Project: IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs)

Submission Title: [SFD Selection for 802.15.4g]
Date Submitted: [Mar 1, 2010]
Source: [Steve Shearer] Company [Independent]
Address [Pleasanton California]
Voice:[(925) 997 0576], FAX: [n/a], E-Mail:[Shearer_inc @ yahoo.com]

Re: [SFD Selection for 802.15.4g}

Abstract: [This presentation seeks to assist the current discussions and choice of SFD pairs by providing an independent set of results]

Purpose: [This presentation seeks to assist the current discussions and choice of SFD pairs by providing an independent set of results]

SFD Selection for 802.15.4g

Steve Shearer Mar 2010

Introduction

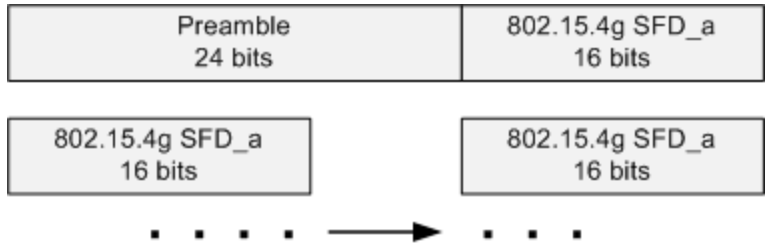
- This presentation seeks to assist the current discussions and choice of SFD pairs by providing an independent set of results
- Hopefully this can help reconcile/validate the other results that have been produced

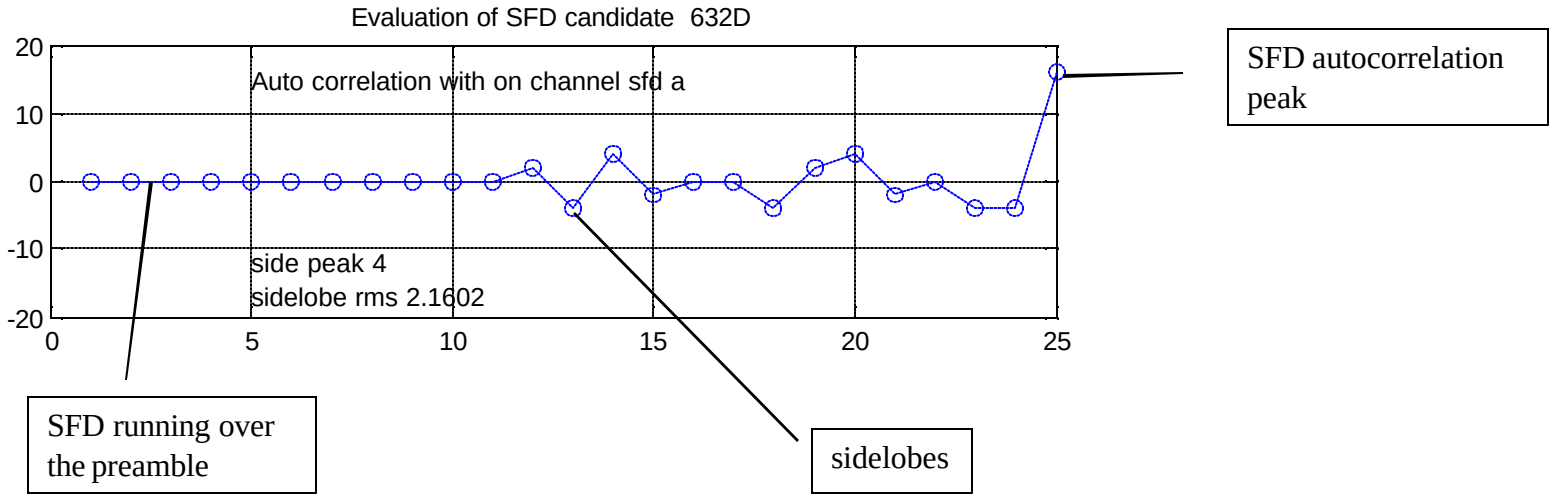
SFD Requirements

- Good autocorrelation properties
- At least one orthogonal sequence which has good auto and cross correlation properties
- Performance that is not badly affected by correlating over the preamble 55
- Has the ability to reject inverses of itself and its orthogonal sequence
  - caused by the possibility that the receiver may lock onto an image where the bits are inverted.
- Ability to reject 802.15.4d bursts consisting of preamble 55 and SFD E5

