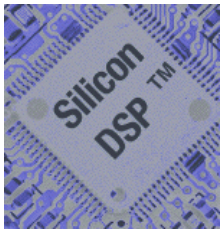
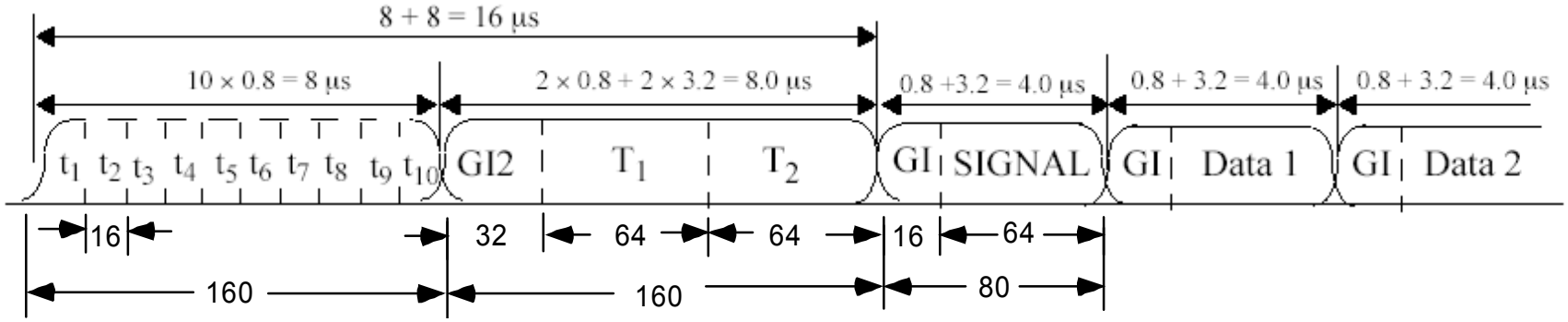
Frequency Domain Equalization

