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ERL Measured Results for 50G-KR Device (update)

May/2018

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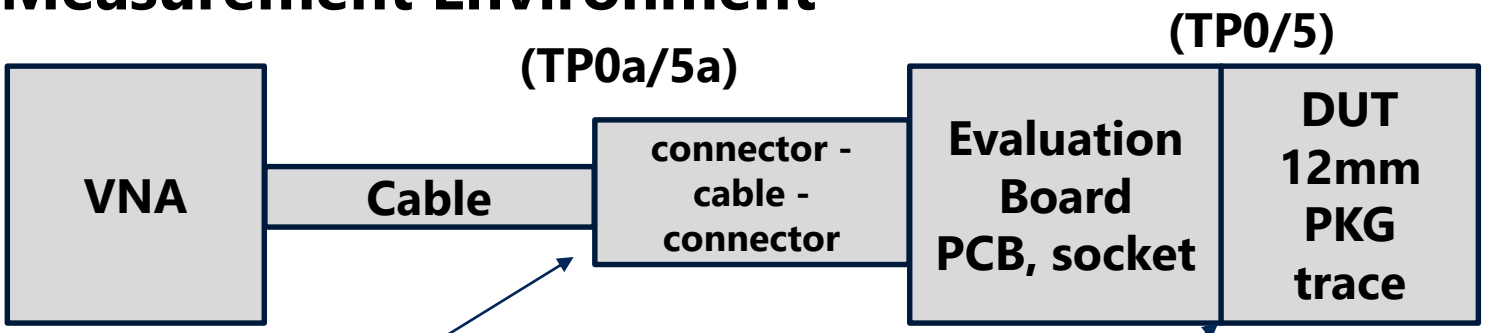
Socionext Inc.

1. 50G-KR Device ERL measurement

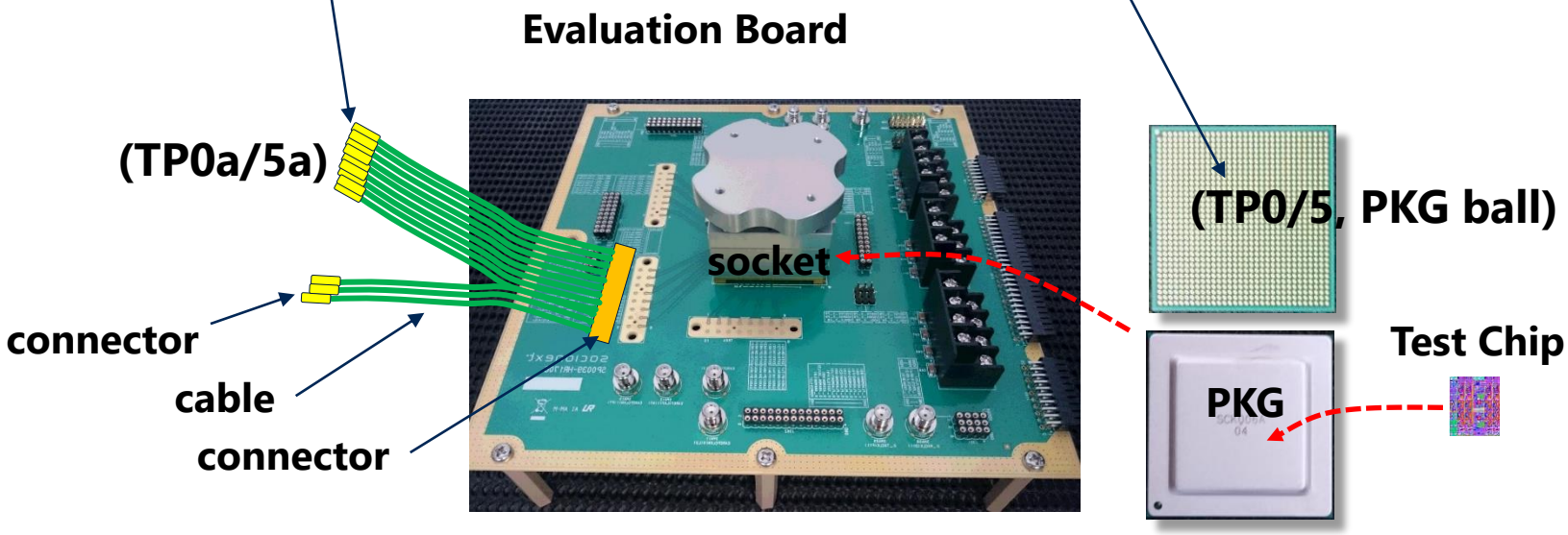
updated

Measurement Environment



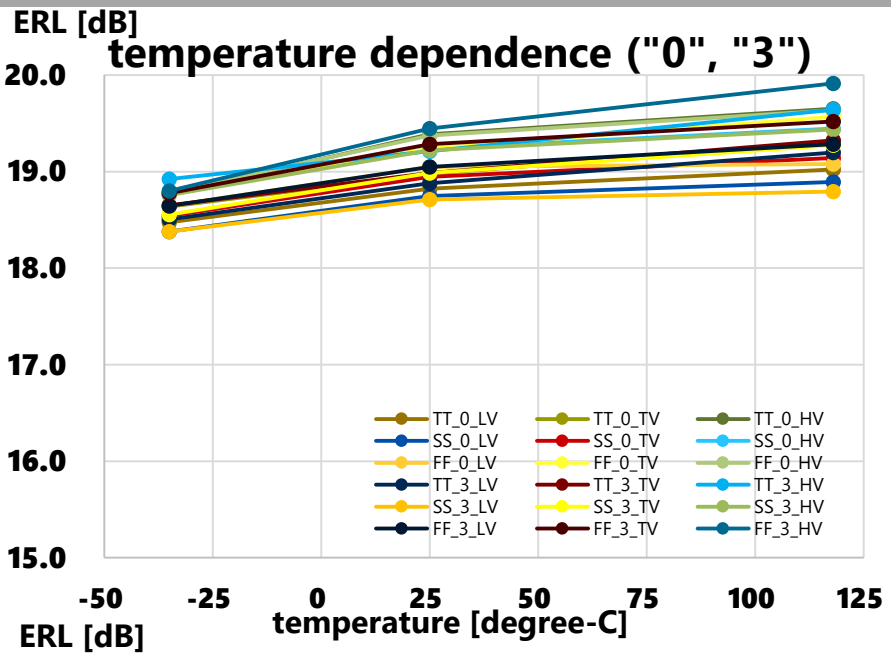
VNA calibration point
at RL(S-parameter) measurement
(TP0a/5a, at connector)

