|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Traveler Title | C100R Cryomodule Acceptance Testing | | | |
| Traveler Abstract | C100R cryomodule acceptance testing. This traveler covers cool down, low power and high power testing and the warm up | | | |
| Traveler ID | C100R-CMTF-CM-ACTS | | | |
| Traveler Revision | R4 | | | |
| Traveler Author | M. Drury | | | |
| Traveler Date | 17-Mar-23 | | | |
| NCR Informative Emails | areilly,michaelm | | | |
| NCR Dispositioners | areilly,drury,ganey | | | |
| D3 Emails | areilly,drury,michaelm,ganey | | | |
| Approval Names | M. Drury | M. McCaughan | M. Drury | A. Reilly |
| Approval Signatures |  |  |  |  |
| Approval Dates |  |  |  |  |
| Approval Title | Author | Reviewer | Reviewer | Project Manager |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| References | List and Hyperlink all documents related to this traveler. This includes, but is not limited to: safety (THAs, SOPs, etc), drawings, procedures, and facility related documents. | | | |
|  | [SRF-22-131703-OSP](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-263242/CMTF%20OSP%202022%20revision_131703.pdf) |  |  |  |

|  |  |
| --- | --- |
| Revision Note |  |
| R1 | Initial release of this Traveler |
| R2 | Replacing old and missing Acceptance traveler |
| R3 | Correcting errors in previous revision |
| R4 | Step 13 clarifies setting and checking the LVDT, vice performing a calibration.  Step 30 clarifies measurement of RF cable offsets, vice performing a calibration.  Step 30 & 41 specifically require the use of Critical MTE and the recording of serial numbers and cal due dates. |

|  |  |  |
| --- | --- | --- |
| Step No. | Instructions | Data Input |
| 1 | Record the Cryomodule serial number. | [[CMSN]] <<CMSN>> |
| 2 | Record the Cavity SN's for each cavity position. (Note: Cavity 1-Supply side, Cavity 8-Return side) | [[CAVSN1]] <<CAVSN>>  [[CAVSN2]] <<CAVSN>>  [[CAVSN3]] <<CAVSN>>  [[CAVSN4]] <<CAVSN>>  [[CAVSN5]] <<CAVSN>>  [[CAVSN6]] <<CAVSN>>  [[CAVSN7]] <<CAVSN>>  [[CAVSN8]] <<CAVSN>> |
| 3 | Verify that the ground cable is connected to the cryomodule. | [[GroundCableInspector]] <<SRF>>  [[GroundCableTime]] <<TIMESTAMP>>  [[GroundCableVerified]] (Yes) <<CHECKBOX>> |
| 4 | Verify that the Insulating Vacuum gauge is connected to data acquisition and the correct readout is available in the Control Room. Record the Insulating Vacuum pressure (in torr). | [[WarmInsVacInspector]] <<SRF>>  [[WarmInsVacTime]] <<TIMESTAMP>>  [[WarmInsVacPressure]] <<SCINOT>> (torr) |
| 5 | Verify that the Beamline ion pump is connected to data acquisition and the correct readout is available in the Control Room. Record the Beamline Vacuum pressure (in torr). | [[WarmBLVacInspector]] <<SRF>>  [[WarmBLVacTime]] <<TIMESTAMP>>  [[WarmBLVacPressure]] <<SCINOT>> (torr) |
| 6 | Verify that the Waveguide Vacuum ion pumps are connected to data acquisition and that the correct readouts are available in the Control Room. Record the Waveguide Vacuum pressures (in torr). | [[WarmWGVacInspector]] <<SRF>>  [[WarmWGVacTime]] <<TIMESTAMP>>  [[WarmWG1VacPressure]] <<SCINOT>> (torr)  [[WarmWG2VacPressure]] <<SCINOT>> (torr)  [[WarmWG3VacPressure]] <<SCINOT>> (torr)  [[WarmWG4VacPressure]] <<SCINOT>> (torr)  [[WarmWG5VacPressure]] <<SCINOT>> (torr)  [[WarmWG6VacPressure]] <<SCINOT>> (torr)  [[WarmWG7VacPressure]] <<SCINOT>> (torr)  [[WarmWG8VacPressure]] <<SCINOT>> (torr) |
| 7 | List any problems involving vacuum pumps or vacuum instrumentation. | [[VacuumProblems]] <<COMMENT>> |

|  |  |  |
| --- | --- | --- |
| **Step No** | **Instructions** | **Data Inputs** |
| 8 | Verify that the Cavity Diodes are connected to data acquisition and that the correct read outs are available in the Control Room. List any diodes, by epics PV and physical location, that do not read correctly in comment block. | [[CavityDiodeInspector]] <<SRF>>  [[CavityDiodeTime]] <<TIMESTAMP>>  [[CavityDiodesVerified]] <<YESNO>>  [[DeadCavityDiodeList]] <<COMMENT>> |
| 9 | Verify that End Can Diodes are connected to data acquisition and the correct readouts are available in Control Room. List any diodes, by epics PV and physical location, that do not read correctly in comment block. | [[EndCanDiodeInspector]] <<SRF>>  [[EndCanDiodeTime]] <<TIMESTAMP>>  [[SupplyEndCanDiodesVerified]] <<YESNO>>  [[ReturnEndCanDiodesVerified]] <<YESNO>>  [[DeadEndCanDiodeList]] <<COMMENT>> |
| 10 | Verify that Liquid Level Sensors on both Supply and Return end cans are connected to data acquisition and the correct readouts are available in the Control Room. Note any problems in the Comment block. | [[LiqLevelProbeInspector]] <<SRF>>  [[LiqLevelProbeTime]] <<TIMESTAMP>>  [[SupplyLiqLevelProbeVerified]] <<YESNO>>  [[ReturnLiqLevelProbeVerified]] <<YESNO>> |
| 11 | Verify that Pressure Transducers (50 torr, 100 torr and 5000 torr) are connected to data acquisition and the correct readouts are available in the Control Room. Note any problems in the Comment block. | [[PressureTransducerInspector]] <<SRF>>  [[PressureTransducerTime]] <<TIMESTAMP>>  [[TransducerVerified50TorrPress]] <<YESNO>>  [[TransducerVerified100TorrPress]] <<YESNO>>  [[TransducerVerified5KTorrPress]] <<YESNO>> |
| 12 | Verify that all Heaters are connected and operational. List any problems in the Comment block. (This inspection should be completed after liquid Helium level reaches 20%.) | [[CryoHeaterInspector]] <<SRF>>  [[CryoHeaterInspectorTime]] <<TIMESTAMP>>  [[CryoHeaterInspectorVerified]] <<YESNO>> |
| 13 | Verify that JT valve actuator is installed and set up properly. Verify that the LVDT position is correctly set and reading back through the epics control system. List JT valve readings that correspond to completely closed and fully opened. | [[JTValveInspector]] <<SRF>>  [[JTValveTime]] <<TIMESTAMP>>  [[JTValveInformation]] <<COMMENT>> |
| 14 | List any problems involving the process instrumentation and controls listed in steps 8 -12 above. | [[ProcessInstrProblems]] <<COMMENT>> |

