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| Traveler Title | LCLS-HE Cryomodule Acceptance Testing in the LERF |
| Traveler Abstract | LCLS-HE Cryomodule Testing. This traveler covers testing of the cryomodule after installation in the Low Energy Recirculator Facility. Assumes that the CM is cold at 2K. |
| Traveler ID | L2HE-LERF-CM-ACTS |
| Traveler Revision  | R1 |
| Traveler Author | M. Drury |
| Traveler Date | 23-Sep-21 |
| NCR Informative Emails | areilly,drury,kwilson,hogan |
| NCR Dispositioners | drury,fischer,forehand,powen,huque,hannesv,hogan |
| D3 Emails | hogan,kwilson,drury,hogan |
| Approval Names | M. Drury | G. Ciovati | J. Vennekate | J. Hogan |
| Approval Signatures |  |  |  |  |
| Approval Dates |  |  |  |  |
| Approval Title | Author | Reviewer | Reviewer | Project Manager |

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| 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. |
|  | [Accelerator Operations Directive](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-244027/accel_ops_directives.pdf) | [OSP LCLS-II Acceptance Testing in the LERF](file:///C%3A%5CUsers%5Csamuels%5CAppData%5CWork%20Control%20Docs%5CSRF-19-81378-OSP%20%28LCLS-II%20Testing%20in%20LERF%29.pdf) | [Minimum Acceptance Criteria](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-248266/LCLSII-HE-1.2-PP-0255.pdf) |  |
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| Revision Note |  |
| R1 | Initial release of this Traveler. |

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| 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>>[Pull the CAVSNs from the CST ASSY traveler]] <<NOTE>>[[IDsRecordedBy]] <<SRF>>[[TimeIDsRecorded]] <<TIMESTAMP>>[[TravOpenDate]] <<TIMESTAMP>>[[TravOpenBy]] <<SRF>>[[TestSummaries]] <<FILEUPLOAD>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 3 | Record the Insulating Vacuum pressure as displayed in epics. Note any problems or concerns relating to the insulating vacuum in the comment block. | [[InsulatingVacInspector]] <<SRF>>[[InsulatingVacPreTestTime]] <<TIMESTAMP>>[[InsulatingVacPreTest]] <<SCINOT>>[[InsulatingVacComments]] <<COMMENT>> |
| 4 | Record the Beam Line Vacuum pressure as displayed in epics. Note any problems or concerns relating to the beamline vacuum in the comment block. | [[BLVacInspector]] <<SRF>>[[BLVacPreTestTime]] <<TIMESTAMP>>[[BLVacPreTest]] <<SCINOT>>[[BLVacComments]] <<COMMENT>> |
| 5 | Record the Coupler Vacuum Pressure as displayed in epics. Note any problems or concerns relating to the waveguide vacuums in the comment block. | [[CplrVacInspector]] <<SRF>>[[CplrVacPreTestTime]] <<TIMESTAMP>>[[CplrVac1PreTest]] <<SCINOT>>[[WGVacComments]] <<COMMENT>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 6 | **Insulating Vacuum Leak Check:** Isolate the insulating vacuum from the pumping station after the cool down is complete and the cryomodule is stable in terms of pressure and liquid level. 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. | [[InsVacTech1]] <<SRF>>[[InsVacLeakTstStartTime]] <<TIMESTAMP>>[[InsVacLeakTstStartPress]] <<SCINOT>> (torr)[[InsVacTech2]] <<SRF>>[[InsVacLeakTstStopTime]] <<TIMESTAMP>>[[InsVacLeakTstFinalPress]] <<SCINOT>> (torr)[[ElapseTimeInsVacLeakTst]] <<FLOAT>> (days)[[InsVacDelta]] <<SCINOT>>[[InsVacLeakTestComments]] <<COMMENT>> |

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| **Step No** | **Instructions** | **Data Inputs** |
|  | **High Power Checklist** |  |
| 7 | **Inspect all waveguide connections in the test cave.** All waveguide / sections must be in place with all connections secured. All bolt-holes on waveguide flanges must be secured. Each leg of the 1300 MHz system must be connected to an SSA output on the upstream end and to a FPC on the downstream end. Note any problems in the comment box.**\*\*No waveguide that is capable of delivering RF power into the cave may be open. Waveguide must be terminated either by connection to cryomodule or by shorting plate or an appropriate load.** **The Vault must not be safed unless this step has been completed.\*\*** | [[WGInspector]] <<SRF>>[[WGInspectComp]] <<TIMESTAMP>>[[WGComments]] <<COMMENT>>[[WaveguideInspectPassed]] <<YESNO>> |
| 8 | **Inspect all RF heliax cable connections.** A proper connection means at least hand tightened and connected to the appropriate connector. Note any problems in the comment block.* 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 pairs of cable coming from the directional couplers are properly connected.

**\*\* The Vault must not be safed until this inspection has been successfully completed.\*\*** | [[RFCableInspector]] <<SRF>>[[RFCableInspectComp]] <<TIMESTAMP>>[[RFCableComments]] <<COMMENT>>[[RFCableInspectPassed]] <<CHECKBOX>> |
| 9 | Verify that Decarad chassis is in place and connected Ensure that Geiger-Mueller tubes are connected and correctly positioned around cryomodule. Verify that all Decarad signals are live and updating in epics.Stanndard arrangement for this type of cryomodule:* Channel 1 at Coupler for Cavity 1
* Channel 2 at Coupler for Cavity 2
* Channel 3 at Coupler for Cavity 3
* Channel 4 at Coupler for Cavity 4
* Channel 5 at Coupler for Cavity 5
* Channel 6 at Coupler for Cavity 6
* Channel 7 at Coupler for Cavity 7
* Channel 8 at Coupler for Cavity 8
* Channel 9 at Supply Side of Beamline as close to beam pipe as possible.
* Channel 10 at Return Side of Beamline as close to beam pipe as possible..
 | [[DecaRadInspector]] <<SRF>>[[DecaRadTime]]<<TIMESTAMP>>[[DecaRadComments]] <<COMMENT>> |
| 10 | Record the **Cable, Coupler and Other Attenuation** values listed on the SRF Signal Calibration Screens for each cavity at the beginning of HPRF testing on a given cavity in a spreadsheet. Include Total Attenuation and Final Calibration Scale Factor. Revisit at any time a cavity is powered up.If any values change, record changes with dates | [[RFCableCalTech]] <<SRF>>[[RFCableCalComplete]] <<TIMESTAMP>>[[RFCableCalComments]] <<COMMENT>>[[RFCableCalibrationFile]] <<FILEUPLOAD>> |

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| **Step No** | **Instructions** | **Data Inputs** |
|  | **High Power Checklist** |  |
| 11 | Test Arc Detectors for Cavities 1-8. Verify that each detector generates a fault and disables RF. Record whether the interlock is working correctly **(Good)** or not **(No)**. Note any problems in the Comment block**\*\*Do Not Attempt to Supply High Power RF to Cavity if the Arc Detector and Interlock are not Functioning Correctly!\*\*** | [[ArcDetectorInspector]] <<SRF>>[[ArcDetectorTime]] <<TIMESTAMP>>[[Cav1ArcDetectorIntlkPassed]] <<YESNO>>[[Cav2ArcDetectorIntlkPassed]] <<YESNO>>[[Cav3ArcDetectorIntlkPassed]] <<YESNO>>[[Cav4ArcDetectorIntlkPassed]] <<YESNO>>[[Cav5ArcDetectorIntlkPassed]] <<YESNO>>[[Cav6ArcDetectorIntlkPassed]] <<YESNO>>[[Cav7ArcDetectorIntlkPassed]] <<YESNO>>[[Cav8ArcDetectorIntlkPassed]] <<YESNO>> |
| 12 | Use the Comment block to list any problems associated with Arc Detectors. | [[ArcDetectorIntlkComments]] <<COMMENT>> |

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| **Step No** | **Instructions** | **Data Inputs** |
|  | **High Power Checklist** |  |
| 13 | Test the Beamline Vacuum Interlock. Verify that a fault is generated and RF is disabled. Record whether the interlock is working correctly **Good (Yes)** or not **(No)**.**\*\* Do Not Attempt to Supply High Power RF to any Cavity if the Beamline Vacuum Interlock is Not Working Properly \*\*** | [[BLVacIntlkInspector]] <<SRF>>[[BLVacIntlkInspectTime]] <<TIMESTAMP>>[[BLVacIntlkPassed]] <<YESNO>> |
| 14 | Test the Coupler Vacuum Interlock. Verify that a fault is generated and RF is disabled. Record whether the interlock is working correctly **Good (Yes)** or not **(No)**.**\*\* Do Not Attempt to Supply High Power RF to Cavity if the Waveguide Vacuum Interlock is Not Working Properly \*\*** | [[CplrVacIntlkInspector]] <<SRF>>[[CplrVacIntlkInspectTime]] <<TIMESTAMP>>[[CplrVacIntlkPassed]] <<YESNO>> |
| 15 | Use the Comment block to list any problems associated with vacuum interlocks. | [[VacuumIntlkComments]] <<COMMENT>> |

