3GPP TSG-RAN WG2 Meeting #116 electronic ***R2-211xxxx***

Online, November 1-12, 2021

**Agenda item:** 8.24.1

**Source:** China Telecom

**Title:** Draft-Summary of [AT116-e][021][NR17] Power Class (Qualcomm, China Telecom)

**WID/SID:** HPUE\_PC1\_5\_n77\_n78-Core, NR\_SAR\_PC2\_interB\_SUL\_2BUL

**Document for:** Discussion and Decision

# Introduction

This document is the report of the following email discussion:

* [AT116-e][021][NR17] Power Class (Qualcomm, China Telecom)

Scope: Treat R2-2109355, R2-2109796, R2-2109797, R2-2109356, R2-2109799, R2-2110425, R2-2110426, Determine agreeable parts, including CRs, and reply LS if applicable.

Intended outcome: Report, Agreed or agreed in principle CRs, approved Reply LSes if applicable

Deadline: Wed W2, Offline approval.

Rapporteur suggests companies provide comments **before Tuesday W2 10:00 UTC (November 9**), so that the agreeable parts can be summarized before the deadline of this offline discussion.

**Contact from companies**

|  |  |
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# Discussion

## Signaling for power class 1.5

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| [R2-2109355](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2109355.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2109355.zip) LS on signaling for power class 1.5 (R4-2114929; contact: Qualcomm) RAN4 LS in Rel-17 HPUE\_PC1\_5\_n77\_n78 To:RAN2  [R2-2109796](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2109796.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2109796.zip) Duty cycle signalling for power class 1.5 Nokia, Nokia Shanghai Bell CR Rel-16 38.331 16.6.0 2817 - C HPUE\_PC1\_5\_n77\_n78-Core  [R2-2109797](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2109797.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2109797.zip) Duty cycle signalling for power class 1.5 Nokia, Nokia Shanghai Bell CR Rel-16 38.306 16.6.0 0646 - C HPUE\_PC1\_5\_n77\_n78-Core |

[R2-2109355](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2109355.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2109355.zip) is an LS from RAN4 on signalling for power class 1.5. In RAN4#100-e meeting, RAN4 agreed that there is a benefit to introduce a new maximum duty cycle capability to facilitate the FWA device to meet Maximum Permissible Exposure (MPE) requirements. RAN4 respectfully requests RAN2 to define a new UE capability signaling element allowing the PC 1.5 UE to report its maximum uplink duty cycle capability for compliance with MPE.

[R2-2109796](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2109796.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2109796.zip) is a CR to TS 38.331 based on LS [R2-2109355](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2109355.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2109355.zip) for allowing the PC 1.5 UE to report its maximum uplink duty cycle capability for compliance with MPE. The proposed changes in the CR includes: adding capability *maxUplinkDutyCycle-PC1dot5-MPE-FR1* to *BandNR*.

[R2-2109797](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2109797.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2109797.zip) is a CR to TS 38.306 based on LS [R2-2109355](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2109355.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2109355.zip) for allowing the PC 1.5 UE to report its maximum uplink duty cycle capability for compliance with MPE. The proposed changes in the CR includes: adding capability *maxUplinkDutyCycle-PC1dot5-MPE-FR1* to *BandNR*.

**Q1: Do companies agree with the proposed changes in [R2-2109796](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2109796.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2109796.zip)** **and [R2-2109797](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2109797.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2109797.zip)?**

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| **Company** | **Yes/No** | **Comments** |
| China Telecom | Yes |  |
| Qualcomm Incorporated | Yes | We thank Nokia for providing the CRs.  Unfortunately, RAN4 LS is not clear about the UE capability definition. But our understanding is in line with Nokia’s CRs. |
| Apple | Yes |  |
| MediaTek | Yes |  |
| Nokia | Yes |  |
| OPPO | Yes |  |
| Samsung | Yes |  |
| LG | Yes |  |
| Ericsson | Yes |  |
| ZTE | Yes |  |

**Summary 1**: TBD.

**Proposal 1**: TBD.

## UE capability for UE power class 2 NR inter-band CA and SUL configurations

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| [R2-2109356](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2109356.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2109356.zip) LS on UE capability for UE power class 2 NR inter-band CA and SUL configurations (R4-2114933; contact: China Telecom) RAN4 LS in Rel-17 NR\_SAR\_PC2\_interB\_SUL\_2BUL To:RAN2  [R2-2109799](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2109799.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2109799.zip) UE capability for UE power class 2 NR inter-band CA and SUL configurations Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_SAR\_PC2\_interB\_SUL\_2BUL-Core  [R2-2110425](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2110425.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2110425.zip) CR to TS 38.306 on UE capability for UE power class 2 NR inter-band CA and SUL configurations China Telecom, Huawei, HiSilicon CR Rel-17 38.306 16.6.0 0651 - B NR\_SAR\_PC2\_interB\_SUL\_2BUL  [R2-2110426](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2110426.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2110426.zip) CR to TS 38.331 on UE capability for UE power class 2 NR inter-band CA and SUL configurations China Telecom, Huawei, HiSilicon CR Rel-17 38.331 16.6.0 2829 - B NR\_SAR\_PC2\_interB\_SUL\_2BUL |

[R2-2109356](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2109356.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2109356.zip) is an LS from RAN4 on UE capability for UE power class 2 NR inter-band CA and SUL configurations. In RAN4#100-e meeting, RAN4 has discussed the SAR solutions for UE power class 2 NR inter-band CA and SUL configurations, and achieved the agreements on duty cycle based SAR solution. It is agreed to report one total dutycycle capability of *maxUplinkDutyCycle-interBandCA-PC2* independent of power class cases for power class 2 NR inter-band CA, and report one total dutycycle capability of *maxUplinkDutyCycle- SULcombination-PC2* for power class 2 NR SUL configurations. RAN4 kindly asks RAN2 to take the RAN4 agreements into consideration and design the capability signalling.