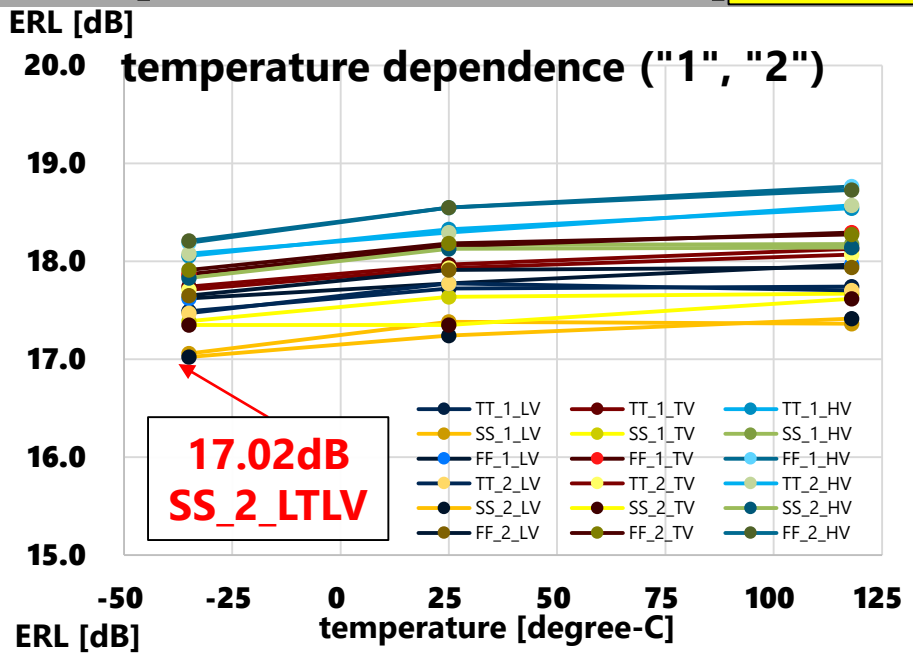
Test fixture delay (Tfx) setting point
at ERL calculation (TP0/5, at PKG ball)

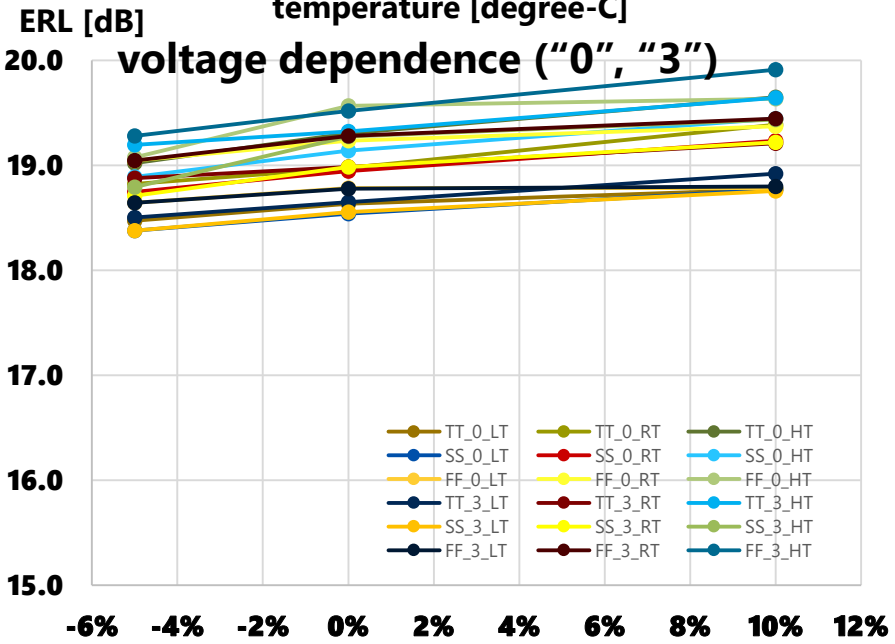


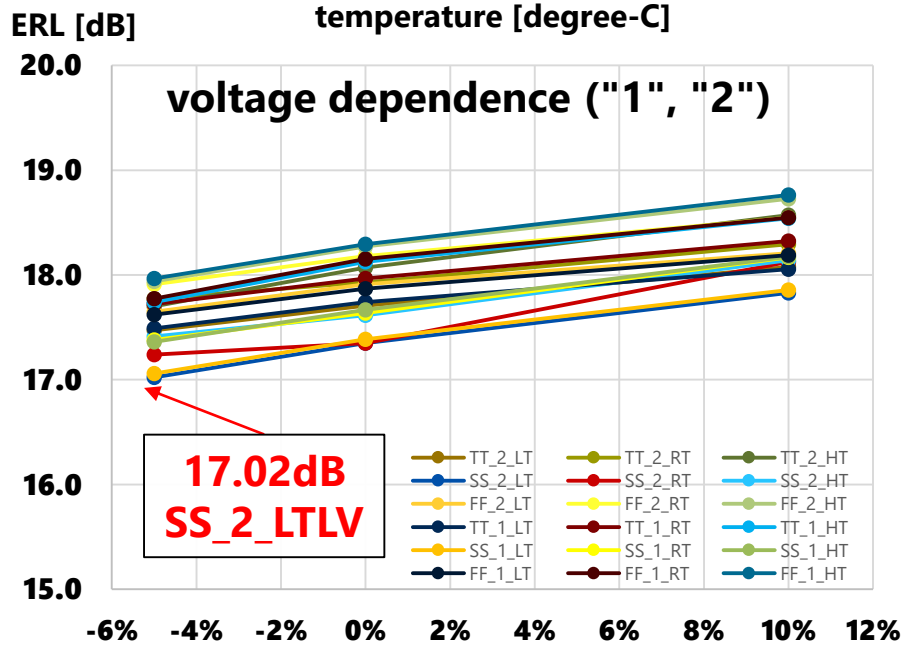
2. Tx ERL measurement (COM2.28, 1/2)

