

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
)	
Amendment of Section 74.1231(i) of the Commission's Rules on FM Broadcast Booster Stations)	MB Docket No. 20-401
)	
Modernization of Media Regulation Initiative)	MB Docket No. 17-105
)	
Amendment of Section 74.1231(i) of the Commission's Rules on FM Broadcast Booster Stations)	RM-11854
)	

**REPLY COMMENTS OF
THE NATIONAL ASSOCIATION OF BROADCASTERS**

1 M Street SE
Washington, DC 20003
(202) 429-5430

Rick Kaplan
Larry Walke
David Layer
Robert Weller

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I. INTRODUCTION AND SUMMARY

The National Association of Broadcasters (NAB)¹ has carefully reviewed the recent comments and technical record regarding GeoBroadcast Solutions LLC's (GBS) proprietary technology, ZoneCasting,² and nothing in the record dissuades us from our previous conclusion that changing the FCC's rules to allow the origination of distinct, geo-targeted radio signals within a station's service contour will cause material interference that harms listeners and threatens FM radio service.³ Commenters representing the vast majority of commercial

¹ NAB is a nonprofit trade association that advocates on behalf of local radio and television stations and also broadcast networks before Congress, the Federal Communications Commission and other federal agencies, and the courts.

² *Media Bureau Seeks Comment on Recent Filings Concerning Use of FM Boosters for Geo-Targeted Content*, Public Notice, DA 22-249 (rel. Apr. 18, 2022); *Amendment of Section 74.1231(i) of the Commission's Rules on FM Broadcast Booster Stations*, Notice of Proposed Rulemaking, 35 FCC Rcd 14213 (2020) (NPRM).

³ Comments of NAB, MB Docket Nos. 20-401 and 17-105, and RM-11854 (June 6, 2022).

FM radio stations,⁴ National Public Radio, Inc.,⁵ Xperi, the developer of HD Radio™,⁶ and Low-Power FM radio stations,⁷ all agree that GBS's tests – including the way in which they were designed – show that ZoneCasting will raise unresolvable technical problems that will undermine the public interest.⁸

The broadcasters and others raising concerns about GBS's tests all strongly support innovation. Indeed, many of them have spent countless hours exploring and investing considerable sums in new technologies to propel the industry forward in today's crowded audio marketplace. NAB and other commenters would be first in line to advocate for a proposal that would help the industry if that proposal had any conceivable promise.⁹ Unfortunately, GBS's technology does not meet even that relatively low bar.

The Commission should know that GBS has tried for more than a decade to convince radio stations to support ZoneCasting concept. During numerous meetings over the years with NAB and individual broadcast companies,¹⁰ GBS has provided a parade of economic and

⁴ NAB Comments at 2; Comments of Audacy, Inc., Beasley Media Group, LLC, Cumulus Media New Holdings Inc., iHeart Communications, Inc., New York Public Radio, and Salem Media Group, Inc. (Joint Broadcasters) at 14-18, MB Docket Nos. 20-401 and 17-105, and RM-11854 (June 6, 2022).

⁵ Comments of National Public Radio, Inc. (NPR) at 3-4, MB Docket Nos. 20-401 and 17-105, and RM-11854 (June 6, 2022).

⁶ Comments of Xperi Holding Corporation at 2-4, MB Docket Nos. 20-401 and 17-105, and RM-11854 (June 6, 2022).

⁷ Comments of REC Networks at 10, MB Docket Nos. 20-401 and 17-105, and RM-11854 (June 6, 2022).

⁸ Although some commenters raise additional concerns regarding the potential economic and competitive impacts of ZoneCasting, NAB focuses these comments on the clear shortcomings of GBS's field testing.

⁹ We note that some NAB members and some of the Joint Broadcasters' stations use GBS's other product, MaxxCasting, to expand the coverage area of FM signals. However, unlike ZoneCasting, MaxxCasting does not geo-target different programming.

¹⁰ GBS has also tried to end-run station groups' management and technology leaders who are familiar with ZoneCasting's problems by meeting directly with their ad sales teams.

technical information supposedly supporting why GBS’s proprietary technology would help broadcasters. GBS failed, however, to put forth any compelling case to broadcasters as to why the FCC should upend its longstanding policy concerning boosters. Now, apparently because GBS has been unable to win over the industry it claims to benefit, rather than go back to the drawing board to develop a system that meets industry expectations, it has instead expended considerable resources to urge the FCC to foist ZoneCasting upon the industry. Flipping the old adage on its head, GBS’s approach has been, “if you can’t join them, beat them.”

