



Engineering, Inc.  
5969 Robinson Avenue  
Riverside, CA 92503-8620  
[www.dnbenginc.com](http://www.dnbenginc.com)

ATCB  
6731 Whittier Avenue  
McLean, VA 22101

19 Feb 2005

Attention: Timothy Johnson

RE: FCC ID: QOHSR20

Dear Tim,

Please review the attached documentation in response to your comments dated 15 Feb 2005. Also please use this letter as a request for confidentiality on block diagrams, schematics, and parts lists as supplied as part of this reply.

- 1) The block diagram should show the frequencies of all oscillators in the TX portion of the device (CFR 2.1033(a)(5)), unless this portion of the device is an OEM part from another manufacturer. Please provide either the block diagram for the TX portion, or alternatively provide a parts list that shows that this part is provided by another manufacturer.

File attached: Block diagram of EYSF2CAUX\_040928 (Confidentiality requested)

File attached: Bill\_of\_material\_EYSF2CAUX\_040928 (Confidentiality requested)

- 2) Please provide complete external photographs (top and bottom) showing the entire host device.

File attached: Photo Ext Front

File attached: Photo Ext Rear

- 3) Please provide top and bottom internal photographs of each board in the device. Additional photographs are also required to show the area underneath any sub-shields if present (i.e. Bluetooth module).

File attached: Photo Int Rear Housing (Identical to FCC ID: QOHGS20)

File attached: Photo Int Front Housing (Identical to FCC ID: QOHGS20)

File attached: Photo Int Front view 2 (Identical to FCC ID: QOHGS20)

File attached: Photo Xmtr Top (Identical to FCC ID: QOHGS20)

File attached: Photo Xmtr Btm (Identical to FCC ID: QOHGS20)

File attached: Int Blue CS (Modification to FCC ID: QOHGS20)

File attached: Int Blue SS (Modification to FCC ID: QOHGS20)

Please note ALL components are identical to the previous FCC ID: QOHGS20 except the bluetooth module. Also note that the bluetooth module is NOT the transmitter it is used as a hardwire interface from the GPS positioning hardware to the transmitter. This is why this was presented as a Class II permissive change in accordance with FCC Part 15 Sec 1.1043.

Continued:

Sec. 2.1043 Changes in certificated equipment. (a) Except as provided in paragraph (b)(3) of this section, changes to the basic frequency determining and stabilizing circuitry (including clock or data rates), frequency multiplication stages, basic modulator circuit or maximum power or field strength ratings shall not be performed without application for and authorization of a new grant of certification. Variations in electrical or mechanical construction, other than these indicated items, are permitted provided the variations either do not affect the characteristics required to be reported to the Commission or the variations are made in compliance with the other provisions of this section. Changes to the software installed in a transmitter that do not affect the radio frequency emissions do not require a filing with the Commission and may be made by parties other than the holder of the grant of certification.

Changes to frequency determining and stabilization:	No
Changes to frequency modulation:	No
Changes to basic modulator circuit:	No
Changes to maximum power or field strength:	Possibly

Possibly because the output power has decreased from the original submittal. This could be classified as a degradation of performance under paragraph (2). The accompanying test data which was supplied with the original application indicated a reduction in output power.

(2) A Class II permissive change includes those modifications which degrade the performance characteristics as reported to the Commission at the time of the initial certification. Such degraded performance must still meet the minimum requirements of the applicable rules. When a Class II permissive change is made by the grantee, the grantee shall supply the Commission with complete information and the results of tests of the characteristics affected by such change. The modified equipment shall not be marketed under the existing grant of certification prior to acknowledgement by the Commission that the change is acceptable.

4) Please provide and agency agreement form.

File attached: FCC Agency Authorization Form

5) Is confidentiality requested on any exhibits (block diagram, operational description, schematic, etc.). If so, please upload a confidentiality letter to request this.

File attached: RV58074 Conf Ltr

Continued:

- 6) The schematics do not include the Bluetooth card. Note that a schematic for the TX portion of the device is required as specified 2.1033(b)(5) for the RF section. Please provide either a schematic for the Bluetooth device or as an alternative, you may provide a parts list that lists that shows that this part is provided by another manufacturer. Please provide either a schematic or parts list as specified. If necessary, please update the confidentiality letter to include the parts list.

