

8b/10b ISI Killer Pattern Presentation & Comparison With CJTPAT

January 17th 2001

Eyran Lida : eyranl@mysticom.com

Boaz Shahaar : boazs@mysticom.com



8b/10b ISI Killer Pattern

- Based on the sequence: F4 (D20.7) , EB (D11.7)
- Repeating this sequence starting with RD- will give: 0010110111,1101001000,0010110111,1101001000,...
- 5 contiguous 1's followed by a single 0 and 5 contiguous 0's followed by a single 1 occurs every 20 bits.
- The pattern is a valid XAUI coding sequence and can be created easily because of its repetitive nature.
- To ensure the right initial disparity we repeat F4,EB sequence for 32 times (64 chars) and then add another F4 to flip the disparity (total of 65 chars). Repeating this 65 chars sequence ensure killer pattern in 50% of the time.



CJTPAT Payload Used For The Comparison

167 7E's

1 74

1 7E

1 AB

51 B5's

1 5E

1 4A

4 7E's

1 FE

Repeating this 228 chars sequence will ensure “real CJTPAT” in 50% of the time.

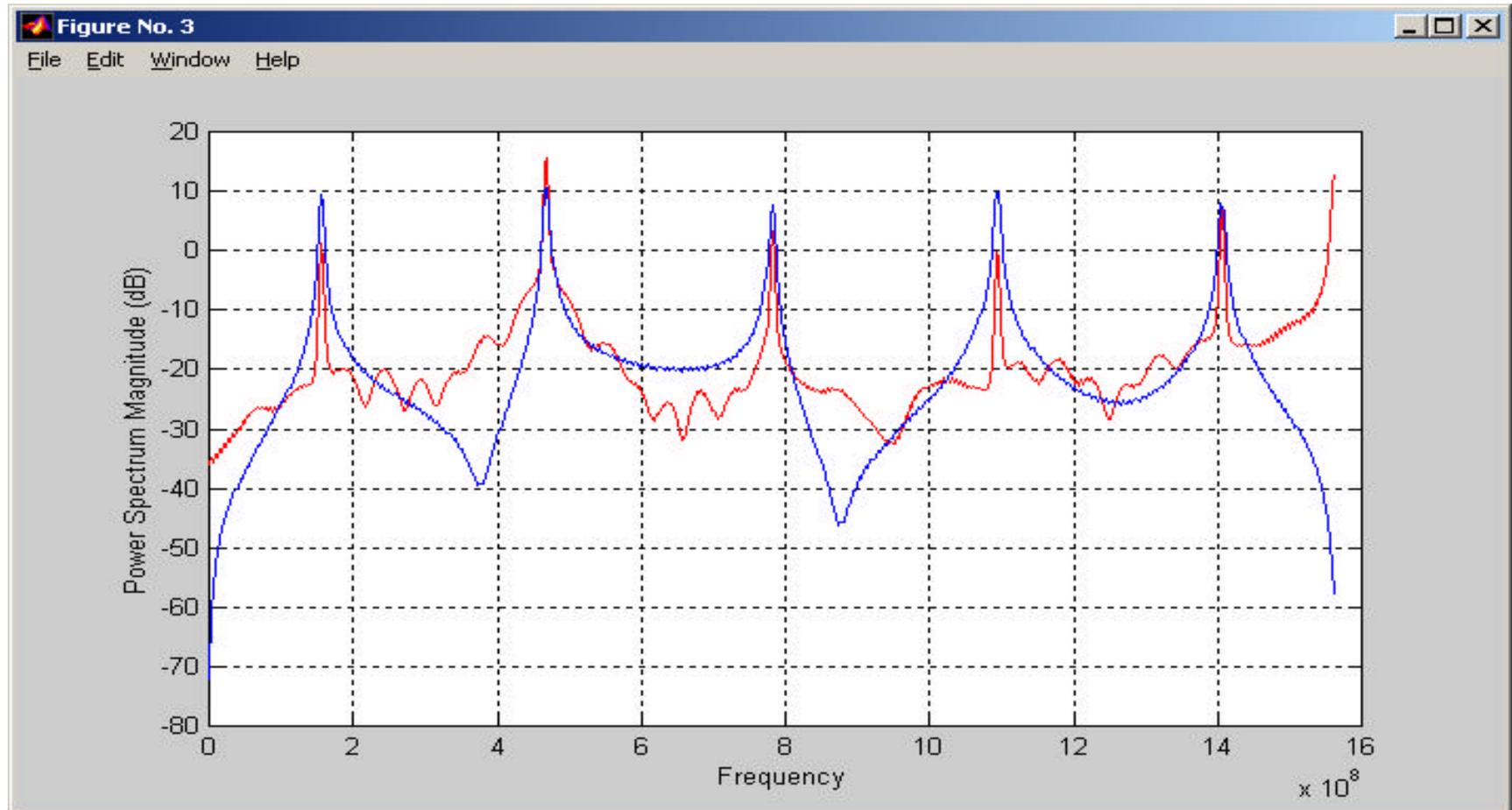


Comparison Simulation

- Matlab Simulation with the two data patterns were done separately on the same setup.
- Each simulation consists of more than 40000 transmitted bits sequence which creates about 20000 transitions.
- The bit sequence contains long data patterns (1500 to 1550 chars of the CJTPAT payload or the ISI killer pattern) separated with short random Idle sequence (less than 11 chars of IPG).
- For the CJTPAT payload sequence we had 44716 bits with 20553 transitions.
- For the ISI killer pattern sequence we had 41362 bits with 20596 transitions.



