Transmit PSD mask (Comment #290)

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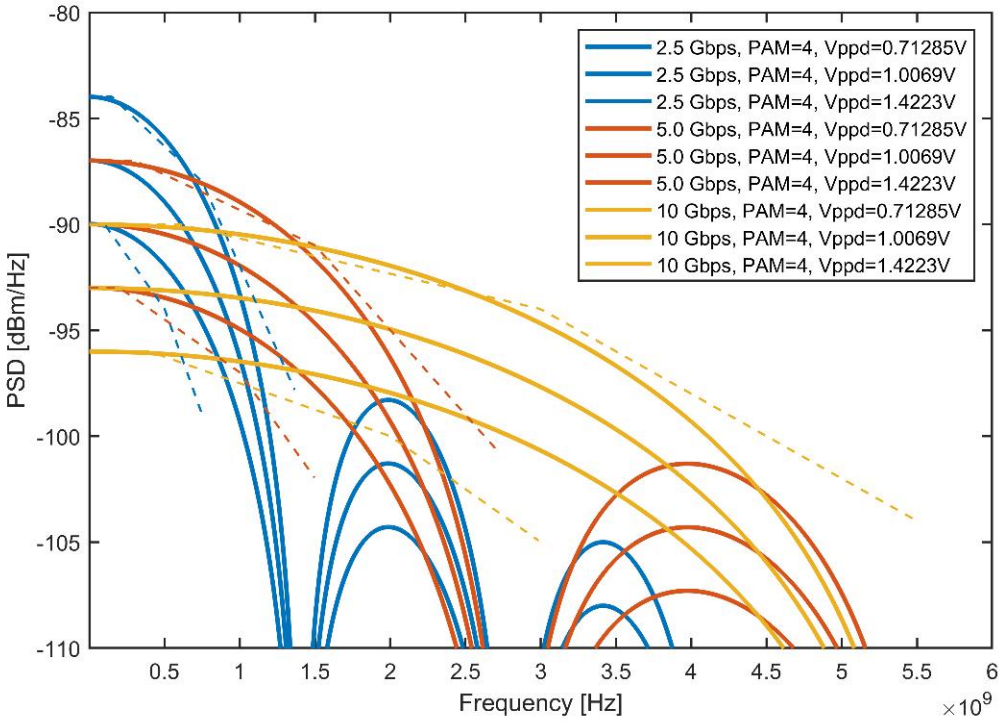
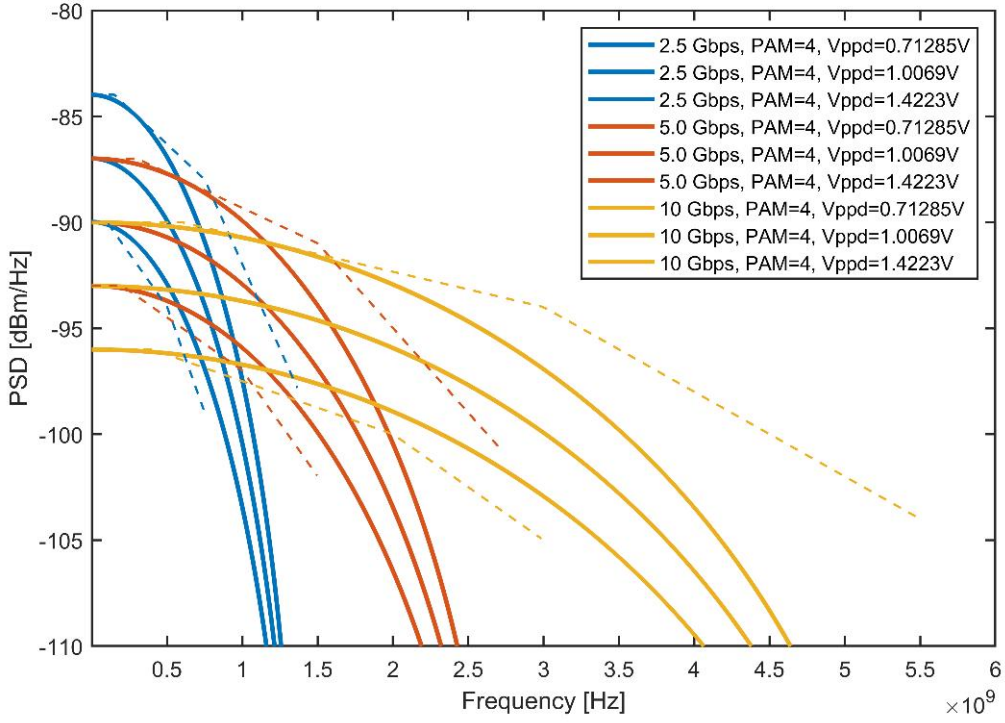
Rationale of proposed modifications

