

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

Notebook with 802.11b WLAN

System Model Name: ZW1L

Module Model Name: WM3B2100

FCC ID: HFSZW1LWM3B2100

REPORT NO: 030057-R-ID

ISSUE DATE: May 7, 2003

Prepared for

**Quanta Computer Inc.
No. 188, Wen Hwa 2nd Rd., Kuei Shan Hsiang,
Tao Yuan Hsien, Taiwan, R.O.C.**

Prepared by



**C&C LABORATORY, CO., LTD.
No. 81-1, Lane 210, Bade Rd. 2,
Luchu Hsiang, Taoyuan Hsien, Taiwan.**

TEL: 886-3-3240332

FAX: 886-3-3245235

**This report shall not be reproduced, except in full, without the written approval of
C&C Laboratory, Co., Ltd.**

VERIFICATION OF COMPLIANCE

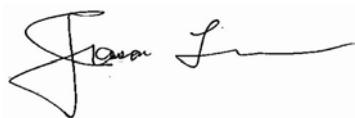
Applicant:	Quanta Computer Inc. No. 188, Wen Hwa 2 nd Rd., Kuei Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.
Product Description:	Notebook with 802.11b WLAN
Brand Name:	Quanta
Model No.:	ZW1L
Serial Number:	N/A
File Number:	030057-R-ID
Date of test:	May 2 ~ 5, 2003

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



Jonson Lee / Director
C&C Laboratory Co., Ltd.

Review By



Susan Su / Section Manager
C&C Laboratory Co., Ltd.

Table of Contents

1.	GENERAL INFORMATION	4
1.1	PRODUCT DESCRIPTION	4
1.2	RELATED SUBMITTAL(S) / GRANT (S).....	4
1.3	TEST METHODOLOGY.....	4
1.4	TEST FACILITY	4
1.5	SPECIAL ACCESSORIES.....	4
1.6	EQUIPMENT MODIFICATIONS	4
2.	SYSTEM TEST CONFIGURATION	5
2.1	EUT CONFIGURATION.....	5
2.2	EUT EXERCISE.....	5
2.3	TEST PROCEDURE.....	5
2.4	CONFIGURATION OF TESTED SYSTEM.....	6
3.	SUMMARY OF TEST RESULTS	7
4.	DESCRIPTION OF TEST MODES	7
5.	SPURIOUS EMISSION TEST	8
5.1	STANDARD APPLICABLE	8
5.2	EUT SETUP	8
5.3	MEASUREMENT PROCEDURE.....	8
5.4	TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION).....	9
5.5	MEASUREMENT EQUIPMENT USED:	10
5.6	MEASUREMENT RESULT	10
6.	AC POWER LINE CONDUCTED EMISSION TEST	23
6.1	STANDARD APPLICABLE	23
6.2	EUT SETUP	23
6.3	MEASUREMENT PROCEDURE.....	23
6.4	MEASUREMENT EQUIPMENT USED:	24
6.5	MEASUREMENT RESULT	24
7.	ANTENNA REQUIREMENT	27
7.1	STANDARD APPLICABLE	27
7.2	ANTENNA CONNECTED CONSTRUCTION	27
8.	RF EXPOSURE.....	28
8.1	STANDARD APPLICABLE	28
8.2	MEASUREMENT RESULT:	28
	APPENDIX 1 PHOTOGRPHS OF SET UP	29
	APPENDIX 2 EXTERNAL PHOTOGRPHS OF EUT.....	32
	APPENDIX 3 INTERNAL PHOTOGRPHS OF EUT.....	37

1. GENERAL INFORMATION

1.1 Product Description

Quanta Computer Inc. Model: ZW1L (referred to as the EUT in this report) is a Notebook with wireless LAN module. The EUT is compliance with IEEE802.11b Standard.

A major technical descriptions of EUT is described as following:

WLAN Module: Intel, WM3B2100, FCC ID: PD9WM3B2100

A). Operation Frequency: 2.412GHz – 2.462GHz; 11 channels;

B). Transmit Power: 16.7 dBm

C). Modulation type: Direct Sequence Spread Spectrum, (CCK; DQPSK; DBPSK)

D). Transition Speed: 1/2/5.5/11Mbps

E). Antenna Designation: PIFA Antenna; Embedded Non-User changeable, two provided.
TX and RX Diversity.

F). Power Supply: Model: PA-1750-01

Input: AC 100~240V, 2.3A, 50-60Hz

Output: DC +19V, 3.95A

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: HFSZW1LWM3B2100 filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules. The composite system (digital device) 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 are measured in the frequency range between 0.15 MHz and 30 MHz 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) were 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

