

**LNA S-BAND, WR430, 2.2-2.4 GHZ, 56 DB  
GAIN, 30K, +14 DBM**

DRAWING NO.: 1355627

REVISION: 003

CO-184637

## 1. SCOPE

### 1.1 Description

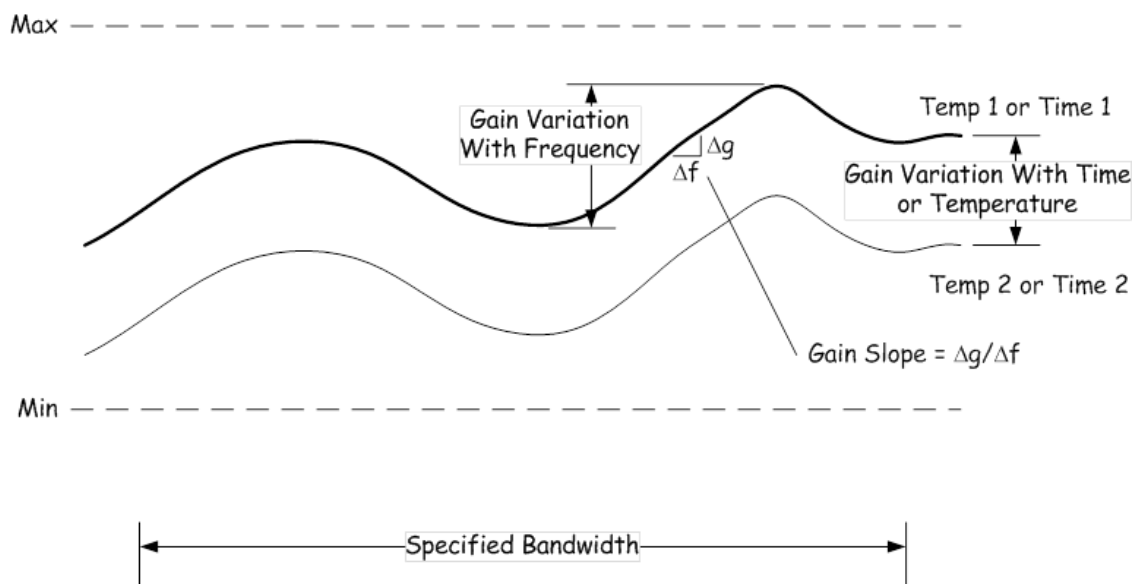
This specification details the requirements for an outdoor watertight S-band waveguide low noise amplifier (henceforth will be called Unit). The unit is designed for use in portable or fixed S-band satellite earth terminals. The noise temperature must be met with any arbitrary input/output impedance. The Unit must also be unconditionally stable with no oscillations. Detailed requirements are included in this document.

### 1.2 Abbreviations

EMI	Electromagnetic Interference
LNA	Low Noise Amplifier
MTBF	Mean Time Between Failures
RF	Radio Frequency
RFI	Radio Frequency Interference
TBD	To Be Determined
TEC	Thermo-electric cooled

### 1.3 Definitions

Figure 1-1 illustrates some of the gain specification terms used within this document.



**Figure 1-1: Gain Characteristics**

## 2. APPLICABLE DOCUMENTS

### 2.1 Applicability

The following documents, of the indicated revisions, apply to the extent specified herein or within transmitted contract purchasing flyersheets. The Statement of Work (SOW) or Purchase Order shall be considered to contain the superseding requirements in the event of a conflict with any of the documents listed.