updated

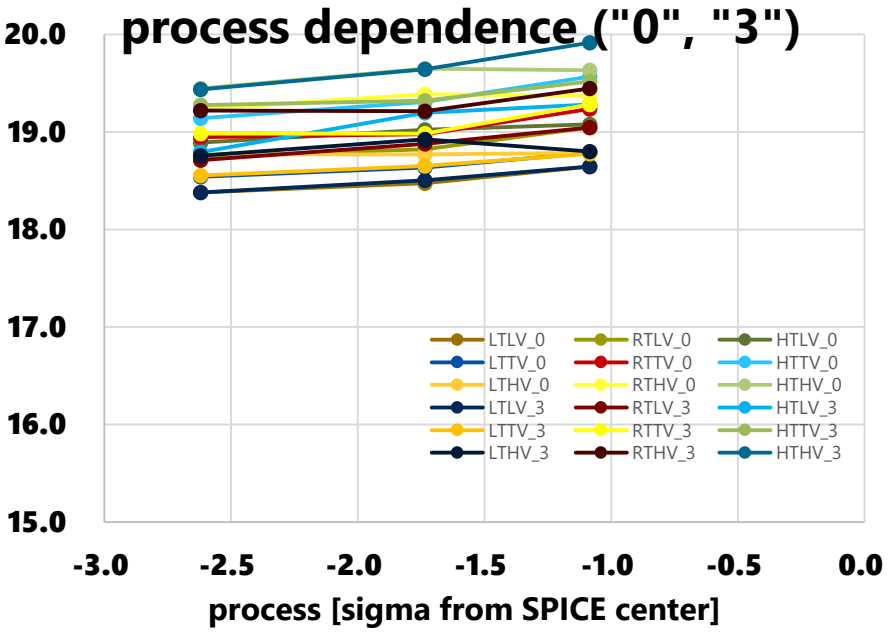


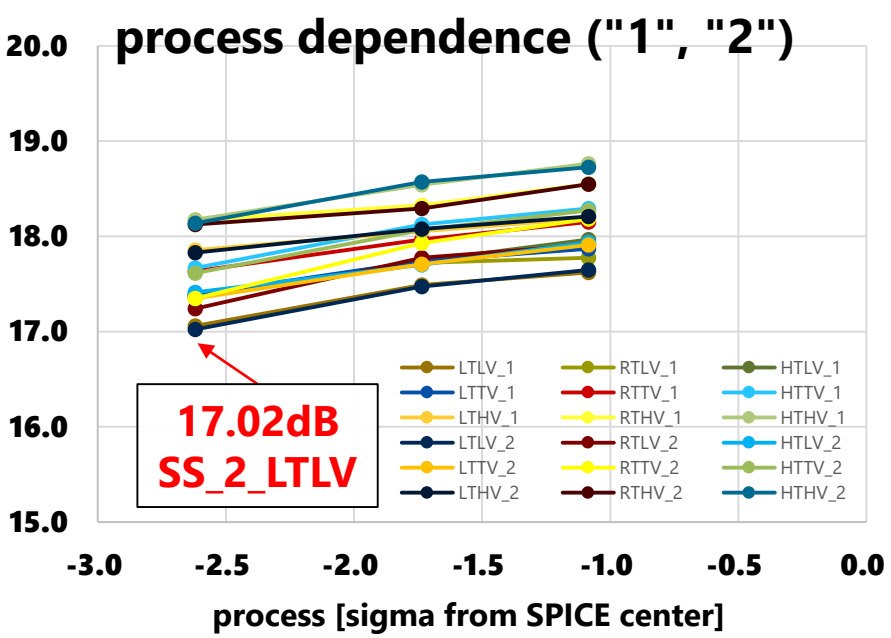






2. Tx ERL measurement (COM2.28, 2/2) updated





- PAM4-level “1” and “2” have worse ERL that “0” and “3” due to circuit implementation.
- SS/LV/LT and level “1/2” condition has worse ERL value.
- Since Rx ERL (22.37dB) is much better than Tx ERL (17.9dB) in TT/TV/RT condition, only PVT swept Tx ERL was measured.

⇒Tx ERLmin ≥15.0dB is appropriate

- Considering process variation (-0.41dB/sigma, worst) and LV/LT condition.

3. Conclusion

updated

1. Updated 50G-KR Device ERLmin values were proposed.
   "mellitz_3cd_01_050918_elect_adhoc.pdf"
   "8023cd_D32_comment_received_by_clause.pdf"
   (relating to #r02-25,)
   - Tx ERL at TP0a ≥ 15.0dB (16.1dB in D3.2, 19.5dB in D3.1)
   - Rx ERL at TP5a ≥ 15.0dB (16.1dB in D3.2, 19.5dB in D3.1)

2. Measured ERLmin values
   - TP0a/TP5a, Tfx excluded, RL passed
   - Tx ERL11 : 17.02dB (updated, PVT swept)
   - Rx ERL22 : 22.37dB (typical condition)

3. Proposed 50G-KR Device Tx/Rx ERLmin limit 15.0dB is appropriate, considering PVT and circuit implementation margin.
   - CL 137.9.2.1 Tx ERLmin
   - CL 137.9.3.1 Rx ERLmin

Thank you!

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backup slides

A-1 ERL test points (TP)

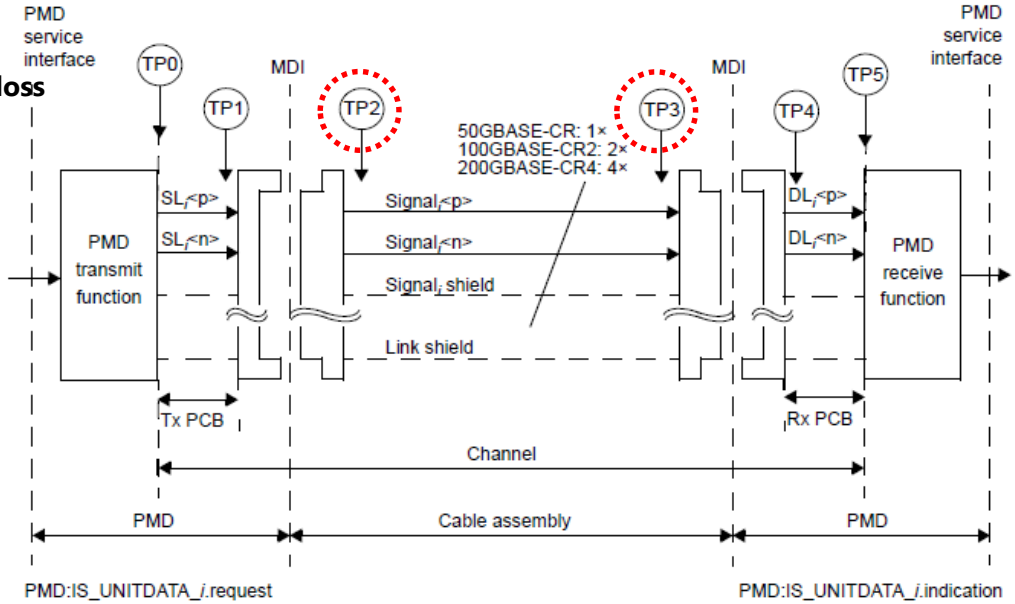
Test Points

• 50GBASE-CR/100GBASE-CR2/200GBASE-CR4

136.9.3.4
Transmitter effective return loss

Transmitter ERL at TP2 is recommended to be greater than 9 dB.

[updated 02/21 ad hoc] 14.5dB



136.9.4.5
Receiver effective return loss

~~Transmitter~~ Receiver ERL at ~~TP2~~ TP3 is recommended to be greater than 9 dB.

