



243 Jubug-Ri, Yangji-Myeon, Yongin-Si, Gyeonggi-Do, Korea 449-822
 Tel: +82-31-323-6008 Fax: +82-31-323-6010
<http://www.ltalab.com>



Dates of Tests: July 12 ~ 18, 2005
 Test Report S/N: LR500110607F
 Test Site : LTA CO., LTD.

CERTIFICATION OF COMPLIANCE

FCC ID

UEUWK750

APPLICANT

HUTECHVISION CO., Ltd.

Manufacturing Description : Wireless Microphone
Manufacturer : HUTECHVISION CO., Ltd.
Model name : WK-750
Test Device Serial No.: : Identification
FCC Rule Part(s) : §74(H), §2
Frequency Range : 740.5 ~ 751.3 MHz
Max. RF Output Power : 0.00158W (2.00dBm) - Conducted
Emission Designators: : 81K8F3E
Data of issue : July 19, 2006

This test report is issued under the authority of:

Dong-Min JUNG, Technical Manager

The test was supervised by:

Kyung-Taek LEE, Test Engineer

This test result only responds to the tested sample. It is not allowed to copy this report even partly without the allowance of the test laboratory. This report must not be used by the applicant to claim product endorsement by any agency.

NVLAP LAB Code.: 200723-0

TABLE OF CONTENTS

1. GENERAL INFORMATION'S -----	3
2. INFORMATION'S ABOUT TEST ITEM -----	4
3. TEST REPORT -----	5
3.1 SUMMARY OF TESTS -----	5
3.2 TRANSMITTER REQUIREMENTS -----	6
3.2.1 RF POWER OUTPUT -----	6
3.2.2 MODULATION CHARACTERISTICS -----	9
3.2.2.1 FREQUENCY RESPONSE -----	9
3.2.2.2 MODULATION LIMITING -----	10
3.2.3 OCCUPIED BANDWIDTH -----	11
3.2.4 SPURIOUS EMISSION AT ANTENNA TERMINAL -----	14
3.2.5 FIELD STRENGTH OF SPURIOUS RADIATION -----	21
3.2.6 FREQUENCY STABILITY -----	22

APPENDIX

APPENDIX 1 TEST EQUIPMENT USED FOR TESTS -----	24
APPENDIX 2 LABEL AND USER'S MANUAL INFORMATION -----	26

1. General information's

1-1 Test Performed

Company name : LTA Co., Ltd.
 Address : 243, Jubug-ri, Yangji-Myeon, Youngin-Si, Kyunggi-Do, Korea. 449-822
 Web site : <http://www.ltalab.com>
 E-mail : chahn@ltalab.com
 Telephone : +82-31-323-6008
 Facsimile : +82-31-323-6010

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the “General requirements for the competents of calibration and testing laboratory”.

1-2 Accredited agencies

LTA Co., Ltd. is approved to perform EMC testing by the following agencies:

Agency	Country	Accreditation No.	Validity	Reference
NVLAP	U.S.A	200723-0	2006-09-30	ECT accredited Lab.
RRL	KOREA	KR0049	2007-07-13	EMC accredited Lab.
FCC	U.S.A	610755	2008-03-28	FCC filing
VCCI	JAPAN	R2133, C2307	2008-06-22	VCCI registration
IC	CANADA	IC5799	2008-04-23	IC filing

2. Information's about test item

2-1 Client

Company name : HUTECHVISION CO.,Ltd.
 Address : #2, Hyundai B/D, 67-13, Wonjong-dong, Ojeong-gu, Bucheon-city,
 Kyunggi-do, Korea, 421-200
 Telephone : +82-32-683-8900
 Facsimile : +82-32-683-8904

2-2 Equipment Under Test (EUT)

Type of Equipment : Wireless Microphone
 Model name : WK-750
 Serial number : Identification
 Date of receipt : June 26, 2006
 EUT condition : Pre-production, not damaged
 Frequency Range : 740.5 ~ 751.3 MHz
 Frequency Tolerance : $\pm 0.005\%$
 Emission Designators : 81K8F3E
 Antenna gain : Max 0.7dBi
 Power source : 3.7V Li-ion polymer battery

2-3 Tested frequency

Frequency (CH)	TX (MHz)
Low (1)	740.5
Mid (13)	745.3
High (28)	751.3

2-4 Test at Extremes of Temperature and Voltage

Temperature Test Conditions		Voltage Test Conditions	
T nom	Per ambient conditions	V nom	3.7
T cold	-10	V min	3.2
T hot	+50	V max	4.2

The extreme temperatures are specified between -10 to +50°C in the User's manual.

3. Test Report

3.1 Summary of tests

FCC Part Section(s)	Parameter	Limit	Test Condition	Status (note 1)
2.1046 / 74.861(e)(1)(ii)	RF Power Output	250mW	Conducted	C
2.1047 / 74.861(e)(3)	Modulation Characteristics. – Frequency response	+/- 75kHz		C
2.1047	Modulation Characteristics. – Modulation Limiting	-		C
2.1049 / 74.861(e)(5)	Occupied Bandwidth	200kHz		C
2.1051 / 74.861(e)(6)(iii)	Spurious Radiation at Antenna Terminal	-13dBm		C
2.1055 / 74.861(e)(4)	Frequency Stability	0.005%		C
2.1051 / 74.861(e)(6)(iii)	Field Strength of Spurious Radiation	-13dBm	Radiated	C

Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable

Note 2: The data in this test report are traceable to the national or international standards.

The sample was tested according to the following specification:

FCC Parts 2, Subpart J and Part 74, Subpart H; ANSI C-63.4-2003

3.2 Transmitter requirements

3.2.1 Carrier Output Power (Conducted)

Definition:

- The carrier power output for a transmitter for this service is the power available at the output terminals of the transmitter when the output terminals are connected to the standard transmitter load.