Training for Equalization



Silicon DSP Corporation

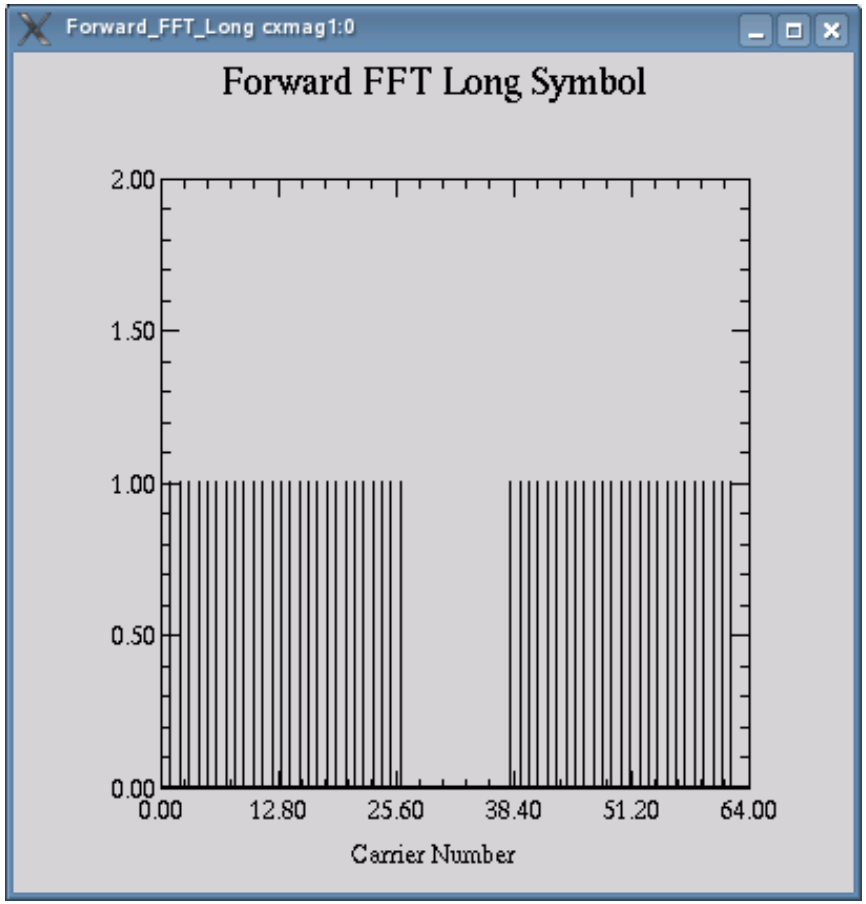

8 + 8 = 16 µs
10 × 0.8 = 8 µs
2 × 0.8 + 2 × 3.2 = 8.0 µs
0.8 +3.2 = 4.0 µs
0.8 + 3.2 = 4.0 µs
0.8 + 3.2 = 4.0 µs
t1 t2 t3 t4 t5 t6 t7 t8 t9 t10
GI2
T1
T2
GI
SIGNAL
GI
Data 1
GI
Data 2
16
32
64
64
16
64
160
160
80

Training

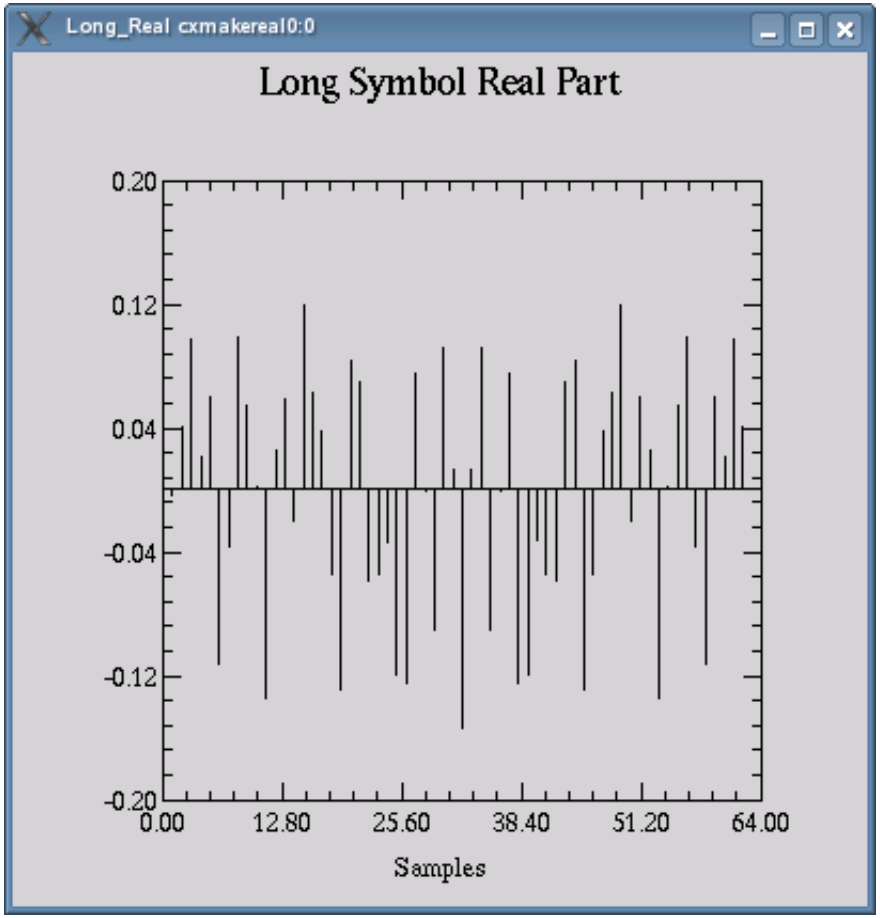
Carrier Amplitudes for Long Training Symbol Frequency Domain

