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

In the Matter of	)	
Digital Audio Broadcasting Systems And Their Impact on the Terrestrial Radio Broadcast Service	)	MM Docket No. 99-325

EX PARTE COMMENTS

I, Alan W. Jurison am personally filing these *ex parte* comments and analysis in response to the *ex parte* filing of National Public Radio ("NPR") on November 6, 2009 of an *ex parte* meeting that was held on November 5, 2009 related to the NPR Labs Advanced IBOC Coverage and Compatibility Study ("NPR Labs Study"). In addition, I have comments related to the joint letter filed by NPR and iBiquity Digital Corporation ("iBiquity") on November 5, 2009 ("Joint Agreement").

Professional Background

I have been involved in the technical aspect of the broadcast industry for over fifteen years. I have prepared or helped prepare engineering applications before the Commission for the purposes of updating and upgrading both FM and AM broadcast stations in the Northeast. In addition to the preparation of applications, I have physically installed, upgraded and/or maintained broadcast facilities and related systems, including those using iBiquity's IBOC "HD Radio" technology. I also have done extensive "real world" in-field testing with many portable and mobile HD receivers available to the public.

I am a long standing member of the Society of Broadcast Engineers (SBE) and hold several certifications from that organization, including Certified Senior Broadcast Radio Engineer (CSRE) with Certified AM Directional Specialist (AMD) and Certified Digital Radio Broadcast (DRB) credentials.

Need of Maximum Power Increase

First, I support the notion that a power increase is needed to improve the reception of IBOC "HD Radio" on the FM band. My experience with this technology, which started in 2006, immediately showed the flaws the industry didn't seem to find until much later. While so much time was spent on protection ratios, interference analysis, and regional coverage via mobile

reception, very little practical engineering research was done early in the creation of this system as it relates to indoor reception and penetration of the digital signal.

Having used a variety of different HD radios, it is very clear that the power level of -20dBc is not sufficient in penetrating indoor structures. As it stands now, at -20dBc, it is very unlikely that a listener will be able to receive reliable digital broadcasts in a signal level below an FCC 70dBu F(50,50) contour. In fact, in many larger commercial structures, this threshold could be considered near 80dBu or greater in some situations. While typical portable and tabletop analog radios will perform with a 60dBu contour, or sometimes less, the digital versions of these radios do not perform as the public would expect at the -20dBc power level.

To that point, it is imperative that the Commission approve a higher power level for IBOC digital operations. While the Joint Agreement outlines a very structured process for -14dBc, and in some situations -10dBc, I believe this process is very cumbersome and also prevents the full effect of having maximum power for the public to enjoy solid, reliable digital reception. The evidence of the NPR Labs Study does not support such a cumbersome process. The Commission should consider a blanket -10dBc authorization.

Analysis of NPR Labs Study

Before I dissect certain parts of the NPR Labs Study, I would like to emphasize that I support the concept behind the tests, and respect the engineers and process behind the research. Unfortunately, I believe that there was a disconnect between the data and the conclusions reached. This disconnect was likely due to the organization that conducted the tests, National Public Radio, having their own agenda which may have permeated the analysis of the data. These comments are aimed at being an objective criticism of the NPR Labs Study, of which, to date, very few people are on record with any analysis.

At first glance, the NPR Labs Study is very impressive. And it is. There is no doubt to the contribution of countless hours from many participants, and that is to be respected. Many of the methodologies used in the study are very well thought out. However there are several fundamental flaws which need to be pointed out and discussed.

NPR Labs Study Lacks Indoor Reception and Interference Tests

The NPR Labs Study did not perform any meaningful interference analysis as it relates to indoor reception. While they planned on performing tests, no data was ever presented[1]. This is a disappointment. The industry ended up with the problem that have today (i.e. needing a digital power increase) because no indoor testing was performed. We're making a decision on the power levels and interference of elevated IBOC carriers without doing indoor testing. We're

[1] *See* National Public Radio's "Report to the FCC on the Advanced IBOC Coverage and Compatibility Study", November 4, 2009 at Page 6.

solely basing our decision process on mobile reception testing on the edge of a station's coverage area. This is a big mistake.

I speculate that indoor testing would not only help validate the need of elevated digital power, but also show that the actual interference on the first adjacent channels would be minimal. The engineering theory behind this is as follows. In an interference analysis, consider an indoor listener trying to tune an analog FM carrier on a standard indoor receiver, such as a portable, tabletop or clock radio, within the station's protected contour. The desired station, being more proximate to the listener's location, will have building penetration and is being received. However, the undesired IBOC "interfering" station, will be very distant, and in most cases, is guaranteed to be at least -6dBu (or better) *below* the desired station using an FCC (50,10) model. Given the great distance the "interfering" station must travel, curvature of the Earth, lack of building penetration of this interfering station, lack of a good receiving antenna, and subsequent reception by a relatively unsophisticated portable, the tabletop or clock radio receiver would likely experience *no interference.* Considering many radio listeners are in fixed, indoor locations, such as at a home or office, it is important that we consider these types of listening locations. The NPR Labs Study doesn't consider these situations. I feel if these were given the same level of attention to detail as the mobile reception, it would show little or no undesired IBOC interference.

NPR Labs Study Uses One Single Mobile Receiver for Tests

The NPR Labs Study uses only a single, mobile Kenwood KTC-HR100 tuner in their tests[2]. While Kenwood makes fine receivers, this is not a typical mobile receiver. Mobile reception usually being done by a factory installed (OEM) receiver that came with the automobile. NPR did no testing on any of these receivers. I think this is a red flag. In *Appendix B* of the NPR Labs Study, NPR tested four different types of subcarrier receivers when determining the impact of elevated digital carriers on SCA receivers. Why did NPR Labs not test multiple FM receivers? Again, we're making sweeping decisions based on a limited data set. We're attempting to make decisions on a receiver that few mobile listeners have.

Further, the NPR Labs Study noted issues as it related to the receiver they used for their tests. NPR Labs notes that the Kenwood KTC-HR100 receiver goes into stereo/mono blending when the D/U ratio is in the 4 to 8 dB range, which causes abnormal results[3]. This too, should raise a red flag amongst those analyzing the NPR Labs Study based on its technical merits. Viewing Figures 23 and 24, it appears the receiver NPR Labs used in its testing has a phenomenon in the 4-13dB range as it relates to its stereo/mono blending. Further, NPR Labs does not show how analog-to-analog reception performs with an MOS score in those situations. It is imperative to know what the analog component scored in these tests. Perhaps the Kenwood KTC-HR100 receiver's mono/stereo blending circuitry is unacceptable altogether in any

[2] *Ibid* at Section 3.3.1, Page 16.

[3] *Ibid* at Section 4.5, Page 27.

situation. This should have been an area of further research by NPR, and would have supported the analysis of other, more common, OEM mobile receivers.

NPR's Selection MOS of 2.7 Not Supported By Data

Section 4.4.1 of the NPR Labs Study, Figures 21 and 22 shows in-room samples using Speech and Low Density Music. The analog, -20dBc, -14dBc, and -10dBc all fall near or below a 2.7 MOS. Using their methodology, analog-to-analog interference is objectionable and would cause the listener to tune out. However, the NPR tests were conducted at the point where the analog-to-analog interference was within FCC limits. NPR Labs makes no reference to this. If a 2.7 MOS is the true point where listeners tune away, then NPR Labs has significant explaining to do. NPR Labs Study shows in Figures 21 and 22 that the existing analog-to-analog system (no digital carriers) causes objectionable interference and in these situations people wouldn't be listening. Clearly, that is not the case, but NPR Labs uses the 2.7 MOS criteria in their analysis.

