

Test Report

Product Name : RF Remote Control

Model No. : 59F-0811-0001

FCC ID : DXLC-IH-9000

Applicant : LUNG HWA Electronics Co., LTD

Address : 3F. 248, Pei Sheng Rd Sec. 3. Sheng Keng Taipei
Hsien(222), Taiwan.R.O.C

Date of Receipt : 2006/11/10

Issued Date : 2007/01/30

Report No. : 06BS006-RF-US-P04V01

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 : 2007/01/30

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Product Name : RF Remote Control

Applicant : LUNG HWA Electronics Co.,LTD

Address : 3F. 248, Pei Sheng Rd Sec. 3. Sheng Keng Taipei
Hsien(222), Taiwan.R.O.C

Manufacturer : Expert Electronics (Wujiang)Co.,LTD

Model No. : 59F-0811-0001

FCC ID : DXLC-IH-9000

Rated Voltage : AC 120 V / 60 Hz

EUT Voltage : AC 100-240 V / 50-60 Hz

Trade Name : N/A

Applicable Standard : FCC CFR Title 47 Part 15 Subpart C: 2006
ANSI C63.4: 2003

Test Result : Complied

Performed Location : SuZhou EMC laboratory
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FCC Registration number: 800392

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Laboratory Information

We , **QuietTek 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:

Taiwan R.O.C.	: BSMI, DGT, CNLA
Germany	: TÜV Rheinland
Norway	: Nemko, DNV
USA	: FCC, NVLAP
Japan	: VCCI

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

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

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

Product Name	RF Remote Control
Trade Name	N/A
Model No.	59F-0811-0001
FCC ID	DXLC-IH-9000
Working Voltage	AC 230 V / 50 Hz
Frequency Range	433.802250
Channel Number	1
Antenna Gain	0 dBi
Type of Modulation	FSK
Channel Control	Manual
Antenna type	Printed

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:

Test Mode
Mode 1: Transmit

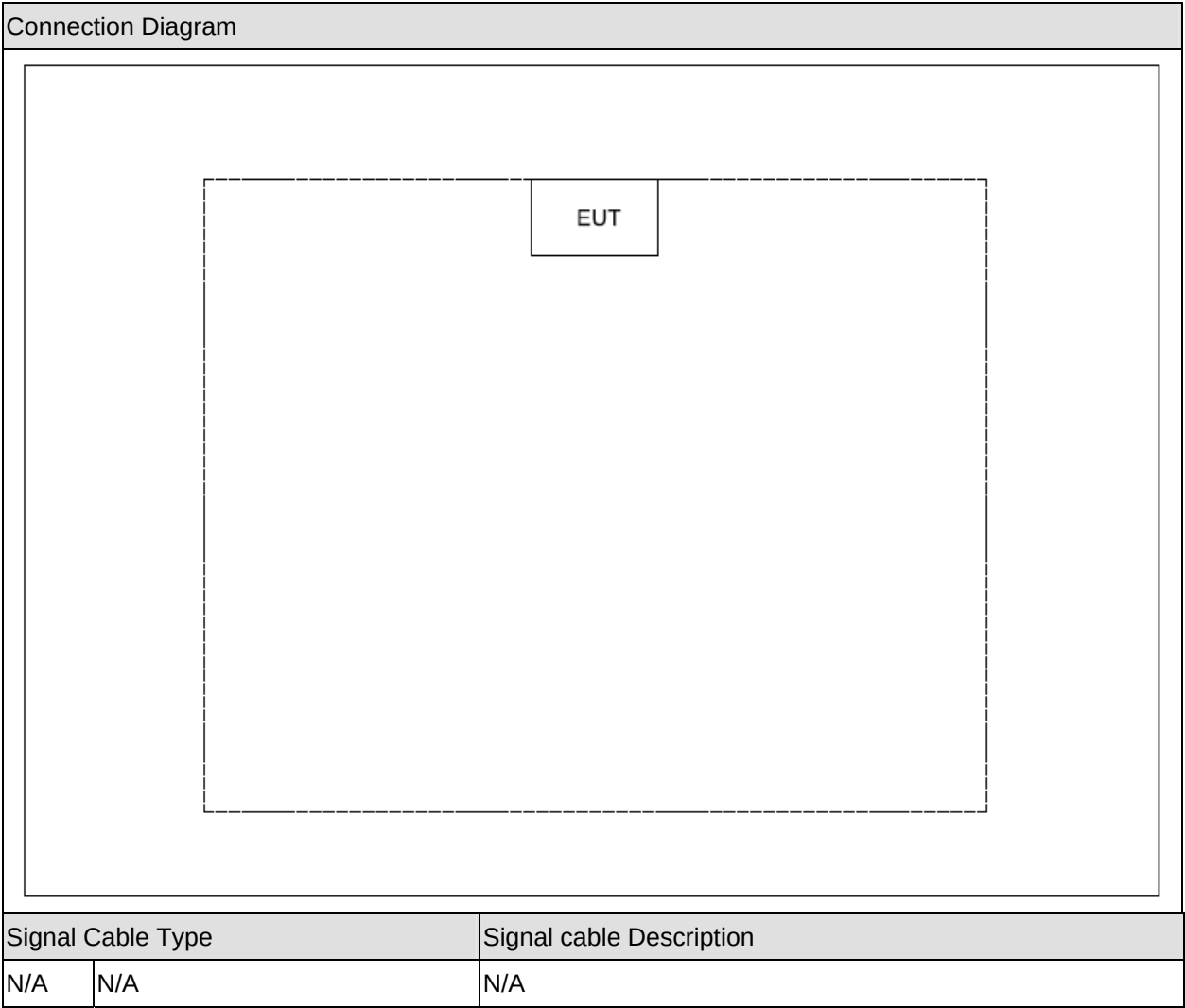
Note: This device is a composite device in accordance with Part 15 Subpart B regulations. The function for the receiver was measured and made a test report that the report number is 06BS006-RF-US-P01V02-R, certified under Declaration of Conformity.

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	N/A	N/A	N/A	N/A	N/A

1.4. Configuration of Tested System



1.5. EUT Exercise Software

1	Setup the EUT and simulators as shown on 1.5.
2	Press RF button to start continue transmit.

2. Technical Test

2.1. Summary of Test Result

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

Performed Test Item	Normative References	Test Performed	Deviation
Conducted Emission	FCC CFR Title 47 Part 15 Subpart C: 2006 Section 15.207	No	No
Radiated Emission	FCC CFR Title 47 Part 15 Subpart C: 2006 Section 15.231(b) and (e)	Yes	No
Transmit Activated Time	FCC CFR Title 47 Part 15 Subpart C: 2006 Section 15.231(a)(1)(2)(3)	Yes	No
Occupied Bandwidth	FCC CFR Title 47 Part 15 Subpart C: 2006 Section 15.231 (c) and (d)	Yes	No
Frequency Stability Under Temperature & Voltage Variations	FCC CFR Title 47 Part 15 Subpart C: 2006 Section 15.247(d)	No	No

2.2. Test Environment

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	21
Humidity (%RH)	25-75	50
Barometric pressure (mbar)	860-1060	950-1000

