

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

In the Matter of:
Establishment of Rules and Policies for the
Digital Audio Radio Satellite Service in the
2310-2360 MHz Frequency Band

IB Docket No. 95-91/
RM No. 8610
GEN Docket No. 90-357
DA No. 01-2750

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U.S. DEPARTMENT OF COMMERCE
FEDERAL COMMUNICATIONS COMMISSION

Comments of Sirius Satellite Radio Inc.

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EXECUTIVE SUMMARY

Over a decade ago, on May 18, 1990, Sirius sought the first-ever license to revolutionize and revitalize mass market radio in vehicles, as well as to provide an alternative to CDs and tape cassettes. The concept was called satellite Digital Audio Radio Services (“satellite DARS”), and it promised enormous improvements in signal quality, multiple channels, and nationwide coverage. From that time to the present, the company raised seed money (equity and debt), and designed, built, and launched a satellite network that will expand exponentially the audio choices available to consumers, including commuters, truck drivers, and even the casual driver on an errand. The Federal Communications Commission (“Commission” or “FCC”) endorsed the concept, allocated the spectrum, enriched the U.S. Treasury by over \$170 million in auction receipts, licensed the satellites, and granted special temporary authority (“STA”) to begin service to the public.

After more than eleven and one half years, however, the United States government still has not finalized parameters for satellite terrestrial repeaters operating on the same nationwide and exclusive channels purchased by each satellite DARS licensee. Repeaters were first proposed by the FCC in 1995 and were the subject of a further NPRM in 1997. FCC rulemakings normally are straight-forward and brief, rarely requiring staff labors of more than 18 months. With the central public interest claim long decided—and each of the two DARS licensee satellite systems in orbit (5 spacecraft) at a total cost of more than \$2 billion raised from public and private equity markets—quick resolution of this proceeding should be routine. But, a final decision repeatedly has been delayed, most recently by objections from licensees of the Wireless Communications Service (“WCS”), whose spectrum is adjacent to the satellite DARS allocation.

Historically, the WCS service was carved out of the international allocation for satellite DARS and accompanied by rules designed to protect satellite DARS operations. The satellite DARS service has always included complementary terrestrial repeaters (as evidenced by the international definition of satellite DARS), and all but the illiterate have long known of the power levels to be employed by such repeaters (as evidenced by Sirius' original 1990 FCC application). It is beyond cavil that the "WCS industry" bought spectrum rights knowing that they would be adjacent to, and must provide interference protection to, satellite DARS systems, including higher power repeaters.

Today, it is far from clear that there is any "WCS industry" to speak of. Many of the WCS licensees that allegedly were worried about the (tiny) potential for interference began pulling out of the market for business reasons. What remains are a few licensee companies; a couple of rapidly changing draft business plans; but little investment and few, if any, actual customers. Most WCS licensees have no firm plans to use their spectrum, and can make no binding statements about the "potential" for satellite DARS interference to them. As a result, the WCS licensees' position amounts to nothing more than a request to warehouse spectrum. This alone should make resolution of the instant proceeding both simple and quick.

At this juncture, the FCC and its staff (particularly the Wireless Telecommunications and International Bureaus) must choose rapidly between two alternatives. The path promoted by WCS licensees would not serve the public interest and is fantastically "over-regulatory" in its approach. The most ludicrous plea—a freeze on new transmitter deployment—never before has been imposed on a new service and would undermine satellite radio as a business from its very inauguration. In particular, the numbers, locations, and parameters for the repeaters sought (and granted) in the STA requests this past summer cannot now metastasize into a ceiling for licensed

repeaters. Such a freeze—which could be read to last 18 months—would undermine the ability of a satellite DARS licensee to correct, augment and "tweak" repeater technical parameters *precisely* during the period when satellite coverage gaps, if any, will be identified (through interaction with new consumers) and corrected.

In contrast, the preferred path based on a power cap compromise—summarized below—permits the agency rapidly to complete the final, delayed, but relatively simple, terrestrial repeater rulemaking along the lines already on the record in the docket.

- *Preferred Power Cap Compromise:* The Commission should allow satellite DARS licensees to expand their terrestrial repeater networks immediately and in the future—without any coordination or financial liability to WCS licensees—by adding at any location (or modifying at an existing location) a terrestrial repeater at or under 18 kW EIRP (averaged over 360 degrees). Under this approach, affected WCS licensees may seek coordination of their affected base stations with satellite DARS repeaters proposed for operation above 18 kW EIRP (averaged over 360 degrees). Before operating a terrestrial repeater at power levels above 18 kW EIRP (averaged over 360 degrees), satellite DARS licensees must gain approval of all WCS licensees that submit a timely and complete coordination request. This simple proposal would be substantially easier to codify and administer.
- *Less Preferred Numbers Cap:* If the Commission does not adopt Sirius' preferred power-based compromise, each satellite DARS licensee should be permitted to operate up to 155 terrestrial repeaters with power levels greater than 2 kW (averaged over 360 degrees) without any coordination with, or financial liability to, WCS licensees.
- *Least Preferred Single Liability Zone:* If the Commission does not adopt either a power-based compromise or numbers cap, the FCC could require the satellite DARS licensees to mitigate interference from terrestrial repeaters operating at power levels greater than 2 kW but not exceeding 40 kW (without regard to 360 degree averaging) to WCS base stations (not Customer Premises Equipment) located within the terrestrial repeater's liability zone based on a single WCS receiver overload point and affected by interference in excess of the amount of a 2 kW transmitter.
- *Compensation Dates:* If the Commission adopts the single liability zone option, the satellite DARS licensee's financial liability to mitigate interference to affected WCS base stations should be shared with WCS licensees, capped at \$1,000,000 total and \$10,000 per base station and terminate no later than September 17, 2002—one year from the Commission's STA grants.

- *Listing and Publication Requirements:* Each satellite DARS licensee should maintain a list of terrestrial repeaters at power levels above 200 W EIRP (averaged over 360 degrees). This list must include parameters, such as: (1) geographic coordinates; (2) antenna type; (3) antenna orientation; (4) antenna radiation pattern and any applicable vertical downtilt; (5) total EIRP; and (6) height Above Ground Level (AGL). This list should be published on the Internet no later than 30 days before the repeater becomes operational. A copy of the list for terrestrial repeaters operating above 18 kW (averaged over 360 degrees) should also be filed with the FCC's International and Wireless Telecommunications Bureaus as an informational filing. (Terrestrial repeaters that were included in the current STA have already been published; any additions to the current constellation will be filed when known.) Each satellite DARS licensee should also provide the contact name of a person assigned to terrestrial repeater interference issues and that person's complete street address and email address. "Micro repeaters" operating at or below 200 W EIRP (averaged over 360 degrees) should be exempt from any listing and publication requirement.

Prompt adoption of these rules would assist a new mass-market satellite service that is fully-funded, launched, ready, and serving customers. Having already been blocked more than eleven and one half years, Sirius would be irreparably harmed by further delay. As the D.C. Circuit said more than 20 years ago:

In this dynamic and technologically innovative industry, a proposed venture may become obsolete in just a few years. Even without regulatory delay, a satellite firm is faced with the daunting prospect of time-consuming research and construction, which entail advance planning and risky lead time—and which may lead to naught. To delay a proposed project six months will increase capital cost and diminish technological advantage; to delay it a year or more may destroy its attractiveness as an investment.¹

Especially given the current economic downturn, this sentiment is even true today. Therefore, the time is ripe for the agency to finalize its terrestrial repeater rules.

¹ *United States v. FCC*, 652 F.2d 72, 95 (D.C. Cir. 1980) (en banc) (citations omitted).

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DA No. 01-2570

Comments of Sirius Satellite Radio Inc.

Sirius Satellite Radio Inc. (“Sirius”) herein responds to the Federal Communications Commission’s (“FCC’s” or “Commission’s”) request for further comments on proposed rules for satellite Digital Audio Radio Service (“satellite DARS”) terrestrial repeater networks.² For eleven and one half years, the satellite DARS licensees have sought—without success—final terrestrial repeater service rules. The Commission’s request for further comments at this time stems primarily from the Wireless Communications Service (“WCS”) licensees’ specious interference concerns. Although Sirius has addressed these matters in its numerous comments, reply comments, and *ex parte* presentations, it files these further comments in view of the importance of resolving these issues and adopting terrestrial repeater rules for the nascent satellite DARS industry.

