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FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

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August 21, 2001

Received

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Satellite Policy Branch  
International Bureau

VIA COURIER

Ms. Magalie Roman Salas  
Secretary  
Federal Communications Commission  
445 Twelfth Street, S.W.  
Washington, D.C. 20554

Re: Comments of Metricom, Inc., Debtor-In-Possession  
Request of Sirius Satellite Radio, Inc. for Special Temporary Authority  
to Operate Digital Audio Radio Service Terrestrial Repeaters  
FCC File No. SAT-STA-20010712-00064

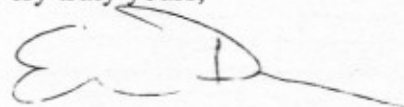
Dear Ms. Salas:

Enclosed for filing are the Comments of Metricom, Inc., Debtor-In-Possession, opposing grant of the above-referenced request for special temporary authority.

We have also included a copy of this filing to be date-stamped and returned with our waiting messenger.

Please direct any questions or correspondence regarding this filing to the undersigned.

Very truly yours,



Tom W. Davidson, Esq.  
Erin L. Dozier, Esq.

cc: Service List

Enclosures

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AUG 21 2001

FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, DC 20554

In the Matter of	)	
	)	
Request of Sirius Satellite Radio, Inc.	)	FCC File No. SAT-STA-20010712-00064
for Special Temporary Authority	)	
to Operate Digital Audio Radio	)	
Service Terrestrial Repeaters	)	

To: the International Bureau

**COMMENTS OF METRICOM, INC., DEBTOR-IN-POSSESSION**

Metricom, Inc., Debtor-In-Possession, ("Metricom"),<sup>1</sup> licensee of Wireless Communications Service ("WCS") Stations KNLB207, KNLB295, KNLB296, KNLB297, KNLB298, KNLB299, KNLB300, and KNLB301,<sup>2</sup> by its attorneys and in response to the Federal Communications Commission ("FCC" or "Commission") Public Notice announcing acceptance of the above-captioned request for special temporary authority (the "Request"),<sup>3</sup> hereby submits these comments opposing grant of the Request. As a WCS licensee authorized to

<sup>1</sup> On July 2, 2001, Metricom, Inc. filed a petition pursuant to Chapter 11 of the U.S. Bankruptcy Code (11 U.S.C. §§ 101-1330) in the United States Bankruptcy Court of the Northern District of California (the "Petition"). Metricom provided timely notification to the FCC of the filing of its Petition, and, on July 26, 2001, Metricom filed a pro forma application for assignment of its licenses from Metricom, Inc., to Metricom, Inc., Debtor-In-Possession. See Letter from Michael K. Hamra, Esq. to Ms. Magalie Roman Salas, Secretary of the Federal Communications Commission, dated July 17, 2001 (notifying the FCC of the filing of the Petition); FCC File No. 0000539648 (requesting FCC consent to pro forma assignment of license). The FCC granted its consent to this pro forma assignment on August 6, 2001.

<sup>2</sup> The stations authorize WCS operations as follows: KNLB207 authorizes operation on frequency block A in the St. Louis, MO Major Economic Area ("MEA") using 10 MHz of spectrum; KNLB295 authorizes operation on frequency block A in the Portland, OR MEA using 10 MHz of spectrum; KNLB296 authorizes operation on frequency block A in the Seattle, WA MEA using 10 MHz of spectrum; KNLB297 authorizes operation on frequency block D in the Northeast Regional Economic Area Grouping ("REAG") using 5 MHz of spectrum; KNLB298 authorizes operation on frequency block C in the Central REAG using 5 MHz of spectrum; KNLB299 authorizes operation on frequency block D in the Central REAG using 5 MHz of spectrum; KNLB300 authorizes operation on frequency block C in the West REAG using 5 MHz of spectrum; KNLB301 authorizes operation on frequency block D in the West REAG using 5 MHz of spectrum. The Northeast REAG encompasses the following MEAs: Boston, MA; New York City, NY; Buffalo, NY, and Philadelphia, PA. The Central REAG encompasses the following MEAs: Houston, TX; Dallas-Fort Worth, TX; Denver, CO; Omaha, NE; Wichita, KS; Tulsa, OK; Oklahoma City, OK; San Antonio, TX; El Paso-Albuquerque, NM; and Phoenix, AZ. The West REAG encompasses the following MEAs: Spokane-Billings; Salt Lake City, UT; San Francisco-Oakland-San Jose, CA; Los Angeles-San Diego, CA; Portland, OR; and Seattle, WA.

