

TIMCO ENGINEERING INC.

849 NW State Road 45

Newberry, Florida 32669

<http://www.timcoengr.com>

888.472.2424 F 352.472.2030 email: sid@timcoengr.com



Test Report

Product Name: 27 MHz TRANSMITTER

FCC ID: OKP51640

Applicant:

**WOW WEE LIMITED
ENERGY PLAZA, SUITE 301A-C
92 GRANVILLE ROAD
TST EAST
HONG KONG**

Date Receipt: 6/30/2003

Date Tested: 7/15/2003

APPLICANT: WOW WEE LIMITED

FCC ID: OKP51640

REPORT #: W/WOW_OKP\878ZHT3\878ZHT3TestReport.doc

COVER SHEET

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EMC Equipment List

Last Update: 7/8/03

| | DEVICE | MFGR | MODEL | SERNO | CAL/CHAR DATE | DUE DATE or STATUS |
|---|---|-----------------|---------------|--------------------------|-------------------|--------------------|
| X | 3-Meter OATS | TEI | N/A | N/A | Listed 1/13/03 | 1/13/06 |
| | 3/10-Meter OATS | TEI | N/A | N/A | Listed 3/26/01 | 3/26/04 |
| | Receiver, Beige Tower Spectrum Analyzer | HP | 8566B Opt 462 | 3138A07786 3144A20661 | CAL 8/31/01 | 8/31/03 |
| | RF Preselector | HP | 85685A | 3221A01400 | CAL 8/31/01 | 8/31/03 |
| | Quasi-Peak Adapter | HP | 85650A | 3303A01690 | CAL 8/31/01 | 8/31/03 |
| | Preamplifier | HP | 8449B-H02 | 3008A00372 | CHAR 3/4/01 | 3/4/03 |
| X | Receiver, Blue Tower Spectrum Analyzer | HP | 8568B | 2928A04729 2848A18049 | CAL 4/15/03 | 4/15/05 |
| X | RF Preselector | HP | 85685A | 2926A00983 | CAL 4/15/03 | 4/15/05 |
| X | Quasi-Peak Adapter | HP | 85650A | 2811A01279 | CAL 4/15/03 | 4/15/05 |
| | Receiver, Silver/Grey Tower Spectrum Analyzer | HP | 8566B Opt 462 | 3552A22064 3638A08608 | CAL 10/14/02 | 10/14/04 |
| | RF Preselector | HP | 85685A | 2620A00294 | CAL 10/14/02 | 10/14/04 |
| | Quasi-Peak Adapter | HP | 85650A | 3303A01844 | CAL 10/14/02 | 10/14/04 |
| | Preamplifier | HP | 8449B | 3008A01075 | CHAR 1/28/02 | 1/28/04 |
| X | Biconnical Antenna | Electro-Metrics | BIA-25 | 1171 | CAL 4/26/01 | 4/26/03 |
| | Biconnical Antenna | Eaton | 94455-1 | 1096 | CAL 10/1/01 | 10/1/03 |
| | Biconnical Antenna | Eaton | 94455-1 | 1057 | CAL 3/18/03 | 3/18/05 |
| | BiconiLog Antenna | EMCO | 3143 | 9409-1043 | | |
| X | Log-Periodic Antenna | Electro-Metrics | LPA-25 | 1122 | CAL 10/2/01 | 10/2/03 |