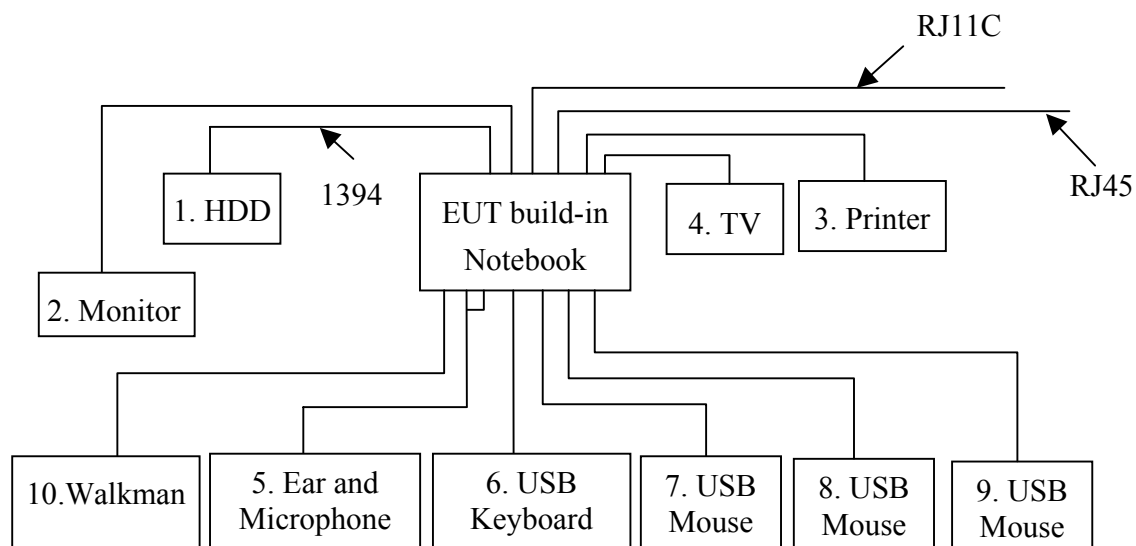


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Data Cable	Power Cord
1.	External HDD	IBM	N/A	N/A	DCAS-34330	Shielded, 1.8m	AC I/P: Unshielded, 1.8m DC P/P: Unshielded, 1.8m
2.	Monitor	SONY	3882B102	2716043	CPD-G200	Shielded, 1.8m With a core	Shielded, 1.8m
3.	Printer	EPSON	EPSON STYLUS C20SX	N/A	DW4E130542	Shielded, 1.8m	Unshielded, 1.8m
4.	TV	PROTON	FT-21S	N/A	FT-21S00002CA00112	S-Video Cable: Unshielded, 1.8m	Unshielded, 1.8m
5.	Ear/Microphone	GITON	N/A	N/A	GT-2004V	Unshielded, 1.25m	N/A
6.	USB Keyboard	BTC	3872B597	G91400266	7932M	Shielded, 1.8m	N/A
7.	USB Mouse	Logitech	4872A221	LZE92250102	M-BB48	Shielded, 1.8m	N/A
8.	USB Mouse	Logitech	M-BB48	FCC DoC	LZE92250113	Shielded, 1.8m	N/A
9.	USB Mouse	Logitech	M-BB48	FCC DoC	LZE93300460	Shielded, 1.8m	N/A
10.	Walkman	Panasonic	RQ-L10	N/A	HB003029	Unshielded, 1.8m	N/A

3. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§ 15.209(a) (f) / 15.247 (c)	Spurious Emission	Compliant
§ 15.207(a)	AC Power Port Conducted Emission	Compliant
§ 15.203	Antenna Requirement	Compliant
§ 1.1307(b)(1)	RF exposures	Compliant

4. DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.

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

Radiated and conducted spurious emission was perform at channel 1 (2412MHz), 6 (2437MHz) and 11 (2462MHz) with Max conducted peak output power 16.7dBm at Antenna port J6 which was the worst case and reported.

Other Conducted test items refer to WLAN conducted report.

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

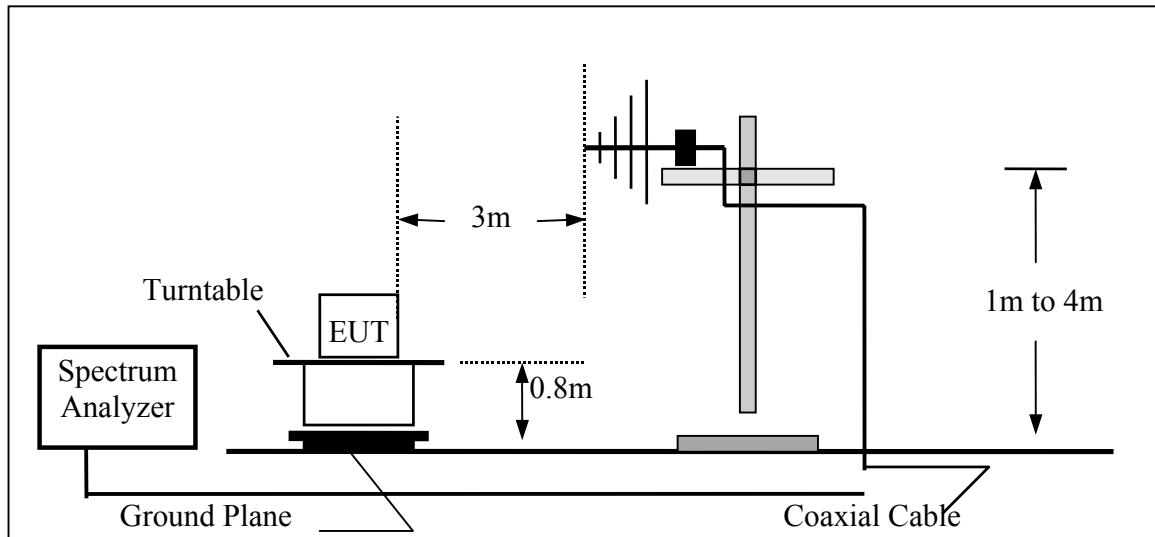
1. The radiated emission tests were performed in the 3 meter open-test site, using the setup in accordance with the ANSI C63.4-1992.
2. The EUT was put in the front of the test table. The host PC system was placed on the center of the back edge on the test table. The peripherals like modem, monitor, 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

