



**ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
INTENTIONAL RADIATOR CERTIFICATION TO
FCC PART 15 SUBPART C REQUIREMENT**

OF

802.11b WLAN Access Point

MODEL No.: WA1300

FCC ID: QDWAB025WA1300

REPORT NO: 020107-RF-ID

ISSUE DATE: Jan. 09, 2003

Prepared for

**Airvast Technology Inc.
4F, No. 1 , Lane 21, Hsin Hua Rd.,
Kueishan Industria Park, Taoyuan 330, Taiwan, R.O.C**



Prepared by

**C&C LABORATORY, CO., LTD.
#B1, 1st Fl., Universal Center,
No. 183, Sec. 1, Tatung Rd., Hsi Chih,
Taipei Hsien, Taiwan, R.O.C.**

TEL: (02)8642-2071~3

FAX: (02)8642-2256



VERIFICATION OF COMPLIANCE

Applicant: Airvast Technology Inc.
4F, No. 1 , Lane 21, Hsin Hua Rd.,
Kueishan Industria Park, Taoyuan 330, Taiwan, R.O.C

Product Description: 802.11b WLAN Access Point

Model No.: WA1300

Serial Number: N/A

File Number: 020107-RF-ID

Date of test: December 18 2002 ~January 07, 2003

We hereby certify that:

The above equipment was tested by C&C Laboratory Co., Ltd. The test data , data evaluation , test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (1992) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.247

The test results of this report relate only to the tested sample identified in this report.

Approved By

A handwritten signature in black ink, appearing to read 'Vincent Su'.

Vincent Su / Vice Manager
C&C Laboratory Co., Ltd..



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1. GENERAL INFORMATION

1.1 Product Description

The 802.11b WLAN Access Point. Model: WA1300 (referred to as the EUT in this report) is a 2.4G wireless AP. The EUT is compliance with IEEE802.11b Standard.

A major technical descriptions of EUT is described as following:

- A). Operation Frequency: 2.412GHz – 2.462GHz; 11 channels;
- B). Transmit Power: 20dBm
- C). Modulation type: Direct Sequence spread Spectrum, (CCK; DQPSK; DBPSK)
- D). Transition Speed: 1/2/5.5/11Mbps
- E). Antenna Designation: PIFA Antenna; Non-User Replaceable (Fixed), two provided.
one for Tx, another for Rx.
- F). Power Supply: MODEL: TC10A-050
 - INPUT: 100~240V, 1.0A,MAX, 50-60Hz
 - OUTPUT:+5V,2.0A
- MODEL: MU15-050200-A1,
 - INPUT: 100-240V, 50~60Hz, 0.5A
 - OUTPUT: 5.0V, 2.0A

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: QDWAB025WA1300 filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules. The composite system (receiver) is compliance with Subpart B is authorized under a DoC procedure.

1.3 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4 (1992). Radiated testing was performed at an antenna to EUT distance 3 meters..

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the address of C&C Laboratory, Co., Ltd. No. 81-1, 210 Lane, Pa-de 2nd Road, Lu-Chu Hsiang, Taoyuan, Taiwan, R.O.C.. The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 1992 and CISPR 22/EN 55022 requirements.

1.5 Special Accessories

Not available for this EUT intended for grant.

1.6 Equipment Modifications

Not available for this EUT intended for grant.



2. SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The EUT (Transmitter) was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4-1992. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak detector mode.

2.3.2 Radiated Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.4-1992.

2.4 Configuration of Tested System

Fig. 2-1 Configuration of Tested System

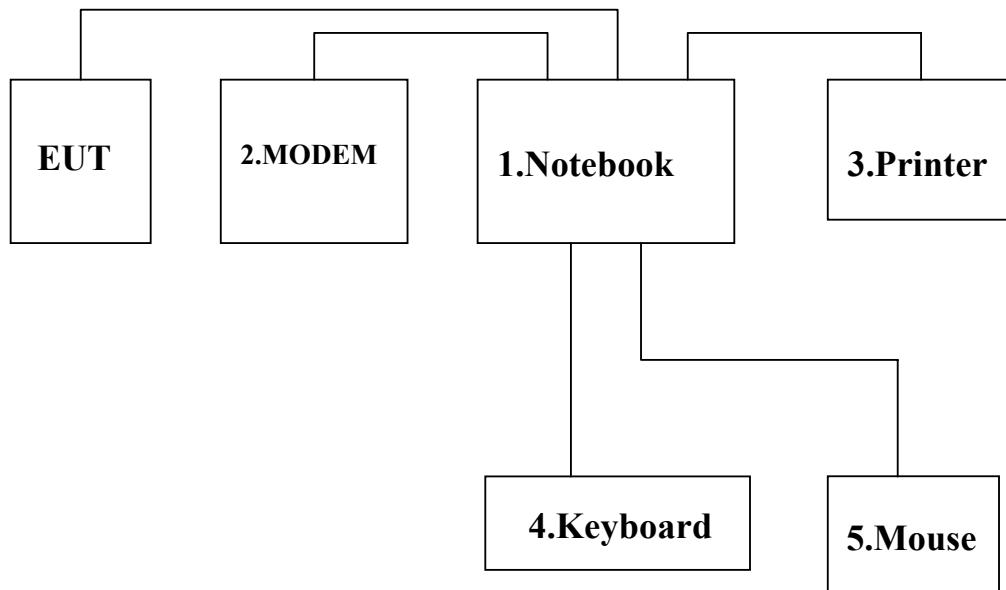


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	FCC ID	Series No.	Data Cable	Power Cord
1	Notebook	KDS	Valiant6380i 9TD	N/A	N/A	<i>Unshielded,1.0m</i>	<i>Unshielded,1.8m</i>
2	Modem	Hayes	231AA	BFJ9D93108US	A08431083982	<i>Shielded,1.8m</i>	<i>UnShielded,1.8m</i>
3	Printer	HP	2225C	DSI6XU2225	3137S01428	<i>Shielded,1.8m</i>	<i>UnShielded,1.8m</i>
4	Keyboard	Compaq	SK-2800C	GYUR79SK	B1C790BCPJ73JQ	<i>Shielded,1.8m</i>	N/A
5	PS2/Mouse	Compaq	SK-2800C	GYUR79SK	B1C790BCPJ73JQ	<i>Shielded,1.8m</i>	N/A



3. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.209(a) (f)	Spurious Emission	Compliant
§15.207(a)	AC Power Port Conducted Emission	Compliant
§15.247(a)(2)	6dB Bandwidth	Compliant
§15.247(b)	Peak Output Power	Compliant
§15.247(c)	100 KHz Bandwidth Of Frequency Band Edges	Compliant
§15.247(d)	Power Density	Compliant
§15.203	Antenna Requirement	Compliant
§1.1310 and §2.1093	RF exposures	Compliant

4. DESCRIPTION OF TEST MODES

The EUT (A.P) has been tested under operating condition.

Software used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Channel 1(2412MHz) 、7(2442MHz) and 11(2462MHz) with 11Mbps highest data rate are chosen for full testing.

AC Power port conducted emission and Radiated Spurious Emission are measured with both AC/ DC power adaptor.



5. SPURIOUS EMISSION TEST

5.1 Standard Applicable

According to §15.247(c), all other emissions outside these bands shall not exceed the general radiated emission limits specified in §15.209(a). And according to §15.33(a)(1), for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

5.2 EUT Setup

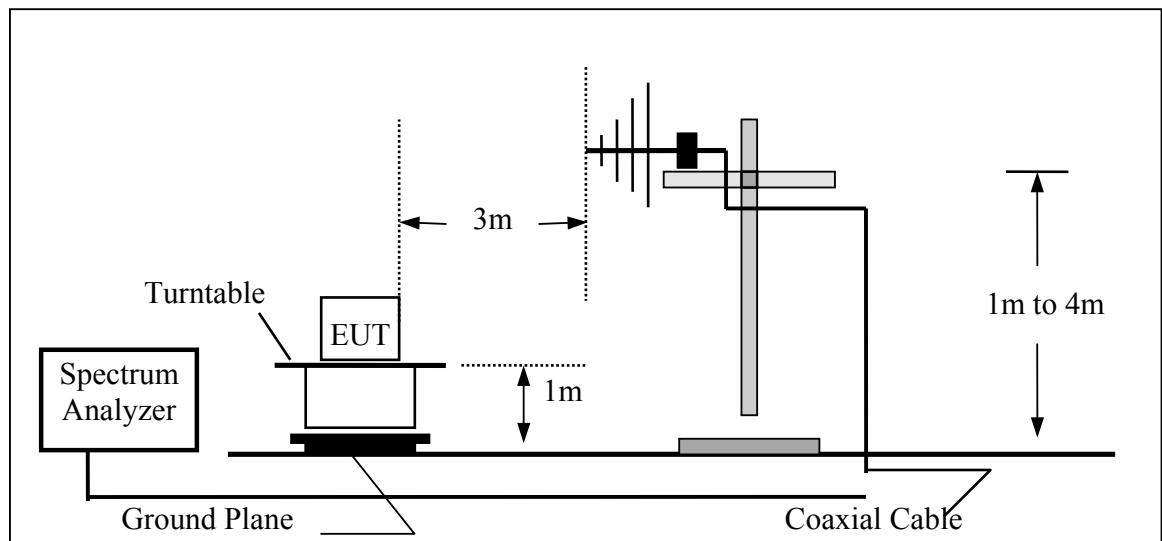
1. The radiated emission tests were performed in the 3 meter open-test site, using the setup in accordance with the ANSI C63.4-1992.
2. The EUT was put in the front of the test table. The host PC system was placed on the center of the back edge on the test table. The peripherals like modem, monitor printer, K/B, and mouse were placed on the side of the host PC system. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
3. The keyboard was placed directly in the front of the monitor, flushed with the front tabletop. The mouse was placed next to the Keyboard, flushed with the back of keyboard.
4. The spacing between the peripherals was 10 centimeters.
5. External I/O cables were draped along the edge of the test table and bundle when necessary.
6. The host PC system was connected with 110Vac/60Hz power source.

