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| Traveler Title | Cavity Vertical Testing | | | |
| Traveler Abstract | Cryogenic RF testing of JLEIC Crab Cavity | | | |
| Traveler ID | SRFRD-VTA-CAV-VTRF-JLEIC | | | |
| Traveler Revision | R1 | | | |
| Traveler Author | SUBA | | | |
| Traveler Date | 10-Mar-23 | | | |
| NCR Informative Emails |  | | | |
| NCR Dispositioners |  | | | |
| D3 Emails |  | | | |
| Approval Names | SUBA | JTKENT | POWEN |  |
| 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. | | | |
| [VTA SOP](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-20642/VTA%20Cryo%20Use%20Procedures.pdf) | [C100R VTA Test Procedure](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-245459/C100R-PR-VTA-CAV-VTRF-R2.pdf) | [VTA Cavity Test Data Processing Template](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-247085/VTRF_Data_Processing_Spreadshet_Templete.xlsm) |  |  |
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| Revision Note |  |
| R1 | Initial release of this Traveler. Based on C100R-CAV-VTRF-R3 |

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| Step No. | Instructions | Data Input |
| 1 | Enter cavity SN for JLEIC\_CRAB.  Note any special handling, processing (chemistry or bake) or off-normal conditions associated with this cavity before test. | [[CAVSN]] <<CAVSN>>  [[SpecialHandling]] <<COMMENT>> |
| 2 | Cavity Parameters | [[Freq]] <<FLOAT>>(MHz)  [[NumOfCells]] <<FLOAT>>  [[HalfWaveLength]] <<FLOAT>>(m)  [[RoverQ]] <<FLOAT>>(Ohm)  [[GeoFactor]] <<FLOAT>>(Ohm)  [[EpOverVt]] <<FLOAT>>  [[BpOverVt]] <<FLOAT>> |
| 3 | Record Test Date, Dewar No, Top Plate ID and Operator(s). | [[TestDate]] <<TIMESTAMP>>  [[Dewar]]{{3,4,5,7,8}} <<SELECT>>  [[VTATSSN]]<<VTATSSN>>  [[TestOperator1]] <<VTAOPS>>  [[TestOperator2]] <<VTAOPS>> |
| 4 | Note whether cavity vacuum is OK.  Record cavity vacuum pressure, if so instrumented.  Note any conditions unfavorable to proceed with testing. | [[CavityVacuumOK]] <<YESNO>>  [[CavityVacuum]] <<SCINOT>>  [[VacuumUnit]]{{mBarr, Torr}} <<SELECT>>  [[CavityVacuumComment]] <<COMMENT>> |
| 5 | Record Dewar helium bath liquid level, temperature and baratron pressure.  Do not continue unless Dewar LHe level is above the end group. | [[DewarLHeLevelcm]] <<FLOAT>>(cm)  [[DewarTempK]] <<FLOAT>>(K)  [[DewarPressureTorr]] <<FLOAT>>(Torr) |
| 6 | Zero power meters then calibrate cables at cavity fundamental frequency as specified in theC100R VTA Test Procedure[.](https://jlabdoc.jlab.org/docushare/dsweb/Get/Document-48113/CP-C100-CAV-VTRF-R2.docx) | [[PowermetersZeroed]] <<YESNO>>  [[CableCalibrationOK]] <<YESNO>>  [[CableCalibrationComment]] <<COMMENT>> |

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| **Step No** | **Instructions** | **Data Inputs** |
| 7 | Perform fundamental mode measurements using a network analyzer in accordance with the C100R VTA Test Procedure.  Fundamental mode frequency must be closed to 958 MHz. | [[Freq]] <<FLOAT>>(MHz) |
| 8 | At approximately 1-3 W, determine the cavity coupling.  If the cavity appears to be critically coupled, perform the steps in the procedure to determine coupling. If the cavity is critically coupled, select Overcoupled.  Optional: Upload oscilloscope data. | [[CavityCoupling]]  {{Overcoupled, Undercoupled}}  <<SELECT>>  [[TDS\_txt]] <<FILEUPLOAD>> |
| 9 | Perform decay measurements and record Vt, Qo, Qext2, Qext1, %error**.** | [[Vt]] <<FLOAT>> (MV)  [[Qo]] <<SCINOT>>  [[Qextin]] <<SCINOT>>  [[Qextfp]] <<SCINOT>>  [[Qextfperror]] <<FLOAT>> (%) |
| 10 | Process multipacting levels and record Vt where multipacting barriers were observed in the comment section. | [[MultipacitngProcessed]] <<YESNO>>  [[DewarTempK]] <<FLOAT>>(K)  [[MultipactingBarriersComment]] <<COMMENT>> |
| 11 | **High Power Test**  Test the cavity performance over its full dynamic range. Observe the administrative limit: FE Limit 1000 mR/hr  Record the following values from the high power test. |  |
| Low field Q0  Maximum cavity voltage achieved (Vt)  Q0 at maximum Vt | [[Max\_Q0]] <<FLOAT>>  [[Max\_Vt]] <<FLOAT>>(MV/m)  [[Max\_Q0AtVtmax]] <<FLOAT>> |
| FEonset: Onset of field emission (FE onset, defined to be the first measured voltage where measured radiation is >= 1e-2 mR/hr). | [[FEonsetMV]] <<FLOAT>> (MV) |
| Rmax value for the highest radiation level inside Dewar lid | [[Radmax]] <<SCINOT>> (mR/h) |

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| **Step No** | **Instructions** | **Data Inputs** |
| 12 | Record cavity performance limitation. If the performance limit is Other, record performance limit description in the comment box. | [[PerformancLimit]] {{RF power,FE,Quench,Cable,Operator,Admin,Other}} <<SELECT>>  [[PerformanceLimit]] <<COMMENT>> |
| 13 | Upload the raw data file with VTA RF testing results using file name: CavID raw data.txt. | [[RF\_TestRawData]] <<FILEUPLOAD>> |
| 14 | Upload Screenshot for Cable Calibration | [[Cable\_Calibration]] <<FILEUPLOAD>> |
| 15 | Uplaod data file from Temperature Sensor Measurement | [[Temp\_SensorData]] <<FILEUPLOAD>> |