

Before the  
**Federal Communications Commission**  
Washington DC 20554

In the Matter of	)	
	)	GN Docket No. 18-122
Expanding Flexible Use of the 3.7 GHz	)	RM-11791
to 4.2 GHz Band	)	RM-11778

**COMMENTS OF THE  
FIXED WIRELESS COMMUNICATIONS COALITION**

The Fixed Wireless Communications Coalition, Inc. (“FWCC”)<sup>1</sup> files these comments in response to the Order and Notice of Proposed Rulemaking in the above-captioned proceeding.<sup>2</sup>

FWCC members build, coordinate, and operate licensed Fixed Service (“FS”) microwave links in the 3.7-4.2 GHz band. There are presently 914 such links (discrete transmit frequencies) under 61 call signs.<sup>3</sup>

The Notice proposes to “sunset” these licenses to make room for new mobile and point-to-multipoint services in the band.<sup>4</sup> It asks whether the existing fixed links should be

---

<sup>1</sup> The FWCC is a coalition of companies, associations, and individuals actively involved in the fixed services—*i.e.*, terrestrial fixed microwave communications. Our membership includes manufacturers of microwave equipment, fixed microwave engineering firms, licensees of terrestrial fixed microwave systems and their associations, and communications service providers and their associations. The membership also includes railroads, public utilities, petroleum and pipeline entities, public safety agencies, cable TV providers, backhaul providers, and/or their respective associations, communications carriers, and telecommunications attorneys and engineers. Our members build, install, and use both licensed and unlicensed point-to-point, point-to-multipoint, and other fixed wireless systems, in frequency bands from 900 MHz to 95 GHz. For more information, see [www.fwcc.us](http://www.fwcc.us).

<sup>2</sup> *Expanding Flexible Use of the 3.7 GHz to 4.2 GHz Band*, GN Docket Nos. 18-122, 17-183 (Inquiry Terminated as to 3.7-4.2 GHz), Order and Notice of Proposed Rulemaking, FCC 18-91 (released July 13, 2018) (“Notice”).

<sup>3</sup> Data as of October 18, 2018, courtesy of Comsearch. The Commission’s count of 115 licenses, Notice at ¶ 9, includes temporary fixed/mobile licenses unrelated to the permanent fixed links at issue here.

<sup>4</sup> Notice at ¶ 48. A freeze currently in effect bars new applications. *Temporary Freeze on Applications for New or Modified Fixed Satellite Service Earth Stations and Fixed Microwave*

grandfathered or transitioned out of the band over some time period, perhaps three or five years.<sup>5</sup> It asks about different treatment for fixed links at the upper end of the band, which is proposed to be set aside for point-to-multipoint fixed use.<sup>6</sup>

#### **A. SUMMARY**

Notwithstanding the Notice's emphasis on declines in 4 GHz FS usage, the band remains critical for long-haul applications that need high reliability. The Commission's proposal to simply "sunset" these links out of existence, with no compensation or reimbursement for relocation to other frequencies, would be a first. The legal basis for this step is shaky at best.

The Commission should compensate displaced FS operators, much as it proposes to do for the co-equal Fixed Satellite Service ("FSS"), or else have incoming users reimburse the operators for the costs of relocation, as it did when reallocating the 2 GHz band. At the very least, the Commission should extend the same grandfathering to FS links as it did to displaced 3650-3700 MHz licensees: five years or the balance of the license term, whichever is longer.

FS links that remain in the band will need interference protection commensurate with their extreme reliability.

#### **B. IMPORTANT BACKGROUND**

The 1950s saw a transcontinental network of 2 GHz and 4 GHz systems carrying long-distance telephone calls, network TV programming, and more. Propagation characteristics at these frequencies make them ideal for long-haul links that must reliably span many tens of miles.

---

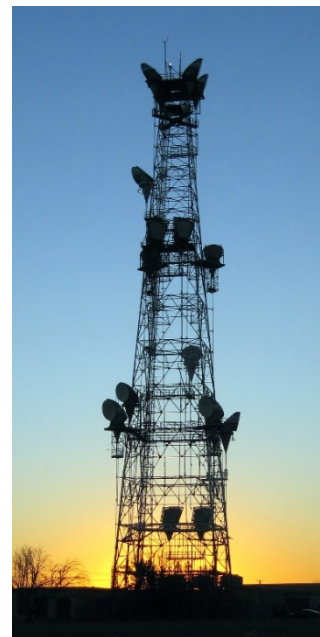
*Stations in the 3.7-4.2 GHz Band*, GN Docket Nos. 17-183, 18-122, Public Notice, DA 18-398 (released April 19, 2018).

<sup>5</sup> Notice at ¶ 48.

<sup>6</sup> *Id.*; see also Notice at ¶ 119.

Growing telecommunications needs expanded these networks through the rest of the 20th century.

