

File # SAT-STA-20080429-00094

Call Sign \_\_\_\_\_ Grant Date July 1, 2008

(or other identifier)

Approved by OMB  
3060-0678

Term Dates see attached

To conditions

From \_\_\_\_\_

By \_\_\_\_\_

*Andrea I. Kelly*  
Andrea I. Kelly, Chief  
Satellite Policy Branch

Date & Time Filed: Apr 29 2008 2:43:04:576PM

File Number: SAT-STA-20080429-00094

Callsign:

\*subject to conditions

FEDERAL COMMUNICATIONS COMMISSION  
APPLICATION FOR SPACE STATION SPECIAL TEMPORARY AUTHORITY

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APPLICANT INFORMATION

Enter a description of this application to identify it on the main menu:

Request for Special Temporary Authority to Operate a Very Low Power Terrestrial Repeater in Vienna, Virginia for 180 Days

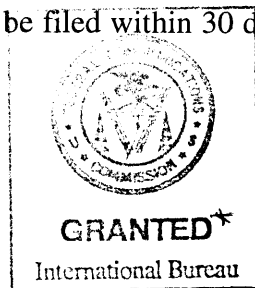
1. Applicant

<b>Name:</b>	XM Radio Inc.	<b>Phone Number:</b>	202-380-4000
<b>DBA Name:</b>		<b>Fax Number:</b>	202-380-4981
<b>Street:</b>	1500 Eckington Place, NE	<b>E-Mail:</b>	james.blitz@xmradio.com
<b>City:</b>	Washington	<b>State:</b>	DC
<b>Country:</b>	USA	<b>Zipcode:</b>	20002 -
<b>Attention:</b>	James S. Blitz		

**Application of XM Radio Inc. for Special Temporary Authority  
IBFS File No. SAT-STA-20080429-00094**

Special temporary authority (STA) is granted to XM Radio Inc. (XM Radio) to operate one indoor terrestrial repeater with an Effective Isotropically Radiated Power (EIRP) of up to 0.5 watts (average) for 180 days at a location in Vienna, Virginia, according to the technical parameters specified in Exhibits A & B of the application and subject to the following conditions:

1. Any actions taken as a result of this STA are solely at the applicant's own risk. This STA shall not prejudice the outcome of the final rules adopted by the Commission in IB Docket No. 95-91;
2. Operation of the terrestrial repeater authorized pursuant to this STA is on a non-interference basis with respect to all permanently authorized radiocommunication facilities. XM Radio shall provide the information and follow the process set forth in paragraphs 14 and 17 in 16 FCC Rcd 16773 (Int'l Bur. 2001) and 16 FCC Rcd 16781 (Int'l Bur. 2001), as modified by 16 FCC Rcd 18481 (Int'l Bur. 2001) and 16 FCC Rcd 18484 (Int'l Bur. 2001);
3. The terrestrial repeater is restricted to the simultaneous retransmission of the complete programming, and only that programming, transmitted by the satellite directly to SDARS receivers;
4. The terrestrial repeater shall comply with Part 1 of the Commission's rules, Subpart I - Procedures Implementing the National Environmental Policy Act of 1969, including the guidelines for human exposure to radio frequency electromagnetic fields as defined in Sections 1.1307(b) and 1.1310 of the Commission's rules;
5. The out-of-band emissions of the terrestrial repeater shall be limited to 75+log(EIRP) dB less than the transmitter EIRP;
6. XM Radio will maintain full ownership and operational control of the terrestrial repeater;
7. XM Radio will immediately shut down the terrestrial repeater upon a complaint of interference, upon direction from the Commission, or upon finding that the repeaters have not been properly installed;
8. This STA expires after 180 days, or on the date on which permanent rules governing repeater operations become effective, whichever occurs first;
9. XM is granted 30 days from the date of the release of this authorization to decline the authorization as conditioned. Failure to respond within that period will constitute formal acceptance of the authorization as conditioned;
10. This action is taken on delegated authority pursuant to 47 C.F.R. § 0.261 and is effective upon release. Petitions for reconsideration under 47 C.F.R. § 1.106 or applications for review under 47 C.F.R. § 1.115 may be filed within 30 days of the date of the Public Notice announcing this action.