|  |  |  |
| --- | --- | --- |
| **Step No** | **Instructions** | **Data Inputs** |
| 15 | Verify that all Arc Detector assemblies are installed and are connected to power and interlock controls. | [[ArcDetectorInstaller]] <<SRF>>  [[ArcDetectorInstTime]] <<TIMESTAMP>>  [[ArcDetectorsVerified]] <<YESNO>>  [[DeadArcDetectorList]] <<COMMENT>> |
| 16 | Verify that all IR Detectors are connected to data acquisition and the correct readouts are available in the Control Room. List any problems in the comment block. | [[IRDetectorInspector]] <<SRF>>  [[IRDetectorTime]] <<TIMESTAMP>>  [[IRDetectorsVerified]] <<YESNO>>  [[DeadIRDetectorList]] <<COMMENT>> |
| 17 | Verify that the Stepper Motors and Limit Switches are connected. | [[StepperInspector]] <<SRF>>  [[StepperTime]] <<TIMESTAMP>>  [[StepperVerified]] <<YESNO>> |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Step No** | **Instructions** | | | | **Data Inputs** | | |
| 18 | Record cavity warm frequencies (in MHz) in table below. | | | | [[WarmFreqOperator]] <<SRF>> | | |
| **Cavity Number** | **1/7 Pi** | **2/7 Pi** | **3/7 Pi** | **4/7 Pi** | **5/7 Pi** | **6/7 Pi** | **Pi** |
| **1** | [[Cav1Warm17Pi]] <<FLOAT>> | [[Cav1Warm27Pi]] <<FLOAT>> | [[Cav1Warm37Pi]] <<FLOAT>> | [[Cav1Warm47Pi]] <<FLOAT>> | [[Cav1Warm57Pi]] <<FLOAT>> | [[Cav1Warm67Pi]] <<FLOAT>> | [[Cav1WarmPi]] <<FLOAT>> |
| **2** | [[Cav2Warm17Pi]] <<FLOAT>> | [[Cav2Warm27Pi]] <<FLOAT>> | [[Cav2Warm37Pi]] <<FLOAT>> | [[Cav2Warm47Pi]] <<FLOAT>> | [[Cav2Warm57Pi]] <<FLOAT>> | [[Cav2Warm67Pi]] <<FLOAT>> | [[Cav2WarmPi]] <<FLOAT>> |
| **3** | [[Cav3Warm17Pi]] <<FLOAT>> | [[Cav3Warm27Pi]] <<FLOAT>> | [[Cav3Warm37Pi]] <<FLOAT>> | [[Cav3Warm47Pi]] <<FLOAT>> | [[Cav3Warm57Pi]] <<FLOAT>> | [[Cav3Warm67Pi]] <<FLOAT>> | [[Cav3WarmPi]] <<FLOAT>> |
| **4** | [[Cav4Warm17Pi]] <<FLOAT>> | [[Cav4Warm27Pi]] <<FLOAT>> | [[Cav4Warm37Pi]] <<FLOAT>> | [[Cav4Warm47Pi]] <<FLOAT>> | [[Cav4Warm57Pi]] <<FLOAT>> | [[Cav4Warm67Pi]] <<FLOAT>> | [[Cav4WarmPi]] <<FLOAT>> |
| **5** | [[Cav5Warm17Pi]] <<FLOAT>> | [[Cav5Warm27Pi]] <<FLOAT>> | [[Cav5Warm37Pi]] <<FLOAT>> | [[Cav5Warm47Pi]] <<FLOAT>> | [[Cav5Warm57Pi]] <<FLOAT>> | [[Cav5Warm67Pi]] <<FLOAT>> | [[Cav5WarmPi]] <<FLOAT>> |
| **6** | [[Cav6Warm17Pi]] <<FLOAT>> | [[Cav6Warm27Pi]] <<FLOAT>> | [[Cav6Warm37Pi]] <<FLOAT>> | [[Cav6Warm47Pi]] <<FLOAT>> | [[Cav6Warm57Pi]] <<FLOAT>> | [[Cav6Warm67Pi]] <<FLOAT>> | [[Cav6WarmPi]] <<FLOAT>> |
| **7** | [[Cav7Warm17Pi]] <<FLOAT>> | [[Cav7Warm27Pi]] <<FLOAT>> | [[Cav7Warm37Pi]] <<FLOAT>> | [[Cav7Warm47Pi]] <<FLOAT>> | [[Cav7Warm57Pi]] <<FLOAT>> | [[Cav7Warm67Pi]] <<FLOAT>> | [[Cav7WarmPi]] <<FLOAT>> |
| **8** | [[Cav8Warm17Pi]] <<FLOAT>> | [[Cav8Warm27Pi]] <<FLOAT>> | [[Cav8Warm37Pi]] <<FLOAT>> | [[Cav8Warm47Pi]] <<FLOAT>> | [[Cav8Warm57Pi]] <<FLOAT>> | [[Cav8Warm67Pi]] <<FLOAT>> | [[Cav8WarmPi]] <<FLOAT>> |

|  |  |  |
| --- | --- | --- |
| **Cool Down Section** | | |
| 19 | Verify that U-tube installation is complete. List any problems in the comment block. | [[UTubeInstallTech]] <<SRF>>  [[UTubeInstallTime]] <<TIMESTAMP>>  [[UTubeInstallComments]] <<COMMENT>> |
| 20 | Verify that all U-Tube Diodes are connected to data acquisition and the correct readouts are available in the Control Room. List any diodes, by epics PV and physical location, that do not read correctly in comment block. | [[UTubeDiodeInspector]] <<SRF>> |
| 21 | Return U-tube pneumatic valve:   * Verify that air-line is connected. * Verify that purge line is connected. * Verify that valve is bagged. * Verify that solenoid switch in control room is in open position. * Verify that pressure bleed valve on cave wall is open. * Verify operation of the valve.   List any problems in the Comment block. | [[RTValveTech]] <<SRF>>  [[RTValveTime]] <<TIMESTAMP>>  [[RTVerificationComplete]] <<CHECKBOX>>  [[RTValveProblems]] <<COMMENT>> |
| 22 | Install guard vacuum on circle seal and sub-atmospheric U-tube. | [[GuardVacInstTech]] <<SRF>>  [[GuardVacInstTime]] <<TIMESTAMP>>  [[GuardVacInstProblems]] <<COMMENT>> |

|  |  |  |
| --- | --- | --- |
| **Step No** | **Instructions** | **Data Inputs** |
| 23 | Record date and time of cool down start. | [[CoolDownOperator]] <<SRF>>  [[CoolDownStartTime]] <<TIMESTAMP>> |
| 24 | Record date and time at which cool down to 4 K was completed. Reference cavity cool down diodes at either end of the cryomodule to determine time. | [[CoolDownOperator4k]] <<SRF>>  [[CoolDown4KTime]] <<TIMESTAMP>> |
| 25 | Record date and time at which pump-down to 2 K was initiated.  Record time at which 2K fill is complete. (Defined as the time the liquid level measured at return end of the cryomodule reaches the set point.) | [[PumpDownOperator3]] <<SRF>>  [[PumpDownStartTime]] <<TIMESTAMP>>  [[LiqLvlFillCompleteTime]] <<TIMESTAMP>> |
| 26 | Verify that the guard vacuum is being actively pumped. | [[GuardVacVerifyTech]] <<SRF>>  [[GuardVacVerifyTime]] <<TIMESTAMP>> |
| 27 | Note any problems associated with the cool down or the pump down and fill. | [[CMCoolDownProblems]] <<COMMENT>> |
| 28 | Upload logfiles generated by Labview. Logfiles should cover the entire period from start of cool down to end of pump down and fill | [[CMCoolDownFiles]] <<FILEUPLOAD>> |

|  |  |  |
| --- | --- | --- |
| **Step No** | **Instructions** | **Data Inputs** |
| 29 | Begin the **Integrated Insulating Vacuum Leak Check**:  Isolate the insulating vacuum from the pumping station after the pump down and fill are complete and the cryomodule primary pressure and liquid level are stable. Monitor the insulating vacuum pressure for at least 1 week. Record start, time, completion time and the vacuum pressure (in torr) at start and finish. | [[InsVacLeakTech1]] <<SRF>>  [[InsVacLeakCheckStartTime]] <<TIMESTAMP>>  [[InsVacLeakCheckStartPressure]] <<SCINOT>>  [[InsVacLeakTech2]] <<SRF>>  [[InsVacLeakCheckEndTime]] <<TIMESTAMP>>  [[InsVacLeakCheckEndPressure]] <<SCINOT>> |