<sup>3</sup> See Public Notice, Report No. SAT-00077 (rel. July 31, 2001).

use spectrum adjacent to that allocated for the Satellite Digital Audio Radio Service ("SDARS"), Metricom is significantly affected by Sirius' proposed operation of terrestrial repeaters in the SDARS band.

I. Introduction

Metricom is a WCS licensee authorized to provide service within the Northeast, Central, and West Regional Economic Area Groups, as well as several Major Economic Areas ("MEAs"). Metricom's authorized service area encompasses the following MEAs: Boston, MA; Dallas-Fort Worth, TX; Denver, CO; Houston, TX; Los Angeles-San Diego, CA; New York City, NY; Philadelphia, PA; Phoenix, CO; Salt Lake City, UT; San Francisco-Oakland-San Jose, CA; Seattle, WA; St. Louis, MO; Portland, OR, Buffalo, NY, Omaha, NE; Wichita, KS; Tulsa, OK; Oklahoma City, OK; San Antonio, TX; El Paso-Albuquerque, NM; and Spokane-Billings.

Metricom has developed a high-speed wireless Internet access service called "Ricochet." Subscribers communicate with the Ricochet network through a small transceiver for use with laptops and CE devices. The subscriber unit, a Part 15 device which fits in the Type II slot of laptops and CE devices, performs the function of a modem and transmits the subscriber's data using packet-switched, frequency-hopping spread spectrum technology. The subscriber unit communicates with a nearby transceiver that is most often mounted on the mast arm of a street light pole (a "poletop" unit). The poletop unit can receive transmissions from subscriber modems located within approximately a quarter -mile radius. Communications proceed from poletop to poletop until they reach a wired access point ("WAP"). WAPs, typically located on building rooftops, are the points at which the wireless communications are transferred to a wired frame relay network. Once they have entered the wired network, communications may be transferred to an Internet gateway, a corporate Intranet, or an ordinary telephone modem. Communications originating from any of these sources follow the reverse path to the Ricochet subscriber. The transmission of data between the subscriber modems and poletop units, from

poletop to poletop, and from poletop to WAP is accomplished using unlicensed frequencies pursuant to Part 15 of the Commission's rules.

Metricom recently suspended provision of its Ricochet service pending successful reorganization of the company pursuant to Chapter 11 of the U.S. Bankruptcy Code (11 U.S.C. §§ 101-1330).<sup>4</sup> Prior to Metricom's suspension of service, it offered service to subscribers in the following markets: Atlanta, Baltimore, Boston, Chicago, Dallas/Ft Worth, Denver, Detroit, Houston, Kansas City, Los Angeles, Miami, Minneapolis-St Paul, New York City, Philadelphia, Phoenix, Salt Lake City, San Diego, the San Francisco Bay Area, Seattle, St. Louis, and the Washington, D.C. metropolitan area.

Although Metricom's service network previously operated on unlicensed frequencies pursuant to Part 15 of the Commission's rules, Metricom already had developed and was implementing plans to commence operations using its WCS licenses in the following markets: Boston, Dallas-Fort Worth, Denver, Houston, Los Angeles, New York City, Philadelphia, Phoenix, Salt Lake City, San Diego, San Francisco-Oakland-San Jose, Seattle, and St. Louis. Specifically, Metricom was implementing its plans to convert a portion of its unlicensed use of 2.4 GHz links between WAPs and poletops to licensed operations using its WCS spectrum. Consistent with this conversion plan, Metricom has deployed FCC-certified equipment to operate its network on WCS frequencies in several of these markets. Metricom has expended millions of dollars designing and developing equipment and systems to operate consistent with the technical parameters of the WCS service, and has obtained FCC approval for such equipment.

