



**MET Laboratories, Inc.** *Safety Certification - EMI - Telecom Environmental Simulation*  
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September 30, 2004

Panasonic Mobile Communications  
1225 Northbrook Pky  
Suite 2-359  
Suwanee, GA 30024

Dear Paul Schlagheck,

Enclosed is the EMC test report for compliance testing of the Panasonic Mobile Communications, X700/EB-X700. The Panasonic Mobile Communications, X700/EB-X700 was tested to the requirements of the FCC Certification rules under Title 47 of the CFR Part 24 Subpart E, radiated spurious emissions, and EIRP, for Broadband PCS Devices.

Thank you for using the services of MET Laboratories, Inc. If you have any questions regarding these results or if MET can be of further service to you, please feel free to contact me.

Sincerely yours,

MET LABORATORIES, INC.

Rob Beauvais  
Documentation Department

Reference: (\Panasonic Mobile Communications\ EMC15920-FCC24)

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## **Electromagnetic Compatibility Criteria Test Report**

For the

**Panasonic Mobile Communications  
X700/EB-X700**

**Tested under**

**FCC Certification Rules  
Title 47 of the CFR, Part 24 Subpart E, Radiated Spurious Emissions, and EIRP  
for Broadband PCS Devices**

**MET Report: 15920-FCC24**

September 30, 2004

**Prepared For:**

**Panasonic Mobile Communications  
1225 Northbrook Pky  
Suite 2-359  
Suwanee, GA 30024**

**Prepared By:  
MET Laboratories, Inc.  
Baltimore, MD 21230**



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Kevin A. Mehaffey  
Electromagnetic Compatibility Lab

Rob Beauvais  
Documentation Department

**Engineering Statement:** The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of Part 24 Subpart E of the FCC Rules under normal use and maintenance.

Jeff Hazen  
Electromagnetic Compatibility Lab



Panasonic Mobile Communications  
X700/EB-X700  
FCC ID: NWJ22A001A

CFR Title 47 Part 24 Subpart E

## Report Status Sheet

Revision	Report Date	Reason for Revision
Ø	September 30, 2004	Initial Issue.



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## List of Terms and Abbreviations

<b>AC</b>	<b>Alternating Current</b>
<b>ACF</b>	<b>Antenna Correction Factor</b>
<b>Cal</b>	<b>Calibration</b>
<b>d</b>	<b>Measurement Distance</b>
<b>dB</b>	<b>Deci Bels</b>
<b>dB<math>\Phi</math>V</b>	<b>Deci-Bels above one micro Volt</b>
<b>dB<math>\Phi</math>V/m</b>	<b>Deci-Bels above one micro Volt per meter</b>
<b>DC</b>	<b>Direct Current</b>
<b>DCF</b>	<b>Distance Correction Factor</b>
<b>E</b>	<b>Electric Field</b>
<b>EUT</b>	<b>Equipment Under Test</b>
<b>e.i.r.p</b>	<b>equivalent isotropically radiated power</b>
<b>f</b>	<b>Frequency</b>
<b>FCC</b>	<b>Federal Communications Commission</b>
<b>GHz</b>	<b>Giga Hertz</b>
<b>Hz</b>	<b>Hertz</b>
<b>IEC</b>	<b>International Electrotechnical Commission</b>
<b>kHz</b>	<b>kilohertz</b>
<b>kV</b>	<b>kilo Volt</b>
<b>LISN</b>	<b>Line Impedance Stabilization Network</b>
<b>MHz</b>	<b>MegaHertz</b>
<b>RF</b>	<b>Radio Frequency</b>
<b>RMS</b>	<b>Root-Mean-Square</b>
<b>V/m</b>	<b>Volts per meter</b>



## 1. Requirements Summary

Reference	Description	Compliance
2.1046; Part 24 Subpart E §24.232 (a), (c)	RF Power Output	Not Tested
2.1047 (a)	Modulation Characteristics	Not Tested
2.1049	Occupied Bandwidth	Not Tested
2.1051; 24.238 (a)	Spurious Emissions at Antenna Terminals	Not Tested
2.1051; 24.238 (b)	Spurious Emissions at Antenna Terminals Frequency Block Edges	Not Tested
2.1053; 24.238 (a)	Radiated Spurious Emissions	Complies
2.1053; 24.238 (a)	Radiated Spurious Emissions - Substitution Equivalent Isotropic Radiated Power (E.I.R.P.)	Complies
2.1055 (a) (1)	Frequency Stability Over Temperature Variations	Not Tested
2.1055 (d) (2)	Frequency Stability Over Battery Power	Not Tested

