RTPGE EMC ad hoc

Initial work plan

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Overview

- Discuss charter
  - What we want to do over time
- Outlines questions to be answered
  - Provides a roadmap for people to fill in the blanks with contributions
  - NOT intending to answer or have lengthy discussion on the subject matter here
  - This is intended to help focus and accelerate future discussion

Proposed charter

- First phase:
  - Agree on model development methodology (ingress and egress)
  - Solicit contributions with data to support model development
  - Build consensus on EM ingress and egress models
  - Build consensus on limits for egress
    - Needed to guide PHY design, may be channel-specific
- Second phase:
  - Build consensus on tests for susceptibility, using ingress models
  - Develop text for standard

Phase one:
EMC model development

1. Classification of EMC environments

- Do we have one operating environment? (worst case is automotive, bad cable)
- Or several?
  - Automotive bad cable, automotive good cable, industrial etc.
- Need to develop consensus

2. Immunity

BASIC QUESTION: need to build group consensus

- Should we

  a) separate channel transfer function from noise sources and model both parts of the system separately ?

  b) directly model background noise levels ?

  c) do we need a combination of discrete sources and background noise? (a & b together)

2a) If we separate the channel transfer function from noise sources

- Need a channel balance measurement methodology (see pischl_01_1112_rtpge.pdf)
  - Needs to be defined through contributions
- EM ingress (susceptibility) measurement methodology
  - Needs to be defined through contributions
- Demonstrate correlation of EM range ingress to balance or other transfer function measurements (TBD)
- Iterate until correlation is achieved and a consensus model is presented
- Is any interaction needed with the RTPGE channel ad hoc?
- ….and…

2a) Operational requirements for EMC

- **For each operating environment from 1)**
- Define noise sources
  - Narrowband sources
  - Broadband sources
  - Impulse noise

2b) If we use channel background noise level models

- Define measurement methodology for background noise in the environment(s)
- Need proposals for background noise levels / cabling environment models
  - Alien crosstalk (including power lines, other links, engine noise etc.)

3. Emissions modeling

- Develop PHY to emissions model
- Reach consensus on definition of a model and baseline limits for EM emissions
  - For comparison of PHY / channel proposals

Phase one outputs

1. Defined operating environment(s)
2. Ingress models
   - Channel transfer function & source models and/or background noise measurements
3. Egress limits and conversion models

Task force will use phase one outputs to guide the PHY design

Phase two: Tests and text

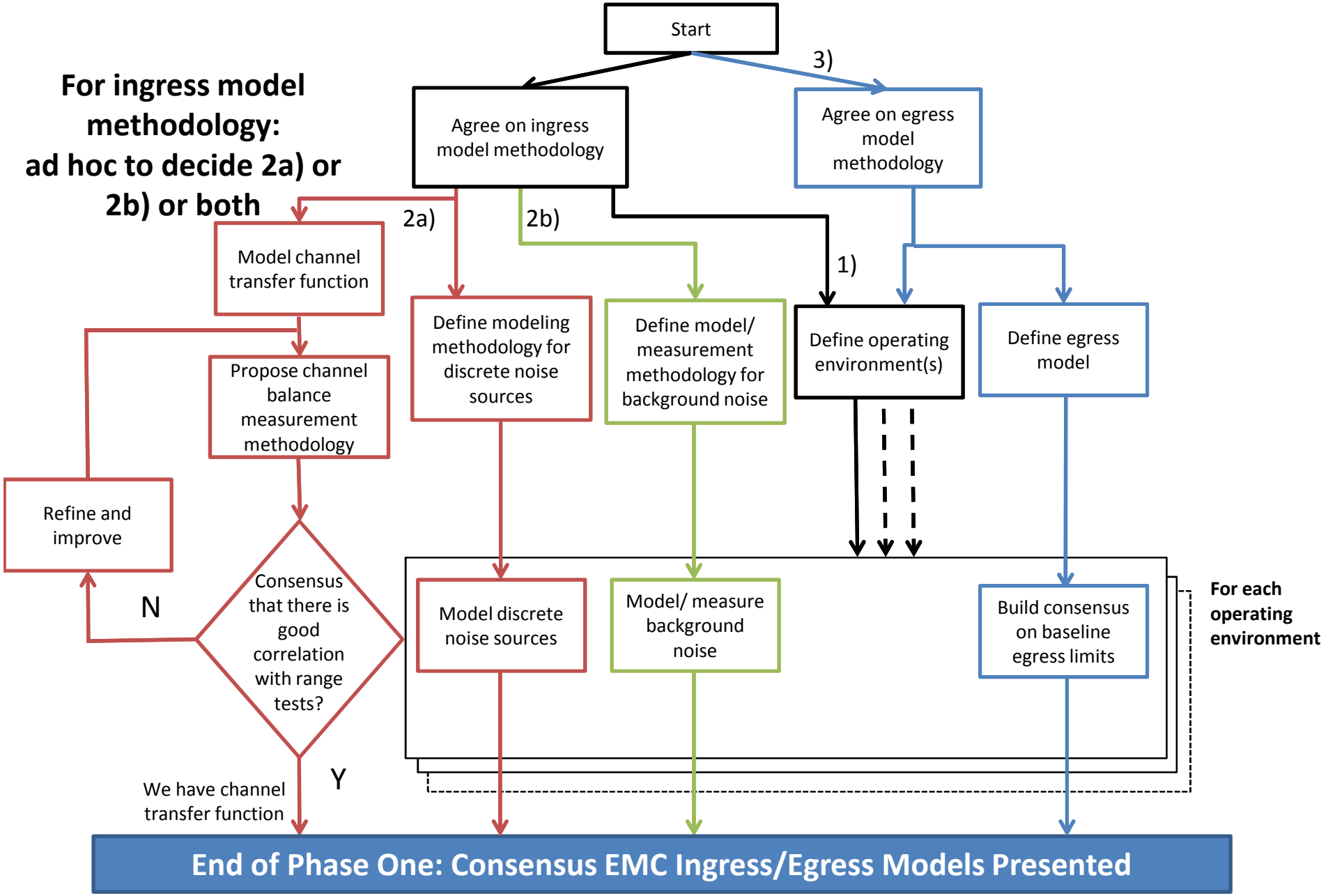
- Description of component level immunity tests that can be done without an EMC chamber
  - Requires contributions to develop these tests
  - Done **after** tasks in Phase One are complete
  - See past work in 802.3
    - cable clamp (40.6.1.33/Annex 40B) , 6 around 1 noise injection system (55.5.4.4)
- Likely to be based on existing automotive tests
  - see buntz_01_1112_rtpge.pdf
  - Q: Do we need to liaise with other groups on this?
    - If so, process should start early
  - Q: Do we need to develop (or ask for) new tests?
- Definition of egress parameters
  - E.g. transmit PSD

Phase two outputs

- Ingress test methodology
- Text for ingress tests
  - Detailed description of component level tests
- Text for egress parameters
  - E.g. driver balance, transmit PSDs
- There *may* be no text for egress tests
  - Emissions tests are not normally part of IEEE 802 text
    - IEEE 802 has preferred to avoid being responsible for compliance and leaves this to OEMs and local regulatory bodies
    - Text states do ‘not preclude meeting applicable emissions requirements’

Backup

Flowchart – Phase one



Flowchart – Phase two