### 2.2 CUSTOMER Documents

None

### 2.3 Military Documents

MIL-F-3922	Flanges, Waveguide, General Purpose General Specification for
MIL-C-39012	Connectors, Coaxial, Radio Frequency
MIL-F-14072	Finishes for Ground Signal Equipment
MIL-C-5541	Chemicals, Films and Film Materials for Aluminum and Aluminum Alloys
MIL-E-4158	General Requirements for Ground Electronic Equipment
MIL-STD-1686A	Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts, Assemblies, and Equipment (Excluding electrically initiated explosive devices)
MIL-STD-454	Standard General Requirements for Electronic Equipment

### 2.4 Industry Standards

AS5533	Counterfeit Electronic Parts, Avoidance, Detection, Mitigation, and Disposition
Telcordia SR-332	Reliability Prediction Procedure for Electronic Equipment
CUSTOMER PR000512	QAPP 61 Engineering Records
CUSTOMER PR000512	QAPP 62 Environmental QAPPS
IPC-610	Acceptability of Electronics Assemblies
IPC-620	Requirements and Acceptance for Cable and Wire Harness Assemblies
J-STD-001F	Requirements for Soldered Electrical and Electronics Assemblies

---

---

EU Directive 2011/65/EU (or version in effect at time of unit manufacture	On the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment
IEC 60154	Flanges for Waveguide
Regulation (EC) No 1907/2006	Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 Concerning the <b>Registration,</b> <b>Evaluation, Authorization and Restriction of Chemicals</b>
IEC 60529	Degrees of Protection Provided by Enclosures (IP Code)

### **3. REQUIREMENTS**

#### **3.1 General**

The requirements herein shall apply as follows for the Unit:

- a) Unless otherwise specified, all requirements shall apply for all environmental conditions listed in Table 3.6-1. (Note that in some cases the environmental condition is reiterated to emphasize its applicability to a given requirement. This does NOT imply that the environmental requirements are not applicable to other requirements.) Unless otherwise specified, all requirements shall be met over the life of the Unit.
- b) Unless otherwise specified, all requirements shall be met over the entire frequency band.
- c) The electrical requirements shall apply at the external interfaces of the Unit (e.g.: gain is specified from the input connector to the output connector).

#### **3.2 Functional**

The Unit shall provide the following functions, as a minimum:

The Unit shall consist of RF amplifiers and associated electronics capable of low noise amplification of RF signals. These RF signals shall be amplified across the entire frequency range in accordance with the electrical requirements specified in this document. Full compliance to these requirements shall be unaffected by the Unit's physical orientation.

#### **3.3 Electrical Requirements**

The Unit shall meet the following requirements when operated under any combination of the environmental conditions listed in Table 3.6-1.

##### **3.3.1 Frequency of Operation**

The Unit shall operate instantaneously over the following frequency band is 2.200 – 2.400 GHz.

### 3.3.2 RF Gain

The RF gain of the Unit shall be 56 dB  $\pm$  2.0 dB, minimum.

### 3.3.3 Gain Ripple

The gain ripple of the Unit shall be no more than  $\pm$  0.5 dB across the band.

### 3.3.4 Gain Stability

The gain stability of the Unit with temperature variation shall not exceed 0.5 dB per 80°F. The gain (at a constant temperature) of the Unit shall drift less than  $\pm$ 0.1 dB per minute,  $\pm$ 0.5 dB per 24 hour period, and  $\pm$ 0.5 dB per week.

### 3.3.5 Phase Stability

The phase stability of the Unit over the temperature range of 0°C to +50°C shall be  $\pm$ 5°, and  $\pm$ 10° from -40°C to 0°C. The phase (at a constant temperature) of the Unit shall drift less than  $\pm$ 0.5° per minute, less than  $\pm$ 1.5° per 24 hours, and less than  $\pm$ 3° per 6 month period across the frequency band.

### 3.3.6 1 dB Output Gain Compression

The 1 dB output gain compression of the Unit shall be no less than +14 dBm. This specification shall be met when an additional two input signals each with level of -30 dBm each with one in any frequency in the 1.7 to 2.16 GHz band and another in any frequency in the 5.725 to 6.725 GHz band. The vendor shall supply the amplifier gain and compression points for signals in the 1.7 to 2.16 GHz and 5.725 to 6.725 GHz bands. For the interference bands, the 1 dB output gain compression shall be no more than +17 dBm referenced to the output.

