**3GPP TSG-RAN4 Meeting #109 *R4-2322011***

**Chicago, United States, 13th Nov 2023 - 17th Nov 2023**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.101-1** | **CR** | **1909** | **rev** | **3** | **Current version:** | **18.3.0** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network |  |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | Running CR to TS 38.101-1 - Introduction of Aerial UEs support | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson, Nokia, Huawei, Murata, Qualcomm | | | | | | | | | |
| ***Source to TSG:*** | R4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_UAV-Core | | | | |  | ***Date:*** | | | 2023-11-22 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-18 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | This draft running CR is based on the past RAN4 agreements, which are proposing to introduce a new UE variant and new NSs to manage Aerial UEs additional OOBE requirements. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Add the definition of Aerial UE, new aerial UE variant “K” and specify new NSs for aerial UE. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The aerial UEs can’t be supported in bands n3, n7 and n38 in CEPT countries. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 2, 3.1, 3.3, 4.3, 5.5K (new), 6.2K (new), 6.5K (new) | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | | **X** |  | Test specifications | | | | TS 38.521-1 | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | | This CR is the re-submission of the agreed CR R4-2321991 only updating the clause number for the operating band sub-clause (5.5K -> 5.2K) | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

*<Start of the change>*

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

For a specific reference, subsequent revisions do not apply.

For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document in the same Release as the present document.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 38.101-2: "NR; User Equipment (UE) radio transmission and reception; Part 2: Range 2 Standalone".

[3] 3GPP TS 38.101-3: "NR; User Equipment (UE) radio transmission and reception; Part 3: Range 1 and Range 2 Interworking operation with other radios".

[4] 3GPP TS 38.521-1: "NR; User Equipment (UE) conformance specification; Radio transmission and reception; Part 1: Range 1 Standalone".

[5] Recommendation ITU-R M.1545: "Measurement uncertainty as it applies to test limits for the terrestrial component of International Mobile Telecommunications-2000".

[6] 3GPP TS 38.211: "NR; Physical channels and modulation".

[7] 3GPP TS 38.331: "Radio Resource Control (RRC) protocol specification".

[8] 3GPP TS 38.213: "NR; Physical layer procedures for control".

[9] ITU-R Recommendation SM.329-10, "Unwanted emissions in the spurious domain".

[10] 3GPP TS 38.214: "NR; Physical layer procedures for data".

[11] 3GPP TS 36.101: Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception;

[12] ETSI TS 102 792: "Intelligent Transport Systems (ITS); Mitigation techniques to avoid interference between European CEN Dedicated Short Range Communication (CEN DSRC) equipment and Intelligent Transport Systems (ITS) operating in the 5 GHz frequency range".

[13] 3GPP TS 38.133: "NR; Requirements for support of radio resource management".

[14] 3GPP TS 37.213: “Physical layer procedures for shared spectrum channel access”.

[15] 3GPP TS 38.306: “NR; User Equipment (UE) radio access capabilities”.

[16] 3GPP TS 23.256: “Support of Uncrewed Aerial Systems (UAS) connectivity, identification and tracking; Stage 2”.

[17] ECC Decision(22)07, “Harmonised technical conditions for the usage of aerial UE for communications based on LTE and 5G NR in the bands 703-733 MHz, 832-862 MHz, 880-915 MHz, 1710-1785 MHz, 1920-1980 MHz, 2500-2570 MHz and 2570-2620 MHz harmonised for MFCN”, 18 November 22.*<End of the change>*

*<Start of the change>*

## 3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

**Aerial UE:** A UE supporting UAS (Uncrewed Aircraft Systems) as indicated by the capability *[NR-UAV-support]* [15]and that has an aerial subscription as described in TS 23.256 [16]. The UE is considered to have access to UAS services after the UE ha performed a successful authentication and authorization with the USS as described in TS 23.256 [16].

**Aggregated Channel Bandwidth**: The RF bandwidth in which a UE transmits and receives multiple contiguously aggregated carriers.

**Carrier aggregation**: Aggregation of two or more component carriers in order to support wider transmission bandwidths.

**Carrier aggregation band**: A set of one or more operating bands across which multiple carriers are aggregated with a specific set of technical requirements.

