# FCC CFR47 PART 22 TYPE ACCEPTANCE

# TEST REPORT

# FOR

## WIRELESS LOCAL LOOP SUBSCRIBER UNIT

## MODEL: SU-250, SU-210

**FCC ID: NT7SU-2XX**

**REPORT NUMBER: 99U0100**

**ISSUE DATE:MARCH 11,1999**

*Prepared for*

**DIVA COMMUNICATIONS**
**1999 HARRISON, SUITE 1400**
**OAKLAND, CA 94612**
**USA**

*Prepared by*

**COMPLIANCE ENGINEERING SERVICES, INC.**
**d.b.a.**
**COMPLIANCE CERTIFICATION SERVICES**
**1366 BORDEAUX DRIVE**
**SUNNYVALE, CA 94089, USA**
**TEL: (408) 752-8166**
**FAX: (408) 752-8168**

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# 1. VERIFICATION OF COMPLIANCE

COMPANY NAME: DIVA COMMUNICATIONS
1999 HARRISON, SUITE 1400
OAKLAND, CA 94612

CONTACT PERSON: WILLIAM B. BARINGER / SENIOR RF ENGINEER

TELEPHONE NO: 510-986-6421

MODEL NO/NAME: SU-250, SU-210

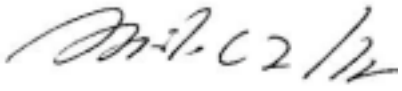
SERIAL NO: N/A

DATE TESTED: MARCH 8, 1999

| | |
|---|---|
| TYPE OF EQUIPMENT: | WIRELESS LOCAL LOOP SUBSCRIBER UNIT |
| MEASUREMENT DISTANCE: | 3 METER |
| TECHNICAL LIMIT: | FCC 22.355, 22.917, 22.913, 22.905 |
| FCC RULES: | PART 15, PART 22 |
| EQUIPMENT AUTHORIZATION PROCEDURE | CERTIFICATION |
| MODIFICATIONS MADE ON EUT | YES (X )NO |

The above equipment was tested by Compliance Consulting Services for compliance with the requirements set forth in the FCC CFR 47, PART 15 AND 22. The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

*Approved By*



MIKE KUO/ VICE PRESIDENT
COMPLIANCE CERTIFICATION SERVICES

## 2. PRODUCT DESCRIPTION

The Subscriber Unit transmits in the uplink band (824.01 to 848.97 MHz) and receives in the downlink band (869.01 to 893.97 MHz). Since the system is TDMA, the subscriber unit only transmits on one or two of the three available time slots. The subscriber units operates in a manner similar to cellular mobiles. Upon power-up, the subscriber unit searches for an available control channel, then receives direction from the Modular Base Station as to which channel and slot to transmit on. In addition, the SU transmitter power is controlled by the base station over a 20 dB range to minimize the transmitted power level consistent with a minimum signal level received at the Modular Base Station. The modulation, coding, and ID used in the system only allow the SU to be controlled by an authorized DIVA Modular Base Station. The SU also uses a Modular Base Station transmit channel as a frequency reference to set its internal reference oscillator prior to transmission. In this way the Modular Base Station controls the frequency accuracy of the SU transmitter.

The SU can be installed by the end user (subscriber) using the built-in antennas. A higher gain antenna may be installed. This antenna and interface cable combination would be such that the maximum ERP would not exceed the FCC cellular mobile limit of 38.5 dBm (7 W) ERP, FCC 47CFR22.913(a). The antenna and cable would be provided by the Service Provider. A UDC type (non-standard) multi-pin connector is provided on the SU for this purpose and is connected to the antenna via a custom cable harness provided by DIVA to the Service Provider.

The Diva Subscriber Unit model SU-210 provides voice service only. The Diva Subscriber Unit model SU-250 provides voice service, 9600 bps fax service, and 2400 bps data service, utilizing standard commercially available fax and data modem equipment connected to the RJ-11 phone jack of the SU-250. The SU-210 utilizes an identical RF circuitry as the SU-250, and the two models utilize the same printed circuit board (encompassing both the RF and the digital portions of the design). The SU-210 differs from the SU-250 only in that fax service and data service digital circuitry components are removed from the SU-250 to create the SU-210.

## 3. TEST FACILITY

The open area test sites and conducted measurement facilities used to collect the radiated and conducted data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

## 4. ACCREDITATION AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code:200065-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or

imply product endorsement by NVLAP or any agency of the US Government. In addition, the test facilities are listed with Federal Communications Commission (reference no: 31040/SIT (1300B3) and 31040/SIT(1300F2))

## 5. MEASUREMENT INSTRUMENTATION

Radiated emissions were measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, ridged waveguide, liner horn. EMI receivers were used for line conducted readings, spectrum analyzers with pre-selectors and quasi-peak detectors were used to perform radiated measurements. Receiving equipment (i.e., receiver, analyzer, quasi-peak adapter, pre-selector) and LISNs conform to CISPR specification for "Radio Interference Measuring Apparatus and Measurement Methods," Publication 16.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

## 6. MEASURING INSTRUMENT CALIBRATION

The measuring equipment which was utilized in performing the tests documented herein has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment which is traceable to recognized national standards.

## 7. UNITS OF MEASUREMENT

Measurements of radiated interference are reported in terms of dB(uV/m) at a specified distance. The indicated readings on the spectrum analyzer were converted to dB(uV/m) by use of appropriate conversion factors. Measurements of conducted interference are reported in terms of dB(uV).

The field strength is calculated by adding the Antenna Factor and Cable Factors, then by subtracting the Amplifier Gain from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG

Where FS = Field Strength
RA = Receiver Amplitude
AF = Antenna Factor
CF = Cable Attenuation Factor
AG = Amplifier Gain

Assume a receiver reading of 52.5 dBuV is obtained. The Antenna Factor of 7.4dB/m and a Cable Factor of 1.1dB is added. The Amplifier Gain of 29 dB is subtracted, giving a field strength of 32 dBuV/m. The 32 dBuV/m value was mathematically converted to its corresponding level in uV/m.

FS = 52.5 + 7.4 + 1.1 - 29 = 32 dBuV/m

Level in uV/m = Common Antilogarithm [(32 dBuV/m)/20] = 39.8 uV/m

## 8. CLASSIFICATION OF DIGITAL DEVICE

Class A includes digital devices that are marketed for use in commercial, industrial or business environments, excluding devices which are marketed for use by the general public or are intended to be used in the home.

Class B includes digital devices that are marketed for use in residential environments, notwithstanding use in commercial, business and industrial environments.

Note: The responsible party may also qualify a device intended to be marketed in a commercial, business or industrial environment as Class B device, and in fact is encouraged to do so provided the device complies with the technical specifications for a Class B digital device. In the event that a particular type of device has been found to repeatedly cause harmful interference to radio communications, the Commission may classify such a digital device as a Class B digital device, regardless of its intended use.

## 9. RADIATED EMISSION LIMITS

FCC PART 15 CLASS A

| MEASURING DISTANCE OF 10 METER | | |
|---|---|---|
| FREQUENCY RANGE (MHz) | FIELD STRENGTH (Microvolts/m) | FIELD STRENGTH (dBuV/m) |
| 30-88 | 90 | 39.1 |
| 88-216 | 150 | 43.5 |
| 216-960 | 210 | 46.4 |
| Above 960 | 300 | 49.5 |

FCC PART 15 CLASS B

| MEASURING DISTANCE OF 3 METER | | |
|---|---|---|
| FREQUENCY RANGE (MHz) | FIELD STRENGTH (Microvolts/m) | FIELD STRENGTH (dBuV/m) |
| 30-88 | 100 | 40 |
| 88-216 | 150 | 43.5 |
| 216-960 | 200 | 46 |
| Above 960 | 500 | 54 |

## 10. RADIATED EMISSION TEST PROCEDURE

The EUT and all other support equipment are placed on a wooden table 80 cm above the ground screen. Antenna to EUT distance is 3 meters . During the test, the table is rotated 360 degrees to maximize emissions and the antenna is positioned from 1 to 4 meters above the ground screen to further maximize emissions. The antenna is polarized in both vertical and horizontal positions.

