

# **THRULab & Engineering.**

**RM1105,11FL, ACE TECHNO TOWER**

**197-22,GURO-DONG GURO-GU SEOUL KOREA**

**T81221095059F81221095056 email thrukang@kornet.net**



## **Test Report**

**Product Name: 26.96-27.28 MHz Wireless R/C Toy - TX**

**FCC ID: OKP0235**

### **Applicant:**

**WOW WEE LIMITED.  
Energy Plaza, Suite 301A-C,  
92 Granville Road  
T.S.T East, Hong Kong.**

**Date Receipt:05/25/2004**

**Date Tested:06/10/2004**

**APPLICANT: WOW Wee Ltd.**

**FCC ID: OKP0235**

**REPORT #: THRU-406011**

**COVER SHEET**

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**FCC ID:** OKP0235

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## Test Equipment List

| DEVICE                    | MODEL        | MFGR                       | SERNO          | DUE.CAL     |
|---------------------------|--------------|----------------------------|----------------|-------------|
| EMI Test Receiver         | ESVS 10      | Rohde & Schwarz            | 830489/001     | 2005.04.07. |
| Spectrum Analyzer         | 8566B        | Hewlett Packard            | 2311A02394     | 2005.04.07. |
| Spectrum Display          | 85662A       | Hewlett Packard            | 2542A12429     | 2005.04.07. |
| Quasi-Peak Adapter        | 85650A       | Hewlett Packard            | 2521A00887     | 2005.04.07. |
| RF Preselector            | 85685A       | Hewlett Packard            | 2648A00504     | 2005.04.07. |
| Pre-Amplifier             | 8449B        | Hewlett Packard            | 3008A00375     | 2005.04.07. |
| Pre-Amplifier             | 8447F        | Hewlett Packard            | 3113A05367     | 2005.04.07. |
| Spectrum Monitor          | EZM          | Rohde & Schwarz            | 862304/007     | 2005.04.07. |
| Bico-Antenna              | 94455-1      | Eaton                      | 977            | 2005.03.17. |
| Log-Periodic Antenna      | 3146         | EMCO                       | 2051           | 2005.03.17. |
| Dipole Antenna            | TDA25/1/2    | Electro Metrics            | 176/200/200    | 2005.03.17. |
| Horn Antenna              | SAS-571      | A.H Systems                | 414            | 2005.04.07. |
| Spectrum Analyzer         | R3261C       | Advantest                  | 71720189       | 2005.03.17. |
| LISN                      | KNW-242      | Kyoritsu                   | 8-923-2        | 2004.04.17  |
| LISN                      | 8012-50-R-24 | Solar                      | 8379121        | 2004.04.17. |
| Loop Ant                  | 6507         | EMCO                       | 1435           | 2004.10.06. |
| Signal Generator          | SMS          | Rohde & Schwarz            | 872165/100     | 2005.04.07. |
| Modulation Analyzer       | 8901B        | Hewlett Packard            | 3438A05094     | 2005.04.07. |
| Frequency Counter         | CMC251       | Tektronic                  | CMC-251TW52489 | 2005.04.07. |
| Digital DC Power Supplier | HYP-3010D    | Han Young Elec, .Co., Ltd. | -              | N/A         |

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## TEST PROCEDURE

**GENERAL:** This report shall NOT be reproduced except in full without the written approval of Thrulab & Engineering.

**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 27°C with a humidity of 57%.

**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.

The situation was similar for the conducted measurement except that the table did not rotate. The EUT was setup as described in ANSIC63.4-1992 with the EUT 40 cm from the vertical ground wall.

**Not Applicable, battery operated.**

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**APPLICANT:** WOW Wee Ltd.

