

Presentation to IEEE P802.3ap Backplane Ethernet Task Force Channel ad-hoc Working Session

Title: EIT Simulation Results

Source: Joe Abler
abler@us.ibm.com
IBM Microelectronics

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Simulation setup for EIT

Simulation model base setup

▪ Configuration	NRZ FFE3/DFE5
▪ Launch amplitude set to minimum	800 mVpp
▪ Transmitter DJ set to maximum	0.15 UIpp
▪ Transmitter RJ set to maximum	0.0107 UIrms (0.15UIpp @ 10^{-12} BER)
▪ Tx/Rx termination set to nominal (ideal)	5050/5050 ohms
▪ Receiver DJ	0.10 UIpp
▪ Receiver RJ set to maximum	0.0107 UIrms (0.15UIpp @ 10^{-12} BER)
▪ Data rate	10.3 Gbps
▪ Receiver offset	200 ppm
▪ Data pattern (through channel)	PRBS23
▪ Random noise	1.46mV rms
▪ Minimum latch overdrive	10mV
▪ Package	Spec_RL_cap_like
▪ Simulation time	10M bits

Note:

- ▶ Several parameters are not set for worst case evaluation (i.e. results may still be optimistic for concluding limits on a test which must support all PVT variation)
 - Terminations (both Tx & Rx) are ideal 50ohm
 - Minimum latch overdrive is set to what's considered a nominal value

Simulation Cases

EIT Simulations

- ▶ Agilent ITTC_23 through channel
 - Also replicated as xtalk channel and calibrated for known amount of interference
- ▶ Conditions (in addition to base setup on previous page)
 - PRBS23 data pattern
 - 1010 xtalk pattern
 - Xtalk scaled to apply varying interference levels at receiver input
- ▶ Results run for 2 different TJ amounts
 - 0.30UI TJ & 0.28UI TJ
 - RJ kept constant as defined for base setup (SJ reduced 0.02UI)

Xtalk Comparison Simulations

- ▶ Agilent ITTC_23 through channel run with 3 different crosstalk aggressors
 - Tyco Case5_DS_13_10_N2_D13_L6.s4p
 - Molex 1m_INBOUND_FEXT/sf5k5g4h4_SPARS.s4p
 - Intel peters_01_0605_T12_next5.s4p
- ▶ Conditions (in addition to base setup on previous page)
 - PRBS23 data pattern
 - PRBS23 xtalk pattern
 - No xtalk scaling (1x factor)

Results run with varying % of DCD

- ▶ 0%, 3.13%, 6.25% UIpp DCD
- ▶ Amount of Tx DJ (SJ) appropriately reduced by % DCD to keep a constant TJ

Simulation Results - EIT with 0.30UI TJ



	DCD (UIpp)		
Agilent ITTC23 channel (%eye opening @ BER 10^{-12})	0	3.13%	6.25%
Through channel only	21.4	18.5	7.5
10mV EIT	15.9	12.9	0
20mV EIT	8.2	2.3	0
25mV EIT	1.2	0	0
30mV EIT	0	0	0

	DCD (UIpp)		
Agilent ITTC23 channel (mVpk opening @ BER 10^{-12})	0	3.13%	6.25%
Through channel only	37.0	32.1	6.5
10mV EIT	29.1	23.6	0
20mV EIT	12.9	4.1	0
25mV EIT	2.8	0.1	0
30mV EIT	0	0	0

