



RFD Dressed Cavities

- Status of Production
- Readiness for PRR
- Delivery Dates

Leonardo Ristori - Fermilab

Global CC Coordination Meeting – 25 Sep 2020



AUP Prototype #1 – Received 18 Sep 2020



RF frequency measurements

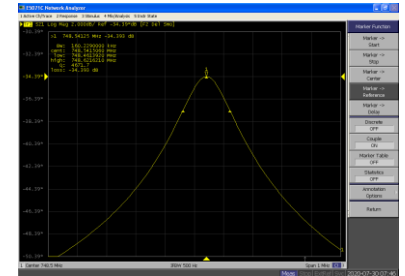
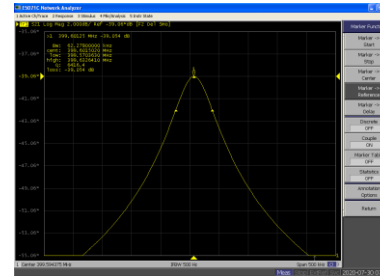
- First RF measurements are consistent with the one taken at Zanon

- Final Zanon measurements:

- 399.601 MHz QI= 6400
- 748.541 MHz QI= 4400

- FNAL Measurements:

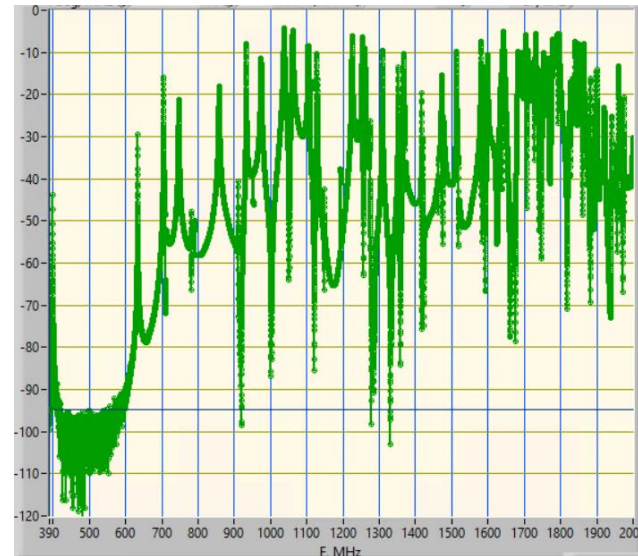
- 748 MHz mode was slightly over coupled at Zanon, shorter antenna needed.
- Full HOMs survey up to 2 GHz in progress



9/21/2020 4:44:23 PM. 1-2 Cavity NRFDP001 delivered from Zanon, Prototype #1 in ICB RFQC T-22.3 C H=40%, P=990 hPa, S21 BP2 to FPC.

F [MHz] QI

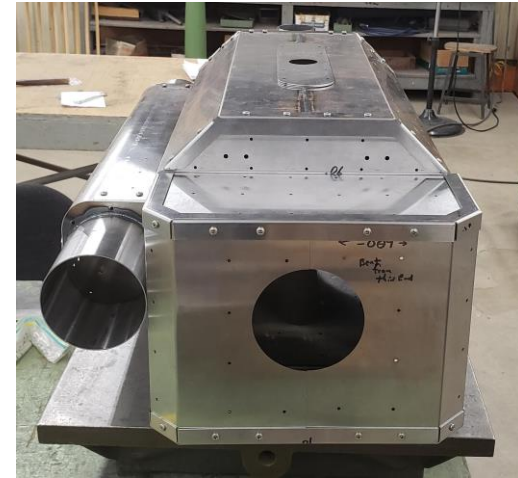
399.670	6872.645
748.766	7536.286



Next RF measurements and other steps

- Full HOMs survey
- Bead-pull of fundamental mode
- Bead-pull of interesting HOMs (TBD)
- Electric center measurements
- Multipoles measurements
- After RF:
 - Complete visual inspection
 - CMM
 - Leak check
 - Formal acceptance to Zanon
- Preparations for Cold Test at FNAL
 - VTS Hardware is ready
 - Move to ANL for degreasing, chemistry
 - Move to FNAL for heat treatment & clean-room preparations

Magnetic Shields (Ad-Vance, USA)



3 units ordered (1 spare)

Final QC at supplier complete, shipping imminent.

AUP Aware of small changes by UK after first integration.

Appears that we can apply to prototypes.