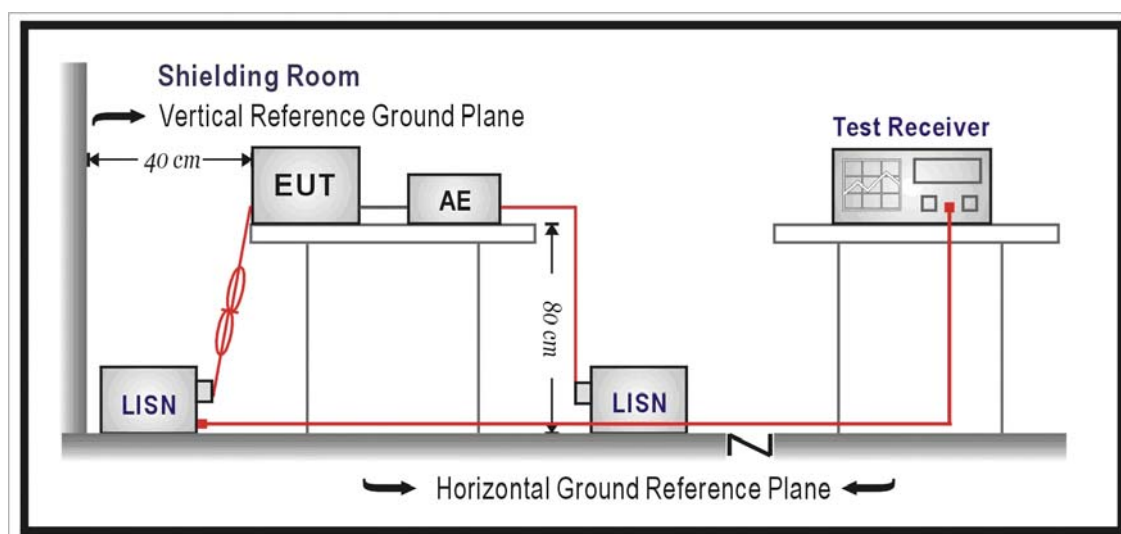
3. Conducted Emission

3.1. Test Equipment

Conducted Emission / SR-1

Instrument	Manufacturer	Type No.	Serial No	Cal. Date
EMI Test Receiver	R&S	ESCI	100175	2006/11/20
Two-Line V-Network	R&S	ENV216	100013	2006/11/20
Two-Line V-Network	R&S	ENV216	100014	2006/11/20
V-Network	R&S	ESH3-Z6	100248	2006/11/20
V-Network	R&S	ESH3-Z6	100249	2006/11/20
ISN	Schaffner	ISN T400	21648	2006/11/20
Current Probe	R&S	EZ-17	100252	2006/04/18
50ohm Coaxial Switch	ANRITSU	MP59B	6200447305	2006/11/25
50ohm Impedance	SHX	50ohmI	QT-IM001	2006/03/20
Matching network	SHX	TZ25	06062901	N/A
Matching network	SHX	TZ25	06062902	N/A
Matching network	SHX	TZ25	06062903	N/A
Combining network	SHX	N-50KKK	N/A	N/A
Temperature/Humidity Meter	zhicheng	ZC1-2	QT-TH004	2006/03/30

3.2. Test Setup



3.3. Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits (dBuV)		
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. Uncertainty

The measurement uncertainty is defined as ± 2.02 dB

3.6. Test Result

EUT is a DC(3V) power device, so the test item is not necessary performed.

4. Radiated Emission

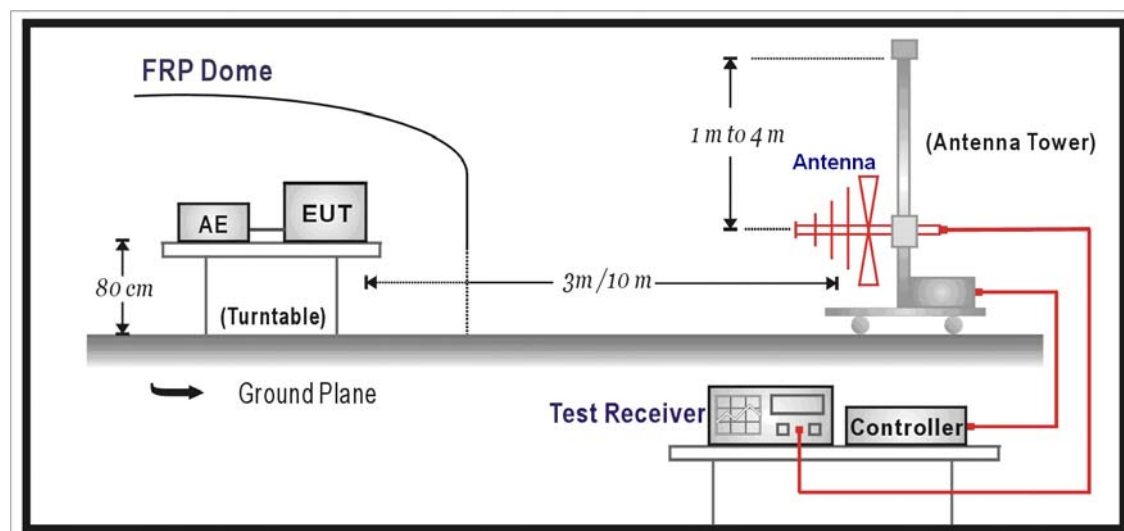
4.1. Test Equipment

Radiated Emission / AC-2

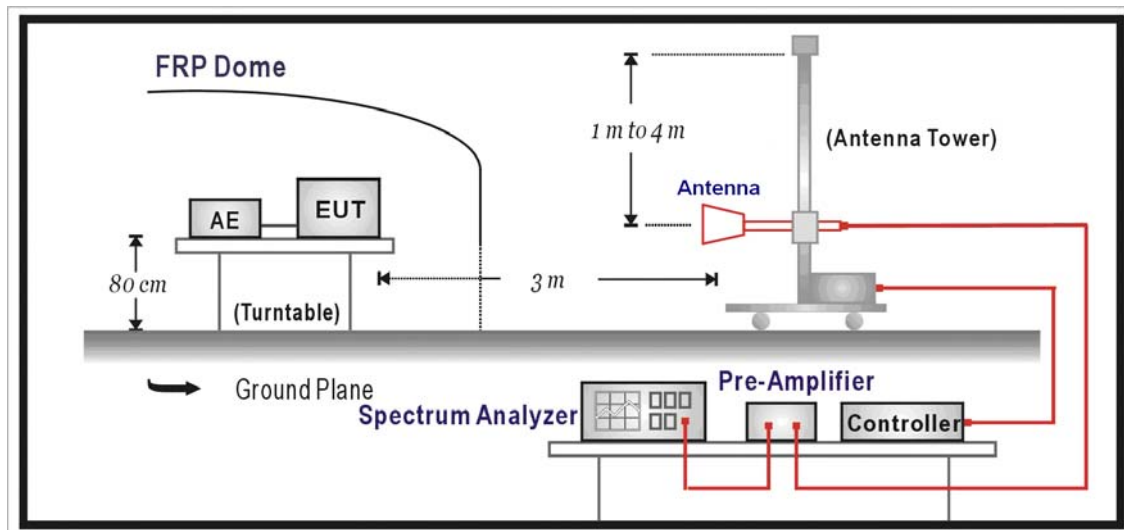
Instrument	Manufacturer	Type No.	Serial No	Cal. Date
Spectrum Analyzer	Agilent	E4408B	MY45102679	2006/11/20
EMI Test Receiver	R&S	ESCI	100175	2006/11/25
Preamplifier	Quietek	AP-025C	QT-AP003	2006/11/25
Preamplifier	Quietek	AP-180C	CHM-0602013	2006/03/20
Bilog Type Antenna	Schaffner	CBL6112B	2932	2006/10/26
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	496	2006/11/30
Broad-Band Horn Antenna	Schwarzbeck	BBHA9170	294	2006/11/30
Temperature/Humidity Meter	zhicheng	ZC1-2	QT-TH002	2006/03/30

