

**TRENDware**  
**TEW-228PI**  
**RF Test Report**

# Declaration of Conformity

We, the under signed,

<b>Company</b>	TRENDware International, Inc.
<b>Address, City</b>	3135 Kashiwa Street, Torrance, CA 90505,
<b>Country</b>	USA
<b>Phone number</b>	310-891-1100
<b>Fax number</b>	310-891-1111
<b>E-mail</b>	

certify and declare under our sole responsibility that the following equipment:

<b>Product Description / Supplementary Info</b>	802.11b Wireless LAN PCI Adapter
<b>Manufacturer</b>	TRENDware International, Inc.
<b>Brand</b>	TRENDware
<b>Type</b>	TEW-228PI

is tested to and conforms with the essential radio test suites included in the following standards:

<b>Standard</b>	<b>Issue date</b>
ETSI EN 300 328-2	V1.2.1 Dec. 2001
ETSI EN 301 489-1	V1.4.1 Aug. 2002
ETSI EN 301 489-17	V1.2.1 Apr. 2002
EN 60950	2000


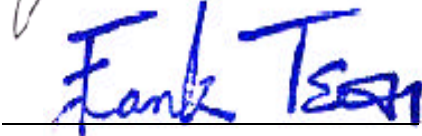
and therefore complies with the essential requirements and provisions of the **R&TTE directive 1999/5/EC** of the European Parliament and of the council of 9 March 1999 on radio equipment and Telecommunications Terminal Equipment and the mutual recognition of their conformity and the requirements of Annex III (conformity Assessment procedure referred to in article 10(4)).

The technical documentation as required by the Conformity Assessment procedure is kept at the following address:

<b>Company</b>	TRENDware International, Inc.
<b>Address, City</b>	3135 Kashiwa Street, Torrance, CA 90505,
<b>Country</b>	USA
<b>Phone number</b>	310-891-1100
<b>Fax number</b>	310-891-1111
<b>E-mail</b>	



<b>Draw up in</b>	USA
<b>Date</b>	2004/02/20
TRENDware International, Inc. 3135 Kashiwa Street, Torrance, CA 90505, USA	
<b>Signature &amp; company stamp</b>	Mr. Pei C. Huang / President

Report No.	C51ET143
Specifications	ETSI EN 300 328-1 (V.1.3.1) / December, 2001 ETSI EN 300 328-2 (V.1.2.1) / December, 2001
Applicant	TRENDware International, Inc.
Applicant address	3135 Kashiwa Street Torrance, CA 90505, USA
Items tested	802.11b Wireless LAN PCI Adapter
Model No.	TEW-228PI
EUT Condition	<input checked="" type="checkbox"/> Engineering sample; <input type="checkbox"/> Pre-production; <input type="checkbox"/> Final production (Sample # C51638)
Results	<b>Compliance</b> (As detailed within this report)
Date	04/30/2003 (month / day / year) (Sample received) 05/15/2003 (month / day / year) (Test)
Prepared by	 Project Engineer (Jack Tsai)
Authorized by	 General Manager (Frank Tsai)
Issue date	February 21, 2004 (month / day / year)
Modifications	None
Tested by	Training Research Co., Ltd.
Office at	No. 255, Nan Yang Street, Shijr City, Taipei Hsien 221, Taiwan
Laboratory at	1F, No. 255, Nan Yang Street, Shijr City, Taipei Hsien 221, Taiwan
Open site at	No. 15, Lane 530, Balian Rd., Sec. 1, Shijr City, Taipei Hsien 221, Taiwan

**Conditions of issue:**

**This test report shall not be reproduced except in full, without written approval of TRC. And the test result contained within this report only relate to the sample submitted for testing.**

**★ Aut. No. ELA 131**

**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 ETSI EN 300328-2 (V.1.2.1) (Dec. 2001) 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 second edition in the European Telecommunication Standard ETSI EN 300328-2 (V.1.2.1) (Dec. 2001).

**Reservation:**

The test results herein refer only to the tested sample. Training Research Co., Ltd. is not responsible for any generalizations or conclusions draw from these test results and concerning further samples. Any modification of the tested samples is prohibited and leads to the invalidity of this test report.

Test by :

***Training Research Co., Ltd.***

**TEL: 886-2-26935155**

**FAX: 886-2-26934440**

No. 255, Nanyang Street, Shijr, Taipei Hsien 221, 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 of a wireless LAN measurement in accordance with ETSI EN 300328-2 (V.1.2.1) (Dec. 2001) of the European Telecommunication Standard.