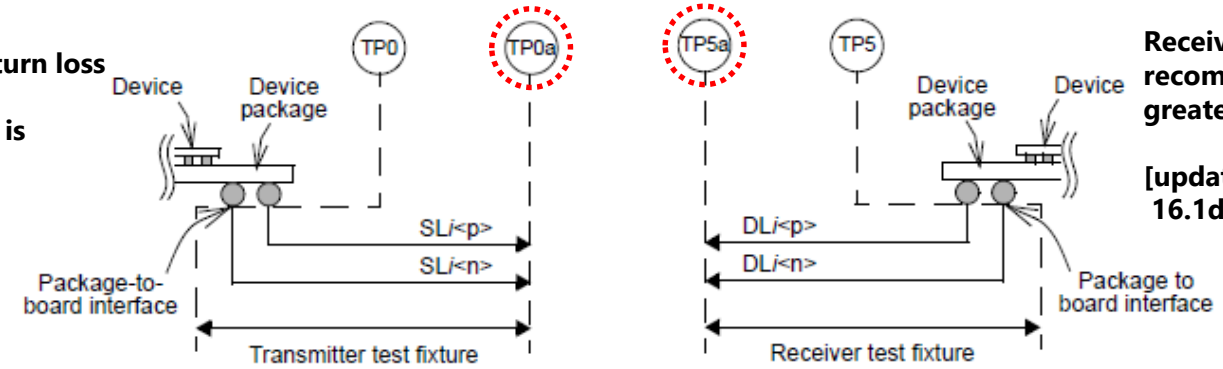
[updated 02/21 ad hoc] 14.5dB

• 50GBASE-KR/100GBASE-KR2/200GBASE-KR4

137.9.2.1
Transmitter effective return loss

Transmitter ERL at TP0a is recommended to be greater than 19.5 dB.

[updated 02/21 ad hoc] 16.1dB

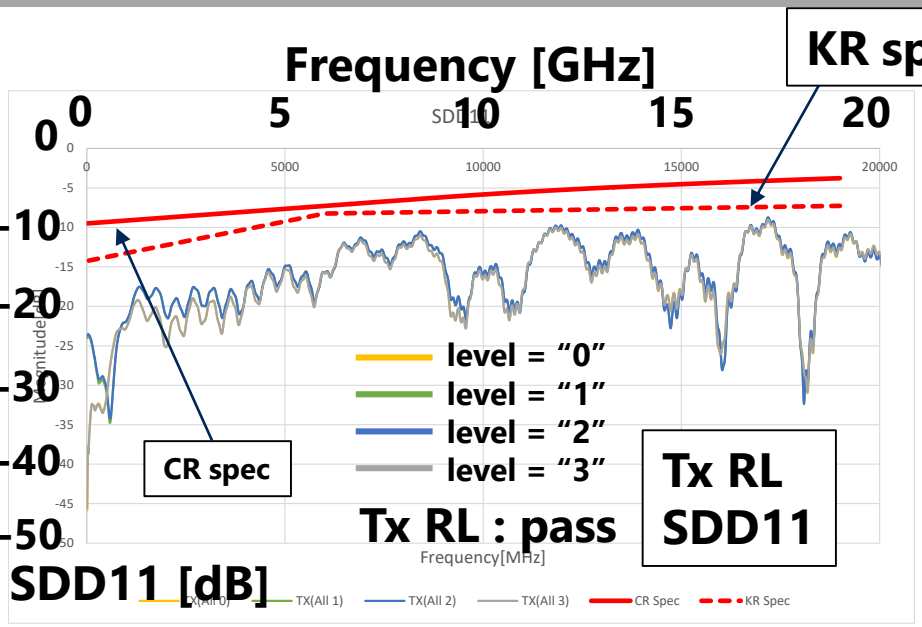


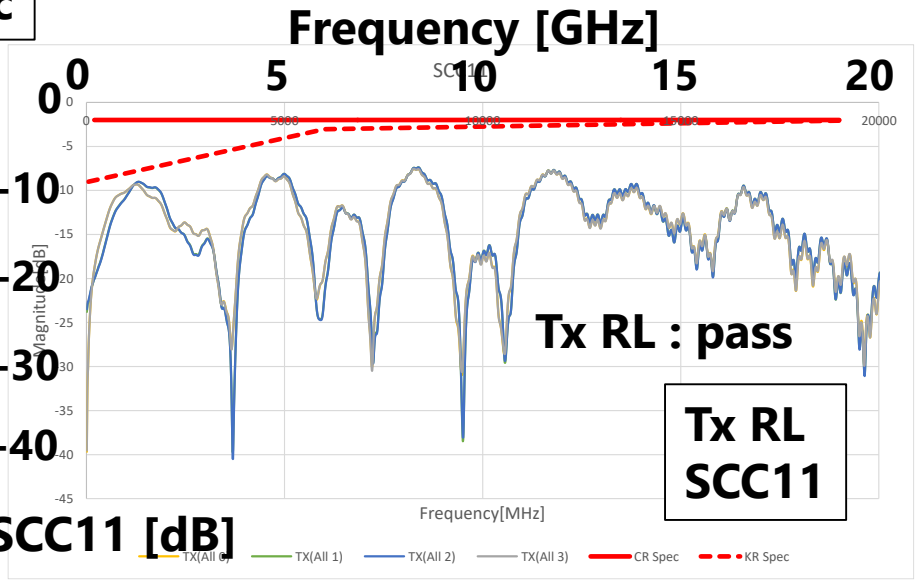
137.9.3.1
Receiver effective return loss

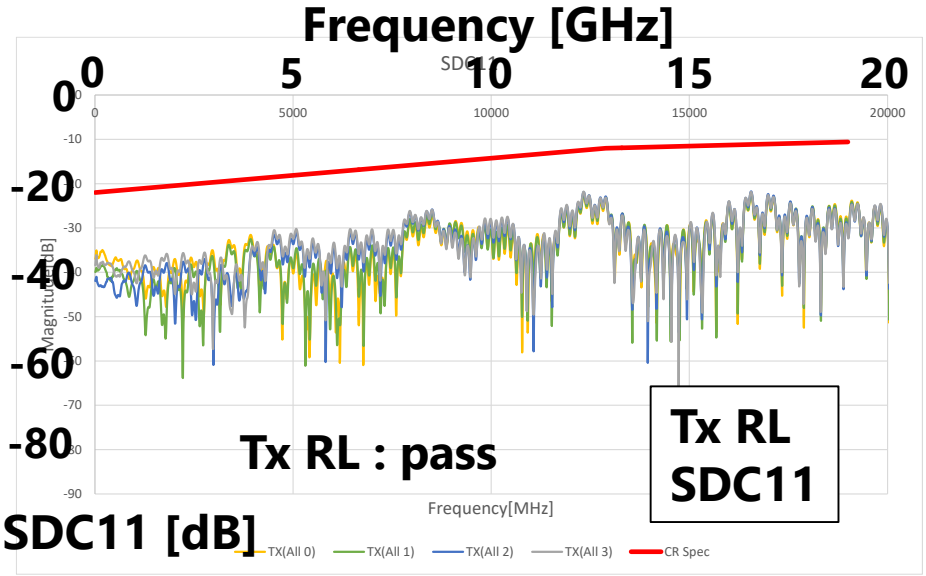
Receiver ERL at TP5a is recommended to be greater than 19.5 dB.

