

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

In the Matter of)	
)	
Amendment of Part 15 of the Commission's)	ET Docket No. 14-165
Rules for Unlicensed Operations in the)	
Television Bands, Repurposed 600 MHz Band,)	
600 MHz Guard Bands and Duplex Gap, and)	
Channel 37, and)	
)	
Amendment of Part 74 of the Commission's)	
Rules for Low Power Auxiliary Stations in the)	
Repurposed 600 MHz Band and 600 MHz)	
Duplex Gap)	GN Docket No. 12-268
)	
Expanding the Economic and Innovation)	
Opportunities of Spectrum Through Incentive)	
Auctions)	

**COMMENTS
OF THE CONSUMER ELECTRONICS ASSOCIATION**

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TABLE OF CONTENTS

	<u>Page</u>
I. Introduction.....	2
II. Carefully Considering the Impact of Wireless Microphones on Licensed Operations will Avoid the Potential for Harmful Interference.....	3
A. Unlicensed Wireless Microphones Could Affect Licensed Television Stations After Repacking, Particularly If the Technical Requirements are Loosened Too Much.	3
B. Unlicensed Wireless Microphones Operating In the Guard Band and Duplex Gap Could Create Harmful Interference For Mobile Broadband Operators and Require Further Technical Analysis.	5
C. Licensed Wireless Microphones Operating in the Duplex Gap Also Raise Interference Concerns and Require Further Analysis.	6
III. Conclusion	7

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COMMENTS OF THE CONSUMER ELECTROINCS ASSOCIATION

The Consumer Electronics Association (“CEA”)¹ respectfully submits these comments in response to the above-captioned Notice of Proposed Rulemaking (the “*Part 15 NPRM*” or the “*NPRM*”).²

¹ CEA is the principal U.S. trade association of the consumer electronics and information technologies industries. CEA’s more than 2,000 member companies lead the consumer electronics industry in the development, manufacturing and distribution of audio, video, mobile electronics, communications, information technology, multimedia, and accessory products, as well as related services, that are sold through consumer channels. Ranging from giant multinational corporations to specialty niche companies, CEA members cumulatively generate more than \$223 billion in annual factory sales and employ tens of thousands of people in the United States.

² *Amendment of Part 15 of the Commission’s Rules for Unlicensed Operations in the Television Bands, Repurposed 600 MHz Band, 600 MHz Guard Bands and Duplex Gap, and Channel 37; Amendment of Part 74 of the Commission’s Rules for Low Power Auxiliary Stations in the Repurposed 600 MHz Band and 600 MHz Duplex Gap; Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Notice of Proposed Rulemaking, 29 FCC Rcd 12248 (2014).

I. INTRODUCTION

The coexistence of licensed and unlicensed wireless microphones alongside other operations in the 600 MHz band poses a heightened risk of harmful interference under certain of the proposals in the *NPRM*. Failure to fully analyze the possible interference concerns prior to the deployment of such licensed and unlicensed services could cause interference conditions that are exceptionally difficult and costly to remedy after the fact.

While higher-power wireless microphones use vacant television channels to successfully coexist with television licensees today, the incentive auction will greatly reduce the number of vacant television channels available and place wireless microphones in greater proximity to licensed television operations more frequently than ever before. Among other things, the Commission recognizes that aggregate power levels from unlicensed wireless microphones could substantially exceed the aggregate power limits for unlicensed white space devices, but does not provide any meaningful analysis as to why this elevated aggregate power level does not pose a risk of interference. Likewise, the Commission proposes authorizing licensed wireless microphones with only one megahertz of frequency separation from commercial mobile devices receiving licensed 600 MHz wireless downlink, but does not provide any technical analysis regarding how these operations will avoid interference. Before licensed or unlicensed microphone operations are authorized, the Commission should conduct the necessary technical analyses to ensure that licensed mobile wireless and broadcast television operators do not receive harmful interference.

II. CAREFULLY CONSIDERING THE IMPACT OF WIRELESS MICROPHONES ON LICENSED OPERATIONS WILL AVOID THE POTENTIAL FOR HARMFUL INTERFERENCE.

A. *Unlicensed Wireless Microphones Could Affect Licensed Television Stations After Repacking, Particularly If the Technical Requirements are Loosened Too Much.*

The reduced number of vacant broadcast channels after the incentive auction will increase the risk of interference between licensed digital television receivers and unlicensed wireless microphones.³ As part of the incentive auction process, broadcast spectrum will be converted to mobile broadband use, with a corresponding reduction in the number of frequencies available for use by unlicensed white space devices and wireless microphones.⁴ With more unlicensed users sharing fewer available channels, there will be an increased potential for interference to neighboring broadcast services from unlicensed microphones.