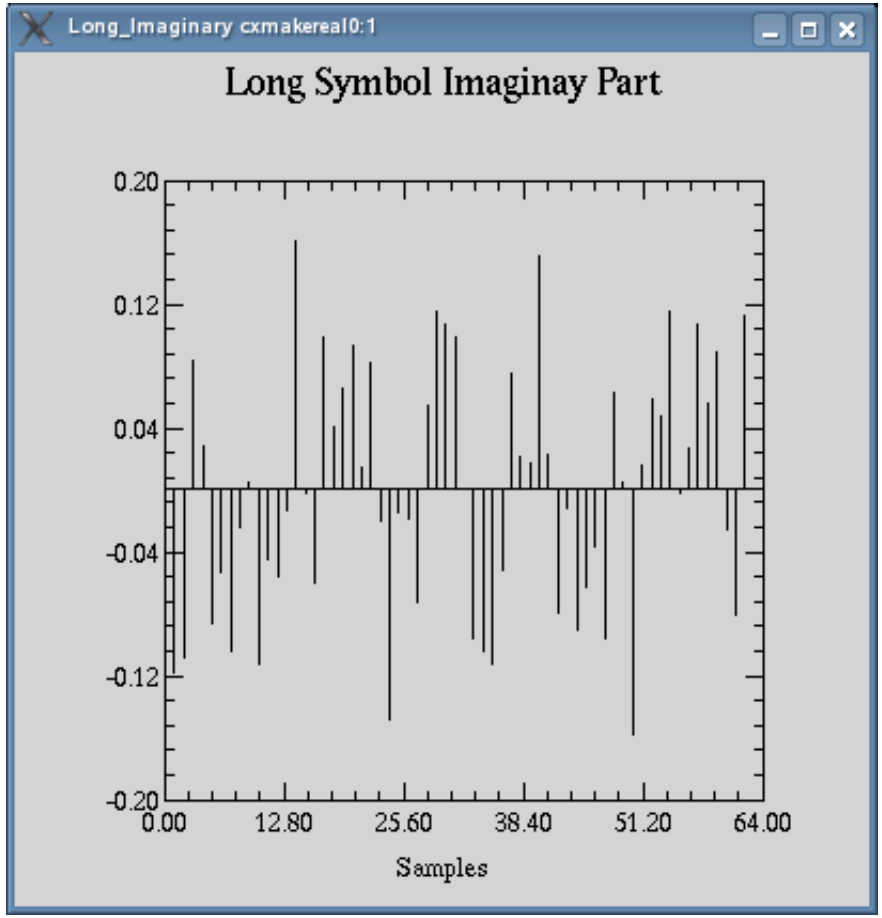
Imaginary Part is Zero

{0,1,-1,-1,1,1,-1,1,-1,1,-1,-1,-1,-1,-1,1,1,-1,-1,1,-1,1,-1,1,1,1,1,1,0,0,0,0,0
,0,0,0,0,0,0,1,1,-1,-1,1,1,-1,1,-1,1,1,1,1,1,1,1,-1,-1,1,1,-1,1,-1,1,1,1,1,1}