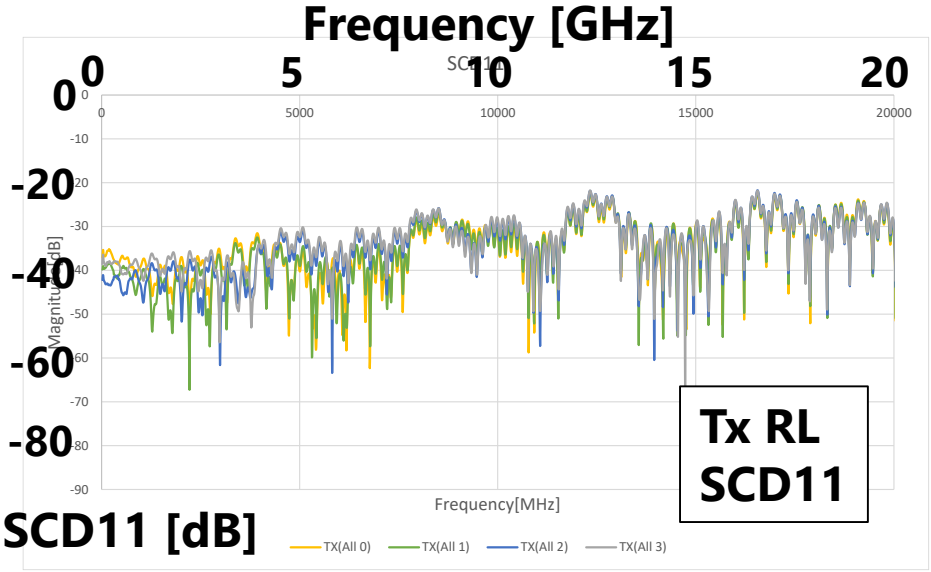
[updated 02/21 ad hoc] 16.1dB

A-2-1 : Measured Tx RL (return loss)