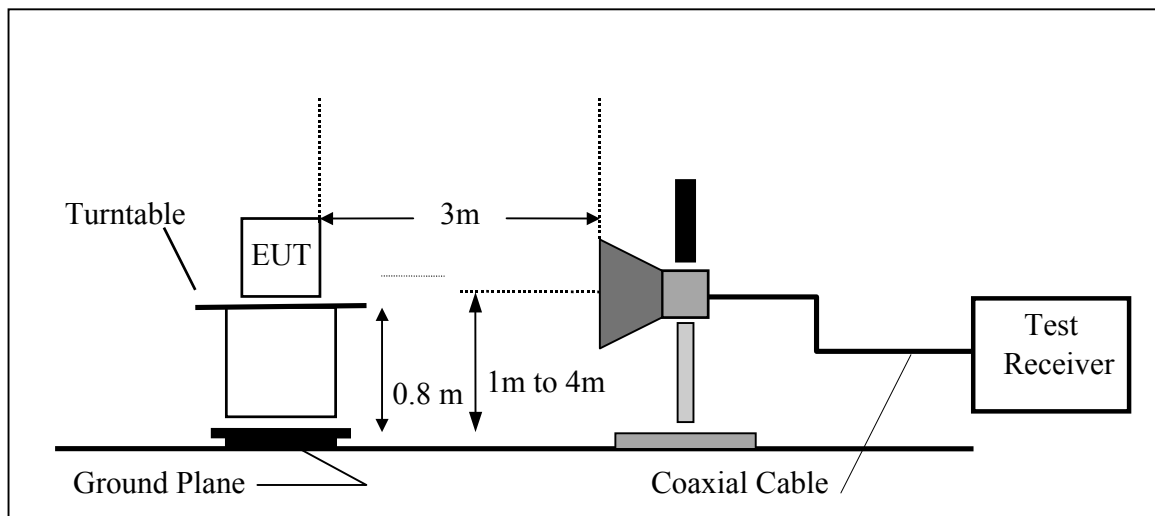
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was 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	81720301	08/28/2002	08/27/2003
Spectrum Analyzer	ROHDE & SCHWARZ	FSP30	100112	06/29/2002	06/28/2003
EMI Test Receiver	R&S	ESVS20	838804/004	01/09/2003	01/08/2004
Pre-Amplifier	HP	8447D	2944A09173	03/03/2003	03/02/2004
Bilog Antenna	SCHWAZBECK	VULB9163	145	07/06/2002	07/05/2003
Horn antenna	Schwarzbeck	BBHA 9120	D210	2/24/2003	2/23/2004
Pre-Amplifier	HP	8449B	3008B00965	10/01/2002	10/02/2003
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	09/07/2002	09/06/2003

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

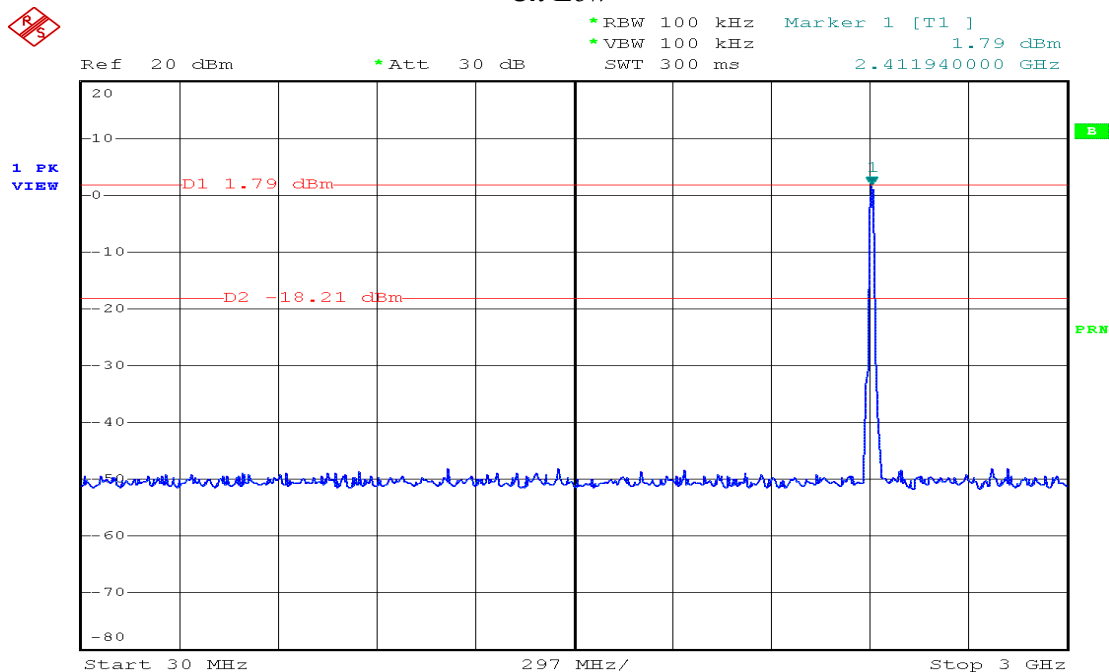
Refer to attach tabular data sheets.

