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LCLS-II High Energy (HE) 1.3 GHz Nine Cell Dressed and Undressed Cavity 2K VTS Testing (RFCHE)

[464504 Rev. B](#)

Series	Serial No.	Job No.	Task No.	Released By	Released Date	Status
RFCHE	CAVR090-0	584	See Job Page	Alexander Netepenکو	11/7/2022 4:17:42 PM	Closed

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1.0 Abstract [Top](#)

1.1 This traveler is to be used during the Nine Cell Dressed or Undressed Cavity 2K VTS Testing for the LCLS-II High Energy (HE).

2.0 General Notes [Top](#)

2.1 Follow the requirements in the appropriate General Cavity Procedures.

3.0 Supporting Documentation [Top](#)

3.1 Electronically attach all appropriate memos, specific instructions, digital photographs, discrepancy reports and other documentation in the appropriate step in this traveler.

Note: Additional files can be attached to a traveler by clicking on the step number, then selecting Insert Attachment from the Traveler's Step Tools Menu

4.0 Process Readiness Verification [Top](#)

4.1 Verify the current location of the cavity.

Cavity Location:

VTS 1

VTS 2

VTS 3

Technician:

Date:

4.2 Responsible Authority MUST verify the following process has been completed and signed-off by the process Authority.



Verify the cavity process has been completed in Traveler 464240 and signed-off by the process Authority.

Verified

Comments:

Responsible Authority/Designee:

Date:

4.3 Is this a re-test?

Yes

No

If yes explain in comment box.

Comment:

5.0 Testing and Results [Top](#)

5.1 Test Operator, and Date.

Principal Test Operator: *Alex Netepenko*

Test Date: *11/7/2022*

5.2 Cool down Parameters.

Enter the temperature gradient between top and bottom when bottom transitions trough Tc.

Temperature Gradient K

5.3 Test Parameters.

Dewar Number **2**

Top Plate Number: **3**

Top Plate Ports: **Pi 2**

Pt **2**

HOM A **3**

HOM B **4**

Dewar Bath Temperature is 2K

Dewar Bath Temperature if different from 2K: K

Isolated from stand?

Yes

No

HOM Feedthroughs?

Yes

No

He vessel?

Yes

No

Cavity Flange type:

Flange at FP side

NbTi

SS

Flange at FPC side

NbTi

SS

Magnetic Fluxgate:

Standard location of Fluxgates

If not comment:

Maximum field at room temperature before cool-down mG

5.4 Network Analyzer.

Cavity Frequency: **1300.227 MHz**

8/9 Cavity Frequency: **1299.45 MHz**

7/9 Cavity Frequency: **1297.221 MHz**

6/9 Cavity Frequency: **1293.861 MHz**

5/9 Cavity Frequency: **1289.724 MHz**

4/9 Cavity Frequency: **1285.333 MHz**

3/9 Cavity Frequency: **1281.332 MHz**

2/9 Cavity Frequency: **1277.988 MHz**

1/9 Cavity Frequency: **1275.827 MHz**

5.5 Calibration.

Calibration constants:

Ci: **3442**

Cr: **14923**

Ct: **183**

CHOMA **802**

CHOMB **813**

Comment if Ci, Cr, Ct were re-measured during the test:

5.6 Decay Measurement.

If BETA>1 cavity is overcoupled. If BETA<1 cavity is undercoupled.

Cavity Coupling:

- Overcoupled
 Undercoupled

Qext1 **1.96e10**

Qext2 **1.16e12**

Q HOM A **6e15**

Q HOM B **3.9e12**

Comment if Qext1, Qext2, Q HOM A, Q HOM B were remeasured during the test:

The accepted ranges for antennas Q-factors are:

- o $1.1e10 \leq Q1 \leq 1.9e10$
- o $7.5e11 \leq Q2 \leq 2.5e12$
- o $QHOM \geq 2.7e11$

5.7 CW Measurement. at 2K.

Check if radiation was detected

Select all that applies:

- Field emission

Eacc @ FE onset: **4 MV/m**

- Multipacting

Eacc @ MP onset: **MV/m**

Check if measurement was stopped because radiation could not be processed away

NOTE: No field-emission-induced radiation should be detected up to the maximum gradient. Any multipacting must be fully processed before the final Q vs Eacc measurement.

E_{acc} @ quench **4.8**

Highest Eacc @ $Q = 2.5e10$

The usable gradient (the lowest of the above E_{acc}

NOTE: Max gradient must be ≥ 23 MV/m

$Q_0, 10^{10}$

Maximum

Eacc at Maximum Q_0

At E_{acc} of 20.8 MV/m

P_{HOM_A} When $E_{acc} = 20.8$ MV/m

P_{HOM_B} When $E_{acc} = 20.8$ MV/m

NOTE: The accepted values @ $E_{acc} = 20.8$ MV/m are:

- $Q_0 \geq 2.5e10$
- $P_{HOM} \leq 1.7$ W

5.8 Cavity Performance Summary.

Maximum radiation (after all processing):

Rad_{max} : **1068 mR/hr**

Comment on Performance Limitation: **Test aborted due to high radiation.**

Comment on Multipacting, if Applicable:

5.9 Upload Files.

RF data (text file): [Link](#)

AUX Data File 1: [Link](#)

AUX Data File 2: [Link](#)

AUX Data File 3: [Upload File](#)

Responsible Authority/Designee:

Date:

6.0 Process Completeness Verification [Top](#)

6.1 Responsible Authority MUST ensure this Traveler is complete, all specifications are met and the device is ready for the next process.



Qualified

Need reprocessing

Rejected

Comment -

Responsible Authority/Designee: **Daniel Bafia**

Date: **11/7/2022**

6.2 Select the next destination for the cavity. If the option "Other" is chosen from the drop box, please type the location in the text field below the drop box.

Cavity Destination:

Other

Technician:

Date:

7.0 Process/Production Complete [Top](#)

Note: This section to be filled out by Process Engineering.

7.1 Verify the Traveler is accurate and complete. Personnel shall conduct a review of all steps to ensure all operations required have been completed/signed off by required personnel. Ensure all Discrepancy Reports, Non-Conformance Reports, Repair/Rework forms, Deviation Index and dispositions have been reviewed and followed by the Responsible Authority before being approved/completed.

Comments: -

Process Engineering/Designee: **Richard Motill**

Date: **11/8/2022**