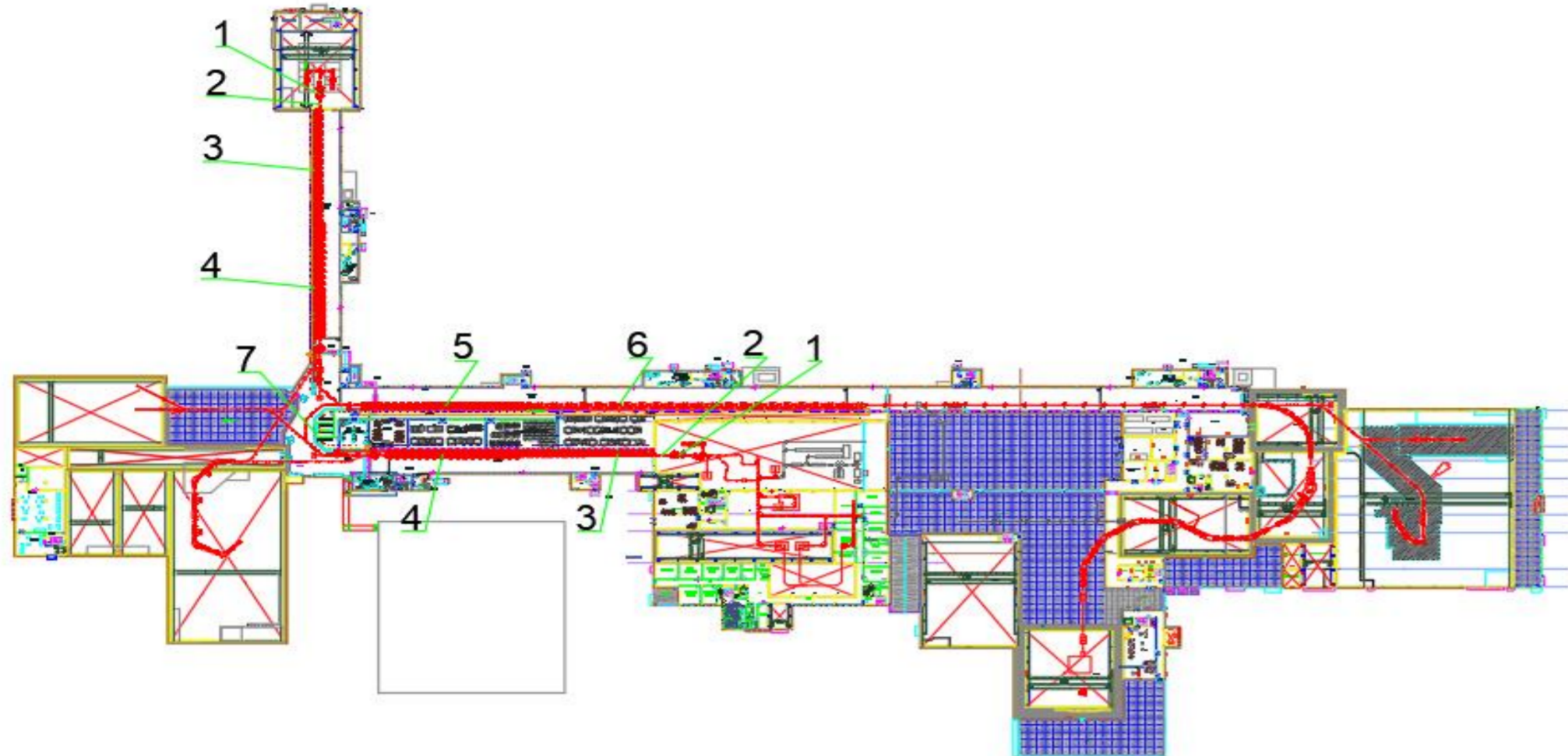


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Abstract

The high power RF (HPRF) systems have been designed for a heavy ion accelerator of Rare Isotope Science Project (RISP). The HPRF system includes SSPAs (160kW for RFQ, 4kW for QWR, 4kW for HWR), high power circulators, high power RF transmission system. The HPRF transmission systems have designed to provide RF power to each accelerator. The HPRF transmission systems for the performance test of RFQ and superconducting cavities have been installed and operated at the SRF test facility.