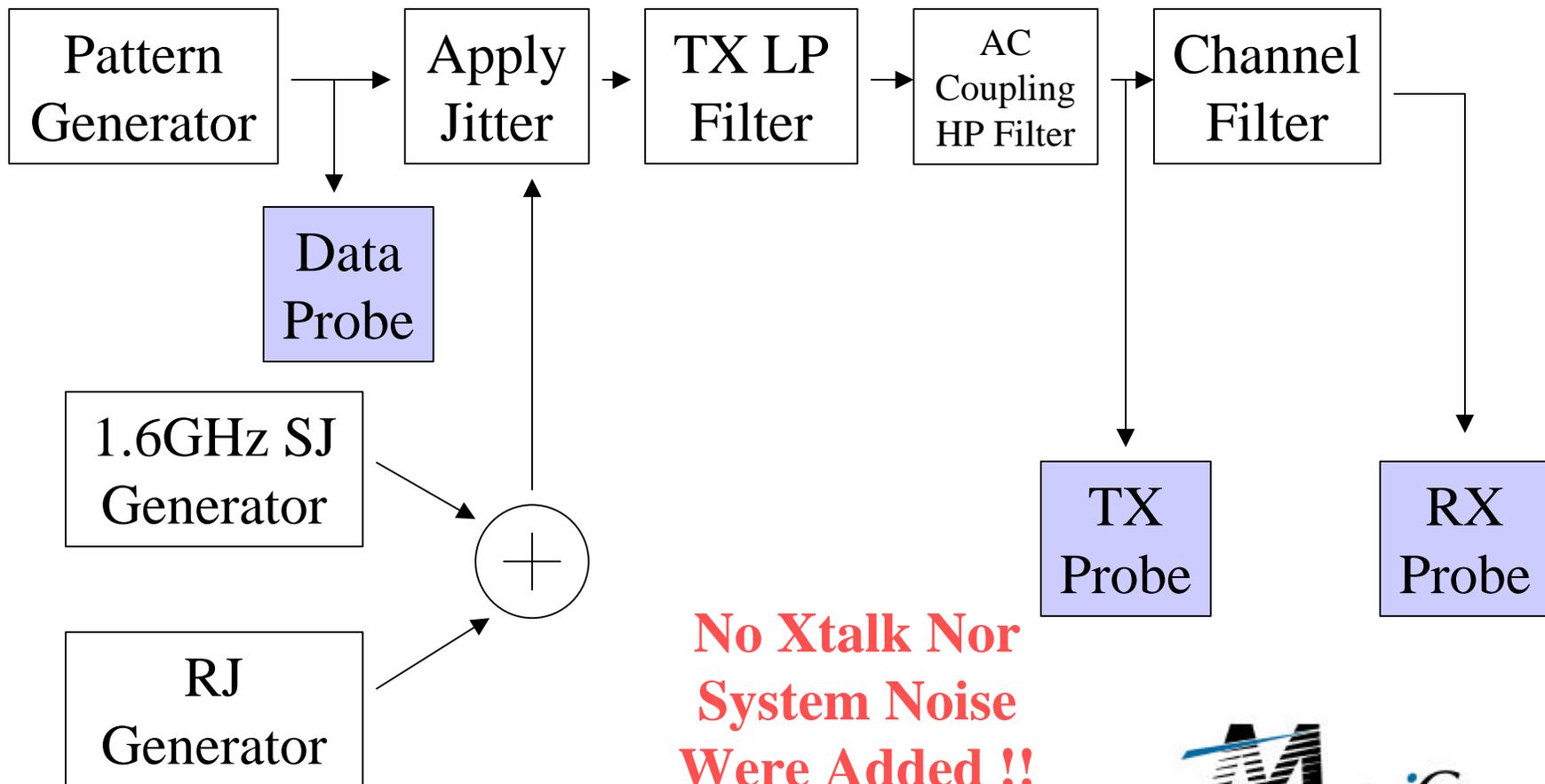
Data Patterns PSD



CJTPAT in red

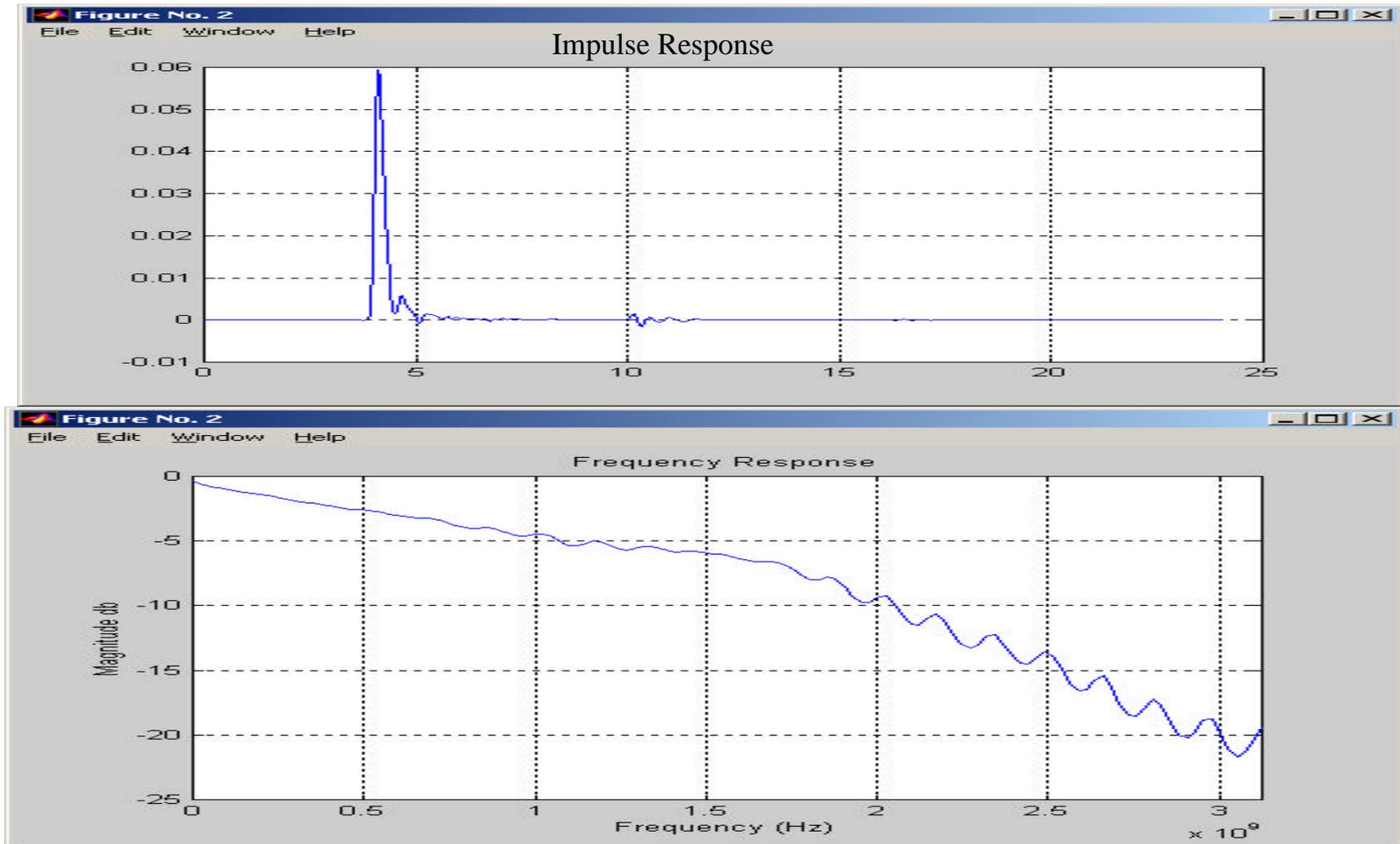
