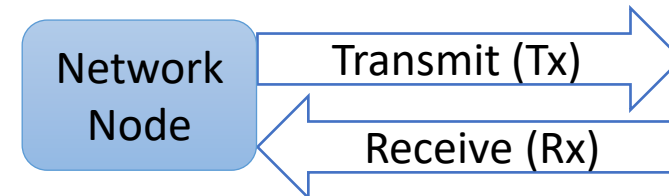
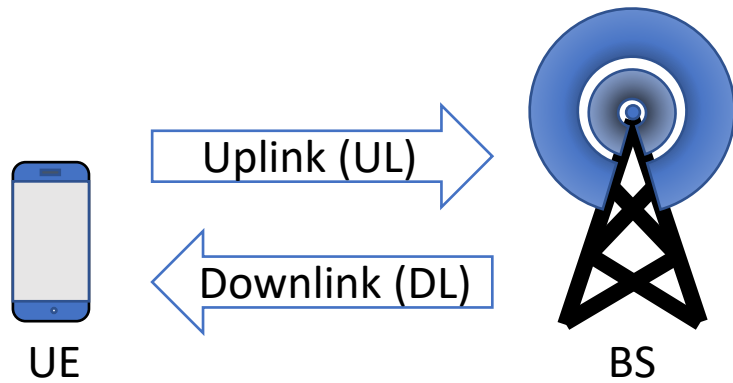


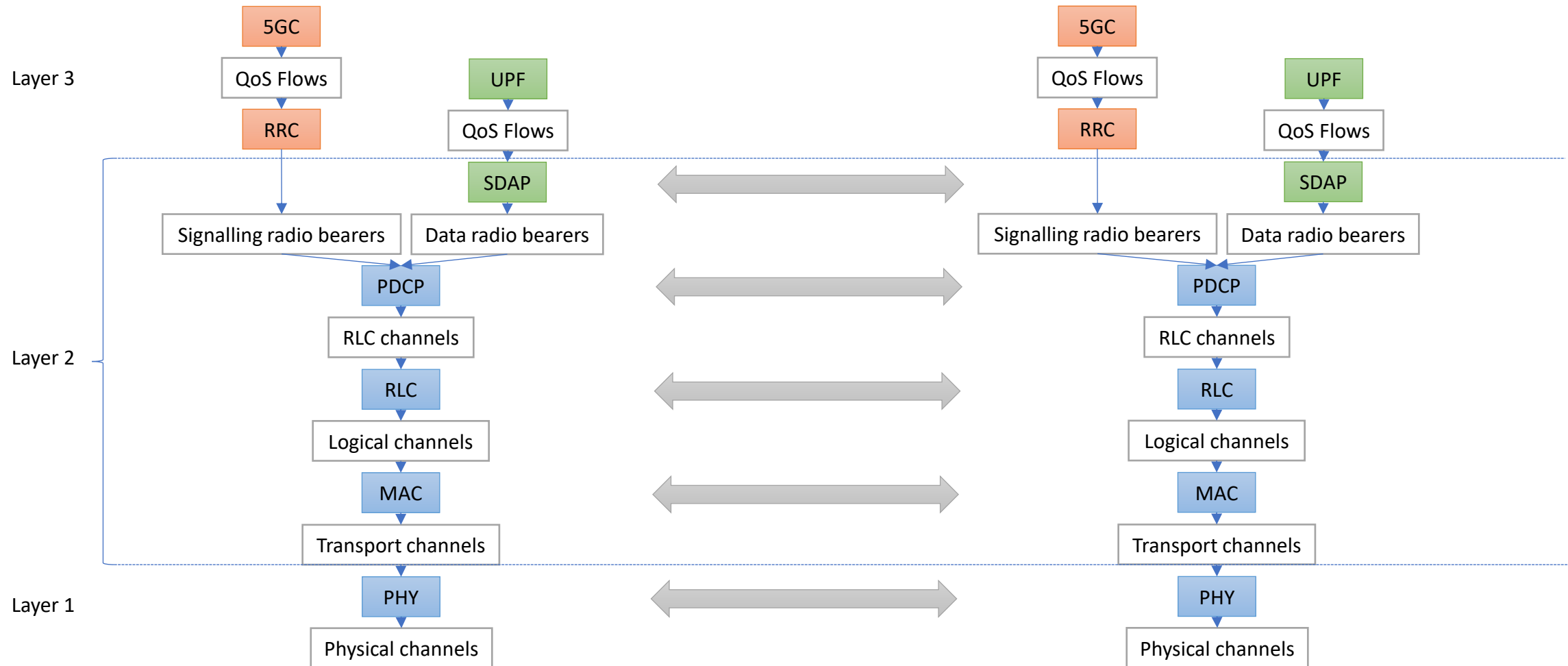
Lab 5

5G NR channels and signals in UL

UE and RAN



Protocol stack between UE and BS



Logical, transport, physical channels (R&S 5G book)

- On physical layer:
 - Physical Random Access Channel (PRACH)
 - Physical Uplink Control Channel (PUCCH)
 - Physical Uplink Shared Channel (PUSCH)

