Before the
Federal Communications Commission
Washington, D.C.

In the matter of:

	)	
Revitalization of the AM Radio Service	)	**MB Docket No. 13-249**
	)	

COMMENTS OF DU TREIL, LUNDIN & RACKLEY, INC.

The engineering consulting firm of du Treil, Lundin & Rackley, Inc. ("dLR") hereby submits these comments in response to the Commission's October 31, 2013 Notice of Proposed Rulemaking in the above-captioned proceeding. In that Notice, the Commission solicited comments on its various specific proposals and also invited submission of further proposals.

We have reviewed the Notice and we strongly support the Commission's goal of revitalizing the AM radio service. Based on experience from the 73 year history of providing engineering consulting services to the licensees of AM radio stations of our firm and its direct predecessors, we intend with these comments to provide focused analysis of the Commission's specific proposals related to AM transmission standards and also add to the discussion with further proposals we believe to be very important for AM revitalization.

FCC Proposal A. – Open FM Translator Filing Window Exclusively for AM Licensees and Permittees

We recognize that FM translators may help AM stations that are able to use them to provide service to the public, and we support the FCC's facilitation of that with the proposed filing window, but we do not see FM translators as a universal avenue to

revitalization of the AM radio service. FM frequency availability will limit the extent to which AM stations are able to use FM translators, particularly in and near larger radio markets. Our comments will focus on rule changes that can be used by AM stations in general to improve their flexibility in developing technical facilities to improve their coverage in the existing AM band.

FCC Proposal B – Modify Daytime Community Coverage Standards for Existing AM Stations

We believe that the requirement should be eliminated altogether and that AM stations should not be licensed to cover communities. The community of license concept is an obsolete relic dating from the time 80 or more years ago when the FCC was responsible for rationing frequencies to be used by the very limited number of radio stations that would provide 100% of the over-the-air entertainment and information available to the public at the time. Today's situation is radically different from that – with AM stations providing a very small segment of the electronically-delivered audio content available to the public from an increasingly diverse number of over-the-air sources – and a radical change is called for to allow them the flexibility to see normal business forces guide them in how to best serve their actual audiences.

FCC Proposal C – Modify Nighttime Community Coverage Standards for Existing AM Stations

See answer for FCC Proposal B.

FCC Proposal D – Eliminate the AM "Ratchet Rule"

We were among the original petitioners for this rule change in RM-11560, which remains open at this time. The rationale remains unchanged from the time of the original petition, dated August 25, 2009, and we note that the subsequent reply comments in response to the Media Bureau's September 9, 2009 Public Notice, Report No. 2897, were

unanimously in favor of modifying Section 73.182(q), Footnote 1 of the FCC Rules to eliminate the "Ratchet Clause." The change should be made for the reasons stated in the original petition and supplemented by those who subsequently submitted reply comments. It should be made without delay in the context of the open RM-11560 and not be postponed by inclusion in this larger proceeding.

FCC Proposal E – Permit Wider Implementation of Modulation Dependent Carrier Level Control Technologies

We favor allowing AM broadcasters to have maximum flexibility in minimizing power costs for providing service to their listeners. We support wider implementation of modulation dependent carrier level control technologies.

FCC Proposal F – Modify AM Antenna Efficiency Standards

We believe that minimum AM antenna efficiency requirements should be eliminated from the rules. Their original reason for existence at the time they were developed for the FCC's Standards of Good Engineering Practice in the 1930s – to ensure that a minimum amount of service would be provided from each of the scarce AM channel assignments at a time when there were no other electronic media services – is no longer of sufficient concern to justify the impairment of flexibility for choosing locations that are available to provide service to actual AM station audiences that are implicit in them. Being located well for serving audiences means being near listeners, and local regulation of tower construction - coupled with the availability of land to meet the ground system requirements for minimum efficiency – both work against finding such locations. AM stations should have complete flexibility in choosing tower height and ground system dimensions and normal business forces can be relied upon to influence their owners to seek optimum locations for serving their audiences. The FCC's concern should only be with the avoidance of interference to other stations – something that can be safely addressed by requiring that allocation studies be based on minimum efficiency standards

where actual radiation efficiency, whether due to tower height, ground system restrictions, or both, may be expected to be lower.

FCC Proposal Request G – Submission of Further Proposals

DLR believes that the following steps can be taken now to encourage revitalization of the AM radio service and we strongly encourage the FCC to take them.