I. BACKGROUND

From their inception, the satellite DARS licensees have complied with Commission regulation of their new radio service. Pursuant to auction, Sirius and XM Radio, Inc. (“XM”) obtained licenses to provide satellite DARS, which, by definition, included operation of

² *Satellite Policy Branch Information*, Report No. SPB-176, IB Docket No. 95-91, DA 01-2570, GEN Docket No. 90-357 (Nov. 1, 2001) (Public Notice) (requesting further comment on selected issues regarding satellite DARS terrestrial repeater networks) (“*Public Notice*”).

terrestrial repeaters.³ Confident that the FCC would adopt final terrestrial repeater rules shortly after the 1997 satellite DARS service rules, Sirius and XM developed, built, and launched their satellite systems and complementary terrestrial networks. Without their diligence, the nationwide provision of satellite DARS would still be years away.⁴

The Commission has amassed a voluminous record upon which to base terrestrial repeater rules. The agency first requested comments on repeaters over six years ago.⁵ Then, in 1997, it issued a further notice of proposed rulemaking seeking comments on whether it should apply the regulatory structure for mobile earth stations to satellite DARS terrestrial repeaters.⁶ The 1997 notice also requested comments on the potential impact of terrestrial repeaters on adjacent countries and on the public. Thereafter, the Commission issued two subsequent public notices seeking additional comments—one in late 1997⁷ and another in early 2000.⁸ Literally hundreds of *ex parte* comments have been filed over the same period.

Today, however, the rules are still delayed, based in large part on the specious concerns of the WCS industry, which have hindered the Wireless and International Bureaus' timely

³ See 47 C.F.R. § 25.201 (2001) (defining satellite DARS as “[a] radiocommunication service . . . which may involve complementary repeating terrestrial transmitters, telemetry, tracking and control facilities.”).

⁴ Satellite services take longer to initiate, given the typical three-year construction period for satellites.

⁵ *Rules and Policies for the Digital Audio Radio Satellite Service in the 2310-2360 MHz Frequency Band*, 11 FCC Rcd 1 (1995) (Notice of Proposed Rulemaking) (“1995 NPRM”).

⁶ *Rules and Policies for the Digital Audio Radio Satellite Service in the 2310-2360 MHz Frequency Band*, 12 FCC Rcd 5754 (1997) (Report and Order Memorandum Opinion and Order and Further Notice of Proposed Rulemaking) (“1997 FNPRM”).

⁷ *Satellite Policy Branch Information: Applications Accepted for Filing*, Report No. SPB-112 (Dec. 23, 1997) (Public Notice) (establishing a reply comment deadline of January 9, 1998).

⁸ *Satellite Policy Branch Information*, IB Docket No. 95-91, Gen. Docket No. 90-357 (Jan. 21, 2000) (Public Notice) (establishing a comment deadline of February 22, 2000 and a reply comment deadline of March 8, 2000).

resolution of interference issues. When compared to satellite DARS, the WCS licensees acquired their spectrum at a discount.⁹ They received this discount, in part, because use of the WCS spectrum is constrained by the necessity to protect satellite DARS operations. These terrestrial mobile licensees knew or should have known that they would have to design equipment capable of rejecting higher power adjacent channel terrestrial signals, but instead have indicated that they will select cheaper off-the-shelf designs. Thus, WCS licensees should not now be permitted to cry “foul” when presented with the possibility of interference that already was reflected in the auction price. This is particularly true given that the WCS spectrum is lightly loaded, and companies with former Fixed Wireless Access plans (Sprint, AT&T Wireless, and most recently MCI WorldCom) have steadily downgraded their interest in providing the service in any band.¹⁰

⁹ *FCC Announces Auction Winners for Digital Audio Radio Service*, 12 FCC Rcd 18727, 18727 (1997) (Public Notice) (noting that the satellite DARS licensees Satellite CD Radio, Inc. and American Mobile Radio Corporation paid \$83,346,000.00 and \$89,888,888.00, respectively); *WCS Auction Closes Winning Bidders in the Auction of 128 Wireless Communications Service Licenses*, 12 FCC Rcd 21653, 21653 (1997) (Public Notice) (noting that the WCS auction raised a net total of \$13,638,940.00).

¹⁰ Sprint an MMDS licensee, and AT&T Wireless, both WCS licensees, have pulled out of the market and WorldCom has sent mixed signals about its continued commitment to WCS. See *Letter from William M. Wiltshire, Counsel For AT&T Wireless Services, Inc. to Magalie R. Salas, Secretary, FCC*, IB Docket No. 95-91 (filed Oct. 29, 2001), attaching AT&T Wireless Press Release (filed Oct. 23, 2001) (“*AWS Letter and Press Release*”); Jennifer Beauprez, *High-Speed Net Options are out there Set Adrift by Excite@Home, Users Forced to Shop Around*, Denver Post, Dec. 6, 2001, at C-01 (stating that “Sprint Broadband, AT&T and WorldCom all abandoned costly plans to send Internet signals via fixed wireless”) (available at www.denverpost.com/Stories/0,1002,33%7E257371,00.html?search=filter) <visited Dec. 11, 2001>; Jim Wagner, *AT&T Wireless Drops Fixed Wireless*, ISP News, Oct. 23, 2001 (available at www.internetnews.com/isp-news/article/0,,8_909201,00.html) <visited Dec. 13, 2001>; *Broadband Must Wait Until Its Time Comes*, Wireless Today, October 26, 2001. Metricom, attempting to emerge from bankruptcy, still exists, but its base station equipment appears largely immune from any potential interference from satellite DARS repeaters (especially given its relatively low “pole mount” locations). See also *Comments of Metricom, Inc. Debtor-In-Possession*, at 1 n.1 and 3, File No. SAT-STA-20010712-00064 (filed Aug. 21, 2001) (“*Metricom Comments*”).

In any event, the WCS licensees' alleged interference concerns are easily alleviated.

With respect to emissions in the WCS band, the satellite DARS signal is already reduced to an acceptable level at the WCS receiver by frequency attenuation and path loss.¹¹ The susceptibility of these same WCS receivers to interference in the satellite DARS band results from the WCS licensees' poor engineering decisions. WCS licensees have designed receivers (both consumer and base station) that reject some—but not sufficient—authorized transmissions in the satellite DARS band. In contrast, Sirius—facing comparable interference—designed a receiver that adequately rejects XM's adjacent band transmissions.¹² If the WCS licensees employed a similar technology, there would be no potential for interference.¹³

Yet, practical engineering solutions still will resolve any potential blanketing interference in the WCS band. Careful placement of hypersensitive WCS base stations outside the transmission sector¹⁴ of known Sirius high power terrestrial repeaters¹⁵ will mitigate most

¹¹ Sirius' terrestrial repeater out-of-band emission levels are far lower than the requirement specified in Section 25.202(f) of the Commission's Rules, 47 C.F.R. § 25.202(f) (2001). See *Sirius Satellite Radio, Inc. Application for Special Temporary Authority to Operate Satellite Digital Audio Radio Service Complementary Terrestrial Repeaters*, File No. SAT-STA-20010724-00064, 2001 FCC LEXIS 4931, DA 01-2171, ¶ 15 (Sept. 17, 2001) (Order and Authorization) ("*Sirius STA Order*"). Moreover, WCS base stations will receive out-of-band emissions from Sirius' satellite DARS terrestrial repeaters at a level well below the out-of-band emissions received from other in-band WCS base stations. *Comments of Sirius Satellite Radio* at Exhibit 1 (filed Jan. 18, 2000); 47 C.F.R. § 27.53 (2001).

¹² *Reply Comments of Sirius Satellite Radio Inc.* at 14 (filed Aug. 31, 2001) ("*Sirius STA Reply Comments*").

¹³ Sirius offered to discuss its technology with the WCS licensees during a Commission sponsored meeting on August 30, 2001.

¹⁴ As discussed in Section II, *infra*, the Sirius repeaters that are sectorized transmitters will focus their transmissions in a particular direction to provide the necessary supplementary coverage and will transmit significantly less RF energy in other geographic directions. *Supplemental Comments of Sirius Satellite Radio*, Exhibit 1 at 2 (filed Jan. 18, 2000).

