TRENDware
TEW-229UB
RF-EMC Test Reports

Report No.	C51ET379
Specifications	ETSI EN 300 328-2 (V.1.2.1) / (2001-12)
Applicant	TRENDware International, Inc.
Applicant address	3135 Kashiwa Street Torrance, CA 90505, USA
Items tested	11Mbps Wireless USB LAN Adapter
Model No.	TEW-229UB
Results	**Compliance** (As detailed within this report)
Date	07/07/2003 (month / day / year) (Sample received) 07/17/2003 (month / day / year) (Test)
Prepared by	Project Engineer (Jack Tsai)
Authorized by	General Manager (Frank Tsai)
Issue date	*November 22, 2003* (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

★ ***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.1.1.1) 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.1.1.1).

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 300328-2s (V.1.1.1) (January 2003) of the European Telecommunication Standard.

1.2 Description of EUT

Product Name : 11Mbps Wireless USB LAN adapter

Model No. : TEW-229UB

Frequency Range : 2.412 GHz ~ 2.472GHz

Support Channel : 13 Channels

Modulation Skill : DBPSK, DQPSK, CCK

Power Type : By the USB of Notebook

Data Cable : 23cm, shielded, no ferrite bead, USB cable

1.3 Description of Support Equipment

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

Notebook	**:**	**IBM Think Pad X20**
Type No.	:	2662-11T
Serial No.	:	FX-11922 00/09
FCC ID	:	Doc Approved
檢磁	:	3892B565
AC Adaptor	**:**	**IBM**
Model No.	:	PA2450U
Serial No.	:	02K6654
FCC ID	:	Doc Approved
Power Core	:	Non-shielded, 180cm long, Plastic hoods, with ferrite bead
Power type	:	100 ~ 240VAC, 50 ~ 60Hz, 0.5A ~ 1.2A / 16Vdc, 4.5A

1.4 Test Method

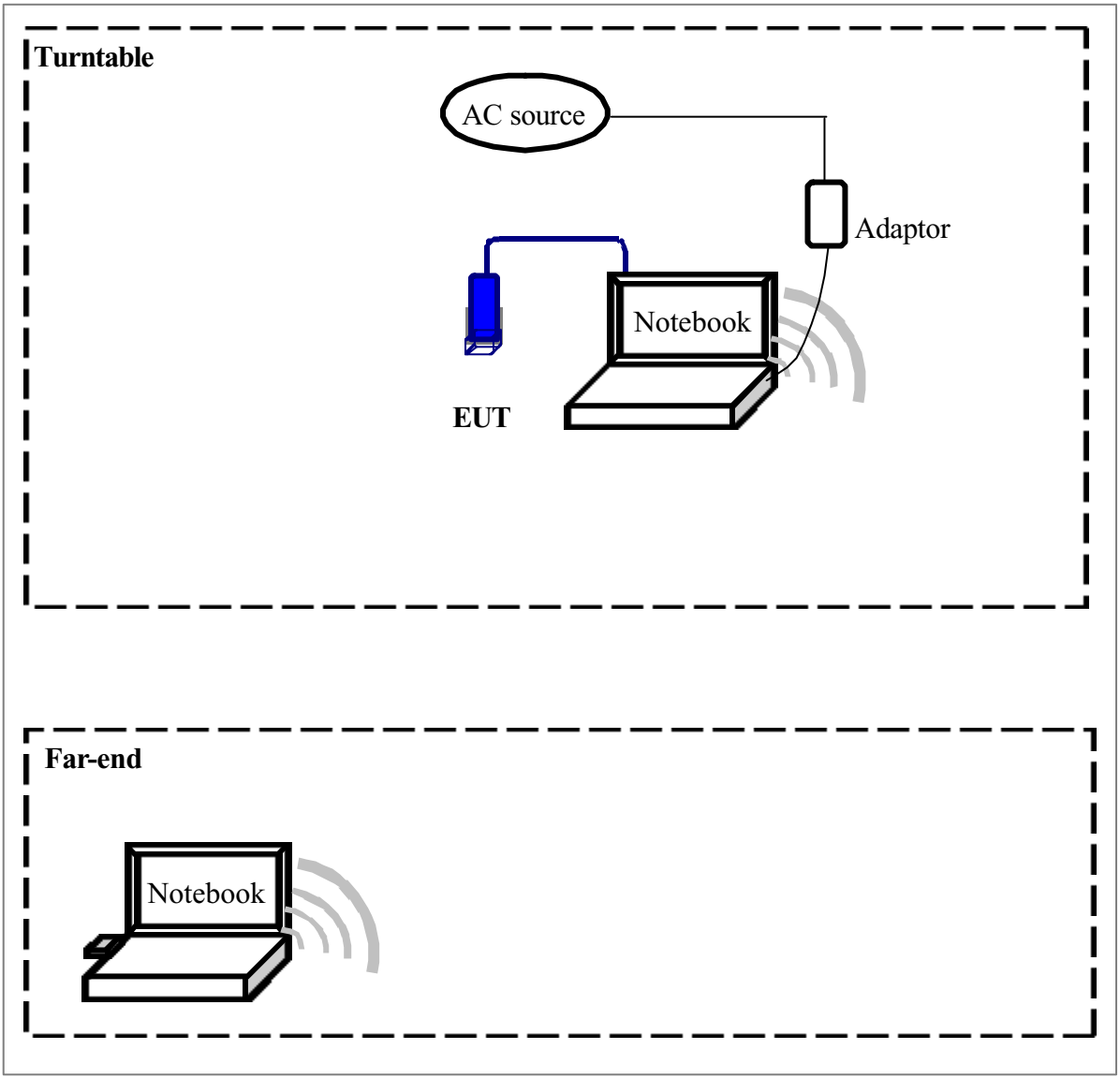
1. The EUT connected with computer :
   (a) Insert the EUT into the USB interface of the notebook computer.
   (b) The EUT connected with notebook by USB cable.

   The strength of spurious emission of (b) mode is more than (a) mode that recorded wore case test data in this test report.

2. Using the notebook 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

1.5 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 1.4 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.

(3) E.T.S.I 2.412GHz – 2.4835GHz , France 2.4465GHz – 2.4835GHz

1.7 Test Procedure

All measurements performed in this report were performed mainly according to the techniques described in ETSI EN 300328-2 (January, 2003) and the pre-setup was written on <1.4 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℃ to +35℃;
- 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℃ to +55℃;

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

a) 0℃ to +35℃ 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 subclause5.2.1 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 ±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 14.43 dBm

TEST CONDITION		TRANSMITTER PEAK POWER		
		Tx Peak (dBm)	Tx On (dBm)	Cable Loss (dB)
Channel 1	0 °C	4.29	1.98	5.8
	25 °C	8.43	5.91	
	35 °C	5.25	2.74	
Channel 7	0 °C	3.29	1.02	5.8
	25 °C	7.43	4.84	
	35 °C	3.98	1.77	
Channel 13	0 °C	2.18	0.11	5.8
	25 °C	6.03	3.56	
	35 °C	2.85	0.55	
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.I.R.P. = Actually Peak Power + Antenna Gain (14.23dBm + 0.2dBi = 14.43dBm)

(4) ETSI (2400MHz ~ 2483.5MHz), FRANCE (2446.5 MHz ~ 2483.5MHz)

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	-0.37	6.6	6.23	10.00	-3.77
CH 7	2442	11	-1.75	6.6	4.85	10.00	-5.15
CH 11	2472	11	-2.64	6.6	3.96	10.00	-6.04

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.

(6)ETSI (2400MHz ~ 2483.5MHz), FRANCE (2446.5 MHz ~ 2483.5MHz)

Channel 1


MKR:2.41340GHz
-0.37dBm
RLV: 10.00dBm
WLB-1106 CH1
RB 1MHz#
VB 1MHz
AT 20dB#
ST 20ms
Peak
Band auto
10dB/
Tr-A
Hold 730
Zone Center =
2.412 400 0000GHz
CF:2.41200GHz
Span:50.0MHz

Channel 7


MKR:2.44350GHz
-1.75dBm
RLV: 10.00dBm
10dB/
WLB-1106 CH7
RB 1MHz#
VB 1MHz
AT 20dB#
ST 20ms
Peak
Band auto
Tr-A
Hold 314
Zone Center =
2.448 500 000GHz
CF:2.44200GHz
Span:50.0MHz

Channel 13


MKR:2.47330GHz
-2.64dBm
RLV: 10.00dBm
WLB-1106 CH13
RB 1MHz#
VB 1MHz
AT 20dB#
ST 20ms
Title
Band auto
10dB/
Tr-A
Hold 1917
CF:2.47200GHz
Span:50.0MHz

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℃	207 V	2402.3	11	2482.6	11
	253 V	2402.3	11	2482.6	11
25℃	230 V	2402.6	11	2482.3	11
35℃	207 V	2402.5	11	2482.2	11
	253 V	2402.5	11	2482.2	11
Measured frequencies (lowest and highest)		FL = 2402.30 MHz		FH = 2482.60 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).

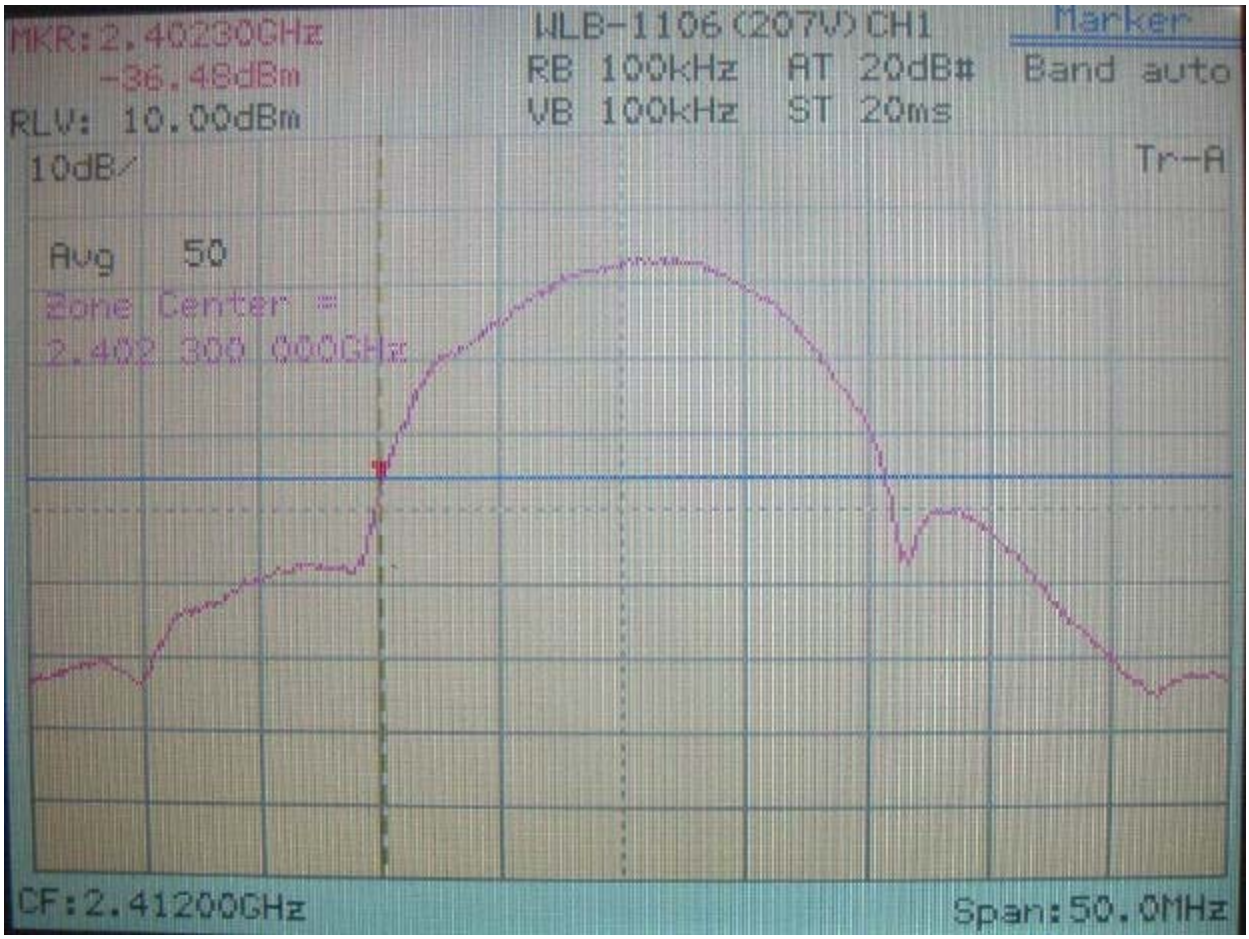
(2) B: Battery, AC: AC Source, Rate: Transmitter Rate.