Further Proposal 1 – Allow No Applications for New AM Stations and Have No More Filing Windows for Short Form Applications

We believe that the AM band has reached maturity and that with the numerous alternative program delivery options there are available today and the smaller total audience of AM listeners it makes no sense to consider adding new AM stations. Existing AM stations should be encouraged to improve their service to their actual audiences with as much flexibility as possible in choosing their transmitter site locations and the details of their technical facilities – or get out of the way to let other stations make improvements subject to agreements submitted to the FCC for that purpose.

Much harm has been done to the prospects for improving AM stations in recent years because filing windows were held to allow in short-form applications for new stations and major changes that effectively blocked improvement possibilities for existing stations for years because of the need to protect the new short-form applications based on their assumed facilities. This should never happen again.

Further Proposal 2 – Adopt Daytime Protected Contour Levels That are More Resistant to Noise

We believe that the daytime protected contour level for Class B, C and D stations should be raised from 0.5 mV/m to 2.0 mV/m, a level that is more representative of the signal levels needed to overcome present day noise levels. The 0.1 mV/m daytime protected

contour for Class A stations should be raised to 0.5 mV/m, a change that recognizes the historic wider area coverage of Class A stations for listeners amenable to listening through noise while giving approximately the same decibel increase.

Further Proposal 3 – Change the Requirements for Protection of Class A Stations to the 0.5 mV/m Groundwave Contour Level Day and Night

We believe that the rules should be changed to make the protected contour for daytime co-channel overlap, daytime first-adjacent channel overlap, daytime critical hours protection and nighttime overlap from co-channel skywave signals the 0.5 mV/m groundwave contour for Class A stations. In the daytime, this will replace the presently protected 0.1 mV/m contour - which we believe should not be considered a coverage contour under today's noise conditions. At night, it will replace the 0.5 mV/m skywave contour – which we believe to be obsolete.

The proposed daytime change will allow increased flexibility for daytime coverage improvement by cochannel and first-adjacent channel AM stations while still providing a greater degree of protection to Class A stations than what we have proposed for Class B, C and D stations. The proposed 0.5 mV/m protected level will provide for listeners who might be motivated to listen through receiver noise to Class A stations' programming content, in recognition of Class A stations' historic role in providing such content to the public. It is noted that the increase from the old Class A station 0.1 mV/m protected contour level to 0.5 mV/m (14 dB) to account for modern-day noise levels will be on the same order of magnitude as the proposed change from 0.5 mV/m to 2.0 mV/m (12 dB) for other Classes of stations.

The proposed nighttime change will make possible improved fulltime service for many AM stations by eliminating the obsolete 0.5 mV/m skywave contour protection requirement that is in effect today. The improvement possibilities will apply to Class A stations as well as others, since Class A stations that use DAs to protect other Class A stations at night will have the signal radiation restrictions toward the skywave coverage

areas of other Class A stations eliminated to allow for substantially improved groundwave coverage of their primary market areas with redesigned DAs.

It has been difficult for us to acknowledge that Class A station 0.5 mV/m nighttime coverage has become obsolete in modern times, because of our own tendency as well as that of others to romanticize listening to distant signals fade in and out overnight and the hobby aspects of “DX-ing” distant signals. The reality is that the wide area programming that used to be carried overnight by Class A stations exclusively can now be distributed to listeners fulltime wherever they are with consistent audio quality using other modern technologies like satellite and Internet Protocol (“IP”) delivery. Much of the overnight programming that has historically been provided by Class A AM stations already has migrated to satellite distribution and increasing use of Internet Protocol (“IP”) delivery is threatening to overtake satellite delivery someday soon. The future is going to bring what some are calling the “connected dashboard” to more and more vehicles to allow more choices of audio programming delivered from more sources. The reality is going to be that listeners who remain for AM stations are going to be there because the programming they desire is available on their AM radios. AM radio stations need to focus on finding what programming that is and delivering it in a way that competes as well as possible with the other modern-day delivery methods, meaning with signals optimized for quality reception – something that nighttime skywave service cannot provide.

