Mario de Aranzeta
Engineer
Timco Engineering Inc.

To: Andy Leimer

Re: FCC ID PT9SDU-2000
Ref # 21335
731 Confirm #: EA102679

1) The BW plots do not appears to be for the maximum data rates. It is not clear as to what the 825 Hz tone represents. Submit new BW plots at the maximum data rates.

The plot is marked in error. I've looked at the original plot in our records. It is marked (on the reverse side) 9600 baud with an 825 Hz deviation (the peak deviation). This plot is identical to the plot on the next page but at a different center frequency. I've included a revised plot (labeled correctly) as page 5 of this note.

2) The calculations for Authorized BW (2M + 2D) were done with a peak deviation of 0.4 kHz for 25 kHz channel spacing and 0.825 kHz for 12.5 kHz channel spacing. Please explain why this was done.

If the deviation is increased any higher it will exceed the allowed bandwidth as per the equation. The deviation is set at the factory based on the license of the final customer.
I noticed a typographical error on page 1 of the report in the calculation for the 25 kHz BW the 10.4 is incorrect and 0.4 is correct as in the information above the equation. A corrected page is enclosed as page 2 of this note.

3) Provide measurement details for radiated spurious emissions. Provide a sample calculation.

The radiated spurious emission page should have a statement that the procedure used was the substitution method in TIA/EIA 603-.2.2.12. This line was inadvertently omitted from the page. These are dBc values (below the carrier). A corrected copy is enclosed as page 3.

4) The Tune-up Procedure says to set the power to 2 +- 0.05 Watts. The application is for 4.5 Watts conducted power. Explain this discrepancy.

The SD2000 device is the same exact radio as a previous product except for the change in output power from 2 watts to 4.5 watts which was done by changing the final RF semiconductor device.. The tune-up procedure submitted by the customer was for this previous product and failed to reflect the change. A new page reflecting this change is included as page 4.

Timco Engineering Inc.
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GENERAL_INFORMATION_REQUIRED
FOR_TYPE_ACCEPTANCE

2.1033 (c)(1)(2) TECNET GLOBAL CORPORATION will sell the FCC ID: PT9SDU-2000 UHF transceiver in quantity, for use under FCC RULES PART 22 & 90.

2.1033 (c) TECHNICAL DESCRIPTION

2.1033 (3) User Manual See Exhibit 3
MODELS SDU-2000 AND TNET-44 SHARE THE SAME USERS MANUAL

2.1033 (4) Type of Emission: 20K0F2D For 25 kHz
10K0F2D For 12.5 kHz

For 25 kHz
Bn = 2M + 2DK
M = 19,200Bits per second
D = 0.4 kHz (Peak Deviation)
K = 1
Bn = 2(19,200/2) + 2(0.4k)(1) = 19.2k + 0.8k = 20.0K
ALLOWED AUTHORIZED BANDWIDTH = 20.00 kHz.

For 12.5 kHz
Bn = 2M +2DK
M = 9600Bits per second
D = 0.825 kHz (Peak Deviation)
K = 1
Bn = 2(9.6/2) K + 2(0.825k)(1) = 9.6k = 1.65k = 11.25 k
ALLOWED AUTHORIZED BANDWIDTH = 11.25 kHz.

90.209(b)(5)

2.1033 (5) Frequency Range: 450-470 MHz

(6) Power Range and Controls:There are NO user Power controls.

(7) Maximum Output Power Rating: 4.5 Watts , into a 50 ohm resistive load.

(8) DC Voltages and Current into Final Amplifier:

POWER INPUT
FINAL AMPLIFIER ONLY
Vce = 13.6 Volts
IC = 1.2A

Pin = 16.3 Watts

Efficiency = 27.6%

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2.1053 Field strength of spurious emissions:

NAME OF TEST: RADIATED SPURIOUS EMISSIONS

REQUIREMENTS: Emissions must be 50 +10log(Po) dB below the mean power output of the transmitter.