(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.

(5) ETSI(2400MHz~2483.5MHz), FRANCE(2446.5 MHz~2483.5MHz)

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

5.1 Test Result of Transmitter Spurious Emissions (Radiated)

Channel 1 (30MHz-1GHz)

Frequency (MHz)	A. P. (H/V)	LEVEL (dBm)	Limit (dBm)	Margin (dB)	Rate (Mbps)
112.45	V	-73.46	-36.00	-37.46	11
135.49	V	-71.33	-36.00	-35.33	11
179.14	V	-71.83	-36.00	-35.83	11
200.96	V	-67.47	-36.00	-31.47	11
262.80	V	-74.96	-36.00	-38.96	11
434.97	V	-65.48	-36.00	-29.48	11
59.10	H	-66.67	-36.00	-30.67	11
202.17	H	-60.41	-36.00	-24.41	11
222.79	H	-66.94	-36.00	-30.94	11
267.65	H	-65.74	-36.00	-29.74	11
333.12	H	-66.04	-36.00	-30.04	11
398.60	H	-65.29	-36.00	-29.29	11

Note:

(1) A. P. means antenna polarization, horizontal and vertical.
Amplitude means the fundamental emission measured
C F. means Correct Factor, Rate means transmitter rate
Corrected Factor (C. F.) = Cable Loss + Antenna Factor – Amplified Gain
LEVEL = Amplitude + Corrected Factor

(2) The margin is minus that means under limit.

(3) The value of table is the worst case during test condition. This is including different combinations of transmitter rate antenna polarity and temperature.

(4) ETSI (2400MHz~2483.5MHz), FRANCE (2446.5 MHz~2483.5MHz)

Channel 7 (30MHz-1GHz)

Frequency (MHz)	A. P. (H/V)	LEVEL (dBm)	Limit (dBm)	Margin (dB)	Rate (Mbps)
135.49	V	-71.40	-36.00	-35.40	11
179.14	V	-70.96	-36.00	-34.96	11
202.17	V	-68.96	-36.00	-32.96	11
236.12	V	-73.22	-36.00	-37.22	11
262.80	V	-72.93	-36.00	-36.93	11
285.84	V	-73.32	-36.00	-37.32	11
436.19	V	-66.01	-36.00	-30.01	11
202.17	H	-61.45	-36.00	-25.45	11
222.79	H	-69.57	-36.00	-33.57	11
267.65	H	-66.37	-36.00	-30.37	11
333.12	H	-66.79	-36.00	-30.79	11
398.60	H	-64.49	-36.00	-28.49	11
434.97	H	-66.12	-36.00	-30.12	11

Channel 13 (30MHz-1GHz)

Frequency (MHz)	A. P. (H/V)	LEVEL (dBm)	Limit (dBm)	Margin (dB)	Rate (Mbps)
80.92	V	-71.36	-36.00	-35.36	11
124.57	V	-72.65	-36.00	-36.65	11
135.49	V	-71.54	-36.00	-35.54	11
179.14	V	-71.38	-36.00	-35.38	11
202.17	V	-68.61	-36.00	-32.61	11
434.79	V	-65.73	-36.00	-29.73	11
203.39	H	-62.57	-36.00	-26.57	11
217.94	H	-65.25	-36.00	-29.25	11
266.44	H	-66.26	-36.00	-30.26	11
333.12	H	-67.25	-36.00	-31.25	11
398.60	H	-64.84	-36.00	-28.84	11
434.97	H	-63.35	-36.00	-27.35	11

Channel 1 (1GHz-12.75GHz)

Frequency (MHz)	A. P. (H/V)	LEVEL (dBm)	Limit (dBm)	Margin (dB)	Rate (Mbps)
4078.12	V	-66.41	-30.00	-36.41	11
4825.83	V	-64.86	-30.00	-34.86	11
6112.12	V	-59.36	-30.00	-29.36	11
7238.54	V	-59.69	-30.00	-29.69	11
9651.25	V	-59.65	-30.00	-29.65	11
4078.12	H	-66.31	-30.00	-36.31	11
4825.83	H	-65.19	-30.00	-35.19	11
6113.12	H	-60.53	-30.00	-30.53	11
7238.54	H	-58.86	-30.00	-28.86	11
9651.25	H	-59.65	-30.00	-29.65	11

Channel 13 (1GHz-12.75GHz)

Frequency (MHz)	A. P. (H/V)	LEVEL (dBm)	Limit (dBm)	Margin (dB)	Rate (Mbps)
4201.46	V	-62.61	-30.00	-32.61	11
4949.17	V	-60.08	-30.00	-30.08	11
7415.83	V	-60.75	-30.00	-30.75	11
8394.79	V	-60.46	-30.00	-30.46	11
9890.21	V	-58.11	-30.00	-28.11	11
4201.46	H	-63.28	-30.00	-33.28	11
4949.17	H	-62.75	-30.00	-32.75	11
7415.83	H	-61.09	-30.00	-31.09	11
9890.21	H	-59.11	-30.00	-29.11	11

Ⅵ. Section 5.3.2: Receiver Spurious Emissions

6.1 Test Result of Receiver Spurious Emissions (Radiated)

Channel 1 (30MHz-12.75GHz)

Frequency (MHz)	A. P. (H/V)	LEVEL (dBm)	Limit (dBm)	Margin (dB)	Rate (Mbps)
135.49	V	-70.76	-57.00	-13.76	11
200.96	V	-68.77	-57.00	-11.77	11
222.79	V	-72.28	-57.00	-15.28	11
261.59	V	-70.17	-57.00	-13.17	11
307.66	V	-72.47	-57.00	-15.47	11
434.97	V	-65.92	-57.00	-8.92	11
194.90	H	-66.03	-57.00	-9.03	11
200.96	H	-61.05	-57.00	-4.05	11
222.79	H	-63.72	-57.00	-6.72	11
266.44	H	-61.64	-57.00	-4.64	11
333.12	H	-67.01	-57.00	-10.01	11
399.81	H	-64.49	-57.00	-7.49	11

Note:

(1) A. P. means antenna polarization, horizontal and vertical.
Amplitude means the fundamental emission measured.
C F. means Correct Factor, Rate means transmitter rate
Corrected Factor (C. F.) = Cable Loss + Antenna Factor – Amplified Gain
LEVEL = Amplitude + Corrected Factor

(2) The value of table is worst case during test condition, includes different combinations of transmitter rate antenna polarity and temperature.

(3) ETSI (2400MHz~2483.5MHz),

Channel 7 (30MHz-12.75GHz)

Frequency (MHz)	A. P. (H/V)	LEVEL (dBm)	Limit (dBm)	Margin (dB)	Rate (Mbps)
200.96	V	-68.56	-57.00	-11.56	11
236.12	V	-72.62	-57.00	-15.62	11
262.80	V	-69.44	-57.00	-12.44	11
287.05	V	-70.93	-57.00	-13.93	11
302.81	V	-70.61	-57.00	-13.61	11
434.97	V	-65.76	-57.00	-8.76	11
177.92	H	-65.71	-57.00	-8.71	11
202.17	H	-61.14	-57.00	-4.14	11
222.79	H	-63.16	-57.00	-6.16	11
267.65	H	-63.70	-57.00	-6.70	11
333.12	H	-66.37	-57.00	-9.37	11
399.81	H	-63.53	-57.00	-6.53	11

Channel 13 (30MHz-12.75GHz)

Frequency (MHz)	A. P. (H/V)	LEVEL (dBm)	Limit (dBm)	Margin (dB)	Rate (Mbps)
34.85	V	-68.51	-57.00	-11.51	11
80.92	V	-71.41	-57.00	-14.41	11
135.49	V	-71.16	-57.00	-14.16	11
179.14	V	-69.43	-57.00	-12.43	11
200.96	V	-67.56	-57.00	-10.56	11
266.44	V	-69.22	-57.00	-12.22	11
134.27	H	-66.70	-57.00	-9.70	11
179.14	H	-65.77	-57.00	-8.77	11
200.96	H	-60.39	-57.00	-3.39	11
266.44	H	-62.71	-57.00	-5.71	11
333.12	H	-66.68	-57.00	-9.68	11
399.81	H	-65.76	-57.00	-8.76	11

VII. Instrument and Ancillaries Equipment of List

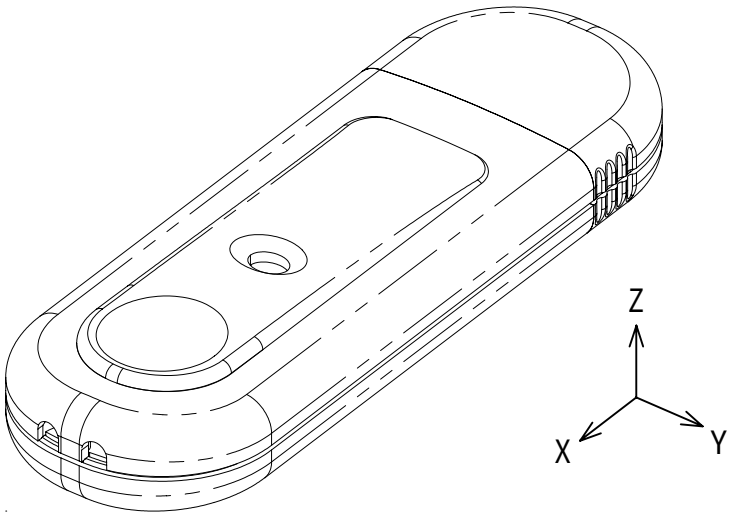
No.	Type of Equipment	Brand Name	Model No.	Serial No.
01	EMI Receiver	H P	8546A	3520A00242
02	RF Filter Section	H P	85460A	3448A00217
03	Auto Switch Box	TRC	ASB-01	9904-01
04	Spectrum Analyzer	H P	8564E	US36433002
05	Spectrum Analyzer	Anritsu	MS2665C	6200175476
06	Microwave Pre. Amp.	H P	83051A	3232A00347
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