We hope that by proposing replacement of obsolete Class A standards with a plan to protect 0.5 mV/m groundwave service, giving Class A stations enhanced protection relative to other Classes of stations, we can avoid a situation where lesser protection might be enforced someday. We are concerned about the “bubble” within which Class A stations exist – where other stations are denied the opportunity to provide service to their local areas because of the requirements to protect daytime 0.1 mV/m and nighttime 0.5 mV/m skywave coverage areas for which the Class A stations pay no spectrum fees. This is a “loophole” in which Class A stations have existed ever since the concept of spectrum fees was adopted for the FCC’s regulation of spectrum users and we fear that if it is ever

closed, and we must recognize that policy in Washington is closely linked to the concept of spectrum fees, Class A stations might receive no greater protection than other Classes of AM stations. We believe that our proposed 0.5 mV/m daytime and nighttime groundwave protection standards represent a good compromise for Class A and all other AM radio stations that can be approved now and leave Class A stations on a sound footing for providing service into the future.

We appreciate the importance Class A station wide area skywave coverage at night has historically had for providing service during natural disasters and national emergencies. Although the multiplicity of coverage possibilities that exist today that do not involve broadcast stations may seem to make that unimportant, we note that as long as the Class A stations remain viable they will be able to provide the same skywave service if called upon to do so under the EAS system. Perhaps some consideration should be given to an automatic plan for eliminating all non Class A stations on the Class A channels from operation at night, without requiring the FCC to coordinate with FEMA for piecemeal decisions, if any situation where other services become inoperable ever arises.

Further Proposal 4 – Return to 0 dB First-Adjacent Daytime Protection Ratio

We believe that the first adjacent channel protection ratio increase from 0 dB (1:1) to 6 dB (0.5:1) undesired-to-desired in the "anti-interference" rulemaking that concluded in 1991 was misguided and has done great harm to the ability of AM stations to make facility changes necessitated by forced relocation or relocation to optimize audience coverage. The requirement should be returned to 0 dB (1:1) at the protected daytime contour.

We refer to two publicly available documents that we believe clearly illustrate our point: NRSC-R10 "AM Pre-emphasis Standards" dated April 7, 1986 and NRSC-R101 "Summary Report: Consumer Testing of AM Broadcast Transmission Bandwidth and Audio Performance Measurements of Broadcast AM Receivers" dated December 2006. On page 2 of the 1986 report, it is stated that surveyed radios at that time ranged in audio

bandwidth from 3.1 to 6.0 KHz, and on page 3 it is stated that receiver manufacturers would be expected to respond to new transmission standards that were being discussed at the time with the introduction of wideband radios – defined as having audio bandwidths greater than 7.5 KHz. The so called "NRSC Curve" for audio response was subsequently adopted based on the Committee's work in the 1980s and the allocation requirements were later changed to increase daytime first-adjacent protection by 6 dB and add first-adjacent channel protection for skywave interference at night. The desired results were not realized, however, because the rule changes were made without proper consideration of the fundamental transmission channel limitations of the 10 KHz spacing scheme and the mature nature of the AM band in the United States. This is obvious on page 2 of the 2006 report, where it is stated "…the majority of current analog AM receivers have audio bandwidths of less than 5 KHz. In fact, with only a few exceptions, the frequency response of individual receivers falls off above 1 or 2 KHz. As shown in Figure 1, the combined frequency response of all receivers through the test bed (the middle curve, in blue) was -3 dB at 2450 Hz and -10 dB at 4100 Hz."

The 2006 data show that the wideband radios posited in the discussions of the 1980s had not materialized after 15 years of AM stations being required to transmit with "NRSC Curve" defined response limitations - while being restricted in improving their coverage, or maintaining coverage when transmitter sites had to be moved, by rules with tightened adjacent channel protection in the daytime and added first adjacent channel protection at night. In fact, although the data are not presented so as to be compared directly, it appears that the average receiver bandwidth may have gotten even worse by 2006. We do not believe that there has been any improvement since then.

Furthermore, the graph that appears on page 3 of the 2006 report shows that applying a 0.5:1 (6 dB) first adjacent channel protection ratio, as was enacted in the present rules, would only reduce the impact of adjacent channel interference with 10 KHz transmission by approximately 0.5 dB at the protected contour - if station signals actually changed by that amount, that is, which of course they did not. The 6 dB increase in first-adjacent channel protection ratio, therefore, serves no good purpose. Its application for both

daytime groundwave and nighttime skywave protection required by the present rules severely limits the flexibility of AM stations for making choices in transmitter location and/or antenna design to optimize coverage of their actual audiences.