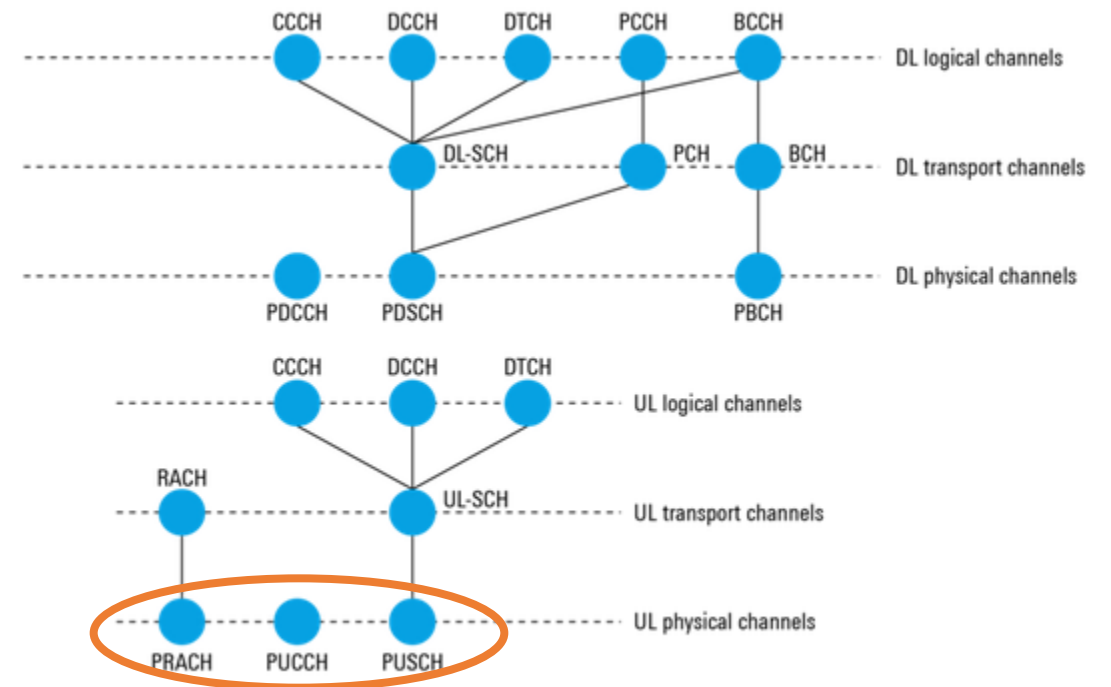
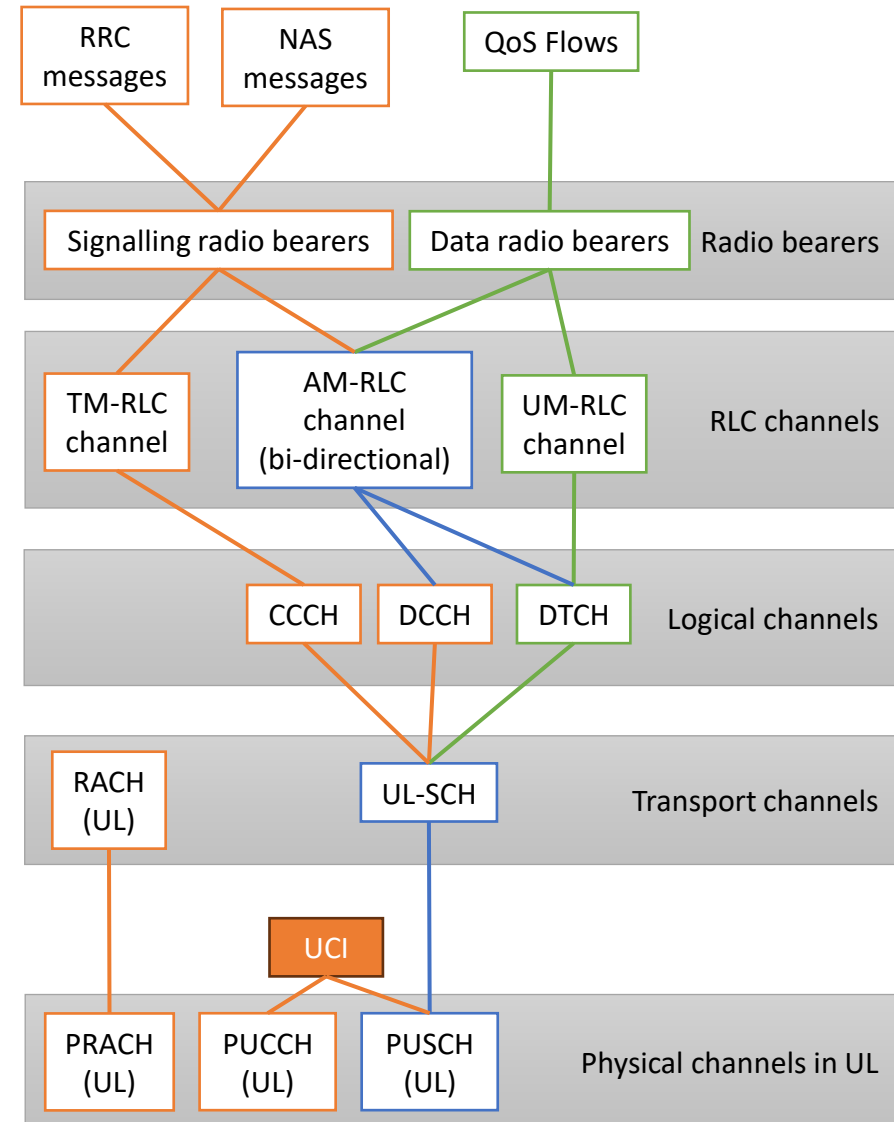


Fig. 1-10 NR logical, transport and physical channel mapping for the uplink and downlink.

UL channels

- Physical Random Access Channel (PRACH)
 - For random access
- Physical Uplink Control Channel (PUCCH)
 - Contains uplink control information (**UCI**), which contains **ACK/NAK**, Channel Quality Indicator (**CQI**), scheduling request (**SR**)
 - UCI can be sent on PUCCH or PUSCH
- Physical Uplink Shared Channel (PUSCH)
 - Contains UE data, and associated reference signals



<https://se.mathworks.com/videos/5g-explained-uplink-control-information-in-5g-nr-1566972297188.html>
<https://se.mathworks.com/videos/5g-explained-uplink-data-in-5g-nr-1558601656873.html>

Physical Random Access Channel (PRACH)

- Channel open for every UE except if cell barred (indicated in MIB)
- PRACH access rules and PRACH resource allocation are broadcasted via SIB
- 2 types of PRACH access procedures
 - Contention-based random access (CBRA)
 - Contention-free random access (CFRA)

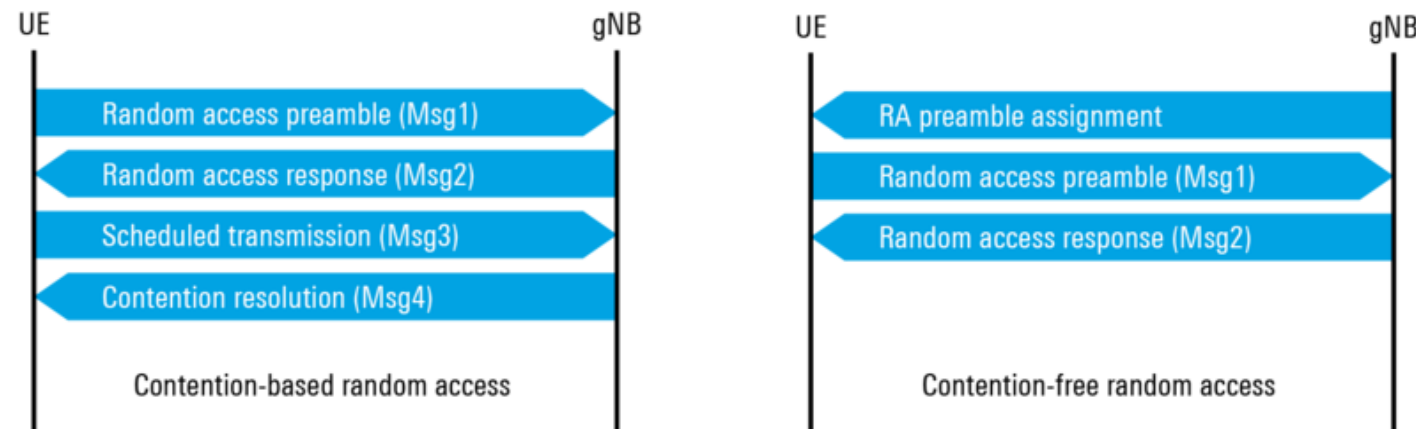


Fig. 2-20 Contention-based and contention-free random access procedure in 5G NR.

