



Test Report

For

Applicant : RF-Link Systems Inc.
Equipment Type : Wireless Game Controller
Model : RF50401
FCC ID : MIBRF50401

Report No. : 997H017FI



Test Report Certification

Quietek Corporation

No.75-1, Wang-Yeh Valley, Yung-Hsing, Chiung-Lin,

Hsin-Chu County, Taiwan, R.O.C.

Tel : 886-3-592-8858, Fax: 886-3-592-8859

E-Mail : quietek@ms24.hinet.net

Accredited by NIST(NVLAP), VCCI, BSMI, DNV, TUV

Applicant : RF-Link Systems Inc.
Address : 1F, No.9, Chan Yeh Road 1, Science-Based Industrial Park,
Hsin-Chu, Taiwan, R.O.C.
Equipment Type : Wireless Game Controller
Model : RF50401
FCC ID. : MIBRF50401
Measurement Standard : FCC Part 15 Subpart C Paragraph 15.249
Measurement Procedure : ANSI C63.4 /1992
Operation Voltage : DC 3V
Test Result : Complied
Test Date : July 20, 1999
Report No. : 997H017FI



The Test Results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of Quietek Corporation.

This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

Documented by: Kim Huang

Test Engineer: Jeff Chen

Approved: Gene Chang

Handwritten signature of Kim Huang in black ink.

Handwritten signature of Jeff Chen in black ink.

Handwritten signature of Gene Chang in black ink.



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LABORATORY OF LICENSE

1. General Information

1.1 EUT Description

Applicant : RF-Link Systems Inc.
Address : 1F, No.9, Chan Yeh Road 1, Science-Based
Industrial Park, Hsin-Chu, Taiwan, R.O.C.
Equipment Type : Wireless Game Controller
Model : RF50401
FCC ID : MIBRF50401
Frequency Range : 902 MHz to 928MHz
Channel Number : 2 (Group A and B)
Frequency of each Channel : 917.3, and 906.7MHz
Working Frequency
Type of Modulation : FM (Frequency $\leq 100\text{kHz}$)
Operator Selection of : Manual Switch
Operating Frequency
Operation Voltage : DC 3V

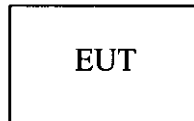
- Note : 1. This device with the receiver are combined with a 900MHz wireless Game Controller.
2. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.249 for non-spread spectrum devices.
3. This receiver was, measured and made a test report that the report number is 997H017F2, certified under Declaration of Conformity.

1.2 Tested System Details

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

1.2.1 None

1.3 EUT Configuration



1.4 EUT Exercise Software

The EUT exercise program used during conducted testing was designed to exercise the EUT in a manner similar to a typical use. The exercise sequence is listed as below:

- 1.4.1 Setup the EUT and simulators as shown on 1.3.
- 1.4.2 Turn on the power of all equipment.
- 1.4.3 The EUT will emit the fundamental frequency with data code to Receiver.
- 1.4.4 Repeat the above procedure 1.4.2 to 1.4.3

1.5 Test performed

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

Radiated emissions were investigated over the frequency range from **30MHz to 1000MHz** using a receiver bandwidth of 120kHz and the frequency range from **1GHz to 10GHz** using a receiver bandwidth of 1MHz.

Radiated testing was performed at an antenna to EUT distance of 3 meters .

1.6 Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

Site Description: November 3, 1998 File on
 Federal Communications Commission
 FCC Engineering Laboratory
 7435 Oakland Mills Road
 Columbia, MD 21046
 Reference 31040/SIT1300F2



September 30, 1998 Accreditation on NVLAP
 NVLAP Lab Code: 200347-0



February 23, 1999 Accreditation on DNV
 Statement No. : 413-99-LAB11

December 8, 1998 Registration on VCCI
 Registration No. for No.2 Shielded Room C-858
 Registration No. for No.1 Open Area Test Site R-823
 Registration No. for No.2 Open Area Test Site R-835



January 04, 1999 Accreditation on TÜV Rheinland
 Certificate No.: I9865712-9901



Name of firm : QuieTek Corporation

Site location : No.75-1, Wang-Yeh Valley, Yung-Hsing Tsuen,
 Chiung-Lin, Hsin-Chu County, Taiwan, R.O.C.