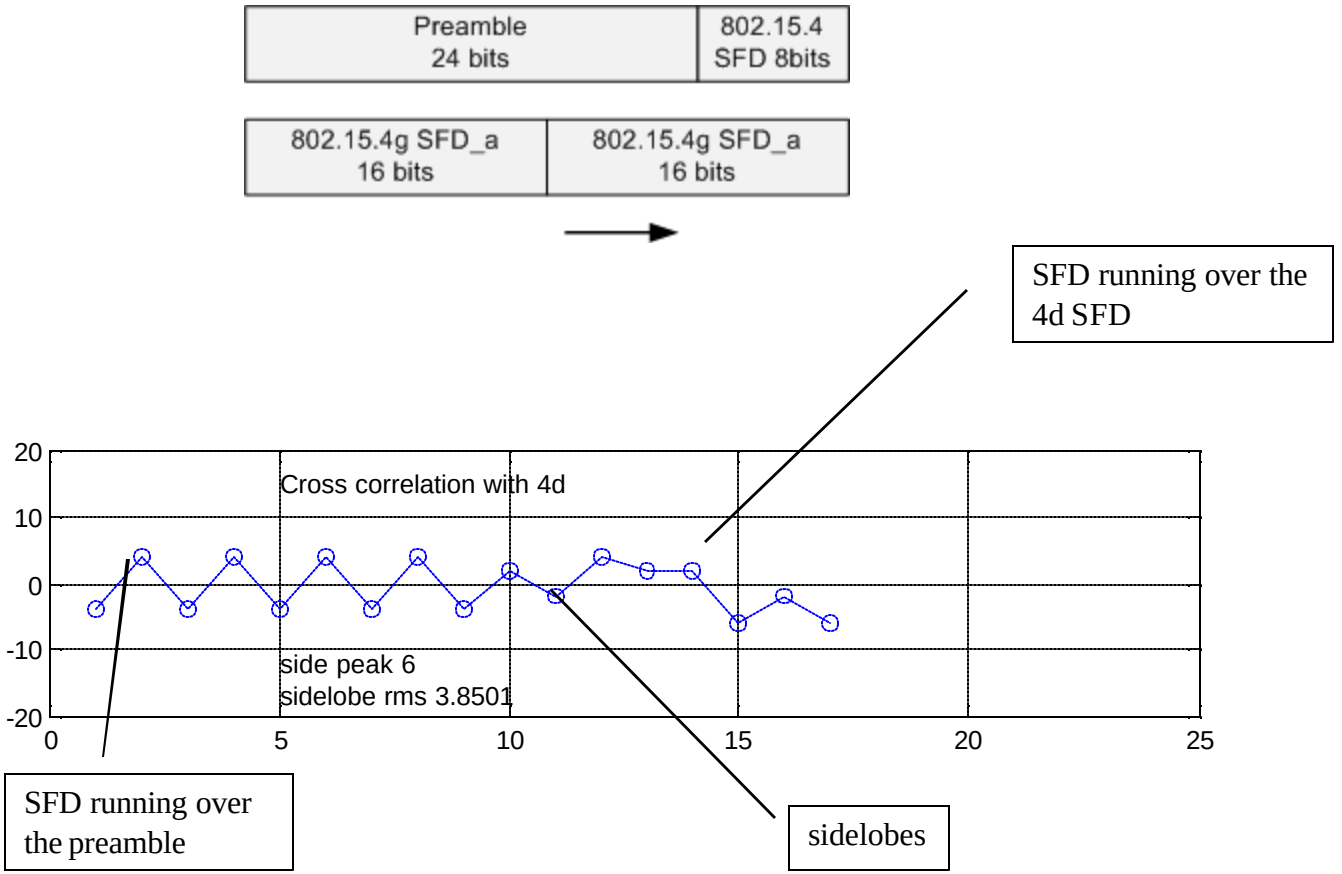
Test Setup – Typical Correlator Output

- Correlation output is achieved by sliding the test SFD over the test burst as shown below





