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EX PARTE OR LATE FILED

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February 19, 2002

Carl R. Frank
202.719.7269
cfrank@wrf.com

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FEB 19 2002

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

BY HAND DELIVERY

Mr. William F. Caton
Acting Secretary
Federal Communications Commission
236 Massachusetts Avenue, NE
Washington, DC 20002

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

Dear Mr. Caton:

Pursuant to Section 1.206(b)(1) of the Commission's rules, 47 C.F.R. § 1.1206(b)(1), Sirius Satellite Radio Inc. ("Sirius") hereby submits an original and two copies of a written *ex parte* presentation in the above-captioned docket. Sirius submits the enclosed timeline and supporting materials—which highlight the numerous occasions on which Sirius publicly disclosed the proposed power levels and locations for its terrestrial repeaters—at the request of the International Bureau.

If there are any questions about this submission, please contact the undersigned at 202.719.7269.

Sincerely,

Carl R. Frank
Counsel for Sirius Satellite Radio Inc.

Enclosures

cc: Richard Engelman
Donald Abelson
Thomas Sugrue
Bruce Franca
Monica Desai
Paul Margie

No. of Copies rec'd 0+2
List A B C D E

Wiley Rein & Fielding LLP

Mr. William J. Caton
February 19, 2002
Page 2

Peter Tenhula
Bryan Tramont
David Furth
Tom Stanley
Susan Steiman
Ronald Netro
Ronald Repasi
Julius Knapp
Chris Murphy
John J. O'Connor
Bruce Jacobs
Hon. Michael K. Powell
Hon. Kathleen Q. Abernathy
Hon. Michael J. Copps
Hon. Kevin J. Martin
Roy Stewart
Keith Larsen
Rockie Patterson
Rosalee Chiara

DARS/WCS TIMELINE

1990

- **May 18, 1990:** Sirius Satellite Radio Inc. (formerly CD Radio) (“Sirius”) and Radio Satellite Corporation file applications with FCC. Sirius’ application proposes the use of terrestrial repeaters in urban areas to compensate for the effects of shadowing. *See* Excerpt from Application of Satellite CD Radio, Inc., File No. SAT-LOA-19900518-00037 (May 18, 1990) at Tab 1. The application proposes repeater powers of well over 100,000 watts depending on the number of channels on a given repeater.

1997

- **Nov. 14, 1997:** Sirius files an *ex parte* letter that sets forth transmitter output power levels of up to 1,000 watts and antenna gains between 15 to 28 dBi. *See* Letter from Robert D. Briskman, Chief Technical Officer, Satellite CD Radio, Inc., to Rosalee Chiara, Federal Communications Commission, IB Docket No. 95-91 (Nov. 14, 1997) at Tab 2. Because EIRP is calculated by adding transmitter power and antenna gain, these data indicate proposed repeater power levels of the same order of magnitude as those first proposed (*i.e.*, hundreds of thousands of watts). The letter also noted that a total of between 100-150 active terrestrial repeaters would be required with higher numbers of repeaters in more dense cities.

1998

- **Sept. 4, 1998:** Sirius files applications for experimental radio station construction permits for repeaters in Berkeley, San Leandro, Woodside, San Francisco and Brisbane, California. Copies of these applications are attached at Tab 3. Each of these applications propose repeater powers of up to 50,000 watts.