**Table 1. Requirements Summary of EMC Part 24 Compliance Testing**





## Equipment Configuration

### 2.1. Overview

An EMC evaluation to determine compliance of the Panasonic Mobile Communications, X700/EB-X700 with the requirements of Part 24 Subpart E, was performed. All references are to the most current version of Title 47 of the Code of Federal Regulations in effect. In accordance with §2.1033, the following data is presented in support of the Certification of the Panasonic Mobile Communications, X700/EB-X700. Panasonic Mobile Communications should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the X700/EB-X700 has been **permanently** discontinued.

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 24 Subpart E, , in accordance with Panasonic Mobile Communications, purchase order number PMCD-9449. All tests were conducted using measurement procedure *ANSI C63.4-1992*.

<b>Type of Submission/Rule:</b>	Part 24 Original Filing
<b>Model(s) Tested:</b>	X700/EB-X700
<b>Model(s) Covered:</b>	X700/EB-X700
<b>EUT Specifications:</b>	Primary Power: 110 VAC 60 Hz
	FCC ID NWJ22A001A
	Emission Designator: 246KGXW
	RF Power Output: See Page 8
	EIRP: See Page 8
	Equipment Frequency Range: 1850.5 – 1909.8 MHz
	Frequency Stability: N/A
<b>Analysis:</b>	The results obtained relate only to the item(s) tested.
<b>Evaluated by:</b>	Liming Xu
<b>Date(s):</b>	September 30, 2004



## 2.2. Test Site

All testing was performed at MET Laboratories, Inc., 914 W. Patapsco Avenue, Baltimore, MD 21230. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology.

Radiated Emissions measurements were performed in a semi-anechoic chamber. In accordance with §2.948(a)(3), a complete site description is contained at MET Laboratories. In accordance with §2.948(d), MET Laboratories has been accredited by the National Voluntary Laboratory Accreditation Program (Lab Code: 100273-0).

## 2.3. Description of Test Sample

The X700/EB-X700, Equipment Under Test (EUT), is powered from a 110 VAC 60 Hz supply. The EUT is a “Smart” Mobile Phone E-GSM + GPRS 900 / 1800 & 1900 MHz.