Twenty years ago, the Commission reallocated the 2 GHz band—a workhorse for intercity links—for mobile voice and text, and other services. The former 2 GHz licensees had to squeeze into the 4 GHz and 6 GHz bands, as higher frequencies were unable to cover the required distances. Today the 4/6 GHz applications include synchronizing the movement of railroad trains, control of petroleum and natural gas pipelines, control of the national electric grid, backhaul to dispatch public safety and emergency vehicles, Internet and telephone carriage, backhaul for consumer voice and 3G/4G cellular systems, and vast amounts of business data.



**Figure 1**  
Tower near Dallas TX  
with 4 GHz antennas

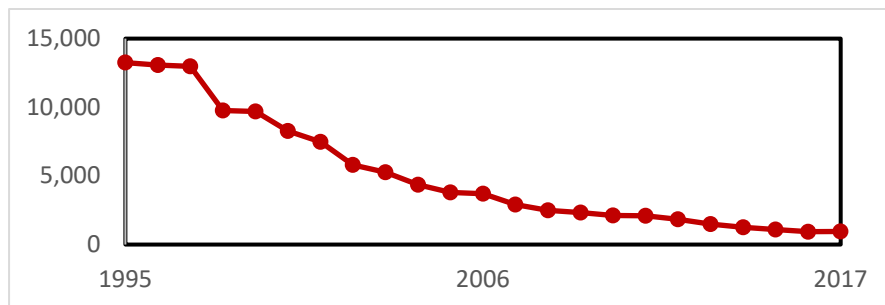
Over the last twenty years or so, the 4 GHz band has become largely unavailable for fixed use.<sup>7</sup> Downlink earth stations in the FSS share the band with the FS on a co-primary basis. But the sharing is highly asymmetrical. The FS must protect every FSS earth station against interference across the entire 3.7-4.2 GHz band and the entire geostationary arc, even if the earth station communicates with only one transponder on one satellite.<sup>8</sup> This requirement makes it impossible to coordinate 4 GHz FS links across much of the country. In most of the FS bands, links come and go over the years, in response to operators' and

---

<sup>7</sup> See Notice at ¶ 47.

<sup>8</sup> For details on the FS/FSS coordination issues, see Petition for Rulemaking of the Fixed Wireless Communications Coalition in RM-11778 (filed Oct. 11, 2016). Making matters worse, almost two-thirds of the earth stations the FS must protect in fact do not exist or are licensed at a wrong location. See Letter from Andrew Kreig, Co-Chair, FWCC to Mindel De La Torre, Chief, International Bureau, FCC (Sept. 30, 2016) (presenting data on missing and mislocated earth stations).

customers' changing needs. But at 4 GHz, the links just go. Frequency coordinators find they must put new links into other bands. See Figure 2.



**Figure 2**  
4 GHz Frequency Usage 1995-2017

**C. THE COMMISSION SHOULD REQUIRE COMPENSATION OR REIMBURSEMENT FOR THE RELOCATION OF 4 GHz FIXED LINKS.**

Although declining in numbers, 4 GHz links continue to carry essential services whose protection is in the public interest. The facilities needed to support these links are expensive. When the Commission reallocated the 2 GHz FS band, it required the incoming 2 GHz users to reimburse FS operators for the costs of relocation to other frequencies.<sup>9</sup>

The Notice, in contrast, would require 4 GHz FS operators to expend their own funds to relocate, so that incoming users can profit from the cleared spectrum. This is plainly unfair. The entities that will benefit from the absence of 4 GHz FS should pay the reasonable costs of its departure.

In further contrast, the Notice presents a lengthy and detailed discussion of ways to provide FSS operators with compensation for vacating the band.<sup>10</sup> The FS and FSS have co-

<sup>9</sup> See 47 C.F.R. § 101.69.

<sup>10</sup> Notice at ¶¶ 58-115. The Commission proposes to compensate displaced FSS operators via auction, by analogy to the recent broadcast incentive auction.

equal status. They have equal claims for compensation. There is no principled explanation in the Notice—indeed, no explanation at all—for their disparate treatment.

**D. THE COMMISSION SHOULD GRANDFATHER 4 GHz LICENSEES FOR AT LEAST FIVE YEARS OR THE REMAINING LICENSE TERM.**

The nearest recent analogy to 4 GHz relocation is the displacement of adjacent 3650-3700 MHz fixed users to make room for the Citizens Broadband Radio Service. There, “in light of the significant investment many incumbent 3650-3700 MHz licensees have made in the band,” the Commission grandfathered fixed operations for five years after the rule adoption date or the remainder of the license term, whichever is longer.<sup>11</sup>

In the absence of reimbursement for relocation, the Commission should at least provide the same grandfathering here.

The 3650-3700 MHz band, which lacks mandatory prior frequency coordination, presents a much higher risk of harmful interference than does 4 GHz. For that reason the 3650-3700 MHz band carries few, if any, critical services. Operators in the 4 GHz band, which has always carried critical services, should be permitted to remain in operation for at least as long.