**Carrier aggregation bandwidth class**: A class defined by the aggregated transmission bandwidth configuration and maximum number of component carriers supported by a UE.

**Carrier aggregation configuration**: A combination of CA operating band(s) and CA bandwidth class(es) supported by a UE.

**Con-current operation**: The simultaneous transmission and reception of sidelink and Uu interfaces while operation is agnostic of the service used on each interface.

**Contiguous carriers**: A set of two or more carriers configured in a spectrum block where there are no RF requirements based on co-existence for un-coordinated operation within the spectrum block.

**Contiguous resource allocation**: A resource allocation of consecutive resource blocks within one carrier or across contiguously aggregated carriers. The gap between contiguously aggregated carriers due to the nominal channel spacing is allowed.

**Contiguous spectrum**: Spectrum consisting of a contiguous block of spectrum with no sub-block gaps.

**Inter-band carrier aggregation:** Carrier aggregation of component carriers in different operating bands.

NOTE: Carriers aggregated in each band can be contiguous or non-contiguous.

**Intra-band contiguous carrier aggregation**: Contiguous carriers aggregated in the same operating band.

**Intra-band non-contiguous carrier aggregation**: Non-contiguous carriers aggregated in the same operating band.

**RedCap UE**: The UE with reduced capabilities as defined in clause 4.2.21.1 from TS38.306 [15].

**Sub-band**: For a UE that supports shared spectrum channel access in wideband operation, a sub-band is the set of RBs within an approximately 20 MHz segment of the channel where the wideband channel is uniformly divided into an integer number of 20 MHz sub-bands. Sub-bands may be separately allocated in uplink and downlink.

**Sub-block**: This is one contiguous allocated block of spectrum for transmission and reception by the same UE. There may be multiple instances of sub-blocks within an RF bandwidth.

**Sub-block bandwidth**: The bandwidth of one sub-block.

**Sub-block gap**: A frequency gap between two consecutive sub-blocks within an RF bandwidth, where the RF requirements in the gap are based on co-existence for un-coordinated operation.

**UE transmission bandwidth configuration**: Set of resource blocks located within the UE channel bandwidth which may be used for transmitting or receiving by the UE.

**Vehicular UE:** A UE embedded in a vehicle, permanently connected to an embedded antenna system that radiates externally for NR operating bands.

NOTE: Vehicular UE does not refer to other UE form factors placed inside the vehicle.

**Wideband operation:** For a UE that supports shared spectrum channel access, wideband operation refers to operation within a channel larger than 20 MHz in which intra-cell guard bands may be configured to distinguish individual RB-sets

*<End of the change>*

*<Start of the change>*

## 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

ACLR Adjacent Channel Leakage Ratio

ACS Adjacent Channel Selectivity

A-MPR Additional Maximum Power Reduction

BS Base Station

BW Bandwidth

BWP Bandwidth Part

CA Carrier Aggregation

CA\_nX-nY Inter-band CA of component carrier(s) in one sub-block within Band nX and component carrier(s) in one sub-block within Band nY where nX and nY are the applicable NR *operating bands*

CC Component Carriers

CG Carrier Group

CP-OFDM Cyclic Prefix-OFDM

CW Continuous Wave

DC Dual Connectivity

DFT-s-OFDM Discrete Fourier Transform-spread-OFDM

DM-RS Demodulation Reference Signal

DTX Discontinuous Transmission

E-UTRA Evolved UTRA

EIRP Equivalent Isotropically Radiated Power

EVM Error Vector Magnitude

FR Frequency Range

FRC Fixed Reference Channel

FWA Fixed Wireless Access

GSCN Global Synchronization Channel Number

IBB In-band Blocking

IDFT Inverse Discrete Fourier Transformation

ITS Intelligent Transportation System

ITU‑R Radiocommunication Sector of the International Telecommunication Union

MBW Measurement bandwidth defined for the protected band

MCG Master Cell Group

MOP Maximum Output Power

MPR Allowed maximum power reduction

MSD Maximum Sensitivity Degradation

NR New Radio

NR-ARFCN NR Absolute Radio Frequency Channel Number

NS Network Signalling

OCNG OFDMA Channel Noise Generator

OOB Out-of-band

P-MPR Power Management Maximum Power Reduction

PRB Physical Resource Block

PS Public Safety

PSCCH Physical Sidelink Control CHannel

PSSCH Physical Sidelink Shared CHannel

QAM Quadrature Amplitude Modulation

RE Resource Element

REFSENS Reference Sensitivity

RedCap Reduced Capability

RF Radio Frequency

RMS Root Mean Square (value)

