



# **CBRS Commercial Weather RADAR Comments**

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

In the Matter of	)	
	)	
Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550- 3650 MHz Band	)	GN Docket No. 12-354
	)	
Petition for Rulemaking of CTIA	)	RM-11788
	)	
Petition for Rulemaking of T-Mobile	)	RM-11789
	)	

**COMMENTS OF THE WIRELESS INNOVATION FORUM**

The Wireless Innovation Forum (WInnForum)<sup>1</sup> asks the Commission, as it considers a targeted proceeding on the 3.5 GHz Citizens Broadband Radio Service (CBRS) rules,<sup>2</sup> to incorporate interference rules that will protect the CBRS ecosystem from commercial weather radar systems licensed in the adjacent band on a secondary basis. Clear interference protection parameters will (i) provide CBRS stakeholders – Priority Access Licensees (PALs) and General Authorized Access (GAA) users alike – with needed additional certainty to invest in the band,

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<sup>1</sup> WInnForum represents an international group of stakeholders who share the common business interests of advancing technologies supporting the innovative utilization of spectrum and the development of wireless communications systems, including essential or critical communications systems. With respect to 3.5 GHz and CBRS, WInnForum addresses all aspects of standardization for CBRS entities, including radio technology-agnostic aspects of CBRS operation and all aspects of three-tier spectrum management, incumbent protection, operations, and operational/communication security for CBRS.

<sup>2</sup> See *Public Notice*, Wireless Telecommunications Bureau and Office of Engineering and Technology Seek Comment on Petitions for Further Rulemaking Regarding the Citizens Broadband Radio Service, GN Docket No. 12-354, DA 17-609 (rel. June 22, 2017).

and (ii) allow further deployment of high-power commercial weather radar deployments below 3550 MHz with the certainty that they comport with the secondary status of those operations.

As part of the 2015 order establishing the CBRS framework for the 3550-3700 GHz band (*3.5 GHz Report & Order*), the FCC removed the allocation for non-federal radiolocation service – used for commercial weather radars – from the 3550-3650 MHz band but preserved that allocation below 3550 MHz on a secondary basis. Since then, CBRS stakeholders have engaged in substantial study of the CBRS operating parameters, which has shown that CBRS will require additional measures to ensure adequate interference protection from commercial weather radars operating below 3550 MHz.

***The 3.5 GHz Band is Generating Significant Interest and Investment.*** The 3.5 GHz CBRS regime is at the vanguard of mid-band spectrum development for wireless broadband. The three-tier access framework, which protects incumbent operations in the band while enabling PAL and GAA use, is as innovative a spectrum sharing scheme as ever developed. Spectrum Access Systems (SASs) and Environmental Sensing Capability (ESC) operations will protect DoD system operations in the band, while allowing non-interfering PAL and GAA operations.

Both commercial and government stakeholders have expended considerable resources and made substantial investments to develop detailed common industry and government functionality and architecture for SAS operations, sensors, and CBRS devices. WinnForum's Spectrum Sharing Committee "serves as a common industry and government standards body to support the development and advancement of spectrum sharing technologies based on the

three-tier architecture proposed for the 3.5 GHz (CBRS Band) rulemaking activities.”<sup>3</sup> In late 2016, the FCC granted conditional approval of seven SAS providers as an important step toward making this spectrum available for wireless broadband and other innovative uses.<sup>4</sup>

There is broad industry support for CBRS, as a variety of companies are driving technology developments necessary to achieve deployment in the 3.5 GHz band. And the significant research and development into deploying broadband in the 3.5 GHz band is further evidenced by the numerous FCC experimental licenses that carriers and equipment vendors have obtained as well. In sum, CBRS stakeholders have invested millions of dollars in the development of the 3.5 GHz band.

As CBRS stakeholders – both PAL and GAA – move forward, we need a clear-cut interference protection regime in place to address the growing operations of commercial weather radars in the immediately adjacent, 3500-3550 MHz band.

***The 3.5 GHz Report & Order and Commercial Weather Radar Systems.*** The *3.5 GHz Report & Order* eliminated the non-federal radiolocation allocation in the 3550-3650 MHz band given the threat of interference to CBRS operations.<sup>5</sup> As noted, the FCC preserved a secondary allocation

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<sup>3</sup> Wireless Innovation Forum, available at <http://www.wirelessinnovation.org/projects-committees>.

<sup>4</sup> See *Public Notice*, Wireless Telecommunications Bureau and Office of Engineering and Technology Conditionally Approve Seven Spectrum Access System Administrators for the 3.5 GHz Band, GN Docket No. 15-319, DA 16-1426 (rel. Dec. 21, 2016).

<sup>5</sup> *Report & Order*, 30 FCC Rcd at 3974 ¶ 40. The FCC permitted continued operation of existing licenses (and any pending applications) on a secondary basis in the 3550-3650 MHz band. Although ULS identifies three existing non-federal radiolocation licensees in the 3550-3700 MHz band, there are no grants of equipment authorizations for Part 90 equipment consistent with the licensed parameters. If licensees are operating using non-certified equipment, those licenses should be removed from ULS.

for the non-federal radiolocation service right up to the 3550 MHz CBRS band edge.<sup>6</sup>

Increasingly, the non-federal radiolocation allocation in the 3 GHz band is used for commercial weather radar systems by local news broadcasters.

***The FCC Should Use This Proceeding to Adopt Interference Protection Measures that Will***

***Promote Certainty for the CBRS Community.*** CBRS stakeholders are concerned that even with the secondary nature of the non-federal radiolocation service allocation, there is tremendous uncertainty caused by high-power radar system operations up to the 3550 MHz band edge.