ISI Killer Pattern in blue

Simulation Setup



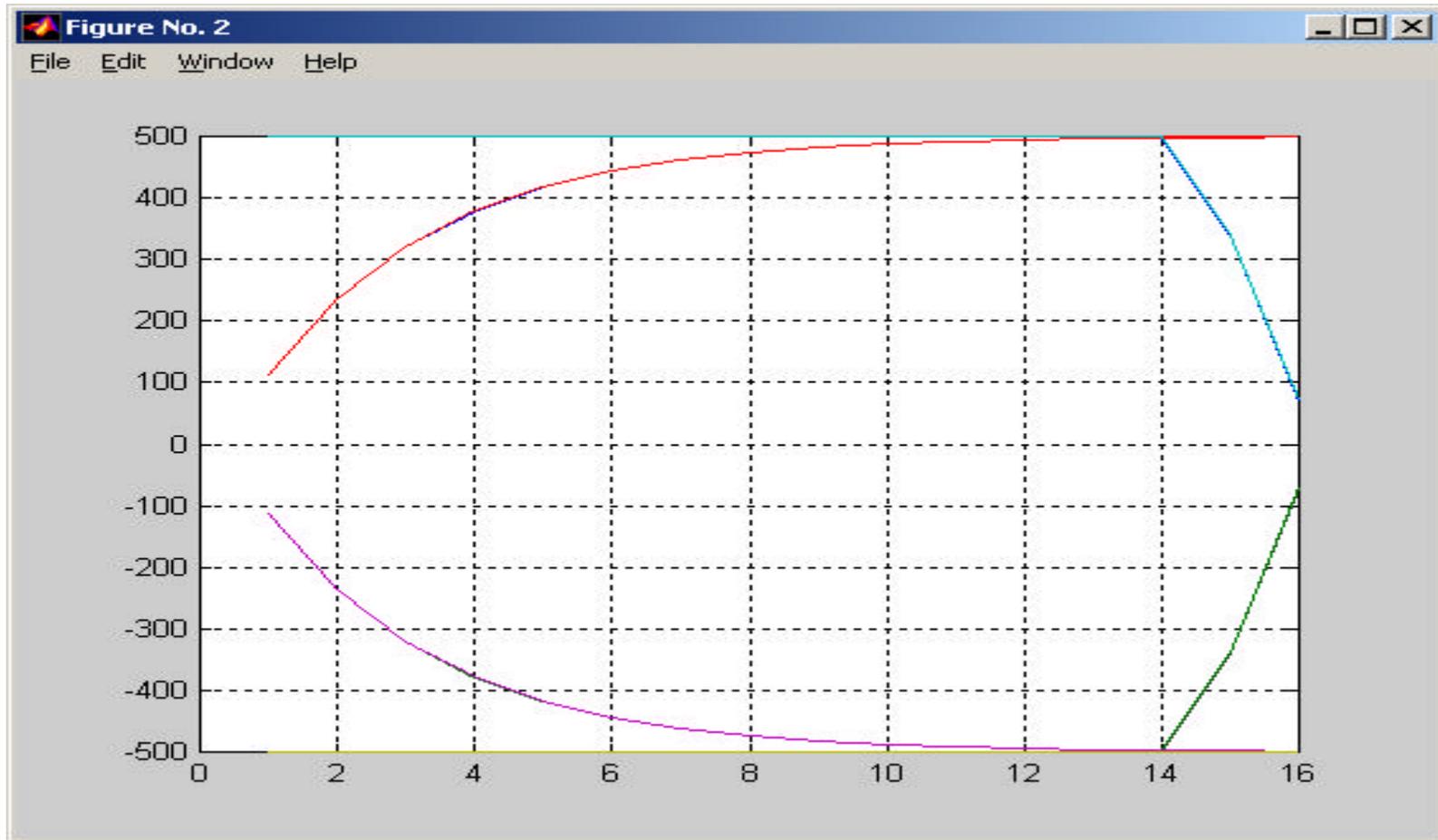
**No Xtalk Nor
System Noise
Were Added !!**