R&S. (2020). 5G New Radio. Fundamentals, procedures, testing aspects.

<https://gloris.rohde-schwarz.com/ebooks/5G>

PUCCH

- Carries UCI from UE to gNB
- PUCCH formats 0-4
- Long PUCCH formats contain DMRS time-division multiplexed with UCI
- PUCCH format 2 contains DMRS frequency multiplexed
- PUCCH formats 0, 1 and 4 enable multi-UE multiplexing

Format	Long/ short	Number of symbols	UCI payload	UCI payload in bits	UE multiplexing capacity in same PRB	Frequency hopping
0	short	1 or 2	small	Up to 2	6 UEs	No
1	long	4 to 14	small	Up to 2 bit	Up to 84 UEs	No
					Up to 36 UEs	yes
2	short	1 or 2	large	More than 2 bit	No	No
3	long	4 to 14	large	More than 2 bit	no	No
4	long	4 to 14	moderate	More than 2 bit	Up to 4 UEs	No

3GPP. (2024). TS 38.300 NR; NR and NG-RAN Overall Description; Stage 2.

<https://www.3gpp.org/DynaReport/38300.htm>

Uplink Control information (UCI)

- UCI contains (combinations of):
 - Channel state information (CSI)
 - HARQ feedback, ACK/NAK (1 or 2 bits)
 - Scheduling request (SR)

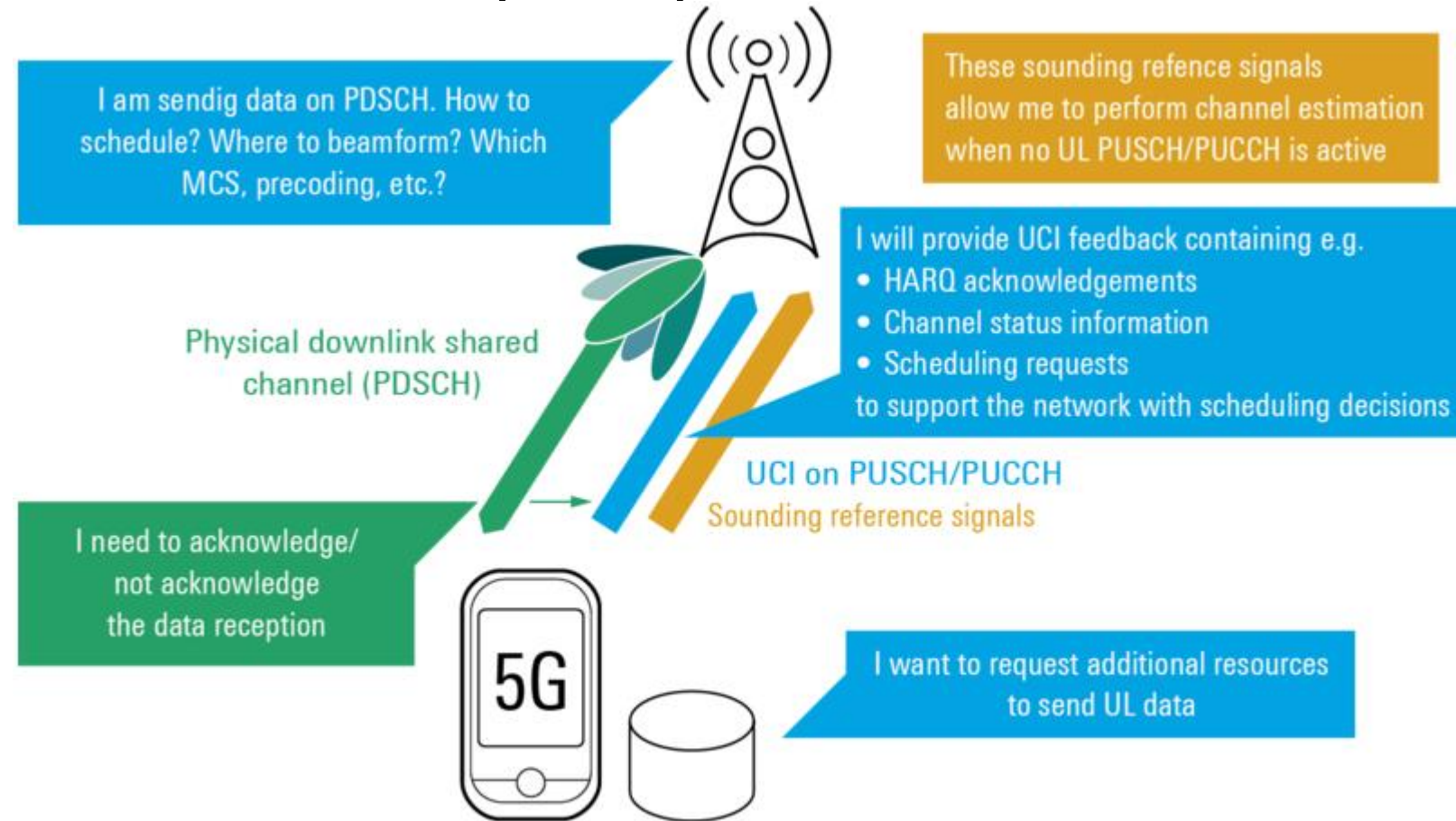


Fig. 2-74 Uplink control information (UCI) – general model overview.

R&S. (2020). 5G New Radio. Fundamentals, procedures, testing aspects.

