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| Traveler Title | VTA RF Cavity Test |
| Traveler Abstract | Standard Data Acquisition for testing of cavities in the Vertical Test Area (VTA) |
| Traveler ID | USLARP-CAV-VTRF-RFD |
| Traveler Revision  | R2 |
| Traveler Author | N. Huque |
| Traveler Date | 5-Oct-2018 |
| NCR Emails |  |
| Approval Names | N. Huque | T. Powers | A. McEwen |  |
| Approval Signatures |  |  |  |  |
| Approval Dates |  |  |  |  |
| Approval Title | Author | Reviewer | Reviewer |  |

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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. |
| See SOP posted at workcenter | **Automated Testing Spreadsheet:** | [Automated Cavity VTA RF Test Template Spreadsheet](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-98189/SpreadsheetTemplate%20for%20STP-CAV-VTRF_29Aug2016.xlsm) | [VTA Operation Procedures: CP-STP-CAV-VTA-OPS](https://jlabdoc.jlab.org/docushare/dsweb/View/Collection-160) |  |
| [VIEW Cavity Type Spreadsheet](https://pansophy.jlab.org/pansophy/Admin/VIEW_CavType.cfm) | **Manual testing Spreasheet:** | [Manual Cavity VTA RF Test Template Spreadsheet](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-82195/Cavity%20RF%20Test%20Template_013114.xlsx)  |  |  |

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| Revision Note |  |
| R1 | Initial release of this Traveler. |
| R2 | Modifications per T. Powers & A. McEwen |

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| **Standard VTA RF Cavity Test Traveler** |
| **SETUP** |
| [[CAVSN]] <<CAVSN>> | [[TestOperator]] <<VTAOPS>> | Test Purpose Comment (Include recent history note):[[TestPurpose]] <<COMMENT>> |
| [[TestDate]] <<TIMESTAMP>> |
| [[Dewar]] {{3,4,5,6,7,8}} <<SELECT>> |
| [[VTATSSN]] <<VTATSSN>> |
| **Cavity Parameters**[[CavityType]] <<TEXT>>[[NumOfCells]] <<INTEGER>>[[Freq]] <<FLOAT>>[[CavLength]] <<FLOAT>>[[Kappa]] <<FLOAT>>[[EpVsEacc]] <<FLOAT>>[[BpVsEacc]] <<FLOAT>>[[GeoFactor]] <<FLOAT>> |
| **TEST** |
| [[PrimaryTemperature]] <<FLOAT>> |

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|  | **Voltage Reflected** | **Qo** | **Rad** |
| **Initial Rad Onset > 0.03 mrem/hr** | [[VRadInit]] <<SCINOT>>[[InitFEFree]] <<CHECKBOX>>[[If FEFree checked, make VRad 0]] <<NOTE>> | [[QoRadInit]] <<SCINOT>> | > 0.03mrem/hr |
| **Final Rad Onset = 0.03 mrem/hr** | [[VRadFinal]] <<SCINOT>>[[FinalFEFree]] <<CHECKBOX>>[[If FEFree checked, make VRad 0]] <<NOTE>> | [[QoRadFinal]] <<SCINOT>> | = 0.03 mrem/hr |
| **Benchmark Field** | [[VBenchmark]] <<SCINOT>> | [[QoBenchmark]] <<SCINOT>> | [[RadBenchmark]] <<SCINOT>> mrem/hr |
| **MAX Field** | [[VMax]] <<SCINOT>> | [[QoMax]] <<SCINOT>> | [[RadMax]] <<SCINOT>> mrem/hr |

 |
| [[PrimaryFrequency]] <<FLOAT>> |
| **RESULTS** |
| **Manual Testing Data Files:** [[ManualSpreadsheet]] <<FILEUPLOAD>> | [[LorentzCoeff]] <<FLOAT>>[[ResultsComment]] <<COMMENT>> |
| **Automated Testing Data Files:**[[RawDataFile]] <<FILEUPLOAD>>[[ProcessedSpreadsheet]] <<FILEUPLOAD>> |
| **Graphs:**  |
| [[QvsE]] <<FILEUPLOAD>> | [[FvsE2]] <<FILEUPLOAD>> | [[RADvsE]] <<FILEUPLOAD>> | [[OtherFiles]] <<FILEUPLOAD>> |

