



## Test Report

Product Name : GPS Receiver

Model No. : GPS-6017, GPS-6017-U

FCC ID : R3E-60170012

Applicant : Rikaline International Corp.

Address : 14F, 171, ChengGong Rd., Sanchong City, Taipei  
241, Taiwan, R.O.C.

Date of Receipt : 2006/03/09

Issued Date : 2006/03/16

Report No. : 063L048-IT-US-P01V02

The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.

This report must not be used to claim product endorsement by CNLA, NVLAP, NIST or any agency of the Government.

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## Test Report Certification

Issued Date : 2006/03/16  
Report No. : 063L048-IT-US-P01V02

# QuiTek

Product Name : GPS Receiver  
Applicant : Rikaline International Corp.  
Address : 14F, 171, ChengGong Rd., Sanchong City, Taipei  
241, Taiwan, R.O.C.  
Manufacturer : Rikaline International Corp.  
Model No. : GPS-6017, GPS-6017-U  
Rated Voltage : AC 120 V / 60 Hz  
EUT Voltage : Power by PC  
Trade Name : RIKALINE  
Applicable Standard : FCC CFR Title 47 Part 15 Subpart B: 2005 Class B  
CISPR 22: 2005  
Test Result : Complied  
Performed Location : Linkou EMC laboratory  
No.5-22, Ruei-Shu Valley, Ruei-Ping Tsuen Lin Kuo Shiang,  
Taipei, 244 Taiwan, R.O.C.  
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## Laboratory Information

We, **QuieTek Corporation**, are an independent EMC and safety consultancy that was established the whole facility in our laboratories. The test facility has been accredited by the following accreditation Bodies in compliance with ISO 17025, EN 45001 and Guide 25:

<b>Taiwan R.O.C.</b>	:	<b>BSMI, DGT, CNLA</b>
<b>Germany</b>	:	<b>TUV Rheinland</b>
<b>Norway</b>	:	<b>Nemko, DNV</b>
<b>USA</b>	:	<b>FCC, NVLAP</b>
<b>Japan</b>	:	<b>VCCI</b>

The related certificate for our laboratories about the test site and management system can be downloaded from QuieTek Corporation's Web Site : <http://tw.quietek.com/modules/myalbum/>

The address and introduction of QuieTek Corporation's laboratories can be founded in our Web site : <http://www.quietek.com/>

If you have any comments, Please don't hesitate to contact us. Our contact information is as below:

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NVLAP Lab Code : 200347-0



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NVLAP Lab Code: 200533-0



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**1. General Information****1.1. EUT Description**

Product Name	GPS Receiver
Trade Name	RIKALINE
Model No.	GPS-6017, GPS-6017-U

**Note:**

The EUT is including two models for different Cable.

**1.2. Mode of Operation**

QuieTek has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

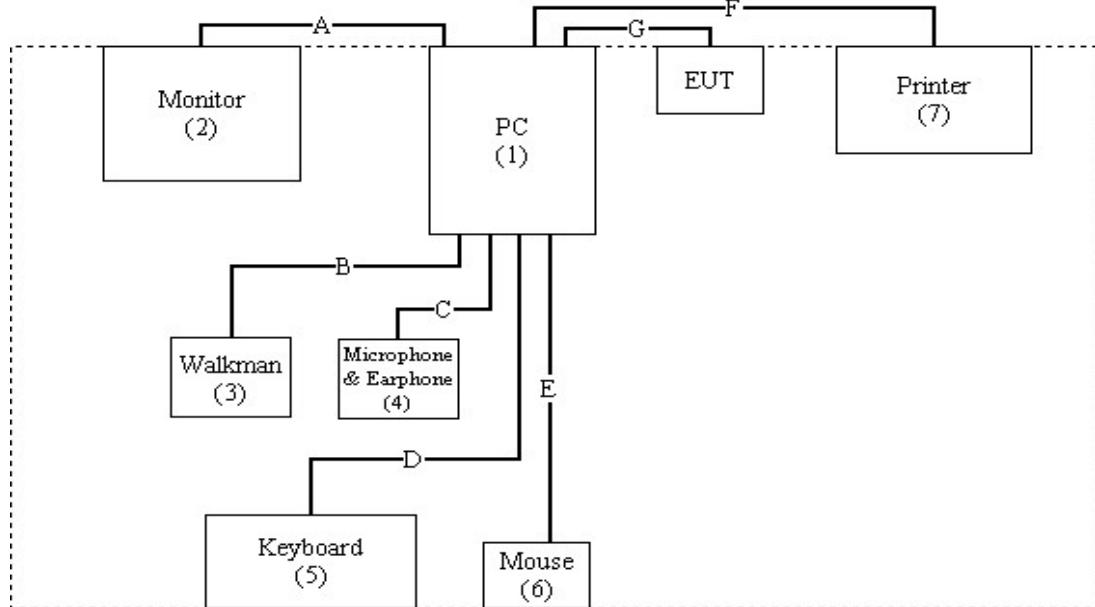
Pre-Test Mode	
Mode 1:Normal Operation (USB)	
Mode 2:Normal Operation (PS/2)	
Final Test Mode	
Emission	Mode 1:Normal Operation (USB)

