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November 19, 2004

Ms. Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street SW
Washington DC 20554

Re: IB Docket No. 02-10, *Earth Station Vessels*
Ex parte Communication

On behalf of the Fixed Wireless Communications Coalition (FWCC), and pursuant to Section 1.1206(b)(1) of the Commission's Rules, I am electronically filing this letter and its attachment as a written *ex parte* communication.

The attachment responds to ex parte filings in this docket by Broadband Maritime, Inc. (BMI) dated October 27, 2004 and November 11, 2004. It shows that BMI is not using accepted industry standards for its calculations, and is using incorrect assumptions on the transmission parameters of the ESV and FS stations.

The FWCC has made a separate filing today on growth on the 6 GHz Fixed Service band, the critical need for reliable communications in this band, and examples of specific Fixed Service microwave systems that are vulnerable to interference from Earth Station Vessels.

Please do not hesitate to call with any questions.

Respectfully submitted,

Mitchell Lazarus
Counsel for the Fixed Wireless
Communications Coalition

cc: Service list

In the Matter of
Earth Stations on Board Vessels
IB Docket No. 02-10

Response of the Fixed Wireless Communications Coalition
to Ex Parte Filings by Broadband Maritime, Inc.
dated October 27, 2004 and November 11, 2004

The Fixed Wireless Communications Coalition (FWCC) disputes statements made by Broadband Maritime, Inc. (BMI) in the above referenced ex parte documents filed with the Commission. Throughout its documentation, BMI dismisses the potential interference situations that can occur between earth stations on board vessels (ESVs) operating in the C-band (5925-6425 MHz) and fixed service (FS) microwave stations licensed and coordinated in the overlapping 6 GHz band.

As stated in the FWCC ex parte letter dated July 29, 2004, the earth station parameters that are shown in the examples came from an actual Prior Coordination Notice (PCN) for a proposed C-band ESV deployment. **The calculated level of interference shown in the FWCC examples—based on realistic transmission and equipment parameters—will totally disrupt the service of an FS network.** Furthermore, the list of proposals offered in the BMI filing dated November 11, 2004, are not sufficient to prevent interference into FS receivers from ESV transmissions and place an undue burden on the incumbent FS licensee to identify and report interference after it occurs.

The parameters given in the BMI filing dated October 27, 2004, do not appear to reflect the ESVs that have been coordinated to date and are not in a format that allows any direct comparison with a typical ESV PCN. After checking with two frequency coordination agencies this author was not able to establish whether Broadband Maritime ever sent out a PCN for their proposed ESVs.

<u>The following comments are offered by FWCC for each of the numbered items presented in the Broadband Maritime filing on October 27, 2004:</u>

1) ***BMI***: The assumption that FS and ESV transmit at the same BW is wrong. FS transmits 3 MHz and up while ESV transmits 64-128 kbps.

FWCC Response: Neither of the two examples filed by FWCC indicated the same bandwidth (BW) for fixed service (FS) and ESV service. The first FWCC example was based on the current industry practice of referencing FS and ESV signal levels in dBW/4 kHz. The second was based on total power in a 3 MHz bandwidth for the ESV and 30 MHz for the FS station. Both examples consider a co-frequency case in which the 3 MHz ESV signal is within the 30 MHz FS receiver bandwidth. The 64-128 kbps data rate given by Broadband Maritime does not define the occupied bandwidth of the ESV signal. Other ESV operators typically provide T-1 (1.544 Mbps) or multiple T-1 service in a 3 MHz bandwidth.

2) ***BMI***: The assumption that ESV minimum look angle is 10 degrees is wrong. The minimum angle is 20 degrees.

FWCC Response: As noted in the FWCC examples, the elevation angle was obtained from an actual PCN which indicated a minimum elevation angle of 9.9 degrees. This was for an ESV located near Everett, Washington. The minimum elevation angle allowed by the FCC Rules and Regulations is 5 degrees. The frequency coordination process requires an analysis of the entire range of earth station azimuths and elevations in order to calculate potential interference conflicts with fixed service terrestrial stations.

3) ***BMI***: ESV transmit power (at the HPA output) is 33 dBm @64 kbps and 35 dBm @ 128 kbps.

FWCC Response: It is not possible to calculate the interference signal level per 4 kHz without knowing the occupied bandwidth of the 64 kbps or 128 kbps carriers referenced by Broadband Maritime. The total power for a 3 MHz carrier would be +52 dBm as derived from a specified power level of -7 dBW/4 kHz as stated in an actual PCN. (Reference Example 2 of the FWCC ex parte filing of July 29, 2004.)