4.2. Test Setup

Under 1GHz Test Setup:



Above 1GHz Test Setup:



4.3. Limit

For operating transmitter at a periodic rate not exceed 5 seconds:

FCC Part 15.231 (microvolts/m)		
Fundamental Frequency (MHz)	Field Strength of Fundamental (microvolts/meter)	Field Strength of Spurious Emissions (microvolts/meter)
40.66 - 40.70	2250	225
70 - 130	1250	125
130 -174	1250 to 3750 **	125 to 375 **
174 - 260	3750	375
260 – 470	3750 to 12500 **	375 to 1250 **
Above 470	12500	1250

Remark:

1. ** linear interpolations
2. Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follow: for the band 130 - 174 MHz, $\mu\text{V/m at 3 meters} = 56.81818(F) - 6136.3636$; for the band 260 - 470 MHz, $\mu\text{V/m at 3 meters} = 41.6667(F) - 7083.3333$. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.

For operating transmitter at a periodic rate exceed that specified in paragraph FCC 15.231(a):

FCC Part 15.231 (microvolts/m)		
Fundamental Frequency (MHz)	Field Strength of Fundamental (microvolts/meter)	Field Strength of Spurious Emissions (microvolts/meter)
40.66 - 40.70	1000	100
70 - 130	500	50
130 -174	500 to 1500 **	50 to 150 **
174 - 260	1500	150
260 – 470	1500 to 5000 **	150 to 500 **
Above 470	5000	500

Remark:

1. ** linear interpolations
2. Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follow: for the band 130 - 174 MHz, $\mu\text{V/m at 3 meters} = 22.72727(F) - 2454.545$; for the band 260 - 470 MHz, $\mu\text{V/m at 3 meters} = 16.6667(F) - 2883.3333$. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.

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.

The additional latch filter below 1GHz was used to measure the level of harmonics radiated emission during field strength of harmonics measurement.

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

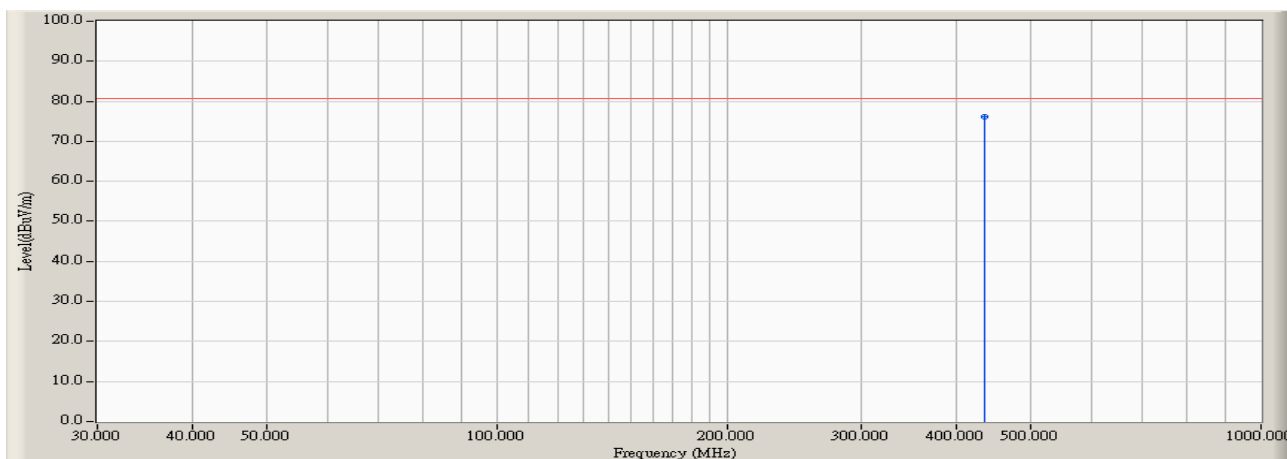
The frequency range from 30MHz to 10th harmonic is checked.

4.5. Uncertainty

The measurement uncertainty above 1G is defined as ± 3.9 dB
under 1G is defined as ± 3.8 dB

4.6. Test Result

Engineer : Johnwang	
Site : AC-2 (3m Semi-Chamber)	Time : 2006/12/12 - 16:56
Limit : FCC_15.231_Fundamental_QP	Margin : 0
EUT : RF Remote Control	Probe : CBL6141A_4278(30-2000MHz) - HORIZONTAL
Power : DC 3V	Note : Mode 1: Transmit (Fundamental)

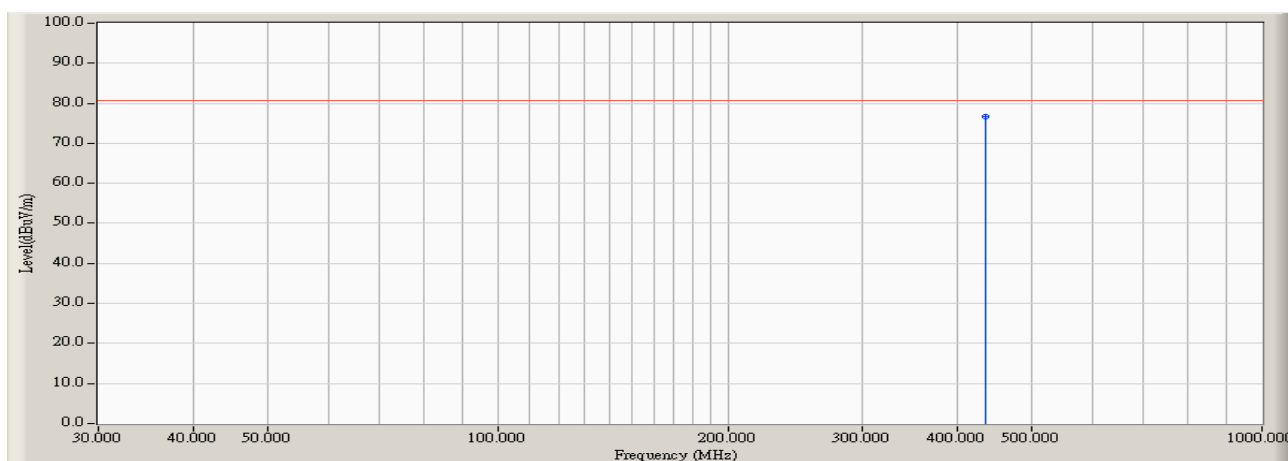


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	434.167	-6.908	83.128	76.220	-3.780	80.800	QUASIPeAK

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

Engineer : Johnwang	
Site : AC-2 (3m Semi-Chamber)	Time : 2006/12/12 - 16:56
Limit : FCC_15.231_Fundamental_QP	Margin : 0
EUT : RF Remote Control	Probe : CBL6141A_4278(30-2000MHz) - VERTICAL
Power : DC 3V	Note : Mode 1: Transmit (Fundamental)