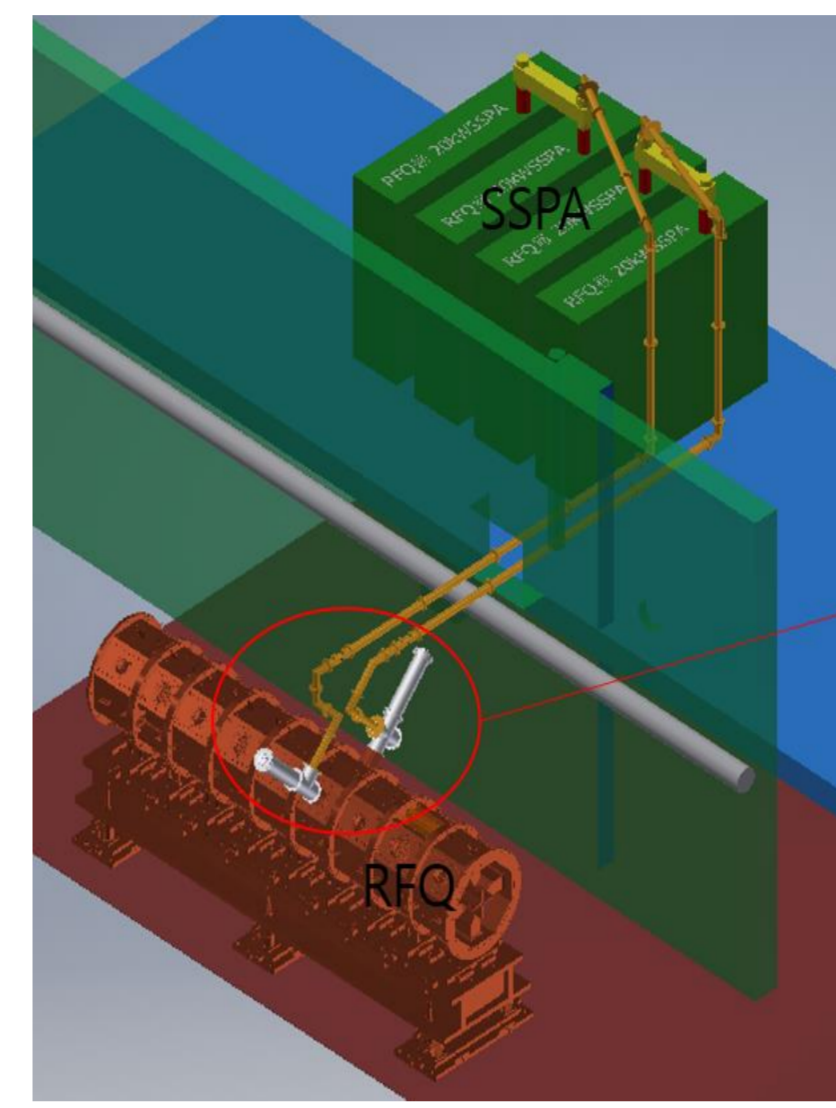
RISP System



Main specifications of RF system

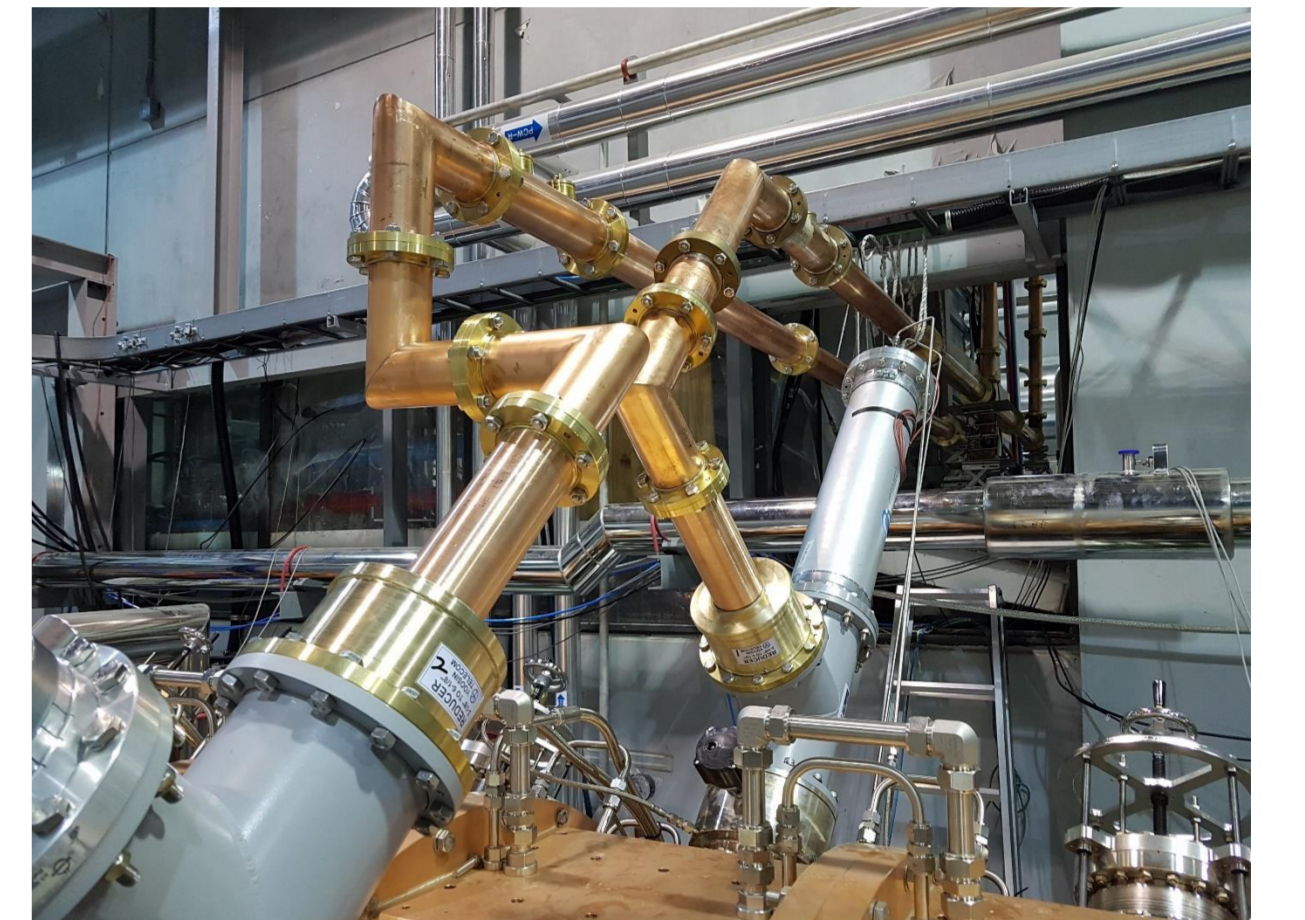
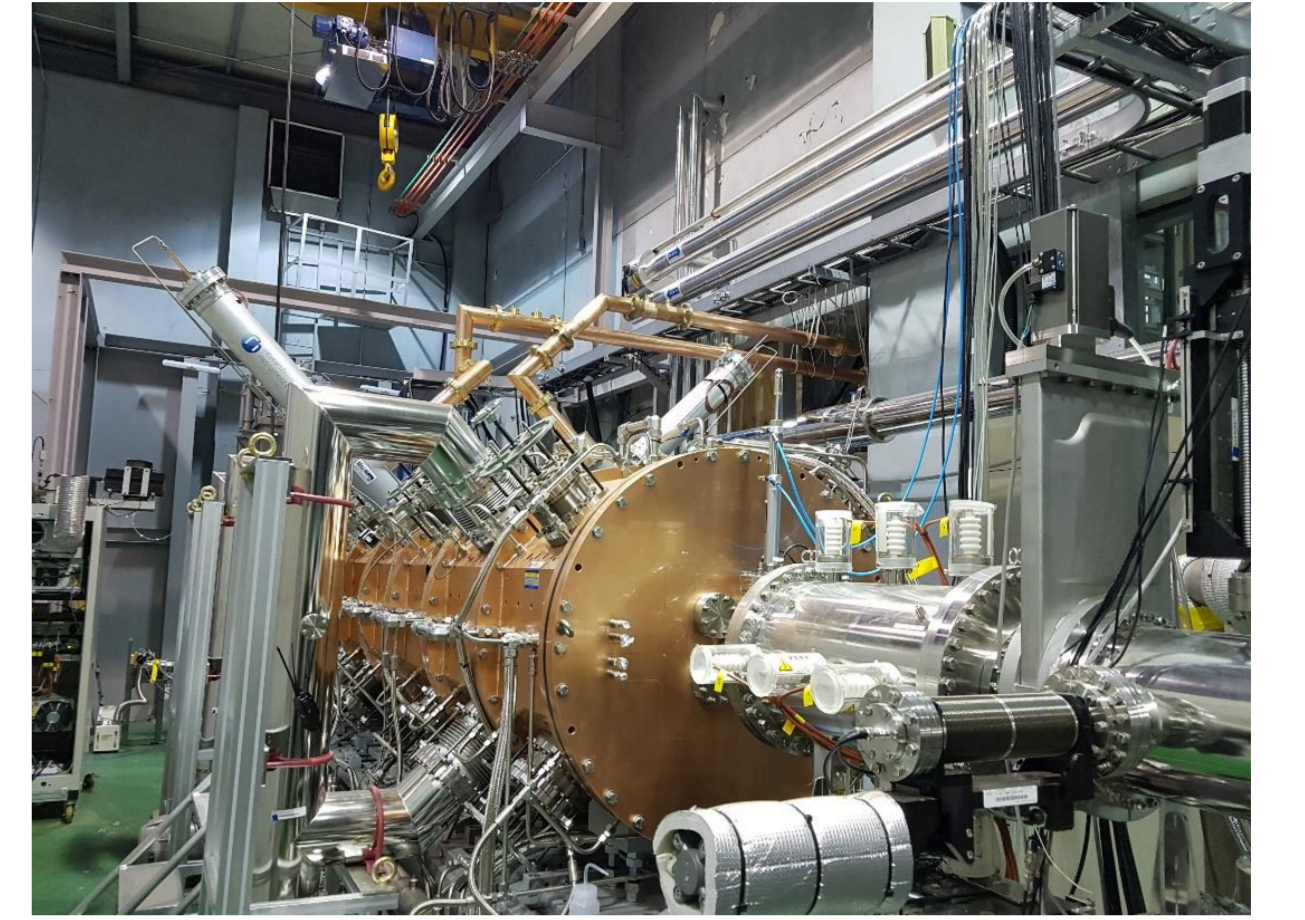
	Section No.	Cavity	Quantity (EA)	Frequency (MHz)	RF Power (kW)	RF Transmission Line Handling Power (kW)	RF Transmission Line
SCL1	1	RFQ	2	81.25	80	>160	6 1/8 inch EIA
	2	Rebuncher	4	81.25	20,15,4	>40,30,8	3 1/8 inch EIA
	3	QWR	22	81.25	4	>8	1 5/8 inch EIA
SCL2	4	HWR	102	162.5	4	>8	1 5/8 inch EIA
	5	SSR1	69	325	8	>16	3 1/8 inch EIA
SCL3	6	SSR2	144	325	20	>40	4 1/16 inch EIA
	1	RFQ	2	81.25	80	>160	6 1/8 inch EIA
SCL3	2	Rebuncher	4	81.25	20,15,4	>40,30,8	3 1/8 inch EIA
	3	QWR	22	81.25	4	>8	1 5/8 inch EIA
P2DT & CSS	4	HWR	102	162.5	4	>8	3 1/8 inch EIA
	7	HWR	6	162.5	4	>8	1 5/8 inch EIA

