

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of)
)
Creation of Interstitial 12.5 kHz Channels in the) WP Docket No. 15-32
800 MHz Band Between 809-817/854-862 MHz) RM-11572
)

To: The Commission

**COMMENTS OF
THE BOEING COMPANY**

The Boeing Company (“Boeing”) provides these comments in response to the Commission’s Notice of Proposed Rulemaking (“NPRM”) regarding rules for introducing full power interstitial 12.5 kHz “offset” channels in the 809-817/854-862 MHz band (“800 MHz Mid-Band”).¹ As an intensive user of business/industrial wireless licenses in the 800 MHz Mid-Band, Boeing concurs with the numerous comments in the record that this proposal may improve spectral efficiency in a heavily-used frequency band. At the same time, the Commission must ensure that incumbent systems remain protected from the introduction of new and potentially non-compatible users, including the potential future addition of terrestrial trunked radio (“TETRA”) systems on interstitial channels.²

¹ Creation of Interstitial 12.5 kHz Channels in the 800 MHz Band Between 809-817/854-862 MHz, FCC 15-17 (Feb. 9, 2015) (“800 MHz NPRM”).

² Although TETRA is not one of the potential interstitial uses discussed in the NPRM, Boeing believes that the interference protection criteria should be sufficient to ensure that incumbent operations remain protected even from intensive use similar to TETRA.

In particular, Boeing wishes to draw attention to the potential for harmful interference to incumbent operations that continue to make use of the whole band, such as users of Class B signal boosters and analog wideband stations. Class B or “bandpass” style signal boosters are widely used in the 800 MHz Mid-Band, and would be subject to significant interference from strong interstitial signals, which would be amplified along with the desired signal. Likewise, wideband analog stations would be subject to harmful interference from strong interstitial channels at both ends of the incumbent channel. Boeing therefore urges the Commission to augment or clarify the interference protection measures currently under consideration to provide full protection for the many incumbents that rely on such systems. In addition, the Commission should consider other means of fully protecting incumbent users from harmful interference because their existing equipment configurations may no longer perform as needed in an interstitial frequency environment.

I. THE INTRODUCTION OF INTERSTITIAL CHANNELS MAY CAUSE HARMFUL INTERFERENCE TO INCUMBENT USERS OPERATING CLASS B SIGNAL BOOSTERS AND/OR ANALOG WIDEBAND SYSTEMS

A fundamental premise of this proceeding has been that the benefits of new interstitial channels should not be realized at the expense of existing users. In its initial petition for rulemaking, the Enterprise Wireless Association stated its goal to “accommodate existing business requirements” and provide new spectrum “without compromising incumbent operations.”³ The Commission reiterates this necessity in the NPRM, stating that interstitial channels would be added “without requiring existing systems that use the standard channels to

³ Petition of the Enterprise Wireless Association, RM-11572, at 1 (Apr. 29, 2009) (“*EWA Petition*”).

modify their operations.”⁴ As APCO notes, however, it is not clear that the interference mitigation criteria currently under consideration have taken into account incumbent licensees operating with bandwidths of 20 kHz or greater,⁵ such as those using analog wideband channels of 25 kHz. For these users, the proposed addition of interstitial channels creates the risk of overlap and substantial harmful interference between interstitial signals and incumbent operations unless the interference criteria accounts for all potential incumbent network configurations.

Boeing raises this issue as a major user of Class B boosters and wideband systems. Boeing operates an extensive 800 MHz radio system covering multiple facilities across several states.⁶ These radio systems support communications for general facilities operations, logistics, security, and public safety mutual aid. As with other entities operating large scale radio systems, Boeing relies on signal boosters to ensure that its network is reliably accessible over the entirety of Boeing’s licensed area, including indoors, tunnels, and basements.

Many widely deployed signal boosters function by amplifying and retransmitting any traffic in a specified band. Such “bandpass” or “Class B” repeaters are subject to harmful interference from undesired signals within the band, either by amplifying and retransmitting undesired signals or, in the case of repeaters using Automatic Level Control (“ALC”), by reducing overall system power in response to high powered undesired signals. As a result, interstitial channels can dramatically reduce the effectiveness of such systems with respect to

⁴ *800 MHz NPRM*, ¶ 15.

⁵ Comments of APCO, RM-11572, at 1 (Oct. 15, 2014).

⁶ Boeing operates twelve separate call signs supporting thousands of fixed and mobile units across hundreds of square miles. *See* FCC ULS Database. Boeing relies on Class B signal boosters at its facilities in t Puget Sound, WA, St. Louis, MO, and Huntsville, AL.

their ability to retransmit desired signals, in turn disrupting critical operational and public safety networks.⁷

The creation of adjacent interstitial channels would also affect wideband analog systems. Because they use the entire 25 kHz channel, legacy analog systems would be subject to harmful interference from interstitial channels on both sides. Such interference is particularly concerning because many of the remaining legacy analog wideband systems are used for interoperability with public safety mutual aid partners.⁸ These wideband analog systems are often installed as high-site specialized mobile radio (“SMR”) stations, which would be particularly susceptible to harmful interference from more numerous “low site” interstitial stations.

Without full protection for incumbent users, particularly those using Class B signal boosters or wideband analog systems, the Commission is at risk of creating the same kinds of harmful interference that led to the need for rebanding.⁹

⁷ In Boeing’s case, Class B boosters are used for legacy reasons as well as to provide incidental amplification to public safety mutual aid partners. In the event harmful interference from interstitial channels requires Boeing to abandon Class B boosters for channelized Class A boosters, this valuable additional function would be lost.