The record unequivocally shows that ZoneCasting cannot be implemented without materially degrading signal quality. Although the various commenters reach this conclusion from different perspectives,¹¹ a few incontrovertible truths stand out. First, the ZoneCasting tests do not remotely simulate what stations will actually experience in markets across the country. GBS has only tested ZoneCasting in extremely limited, carefully designed situations calculated to produce only the most favorable results. The testing ignores effects beyond the miniscule area tested, including larger, more realistic zones where interference is predicted between the ZoneCasting system and a station’s primary signal.¹² Second, GBS used questionable methodologies to estimate – but not *measure* – ZoneCasting’s impact on listener impressions of audio quality. The audio analysis tool used by GBS’s consultant does

¹¹ GBS has most recently tested ZoneCasting in San Jose, California with FM Station KSJO(FM), and in Jackson, Mississippi with Station WRBJ-FM. Letter from Gerard J. Waldron, Covington & Burling LLP, to Marlene H. Dortch, Secretary, FCC, MB Docket Nos. 20-401 and 17-105, and RM-11854 (Sept. 17, 2021), attaching Roberson and Associates, LLC, *KSJO(FM) Demonstration System, Geo-Targeted FM/HD Broadcast Technical Report* (KSJO(FM) Cover Letter or KSJO(FM) Test Report); Letter from Gerard J. Waldron, Covington & Burling LLP, to Marlene H. Dortch, Secretary, FCC, MB Docket Nos. 20-401 and 17-105, and RM-11854 (Mar. 30, 2022), attaching Roberson and Associates, LLC, *WRBJ-FM Demonstration System, Geo-Targeted FM/HD Broadcast Technical Report* (WRBJ-FM Cover Letter or WRBJ-FM Test Report).

¹² NAB Comments at 11-14; Joint Broadcasters Comments at 16-18.

not apply to cases like ZoneCasting where the audio interference being analyzed is from two different sources.¹³ Third, neither test addresses questions about ZoneCasting's impact on HD Radio,¹⁴ the digital audio broadcasting technology selected by the FCC for the United States, or its incompatibility with digital audio subchannels (HD-2, HD-3, etc.) or the Artist Experience, which transmits graphics to the receiver. Finally, even under GBS's cherry-picked scenarios, the testing revealed that ZoneCasting will cause unacceptable interference for exceedingly long periods of time.¹⁵

Most importantly, the record is now replete with evidence that ZoneCasting will not work. NAB and NPR jointly engaged the leading technical expert in this arena, John Kean of Cavell, Mertz & Associates, to evaluate GBS's testing reports.¹⁶ In 2013, GBS hired NPR Labs, Mr. Kean's employer at the time, to build a scientific-based subjective evaluation listener study of both simulcast single frequency networks (SFNs) and ZoneCasting.¹⁷ The results of this study showed that ZoneCasting would cause unacceptable interference *that less than 10% of listeners would tolerate*.¹⁸ The vast majority of listeners in these areas, when experiencing the interference caused by ZoneCasting, would either change the channel (or service) or just turn off the radio. It is damning that GBS *never published* this data and has

¹³ Joint Broadcasters Comments at 6.

¹⁴ *Id.* at 14-16; Xperi Comments at 4-7; NAB Comments at 19-21.

¹⁵ Joint Broadcasters Comments at 13; NAB Comments at 10.

¹⁶ John Kean, *Analysis of Technical Reports for ZoneCasting at KSJO(FM), San Jose, CA and WRBJ-FM, Brandon, MS* (ZoneCasting Tests Analysis), attached to NAB's comments.

¹⁷ Note that the SFN study was directly applicable to another GBS product called MaxxCasting. Only the results of the SFN tests were published. John Kean, NPR Labs, and Eilyn Sheffield, Melinda Hines, Towson University, *Design Parameters for Analog FM Signal Repeaters Based on Listener Testing*, attached as Exhibit C to Reply Comments of GBS, RM-11854 (May 19, 2020) (NPR Labs Study).

¹⁸ In contrast, the NPR Labs testing determined that MaxxCasting, when properly implemented, can improve reception without creating excessive interference.

carefully avoided mentioning it when referencing the NPR Labs study in FCC filings. These ZoneCasting listening results were divulged publicly for the first time in Mr. Kean's recently submitted study.

The FCC should no longer put any time, effort, and resources into considering ZoneCasting, which neither listeners nor stations want, even if using the system is not strictly mandatory. Interference is interference, listeners will suffer, and all radio stations will lose value, regardless of whether a station chooses to use ZoneCasting.¹⁹ Moreover, stations opting not to deploy ZoneCasting will nevertheless be forced to reduce advertising rates to match the lower rates that stations using ZoneCasting in their market will charge for geo-targeted ads.²⁰ Thus, touting that the proposal is "voluntary" is of no moment.

On the other hand, there is nothing new in the record to bolster GBS's technical claims regarding ZoneCasting. GBS appears to have sponsored a couple of letters from broadcast engineers claiming to have "peer reviewed" GBS's testing reports,²¹ both of whom used identical text to describe GBS's tests and their own conclusions, suggesting that they did not carefully and individually review the testing plans, but rather merely signed off on the company's cookie-cutter language. Moreover, none of the supporting technical comments acknowledged GBS's clear testing design failures,²² such as only conducting tests in the close

¹⁹ Joint Broadcasters Comments at 16-17.

²⁰ Letter from Rick Kaplan, Chief Legal Officer and EVP, NAB, to Marlene H. Dortch, Secretary, FCC, MB Docket Nos. 20-401 and 17-105, and RM-11854, at 2 (June 14, 2022).