Test Requirements : 47 CFR Part 2, Subpart J

Test method : 47 CFR 2.1046

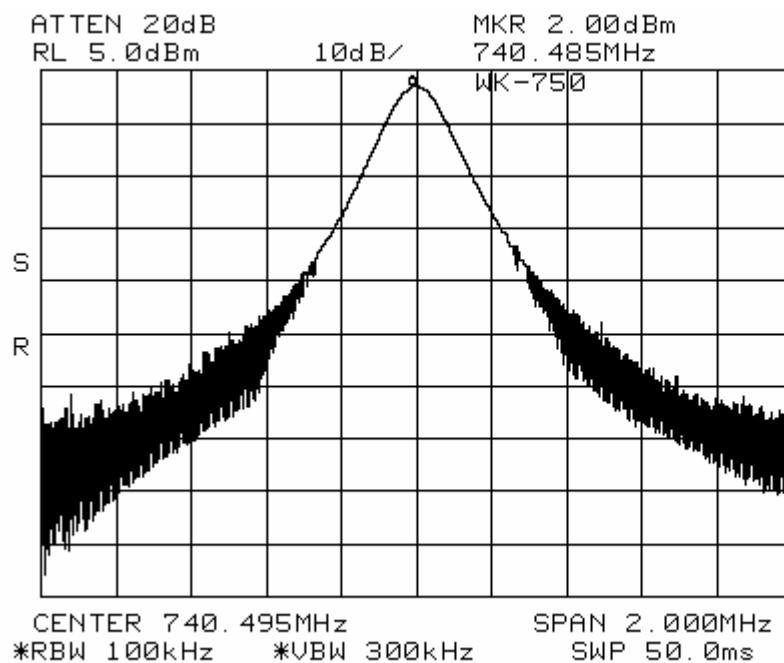
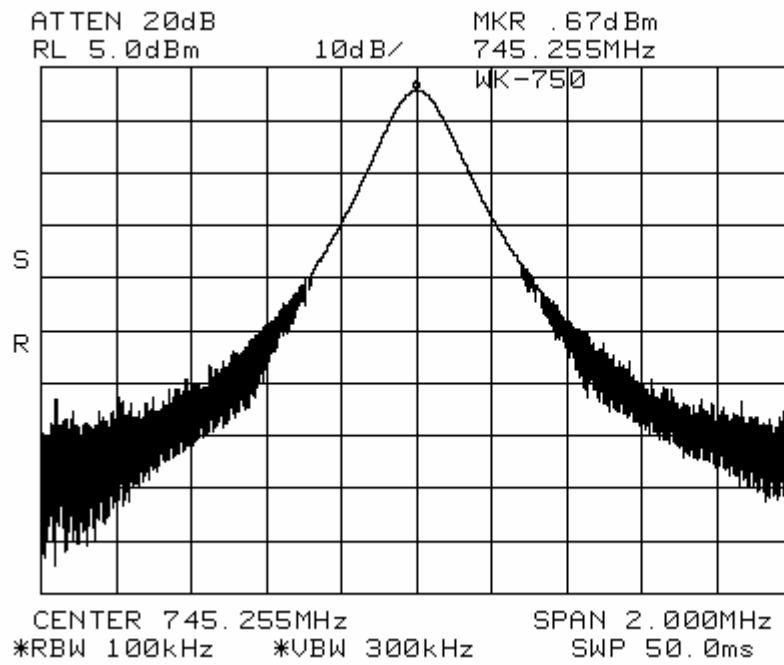
Measurement Procedure:

- The EUT was connected to a resistive coaxial attenuator of normal load impedance, and the unmodulated output power was measured by means of an R.F. Power Meter.

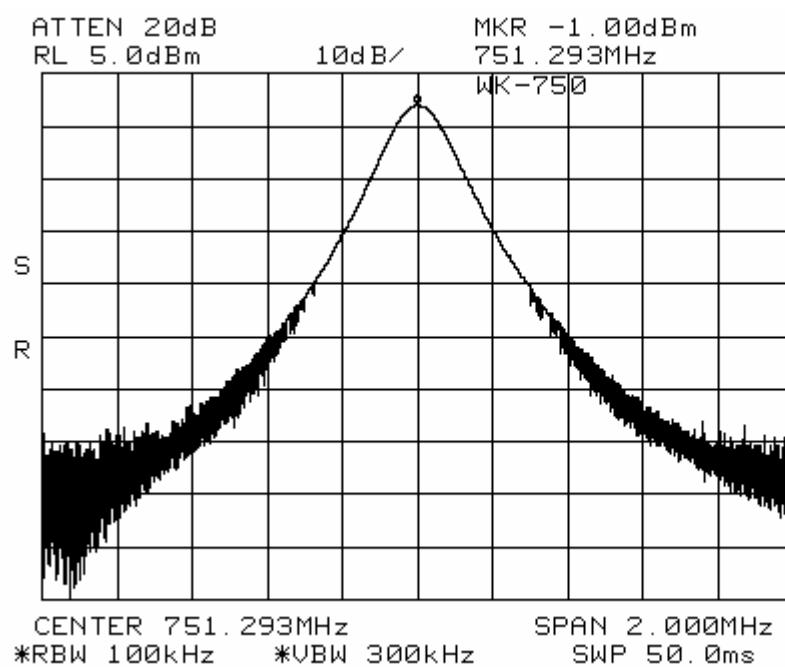
TEST CONDITIONS		Carrier power(dBm)		
Temp(°C)	Humidity (%)	Low	Middle	High
25	60	2.00	0.67	-1.00
Measurement uncertainty		± 0.5 dB		

Minimum Standard: 47 CFR 74.861(e)(1)(ii)

250mW (24dBm)

Low channel**Middle channel**

High channel



3.2.2 Modulation Characteristics

3.2.2.1 Audio Frequency Response

Definition:

- The audio frequency response is the degree of closeness to which the frequency deviation of the transmitter follows a prescribed characteristic.