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|------------------------------------|-----------------------------|------------|------------|-----------------|--------------------|
| Log-Periodic Antenna | Electro-Metrics | EM-6950 | 632 | CHAR 10/15/01 | 10/15/03 |
| Log-Periodic Antenna | Electro-Metrics | LPA-30 | 409 | CAL 3/4/03 | 3/4/05 |
| Log-Periodic Antenna | Eaton | 96005 | 1243 | CAL 5/8/03 | 5/8/05 |
| Dipole Antenna Kit | Electro-Metrics | TDA-30/1-4 | 152 | CAL 3/21/01 | 3/21/04 |
| Dipole Antenna Kit | Electro-Metrics | TDA-30/1-4 | 153 | CAL 9/26/02 | 9/26/05 |
| Double-Ridged Horn Antenna | Electro-Metrics | RGA -180 | 2319 | CAL 2/17/03 | 2/17/05 |
| Horn Antenna *(at 3 meters) | Electro-Metrics | EM-6961 | 6246 | CAL 3/31/03 | 3/31/05 |
| Horn Antenna *(at 10 meters) | Electro-Metrics | EM-6961 | 6246 | CAL 6/4/03 | 6/4/05 |
| Horn Antenna | ATM | 19-443-6R | None | No Cal Required | |
| Passive Loop Antenna | EMC Test Systems | EMCO 6512 | 9706-1211 | CHAR 7/10/01 | 7/10/03 |
| Harmonic Mixer with Horn Antenna | Oleson Microwave Labs | M08HW/A | F30425-1 | CHAR 4/25/03 | 4/25/05 |
| Harmonic Mixer with Horn Antenna | Oleson Microwave Labs | M12HW/A | E30425-1 | CHAR 4/25/03 | 4/25/05 |
| Line Impedance Stabilization . . . | Electro-Metrics | ANS-25/2 | 2604 | CAL 10/9/01 | 10/9/03 |
| Line Impedance Stabilization . . . | Electro-Metrics | EM-7820 | 2682 | CAL 3/12/03 | 3/12/05 |
| Termaline Wattmeter | Bird Electronic Corporation | 611 | 16405 | CAL 5/25/99 | 5/25/01 |
| Termaline Wattmeter | Bird Electronic Corporation | 6104 | 1926 | CHAR 9/7/01 | 9/7/03 |
| Oscilloscope | Tektronix | 2230 | 300572 | CAL 7/3/03 | 7/3/05 |
| System One | Audio Precision | System One | SYS1-45868 | CHAR 4/25/02 | 4/25/04 |
| Temperature Chamber | Tenney Engineering | TTRC | 11717-7 | CHAR 1/22/02 | 1/22/04 |
| AC Voltmeter | HP | 400FL | 2213A14499 | CAL 10/9/01 | 10/9/03 |
| AC Voltmeter | HP | 400FL | 2213A14261 | CHAR 10/15/01 | 10/15/03 |
| AC Voltmeter | HP | 400FL | 2213A14728 | CHAR 10/15/01 | 10/15/03 |

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|---|---------------------------|-------------------------|------------------|--------------|-----------------|--------------------|
| X | Digital Multimeter | Fluke | 77 | 35053830 | CHAR 1/8/02 | 1/8/04 |
| | Digital Multimeter | Fluke | 77 | 43850817 | CHAR 1/8/02 | 1/8/04 |
| | Digital Multimeter | HP | E2377A | 2927J05849 | CHAR 1/8/02 | 1/8/04 |
| | Multimeter | Fluke | FLUKE-77-3 | 79510405 | CHAR 9/26/01 | 9/26/03 |
| | Peak Power Meter | HP | 8900C | 2131A00545 | CAL 7/2/03 | 7/2/05 |
| | Power Sensor | Agilent Technologies | 84811A | 2551A02705 | CAL 7/2/03 | 7/2/05 |
| | Power Meter | HP | 432A | 1141A07655 | CAL 4/15/03 | 4/15/05 |
| | Power Sensor | HP | 478A | 72129 | CAL 4/15/03 | 4/15/05 |
| | Power Meter And Sensor | Bird | 4421-107 4022 | 0166 0218 | CAL 4/16/03 | 4/16/05 |
| | Digital Thermometer | Fluke | 2166A | 42032 | CAL 1/16/02 | 1/16/04 |
| | Thermometer | Traulsen | SK-128 | | CHAR 1/22/02 | 1/22/04 |
| | Thermometer | Extech | 4028 | 14871-2 | CAL 3/7/03 | 3/7/05 |
| X | Hygro-Thermometer | Extech | 445703 | 0602 | CAL 10/4/02 | 10/4/04 |
| | Frequency Counter | HP | 5352B | 2632A00165 | CAL 11/28/01 | 11/28/03 |
| | Frequency Counter | HP | 5385A | 2730A03025 | CAL 3/7/03 | 3/7/05 |
| | Service Monitor | IFR | FM/AM 500A | 5182 | CAL 11/22/00 | 11/22/02 |
| | Comm. Serv. Monitor | IFR | FM/AM 1200S | 6593 | CAL 5/12/02 | 5/12/04 |
| | Signal Generator | HP | 8640B | 2308A21464 | CAL 2/15/02 | 2/15/04 |
| | Sweep Generator | Wiltron | 6648 | 101009 | CAL 4/15/03 | 4/15/05 |
| | Sweep Generator | Wiltron | 6669M | 007005 | CAL 3/3/03 | 3/3/05 |
| | Modulation Analyzer | HP | 8901A | 3435A06868 | CAL 9/5/01 | 9/5/03 |
| | Modulation Meter | Boonton | 8220 | 10901AB | CAL 4/15/03 | 4/15/05 |

