Attn: Reviewing Engineer
Federal Communications Commission
7435 Oakland Mills Road
Columbia, MD 21046

RE: RESPONSE TO FCC DA 00-1407 PUBLIC NOTICE

To Whom It May Concern:

We the undersigned, hereby request Modular Approval for the Wilcoxon Research model C1B V5.6 Transceiver Module. In accordance with FCC Public Notice DA 00-1407, we have attached a copy of the Notice with responses to each numbered requirement, and the means used to comply with the listed requirement. Thank you for your attention to this matter.

Marc Rody

Principle Electrical Engineer, Wilcoxon Research Inc.

Point by Point address to FCC DA 00-1407 by the Wilcoxon C1B V5.6 Bluetooth module

The following is the body of relevant text from FCC PUBLIC NOTICE: DA 00-1407, Released: June 26, 2000, Titled: PART 15 UNLICENSED MODULAR TRANSMITTER APPROVAL.

"In order to obtain a modular transmitter approval, a cover letter requesting modular approval must be submitted and the numbered requirements identified below must be addressed in the application for equipment authorization."

Required cover letter attached. Above

1. "The modular transmitter must have its own RF shielding. This is intended to ensure that the module does not have to rely upon the shielding provided by the device into which it is installed in order for all modular transmitter emissions to comply with Part 15 limits. It is also intended to prevent coupling between the RF circuitry of the module and any wires or circuits in the device into which the module is installed. Such coupling may result in non-compliant operation."

The C1B V5 is provided with a tin plated brass shield on five sides, soldered on six sides with all active components contained within the defined volume. The sixth side being the bottom surface of the module's printed wiring board. The top solder surface of the shield's attachment point on the printed wiring board is connected to the bottom surface through a series of vias located on tenth inch centers around the periphery of the module. The connections provide a Gaussian surface about all six sides.

Data and power connections are made at the modules edge and bottom surfaces. The connections are routed through low pass stripline filters integrated into the printed wiring board and subsequently under the shield to the internal components. Ferrite energy absorbing beads on these lines are fully contained within shielded volume and are not used externally.

2. The modular transmitter must have buffered modulation/data inputs (if such inputs are provided) to ensure that the module will comply with Part 15 requirements under conditions of excessive data rates or over-modulation.

All the incoming Data lines interface with a microprocessor. The data is conditioned and buffered by a microprocessor to limit the data rate and provide isolation between the user interface and the intentional emitter.

3. The modular transmitter must have its own power supply regulation. This is intended to ensure that the module will comply with Part 15 requirements regardless of the design of the power supplying circuitry in the device into which the module is installed.

The C1B V5.6 transmitter is composed of a silicon integrated circuit that provides the radio frequency exciter function and a following power amplifier to provide the required gain and output isolation.

The exciter is powered by the incoming DC power (3.3 VDC nominal), which is regulated down to 1.8 VDC by a low drop out linear regulator. The exciter has an internal under-voltage lockout to prevent undefined logic levels and unanticipated spurious emissions.

The power amplifier is connected to the incoming 3.3 VDC through an internal voltage regulator that provides the bias to the active gain elements. The bias is arranged to adjust the reference DC gain to inversely track supply variations, resulting in little corresponding radio frequency gain change. By this method, gain variations of the power amplifier due to temperature changes and supply changes are controlled.

4. The modular transmitter must comply with the antenna requirements of Section 15.203 and 15.204(c). The antenna must either be permanently attached or employ a "unique" antenna coupler (at all connections between the module and the antenna, including the cable). Any antenna used with the module must be approved with the module, either at the time of initial authorization or through a Class II permissive change. The "professional installation" provision of Section 15.203 may not be applied to modules.

The RF connection path has designed to progressively restrict access to the RF path. At the most accessible user level, the RF connection from the cable to the antenna is made with a reversed center pin sex, SMA style connector. The module-antenna interconnecting coax is conventional UG-316 style. The coax-module connection is made with an un-overmolded MCX style connection. This connection is made through the shield, precluding any commercial overmolded connector. The MCX is similar in style to the widely used MMCX connector but cannot be made to connect due to differences in physical dimensions, thus precluding after-market cellular telephone extension antennas.

5. The modular transmitter must be tested in a stand-alone configuration, i.e., the module must not be inside another device during testing. This is intended to demonstrate that the module is capable of complying with Part 15 emission limits regardless of the device into which it is eventually installed. Unless the transmitter module will be battery powered, it must comply with the

AC line conducted requirements found in Section 15.207. AC or DC power lines and data input/output lines connected to the module must not contain ferrites, unless they will be marketed with the module (see Section 15.27(a)). The length of these lines shall be length typical of actual use or, if that length is unknown, at least 10 centimeters to insure that there is no coupling between the case of the module and supporting equipment. Any accessories, peripherals, or support equipment connected to the module during testing shall be unmodified or commercially available (see Section 15.31(i)).

The C1B V5.6 has been tested to comply with 15.207. This unit has been designed to be EMS and ESD independent of external connections. No external EMI, EMS control is required by the user. The unit was fully tested with random lengths of data and power lines all in excess of 10 centimeters. With the exception of data sources and a power supply, no accessories, peripherals, or support equipment are utilized, or required by C1B V5.6 module.

6. The modular transmitter must be labeled with its own FCC ID number, and, if the FCC ID is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains Transmitter Module FCC ID: XYZMODEL1" or "Contains FCC ID: XYZMODEL1." Any similar wording that expresses the same meaning may be used. The Grantee may either provide such a label, an example of which must be included in the application for equipment authorization, or, must provide adequate instructions along with the module which explain this requirement. In the latter case, a copy of these instructions must be included in the application for equipment authorization.

The C1B modular transmitter has the required FCC label affixed to the exterior surface in a clearly visible location. A copy of the label and the mounting location has been included with this filing. An additional label is supplied for the end user to affix to the exterior of the end user assembly.

7. The modular transmitter must comply with any specific rule or operating requirements applicable to the transmitter and the manufacturer must provide adequate instructions along with the module to explain any such requirements. A copy of these instructions must be included in the application for equipment authorization. For example, there are very strict operational and timing requirements that must be met before a transmitter is authorized for operation under Section 15.231. For instance, data transmission is prohibited, except for operation under Section 15.231(e), in which case there are separate field strength level and timing requirements. Compliance with these requirements must be assured.

The Data, Timing structure, RF power levels and frequencies used by the C1B V6.5 Bluetooth module are not accessible to the user. Full control over these functions is maintained by internal firmware finalized during manufacture.

8. The modular transmitter must comply with any applicable RF exposure requirements. For example, FCC Rules in Sections 2.1091, 2.1093 and specific Sections of Part 15, including 15.319(i), 15.407(f), 15.253(f) and 15.255(g), require that Unlicensed PCS, UNII and millimeter wave devices perform routine environmental evaluation for RF Exposure to demonstrate compliance. In addition, spread spectrum transmitters operating under Section 15.247 are required to address RF Exposure compliance in accordance with Section 15.247(b)(4). Modular transmitters approved under other Sections of Part 15, when necessary, may also need to address certain RF Exposure concerns, typically by providing specific installation and operating instructions for users, installers and other interested parties to ensure compliance.

The C1B V5.6 module is operating under Section 15.247 (b)(4). The unit hops over 79 channels with a nominal output power of +12 dBm +/- 2 dB to allow for variations in production and quality of RF connections. In addition the user is directed to mount the unit at a distance greater than 20 cm from any people. Directions and warnings are provided in the user instructions.