**1.3. Tested System Details**

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product		Manufacturer	Model No.	Serial No.	Power Cord
1	PC	COMPAQ	Evo D310	SG30801023	Non-Shielded, 1.8m
2	LCD Monitor	CMV	CT-723D	3RC213238L40223	Non-Shielded, 1.8m
3	Walkman	AIWA	HS-TA164	N/A	N/A
4	Microphone & Earphone	N/A	MIC-06	N/A	N/A
5	Keyboard	COMPAQ	KB-0133	B55940MGAPK00G	N/A
6	Mouse	COMPAQ	M-S69	44H0	N/A
7	Printer	EPSON	StyLus C63	FAPY094321	Non-Shielded, 1.9m

#### 1.4. Configuration of Tested System

Connection Diagram		
		
Signal Cable Type	Signal cable Description	
A	D-SUB Cable	Shielded, 1.5m, with two ferrite cores bonded
B	Audio Cable	Non-Shielded, 1.5m
C	Earphone & Microphone Cable	Non-Shielded, 1.8m
D	Keyboard Cable	Shielded, 1.8m
E	Mouse Cable	Shielded, 1.8m
F	Printer Cable	Shielded, 1.5m
G	USB Cable	Shielded, 2.0m

## 1.5. EUT Exercise Software

### Operational Description :

The EUT has the fast acquisition to 20 parallel satellites and tracking up to 12 satellites.

Its update rate is 1 second and averaged Snap Start 3 sec, averaged Hot start 6 sec, averaged Warm start 38 sec., averaged Cold start 42 sec.

It has Built-in WAAS/EGNOS (Optional for WAAS/EGNOS covered area) for accurate positioning result.

Built-in rechargeable Lithium battery is used for backup ephemeris for quick hot start.

It supports NMEA 0183V2.2 data protocol and user initialization is not required.

Enhanced algorithms provide superior navigation performance in urban, canyon and foliage environments.

The position accuracy is as follows :

A) Non DGPS (Differential GPS)

Position <10 M at 2D RMS

Velocity 0.1 meters/second, with SA off

Time 1 microsecond synchronized GPS time

B) DGPS (Differential GPS) or WAAS / EGNOS ON (Built by demand)

Position 1 ~ 5 meter, typical

Velocity 0.05 meters/second, typical

A rechargeable battery sustains internal clock and memory.

It has built-in Magnets which is used on top of the car and water proof design for all weather.

## 2. Technical Test

### 2.1. Summary of Test Result

- No deviations from the test standards
- Deviations from the test standards as below description:

Emission			
Performed Item	Normative References	Test Performed	Deviation
Conducted Emission	FCC CFR Title 47 Part 15 Subpart B: 2005 Class B ANSI C63.4: 2003	Yes	No
Radiated Emission	FCC CFR Title 47 Part 15 Subpart B: 2005 Class B ANSI C63.4: 2003	Yes	No

## 2.2. List of Test Equipment

### Conducted Emission / SR1

Instrument	Manufacturer	Type No.	Serial No	Cal. Date
EMI Test Receiver	R&S	ESCS 30	836858/022	2006/02/18
LISN	R&S	ESH3-Z5	836679/020	2006/02/14
LISN	R&S	ENV4200	833209/007	2005/07/27
Pulse Limiter	R&S	ESH3-Z2	357.88.10.52	2005/09/07

### Radiated Emission / Site3

Instrument	Manufacturer	Type No.	Serial No	Cal. Date
Bilog Antenna	Schaffner Chase	CBL6112B	2704	2005/09/15
Broadband Horn Antenna	Schwarzbeck	BBHA9170	208	2005/07/25
EMI Test Receiver	R&S	ESCS 30	838251/001	2005/03/22
EMI Test Receiver	R&S	ESI 26	838786/004	2005/05/25
Horn Antenna	Schwarzbeck	BBHA9120D	305	2005/08/10
Pre-Amplifier	MITEQ	AMF-4D-18040 0-45-6P	925974	2006/01/03
Pre-Amplifier	QTK	N/A	N/A	2006/01/03
Spectrum Analyzer	Advantest	R3162	101102468	2005/10/24

### **2.3. Measurement Uncertainty**

#### Conducted Emission

The measurement uncertainty is evaluated as  $\pm$  2.26 dB.

#### Radiated Emission

The measurement uncertainty is evaluated as  $\pm$  3.19 dB.

