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October 13, 2015

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

**Re: *Ex parte* filing in IB Docket Nos. 11-109, 12-340; IBFS File Nos. SAT-MOD-20101118-00239; SAT-MOD-20120928-00160; SAT-MOD-20120928-00161; SES-MOD-20121001-00872**

Dear Ms. Dortch:

This *ex parte* letter responds to *ex parte* meetings Garmin International, Inc. (“Garmin”) held with Julius Knapp and Philip Verveer on September 22, 2015. In those meetings, Garmin representatives discussed GPS performance criteria and presented a hand-out stating that there are “four aspects to GPS performance that are critical in many existing and emerging applications.” These aspects, also referred to in the hand-out as “parameters,” are “Accuracy, Integrity, Availability and Continuity.”

LightSquared has stated many times in this proceeding that the Commission must evaluate harmful interference according to whether the functioning of a GPS device is actually endangered, meaning that there would be a user-perceptible impact on the position reported by the device. The testing being conducted by Roberson and Associates seeks to show whether operation of wireless broadband near GPS causes any such impact. Garmin now appears to agree that understanding real world impact on GPS is, ultimately, the appropriate way of understanding harmful interference and determining whether it exists.

But rather than actually measure that impact, Garmin still wants to determine harmful interference by using a 1 dB rise in the carrier to noise ratio (the “1dB proposal”). Garmin states that to use any other measure “would require analyzing many complicated use cases for interference impact.” This quite plainly shows that not even Garmin believes the 1 dB proposal shows actual harmful interference. Rather, the 1 dB proposal is a proxy Garmin wants to use for no other reason than Garmin’s belief that it is just too hard to show harmful interference any other way.

Perhaps this sort of argument would make sense if an increase in the noise floor was the most significant variable in assessing interference for GPS devices and was the only variable that was measurable in a testing lab. Neither proposition is true. All of the other routine variables such as satellite position and atmospheric conditions contribute far more to the range of error

## COVINGTON

Marlene H. Dortch  
October 13, 2015  
Page 2

for a GPS device's reported location than background radio noise. GPS receivers are designed to operate in hostile environmental and spectral environments, correct for the errors introduced by those environments, and continue functioning accurately. Furthermore, it is possible to measure key performance indicators that relate directly to the user experience, such as position error. Roberson and Associates is testing such indicators, and is doing so without help from the GPS community despite repeated requests.

Quite aside from insisting that the 1 dB proposal is the only way to determine harmful interference, Garmin asserts that a "small increase in the noise floor may impact any one of these parameters in unexpected or dramatic ways." This statement shows even more clearly why the 1 dB proposal is wrong. Garmin provides no evidence whatsoever to substantiate that an increase in the noise floor of as small as 1dB *would actually* impact any actual performance of the device—nor has the GPS Innovation Alliance or any other party in this or related proceedings. It is merely asserted, and almost five years into this process these assertions increasingly appear to be little more than articles of faith.

Even Garmin's own reference to the ICAO International GNSS Standards and Recommended Practices (SARPS) fails to support its position. The ICAO SARPS include definitions and requirements for accuracy, integrity, availability and continuity, as Garmin states. Nowhere, however, do the ICAO SARPS use an increase of as small as 1 dB in the carrier to noise ratio as the threshold for showing that the parameter is not met.

Remarkably, Garmin and others continue to make these kinds of arguments, even though only last year the Commission flatly rejected GPS Innovation Alliance arguments for applying stricter out-of-band emission limits to AWS-3 spectrum because of general, but unsubstantiated, concerns about interference. The Commission did so stating that "GPSIA's arguments that the proposed OOB limit *may* present some risk of interference do not warrant deferring action on the proposed OOB limit."<sup>1</sup>

Aside from its assertion that an increase may impact performance parameters, Garmin states that its 1 dB proposal has been "internationally recognized." While this is slightly more accurate than a previous GPS Innovation Alliance assertion that the 1 dB proposal is the accepted interference standard, this statement is still misleading. As LightSquared has explained,<sup>2</sup> and will explain again here, the 1 dB proposal was *recommended* by the International Telecommunication Union for a very limited purpose—for *co-channel* interference as applied only to GPS devices using assisted GPS (*i.e.*, cellular), which were the only devices addressed by the recommendation. And Garmin fails to note—as GPS parties have repeatedly

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<sup>1</sup> *Amendment of the Commission's Rules with Regard to Commercial Operations in the 1695-1710 MHz, 1755-1780 MHz, and 2155-2180 MHz Bands*, Report and Order, GN Docket No. 13-185, ¶ 62 (Mar. 31, 2014) (emphasis in original).

<sup>2</sup> Letter from Gerard J. Waldron to Marlene H. Dortch, IB Docket No. 12-340, at 5–6 (filed July 2, 2015).

**COVINGTON**

Marlene H. Dortch  
October 13, 2015  
Page 3

failed to note—that this recommendation, as narrow as it is, has never been adopted by any relevant equipment standards body (such as 3GPP).

Thus, while the Garmin hand-out does helpfully discuss performance parameters that actually relate to the use of GPS devices, it raises more questions about the 1 dB proposal than it answers. Moreover, the hand-out fails to show what steps, if any, Garmin is taking to make its devices more resilient to licensed operations in adjacent bands, so that these functions are not negatively impacted by poor receiver design choices.

Please direct any questions to the undersigned.

Respectfully submitted,

/s/ Gerard J. Waldron

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Gerard J. Waldron  
*Counsel to LightSquared*

CC: Julius Knapp  
Philip Verveer