# EMC Burst Noises

## IEEE 802.3dm

AdHoc

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# Overview

- EMC burst noises - Discussion of system impact

# ISO 7637 Pulses

- Test pulses 1-7 to emulate different effect from supply disconnect, ignition switching, starter motor, alternator and switching transients

- Fastest pulse is 3a/3b to emulate switching transients

- Pulse applied to capacitive coupling clamp around the shielded cable

https://www.ametek-cts.com/-/media/ametekcts/importdata/documents/datasheets/em-test/acc.pdf
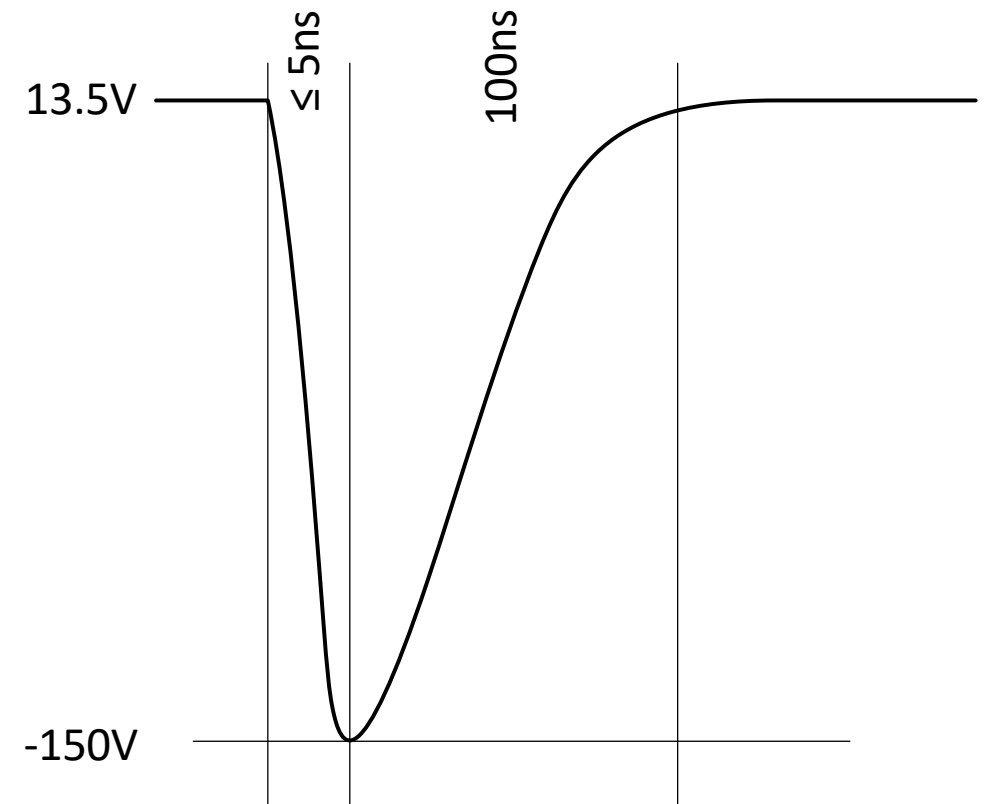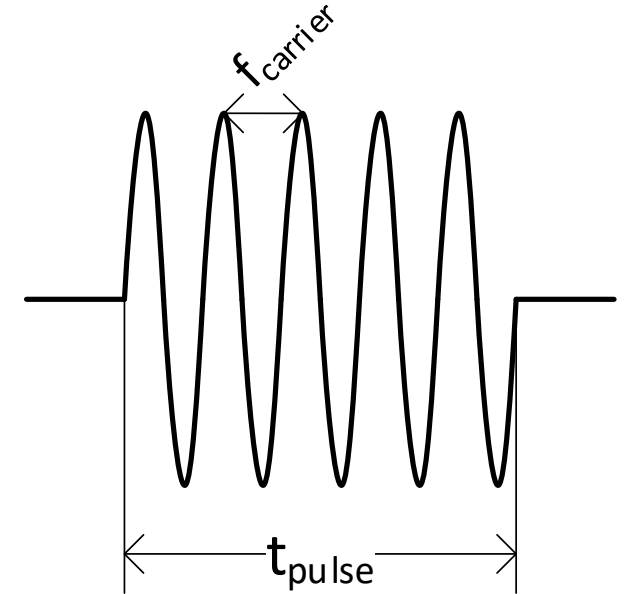
# ISO 7637 Pulses

