November 18, 2002

Mr. Joseph Dichoso
Electronics Engineer
Federal Communications Commission
Laboratory Division
Equipment Authorization Branch
7435 Oakland Mills Road
Columbia, MD 21046

Re: FreeWave Technologies, Inc.
Application Submitted: 9/30/2002
Equipment Class: DSS-Part 15 Spread Spectrum Transmitter
FCC ID: KNY2920513513419
Form 731 Confirmation Number: TC473169

Dear Mr. Dichoso:

This letter responds to your correspondence dated October 30, 2002, dismissing the above-referenced application (Form 731) submitted by FreeWave Technologies, Inc. ("FreeWave") requesting equipment authorization for FreeWave's I-Series spread spectrum radio transceiver (FCC ID # KNY2920513513419).

This response will address the issues raised in the dismissal letter in the same order posed in that letter.

1) The filing did not indicate how the device meets all of the modular approval requirements.

2) The filing did not justify professional installation for all antennas. Professional installation is not allowed for full modular approval. This device should be a limited modular approval. The device is limited for use with antennas that are professionally installed.

RESPONSE: FreeWave is not seeking modular approval for the I-Series radio transceiver (FCC ID # KNY2920513513419), and the application submitted, along with its accompanying exhibits, demonstrate that the I-Series device is a radio transceiver.

However, upon review of the exhibits submitted with the application, which provided photographs of the FCC ID label and its placement on the equipment, FreeWave recognizes that these exhibits could have given the erroneous impression that the I-Series transceiver might need to be certified as a modular transmitter.

Additionally, in the "Technical Description" (page 6) and "Operating Description" (page 4) exhibits, the phrase "customers needed an embedded product" was used. FreeWave believes that this phrase might have been misinterpreted and might have suggested that the device requires modular approval. Therefore, this phrase has been replaced with the phrase "customers needed an industrial class product" in the new versions of the "Technical Description" and "Operating Description" exhibits, which are being submitted with this response.

To avoid confusion and to address the Commission's concerns, FreeWave has updated the exhibits listed below and is resubmitting these exhibits with this response:

- Internal and External Photographs for I-Series device;
- Photograph of an FCC ID label;
- "Technical Description" and "Operating Description" exhibits with different wording used in the "Main applications" section.

3) What are the center frequencies of the lowest channel and the center frequency of the highest channel? Include offset frequencies.

RESPONSE: The lowest frequency channel is 2,400.3072 MHz (channel number 0, frequency offset '0'). The highest frequency channel is 2,483.136 MHz (channel number 239, frequency offset '2'). This information is provided in the "Operating Description" exhibit at pages 3 and 6-11.

4) Filing did not provide photos of all antennas.

RESPONSE: An additional file providing photographs of all antennas is being submitted with this response.

5) The filing did not provide RF safety calculations for all antennas. Ensure that the grant condition, user manual and antenna instruction statements agree with the RF safety calculations.

RESPONSE: The exhibit providing RF Safety calculations with all of the requested additions is being submitted with this response.

The User Manual, Grant Conditions and the Installation Manual statements agree with the RF Safety calculations exhibit.

6) For all antennas, show compliance with the peak and average field strength level limits in the restricted band of 2483.5-2500 MHz. Show the data with the device operating on the highest channel.

RESPONSE: Page 31 of the revised Test Report submitted with this response provides the required measurements for the highest gain of the two types of antennas (directional and omnidirectional).

7) The transmitter cannot coordinate its hopping sequence with the hopping sequence of other transmitters, or vice versa, for the purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters. Provide a description on how the device complies with this rule.

RESPONSE: A typical installation for the I-Series radio transceivers involves a single Master radio and one or more remote Slave(s). All Slaves hop in coordination with the Master. If more than one Master is co-located, each Master does not coordinate its hopping sequence with other Masters.

8) The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies. Indicate how the pseudorandom hopping sequence is derived. Provide a list of channel frequencies and a sample of a few sequences.

RESPONSE: Special software was written to derive the pseudo-random hopping sequence used by the I-Series radio transceivers. This software uses a proprietary random numbers generator.

All of the hopping patterns available for the transceiver are loaded into the transceiver's read-only memory. An example of one of the pseudo-random hopping sequences is provided on page 13 of the "Technical Description" exhibit submitted with FreeWave's initial application.

9) Each frequency must be used equally on the average by each transmitter. Except for voice systems, each new transmission must start at a different point in the sequence so that on average the full sequence is used. Therefore, Describe where the next transmission starts when all frequencies are not used for a previous message. This is required because some transmissions may need only a few frequency hops to be completed. i.e. If the transmission started on the same frequency each time, this frequency would be used more than the others if many short transmissions were sent.

RESPONSE: The I-Series radio transceiver uses frequencies from its hopping pattern sequentially and regardless of whether it has user data to send or not. The RF section of the transceiver is synchronized to the timing in the communication network and is totally asynchronous to the RS232 input data of the device. Thus,

the frequency channel used by the transceiver to transmit user data is determined by the time when the user data is ready to be sent and by the current frequency channel in the frequency hopping pattern used at that time.

10) Section 15.247(a)1 indicates that the system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals. Please explain how the device complies with this rule when a packet is repeated or when multiple packets are sent. What is the receiver input bandwidth? How does the receiver shift frequencies and determine which frequency to shift to in order to synchronize with this transmitter?

RESPONSE: The receiver's IF bandwidth is 230 kHz, which matches the bandwidth occupied by a signal transmitted by its corresponding transmitter. Detailed specifications and circuitry functionality explanations are provided on page 14 of the "Technical Description" exhibit.

Shifting in the frequency domain is implemented based on the timing of the over-the-air communication channel only, regardless of the timing of the user data . Thus, user data and its appearance in the over-the-air communication channel will not affect compliance of the I-Series transceiver with the FCC Rules and Regulations.

The shifting in the frequency domain is synchronized between all of the devices in a network. At any given moment, each communication network will use one frequency channel at the time and all of the frequency shifts in this network will be synchronized by the signal from the Master radio.

Please direct any questions concerning this response to the undersigned.

Respectfully submitted,

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Attachments