# The changes in IMT‑2020/12

| | Document | Changes |
|---|---|---|
| 1. | 5.2.3.2.2.1 and the following sections In Characteristics template | *IMT bands* <br> *->* <br> *sub-6GHz bands* |
| 2. | 5.2.3.2.2.1 and the following sections template in Characteristics | *higher frequency bands* <br> *->* <br> *mmWave bands* |
| 3. | 5.2.3.2.2.1 in Characteristics template | *The minimum frequency resource packet of the OFDMA is 16 sub-carriers (Resource Unit, RU). The sub-carrier spacing of EUHT IMT bands is 78.125KHz. If bandwidth is 10MHz/5MHz, the sub-carrier spacing will be 39.0625KHz/19.53KHz.* <br> *->* <br> *The minimum allocable frequency resource of the OFDMA is 16 sub-carriers (Resource Unit, RU). The sub-carrier spacing of EUHT in Sub-6GHz bands is 78.125KHz/ 39.0625KHz/19.53KHz.* |
| 4. | 5.2.3.2.2.1 in Characteristics template | *The sub-carrier spacing of EUHT IMT bands is 78.125KHz. If bandwidth is 10MHz/5MHz, the sub-carrier spacing will be 39.0625KHz/19.53KHz. The sub-carrier spacing of EUHT higher frequency bands is 390.625KHz.* <br> *->* <br> *The sub-carrier spacing of EUHT in Sub-6GHz bands is 78.125KHz/ 39.0625KHz/19.53KHz. The sub-carrier spacing of EUHT in mmWave bands is 390.625KHz* |
| 5. | 5.2.3.2.2.2.1 in Characteristics template | *Symbol rate: 69.4K symbols/s (The OFDM symbol rate is 14.4us when the 1/8-ratio CP is applied)* <br> *->* <br> *Symbol rate: 69.4K symbols/s (When the OFDM symbol duration is 14.4us and the 1/8-ratio CP is applied)* |
| 6. | 5.2.3.2.2.2.1 in Characteristics template | *Symbol rate: 347.2K symbols/s (OFDM sampling rate: 400MHz, FFT: 1024 points, CP ratio 1/8* <br> *->* <br> *Symbol rate: 347.2K symbols/s (When the OFDM symbol duration is 2.88us and the 1/8-ratio CP is applied)* |
| 7. | 5.2.3.2.2.3.1 in Characteristics template | *Convolutional coding with 1/2 code rate is used.* <br> *->* <br> *Convolutional coding with 1/2 in URLLC mode; LDPC with 4/7 code rate is used in other modes.* |
| 8. | 5.2.3.2.3 and the following sectors in Characteristics | *System information channel (SICH) (in mmWave bands)* <br> *- >* |

| | template | *Directional System information channel (D-SICH)* |
|---|---|---|
| 9. | 5.2.3.2.3 and the following sections in Characteristics template | *UL preamble can be used for synchronization*<br>*->*<br>*DL preamble can be used for synchronization* |
| 10. | 5.2.3.2.4.1 in Characteristics template | *valid data subcarriers*<br>*->*<br>*data subcarriers* |
| 11. | 5.2.3.2.4.1 in Characteristics template | *the number of the bits used by each subcarrier modulation symbol (BPSK&SQPSK: 1, QPSK: 2, 16QAM: 4, 64QAM: 6, 256QAM: 8, 1024QAM: 10)*<br><br>*->*<br><br>*the number of the bits used by each subcarrier modulation symbol (BPSK: 1, QPSK: 2, 16QAM: 4, 64QAM: 6, 256QAM: 8, 1024QAM: 10)* |
| 12. | 5.2.3.2.4.2 in Characteristics template | *The number of the transmission symbols of the L1/L2 System Information and Control signalling (SICH/CCH) is up to 2 OFDM symbols for URLLC, and it is up to 7 OFDM symbols for other scenarios.*<br>*->*<br>*L1/L2 System Information and Control signalling (SICH/CCH)", detailed information is in the following table* |
| 13. | 5.2.3.2.4.2 in Characteristics template | *Example configurations (2ms frame length)*<br><br>*->*<br><br>*Example configurations (2ms frame length, 20MHz bandwidth, 78.125KHz subcarrier spacing, short CP)* |
| 14. | 5.2.3.2.4.2 in Characteristics template | *Reference configuration (20ms frame length, 1ms for each user)*<br><br>*->*<br><br>*Example configurations (20ms frame length, 100MHz bandwidth, short CP)* |
| 15. | 5.2.3.2.4.2 in Characteristics template | *Synchronous signals and demodulation reference signals in SICH and more SICHs with different antenna beam pattern used in beam training.*<br>*->*<br>*Synchronous signals and demodulation reference signals in D-SICH with different antenna beam pattern used in beam training.* |
| 16. | 5.2.3.2.4.2 in Characteristics | *UL-preamble   1 OFDM x Nss   ofdm/1ms*(19/20)*Nss =0.27%*Nss* |

