FMT 6-6-2012

K7HIL

|	Corrected Test Frequency	Est Error
Average ESE	14,140,003.753 881	0.000 120
Average WNW	14,140,003.754 092	-0.000 092
Average S	14,140,003.754 020	-0.000 020
Submit	**14,140,003.753 998**	**0.000 002**

Test Method

- **Calibrate the sound card using GPSDO/HP3325A**
- **Calibrate the radio CW tone using GPSDO/HP3325A**
- **Tune in the published reference signal on the IC7800 main receiver**
- **Tune in the test signal on the IC7800 sub receiver**
- **Record the radio audio frequency vice time using Spectrum Labs**
- **Import the SL data into Excel**

B	C	D	E	F	G	H	I
Time	FMT 6-06 REF Freq (main RX)	FMT 6-06 FUT Freq (sub RX)		Estimated Ref Freq (Raw)	Ref correction	Estimated Test Frequency (Raw)	Corrected Test Frequency
19:25:14	649.9884789	653.7769198		14120000.032750	-0.033	14140003.776851	14140003.744101
19:25:15	649.9889903	653.7784638		14120000.033261	-0.033	14140003.778395	14140003.745133
19:25:16	649.9859722	653.7792548		14120000.030243	-0.030	14140003.779186	14140003.748943