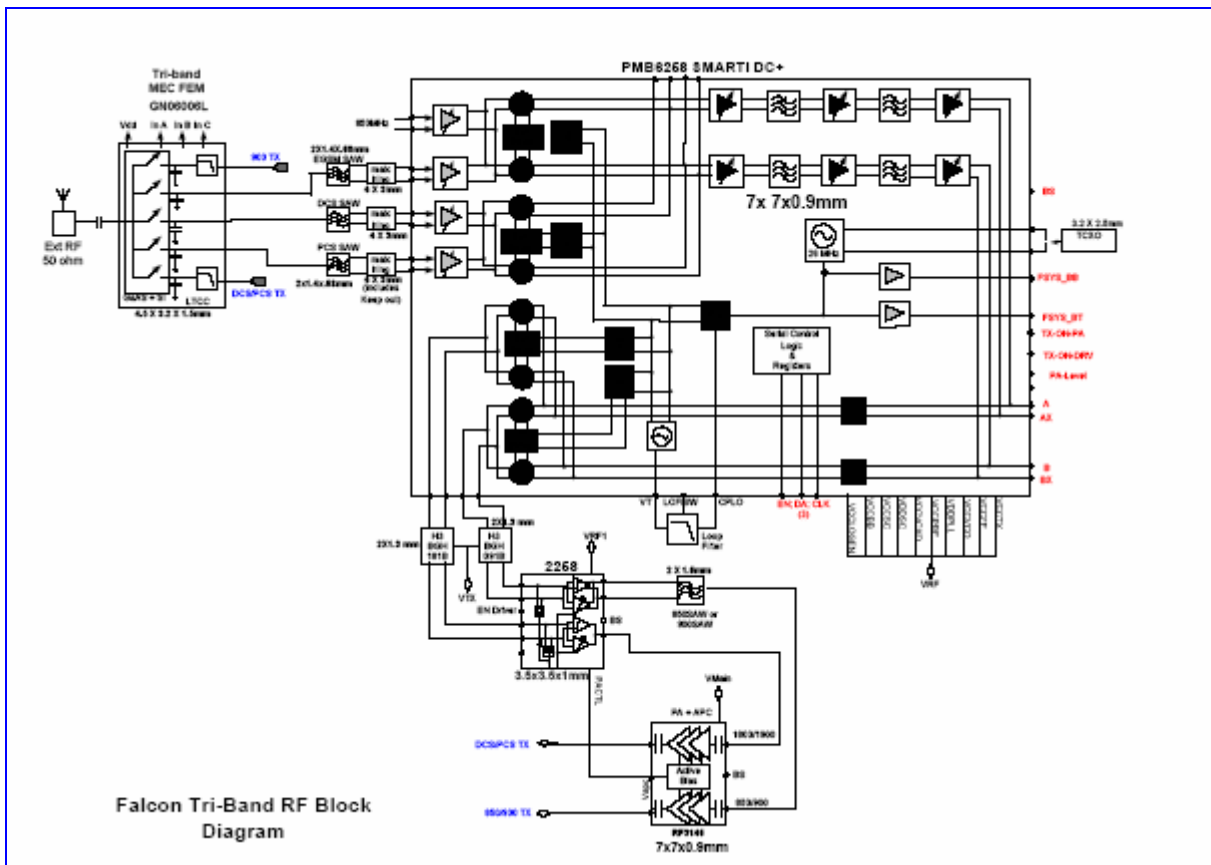


Figure 1. Falcon Tri-Band RF Block Diagram

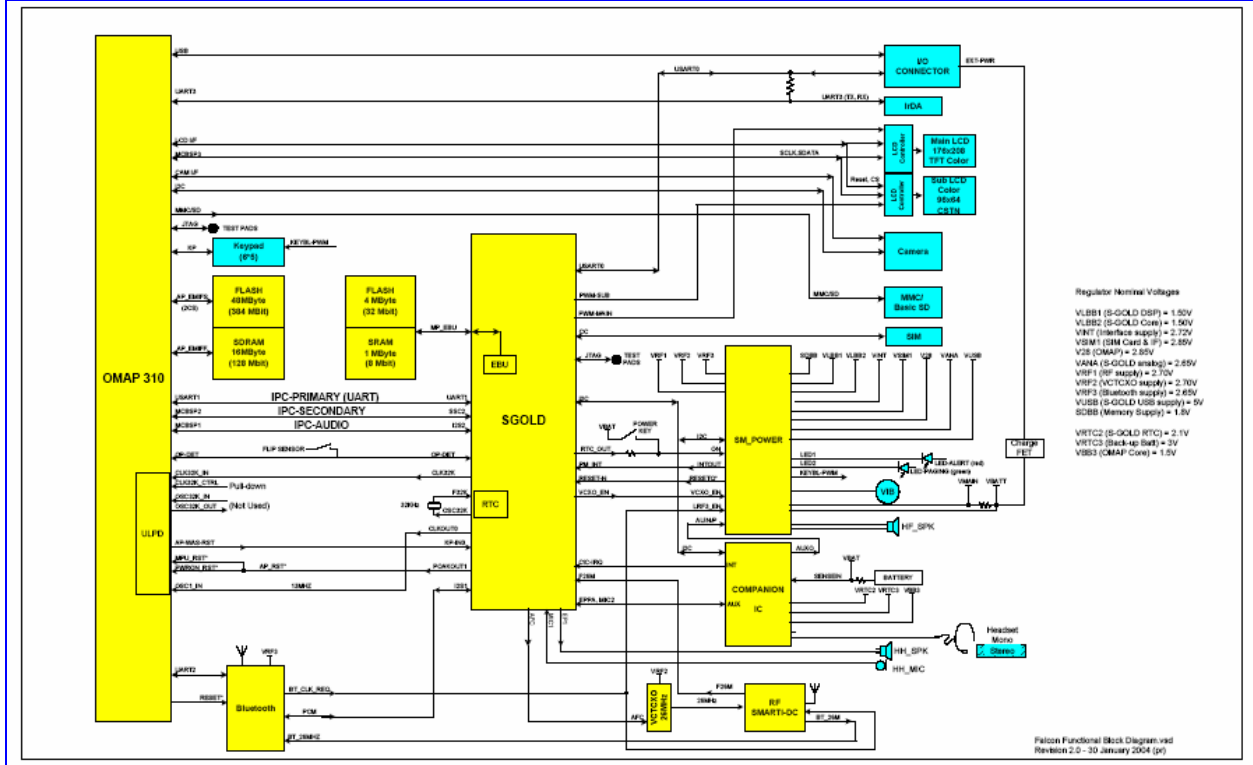


Figure 2. Falcon Functional Block Diagram



## 2.4. Mode of Operation

The EUT was connected to the DC power supply and a laptop computer. The EUT is set to communicate at its maximum power level on a continuous basis.

GSM 1900 MHz Voice Call on Bluetooth Link- X700 is set in a voice call using the 1900MHz GSM band. A Bluetooth audio link is established to another Bluetooth device. The Universal AC Mains Charger is connected and the battery charging process is being controlled by the handset.

## 2.5. Modifications

### 2.5.1. Modifications to EUT

No modifications were made to the EUT.

### 2.5.2. Modifications to Test Standard

No modifications were made to the test standard.

## 2.6. Disposition of EUT

The test sample including all support equipment submitted to the Electro-Magnetic Compatibility Lab for testing was returned to Panasonic Mobile Communications upon completion of testing.



## 2.7. Spurious Emissions

### 2.7.1. Radiated Spurious Emissions

**Test Requirement(s):** § 2.1053 Measurements required: Field strength of spurious radiation.

§ 2.1053 (a)

§ 2.1053 (b)

§ 24.238 Emission limitations for Broadband PCS equipment

§ 24.238 (a)

**Test Procedures:**

As required by §2.1053, field strength of spurious radiation measurements were made in accordance with the general procedures of *ANSI C63.4-1992 "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz"*. Preliminary radiated emission measurements were performed inside a shielded chamber with all digital signal generators on and terminated. The frequency list from the preliminary measurements was used as a guide for making final measurements in a 3 meter semi-anechoic chamber (equivalent to an Open Area Test Site). The unit was scanned over the frequency range of the lowest system oscillator value to 20 GHz. The Radiated Spurious Emissions Limit is obtained by the following:

Based on an output power (as measured at the output of the amplifier) of 1.42 watts:

$$P_o = 1.42 \text{ W}$$

-the radiated power level of all spurious emissions must be attenuated by at least  $43 + 10\log(P_o)$  below  $P_o$ , yielding:

$$P_o - [43 + 10\log(P_o)] = -13\text{dBm}$$

**Test Results:** The EUT complied with the requirement(s) of this section.

Frequency (GHz)	EUT Azimuth (Degrees)	Antenna Polarity (H/V)	Antenna HEIGHT (m)	Uncorrected Amplitude (dBuv)	Antenna Correction Factor (dB) (+)	System Gain (dB) (-)	Distance Correction Factor (dB) (-)	Corrected Amplitude (dBuv)	Limit (dBuv)	Margin (dB)
7.479	0	V	1.00	38.00	37.35	-4.10	20.00	59.45	94.00	-34.55
7.479	0	H	1.00	37.83	37.45	-4.10	20.00	59.38	94.00	-34.62

**Test Engineer:** Jeffrey Hazen

**Test Date(s):** September 14, 2004



### 2.7.2. Fundamental Emissions -Substitution Equivalent Isotropic Radiated Power (E.I.R.P.)

**Test Requirements:** CFR 47 Part 24

**Test Procedures:** Radiated Measurements were made on a GSM 1900Mhz phone. The EUT was placed on a 0.8-m high wooden table inside a shielded enclosure. An Antenna was placed 1meter from the EUT and measurements were made for frequencies and amplitude of field strengths in three channel settings (Low, Mid and High). For EIRP Substitution method EUT was replaced with a horn antenna, which was driven by a signal generator whose level, were adjusted to obtain the same level as received via the radiated method. EIRP is calculated by adding the gain of the horn antenna to the level on the signal generator. Measurements were made according to the Substitution Method of ANSI/TIA/EIA-603-A.

**Test Results:** The EUT complied with the requirement(s) of this section. Measurement were made with the GSM 1900MHz phone.