Long Training Symbol Time Domain

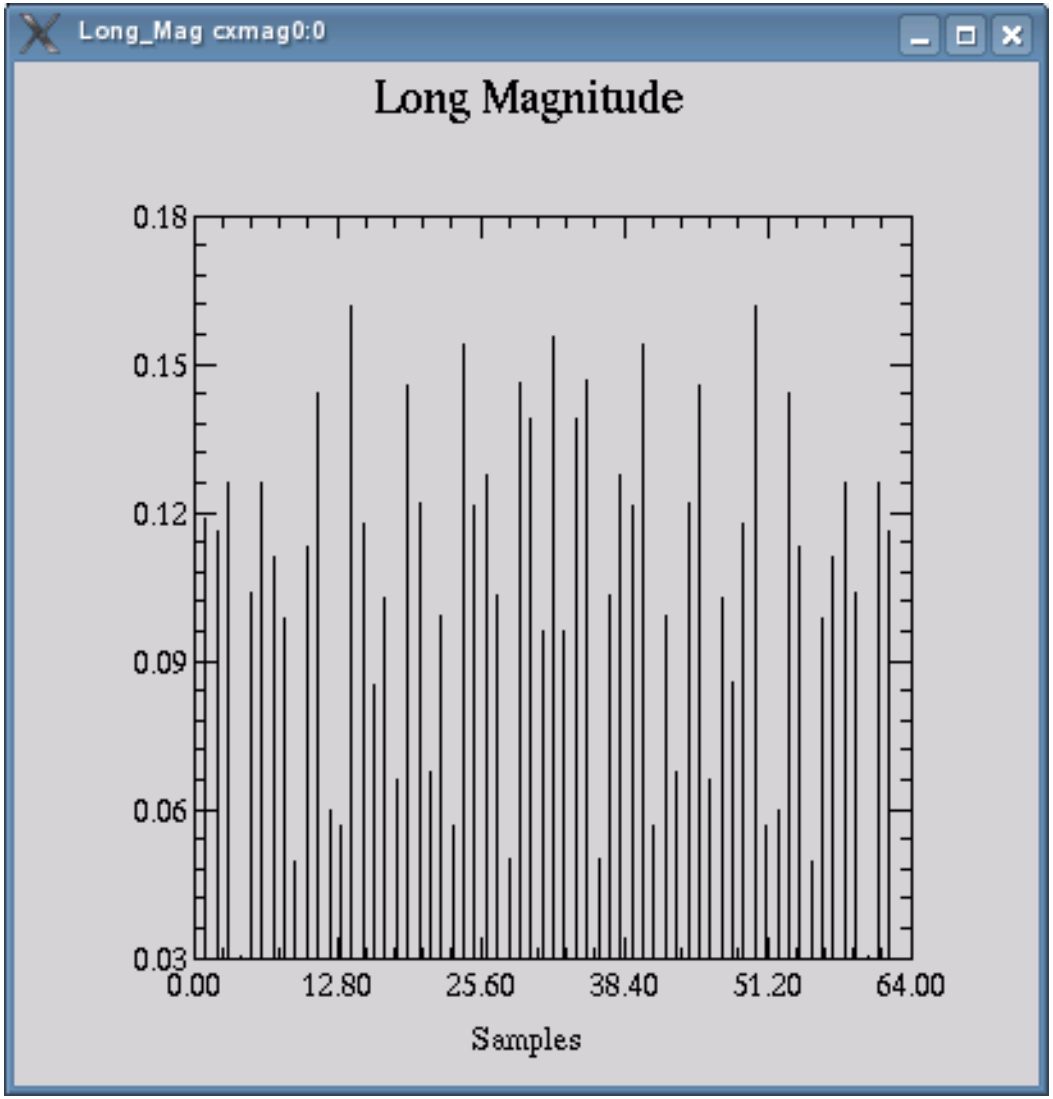




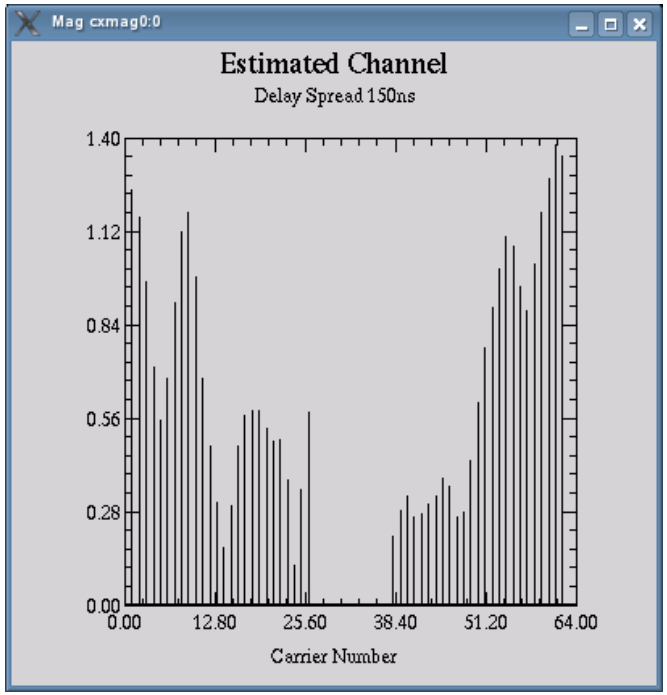
Note Symmetries Around Sample 32

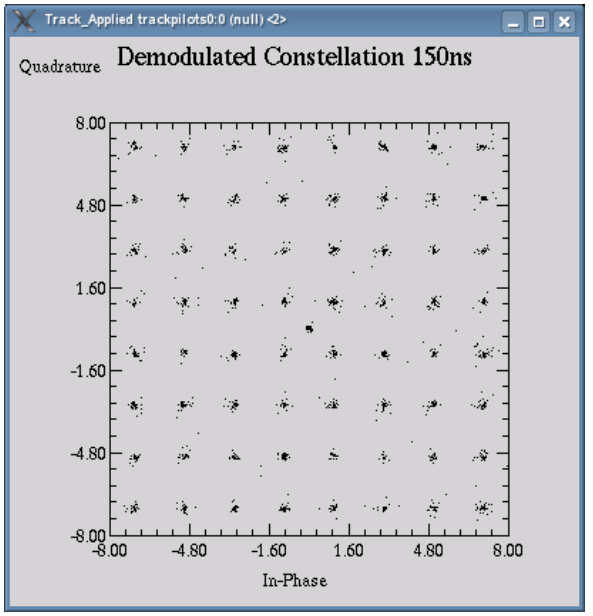
Corresponding to Zero Imaginary Component in Frequency Domain

