# ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
# TESTED TO FCC PART 15 REQUIREMENTS

*For*

**INTENTIONAL RADIATOR**

**FM WIRELESS UNIVERSAL HANDS FREE**
**TO BE USED WITH CELL PHONE INSIDE A VEHICLE**

**MODEL NO: HFUFM**

**FCC ID: O8XHFUFM**

**REPORT NO: 00E8925**

**ISSUE DATE: SEPTEMBER 27, 2000**

*Prepared for*
**AEOLUS ELECTRONIC CO., LTD.**
**2ND FLOOR, NO. 111-32, SEC. 4, SAN HO RD.**
**SANCHUNG CITY, TAIPEI HSIEN**
**TAIWAN, R. O. C.**

*Prepared by*
**COMPLIANCE ENGINEERING SERVICES, INC.**
*d.b.a.*
**COMPLIANCE CERTIFICATION SERVICES**
**1366 BORDEAUX DRIVE**
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COMPLIANCE
Certification Services
FCC, VCCI, CISPR, CE, AUSTEL, NZ
UL, CSA, TÜV, BCIQ, DHHS, NVLAP

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TEST DATA


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# 1. VERIFICATION OF COMPLIANCE

COMPANY NAME : AEOLUS ELECTRONIC CO., LTD.
2ND FLOOR, NO. 111-32, SEC. 4,
SAN HO ROAD, SANCHUNG CITY,
TAIPEI HSIEN, TAIWAN, R. O. C.

CONTACT PERSON : DUNG-YUAN TSAI / MANAGER

TELEPHONE NO. : (02) 2287-1482

EUT DESCRIPTION : FM WIRELESS UNIVERSAL HANDS FREE TO BE USED WITH CELL PHONE INSIDE A VEHICLE

MODEL NAME/NUMBER : HFUFM

DATE TESTED : SEPTEMBER 20, 2000

REPORT NUMBER : 00E8925

| | |
|---|---|
| TYPE OF EQUIPMENT | FM WIRELESS UNIVERSAL HANDS FREE TO BE USED WITH CELL PHONE INSIDE A VEHICLE |
| EQUIPMENT TYPE | 88.3MHz TRANSMITTER |
| MEASUREMENT PROCEDURE | ANSI C63.4 / 1992 |
| LIMIT TYPE | CERTIFICATION |
| FCC RULE | CFR 47, PART 15 |

The above equipment was tested by Compliance Engineering Services, Inc. for compliance with the requirements set forth in CFR 47, PART 15. This said equipment in the configuration described in this report shows that maximum emission levels emanating from equipment are within the compliance requirements. **Warning** : This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification will constitute fraud and shall nullify the document.

Rick Yeo

RICK YEO / EMC MANAGER
COMPLIANCE ENGINEERING SERVICES, INC.



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## 2. PRODUCT DESCRIPTION

| | |
|---|---|
| Fundamental Frequency | **88.3 MHz** |
| Power Source | **FROM VEHICLE DC** |
| Usage | **VEHICLE HANDS-FREE KIT** |
| Power Requirement | **12 VDC** |
| Antenna Requirement | **Permanently attached** |

## 3. TEST FACILITY

The 3/10/30 meter open area test site and conducted measurement facility used to collect the radiated data is located at 561F Monterey Road, Morgan Hill, California, U.S.A. A detailed description of the test facility was submitted to the Commission on May 27,1994.

## 4. MEASUREMENT STANDARDS

The site is constructed and calibrated in conformance with the requirements of ANSI C63.4/1992.

