ARF1 Frequency and Amplitude Curve Calibration

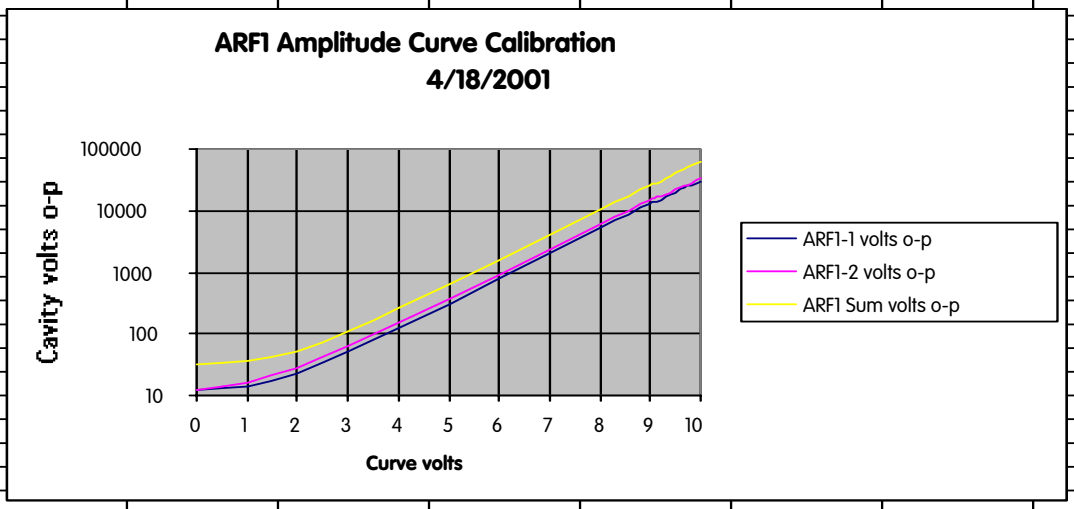
ARF1 was calibrated and checked on 4/18/01. The technique used was to set the start/stop timers (A:R1LLT1 and A:R1LLT2) for duration of 200 msec. Driving the cavities for longer than 200 msec at full voltage could put some stress on the Hipotronics anode supply. The Camac curve generator card was substituted with a precision DC voltage source. Data for both amplitude and frequency were taken with the DC source. A HP 8563A spectrum analyzer in zero span with resolution bandwidth of 1 MHz at a center frequency of 52.818 MHz was used to take the amplitude data. The dynamic curve was a triangle waveform provided by a triggered HP3213A function generator. Frequency was measured on the Fluke frequency counter mounted in the rack in AP50 (with the high level RF off).

The attached data and graph contain the current calibration. ARF1-1 is slightly lower voltage than ARF1-2, but well within spec. The calibration was made with the Anode supply at 9 Kvolts, the bend busses were off due to an access that was in progress. Due to the unregulated Anode supply, the voltage levels observed may be slightly higher than with bend busses on. The dynamic performance with the triangle waveform looks correct. The peak voltages measured for ARF1-1 and ARF1-2 were 27.1 KV and 32.9 KV respectively. The calibration for the fanback is 22 Kvolts per volt for ARF1-1&2, and 66 Kvolts per volt for ARF1 Sum.

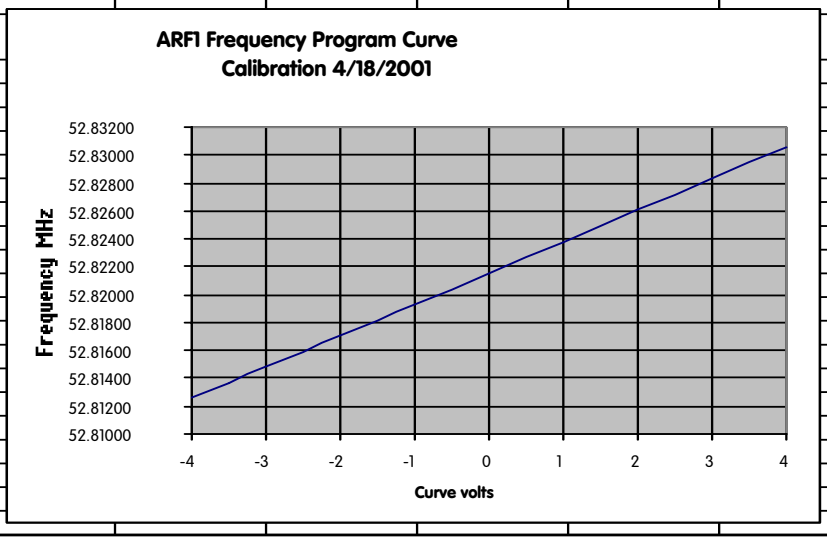
ARF1 has historically run with a flat top voltage duration of 160 msec. The current curve generator has lengthened that time considerably. The curve generator should take full advantage of the 65 dB dynamic range measured.