1999

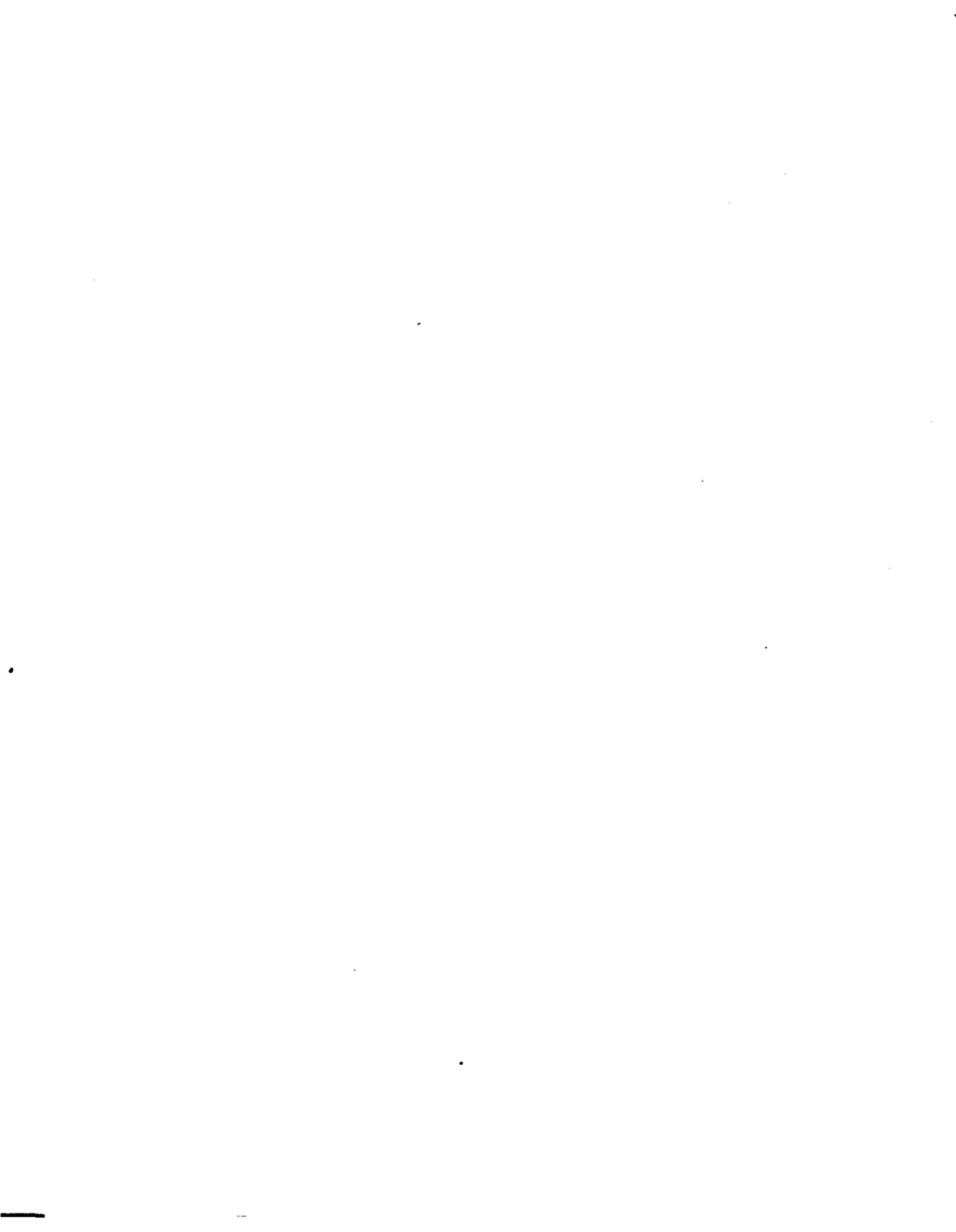
- **Mar. 4, 1999:** FCC grants Sirius’ applications for experimental radio station licenses for repeaters in Berkeley, San Leandro, Woodside, San Francisco and Brisbane, California. *Experimental Actions*, Report No. 315 (Mar. 4, 1999) at Tab 4.
- **Sept. 21, 1999:** Sirius submits application for experimental radio station construction permit for its terrestrial repeater network. Application proposes repeater power of up to 50,000 watts. A copy of this application is attached at Tab 5.
- **Oct. 14, 1999:** FCC grants Sirius a nationwide experimental license to conduct tests of its terrestrial repeater network. License authorizes repeater powers of 50,000 watts. A copy of this authorization is attached at Tab 6. Sirius begins design and propagation experiments with terrestrial repeaters in 69 cities nationwide at various power levels up to 40,000 watts.

2000

- **Jan. 18, 2000** : Sirius submits supplemental information on its proposed terrestrial repeater network. *See* Supplemental Comments of Sirius Satellite Radio, IB Docket No. 95-91 and GEN Docket No. 90-357 (Jan. 18, 2000) at Tab 7. The supplement notes that Sirius will need repeaters with powers up to 40,000 watts at approximately 105 sites in the urban cores of 46 cities. FCC issues a Public Notice seeking comment on these submissions.

2001

- **July 24, 2001**: Sirius completes its design and propagation experiments begun in October 1999. Sirius and XM file STA requests to operate terrestrial repeater networks. Both Sirius and XM include exhibits listing every location at which they propose to operate terrestrial repeaters. In its request, Sirius sought STA to operate terrestrial repeaters at power levels up to 25,000 watts. A copy of this request is attached at Tab 8.
- **Sept. 17, 2001**: FCC grants Sirius and XM STA to operate their terrestrial repeater networks. Each company is authorized to operate its terrestrial repeaters in the manner proposed in their STA requests.



MARCOR

Techworld Plaza
800 K Street, NW # 750
Washington, DC 20001-8000

Technology Analysis
Search Corporation

Tel: 202/408-0080
Fax: 202/408-0925

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44 TSS MCA 90

May 18, 1990

Ms. Donna R. Searcy
Secretary
Federal Communications Commission
1919 M Street, N.W., Suite 222
Washington, D.C. 20554

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JUN 8 1990

ATTN: Ms. Cecily C. Holiday
Chief, Satellite Radio Branch

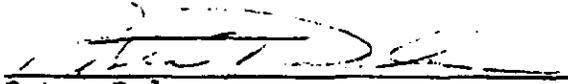
RE: Satellite Sound Broadcasting
Radio Service

Dear Ms. Searcy:

Transmitted herewith, on behalf of Satellite CD Radio, Inc., are an original and four (4) copies of a "Petition for Rulemaking" to establish and allocate frequencies for a new CD-quality radio service, and an original and nine (9) copies of applications to construct, launch, and operate a two-satellite system to provide a satellite CD-quality radio service. Also attached is a check for \$39,600.00 to cover the filing fees for these applications.

If additional information is required concerning this matter, please communicate with this office.

Very truly yours,
SATELLITE CD RADIO, INC.


Peter Dolan
President

Enclosures

Circular polarization will be used on the downlinks.

6.2 TERRESTRIAL REPEATERS. Terrestrial repeaters will be provided as an integral part of the CD Radio system. The use of repeaters ensures the availability of uncompromised, CD-quality stereo broadcasting service in heavily shadowed urban areas that would otherwise receive weak signals.

The CD Radio frequency plan is based on a reuse factor of 3. Thus, each of the satellite beams is assigned 1/3 of the total available satellite spectrum. Within each of the satellite beam areas, the remaining frequencies are available for use by the terrestrial repeaters (except in areas where the satellite beams overlap one another). In the overlap areas, only one set of the frequencies is available on a non-interfering basis. As an example, consider three blocks of frequencies. One-third of the frequencies will be assigned to each block, F1, F2, and F3. Each of the 66 program channels will be associated with a specific 300 kHz bandwidth channel in each frequency block. In each region of the country, one of the blocks will be used for the satellite transmissions and the other blocks will be used for terrestrial transmitters.