Below is the data taken from the Panasonic Phone:

Frequency (MHz)	*Conducted Level (dBm)	**EIRP (dBm)	**EIRP (W)
1850.2	29.8	31.2	1.30
1889.2	29.8	31.7	1.42
1909.8	29.8	31.5	1.40

\* Conducted level from Panasonic test report

\*\* EIRP measurement is performed by Met labs

**Test Engineer:** Liming Xu

**Test Date(s):** September 15, 2004



### 3. Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of *ANSI/NCSL Z540-1-1994* and *ANSI/ISO/IEC 17025:2000*.

Test Name: Radiated Spurious Emissions & EIRP measurements for GSM			Test Date(s): September 14-15, 2004		
MET Asset #	Nomenclature	Manufacturer	Model	Last Cal Date	Cal Due Date
1T4300	SEMI-ANECHOIC CHAMBER # 1	EMC TEST SYSTEMS	NONE	SEE NOTE	
1T4303	ANTENNA; BILOG	SCHAFNER - CHASE EMC	CBL6140A	4/9/04	4/9/05
1T2665	HORN ANTENNA	EMCO	3115	3/12/04	3/12/05
1S2261	SIGNAL GENERATOR	ROHDE & SCHWARZ	SMIQ 03	2/11/04	2/11/05
1T4351	SPECTRUM ANALYZER	AGILENT	E 7405A	8/21/03	8/21/04
1T2511	HORN ANTENNA	EMCO	3115	7/14/04	7/14/05
1T4302	SPECTRUM ANALYZER	HP	8563A	7/16/04	7/16/05
1T4409	EMI RECEIVER	RHODE & SCHWARZ	ESP17	4/8/04	4/8/05

Notes: Functionally verified test equipment is verified using calibrated instrumentation at the time of testing.





## 4. Compliance Information

### 4.1. Certification Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart I — Marketing of Radio frequency devices:

#### § 2.801 Radio-frequency device defined.

As used in this part, a radio-frequency device is any device which in its operation is capable of Emitting radio-frequency energy by radiation, conduction, or other means. Radio- frequency devices include, but are not limited to:

- (a) The various types of radio communication transmitting devices described throughout this chapter.
- (b) The incidental, unintentional and intentional radiators defined in Part 15 of this chapter.*
- (c) The industrial, scientific, and medical equipment described in Part 18 of this chapter.
- (d) Any part or component thereof which in use emits radio-frequency energy by radiation, conduction, or other means.

#### § 2.803 Marketing of radio frequency devices prior to equipment authorization.

- (a) Except as provided elsewhere in this chapter, no person shall sell or lease, or offer for sale or lease (including advertising for sale or lease), or import, ship or distribute for the purpose of selling or leasing or offering for sale or lease, any radio frequency device unless:
  - (1) In the case of a device subject to certification, such device has been authorized by the Commission in accordance with the rules in this chapter and is properly identified and labeled as required by §2.925 and other relevant sections in this chapter; or
  - (2) In the case of a device that is not required to have a grant of equipment authorization issued by the Commission, but which must comply with the specified technical standards prior to use, such device also complies with all applicable administrative (including verification of the equipment or authorization under a Declaration of Conformity, where required), technical, labeling and identification requirements specified in this chapter.
- (d) Notwithstanding the provisions of paragraph (a) of this section, the offer for sale solely to business, commercial, industrial, scientific or medical users (but not an offer for sale to other parties or to end users located in a residential environment) of a radio frequency device that is in the conceptual, developmental, design or pre-production stage is permitted prior to equipment authorization or, for devices not subject to the equipment authorization requirements, prior to a determination of compliance with the applicable technical requirements *provided* that the prospective buyer is advised in writing at the time of the offer for sale that the equipment is subject to the FCC rules and that the equipment will comply with the appropriate rules before delivery to the buyer or to centers of distribution.



