

# Using WSPR to Evaluate Antennas

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# Overview

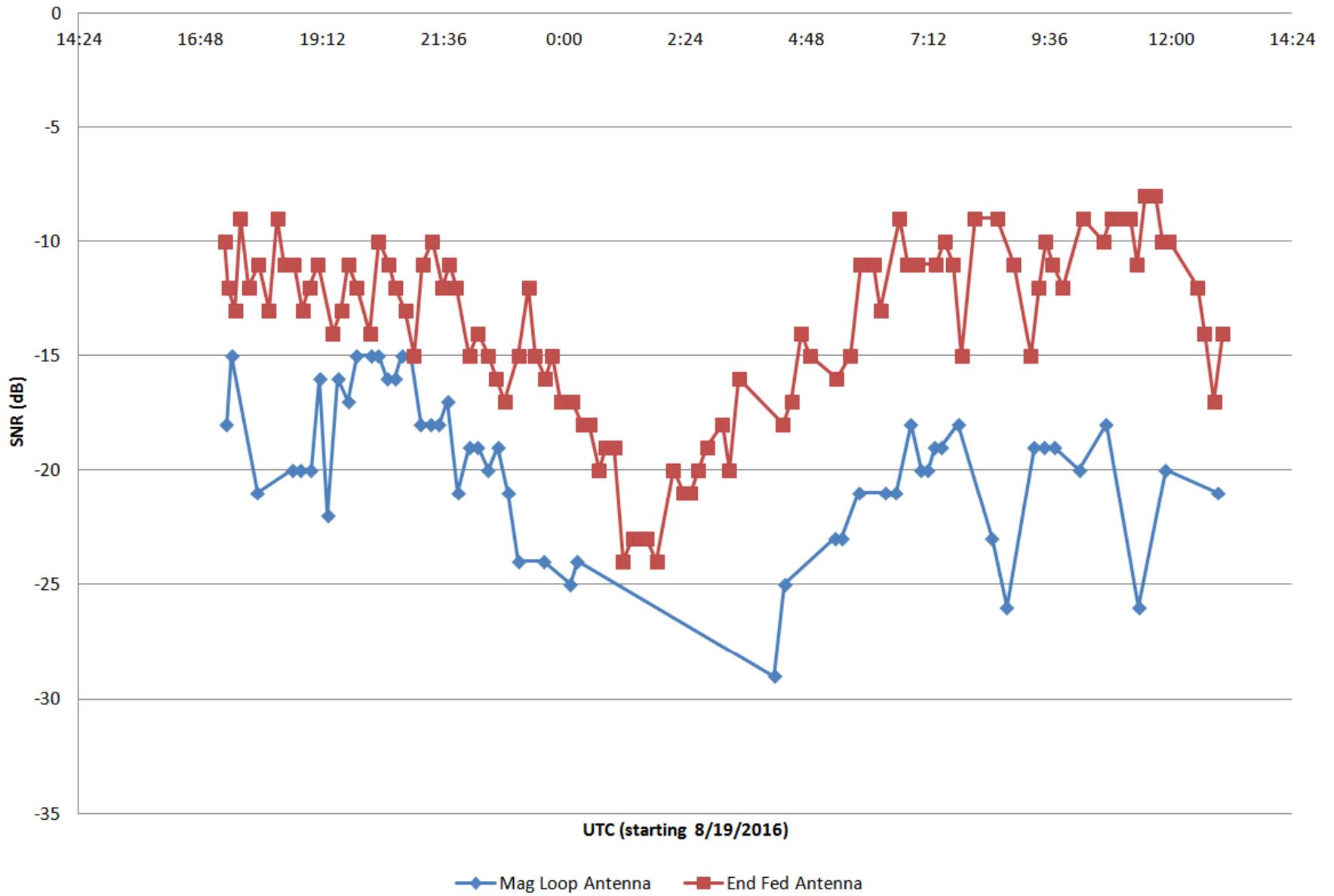
- Investigate using Weak Signal Propagation Reporter (WSPR) mode to compare performance of two different antenna systems.
- Methodology:
  - Setup two WSPR stations at the same QTH, with same power for transmit on the same band over a 12-24 hour period. No receive.
    - ½ watt
    - Homebrew Magnetic Loop vs. Ultimax Dxtreme end fed antenna
      - Magnetic loop oriented East-West indoors
      - End Fed Antenna horizontal North- South up 20 feet (my main Base Antenna).
  - Analyze reporter data for each antenna over time.