In particular, the power levels and rolloff characteristics of adjacent band weather radar systems will pose challenges to CBRS operations in the 3.5 GHz band. Out-of-band emissions (OOBE) from the radar systems into the adjacent CBRS band are sufficiently high to result in base station shut down or even damage.

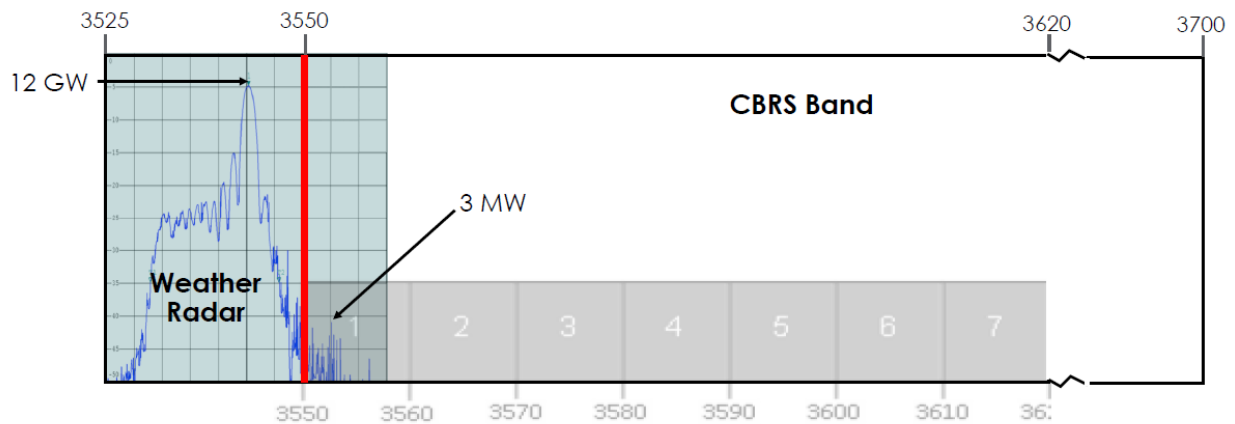
And these high-power radar systems are even more likely to cause improper operation of Environmental Sensor Capability (ESC) detection networks designed to detect the presence of military radar and alert the SAS Administrators CBRS operations must be shut down in the affected areas. The non-federal radar characteristics may result in false positive detections, thus impacting operation of any CBRS stations that depend on the ESC to mitigate interference into DoD radars. Government and industry have worked cooperatively for months to set standards for the maximum level of interference into ESC sensors so that their detection performance, and ultimately protection of the primary federal radiolocation service, is not compromised. WInnForum's Release 1 CBRS standards, created in conjunction with DoD, NTIA,

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<sup>6</sup> 47 C.F.R. §90.103 (Radiolocation Service Frequency Table).

and FCC, set the maximum allowable interference level into ESC sensors. The protection criteria is -99 dBm/MHz peak power as measured at the output terminal of the ESC sensor antenna.

As Figure 1 below shows, emissions from high-power weather radars have the potential to place significant unwanted emissions into the adjacent CBRS band.<sup>7</sup> These emissions are nearly 200 dB above the ESC protection criteria, and without mitigation will threaten the operations of ESCs located within hundreds of miles of a radar station.



**Figure 1. Estimate of unwanted emissions from 3545 MHz weather radar into lower CBRS band.**

Interference from out-of-band emissions of non-federal weather radars potentially threatens CBRS and ESC operations up and down U.S. coastlines, as well as ESCs placed inland around select government installations to protect military related operations and testing. Without FCC action to protect the operation of CBRS and ESCs, these unwanted emissions could diminish the

<sup>7</sup> The data used to represent the weather radar comes from the equipment authorization documentation for a weather radar produced by Baron Services Inc. (FCCID NX5VHDD-1000S and FCCID NX5KHDD-1000S)

utility of the CBRS band and jeopardize investments to purchase licenses and build networks. Although commercial weather radars below 3550 MHz are authorized on a secondary basis, the risk of interference to CBRS operations warrants adoption of rules that prevent interfering operations from the outset. The proposal below will do so, while maintaining sufficient operational flexibility to allow commercial weather radars to continue to operate and expand.

***Interference Protection Proposal.*** WInnForum urges the FCC to incorporate the following proposal into a further proceeding to modify the 3.5 GHz CBRS rules. The FCC should require the following protections as part of the commercial radar license approval process:

- Weather radars must include filters to protect the CBRS band from interference.
- Weather radars should be licensed below 3540 MHz to provide a guard band between the two uses.
- The FCC should modify Section 90.175 of its rules to require frequency coordination with ESC operators within 150 km of proposed radiolocation stations operating in the 3500-3550 MHz band prior to licensing those stations. The ESC interference objective must be met throughout 3550-3700 MHz band.
- A neutral frequency coordination body should conduct the coordination. ESC operators should have a fixed time to respond.

In addition to the protections above, the FCC should modify the Table of Frequency Allocations to reflect the lack of authorized non-federal radiolocation stations operating in the United States today. In addition, the Radiolocation Service Frequency Table in Section 90.103 of the FCC Rules should be modified to remove the 3550-3650 MHz band.



**Conclusion.** WinnForum asks the FCC to propose interference rules that will protect the CBRS ecosystem from commercial weather radar systems licensed in the band below 3550 MHz.

Respectfully submitted,

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