

Latest results of the Dynamic Aperture studies for insertion quadrupoles

- Scan of skew components for MQM quadrupole magnets
- Progress on studies for MQY quadrupoles
- Outlook

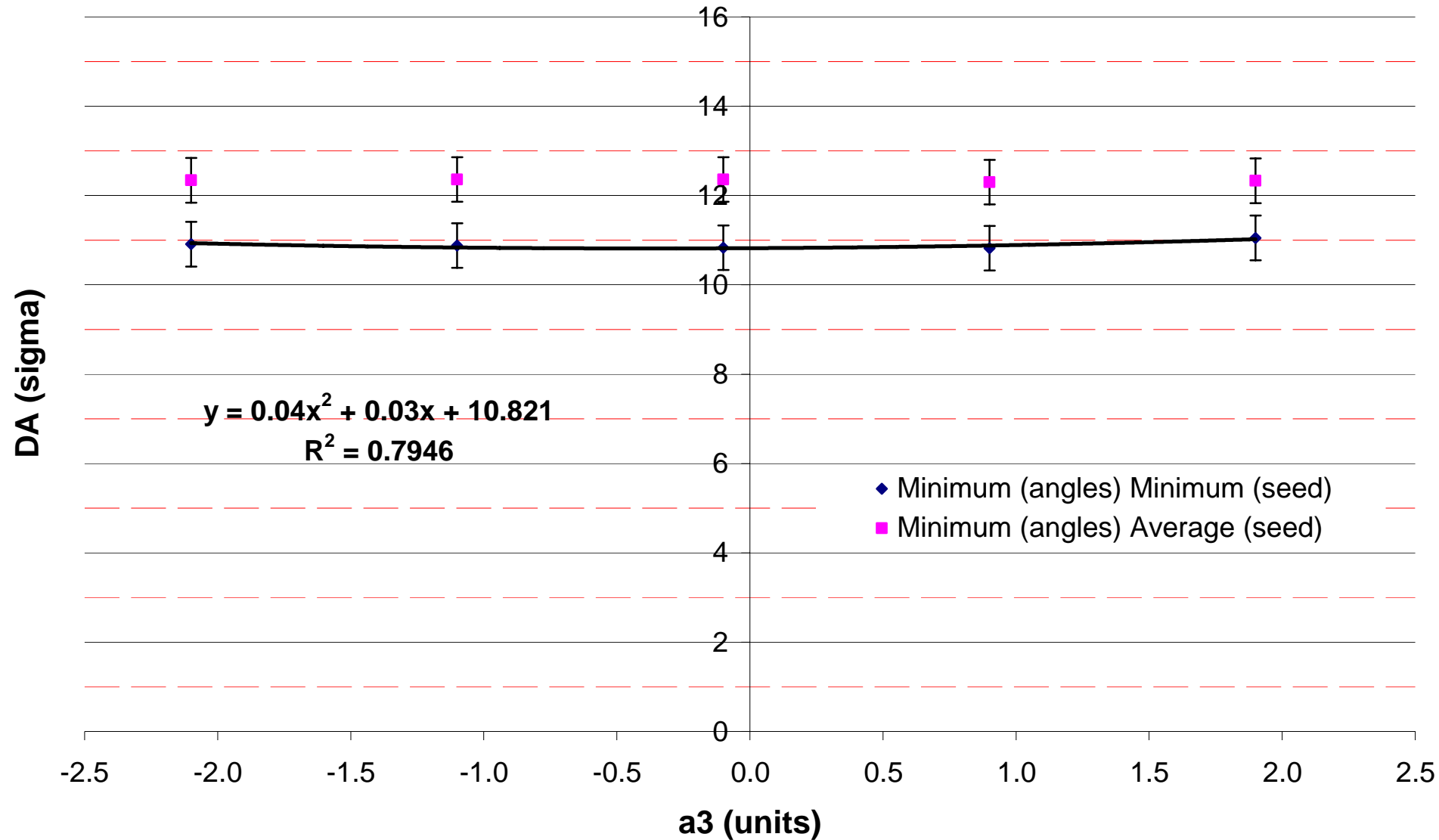
Summary of studies for MQMs (from previous LOC meetings)

- Minimum DA with measured field quality is 10.8σ
- Almost no dependence on systematic multipoles, but b7 when b_n is changed by ± 2 units around measured systematic value.
- Based on previous observation, an uncertainty of 1 unit (corresponding to a variation of b_n of ± 0.5 units) has been assumed.
- Tracking with such field quality, i.e. measured multipoles+uncertainty, done: minimum DA 11.28.

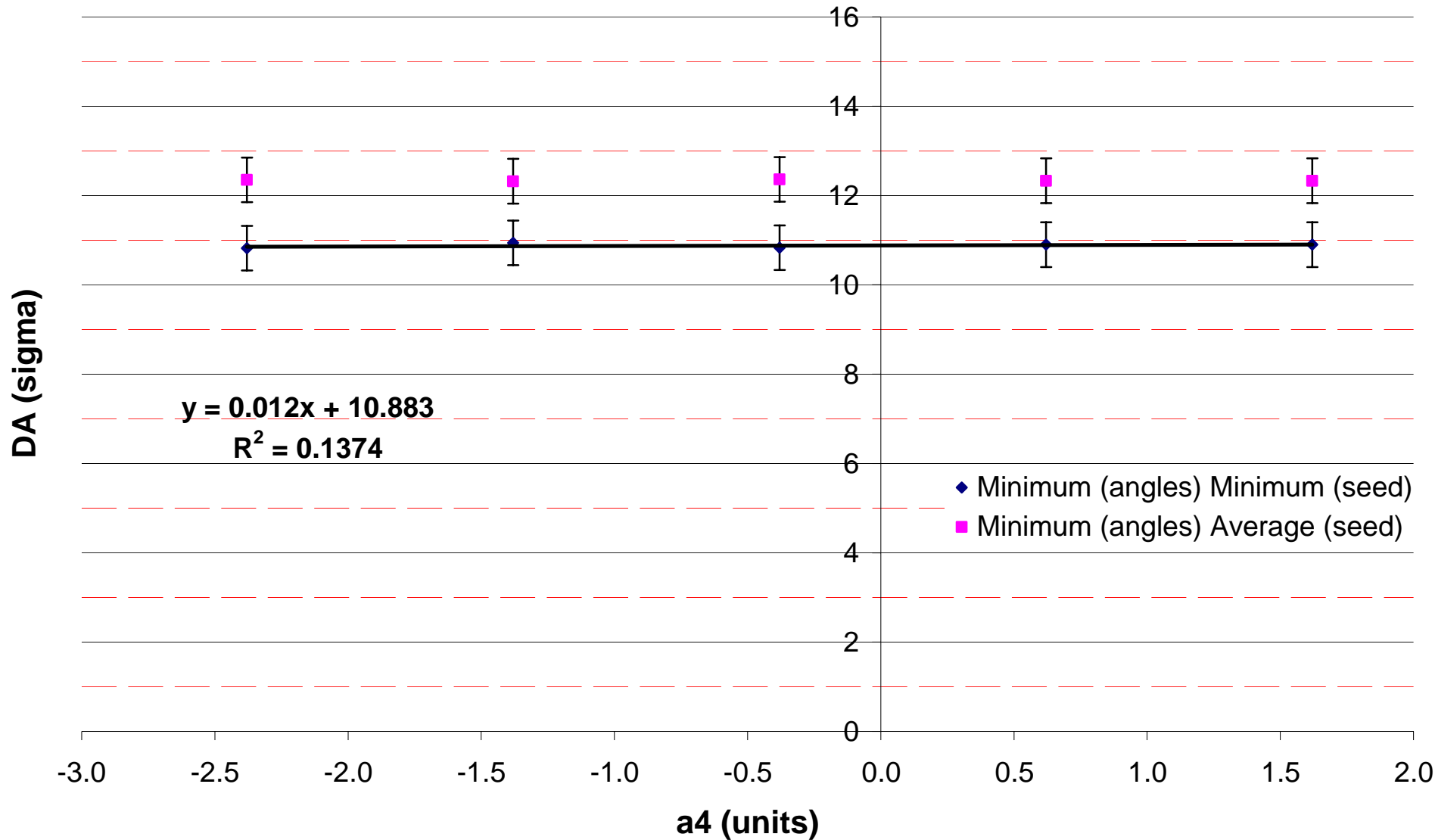
New tracking studies for MQMs: scan over skews - I