Further Proposal 5 – Eliminate Third-Adjacent Groundwave Protection

We believe that the third-adjacent protection requirements should be eliminated from the rules. With the reality of receiver bandwidth being what it is now and what it can be expected to be in the future, the requirements are useless for avoiding interference and serve only to hamper the selection of transmitter sites for optimum coverage in the rare instances where they are a factor at all.

Further Proposal 6 – Change Back to Nighttime RSS 50% Exclusion

We believe that nighttime protection should be based on protected station RSS calculations using 50% exclusion – the method that was in use for decades before the "Ratchet Clause," which we wish to see eliminated, was adopted in the rules. We believe that the 50% exclusion method is based on valid statistical principles that account for the highly variable nature of multiple interfering skywave signals arriving from different directions with each being expressed in terms of its value that is exceeded 10% of the time. The present reliance on 25% exclusion was placed in the rules to facilitate the misguided "interference reduction" goal of the "Ratchet Clause" and it complicates the nighttime allocation calculations and protection requirements in a way that reduces the flexibility for AM stations to find good signal improvement and/or station relocation options. Elimination of the "Ratchet Clause" will make the distinction between nighttime RSS interference calculated using 25-percent exclusion and 50-percent exclusion unnecessary. The standard should revert to the former 50-percent exclusion method.

Further Proposal 7 – Standardize on Site-to Site Nighttime RSS Limit Calculations

We believe that calculation of nighttime interference protection for Class B and Class C stations should be standardized to use only site-to-site RSS calculations. This will maximize the efficiency with which modern computer resources can be used in antenna design to optimize coverage using the method that has already evolved as the consensus standard for such studies in CP applications today, by removing the uncertainty of having alternate methods in use.

At one time in AM radio's long-ago past, it was the standard practice for calculations to be done to establish differing RSS interference-free levels at different locations within the coverage areas of stations being protected at night to establish different protection requirements for each location. Such "clipping study" calculations were very cumbersome and time consuming, but were considered to be worthwhile at the time when AM stations' signals were not as noise limited as they are today. The FCC, in the 1970s, adopted a method of studying RSS calculations on a site-to-site basis with protections based on interference levels at transmitter sites as their standard way of processing applications – but kept the option of doing "clipping studies" open for contested cases. There were a few contested cases where "clipping studies" were used after that, but over the years the situation has evolved to reliance on site-to-site calculations in virtually all cases. We believe that the standard pattern requirements for DA systems that were enacted after the FCC standardized on site-to-site calculations for non-contested cases, which limit the depth of protection nulls below what was possible when "clipping studies" were the norm, coupled with the statistical nature of nighttime skywave propagation for calculation of interfering signals will result in satisfactory interference protection with only site-to-site calculations.

Further Proposal 8 – Eliminate Nighttime Skywave First-Adjacent Channel Protection

We believe that the method for calculating nighttime protection should be changed back to consider only co-channel RSS contributions, the way that was standard for decades before the failed experiment to encourage wideband radios was initiated with the 1991 rule changes. Radio receivers having the wideband characteristics envisioned at the time never reached the market. [See the discussion in "Further Proposal 4" herein.]

Not only does the first-adjacent channel RSS inclusion requirement encumber, for no good reason, AM stations wanting and/or needing to make antenna system changes, actual harm can result to the interference levels stations receive in some cases. The RSS of a station can be raised on paper by a first-adjacent channel interference contribution that is of little, if any, significance on listenership with actual radios and allow higher co-channel contributions from other stations that cause real interference. The unintended consequence is increased co-channel nighttime interference due to masking in RSS calculations which include first-adjacent channel skywave signal contributions.

Those who believe that designing directional antennas to provide first-adjacent channel skywave protection to distant stations at night accomplishes interference reduction are, in many cases, only fooling themselves. DAs, by their very nature, do not have the same pattern shapes at sideband frequencies that they have at carrier frequency. This is due to the fact that the electrical spacings and heights of the towers, expressed in terms of wavelength, change with frequency and the extent to which their effects influence radiation pattern shapes depends on the design and adjustment of their phasing and coupling networks – things the FCC cannot effectively regulate.

