



Test Report

Product Name : Remote Control
 Model No. : CA212
 FCC ID. : FU5CA212

Applicant : EVERSPRING INDUSTRY CO., LTD
 Address : 7th fl. 609 Wan Shou Road Sec. 1, Kweishan,
 Taoyuan Hsien 333, Taiwan, R.O.C.

Date of Receipt : 2006/03/17
 Issued Date : 2006/03/27
 Report No. : 063L116-RF-US-P04V01

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

Test Report Certification

Issued Date : 2006/03/27

Report No. : 063L116-RF-US-P04V01



Accredited by NIST (NVLAP)
 NVLAP Lab Code: 200533-0

Product Name : Remote Control
 Applicant : EVERSPRING INDUSTRY CO., LTD
 Address : 7th fl. 609 Wan Shou Road Sec. 1, Kweishan, Taoyuan Hsien
 333, Taiwan, R.O.C.
 Manufacturer : EVERSPRING INDUSTRY CO., LTD
 Model No. : CA212
 FCC ID. : FU5CA212
 Rated Voltage : AC 120V/ 60Hz
 EUT Voltage : Battery 12V
 Trade Name : Everspring
 Measurement Standard : FCC 15 Subpart C Section 15.231: 2005
 Measurement Procedure : ANSI C63.4: 2003
 Test Result : Complied

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 : Grace Lin

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(Tim Sung)

Approved By : Gene Chang

(Gene Chang)

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1. General Information

1.1. EUT Description

Product Name	Remote Control
Trade Name	Everspring
Model No.	CA212
FCC ID	FU5CA212
Frequency Range	433.9 MHz
Number of Channel	1
Type of Modulation	FSK
EUT Voltage	Battery 12V
Channel Control	N/A
Antenna Type	Printed

Working Frequency of Each Channel	
Channel	Frequency
01	433.9 MHz

Note:

1. The EUT is a Remote Control with a 433.9MHz transmitter.
2. These tests are conducted on a sample for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.231.
3. This device is a composite device in accordance with Part 15 regulations.
 - (1) The transmitter is tested and produces a test report of which the report number is 063L116-RF-US-P04V01, certified under FCC ID: FU5CA212.
 - (2) The receiver is tested and produces a test report of which the report number is 063L116-RF-US-P01V02, certified under Declaration of Conformity.

1.2. Operation Description

The EUT is a Remote Control with a 433.9MHz transmitter. It remotely controls the operations of a Solar Camera. The data modulation is FSK.

1.3. Test Mode

Quietek verified the construction and function in typical operation. All the test modes are performed in normal operation and are defined as:

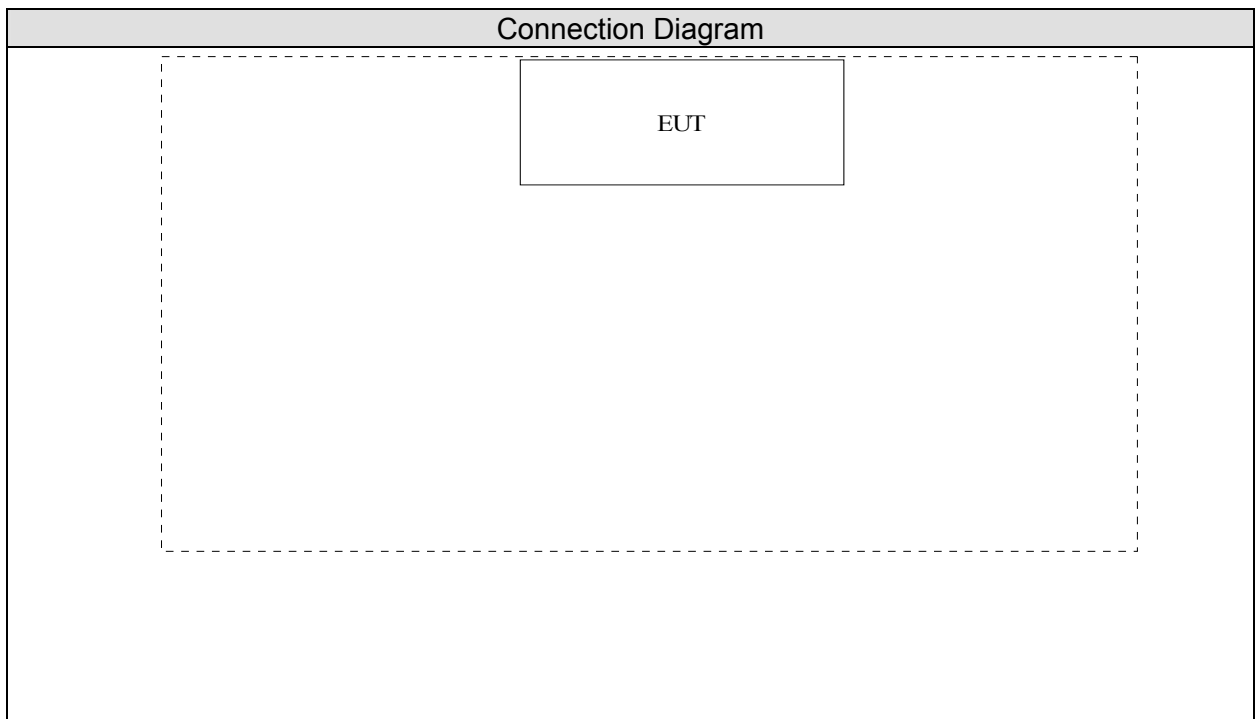
Pre-Test Mode	
TX	Mode 1: Transmit
Final Test Mode	
TX	Mode 1: Transmit