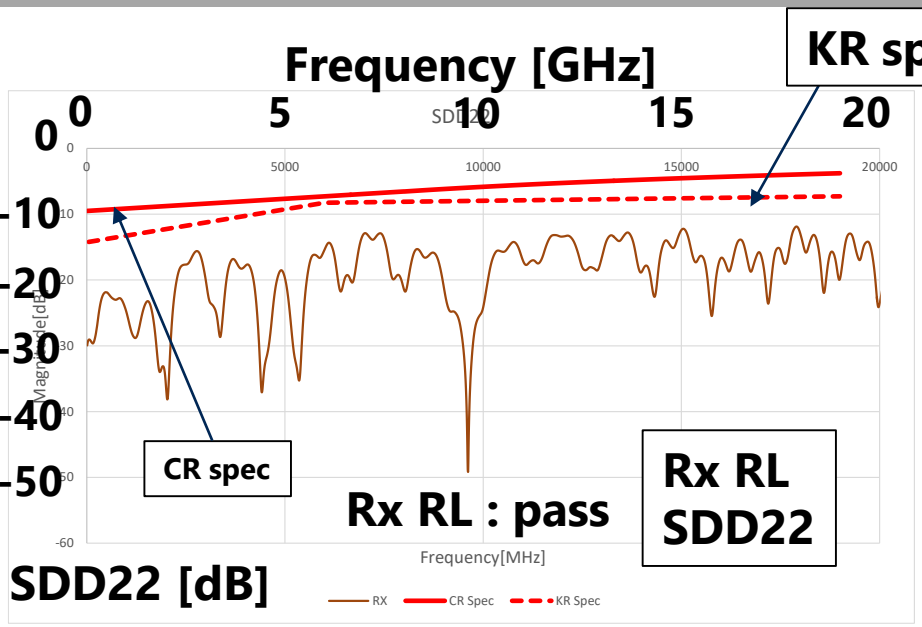


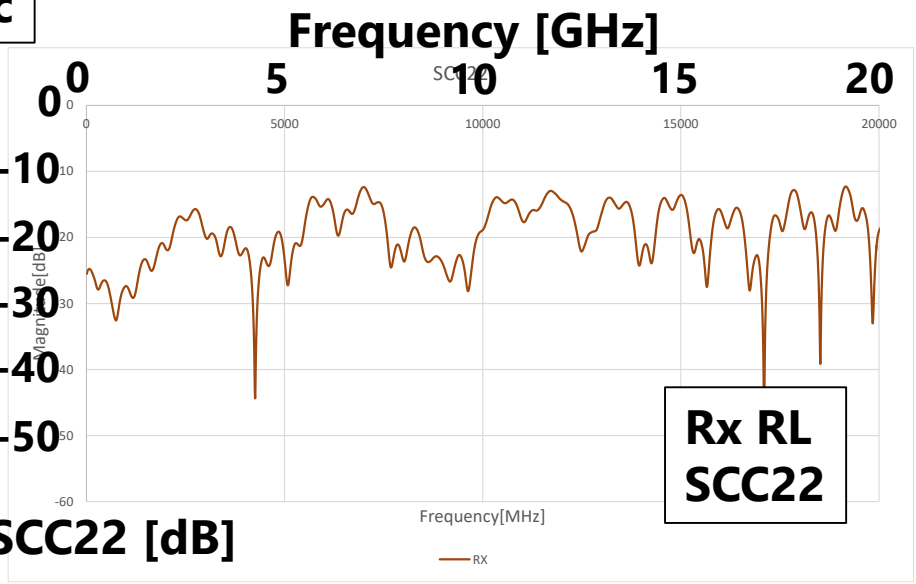


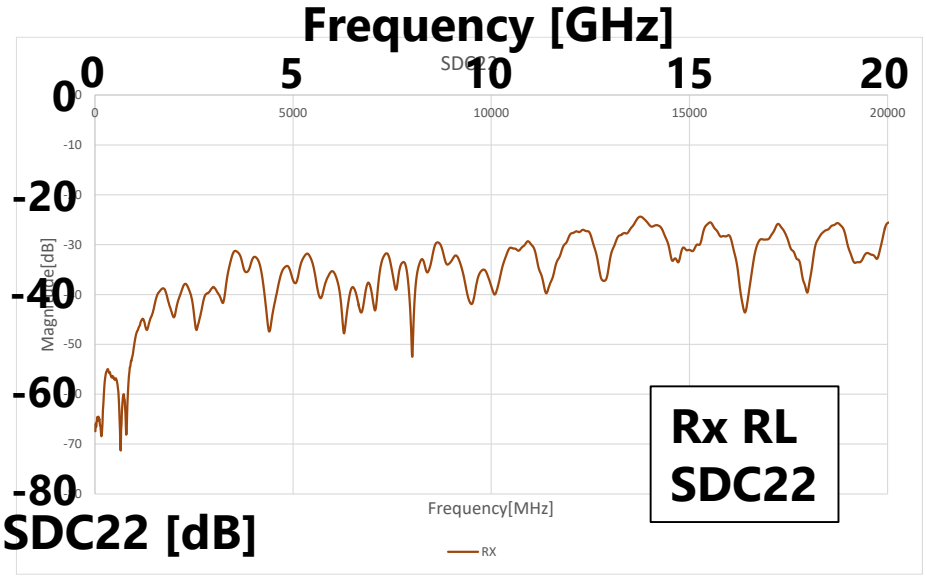


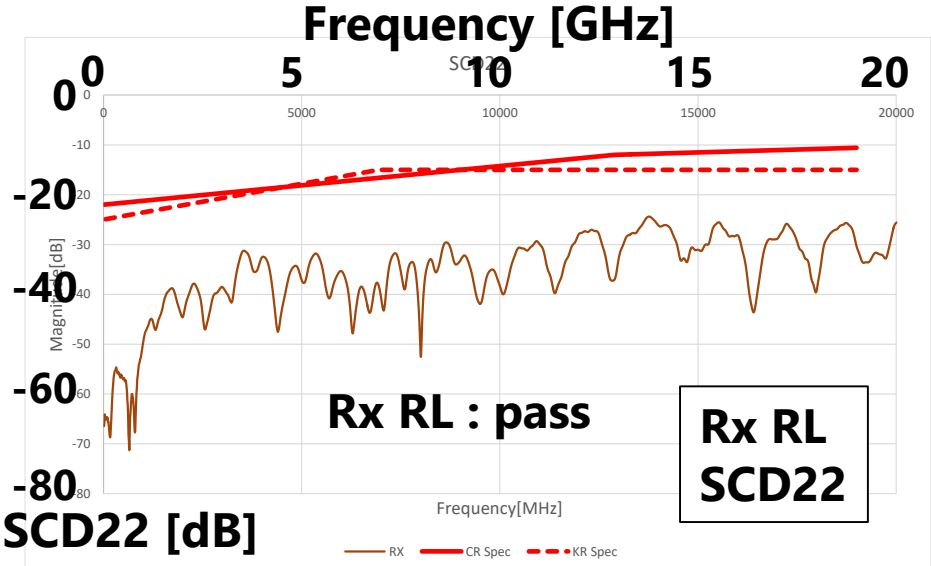


A-2-2 : Measured Rx RL (return loss)