²¹ Comments of Kevin M. Fitzgerald at 3, MB Docket Nos. 20-401 and 17-105, and RM-11854 (June 6, 2022); Ryan Wilhour, Kessler and Gehman Associates, Inc., *Technical Statement in Support of the Use of FM Boosters for Geo-Targeted Content* at 2 (Wilhour Statement), attached to Comments of Aaron P. Shainis, MB Docket Nos. 20-401 and 17-105, and RM-11854 (June 6, 2022) (Shainis Comments).

²² Dennis Wallace, Meintel, Sgrignoli, & Wallace, LLC, *Review of Field Testing of FM Booster Origination Technology* (MSW Statement) attached to Comments of the National Association

vicinity of back-to-back boosters located adjacent to the test roadway (which misleadingly constrains the resulting interference) or failing to recognize the predicted interference in large regions outside the tiny area chosen. Nor do they address the disruption to listeners not travelling on the ideal route for traversing ZoneCasting's interference, the lack of any listener data, or the impact on digital radio, among other issues.

Accordingly, the technical record to date requires dismissing GBS's proposal and terminating this proceeding. At a bare minimum, if the FCC requires GBS to pursue additional testing due to the current massive holes in the record, such testing should be conducted and evaluated by a trusted, independent industry body, such as the National Radio Systems Committee did for digital radio,²³ not only to ensure the completeness and objectivity of the testing, but also to help reduce the time and effort that GBS has forced the FCC and industry to waste on its unwanted proposal.

II. THE SUBSTANTIVE RECORD REGARDING GBS'S TESTING DEMONSTRATES THAT ZONECASTING IS TECHNICALLY UNSOUND

In the words of Press Communications, LLC, a small family-owned broadcaster in New Jersey, ZoneCasting "creates an existential threat to life and sustainability of the radio broadcasting industry."²⁴ The record overwhelmingly agrees, for reasons ranging from GBS's insufficient testing to the disruption listeners' access to emergency information that ZoneCasting will cause.

of Black Owned Broadcasters and Multicultural Media, Telecom and Internet Council (NABOB/MMTC), MM Docket Nos. 20-401 and 17-105, and RM-11854 (June 7, 2022). NAB responds to this statement and NABOB/MMTC's comments even though both were apparently late-filed.

²³ Xperi Comments at 7.

²⁴ Comments of Press Communication LLC at 2-3, MM Docket Nos. 20-401 and 17-105, and RM-11854 (June 1, 2022).

A. GBS Designed ZoneCasting Tests to Win FCC Approval Instead of Demonstrating Whether the Technology Works

The ZoneCasting tests GBS has sponsored to date fall short of industry engineering standards and fails to show that the technology can be implemented without harming the public. As NPR states, GBS has only tested ZoneCasting in “ideal circumstances in an unrealistically small . . . region” that “understated the interference that would have been collected if the testing facilities had been designed to reflect real-world scenarios than minimize interference.”²⁵ ZoneCasting has only been studied using highly directional, back-to-back boosters located extremely close to the test roadway, which artificially reduces the scale of interference, and measurements were done only along the closest, most ideal route for traversing this area to artificially reduce the time that interference occurs.²⁶ GBS ignores ZoneCasting’s effects beyond these contrived borders, including large areas where interference is predicted between the ZoneCasting system and a radio station’s primary signal, or along longer routes that are tangential or diagonal to the interference area, or to stationary listeners near the borders of these areas.²⁷

Moreover, instead of studying ZoneCasting’s impact under conditions that actually simulate real-world conditions, GBS “unjustifiably extrapolated” this skewed performance to the entire interference region.²⁸ Mr. Kean and NAB’s technologists are mystified by this breach of normal engineering testing practices. The only explanation is that GBS is trying to

²⁵ NPR Comments at 3-4.

²⁶ *Id*; ZoneCasting Tests Analysis at 7-9; Joint Broadcasters Comments at 7-9, 12-13.

²⁷ ZoneCasting Tests Analysis at 9; Joint Broadcasters Comments at 8.

²⁸ NPR Comments at 6.

pull the wool over the FCC's eyes, or, if ZoneCasting is allowed, use this misleading data to persuade broadcasters to sign up,²⁹ or perhaps both.

Similarly, instead of conducting any actual listener studies of ZoneCasting's impact on sound quality, as is normal engineering practice, GBS tries to conceal the true interference effects by using hypothetical thresholds and untested methodologies to estimate – but not *measure* – the degradation of sound quality. GBS essentially invents a “20% multipath threshold” for determining whether ZoneCasting's effects would be intolerable to listeners. However, a multipath-derived metric is inapplicable to ZoneCasting. The ZoneCasting Tests Analysis explains that the authors of the GBS Test Reports “do not appear to realize that ZoneCasting involves an entirely different version of program audio from the host station's primary signal, which is properly called co-channel interference – not ‘multipath.’”³⁰

Of course, we now know that GBS has previously examined (but did not disclose) ZoneCasting's actual effect on listener tolerance during the NPR Labs and Towson University study. This test, utilizing a scientifically-based subjective evaluation listening study, determined that the audio quality was “poor” in the large swaths of areas of predicted interference that GBS ignores in its two recent field tests.³¹ NPR and Towson found that only 9% of listeners would keep listening to the quality of signal provided in these areas during transmission of ZoneCasting content, which Mr. Kean characterizes as “surprisingly critical.”³² It's no wonder that GBS never published these results and has taken pains to selectively reference the portion of the NPR study dealing with a simulcast, single frequency network

²⁹ *Id.*

³⁰ ZoneCasting Tests Analysis at 18.

