

BEFORE THE  
**Federal Communications Commission**  
WASHINGTON, DC 20554

In the Matter of	)	
	)	
Service Rules for Advanced Wireless Services in the 2000-2020 MHz and 2180-2200 MHz Bands	)	WT Docket No. 12-70
	)	
Fixed and Mobile Services in the Mobile Satellite Service Bands at 1525-1559 MHz and 1626.5- 1660.5 MHz, 1610-1626.5 MHz and 2483.5-2500 MHz, and 2000-2020 MHz and 2180-2200 MHz	)	ET Docket No. 10-142
	)	
Service Rules for Advanced Wireless Services in the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz and 2175-2180 MHz Bands	)	WT Docket No. 04-356
	)	

To: The Commission

**COMMENTS OF THE U.S. GPS INDUSTRY COUNCIL**

The U.S. GPS Industry Council (the “Council”), by its attorneys and pursuant to Sections 1.415 and 1.419 of the Commission’s Rules (47 C.F.R. §§ 1.415 & 1.419), hereby comments on the proposals advanced in the above-captioned Notice of Proposed Rulemaking and Notice of Inquiry (“AWS-4 NPRM/NOI”) released by the Commission on March 21, 2012.<sup>1</sup> The Council and its members welcome the opportunity to comment on the proposals and inquiries set forth in the AWS-4 NPRM/NOI, which would permit more flexible use of the S-band spectrum allocated to the Mobile-Satellite Service (“MSS”). The Commission proposes service rules to facilitate the introduction of terrestrial mobile wireless broadband services, a goal that the Council supports with the understanding that the Commission will also act in a manner that continues to protect the integrity and stability of existing services. These new terrestrial services would operate in radio frequency bands that have

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<sup>1</sup> See *Service Rules for Advanced Wireless Services in the 2000-2020 MHz and 2180-2200 MHz Bands et al.*, FCC 12-32, slip op. (released March 21, 2012). A summary of the AWS-4 NPRM/NOI was published in the *Federal Register* on April 17, 2012, establishing May 17, 2012 as the Comment deadline. 77 Fed. Reg. 22720 (April 17, 2012). See also FCC Public Notice, “Wireless Telecommunications Bureau Announces Pleading Cycle for Comments and Reply Comments on Advanced Wireless Services in the 2 GHz Band,” DA 12-603 (WTB, released April 17, 2012).

been allocated primarily to space-based communication services for more than a decade, and in which space-based communication services will continue to operate on a co-primary basis.

The Council and its members continue to support the Commission's efforts to promote expanded wireless broadband services in the 2 GHz MSS bands.<sup>2</sup> The Council focuses its comments here on matters with a direct impact on the continued successful operation of applications using the Global Positioning System ("GPS") within the 1559-1610 MHz band that is allocated on a primary basis to the Radionavigation-Satellite Service ("RNSS").

**1. The Commission Has Properly Initiated A Comprehensive, Focused Rulemaking Addressing The Many Technical, Legal And Policy Questions Surrounding Introduction of New Terrestrial Service In The 2 GHz Band.**

The Council commends the Commission's approach in this proceeding and believes that the groundwork has been laid to enable the 2 GHz MSS/ATC licensees to commence expeditiously to provide MSS and AWS-4 services. Notwithstanding the need for additional terrestrial broadband spectrum, this service rules proceeding, following on the heels of the 2010 reallocation rulemaking and inquiry proceeding for the 2000-2020 MHz and 2180-2200 MHz bands in ET Docket No. 10-142, reflects the fact that any reallocation of spectrum to accommodate new services is necessarily a complex undertaking. This is especially the case in bands being used to provide existing services that are adjacent to or near frequency bands where other, distinct services are already deployed. Under these circumstances, the Commission's determination to undertake a careful and deliberative evaluation of the many policy, legal, and technical questions posed is indispensable to a successful outcome. The *AWS-4 NPRM/NOI* follows the appropriate course for examining these issues by posing detailed technical questions at the outset, allowing interested parties to provide specific comments in the initial stages concerning the broad range of issues implicated in this proceeding. This will permit and encourage careful review of the important questions that the Commission raises,

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<sup>2</sup> See also Comments of the U.S. GPS Industry Council, IB Docket No. 11-149, FCC File Nos. SES-MOD-20110822-00983 & -00985, at 2 (filed October 17, 2011) (supporting waivers requested by New DBSD Satellite Service, G.P. and TerreStar Licensee Inc. to permit expanded terrestrial mobile broadband operations under their 2 GHz MSS ancillary terrestrial component authorizations).

as well as an exploration and discussion of related issues that are or may be triggered by the proposals and comments responding to these technical questions.