Frequencies for terrestrial transmitters must be chosen so that there is no interference from the same frequency used for a satellite channel in the adjacent beam.

In other words, if frequency block F2 is used in the Central beam, channels from block F1 could be used for terrestrial transmitters in that same Region, except in its western parts where satellite signals from the Western Beam (which also uses Block 1) can be received. Similarly, channels from Block 3 could be used for terrestrial transmitters in the Central Region, except in its Eastern portions, where signals from the Eastern Beam (which also uses Block 3) can be received.

The radiated power of the repeater will be on the order of 30 dBW to 40 dBW per stereophonic channel. The repeater site will be selected to permit the transmitting antenna to be mounted sufficiently high to provide the desired coverage. The antenna will generally be circularly polarized and have an omnidirectional pattern with 5 dBic gain. This will provide service to a vehicular receiver at distances on the order of 20 km.



EX PARTE OR LATE FILED

DOCKET FILE COPY ORIGINAL

November 14, 1997

NOV 17 1997

Rosalee Chiara, Deputy Chief
Satellite Policy Branch
Satellite & Radiocommunication Division
International Bureau
Federal Communications Commission
2000 M Street, NW
Washington, D.C. 20554

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NOV 21 1997

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Re: Terrestrial S-DARS Repeaters (Docket No. IB 95-91)

Dear Ms. Chiara:

This letter responds to a request from Commission staff to address specific issues regarding terrestrial repeaters. In particular, the staff has asked:

1. What is the estimated approximate number of terrestrial repeaters the CD Radio system will need?
2. Confirm that repeaters can be designed or configured to create "negligible" cross-border radiation in terms of interference potential.
3. What is the expected EIRP and antenna gain of a repeater?

As CD Radio has explained in its Comments and Replies in the above-captioned rulemaking, the FCC should permit blanket licensing of terrestrial repeaters used in connection with satellite DARS service, for several reasons:

- The allocation and the service itself already contemplate terrestrial stations transmitting within the authorized allocation; terrestrial repeaters normally will not exacerbate any adjacent channel interference and will ensure that consumers are not deprived of satellite DARS in difficult propagation environments.
- As CD Radio has long proposed, the terrestrial stations will be limited to repeating signals from the satellite. Thus, the terrestrial component of DARS is dependent on, and subordinate to, satellite transmissions. In particular, terrestrial stations cannot increase the service coverage area—it can only fill in weak or no-signal areas.

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CD Radio Answers to Staff Questions Regarding Terrestrial Repeaters

Page 2

- The Commission has eliminated individual licensing requirements for repeaters, boosters, and additional transmitters in a host of services—such as cellular, PCS, LMDS, and fixed microwave services—and has proposed to do the same for FM broadcast booster stations.
- Satellite DARS providers require the flexibility to respond to changing terrain and signal losses. For example, to provide reliable and high-quality service to the public CD Radio may need the ability promptly to install a repeater where new buildings have been constructed, creating blockage and shielding where there was no obstruction before.
- No purpose would be served by individual licensing. Market forces will assure that satellite DARS licensees will neither overbuild, nor underbuild terrestrial repeaters. An individual licensing requirement would result in a waste of the Commission's resources and unnecessary expense for licensees.

As a result, specific plans of satellite DARS licensees should not be of major relevance to the instant rulemaking. Indeed, given these facts, CD Radio suspects that opponents of blanket licensing—primarily terrestrial broadcasters without co- or adjacent-frequency licenses—seek DARS individual repeater licensing solely as a way of constraining satellite DARS flexibility and cost effectiveness.¹ Such a motivation—fear of marketplace competition—may be understandable, but should not persuade the FCC.

BACKGROUND

Solely for the information of the Commission staff, CD Radio herein provides a preliminary overview and estimate of its planned repeater operations. It is important to note, however, that this data may change:

- Detailed site engineering has not been completed; CD Radio is awaiting the FCC *Report and Order* so that it can comply with any regulatory requirements. Because CD Radio cannot move forward with terrestrial repeater engineering until the Commission defines the terms of licensing, CD Radio urgently requests the Commission to complete this rulemaking as quickly as possible.

¹ The latest example of such opposition is a comment filed by Mt. Wilson FM Broadcasters, Inc., late-filed on October 24, 1997. This filing offers no new information and repeats policy arguments that at bottom object to the use of terrestrial repeaters because they will make the satellite-based service more attractive to consumers.

CD Radio Answers to Staff Questions Regarding Terrestrial Repeaters

Page 3

- The number of repeaters will vary as a function of repeater antenna installation height, transmitter power and antenna directivity, which cannot be finalized absent individual site surveys.
- The number of repeaters will vary as a function of repeater network type (*i.e.*, one-way versus cellular, active versus passive, etc.).
- The number of repeaters will vary as a function of topography (*i.e.*, San Francisco and Chicago will be different).
- The number of repeaters will vary as a function of local factors such as density and heights of obstructing buildings in urban cores, foliage, tunnels, etc.

With the foregoing in mind, what follows is general information about CD Radio's planned repeater design, and then specific answers to the staff's questions.