Metricom's deployment of WCS operations has been halted due to its Chapter 11 filing. However, if Metricom successfully reorganizes and resumes operations, Metricom fully intends to continue the process of converting its WAP-to-poletop links to WCS licensed operations, and to expand the Ricochet service network within each MEA using its WCS spectrum. Metricom

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<sup>4</sup> See *supra*, Note 2.

also holds WCS authorizations for the following MEAs in which it has not yet deployed any licensed or unlicensed service: Portland, OR, Buffalo, NY, Omaha, NE; Wichita, KS; Tulsa, OK; Oklahoma City, OK; San Antonio, TX; El Paso-Albuquerque, NM; and Spokane-Billings. Although Metricom has not yet commenced service offerings in these areas, deployment of service to these markets was part of Metricom's business plan, and in the event of a successful reorganization, Metricom would continue the process of marketing and deploying its service to these areas.

On July 24, 2001, Sirius Radio, Inc. ("Sirius"), one of two SDARS licensees in the United States, requested a 180-day Special Temporary Authority ("STA") to operate 151 terrestrial repeaters at power levels above 2 kW Effective Isotropic Radiated Power ("EIRP"), as well as an undisclosed number of terrestrial repeaters, which will operate at or below 2 kW EIRP. The STA Request seeks authority to operate terrestrial repeaters in some 70 different markets, including each of the twelve markets where Metricom already is poised to deploy service using its WCS spectrum, and five other markets in which Metricom is authorized to deploy WCS service. Because the Request provides no data regarding the locations of any terrestrial repeaters operating at or below 2 kW EIRP, Metricom cannot determine whether its WCS operations will be affected in other markets.

Metricom strongly opposes grant of the STA Request because: (1) Sirius' Request fails to make the requisite showing for an STA under Section 25.120 of the Commission's rules; and (2) grant of the Request will severely prejudice the public interest by impeding deployment of WCS service. If Sirius successfully supplements its STA Request to provide the additional data needed for the FCC to fully evaluate its Request, at a minimum, any STA grant must be subject to the conditions specified herein to protect the operations of WCS licensees.

## II. Sirius Has Not Made the Requisite Showing to Justify Grant of an STA

Under Section 25.120 of the Commission's rules, an STA only can be granted upon a finding that "there are extraordinary circumstances requiring temporary operations in the public interest and that delay in the institution of these temporary operations would seriously prejudice the public interest."<sup>5</sup> A request for STA "must contain the full particulars of the proposed operation including all facts sufficient to justify the temporary authority sought and the public interest therein."<sup>6</sup> Sirius' STA Request is deficient with respect to all of these requirements. Sirius' Request provides no demonstration of extraordinary circumstances warranting the requested relief, nor does it explain how the public interest will be seriously prejudiced if the Request is not granted. Moreover, by failing to provide *any* data relating to its use of terrestrial repeaters that operate at or below 2 kW, Sirius has not provided facts sufficient to allow the Commission, other licensees in adjacent bands, or the public to ascertain the level of interference that will be created by such repeaters, which is necessary to properly evaluate its Request.

Sirius' stated justification for its Request is that an STA will allow Sirius "imminently to initiate uniformly high quality commercial satellite DARS programming nationwide."<sup>7</sup> Sirius also offers some very general explanations of how provision of SDARS will benefit the public. However, the fact that provision of SDARS generally is consistent with the public interest does not constitute an "extraordinary circumstance" that overrides the public interest in allowing the Commission to complete its rulemaking process before SDARS licensees initiate commercial service. The Request seeks to operate a SDARS terrestrial system in a manner that is the subject of an ongoing rulemaking proceeding.<sup>8</sup> The Commission has yet to determine whether the

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<sup>5</sup> See 47 C.F.R. § 25.120 (2000).

<sup>6</sup> *Id.*

<sup>7</sup> See Sirius STA Request at 1.

<sup>8</sup> See In the Matter of Establishment of Rules and Policies for the Digital Audio Radio Service in the 2310-2360 MHz Frequency Band, Report and Order and Further Notice of Proposed Rulemaking, IB Docket No. 95-91,12 F.C.C. Rcd. 5754 (1997) (the "SDARS proceeding").

operation of terrestrial repeaters in the manner proposed by SDARS licensees in both the rulemaking proceeding and in STA requests, is consistent with the public interest. Sirius offers no explanation of how the public interest will be prejudiced by rollout of terrestrial SDARS service *after* the Commission has determined what rules will govern the use of terrestrial repeaters to augment SDARS.