1.4. 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.	FCC ID	Power Cord
1	N/A	N/A	N/A	N/A	N/A	N/A

1.5. Configuration of tested System



1.6. EUT Exercise Software

1	Setup the EUT as shown in Section 1.5.
2	Install the batteries.
3	Verify that the EUT transmits continuously.

1.7. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Required (IEC 68-1)	Actual
Temperature (°C)	FCC PART 15 C 15.207 Conducted Emission	15 - 35	22
Humidity (%RH)		25 - 75	55
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.231 Duty Cycle	15 - 35	22
Humidity (%RH)		25 - 75	55
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.231 Occupied Bandwidth	15 - 35	22
Humidity (%RH)		25 - 75	55
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.231 Radiated Emission	15 - 35	22
Humidity (%RH)		25 - 75	55
Barometric pressure (mbar)		860 - 1060	950-1000

Site Description:

June 22, 2001 File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Reference 31040/SIT1300F2



0914

Accredited by CNLA
Accreditation Number: 0914

Accredited by NVLAP
NVLAP Lab Code: 200533-0



Site Name: Quietek Corporation

Site Address: No. 5, Ruei-Shu Valley, Ruei-Ping Tsuen,
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Taiwan, R.O.C.
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2. Conducted Emission

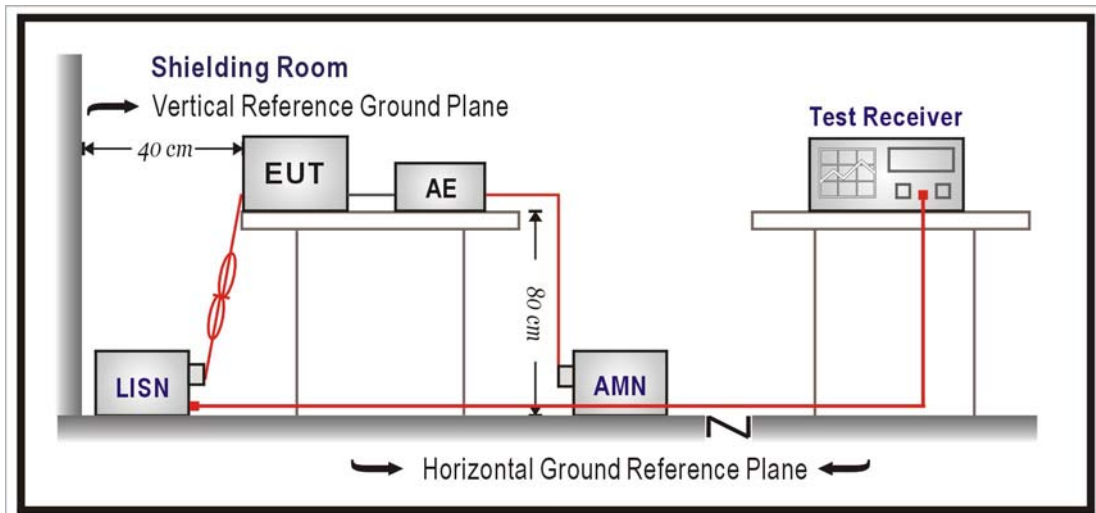
2.1. Test Equipment

The following test equipment are used during the test:

Item	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/838251/001	Jan., 2006	
2	L.I.S.N.	R & S	ESH3-Z5/836679/0023	May, 2005	Peripheral
3	L.I.S.N.	R & S	ENV	May, 2005	EUT
4	Pulse Limiter	R & S	ESH3-Z2	May, 2005	
5	No.1 Shielded Room			N/A	

Note: All instruments are calibrated every one year.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 Limits (dBuV)		
Frequency MHz	QP	AV
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.