The Channel

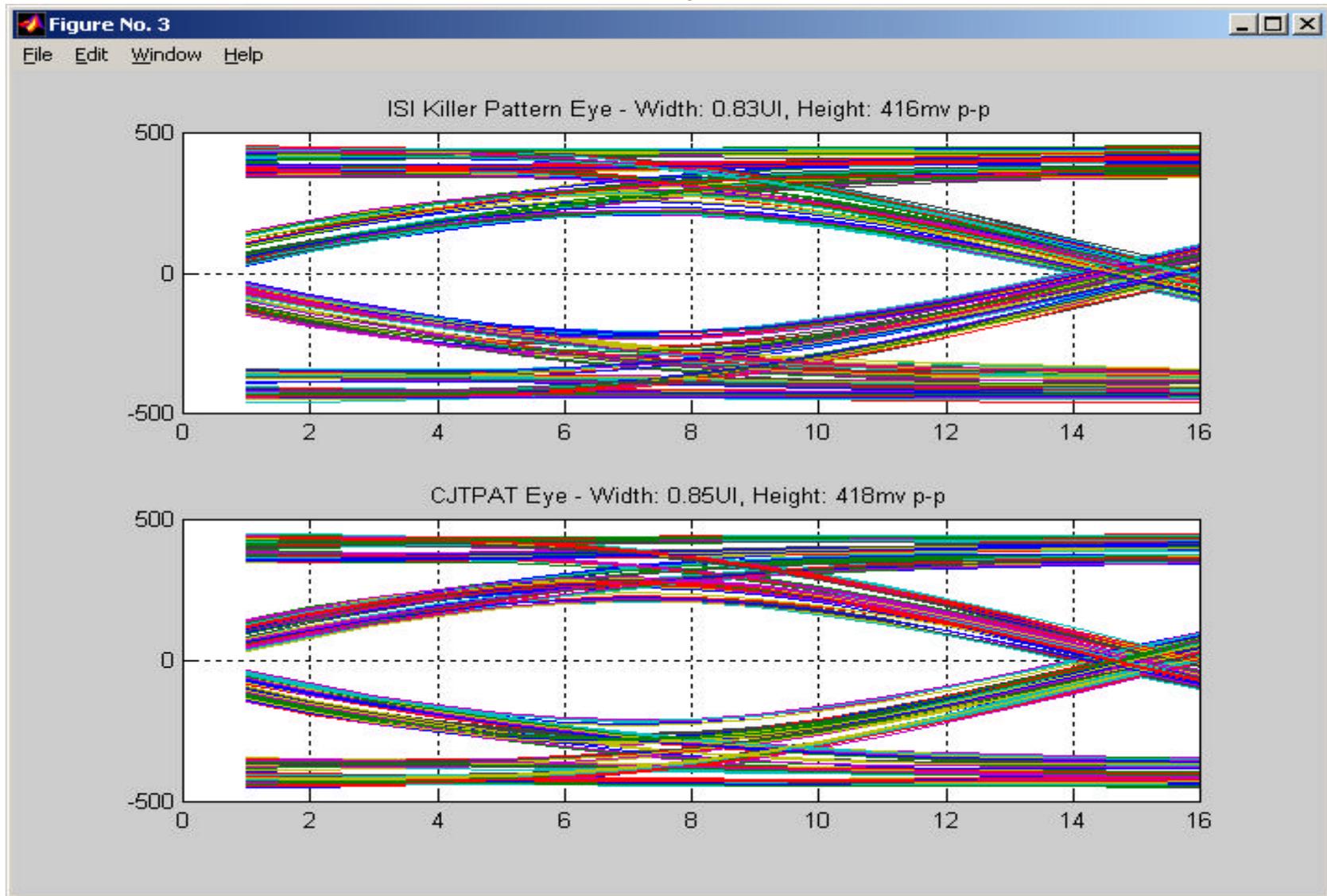


Based on the file IEEE_CH_21_Final.txt
sent by Anthony 9th January 2001

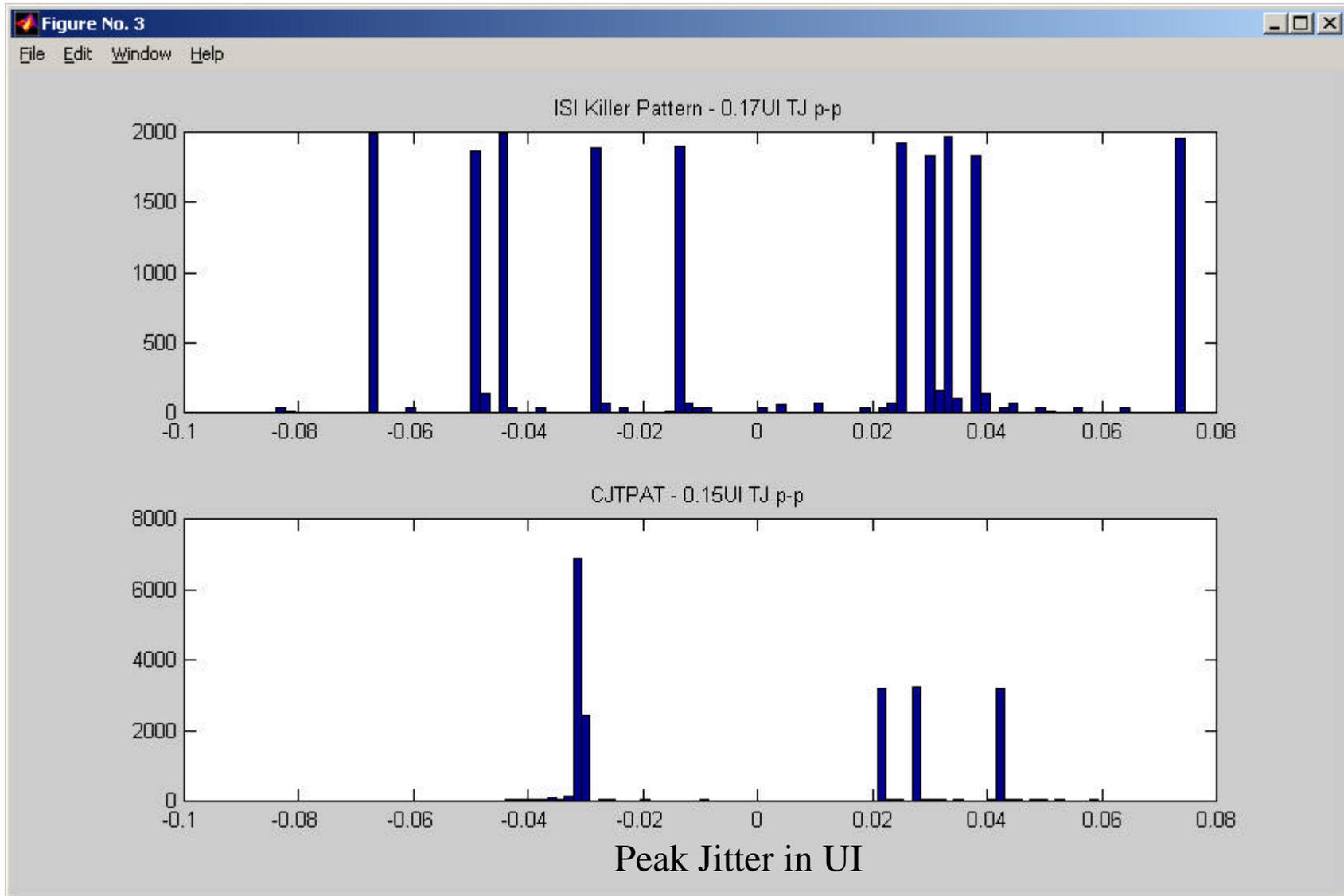
TX Eye – With Out Applied Jitter



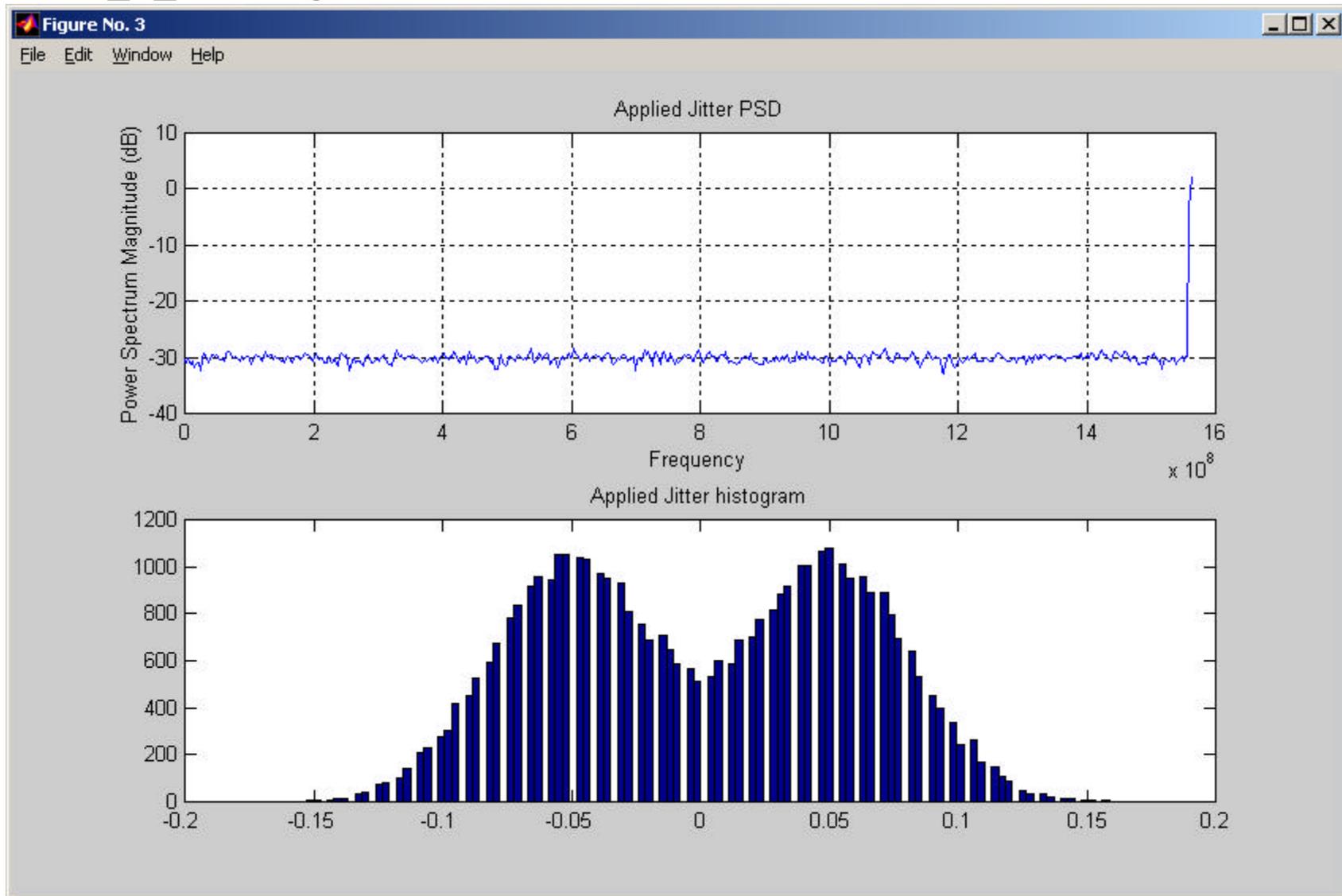
RX Eyes



RX Jitter Histograms

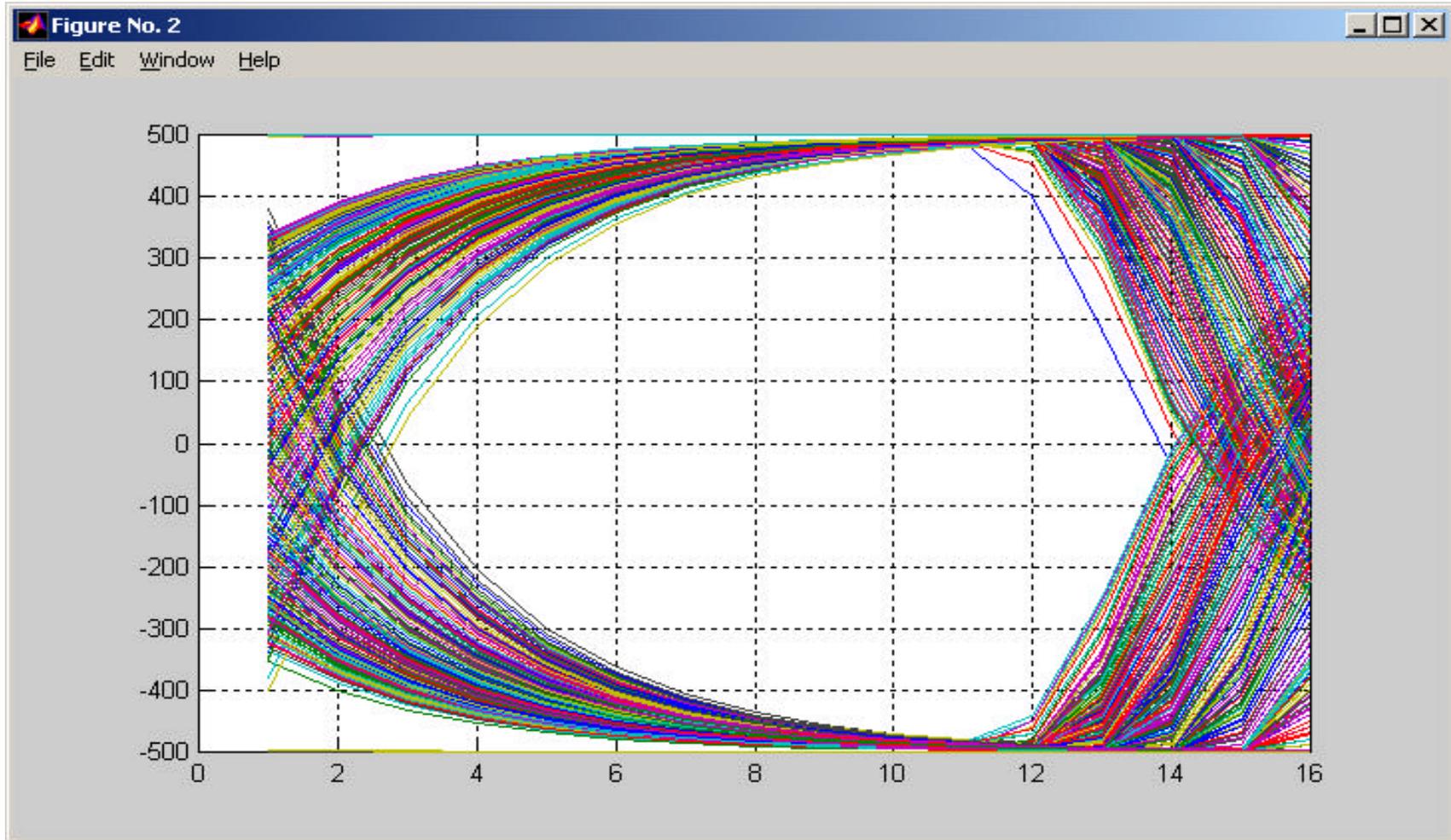