Further Proposal 9 – Return to Former Method for Calculating Skywave Signal Long-Path Propagation to Domestic Stations

We believe that the rules should be changed to specify the formerly-employed nighttime skywave model for calculations over paths between stations outside the Continental United States. The nighttime skywave propagation model specified in the present rules, while believed to accurately take into account conditions that exist over the continental United States, has been found since it was placed in the rules over 20 years ago to produce greatly exaggerated values for certain long path calculations – particularly for source stations outside the 48 States near the Equator and over Pacific Ocean paths between Hawaii and the 48 States. The problem has become well known and the effects "cut both ways," meaning that interference levels from foreign contributors can raise nighttime RSS values "on paper" at domestic stations to unrealistically high values that can lead to excessive actual interference from other stations due to masking while in other cases excessively restrictive protection levels are required between, for instance, stations in Hawaii and the 48 States. Use of the method as required in the present rules does harm to interference protection and reduces the flexibility for AM station nighttime coverage maximization through directional antenna and/or transmitter site changes. The FCC can remedy this by reverting to the former method that was in use for many years for propagation paths outside the Continental United States, until further work can be done to remedy the issues with the defective latitude-dependent model if it is desired to have one model specified in the rules.

Further Proposal 10 – Eliminate Consideration of Received Daytime Overlap from Foreign Stations

We believe that domestic AM radio stations should be able to make changes without regard to received daytime overlap from foreign stations, as long as such foreign stations are protected from receiving overlap under applicable international agreements. This would allow flexibility for AM stations to choose transmitter sites where the interference resulting from foreign stations can be minimized over actual audience areas. Presently,

AM stations within areas where signal contours calculated from notified transmitter sites in foreign countries are present can be severely limited in what they can do to overcome actual interference out of concern for “on paper” interference – which often would mean choosing transmitter sites within or close to the actual audience areas to overcome actual interference if the FCC Rules would permit it. Making matters worse is the fact that many such restrictions “on paper” are not real because of the multiplicity of foreign “notifications” for stations that do not, and perhaps never will, exist. The FCC Rules should allow the flexibility needed for AM stations to make choices about their transmitter site locations and antenna characteristics to optimize coverage without regard to “on paper” foreign overlap. Station owners can be depended upon to desire good coverage of their actual audiences. Normal business forces encourage it.

Further Proposal 11 – Change the Rules to Permit Station Improvements Based on Changes at Other Stations Without Regard to Interference Reduction

We believe that AM stations should be able to improve their signals by entering into agreements with other stations to modify their facilities or remove them from the air as they choose to do so. Such agreements are allowed now, but with a requirement for interference reduction that limits their applicability and makes very cumbersome and expensive analysis necessary where they are possible at all. We recommend that the rules be changed to allow them without regard to overall interference reduction in the AM band. In the present situation to which the various platforms for public listenership have evolved, with AM stations providing one of many services that is received by an increasingly small segment of the public, overall interference reduction within the AM band should no longer be a concern when stations need flexibility to make decisions on how to better serve their actual audiences. Normal business forces can be relied upon to guide the improvement process.

Further Proposal 12 – Change the Bandwidth Mask for AM Signal Transmission and Eliminate the "NRSC" Response Curve

We believe that the bandwidth mask should be changed to specify rolloff of frequencies above 6 KHz from carrier frequency. We also believe that the standard "NRSC" pre-emphasis specification should be eliminated altogether. There are very good reasons for both positions, and both will work toward improved AM service – the first by substantially reducing adjacent channel interference that is implicit with the 10 KHz spaced allocation scheme and the second by allowing stations flexibility in audio processing setup based on program content.

The failed experiment in encouraging the development of wideband radios has not resulted in anything close to reaching that goal. [See the discussion in "Further Proposal 4" herein.] Also, research done after the rules were changed to specify the present standards – presented in NRSC-R101 "Summary Report: Consumer Testing of AM Broadcast Transmission Bandwidth and Audio Performance Measurements of Broadcast AM Receivers" dated December 2006 – makes it clear that the wrong approach was used for reducing adjacent channel protection when the present rules were enacted. This report is publicly available so it will be cited without duplicating its content herein.

The graph that appears on page 3 of the report shows that applying a 0.5:1 (6 dB) first adjacent channel protection ratio, as was enacted in the present rules, would reduce the impact of adjacent channel interference with 10 KHz transmission by approximately 0.5 dB at the protected contour - if station signals actually changed by that amount, that is, which of course they did not. It can be seen from the same graph of the 2006 report, however, that much better improvement in adjacent channel interference is possible with transmitted bandwidth restriction – something that could have been realized immediately if a rational bandwidth plan had been adopted in 1991. Specifically, 5, 6 and 7 KHz transmitted audio would result in adjacent channel interference reductions of 5.8, 9.2 and 12.0 dB, respectively. Bandwidth restriction is clearly the way to go for improving

adjacent channel interference to AM reception, and the mistake that was made in 1991 can and should be corrected now.

