

**Before the  
Federal Communications Commission  
Washington, D.C. 20554**

In the Matter of	)	
	)	
Use of Spectrum Bands Above 24 GHz for Mobile Radio Services	)	GN Docket No. 14-177
	)	
Establishing a More Flexible Framework to Facilitate Satellite Operations in the 27.5-28.35 GHz and 37.5-40 GHz Bands	)	IB Docket No. 15-256
	)	
Petition for Rulemaking of the Fixed Wireless Communications Coalition to Create Service Rules for the 42-43.5 GHz Band	)	RM-11664
	)	
Amendment of Parts 1, 22, 24, 27, 74, 80, 90, 95, and 101 to Establish Uniform License Renewal, Discontinuance of Operation, and Geographic Partitioning and Spectrum Disaggregation Rules and Policies for Certain Wireless Radio Services	)	WT Docket No. 10-112
	)	
Allocation and Designation of Spectrum for Fixed-Satellite Services in the 37.5-38.5 GHz, 40.5-41.5 GHz, and 48.2-50.2 GHz Frequency Bands; Allocation of Spectrum to Upgrade Fixed and Mobile Allocations in the 40.5-42.5 GHz ) Frequency Band; Allocation of Spectrum in the ) 46.9-47.0 GHz Frequency Band for Wireless ) Services; and Allocation of Spectrum in the 37.0- ) 38.0 GHz and 40.0-40.5 GHz for Government ) Operations )	)	IB Docket No. 97-95

**COMMENTS OF IRIDIUM COMMUNICATIONS, INC.**

**INTRODUCTION**

As telecommunications services become more capable on the ground, greater opportunities will surface to support those networks from space – and that support may become even more critical to the public than it already is today. That is why Iridium Communications, Inc. (“Iridium”) welcomes the Commission’s Notice of Proposed Rulemaking to bring advanced

terrestrial services to the spectrum frontiers (the “NPRM”).<sup>1</sup> In the NPRM, the Commission recognizes that both satellite and terrestrial communications are vital to U.S. consumers, and that new rules governing millimeter wave spectrum must allow next generation 5G services and satellite services to co-exist. Because of the difficulties inherent in creating the appropriate balance, the Commission’s proposal is at times very (and perhaps too) complex. With respect to the 29.1-29.25 GHz band, however, the Commission’s conclusion is simple: this spectrum just cannot support the robust use that carriers will need to deliver 5G services. And with respect to this spectrum, the Commission’s conclusion is also correct.

Iridium supports the Commission’s decision not to explore mobile use in 29.1-29.25 GHz at this time. While the 29.1-29.25 GHz band now supports communications that are essential to the U.S. government and citizens, it provides little value to mobile carriers seeking large quantities of contiguous spectrum. Iridium also asks the Commission to consider more carefully the challenges to co-existence in the 29.1-29.25 GHz band should the issue resurface in a future proceeding. Because of Iridium’s unique network architecture, the growing demands on its ground infrastructure, and the exceptional public importance of the communications transmitted over its network, successful coordination with mobile broadband services in this band may prove difficult or impossible.

**I. The Commission Correctly Concluded that 29.1-29.25 GHz is Unsuitable for Terrestrial Broadband Use.**

In the NPRM, the Commission set forth “four main criteria” for identifying bands suitable for expanded mobile use.<sup>2</sup> First, the Commission noted that 5G services will need a

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<sup>1</sup> *Use of Spectrum Bands Above 24 GHz For Mobile Radio Services*, G.N. Docket No. 14-177, et al., Notice of Proposed Rulemaking, FCC 15-138, 30 FCC Rcd. 11,878 (rel. Oct. 23, 2015) (“NPRM”).