5.3 Measurement Procedure

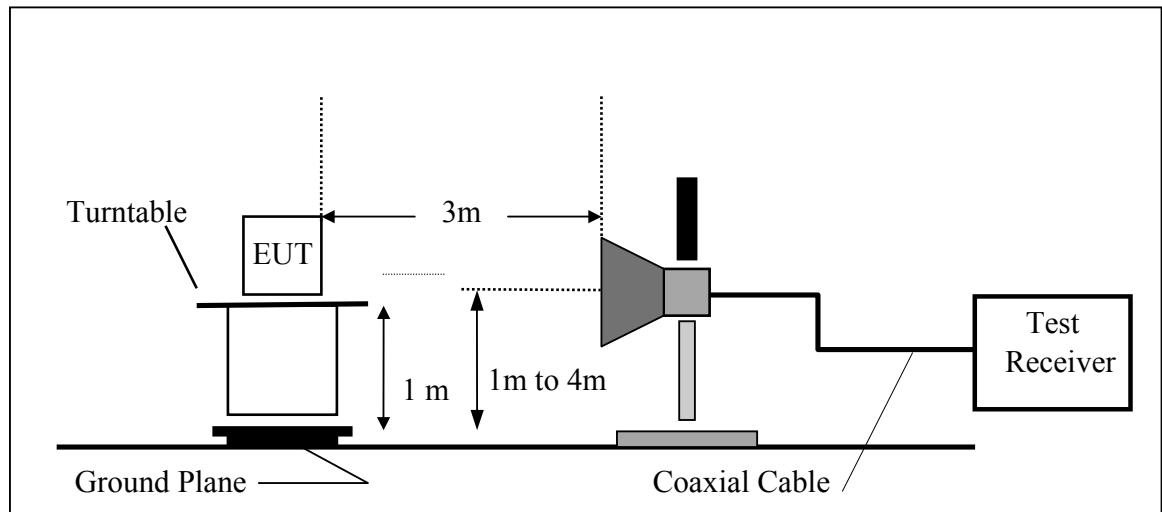
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until all frequency measured were complete.

5.4 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-UP Frequency Over 1 GHz





5.5 Measurement Equipment Used:

Open Area Test Site # 3					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	ADVANTEST	R3261A	N/A	03/19/2002	03/18/2003
Spectrum Analyzer	Advantest	R3182	110600647	11/16/2002	11/15/2003
Spectrum Analyzer	ROHDE & SCHWARZ	FSP30	100112	06/29/2002	06/28/2003
EMI Test Receiver	R&S	ESVS20	838804/004	01/05/2002	01/04/2003
Pre-Amplifier	HP	8447D	2944A09173	03/04/2002	03/03/2003
Bilog Antenna	SCHWAZBECK	VULB9163	145	07/06/2002	07/05/2003
Turn Table	EMCO	2081-1.21	9709-1885	N.C.R	N.C.R
Antenna Tower	EMCO	2075-2	9707-2060	N.C.R	N.C.R
Controller	EMCO	2090	9709-1256	N.C.R	N.C.R
RF Switch	ANRITSU	MP59B	M53867	N.C.R	N.C.R
Site NSA	C&C	N/A	N/A	11/17/2002	11/16/2003
Horn antenna	Schwarzbeck	BBHA 9120	D210	2/24/2002	2/23/2003
Pre-Amplifier	HP	8449B	3008B00965	10/01/2002	10/02/2003

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

5.6 Measurement Result

Refer to attach tabular data sheets.

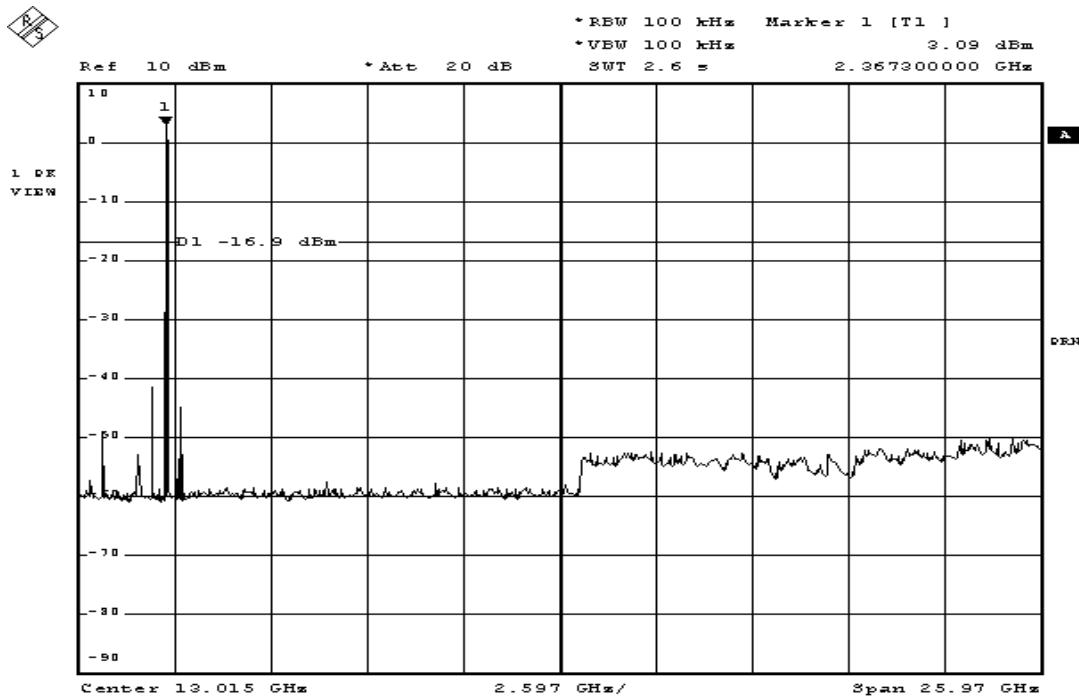
NOTE:

The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 100kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.



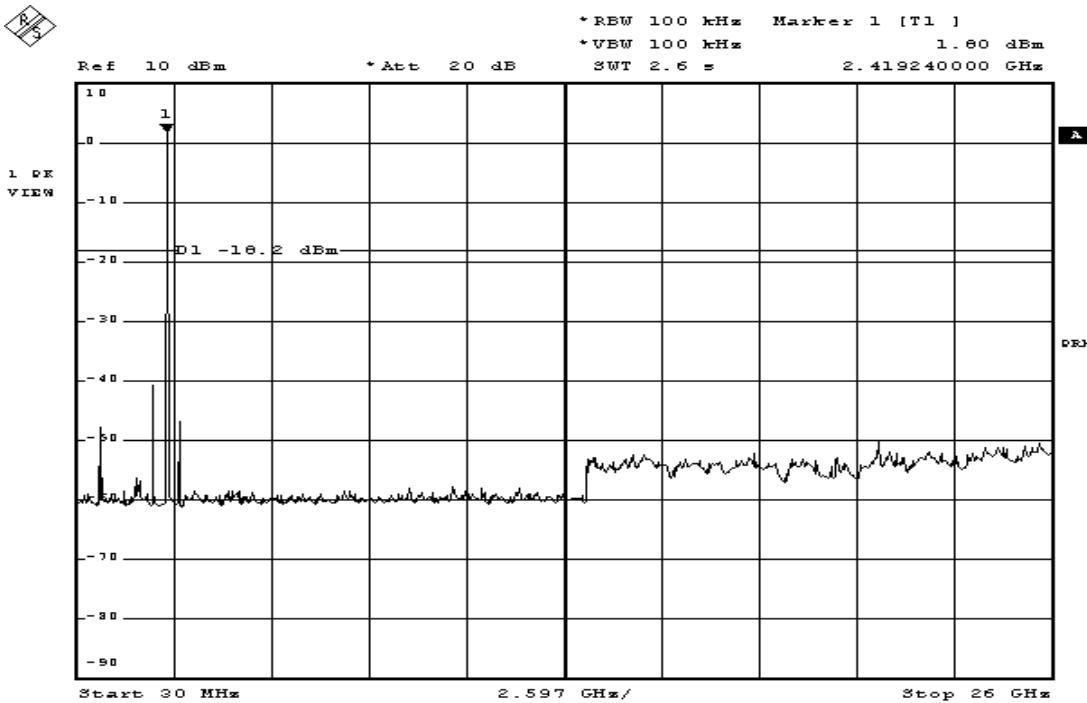
Conducted Spurious Emission Measurement Result

CH Low 30MHz – 26GHz



Date: 25.DEC.2002 03:31:16

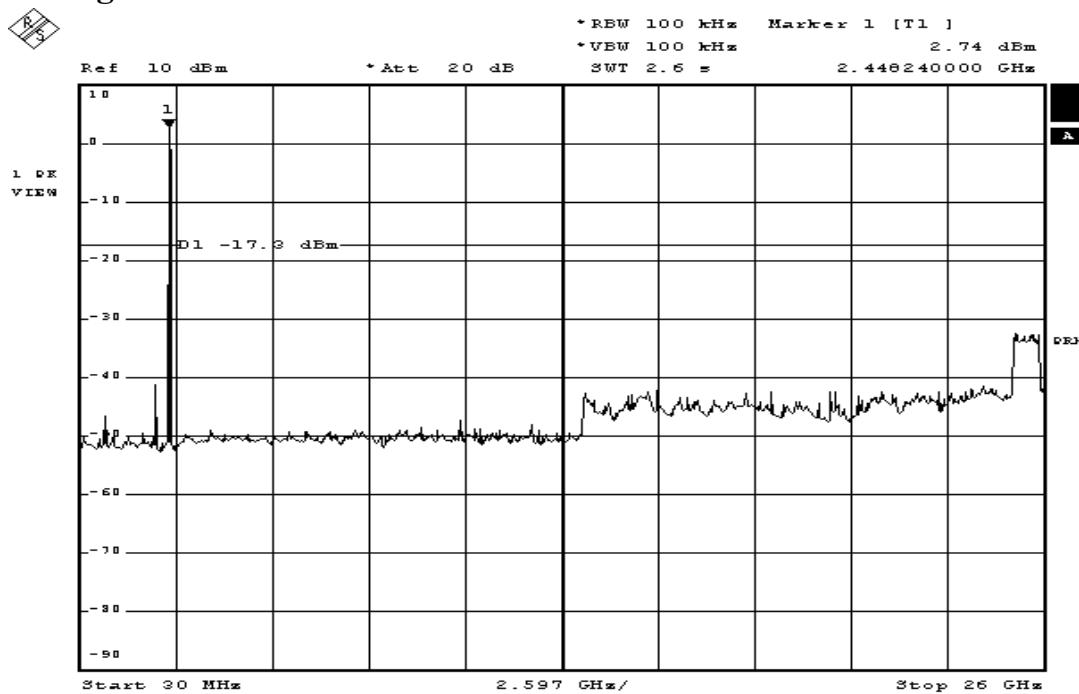
CH Mid 30MHz – 26GHz



Date: 25.DEC.2002 03:41:03



CH High 30MHz – 26GHz



Date: 25.DEC.2002 03:50:36

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode: TX CH Low Mode Test Date : Dec. 18 2002
 Temperature : 23 °C Test By: Robin
 Humidity : 65 % Pol: Ver./Hor
 Power Adaptor TC10A-050

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Ant./CL/ Amp. CF(dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
55.200	V	Peak	33.67	-5.56	28.11	40.00	-11.89
120.000	V	Peak	45.34	-17.88	27.46	43.50	-16.04
240.150	V	Peak	36.84	-14.37	22.47	46.00	-23.53
374.667	V	Peak	39.34	-10.72	28.62	46.00	-17.38
479.667	V	Peak	35.84	-8.49	27.35	46.00	-18.65
120.000	H	Peak	38.34	-18.78	19.56	43.50	-23.94
240.150	H	Peak	33.00	-14.37	18.63	46.00	-27.37
359.500	H	Peak	39.50	-10.92	28.58	46.00	-17.42
374.667	H	Peak	43.84	-10.72	33.12	46.00	-12.88
480.833	H	Peak	37.67	-8.47	29.20	46.00	-16.80

Remark :

- (1) Measuring frequencies from 30 MHz to the 1GHz .
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.
- (3) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.