## 2.4. Test Environment

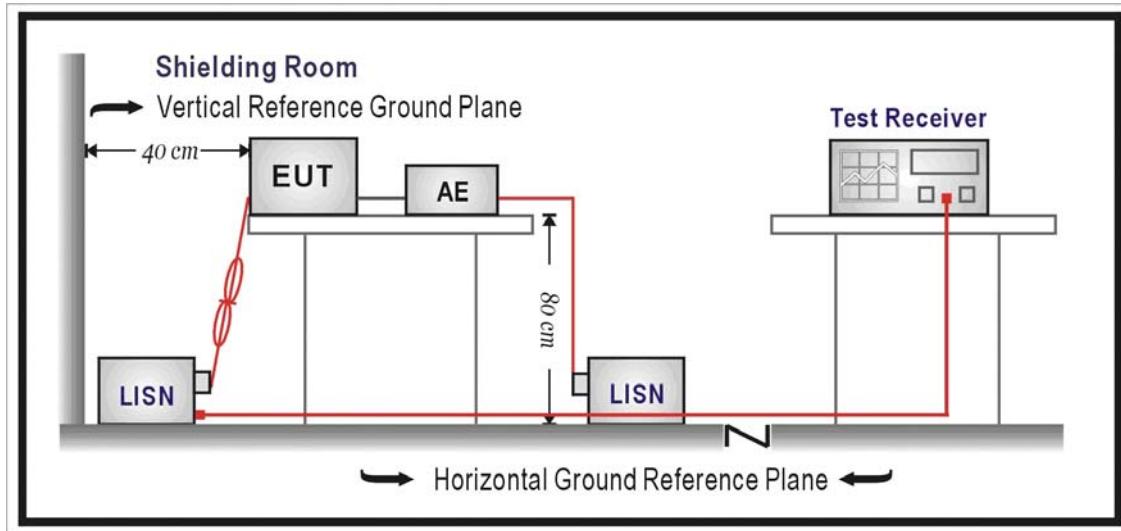
Performed Item	Items	Required	Actual
Conducted Emission	Temperature (°C)	15-35	25
	Humidity (%RH)	25-75	50
	Barometric pressure (mbar)	860-1060	950-1000
Radiated Emission	Temperature (°C)	15-35	25
	Humidity (%RH)	25-75	50
	Barometric pressure (mbar)	860-1060	950-1000

### 3. Conducted Emission

#### 3.1. Test Specification

According to Standard : FCC Part 15 Subpart B, ANSI C63.4

#### 3.2. Test Setup



#### 3.3. Limit

Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
0.15 - 0.50	66 - 56	56 – 46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks: In the above table, the tighter limit applies at the band edges.

### **3.4. Test Procedure**

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination.

(Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed on conducted measurement.

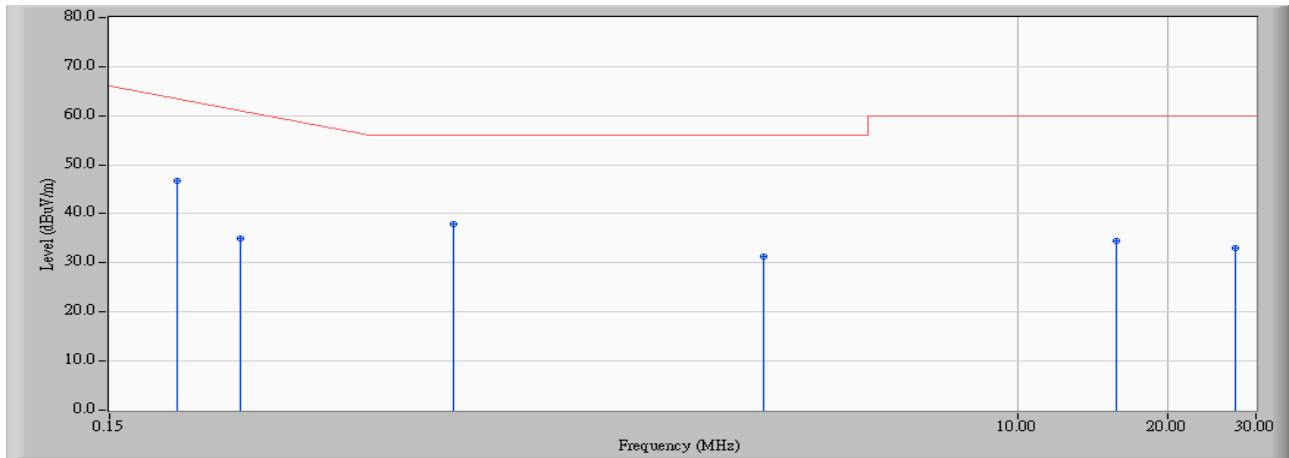
Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

### 3.5. Test Result

Site : SR-1	Time : 2006/03/15 - 21:31
Limit : CISPR_B_00M_QP	Margin : 10
EUT : GPS RECEIVER	Probe : LISN-L(023) - Line1
Power : AC 120V/60Hz	Note : MODE 1



Site : SR-1	Time : 2006/03/15 - 21:33
Limit : CISPR_B_00M_QP	Margin : 0
EUT : GPS RECEIVER	Probe : LISN-L(023) - Line1
Power : AC 120V/60Hz	Note : MODE 1