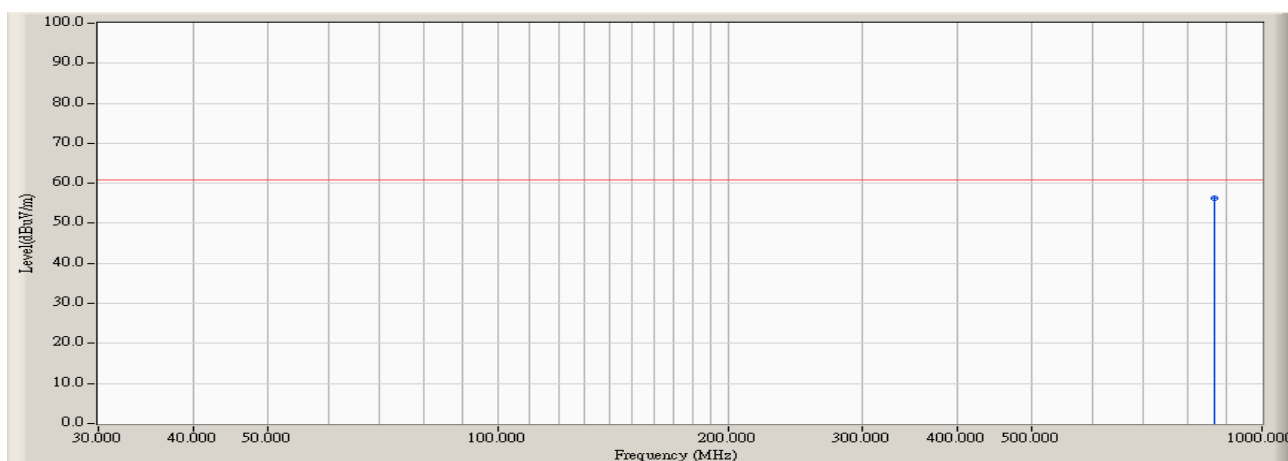


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	434.167	-6.908	83.686	76.778	-4.022	80.800	QUASIPeAK

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

Engineer : Jack	
Site : AC-2 (3m Semi-Chamber)	Time : 2006/12/12 - 17:07
Limit : FCC_15.231_Spurious_03M_QP	Margin : 0
EUT : RF Remote Control	Probe : CBL6141A_4278(30-2000MHz) - HORIZONTAL
Power : DC 3V	Note : Mode 1: Transmit (Spurious)

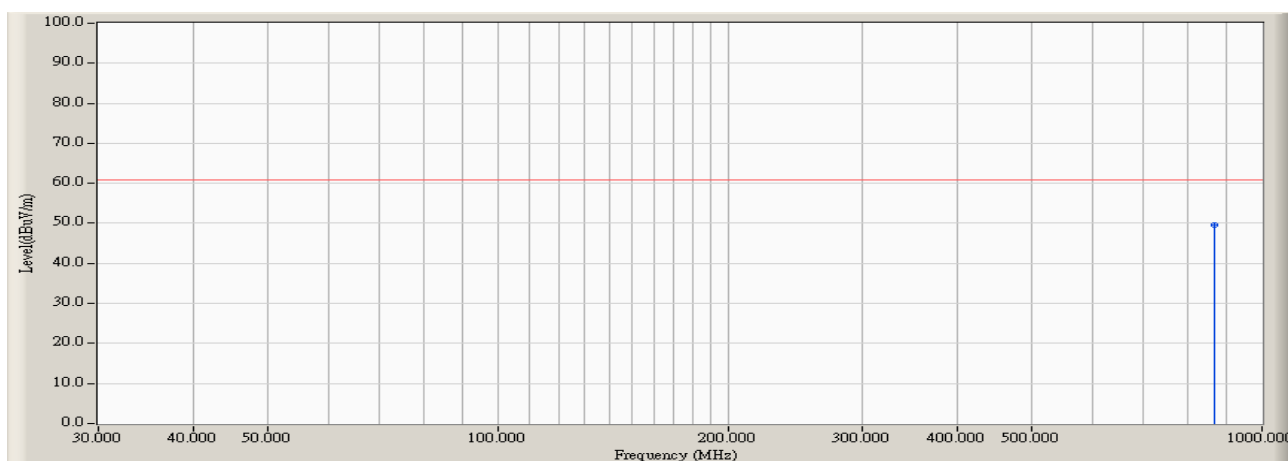


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	867.433	0.160	56.124	56.285	-4.515	60.800	QUASIPeAK

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

Engineer : Jack	
Site : AC-2 (3m Semi-Chamber)	Time : 2006/12/12 - 17:07
Limit : FCC_15.231_Spurious_03M_QP	Margin : 0
EUT : RF Remote Control	Probe : CBL6141A_4278(30-2000MHz) - VERTICAL
Power : DC 3V	Note : Mode 1: Transmit (Spurious)

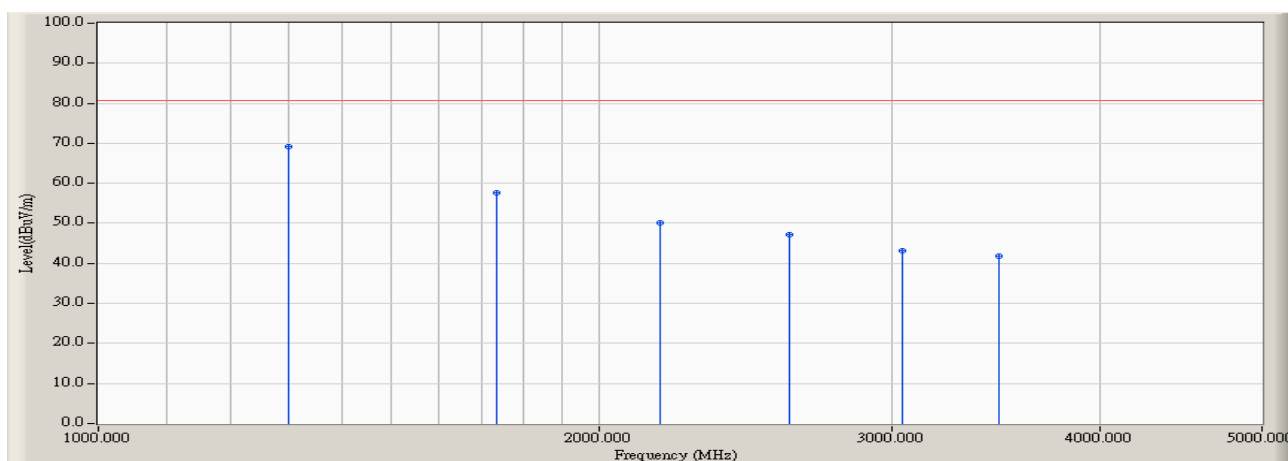


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	867.433	0.160	49.520	49.681	-11.119	60.800	QUASIPeAK

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

Engineer : Jack	
Site : AC-2 (3m Semi-Chamber)	Time : 2006/12/12 - 16:32
Limit : FCC_15.231_03M_PK	Margin : 0
EUT : RF Remote Control	Probe : 9120D_(1G-18G) - HORIZONTAL
Power : DC 3V	Note : Mode 1: Transmit (Spurious)