SRF Test Facility RFQ

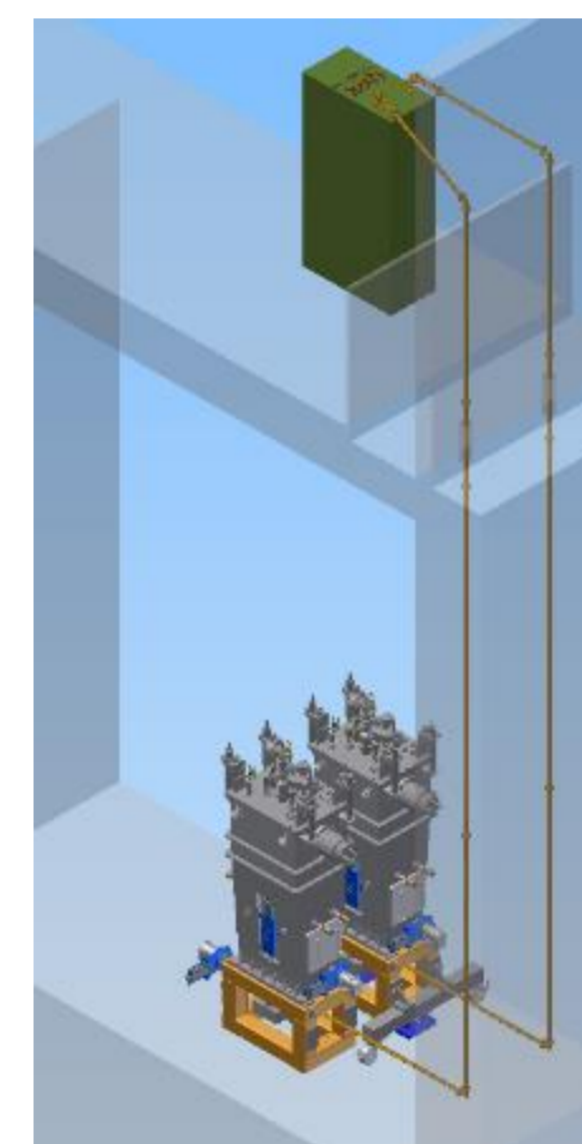


RFQ design

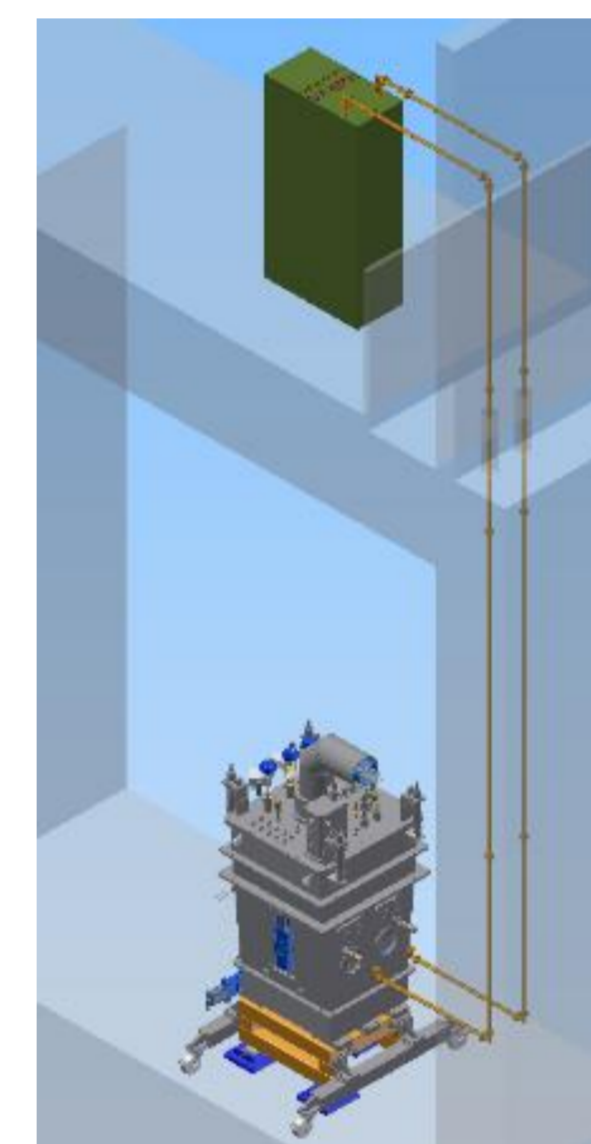
- Frequency : 81.25 MHz
- Transmission line : 3-1/8" rigid coaxial line