Operation Mode: TX CH Mid Mode Test Date : Dec. 18 2002
 Temperature : 23 °C Test By: Robin
 Humidity : 65 % Pol: Ver./Hor
 Power Adaptor TC10A-050

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Ant./CL/ Amp. CF(dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
55.650	V	Peak	33.67	-5.81	27.86	40.00	-12.14
120.000	V	Peak	45.00	-17.88	27.12	43.50	-16.38
240.150	V	Peak	36.34	-14.37	21.97	46.00	-24.03
374.667	V	Peak	37.84	-10.72	27.12	46.00	-18.88
479.667	V	Peak	34.84	-8.49	26.35	46.00	-19.65
120.000	H	Peak	38.67	-18.78	19.89	43.50	-23.61
240.150	H	Peak	32.50	-14.37	18.13	46.00	-27.87
359.500	H	Peak	38.17	-10.92	27.25	46.00	-18.75
375.833	H	Peak	40.67	-10.68	29.99	46.00	-16.01
480.833	H	Peak	37.50	-8.47	29.03	46.00	-16.97

Remark :

- (1) Measuring frequencies from 30 MHz to the 1GHz °
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.
- (3) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.



Operation Mode: TX CH High Mode Test Date : Dec. 18 2002
 Temperature : 23 °C Test By: Robin
 Humidity : 65 % Pol: Vertical
 Power Adaptor TC10A-050

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Ant./CL/ Amp. CF(dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
56.100	V	Peak	33.67	-6.07	27.60	40.00	-12.40
120.000	V	Peak	44.67	-17.88	26.79	43.50	-16.71
240.150	V	Peak	36.50	-14.37	22.13	46.00	-23.87
374.667	V	Peak	36.50	-10.72	25.78	46.00	-20.22
479.667	V	Peak	36.84	-8.49	28.35	46.00	-17.65
120.000	H	Peak	37.00	-18.78	18.22	43.50	-25.28
240.150	H	Peak	32.17	-14.37	17.80	46.00	-28.20
359.500	H	Peak	34.50	-10.92	23.58	46.00	-22.42
373.500	H	Peak	40.50	-10.76	29.74	46.00	-16.26
479.667	H	Peak	39.34	-8.49	30.85	46.00	-15.15

Remark :

- (1) Measuring frequencies from 30 MHz to the 1GHz .
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.
- (3) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

Radiated Spurious Emission Measurement Result (Above 1GHz)

Operation Mode: TX CH Low Mode Test Date : Dec. 18 2002
 Temperature : 23 °C Test By: Robin
 Humidity : 65 % Pol: Vertical
 Power Adaptor TC10A-050

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
				Peak (dBuV/m)	AV (dBuV/m)			
1663.33	54.50		-8.84	45.66		74.00	54.00	-8.34 Peak
2783	59.34	56.50	-5.38	53.96	51.12	74.00	54.00	-2.88 AV
4824	--					74.00	54.00	
7236	--					74.00	54.00	
9648	--					74.00	54.00	
12060	--					74.00	54.00	
14472	--					74.00	54.00	
16884	--					74.00	54.00	
19296	--					74.00	54.00	
21708	--					74.00	54.00	
24120	--					74.00	54.00	

Remark :

- (1) Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency .
- (2) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column .
- (4) Spectrum Peak Setting 1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
 Spectrum AV Setting 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.



Operation Mode: TX Low Mode Test Date : Dec. 18 2002
 Temperature : 22 °C Test By: Robin
 Humidity : 65% Pol: Horizontal
 Power Adaptor TC10A-050

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
1660.0	53.00		-8.84	44.16		74.00	54.00	-9.84 Peak
4824	--					74.00	54.00	
7236	--					74.00	54.00	
9648	--					74.00	54.00	
12060	--					74.00	54.00	
14472	--					74.00	54.00	
16884	--					74.00	54.00	
19296	--					74.00	54.00	
21708	--					74.00	54.00	
24120	--					74.00	54.00	

Remark :

- (1) Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency °
- (2) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column °
- (4) Spectrum Peak Setting 1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
Spectrum AV Setting 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.



Operation Mode: TX Mid Mode Test Date : Dec. 18 2002
 Temperature : 22 °C Test By: Robin
 Humidity : 65% Pol: Vertical
 Power Adaptor TC10A-050

Freq. (MHz)	Peak Reading	AV Reading	Ant./CL	Actual FS		Peak Limit	AV Limit	Margin
	(dBuV)	(dBuV)	CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)
2806.7	59.50	48.17	-5.33	54.17	42.84	74.00	54.00	-11.16 AV
4888	--					74.00	54.00	
7332	--					74.00	54.00	
9776	--					74.00	54.00	
12220	--					74.00	54.00	
14664	--					74.00	54.00	
17108	--					74.00	54.00	
19552	--					74.00	54.00	
21996	--					74.00	54.00	
24440	--					74.00	54.00	

Remark :

- (1) Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency °
- (2) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column °
- (4) Spectrum Peak Setting 1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
 Spectrum AV Setting 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.



Operation Mode: TX Mid Mode Test Date : Dec. 18 2002
 Temperature : 22 °C Test By: Robin
 Humidity : 65% Pol: Horizontal
 Power Adaptor TC10A-050

Freq. (MHz)	Peak	AV	Ant./CL CF(dB)	Actual FS		Peak	AV	Margin (dB)
	Reading (dBuV)	Reading (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)	
2060.0	55.67		-7.74	47.93		74.00	54.00	-6.07 Peak
4888	--					74.00	54.00	
7332	--					74.00	54.00	
9776	--					74.00	54.00	
12220	--					74.00	54.00	
14664	--					74.00	54.00	
17108	--					74.00	54.00	
19552	--					74.00	54.00	
21996	--					74.00	54.00	
24440	--					74.00	54.00	

Remark :

- (1) Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency °
- (2) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column °
- (4) Spectrum Peak Setting 1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
 Spectrum AV Setting 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.



Operation Mode: TX High Mode Test Date : Dec. 18 2002
 Temperature : 22 °C Test By: Robin
 Humidity : 65% Pol: Vertital
 Power Adaptor TC10A-050

Freq. (MHz)	Peak	AV	Actual FS		Peak	AV	Margin
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dB)
2086.0	61.17	59.00	-7.63	53.54	51.37	74.00	54.00 -2.63 AV
2830.0	56.00		-10.51	45.49		74.00	54.00 -8.51 Peak
4924	--				74.00	54.00	
7386	--				74.00	54.00	
9848	--				74.00	54.00	
12310	--				74.00	54.00	
14772	--				74.00	54.00	
17234	--				74.00	54.00	
19696	--				74.00	54.00	
22158	--				74.00	54.00	
24620	--				74.00	54.00	

Remark :

- (1) Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency °
- (2) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column °
- (4) Spectrum Peak Setting 1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
 Spectrum AV Setting 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.



Operation Mode: TX High Mode Test Date : Dec. 18 2002
 Temperature : 22 °C Test By: Robin
 Humidity : 65% Pol: Horizontal
 Power Adaptor TC10A-050

Freq. (MHz)	Peak	AV	Actual FS		Peak	AV	Margin (dB)
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	
4924	--				74.00	54.00	
7386	--				74.00	54.00	
9848	--				74.00	54.00	
12310	--				74.00	54.00	
14772	--				74.00	54.00	
17234	--				74.00	54.00	
19696	--				74.00	54.00	
22158	--				74.00	54.00	
24620	--				74.00	54.00	

Remark :

- (1) Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency .
- (2) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column .
- (4) Spectrum Peak Setting 1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
 Spectrum AV Setting 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.



Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode: TX CH Low Mode Test Date : Jan. 05 2003
 Temperature : 23 °C Test By: Robin
 Humidity : 65 % Pol: Ver./Hor
 Power Adaptor MU15-050200-A1

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Ant./CL/ Amp. CF(dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
106.950	V	Peak	35.50	-17.96	17.54	43.50	-25.96
264.450	V	Peak	31.67	-13.27	18.40	46.00	-27.60
373.500	V	Peak	43.67	-10.76	32.91	46.00	-13.09
484.333	V	Peak	39.84	-8.42	31.42	46.00	-14.58
583.500	V	Peak	38.00	-7.48	30.52	46.00	-15.48
682.667	V	Peak	32.50	-6.00	26.50	46.00	-19.50
120.450	H	Peak	43.50	-18.75	24.75	43.50	-18.75
187.950	H	Peak	41.00	-16.16	24.84	43.50	-18.66
360.667	H	Peak	39.17	-10.92	28.25	46.00	-17.75
484.333	H	Peak	37.17	-8.42	28.75	46.00	-17.25
539.167	H	Peak	36.84	-7.80	29.04	46.00	-16.96
583.500	H	Peak	35.17	-7.48	27.69	46.00	-18.31

Remark :

- (1) Measuring frequencies from 30 MHz to the 1GHz .
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.
- (3) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.



Operation Mode: TX CH Mid Mode Test Date : Jan. 05 2003
 Temperature : 23 °C Test By: Robin
 Humidity : 65 % Pol: Ver./Hor
 Power Adaptor MU15-050200-A1

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Ant./CL/ Amp. CF(dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
120.450	V	Peak	36.50	-17.88	18.62	43.50	-24.88
264.450	V	Peak	31.67	-13.27	18.40	46.00	-27.60
360.667	V	Peak	40.34	-10.92	29.42	46.00	-16.58
374.667	V	Peak	42.50	-10.72	31.78	46.00	-14.22
480.833	V	Peak	43.00	-8.47	34.53	46.00	-11.47
583.500	V	Peak	34.67	-7.48	27.19	46.00	-18.81
120.450	H	Peak	46.50	-18.75	27.75	43.50	-15.75
240.150	H	Peak	36.50	-14.37	22.13	46.00	-23.87
360.667	H	Peak	36.84	-10.92	25.92	46.00	-20.08
395.667	H	Peak	34.67	-10.09	24.58	46.00	-21.42
480.833	H	Peak	36.67	-8.47	28.20	46.00	-17.80

Remark :

- (1) Measuring frequencies from 30 MHz to the 1GHz .
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.
- (3) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.