### 3.3.7 Noise Temperature

Table 3.3-1 Noise Temperature Specification	
2.2 to 2.4 GHz	
NT @ 23°C	NT @ 60°C
30 K	35 K

### 3.3.8 Third Order Intercept Point

The third order intercept point shall be +20 dBm minimum across the 2.2 to 2.4 GHz band. This specification shall be met when an additional two input signals with level of -30 dBm each with one in any frequency in the 1.7 to 2.16 GHz band and another in any frequency in the 5.725 to 6.725 GHz band

### **3.3.9 Radiation Susceptibility**

The radiation susceptibility at the output of the unit shall not exceed –30 dBm between 2.2 and 2.4 GHz and –70 dBm between 1.7 and 2.16 GHz or between 5.725 and 6.725 GHz when a WR430 coaxial to waveguide adapter connected to a +0 dBm RF source is used to radiate the LNA on all sides at a distance of 1 inch.

### **3.3.10 Reverse Isolation**

The reverse isolation shall be a minimum of 50 dB.

### **3.3.11 Input VSWR**

The input VSWR of the Unit shall be no more than 1.3:1 (referenced to 50 Ohms).

### **3.3.12 Output VSWR**

The output VSWR of the Unit shall be no more than 1.5:1 (referenced to 50 Ohms).

### **3.3.13 Maximum RF Input Overload**

The maximum RF input overload with no permanent damage is a minimum of +10 dBm.

### **3.3.14 Stability**

The Unit shall be unconditionally stable when connected to any input and/or output impedance.

### **3.3.15 AM-PM Conversion**

The unit AM-PM conversion shall be less than 0.05°/dB at +0 dBm output.

### **3.3.16 Intermodulation**

The intermodulation with two –80 dBm input signals 5 MHz apart present shall be  $\leq -75$  dBc.

### **3.3.17 Group Delay**

The total group delay over the receive band shall not exceed 4 ns peak to peak.

### **3.3.18 Out of Band Rejection**

An interstage filter that rejects the 1.7-2.16 GHz and 5.725-6.725 GHz bands shall be integrated with the amplifier. The filter will allow a -24 dBm input signal to be input with all other electrical specifications of this article met. The gain of the amplifier shall be a maximum of 30 dB over the 1.7-2.16 GHz and 5.725-6.725 GHz bands.

### 3.4 Prime Power

#### 3.4.1 Prime Power for Uncooled Units

The prime power for shall be +24 VDC, with a maximum current of 500 mA.

### 3.5 Mechanical Requirements

The Unit shall meet the following mechanical requirements when operated under any combination of the environmental conditions listed in Section 3.6.

#### 3.5.1 Enclosure

The Unit enclosure shall be aluminum RF sealed and weatherproof enclosures designed to handle the specified environmental conditions listed in Section 3.6. Use IEC 60529 as a reference. The Unit shall be shielded from EMI and RFI interference.

#### 3.5.2 Unit Interchangeability

The Unit shall be designed such that a Unit exchange shall require no adjustment in mounting interface and shall be accomplished with no degradation of system performance.

#### 3.5.3 RF Input / Output Connectors

- a) The input shall be a CPR430G flange per MIL-F3922 with 10 thru holes sized for ¼-20 screw fasteners
- b) The output for all part numbers shall be a hermetic (IP 68) N female connector per MIL-C-39012.

#### 3.5.4 DC Input Connectors

The electrical interface to the unit shall be a 6 pin MS connector (PT07E10-6S) as shown in Table 3.5-1.

