ANNEXURE-I

QA REQUIREMENTS

No.	Specifications	Details	Compliance
1	Quality specifications	1. Vendor should be on QPL 55310 or should be qualified by ISRO for Crystal Oscillator.	
		2. The devices shall be MIL-PRF-55310 qualified to product level S requirements or MIL-PRF-55310 product level S equivalent or manufacturer's equivalent space grade flow.	
		3. The ceramic Capacitors used shall meet the requirement of MIL-PRF-123.	
		4. All the individual components used in the device shall meet the requirement of 100 K Rad Total Ionization Dose (TID) and shall be SEE immune to LET of 80 MeV/mg/cm2.	
		5. Elemental evaluation shall be performed as per Appendix B, Class 2, Para B.3.3 of MIL-PRF-55310.	
		6. All the devices shall be serialized and subjected to the following tests as per MIL-PRF-55310.	
		a. The devices shall undergo Screening (100 %) as per Annexure -III, TABLE – III of MIL-PRF-55310 (reproduced in Annexure – II, TABLE-I)	
		b. Group A, testing as per TABLE – V of MIL-PRF-55310 Class S requirement. (reproduced in Annexure – II, TABLE-II)	
		c. Group B frequency aging test as per para 3.6.34 of MIL-PRF-55310 on 100 % devices for 30 days as per Class S requirements	
		d. Group C test as per Annexure -II, TABLE-III	
		e. Life Test: 2 units shall undergo Steady state operating life test at maximum operating temperature for 1000 Hours.	
		f. Items 1.6.d and 1.6.e above shall be quoted individually. Vendor shall provide generic qualification data/ latest QCI data for this frequency or similar frequency. Depending on the generic data, SAC shall decide about the necessity of this test and number of samples.	
		7. The devices shall be hermetically sealed.	
		8. Manufacturer shall generate the Source Control Drawing including design, material, process control, electrical specifications, etc. similar to 55310 and submit to SAC for review/approval before start of production.	
2	Information required along with the quote	1. The vendor(s) authorized by original part manufacturer to source and sell parts in INDIA shall only be considered. Latest copy of authorization letter and point by point compliance endorsed by the Original Part Manufacturer in case quote is not from OEM.	
		2. SMD data sheet or equivalent as per MIL-PRF-55310 if available.	
		3. Manufacturer's qualification details and certificate.	

		4. If the manufacturer is qualified by ISRO, the complete Qualification report, and compliance, as to how the qualified device meets the present requirements.	
		5. Space heritage for the device.	
		6. Manufacturer's space grade flow.	
		7. TID and SEE specifications for Active component used in the device.	
		8. Generic Group C and life test results if available.	
		9. Proposed quality and elemental evaluation details for components used in the device.	
		10. Burn In and Life test circuit, including Test Duration, Test condition, Test Temperature, inputs, outputs, biases, Power dissipation etc.	
		11. Generic Radiation test results for TID, SEL and SEU for the device if available.	
		12. ***If supplier is HI-REL Parts Procurement Agency (HRPPA) OR Representative of HRPPA, in addition to all the quality requirement of this Indent compliance with the supporting documents/certificates for the following shall be provided along with the quote-***: • It is mandatory that the vendor should have more than 5 years of experience as HRPPA. Details regarding the same to be supplied. • Details of EEE part types supplied to other customers with name of space programs supported and Space agencies / Satellite payload manufacturers. • Supplied parts shall meet Manufacturer recommended storage & cleanliness condition. • Outline of the Vendor's operating procedure, for compliance to quality requirements of this document; including details of mechanism for traceability starting from Original Parts Manufacturer till delivery to SAC. • Details of Quality documents that will be supplied along with deliverables. • For off-the-shelf / inventory parts: ▪ Date-code of supplied parts ▪ Storage and inspection criteria to be supplied whenever applicable. ▪ Technical and Quality Procurement specifications. • Acceptability of such off-the-shelf parts will be at decided by SAC based on date code and the relifing details.	
		13. Devices shall be supplied preferably from single lot date code and preferably not older than 2 years. Acceptability of older parts shall be decided by SAC; In such case: **A.** If the components are offered from existing stock, then vendor shall share the test data and date code details of the devices.	

		B. Depending on the date code, rescreening shall be carried out before the delivery of the devices.	
3	Documents required along with the supply of Components	1. Certificate of Conformance from manufacturer	
		2. Screening, Group A, Group B, test data.	
		Optional Data pack:	
		1. Elemental evaluation test data.	
		2. Group C test data on lot specific samples	
		3. Life test report	
		4. Derating and Stress data	
		5. Failure rate analysis data	
		The data shall be supplied in soft copy only.	
4	Additional requirements	1. Each device shall be packed in ESD safe package.	
		2. Devices shall be supplied preferably; from a single lot date code and preferably shall not be older than 2 years.	
PLEASE PROVIDE POINT-TO-POINT COMPLIANCE TO THIS REQUIREMENT PROVIDING NECESSARY SUPPORTING DOCUMENTS ALONGWITH THE QUOTE.			

ANNEXURE – II

TABLE - I

MIL-PRF-55310 TABLE III. Screening (100 percent) for class 2 oscillators.

Test inspection	MIL STD 883 method-condition	Remarks
Nondestructive bond pull	Method 2023	
Internal visual	Method 2017	Class level S
Stabilization bake (prior to seal)	Method 1008, condition C	(+150ºC), 48 hours minimum
Thermal shock	Method 1011, condition A	
Temperature cycling	Method 1010, condition C	10 Cycles
Constant acceleration	Method 2001, condition A, Y_1 only	5000 g's
Seal (fine)		
Seal (gross leak)	Method 1014, condition C	
Particle impact noise detection (PIND)	Method 2020	
Electrical test:	As per Specifications	Measure all the parameters.
Burn-in (load)	Method 1015	+125ºC, nominal supply voltage and burn-in load, 240 hours minimum
Electrical test:	Nominal and extreme supply voltages, specified load, +25ºC and temperature extremes, record all test parameters by serial number.	Measure all the parameters.
Radiographic	Method 2012	

TABLE - II

TABLE V. Group A inspection (for product level S only).

Inspection	Requirement paragraph	Sampling Size
Electricals	As specified @ 25°C, minimum and maximum temperature, including Frequency – Temperature stability tolerance over the operating temperature range @ 10°C intervals.	100 %
External Visual Inspection	MIL-STD-883 Method 2009	100 %
Solderability	MIL-STD-202 Method 208	As per para 4.7.1.4.5 of MIL-PRF-55310

TABLE III. Group C inspection. (4 Samples)

Test Inspection	Standard	Method & Condition	Sample Size
Subgroup -1			**4 Samples**
Vibration (Sinusoidal)	202	204 Cond D	
Shock (non-operating)	202	213 Cond I	
Acceleration (non-operating)	202	212 Cond B	
Subgroup -2			**2 Samples**
Thermal shock	202	107 Cond B	
Storage temperature		@ Min & max operating temp, 24 Hrs dwell time.	
Subgroup -3			**1 Sample**
Steady State Humidity	202	103 A	
Subgroup -4			**1 Sample**
Terminal strength (lead integrity)	Para 3.6.51 & 4.8.52 MIL-PRF-55310		
Resistance to solvents	202	215	