- Tracking setting-up:
 - Injection energy
 - Measured errors in MBs
 - Target errors for MQs (AL)
 - Shift of b6 for MQs in two sectors
 - New measured error tables for MQWs (based on measurement results of 22 MQWs)
 - Expected error tables for cold D1s, D2s, D3s and D4s
 - New signs for the error routines (AL)
 - Initial field quality for MQMs: measured multipoles (systematic and random)
 - No uncertainty in the normal multipoles

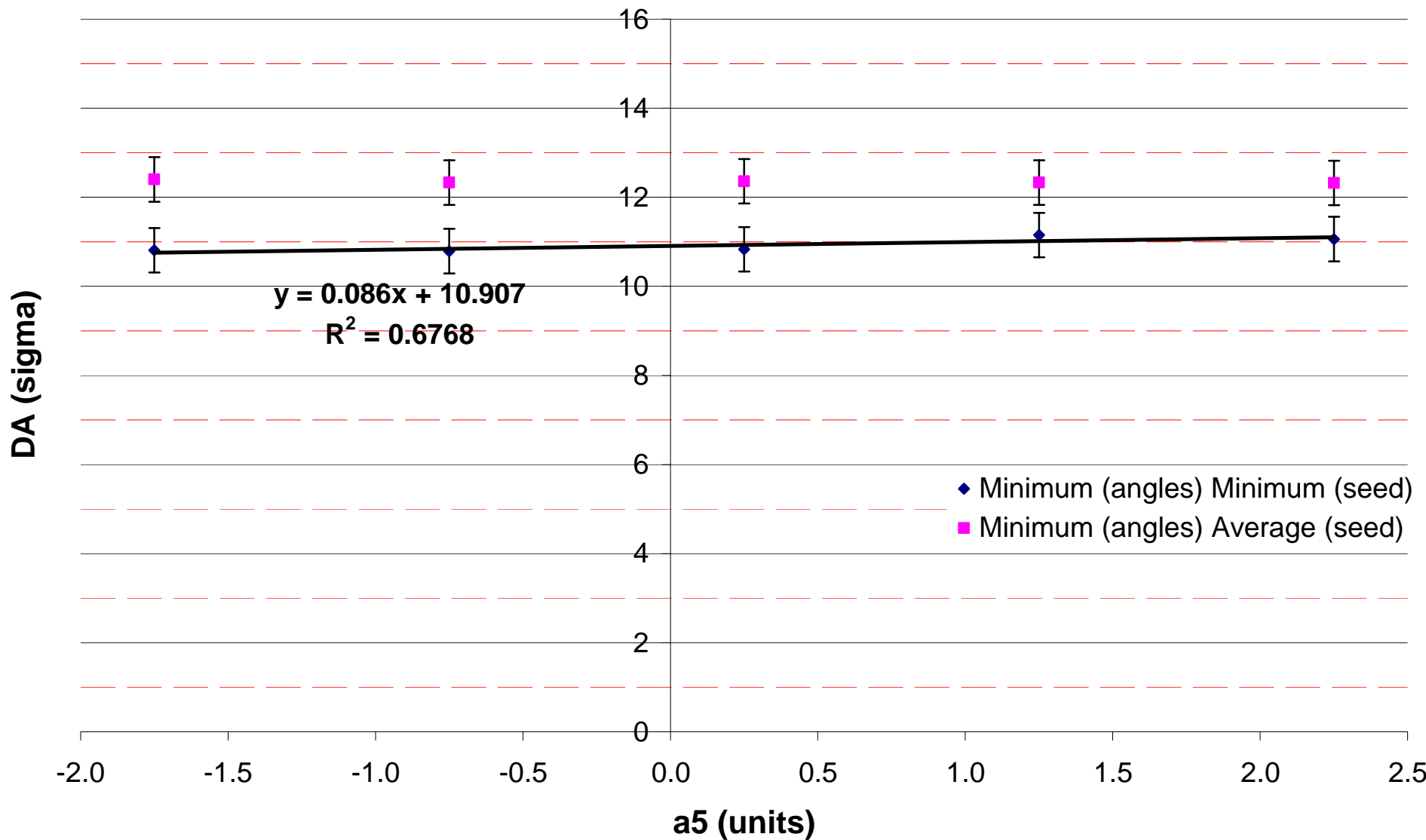
MQMs tracking results - I



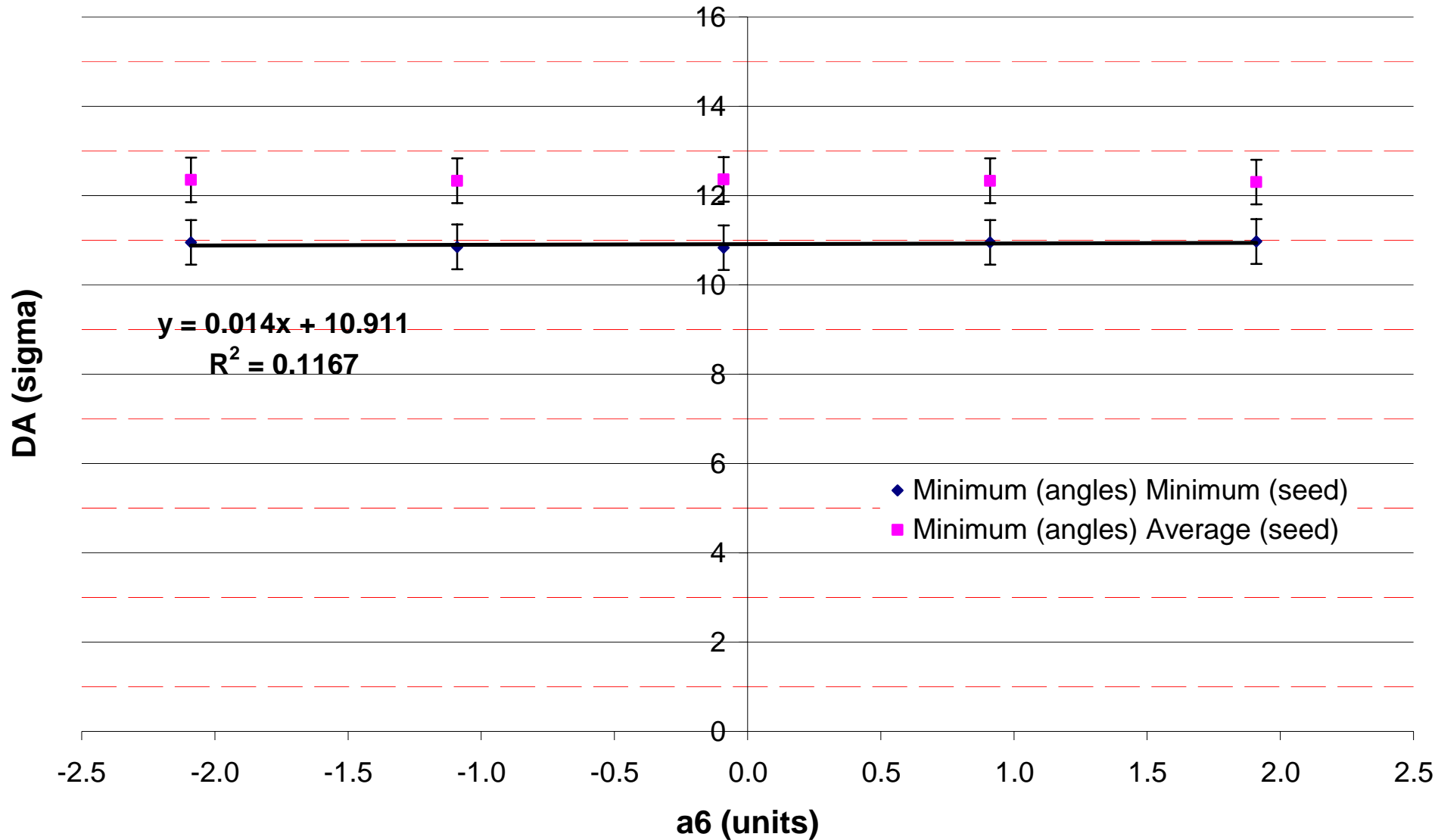
MQMs tracking results - II



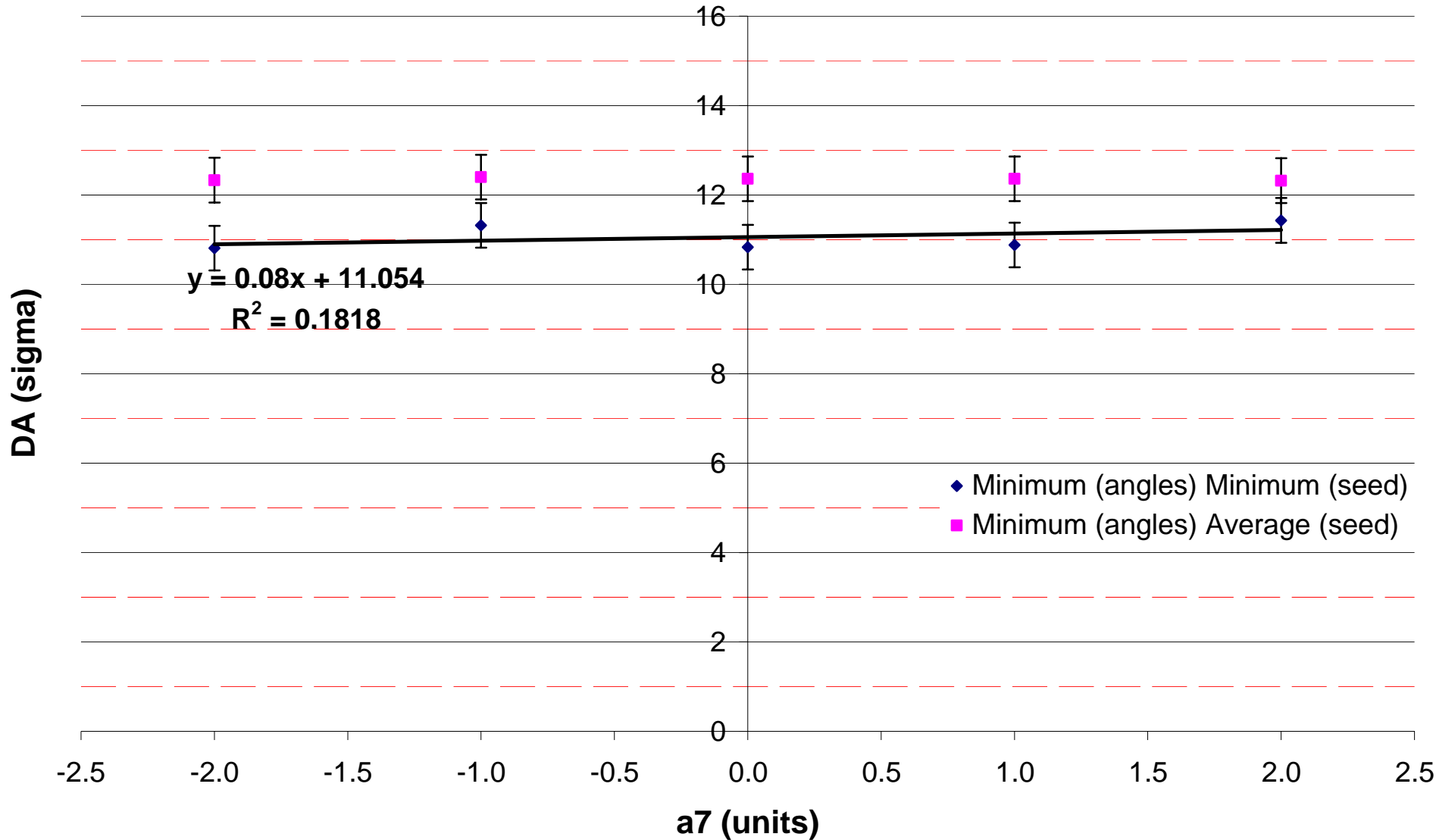
MQMs tracking results - III



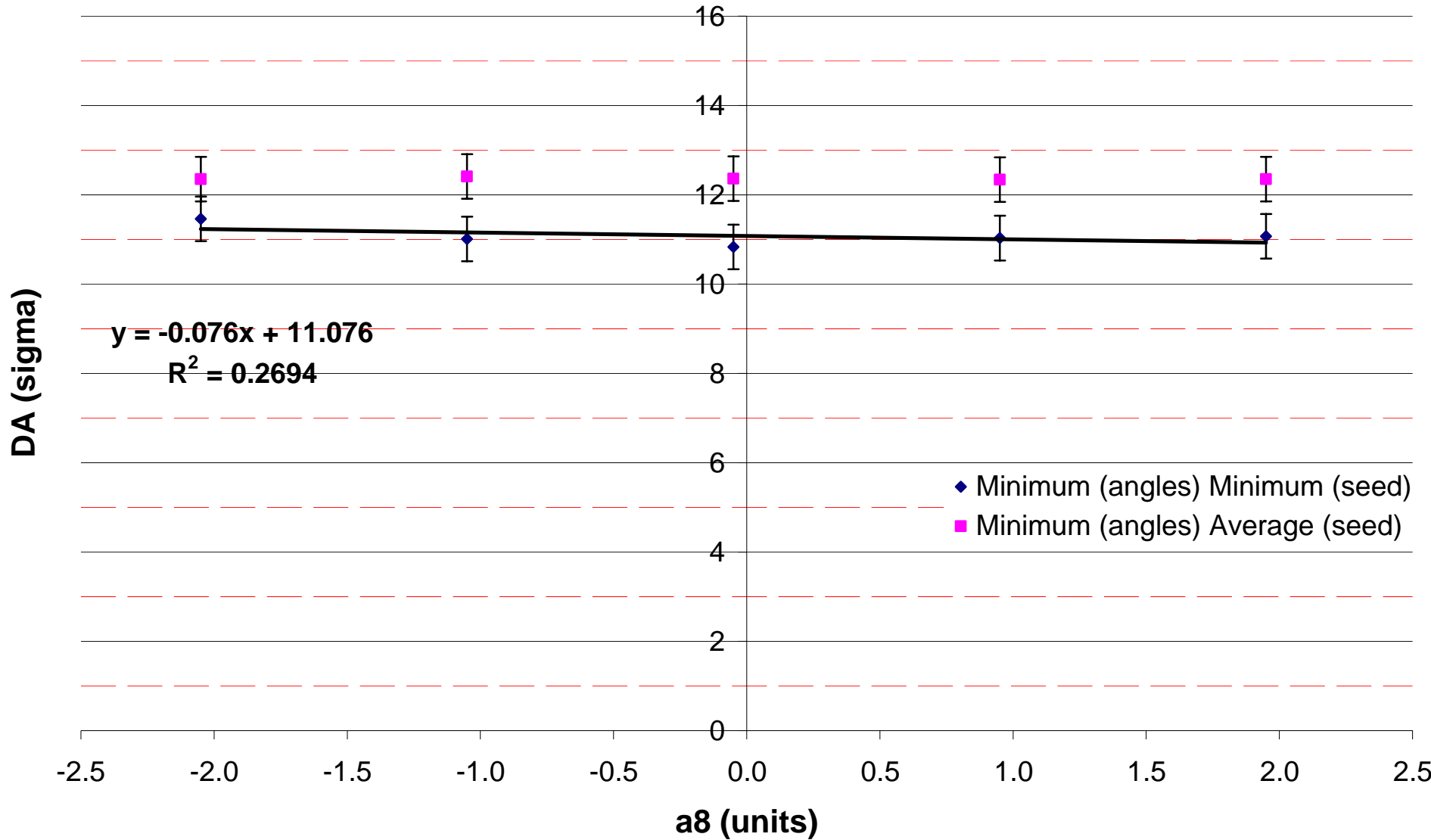
MQMs tracking results - IV



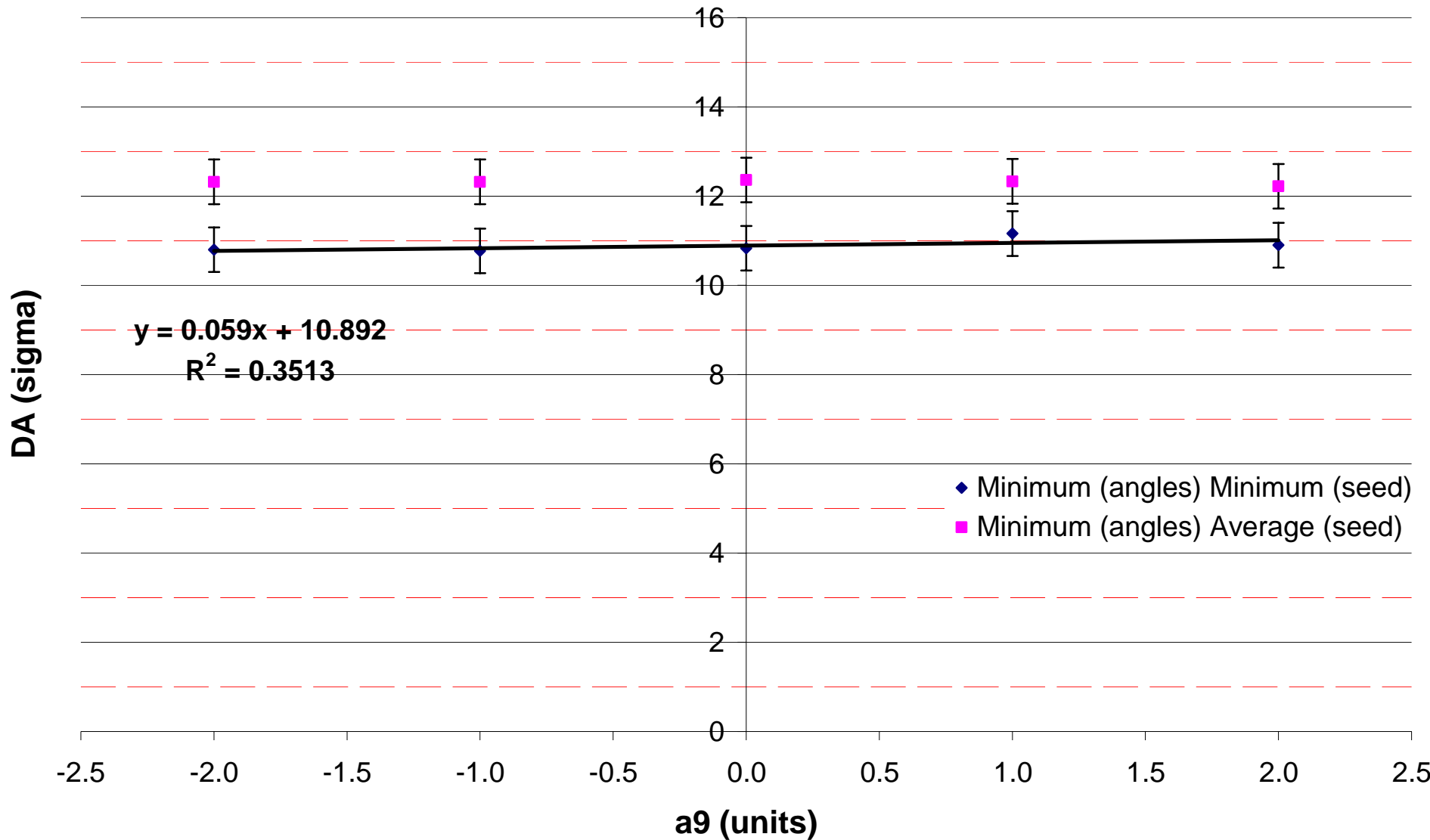