<https://gloris.rohde-schwarz.com/ebooks/5G>

Scheduling request (SR)

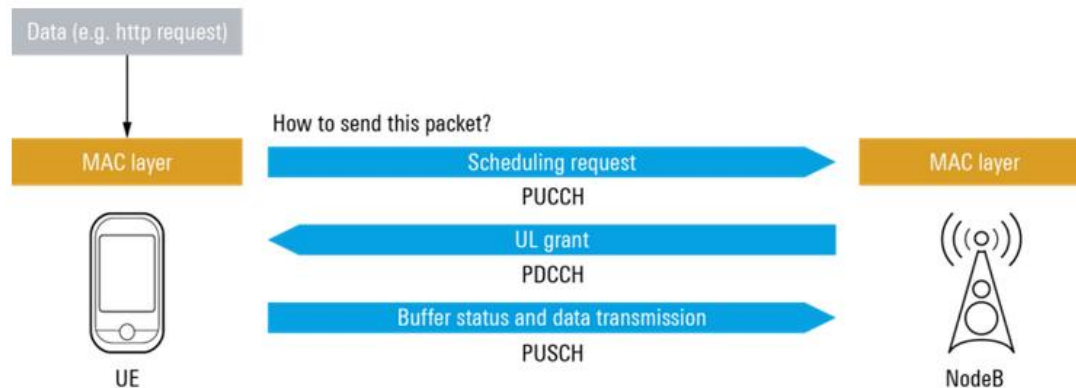


Fig. 2-67 Scheduling request procedure.

- Each logical channel associated with specific SR id per cell and BWP.
- UE may transmit SR as soon as it has data in the applicable buffer of logical channel
- If no PUCCH resources then UE starts random access procedure
- Buffer Status Report (BSR)

R&S. (2020). 5G New Radio. Fundamentals, procedures, testing aspects.

<https://gloris.rohde-schwarz.com/ebooks/5G>

PUSCH

- Carry UE data in UL
- LDPC coding scheme
- DMRS reference signals (type A or type B)
- UCI can be multiplexed

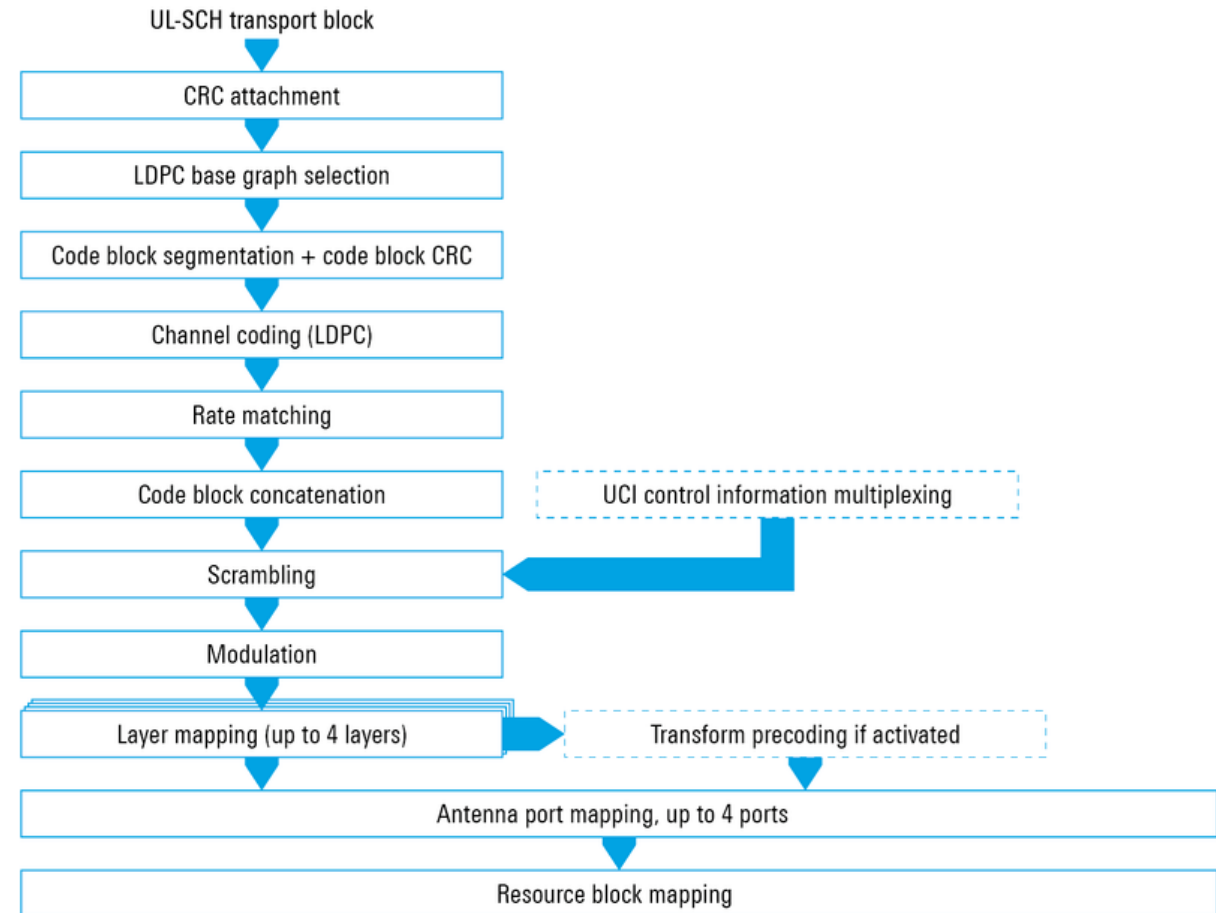


Fig. 1-70 PUSCH physical layer processing.

R&S. (2020). 5G New Radio. Fundamentals, procedures, testing aspects.