- Make upper mask limit meaningful
  - Current upper limit is rather meaningless apart from some implicit level tightening
  - Up to which freq do we want to specify the TX mask?
- Reduce transmit level cq power tolerance
  - Currently only an upper limit <3dBm
  - Propose to add dBm lower limit
- Make lower frequency bound consistent
  - 0 Mhz low-freq limit for upper PSD mask is a issue with PoDL
  - Propose: make upper limit low-freq consistent at 1MHz
  - Keep low-freq limit for lower PSD mask at 5MHz for PoDL
- Fix max differential amplitude TBD

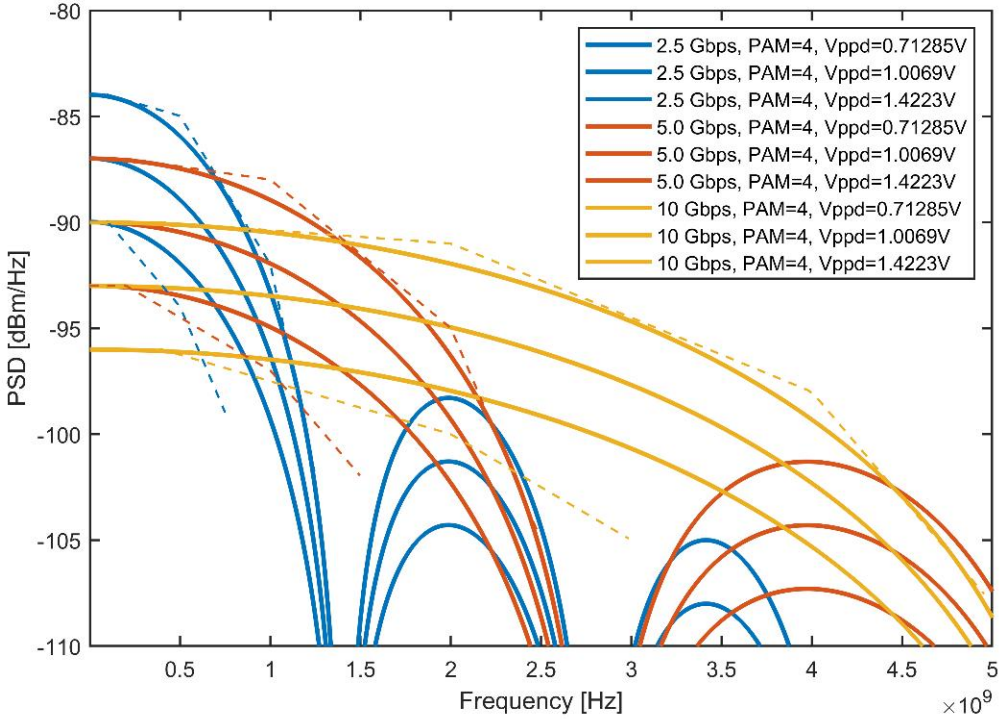
PSD shapes with current PSD mask

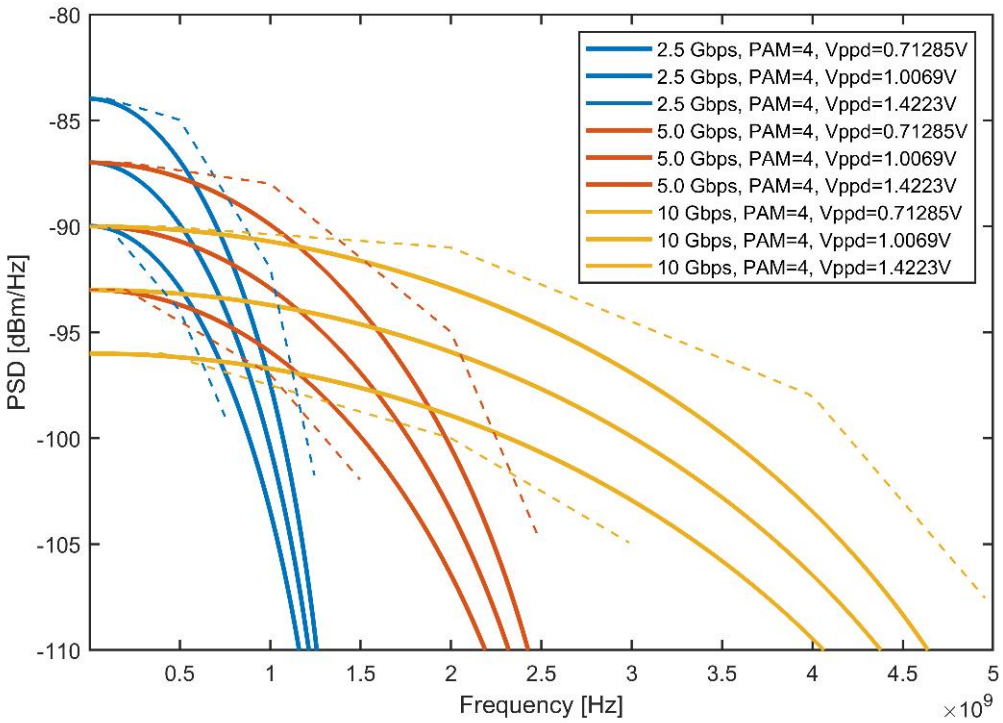




- Actual PSD shape shown for steep and smooth edges
- Current upper limit does not follow ‘native’ PSD shape
- PSD over the limit <2GHz for +3dB (implicit constraint)
- Limit above 2GHz is practically meaningless here