## 5. TEST METHODOLOGY

For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 KHz, up to at least the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower. (CFR 47 Section 15.33)

## 6. MEASUREMENT EQUIPMENT USED

| Manufacturer | Model No. | Description | Cal Due Date |
|---|---|---|---|
| H.P. | 8566B | Spectrum Analyzer (100Hz – 22GHz) | 12/00 |
| H.P. | 8595EM | Spectrum Analyzer (9KHz – 6.5GHz) | 01/01 |
| EMCO | 3115 | Antenna (1-18GHz) | 09/01 |
| EMCO | 3142 | Antenna (30-2000MHz) | 06/01 |
| H.P. | 8447D B | Amplifier(30-1300MHz) | 05/01 |
| MITEQ | NSP2600-44 | Amplifier(1-26GHz) | 12/00 |



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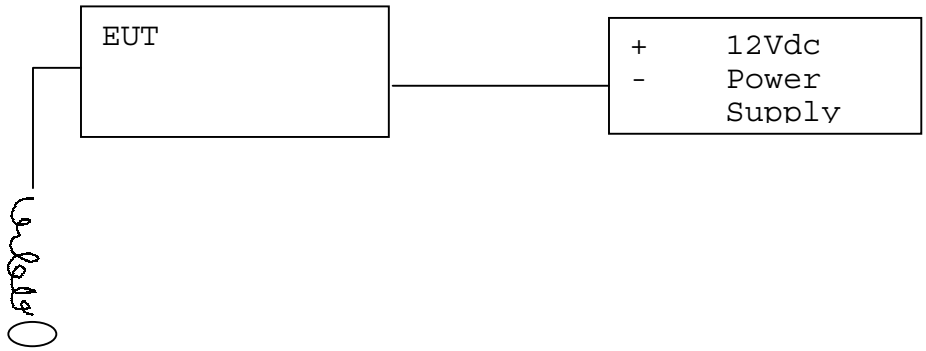
## 7. RADIATED EMISSION LIMITS

| | |
|---|---|
| GENERAL REQUIREMENTS | SECTION 15.209, 15.239 |

## 8. SYSTEM TEST CONFIGURATION

Used 12Vdc to activate the EUT.