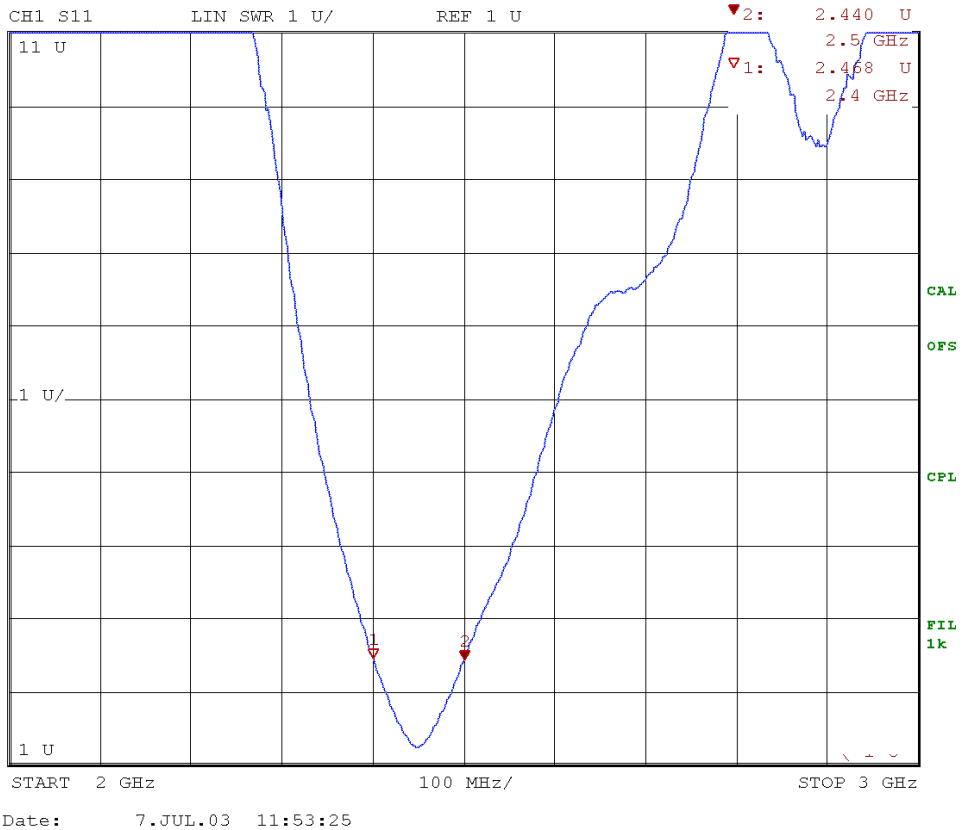
Measurement result of USB-stick Printed Antenna

Orientation of DUT measured in chamber



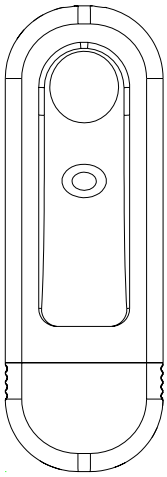
Measurement Result

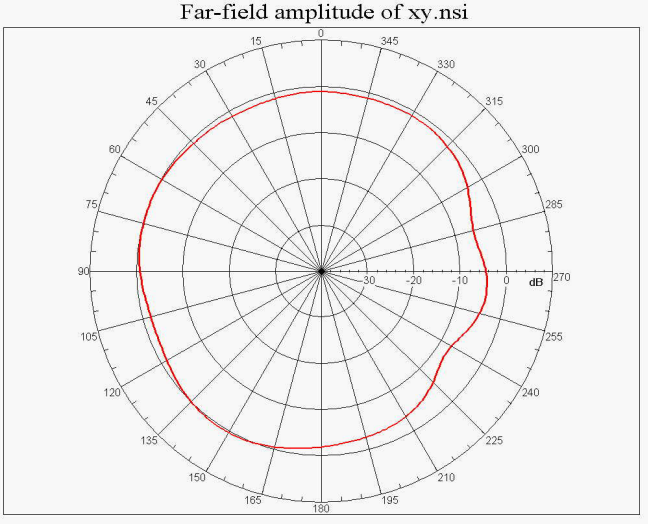
VSWR



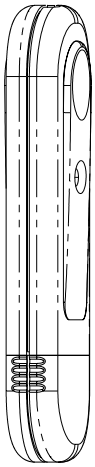
Radiation Pattern

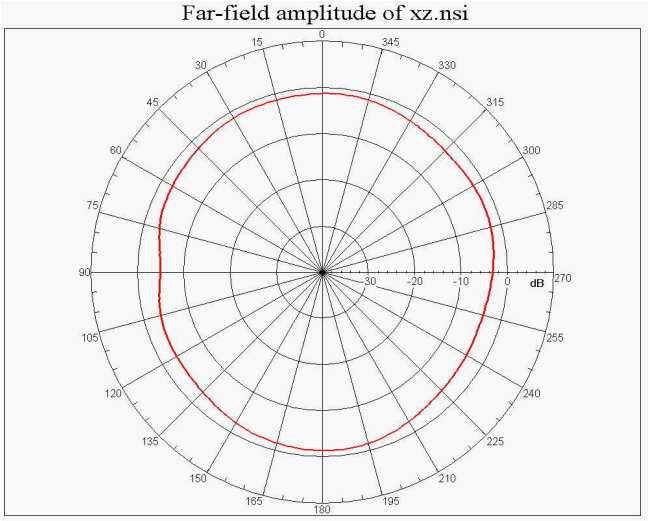
1.XY-plane



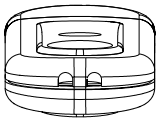


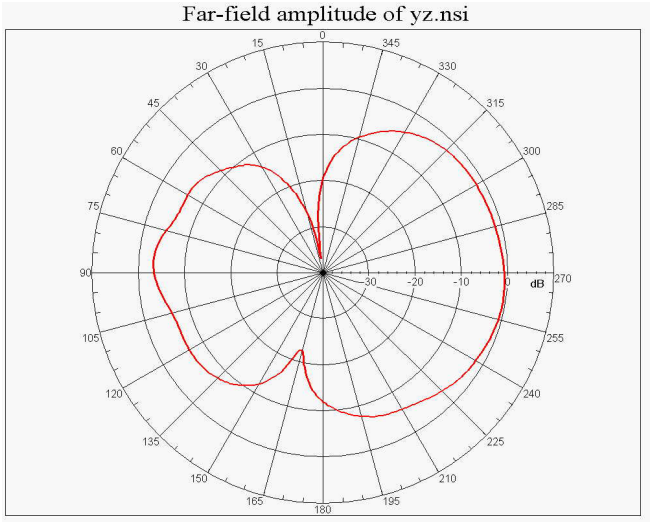
2.XZ-plane





3.YZ-plane





Report No.	C51ET379
Specifications	ETSI EN 301 489-1 V1.3.1 (2001-09) ETSI EN 301 489-17 V1.1.1 (2000-09)
Applicant	TRENDware International Inc.
Applicant address	3135 Kashiwa Street Torrance, CA 90505, USA
Items tested	11Mbps Wireless USB LAN adapter
Model No.	TEW-229UB
Results	**Compliance** (As detailed within this report)
Date	07/07/2003 (month / day / year) (Sample received) 07/17/2003 (month / day / year) (Test)
Prepared by	Project Engineer (Jack Tsai)
Authorized by	General Manager (Frank Tsai)
Issue date	*November 24, 2003* (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

★ ***Aut. No. ELA 131***

Generally Statement:

The results appear in the following order:

Electromagnetic compatibility and radio spectrum matters (ERM); Electro Magnetic Compatibility (EMC) standard for radio equipment and services;

Part 1: Common Technical requirements

Part 17: Specific conditions for Wideband data and HIPERLAN equipment.

The results exhibits below only apply to particular samples tested and to the specific tests carried out, as detailed in this Test Report. The issue of this Test Report does not indicate any measure of Approval, Certification, Supervision, Control or Surveillance by Training Research Co., Ltd. of any product. No extract, abridgement or abstraction from a Test Report may be published or used to advertise a product without the written consent of the Director, Training Research Co., Ltd. who reserves the absolute right to agree or reject all or any of the details of any item of publicity for which consent may be sought.

Contents

Chapter 0 Emission and Susceptibility Standards

Emission Standards

Emission Standard	European Standard	International Standard
( )	EN 61000-6-3/2001	IEC 61000-6-3/1996
( )	EN 61000-6-4/2001	IEC 61000-6-4/1997
( )	EN 50081-1/1992	
( )	EN 50081-1/8.93	
( )	EN 55014/4.93	CISPR 14: 1993
( )	EN 55015/12.93	CISPR 15: 1992
( )	EN 55011/91	CISPR 11: 1990
(X)	EN 55022/98	CISPR 22: 1997
(X)	EN 61000-3-2/2000	IEC 61000-3-2: 2000 (Modified)
(X)	EN 61000-3-3/1995	IEC 61000-3-3: 1994 + A1/2001

Susceptibility Standards

Susceptibility Standard	European Standard	International Standard
( )	EN 61000-6-1/2001	IEC 61000-6-1/1997
( )	EN 61000-6-2/2001	IEC 61000-6-2/1999
( )	EN 50082-1/1997	
( )	EN 50082-2/1994	
(X)	EN 55024/1998	CISPR 24/1997
( )	EN 55020/2002	CISPR 20/2002
(X)	EN 61000-4-2:1995	IEC 61000-4-2:1995
(X)	EN 61000-4-3:1996	IEC 61000-4-3:1995
(X)	EN 61000-4-4:1995	IEC 61000-4-4:1995
(X)	EN 61000-4-5:1995	IEC 61000-4-5:1995
(X)	EN 61000-4-6:1996	IEC 61000-4-6:1996
( )	EN 61000-4-8:1993	IEC 61000-4-8:1993
(X)	EN 61000-4-11:1994	IEC 61000-4-11:1994
( )	EN 55014-2:1993	CISPR/F (Sec) 159

Chapter 1 Introduction

Description of EUT

Product Name	**:**	11Mbps Wireless USB LAN adapter
Model Name	**:**	TEW-229UB
Frequency Range	**:**	2.400GHz ~ 2.4835GHz
Operating Frequency	**:**	2.412GHz ~ 2.472GHz
Support Channel	**:**	13 Channels
Modulation Skill	**:**	DBPSK, DQPSK, CCK
Power Type	**:**	Power by the USB of client' s device
Data cable	**:**	23cm, non-shielded, no ferrite bead, USB cable

Test Method

1. The EUT connected with computer :
   (a) Insert the EUT into the USB interface of the notebook computer.
   (b) The EUT connected with notebook by USB cable.
   The strength of spurious emission of (b) mode is more than (a) mode that recorded wore case test data in this test report.
2. Using the notebook computer and software provided by the manufacturer to control EUT.
3. Then making EUT to the following mode.
   (a) EMI testing: Ancillary equipments used during testing.
   (b) EMS testing: Making EUT to the linking mode with other support equipments

