

# MRAO FSX-3 (10-bit) Spectrograph Step Calibration

30-Jul-2013 14:25 UTC

HP461A noise source + Kay 431D step attenuator

Calibration Plane: Multicoupler Input

T0 (K)	290
Noise source temperature (MK)	74.8
Feed loss, cal plane to antenna (dB)	5.5
Receiver noise figure (dB)	6.0

RSS Color Offset:	265	280	0.00	0.00
RSS Color Gain:	1.90	3.30	1.00	1.00

Solar

Jupiter

Custom 1

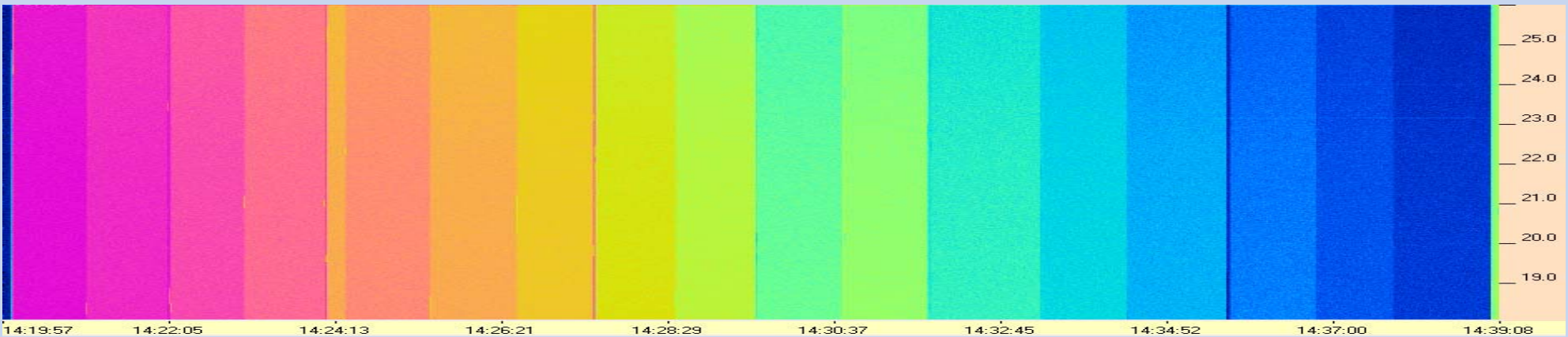
Custom 2



Att. dB	Source Temp (kK)	Equiv. Ant. Temp. (kK)	50 s Avg. @ Average MHz
0.1	73,098	259,358	740
3.1	36,636	129,987	708
6.1	18,362	65,148	677
9.1	9,204	32,652	645
11.9	4,831	17,136	615
14.8	2,478	8,788	584
17.8	1,243	4,405	552
21.1	582	2,060	519
24.1	292	1,033	486
27.0	150	530	454
29.7	81	285	424
32.6	42	146	391
35.6	22	73	362
38.7	11	36	335
42.2	5.7	16.3	312
45.1	3.5	8.5	297
48.1	2.3	4.4	287

