



M. Flom Associates, Inc. - Global Compliance Center

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C E R T I F I C A T I O N

of

RECEIVER MODEL: FT-897

FCC ID: K66FT-897

to

FEDERAL COMMUNICATIONS COMMISSION

Part 15(B)
(New)

DATE OF REPORT: May 1, 2002

ON THE BEHALF OF THE APPLICANT:

Vertex Standard Co., Ltd.

AT THE REQUEST OF:

P.O. UPS 4/24/2002

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:

A handwritten signature in black ink that reads 'M. Flom P. Eng.' The signature is stylized with a large 'M' and a long horizontal stroke.

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: d0250001

d) Client: Vertex Standard USA Inc.
10900 Walker Street
Cypress, CA 90630

e) Identification: FT-897
FCC ID: K66FT-897
Description: Scanning Receiver

f) EUT Condition: Not required unless specified in individual tests.

g) Report Date: May 1, 2002
EUT Received: April 24, 2002

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.

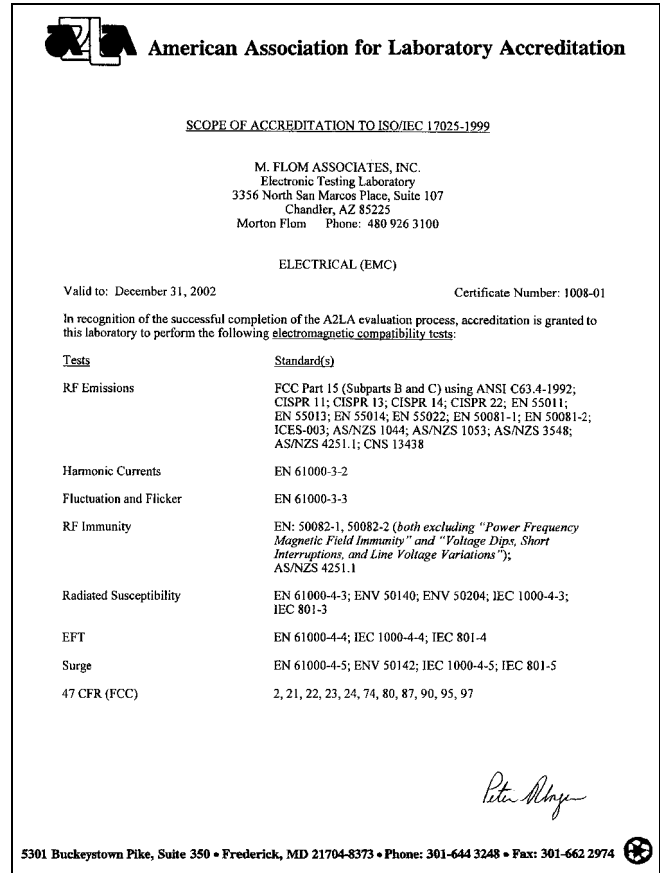
n) Results: The results presented in this report relate only to the item tested.

o) Reproduction: This report must not be reproduced, except in full, without written permission from this laboratory.

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



"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.

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GENERAL INFORMATIONPart 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 13, 2000. All pertinent changes will be reported to the Commission by up-date prior to March 2003.

(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

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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:

K66FT-897

MODEL NO:

FT-897

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."
- ___

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EXPOSITORY STATEMENT

1. NUMBER OF BANDS = 4
2. NUMBER OF CHANNELS = per manual
3. TUNING RANGE, MHz = 0.1 to 56.0
76 to 108
118 to 164
420 to 470
4. OSCILLATOR RANGE, MHz = 68.4 to 124.32
65.3 to 118.7
186.33 to 232.33
488.33 to 513.33
5. I.F., MHz = 68.33
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.

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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:

100 Hz - 50 MHz: Emco 3301B Active Rod
 10 kHz - 32 MHz: Singer 94593-1 Loop
 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