EUT test configuration is according to Section 8 of ANSI C63.4/1992.

Monitor the frequency range of interest at a fixed antenna height and EUT azimuth. Frequency span should be small enough to easily differentiate between broadcast stations and intermittent ambients. Rotate EUT 360 degrees to maximize emissions received from EUT. If emission increases by more than 1 dB, or if another emission appears that is greater by 1 dB, return to azimuth where maximum occurred and perform additional cable manipulation to further maximize received emission.

Move antenna up and down to further maximize suspected highest amplitude signal. If emission increased by 1 dB or more, or if another emission appears that is greater by 1dB or more, return to antenna height where maximum signal was observed and manipulate cables to produce highest emissions, noting frequency and amplitude.

## 11. AMBIENT CONDITIONS

The ambient conditions at the time of final tests were as follows:

| | Radiated Emission | Conducted Emission |
|---|---|---|
| Temperature | **13** $^{o}$C | **12**$^{o}$C |
| Humidity | **60%** | **62%** |

.

## 12. TEST EQUIPMENT LIST

| Equipment | Manufacturer | Model No. | Serial No. | Site | Cal Date | Due Date |
|---|---|---|---|---|---|---|
| Spectrum Analyzer | H.P. | 8593EM | 3710A00205 | A | 5/2/98 | 5/2/99 |
| Antenna | CHASE | CBL6112 | 2049 | A/F | 5/08/98 | 5/08/99 |
| Antenna | EMCO | 3115 | 9001-3245 | N/A | 12/11/98 | 12/11/99 |
| Pre-Amp | H.P.(P2) | 8447D | 2944A06265 | A/F | 10/27/98 | 10/27/99 |
| Pre-Amp | H.P. | 8449B | 3008A00369 | A/F | 4/2/998 | 4/2/99 |
| Power Meter | H.P. | 436A | 2709A29209 | N/A | 2/24/99 | 2/24/00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Thermal coupler | Tecktronics | DTM920 | DTM920TW | N/A | 4/14/98 | 4/14/99 |

## 13. SUPPORT EQUIPMENT

| Device Type | Manufacturer | Model Number | Serial No. | FCC ID / DoC |
|---|---|---|---|---|
| PC | COMPUTERLINK | N/A | N/A | N/A |
| TEST INTERFACE BOX | KOKUSAI ELECTRONICS | N/A | N/A | N/A |
| DC POWER SUPPLY | KOKUSAI ELECTRONICS | ZEBRA ZA-X151501 | K9809311511 | N/A |
| TELEPHONE | AMTEL | N/A | N/A | 2GUCHN-73412 |

## 14. EUT SETUP PHOTOS

**Radiated Emission Test Setup**

**Conducted Emission Test Setup**

**Radiated Emission Test Setup**

## 15. TEST RESULT SUMMARY

FCC PART 15 Radiated Emission Test was conducted by operating the configuration as indicated below.

| OATS No:A<br>A / 3 meter | Data Report No.<br>990305A1 | Date<br>03/05/99 | Tested By:<br>PETE KREBILL |
|---|---|---|---|

**Six Highest Radiated Emission Readings**

| Frequency Range Investigated | | | | 30 MHz TO 9000 MHz | | | |
|---|---|---|---|---|---|---|---|
| Freq (MHz) | Meter Reading (dBuV) | C.F. (dB/m) | Corrected Reading (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Reading Type (P/Q/A) | Polar (H/V) |
| 140.7 | 41.49 | -12.7 | 28.79 | 43.50 | -14.71 | P | V |
| 86.44 | 38.78 | -16.91 | 21.87 | 40.00 | -18.13 | P | V |
| 32.76 | 41.30 | -9.7 | 31.60 | 40.00 | -8.40 | P | V |
| 120.0 | 37.10 | -12.09 | 25.01 | 43.50 | -18.49 | P | V |
| 86.44 | 35.90 | -17.6 | 18.30 | 40.00 | -21.70 | P | H |
| 32.77 | 41.40 | -8.79 | 32.61 | 40.00 | -7.39 | P | H |

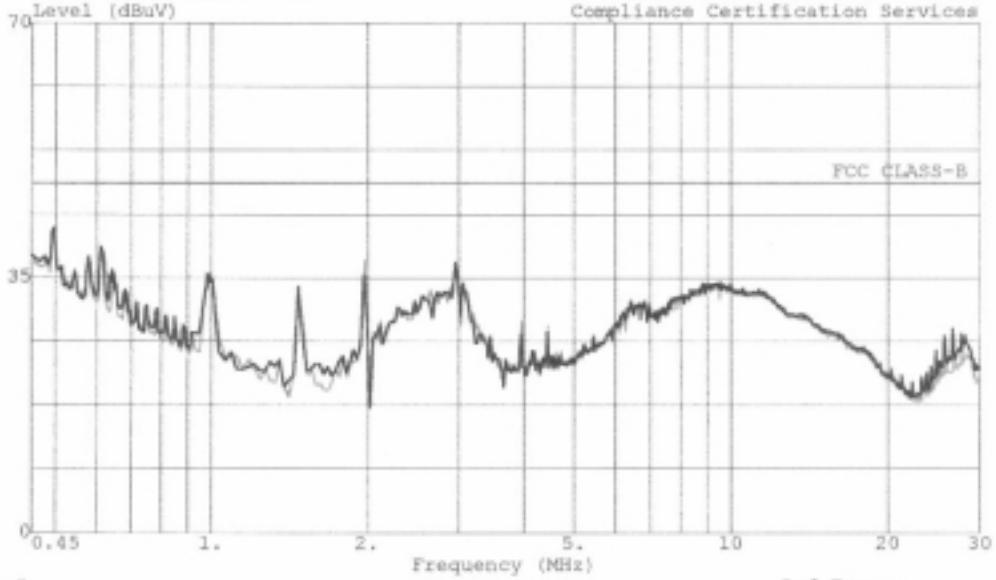
C.F.(Correction Factor)=Antenna Factor + Cable Loss-Amplifier Gain
Corrected Reading = Metering Reading + C.F. Margin = Corrected Reading - Limits
P= Peak Reading H= Horizontal Polarization/Antenna
Q= Quasi-peak V= Vertical Polarization/Antenna
A= Average Reading
Comments: N/A

| Conducted Room | Plot No. N/A | | Date 03/08/99 | | Tested By: Pete Krebill | |
|---|---|---|---|---|---|---|
| **Six Highest Conducted Emission Readings** | | | | | | |
| Frequency Range Investigated | | | 450 kHz TO 30 MHz | | | |
| Freq (MHz) | Meter Reading (dBuV) | C.F. (dB) | Corrected Reading (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Reading Type (P/Q/A) | Line (L1/L2) |
| 0.494 | 41.29 | 0 | 41.29 | 48.0 | -6.71 | P | 1 |
| 0.614 | 37.75 | 0 | 37.75 | 48.0 | -10.25 | P | 1 |
| 1.97 | 37.44 | 0 | 37.44 | 48.0 | -10.56 | P | 1 |
| 0.494 | 41.42 | 0 | 41.42 | 48.0 | -6.58 | P | 2 |
| 0.614 | 39.26 | 0 | 39.26 | 48.0 | -8.74 | P | 2 |
| 0.581 | 37.47 | 0 | 37.47 | 48.0 | -10.53 | P | 2 |

C.F.(Correction Factor)=Insertion Loss + Cable Loss
Corrected Reading = Metering Reading + C.F.
Margin= Corrected Reading - Limits
P= Peak Reading L1=Hot
Q= Quasi-peak L2=Neutral
A= Average Reading

COMPLIANCE Engineering Services, inc.
1366 Bordeaux Dr. PK
Sunnyvale, CA 94089-1005 USA
Tel: (408) 752-8166
Fax: (408) 752-8168

Data#: 7 File#: 99U0100.EMI Date: 03-05-1999 Time: 11:29:41




Trace: 3 Ref Trace:
Project No. : 99u0100
Report No. : 990305
Test Engr : PETE KREBILL
Company : DIVA COMM
EUT : SU-250
Test Config.: EUT/PHONE
Type of Test: FCC 15.109
Mode of Op. : TX MAX POWER
: PEAK: L1(Green), L2(Black)
: 120Vac, 60Hz

## FCC PART 2 TYPE ACCEPTANCE TEST REQUIREMENT:

*SECTION 2.983 (A) NAME OF APPLICANT:*

DIVA Communications
1999 Harrison St.
Suite 1400
Oakland, CA 94612

Name of Manufacturer: Kokusai Electric Co., LTD.
1007-176 Isumisawa
Chitose City Hokkaido
Japan 066-8666

*SECTION 2.983 (B) EQUIPMENT IDENTIFICATION:*

DIVA Communications
Model Number: SU-250, SU-210
FCC ID:NT7SU-2XX

*SECTION 2.983 (C) PLANNED FOR QUANTITY PRODUCTION.*

*SECTION 2.983 (D) TECHNICAL DESCRIPTION :*

Please refer to attachment. Confidentiality is requested on this document.