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| **Step No** | **Instructions** | **Data Inputs** |
|  | **High Power Checklist** |  |
| 16 | **Test the Stepper Motor Temperature Interlocks** for Cavities 1-8. . Insure that each temperature sensor is functioning correctly. Verify that each interlock will generate a fault and disable tuner operation. Check off each working coupler temp interlock. **If any RTD is determined to be non functional, generate an NCR.****\*\*Do Not Attempt to operate a mechanical tuner if the temperature sensor and Interlock are not functioning correctly!\*\*** | [[StpMotorTempInspector]] <<SRF>>[[StpMtrTempIntlkChkTime]] <<TIMESTAMP>>[[C1StpMtrTempIntlkPassed]] <<YESNO>>[[C2StpMtrTempIntlkPassed]] <<YESNO>>[[C3StpMtrTempIntlkPassed]] <<YESNO>>[[C4StpMtrTempIntlkPassed]] <<YESNO>>[[C5StpMtrTempIntlkPassed]] <<YESNO>>[[C6StpMtrTempIntlkPassed]] <<YESNO>>[[C7StpMtrTempIntlkPassed]] <<YESNO>>[[C8StpMtrTempIntlkPassed]] <<YESNO>> |
| 17 | Use the Comment block to list any problems associated with the stepper motor temperature interlocks. | [[StpMtrTempIntlkComments]] <<COMMENT>> |
| 18 | **Test the Fundamental Power Coupler Temperature Interlocks** for Cavities 1-8. Insure that each temperature sensor is functioning correctly. Verify that each of the two interlock channels will generate a fault and disables RF. Check off each working coupler temp interlock. Note any problems in the comment block. **If any RTD is determined to be non functional, generate an NCR.****\*\*Do Not Attempt to Supply High Power RF to a cavity unless at least one of the Temperature Interlocks are functioning correctly!\*\*** | [[FPCTempInspector]] <<SRF>>[[CplrTempIntlkChkTime]] <<TIMESTAMP>>[[CplrTempIntlkComments]] <<COMMENT>>[[C1CplrTemp1IntlkPassed]] <<YESNO>>[[C1CplrTemp2IntlkPassed]] <<YESNO>>[[C2CplrTemp1IntlkPassed]] <<YESNO>>[[C2CplrTemp2IntlkPassed]] <<YESNO>>[[C3CplrTemp1IntlkPassed]] <<YESNO>>[[C3CplrTemp2IntlkPassed]] <<YESNO>>[[C4CplrTemp1IntlkPassed]] <<YESNO>>[[C4CplrTemp2IntlkPassed]] <<YESNO>>[[C5CplrTemp1IntlkPassed]] <<YESNO>>[[C5CplrTemp2IntlkPassed]] <<YESNO>>[[C6CplrTemp1IntlkPassed]] <<YESNO>>[[C6CplrTemp2IntlkPassed]] <<YESNO>>[[C7CplrTemp1IntlkPassed]] <<YESNO>>[[C7CplrTemp2IntlkPassed]] <<YESNO>>[[C8CplrTemp1IntlkPassed]] <<YESNO>>[[C8CplrTemp2IntlkPassed]] <<YESNO>> |
| 19 | Use the Comment block to list any problems associated with the Coupler temperature interlocks. | [[CplrTempIntlkComments]] <<COMMENT>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 20 | Complete the **Mechanical Tuner Range and Hysteresis** test for Cavities 1-8. Note any problems in the comment blocks.Verify that the mechanical tuner for cavity 1will tune through the range, **1.3 GHz +/- 20 kHz (cavity 1).**Verify that the mechanical tuners for cavities 2 – 8 will tune through the range, from **1299.535 MHz to 1300.020 MHz.**Record the frequency for each cavity at the beginning of test.Record minimum and maximum frequencies for each cavityRecord any limit switch activation.Record final tuned frequency**If any cavity cannot be tuned through the specified ranges, create an NCR.** | [[C1StepperTestTech]] <<SRF>>[[C1StepperTestCompTime]] <<TIMESTAMP>>[[C2StepperTestTech]] <<SRF>>[[C2StepperTestCompTime]] <<TIMESTAMP>>[[C3StepperTestTech]] <<SRF>>[[C3StepperTestCompTime]] <<TIMESTAMP>>[[C4StepperTestTech]] <<SRF>>[[C4StepperTestCompTime]] <<TIMESTAMP>>[[C5StepperTestTech]] <<SRF>>[[C5StepperTestCompTime]] <<TIMESTAMP>>[[C6StepperTestTech]] <<SRF>>[[C6StepperTestCompTime]] <<TIMESTAMP>>[[C7StepperTestTech]] <<SRF>>[[C7StepperTestCompTime]] <<TIMESTAMP>>[[C8StepperTestTech]] <<SRF>>[[C8StepperTestCompTime]] <<TIMESTAMP>> |
| 21 | Use the Comment block to list any problems associated with the mechanical tuners | [[StepperTestComments]] <<COMMENT>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 22 | Record the requested information from the **Mechanical Tuner Range Test** in the table below.This data must also be recorded in the paper logbook. Use comment block on preceding page for details.  |  |
| **Cavity** | **Initial Frequency****(MHz)** | **Min Frequency****(MHz)** | **Low Limit Switch****Activated?** | **Max Frequency****(MHz)** | **High Limit Switch****Activated?** | **Tuner Range****(kHz)** | **Final Frequency (MHz)** | **File Upload** |
| **1** | [[C1InitFreq]] <<FLOAT>> | [[C1StepMinFreq]] <<FLOAT>> | [[C1StepLoLimit]] <<YESNO>> | [[C1StepMaxFreq]] <<FLOAT>> | [[C1StepHiLimit]] <<YESNO>> | [[C1StepRange]] <<FLOAT>> | [[C1StepFinalFreq]] <<FLOAT>> | [[C1StepFile]] <<FILEUPLOAD>> |
| **2** | [[C2InitFreq]] <<FLOAT>> | [[C2StepMinFreq]] <<FLOAT>> | [[C2StepLoLimit]] <<YESNO>> | [[C2StepMaxFreq]] <<FLOAT>> | [[C2StepHiLimit]] <<YESNO>> | [[C2StepRange]] <<FLOAT>> | [[C2StepFinalFreq]] <<FLOAT>> | [[C2StepFile]] <<FILEUPLOAD>> |
| **3** | [[C3InitFreq]] <<FLOAT>> | [[C3StepMinFreq]] <<FLOAT>> | [[C3StepLoLimit]] <<YESNO>> | [[C3StepMaxFreq]] <<FLOAT>> | [[C3StepHiLimit]] <<YESNO>> | [[C3StepRange]] <<FLOAT>> | [[C3StepFinalFreq]] <<FLOAT>> | [[C3StepFile]] <<FILEUPLOAD>> |
| **4** | [[C4InitFreq]] <<FLOAT>> | [[C4StepMinFreq]] <<FLOAT>> | [[C4StepLoLimit]] <<YESNO>> | [[C4StepMaxFreq]] <<FLOAT>> | [[C4StepHiLimit]] <<YESNO>> | [[C4StepRange]] <<FLOAT>> | [[C4StepFinalFreq]] <<FLOAT>> | [[C4StepFile]] <<FILEUPLOAD>> |
| **5** | [[C5InitFreq]] <<FLOAT>> | [[C5StepMinFreq]] <<FLOAT>> | [[C5StepLoLimit]] <<YESNO>> | [[C5StepMaxFreq]] <<FLOAT>> | [[C5StepHiLimit]] <<YESNO>> | [[C5StepRange]] <<FLOAT>> | [[C5StepFinalFreq]] <<FLOAT>> | [[C5StepFile]] <<FILEUPLOAD>> |
| **6** | [[C6InitFreq]] <<FLOAT>> | [[C6StepMinFreq]] <<FLOAT>> | [[C6StepLoLimit]] <<YESNO>> | [[C6StepMaxFreq]] <<FLOAT>> | [[C6StepHiLimit]] <<YESNO>> | [[C6StepRange]] <<FLOAT>> | [[C6StepFinalFreq]] <<FLOAT>> | [[C6StepFile]] <<FILEUPLOAD>> |
| **7** | [[C7InitFreq]] <<FLOAT>> | [[C7StepMinFreq]] <<FLOAT>> | [[C7StepLoLimit]] <<YESNO>> | [[C7StepMaxFreq]] <<FLOAT>> | [[C7StepHiLimit]] <<YESNO>> | [[C7StepRange]] <<FLOAT>> | [[C7StepFinalFreq]] <<FLOAT>> | [[C7StepFile]] <<FILEUPLOAD>> |
| **8** | [[C8InitFreq]] <<FLOAT>> | [[C8StepMinFreq]] <<FLOAT>> | [[C8StepLoLimit]] <<YESNO>> | [[C8StepMaxFreq]] <<FLOAT>> | [[C8StepHiLimit]] <<YESNO>> | [[C8StepRange]] <<FLOAT>> | [[C8StepFinalFreq]] <<FLOAT>> | [[C8StepFile]] <<FILEUPLOAD>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 23 | Complete the **Piezo Tuner Range and Hysteresis Test.** Record results in logbook.**If any piezo tuner is demonstrated to have a tuning range of less than 500 Hz, an NCR must be generated.** | [[C1PztTestTech]] <<SRF>>[[C1PztTestCompleteTime]] <<TIMESTAMP>>[[C1PztTestRange]] <<FLOAT>> (Hz)[[C2PztTestTech]] <<SRF>>[[C2PztTestCompleteTime]] <<TIMESTAMP>>[[C2PztTestRange]] <<FLOAT>> (Hz)[[C3PztTestTech]] <<SRF>>[[C3PztTestCompleteTime]] <<TIMESTAMP>>[[C3PztTestRange]] <<FLOAT>> (Hz)[[C4PztTestTech]] <<SRF>>[[C4PztTestCompleteTime]] <<TIMESTAMP>>[[C4PztTestRange]] <<FLOAT>> (Hz)[[C5PztTestTech]] <<SRF>>[[C5PztTestCompleteTime]] <<TIMESTAMP>>[[C5PztTestRange]] <<FLOAT>> (Hz)[[C6PztTestTech]] <<USERNAME>>[[C6PztTestCompleteTime]] <<TIMESTAMP>>[[C6PztTestRange]] <<FLOAT>> (Hz)[[C7PztTestTech]] <<SRF>>[[C7PztTestCompleteTime]] <<TIMESTAMP>>[[C7PztTestRange]] <<FLOAT>> (Hz)[[C8PztTestTech]] <<SRF>>[[C8PztTestCompleteTime]] <<TIMESTAMP>>[[C8PztTestRange]] <<FLOAT>> (Hz)[[PztTestFile]] <<FILEUPLOAD>> |
| 24 | Use the Comment block to list any problems associated with the piezo tuners. | [[PztTunerTestComments]] <<COMMENT>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 25 | **Tune each of the Fundamental Power Coupler Qext’s to 6E7.** Verify that the tunable range for each coupler is **1E7 – 8E7**, then tune to 6E7. **This measurement must be completed only after the Mechanical Tuner Range and Hysteresis Test is complete.****If any FPC cannot be tuned to 6E7 or the range is less than specified above, an NCR must be generated.** | [[FPCTuneTech]] <<SRF>>[[TunedQextComplete]] <<TIMESTAMP>>[[TunedQextComments]] <<COMMENT>> |
|  |  | **CAV1** | **CAV2** | **CAV3** | **CAV4** | **CAV5** | **CAV6** | **CAV7** | **CAV8** |
|  | **FPC Qext Minimum** | [[FPCQEXT1L]] <<SCINOT>> | [[FPCQEXT2L]] <<SCINOT>> | [[FPCQEXT3L]] <<SCINOT>> | [[FPCQEXT4L]] <<SCINOT>> | [[FPCQEXT5L]] <<SCINOT>> | [[FPCQEXT6L]] <<SCINOT>> | [[FPCQEXT7L]] <<SCINOT>> | [[FPCQEXT8L]] <<SCINOT>> |
|  | **FPC Qext Maximum** | [[FPCQEXT1U]] <<SCINOT>> | [[FPCQEXT2U]] <<SCINOT>> | [[FPCQEXT3U]] <<SCINOT>> | [[FPCQEXT4U]] <<SCINOT>> | [[FPCQEXT5U]] <<SCINOT>> | [[FPCQEXT6U]] <<SCINOT>> | [[FPCQEXT7U]] <<SCINOT>> | [[FPCQEXT8U]] <<SCINOT>> |
|  | **FPC Qext Final** | [[FPCQEXT1F]] <<SCINOT>> | [[FPCQEXT2F]] <<SCINOT>> | [[FPCQEXT3F]] <<SCINOT>> | [[FPCQEXT4F]] <<SCINOT>> | [[FPCQEXT5F]] <<SCINOT>> | [[FPCQEXT6F]] <<SCINOT>> | [[FPCQEXT7F]] <<SCINOT>> | [[FPCQEXT8F]] <<SCINOT>> |
| 26 | Measure the **Cold Cavity Passband Frequencies** (in MHz). Measure the frequencies and Qext’s for all nine passbands after tuning of the FPC Qext’s.Record the frequency and Qext data in the logbook and in a spreadsheet. Upload the spreadsheet here.**This measurement should be completed only after the Mechanical Tuner Range and Hysteresis Test is complete and after the FPC’s are tuned.** | [[PassBandTech]] <<SRF>>[[ColdTunedPassbandComp]] <<TIMESTAMP>>[[ColdTunedPassbandFile]] <<FILEUPLOAD>>[[ColdTunedPassbandComm]] <<COMMENT>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 27 | **Complete the Electrical Verification of the Beam Position Monitor (BPM)**Check off each step as completed.Create a file containing test results and upload the file.**If any shorts or opens are detected, an NCR must be generated.****If the difference in S21 between electrodes is> 1dB, an NCR must be generated.** | [[BPMTestTech]] <<SRF>>[[BPMTestHiPotPassed]] <<YESNO>>[[BPMTestTDRPassed]] <<YESNO>>[[S21TopBottomPassed]] <<YESNO>>[[S21TopRightPassed]] <<YESNO>>[[S21TopLeftPassed]] <<YESNO>>[[S21RightLeftPassed]] <<YESNO>>[[S21RightBottomPassed]] <<YESNO>>[[S21BottomLeftPassed]] <<YESNO>>[[BPMTestComplete]] <<TIMESTAMP>>[[BPMTestFile]] <<FILEUPLOAD>>[[BPMTestComments]] <<COMMENT>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 28 | **Verify that the Magnets are without Shorts or Opens**.Hipot at 500V with <1uA under insulating vacuum, <5uA in ambient pressure.**An NCR must be generated for any magnet that does not pass this test.** | [[MagnetHipotTech]] <<SRF>>[[MagnetTestHiPotPass]] <<YesNo>>[[MagnetTestHiPot Comments]] <<COMMENT>> |
| 29 | **Complete the Magnet Test Procedure for the Quad, XCOR and YCOR magnets.** Check off each step as completed. Record the elapsed time for the 20A soak. Note any problems in the comment block**An NCR must be generated for any magnet that does not complete a one hour soak at 20A.** | [[MagnetTestTech]] <<SRF>>[[QuadMagSoak20AOneHrComp]] <<YESNO>>[[XCorMagSoak20AOneHrComp]] <<YESNO>>[[YCorMagSoak20AOneHrComp]] <<YESNO>>[[QuadSoakTime20A]] <<FLOAT>> (hrs)[[XCorSoakTime20A]] <<FLOAT>> (hrs)[[YCorSoakTime20A]] <<FLOAT>> (hrs)[[MagnetTestComplete]] <<TIMESTAMP>>[[MagnetTestFile]] <<FILEUPLOAD>>[[MagnetTestComments]] <<COMMENT>> |