Given these frequency-band-specific technical questions, the Commission is correct in limiting the scope of the current proceeding to the 2 GHz MSS bands.<sup>3</sup> To the extent that the Commission may ultimately consider changes in spectrum use and associated service rules in other frequency bands that are currently allocated for MSS, such changes, if proposed, will need to be the subject of separate rulemaking notices tailored to the technical and policy issues raised by terrestrial fixed and mobile operations in those particular bands. Injecting into this service rules proceeding new issues involving the potential reallocation of other spectrum bands that the Commission has not specifically advanced for evaluation in the current NPRM/NOI would be counterproductive and contrary to the well-considered framework the Commission has established in the *AWS-4 NPRM/NOI*.<sup>4</sup>

**2. The Commission’s Proposal That The MSS And Terrestrial AWS Components In The 2 GHz Band Should Be Operated By The Same Licensee Is Sound.**

Where space-based and terrestrial systems share the same spectrum, careful coordination is required in order to avoid harmful interference between and among facilities operating in the two services. This is especially the case when both the satellite and ground-based components include mobile operations. Therefore, the Council agrees with the Commission’s initial determination that “assignment of terrestrial licenses to any entity other than the incumbent MSS licensee remains impractical.”<sup>5</sup> The Council also concurs that the only way the Commission may permit the terrestrial use of the 2 GHz MSS band is by modifying the existing MSS licenses under Section 316 of the Communications Act.

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<sup>3</sup> See *AWS-4 NPRM/NOI* at 3 (¶ 2) (“Due to the unique characteristics of each band, we intend to address the Commission’s Ancillary Terrestrial Component (ATC) rules for Big LEO and L-band MSS separately”).

<sup>4</sup> Unlike the 2000-2020 MHz and 2180-2200 MHz bands, the other MSS ATC bands are not allocated internationally for mobile use.

<sup>5</sup> *AWS-4 NPRM/NOI* at 24 (¶ 71).

As the Commission has noted on multiple occasions, and most recently reiterated in the *AWS-4 NPRM/NOI* itself, “granting shared usage of the same MSS frequency band to separate MSS and terrestrial operators would likely compromise the effectiveness of both systems.”<sup>6</sup> Indeed, the Commission has never authorized independently-operated, ubiquitously-deployed high-power terrestrial operations in any MSS band, and ubiquitous terrestrial mobile broadband deployment is a completely different use of these bands than was ever contemplated. The Commission’s proposed single-licensee approach under these circumstances, even with separate licensing rules and procedures for MSS and AWS-4, is thus fully justified.

Moreover, if the space and terrestrial mobile services were partitioned geographically or the spectrum were disaggregated into smaller units, the result would be less efficient spectrum use and a likely increase in the noise floor. Only a single operator is capable of maintaining the noise floor at its minimum. Thus, the Commission has logically and appropriately concluded that “the parties would not be able to overcome the technical hurdles to reach a workable sharing arrangement.”<sup>7</sup> Consistent with these findings, the Commission should tailor its AWS regulations to conform to these realities. The Council supports extension of the Commission’s spectrum manager leasing rules to cover additional AWS spectrum at 2 GHz, but licensees should not be permitted to partition or disaggregate spectrum through sale or *de facto* transfer in a manner that separates operational oversight and implementation of the satellite and terrestrial elements.<sup>8</sup>

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<sup>6</sup> *AWS-4 NPRM/NOI* at 5 (¶ 6), citing *Flexibility for Delivery of Communications by Mobile Satellite Service Providers in the 2 GHz Band, the L-Band and the 1.6/2.4 GHz Bands*, Report and Order and Notice of Proposed Rulemaking, 18 FCC Rcd 1962, 1965 (¶ 2) & 1993 (¶ 52).