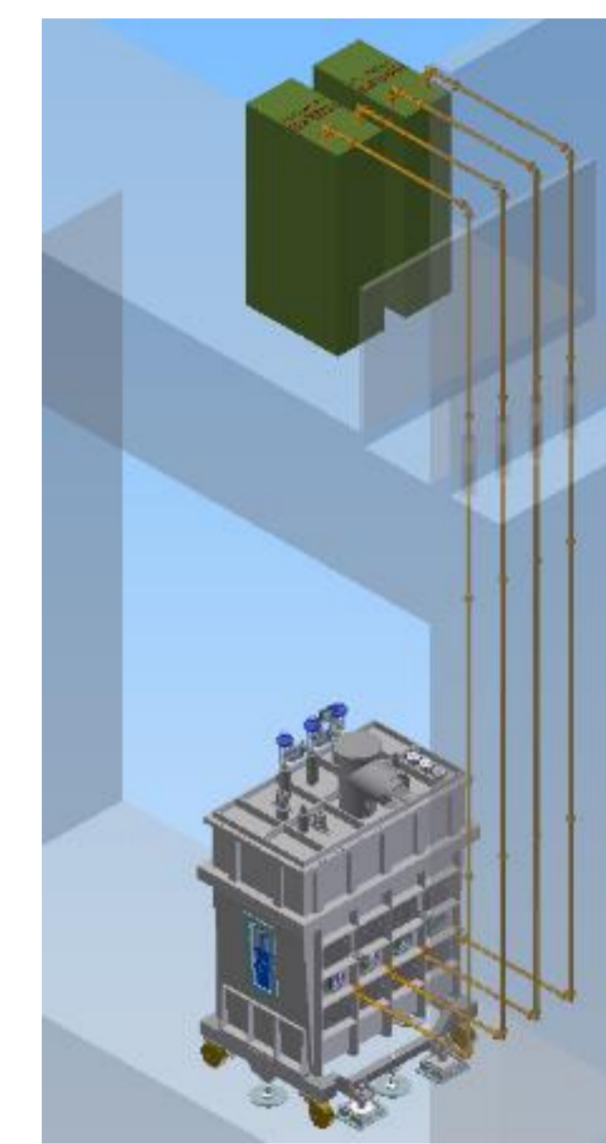
QWR, HWR, SSR1 Between gallery and tunnel