*SECTION 2.985 RF POWER OUTPUT*

| MEASURED RF POWER OUTPUT |
|---|
| 0.42WATTS |

*SECTION 2.987 MODULATION CHARACTERISTICS*

The modulation type is PI/4 DQPSK (PI/4 Shifted Differential Quadrature Phase Shift Keying), and the carrier is both amplitude and phase modulated. Using a square root raised cosine baseband filter with an excess bandwidth of 0.5 over the Nyquist bandwidth. The "total" RF bandwidth ( ideally) is then :BW(total) = 2* bit rate * symbols/bit * baseband filter bandwidth. The

baseband filter bandwidth = Nyquist bandwidth * ( 1 + excess bandwidth ) = (1/2) * (1.5) = 0.75. Therefore the ideal maximum BW = 2* 42,000 bps * (1/2) * (0.75) = 31.5 kHz. The Necessary BW ( minimum occupied as defined in Section 2.202) = 26.64 kHz (26K6). This was obtained by integrating the baseband pulse response ( raised cosine baseband response). See the following plot.

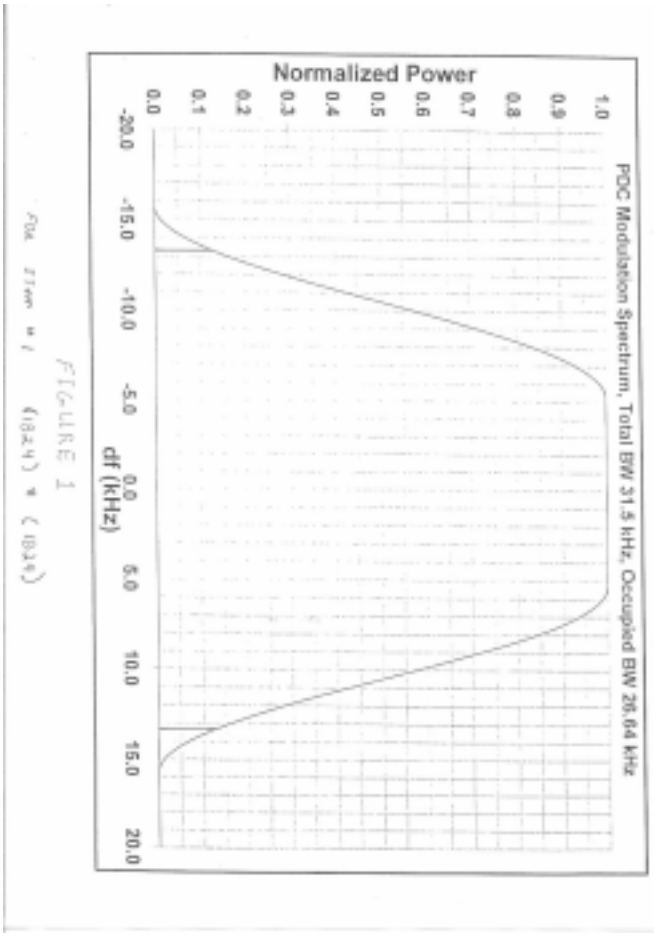
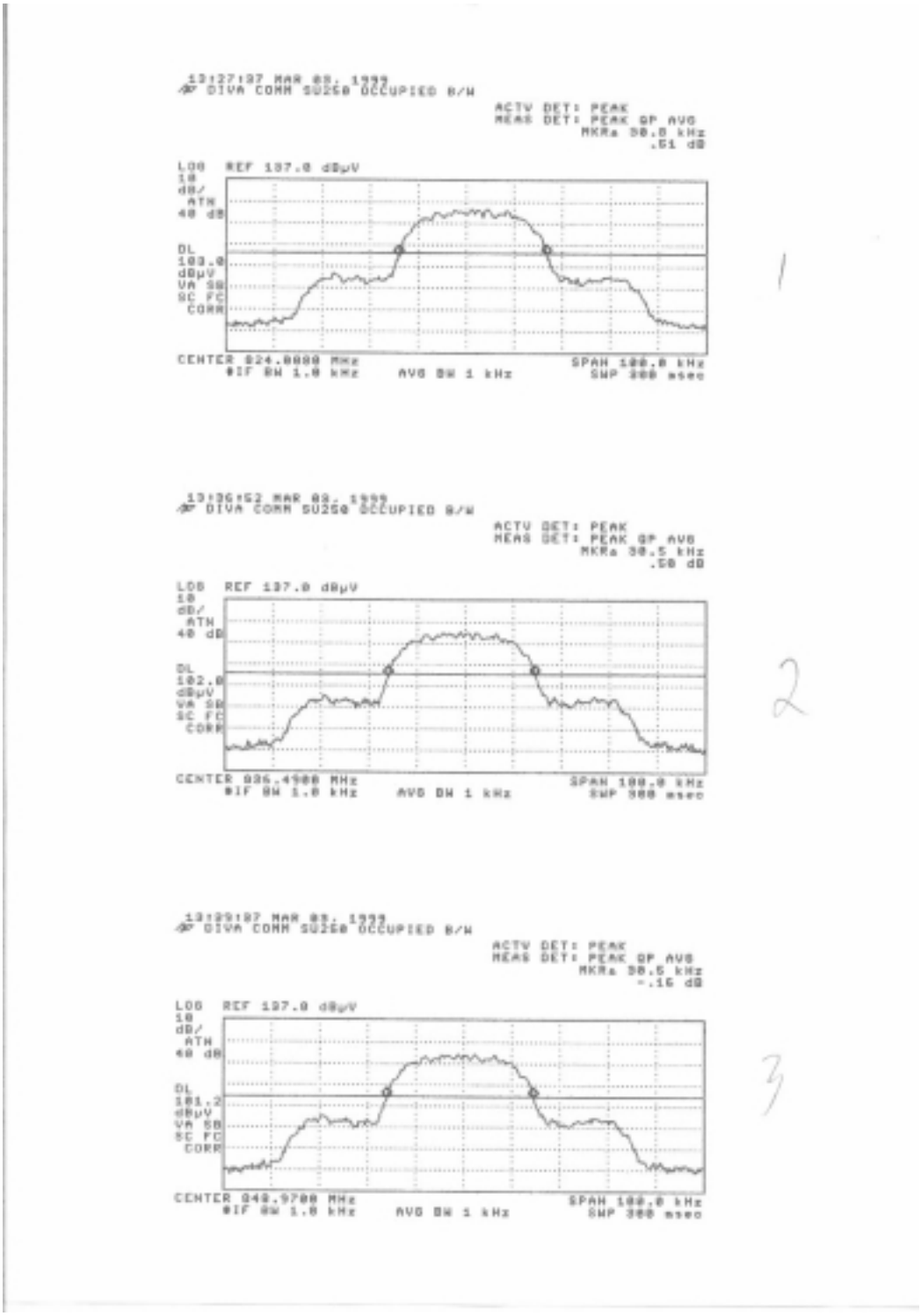



