RWS-180017

3GPP RAN Workshop on 3GPP submission towards IMT-2020

Brussels, Belgium, 24-25 October 2018

Self-Evaluation: Calibration method and results

Source: Qualcomm
(Francesco Pica)

Self-Evaluation: Simulations Calibration

- Initial simulators calibration has been performed, for results' alignment
  - ~20 companies contributed: *CATR, CATT, CEWiT, China Telecom, China Mobile, Ericsson, Huawei, Intel, ITRI, LG Electronics, Mediatek, Motorola/Lenovo, NEC, Nokia, DOCOMO, OPPO, Qualcomm, Samsung, Sharp, vivo, ZTE*.

- The calibration was conducted for all Test Environments and evaluation configurations (for both channel model A and B)

- Two metrics were selected for initial calibration:
  - DL Geometry (SINR), Coupling gain

Calibration phase – Timelines & Outcomes

- Sept. 2017 (RAN#77)
  - Calibration phase started (over RAN ITU-R Ad-Hoc email reflector)
- Dec. 2017 (RAN#78)
  - RP-172728: Initial summary of email discussion
  - Calibration phase extended till Feb ’18

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- Mar. 2018 (RAN/SA#79)
  - RP-180524: Final summary of calibration results (also captured in TR 37.910)
  - A Letter (SP-180248) was sent out to *WP5D and all Independent Evaluation Groups (IEGs),* informing about the completion of the Calibration phase (summary&results enclosed), and advertising the future 3GPP WS (Oct’18)

Calibration Results - Overview

Test environment	Evaluation configuration	Calibration results (CM/TRxPs)
Indoor Hotspot - eMBB	Config. A (4 GHz)	Channel model A, 12&36 TRxP
		Channel model B, 12&36 TRxP
	Config. B (30 GHz)	Channel model A/B, 12&36 TRxP
	Config. C (70 GHz)	Channel model A/B, 12&36 TRxP
Dense Urban - eMBB	Config. A (4 GHz)	Channel model A
		Channel model B
	Config. B (30 GHz)	Channel model A/B
Rural - eMBB	Config. A (1732 m, 700 MHz)	Channel model A
		Channel model B
	Config. B (1732 m, 4 GHz)	Channel model A
		Channel model B
	Config. C (LMLC, 6000 m, 700 MHz)	Channel model A
		Channel model B
Urban Macro - mMTC	Config. A (500 m, 700 MHz)	Channel model A
		Channel model B
	Config. B (1732 m, 700 MHz)	Channel model A
		Channel model B
Urban Macro - URLLC	Config. A (4 GHz)	Channel model A
		Channel model B
	Config. B (700 MHz)	Channel model A
		Channel model B

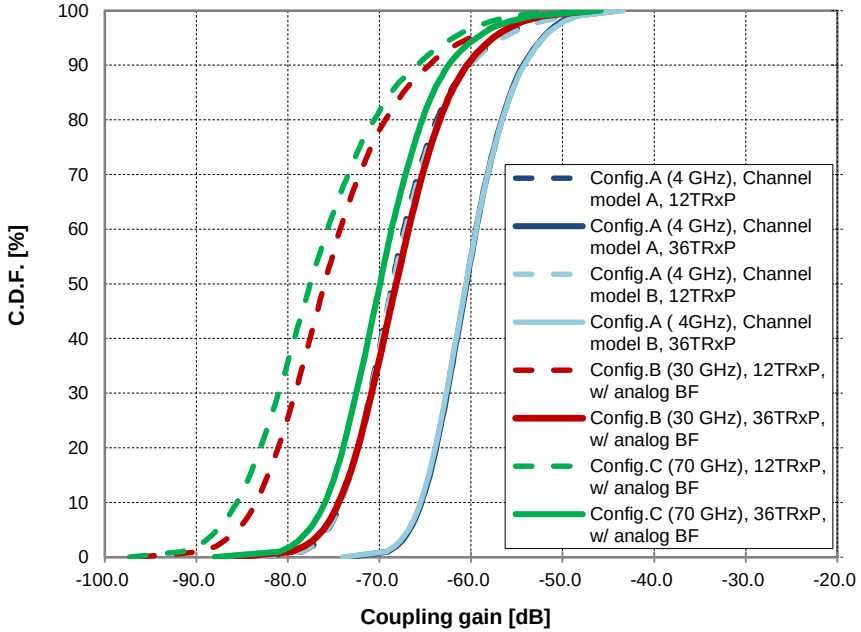
Ref: specific calibration parameters and assumptions for each TE/configuration, and detailed results, are captured in RP-180524 (sec. 4).