MQMs tracking results - V



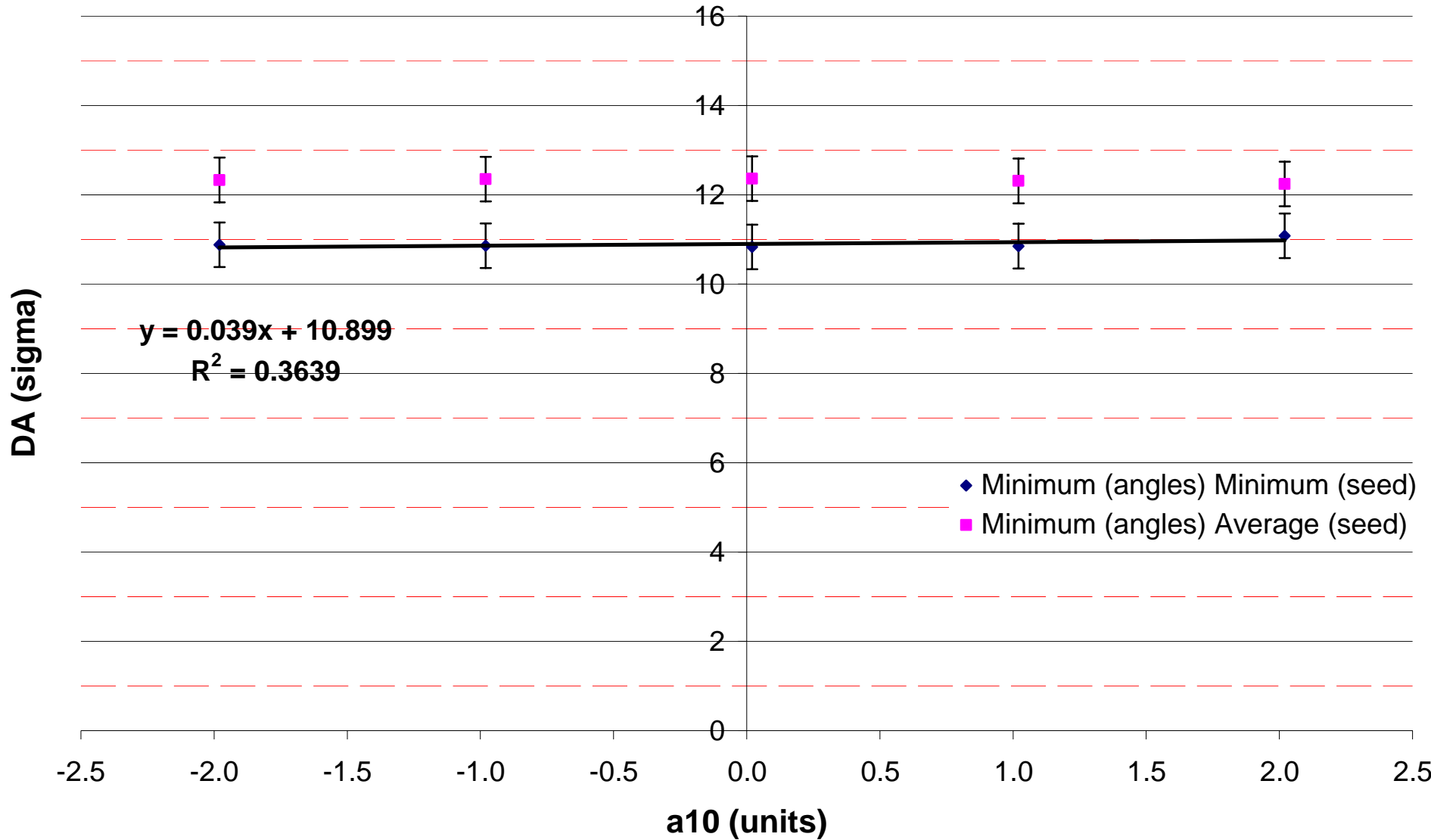
MQMs tracking results - VI



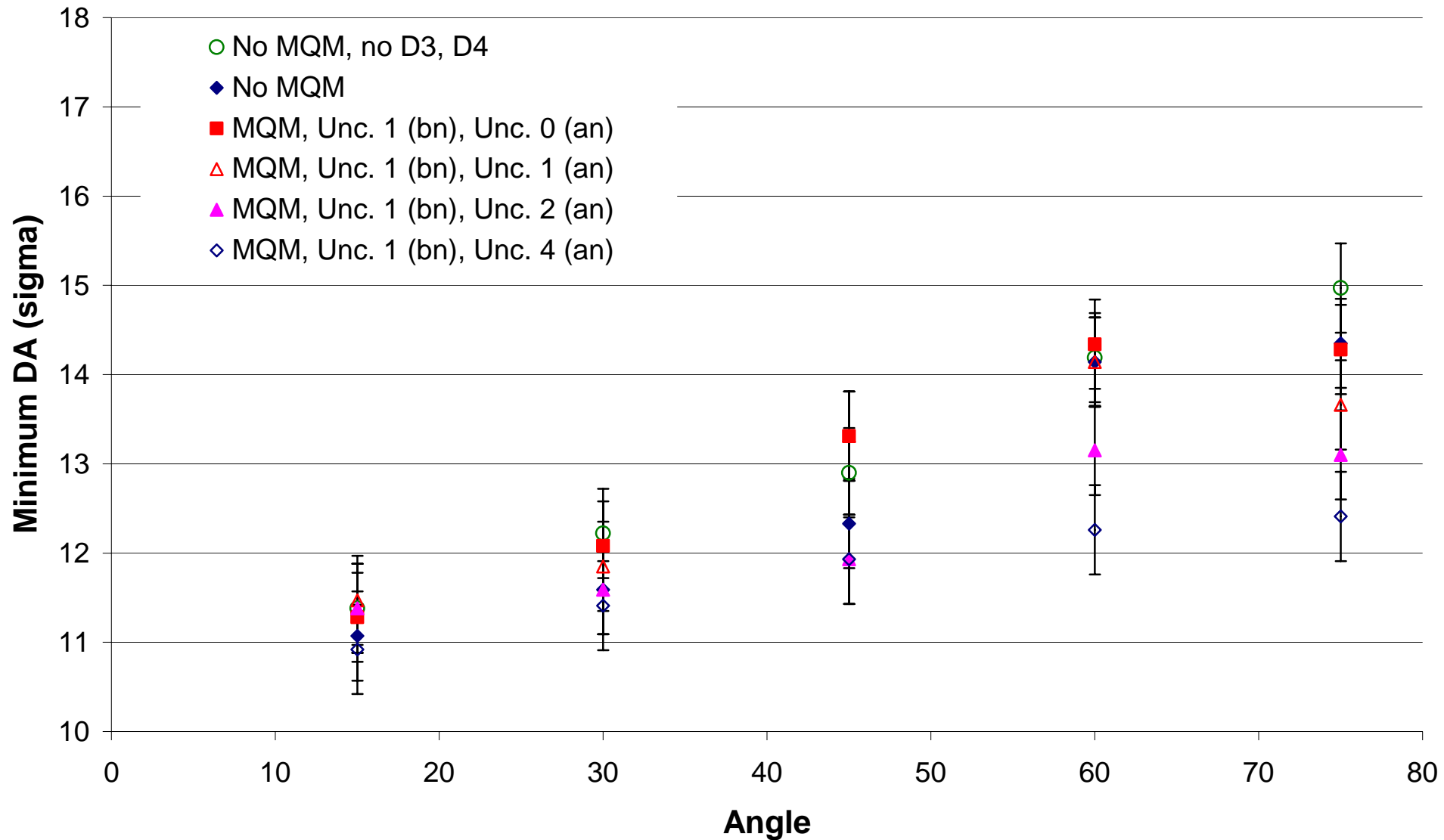
MQMs tracking results - VII



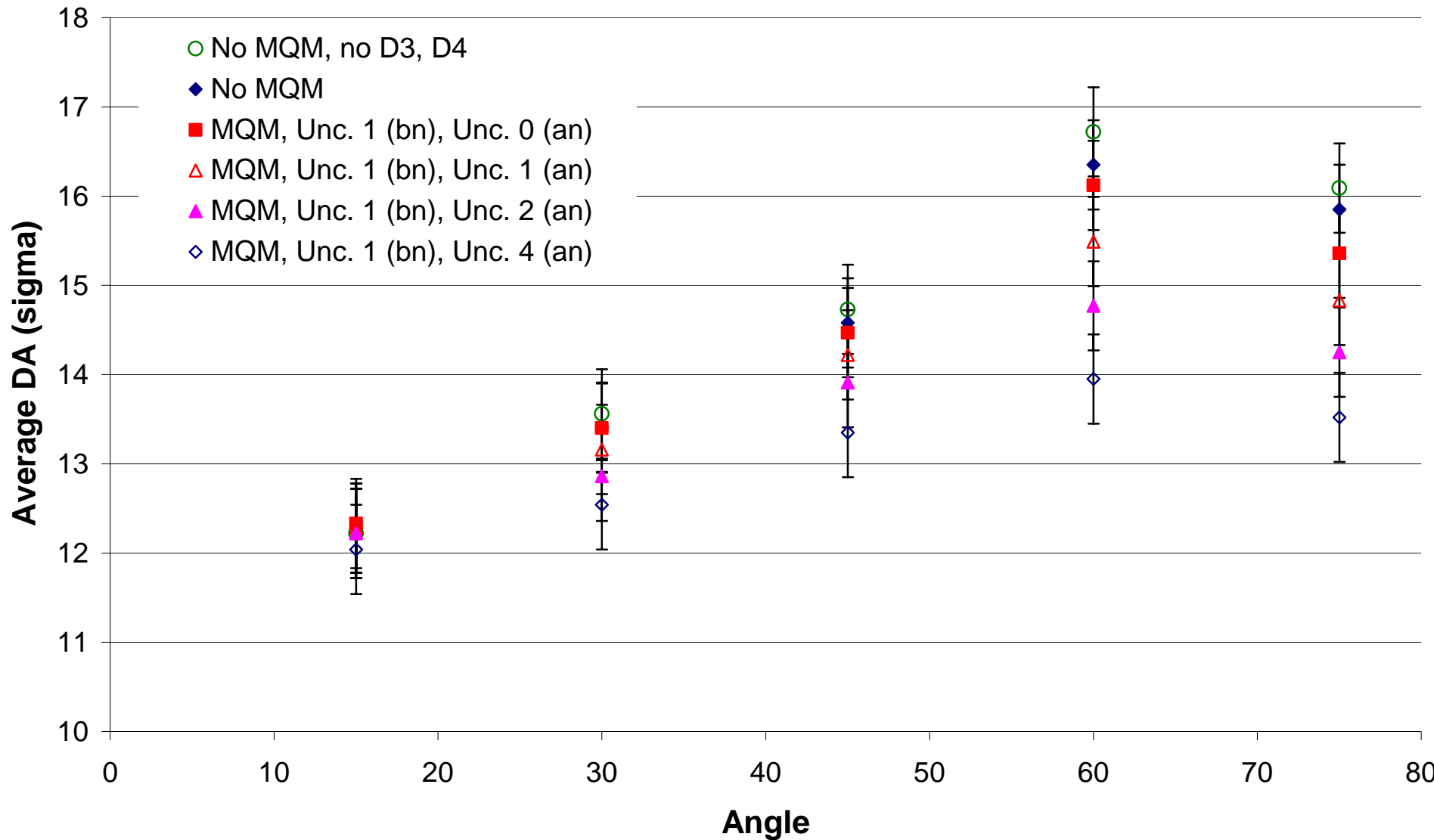
MQMs tracking results - VIII



MQMs tracking results - IX



MQMs tracking results - X



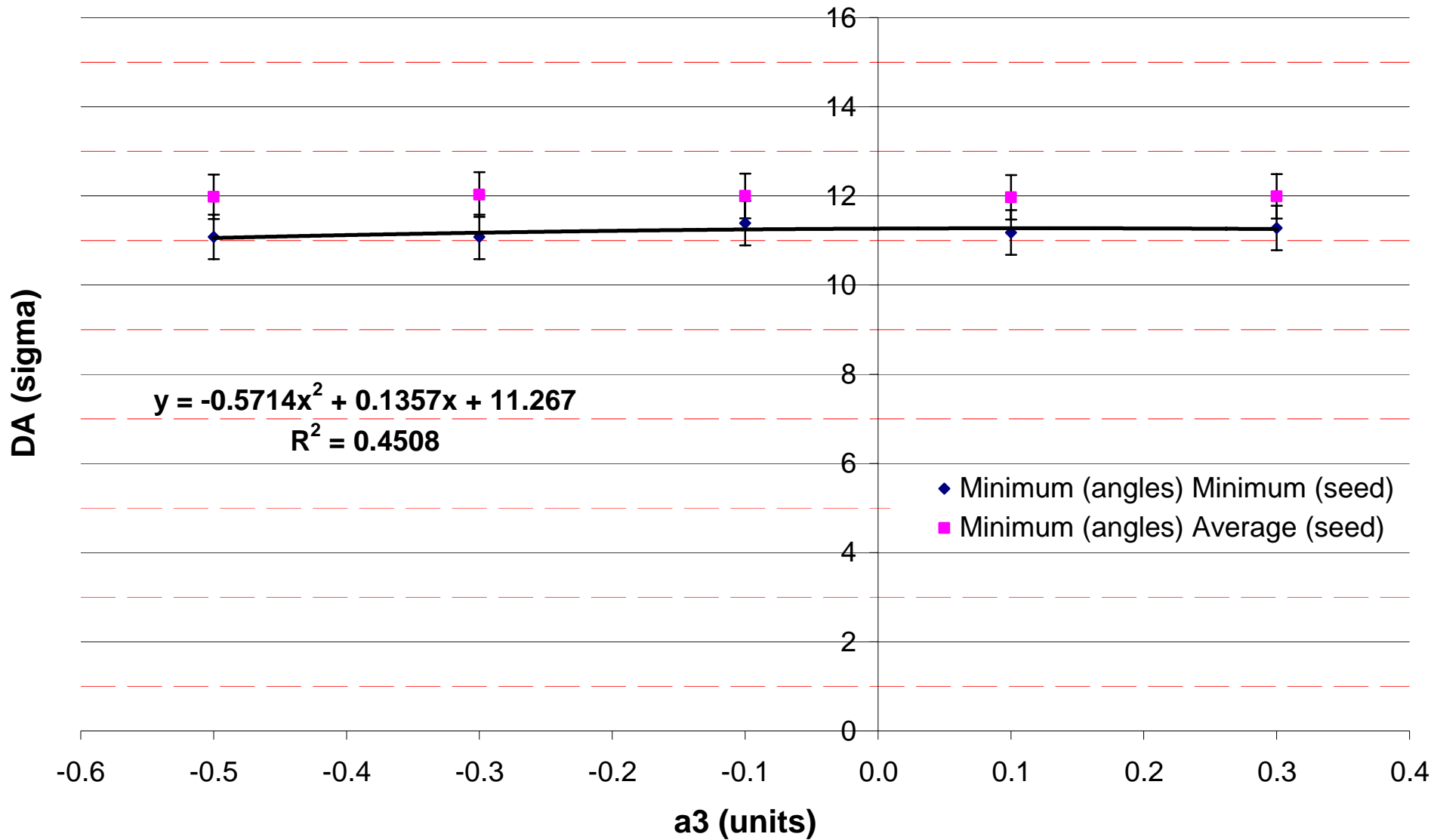