50 + 10log(4.5) = 56.50dB

TEST DATA:

Emission Frequency MHz	Ant. Polarity	Attn. dBc	Margin dB
460.10	H	0.00	0.00
920.20	H	55.93	0.25
1,380.30	v	69.76	14.08
1,840.50	v	81.63	25.95
2,300.60	v	75.55	19.87
2,760.70	h	96.87	41.19
3,220.80	v	84.20	28.52
3,681.00	v	93.50	37.82
4,141.10	v	79.38	23.70
4,601.20	h	91.65	35.97

METHOD OF MEASUREMENT: The tabulated Data shows the results of the radiated field strength emissions and attenuation calculated per TIA/EIA 603. The spectrum was scanned from 30 to at least the tenth harmonic of the fundamental. This test was conducted per TIA/EIA 603-2.2.12 (substitution method). Measurements were made at the open field test site of TIMCO ENGINEERING INC. located at 849 N.W. STATE ROAD 45, NEWBERRY, FL 32669.

4.2 Alignment.

Follow step 1 through step 3, refer to figure 4.1

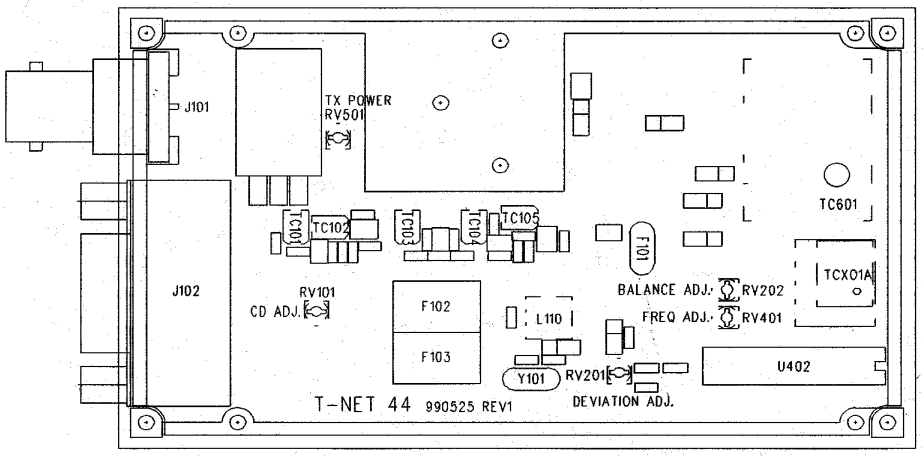


Figure 4.1

Step 1(VCO Alignment)

a. Turn TC601 to read 2.0Volts +-0.05Volts at junction of R406 and C408 on bottom of the PCB.

Step 2(Transmitter Alignment)

a. Press PTT switch and turn RV401(FREQ. ADJ) to set precise transmit frequency such as 460.0000Mhz +-50Hz.

b. Press PTT switch and turn RV501(TX POWER) to set the power to 4.5 Watts

c. Set RV202 and RV201 to center position and press PTT switch while supply 100Hz 25mVrms sine wave signal to J102 pin#4-Audio(Data) In-.

d. Read FM deviation on test equipment with 100Hz 25mVrms sine wave and supply 1000Hz 25mVrms sine wave signal to J102 pin#4-Audio(Data) In-

e. Turn RV202(Balance Adj.) to set FM deviation on test equipment with 1000Hz is same deviation with that of 100Hz.

f. Repeat "c" through "e" to get same FM deviation for 100Hz 25mVrms sine wave and 1000Hz 25mVrms sine wave.

g. Once the Balance Adjustment(RV202 with 100Hz and 1000Hz sine wave) is done, set test equipment to output 1000Hz 500mVrms sine wave.

h. Turn RV201(Deviation Adj.) to set +-4.4Khz FM deviation for 16Khz occupied bandwidth(Also known as "Wide" or 25Khz) or +-2.2Khz FM deviation for 8.5Khz occupied bandwidth(Also known as "Narrow" or 12.5Khz).