RSRP Reference Signal Receiving PowerRx Receiver

Rx Receiver

SC Single Carrier

SCG Secondary Cell Group

SCS Subcarrier spacing

SDL Supplementary Downlink

SEM Spectrum Emission Mask

SL Sidelink

SL-MIMO Sidelink-Multiple Antenna transmission

SNR Signal-to-Noise Ratio

SRS Sounding Reference Symbol

SS Synchronization Symbol

SUL Supplementary uplink

TAE Time Alignment Error

TAG Timing Advance Group

Tx Transmitter

TxD Tx Diversity

UAS Uncrewed Aircraft Systems

UAV Uncrewed Aerial Vehicle

UL MIMO Uplink Multiple Antenna transmission

ULFPTx Uplink Full Power Transmission

USS UAS Service Supplier

V2X Vehicle to Everything

*<End of the change>*

*<Start of the change>*

## 5.2K Operating bands for Aerial UE

Aerial UE is designed to operate in NR operating bands as defined in Table 5.2-1, following applicable spectrum regulations, e.g. ECC Decision (22)07 [17] for CEPT countries.

*<End of the change>*

*<Start of the change>*

## 4.3 Specification suffix information

Unless stated otherwise, the suffixes shown in Table 4.3-1 are used for indicating at 2nd level clause. For shared spectrum channel access, suffices A, B, and D are used for indicating at 3rd level clause.

Table 4.3-1: Definition of suffixes

|  |  |
| --- | --- |
| Clause suffix | Variant |
| None | Single Carrier |
| A | Carrier Aggregation (CA) |
| B | Dual-Connectivity (DC) |
| C | Supplement Uplink (SUL) |
| D | UL MIMO |
| E | V2X |
| F | Shared spectrum channel access |
| G | Tx Diversity (TxD) |
| H | Carrier Aggregation(CA) with UL MIMO |
| I | RedCap |
| K | Aerial UE (UAV) |

A terminal which supports the above features needs to meet both the general requirements and the additional requirement applicable to the additional clause (suffixes A to K) in clauses 5, 6 and 7. Where there is a difference in requirement between the general requirements and the additional clause requirements (suffixes A to K) in clauses 5, 6 and 7, the tighter requirements are applicable unless stated otherwise in the additional clause.

A terminal which supports advanced V2X services, public safety services and other commercial use cases related to NR sidelink operation shall meet all of the separate corresponding requirements in suffix E.

For a terminal that supports SUL for the band combination specified in Table 5.2C-1, the current version of the specification assumes the terminal is configured with active transmission either on UL carrier or SUL carrier at any time in one serving cell and the UE requirements for single carrier shall apply for the active UL or SUL carrier accordingly.

For a terminal that supports public safety service using sidelink, the minimum requirements are applicable when

- The UE is associated with a serving cell on PS carrier, or

- The UE is not associated with a serving cell on the PS carrier and is provisioned with the preconfigured radio parameters for PS that are associated with known Geographical Area, or

- The UE is associated with a serving cell on a carrier different than the PS carrier, and the radio parameters for PS that are provided by the serving cell, or

- The UE is associated with a serving cell on a carrier different than the PS carrier, and has a non-serving cell selected on the PS carrier with the preconfigured radio parameters.

When the advanced-V2X or PS UE is not associated with a serving cell on the V2X or PS carrier, and the UE does not have knowledge of its geographical area, or is provisioned with preconfigured radio parameters that are not associated with any Geographical Area, V2X or PS UE’ transmissions are not allowed, and the requirements in Section 6.3E.2 apply.

For a terminal that supports operation in shared spectrum, the current version of this specification assumes in the uplink sub-bands within a wideband channel shall be contiguously allocated to the UE. The uplink requirements for one or more non-transmitted sub-bands between two transmitted sub-bands does not form a part of the current version of this specification.

