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FCC ID: OIRCE238

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TEST EQUIPMENT LIST

1. Spectrum Analyzer: HP 8566B-Opt 462, S/N 3138A07786, w/ preselector HP 85685A, S/N 3221A01400, Quasi-Peak Adapter HP 85650A, S/N 3303A01690 & Preamplifier HP 8449B-OPT H02, S/N 3008A00372 Cal. 1/19/01
2. Biconnical Antenna: Eaton Model 94455-1, S/N 1057, Cal 3/15/00
3. Biconnical Antenna: Electro-Metrics Model BIA-25, S/N 1171 Cal. 3/16/01
4. Log-Periodic Antenna: Electro-Metrics Model EM-6950, S/N 632 Cal. 3/15/00
5. Log-Periodic Antenna: Electro-Metrics Model LPA-30, S/N 409 Cal. 3/15/00
6. Double-Ridged Horn Antenna: Electro-Metrics Model RGA-180, 1-18 GHz, S/N 2319
7. 18-26.3GHz Systron Donner Standard Gain Horn #DBE-520-20
8. Horn 40-60GHz: ATM Part #19-443-6R
9. Line Impedance Stabilization Network: Electro-Metrics Model EM-7820, w/NEMA Adapter S/N 2682 Cal. 3/16/01
10. Temperature Chamber: Tenney Engineering Model TTRC, S/N 11717-7 Cal. 1/21/01
11. Frequency Counter: HP Model 5385A, S/N 3242A07460 Cal 11/20/00
12. Peak Power Meter: HP Model 8900C, S/N 2131A00545, Cal. 1/26/01
13. Open Area Test Site #1-3meters Cal. 12/22/99
14. Signal Generator: HP 8640B, S/N 2308A21464 Cal. 11/21/00
15. Signal Generator: HP 8614A, S/N 2015A07428
16. Passive Loop Antenna: EMC Model 6512, 9KHz to 30MHz, S/N 9706-1211 Cal. 6/10/00
17. Dipole Antenna Kit: Electro-Metrics Model TDA-30/1-4, S/N 153 Cal. 11/24/00
18. AC Voltmeter: HP Model 400FL, S/N 2213A14499 Cal. 2/1/01
19. Digital Multimeter: Fluke Model 8012A, S/N 4810047 Cal 9/21/99
20. Digital Multimeter: Fluke Model 77, S/N 43850817 Cal 11/16/00
21. Oscilloscope: Tektronix Model 2230, S/N 300572 Cal 2/1/01

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TEST PROCEDURE

GENERAL: This report shall NOT be reproduced except in full without the written approval of TIMCO ENGINEERING, INC.

RADIATION INTERFERENCE: The test procedure used was ANSI STANDARD C63.4-1992 using a HEWLETT PACKARD spectrum analyzer with a preselector. The bandwidth of the spectrum analyzer was 100 kHz with an appropriate sweep speed. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was 100KHz and the video bandwidth was 300KHz. The ambient temperature of the UUT was &tempr& with a humidity of &humr&.

FORMULA OF CONVERSION FACTORS: The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBuV) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB. The gain of the Preselector was accounted for in the Spectrum Analyzer Meter Reading.

Example:

| | |
|------------|--|
| Freq (MHz) | METER READING + ACF = FS |
| 33 | 20 dBuV + 10.36 dB = 30.36 dBuV/m @ 3m |

ANSI STANDARD C63.4-1992 10.1.7 MEASUREMENT PROCEDURES: The unit under test was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The table used for radiated measurements is capable of continuous rotation.

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

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FCC ID: OIRCE238

NAME OF TEST: RADIATION INTERFERENCE

RULES PART NO.: 15.235

REQUIREMENTS: CARRIER FREQUENCY WILL NOT EXCEED 80 dBuV/m AT 3M.
OUT-OF-BAND EMISSIONS SHALL NOT EXCEED:

| | | |
|---------------|-------------|----------------------|
| 30 - 88 MHz | 40.0 dBuV/M | MEASURED AT 3 METERS |
| 88 - 216 MHz | 43.5 dBuV/M | |
| 216 - 960 MHz | 46.0 dBuV/M | |
| ABOVE 960 MHz | 54.0 dBuV/M | |

* Harmonics must be less than the fundamental.