Sirius also states that grant of its Request would ensure that there will be “no reduction in the quality of DARS service.” To the contrary, grant of the Request *increases* the chance that there will be a reduction in the quality of SDARS service. First, if Sirius is operating consistent with the terms of its experimental license, it is not yet offering any service to the public, so there can be no “reduction” in service quality. Second, notwithstanding Sirius’ apparent confidence that the Commission will adopt rules in the pending SDARS proceeding that are consistent with Sirius’ proposals, the rulemaking proceeding remains pending. Should the Commission adopt terrestrial SDARS rules that adequately protect licensees in adjacent bands, Sirius will be required to redesign and re-deploy its terrestrial system to comply with the Commission’s rules. Because Sirius has developed all of its business and operating plans around its own proposals, if Sirius has commenced service under the proposed STA, a return to the “drawing board” may result in delays in deployment of service or even service interruptions. The public interest is best served by allowing the Commission to implement a regulatory scheme for SDARS repeater operations *before* the rollout of SDARS service.

In addition, it is well established that Commission licensees cannot use an STA to prematurely implement a new service or deploy new facilities that remain the subject of an ongoing rulemaking proceeding. As a practical matter, grant of such a request prejudices the outcome of the proceeding. Despite any qualifications that may be contained in the instrument of authorization, the licensee holding such authorization will invest financial and other resources in operations consistent with the STA, and consumer expectations will be raised. The

Commission's decision in the SDARS proceeding should be based on data in the record, and should not be tainted by issues resulting from the premature deployment of terrestrial repeaters.

Even if Sirius' Request provided an adequate justification for an STA, the Request remains deficient because it fails to provide the "full particulars" of its proposed STA operations, as required by Section 25.120 of the Commission's rules. Although Sirius has provided the geographic coordinates, antenna type, antenna orientation, antenna radiation pattern, total EIRP, and height above ground level ("AGL") for each of its proposed terrestrial repeaters operating above 2 kW EIRP, Sirius provides none of this data for terrestrial repeaters operating below 2 kW. Metricom's WCS system was designed to operate at or below 2 kW, in an environment where other licensees also operate at or below 2 kW, as provided by the Commission's technical rules for WCS service. Even in an environment where all licensees are operating at or below 2 kW, WCS licensees must still coordinate their operations to avoid interfering with each other. Since any STA operations that are authorized will be on a non-interference basis, Metricom needs site-specific information on the repeaters operating below 2 kW so that it can determine the source of any interference to its operations. Without this critical information, neither the Commission nor WCS licensees can fully evaluate the potential interference effects of Sirius' proposed STA operations and take steps to mitigate the effects of such interference. Sirius' Request should therefore be denied on grounds that it fails to provide critical information needed to determine how its proposed operations will affect the operations of other Commission licensees.

### III. Grant of the STA Will Harm the Public Interest

Because the operations proposed in the STA will preclude WCS operations in large portions of the MEAs that WCS licensees are authorized to serve, grant of the STA will harm the public interest. As the Commission has repeatedly recognized in numerous contexts, there is a critical need to increase the availability of broadband technologies like Metricom's high-speed



wireless data network. The deployment of broadband wireless services by WCS licensees is critical to achieving this goal. Grant of the Request will further impede deployment of broadband wireless services using WCS spectrum by drastically limiting the areas in which WCS licensees can offer service and by making rollout of service economically unfeasible.

Metricom cannot fully evaluate the effect of Sirius' proposed operations because Sirius has failed to provide the relevant data for terrestrial repeaters operating at or below 2 kW EIRP. However, Metricom has attached an engineering exhibit analyzing the impact that Sirius' operation of repeaters at a variety of power levels would have on Metricom's ability to initiate service using its allotted WCS spectrum. As Metricom has explained in its comments in the SDARS proceeding, Metricom's system can accommodate operations of SDARS terrestrial repeaters at power levels at or below 2 kW EIRP.<sup>9</sup> However, there is no technically feasible means by which Metricom can equip its stations to accommodate SDARS operations at levels ranging from over 2 kW to 40 kW EIRP, as proposed by Sirius in its STA Request. Even if such modifications were technically feasible, Metricom already has devoted extensive financial and other resources to the design and deployment of a system based on a 2 kW environment. Having designed and developed its system consistent with Commission rules, there is no reason that Metricom should be forced to redevelop its system and redeploy its equipment.