Terminal that supports inter-band NR-DC configuration shall meet the minimum requirements for corresponding CA configuration (suffix A), unless otherwise specified.

*<End of the change>*

*<Start of the change>*

## 6.2K Transmitter power for Aerial UE

### 6.2K.1 Maximum output power for Aerial UE

For Aerial UE, the requirements for power class 3 specified in clause 6.2.1 apply.

### 6.2K.2 Maximum output power reduction for Aerial UE

### For Aerial UE, the requirements specified in clause 6.2.2 apply.6.2K.3 Additional maximum output power reduction for Aerial UE

#### 6.2K.3.1 General

Additional emission requirements can be signalled by the network. Each additional emission requirement is associated with a unique network signalling (NS) value indicated in RRC signalling by an NR frequency band number of the applicable operating band and an associated value in the field [*additionalSpectrumEmissionUAV].* Throughout this specification, the notion of indication or signalling of an NS value refers to the corresponding indication of an NR frequency band number of the applicable operating band, the IE field *freqBandIndicatorNR* and an associated value of [*additionalSpectrumEmissionUAV]* in the relevant RRC information elements [7]*.*

To meet the additional requirements, additional maximum power reduction (A-MPR) is allowed for the maximum output power as specified in Table 6.2.1-1. Unless stated otherwise, the total reduction to UE maximum output power is max(MPR, A-MPR) where MPR is defined in clause 6.2.2. Outer and inner allocation notation used in clause 6.2K.3 are defined in clause 6.2.2. Unless stated otherwise, Edge RB allocations get the same AMPR as Outer RB allocations. In absence of modulation and waveform types the A-MPR applies to all modulation and waveform types.

Table 6.2K.3.1-1 specifies the additional requirements with their associated Network Signalling label and the allowed A-MPR and applicable operating band(s). The mapping of NR frequency band numbers and values of the [*additionalSpectrumEmissionUAV]* to network signalling labels is specified in Table 6.2.3.1-1A.

For almost contiguous allocations in CP-OFDM waveforms in power class 3, the allowed A-MPR defined in clause 6.2K.3 is increased by CEIL{ 10 log10(1 + NRB\_gap / NRB\_alloc), 0.5 } dB, where CEIL{x, 0.5} means x rounding upwards to closest 0.5dB, NRB\_gap is the total number of unallocated RBs between allocated RBs and NRB\_alloc is the total number of allocated RBs, and the parameter LCRB is replaced by NRB\_alloc + NRB\_gap in specifying the RB allocation regions.

Table 6.2K.3.1-1: Additional Maximum Power Reduction (A-MPR) for Uncrewed Aerial UE

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Network signalling label | Requirements (clause) | NR Band | Channel bandwidth (MHz) | Resources blocks (*N*RB) | A-MPR (dB) |
| NS\_UAV\_44 | 6.5K.3.3.1 | 38 | 25, 30, 40 | Table 6.2K.3.2-1 | Table 6.2K.3.2-2 |
| NS\_UAV\_46 | 6.5K.3.3.2 | 7 | 5, 10, 15, 20, 25, 30, 35, 40, 50 |  | N/A |
| NS\_UAV\_70 | 6.5K.3.3.3 | 3 | [5, 10, 15, 20, 25, 30, 35, 40, 45, 50] | Table 6.2K.3.3-1 | Table 6.2K.3.3-2 |

Table 6.2K.3.1-1A: Mapping of network signalling label

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR band | Value of [*additionalSpectrumEmissionUAV]* | | | | | | | |
|  | **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| n3 | NS\_UAV\_01 | NS\_UAV\_70 |  |  |  |  |  | Reserved |
| n7 | NS\_UAV\_01 | NS\_UAV\_46 |  |  |  |  |  | Reserved |
| n38 | NS\_UAV\_01 | NS\_UAV\_44 |  |  |  |  |  | Reserved |