¹⁵ Sirius has already disclosed data regarding its STA plan for terrestrial repeaters. *Sirius STA Order*, ¶ 6. Sirius proposes to provide advance notice of future terrestrial repeaters with an EIRP greater than 2 kW. See Section IX, *infra*.

interference from authorized transmissions in the satellite DARS band. Deployment of alternate WCS base stations outside the transmission sector of the high power terrestrial repeater also will minimize the effect on WCS CPE pointing (discussed in Section VII, *infra*).¹⁶ Moreover, additional base station filtering may mitigate any actual interference.¹⁷ Finally, all WCS licensees could (rather easily) re-work existing deployed equipment to be immune from adjacent channel satellite DARS repeaters, or could use existing (and overly sensitive equipment) in numerous other frequencies (such as the PCS or MMDS bands).

Furthermore, the 40 kW EIRP sought by the satellite DARS service is not unusual, as the WCS licensees would have the FCC believe. In fact, most other mass-market services of which the public demands high reliability operate at similarly high power levels. For example, 50 kW is the maximum power for radio (1 MHz (AM) and 100 MHz (FM)) and five million watts is the current UHF analog TV standard. Both of these services operate in spectrum well below the

¹⁶ Sirius' operation of fewer sectorized high power terrestrial repeaters as opposed to larger numbers of low power repeaters will facilitate location of base stations outside the zone of interference. *Sirius STA Reply Comments* at 13; *Letter of Carl R. Frank, Counsel for Sirius Satellite Radio Inc. to Magalie Roman Salas, Secretary, FCC*, at 2 and Attachments 1 and 2, IB Docket No. 95-91 (filed Feb. 5, 2001) ("*Sirius Feb. 5, 2001 Letter*") (smaller zone of potential interference generated in Houston using high power repeaters as opposed to low power repeaters).

¹⁷ The WCS licensees have already endorsed filtering as a viable solution. BellSouth Corporation has acknowledged that the ability to distribute the cost of base station filters among many customers makes economic the use of cavity RF filters to mitigate potential RF interference from satellite DARS terrestrial repeaters. *Ex parte Letter of Karen B. Possner, Vice President-Strategic Policy, BellSouth Corporation, to Magalie Roman Salas, Secretary, FCC, Rules for the Digital Audio Radio Satellite Service in the 2310 – 2360 MHz Frequency Band Presentation*, at Attachment 2, IB Docket No. 95-91, GEN Docket No. 90-357 (filed Mar. 8, 2001). BeamReach Networks Inc. also agrees that the use of cavity filters could provide very high attenuation across the satellite DARS band. *Ex parte Letter of Randall Schwartz, Director, Regulatory and Standards, BeamReach Networks, Inc., to Magalie Roman Salas, Secretary, FCC*, IB Docket No. 95-91 Establishment of Rules and Policies for the Digital Audio Radio Satellite Service in the 2310 – 2360 MHz Frequency Band, at 6 (filed May 30, 2001). Furthermore, the size and weight of base stations make filtering a viable option from a physical perspective.

satellite DARS frequencies and thus have even better propagation characteristics, which means that Sirius' radiated power must be higher to achieve comparable distribution and quality.

Accordingly, any further delay based on alleged interference to WCS licensees is baseless and threatens irreparable harm to the radio-listening public's interest in receiving satellite DARS. The provision of a new satellite service costs more than any other service regulated by the agency. The enormous costs involved make satellite services uniquely sensitive to regulatory delays. For those reasons, more than a generation ago, the D.C. Circuit cautioned the agency to avoid placing unnecessary obstacles to new satellite services.¹⁸ In order to give the satellite DARS industry the opportunity to succeed in the marketplace, the FCC should promptly complete this rulemaking.

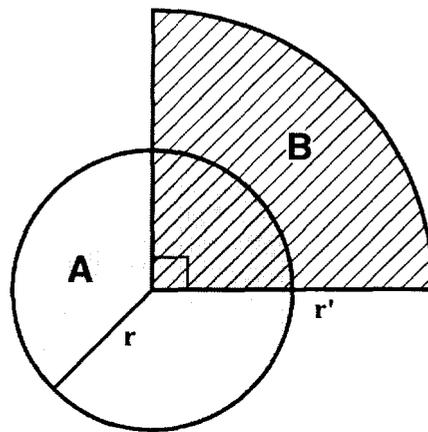
II. CONSISTENT WITH LONG-STANDING FCC RULES, THE COMMISSION SHOULD AVERAGE REPEATER POWER OVER 360 DEGREES

The Commission should employ 360 degree averaging when evaluating potential interference in the satellite DARS context.¹⁹ Sirius repeaters permit no more than about 18 kW repeater transmitter power for omnidirectional antennas. Virtually all of Sirius' repeaters achieve higher power through antenna gain, *i.e.*, through sectorization. These sectorized antennas produce potentially interfering RF energy in a smaller geographic area than an omnidirectional terrestrial repeater operating at the same EIRP.

¹⁸ *United States v. FCC*, 652 F.2d 72, 95 (D.C. Cir. 1980) (en banc) (citations omitted) (“In this dynamic and technologically innovative industry, a proposed venture may become obsolete in just a few years. Even without regulatory delay, a satellite firm is faced with the daunting prospect of time-consuming research and construction, which entail advance planning and risky lead time—and which may lead to naught. To delay a proposed project six months will increase capital cost and diminish technological advantage; to delay it a year or more may destroy its attractiveness as an investment.”).

¹⁹ Sirius and XM already have provided detailed and specific proposed rules to implement 360 averaging. *Letter of Carl R. Frank, Counsel for Sirius Satellite Radio Inc., and Bruce D. Jacobs, Counsel for XM Radio, Inc., to Magalie Roman Salas, Secretary, FCC, IB Docket No. 95-91* (filed Sept. 26, 2001) (“*September 2001 Joint Rules*”).

In fact, a 90-degree sectorized antenna with a power of 8 kW has the same reach and potential geographic area of interference as an omnidirectional antenna with a power of 2 kW and should be treated accordingly.²⁰ In the figure below, the circle “A” represents the area of potential interference generated by an omnidirectional repeater with an EIRP of 2 kW and the sector “B” represents the area of interference generated by a 90 degree sectorized repeater with an EIRP of 8 kW. Assuming the free space path loss proposed in the *Public Notice*,²¹ the areas of “A” and “B” are exactly the same.²²



Of course, in reality, the path loss in dense urban areas will be even greater than free space path loss, meaning that any potential interference to WCS will actually be well less than the *Public Notice* seems to assume.²³ Although the 360 degree averaging formula proposed in

²⁰ See *September 2001 Joint Rules* (determining maximum EIRP in any given direction of a low power sectorized antenna by the following formula: $EIRP = 33 \text{ dBW} + 10 \log(360/\text{beamwidth}) \text{ dBW}$, where $10 \log(360/\text{beamwidth})$ is less than 6 dB).

²¹ $Loss_{dB} = 32.5 + 20\log(\text{distance in km}) + 20\log(\text{frequency in MHz})$.

²² Area “A” = πr^2 . ($r' = 2r$ (inverse square free space path loss)). Area “B” = $(1/4)\pi r'^2 = (1/4)\pi(2r)^2 = (1/4)\pi 4r^2 = \pi r^2$

²³ One approximation of the actual path loss is the Hata-suburban propagation model that gives a propagation loss that is 30 dB higher than free space path loss for distances on the order of 20 km. For example, for path loss that varies as a function of r^{-3} (rather than the r^{-2} of free space path loss), a 16 kW, 90-degree sectorized repeater with a -35 dBm contour of radius $2r$

the *September 2001 Joint Rules* is a better approximation of the true interference potential of sectorized repeaters, it still overestimates the interference potential of sectorized antennas in the urban environment that will be encountered by Sirius repeaters. In the spirit of compromise, Sirius nevertheless is willing to accept the simplified free space path loss assumption that the Commission historically has applied.

The Commission has recognized the utility of 360-degree averaging and free space path loss assumptions in the MDS service,²⁴ and should apply that same logic here. Otherwise, the rules could penalize Sirius for operating a high power repeater that directs transmissions where supplemental coverage is needed rather than using omnidirectional repeaters that could generate significant interference in areas where satellite coverage is adequate to provide reliable satellite DARS service. Thus, 360 degree averaging should be used to classify all repeaters by their true interference potential.

