**3GPP TSG RAN WG1 #100bis R1-200xxxx**

**e-Meeting, April 20th – 30th, 2020**

**Source: Ad-Hoc Chair (AT&T)**

**Title: Chairman's Notes of AI 7.2.11.6**

**Agenda Item:** **7.2.11.6**

**Document for:** **Endorsement**



#### 7.2.11.6 UE features for eMIMO

[R1-2001868](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_100b\Docs\R1-2001868.zip) Summary on UE features for eMIMO Moderator (AT&T)

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| Features | Index | Feature group | Components | Prerequisite feature groups | Need for the gNB to know if the feature is supported | Applicable to the capability signalling exchange between UEs (V2X WI only)”. | **Consequence if the feature is not supported by the UE** | **Type**  **(the ‘type’ definition from UE features should be based on the granularity of 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)** | Need of FDD/TDD differentiation | Need of FR1/FR2 differentiation | Capability interpretation for mixture of FDD/TDD and/or FR1/FR2 | Note | Mandatory/Optional |
|  | 16-3a | Regular eType-II | Basic components:   1. ~~FFS:~~ {Max # of Tx ports in one resource, Max # of resources and total # of Tx ports} to support regular eType-II including PMI sub-band size (FFS: Support of PMI sub-bands with R=2 as new FG instead) 2. ALT 1-1) 8 parameter combinations [see Alt. 2 in R1-2001868] (FFS: Value of L per the number of antenna ports) ALT 1-2) Support of parameter combinations 1-6 3. ~~Number of PMI sub-bands (R=1 is mandatory, FFS: R=2 is mandatory or optional)~~ Support of PMI sub-bands with value R=1 4. Support ~~Rank restriction~~ of rank 1,2 5. FFS: UCI omission [based on CSI group definition] 6. FFS: CBSR with hard amplitude restriction   Optional components   1. ~~Number of PMI sub-bands (R=1 is mandatory, FFS: R=2 is mandatory or optional)~~ Support of PMI sub-bands with R=2 2. ~~Rank 1 to 4~~ Support of rank 3,4 3. ALT 1) CBSR with soft amplitude restriction (capture consequence if not supported 🡪 hard amplitude restriction is supported) 4. ALT 2) CBSR 5. ALT 3) soft amplitude restriction 6. ~~FFS:~~ The maximum number of configured aperiodic CSI Report Settings for all codebook types (ALT 1 new 16-x ALT 2 handle by type or BC: more ports in FR1 than FR2) 7. FFS: new Support of mixed codebook types (new FG) 8. optional parameter combinations (see Alt. 1-1/1-2) | TBD |  | N/A |  | FFS: Per band or Per band per BC | N | N |  |  | Optional |
| 16-3b | Port selection eType-II | Basic components:   1. FFS: {Max # of Tx ports in one resource, Max # of resources and total # of Tx ports} to support regular eType-II 2. 6 parameter combinations (combos with L=6 don’t apply) (FFS: Value of L per the number of antenna ports) 3. ~~Number of PMI sub-bands (R=1 is mandatory, FFS: R=2 is mandatory or optional)~~ Support of PMI sub-bands with value R=1 4. Rank restriction 5. ~~FFS:~~ UCI omission   Optional components:   1. ~~Number of PMI sub-bands (R=1 is mandatory, FFS: R=2 is mandatory or optional)~~ Support of PMI sub-bands with R=2 2. ~~Rank 1 to 4~~ Support of rank 3,4 3. FFS: The maximum number of configured aperiodic CSI Report Settings 4. FFS: Support of mixed codebook types | TBD |  | N/A |  | FFS: Per band or Per band per BC | N | N |  |  | Optional |
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| 16-2a | Multi-DCI based multi-TRP | Basic components:   1. The maximum number of CORESETs configured per “PDCCH-Config” 2. The maximum number of CORESETs configured per CORESETPoolIndex ( if CORESETPoolIndex is not configured, it is assumed CORESETPoolIndex = 0) per “PDCCH-Config” 3. The value of R=[1,2] for BD/CCE 4. Support of fully/partially time/frequency overlapped PDSCH reception (PDSCHs overlapping types in time and frequency domain) (requires 5/6/7 to schedule) 5. Support of out-of-order operation for PDCCH to PDSCH (FFS whether to be a basic component) 6. Support of out-of-order operation for PDSCH to HARQ-ACK (FFS whether to be a basic component) 7. Support of out-of-order operation for PDCCH to PUSCH (FFS whether to be a basic component) 8. FFS: The maximum number of activated TCI states 9. FFS: The maximum number of MIMO layers of scheduled PDSCHs 10. FFS: the maximum number of CCs supporting multi-DCI based multi-TRP   Optional components:   1. Whether the UE shall rate match around configured CRS patterns which is associated with CORESETPoolIndex (if configured) and are applied to the PDSCH scheduled with a DCI detected on a CORESET with the same value of CORESETPoolIndex 2. FFS: Support of two PDSCH scrambling sequences per serving cell 3. Support of default QCL assumption per CORESETPoolIndex 4. Support of separate HARQ-ACK 5. Support of joint HARQ-ACK 6. Support of two TDMed long PUCCHs in a slot | TBD |  | N/A |  | TBD [per band / per FSPC] | N | TBD |  |  | TBD |

[R1-2001604](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_100b\Docs\R1-2001604.zip) NR eMIMO UE features ZTE

[R1-2001722](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_100b\Docs\R1-2001722.zip) Discussion on Rel-16 eMIMO UE features vivo

[R1-2001738](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_100b\Docs\R1-2001738.zip) Discussion on Rel-16 eMIMO UE features OPPO

[R1-2001794](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_100b\Docs\R1-2001794.zip) UE features for MIMO China Unicom

[R1-2001829](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_100b\Docs\R1-2001829.zip) Views on Rel-16 UE features for NR eMIMO MediaTek Inc.

[R1-2002020](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_100b\Docs\R1-2002020.zip) UE features for NR eMIMO Intel Corporation

[R1-2002071](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_100b\Docs\R1-2002071.zip) Discussion of UE features for NR MIMO CATT

[R1-2002155](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_100b\Docs\R1-2002155.zip) UE features for eMIMO Samsung

[R1-2002161](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_100b\Docs\R1-2002161.zip) Discussion on RAN1 UE feature for NR eMIMO LG Electronics

[R1-2002274](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_100b\Docs\R1-2002274.zip) Discussions on UE features for eMIMO Spreadtrum Communications

[R1-2002353](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_100b\Docs\R1-2002353.zip) Views on Rel-16 eMIMO UE feature list Apple

[R1-2002476](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_100b\Docs\R1-2002476.zip) On UE features for eMIMO Nokia, Nokia Shanghai Bell

[R1-2002494](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_100b\Docs\R1-2002494.zip) eMIMO UE features Ericsson

[R1-2002499](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_100b\Docs\R1-2002499.zip) Discussion on UE features for eMIMO CMCC

[R1-2002567](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_100b\Docs\R1-2002567.zip) Discussion on eMIMO UE features Qualcomm Incorporated

[R1-2002592](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_100b\Docs\R1-2002592.zip) Rel-16 UE features for MIMO Huawei, HiSilicon

[R1-2002628](file:///C:\Users\wanshic\OneDrive%20-%20Qualcomm\Documents\Standards\3GPP%20Standards\Meeting%20Documents\TSGR1_100b\Docs\R1-2002628.zip) Discussion on UE capability issues Fraunhofer IIS, Fraunhofer HHI