**FCC ID:** OKP0235

**NAME OF TEST:** RADIATION INTERFERENCE

**RULES PART NO.:** 15.227(a)

**REQUIREMENTS:** CARRIER FREQUENCY SHALL NOT EXCEEDS 10,000 microvolts/meter  
AT 3M.

| Frequency<br>(MHz) | Reading<br>Receiver<br>dBuV/m<br>PK | Reading<br>Receiver<br>dBuV/m<br>AV | Polar | Ant<br>Height<br>m | Antenna<br>Factor<br>dB | Cable<br>Loss<br>dB | Result<br>dBuV<br>PK | Result<br>dBuV<br>AV | Limit<br>dBuV/m<br>PK | Limit<br>dBuV/m<br>AV | Margin<br>dBuV/m<br>PK | Margin<br>dBuV/m<br>AV |
|--------------------|-------------------------------------|-------------------------------------|-------|--------------------|-------------------------|---------------------|----------------------|----------------------|-----------------------|-----------------------|------------------------|------------------------|
| 27.1429            | 62.6                                | 54.3                                | H     | 1.8                | 15.9                    | 0.9                 | 79.4                 | 71.1                 | 100                   | 80                    | -20.6                  | -8.9                   |
| 27.1429            | 56.3                                | 50.3                                | V     | 1.0                | 15.9                    | 0.9                 | 73.1                 | 67.1                 | 100                   | 80                    | -26.9                  | -12.9                  |

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:** K.M CHOI

**DATE:** 06/10/2004

APPLICANT: WOW Wee Ltd.

FCC ID: OKP0235

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APPLICANT: WOW Wee Ltd.  
FCC ID: OKP0235  
NAME OF TEST: RADIATION INTERFERENCE  
RULES PART NO.: 15.227(b)  
REQUIREMENTS: 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:

| No | Emission Frequency (MHz) | Meter Reading dBuV | Ant. Polarity | Correction Factor dB | Cable Loss dB | Field Strength (dBuV/m) | Margin (dBuV) | Limit (dBuV/m) |
|----|--------------------------|--------------------|---------------|----------------------|---------------|-------------------------|---------------|----------------|
| 1  | 56.29                    | 19.5               | H             | 8.7                  | 1.1           | 29.3                    | -10.7         | 40.0           |
| 2  | 81.43                    | 16.4               | H             | 8.4                  | 1.4           | 26.2                    | -13.8         | 40.0           |
| 3  | 108.58                   | 9.5                | H             | 11.0                 | 1.7           | 22.2                    | -21.3         | 43.5           |
| 4  | 135.71                   | 2.6                | H             | 14.1                 | 2.0           | 18.6                    | -24.9         | 43.5           |
| 5  | 190.02                   | 3.1                | H             | 13.5                 | 2.4           | 19.0                    | -24.5         | 43.5           |
| 6  | 217.15                   | 8.4                | H             | 10.7                 | 2.7           | 21.8                    | -24.2         | 46.0           |
| 7  | 244.29                   | 1.8                | H             | 11.6                 | 3.1           | 16.4                    | -29.6         | 46.0           |

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:** K.M CHOI

**DATE:** 06/10/2004

APPLICANT: WOW Wee Ltd.  
FCC ID: OKP0235  
REPORT #: THRU-406011

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APPLICANT: WOW Wee Ltd.  
FCC ID: OKP0235  
NAME OF TEST: RADIATION INTERFERENCE  
RULES PART NO.: 15.227(b)  
REQUIREMENTS: 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: |                                |                          |                   |                            |                     |                               |                  |                   |
|------------|--------------------------------|--------------------------|-------------------|----------------------------|---------------------|-------------------------------|------------------|-------------------|
| No         | Emission<br>Frequency<br>(MHz) | Meter<br>Reading<br>dBuV | Ant.<br>Polaritry | Correction<br>Factor<br>dB | Cable<br>Loss<br>dB | Field<br>Strength<br>(dBuV/m) | Margin<br>(dBuV) | Limit<br>(dBuV/m) |
| 1          | 56.29                          | 13.4                     | V                 | 8.7                        | 1.1                 | 23.2                          | -16.8            | 40.0              |
| 2          | 81.43                          | 9.3                      | V                 | 8.4                        | 1.4                 | 19.1                          | -20.9            | 40.0              |
| 3          | 108.58                         | 4.6                      | V                 | 11.0                       | 1.7                 | 17.3                          | -26.2            | 43.5              |
| 4          | 135.71                         | 2.1                      | V                 | 14.1                       | 2.0                 | 18.1                          | -25.4            | 43.5              |
| 5          | 217.15                         | 1.3                      | V                 | 10.7                       | 2.7                 | 14.7                          | -31.3            | 46.0              |

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:** K.M CHOI

**DATE:** 06/10/2004

APPLICANT: WOW Wee Ltd.  
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APPLICANT: WOW Wee Ltd.

FCC ID: OKP0235

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.

|               |                                   |
|---------------|-----------------------------------|
| 1.705-30 MHz  | 69.54 dBuV/M MEASURED AT 3 METERS |
| 30 - 88 MHz   | 40.0 dBuV/M                       |
| 88 - 216 MHz  | 43.5 dBuV/M                       |
| 216 - 960 MHz | 46.0 dBuV/m                       |
| ABOVE 960 MHz | 54.0 dBuV/m                       |

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.