III. THE COMMISSION SHOULD NOT “FREEZE” DEPLOYMENT OF HIGH POWER TERRESTRIAL REPEATERS AT STA LEVELS

The Commission should not limit the satellite DARS licensees’ deployment of high power terrestrial repeaters (*i.e.*, terrestrial repeaters with an EIRP greater than 2 kW) to the numbers, locations and parameters identified in their STA requests.²⁵ As explained below,

would produce an equivalent area of potential interference as a 2 kW omnidirectional antenna. Using r^{-3} path loss, the EIRP of a 90-degree sectorized antenna that will have a -35 dBm power contour of twice the radius of an omnidirectional 2 kW repeater can be determined.

$$\begin{aligned} P_{90}/P_{360} &= r_{90}^3/r_{360}^3 \\ P_{90}/2 \text{ kW} &= (2r)^3/r^3 \\ P_{90} &= 16 \text{ kW} \end{aligned}$$

²⁴ 47 C.F.R. § 21.904(b) (2001).

²⁵ *Public Notice* at 6 (appearing to suggest that “for 18 months after the final rules are effective, the SDARS [high power terrestrial repeater] operations would be limited to the locations and parameters identified in the STA requests.”).

“freezing” modification or expansion of the satellite DARS licensees’ high power terrestrial repeater networks for 18 months would harm consumers, violate Commission policy and undermine competition.

First, limiting terrestrial redistribution of satellite DARS programming at its inception would contravene the radio-listening public’s interest in receiving high quality, nationwide service. Sirius is currently conducting “soft launch” testing in a number of urban areas and expects to begin service on February 14, 2001.²⁶ XM just recently began nationwide service. Neither company—nor the FCC—can yet predict the exact terrestrial repeater needs of this new service. Assessing gaps in satellite coverage will be an iterative process that will continue as Sirius and XM acquire more customers.

Although the repeaters already authorized by the STA represent Sirius’ preliminary estimate of the numbers, locations and parameters of terrestrial repeaters necessary to rectify areas where terrain shielding, blockage and multipath prevent satellite reception, further gaps may remain. It is conceivable that Sirius will need to supplement its repeater network to improve service to the public and to ensure the ubiquitous coverage the Commission promised years ago. Moreover, subjecting relatively minor changes (*e.g.*, down-tilt or power reduction) to the terrestrial repeater constellation operated pursuant to the STA in any “freeze” would benefit no one. In short, if the Commission *forbids Sirius to remedy quality problems*, consumers’ reception will be handicapped, and the service will acquire a poor reputation. This would be

²⁶ *Sirius Announces Launch Plans; February Service Kick-Off in Houston, Denver and Phoenix* (Nov. 14, 2001) (Press Release) (available at www.prnewswire.com/cgi-bin/stories.pl?ACCT=104&STORY=/www/Story/11-14-2001/0001615916&EDATE=)<visited Dec. 11,2001>.

inconsistent with the agency's statutory mission,²⁷ making any suggested "freeze" unjust and illogical.

In addition, forcing the satellite DARS licensees to rely solely on repeaters operating at or below 2 kW EIRP to eliminate newly discovered satellite blockages would cause greater interference than using high power repeaters to fill the same area.²⁸ Although many coverage gaps can be overcome using repeaters at or less than 2 kW power, some will require higher power repeaters, which, as Sirius has long maintained, will cause little interference to WCS systems. Thus, concerns of the WCS/MDS/ITFS community about the number of high power repeaters are unproven and unwarranted, and the FCC should reject any attempt to limit the flexibility of the satellite DARS licensees.

Second, the FCC proposal strangely appears to set a "ceiling" on the numbers, locations and parameters of satellite DARS repeaters based on the applications for STA the two satellite DARS licensees sought and obtained several months ago.²⁹ But, the STAs were designed to cover licensees' *initial* repeater deployment, not set the ceiling for all time. The STA grants expressly disclaimed any intent to "prejudice the outcome of the final rules adopted by the Commission,"³⁰ yet this is exactly what the FCC now proposes. This approach is at odds with long-time agency practice and policy. Notably, setting final licensing parameters on the basis of

²⁷ 47 U.S.C. §§151 and 303(g) (requiring the FCC to "encourage the larger and more effective use of radio").

²⁸ *Sirius Feb. 5, 2001 Letter* (showing that multiple 2 kW EIRP repeaters would create a greater interference zone in Houston than fewer high power repeaters).

²⁹ *Sirius STA Order*, ¶ 18. *XM Radio Inc. Application for Special Temporary Authority to Operate Satellite Digital Audio Radio Service Complementary Terrestrial Repeaters*, File No. SAT-STA-20010712-00063, 2001 FCC LEXIS 4930, DA 01-2172, ¶ 18 (Sept. 17, 2001) (Order and Authorization).

³⁰ *Sirius STA Order*, ¶18.

temporary authorizations is inconsistent with the WCS industry's plea to ensure that the FCC not consider the experimental licenses granted to Sirius and XM to be permanent grants of authority.³¹

Third, limiting deployment of terrestrial repeaters to those requested and authorized in the STA would be anticompetitive. Establishing a terrestrial repeater "ceiling" based on the STA requests would vitiate the ability of each satellite DARS provider to maintain service parity with the other licensee. Perversely, Sirius would be harmed disproportionately (*i.e.*, have a lower ceiling) merely because it, in good faith, sought to initiate its service with fewer high power terrestrial repeaters than XM. Thus, the Commission should not restrict operation of high power repeaters for the next 18 months to the initial STA requests. Instead, as explained below, the Commission should allow each satellite DARS licensee to operate sufficient high power repeaters to expand their nascent service.

IV. THE COMMISSION SHOULD ADOPT A POWER CAP COMPROMISE BASED ON 18 KW EIRP (AVERAGED OVER 360 DEGREES)

The Commission should allow the satellite DARS licensees to operate unlimited terrestrial repeaters up to 18 kW EIRP (averaged over 360 degrees) without coordination with, or financial liability to, WCS licensees.³² Throughout the course of this rulemaking proceeding,

³¹ Neither Sirius nor XM viewed as grants of permanent authority, despite WCS community allegations to the contrary. As Sirius consistently has explained, *see Letter from Carl Frank to Bruce Franca*, File No. WA2XXE, at 1 and Exhibit 1 (Sept. 7, 2001), its experimental license was obtained to test propagation models, repeater design and site locations. In some cases, up to five potential sites were tried, and rejected after installation and testing, before a site was selected. This experimental program clearly was lawful. *See* 47 C.F.R. § 5.83 (2001) ("The applicant for a station in the Experimental Radio Services accepts the license with the express understanding: (a) that the authority to use the frequency or frequencies assigned is granted upon an experimental basis and does not confer any right to conduct an activity of a continuing nature..."); *cf.* 47 C.F.R. only § 25.113(b) (2001) ("Construction of [satellite earth stations] may commence prior to grant of a license at the applicant's own risk.").

³² *See September 2001 Joint Rules* (determining maximum EIRP in any given direction of high power sectorized antenna by the following formula: $EIRP = 42.6 \text{ dBW} + 10 \log(360/\text{beamwidth}) \text{ dBW}$, where $10 \log(360/\text{beamwidth})$ is less than 3 dB).

Sirius consistently requested operation of terrestrial repeaters up to 40 kW. Now, in a spirit of compromise, Sirius agrees to reduce its maximum terrestrial repeater power to 18 kW (averaged over 360 degrees), *provided that* the Commission imposes no further numbers cap, coordination obligation or financial liability on Sirius.³³

The Commission wisely proposed such a power-based compromise in the *Public Notice* for implementation after 18 months.³⁴ Under Sirius' proposal, the satellite DARS and WCS licensees immediately would share responsibility for operating as good spectral neighbors. The satellite DARS licensees would reduce power by 70 percent and the WCS licensees would relocate, add filters or deploy quality equipment capable of co-existing with terrestrial repeaters operating at powers up to 18 kW (averaged over 360 degrees).

