TX SNDR and Rpeak limits for CR and C2M

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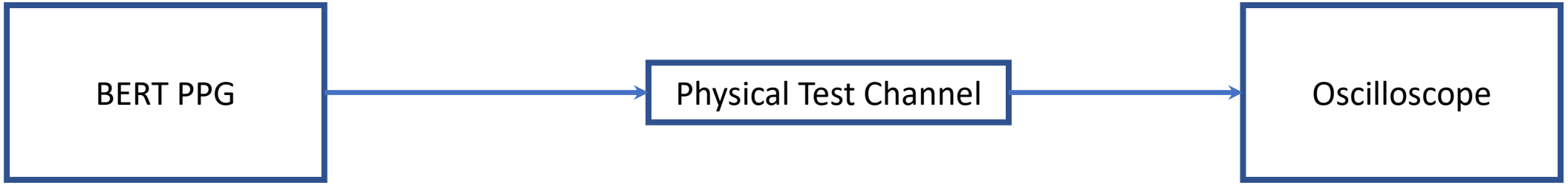
Introduction

- The current limits for Rpeak seem to be placeholders. When tested with an instrument-grade TX and practical host channels, these limits are marginal for HL and cannot be met for HN.
- Current limits for SNDR for most of the presets cannot be met even with instrument-grade TX and practical host channels.
- Currently the SNDR limits are the same for all CR and C2M host types. Measurements indicate a dependence of SNDR on the host loss and signal strength.
- Relates to comments 299 and 300.

Test setup



Vf calibrated to 400, 450 and 500 mV

PCB trace + OSFP connector + HCB

Test channels with IL matching the different host loss case. All channels include an OSFP connector and a test fixture.

For all tested channels – ERL > 12 dB.

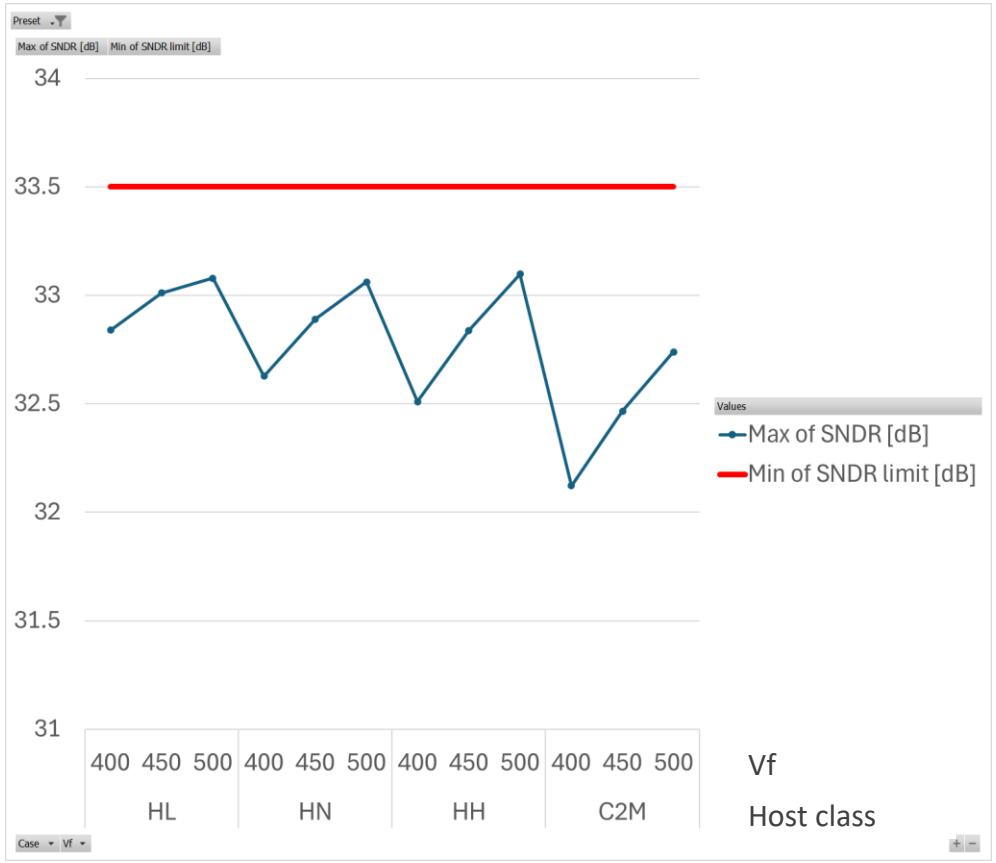
Rpeak Measurements

Case	Vf [mV]	Rpeak limit	Measured Rpeak
HL	400	0.456	0.474
	450		0.476
	500		0.464
HN	400	0.345	0.324
	450		0.325
	500		0.322
HH	400	0.234	0.274
	450		0.275
	500		0.275
C2M	400	0.123	0.197
	450		0.197
	500		0.204