³¹ *Id.* at 14-15.

³² *Id.* at 4.

(SFN) configuration or misinterpret select ZoneCasting results in FCC filings.³³ For example, GBS has stated: “The parameters for ZoneCasting were verified by simulations of transmitted FM signals at NPR Labs, and these simulation results were then evaluated by a large group of listeners in controlled subjective testing at Towson University.”³⁴ However, GBS never adds the concluding chapter about listeners’ negative views of the signal quality problems caused by ZoneCasting.

Finally, even under the underinclusive scenarios that GBS tested, ZoneCasting was shown to cause objectional interference that is far more widespread and disruptive than GBS suggests.³⁵ For example, the Joint Broadcasters highlight that GBS’s testing focused on measuring ZoneCasting’s impact when traveling on a perpendicular path through the interference area.³⁶ However, even along this ideal route for cutting through the interference, GBS’s own test data at KSJO(FM) reveals that a listener traveling at 10 mph would be subject to interference for more than 11 seconds. And in other situations, like that at WRBJ-FM, which do not enjoy natural terrain shielding like the KSJO(FM) test, the interference area caused by

³³ In a 2017 filing, GBS discussed testing at FM Station WIIL, Union Grove, Wisconsin. Letter from Gregory L. Masters, Wiley Rein, to Marlene H. Dortch, Secretary, FCC, Facility ID No. 28473 (Feb. 2, 2017), attaching “ZoneCasting Proposed Test” (dated Dec. 21, 2016) (WIIL Proposed Test). GBS states that “For ZoneCasting spots in Mono, the average minimum threshold for acceptability was found at approximately 16 dB C/I (equivalent to D/U ratio), at a MOS score of 2.5, under mobile multipath fading conditions” and consequently GBS uses 16 dB C/I as a “design requirement.” *Id.* at 19-20. Not mentioned is the “turn-off” score associated with this operating point which is greater than 80% of listeners. This mis-application of NPR Labs data is highlighted by the fact that in analyzing the WRBJ-FM data, the ZoneCasting Tests analysis found a C/I of 11 dB is necessary to account for the statistical signal variations of the desired and undesired signals, a far worse situation, suggesting that in fact GBS is not using the 16 dB C/I as a design requirement at all.

³⁴ Petition for Rulemaking, GeoBroadcast Solution LLC at 9, RM-11854 (Mar. 13, 2020).

³⁵ NPR Comments at 7; Joint Broadcasters Comments at 4, 8-9, and 13.

³⁶ Joint Broadcasters Comments at 9.

ZoneCasting will average 239.5 feet, with many areas exceeding 459 feet and up to 614.5 feet.³⁷ This means that a listener travelling at 20 mph would suffer radio disruption for an average of 8 seconds, with many exceeding 16 seconds and some longer than 20 seconds.

Thus, as NPR states, the answer to the FCC's question whether stations will be able to adequately manage the interference that ZoneCasting will cause is "no."³⁸ GBS's testing is hopelessly incomplete and leaves unanswered numerous technical questions specifically asked by the FCC.³⁹ And the information that GBS does provide is fatally flawed because it misrepresents the size, location, and extent of predicted interference that ZoneCasting will cause, misrepresents the impact of ZoneCasting on listeners' reception and NPR Labs' data on ZoneCasting system design, and demonstrates a fundamental lack of understanding of multipath measurements.⁴⁰ The FCC should not move ahead with GBS's proposal based on the flimsy, misleading technical record at hand.

B. The Xperi Field Test Report Identified Significant Problems That ZoneCasting Will Cause

Xperi, the developers and implementers of HD Radio technology, submitted a comprehensive field test report describing tests conducted by Xperi of ZoneCasting at KSJO(FM) on March 22-24, 2022.⁴¹ Xperi reports that they identified three potential problem areas regarding the use of HD Radio receivers subject to ZoneCasting signals, and while Xperi offers some possible remedies, it cautions that resolution of ZoneCasting's problems may be impractical and unrealizable. In addition, Xperi noted that, because of the terrain shielding

³⁷ *Id.* at 13.

³⁸ NPR Comments at 8 citing NPRM, 35 FCC Rcd at 14217.

³⁹ Joint Broadcasters Comments at 18.

⁴⁰ ZoneCasting Tests Analysis at 16-19.