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| **Cavity 1** |
| **Step No** | **Instructions** | **Data Inputs** |
| 30 | Record QextFPC, QextFP, QextHOM1, and QextHOM2 for Cavity 1. Record the gradient at which these measurements were completed.**An NCR must be generated if either HOM coupler has a Qext lower than 2E11.** | [[Cav1QextOperator]] <<SRF>>[[Cav1QextMeasTime]] <<TIMESTAMP>>[[Cav1QextFPC]] <<SCINOT>>[[Cav1QextFP]] <<SCINOT>>[[Cav1QextHOM1]] <<SCINOT>>[[Cav1QextHOM2]] <<SCINOT>>[[Cav1QextMeasGradient]] <<FLOAT>> |
| 31 | Record the Maximum Gradient (Emax) for Cavity 1 and the gradient limiting condition.**An NCR must be generated for any cavity that has a Maximum gradient lower than 16 MV/m.** | [[Cav1EmaxOperator]] <<SRF>>[[Cav1EmaxMeasTime]] <<TIMESTAMP>>[[Cav1Emax]] <<FLOAT>> (MV/m)[[Cav1EmaxLimit]] {{Admin Limit,Quench,FE related,Arc Fault,Window Temp Fault,BL Vacuum Fault,Coupler Vacuum Fault,RF Power,Heat Load,End Group Quench }} <<SELECT>> |
| 32 | Record the gradient at which a successful One Hour Run was completed for Cavity 1. Upload spreadsheet containing data on the One Hour run.**An NCR must be generated for any cavity that cannot complete a One Hour Run at or above 16 MV/m.** | [[Cav1OneHourRunOperator]] <<SRF>>[[Cav1OneHourRunTime]] <<TIMESTAMP>>[[Cav1Emaxop]] <<FLOAT>> (MV/m)[[Cav1OneHourRunFile]] <<FILEUPLOAD>> |
| 33 | Record the Field Emission Onset gradient for Cavity 1. Upload the file containing Field emission data.**An NCR must be generated for any cavity that has a FE Onset gradient lower than 16 MV/m.** | [[Cav1FEOperator]] <<SRF>>[[Cav1FEMeasTime]] <<TIMESTAMP>>[[Cav1FEOnset]] <<FLOAT>> (MV/m)[[Cav1FE50mR]] <<FLOAT>>[[Cav1FEMaxDoseRate]] <<FLOAT>> (R/hr)[[Cav1FEFile]] <<FILEUPLOAD>> |
| 34 | The Maximum Useable Gradient is the highest available gradient that meets one or more of the following criteria:* Cavity can operate in a stable manner for at least one hour.
* Cavity is operating at least 0.5 MV/m below any quench gradient
* Radiation is less than 50 mR/hr during individual cavity operation.