### **1.2 Description of EUT**

<b>Product Name</b>	:	802.11b Wireless LAN PCI Adapter
<b>Model No.</b>	:	TEW-228PI
<b>Frequency Range</b>	:	2.412 GHz ~ 2.472GHz
<b>Support Channel</b>	:	13 Channel
<b>Modulation Skill</b>	:	DBPSK, DQPSK, CCK
<b>Power Type</b>	:	By the Protocol Control Information interface of computer
<b>Data Cable</b>	:	None

### **1.3 Test Method**

1. Put the EUT into a personal computer's PCI bus and screw it.
2. Using the computer and software provided by the manufacturer to control EUT. The software is operated under the Windows to control the EUT in the continuous transmission mode. The test is performed under those specific conditions.
3. Set different channel being tested and making EUT to the mode of continuous transmission

#### 1.4 Description of Support Equipment

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

**PC** : **IBM 6840**  
Model No. : 6840MJV  
Serial No. : 96CC 0BT  
FCC ID : DoC Approved  
檢磁 : 3892I279  
Power type : 100 ~ 127/ 200 ~ 240VAC, 4A/2A 50/60 Hz, Switching  
Power cord : Non-shielded, 182cm length, Plastic hood, No ferrite core

**Monitor** : **HP 15' Color Monitor**  
Model No. : D2827A  
Serial No. : KR91161716  
FCC ID : C5F7NFCMC1518X  
檢磁 : 3872B039  
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. : 5181  
Serial No. : BE21700405  
FCC ID : Doc Approved  
檢磁 : 3892C981  
Power type : By PC  
Data cable : Shielded, 1.70m length, with ferrite core

**PS/2 Mouse** : **HP**  
Model No. : M-S34  
Serial No. : LZB90714106  
FCC ID : DZL211029  
檢磁 : 4862A011  
Power type : By PC  
Power cord : Non-shielded, 1.88m long, No ferrite core

**Notebook** : **ASUSTek Computer**  
Model No. : AB00F  
Serial No. : 24NP016361  
FCC ID : DoC Approved  
BSMI : 41016012  
Power type : 100 ~ 240VAC, 1A 50/60 Hz, Switching