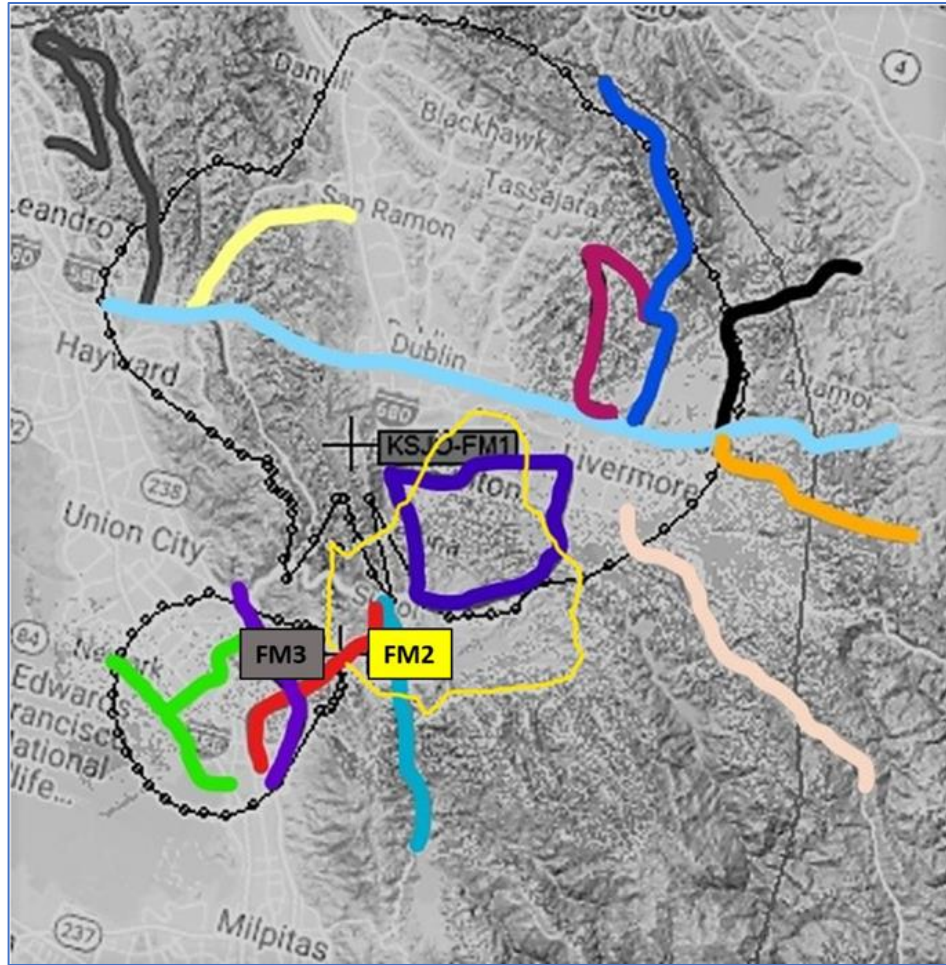
⁴¹ Xperi Holding Corporation, *Xperi Evaluation of GeoBroadcast Solutions (GBS) ZoneCasting System, Field Test Report*, (June 2022), attached to Xperi Comments (Xperi Report).

which effectively separates the ZoneCasting booster signal from the main signal of KSJO(FM), their tests results may not reflect areas without terrain shielding which could “...result in larger transition areas or require additional boosters” for those areas.⁴²

The Xperi Report also offers a stark contrast to the test efforts of GBS in at least two important ways. First, Xperi’s tests were conducted under a variety of reception conditions which exist in various locations throughout the zone, while the GBS tests collected data at only at a few select points guaranteed to produce the most favorable results. Reproduced below is a figure from the Xperi Report which illustrates the various locations of the routes tested by Xperi.⁴³ Comparing the locations of these test routes to the zone boundary (depicted in this figure as the large areas surrounded by a black line with dot markers), Xperi’s routes are seen to be in different locations and with different orientations, as one would expect for testing designed to fairly assess the performance of the system.

⁴² Xperi Report at 34.

⁴³ *Id.* at 11, Figure 5. According to Xperi, all routes shown in this map were covered except for the gray and yellow routes, which were excluded due to time constraints.



Second, the test routes used by Xperi were chosen based upon analytic investigations into where problem areas might exist with testing in those areas to determine the true nature of any problems. The Xperi Report states: “All selected routes traversed regions with expected digital-to-digital co-channel interference (DDCI) as predicted by GBS simulation.”⁴⁴ This is a particularly telling quote which begs the question: why were the GBS tests not structured in this fashion – to target and test expected problem areas – especially if GBS had the ability to conduct such simulations that could help illuminate any issues?

⁴⁴ *Id.* at 11.

Xperi's testing did confirm one of GBS' conclusions, that good synchronization between main signal and booster signal "Exporters" is vital for proper HD Radio operation in a ZoneCasting system.⁴⁵ However, Xperi takes this conclusion even farther, noting that "All transmitters within the ZoneCasting system – whether broadcasting targeted content or not – must be synchronized at both physical and audio protocol layers, or digital audio outages and degradation may occur."⁴⁶ Xperi has previously emphasized that designing a ZoneCasting system would not be a simple matter, and ensuring its functionality even more difficult.⁴⁷

Xperi highlights that broadcasters would be required to maintain constant vigilance so as to achieve this main signal/booster signal synchronization, and notes that in its experience "broadcast engineers consistently [fail] to properly align analog and digital audio signals, a simpler form of synchronization than what appears to be required for good ZoneCasting performance."⁴⁸ NAB agrees, and cautions the FCC against approving ZoneCasting because of the challenges that stations will face in trying to manage the self-interference that will result.