Determine and record the Maximum Useable Gradient for Cavity 1 using measurments made in the above steps. **An NCR must be generated for any cavity that has a Maximum Useable Gradient lower than 16 MV/m.** | [[Cav1MaxUseGradient]] <<FLOAT>> |
| 35 | After completing the Q0 measurement sequence for Cavity 1, record the values of Q0 at 20.8 MV/m or at the Maximum Useable Gradient. Upload the Q0 measurement file.**An NCR must be generated for any cavity that has a Q0 lower than 2.7E10 at either 20.8 MV/m or at the Maximum Useable Gradient.** | [[Cav1QoOperator]] <<SRF>>[[Cav1QoMeasTime]] <<TIMESTAMP>>[[Cav1QoDesignGradient]] <<SCINOT>>[[Cav1RFHeatDesignGradient]] <<FLOAT>> (W)[[Cav1QoMaxUseable]] <<SCINOT>>[[Cav1RFHeatMaxUseable]] <<FLOAT>> (W)[[Cav1QoFile]] <<FILEUPLOAD>> |
| 36 | Record the Pressure Sensitivity data collected during the Q0 measurement sequence. | [[Cav1PressureSensOperator]] <<SRF>>[[Cav1PressureSensTime]] <<TIMESTAMP>>[[Cav1PressureSensitivity]] <<FLOAT>>[[Cav1PressureSensFile]] <<FILEUPLOAD>> |
| 37 | Record the Static Lorentz coefficient calculated from data gathered during field emission measurements or other automated gradient ramping exercise. | [[Cav1StaticLorentzOperator]] <<SRF>>[[Cav1StaticLorentzTime]] <<TIMESTAMP>>[[Cav1StaticLorentzCoeff]] <<FLOAT>>[[Cav1StaticLorentzFile]] <<FILEUPLOAD>> |
| 38 | Upload files containing any microphonics measurements for Cavity 1. | [[Cav1MicrophonicsOperator]] <<SRF>>[[Cav1MicrophonicsTime]] <<TIMESTAMP>>[[Cav1MicrophonicsFile]] <<FILEUPLOAD>> |
| 39 | Use the comment box to list any problems or anything unusual about the performance of Cavity 1. | [[Cav1HPRFComments]] <<COMMENT>> |

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| **Cavity 2** |
| **Step No** | **Instructions** | **Data Inputs** |
| 40 | Record QextFPC, QextFP, QextHOM1, and QextHOM2 for Cavity 2. Record the gradient at which these measurements were completed.**An NCR must be generated if either HOM coupler has a Qext lower than 2E11.** | [[Cav2QextOperator]] <<SRF>>[[Cav2QextMeasTime]] <<TIMESTAMP>>[[Cav2QextFPC]] <<SCINOT>>[[Cav2QextFP]] <<SCINOT>>[[Cav2QextHOM1]] <<SCINOT>>[[Cav2QextHOM2]] <<SCINOT>>[[Cav2QextMeasGradient]] <<FLOAT>> |
| 41 | Record the Maximum Gradient (Emax) for Cavity 2 and the gradient limiting condition.**An NCR must be generated for any cavity that has a Maximum gradient lower than 16 MV/m.** | [[Cav2EmaxOperator]] <<SRF>>[[Cav2EmaxMeasTime]] <<TIMESTAMP>>[[Cav2Emax]] <<FLOAT>> (MV/m)[[Cav2EmaxLimit]] {{Admin Limit,Quench,FE related,Arc Fault,Window Temp Fault,BL Vacuum Fault,Coupler Vacuum Fault,RF Power,Heat Load,End Group Quench }} <<SELECT>> |
| 42 | Record the gradient at which a successful One Hour Run was completed for Cavity 2. Upload spreadsheet containing data on the One Hour run.**An NCR must be generated for any cavity that cannot complete a One Hour Run at or above 16 MV/m.** | [[Cav2OneHourRunOperator]] <<SRF>>[[Cav2OneHourRunTime]] <<TIMESTAMP>>[[Cav2Emaxop]] <<FLOAT>> (MV/m)[[Cav2OneHourRunFile]] <<FILEUPLOAD>> |
| 43 | Record the Field Emission Onset gradient for Cavity 2. Upload the file containing Field emission data.**An NCR must be generated for any cavity that has a FE Onset gradient lower than 16 MV/m.** | [[Cav2FEOperator]] <<SRF>>[[Cav2FEMeasTime]] <<TIMESTAMP>>[[Cav2FEOnset]] <<FLOAT>> (MV/m)[[Cav2FE50mR]] <<FLOAT>>[[Cav2FEMaxDoseRate]] <<FLOAT>> (R/hr)[[Cav2FEFile]] <<FILEUPLOAD>> |
| 44 | The Maximum Useable Gradient is the highest available gradient that meets one or more of the following criteria:* Cavity can operate in a stable manner for at least one hour.
* Cavity is operating at least 0.5 MV/m below any quench gradient
* Radiation is less than 50 mR/hr during individual cavity operation.

Determine and record the Maximum Useable Gradient for Cavity 2 using measurments made in the above steps.  | [[Cav2MaxUseGradient]] <<FLOAT>> |
| 45 | After completing the Q0 measurement sequence for Cavity 2, record the values of Q0 at 20.8 MV/m or at the Maximum Useable Gradient. Upload the Q0 measurement file.**An NCR must be generated for any cavity that has a Q0 lower than 2.7E10 at either 20.8 MV/m or at the Maximum Useable Gradient.** | [[Cav2QoOperator]] <<SRF>>[[Cav2QoMeasTime]] <<TIMESTAMP>>[[Cav2QoDesignGradient]] <<SCINOT>>[[Cav2RFHeatDesignGradient]] <<FLOAT>> (W)[[Cav2QoMaxUseable]] <<SCINOT>>[[Cav2RFHeatMaxUseable]] <<FLOAT>> (W)[[Cav2QoFile]] <<FILEUPLOAD>> |
| 46 | Record the Pressure Sensitivity data collected during the Q0 measurement sequence. | [[Cav2PressureSensOperator]] <<SRF>>[[Cav2PressureSensTime]] <<TIMESTAMP>>[[Cav2PressureSensitivity]] <<FLOAT>>[[Cav2PressureSensFile]] <<FILEUPLOAD>> |
| 47 | Record the Static Lorentz coefficient calculated from data gathered during field emission measurements or other automated gradient ramping exercise. | [[Cav2StaticLorentzOperator]] <<SRF>>[[Cav2StaticLorentzTime]] <<TIMESTAMP>>[[Cav2StaticLorentzCoeff]] <<FLOAT>>[[Cav2StaticLorentzFile]] <<FILEUPLOAD>> |
| 48 | Upload files containing any microphonics measurements for Cavity 2. | [[Cav2MicrophonicsOperator]] <<SRF>>[[Cav2MicrophonicsTime]] <<TIMESTAMP>>[[Cav2MicrophonicsFile]] <<FILEUPLOAD>> |
| 49 | Use the comment box to list any problems or anything unusual about the performance of Cavity 2. | [[Cav2HPRFComments]] <<COMMENT>> |