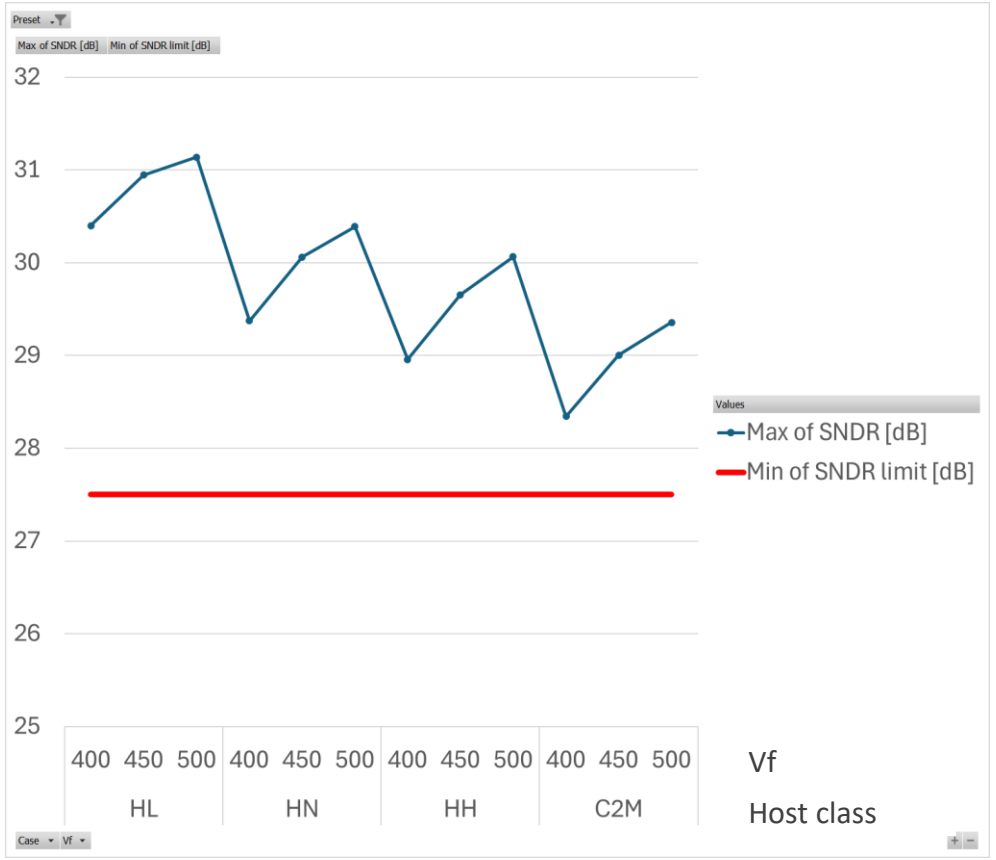
- Borderline measurements for HL (<2% margin).
- Measured values below limit for HN.