FIGURE 1

*SECTION 2.989 OCCUPIED BANDWIDTH*

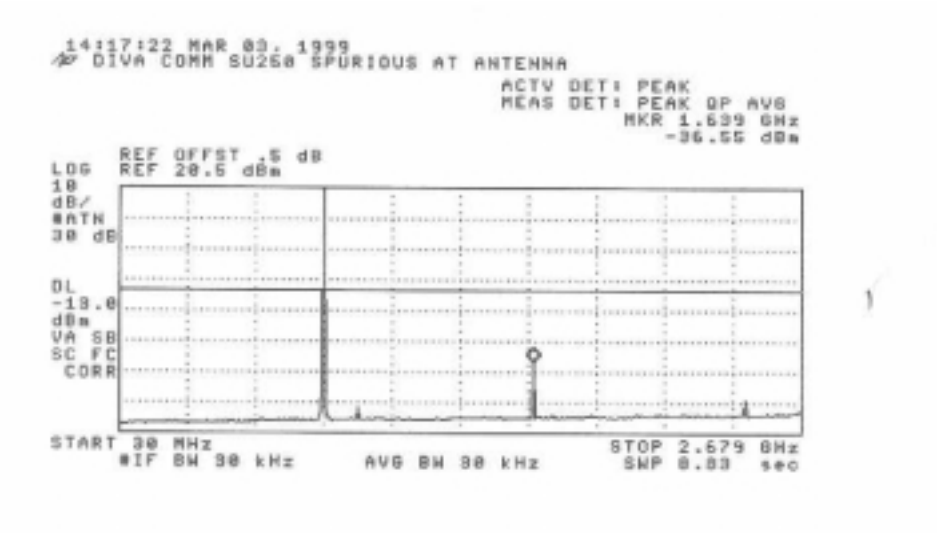
| CHANNEL/ FREQUENCY | PLOT # |
|---|---|
| 990/824.01MHZ | 1 |
| 383/836.49MHZ | 2 |
| 799/848.97MHZ | 3 |



*SECTION 2.991 SPURIOUS EMISSION AT ANTENNA TERMINALS*

| CHANNEL | PLOT DESCRIPTION | PLOT# |
|---|---|---|
| #990/824.01MHZ | OUT OF BAND LOW | 1 |
| #990 | OUT OF BAND HIGH | 2 |
| #990 | 1ST IN BAND | 3 |
| #990 | 2ND IN BAND | 4 & 5 |
| #990 | 2nd IN BAND | 6 |
| #383/836.49MHZ | OUT OF BAND LOW | 7 |
| #383 | OUT OF BAND HIGH | 8 |
| #383 | 1ST IN BAND | 9 |
| #383 | 2ND IN BAND | 10 |
| #799/848.97MHZ | OUT OF BAND LOW | 11 |
| #799 | OUT OF BAND HIGH | 12 |
| #799 | 1ST IN BAND | 13 |
| #799 | 2ND IN BAND | 14 |
| #799 | MOBILE EMISSIONS IN BASE BAND | 15 |

Plots 4 & 5 show 30K and 10K resolution bandwidth settings do not accurately show emissions.

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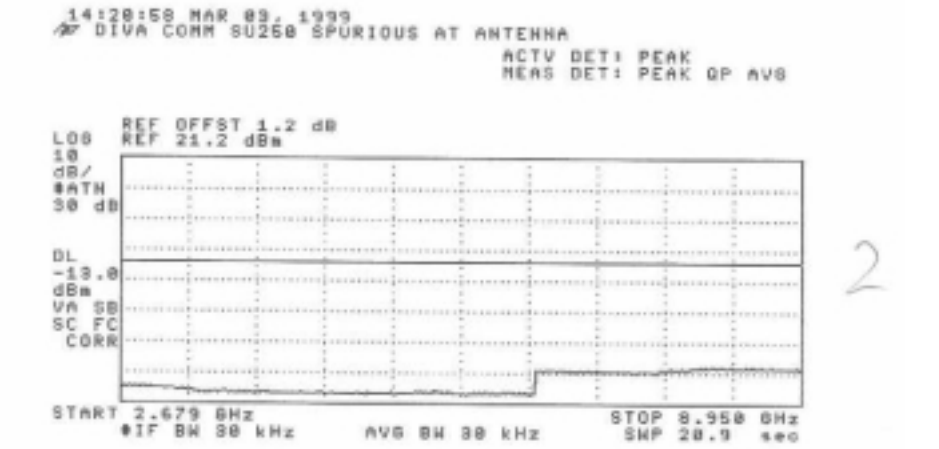


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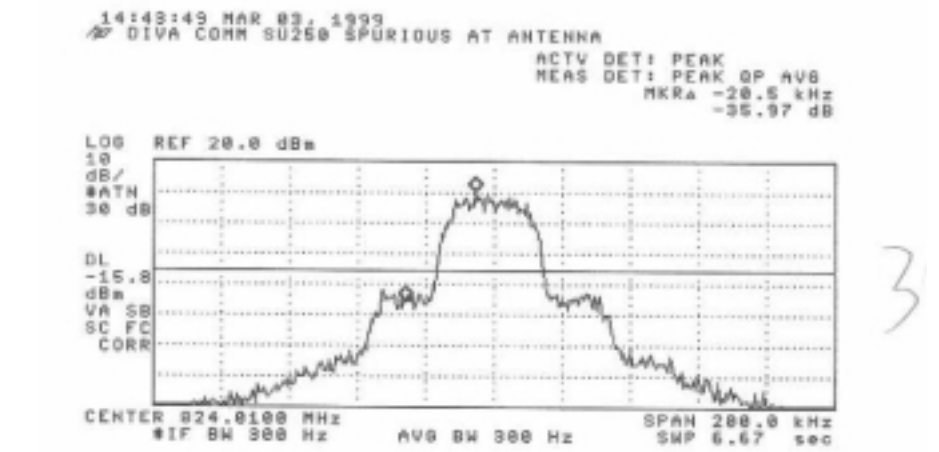


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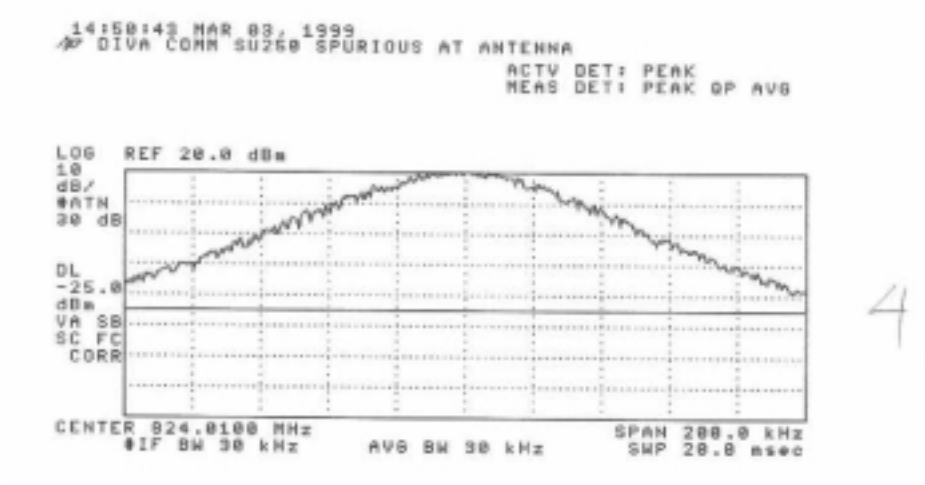


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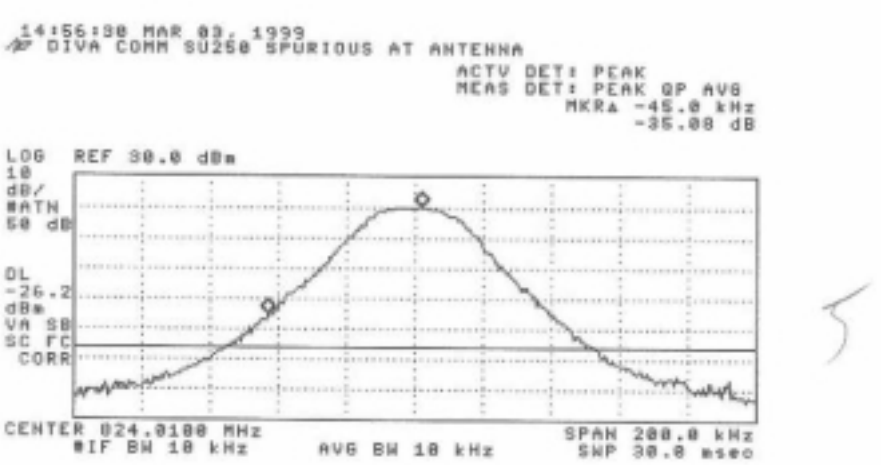