Operation Mode: TX CH High Mode Test Date : Jan. 05 2003
 Temperature : 23 °C Test By: Robin
 Humidity : 65 % Pol: Vertical
 Power Adaptor MU15-050200-A1

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Ant./CL/ Amp. CF(dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
160.500	V	Peak	38.84	-17.70	21.14	43.50	-22.36
240.150	V	Peak	39.84	-14.37	25.47	46.00	-20.53
360.667	V	Peak	42.00	-10.92	31.08	46.00	-14.92
375.833	V	Peak	41.00	-10.68	30.32	46.00	-15.68
480.833	V	Peak	42.34	-8.47	33.87	46.00	-12.13
120.450	H	Peak	44.34	-18.75	25.59	43.50	-17.91
240.150	H	Peak	35.67	-14.37	21.30	46.00	-24.70
360.667	H	Peak	39.50	-10.92	28.58	46.00	-17.42
396.833	H	Peak	34.67	-10.05	24.62	46.00	-21.38
484.330	H	Peak	36.17	-8.42	27.75	46.00	-18.25

Remark :

- (1) Measuring frequencies from 30 MHz to the 1GHz .
- (2) Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using Peak detector mode.
- (3) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA between 30MHz to 1GHz was 100KHz.

Radiated Spurious Emission Measurement Result (Above 1GHz)

Operation Mode: TX CH Low Mode Test Date : Jan. 05 2003
 Temperature : 23 °C Test By: Robin
 Humidity : 65 % Pol: Vertical
 Power Adaptor MU15-050200-A1

Freq. (MHz)	Peak	AV	Actual FS		Peak	AV	Margin (dB)	
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)		
1660	56.34		-8.84	47.50		74.00	54.00	-6.50 Peak
2783	60.84	57.20	-5.38	55.46	51.82	74.00	54.00	-2.18 AV
4824	--					74.00	54.00	
7236	--					74.00	54.00	
9648	--					74.00	54.00	
12060	--					74.00	54.00	
14472	--					74.00	54.00	
16884	--					74.00	54.00	
19296	--					74.00	54.00	
21708	--					74.00	54.00	
24120	--					74.00	54.00	

Remark :

- (1) Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency °
- (2) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column °
- (4) Spectrum Peak Setting 1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
 Spectrum AV Setting 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.



Operation Mode: TX Low Mode Test Date : Jan. 05 2003
 Temperature : 22 °C Test By: Robin
 Humidity : 65% Pol: Horizontal
 Power Adaptor MU15-050200-A1

Freq. (MHz)	Peak Reading (dBuV)	AV Reading (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)
1663.3	55.17		-8.84	46.33		74.00	54.00	-7.67 Peak
2036.0	55.67		-7.84	47.83		74.00	54.00	-6.17 Peak
4824	--					74.00	54.00	
7236	--					74.00	54.00	
9648	--					74.00	54.00	
12060	--					74.00	54.00	
14472	--					74.00	54.00	
16884	--					74.00	54.00	
19296	--					74.00	54.00	
21708	--					74.00	54.00	
24120	--					74.00	54.00	

Remark :

- (1) Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency .
- (2) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column .
- (4) Spectrum Peak Setting 1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
 Spectrum AV Setting 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.



Operation Mode: TX Mid Mode Test Date : Jan. 05 2003
 Temperature : 22 °C Test By: Robin
 Humidity : 65% Pol: Vertical
 Power Adaptor MU15-050200-A1

Freq. (MHz)	Peak	AV	Actual FS		Peak	AV	Margin (dB)
	Reading (dBuV)	Reading (dBuV)	Ant./CL CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	
2806.7	59.50	48.17	-5.33	54.17	42.84	74.00	54.00
							-11.16 AV
4888	--					74.00	54.00
7332	--					74.00	54.00
9776	--					74.00	54.00
12220	--					74.00	54.00
14664	--					74.00	54.00
17108	--					74.00	54.00
19552	--					74.00	54.00
21996	--					74.00	54.00
24440	--					74.00	54.00

Remark :

- (1) Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency °
- (2) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column °
- (4) Spectrum Peak Setting 1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
 Spectrum AV Setting 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.



Operation Mode: TX Mid Mode Test Date : Jan. 05 2003
 Temperature : 22 °C Test By: Robin
 Humidity : 65% Pol: Horizontal
 Power Adaptor MU15-050200-A1

Freq. (MHz)	Peak (dBuV)	AV (dBuV)	AV CF(dB)	Ant./CL	Actual FS Peak (dBuV/m)	Actual FS AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Peak
2063.3	57.00			-7.73	49.27		74.00	54.00	-4.73	Peak
4888	--					74.00	54.00			
7332	--					74.00	54.00			
9776	--					74.00	54.00			
12220	--					74.00	54.00			
14664	--					74.00	54.00			
17108	--					74.00	54.00			
19552	--					74.00	54.00			
21996	--					74.00	54.00			
24440	--					74.00	54.00			

Remark :

- (1) Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency .
- (2) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column .
- (4) Spectrum Peak Setting 1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
 Spectrum AV Setting 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.



Operation Mode: TX High Mode Test Date : Jan. 05 2003
 Temperature : 22 °C Test By: Robin
 Humidity : 65% Pol: Vertital
 Power Adaptor MU15-050200-A1

Freq. (MHz)	Peak (dBuV)	AV (dBuV)	Ant./CL CF(dB)	Actual FS Peak (dBuV/m)	AV (dBuV/m)	Peak (dBuV/m)	AV (dBuV/m)	Margin (dB)
2086.7	57.50		-7.63	49.87		74.00	54.00	-4.13 Peak
4924	--				74.00	54.00		
7386	--				74.00	54.00		
9848	--				74.00	54.00		
12310	--				74.00	54.00		
14772	--				74.00	54.00		
17234	--				74.00	54.00		
19696	--				74.00	54.00		
22158	--				74.00	54.00		
24620	--				74.00	54.00		

Remark :

- (1) Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency .
- (2) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column .
- (4) Spectrum Peak Setting 1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
 Spectrum AV Setting 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.



Operation Mode: TX High Mode Test Date : Jan. 05 2003
 Temperature : 22 °C Test By: Robin
 Humidity : 65% Pol: Horizontal
 Power Adaptor MU15-050200-A1

Freq. (MHz)	Peak	AV	Ant./CL CF(dB)	Actual FS		Peak	AV	Margin (dB)
	Reading (dBuV)	Reading (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)	
4924	--					74.00	54.00	
7386	--					74.00	54.00	
9848	--					74.00	54.00	
12310	--					74.00	54.00	
14772	--					74.00	54.00	
17234	--					74.00	54.00	
19696	--					74.00	54.00	
22158	--					74.00	54.00	
24620	--					74.00	54.00	

Remark :

- (1) Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency .
- (2) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (3) Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column .
- (4) Spectrum Peak Setting 1GHz- 26GHz, RBW= 1MHz, VBW= 1MHz, Sweep time= 200 ms.
 Spectrum AV Setting 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.



6. AC POWER LINE CONDUCTED EMISSION TEST

6.1 Standard Applicable

According to §15.207. frequency within 150KHz to 30MHz shall not exceed

Frequency range MHz	Limits dB(uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Note

- 1.The lower limit shall apply at the transition frequencies
- 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

6.2 EUT Setup

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4-1992.
2. The EUT was plug-in the host PC via USB port. The host PC system was placed on the center of the back edge on the test table. The peripherals like modem, monitor printer, K/B, and mouse were placed on the side of the host PC system. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
3. The keyboard was placed directly in the front of the monitor, flushed with the front tabletop. The mouse was placed next to the Keyboard, flushed with the back of keyboard.
4. The spacing between the peripherals was 10 centimeters.
5. External I/O cables were draped along the edge of the test table and bundle when necessary.
6. The host PC system was connected with 110Vac/60Hz power source.

6.3 Measurement Procedure

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

**6.4 Measurement Equipment Used:**

Conducted Emission Test Site # 3					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESHS30	828144/003	08/08/2002	08/07/2003
LISN	R&S	ESH2-Z5	843285/010	10/17/2002	10/16/2003
LISN	EMCO	3825/2	9003-1628	07/26/2002	07/25/2003
Spectrum Analyzer	ADVANTEST	R3261A	91720031	N/A	N/A
2X2 WIRE ISN	R&S	ENY22	100020	06/20/2002	06/19/2003
FOUR WIRE ISN	R&S	ENY41	100006	06/20/2002	06/19/2003

6.5 Measurement Result

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.



Operation Mode: TX + RX Mode Test Date : Dec 20 2002
 Temperature : 24 °C Test By: Robin
 Power Adaptor TC10A-050 Humidity : 62%

FREQ MHz	Q.P. Raw dBuV	AVG Raw dBuV	Q.P. Limit dBuV	AVG Limit dBuV	Q.P. Margin dB	AVG Margin dB	NOTE
0.161	54.8	39.8	65.41	55.41	-10.61	-15.61	L1
0.438	40.2	---	57.10	47.10	-16.90	---	L1
0.607	43.0	---	56.00	46.00	-13.00	---	L1
0.746	42.2	---	56.00	46.00	-13.80	---	L1
1.604	37.6	---	56.00	46.00	-18.40	---	L1
0.161	51.2	---	65.41	55.41	-14.21	---	L2
0.297	42.4	---	60.33	50.33	-17.93	---	L2
0.605	41.2	---	56.00	46.00	-14.80	---	L2
0.726	40.8	---	56.00	46.00	-15.20	---	L2
0.994	38.6	---	56.00	46.00	-17.40	---	L2
1.746	38.8	---	56.00	46.00	-17.20	---	L2

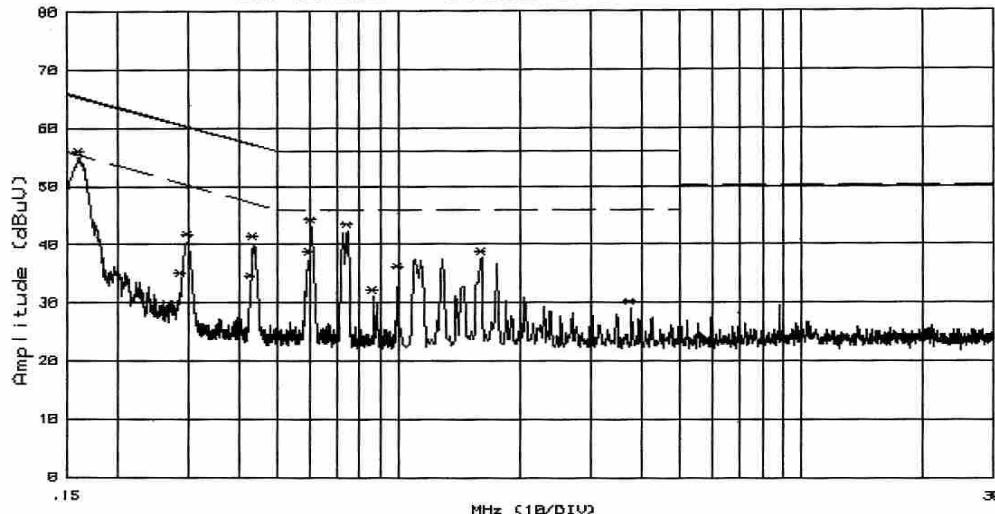
Remark :