<sup>7</sup> *AWS-4 NPRM/NOI* at 23 (¶ 69).

<sup>8</sup> See *AWS-4 NPRM/NOI* at 38-39 & 40 (¶¶ 114 & 116-117).

**3. The Commission Should Carry Over To The Part 27 AWS Rules All Of The Interference Protections Now Contained In Individual MSS ATC System Authorizations And In Part 25.**

**a. The Specific Out-Of-Band Emissions Limits Applicable To MSS ATC Licensees Should Be Codified Under Part 27.**

The Council also strongly agrees with the Commission’s proposal that “the technical rules and license conditions applicable today to the provision of terrestrial [ATC] services in the 2 GHz bands should generally apply to the AWS-4 bands.”<sup>9</sup> Nevertheless, because ATC was not previously intended to be a ubiquitous, high density, mobile terrestrial broadband service, the Commission must re-confirm that those technical rules and license conditions remain sufficient. As outlined in the *AWS-4 NPRM/NOI*, the Commission’s efforts in this proceeding should be implemented in a manner that carefully preserves and explicitly codifies existing, agreed upon out-of-band emission (“OOBE”) limits applicable via licensing decisions to existing and planned services, including previously authorized space-based and terrestrial augmentations.<sup>10</sup>

As the Commission notes in the *AWS-4 NPRM/NOI*, the currently-licensed 2 GHz MSS systems have been authorized for several years to operate an ancillary terrestrial component (“ATC”) associated with their authorized satellite operations.<sup>11</sup> These authorizations are explicitly conditioned upon limitation of OOBE into the 1559-1610 MHz band allocated for RNSS.<sup>12</sup> In its initial 2 GHz NPRM, the Commission referenced these OOBE limits, and stated its intention to impose them on any new fixed or mobile service in the MSS bands, proposing to require these service providers to operate “according to the technical and operational conditions *specified in the ATC authorizations.*”<sup>13</sup>

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<sup>9</sup> *AWS-4 NPRM/NOI* at 13 (¶ 28).

<sup>10</sup> *AWS-4 NPRM/NOI* at 13-20 (¶¶ 30-55).

<sup>11</sup> *AWS-4 NPRM/NOI* at 24 (¶ 70).

<sup>12</sup> See *New ICO Satellite Services G.P.*, 24 FCC Rcd 171, 195 (¶ 65) & 197 (¶ 69(g)) (IB 2009) (“*ICO MSS ATC Waiver Order*”); *TerreStar Networks, Inc.*, 25 FCC Rcd 228, 237 (¶ 28) & 239 (¶ 34(g)) (Sat. Div. 2010) (“*TerreStar MSS ATC Waiver Order*”).

<sup>13</sup> See *Fixed and Mobile Services in the Mobile Satellite Service Bands at 1525-1559 MHz and 1626.5-1660.5 MHz, 1610-1626.5 MHz and 2483.5-2500 MHz and 2000-2020 MHz and 2180-2200*

However, the current *AWS-4 NPRM/NOI* does not specifically propose to carry forward these established operating parameters as currently specified in the 2 GHz MSS ATC authorizations. Instead, the Commission proposes “generally” to apply to AWS-4 the license conditions applicable to the provision of 2 GHz ATC services,<sup>14</sup> and asks “whether any special interference rules protecting GPS are warranted for the 2 GHz band if we implement the AWS-4 proposals.”<sup>15</sup> The Commission should adopt the approach outlined in the *2 GHz NPRM* and codify the existing OOB limits from the 2 GHz MSS/ATC licenses directly into the Part 27 AWS-4 rules.