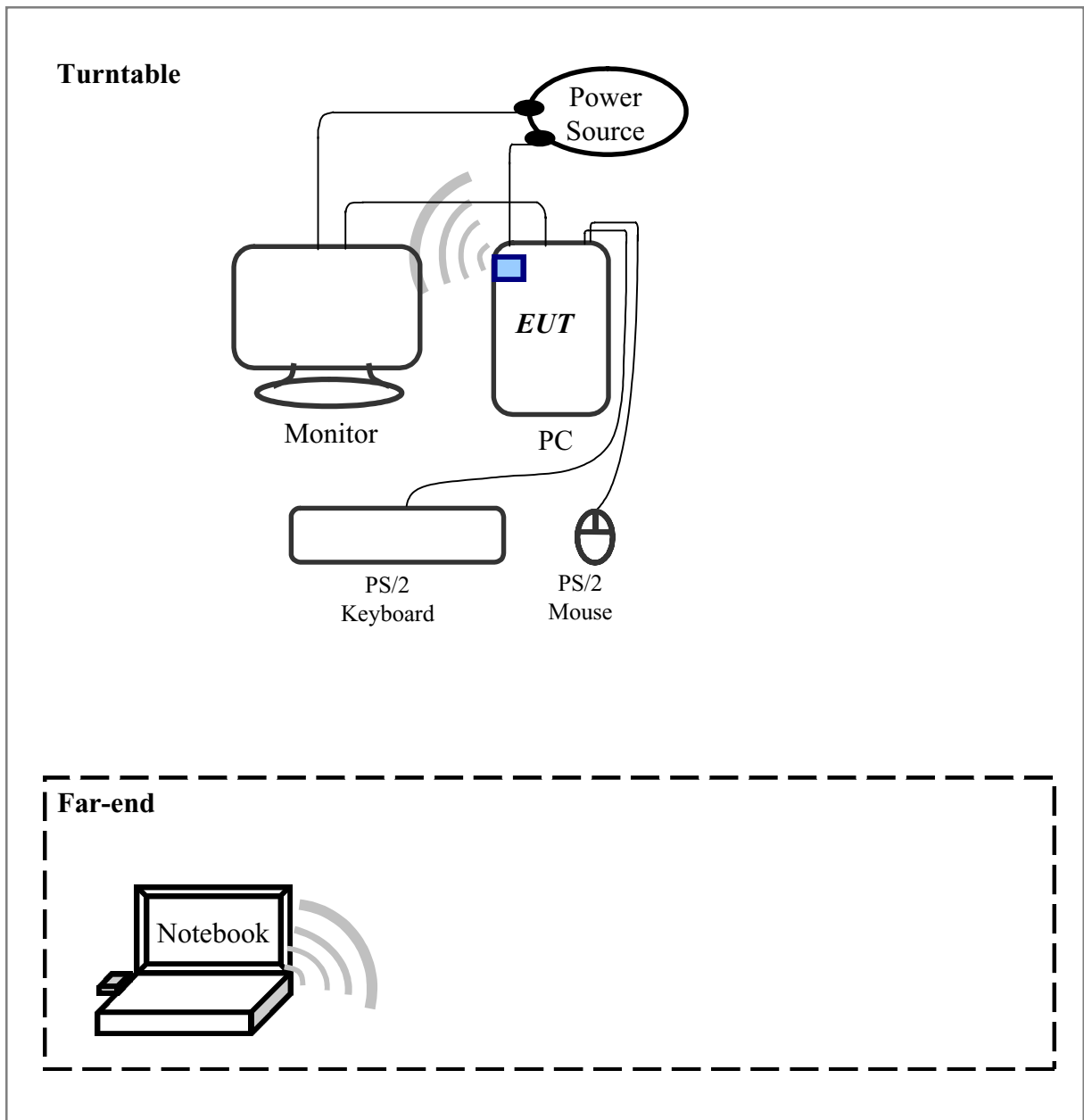
**Adaptor of**

**Notebook** : **LITE-ON Electronics, Inc.**  
Model No. : PA-1530-01  
Serial No. : 00151184  
FCC ID : Doc Approved  
檢磁 : 3882B259  
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)

**WLAN Card** : **Gemtek Technology Co., Ltd.**  
Model No. : C911003  
FCC ID : MXF-C911003



### 1.5 Configuration of System Under Test



The tests below are carried with the EUT transmitter set at high power in TDD mode. The EUT is forced to select of output power level and channel number by notebook computer.

The setting up procedure was recorded in 1.3 test method.

## 1.6 Verify the Frequency and Channel

Channel	Frequency (GHz)
1	2.412
2	2.417
3	2.422
4	2.427
5	2.432
6	2.437
7	2.442
8	2.447
9	2.452
10	2.457
11	2.462
12	2.467
13	2.472

Note:

- (1) This is for sure that all frequencies are in 2.4GHz – 2.4835 GHz.
- (2) After test, the EUT operating frequencies are in 2.412GHz to 2.472GHz. So all the item as followed in testing report are need to test these three frequencies: channel 1, channel 7, and channel 13.

### **1.7 Test Procedure**

All measurements performed in this report were performed mainly according to the techniques described in ETSI EN 300328-2 (V.1.2.1) (Dec. 2001) and the pre-setup was written on 1.3 test method, the detail setup was written on each test item.

### **1.8 Location of the Test Site**

The radiated emissions measurements required by the rules were performed on the **three-meter, Anechoic Chamber (Registration Number: 93906)** maintained by *Training Research Co., Ltd.* 1F., No. 255 Nanyang Street, Shijr, Taipei Hsien 221, Taiwan, R.O.C. Complete description and measurement data have been placed on file with the commission. The conducted power line emissions tests and other test items were performed in a anechoic chamber also located at Training Research Co., Ltd.

No. 255 Nanyang Street, Shijr, Taipei Hsien 221, Taiwan, R.O.C. *Training Research Co., Ltd.* is listed by the FCC as a facility available to do measurement work for others on a contract basis.

### **1.9 General Test Condition**

The test condition shall be as follows: (See Clause 6)

The NORMAL temperature and humidity conditions for tests shall be any convenient combination of temperature and humidity within the following ranges:

-temperature: +15°C to +35°C;

-relative humidity: 20% to 75%.

The normal test voltage for equipment to be connected to the main shall be the nominal mains voltage.

For purpose of this ETS, the normal voltage shall be the declared voltage or any of the declared voltages for which the equipment was designed.

The frequency of the test power source corresponding to the AC mains shall be between 49Hz and 51Hz. When radio equipment is intended for operation from the usual, alternator fed lead-acid battery power source used on vehicles, then the normal test voltage shall be 1.1 times the nominal voltage of the battery (6V, 12V, etc.)

For operation from other power sources or types of battery (primary or secondary), the nominal test voltage shall be as declared by the equipment manufacturer. This shall be recorded in the test report.