- (1) Measuring frequencies from 0.15 MHz to 30MHz .
- (2) The emissions measured in frequency range from 0.15 MHz to 30MHz were made with an instrument using Qusia-Peak detector and Average detector.
- (3) “---” denotes the emission level was or more than 2dB below the Average limit, so no re-check anymore.
- (4) The IF bandwidth of SPA between 0.15MHz to 30MHz was 10KHz;
 The IF bandwidth of Test Receiver between 0.15MHz to 30MHz was 9KHz;
- (5) L1 = Line One (Hot side) / L2 = Line Two (Neutral side)



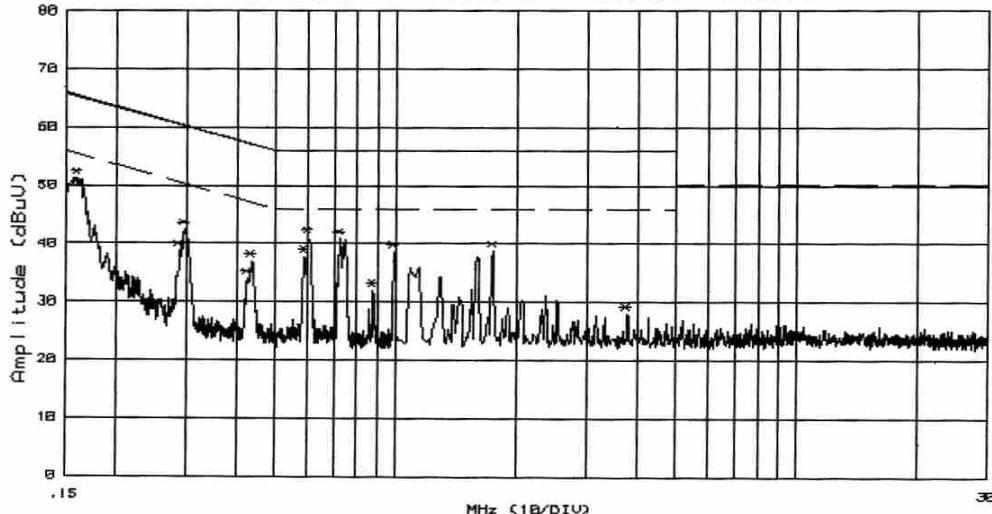
Conducted Test Data

C&C Lab. Co. Shielded Room3
EN 55022 - Class B QP/AU Limit



Customer: AIRVAST File#: 366 Date : 18 Dec 2002 14:43:13
 Model : WA1300 Humd.: 65 (%) Temp. : 25 (C)
 Mode : TX+RX Port : L1 Tested by: Jean
 Reading : Peak (R3261C SPA)
 Remark : 110V (Adaptor Model: TC 10A-050)

C&C Lab. Co. Shielded Room3
EN 55022 - Class B QP/AU Limit



Customer: AIRVAST File#: 367 Date : 18 Dec 2002 14:45:22
 Model : WA1300 Humd.: 65 (%) Temp. : 25 (C)
 Mode : TX+RX Port : L2 Tested by: Jean
 Reading : Peak (R3261C SPA)
 Remark : 110V (Adaptor Model: TC 10A-050)



Operation Mode: TX + RX Mode Test Date : Jan. 06 2003
 Temperature : 24 °C Test By: Robin
 Power Adaptor: MU15-050200-A1 Humidity : 62%

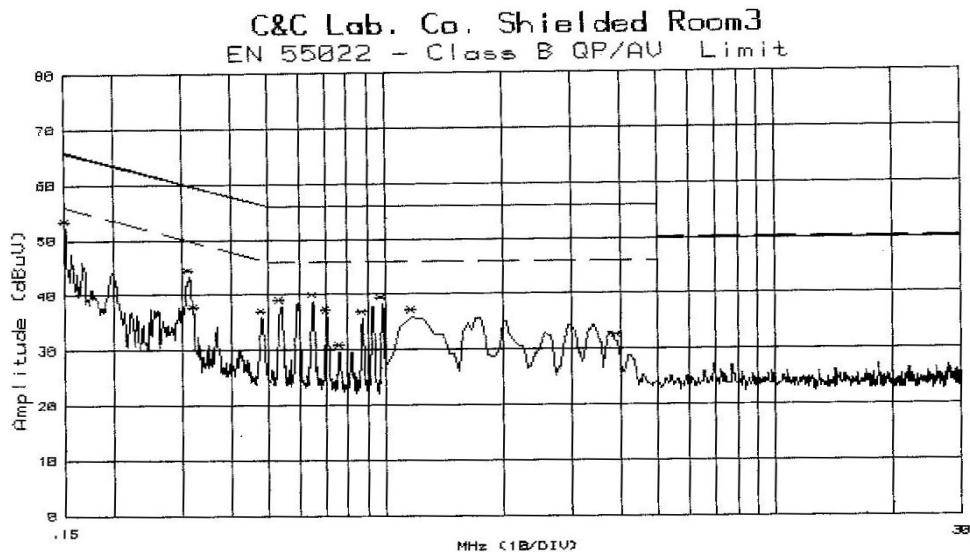
FREQ MHz	Q.P. Raw dBuV	AVG Raw dBuV	Q.P. Limit dBuV	AVG Limit dBuV	Q.P. Margin dB	AVG Margin dB	NOTE
0.151	51.9	---	65.94	55.94	-14.04	---	L1
0.314	42.7	---	59.86	49.86	-17.16	---	L1
0.539	37.4	---	56.00	46.00	-18.60	---	L1
0.652	38.4	---	56.00	46.00	-17.60	---	L1
0.707	35.6	---	56.00	46.00	-20.40	---	L1
0.154	51.3	---	65.78	55.78	-14.48	---	L2
0.313	41.5	---	59.89	49.89	-18.39	---	L2
0.541	36.9	---	56.00	46.00	-19.10	---	L2
0.597	37.5	---	56.00	46.00	-18.50	---	L2
0.709	34.9	---	56.00	46.00	-21.10	---	L2
0.928	37.5	---	56.00	46.00	-18.50	---	L2

Remark :

- (1) Measuring frequencies from 0.15 MHz to 30MHz .
- (2) The emissions measured in frequency range from 0.15 MHz to 30MHz were made with an instrument using Qusia-Peak detector and Average detector.
- (3) “---” denotes the emission level was or more than 2dB below the Average limit, so no re-check anymore.
- (4) The IF bandwidth of SPA between 0.15MHz to 30MHz was 10KHz;
 The IF bandwidth of Test Receiver between 0.15MHz to 30MHz was 9KHz;
- (5) L1 = Line One (Hot side) / L2 = Line Two (Neutral side)

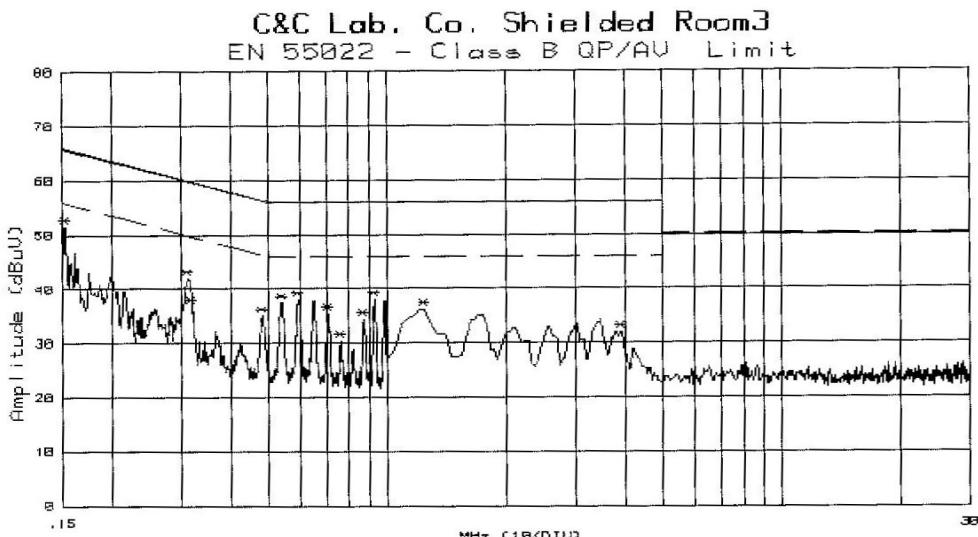


Conducted Test Data L1



Customer: AIRVAST File#: 506 Date :26 Dec 2002 19:26:42
Model : WA1300 Humd.: 70 (%) Temp. :18 (C)
Mode : TX+RX Port :L1 Tested by:ROBIN
Reading :Peak(R3261C SPA)
Remark :110V (Adaptor Model:MU15-050200-A1)

L2



Customer: AIRVAST File#: 507 Date :26 Dec 2002 19:29:42
Model : WA1300 Humd.:70 (%) Temp. :18 (C)
Mode : TX+RX Port :L2 Tested by:ROBIN
Reading :Peak(R3261C SPA)
Remark :110V (Adaptor Model:MU15-050200-A1)

7. 6 dB Bandwidth Measurement

7.1 Standard Applicable

According to § 15.247(a)(2), DSSS Systems operating in the 2400MHz-2483.5 MHz and 5725MHz – 5850MHz bands. The Minimum 6dB bandwidth shall be at least 500KHz.

7.2 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	Model No.	Serial No.	LAST CAL.	Cal. Due.
Spectrum Analyzer	Advantest	R3182	110600647	11/16/2002	11/15/2003
Spectrum Analyzer	R&S	FSP30	1093.4495.30	07/23/2002	07/22/2003
low loss cable	Huber + Suhner	Sucoflex 104	N/A	N/A	N/A