Summary of tracking results for MQM-like quadrupoles

- Minimum DA for errors in MBs, MQs, MQWs, cold D1s, D2s: **11.38**
- Minimum DA for errors in MBs, MQs, MQWs, cold D1s, D2s, D3s, D4s: **11.07**
- Minimum DA for errors in MBs, MQs, MQWs, cold D1s, D2s, D3s, D4s, MQM: **10.83** (UNC. = 0 for bn)
- Minimum DA for errors in MBs, MQs, MQWs, cold D1s, D2s, D3s, D4s, MQM: **11.28** (UNC. = 1 for bn)
- Minimum DA for errors in MBs, MQs, MQWs, cold D1s, D2s, D3s, D4s, MQM: **11.47** (UNC. = 1 for bn, UNC. = 1 for an)
- Minimum DA for errors in MBs, MQs, MQWs, cold D1s, D2s, D3s, D4s, MQM: **11.38** (UNC. = 1 for bn, UNC. = 2 for an)

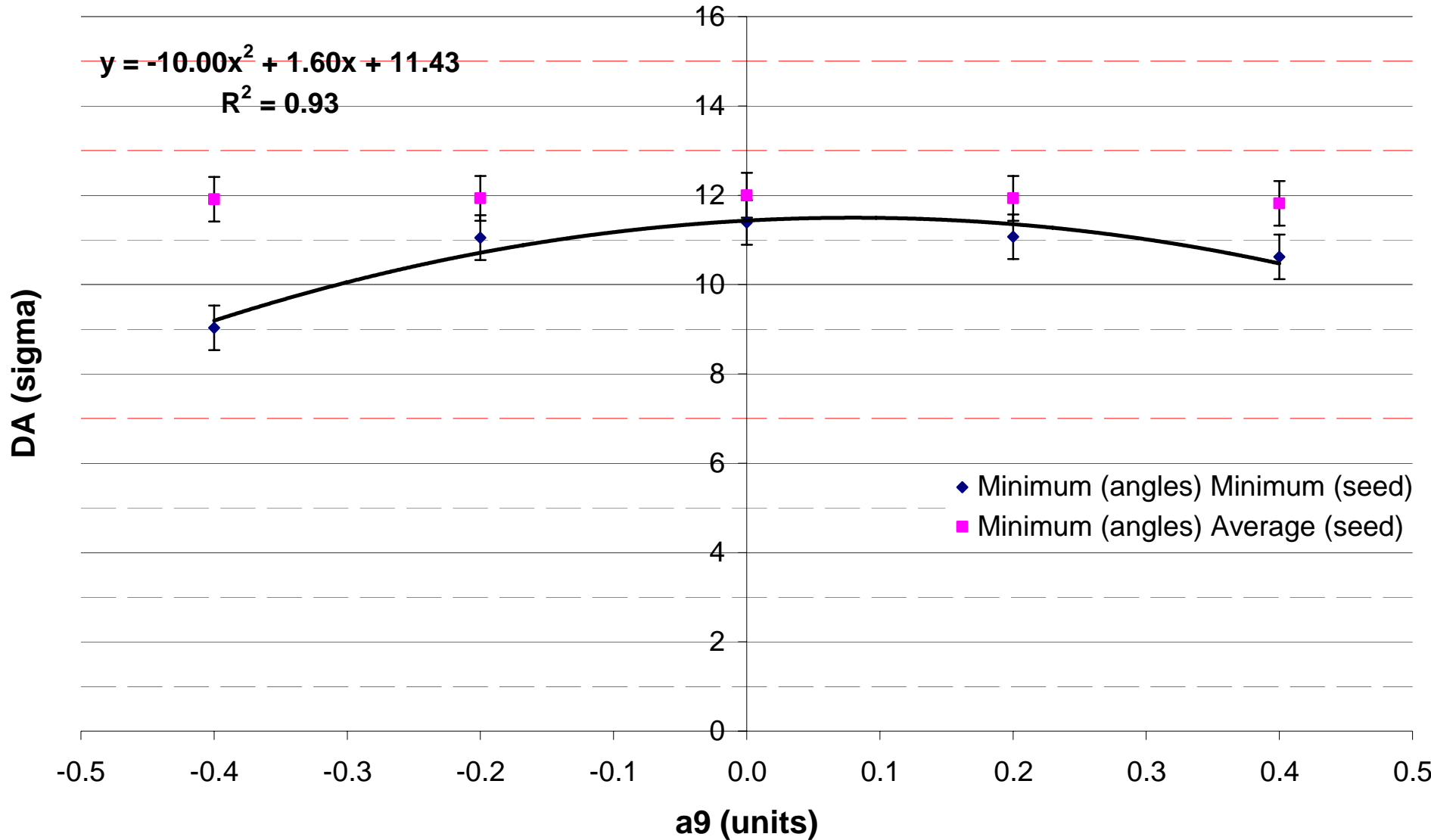
Tracking studies for MQYs: scan over skew and normal multipoles- I