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: 2001 on conducted measurement.

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

2.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.207: 2005

2.6. Test Result

The EUT uses batteries. The test is not performed.

3. Radiated Emission

3.1. Test Equipment

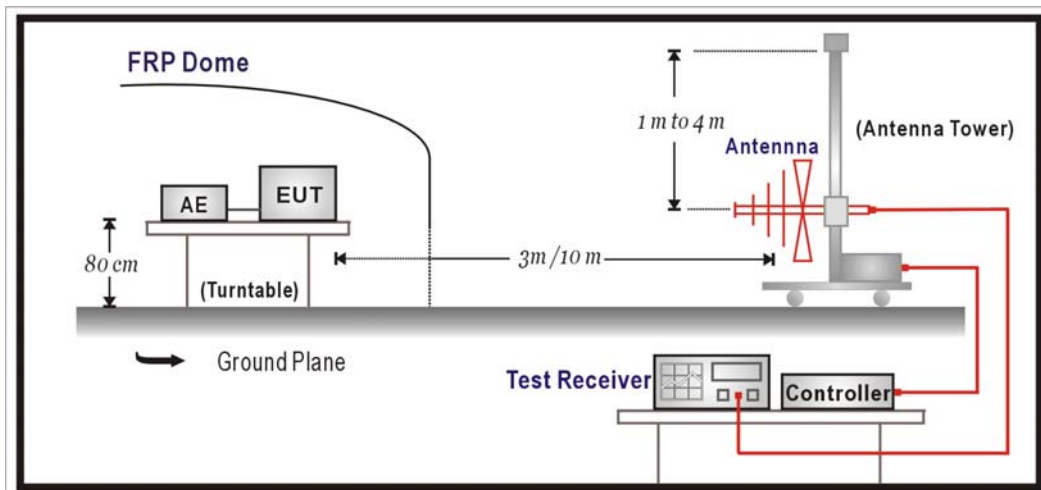
The following test equipment are used during the test:

Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒ OATS 3	Test Receiver	R & S	ESCS 30 / 100122	Feb., 2006
	Spectrum Analyzer	Advantest	R3162 / 120300652	Feb., 2006
	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2005
	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2005
	Horn Antenna	ETS	3115 / 0005-6160	July, 2005
	Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2005

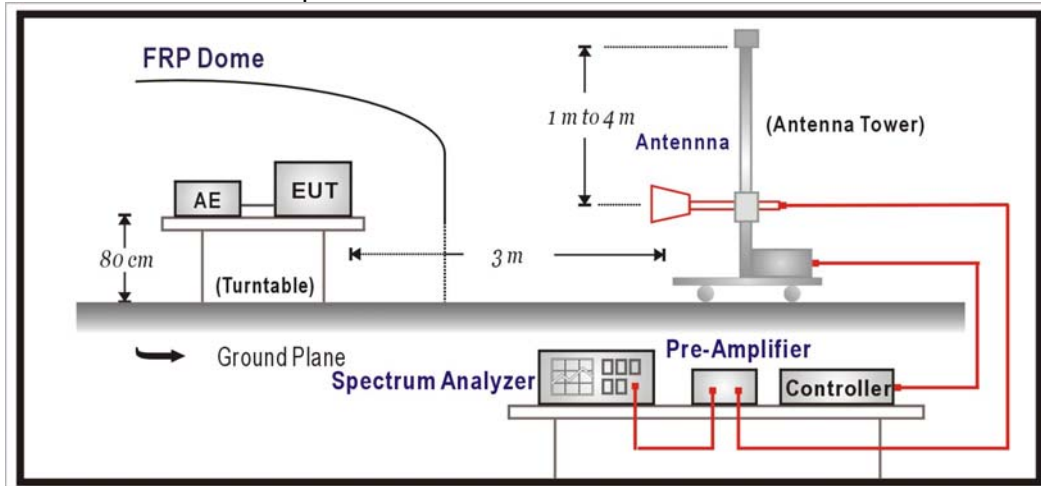
Note: 1. All instruments are calibrated every one year.
 2. The test instruments marked by "X" are used to measure the final test results.