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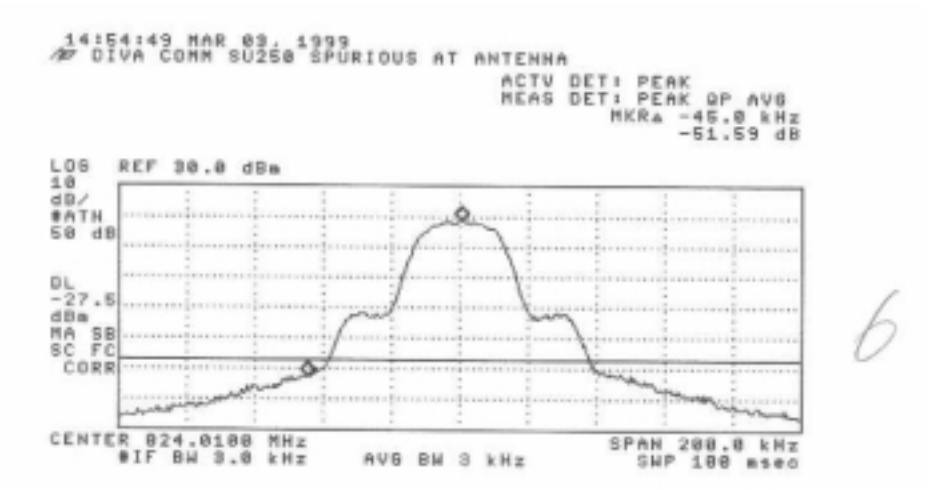


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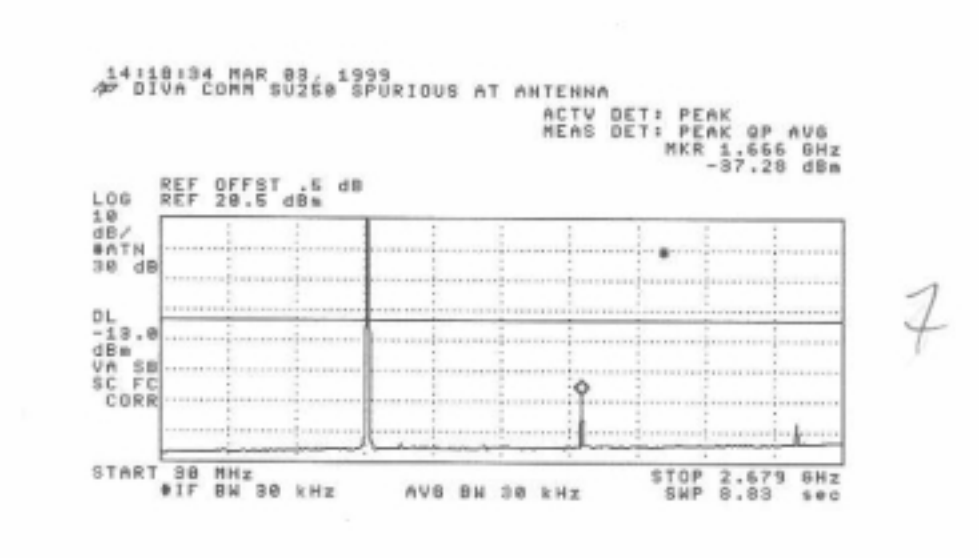


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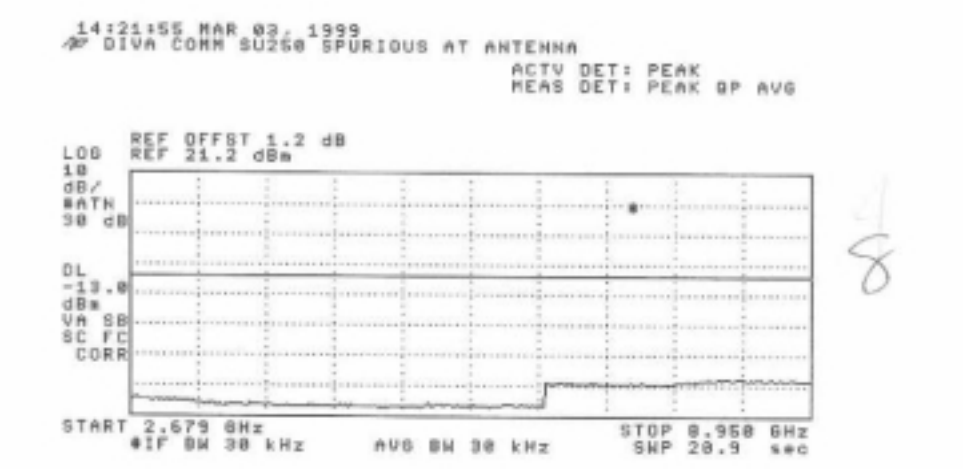


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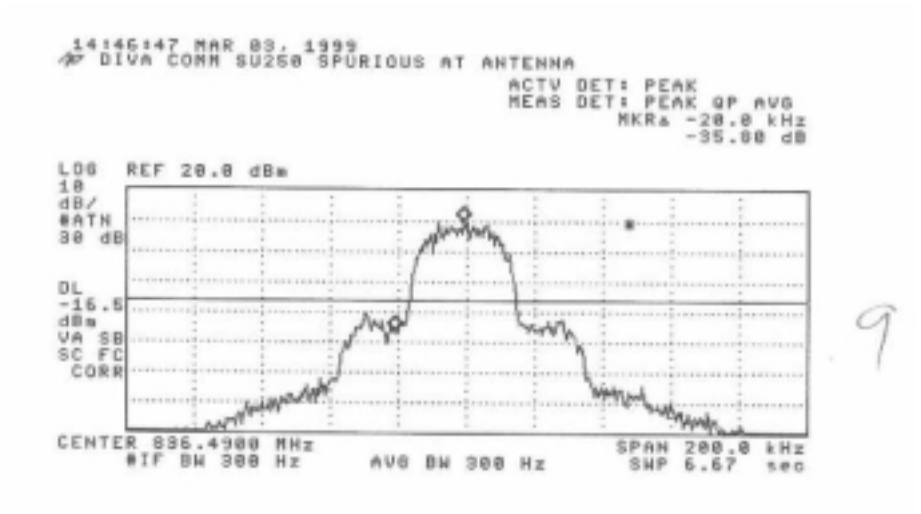


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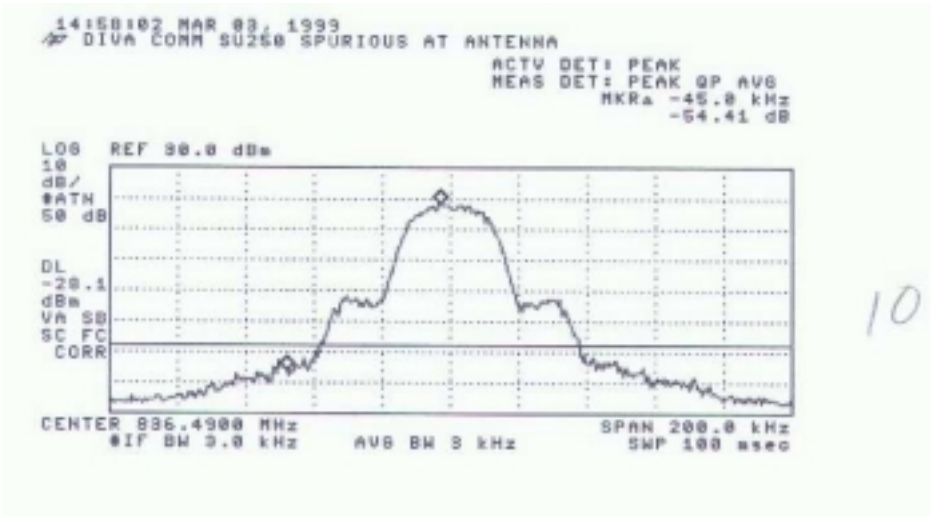