\* subject to conditions

SAT- STA- 20080429- 00095  
Call Sign \_\_\_\_\_ Grant Date July 1, 2008  
(or other identifier)  
Term Dates  
From \_\_\_\_\_ To: see above  
Approved: Andrea I. Kelly  
Andrea I. Kelly, Chief  
Satellite Policy Branch

2. Contact	
<b>Name:</b> James S. Blitz	<b>Phone Number:</b> 202-380-4000
<b>Company:</b> XM Satellite Radio Inc.	<b>Fax Number:</b> 202-380-4981
<b>Street:</b> 1500 Eckington Place NE	<b>E-Mail:</b> james.blitz@xmradio.com
<b>City:</b> Washington	<b>State:</b> DC
<b>Country:</b> USA	<b>Zipcode:</b> 20002 -
<b>Attention:</b>	<b>Relationship:</b> Same
(If your application is related to an application filed with the Commission, enter either the file number or the IB Submission ID of the related application. Please enter only one.)	
3. Reference File Number or Submission ID	
4a. Is a fee submitted with this application?	
<input checked="" type="radio"/> If Yes, complete and attach FCC Form 159. If No, indicate reason for fee exemption (see 47 C.F.R. Section 1.1114). <input type="radio"/> Governmental Entity <input type="radio"/> Noncommercial educational licensee <input type="radio"/> Other (please explain):	
4b. Fee Classification    CRY - Space Station (Geostationary)	
5. Type Request	
<input type="radio"/> Change Station Location <input type="radio"/> Extend Expiration Date <input checked="" type="radio"/> Other	
6. Temporary Orbit Location	7. Requested Extended Expiration Date

8. Description (If the complete description does not appear in this box, please go to the end of the form to view it in its entirety.)		
<div style="border: 1px solid black; padding: 5px;"> <p>XM Radio Inc. (XM) requests Special Temporary Authority (STA) to operate one very low power terrestrial repeater (less than 2kW EIRP) at an XM office site in Vienna, Virginia for 180 days pursuant to the technical parameters listed in Exhibit A.</p> </div>		
9. By checking Yes, the undersigned certifies that neither applicant nor any other party to the application is subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Act of 1988, 21 U.S.C. Section 862, because of a conviction for possession or distribution of a controlled substance. See 47 CFR 1.2002(b) for the meaning of "party to the application"; for these purposes. <input checked="" type="radio"/> Yes <input type="radio"/> No		
10. Name of Person Signing James S. Blitz	11. Title of Person Signing Vice President, Regulatory Counsel	
12. Please supply any need attachments.		
Attachment 1: STA Request	Attachment 2:	Attachment 3:
<p><b>WILLFUL FALSE STATEMENTS MADE ON THIS FORM ARE PUNISHABLE BY FINE AND / OR IMPRISONMENT</b>  (U.S. Code, Title 18, Section 1001), AND/OR REVOCATION OF ANY STATION AUTHORIZATION  (U.S. Code, Title 47, Section 312(a)(1)), AND/OR FORFEITURE (U.S. Code, Title 47, Section 503).</p>		

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**THE FOREGOING NOTICE IS REQUIRED BY THE PAPERWORK REDUCTION ACT OF 1995, PUBLIC LAW 104-13, OCTOBER 1, 1995, 44 U.S.C. SECTION 3507.**



## **XM SATELLITE RADIO**

James S. Blitz  
Vice President, Regulatory Counsel  
XM SATELLITE RADIO  
1500 Eckington Place, NE  
Washington, DC 20002  
[jim.blitz@xmradio.com](mailto:jim.blitz@xmradio.com)  
P: 202-380-1383  
F: 202-380-4981