# 40m WSPR Results

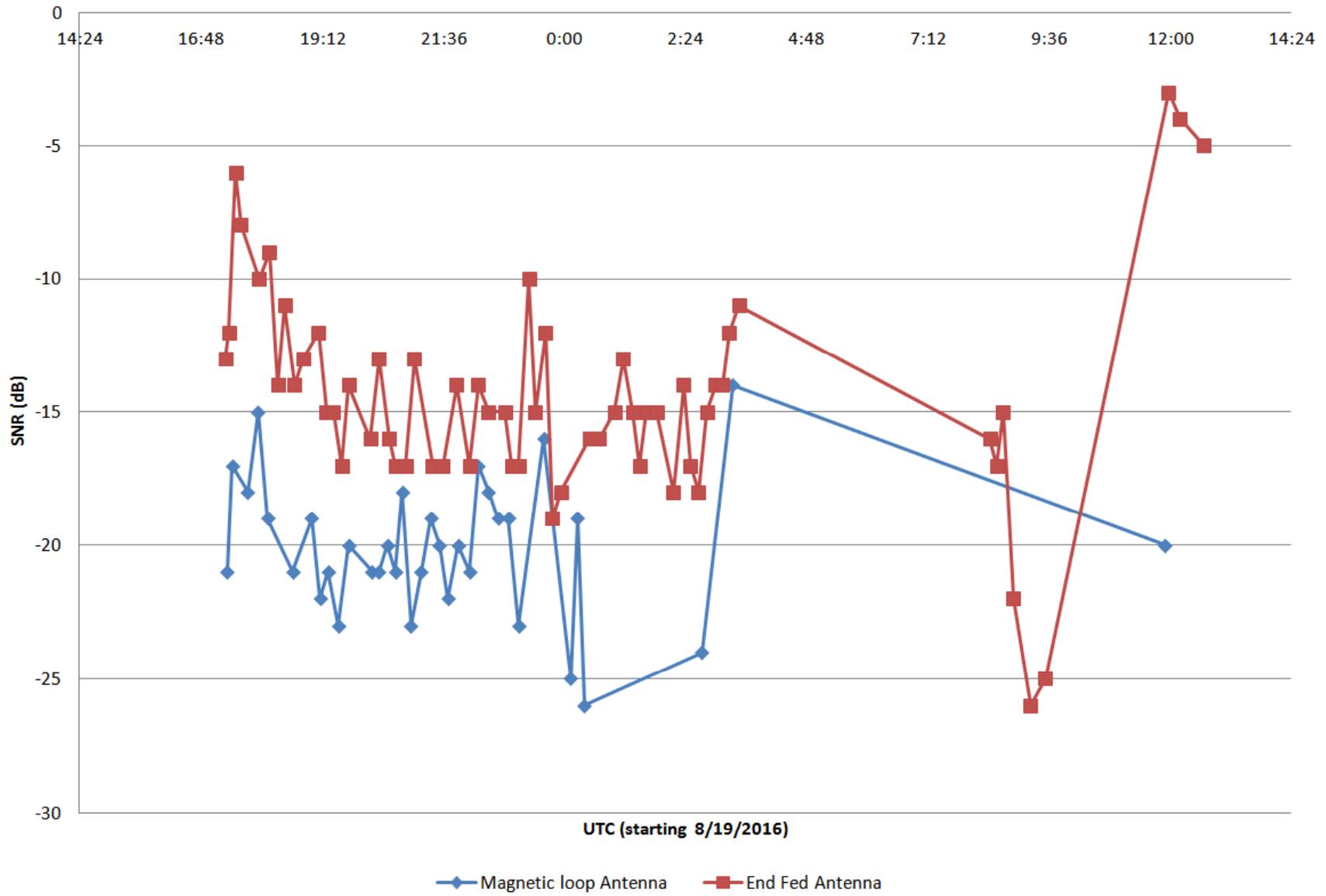
- Homebrew magnetic loop is known low efficiency on 40m.
- Reporter Stations:

Station	Distance (km)	Azimuth (deg)
N5CEY	19	0
KD6RF	716	19
WB2TQE	1721	85
K6EME	2563	306
N2NOM	2677	42