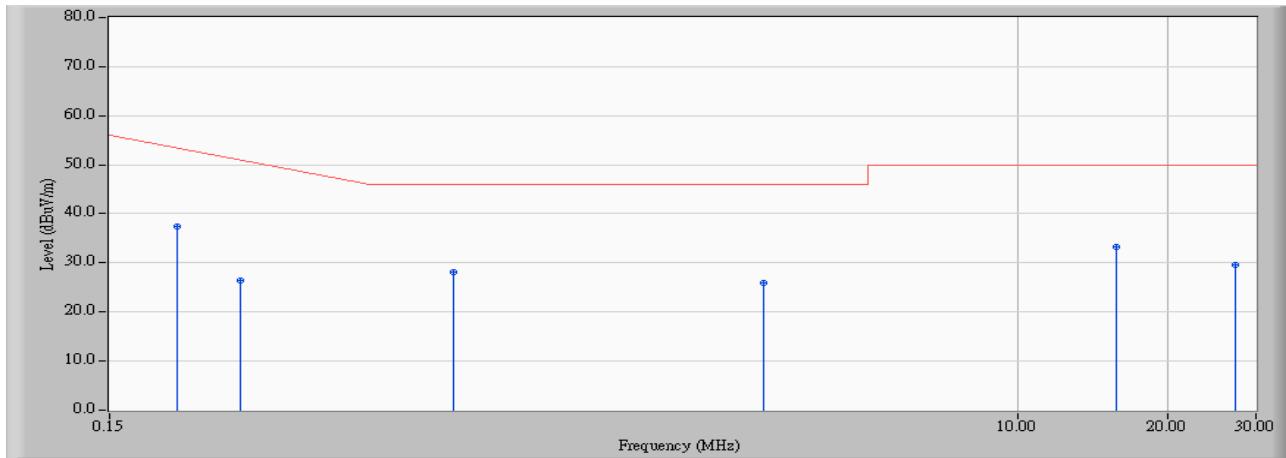


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	*	0.205	0.613	46.000	46.613	-17.816	64.429	QUASIPEAK
2		0.275	0.300	34.590	34.890	-27.539	62.429	QUASIPEAK
3		0.736	0.310	37.670	37.980	-18.020	56.000	QUASIPEAK
4		3.076	0.370	30.830	31.200	-24.800	56.000	QUASIPEAK
5		15.748	1.010	33.420	34.430	-25.570	60.000	QUASIPEAK
6		27.322	1.200	31.780	32.980	-27.020	60.000	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Site : SR-1	Time : 2006/03/15 - 21:33
Limit : CISPR_B_00M_AV	Margin : 0
EUT : GPS RECEIVER	Probe : LISN-L(023) - Line1
Power : AC 120V/60Hz	Note : MODE 1

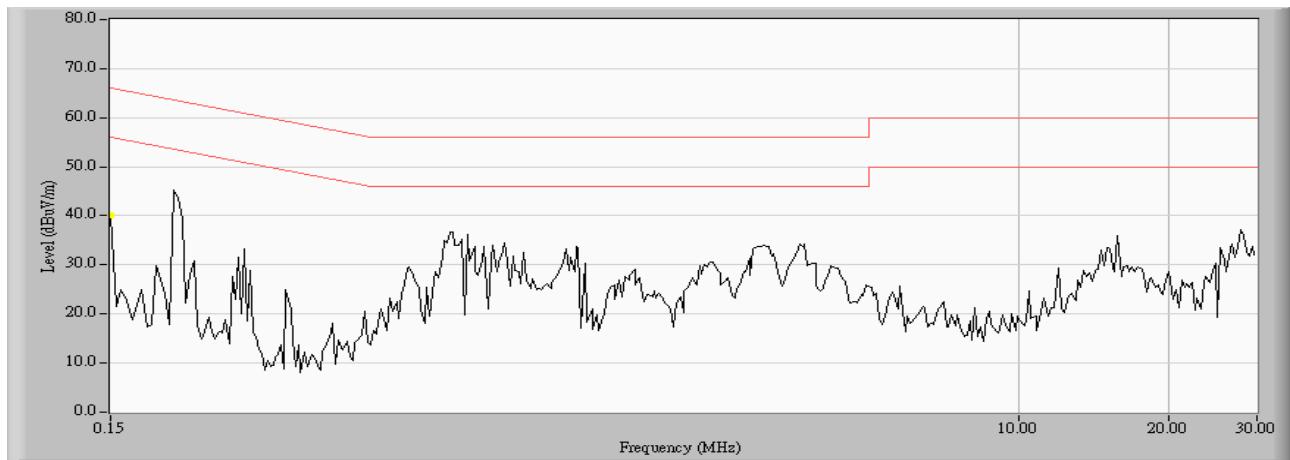


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	0.205	0.613	36.780	37.393	-17.036	54.429	AVERAGE
2	0.275	0.300	26.060	26.360	-26.069	52.429	AVERAGE
3	0.736	0.310	27.840	28.150	-17.850	46.000	AVERAGE
4	3.076	0.370	25.640	26.010	-19.990	46.000	AVERAGE
5	*	1.010	32.200	33.210	-16.790	50.000	AVERAGE
6	27.322	1.200	28.380	29.580	-20.420	50.000	AVERAGE

