**3GPP TSG-RAN WG4 #107 Meeting R4-** **2310312**

Incheon, Republic of Korea, 22nd – 26th May, 2023

**Agenda Item: 8.31.2.3**

**Title: TP for TR 38.786 on the updated TR structure for NR SL CA operation**

**Source: Meta Ireland**

**Document for: Approval**

# Background

This contribution provides text proposal to update the TR structure to add the NR SL CA operation and update the agreements for NR SL CA UE RF requirements based on the agreed WF [1].

# Text Proposal

##### <<<<<<<<<<< Start of changes in section 5 >>>>>>>>>>

# 5 Operating bands and channel arrangement for SL evolution

## 5.1 Operating bands

### 5.1.1 Operating bands for single carrier operation in unlicensed band

### 5.1.2 Operating band combinations for inter-band con-current operation

### 5.1.3 Operating band combinations for NR SL CA operation

NR SL CA operation is designed to operate in the operating bands in FR1 defined in Table 5.1.3.

Table 5.1.3-1: Intra-band contiguous CA operating bands for SL CA in FR1

|  |  |  |
| --- | --- | --- |
| NR SL CA Band | NR Band | Interface |
| SL\_n47 | n47 | PC5 |

## 5.2 Channel bandwidth

### 5.2.1 Channel bandwidth for single carrier operation in unlicensed band

### 5.2.2 Channel bandwidth for inter-band con-current operation

### 5.2.3 Channel bandwidth for NR SL CA operation

For NR SL CA operation, the SL CA channel bandwidths for each operating band is specified in Table 5.2.3-1.

Table 5.2.3-1: Intra-band contiguous CA operating bands for SL CA in FR1

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Sidelink CA configuration / Bandwidth combination set | | | | | | | |
| Sidelink CA configuration | Sidelink CA configuration for TX | Component carriers in order of increasing carrier frequency | | | | Maximum aggregated  bandwidth [MHz] | Bandwidth combination set |
| Channel bandwidths for carrier [MHz] | Channel bandwidths for carrier [MHz] | Channel bandwidths for carrier [MHz] | **Channel bandwidths for carrier [MHz]** |
| SL\_n47B | SL\_n47B | [10] | [20,30] |  |  | 70 | 0 |
| [20] | [20,30] |  |  |
| 30 | [30],40 |  |  |

## 5.3 Channel arrangement

### 5.3.1 Channel raster

### 5.3.2 Synchronization raster

##### <<<<<<<<<<< Unchanged sections are omitted >>>>>>>>>>

## 6.2 Tx requirements for inter-band con-current operation

### 6.2.1 Maximum output power for inter-band con-current operation

### 6.2.2 UE maximum output power reduction for inter-band con-current operation

### 6.2.3 UE additional maximum output power reduction for inter-band con-current operation

### 6.2.4 Configured transmitted power for inter-band con-current operation

### 6.2.5 Minimum output power for inter-band con-current operation

### 6.2.6 Transmit OFF power for inter-band con-current operation

### 6.2.7 ON/OFF time mask for inter-band con-current operation

### 6.2.8 Power control for inter-band con-current operation

### 6.2.9 Transmit signal quality for inter-band con-current operation

### 6.2.10 Spectrum emission mask for inter-band con-current operation

### 6.2.11 ACLR requirements for inter-band con-current operation

### 6.2.12 Spurious emissions for inter-band con-current operation

### 6.2.13 Spurious emission band UE co-existence for inter-band con-current operation

### 6.2.14 Transmit intermodulation for inter-band con-current operation

## 6.3 Tx requirements for NR SL CA operation

### 6.3.1 Maximum output power for NR SL CA operation

For the intra-band SL CA operation, the following NR SL CA UE Power Classes define the maximum output power for any transmission bandwidth within the channel bandwidth. The period of measurement shall be at least one sub frame (1ms).