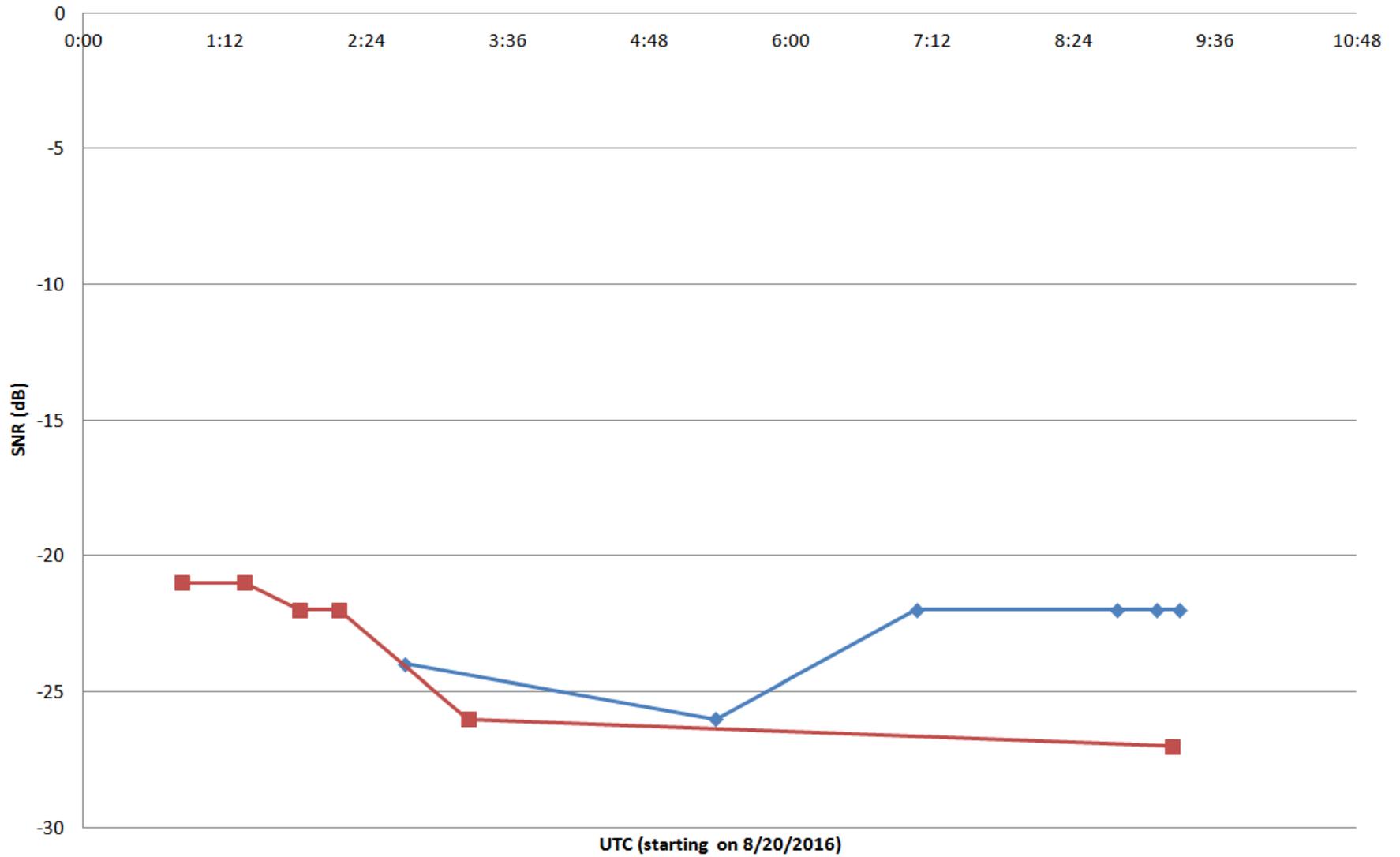
# 40m WSPR de N5CEY



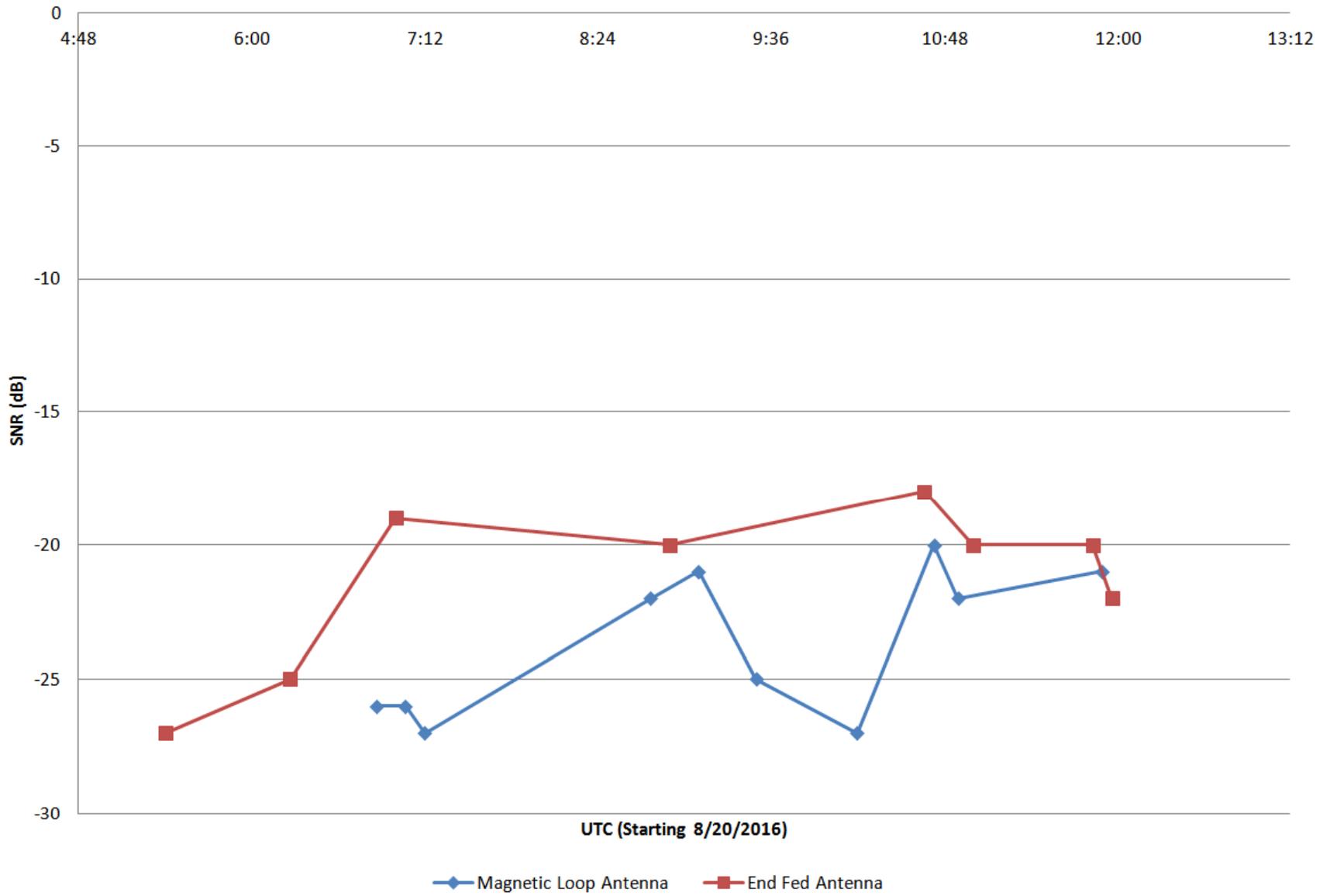
# 40m WSPR de KD6RF



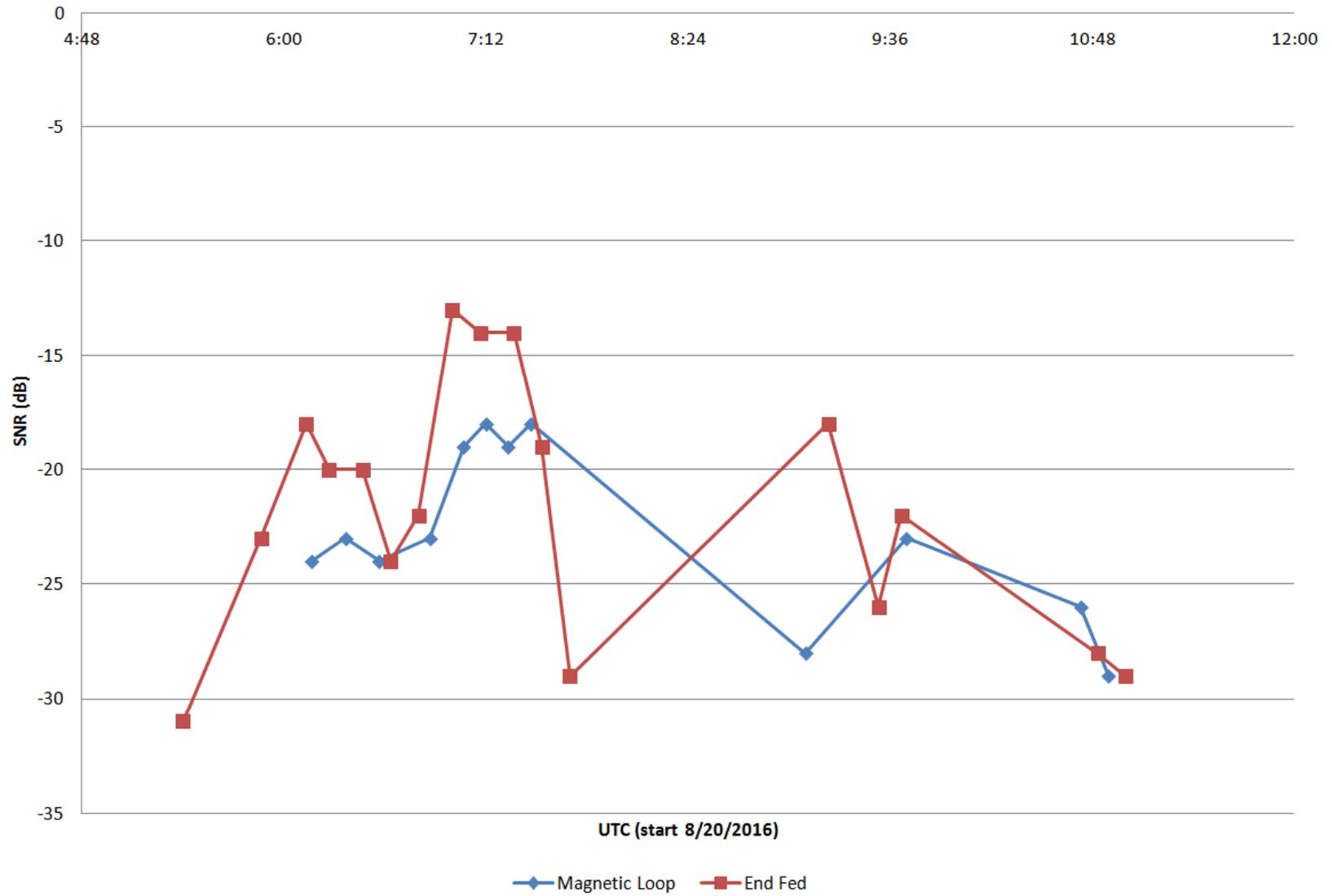
# 40m WSPR de WB2TQE



# 40m WSPR de K6EME



# 40m WSPR de N2NOM



# 40m Observations

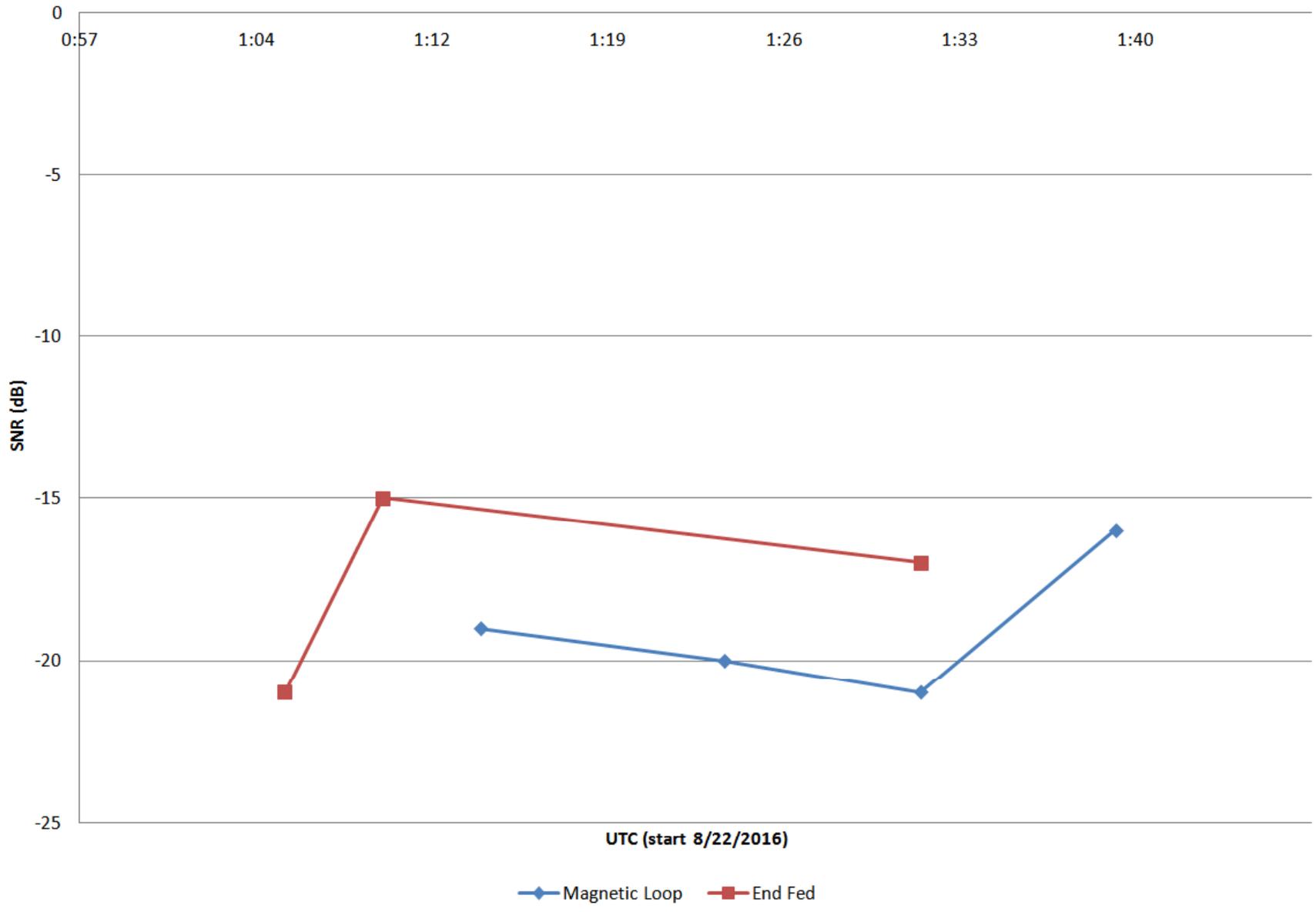
- There are more data points observed the closer the station
- Stations within about 1000km show a clear difference between antennas
  - Magnetic Loop about 6-8dB weaker
- Stations greater than 1000km show roughly equal performance.
- Data suggests that End Fed antenna is operating better as an NVIS antenna than the Magnetic loop.