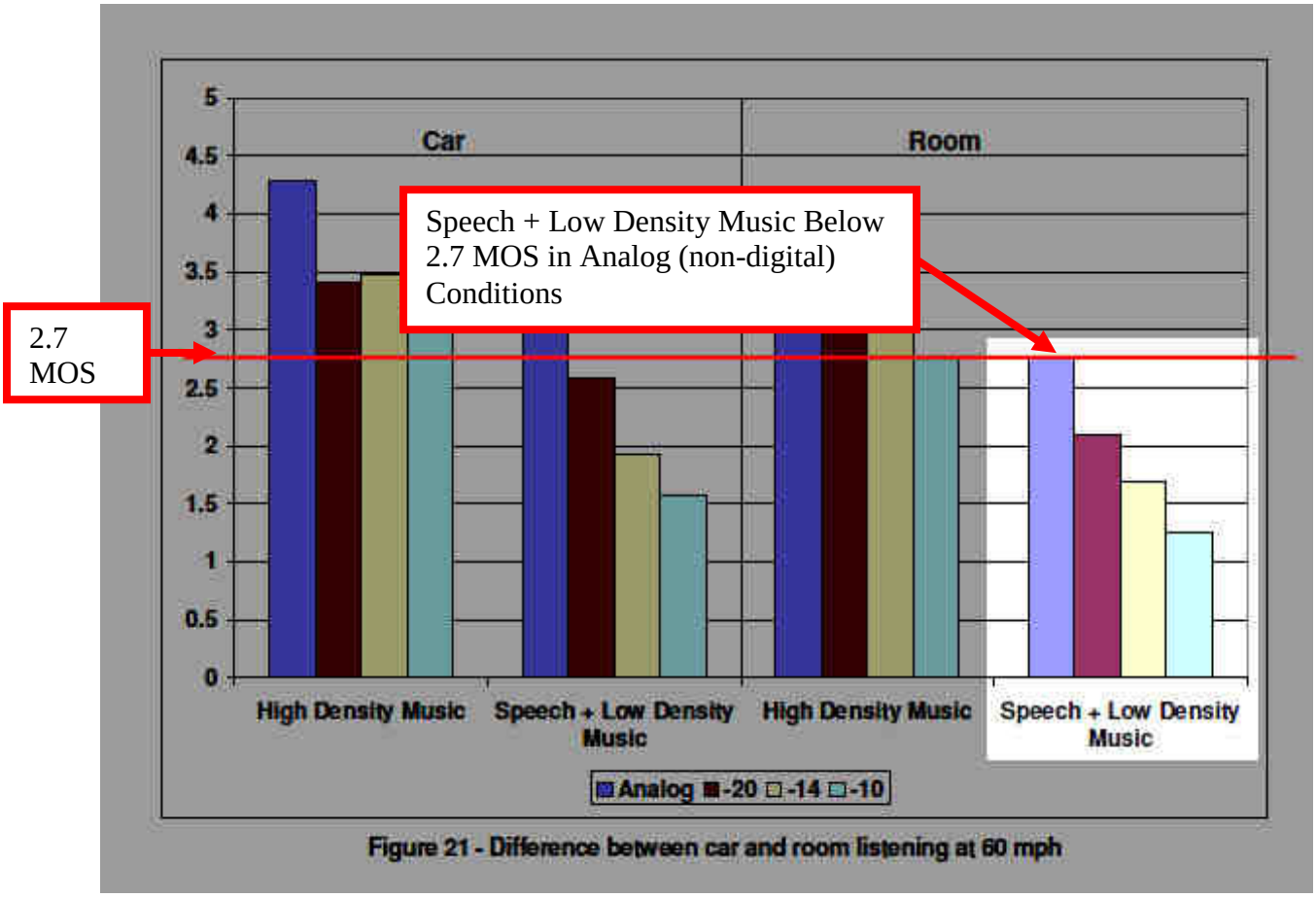
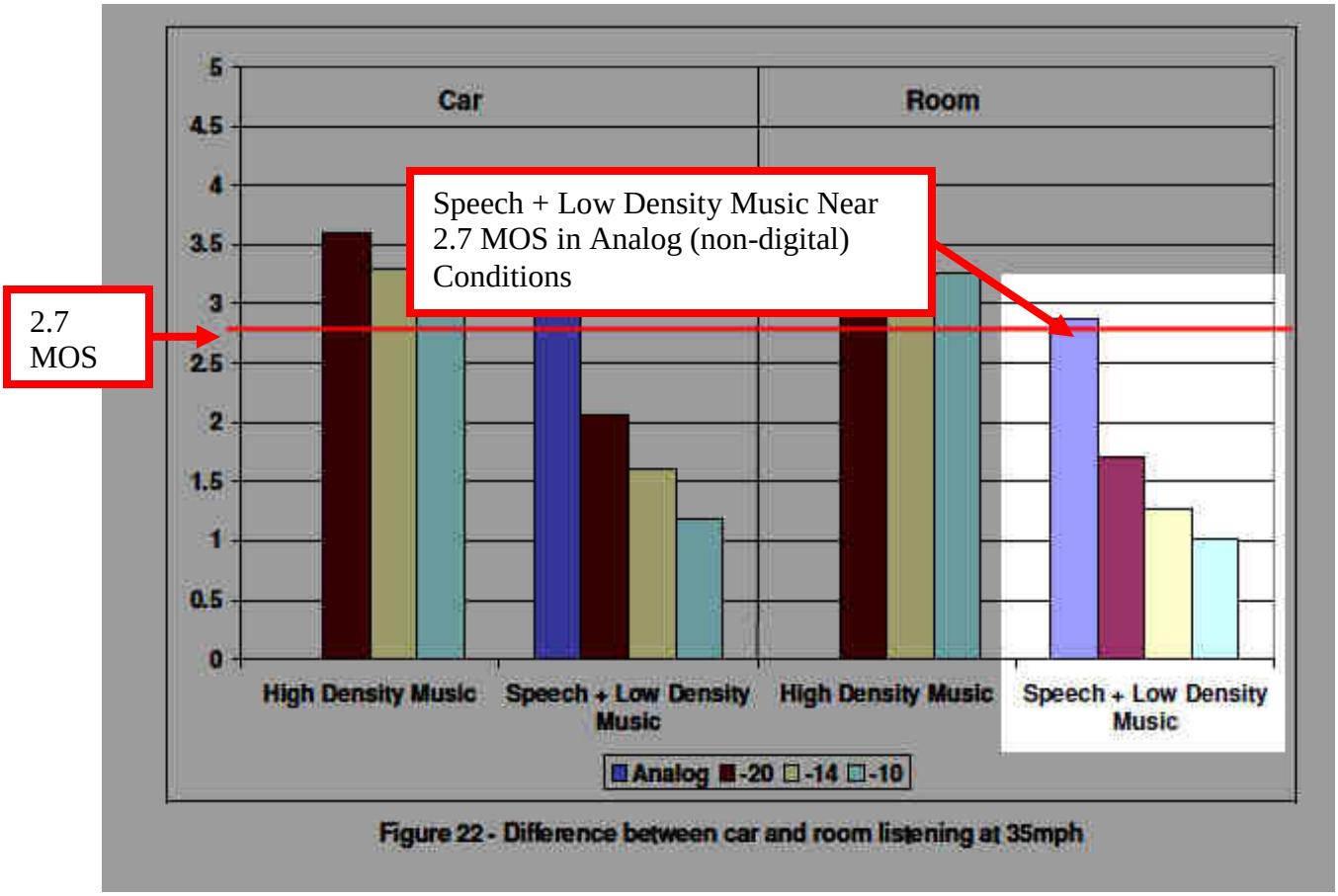


Figure 21 - Difference between car and room listening at 60 mph



It is also important to note that Figures 21 and 22 are the last you'll ever see the analog-to-analog MOS plotted in the report. This should raise a red flag, because NPR Labs isn't showing us the full picture. Why is the analog component not shown in figures 23 and 24? Given the trend of how the analog performs in Figures 21 and 22, it is likely that the analog system (i.e. no digital carriers) would also perform poorly and be unacceptable on the MOS scale in the Speech + Low Density Music tests. If that's the case, there is an issue with either the specific receiver they used or their overall methodology.

Given the above, NPR Labs should have immediately followed up with testing additional receivers before drawing conclusions from just one receiver. If additional receivers showed similar results, then the 2.7 MOS criteria NPR selected is inaccurate. Perhaps the testing of additional receivers would show the Kenwood KTC-HR100's mono/stereo blending circuit causes listeners to tune out while other, more widely deployed OEM receivers do not. Given the results that NPR Labs has shown, in the current analog domain, with no digital carriers at all, that the desired signal is already being tuned out – and if that's the case, then we're creating a protection methodology that has a higher standard than our current level of analog-to-analog broadcasts, for which NPR has not provided any justification.