- Tracking setting-up:
 - Injection energy
 - Measured errors in MBs
 - Target errors for MQs (AL)
 - Shift of b_6 for MQs in two sectors
 - New measured error tables for MQWs (based on measurement results of 22 MQWs)
 - Expected error tables for cold D1s, D2s, D3s and D4s
 - New signs for the error routines (AL)
 - Initial field quality for MQMs: measured multipoles (systematic and random) with **UNC. = 1 on b_n**
 - Measured multipoles for MQY field quality

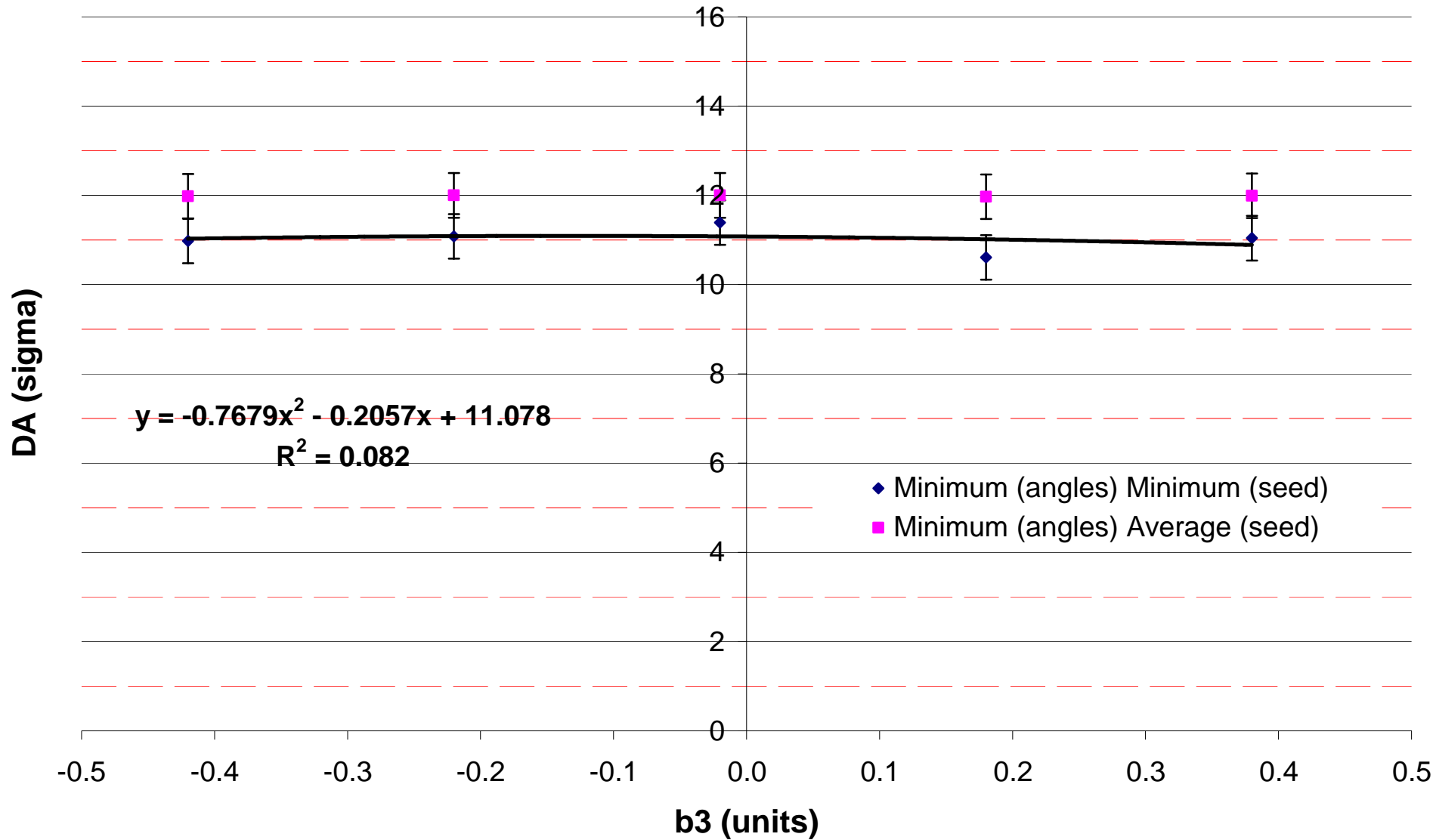