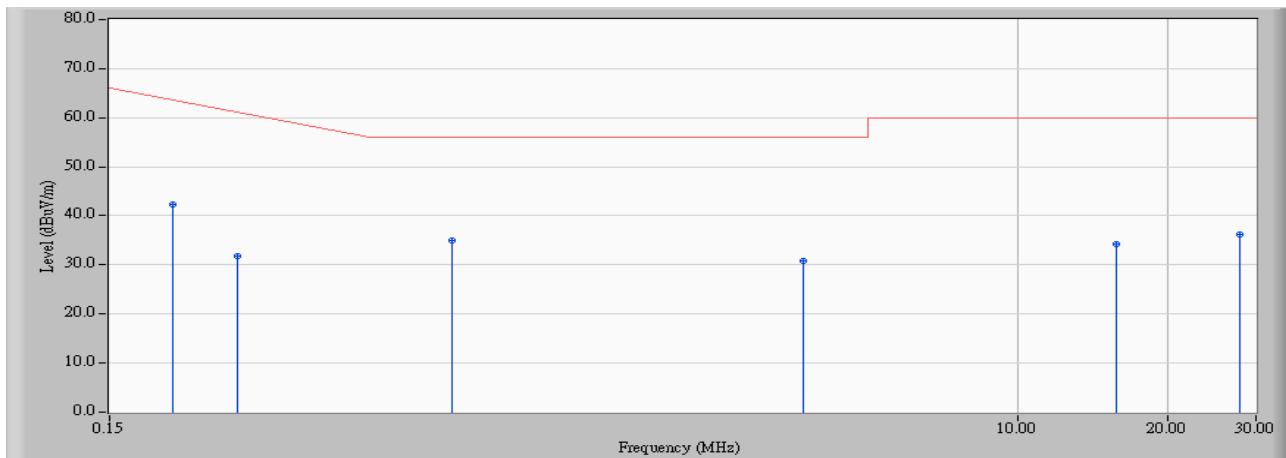
Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Site : SR-1	Time : 2006/03/15 - 21:36
Limit : CISPR_B_00M_QP	Margin : 10
EUT : GPS RECEIVER	Probe : LISN-N(023) - Line2
Power : AC 120V/60Hz	Note : MODE 1



Site : SR-1	Time : 2006/03/15 - 21:39
Limit : CISPR_B_00M_QP	Margin : 0
EUT : GPS RECEIVER	Probe : LISN-N(023) - Line2
Power : AC 120V/60Hz	Note : MODE 1

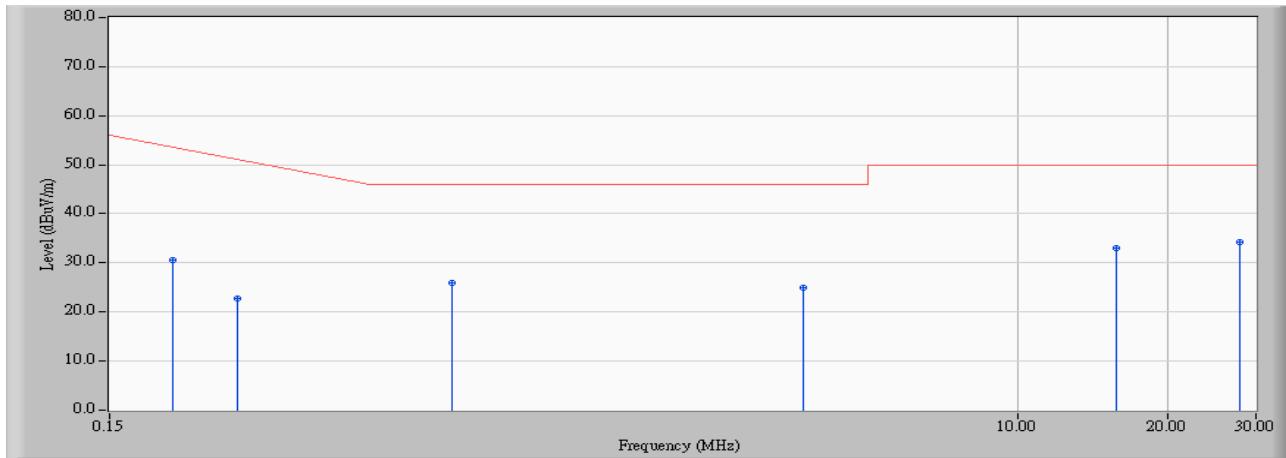


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	0.201	0.300	42.020	42.320	-22.223	64.543	QUASIPEAK
2	0.271	0.300	31.620	31.920	-30.623	62.543	QUASIPEAK
3	* 0.732	0.315	34.640	34.955	-21.045	56.000	QUASIPEAK
4	3.705	0.390	30.440	30.830	-25.170	56.000	QUASIPEAK
5	15.748	0.900	33.320	34.220	-25.780	60.000	QUASIPEAK
6	27.892	1.040	35.230	36.270	-23.730	60.000	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Site : SR-1	Time : 2006/03/15 - 21:39
Limit : CISPR_B_00M_AV	Margin : 0
EUT : GPS RECEIVER	Probe : LISN-N(023) - Line2
Power : AC 120V/60Hz	Note : MODE 1