Data Inconsistencies in Speech and Low Density Music Tests

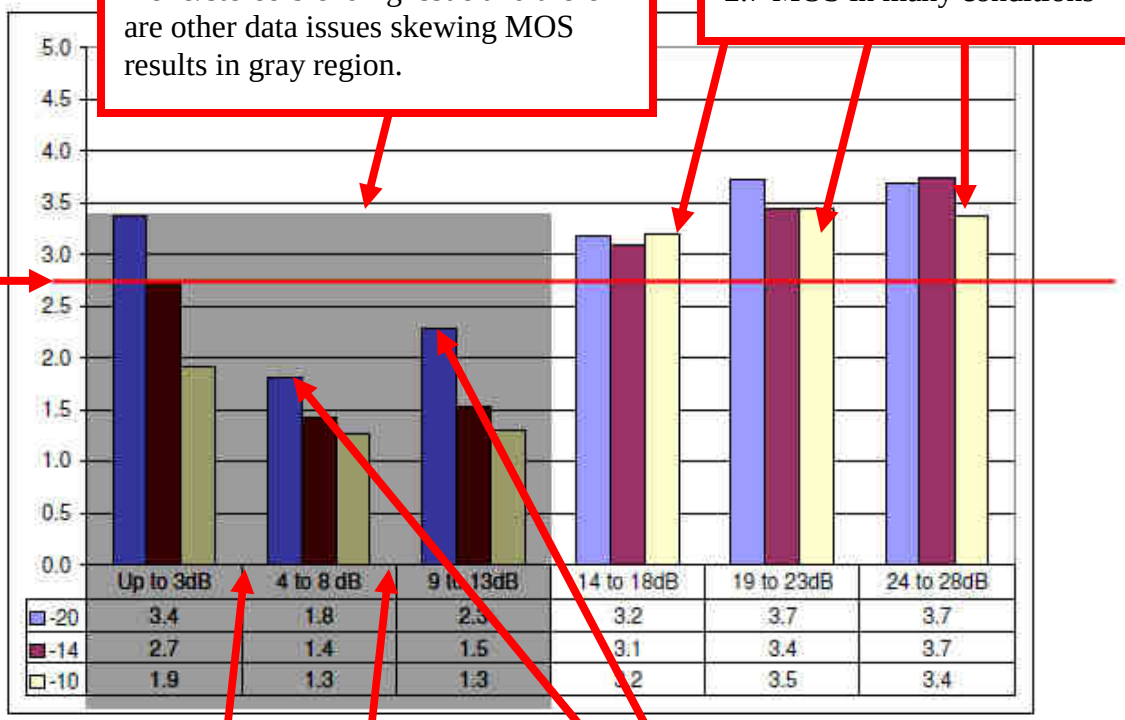
Figure 24 of the NPR Labs report shows that there is objectionable interference received in the 4 to 13dB region. However, according to their own figure, even today's digital operations of -20dBc fall below a 2.7 MOS. NPR makes no mention of this. If you are to believe the NPR report, existing IBOC operations at -20dBc already are "detrimental" because they produce scores below a 2.7 MOS, thus showing no basis for a power increase at all. Why would NPR support a power increase above -20dBc based on this data?

Clearly, there isn't much interference at the -20dBc level, otherwise there would be far more complaints filed with the Commission. Also, as I maintain above, if the analog to analog components were shown on this graph, it is likely that they would not meet the 2.7 MOS in the 4 to 13dB range either; holding IBOC digital operation to a higher interference standard than that of analog. There is an anomaly with the mono/stereo blending feature of the mobile receiver and that is making the data to look poorly. There are other issues discussed later in my report that skew these results (see Page 8 below).

Kenwood KTC-HR100 has mono/stereo blending issue and there are other data issues skewing MOS results in gray region.

Speech + Low Density Above 2.7 MOS in many conditions

2.7 MOS



	Up to 3dB	4 to 8 dB	9 to 13dB	14 to 18dB	19 to 23dB	24 to 28dB
-20	3.4	1.8	2.3	3.2	3.7	3.7
-14	2.7	1.4	1.5	3.1	3.4	3.7
-10	1.9	1.3	1.3	3.2	3.5	3.4

Figure 24 - Speech and Low Density Music at -20, -14 and -10 dBc

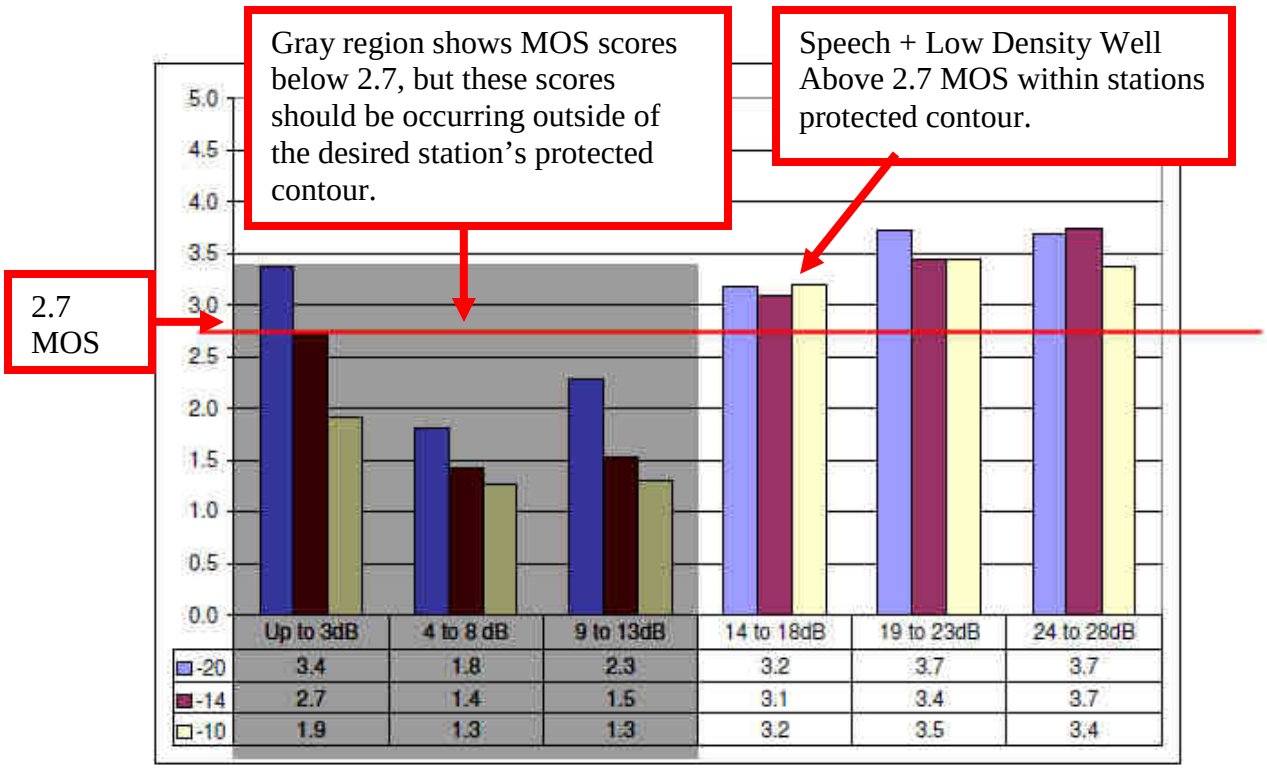
Analog-Analog Components Not Shown. Trend of data here and data from Figures 21 and 22 would suggest Analog-Analog would be impaired and fall below 2.7 MOS.

-20dBc Unacceptable In These Tests. If you believe the data in Figure 24, -20dBc operation also falls below a 2.7 MOS and is allegedly already "detrimental" and causing interference.

When adjusting for the correction factors as listed on Page 30 of their report, NPR states that there is a 8dB correction factor which needs to be applied to the measured data to correspond with the FCC(50,50) and FCC(50,10) standards for predicting interference. When doing so, the measured results would fall into the 14 to 18dB region of Figure 24. Accordingly, when applying the correction factor NPR shows on Page 30, anything below the "14 to 18dB" range would actually be located beyond the desired station's protected service contour under normal conditions.

NPR's own data shows that digital operations at -20dBc, -14dBc, and -10dBc actually do not cause MOS scores below 2.7 in the protected contour under normal conditions, meaning objectionable interference does not exist within the protected contour, even on Speech and Low Density Music tests under normal conditions.

While many stations enjoy coverage beyond their protected service contour, the Commission does not protect stations or listening beyond the protected service contour. NPR is providing data and creating an interference standard that protects stations beyond their protected contour, which should not be permitted because it is counter to all Commission policies as it relates to the FM band.