4) ***BMI***: The assumption that FS and ESV antennas don't have azimuth angle between them is not reasonable. 20 degree azimuth shift is more practical.

FWCC Response: Broadband Maritime is ignoring the reality that an ESV could pass across the main beam area or aperture of an FS station antenna that is facing the coastline. This would result in a zero degree discrimination angle with respect to the FS antenna and would subject the ESV signal to the main beam gain of the FS antenna.

5) ***BMI***: FS antenna is more likely to be 3 ft (8 ft antenna is rare and will need special structure to support wind load).

FWCC Response: Contrary to Broadband Maritime's assertion, 3-foot antennas can not be used at all for FS applications in the 6 GHz band because they do not meet the current minimum performance criteria as specified in Section 101.115 of the FCC rules. The 8-foot antenna size is very common for fixed service installations in the 6 GHz band. Indeed, antennas deployed for fixed service applications typically range in size from 6-foot to 10-foot diameter and could be as large as 12-foot or 15-foot if needed to meet the path availability criteria. Tower structures are then designed to withstand the corresponding wind loads and ice loads, where applicable.

6) ***BMI***: Although the minimum discernible signal of the standard Microwave system is –70 dBm the received signal is at least 25 dB higher to overcome fading.

FWCC Response: Broadband Maritime is apparently not familiar with current industry practice for frequency coordination that uses a -154 dBW/4 kHz long-term objective for a C-band earth station into a 6 GHz FS terrestrial station. Neither the FS receiver threshold nor the FS station fade margin is relevant when the -154 dBW/4kHz objective is used. The -154 dBW/4 kHz objective was specified in Part 25 of the FCC Rules and Regulations over 25 years ago and is still being used by the satellite and fixed service industries as a default value for frequency coordination at this time. As noted in Example 1 of the FWCC filing, the calculated interference level of -94 dBW/4 kHz from the ESV into the FS station misses the -154 dBW/4 kHz objective by 60 dB (i.e., a factor of 1,000,000 times above the objective level). This interference level will totally disrupt the FS service.

7) ***BMI***: The only criterion to determine interference is S/(N+I) >= S/Nmin(=34 dB)

FWCC Response: Similar comment as stated in paragraph (6) above. The interference objective of -154 dBW/4 kHz has been used for coordinating C-band earth stations into FS stations for over 25 years and is still the current industry standard. This objective was derived by industry experts to protect 6 GHz analog FS receivers from the operation of C-band earth stations. The ITU is continuing its work on a suitable long-term interference objective that may be around -170 dBW/4 kHz for a digital receiver. TIA bulletin 10-F proposes the use of a stricter threshold-to-interference (T/I) criteria for protecting the current generation of digital FS receivers. This method is illustrated in Example 2 of the FWCC filing of July 29, 2004.

8) ***BMI***: We assumed negligible NF and cable loss, as they affect the signal and the interference in the same.

FWCC Response: Even though the receiver noise figure (NF) and cable loss affect the desired FS signal and the ESV interference signal in the same way, the -154 dBW/4 kHz objective is specified at the input of the FS receiver. The cable (or waveguide) loss would further reduce the ESV interference signal level and should be used in the interference level calculation. This would be advantageous for the ESV in meeting the -154 dBW/4 kHz objective.

ADDITIONAL COMMENTS ON BMI'S PROPOSALS SUBMITTED IN THEIR NOVEMBER 11, 2004, EX PARTE FILING:

FWCC General Comment: The proposals presented in the BMI filing will not eliminate or prevent interference from occurring into a FS facility.

BMI proposes a "Minimum 20 degree angle of elevation for the main lobe."

FWCC Response: Even if a 20-degree minimum elevation angle were specified for the ESV, the resulting interference level would only be reduced by 7.5 dB vis-a-vis the 9.9-degree angle used in the FWCC examples. The FWCC examples show that interference levels can be 60 dB or more above the industry accepted criteria. Therefore, a 7.5 dB reduction would still not eliminate the possibility of interference into the FS station.

In areas along the western coast of the United States, including the state of Alaska, the FS station could be located at a high elevation such that the 20 degree elevation angle of the ESV is effectively reduced by the positive angle to the FS antenna on the tower. Example: A centerline of 600 feet above mean sea level for the FS antenna at a distance of 1 mile from an ESV would result in an angle of more than 5 degrees above the ESV platform. If the ESV elevation angle were at 20 degrees, then the main beam of the ESV antenna would only be 15 degrees above the FS antenna. This would result in less discrimination with respect to the ESV antenna and a higher interference level into the FS antenna.