Notwithstanding that no licensee has legal rights in the spectrum,<sup>12</sup> a licensee plans its business and makes investments based on the expectation that its license will continue in force for the full term. A provider that suspected the Commission might rescind an entire category of licenses years before expiration would either have to charge higher rates to offset the risk, or forgo the business entirely. Neither outcome is in the public interest. The Commission should conform to past practice with an adequate grandfathering period.

---

<sup>11</sup> *Commercial Operations in the 3550-3650 MHz Band*, Report and Order and Second Further Notice of Proposed Rulemaking, 30 FCC Rcd. 3959 at ¶ 400 (2015).

<sup>12</sup> 47 U.S.C. § 304.

**E. THERE IS NO AUTHORITY OR PRECEDENT TO “SUNSET” ACTIVE LICENSES.**

The Notice’s proposal for a three-year or five-year sunset period will likely result in cutting off some licenses prior to expiration. As its authority, the Notice cites to 47 U.S.C. § 316 and 47 C.F.R. § 1.87.<sup>13</sup> These provisions on their face permit the Commission only to *modify* a license. Neither expressly allows the Commission to *cancel* a license outright. To be sure, the Commission sometimes cancels licenses for failure to make payments or for missed construction deadlines, discontinuation of operation, or otherwise for cause. These actions rest on a licensee’s failure to meet its obligations under the rules for the particular service. They do not entail recourse to Section 1.87.

Perhaps the Commission regards cancellation as an extreme form of modification, and thereby within the ambit of Section 1.87. That would be a novel construction. We have found no case in which the Commission relied on Section 1.87 to cancel a license where the licensee was operating in compliance with the rules.

**F. GRANDFATHERED FS FACILITIES WILL NEED CAREFULLY MANAGED PROTECTION.**

To accommodate applications that are critical to the safety of life and property, 4 GHz FS systems are typically designed for at least 99.999% (“five nines”) availability. Some are designed for 99.9999% (“six nines”). These numbers allow for total outages per year from all causes of just five minutes or thirty seconds, respectively. A strong enough source of interference will cause errors in transmission. If the microwave link is part of a network—most are—this causes the network to lose synchronization. The whole network stays down while it

---

<sup>13</sup> Notice at ¶ 48 n.90. Section 1.87 is an implementing regulation that closely tracks 47 U.S.C. § 316.

resynchronizes. Cellular and land mobile backhaul facilities commonly need fifteen minutes to resync after a short interruption. It takes just one such incident to consume several years' worth of outage allowance.

Thanks to frequency coordination, interference to 4 GHz FS receivers is vanishingly rare. Outages that do occur result from atmospheric fading.<sup>14</sup> When a link is under stress from a deep fade, even a low level of interfering signal can shut it down. To maintain the existing reliability, an incoming service will have to show a very low probability of causing disabling interference into any given receiver: on the order of one-tenth the permitted outage rate, *i.e.*, one in a million to one in ten million. It may be feasible to achieve this level of protection from fixed point-to-multipoint transmitters, using established methods of frequency coordination, but will be much more difficult as to mobile devices.

The Commission proposes to set aside some portion of the band for non-mobile point-to-multipoint operation.<sup>15</sup> Unfortunately relocating fixed point-to-point links into the same portion of the band is not practicable. Many of the fixed systems are twenty years old. The components needed to move them to new frequencies are no longer available.

The Notice proposes authorizing point-to-multipoint facilities to use time division duplex (TDD).<sup>16</sup> We have no objection, except to note that TDD will make it difficult for point-to-multipoint facilities to share towers with the FS. TDD inevitably results in “bucking”:

---

<sup>14</sup> At 4 GHz all fading is caused by “multipath”: changes in temperature or humidity at different atmospheric elevations that refract (bend) an upward-traveling component of a transmitted radio signal back toward the receive antenna, just as a lens bends light rays. Because the refracted signal takes a longer path than the direct signal, it can arrive at the receiver out of phase with the direct signal, and partially cancel out the direct signal. This reduces the signal strength at the receiver by anywhere from a few dB to a few tens of dB.

<sup>15</sup> Notice at ¶ 119.

<sup>16</sup> Notice at ¶ 118.

transmitting in a part of the band that others on the same or a nearby tower use for receiving. Bucking transmitters complicate frequency coordination. TDD will make interference-free coexistence between FS and point-to-multipoint users in the same area more difficult.

### **CONCLUSION**

The FWCC acknowledges the declining FS use of the 4 GHz band and the public interest in introducing new services to the band. We ask, however, that existing links be reimbursed or compensated for the costs of relocating to another band, or at the very least be grandfathered, with adequate interference protection, for at least the longer of five years or the remaining license term.

Respectfully submitted,



Cheng-yi Liu  
Mitchell Lazarus  
FLETCHER, HEALD & HILDRETH, P.L.C.  
1300 North 17th Street, 11th Floor  
Arlington, VA 22209  
Counsel for the Fixed Wireless  
Communications Coalition

October 29, 2018