

Reduced Twisted Pair Gigabit Ethernet

EMC Ad Hoc Next Steps

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Review of the work to do

- Further clarification for the operating environments
- Ingress modeling
 - Define the noise sources
 - In-car background noise (Stefan's presentation)
 - Impulse noise (contributions are needed)
 - Immunity limit-lines
 - Alien XTALK limit-lines (based on Kirsten's input)
 - Define the channel transfer function measurement/modeling methodology (Mehmet's presentation)
- Egress Modeling
 - Block diagram for PHY emissions (Mehmet's presentation)
 - Define emissions' mask
 - Define measurements to be made
- End-to-end EM ingress model
- End-to-end EM egress model
- Need to agree on worst-case limit-lines

What is missing for EMC Ad Hoc?

ITEM	Description	Parameters & Metric	Status	Contributors
BACKGROUND NOISE	<ul style="list-style-type: none"> In-car background noise needs to be measured for various models and conditions. The noise can be captured as common mode voltage on a harness in a lab environment and/or in real life (for the details of the measurement please refer to (1)) 	<ul style="list-style-type: none"> Various stages of the operation: (Ignition OFF, Ignition ON, Engine Start, Engine Running) dBuV (or dBm/Hz) 	<ul style="list-style-type: none"> Stefan Buntz (Daimler, AG) provided a contribution. More Automotive OEM inputs are needed!! 	<ul style="list-style-type: none"> Stefan Buntz (Daimler) ¹⁾ ?
IMPULSE NOISE	<ul style="list-style-type: none"> Need in-car measurement results in order to accurately represent it in the noise budget calculations An accurate impulse noise model 	<ul style="list-style-type: none"> Duration of the impulse noise Amplitude of the impulse noise Pulse rate (if any) Time or Frequency domain response 	<ul style="list-style-type: none"> Contributions are expected 	<ul style="list-style-type: none"> Thomas Hoegenmuller? (Bosch) Larry Matola? (Delphi)

1) http://www.ieee802.org/3/bp/public/mar13/buntz_3bp_01_0313.pdf

What is missing for EMC Ad Hoc? (cntd.)

ITEM	Description	Parameters & Metric	Status	Contributors
EMI	<ul style="list-style-type: none"> The emission observed in a car environment is a key parameter which defines the transmit PSD for a given modulation scheme. 	<ul style="list-style-type: none"> An emission mask (limit-line) as a function of frequency (dBuV or dBm/Hz) 	<ul style="list-style-type: none"> Need consensus for a limit-line for emissions. Do earlier provided values represent the 'realistic' in-car emissions? Further discussion and contributions are expected from OEMs 	<ul style="list-style-type: none"> Stefan Buntz (Daimler) ¹⁾²⁾ ?
IMMUNITY	<ul style="list-style-type: none"> Radiated immunity, BCI and DPI as well as transient immunity are important measures for EM immunity performance 	<ul style="list-style-type: none"> A limit-line /threshold as a function of frequency (maximum V/m) 	<ul style="list-style-type: none"> Need consensus for a limit-line for immunity Do earlier provided values represent the 'realistic' in-car immunity levels? Further discussion and contributions are expected from OEMs 	<ul style="list-style-type: none"> Stefan Buntz (Daimler) ¹⁾²⁾ ?

1) http://grouper.ieee.org/groups/802/3/RTPGE/public/may12/buntz_01_0512.pdf

2) http://grouper.ieee.org/groups/802/3/RTPGE/public/nov12/buntz_01_1112_rtpge.pdf

What is missing for EMC Ad Hoc? (cntd.)

ITEM	Description	Parameters & Metric	Status	Contributors
Alien XTALK	<ul style="list-style-type: none"> The XTALK between RTPGE lines and from other data lines in the harness 	<ul style="list-style-type: none"> A limit-line as a function of frequency (dBm/Hz) 	<ul style="list-style-type: none"> Kirsten Matheus (BMW) provided topologies for different use cases Need to measure Alien XTALK and establish the limit lines 	<ul style="list-style-type: none"> Kirsten Matheus (BMW) ¹⁾ UNH Team Richard Mei (Commscope) ²⁾
EMC Channel Transfer Function	<ul style="list-style-type: none"> Various RTPGE link segments needs to be analyzed in order to determine the CM-to-DM conversion transfer functions 	A transfer function as a function of frequency (dB)	<ul style="list-style-type: none"> Mehmet Tazebay provided a methodology to measure the mode conversion transfer function of a given link segment. Need correlation to 4-port network analyzer measurements 	<ul style="list-style-type: none"> Mehmet Tazebay (Broadcom) ³⁾ Thomas Muller (Rosenberger) ⁴⁾ Richard Mei (Commscope) ⁵⁾

- 1) http://www.ieee802.org/3/bp/public/jan13/matheus_3bp_02_0113.pdf
- 2) http://www.ieee802.org/3/bp/public/jan13/mei_3bp_01_0113.pdf
- 3) http://www.ieee802.org/3/bp/public/jan13/tazebay_3bp_01a_0113.pdf
- 4) http://www.ieee802.org/3/bp/public/jan13/mueller_3bp_01_0113.pdf
- 5) http://www.ieee802.org/3/bp/public/jan13/mei_3bp_01_0113.pdf