Readiness for Bare-Cavity PRR (QA documentation)

Description Procedure	Procedure N.	Revision	Status
Niobium Sheets	PO 657756	NA	QC Approved
Niobium & Nb55Ti (Rods/Plates/Disks)	PO ongoing	NA	QC docs not available
Niobium Tubes	PO ongoing	NA	QC docs not available
RFD Crab Cavity Drawing Package	3326.1.000.000	0	Check Ongoing (CERN)
Manufacturing Drawing Tooling	Not Available	0	Update Ongoing (ZRI)
Welding Book	3326.W.001	2	Check Ongoing (CERN)
- section 1: Welding Map	3326.W.001	2	Check Ongoing (CERN)
- section 2: WPS	3326.W.001	2	Check Ongoing (CERN)
- section 3: Test Coupon (WPQR)	3326.W.001 (Test Plan PQR p3326)	2	Check Ongoing (CERN)
- section 4: WOPQ	3326.W.001	2	Check Ongoing (CERN)
MIP – Prototypes (QCP @ ZRI)	3326.F.002	2	CERN comments received
MIP – Pre-series (QCP @ ZRI)	3326.F.001	2	Update Ongoing (ZRI)
Cleaning & Chemical Etching	3326.S.004	1	Approved
Identification, Marking, Traceability	3326.S.001	1	Approved
Radiographic Examination (RT)	3326.S.005	1	Approved
Radiographic Test Extent	Radiographic Tests Extent	1	Approved
Manufacturing Sequence	3326.S.008	0	Approved
Helium Leak (LT)	3326.S.006	0	Check Ongoing (CERN)
Dimensional Control	3326.S.002	0	Check Ongoing (CERN)
Visual Inspection	3326.S.003	1	Approved
Packing Procedure	3326.P.001	0	Check Ongoing (CERN)

Urgent!

Urgent!

QA documents provided by Zanon are available on EDMS CERN-0000194947

COVID-19 Impact on Schedule (Prototypes)

Prototypes:

CAVITIES - delays accumulated due to several (correlated ?) reasons:

- Unforeseen issues during final stages of assembly (e.g. frequency outside tolerance bandwidth)
- Impossibility to interact in person, leading to longer turnaround times for problem solving
- Inefficiencies and closures at E. Zanon during lock-down

Prototype Dressed Cavities:

- ETA Fall of 2021 first prototype to TRIUMF. Will continue to monitor impact of COVID.

RF ANCILLARIES – delays at Jlab due to lock-down more severe than what is experienced at other labs.

COVID-19 Impact on Schedule (PS & Series)

Pre-Series:

CAVITIES - Work at E. Zanon on Pre-Series is also experiencing delays for COVID-related inefficiencies/interactions issues as for the prototypes.

Fabrication lead time was also reassessed based on prototype experience.

PRR for Bare-Cavity Pre-Series is not yet scheduled.

We estimated to be ready in ~~Sep 2020~~ → Now Oct 2020? (TBD w/CERN)

We want to hold PRR before CD-3 review (which is Nov 17th)

RF ANCILLARIES – Start of fabrication at Jlab shifted to allow completion of prototypes for mechanical validation.

COVID-19 Impact on Schedule (PS & Series)

Series:

Cavities - Placement of PO still according to baseline, but revisited lead times as a result of recent experience with prototypes.

Schedule adjustments translate to a slippage on dressed cavities.

PO estimated in October 2021.

RF Ancillaries – Schedule delay to allow completion of pre-series RF Ancillaries

Delivery Dates

	Planned Delivery Date (CERN Master Schedule)	"Known" COVID Effects							Agreed Delivery Dates
Cavities 01 & 02	Jun-22								Jun-23
Cavities 03 & 04	Sep-22	Dec-22							Sep-23
Cavities 05 & 06	Nov-22		Mar-23						Dec-23
Cavities 07 & 08	Jan-23			Jun-23					Feb-24
Cavities 09 & 10	Mar-23			Aug-23					May-24

Deliveries to TRIUMF:

Deliveries are still within the agreed “window”, but we are experiencing delays of up to 5 months for the last delivery, with respect to “early” delivery dates.

Accumulated additional 2-3 months of delay since last coordination meeting in August, as we included the forecasted impact up to end of October 2020.

Additional delays could result if COVID impacts stretch beyond Oct 2020, and/or if string-assembly (mech. Validation) at CERN is delayed beyond Oct 2021.