<sup>2</sup> *Id.* at 11,887 ¶ 20.

substantial amount of contiguous spectrum,<sup>3</sup> and that even with available spectrum aggregation technology, “it will be easier to accommodate mobile use in wider bands.”<sup>4</sup> Accordingly, the Commission determined that it would “focus on bands with at least 500 megahertz of contiguous spectrum.”<sup>5</sup> Second, the Commission determined that it would “propose bands that are being considered internationally for mmW mobile service,” given the importance of “promoting a unified world market” for mobile broadband.<sup>6</sup> Third, the Commission determined that mobile use “should be compatible with existing incumbent license assignments and uses.”<sup>7</sup> Finally, the Commission sought “to establish a flexible regulatory framework that accommodates as wide a variety of services as possible”—including satellite services—above 24 GHz.<sup>8</sup>

Iridium believes the Commission acted wisely in providing principled guideposts for its approach to millimeter wave spectrum and supports the specific criteria identified in the NPRM. These criteria conform to the technical requirements for 5G as expressed by many parties interested in developing 5G network technology.<sup>9</sup> They also reflect the need for regulators to account for the settled expectations of existing services and their users when considering policy changes with economic and, often, military and public safety significance. The Commission’s considerations also recognize that consumers benefit when a variety of communications

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<sup>3</sup> *Id.* at 11,886 ¶ 16.

<sup>4</sup> *Id.* at 11,887 ¶ 20.

<sup>5</sup> *Id.*

<sup>6</sup> *Id.* at 11,887 ¶ 21.

<sup>7</sup> *Id.* at 11,887-88 ¶ 22.

<sup>8</sup> *Id.* at 11,888 ¶ 23.

<sup>9</sup> *See, e.g., Comments of NYU Wireless* at 56, GN Docket No. 14-177, et al. (filed Jan. 14, 2015); *Comments of Qualcomm Incorporated* at 2, GN Docket No. 14-177, et al. (filed Jan. 15, 2015); *Comments of the Telecommunications Industry Association* at 3, GN Docket No. 14-177, et al. (filed Jan. 15, 2015); *Comments of Huawei Technologies, Inc. (USA) and Huawei Technologies, Ltd.* at 13-14, GN Docket No. 14-177 et al. (filed Jan. 15, 2015).

networks, including terrestrial broadband and satellite networks, compete, complement, and interconnect with another.

Applying these principles to the 29.1-29.25 GHz band, the Commission’s decision to “decline to propose authorizing mobile operation” in this spectrum was unquestionably correct.<sup>10</sup> As the Commission recognized,<sup>11</sup> the amount of contiguous spectrum available from 29.1-29.25 GHz falls well below the minimum thresholds supported by most participants in the proceeding. Moreover, as the final acts of the 2015 World Radiocommunication Conference reveal, there is no international interest in using—or even studying—the 29.1-29.25 GHz band for mobile use.<sup>12</sup>

The Commission also acknowledged that Iridium’s feeder links operate in the 29.1-29.25 GHz band on a co-primary basis, raising the possibility that the entry of new services would interfere with this existing use and allocation. Although the Commission ultimately concluded that 29.1-29.25 GHz was unsuitable for mobile use at this time, it nevertheless noted that “it could be possible to develop a sharing regime between [Iridium’s] feeder links and mobile operations” because “there are currently only five active licenses for feeder link and telemetry, tracking, and command earth stations” in the band.<sup>13</sup> For the reasons detailed below, Iridium believes this part of the Commission’s analysis understated the difficulties of allowing mobile use in the 29.1-29.25 GHz band.

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<sup>10</sup> NPRM at 11,902 ¶ 70.

<sup>11</sup> *Id.*

<sup>12</sup> See World Radiocommunication Conference, Provisional Final Acts, Resolution COM6/20 (WRC-15) at 426 (declining to study the 29.1-29.25 GHz band for future development of international mobile telecommunications), available at [https://www.itu.int/dms\\_pub/itu-r/opb/act/R-ACT-WRC.11-2015-PDF-E.pdf](https://www.itu.int/dms_pub/itu-r/opb/act/R-ACT-WRC.11-2015-PDF-E.pdf).