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| **Cavity 3** |
| **Step No** | **Instructions** | **Data Inputs** |
| 50 | Record QextFPC, QextFP, QextHOM1, and QextHOM2 for Cavity 3. Record the gradient at which these measurements were completed.**An NCR must be generated if either HOM coupler has a Qext lower than 2E11.** | [[Cav3QextOperator]] <<SRF>>[[Cav3QextMeasTime]] <<TIMESTAMP>>[[Cav3QextFPC]] <<SCINOT>>[[Cav3QextFP]] <<SCINOT>>[[Cav3QextHOM1]] <<SCINOT>>[[Cav3QextHOM2]] <<SCINOT>>[[Cav3QextMeasGradient]] <<FLOAT>> |
| 51 | Record the Maximum Gradient (Emax) for Cavity 3 and the gradient limiting condition.**An NCR must be generated for any cavity that has a Maximum gradient lower than 16 MV/m.** | [[Cav3EmaxOperator]] <<SRF>>[[Cav3EmaxMeasTime]] <<TIMESTAMP>>[[Cav3Emax]] <<FLOAT>> (MV/m)[[Cav3EmaxLimit]] {{Admin Limit,Quench,FE related,Arc Fault,Window Temp Fault,BL Vacuum Fault,Coupler Vacuum Fault,RF Power,Heat Load,End Group Quench }} <<SELECT>> |
| 52 | Record the gradient at which a successful One Hour Run was completed for Cavity 3. Upload spreadsheet containing data on the One Hour run.**An NCR must be generated for any cavity that cannot complete a One Hour Run at or above 16 MV/m.** | [[Cav3OneHourRunOperator]] <<SRF>>[[Cav3OneHourRunTime]] <<TIMESTAMP>>[[Cav3Emaxop]] <<FLOAT>> (MV/m)[[Cav3OneHourRunFile]] <<FILEUPLOAD>> |
| 53 | Record the Field Emission Onset gradient for Cavity 3. Upload the file containing Field emission data.**An NCR must be generated for any cavity that has a FE Onset gradient lower than 16 MV/m.** | [[Cav3FEOperator]] <<SRF>>[[Cav3FEMeasTime]] <<TIMESTAMP>>[[Cav3FEOnset]] <<FLOAT>> (MV/m)[[Cav3FE50mR]] <<FLOAT>>[[Cav3FEMaxDoseRate]] <<FLOAT>> (R/hr)[[Cav3FEFile]] <<FILEUPLOAD>> |
| 54 | The Maximum Useable Gradient is the highest available gradient that meets one or more of the following criteria:* Cavity can operate in a stable manner for at least one hour.
* Cavity is operating at least 0.5 MV/m below any quench gradient
* Radiation is less than 50 mR/hr during individual cavity operation.

Determine and record the Maximum Useable Gradient for Cavity 3 using measurments made in the above steps.  | [[Cav3MaxUseGradient]] <<FLOAT>> |
| 55 | After completing the Q0 measurement sequence for Cavity 3, record the values of Q0 at 20.8 MV/m or at the Maximum Useable Gradient. Upload the Q0 measurement file.**An NCR must be generated for any cavity that has a Q0 lower than 2.7E10 at either 20.8 MV/m or at the Maximum Useable Gradient.** | [[Cav3QoOperator]] <<SRF>>[[Cav3QoMeasTime]] <<TIMESTAMP>>[[Cav3QoDesignGradient]] <<SCINOT>>[[Cav3RFHeatDesignGradient]] <<FLOAT>> (W)[[Cav3QoMaxUseable]] <<SCINOT>>[[Cav3RFHeatMaxUseable]] <<FLOAT>> (W)[[Cav3QoFile]] <<FILEUPLOAD>> |
| 56 | Record the Pressure Sensitivity data collected during the Q0 measurement sequence. | [[Cav3PressureSensOperator]] <<SRF>>[[Cav3PressureSensTime]] <<TIMESTAMP>>[[Cav3PressureSensitivity]] <<FLOAT>>[[Cav3PressureSensFile]] <<FILEUPLOAD>> |
| 57 | Record the Static Lorentz coefficient calculated from data gathered during field emission measurements or other automated gradient ramping exercise. | [[Cav3StaticLorentzOperator]] <<SRF>>[[Cav3StaticLorentzTime]] <<TIMESTAMP>>[[Cav3StaticLorentzCoeff]] <<FLOAT>>[[Cav3StaticLorentzFile]] <<FILEUPLOAD>> |
| 58 | Upload files containing any microphonics measurements for Cavity 3. | [[Cav3MicrophonicsOperator]] <<SRF>>[[Cav3MicrophonicsTime]] <<TIMESTAMP>>[[Cav3MicrophonicsFile]] <<FILEUPLOAD>> |
| 59 | Use the comment box to list any problems or anything unusual about the performance of Cavity 3. | [[Cav3HPRFComments]] <<COMMENT>> |

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| **Cavity 4** |
| **Step No** | **Instructions** | **Data Inputs** |
| 60 | Record QextFPC, QextFP, QextHOM1, and QextHOM2 for Cavity 4. Record the gradient at which these measurements were completed.**An NCR must be generated if either HOM coupler has a Qext lower than 2E11.** | [[Cav4QextOperator]] <<SRF>>[[Cav4QextMeasTime]] <<TIMESTAMP>>[[Cav4QextFPC]] <<SCINOT>>[[Cav4QextFP]] <<SCINOT>>[[Cav4QextHOM1]] <<SCINOT>>[[Cav4QextHOM2]] <<SCINOT>>[[Cav4QextMeasGradient]] <<FLOAT>> |
| 61 | Record the Maximum Gradient (Emax) for Cavity 4 and the gradient limiting condition.**An NCR must be generated for any cavity that has a Maximum gradient lower than 16 MV/m.** | [[Cav4EmaxOperator]] <<SRF>>[[Cav4EmaxMeasTime]] <<TIMESTAMP>>[[Cav4Emax]] <<FLOAT>> (MV/m)[[Cav4EmaxLimit]] {{Admin Limit,Quench,FE related,Arc Fault,Window Temp Fault,BL Vacuum Fault,Coupler Vacuum Fault,RF Power,Heat Load,End Group Quench }} <<SELECT>> |
| 62 | Record the gradient at which a successful One Hour Run was completed for Cavity 4. Upload spreadsheet containing data on the One Hour run.**An NCR must be generated for any cavity that cannot complete a One Hour Run at or above 16 MV/m.** | [[Cav4OneHourRunOperator]] <<SRF>>[[Cav4OneHourRunTime]] <<TIMESTAMP>>[[Cav4Emaxop]] <<FLOAT>> (MV/m)[[Cav4OneHourRunFile]] <<FILEUPLOAD>> |
| 63 | Record the Field Emission Onset gradient for Cavity 4. Upload the file containing Field emission data.**An NCR must be generated for any cavity that has a FE Onset gradient lower than 16 MV/m.** | [[Cav4FEOperator]] <<SRF>>[[Cav4FEMeasTime]] <<TIMESTAMP>>[[Cav4FEOnset]] <<FLOAT>> (MV/m)[[Cav4FE50mR]] <<FLOAT>>[[Cav4FEMaxDoseRate]] <<FLOAT>> (R/hr)[[Cav4FEFile]] <<FILEUPLOAD>> |
| 64 | The Maximum Useable Gradient is the highest available gradient that meets one or more of the following criteria:* Cavity can operate in a stable manner for at least one hour.
* Cavity is operating at least 0.5 MV/m below any quench gradient
* Radiation is less than 50 mR/hr during individual cavity operation.

Determine and record the Maximum Useable Gradient for Cavity 4 using measurments made in the above steps.  | [[Cav4MaxUseGradient]] <<FLOAT>> |
| 65 | After completing the Q0 measurement sequence for Cavity 4, record the values of Q0 at 20.8 MV/m or at the Maximum Useable Gradient. Upload the Q0 measurement file.**An NCR must be generated for any cavity that has a Q0 lower than 2.7E10 at either 20.8 MV/m or at the Maximum Useable Gradient.** | [[Cav4QoOperator]] <<SRF>>[[Cav4QoMeasTime]] <<TIMESTAMP>>[[Cav4QoDesignGradient]] <<SCINOT>>[[Cav4RFHeatDesignGradient]] <<FLOAT>> (W)[[Cav4QoMaxUseable]] <<SCINOT>>[[Cav4RFHeatMaxUseable]] <<FLOAT>> (W)[[Cav4QoFile]] <<FILEUPLOAD>> |
| 66 | Record the Pressure Sensitivity data collected during the Q0 measurement sequence. | [[Cav4PressureSensOperator]] <<SRF>>[[Cav4PressureSensTime]] <<TIMESTAMP>>[[Cav4PressureSensitivity]] <<FLOAT>>[[Cav4PressureSensFile]] <<FILEUPLOAD>> |
| 67 | Record the Static Lorentz coefficient calculated from data gathered during field emission measurements or other automated gradient ramping exercise. | [[Cav4StaticLorentzOperator]] <<SRF>>[[Cav4StaticLorentzTime]] <<TIMESTAMP>>[[Cav4StaticLorentzCoeff]] <<FLOAT>>[[Cav4StaticLorentzFile]] <<FILEUPLOAD>> |
| 68 | Upload files containing any microphonics measurements for Cavity 4. | [[Cav4MicrophonicsOperator]] <<SRF>>[[Cav4MicrophonicsTime]] <<TIMESTAMP>>[[Cav4MicrophonicsFile]] <<FILEUPLOAD>> |
| 69 | Use the comment box to list any problems or anything unusual about the performance of Cavity 4. | [[Cav4HPRFComments]] <<COMMENT>> |