NOTE:

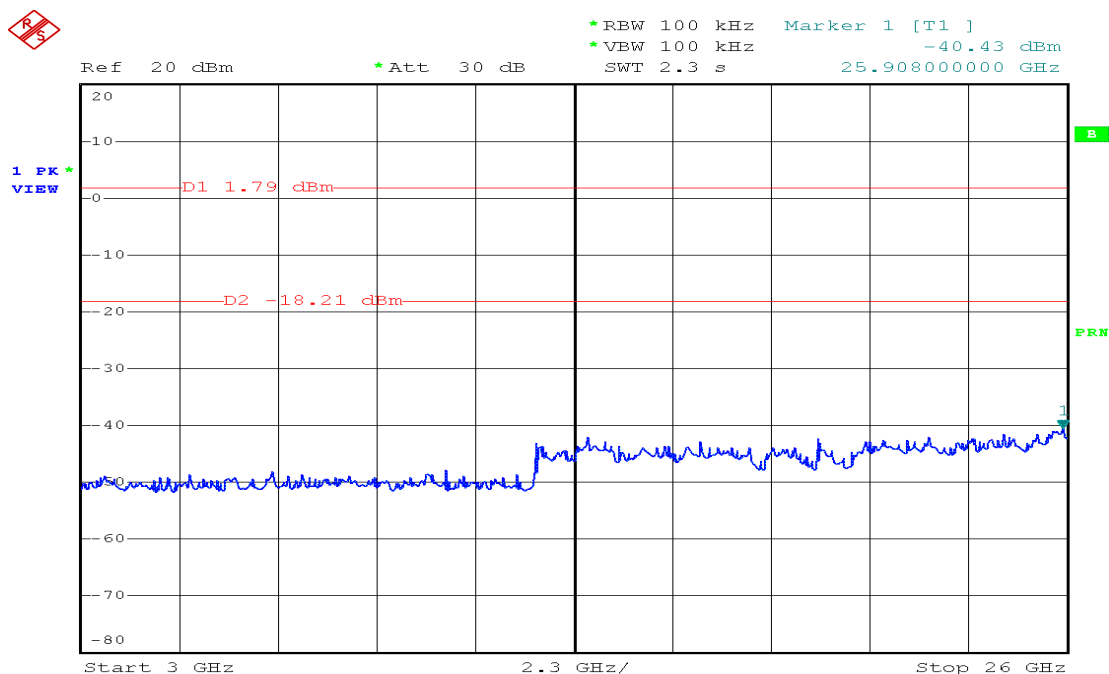
The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 100kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.