Confining terrestrial repeater operations to 18 kW (averaged over 360 degrees) more than satisfies any reasonable burden of mitigating interference to WCS base stations, and, thus, no further coordination or financial compensation to the WCS licensees should be imposed. As discussed above, the WCS licensees generated a theoretical interference problem through projected use of sub-par equipment. For repeaters at or under 18 kW (averaged over 360 degrees), the WCS licensees should assume financial liability to improve, filter, or relocate their WCS base stations to co-exist with DARS, as contemplated in the WCS rules and auction. Given that the WCS licensees have few, if any, current commercial operations, such steps are not burdensome.

Repeaters with over 18 kW power (averaged over 360 degrees) would be treated differently. Satellite DARS licensees would publish proposed higher-power repeater information

³³ If the Commission decides not to average power over 360 degrees, it should permit the satellite DARS licensees to operate repeaters up to 40 kW.

³⁴ *Public Notice* at 7-8.

and any affected WCS licensee could request coordination of an affected base station with that terrestrial repeater within 30 days of publication. The WCS licensee's request for coordination must include: (1) the name of the licensee; (2) the identity of the market in which interference is suspected; (3) a description (with test equipment graphs) of the nature, duration, and directionality of the interference that might be expected from the proposed repeater; (4) a *prima facie* demonstration that the claimed interference would be caused by the proposed repeater of the relevant licensee; (5) information on the predicted effect of the planned new terrestrial repeater site on existing WCS base stations; (6) a list (including relevant parameters) of that licensees' WCS base stations (in service or under construction) within a 16 mile radius; (7) a demonstration of how the alleged interference could "prevent the provision of commercial [WCS] service" (discussed in Section VII, *infra*) and (8) the name, street address and email address of the appropriate and available contact point.³⁵

The power cap proposal is administratively simple and provides an effective way to cut alleged interference to WCS licensees. This approach is also competitively neutral because it shares the burden of mitigating interference between the WCS and satellite DARS licensees. Because it is efficient, effective, and equitable, the Commission should implement immediately this preferred power-based solution in its final terrestrial repeater rules.

V. ADOPTION OF A NUMBERS CAP IS A LESS PREFERRED, BUT STILL ACCEPTABLE, INTERFERENCE SOLUTION

In the event that the Commission does not accept the preferred straightforward power-based compromise set forth above, each satellite DARS licensee should be permitted to operate

³⁵ Toward this end, Sirius supports the Commission's proposal that WCS licensees provide "in as expeditious a manner as possible," information about WCS station deployment (*e.g.*, number planned for the next 18 months, location, technical characteristics and estimated cost of resolving interference). *Public Notice* at 6.

up to 155 high power terrestrial repeaters. Such high power terrestrial repeaters would include the repeaters identified in the current satellite DARS licensees' STA requests plus additional terrestrial repeaters, which operate at power levels greater than 2 kW EIRP (averaged over 360 degrees). Under this approach, coordination with, and financial compensation to, WCS licensees would only be required for any high power terrestrial repeaters in excess of 155. Such WCS licensees would have sufficient notice to request coordination based on the publication requirements set forth in Section IX, *infra*. Similarly, 30 days advance notice of the first 155 repeaters provides more than adequate time for the WCS licensees to relocate, or add filters to the few existing WCS base stations that might be affected.

The Commission should embrace this “numbers cap” because it predictably bounds potential interference to WCS licensees, while still enabling the satellite DARS licensees to remedy newly discovered gaps in satellite service. It also would be administratively simple to implement and to monitor compliance.

VI. ALTERNATIVELY (AND LEAST PREFERRED) THE COMMISSION COULD ADOPT A SIMPLIFIED “SAFE HARBOR” AND “LIABILITY ZONE” METHODOLOGY BASED ON A SINGLE WCS RECEIVER OVERLOAD

Should the Commission reject both the power-based and number-based approaches (each of which is dependent on averaging power over 360 degrees), the FCC should permit satellite DARS licensees to operate terrestrial repeaters up to 40 kW (independent of 360 degree averaging) pursuant to a simplified “safe harbor” and “liability zone” methodology. The variable interference methodology in the *Public Notice* is overly complex and administratively burdensome; the proposal reads like a cross between the tax code and taxicab zone pricing in the District of Columbia.³⁶

³⁶ Sirius reads the *Public Notice* to draw an outer limit of the “liability zone” in a fashion consistent with the actual pattern of the satellite DARS repeater transmission, including use of

In part, the complexity stems from reliance on multiple, self-selected, WCS receiver system threshold characteristics. WCS licensees claim base stations with a variety of overload points, ranging from -25 dBm to -51 dBm.³⁷ As a result, the agency's proposal would force each satellite DARS high power terrestrial repeater to draw multiple zones within which compensation might be due. Perversely, the WCS licensee with the poorest base station design would receive compensation most often because it would have the largest geographic zone. Thus, by attempting to accommodate such a wide range of receivers in its interference methodology, the Commission is encouraging spectrum inefficiency and equipment design below industry standards. Indeed, the FCC's plan practically begs WCS licensees to game the system in a way that forces the DARS licensees to finance the upgrade of their receivers to industry standards.³⁸

sectorized antennas. *See Public Notice* at 5 (seeking comment on the satellite DARS licensees coordination obligation "within the Liability Zone defined by the power level contour generated by the actual HPR EIRP").

³⁷ *See Letter of Paul J. Sinderbrand, Counsel to Wireless Communications Association International, Inc. to Magalie Roman Salas, Secretary, FCC*, IB Docket No. 95-91 and Gen. Docket No. 90-357, Appendix at 7 (filed Dec. 15, 2000) (Metricom overload point of -25 dBm); *Comments of Metricom, Inc.*, File No. SAT-STA-20010712-00064, at Exhibit A, p. 1 (filed Aug. 21, 2001) (a -32 dBm overload point); *Letter of Tom Peragine, Founder and Chief Engineering Strategist, Spike Broadband Systems, Inc. to Magalie Roman Salas, Secretary, FCC*, IB Docket No. 95-91 at 2 (filed May 23, 2001) (Spike Broadband Systems, Inc. manufactures WCS base stations with an "overload [of] -35 dBm"); *Letter of Karen B. Possner, Vice President-Strategic Policy, BellSouth Corporation, to Magalie Roman Salas, Secretary, FCC*, at Attachment 2, IB Docket No. 95-91, (filed Mar. 8, 2001) ("a reasonable estimate for [base station] receiver sensitivities is also -34 dBmW"); *Comments of BellSouth*, File No. SAT-STA-20010724-00064, at Attachment A, pp. 3-6 (filed Aug. 21, 2001) (a -35 dBm overload point); *Comments of WorldCom Inc.*, File No. SAT-STA-20010712-00064, at Exhibit 1 (August 21, 2001) (a -51 dBmW overload point); *Reply Comments of Verizon Wireless*, File No. Sat-STA-20010712-00063, Appendix at 3 (Aug. 30, 2001) ("[b]locking signal level = -31 dBm"); *Letter from William M. Wiltshire, Counsel for AT&T Wireless, to Magalie R. Salas, FCC*, IB Docket No. 95-91 at 5 (Apr. 30, 2001) ("[b]ase station sensitivity is -45.1 dBm").

³⁸ Under the multiple receiver methodology proposed by the Commission, WCS licensees can select a receiver with an overload point that optimizes the area inside the liability zone and outside the safe harbor—the area for potential interference claims—for the given population distribution in a particular market. In cities characterized by sprawl, such as Houston and Los Angeles, the population is spread over a relatively wide geographic area and relatively high

In light of these flaws, the agency (if it rejects a power-based compromise or numbers cap) should simplify the “safe harbor” and “liability zone” methodology to reflect a single WCS receiver overload point.

Mandating a WCS receiver standard for purposes of evaluating interference would not be as difficult as the FCC might have imagined. Indeed, the Commission should impose a single safe harbor and liability zone based on a –35 dBm overload point. This standard reflects reasonably good, but not state-of-the-art equipment, which is technically achievable by all WCS licensees.