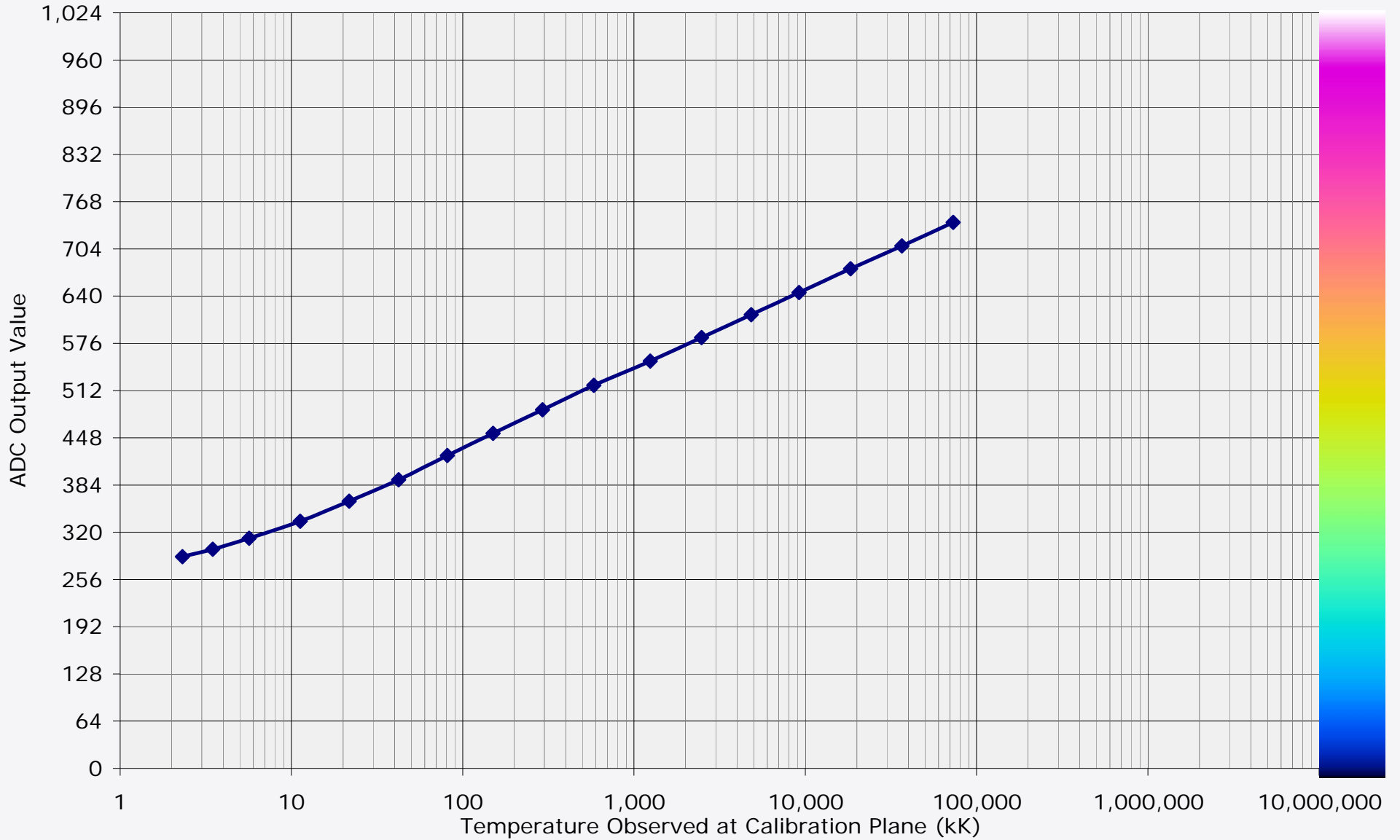
Adjusted Value	Adjusted Value	Adjusted Value	Adjusted Value
903	1024	740	740
842	1024	708	708
783	1024	677	677
722	1024	645	645
665	1024	615	615
606	1003	584	584
545	898	552	552
483	789	519	519
420	680	486	486
359	574	454	454
302	475	424	424
239	366	391	391
184	271	362	362
133	182	335	335
89	106	312	312
61	56	297	297
42	23	287	287