7.3 Test Set-up:

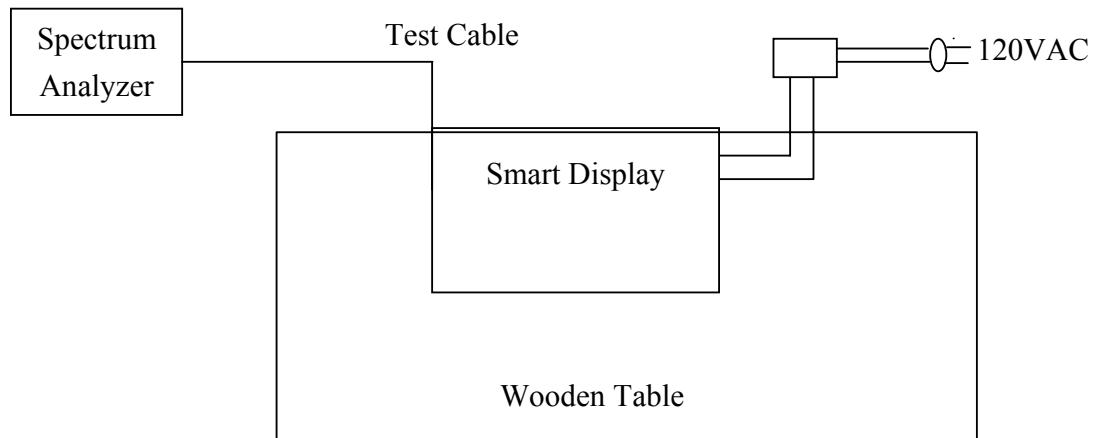


Fig. 4

Fig. 4 : Measurement setup for testing on Antenna connector



7.4 Measurement Procedure

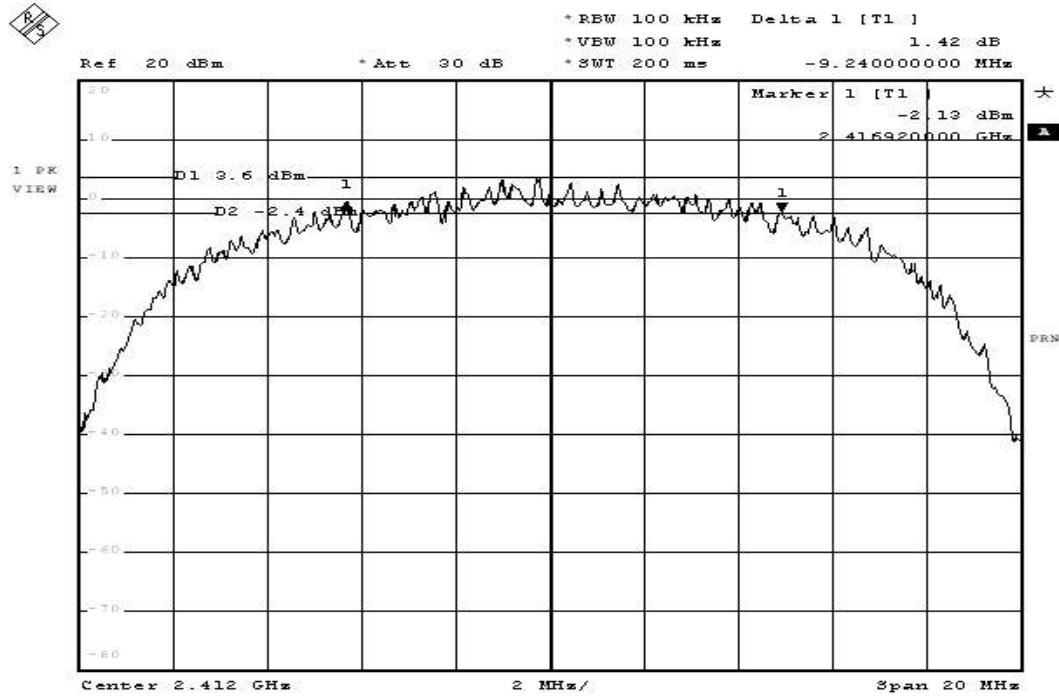
1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW=100KHz, VBW = RBW, Span= 20MHz, Sweep=auto
4. Mark the peak frequency and –6dB (upper and lower) frequency.
5. Repeat above procedures until all frequency measured were complete.

7.5 Measurement Result

CH	Bandwidth (MHz)	Bandwidth (KHz)	Result
Lower	9.24	> 500	PASS
Mid	11.04	> 500	PASS
Higher	10.34	> 500	PASS

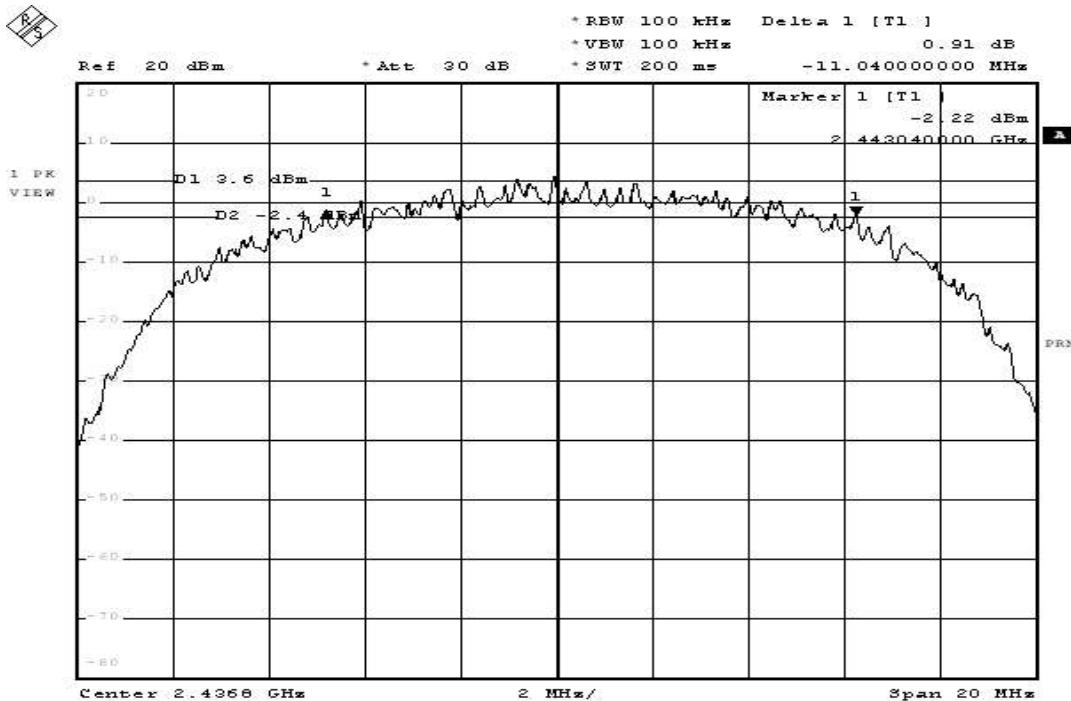


6dB Band Width Test Data CH-LOW



Date: 17.DEC.2002 11:12:53

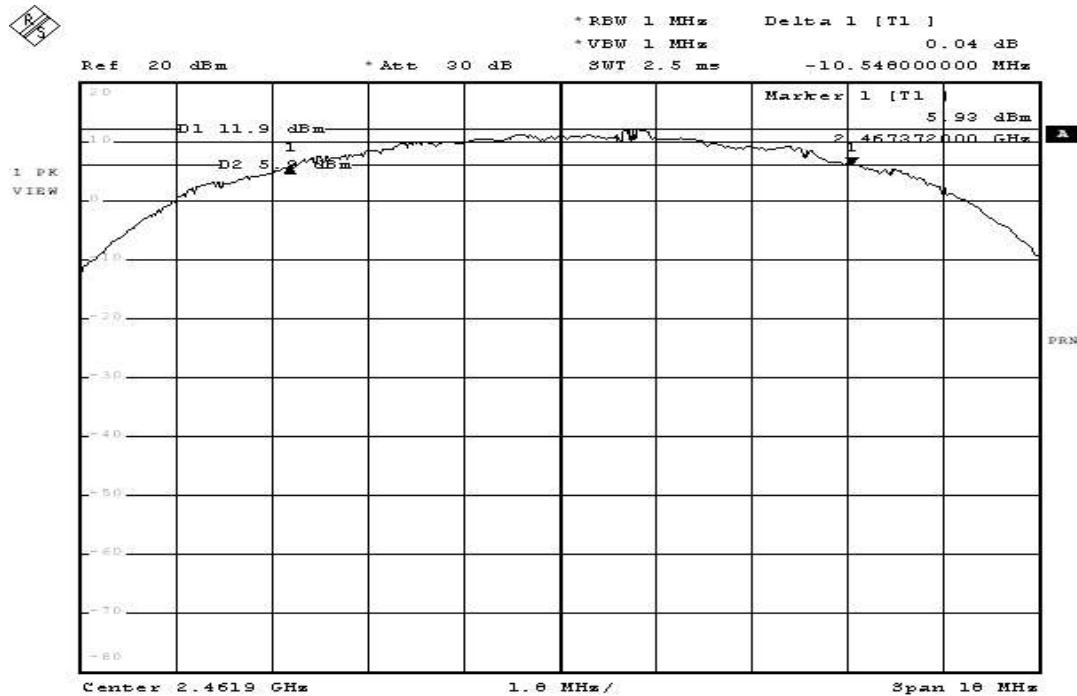
6dB Band Width Test Data CH-MID



Date: 17.DEC.2002 11:16:11



6dB Band Width Test Data CH-HIGH



Date: 17.DEC.2002 11:51:54

8. PEAK OUTPUT POWER MEASUREMENT

8.1 Standard Applicable

According to §15.247(b)(2), for direct sequence systems, the maximum peak output power of the intentional radiator shall not exceed 1 Watt.

8.2 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter or spectrum. (Channel power function, RBW, VBW = 1MHz, Bandwidth=26dB occupied Bandwidth)
3. Record the max. reading.
4. Repeat above procedures until all frequency measured were complete.

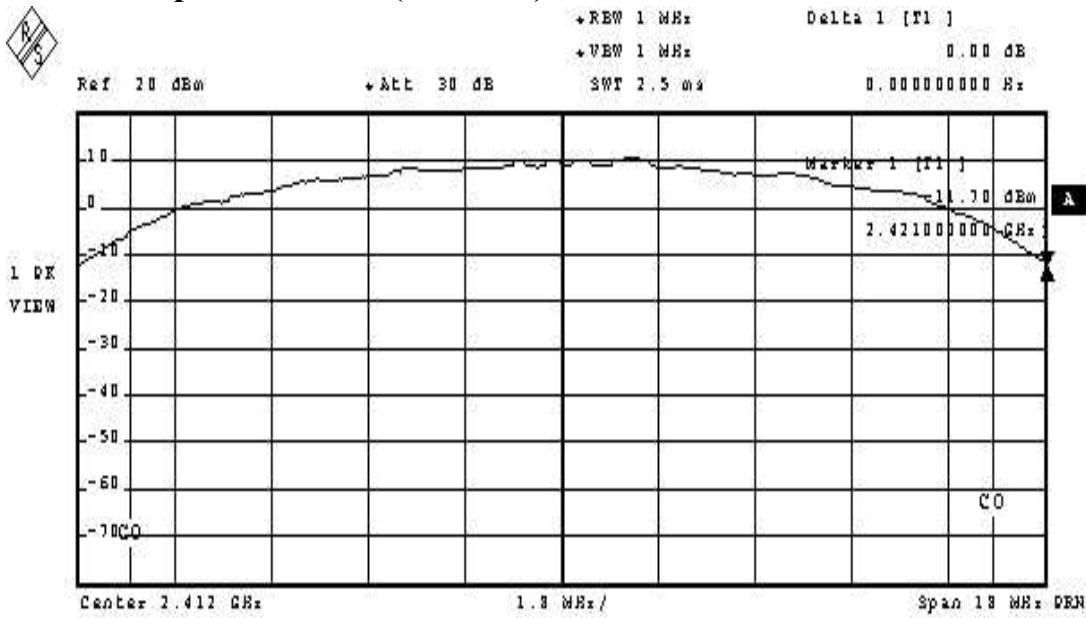
8.3 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	Model No.	Serial No.	LAST CAL.	Cal. Due.
Spectrum Analyzer	Advantest	R3182	110600647	11/16/2002	11/15/2003
Spectrum Analyzer	R&S	FSP30	1093.4495.30	07/23/2002	07/22/2003
low loss cable	Huber + Suhner	Sucoflex 104	N/A	N/A	N/A