| | | |
|---|---|---|
| | template | -> |
| | | DL-preamble 1 OFDM ofdm/1ms*(19/20)=0.27% |
| 17. | 5.2.3.2.4.2 in Characteristics template | Headers and FCS in the table is removed |
| 18. | 5.2.3.2.4.5 in Characteristics template | (LDPC codes for user data)<br><br>-><br><br>(LDPC codes can be userd for user data) |
| 19. | 5.2.3.2.7.1 in Characteristics template | The ratio of the cyclic prefix is 1/8 or 1/4 of DFT length, so the time length of CP is correspondingly 0.8us or 1.6us.<br><br>-><br><br>The ratio of the cyclic prefix is 1/8 or 1/4 of DFT length, so the time length of CP is correspondingly 1.6us or 3.2us for 78.125KHz sub-carrier spacing. |
| 20. | 5.2.3.2.7.1 in Characteristics template | The TCH sub-frame contains the downlink transmission period (DL-preamble, DRS, CCH, DL-TCH, DL-TRN), the uplink transmission period (UL-preamble, UL-TCH, UL-TRN)<br><br>-><br><br>The TCH sub-frame contains the downlink transmission period (DL-preamble, DL-DRS, CCH, DL-TCH, DL-TRN), the uplink transmission period (UL-DRS, UL-TCH, UL-TRN) |
| 21. | 5.2.3.2.7.1 in Characteristics template | Maximum power control rate is 1 kHz for 1ms frame<br><br>-><br><br>Maximum power control rate is 1 kHz for 1ms TCH sub-frame |
| 22. | 5.2.3.2.8.2 in Characteristics template | One component carrier can support a scalable bandwidth of 5, 10, 20, 40, 80 or 100MHz<br><br>-><br><br>One component carrier can support a scalable bandwidth of 5, 10, 15, 20, 25, 30, 40, 50, 60, 80 or 100MHz |
| 23. | 5.2.3.2.8.2 in Characteristics template | One component carrier can support 50, 100, 200 or 400MHz bandwidth for frequency range 24250 – 52600MHz<br>-> |

| | | One component carrier can support 50, 100, 200 or 400MHz bandwidth for frequency range above 24250MHz |
|---|---|---|
| 24. | 5.2.3.2.8.3 in Characteristics template | Operating band numbering is removed |
| 25. | 5.2.3.2.8.5 in Characteristics template | BW = 400MHz: The 3dB bandwidth is 375MHz. <br><br> -> <br><br> BW = 400MHz: The 3dB bandwidth is 392MHz. |
| 26. | 5.2.3.2.10.1 in Characteristics template | It currently supports at most 61 types of MCS. The number of the multi-antenna MIMO transmission layers is 1-4, and the code rate range is 0.0293-0.875. <br><br> -> <br><br> There are about 100 combinations of different modulation modes/code rates.  The number of the multi-antenna MIMO transmission layers is 1-4, and the code rate range is 0.03~0.875. |
| 27. | 5.2.3.2.11.1.1 in Characteristics template | Operating band N1 is removed |
| 28. | 5.2.3.2.11.1.3 in Characteristics template | Measurement bandwidth (MHz)： 380.16 <br><br> -> <br><br> Measurement bandwidth (MHz)： 390 |
| 29. | 5.2.3.2.13.1 in Characteristics template | Downlink  Transmission  Channel <br><br> -> <br><br> Downlink  Traffic Channel |
| 30. | 5.2.3.2.13.1 in Characteristics template | Uplink  Transmission  Channel <br><br> -> <br><br> Uplink  Traffic Channel |
| 31. | 5.2.3.2.23.2 in Characteristics template | The access of the narrow-band (low power consumption) STAs to a broadband system is supported. The narrow-band is as narrow as 500KHz. <br><br> - > <br> The OFDMA (low power consumption) STAs to a broadband system is supported. The resource unit in OFDMA is as narrow as 312.5KHz. |