|  |  |  |
| --- | --- | --- |
| **High Power Checkout** | | |
| **Step No** | **Instructions** | **Data Inputs** |
| 30 | Complete the RF Cable Offset Measurements for the cryomodule under test.  THIS IS A CRITICAL MEASUREMENT.  Use of CRITICAL MTE is required.  Record F-tag (or serial No.) and Cal DUE date for:  a. Critical MTE Pulsed RF Power Meter (FWD)  b. Critical MTE Pulsed RF Power Meter (REFL & TRAN)  c. Critical MTE Pulsed RF Power Meter (REFL & TRAN)  d. Critical MTE Pulsed RF Power Sensor (FWD)  e. Critical MTE Pulsed RF Power Sensor (REFL)  f. Critical MTE Pulsed RF Power Sensor (TRAN)  g. Critical MTE Pulsed RF Power Sensor (HomA)  h. Critical MTE Pulsed RF Power Sensor (HomB)  Upload the completed spreadsheet. | [[RFCableCalTech]] <<SRF>>  [[RFCableCalTime]] <<TIMESTAMP>>  [[RFCableCalWorksheet]] <<FILEUPLOAD>>  [[RFCableCalComment]] <<COMMENT>>  [[CableCritMeterFwdSN]] <<SN>>  [[CableCritMeterFwdDueDate]] <<TIMESTAMP>>  [[CableCritMeterRefTranSN]] <<SN>>  [[CableCritMeterRefTranDueDate]] <<TIMESTAMP>>  [[CableCritMeterHomSN]] <<SN>>  [[CableCritMeterHomDueDate]] <<TIMESTAMP>>  [[CableCritSensorFwdSN]] <<SN>>  [[CableCritSensorFwdDueDate]] <<TIMESTAMP>>  [[CableCritSensorReflSN]] <<SN>>  [[CableCritSensorReflDueDate]] <<TIMESTAMP>>  [[CableCritSensorTranSN]] <<SN>>  [[CableCritSensorTranDueDate]] <<TIMESTAMP>>  [[CableCritSensor HomASN]] <<SN>>  [[CableCritSensor HomADueDate]] <<TIMESTAMP>>  [[CableCritSensor HomBSN]] <<SN>>  [[CableCritSensorHomBDueDate]] <<TIMESTAMP>> |
| 31 | Test Arc Detectors for Cavities 1-8. Verify that each detector generates a fault and disables RF. Check off each working arc detector interlock.  **\*\*Do Not Attempt to Supply High Power RF to Cavity if its Arc Detector and Interlock are not Functioning Correctly!\*\*** | [[ArcDetectorInspector]] <<SRF>>  [[ArcDetectorTime]] <<TIMESTAMP>>  [[C1ArcDetectorIntlkGood]] <<YESNO>>  [[C2ArcDetectorIntlkGood]] <<YESNO>>  [[C3ArcDetectorIntlkGood]] <<YESNO>>  [[C4ArcDetectorIntlkGood]] <<YESNO>>  [[C5ArcDetectorIntlkGood]] <<YESNO>>  [[C6ArcDetectorIntlkGood]] <<YESNO>>  [[C7ArcDetectorIntlkGood]] <<YESNO>>  [[C8ArcDetectorIntlkGood]] <<YESNO>> |
| 32 | Test Warm Window IR Detectors for Cavities 1-8. Verify that each detector generates a fault and disables RF. Check off each working IR detector interlock. Note any problems in the Comment block.  **\*\*Do Not Attempt to Supply High Power RF to Cavity if its IR Detector and Interlock are not Functioning Correctly!\*\*** | [[IRDetectorTestInspector]] <<SRF>>  [[IRDetectorTestTime]] <<TIMESTAMP>>  [[C1IRDetectorIntlkGood]] <<YESNO>>  [[C2IRDetectorIntlkGood]] <<YESNO>>  [[C3IRDetectorIntlkGood]] <<YESNO>>  [[C4IRDetectorIntlkGood]] <<YESNO>>  [[C5IRDetectorIntlkGood]] <<YESNO>>  [[C6IRDetectorIntlkGood]] <<YESNO>>  [[C7IRDetectorIntlkGood]] <<YESNO>>  [[C8IRDetectorIntlkGood]] <<YESNO>> |
| 33 | Use the Comment block to list any problems associated with Arc and/or IR detectors. | [[ArcAndIRProblems]] <<COMMENT>> |

|  |  |  |
| --- | --- | --- |
| **Step No** | **Instructions** | **Data Inputs** |
| 34 | Test the Beamline Vacuum Interlock. Verify that a fault is generated and RF is disabled. Check the box if working.  **\*\* Do Not Attempt to Supply High Power RF to any Cavity if Beamline Vacuum Interlock is Not Working Properly \*\*** | [[BLVacIntlkInspector]] <<SRF>>  [[BLVacIntlkInspectTime]] <<TIMESTAMP>>  [[BLVacIntlkGood]] <<YESNO>> |
| 35 | Test the Waveguide Vacuum. Verify that a fault is generated and RF is disabled. Check off each working interlock  **\*\* Do Not Attempt to Supply High Power RF to Cavity if its Waveguide Vacuum Interlock is Not Working Properly \*\*** | [[WGVacIntlkInspector]] <<SRF>>  [[WGVacIntlkInspectTime]] <<TIMESTAMP>>  [[WG1VacIntlkGood]] <<YESNO>>  [[WG2VacIntlkGood]] <<YESNO>>  [[WG3VacIntlkGood]] <<YESNO>>  [[WG4VacIntlkGood]] <<YESNO>>  [[WG5VacIntlkGood]] <<YESNO>>  [[WG6VacIntlkGood]] <<YESNO>>  [[WG7VacIntlkGood]] <<YESNO>>  [[WG8VacIntlkGood]] <<YESNO>> |
| 36 | Use the Comment block to list any problems associated with vacuum interlocks. | [[VacuumIntlkProblems]] <<COMMENT>> |

|  |  |  |
| --- | --- | --- |
| **Step No** | **Instructions** | **Data Inputs** |
| 37 | Verify that DecaRad Geiger-Mueller tubes are connected and correctly positioned around cryomodule. Ensure that read outs are active in epics.  Typical setup for this type of cryomodule::   * Channel 1 at Tophat for Cavity 1 * Channel 2 at Tophat for Cavity 2 * Channel 3 at Tophat for Cavity 3 * Channel 4 at Tophat for Cavities 4 / 5 * Channel 5 at Top Center of Cryomodule * Channel 6 at Tophat for Cavity 6 * Channel 7 at Tophat for Cavities 7 * Channel 8 at Tophat for Cavities 8 * Channel 9 at Supply Side of Beamline * Channel 10 at Return Side of Beamline.   Deviations from this layout should be noted in the Comment box.  Any problems such as dead channels should be noted in the Comment box. | [[DecaRadTech]] <<SRF>>  [[DecaRadSetupTime]] <<TIMESTAMP>>  [[DecaRadDeviations]] <<COMMENT>> |
| 38 | Inspect all waveguide connections in the Test Cave. All waveguide sections must be in place with all flange bolt holes filled. Bolts must not be loose.  **\*\*No waveguide that is capable of delivering RF power into the cave may be open during High power RF. Waveguides must be terminated either by connection to cryomodule or by shorting plate or an appropriate load. Do not perform PSS Sweep of Test Cave until this step has been completed.\*\*** | [[WaveGuideTech]] <<SRF>>  [[WaveGuideCheckTime]] <<TIMESTAMP>>  [[WaveGuideProblems]] <<COMMENT>> |