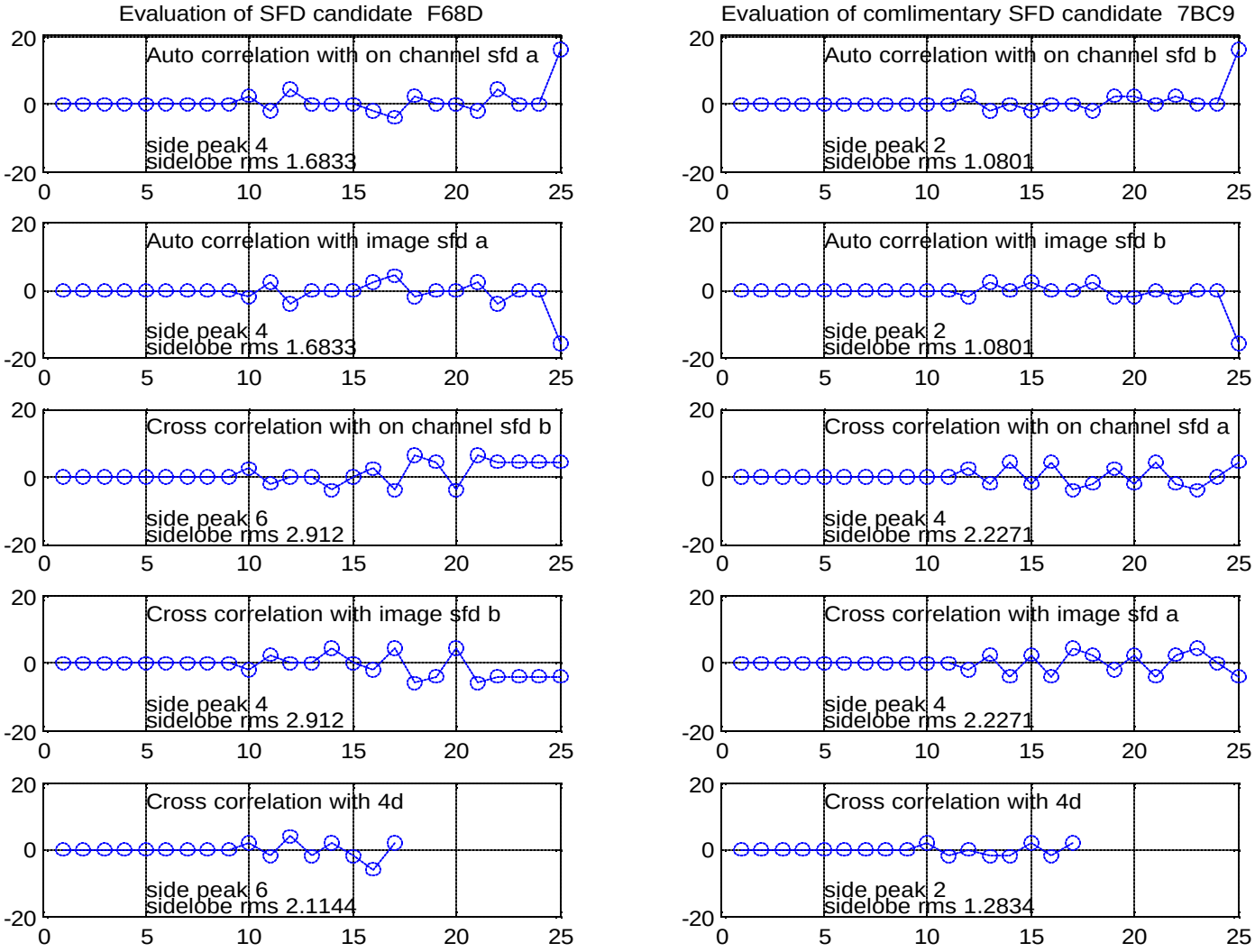
Test Setup – 4d measurement



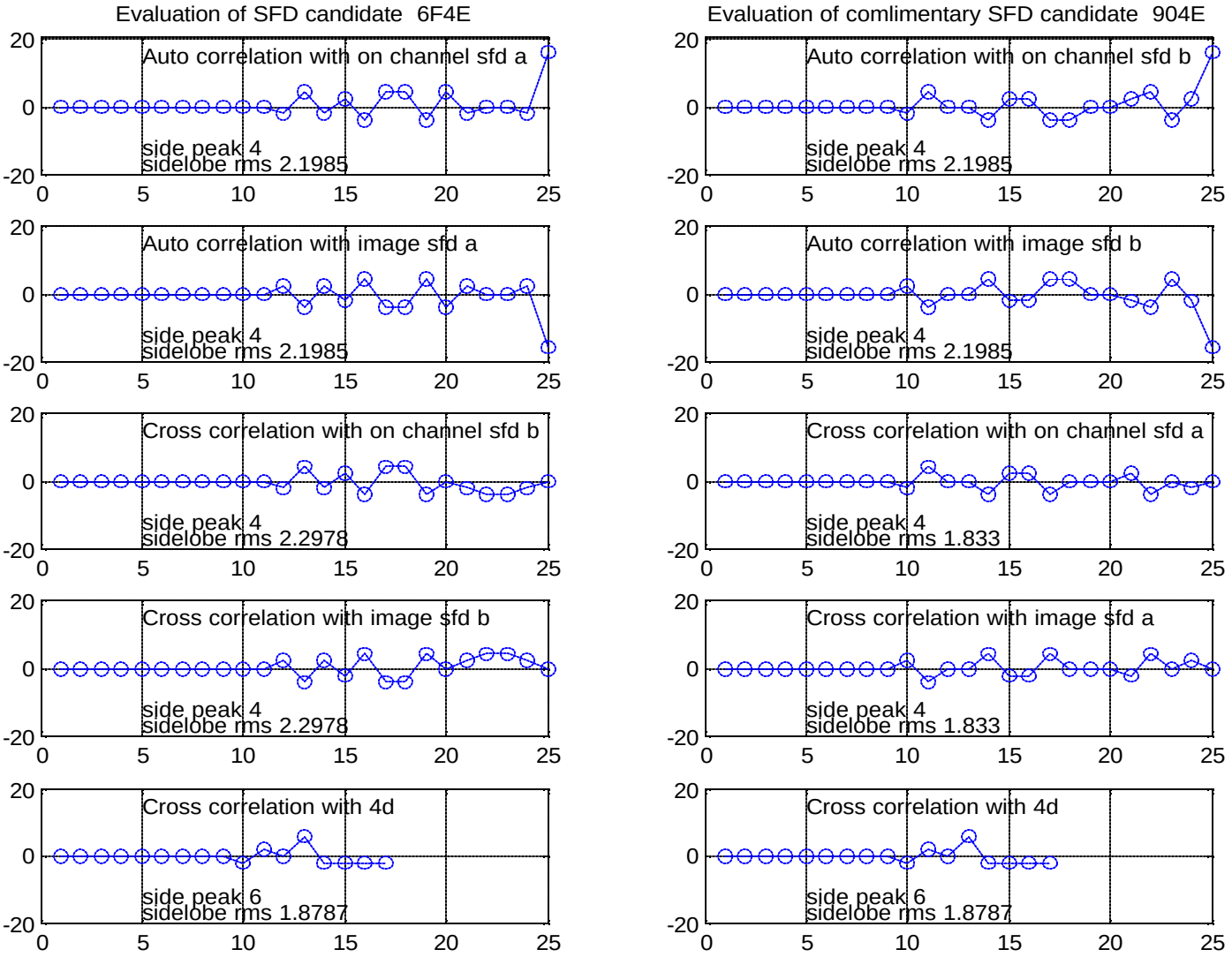
Performance criteria

- In FEC coded transmissions it is necessary to lower the threshold for detection of the auto correlation peak so that the SFD can be detected in poorer SNR
- Lowering the threshold introduces the possibility that sidelobes can cause false detections
- Therefore the SFD should be chosen so that the sidelobes are as low as possible
  - Measure the worst peak sidelobe
  - Measure the RMS of the sidelobes