Conducted Spurious Emission Measurement Result

Ch Low



Date: 2.MAY.2003 13:26:09

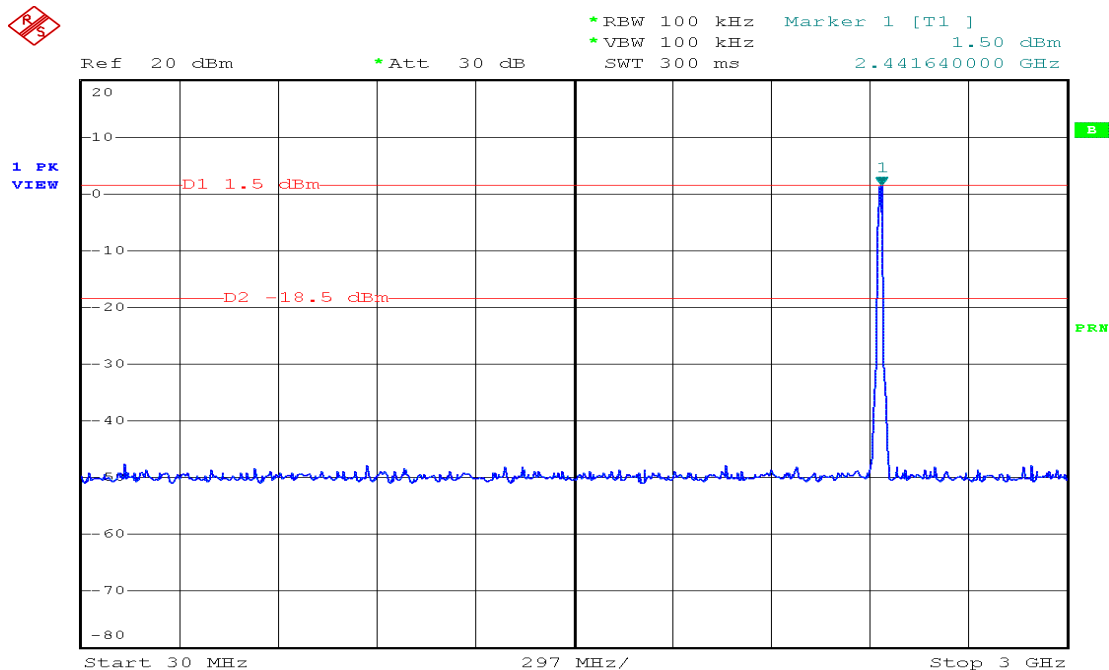


Date: 2.MAY.2003 13:28:00

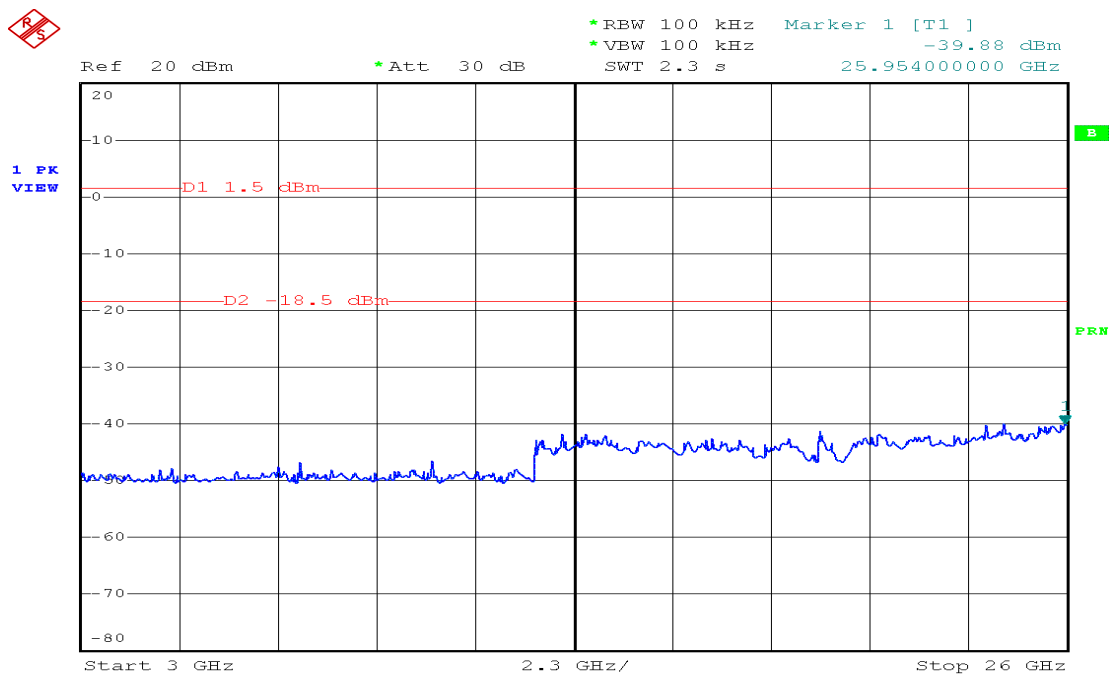


0363
ILAC MRA

Ch Mid



Date: 2.MAY.2003 13:23:09

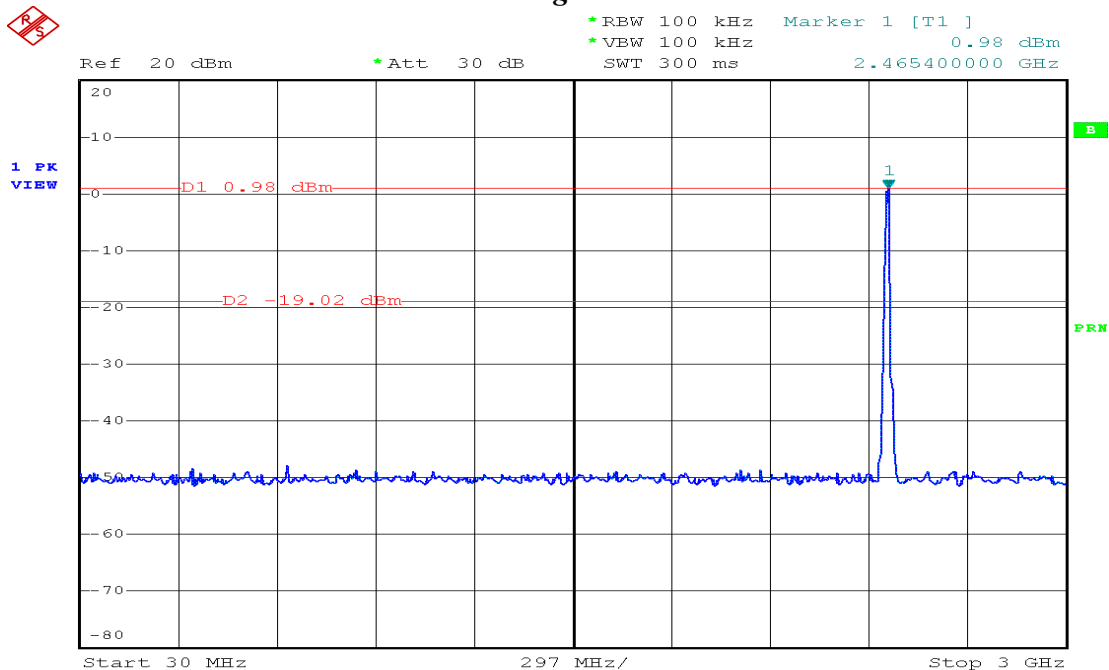


Date: 2.MAY.2003 13:24:44

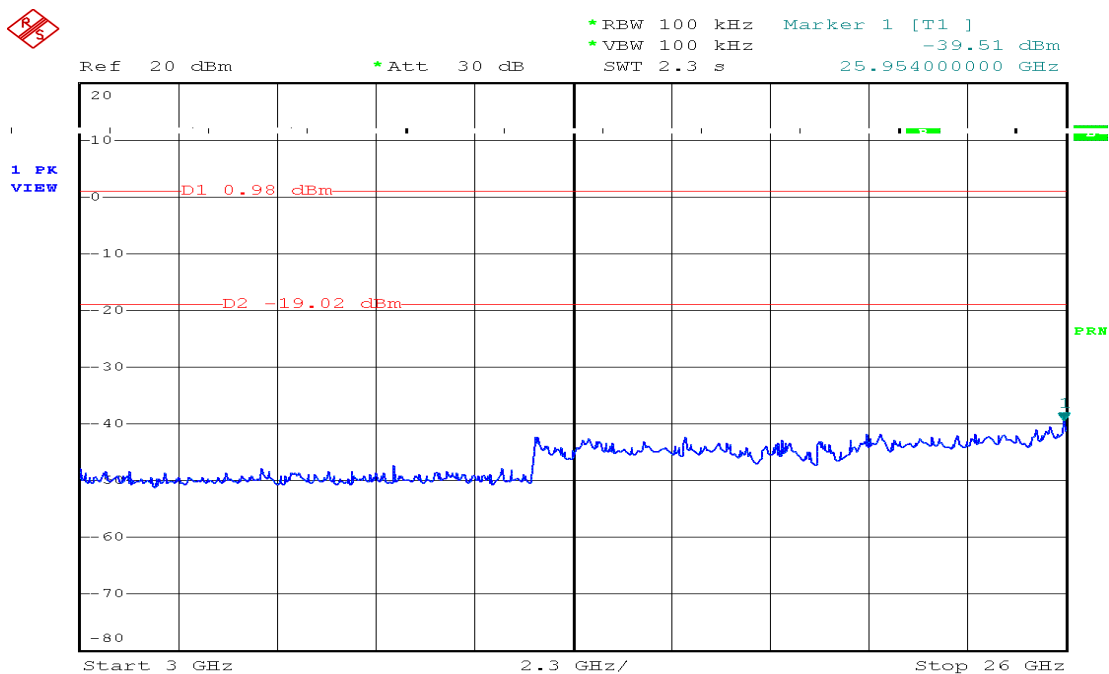


0363
ILAC MRA

Ch High



Date: 2.MAY.2003 13:20:36



Date: 2.MAY.2003 13:21:41

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode:	TX CH Low Mode	Test Date:	May 5, 2003
Temperature:	20°C	Test By:	Jacky
Humidity:	70 %	Pol:	Ver./Hor

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
54.30	V	Peak	15.16	14.61	29.77	40.00	-10.23
72.12	V	Peak	18.12	10.00	28.12	40.00	-11.88
220.62	V	Peak	19.65	15.25	34.90	46.00	-11.10
332.20	V	Peak	19.45	17.55	37.00	46.00	-9.00
385.40	V	Peak	14.02	19.93	33.95	46.00	-12.05
801.20	V	Peak	8.17	26.17	34.34	46.00	-11.66
72.12	H	Peak	22.59	10.00	32.59	40.00	-7.41
84.54	H	Peak	19.90	10.68	30.58	40.00	-9.42
96.42	H	Peak	20.96	13.40	34.36	43.50	-9.14
99.66	H	Peak	17.97	14.06	32.03	43.50	-11.47
332.20	H	Peak	21.51	17.55	39.06	46.00	-6.94
801.20	H	Peak	8.00	26.17	34.17	46.00	-11.83

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 (below 1GHz)**

Operation Mode: TX CH Mid Mode

Test Date:

May 5, 2003

Temperature: 20°C

Test By:

Jacky

Humidity: 70 %

Pol:

Ver./Hor

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)
54.30	V	Peak	15.86	14.61	30.47	40.00	-9.53
193.62	V	Peak	17.04	14.29	31.33	43.50	-12.17
220.62	V	Peak	19.05	15.25	34.30	46.00	-11.70
332.20	V	Peak	19.37	17.55	36.92	46.00	-9.08