OVERVIEW

Considerable planning effort on the requirements for terrestrial repeaters has been accomplished, although detailed engineering has not been completed. Several important factors are summarized below:

- The transmission plan is based on CDMA PCS. The transmissions from the terrestrial repeaters are similar to those from the cell transmitters to the mobile users as specified by PCS standard I-95 and generally implemented in the United States at 1.9 GHz. The S-DARS mobile subscribers use a RAKE type receiver again similar to that standard.
- Although S-DARS has a cellular design heritage, S-DARS repeaters do not need to be as closely spaced as PCS cells. In PCS systems, a two-way transmission must occur between the repeater and the mobile unit. The size of a cell in a PCS system (and, thus, the number of transmitters required) is limited by the mobile unit's low-power transmitter, typically less than 0.5 watts. In contrast, the S-DARS terrestrial repeaters are transmitting a one-way signal to the mobile unit with significantly greater power (as discussed below). Thus the range between repeater and mobile is also much greater and S-DARS does not need as many repeaters as a PCS system to serve the same area.
- CD Radio will employ three types of S-DARS terrestrial repeaters:
 1. *Active.* The transmitter of this type repeater feeds, for various sites, a variety of directive antennas, which could include an omnidirectional "pancake," a sectorial coverage, or several sectorial coverages. The transmitter power of the various

repeaters varies with the type of antenna at a particular site, with the lowest power generally being associated with a single sectorial coverage. Also, the actual transmitter output power rating is higher than the power transmitted, to maintain quasi-linearity (*i.e.*, transmitter output power backoff). Given the differences in terrain, the actual transmitter powers can be expected to vary over a wide range.

2. *Passive.* This repeater consists of a directive receive antenna (*e.g.*, one meter diameter 23 dBi on-axis gain with 10° beamwidth) pointed at one CD Radio satellite that is connected to a low directivity transmit antenna (*e.g.*, 5 dBi patch). This passive repeater configuration is useful for filling-in "dead zones" in urban areas and unique topographies (*e.g.*, very steep mountain passes in the Rocky Mountains). The configuration is very inexpensive and generally provides low interference.
3. *Tunnels.* There are long tunnels in the United States, particularly in the eastern portion. The terrestrial repeater for this situation consists of a receiver located at the open area before such a tunnel which receives the signal and amplifies it with a low power (*e.g.*, 8 watt) transmitter. The transmitter is connected to a "leaky coaxial cable" usually installed in a tunnel ceiling cable run. The coaxial cable controlled leakage to vehicles in the tunnel is accomplished by a lengthwise split in the cable's shield.

RESPONSES TO SPECIFIC QUESTIONS

The Commission's inquiries are answered below in the context of the foregoing discussion.

Number of Repeaters

- The current plan for active terrestrial repeaters is to install them in forty major cities. A total of between 100-150 active terrestrial repeaters are believed required with higher numbers in the larger more dense cities (*e.g.*, the New York City area might require as many as ten whereas Tampa would require at most one repeater).² No significant numbers of active terrestrial repeaters are believed required in rural areas due to the use of satellite spatial and time diversity.

² The number of required active terrestrial repeaters has been derived from several sources. One is the Canadian 1.5 GHz theoretical and demonstrational DAB terrestrial network adjusted for 2.3 GHz operation (see Francis Conway's paper in the *Proceedings* of the International Symposium on Digital Audio Broadcasting, Toronto, March 1994, describing a three site DAB

- The active terrestrial repeater with the pancake omnidirectional antenna is expected to provide service within a 5-7 mile radius for a dense urban core when installed at 200-300 foot heights.
- Passive terrestrial repeaters will be used to fill in "dead zones" in urban areas, cover such zones in deep western highway passes, and assist in some dense foliage areas. Six to eight hundred of these are currently planned. Each passive receiver will cover approximately a 15 mile radius in "open" areas, assuming 70-100 foot height installation.
- Tunnel terrestrial repeaters will be installed in the major East Coast tunnels. Sixteen of them are planned.

Power and Antenna Gain

- The maximum transmitter useful output power is estimated at under one kilowatt. This represents the highest expected transmitter power; there will be many cases where the topography will permit significantly lower power levels. Antenna gains will vary for the same reasons, but would generally be between 15-28 dBi. Coverage in areas with multiple active terrestrial repeaters would generally be accomplished with sectorial beam antennas.

Cross-Border Interference:

- Interference coordination with Canada and Mexico will be required to consider both satellite and terrestrial repeater emissions. CD Radio expects that the interference criterion associated with the to-be-agreed satellite power flux density would be the basis for the terrestrial repeater criterion (with appropriate adjustment for elevation angle of arrival) throughout the adjacent administrations, other than in a few portions of the immediate border areas.
- There are a few cases near the border that will require special attention and detailed coordination. These are Seattle, Detroit, and Buffalo with Canada and

(...Continued)

transmitter network in Montreal with average site separation of 53 km). A second is 1.9 GHz CDMA PCS cell design, which CD Radio adjusted for one-way operation at 2.3 GHz (using Okumura and Hata). A third is the July 1996 CEMA 1.5 GHz DAB field test in San Francisco, where the entire downtown area received good service from two terrestrial transmission facilities using transmitter powers of under 100 watts.

San Diego and El Paso with Mexico. Any active terrestrial repeaters in these cities will be configured with sectorial antennas pointed to exhibit an approximately -15 dBi antenna gain at azimuths towards the border. This gain will be further reduced where required by artificial shielding (mesh screens with peripheral chokes). The screens can be configured to provide a further 15 to 25 dB of isolation depending on installation.