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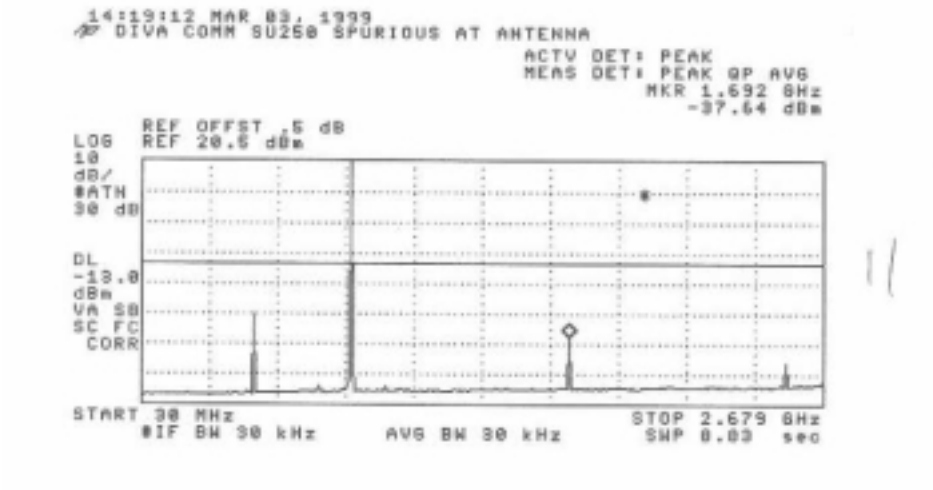


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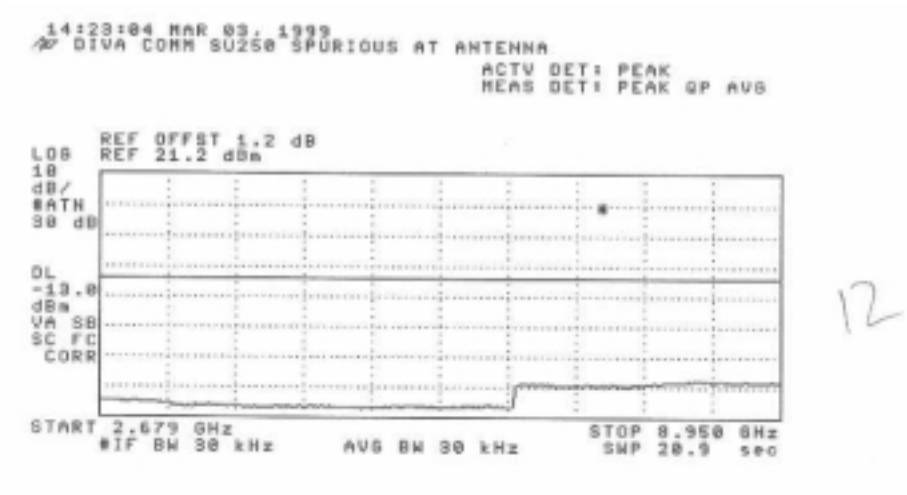


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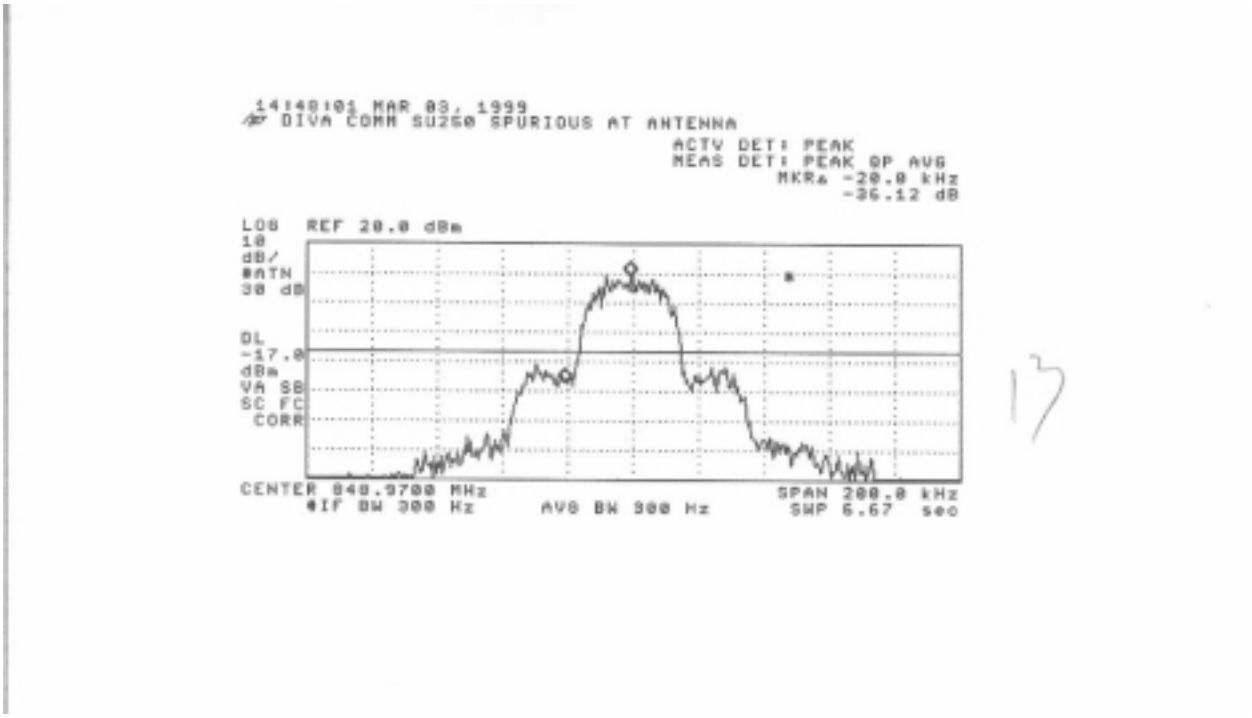


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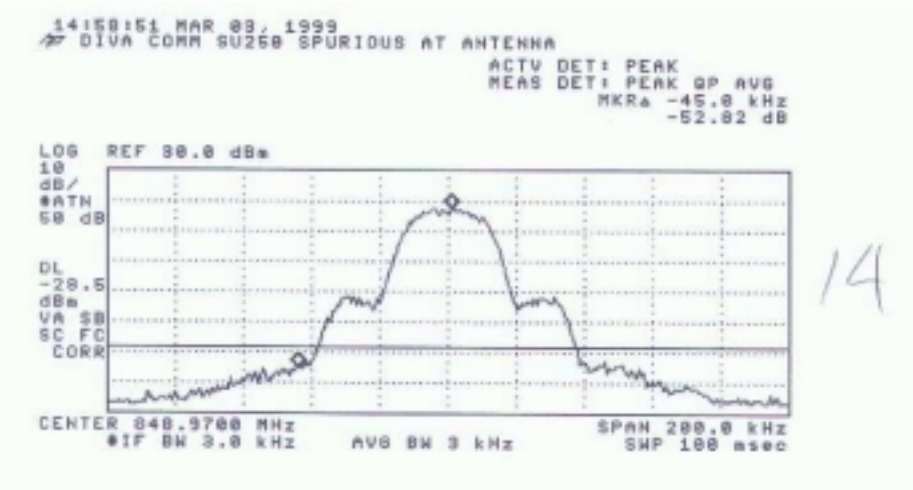


