

Abstract

The Cryo Module Test Bench (CMTB) at DESY is used since several years for the SRF module tests. Three XFEL prototypes modules, PXFEL1,2,3, were tested on this facility. An update on the SRF modules testing activities since PXFEL1 test is presented (see Table 1).

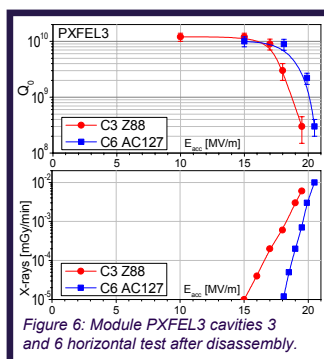
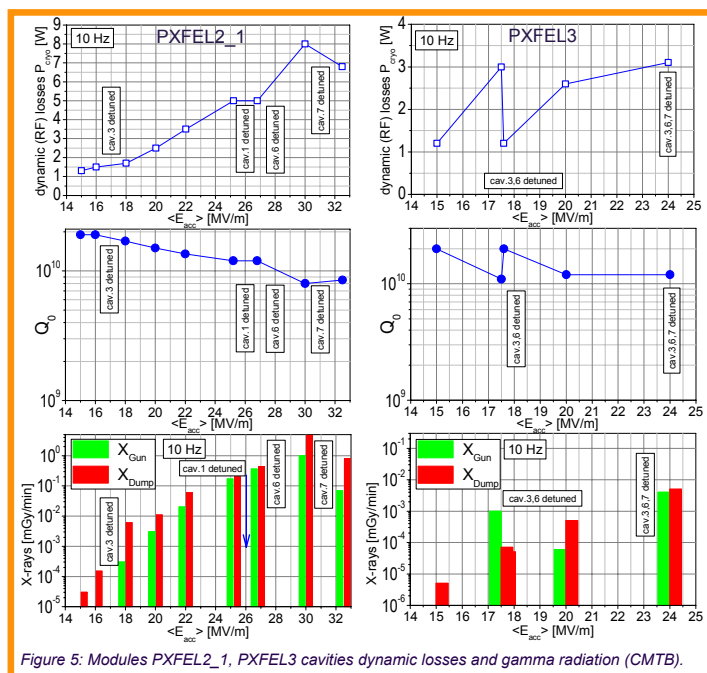
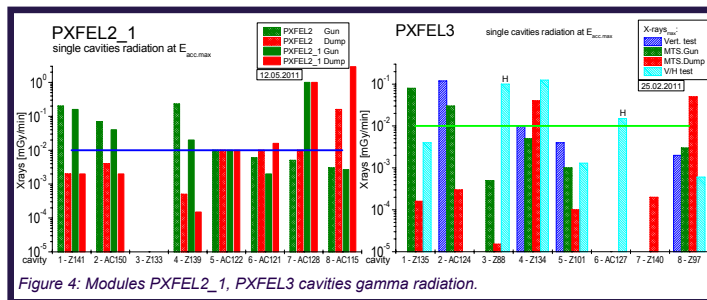
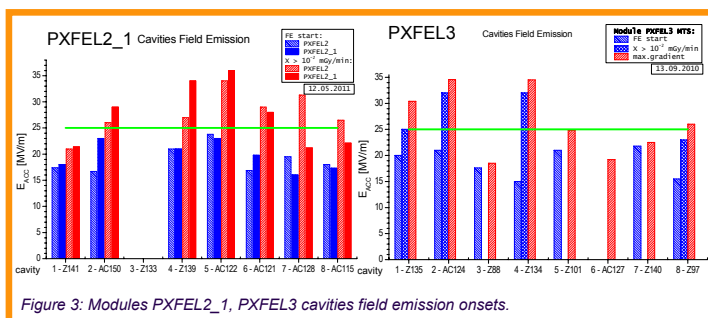
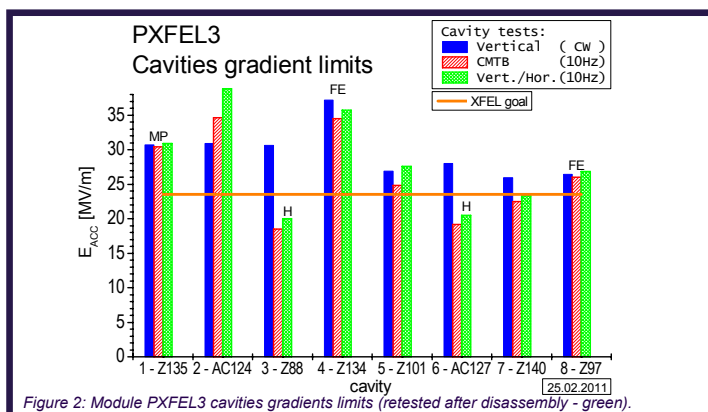
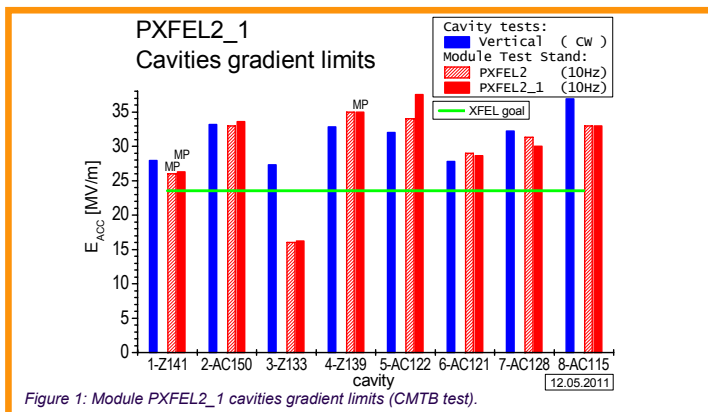