Test Requirements : 47 CFR Part 2, Subpart J

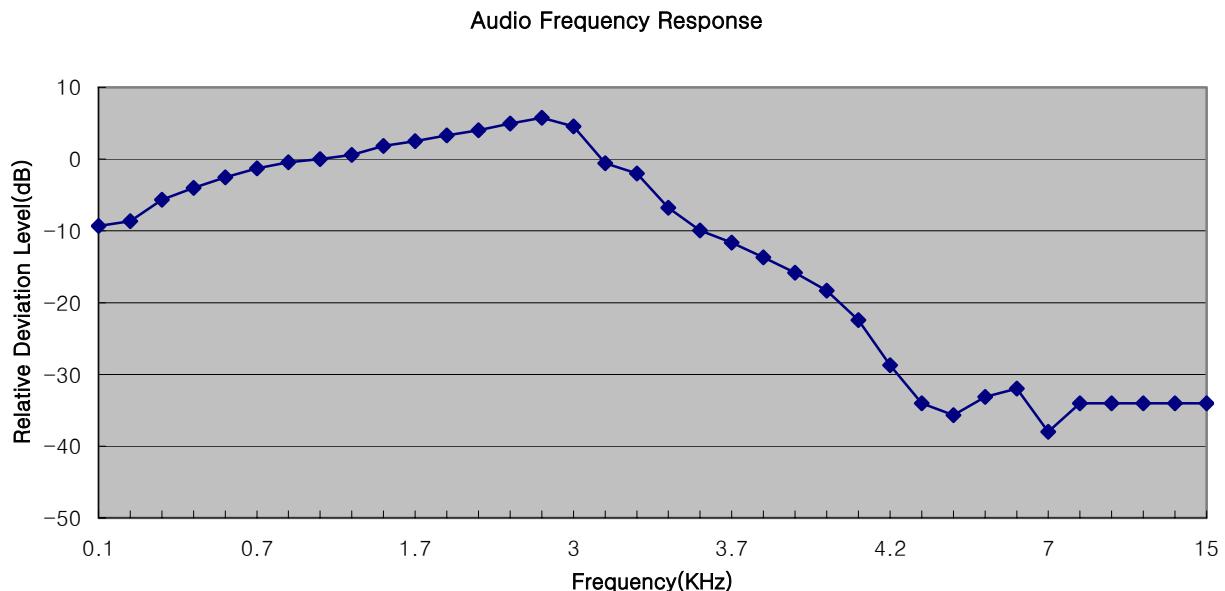
Test method : 47 CFR 2.1047

Measurement Procedure:

- The audio signal input was adjusted to obtain 20% modulation at 1kHz, and this point was taken as the 0dB reference level.
- With input levels held constant and below limiting at all frequencies, the audio signal generator was varied from 100 Hz to 15 kHz.
- The response in dB relative to 1 kHz was then measured, using the HP 8901A Modulation Analyzer.

Measurement Data:

REFERENCE LEVEL : 0dB @ 1kHz



Minimum Standard: 47 CFR 74.861(e)(3)

Any form of modulation may be used. A maximum deviation of +/- 75kHz is permitted when FM is employed.

3.2.2.2 Modulation Limiting

Definition:

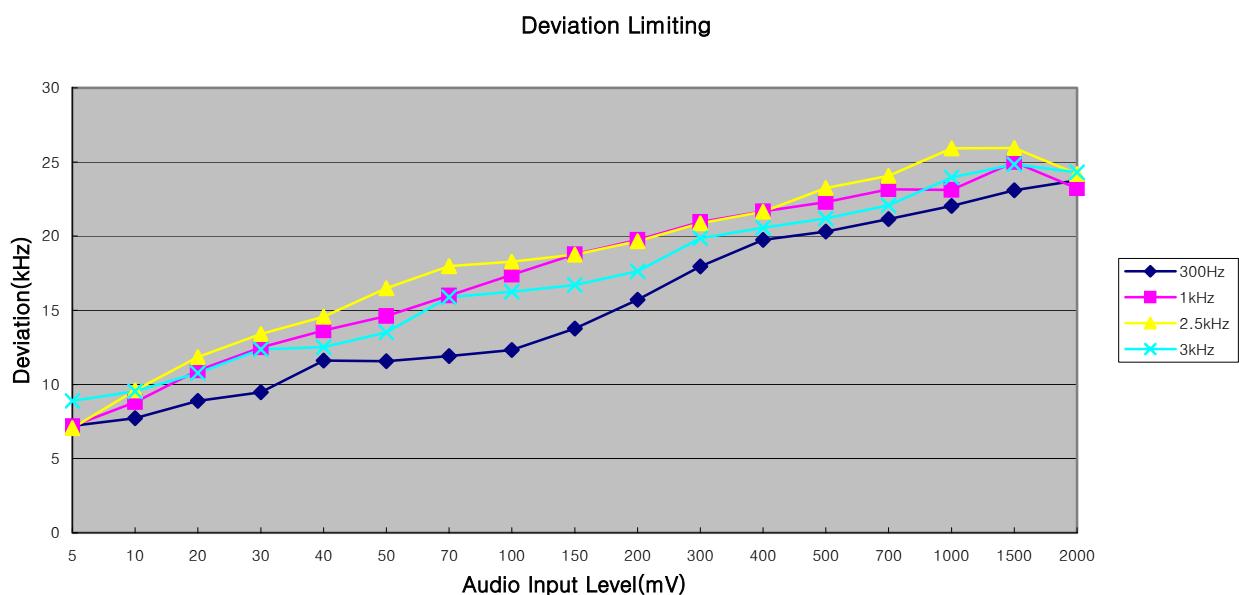
- Modulation limiting refers to the transmitter circuits ability to limit the transmitter from producing deviations due to modulation in excess of a rated system deviation.

Test Requirements	: 47 CFR Part 2, Subpart J
Test method	: 47 CFR 2.1047
Limits	: none stated

Measurement Procedure:

- The signal generator was connected to the input of the EUT as for " Frequency Response of the Modulating Circuit."
- The modulation response was measured for each of three frequencies (one of which was the frequency of maximum response), and the input voltage was varied and was observed on an HP 8901A Modulation Analyzer.
- The input level was varied from 30% modulation (± 1.5 kHz deviation) to at least 20 dB higher than the saturation point.

Measurement Data:



3.2.3 Occupied Bandwidth

Definition:

- The term transmitter Sideband Spectrum denotes the sideband energy produced at a discrete frequency separation from the carrier up to the test bandwidth due to all sources of unwanted noise within the transmitter in a modulated condition.

Test Requirements : 47 CFR Part 2, Subpart J
 Test method : 47 CFR 2.1049

Measurement Procedure:

- The EUT and test equipment were set up as shown on the following page, with the Spectrum Analyzer connected.
- For EUTs supporting audio modulation, the audio signal generator was adjusted to the frequency of maximum response and with output level set for 50% modulation. With level constant, the signal level was increased 16dB.
- For EUTs supporting digital modulation, the digital modulation mode was operated to its maximum extent.
- The Occupied Bandwidth was measured with the Spectrum Analyzer controls set as shown on the test results.

