

**MFA** **M. Flom Associates, Inc. - Global Compliance Center**  
3356 North San Marcos Place, Suite 107, Chandler, Arizona 85225-7176  
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**Certification**

of

**Receiver Model:** FT-7800R

FCC ID: K6620165X40

to

**Federal Communications Commission**

Part 15.121, Confidentiality

**Date of Report:** September 17, 2003

**On the Behalf of the Applicant:**

Vertex Standard Co., Ltd.

**At the Request of:**

P.O. UPS 09/03/2003

Vertex Standard USA Inc.  
10900 Walker Street  
Cypress, CA 90630

Attention of:

Mikio Maruya, Executive Vice President  
(800) 255-9237; FAX: (800) 477-9237  
(714) 827-7600; FAX: -8100  
m.maruya@vxstdusa.com

Supervised By:




Morton Flom, P. Eng.

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*Required information per ISO/IEC Guide 25-1990, paragraph 13.2:*

- a) **Test Report**
- b) Laboratory: M. Flom Associates, Inc.  
(FCC: 31040/SIT) 3356 N. San Marcos Place, Suite 107  
(Canada: IC 2044) Chandler, AZ 85225
- c) Report Number: d0390075
- d) Client: Vertex Standard USA Inc.  
10900 Walker Street  
Cypress, CA 90630
- e) Identification: FT-7800R  
FCC ID: K6620165X40  
Description: Amateur Transmitter with Scanning Receiver
- f) EUT Condition: Not required unless specified in individual tests.
- g) Report Date: September 17, 2003  
EUT Received: September 3, 2003
- h, j, k): As indicated in individual tests.
- i) Sampling method: No sampling procedure used.
- l) Uncertainty: In accordance with MFA internal quality manual.
- m) Supervised by:   
Morton Flom, P. Eng.
- n) Results: The results presented in this report relate only to the item tested.
- o) Reproduction: This report must not be reproduced, except in full, without written permission from this laboratory.

M. Flom Associates, Inc. is accredited by the American Association for Laboratory Association (A2LA) as shown in the scope below.



**THE AMERICAN ASSOCIATION FOR LABORATORY ACCREDITATION**

**ACCREDITED LABORATORY**

A2LA has accredited

**M. FLOM ASSOCIATES, INC.**  
Chandler, AZ

for technical competence in the field of

**Electrical (EMC) Testing**


The accreditation covers the specific tests and types of tests listed on the agreed scope of accreditation. This laboratory meets the requirements of ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration Laboratories" and any additional program requirements in the identified field of testing. Testing and calibration laboratories that comply with this International Standard also operate in accordance with ISO 9001 or ISO 9002.

Presented this 2<sup>nd</sup> day of March, 2001.



*Pete Almy*  
President  
For the Accreditation Council  
Certificate Number 1008.01  
Valid to December 31, 2002

For tests or types of tests to which this accreditation applies, please refer to the laboratory's Electrical (EMC) Scope of Accreditation



**American Association for Laboratory Accreditation**

**SCOPE OF ACCREDITATION TO ISO/IEC 17025-1999**

M. FLOM ASSOCIATES, INC.  
Electronic Testing Laboratory  
3356 North San Marcos Place, Suite 107  
Chandler, AZ 85225  
Morton Flom Phone: 480 926 3100

**ELECTRICAL (EMC)**

Valid to: December 31, 2002 Certificate Number: 1008-01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following electromagnetic compatibility tests:

Tests	Standard(s)
RF Emissions	FCC Part 15 (Subparts B and C) using ANSI C63.4-1992, CISPR 11; CISPR 13; CISPR 14; CISPR 22; EN 55011; EN 55013; EN 55014; EN 55022; EN 50081-1; EN 50081-2; ICES-003; AS/NZS 1044; AS/NZS 1053; AS/NZS 3548; AS/NZS 4251.1; CNS 13438
Harmonic Currents	EN 61000-3-2
Fluctuation and Flicker	EN 61000-3-3
RF Immunity	EN: 50082-1, 50082-2 (both excluding "Power Frequency Magnetic Field Immunity"), 55024 (excluding Power Frequency Magnetic Field and Conducted Immunity); AS/NZS 4251.1
Electrostatic Discharge (ESD)	EN 61000-4-2
Radiated Susceptibility	EN 61000-4-3; ENV 50140; ENV 50204; IEC 1000-4-3; IEC 801-3
EFT	EN 61000-4-4; IEC 1000-4-4; IEC 801-4
Surge	EN 61000-4-5; ENV 50142; IEC 1000-4-5; IEC 801-5
Voltage Dips, Short Interruptions, and Line Voltage Variations	EN 61000-4-11
47 CFR (FCC)	Part: 2, 18, 21, 22, 23, 24, 25, 26, 27, 74, 80, 87, 90, 95, 97, 101 (excluding SAR Testing)

*Robert M. Robinson*

(A2LA Cert. No. 1008.01) 05/10/02 Page 1 of 1

5301 Buckeystown Pike, Suite 350 • Frederick, MD 21704-8373 • Phone: 301-644 3248 • Fax: 301-662 2974

"This laboratory is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this report have been determined in accordance with the laboratory's terms of accreditation unless stated otherwise in the report."

Should this report contain any data for tests for which we are not accredited, or which have been undertaken by a subcontractor that is not A2LA accredited, such data would not covered by this laboratory's A2LA accreditation.

**General Information**

**Part 2.948:**

(a)(b) **Description Of Measurement Facilities:**

File: 31040/SIT

A description of the measurement facilities was filed with the Commission and was found to be in compliance with the requirements of Section 2.948, by letter dated March 5, 2003. All pertinent changes will be reported to the Commission by up-date prior to March 2006.

(b)(4) **Supporting Structures:**

Sketch - Attached Exhibits

(b)(5)(6) **Test Instrumentation:**

List - See Exhibits

**2.925: Identification of an Authorized Device:**

Drawing - See Exhibits

Location of Label - See Photos

**Name and Address of Applicant:**

Vertex Standard Co., Ltd.  
4-8-8 Nakameguro, Meguro-Ku  
Tokyo 153-8644 Japan

Page Number 4 of 14.  
**2.911:**  
2.1033(b)(6)

## Technical Report

### Manufacturer:

Vertex Standard Co., Ltd.  
4-8-8 Nakameguro, Meguro-Ku  
Tokyo 153-8644 Japan

### FCC ID:

K6620165X40

### Model Number:

FT-7800R

### Photographs:

See List of Exhibits

### DUT Description:

This unit Passes

### 15.31: Measurement Standard & Procedure:

- \_\_\_ IEEE Standard 187 was used as a guide.
- \_\_\_ FCC Measurement Procedure MP-1
- x ANSI 63.4 (1992/2000) "Methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz."
- \_\_\_

**Expository Statement**

- 1. Number of Bands = 5
- 2. Number of Channels = 1
- 3. Tuning Range, MHz = 108 to 200  
200 to 300  
300 to 400  
400 to 520  
700 to 1000
- 4. Oscillator Range, MHz = 153 to 245  
155 to 255  
345 to 445  
355 to 475  
655 to 955
- 5. I.F., MHz = 45.05
- 6. Block Diagram = Attached
- 7. For cellular receiver only, the radio transceiver meets the requirements of FCC Bulletin OET 53 ("Cellular System Mobile Stations-Land-System Compatibility Specification."). See attached affidavit.

**15.203: Antenna Requirement:**

- The antenna is permanently attached to the EUT
- The antenna uses a unique coupling
- The EUT must be professionally installed
- The antenna requirement does not apply

Supervised By:

Morton Flom, P. Eng.

Page Number 6 of 14.