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|----------------------|---------------------|----------------------|------------|------------------|--------------------|
| Near Field Probe | HP | HP11940A | 2650A02748 | CHAR 2/1/01 | 2/1/03 |
| BandReject Filter | Lorch Microwave | 5BR4-2400/ 60-N | Z1 | CHAR 4/17/03 | 4/17/05 |
| BandReject Filter | Lorch Microwave | 6BR6-2442/ 300-N | Z1 | CHAR 4/17/03 | 4/17/05 |
| BandReject Filter | Lorch Microwave | 5BR4-10525/ 900-S | Z1 | CHAR 4/12/03 | 4/12/05 |
| Notch Filter | Lorch Microwave | 5BRX-850/ X100-N | AD-1 | CHAR 4/17/03 | 4/17/05 |
| High Pass Filter | Unk | 3768(5)-400 | 041 | CHAR 12/17/02 | 12/17/04 |
| High Pass Filter | Microlab | HA-10N | | CHAR 11/17/02 | 11/17/04 |
| High Pass Filter | Microlab | HA-20N | | CHAR 12/17/02 | 12/17/04 |
| Audio Oscillator | HP | 653A | 832-00260 | CHAR 12/1/02 | 12/1/04 |
| Audio Generator | B&K Precision | 3010 | 8739686 | CHAR 12/1/02 | 12/1/04 |
| Frequency Counter | HP | 5382A | 1620A03535 | CHAR 3/2/01 | 3/2/03 |
| Frequency Counter | HP | 5385A | 3242A07460 | CAL 3/7/03 | 3/7/05 |
| Amplifier | HP | 11975A | 2738A01969 | CHAR 3/1/01 | 3/1/03 |
| Egg Timer | Unk | | | CHAR 2/1/02 | 2/1/04 |
| Measuring Tape, 20M | Kraftixx | 0631-20 | | CHAR 2/1/02 | 2/1/04 |
| Measuring Tape, 7.5M | Kraftixx | 7.5M PROFI | | 2/1/02 | 2/1/04 |
| Coaxial Cable #51 | Insulated Wire Inc. | NPS 2251-2880 | Timco #51 | CHAR 1/23/02 | 1/23/04 |
| Coaxial Cable #64 | Semflex Inc. | 60637 | Timco #64 | CHAR 1/24/02 | 1/24/04 |
| Coaxial Cable #65 | General Cable Co. | E9917 RG233/U | Timco #65 | CHAR 1/23/02 | 1/23/04 |
| Coaxial Cable #106 | Unknown | Unknown | Timco #106 | CHAR 1/23/02 | 1/23/04 |

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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 100 kHz and the video bandwidth was 300 kHz. The ambient temperature of the UUT was 80°C with a humidity of 76%.

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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NAME OF TEST: RADIATION INTERFERENCE

RULES PART NO.: 15.227

REQUIREMENTS: CARRIER FREQUENCY WILL NOT EXCEEDS 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 |

TEST DATA:

| Emission Frequency MHz | Meter Reading dBuV | ANT. POLARITY | Coax Loss dB | Correction Factor dB | Field Strength dBuV/m | Margin dB |
|------------------------------|--------------------------|------------------|--------------------|----------------------------|-----------------------------|--------------|
| 27.10 | 46.4 | H | 0.31 | 13.13 | 59.84 | 20.17 |
| 27.10 | 63.2 | V | 0.31 | 13.13 | 76.64 | 3.36 |
| 54.20 | 20.4 | H | 0.84 | 10.39 | 31.63 | 8.37 |
| 54.20 | 27.4 | V | 0.84 | 10.39 | 38.63 | 1.37 |
| 81.40 | 21.5 | H | 1.06 | 9.11 | 31.67 | 8.33 |
| 81.40 | 28.7 | V | 1.06 | 9.11 | 38.87 | 1.13 |
| 108.50 | 16.4 | V | 1.23 | 11.06 | 28.69 | 14.81 |
| 108.50 | 17.3 | H | 1.23 | 11.06 | 29.59 | 13.91 |
| 135.70 | 12.2 | V | 1.34 | 14.44 | 27.98 | 15.52 |
| 135.70 | 16.6 | H | 1.34 | 14.44 | 32.38 | 11.12 |
| 162.80 | 9.8 | V | 1.50 | 16.72 | 28.02 | 15.48 |
| 162.80 | 15.3 | H | 1.50 | 16.72 | 33.52 | 9.98 |
| 190.00 | 13.0 | V | 1.72 | 14.20 | 28.92 | 14.58 |
| 190.00 | 15.7 | H | 1.72 | 14.20 | 31.62 | 11.88 |
| 217.10 | 11.2 | V | 1.87 | 12.19 | 25.26 | 20.74 |
| 217.10 | 15.0 | H | 1.87 | 12.19 | 29.06 | 16.94 |
| 244.30 | 16.3 | V | 1.98 | 12.52 | 30.80 | 15.20 |
| 244.30 | 18.0 | H | 1.98 | 12.52 | 32.50 | 13.50 |
| 271.40 | 18.2 | H | 2.09 | 13.71 | 34.00 | 12.00 |
| 271.40 | 19.1 | V | 2.09 | 13.71 | 34.90 | 11.10 |

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

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. The UUT was tested in 3 orthogonal planes.