List of Support Equipment

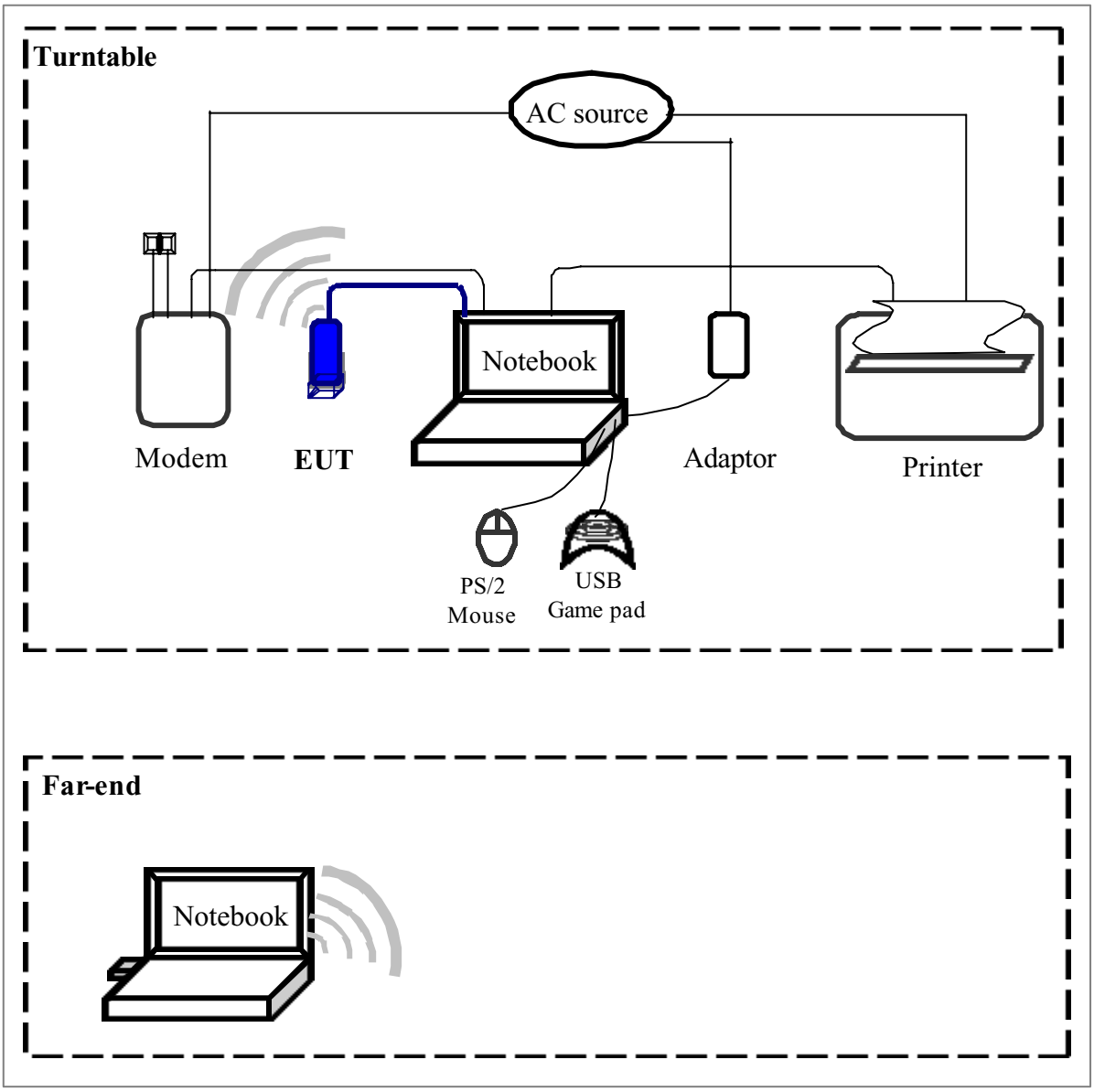
In order to construct the minimum testing, following equipment were used as the support units.

Notebook	**:**	**IBM Think Pad X20**
Type No.	:	2662-11T
Serial No.	:	FX-11922 00/09
FCC ID	:	Doc Approved
檢磁	:	3892B565
AC Adaptor	**:**	**IBM**
Model No.	:	PA2450U
Serial No.	:	02K6654
FCC ID	:	Doc Approved
Power Core	:	Non-shielded, 180cm long, Plastic hoods, with ferrite bead
Power type	:	100 ~ 240VAC, 50 ~ 60Hz, 0.5A ~ 1.2A / 16Vdc, 4.5A
Notebook	**:**	**ASUSTek Computer**
Model No.	:	AB00F
Serial No.	:	24NP016361
FCC ID	:	Doc Approved
BSMI	:	41016012
Power type	:	100 ~ 240VAC, 1A 50/60 Hz, Switching
Power Adaptor	**:**	**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)

Modem	**:**	**ACEEX**
Model No.	:	XDM-56V14
FCC ID	:	IFAXDM-56V14
Power type	:	Linear
Power cord	:	Non-shielded, 1.9m length, No ferrite cord
Data cable	:	RS232, Shielded, 1.2m length, No ferrite core
		RJ11C x 2, 7’ length non-shielded, No ferrite core
Printer	**:**	**HP**
Model No.	:	C6464A, C2642A
Serial No.	:	TH16LEB5PK, SG69A196GV
FCC ID	:	None (DoC Approved), B94C2642X
檢磁	:	3892H381, None
Power type	:	Switching adaptor
Power cord	:	Non-shielded, 173cm length, No ferrite core
		(between adaptor and AC source)
		Non-shielded, 180cm length, with ferrite core
		(between printer and adaptor)
Data cable	:	Shielded, 1.70m length, No ferrite core
USB Gamepad	**:**	**Rockfire**
Model No.	:	QF-337uv
Serial No.	:	10600545, KR91379759
FCC ID	:	None (CE approval)
檢磁	:	3862A574
Power type	:	By computer
Data Cable	:	Shielded, 1.81m length, Plastic, with ferrite core
PS/2 Mouse	**:**	**HP**
Model No.	:	M-S34
Serial No.	:	LZB90714106, LZC84446151
FCC ID	:	DZL211029
檢磁	:	4862A011
Power type	:	By PC
Power cord	:	Non-shielded, 1.88m length, No ferrite core

Configuration of System under Test

(Conducted and Radiatedl)



Connections of Computer:

*Parallel Port --- a printer

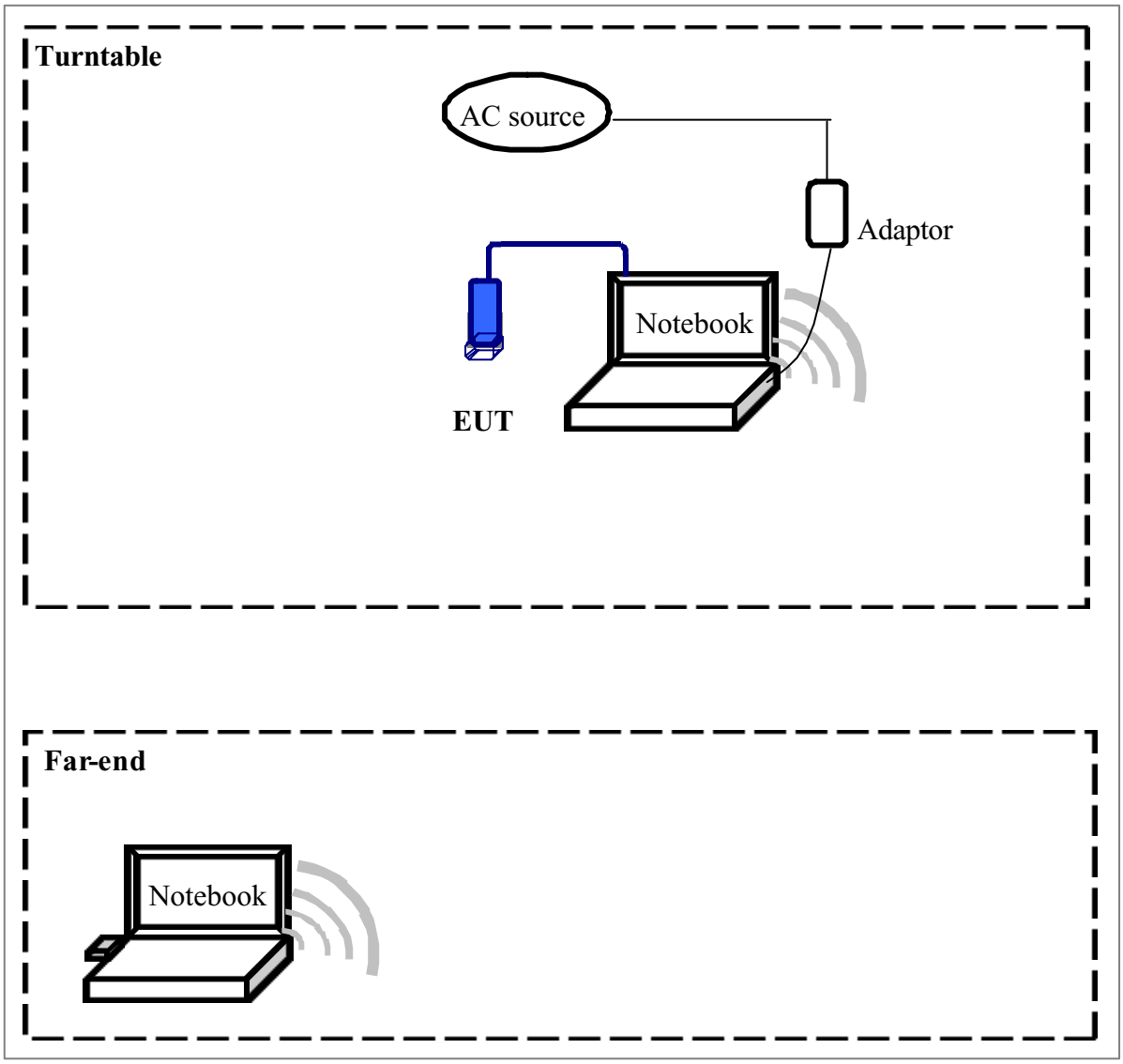
*Serial Port --- an external modem

*PS/2 Port --- a PS/2 mouse

*USB-A Port --- a USB game pad

*USB-B Port --- **EUT**

(EMS)



Chapter 2 Emission and Immunity Requirements Overview

Emission (ETSI EN 301 489-1)

Phenomenon	Application	Equipment test requirement			Reference Subclause in the present document
		Radio and ancillary equipment for fixed use (base station equipment)	Radio and ancillary equipment for vehicular use (mobile equipment)	Radio and ancillary equipment for portable use (portable equipment)	
Radiated emission	Enclosure of ancillary equipment	Applicable for stand alone testing	Applicable for stand alone testing	Applicable for stand alone testing	8.2
Conducted emission	DC power input/output port	Applicable	Applicable	Not applicable	8.3
Conducted emission	AC mains input/output port	Applicable	Not applicable	Not applicable	8.4
Harmonic current emissions	AC mains input port	Applicable	Not applicable	Not applicable	8.5
Voltage fluctuations and flicker	AC mains input port	Applicable	Not applicable	Not applicable	8.6

Immunity (ETSI EN 301 489-1)

Phenomenon	Application	Equipment test requirement			Reference Subclause in the present document
		Radio and ancillary equipment for fixed use (base station equipment)	Radio and ancillary equipment for vehicular use (mobile equipment)	Radio and ancillary equipment for portable use (portable equipment)	
RF electromagnetic field (80MHz to 1GHz)	Enclosure	Applicable	Applicable	Applicable	9.2
Electrostatic discharge	Enclosure	Applicable	Applicable	Applicable	9.3
Fast transients common mode	Signal, telecommunication and control ports, DC and AC power ports	Applicable	Not applicable	Not applicable	9.4
RF common mode 0.15 MHz to 80MHz	Signal, telecommunication and control ports, DC and AC power ports	Applicable	Applicable	Not applicable	9.5
Transients and surges	DC power input ports	Not applicable	Applicable	Not applicable	9.6
Voltage dips and interruptions	AC mains power input ports	Applicable	Not applicable	Not applicable	9.7
Surges, line to line and line ground	AC mains power input ports, telecommunication ports	Applicable	Not applicable	Not applicable	9.8

Chapter 3 Performance Criteria

ETSI EN 301 489-17, Subclause 6.2

Table 1 Performance criteria		
Criteria	**During test**	**After test**
A	Shall operate as intended May show degradation of performance (**NOTE 1**) Shall be no loss of function Shall be no unintentional transmissions	Shall operate as intended Shall be no degradation of performance **(NOTE 2)** Shall be no loss of function Shall be no loss of stored data or user programmable functions
B	May show loss of function (one or more) May show degradation of performance **(NOTE 1)** No unintentional transmissions	Function shall be self-recoverable Shall operate as intended after recovering Shall be no degradation of performance **(NOTE 2)** Shall be no loss of stored data or user programmable functions
C	May be loss of function (one or more)	Functions shall be recoverable by the operator Shall operate as intended after recovering Shall be no degradation of performance **(NOTE 2)**

NOTE 1:

Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance.