ARF1 Calibrations 4/18/01

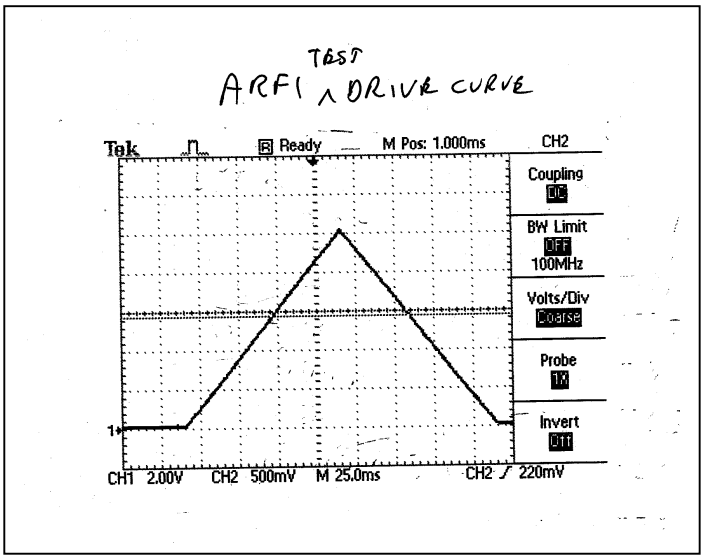
Curve drive Volts	ARF1-1 volts o-p	ARF1-2 volts o-p	ARF1 Sum volts o-p	ARF1-1 dBm	ARF1-2 dBm	ARF1 Sum dBm
0	12	13	32	-55.33	-54.83	-56.17
1	14	16	36	-54.00	-52.83	-55.33
2	23	27	50	-49.50	-48.17	-52.33
3	50	62	107	-42.83	-41.00	-45.83
4	124	150	258	-35.00	-33.33	-38.17
5	311	369	635	-27.00	-25.50	-30.33
6	796	928	1596	-18.83	-17.50	-22.33
7	2118	2376	4164	-10.33	-9.33	-14.00
8	5216	5968	10665	-2.50	-1.33	-5.83
9	12614	14416	24802	5.17	6.33	1.50
9.1	13879	15572	27288	6.00	7.00	2.33
9.2	15271	17134	30059	6.83	7.83	3.17
9.3	16821	18508	33073	7.67	8.50	4.00
9.4	18508	19992	36390	8.50	9.17	4.83
9.5	19992	21997	40085	9.17	10.00	5.67
9.6	21570	23761	44104	9.83	10.67	6.50
9.7	23761	25636	48526	10.67	11.33	7.33
9.8	25636	28240	53454	11.33	12.17	8.17
9.9	28240	31071	58814	12.17	13.00	9.00
10	28765	32912	62299	12.33	13.50	9.50

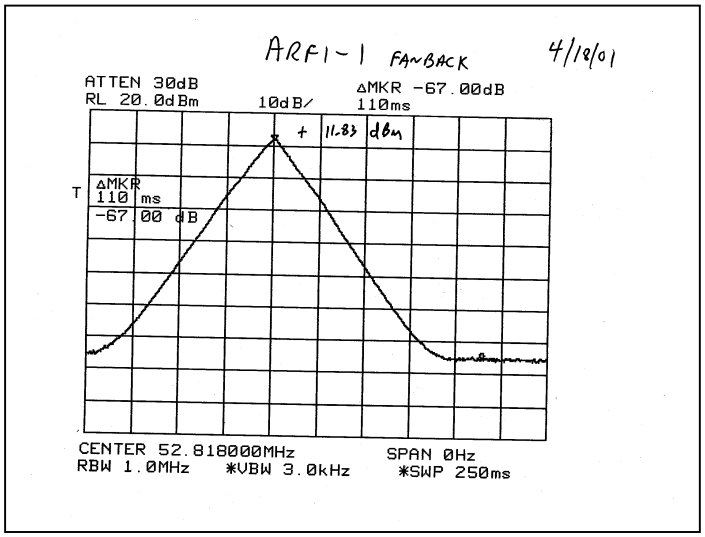


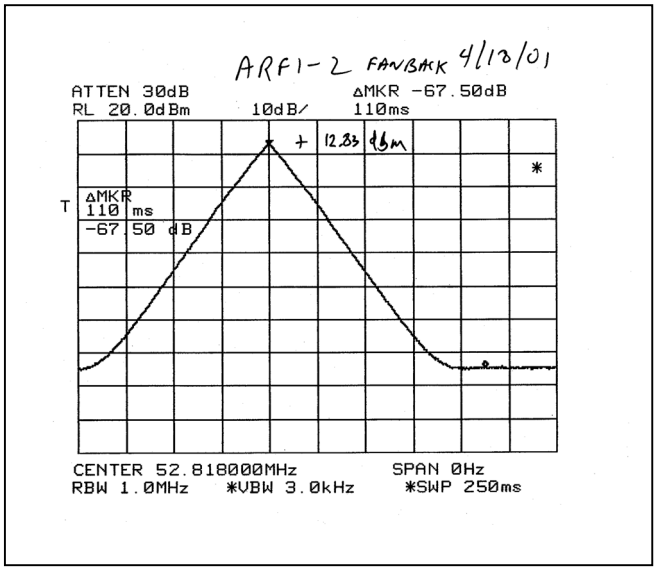
Curve drive Volts	Frequency MHz
-4	52.81258
-3.5	52.81368
-3	52.81480
-2.5	52.81591
-2	52.81702
-1.5	52.81814
-1	52.81927
-0.5	52.82040
0	52.82153
0.5	52.82267
1	52.82380
1.5	52.82494
2	52.82608
2.5	52.82721
3	52.82834
3.5	52.82947
4	52.83060



ARF1 curve used for dynamic system test. Function generator 0-10 Volt ramp is pumped directly into the LLRF.







ARF1 fanback spectrograms for triangle curve drive. Peak values are 27.1 kV ARF1-1, 30.5 kV ARF1-2, 55 kV for ARF1 Sum. While a higher voltage is possible from the DC drive, some distortion may result when driven dynamically to higher voltages.