|  |  |  |
| --- | --- | --- |
| **Step No** | **Instructions** | **Data Inputs** |
| 39 | Inspect all RF heliax cable connections. A proper connection means at least hand tightened and connected to the appropriate connector.  Ensure that:   * All eight Ptrans cables are properly connected to the appropriate field probe connectors. * All RF Heliax cables hanging from RF patch panels 1A, 2A, 3A, 4A are properly connected. * All eight pair of cables coming from the directional couplers are properly connected. * All cables are properly connected to waveguide switching chassis located on South wall of cave.   **\*\*Do not perform PSS Sweep of Test Cave until this step has been completed.\*\*** | [[RFCableTech]] <<SRF>>  [[RFCableCheckTime]] <<TIMESTAMP>>  [[RFCableProblems]] <<COMMENT>> |
| 40 | PSS Function Check:  After completing a sweep of the cave, bring the RF HPA into the high voltage state. Drop the PSS state from Run to Open Access using the PSS key and verify that HPA has dropped out of the High Voltage. Note any problems in comment block.  **\*\*If PSS fails this test, contact PSS on-call personnel immediately. HPRF must not be supplied to cavities until this test is completed successfully.\*\*** | [[PSSFunctionTech]] <<SRF>>  [[PSSFunctionCheckTime]] <<TIMESTAMP>>  [[PSSProblems]] <<COMMENT>>  [[PSSFunctionTestPassed]] <<YESNO>> |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Step No** | **Instructions** | | | | **Data Inputs** | | |
| 41 | THIS IS A CRITICAL MEASUREMENT.  Use of CRITICAL MTE is required.  Record F-tag (or serial No.) and Cal DUE date for:   1. Critical MTE RF Frequency Counter   Complete the +/- 200 kHz Mechanical Tuner Range and +/-2 kHz Loop Tests for cavities 1-8. Check off the completion of each step and enter the requested information. **Record the frequency prior to moving the tuners**. Complete the range test and loop test for each cavity. Record requested data in the tables in steps 41 and 42. | | | | [[TunCritCOUNTSN]] <<SN>>  [[TunCritCOUNTDueDate]] <<TIMESTAMP>>  [[TunCritCOUNTcomment]] <<COMMENT>> | | |
| **Cavity** | **Operator** | **Time of Test** | **Start Frequency (MHz)** | **Min Frequency (MHz)** | **Low Frequency Limit Activated?** | **Max Frequency (MHz)** | **High Frequency Limit Activated?** |
| 1 | [[C1TunerOperator]] <<SRF>> | [[C1TunerTime]] <<TIMESTAMP>> | [[C1StartFreq]] <<FLOAT>> | [[C1MinFreq]] <<FLOAT>> | [[C1LowLimit]] <<YESNO>> | [[C1MaxFreq]] <<FLOAT>> | [[C1HiLimit]] <<YESNO>> |
| 2 | [[C2TunerOperator]] <<SRF>> | [[C2TunerTime]] <<TIMESTAMP>> | [[C2StartFreq]] <<FLOAT>> | [[C2MinFreq]] <<FLOAT>> | [[C2LowLimit]] <<YESNO>> | [[C2MaxFreq]] <<FLOAT>> | [[C2HiLimit]] <<YESNO>> |
| 3 | [[C3TunerOperator]] <<SRF>> | [[C3TunerTime]] <<TIMESTAMP>> | [[C3StartFreq]] <<FLOAT>> | [[C3MinFreq]] <<FLOAT>> | [[C3LowLimit]] <<YESNO>> | [[C3MaxFreq]] <<FLOAT>> | [[C3HiLimit]] <<YESNO>> |
| 4 | [[C4TunerOperator]] <<SRF>> | [[C4TunerTime]] <<TIMESTAMP>> | [[C4StartFreq]] <<FLOAT>> | [[C4MinFreq]] <<FLOAT>> | [[C4LowLimit]] <<YESNO>> | [[C4MaxFreq]] <<FLOAT>> | [[C4HiLimit]] <<YESNO>> |
| 5 | [[C5TunerOperator]] <<SRF>> | [[C5TunerTime]] <<TIMESTAMP>> | [[C5StartFreq]] <<FLOAT>> | [[C5MinFreq]] <<FLOAT>> | [[C5LowLimit]] <<YESNO>> | [[C5MaxFreq]] <<FLOAT>> | [[C5HiLimit]] <<YESNO>> |
| 6 | [[C6TunerOperator]] <<SRF>> | [[C6TunerTime]] <<TIMESTAMP>> | [[C6StartFreq]] <<FLOAT>> | [[C6MinFreq]] <<FLOAT>> | [[C6LowLimit]] <<YESNO>> | [[C6MaxFreq]] <<FLOAT>> | [[C6HiLimit]] <<YESNO>> |
| 7 | [[C7TunerOperator]] <<SRF>> | [[C7TunerTime]] <<TIMESTAMP>> | [[C7StartFreq]] <<FLOAT>> | [[C7MinFreq]] <<FLOAT>> | [[C7LowLimit]] <<YESNO>> | [[C7MaxFreq]] <<FLOAT>> | [[C7HiLimit]] <<YESNO>> |
| 8 | [[C8TunerOperator]] <<SRF>> | [[C8TunerTime]] <<TIMESTAMP>> | [[C8StartFreq]] <<FLOAT>> | [[C8MinFreq]] <<FLOAT>> | [[C8LowLimit]] <<YESNO>> | [[C8MaxFreq]] <<FLOAT>> | [[C8HiLimit]] <<YESNO>> |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Step No** | **Instructions** | | | **Data Inputs** | | |
| 42 | Record the requested information from the Mechanical Tuner Tests in the table below. Upload the post-processed Excel files. | | |  | | |
| **Cavity** | **Tuner Range (kHz)** | **Hz / Steps** | **Hysteresis (Hz)** | **Final Tuned Frequency (MHz)** | | **Tuner File Uploads** |
| 1 | [[C1TunerRange]] <<FLOAT>> | [[C1TunerHzPerStep]] <<FLOAT>> | [[C1TunerHysteresis]] <<FLOAT>> | [[C1TunerFinalFreq]] <<FLOAT>> | | [[C1TunerFiles]] <<FILEUPLOAD>> |
| 2 | [[C2TunerRange]] <<FLOAT>> | [[C2TunerHzPerStep]] <<FLOAT>> | [[C2TunerHysteresis]] <<FLOAT>> | [[C2TunerFinalFreq]] <<FLOAT>> | | [[C2TunerFiles]] <<FILEUPLOAD>> |
| 3 | [[C3TunerRange]] <<FLOAT>> | [[C3TunerHzPerStep]] <<FLOAT>> | [[C3TunerHysteresis]] <<FLOAT>> | [[C3TunerFinalFreq]] <<FLOAT>> | | [[C3TunerFiles]] <<FILEUPLOAD>> |
| 4 | [[C4TunerRange]] <<FLOAT>> | [[C4TunerHzPerStep]] <<FLOAT>> | [[C4TunerHysteresis]] <<FLOAT>> | [[C4TunerFinalFreq]] <<FLOAT>> | | [[C4TunerFiles]] <<FILEUPLOAD>> |
| 5 | [[C5TunerRange]] <<FLOAT>> | [[C5TunerHzPerStep]] <<FLOAT>> | [[C5TunerHysteresis]] <<FLOAT>> | [[C5TunerFinalFreq]] <<FLOAT>> | | [[C5TunerFiles]] <<FILEUPLOAD>> |
| 6 | [[C6TunerRange]] <<FLOAT>> | [[C6TunerHzPerStep]] <<FLOAT>> | [[C6TunerHysteresis]] <<FLOAT>> | [[C6TunerFinalFreq]] <<FLOAT>> | | [[C6TunerFiles]] <<FILEUPLOAD>> |
| 7 | [[C7TunerRange]] <<FLOAT>> | [[C7TunerHzPerStep]] <<FLOAT>> | [[C7TunerHysteresis]] <<FLOAT>> | [[C7TunerFinalFreq]] <<FLOAT>> | | [[C7TunerFiles]] <<FILEUPLOAD>> |
| 8 | [[C8TunerRange]] <<FLOAT>> | [[C8TunerHzPerStep]] <<FLOAT>> | [[C8TunerHysteresis]] <<FLOAT>> | [[C8TunerFinalFreq]] <<FLOAT>> | | [[C8TunerFiles]] <<FILEUPLOAD>> |
|  | Use the Comment block to document any problems with the tuner tests. | | | | [[TunerTestComments]] <<COMMENT>> | |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Step No** | **Instructions** | | | | **Data Inputs** | | |
| 43 | **Measure the Cold Cavity Passband Frequencies and associated loaded Q's (QL). Record the cold frequencies (in MHz) and QL's in the tables below.**  **This measurement must be completed after the Mechanical Tuner Range and Hysteresis Test is complete.** | | | | **[[ColdPassBandOperator]] <<SRF>>**  **[[ColdPassBandTime]] <<TIMESTAMP>>** | | |
| **Cavity** | **1/7 Pi** | **2/7 Pi** | **3/7 Pi** | **4/7 Pi** | **5/7 Pi** | **6/7 Pi** | **Pi** |
| **1** | [[C1Cold17PassBand]] <<FLOAT>> | [[C1Cold27PassBand]] <<FLOAT>> | [[C1Cold37PassBand]] <<FLOAT>> | [[C1Cold47PassBand]] <<FLOAT>> | [[C1Cold57PassBand]] <<FLOAT>> | [[C1Cold67PassBand]] <<FLOAT>> | [[C1ColdPiPassBand]] <<FLOAT>> |
| **2** | [[C2Cold17PassBand]] <<FLOAT>> | [[C2Cold27PassBand]] <<FLOAT>> | [[C2Cold37PassBand]] <<FLOAT>> | [[C2Cold47PassBand]] <<FLOAT>> | [[C2Cold57PassBand]] <<FLOAT>> | [[C2Cold67PassBand]] <<FLOAT>> | [[C2ColdPiPassBand]] <<FLOAT>> |
| **3** | [[C3Cold17PassBand]] <<FLOAT>> | [[C3Cold27PassBand]] <<FLOAT>> | [[C3Cold37PassBand]] <<FLOAT>> | [[C3Cold47PassBand]] <<FLOAT>> | [[C3Cold57PassBand]] <<FLOAT>> | [[C3Cold67PassBand]] <<FLOAT>> | [[C3ColdPiPassBand]] <<FLOAT>> |
| **4** | [[C4Cold17PassBand]] <<FLOAT>> | [[C4Cold27PassBand]] <<FLOAT>> | [[C4Cold37PassBand]] <<FLOAT>> | [[C4Cold47PassBand]] <<FLOAT>> | [[C4Cold57PassBand]] <<FLOAT>> | [[C4Cold67PassBand]] <<FLOAT>> | [[C4ColdPiPassBand]] <<FLOAT>> |
| **5** | [[C5Cold17PassBand]] <<FLOAT>> | [[C5Cold27PassBand]] <<FLOAT>> | [[C5Cold37PassBand]] <<FLOAT>> | [[C5Cold47PassBand]] <<FLOAT>> | [[C5Cold57PassBand]] <<FLOAT>> | [[C5Cold67PassBand]] <<FLOAT>> | [[C5ColdPiPassBand]] <<FLOAT>> |
| **6** | [[C6Cold17PassBand]] <<FLOAT>> | [[C6Cold27PassBand]] <<FLOAT>> | [[C6Cold37PassBand]] <<FLOAT>> | [[C6Cold47PassBand]] <<FLOAT>> | [[C6Cold57PassBand]] <<FLOAT>> | [[C6Cold67PassBand]] <<FLOAT>> | [[C6ColdPiPassBand]] <<FLOAT>> |
| **7** | [[C7Cold17PassBand]] <<FLOAT>> | [[C7Cold27PassBand]] <<FLOAT>> | [[C7Cold37PassBand]] <<FLOAT>> | [[C7Cold47PassBand]] <<FLOAT>> | [[C7Cold57PassBand]] <<FLOAT>> | [[C7Cold67PassBand]] <<FLOAT>> | [[C7ColdPiPassBand]] <<FLOAT>> |
| **8** | [[C8Cold17PassBand]] <<FLOAT>> | [[C8Cold27PassBand]] <<FLOAT>> | [[C8Cold37PassBand]] <<FLOAT>> | [[C8Cold47PassBand]] <<FLOAT>> | [[C8Cold57PassBand]] <<FLOAT>> | [[C8Cold67PassBand]] <<FLOAT>> | [[C8ColdPiPassBand]] <<FLOAT>> |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Step No** | **Instructions** | | | | **Data Inputs** | | |
| **Cavity** | **1/7 Pi** | **2/7 Pi** | **3/7 Pi** | **4/7 Pi** | **5/7 Pi** | **6/7 Pi** | **Pi** |
| **1** | [[C1Cold17QL]] <<FLOAT>> | [[C1Cold27QL]] <<FLOAT>> | [[C1Cold37PiQL]] <<FLOAT>> | [[C1Cold47PiQL]] <<FLOAT>> | [[C1Cold57PiQL]] <<FLOAT>> | [[C1Cold67PiQL]] <<FLOAT>> | [[C1ColdPiQL]] <<FLOAT>> |
| **2** | [[C2Cold17QL]] <<FLOAT>> | [[C2Cold27QL]] <<FLOAT>> | [[C2Cold37PiQL]] <<FLOAT>> | [[C2Cold47PiQL]] <<FLOAT>> | [[C2Cold57PiQL]] <<FLOAT>> | [[C2Cold67PiQL]] <<FLOAT>> | [[C2ColdPiQL]] <<FLOAT>> |
| **3** | [[C3Cold17QL]] <<FLOAT>> | [[C3Cold27QL]] <<FLOAT>> | [[C3Cold37PiQL]] <<FLOAT>> | [[C3Cold47PiQL]] <<FLOAT>> | [[C3Cold57PiQL]] <<FLOAT>> | [[C3Cold67PiQL]] <<FLOAT>> | [[C3ColdPiQL]] <<FLOAT>> |
| **4** | [[C4Cold17QL]] <<FLOAT>> | [[C4Cold27QL]] <<FLOAT>> | [[C4Cold37PiQL]] <<FLOAT>> | [[C4Cold47PiQL]] <<FLOAT>> | [[C4Cold57PiQL]] <<FLOAT>> | [[C4Cold67PiQL]] <<FLOAT>> | [[C4ColdPiQL]] <<FLOAT>> |
| **5** | [[C5Cold17QL]] <<FLOAT>> | [[C5Cold27QL]] <<FLOAT>> | [[C5Cold37PiQL]] <<FLOAT>> | [[C5Cold47PiQL]] <<FLOAT>> | [[C5Cold57PiQL]] <<FLOAT>> | [[C5Cold67PiQL]] <<FLOAT>> | [[C5ColdPiQL]] <<FLOAT>> |
| **6** | [[C6Cold17QL]] <<FLOAT>> | [[C6Cold27QL]] <<FLOAT>> | [[C6Cold37PiQL]] <<FLOAT>> | [[C6Cold47PiQL]] <<FLOAT>> | [[C6Cold57PiQL]] <<FLOAT>> | [[C6Cold67PiQL]] <<FLOAT>> | [[C6ColdPiQL]] <<FLOAT>> |
| **7** | [[C7Cold17QL]] <<FLOAT>> | [[C7Cold27QL]] <<FLOAT>> | [[C7Cold37PiQL]] <<FLOAT>> | [[C7Cold47PiQL]] <<FLOAT>> | [[C7Cold57PiQL]] <<FLOAT>> | [[C7Cold67PiQL]] <<FLOAT>> | [[C7ColdPiQL]] <<FLOAT>> |
| **8** | [[C8Cold17QL]] <<FLOAT>> | [[C8Cold27QL]] <<FLOAT>> | [[C8Cold37PiQL]] <<FLOAT>> | [[C8Cold47PiQL]] <<FLOAT>> | [[C8Cold57PiQL]] <<FLOAT>> | [[C8Cold67PiQL]] <<FLOAT>> | [[C8ColdPiQL]] <<FLOAT>> |

