



Subject: Modular Approval Request  
FCC ID: LOBSRF304  
05/25/2011

Dear Application Examiner,

Cervis Inc. (aka Structured Mining Systems), would like to have your authorization for modular transmitter approval of the proprietary radio transmitter (RT) module FCC ID: LOBSRF304 so as to be used with various Cervis Inc. product varieties where the application-specific input and output electronics may change. The RT module is intended for use in “modular transmitter” applications, where the radio frequency (RF) functions reside in a standardized design module that is distinct from the host application’s functional controller circuits. The requirements of Public Notice DA00-1407 have been met and shown on the following statements.

In all cases where reference is made to RT module LOBSRF304 the hardware includes only the PCB area that implements the RF circuits of the module, plus the non-RF circuits specifically included in the LOBSRF304 design to support proper operation of the RF circuits. RT module LOBSRF304 may be realized as a physically distinct circuit module intended to be installed on a carrier PCB. RT module LOBSRF304 may also be realized by being exactly incorporated as a section of a PCB that includes other functions that are not immediately related to RF operation, and that do not adversely affect proper RF operation.

The RT module LOBSRF304 contains an Atmel AT86RF212 (RF IC) that incorporates all the RF transmit and receive functions, including power filtering/regulation, RF analog circuits, modulation and demodulation circuits, frequency control circuits, operational timing circuits and data memory buffers. High level control of the RF IC (frequency, message data, TX/RX operations) is provided by a separate microcontroller (uC IC) that is part of the host application. The electrical connection between the RT module and the host application consists of a logic-level serial data link (SPI), various logic level control signals and a source of DC operating power. The RF IC contains digital data registers that may be read by the host uC IC to determine the make and model of the RF IC so the proper firmware functions are called to correctly operate the RT module.

There are no physical user adjustments to the RT module hardware. The host application firmware may make use of only the documented control features supported by the RF IC.

The RT module is a proprietary design that will ONLY be supplied incorporated into a compliant host application, ALWAYS in combination with an approved antenna that is supplied with the host application. The RT module will NOT be available for sale as a retail or wholesale item, or as a repair or spare item. End user modification or repair of the RT module is not allowed.

All instruction, cautions and prohibitions related to proper RF operation are specifically noted in the host application operating manual. Both the RT module and the host application are appropriately labeled.

15.212(a)(1)(i)

***The modular transmitter radio elements must be shielded.*** The radio elements of the RT module are shielded by means of a 5-sided formed metal shield soldered to a printed circuit board (PCB)

ground flood forming a 6-sided enclosure around all the RF elements, including the crystal but excluding the antenna.

15.212(a)(1)(ii)

***The modular transmitter must have buffered modulation/data inputs.*** The RT module contains buffered data inputs. The component with buffered data inputs is the RF IC.

15.212(a)(1)(iii)

***The modular transmitter must have its own power supply regulation.*** The RF IC has separate internal DC linear regulators that provide regulated power to the internal analog and digital circuits that control radio functions. The RT module contains an additional linear low-noise pre-regulator at the RT module's DC input port which provides additional noise isolation from the host power supply. There is a supplemental LC pi-filter between the output of the pre-regulator and the DC input ports to the RF IC. The host applications contain DC regulators supplying power to the RT module, which provide additional noise isolation from the main power input that serves the host application.

15.212(a)(1)(iv)

***The modular transmitter must comply with the antenna requirements of section 15.203 and 15.204(C).*** The host application in combination with the RT module meets the FCC antenna requirements by either of two means: A fixed internal antenna or a supplied external antenna with a unique connector. All supplied antennas are low gain omni-directional types. The spurious emission, unique antenna connector and photos of typical antennas are shown in the application exhibits.

Host applications using the RT module are always supplied with a suitable type of antenna, either internal or external. Internal antennas are permanently attached to the RT module, either by direct connection to an RF transmission line (e.g. microstrip) or by using a unique connector (e.g. U.FL) on a short extension cable that allows the internal antenna to be favorably positioned within the host application enclosure. Approved external antennas and extension transmission lines always use unique connectors such as RP-TNC or RP-SMA. All host application manuals specifically note that the equipment may be used only with approved antennas and other RF accessories, and that use of un-approved items violates the warranty, terms of use and applicable regulations.

***The modular transmitter must be tested in a stand-alone configuration.*** The RT module was tested in conjunction with a base board in as a typical application. Tests are performed both with the RT module in the normal position within the application and with the RT module positioned by extension wires some distance away from the rest of the application.. Please see exhibit "Test Setup".

15.212(a)(1)(vi)(A)

***The modular transmitter must be labeled with its own FCC ID number.*** Please see exhibit "FCC Module Label" for the FCC ID of this module. Please see exhibit "FCC Application Label" for the FCC ID of host applications containing this module.

15.212(a)(1)(vii)

***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.*** LOBSRF304 is compliant with all applicable FCC rules. Detail instructions for maintaining compliance are given in the Users Manual.

15.212(a)(1)(viii)

***The modular transmitter must comply with any applicable RF exposure requirements.*** The RT module is compliant with all applicable RF exposure requirements. The maximum RF output can be no more than 20mW at the transmit port of the RF IC (data sheet best case values).

15.247(a)(2)

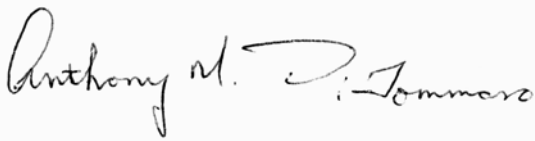
***Operation in the band 902-928 MHz with a minimum 6dB bandwidth of 500 kHz.*** The transmit bandwidth is at least 630 KHz at 6dB.

15.247(b)(3)

***The conducted output power for digital modulation must be  $\leq 1W$ .*** The conducted output is no more than 20mW at the transmit port of the RF IC (data sheet best case values, assuming 0dB path loss between the RF IC output pins and the antenna). The typical maximum conducted power is 10mW.

Please contact me if you have any further questions. Thank you for your attention.

Sincerely,

A handwritten signature in black ink, reading "Anthony M. Di Tommaso". The signature is written in a cursive style with a large initial 'A' and a stylized 'D'.

Anthony M. Di Tommaso  
Manager, Product Development  
Cervis, Inc.

Exhibits (TBD):

Photos

Diagrams

LOBSRF304 Module label

LOBSRF304 Application Label

Whatever else should be included