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| **Cavity 5** |
| **Step No** | **Instructions** | **Data Inputs** |
| 70 | Record QextFPC, QextFP, QextHOM1, and QextHOM2 for Cavity 5. Record the gradient at which these measurements were completed.**An NCR must be generated if either HOM coupler has a Qext lower than 2E11.** | [[Cav5QextOperator]] <<SRF>>[[Cav5QextMeasTime]] <<TIMESTAMP>>[[Cav5QextFPC]] <<SCINOT>>[[Cav5QextFP]] <<SCINOT>>[[Cav5QextHOM1]] <<SCINOT>>[[Cav5QextHOM2]] <<SCINOT>>[[Cav5QextMeasGradient]] <<FLOAT>> |
| 71 | Record the Maximum Gradient (Emax) for Cavity 5 and the gradient limiting condition.**An NCR must be generated for any cavity that has a Maximum gradient lower than 16 MV/m.** | [[Cav5EmaxOperator]] <<SRF>>[[Cav5EmaxMeasTime]] <<TIMESTAMP>>[[Cav5Emax]] <<FLOAT>> (MV/m)[[Cav5EmaxLimit]] {{Admin Limit,Quench,FE related,Arc Fault,Window Temp Fault,BL Vacuum Fault,Coupler Vacuum Fault,RF Power,Heat Load,End Group Quench }} <<SELECT>> |
| 72 | Record the gradient at which a successful One Hour Run was completed for Cavity 5. Upload spreadsheet containing data on the One Hour run.**An NCR must be generated for any cavity that cannot complete a One Hour Run at or above 16 MV/m.** | [[Cav5OneHourRunOperator]] <<SRF>>[[Cav5OneHourRunTime]] <<TIMESTAMP>>[[Cav5Emaxop]] <<FLOAT>> (MV/m)[[Cav5OneHourRunFile]] <<FILEUPLOAD>> |
| 73 | Record the Field Emission Onset gradient for Cavity 5. Upload the file containing Field emission data.**An NCR must be generated for any cavity that has a FE Onset gradient lower than 16 MV/m.** | [[Cav5FEOperator]] <<SRF>>[[Cav5FEMeasTime]] <<TIMESTAMP>>[[Cav5FEOnset]] <<FLOAT>> (MV/m)[[Cav5FE50mR]] <<FLOAT>>[[Cav5FEMaxDoseRate]] <<FLOAT>> (R/hr)[[Cav5FEFile]] <<FILEUPLOAD>> |
| 74 | The Maximum Useable Gradient is the highest available gradient that meets one or more of the following criteria:* Cavity can operate in a stable manner for at least one hour.
* Cavity is operating at least 0.5 MV/m below any quench gradient
* Radiation is less than 50 mR/hr during individual cavity operation.

Determine and record the Maximum Useable Gradient for Cavity 5 using measurments made in the above steps.  | [[Cav5MaxUseGradient]] <<FLOAT>> |
| 75 | After completing the Q0 measurement sequence for Cavity 5, record the values of Q0 at 20.8 MV/m or at the Maximum Useable Gradient. Upload the Q0 measurement file.**An NCR must be generated for any cavity that has a Q0 lower than 2.7E10 at either 20.8 MV/m or at the Maximum Useable Gradient.** | [[Cav5QoOperator]] <<SRF>>[[Cav5QoMeasTime]] <<TIMESTAMP>>[[Cav5QoDesignGradient]] <<SCINOT>>[[Cav5RFHeatDesignGradient]] <<FLOAT>> (W)[[Cav5QoMaxUseable]] <<SCINOT>>[[Cav5RFHeatMaxUseable]] <<FLOAT>> (W)[[Cav5QoFile]] <<FILEUPLOAD>> |
| 76 | Record the Pressure Sensitivity data collected during the Q0 measurement sequence. | [[Cav5PressureSensOperator]] <<SRF>>[[Cav5PressureSensTime]] <<TIMESTAMP>>[[Cav5PressureSensitivity]] <<FLOAT>>[[Cav5PressureSensFile]] <<FILEUPLOAD>> |
| 77 | Record the Static Lorentz coefficient calculated from data gathered during field emission measurements or other automated gradient ramping exercise. | [[Cav5StaticLorentzOperator]] <<SRF>>[[Cav5StaticLorentzTime]] <<TIMESTAMP>>[[Cav5StaticLorentzCoeff]] <<FLOAT>>[[Cav5StaticLorentzFile]] <<FILEUPLOAD>> |
| 78 | Upload files containing any microphonics measurements for Cavity 5. | [[Cav5MicrophonicsOperator]] <<SRF>>[[Cav5MicrophonicsTime]] <<TIMESTAMP>>[[Cav5MicrophonicsFile]] <<FILEUPLOAD>> |
| 79 | Use the comment box to list any problems or anything unusual about the performance of Cavity 5. | [[Cav5HPRFComments]] <<COMMENT>> |

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| **Cavity 6** |
| **Step No** | **Instructions** | **Data Inputs** |
| 80 | Record QextFPC, QextFP, QextHOM1, and QextHOM2 for Cavity 6. Record the gradient at which these measurements were completed.**An NCR must be generated if either HOM coupler has a Qext lower than 2E11.** | [[Cav6QextOperator]] <<SRF>>[[Cav6QextMeasTime]] <<TIMESTAMP>>[[Cav6QextFPC]] <<SCINOT>>[[Cav6QextFP]] <<SCINOT>>[[Cav6QextHOM1]] <<SCINOT>>[[Cav6QextHOM2]] <<SCINOT>>[[Cav6QextMeasGradient]] <<FLOAT>> |
| 81 | Record the Maximum Gradient (Emax) for Cavity 6 and the gradient limiting condition.**An NCR must be generated for any cavity that has a Maximum gradient lower than 16 MV/m.** | [[Cav6EmaxOperator]] <<SRF>>[[Cav6EmaxMeasTime]] <<TIMESTAMP>>[[Cav6Emax]] <<FLOAT>> (MV/m)[[Cav6EmaxLimit]] {{Admin Limit,Quench,FE related,Arc Fault,Window Temp Fault,BL Vacuum Fault,Coupler 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.**An NCR must be generated for any cavity that cannot complete a One Hour Run at or above 16 MV/m.** | [[Cav6OneHourRunOperator]] <<SRF>>[[Cav6OneHourRunTime]] <<TIMESTAMP>>[[Cav6Emaxop]] <<FLOAT>> (MV/m)[[Cav6OneHourRunFile]] <<FILEUPLOAD>> |
| 83 | Record the Field Emission Onset gradient for Cavity 6. Upload the file containing Field emission data.**An NCR must be generated for any cavity that has a FE Onset gradient lower than 16 MV/m.** | [[Cav6FEOperator]] <<SRF>>[[Cav6FEMeasTime]] <<TIMESTAMP>>[[Cav6FEOnset]] <<FLOAT>> (MV/m)[[Cav6FE50mR]] <<FLOAT>>[[Cav6FEMaxDoseRate]] <<FLOAT>> (R/hr)[[Cav6FEFile]] <<FILEUPLOAD>> |
| 84 | The Maximum Useable Gradient is the highest available gradient that meets one or more of the following criteria:* Cavity can operate in a stable manner for at least one hour.
* Cavity is operating at least 0.5 MV/m below any quench gradient
* Radiation is less than 50 mR/hr during individual cavity operation.