Since the late 1990s, the Council and its members have consistently sought to protect the expanding installed RNSS user base by seeking sensible interference protection limits when necessary to protect RNSS from newly-proposed operational scenarios. And, as appropriate, the Council and its members have achieved agreement with new service operators and equipment suppliers on feasible and cost-effective OOB limits to protect RNSS operations, and these limits have been imposed as conditions on the operators’ MSS/ATC licenses. In prior comments filed in response to the *2 GHz NPRM*, the Council supported the addition of terrestrial allocations in the 2 GHz MSS bands based on the Commission sustaining existing agreed upon OOB limits relative to RNSS.<sup>16</sup> These mutually agreed OOB limits were based on the ancillary nature of ATC and mobile cellular industry commercial best practices that provided achievable certainty for the MSS/ATC operators and protection for the installed RNSS user base.

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*MHz*, 25 FCC Rcd 9481, 9487 n.51 (2010) (“*2 GHz NPRM*”) (emphasis added); *see also id.* at 9487 (¶ 13), 9488-89 (¶ 18) & n.56.

<sup>14</sup> *AWS-4 NPRM/NOI* at 13 (¶ 28).

<sup>15</sup> *AWS-4 NPRM/NOI* at 20 (¶ 55). *See also Id.* at 47 (¶ 136) (Commission proposes to modify ATC authorization to assign rights under Part 27, but does not specify the proposed disposition of the OOB conditions in the current ATC licenses).

<sup>16</sup> *See Comments of the U.S. GPS Industry Council in Response to Notice of Proposed Rulemaking and Notice of Inquiry, ET Docket No. 10-142, at 7-8 (filed September 15, 2010) (“To Achieve Clarity and Certainty, Essential Interference Protections Adopted for Ancillary Terrestrial Component Operations Must Be Codified”).*

No new facts have been introduced to date in any of these proceedings that would justify a relaxation of the existing OOB limits in the 2 GHz MSS/ATC licenses that protect RNSS. To the contrary, the introduction of ubiquitous terrestrial service in the place of limited ATC authority makes it even more critical that the previously accepted technical limits be reaffirmed by codification in this proceeding. The Council therefore strongly urges the Commission to capture and apply to AWS-4 operations the OOB limits that are included in the existing 2 GHz MSS/ATC licenses. With the deployment of terrestrial base stations and handsets in these frequency bands expected to increase exponentially in the event that the proposals set forth in the *AWS-4 NPRM/NOI* are adopted, the Commission needs to ensure that all OOB limits from the authorizations that apply to terrestrial operations in these bands today continue to so apply. To do otherwise would open the door to potentially harmful interference to the large installed base of existing RNSS users, as well as future users.

The MSS ATC conditions agreed upon by the 2 GHz MSS licensees and imposed in the 2 GHz MSS licenses are different from the provisions that are otherwise spelled out in the FCC's Part 25 Rules,<sup>17</sup> and these mutually-agreed license conditions are essential to the protection of GPS. The -70 dBW/MHz OOB level for the RNSS bands at 1559-1610 MHz and below that is specified in Section 25.252 of the Commission's Rules was recognized at the time of its adoption nearly a decade ago to have been based on a very dated analysis that measured the expected impact of a single mobile terminal transmitting in the vicinity of an aircraft descending on final approach. This limited scenario did not take into account the potential impact of large numbers of terrestrial handsets and base stations operating simultaneously in proximity to the broad range of RNSS receiving devices that were in use even then, let alone with respect to the even broader array of devices now deployed.<sup>18</sup> For these

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<sup>17</sup> See 47 C.F.R. §§ 25.252(a)(7), (b)(3), cited at *AWS-4 NPRM/NOI* at 20 (¶ 55) & n.106.