Radiated Open Site Test Set-up



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## 9. TEST PROCEDURE

**Radiated Emissions, 15.209**

**Test Set-up for frequency range 30-1000 MHz**

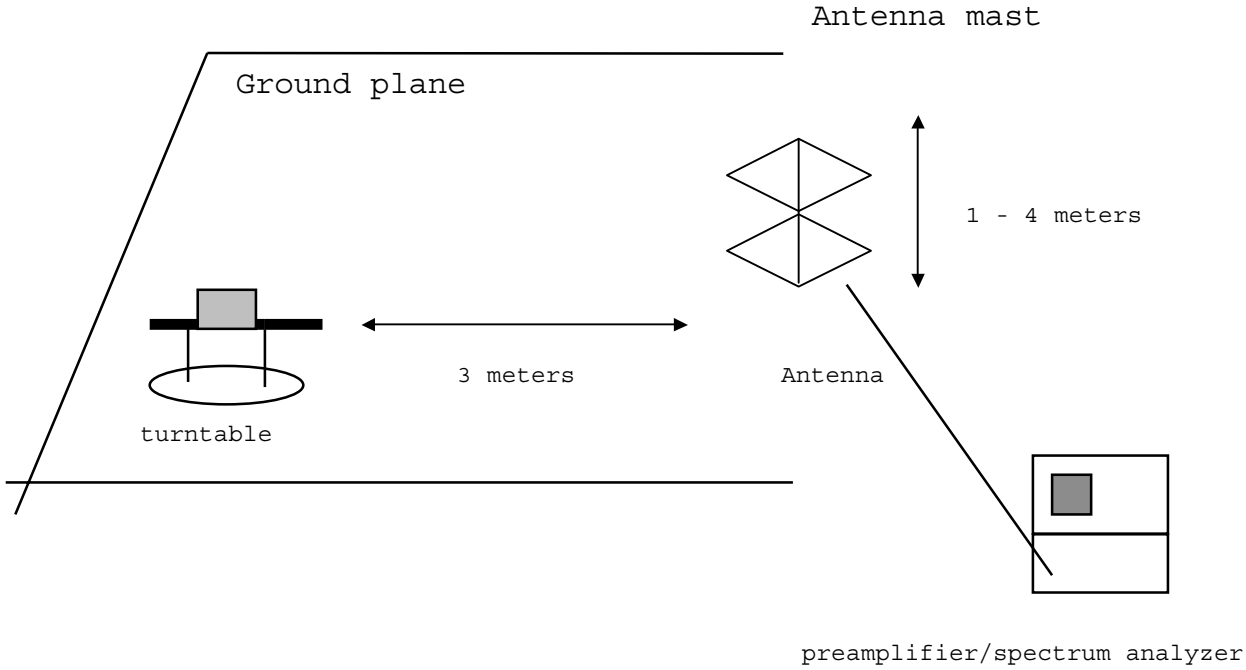


**Fig. 1**

1. The EUT was placed on a wooden table on the outdoor ground plane. The search antenna was placed 3-meters from the EUT.

2. The turntable was slowly rotated to locate the direction of maximum emission. The EUT was moved throughout the.

3. Once maximum direction was determined, the search antenna was raised and lowered .The maximum readings so obtained are recorded in the data listed below.



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**Radiated Emissions, 15.239 (a) & 15.239(b), (c)**

According to FCC 15.239(a), the EUT and accessories shall be placed on the 1 meter site in above configuration.

First, connect 12Vdc + and - pins of battery to the power inputs of EUT by using the wires to activate the continuous emissions.

Using a probe to detect the emission signal from the EUT and measure 88.7MHz EUT signal level on the screen of spectrum analyzer (HP 8595EM) with RES BW=VID BW=1KHz and Span Size = 200kHz.

Apply a low frequency signal of signal generator to #5 and #7 pin of HEADER connector of EUT using 2 wires.

Turn on the signal generator. Set up 2.5 kHz as a modulation frequency and adjust the output amplitude value to get the modulated FM signal with about 200kHz deviation. (See attached plots).

Measure the band width of FM modulated signal on the level 20dB down below the original CW signal.

A plot of such combined signal pattern was made. (See attached)



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## 10. SETUP PHOTOS

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## 11. TEST RESULT

All emissions were measured at 3 meters by using the following limits. Attached data sheet and plots show the passing radiation results to testing to 15.209 and 15.239.

The limit of any emissions in 80-108MHz shall not exceed 250uV (0r 48 dBuV/m) at 3 meters.

The test is based on measurement instrumentation employing average detector, not Q-P detection.

The test block diagram is without FM modulation signal input (CW EUT emission signal test only) at 3 meters.

The radiation limit of any frequency outside of band follows 15.209



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Tel:02-2217-0894 Fax:02-2217-1254