TEST DATA:

| Emission Frequency MHz | Meter Reading dBuv | Ant. Polarity | Coax Loss dB | Correction Factor dB | Field Strength dBuV/m | Margin dB |
|------------------------|--------------------|---------------|--------------|----------------------|-----------------------|-----------|
| 49.9 | 25.8 | v | 0.80 | 11.00 | 37.60 | 42.40 |

SAMPLE CALCULATION: $FSdBuV/m = MR(dBuV) + ACFdB$.

WITH THE TRANSMITTER SECTIONS OF THIS UNIT DISABLED BY REMOVING R11, THE SPECTRUM WAS SCANNED FROM 30 TO 1000 MHz. NO SIGNIFICANT EMISSIONS WERE NOTED.

TEST PROCEDURE: The procedure used was ANSI STANDARD C63.4-1992. The spectrum was scanned from 30 MHz to 1000 MHz. When an emission was found, the table was rotated to produce the maximum signal strength. The antenna was placed in both the horizontal and vertical planes and the worse case emissions were reported.

TEST RESULTS: THE UNIT does MEET THE FCC REQUIREMENTS.

PERFORMED BY: JOSEPH SCOGLIO

DATE: APRIL 20, 2001

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FCC ID: OIRCE238

NAME OF TEST: RADIATION INTERFERENCE

RULES PART NUMBER: 15.209

REQUIREMENTS:

| | | | | | | | |
|-----------------------------|----|-----|------|-------|--------|-----|--------|
| 1.705 | to | 30 | MHz: | 49.54 | dBuV/m | @ 3 | METERS |
| 30 | to | 88 | MHz: | 40.00 | dBuV/M | @ 3 | METERS |
| 88 | to | 216 | MHz: | 43.52 | dBuV/M | | |
| 216 | to | 960 | MHz: | 46.02 | dBuV/M | | |
| ABOVE 960 MHz: 54.00 dBuV/M | | | | | | | |

* Harmonics must be less than the fundamental.

TEST RESULTS: A search was made of the spectrum from 30 to 1000 MHz and the measurements indicate that the unit DOES meet the FCC requirements.

TEST DATA:

| Emission Frequency MHz | Meter Reading dBuv | Ant. Polarity | Coax Loss dB | Correction Factor dB | Field Strength dBuv/m | Margin dB |
|---------------------------|-----------------------|---------------|-----------------|-------------------------|--------------------------|--------------|
| 49.4 | 25.3 | v | 0.80 | 11.00 | 37.10 | 2.90 |

SAMPLE CALCULATION: $FS_{dBuV/m} = MR_{(dBuV)} + ACF_{dB}$.

TEST PROCEDURE: ANSI STANDARD C63.4-1992 using a Hewlett Packard Model 8566B spectrum analyzer, a Hewlett Packard Model 85685A Preselector, a Hewlett Packard Model 85650A Quasi-Peak adapter, and an appropriate antenna. The bandwidth of spectrum analyzer was 100 kHz with an appropriate sweep speed. When an emission was found, the table was rotated to produce the maximum signal strength. The antenna was placed in both the horizontal and vertical planes and the worse case emissions were reported.

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NAME OF TEST: Occupied Bandwidth

RULES PART NO.: 15.235

REQUIREMENTS: The field strength of any emissions appearing between the band edges and up to 10 kHz above and below the band edges shall be attenuated at least 26 dB below the level of the unmodulated carrier or to the general limits of 15.209, whichever permits the higher emission levels.

THE GRAPHS ON THE FOLLOWING PAGES REPRESENT THE EMISSIONS TAKEN FOR THE DEVICE.