<sup>18</sup> In a new technical recommendation regarding protection of RNSS receivers in the 1559-1610 MHz band that went into effect earlier this year, the International Telecommunication Union ("ITU") expressly recognized that the OOB limit of -70 dBW/MHz that is specified for Big LEO MSS user terminals in an ITU recommendation (Recommendation ITU-R M.1343) from the 1990s was

reasons, among others, the inadequate -70 dBW/MHz OOB level limit has been superseded by the specific provisions that are set forth in the current 2 GHz MSS ATC authorizations.<sup>19</sup>

Under the 2 GHz licenses, mobile terrestrial earth stations, which include the handsets used for ATC due to the integration requirements, must limit equivalent isotropically radiated power (“EIRP”) density for wideband emissions to -95 dBW/MHz; while narrowband emissions are subject to a limit of -105 dBW/kHz.<sup>20</sup> In addition, fixed or mobile base stations must adhere to a wideband EIRP density emission limit of -100 dBW/MHz; and a narrowband emission limit of -110 dBW/kHz.<sup>21</sup> To date, these limits have appeared only in the individual system authorizations, and therefore are not readily accessible or identifiable in the provisions codified in Part 25 of the FCC’s Rules.

The Council urges the Commission, as it makes the other service rule modifications required to implement the changes proposed in the *AWS-4 NPRM/NOI*, to expressly codify in Part 27 of its Rules the existing OOB limits contained in the current 2 GHz MSS ATC authorizations. Only by taking this step can the Commission both provide certainty to 2 GHz AWS operators and protect from

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developed for a specific interference scenario (the case of a single mobile terminal transmitting in the vicinity of an aircraft on final descent), and is “not intended to be applied to any service other than MSS [mobile earth stations] operating in the 1-3 GHz range without further study” to determine the appropriate OOB to protect RNSS. Recommendation ITU-R M.1903, “Characteristics and protection criteria for receiving earth stations in the radionavigation-satellite service (space-to-Earth) and receivers in the aeronautical radionavigation service operating in the band 1 559-1 610 MHz,” at 2, Recommends 1-3 and Note 1 (2012). Terrestrial mobile broadband would be a “service other than MSS [mobile earth stations].”

<sup>19</sup> These limits were originally agreed to as a result of discussions between the Council and the L-band MSS ATC licensee. See *Ex Parte* Letter from Bruce D. Jacobs, Counsel to Mobile Satellite Ventures L.P., and Raul R. Rodriguez, Counsel to the U.S. GPS Industry Council, IB Docket No. 01-185, filed July 17, 2002. The limits were accepted without caveat by the experienced satellite network operator that acquired the 2 GHz MSS/ATC system licenses last year.

<sup>20</sup> See *ICO MSS ATC Waiver Order*, 24 FCC Rcd at 195 (¶ 65) & 197 (¶ 69(g)); *TerreStar MSS ATC Waiver Order*, 25 FCC Rcd at 237 (¶ 28) & 239 (¶ 34(g)) (“The limits in this table are material terms of the authorization”).

<sup>21</sup> *Id.*

harmful interference the existing installed GPS user base.<sup>22</sup> The Council provides in an attachment to these Comments its proposed text for such a rule. *See* Exhibit 1, Proposed Rules Governing Non-Interference Obligations and Out-of-Band Emissions Limitations Affecting the Radionavigation-Satellite Service Band. The proposed rule is limited to OOB emissions into the RNSS bands from AWS-4 terrestrial operations in the 2000-2020 MHz and 2180-2200 MHz bands. The existing OOB limits applicable to the 2 GHz bands have been specifically determined to be appropriate for the protection of RNSS under this particular spectrum environment and based upon industry commercial best practices within these bands.

**b. The Overall Interference Protections Of Section 25.255 Of The FCC's Rules Must Be Maintained.**

Finally, the Commission has explicitly acknowledged in recent letters to Congressional leaders that the FCC's regulations broadly require that where "harmful interference is caused to other services by ancillary MSS ATC operations, either from ATC base stations or mobile terminals, the MSS ATC operator must resolve any such interference."<sup>23</sup> Given this requirement with respect to