Measurement Data:

Frequency (MHz)	Channel No.	Test Results	
		Measured Bandwidth (kHz)	Result
740.5	1	51.67	Complies
745.3	13	73.33	Complies
751.3	28	74.00	Complies

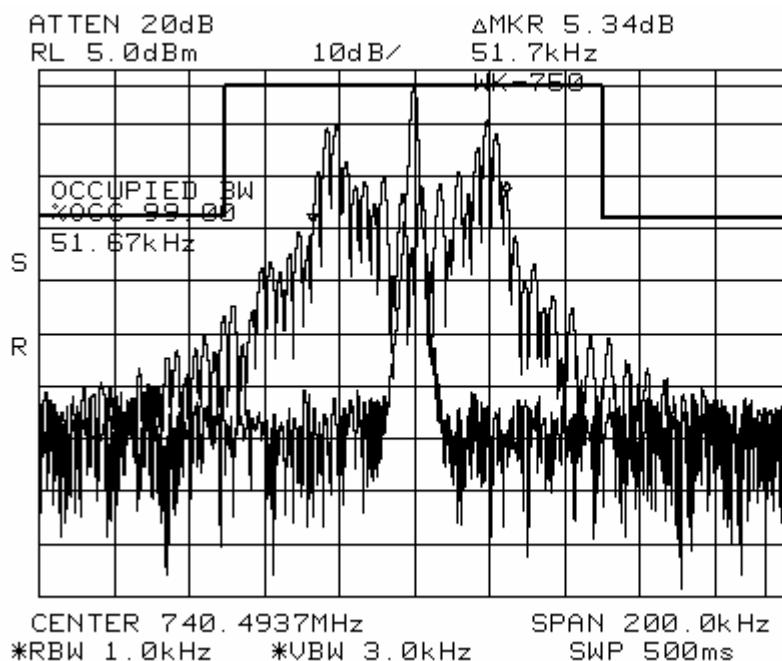
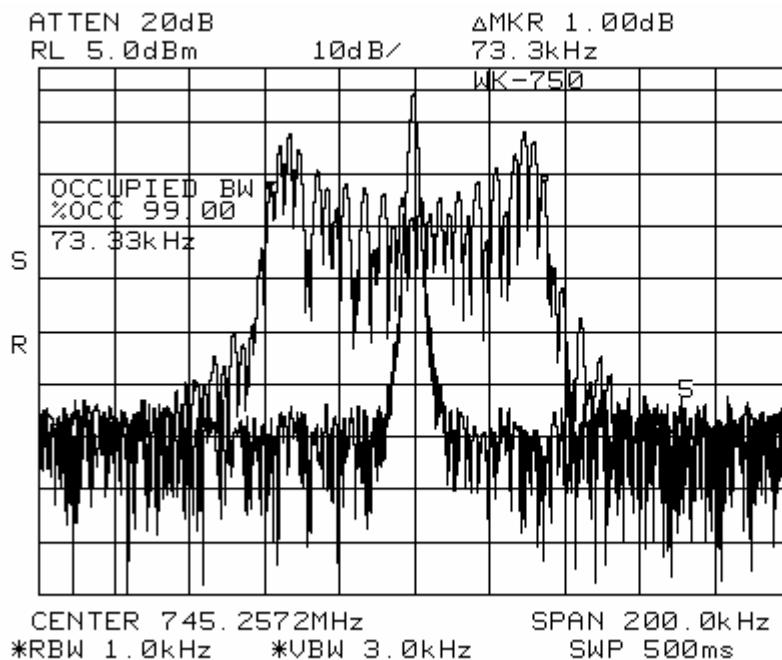
- See next pages for actual measured spectrum plots.

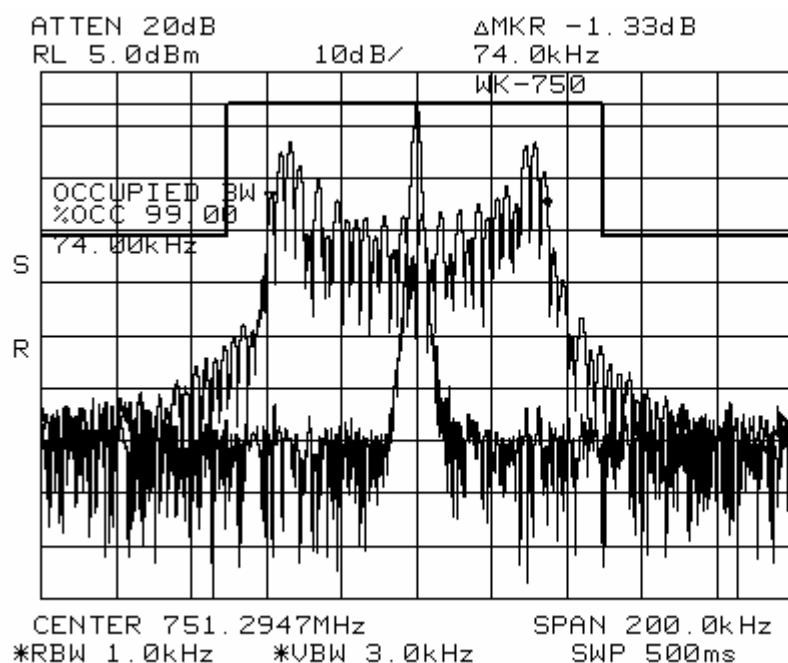
Emission Designator

$$2M + 2D = (2 * 15\text{kHz}) + (2 * 25.9\text{kHz}) = 81\text{K}8\text{F}3\text{E}$$

Minimum Standard: 47 CFR 74.861(e)(5)

200 kHz

Low channel**Middle channel**

High channel

3.2.4 Spurious Emissions at Antenna Terminals

Procedure:

The bandwidth at 20dB down from the highest inband spectral density is measured with a spectrum analyzer connected to the antenna terminal, while EUT had its hopping function disabled at the highest, middle and the lowest available channels.