Table 6.3.1-1: NR SL CA UE Power Class

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| NR SL CA band Configuration | Class 1 (dBm) | Tolerance (dB) | Class 2 (dBm) | Tolerance (dB) | Class 3 (dBm) | Tolerance (dB) | Class 4 (dBm) | Tolerance (dB) |
| V2X\_n47B |  |  |  |  | 23 | +2/-33 |  |  |
| NOTE 1: PPowerClass is the maximum UE power specified without taking into account the tolerance  NOTE 2: For intra-band SL CA UE, the maximum power requirement apply to the total transmitted power over all component carriers (per UE).  NOTE 3: 3 refers to the transmission bandwidths (Figure 5.6-1 in TS38.101-1) confined within FUL\_low and FUL\_low + 4 MHz or FUL\_high – 4 MHz and FUL\_high, the maximum output power requirement is relaxed by reducing the lower tolerance limit by 1.5 dB | | | | | | | | |

### 6.3.2 UE maximum output power reduction for NR SL CA operation

For basic parameters, reuse the simulation assumptions in TR38.785 (Rel-17 enhanced NR sidelink). Other constraints for PSCCH/PSSCH/PSFCH/S-SSB can be assumed based on current RAN1’s agreement.

|  |  |
| --- | --- |
| Center frequency | 5.9GHz |
| Bandwidth | per CC: 10/20/30/40MHz  Aggregated CBW: Table 5.2.3-1 (up to 70MHz CBW) |
| Maximum output power for aggregated CBW | 23dBm |
| Numerology | 15 kHz/30kHz/60kHz |
| Modulation per CC | QPSK/16QAM/64QAM/256QAM |
| Waveform | CP-OFDM |
| Carrier leakage | 25dBc |
| IQ image | 25dBc |
| CIM3 | FFS: 45dBc or,  45dBc and 60dBc |
| PA calibration | PA calibrated to deliver [31dBc] ACLR for a fully allocated RBs in 20MHz QPSK DFT- S-OFDM waveform at 1 dB MPR.  This is based to share PA between LTE V2X and NR V2X at 5.9GHz as worst case. |

6.3.2.1 MPR for NR SL CA operation

*<Editor Note> Detail MPR requirements will be added.*

### 6.3.3 UE additional maximum output power reduction for NR SL CA operation

For the additional emission limits in Europe in ITS spectrum, RAN4 already defined the regulatory requirements in TS38.101-1. The ETSI regulation shall be considered to derive the A-MPR requirements for NR SL CA UE. For the US related regulatory requirements will be studied after final FCC announcement for the additional emission limits in US.

To derive A-MPR requirements for SL CA operation in ITS spectrum, RAN4 will assume the basic simulation parameters and assumptions in section 6.3.2 and the additional spectrum emission mask in Table 6.5E.2.3.1-1 and additional spurious emission requirements in Table 6.5E.3.4.2-1 and Table 6.5E.3.4.2-2 in TS38.101-1 will be considered when NS\_33 is configured from the pre-configured radio parameters in the geometrical region or indicated in the cell.

6.3.3.1 A-MPR for NR SL CA operation

*<Editor Note> Detail A-MPR requirements will be added.*

### 6.3.4 Configured transmitted power for NR SL CA operation

### 6.3.5 Minimum output power for NR SL CA operation

### 6.3.6 Transmit OFF power for NR SL CA operation

### 6.3.7 ON/OFF time mask for NR SL CA operation

### 6.3.8 Power control for NR SL CA operation

### 6.3.9 Transmit signal quality for NR SL CA operation

### 6.3.10 Spectrum emission mask for NR SL CA operation

### 6.3.11 ACLR requirements for NR SL CA operation

### 6.3.12 Spurious emissions for NR SL CA operation

### 6.3.13 Spurious emission band UE co-existence for NR SL CA operation

### 6.3.14 Transmit intermodulation for NR SL CA operation

##### <<<<<<<<<<< Unchanged sections are omitted >>>>>>>>>>

## 7.2 Rx requirements for inter-band con-current operation

### 7.2.1 Reference sensitivity power level for inter-band con-current operation

### 7.2.2 Maximum input level for inter-band con-current operation

### 7.2.3 Adjacent Channel Selectivity for inter-band con-current operation

### 7.2.4 Blocking characteristics for inter-band con-current operation

### 7.2.5 Spurious response for inter-band con-current operation

### 7.2.6 Intermodulation characteristics for inter-band con-current operation

## 7.3 Rx requirements for NR SL CA operation

### 7.3.1 Reference sensitivity power level for NR SL CA operation

### 7.3.2 Maximum input level for NR SL CA operation

### 7.3.3 Adjacent Channel Selectivity for NR SL CA operation

### 7.3.4 Blocking characteristics for NR SL CA operation

### 7.3.5 Spurious response for NR SL CA operation

### 7.3.6 Intermodulation characteristics for NR SL CA operation

##### <<<<<<<<<<< End of changed in TR38.786 >>>>>>>>>>

# References

1. R4-2306633 “WF on NR SL CA,” Huawei
2. R4-2305422 “TR38.786 v0.1.0,” OPPO