- **Columns B, C and D are SL imported data, Columns F – I are calculated values**
- **Plot the Estimated Ref data and the Estimated Test data against time to see correlation areas**
- **For those areas add the Ref Correction to the Estimated Test Freq (Raw) to obtain the Corrected Test Frequency**
- **Calculate the average of the data bins for each transmission selected**
- **Calculate the overall average of the individual averages for the "true" frequency**
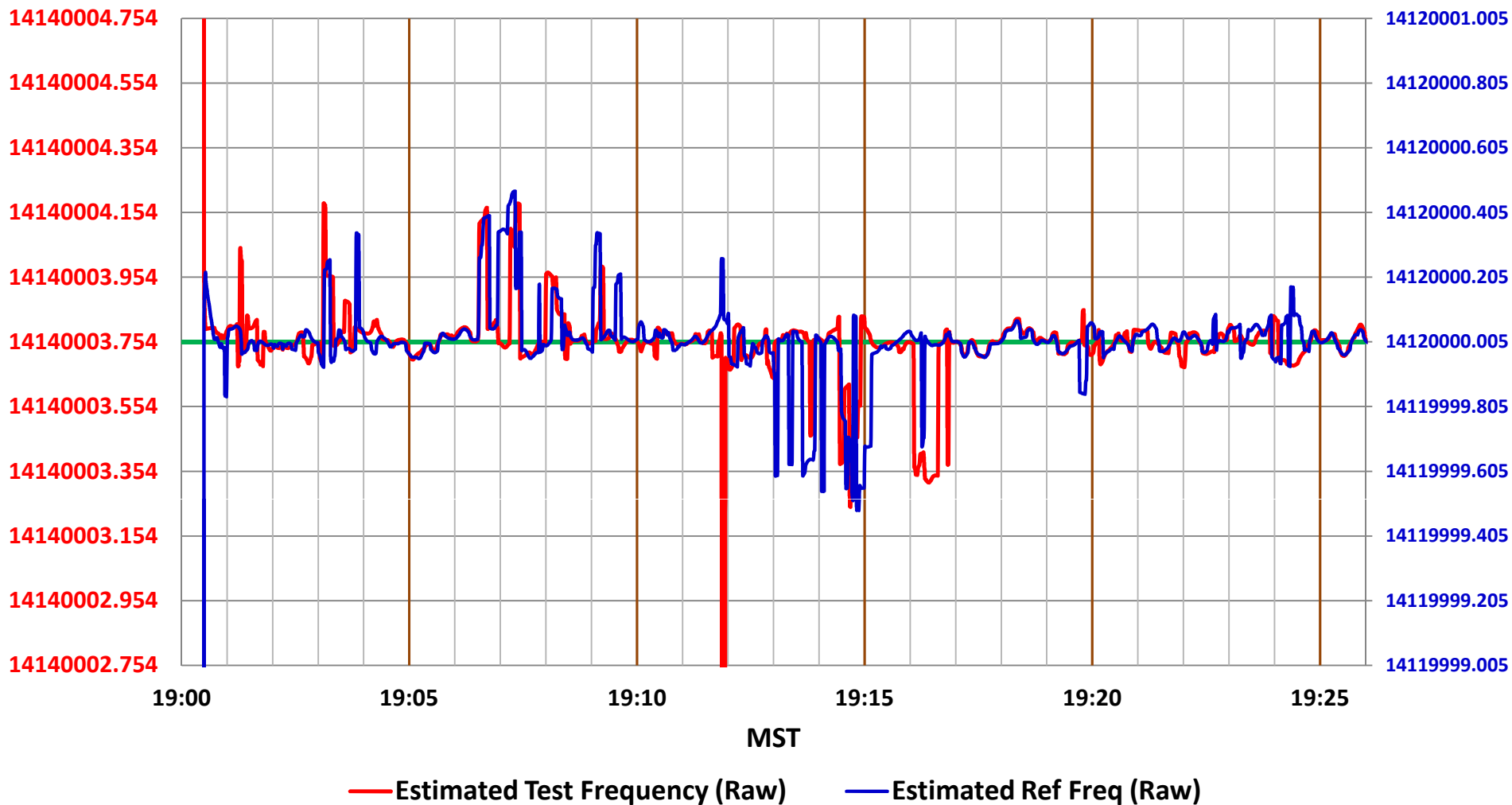- **Submit the "true" frequency**
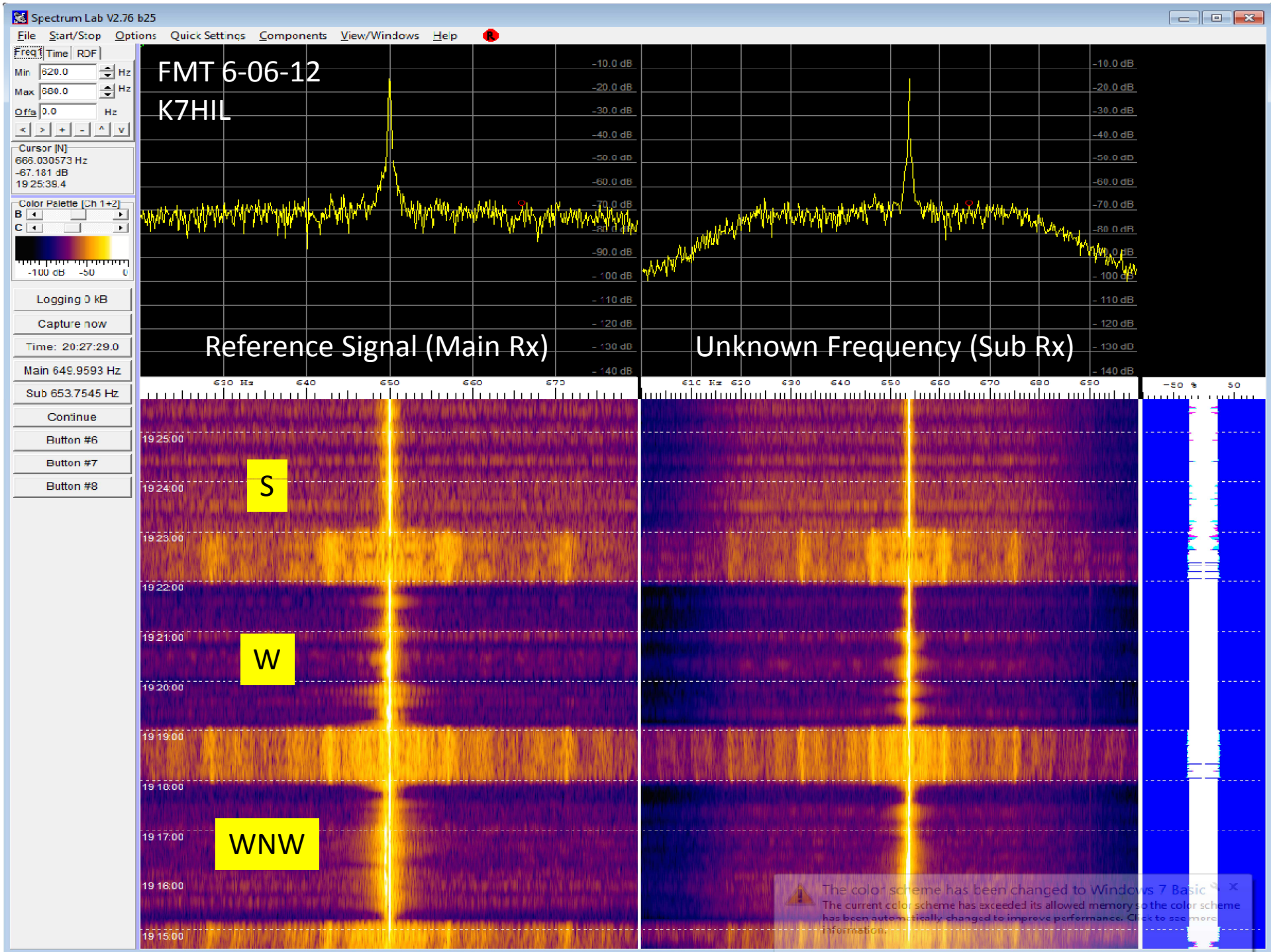
FMT 6-06-2012 Estimated Ref Freq (Raw)
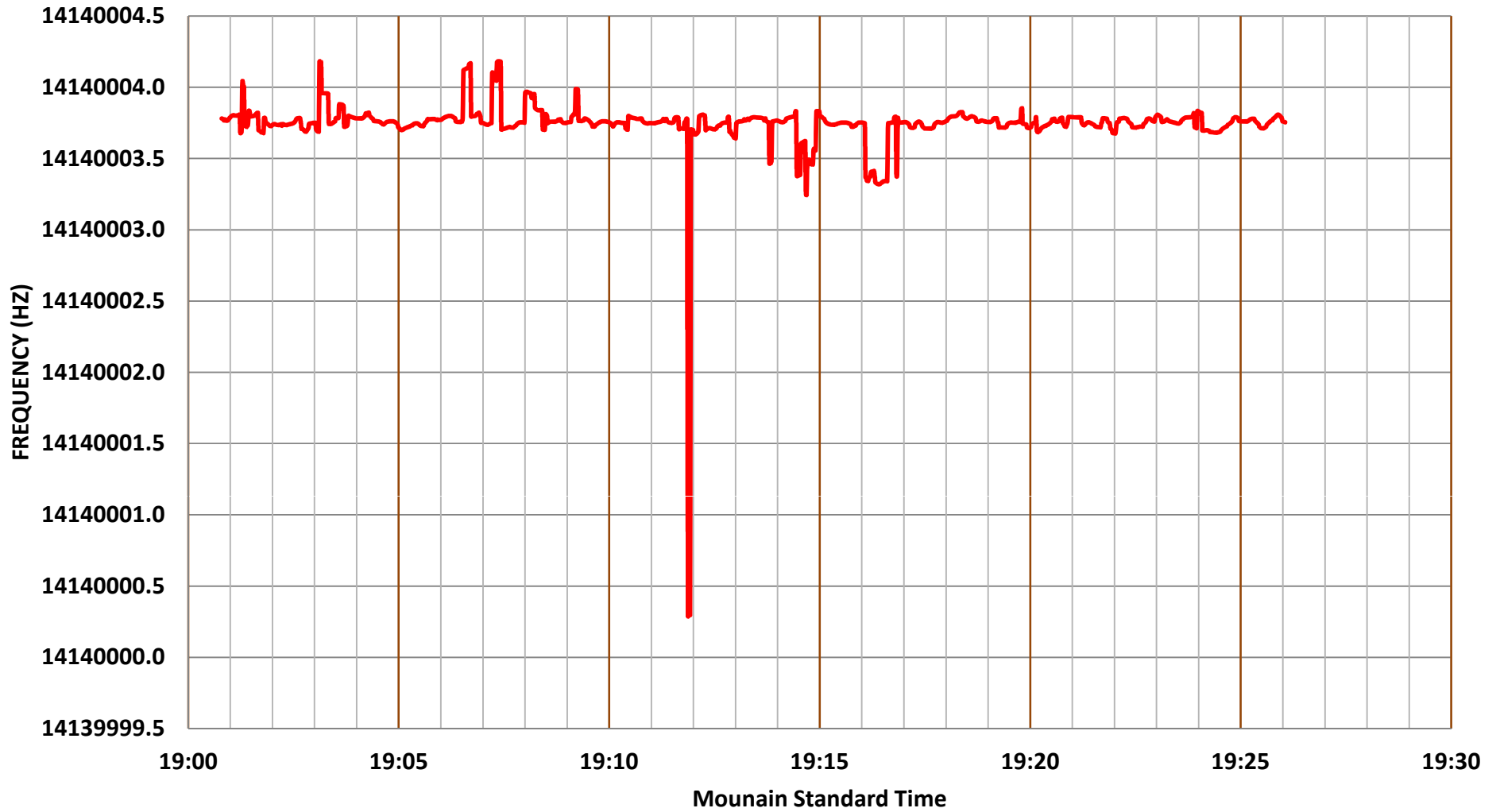
Plot of Spectrum Labs FFT data showing the overall frequency range of the test signal (~4 Hz)