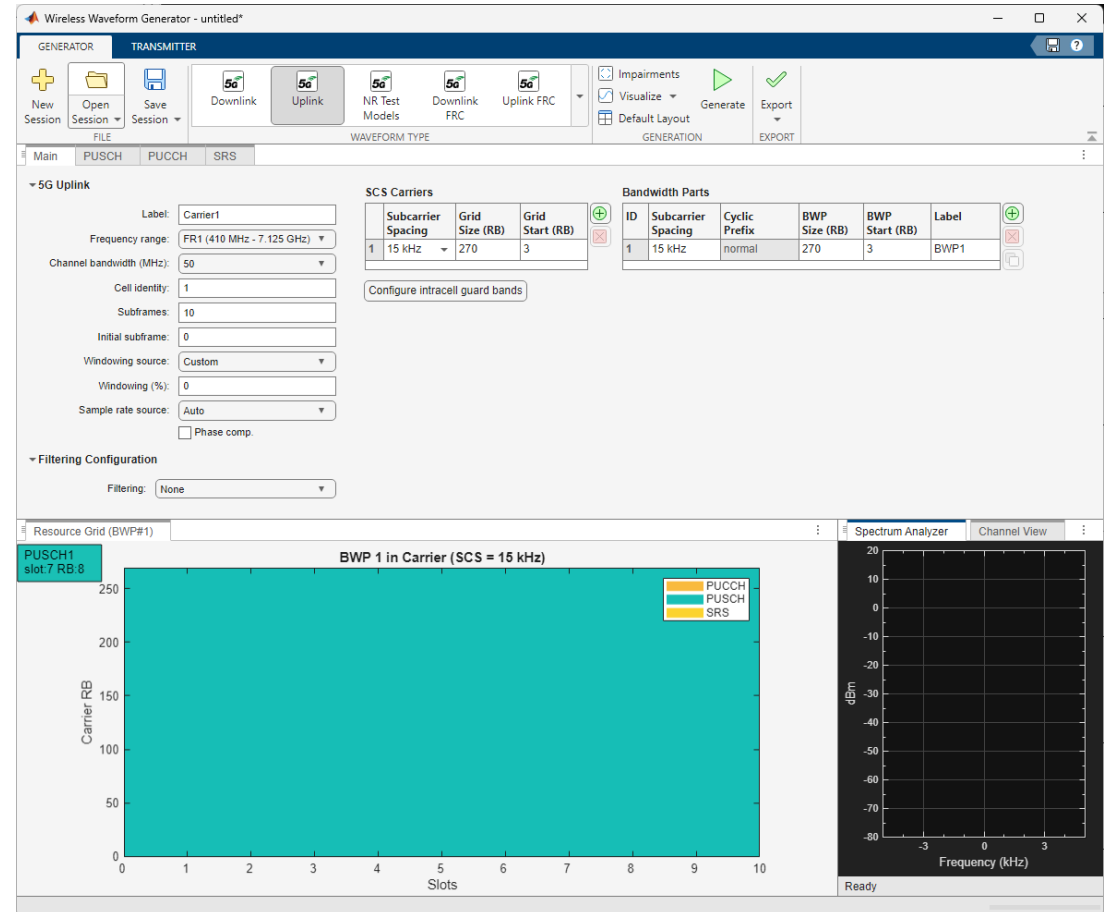
<https://gloris.rohde-schwarz.com/ebooks/5G>

Signals (in UL transmitted by UE)

- Demodulation reference signal (DM-RS) – for channel estimation and equalization, for power control
 - For PUSCH
 - Different sequences depending on transform precoding enabled or disabled
 - For PUCCH
 - Different sequences depending on PUCCH format 1, 2, 3 or 4
- Phase-tracking reference signal (PT-RS) – to suppress phase noise
 - Can be used for PUSCH
 - Different sequences depending on transform precoding enabled or disabled
- Sounding Reference signal (SRS) – sent by UE to enable channel estimation
 - Aperiodic, periodic or semi-persistent (triggered)

Tasks

- UL grid and waveform
- Generate PUCCH format 1, 2, 3 or 4
 - Generate PUSCH
- Get configuration info from SIB1 example (see next 14 slides)
- **Use 5G Waveform Generator app**



Example MIB

Channel	Message	Category	
5G NR Channel 1 @ 3491.040 MHz (632736)	BCCH BCH Message	BCH MIB Parameters	

Sub-Category	Path	IE	Value
Cell Status Info	_MIB/cellBarred	cellBarred	1
Reference Signals Info	_MIB/dmrs_TypeA_Position	dmrs_TypeA_Position	0
Cell Selection Info	_MIB/intraFreqReselection	intraFreqReselection	0
PDCCH CORESET Info	_MIB/pdcch_ConfigSIB1/controlResourceSetZero	controlResourceSetZero	12
PDCCH CORESET Info	_MIB/pdcch_ConfigSIB1/searchSpaceZero	searchSpaceZero	2
PDCCH CORESET Info	_MIB/pdcch_ConfigSIB1/searchSpaceZero	searchSpaceZero	4
SS/PBCH Block Info	_MIB/ssb_SubcarrierOffset	ssb_SubcarrierOffset	8
Sub Carrier Spacing Info	_MIB/subCarrierSpacingCommon	subCarrierSpacingCommon	1

Example SIB1: cell access parameters (1)

Channel	Message	Category
5G NR Channel 1 @ 3491.040 MHz (632736)	System Information Block 1	SIB1 Cell Access Parameters

Sub-Category	Path	IE	Value
PLMN Info	_SIB1/cellAccessRelatedInfo/plmn_IdentityInfoList/_PLMN_IdentityInfo/plmn_IdentityList/_PLMN_Identity/mcc/MCC_MNC_Digit[0]	MCC_MNC_Digit[0]	2
PLMN Info	_SIB1/cellAccessRelatedInfo/plmn_IdentityInfoList/_PLMN_IdentityInfo/plmn_IdentityList/_PLMN_Identity/mcc/MCC_MNC_Digit[1]	MCC_MNC_Digit[1]	4
PLMN Info	_SIB1/cellAccessRelatedInfo/plmn_IdentityInfoList/_PLMN_IdentityInfo/plmn_IdentityList/_PLMN_Identity/mcc/MCC_MNC_Digit[2]	MCC_MNC_Digit[2]	8
PLMN Info	_SIB1/cellAccessRelatedInfo/plmn_IdentityInfoList/_PLMN_IdentityInfo/plmn_IdentityList/_PLMN_Identity/mnc/MCC_MNC_Digit[0]	MCC_MNC_Digit[0]	2
PLMN Info	_SIB1/cellAccessRelatedInfo/plmn_IdentityInfoList/_PLMN_IdentityInfo/plmn_IdentityList/_PLMN_Identity/mnc/MCC_MNC_Digit[1]	MCC_MNC_Digit[1]	7

Example SIB1: cell access parameters (2)

Channel	Message	Category
5G NR Channel 1 @ 3491.040 MHz (632736)	System Information Block 1	SIB1 Cell Access Parameters

Sub-Category	Path	IE	Value
Cell Info	_SIB1/cellAccessRelatedInfo/plmn_IdentityInfoList/_PLMN_IdentityInfo/cellIdentity	cellIdentity	0x0000043f80
Cell Info	_SIB1/cellAccessRelatedInfo/plmn_IdentityInfoList/_PLMN_IdentityInfo/cellIdentity[36Bit 28/8]	cellIdentity[36Bit 28/8]	17400
Cell Info	_SIB1/cellAccessRelatedInfo/plmn_IdentityInfoList/_PLMN_IdentityInfo/cellReservedForOperatorUse	cellReservedForOperatorUse	1
Cell Info	_SIB1/cellAccessRelatedInfo/plmn_IdentityInfoList/_PLMN_IdentityInfo/trackingAreaCode	trackingAreaCode	0x001389
Cell Info	_SIB1/cellAccessRelatedInfo/plmn_IdentityInfoList/_PLMN_IdentityInfo/trackingAreaCode[]	trackingAreaCode[]	5001