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<sup>22</sup> While the Council supports codification of these existing OOB limits to protect GPS from operations in the 2 GHz bands, the Council has noted previously that any proposed use of other MSS spectrum for greater terrestrial use requires a "band specific analysis." For example, in the Commission's proceeding last year on the requests of the 2 GHz MSS/ATC licensees for waivers of the ATC gating criteria, the Council noted that the "2 GHz MSS spectrum ...does not present "substantially similar" intra-band and out-of-band interference considerations" to Big LEO MSS spectrum at 1.6 GHz and 2.4 GHz licensed to Globalstar, due to the spectrum's greater proximity to the RNSS band. *See* Response of the U.S. GPS Industry Council to Initial Comments of Globalstar, Inc., IB Docket No. 11-149, *et. seq.*, at 3 (filed October 27, 2011). In particular, the Council noted that the impact of user handsets on the overall interference environment is among the issues that need to be addressed on a band- and service-specific basis. *Id.* at 5. The Council noted further that there are "significant technical concerns that need to be addressed with respect to the potential widespread deployment of stand-alone mobile handsets that a full-time, non-integrated terrestrial mobile system would entail (both in terms of out-of-band emissions from individual handsets and the aggregation of such emissions from an increased number of operating handsets) in that band." *Id.* The Commission stated that it intends to address issues pertaining to the ATC rules for the other MSS bands in one or more additional rulemaking proceedings at a later date. *See* AWS-4 NPRM/NOI at 47 (¶ 136). The Council is prepared to work with the licensees in the other MSS/ATC bands to address the OOB considerations relative to the protection of GPS from transmissions generated by potential wireless terrestrial mobile service operations if and when the additional rulemaking proceedings are initiated.

<sup>23</sup> Letter from FCC Chairman Julius Genachowski to Hon. Fred Upton, Chairman, House Committee on Energy and Commerce, at 1 (dated March 23, 2012), *citing* 47 C.F.R. § 25.255.

existing terrestrial service, a requirement upon which the increasing numbers of GPS users rely, it is critical for the Commission to maintain established requirements for interference avoidance by terrestrial licensees. The Commission should, in addition to the further, specific steps described above with respect to OOB limits, include the explicit protections afforded in Section 25.255 of the FCC's Rules into its Part 27 regulations. The Council has included in its attachment to these Comments a proposed Part 27 rule maintaining this coverage. *See* Exhibit 1. Such an approach is essential both to provide existing RNSS users the protections to which they have long been entitled and to continue to apprise terrestrial operators of the interference conditions under which they must operate.

### **CONCLUSION**

For the foregoing reasons, the Council respectfully urges the Commission, in connection with any order adopting the changes proposed in the *AWS-4 NPRM/NOI*, to codify in Part 27 the existing interference protections for RNSS, including the OOB limits that apply to MSS ATC licenses. The Commission should also adopt its proposal that the satellite MSS and terrestrial AWS authorizations within each licensed band be assigned to the same operator in order to facilitate successful co-primary operation of these services.

Respectfully submitted,

**THE U.S. GPS INDUSTRY COUNCIL**

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## Exhibit 1

### **Proposed Rules Governing Non-Interference Obligations and Out-of-Band Emissions Limitations Affecting the Radionavigation-Satellite Service Band**

#### **§27.1137 Out of Band Emission limitations in the Radionavigation-Satellite Service Band at 1559-1610 MHz from AWS-4 operations.**

(a) The requirements of this section govern emissions of AWS licensees that affect the Radionavigation-Satellite Service (“RNSS”). AWS licensees may employ any type of emission or technology that complies with the technical rules in this subpart.

(b) The power of any out of band emission falling in the RNSS at the 1559-1610 MHz frequency range must be limited such that the EIRP density is controlled.

(1) Mobile transmitters having intermittent transmissions shall limit EIRP density for:

- (i) Wideband emissions to no more than -95 dBW/MHz and ;
- (ii) Narrowband emissions to no more than -105 dBW/kHz.

(2) Fixed or mobile base stations shall limit EIRP density for:

- (i) Wideband emissions to no more than -100 dBW/MHz and;
- (ii) Narrowband emissions to no more than -110 dBW/kHz.

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#### **§27.1138 Procedures for Resolving Harmful Interference Related to AWS-4 Operations in the 2 GHz Bands**

If harmful interference is caused to other services by AWS-4 operations, either from base stations or mobile terminals, the AWS-4 licensee must resolve any such interference. If the AWS-4 licensee claims to have resolved the interference and other operators claim that interference has not been resolved, then the parties to the dispute may petition the Commission for a resolution of their claims.