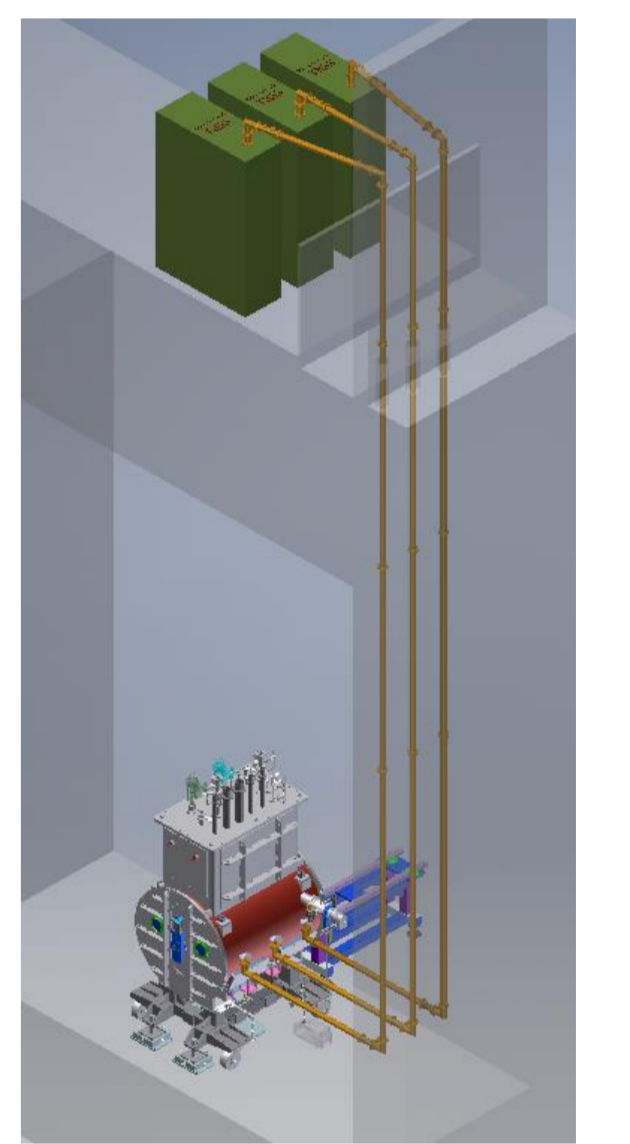
QWR



HWR#A



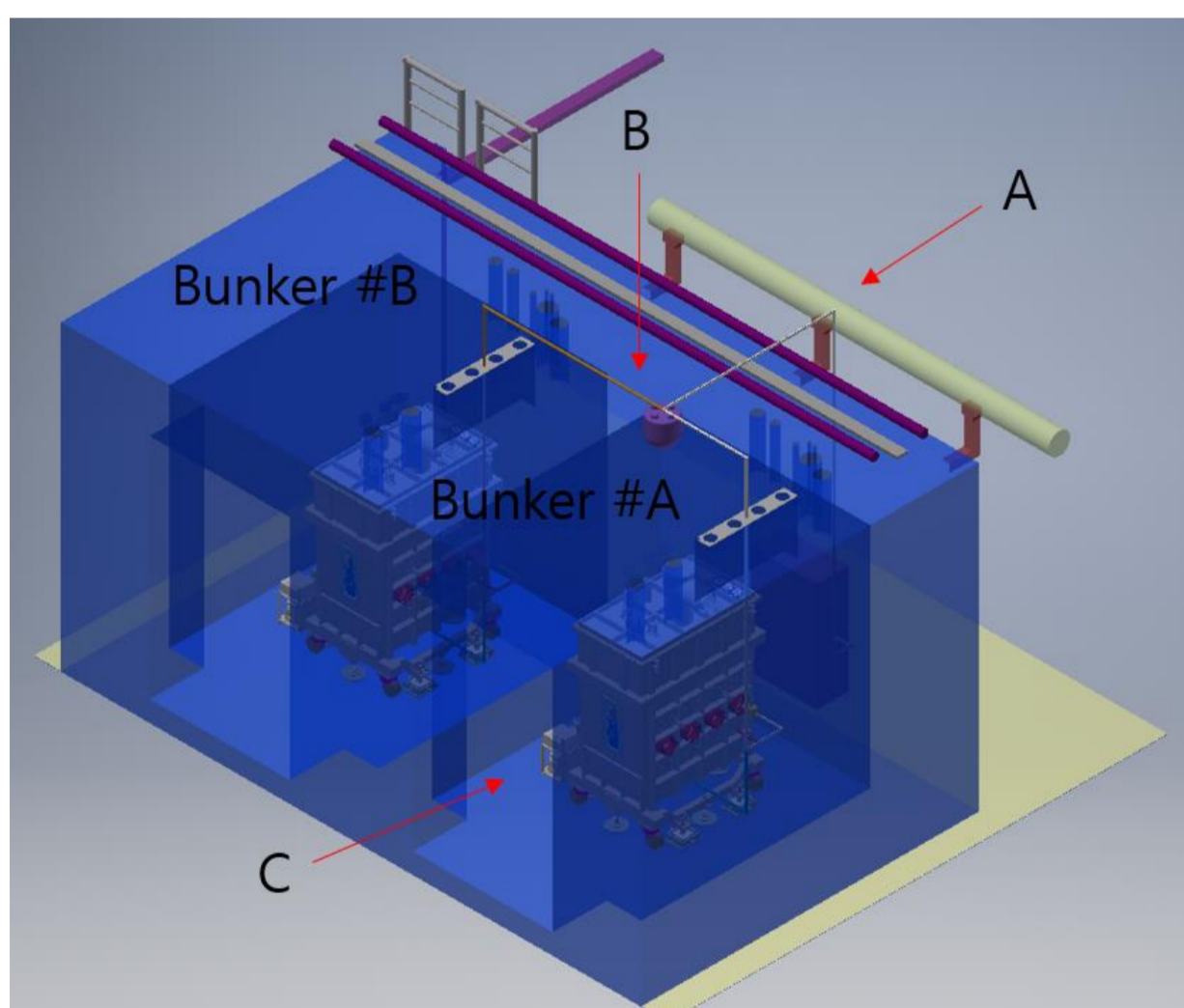
HWR#B



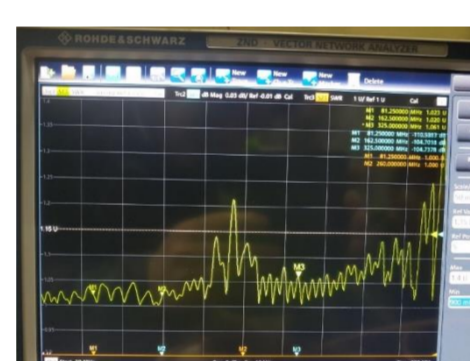
SSR1

- QWR Transmission line : 1-5/8" 50 ohm rigid coaxial line
- HWR Transmission line : 1-5/8" 50 ohm rigid coaxial line
- SSR1 Transmission line : 3-1/8" 50 ohm rigid coaxial line
- SSR2 Transmission line : 4-1/16" 50 ohm rigid coaxial line

