

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554**

In the Matter of

Promoting Efficient Use of Spectrum Through  
Improved Receiver Interference Immunity  
Performance

ET Docket No. 22-137

**COMMENTS OF 5G AMERICAS**

5G Americas, the wireless industry trade association that is the voice for 5G and LTE in the Americas, submits these brief comments in response to the Commission’s Notice of Inquiry (“*Notice*” or “*NoI*”) in the above-referenced proceeding concerning receiver performance.

Currently chaired by T-Mobile US, 5G Americas has a broad membership of leading wireless operators and vendors promoting and facilitating throughout the Americas the seamless deployment and widespread adoption of the 3rd Generation Partnership Project (“3GPP”) family of technologies, including LTE-Advanced, 5G and beyond.<sup>1</sup> 5G Americas commends the Commission for launching this *Notice* on this important and complex issue, but cautions that the existing body of Advisory Council work in this area needs first to be re-examined in light of a decade of mobile technology evolution in order to achieve improved receiver performance.

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<sup>1</sup> 5G Americas Board of Governors members include Airspan Networks, Antel, AT&T, Ciena, Cisco, Crown Castle, Ericsson, Intel, Liberty Latin America, Mavenir, Nokia, Qualcomm Incorporated, Samsung, Shaw Communications Inc., T-Mobile US, Inc., Telefónica, VMware and WOM. [Board of Governors](#), 5G Americas (last visited Jun. 27, 2022).

## Introduction

Revising spectrum allocations to allow more efficient use has always been difficult, but over the last several decades, as demand for wireless services has grown and the Commission has labored to allow more economically-efficient uses of spectrum, the ability of incumbents to co-exist with new entrants has increasingly depended on the quality of their receiver performance. A recent Ericsson Mobility Report predicts that by 2025 mobile networks will carry between two to four times the data of today’s networks.<sup>2</sup> Such increases will add new demands on service providers to increase network capacity, including by requiring additional spectrum. Spectrum repurposing will remain challenging. To achieve the expected mobile data growth, adjacent services will need to operate in closer proximity. More intensive spectrum use will require better performance from both radio transmitters and receivers. Recent disagreements over alleged interference to incumbents’ receivers from new entrants make the Commission’s *Notice* more timely than ever, and an important step to ensuring the Commission can continue to deliver on its congressional mandate to regulate spectrum use so as to make available efficient radio communications services.<sup>3</sup>

The *Notice* raises questions on whether the Commission should require or encourage industry to develop interference limits. Importantly, the Commission is not seeking to build a record to mandate the “design” of receivers that could chill technology evolution.<sup>4</sup> According to the Commission’s Technical Advisory Council (“TAC”), interference limits policies are ways to impact *the environment* in which a receiver must operate.<sup>5</sup> Commission and international rules

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<sup>2</sup> See Ericsson, [Ericsson Mobility Report](#) 11, 16 (2022).

<sup>3</sup> See Communications Act of 1934, 47 U.S.C. § 151.

<sup>4</sup> See Promoting Efficient Use of Spectrum through Improved Receiver Interference Immunity Performance, 87 Fed. Reg. 29248, 29265, ¶ 130 (May 13, 2022) (“*Notice*”).

<sup>5</sup> See TAC, [Interference Limits and Harm Claim Thresholds](#) 2 (2014).

define harmful interference as the level of interference that “seriously degrades, obstructs, or repeatedly interrupts a . . . service.”<sup>6</sup> But if the harmfulness of any interference is determined not solely by the new entrant’s signal parameters, but by the receiver performance of the incumbent, good spectrum policy may call for some incentives for receivers to reject noise outside of their authorized spectrum. This is the central quandry the Commission’s *Notice* rightfully explores.