3.2. Test Setup

Under 1GHz Test Setup:



Above 1GHz Test Setup:



3.3. Limits

➤ Fundamental and Harmonics Emission Limits

FCC Part 15 Subpart C Paragraph 15.231 Limits				
Fundamental Frequency MHz	Field Strength of Fundamental		Field Strength of Harmonics	
	uV/m	dBuV/m	uV/m	dBuV/m
40.66-40.70	2250	67.0	225	47.0
70-130	1250	62.0	125	42.0
130-174	1250-3750	62.0-71.5	125-375	42.0-51.5
174-260	3750	71.5	375	51.5
260-470	3750-12500	71.5-82.00	375-1250	51.5-62.0
above 470	12500	82.00	1250	62.0

Remarks : 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)

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. The emission limit in this paragraph is based on measurement instrumentation employing an average detector.

➤ Spurious electric field strength limits

FCC Part 15 Subpart C Paragraph 15.209 Limits			
Frequency MHz	uV/m	dBuV/m	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	See Remark ¹	300
0.490-1.705	24000/F(kHz)	See Remark ¹	30
1.705-30	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Remarks : 1. RF Voltage (dBuV) = 20 log RF 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 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 C63.4:2003 on radiated measurement.

On the field strength of fundamental and harmonics, the limits shown are based on measuring equipment employing a average detector function. As an alternative, compliance with the limits may be based on the use of measurement instrumentation with a CISPR quasi-peak detector.

On the field strength of spurious electric, on any frequency or frequencies below or equal to 1000 MHz, the limits shown are based on measuring equipment employing a quasi-peak detector function and on any frequency or frequencies above 1000 MHz the radiated limits shown are based upon the use of measurement instrumentation employing an average detector function.

When average radiated emission measurement are included emission measurement below 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.

The bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

3.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.231: 2005

3.6. Test Result

Product	Remote Control		
Test Item	Radiated Emission		
Test Mode	Mode 1: Transmit		
Date of Test	2006/03/22	Test Site	No.3 OATS

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
------------------	-------------------------	--------------------------	--------------------------------	--------------	-----------------

Fundamental Radiated Emission

Horizontal

Peak

434.980	-2.395	89.125	86.730	-14.090	100.82
---------	--------	--------	--------	---------	--------

Peak = 86.730dBuV/m, Duty Cycle = -9.88

Average = Peak + Duty Cycle = 76.85 dBuV/m

Average Limit = 80.82 dBuV/m

Peak Limit = 80.82 + 20 = 100.82 dBuV/m

Note:

1. Measurement Level = Reading Level +Correct Factor.
2. Spectrum analyzer setting (Peak Detector): RBW=100kHz, VBW=1MHz

Product	Remote Control		
Test Item	Radiated Emission		
Test Mode	Mode 1: Transmit		
Date of Test	2006/03/22	Test Site	No.3 OATS

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
------------------	-------------------------	--------------------------	--------------------------------	--------------	-----------------

Fundamental Radiated Emission

Vertical

Peak

434.980	-9.319	85.319	76.000	-24.820	100.82
---------	--------	--------	--------	---------	--------

Peak = 76.000dBuV/m, Duty Cycle = -9.88

Average = Peak + Duty Cycle = 66.12 dBuV/m

Average Limit = 80.82 dBuV/m

Peak Limit = 80.82 + 20 = 100.82 dBuV/m

Note:

1. Measurement Level = Reading Level +Correct Factor.
2. Spectrum analyzer setting (Peak Detector): RBW=100kHz, VBW=1MHz

Product	Remote Control		
Test Item	Radiated Emission		
Test Mode	Mode 1: Transmit		
Date of Test	2006/03/22	Test Site	No.3 OATS

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Peak Limit dBuV/m	Average Limit dBuV/m
------------------	-------------------------	--------------------------	--------------------------------	--------------	-------------------------	----------------------------

Harmonic Radiated Emission

Horizontal

Peak

869.050	4.909	53.841	58.750	-23.180	81.930	61.930
1300.000	-5.975	54.373	48.398	-33.532	81.930	61.930
1735.000	-5.392	53.165	47.773	-34.157	81.930	61.930
2170.000	-3.402	52.774	49.373	-32.557	81.930	61.930
2605.000	-1.694	47.847	46.153	-35.777	81.930	61.930

Note:

1. All Readings Levels are performed with peak and/or average measurements as necessary.
3. Measurement Level = Reading Level +Correct Factor.
4. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product	Remote Control		
Test Item	Radiated Emission		
Test Mode	Mode 1: Transmit		
Date of Test	2006/03/22	Test Site	No.3 OATS

