Correspondence Summary
Questions and Answers

June 12, 2003

SUBJECT: RITRON, INC. - FCC ID: AIERIT17-142

TCB 1.: This device does not appear to be a finished product, as it does not have its own enclosure. Module approval could be an option if the transmitter portion had its own shield. The photos show that the transmitter portion of this device is not entirely covered by a shield. This application was not made for a module approval. Please, explain

Applicant 1.: It is RITRON's desire to get Certification on this product as a module approval. As you know, there are no FCC rules which specifically address a module approval, a module being defined as a product without a case and designed to be integrated into another product. There is, however, a policy document, DA 00-1407, which addresses module approval for Part 15 intentional radiators. Some, although not all, of the guidelines in that document could apply to our Part 90 submission. The overarching issue is that the Commission wants devices approved as modules to be essentially installation and enclosure independent i.e. incorporating the module into another piece of equipment and/or enclosure should not jeopardize meeting the regulations involving power, spurious, occupied bandwidth, etc.

RITRON's issue is with the requirement that the entire transmitter be shielded. A shield over the entire transmitter should, by logic, prevent RF coupling to other structures (enclosures) by acting as a Faraday shield. In our product, however, it was determined that shielding the entire transmitter section was problematic from both a performance and a practical standpoint. With one large shield, coupling between the RF structures under the shield was a problem especially in meeting conducted spurious emissions. Also, it was very difficult to create a shield of the size required that would allow the unit to meet radiated spurious unless the shield was constructed with no holes and almost completely soldered around its perimeter to the ground plane. From a practical standpoint, this was nearly impossible and created an issue when adjustments were required of some of the components under the shield. Placing holes in the large shield jeopardized meeting the spurious emissions limits. Instead, the greatest performance was achieved by shielding the individual emission radiating components. This included the final transmitting amplifying stage and the inductors in the transmitter low-pass filter. In addition, shields were placed over the matching inductors in the mixer circuit to limit local oscillator radiation from the receiver, over the reference oscillator which determines the frequency stability of the unit, and over the voltage

regulator section. This allowed the unit to meet the intent of the policy document, if not the letter. Also, adjustments required by the alignment process could be done without the arduous task of removing a large shield. Our testing with our own enclosure has demonstrated that compliance inside an enclosure should not be a problem.

In addition, all input/output pins, including the power input, are de-coupled and buffered. Multiple voltage regulators exist within the unit to make the performance essentially independent of installation and enclosure.

TCB 2.: This radio appears to be using a different frequency determining and stabilizing circuitry for the low split 136-156M and high split 154-174M models. If this is the case, each split must be approved separately under its own FCCID. Please, explain.

Applicant 2.: The frequency determining section of this device is common to both frequency splits. It consists of a shielded and packaged voltage controlled temperature compensated reference oscillator (VCTCXO) operating at 14.4 MHz. The specifications of the oscillator are in excess of that required by the FCC frequency stability rules. This part of the circuit does not differ between the two splits.

TCB 7.: 90.203(e) - Programming capability: It is not explicitly written in the manual that the PC programming features are not available to the end-users, as this transmitter may be programmed outside the authorized frequency band. Please, show compliance with this section.

Applicant 7.: Programming this unit requires both a special cable and proprietary programming software, both available only from RITRON and only to qualified RITRON customers. RITRON is very careful about allowing these two items to be sold to those that might be end users.

TCB 8.: The Manual lists “The installer should confirm there is no RF interference picked up on the analog and digital control lines coming into the transceiver. “ Please, explain the impact of such statement on this equipment authorization

Applicant 8.: This statement was placed in the manual mainly to protect equipment connected to the DTX-142 from RF exposure effects, not the unit itself. The unit is never in danger of not meeting the FCC requirements due to the de-coupling and buffering of the I/O.

TCB 10.: Spurious emissions: Compliance testing was demonstrated at Mid-band and for High power only. Please, explain and include a rationale/statement in the test report

describing how compliance at 136 and 174MHz and at the lower power setting was determined.

Applicant 10.: During emissions testing it was verified that worst case emissions occurred at the 5-watt level, the maximum power for this product. The band edges were checked as well and found to be at, or below, that listed for the center frequency. RITRON will continue to check the product at frequencies across the band and at various power levels and will either bring the unit into line with the values submitted or request a Class II permissive change to update the report. It is understood by RITRON that center frequency data is acceptable to the Commission, but compliance at all frequencies available under the grant parts is required. In any and all variants of power and frequency, RITRON will ensure compliance.

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