We believe that a transmitted bandwidth restriction of 6 KHz represents a good compromise with its 9.2 dB improvement in adjacent channel interference. The 6 KHz response exceeds the reception capability of virtually all present-day receivers, but leaves room for significant improvement in future designs that might take advantage of the improved adjacent channel interference situation that would come along with its adoption.

Further Proposal 13 – Eliminate the Requirement for Periodic "NRSC" Emission Measurements

We believe that the requirement for annual spectrum measurements to be placed in stations' public files is unnecessary. We are experienced in the design of filters to remedy interference problems that occur due to spurious emissions from AM transmitters and the making of field strength measurements to diagnose such problems. It is our experience that problems that require filters and/or transmitting equipment adjustment to resolve are identifiable by observation of interference with other station's signals. The electromagnetic environment in which stations operate, with many possible sources of harmonic and cross-modulation products existing in the above ground power grid and wired telecommunications services within their coverage areas, makes meaningful analysis based on random signal observations impossible. All it takes is a corroded connection in a ground wire on a utility pole or a similar nonlinear electrical junction in any above ground conductor – such as are very common in the real world - to produce and scatter spurious frequency RF energy that may be picked up by measuring equipment and give corrupt results. Much effort is required to make multiple observations at different locations with directional receiving antennas to pinpoint interfering signals that are actually coming from AM station transmitter sites when that is necessary. What you get with external field measurements is often "gibberish" in the typical urban environment. The type of measurements that are made to meet the present annual

requirements are of limited value for assessing the spectral purity of AM station emissions and we believe them to be an unnecessary burden for AM station licensees. When actual interference is suspected, it can readily be studied using purpose-made measurements in comparison with the requirements of the rules and that is how, for all practical purposes, matters of actual interference are handled today. The requirement for periodic measurements is unnecessary and it imposes a significant burden on AM stations that try to meet it. It should be eliminated from the rules.

Further Proposal 14 – Enact Allocation Rules for Use in the Expanded Band

We believe that allocation standards for use in the expanded band – the frequencies between 1610 and 1700 KHz – are long overdue. This keeps AM stations from being able to voluntarily migrate to the expanded band and also restricts the flexibility of stations already operating there to make changes.

When the expanded band was activated, channels were assigned to stations that were chosen by the FCC to migrate there and distance spacings were used to allocate the frequencies instead of daytime contour overlap or nighttime RSS studies. The FCC's stated intention was to make expanded band rules before the end of the trial period when the stations that originally migrated were to make final decisions on whether or not to remain. But, that never happened. Rules should be adopted containing allocation standards for the expanded band. We believe that the same standards that are enacted for use in the original AM band should be applicable in the expanded band.

Further Proposal 15 – Modify the Requirements for Partial Proof of Performance Radials

We believe that only radials specified for monitor points should be required to be measured for a DA partial proof of performance. Presently, when an AM station that operates with a directional antenna must conduct a partial proof of performance it is required to make field strength measurements on all radials having monitor points, with

additional ones to make a minimum of four radials if the pattern has less than four monitor points. We do not believe that requiring measurements on more than the monitor point radials that were assigned to assist with maintaining the pattern shape when a station was licensed serves any purpose and we believe that the requirement should change to specify that only the monitor point radials be required to be measured in a partial proof of performance. This will reduce the cost of maintaining DA systems in correct working order and also improve the ability of stations having night DAs with less than four monitor points to provide service by reducing the amount of time required to operate with their nighttime DAs in the daytime for partial proof field strength measurements.

Further Proposal 16 – Revise the Ground Conductivity Map to Better Reflect Actual Conditions

We believe that the R-3 Map, "Estimated Effective Ground Conductivity in the United States," significantly overstates the actual ground conductivity in most cases and should be revised taking into account measured ground conductivities that have been filed with the FCC in the 60 years since it was originally adopted. In our experience with determining actual ground conductivity values through analyzing field strength measurements, the ground conductivities in almost all cases are significantly overstated by the R-3 Map. This restricts the ability of AM stations to make improvements by over predicting signal contour areas and under predicting permissible field levels for avoiding increased overlap with other stations when the map is used.