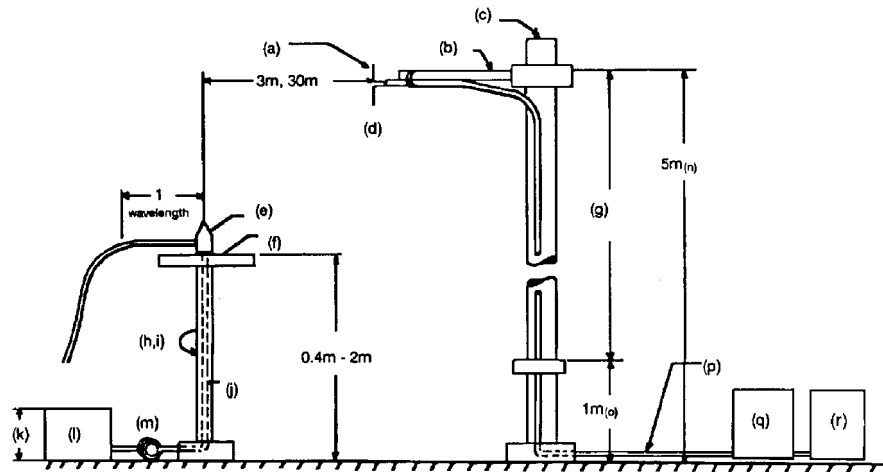
1. At first, bench tests were performed to locate the spurious emissions at the antenna terminals.
2. In the field, tests were conducted over the range shown, The test sample was set up on a wooden turntable above ground, and at a distance of three meters from the antenna connected tot he Spectrum Analyzer.
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:

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

5. MEASUREMENT RESULTS: Attached for "Worst Case" conditions.

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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 Description (as applicable)	s/n	Cycle	Last Cal
Per ANSI C63.4-1992/2000 Draft, 10.1.4			
<u>TRANSDUCER</u>			
i00088 EMC0 3109-B 25MHz-300MHz	2336	12 mo.	Sep-01
i00089 Aprel 2001 200MHz-1GHz	001500	12 mo.	Sep-01
i00103 EMC0 3115 1GHz-18GHz	9208-3925	12 mo.	Sep-01
i00065 EMC0 3301-B Active Monopole	2635	12 mo.	Sep-01
<u>AMPLIFIER</u>			
i00028 HP 8449A	2749A00121	12 mo.	Mar-02
<u>SPECTRUM ANALYZER</u>			
i00029 HP 8563E	3213A00104	12 mo.	Jan-02
i00033 HP 85462A	3625A00357	12 mo.	Jan-02
i00048 HP 8566B	2511AD1467	6 mo.	Jan-02
<u>MISCELLANEOUS</u>			
Microphone	_____		
Antenna	_____		
All Ports Terminated	_____		

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TEST SETUP: Radiated Emissions



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NAME OF TEST: Receiver Spurious Emissions (Radiated)

MEASUREMENT DETAILS

SITE REFERENCE = 31040/SIT
 SPECTRUM SEARCHED = 0 to 10 x F_R
 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:

$$\begin{aligned} \text{EMISSION FREQUENCY, MHz} &= 0.100000 \\ \text{LEVEL} &= \text{Log}_{10}^{-1} \left(\frac{-21.37 + 55.2}{20} \right) \\ \text{LEVEL, } \mu\text{V/m @ 0m} &= 6737.52 \end{aligned}$$

MEASUREMENT RESULTS = ATTACHED

NOTE: WORST CASE OF SCAN AND NON-SCAN MODES REPORTED.

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NAME OF TEST: Receiver Spurious Emissions (Radiated)

RULE 15.109(a) LIMITS:	FREQUENCY, MHz	FIELD STRENGTH $\mu\text{V/m}$	DISTANCE, m
	30 - 88	100	3
	88 - 216	150	3
	216 - 960	200	3
	Above 960	500	3

g0240067: 2002-Apr-25 Thu 16:13:00

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	LEVEL, dBuV	@ m	C.F., dB	$\mu\text{V/m}$	@ m
0.100000	68.430900	16.3	3	12.71	28.22	3
28.050000	96.380000	17.32	3	13.54	34.91	3
56.000000	124.330000	10.59	3	16.5	22.62	3
28.050000	192.760000	12.73	3	18.93	38.28	3
56.000000	248.612500	12.11	3	21.35	47.1	3

g0240065: 2002-Apr-25 Thu 14:46:00

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	LEVEL, dBuV	@ m	C.F., dB	$\mu\text{V/m}$	@ m
76.000000	65.298000	14.09	3	13.35	23.55	3
92.000000	102.698000	16.87	3	14.48	36.94	3
108.000000	118.698000	7.92	3	16.02	15.74	3
76.000000	130.690000	11.2	3	16.71	24.86	3
92.000000	205.433000	8.54	3	19.55	25.38	3
108.000000	237.458000	12.22	3	20.91	45.34	3