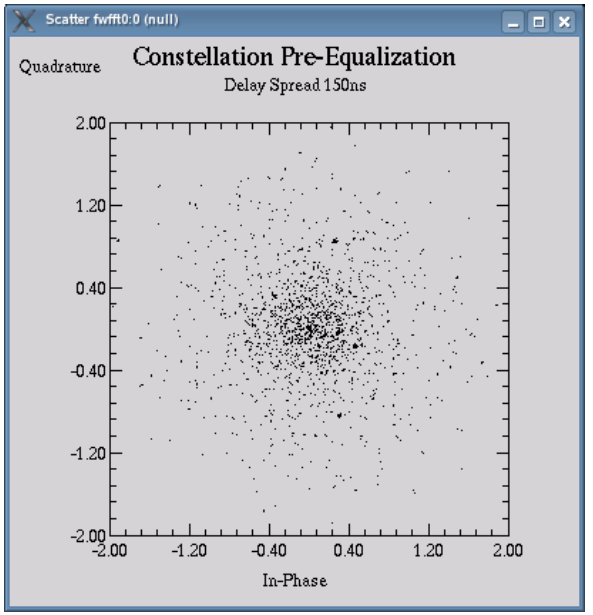
Long Symbol Magnitude Time Domain

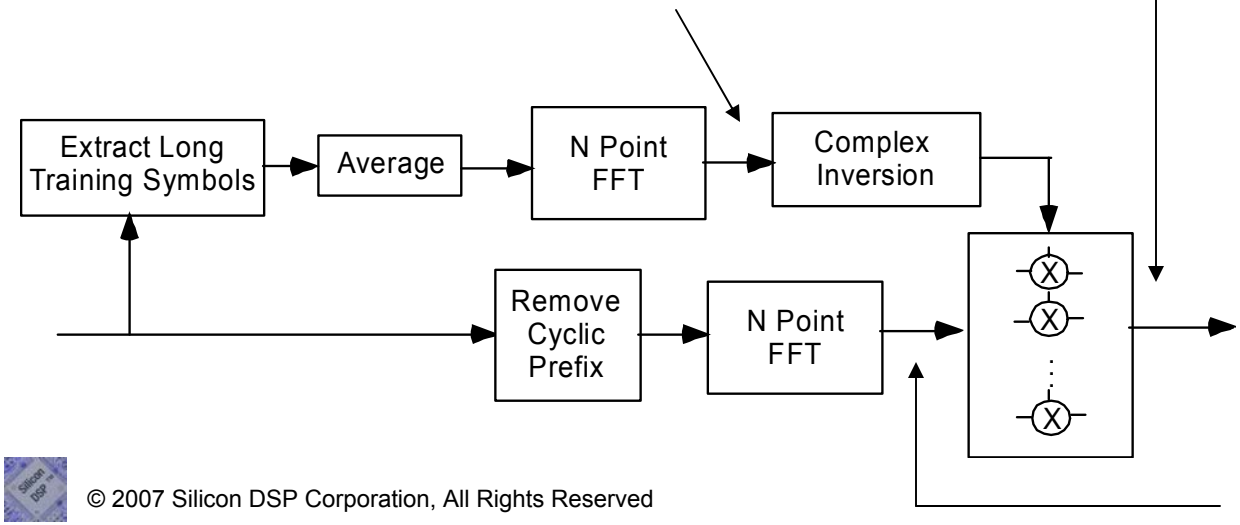


Frequency Domain Per Carrier Equalization









See the following to avoid division in Equalizer (IEEE 1999):