- The antennas of active terrestrial repeaters will generally be downward looking from the horizon which should make tropospheric and ionospheric scattering low, particularly due to the 2.3 GHz operating frequency. There is also no appreciable rain scattering at this operating frequency.

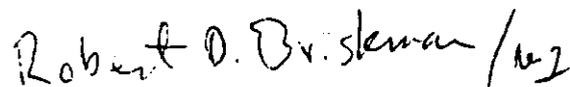
CONCLUSION

The previous technical discussion of required terrestrial facilities is based on CD Radio's design (now under construction) employing CDM with mobile receivers similar to PCS receivers using I-95 standard technology. In particular, the mobile receiver uses a 4 finger RAKE receiver and operates in an urban core area with a G/T of -22 dB/K. The RAKE receiver allows both constructive combining of significant strength multipath components and soft handoffs between the satellite and various types of terrestrial repeaters and between terrestrial repeaters themselves.

CD Radio has waited for seven years to obtain its licenses and has already paid auction fees of \$83 million. Under these circumstances, CD Radio hopes that the Commission will expedite this final rulemaking proceeding and will adopt a policy of blanket licensing for terrestrial repeaters so that CD Radio can meet its goal of serving consumers by the Fall of 1999.

Please contact the undersigned if you require further information.

Respectfully submitted,

Handwritten signature of Robert D. Briskman in black ink, with a stylized flourish at the end.

Robert D. Briskman
Chief Technical Officer

cc: Alexander Roytblat





DUPLICATE

Approved by OMB
3060-0065
Expires 9/30/98

FEDERAL COMMUNICATIONS COMMISSION

FCC FORM 442

FOR FCC USE ONLY
SEP 04 1998

APPLICATION FOR NEW OR MODIFIED RADIO STATION AUTHORIZATION UNDER PART 5 OF FCC RULES - EXPERIMENTAL RADIO SERVICE (OTHER THAN BROADCAST)

SECTION I

APPLICANT NAME (Last, first, middle initial)

Satellite CD Radio, Inc.

MAILING ADDRESS (Line 1) (Maximum 35 characters - refer to Instruction (2) on reverse of form)

2175 K Street, NW

MAILING ADDRESS (Line 2) (if required) (Maximum 35 characters)

6th Floor

CITY

Washington

STATE OR COUNTRY (if foreign address)

DC

ZIP CODE

20037

CALL SIGN OR FILE NUMBER

Enter in Column (A) the correct Fee Type Code for the service you are applying for. Fee Type Codes may be found in FCC Fee Filing Guides. Enter in Column (B) the Fee Multiple, if applicable. Enter in Column (C) the result obtained from multiplying the value of the Fee Type Code in Column (A) by the number entered in Column (B), if any.

(A)	(B)	(C)	
FEE TYPE CODE	FEE MULTIPLE (if required)	FEE DUE FOR FEE TYPE CODE IN COLUMN (A)	FOR FCC USE ONLY
(1) E A E		\$ 45.00	

SECTION II - To be used only when you are requesting concurrent actions which result in a requirement to list more than one Fee Type Code.

(A)	(B)	(C)	
FEE TYPE CODE	FEE MULTIPLE (if required)	FEE DUE FOR FEE TYPE CODE IN COLUMN (A)	FOR FCC USE ONLY
(2)		\$	
(3)		\$	
(4)		\$	
(5)		\$	
ADD ALL AMOUNTS SHOWN IN COLUMN C, LINES (1) THROUGH (5), AND ENTER THE TOTAL HERE. THIS AMOUNT SHOULD EQUAL YOUR ENCLOSED REMITTANCE.		TOTAL AMOUNT REMITTED WITH THIS APPLICATION OR FILING	FOR FCC USE ONLY
		\$ 45.00	

APPLICATION FOR NEW OR MODIFIED RADIO STATION AUTHORIZATION UNDER PART 5
OF FCC RULES - EXPERIMENTAL RADIO SERVICE (OTHER THAN BROADCAST)

<p>1. Applicant's Name and Post Office address (Street address, city, state, and ZIP Code. See instruction No. 4)</p> <p>Satellite CD Radio, Inc. 2175 K Street, NW, 6th Floor Washington, DC 20037</p>	<p style="text-align: center;">DO NOT WRITE IN THIS BLOCK</p> <p>File No. _____</p>
---	---

<p>2(a). Application for (check only one box)</p> <p><input checked="" type="checkbox"/> New station <input type="checkbox"/> Modification of existing authorization</p>	<p>2(b). For Modification indicate below:</p> <p>File No.: _____ Call Sign: _____</p>
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3. Application for Modification: Check the box beside all particulars to be modified. Check either addition or replacement to indicate whether the change is an addition or a replacement of parameters in the current authorization.

<input type="checkbox"/> FREQUENCY -	<input type="checkbox"/> EMISSION -	<input type="checkbox"/> POWER -	<input type="checkbox"/> LOCATION -
<input type="checkbox"/> addition or <input type="checkbox"/> replacement?			