|  |  |  |
| --- | --- | --- |
| **Step No** | **Instructions** | **Data Inputs** |
| 44 | * After initial tuning of RF to the Cavity under Test, measure the Qext's of the Fundamental Power Coupler and Field Probe. Record those values in the appropriate fields in the table for the Cavity under Test below. * Proceed with the determination of Emax for the Cavity under Test. Once Emax has been determined, record the requested data in the table below. * Proceed with the determination of Emaxop by completing a One Hour Run. Enter all requested data in the table for the Cavity under Test below. * At the end of a successful One Hour Run, use the automated Labview routine to ramp down the gradient and collect field emission data. Enter all requested data in the table for the Cavity under Test below. (Note: frequency data is also collected at this time for static Lorentz measurement.) * After completing all gradient measurements, proceed to Q0 measurements. Complete a Q0 vs. Eacc curve up to Emaxop in 1 MV/m steps. Collect pressure sensitivity data during pump downs for each cavity. Record the requested data in the table for the Cavity under Test below. | [[CommentOnInstructions]] <<COMMENT>> |

|  |  |  |
| --- | --- | --- |
| **Cavity 1** | | |
| **Step No** | **Instructions** | **Data Inputs** |
| 45 | Record QextFPC and QextFP for Cavity 1 and the gradient at which measurement was made (in MV/m). | [[C1QextTech]] <<SRF>>  [[C1QextMeasTime]] <<TIMESTAMP>>  [[C1QextFPC]] <<SCINOT>>  [[C1QextFP]] <<SCINOT>>  [[C1QextHOM1]] <<SCINOT>>  [[C1QextHOM2]] <<SCINOT>>  [[C1QextMeasGradient]] <<FLOAT>> |
| 46 | Record the Maximum gradient (Emax) for Cavity 1 and the gradient limiting condition. | [[C1EmaxTech]] <<SRF>>  [[C1EmaxMeasTime]] <<TIMESTAMP>>  [[C1Emax]] <<FLOAT>> (MV/m)  [[C1EmaxLimit]] {{Admin Limit,Quench,FE related,Arc Fault,Window Temp Fault, BL Vacuum Fault, WG Vacuum Fault,RF Power, Heat Load,End Group Quench}} <<SELECT>> |
| 47 | Record the gradient at which a successful One Hour Run was completed for Cavity 1. Upload spreadsheet containing data on the One Hour run.  **If the One Hour Run Gradient is lower than 19.2 MV/m, write an NCR.** | [[C1OneHourRunTech]] <<SRF>>  [[C1OneHourRunTime]] <<TIMESTAMP>>  [[C1Emaxop]] <<FLOAT>>  [[C1OneHourRunFile]] <<FILEUPLOAD>> |
| 48 | Record Static Lorentz value for Cavity 1 calculated from data collected during the Field Emission Measurement gradient ramping. | [[C1StaticLorentz]] <<FLOAT>>  [[C1StaticLorentzFile]] <<FILEUPLOAD>> |
| 49 | Record the Field Emission Onset gradient for Cavity 1. Upload the file containing Field Emission data. | [[C1FETech]] <<SRF>>  [[C1FEMeasTime]] <<TIMESTAMP>>  [[C1FEOnset]] <<FLOAT>> (MV/m)  [[C1FEMaxDoseRate]] <<FLOAT>> (R/hr)  [[C1FEFile]] <<FILEUPLOAD>> |
| 50 | After completing the Q0 measurement sequence for Cavity 1, record the values of Q0 at 19.2 MV/m and / or Emaxop. Upload the Q0 measurement file.  **If Q0 at 19.2 MV/m is less than 7.2E9, write an NCR.** | [[C1QoTech]] <<SRF>>  [[C1QoMeasTime]] <<TIMESTAMP>>  [[C1QoNineteen]] <<SCINOT>>  [[C1QoEmaxop]] <<SCINOT>>  [[C1QoFile]] <<FILEUPLOAD>> |
| 51 | Record the Pressure Sensitivity data collected for Cavity 1 during the Q0 measurement sequence | [[C1PressSensitivity]] <<FLOAT>>  [[C1PressSensitivityFile]] <<FILEUPLOAD>> |