#### 6.2K.3.2 A-MPR for NS\_UAV\_44

Table 6.2K.3.2-1: A-MPR regions for NS\_UAV\_44

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Channel Bandwidth, MHz | Carrier Center Frequency, Fc, MHz | Regions | | A-MPR |
|  |  | RBend\*12\*SCS  MHz | LCRB\*12\*SCS  MHz |  |
| 25 MHz | 2582.5≤ FC ≤ 2602.5 | <18.0 | >max(0, 12\*SCS\* RBend - 3.6) | A3 |
|  |  | ≥18.0 | <7.2 | A3 |
|  |  | ≥18.0 | ≥7.2 | A6 |
| 30 MHz | 2585 ≤ FC ≤ 2600 | <21.6 | >max(0, 12\*SCS\* RBend - 3.6) | A3 |
|  |  | ≥21.6 | <12.6 | A3 |
|  |  | ≥21.6 | ≥12.6 | A6 |
| 40 MHz | 2590 ≤ FC ≤ 2595 | ≥0, <2.88 | >0 | A1 |
|  |  | ≥2.88, <14.4 | >max (0, 12\*SCS\*RBend - 3.6) | A2 |
|  |  | ≥14.4, <23.4 | >10.8 | A3 |
|  |  | ≥23.4, <32.4 | >16.2 | A4 |
|  |  | ≥32.4 | >0 | A5 |

Table 6.2K.3.2-2: A-MPR for NS\_UAV\_44

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Modulation/Waveform | | A1 | A2 | A3 | A4 | A5 | A6 |
|  | | Outer/Inner | Outer/Inner | Outer/Inner | Outer/Inner | Outer/Inner | Outer/Inner |
| DFT-s-OFDM | PI/2 BPSK | 5 | 2 | 3 | 7 | 12 | 4 |
|  | QPSK | 5 | 2 | 3 | 7 | 12 | 4 |
|  | 16 QAM | 5 | 2 | 3 | 7 | 12 | 4 |
|  | 64 QAM | 5 |  | 3 | 7 | 12 | 4 |
|  | 256 QAM | 5 |  |  | 7 | 12 |  |
| CP-OFDM | QPSK | 5 | 4 | 5 | 8 | 12 | 6 |
|  | 16 QAM | 5 | 4 | 5 | 8 | 12 | 6 |
|  | 64 QAM | 5 | 4 | 5 | 8 | 12 | 6 |
|  | 256 QAM | 5 |  |  | 8 | 12 |  |