OTHER PARTICULARS - addition or replacement? (Describe below or in attached EXHIBIT No. _____)

4. Particulars of Operation (see instruction below)

Frequency (MHz = MHz or MHz)	POWER			EMISSION (E)	MODULATING SIGNAL (F)	NECESSARY BANDWIDTH (kHz) (G)
	(B)	(C)	(D)			
2326.1 MHz	1000W	50,000W	MEAN	M7E	1536.1 kHz, 384.4 kHz, 142.8 kHz	1,536

- (A) List each frequency or frequency band separately. (If more space is required, attach as EXHIBIT No. _____)
- (B) Insert maximum R.F. output power at the transmitter terminals. Specify units.
- (C) Insert maximum effective radiated power from the antenna (If pulsed emission, specify peak power). Specify units.
- (D) Insert "MEAN" or "PEAK" (See definitions in Part 5).
- (E) List each type of emission separately for each frequency. (See Section 2.201 of FCC Rules.)
- (F) Insert as appropriate for the type of modulation:
 - (1) the maximum speed of keying in bauds;
 - (2) maximum audio modulating frequency;
 - (3) frequency deviation of carrier;
 - (4) pulse duration and repetition rate.
 For complex emissions, describe in detail in the space provided below.
- (G) Describe how the necessary bandwidth was determined in space provided below.

5(a). Proposed location of transmitter and transmitting antenna (check only one box to indicate type of operation):

FIXED/BASE

MOBILE

BASE AND MOBILE

5(b). If permanently located at a FIXED location, give below:

State: CA County: Contra Costa City or Town: Berkeley

Number and street (or other indication of location) (Grizzly Peak)

Grizzly Peak Blvd.

5(c). If mobile, describe the exact area of operation

Receive-only vehicular

5(b)(1). Enter geographical coordinates exact to the nearest second (see instruction 10)

5(c)(1) Enter geographical coordinates of the approximate center of mobile operation (see instruction 10)

North Latitude (DD-MM-SS)

West Longitude (DD-MM-SS)

North Latitude

West Longitude

37 52 56

122 13 58

5(d). Datum (see instruction 10): NAD 27 NAD 83

6. Is a directional antenna (other than radar) used? YES NO

If "YES", give the following information:

(a) Width of beam in degrees at the half-power point 120°

(b) Orientation in horizontal plane 160°, 280° (c) Orientation in vertical plane 0°, 0°

7. Is this authorization to be used for fulfilling the requirement of a government contract with an agency of the United States Government?

YES NO

If "YES", attach as EXHIBIT No. _____, a narrative statement describing the government project, agency and contact number.

8. Is this authorization to be used for the exclusive purpose of developing radio equipment for export to be employed by stations under the jurisdiction of a foreign government?

YES NO

If "YES", attach as EXHIBIT No. _____, the following information: Provide the contract number and the name of the foreign government concerned.

9. Is this authorization to be used for providing communications essential to a research project? (The radio communication is not the objective of the research project).

YES NO

If "YES", attach as EXHIBIT No. _____, a narrative statement providing the following information:

- (a) A description of the nature of the research project being conducted.
- (b) A showing that the communications facilities requested are necessary for the research project involved.
- (c) A showing that existing communications facilities are inadequate.

10. If all the answers to Items 7, 8, and 9, are "NO", attach as EXHIBIT No. I, a narrative statement describing in detail the following:

- (a) The complete program of research and experimentation proposed including description of equipment and theory of operation.
- (b) The specific objectives sought to be accomplished.
- (c) How the program of experimentation has a reasonable promise of contribution to the development, extension, expansion, or utilization of the radio art, or is along line not already investigated.

11 (a). Give an estimate of the length of time that will be required to complete the program of experimentation proposed in this application: 2 years

(b) If less than 2 years, give the length of time in months that the authorization requested in this application will be required:

12. Would a Commission grant of this application come within Section 1.1307 of the FCC Rules, such that it may have a significant environmental impact (see instruction 11)?

YES NO

If "YES", attach as EXHIBIT No. _____ an Environmental Assessment as required by Section 1.1311.

13. List below transmitting equipment to be installed (if experimental, so state):

MANUFACTURER: Unique Systems MODEL NUMBER: DAB2005/0-UTX NO. OF UNITS: 16

14. Is the equipment listed in Item 13 capable of station identification pursuant to Section 5.152? YES NO

15. Will the antenna extend more than 6 meters above the ground, or if mounted on an existing building, will it extend more than 6 meters above the building, or will the proposed antenna be mounted on an existing structure other than a building? YES NO

If "YES", give the following (see instruction 9):

- (a) Overall height above ground to tip of antenna is 40 meters.
- (b) Elevation of ground at antenna site above mean sea level is 385 meters.
- (c) Distance to nearest aircraft landing area is 13.6790 K to Oakland Airport kilometers.
- (d) List any natural formations of existing man-made structures (hills, trees, water tanks, towers, etc.) which, in the opinion of the applicant, would tend to shield the antenna from aircraft and thereby minimize the aeronautical hazard of the antenna.

(e) Submit as EXHIBIT No. II, a vertical profile sketch of total structure including supporting building, if any, giving heights in meters above ground for all significant features. Clearly indicate existing portion, noting particulars of aviation obstruction lighting already available.

16. Applicant is: (Check only one box)

INDIVIDUAL ASSOCIATION PARTNERSHIP CORPORATION

OTHER (describe in space provided below)

17. Is applicant a foreign government or a representative of a foreign government? YES NO

18. Has applicant or any party to this application had any FCC station license or permit revoked or had any application for permit, license or renewal denied by this Commission? YES NO

If "YES", attach as EXHIBIT No. _____, a statement giving call sign of license or permit revoked and relate circumstances.

19. Will applicant be owner and operator of the station? YES NO

20. Give name, title, and telephone number (include area code), and Internet e-mail address (if applicable) of person who can best handle inquiries pertaining to this application.