File attached: Circuit schematic of EYSF2CAUX\_040928 (Confidentiality requested)

- 7) Test photographs must be provided for radiated emissions. Please provide as a test configuration photograph exhibit.

File attached: 3M DRG V EUT X axis  
File attached: 3M DRG H EUT Y axis  
File attached: 3M DRG H EUT Z axis  
File attached: 10M LOG V EUT X axis  
File attached: 10M LOG H EUT Y axis  
File attached: 10M LOG H EUT Z axis  
File attached: 10M BCN V EUT X axis  
File attached: 10M BCN H EUT Y axis  
File attached: 10M BCN H EUT Z axis

- 8) This device appears to be possibly used in hand held configurations as well and therefore 20 cm can not be assumed for MPE. However, the power is significantly low such that SAR is not required. Please provide an appropriate exhibit for RF exposure. An example has been provided but will need to be adjust for this device.

File attached: RV58074AR4 Exposure  
File attached: RV58074AR4 FCC Xmtr Part 2

Note: A new Part 2 of the report is attached because this information is duplicated in the report.

- 9) The device appears to be capable of connecting to a PC via a data cable is also categorized as a PC peripheral device. Please clarify if you are asking for:
- a) Certification of the device as a TX, and a DoC has been performed by an appropriately accredited test lab for a PC peripheral
  - b) Certification as a TX + PC peripheral.

Note 1: The option b) would be considered as a composite application and 2 certificates (one for the TX, one for the PC peripheral portion) would be issued. There are additional review costs associated with this additional certification.

Note 2: To qualify to perform DoC applications, the test lab must be accredited (i.e. NVLAP or A2LA) to perform testing under the DoC procedure and the device has additional labeling and manual requirements for the DoC. Currently the device does not appear to be appropriately labeled for a DoC.

Continued:

Note 3: Note that for DoC tests, the device is configured with a minimum test configuration as specified by ANSI C63.4 which includes complete computer + 2 I/O devices attached (one may be the EUT).

Incorrect assumption, the port located on the device is for an external battery pack only. There is no connection to an external device. There is no capability to download information other than through the tx portion of the device.

DNB Engineering NVLAP Code: 200587-0

10) User Manual page 30 states a 2.7 dBi antenna. The MPE information mentions 1 dBi. Please correct and explain as necessary.

Error on my part, correct antenna gain is 2.7dBi. Information has been corrected and re-submitted. See file attached under item 8.

11) Users manual appears to be missing information required by 15.21. Please explain where this may be found or correct.

Sec. 15.21 Information to user. The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. In cases where the manual is provided only in a form other than paper, such as on a computer disk or over the Internet, the information required by this section may be included in the manual in that alternative form, provided the user can reasonably be expected to have the capability to access information in that form.

The following information is located on Page 27 of manual. I believe this satisfies this requirement please confirm.



**WARNING:**

Changes or modifications not expressly approved by Leica Geosystems for compliance could void the user's authority to operate the equipment.

12) Please consider adding the following or similar to the users manual:

“This device complies with the Federal Communications Commission (FCC) RF exposure limits for the General Population/Uncontrolled exposure environment.”

I will advise the customer to add the above statement to the manual at the next iteration.

Continued:

- 13) The test methodology on page 11 of the test report mentions 3 meters, but the limits in the data do not appear to be for 3 meter. Please correct and explain as necessary. What test distance was used? Measurements are generally provided at 3 meters, especially > 1 Ghz.
- (g) As an alternative to the radiated emission limits shown in paragraphs (a) and (b) of this section, digital devices may be shown to comply with the standards contained in Third Edition of the International Special Committee on Radio Interference (CISPR), Pub. 22, "Information Technology Equipment--Radio Disturbance Characteristics-- Limits and Methods of Measurement" (incorporated by reference, see Sec. 15.38). In addition:
- (1) The test procedure and other requirements specified in this part shall continue to apply to digital devices.
  - (2) If, in accordance with Sec. 15.33 of this part, measurements must be performed above 1000 MHz, compliance above 1000 MHz shall be demonstrated with the emission limit in paragraph (a) or (b) of this section, as appropriate. Measurements above 1000 MHz may be performed at the distance specified in the CISPR 22 publications for measurements below 1000 MHz provided the limits in paragraphs (a) and (b) of this section are extrapolated to the new measurement distance using an inverse linear distance extrapolation factor (20 dB/decade), e.g., the radiated limit above 1000 MHz for a Class B digital device is 150 uV/m, as measured at a distance of 10 meters.
  - (3) The measurement distances shown in CISPR Pub. 22, including measurements made in accordance with this paragraph above 1000 MHz, are considered, for the purpose of Sec. 15.31(f)(4) of this part, to be the measurement distances specified in this part.

You are correct, this device was tested at a test distance of 10 meters per CISPR 22 in accordance with the clause as listed above.

- 14) Peak conducted power must be measured with a RBW > bandwidth. Please remeasure using either 1 or 3 MHz RBW as appropriate.

Corrected plot has been updated into part 2 of the report with the correct RBW of 1MHz. Reference file attachments under item 8 above.

- 15) The device is a portable device. Therefore radiated emissions must be tested with the device positioned in each of 3 axis in order to obtain worse case results. Please confirm if this was done.

Yes, only the worst case position was recorded in the test report.

Continued:

- 16) Emissions appear to be tested only up to 1 GHz. Spurious emissions must be investigated up to 10 times the fundamental or highest oscillator. Please explain/provide data as necessary. For example > 1 GHz, there are peak limits of 74 dBuV/m and average limits of 54 dBuV/m. The FCC expects the device to be hop stopped and measured for compliance to peak. Compliance to average may be shown by mathematically correcting the peak results to average based upon worse case duty cycle that can occur in any 100 msec period of time. However, please note that worse case duty cycle is unknown given this transmitter does not behave like a normal Bluetooth. Theory must be provided to support worse case duty cycle (not just typical). Please review. Additionally, please note that from conducted spurious, high emissions at the 2nd harmonic are expected.

Emissions were tested from 30MHz to 25GHz. No emissions within 16dB of the limits were observed. Conducted readings indicate emissions at the second harmonic but it did not appear above the ground floor when measuring on the OATS. Emissions above 1GHz are measured at a test distance of 3 meters with a DRG horn antenna. When this occurs we reduce resolution bandwidth, but we still did not observe any emissions.

- 17) Please provide test data to show compliance in the restricted bands < 2390 MHz and > 2483.5 MHz to the 54 and 74 dBuV/m limits.

This test is required for any spurious emission or modulation product that falls in a Restricted Band, as defined in Section 15.205.

No products fell within the restricted band.

- 18) Most Bluetooth operate from 2402-2480. This also matches the same frequency band specified on the 731 form. However, it appears from the data that the device only operates on frequencies 2415 – 2478 which is unusual for a Bluetooth device. Please note that the FCC requires testing on the lowest and highest channels and additionally a channel around the center. Please confirm the actual operational band for this device and if necessary please provide additional data as necessary.

This is not your “typical” bluetooth device. The plots provided are the actual data that was observed during testing. From the 6dB bandwidth plots provided indicates that channel 1 corresponds to the lowest channel at 2.41596 and channel 32 the highest at 2.47795 with channel 16 at 2.44596. This is the way it is.

- 20) Please provide a complete tunable list of frequencies for this device.

This device is not tunable. The spectrum provided indicates that channels used, this is set at the factory.

Continued:

Hopefully, this clears everything up.

Kindest regards,

A handwritten signature in blue ink, appearing to read "C L Payne III".

C L Payne III  
DNB Engineering Inc  
5869 Robinson Avenue  
Riverside, CA 92503  
(951) 637-2630      (951) 637-2704 (Fax)  
[Les@dnbenginc.com](mailto:Les@dnbenginc.com)  
[www.dnbenginc.com](http://www.dnbenginc.com)