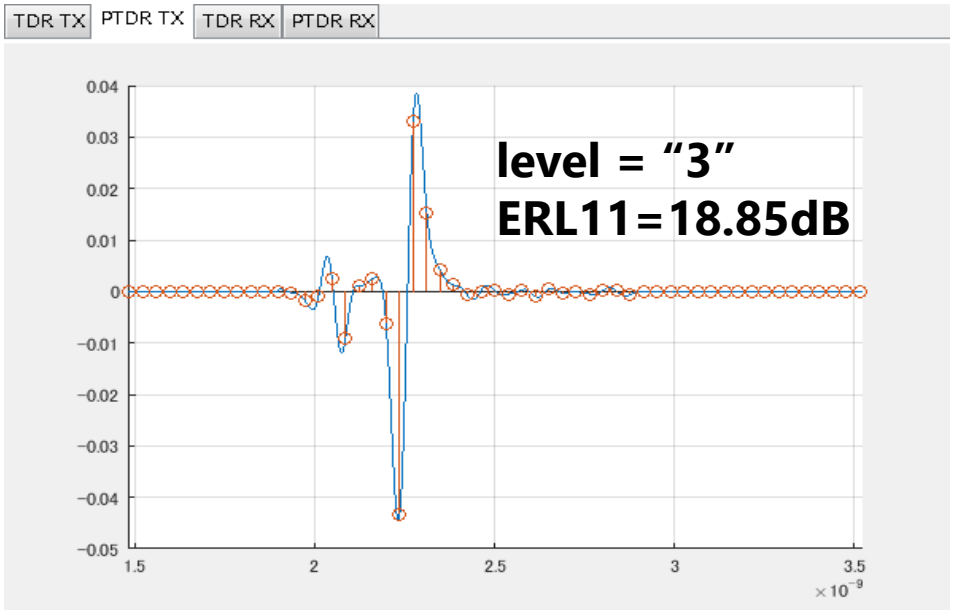


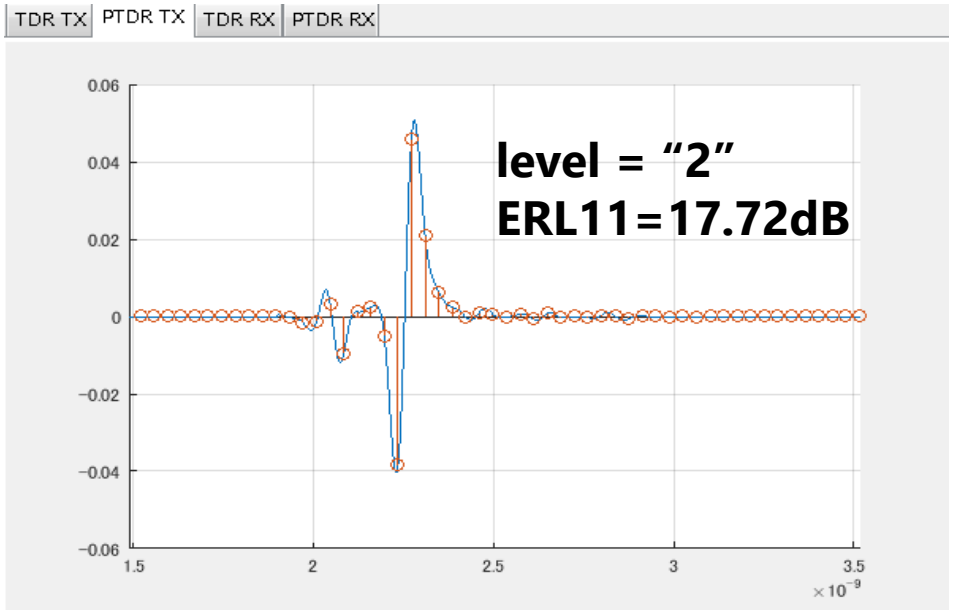


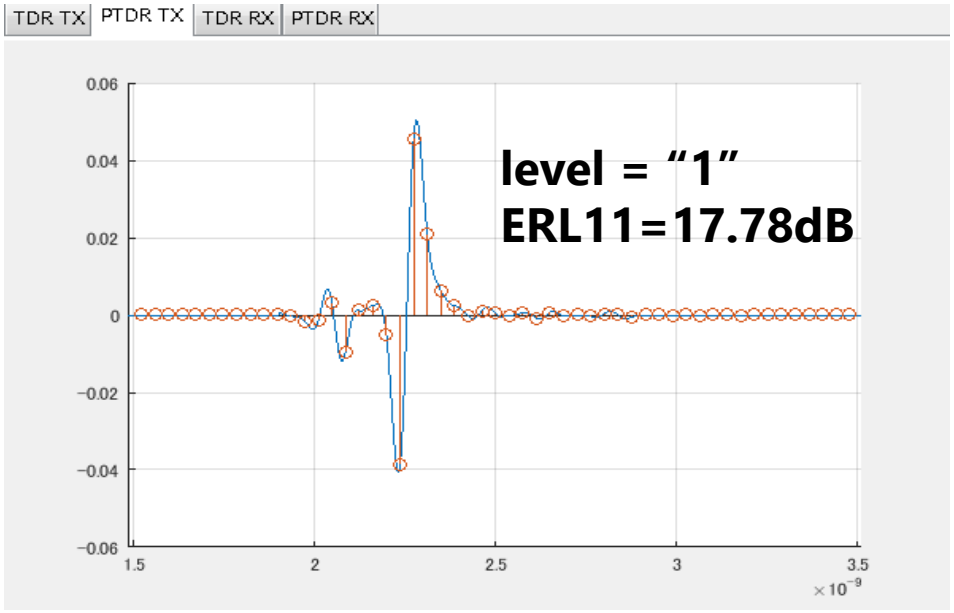


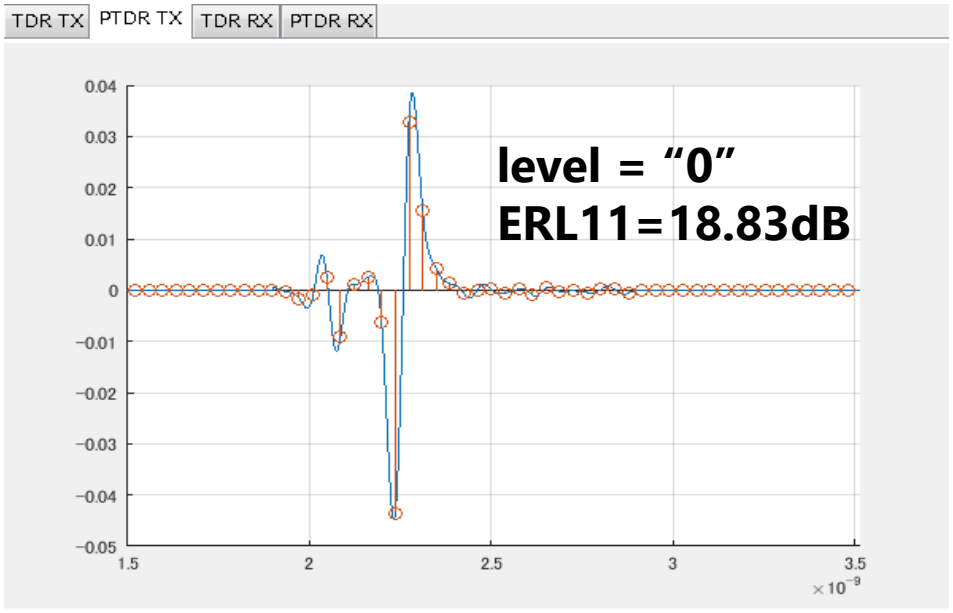


A-3 : Tx PTDR/ERL (COM 2.2.4)

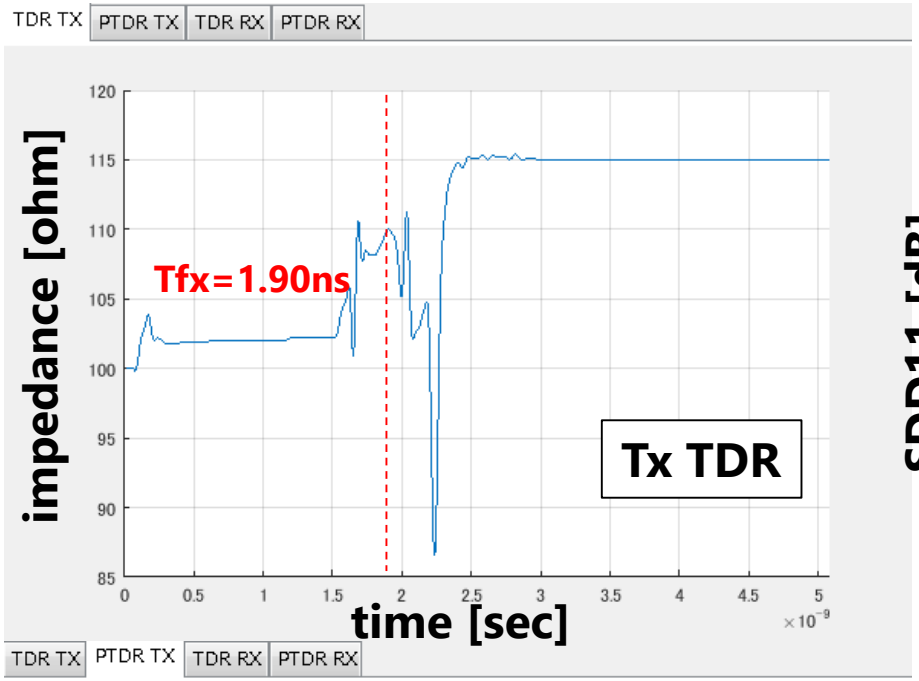


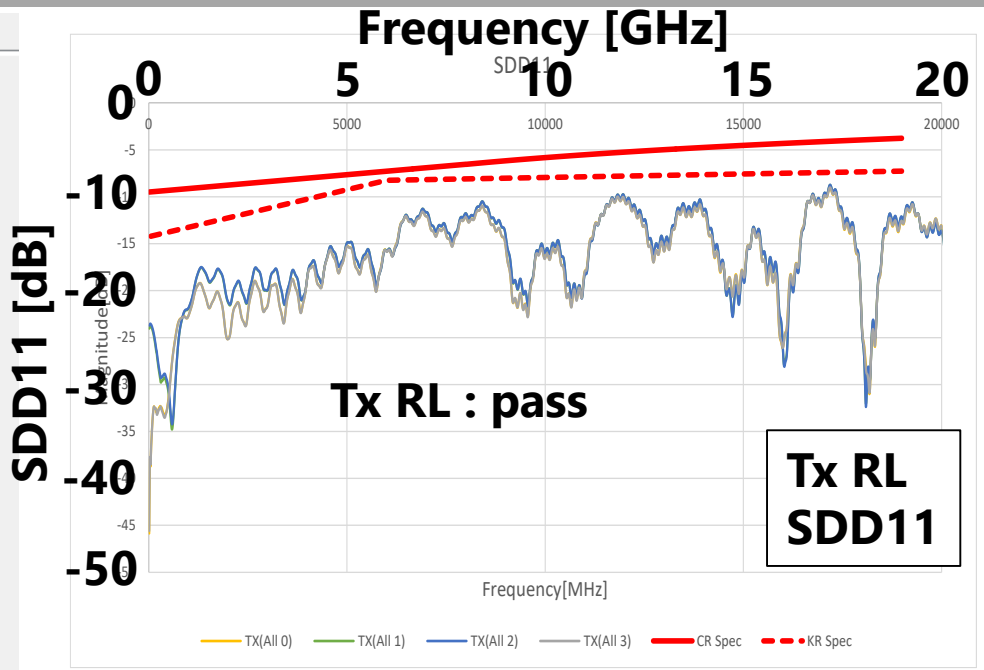






A-4. 50G-KR Device Tx ERL (COM2.2.4)