Simulation Results - EIT with 0.28UI TJ

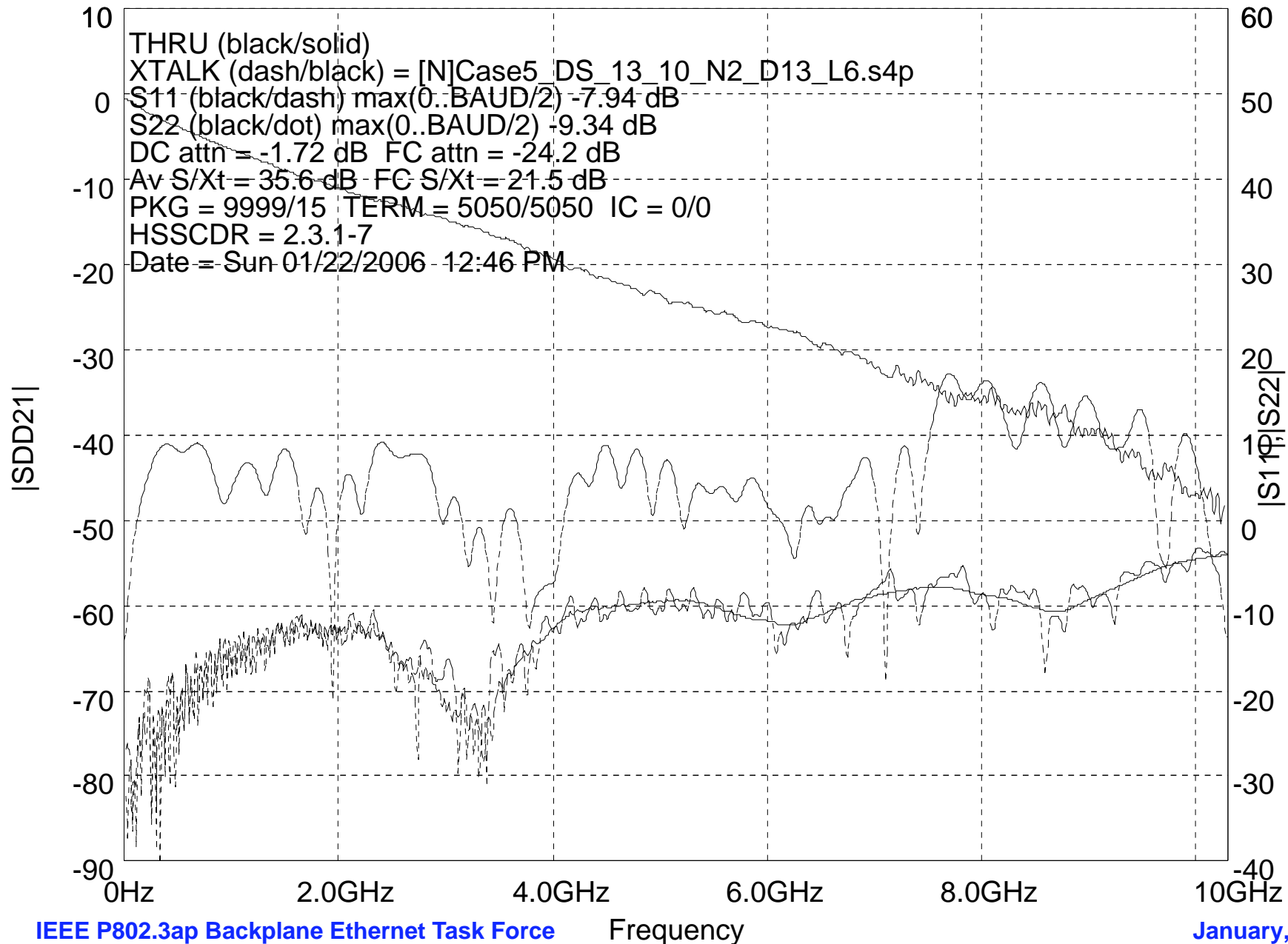


	DCD (UIpp)		
Agilent ITTC23 channel (%eye opening @ BER 10^{-12})	0	3.13%	6.25%
Through channel only	23.3	23.3	0
10mV EIT	19.2	11.1	0
20mV EIT	9.1	6.3	0
25mV EIT	4.7	0	0
30mV EIT	0	0	0

	DCD (UIpp)		
Agilent ITTC23 channel (mVpk opening @ BER 10^{-12})	0	3.13%	6.25%
Through channel only	40.1	38.4	0.4
10mV EIT	34.8	18.5	0
20mV EIT	14.0	9.7	0
25mV EIT	6.9	0.2	0
30mV EIT	0	0	0