For tests at EXTREME temperatures, measurements shall be made in accordance with the procedures specified in subclause 6.4.3, at the upper and lower temperatures of the range as follows:

- temperature: -20°C to +55°C;

Where the manufacturer's declared operating range does not include the range of -20°C to +55°C, the equipment shall be tested over the following temperature ranges:

a) 0°C to +35°C for equipment intended for INDOOR use only, or intended for use in areas where the temperature is controlled within this range;

b) Over the extremes of the operating temperature range(s) of the declared host equipment(s) in case of plug-in radio devices.

The frequency range as in subclause 5.2.3 and the e.i.r.p. Limit in subclause 5.2.1 shall not be exceeded.

Tests at extreme power source voltages specified below are not required when the equipment under test is designed for operation as part of and powered by another system or piece of equipment. Where this is the case, the limit values of the host system or host equipment shall apply. The appropriate limit values shall be declared by the manufacturer and recorded in the test report.

The EXTREME TEST VOLTAGE for equipment to be connected to an AC mains source shall be the nominal mains voltage  $\pm 10\%$ .

When radio equipment is intended for operation from the usual type of alternator fed lead-acid battery power source used on vehicles, then extreme test voltage shall be 1.3 and 0.9 times the nominal voltage of the battery (6V, 12V, etc.).

The lower extreme test voltage for equipment with power source using the following type of battery, shall be:

- for the Leclanche' or lithium type battery: 0.85 times the nominal voltage of the battery;
- for the mercury or nickel-cadmium type of battery: 0.9 times the nominal voltage of the battery.

In both cases, the upper extreme test voltage shall be 1.15 times the nominal voltage of the battery.

For equipment using other power sources, or capable of being operated from a variety of power sources (primary or secondary), the extreme test voltages shall be those declared by the manufacturer; these shall be recorded in the test report. Before measurements are made the equipment shall have reached thermal balance in the test chamber.

## II. Section 5.2.1: Effective Radiated Power

### 2.1 Test Result of Effective Radiated Power

Power level at which the measurement has been performed 17.60 dBm

TEST CONDITION		TRANSMITTER PEAK POWER		
		Tx Peak (dBm)	Tx On (dBm)	Cable Loss (dB)
Channel 1	25 °C	8.03	5.76	5.80
	0 °C	9.13	7.04	
	35 °C	7.64	5.38	
Channel 7	25 °C	7.93	5.62	5.80
	0 °C	8.87	6.55	
	35 °C	7.37	5.01	
Channel 13	25 °C	8.82	6.54	5.90
	0 °C	9.90	7.65	
	35 °C	8.41	6.18	
Limit		Tx Peak : 23dBm / -7dBW Tx On : 20dBm / -10dBW		

NOTE:

- (1) The E.U.T is a stand-alone radio device (see the clause 6.2.2). The powered by the adaptor. So, the AC power is used as the extreme voltage source. (See clause 6.3.2.1).
- (2) The value of table is worst case during test condition, includes different combinations of transmitter rate antenna polarity and temperature.
- (3) TX PEAK: Max Peak Power, TX ON: Average Peak.  
 Actually Peak Power = Tx Peak + Cable Loss,  
 E.R.P. = Actually Peak Power + Antenna Gain (15.80dBm + 1.8dBi = 17.6 dBm)