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Peak Limit dBuV/m	Average Limit dBuV/m
Harmonic Radiated Emission						
Vertical						
Peak						
869.050	0.239	49.251	49.490	-32.440	81.930	61.930
1300.000	-5.975	57.905	51.930	-30.000	81.930	61.930
1735.000	-5.392	56.006	50.614	-31.316	81.930	61.930
2170.000	-3.402	53.885	50.484	-31.446	81.930	61.930
2605.000	-1.694	53.418	51.724	-30.206	81.930	61.930

Note:

1. All Readings Levels are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level +Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product	Remote Control		
Test Item	Radiated Emission		
Test Mode	Mode 1: Transmit		
Date of Test	2006/03/22	Test Site	No.3 OATS

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Quasi-Peak					
270.080	13.522	5.958	19.480	-26.520	46.000
461.650	18.642	7.421	26.063	-19.937	46.000
544.100	19.945	8.398	28.343	-17.657	46.000
689.600	21.041	8.429	29.470	-16.530	46.000
745.380	20.852	6.786	27.639	-18.361	46.000
*803.580	21.827	8.958	30.785	-15.215	46.000

Note:

1. All Readings for restricted bands are Quasi-Peak, other 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. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product	Remote Control		
Test Item	Radiated Emission		
Test Mode	Mode 1: Transmit		
Date of Test	2006/03/22	Test Site	No.3 OATS

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Vertical					
Quasi-Peak					
284.620	13.791	5.909	19.700	-26.300	46.000
333.120	14.322	8.428	22.750	-23.250	46.000
379.200	16.655	7.205	23.860	-22.140	46.000
544.100	20.532	4.838	25.370	-20.630	46.000
595.030	21.868	2.142	24.010	-21.990	46.000
*619.280	21.591	5.359	26.950	-19.050	46.000

Note:

1. All Readings for restricted bands are Quasi-Peak, other 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. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

3.7. Test Photo

Test Mode : Mode 1: Transmit

Description : Front View of Radiated Emission Test Setup



Test Mode : Mode 1: Transmit

Description : Back View of Radiated Emission Test Setup



Test Mode : Mode 1: Transmit

Description : Front View of Radiated Emission Test Setup (Horn)



4. Occupied Bandwidth

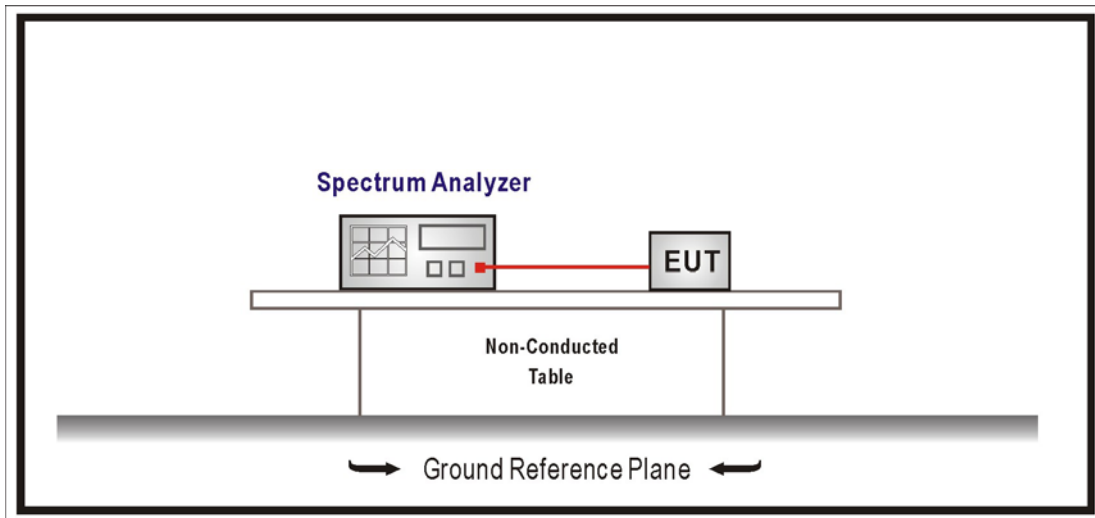
4.1. Test Equipment

The following test equipment are used during the test:

Item	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.
1	Spectrum Analyzer	Advantest	R3272 / 72421194	May, 2005

Note: 1. All instruments are calibrated every one year.