Table 1. Module Tests at DESY.		
Module	Date	comment
PXFEL2	Oct.2009	first test
PXFEL3	Aug.2010	first test
	Feb.2011	after disassembly: single cavities
PXFEL2_1	Mar.2011	after reassembly at CEA Saclay

Summary

- Two new XFEL prototype accelerating modules (see Table 1) were tested on CMTB at DESY.
- PXFEL2_1 cavities string was not reassembled, but vented from dump-side (quadrupole and cavity 8). PXFEL3 cavities were tested after the disassembly at DESY.
- PXFEL2_1 Cavity 1 did show strong multipacting at 19..21 MV/m with high FE (up to 3 mGy/min) and BD, it was successfully conditioned, this was the case also with module PXFEL2. Cavity 4 had MP at 20..21 MV/m as well. Cavity 3 is limited at 16.2 MV/m, without FE, like in PXFEL2. Cavity 5 went to 37.5 MV/m and was RF power limited. Cavities 7 and 8 showed strong FE increase (mostly at cavity 7), it was partially conditioned during the test. Accelerating gradient limits are close to PXFEL2 ones, no degradation.
- Module PXFEL3 suffered from two cavities degradation: cavity 3 is limited at 18.5 MV/m with very low FE, cavity 6 is limited at 19.2 MV/m – no FE measured. Cavities 3 and 6 show high dynamic cryo-losses just before the quench. Cavity 1 did show multipacting at 22.5 MV/m, it was successfully conditioned. Cavities 4 and 8 have high FE, starting from 15 MV/m. Stable operation was possible with average gradient of 17.5 MV/m with low gamma radiation (10-3 mGy/min). Cavities retested after the module disassembly showed the same gradient limits. Both cavities 3 (Z88) and 6 (AC127) did have high cryo-losses (up to 20 W) in horizontal test just before BD, cavity 6 showed FE (initially high and partially conditioned).
- Both tested module suffered from some cavities degradation, but the degraded cavities behavior is different. Cavity degradation phenomena is under investigation.