

TRP/Cetecom bvba

September 24, 2001

Federal Communications Commission
7435 Oakland Mills Rd
Columbia, MD 21036

Re: FCC confirmation number, EA101844, and correspondence number 20699

Gentlemen:

Following are clarifications of the measurement procedures used by Cetecom ICT Services for showing compliance with the technical parameters specified in Section 74.861 for Low Power Auxiliary Stations. The parameters measured to show compliance with the technical specifications in Section 74.861 are the following: 1) power output, 2) frequency stability with voltage and temperature, 3) audio modulation circuitry, 4) occupied bandwidth, and 5) spurious emissions.

1. Power output: The equipment uses a small vertical whip antenna and ERP measurements were made using a substitution technique. A reference level from the EUT was established on a spectrum analyzer. A signal generator attached to a dipole cut to the frequency being measured was substituted for the EUT. The signal generator power level was adjusted to match the reference level on the spectrum analyzer and the power level setting of the generator was recorded as the ERP power level at the frequency being measured in dBm. The power level in dBm was then converted to ERP power level in milliwatts. Maximum ERP power level is 17.38 mW and complies with 74.861(d)(1) and 74.861(e)(1)(ii) as appropriate.
2. Frequency stability with voltage and temperature: Frequency variation with temperature was run using a temperature chamber in 10-degree Centigrade steps. At each temperature step the EUT was allowed to "soak" a sufficient amount of time to allow the EUT frequency determining components to stabilize at each temperature level and the frequency measurement was then made.

Frequency variation with voltage level was conducted using a variable DC voltage source to replace the conventional batteries. Nominal voltage from a set of new batteries is 3.0 V. The manufacture specifies the operating voltage range to be from 1.89 V (63% of nominal) to the full battery voltage. A set of frequency measurements made over the range of power supply voltages from 1.89 V to 3 V were made and are presented in the report.

Measured frequency stability easily meets the tolerance requirement of 0.005% for both temperature and voltage variation of 74.681(e)(5).

3. Audio modulation circuitry: The audio frequency response over a frequency range from 10 to 21kHz is shown for 4 RF frequencies across the band with a range of audio input voltages from 10 millivolts to 3 volts incremented in 5 dB steps. The response curve shows that essentially full limiting occurs with an audio input level of approximately 100 millivolts. All measurements were done under computer control with the measurement data taken at the input to the EUT modulator.

4. Occupied bandwidth: Occupied bandwidth measurements were made in accordance with the requirements for transmitters for use in the broadcast radio services, Section 2.1049(e)(3). Tone used was 15 kHz at an 85% modulation level. The audio signal was input through the microphone and the radiated signal was displayed on the spectrum analyzer. Four occupied bandwidth plots at frequencies across the band of operation show the requirements for +/- 75 kHz maximum deviation, the 200 kHz operating bandwidth and that emissions requirements within the band of frequencies of 250% of the authorized bandwidth centered on the operating frequency are met. For emissions within 100 kHz to 200 kHz of the operating frequency, the levels are attenuated at least -60 dB thus meeting the 25-dB requirement. At frequencies between 200 kHz and 250 kHz removed from the operating frequency, emissions are attenuated to a level of -68 dB below the operating frequency. All close in emissions are attenuated to the measurement system noise floor, -70 dB or better below the operating frequency carrier level, at frequencies greater than 250 kHz removed from the operating frequency. In this region of spectrum attenuation below $43 + 10 \log_{10}(\text{mean power in watts}) = 43 - 12$ or 31 dB which is easily met.
5. Spurious emissions: To show compliance with the spurious limit spectrum scans from 30 MHz to 12 GHz are presented. These scans show that all emissions outside the band +/- 250 kHz of the operating frequency are attenuated more than -60 dB based on radiated levels relative to the level of the operating frequency. The spectrum analyzer computes and displays all levels in terms of dBuV/m.

Sincerely,

Phillip Inglis
Consultant