Determine and record the Maximum Useable Gradient for Cavity 6 using measurments made in the above steps.  | [[Cav6MaxUseGradient]] <<FLOAT>> |
| 85 | After completing the Q0 measurement sequence for Cavity 6, record the values of Q0 at 20.8 MV/m or at the Maximum Useable Gradient. Upload the Q0 measurement file.**An NCR must be generated for any cavity that has a Q0 lower than 2.7E10 at either 20.8 MV/m or at the Maximum Useable Gradient.** | [[Cav6QoOperator]] <<SRF>>[[Cav6QoMeasTime]] <<TIMESTAMP>>[[Cav6QoDesignGradient]] <<SCINOT>>[[Cav6RFHeatDesignGradient]] <<FLOAT>> (W)[[Cav6QoMaxUseable]] <<SCINOT>>[[Cav6RFHeatMaxUseable]] <<FLOAT>> (W)[[Cav6QoFile]] <<FILEUPLOAD>> |
| 86 | Record the Pressure Sensitivity data collected during the Q0 measurement sequence. | [[Cav6PressureSensOperator]] <<SRF>>[[Cav6PressureSensTime]] <<TIMESTAMP>>[[Cav6PressureSensitivity]] <<FLOAT>>[[Cav6PressureSensFile]] <<FILEUPLOAD>> |
| 87 | Record the Static Lorentz coefficient calculated from data gathered during field emission measurements or other automated gradient ramping exercise. | [[Cav6StaticLorentzOperator]] <<SRF>>[[Cav6StaticLorentzTime]] <<TIMESTAMP>>[[Cav6StaticLorentzCoeff]] <<FLOAT>>[[Cav6StaticLorentzFile]] <<FILEUPLOAD>> |
| 88 | Upload files containing any microphonics measurements for Cavity 6. | [[Cav6MicrophonicsOperator]] <<SRF>>[[Cav6MicrophonicsTime]] <<TIMESTAMP>>[[Cav6MicrophonicsFile]] <<FILEUPLOAD>> |
| 89 | Use the comment box to list any problems or anything unusual about the performance of Cavity 6. | [[Cav6HPRFComments]] <<COMMENT>> |

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| **Cavity 7** |
| **Step No** | **Instructions** | **Data Inputs** |
| 90 | Record QextFPC, QextFP, QextHOM1, and QextHOM2 for Cavity 7. Record the gradient at which these measurements were completed.**An NCR must be generated if either HOM coupler has a Qext lower than 2E11.** | [[Cav7QextOperator]] <<SRF>>[[Cav7QextMeasTime]] <<TIMESTAMP>>[[Cav7QextFPC]] <<SCINOT>>[[Cav7QextFP]] <<SCINOT>>[[Cav7QextHOM1]] <<SCINOT>>[[Cav7QextHOM2]] <<SCINOT>>[[Cav7QextMeasGradient]] <<FLOAT>> |
| 91 | Record the Maximum Gradient (Emax) for Cavity 7 and the gradient limiting condition.**An NCR must be generated for any cavity that has a Maximum gradient lower than 16 MV/m.** | [[Cav7EmaxOperator]] <<SRF>>[[Cav7EmaxMeasTime]] <<TIMESTAMP>>[[Cav7Emax]] <<FLOAT>> (MV/m)[[Cav7EmaxLimit]] {{Admin Limit,Quench,FE related,Arc Fault,Window Temp Fault,BL Vacuum Fault,Coupler Vacuum Fault,RF Power,Heat Load,End Group Quench }} <<SELECT>> |
| 92 | Record the gradient at which a successful One Hour Run was completed for Cavity 7. Upload spreadsheet containing data on the One Hour run.**An NCR must be generated for any cavity that cannot complete a One Hour Run at or above 16 MV/m.** | [[Cav7OneHourRunOperator]] <<SRF>>[[Cav7OneHourRunTime]] <<TIMESTAMP>>[[Cav7Emaxop]] <<FLOAT>> (MV/m)[[Cav7OneHourRunFile]] <<FILEUPLOAD>> |
| 93 | Record the Field Emission Onset gradient for Cavity 7. Upload the file containing Field emission data.**An NCR must be generated for any cavity that has a FE Onset gradient lower than 16 MV/m.** | [[Cav7FEOperator]] <<SRF>>[[Cav7FEMeasTime]] <<TIMESTAMP>>[[Cav7FEOnset]] <<FLOAT>> (MV/m)[[Cav7FE50mR]] <<FLOAT>>[[Cav7FEMaxDoseRate]] <<FLOAT>> (R/hr)[[Cav7FEFile]] <<FILEUPLOAD>> |
| 94 | The Maximum Useable Gradient is the highest available gradient that meets one or more of the following criteria:* Cavity can operate in a stable manner for at least one hour.
* Cavity is operating at least 0.5 MV/m below any quench gradient
* Radiation is less than 50 mR/hr during individual cavity operation.

Determine and record the Maximum Useable Gradient for Cavity 7 using measurments made in the above steps.  | [[Cav7MaxUseGradient]] <<FLOAT>> |
| 95 | After completing the Q0 measurement sequence for Cavity 7, record the values of Q0 at 20.8 MV/m or at the Maximum Useable Gradient. Upload the Q0 measurement file.**An NCR must be generated for any cavity that has a Q0 lower than 2.7E10 at either 20.8 MV/m or at the Maximum Useable Gradient.** | [[Cav7QoOperator]] <<SRF>>[[Cav7QoMeasTime]] <<TIMESTAMP>>[[Cav7QoDesignGradient]] <<SCINOT>>[[Cav7RFHeatDesignGradient]] <<FLOAT>> (W)[[Cav7QoMaxUseable]] <<SCINOT>>[[Cav7RFHeatMaxUseable]] <<FLOAT>> (W)[[Cav7QoFile]] <<FILEUPLOAD>> |
| 96 | Record the Pressure Sensitivity data collected during the Q0 measurement sequence. | [[Cav7PressureSensOperator]] <<SRF>>[[Cav7PressureSensTime]] <<TIMESTAMP>>[[Cav7PressureSensitivity]] <<FLOAT>>[[Cav7PressureSensFile]] <<FILEUPLOAD>> |
| 97 | Record the Static Lorentz coefficient calculated from data gathered during field emission measurements or other automated gradient ramping exercise. | [[Cav7StaticLorentzOperator]] <<SRF>>[[Cav7StaticLorentzTime]] <<TIMESTAMP>>[[Cav7StaticLorentzCoeff]] <<FLOAT>>[[Cav7StaticLorentzFile]] <<FILEUPLOAD>> |
| 98 | Upload files containing any microphonics measurements for Cavity 7. | [[Cav7MicrophonicsOperator]] <<SRF>>[[Cav7MicrophonicsTime]] <<TIMESTAMP>>[[Cav7MicrophonicsFile]] <<FILEUPLOAD>> |
| 99 | Use the comment box to list any problems or anything unusual about the performance of Cavity 7. | [[Cav7HPRFComments]] <<COMMENT>> |

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| **Cavity 8** |
| **Step No** | **Instructions** | **Data Inputs** |
| 100 | Record QextFPC, QextFP, QextHOM1, and QextHOM2 for Cavity 8. Record the gradient at which these measurements were completed.**An NCR must be generated if either HOM coupler has a Qext lower than 2E11.** | [[Cav8QextOperator]] <<SRF>>[[Cav8QextMeasTime]] <<TIMESTAMP>>[[Cav8QextFPC]] <<SCINOT>>[[Cav8QextFP]] <<SCINOT>>[[Cav8QextHOM1]] <<SCINOT>>[[Cav8QextHOM2]] <<SCINOT>>[[Cav8QextMeasGradient]] <<FLOAT>> |
| 101 | Record the Maximum Gradient (Emax) for Cavity 8 and the gradient limiting condition.**An NCR must be generated for any cavity that has a Maximum gradient lower than 16 MV/m.** | [[Cav8EmaxOperator]] <<SRF>>[[Cav8EmaxMeasTime]] <<TIMESTAMP>>[[Cav8Emax]] <<FLOAT>> (MV/m)[[Cav8EmaxLimit]] {{Admin Limit,Quench,FE related,Arc Fault,Window Temp Fault,BL Vacuum Fault,Coupler Vacuum Fault,RF Power,Heat Load,End Group Quench }} <<SELECT>> |
| 102 | Record the gradient at which a successful One Hour Run was completed for Cavity 8. Upload spreadsheet containing data on the One Hour run.**An NCR must be generated for any cavity that cannot complete a One Hour Run at or above 16 MV/m.** | [[Cav8OneHourRunOperator]] <<SRF>>[[Cav8OneHourRunTime]] <<TIMESTAMP>>[[Cav8Emaxop]] <<FLOAT>> (MV/m)[[Cav8OneHourRunFile]] <<FILEUPLOAD>> |
| 103 | Record the Field Emission Onset gradient for Cavity 8. Upload the file containing Field emission data.**An NCR must be generated for any cavity that has a FE Onset gradient lower than 16 MV/m.** | [[Cav8FEOperator]] <<SRF>>[[Cav8FEMeasTime]] <<TIMESTAMP>>[[Cav8FEOnset]] <<FLOAT>> (MV/m)[[Cav8FE50mR]] <<FLOAT>>[[Cav8FEMaxDoseRate]] <<FLOAT>> (R/hr)[[Cav8FEFile]] <<FILEUPLOAD>> |
| 104 | The Maximum Useable Gradient is the highest available gradient that meets one or more of the following criteria:* Cavity can operate in a stable manner for at least one hour.
* Cavity is operating at least 0.5 MV/m below any quench gradient
* Radiation is less than 50 mR/hr during individual cavity operation.