It is inconvenient to avoid reliance on the R-3 map, because field strength measurements must be used to determine alternate ground conductivities for use in FCC applications. In a case where new transmitter location is proposed, it can be necessary to construct a test transmitter site to operate under an experimental authorization in order to obtain the necessary field strength measurements.

In our practice, we commonly run allocation studies assuming both ½ of the R-3 conductivity and its full value. If significant improvement can be had if the conductivity can be established to be ½ the full map value, we offer the client the option of running field strength measurements to establish the correct value to use in the application. When such measurements are made, we seldom find measured conductivities out to critical distances for allocation studies that exceed ½ the R-3 values.

There is a good reason for this. The R-3 Map was prepared in 1954 and measurements that were on file with the FCC at that time were used as reference values for it. Most measurements that were used had been filed with DA proof of performance reports – and the rules that had existed up until about that time did not require ND measurements on the radials used in DA proofs, something that often led to overstatement of ground conductivity on null radials of DA patterns. This problem was recognized by the FCC in connection with DA analysis in proofs and the requirement for ND measurements to assist with correct conductivity determination was added, but the R-3 Map was never re-studied with the newer, more accurate ground conductivity data. AM stations that don't want to use field strength measurement based conductivities have been suck with the well known errors ever since. In many cases, it is a lot more trouble for AM stations to realize facility optimization because of this.

We believe that a revised R-3 Map should be developed. We suggest, as an expedient that we believe will result in a much better situation than we have today, assuming an across the board revision with ½ the present ground conductivity everywhere and then reviewing field strength data that is on file with the FCC to look for areas with significantly higher terminal conductivities (at radial ends) in proof of performance reports. In areas where conductivities are found to trend significantly higher, an average of the higher conductivities will replace the ½ R-3 assumed values.

Further Proposal 17 – Change the MoM Directional Antenna Proof Rules to Eliminate the Recertification Measurement Requirement

We believe that the present requirement that directional antenna systems licensed using computer modeling (with MoM proofs) have recertification measurements performed every two years is not necessary. The very detailed documentation of antenna sampling system characteristics required for MoM DA proofs makes it possible to determine causes of problems that sometimes manifest themselves as shifts in observed operating parameters, and that sufficiently provides for continuing maintenance of DA systems without periodic recertification. Experience with making the measurements in the five years since the rules were modified to allow computer modeling proofs has shown this to be so for our clients, and also heightened our concern over the possibility of damage to antenna monitor sampling devices when they are removed for the required testing. We propose that the recertification requirements be eliminated.

Further Proposal 18 – Change the MoM Directional Antenna Proof Rules with Regard to Recertification Measurements if They Continue to be Required

We believe that the requirements for MoM proof recertification measurements should be modified if our recommendation to eliminate them is not adopted. We believe that periodic removal and bench testing of base current or voltage sampling devices is unnecessary and undesirable because it increases risk of damage to the devices and/or their coaxial connectors. To paraphrase Newton's First Law of Motion, we say that a sampling system in a working state tends to remain in that state unless an external force is applied to it. Such "external force" comes in the form of either physical damage, such as occurs to sampling lines due to wind or gnawing by rodents, or electrical damage such as occurs due to lightning strikes. Whenever such a problem arises, it is obvious that something is wrong from the accompanying shift in antenna monitor parameters. Bench measurements of sampling devices and sampling line measurements, supported by the documentation that is required with MoM proofs, are useful for troubleshooting such problems. They are not necessary or desirable in the absence of problems, however. We

suggest that the rule be changed to require the same kind of measurements that are required for antenna systems using sampling loops with the sampling devices connected to the sampling lines.

Further Proposal 19 – Change the MoM Directional Antenna Proof Rules with Regard to Indicated Software Errors

We believe that the rules should be changed to allow software to be used for MoM modeling without further study as long as the model geometry does not result in errors according to its internal diagnostics. Presently, the rule says that a model must not "violate any of the internal constraints of the computer program." Confusion occasionally exists because some software has a function to indicate "warnings" when model geometry having to do with the radius to segment length ratios of conductors falls close to, but outside the error region. They are intended to "warn" users to check before making further model changes that might cross the line into the error region, rather than indicate an actual problem with the geometry being studied at the time. The problem is that they have been taken as violations of internal constraints, requiring additional work and expense to do stability studies for proofs which experience has shown to be unnecessary. The rules should be changed to require stability studies only where geometry errors are indicated. [Errors do not necessarily mean that the software cannot be relied upon to correctly relate tower drive conditions to their far field radiation characteristics – the function that is used for MoM proofs – because errors in other functions like near-field calculations may occur while the far-field function relied upon for MoM proofing still works correctly. Stability studies are conducted to make that determination.]