596.80	V	Peak	7.93	25.30	33.23	46.00	-12.77
801.20	V	Peak	9.74	26.17	35.91	46.00	-10.09
73.74	H	Peak	21.58	9.90	31.48	40.00	-8.52
84.54	H	Peak	20.62	10.68	31.30	40.00	-8.70
90.48	H	Peak	20.59	12.19	32.78	43.50	-10.72
96.42	H	Peak	19.12	13.40	32.52	43.50	-10.98
332.20	H	Peak	23.01	17.55	40.56	46.00	-5.44
801.20	H	Peak	10.59	26.17	36.76	46.00	-9.24

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 (below 1GHz)

Operation Mode:	TX CH High Mode	Test Date:	May 5, 2003
Temperature:	20°C	Test By:	Jacky
Humidity:	70 %	Pol:	Ver./Hor

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBUV)	Factor (dB)	Actual FS (dBUV/m)	Limit3m (dBUV/m)	Safe Margin (dB)
54.30	V	Peak	15.27	14.61	29.88	40.00	-10.12
72.12	V	Peak	17.72	10.00	27.72	40.00	-12.28
199.02	V	Peak	17.06	14.82	31.88	43.50	-11.62
220.62	V	Peak	18.51	15.25	33.76	46.00	-12.24
332.20	V	Peak	19.79	17.55	37.34	46.00	-8.66
801.20	V	Peak	7.83	26.17	34.00	46.00	-12.00
72.12	H	Peak	21.39	10.00	31.39	40.00	-8.61
84.54	H	Peak	22.00	10.68	32.68	40.00	-7.32
90.48	H	Peak	22.40	12.19	34.59	43.50	-8.91
332.20	H	Peak	21.72	17.55	39.27	46.00	-6.73
463.80	H	Peak	13.31	20.82	34.13	46.00	-11.87
801.20	H	Peak	9.55	26.17	35.72	46.00	-10.28

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: May 5, 2003
Temperature: 20°C Test By: Jacky
Humidity: 70 % Pol: Vertical

Freq. (MHz)	Peak Reading	AV Reading	Ant./CL CF(dB)	Actual FS		Peak Limit	AV Limit	Margin (dB)	Remark
	(dBuV)	(dBuV)		Peak (dBuV/m)	AV (dBuV/m)	(dBuV/m)	(dBuV/m)		
1132	51.45	---	-9.49	41.96	---	74.00	54.00	-12.04	Peak
1196	48.62	---	-9.04	39.58	---	74.00	54.00	-14.42	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.