The WCS licensees’ submissions themselves support a –35 dBm standard. Most of their submissions disclosed proposed receiver overload points in the narrow range between –31 dBm and –35 dBm. The exceptions merely prove the rule: Although AT&T Wireless had begun to deploy a base station allegedly with an overload point at –45 dBm at the antenna, AT&T recently has left the WCS market. Metricom’s –25 dBm receiver is the most robust receiver of any of the WCS licensees, and its placement at relatively low heights likely eliminates the possibility of any interference. WorldCom claims a –51 dBm overload point, but may be exiting the market.³⁹ The -35 dBm standard represents the common receiver overload employed by WCS licensees.

population densities extend a considerable distance from the center of the city. In those cities, the WCS licensee could deploy a poor quality base station (*i.e.*, –51 dBm) to include the greatest number of base stations in the area for potential interference claims. In cities, such as Denver and Cincinnati, where the population is concentrated in a small geographic area without significant sprawl, the WCS licensee would desire the smallest possible safe harbor to minimize the portion of the dense population that is not subject to an interference complaint. In that situation, the WCS licensee could deploy a better quality base station (*i.e.*, –25 dBm). In either case, the WCS licensee can manipulate the Commission’s multiple overload point proposal to maximize the probability that Sirius would be required to upgrade the WCS receiver to reduce interference.

³⁹ In any event, WorldCom’s failure to design a receiver as robust as all of the other licensees does not warrant the added complexity of the variable receiver methodology.

A requirement to deploy equipment that rejects adjunct channel signals of at least -35 dBm would correspond to a universal 0.5 mile radius safe harbor within which the satellite DARS licensees would have no responsibility to coordinate or correct interference to WCS licensee base stations from terrestrial repeaters operating at powers up to 40 kW. Using this same -35 dBm overload point, the Commission should establish a 2.2 mile maximum liability zone distance for a maximum high power repeater of 40 kW.⁴⁰ For the sake of simplicity, Sirius agrees to apply this 2.2 mile radius to all high power repeaters, including those that operate at less than 40 kW and would otherwise have smaller liability zones.

Although this option does not provide the predictability and simplicity of either the “power cap compromise” or the numbers cap approach (each discussed above), it markedly reduces the complexity of the multiple compensation methodology proposed in the *Public Notice*. This also would make the compensation process more predictable. A single receiver overload point also would ease the burden of administering interference disputes on the FCC staff and the WCS and satellite DARS licensees. Adoption of a single standard also eliminates the opportunity for abuse present in the variable liability zone proposal of the *Public Notice*. It would, thus, avoid rewarding the most poorly designed WCS receivers and, given the statements and proposals on the record, should not disrupt any current WCS deployment.

VII. COMPENSATION, IF ANY, SHOULD BE OF SHORT DURATION, LIMITED TO WCS BASE STATIONS, AND SHARED WITH WCS LICENSEES

As noted above, the simplest approach would be to avoid complicated “liability zone” methodologies for evaluating interference, by adopting either a “power cap” or a “numbers cap.” However, if satellite DARS licensees are saddled with some form of liability zone, the *Public Notice* recognizes appropriately that, where commercial WCS service is prevented, the satellite

⁴⁰ *Public Notice* at 5.

DARS licensees should share financial liability with WCS licensees for a limited period of time.⁴¹

The theory behind any transition period is to give an affected entity time to adjust to new and unexpected developments. No such period is warranted here. The WCS service was carved out of satellite DARS and always responsible for protecting satellite DARS operations. Moreover, Sirius itself proposed far higher terrestrial repeater power levels in 1990,⁴² the Commission first proposed permitting repeaters in 1995, and Sirius reminded the agency of its (far higher) proposed power levels in 1997. These were public, docketing filings, and all entities—including WCS licensees—are responsible for knowing the contents of the agency's files. Because WCS licensees knew, or should have known, of the issue, no compensation scheme is necessary or appropriate.

If a transition period nonetheless is authorized, one aspect of the FCC's proposal must remain. As a prerequisite to financial compensation, blanketing interference from satellite DARS terrestrial repeaters within a liability zone must "prevent[] the provision of commercial service" in a manner that cannot otherwise be resolved through coordination.⁴³ (WCS licensees must bear both the burden of production and persuasion on this point.) Commercial service would be prevented by a particular WCS base station only if that base station was so debilitated that service was blocked on a wide-spread basis. To the contrary, if the base station can still

⁴¹ *Public Notice* at 6-7.

⁴² *See Application of Satellite CD Radio, Inc. for Authority to Construct, Launch and Operate a Space Station in the Satellite Sound Broadcasting Service at 121° West Longitude*, File Nos. SAT-LOA-19900518-00036, 49-DDS-P/LA-90, 50-DDS-P/LA-90, at 21 (May 18, 1990) (noting that "[t]he radiated power of the repeater will be on the order of 30 dBW to 40 dBW per stereophonic channel" and that Sirius proposed to offer between 12 and 25 channels via repeaters. At 40 dBW per 12 to 25 stereophonic channels, this represents repeater powers of between 120,000 watts (for 12 channels) and 250,000 watts (for 25 channels)).

⁴³ *Public Notice* at 6.

serve a substantial amount of the population within the service area, then it would still be providing commercial service. In other words, merely reducing somewhat the service area of a particular base station—when the affected area easily could be served by an additional base station in the cellular-like deployment—would not establish that the WCS base station is incapable of rendering commercial service. Under such circumstances, no financial liability would accrue.

Second, the compensation schedule should be simplified and shortened. The WCS licensees have had actual notice of the power levels since January 2000 (when they first objected), and were provided with copies of both satellite DARS licensees’ initial deployment plans in the summer of 2001. The first date of the transition plan should, at a minimum, begin no later than the date of *Public Notice* of the Sirius and XM STA applications. Thereafter, Sirius proposes the following schedule, all assuming timely receipt of complete and sufficient requests for coordination. For purposes of the chart below, “Satellite DARS Licensee Responsibility” means the reasonable costs of mitigating interference to the level the affected WCS base station would receive from a 2 kW terrestrial repeater.

In-Service Date For WCS Base Station	Satellite DARS Licensee Responsibility
Prior to January 1, 2002	100 %
January 1, 2002 through March 17, 2002	50%
March 18, 2002 through September 17, 2002	0% (if repeater identified in STA) 50% (if repeater not identified in STA)
After September 17, 2002	None

As indicated in this chart, the satellite DARS licensees should pay no compensation after September 17, 2002. In addition, total compensation to all WCS licensees by each Satellite DARS licensee should not exceed \$1,000,000 and compensation for each individual WCS base station should not exceed \$10,000 per base station. Furthermore, all other costs associated with

mitigating interference (*e.g.*, labor) should be the WCS licensees' expense. Finally, satellite DARS licensees should not be obliged to compensate WCS licensees for costs of resolving any interference to Consumer Premises Equipment ("CPE") including, but not limited to, equipment or labor costs of repointing or shielding (see Section VIII, *infra*).

This joint sharing of financial responsibility between the WCS licensees and satellite DARS licensees will ensure that all parties act reasonably. It will provide the WCS licensees an incentive to deploy equipment with a higher overload point and the satellite DARS licensees an incentive to deploy terrestrial repeaters with the lowest power necessary to fill gaps in satellite coverage. The approach is also fair because the WCS licensees had actual notice since at least February 2000, the date on which WCS licensees first commented in this proceeding, that their WCS base stations did not reject adequately interference from satellite DARS high power terrestrial repeaters.⁴⁴ Indeed, the WCS licensees who are themselves responsible for the interference, through poor engineering, can correct such interference through equipment redesign and/or placement, and can have no legitimate expectation of continuing compensation for poorly-engineered WCS base stations deployed near these high power repeaters. The Commission should not require the satellite DARS licensees to fund business and technological decisions the WCS licensees would make anyway. *Satellite DARS licensees are not bank ATMs* and rewarding the WCS licensees' extended and repeated engineering failures and indifference to FCC proceedings sends nothing but the wrong signals.

For the same reasons, the Commission should cap each satellite DARS licensee's total financial liability at \$1,000,000 for all WCS licensees and \$10,000 per WCS base station.

⁴⁴ See *Comments of BellSouth Corporation*, IB Docket No. 95-91, GEN Docket No. 90-357 (filed Feb. 22, 2000); *Comments of the Wireless Communications Association International, Inc.*, IB Docket 95-91, GEN Docket No. 90-357 (filed Feb. 22, 2000).

Anything more would be an unreasonable financial burden on the new satellite DARS service. These caps should more than adequately cover the relatively small number of interference cases because virtually all WCS deployment plans are moot or uncertain.

