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ESS spoke RF power station (400kwp@352mhz) soak testing: issues and mitigations

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The European Spallation Source (ESS) will accelerate a beam of protons with a beam pulse width 2.86ms long and pulse repetition frequency 14Hz. The acceleration will be provided by 155 cavities, out of which 97% of the cavities are superconducting.

The first section of the ESS superconducting linac is the Spoke linac. The spoke linac increases the beam energy from 90MeV to 216MeV using the 26 superconducting Spoke cavities, resonant at 352MHz, situated in 13 cryomodules. The spoke cavities are powered by Spoke RF Power Stations (RFPS). The maximum power requirement for the spoke RFPS is 400kWp@352MHz. Outputs of two tetrode TH595A based amplifiers are combined to achieve 400kW output.

The RFPS are delivered by Elettra as a part of Italian in-kind contribution towards the construction of ESS. The detailed design of RFPS is done by ESS and Elettra. At present, 27 RFPS are delivered to ESS. Out of these, 20 RFPSs are installed and commissioned at ESS gallery. Out of these, four RFPSs are under soak testing at 400kWp and four RFPSs are under soak testing at 300kWp. The present paper discusses test results, issues faced during soak testing and their possible mitigations.

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Footnotes

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Yes

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