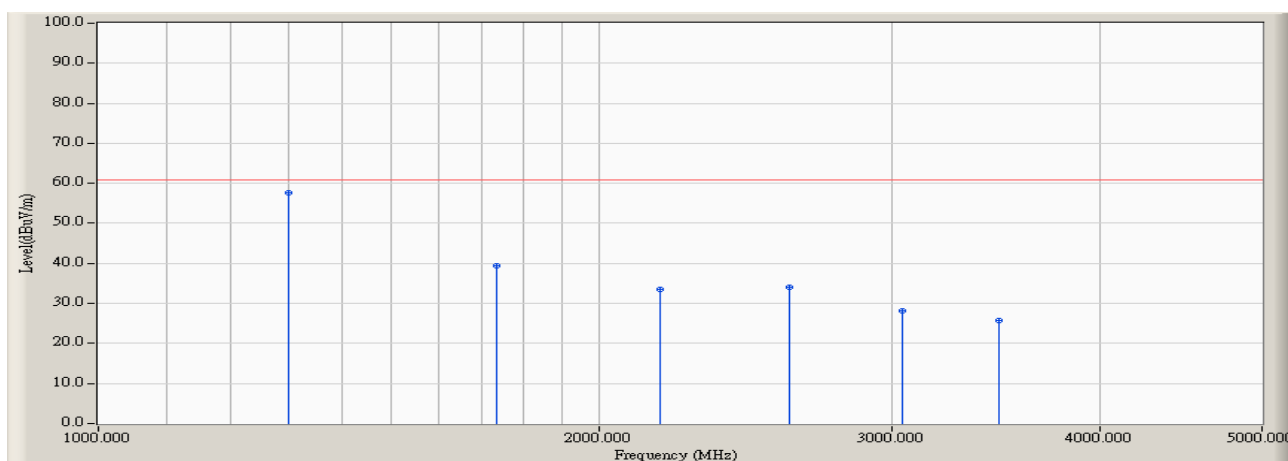


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	1300.000	-6.606	75.697	69.091	-11.709	80.800	PEAK
2		1733.333	-5.619	63.269	57.650	-23.150	80.800	PEAK
3		2173.333	-1.867	52.106	50.239	-30.561	80.800	PEAK
4		2600.000	-1.357	48.432	47.076	-33.724	80.800	PEAK
5		3040.000	-0.400	43.672	43.272	-37.528	80.800	PEAK
6		3473.333	0.514	41.370	41.884	-38.916	80.800	PEAK

Note:

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

Engineer : Jack	
Site : AC-2 (3m Semi-Chamber)	Time : 2006/12/12 - 16:46
Limit : FCC_15.231_03M_AV	Margin : 0
EUT : RF Remote Control	Probe : 9120D_(1G-18G) - HORIZONTAL
Power : DC 3V	Note : Mode 1: Transmit (Spurious)

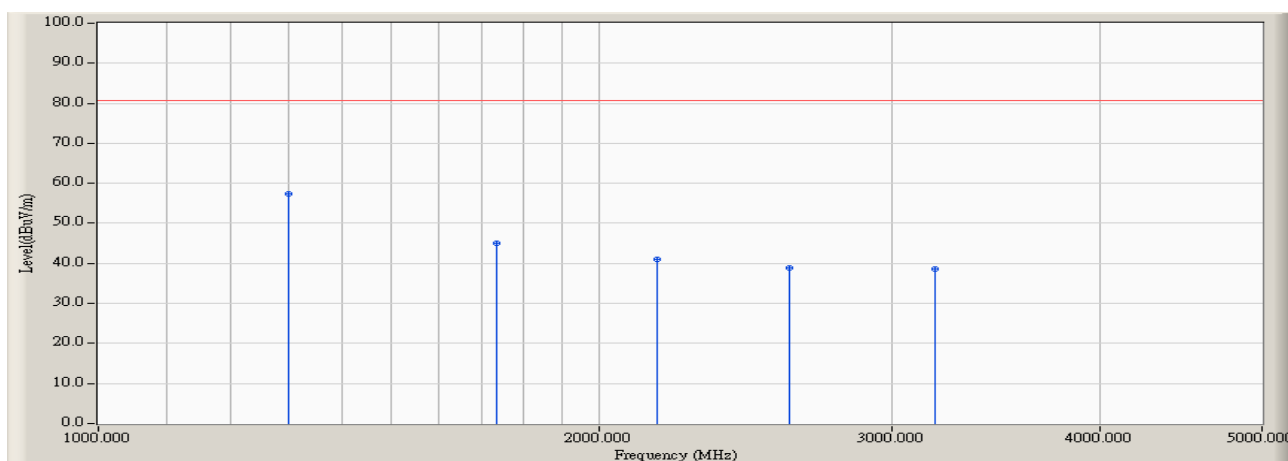


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	1300.000	-6.606	64.370	57.764	-3.036	60.800	AVERAGE
2		1733.333	-5.619	45.160	39.541	-21.259	60.800	AVERAGE
3		2173.333	-1.867	35.470	33.603	-27.197	60.800	AVERAGE
4		2600.000	-1.357	35.450	34.094	-26.706	60.800	AVERAGE
5		3040.000	-0.400	28.670	28.270	-32.530	60.800	AVERAGE
6		3473.333	0.514	25.290	25.804	-34.996	60.800	AVERAGE

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

Engineer : Jack	
Site : AC-2 (3m Semi-Chamber)	Time : 2006/12/12 - 16:56
Limit : FCC_15.231_03M_PK	Margin : 0
EUT : RF Remote Control	Probe : 9120D_(1G-18G) - VERTICAL
Power : DC 3V	Note : Mode 1: Transmit (Spurious)

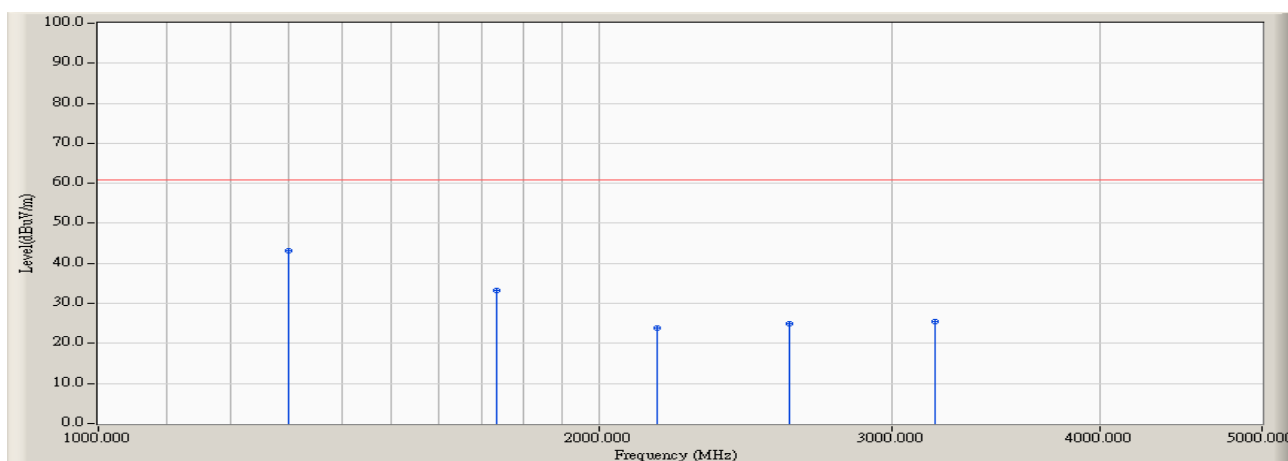


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	1300.000	-6.606	64.111	57.505	-23.295	80.800	PEAK
2		1733.333	-5.619	50.776	45.157	-35.643	80.800	PEAK
3		2166.667	-1.918	42.892	40.974	-39.826	80.800	PEAK
4		2600.000	-1.357	40.127	38.771	-42.029	80.800	PEAK
5		3180.000	-0.180	38.732	38.552	-42.248	80.800	PEAK