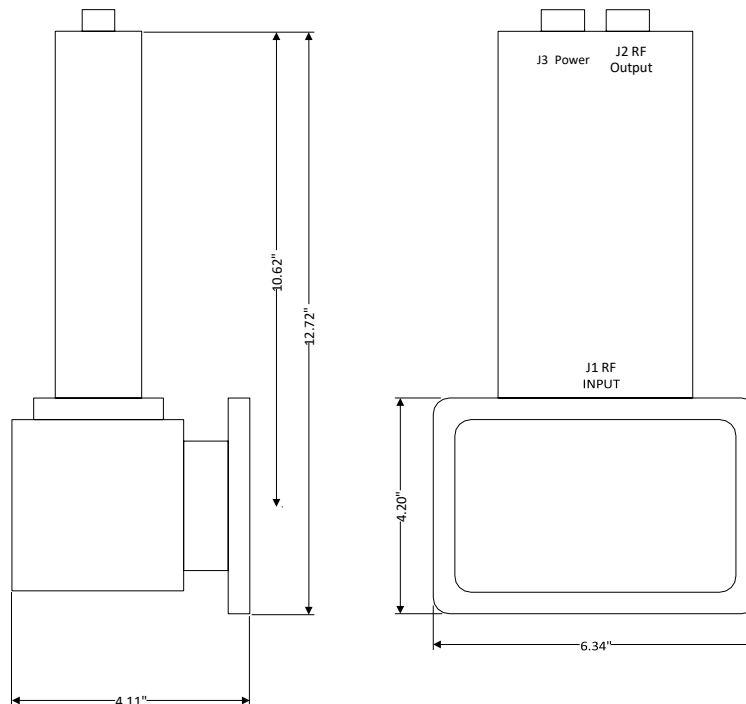
Table 3.5-1 DC Input Connector	
Connector Type	6 pin MS Connector Male
Function	Pin Assignment
Ground Return	A
+24 V DC	B
+24 V DC Return	C
Shield Return	D
Shield Return	E

### 3.5.5 Weight

The Unit shall weigh no more than 6 pounds.

### 3.5.6 Layout Dimensions

- a) The accepted layouts of the unit are shown in Figure 3-1. Any other layout must be approved by CUSTOMER .
- b) The final CAD model of the design unit shall be supplied 30 days ARO.



**Figure 3-1: Layout Dimensions**

### 3.5.7 Fabrication Requirements

- a) Material non-nutrient to fungus shall be used throughout as defined in MIL-E-4158 or proper material protection shall be applied to affected areas.
- b) Metals used in the unit construction shall be of corrosion-resistance type. Materials that rub off, or easily deteriorate shall not be used.
- c) Dissimilar metals as defined in MIL-F-14072 shall not be used in intimate contact unless suitably protected against electrolysis.

### 3.5.8 Marking and Identification

The LNA shall a minimum, include the following markings:

---



1. CUSTOMER Unit part number (in accordance with the Purchase Order)
2. CUSTOMER Unit revision number (in accordance with the Purchase Order)
3. OEM name and item model number
4. Regulatory compliance markings
5. Signal, power, and status connector designation
6. Signal input, output, or other relevant identification
7. Safety markings

### 3.5.9 ESD Prevention

- a) The supplier is required to maintain ESD controls throughout his facility suitable to preclude degradation of units delivered. MIL-STD-1686A shall be used as a guideline.
- b) If required, unit packaging material shall be conductive and/or antistatic. Shipping and intermediate containers shall be prominently marked with labels and/or markings to prevent mishandling.
- c) The Unit assembly shall not suffer from Electrostatic Discharge (ESD) damage when handled transported and mounted using reasonable precautions. The Unit assembly shall not require anti-static bags or wrist straps when handling the completed assembly.

## 3.6 Environmental Requirements

### 3.6.1 Operating Environment

Exposure of the Unit to any combination of the environmental conditions listed in Table 3.6-1 shall not degrade the performance characteristics outlined in Sections 3.3 and 3.4. For additional information, the waveguide will be pressurized will installed in the operating environment.

Table 3.6-1 Operating Environmental Conditions	
Condition	Requirement
Temperature	-40° C to +60° C
Rainfall	Up to 5.31 inches per hour (135 mm per hour)
Humidity	Up to 100% humidity including condensation
Altitude	Up to 15,000 feet above sea level
Salt Mist	Per IEC 60068-2-11 Test Ka: Salt mist

### 3.6.2 Non-Operating Environment

The Unit shall survive any combination of the following environmental conditions listed in Table 3.6-2 without degradation to subsequent performance.

