Testing Tomorrow's Technology

April 23, 2010

ATCB
6731 Whittier Avenue
Suite C110
McLean, VA 22101

RE: Cirronet, Inc. (RFM) FCC ID HSW-WSN802G, IC NUMBER 4492A-WSN802G Permissive Change

Dear Applications Examiner:

Enclosed please find the test report and supporting documentation for a Class 2 Permissive Change for the product referenced above.

The module was originally only tested and certified at the two lowest WiFi data rates - 1 Mbps and 2 Mbps. The modified module is now using a new pin-for-pin-compatible version of the WiFi chip that does the 5.5 Mbps and 11 Mbps rates.

Per Cirronet:

"The crystals and clocks used on the new version of the module are identical to the old. The internal frequency determining circuitry is also unchanged as the channel centers for 802.11 are well defined and have not shifted during any subsequent enhancements to the standard. Finally, the output power exhibited with the higher rates is the same as with the lower rates.

The over-the-air data (i.e. chip) rates of the older 802.11 modulation scheme (the thing we tested) and the new 802.11b modulation schemes (the standard that the new chip complies with) are identical. In other words, the new, higher-rate signal propagates through the ether using exactly the same signaling rates and bandwidths as the 2 Mbps rate already tested in the original submission.

From an over the air standpoint, the essential difference between 802.11 and 802.11b is how many bits are sent per chip sequence. In the old 802.11 format, a unique 11 chip sequence was transmitted for every 1 bit. For the 1 Mbps rate, that chip sequence was modulated on to a carrier using BPSK. For the 2 Mbps rate, DQPK was used to keep the bandwidth the same as in the 1 Mbps case.

In the newer 802.11b format, a fancier implementation called CCK was used. In that scheme, more bits are represented by the exact same number of chips. It's the chip rate (the signaling rate) that matters from an over-the-air perspective and that remained the same in the switchover from 802.11 to 802.11b. The fact that the users 'data' rate increased from 1-2 Mbps to 5.5-11 Mbps doesn't imply an increase in the chip rate or the bandwidth of the over-the-air modulated signal at all (the part that the FCC sees and cares about). In the end, the chip rate is identical (11 Mcps) and the modulation approach is the same (DQPSK) as in the previous version.

That was, in fact, the whole point of using CCK in the 802.11b standard. It employed the same signaling rates and modulation techniques as the older 802.11 technique. The IEEE standard

shows identical emissions masks for both because the underlying modulation approach is exactly the same."

Furthermore, through FCC KDB Number 907292, the FCC has acknowledged that a Class 2 Permissive Change would be acceptable to document this change. A copy of the FCC Response is below:

From: oetech@fccsun27w.fcc.gov [mailto:oetech@fccsun27w.fcc.gov]
Sent: 2010-03-23 10:25 AM
To: Mark Tucker
Subject: Response to Inquiry to FCC (Tracking Number 907292)

Office of Engineering and Technology

Inquiry:

---**Reply from Customer on 03/19/2010**---

RFM/Cirronet responses are in Blue Ink. Response: The chip replacement is for chips performing sub-functions like an amplifier or an oscillator. This appears to be for a main component. Changes to hardware components to add modulation types generally require a new ID. It is important to note that the Modulation in the new chip has not changed. The chip rate (11 Mcps) and modulation format (DQPSK) in the new unit is exactly the same as was previously tested in the currently certified units. The only thing that has changed in the 802.11 to 802.11b upgrade is the underlying number of bits represented by the transmitted chipping sequence. In 802.11, the resultant chip to bit ratio was 11:1. In 802.11b, that ratio becomes 1:1. The baseband symbol rate into the modulator, the over-the-air signaling (chip) rate, the DQPSK modulation approach and resultant spectrum have remained unchanged between versions. We're not splitting hairs here. There is no discernable difference between the transmitted waveforms and spectra at any rate. The plots sent in the previous submission are the best indication of that. The physical layer characteristics of 802.11 and 802.11b are widely known and documented. OET Engineering is certainly familiar with the details as their staff worked with the IEEE 802.11 committees back in 1999 to ensure that the 'b' standard would meet all current (DSS at the time) regulatory rules. While internal frequencies from the chip may differ. The chip replacement requires frequencies outside the chip to be the same. Are the range of frequencies coming from the chips identical? This information may be needed from the manufacturer. Output frequencies are defined by the 802.11b standard and are identical to the 802.11 standard. We have verified with Gainspan that there will be no differences in internal or external frequencies with the upgrade. Clock frequencies used on the PCB are identical as well. Regarding radio parameters, how about power density? Did that change? Our measurements show that the PSD of the two higher rates is actually lower than that of the two lower rates. Please provide photo's of the two devices. See attached. It appears there may be more changes other than just the chip. Please provide a component list highlighting the differences between

the two transmitter modules. The only change in the module is the GS1010 to GS1011 chip upgrade. No other components are affected. Note that we really have no choice in this matter as Gainspan is discontinuing the older GS1010 and we have to move to the newer GS1011. To repeat, we are pressing for a C2PC for three reasons. First, as argued in my previous submission, we believe this upgrade meets the requirements for "Part Substitution" in section 2c of the Permissive Change Policies notice of 8/6/2009. Secondly, recertification costs are roughly $12,000 versus a C2PC at $3,000. RFM/Cirronet is a small company and certification cost is always a factor in our business. It is very expensive to recertify products every time a vendor makes minor changes in their IC - especially if those changes fall within the existing C2PC rules and are completely benign with regards to any characteristics the FCC has interest in (or can measure for that matter). Thirdly, we already have customers using the present module out in the field. They will upgrade to the new chip/module for new purchases and would greatly prefer to maintain the same ID to maintain consistency with already-fielded units. Regards, Mark Tucker

Response:
The change is acceptable as a Permissive change based on the information and arguments provided.

Do not reply to this message. Please select the Reply to an Inquiry Response link from the OET Inquiry System to add any additional information pertaining to this inquiry.

Sincerely,

Sandi McEnery
Agent for Cirronet (RFM), Inc.