4.2. Test Setup



4.3. Limits

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz. For devices operating above 900MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier

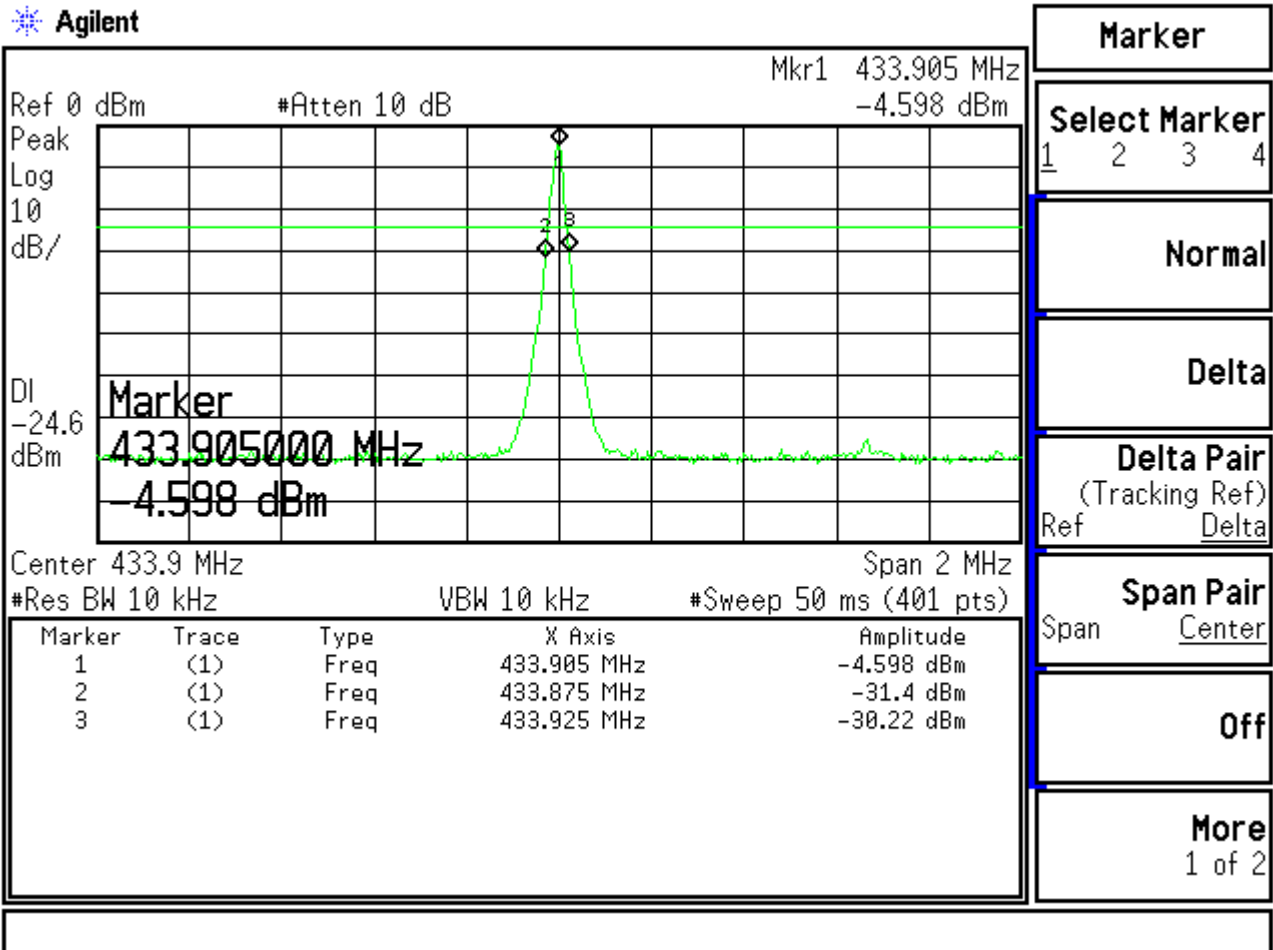
4.4. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.231: 2005

4.5. Test Result

Product	Remote Control		
Test Item	Occupied Bandwidth		
Test Mode	Mode 1: Transmit		
Date of Test	2005/07/17	Test Site	No.3 OATS

Center Frequency	433.905 MHz
Allowable Bandwidth (70-900 MHz: 0.25%, Above 900MHz: 0.5%)	1.085 MHz
Bandwidth at 20dB down (Max)	50 kHz
Result	PASS