Table 3.6-2 Non-Operating Environmental Conditions	
Condition	Requirement
Temperature (storage)	-50° C to +66° C
Humidity	Up to 100% humidity including condensation
Altitude	Up to 35,000 feet above sea level
Shock & Vibration	Per ISTA (International Safe Transit Association) 3B (2013) or equivalent.

### 3.6.3 Operational Life

The Unit shall have a useful life of 15 years of continuous operation, minimum.

### 3.6.4 Reliability

The mean time between failures (MTBF) of the LNA shall be at least 150,000 hours.

MTBF shall be verified by one of the following methods.

- Field failure data or failure rates of similar items.
- Calculated reliability in accordance with Telcordia SR-332 (Ground, Fixed, Controlled environment) at the maximum required operating temperature listed in Table 3.6-1.
- Calculated reliability in accordance with MIL-HDBK-217F (Ground, Fixed environment)

### 3.6.5 Finish

The unit shall be suitably protected against corrosion by RoHS compliant chromate conversion coating or base metals or painting with non-nutrient white epoxy paint. Other finish coatings must be approved by CUSTOMER .

### 3.6.6 Transportation and Storage

The Unit shall be capable of being transported by normally available common carriers (land, sea, and air) without damage or adverse effects on performance. The shipping and storage containers or packaging shall be adequate for storage in facilities normally available to commercial carriers.

## 3.7 Regulatory Compliance

### 3.7.1 RoHS Compliance

Finished part and its components shall be RoHS compliant in accordance with the applicable directive of the European Union. Exemptions that are not found in the Annex of the Directive shall not be used unless written approval from CUSTOMER is received. The seller provide a RoHS

material declaration with the Unit First Article Test Report that includes full substance disclosure of the finished part. Substance weight shall be provided in PPM (parts per million). The finished part may be subjected to RoHS testing and / or auditing. The seller must be able to provide support documentation for their material declaration within one week if requested.

### **3.7.2 WEEE Compliance**

Not required.

### **3.7.3 CE Mark**

The Unit shall be CE marked.

### **3.7.4 EU REACH**

Finished part to be REACH compliant per EU regulation 1907/2006 and shall not use ozone depleting substances per US regulatory. Material declarations for REACH (SVHC's) shall be provided and updated as needed in accordance with the requirement of PR000608. REACH SVHC declaration updates shall be forwarded to: \_

## **3.8 Counterfeit Parts / Items**

The seller shall maintain a Counterfeit Item risk mitigation process internally and with its suppliers in accordance with AS5553 as defined in PR000512.

Seller shall flow down to, and ensure compliance with Counterfeit Parts requirements to, lower tier sellers providing items for delivery to CUSTOMER .

Unless defined in a document with a higher order of precedence, the following definitions shall apply herein:

- a. "Counterfeit Item" is defined to include, but is not limited to, (i) an item that is an illegal or unauthorized copy or substitute of an Original Equipment Manufacturer ("OEM") or Original Component Manufacturer ("OCM") item; (ii) an item that does not contain the proper external or internal materials or components required by the OEM or OCM or that is not constructed in accordance with OEM or OCM design, but is represented as such; (iii) an item or component thereof that is used, refurbished or reclaimed but the Seller represents as being a new item; (iv) an item that has not successfully passed all OEM or OCM required testing, verification, screening and quality control but that Seller represents as having met or passed such requirements; or (v) an item with a label or other marking intended, or reasonably likely, to mislead a reasonable person into believing a non-OEM or OCM item is a genuine OEM or OCM item when it is not.
- b. "Authorized Distributor" is defined as a distributor with which the Original Manufacturer ("OM") has a contractual agreement to stock, repackage, sell and distribute its product lines. Authorized Distributors normally offer the product for sale with full manufacturer flow-through warranty.