**Name of Test:** Receiver Spurious Emissions (Radiated)

**Specification:**

15.109: Radiated Interference Limits  
 15.33: Frequency Range of Radiated Measurements  
 80.217: Suppression of Interference Aboard Ships

**Guide:** See measurement procedure below

**Test Conditions:** Standard Temperature & Humidity

**Test Equipment:** As per attached page

**Search Antennas:**

25 MHz - 300 MHz: Emco 3109 Biconical  
 200 MHz - 1 GHz: Aprel 2001 Log Periodic  
 1 GHz - 18 GHz: Emco 3115 Horn  
 10 GHz - 40 GHz: Emco 3116 Horn with HP11970A Mixer

### Measurement Procedure

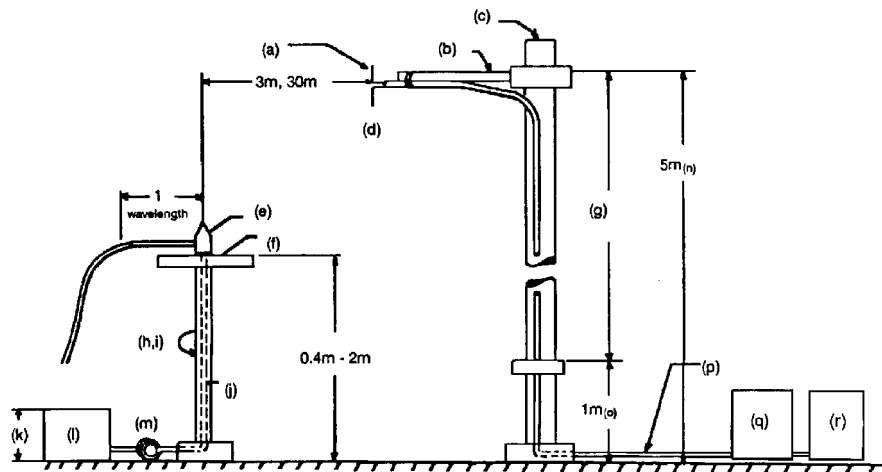
1. At first, bench tests were performed to locate the spurious emissions at the antenna terminals.
2. In the field, tests were conducted over the range shown, The test sample was set up on a wooden turntable above ground, and at a distance of three meters from the antenna connected to the Spectrum Analyzer.
3. In order to obtain the maximum response at each frequency, the turntable was rotated, and the search antenna was raised and lowered. The EUT was also adjusted for maximum response. Tests were conducted in Horizontal & Vertical polarization modes.
4. The field strength was calculated from:

$$E \mu\text{V/m @ 3 m} = \text{Log}_{10}^{-1}(\frac{\text{dB}\mu\text{V} + \text{A.F.} + \text{C.L.}}{20})$$

5. Measurement Results: Attached for "Worst Case" conditions.



### Radiated Test Setup



**NOTES:**

- (a) Search Antenna - Rotatable on boom
- (b) Non-metallic boom
- (c) Non-metallic mast
- (d) Adjustable horizontally
- (e) Equipment Under Test
- (f) Turntable
- (g) Boom adjustable in height.
- (h) External control cables routed horizontally at least one wavelength.
- (i) Rotatable
- (j) Cables routed through hollow turntable center
- (k) 30 cm or less
- (l) External power source
- (m) 10 cm diameter coil of excess cable
- (n) 25 cm (V), 1 m-7 m (V, H)
- (o) 25 cm from bottom end of 'V', 1m normally
- (p) Calibrated Cable at least 10m in length
- (q) Amplifier (optional)
- (r) Spectrum Analyzer