The Commission references the TAC’s nine principles for spectrum compatibility—three each under the following subject areas: Interference Realities; Responsibilities of Services; Regulatory Requirements and Actions.<sup>7</sup> These are interesting principles to get a discussion started, but further refinement is needed before the Commission should undertake any policy decisions. At a high level, the principles are aligned with the laudable goal of greater transparency. Detailed parameters on how both the transmitting and receiving system operate must be understood in order for improvements in spectral efficiency to be achieved. Transparency of the operating characteristics of both the transmitting and receiving systems would benefit more efficient spectrum use.

### **The Mobile Industry has been a Leader in Receiver Innovation**

The mobile industry has long been a leader in developing and abiding by industry receiver standards. As the Commission recognizes, 3GPP has specified the minimum undesired out-of-band power at which some receivers can operate without a degradation metric exceeding a low minimum.<sup>8</sup> 3GPP has studied the balance of transmitter impairments with receiver impairments through the parameters of Adjacent Channel Leakage Ratio and Adjacent Channel

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<sup>6</sup> See 47 C.F.R. § 2.1(c); see also Int’l Telecommc’ns Union [ITU], [International Radio Regulations](#) RR1-16, 1.169 (2020).

<sup>7</sup> See *Notice* ¶ 115.

<sup>8</sup> See *Notice* ¶ 130 n.155.

Selectivity. In mobile networks, transmitter and receiver specifications are set in 3GPP RAN 4, including for out-of-band interference (“OBI”).

The Commission traditionally has regulated spectrum use by developing transmission power limits and out-of-band emission masks by new uses sought by the commercial community, often by the wireless industry. The mobile industry has complied with FCC requirements. Moreover, with the availability of new technologies, the mobile industry has evolved its transmitter and receiver specifications over time to leverage those technologies. Other industries have generally not adopted receiver specifications, nor evolved them over time. This situation has led to the aviation C-Band altimeter and L-Band Global Positioning System (“GPS”) crises.

Recent events with aviation radar altimeters have brought receiver standards back into the mainstream press, but receiver interference immunity performance has been an ongoing issue for a long time. The mobile community has been coping with poor receivers by certain non-commercial licensees or users for decades, such as with land mobile radios by certain public safety users in the 700 MHz and 800 MHz bands. Ligado’s attempt to deploy commercial broadband under its L-Band license was thwarted by the poor filters in off-the-shelf GPS equipment in an adjacent band. With demand for spectrum increasing, and its use becoming more intense, OBI will get worse, absent concerted effort.

Wireless licensees are required to control the power of the equipment that operates within their assigned frequencies and limit the emissions of their equipment outside the spectrum they are assigned. It stands to reason that receivers should be responsible for mitigating interference outside their assigned channels as well.<sup>9</sup> As the British regulator Ofcom has determined, there

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<sup>9</sup> See Notice ¶ 115.

should be no guarantee of regulator enforcement against harmful interference if one's receiver has poor performance.<sup>10</sup> Transmitter performance is already regulated. Addressing receiver resilience and immunity to OBI is needed, and will make spectrum use more efficient. Other regulators have begun to examine the role of receivers in enhancing spectrum efficiency, at least for purposes of conducting sharing and compatibility studies as a precondition for authorizing additional use.<sup>11</sup> The Commission's *Notice* will provide an opportunity to re-examine the TAC's prior work in light of enhancements in mobile technology, such as massive multiple-input and multiple-output ("MIMO"), active array antennas, multi-channel beamforming, and others.

### **Conclusion**

Receiver interference immunity performance is an important consideration for ensuring wireless spectrum is put to the most efficient and best use for society. 5G Americas hopes to respond at a future date with additional information on industry's efforts in this area. To meet increasingly intensive use of spectrum, receiver resilience and immunity to out-of-band interference must be addressed. 5G Americas is committed to providing its expertise in developing a successful receiver initiative, consistent with the United States' traditional reliance on industry-led innovation.

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<sup>10</sup> *Id.* ¶ 32.

<sup>11</sup> See Electronic Commc'ns Committee ("ECC"), [Evaluation of receiver parameters and the future role of receiver characteristics in spectrum management, including in sharing and compatibility studies](#), Rep. 310, §3 (Jan. 2020).