As demonstrated in the attached technical analysis, Sirius' proposed operations will preclude Metricom's use of WCS radios in substantial portions of nearly every MEA that Metricom is licensed to serve. Each terrestrial repeater operating at 2 kW EIRP will preclude WCS operations by Metricom within a .46 square mile geographic area or "exclusion zone."<sup>10</sup> Each 10 kW repeater precludes operations within a 2 square mile area, each 20 kW repeater

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<sup>9</sup> See In the Matter of Establishment of Rules and Policies for the Digital Audio Radio Service in the 2310-2360 MHz Frequency Band, *Comments of Metricom, Inc.* (filed March 8, 2000); See also *Notification of Ex Parte Communication of AT&T Wireless Services, Inc., Bell South Corporation, Metricom, Inc., and Wireless Communications Association International* (filed Feb. 1, 2001); *Notification of Ex Parte Communication of AT&T Wireless Services, Inc., Bell South Corporation, and Metricom, Inc.* (filed Feb. 6, 2001).

precludes operations within a 4.08 square mile area, and each 40 kW repeater precludes Metricom service within an 8.14 square mile area.<sup>11</sup> In markets like Los Angeles, where Sirius proposes to operate 22 terrestrial repeaters at power levels above 2 kW EIRP, Metricom's ability to operate its WCS radios will be significantly curtailed. As Metricom and other WCS licensees have explained throughout the SDARS proceeding, SDARS terrestrial operations above 2 kW EIRP severely impairs the ability of WCS licensees to serve the public.

Given the lack of a public interest justification for grant of the STA and the harm to the public interest that is certain to result from the severe impact of the SDARS terrestrial repeaters on WCS operations, the STA Request should be denied.

IV. Should the Commission Determine that an STA is Warranted In the Future, Conditions Must be Placed on the STA to Protect the Operations of WCS Licensees

Assuming *arguendo* that Sirius can supplement its Request to justify grant of the STA and provide information on terrestrial repeaters that will operate below 2 kW, Metricom urges the Commission to place certain minimum conditions on any grant of the STA to protect the operations of WCS licensees. First, as a condition to grant of the Request, Sirius must be required to designate a contact representative to receive interference complaints arising from its operation of terrestrial repeaters. Should a licensee in an adjacent band determine, after reasonable investigations, that a Sirius repeater is causing interference to its operations, the licensee would notify Sirius's contact representative. Upon receipt of such a notification, Sirius must be required to immediately turn off the offending repeater, without dispute. Further, any STA should provide that if Sirius disagrees with an interference claim, an uninterested third party will test the interference at Sirius's expense, and the results of the third party's interference analysis will be binding on both parties. Sirius may not resume operation of the repeater until the dispute is resolved. Second, as Sirius has conceded, the Commission's action on its STA Request

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<sup>10</sup> See Technical Analysis, Exhibit A.

<sup>11</sup> Id. at Figure 5. See also Table 1.

should be without prejudice to the outcome of the SDARS rulemaking proceeding. If the Commission determines that grant of an STA is in the public interest, Metricom urges the Commission to explicitly note that such grant is without prejudice to its determination in the SDARS proceeding.

V. Conclusion

Sirius has failed to provide any public interest justification for grant of its STA Request, and, by failing to provide any data on its proposed operation of an undisclosed number of terrestrial repeaters operating at or below 2 kW EIRP, has neglected to include information critical to an assessment of the impact of its request on the operations of licensed users of adjacent frequencies. While Sirius has failed to identify a public interest benefit from its operation of terrestrial repeaters, the harm to the public interest that will result from its operation of terrestrial repeaters is clear. Grant of Sirius' Request will severely curtail the ability of Metricom and other WCS licensees to deploy broadband wireless services to the public. Unless and until Sirius justifies its need for an STA, the Request should be denied. Should the Commission determine in the future that an STA is warranted, the Commission should place conditions on grant of the STA to protect the operations of WCS licensees in adjacent bands.

Respectfully submitted,

METRICOM, INC.,  
DEBTOR-IN-POSSESSION

By: Michael K. Hamra *eg AD*  
Michael K. Hamra, Esq.

