

**AT&T WIRELESS SERVICES, INC.
BEAMREACH NETWORKS, INC.
BELLSOUTH CORPORATION
VERIZON WIRELESS, INC.
WIRELESS COMMUNICATIONS ASSOCIATION
INTERNATIONAL, INC.
WORLD COM, INC.**

February 19, 2002

BY ELECTRONIC FILING

William F. Caton
Acting Secretary
Federal Communications Commission
445 Twelfth Street, S.W.
Washington, DC 20554

Re: ***Ex Parte Presentation***
*Establishment of Rules and Policies for the Satellite Digital Audio Radio
Service in the 2310-2360 MHz Band, IB Docket No. 95-91*

Dear Mr. Caton:

Throughout the course of this proceeding, Wireless Communications Service (“WCS”) licensees and equipment manufacturers have demonstrated that high power terrestrial repeaters in the satellite Digital Audio Radio Service (“SDARS”) will cause debilitating blanketing interference and intermodulation distortion that will effectively relegate WCS licensees to secondary status in their own band. In order to address this concern, the WCS Coalition has proposed a number of solutions, all of which share a common element: ultimately limiting SDARS repeaters to no more than 2 kW EIRP, which is the standard in the band. The SDARS licensees have instead proposed rules under which they would be allowed to operate their existing nationwide experimental repeater deployments, as well as future deployments, at power levels up to 40 kW EIRP. Not surprisingly, these two incompatible positions have made a consensus approach elusive.

However, the Commission just last month released an order that may provide a framework for compromise. In the *Lower 700 MHz Order*,¹ the Commission adopted a plan designed to allow two services operating at very disparate power levels to share a single spectrum band by limiting the power flux density (“PFD”) of the higher power

¹ *Reallocation and Service Rules for the 698-746 MHz Spectrum Band (Television Channels 52-59)*, FCC 01-364 (rel. Jan. 18, 2002)(“*Lower 700 MHz Order*”).

transmissions. Based upon that approach, and in the spirit of compromise, the WCS Coalition proposes the following rules for SDARS terrestrial repeaters:

- To the extent an SDARS repeater operates at greater than 2 kW EIRP, the PFD of such repeater shall not exceed $7.9 \mu\text{W}/\text{m}^2/\text{MHz}$ at all points 2 km or more from the base of the SDARS repeater antenna mounting structure. Verification of the PFD level shall be measured based on peak RMS power with one MHz bandwidth resolution at a level that assures free space propagation (generally 30 meters above local ground level); *and*
- Any SDARS licensee intending to operate a terrestrial repeater in excess of 2 kW EIRP must file notifications with the Commission and provide notifications to all WCS licensees authorized to operate in the affected market(s) at least 90 days prior to the commencement of station operation.

This “PFD Proposal” will enable the SDARS licensees to (1) achieve their target PFD levels, (2) continue using a large number of their existing terrestrial repeaters, (3) deploy additional repeaters operating at more than 2 kW EIRP, and (4) use higher power repeaters to reach distances necessary to synchronize lower power repeaters. At the same time, it will ensure that WCS licensees will be able to operate within reasonable distances of all SDARS repeaters.

DISCUSSION

The Commission has long recognized the difficulty inherent in allowing spectrum licensees to provide services with very different power levels in a single band. This issue has recently arisen in the context of the Commission’s efforts to reallocate spectrum made available as part of the transition to digital television. In its first reallocation order, which related to the upper 700 MHz band (TV channels 60-69), the Commission adopted a uniform 1 kW ERP power limit, specifically rejecting requests for a higher power level more conducive to broadcast services.² Although the Commission wanted to give licensees in this spectrum block the most flexibility possible, ultimately it concluded that it could not adopt rules that would allow both traditional broadcasting and new wireless services. “Establishing regulatory flexibility sufficient to accommodate conventional television broadcasting would impose disproportionate, offsetting burdens on wireless services, constraining their technical effectiveness and, consequently, their economic practicability.”³ The Commission explained that where there is a substantial disparity in power levels between services, it is very difficult to craft rules under which they can coexist.

² *Service Rules for the 746-764 and 776-794 Bands, and Revisions to Part 27 of the Commission’s Rules*, 15 FCC Rcd. 476 (2000)(“*Upper 700 MHz Order*”).

³ *Id.* at 484.

Any substantial disproportion between the power levels of services sharing a spectrum band creates much greater interference difficulties for the lower-power service than when sharing or adjacent-band services operate at comparable power levels. . . . Establishing standards to manage the inherent interference between such dissimilar transmissions as conventional television and wireless services would create substantial spectrum inefficiencies in a band where efficiency is especially important because of the band's suitability for uses ranging from wideband mobile communications to innovative, fixed wireless Internet access services and new broadcast-type services.⁴

The Commission chose to adopt a single power limit (1 kW ERP) well below that used for traditional broadcast services. However, it specifically allowed broadcasters who could provide service while operating within that framework to use the spectrum for broadcast services.