g0240066: 2002-Apr-25 Thu 15:28:00

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	LEVEL, dBuV	@ m	C.F., dB	$\mu\text{V/m}$	@ m
118.000000	186.329500	9.85	3	18.58	26.39	3
141.000000	209.329500	11.22	3	19.73	35.28	3
164.000000	232.329500	10.99	3	20.7	38.41	3
118.000000	372.660000	12.86	3	24.94	77.62	3
141.000000	418.652500	12.03	3	26.33	82.79	3
164.000000	464.656000	13.57	3	26.38	99.43	3

g0240064: 2002-Apr-25 Thu 13:07:00

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	LEVEL, dBuV	@ m	C.F., dB	$\mu\text{V/m}$	@ m
420.000000	488.330000	11.18	3	26.4	75.68	3
445.000000	513.343000	11.62	3	26.88	84.14	3
470.000000	538.343000	11.29	3	27.74	89.43	3
420.000000	976.210000	12.83	3	40.01	438.53	3
445.000000	1026.210000	12.36	3	36.16	266.69	3
445.000000	1076.648000	10.39	3	36.82	229.35	3

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



PERFORMED BY:

Doug Noble, B.A.S. E.E.T.

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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.

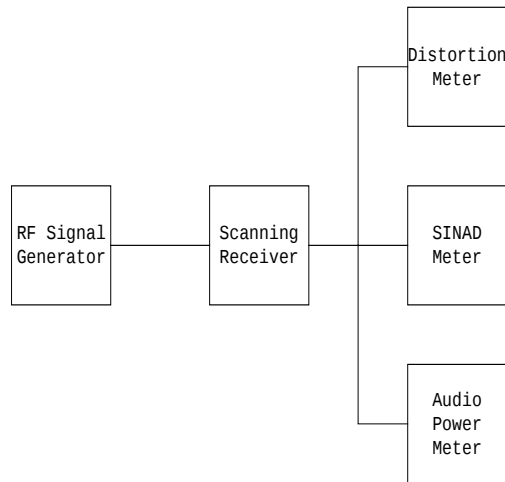
WARNING: MODIFICATION OF THIS DEVICE TO RECEIVE CELLULAR RADIOTELEPHONE SERVICE SIGNALS IS PROHIBITED UNDER FCC RULES AND FEDERAL LAW.

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.

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SCANNING RECEIVER:

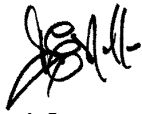
Reference Level Sensitivity measured in step 5 =

Frequency of EUT, MHz	Displayed Frequency, MHz	Level for 12 dB SINAD, dBm	Rejection, dB
0.100 - 056	848.97 836.4 824.04	< -113	< -130
76 - 108	848.97 836.4 824.04	< -113	< -130
118 - 164	848.97 836.4 824.04	< -113	< -130
420 - 470	848.97 836.4 824.04	< -113	< -130

NOTE: 1) System Sensitivity = -130 dbm

2) No spurious response detectable within these frequency ranges.

PERFORMED BY:


 Doug Noble, B.A.S. E.E.T.

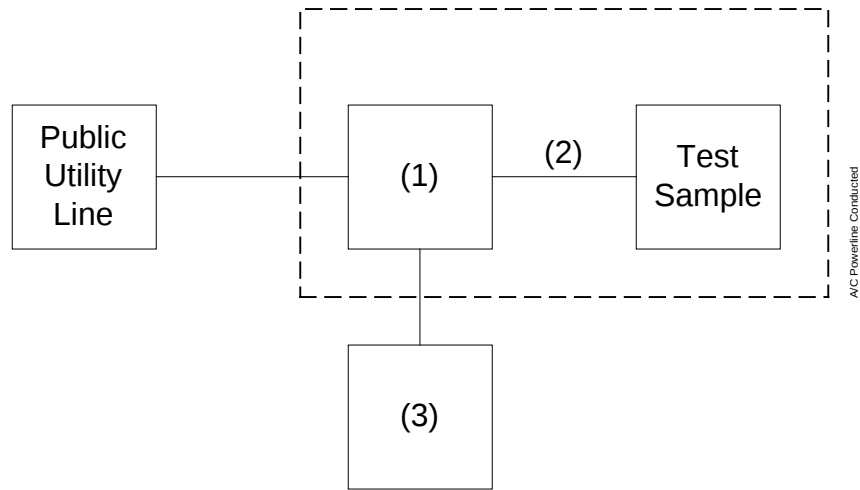
PAGE NO. 13 of 19.
NAME OF TEST: A/C Powerline Conducted Emissions
SPECIFICATION: FCC: 47 CFR 15.107
GUIDE: IEEE Standard 213
TEST CONDITIONS: S. T. & H.
TEST EQUIPMENT: As per attached page

MEASUREMENT PROCEDURE

1. A test sample was connected to the Public Utility lines through a LISN Ailtech Model 94641-1 (50 μ H).
2. A reference level of 250 μ V was set on the Spectrum Analyzer. The spectrum was searched over the range of 450 kHz to 30 MHz.
3. All other emissions were 20 dB or more below limit.
4. x The test sample used a charger.
 The test sample does not use a charger.
5. Measurement Results: Attached.