5. Duty Cycle

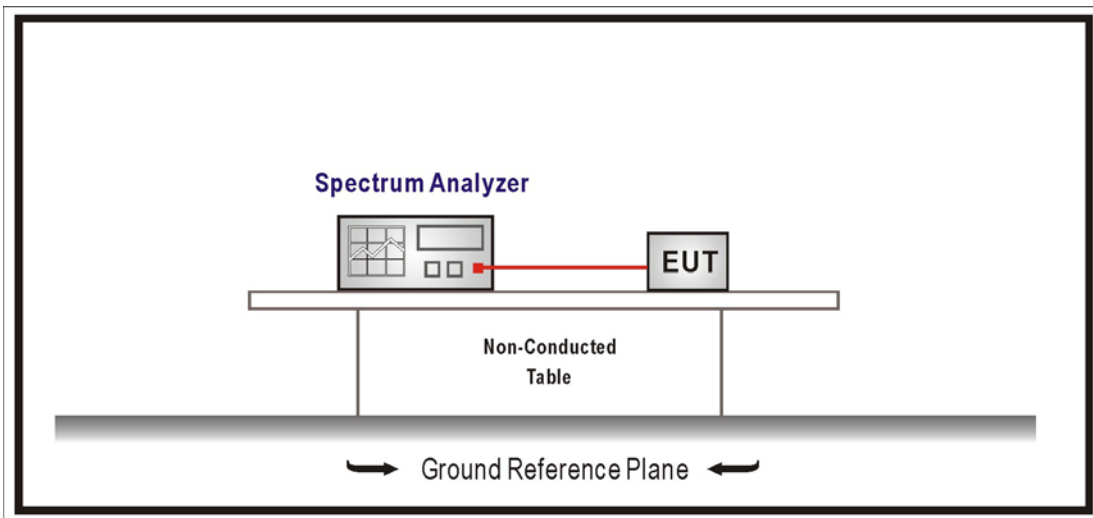
5.1. Test Equipment

The following test equipment are used during the test:

Item	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.
1	Spectrum Analyzer	R & S	FSP / 100561	Mar., 2006
2	No.3 OATS			

Note: 1. All instruments are calibrated every one year.

5.2. Test Setup



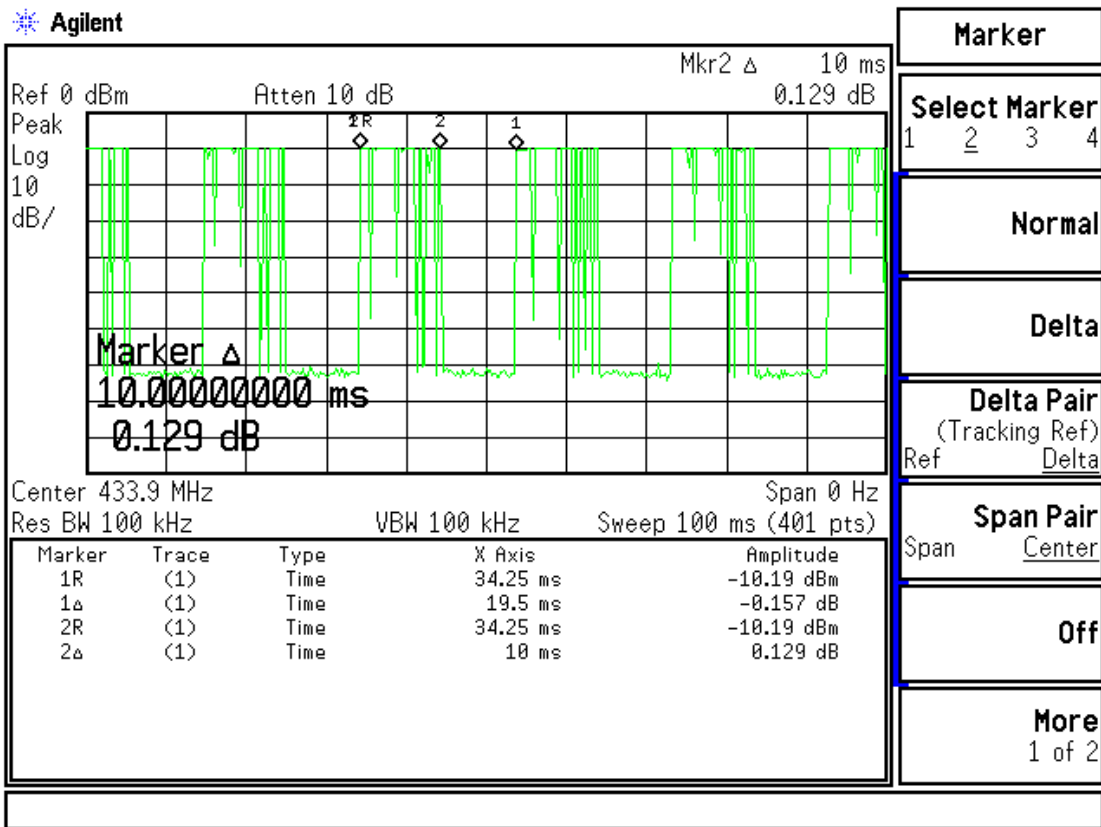
5.3. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.231: 2005