TEST RESULTS: THE UNIT DOES MEET THE FCC REQUIREMENTS.

PERFORMED BY: JOSEPH SCOGLIO

DATE: 7/15/2003

APPLICANT: WOW WEE LIMITED

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APPLICANT: WOW WEE LIMITED
FCC ID: OKP51640
NAME OF TEST: Occupied Bandwidth
RULES PART NO.: 15.227

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 to the general limits of 15.209.

THE GRAPH ON THE NEXT PAGE REPRESENTS THE EMISSIONS TAKEN FOR THE DEVICE.

METHOD OF MEASUREMENT: A small sample of the transmitter output was fed into the spectrum analyzer and the attached plot was taken. The vertical scale is set to 10 dB per division. The horizontal scale is set to 10 kHz per division.

TEST RESULTS: The unit DOES meet the FCC requirements.

PERFORMED BY: JOSEPH SGOGLIO

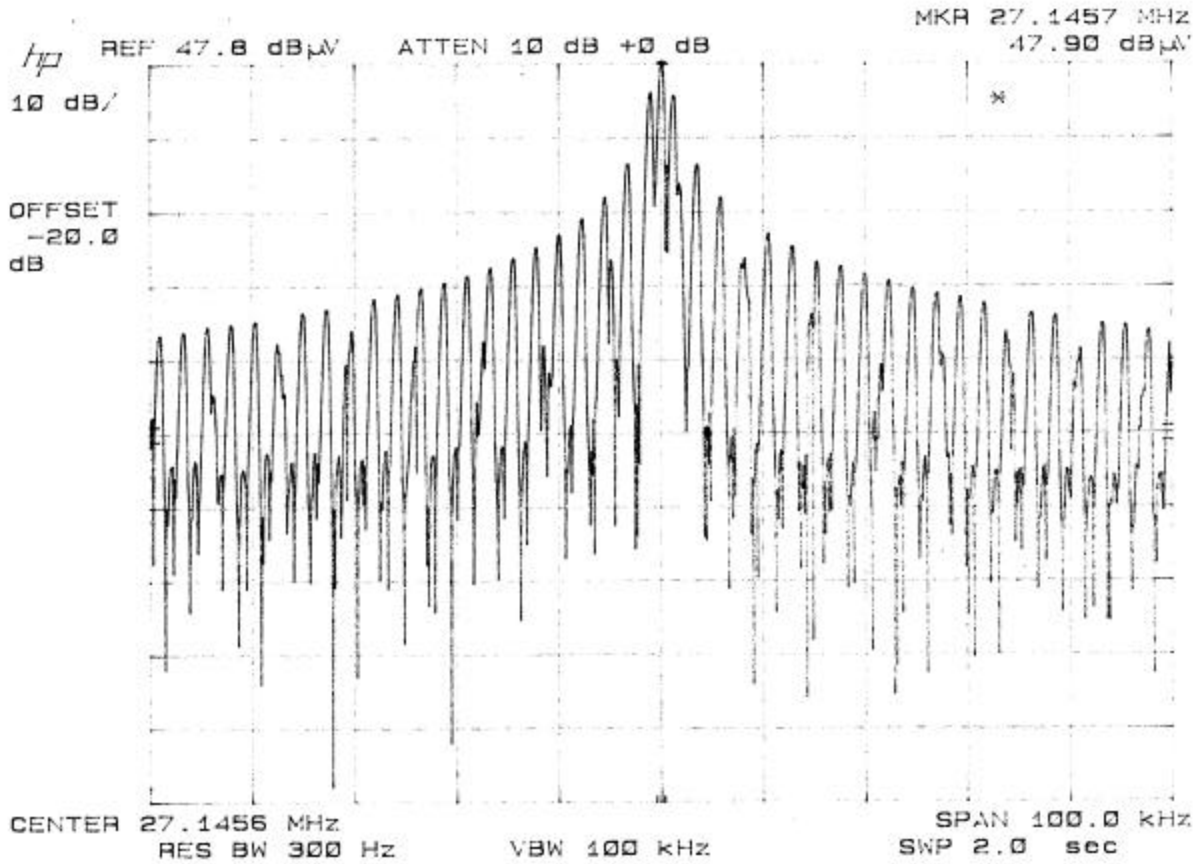
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OCCUPIED BANDWIDTH PLOT



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