Example SIB1: cell common configuration (1)

Channel	Message	Category	
5G NR Channel 1 @ 3491.040 MHz (632736)	System Information Block 1	SIB1 Cell Config Common Parameters	
Sub-Category	Path	IE	Value
Timing Advance Info	_SIB1/servingCellConfigCommon/n_TimingAdvanceOffset	n_TimingAdvanceOffset	1
SS/PBCH Block Info	_SIB1/servingCellConfigCommon/ss_PBCH_BlockPower	ss_PBCH_BlockPower	-6
SS/PBCH Block Info	_SIB1/servingCellConfigCommon/ssb_PeriodicityServingCell	ssb_PeriodicityServingCell	2
SS/PBCH Block Info	_SIB1/servingCellConfigCommon/ssb_PositionsInBurst/inOneGroup	inOneGroup	0x80

Example SIB1: cell common configuration (2)

Channel	Message	Category
5G NR Channel 1 @ 3491.040 MHz (632736)	System Information Block 1	SIB1 Cell Config Common Parameters

Sub-Category	Path: _SIB1/servingCellConfigCommon/tdd_UL_DL_Configurati onCommon/_TDD_UL_DL_ConfigCommon/	IE	Value
TDD Pattern 1 Info	pattern1/_TDD_UL_DL_Pattern/dl_UL_TransmissionPeriodicity	dl_UL_TransmissionPeriodicity	5
TDD Pattern 1 Info	pattern1/_TDD_UL_DL_Pattern/nrofDownlinkSlots	nrofDownlinkSlots	3
TDD Pattern 1 Info	pattern1/_TDD_UL_DL_Pattern/nrofDownlinkSymbols	nrofDownlinkSymbols	10
TDD Pattern 1 Info	pattern1/_TDD_UL_DL_Pattern/nrofUplinkSlots	nrofUplinkSlots	1
TDD Pattern 1 Info	pattern1/_TDD_UL_DL_Pattern/nrofUplinkSymbols	nrofUplinkSymbols	2
TDD Info	referenceSubcarrierSpacing	referenceSubcarrierSpacing	1

Example SIB1: DL cell common configuration (1)

Channel	Message	Category
5G NR Channel 1 @ 3491.040 MHz (632736)	System Information Block 1	SIB1 DL Cell Config Common Parameters

Sub-Category	Path: _SIB1/servingCellConfigCommon/downlinkConfigCommon /	IE	Value
BCCH Config Info	bcch_Config/modificationPeriodCoeff	modificationPeriodCoeff	0
DL Frequency Band Info	frequencyInfoDL/frequencyBandList/_NR_MultiBandInfo/fr eqBandIndicatorNR	freqBandIndicatorNR	78
DL Frequency Band Info	frequencyInfoDL/offsetToPointA	offsetToPointA	36
DL Carrier Info	frequencyInfoDL/scs_SpecificCarrierList/_SCS_SpecificCarrie r/carrierBandwidth	carrierBandwidth	162
DL Carrier Info	frequencyInfoDL/scs_SpecificCarrierList/_SCS_SpecificCarrie r/offsetToCarrier	offsetToCarrier	0
DL Carrier Info	frequencyInfoDL/scs_SpecificCarrierList/_SCS_SpecificCarrie r/subcarrierSpacing	subcarrierSpacing	1

162 = 60 MHz

[5G | [ShareTechnote](#)]

Example SIB1: DL cell common configuration (2)

Channel	Message	Category
5G NR Channel 1 @ 3491.040 MHz (632736)	System Information Block 1	SIB1 DL Cell Config Common Parameters

Sub-Category	Path: <u>SIB1/servingCellConfigCommon/downlinkConfigCommon/</u>	IE	Value
Generic initial DBWP Info	initialDownlinkBWP/_BWP_DownlinkCommon/genericParameters/_BWP/locationAndBandwidth	locationAndBandwidth	31624
Generic initial DBWP Info	initialDownlinkBWP/_BWP_DownlinkCommon/genericParameters/_BWP/subcarrierSpacing	subcarrierSpacing	1
PCCH Config Info	pcch_Config/defaultPagingCycle	defaultPagingCycle	2
PCCH Config Info	pcch_Config/firstPDCCH_MonitoringOccasionOfPO/sCS30KHZoneT_SCS1_5KHZhalfT/_of25_	_of25_	5
PCCH Config Info	pcch_Config/nAndPagingFrameOffset/oneT	oneT	0
PCCH Config Info	pcch_Config/ns	ns	2

Example SIB1: DL cell common configuration (3)

Channel	Message	Category	Sub-Category
5G NR Channel 1 @ 3491.040 MHz (632736)	System Information Block 1	SIB1 DL Cell Config Common Parameters	Initial DBWP PDCCH Info

Path:		
SIB1/servingCellConfigCommon/downlinkConfigCommon/initialDownlinkBWP/		
BWP_DownlinkCommon/pdcch_ConfigCommon/setup/		
	IE	Value
_PDCCH_ConfigCommon/commonSearchSpaceList/_SearchSpace/controlResourceSetId	controlResourceSetId	0
_PDCCH_ConfigCommon/commonSearchSpaceList/_SearchSpace/monitoringSlotPeriodicityAndOffset/sl1	sl1	0
_PDCCH_ConfigCommon/commonSearchSpaceList/_SearchSpace/monitoringSymbolsWithinSlot	monitoringSymbolsWithinSlot	0x2000
_PDCCH_ConfigCommon/commonSearchSpaceList/_SearchSpace/nrofCandidates/aggregationLevel1	aggregationLevel1	0
_PDCCH_ConfigCommon/commonSearchSpaceList/_SearchSpace/nrofCandidates/aggregationLevel16	aggregationLevel16	0
_PDCCH_ConfigCommon/commonSearchSpaceList/_SearchSpace/nrofCandidates/aggregationLevel2	aggregationLevel2	0
_PDCCH_ConfigCommon/commonSearchSpaceList/_SearchSpace/nrofCandidates/aggregationLevel4	aggregationLevel4	0
_PDCCH_ConfigCommon/commonSearchSpaceList/_SearchSpace/nrofCandidates/aggregationLevel8	aggregationLevel8	1
_PDCCH_ConfigCommon/commonSearchSpaceList/_SearchSpace/searchSpaceId	searchSpaceId	1
_PDCCH_ConfigCommon/commonSearchSpaceList/_SearchSpace/searchSpaceType/common/dci_Format0_0_AndFormat1_0/	dci_Format0_0_AndFormat1_0	n.a.
_PDCCH_ConfigCommon/pagingSearchSpace	pagingSearchSpace	1
_PDCCH_ConfigCommon/ra_SearchSpace	ra_SearchSpace	1
_PDCCH_ConfigCommon/searchSpaceOtherSystemInformation	searchSpaceOtherSystemInformation	1
_PDCCH_ConfigCommon/searchSpaceSIB1	searchSpaceSIB1	0