[R2-2109799](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2109799.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2109799.zip) is a discussion paper based on LS [R2-2109356](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2109356.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2109356.zip). The proposals in this discussion paper are listed below:

**Proposal 1:** Introduce the new duty cycle capabilities within *CA-ParametersNR* in Rel-17 RRC.

**Proposal 2**: Agree to the above capability descriptions for the new PC2 duty cycle capabilities and introduce them to Rel-17 specifications in March 2022.

[R2-2110425](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2110425.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2110425.zip) is a Rel-17 CR to TS 38.306 based on LS [R2-2109356](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2109356.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2109356.zip) on UE capability for UE power class 2 NR inter-band CA and SUL configurations. The proposed changes in the CR includes: adding UE capabilities of *maxUplinkDutyCycle-interBandCA-PC2* and *maxUplinkDutyCycle-SULcombination-PC2* to *CA-ParametersNR*.

[R2-2110426](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2110426.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2110426.zip) is a Rel-17 CR to TS 38.331 based on LS [R2-2109356](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2109356.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2109356.zip) on UE capability for UE power class 2 NR inter-band CA and SUL configurations. The proposed changes in the CR includes: adding UE capabilities of *maxUplinkDutyCycle-interBandCA-PC2* and *maxUplinkDutyCycle-SULcombination-PC2* to *CA-ParametersNR*.

Since the capability descriptions proposed in [R2-2109799](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2109799.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2109799.zip) are quite similar to the proposed changes in CRs [R2-2110425](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2110425.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2110425.zip) and [R2-2110426](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2110426.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2110426.zip). To make it clearer and easier, the rapporteur suggests companies take the CRs [R2-2110425](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2110425.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2110425.zip) and [R2-2110426](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2110426.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2110426.zip) as the baseline for further discussion.

**Q2: Do companies agree with the proposed changes in [R2-2110425](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2110425.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2110425.zip) and [R2-2110426](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2110426.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2110426.zip)?**

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| **Company** | **Yes/No** | **Comments** |
| China Telecom | Yes | RAN4 LS is quite clear. New duty cycle capabilities shall be introduced. We think the proposed changes in R2-2110425 and R2-2110426 are aligned with RAN4 LS and can be agreed in principle. |
| Qualcomm Incorporated | Yes |  |
| Apple | Yes |  |
| MediaTek | Yes |  |
| Nokia | Yes | Yes we could agree for some baseline but formally introduce these in Rel-17 specifications in March 2022. |
| OPPO | Yes |  |
| Samsung | Yes |  |
| LGE | Yes |  |
| Ericsson | Yes | A q-n: We noted the 30306 CR has a NOTE that does not exist for the other similar capabilities for UL duty cycles. Is there a reason for the NOTE in particular cases of this CR? Field description already catches what UE supports in case field is absent or?  NOTE: Specific targeted UL duty cycle percentage is not assumed if the field is absent. |
| ZTE | Yes |  |

**Summary 2**: TBD.

**Proposal 2**: TBD.

# Conclusion

# Reference

1. [R2-2109355](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2109355.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2109355.zip) LS on signaling for power class 1.5 (R4-2114929; contact: Qualcomm) RAN4 LS in Rel-17 HPUE\_PC1\_5\_n77\_n78 To:RAN2
2. [R2-2109796](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2109796.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2109796.zip) Duty cycle signalling for power class 1.5 Nokia, Nokia Shanghai Bell CR Rel-16 38.331 16.6.0 2817 - C HPUE\_PC1\_5\_n77\_n78-Core
3. [R2-2109797](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2109797.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2109797.zip) Duty cycle signalling for power class 1.5 Nokia, Nokia Shanghai Bell CR Rel-16 38.306 16.6.0 0646 - C HPUE\_PC1\_5\_n77\_n78-Core
4. [R2-2109356](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2109356.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2109356.zip) LS on UE capability for UE power class 2 NR inter-band CA and SUL configurations (R4-2114933; contact: China Telecom) RAN4 LS in Rel-17 NR\_SAR\_PC2\_interB\_SUL\_2BUL To:RAN2
5. [R2-2109799](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2109799.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2109799.zip) UE capability for UE power class 2 NR inter-band CA and SUL configurations Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_SAR\_PC2\_interB\_SUL\_2BUL-Core
6. [R2-2110425](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2110425.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2110425.zip) CR to TS 38.306 on UE capability for UE power class 2 NR inter-band CA and SUL configurations China Telecom, Huawei, HiSilicon CR Rel-17 38.306 16.6.0 0651 - B NR\_SAR\_PC2\_interB\_SUL\_2BUL
7. [R2-2110426](file:///D:\\Documents\\3GPP\\tsg_ran\\WG2\\TSGR2_116-e\\Docs\\R2-2110426.zip" \o "D:Documents3GPPtsg_ranWG2TSGR2_116-eDocsR2-2110426.zip) CR to TS 38.331 on UE capability for UE power class 2 NR inter-band CA and SUL configurations China Telecom, Huawei, HiSilicon CR Rel-17 38.331 16.6.0 2829 - B NR\_SAR\_PC2\_interB\_SUL\_2BUL