	Up to 3dB	4 to 8 dB	9 to 13dB	14 to 18dB	19 to 23dB	24 to 28dB
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-10	1.9	1.3	1.3	3.2	3.5	3.4

Figure 24 - Speech and Low Density Music at -20, -14 and -10 dBc

NPR Suppresses Critical Data

As stated on page 6 above, NPR has not shown the MOS score of the analog-to-analog (non-digital) operation in Figure 24. I have demonstrated above, on page 7, regions that score below a 2.7 MOS under normal conditions are going to be beyond the desired station's protected contour. If they are occurring inside the protected contour, this requires further examination.

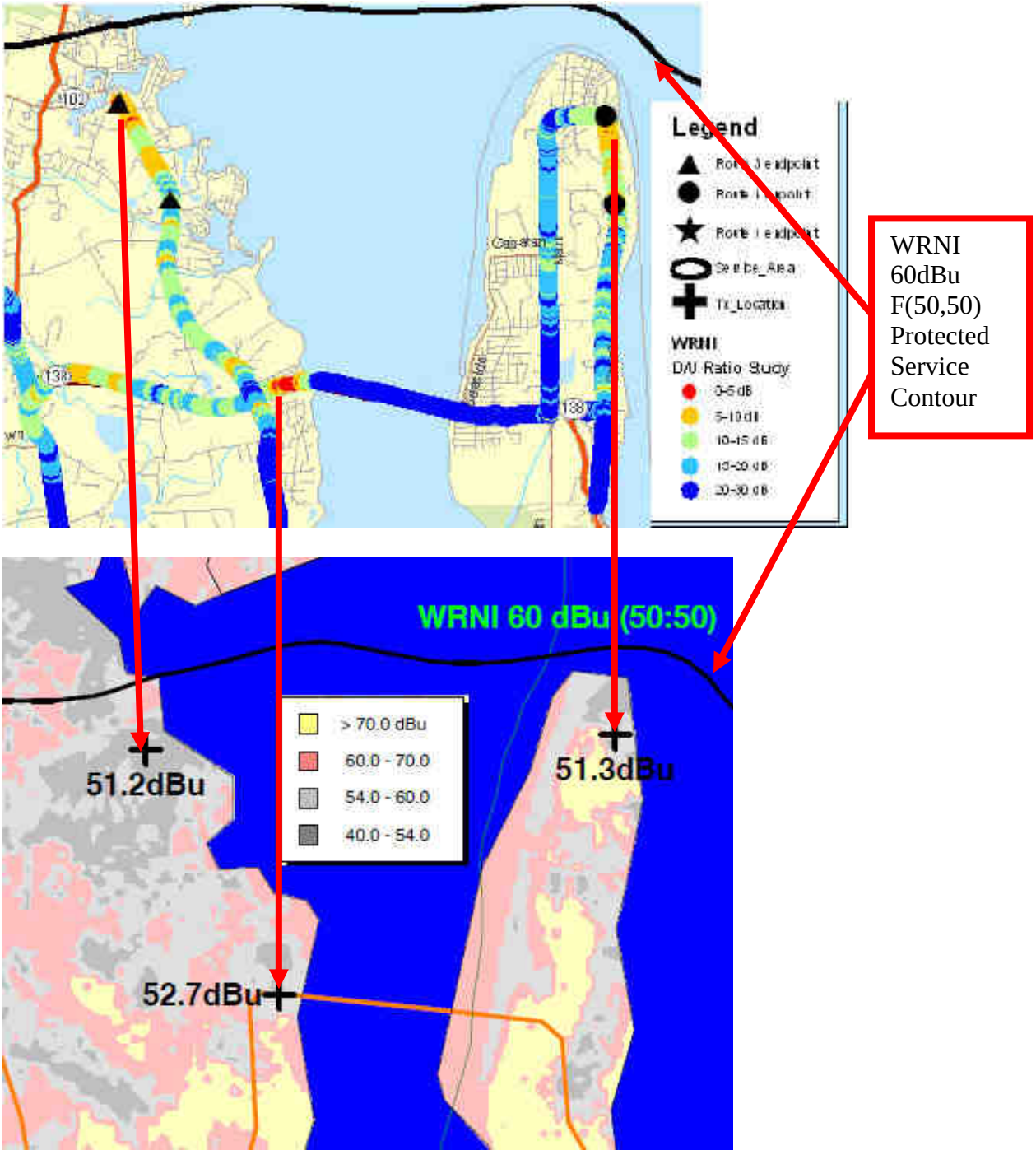
The analog data, which has been omitted from Figure 24 is very important. Looking at NPR's map of WRNI(FM) Rhode Island in *Appendix C*, Figure 39, you can see that there are D/U ratios inside of WRNI's protected 60dBu service contour which are below the 14-18dBu D/U ratio. Even when considering the correction factor, there are many sections where there are 0-5dB D/U (denoted with red dots) and 5-10dB D/U (denoted with yellow dots). If we're in the station's protected contour, WRNI should always be at least 6dB (14dB after correction) higher than the undesired station. How can this be? It's because WRNI has a very distant, weak, and obstructed signal in these locations.

While the FCC 60dBu F(50,50) goes well beyond these areas of unacceptable D/U ratios, a Longley-Rice propagation model shows very low predicted signal in these exact same regions. Unfortunately, NPR did not provide a log of Field Strength data (measured in dBu) along the same test route for this station. If they did provide this data, you will likely find values being recorded well below 60dBu.

On the next page, you will see a Longley-Rice plot of WRNI compared to the D/U map data that NPR has provided in *Appendix C* of their report. You'll note three major regions where the D/U ratios become unacceptable. On the Longley-Rice plot, these regions are shaded in various forms of gray, showing received signal strengths of 40-54dBu in the general area that the D/U ratio data which NPR collected. While NPR has not provided exact location coordinates, I've outlined three points on the map proximate to the NPR route showing a predicted signal strength between 51-53dBu.

I have had a lot of experience "traveling signals" and comparing them to both FCC and Longley-Rice prediction models. Anyone listening to WRNI in these locations, in an analog-to-analog situation, listening to speech and light music programming, would hear significant signal impairments, and likely score it with an MOS of below 2.7. Why did NPR not collect and/or provide the analog-to-analog MOS scoring data in this situation? This is very concerning because, if the analog reception without any digital carriers is unacceptable, then these points should not have been considered in their analysis. With the analog signal impaired to the point where a listener would tune away, digital operation are not going to be any better. NPR continues to hold digital interference to a higher standard than analog.

Note: Within WRNI's protected service contour, due to terrain and other propagation issues, WRNI's analog signal is poor in this area and digital data points should be dropped.