|  |  |  |
| --- | --- | --- |
| **Cavity 2** | | |
| **Step No** | **Instructions** | **Data Inputs** |
| 52 | Record QextFPC and QextFP for Cavity 2 and the gradient at which measurement was made (in MV/m). | [[C2QextTech]] <<SRF>>  [[C2QextMeasTime]] <<TIMESTAMP>>  [[C2QextFPC]] <<SCINOT>>  [[C2QextFP]] <<SCINOT>>  [[C2QextHOM1]] <<SCINOT>>  [[C2QextHOM2]] <<SCINOT>>  [[C2QextMeasGradient]] <<FLOAT>> |
| 53 | Record the Maximum gradient (Emax) for Cavity 2 and the gradient limiting condition. | [[C2EmaxTech]] <<SRF>>  [[C2EmaxMeasTime]] <<TIMESTAMP>>  [[C2Emax]] <<FLOAT>> (MV/m)  [[C2EmaxLimit]] {{Admin Limit,Quench,FE related,Arc Fault,Window Temp Fault, BL Vacuum Fault, WG Vacuum Fault,RF Power, Heat Load,End Group Quench}} <<SELECT>> |
| 54 | Record the gradient at which a successful One Hour Run was completed for Cavity 2. Upload spreadsheet containing data on the One Hour run.  **If the One Hour Run Gradient is lower than 19.2 MV/m, write an NCR.** | [[C2OneHourRunTech]] <<SRF>>  [[C2OneHourRunTime]] <<TIMESTAMP>>  [[C2Emaxop]] <<FLOAT>>  [[C2OneHourRunFile]] <<FILEUPLOAD>> |
| 55 | Record Static Lorentz value for Cavity 2 calculated from data collected during the Field Emission Measurement gradient ramping. | [[C2StaticLorentz]] <<FLOAT>>  [[C2StaticLorentzFile]] <<FILEUPLOAD>> |
| 56 | Record the Field Emission Onset gradient for Cavity 2. Upload the file containing Field Emission data. | [[C2FETech]] <<SRF>>  [[C2FEMeasTime]] <<TIMESTAMP>>  [[C2FEOnset]] <<FLOAT>> (MV/m)  [[C2FEMaxDoseRate]] <<FLOAT>> (R/hr)  [[C2FEFile]] <<FILEUPLOAD>> |
| 57 | After completing the Q0 measurement sequence for Cavity 2, record the values of Q0 at 19.2 MV/m and / or Emaxop. Upload the Q0 measurement file.  **If Q0 at 19.2 MV/m is less than 7.2E9, write an NCR.** | [[C2QoTech]] <<SRF>>  [[C2QoMeasTime]] <<TIMESTAMP>>  [[C2QoNineteen]] <<SCINOT>>  [[C2QoEmaxop]] <<SCINOT>>  [[C2QoFile]] <<FILEUPLOAD>> |
| 58 | Record the Pressure Sensitivity data collected for Cavity 2 during the Q0 measurement sequence | [[C2PressSensitivity]] <<FLOAT>>  [[C2PressSensitivityFile]] <<FILEUPLOAD>> |

|  |  |  |
| --- | --- | --- |
| **Cavity 3** | | |
| **Step No** | **Instructions** | **Data Inputs** |
| 59 | Record QextFPC and QextFP for Cavity 3 and the gradient at which measurement was made (in MV/m). | [[C3QextTech]] <<SRF>>  [[C3QextMeasTime]] <<TIMESTAMP>>  [[C3QextFPC]] <<SCINOT>>  [[C3QextFP]] <<SCINOT>>  [[C3QextHOM1]] <<SCINOT>>  [[C3QextHOM2]] <<SCINOT>>  [[C3QextMeasGradient]] <<FLOAT>> |
| 60 | Record the Maximum gradient (Emax) for Cavity 3 and the gradient limiting condition. | [[C3EmaxTech]] <<SRF>>  [[C3EmaxMeasTime]] <<TIMESTAMP>>  [[C3Emax]] <<FLOAT>> (MV/m)  [[C3EmaxLimit]] {{Admin Limit,Quench,FE related,Arc Fault,Window Temp Fault, BL Vacuum Fault, WG Vacuum Fault,RF Power, Heat Load,End Group Quench}} <<SELECT>> |
| 61 | Record the gradient at which a successful One Hour Run was completed for Cavity 3. Upload spreadsheet containing data on the One Hour run.  **If the One Hour Run Gradient is lower than 19.2 MV/m, write an NCR.** | [[C3OneHourRunTech]] <<SRF>>  [[C3OneHourRunTime]] <<TIMESTAMP>>  [[C3Emaxop]] <<FLOAT>>  [[C3OneHourRunFile]] <<FILEUPLOAD>> |
| 62 | Record Static Lorentz value for Cavity 3 calculated from data collected during the Field Emission Measurement gradient ramping. | [[C3StaticLorentz]] <<FLOAT>>  [[C3StaticLorentzFile]] <<FILEUPLOAD>> |
| 63 | Record the Field Emission Onset gradient for Cavity 3. Upload the file containing Field Emission data. | [[C3FETech]] <<SRF>>  [[C3FEMeasTime]] <<TIMESTAMP>>  [[C3FEOnset]] <<FLOAT>> (MV/m)  [[C3FEMaxDoseRate]] <<FLOAT>> (R/hr)  [[C3FEFile]] <<FILEUPLOAD>> |
| 64 | After completing the Q0 measurement sequence for Cavity 3, record the values of Q0 at 19.2 MV/m and / or Emaxop. Upload the Q0 measurement file.  **If Q0 at 19.2 MV/m is less than 7.2E9, write an NCR** | [[C3QoTech]] <<SRF>>  [[C3QoMeasTime]] <<TIMESTAMP>>  [[C3QoNineteen]] <<SCINOT>>  [[C3QoEmaxop]] <<SCINOT>>  [[C3QoFile]] <<FILEUPLOAD>> |
| 65 | Record the Pressure Sensitivity data collected for Cavity 3 during the Q0 measurement sequence | [[C3PressSensitivity]] <<FLOAT>>  [[C3PressSensitivityFile]] <<FILEUPLOAD>> |

|  |  |  |
| --- | --- | --- |
| **Cavity 4** | | |
| **Step No** | **Instructions** | **Data Inputs** |
| 66 | Record QextFPC and QextFP for Cavity 4 and the gradient at which measurement was made (in MV/m). | [[C4QextTech]] <<SRF>>  [[C4QextMeasTime]] <<TIMESTAMP>>  [[C4QextFPC]] <<SCINOT>>  [[C4QextFP]] <<SCINOT>>  [[C4QextHOM1]] <<SCINOT>>  [[C4QextHOM2]] <<SCINOT>>  [[C4QextMeasGradient]] <<FLOAT>> |
| 67 | Record the Maximum gradient (Emax) for Cavity 4 and the gradient limiting condition. | [[C4EmaxTech]] <<SRF>>  [[C4EmaxMeasTime]] <<TIMESTAMP>>  [[C4Emax]] <<FLOAT>> (MV/m)  [[C4EmaxLimit]] {{Admin Limit,Quench,FE related,Arc Fault,Window Temp Fault, BL Vacuum Fault, WG Vacuum Fault,RF Power, Heat Load,End Group Quench}} <<SELECT>> |
| 68 | Record the gradient at which a successful One Hour Run was completed for Cavity 4. Upload spreadsheet containing data on the One Hour run.  **If the One Hour Run Gradient is lower than 19.2 MV/m, write an NCR.** | [[C4OneHourRunTech]] <<SRF>>  [[C4OneHourRunTime]] <<TIMESTAMP>>  [[C4Emaxop]] <<FLOAT>>  [[C4OneHourRunFile]] <<FILEUPLOAD>> |
| 69 | Record Static Lorentz value for Cavity 4 calculated from data collected during the Field Emission Measurement gradient ramping. | [[C4StaticLorentz]] <<FLOAT>>  [[C4StaticLorentzFile]] <<FILEUPLOAD>> |
| 70 | Record the Field Emission Onset gradient for Cavity 4. Upload the file containing Field Emission data. | [[C4FETech]] <<SRF>>  [[C4FEMeasTime]] <<TIMESTAMP>>  [[C4FEOnset]] <<FLOAT>> (MV/m)  [[C4FEMaxDoseRate]] <<FLOAT>> (R/hr)  [[C4FEFile]] <<FILEUPLOAD>> |
| 71 | After completing the Q0 measurement sequence for Cavity 4, record the values of Q0 at 19.2 MV/m and / or Emaxop. Upload the Q0 measurement file.  **If Q0 at 19.2 MV/m is less than 7.2E9, write an NCR** | [[C4QoTech]] <<SRF>>  [[C4QoMeasTime]] <<TIMESTAMP>>  [[C4QoNineteen]] <<SCINOT>>  [[C4QoEmaxop]] <<SCINOT>>  [[C4QoFile]] <<FILEUPLOAD>> |
| 72 | Record the Pressure Sensitivity data collected for Cavity 4 during the Q0 measurement sequence | [[C4PressSensitivity]] <<FLOAT>>  [[C4PressSensitivityFile]] <<FILEUPLOAD>> |

