

Application Note

Cold Weather Operation

Test Results

OVERVIEW

Wireless equipment can have issues operating at extreme temperatures – hot or cold. In this application note, we present test data for the cold temperature performance of the SignalFire equipment.

The equipment that was tested included:

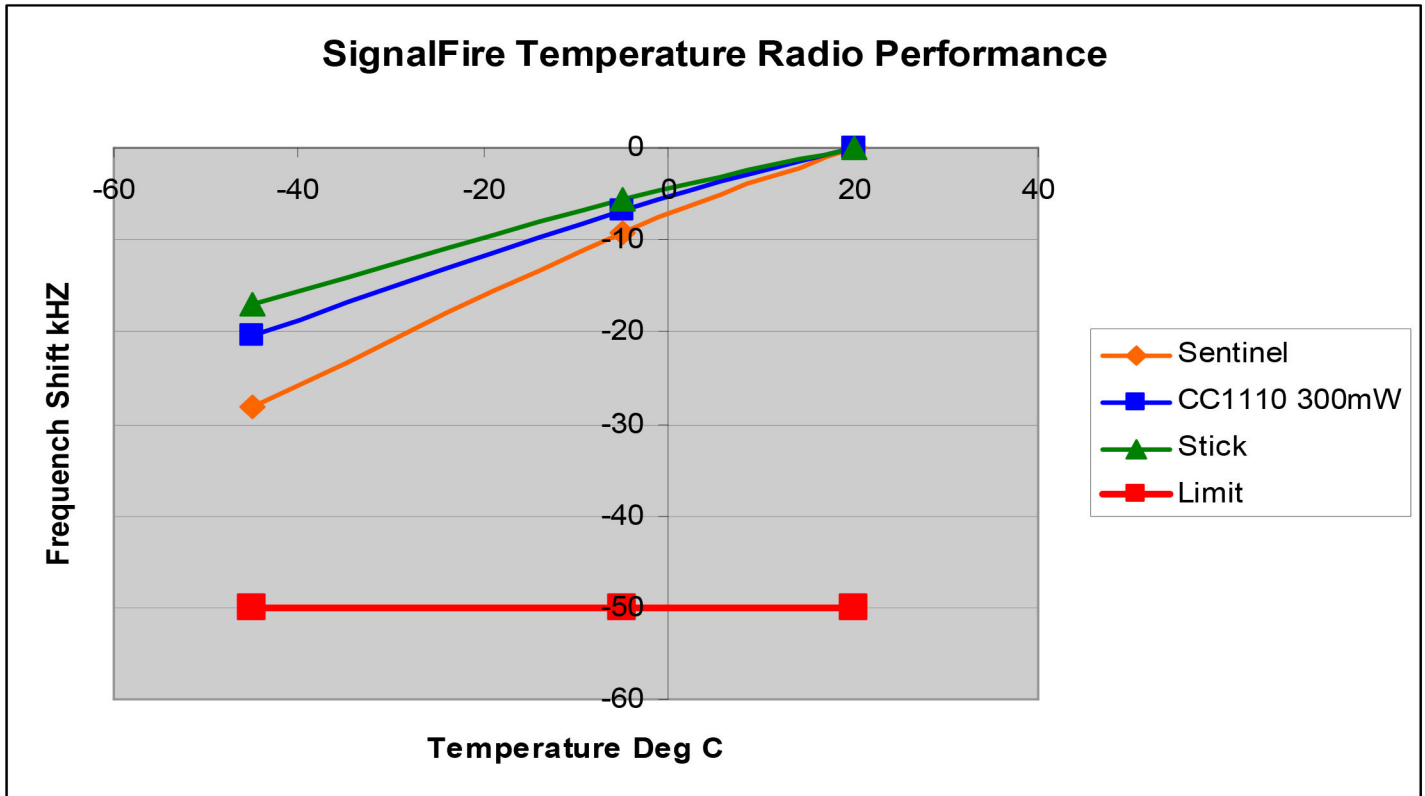
- Sentinels
- 300mW-Based Systems (A2, Field Monitor,...)
- Stick Units (Gateway, Modbus, RSD, Counter,...)
- Lithium Primary Battery Packs
- Sealed Lead Acid rechargeable Packs

TEST SETUP

We used dry ice to set the temperature to approximately -45 to -50 degrees C inside of an insulated enclosure. All SignalFire equipment is rated to -40 degrees C, but we wanted to test past this range.

RESULTS

The test results were very good. All radios experienced a small frequency shift in the same direction. The magnitude of the shift was within acceptable tolerances – especially if you consider that all units would be operating at similar temperatures. See the chart on the next page:



Note – You can see that the frequency shift is less than the limit. Also, if all the units are similar temperature, only the *frequency difference* matters, so that is much smaller.

BATTERY PERFORMANCE

The battery performance degradation was minimal. The following is the battery voltage readings under full load (4-20mA Sensor):

	Room Temp	-40 to -45 C	Voltage drop
Lithium	3.326	3.159	0.167
Solar	3.699	3.48	0.219

The voltage drops here are negligible as the system will work well under 3.0 V. A low power sensor (like a HART or Voltage) sensor (drawing 3-5 mA) would result in less of a voltage drop and would be recommended for low temperatures.