Frequency Response w/ Tyco Xtalk Channel

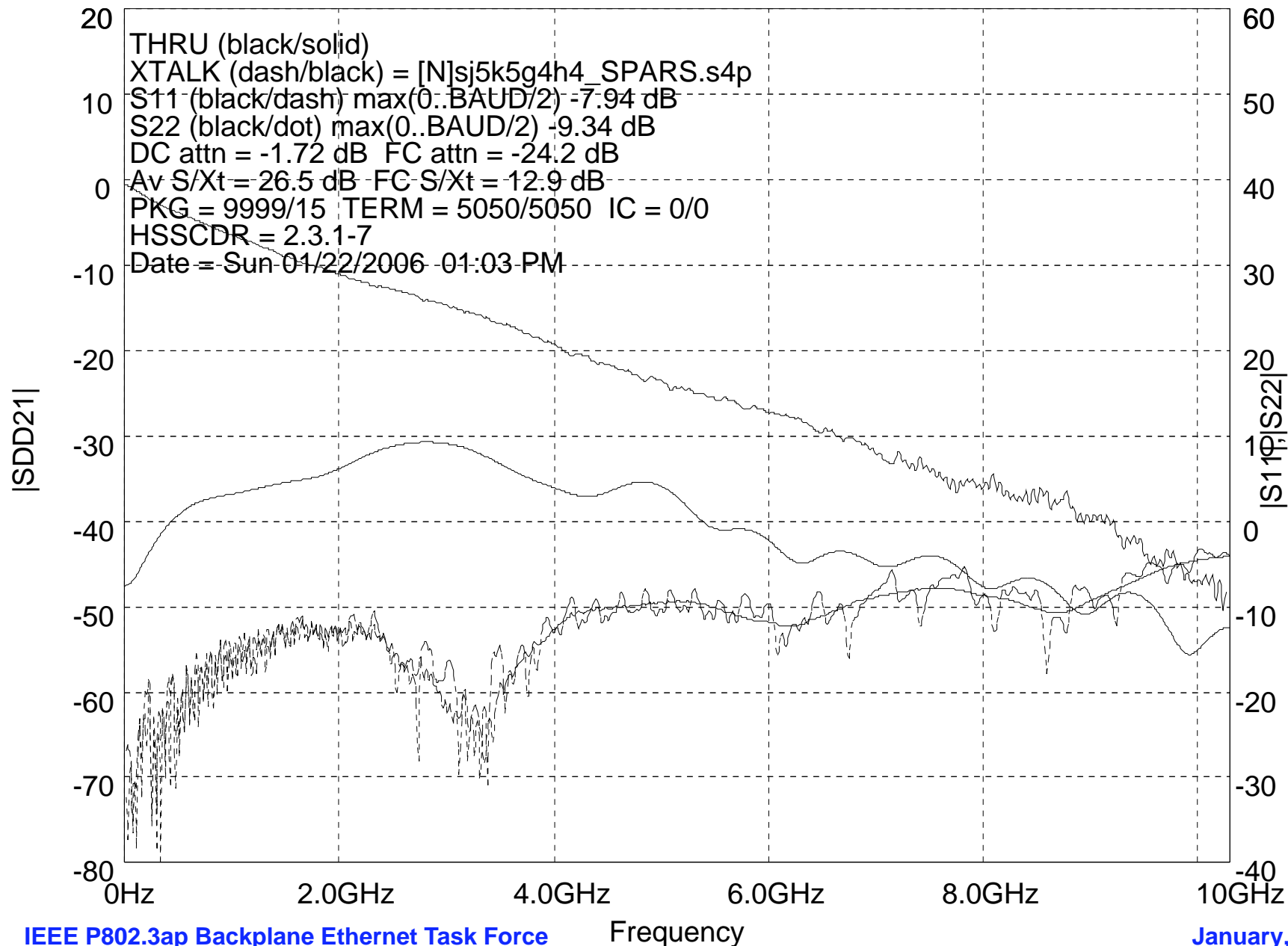
ITTC23 Channel Response



Frequency Response w/ Molex Xtalk Channel

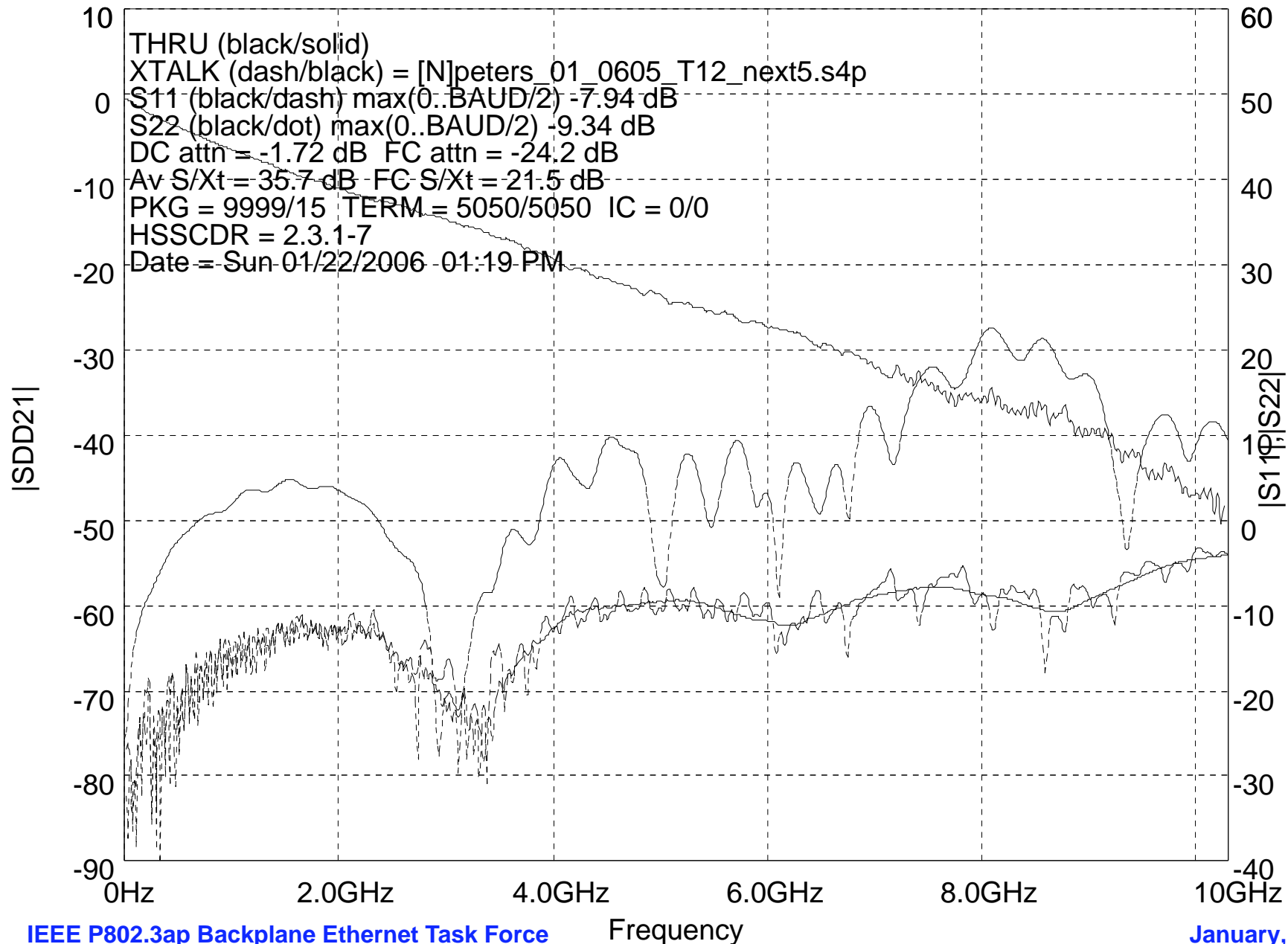


ITTC23 Channel Response



Frequency Response w/ Intel Xtalk Channel

ITTC23 Channel Response



Simulation Results - Xtalk Comparison



	DCD (UIpp)		
Agilent ITTC23 channel (%eye opening @ BER 10^{-12})	0	3.13%	6.25%
Through channel only	21.4	18.5	7.5
Tyco xtalk	16.8	16.8	0.1
Molex xtalk	9.9	3.4	0
Peters xtalk	19.2	18.3	0

	DCD (UIpp)		
Agilent ITTC23 channel (mVpk opening @ BER 10^{-12})	0	3.13%	6.25%
Through channel only	37.0	32.1	6.5
Tyco xtalk	30.0	30.1	1.1
Molex xtalk	17.8	14.8	0
Peters xtalk	33.4	29.6	0.1