Seller shall participate in the Government Industry Data Exchange Program (GIDEP) monitoring and acting on GIDEP reports which affect product delivered to the CUSTOMER . When suspect or confirmed counterfeit item(s) associated with this purchase order are discovered the seller shall issue a GIDEP report and shall ensure suspect counterfeit items are not delivered to CUSTOMER .

Seller shall immediately notify CUSTOMER with the pertinent facts if seller becomes aware or suspects that items delivered in accordance with this specification contain suspect or confirmed counterfeit items. When requested by CUSTOMER , seller shall provide OCM/OEM documentation that authenticatetraceability of the affected items to the applicable OCM/OEM. Seller shall purchase material directlyfrom OEMs or OCMs or from Authorized Distributors of OEMs or OCMs and shall obtain approval from CUSTOMER if items required to satisfy this order cannot be procured from these sources.

#### **4. PREPARATION FOR DELIVERY**

Items supplied to this specification shall be packaged in a manner that will afford adequate protection against contamination, corrosion, deterioration and physical damage. The items shall be easily accessible for removal from the protective packaging. Packaging shall be adequate for international air transportation. Unit packages and shipping containers shall be marked with contract or purchase order number, model number, manufacturer's part number, and serial number (if applicable).

#### **5. QUALITY ASSURANCE PROVISIONS**

##### **5.1 Responsibility for Verification of Performance**

Unless otherwise specified in the contract or purchase order, the supplier is responsible for all verifications specified herein. CUSTOMER reserves the right to witness supplier verifications, or to perform such verifications as deemed necessary to assure supplier conformance to the requirements of this specification. The supplier shall notify CUSTOMER at least 2 weeks prior to thebeginning of these test verifications.

Failure of the supplier to promptly correct deficiencies discovered by him, or when notified, to correct deficiencies discovered by CUSTOMER , shall be cause for return of subject items and suspensionof acceptance until remedial action has been demonstrated. Individual units that have been assigned a CUSTOMER Deviation number shall include a permanent label with the deviation number located near the unit identification.

##### **5.2 First Article Testing (FAT)**

- a. First Article testing is formal testing intended to demonstrate that the deliverable equipment will meet all performance requirements as defined in this specification in conjunction with the environmental requirements specified herein.
- b. The supplier shall perform the First Article tests listed in the RVTM (Table 5.5-1) under "FAT" column. The First Article testing will be conducted on unit(s) produced and delivered out of the production environment. It is not acceptable to conduct FAT on a prototype or engineering lab-built unit.

- c. Environmental Stress Screening (ESS) shall be performed prior to first article testing.

### **5.3 Production Acceptance Testing (PAT)**

- a. The intent of production acceptance testing is to screen component and subassembly hardware for manufacturing, processing, and assembly defects prior to shipment.
- b. The supplier shall perform the production tests listed in the RVTM (Table 5.5-1) under "PAT" column.
- c. Production testing shall be applicable to all production deliverables.
- d. All units that are repaired shall also be subjected to the same screening and test criteria.

### **5.4 Environmental Stress Screening (ESS)**

#### **5.4.1 ESS Processing**

All units shall be processed through (ESS) as part of production testing. The intent of ESS is to identify units with potential material or workmanship defects that could lead to infant failures. The test configuration shall include the ability to continuously monitor and record the unit gain. Gain max/min limits shall be established and used to determine ESS pass/fail. Multiple units may be screened at the same time. When failures are detected, the unit shall be analyzed, repaired, and re-screened until it passes without failure. The ESS testing shall consist of the following tests, as a minimum, in the following sequence:

- a) Burn-in
- b) Thermal Cycling

#### **5.4.2 ESS-Burn-In**

The unit shall undergo a forty-eight (48) hour burn-in with dc power applied at the maximum temperature stated in Table 3.6-1.

#### **5.4.3 ESS Thermal Cycling**

The unit shall undergo temperature cycling per the following sequence as a mechanical stress test only, without power applied.