After the trace being stable, Use the marker-to-peak function to measure 20 dB down both sides of the intentional emission.

Test Requirements : 47 CFR Part 2, Subpart J
Test method : 47 CFR 2.1051

The spectrum analyzer is set to:

Center frequency = the highest, middle and the lowest channels

RBW = 100 kHz VBW = 100 kHz

Span = 10 MHz Detector function = peak

Trace = max hold Sweep = auto

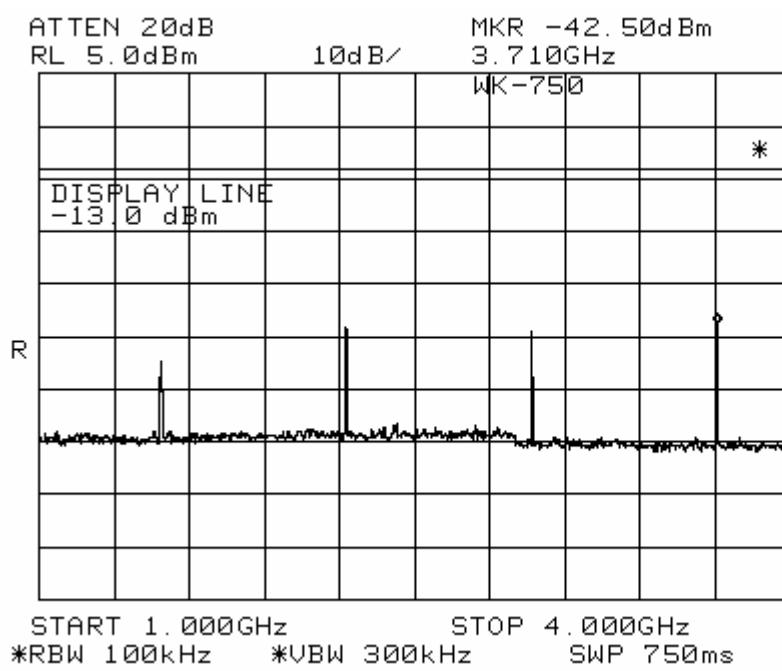
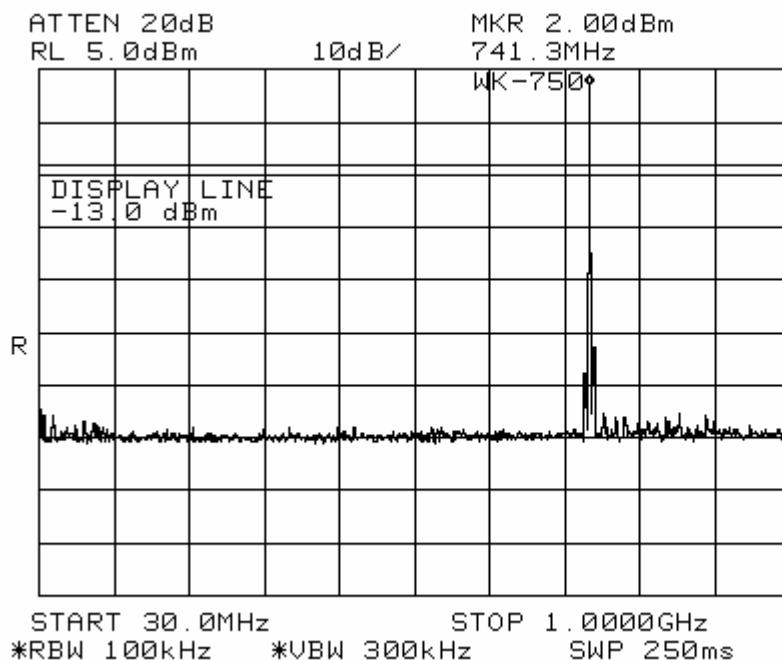
Measurement Data: Complies

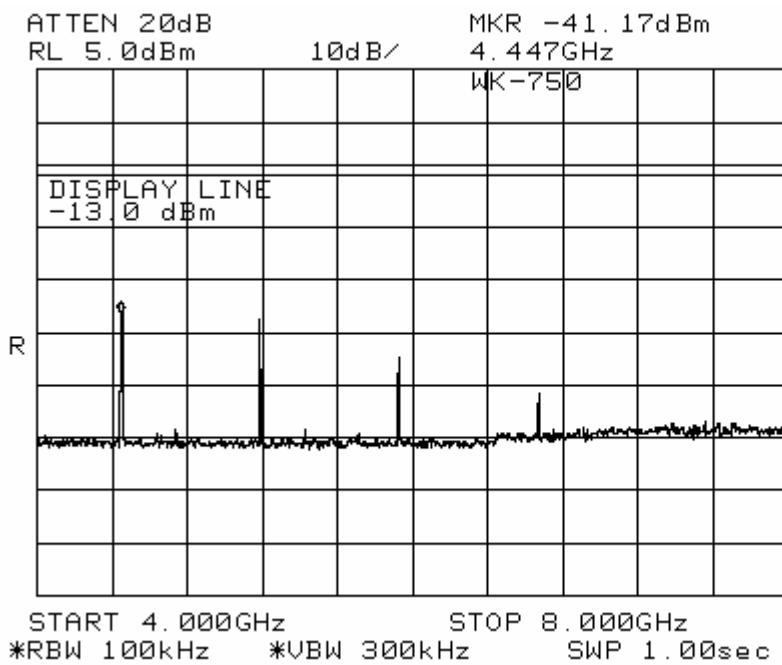
- All conducted emission in any 100kHz bandwidth outside of the spread spectrum band was at least 20dB lower than the highest inband spectral density. Therefore the applying equipment meets the requirement.
- See next pages for actual measured spectrum plots.