If the minimum performance level or the permissible performance degradation in not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect form the apparatus if used as intended.

NOTE 2:

No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed.

If the minimum performance level or the permissible performance degradation in not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect form the apparatus if used as intended.

ETSI EN 301 489-1

Performance criteria for Continuous phenomena applied Transmitters (CT)

If no further details are given in the relevant part of the present document dealing with the particular type of radio equipment, the following *general performance criteria for continuous phenomena* shall apply.

During and after the test:

The apparatus shall continue to operate as intended. No *degradation of performance* or *loss of function* is allowed below a permissible performance level specified by the manufacturer when the apparatus is used as intends. In some cases this permissible performance level may be replaced by a permissible loss of performance.

During the test:

The EUT shall not unintentionally transmit or change its actual operating state and stored data. If the *minimum performance level* or the *permissible loss* is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect form the apparatus if used as intended.

For ancillary equipment the pass/failure criteria supplied by the manufacturer (see subclause 6.4) shall apply, unless the ancillary equipment is tested in connection with a receiver or transmitter in which case the corresponding performance criteria above shall apply.

Performance criteria for Transient phenomena applied Transmitters (TT)

If no further details are given in the relevant part of the present document dealing with the particular type of radio equipment, the following *general performance* criteria for transient phenomena shall apply.

After the test:

The apparatus shall continue to operate as intended. No *degradation of performance* or *loss of function* is allowed below a permissible performance level specified by the manufacturer when the apparatus is used as intends. In some cases this permissible performance level may be replaced by a permissible loss of performance.

During the test:

The EMC exposure to an electromagnetic phenomenon, a *degradation of performance* is, however, allowed. No change of the actual mode of operation (e.g. unintended transmission) or stored data is allowed.

If the minimum performance level or the permissible loss is not specified by the manufacturer, Then either of these may be deduced from the product description and documentation and what the user may reasonably expect form the apparatus if used as intended.

For ancillary equipment the pass/failure criteria supplied by the manufacturer (see subclause 6.4) shall apply, unless the ancillary equipment is tested in connection with a receiver or transmitter in which case the corresponding performance criteria above shall apply.

Performance criteria for Continuous phenomena applied Receivers (CR)

If no further details are given in the relevant part of the present document dealing with the particular type of radio equipment, the following *general performance* criteria for continuous phenomena shall apply.

During and after the test:

The apparatus shall continue to operate as intended. No *degradation of performance* or *loss of function* is allowed below a permissible performance level specified by the manufacturer when the apparatus is used as intends. In some cases this permissible performance level may be replaced by a permissible loss of performance.

During the test:

The EUT shall not unintentionally transmit or change its actual operating state and stored data. If the minimum performance level or the permissible loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect form the apparatus if used as intended.

For ancillary equipment the pass/failure criteria supplied by the manufacturer (see subclause 6.4) shall apply, unless the ancillary equipment is tested in connection with a receiver or transmitter in which case the corresponding performance criteria above shall apply.

Performance criteria for Transient phenomena applied Receivers (TR)

If no further details are given in the relevant part of the present document dealing with the particular type of radio equipment, the following *general performance* criteria for transient phenomena shall apply.

After the test:

The apparatus shall continue to operate as intended. No *degradation of performance* or *loss of function* is allowed below a permissible performance level specified by the manufacturer when the apparatus is used as intends. In some cases this permissible performance level may be replaced by a permissible loss of performance.

During the test:

The EMC exposure to an electromagnetic phenomenon, a degradation of performance is, however, allowed. No change of the actual mode of operation (e.g. unintended transmission) or stored data is allowed.

If the minimum performance level or the permissible loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect form the apparatus if used as intended.

For ancillary equipment the pass/failure criteria supplied by the manufacturer (see subclause 6.4) shall apply, unless the ancillary equipment is tested in connection with a receiver or transmitter in which case the corresponding performance criteria above shall apply.

ETSI EN 301 489-17

Performance criteria for Continuous phenomena applied Transmitters (CT)

The performance criteria A shall apply.

Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an ACKnowledgement (ACK) or Not ACKnowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance criteria for Transient phenomena applied Transmitters (TT)

The performance criteria B shall apply, except for voltage dips of 100ms and voltage interruptions of 5000 ms duration, for which performance criteria C shall apply.

Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In system using acknowledgement signals, it is recognized that an acknowledgement (ACK) or not-acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance criteria for Continuous phenomena applied Receivers (CR)

The performance criteria A shall apply.

Where the EUT is a *transceiver*, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of test is correctly interpreted.

Performance criteria for Transient phenomena applied Receivers (TR)

The performance criteria B shall apply, except for voltage dips of 100ms and voltage interruptions of 5000 ms duration, for which performance criteria C shall apply.

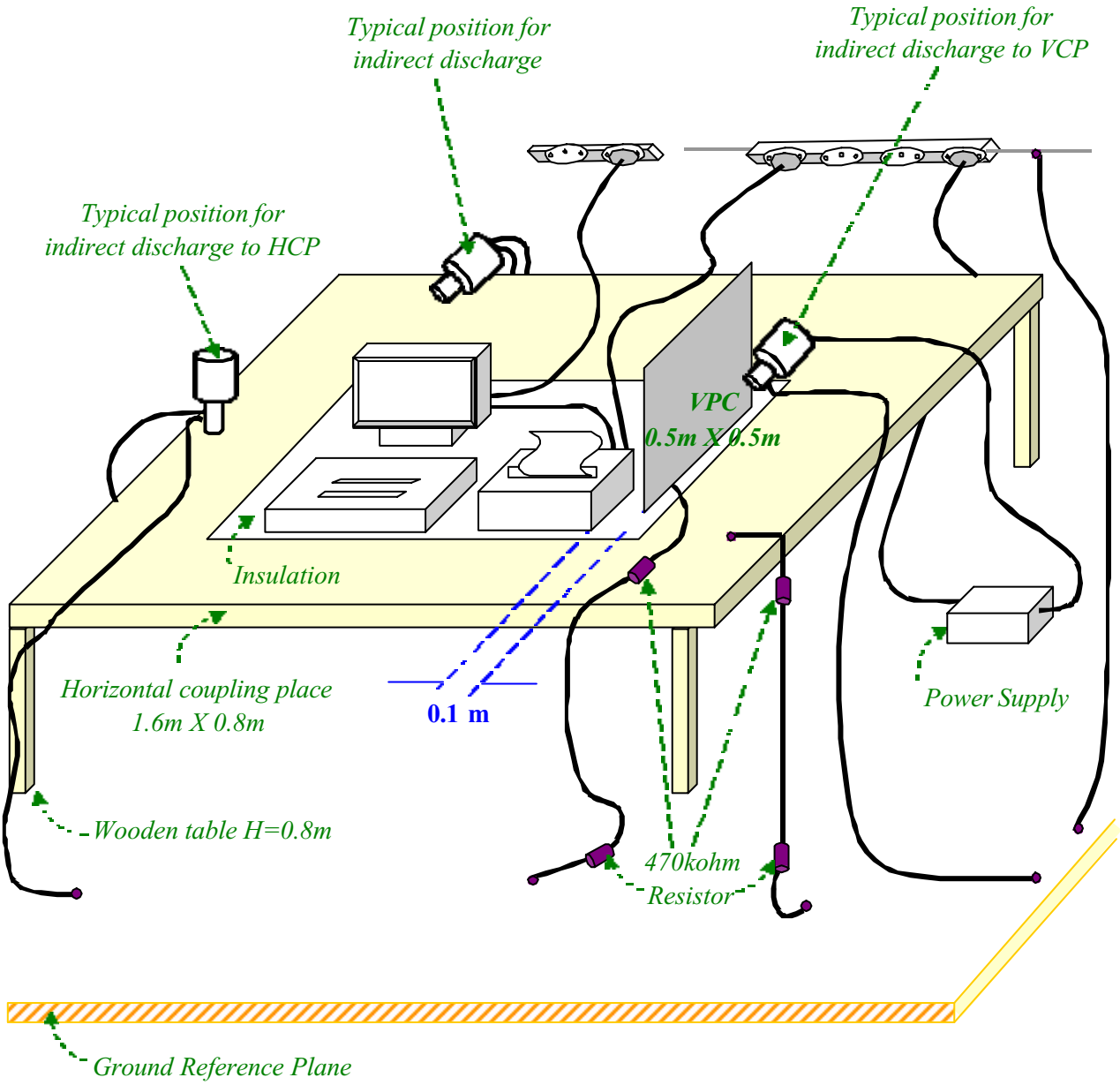
Where the EUT is a *transceiver*, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of test is correctly interpreted.

Chapter 4 Electrostatic Discharges Immunity Test

ESD Test information:

Test setup: Shielded room, According to EN 61000-4-2

Test setup for table-top equipment at laboratory tests:



Test levels: (Apply Level 2 and Level 3)

1a —Contact discharge		1b —Air discharge	
Level	Test voltage (kV)	Level	Test voltage (kV)
1	2	1	2
2	4	2	4
3	6	3	8
4	8	4	15
X	Special	X	Special
NOTE: "X" is an open level. The level has to be specified in the dedicated equipment specification. If higher voltages than those shown are specified, special test equipment may be needed.			

Test Voltage: (X) 4KV contact discharge (X) 8KV air discharge

Indirect Discharges: (X) HCP (X) VCP

Polarity: (X) Positive (X) Negative

Test mode: Ref. Test method of Chapter 1

Test points: Each connector and enclosure of EUT.