FLEXIBLE OFDM TRANSCEIVER FOR A HIGH-SPEED WIRELESS LAN

Wolfgang Eberle - Mustafa Badaroglu - Veerle Derudder
Steven Thoen - Patrick Vandenameele - Liesbet Van der Perre
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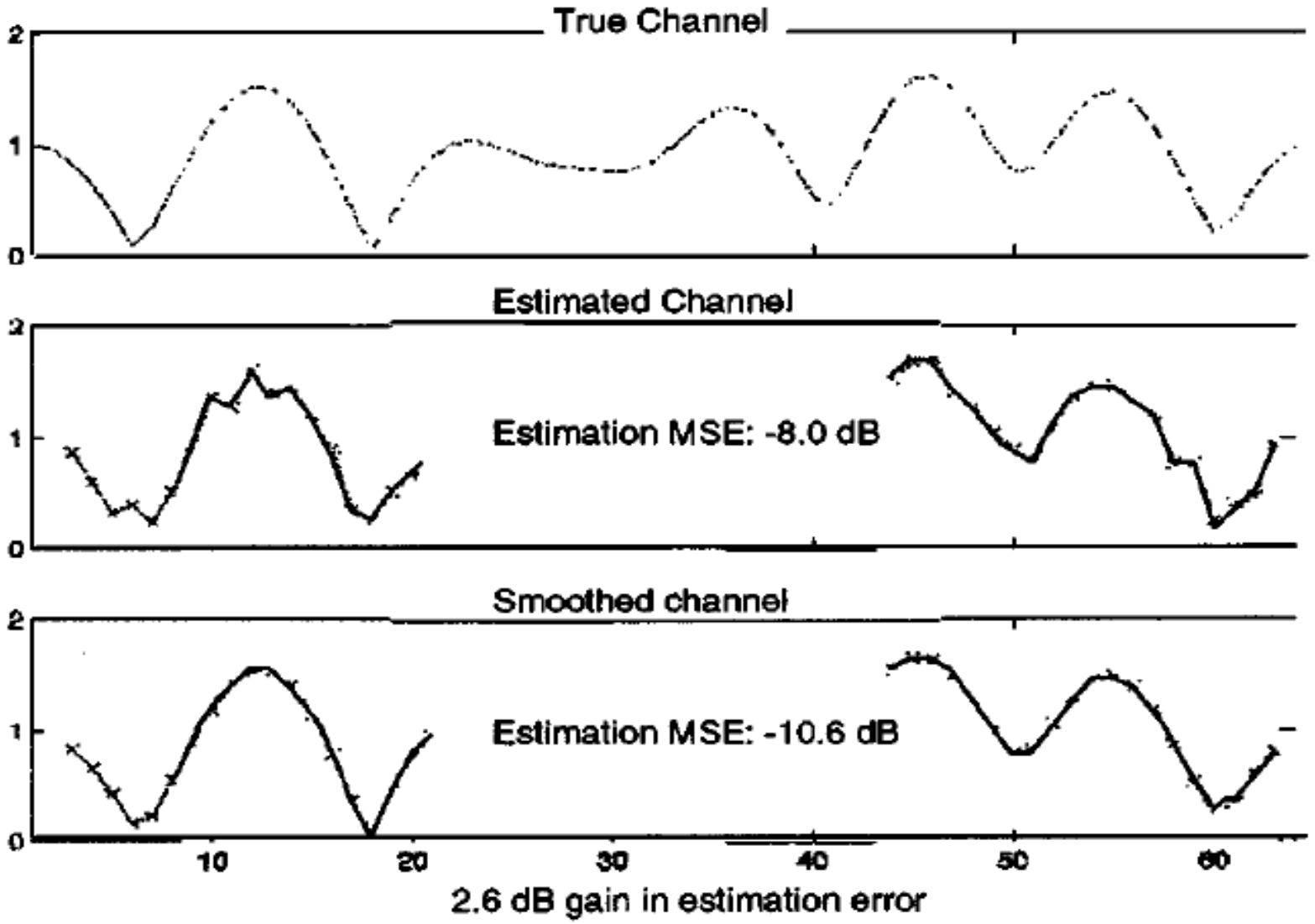
Smoothing Estimated Channel Frequency Response



"80-Mb/s QPSK and 72-Mb/s 64-QAM Flexible and Scalable Digital OFDM Transceiver ASICs for Wireless Local Area Networks in the 5-GHz Band," Wolfgang Eberle,, et.al. IEEE JOURNAL OF SOLID-STATE CIRCUITS, VOL. 36, NO. 11, NOVEMBER 2001