Minimum Standard: 47 CFR 74.861(e)(6)(iii)

$$= 43 + 10 \log_{10} (P) \text{ dBc (or -13 dBm)}$$

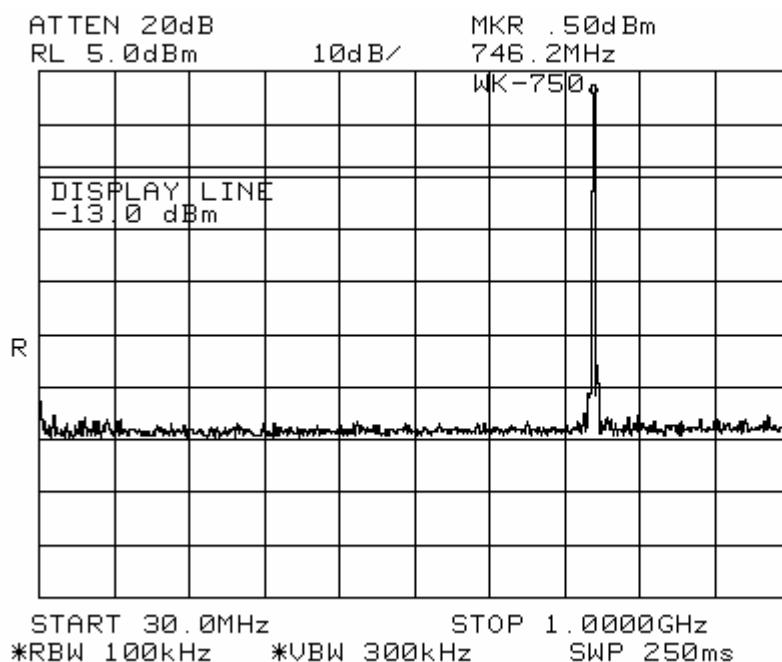
Low channel



Low channel**Frequency Range = 30MHz ~ 10th harmonic.**

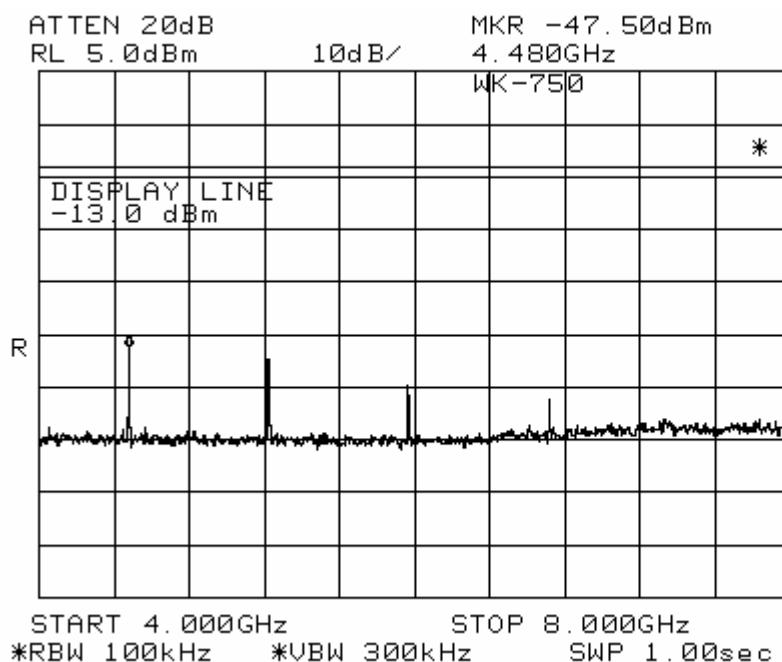
Middle channel

Frequency Range = 30MHz ~ 10th harmonic.

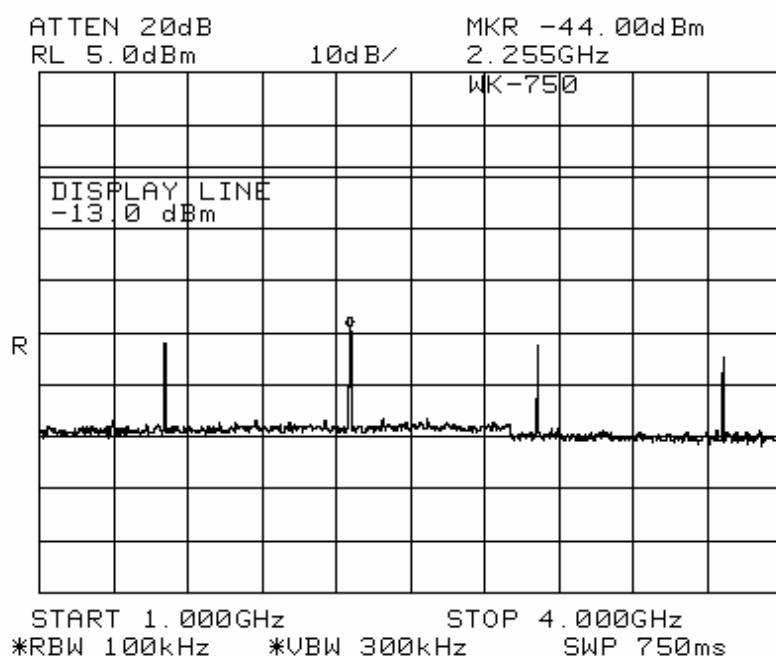
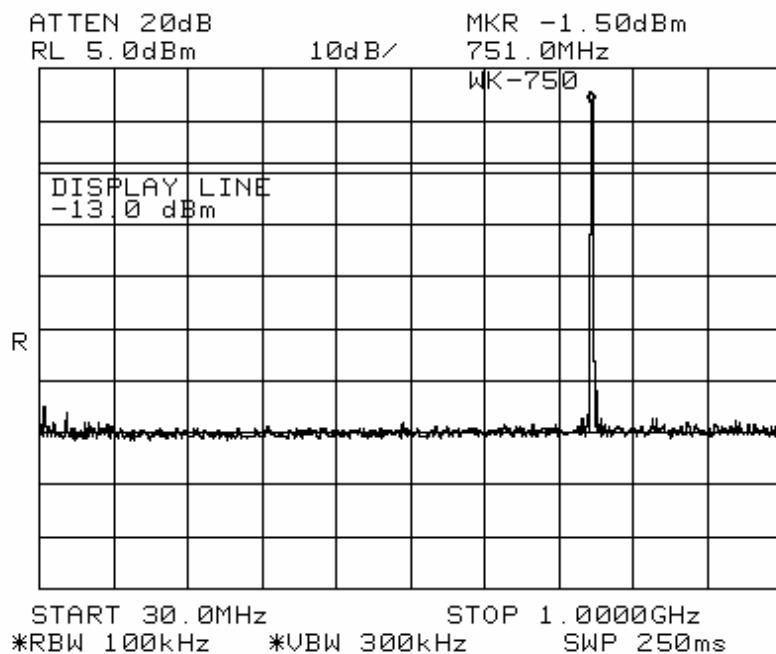


Middle channel

Frequency Range = 30MHz ~ 10th harmonic.