SNDR Measurements

Preset 1

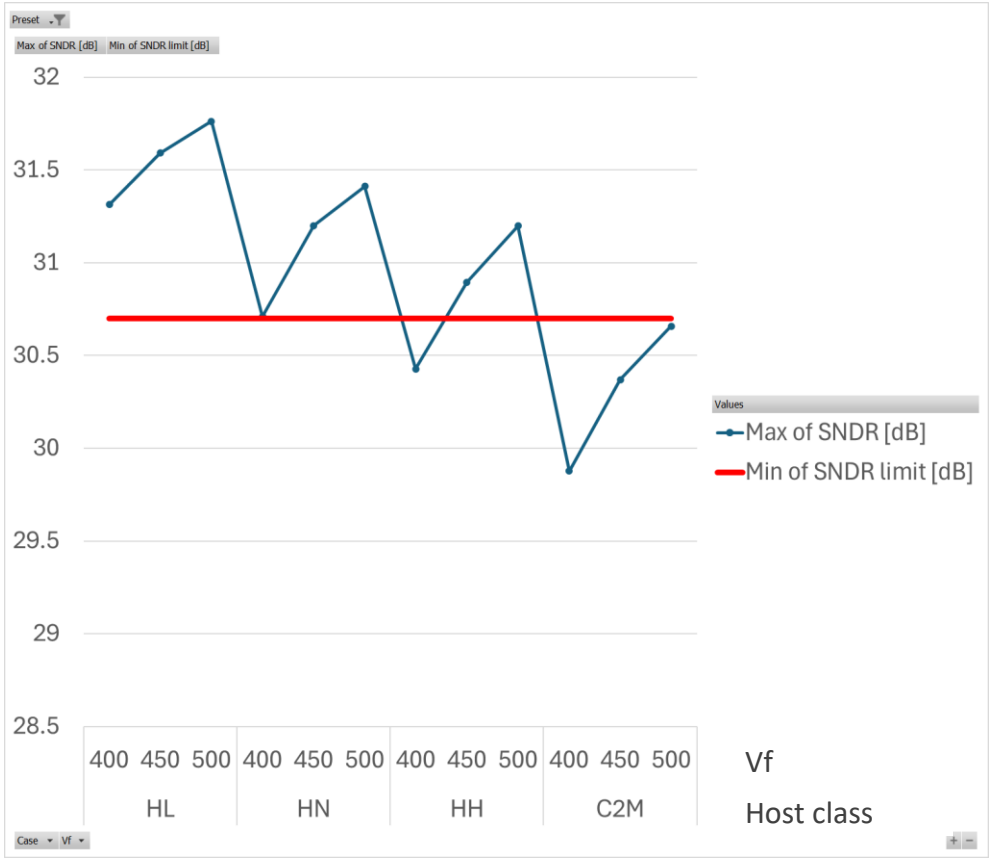


Preset 2

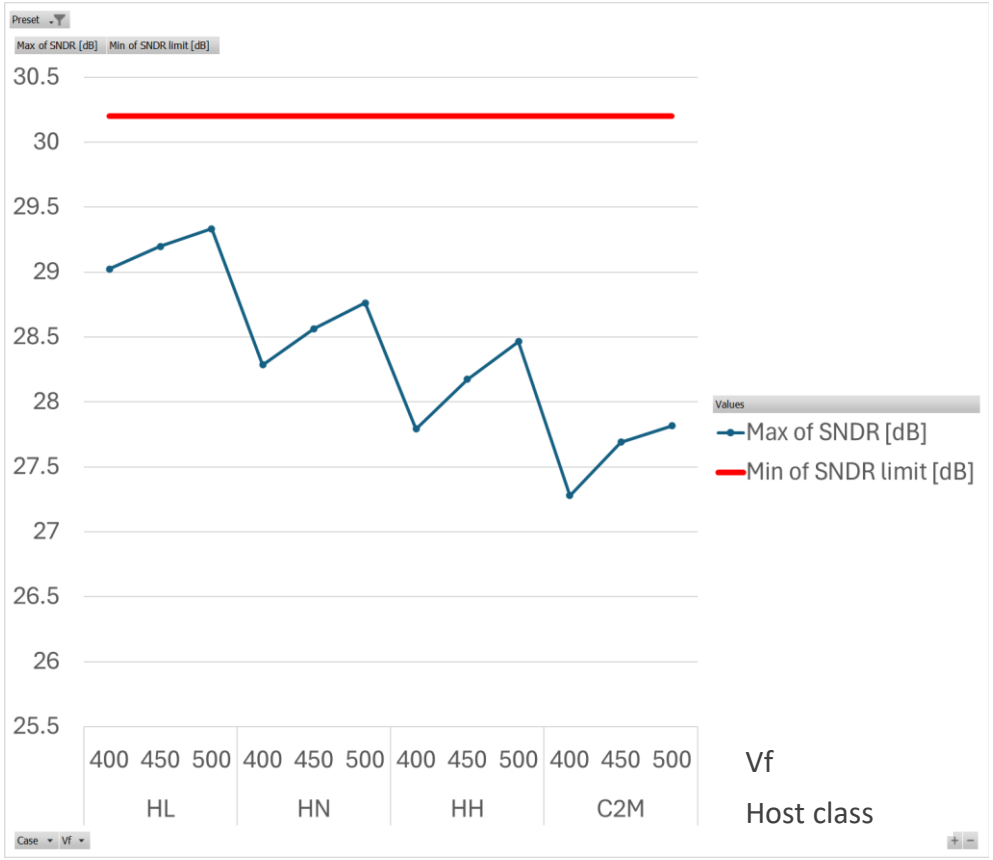


SNDR Measurements

Preset 3

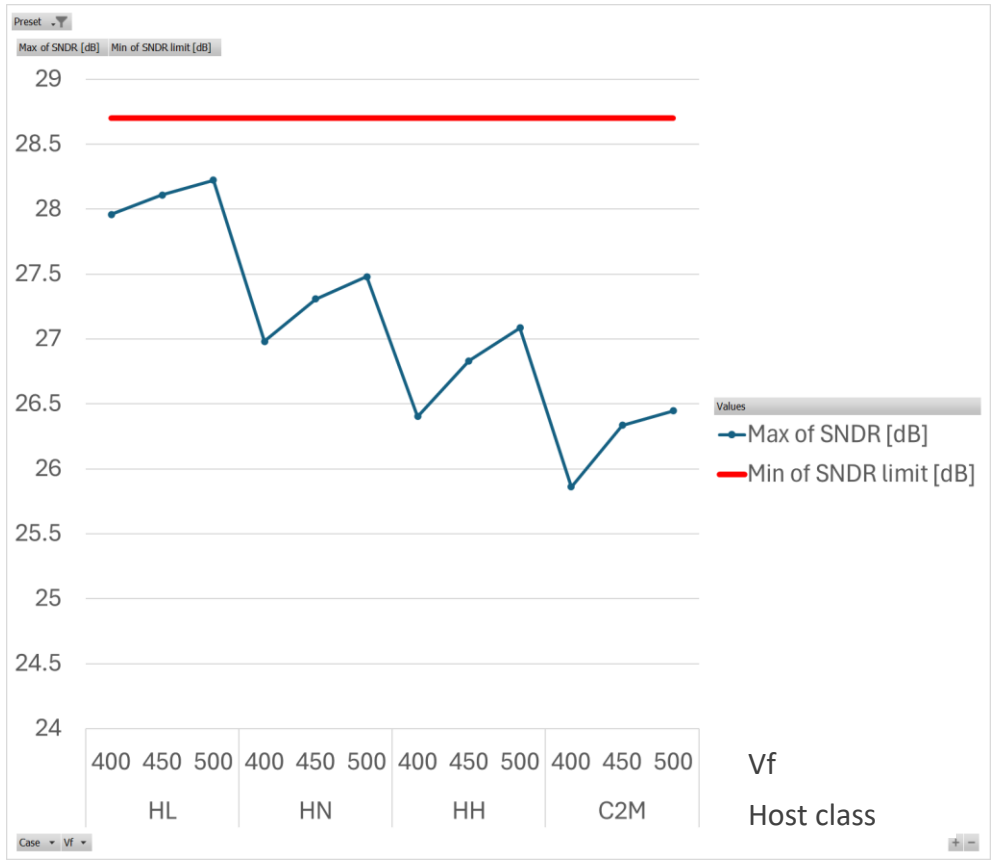


Preset 4



SNDR Measurements

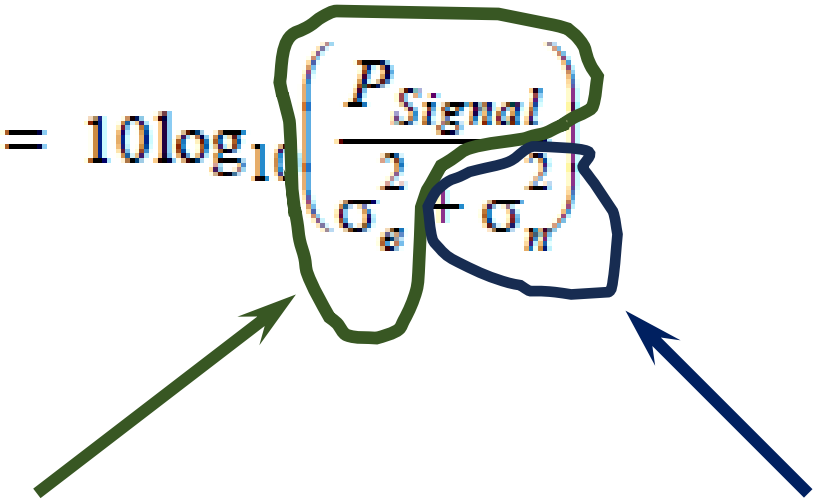
Preset 5



Preset 6

SNDR Measurements

$$SNDR = 10\log_{10}\left(\frac{P_{Signal}}{\sigma_e^2 + \sigma_n^2}\right) \qquad (179\text{–}8)$$



Scale with Vf and channel loss

Less dependent on Vf and channel loss

Conclusions

- Current Rpeak limits are marginal for HL and cannot be met for HN when tested with instrument-grade TX and practical host channels.
- SNDR limits for most presets cannot be met in practice, even with instrument-grade TX and practical host channels.
- Measured data shows a dependence of SNDR on the host loss and signal strength.

Proposed changes

- Adjust Rpeak limits in CL179 for HL and HN classes:
  - Rpeak for HL = 0.425
  - Rpeak for HN = 0.3
- Adjust the SNDR limits based on the lab data:

Preset	Current limit [dB]	Proposed limit [dB]
1	33.5	32
2	27.5	28
3	30.7	29.5
4	30.2	27
5	28.7	25.7
6 (initialize)	31	30

- Alternatively, define SNDR limits per host class, with values derived from lab data and reflecting measured dependence on loss and signal swing.

Thank you!