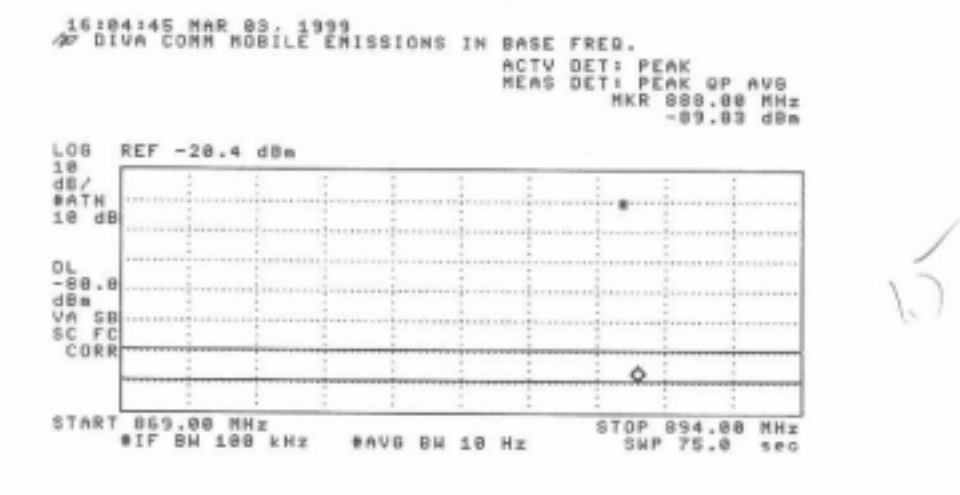

*SECTION 2.993 FIELD STRENGTH OF SPURIOUS RADIATION*

Technical Limits applied :Section, 22.917 emission masks

DIVA COMMUNICATIONS — PETE KREBILL
Subscriber Unit SU250/210 — 3/8/99

ALL READINGS ARE PEAK

| F(MHz) | Level (dBuV) | AF (dB) | CL (dB) | AMP (dB) | FILTER (dB) | DIST (dB) | Total (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|
| **LOW CHANNEL 824.01MHZ** | | | | | | | | | |
| 1648V | 78.3 | 26.4 | 2.52 | -35.5 | 10 | -10 | 71.72 | 82 | -10.28 |
| 2472V | 66 | 29.4 | 3.06 | -35.5 | 1 | -10 | 53.96 | 82 | -28.04 |
| 3296V | 56.88 | 29.9 | 3.96 | -35.5 | 1 | -10 | 46.24 | 82 | -35.76 |
| 4120V | 46.73 | 32.3 | 5.04 | -35.5 | 1 | -10 | 39.57 | 82 | -42.43 |
| 4944NF | 40.02 | 34.3 | 5.4 | -35.5 | 1 | -10 | 35.22 | 82 | -46.78 |
| 5768NF | 39.8 | 35.2 | 5.58 | -35.5 | 1 | -10 | 36.08 | 82 | -45.92 |
| 6592NF | 42.3 | 36 | 5.94 | -35.5 | 1 | -10 | 39.74 | 82 | -42.26 |
| 7416NF | 44.6 | 36.8 | 6.12 | -35.5 | 1 | -10 | 43.02 | 82 | -38.98 |
| 8240NF | 45.1 | 37.3 | 6.3 | -35.5 | 1 | -10 | 44.2 | 82 | -37.8 |
| **MID CHANNEL 836.49MHZ** | | | | | | | | | |
| 1672V | 79.65 | 26.4 | 2.52 | -35.5 | 10 | -10 | 73.07 | 82 | -8.93 |
| 2508V | 65.53 | 29.4 | 3.06 | -35.5 | 1 | -10 | 53.49 | 82 | -28.51 |
| 3344V | 56.95 | 29.9 | 3.96 | -35.5 | 1 | -10 | 46.31 | 82 | -35.69 |
| 4180V | 49.53 | 32.3 | 5.04 | -35.5 | 1 | -10 | 42.37 | 82 | -39.63 |
| 5016NF | 40 | 34.3 | 5.4 | -35.5 | 1 | -10 | 35.2 | 82 | -46.8 |
| 5852NF | 39.9 | 35.2 | 5.58 | -35.5 | 1 | -10 | 36.18 | 82 | -45.82 |
| 6688NF | 43.3 | 36 | 5.94 | -35.5 | 1 | -10 | 40.74 | 82 | -41.26 |
| 7524NF | 44.2 | 36.8 | 6.12 | -35.5 | 1 | -10 | 42.62 | 82 | -39.38 |
| 8360NF | 45.3 | 37.3 | 6.3 | -35.5 | 1 | -10 | 44.4 | 82 | -37.6 |
| **HIGH CHANNEL 848.97MHZ** | | | | | | | | | |
| 1696V | 78.95 | 26.4 | 2.52 | -35.5 | 10 | -10 | 72.37 | 82 | -9.63 |
| 2544V | 69.02 | 29.4 | 3.06 | -35.5 | 1 | -10 | 56.98 | 82 | -25.02 |
| 3392V | 55.33 | 29.9 | 3.96 | -35.5 | 1 | -10 | 44.69 | 82 | -37.31 |
| 4240V | 50.26 | 32.3 | 5.04 | -35.5 | 1 | -10 | 43.1 | 82 | -38.9 |
| 5088NF | 40.02 | 34.3 | 5.4 | -35.5 | 1 | -10 | 35.22 | 82 | -46.78 |
| 5936NF | 39.9 | 35.2 | 5.58 | -35.5 | 1 | -10 | 36.18 | 82 | -45.82 |
| 6784NF | 42.6 | 36 | 5.94 | -35.5 | 1 | -10 | 40.04 | 82 | -41.96 |
| 7632NF | 44.6 | 36.8 | 6.12 | -35.5 | 1 | -10 | 43.02 | 82 | -38.98 |
| 8480NF | 45.2 | 37.3 | 6.3 | -35.5 | 1 | -10 | 44.3 | 82 | -37.7 |

AF=ANTENNA FACTOR — V=VERTICAL — RBW & VBW=1MHZ
CL=CABLE LOSS — H=HORIZONTAL
AMP=AMPLIFIER GAIN — NF=NOISE FLOOR READING
FILTER=FILTER INSERTION LOSS
DIST=DISTANCE CORRECTION
ALL FREQUENCIES WERE MEASURED IN VERTICAL
AND HORIZONTAL, ONLY HIGHEST READING WAS REPORTED.

*SECTION 2.995 FREQUENCY STABILITY*

| ~~Tx Output (MHz)~~ | ~~limit(ppm)~~ | ~~limit (Hz)~~ | | | | | |
|---|---|---|---|---|---|---|---|
| 836.01 | 2.5 | 2090.025 | | | | | |
| | | | | | | | |
| Frequency (MHz) | Temp(degreeC) | Delta (MHz) | | | | | |
| | | | | | | | |
| 836.01025 | -30 | 0.000250 | | | | | |
| 836.01013 | -20 | 0.000130 | | | | | |
| 836.01013 | -10 | 0.000130 | | | | | |
| 836.01013 | 0 | 0.000130 | | | | | |
| 836.01013 | 10 | 0.000130 | | | | | |
| 836.01013 | 20 | 0.000130 | | | | | |
| 836.01013 | 30 | 0.000130 | | | | | |
| 836.01013 | 40 | 0.000130 | | | | | |
| 836.01025 | 50 | 0.000250 | | | | | |
| | | | | | | | |
| 836.01 | 93VAC | 0.000000 | At AC input | | | | |
| 836.01013 | 110VAC | 0.000130 | " | | | | |
| 836.01013 | 138VAC | 0.000130 | " | | | | |
| 836.00963 | 10.2VDC | -0.000370 | " | | | | |
| 836.01025 | 10.6VDC | 0.000250 | At battery input | | | | |
| 836.00975 | 12.7VDC | -0.000250 | " | | | | |
| 836.00975 | 14.6VDC | -0.000250 | " | | | | |
| 836.00988 | 12.75VDC | -0.000120 | At DC input jack | | | | |
| 836.00988 | 15VDC | -0.000120 | " | | | | |
| 836.00975 | 17.25VDC | -0.000250 | " | | | | |
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*SECTION 2.1091*

The DIVA radios can be used with the 0 dBd built-in TX/RX antenna or an external antenna with a maximum gain of 9 dBi. The power output at the antenna port is 0.8 watts +20/-50% or 0.96 watts maximum (0.8 watts + 20%).
The maximum antenna gain G is 9 dBi (7.94 numeric ratio) (for the 9 dBi antenna). The Transmitter Duty Cycle DF is 33% for TDMA (used by the SU-200).