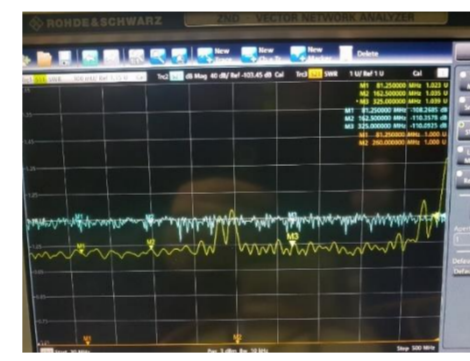
SRF Test Facility Horizontal Test



Horizontal Test bunker design



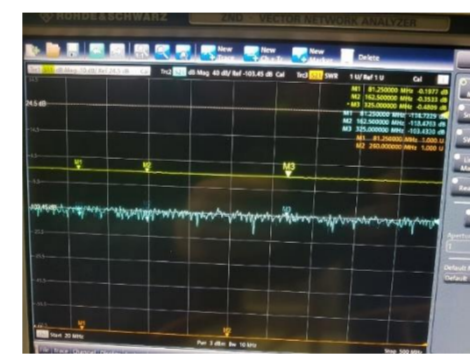
#A VSWR



#A Loss



#B VSWR



#B Loss

Measured Value

- Bunker #A VSWR : 1.023, Loss : 0.1107
- Bunker #B VSWR : 1.023, Loss : 0.0989

- Frequency : 81.25 MHz, 162.5 MHz

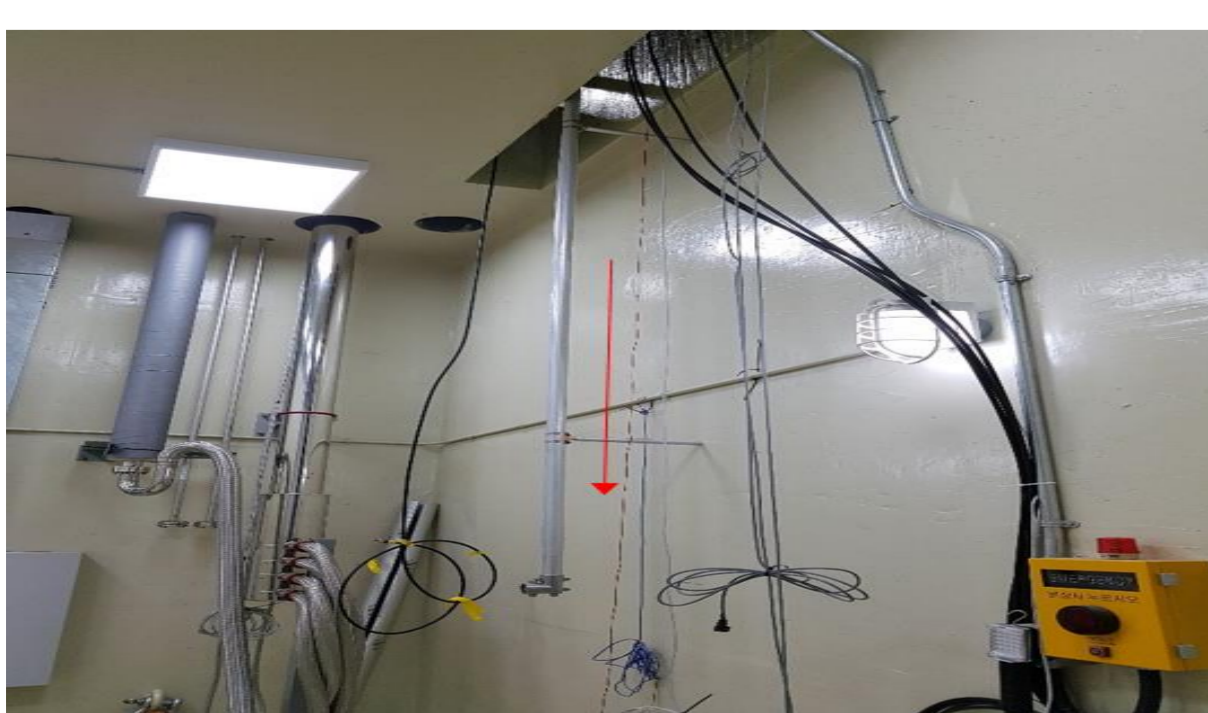
- Transmission line : 1-5/8" rigid coaxial line (Unflange)



