VEGAS modes and the parameters associated with the Modes

D. Anish Roshi[1]
[1] National Radio Astronomy Observatory, Green Bank & Charlottesville

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The parameters required for configuring different modes are given in Table 1. The Notes below are linked to Table 1.

Notes

1. The maximum bandwidth over which the subbands can be tuned is determined by the ADC sampling frequency. For Modes 20 to 24, this bandwidth is 1500 MHz and for Modes 25 to 29 it is 1000 MHz. The config tool computes the LOs so that the average of the sky frequencies that can be observer in these modes will be tuned to $IF3_{center}$. The $IF3_{center}$ will be 750 MHz for Modes 20 to 24 and 500 MHz for Modes 25 to 29. The config tool then computes the IF3 frequencies corresponding to the user specified sky frequencies and pass these values to the VEGAS manager. The config tool shall use the parameter sub_frequencyX:1:8, X=A to H, to pass this information to the manager.
2. Based on the 8 sub_frequencyX:1:8 values the manager computes the actual digital LO frequencies (actual_LO). For subband modes CRVAL1 = actual_LO for each subband.

Revision History

1. Dec 5, 2013 – updated the spectral resolution of mode 1 and 2.

Table 1: **Valon Freq, Effective Sampling freq and VEGAS IF Center freq**

Mode Name	Nspecwin[d]	Bandwidth of Spectral Window (MHz)	Nchan[e]	Spectral resolution (KHz)	Valon freq (f_{valon}) (MHz)	Effective Samp freq[c] (MHz)	IF_3[a] (MHz)	CRVAL (Hz)	filter_bw (MHz)
Single Sub-band mode									
Mode 1 (H1K/HBW)	1	1250	1024	1465	1500	3000(2xf_{valon})	760[b]	$f_{valon}/2$	1400
Mode 2 (H16K/HBW)	1	1250	16384	92	1500	3000(2xf_{valon})	760[b]	$f_{valon}/2$	1400
Mode 3 (H16K/HBW)	1	850	16384	61	1000	2000(2xf_{valon})	505[b]	$f_{valon}/2$	950
Mode 4 (L1/LBW1)	1	187.5	32768	5.7	1500	375($f_{valon}/4$)	751[b]	$f_{valon}/2$	950
Mode 5 (L1/LBW1)	1	187.5	65536	2.9	1500	375($f_{valon}/4$)	751[b]	$f_{valon}/2$	950
Mode 6 (L1/LBW1)	1	187.5	131072	1.4	1500	375($f_{valon}/4$)	751[b]	$f_{valon}/2$	950
Mode 7 (L1/LBW1)	1	100	32768	3.1	800	200($f_{valon}/4$)	401[b]	$f_{valon}/2$	950
Mode 8 (L1/LBW1)	1	100	65536	1.5	800	200($f_{valon}/4$)	401[b]	$f_{valon}/2$	950
Mode 9 (L1/LBW1)	1	100	131072	0.8	800	200($f_{valon}/4$)	401[b]	$f_{valon}/2$	950
Mode 10 (L8/LBW1)	1	23.44	32768	0.7	1500	46.875($f_{valon}/32$)	250	$f_{valon}/6$	950
Mode 11 (L8/LBW1)	1	23.44	65536	0.4	1500	46.875($f_{valon}/32$)	250	$f_{valon}/6$	950
Mode 12 (L8/LBW1)	1	23.44	131072	0.2	1500	46.875($f_{valon}/32$)	250	$f_{valon}/6$	950
Mode 13 (L8/LBW1)	1	23.44	262144	0.1	1500	46.875($f_{valon}/32$)	250	$f_{valon}/6$	950
Mode 14 (L8/LBW1)	1	23.44	524288	0.05	1500	46.875($f_{valon}/32$)	250	$f_{valon}/6$	950
Mode 15 (L8/LBW1)	1	11.72	32768	0.4	750	23.438($f_{valon}/32$)	250	$f_{valon}/3$	950
Mode 16 (L8/LBW1)	1	11.72	65536	0.2	750	23.438($f_{valon}/32$)	250	$f_{valon}/3$	950
Mode 17 (L8/LBW1)	1	11.72	131072	0.1	750	23.438($f_{valon}/32$)	250	$f_{valon}/3$	950
Mode 18 (L8/LBW1)	1	11.72	262144	0.05	750	23.438($f_{valon}/32$)	250	$f_{valon}/3$	950
Mode 19 (L8/LBW1)	1	11.72	524288	0.02	750	23.438($f_{valon}/32$)	250	$f_{valon}/3$	950
8 Sub-band modes									
Mode 20 (L8/LBW8)	8	23.44	4096	5.7	1500	46.875($f_{valon}/32$)	(see Note 1)	(see Note 2)	1400
Mode 21 (L8/LBW8)	8	23.44	8192	2.9	1500	46.875($f_{valon}/32$)	(see Note 1)	(see Note 2)	1400
Mode 22 (L8/LBW8)	8	23.44	16384	1.4	1500	46.875($f_{valon}/32$)	(see Note 1)	(see Note 2)	1400
Mode 23 (L8/LBW8)	8	23.44	32768	0.7	1500	46.875($f_{valon}/32$)	(see Note 1)	(see Note 2)	1400
Mode 24 (L8/LBW8)	8	23.44	65536	0.4	1500	46.875($f_{valon}/32$)	(see Note 1)	(see Note 2)	1400
Mode 25 (L8/LBW8)	8	15.625	4096	3.8	1000	31.25($f_{valon}/32$)	(see Note 1)	(see Note 2)	950
Mode 26 (L8/LBW8)	8	15.625	8192	1.9	1000	31.25($f_{valon}/32$)	(see Note 1)	(see Note 2)	950
Mode 27 (L8/LBW8)	8	15.625	16384	0.95	1000	31.25($f_{valon}/32$)	(see Note 1)	(see Note 2)	950
Mode 28 (L8/LBW8)	8	15.625	32768	0.48	1000	31.25($f_{valon}/32$)	(see Note 1)	(see Note 2)	950
Mode 29 (L8/LBW8)	8	15.625	65536	0.24	1000	31.25($f_{valon}/32$)	(see Note 1)	(see Note 2)	950

[a] The user specified sky frequency will be mapped to these default VEGAS IF freq IF_3. [b] The IF center frequency has been shifted by about 1% of the bandwidth from half the sampling frequency since the central channel will have high value due to offsets in the ADC cores.[c] CDELTA=effective_Samp_freq/Number_of_spec_channels in Hz. [d]Number of spectral window per spectrometer per pol. [e]Number of spectral channel per pol per spectral window.