Determine and record the Maximum Useable Gradient for Cavity 8 using measurments made in the above steps.  | [[Cav8MaxUseGradient]] <<FLOAT>> |
| 105 | After completing the Q0 measurement sequence for Cavity 8, record the values of Q0 at 20.8 MV/m or at the Maximum Useable Gradient. Upload the Q0 measurement file.**An NCR must be generated for any cavity that has a Q0 lower than 2.7E10 at either 20.8 MV/m or at the Maximum Useable Gradient.** | [[Cav8QoOperator]] <<SRF>>[[Cav8QoMeasTime]] <<TIMESTAMP>>[[Cav8QoDesignGradient]] <<SCINOT>>[[Cav8RFHeatDesignGradient]] <<FLOAT>> (W)[[Cav8QoMaxUseable]] <<SCINOT>>[[Cav8RFHeatMaxUseable]] <<FLOAT>> (W)[[Cav8QoFile]] <<FILEUPLOAD>> |
| 106 | Record the Pressure Sensitivity data collected during the Q0 measurement sequence. | [[Cav8PressureSensOperator]] <<SRF>>[[Cav8PressureSensTime]] <<TIMESTAMP>>[[Cav8PressureSensitivity]] <<FLOAT>>[[Cav8PressureSensFile]] <<FILEUPLOAD>> |
| 107 | Record the Static Lorentz coefficient calculated from data gathered during field emission measurements or other automated gradient ramping exercise. | [[Cav8StaticLorentzOperator]] <<SRF>>[[Cav8StaticLorentzTime]] <<TIMESTAMP>>[[Cav8StaticLorentzCoeff]] <<FLOAT>>[[Cav8StaticLorentzFile]] <<FILEUPLOAD>> |
| 108 | Upload files containing any microphonics measurements for Cavity 8. | [[Cav8MicrophonicsOperator]] <<SRF>>[[Cav8MicrophonicsTime]] <<TIMESTAMP>>[[Cav8MicrophonicsFile]] <<FILEUPLOAD>> |
| 109 | Use the comment box to list any problems or anything unusual about the performance of Cavity 8. | [[Cav8HPRFComments]] <<COMMENT>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 110 | **Eight Cavity Extended Run:** Set up and operate all eight cavities at either 20.8 MV/m or at the Maximum Usable Gradient, if lower. Record the requested information in the table below. Record the maximum operating gradients set for each cavity at the completion of the Extended Run.Record the maximum temperature indicated by either of the two RTD’s that measure coupler temperatures. * Extended Run begins when all eight cavities are in RF ON at the desired gradients.
* Extended Run ends when all Coupler Temperatures have reached their maximum temperatures.

**It is expected that the set up and execution of the Extended Run will require up to two shifts to complete.** | [[ExtendedRunOperator]] <<SRF>>[[ExtendedRunStartTime]] <<TIMESTAMP>>[[ExtendedRunTotalRunTime]] <<FLOAT>> (hours)[[ExtendedRunFiles]] <<FILEUPLOAD>> |
| **Cavity** | **Gradient****(MV/m)** | **Forward Power** **(kW)** | **Maximum Coupler 1 Temperature****(K)** | **Maximum Coupler 2 Temperature****(K)** |
| **1** | [[Cav1EightCavGradient]] <<FLOAT>> (MV/m) | [[Cav1EightCavFwdPwr]] <<FLOAT>> (kW) | [[Cav1EightCavCplr1MaxTemp]] <<FLOAT>> (K) | [[Cav1EightCavCplr2MaxTemp]] <<FLOAT>> (K) |
| **2** | [[Cav2EightCavGradient]] <<FLOAT>> (MV/m) | [[Cav2EightCavFwdPwr]] <<FLOAT>> (kW) | [[Cav2EightCavCplr1MaxTemp]] <<FLOAT>> (K) | [[Cav2EightCavCplr2MaxTemp]] <<FLOAT>> (K) |
| **3** | [[Cav3EightCavGradient]] <<FLOAT>> (MV/m) | [[Cav3EightCavFwdPwr]] <<FLOAT>> (kW) | [[Cav3EightCavCplr1MaxTemp]] <<FLOAT>> (K) | [[Cav3EightCavCplr2MaxTemp]] <<FLOAT>> (K) |
| **4** | [[Cav4EightCavGradient]] <<FLOAT>> (MV/m) | [[Cav4EightCavFwdPwr]] <<FLOAT>> (kW) | [[Cav4EightCavCplr1MaxTemp]] <<FLOAT>> (K) | [[Cav4EightCavCplr2MaxTemp]] <<FLOAT>> (K) |
| **5** | [[Cav5EightCavGradient]] <<FLOAT>> (MV/m) | [[Cav5EightCavFwdPwr]] <<FLOAT>> (kW) | [[Cav5EightCavCplr1MaxTemp]] <<FLOAT>> (K) | [[Cav5EightCavCplr2MaxTemp]] <<FLOAT>> (K) |
| **6** | [[Cav6EightCavGradient]] <<FLOAT>> (MV/m) | [[Cav6EightCavFwdPwr]] <<FLOAT>> (kW) | [[Cav6EightCavCplr1MaxTemp]] <<FLOAT>> (K) | [[Cav6EightCavCplr2MaxTemp]] <<FLOAT>> (K) |
| **7** | [[Cav7EightCavGradient]] <<FLOAT>> (MV/m) | [[Cav7EightCavFwdPwr]] <<FLOAT>> (kW) | [[Cav7EightCavCplr1MaxTemp]] <<FLOAT>> (K) | [[Cav7EightCavCplr2MaxTemp]] <<FLOAT>> (K) |
| **8** | [[Cav8EightCavGradient]] <<FLOAT>> (MV/m) | [[Cav7EightCavFwdPwr]] <<FLOAT>> (kW) | [[Cav8EightCavCplr1MaxTemp]] <<FLOAT>> (K) | [[Cav8EightCavCplr2MaxTemp]] <<FLOAT>> (K) |
| 111 | Use the comment block to document any problems or unusual behavior encountered in completing the Extended Run. Explain any reductions in gradient from what is specified for this test. | [[ExtendedRunComments]] <<COMMENT>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 112 | Record the **Total Integrated Voltage** for this cryomodule. This is the sum of the Maximum Useable Gradients multiplied by the cavity length (1.038 m). Any reductions in gradient that were necessary in order to complete the Extended Run and that were due to cavity performance issues should be taken into consideration.**An NCR must be generated if theTotal Integrated Voltage is less than 173 MV.** | [[CMTotalVoltage]] <<FLOAT>> (MV) |
| 113 | Record the **Static Heat Load** (in Watts) to the primary (2K) helium circuit. The average heat load is calculated across all of the measurements made during the Qo measurement procedure. Upload the data in a spreadsheet file. Enter any requested information to the right.**Specification: 7 Watts Nominal** | [[StaticHeatLoadCalcDate]] <<TIMESTAMP>>[[StaticHeatLoadComments]] <<COMMENT>>[[StaticHeatLoad]] <<FLOAT>> (W)[[StaticHeatLoadFile]] <<FILEUPLOAD>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 114 | Record the **beamline vacuum**, **coupler vacuum,** and the **insulating vacuum** (in torr) prior to beginning warm up. Note any problems in comment block | [[VacTech]] <<SRF>>[[FinalVacCheckComplete]] <<TIMESTAMP>>[[FinalVacCheckComments]] <<COMMENT>>[[FinalInsVac]] <<SCINOT>> (torr)[[FinalBeamLineVac]] <<SCINOT>> (torr)[[FinalCplrVac]] <<SCINOT>> (torr) |
| 115 | Detune all cavities using the mechanical tuners. Detune to approximate initial untuned frequencies. Check off each cavity that has been detuned. Enter requested information. | [[DetuneOperator]] <<SRF>>[[DetuneComplete]] <<TIMESTAMP>>[[DetuneComments]] <<COMMENT>>[[C1Detuned]] <<YESNO>>[[C2Detuned]] <<YESNO>>[[C3Detuned]] <<YESNO>>[[C4Detuned]] <<YESNO>>[[C5Detuned]] <<YESNO>>[[C6Detuned]] <<YESNO>>[[C7Detuned]] <<YESNO>>[[C8Detuned]] <<YESNO>> |
| 116 | Begin the cryomodule warm up procedure. Record the start time for the warm up to the right. | [[WarmUpCryoOperator]] <<SRF>>[[WarmStartTime]] <<TIMESTAMP>>[[WarmUpComments]] <<COMMENT>> |
| 117 | Record any additional information and notes from cryomodule testing. | [[ReportFiles]] <<FILEUPLOAD>>[[ReportComments]] <<COMMENT>> |