VIII. SATELLITE DARS LICENSEES SHOULD BEAR NO RESPONSIBILITY FOR ANY WCS CONSUMER PREMISES EQUIPMENT (“CPE”)

The satellite DARS licenses should bear no liability for interference to WCS CPE because such receivers can be pointed in a non-interfering direction.⁴⁵ The typical WCS CPE antenna is highly directional and therefore has significant signal rejection capability.⁴⁶ As long as the CPE is not pointed in the direction of a satellite DARS high power repeater, the CPE should be able to reject any in-band satellite DARS transmissions. This should be true even if the CPE were located in the transmission sector of the satellite DARS terrestrial repeater.

Interference to WCS CPE is highly improbable. Any given unit is unlikely to be pointed directly at a terrestrial repeater. Indeed, the probabilities of such interference were fully explored in Sirius’ January 2000 Comments and March 2000 Replies,⁴⁷ which addressed interference to MMDS/ITFS equipment, but the probability analysis is identical.

WCS licensees knew the location of terrestrial repeaters and should not now receive compensation for pointing towards them. The WCS licensees are and will continue to be aware if one or more of Sirius’ high power terrestrial repeaters exist in the area of planned WCS deployment—through STA notice of existing repeaters or internet-based publication of future repeaters (discussed in Section IX, *infra*). Requiring the WCS licensees to consider the location

⁴⁵ The record contains no indication that repointing CPE would be not be feasible.

⁴⁶ See, e.g., *Reply Comments of Verizon Wireless*, IB Docket No. 95-91 Appendix at 3 (18 dBi) (filed Aug. 30, 2001).

⁴⁷ *Supplemental Comments of Sirius Satellite Radio* (filed Jan. 18, 2000); *Reply Comments of Sirius Satellite Radio*, Exhibit A at 17 (filed Mar. 8, 2000) (demonstrating only an approximately 0.04 percent probability of interference to legacy analog MDS receivers).

of Sirius' high power terrestrial repeaters and to point their CPE toward unaffected base stations from the start would be far less disruptive for the FCC and all parties than imposing a burden on the satellite DARS licensees to pay to re-point the affected CPE at some later date. It would also be cost-effective, as the WCS licensees already bear the labor cost of pointing CPE at the time of initial installation. Furthermore, the pointing of CPE outside the line-of-sight of a satellite DARS terrestrial repeater will be routine at installation if the WCS licensees deploy base stations outside the transmission sector of satellite DARS terrestrial repeater. Accordingly, adjudicating CPE interference concerns would waste unnecessarily FCC staff resources.

IX. SATELLITE DARS LICENSEES SHOULD PUBLISH THE OPERATIONAL PARAMETERS OF REPEATERS ABOVE 200 W ON THE INTERNET

Instead of notifying WCS licensees individually, as proposed by the *Public Notice*,⁴⁸ the Commission should allow the satellite DARS licensees to publish, on the Internet, the location and operational parameters of their terrestrial repeater operating above 200 W EIRP. Sirius proposes Internet-based publication of repeater information including: (1) geographic coordinates; (2) antenna type; (3) antenna orientation; (4) antenna radiation pattern and any applicable vertical downtilt; (5) total EIRP; and (6) height Above Ground Level (AGL). In addition, satellite DARS licensees would provide the contact name of the person responsible for terrestrial repeater interference issues and that person's complete mailing and e-mail addresses.

Terrestrial repeaters included in the current STA have already been provided to the FCC and the WCS licensees and would form the initial electronic list available on the Internet by the time final rules become effective. New repeaters operating at powers above 200 W EIRP (averaged over 360 degrees) would be published no later than 30 days before the repeater is to

⁴⁸ See *Public Notice* at 4, 5.

become operational. Finally, the list containing the operational information for new repeaters above 18 kW (averaged over 360 degrees) would also be made available to the FCC International and Wireless Telecommunications Bureaus, via an informational filing.

Satellite DARS licensees need not publish information about repeaters operating at 200 watts or less. The probability of interference from such repeaters is negligible, and such “micro-repeaters” are anticipated to be used to address immediate coverage needs (including curing unanticipated gaps). Any notification or publication obligation covering such repeaters would only hamstring satellite DARS licensees, with little practical effect on WCS systems (if any).

Internet-based publication, as opposed to a notification requirement, would meet the operational needs of satellite DARS licensees while at the same time mitigating the risk of interference to adjacent spectrum licensees, such as the WCS. Requiring the satellite DARS licensees to contact each WCS licensee, in writing, prior to commencing permanent operation of these repeaters would be unnecessarily burdensome.

X. THE COMMISSION SHOULD ADOPT THE REMAINING PROPOSALS IN THE PUBLIC NOTICE WITH ONLY MINOR MODIFICATIONS

A. Satellite DARS Licensees Should Deploy Unlimited Numbers of Repeaters At or Below 2 kW

Regardless of whether the Commission selects the “power cap compromise,” a numbers cap, or a liability zone system to resolve the WCS licensees interference concerns, Sirius supports the FCC’s tentative conclusion not to restrict the satellite DARS licensees’ deployment of terrestrial repeaters operating at or below 2 kW. The satellite DARS licensees should have the same opportunity to operate unlimited numbers of these low power terrestrial repeaters as adjacent WCS spectrum licensees.⁴⁹ Moreover, as noted above, the WCS licensees have been on

⁴⁹ See 47 C.F.R. § 27.50 (2001) (limiting the power but not the number of WCS base stations).

notice since 1990 that the use of complementary terrestrial repeaters would be an important part of the satellite DARS systems, and they have assumed the risk that such repeaters would interfere with their operations when they acquired their spectrum rights and designed their systems. In addition, there has been little controversy regarding the use of low power terrestrial repeaters. For example, Metricom stated—on the record—that its system could “accommodate operations of SDARS terrestrial repeaters at power levels at or below 2 kW EIRP.”⁵⁰ In addition, WorldCom commented that “[w]hile a repeater with an output power of 2kW will still cause some interference . . . WorldCom can accept such power levels without serious degradation to its system.”⁵¹ In sum, the record supports unlimited deployment of low power terrestrial repeaters.

B. The Commission Should Not Regulate Terrestrial Repeaters in the Same Manner As WCS Licensees Vis-à-vis Legacy MDS/ITFS Licensees

Contrary to the *Public Notice*, the Commission should not obligate the satellite DARS licensees to remedy, or compensate for, alleged blanketing interference to analog MDS/ITFS systems. Such an obligation is unjustified because the protection for analog MDS/ITFS licensees expires on February 20, 2002. No final rule is likely to become effective prior to that date. The potential for interference, and the demands of the market for either more video channels or conversion to data services, is dictating the conversion of MDS/ITFS operations from analog to

⁵⁰ *Metricom Comments* at 8.

⁵¹ *WorldCom, Inc. Opposition to STA Request* at 2 (filed August 21, 2001) (“*WorldCom Comments*”). Although the WCS licensees later asserted that they “did not agree to accept rules that would allow unlimited deployment of 2 kW terrestrial repeaters,” they did not reject the idea outright. Rather, the WCS licensees requested that the Commission require satellite DARS licensees to provide additional information about low power terrestrial repeater deployment, which the satellite DARS licensees have done as part of their STA. *See Ex Parte Letter from Donald C. Brittingham, Verizon Wireless, et al. to Magalie R. Salas, Secretary, FCC* at 2-3 (filed Sept. 7, 2001) (“*WCS Filing*”). In addition, it would be disingenuous for WorldCom to first state that low power repeaters would not have an impact on their system and then object to unlimited deployment when it is in a position to operate as many low power stations as it wants.

digital, making these systems more robust and less vulnerable to interference, including interference from satellite DARS repeaters. The FCC need not craft a new compensation program to fortify incentives and business plans already well in transition. The WCS licensees have been fully liable for blanketing interference to MDS/ITFS systems and any rule requiring satellite DARS licensees to be liable, as well, would amount to double recovery for MDS/ITFS licensees.

C. Only Those Repeaters With An EIRP Exceeding 2000W Should Be Subject To The Environmental Assessment (“EA”) Requirement

Sirius concurs with the environmental assessment threshold proposed in the *Public Notice*—*i.e.*, 2000W EIRP.⁵² This level is sufficient to protect the public against harmful RF exposure. The satellite DARS licensees have always planned to comply with FCC limits, and testing under the experimental license has confirmed that repeaters can be deployed consistent with these limits. In addition, satellite DARS terrestrial repeaters will tend to be higher in altitude and limited to the tops of tall buildings or existing towers. Thus, members of the general public will never be near repeater sites.