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AC POWERLINE CONDUCTED MEASUREMENTS

Asset Description (as applicable)	s/n	Cycle	Last Cal
Per ANSI C63.4-1992/2000 Draft, 10.1.4			
(1) <u>LINE IMPEDANCE STABILIZATION NETWORK</u>			
i00077 Singer 91221-1 (5 μH)	0396	12 mo.	Sep-01
i00155 Eaton 94641-1 (50 μH)	178	12 mo.	
i00167 Ailtech 94641-1 (50 μH)	0103	12 mo.	
(2) <u>SCREEN ROOM</u>			
i00169 Lindgren 22-2/2-0	3861	N/A	none
i00170 Lindgren LG170	4999		
(3) <u>SPECTRUM ANALYZER</u>			
i00029 HP 8563E	3213A00104	12 mo.	Jan-02
i00033 HP 85462A	3625A00357	12 mo.	Jan-02
i00048 HP 8566B	2511AD1467	6 mo.	Jan-02

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TEST SETUP: A/C Powerline Conducted Emissions



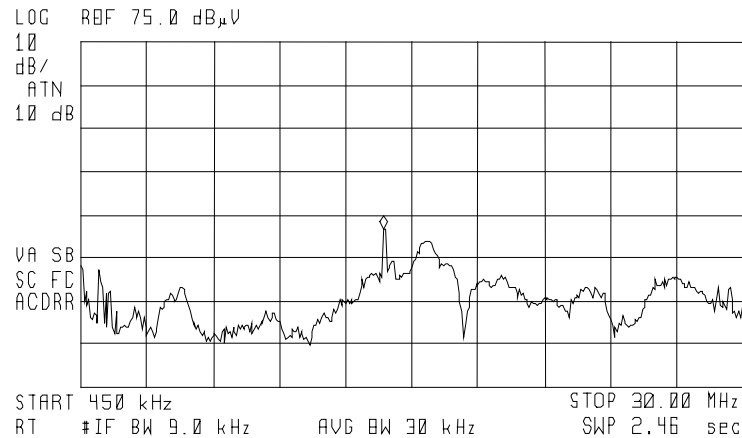
PAGE NO.

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NAME OF TEST: A/C Powerline Conducted Emissions
 g0240068: 2002-Apr-30 Tue 11:55:00
 STATE: 0:General

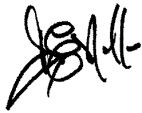


ACTV DET: PBAK
 MEAS DET: PBAK QP AVG
 MKR 13.97 MHz
 31.73 dBμV



NEUTRAL SIDE, GROUNDED

PERFORMED BY:


 Doug Noble, B.A.S. E.E.T.

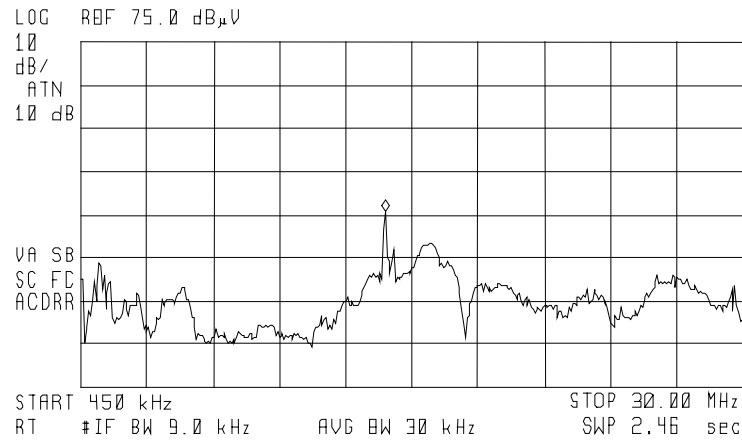
PAGE NO.

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NAME OF TEST: A/C Powerline Conducted Emissions
 g0240069: 2002-Apr-30 Tue 11:57:00
 STATE: 0:General



ACTV DET: PBAK
 MEAS DET: PBAK QP AVG
 MKR 14.04 MHz
 35.63 dBμV



LINE SIDE, GROUNDED

PERFORMED BY:


 Doug Noble, B.A.S. E.E.T.