**Radiated Spurious Emission Measurement Result (Above 1GHz)**

Operation Mode: TX Low Mode

Test Date: May 5, 2003

Temperature: 20°C

Test By: Jacky

Humidity: 70 %

Pol: Horizontal

Freq. (MHz)	Peak	AV	Ant./CL CF(dB)	Actual FS		Peak	AV	Margin (dB)	Remark
	Reading (dBuV)	Reading (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)		
1128	48.54	---	-9.51	39.03	---	74.00	54.00	-14.97	Peak
1260	48.40	---	-8.80	39.60	---	74.00	54.00	-14.40	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.

Radiated Spurious Emission Measurement Result (Above 1GHz)

Operation Mode: TX Mid Mode Test Date: May 5, 2003
Temperature: 20 °C Test By: Jacky
Humidity: 70 % Pol: Vertical

Freq. (MHz)	Peak Reading	AV Reading	Ant./CL CF(dB)	Actual FS		Peak Limit	AV Limit	Margin (dB)	Remark
	(dBuV)	(dBuV)		Peak (dBuV/m)	AV (dBuV/m)	(dBuV/m)	(dBuV/m)		
1128	50.80	---	-9.51	41.29	---	74.00	54.00	-12.71	Peak
1256	48.22	---	-8.81	39.41	---	74.00	54.00	-14.59	Peak
4874	--					74.00	54.00		
7311	--					74.00	54.00		
9748	--					74.00	54.00		
12185	--					74.00	54.00		
14622	--					74.00	54.00		
17059	--					74.00	54.00		
19496	--					74.00	54.00		
21933	--					74.00	54.00		
24370	--					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 (Above 1GHz)

Operation Mode: TX Mid Mode Test Date: May 5, 2003
Temperature: 20 °C Test By: Jacky
Humidity: 70 % Pol: Horizontal

Freq. (MHz)	Peak	AV	Ant./CL CF(dB)	Actual FS		Peak	AV	Margin (dB)	Remark
	Reading (dBuV)	Reading (dBuV)		Peak (dBuV/m)	AV (dBuV/m)	Limit (dBuV/m)	Limit (dBuV/m)		
1264	47.81	---	-8.79	39.02	---	74.00	54.00	-14.98	Peak
4874	--					74.00	54.00		
7311	--					74.00	54.00		
9748	--					74.00	54.00		
12185	--					74.00	54.00		
14622	--					74.00	54.00		
17059	--					74.00	54.00		
19496	--					74.00	54.00		
21933	--					74.00	54.00		
24370	--					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 (Above 1GHz)

Operation Mode: TX High Mode Test Date: May 5, 2003
Temperature: 20 °C Test By: Jacky
Humidity: 70 % Pol: Vertital

Freq. (MHz)	Peak Reading	AV Reading	Ant./CL CF(dB)	Actual FS		Peak Limit	AV Limit	Margin (dB)	Remark (dB)
	(dBuV)	(dBuV)		Peak (dBuV/m)	AV (dBuV/m)	(dBuV/m)	(dBuV/m)		
1128	50.28	---	-9.51	40.77	---	74.00	54.00	-13.23	Peak
1264	48.34	---	-8.79	39.55	---	74.00	54.00	-14.45	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.

Radiated Spurious Emission Measurement Result (Above 1GHz)

Operation Mode: TX High Mode Test Date: May 5, 2003
Temperature: 20 °C Test By: Jacky
Humidity: 70 % Pol: Horizontal

Freq. (MHz)	Peak Reading	AV Reading	Ant./CL CF(dB)	Actual FS		Peak Limit	AV Limit	Margin (dB)	Remark (dB)
	(dBuV)	(dBuV)		Peak (dBuV/m)	AV (dBuV/m)	(dBuV/m)	(dBuV/m)		
1124	49.07	---	-9.54	39.53	---	74.00	54.00	-14.47	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.

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	ESCS30	847793/012	12/21/2002	12/20/2003
LISN	R&S	ESH2-Z5	843285/010	12/16/2002	12/15/2003
LISN	EMCO	3825/2	9003-1628	07/26/2002	07/25/2003
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.

