20	55-130

Rev	Change	By	Date
A	General Update	MTP	03/04/02



Construction:

A) Center Conductor:
30 7/38 SPCW*
OD .012" ± .001"

B) Dielectric:
Extruded PTFE
OD .033" ± .002"

C) Shield:
38 AWG SPC*
OD .051" Nom.

D) Jacket:
FEP – Brown Tint
OD .071" ± .004"
Surface Printed:
"RG178HF HARBOUR INDUSTRIES 27478"

* Silver plating thickness is a minimum of 40µ".
Per MIL-C-17 and ASTM B298.

Electricals:

Impedance:	50 ± 2 Ohms
Capacitance:	32 pF/ft Max.
Velocity of Prop.:	70% Nom.
Cut off Frequency:	116 GHz
VSWR(.10 – 6.0 GHz):	1.20:1 Mean
Ramp Function:	
0.10GHz:	1.10:1
6.00GHz:	1.40:1

Physical Properties:

Weight per 1000 ft:	6.3 lbs Max.
Minimum Bend Radius:	.35"
Operating Temperature Range:	–55°C to 200°C
Conductor Break Strength:	4.6 lbs.

Attenuation:

0.10 GHz	14.0 dB/100ft.
0.40 GHz	28.2 dB/100ft.
1.00 GHz	45.0 dB/100ft.
2.00 GHz	64.4 dB/100ft.
2.45 GHz	71.6 dB/100ft.
3.00 GHz	79.7 dB/100ft.
4.00 GHz	92.7 dB/100ft.
5.00 GHz	104.3 dB/100ft.
6.00 GHz	115.0 dB/100ft

Harbour Industries

Date: 12/17/01	Scale: None	Drawn By: MTPiner	
		Approved By: MTP	
Drawing Name: RG178HF		Rev: A	Sheet 1 of 1
Part Number: TBD		Drawing Number: 121701_1	