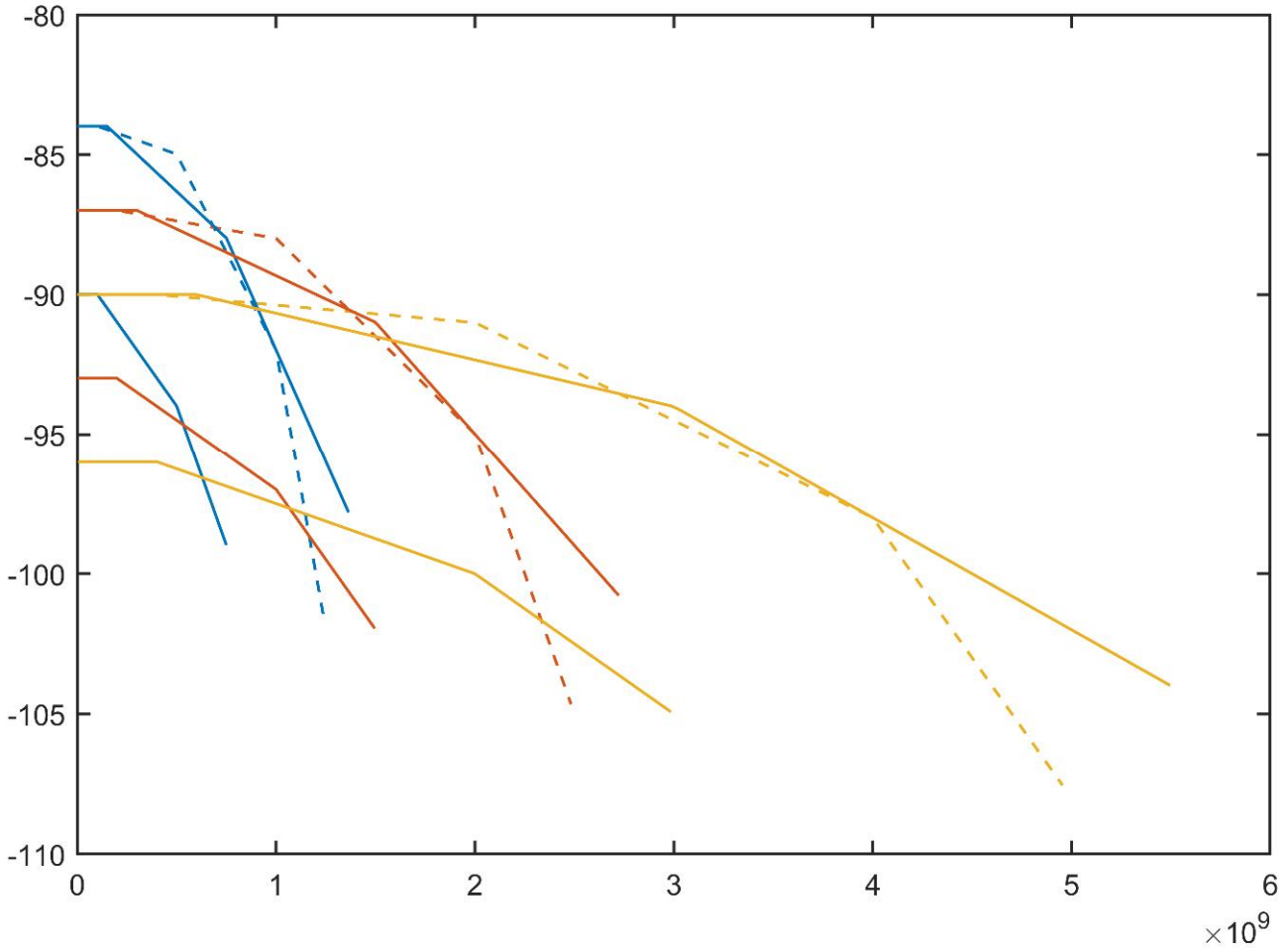
PSD shapes with proposed PSD mask





- Actual PSD shape shown for steep and smooth edges
- Proposed upper limit <u>follows</u> ‘native’ PSD shape

Comparing masks



- Looser < 3S GHz, tighter >4S GHz

Formulas

- Upper mask limit

$$\begin{cases} -90 - K & dBm/Hz & 1 < f \le 400 \cdot S \\ -90 - K - \dfrac{f - 400 \cdot S}{1600 \cdot S} & dBm/Hz & 400 \cdot S < f \le 2000 \cdot S \\ -91 - K - \dfrac{f - 2000 \cdot S}{2000 \cdot S / 7} & dBm/Hz & 2000 \cdot S < f \le 4000 \cdot S \\ -98 - K - \dfrac{f - 4000 \cdot S}{100 \cdot S} & dBm/Hz & 4000 \cdot S < f \le 5000 \cdot S \end{cases}$$

- Lower mask limit
  - Shape untouched, add 1dB to all sub-formulas of draft D1.1

$$\begin{cases} -96 - K & dBm/Hz & 5 < f \le 400 \cdot S \\ -96 - K - \dfrac{f - 400 \cdot S}{400 \cdot S} & dBm/Hz & 400 \cdot S < f \le 2000 \cdot S \\ -100 - K - \dfrac{f - 2000 \cdot S}{200 \cdot S} & dBm/Hz & 2000 \cdot S < f \le 3000 \cdot S \end{cases}$$

Transmit power limits

- A 1Vpp PAM4 signal is 0.25-1.5dBm depending on shaping
- The upper limit is already explicitly constrained to <3dBm
- The lower side is currently unconstrained and does allow undesirably low transmit power levels (about -4dBm)
- Propose to add a lower transmit power limit
  - Range of +/-2dB, results into -1 to 3 dBm
  - Range of +/-1.5dB results into -0.5 to 2.5 dBm

Max differential amplitude

- Needs to be investigate if this can be eliminated
- If it is included it need to be 1.3Vpp for consistency with transmit power
- Propose to put 1.3Vpp into the spec now and follow-up on the value in the next review cycle

End