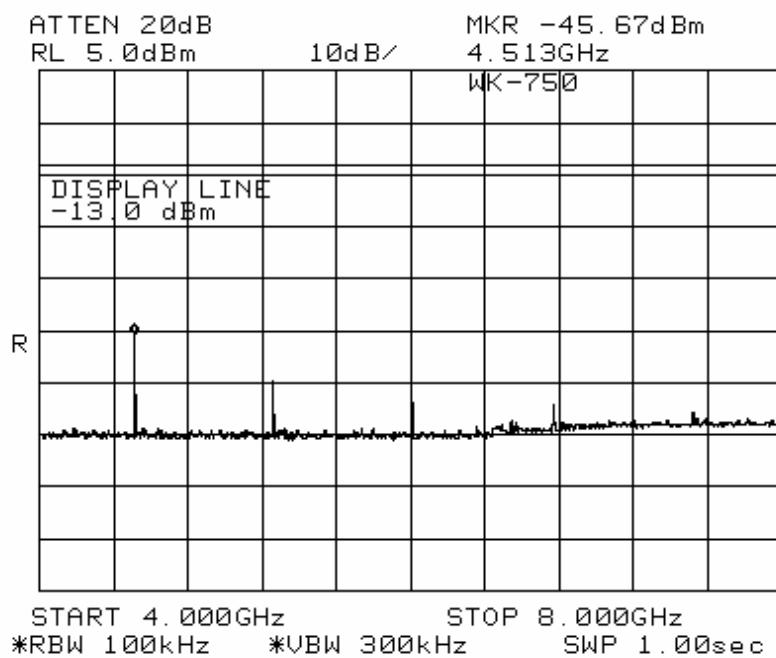


High channel



High channel

Frequency Range = 30MHz ~ 10th harmonic.



3.2.5 Field Strength of Harmonics

Procedure:

The EUT was placed on a 0.8m high wooden table inside a shielded enclosure. An antenna was placed near the EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed in OATS. Measurements were performed with the EUT oriented in 3 orthogonal axis and rotated 360 degrees to determine worst-case orientation for maximum emissions.

Test Requirements : 47 CFR Part 2, Subpart J

Test method : 47 CFR 2.1053

The spectrum analyzer is set to:

Center frequency = the worst channel

Frequency Range = 30 MHz ~ 10th harmonic.

$$\text{RBW} = 100 \text{ kHz} \text{ (30MHz } \sim 1 \text{ GHz) } \quad \text{VBW} \geq \text{RBW}$$

= 1 MHz (1 GHz \sim 10th harmonic)

Detector function = peak

Span = 100 MHz

Trace = max hold

Detector function = peak

Trace = max hold

Sweep = auto

Measurement Data: Complies

Low channel		Mid channel		High channel	
Frequency (MHz)	Level (dBuV)	Frequency (MHz)	Level (dBuV)	Frequency (MHz)	Level (dBuV)
-	-	-	-	-	-
No emissions were detected at a level greater than 20dB below limit.					
-	-	-	-	-	-
Measurement uncertainty		\pm 6 dB			

Minimum Standard: 47 CFR 74.861(e)(6)(iii)

$$= 43 + 10 \log_{10} (P) \text{ dBc (or -13 dBm)}$$

3.2.6 Frequency Stability

Definition:

- Modulation limiting refers to the transmitter circuits ability to limit the transmitter from producing deviations due to modulation in excess of a rated system deviation.

Test Requirements : 47 CFR Part 2, Subpart J
 Test method : 47 CFR 2.1055

Measurement Procedure:

The frequency stability of the transmitter is measured by:

- a) Temperature: The temperature is varied from -10°C to +50°C using an environmental chamber.
- b) Primary Supply Voltage: The primary supply voltage is varied from 85% to 115% of the voltage normally at the input to the device or at the power supply terminals if cables are not normally supplied.

Specification- The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within $\pm 0.005\%$ of the center frequency.

Time Period and Procedure:

1. The carrier frequency of the transmitter and the individual oscillators is measured at room temperature (25°C to 27°C to provide a reference).
2. The equipment is subjected to an overnight “soak” at -10°C without power applied.
3. After the overnight “soak” at 30°C (usually 14-16 hours), the equipment is turned on in a “standby” condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter and the individual oscillators is made within a three minute interval after applying power to the transmitter.
4. Frequency measurements are made at 10°C interval up to room temperature. At least a period of one and one half-hour is provided to allow stabilization of the equipment at each temperature level.
5. Again the transmitter carrier frequency and the individual oscillators is measured at room temperature to begin measurement of the upper temperature levels.
6. Frequency measurements are at 10 intervals starting at -10°C up to +50°C allowing at least two hours at each temperature for stabilization. In all measurements the frequency is measured within three minutes after re-applying power to the transmitter.
7. The artificial load is mounted external to the temperature chamber.

Measurement Data:

- See the next page.