Applying 0.24UI RJ + 0.1UI HF DJ

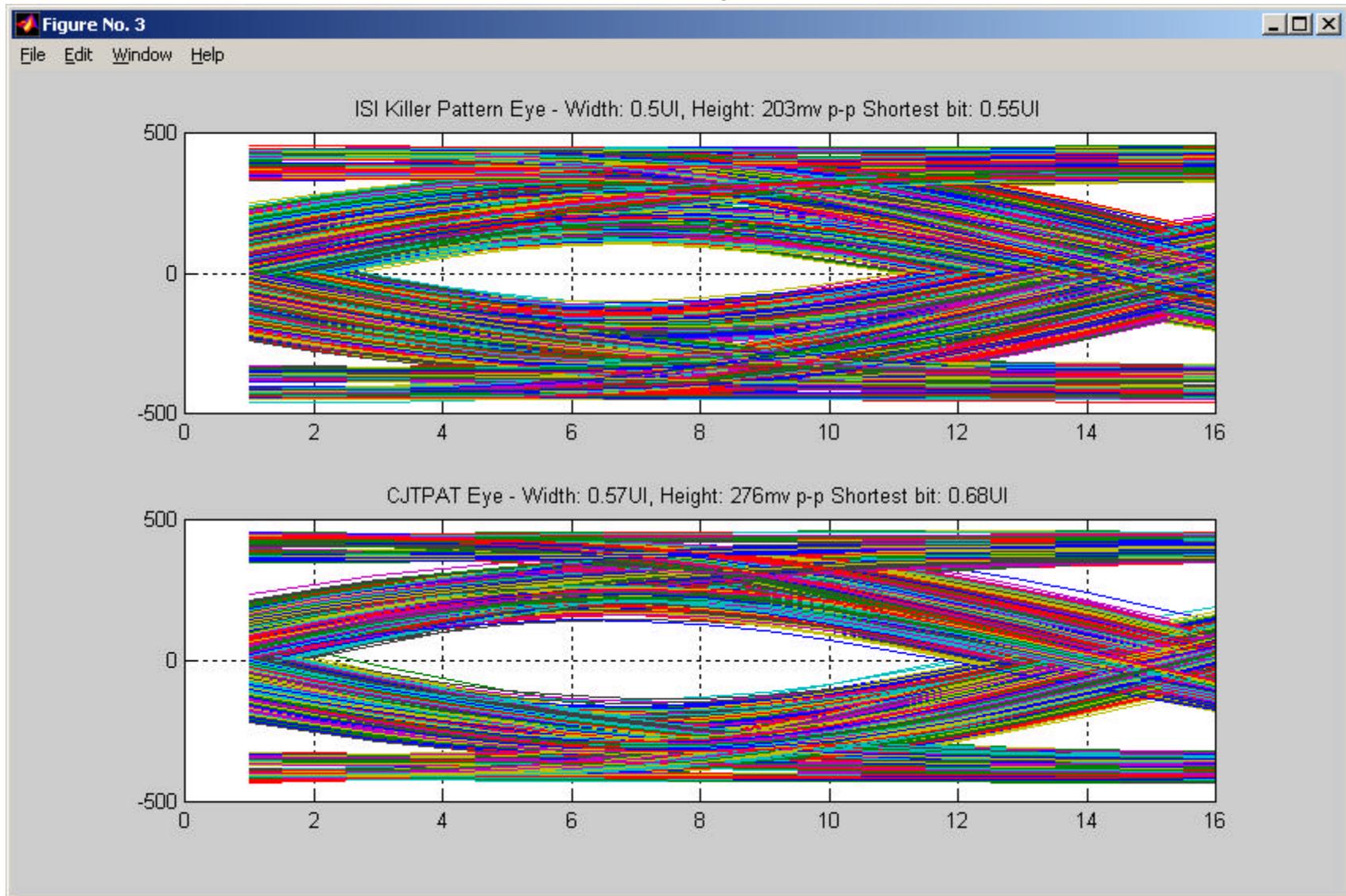


TX Eye With The Applied Jitter

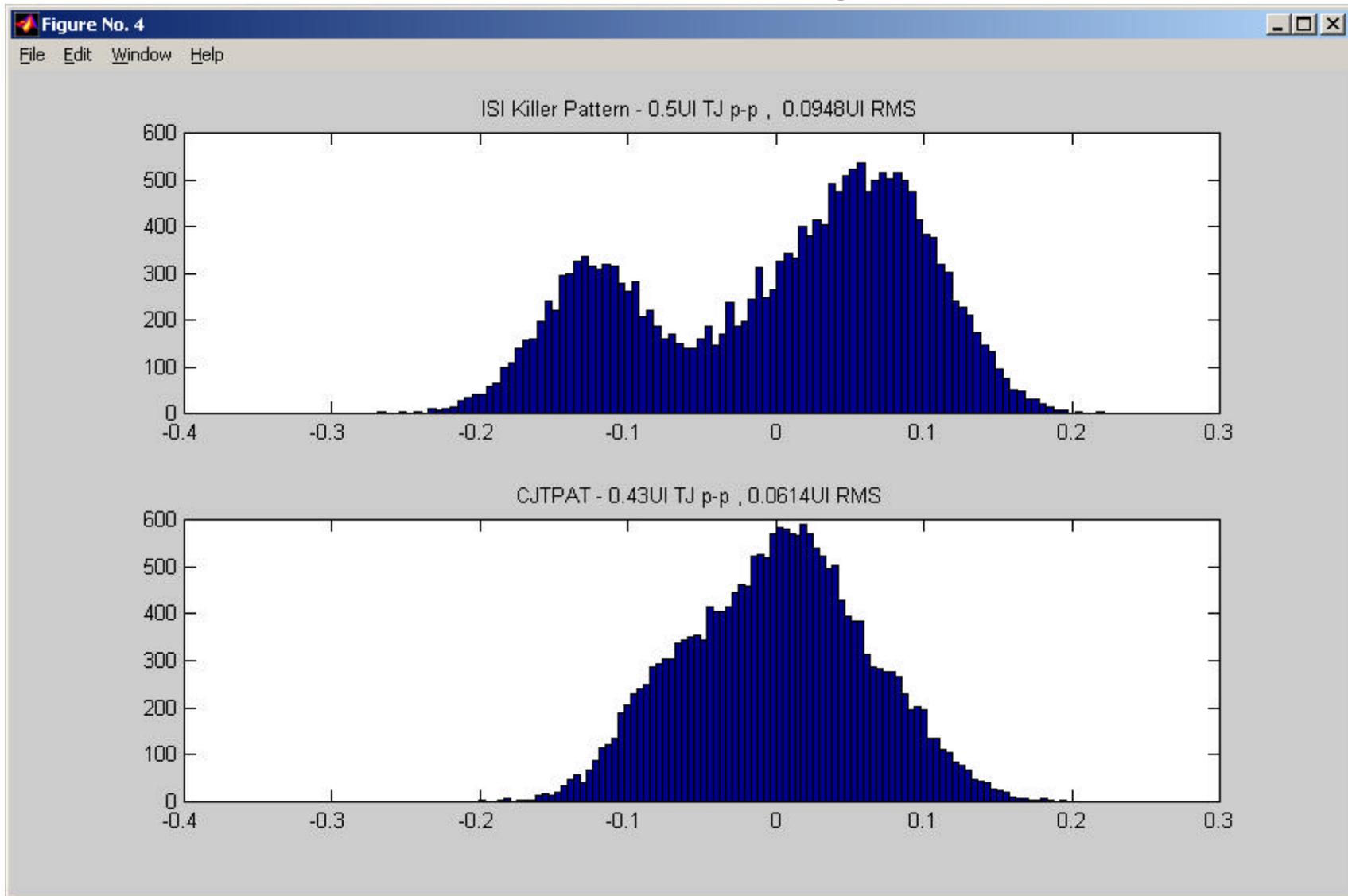
$0.24\text{UI RJ} + 0.1\text{UI HF DJ}$



RX Eyes



RX Jitter Histograms



In Addition We Have More Jitter Contributors Within The Receiver

- RX PLL RJ and DJ
- Comparators offsets
- Receiver Cross Talk and other noise.
- Receiver capacitance (additional low pass filter).
- Jitter created by the CDR algorithm / circuit.

The probability for decision error depended directly upon the combination of these jitter components among themselves and with the jitter exists in the incoming signal



Summery

- The ISI Killer pattern creates more jitter at the entrance to the receiver in terms of peak to peak and density.
- CJTPAT creates such a jitter that will cause the worst CDR algorithm / circuit jitter addition.
- The relation between the different receiver jitter contributors is very implementation depended.
- In some implementations the ISI Killer pattern will cause more decision errors.

We propose to combine between these two pattern to create the 8b/10b IKJPAT.



IKJPAT

167 7E's

1 74

1 7E

1 AB

51 B5's

1 5E

1 4A

4 7E's

1 FE

128 IKSEQ (which is F4 Followed by EB)

Repeating this 484 chars sequence will ensure “real IKJPAT”
in 50% of the time.