**III. Section 5.2.2: Peak Power Density**

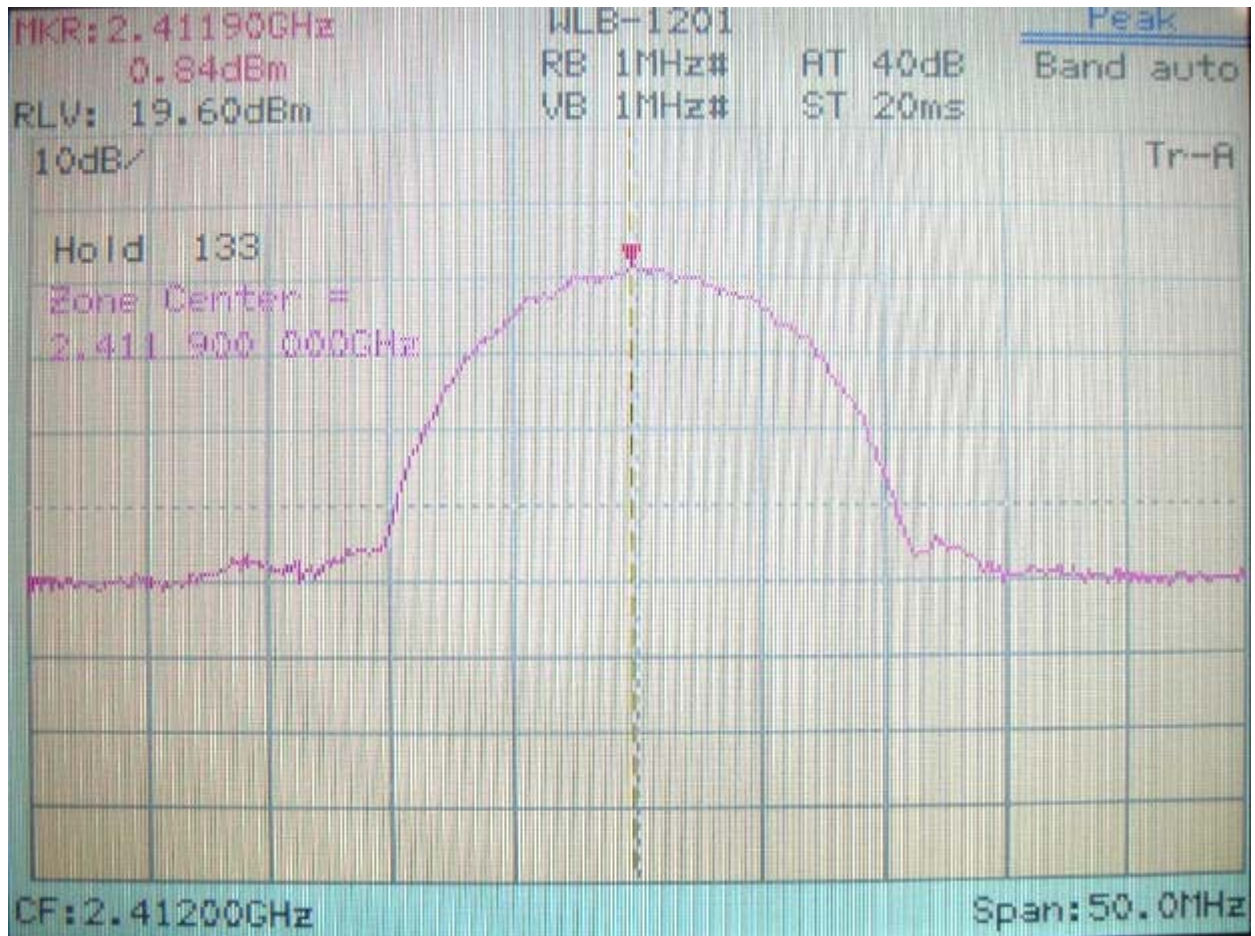
**3.1 Test Result of Peak Power Density**

Channel	Frequency (MHz)	Rate (Mbps)	Ppr (dBm)	CF (dB)	Ppq (dBm)	Limit (dBm)	Margin (dB)
CH 1	2412	11	0.82	6.60	7.42	10.00	-2.58
CH 7	2442	11	0.82	6.60	7.42	10.00	-2.58
CH 11	2472	11	1.38	6.70	8.08	10.00	-1.92