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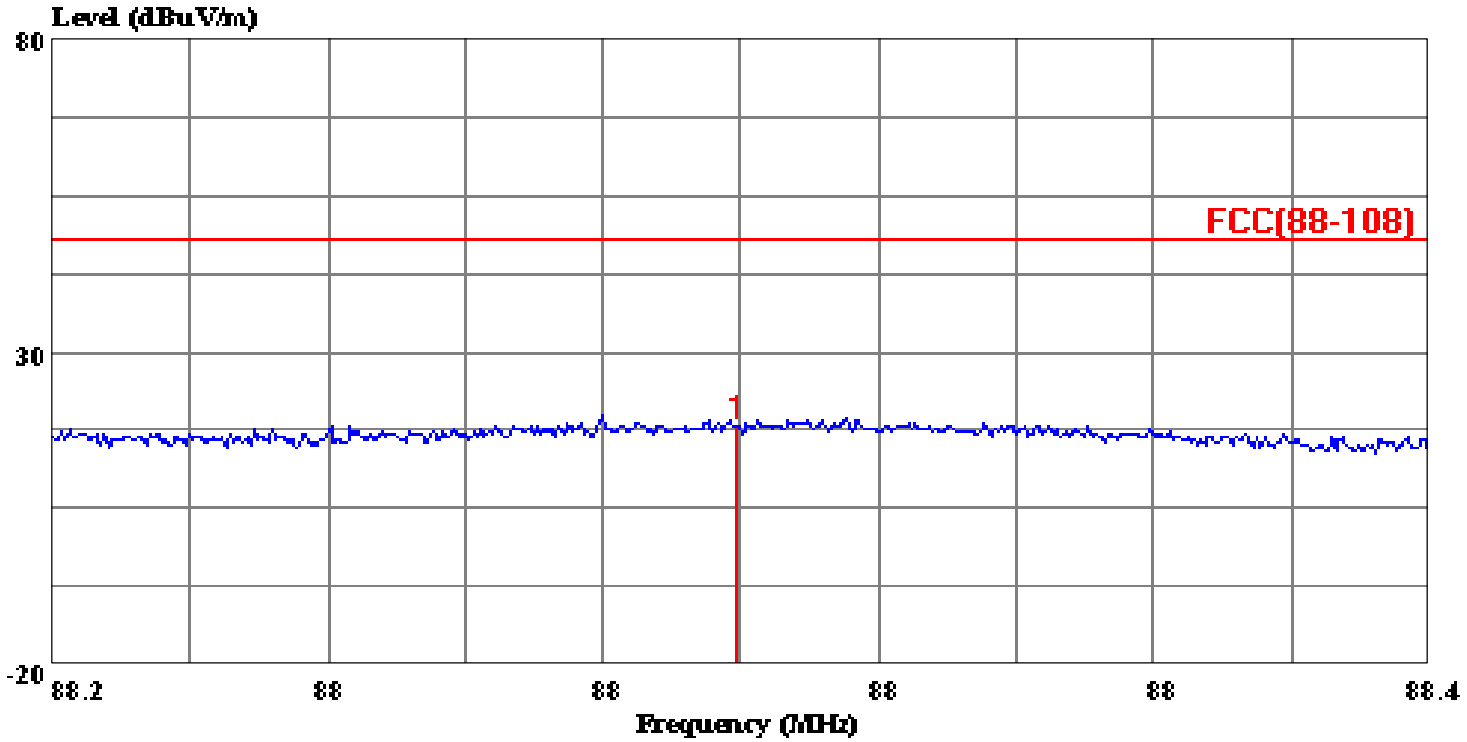


(CCS E-Site)

Trace: 16 Ref Trace:

Condition: HORIZONTAL
Report No. : 00E8925
Test Engr. : VINCE CHIANG
Company : AEOLUS
EUT : HFUFM
Test Config : EUT/CELL PHONE/POWER SUPPLY
Type of Test: FCC 15.239
Mode of Op. : TX MODE
: 200KHz/Peak Reading Under Average Limit

Page: 1

| | Freq | Read Level | Probe Factor | Cable Loss | Preamp Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dB | dB | dBuV/m | dBuV/m | dB | |
| 1 | 88.299 | 32.07 | 8.84 | 1.57 | 24.30 | 18.18 | 48.00 | -29.82 | Peak |