In the *Lower 700 MHz Order* released just last month, however, the Commission crafted an approach that could allow services of very disparate power levels to coexist. Specifically, the Commission adopted rules that would allow a licensee to operate at up to 50 kW ERP but, to the extent it operated at more than the standard 1 kW ERP, the licensee would be required to meet a PFD limitation designed to ensure that the interference potential to other operators would be similar to that expected from a 1 kW ERP transmitter.⁵

Licensees operating base stations at power levels in excess of 1 kW ERP must design their systems such that transmissions from their base station antenna produce PFD levels that are no greater than the PFD levels that would ordinarily occur from stations operating at power levels of 1 kW ERP or less. . . . This PFD standard will minimize the likelihood of adjacent channel interference to ground-based devices by effectively limiting the energy received by such devices to levels no greater than what they would receive from adjacent channel base stations operating at 1 kW ERP or less.⁶

Accordingly, the Commission imposed a PFD limit on all fixed transmitters in the band operating above 1 kW ERP.

In order to determine the appropriate PFD level for the lower 700 MHz band, the Commission hypothesized a typical transmitter operating at 1 kW ERP to determine its characteristics. Specifically, as discussed in Appendix D of the *Lower 700 MHz Order*, the Commission assumed a half-wave dipole antenna transmitting at 1 kW ERP (or 1.64 kW EIRP) from a height of 75 meters above ground level ("AGL") Based upon these

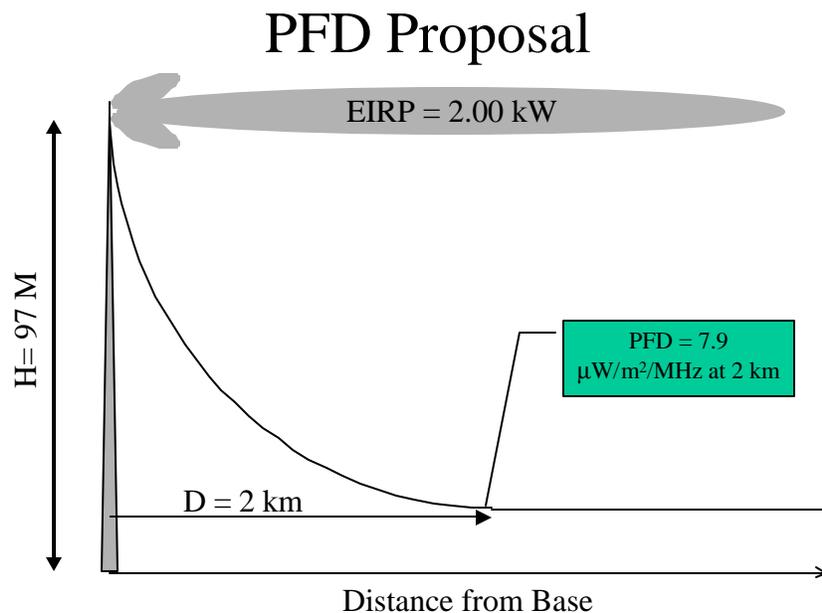
⁴ *Id.* at 484-85.

⁵ *Lower 700 MHz Order* at ¶¶ 102-107.

⁶ *Id.* at ¶¶ 104, 105.

assumptions, the Commission chose a PFD limit to use as the standard limitation going forward.

Using data from the record in this proceeding and the same methodology as in the *Lower 700 MHz Order*, the WCS Coalition has determined the analogous curve for a standard power repeater operating in the 2.3 GHz band. As before, the analysis assumes a half-wave dipole antenna. However, consistent with the standard in this band, the transmitter is assumed to operate at 2 kW EIRP rather than 1.6 kW. The presumed height of the SDARS repeater is 97 meters AGL, a figure based upon the average height of the SDARS repeaters disclosed to the Commission by XM and Sirius in their applications for special temporary authorization with an allowance to protect WCS receiving equipment located at up to 30 meters above local ground level.⁷ Using these assumptions and the methodology used in the *Lower 700 MHz Order* leads to the following curve:



This curve is the basis for the WCS Coalition's PFD Proposal. The WCS licensees have anticipated throughout this proceeding that even SDARS repeaters operating at 2 kW EIRP will create an exclusion zone with a radius of approximately 2 km. Accordingly,

⁷ The STA data reveals that the average SDARS repeater operates at 67 meters AGL. Many WCS operators anticipate deploying base stations at a height of approximately 30 meters. In addition, WorldCom has deployed customer premises equipment to existing subscribers at heights over 30 meters. Raising the assumed height of the SDARS repeater by 30 meters is equivalent to determining the appropriate PFD protection level at 30 meters off the ground without raising the repeater height. Accordingly, for purposes of this analysis, the presumed height has been set at 97 meters. The calculation also assumes 5 MHz of repeater spectrum.

the PFD Proposal takes the PFD level predicted on the curve above at 2 km -- 7.9 $\mu\text{W}/\text{m}^2/\text{MHz}$ -- and requires that repeaters not exceed that level at any point outside a 2 km circle around the SDARS transmitter.