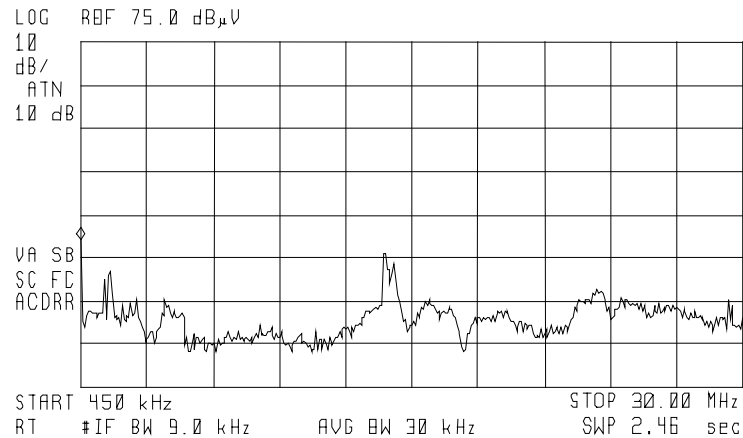
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NAME OF TEST: A/C Powerline Conducted Emissions
g0240070: 2002-Apr-30 Tue 12:00:00
STATE: 0:General



ACTV DET: PBAK
MEAS DET: PBAK QP AVG
MKR 450 kHz
29.26 dBμV



LINE SIDE, GROUND

PERFORMED BY:


Doug Noble, B.A.S. E.E.T.

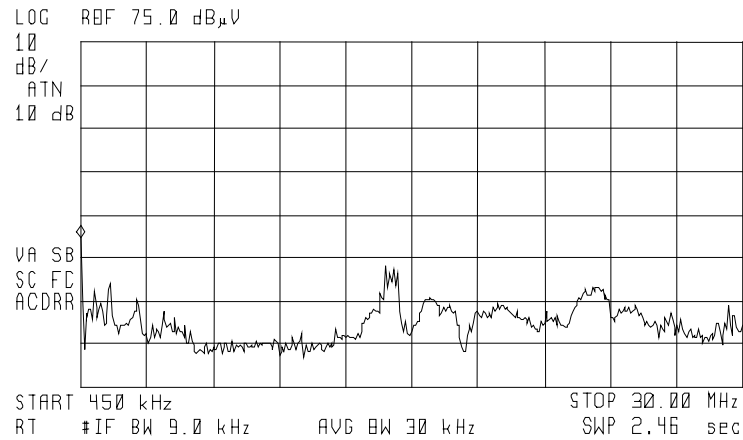
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NAME OF TEST: A/C Powerline Conducted Emissions
 g0240071: 2002-Apr-30 Tue 12:02:00
 STATE: 0:General

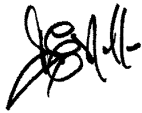


ACTV DET: PBAK
 MEAS DET: PBAK QP AVG
 MKR 450 kHz
 29.45 dB μ V



NEUTRAL SIDE, GROUNDED

PERFORMED BY:
END OF TEST REPORT


 Doug Noble, B.A.S. E.E.T.

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.

LABELLING OF SCANNING RECEIVERS

1

Scanning receivers shall have a label permanently affixed to the product, and this label shall be readily visible to the purchaser at the time of purchase. The label shall read as follows:

WARNING: MODIFICATION OF THIS DEVICE TO RECEIVE CELLULAR
RADIOTELEPHONE SERVICE SIGNALS IS PROHIBITED UNDER FCC RULES
AND FEDERAL LAW.

"Permanently affixed" means that the label is etched, engrave, 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-897
K66FT-897

BY APPLICANT:

IF APPLICABLE: Subsection 2.1033

1. LETTER OF AUTHORIZATION
2. ATTESTATION
3. IDENTIFICATION LABEL DRAWING
 - ___ LABEL
 - ___ LOCATION OF LABEL
 - ___ COMPLIANCE STATEMENT
 - ___ LOCATION OF COMPLIANCE STATEMENT
4. DOCUMENTATION: 2.1033(b)
 - (3) USER MANUAL
 - (4) OPERATIONAL DESCRIPTION
 - (5) BLOCK DIAGRAM
 - (5) SCHEMATIC DIAGRAM
 - (7) PHOTOGRAPHS

BY M.F.A. INC.

- A. STATEMENT OF COMPLIANCE
- B. STATEMENT OF QUALIFICATIONS