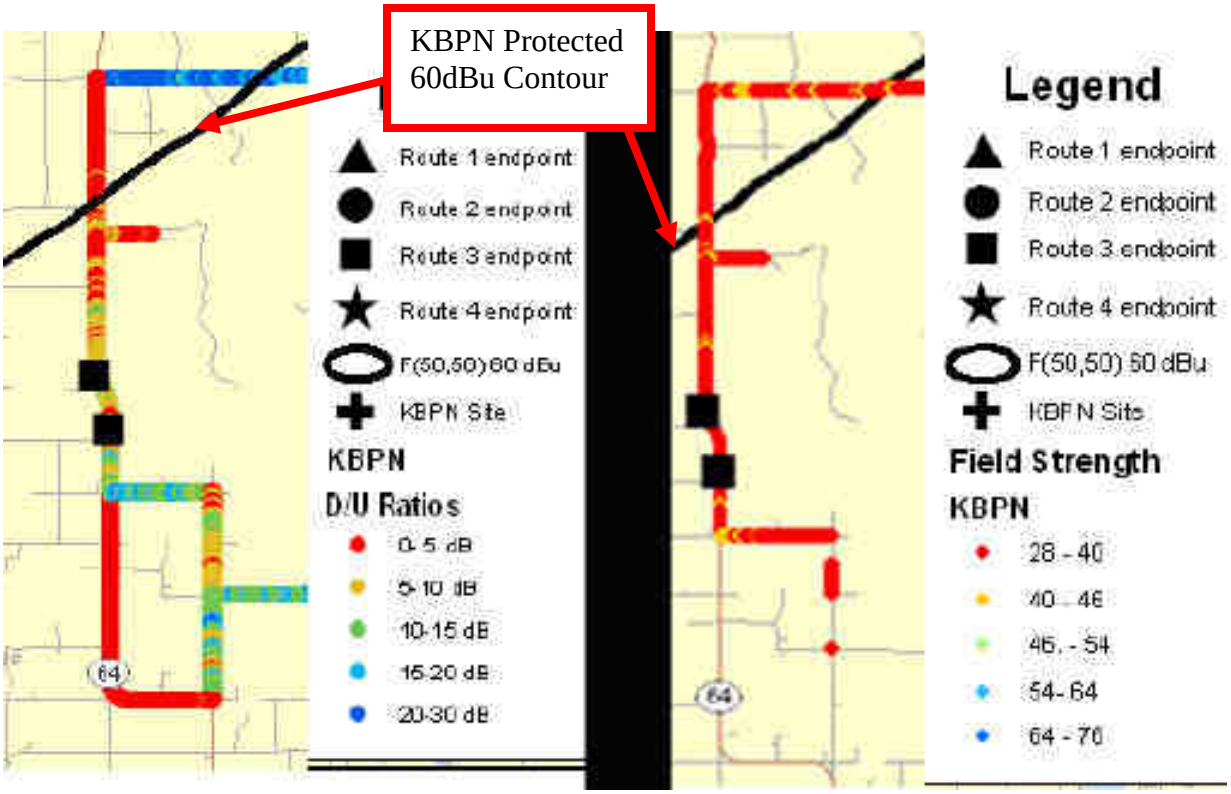


Top: Figure 39 from *Appendix C* of NPR's Report: WRNI, Zoomed in to Areas of Poor D/U
Bottom: Zoomed in Longley-Rice study showing WRNI's poor signal strength in these areas. Full Longley Rice study map available in Exhibit B.

Let's look at another example from NPR's report. Appendix D, Figure 43, shows D/U ratios data as collected on KBPN. On the next page, Figure 44 is a list of Signal Strength collected on KBPN at the same data points (You'll note, there is actually a lot of data on Route 64 missing from Figure 44).

In the case of the KBPN results, although many of the measurements are being taken within its protected 60dBu contour, you'll notice in Figure 43 D/U ratios of between 0-5dB and 5-10dB. This would normally be cause of concern. But, looking to Figure 44, and you'll see that the received signal of KBPN in many of these same locations was between 28-40dBu. If NPR would have presented the analog-to-analog MOS data in this situation, you would likely find it below a 2.7 MOS, especially in speech and low-density music situations.

Figures 43 (left) and 44 (right) from Appendix D of NPR's Report, of KBPN, Zoomed in to Areas of Poor D/U (left), but also poor received signal strength (right).



The problem is, what I have shown is one section of the KBPN data and one section of WRNI data. There are several more areas on these stations that I have not outlined graphically which exhibit the same problem. When you look at the other test stations in Appendix E and F, KLDN and KBWA, they too have the same issue. Many data points that have bad D/U ratios have received signal strengths in the 32-45dBu range for KLDN and 33-44dBu range for KBWA. These received signals are simply unusable, unacceptable, and should be discarded.

According to Table 5 on Page 21 of NPR's Report, apparently NPR didn't conduct many analog only MOS score tests in the 0dB – 13dB D/U range. This is extremely concerning, because it is this range that NPR is using to show that -10dBc, -14dBc (and even -20dBc) doesn't meet the 2.7 MOS in Speech and Low Density Music tests. Table 5 shows that 6 analog only audio samples were taken from KBPN and were part of the MOS scoring tests, but NPR never presents that data. No other stations were part of the analog only test. No other MOS scoring was done. This is unacceptable.

What NPR should have done after collecting the data and seeing that the 0-13dB D/U ratio was the area to focus on was to include more audio samples from the other 3 radio stations used in this study and do MOS testing on the analog only samples. They did none of this. They inappropriately use the digital data to lower the digital MOS averages and claim digital interference in Speech and Low Density Music situations, but don't fairly show you that in these same locations the analog also would fail their MOS testing criteria.

Not only did NPR omit the analog MOS scoring data in the KBPN tests, the fact that NPR would consider these points in their digital interference analysis but not their analog interference analysis is bad engineering practice, and disingenuous. These points should have been dropped from the analysis due to poor analog field strength of the desired station, and due to likely poor analog only MOS scores (below 2.7) that NPR likely obtained in the KBPN case and would have obtained in the other tests had they performed them. Likewise, if NPR really wanted to accurately test this, they should have used audio samples from other stations in the test group in addition to KBPN – but they didn't take these samples and/or test them using any MOS scoring methods.

It is astounding that NPR has included digital data without an analog control reference sample. If the analog isn't acceptable in an analog-to-analog situation, the digital data collected at these points are scientifically meaningless. These areas of low analog signal strength included in the study, both predicted and measured, are brining down MOS scores for digital. Every station has analog signal impairments within their protected service contours. Nothing is guaranteed that you'll have a perfect 60dBu signal within your protected FCC (50,50) 60dBu contour. NPR seems to have found areas where the analog is impaired to take their digital samples, and omitted the analog control data. The data is being manipulated by NPR to only show part of the story, one that furthers their position and bias in this matter.

The KBPN analog samples were never accurately depicted in NPR's Interference Protection Methodology, in Section 5 of their report. Figure 26, which show the Analog MOS scores averaging near a MOS of 4, with the lowest data point slightly above a 3.5. Clearly, analog-to-analog MOS data on KBPN's 28dBu signal with a 0-5dB D/U ratio was not considered in this analysis. NPR appears to be hand picking which data they want to present.

Analog MOS Scores **DO NOT** reflect signal impairments from field testing data

Digital MOS Scores **DO** reflect signal impairments from field testing data

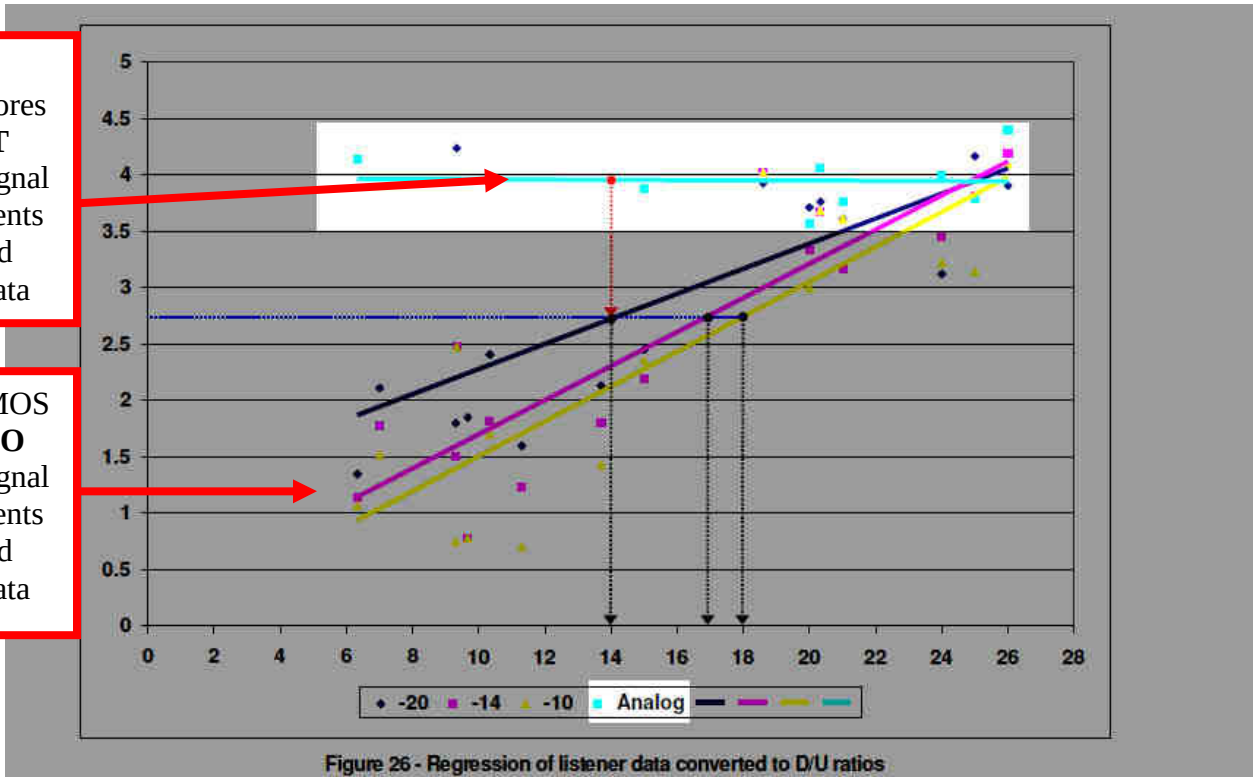


Figure 26 - Regression of listener data converted to D/U ratios

NPR's Interference Prediction Methodology Flawed

NPR bases their entire Interference Prediction Methodology from Figure 26 in their report. NPR inappropriately included digital MOS scores in weighting down the digital MOS scores when the analog only (non-digital) signal was poor. Likely the MOS scores of the analog at the same physical point would also have been weighted down below a 2.7 MOS, rendering these data points invalid for analysis.