A-Back side



B-Top

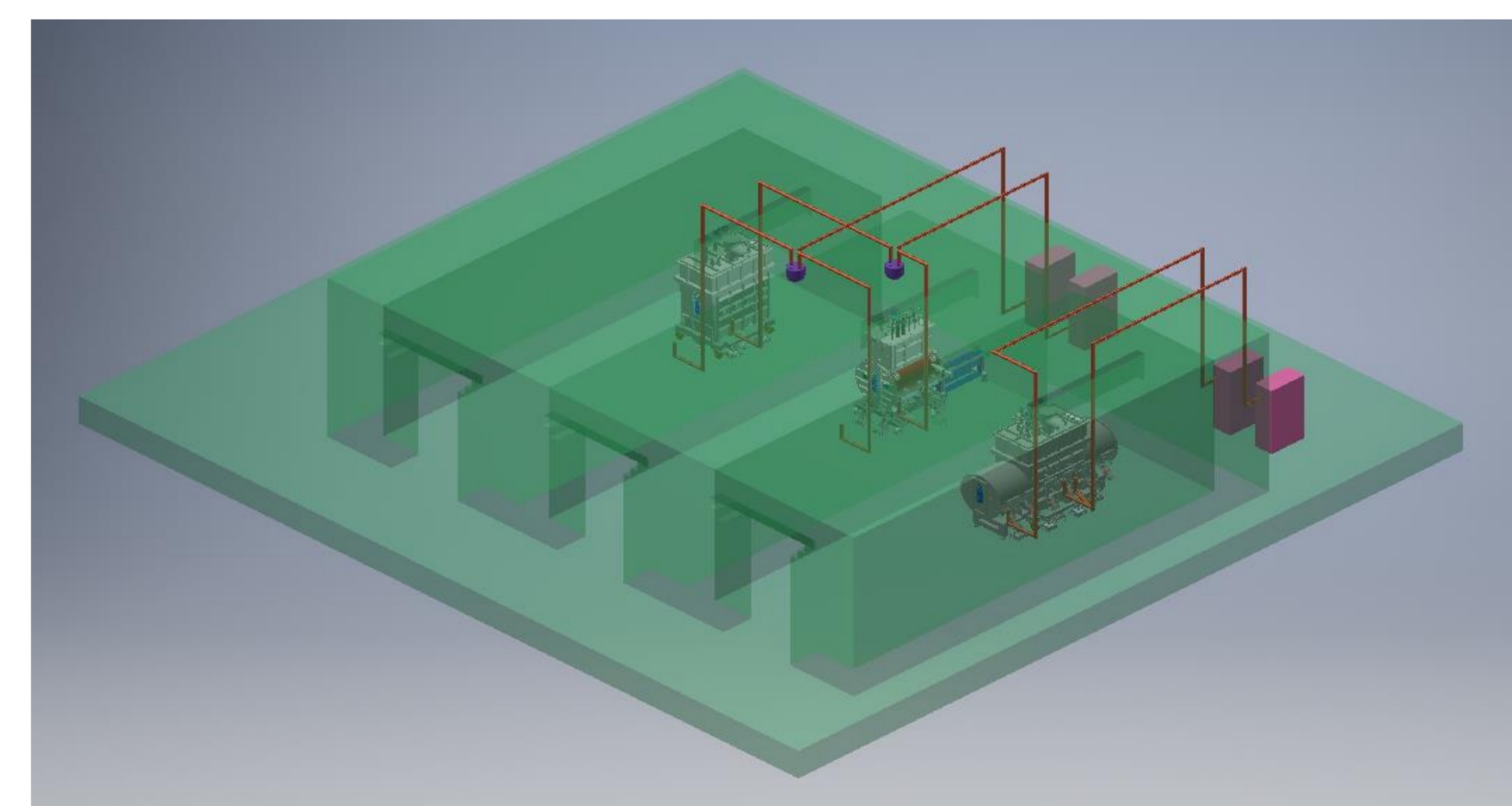


C-Inside 1



C-Inside 2

SRF Horizontal Test



- Frequency : 162.5 MHz, 325 MHz
- Transmission line : 4-1/16" rigid coaxial line

Summary

HPRF transmission systems from SSPAs in the gallery to cavities in the tunnel have been designed for RISP heavy ion accelerator.

Two 6-1/8" coaxial lines will be installed to deliver 150 kW power to RFQ accelerator. (Each line deliver 80 kW RF power)

1-5/8" coaxial lines for QWR and HWR, 3-1/8" lines for SSR1, and 4-1/16" lines for SSR2 will be installed.

HPRF transmission lines for SRF test facilities (Munji and Shindong) have been designed.