AGLcom Dish performance

Introduction:

The following are results from a series of tests of AGLcom's parabolic dish antennas on an existing link that is 5.7 miles long. The link typically passes 80-90Mbs with a TX capacity of 140 Mbs and radios used are Ubiquiti AF5X operating at 5218 Mhz.

The tests were taken in stages:

1) The normal performance of the link was recorded.
2) The 2' dish at one end, B, was replaced with the AGLcom, C, dish and the link reestablished. The link performance was recorded.
3) The 2' dish at the other end, A, was replaced with the AGLcom, D, dish and the link reestablished. The link performance was recorded.
4) The setting on the AF5xs were adjusted to optimize the link performance with data recorded.
5) The 2' dish, B was put back in the link and the performance was recorded.
6) The ACLcom C was put back into place.

The tables below do not follow the test order as the third line of data was actually the last test performed.

Antennas:

A-Jirous JRC-29EX MIMO
B-Jirous JRC-29EX MIMO
C-AGLcom - PS-6100-30-06-DP
D-AGLcom - PS-6100-29-06-DP-UHP

Results:

Table 1 is the signal strength results of the various dishes on the link. The first line, A-B, is the original Jirous to Jirous. A is the first two columns of the link and are the A side and the last two columns are the B side on the link. What is of interest is that exchanging B to C in the second line brought the signal deviation between the channels to only 1db and 0 db as seen in Table 2. The third line was a result of replacing the horn on the A dish and optimizing the setting on the AF5X radios. This changed the signal by around 7db and improved the link capacity, Table 3. Clearly, the A dish had a problem with the original horn.

In the fourth line, D-B, the signal strength improved as well at the signal deviation on the two channels, Table 2 first two columns. This link was not optimized. The fifth line, D-C is both AGLcom dishes which improved the bandwidth, Table 3, and the signal deviations, Table 2. The final line, D-C, was the previous line optimized. The signal strengths moved closer together and the bandwidth improved.

Link	Ch0	Ch1	Ch0	Ch1
A-B	-73	-76	-70	-74
A-C	-73	-74	-71	-71
A*-C	-64	-66	-65	-66
D-B	-63	-62	-59	-59
D-C	-62	-62	-58	-58
D*-C	-60	-60	-61	-61

Signal Strength (* optimized data)
Table 1

Table 2 has four data columns, the first two being the measured results and the latter two being the measured difference from theory. The Jirous and AF5X calculators were used for the theory signals. Clearly the signal approached the theoritical limit with the optimization and with the change of dishes. The optimization improved the signal by ~9db for the link that we replaced the horn on the Jirous and by ~2db for the AGLcom link.

Link	dSig	dSig	dSig	dSig
A-B	3	4	-16.5	-17.4
A-C	1	0	-17.0	-15.0
A*-C	2	1	-8.0	-9.0
D-B	-1	0	-13.3	-5.3
D-C	0	0	-7.0	-4.3
D*-C	0	0	-5.0	-6.0

Signal strength variation from theory
Table 2

The band width improvement was more obvious, Table 3, from 22 Mbs to 39 Mbs for the RX and 144 Mbs to 141 Mbs TX for the link with the horn replacement. The bandwidth improvement for the optimization of the AGLcom link was from 61Mbs to 66Mbs RX and from 211Mbs to 267Mbs for TX.

The bandwidth improvement from the original, optimized link to the AGLcom link is from 61Mbs RX to 67Mbs and from 210Mbs TX to 267Mbs. There is a clear improvement for the AGLcom link over the Jirous link.

Link	BW-RX	BW-TX
A-B	22.5	144.6
A-C	39.0	141.4
A*-C	60.9	210.0
D-B	61.4	211.0
D-C	60.6	215.0
D*-C	66.6	267.6

Table 3

Conclusions:

The data supports a measurable improvement in both signal strength and bandwidth with the use of the AGLcom dishes. However, it is difficult to quantify the improvement. The Jirous dishes were identical whereas the AGLcom dishes were not. One of the jirous dishes was under performing initially but was repaired for the last tests. Additional testing is needed to provide accurate data analysis and performance comparison. The best performance tests would involve identical AGLcom dishes, ideally two links, one each of both types of dishes.