Signal Correlation between reference and unknown frequency

Estimated Test Frequency (Raw) Estimated Ref Freq (Raw)

The (raw) reference signal and the (raw) test signal were plotted with the same vertical scale (2 Hz full scale) and centered to show areas of correlation

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Signal Correlation between reference and unknown frequency
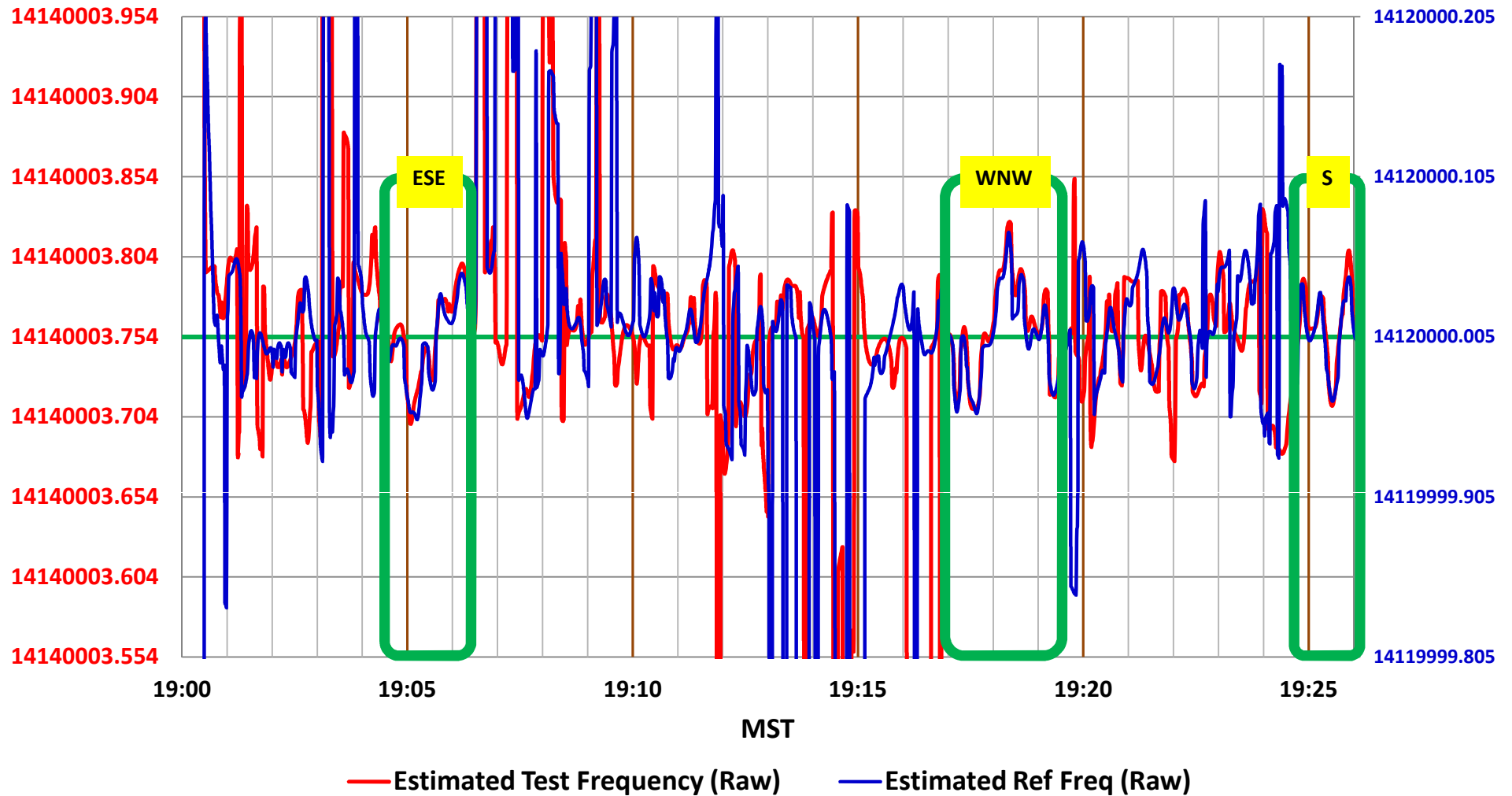
Three sections of the six individual transmissions were selected for further analysis
- The shape of the reference and test signals were similar
- The slope of the reference and test signals were similar
- The centroid (or average) of the signal areas selected looked similar

