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Call For Data of Real Device Return Loss

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Background

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- I proposed to improve COM package model (#18 on D1.3)
  - Options to improve the package model of COM
    - Option A: Use the new T-Coil model in this presentation.
    - Option B: Reduce the device capacitance C_d to an equivalent lower value.
    - Option C: No change.

- Response to this comment #18
  - REJECT
  - Straw Poll on options in slide 27 of hidaka_3bs_01a_0516.pdf
    - Option A: 3
    - Option B: 4
    - Option C/More information needed: 11
  - More information and further presentations solicited

- Problem: neither of Option A nor B were justified by real device

Justification by Real Device is Difficult

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- Various C_d values are used as hypothetical improved package model.
  - 250fF(Annex 93A) → 280fF(Annex 120D, D1.3) → 230/200/160/150/120/100fF (w/o T-Coil) or 600fF (w/ T-Coil)
- Justification by real device is important to choose a relevant C_d value, regardless of with or without T-Coil.
- However, it is difficult for device vendors.
  - They have real device, and real device data, measured or simulated.
  - However, they want to keep the real device data confidential.
    - In particular from their competitors.
    - They also want to keep margin and avoid optimistic value, as much as possible.
- It is also difficult for system or component vendors.
  - They do not have real device, unless they obtain device samples.
    - Even if they obtain device samples, they have to characterize by themselves.
      - They do not want to characterize device samples, but focus on functional evaluation.
      - They may get characterization report from device vendors, but only under NDA.

How we can do Justification by Real Device

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- Gather real device data from multiple device vendors to an individual(s) X.
  - Real device data = measured (or simulated) return loss data of device for 50+Gbps.
  - We need data from at least 3 vendors.
- X derives candidates of RL specs and C_d values w/ and w/o T-Coil.
  - To derive specs, X de-embeds package from raw data and augments various packages.
- X shares the results with each device vendor for preview before Task Force.
  - Only with the device vendors who provided real device data.
  - Data is consolidated anonymously, but each device vendor is informed of their own data.
    - Communication with each device vendor is done independently to keep other vendors anonymous.
  - Device vendors may withdraw contribution of their device data after preview.
    - Withdrawn data will be removed from consolidated data.
- X provides the results to P802.3.bs Task Force (and Elect Ad Hoc) for review.
  - At face-to-face Task Force meeting, we will choose one of the candidates of the spec.
- I volunteer to work as an individual(s) X.
  - I swear to keep raw data and its contributors confidential including within my company.
    - In my company, I am currently not affiliated by any development group of products such as SerDes or system or component. I am affiliated only by a research laboratory for future computer architecture.
  - I can work with someone else as a group of X, unless contributors of device data object.

Call For Data

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- Purpose
  - Derive and justify return-loss spec and COM C_d values w/ and w/o T-Coil.
- Wanted data
  - Measured (or simulated) return-loss data of real device designed for 50+Gbps.
  - Both of Tx and Rx (contribution of only either Tx or Rx is also welcome).
- Data format
  - 1-port differential or 2-port single-end S-parameter in touch-stone format.
    - Best frequency grid is linearly from 10MHz to 40~65GHz with 10MHz step, but not necessary.
- Measurement (or simulation) condition
  - Any condition is OK, but the detail information between the device and the reference plane where the calibration was done is required.
    - This information is required to accurately de-embed package (and eval board) from raw data.
      - E.g. configuration of test setup (such as GSGSG probe on package or V connector on eval board), trace length and material of package, trace length and material of eval board, etc.
      - If available, measured data of test coupon (or calibration kit) is very helpful.
- Contract (e.g. Non-Disclosure Agreement of raw data)
  - If required, each X can sign up a contract as an individual, as long as it allows public disclosure of consolidated anonymous data as justification of standard specification.
- Destruction of raw data
  - X will delete all raw data including copies after completion of this work.

Advantages and Risks for Device Vendors

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- Advantages for Device Vendors by Contributing Device Data
  - Your device is likely to meet the return loss spec.
  - Your device is likely to be well aligned with the COM C_d value.
  - You can easily know your position in the consolidated anonymous data.

- Risks for Device Vendors by Not Contributing Device Data
  - Your device may violate the return loss spec.
    - Because the spec will be chosen without consideration of your device.
  - Your device may not be well aligned with the COM C_d value.
    - You may need to consume extra margin allocated to Rx.
  - You will be out of the loop of preview of the results before Task Force.
    - You may be surprised when the results are provided to Task Force.

- Lower risks for excellent devices, higher risks for fair devices.

Legal Concerns for Competition Law

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- We need real device data from *at least 3 device vendors*.
  - In order to make the spec loose enough to have sufficient competition in the market.
    - If the spec is derived from excellent device of one vendor, the spec will be too tight, and the other vendors may be excluded from the market. This is a violation of the competition law.
  - Name and affiliation of contributors of real device data will be listed as a contributor.
    - This is necessary to prove that the spec is not dominated by a particular vendor.
    - Those who withdrawn contribution of real device data are not listed as a contributor.

- The closed discussion of the preview results is OK, as long as participation to Call For Data is *open to all device vendors*.
  - This is OK, because competition between device vendors is maintained to be fair.
    - If participation to Call For Data is limited only to some excellent device vendors, the other ordinary device vendors may be difficult to meet the tight spec. This is unfair.
    - The preview discussion must be closed to ask for contribution of highly confidential data.

- Exclusion of system and component vendors from the closed discussion of the preview results is also OK in terms of the competition low.
  - System and component vendors are *not competitors of device vendors in the market*.
    - They are always business partners in the market.
    - They are just technically competing on the limited overall operating margin, not market share.
  - They can still participate to choose the spec in the Task Force.

Concluding Remarks

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- I cannot move forward this activity without real device data.
  - Once the device is shipped, anybody can measure it. It cannot be secret.
    - If you already have data, please share the data. It saves a lot of time.
  - I just need return loss data. Nothing else. It is just for a better standard.

- If you are interested in making contribution of real device data, send me an e-mail (yasuo.hidaka@us.fujitsu.com).
  - Even if you are not sure to get an approval in your company, but if you have a will as an individual to give it a try, send me an e-mail as well.
    - We may be able to revise the procedure and conditions in order for you to get an approval in your company. Let's try.
    - Even if you failed to get an approval, I appreciate your effort. It also helps me to understand how this type of approach is accepted in this group.

- If you are interested in working with me as X, also send me an e-mail. I will confirm if any contributor of real device data has an objection against your participation as X.

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Questions?