This increased risk of interference is particularly troubling given the proposed adjustment to the separation distance between unlicensed wireless microphones and the service contour of licensed broadcast stations. Specifically, the *NPRM* proposes prohibiting unlicensed wireless microphones from operating within four kilometers of the protected service contours of co-channel TV stations.⁵ This proposal represents a significant reduction from the Commission's previously proposed distances, which ranged from 97 to 129 kilometers.⁶ The *NPRM* also seeks

³ CEA is submitting separate comments regarding the effects of licensed wireless microphones on remaining broadcasters in the TV Bands in proceeding GN Docket No. 14-166. *See Promoting Spectrum Access for Wireless Microphone Operations; Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Notice of Proposed Rulemaking, 29 FCC Rcd 12343 (2014) (“*Wireless Microphone NPRM*”).

⁴ *See, e.g., Part 15 NPRM* ¶ 1.

⁵ *Id.* ¶ 150.

⁶ *See Revisions to Rules Authorizing the Operation of Low Power Auxiliary Stations in the 698-806 MHz Band; Public Interest Spectrum Coalition, Petition for Rulemaking Regarding Low Power Auxiliary Stations, Including Wireless Microphones, and the Digital Television*

comment on whether this distance should be further reduced because it was calculated using the power limit for licensed wireless microphones users (250 milliwatts)⁷ rather than that proposed for unlicensed wireless microphones (50 milliwatts).⁸ Given the changing environment in which wireless microphones will be operating and the increasing potential for interference, the Commission should take a cautious approach and, at a minimum, avoid reducing the four kilometer protection requirement.

The *NPRM* also proposes permitting wireless microphones to operate in the TV band with a conducted power level to the antenna of up to 50 milliwatts – a power level that could possibly be reduced while still promoting the use of unlicensed wireless microphones.⁹ As the *NPRM* notes, unlicensed Part 15 wireless microphone users will usually be smaller operators that do not require higher powers.¹⁰ Likewise, as the *NPRM* discusses in proposing a conducted limit of 20 milliwatts for licensed microphones in the duplex gap, “many wireless microphones operate at power levels between 10 and 20 milliwatts.”¹¹ To the extent that a lower power level could provide meaningfully greater protection for the remaining broadcasters without

Transition; Amendment of Parts 15, 74, and 90 of the Commission’s Rules Regarding Low Power Auxiliary Stations, Including Wireless Microphones, Report and Order and Further Notice of Proposed Rulemaking, 25 FCC Rcd 643, 693 ¶ 115 (2010). These distances were proposed, and imposed on unlicensed wireless microphone users operating subject to a waiver, *id.* ¶ 89, but were never formally adopted. *See Part 15 NPRM* ¶ 6.

⁷ *See* 47 C.F.R. § 74.861(e)(1)(ii).

⁸ *See Part 15 NPRM* ¶ 151.

⁹ *Id.* ¶ 151.

¹⁰ *See id.* (“[W]e expect that parties using [unlicensed] wireless microphones will typically be entities operating in smaller venues that do not require the longer range operation that higher power allows”).

¹¹ *Id.* ¶ 160.

constraining unlicensed wireless microphone users, considering such a lower power level would promote coexistence.

B. Unlicensed Wireless Microphones Operating In the Guard Band and Duplex Gap Could Create Harmful Interference For Mobile Broadband Operators and Require Further Technical Analysis.

In addition to allowing unlicensed white space devices in the duplex gap and guard band, the *NPRM* also proposes permitting unlicensed microphones to operate within the same spectrum bands.¹² And while the *NPRM* proposes a reduced power limit for these operations,¹³ those limits may be inadequate to safeguard licensed operations against interference. Specifically, the *NPRM* proposes a 20 milliwatt conducted power limit per wireless microphone channel.¹⁴ However, as the *NPRM* explains, wireless microphones operate on 200 kilohertz channels, allowing for up to sixteen wireless microphones simultaneously operating in the six-megahertz allocation for unlicensed use in the duplex gap in a given area.¹⁵ Under the *NPRM*'s proposal, at 20 milliwatts each and assuming 0 dBi antenna gain, this power level would authorize an aggregate EIRP of 320 milliwatts, eight times the proposed EIRP level of an unlicensed white space device (40 milliwatts) operating in the same spectrum band. Although the *NPRM* recognizes that this 20 milliwatt limit could authorize a greater aggregate interference, the *NPRM* does not meaningfully analyze the potential. However, the potential aggregate power output here of 320 milliwatts raises serious concerns.