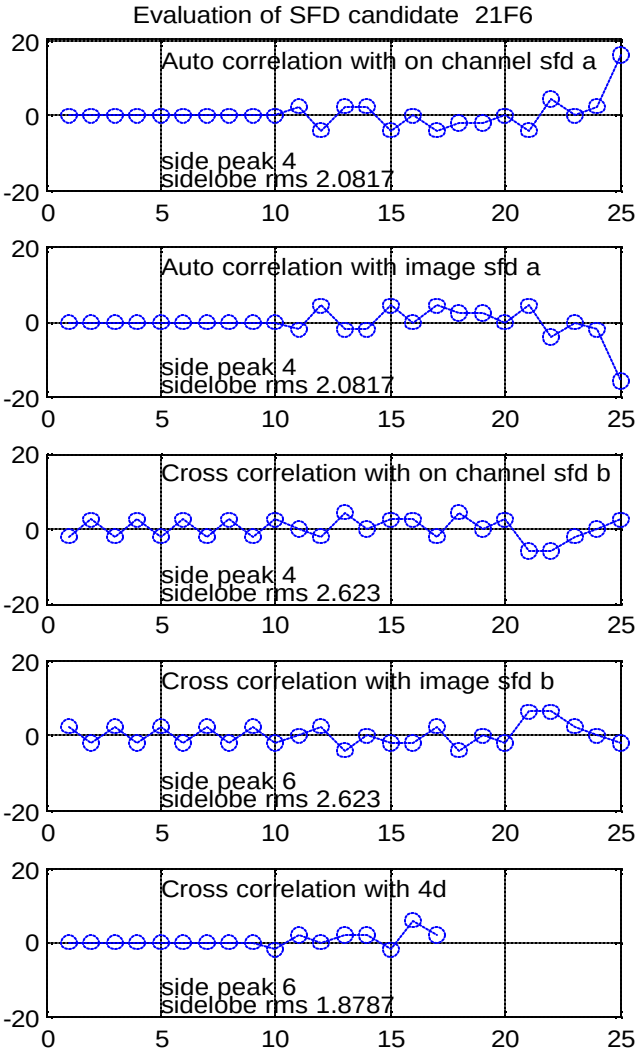
Results for Plan A

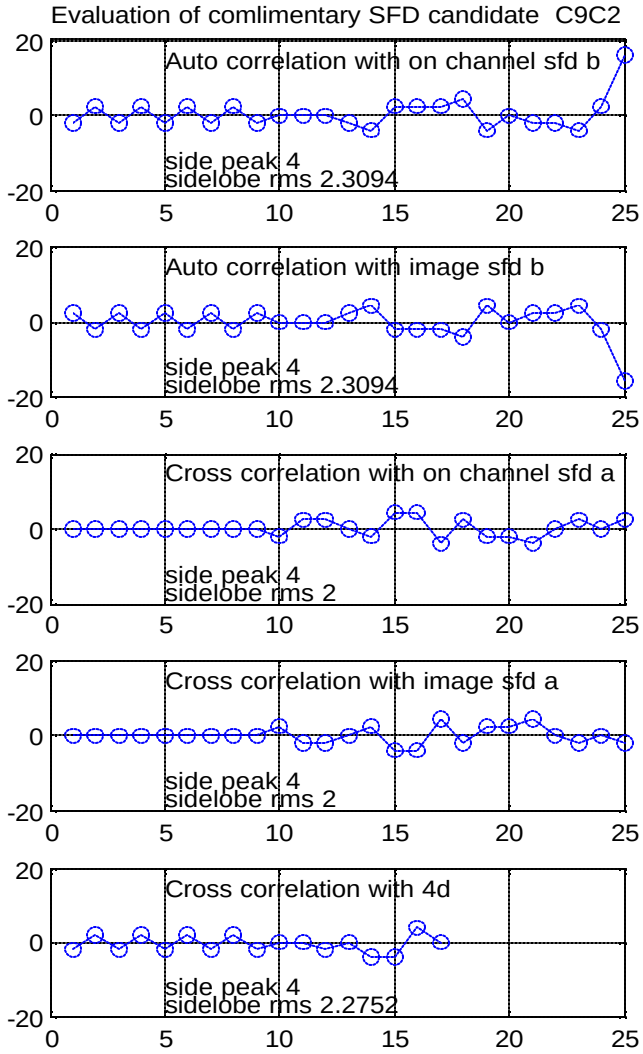


Results for Plan B

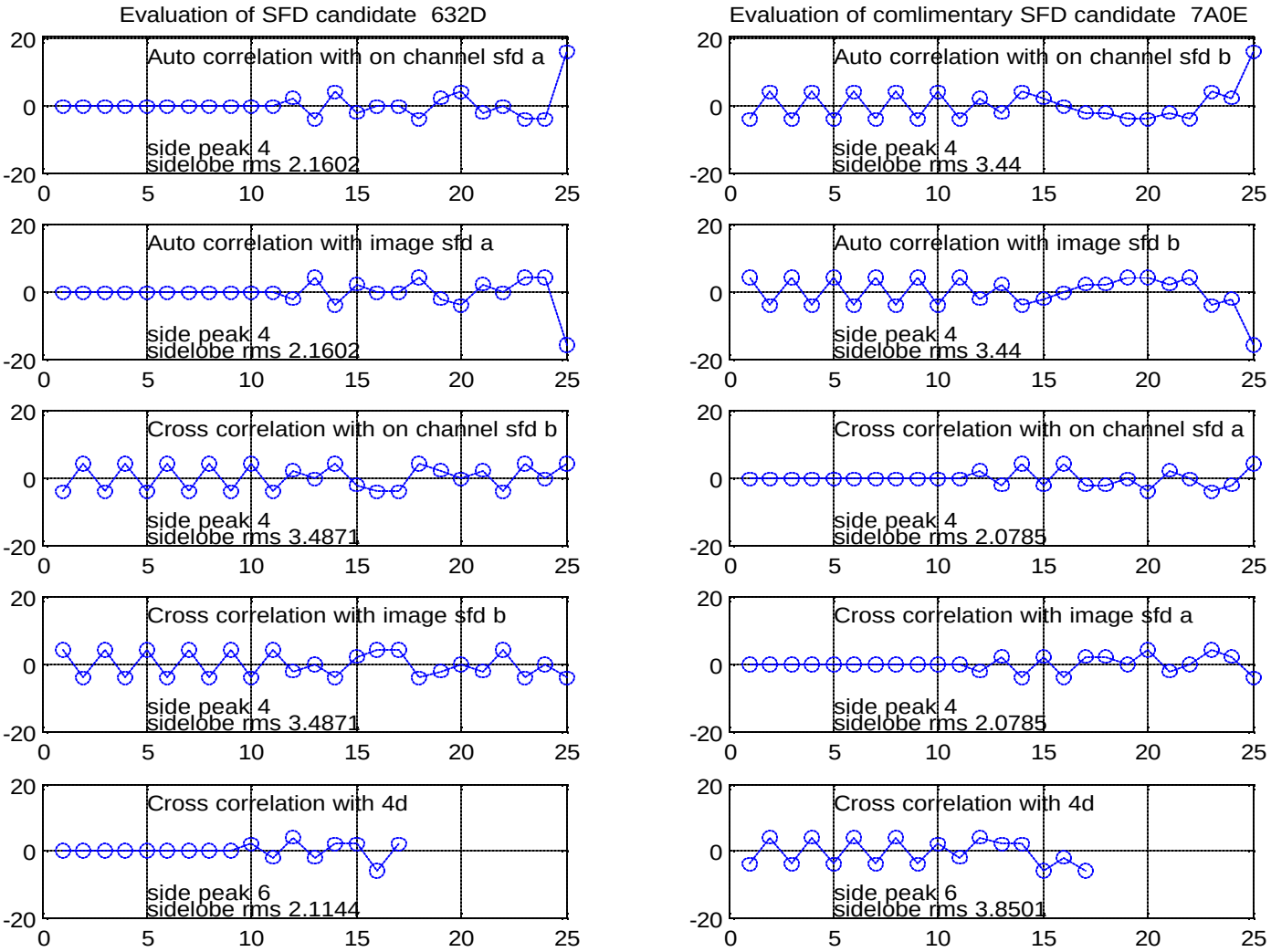


Results for Plan C





Results for Plan D



Conclusion

- According to several discussions this analysis appears to align with results from others
  - Any differences can be discussed in the up-coming conf call
- This analysis shows Plan B to have the best overall performance