The PFD level of 7.9 $\mu\text{W}/\text{m}^2/\text{MHz}$ established through this analysis equates to a signal strength level of -39.8 dBm at the SDARS mobile receivers. According to information filed with the Commission by the SDARS licensees, this signal level is far greater than *both* the signal delivered by the SDARS satellite *and the target signal level to be achieved through the use of SDARS repeaters*. Specifically, the SDARS licensees have stated that (1) the mobile receive level from an SDARS satellite is -110 dBW/ m^2/MHz at their coverage boundary, which translates to -99 dBm;⁸ and (2) the desired signal level from an SDARS repeater is -77 dBm.⁹ Thus, the PFD level derived above will allow the SDARS licensees to provide a signal **37.2 dB higher** than their stated terrestrial repeater design objective.

The Commission's stated objective in adopting a PFD approach in the *Lower 700 MHz Order* was to achieve the maximum practical level of flexibility for services allowable under the rules.¹⁰ In this case as well, the PFD Proposal will grant significant flexibility to XM and Sirius in the design of their repeater networks. A review of the high power terrestrial repeater deployments in Atlanta illustrates this point.

SITE DESIGNATION	ANTENNA HEIGHT (m)	EIRP (WATTS)	DOWN TILT (DEGREES)	MEETS REQUIREMENT AS IS	MEETS REQUIREMENT WITH REDUCED DOWN TILT	MEETS REQUIREMENT WITH REDUCED EIRP	MEETS REQUIREMENT WITH INCREASED ANTENNA HEIGHT
XM, ATL 10B	202.4	3444	4		X	X	X
XM, ATL, 27A	51.8	2496	0	X			
XM, ATL 41B	70.1	12926	4			X	X
XM, ATL 43B	57.9	2396	6	X			
XM, ATL 46A	182.9	7294	0	X			
XM, ATL, 48E	45	3606	0	X			
XM, ATL, 53A	77.7	2014	0	X			
XM, ATL, 67A	47.9	2634	0	X			
XM, ATL, 69A	63.4	3444	0	X			
XM, ATL, 508B	40.6	2416	0	X			
XM, ATL, B10B	202.4	3444	4		X	X	X
SIRIUS, ATL, 01/01	310	7943.3	0	X			
SIRIUS, ATL, 01/02	310	6309.4	0	X			
SIRIUS, ATL, 02	135	19963	0			X	X
SIRIUS, ATL, 03/01	69.5	8318	0			X	X
SIRIUS, ATL, 03/02	69.5	7586	0			X	X
SIRIUS, ATL, 04/01	70.5	10715	0			X	X
SIRIUS, ATL, 04/02	70.5	10965	0			X	X
SIRIUS, ATL, 05/01	50	7589	0			X	X
SIRIUS, ATL, 05/02	50	7413	0			X	X

⁸ See Petition for Rulemaking of Sirius Satellite Radio, Inc., at p. 23 (filed Jan. 23, 2002).

⁹ See Letter from Bruce D. Jacobs and Carl R. Frank to Magalie Roman Salas at p. 1 (dated April 30, 2001).

¹⁰ *Lower 700 MHz Order* at ¶¶ 102-107.

As set forth in the table above, eight out of the eleven XM repeater sites and one out of five Sirius repeater sites would meet the proposed PFD levels without any adjustments whatsoever. Of the remaining seven sites, there are at least two straightforward modification options – such as reduced down tilt, reduced EIRP, or increased antenna height – that could be used to achieve compliance. Accordingly, much of the existing repeater infrastructure could remain intact and the SDARS licensees would be free to explore a range of options for additional repeater deployment, subject to compliance with the PFD requirement.

CONCLUSION

As the Commission recognized in the *Lower 700 MHz Order*, “[m]aximizing flexibility without due consideration of harmful interference is not in the public interest.”¹¹ The PFD Proposal is a compromise that would allow SDARS licensees significant flexibility in designing high power repeater networks but would also provide significant protections to WCS operators, especially for receivers near ground level. Like all compromises, it requires each side to share the burden of spectrum management. The WCS Coalition believes, however, that the PFD Proposal is fair and equitable to both SDARS and WCS interests, and may be the best way to break the current impasse. Accordingly, the WCS Coalition urges the Commission to implement the PFD Proposal.

Sincerely yours,

/s/
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/s/
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¹¹ *Id.* at ¶ 107.

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