i. Release PTT switch

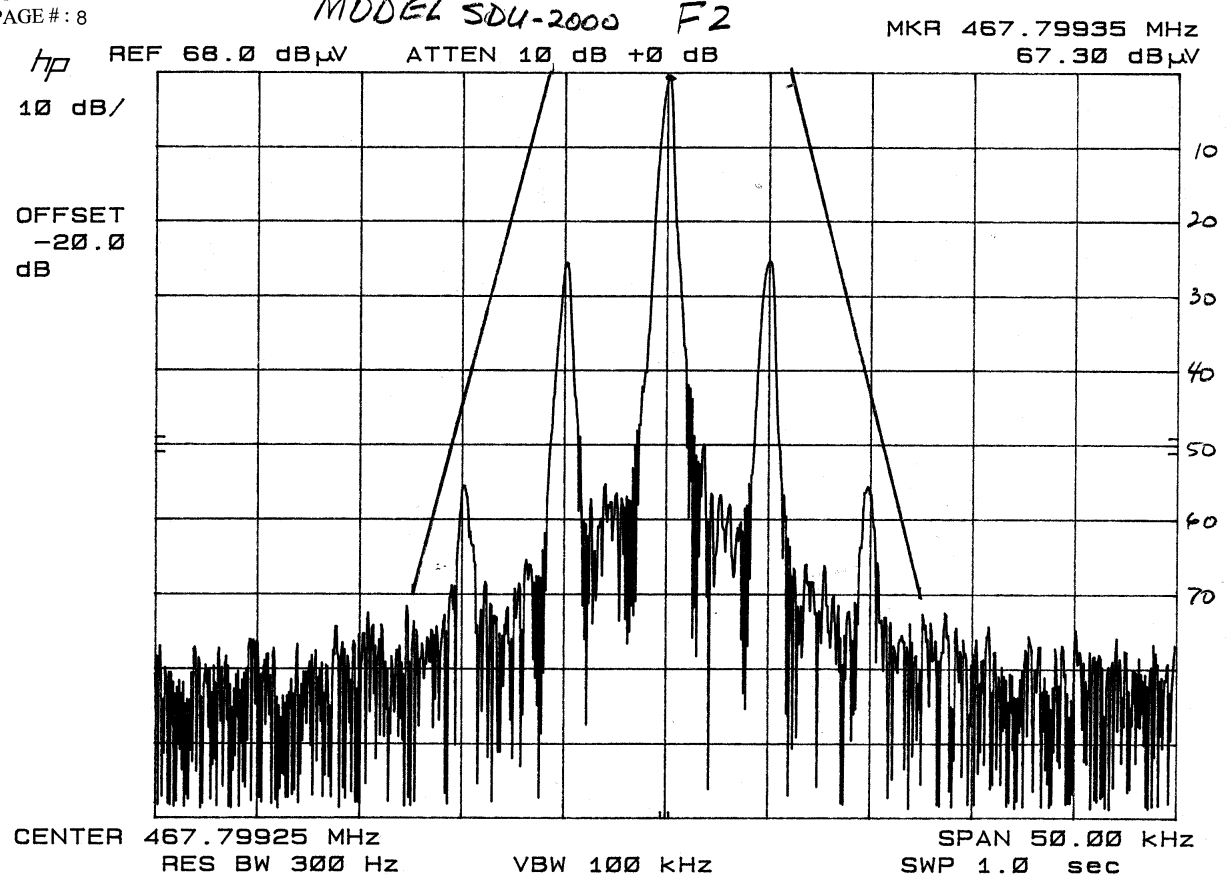
Step 3(Receiver Alignment)

a. Set test equipment for RX mode.

TecNET GLOBAL CORP.
FCC ID : PT9SDU-2000
JOB # : 665ZAU1
PAGE # : 8

825 Hz deviation
9600 baud

MODEL SDU-2000 F2



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