Image Below  
Offset: 265  
Gain: 1.90



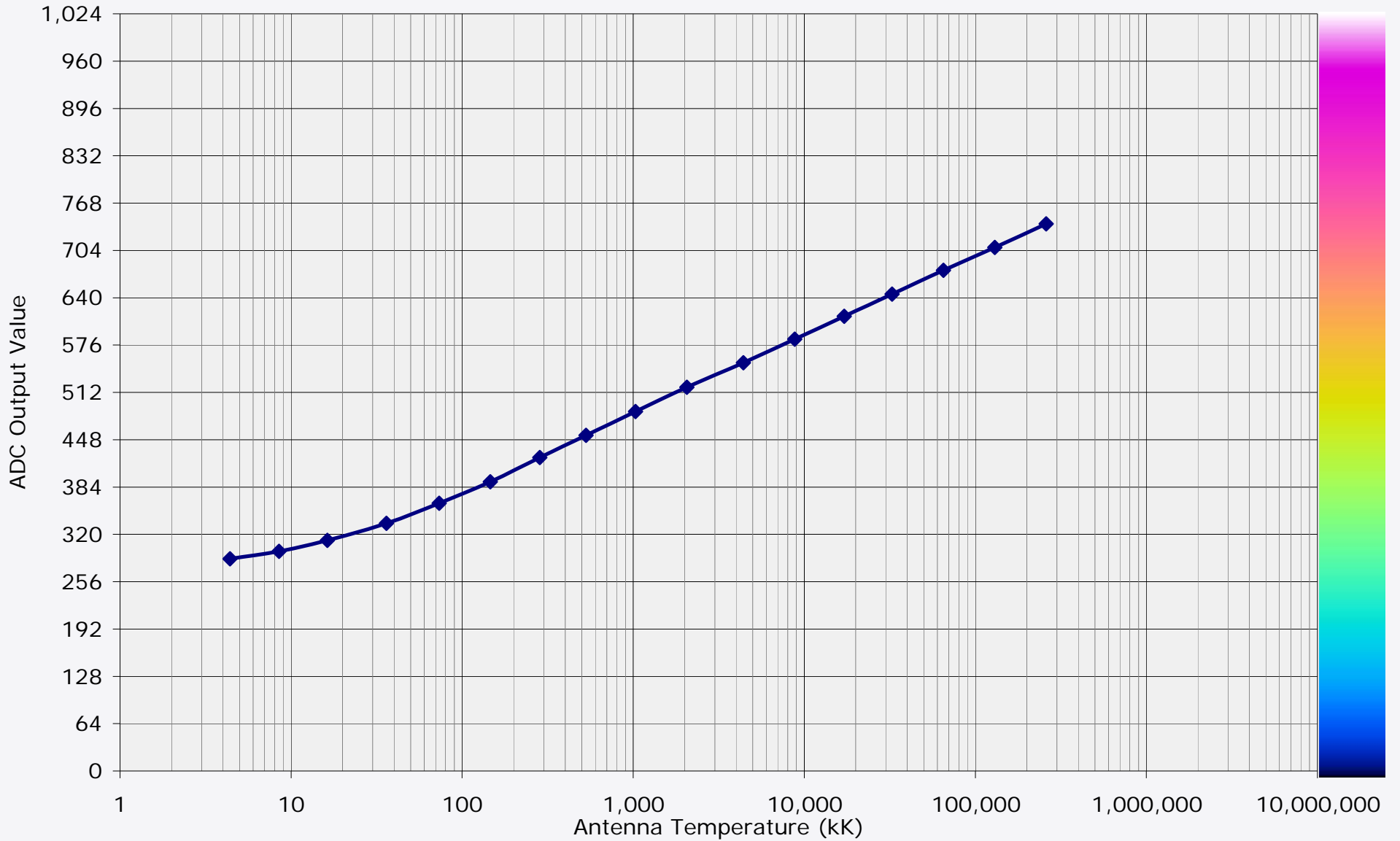
Raw ADC Output Value & Color vs Temperature Observed at Multicoupler Input

Color Bar Corresponds to RSS Color Offset = 0, Color Gain = 1



Raw ADC Output Value & Color vs Antenna Temperature for 5.5 dB Feed Loss

Color Bar Corresponds to RSS Color Offset = 0, Color Gain = 1



Radio-Sky Spectrograph Configuration:

Offset: 265

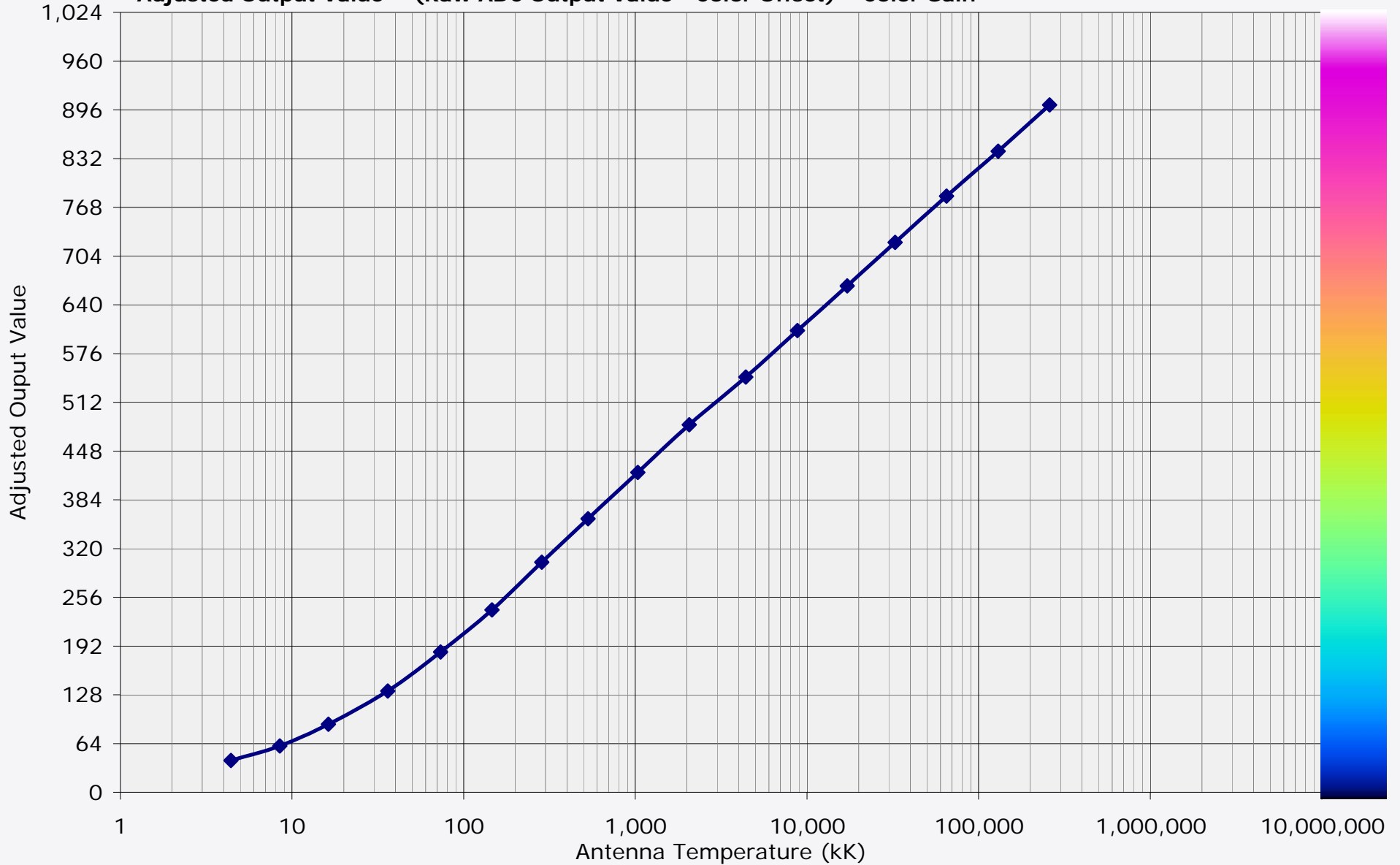
Gain: 1.90

**Adjusted Output Value & Color vs Antenna Temperature for 5.5 dB Feed Loss**

Color Bar Corresponds to RSS Color Offset = 265, Color Gain = 1.90

Adjusted Output Value = (Raw ADC Output Value - Color Offset) \* Color Gain

SOLAR



# MRAO FSX-3 (10-bit) Spectrograph Step Calibration

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Radio-Sky Spectrograph Configuration:

Offset: 280

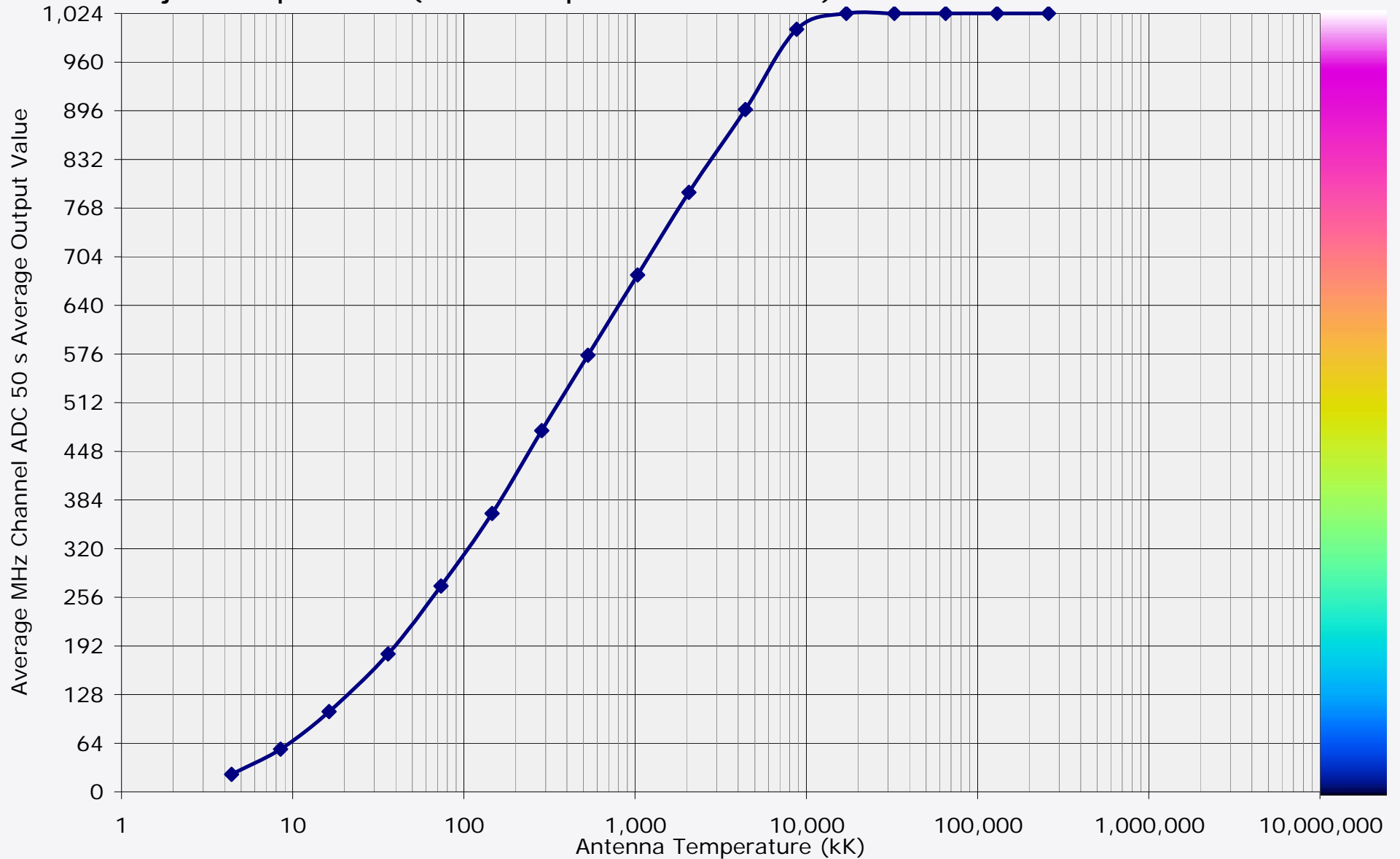
Gain: 3.30

Adjusted Output Value & Color vs Antenna Temperature for 5.5 dB Feed Loss

Color Bar Corresponds to RSS Color Offset = 280, Color Gain = 3.30

Adjusted Output Value = (Raw ADC Output Value - Color Offset) \* Color Gain

JUPITER



# MRAO FSX-3 (10-bit) Spectrograph Step Calibration

30-Jul-2013 14:25 UTC

Radio-Sky Spectrograph Configuration:

Offset: 0

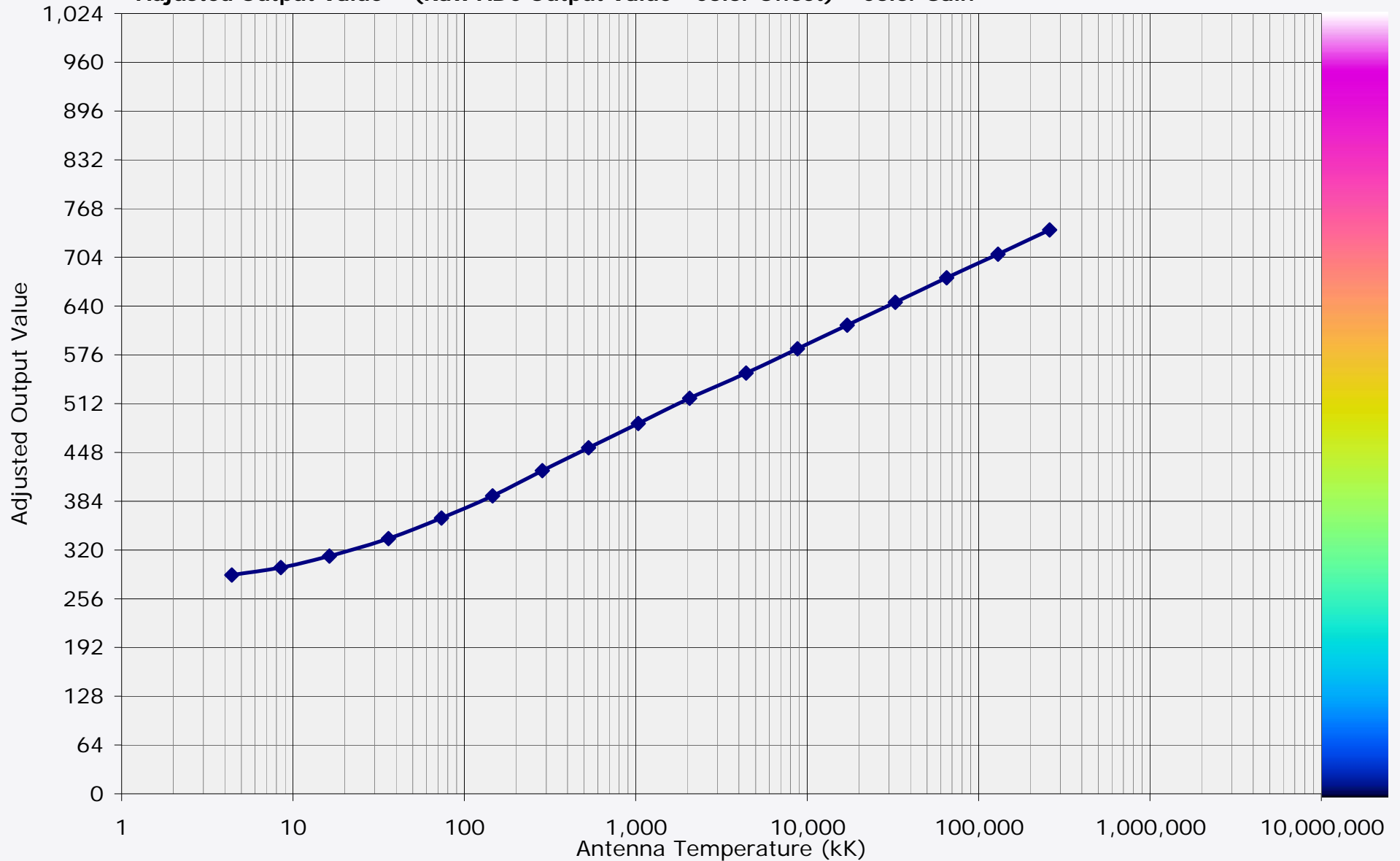
Gain: 1.00

Adjusted Output Value & Color vs Antenna Temperature for 5.5 dB Feed Loss

Color Bar Corresponds to RSS Color Offset = 0, Color Gain = 1.00

Adjusted Output Value = (Raw ADC Output Value - Color Offset) \* Color Gain

CUSTOM 1



# MRAO FSX-3 (10-bit) Spectrograph Step Calibration

30-Jul-2013 14:25 UTC

Radio-Sky Spectrograph Configuration:

Offset: 0

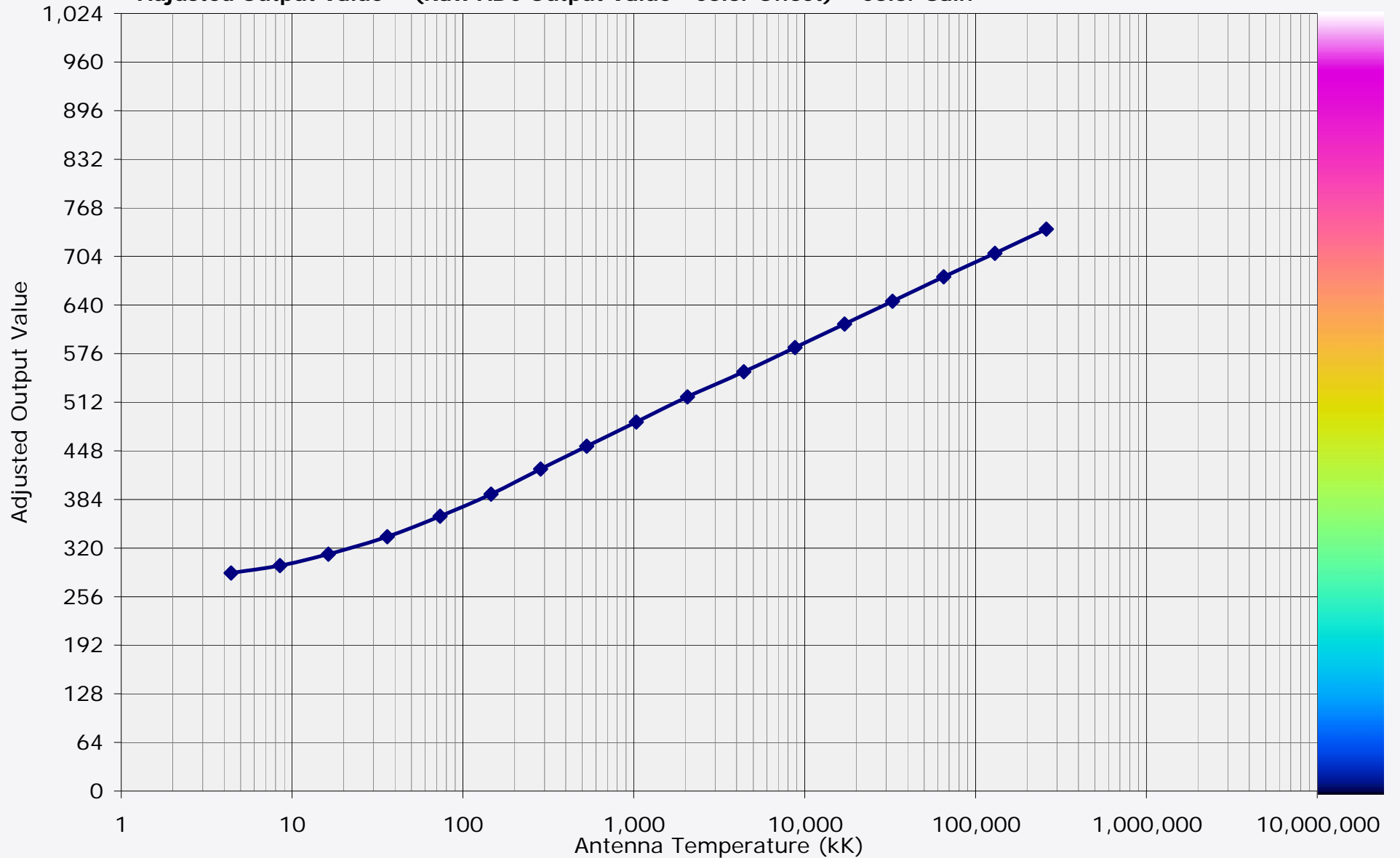
Gain: 1.00

Adjusted Output Value & Color vs Antenna Temperature for 5.5 dB Feed Loss

Color Bar Corresponds to RSS Color Offset = 0, Color Gain = 1.00

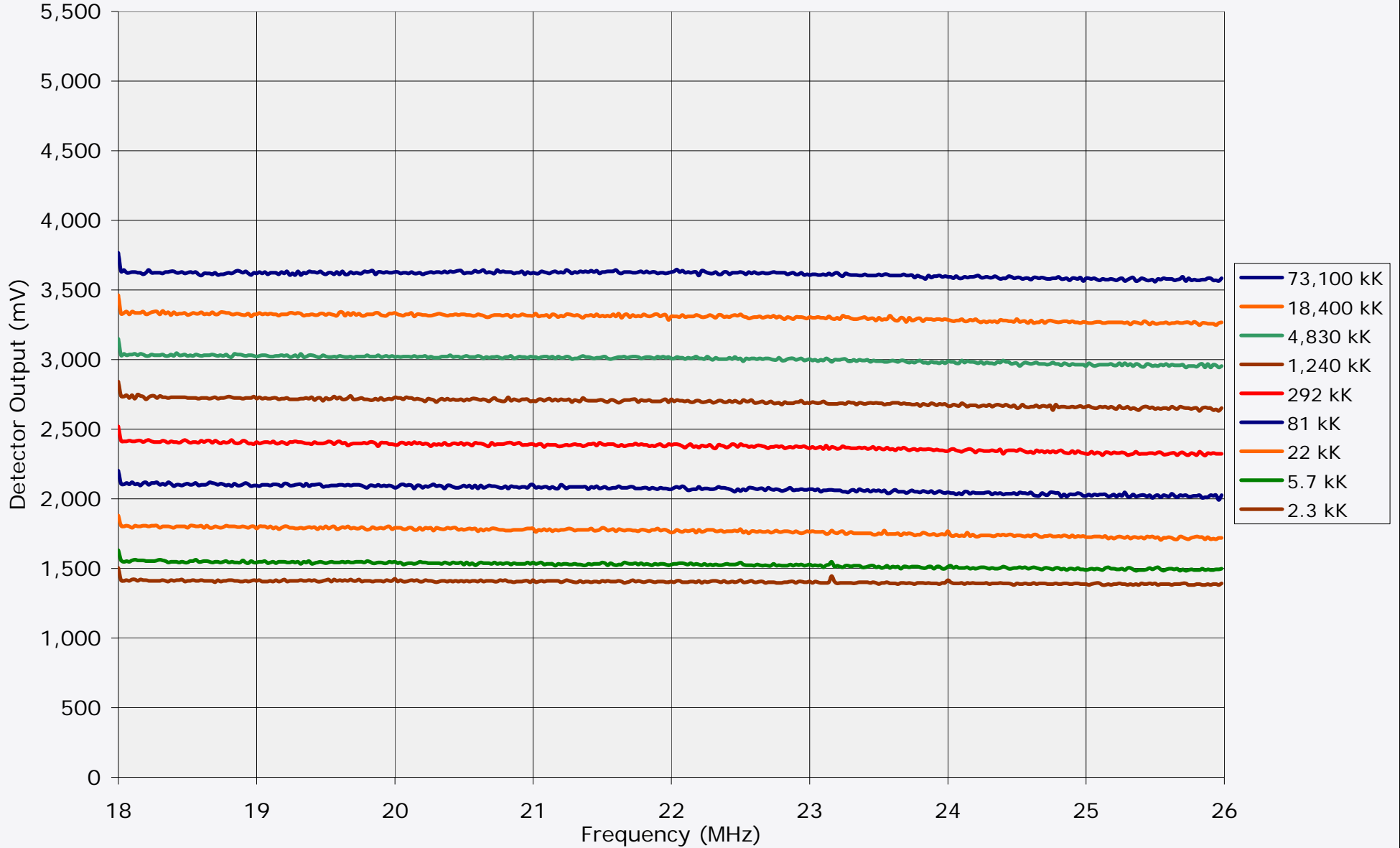
Adjusted Output Value = (Raw ADC Output Value - Color Offset) \* Color Gain

CUSTOM 2



## Detector Output vs Frequency vs Temperature Observed at Multicoupler Input

ADC Voltage Reference = 5 V    Receiver Noise Figure = 6 dB





Detector Response Averaged Over Adjacent 3 dB Calibration Steps