Finally, environmental assessments could further delay introduction of this service to the public. In contrast, the deployment of unlimited repeaters operating at or below 2 kW is designed to permit satellite DARS licensees to rectify service coverage gaps, without increasing the potential for interference. Mandating environmental assessments for repeaters below this “safe harbor” would undermine this logical strategy. In sum, because there is little risk of RF exposure to the public, the FCC should limit any requirement to conduct an environmental assessment to those repeaters operating above 2000 W EIRP.

⁵² It would not make sense to average power over 360 degrees in this case because the environmental assessment rules intend to prevent public harm in situations where power exceeds 2000W in any direction.

D. The Commission Should Impose Only One Out-of-Band Emission Limit on Satellite DARS Terrestrial Repeaters

All parties agree that terrestrial repeaters should be subject to out-of-band emission limits. However, because Section I.D.1 of the *Public Notice*, which refers to Section 25.202(f) of the FCC rules, would impose different and less restrictive limits on out-of-band emissions from satellite DARS terrestrial repeaters, Section I.D.1 should be deleted.

A different problem presents itself in Section I.D.2 of the *Public Notice*. The proposal properly employs the $75 + 10\log(p)$ emission mask under which the Sirius and XM repeaters were designed. As drafted, however, the provision could be interpreted to require satellite DARS licensees to attenuate their repeater transmissions to that level only *outside the entire DARS band, as opposed to the stricter requirement that the mask apply outside each licensee's individually licensed spectrum*. Thus, the Commission should revise the out-of-band emission limits proposal by: (1) deleting Section I.D.1; (2) revising Section I.D.2 (now labeled I.D.1) to apply more clearly at each satellite DARS licensees' band edge; and (3) renumbering the current Section I.D.3 as I.D.2. Thus, the *Public Notice* should be deleted, and the *Public Notice's* paragraph I.D.2 should be renumbered as paragraph I.D.1 and read:

“Below 2320 MHz and above 2332.5 MHz, the peak equivalent isotropically radiated power (Peirp) from any satellite DARS repeater operating within its assigned band between 2320 MHz and 2332.5 MHz shall be attenuated by a factor (Pa) at least equal to $Pa = 75 + \log(Peirp)$ dB, where Peirp is in units of watts as measured by the method specified in the following paragraph. Below 2332.5 MHz and above 2345 MHz, the Peirp from any satellite DARS repeater operating within its assigned band between 2332.5 MHz and 2345 MHz shall be attenuated by a factor (Pa) at least equal to $Pa = 75 + \log(Peirp)$ dB where Peirp is in units of watts.”

E. Sirius Will Operate Terrestrial Repeaters in the Center of Its Assigned Frequency Band

The Commission should adopt the *Public Notice's* proposal that satellite DARS terrestrial repeaters operate in the center of each licensee's exclusively assigned frequency bands. Under

this proposal, the repeater transmission will be no less than 3.715 MHz from the edge of the satellite DARS allocation at 2320 MHz and 2345 MHz.

F. Sirius Fully Supports Appropriate Limits On Transmissions From Satellite DARS Terrestrial Repeaters

Sirius fully supports the FCC's proposal to limit terrestrial repeater transmissions to programming that is transmitted by a DARS satellite, and in such a way that the repeater signal and the satellite signal arrive at the DARS receiver nearly simultaneously. This language is nearly identical to the text Sirius and XM provided in their *September 2001 Joint Rules*.⁵³ The satellite DARS licensees have always supported using terrestrial repeaters to retransmit the same programming as the DARS satellites. The *Public Notice*'s language will ensure that satellite transmissions will remain the primary source of service and that terrestrial repeaters are used as "gap fillers" in those areas not covered by satellite signals.⁵⁴ This language should assuage the NAB's alleged, but overwrought, concerns that terrestrial repeaters could be employed primarily for terrestrial broadcasting.

G. The Commission Should Adopt Prior Approval Requirements For International Coordination, FAA Antenna Registration and Significant Environmental Effects

The *Public Notice* appropriately does not require prior Commission approval for each terrestrial repeater, but limits such requirements to the rare cases in which a terrestrial repeater exceeds the power levels and/or proximity restrictions specified in international agreements with Canada and Mexico. However, prior approval should not be required for satellite DARS

⁵³ See *September 2001 Joint Rules*.

⁵⁴ In fact, Sirius proposed the rule prohibiting local origination of programming, which was subsequently echoed by the Commission. See *Rules and Policies for the Digital Audio Radio Satellite Service in the 2310-2360 MHz Frequency Band*, 12 FCC Rcd 5754, 5812 (1997) (Report and Order Memorandum Opinion and Order and Further Notice of Proposed Rulemaking) (reaching the "tentative conclusion to prohibit the use of terrestrial repeaters to transmit locally originated programming").

repeaters that have already been coordinated successfully with relevant foreign authorities. The Commission also logically mandates prior Commission approval of terrestrial repeaters exceeding FAA Antenna Registration requirements as described in 47 C.F.R. § 17.4 (2001). Finally, Sirius does not object to the FCC's proposal to require prior approval where a repeater would have "significant environmental effects," as defined in 47 C.F.R. §§ 1.1301-1.319 (2001).

XI. CONCLUSION

Sirius has followed the rules. It pioneered development of satellite DARS, raised money to outlast interminable, specious objections to creating a satellite DARS allocation and services, and took the lead in the advocacy necessary to gain FCC approval for the new satellite service. After seven years, it won one of two FCC licenses at auction, and immediately paid more than \$80 million to the United States Treasury. Sirius built and launched three satellites, well in advance of the "milestone" dates required by its license. Sirius is now at the finish line, poised to offer service to the public, while XM already is in the marketplace.

WCS licensees have abused the rules. They slept on their rights, delaying resolution of an issue first raised in 1995, the seventh anniversary of which rapidly is approaching. No rational person could have expected or encouraged this delay. Should the Commission reward such "sandbagging," it would encourage pointless oppositions and regulatory delays in future proceedings. The Administrative Procedure Act was not designed to allow players to "check" for years, then "raise" at the wire.

The WCS licensees propose a complex solution to a simple problem. These licensees would have the Commission create a bureaucratic nightmare and a tax on the resources of regulated entities. In particular, WCS proposes unfairly to increase regulatory barriers to entry (in time and money) for satellite DARS licensees. Their goal: over-regulation of a new mass-market radio service.

The objects of this proposed protectionism—WCS licensees—are particularly unworthy. Their approach would legitimize speculative, unproven arguments devoid of any rational public interest justification. The simple facts are that: (1) almost no WCS licensees have deployed any systems; (2) many WCS licensees—including AT&T Wireless—have now exited the market; (3) almost no WCS licensees have any notion of a date by which they will implement expansive service; and (4) few WCS licensees have any real idea which equipment they plan to use, and therefore whether there is *any* potential for interference from satellite DARS receivers. In any world but WCS, zero plus zero would equal zero.

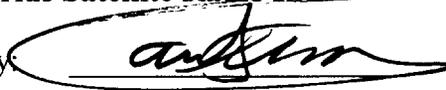
Sirius, in contrast, seeks a reasonable solution to end this proceeding. With that objective, these comments provide several proposals to resolve issues more simply: an 18 kW (measured over 360 degrees) power cap, or, in the alternative, a cap of no more than 155 high power repeaters (averaged over 360 degrees). Satellite DARS repeaters exceeding whichever limit is chosen would have to be coordinated with affected licensees, and compensation paid if and as required. Failing these previous two proposals, and very much as a fall-back solution, the Commission could simplify its “safe harbor” and “liability zone” proposals by setting a single WCS receiver rejection standard. Should there be any required compensation to WCS licensees, the FCC should dramatically shorten any transition period so as not to extend beyond September 17, 2002—more than a decade after all parties knew, or should have known, of satellite DARS repeater plans.

For the foregoing reasons, Sirius respectfully requests that the Commission adopt *simplified* final rules for the operation of satellite DARS terrestrial repeaters as described above.

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