

To: Stan Lyles, FCC Applications Processing Branch
From: Jeff Olson, Engineer, Tactical Technologies Inc.
Date: November 1, 2002
Sub: Your correspondence:

REF: 24122
FCCID: IP9751V

Mr Lyles:

Here are the answers to the 3 questions you asked us. Thanks in advance.

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1.) Thank you for correcting this for us.

2.) Rf Power Output Measurement

The output power was measured with a Hewlett Packard Microwattmeter at the RF terminal of the transmitter. The electrical characteristics of the RF load were 50 ohms resistive. A 30 dB pad was inserted between the RF terminal of the transmitter and the wattmeter to avoid overloading the wattmeter. The RF power output measured .50 Watt at 9.0 Vdc.

3.) Field Strength Of Spurious Radiation 2.1053 and 90.209

Conditions: Battery Power: 9volt dc Battery
Radiation into antenna - Table 2

Minimum Standard: Part 2.1053 The power of any emission shall
be attenuated below the carrier power (P) by at
least $(50 + 10\log P)$ dB or 70dB, whichever is the
least attenuation.

Calculation of Radiated Power Limit:

The emissions limit is the equivalent power that would have to be fed into a dipole antenna in order to produce the same electric field strength.

$E = (49.2 P)^{1/2} / R$ Where: E = electric field intensity V/m
P = power in watts
R = distance in meters

For this case $E = 1.65 \text{ V/m} = 124.4 \text{ dBuV/m}$

Attenuation Requirement:

Part 2.1053 requires that the spurious radiated emissions is attenuated at least $(50 + 10\log (.5)) = 47$ dB below the unmodulated carrier field strength.

The limit @ 3m = $124.4 - 47\text{dB} = 77.4 \text{ dBuV/m}$

TABLE 2
Spurious Radiated Emissions
Radiation into Antenna

Horizontal		Generator Level	Ant. Correction	Final Emission Level	FCC Limit @ 3m
MHz	Height	dBuV	Factor dB	dBuV	dBuV/m
173.9	1.50m	88.6	14.2	102.8	
347.8	1.85m	25.5	18.2	43.7	77.4
521.7	1.30m	24.1	21.3	45.4	77.4
695.6	1.75m	23.4	24.7	48.1	77.4
869.5		No emissions were observed			77.4
1217		No emissions were observed			77.4
1391		No emissions were observed			77.4
1565	1.00m	*			77.4
1739	1.00m	*			77.4

Vertical		Generator Level	Ant. Correction	Final Emission Level	FCC Limit @3m
MHz	Height	dBuV	Factor dB	dBuV	dBuV/m
173.9	2.20m	98.5	15.5	114.0	
347.8	2.15m	46.5	17.5	64.0	77.4
521.7	2.15m	35.2	21.5	56.7	77.4
695.6	2.45m	*			77.4
869.5		No emissions were observed			77.4
1043	1.00m	*			77.4
1217		No emissions were observed			77.4
1391	1.00m	*			77.4
1565	1.00m	*			77.4
1739	1.00m	*			77.4

* Spurious Emissions that were not reported were more than 30 dB below the permitted limit.

Test Result: The strongest spurious emission was the second harmonic of 173.9 MHz test frequency with a level of 64 dBuV/m @ 3m. This is 13.4 dB below the limit, and 50 dBc.

Radiated Spurious Emissions: TIA/EIA-603-A-2001 2.2.12

The radiated spurious emissions was measured from the transmitter transmitting into a antenna which was placed on a table 3 meters away from the test antenna. Each spurious frequency that was recorded was taken by raising the test antenna from 1 to 4 meters until the maximum reading was obtained.

The transmitter was then replaced with a substitution antenna, which was fed

from a Rf Signal Generator. The output power of the generator was adjusted to match the transmitters radiated emission at that frequency and antenna height.