C. Additional Serious Concerns Justify Dismissal of GBS's Proposal

Short of repeating the entire litany of problems that warrant rejection of GBS's proposed rule change, NAB submits that a few specific issues bear repeating. First, contrary to the claims of some commenters,⁴⁹ NAB understands that GBS has *not* resolved FEMA's

⁴⁵ KSJO Test Report at 29.

⁴⁶ Xperi Report at 33.

⁴⁷ Comments of Xperi Holding Corporation (Xperi) at 6-12, MB Docket Nos. 20-401 and 17-105, RM-11854 (Feb. 10, 2021).

⁴⁸ *Id.*

⁴⁹ Letter from Gregory Cooke, to Marlene H. Dortch, Secretary, FCC, MB Docket Nos. 20-401 and 17-105, and RM-11854 (June 13, 2022); Letter from Gerard J. Waldron, Covington & Burling LLP, to Marlene H. Dortch, Secretary, FCC, MB Docket Nos. 20-401 and 17-105, and RM-11854, attachment at 31-33 (Oct. 13, 2021).

concerns about the impact of ZoneCasting on the emergency alert system (EAS).⁵⁰ GBS has only tested ZoneCasting under idealized conditions, and the effectiveness of ZoneCasting's supposed override mechanism on EAS at two locations only under tightly designed conditions.⁵¹ Nor has GBS subjected ZoneCasting to independent field testing or review, or conducted any testing of ZoneCasting in concert with FEMA or the FCC to ensure the functionality of the EAS system. Simply put, the ZoneCasting testing so far is not a fair illustration of real-world conditions, and the commenters who claim that GBS has met its burden of showing that ZoneCasting will not impact EAS have missed the bigger picture. At a minimum, implementing ZoneCasting will add complexity to a radio station's operations that could increase the risks of error in the reliable distribution of EAS messages.⁵²

In the same vein, NAB remains concerned that ZoneCasting will bifurcate a station's transmission of news and information about emergency situations. GBS speculates that stations will use ZoneCasting to geo-target weather or traffic updates to only parts of their market.⁵³ NAB is far more concerned that ZoneCasting will disrupt the timely delivery of emergency news throughout a station's market, if one booster is broadcasting such news while another continues with its regularly scheduled advertisements. It could be annoying, if not dangerous, for listeners in cars to suddenly lose reception as they traverse a ZoneCasting area of interference. At the same time, listeners driving in the other direction will not receive such news as they unwittingly travel toward the weather or traffic event.

⁵⁰ Comments of Federal Emergency Management Agency (FEMA) Integrated Public Alert and Warning System Program Management Office (IPAWS PMO), MB Docket Nos. 20-401 and 17-105, and RM-11854 (Feb. 8, 2021).

⁵¹ KSJO Test Report at 34-35.

⁵² NPR Comments at 9.

⁵³ GBS Petition at 13-14.

These questions coincide with NPR’s concerns that allowing ZoneCasting will disserve the public interest in providing high quality, free, over-the-air radio service.⁵⁴ NAB agrees with NPR that ZoneCasting will negatively impact the fidelity of FM broadcasting and listener trust in radio service.⁵⁵ NPR explains that the testing of ZoneCasting at NPR Labs shows that ZoneCasting’s effect on sound quality may push listeners away from their local broadcasters and toward non-broadcast alternatives, which would directly impair the relationship between listeners and radio and lead to reduced listener underwriting support for non-commercial stations.⁵⁶ NPR rightly fears that ZoneCasting will harm the American public by undercutting stations’ ability to provide the essential local news and information on which listeners rely.⁵⁷

III. COMMENTERS SUPPORTING ZONECASTING PROVIDE NO TECHNICAL ANALYSIS AND FAIL TO UNDERSTAND INDUSTRY CONCERNS

Synchronization of audio is not possible in ZoneCasting. None of the commenters supporting the GBS proposal acknowledges or appears to understand ZoneCasting or the improper testing that was done to evaluate it. For example, TBA Communications conflates “Geo-Targeting” with “SFN transmission system development,” explaining that “with appropriate synchronization, these systems [referring to Geo-Targeting and SFN systems] will provide beneficial Geo-Targeted advertising, weather, traffic, alerts and warnings with no appreciable degradation to the listener experience.”⁵⁸ Synchronization of *simulcast* booster facilities does indeed minimize interference in an SFN environment, but synchronization does

⁵⁴ NPR Comments at 7.

⁵⁵ *Id.*

⁵⁶ *Id.* at 8.