FMT 6-06-2012 Corrected Test Frequency K7HIL
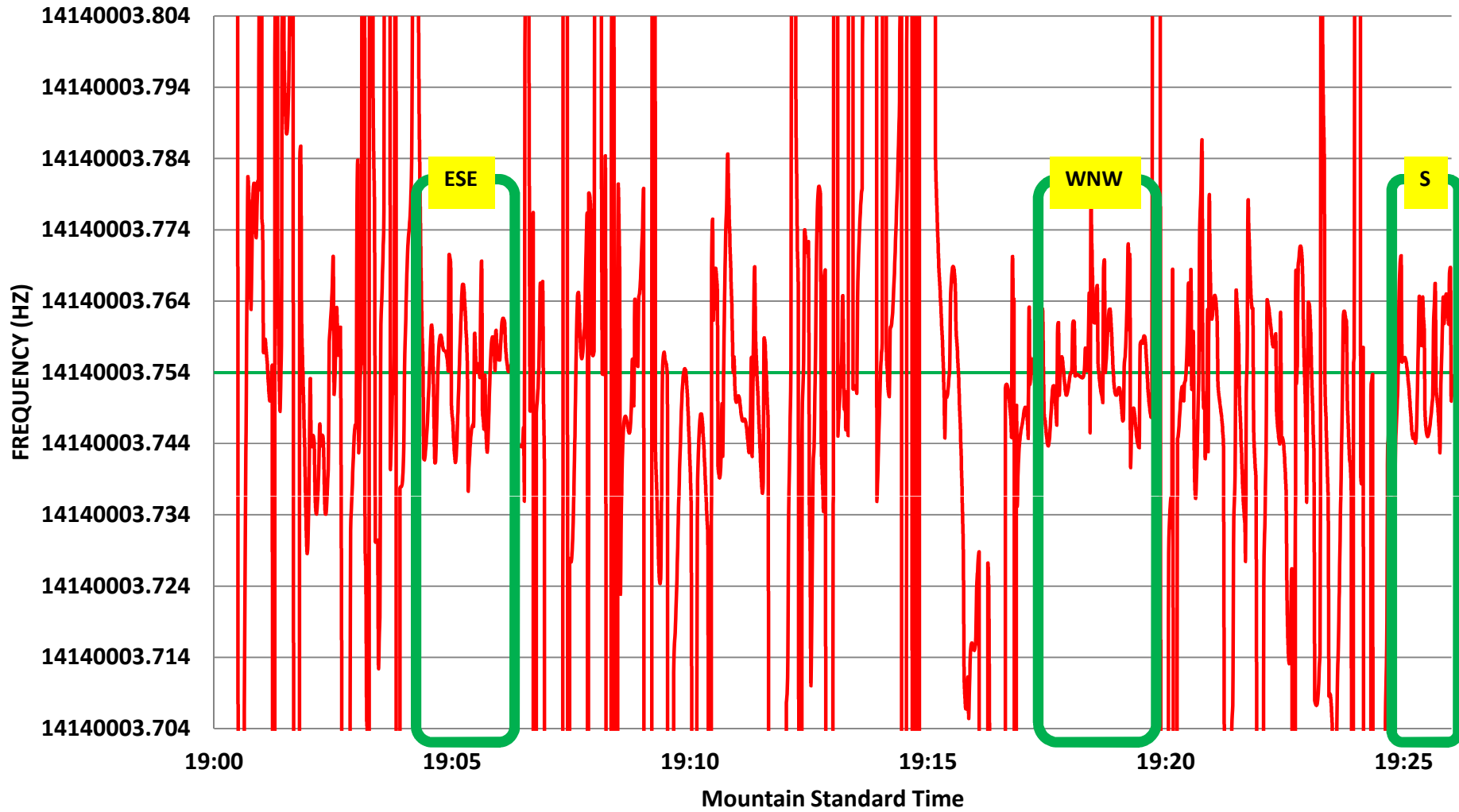
This plot is the raw test signal plus the difference between the raw ref signal and the true ref signal.
The averages of each of the individual sections were calculated and the overall average was calculated

- Average of ESE transmission = 14,140,003.753881 Hz error = + 0.000120 Hz
- Average of WNW transmission = 14,140,003.754092 Hz error = - 0.000092 Hz
- Average of S transmission = 14,140,003.754020 Hz error = - 0.000020 Hz
- **Average frequency = 14,140,003.753998 Hz error = + 0.000002 Hz**