1. Thermal cycle from present temperature to +66°C
2. Maintain constant temperature +66°C until thermal equilibrium is reached
3. Thermal cycle from +66°C to -50°C
4. Maintain constant temperature of -50°C until thermal equilibrium is reached.

For a thermal rate of change of 10°C / min or greater, the thermal cycle shall be repeated a total of 2 times, minimum. For a thermal rate of change of 5°C / min or less, the thermal cycle shall be repeated a total of 5 times, minimum.

Alternate thermal profiles may be utilized if approved by CUSTOMER .

## **5.5 Verification Methods**

### **5.5.1 Inspection (I)**

Verification by inspection involves examination, review of descriptive documentation, and comparison of the appropriate characteristics with a predetermined standard. This method may require moving, turning or partial disassembly of the item to accomplish verification.

### **5.5.2 Analysis (A)**

Verification by analysis shall prove that the item meets specified requirements by technical evaluation of equations, charts, graphs, circuit diagrams and representative data, or by comparison to previously evaluated/qualified equipment (qualification by similarity).

### **5.5.3 Test (T)**

Verification by test involves operation of the item and instrumenting, recording, and evaluating the resultant quantitative data. Acceptability of the item shall be determined by comparing data with pre-established quantitative requirements. Verification shall be made against the required characteristics stated in this specification. Successful completion of verification shall consist of meeting the requirements.

### **5.5.4 Certificate of Compliance (CoC)**

The vendor shall supply a certificate on compliance guaranteeing the performance of the performance specification.

<b>Table 5.5-1 Verification Matrix</b>			
<b>Paragraph</b>	<b>Requirements</b>	<b>FAT</b>	<b>PAT</b>
3	REQUIREMENTS	NA	NA
3.1	General	CoC	CoC
3.2	Functional	CoC	CoC
3.3	Electrical Requirements	CoC	CoC
3.3.1	Frequency of Operation	T	T
3.3.2	RF Gain	T	T
3.3.3	Gain Ripple	T	T
3.3.4	Gain Stability Note: 1 week stability verified by analysis	T <sup>1</sup> /A	CoC
3.3.5	Phase Stability Note: 6 month stability verified by analysis	T <sup>1</sup> /A	CoC

Table 5.5-1 Verification Matrix			
Paragraph	Requirements	FAT	PAT
3.3.6	1 dB Output Gain Compression With two interference tones (mid, low, high band)	T	CoC
3.3.6	1 dB Output Gain Compression Without interference tones	T <sup>1</sup>	T
3.3.7	Noise Temperature	T <sup>1</sup>	T
3.3.8	Third Order Intercept Point	T	T
3.3.9	Radiation Susceptibility	T	CoC
3.3.10	Reverse Isolation	T	T
3.3.11	Input VSWR	T <sup>1</sup>	T
3.3.12	Output VSWR	T <sup>1</sup>	T
3.3.13	Maximum Rf Input Overload	T	CoC
3.3.14	Stability Analysis of stability factor Tested with open, short, and 50 ohm load	A/T	CoC
3.3.15	AM-PM Conversion	T	CoC
3.3.16	Intermodulation	T	CoC
3.3.17	Group Delay	T	CoC
3.3.18	Out of Band Rejection	T	T
3.4	Prime Power	NA	NA
3.4.1	Prime Power for Uncooled Units	T	T
3.5	Mechanical Requirements	CoC	CoC
3.5.1	Enclosure	I	I
3.5.2	Unit Interchangeability	I	CoC
3.5.3	RF Input / Output Connectors	I	CoC
3.5.4	DC Input Connectors	I	CoC
3.5.5	Weight	T	CoC
3.5.6	Layout Dimensions	I	CoC
3.5.7	Fabrication Requirements	I	CoC
3.5.8	Marking and Identification	I	I

