

To: Joe Dichoso
From: Dave Fry, null
Date: Aug. 16, 2001

Re: FCC ID EHARFID2450PCC-5
Applicant: Intermec Technologies Corporation
Correspondence Reference Number: 19797
731 Confirmation Number: EA101090

- 1) Block diagram. Place in the Block diagram folder of the electronic file.

The block diagram from the Operational Description has been relocated to the Block Diagram portion of the EAS system. Applications made in the future will separate all appendixes as independent portions to accommodate the FCC EAS system. Please amend the confidentiality request as below to address restrictions for the release of the diagram.

Confidentiality:

Pursuant to Section 0.459 of the Commission's rules (CFR 47), Intermec requests confidentiality for portions of the material contained in this application and that the identified material be withheld from public inspection following the grant of this authorization. This material contains Intermec trade secrets and confidential information that Intermec does not customarily release to the public and which is otherwise not generally available to the public. Confidentiality is requested for the following exhibits:

- ***Appendix K Theory of Operation***
- ***Appendix L Schematics and Parts Placement***
- ***Block Diagram contained within FCC EAS system***

A revised letter addressing this change in confidentiality is also sent for your files.

- 2) Internal photo's. Place in the Internal photo folder of the electronic file.

The internal photos have been relocated from the External Photos to Internal Photos of the EAS system. Applications made in the future will separate all appendixes as independent portions to accommodate the FCC EAS system.

3) The test report on page 11 indicates 30 dBm and 29 dBm +/-1 dB. The SAR was tested at output powers of 29 dBm and less. Please explain/correct. The output power in the SAR report must be greater or equal to that in the filing.

The SAR for the handheld is repeated at a power of + 30 dBm. The test results are downloaded in the report from Celltech and labeled "Handheld SAR Retest". We still are listing the power of the module as +29 dBm +/- 1 dB. If needed, we give the FCC permission to revise the 731 form to show TX power 1.0 watt.

Based on the retest results for the handheld, the remote antennas were not retested. The safe user distances from those original reports will be used.

4) Verify that the 0 dBi antenna is the only antenna used with the 6100 Hand held terminal.

The 0-dBi antenna is the only antenna to be used on the 6100 terminal. It is our intent to use the 0 dBi antenna with other Intermec hand held terminals. Photos of the Intermec hand held computers, 2410, 2415, 5020 and 6400 are included for you reference. Antenna placements will be at the top end of these additional Intermec terminals and the condition of operated only when in the hand will apply.

5) Verify that only the 3.5 dBi antenna and 5 dBi antenna will only be used in the laptop computers listed. Provide photo's of the laptops, 2410, 2415, 5020, 64000.

The 3.5-dBi and 5-dBi antennas (remote antennas) will be used with "Laptop Personal Computers" and other larger products that support PCMCIA cards. A photo of a Dell laptop has been provided to clarify my laptop description. As described in (4) above, Intermec manufactures hand-held computers, not laptops. Current marketing forecasts has Intermec selling the 2450 PC Card and remote antenna to users needing to interrogate small quantities of RFID tags. Intermec sells "Access Points" that provide interface from Wireless LAN terminals to an Ethernet hardwired backbone. Intermec intends to offer the 2540 PC Card within these "Access Points" as a low-cost RFID solution that also interfaces to a hardwired computer network. As the radio is a PC card I thought it unnecessary to send in multiple photographs of products that have a PCMCIA interface. All products that integrate this radio will use the unique antenna connector defined within the report. If a product utilizes another unique connector, sales will be contingent to FCC approval of a Class II Permissive Change for the connector modification.

6) Indicate compliance with the requirements for modular approval.

Transmitter modular approval, conditional requirements.