The regression lines NPR has shown for -20dBc, -14dBc, and -10dBc are not valid. The regression lines are how they determine their interference and protection values. Since I've shown many of those digital data points are invalid, this means their prediction methodology is flawed.

These findings have far-reaching consequences because it invalidates all of Section 5 in the NPR Labs Report, it invalidates the formula NPR derived in *Appendix J* entitled "Allowable IBOC Transmission Power Calculator", and it invalidates the online calculator they've published on their website[4]. In essence, NPR's argument for this cumbersome digital power increase process is invalid given the data they've presented.

NPR Should Publish Suppressed Data and Revise Interference Analysis

Given the findings above, as a matter of being a transparent, nonbiased party in the research of a digital power increase, NPR should immediately publish the following data:

- The MOS scores obtained from the "analog only" recordings of KBPN's audio samples in the 0-13dB D/U range.

- The "analog only" audio recordings of KBPN 0-13dB D/U range that were used in "Test 1" of Table 5 in the NPR Report. Recordings should be left untampered, in original form as recorded on the CD. Linear .WAV 44.1 uncompressed format.

- If more "analog only" audio samples were recorded but not included in the report in the 0-13dB D/U range, include those as well.

- An explanation as to why "analog only" MOS scores collected were suppressed from Figure 24.

- An explanation as to why no other "analog only" recordings or MOS testing was done on the 3 other test stations.

- The omitted signal strength map plot from WRNI in *Appendix C* of their report.

- A revised Figure 24 showing the "analog only" MOS scores from KBPN or any other "analog MOS" scores that were collected.

- A revised Figure 26 showing the "analog only" MOS scores from KBPN or any other "analog MOS" scores that were collected. Let's call this "Figure 26.r1"

- A revised Figure 26, called "Figure 26.r2," and regression analysis dropping any digital point where the analog MOS score also did not score a 2.7, and, dropping any digital points that were taken without a corresponding "analog only" MOS score. This is the most statistically accurate table available given NPR's flaw in their testing methodologies. However, below I outline a way they may be able to use some of the

[4] *See* http://www.nprlabs.org/publications/distribution/IBOCpowercalculator/index.php

data they collected to help analyze the data they *might* have collected had they not had this flaw in their testing methodology:

- o A new diagram with any "analog only" MOS scores obtained on the left axis and the "analog only" received desired signal strength on the other axis. For sake of discussion, let's call this "Figure 100".

- o A new diagram with any "analog only" MOS scores obtained on the left axis and the "analog only" received D/U ratio on the other axis. For sake of discussion, let's call this "Figure 101".

- o A revised Figure 26 called "Figure 26.r3," and regression analysis dropping any digital point where the analog field strength recorded at any given point was below a 2.7 MOS based on the newly created Figures 100 and 101. I am requesting this because, according to Table 5, NPR apparently didn't do any "analog only" recordings on the other 3 test stations. While this isn't the best way to accurately remove improper data from the other 3 test stations, it may provide a glimpse of what NPR should have done to filter bad digital MOS scores that also would have had bad analog only MOS scores. Let's say that the KBPN tests showed that the "analog only" scores dropped below a 2.7 MOS when the received desired signal strength, now plotted this new "Figure 100", were below 54dBu. That would show that since the analog only signal was unusable, that the digital only samples on the other three stations that were recorded with field strengths below 54dBu should be removed from the study. Likewise, if the KBPN tests showed the "analog only" scores dropped below a 2.7 MOS when the received D/U ratio in "analog only" mode, now plotted in "Figure 101", below 10 D/U, this would show that digital samples from the other three stations that were recorded with D/U ratios below 10 should be removed from the study.

- Newly revised interference calculations and methodology after three revisions of Figure 26 (r1, r2, and r3) have been done.

This revised data and figures should be filed publically with the Commission, and made available publically on a web or FTP site for the public to examine and comment.

Report Shows -10dBc Acceptable in High Density Music Situations

Figure 23 of the NPR Labs Report shows that there is no objectionable interference received in any situation on the graph. Each situation, whether it be -20dBc, -14dBc, or -10dBc High Density Music passes the NPR tests. The summaries of the NPR Labs Report don't mention this very important fact. These results are actually very encouraging, and the data suggests that in many situations stations should be allowed a blanket digital power increase to -10dBc. Why this isn't being brought up as a point of discussion is perplexing. In essence, buried in the NPR Labs Report, it shows that -10dBc works in High Density Music situations. This should be a key part of allowing stations to automatically go to a blanket -10dBc digital power level.

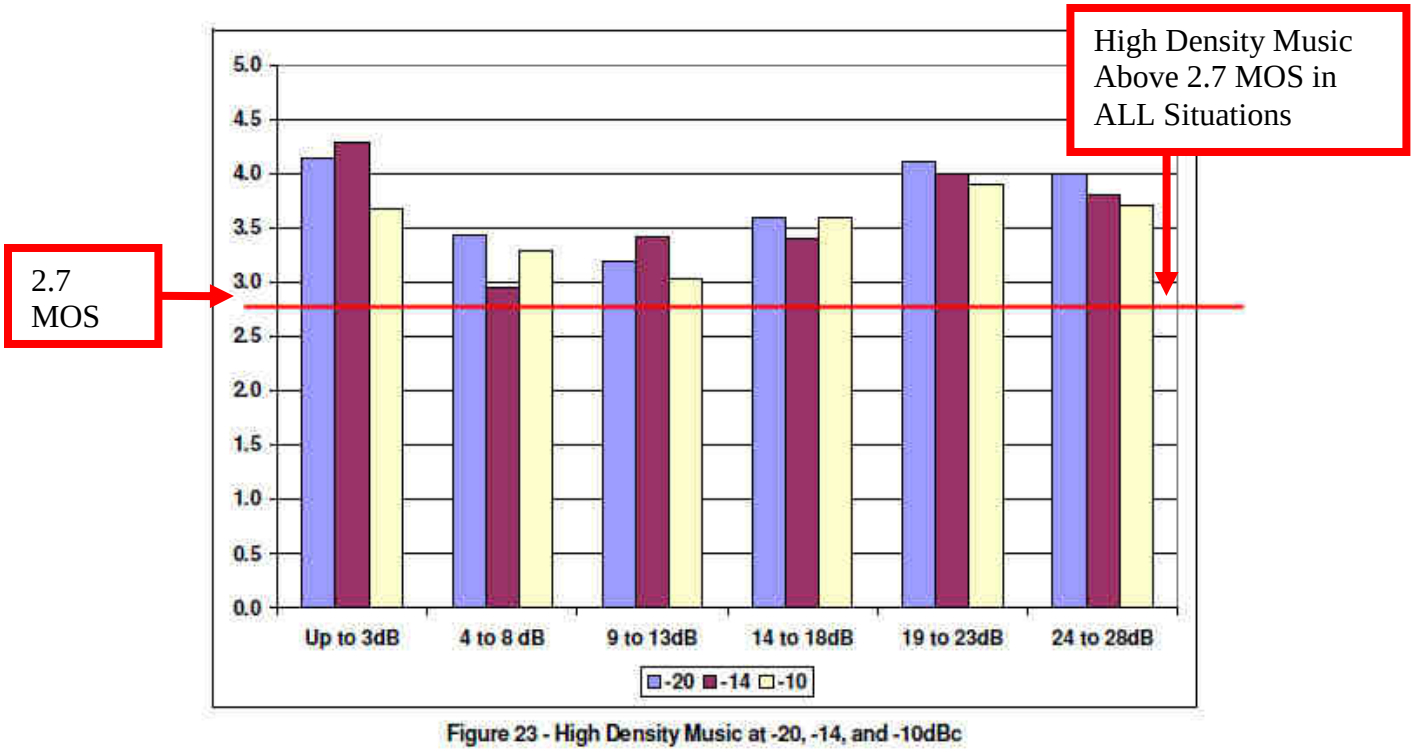


Figure 23 - High Density Music at -20, -14, and -10dBc

Decision of Speech/Low Density Music Standard

There has been no public discussion as to why the "Speech/Low Density Music" results should be the basis of the proposed interference rules. The NPR Labs Report automatically selects this without discussion. Why isn't this being discussed? While NPR is looking out for the interest of the reserved-band, most commercial stations operating in the non-reserved band run mostly High Density Music. Why is NPR automatically shaping the policy of the entire band without any discussion? What if two High Density Music stations wish to employ -10dBc operations? The NPR Labs Report shows that it's acceptable in all cases, but yet, since NPR has selected the "Speech/Low Density Music" data to be applied in all cases, these stations cannot

automatically decide to go to -10dBc. NPR has failed to show why the Speech/Low Density threshold should apply to all stations in the FM band. Also, as demonstrated above, I have questions as to the reliability of the data NPR has presented for Speech/Low Density.