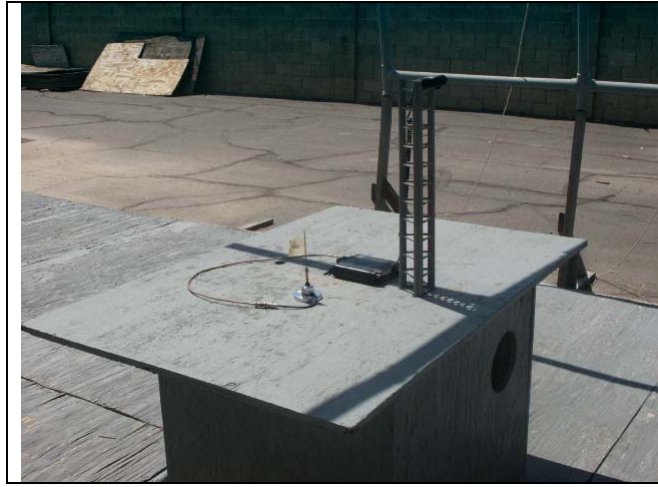
Asset (as applicable)	Description	s/n	Cycle	Last Cal
<b>Transducer</b>				
i00088	EMCO 3109-B 25MHz-300MHz	2336	12 mo.	Sep-02
i00089	Aprel 2001 200MHz-1GHz	001500	12 mo.	Sep-02
i00103	EMCO 3115 1GHz-18GHz	9208-3925	12 mo.	Sep-02
i00065	EMCO 3301-B Active Monopole	2635	12 mo.	Sep-02
<b>Amplifier</b>				
i00028	HP 8449A	2749A00121	12 mo.	Mar-03
<b>Spectrum Analyzer</b>				
i00029	HP 8563E	3213A00104	12 mo.	Jan-03
i00033	HP 85462A	3625A00357	12 mo.	Jan-03
i00048	HP 8566B	2511AD1467	6 mo.	Jul-03
<b>Miscellaneous</b>				
Microphone		<u>Yes</u>		
Antenna		<u>Whip</u>		
All Ports Terminated		<u>N/A</u>		

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**Test Setup:**

Radiated Emissions



Page Number 9 of 14.

**Name of Test:** Receiver Spurious Emissions (Radiated)

### Measurement Details

Site Reference = 31040/SIT  
 Spectrum Searched = 0 to 10 x F<sub>R</sub>  
 Worst Case = V  
 Limits = 15.109(a) (Attached)  
 All Other Emissions = 20 dB or More Below Limit

### Tests were conducted with:

- a. All controls and switches operated.
- b. Half-wave dipole antenna or manufacturer/applicant supplied antenna.

### Sample Calculation:

Emission Frequency, MHz = 354.949600  
 Level =  $\text{Log}_{10}^{-1} \left( \frac{12.83 + 23.97}{20} \right)$   
 Level,  $\mu\text{V}/\text{m}$  @ 3m = 69.18

Measurement Results = Attached

Note: Worst Case of Scan and Non-Scan Modes Reported.

Page Number 10 of 14.

**Name of Test:** Receiver Spurious Emissions (Radiated)

Rule 15.109(a) Limits:

Frequency, MHz	Field Strength μV/m	Distance, m
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

g0390085: 2003-Sep-03 Wed 14:36:00

Frequency Tuned, MHz	Frequency Emission, MHz	Level, dBuV	@ m	C.F., dB	μV/m	@ m
108.000000	153.050000	22.83	3	17.4	102.68	3
154.000000	199.049833	17.73	3	19.25	70.63	3
200.000000	245.050000	16.07	3	21.21	73.11	3
108.000000	306.098333	15.73	3	20.66	65.99	3
154.000000	398.099998	7.23	3	26.21	46.99	3
108.000000	459.146667	12.57	3	26.39	88.72	3
200.000000	490.103333	13.07	3	26.39	93.97	3
154.000000	597.149997	6.9	3	30.08	70.63	3
108.000000	612.196667	7.07	3	30.3	73.88	3
200.000000	735.148333	6.23	3	31.72	78.98	3
108.000000	765.246667	2.07	3	32.16	51.46	3
154.000000	796.199996	3.07	3	32.56	60.46	3
200.000000	980.198333	5.07	3	40.37	187.07	3
154.000000	995.249995	2.57	3	41.69	163.31	3
108.000000	1225.250000	7.4	3	37.53	176.4	3