⁸ For instance, Boeing maintains an analog 800 MHz system operating in Portland, OR to ensure interoperability with local public safety entities.

⁹ Comments of the American Petroleum Institute, RM-11752, at 3 (Nov. 24, 2009) (noting that “[t]here must also be unquestionable evidence that the addition of interstitial channels will not bring about a déjà vu scenario”).

II. THE INTERFERENCE PROTECTION MEASURES SHOULD ENSURE PROTECTION OF ANALOG WIDEBAND SYSTEMS AND CLASS B SIGNAL BOOSTERS

The many commenting parties and the Commission agree that incumbent users should be protected, and existing systems should be able to continue to operate unmodified. To this end, it is imperative that the 800 MHz interstitial rules contain sufficient protection for existing 800 MHz systems, including analog wideband 25 kHz channel systems and Class B signal boosters.

A. Protection Criteria for Incumbent Analog Wideband Systems

One approach to securing protection for incumbent users of analog wideband systems would be to provide preferential access to interstitial channels within an incumbent's existing channel blocks. Such "infill" licensing would assist intensive users of the 800 MHz band in maximizing the spectrum efficiency of their systems and reduce the need for additional spectrum, while also substantially reducing the risk of harmful interference from unaffiliated operations on interstitial channels. Boeing therefore concurs with the Commission's proposed rule that interstitial channel eligibility should be assigned based on the category of the lower-adjacent standard channel,¹⁰ with a preference or right of refusal to the current active user of the adjacent channel. In addition, it is equally important to protect incumbent users from potential harmful interference that may be caused by the higher-adjacent channel as well, and therefore the same preference or right of refusal should be provided to the current active user of that higher-adjacent channel. Following incumbent users, these channels should be made available to business/industrial wireless license holders and public safety entities, in recognition of the importance of protecting the critical economic, industrial safety, and national security operations

¹⁰ *Id.*, ¶ 30.

that they support. To the extent interstitial channels are secured by incumbents, this would represent a succinct solution to potential harmful interference from incompatible interstitial uses.

Another approach would be to require applicants for new interstitial channels to agree to coordination with wideband incumbents, and for them to demonstrate that their system configurations and operations are based on established, compatible technologies for which the risk of causing harmful interference can be readily assessed and addressed. Such coordination would not be necessary for many users, but incumbents must have an opportunity to request coordination, such as a letter of understanding, to the extent that their particular networks would be affected by a proposed interstitial station.

In the absence of either of these preferred solutions, incumbents using wideband analog systems will require more stringent protection measures to ensure full protection regardless of the nature or intensiveness of the interstitial band operations. To adequately protect wideband analog uses, Boeing recommends that the Commission adopt a F(50,10) protection criteria or reciprocal contour overlay analysis, whichever results in less interference from adjacent interstitial channel users.

B. Interference Protection Criteria for Incumbent Class B Signal Boosters

Significant attention is also needed with respect to the measures that would be necessary to provide full protection for incumbent users of Class B signal boosters. A protection criteria of F(50,10) alone would not fully protect users of Class B signal boosters from harmful interference caused by the retransmission of signals from interstitial channel users. Nor would an approach of providing preferential access or coordination requirements alone. Thus, on the record available, Boeing has not yet identified the combination of protection criteria necessary to fully protect users of Class B signal boosters. Boeing therefore recommends that the

Commission carefully consider the above solutions, as well as any other proposals that may provide the necessary assurance that incumbent systems can continue to operate without harmful interference from new interstitial channels.

III. CONCLUSION

The potential benefits of new interstitial channels must not be realized at the cost of existing users. The Commission and the numerous commenters in this proceeding unanimously agree on this premise. Boeing submits these comments to highlight the need to protect incumbents, such as ourselves, that continue to rely on full-channel systems and equipment, such as analog wideband systems or Class B signal boosters. The Commission should ensure that interstitial channels can be added “without requiring existing systems that use the standard channels to modify their operations.”¹¹

To protect wideband analog users, the Commission should consider adopting either 1) an “infill” eligibility that provides incumbents with preferential access to potentially conflicting interstitial channels, or 2) a requirement that new interstitial applicants use only established configurations and technologies and that they coordinate with incumbents as necessary to avoid causing harmful interference. Alternatively, a less flexible, but more protective approach for incumbent wideband analog systems is the adoption of a F(50,10) protection criteria or reciprocal contour overlay analysis, whichever results in less interference from adjacent interstitial channel users.

Class B signal boosters will likely require measures providing at least as much protection as analog wideband systems, and likely additional measures as well. Thus, the Commission should carefully consider other means necessary to fully protect incumbent users from harmful

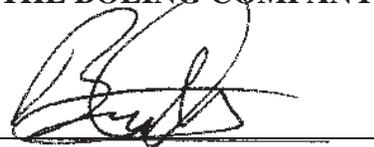
¹¹ 800 MHz NPRM, ¶ 15.

interference and to ensure that their existing equipment configurations will continue to perform as needed in an interstitial frequency environment.

Respectfully submitted,

THE BOEING COMPANY

By:

A handwritten signature in black ink, appearing to read "Bruce A. Olcott", is written over a solid horizontal line.

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