2. Conducted Emission

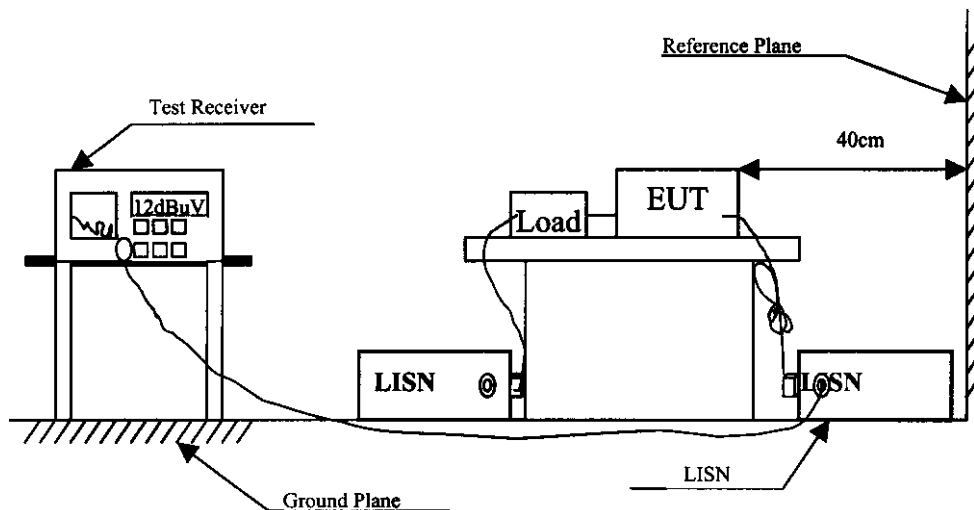
2.1 Test Equipment List

The following test equipment are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal..	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 1999	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 1999	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 1999	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	N/A	
5	N0.2 Shielded Room			N/A	

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

2.2 Test Setup



2.3 Limits

FCC Part 15 Paragraph 15.207 (dBuV)		
Frequency MHz	Limits	
	uV	dBuV
0.45 - 30	250	48.0

2.4 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 according to ANSI C63.4 /1992 on conducted measurement.

The bandwidth of the field strength meter (R & S Test Receiver ESCS 30) is set at 9kHz.

2.5 Test Results

The EUT is a Battery Supplied, No conduction measurement was performed.