Director of Regulatory and Government  
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By: [Signature]  
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Suite 400

Washington, D.C. 20036

202/887-4000

Its Attorneys

Dated: August 21, 2001

## CERTIFICATE OF SERVICE

I, Erin Dozier, an employee of Akin, Gump, Strauss, Hauer & Feld, L.L.P., certify that a copy of the foregoing Comments on behalf of Metricom, Inc., Debtor-In-Possession Opposing Grant of the Request of Sirius Satellite Radio, Inc. for Special Temporary Authority to Operate Digital Audio Radio Service Terrestrial Repeaters, was served via first class, postage prepaid mail on this 21<sup>st</sup> of August, 2001, upon the following:

Donald Abelson  
International Bureau  
Federal Communications Commission  
445 Twelfth Street, S.W.  
Washington, DC 20554

Ron Repasi  
International Bureau  
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445 Twelfth Street, S.W.  
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Robert D. Briskman  
Technical Executive  
Sirius Satellite Radio, Inc.  
1221 Avenue of the Americas  
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Erin Dozier

# **Exhibit A**

# Technical Analysis of Interference from High Power DARS Terrestrial Repeaters to Metricom's WCS Receivers

## Abstract

The DARS satellite service operators have proposed to operate high power terrestrial repeaters with power levels up to 40 kW within 4 MHz of Metricom's WCS A, C and D blocks as shown in Fig 1. The Metricom system as shown in Fig. 2 uses the WCS band to communicate one way from building tops to radios typically mounted on street lights. Every Metricom radio mounted on a street light has a WCS receiver with an overload level of -25dBm at the input to the receiver and a 7 dBi gain antenna. These street light radios are typically installed at a density of 6 to 8 radios per square mile. A signal from a DARS terrestrial repeater with a level of -32 dBm at the antenna will degrade the performance of a radio on the street light. This analysis examines the impact of high power repeaters on the Metricom WCS receiver and shows that every 40 kW repeater creates an exclusion area that is 8 times greater than that created by a single 2 kW repeater. The interference to WCS operations caused by SDARS high power repeaters significantly outweighs any coverage benefit, because the same coverage can be achieved by using a greater number of SDARS terrestrial repeaters at or below 2 kW, which causes significantly less interference to WCS operations. This is technically based on the fact that the exclusion area is based on line of sight conditions (pathloss exponent = 2.0) and the coverage area analysis is based on non line of sight conditions with higher pathloss exponents.