|  |  |  |
| --- | --- | --- |
| **Cavity 5** | | |
| **Step No** | **Instructions** | **Data Inputs** |
| 73 | Record QextFPC and QextFP for Cavity 5 and the gradient at which measurement was made (in MV/m). | [[C5QextTech]] <<SRF>>  [[C5QextMeasTime]] <<TIMESTAMP>>  [[C5QextFPC]] <<SCINOT>>  [[C5QextFP]] <<SCINOT>>  [[C5QextHOM1]] <<SCINOT>>  [[C5QextHOM2]] <<SCINOT>>  [[C5QextMeasGradient]] <<FLOAT>> |
| 74 | Record the Maximum gradient (Emax) for Cavity 5 and the gradient limiting condition. | [[C5EmaxTech]] <<SRF>>  [[C5EmaxMeasTime]] <<TIMESTAMP>>  [[C5Emax]] <<FLOAT>> (MV/m)  [[C5EmaxLimit]] {{Admin Limit,Quench,FE related,Arc Fault,Window Temp Fault, BL Vacuum Fault, WG Vacuum Fault,RF Power, Heat Load,End Group Quench}} <<SELECT>> |
| 75 | Record the gradient at which a successful One Hour Run was completed for Cavity 5. Upload spreadsheet containing data on the One Hour run.  **If the One Hour Run Gradient is lower than 19.2 MV/m, write an NCR.** | [[C5OneHourRunTech]] <<SRF>>  [[C5OneHourRunTime]] <<TIMESTAMP>>  [[C5Emaxop]] <<FLOAT>>  [[C5OneHourRunFile]] <<FILEUPLOAD>> |
| 76 | Record Static Lorentz value for Cavity 5 calculated from data collected during the Field Emission Measurement gradient ramping. | [[C5StaticLorentz]] <<FLOAT>>  [[C5StaticLorentzFile]] <<FILEUPLOAD>> |
| 77 | Record the Field Emission Onset gradient for Cavity 5. Upload the file containing Field Emission data. | [[C5FETech]] <<SRF>>  [[C5FEMeasTime]] <<TIMESTAMP>>  [[C5FEOnset]] <<FLOAT>> (MV/m)  [[C5FEMaxDoseRate]] <<FLOAT>> (R/hr)  [[C5FEFile]] <<FILEUPLOAD>> |
| 78 | After completing the Q0 measurement sequence for Cavity 5, record the values of Q0 at 19.2 MV/m and / or Emaxop. Upload the Q0 measurement file.  **If Q0 at 19.2 MV/m is less than 7.2E9, write an NCR** | [[C5QoTech]] <<SRF>>  [[C5QoMeasTime]] <<TIMESTAMP>>  [[C5QoNineteen]] <<SCINOT>>  [[C5QoEmaxop]] <<SCINOT>>  [[C5QoFile]] <<FILEUPLOAD>> |
| 79 | Record the Pressure Sensitivity data collected for Cavity 5 during the Q0 measurement sequence | [[C5PressSensitivity]] <<FLOAT>>  [[C5PressSensitivityFile]] <<FILEUPLOAD>> |

|  |  |  |
| --- | --- | --- |
| **Cavity 6** | | |
| **Step No** | **Instructions** | **Data Inputs** |
| 80 | Record QextFPC and QextFP for Cavity 6 and the gradient at which measurement was made (in MV/m). | [[C6QextTech]] <<SRF>>  [[C6QextMeasTime]] <<TIMESTAMP>>  [[C6QextFPC]] <<SCINOT>>  [[C6QextFP]] <<SCINOT>>  [[C6QextHOM1]] <<SCINOT>>  [[C6QextHOM2]] <<SCINOT>>  [[C6QextMeasGradient]] <<FLOAT>> |
| 81 | Record the Maximum gradient (Emax) for Cavity 6 and the gradient limiting condition. | [[C6EmaxTech]] <<SRF>>  [[C6EmaxMeasTime]] <<TIMESTAMP>>  [[C6Emax]] <<FLOAT>> (MV/m)  [[C6EmaxLimit]] {{Admin Limit,Quench,FE related,Arc Fault,Window Temp Fault, BL Vacuum Fault, WG Vacuum Fault,RF Power, Heat Load,End Group Quench}} <<SELECT>> |
| 82 | Record the gradient at which a successful One Hour Run was completed for Cavity 6. Upload spreadsheet containing data on the One Hour run.  **If the One Hour Run Gradient is lower than 19.2 MV/m, write an NCR.** | [[C6OneHourRunTech]] <<SRF>>  [[C6OneHourRunTime]] <<TIMESTAMP>>  [[C6Emaxop]] <<FLOAT>>  [[C6OneHourRunFile]] <<FILEUPLOAD>> |
| 83 | Record Static Lorentz value for Cavity 6 calculated from data collected during the Field Emission Measurement gradient ramping. | [[C6StaticLorentz]] <<FLOAT>>  [[C6StaticLorentzFile]] <<FILEUPLOAD>> |
| 84 | Record the Field Emission Onset gradient for Cavity 6. Upload the file containing Field Emission data. | [[C6FETech]] <<SRF>>  [[C6FEMeasTime]] <<TIMESTAMP>>  [[C6FEOnset]] <<FLOAT>> (MV/m)  [[C6FEMaxDoseRate]] <<FLOAT>> (R/hr)  [[C6FEFile]] <<FILEUPLOAD>> |
| 85 | After completing the Q0 measurement sequence for Cavity 6, record the values of Q0 at 19.2 MV/m and / or Emaxop. Upload the Q0 measurement file.  **If Q0 at 19.2 MV/m is less than 7.2E9, write an NCR.** | [[C6QoTech]] <<SRF>>  [[C6QoMeasTime]] <<TIMESTAMP>>  [[C6QoNineteen]] <<SCINOT>>  [[C6QoEmaxop]] <<SCINOT>>  [[C6QoFile]] <<FILEUPLOAD>> |
| 86 | Record the Pressure Sensitivity data collected for Cavity 6 during the Q0 measurement sequence. | [[C6PressSensitivity]] <<FLOAT>>  [[C6PressSensitivityFile]] <<FILEUPLOAD>> |

|  |  |  |
| --- | --- | --- |
| **Cavity 7** | | |
| **Step No** | **Instructions** | **Data Inputs** |
| 87 | Record QextFPC and QextFP for Cavity 7 and the gradient at which measurement was made (in MV/m). | [[C7QextTech]] <<SRF>>  [[C7QextMeasTime]] <<TIMESTAMP>>  [[C7QextFPC]] <<SCINOT>>  [[C7QextFP]] <<SCINOT>>  [[C7QextHOM1]] <<SCINOT>>  [[C7QextHOM2]] <<SCINOT>>  [[C7QextMeasGradient]] <<FLOAT>> |
| 88 | Record the Maximum gradient (Emax) for Cavity 7 and the gradient limiting condition. | [[C7EmaxTech]] <<SRF>>  [[C7EmaxMeasTime]] <<TIMESTAMP>>  [[C7Emax]] <<FLOAT>> (MV/m)  [[C7EmaxLimit]] {{Admin Limit,Quench,FE related,Arc Fault,Window Temp Fault, BL Vacuum Fault, WG Vacuum Fault,RF Power, Heat Load,End Group Quench}} <<SELECT>> |
| 89 | Record the gradient at which a successful One Hour Run was completed for Cavity 7. Upload spreadsheet containing data on the One Hour run.  **If the One Hour Run Gradient is lower than 19.2 MV/m, write an NCR.** | [[C7OneHourRunTech]] <<SRF>>  [[C7OneHourRunTime]] <<TIMESTAMP>>  [[C7Emaxop]] <<FLOAT>>  [[C7OneHourRunFile]] <<FILEUPLOAD>> |
| 90 | Record Static Lorentz value for Cavity 7 calculated from data collected during the Field Emission Measurement gradient ramping. | [[C7StaticLorentz]] <<FLOAT>>  [[C7StaticLorentzFile]] <<FILEUPLOAD>> |
| 91 | Record the Field Emission Onset gradient for Cavity 7. Upload the file containing Field Emission data. | [[C7FETech]] <<SRF>>  [[C7FEMeasTime]] <<TIMESTAMP>>  [[C7FEOnset]] <<FLOAT>> (MV/m)  [[C7FEMaxDoseRate]] <<FLOAT>> (R/hr)  [[C7FEFile]] <<FILEUPLOAD>> |
| 92 | After completing the Q0 measurement sequence for Cavity 7, record the values of Q0 at 19.2 MV/m and / or Emaxop. Upload the Q0 measurement file.  **If Q0 at 19.2 MV/m is less than 7.2E9, write an NCR.** | [[C7QoTech]] <<SRF>>  [[C7QoMeasTime]] <<TIMESTAMP>>  [[C7QoNineteen]] <<SCINOT>>  [[C7QoEmaxop]] <<SCINOT>>  [[C7QoFile]] <<FILEUPLOAD>> |
| 93 | Record the Pressure Sensitivity data collected for Cavity 7 during the Q0 measurement sequence. | [[C7PressSensitivity]] <<FLOAT>>  [[C7PressSensitivityFile]] <<FILEUPLOAD>> |