#### 6.2K.3.3 A-MPR for NS\_UAV\_70

Table 6.2K.3.3-1: A-MPR regions for NS\_UAV\_70 (Power Class 3)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Channel | Carrier Center | Regions | | A-MPR |
| Bandwidth, [MHz] | Frequency, Fc, [MHz] | RBstart\*12\*SCS  [MHz] | LCRB\*12\*SCS  [MHz] |  |
| 5 MHz | FC ≤ 1722.5 | ≤ 0.18 | ≤ 2.34 | A1 |
|  |  |  | > 2.34 | A3 |
|  |  | > 0.18, ≤ 0.36 | ≤ 0.36 | A2 |
|  |  |  | > 0.36 | A3 |
|  |  | > 0.36, ≤ 0.72 | < 1.8 | A4 |
|  |  |  | ≥ 1.8 | A3 |
|  |  | > 0.72 | MAX(0, > 1.5\*RBstart\*12\*SCS - 2.5\*12\*SCS) | A4 |
|  |  |  | MAX(0, ≤ 1.5\*RBstart\*12\*SCS – 2.5\*12\*SCS) | A5 |
| 10 MHz | FC ≤ 1735 | ≤ 0.72 | ≤ 1.26 | A1 |
|  |  |  | > 1.26 | A2 |
|  |  | > 0.72, ≤ 3.78 | MAX(0, > 1.5\*RBstart\*12\*SCS - 2.5\*12\*SCS) | A4 |
|  |  |  | MAX(0, ≤ 1.5\*RBstart\*12\*SCS - 2.5\*12\*SCS) | A5 |
|  |  | > 3.78, ≤ 5.04 | > 2.7 | A5 |
|  |  |  | ≤ 2.7 | A6 |
|  |  | > 5.04 | > 0 | A5 |
| 15 MHz | FC ≤ 1747.5 | ≤ 0.72 | ≤ 1.26 | A1 |
|  |  |  | > 1.26 | A2 |
|  |  | > 0.72, ≤ 5.58 | MAX(0, > 1.5\*RBstart\*12\*SCS - 2.5\*12\*SCS) | A4 |
|  |  |  | MAX(0, ≤ 1.5\*RBstart\*12\*SCS - 2.5\*12\*SCS) | A5 |
|  |  | > 5.58, ≤ 9.72 | > 3.78 | A5 |
|  |  |  | ≤ 3.78 | A6 |
|  |  | > 9.72 | > 0 | A5 |
| 20 MHz | FC ≤ 1760 | ≤ 0.72 | ≤ 8.1 | A1 |
|  |  |  | > 8.1 | A4 |
|  |  | > 0.72, ≤ 7.2 | MAX(0, > 1.5\*RBstart\*12\*SCS - 2.5\*12\*SCS) | A4 |
|  |  |  | MAX(0, ≤ 1.5\*RBstart\*12\*SCS - 2.5\*12\*SCS) | A5 |
|  |  | > 7.2, ≤ 12.96 | > 5.58 | A5 |
|  |  |  | ≤ 5.58 | A6 |
|  |  | > 12.96 | > 0 | A5 |
| 25 MHz | FC ≤ 1772.5 | ≤ 0.72 | > 0 | A1 |
|  |  | > 0.72, ≤ 8.64 | MAX(0, > 1.5\*RBstart\*12\*SCS - 2.5\*12\*SCS) | A4 |
|  |  |  | MAX(0, ≤ 1.5\*RBstart\*12\*SCS - 2.5\*12\*SCS) | A5 |
|  |  | > 8.64 | > 6.12 | A5 |
|  |  |  | ≤ 6.12, > 0.72 | A6 |
|  |  |  | ≤ 0.72 | A5 |
| 30 MHz | FC ≤ 1750 | ≤ 24.3 | > 0 | A2 |
|  |  | > 24.3 | > 0 | A5 |
|  | 1750 < FC < 1765 | ≤ 24.3 | > 0 | A5 |
|  |  | > 24.3 | > 0 | A6 |
|  | FC ≥ 1765 | ≥ 0 | > 0 | A5 |
| 35 MHz | FC ≤ 1750 | ≤ 29.16 | > 0 | A2 |
|  |  | > 29.16 | > 0 | A5 |
|  | 1750 < FC < 1765 | ≤ 29.16 | > 0 | A5 |
|  |  | > 29.16 | > 0 | A6 |
|  | FC ≥ 1765 | ≥ 0 | > 0 | A6 |
| 40 MHz | FC ≤ 1740 | ≤ 32.4 | > 0 | A2 |
|  |  | > 32.4 | > 0 | A5 |
|  | FC > 1740 | ≤ 32.4 | > 0 | A5 |
|  |  | > 32.4 | > 0 | A6 |
| 45 MHz | FC ≤ 1740 | ≤ 35.64 | > 0 | A2 |
|  |  | > 35.64 | > 0 | A5 |
|  | FC > 1740 | ≤ 35.64 | > 0 | A5 |
|  |  | > 35.64 | > 0 | A6 |
| 50 MHz | FC ≤ 1740 | ≤ 38.88 | > 0 | A2 |
|  |  | > 38.88 | > 0 | A5 |
|  | FC > 1740 | ≤ 38.88 | > 0 | A5 |
|  |  | > 38.88 | > 0 | A6 |
| NOTE 1: The A-MPR values are listed in Table 6.2K.3.2-2.  NOTE 2: For any undefined region, MPR applies. | | | | |