	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type	
1	0.201	0.300	30.300	30.600	-23.943	54.543	AVERAGE	
2	0.271	0.300	22.430	22.730	-29.813	52.543	AVERAGE	
3	0.732	0.315	25.700	26.015	-19.985	46.000	AVERAGE	
4	3.705	0.390	24.450	24.840	-21.160	46.000	AVERAGE	
5	15.748	0.900	32.060	32.960	-17.040	50.000	AVERAGE	
6	*	27.892	1.040	33.320	34.360	-15.640	50.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

### 3.6. Test Photograph

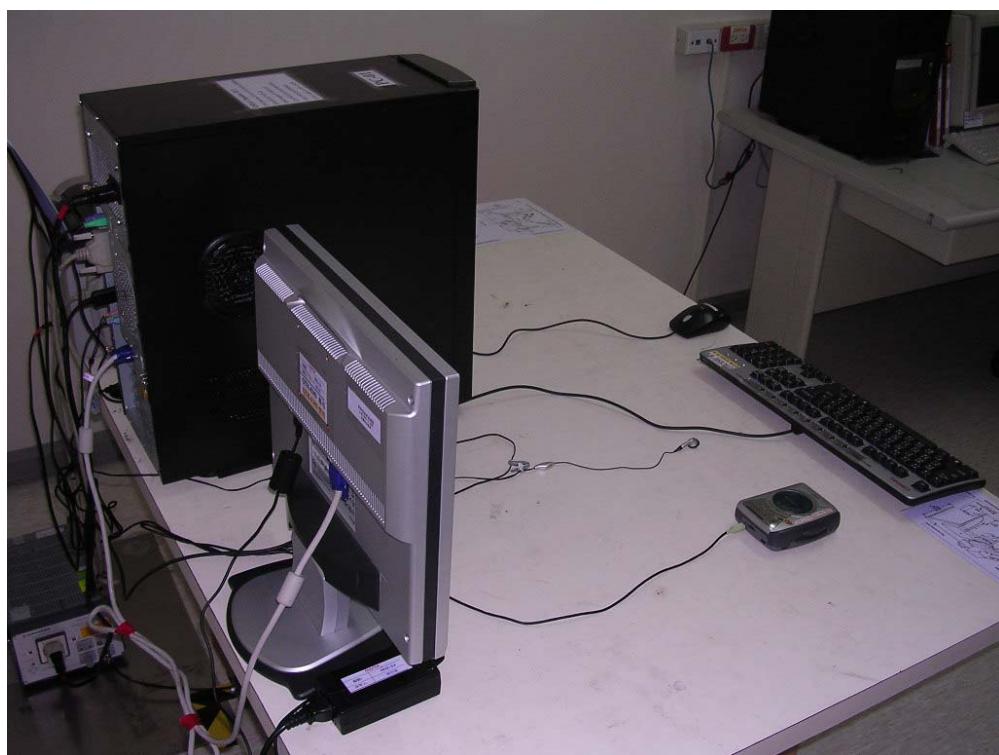
Test Mode : Mode 1:Normal Operation (USB)

Description : Front View of Conducted Test



Test Mode : Mode 1:Normal Operation (USB)