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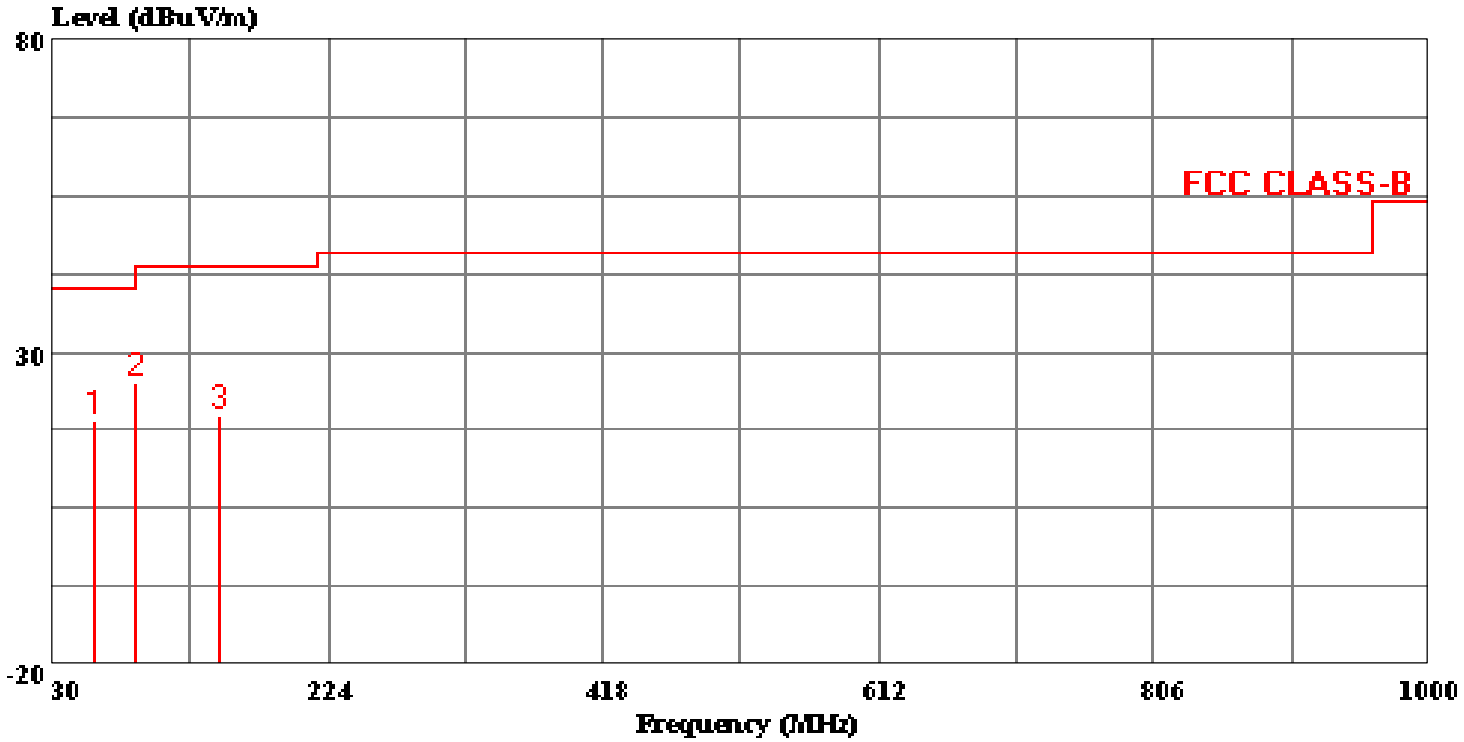


(CCS E-Site)

Trace: Ref Trace:

Condition: HORIZONTAL
Report No. : 00E8925
Test Engr. : VINCE CHIANG
Company : AEOLUS
EUT : HFUFM
Test Config : EUT/CELL PHONE/POWER SUPPLY
Type of Test: FCC 15.209
Mode of Op. : TX MODE

Page: 1

| | Freq | Read Level | Probe Factor | Cable Loss | Preamp Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dB | dB | dBuV/m | dBuV/m | dB | |
| 1 | 58.873 | 35.78 | 6.36 | 1.37 | 24.35 | 19.15 | 40.00 | -20.85 | |
| 2 | 88.130 | 39.15 | 8.71 | 1.55 | 24.32 | 25.09 | 43.50 | -18.41 | |
| 3 | 147.210 | 30.15 | 11.84 | 2.10 | 24.22 | 19.87 | 43.50 | -23.63 | |