Table 6.2K.3.3-2: A-MPR for NS\_UAV\_70 (Power Class 3)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Modulation/Waveform | | A1 | A2 | A3 | A4 | A5 | A6 |
|  | | Outer/Inner | Outer/Inner | Outer/Inner | Outer/Inner | Outer/Inner | Outer/Inner |
| DFT-s-OFDM | PI/2 BPSK | 30 | 25 | 20 | 15 | 10 | 5 |
|  | QPSK | 30 | 25 | 20 | 15 | 10 | 5 |
|  | 16 QAM | 30 | 25 | 20 | 15 | 10 | 5 |
|  | 64 QAM | 30 | 25 | 20 | 15 | 10 | 5 |
|  | 256 QAM | 30 | 25 | 20 | 15 | 10 |  |
| CP-OFDM | QPSK | 30 | 25 | 20 | 15 | 10 | 5 |
|  | 16 QAM | 30 | 25 | 20 | 15 | 10 | 5 |
|  | 64 QAM | 30 | 25 | 20 | 15 | 10 | 5 |
|  | 256 QAM | 30 | 25 | 20 | 15 | 10 |  |
| NOTE 1: The backoff applied is max (MPR, A-MPR) where MPR is defined in Table 6.2.2-1 | | | | | | | |

*<End of the change>*

*<Start of the change>*

## 6.5K Output RF spectrum emissions for Aerial UE

### 6.5K.1 Occupied bandwidth for Aerial UE

For Aerial UE, the requirements specified in clause 6.5.1 apply.

### 6.5K.2 Out of band emission for Aerial UE

For Aerial UE, the requirements specified in clause 6.5.2 apply.

### 6.5K.3 Spurious emissions for Aerial UE

#### 6.5K.3.0 General

For Aerial UE, the requirements specified in clause 6.5.3.0 apply.

#### 6.5K.3.1 General spurious emissions

For Aerial UE, the requirements specified in clause 6.5.3.1 apply.

#### 6.5K.3.2 Spurious emissions for UE co-existence

For Aerial UE, the requirements specified in clause 6.5.3.2 apply.

#### 6.5K.3.3 Additional spurious emissions

##### 6.5K.3.3.1 Requirement for network signalling value "NS\_UAV\_44"

When "NS UAV\_44" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.5K.3.3.1-1. This requirement also applies for the frequency ranges that are less than FOOB (MHz) in Table 6.5.3.1-1 from the edge of the channel bandwidth.

Table 6.5K.3.3.1-1: Additional requirements for "NS\_UAV\_44"

|  |  |  |  |
| --- | --- | --- | --- |
| Frequency range  (MHz) | Channel bandwidth (MHz) / Spectrum emission limit (dBm) | Measurement bandwidth | Note |
|  | 5, 10, 15, 20, 25, 30, 40 MHz |  |  |
| 2620 ≤ f < 2645 | -15.5 | 5 MHz | 1 |
| 2645 ≤ f < 2690 | -40 | 1 MHz |  |
| 2690 ≤ f ≤ 2900 | -50 | 1 MHz |  |
| NOTE 1: For these adjacent bands, the emission limit could imply risk of harmful interference to UE(s) operating in the protected operating band. | | | |

##### 6.5K.3.3.2 Requirement for network signalling value "NS\_UAV\_46"

When "NS\_UAV\_46" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.5K.3.3.2-1. This requirement also applies for the frequency ranges that are less than FOOB (MHz) in Table 6.5.3.1-1 from the edge of the channel bandwidth.

Table 6.5K.3.3.2-1: Additional requirements for "NS\_UAV\_46"

|  |  |  |
| --- | --- | --- |
| Frequency range  (MHz) | Channel bandwidth (MHz) / Spectrum emission limit (dBm) | Measurement bandwidth |
|  | 5, 10, 15, 20, 25, 30, 35, 40, 50 MHz |  |
| 1675 ≤ f ≤ 1710 | -40 | 1 MHz |

##### 6.5K.3.3.3 Requirement for network signalling value “NS\_UAV\_70"

When "NS UAV\_70" is indicated in the cell, the power of any UE emission shall not exceed the levels specified in Table 6.5K.3.3.3-1. This requirement also applies for the frequency ranges that are less than FOOB (MHz) in Table 6.5.3.1-1 from the edge of the channel bandwidth.

Table 6.5K.3.3.3-1: Additional requirements for "NS\_UAV\_70"

|  |  |  |
| --- | --- | --- |
| Frequency range  (MHz) | Channel bandwidth (MHz) / Spectrum emission limit (dBm) | Measurement bandwidth |
|  | 5, 10, 15, 20, 25, 30, 35, 40, 45, 50 MHz |  |
| 1675 ≤ f ≤ 1710 | -40 | 1 MHz |

*<End of the change>*