Robert D. Briskman, President, Satellite CD Radio, Inc. 202-296-6840, rbriskman@cdradio.com

21. **APPLICANT ANTI-DRUG ABUSE CERTIFICATION:**

By checking "YES", the individual applicant certifies that he or she is eligible for this license. This requires that he or she is not subject to a denial of federal benefits, including FCC benefits, as a result of a drug offense conviction pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 862. A non-individual applicant, e.g., corporation, partnership or other unincorporated association, certifies that no party to the application is subject to a denial of federal benefits, pursuant to that section. For definition of a "party" for these purposes, see 47 CFR 1.2002(b).

YES NO

22. List below all exhibits in numerical sequence and the item number of form requiring the exhibit identified.

EXHIBIT NUMBER	ITEM NO. OF FORM	EXHIBIT NUMBER	ITEM NO. OF FORM	EXHIBIT NUMBER	ITEM NO. OF FORM
I	10				
II	15(e)				

23. CERTIFICATION:

Attention: Read this certification carefully before signing this application.

THE APPLICANT CERTIFIES THAT:

- (a) Copies of FCC Rule Parts 2 and 5 are on hand; and
- (b) Adequate financial appropriations have been made to carry on the program of experimentation which will be conducted by qualified personnel; and
- (c) All operations will be on an experimental basis in accordance with Part 5 and other applicable rules, and will be conducted in such a manner and at such a time as to preclude harmful interference to any authorized station; and
- (d) Grant of the authorization requested herein will not be construed as a finding on the part of the Commission:
 - (1) that the frequencies and other technical parameters specified in the authorization are the best suited for the proposed program of experimentation, and
 - (2) that the applicant will be authorized to operate on any basis other than experimental, and
 - (3) that the Commission is obligated by the results of the experimental program to make provision in its rules including its table of frequency allocations for applicant's type of operation on a regularly licensed basis.

APPLICANT CERTIFIES FURTHER THAT:

- (e) All the statements in the application and attached exhibits are true, complete and correct to the best of the applicant's knowledge; and
- (f) The applicant is willing to finance and conduct the experimental program with full knowledge and understanding of the above limitations; and
- (g) The applicant waives any claim to the use of any particular frequency or of the electromagnetic spectrum as against the regulatory power of the USA.

Signed and dated this 4th day of September, 19 98

Name of Applicant Satellite CD Radio, Inc.
(must correspond with name given on page 1)

By Robert D. Briskman *Robert D. Briskman*
(print) (signature)

Title President

Check appropriate classification:

- Individual applicant
- Member of applicant partnership
- Authorized employee
- Office of applicant corporation or association

WILLFUL FALSE STATEMENTS MADE ON THIS FORM ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. Code, Title 18 Section 1001), AND/OR REVOCATION OF ANY STATION LICENSE OR CONSTRUCTION PERMIT (U.S. Code, Title 47, Section 312(a)(1), AND/OR FORFEITURE (U.S. Code, Title 47, Section 503).

NOTIFICATION TO INDIVIDUALS UNDER PRIVACY ACT OF 1974 AND THE PAPERWORK REDUCTION ACT OF 1980

Information requested through this form is authorized by the Communications Act of 1934, as amended, and specified by Section 308 therein. The information will be used by Federal Communications Commission staff to determine eligibility for issuing authorizations in the use of the frequency spectrum and to effect the provisions of regulatory responsibilities rendered by the Commission by the Act. Information requested by this form will be available to the public unless otherwise requested pursuant to 47 CFR 0.459 of the FCC Rules and Regulations. Your response is required to obtain this authorization.

Public reporting burden for this collection of information is estimated to average four (4) hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden to the Federal Communications Commission, Records Management Branch, Paperwork Reduction Project (3060-0065), Washington, DC 20554. DO NOT send completed applications to this address. Individuals are not required to respond to this collection unless it displays a currently valid OMB control number.

THE FOREGOING NOTICE IS REQUIRED BY THE PRIVACY ACT OF 1974, P.L. 93-579, DECEMBER 31, 1974, 5 U.S.C. 552a(e)(3), AND THE PAPERWORK REDUCTION ACT OF 1980, P.L. 96-511, DECEMBER 11, 1980, 44 U.S.C. 3507.

EXHIBIT I

By this application, Satellite CD Radio, Inc. (CD Radio), will begin testing of S-Band terrestrial repeater ground stations for its satellite Digital Audio Radio Service (DARS) system. The overall purpose of the requested experimentation is to finalize the engineering of CD Radio's terrestrial repeaters. CD Radio expects that this effort will yield significant new information about power levels required to ensure satellite DARS reception in urban "canyons" and near other obstacles, and will permit as well measurement of out-of-band emissions from such terrestrial stations.

Specifically, CD Radio plans:

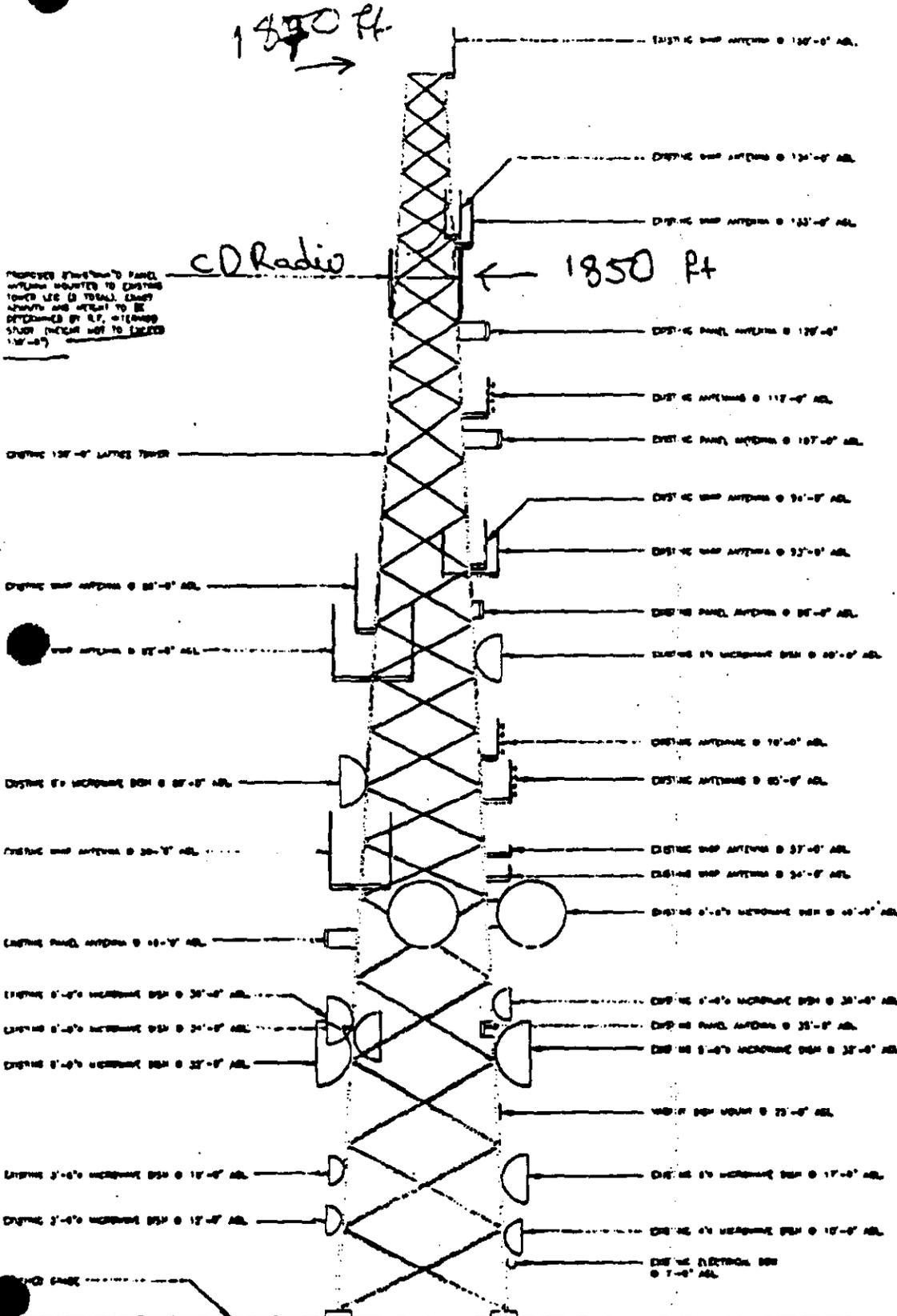
1. To measure objective (e.g., signal strength, delay speed, multipath, etc.) and subjective (e.g., music quality) transmission performance using parameter values of operational system.
 - a) Measurements at S-band in CD Radio's licensed spectrum. No confirming measurements of terrestrial transmission performance for Satellite DARS have yet been made.
 - b) Measurements in a severe urban environment. San Francisco is a particularly difficult propagation environment and, additionally, has subenvironments (e.g., hilly terrain, water boundary, treed areas, etc.)
 - c) Measurements in the projected Satellite DARS environment using transmitter sites suitable for the operational system with objective and subjective performance measured in a moving vehicle.

3. To optimize transmission parameter values particularly transmitter power and modulation.
 - a) Various power levels of the transmitters will be used with a maximum of 1000 watts

- b) Modulation optimization will be checked, especially number of subcarriers, their spacing and symbol guard time. Performance under doppler conditions will also be confirmed.
- c) Out-of-band emissions and spectral occupancy will be measured, including sidelobe regrowth due to transmitter non-linearity.

EXHIBIT II

NO AVIATION LIGHTS Grizzly Peak



AGL = 1720 Ft.

TOWER ELEVATION

1

CD Radio Inc.
 1180 Avenue of Americas, 14th Floor
 New York, NY 10038
 TEL (212) 899-8000
 FAX (212) 899-8080

CONSULTANT:
WFI
 Wireless Facilities Inc.
 San Diego Tech Center
 9725 Sacramento Road, Suite 100
 San Diego, CA 92123
 Tel: (619) 520-2988
 Fax: (619) 520-2988

PROJECT INFORMATION:
GRIZZLEY PEAK
 APN 287-010-003-7
 GRIZZLEY PEAK BLVD.
 BERKELEY, CA
 ALAMEDA COUNTY

CURRENT ISSUE DATE:
8/14/98

ISSUED FOR:
EXHIBIT "B"

REV.	DATE	DESCRIPTION	BY
1	8/14/98	ISSUED FOR EXHIBIT "B"	JM

PLANS PREPARED BY:
DELTA GROUPS ENGINEERING, INC.
 CONSULTING ENGINEERS
 2000 SHENANDOHE BLVD, SUITE 110
 PLUMMER, CA 94558
 TEL 925-468-0119 Fax 925-468-0385

DRAWN BY: **JM** CHK: **JM** APV:
 LICENSE:
 SHEET TITLE:
TOWER ELEVATION

SHEET NUMBER: **A2** REVISION: **1**
980203