

**ENGINEERING STATEMENT**

 Of  
 William M. Junge

The application consisting of the attached engineering test report and associated FCC form 731 application form has been prepared in support of a request for a Class II Permissive Change for FCC: NP4-5018-500 to add FCC Rule Part 22. The certification NP4-5018-500 has been previously granted to CalAmp Wireless Networks Corporation for its Viper VHF radio modem under FCC Identifier NP4-5018-500. Only data pertinent to complying with specific parts of Part 22 has been provided. CalAmp Wireless Networks Corporation does the final assembly and markets the Viper VHF unit.

**EXISTING CONDITIONS**

The unit utilized for Part 22 verification is a standard production unit. The transceiver operates on VHF frequencies ranging from 136.000 MHz to 174.000 MHz.

**PROPOSED CONDITIONS**

It is proposed to accept the request for the Viper VHF Transceiver/Modem for operation under the FCC Part 22 Rules; specifically Parts 22.535 - Transmitter Rated Power, 22.355 - Frequency tolerance and 22.359 - Emission limitations. The applicant anticipates marketing the device for use in wireless transmission of data.

**PERFORMANCE MEASUREMENTS**
**Parts 22.535 - Transmitter Rated Power**

The maximum power output of the Viper VHF Transceiver/Modem is 12 Watts. This device will be professionally installed. **It is the responsibility of the licensee and installer to properly install the device and be in compliance with the ERP limits of Part 22.535.**

**Parts 22.355 - Frequency Tolerance**

Part 22.355 - TABLE C-1—FREQUENCY TOLERANCE FOR TRANSMITTERS IN THE PUBLIC MOBILE SERVICES is specified at 5.0 ppm from 50 to 450 MHz. The frequency tolerance of the Viper VHF Transceiver/Modem is 1.0 parts per million as granted in NP4-5018-500.

**Part 22.359 - Emission limitations**

All measurements for Occupied Bandwidth were made in accordance with mask compliance Rules and Regulations Sections 2.1041 and 2.1049 of Title 47 of the Code of Federal Regulations. Equipment performance measurements were made in the engineering laboratory located at 299 Johnson Ave Suite 110, Waseca, MN 56093 USA. All measurements were made and recorded by myself. The performance measurements were made November 2, 2015.

The intended Frequencies Bands of Operation per FCC Part 2.106 for Part 22 are:

150.800-152.855 MHz

157.450-161.775 MHz

The Test Frequencies chosen for each bandwidth setting are one standard channel spacing (+/-) away from the Band Edge per the table below to show compliance at the band edges.

Band Edge Frequency	Test Frequencies per Bandwidth		
	6.25 kHz Channel	12.5 kHz Channel	25.0 kHz Channel
150.800000	150.806250 MHz	150.812500 MHz	150.825000 MHz
157.450000	157.456250 MHz	157.462500 MHz	157.475000 MHz
161.775000	161.768750 MHz	161.762500 MHz	161.750000 MHz

The Part 22 Emission Mask used is defined below:

Sidebands and Spurious [Rule 22.359 (a), Rule 22.359 (b) P = 12 Watts]

All sidebands and spurious outside the Frequency Bands of Operation to be attenuated:

$43 + 10\log_{10}(P)$ . At 12W that is 53.8 dB.

The plots supplied clearly show the Viper VHF Transceiver/Modem to be well within the Emission Bandwidth; therefore, we felt it not necessary to provide plots at all the band edges.

For Transmitter Spurious and Harmonics measurements outside the Occupied Bandwidth refer to the NP4-5018-500. Transmitter Spurious and Harmonics were shown to be  $55 + 10\log(P)$  which exceeds the  $43 + 10\log(P)$  of Part 22.359 requirement.

**Regarding compliance with Part 90.203(j)(5) - Certification required.**

**CalAmp's Viper VHF Transceiver/Modem is software programmable to operate on a 6.25 kHz, 12.5 kHz and 25 kHz channels. The equipment is compliant with 90.203(j)(5) as it is capable of four 6.25 kHz channel bandwidth settings with Data Rates of 4.0 kbps, 8.0 kbps, 12.0 kbps and 16.0 kbps as granted in NP4-5018-500.**

Channel Spacing	Data Rate	FCC Rule Parts:
6.25 kHz	4, 8, 12, 16 kbps	90.209 (b)(5), 90.210(e)
12.5 kHz	8, 16, 24, 32 kbps	90.209 (b)(5), 90.210(d)
25 kHz	16, 32, 48, 64 kbps	90.209 (b)(5), 90.210(c)

**CONCLUSION**

Given the results of the measurements contained herein, the applicant requests to be applied a Class II Permissive Change for the Certificate NP4-5018-300/773B-5048300 to add Part 22 for all the emission designators of FCC IDENTIFIER NP4-5018-500.



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