Example SIB1: DL cell common configuration (4)

Channel	Message	Category	Sub-Category
5G NR Channel 1 @ 3491.040 MHz (632736)	System Information Block 1	SIB1 DL Cell Config Common Parameters	Initial DBWP PDSCH Info

Path:		
_SIB1/servingCellConfigCommon/downlinkConfigCommon/initialDownlinkBWP/_BWP_DownlinkCommon/pdsch_ConfigCommon/setup/_PDSCH_ConfigCommon/	IE	Value
pdsch_TimeDomainAllocationList/_PDSCH_TimeDomainResourceAllocation[0]/k0	k0	0
pdsch_TimeDomainAllocationList/_PDSCH_TimeDomainResourceAllocation[0]/mappingType	mappingType	0
pdsch_TimeDomainAllocationList/_PDSCH_TimeDomainResourceAllocation[0]/startSymbolAndLength	startSymbolAndLength	40
pdsch_TimeDomainAllocationList/_PDSCH_TimeDomainResourceAllocation[1]/k0	k0	0
pdsch_TimeDomainAllocationList/_PDSCH_TimeDomainResourceAllocation[1]/mappingType	mappingType	0
pdsch_TimeDomainAllocationList/_PDSCH_TimeDomainResourceAllocation[1]/startSymbolAndLength	startSymbolAndLength	96
pdsch_TimeDomainAllocationList/_PDSCH_TimeDomainResourceAllocation[2]/k0	k0	0
pdsch_TimeDomainAllocationList/_PDSCH_TimeDomainResourceAllocation[2]/mappingType	mappingType	0
pdsch_TimeDomainAllocationList/_PDSCH_TimeDomainResourceAllocation[2]/startSymbolAndLength	startSymbolAndLength	85

Example SIB1: general info

Channel	Message	Category
5G NR Channel 1 @ 3491.040 MHz (632736)	System Information Block 1	SIB1 General Parameters

Sub-Category	Path	IE	Value
Cell Selection Info	_SIB1/cellSelectionInfo/q_RxLevMin	q_RxLevMin	-70
Cell Selection Info	_SIB1/cellSelectionInfo/q_RxLevMin[dBm]	q_RxLevMin[dBm]	-140

Example SIB1: UE parameters

Channel	Message	Category
5G NR Channel 1 @ 3491.040 MHz (632736)	System Information Block 1	SIB1 UE Parameters

Sub-Category	Path	IE	Value
Timers and Constants Info	_SIB1/ue_TimersAndConstants/n310	n310	7
Timers and Constants Info	_SIB1/ue_TimersAndConstants/n311	n311	0
Timers and Constants Info	_SIB1/ue_TimersAndConstants/t300	t300	5
Timers and Constants Info	_SIB1/ue_TimersAndConstants/t301	t301	3
Timers and Constants Info	_SIB1/ue_TimersAndConstants/t310	t310	6
Timers and Constants Info	_SIB1/ue_TimersAndConstants/t311	t311	1
Timers and Constants Info	_SIB1/ue_TimersAndConstants/t319	t319	3

Example SIB1: UL cell common configuration (1)

Channel	Message	Category
5G NR Channel 1 @ 3491.040 MHz (632736)	System Information Block 1	SIB1 UL Cell Config Common Parameters

Sub-Category	Path: <code>_SIB1/servingCellConfigCommon/uplinkConfigCommon/</code>	IE	Value
UL Carrier Info	<code>frequencyInfoUL/p_Max</code>	<code>p_Max</code>	23
UL Carrier Info	<code>frequencyInfoUL/scs_SpecificCarrierList/_SCS_SpecificCarrier/carrierBandwidth</code>	<code>carrierBandwidth</code>	162
UL Carrier Info	<code>frequencyInfoUL/scs_SpecificCarrierList/_SCS_SpecificCarrier/offsetToCarrier</code>	<code>offsetToCarrier</code>	0
UL Carrier Info	<code>frequencyInfoUL/scs_SpecificCarrierList/_SCS_SpecificCarrier/subcarrierSpacing</code>	<code>subcarrierSpacing</code>	1
Generic initial UBWP Info	<code>initialUplinkBWP/_BWP_UplinkCommon/genericParameters/_BWP/locationAndBandwidth</code>	<code>locationAndBandwidth</code>	31624
Generic initial UBWP Info	<code>initialUplinkBWP/_BWP_UplinkCommon/genericParameters/_BWP/subcarrierSpacing</code>	<code>subcarrierSpacing</code>	1
Time Alignment Info	<code>timeAlignmentTimerCommon</code>	<code>timeAlignmentTimerCommon</code>	7

31624 = 162 RBs
[5G | ShareTechnote]

Example SIB1: UL cell common configuration (2)

Channel	Message	Category
5G NR Channel 1 @ 3491.040 MHz (632736)	System Information Block 1	SIB1 UL Cell Config Common Parameters

Sub-Category	Path: _SIB1/servingCellConfigCommon/uplinkConfigCommon/	IE	Value
Initial UBWP PUCCH Info	initialUplinkBWP/_BWP_UplinkCommon/pucch_ConfigCommon/setup/_PUCCH_C onfigCommon/hoppingId	hoppingId	0
Initial UBWP PUCCH Info	initialUplinkBWP/_BWP_UplinkCommon/pucch_ConfigCommon/setup/_PUCCH_C onfigCommon/p0_nominal	p0_nominal	-96
Initial UBWP PUCCH Info	initialUplinkBWP/_BWP_UplinkCommon/pucch_ConfigCommon/setup/_PUCCH_C onfigCommon/pucch_GroupHopping	pucch_GroupHo pping	1
Initial UBWP PUCCH Info	initialUplinkBWP/_BWP_UplinkCommon/pucch_ConfigCommon/setup/_PUCCH_C onfigCommon/pucch_ResourceCommon	pucch_Resource Common	12