April 29, 2008

### **Via IBFS**

Ms. Marlene H. Dortch  
Secretary  
Federal Communications Commission  
445 12th Street, S.W.  
Washington, D.C. 20554

**Re: XM Radio Inc.  
Request for 180-Day Special Temporary Authority to Operate  
A Very Low Power Repeater in Vienna, Virginia**

Dear Ms. Dortch:

Pursuant to Section 25.120(b)(2) of the Commission's rules, 47 C.F.R. § 25.120(b)(2), XM Radio Inc. ("XM"), a licensee in the Satellite Digital Audio Radio Service ("SDARS"), hereby requests 180-Day Special Temporary Authority ("STA") to operate in its licensed frequency band (2332.5-2345 MHz) a very low power repeater (not exceeding 0.5 watts average EIRP) in Vienna, Virginia.<sup>1</sup>

Pursuant to STA granted February 5, 2008,<sup>2</sup> XM currently operates one very low power repeater at an office building located at 2650 Park Tower Drive, Vienna, VA (the "2650 Building"). With the instant application, XM seeks authority to operate a second very low power repeater on the same building, with technical parameters identical to the currently authorized repeater. XM recently relocated employees on its Listener Care team to the 2650 Building. These employees are directly involved in the resolution of subscriber complaints and need to receive a quality XM signal at their desks in order to perform their jobs of assisting XM subscribers.<sup>3</sup> After occupying this new office space for several months, XM has determined that a single repeater does not provide an adequate XM signal for all of its employees who need coverage in this building.

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<sup>1</sup> At the same time it is filing this request, XM is also filing a request to operate the same repeater under a 60-Day Special Temporary Authority pursuant to Section 25.120(b)(3) of the Commission's rules.

<sup>2</sup> See FCC Grant of File No. SAT-STA-20071219-00178, February 5, 2008.

<sup>3</sup> Given the technical parameters of this proposed repeater, it will not be capable of serving members of the general public or XM subscribers located outside of the 2650 Building.

The 2650 Building is a large one and XM occupies two entire floors and part of a third floor of the building. Due to the building's size and physical limitations, as well as limitations imposed by XM's sublease, it is impractical for XM to provide adequate service to its employees using either hard-wire connections or through other existing STA authorizations that XM holds. Rather, a second very low power repeater is the only practical solution for providing service to XM employees at the 2650 Building. Under this configuration, rather than receiving signal from a terrestrial repeater, a mini repeater (containing the receiver, transcoder and upconverter of a terrestrial repeater) located in the 2650 Building receives XM's signal directly from an XM satellite. The existing mini-repeater, which does not radiate at all, transmits the signal directly to a very low power repeater via coaxial cable. The repeater then amplifies the signal via an external amplifier and retransmits the signal via one or more omnidirectional antennas, at a power level not exceeding 0.5 watts average EIRP. The additional repeater proposed in the instant application would operate in the identical manner as XM's existing repeater.

The Commission has recognized that SDARS operators require terrestrial repeaters to provide high-quality service nationwide.<sup>4</sup> Consistent with this policy, in September 2001, the Bureau granted XM an STA to operate a nationwide network of terrestrial repeaters.<sup>5</sup> In the years since, the Bureau has granted XM additional STAs to operate its terrestrial repeaters, pending issuance of final rules governing the deployment and use of repeaters.<sup>6</sup>

*Public Interest Considerations.* Grant of the STA will serve the public interest by providing quality service to XM employees at the 2650 Building, who in turn will be able to provide better customer service assistance to XM subscribers. Moreover, the STA will promote the continued success of satellite radio because the very low power repeater will eliminate the need for hard-wire connections which in this case could cause significant physical disruption to the leased

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<sup>4</sup> See *Establishment of Rules and Policies for the Digital Audio Radio Satellite Service in the 2310-2360 MHz Frequency Band, Report and Order, Memorandum Opinion and Order, and Further Notice of Proposed Rulemaking*, 12 FCC Rcd 5754, 5770 ¶ 37 (1997).