- Resulting disturbance waveform from Pulse 3 on the signal line has much smaller amplitude and time duration than stimulus
- Received disturbance shows a ringing behavior with a fundamental of approximately 25MHz
  → high-pass filtering can help to reduce amplitude further (and does not impact TDD)
- ISO 7637 pulses are not an issue for the target media and signal bandwidth
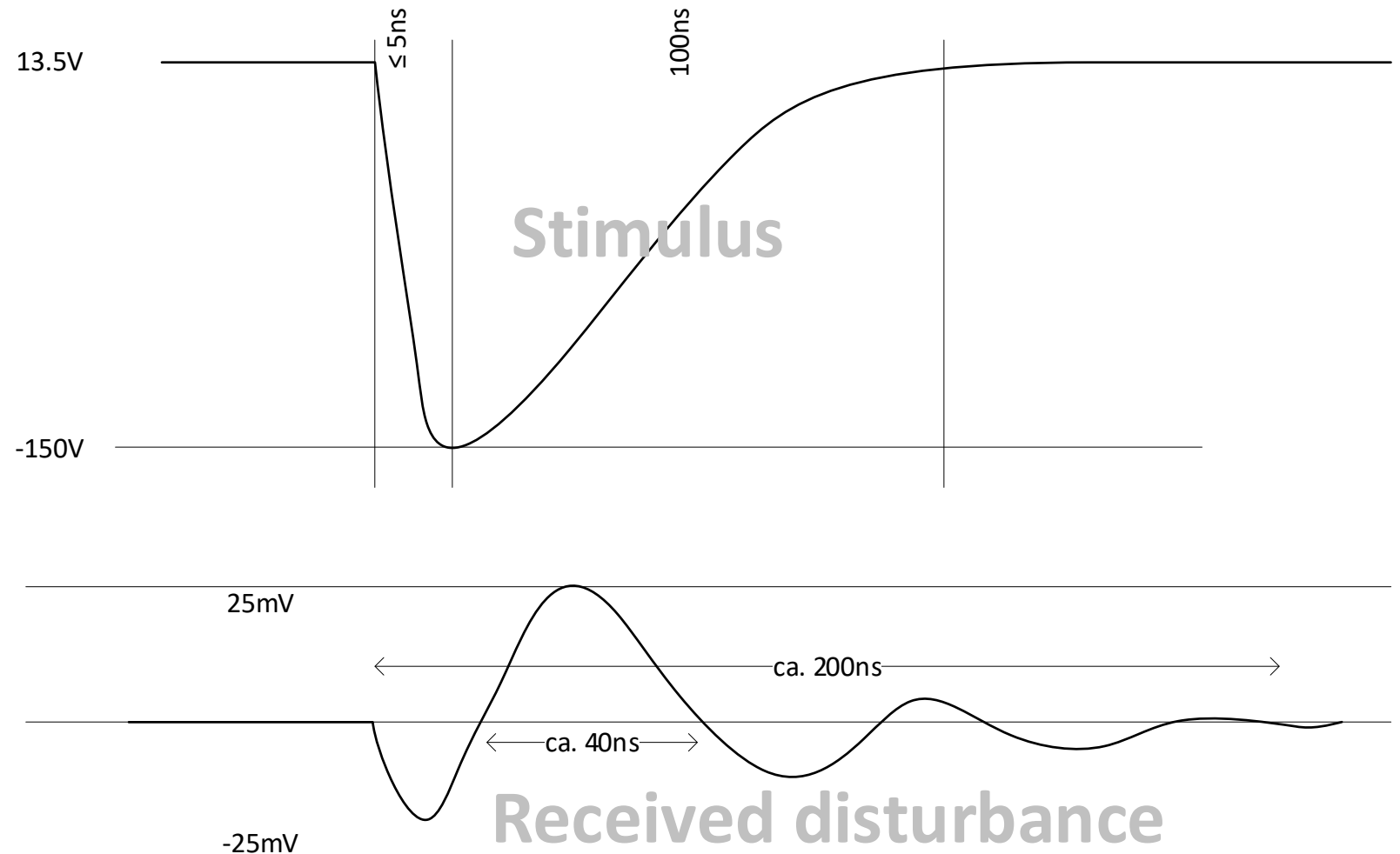
# ISO 11452

- Radiated immunity with antenna (ALSE)
  - Continuous Wave, Amplitude Modulation or Pulse Modulation
- Pulse Modulation is specified to be tested in certain frequency ranges
  - For radar bands, the test field strength prescribed can be especially high
- Pulse durations are long compared to symbol rates being considered in dm … > 500,000 bits even for slowest upstream proposed

- No practical FEC is going to protect against (radar) PM bursts
- PM bursts for dm rates are just the same CW

| $f_{carrier}$ [MHz] | 806-915 | 1200-1400 | 1710-1910 | 2700-3100 | 2700-6000 |
|---|---|---|---|---|---|
| $t_{pulse}$ [µs] | 577 | 3 | 577 | 3 | 300/312.5 |

# Summary

- ISO 7637 Pulses
  - Fast Transients result in small disturbance
  - TDD receiver can easily employ high-pass filtering in the frontend without sacrificing signal integrity
    - Even first order high-pass with cutoff 100MHz reduces peak amplitude to < 9mV
  - Other transients in ISO7637 are slower and play even less of a role

- ISO 11452 Pulse Modulation
  - Essentially the same as CW for all baud rates relevant to dm

→ "Burst protection" by FEC length or FEC interleaving is a not a thing for shielded media and baud rates under consideration in dm; consequently, it should be dropped from the discussion

# Thank You!