AC POWER LINE CONDUCTED EMISSION TEST

Operation Mode:	TX + RX Mode			Test Date :	May 2, 2003
Temperature :	22 °C	Humidity :	70%	Test By:	Jacky

FREQ MHz	Q.P. Raw dBuV	AVG Raw dBuV	Q.P. Limit dBuV	AVG Limit dBuV	Q.P. Margin dB	AVG Margin dB	NOTE
0.165	51.00	---	65.21	55.21	-14.21	---	L1
0.223	41.60	---	62.71	52.71	-21.11	---	L1
0.318	33.80	---	59.76	49.76	-25.96	---	L1
0.396	32.00	---	57.94	47.94	-25.94	---	L1
0.455	30.20	---	56.78	46.78	-26.58	---	L1
0.524	28.80	---	56.00	46.00	-27.20	---	L1
0.152	50.20	---	65.89	55.89	-15.69	---	L2
0.236	42.20	---	62.24	52.24	-20.04	---	L2
0.293	35.80	---	60.44	50.44	-24.64	---	L2
0.402	34.60	---	57.81	47.81	-23.21	---	L2
0.439	32.20	---	57.08	47.08	-24.88	---	L2
0.527	30.00	---	56.00	46.00	-26.00	---	L2

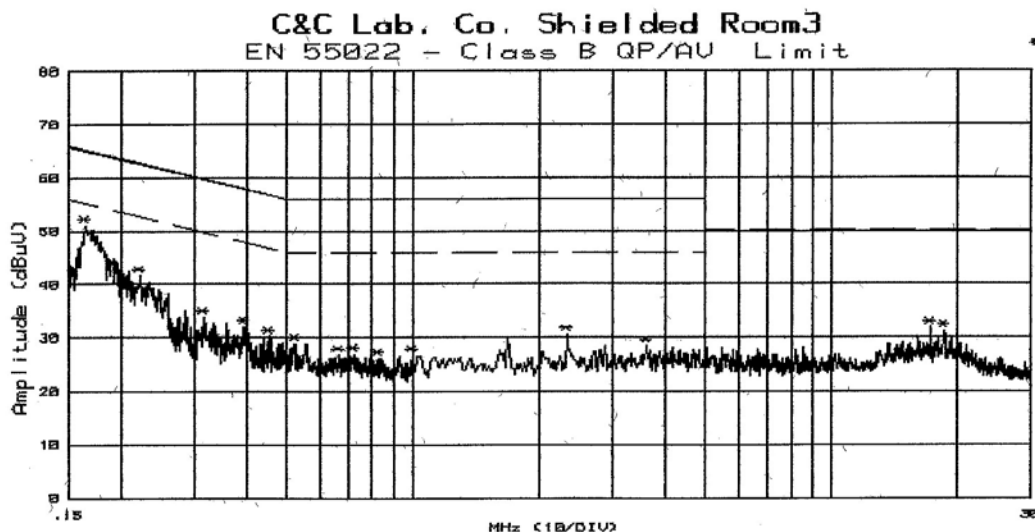
Remark :

- (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

LINE 1

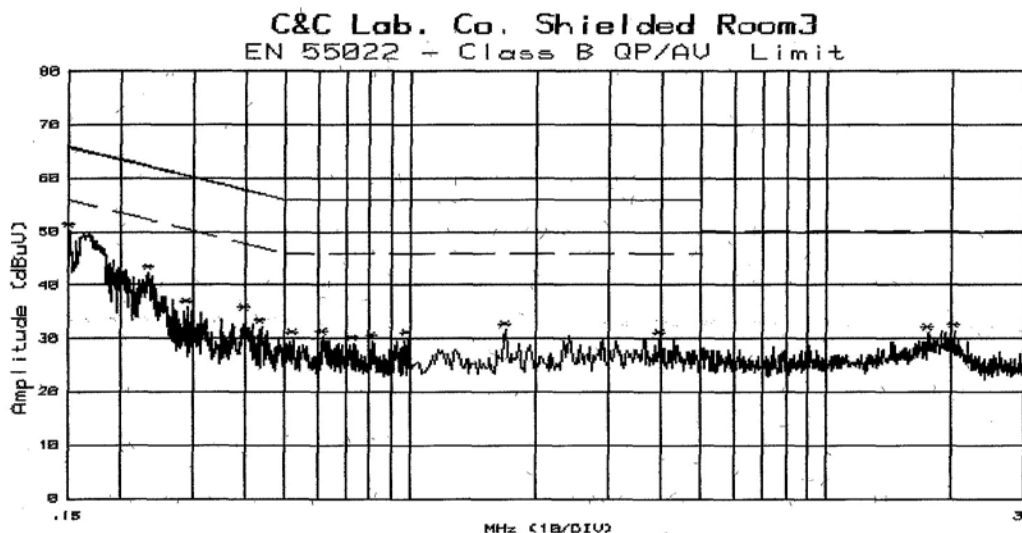


Customer:Quanta
Model :ZW1L
Mode :
Reading :Peak(R3261C SPA)
Remark :110V

File#: 2983
Humd.:68 (%)
Port :L1

Date : 2 May 2003 20:43:36
Temp. :22 (C)
Tested by:Jacky

LINE 2



Customer:Quanta
Model :ZW1L
Mode :
Reading :Peak(R3261C SPA)
Remark :110V

File#: 2984
Humd.:68 (%)
Port :L2

Date : 2 May 2003 20:46:26
Temp. :22 (C)
Tested by:Jacky

7. ANTENNA REQUIREMENT

7.1 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(4)(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.

7.2 Antenna Connected Construction

The directional gain of antenna used for transmitting is -1.74 dBi, and the antenna connector is designed with unique connector and no consideration of replacement by the user. Please see EUT photo for details.

8. RF Exposure

8.1 Standard Applicable

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.

This device is classed as a Portable Device.

8.2 Measurement Result:

Refer to SAR test report.