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| **TEST** plan |
| Upload Test Plan  | [[TestPlan]] <<FILEUPLOAD>> |
| TREATMENTS INFO |
| Has the cavity or component been treated? If so, indicate type(s) of treatment and if baked, add baking temperature and duration. Indicated any additional information about treatments in the comment box below.[[TreatmentComment]] <<COMMENT>> | [[BCP]] <<CHECKBOX>>[[HEP]] <<CHECKBOX>>[[VEP]] <<CHECKBOX>>[[HT]] <<CHECKBOX>>[[Baked]] <<CHECKBOX>>[[BakeTemp]] <<FLOAT>>[[BakeDuration]] <<TEXT>> |
| TEST CONDITIONS |
| Record cavity vacuum pressure, if so instrumented.  | [[CavityVacuum]] <<SCINOT>> (mbar)[[CavityVacuumComment]] <<COMMENT>> |
| Record Dewar helium bath liquid level and baratron pressure.  | [[DewarLHeLevelcm]] <<FLOAT>>(cm)[[DewarPressureTorr]] <<FLOAT>>(Torr) |
| DECAY MEASUREMENTS |
| For the Qext2 chosen to be used in the LabVIEW program, record the results from cavity decay measurments: Eacc, Qo, Qext2, Qext1, %error, radiation, QextHOMaand QextHOMb. Typical values during decay measurements for: |  |
| Eacc (MV/m) | [[Eacc]] <<FLOAT>> (MV/m)  |
| Qo | [[Qo]]<<SCINOT>> |
| Qext1 (input coupler) | [[Qext1]]<<SCINOT>> |
| QextFP (field probe) | [[Qextfp]]<<SCINOT>> |
| %error | [[Qextfperror]]<<FLOAT>> (%) |
| Q HOM | [[QHOM]] <<SCINOT>> |

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| CAVITY PERFORMANCE RESULT |
| Record performance limitation.Definition of performance limitation terms:* Administrative Radiation: 10R/h admin limit
* FE: FE loaded Qo curve
* Quench: non-FE related quench limit
* Multipacting
* RF power: test limited by available RF power
* Cable: test aborted due to cable breakdown or broken cable
* Other: RF Tester defined

If Other is selected, record pertinent information in the Comment box at the right. | [[PerformanceLimit]] {{AdministrativeRadiation,FE,Quench,Multipacting,RFpower,Cable,Operator,Other}} <<SELECT>>[[PerformanceLimitComment]] <<COMMENT>> |
| Temperature dependent Q measurements |
| * Identify the set of field levels at which Q0 measurements will be attempted
* Identify the set of temperatures where these measurements will be made
* Collect data
* Convert data to avg Rs and plot vs. reduced temperature (1 – T / Tc)
* Fit for residual resistance (Rres) at each field level available
* Upload analysis file(s)
 | [[QvsTComments]] <<COMMENT>>[[RsvsReducedTplot]] <<FILEUPLOAD>>[[Residual\_ResistanceComment]] <<COMMENT>>[[BCSandRsAnalysisFiles]] <<FILEUPLOAD>> |
| PASSBAND RF PROCESSING UNSCALED QUENCH LIMITS |
| If RF processing was performed in modes other than the fundmental mode, record the unscaled Eacc quench limit for each mode processed. Use number of entries as appropriate for the multi-cell cavity.Where x = number of cells(e.g., X = 2, 3, 4, 5, 6, 7, 8, 9)[[QuenchStudyComment]]<<COMMENT>> |  |  | 9 | [[EaccUnscaledQuench\_9\_XPi]] <<FLOAT>>(MV/m) |
|  |  |  | [[EaccUnscaledQuench\_8\_XPi]] <<FLOAT>>(MV/m) |
|  | 7 |  | [[EaccUnscaledQuench\_7\_XPi]] <<FLOAT>>(MV/m) |
|  |  |  | [[EaccUnscaledQuench\_6\_XPi]] <<FLOAT>>(MV/m) |
| 5 |  |  | [[EaccUnscaledQuench\_5\_XPi]] <<FLOAT>>(MV/m) |
|  |  |  | [[EaccUnscaledQuench\_4\_XPi]] <<FLOAT>>(MV/m) |
|  |  |  | [[EaccUnscaledQuench\_3\_XPi]] <<FLOAT>>(MV/m) |
|  |  |  | [[EaccUnscaledQuench\_2\_XPi]] <<FLOAT>>(MV/m) |
|  |  |  | [[EaccUnscaledQuench\_1\_XPi]] <<FLOAT>>(MV/m) |