|  |  |  |
| --- | --- | --- |
| **Cavity 8** | | |
| **Step No** | **Instructions** | **Data Inputs** |
| 94 | Record QextFPC and QextFP for Cavity 8 and the gradient at which measurement was made (in MV/m). | [[C8QextTech]] <<SRF>>  [[C8QextMeasTime]] <<TIMESTAMP>>  [[C8QextFPC]] <<SCINOT>>  [[C8QextFP]] <<SCINOT>>  [[C8QextHOM1]] <<SCINOT>>  [[C8QextHOM2]] <<SCINOT>>  [[C8QextMeasGradient]] <<FLOAT>> |
| 95 | Record the Maximum gradient (Emax) for Cavity 8 and the gradient limiting condition. | [[C8EmaxTech]] <<SRF>>  [[C8EmaxMeasTime]] <<TIMESTAMP>>  [[C8Emax]] <<FLOAT>> (MV/m)  [[C8EmaxLimit]] {{Admin Limit,Quench,FE related,Arc Fault,Window Temp Fault, BL Vacuum Fault, WG Vacuum Fault,RF Power, Heat Load,End Group Quench}} <<SELECT>> |
| 96 | Record the gradient at which a successful One Hour Run was completed for Cavity 8. Upload spreadsheet containing data on the One Hour run.  **If the One Hour Run Gradient is lower than 19.2 MV/m, write an NCR.** | [[C8OneHourRunTech]] <<SRF>>  [[C8OneHourRunTime]] <<TIMESTAMP>>  [[C8Emaxop]] <<FLOAT>>  [[C8OneHourRunFile]] <<FILEUPLOAD>> |
| 97 | Record Static Lorentz value for Cavity 8 calculated from data collected during the Field Emission Measurement gradient ramping. | [[C8StaticLorentz]] <<FLOAT>>  [[C8StaticLorentzFile]] <<FILEUPLOAD>> |
| 98 | Record the Field Emission Onset gradient for Cavity 8. Upload the file containing Field Emission data. | [[C8FETech]] <<SRF>>  [[C8FEMeasTime]] <<TIMESTAMP>>  [[C8FEOnset]] <<FLOAT>> (MV/m)  [[C8FEMaxDoseRate]] <<FLOAT>> (R/hr)  [[C8FEFile]] <<FILEUPLOAD>> |
| 99 | After completing the Q0 measurement sequence for Cavity 8, record the values of Q0 at 19.2 MV/m and / or Emaxop. Upload the Q0 measurement file.  **If Q0 at 19.2 MV/m is less than 7.2E9, write an NCR.** | [[C8QoTech]] <<SRF>>  [[C8QoMeasTime]] <<TIMESTAMP>>  [[C8QoNineteen]] <<SCINOT>>  [[C8QoEmaxop]] <<SCINOT>>  [[C8QoFile]] <<FILEUPLOAD>> |
| 100 | Record the Pressure Sensitivity data collected for Cavity 8 during the Q0 measurement sequence. | [[C8PressSensitivity]] <<FLOAT>>  [[C8PressSensitivityFile]] <<FILEUPLOAD>> |

|  |  |  |
| --- | --- | --- |
| **Step No** | **Instructions** | **Data Inputs** |
| 101 | Record the Average Static Heat Load (in Watts) to the primary (2K) helium circuit. Enter any requested information to the right. | [[PrimaryCktStaticHeatLoad]] <<FLOAT>> (W)  [[PrimaryCktStaticHeatLoadFile]] <<FILEUPLOAD>> |
| 102 | Measure the Shield Static Heat Load. Calculate using data acquired at least 1 week after pump down to 2K is completed. Enter the Static Heat Load (in Watts) in the appropriate box. | [[ShieldCktStaticHeatLoad]] <<FLOAT>> (W)  [[ShieldCktStaticHeatLoadFile]] <<FILEUPLOAD>> |

|  |  |  |
| --- | --- | --- |
| **Step No** | **Instructions** | **Data Inputs** |
| 103 | Upload any microphonics data files below: |  |
| **Cavity** | **Operator / Time** | **File Upload** |
| **1** | [[C1MicrophonicsTech]] <<SRF>>  [[C1MicrophonicsMeasTime]] <<TIMESTAMP>> | [[C1MicrophonicsFile]] <<FILEUPLOAD>> |
| **2** | [[C2MicrophonicsTech]] <<SRF>>  [[C2MicrophonicsMeasTime]] <<TIMESTAMP>> | [[C2MicrophonicsFile]] <<FILEUPLOAD>> |
| **3** | [[C3MicrophonicsTech]] <<SRF>>  [[C3MicrophonicsMeasTime]] <<TIMESTAMP>> | [[C3MicrophonicsFile]] <<FILEUPLOAD>> |
| **4** | [[C4MicrophonicsTech]] <<SRF>>  [[C4MicrophonicsMeasTime]] <<TIMESTAMP>> | [[C4MicrophonicsFile]] <<FILEUPLOAD>> |
| **5** | [[C5MicrophonicsTech]] <<SRF>>  [[C5MicrophonicsMeasTime]] <<TIMESTAMP>> | [[C5MicrophonicsFile]] <<FILEUPLOAD>> |
| **6** | [[C6MicrophonicsTech]] <<SRF>>  [[C6MicrophonicsMeasTime]] <<TIMESTAMP>> | [[C6MicrophonicsFile]] <<FILEUPLOAD>> |
| **7** | [[C7MicrophonicsTech]] <<SRF>>  [[C7MicrophonicsMeasTime]] <<TIMESTAMP>> | [[C7MicrophonicsFile]] <<FILEUPLOAD>> |
| **8** | [[C8MicrophonicsTech]] <<SRF>>  [[C8MicrophonicsMeasTime]] <<TIMESTAMP>> | [[C8MicrophonicsFile]] <<FILEUPLOAD>> |
| 104 | Enter any comments relevant to microphonics measurements in the Comment block. | [[MicrophonicsComments]] <<COMMENT>> |

|  |  |  |
| --- | --- | --- |
| **Step No** | **Instructions** | **Data Inputs** |
| 105 | Detune all eight cavities prior to the start of warm up. Use comment block to list any issues. | [[DetuningOperator]] <<SRF>>  [[DetuningTime]] <<TIMESTAMP>>  [[C1Detuned]] <<CHECKBOX>>  [[C2Detuned]] <<CHECKBOX>>  [[C3Detuned]] <<CHECKBOX>>  [[C4Detuned]] <<CHECKBOX>>  [[C5Detuned]] <<CHECKBOX>>  [[C6Detuned]] <<CHECKBOX>>  [[C7Detuned]] <<CHECKBOX>>  [[C8Detuned]] <<CHECKBOX>>  [[DetuningComments]] <<COMMENT>> |
| 106 | Record the beamline vacuum, all waveguide vacuums and the insulating vacuum (in torr) prior to beginning warm up. This should be done when HPRF has been off for at least two hours. | [[FinalVacInspector]] <<SRF>>  [[FinalVacInspectTime]] <<TIMESTAMP>>  [[FinalBLvac]] <<SCINOT>>  [[FinalC1WGVac]] <<SCINOT>>  [[FinalC2WGVac]] <<SCINOT>>  [[FinalC3WGVac]] <<SCINOT>>  [[FinalC4WGVac]] <<SCINOT>>  [[FinalC5WGVac]] <<SCINOT>>  [[FinalC6WGVac]] <<SCINOT>>  [[FinalC7WGVac]] <<SCINOT>>  [[FinalC8WGVac]] <<SCINOT>>  [[FinalInsVac]] <<SCINOT>> |
| 107 | Begin the cryomodule warm up procedure. Record the start time for the warm up. | [[WarmUpOperator]] <<SRF>>  [[WarmUpStartTime]] <<TIMESTAMP>> |
| 108 | Record the start time for the U-tube removal procedure. | [[UTubeTech]] <<SRF>>  [[UTubeRemoveStartTime]] <<TIMESTAMP>> |
| 109 | Use the comment box to list any problems associated with the warm up. | [[CMWarmUpComment]] <<COMMENT>> |
| 110 | Upload the logfiles containing cryomodule warm up data. | [[CMWarmupFiles]] <<FILEUPLOAD>> |