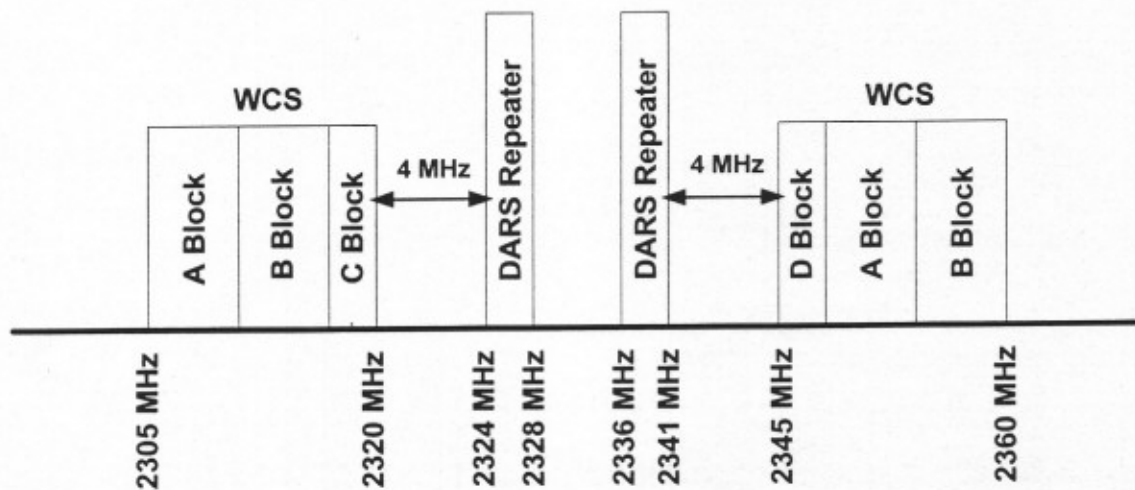


Figure 1 WCS and DARS band

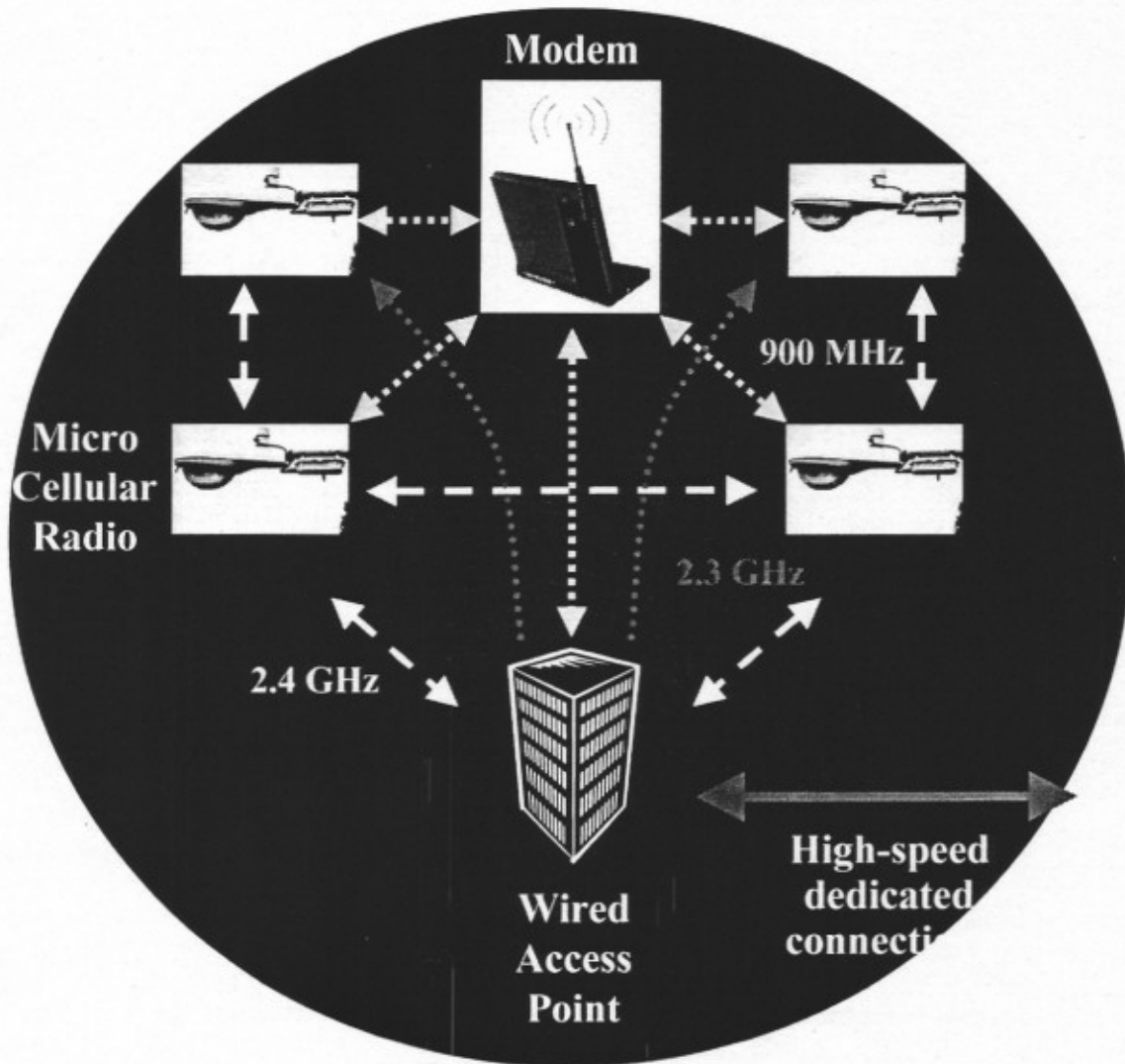


Figure 2 Metricom System Architecture

### Line of Sight Exclusion Zones

Around each high power DARS repeater a circle can be drawn that represents the area that if a Metricom receiver lies within it and has line of sight to the DARS repeater site the performance of that Metricom receiver will be degraded. Given the Metricom receivers are mounted on street lights and are designed to have line of sight back to a building top there is a high probability that the radio will have line of sight to the DARS repeater. Using the equation for free space loss shown in Fig. 3:

$$PL(d, \text{exp}) := 10 \cdot \log \left[ \left( \frac{c}{f \cdot 4 \cdot \pi \cdot d} \right)^{\text{exp}} \right]$$