Example SIB1: UL cell common configuration (3)

Channel	Message	Category	Sub-Category
5G NR Channel 1 @ 3491.040 MHz (632736)	System Information Block 1	SIB1 UL Cell Config Common Parameters	Initial UBWP PUSCH Info

Path:		27= SLIV, S=0, L=14 [5G ShareTechnote]	
_SIB1/servingCellConfigCommon/uplinkConfigCommon/initialUplinkBWP/BWP_UplinkCommon/pusch_ConfigCommon/setup/_		IE	Value
_PUSCH_ConfigCommon/groupHoppingEnabledTransformPrecoding		groupHoppingEnabledTransformPrecoding	0
_PUSCH_ConfigCommon/msg3_DeltaPreamble		msg3_DeltaPreamble	6
_PUSCH_ConfigCommon/p0_NominalWithGrant		p0_NominalWithGrant	-80
_PUSCH_ConfigCommon/pusch_TimeDomainAllocationList/_PUSCH_TimeDomainResourceAllocation[0]/k2		k2	1
_PUSCH_ConfigCommon/pusch_TimeDomainAllocationList/_PUSCH_TimeDomainResourceAllocation[0]/mappingType		mappingType	0
_PUSCH_ConfigCommon/pusch_TimeDomainAllocationList/_PUSCH_TimeDomainResourceAllocation[0]/startSymbolAndLength		startSymbolAndLength	27
_PUSCH_ConfigCommon/pusch_TimeDomainAllocationList/_PUSCH_TimeDomainResourceAllocation[1]/k2		k2	2
_PUSCH_ConfigCommon/pusch_TimeDomainAllocationList/_PUSCH_TimeDomainResourceAllocation[1]/mappingType		mappingType	0
_PUSCH_ConfigCommon/pusch_TimeDomainAllocationList/_PUSCH_TimeDomainResourceAllocation[1]/startSymbolAndLength		startSymbolAndLength	27
_PUSCH_ConfigCommon/pusch_TimeDomainAllocationList/_PUSCH_TimeDomainResourceAllocation[2]/k2		k2	3
_PUSCH_ConfigCommon/pusch_TimeDomainAllocationList/_PUSCH_TimeDomainResourceAllocation[2]/mappingType		mappingType	0
_PUSCH_ConfigCommon/pusch_TimeDomainAllocationList/_PUSCH_TimeDomainResourceAllocation[2]/startSymbolAndLength		startSymbolAndLength	27
_PUSCH_ConfigCommon/pusch_TimeDomainAllocationList/_PUSCH_TimeDomainResourceAllocation[3]/k2		k2	4
_PUSCH_ConfigCommon/pusch_TimeDomainAllocationList/_PUSCH_TimeDomainResourceAllocation[3]/mappingType		mappingType	0
_PUSCH_ConfigCommon/pusch_TimeDomainAllocationList/_PUSCH_TimeDomainResourceAllocation[3]/startSymbolAndLength		startSymbolAndLength	27
_PUSCH_ConfigCommon/pusch_TimeDomainAllocationList/_PUSCH_TimeDomainResourceAllocation[4]/k2		k2	5
_PUSCH_ConfigCommon/pusch_TimeDomainAllocationList/_PUSCH_TimeDomainResourceAllocation[4]/mappingType		mappingType	0
_PUSCH_ConfigCommon/pusch_TimeDomainAllocationList/_PUSCH_TimeDomainResourceAllocation[4]/startSymbolAndLength		startSymbolAndLength	27
_PUSCH_ConfigCommon/pusch_TimeDomainAllocationList/_PUSCH_TimeDomainResourceAllocation[5]/k2		k2	6
_PUSCH_ConfigCommon/pusch_TimeDomainAllocationList/_PUSCH_TimeDomainResourceAllocation[5]/mappingType		mappingType	0
_PUSCH_ConfigCommon/pusch_TimeDomainAllocationList/_PUSCH_TimeDomainResourceAllocation[5]/startSymbolAndLength		startSymbolAndLength	27
_PUSCH_ConfigCommon/pusch_TimeDomainAllocationList/_PUSCH_TimeDomainResourceAllocation[6]/k2		k2	7
_PUSCH_ConfigCommon/pusch_TimeDomainAllocationList/_PUSCH_TimeDomainResourceAllocation[6]/mappingType		mappingType	0 26
_PUSCH_ConfigCommon/pusch_TimeDomainAllocationList/_PUSCH_TimeDomainResourceAllocation[6]/startSymbolAndLength		startSymbolAndLength	27

Example SIB1: UL cell common configuration (4)

Channel	Message	Category	Sub-Category
5G NR Channel 1 @ 3491.040 MHz (632736)	System Information Block 1	SIB1 UL Cell Config Common Parameters	Initial UBWP RACH Info

Path: _SIB1/servingCellConfigCommon/uplinkConfigCommon/initialUplinkBWP/BWP_UplinkCommon/rach_ConfigCommon/setup/		IE	Value
_RACH_ConfigCommon/msg1_SubcarrierSpacing		msg1_SubcarrierSpacing	1
_RACH_ConfigCommon/prach_RootSequenceIndex/l139		l139	85
_RACH_ConfigCommon/ra_ContentionResolutionTimer		ra_ContentionResolutionTimer	1
_RACH_ConfigCommon/rach_ConfigGeneric/msg1_FDM		msg1_FDM	0
_RACH_ConfigCommon/rach_ConfigGeneric/msg1_FrequencyStart		msg1_FrequencyStart	3
_RACH_ConfigCommon/rach_ConfigGeneric/powerRampingStep		powerRampingStep	2
_RACH_ConfigCommon/rach_ConfigGeneric/prach_ConfigurationIndex		prach_ConfigurationIndex	159
_RACH_ConfigCommon/rach_ConfigGeneric/preambleReceivedTargetPower		preambleReceivedTargetPower	-90
_RACH_ConfigCommon/rach_ConfigGeneric/preambleTransMax		preambleTransMax	6
_RACH_ConfigCommon/rach_ConfigGeneric/ra_ResponseWindow		ra_ResponseWindow	4
_RACH_ConfigCommon/rach_ConfigGeneric/zeroCorrelationZoneConfig		zeroCorrelationZoneConfig	9
_RACH_ConfigCommon/restrictedSetConfig		restrictedSetConfig	0
_RACH_ConfigCommon/ssb_perRACH_OccasionAndCB_PreamblesPerSSB/one		one	3
_RACH_ConfigCommon/totalNumberOfRA_Preambles		totalNumberOfRA_Preambles	17