Device (Tx) ERL11=17.72dB (level = "2", worst)

D3.2 : 16.1dB

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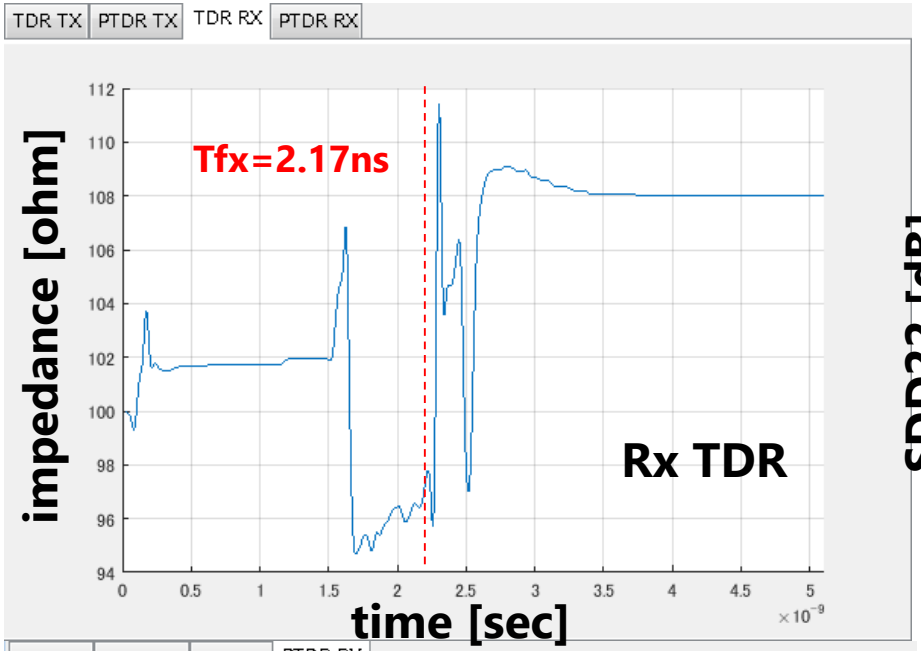
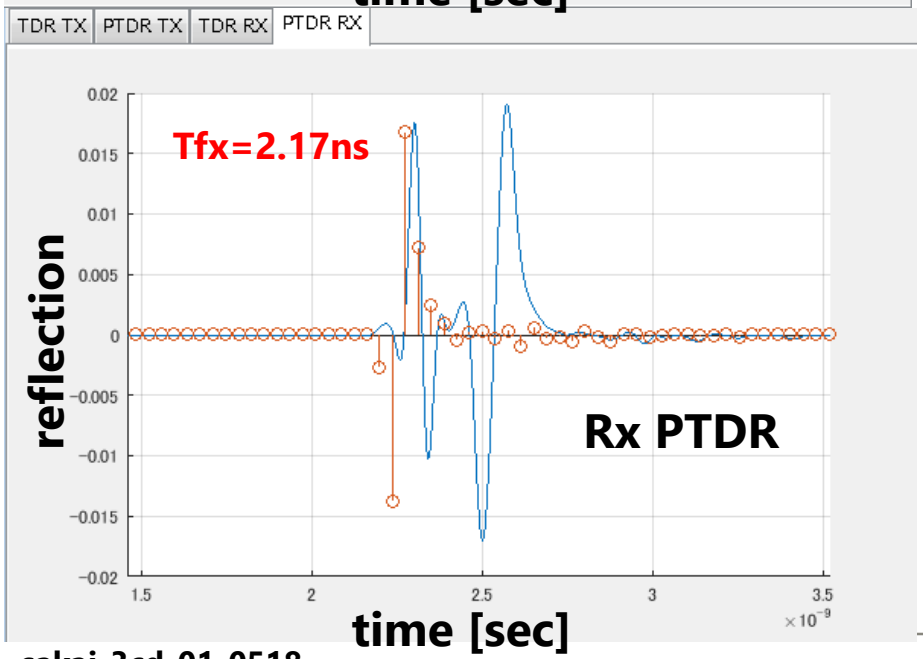
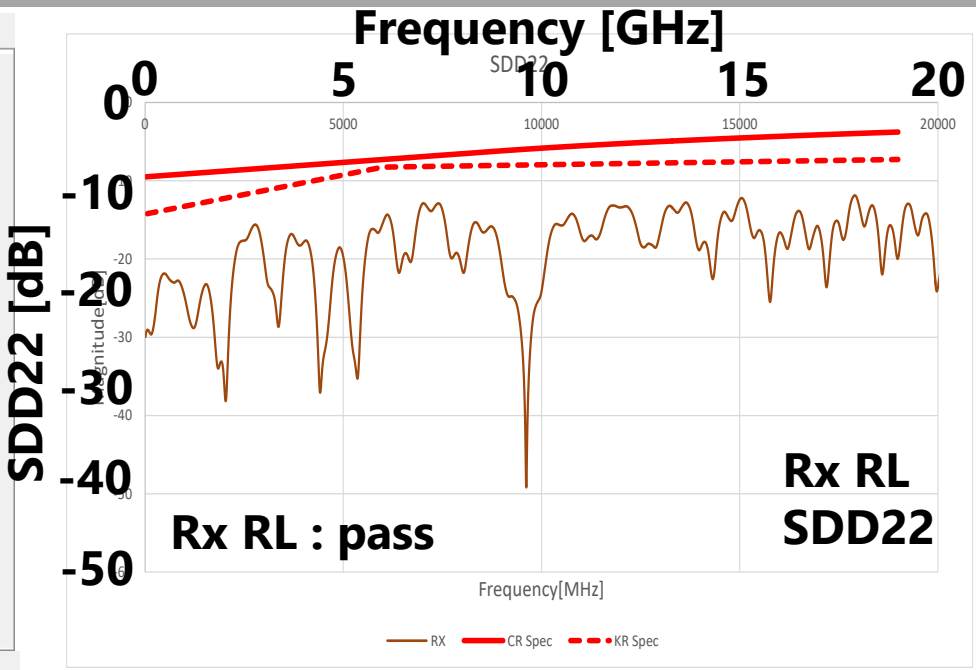
A-4. 50G-KR Device Rx ERL (COM2.2.4)







Device (Rx) ERL22=22.37dB

D3.2: 16.1dB

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