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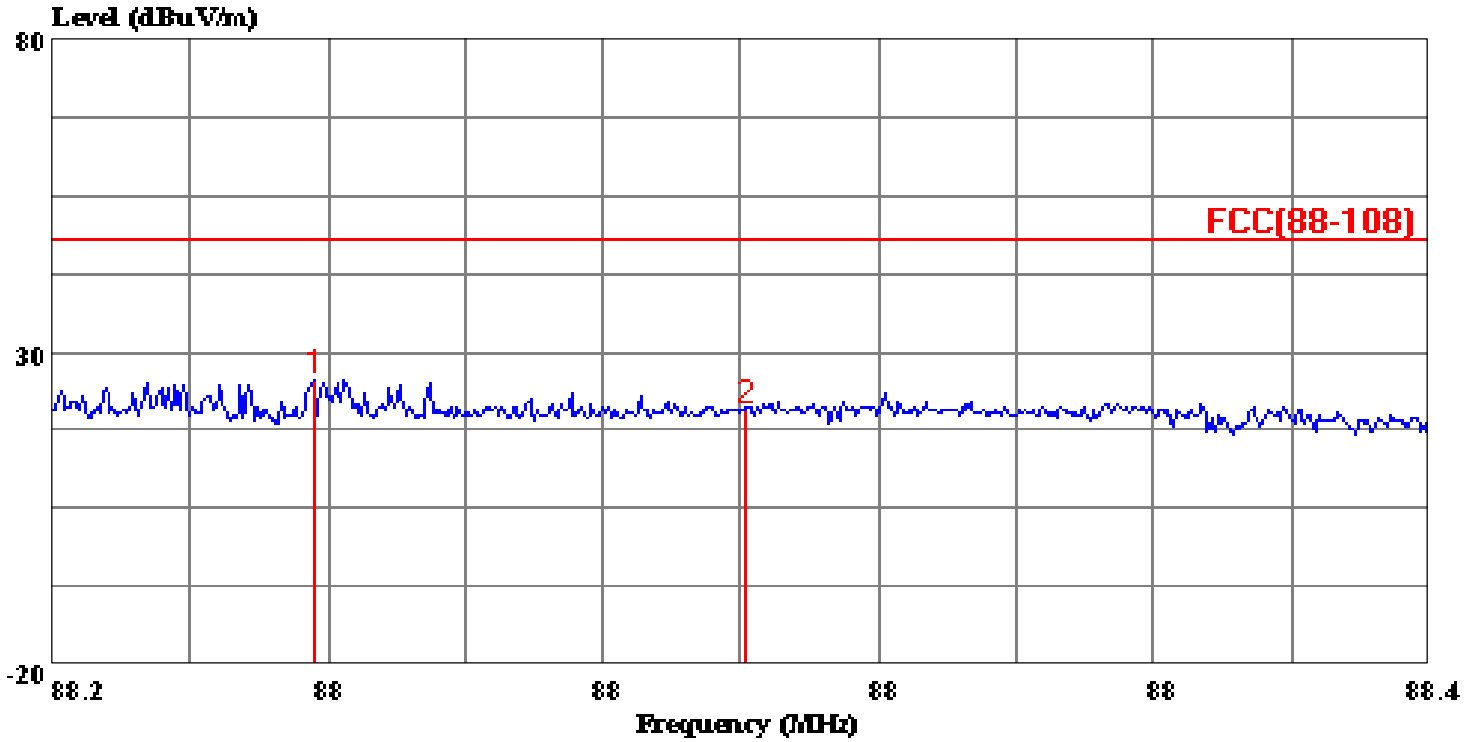


(CCS E-Site)

Trace: 17 Ref Trace:

Condition: VERTICAL
Report No. : 00E8925
Test Engr. : VINCE CHIANG
Company : AEOLUS
EUT : HFUFM
Test Config : EUT/CELL PHONE/POWER SUPPLY
Type of Test: FCC 15.239
Mode of Op. : TX MODE
: 200KHz/Peak Reading Under Average Limit

Page: 1

| | Freq | Read Level | Probe Factor | Cable Loss | Preamp Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dB | dB | dBuV/m | dBuV/m | dB | |
| 1 | 88.238 | 38.75 | 9.45 | 1.57 | 24.30 | 25.47 | 48.00 | -22.53 | Peak |
| 2 | 88.301 | 34.16 | 9.45 | 1.57 | 24.30 | 20.88 | 48.00 | -27.12 | Peak |