**TEST RESULTS:** The unit DOES meet the FCC requirements.

PERFORMED BY: K.M CHOI

DATE: 06/10/2004

APPLICANT: WOW Wee Ltd.  
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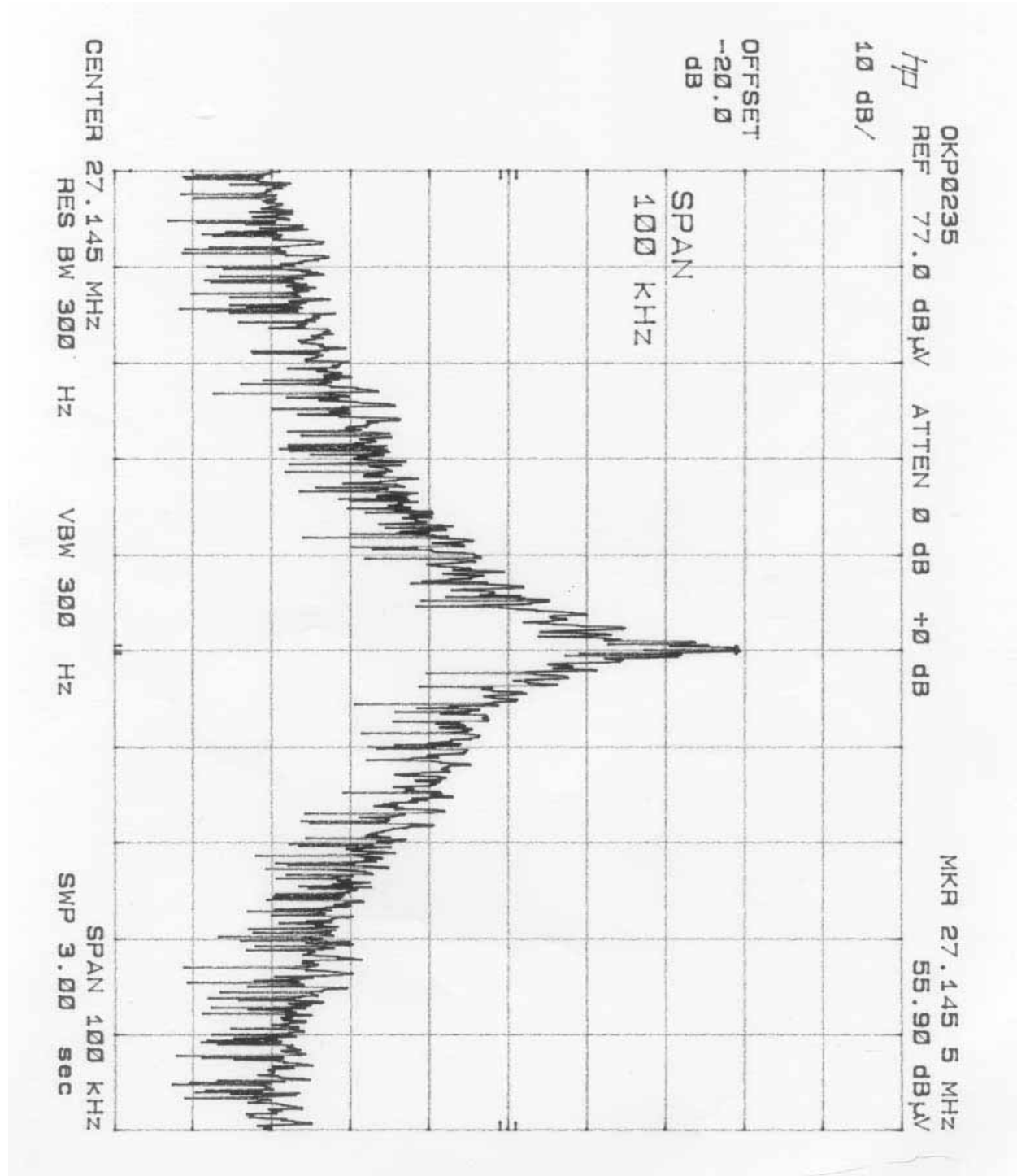
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## OCCUPIED BANDWIDTH PLOT



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