The results/plots shown in next slides are based on the average of the individual results (from different companies)…

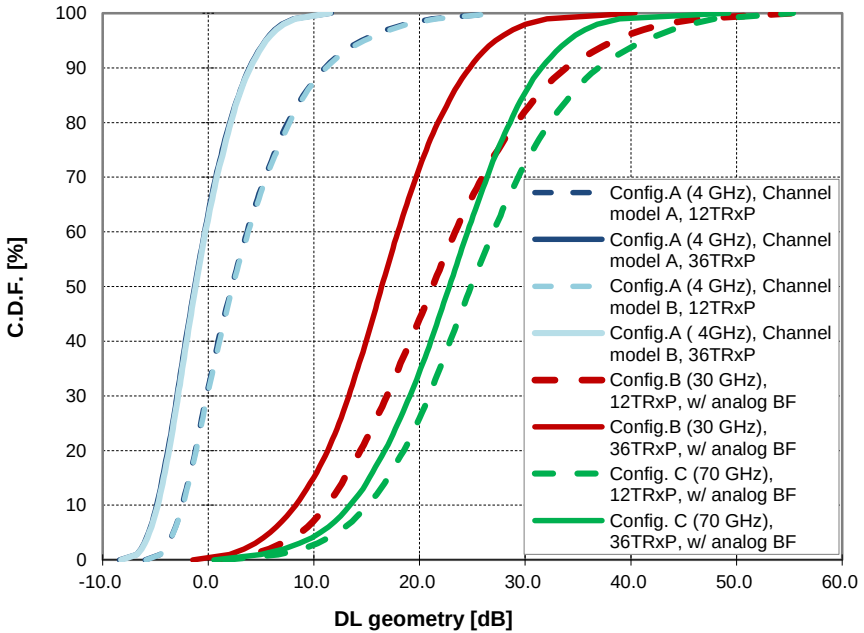
Calibration Results Summary

Indoor Hotspot - eMBB

Coupling Gain



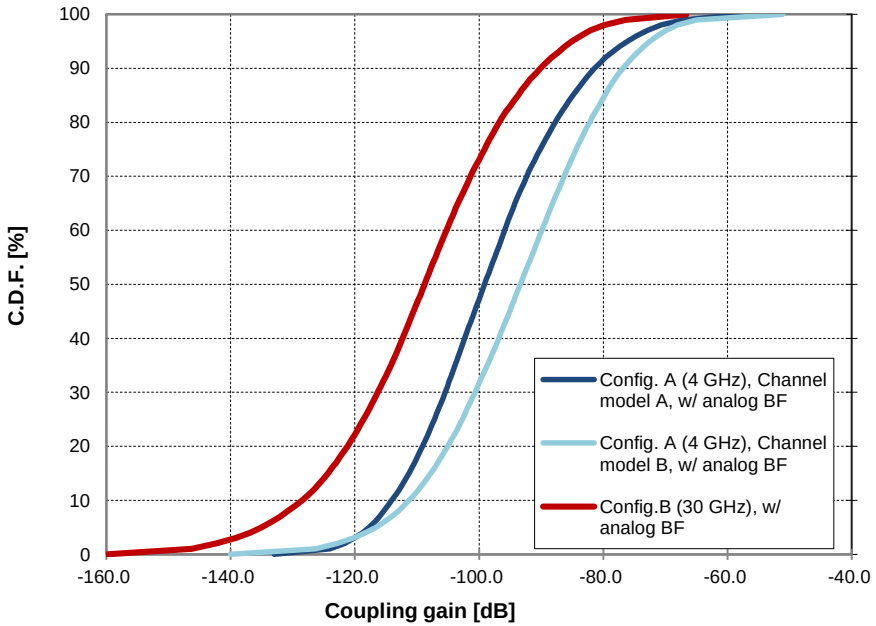
DL Geometry



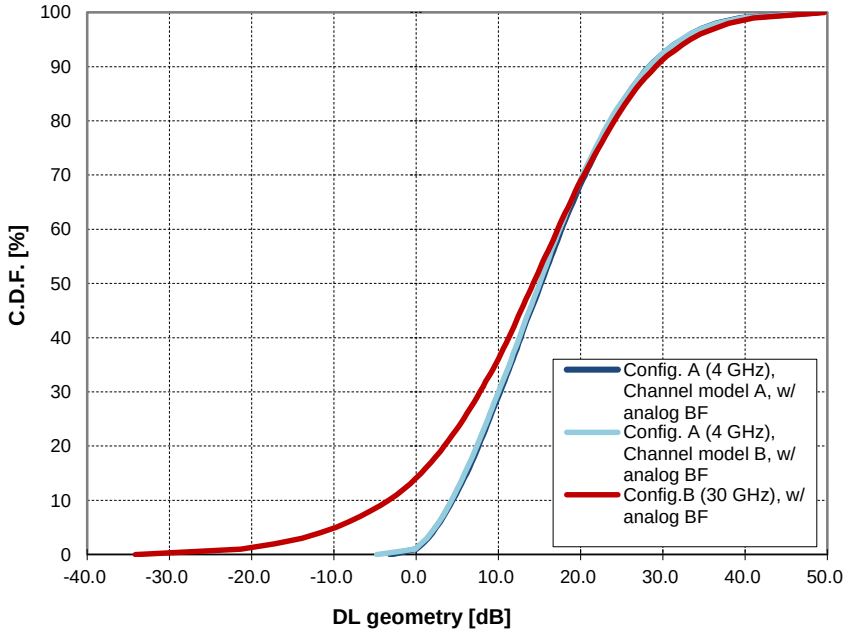
Calibration Results Summary

Dense Urban - eMBB

Coupling Gain



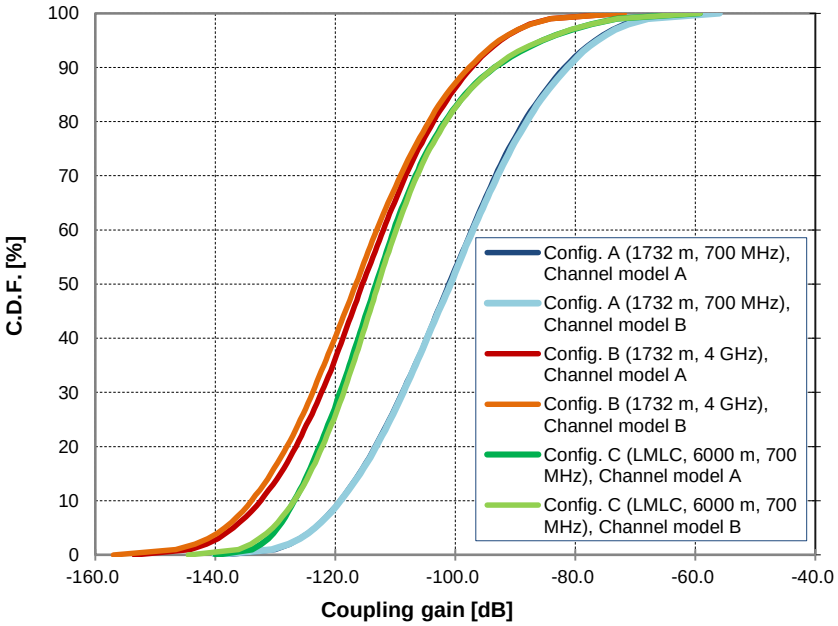
DL Geometry



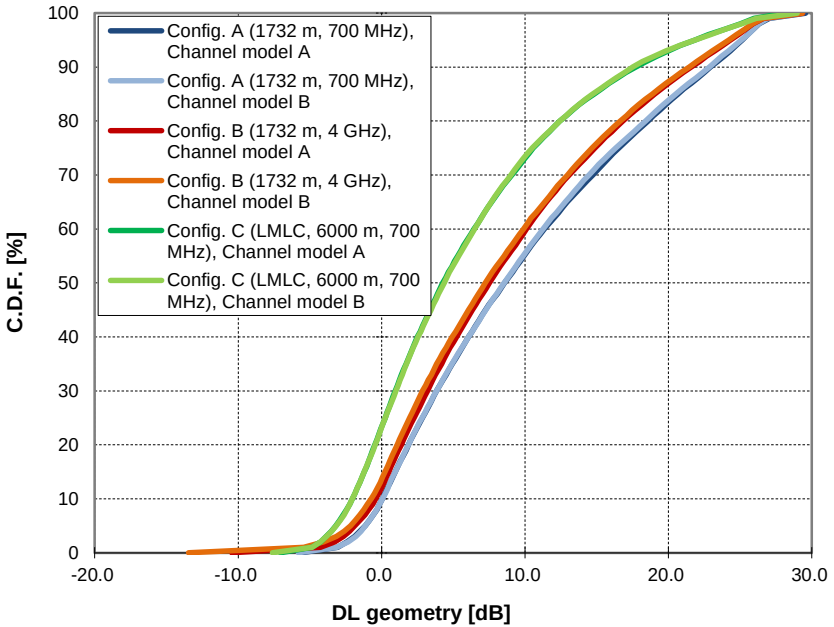
Calibration Results Summary

Rural - eMBB

Coupling Gain



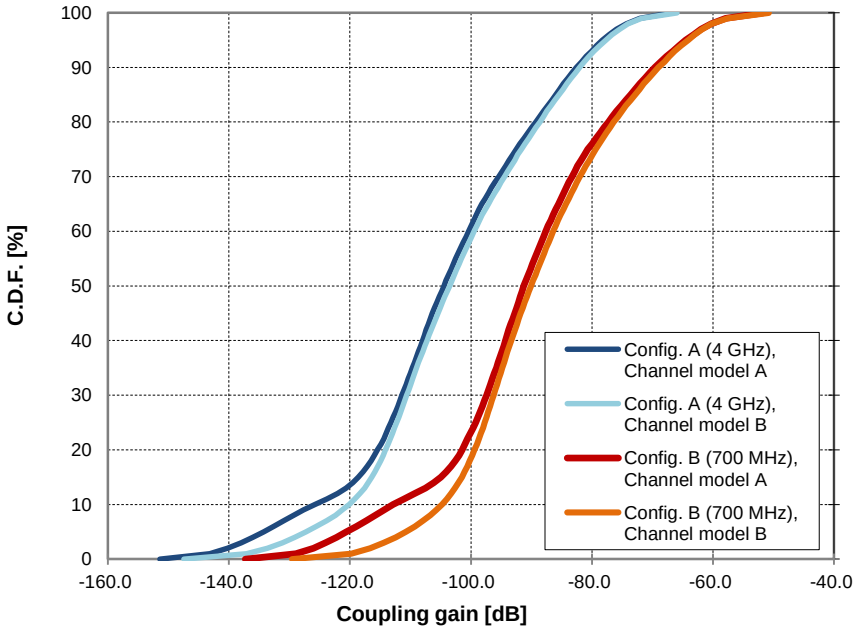