Description : Back View of Conducted Test



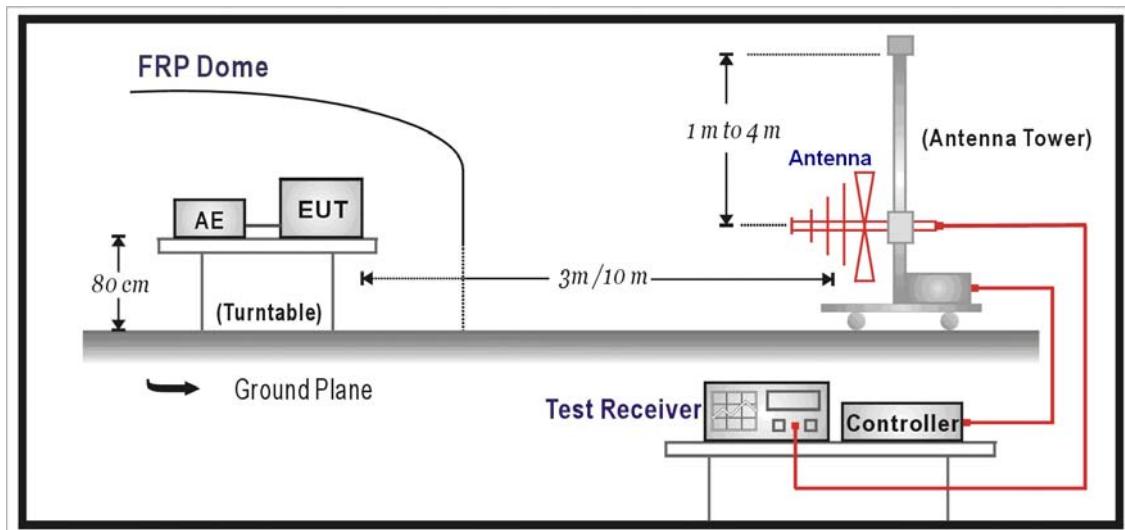
## 4. Radiated Emission

### 4.1. Test Specification

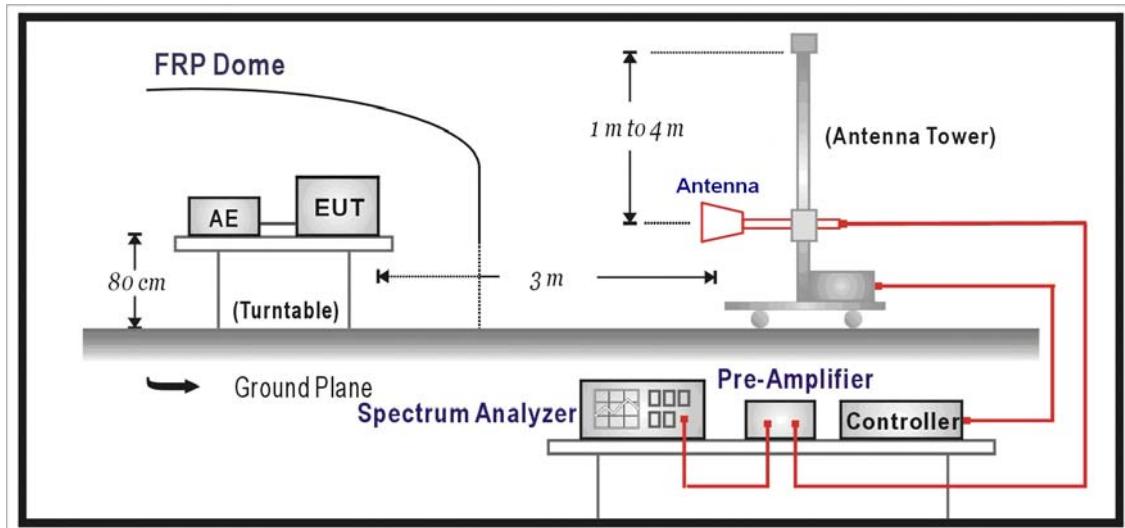
According to EMC Standard : FCC Part 15 Subpart B, ANSI C63.4

### 4.2. Test Setup

Under 1GHz Test Setup:



Above 1GHz Test Setup:



#### 4.3. Limit

Under 1GHz test shall not exceed the following value:

Limits		
Frequency (MHz)	Distance (m)	dBuV/m
30 – 230	10	30
230 – 1000	10	37

Remark:

1. The tighter limit shall apply at the edge between two frequency bands.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

Above 1GHz test shall not exceed the following value:

FCC Part 15 Subpart B Paragraph 15.109 Limits (dBuV/m)		
Frequency (MHz)	Distance (m)	dBuV/m
30-88	3	40
88-216	3	43.5
216-960	3	46
Above 960	3	54

Remark:

1. The tighter limit shall apply at the edge between two frequency bands.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
3. RF Voltage (dBuV/m) =  $20 \log \text{RF Voltage (uV/m)}$

#### 4.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground.

The turn table can rotate 360 degrees to determine the position of the maximum emission level and the antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated on radiated measurement.

For an unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a radiated emission limit is specified, up to the frequency shown in the following table:

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5 <sup>th</sup> harmonic of the highest frequency or 40 GHz, whichever is lower

On any frequency or frequencies below or equal to 1000 MHz, the radiated limits shown are based on measuring equipment employing a quasi-peak detector function and above 1000 MHz, the radiated limits shown are based on measuring equipment employing an average detector function.

When average radiated emission measurement are included emission measurement Above 1000 MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.

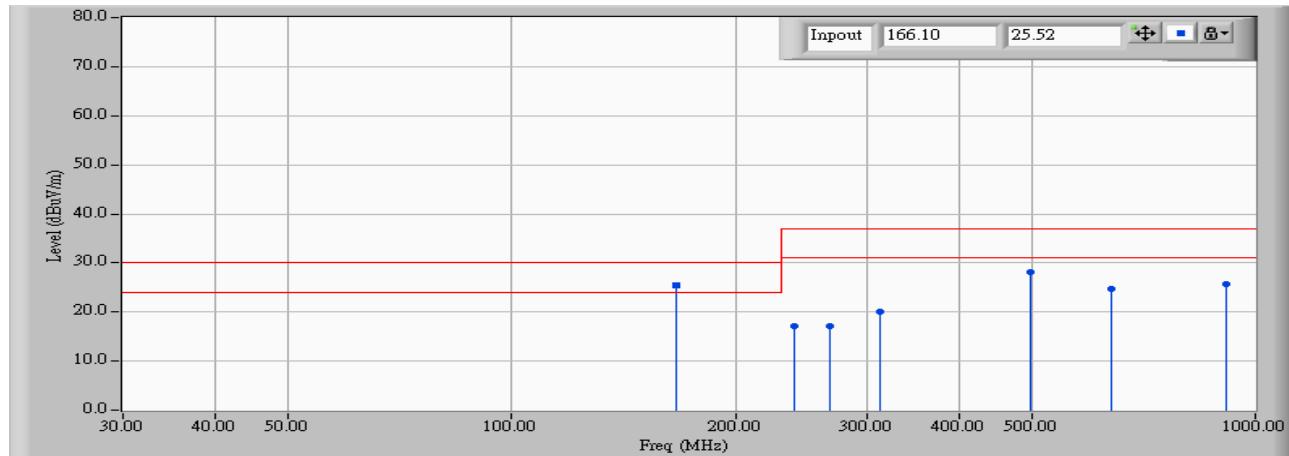
For class A, the measurement distance between the EUT and antenna is 10 meters for under 1GHz and above 1GHz.