The required MPE Limit is f/1500 mW/cm^2.
At 824 MHz the MPE Limit is 0.549 mW/cm^2 (worst-case)

At 849 MHz the MPE Limit is 0.566 mW/cm^2.
The Power density S = E^2/3770 = 0.549 mW/cm^2 for the worst-case MPE.
The electric field strength E = 45.5 V/m for the worst-case MPE.
E = (300000*P*G*DF)^(1/2) / d = 45.5 V/m for the worst-case MPE, where P is in watts, G is a numeric ratio and d is in cm.

Using the values given above with a 9 dBi antenna and solving for d, using worst-case MPE, we obtain d = 19.1 cm (for the 9 dBi external antenna).

Note that the use of the built-in antenna results in d = 6.8 cm for the worst case MPE.

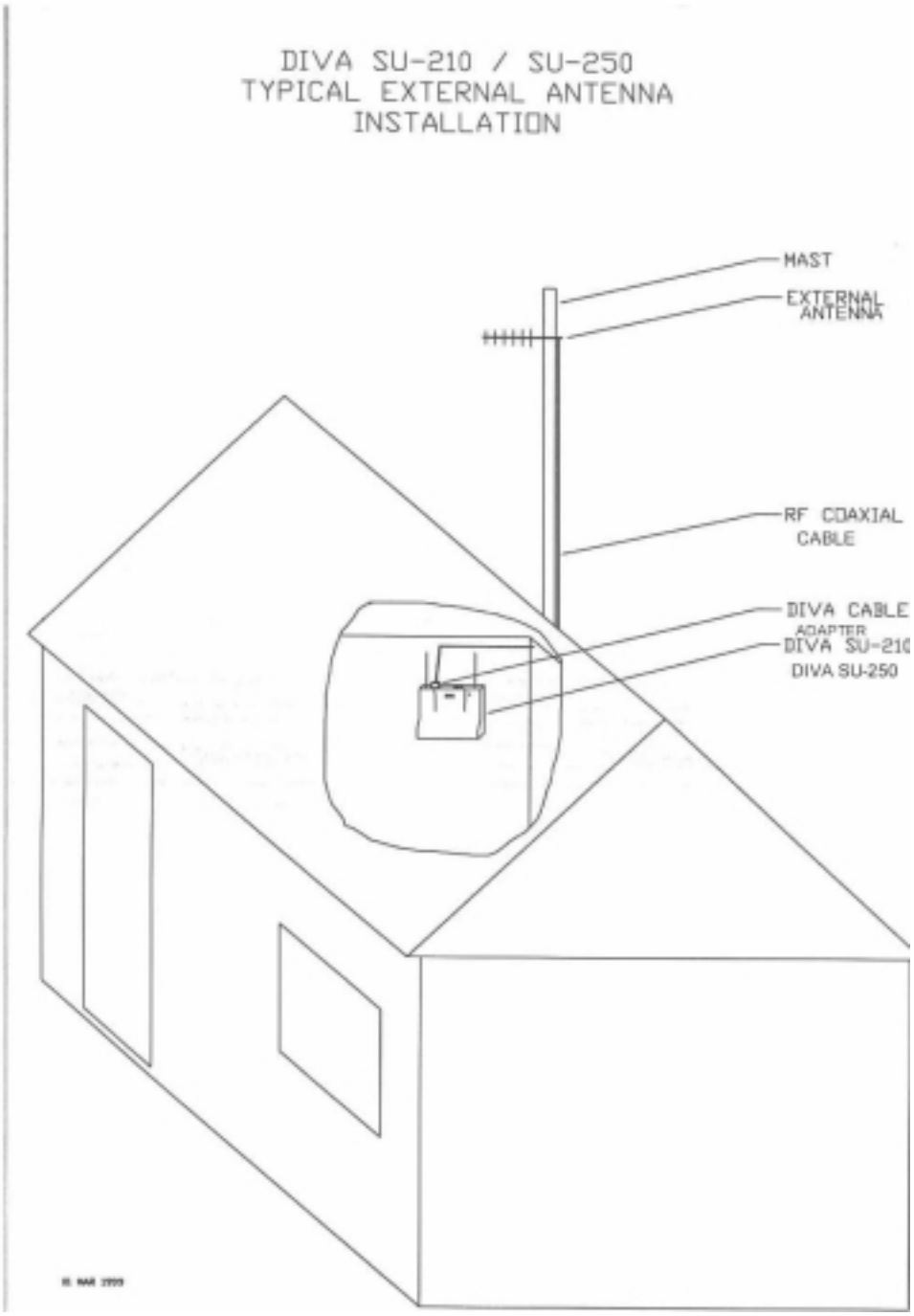
Please note that the unit is designed to be wall mounted near the ceiling and includes an RJ-11 jack to which a standard phone line is attached. Phone line extensions are typically wired through the home or business from this RJ-11 jack. Since generic third party telephone handsets are used, as supplied by the customer, there is no reason for
the SU-250/SU-210 to be in close proximity to the user during normal usage.

Depending on the site requirements, either the built-in antenna is used or an externally mounted higher gain antenna (e.g., the 9 dBi antenna referenced before) is used. The external antenna must be located external to the building, usually on a mast attached to the roof or an external wall of the structure. A DIVA-supplied cable
adapter (DIVA P/N 120-00003-01) and RF cable is used to connect the SU-250/SU-210 to the external antenna. Attached is a drawing of a typical installation using an external antenna.

Please Note : When the external antenna is used, the built-in antenna is disabled.

The following wording is on the inside front cover of the user manual:

While operating this device, radio frequency radiation exposure limits (47 CFR 1.1310) may be exceeded at distances closer than 20 centimeters (8 inches) from the device antenna(s).



## 16. EXTERNAL I/O CABLE CONSTRUCTION DESCRIPTION

| CABLE NO: 1 | |
|---|---|
| I/O Port: SERIAL | Number of I/O ports of this type:1 |
| Number of Conductors:9 | Connector Type:DB9 |
| Capture Type: SCREW-IN | Type of Cable used: UNSHIELDED |
| Cable Connector Type: PLASTIC | Cable Length: 2M |
| Bundled During Tests: NO | Data Traffic Generated: YES |
| Remark: N/A | |

| CABLE NO: 2 | |
|---|---|
| Number of Conductors 16 | Connector Type:UDC data |
| I/O Port: TEST PORT | Number of I/O ports of this type: |
| Capture Type: push in | Type of Cable used: UN-SHIELDED |
| Cable Connector Type: molded | Cable Length: 10cm |
| Bundled During Tests: no | Data Traffic Generated: YES |
| Remark: N/A | |

| CABLE NO: 3 | |
|---|---|
| I/O Port: PHONE | Number of I/O ports of this type:1 |
| Number of Conductors: 2 | Connector Type: RJ11 |
| Capture Type: SNAP-IN | Type of Cable used: UNSHIELDED |
| Cable Connector Type: MOLDED | Cable Length:2M |
| Bundled During Tests: NO | Data Traffic Generated: YES |
| Remark: N/A | |
| | |

| CABLE NO: 4 | |
|---|---|
| I/O Port: DC POWER | Number of I/O ports of this type:1 |
| Number of Conductors: 2 | Connector Type: DC |
| Capture Type: push in | Type of Cable used: UNSHIELDED |
| Cable Connector Type: METAL | Cable Length:3M |
| Bundled During Tests: NO | Data Traffic Generated: NO |
| Remark: N/A | |

| CABLE NO: 5 & 6 | |
|---|---|
| I/O Port: ANTENNA PORT | Number of I/O ports of this type:1 |
| Number of Conductors: 2 | Connector Type: UDC to TNC |
| Capture Type: push in | Type of Cable used: SHIELDED |
| Cable Connector Type: plastic | Cable Length:10cm |
| Bundled During Tests: NO | Data Traffic Generated: YES |
| Remark: N/A | |

| CABLE NO: 7 & 8 | |
|---|---|
| I/O Port: AC POWER | Number of I/O ports of this type:1 |
| Number of Conductors: 3 | Connector Type: USA 110V TYPE |
| Capture Type: PUSH-IN | Type of Cable used: UNSHIELDED |
| Cable Connector Type: MOLDED | Cable Length:1.2M |
| Bundled During Tests: NO | Data Traffic Generated: NO |
| Remark: N/A | |

## 17. TEST CONFIGURATION DIAGRAM