Test instruments:

Name	Model Number	Serial Number	Selected
Best Plus BURST ESD SURGE TRANSIENTS	Best Plus V6.2	199749-019SC	
BEST EMC Test Instrument	BEST EMC V2.3 (-8, -9)	199918-006SC	
KeyTek Instrument ESD Test system	Series 2000	9204303/9204310 9209226/9301395	X
NoiseKen Electrostatic Discharge Simulator	ESS-100L(A)	2100C03605	
NoiseKen Electrostatic Discharge Gun	TC-815P	2100C03566	

Comment:

Performance Criteria: **(According to ETSI EN 301 489-1)**

(X) Enclosure	( )CT	(X)TT	( ) CR	(X)TR
( ) Signal and control ports	( )CT	( )TT	( ) CR	( )TR

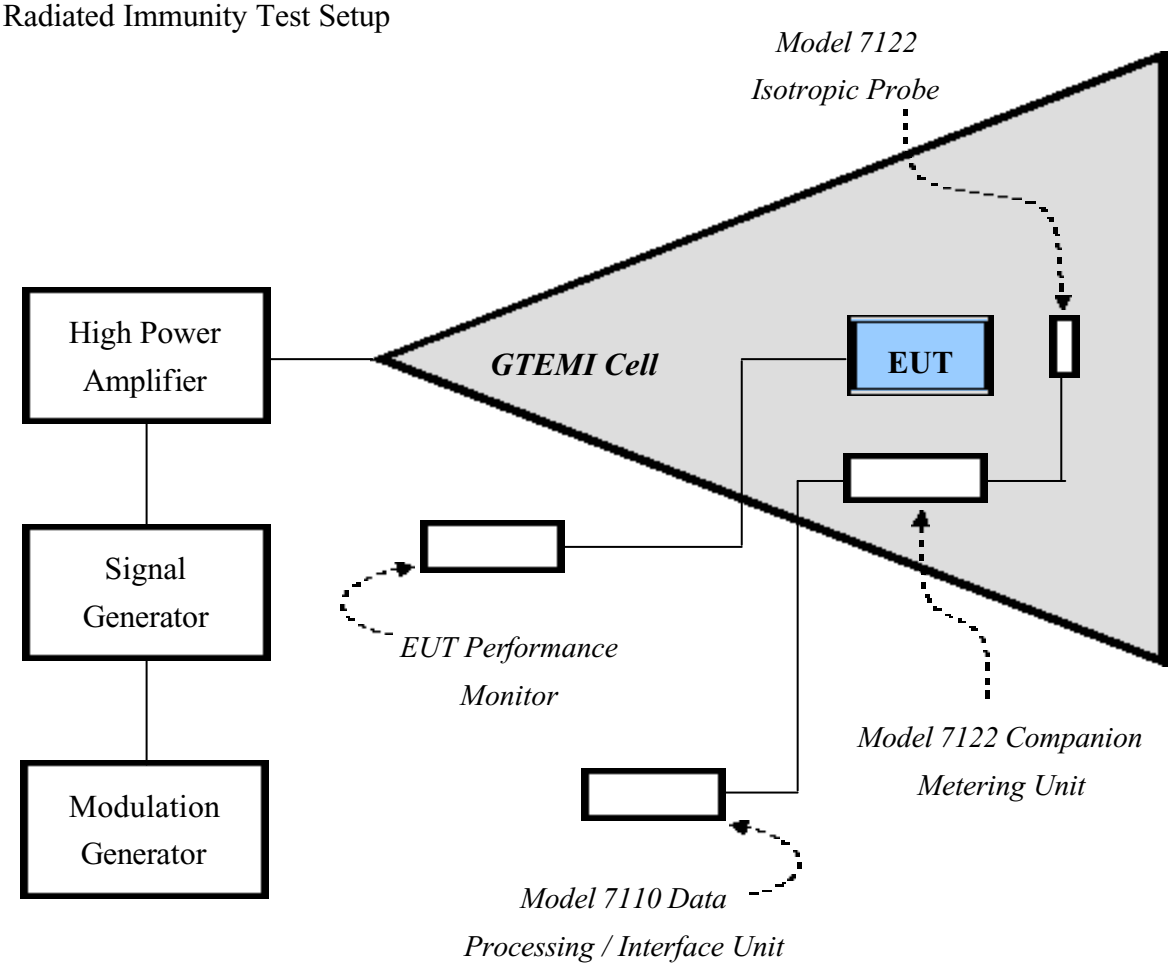
EN 61000-4-2 PHOTO OF TEST SET-UP

Chapter 5 Radio Frequency Immunity Test (RS)

RS Test information:

Test setup: GTEM cell

Radiated Immunity Test Setup



Test levels: **(Apply Level 2)**

Level	Test Field Strength (V/m)
1	1
2	3
3	10
X	Special
NOTE: the "X" is an open test level. This level may be given in the product specification.	

Test Frequency: (X) 80 ~ 1000 MHz,14000 ~ 2000 MHz,
( ) 27 ~ 500 MHz Without Modulation

Modulation: ( ) FM %
(X) 80% AM Modulation with 1KHz
( ) 80% AM Modulation with 400Hz when signal is modulated at 1kHz
( ) 900 KHz± 5 KHz with PM 200 Hz and 100% depth

Step size: (X) 1% step size

Sweep time: (X) 2.5 Second

Field strength: ( ) 1V/m (X) 3V/m ( ) 10V/m

Test mode: Ref. Test method of Chapter 1

Test instruments:

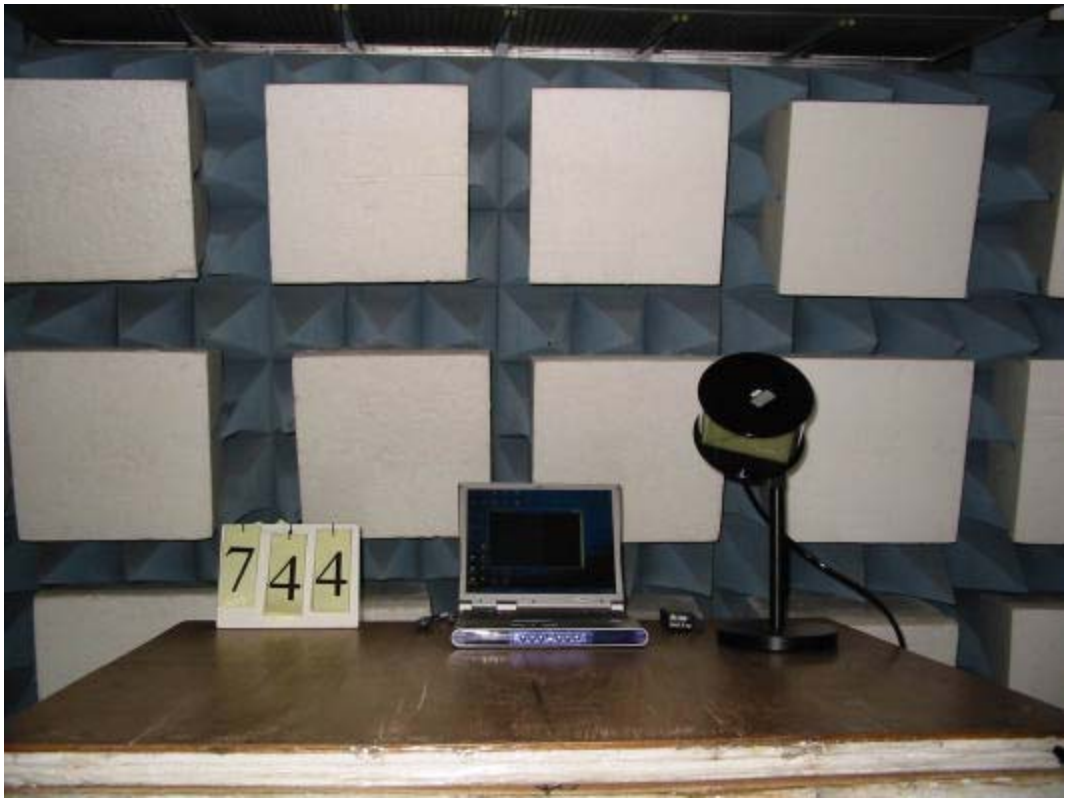
Name	Model Number	Serial Number	Selected
EMCO GTEM	5317	9411-1123	X
EMCO Probe	7122	9406-1194	X
EMCO METERING UNIT	7122	9406-1194	X
EMCO data interface	7110	9410-1273	X
HP Personal Computer	D3178A	3438S00486	X
HP Signal Generator	8657B	2928U00286	X
HP Signal Generator	8648D	3613A00117	X
IFI Wideband Amplifier	SMX50	467-0795	X
HP Transmission Test Set	4935A	3115A24046	X
B & K Precision Sound Level Meter	Type 2232	1810564	X

Comment:

Performance Criteria: **(According to ETSI EN 301 489-1)**

(X) Enclosure (X)CT ( )TT (X) CR ( )TR

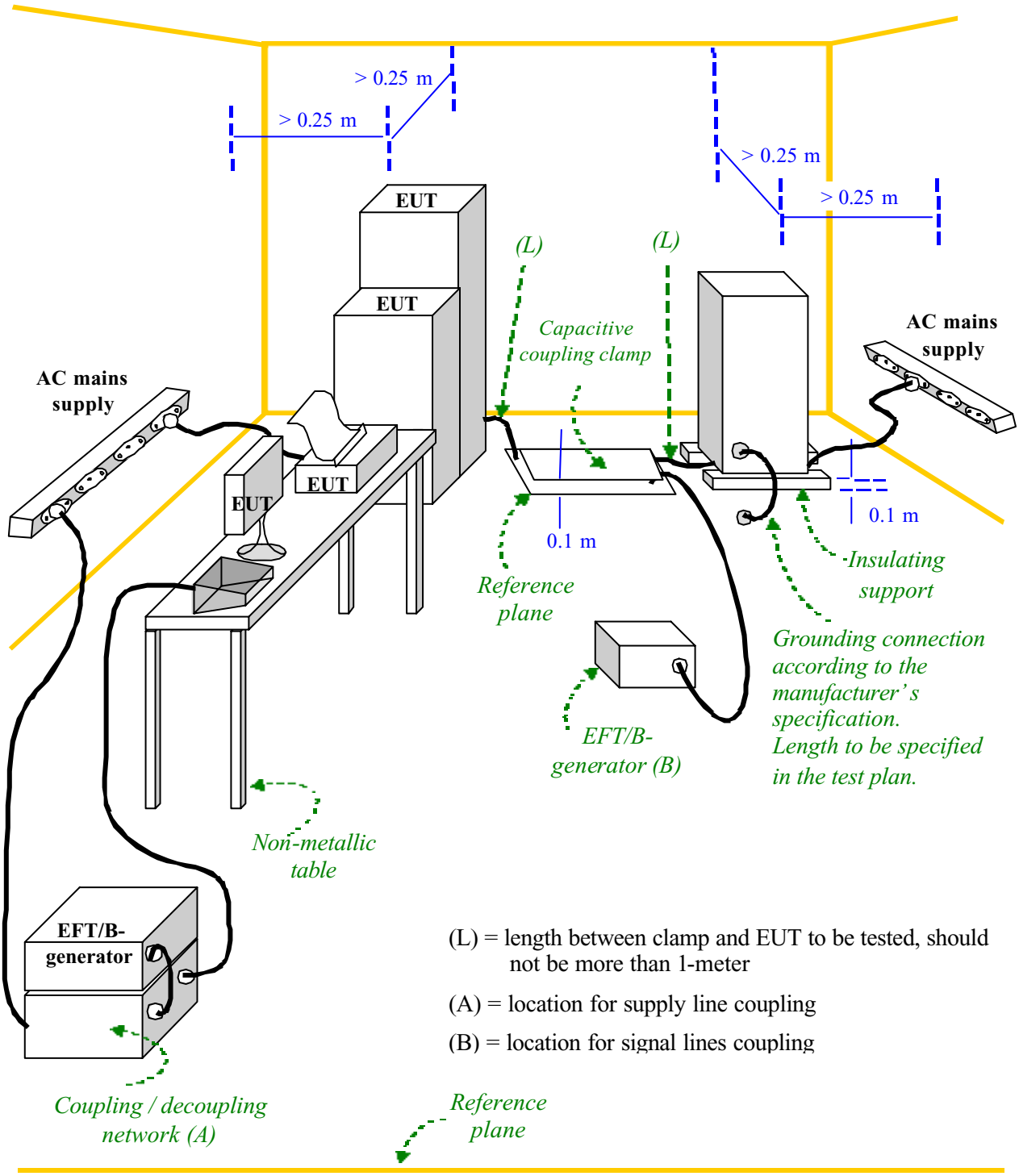
EN 61000-4-3 PHOTO OF TEST SET-UP



Chapter 6 Electric Fast Transient/Burst Requirements Test

EFT Test information:

General test set-up for laboratory type tests:



Test levels: **(Apply Level 2)**

Open-circuit output test voltage (±10%) and repetition rate of the impulses (±20%)				
Level	On power supply port, PE		On input/output signal, data and control ports	
	Voltage peak kV	Repetition rate kHz	Voltage peak kV	Repetition rate kHz
1	0.5	5	0.25	5
2	1	5	0.5	5
3	2	5	1	5
4	4	2.5	2	5
X	Special	Special	Special	Special
NOTE: the "X" is an open level. The level has to be specified in the dedicated equipment specification				

Test setup: According to EN 61000-4-4

Test Voltage: DC Power line ( ) 0.5 KV, 5 KH

AC Power line (X) 1 KV, 5 KHz

Signal & Control line ( ) 0.5 KV, 5 KHz; ( ) 1 KV, 5 KHz

Polarity: (X) Positive (X) Negative

Test Duration: (X) 1 minute ( ) 3 minutes

Connected lines: ( ) Power line shielded (X) Power line non-shielded

( ) Signal & Control line non-shielded ( ) Signal & Control line shielded

Test mode: Ref. Test method of Chapter 1.