Figure 3 Pathloss Equation



The radius of the exclusion area around a high power DARS repeater can be calculated given the EIRP of the DARS repeater and the gain of the Metricom WCS antenna.

$$\text{RSSI}(\text{EIRP}, d, \text{ep}) := \text{EIRP} + \text{RxAnt} + \text{PL}(d, \text{ep})$$

Figure 4 DARS Signal Level Eqn.

The graph and table below (Fig. 5, Table 1) shows the radius of the exclusion zone vs. the transmit EIRP of the DARS repeater. The graph demonstrates that for 6dB increase in power the exclusion radius doubles and given the area goes by the square of the radius the exclusion area quadruples.

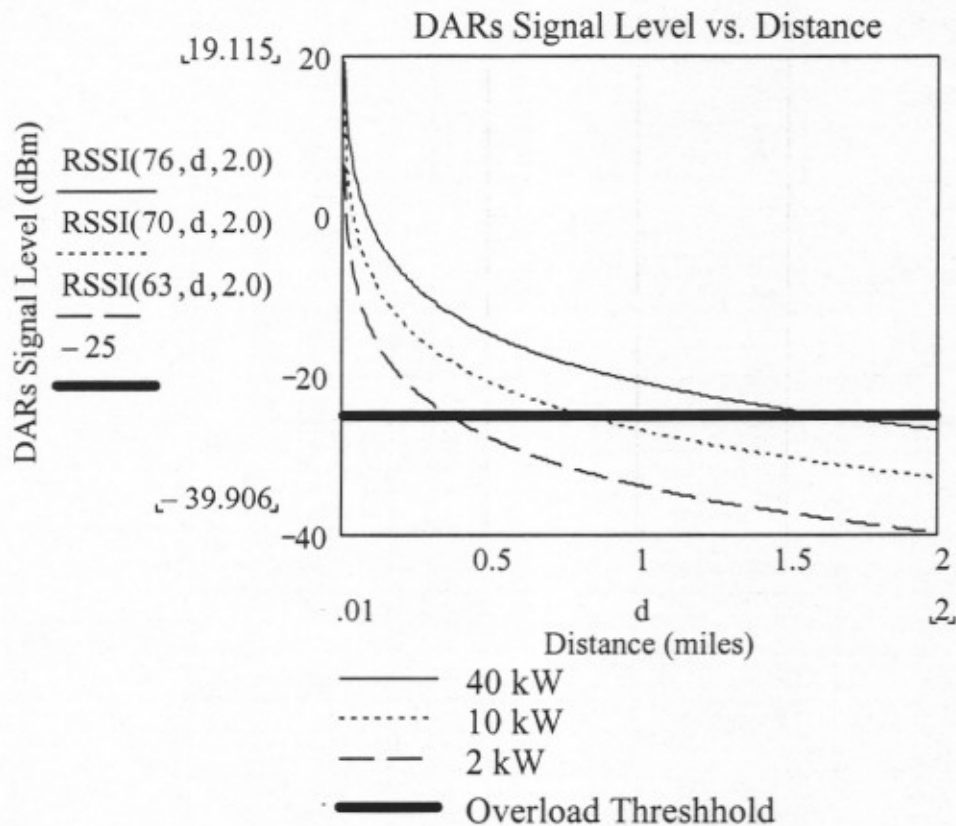


Figure 5 Exclusion Radius

Table 1 Exclusion Radius vs. Power		
Repeater Tx EIRP	Exclusion Radius	Exclusion Area
2 kW (63 dBm)	0.36 mi	0.46 mi <sup>2</sup>
4 kW (66 dBm)	0.51 mi	0.81 mi <sup>2</sup>
10 kW (70 dBm)	0.81 mi	2.00 mi <sup>2</sup>
20 kW (73 dBm)	1.14 mi	4.08 mi <sup>2</sup>
40 kW (76 dBm)	1.61 mi	8.14 mi <sup>2</sup>

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