3. Radiated Emission

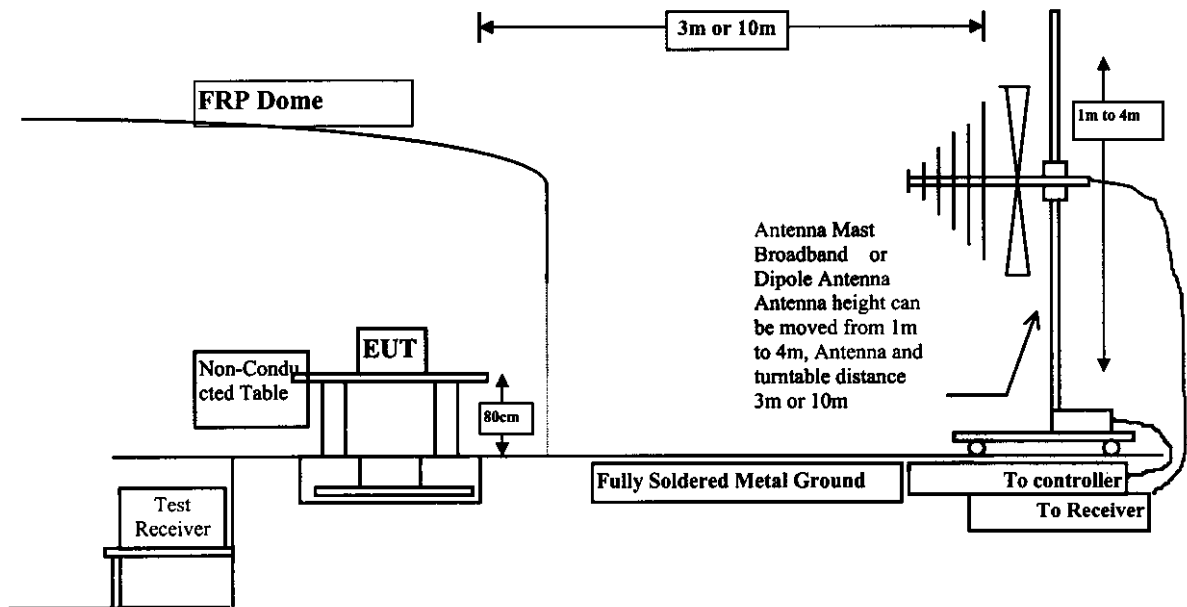
3.1 Test Equipment

The following test equipment are used during the radiated emission test:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Site # 1	X	Test Receiver	R & S	ESCS 30 / 825442/14	May, 1999
		Spectrum Analyzer	Advantest	R3261C / 71720140	May, 1999
		Pre-Amplifier	HP	8447D/3307A01812	May, 1999
	X	Bilog Antenna	Chase	CBL6112B / 12452	Sep., 1998
	X	Horn Antenna	EM	EM6917 / 103325	May, 1999
Site # 2	X	Test Receiver	R & S	ESCS 30 / 825442/17	May, 1999
		Spectrum Analyzer	Advantest	R3261C / 71720609	May, 1999
		Pre-Amplifier	HP	8447D/3307A01814	May, 1999
	X	Bilog Antenna	Chase	CBL6112B / 2455	Sep., 1998
	X	Horn Antenna	EM	EM6917 / 103325	May, 1999

- Note: 1. All equipment upon which need to calibrated are with calibration period of 1 year.
 2.. Mark "X" test instruments are used to measure the final test results.

3.2 Test Setup



3.3 Limits

► Fundamental and Harmonics Emission Limits

Frequency MHz	Field Strength of Fundamental		Field Strength of Harmonics	
	(mV/m @3m)	(dBuV/m @3m)	(uV/m @3m)	(dBuV/m @3m)
902-928	50	94 (Average)	500	54 (Average)
		114 (Peak)		74 (Peak)

► General Radiated Emission Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

Frequency MHz	50dB below of the fundamental (dBuV/m @3m)	15.209 Limits (dBuV/m @3m)	General Radiated Limits (dBuV/m @3m)
30-88	40	40	40
88-216	43.5	43.5	43.5
216-960	44	46	46
Above 960	44	54	54

- Remarks :
1. RF Line Voltage (dBuV) = 20 log RF Line Voltage (uV)
 2. In the Above Table, the tighter limit applies at the band edges.
 3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3.4 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. The EUT was positioned such that the distance from antenna to the EUT was 3 meters . 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 according to ANSI C63.4 /1992 on radiated measurement.

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

3.5 Test Results

The radiated emission from the EUT is measured and shown in Chapter 4. The acceptance criterion was met and the EUT passed the test.



4. **EMI Reduction Method During Compliance Testing**

No modification was made during testing.



5. Attachment

Attachment 1: Summary of Test Results	Number of Pages: 11
Attachment 2: EUT Test Photographs	Number of Pages: 1
Attachment 3 : EUT detail photographic	Number of Pages: 6

Attachment 1 : Summary of Test Results

The test results in the emission were performed according to the requirements of measurement standard and process. Quietek Corporation is assumed full responsibility for the accuracy and completeness of these measurements. The test data of the emission are listed as the attached data.

All the tests were carried out with the EUT in normal operation, which was defined as:

- (1) Mode 1: Group A (917.3 MHz)
- (2) Mode 2: Group B (906.7 MHz)

The EUT passed all the tests.

The uncertainty is calculated in accordance with NAMAS NIS 81, The total uncertainty for this test is as follows:

➤ **Emission Test**

- Uncertainty in the Conducted Emission Test: < ± 2.0 dB
- Uncertainty in the field strength measured: < ± 4.0 dB



Fundamental Radiated Emission Data

Date of Test : July 20, 1999 EUT : Wireless Game Controller
 Test Mode : Mode 1 & 2 Test Site : No.2 Open Test Site

Freq.	Cable Loss	Probe Factor	PreAMP dB	Reading Level	Measurement Horizontal	Margin dB	Limit dBuV/m	Ant cm	Turn deg
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm	deg

Fundamental Frequency

Peak Detector

Group A

918.100	5.58	21.06	26.00	74.40	75.04	38.96	114.00	0	0
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Group B

906.200	5.51	21.09	26.00	75.60	76.21	37.79	114.00	0	0
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Average Detector

The measurement levels of the fundamental frequency were lower than Average limit.
 It is not necessary to test average level.

Remarks:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. " * ", means this data is the worst emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable loss

Fundamental Radiated Emission Data

Date of Test : July 20, 1999 EUT : Wireless Game Controller
 Test Mode : Mode 1 Test Site : No.2 Open Test Site

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement Vertical	Margin	Limit	Ant	Turn
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm	deg

Fundamental Frequency

Peak Detector

Group A

918.100	5.58	21.66	26.00	67.60	68.84	45.16	114.00	0	0
---------	------	-------	-------	-------	-------	-------	--------	---	---

Group B

906.900	5.52	21.39	26.00	68.00	68.91	45.09	114.00	0	0
---------	------	-------	-------	-------	-------	-------	--------	---	---

Average Detector

The measurement levels of the fundamental frequency were lower than Average limit.
 It is not necessary to test average level.