g0390086: 2003-Sep-03 Wed 15:47:00

Frequency Tuned, MHz	Frequency Emission, MHz	Level, dBuV	@ m	C.F., dB	μV/m	@ m
200.000000	154.950000	3.73	3	17.44	11.44	3
250.000000	204.950000	5.07	3	19.53	16.98	3
299.987500	254.937200	14.57	3	22.57	71.94	3
200.000000	309.900000	4.67	3	20.93	19.05	3
250.000000	409.900000	9.67	3	26.31	62.95	3
200.000000	464.850000	12.17	3	26.38	84.63	3
299.987500	509.875000	6.17	3	26.75	44.26	3
250.000000	614.850000	9.5	3	30.31	97.84	3
200.000000	619.800000	9.33	3	30.35	96.38	3
299.987500	764.812500	-1.33	3	32.15	34.75	3
200.000000	774.750000	-1.33	3	32.28	35.28	3
250.000000	819.800000	-7.5	3	32.54	17.86	3
299.987500	1019.750000	4	3	34.7	86.1	3
250.000000	1024.750000	2.83	3	34.78	75.95	3
299.987500	1274.687500	0.83	3	38.12	88.61	3

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**Name of Test:** Receiver Spurious Emissions (Radiated)

g0390087: 2003-Sep-04 Thu 09:12:00

Frequency Tuned, MHz	Frequency Emission, MHz	Level, dBuV	@ m	C.F., dB	$\mu$ V/m	@ m
300.000000	345.050000	19.67	3	23.35	141.58	3
350.000000	395.050000	9.83	3	26.07	62.37	3
399.987500	445.037333	7.5	3	26.37	49.37	3
300.000000	690.100000	4.5	3	30.99	59.5	3
350.000000	790.100000	7	3	32.48	94.19	3
399.987500	890.074533	5.33	3	32.65	79.25	3
300.000000	1035.150000	0.17	3	34.93	56.89	3
350.000000	1185.150000	0	3	37.02	70.96	3
399.987500	1335.112033	-1.33	3	38.83	74.99	3
300.000000	1380.200000	0.17	3	39.33	94.41	3
350.000000	1580.200000	1.33	3	41.03	131.22	3
300.000000	1725.250000	1.17	3	41.75	139.96	3
399.987500	1780.149533	2.5	3	42.01	168.07	3
350.000000	1975.250000	-1.33	3	44.4	142.4	3
399.987500	2225.187500	0.33	3	46.72	225.16	3

g0390088: 2003-Sep-04 Thu 10:12:00

Frequency Tuned, MHz	Frequency Emission, MHz	Level, dBuV	@ m	C.F., dB	$\mu$ V/m	@ m
400.000000	354.949600	12.83	3	23.97	69.18	3
460.000000	414.949750	11.67	3	26.33	79.43	3
520.000000	474.949433	7.83	3	26.39	51.4	3
400.000000	709.900500	5.33	3	31.27	67.61	3
460.000000	829.900042	6.67	3	32.51	90.99	3
520.000000	949.899433	-5.5	3	37.62	40.36	3
400.000000	1064.849267	10.17	3	35.37	189.23	3
460.000000	1244.849233	5.5	3	37.76	145.55	3
400.000000	1419.799267	-0.33	3	39.76	93.65	3
520.000000	1424.850000	-2.33	3	39.81	74.82	3
460.000000	1659.799233	1.17	3	41.43	134.9	3
400.000000	1774.749267	-0.83	3	41.99	114.29	3
520.000000	1899.800000	-3	3	43.43	105.08	3
460.000000	2074.750000	-2.5	3	45.4	139.64	3
520.000000	2374.750000	-0.67	3	47.96	231.47	3