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

Engineer : Jack	
Site : AC-2 (3m Semi-Chamber)	Time : 2006/12/12 - 17:10
Limit : FCC_15.231_03M_AV	Margin : 0
EUT : RF Remote Control	Probe : 9120D_(1G-18G) - VERTICAL
Power : DC 3V	Note : Mode 1: Transmit (Spurious)



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	1300.000	-6.606	49.810	43.204	-17.596	60.800	AVERAGE
2		1733.333	-5.619	38.860	33.241	-27.559	60.800	AVERAGE
3		2166.667	-1.918	25.890	23.972	-36.828	60.800	AVERAGE
4		2600.000	-1.357	26.350	24.994	-35.806	60.800	AVERAGE
5		3180.000	-0.180	25.730	25.550	-35.250	60.800	AVERAGE

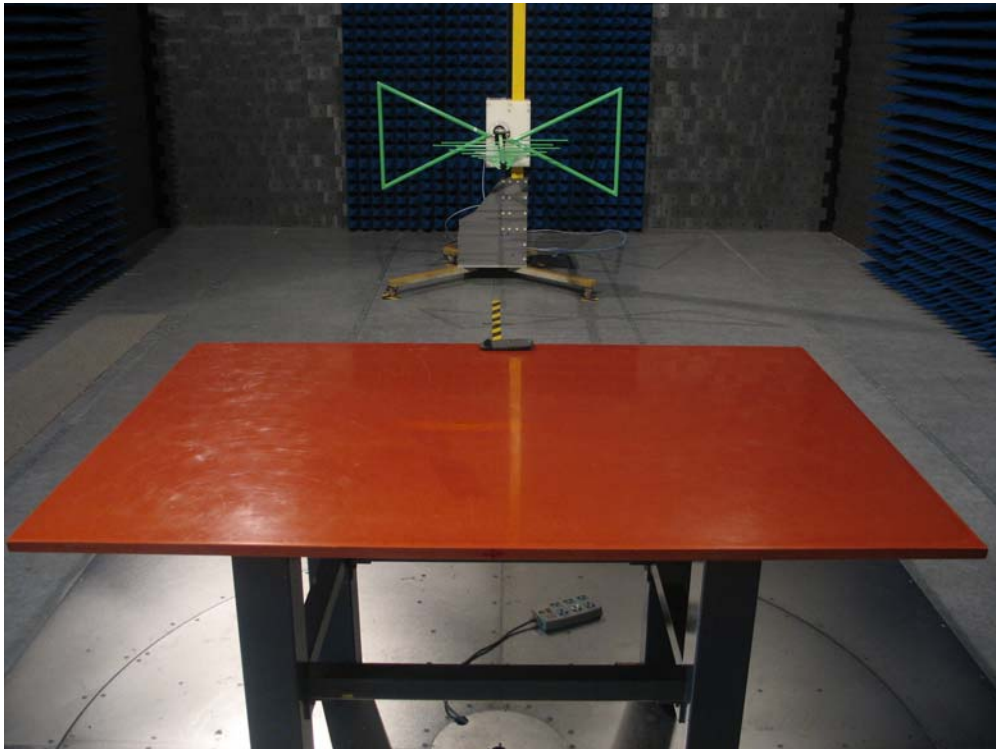
Note:

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

4.7. Test Photograph

Test Mode: Mode 1: Transmit

Description: Front View of Radiated Test for Under 1GHz



Test Mode: Mode 1: Transmit

Description: Back View of Radiated Test for Under 1GHz



Test Mode: Mode 1: Transmit

Description: Front View of Radiated Test for Above 1GHz



Test Mode: Mode 1: Transmit

Description: Back View of Radiated Test for Above 1GHz



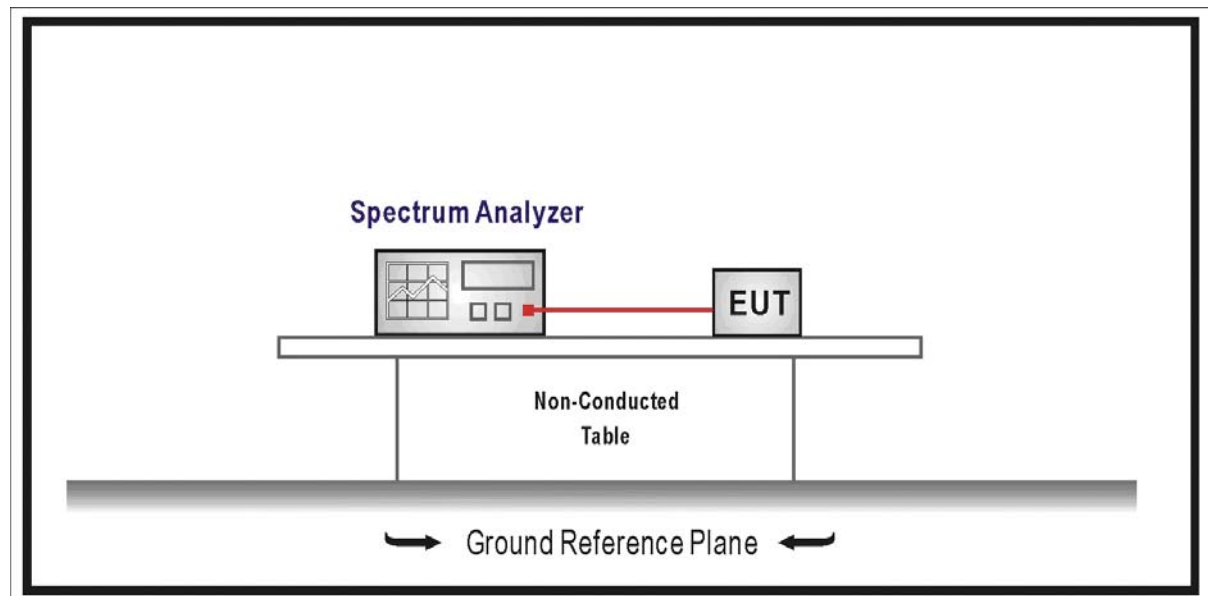
5. Transmit Activated Time

5.1. Test Equipment

Transmit Activated Time / AC-3

Instrument	Manufacturer	Type No.	Serial No	Cal. Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2006/03/23
Temperature/Humidity Meter	zhicheng	ZC1-2	QT-TH003	2006/03/30

5.2. Test Setup



5.3. Limit

- (1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.
- (2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.
- (3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitter used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.

5.4. Test Procedure

- a) Place the EUT on a bench and set it in transmitting mode.
- b) Connect a low loss RF cable from the antenna port to a spectrum analyzer.
- c) The Span is set to zero, and the Sweep time is set to 5 second, then test.

