

January 5, 2005

RE: Caterpillar, Inc.

FCC ID: PQMWCA1

The following is in response to comments made on the above application.

1) Equipment type on the 731 form should be DTS.

The 731 form has been updated and uploaded.

2) Please list the maximum conducted power on the 731 (also see 6 and 7 below).

The 731 form has been updated and uploaded.

3) The users manual mentions a range extender antenna. However, testing was only done for one antenna. Please explain as the additional antenna is not covered by this application.

The extended range antenna works with the host PC, not with the DUT in question. Thus, while it is subject to certification with host's PCMCIA radio, it is not part of the DUT herein.

4) Please explain the use of 12 channels.....Most 802.11 devices are only approved for 11 channels in the U.S. and Canada. If this device can use more than 11 channels in other areas of the world, please explain compliance to 15.15 for the U.S. and Canada Versions.

This is a typographical error in the test report. The radios provided to the manufacturer are enabled only for 11 US channels. So as to demonstrate compliance to the FCC limits, we elected to test low, middle, and high channels 2412, 2437, and 2462 MHz (channels 1, 6 and 11). The test report has been corrected.

5) Section 5 of the report mentions the digital device portion of the device is exempt. FCC policy has typically been this exemption applies only to devices that are mounted in such a way that they are part of the vehicle. Devices that are not mounted have typically not been allowed under this exemption. Please provide further information regarding this device being allowed under this exemption or the digital device data.

Since the DUT is not permanently mounted to the vehicle, we now see there may be some question as to the digital device exemption. In the test report, Section 5.2 stated that no outdoor measurements were made. However, the DUT was measured for digital emissions on the OATS (see test setup photos as originally uploaded) and it meets the Class B limits by > 20 dB. Since no emissions within 20 dB of the FCC Class B limit were identified, no data was taken during testing. The test report has been updated, stating the device compliance with the FCC Class B limits.

6) It appears that average power instead of peak power was measured. If so, then the guidance document (see attached) should be followed for average measurements. Alternatively peak power measurements may be provided.

In section 6.3, the test report describes that peak conducted output power was measured via the crystal detector method.

7) If average power measurements are provided, then the limits for section 6.6 become 30 dB instead of 20 dB. Please review/correct as necessary. Note that the lower bandedge only shows 20.6 dB margin at 2.4 GHz.

Peak output power measurements were provided.

8) Given the bandedge plots and the high side lobe around 2.385 MHz, the output power, antenna gain, etc., it is uncertain how the side lobe at 2.385 GHz meets the 54 dBuV/m limits. Also the data only appears to be measured at 2.39 GHz. It may be possible that the plots shown are overloading the spectrum analyzer, as the fundamental to sidelobe are only around 35 dB. Note that most 802.11 devices have > 50 dB rejection at the sidelobes. Please provide better data/information to support compliance in the restricted band occurring < 2.39 GHz. Also please note that even if this result appears to be marginal, any range extending antenna may be likely to be out of compliance. Measurements must be made on the highest point .

While data table 5.1 lists the emissions at 2390 MHz, this is done simply to demonstrate the worst case emission in the restricted band in question; in this case 2310-2390 MHz. Higher emissions are generally, but not always at 2390 MHz, and as such our data table reflects this. Emissions were measured for compliance over the entire band.

Also, please note that the bandedge plots of figure 6.3 are measured as “peak” conducted emissions in a 100 kHz RBW, 300 kHz VBW, while the data demonstrating restricted band compliance in table 5.1 are measured as “average” radiated emissions with 1 MHz RBW, 100 Hz VBW. Thus, the bandedge data in figure 6.3 does not reflect the spectral roll off of the DUT antenna or the average radiated power of the system in the restricted band in question, and cannot be directly related to compliance with restricted band radiated emission limits.

Furthermore, the emissions in figure 6.3 are not the result of saturating the spectrum analyzer input. An external 20 dB attenuator was used (see figure 6.3) and the peak output power of the radio was measured to be no more than 13 dBm.

9) REL Listing letter for IC portion of the application appears to be missing.

The letter is being provided.