- 1) The transmitter has its own shielding and is tested herein extended outside of a laptop PC. The shield is a standard PCMCIA metal container added during manufacturing. Instructions to end-users and resellers will warn of possible regulatory consequences for modifying the radio in any manner.***
- 2) As a PCMCIA card (PC card), only data and power is presented to the radio, all modulation and control of the transmitter is contained within the PC card.***
- 3) The transmitter operates across a voltage range of +5.0V +/- 5%. Internal power output controls and operating frequency maintains operation within the parameters defined in the regulations. Test data within shows the transmitter characteristics across the specified voltage range.***
- 4) The PC card uses an antenna connector that meets the unique coupler requirements. The antennas offered for sale with the transmitter DO NOT require professional installation.***
- 5) During testing the radio is extended on commercially available PC card extension. The radio is extended two inches (5-cm) beyond the host laptop. The extender allows the radio to be placed horizontal and vertical for a complete evaluation of the radiated characteristics of the shielding on the radio. AC power to the laptop and Intermec 6110 operated the unit during testing. AC line conducted emissions are presented herein.***
- 6) As a PC card, the radio is typically accessible to the end user. In Intermec products that restrict access to the radio the exterior of those units will contain an external label that users the "Contains TX FCC ID: EHARFID915PCC-6". Resellers will also be instructed to label the exterior of products where access to the PC card is restricted.***
- 7) The PC card as manufactured is completely controlled by the onboard processor. There are no influences to the operation of the transmitter the end user can induce that will operate the radio outside of scope of the regulations. Intermec service and manufacturing are the only persons with the equipment to alter the internal radio software that controls transmitter power, operating frequencies, hop sequences and duty cycle. All internal software is placed under revision control within Intermec with restrictions under the supervision of Intermec Safety and Compliance manager. Resellers and integrators will be informed of the operating voltage requirements for the PC card.***

8) *The transmitter herein was tested with the antennas listed. Compliance to RF exposure requirements for all the antennas offered for sale by Intermec is included within this application for approval. Sales information regarding OEM resellers will inform those entities of their regulatory obligations to use the Intermec antennas as presented herein or to seek approval through the appropriate regulatory agency. Instructions to resellers will also define the requirements to show the integrated radio meets the unintentional emissions requirements where appropriate.*

7) Remove the RF safety warnings for other FCC identifiers in the 6100 user statement.

The RF warning statements are removed from a revised version of the Compliance Statement Insert. Please see the revisions in the Appendix N revised sent to the EAS system.

8) The PC card statement should state applicable antennas.

The RF warning statements are revised on a new version of the Compliance Statement Insert. Please see the revisions in the Appendix M revised sent to the EAS system.

9) Justify the 20 cm separation when mounting the antennas in a vehicle.

This statement was inadvertently left in during editing please see the revised Compliance Statement Insert referenced above.

10) The SAR for the 6100 hand held terminal was tested at various distances. Testing at the back of the device was at 1 cm while others were at 0 cm and 5 cm. How does the RF safety statement cover all distances, especially the 1 cm distance?

The SAR report of the 6100 back covered hand and body exposure of the unit. Operation with the 6100 against the body is not applicable as the unit is normally operated in one hand while the other hand presses buttons or touch screen. The 6100 and other Intermec hand-held terminals will be used from the hand. Scanning RFID tags require the terminal antenna be pointed in the direction of packages with the RFID tags. Initiating the transmitter to interrogate the tags requires the user to key the terminal to enable the radio. If no tags are responding to the RF tag reader, the transmitter automatically turns off within milliseconds and the hand-held terminal beeps and displays a warning "No Tags Found". This is normally done with the terminal within the hand and cannot be operated from a belt or shoulder holster. Since the most recent SAR report shows users must remain 0.5 cm from the back of the unit during operation, the distances listed within the RF safety statement protect users and bystanders from excessive RF exposure while using the Intermec hand-held terminals. Photos of the 6110 in the hand are included with this response.

11) If the device is a Class B peripheral, it will require DOC approval or Certification. File a composite application for Certification or provide the DOC certificate and correct the label to include DOC label requirements.

As stated in the report we will apply DOC approval for the Class B peripheral requirements. A revised label diagram has been sent to the FCC EAS system. The Compliance Statement Inserts include the necessary information for FCC DOC approval. See Appendix M and N.

12) 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.

This point of clarification as well as points 13-17 are addressed within a revised Operational Description (Theory of Operation) sent to the FCC EAS system. I will try to guide you to the appropriate paragraphs of the Description to assist in your review. Point 12 is addressed in the paragraph under Table A on page 5.

13) 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.

Point 13 is addressed in the second paragraph under Table A on page 5.

14) 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?

Point 14 is addressed in the paragraph under the heading "Receiver" on page 3.

15) 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.

Point 15 is addressed in the paragraphs under the heading "Hopping Sequence Example" on page 6.

16) Indicate compliance with Section 15.247(g).

Point 16 is addressed in the second paragraph under Table A on page 5.

17) Indicate how the device complies with the definition of a frequency hopping system in Section 2.1.

Point 17 is addressed on page 6.