<sup>13</sup> NPRM at 11,901-02 ¶¶ 67, 70.

## **II. Sharing Between Iridium’s Co-Primary Operations and Mobile Broadband Services Would Be Difficult, and Perhaps Impossible, in the 29.1-29.25 GHz Band.**

Iridium operates a constellation of 66 cross-linked, non-geostationary orbit satellites. Operating as a fully meshed network, Iridium’s constellation provides low-latency global communications covering areas beyond the reach of terrestrial mobile networks and even other satellite systems. Iridium does this with exceptional security and reliability, and continues to work during disasters that overload, damage, and destroy terrestrial networks. These unique features allow Iridium to supply the U.S. military with tactical communications (even on battlefields) and other government departments with mission-critical services that keep our country safe and secure. Iridium also helps first responders, aid organizations, and hospitals to save lives and to coordinate rescue, relief, and reconstruction efforts in areas devastated by disasters and attacks. With its next generation constellation, Iridium NEXT, Iridium will be able to support even more advanced commercial, public safety and national security applications, including real-time flight monitoring and enhanced Global Maritime Distress and Safety System services.

Iridium’s earth stations serve as the backbone of these services, using the 29.1-29.25 GHz band for feeder uplink (earth-to-space) and telemetry, tracking, and command and control (“TT&C”) transmissions. By focusing solely on the number of these earth stations currently licensed in the United States in its sharing analysis, the Commission did not adequately consider the design of these earth stations, user-driven pressures to construct more earth stations, and the nature of the communication that these earth stations support.

First, Iridium’s unique network architecture creates a particularly challenging sharing environment for ubiquitous and high-power terrestrial deployments. To provide the network performance Iridium’s users demand, Iridium’s earth stations must continuously track in-view

satellites as they pass in low earth polar orbit. Thus, although Iridium’s earth stations are fixed in location, they use steerable, phased array antennas that sweep from horizon to horizon. The span of Iridium’s antennas raises the genuine possibility that aggregate interference from terrestrial deployments would impede uplink and TT&C operations, or that Iridium’s earth stations would interfere with 5G devices and infrastructure. Given the design of Iridium’s earth stations, straightforward changes to antenna geometry are unlikely to resolve any interference issues that may arise, and the geographic separation required to reduce the risk of harmful interference could prove unacceptable to 5G operators.

Second, to accommodate user demand, Iridium will have to expand the number of U.S. earth station locations beyond the number in operation today. This would increase the risk that sharing with terrestrial mobile services would prove unworkable.

Finally, users of Iridium terminals include U.S. soldiers, intelligence personnel, and rescue workers. They use Iridium because it works wherever they are located and because it does so reliably. Harmful interference, no matter how sporadic, is not a disruption that Iridium’s users will or should be expected to tolerate. It is not an exaggeration to say that Iridium communications “genuinely hold human lives in the balance”<sup>14</sup> —and dropped calls are more than an inconvenience.

## CONCLUSION

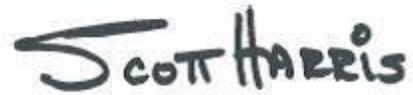
The new terrestrial services under development above 24 GHz show immense promise and should have access to the spectrum they will need to bring next generation wireless technologies to U.S. consumers. The 29.1-29.25 GHz band, however, is neither suitable nor necessary for delivering these services. The Commission was correct to look to other spectrum

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<sup>14</sup> See *Comments of Iridium Satellite LLC* at 8, GN Docket No. 14-177, et al. (filed Jan. 15, 2015).

to accommodate 5G services and should continue to reject proposals that would open this band to intensive terrestrial uses.

Respectfully submitted,

A handwritten signature in black ink that reads "SCOTT HARRIS". The signature is written in a cursive, slightly stylized font. The "S" is large and loops around the "C". The "HARRIS" part is written in a more straightforward, blocky cursive style.

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