5.4. Test Result

Product	Remote Control		
Test Item	Duty Cycle		
Test Mode	Mode 1: Transmit		
Date of Test	2006/03/22	Test Site	No.3 OATS

Each packet period = 19.5ms Period of a pulse = 800us Maximum transmit time of a pulse = 500us $T_{ON} = 10/0.8 * 0.5 = 6.25ms$ Duty cycle = 0.32 Duty Cycle Correction Factor = $20\log(0.32) = -9.88 \text{ dB}$	
Result	Duty Cycle = -9.88 dB



Agilent

Ref 0 dBm
Atten 10 dB
Mkr1 Δ 800 μs

Peak
-0.29 dB

Log

10

dB/

Marker Δ
800.000000 μs
-0.29 dB

Center 433.9 MHz
Span 0 Hz

Res BW 100 kHz
VBW 100 kHz
Sweep 20 ms (401 pts)

Marker	Trace	Type	X Axis	Amplitude
1R	(1)	Time	11.7 ms	-10.94 dBm
1Δ	(1)	Time	800 μs	-0.29 dB
2R	(1)	Time	11.7 ms	-10.94 dBm
2Δ	(1)	Time	500 μs	-0.006 dB

Marker

Select Marker

1 2 3 4

Normal

Delta

Delta Pair
(Tracking Ref)

Ref Delta

Span Pair

Span Center

Off

More
1 of 2

Attachement

➤ **EUT Photograph**

(1) EUT Photo



(2) EUT Photo



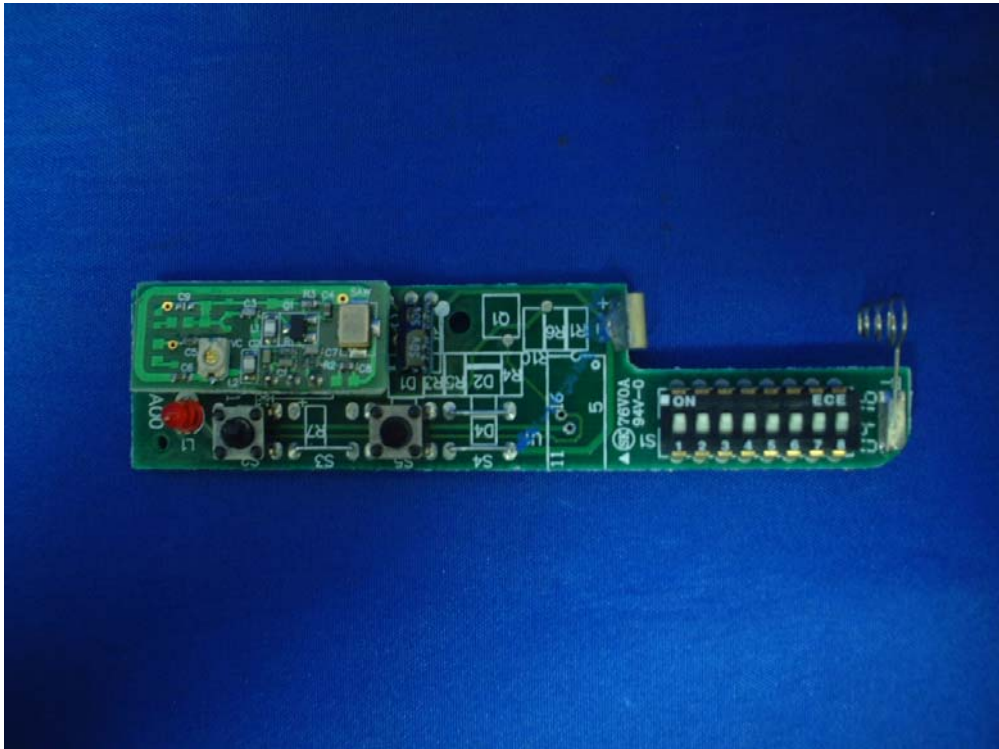
(3) EUT Photo



(4) EUT Photo



(5) EUT Photo



(6) EUT Photo

