# **JEITA IBIS Quality WG Update**

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### Agenda

- 1. Motivation
- 2. IBIS Quality Framework
- 3. Verification of IBIS Quality Framework
- 4. Conclusion and Future Direction

#### 1. Motivation - IBIS Quality issues are confusing



#### 1. Motivation – The Purpose of JEITA IBIS Quality WG



### 1. Motivation - Schedule

Fiscal Year		2007	2008	2009	2010	2011
Basic study of IBIS quality framework			) T	oday's top	ic	
	Single ended IBIS model-low speed (10Mbps class)					
Verification of IBIS quality framework	Single ended IBIS model-high speed (100Mbps class)					
	Differential IBIS model					
Promotion				Prepare WEB contents	Enhance (high-speed	contents , differential) te (low-speed IE

#### 2. IBIS Quality Framework - Definition of Qualified IBIS

• Simulation results for test circuits with qualified IBIS, qualified transmission line simulator, and qualified user, show good agreements with those of SPICE based simulator.



#### 2. IBIS Quality Framework - Test circuits (1/2)

N am e	Term ination	Transmission line				
Circuit 1	50ohm	0cm				
Circuit 2	50ohm	5cm				
Circuit 3	50ohm	30cm				
C ircu it 4	3pF	0cm				
Circuit 5	3pF	5cm				
Circuit 6	3pF	30cm				
Circuit 7	3pF	30cm + 5cm				



#### Input : PULSE Frequency=10MHz



#### 2. IBIS Quality Framework - Test circuits (2/2)

N am e	Term ination	Transmission line					
Circuit 8	3pF	30cm + 5cm + 5cm + 5cm					
Circuit 9	12pF	0cm					
Circuit 10	100ohm + 100ohm	0cm					
Circuit 11	10nH + 3pF	0cm					
Circuit 12	3pF	5cm (Lumped circuit)					



#### Input : PULSE Frequency=10MHz



### 2. IBIS Quality Framework - Usage(1/4)



### 2. IBIS Quality Framework - Usage(2/4)



### 2. IBIS Quality Framework - Usage(3/4)



#### 2. IBIS Quality Framework - Usage(4/4)



#### 3. Verification of IBIS Quality Framework - Method(1/6)



#### 3. Verification of IBIS Quality Framework - Method(2/6)



#### Golden input means qualified input.

#### 3. Verification of IBIS Quality Framework - Method(3/6)



#### 3. Verification of IBIS Quality Framework - Method(4/6)



#### 3. Verification of IBIS Quality Framework - Method(5/6)



#### 3. Verification of IBIS Quality Framework - Method(6/6)



### 3. Verification of IBIS Quality Framework - Result : Ver.1

#### IBIS2



Ver.1: before using IBIS quality framework





Set maker ver.1 result does not agree with chip vendor one.

#### 3. Verification of IBIS Quality Framework - Result : Ver.2

#### IBIS2



Ver.2: after using IBIS quality framework

**Added simulation option** 

Circuit 3



Set maker ver.2 result agree with chip vendor one.

#### 3. Verification of IBIS Quality Framework - All results

#### IBIS2

- $\bigcirc$  : perfect agreement
- $\triangle$  : partial agreement
- $\times$  : disagreement

Ver.1 (before using IBIS quality framework)

Simulator	Circuit No.											
	1	2	3	4	5	6	7	8	9	10	11	12
SimulatorA	Ο	0	0	$\triangle$	0	0	0	0	0	0	$\triangle$	0
SimulatorB	Ο	$\Delta$	$\triangle$	0	0	0	0	0	0	0	$\Delta$	0
SimulatorC	0	0	0	Δ	0	0	0	0	0	0	Δ	0
SimulatorD	0	0	×	$\triangle$	0	0	0	0	0	0	$\Delta$	0
S in u lator E	0	Ο	0	$\triangle$	0	0	0	0	0	0	$\triangle$	0
Simulator F	Ο	Ο	0	$\triangle$	0	0	0	0	0	0	Δ	Δ
SinulatorG	Ο	0	0	0	0	0	0	0	0	0	Δ	Δ
SimulatorH	Ο	0	0	$\Delta$	0	0	0	0	0	0	$\Delta$	0
Sinu lator I	0	0	0	0	0	0	0	0	Ó	0	$\Delta$	Ó

Ver.2 (after using IBIS quality framework)

Simulator	C ircuit No.											
SILLUM	1	2	3	4	5	6	7	8	9	10	11	12
S in ulator A	Ο	0	0	0	0	0	0	0	0	0	0	0
S in ulator B	0	Ο	0	0	0	Ο	0	0	0	0	0	0
SinulatorC	0	0	0	0	0	0	0	0	0	0	0	0
SimulatorD	Ο	0	0	0	0	0	0	0	0	0	0	0
S in u lator E	0	Ο	0	0	Ο	Ο	0	0	0	0	0	0
Simulator F	Ο	0	0	0	0	0	0	0	0	0	0	0
SinulatorG	Ο	0	0	0	0	0	0	0	0	0	0	0
SimulatorH	0	0	0	0	0	Ó	0	0	Ó	Ó	Ó	0
Simulator I	0	Ó	0	0	0	Ó	0	0	0	0	0	0

**IBIS** quality framework helped users to enhance simulation accuracy.

### 4. Conclusion and Future Direction

- Conclusion
  - Completed the verification of IBIS Quality Framework for single-ended 10Mbps-class IBIS model.
- Near Future Direction
  - Extend the applicability of IBIS Quality Framework to other IBIS model
    - Single-ended 100Mbps-class IBIS model (ex. DDR2)
    - Differential IBIS model
  - Promote this frame work
    - Website
    - Seminar



## Thank you

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