Test instrument:

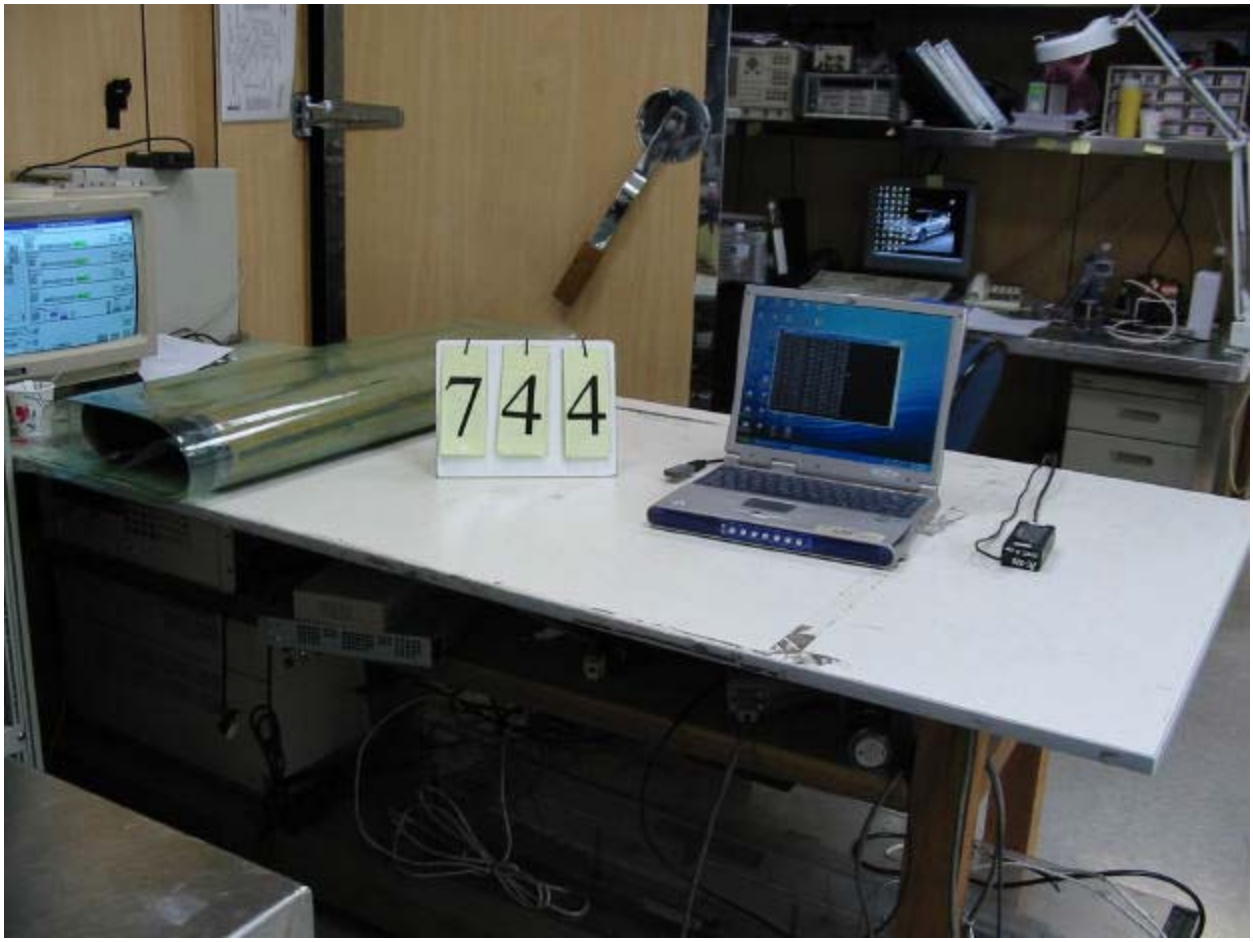
Name	Model Number	Serial Number	Selected
Best Plus BURST ESD SURGE TRANSIENTS	Best Plus V6.2	199749-019SC	
BEST EMC Test Instrument	BEST EMC V2.3 (-8, -9)	199918-006SC	
KeyTek Instrument EFT Test system	E412	9505206/505207	X

Comment:

Performance Criteria: **(According to ETSI EN 301 489-1)**

( ) Signal and control ports	( )CT	( )TT	( ) CR	( )TR
( ) DC power input ports	( )CT	( )TT	( ) CR	( )TR
(X) AC mains input ports	( )CT	(X)TT	( ) CR	(X)TR

EN 61000-4-4 PHOTO OF TEST SET-UP



Chapter 7 Surge Immunity Test

Surge Test information:

Test setup: According to *EN 61000-4-5*

Test levels: **(Apply Level 2 and Level 3)**

Level	Test Field Strength (kV)
1	0.5
2	1.0
3	2.0
4	4.0
X	Special
NOTE: the "X" is an open class. This level may be specified in the product specification.	

Test Voltage: DC Power line ( ) 0.5 KV
AC Power line ( ) Line – Line: 1KV
( ) Line – Ground: 2KV
(X) Line – Line: 0.5KV
(X) Line – Ground: 1KV
Control line ( ) 0.5 KV
Signal ( ) 1 KV, ( ) 0.5KV

Time: (X) 1.2/50μs (8/20μs)

Polarity: (X) Positive (X) Negative

Connected lines: ( ) Power line shielded
(X) Power line non-shielded
( ) Signal & Control line non-shielded
( ) Signal & Control line shielded

Test mode: Ref. Test method of Chapter 1.

Test instrument:

Name	Model Number	Serial Number	Selected
Best Plus BURST ESD SURGE TRANSIENTS	Best Plus V6.2	199749-019SC	
BEST EMC Test Instrument	BEST EMC V2.3 (-8, -9)	199918-006SC	
KeyTek Pulsed-EMI Test System	E103, 501B, E502B, E503, E505A, E4552A	0008260 ~0008264, 0008254	X

Comment:

Performance Criteria: **(According to ETSI EN 301 489-1)**

(X) AC mains input ports	( )CT	(X)TT	( ) CR	(X)TR
( ) Signal and control ports	( )CT	( )TT	( ) CR	( )TR

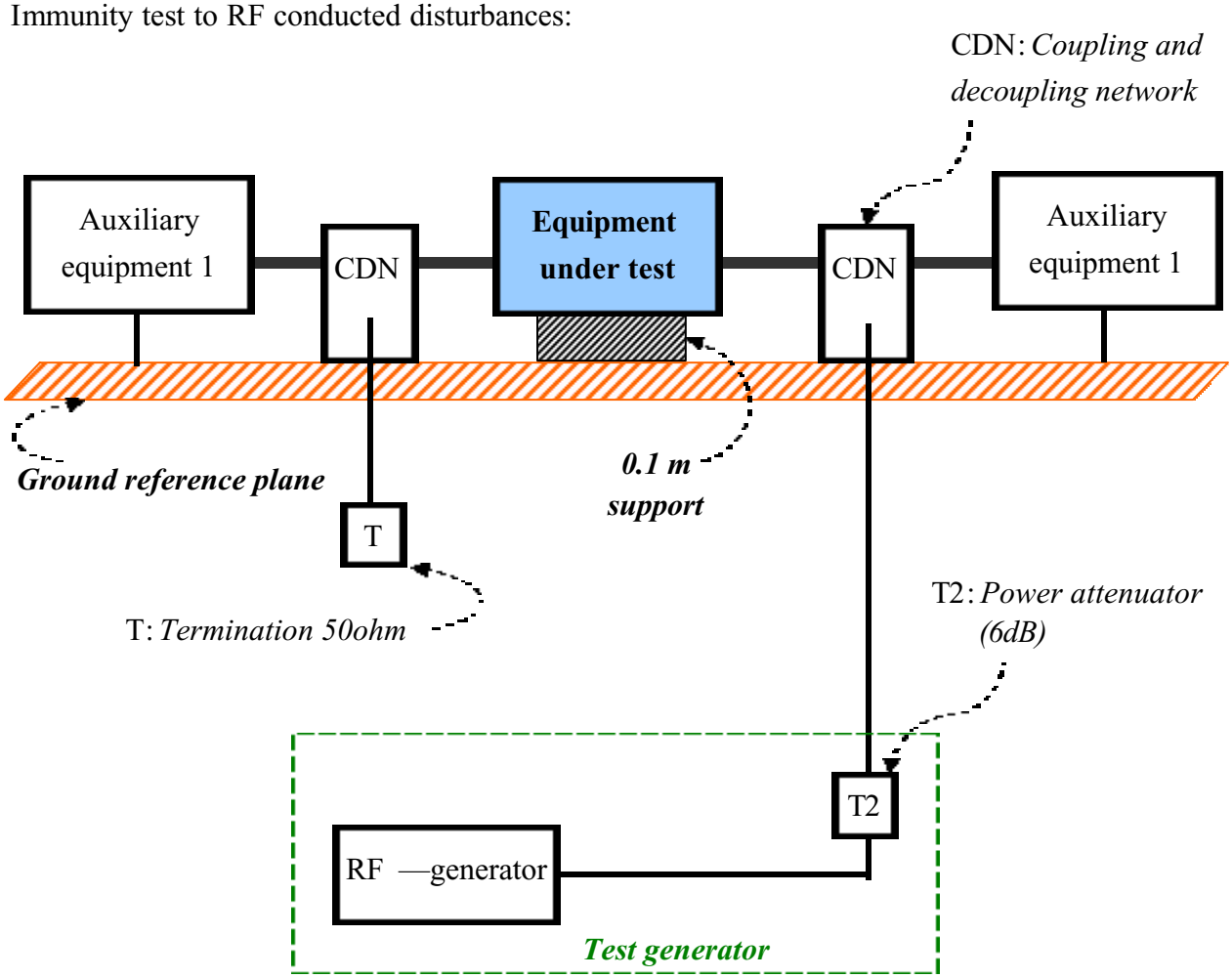
EN 61000-4-5 PHOTO OF TEST SET-UP

Chapter 8 Continuous Wave Voltage Immunity Test

CS Test information:

Test setup: According to EN 61000-4-6

Immunity test to RF conducted disturbances:



Test levels: **(Apply Level 2)**

Frequency range 150kHz to 80MHz		
Level	Voltage level (e.m.f.)	
	Uo [dB(μv)]	*Uo* [V]
1	120	1
2	130	3
3	140	10
X	Special	
NOTE: the "X" is an open test level.		