NPR's data actually suggests that all stations should be allowed a blanket -10dBc, and interference should be handled on a case-by-case basis. Perhaps, if a station receiving actual interference from -10dBc operation typically has Speech/Low Density Music, they could work together under part 3 of the Joint Agreement, which outlines interference mitigation requirements. However, I maintain the Speech/Low Density Music results in the NPR Labs tests are in need of testing on *multiple* receivers, as it seems that there is an anomaly with the single receiver they used in their tests, and NPR improperly used invalid data in those tests.

No Data Supporting Exclusion of Grandfathered Super-powered FM Stations

On Page 31 of the report, NPR Labs briefly suggests that grandfathered "super-powered" stations should be excluded from any blanket digital power increases. NPR Labs briefly outlines a scenario where they believe it would cause harmful interference to adjacent stations. However, NPR does not cite any specific examples in their analysis, nor does NPR provide any field testing supporting their arguments. In *Appendix K* of the NPR Labs Report, NPR outlines 68 grandfathered super-powered FM stations that should be excluded from the blanket increase. However, NPR does not analyze any of these stations specifically nor does it provide any direct data supporting the exclusion of any of these stations. Since NPR is reportedly only concerned about first adjacent stations, NPR should have done an analysis of each station in their list and only present stations that had first adjacent short spacings. Moreover, a contour analysis for each station should have been provided to show if there was any overlap to first adjacent stations.

It is possible that, while the stations have an ERP and/or HAAT combinations that exceed their class maximums, perhaps there are some of these stations do not have any prohibited overlap due to terrain or other factors. Moreover, it's possible that a grandfathered station may have prohibited overlap, but only on one of their first adjacencies. For example, WNTQ(FM), Channel 226B, licensed to Syracuse, NY, continuously on the air since 1956 with 97kW ERP and 201M HAAT, in excess of Class B standards, has 3 Class A stations that encroached on its signal in the 1980s and 1990s on Channel 227. There are no stations with prohibited overlap on Channel 225. Grandfathered stations such as this one should be given blanket authorization at the -14dBc or -10dBc level, and, if interference was created, have the ability to employ asymmetrical digital carrier levels on each side like other licensees, as afforded in Section 3 of the Joint Agreement. Since there is no prohibited overlap on Channel 225, according to NPR's data it is possible for WNTQ(FM) to operate at -10dBc on its lower side without interference, and it may be possible to operate at levels higher than the Joint Agreement stipulate on the higher adjacency, depending on how you interpret NPR's data.

NPR unfairly and categorically excludes these 68 stations without any supporting data or analysis.

Omission of Reserve Band Grandfathered Super-powered FM Stations

A quick analysis of NPR's *Appendix K* shows that not a single station on that list is located in the non-commercial, reserved band. NPR has omitted stations in the non-commercial band from *Appendix K*, but has not stated why.

My brief analysis shows at least 13 grandfathered super-powered stations in the reserved, non-commercial band that NPR has omitted. Of these 13 stations, 10 of which are NPR affiliates according to the NPR web-site[5]. Giving NPR the benefit of the doubt of this omission, it is thought that perhaps NPR omitted these stations from the list because reserve band Grandfathered B stations should already be contour protected and have no prohibited overlap. In a very brief analysis, 5 are perfectly spaced, 6 of them have spacing problems but are those spacing problems are either co-channel, 2nd, 3rd or TV6 spacing issues, which NPR alleges not to be a concern in -10dBc operations. Two of those grandfathered B's, WAMC, Albany, NY and WILL-FM, Urbana, IL have 1st adjacency spacing issues (at 11km and 6km respectively) and should be included on NPR's *Appendix K*. Doing a contour analysis on these stations, they also have prohibited overlap. Given my limited resources, my analysis was very brief and by no means do I consider it complete. There may be more stations to consider. The Commission should further examine this list, as it appears that the one NPR Labs has submitted is not complete.

Grandfathered Super-powered FM Stations Should Not Have To Protect Facilities that Encroached on their Signal

In many, if not all cases, the Grandfathered Super-powered FM stations were created and put on the air before the current class ERP and HAAT maximums were determined in 1964. Over the years, the Commission has allowed other stations to protect these stations as if they were at their maximum class facilities, not to their actual facilities. When a station has done this, they have elected to receive interference inside their protected contour from the grandfathered station. These new stations could have selected sites that were fully spaced protecting them from interference; however, they chose to accept interference from their super-powered neighbor[6]. The Grandfathered station should not have to be subject to new, more stringent interference criteria when its facility location and power have not changed.

Since it has been the Commissions long-standing policy that these newer, short-spaced stations are accepting analog interference from grandfathered super-powered FM stations, it should be the Commissions' policy that these stations should also accept digital interference within their protected contour from grandfathered digital IBOC operations, whether they be at

[5] See Exhibit A.

[6] *See* MO&O On Reconsideration, Creation of Low Power Radio Service, MM Docket No.: 99-25, 21 CR 1530, 15 FCC Rcd 19208, 65 FR 67289, 65 FR 69458, 2000 FCC LEXIS 5243 at ¶ 55.

-20dBc, -14dBc or -10dBc. The Commission should not categorically exclude grandfathered super-powered stations from improving their digital service to their communities.

Increased Interference to Grandfathered Super-powered FM Stations

When these new stations elected to receive interference inside their protected contour from the grandfathered station, they also cause prohibited overlap and interference to the Grandfathered super-powered FM station. Many times, the newer station creates an area of larger interference on the grandfathered super-powered station than it receives. NPR's report and the Joint Agreement do not create to any restrictions that would prevent these newer stations from increasing their power from -20dBc to a blanket -14dBc or -10dBc operation. When these stations do increase digital power, it will in theory create additional interference towards the grandfathered station. This will also affect the digital IBOC "HD Radio" performance of these grandfathered stations. Since the Joint Agreement is preventing many of these super-powered stations from participating in any meaningful digital carrier increase, this lopsided policy unfairly penalizes grandfathered super-powered FM facilities.

Proposed Compromise to Grandfathered Super-powered FM Station Rule

If the Commission is concerned with the issue of interference in this matter, it should handle them on a case-by-case basis by using an interference resolution policy similar to that of translators and low-power stations, and similar to Section 3 of the Joint Agreement. There should be three or more documented cases of actual reception issues, and, given the station has already waived protection to their standard protected contour, a higher contour value should be used for protection, such as the predicted FCC 70dBu F(50,50) contour. If a grandfathered super-powered FM station running elevated IBOC carriers between -10dBc and -14dBc, has produced actual, documented reception issues within the 70dBu F(50,50) contour of a station that elected to short-space themselves (and waived their interference protection), then specific procedures, similar to Section 3 of the Joint Agreement, must be followed.

In the Joint Agreement, both NPR and iBiquity outline a very limiting process for grandfathered "super-powered" stations, which essentially limit most of these stations from upgrading their digital service. Instead, the Commission should adopt my suggestions above and allow grandfathered stations a blanket -14dBc to -10dBc increase, the same as all other stations, and outline a procedure where the licensees can work together to document and mitigate any interference at may be a result of such an increase.

