Compliance with 47 CFR 15.247(i)

> "*Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See § 1.1307(b)(1) of this chapter*."

The EUT is Intermec's 802.11 radio, FCC ID: EHA802UIAG, that is installed in Intermec's CK60 handheld computer. The CK60 also has a Bluetooth radio module, M/N: BTM311, FCC ID: HN2-BTM311. The Bluetooth and 802.11 radios have been previously certified for co-location in the CK60. There have been no changes to the radio or it's antennas. This Class II Permissive Change application is to authorize a new co-location configuration described below.

The CK60 Handheld computer can be installed in the docking station of Intermec's 6820 printer, FCC ID: EHABTS080-2. The printer contains a Bluetooth radio. Intermec Technologies Corporation is seeking a Class 2 Permissive change of EHA802UIAG to permit co-location with FCC ID EHABTS080-2. Each radio transmits through its own antenna and can transmit simultaneously with the other radios. The radio module operates in the 2400-2483.5MHz band and the 5725-5850MHz band. The EUT will only be used with a separation distance of 20 centimeters or greater between the antenna and the body of the user or nearby persons and can therefore be considered a mobile transmitter per 47 CFR 2.1091(b).

The maximum antenna gain measured for the 2400-2483.5MHz band was 2 dBi. The maximum antenna gain measured for the 5725-5850MHz band was 4 dBi. The maximum peak conducted output power (EIRP) for the 2400MHz band and the 5725MHz band were 45.2 mW and 17.24 mW, respectively. Since the transmit frequency is greater than 1.5 GHz, and the output power is less than 3 W ERP, the EUT is categorically excluded from routine environmental evaluation per 47 CFR 2.1091(c).

Each radio transmits through its own antenna and can transmit simultaneously with the other radios.

The MPE estimates are as follows:

Table 1 in 47 CFR 1.1310 defines the maximum permissible exposure (MPE) for the general population as ($f_{MHz}/1500$) mW/cm^2. The exposure level at a 20 cm distance from the EUT's transmitting antenna is calculated using the general equation:

$S = (PG)/4\pi R^2$
Where: S = power density (mW/cm^2)
P = power input to the antenna (mW)
G = numeric power gain relative to an isotropic radiator
R = distance to the center of the radiation of the antenna (20 cm = limit for MPE estimates)
PG = EIRP

Solving for S, the maximum power density 20 cm from the transmitting antenna is summarized in the following tables:

MPE Estimate for 802UIAG in the CK60 by itself
FCC ID: EHA802UIAG

Antenna Type		Transmit Frequency Band (MHz)	Max Peak Conducted Output Power (mW)	Antenna Gain (dBi)	Minimum Antenna Cable Loss (dB)	Power Density @ 20 cm (mW/cm^2)	General Population Exposure Limit from 1.1310 (mW/cm^2)	Ratio of Power Density to the Exposure Limit
Flex Circuit		2400	45.2	2	0	0.01425	1	0.01425

MPE Estimate for BTM311 in the CK60 by itself
FCC ID: HN2-BTM311

Antenna Type	Antenna Part No.	Transmit Frequency (MHz)	Max Peak Conducted Output Power (mW)	Antenna Gain (dBi)	Minimum Antenna Cable Loss (dB)	Power Density @20 cm (mW/cm^2)	General Population Exposure Limit from 1.1310 (mW/cm^2)	Ratio of Power Density to the Exposure Limit
Inverted F Chip Antenna	AH 104F245001-T	2400	8.69	2	0	0.00274	1	0.00274

MPE Estimate for Bluetooth Radio in the 6820 Printer by itself
FCC ID: EHABTS080-2

Antenna Type	Antenna Part No.	Transmit Frequency (MHz)	Max Peak Conducted Output Power (mW)	Antenna Gain (dBi)	Minimum Antenna Cable Loss (dB)	Power Density @20 cm (mW/cm^2)	General Population Exposure Limit from 1.1310 (mW/cm^2)	Ratio of Power Density to the Exposure Limit
Internal Integral Antenna	PCB Trace Antenna	2400	13.86	-1.23	0	0.00208	1	0.00208

The sum of the ratios to the exposure limit for the CK60 is summarized below:

The Ratios to the Exposure Limit Sum for the CK60

Worst case power density ratio of EHA802UIAG	Worst case power density ratio for HN2-BTM311	Sum of Worst Case Ratios (Power Density to the Exposure Limit	FCC Limit for Sum of Worst Case Ratios in CK60
0.01425	0.00274	0.01699	1

The sum of the ratios to the exposure limit for the exposure scenario for the CK60 co-located with the 6820 Printer is summarized in the following table:

The Ratios to the Exposure Limit for the CK60 Handheld Computer co-located with the 6820 Printer

0.01699	0.00208	0.01907	1

Excerpts from TCB Training, April 3, 2002, "Mobile Transmitters", Slide 6:

"*Devices operating in multiple frequency bands*

- *When RF exposure evaluation is required for TCB approval*
  - *Separate antennas – estimated minimum separation distances may be considered for the frequency bands that do not require evaluation or TCB approval, however, the estimated distance should take into account the effect of co-located transmitters. (Note 24)*

    Note 24 According to multiple frequency exposure criteria, the ratio of field strength or power density to the applicable exposure limit at the exposure location should be determined for each transmitter and the sum of these ratios must not exceed 1.0 for the location to be compliant.

Per Note 24, the sum of the worst-case power ratios in any scenario does not exceed 1.0; therefore, the exposure condition is compliant with FCC rules.