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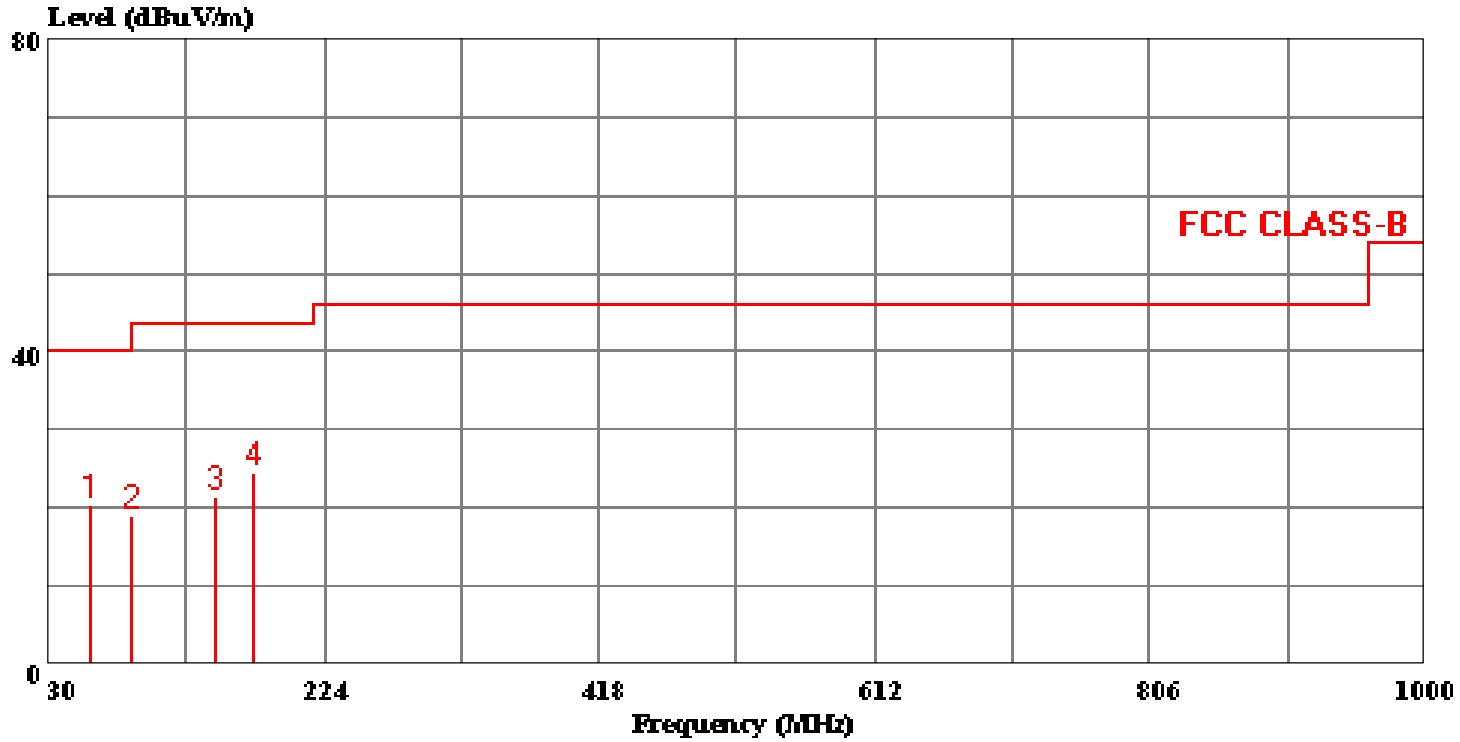
Data#: 23 File#: 8925f.emi Date: 2000-09-20 Time: 10:36:00




(CCS E-Site)

Trace: Ref Trace:

Condition: VERTICAL
Report No. : 00E8925
Test Engr. : VINCE CHIANG
Company : AEOLUS
EUT : HFUFM
Test Config : EUT/CELL PHONE/POWER SUPPLY
Type of Test: FCC 15.209
Mode of Op. : TX MODE

Page: 1

| | Freq | Read Level | Probe Factor | Cable Loss | Preamp Factor | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dB | dB | dBuV/m | dBuV/m | dB | |
| 1 | 58.878 | 37.80 | 5.47 | 1.37 | 24.35 | 20.28 | 40.00 | -19.72 | Peak |
| 2 | 88.482 | 32.48 | 9.45 | 1.57 | 24.31 | 19.19 | 43.50 | -24.31 | Peak |
| 3 | 146.944 | 30.83 | 12.64 | 2.10 | 24.22 | 21.35 | 43.50 | -22.15 | Peak |
| 4 | 175.240 | 35.83 | 10.51 | 2.20 | 24.01 | 24.53 | 43.50 | -18.97 | Peak |