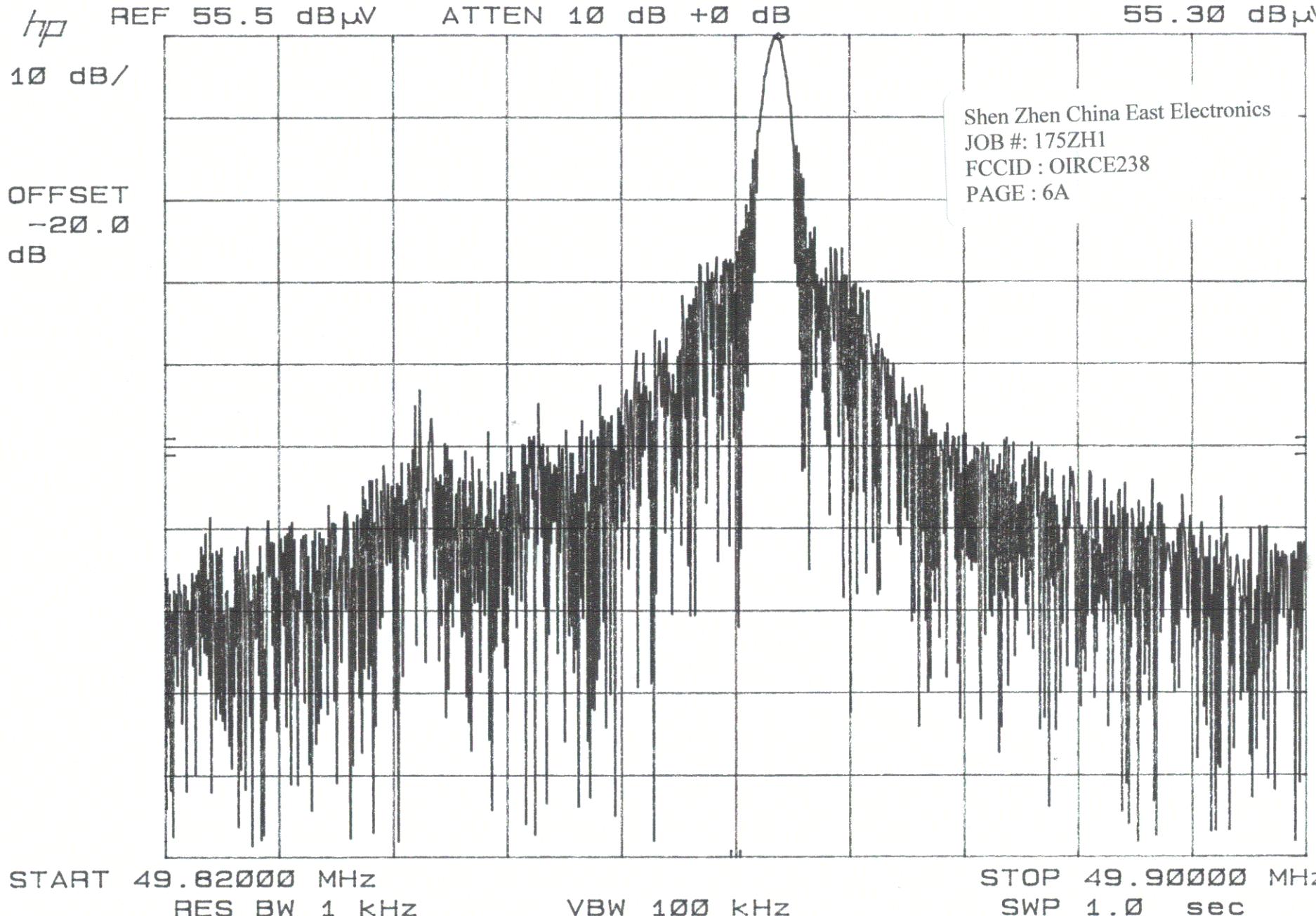
METHOD OF MEASUREMENT: A small sample of the transmitter output was fed into the spectrum analyzer and the following graphs were taken. The vertical scale is set to -10 dBm per division. The horizontal scale is set to 5 kHz per division.

TEST RESULTS: The unit DOES meet the FCC requirements.