| 32. | 5.2.3.2.26.4 in Characteristics template | *This EUHT RIT is new radio developed by NUFRONT, and will be evolved to be a mmWave bands version.* <br> *->* <br> *This EUHT RIT is new radio developed by NUFRONT, and will be evolved to be a more adavanced mmWave bands version.* |
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| 33. | 5.2.3.2.26.5 in Characteristics template | *For STA and CAP of Frequency Band 1 and Frequency Band 2:* <br> *->* <br> *For STA and CAP in Sub-6GHz bands and mmWave bands:* |
| 34. | 5.2.3.2.26.8 in Characteristics template | *The STA will not be awaked when it receives a MAC frame.* <br> *->* <br> *The STA will not be awaked when it receives MAC frame from application layer* |
| 35. | 5.2.3.2.8.2 in Characteristics template | *One component carrier can support 50, 100, 200 or 400MHz bandwidth for frequency range 24250 – 52600MHz* <br> *->* <br> *One component carrier can support 50, 100, 200 or 400MHz bandwidth for frequency range 24250 – 40000MHz* |
| 36. | 5.2.4.2.1 in compliance template | *See the table for IMT bands.* <br> *->* <br> *See the table for sub-6GHz bands.* |
| 37. | 5.2.4.2.2 in compliance template | *See the table for higher frequency bands.* <br> *->* <br> *See the table for mmWave bands.* |
| 38. | 5.1.1 in Self-evaluation report | *DL peak spectral efficiency for both Sub-6GHz bands for 450 MHz ~ 6000 MHz and millimetre Wave (mmWave) bands for 24.25 GHz ~ 52.6 GHz are evaluated.* <br> *->* <br> *DL peak spectral efficiency for both Sub-6GHz bands (450 MHz ~ 6000 MHz) and millimeter Wave (mmWave, above 24.25 GHz) are evaluated.* |
| 39. | 5.4~5.6, B.2 in Self-evaluation report | *Scheme and antenna configuration: MU-MIMO, SU-MIMO* <br> *->* <br> *Scheme and antenna configuration: Adaptive SU/MU-MIMO* |
| 40. | 5.9.2 in Self-evaluation report | *Table 5.9.1-1 EUHT mobility in Dense Urban – eMBB* <br> *->* |

| | | Table 5.9.2-1 EUHT mobility in Dense Urban – eMBB |
|---|---|---|
| 41. | 7.1 Table 7.1-1 in Self-evaluation report | *Bandwidth*<br>*->*<br>*Resource Unit Bandwidth* |
| 42. | 8.1 in Self-evaluation report | *different bandwidths are supported for a component carrier at given SCS as listed in Table 8.1-2.*<br>*->*<br>*different bandwidths and number of data subcarriers ($N_{SD}$) are supported for a component carrier at given SCS as listed in Table 8.1-2.* |
| 43. | 8.1 in Self-evaluation report | *Table 8.1-3, 78.125 10*<br>*->*<br>*Table 8.1-3, 78.125 5* |
| 44. | B.1.1 in Self-evaluation report | *Table B.1.1.1-1 and Table B.1.1.2-1*<br>*Highest modulation order: for IMT bands: 10*<br>*For higher frequency bands: 8*<br>*->*<br>*Highest modulation order: 10,8* |