8.4 Test Results:

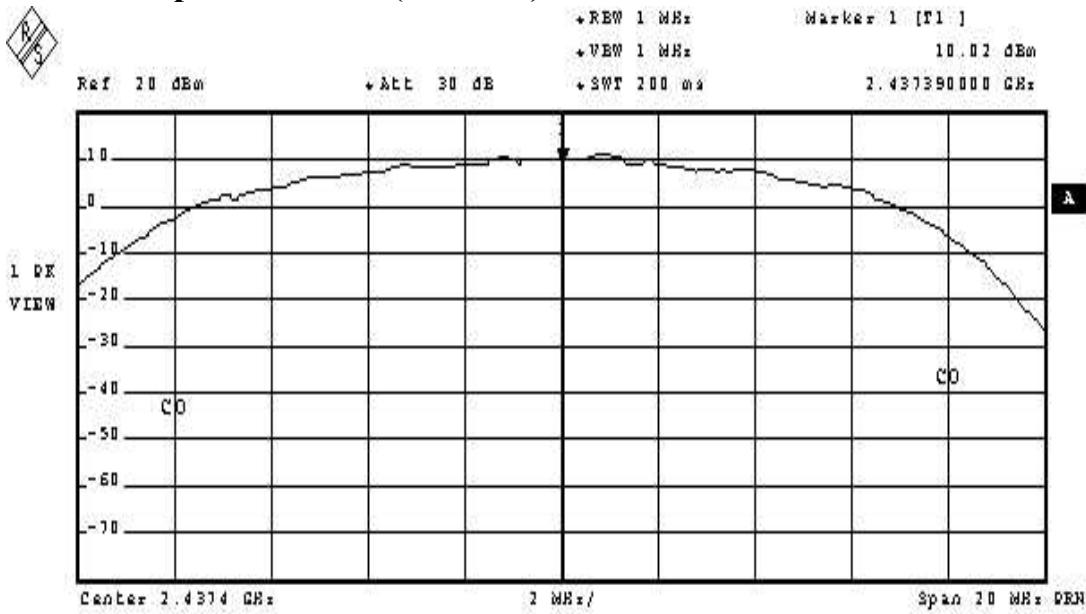
CH	Reading Power dBm	Cabble Loss dB	Output Power dBm	Output Power W	Limit (W)	Result
LOWER	18.21	0.50	18.71	0.07430	1	PASS
MID	18.80	0.50	19.30	0.08511	1	PASS
HIGHER	19.85	0.50	20.35	0.10839	1	PASS

Peak Power Output Data Plot (CH Low)



TM Channel
Bandwidth 16 MHz Power 18.21 dBm

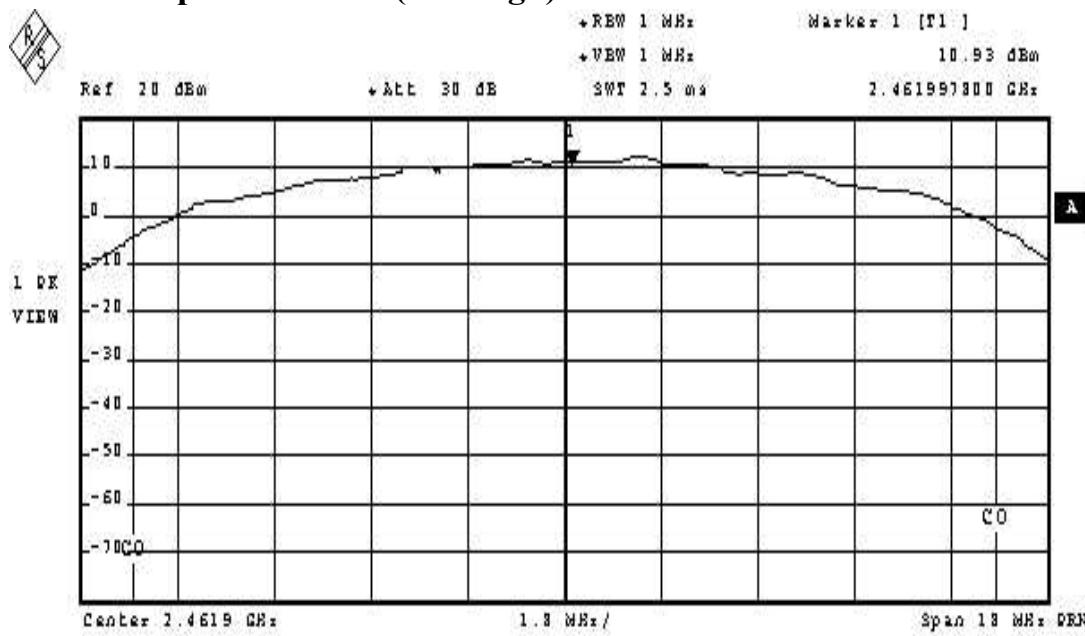
Peak Power Output Data Plot (CH Mid)



TM Channel
Bandwidth 16 MHz Power 18.80 dBm



Peak Power Output Data Plot (CH High)



TM Channel
Bandwidth 16 MHz Power 19.85 dBm



9. 100KHz BANDWIDTH OF BAND EDGES MEASUREMENT

9.1 Standard Applicable

According to §15.247(c), in any 100 KHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100KHz bandwidth within the band that contains the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

9.2 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW, VBW=100KHz, Start = 2.3857GHz, Stop = 2.406GHz or Start = 2.4751GHz, Stop = 2.495GHz, Sweep = auto.
5. Mark Peak ,2.4GHz and 2.4835GHz and record the max. level.
6. Repeat above procedures until all frequency measured were complete.

9.3 Measurement Result

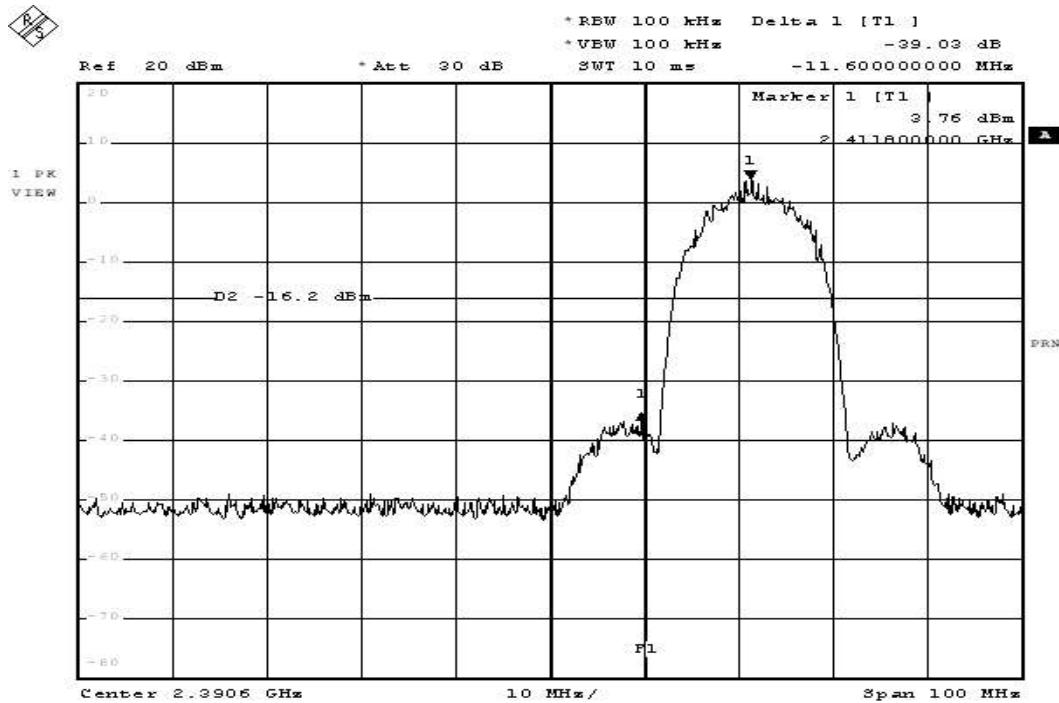
Refer to attach spectrum analyzer data chart.

9.4 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	Model No.	Serial No.	LAST CAL.	Cal. Due.
Spectrum Analyzer	Advantest	R3182	110600647	11/16/2002	11/15/2003
Spectrum Analyzer	R&S	FSP30	1093.4495.30	07/23/2002	07/22/2003
low loss cable	Huber + Suhner	Sucoflex 104	N/A	N/A	N/A

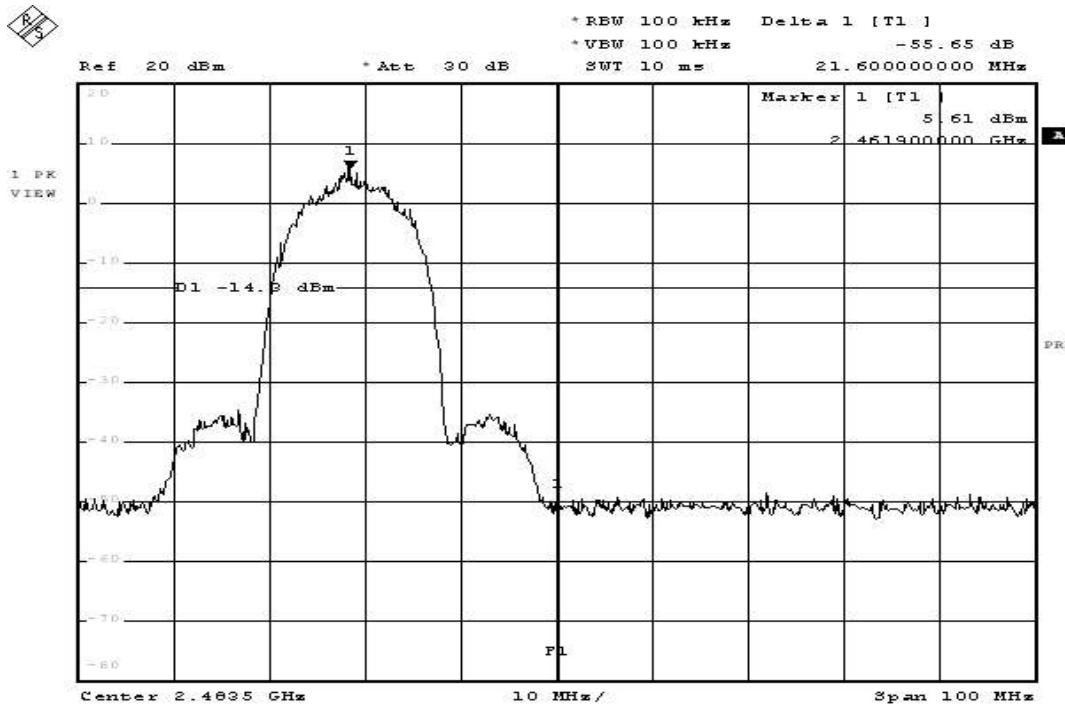


Out of Band Test Data CH-LOW



Date: 17.DEC.2002 11:59:57

Out of Band Test Data CH-HIGH



Date: 17.DEC.2002 11:45:55

10. Peak Power Spectral Density

10.1 Standard Applicable

According to §15.247(d), for direct sequence systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3kHz band during any time interval of continuous transmission.