Super-powered Status Beyond Scope of this Proceeding

The Commission has already ruled that the consideration of super-powered status is beyond the scope of this proceeding[7]. The termination or limitation of any super-powered status cannot be considered without first seeking comment from the public. By adopting specific rules that deny super-powered stations the ability to increase power, the Commission would create a limitation of the super-powered status. NPR and iBiquity have not provided compelling reasons to restrict digital operations from these stations "across the board". They don't present any analysis or field studies that support these requirements. The Commission should give super-powered stations the same blanket authorizations given to other stations and continue to evaluate any complaints of possible IBOC interference on a case-by-case basis as stated in the DAB R&O and reaffirmed in the Second Report and Order in this proceeding.

Limiting Super-powered Stations Limits Improved Digital Service to the Community

Looking at the list that NPR Labs has provided in *Appendix K*, even when modified to also include reserve band super-powered stations that may need to be included, it is limiting some of the most populated markets in the country from improving their digital service. Markets like Los Angeles and San Francisco would be impacted the most, because these markets are comprised mostly of super-powered FM facilities. However, there are many other communities and markets that have several super-powered stations which serve large populations. Creating an exclusionary policy prevents the public in these communities from improvements in digital service. By categorically excluding grandfathered super-powered stations, these communities, and many others, will not be given digital power increases, making IBOC "HD Radio" no-more effective than it is today. Look at the stations on the list. Some of the most super-serving, community-focused, most active and most listened to stations in the country are on this list. The communities that these stations serve, and have been serving for many, many years will be left out of the digital radio transition. Why should the people of Los Angeles or San Francisco not be given an improvement in digital coverage? Clearly, additional power is needed, especially in the larger metro areas. However, the Joint Agreement makes it so it can't happen and this portion should be removed. Should tens of millions of people be excluded from improvement because, potentially, a newer, distant radio station in a less populated area signed on much later and elected to move in close to the grandfathered station? Why can't grandfathered stations be given a meaningful increase in digital power? The Commission should not let this happen, and should allow blanket -14dBc to -10dBc increases on grandfathered stations, and handle interference complaints on a case-by-case basis.

[7] *See Second Report and Order*, Digital Audio Broadcasting Systems and Their Impact on the Terrestrial Radio Broadcast Service, MM Docket No. 99-325 (FCC 07-33, May 31, 2007) 41 CR 960, 22 FCC Rcd 10344, 72 FR 45670, 72 FR 45712 at ¶ 98.

NPR Labs Report Does Not Identify Engineers Involved in Findings

One of the most impressive things about the NPR Labs Report that has been submitted to the Commission is the amount of people "involved" in the process. The report lists a "Peer Review Group" of 8 members, a "Working Group" of 53 members, and 28 other "Contributors" in *Appendix L* that were involved. What I think is important to point out is that these peers and contributors were allowed to "review and comment on the study process"[8]. This does not necessarily mean that all 89 members thoroughly reviewed, commented and approved the final report and findings. NPR does not provide a list of people who were involved in the final report and findings, nor does NPR show which of these 89 individuals approved of said findings. While I'm not questioning the credentials of the people involved in the study, nor am I questioning their valuable input and hard work, I do think it's important to note that just because there's a lengthy list of people "involved" in the process, it didn't mean that they agreed with the process, nor agreed with the conclusions of the data in the report.

The Commission should not think that because so many people were listed in the NPR Labs Report that all of these individuals approve of every conclusion reached in the document. NPR Labs should further clarify which of the individuals listed in the report were actually involved in the compiling, finial review, and conclusions reached in the report. Doing such would be more transparent. NPR should submit further documentation to the Commission as to which of the many individuals named in the report actually have reviewed the final report and agree with the findings. In essence, NPR should provide a ratification of the report by the individuals it listed as "involved" and "contributors". Based on public documents, NPR has not done this, and, on the surface, it makes the NPR Labs Report look more "widely supported" and vetted than it probably is.

Discussion

At first glance, the NPR Labs Study is very impressive. The Commission shouldn't just "rubber stamp" what NPR Labs has submitted. The study doesn't include any indoor testing, and only tests a single mobile FM receiver that is not widely used by the public. Yet, NPR was able to devote the resources to test four subcarrier (SCA) receivers. Why weren't more widely used OEM receivers included in the study? Why weren't indoor receivers included in the study? Why did the NPR Labs Study omit the analog-to-analog MOS scores in Figures 23 and 24? How much impact did the mono/stereo blending of the single Kenwood receiver they selected have on the study? Is it possible that NPR Labs found a receiver to support their position and not test any others? Why does NPR include data samples that have signal strengths well below a usable level that should have been dropped? Why does the NPR Labs Study spell out specific restrictions to Grandfathered super-powered stations, but provide no actual cases or field data supporting those restrictions? Why did NPR omit reserve band grandfathered super-powered stations? Why is NPR, which represents stations mostly in the non-commercial reserved band,

[8] *See* National Public Radio's "Report to the FCC on the Advanced IBOC Coverage and Compatibility Study", November 4, 2009 Page 1.

shaping the policy of the commercial, non-reserved band? Why does NPR Labs automatically select the "Speech/Low Density Music" standard to be applied in all cases, without any public input or discussion? Why doesn't NPR Labs' report conclude that -10dBc operation is acceptable under many conditions? Their data suggests it does.

The organization that conducted the tests, National Public Radio, has their own agenda and bias which seems to permeate the collection and analysis of their data. Is NPR an unbiased source for these tests? Are they looking at the data, presenting what they like and jumping to conclusions? Did all of the individuals named in the NPR document actually review the final report and agree with the findings? Were there individuals out of NPR's influence deeply involved in the findings and conclusions of the report? Perhaps NPR Labs does have the answers to these questions, and maybe over time they'll publish more of their findings. I encourage that.

Conclusion

Given the data that the NPR Labs Study has provided this far, I reach a far different conclusion than NPR does. NPR's data shows that a blanket -10dBc digital operation would not cause objectionable interference in almost every scenario. The only exception is on "Speech and Low Density Music" where, a single Kenwood receiver has issues when it is in mono/stereo blending in a 4 to 13dB D/U range. This one anomaly, this one Kenwood receiver, this one type of format a radio station can run shouldn't dictate the policy of the entire FM band. Moreover, my analysis shows it was poor engineering practice for NPR to include some data in their analysis, yet exclude it from others. Some of the data that NPR presented should have been discarded because of an unusable analog signal level. If this data had been dropped, the NPR report would likely have shown -10dBc digital operation is acceptable in every situation.

I strongly encourage the Commission approve a blanket -10dBc authorization on all stations, including grandfathered super-powered stations. The Commission should handle all reported interference on a case-by-case basis, using the criteria already supported in the Joint Agreement in Section 3.

Respectfully Submitted,

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Exhibit A – Omitted Grandfathered Superpowered FM Stations in the Reserve Band

Call	City	State	Freq	ERP (W)	HAAT (M)	Class	Affiliation	Spacing	1st Adj Short Space	Notes
KQED-FM	San Francisco	CA	88.5	110,000	387	B	NPR	Clear	None	
WERN	Madison	WI	88.7	20,500	385	B	NPR	Clear	None	
WGBH	Boston	MA	89.7	98,000	198	B	NPR	SHORT	None	Short Spaced on 2nd and 3rd Adjacent
WMBI-FM	Chicago	IL	90.1	100,000	134	B		SHORT	None	Short Spaced on Co-Channel
WAMC	**Albany**	**NY**	**90.3**	**10,000**	**600**	**B**	**NPR**	**SHORT**	**WPKT -11km**	**Short Spaced on 1st Adj, TV6**
WKAR-FM	East Lansing	MI	90.5	86,000	273	B	NPR	Clear	None	
KPFK	Los Angeles	CA	90.7	110,000	863	B		SHORT	None	Short Spaced to TV6
WHAD	Delafield	WI	90.7	79,000	213	B	NPR	SHORT	None	Short Spaced on Co-Channel
WILL-FM	**Urbana**	**IL**	**90.9**	**105,000**	**259**	**B**	**NPR**	**SHORT**	**WIBI -6km**	**Short Spaced on 1st Adjacent**
WETA	Washington	DC	90.9	75,000	186	B	NPR	Clear	None	
WIPR-FM	San Juan	PR	91.3	105,000	825	B		Clear	None	
KUSC	Los Angeles	CA	91.5	39,000	891	B	NPR	SHORT	None	Short Spaced to TV6
WUOM	Ann Arbor	MI	91.7	93,000	238	B	NPR	Clear	None	

Exhibit B: Longley-Rice Analysis of WRNI