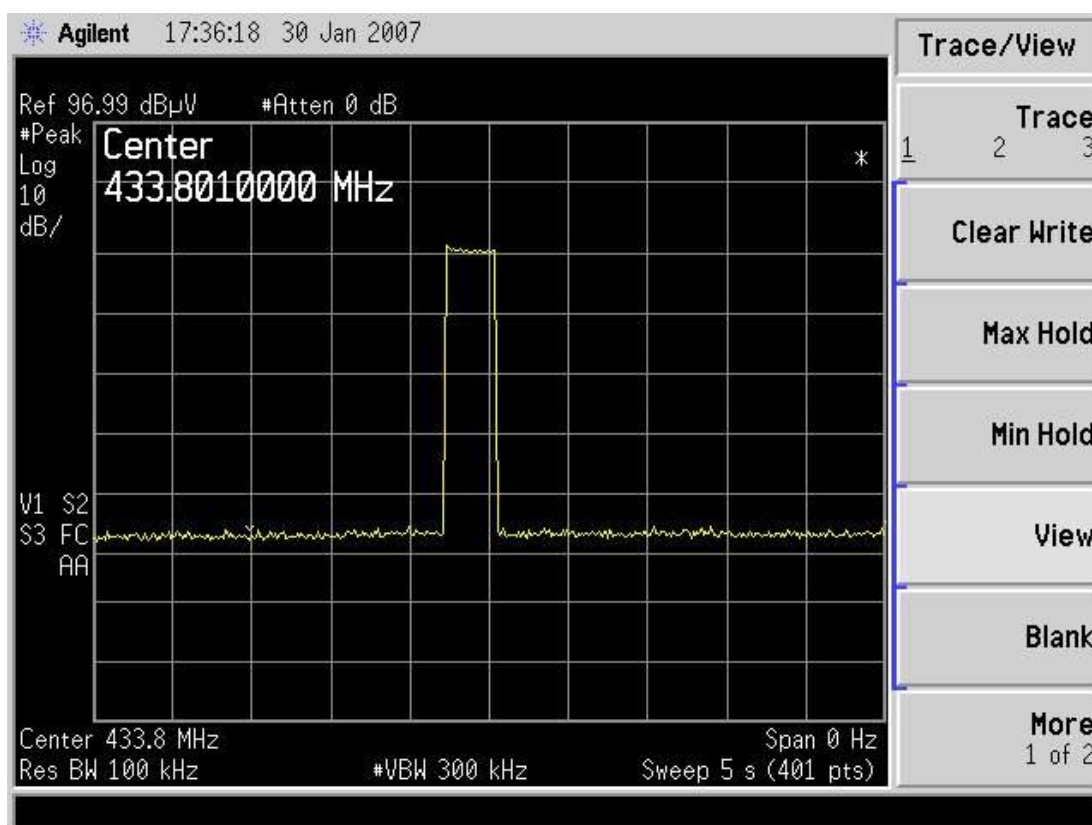
5.5. Uncertainty

The measurement uncertainty is defined as ± 10 ms

5.6. Test Result

Product	:	RF Remote Control
Test Item	:	Transmit Activated Time
Test Site	:	AC-3
Test Mode	:	Mode 1: Transmitter

Channel 01 (433.80109MHz)



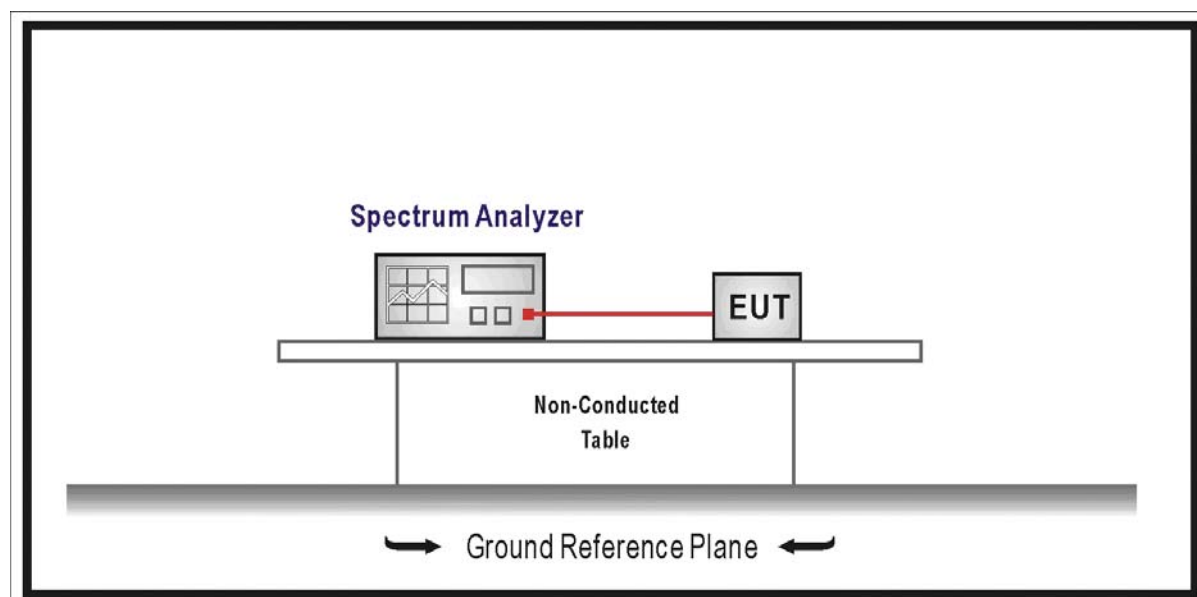
6. Occupied Bandwidth

6.1. Test Equipment

Occupied Bandwidth / AC-3

Instrument	Manufacturer	Type No.	Serial No	Cal. Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2006/03/23
Temperature/Humidity Meter	zhicheng	ZC1-2	QT-TH003	2006/03/30

6.2. Test Setup



6.3. Limit

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, 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.

For devices operating within the frequency band 40.66 - 40.70 MHz, the bandwidth of the emission shall be confined within the band edges.

6.4. Test Procedure

- a) Place the EUT on a bench and set it in transmitting mode.
- b) Connect a low loss RF cable from the antenna port to a spectrum analyzer.
- c) Add a correction factor to the display, and then test.