<sup>5</sup> See *XM Radio, Inc., Application for Special Temporary Authority to Operate Satellite Digital Audio Radio Service Complimentary Terrestrial Repeaters, Order and Authorization*, 16 FCC Rcd. 16781 ¶ 18 (2001) ("XM STA Order").

<sup>6</sup> See, e.g., *XM Radio, Inc.; Request for Special Temporary Authority to Operate Additional Satellite Digital Audio Radio Service Terrestrial Repeaters, Order and Authorization*, 19 FCC Rcd. 18140 (2004) (granting XM an STA in File No. SAT-STA-20031112-00371, effective Sept. 15, 2004); *Public Notice*, 2002 FCC Lexis 5670 (rel. Oct. 30, 2002) (granting XM an STA in File No. SAT-STA-20020815-00153, effective Sept. 30, 2002); *Public Notice*, 2003 FCC Lexis 4803 (rel. Aug. 29, 2002) (granting XM an STA in File No. SAT-STA-20030409-00076, effective June 26, 2003). XM has filed applications to renew its STAs and those renewal applications remain pending before the Commission.

office space. Without this additional very low power repeater, XM cannot provide the signal quality that its listener care employees require.

*Technical Information for Very Low Power Repeater.* The following technical information pertaining to the repeater is provided in Exhibit A: (1) antenna type; (2) antenna orientation; (3) average EIRP; (4) height above ground level (“AGL”); and (5) antenna downtilt. The specification sheet for the antenna is attached as Exhibit B.

*Interference Considerations.* The very low power repeater will not cause harmful interference to other radio services. Because XM has exclusive use of its licensed band, there is no potential for in-band interference. Moreover, this repeater will operate at a power level not exceeding 0.5 watts average EIRP, which is well below the 2,000 watts EIRP threshold identified by the WCS Coalition as a potential interference concern.<sup>7</sup> Accordingly, XM does not anticipate that operation of the new repeater will cause any interference for WCS operators or any other entity. To the extent XM’s original 2001 STA requires it to coordinate with affected Wireless Communications Services (“WCS”) licensees prior to operating any repeater,<sup>8</sup> XM is sending a copy of this STA application to counsel for Horizon Wi-Com, LLC (“Horizon”) in satisfaction of this coordination requirement.<sup>9</sup> In the event that prohibited interference does occur, XM will

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<sup>7</sup> *XM STA Order* ¶ 12 (“The comments from WCS licensees express concern about blanketing interference from DARS repeaters that operate with an Equivalent Isotropically Radiated Power (EIRP) above 2 kW.”). The WCS Coalition has said that it will defer from objecting to STA requests that propose operations of no more than 2,000 watts EIRP, even if they do not specify peak or average EIRP, provided that grant of the STA (i) is conditioned on operation on a non-interference basis; and (ii) is subject to the condition that the issue of peak versus average EIRP will be addressed in the pending DARS rulemaking (IB Docket No. 95-91). See Letter from Paul J. Sinderbrand, Counsel to the WCS Coalition, to Ms. Helen Domenici, FCC, File No. SAT-STA-20061207-00145 (filed March 19, 2007). XM agrees to these conditions.

<sup>8</sup> See *XM STA Order* ¶ 14.

<sup>9</sup> Despite the Bureau’s statement in the *XM STA Order* (at ¶ 14) that it expects “WCS licensees to provide a schedule or as much advance notice as possible of when their stations are to be placed in operation,” XM has not received information directly from any WCS licensee regarding plans for WCS deployment in this market. However, XM’s own review of Commission files show that Horizon has certified that it operates a WCS station in the Washington, D.C. market, Call Sign KNLB315, File No. 0003045282 (filed May 29, 2007). It is not clear from Horizon’s certification whether its base station is receiving transmissions from CPE or whether it is engaged in transmit-only operations. If only the latter, potential interference to the Horizon base station is not an issue. In any event, XM has conducted an

Footnote continued on next page



cease operation of this facility until any such interference can be eliminated. XM's Repeater Control Center (202-380-4725) is available on a continuous basis to receive such reports of any suspected interference and take immediate corrective action.