BMI proposes a "Horizontal EIRP <41 dBm" and "Bandwidth <300 kHz."

FWCC Response: Again, these proposals do not eliminate the possibility of interference into an FS station. The power density of 41 dBm/300 kHz is equivalent to +22 dBm/4 kHz. (41 – 19 dB = +22 dBm/ 4 kHz by using the conversion factor of 10 log 4/300 kHz or –19 dB.) This level is within 1 dB of the level used in Example 2 of the FWCC July 29, 2004, filing. (See Example 2 below.) This +22 dBm/4 kHz level can be converted to dBW by subtracting 30 dB (i.e., 10 log 1/1000 mW = –30 dB). The resultant level of –8 dBW/4 kHz is within 1 dB of the level used in Example 1 of the FWCC filing. (See Example 1 below.) Therefore, the ESV transmission parameters used in the FWCC calculations are consistent with the transmission parameters presented by BMI.

It should be noted that the FWCC calculations do not take into account the aggregate effect from multiple ESV channels on the same or different vessels that could be transmitted simultaneously into the passband of an FS receiver. This would result in a proportionate increase in the interference level at the FS receiver and would require frequency offset to mitigate the interference conflict if sufficient terrain blockage does not exist along the interference path.

SUMMARY: As noted above, Broadband Maritime is not using current industry practices based on FCC Rules and Regulations. The ESV power level of -7.0 dBW/4 kHz referenced above and in the FWCC ex parte filing of July 29, 2004 was specified in a PCN for an ESV near Everett, Washington and several other locations. This level was used to calculate the interference signal level into a terrestrial station as shown in Example 1 of the FWCC filing. As noted in the example, the calculated ESV interference level of -94 dBW/4 kHz into the FS receiver misses the -154 dBW/4 kHz objective by 60 dB (i.e., a factor of 1,000,000 times above the objective level).

This level of interference will totally disrupt the service of an FS network.

NOTE: As stated above, the -154 dBW/4 kHz interference objective was specified in Part 25 of the FCC Rules and Regulations over 25 years ago for frequency coordination purposes and is still being used by the satellite and fixed service industries as a default value at this time.

DLG 11/18/04

Earth Station (ES) to Terrestrial Fixed Station (FS) Interference Calculations

(Part of the FWCC ex parte filing of July 29, 2004 with minor editorial changes)

EXAMPLE 1 uses an uplink power density of -7 dBW/4 kHz for a typical ESV and -154 dBW/4 kHz as the interference objective for a C-band earth station into a terrestrial station:

Power ES = - 7.0 dBW/4 kHz (Earth Station parameters from actual PCN)
ES Antenna Gain = + 7.0 dBi (max toward horizon @ 9.9° minimum elevation angle)
Free Space Loss (FSL) = -132.4 dB (10 miles)
FS Ant. Gain = +41.0 dBi (8' dish, main beam, no discrimination)
FS Line Loss = - 2.4 dB (200' waveguide @ 1.2 dB/100')

Interference = - 7.0 dBW/4 kHz + (antenna gains - FSL - line loss)
Interference = - 7.0 dBW/4 kHz - 87 dB (rounded) = - 94 dBW/4 kHz

Interference case margin = -154 dBW/4 kHz - (-94 dBW/4 kHz) = -60 dB
i.e., the ESV interference level misses the -154 dBW/4 kHz objective by 60 dB into the terrestrial receiver.

EXAMPLE 2 uses the terrestrial T/I objective of 34 dB. Using the -7dBW/4 kHz as above, the earth station interference power into the terrestrial receiver is derived as follows:

-7 dBW/4 kHz = +23 dBm/4 kHz by applying +30 dB conversion factor for dBW to dBm

Total ESV uplink power equals:
+23 dBm/4 kHz + 10 log*(3000/4)kHz for 3 MHz ESV uplink signal; then follows:
+23 dBm/4 kHz + 29 dB = +52 dBm total power in the 3 MHz signal

Interference signal level = +52 dBm - 87 dB (same gains-losses as Example 1 above)
Interference signal level = -35 dBm

Then deriving the interference signal level objective for a 30 MHz digital receiver with a threshold of -70 dBm and a required 34 dB T/I ratio would give the following result:

FS Victim receiver interference objective = -70 dBm (threshold) -34 dB (T/I objective),
FS Interference objective = -104 dBm

Then follows (using the interference signal level of -35 dBm calculated above):
Interference case margin is -104dBm - (-35 dBm) = -69 dB,
i.e., the interference signal level misses the -104 dBm objective by 69 dB.

DLG 11/18/04

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