DL Geometry



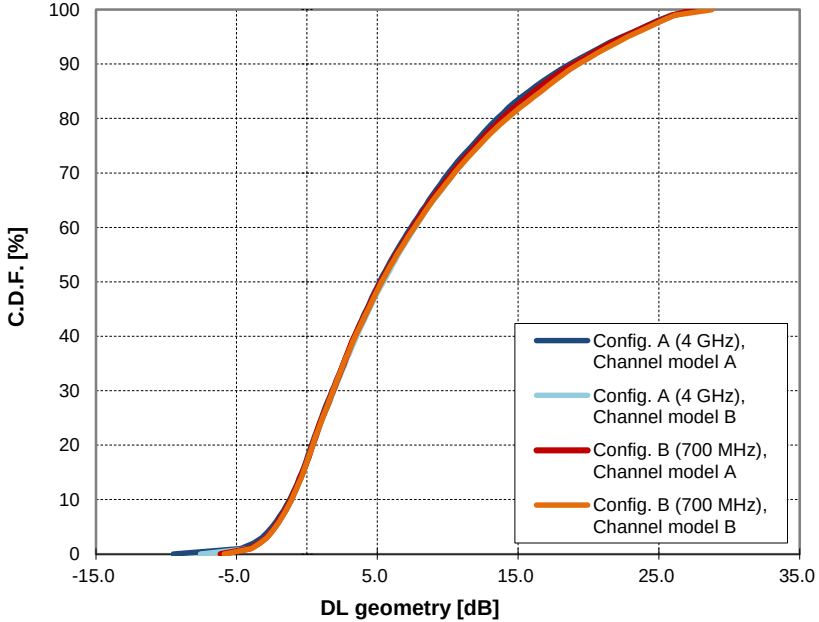
Calibration Results Summary

Urban Macro - URLLC

- Coupling Gain



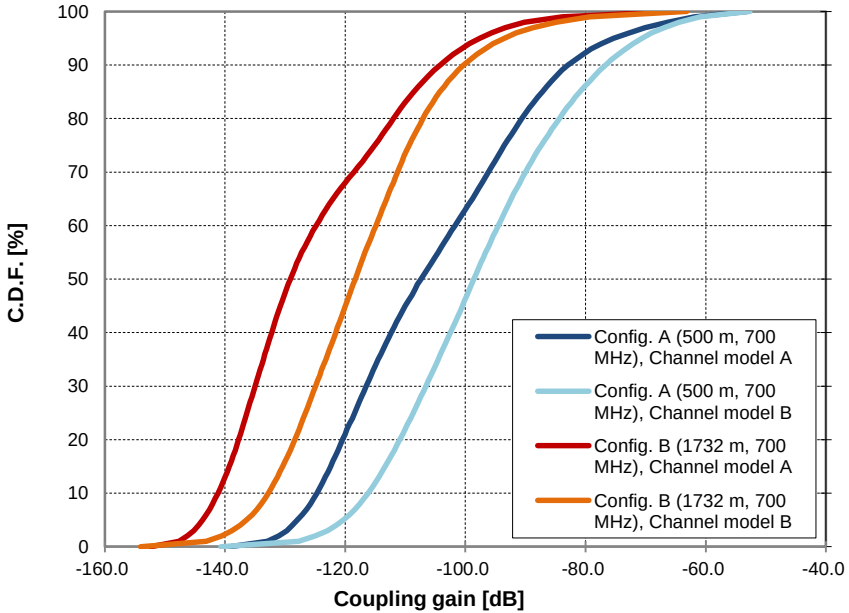
- DL Geometry



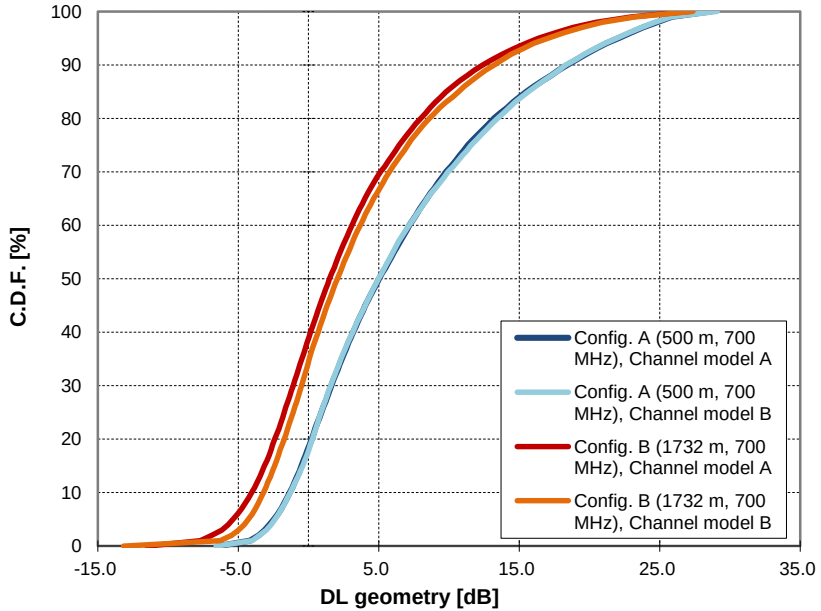
Calibration Results Summary

Urban Macro - mMTC

Coupling Gain



DL Geometry



Conclusions

- Calibration for IMT-2020 self-evaluation shows good results' alignment
  - E.g. DL geometry/SINR results are typically within 1-2 dB of the average SINR

Test environment	Evaluation configuration	Channel model / Topology		Number of samples	DL SINR diff. vs Avg SINR (50%-tile CDF)