Further Proposal 20 – Change the MoM Directional Antenna Proof Rules with Regard to Survey Requirements

We believe that the exemption of the array geometry survey filing requirement for existing stations running MoM proofs that has been adopted by the FCC as policy should

be explicitly stated in the rules, and expanded to recognize that proofs based on field strength measurements in the past demonstrate that the array geometry is correct for any DA pattern using an identical tower geometry. FCC Public Notice DA 09-2340, "Media Bureau Clarifies Procedures for AM Directional Antenna Performance Verification Using Moment Method Modeling," states: "We will exempt licensed stations applying to be re-licensed under the new Rules from the requirement to submit a surveyor's certification, provided there is no change in the authorized theoretical pattern or patterns. We agree with this policy and believe it is important to encourage the adoption of MoM proofing by AM radio stations. We believe the rule should be modified to state it explicitly – and extend its applicability to any directional antenna pattern on any frequency using the towers as long as the tower geometry is not altered and no towers are added to the array. This would encourage station combinations with multi-frequency DA use of existing towers – something that is becoming increasingly important for stations that must relocate but cannot satisfy local land use requirements for new tower construction.

Further Proposal 21 – Clarification of the MoM Directional Antenna Proof Rules with Regard to Shunt Capacitance Effects

We believe that the limitation on the total capacitance used in MoM proof models embodied in the rules as "…in no case will their total capacitive reactance be less than five times the magnitude of the tower base operating impedance without their effects being considered" should be clearly stated to only apply when the total capacitance used to model base region effects exceeds 250 pF. The rule as it is presently worded is unclear. Our proposal is to clarify the rule to agree with the FCC staff's interpretation of it in cases that have arisen to date. Furthermore, we believe that the "five times" requirement should only apply when base current sampling is used and that there should be no such limitation when loop sampling or base voltage sampling is used. The reason for the requirement is to limit imprecision in sampled base current for pattern maintenance due to current division at the base node between the antenna element and shunt currents, something that does not affect base voltage or sampled loop currents.

This change is important to make it possible to evaluate directional antennas for MoM proofing potential, and sampling device selection, based on what can be known before beginning the proofing process.

Further Proposal 22 – Change the MoM Directional Antenna Proof Rules with Regard to Reproofing when Antennas are Added to Towers

We believe that the requirements for MoM proofed DA pattern maintenance when changes are made above the base of a tower, such as changing guy wire insulators or a tower-mounted antenna, should be stated in the Rules. The FCC staff interpretation has been that, when tower base impedance remeasurement after a change, under the same conditions as the measurement in the most recent MoM proof that was filed with the FCC, finds a value that is within the required tolerance of the modeled value of the MoM proof, the measured value and a statement of its comparison to the proof modeled value shall be placed in the station's public file with no further requirement for measurements and no filing required with the FCC. The licensed operating parameters remain unchanged. If the measured value after a change above the base of a tower falls outside the required tolerance of the value modeled in the MoM proof, a new proof must be run and filed with the FCC. We urge adoption of this approach for the rules.

Conclusion

We believe that AM radio stations can be relied upon to provide needed service well into the future, but a new direction in regulation of factors that impact their signal transmission quality is needed to provide them with the flexibility they will need to compete with the ever increasing number of alternative audio programming delivery systems they face today and in the future. The needed rule changes should be made with a pro-service objective and should avoid Utopian assumptions about what can be accomplished through regulation – such as attempting to eliminate interference simply by "outlawing" it, which can accomplish nothing as long as the stations involved remain in

operation. A pro-service approach would make it possible for AM stations to make changes that overcome interference and provide better coverage to their actual audiences.

Perhaps, given the comprehensive set of rule changes that are needed, the most efficient way to proceed would be to form an FCC – Industry committee to study proposals and make recommendations for how rule changes should be worded. We would be interested in participating in such a committee should one be created.

Respectfully Submitted, January 13, 2014

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