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**Name of Test:** Receiver Spurious Emissions (Radiated)

g0390089: 2003-Sep-04 Thu 11:08:00

Frequency Tuned, MHz	Frequency Emission, MHz	Level, dBuV	@ m	C.F., dB	$\mu$ V/m	@ m
700.000	654.950000	7.2	3	30.6	77	3
850.000	804.950000	-1.0	3	32.6	38	3
999.988	954.937500	1.0	3	38.1	90	3
700.000	1309.900000	-2.2	3	38.5	66	3
850.000	1609.900000	-0.3	3	41.2	110	3
999.988	1909.875000	-4.0	3	43.6	95	3
700.000	1964.850000	-3.8	3	44.3	105	3
850.000	2414.850000	-0.8	3	48.3	236	3
700.000	2619.800000	-4.8	3	49.9	178	3
999.988	2864.812500	-13.0	3	51.6	86	3
850.000	3219.788250	14.2	3	4.5	9	3
700.000	3274.750000	16.8	3	4.6	12	3
999.988	3819.753000	12.5	3	6.0	8	3
850.000	4024.738250	14.5	3	6.5	11	3
999.988	4774.691250	13.3	3	8.1	12	3

All other emissions in the required measurement range were more that 20 dB below the required limits.



Performed By:

David Lee

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**Name of Test:** Scanning Receivers Cellular Band Rejection

**Specification:** FCC: 47 CFR 15.121(b)

**Test Equipment:** As per attached page

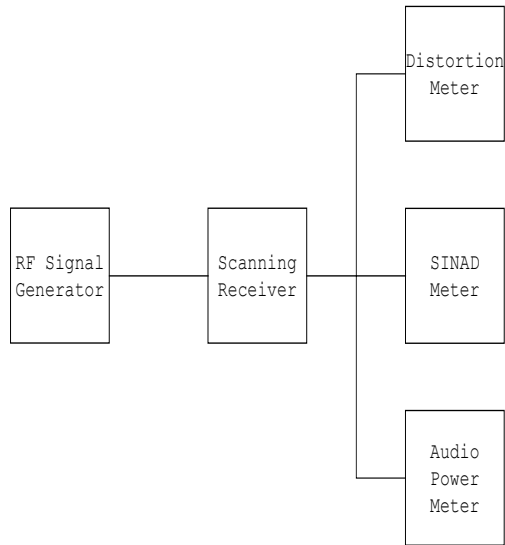
**Guide:** **47 CFR 15.121(b):** Except as provided in paragraph (c) of this section, scanning receivers shall reject any signals from Cellular Radiotelephone Service frequency bands that are 38 dB or higher based upon a 12 dB SINAD measurement, which is considered the threshold where a signal can be clearly discerned from any interference that may be present.

**Warning:** Modification of this device to receive cellular radiotelephone service signals is prohibited under FCC rules and federal law.

### Measurement Procedure

1. Equipment was connected as illustrated in the block diagram.
2. A standard signal was applied to the receiver input terminals.
3. Receiver output audio output was adjusted for rated output and with distortion no greater than 10%.
4. The RF Signal generator was adjusted to produce 12dB SINAD without the audio output power dropping by more than 3dB.
5. This was repeated at three frequencies across all bands to establish a reference sensitivity level. The reference sensitivity taken was the lowest, or worst-case sensitivity for all of the bands.
6. The output of the signal generator was then adjusted to a level of +60dB above the reference level sensitivity established in step 5 and set to the first of three frequencies in the cellular subscriber transmit band.
7. Receiver squelch threshold, the signal level required to open the squelch, should be set to open no greater than +20dB above the reference sensitivity.
8. The receiver was then put in the scanning mode and allowed to scan across it's complete receive range.
9. If the receiver unsquelched or stopped on any frequency, the displayed frequency was recorded. The signal generator was then adjusted in output level until a 12dB SINAD from the receiver was produced. The signal generator level associated with this response was also noted.
10. This procedure was repeated for three frequencies in the cellular base station transmit band.
11. The difference in between the signal generator output for any response recorded and the reference sensitivity is the rejection ratio.