10.2 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 3KHz, VBW = 3KHz, Span = 300KHz, Sweep=100s
4. Record the max. reading.
5. Repeat above procedures until all frequency measured were complete.

10.3 Measurement Result

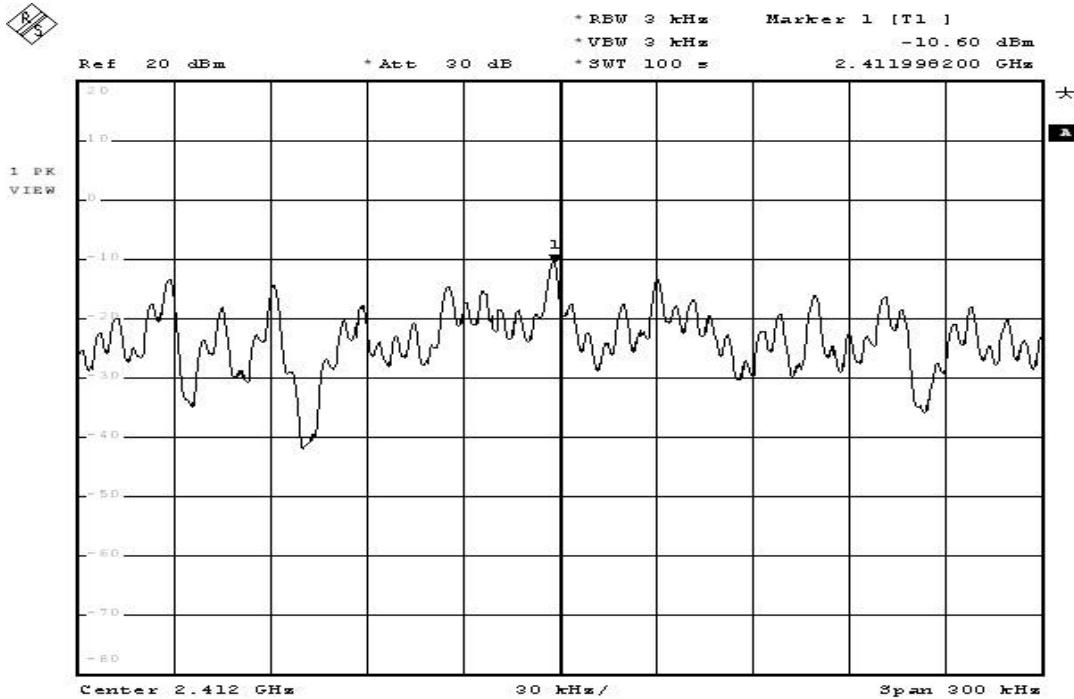
	Reading dBm	Cable Loss dB	Density dBm	Limint dBm	Result
CH-LOW	-10.60	0.50	-10.10	8	PASS
CH-MID	-11.10	0.50	-10.60	8	PASS
CH-HIGH	-9.02	0.50	-8.52	8	PASS

10.4 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	Model No.	Serial No.	LAST CAL.	Cal. Due.
Spectrum Analyzer	Advantest	R3182	110600647	11/16/2002	11/15/2003
Spectrum Analyzer	R&S	FSP30	1093.4495.30	07/23/2002	07/22/2003
low loss cable	Huber + Suhner	Sucoflex 104	N/A	N/A	N/A

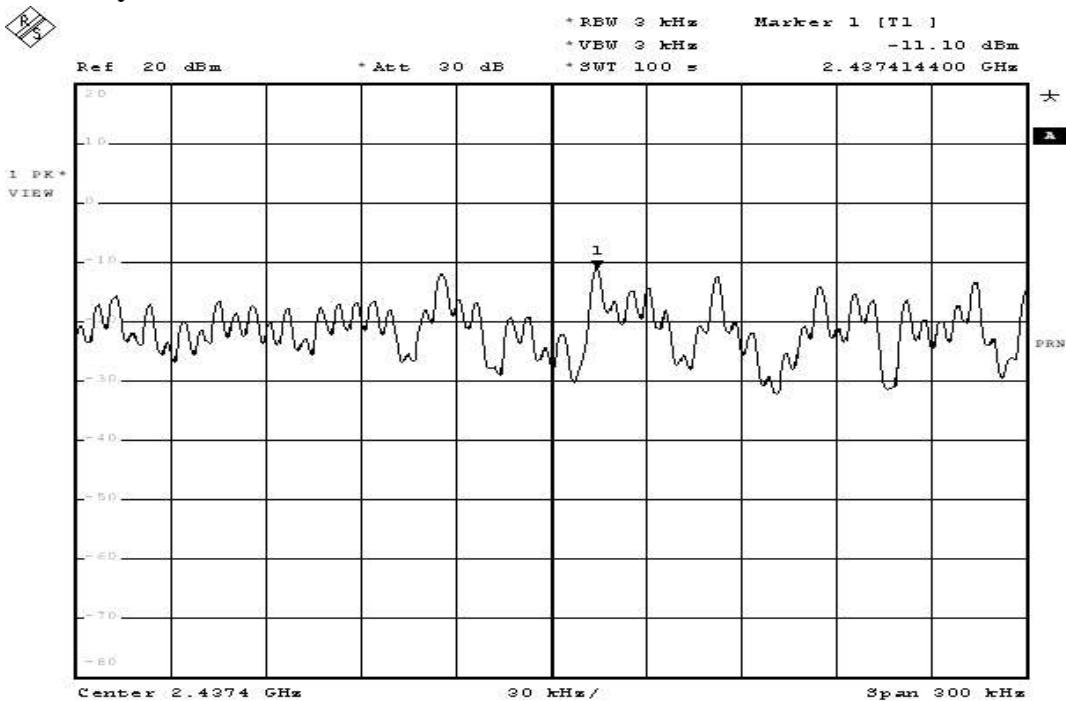


Power Density Test Data CH-LOW



Date: 17.DEC.2002 11:55:59

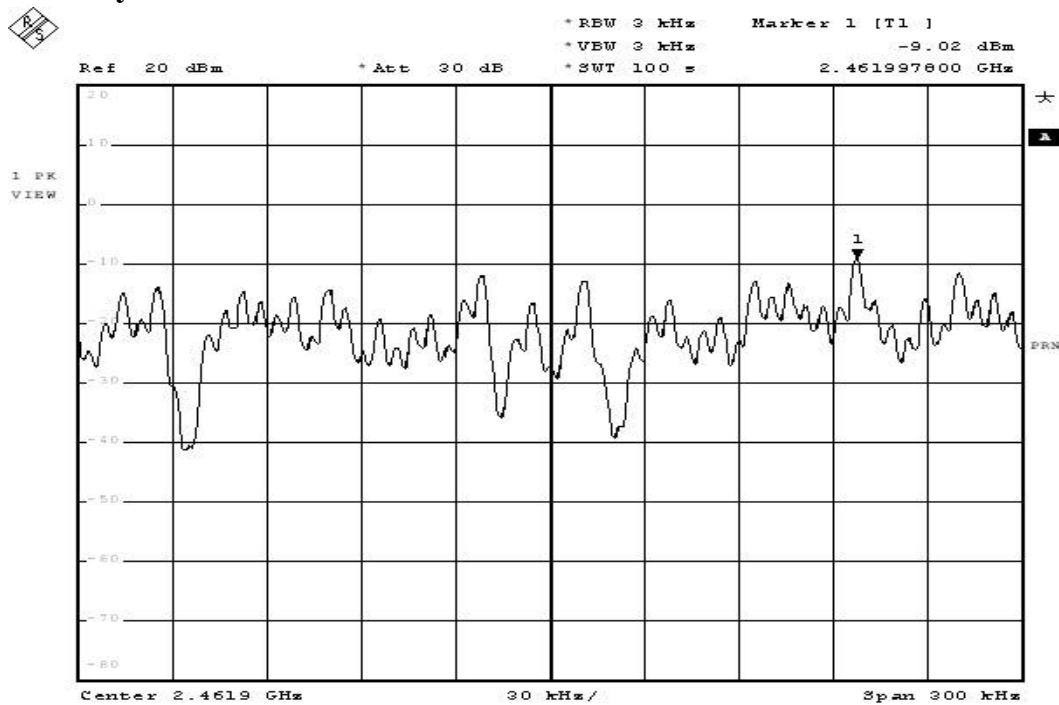
Power Density Test Data CH-MID



Date: 17.DEC.2002 11:32:26



Power Density Test Data CH-HIGH



Date: 17.DEC.2002 11:46:03

11. ANTENNA REQUIREMENT

11.1 Standard Applicable

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than furnished by the responsible party shall be used with the device.

And according to §15.247(i), if transmitting antennas of directional gain greater than 6dBi are used the power shall be reduced by the amount in 1dB that the directional gain of the antenna exceeds 6 dBi.

11.2 Antenna Connected Construction

The directional gins of antenna used for transmitting is 1.95 dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement. Please see EUT photo for details.

11.3 Maximum Permissive Exposure (MPE)

According to §15.247(b)(4) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to §1.1310 and §2.1093 RF exposure is calculated.

Limits for Maximum Permissive Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-15000	/	/	1.0	30

F = frequency in MHz

* = Plane-wave equipment power density



MPE Prediction

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S = Power density

P = Power input to antenna

G = Power gain of the antenna in the direction of interest relative to an isotropic radiator

R = Distance to the center of radiation of the antenna

Maximum peak output power at antenna input terminal: 20.35 (dBm)

Maximum peak output power at antenna input terminal: 108.392 (mW)

Antenna gain (typical): 1.95 (dBi)

Maximum antenna gain: 1.552 (numeric)

Prediction distance: 20 (cm)

Prediction frequency: 2462 (MHz)

MPE limit for uncontrolled exposure at prediction frequency: 1 (mW/cm²)

Power density at prediction frequency at 20 (cm) distance 0.033806 (mW/cm²)

S	P	P	G	G	R
mW/cm ²	mW	dBm	dBi	(numeric)	cm
0.03380262	108.3926914	20.35	1.95	1.5667511	20

Measurement Result

The predicted power density level at 20 cm is 0.033806 mW/cm². This is below the uncontrolled exposure limit of 1 mW/cm² at 2462MHz.