Indoor Hotspot - eMBB	Config. A (4 GHz)	Channel model A	12TRxP	16	<0.8 dB
			36TRxP	15	<0.5 dB
		Channel model B	12TRxP	18	<0.9 dB
			36TRxP	16	<0.4 dB
	Config. B (30 GHz)	Channel model A/B	12TRxP	17	<2.2 dB
			36TRxP	14	<2.2 dB
	Config. C (70 GHz)	Channel model A/B	12TRxP	16	<1.6 dB
			36TRxP	12	<1.9 dB
Dense Urban - eMBB	Config. A (4 GHz)	Channel model A		16	<1.3 dB
		Channel model B		18	<1.3 dB
	Config. B (30 GHz)	Channel model A/B		18	<2.4 dB
Rural - eMBB	Config. A (1732 m, 700 MHz)	Channel model A		18	<0.8 dB
		Channel model B		20	<0.9 dB
	Config. B (1732 m, 4 GHz)	Channel model A		18	<0.9 dB
		Channel model B		20	<1.2 dB
	Config. C (LMLC, 6000 m, 700 MHz)	Channel model A		15	<0.9 dB
		Channel model B		16	<1.0 dB
Urban Macro - mMTC	Config. A (500 m, 700 MHz)	Channel model A		15	<0.9 dB
		Channel model B		16	<0.6 dB
	Config. B (1732 m, 700 MHz)	Channel model A		15	<1.2 dB
		Channel model B		16	<0.6 dB
Urban Macro - URLLC	Config. A (4 GHz)	Channel model A		15	<0.9 dB
		Channel model B		17	<1.0 dB
	Config. B (700 MHz)	Channel model A		15	<0.9 dB
		Channel model B		16	<1.3 dB

Thank you!