*Ownership and Control of Repeaters.* XM will own the very low power repeater and it will be responsible for its installation and operation.

*Certifications.* XM certifies that it will operate the very low power repeater subject to the conditions and certifications set forth in the *XM STA Order* granting XM's September 2001 request for STA to operate terrestrial repeaters. Specifically, XM certifies the following:

- (1) XM will operate the very low power repeaters and signal boosters at its own risk, and such operation shall not prejudice the outcome of the final rules adopted by the Commission in GEN Docket 95-91;
- (2) XM will operate this facility on a non-interference basis with respect to all permanently authorized radiocommunication facilities;
- (3) The facility will be restricted to the simultaneous retransmission of the complete programming, and only that programming, transmitted by the satellite directly to SDARS receivers;
- (4) Where applicable, coordination of the facility will be completed with all affected Administrations prior to operation, in accordance with all applicable international agreements including those with Canada and Mexico;
- (5) The facility will comply with Part 17 of the Commission's rules – Construction, Marking, and Lighting of Antenna Structures;
- (6) The facility will comply with Part 1 of the Commission's rules, Subpart I - Procedures Implementing the National Environmental Policy Act of 1969, including the guidelines for human exposure to radio frequency electromagnetic fields as defined in Sections 1.1307(b) and 1.1310 of the Commission's rules; and
- (7) The out-of-band emissions of the facility will be limited to 75+log (EIRP) dB less than the transmitter EIRP.

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Footnote continued from previous page

interference analysis and determined that this replacement repeater site will not create interference to Horizon's operating WCS site.

Ms. Marlene H. Dortch  
April 29, 2008  
Page 5

XM intends to use input and output filters with this very low power repeater for out-of-band signal removal, to ensure compliance with the last specification above. The input band-pass filter will be used to remove Sirius-band and XM-band satellite signals. A 10 dB coupler is incorporated into the input band-pass filter for input signal monitoring purposes. In addition, an output band-pass filter will be used to remove spurious signal, Sirius-band signal, and XM-band satellite signal. A 20 dB coupler is also incorporated into the output band-pass filter for output signal monitoring. Exhibit C hereto is a block diagram showing the design of this repeater, including these two filters.

XM also plans to employ an anti-feedback mechanism to assure it will not become a broadband noise source if the coupling between the receiver and retransmit antennas is not sufficient to avoid oscillation. Upon installing this repeater, the installer will optimize the antenna placement to avoid any feedback that may create oscillation.

Granting this request will not alter XM's obligation to protect authorized radiocommunications facilities from interference, and it will not prejudice the outcome of the Commission's ongoing rulemaking pertaining to the deployment and operation of terrestrial repeaters.

XM hereby certifies that no party to this application is subject to a denial of Federal benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. § 853(a).

XM is submitting payment to the Federal Communications Commission in the amount of Seven Hundred Ninety Dollars (\$790.00) -- the filing fee applicable to requests for STAs for geostationary ("GSO") satellites.<sup>10</sup>


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<sup>10</sup> See International and Satellite Services Fee Filing Guide (October 2006).

Ms. Marlene H. Dortch  
April 29, 2008  
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Please direct any questions regarding this matter to the undersigned.