6.5. Uncertainty

The measurement uncertainty is defined as ± 100 Hz

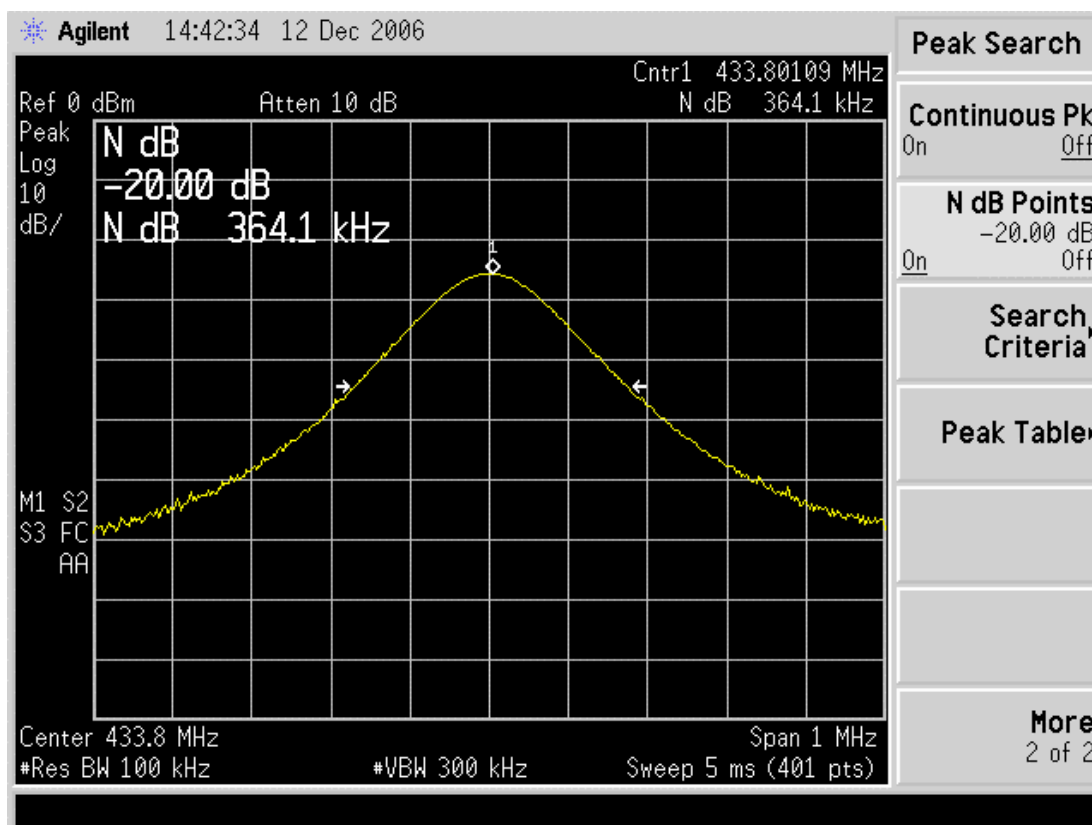
6.6. Test Result

Product	:	RF Remote Control
Test Item	:	Occupied Bandwidth
Test Site	:	AC-3
Test Mode	:	Mode 1: Transmitter

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	433.80109	364.1	1084.5	Pass

Note: Required Limit = 433.80109 * 0.25% = 1.0845MHz

Channel 01 (433.80109MHz)



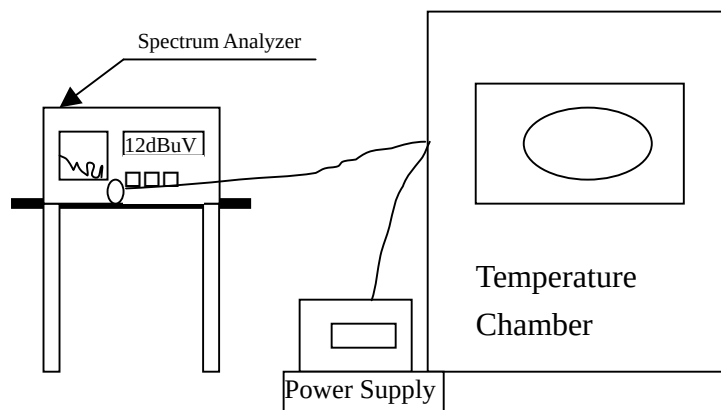
7. Frequency Stability Under Temperature & Voltage Variations

7.1. Test Equipment

Frequency Stability Under Temperature & Voltage Variations / AC-3

Instrument	Manufacturer	Type No.	Serial No	Cal. Date
Spectrum Analyzer	Agilent	E4446A	MY45300103	2006/03/23
AC Power Supply	IDRC	CF-500TP	979422	2006/03/15
DC Power Supply	IDRC	CD-035-020P R	977272	2006/02/17
Programmable Temperature & Humidity Chamber	Gaoyu	TH-1P-B	WIT-05121302	2006/01/24
Temperature/Humidity Meter	zhicheng	ZC1-2	QT-TH003	2006/03/30

7.2. Test Setup



7.3. Limit

For devices operating within the frequency band 40.66 - 40.70 MHz, the frequency tolerance of the carrier shall be $\pm 0.01\%$. This frequency tolerance shall be maintained for a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

7.4. Test Procedure

Measurements of frequency stability vs. temperature:

- b) Place the de-energized EUT in an environmental temperature test chamber. Supply the EUT with nominal ac voltage, or install a new or fully charged battery in the EUT. An antenna should be connected to the antenna output connector of the EUT if possible. Use of a dummy load could affect the output frequency of the EUT. If the EUT is equipped with or uses an adjustable-length antenna, it should be fully extended.
- c) Turn the EUT on, and couple its output to a frequency counter or other frequency-measuring device of sufficient accuracy, considering the frequency tolerance with which the EUT shall comply.

NOTE – An antenna connected to the measuring instrument with a suitable length of coaxial cable may be placed near the RUT (e.g., 15 cm away) for this purpose.

Tune the EUT to one of number of frequencies. Adjust the location of the measurement antenna and the controls on the measuring instrument to obtain a suitable signal level (i.e., a level that will not overload the measuring instrument, but is strong enough to allow measurement of the operating or fundamental frequency of the EUT).

- d) Turn the EUT off, and place it inside an environmental chamber set to the highest temperature specified by the procuring or regulatory agency. For devices that are normally operated continuously, the EUT may be energized while inside the test chamber. For devices that have oscillator heaters, energize only the heater circuit while the EUT is inside the chamber.
- e) Allow sufficient time (approximately 30 minutes) for the temperature of the chamber to stabilize. While maintaining a constant temperature inside the environmental chamber, turn the EUT on and measure the EUT operating frequency at startup, and two, five and ten minutes after startup. Four measurements in total are made.
- f) If requires measurements on only one operating frequency, proceed to step f); otherwise, successively tune the EUT to each of the additional operating frequencies and repeat step d).
- g) Repeat step d) and step e) with the temperature chamber set to the lowest temperature specified by the procuring or regulatory agency. Be sure to allow the environmental chamber temperature to stabilize before performing these measurements.
- h) Prepare the final test report.

Measurements of frequency stability vs. input voltage:

- a) This test may be made at ambient room temperature if it is within the range +15 to +25 °C; otherwise, an environmental temperature test chamber set for a temperature of +20 °C shall be used.

If possible, connect an antenna to the output terminals of the EUT because use of a dummy load could affect the output frequency of the EUT. If the EUT is equipped with or uses an adjustable-length antenna, it should be fully extended.

- b) Supply the EUT with nominal ac voltage, or install a new or fully charged battery in the EUT. Turn on the EUT, and couple its output to a frequency counter or other frequency-measuring device of sufficient accuracy, considering the frequency tolerance with which the EUT shall comply.

NOTE – An antenna connected to the measuring instrument with a suitable length of coaxial cable may be placed near the EUT (e.g., 15 cm away) for this purpose.

- c) Tune the EUT to any one of the frequencies. Adjust the location of the measurement antenna and the controls on the measuring instrument to obtain a suitable signal level (i.e., a level that will not overload the measuring instrument, but is strong enough to allow measurement of the operating or fundamental frequency of the EUT). Turn the EUT off, and place it inside an environmental chamber. Allow sufficient time (approximately 30 minutes) for the chamber to stabilize at + 20 °C before proceeding. Turn the EUT on, and measure the EUT operating frequency at startup, and two, five, and ten minutes after startup. Four measurements in total are made.
- d) If equipment has only one operating frequency, proceed to step e); otherwise, successively tune the EUT to each of the additional operating frequencies and repeat step c).
- e) If the EUT is powered from the ac powerlines, supply it with 85% nominal ac voltage and repeat step c) and step d) before proceeding to step f). If the EUT is battery powered, proceed to step g).
- f) If the EUT is power from the ac powerlines, supply it with 115% nominal ac voltage and repeat step c) and step d) before proceeding to step g).
- g) Prepare the final test report.

7.5. Uncertainty

The measurement uncertainty is defined as $\pm 1 \times 10^{-7}$

7.6. Test Result

The operational frequency of EUT is 433.801 MHz, so it is not suitable for testing this item.