PERFORMED BY: JOSEPH SCOGIO DATE: APRIL 20, 2001

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HP MKR 49.86296 MHz
REF 55.5 dB μ V 55.30 dB μ V



MKR 49.40520 MHz

55.00 dB μ V

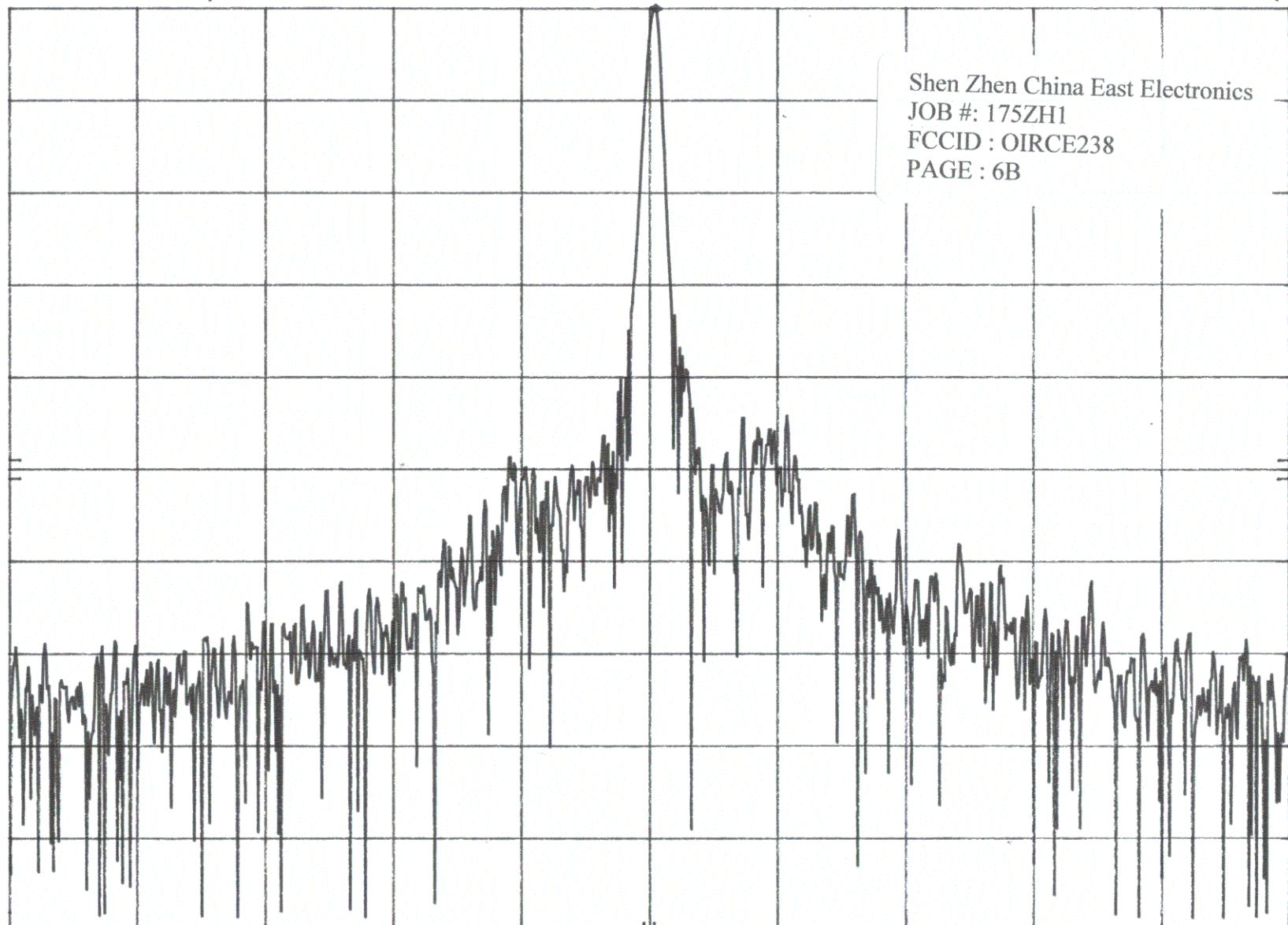
hp

REF 55.0 dB μ V ATTEN 10 dB +0 dB

10 dB/

OFFSET
-20.0 dB

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CENTER 49.40500 MHz

RES BW 300 Hz

VBW 100 kHz

SPAN 50.00 kHz

SWP 1.0 sec