For class B, the measurement distance between the EUT and antenna is 10 meters for under 1GHz and 3 meters for above 1GHz.

The bandwidth below 1GHz setting on the field strength meter (R&S Test Receiver ESCS 30) is 120 kHz and above 1GHz is 1MHz.

#### 4.5. Test Result

Site : OATS-3	Time : 2006/03/16 - 00:53
Limit : CISPR_B_10M_QP	Margin : 6
EUT : GPS Receiver	Probe : LKCBL6112(2704) - HORIZONTAL
Power : AC 120V/60Hz	Note : Mode 1

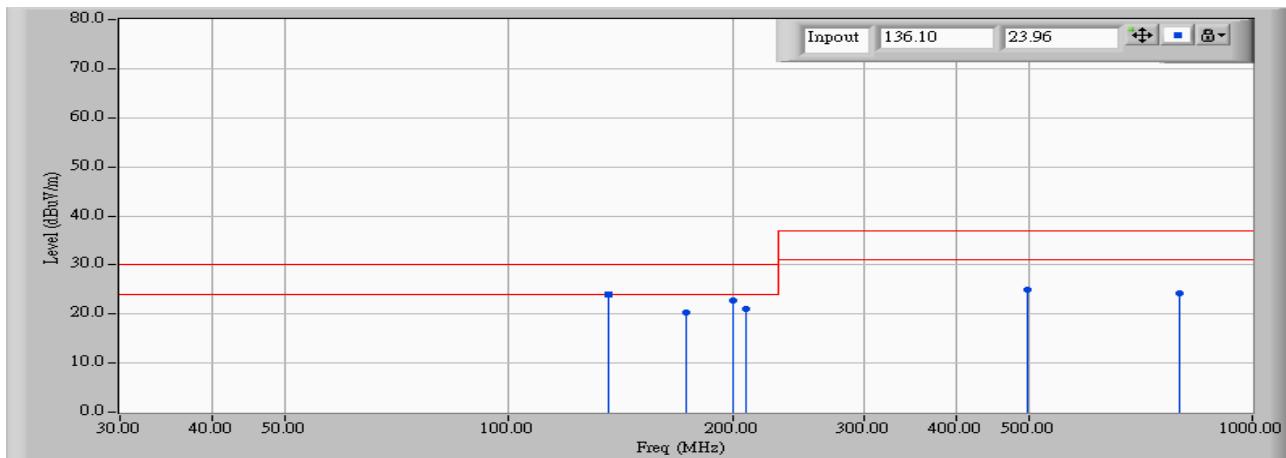


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	166.100	11.310	14.210	25.520	-4.480	30.000	QUASIPEAK
2		240.230	13.131	3.900	17.031	-19.969	37.000	QUASIPEAK
3		267.269	14.796	2.360	17.156	-19.844	37.000	QUASIPEAK
4		312.350	15.000	5.090	20.090	-16.910	37.000	QUASIPEAK
5		498.644	19.909	8.210	28.119	-8.881	37.000	QUASIPEAK
6		639.995	22.805	2.020	24.825	-12.175	37.000	QUASIPEAK
7		911.970	24.550	1.200	25.750	-11.250	37.000	QUASIPEAK

#### Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Site : OATS-3	Time : 2006/03/16 - 00:40
Limit : CISPR_B_10M_QP	Margin : 6
EUT : GPS Receiver	Probe : LKCBL6112(2704) - VERTICAL
Power : AC 120V/60Hz	Note : Mode 1



	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	* 136.100	12.496	11.460	23.956	-6.044	30.000	QUASIPEAK
2	173.300	10.591	9.710	20.301	-9.699	30.000	QUASIPEAK
3	200.000	10.774	12.070	22.844	-7.156	30.000	QUASIPEAK
4	208.899	11.130	9.980	21.110	-8.890	30.000	QUASIPEAK
5	498.135	19.890	5.160	25.050	-11.950	37.000	QUASIPEAK
6	799.990	23.827	0.300	24.127	-12.873	37.000	QUASIPEAK

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " \* ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

#### 4.6. Test Photograph

Test Mode : Mode 1:Normal Operation (USB)

Description : Front View of Radiated Test



Test Mode : Mode 1:Normal Operation (USB)

Description : Back View of Radiated Test