Remarks:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. " * ", means this data is the worst emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable loss

Harmonic Radiated Emission Data

Date of Test : July 20, 1999 EUT : Wireless Game Controller
 Test Mode : Mode 1 Test Site : No.2 Open Test Site

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement Horizontal	Margin	Limit	Ant	Turn
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm	deg
Peak Detect									
1835.100	1.10	27.60	34.60	41.16	35.25	38.75	74.00	0	0
2752.700	1.65	30.14	34.60	43.11	40.31	33.69	74.00	0	0
3670.300	2.20	31.93	34.56	42.88	42.45	31.55	74.00	0	0
4587.900	2.87	33.21	34.42	41.83	43.49	30.51	74.00	0	0
5505.500	3.65	33.96	34.31	41.70	45.00	29.00	74.00	0	0
6423.100	4.56	34.97	34.49	41.59	46.63	27.37	74.00	0	0
7340.700	5.57	36.34	34.74	43.34	50.51	23.49	74.00	0	0
8258.300	6.59	37.08	34.90	45.63	54.40	19.60	74.00	0	0
9175.900	7.53	37.33	35.07	46.71	56.51	17.49	74.00	0	0
Average Detector									
* 8258.300	6.59	37.08	34.90	39.65	48.42	5.58	54.00	0	0
9175.900	7.53	37.33	35.07	38.54	48.33	5.67	54.00	0	0

Remarks:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. " * ", means this data is the worst emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable loss

Harmonic Radiated Emission Data

Date of Test : July 20, 1999 EUT : Wireless Game Controller
 Test Mode : Mode 1 Test Site : No.2 Open Test Site

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement Vertical	Margin	Limit	Ant	Turn
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm	deg
Peak Detect									
1835.100	1.10	27.60	34.60	41.70	35.79	38.21	74.00	0	0
2752.700	1.65	30.14	34.60	44.08	41.28	32.72	74.00	0	0
3670.300	2.20	31.93	34.56	42.88	42.45	31.55	74.00	0	0
4587.900	2.87	33.21	34.42	41.83	43.49	30.51	74.00	0	0
5505.500	3.65	33.96	34.31	41.70	45.00	29.00	74.00	0	0
6423.100	4.56	34.97	34.49	41.59	46.63	27.37	74.00	0	0
7340.700	5.57	36.34	34.74	43.34	50.51	23.49	74.00	0	0
8258.300	6.59	37.08	34.90	45.63	54.40	19.60	74.00	0	0
9175.900	7.53	37.33	35.07	46.71	56.51	17.49	74.00	0	0
Average Detector									
8258.300	6.59	37.08	34.90	40.63	49.40	4.60	54.00	0	0
* 9175.900	7.53	37.33	35.07	39.87	49.66	4.34	54.00	0	0

Remarks:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. " * ", means this data is the worst emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable loss

Harmonic Radiated Emission Data

Date of Test : July 20, 1999 EUT : Wireless Game Controller
 Test Mode : Mode 2 Test Site : No.2 Open Test Site

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement Horizontal	Margin	Limit	Ant	Turn
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm	deg
Peak Detect									
1813.540	1.09	27.54	34.62	42.59	36.60	37.40	74.00	0	0
2720.420	1.64	30.06	34.59	45.25	42.35	31.65	74.00	0	0
3627.180	2.17	31.84	34.60	44.77	44.19	29.81	74.00	0	0
4533.920	2.83	33.15	34.41	43.36	44.93	29.07	74.00	0	0
5440.750	3.60	33.92	34.33	41.84	45.03	28.97	74.00	0	0
6347.580	4.47	34.81	34.47	42.73	47.54	26.46	74.00	0	0
7254.340	5.48	36.26	34.70	43.91	50.94	23.06	74.00	0	0
8161.240	6.48	37.05	34.90	46.48	55.11	18.89	74.00	0	0
9068.100	7.45	37.31	35.02	47.79	57.53	16.47	74.00	0	0
Average Detector									
8161.240	6.48	37.05	34.90	40.34	48.97	5.03	54.00	0	0
* 9068.100	7.45	37.31	35.02	40.78	50.52	3.48	54.00	0	0

Remarks:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. " * ", means this data is the worst emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable loss

Harmonic Radiated Emission Data

Date of Test : July 20, 1999 EUT : Wireless Game Controller
 Test Mode : Mode 2 Test Site : No.2 Open Test Site