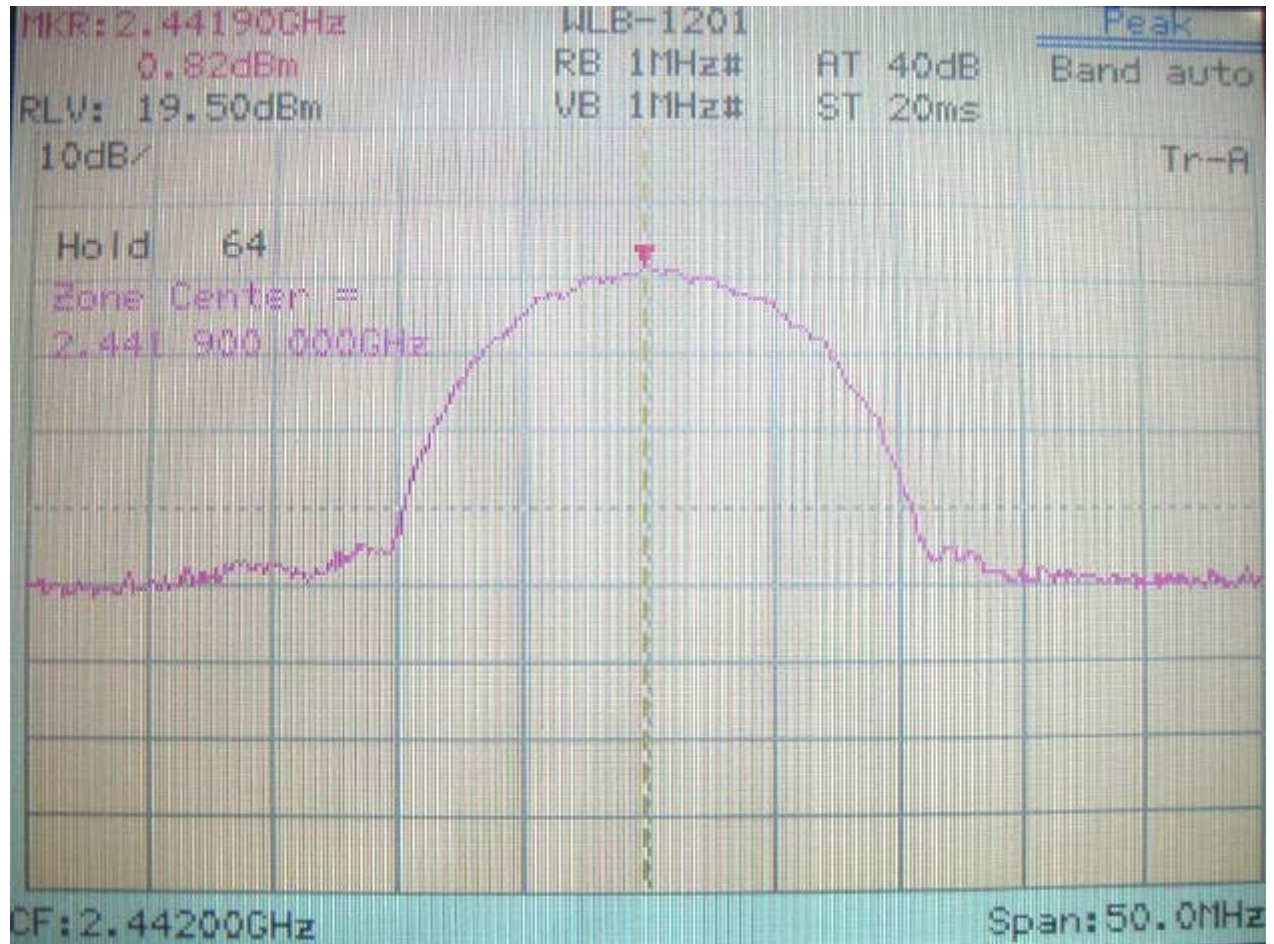
NOTE:

- (1) For equipment using FHSS modulation, the peak power density shall be limit to -10dBW(100mW) per 100kHz E.I.R.P.
- (2) For equipment using other types modulation, the peak power density shall be limit -20dBW(10mW) per MHz E.I.R.P.
- (3) Ppr: spectrum read power density (using peak search mode), CF: correct factor, Ppq: actual peak power density in the spread spectrum band.  $Ppq = Ppr + CF$
- (4) The value of table is worst case during test condition, includes different combination s of transmitter rate, antenna polarity and temperature
- (5) The data in the above table are summarizing the following attachment spectrum analyzer hard copy.

Channel 1



Channel 7





Channel 13



#### IV. Section 5.2.3 : Frequency Range

##### 4.1 Test Result of Frequency Range

##### Transmitter Frequency Range – DSSS Equipment

TEST CONDITION		FREQUENCY(MHz)			
		Lowest Channel		Highest Channel	
		Channel 1		Channel 13	
		Frequency	Rate (Mbps)	Frequency	Rate (Mbps)
0°C	207 V	2402.50	11	2482.20	11
	253 V	2402.50	11	2482.20	11
25°C	230 V	2402.60	11	2482.10	11
35°C	207 V	2402.70	11	2481.90	11
	253 V	2402.70	11	2481.90	11
Measured frequencies (lowest and highest)		FL = 2402.50 MHz		FH = 2482.20 MHz	
Limit		FL > 2400MHz		FH < 2483.5MHz	

Note:

- (1) The E.U.T is a stand-alone radio device (see the clause 6.2.2). This is powered by the main. So, the AC power is used as the extreme voltage source. (see clause 6.3.2.1).
- (2) B: Battery, AC: AC Source, Rate: Transmitter Rate.
- (3) The value of table is worst case during test condition, includes different combinations of transmitter rate, antenna polarity and temperature.
- (4) The data in the above table are summarizing the following attachment spectrum analyzer hard copy.