⁵⁷ *Id.*

⁵⁸ Comments of TBA Communications, LLC at 1-2, MB Docket Nos. 20-401, 17-105, and RM-11854 (June 3, 2022).

not address the co-channel interference that results when *different* audio programming is being carried by a booster and the primary station, as occurs with ZoneCasting.⁵⁹

Interference zones will be large and uncontrollable. Flagstaff Radio and the Shainis Comments consultant simply repeats a statement drafted by GBS’s attorney that “geo-targeted content is unlikely to create any material disturbance in the listener experience and, importantly, frequently will improve signal quality within a zone,” and misrepresents this statement as the entire story told by the GBS Testing Reports.⁶⁰ In fact, the testing reports contain numerous caveats, such as “there could be areas in which it is possible to move for long distances along a zone transition boundary, thus creating the conditions for regular and objectionable signal instability”⁶¹ and “the demo system was designed (as any broadcaster would have the incentive and ability to do so), to minimize the size of the transition region between zones.”⁶² NAB strongly disagrees that any broadcaster would have the ability to minimize the size of the transition region because broadcasters do not have the ability to choose transmitter sites at will. Increasingly, broadcasters are limited to established transmitter sites, which typically are selected to provide broad coverage, not to create narrow

⁵⁹ See also Comments of Anthony V. Bono, MB Docket Nos. 20-401, 17-105, and RM-11854 (June 15, 2022). Mr. Bono’s experience and conclusions appear to be based on SFN booster systems, not systems that will geo-target dissimilar programming and thus will be far more noticeable to listeners as they traverse through the area of interference created by ZoneCasting. Referring to the WRBJ-FM test, Mr. Bono states that he has “heard other stations use this technology with great success.” NAB has no idea what stations Mr. Bono is referencing given that ZoneCasting is a new technology not used at any stations. Interestingly, Mr. Bono makes a point of noting that he has read the comments of Ryan Wilhour, who did not conduct any independent field or lab analysis of ZoneCasting, but ignores the more thorough review and testing of John Kean and Xperi.

⁶⁰ Comments of Flagstaff Radio, Inc. at 3, MB Docket Nos. 20-401, 17-105, and RM-11854 (June 6, 2022); Wilhour Statement at 2; see e.g., WRBJ-FM Cover Letter at 3.

⁶¹ WRBJ-FM Test Report at 36.

⁶² *Id.*

interference zones.⁶³ Wilhour also claims that “Roberson chose” the two stations for testing to represent different “terrain scenarios,”⁶⁴ when in fact it was GBS that selected the stations and designed and deployed the ZoneCasting boosters, which were “designed to cut across highways and interstate roads, resulting in highly controlled, small transition areas.”⁶⁵ NAB understands from broadcasters across the country that such designs will be impossible in many or most practical situations due to site availability, costs of site access, zoning laws, the presence of necessary infrastructure, and other factors. The FCC should not simply take GBS at its word regarding the supposed availability of booster sites that will enable stations to dramatically confine the interference caused by ZoneCasting.

Lack of true peer review. The Shainis Comments consultant and Fitzgerald both claim to have performed a “peer review of the WRBJ(FM) and KSJO(FM) RAA technical reports.”⁶⁶ A peer review is “a process of subjecting an author’s scholarly work, research or ideas to the scrutiny of others who are experts in the same field.”⁶⁷ In this case, the field in question is interference to FM reception as evidenced by degraded audio quality. Neither Flagstaff’s consultant nor Fitzgerald provide evidence of any expertise in that field, which is entirely different from work generally in “the broadcast engineering field.” Locating a qualified peer for review of the GBS technical reports was precisely why NAB and NPR enlisted John Kean, who has unique, direct experience in assessing audio quality assessment and listener impacts.

⁶³ *Tower Zoning Can’t Be Prohibited Everywhere*, (Web), available at <https://www.useful-community-development.org/tower-zoning.html> (last visited June 17, 2022).

⁶⁴ Wilhour Statement at 2.

⁶⁵ WRBJ-FM Cover Letter at 2.

⁶⁶ Wilhour Statement at 2; Fitzgerald Comments at 2.

⁶⁷ *What Is Peer Review?*, International Journal of Computer Applications, available at <https://www.ijcaonline.org/what-is-peer-review> (last visited June 15, 2022).

Neither Flagstaff’s consultant, Fitzgerald, nor any of the other commenters in support of the GBS proposal have provided documentation of expertise in the field of assessing audio quality or conducting listener tests. Finally, there is no basis for claiming that “the assessment on multipath are consistent [sic] with how broadcasters generally would assess the situation.”⁶⁸ Field testing of ZoneCasting represents a novel situation without generally established practices; therefore, there is no basis for claiming how “broadcasters generally” would perform such tests. As NAB and NPR have discussed at length, the assessment of the impacts on listenability of ZoneCasting cannot be extrapolated from other interference situations, such as multipath.⁶⁹

Cut-and-paste advocacy. Fitzgerald provides comments that are nearly word-for-word identical to Flagstaff’s consultant, raising the question whether both were prompted by a common non-specified source. Regardless, Fitzgerald provides no technical analysis whatsoever, but attributes this statement to the technical reports (caps in the original):

IT IS HIGHLY UNLIKELY THAT GEO-TARGETED CONTENT WILL CREATE ANY SIGNIFICANT DISTURBANCE TO THE LISTENER EXPERIENCE, ADDITIONALLY, OFTEN TIMES THE SIGNAL QUALITY WILL BE GREATLY IMPROVED WITHIN THE BOOSTER'S COVERAGE ZONE.⁷⁰

Remarkably, the quoted statement does not exist in either of the testing reports but is similar to a statement made by GBS’s attorney.⁷¹ One would expect an engineering consultant to be able to distinguish the results of technical analysis from advocacy claims, and not represent the latter as the former.