Very truly yours,



James S. Blitz

Vice President, Regulatory Counsel

cc: Stephen Duall, FCC  
Shabnam Javid, FCC  
Thomas Gutierrez, Lukas, Nace, Gutierrez & Sachs

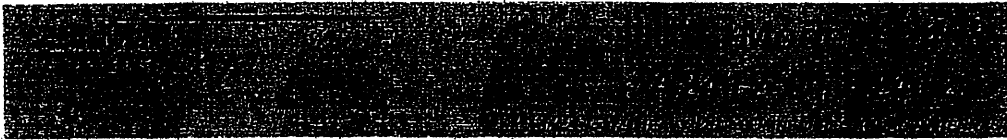
**Exhibit A**

**Technical parameters for repeater**

<b>Antenna Type</b>	<b>Antenna Beamwidth</b>	<b>EIRP Total in Watts</b>	<b>Height AGL</b>
Omni Antenna (YDI Model #2408) and External Amplifier (CPL Model #01027997-00)	300 degrees	0.5	< 50 feet

**Exhibit B**

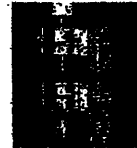
**Antenna Specification Sheet for Repeater**



- Model A2408**
- 8 dBi gain
  - Wide beamwidth (25°)
  - Low profile



- Model A2412-O**
- 12 dBi gain
  - No downtilt
  - 5° beamwidth
- Model A2412-D**
- 12 dBi gain
  - 3° downtilt
  - 5° beamwidth



**Mounting Details  
for Model A2412**

Model	A2408 (omni)	A2412-O (omni)	A2412-D (omni)
TBW Part Number	203-900009-001	203-900004-001	203-900003-001
<b>Electrical</b>			
Frequency Range:	2.400 to 2.500 GHz	2.400 to 2.485 GHz	2.400 to 2.485 GHz
Forward Gain:	8 dBi	12 dBi	12 dBi
VSWR:	< 2:1	< 2:1	< 2:1
Polarization:	Vertical	Vertical	Vertical
Beamwidth:	25 degrees	5 degrees	5 degrees with 3 degrees downtilt
<b>Mechanical</b>			
Termination:	N-type Female	N-type Female	N-type Female
Mounting:	U-Bolt bracket mount for 1-2.5 in O.D.	U-Bolt bracket mount for 1-2.5 in O.D.	U-Bolt bracket mount for 1-2.5 in O.D.
Dimensions (Diameter x Length):	1 in / 16 in	1 in / 5 ft, 5 in	1 in / 5 ft, 5 in
Weight:	2 lbs	3 lbs 8 oz	3 lbs 8 oz
Flat Panel Equivalent Area:	0.11 sq ft	0.45 sq ft	0.45 sq ft
Wind Survival:	125 mph	125 mph	125 mph
Radome:	Heavy-duty white UV inhibited fiberglass radome seal with internal copper elements		

Specifications subject to change without notice

Apr 2005-01

8000 Lee Highway, Falls Church VA 22042  
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Sales: 1-888-297-9090

www.terabeam.com

990 Almanor Avenue, Sunnyvale, CA 94085  
Tel: (408) 617-8150 Fax: (408) 617-8151  
Sales: 1-800-664-7060



SPECIFICATIONS	Cage Code	Sheet 1 of 6	Class	Size	DWG. NO.	Rev
	57982			A	01027997	6

APPLICATION		REVISIONS				
NEXT ASSEMBLY	USED ON	REV	DESCRIPTION	EO	DATE	APPR.
	S-band Gen IV	6	Engr Release	A01104	7/29/00	EAO

01027997

S-band Solid State Intermediate Power Amplifier

UNLESS OTHERWISE DIMENSIONS ARE IN INCHES	CONTRACT NUMBER		MATERIAL:
	DEC: 1PL ± .02	Dr.	SPEC. NO.
3PL ± .005	FRAC ± 1/64	Chk	FINISH:
ANG ± 1 deg	SUR	Appd	Design activity Approval
		Appd	Customer approval



SPECIFICATIONS	Cage Code	Sheet 2 of 6	Class	Size	DWG. NO.	Rev
	57982			A	01027997	6

**1.0 GENERAL DESCRIPTION**

This specification defines the performance requirements for a solid state integrated attenuator/amplifier used as a driver (intermediate power amplifier) in a klystron high power amplifier system. Unless stated otherwise, all specifications apply over the whole frequency passband.