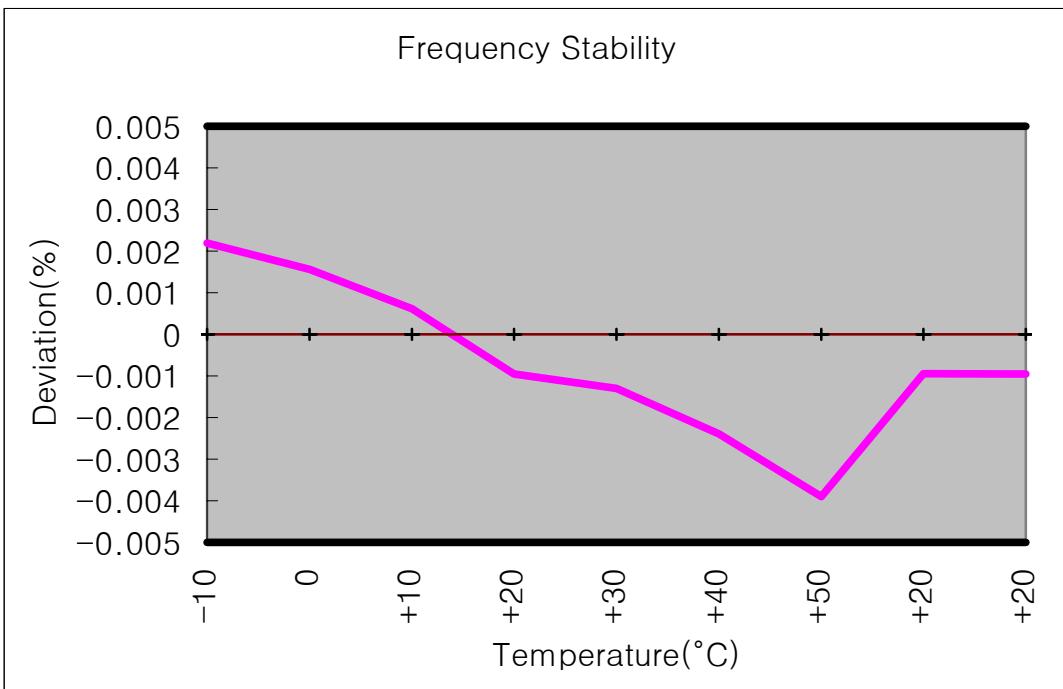
Minimum Standard: 47 CFR 74.861(e)(4)

$\pm 0.005\%$

]Frequency Stability Measurement Data:

OPERATING FREQUENCY : 740,500,000 HzREFERENCE VOLTAGE: 3.7 VDCDEVIATION LIMIT: ± 0.005 %

VOLTAGE (%)	POWER (VDC)	TEMP (dB)	FREQ (Hz)	Deviation (%)
100%	3.7	-10	740,516,229	0.002192
100%		0	740,511,544	0.001559
100%		+10	740,504,572	0.000617
100%		+20	740,492,955	-0.000951
100%		+30	740,490,368	-0.001301
100%		+40	740,482,310	-0.002389
100%		+50	740,471,107	-0.003902
85%		+20	740,492,973	-0.000949
115%	4.2	+20	740,492,933	-0.000954



APPENDIX 1

TEST EQUIPMENT USED FOR TESTS

	Description	Model No.	Serial No.	Manufacturer	Next Cal. Date
1	Spectrum Analyzer	8594E	3649A03649	HP	Dec-06
2	Signal Generator	8657A	3430U02049	HP	Dec-06
3	Attenuator (3dB)	8491A	37822	HP	Dec-06
4	Attenuator (3dB)	8491A	28881	HP	Dec-06
5	EMI Test Receiver	ESVD	843748/001	R&S	Dec-06
6	Spectrum Analyzer	8591E	3649A05888	HP	Jan-07
7	Spectrum Analyzer	8563E	3425A02505	HP	Jan-07
8	RF Amplifier	8447D	2949A02670	HP	Jan-07
9	RF Amplifier	8447D	2439A09058	HP	Jan-07
10	RF Amplifier	8449B	3008A02126	HP	Jun-07
11	TRILOG Antenna	VULB 9160	9160-3172	SCHWARZBECK	Feb-07
12	Log.-Per. Antenna	VULP 9118	9118 A 401	SCHWARZBECK	Feb-07
13	Biconical Antenna	BBA 9106	VHA 9103-2315	SCHWARZBECK	Feb-07
14	Horn Antenna	3115	00055005	ETS LINDGREN	Jun-07
15	Horn Antenna	BBHA 9120D	0499	Schwarzbeck	Jun-07
16	Hygro-Thermograph	THB-36	0041557-01	ISUZU	Feb-07
17	Splitter (BNC)	ZFM-150	15542	Mini-Circuits	-
18	Splitter (SMA)	ZFSC-2-2500	SF617800326	Mini-Circuits	-
19	Power Divider	11636A	6243	HP	Apr-07
20	DC Power Supply	6622A	3448A03079	HP	Apr-07
21	Attenuator (30dB)	8498A	1801A06689	HP	Apr-07
22	Attenuator (10dB)	8491A	63196	HP	Apr-07
23	Power Meter	EPM-441A	GB32481702	HP	Apr-07
24	Power Sensor	8481A	2702A64048	HP	Apr-07
25	Audio Analyzer	8903B	3729A18901	HP	May-07
26	Modulation Analyzer	8901A	3749A05878	HP	May-07
27	Dipole Antenna	VHA9103	2116	Schwarzbeck	Oct-06
28	Dipole Antenna	VHA9103	2117	Schwarzbeck	Oct-06
29	Dipole Antenna	UHA9105	2261	Schwarzbeck	Oct-06
30	Dipole Antenna	UHA9105	2262	Schwarzbeck	Oct-06
31	Digital Multimeter	34401A	US36062141	HP	Apr-07
32	LISN	KNW-407	8-1430-1	Kyoritsu	Jan-07
33	Two-Line V-Network	ESH3-Z5	893045/017	R&S	Jan-07
34	Test Receiver	ESHS10	828404009	R&S	Jan-07
35	TEMP & HUMIDITY Chamber	YJ-500	L05022	Jin Young Tech	-

APPENDIX 2

Label and User's Manual Information

Certification Labeling Requirements

§ 15.19 Labeling requirements.

(a) In addition to the requirements in part 2 of this chapter, a device subject to **certification, or verification** shall be labeled as follows:

(1) Receivers associated with the operation of a licensed radio service, e.g., FM broadcast under part 73 of this chapter, land mobile operation under part 90, etc., shall bear the following statement in a conspicuous location on the device:

This device complies with part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

(2) A stand-alone cable input selector switch, shall bear the following statement in a conspicuous location on the device:

This device is verified to comply with part 15 of the FCC Rules for use with cable television service.

(3) All other devices shall bear the following statement in a conspicuous location on the device:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

(4) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified under paragraph (a) of this section is required to be affixed only to the main control unit.

(5) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (a) of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

User's Manual Information

§ 15.21 Information to user.

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart B - Unintentional Radiators:

§ 15.105 Information to the user.

(b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.