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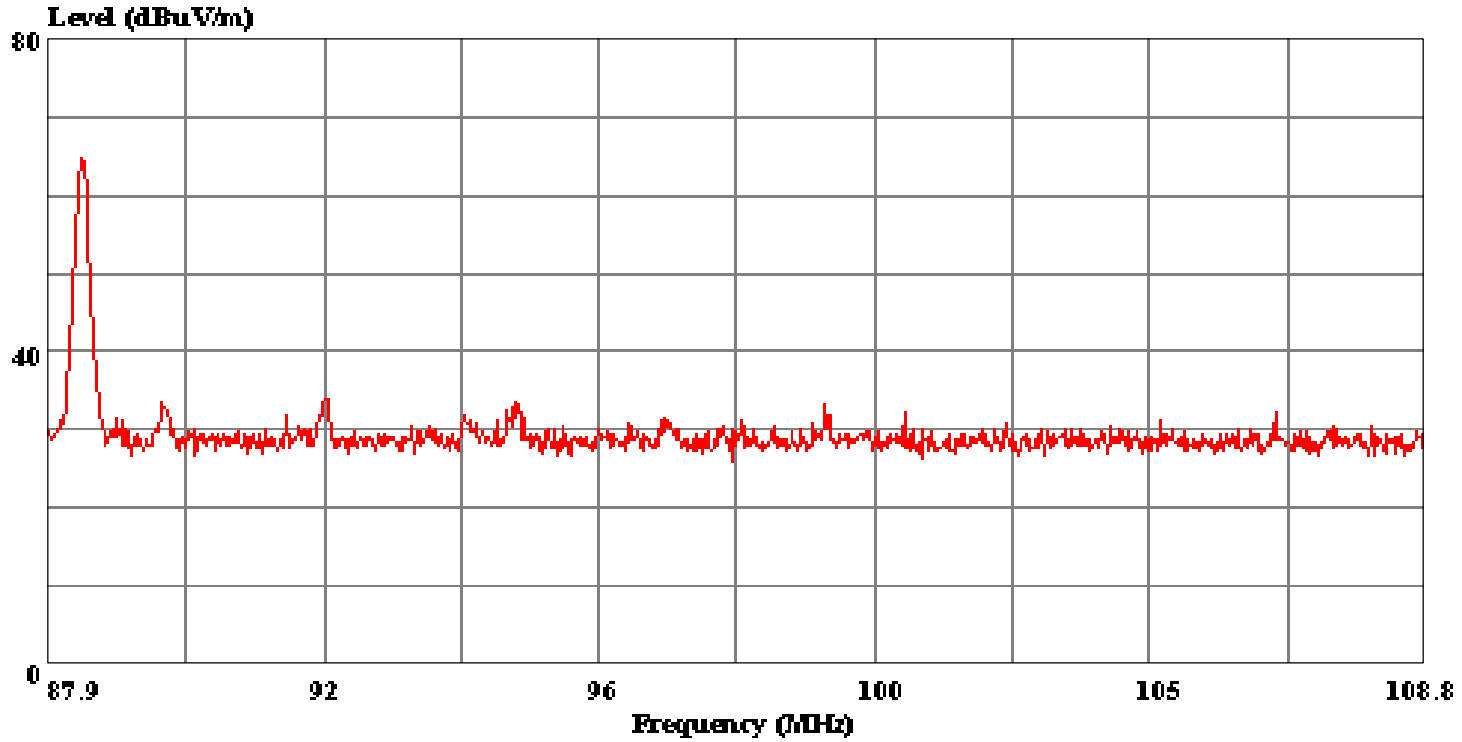


(CCS E-Site)

Trace: Ref Trace:

Report No. : 00E8925
Test Engr. : VINCE CHIANG
Company : AEOLUS
EUT : HFUFM
Test Config : EUT/CELL PHONE/POWER SUPPLY
Type of Test: FCC 15.239(a)
Mode of Op. : PROBE TO EUT/0M