Test Frequency: (X) 0.15 ~ 80MHz

Modulation: ( ) FM %
(X) 80% AM Modulation with 1kHz
( ) 80% AM Modulation with 400Hz when signal is modulated at 1kHz
( ) 900 MHz± 5 MHz with PM 200 Hz and 50% duty cycle

Step size: (X) 50kHz step size in the frequency range 150kHz to 5MHz and
1% frequency increment of the momentary frequency in the frequency range 5MHz to 80MHz
( ) 500kHz step size in the frequency range 150kHz to 5MHz and
10% frequency increment of the momentary frequency in the frequency range 5MHz to 80MHz for **non-continuous duty cycle**

Field strength: ( ) 1Vrms (X) 3Vrms ( ) 10Vrms

Connected lines: ( ) Power line shielded
(X) Power line non-shielded
( ) Signal & Control line non-shielded
( ) Signal & Control line shielded

Test mode: Ref. Test method of Chapter 1

Test instruments:

Name	Model Number	Serial Number	Selected
FRANKONIA EMV–Mess–System	CIT-10	103A3113	X
FRANKONIA CDN	M2+M3	A3011015	X
FRANKONIA CDN	T2-801	A3010002	
FRANKONIA CDN	T4-801	A3015004	
FRANKONIA CDN	S1-801	A3005002	
SCHAFFNER FM-Koppelzange	KEMZ 801	17045	
SCHAFFNER RF-SYNTHE SIZERIAMP21FIER	NSG 2070-1	1020	
SCHAFFNER CDN	M325	13773	
SCHAFFNER CDN	M216	15604	
SCHAFFNER CDN	T004	15230	
SCHAFFNER CDN	S501	15167	
SCHAFFNER FM-Koppelzange	KEMZ 801	14301	
HP Transmission Test Set	4935A	3115A24046	
B & K Precision Sound Level Meter	Type 2232	1810564	

Comment:

Performance Criteria: *(According to ETSI EN 301 489-1)*

( ) Antenna port	( )CT	( )TT	( ) CR	( )TR
( ) Signal and control ports	( )CT	( )TT	( ) CR	( )TR
( ) DC power input ports	( )CT	( )TT	( ) CR	( )TR
(X) AC mains input ports	(X)CT	( )TT	(X) CR	( )TR

EN 61000-4-6 PHOTO OF TEST SET-UP

Chapter 9 Voltage DIP / Interruption Test

DIP Test information:

Test setup: According to *EN 61000-4-11*

Voltage dips: (X) 30%, 0.01 Second
( ) 60%, 0.1 Second

Voltage interruptions: (X) > 95%, 5 Seconds

Test mode: Ref. Test method of Chapter 1

Test instruments:

Name	Model Number	Serial Number	Selected
Best Plus BURST ESD SURGE TRANSIENTS	Best Plus V6.2	199749-019SC	
BEST EMC Test Instrument	BEST EMC V2.3 (-8, -9)	199918-006SC	
Partner EMS Tester	Transienter-1000	PIO	X

Comment:

Performance Criteria: (According to ETSI EN 301 489-1)

Dips 30%:	(X) CT	( ) TT	(X) CR	( ) TR
Dips 60%:	( ) CT	( ) TT	( ) CR	( ) TR
Interruptions >95%:	( ) CT	( ) TT	( ) CR	( ) TR

No unintentional responses shall occur at the end of the test;

( )Event of loss of function(s) ( )Event of loss of user stored data

Performance Criteria: (According to ETSI EN 301 489-17)

Dips 60%, 100 ms :	( ) A	( ) B	(X) C
Interruptions >95%, 5 000 ms:	( ) A	( ) B	(X) C

EN 61000-4-11 PHOTO OF TEST SET-UP

Chapter 10 Harmonics Test

Test information:

Test setup: According to EN 61000-3-2

Test item: Quasi – stationary & Fluctuating Current Harmonics Test.

Test mode: Ref. Test method of Chapter 1

Test instrument:

Name	Model Number	Serial Number	Selected
Harmonic/Flicker Test System	HP 6842A	3531A-00102	X

Test Equipment Settings:	Quasi-stationary Current Harmonics Test	Fluctuating Current Harmonics Test
Line Voltage	230VAC	230VAC
Line Frequency	50Hz	50Hz
Device Class	D	D
Test Limit Overrides	None	None
Total Number of Failures:	None	None
Total Number of Errors:	None	None

Test Result: Pass

Chapter 11 Voltage Fluctuation and Flicker Test

Test information:

Test setup: According to *EN 61000-3-3*

Test mode: Ref. Test method of Chapter 1

Test instrument:

Name	Model Number	Serial Number	Selected
Harmonic/Flicker Test System	HP 6842A	3531A-00102	X

Test Equipment Settings:

Line Voltage	230VAC
Line Frequency	50Hz
Test Limit Overrides	None
Total Number of Failures:	Pst: (0), Plt: (0)
	Dc: (0), Dmax (0), Dt (0)
Total Number of Errors:	None

Test Result: Pass

Chapter 12 Conducted Emission Test

Test condition and setup

All the equipment is placed and setup according to EN 55022.

Mains power:

The EUT is assembled on a wooden table, which is 80 cm high and placed 40 cm from the back-wall, which is a vertical conducting plane. One LISN is for EUT, the other LISN is for support equipment. They are all placed on the conductive ground. The EUT' s LISN connect a line switch box for selecting L1 or L2, then connect to a preamplifier and spectrum.

The spectrum scans from 150KHz to 30MHz. Conducted emission levels are detected at *maximum peak mode*. But if the maximum peak mode failed or over *average limit*, it will be measured by *average detection mode*.

While testing the worst-emission plot printed in the *peak detection mode*, and there are up to 6 highest emissions to be recorded. The plot is kept as the original data and not included in the test report.

List of test Instrument

				Calibration Date	
Instrument Name	Model No.	Brand	Serial No.	Last time	Next time
Receiver	SCR3102	SCHAFFNER	021	04/22/03	04/22/04
LISN (EUT)	3852/2	EMCO	9411-2284	06/21/03	06/21/04
LISN (Support E.)	3852/2	EMCO	9120-2007	08/28/02	08/28/03
Preamplifier	EQ3-006	TRC	---	05/15/03	05/15/04
Line Switch Box	EQ3-007	TRC	---	05/15/03	05/15/04

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

Test Result of Conducted Emissions for Mains power

Testing Room: Temperature: 20 ° C Humidity: 56 % RH

Power Connected Emissions					*Class B*		
Conductor	***Frequency (KHz)***	***Peak (dBμV)***	***QP (dBμV)***	***Average (dBμV)***	***QP-limit (dBμV)***	***AVG-limit (dBμV)***	***Margin (dB)***
Line 1	166.000	38.19	---	---	65.54	55.54	-17.35
	203.000	49.77	---	---	64.49	54.49	-4.72
	226.000	38.40	---	---	63.83	53.83	-15.43
	355.000	39.67	---	---	60.14	50.14	-10.47
	370.000	37.51	---	---	59.71	49.71	-12.20
	384.000	30.09	---	---	59.31	49.31	-11.22
	391.000	37.45	---	---	59.11	49.11	-11.66
	401.000	37.82	---	---	58.83	48.83	-11.01
	409.000	38.84	---	---	58.60	48.60	-9.76
Line 2	152.000	41.92	---	---	65.94	55.94	-14.02
	203.000	47.31	---	---	64.49	54.49	-7.18
	255.000	37.48	---	---	63.00	53.00	-15.52
	384.000	40.64	---	---	59.31	49.31	-8.67
	452.000	35.85	---	---	57.37	47.37	-11.52
	5000.000	29.36	---	---	56.00	46.00	-16.64
	5180.000	26.98	---	---	60.00	50.00	-23.02

****The reading amplitudes are all under limit.***

Chapter 13 Radiated Emission Test

Test condition and setup

Pretest: Prior to the final test (OATS test), the EUT is placed in a shielded enclosure, and scan from 30MHz to 1GHz. This is done to ensure the radiation is exactly emitted from the EUT. ***Final test:*** Final radiation measurements are made on a **10 – meter,** open-field test site. The EUT is placed on a nonconductive table, which is 0.8m height, the top surface is 1.0 x 1.5 meter. The entire placement is according to EN 55022.

The whole range antenna is used to measure frequency from 30 MHz to 1GHz. The final test is used the spectrum analyzer (EMI Receiver). Measure more than six top marked frequencies generated form pretest by computer step by step at each frequency.

The EUT is rotated 360 degrees, and antenna is raised and lowered from 1 to 4 meters to find the maximum emission levels. The antenna is used with both horizontal and vertical polarization. Appropriated preamplifier which is made by TRC is used for improving sensitivity and precautions is taken to avoid overloading .The spectrum analyzer' s 6dB bandwidth is set to 120 kHz, and the EUT is measured at quasi-peak (below 1GHz) mode.

If the emission is close to the frequency band of ambient, the tester will recheck the data and the corrected data will be written in the test data sheet. If the emission is just within the ambient, the data from shielded room will be taken as the final data.

List of test Instrument

				Calibration Date	
Instrument Name	Model No.	Brand	Serial No.	Last time	Next time
Receiver	SCR3102	SCHAFFNER	021	04/22/03	04/22/04
Control box	TWR95-4	TRC	C9001-2	None	None
Antenna	CBL6141A	SCHAFFNER	4206	05/27/03	05/27/04
Pre-amplifier	TRC-CB-2	TRC	CB-002	05/29/03	05/29/04
Coixal cable (20m)	RG-214/U	Jyebao	CL-002	05/29/03	05/29/04
Coixal cable (50cm)	BNC31VB-0316	Jyebao	CL-002	05/29/03	05/29/04
Coixal cable (20cm)	BNC31VB-0318	Jyebao	CL-007	05/29/03	05/29/04
Coixal cable (55cm)	BNC31VB-0316	Jyebao	CL-006	05/29/03	05/29/04
Coixal cable (55cm)	BNC31VB-0316	Jyebao	CL-005	05/29/03	05/29/04
Open test side (Antenna, Amplify, cable calibrated together)				05/15/03	05/15/04

The level of confidence of 95% , the uncertainty of measurement of radiated emission is +2.85dB / -2.77dB.

Test Result of Spurious Radiated Emissions

Test Conditions:

Testing site : Temperature : 25° C Humidity : 73% RH

Radiated Emission Test Result (Polarity-Horizontal)

Radiated Emission				*Correction Factors*	*Corrected Amplitude*	*Class B*	
Frequency (MHz)	*Amplitude (dBμV)*	*Ant. H. (m)*	*Table (°)*	*(dB)*	*(dBμV/m)*	*Limit (dBμV/m)*	*Margin (dB)*
55.46	16.77	1.00	12	3.74	20.51	30.00	-9.49
118.51	17.81	1.00	147	-1.21	16.60	37.00	-20.40
135.49	20.29	1.00	138	-1.78	18.51	37.00	-18.49
202.17	25.93	1.00	224	-2.68	23.25	37.00	-13.75
398.60	17.87	1.00	165	0.39	18.26	37.00	-18.74
434.97	17.68	1.00	134	2.06	19.74	37.00	-17.26

Radiated Emission Test Result (Polarity-Vertical)

Radiated Emission				*Correction Factors*	*Corrected Amplitude*	*Class B*	
Frequency (MHz)	*Amplitude (dBμV)*	*Ant. H. (m)*	*Table (°)*	*(dB)*	*(dBμV/m)*	*Limit (dBμV/m)*	*Margin (dB)*
103.96	19.27	1.00	295	-0.53	18.74	30.00	-11.26
200.96	31.05	1.00	101	-2.68	28.37	30.00	-1.63
266.44	28.02	1.00	253	-2.93	25.09	37.00	-11.91
333.12	26.69	1.00	145	-1.70	24.99	37.00	-12.01
399.81	24.10	1.00	136	0.43	24.53	37.00	-12.47
434.97	24.47	1.00	294	2.06	26.53	37.00	-10.47

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

2. Corrected Amplitude = Reading Amplitude + Correction Factors

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