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement Vertical	Margin	Limit	Ant	Turn
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm	deg
Peak Detect									
1813.540	1.09	27.54	34.62	42.05	36.06	37.94	74.00	0	0
2720.420	1.64	30.06	34.59	44.58	41.68	32.32	74.00	0	0
3627.180	2.17	31.84	34.60	44.34	43.76	30.24	74.00	0	0
4533.920	2.83	33.15	34.41	42.70	44.27	29.73	74.00	0	0
5440.740	3.60	33.92	34.33	43.74	46.93	27.07	74.00	0	0
6347.580	4.47	34.81	34.47	43.57	48.38	25.62	74.00	0	0
7254.340	5.48	36.26	34.70	44.85	51.88	22.12	74.00	0	0
8161.240	6.48	37.05	34.90	46.09	54.72	19.28	74.00	0	0
9068.100	7.45	37.31	35.02	46.84	56.58	17.42	74.00	0	0
Average Detector									
8161.240	6.48	37.05	34.90	39.87	48.50	5.50	54.00	0	0
* 9068.100	7.45	37.31	35.02	40.32	50.06	3.94	54.00	0	0

Remarks:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. " * ", means this data is the worst emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable loss

General Radiated Emission Data

Date of Test : July 20, 1999 EUT : Wireless Game Controller
 Test Mode : Mode 1 Test Site : No.2 Open Test Site

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement Horizontal	Margin	Limit	Ant	Turn
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm	deg
34.817	1.20	17.01	0.00	-1.37	16.84	23.16	40.00	207	1
66.842	1.50	6.31	0.00	10.72	18.54	21.46	40.00	284	61
75.420	1.59	8.26	0.00	14.15	24.00	16.00	40.00	245	62
687.150	5.77	19.05	0.00	5.65	30.47	15.53	46.00	227	5
724.360	5.97	19.80	0.00	-7.03	18.74	27.26	46.00	207	64
* 814.620	6.44	20.51	0.00	3.45	30.40	15.60	46.00	184	147

Remarks:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. " * ", means this data is the worst emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable loss

General Radiated Emission Data

Date of Test : July 20, 1999 EUT : Wireless Game Controller
 Test Mode : Mode 1 Test Site : No.2 Open Test Site

Freq.	Cable	Probe	PreAMP	Reading	Measurement	Margin	Limit	Ant	Turn
MHz	Loss	Factor		Level	Vertical			cm	deg
	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m		
32.485	1.18	17.99	0.00	-1.96	17.20	22.80	40.00	99	200
67.241	1.50	8.15	0.00	10.45	20.10	19.90	40.00	100	39
76.245	1.60	8.53	0.00	9.23	19.35	20.65	40.00	100	31
* 667.521	5.67	19.33	0.00	4.50	29.50	16.50	46.00	168	117
752.460	6.11	20.22	0.00	1.31	27.64	18.36	46.00	163	175
776.320	6.24	20.06	0.00	-4.65	21.65	24.35	46.00	113	37

Remarks:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. " * ", means this data is the worst emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable loss

General Radiated Emission Data

Date of Test : July 20, 1999 EUT : Wireless Game Controller
 Test Mode : Mode 2 Test Site : No.2 Open Test Site

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement Horizontal	Margin	Limit	Ant	Turn
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm	deg
36.514	1.22	16.27	0.00	-5.68	11.80	28.20	40.00	257	94
65.341	1.49	6.11	0.00	11.04	18.63	21.37	40.00	275	32
76.225	1.60	8.26	0.00	11.94	21.80	18.20	40.00	208	43
* 609.841	5.37	19.11	0.00	2.39	26.87	19.13	46.00	164	33
762.548	6.17	20.25	0.00	-2.58	23.84	22.16	46.00	186	32
786.340	6.28	20.26	0.00	-1.73	24.80	21.20	46.00	137	84

Remarks:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. " * ", means this data is the worst emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable loss

General Radiated Emission Data

Date of Test : July 20, 1999 EUT : Wireless Game Controller
 Test Mode : Mode 2 Test Site : No.2 Open Test Site

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement Vertical	Margin	Limit	Ant	Turn
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm	deg
36.847	1.22	15.14	0.00	4.24	20.60	19.40	40.00	99	95
72.680	1.56	8.53	0.00	10.32	20.41	19.59	40.00	100	67
667.520	5.67	19.33	0.00	-0.16	24.84	21.16	46.00	173	154
725.640	5.98	20.21	0.00	0.92	27.10	18.90	46.00	207	61
862.350	6.69	20.83	0.00	4.32	31.84	14.16	46.00	169	164
* 914.620	6.96	21.65	0.00	4.19	32.80	13.20	46.00	147	32

Remarks:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. " * ", means this data is the worst emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable loss