# 20m WSPR Results

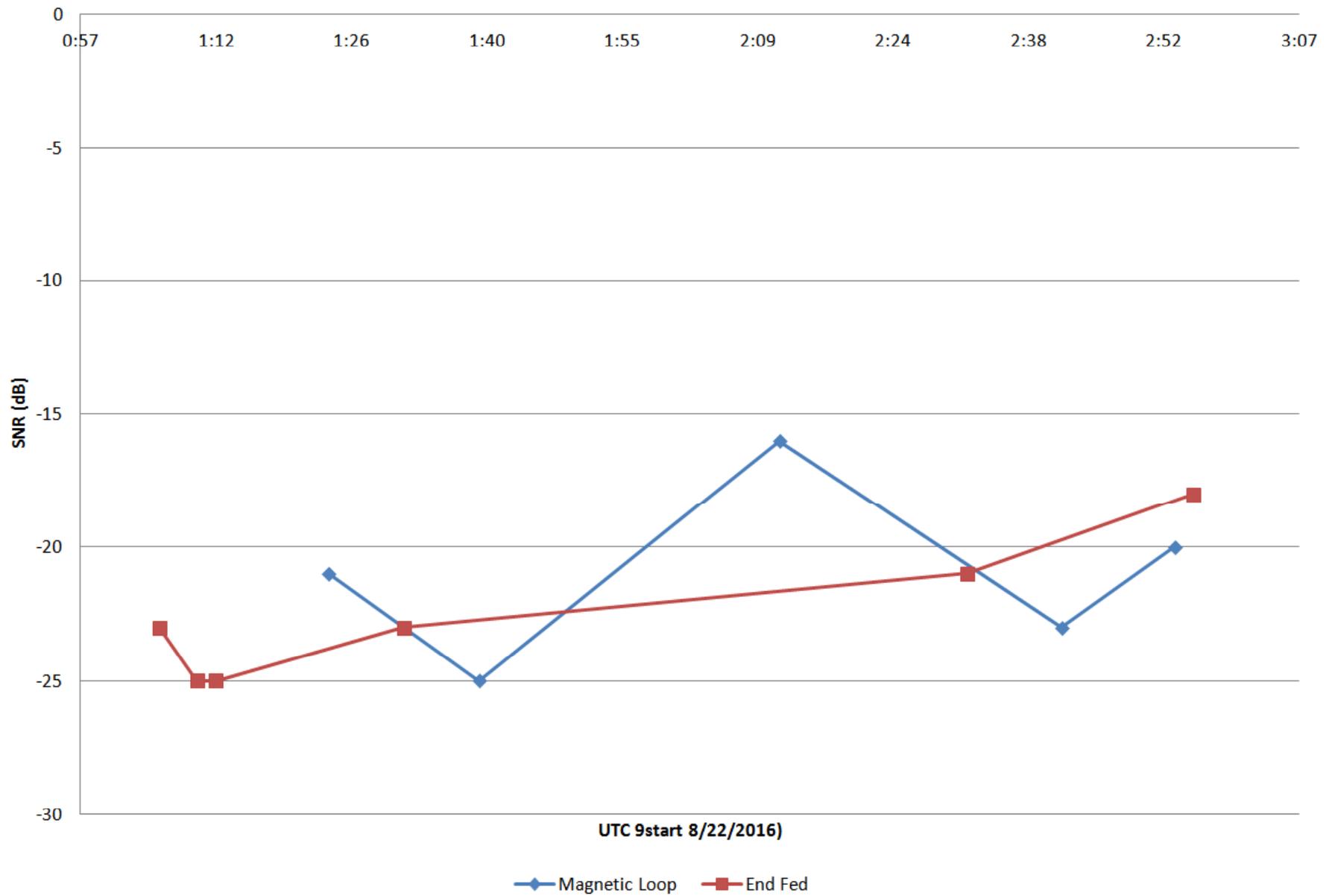
- Reporter Stations:

Station	Distance (km)	Azimuth (deg)
AG5DV	1033	0
K7GXB	1728	307
K9AN	1797	26
W6XY	2535	311
W2CXM	2650	41
KK1D	2880	47

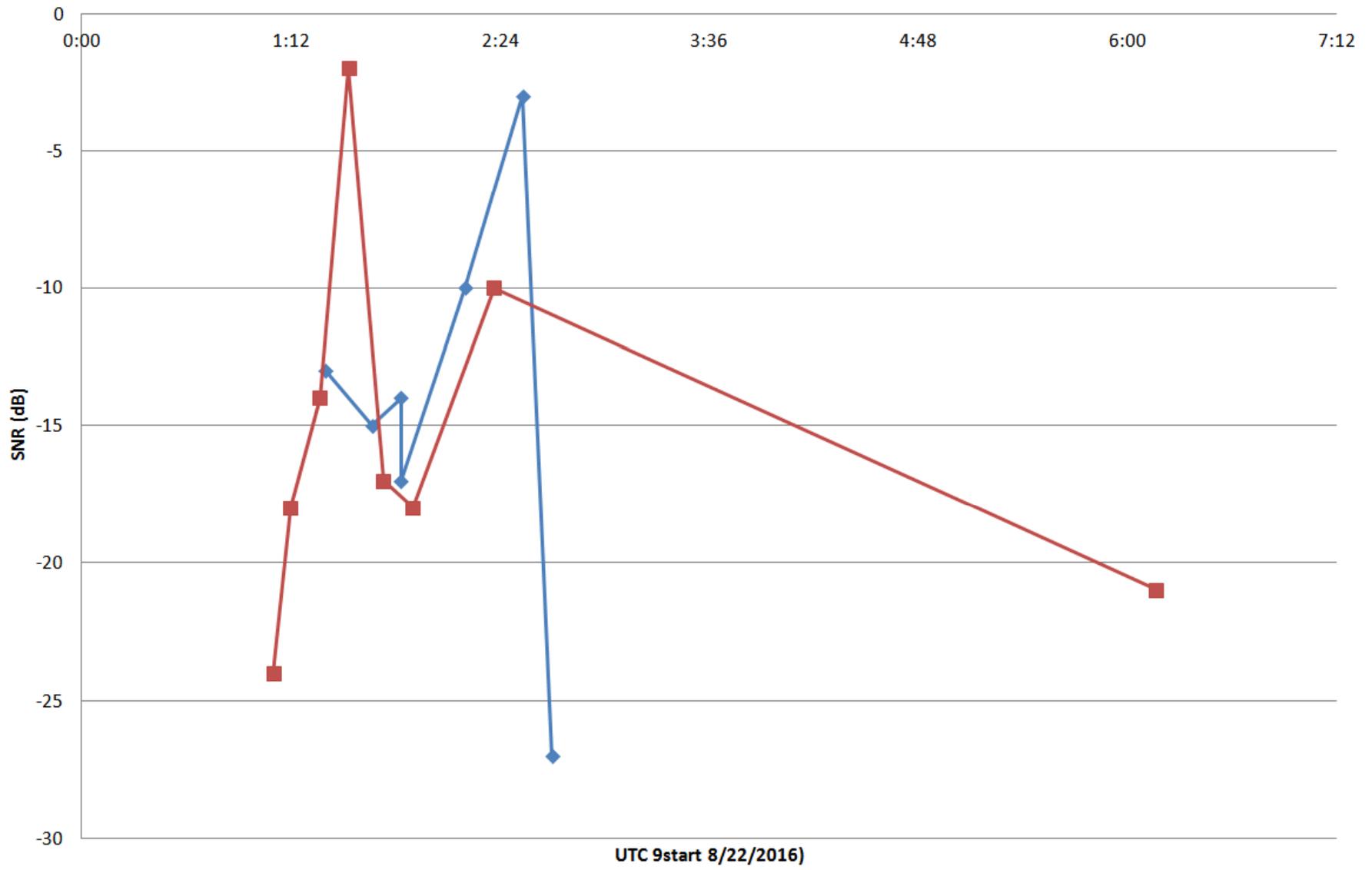
# 20m WSPR de AG5DV



# 20m WSPR de K7GXB

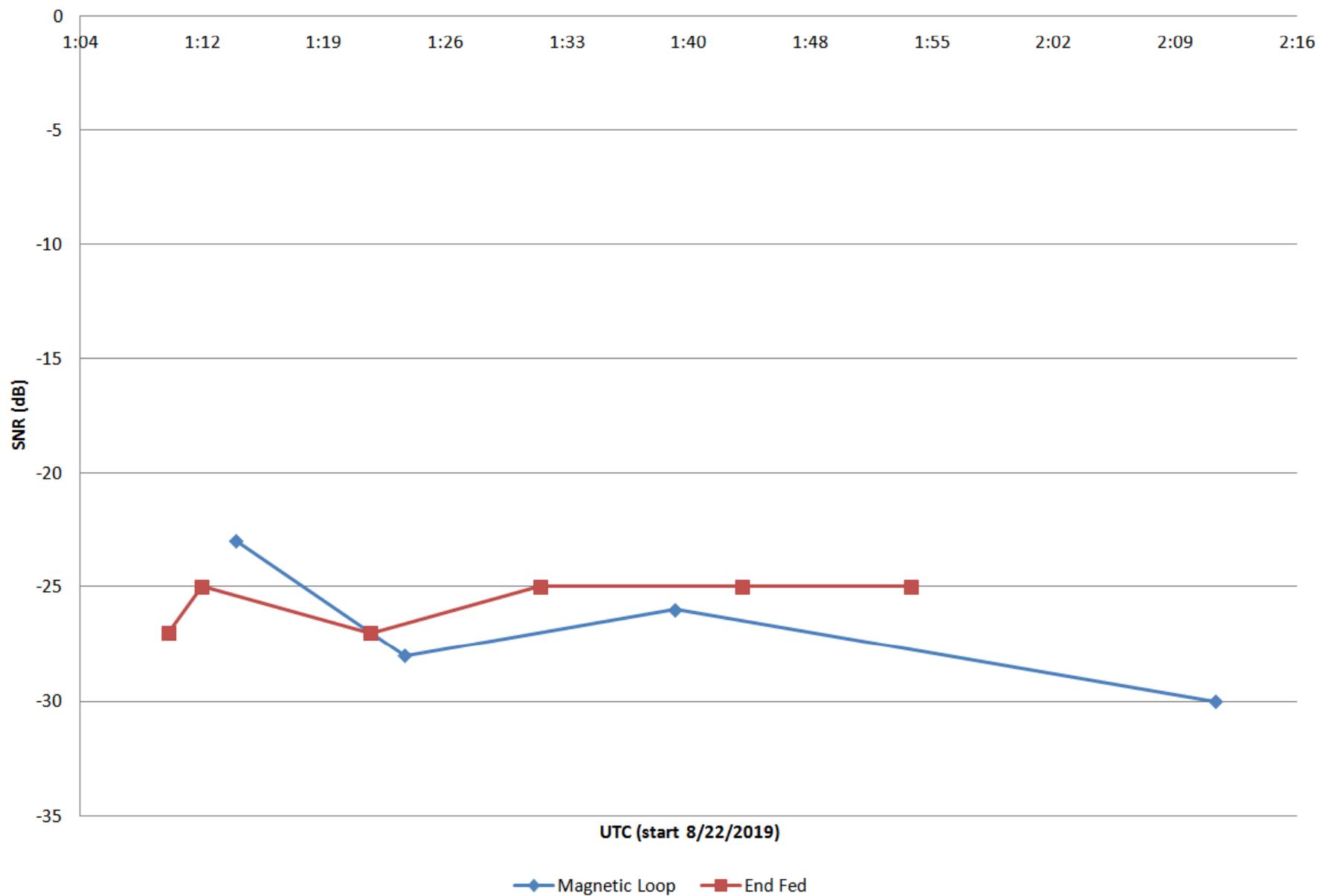


# 20m WSPR de K9AN

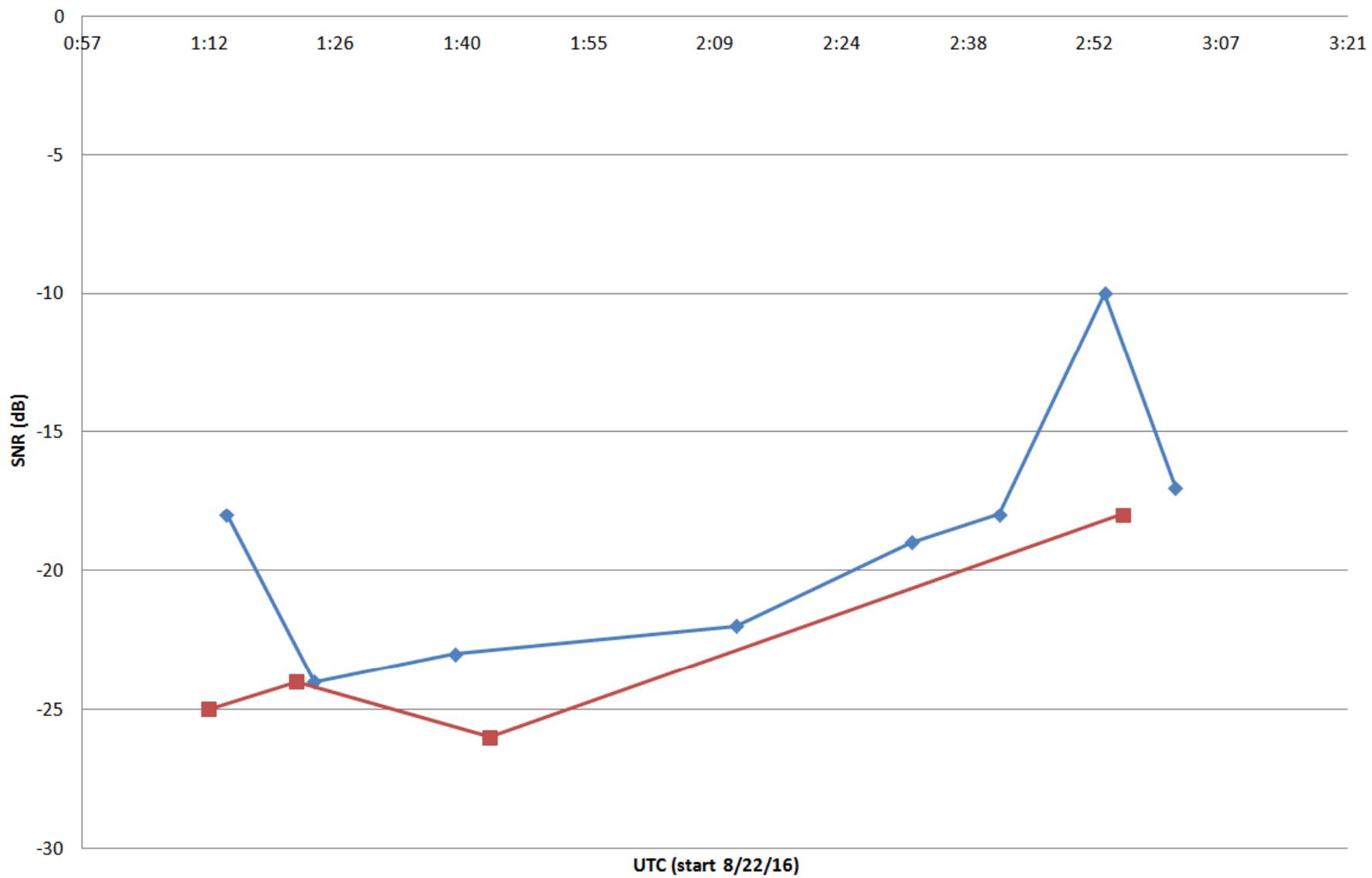


◆ Magnetic Loop    ■ End Fed

## 20m WSPR de W6XY

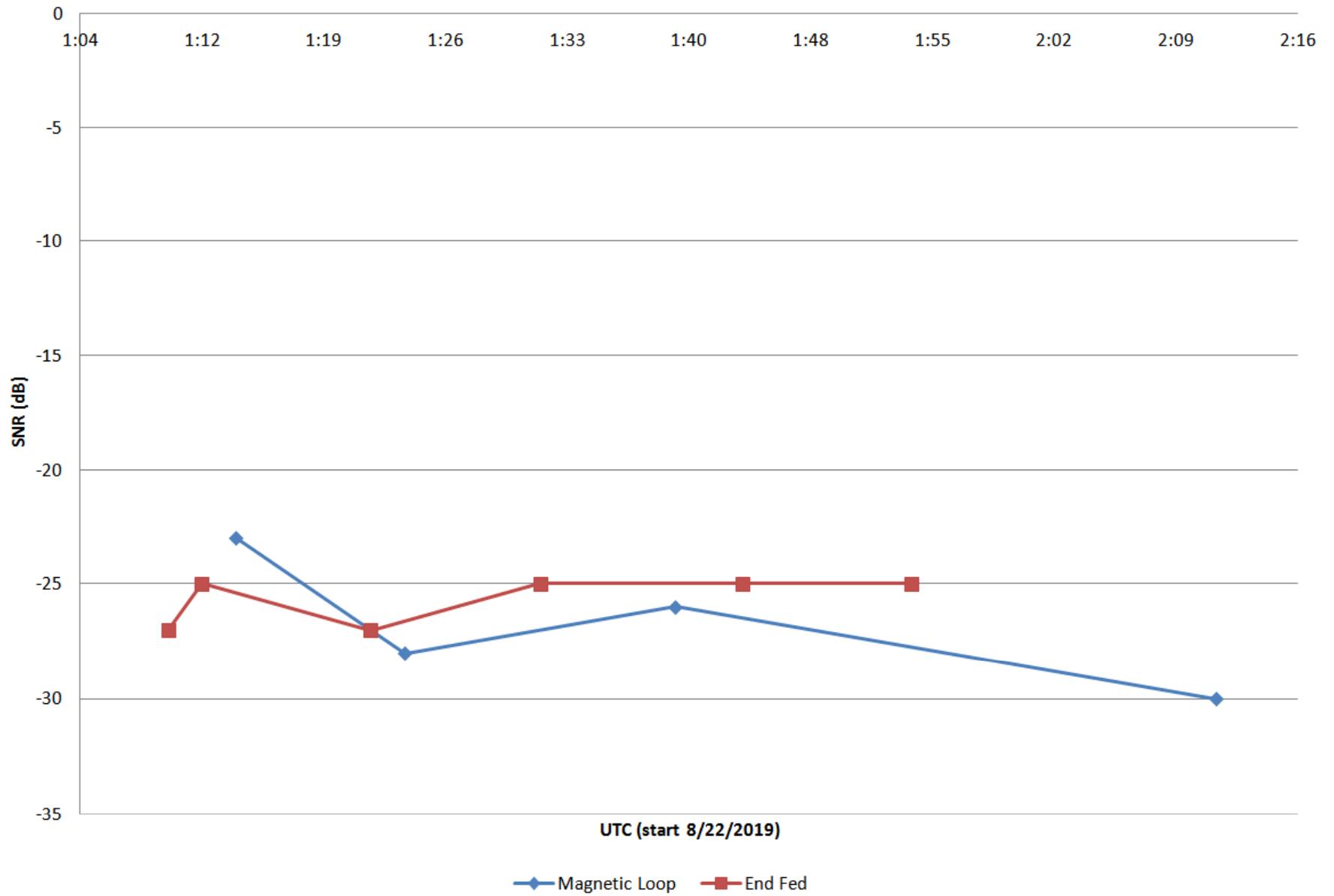


## 20m WSPR de W2CXM



—◆— Magnetic Loop —■— End Fed

# 20m WSPR de W6XY



## 20m Observations

- Reporter stations were all greater than 1000km from QTH.
- Roughly equal performance between antennas.
- Stations within about 1000km show a clear difference between antennas
  - Magnetic Loop has slight edge over end fed
  - ~2-3dB improvement

# Oddball Observations

- Sudden strong observations (single digit SNR)
- Why does program hang when seeing local signal?
- Look at hour to hour mapping and compare to predicted propagation.

# Conclusions

- Basic methodology appears sound
- Magnetic loop works similar to the end fed at 20m and may have slightly better performance.
- Magnetic loop performance is similar to the end fed at 40m but only outside of the NVIS range.
  - Magnetic Loop inside NVIS range is 6-8dB lower on 40m

# Next Steps

- Do receive only tests
- Resolve issue with Software freezing due to local overload
  - Try FT-450D with Signalink.
- Try some different antennas
  - Add some ports to my window feed.
- Streamline data analysis
- Look at hour to hour mapping and compare to predicted propagation.