- (e)(1) Notwithstanding the provisions of paragraph (a) of this section, prior to equipment authorization or determination of compliance with the applicable technical requirements any radio frequency device may be operated, but not marketed, for the following purposes and under the following conditions:
- (i) *Compliance testing;*
  - (ii) Demonstrations at a trade show provided the notice contained in paragraph (c) of this section is displayed in a conspicuous location on, or immediately adjacent to, the device;
  - (iii) Demonstrations at an exhibition conducted at a business, commercial, industrial, scientific or medical location, but excluding locations in a residential environment, provided the notice contained in paragraphs (c) or (d) of this section, as appropriate, is displayed in a conspicuous location on, or immediately adjacent to, the device;
  - (iv) Evaluation of product performance and determination of customer acceptability, provided such operation takes place at the manufacturer's facilities during developmental, design or pre-production states; or
  - (v) Evaluation of product performance and determination of customer acceptability where customer acceptability of a radio frequency device cannot be determined at the manufacturer's facilities because of size or unique capability of the device, provided the device is operated at a business, commercial, industrial, scientific or medical user's site, but not at a residential site, during the development, design or pre-production stages.
- (e)(2) For the purpose of paragraphs (e)(1)(iv) and (e)(1)(v) of this section, the term *manufacturer's facilities* includes the facilities of the party responsible for compliance with the regulations and the manufacturer's premises, as well as the facilities of other entities working under the authorization of the responsible party in connection with the development and manufacture, but not the marketing, of the equipment.
- (f) For radio frequency devices subject to verification and sold solely to business, commercial, industrial, scientific and medical users (excluding products sold to other parties or for operation in a residential environment), parties responsible for verification of the devices shall have the option of ensuring compliance with the applicable technical specifications of this chapter at each end user's location after installation, provided that the purchase or lease agreement includes a proviso that such a determination of compliance be made and is the responsibility of the party responsible for verification of the equipment.



**The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart J — Equipment Authorization Procedures:**

**§ 2.901 Basis and Purpose**

- (a) In order to carry out its responsibilities under the Communications Act and the various treaties and international regulations, and in order to promote efficient use of the radio spectrum, the Commission has developed technical standards for radio frequency equipment and parts or components thereof. The technical standards applicable to individual types of equipment are found in that part of the rules governing the service wherein the equipment is to be operated.<sup>1</sup> *In addition to the technical standards provided, the rules governing the service may require that such equipment be verified by the manufacturer or importer*, be authorized under a Declaration of Conformity, or receive an equipment authorization from the Commission by one of the following procedures: certification or registration.
- (b) The following sections describe the verification procedure, the procedure for a Declaration of Conformity, and the procedures to be followed in obtaining certification from the Commission and the conditions attendant to such a grant.

**§ 2.907 Certification.**

- (a) Certification is an equipment authorization issued by the Commission, based on representation and test data submitted by the applicant.
- (b) Certification attaches to all units subsequently marketed by the grantee which are identical (see Section 2.908) to the sample tested except for permissive changes or other variations authorized by the Commission pursuant to Section 2.1043.

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<sup>1</sup> In this case, the equipment is subject to the rules of Part 15. More specifically, the equipment falls under Subpart B (of Part 15), which deals with unintentional radiators.



**§ 2.948 Description of measurement facilities.**

- (a) Each party making measurements of equipment that is subject to an equipment authorization under Part 15 or Part 18 of this chapter, regardless of whether the measurements are filed with the Commission or kept on file by the party responsible for compliance of equipment marketed within the U.S. or its possessions, shall compile a description of the measurement facilities employed.
  - (1) If the measured equipment is subject to the verification procedure, the description of the measurement facilities shall be retained by the party responsible for verification of the equipment.
    - (i) *If the equipment is verified through measurements performed by an independent laboratory, it is acceptable for the party responsible for verification of the equipment to rely upon the description of the measurement facilities retained by or placed on file with the Commission by that laboratory. In this situation, the party responsible for the verification of the equipment is not required to retain a duplicate copy of the description of the measurement facilities.*
    - (ii) If the equipment is verified based on measurements performed at the installation site of the equipment, no specific site calibration data is required. It is acceptable to retain the description of the measurement facilities at the site at which the measurements were performed.
  - (2) If the equipment is to be authorized by the Commission under the certification procedure, the description of the measurement facilities shall be filed with the Commission's Laboratory in Columbia, Maryland. The data describing the measurement facilities need only be filed once but must be updated as changes are made to the measurement facilities or as otherwise described in this section. At least every three years, the organization responsible for filing the data with the Commission shall certify that the data on file is current.



## 4.2. Label and User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart A — General:

### § 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.

### § 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.**

- (a) 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 when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, 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.