Channel 1 (The lowest one in the frequency range)



Channel 13 (The greatest one in the frequency range)



**V. Section 5.2.4: Transmitter Spurious Emissions (Radiated)**

**5.1 Test Result of Transmitter Spurious Emissions for Detachable antenna**

**Channel 1 (30MHz to 1GHz)**

<b>Frequency (MHz)</b>	<b>A. P. (H/V)</b>	<b>LEVEL (dBm)</b>	<b>Limit (dBm)</b>	<b>Margin (dB)</b>	<b>Rate (Mbps)</b>
76.07	H	-70.24	-36.00	-34.24	11
862.38	H	-61.72	-36.00	-25.72	11
39.70	V	-65.53	-36.00	-29.53	11
866.02	V	-62.69	-36.00	-26.69	11

**Channel 13 (30MHz to 1GHz)**

<b>Frequency (MHz)</b>	<b>A. P. (H/V)</b>	<b>LEVEL (dBm)</b>	<b>Limit (dBm)</b>	<b>Margin (dB)</b>	<b>Rate (Mbps)</b>
75.47	H	-70.51	-36.00	-34.51	11
862.38	H	-61.37	-36.00	-25.37	11
39.70	V	-65.90	-36.00	-29.90	11
866.62	V	-62.19	-36.00	-26.19	11

**Channel 1 (1GHz to 12.75GHz)**

<b>Frequency (MHz)</b>	<b>A. P. (H/V)</b>	<b>LEVEL (dBm)</b>	<b>Limit (dBm)</b>	<b>Margin (dB)</b>	<b>Rate (Mbps)</b>
4824.29	H	-58.70	-30.00	-28.70	11
7230.83	H	-40.23	-30.00	-10.23	11
9649.71	H	-58.32	-30.00	-28.32	11
4824.29	V	-57.70	-30.00	-27.70	11
7232.37	V	-42.06	-30.00	-12.06	11
9651.25	V	-58.65	-30.00	-28.65	11

**Channel 13 (1GHz to 12.75GHz)**

<b>Frequency (MHz)</b>	<b>A. P. (H/V)</b>	<b>LEVEL (dBm)</b>	<b>Limit (dBm)</b>	<b>Margin (dB)</b>	<b>Rate (Mbps)</b>
4939.92	H	-63.11	-30.00	-33.11	11
7417.37	H	-48.42	-30.00	-18.42	11
9888.67	H	-57.26	-30.00	-27.26	11
4943.00	V	-61.27	-30.00	-31.27	11
7418.92	V	-43.42	-30.00	-13.42	11
9890.21	V	-56.61	-30.00	-26.61	11

**VI. Section 5.3.2: Receiver Spurious Emissions (Radiated)**

**6.1 Test Result for Detachable antenna of EUT**

**Channel 1 (30MHz to 1GHz)**

<b>Frequency (MHz)</b>	<b>A. P. (H/V)</b>	<b>LEVEL (dBm)</b>	<b>Limit (dBm)</b>	<b>Margin (dB)</b>	<b>Rate (Mbps)</b>
75.47	H	-70.04	-57.00	-13.04	11
103.36	H	-70.47	-57.00	-13.47	11
862.38	H	-60.69	-57.00	-3.69	11
39.09	V	-68.79	-57.00	-11.79	11
79.11	V	-71.32	-57.00	-14.32	11
867.23	V	-62.97	-57.00	-5.97	11

**Channel 13 (30MHz to 1GHz)**

<b>Frequency (MHz)</b>	<b>A. P. (H/V)</b>	<b>LEVEL (dBm)</b>	<b>Limit (dBm)</b>	<b>Margin (dB)</b>	<b>Rate (Mbps)</b>
71.83	H	-71.09	-57.00	-14.09	11
102.14	H	-70.18	-57.00	-13.18	11
862.38	H	-60.63	-57.00	-3.63	11
39.09	V	-67.05	-57.00	-10.05	11
79.11	V	-71.32	-57.00	-14.32	11
862.99	V	-62.95	-57.00	-5.95	11

**Channel 1 (1GHz to 12.75GHz)**

<b>Frequency (MHz)</b>	<b>A. P. (H/V)</b>	<b>LEVEL (dBm)</b>	<b>Limit (dBm)</b>	<b>Margin (dB)</b>	<b>Rate (Mbps)</b>
1060.71	H	-70.45	-47.00	-23.45	11
1193.87	H	-66.67	-47.00	-19.67	11
1344.67	H	-68.53	-47.00	-21.53	11
1464.12	H	-65.68	-47.00	-18.68	11
1853.83	H	-63.16	-47.00	-16.16	11
1987.00	H	-61.54	-47.00	-14.54	11
1066.58	V	-68.77	-47.00	-21.77	11
1229.12	V	-65.17	-47.00	-18.17	11
1466.08	V	-60.52	-47.00	-13.52	11
1599.25	V	-63.01	-47.00	-16.01	11
1730.46	V	-66.21	-47.00	-19.21	11
1987.00	V	-62.20	-47.00	-15.20	11

