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Construction and commissioning Xbox3: a very high capacity X-band test stand

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The Compact Linear Collider (CLIC) beam-based acceleration baseline uses travelling wave accelerating structures at a frequency of 12 GHz. In order to prove the performance of these structures at high peak power and short pulse width RF, two klystron-based test facilities have been put in operation in the last years. The third X-band testing facility at CERN (Xbox3) has recently been commissioned and has increased the number of testing slots available by 200%. Xbox3 uses a novel way of combining 4 relatively low peak power (6 MW) but high average power klystron units whose power is combined to feed four testing slots with RF to the required power with a repetition rate of up to 400 Hz possible in one slot or up to 100 Hz per slot if there are four devices under test. Besides the repetition rate, peak power, pulse length and pulse shape can be customized to fit the test requirements. In this paper we will describe the layout of the facility, commissioning experience and operation modes and results that we have achieved so far. This novel way of combining pulsed RF high power can eventually be used for many other applications where multiple test slots are required.

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