¹² *Part 15 NPRM* ¶¶ 158-64.

¹³ *Id.* ¶ 160.

¹⁴ *Id.* The 20 mW power limit proposed here is a conducted limit, whereas the 40 mW power limit for white space devices is a radiated limit (EIRP). Any positive gain on wireless microphones' transmitting antennas will cause the radiated power to be greater than the proposed 20 mW, increasing the concern about harmful interference.

¹⁵ *See id.*

The *NPRM*'s proposal to allow unlicensed wireless microphones to operate in the duplex gap and the guard band is particularly disconcerting because it does not provide any type of analysis of potential interference, such as that provided for unlicensed white spaces devices,¹⁶ nor does it justify the adoption of a 20 milliwatt power limit. At most, the *NPRM* acknowledges that “this lower power limit for wireless microphones is necessary in the guard bands and duplex gap to protect licensed wireless services outside these frequency bands.”¹⁷ It is unclear, however, how the Commission derived the 20 milliwatt power limit, and there is nothing in the record to indicate that it will adequately protect soon-to-be licensed mobile broadband operations. Without this information, it is difficult to provide meaningful comment as to the appropriateness of such a proposal or whether the assumptions that support such a proposal are correct. The Commission should therefore carefully consider the adoption of such a limit and should consider whether it is even possible to permit unlicensed microphones in the guard band and duplex gap while protecting licensed services.

C. Licensed Wireless Microphones Operating in the Duplex Gap Also Raise Interference Concerns and Require Further Analysis.

Adopting the *NPRM*'s proposal to allow licensed wireless microphones in four megahertz of the duplex gap¹⁸ could also cause interference to mobile wireless downlink in the 600 MHz band. As with the proposal to permit unlicensed wireless microphones in the duplex gap, the *NPRM* provides no technical analysis supporting the operation of licensed wireless microphones in the duplex gap.¹⁹ Furthermore, the *NPRM* provides no support, evidence, or analysis showing

¹⁶ *Id.* ¶ 84.

¹⁷ *Id.* ¶ 160.

¹⁸ *Id.* ¶¶ 92-95, 165.

¹⁹ *See supra* Section II(B).

that such operations could safely operate without causing harmful interference to mobile broadband operations. Indeed, the discussion of licensed wireless microphones in the duplex gap is limited to a single paragraph of the *NPRM*, even though licensed wireless microphones will be operating with much less frequency separation from wireless downlink than unlicensed microphones (one megahertz vs. five megahertz).²⁰ While the related *Wireless Microphones Proceeding* also addresses issues specific to licensed microphones, operations in the duplex gap are not one of those issues.²¹ The Commission should carefully consider the implications of authorizing licensed wireless microphones in the duplex gap operating in close proximity to wireless broadband and conduct further analyses to ensure that the soon-to-be allocated mobile broadband licenses in the 600 MHz band are adequately protected from interference.

III. CONCLUSION

CEA supports the Commission's efforts to promote the deployment of wireless microphones, but certain of the Commission's proposed technical rules risk interference to licensed services. To avoid costly, after-the-fact remediation, the Commission's analysis of potential interference between wireless microphones and licensed services should rely on reasonable assumptions about the actual or reasonably expected operating parameters of unlicensed and licensed devices.

The benefits of more intensive spectrum use should not color a clear-eyed assessment about the likelihood and magnitude of harmful interference among services. By adopting clear

²⁰ *Part 15 NPRM* ¶ 165.

²¹ *Wireless Microphone NPRM* ¶ 74 (“Nor do we address here the technical rules for licensed wireless microphone operations in the duplex gap, since the technical issues relating to their operations are intertwined with the technical issues concerning unlicensed operations in the duplex gap and protection of licensed operations outside of the duplex gap.”).

and reasonable measures to guard against harmful interference and continuing a measured, incremental approach to authorizing new uses in licensed spectrum, the Commission can improve the prospects for users of wireless microphones as well as licensed and unlicensed operations in the 600 MHz band.

Respectfully submitted,

CONSUMER ELECTRONICS
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