**Channel 13 (1GHz to 12.75GHz)**

<b>Frequency (MHz)</b>	<b>A. P. (H/V)</b>	<b>LEVEL (dBm)</b>	<b>Limit (dBm)</b>	<b>Margin (dB)</b>	<b>Rate (Mbps)</b>
1066.58	H	-70.10	-47.00	-23.10	11
1193.87	H	-67.17	-47.00	-20.17	11
1458.25	H	-65.32	-47.00	-18.32	11
1998.75	H	-60.72	-47.00	-13.72	11
1107.71	V	-71.37	-47.00	-24.37	11
1238.92	V	-63.83	-47.00	-16.83	11
1466.08	V	-61.18	-47.00	-14.18	11
1599.25	V	-63.18	-47.00	-16.18	11
1732.42	V	-67.53	-47.00	-20.53	11
1987.00	V	-62.04	-47.00	-15.04	11



**6.2 Standby mode**

<b>Frequency (MHz)</b>	<b>A. P. (H/V)</b>	<b>LEVEL (dBm)</b>	<b>Limit (dBm)</b>	<b>Margin (dB)</b>	<b>Rate (Mbps)</b>
39.70	H	-68.16	-57.00	-11.16	11
75.47	H	-71.11	-57.00	-14.11	11
396.78	H	-66.69	-57.00	-9.69	11
664.74	H	-66.77	-57.00	-9.77	11
862.38	H	-60.10	-57.00	-3.10	11
39.70	V	-66.88	-57.00	-9.88	11
79.11	V	-69.92	-57.00	-12.92	11
109.42	V	-70.86	-57.00	-13.86	11
197.93	V	-72.20	-57.00	-15.20	11
862.38	V	-62.50	-57.00	-5.50	11

## VII. Instrument and Ancillaries Equipment of List

No.	Type of Equipment	Brand Name	Model No.	Serial No.
01	EMI Receiver	H P	8546A	3520A00242
02	RF Filter Section	H P	85460A	3448A00217
03	Auto Switch Box	TRC	ASB-01	9904-01
04	Spectrum Analyzer	H P	8564E	US36433002
05	Spectrum Analyzer	Anritsu	MS2665C	6200175476
06	Microwave Pre. Amp.	H P	83051A	3232A00347
07	Horn Antenna	EMCO	3115	9704 – 5178
08	EM Rad. Monitor	WG	EMC-20	Y-0026
09	E-Field Sensor 3GHz	WG	TYP-8	Z-0001
10	RF Power Meter	BOONTON	4532	117501
11	Signal Generator	HP	83711A	3429A00434
12	Bi-log Antenna	Schaffner	CBL6141A	4151
13	Temp.& Hum. Chamber	King Son	THS-ML1	240
14	EMC Analyzer	HP	8594EM	3710A00279
15	DC Power Supply	GW	GPC-3030D	8050381
16	AC Power Supply	Ch. Hong	CF-3000E	974302
17	Digital Multimeter	GW	GDM-8055	8080365
18	Small Bi-con. Ant.	Schwarzbeck	UBAA9114	127 (CE use)
19				128 (FCC use)

*Appendix A*

**Antenna Specification**

# RF Antenna Cable Assembly

## Specification

### 1. Electrical Properties :

- 1.1 Frequency Rang..... 2.4GHz ~ 2.5GHz
- 1.2 Impedance ..... 50Ω Nominal
- 1.3 VSWR .....2.0 Max.
- 1.4 Return Loss..... -9.5 dB Maximum
- 1.5 Electrical Wave..... 1/2 λ Diople
- 1.6 Gain..... 1.8 dBi
- 1.7 Admitted Power..... 1W

### 2. Physical Properties :

- 2.1 Cable..... RG-178 50Ω
- 2.2 Connector..... SMA Straight Plug/Reverse
- 2.3 Antenna Cover..... TPE
- 2.4 Antenna Base..... PC
- 2.5 Operating Temp. .... -20°C ~ +65°C
- 2.6 Storage Temp. .... -30°C ~ +75°C
- 2.7 Color ..... Black