ROGERS LABS, INC.

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December 4, 2000

Federal Communications Commission
Equipment Approval Services
P.O. Box 35815
Pittsburgh, PA 15251-3315

Applicant: INTERMEC TECHNOLOGIES CORPORATION
6001 36th Avenue West
Everett, WA 98203-9280
Phone: (505) 856-8054

RE: Correspondence Reference Number: 17151

Equipment: FCC ID: HN21555-900

Gentlemen:

Please find enclosed the response to request for additional information regarding the submittal for grant of certification of Intentional Radiators operated in the frequency range of 902 – 928 MHz. It has been requested that the information contained in the block diagrams, operational description and schematics of the application be held confidential per Section 0.459.

A copy of the information request has been reproduced here for reference.

To: Scot Rogers, Rogers Labs, Inc
From: Joe Dichoso
jdichoso@fcc.gov
FCC Application Processing Branch

Re: FCC ID HN21555-900
Applicant: Intermec Corporation
Correspondence Reference Number: 17151
731 Confirmation Number: EA98687

With regard to items 3 and 4, your reply only indicated how the hop sequence was derived. Please answer these items explicitly.

3) 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.

4) 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.

5) What is the receiver inpunt bandwidth with must match the transmitter bandwidth?

FYI, The measured conducted output power will be placed on the grant and depending on the pending RF safety review.

The items indicated above must be submitted before processing can continue on the above referenced application. Failure to provide the requested information within 60 days of the original e-mail date may result in application dismissal pursuant to Section 2.917 (c) and forfeiture of the filing fee pursuant to section 1.1108.

DO NOT reply to this e-mail by using the Reply button. In order for your response to be processed expeditiously, you must upload your response via the Internet at www.fcc.gov, Electronic Filing, OET Equipment Authorization Electronic Filing. If the response is submitted through Add Attachments, in order to expedite processing, a message which informs the processing staff that a new exhibit has been submitted must also be submitted via Submit Correspondence. Also, please note that partial responses increase processing time and should not be submitted.

Any questions about the content of this correspondence should be directed to the e-mail address listed below the name of the sender.

RESPONSE

3) 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.

4) 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.

As was described before, the Handheld reader uses a pseudo random hop sequence that consists of 63 channels between the frequencies of 902.6 and 927.4 with an equal channel spacing of 400 kHz. The digital board ASIC controls the hopping sequence of the RF source, using look up tables and a simple mathematical algorithm. The code used to generate the hopping sequence is based on the hopping sequence as specified in the IEEE 802.11 standard. Therefore, channel 1 is 902.6 MHz, channel 2 is 903.0 MHz and so on, until channel 62 is 927.0 MHz and channel 63 is 927.4 MHz. The hop sequence is derived from two subsets of random is derived from two subsets of random patterns, which are combined together to form the channel index.

When power is initially applied to the handheld reader, a random number is generated in the digital board ASIC which determines the starting point of the hop sequence. As RF power is applied, the handheld reader will follow the hop sequence. When a command is complete and RF is turned off, the hop sequence position is maintained. When a new command is initiated, and RF is turned back on, the Handheld reader starts the hop sequence where it left off the last time RF was on. Therefore, the transmitter will use each frequency channel equally, on the average. Since the hop sequence starting channel is determined by a random number generated at initial power up, the transmitter cannot coordinate its hopping with any other transmitter.

5. Input bandwidth of the receiver matches that of the transmitter §15.247 (a) (1)

The Hand Held reader communicates with the tag through a spread spectrum, frequency hopping signal. The Hand Held reader modulates the carrier that is decoded by the tag. The tag then imposes modulation upon the carrier and reflects the carrier (modulated backscatter) to the Hand Held reader. The receiver operates in a homodyne mode. The received signals pass through a pre-selector filter designed to eliminate high frequency interference including the harmonics generated in the transmitter. The local oscillator used in the receiver is the same frequency hopping oscillator used to generate the carrier signal that is transmitted to the tag, modulated by the tag, and back-scattered to the receiver. Therefore, both signals are hopping at exactly the same frequency. Since the receiver operates simultaneously with the Hand Held reader transmission, the system receiver will shift frequency in synch with the transmitter signal. The received signals are directly converted to baseband in the homodyne. The down converted signals are band limited by a series of active filters that provide a 3 dB pass band of approximately 6 kHz to 120 kHz. The filters provide the receiver with a 20 dB IF bandwidth of 400 kHz. Since each received signal is down converted and band limited at baseband, the IF bandwidth, and hence the front end bandwidth of the receiver, exactly matches the transmitted signal from the tag.

Should you require any further information, please contact the undersigned.
Thank you for your consideration in this matter.
Sincerely,

Scot D Rogers

Scot Rogers
Rogers Labs, Inc.
Enclosures