MQYs tracking results - I



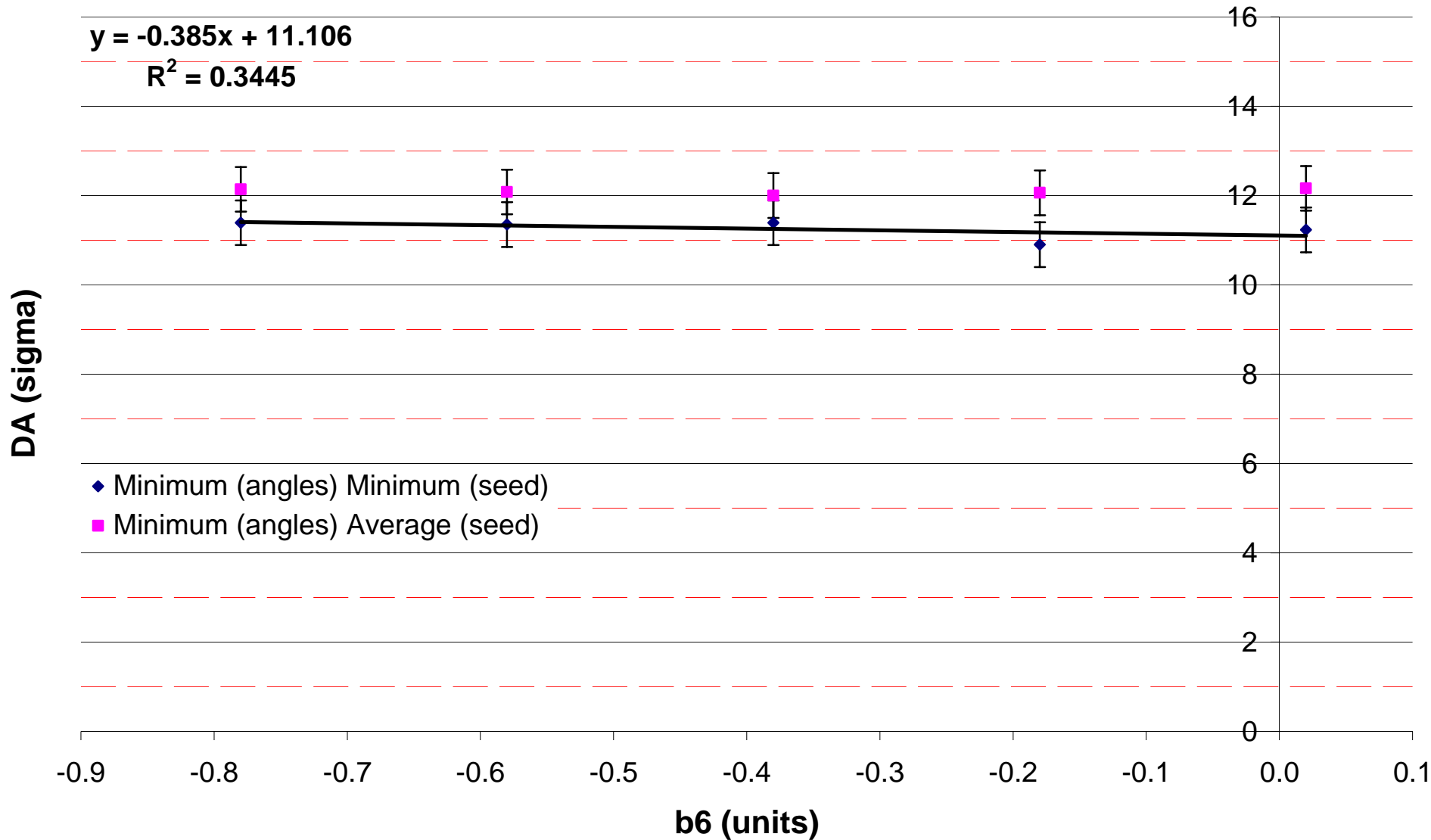
MQYs tracking results - II



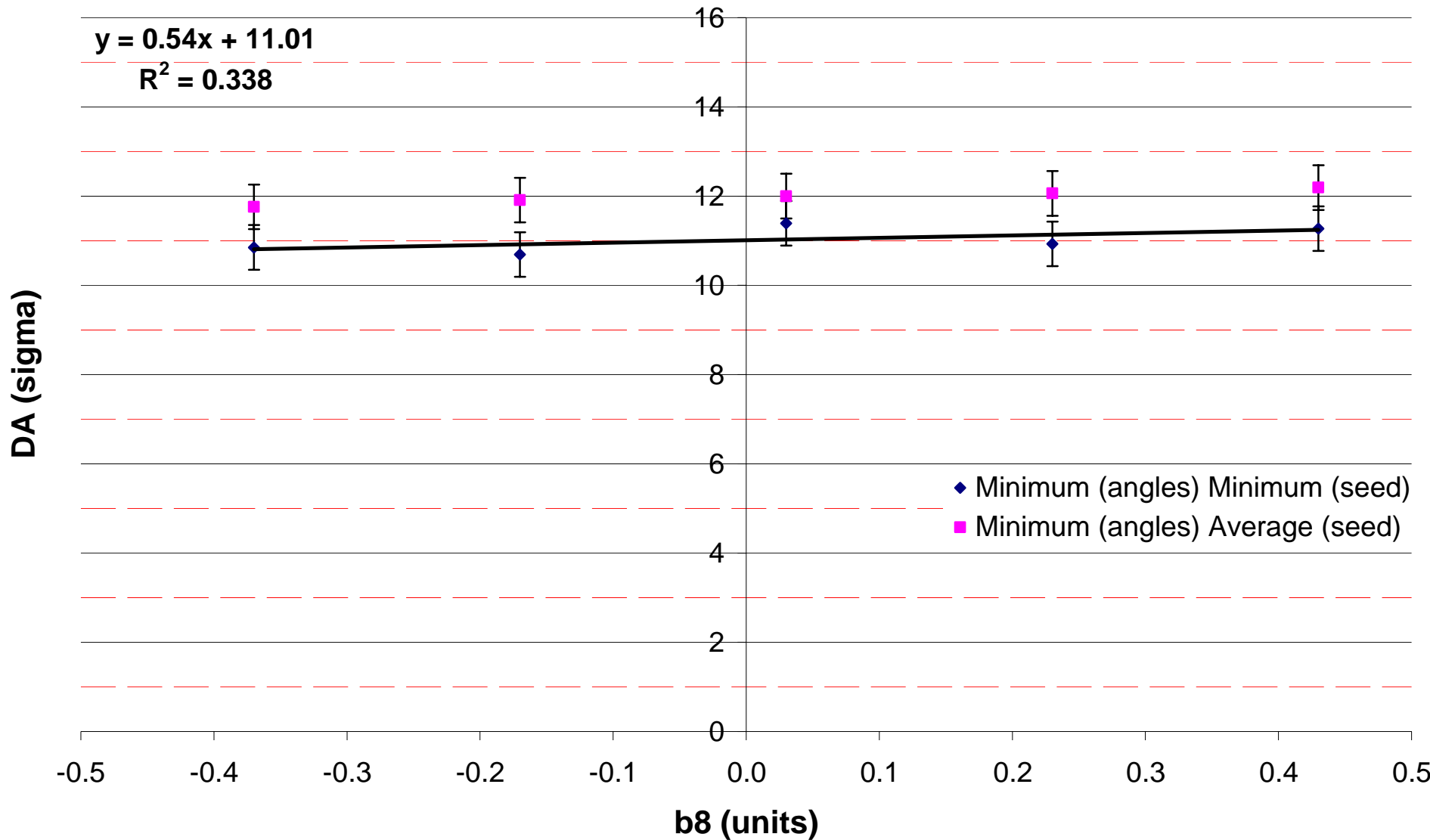
MQYs tracking results - III



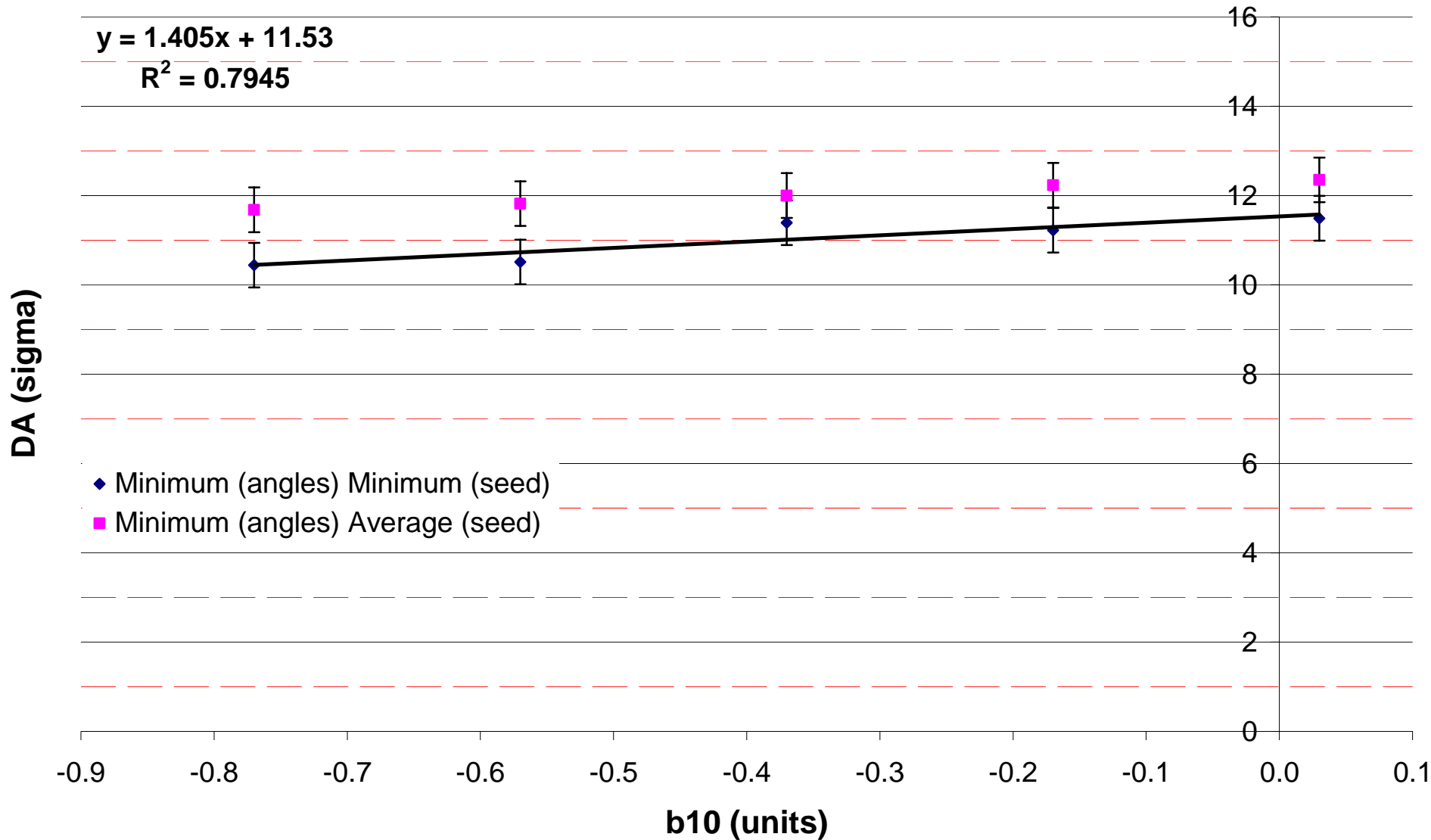
MQYs tracking results - IV



MQYs tracking results - V



MQYs tracking results - VI



Outlook

- **Still missing:**
 - **MQM:**
 - hysteresis
 - **MQY:**
 - complete extended scan
 - hysteresis
 - **Global verification of target both at injection and in collision**