The high power amplifier system is designed for use as the transmitter in SDARS systems (satellite digital audio radio system).

**2.0 RF PERFORMANCE**

- 2.1 Frequency Passband 2.322 to 2.343GHz
- 2.2 Power Output at -1 dB Compr. +32dBm min.
- 2.3 Third Order Intercept +42dBm
- 2.4 Noise Figure 7dB max.
- 2.5 Gain (at Rated Output) 24dB (min.)
- 2.6 Gain (Small Signal) 24dB (min), 28dB (max.)
- 2.7 Gain Variation vs Freq. 0.1dB max
- 2.8 Gain Slope vs Freq. 0.05dB/MHz max. over any 1 MHz
- 2.9 VSWR, Output 1.5:1 max.
- 2.10 VSWR, Input 1.5:1 max.
- 2.11 VSWR, Load 1.3:1 max. to meet specifications
- 2.12 AM/PM Conversion 0.5°/dB max at +25dBm
- 2.13 Spurious (relative to +25dBm in-band) -80dBc max, 2.2-2.4GHz  
-60dBc max, 2.0-2.2GHz, 2.4-18GHz
- 2.14 Harmonics (2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup>) -40 dBc max when operated at +25dBm in-band
- 2.15 Group Delay (ripple across the band) 0.5 ns pk to pk max.
- 2.16 Gain Stability vs Time • 0.1 dB max./24 hours at 20°C ± 2°C after 20 min. warmup.

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SPECIFICATIONS	Cage Code	Sheet 3 of 6	Class	Size	DWG. NO.	Rev
	57982			A	01027997	6

2.17 Gain Stability vs Temperature

Stay within 1.0 dB (total) over the operating temperature range and within 0.5 dB (total) between +25 to +50°C. Applies after 20 minutes warmup.

2.18 Stability wrt Load VSWR

The amplifier output shall be unconditionally stable up to 2:1 VSWR output loading

2.19 RF Off time wrt DC Off time

User will switch "OFF" the +15 VDC power, via solid state switch to ground, to inhibit RF output of the amplifier. RF output power level must decrease by at least 30 dB within 2.0 microseconds after removal of +15 VDC power. If this requirement cannot be met, vendor must quote cost of built-in PIN switch. Switch to be controlled by +15V signal. Separate from the switched +15VDC, ±15VDC @100mA each is available to bias the PIN switch.

3.0 DC POWER REQUIREMENTS

3.1 Power Input, for RF

+15 VDC at 1.4A max.

**NOTE:** 15 VDC supplied to SSIPA may contain transients and noise. Vendor must furnish built-in protection and/or regulators to insure isolation and regulation.

4.0 MECHANICAL

4.1 Size

See Fig. 1

4.2 RF Connectors

Type SMA Female

4.3 DC Connector

Molex 03-06-1023 2-socket receptacle on twisted pair 4" flying lead. This cheap connector is readily available from Digi-Key and other distributors.

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SPECIFICATIONS	Cage Code	Sheet 4 of 6	Class	Size	DWG. NO.	Rev
	57982			A	01027997	6

**5.0 ENVIRONMENTAL**

The amplifier shall meet specified performance under any combination of environmental conditions, listed below.

<u>CONDITION</u>	<u>OPERATIONAL</u>	<u>NON-OPERATIONAL</u>
5.1 Temperature, ambient	-10°C to +60°C	-20°C to +65°C
5.2 Altitude	10,000 feet	40,000 feet
5.3 Relative Humidity	95% non-condensing	95% non-condensing
5.4 Shock, Vibration	Benign	Transportation

**6.0 Test/Information Requirements**

Vendor will supply max baseplate temperature allowed. Vendor to supply a dimensioned drawing that also shows where on the baseplate waste power is being dissipated and where the max baseplate temperature is measured. CPI will use this information to design a suitable heatsink.

Vendor will supply a first article test report with supporting data for prototype quantity units to verify compliance to the following sections. These tests are intended to provide CPI with a level of confidence in the performance and reliability of the product.