**Scanning Receiver:**



Reference Level Sensitivity measured in step 5 = -110 dBm

RF Signal Generator, MHz	Displayed Frequency, MHz	Level for 12 dB SINAD, dBm	Rejection, dB
824.000	None	-72.0	>38
836.500	None	-72.0	>38
849.000	None	-72.0	>38
869.000	None	-72.0	>38
881.500	None	-72.0	>38
894.000	None	-72.0	>38

David Lee

Performed By:  
END OF TEST REPORT



The applicant has been cautioned as to the following:

15.21 Information to User.

The users manual or instruction manual for an intentional 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.

15.27(a) Special Accessories.

Equipment marketed to a consumer must be capable of complying with the necessary regulations in the configuration in which the equipment is marketed. Where special accessories, such as shielded cables and/or special connectors are required to enable an unintentional or intentional radiator to comply with the emission limits in this part, the equipment must be marketed with, i.e. shipped and sold with, those special accessories. However, in lieu of shipping or packaging the special accessories with the unintentional or intentional radiator, the responsible party may employ other methods of ensuring that the special accessories are provided to the consumer, without additional charge.

Information detailing any alternative method used to supply the special accessories for a grant of equipment authorization or retained in the verification records, as appropriate. The party responsible for the equipment, as detailed in § 2.909 of this chapter, shall ensure that these special accessories are provided with the equipment. The instruction manual for such devices shall include appropriate instructions on the first page of text concerned with the installation of the device that these special accessories must be used with the device. It is the responsibility of the user to use the needed special accessories supplied with the equipment.

## Labeling of Scanning Receivers

### **Rule 15.19(a)(3) 2-Part Statement:** Conspicuous Location on Unit

'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 including interference that may cause undesired operation.'

### **Rule Part 15.121(f):** Permanently Affixed to Unit Must Be on Device:

'WARNING: Modification of this device to receive cellular radiotelephone service signals is prohibited under FCC Rules and Federal Law.'

### **Rule 15.21:** Can Be in Manual. Show What Page and Extract It

'Information to User: The User's 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.'

"Permanently affixed" means that the label is etched, engraved, stamped, silkscreened, indelibly printed or otherwise permanently marked on a permanently attached part of the equipment or on a nameplate of metal plastic or other material fastened to the equipment by welding, riveting, or permanent adhesive. The label shall be designed to last the expected lifetime of the equipment in the environment in which the equipment may be operated and must not be readily detachable. The label shall not be a stick-on, paper label.

## Statement of Compliance

**This is to certify:**

That, on the basis of the measurements made, the equipment tested is capable of complying with the requirements of

FCC Rule Part 15, Subpart B x

FCC Rule Part 15, Subpart C    

Using ANSI C63.4-1992/2000 draft in effect as of this date, under normal operation, with the usual maintenance.

That the data contained herein is a summary (worst case) of that obtained on several randomly-selected production samples.

That the equipment meets or exceeds the requirements of Part 15.

**List of Exhibits**  
(FCC **Certification** (Receivers) - Revised 9/28/98)

**Applicant:** Vertex Standard Co., Ltd.

**Equipment:** FT-7800R  
K6620165X40

**By Applicant:**

**If Applicable:** Subsection 2.1033

- |   |   |
|---|---|
| 1. Letter Of Authorization                | x |
| 2. Attestations                           | x |
| 3. Identification Label Drawing           |   |
| <u>x</u> Label                            |   |
| <u>x</u> Location of Label                |   |
| <u>x</u> Compliance Statement             |   |
| <u>x</u> Location of Compliance Statement |   |
| 4. Documentation: 2.1033(b)               |   |
| (3) User Manual                           | x |
| (4) Operational Description               | x |
| (5) Block Diagram                         | x |
| (5) Schematic Diagram                     | x |
| (7) Photographs                           | x |
| 5. Request for Confidentiality            | x |

**By M.F.A. Inc.**

- A. Statement of Compliance