Amplifier Test

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1 Purpose

Test the signal level at the load of the back end chain. Compare signal levels for a burst type signal (like that of the excitation system) versus a continuous sinusoidal signal.

2 Experimental Procedure

For this test, we used the existing back end configuration as shown in Figure ???. For the burst type signal we used the excitation system, and for the continuous type signal we used an arbitrary function generator. The frequencies of the signal are 100, 200, 300, 400 MHz. The signals were adjusted to be approximately the same level when input into the back end chain. At the MUX out load we measure the signal with a Tektronix oscilloscope, triggering on the load signal itself, recording 1K turns (fiducial triggers). The negative (V_{load}^{-p}) and positive (V_{load}^p) peak voltages generated were recorded, from which peak to peak voltages (V_{load}^{pp}) were computed. The input signal was attenuated by 10 dB compared to the normal operating signal used for beam excitation as a cautionary measure. One measurement was made at normal operating power. We measure the loads of two amplifiers, amp 2 and amp 4.

3 Measurement

Tables 1 and 2 display the input signals and measured signals for the different frequencies when monitoring the load of amplifier 4 and amplifier 2, respectively.

Operating at the nominal input signal, removed additional 10 dB attenuator (-11 dBm signal level at 100 MHz at entrance of Wideband Gate). Burst: $V_{load}^{-p} = -78$ mV, $V_{load}^p = 58$ mV, $V_{load}^{pp} = 136$ mV. Continuous: Burst: $V_{load}^{-p} = -44$ mV, $V_{load}^p = 49$ mV, $V_{load}^{pp} = 93$ mV

4 Conclusions

It seems that the burst and continuous signals are rather similar in levels measured at the load, contrary to our initial thought that the continuous levels were about twice that of the burst levels (2:1). See .wfm files listed for actual signals recorded for 1K turns (fiducial triggers).

Table 1: Amplifier 4 load measurement with corresponding input signal levels for burst and continuous type signals

File (130117_)	Frequency (MHz)	V_{in}^{pp}	V_{load}^{-p}	V_{load}^p	V_{load}^{pp}
Burst					
	100	53.0	-32.0	40.8	72.8
	200	50.0	-26.0	25.0	51.0
145128	300	45.7	-8.8	17.2	26.0
151339	400	40.5	-6.6	13.6	20.2
Continuous					
	100	56.0	-45.2	45.2	90.4
	200	49.9	-21.6	21.6	43.2
	300	45.8	-13.8	13.8	27.6
151918	400	40.7	-9.6	10.2	19.8

Table 2: Amplifier 2 load measurement with corresponding input signal levels for burst and continuous type signals

File (130117_)	Frequency (MHz)	V_{in}^{pp}	V_{load}^{-p}	V_{load}^p	V_{load}^{pp}
Burst					
153419	100	53.0	-52.0	39.6	91.6
153537	200	50.0	-21.2	23.0	44.2
153729	300	45.7	-12.6	5.0	17.2
153947	400	40.5	-10.2	5.0	15.2
Continuous					
152910	100	56.0	-42.8	43.6	86.4
152805	200	49.9	-18.4	18.6	37.0
152521	300	45.8	-8.6	8.8	17.4
152302	400	40.7	-6.6	6.2	12.8