-All specifications in Section 2.0 at +30°C. 2.7 and 2.8 should be tested at the power specified in 2.2, and at +25dBm as a minimum.

-All specifications in Section 3.0 including a description of internal protection for transients and noise.

-Section 5.1 – for operation, the metrics of performance will be Sections 2.1, 2.2, 2.5, and 2.7. Once the unit has reached thermal equilibrium at the temperature extremes, testing must last 12 hours. Maximum baseplate temperature during the test should be reported.

-Section 5.4 – either test the design, or if there is field history, provide MTBF numbers in lieu of tests.

If environmental stress screening or highly accelerated life testing has been performed on this design to prove reliability, those test results should be submitted.

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For the production order, vendor will supply a test report for each unit with the following parameters (actual data needs to be provided, a Pass/Fail checklist with no supporting data is not acceptable):

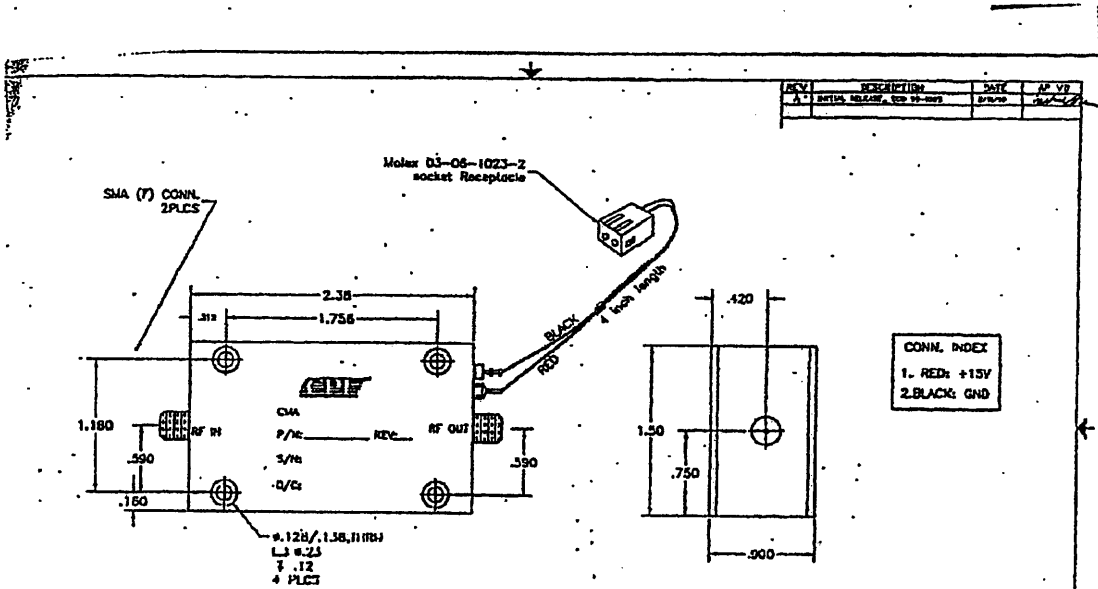
- 2.1 Frequency Passband
- 2.2 Power Output at -1 dB Compr.
- 2.3 Third Order Intercept
- 2.4 Noise Figure
- 2.5 Gain (at Rated Output)
- 2.6 Gain (Small Signal)
- 2.7 Gain Variation vs Freq.
- 2.8 Gain Slope vs Freq.
- 2.9 VSWR, Output
- 2.10 VSWR, Input
- 2.12 AM/PM Conversion
- 2.13 Spurious
- 2.14 Harmonics
- 2.15 Group Delay (ripple across the band)
- 3.1 DC Current Draw @15VDC

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	MATERIALS	N/A		DR	Huang D.	1/01/00
	FINISH	PAINT COLOR #26482		CHK		

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**Exhibit C**

**Repeater Block Diagram**

# Repeater Block Diagram

