

EIRP Calculation of RF Exposure

cm **inches**
20.0 **7.87**

CRF 47 Part 15.247 (b)(5)

(b)(5) 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 Sec. 1.1307(b)(1) of this chapter.

System Description

The CV30 is a mobile computer. The unit contains WLAN and Bluetooth radios.
FCC ID: EHADRCB 802.11 bg
FCC ID: EHA-BTM312 Bluetooth

The radios all transmit on separate antennas.

Radio Disc / Rule	MHz -	MHz	Watts (Conducted)
CV30			
802.11bg radio FCC ID: EHADRCB			
15C	2412	2462	0.078
Bluetooth Radio FCC ID: EHA-BTM312			
15C	2402	2480	0.0076

Table 1 in 47 CFR 1.1310 defines the maximum permissible exposure (MPE) for the general population. The exposure level at the distance listed from the EUT's transmitting antenna is calculated using the general equation:

The exposure level at a 20 cm distance from the EUT's transmitting antenna is calculated using the general equation (See OET 65, Page 19, Eq. 4):

$$S = (PG)/4(P)R^2$$
 Where: S = power density (mW/cm²)
 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 this MPE estimate)
 PG = EIRP

Solving for S, the maximum power densities 20 cm from the transmitting antennas are summarized in the following tables:

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802.11bg Radio **CV30 antenna with highest power frequency band worst case EIRP**
FCC ID: EHADRCB
IC: 1223A-DRCB Calculation for exposure at 20cm distance

Antenna Description	Antenna Type	Antenna Part No.	Transmit Freq. (MHz)	Peak Conducted Power (mW)	Gain (dBi)	Pwr Density @ 20cm mW/cm ²	Pwr Density Limit mW/cm ²	Power Density Ratio
Intermec CV30	linear	panel	2450	78.0	3	0.0310	1.0	0.0310

Bluetooth **CV30 Bluetooth chip antenna worst case EIRP**
FCC ID: EHA-BTM312
IC: 1223A-BTM312 Calculation for exposure at 20cm distance

Antenna Description	Antenna Type	Antenna Part No.	Transmit Freq. (MHz)	Peak Conducted Power (mW)	Gain (dBi)	Pwr Density @ 20cm mW/cm ²	Pwr Density Limit mW/cm ²	Power Density Ratio
on board chip	linear	NA	2450	7.6	2	0.0024	1.0	0.0024

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Co-Located Transmitter Calculation of RF Exposure

Per FCC TCB Training April 3, 2002

"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."

Worst Case Exposure for CV30 with WLAN and BT when using co-located transmitters.

Calculation for exposure at 20cm distance

Transmitter FCC ID: Antenna Description	Antenna Type	Antenna Part No.	Transmit Freq. (MHz)	Peak Conducted Power (mW)	Gain (dBi)	Pwr Density @ 20cm mW/cm ²	Pwr Density Limit mW/cm ²	Power Density Ratio
FCC ID: EHADR CB CV30 linear	linear	panel	2450	78.0	3	0.0310	1.0	0.0310
FCC ID: EHA-BTM312 Internal chip	chip	NA	2450	7.6	2	0.0024	1.0	0.0024
							ratio limit	
Total							1.0	0.0334

The worst case configuration for all combinations of co-located transmitters and antennas are shown. In all cases the ratio of exposure compared the limit when totaled does not exceed 1.0.

The WLAN and Bluetooth radio transceivers are mobile transmitters and are greater than 5 cm from each other and all other simultaneous transmitting antennas.

"KDB 447498 D01 Mobile Portable RF Exposure v04" provides the procedures, requirements, and authorization policies for mobile and portable devices. Item #8 best fits the exposure condition described in this report. Since these mobile devices are categorically excluded from routine evaluation; per footnotes 1 and 33 of KDB 447498, simple calculations may be used to estimate the power density to demonstrate compliance with 47 CFR 1.1310 requirements. The estimate above shows MPE limits are met for simultaneous transmission at a 20cm boundary.