	<b>Table 5.5-1 Verification Matrix</b>		
<b>Paragraph</b>	<b>Requirements</b>	<b>FAT</b>	<b>PAT</b>
3.5.9	ESD Prevention	I	CoC
3.6	Environmental Requirements	NA	NA
3.6.1	Operating Environment	T <sup>4</sup>	CoC
	Temperature	T <sup>4</sup>	CoC
	Rainfall	T	CoC
	Humidity	T	CoC
	Altitude	A	CoC
	Salt Spray	A	CoC
3.6.2	Non-Operating Environment	T <sup>4</sup>	CoC
	Temperature	T <sup>4</sup>	CoC
	Humidity	A	CoC
	Altitude	A <sup>3</sup>	CoC
	Shock and Vibration	T	CoC
3.6.3	Operational Life	A <sup>3</sup>	CoC
3.6.4	Reliability	A <sup>3</sup>	CoC
3.6.5	Finish	I	CoC
3.6.6	Transportation and Storage	I	CoC
3.7	Regulatory Compliance	NA	NA
3.7.1	RoHS Compliance	CoC	CoC
3.7.2	WEEE Compliance	N/A	N/A
3.7.3	CE Mark	N/A	N/A
3.7.4	EU REACH	A	CoC
3.8	Counterfeit Parts / Items	CoC	CoC
4	PREPARATION FOR DELIVERY	I	I
5.4	Environmental Stress Screening (ESS)	N/A	N/A
5.4.1	ESS Processing	T	T
5.4.2	ESS-Burn-In	T	T
5.4.3	ESS Thermal Cycling	T	T



Table 5.5-1 Verification Matrix			
Paragraph	Requirements	FAT	PAT
<sup>1</sup>	Tests on each unit shall be over the operating temperature range. Testing shall be conducted after the Unit has been temperature cycled three times over the non-operating temperature range.		
<sup>2</sup>	If a Test (T) compliance method does not have a Note 1 (T <sup>1</sup> ), the testing is at room temperature only.		
<sup>3</sup>	Similarity can be used to show compliance of these requirements. Data from similar unit test / analysis shall be provided to CUSTOMER for review.		
<sup>4</sup>	<p>Environmental test shall be performed in accordance with the following procedures unless similar items have been previous tested:</p> <ul style="list-style-type: none"> <li>a. Temperature (Operating): Testing of identified electrical requirements in note 1 is sufficient for compliance.</li> <li>b. Temperature (Non-operating): Perform temperature cycles in accordance with Section 5.4.3 using non-operating temperature range, Unit unpowered, minimum 7 cycles.</li> <li>c. Humidity: MIL-STD-810G, Method 507.5, Procedure II, 10 cycles, test after 5th and 10<sup>th</sup> cycles.</li> <li>d. Rain: MIL-STD-810G, Method 506.5, Procedure I, rain rate of 135mm/hr</li> <li>e. Salt Mist: IEC 60068-2-11, 48 hrs. An unpopulated enclosure can be used for this test. The enclosure shall have all connectors required for deliverable units.</li> <li>f. Altitude (Operating): MIL-STD-810G, Method 500.5, Procedure II (Operation), altitude of 15,000 ft, Temperature</li> <li>g. Altitude (Non-Operating): MIL-STD-810G, Method 500.5, Procedure I (Storage) with cabin altitude of 35,000 ft and Procedure III (Rapid Decompression) with initial cabin altitude of 8,000 ft and final cabin altitude of 35,000 ft,</li> <li>h. Shock and Vibration: Per ISTA (International Safe Transit Association) 3B (2013) or equivalent.</li> </ul> <p>If similarity is used to verify compliance to testable requirement then test data from the similar item shall be provided.</p>		

## 6. Approved Source(s) of Supply

Identification of the approved source(s) herein is not to be construed as a guarantee of present or continued availability as a source of supply for the items described in the Control Drawing.

Table 6-1. Approved Source(s) for Supply						
CUSTOMER PN	Re vis io n	Qualified Source	Seller Part Number	Seller Part Revision	Seller Drawing Number	Seller Drawing Revision
1355627	00 1	TBD	TBD	TBD	TBD	TBD

Only items described in this document are approved for use in the applications specified herein. A substitute item shall not be used without prior approval by the qualifying activity.