⁶⁸ See, e.g., Wilhour Statement at 2.

⁶⁹ NPR Comments at 6; NAB Comments at 5.

⁷⁰ Fitzgerald Comments at 2.

⁷¹ WRBJ-FM Cover Letter at 3.

Terrain effects were not tested. Several commenters state that “Roberson chose” two FM stations that “represent the wide diversity of terrain an applicant may face when implementing the geo-targeted technology,” observing that the stations serve “two markets [that] are characterized by excessive flat and rough terrain, respectively, and represent the wide diversity of terrain an applicant may face when implementing the geo-targeted technology.”⁷² This characterization is misleading and irrelevant. Although the test stations generally cover markets with either flat or rough terrain, GBS did not test ZoneCasting’s impact over a diversity of terrain, but only over extremely short stretches of flat roadway that were covered by very close, line-of-sight boosters that effectively prevented any significant signal from the station’s main facilities. The testing did not evaluate the effects of varying terrain that will fluctuate the signal levels of the main and booster facilities independently. GBS could have easily tested the effects of the diversity of terrain (or the lack thereof) on ZoneCasting by conducting measurements over a larger area that included areas of predicted interference, but instead it chose to restrict its measurements to areas where the interference was tightly controlled, and would have the minimum possible effect on listeners. Again, this is consistent with GBS’s aim to avoid subjecting ZoneCasting to testing that simulates real-world conditions.

NABOB and MMTC’s consultant claims that the terrain in the coverage area of “WRBJ-FM provided a nearly ‘worst-case’ geography for testing . . . since there is very little terrain-shielding.”⁷³ This is plainly wrong. The characterization of “no terrain shielding” is irrelevant because the testing was limited to a miniscule portion of roadway that was a point-blank target from the ZoneCasting booster antennas, and at the same time over 15 miles away from

⁷² See, e.g., Wilhour Statement at 2.

⁷³ MSW Statement at 2.

the station's main transmitting site.⁷⁴ The signal level from the WRBJ-FM main transmitter was so much weaker than the signal from the boosters that no interference would reasonably be expected outside of the very small handoff ("transition region") zones where testing was conducted.⁷⁵ Measurements taken at larger distances from the booster antennas, in locations where interference is predicted, would have actually reflected a proper "worst case" condition, but no such testing was performed in those areas.

No listener testing was conducted. NABOB and MMTC's consultant argues that the tests conducted provided "data regarding the listener experience and consumer benefits."⁷⁶ However, as NAB has noted, not a single listener was involved in the testing, so it is not possible that the "listener experience" was assessed.⁷⁷

The consultant's claim that "multipath" "is an excellent objective metric for use in this analysis" reflects either a lack of understanding of ZoneCasting itself or a lack of understanding of multipath.⁷⁸ As discussed in the ZoneCasting Tests Analyses, the Octave Nomad "multipath" parameter is completely inappropriate as a measure of audio impairment for ZoneCasting because ZoneCasting interference does not create "multipath," which is two or more identical signals that are delayed in time.⁷⁹ Rather, ZoneCasting creates co-channel

⁷⁴ The calculated distance from the WRBJ-FM main transmitter to the first measurement location listed in Table 6 of the WRBJ-FM test report is 15.1 miles, while the distance to the "Hwy. 80" booster location listed in Table 2 is 0.048 miles.

⁷⁵ The calculated (using FCC F(50,50) curves) signal level from the WRBJ-FM main facility at the measurement locations was about 63 dBu, while the calculated signal level from the boosters was about 121 dBu – a difference of 58 dB or 794 times stronger. That is, no interference would be expected in the areas measured.

⁷⁶ MSW Statement at 2.

⁷⁷ NAB Comments at 22.

⁷⁸ MSW Statement at 1-2.

⁷⁹ Joint Broadcasters Comments at 5.

interference from different signals.⁸⁰ Using a “multipath” measurement system to detect and measure co-channel interference from different signals has no meaning and can produce no valid or useful results. NAB believes that only testing that involving actual listeners, as was done by NPR Labs, can provide an accurate measure of listenability.

IV. CONCLUSION

For the reasons stated above, NAB respectfully requests that the Commission dismiss GBS’s proposed rule change that would authorize the origination of distinct, geo-targeted programming using FM boosters, and terminate this proceeding.

Respectfully submitted,

NATIONAL ASSOCIATION OF BROADCASTERS
1 M Street SE
Washington, DC 20003
(202) 429-5430



Rick Kaplan
Larry Walke
David Layer
Robert Weller

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⁸⁰ ZoneCasting Tests Analysis at 18-19.