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Physical channels and modulation  
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# Contents

Intellectual Property Rights .....	2
Foreword.....	2
Modal verbs terminology.....	2
Foreword.....	8
1 Scope .....	9
2 References .....	9
3 Symbols and abbreviations.....	9
3.1 Symbols.....	9
3.2 Abbreviations .....	13
4 Frame structure.....	14
4.1 Frame structure type 1 .....	14
4.2 Frame structure type 2.....	15
4.3 Frame structure type 3 .....	16
5 Uplink.....	18
5.1 Overview .....	18
5.1.1 Physical channels.....	18
5.1.2 Physical signals.....	18
5.2 Slot structure and physical resources.....	18
5.2.1 Resource grid .....	18
5.2.2 Resource elements .....	20
5.2.3 Resource blocks .....	20
5.2.4 Narrowbands.....	20
5.2.5 Guard period for narrowband retuning .....	21
5.3 Physical uplink shared channel .....	22
5.3.1 Scrambling.....	22
5.3.2 Modulation.....	23
5.3.2A Layer mapping .....	24
5.3.2A.1 Layer mapping for transmission on a single antenna port.....	24
5.3.2A.2 Layer mapping for spatial multiplexing .....	24
5.3.3 Transform precoding.....	25
5.3.3A Precoding .....	25
5.3.3A.1 Precoding for transmission on a single antenna port.....	25
5.3.3A.2 Precoding for spatial multiplexing .....	25
5.3.4 Mapping to physical resources.....	28
5.4 Physical uplink control channel.....	30
5.4.1 PUCCH formats 1, 1a and 1b .....	31
5.4.2 PUCCH formats 2, 2a and 2b .....	34
5.4.2A PUCCH format 3 .....	35
5.4.2B PUCCH format 4 .....	37
5.4.2C PUCCH format 5 .....	37
5.4.3 Mapping to physical resources.....	38
5.5 Reference signals.....	41
5.5.1 Generation of the reference signal sequence.....	41
5.5.1.1 Base sequences of length $3N_{sc}^{RB}$ or larger .....	41
5.5.1.2 Base sequences of length less than $3N_{sc}^{RB}$ .....	42
5.5.1.3 Group hopping .....	44
5.5.1.4 Sequence hopping .....	45
5.5.1.5 Determining virtual cell identity for sequence generation .....	45
5.5.2 Demodulation reference signal .....	46
5.5.2.1 Demodulation reference signal for PUSCH .....	46
5.5.2.1.1 Reference signal sequence.....	46
5.5.2.1.2 Mapping to physical resources .....	48

5.5.2.2	Demodulation reference signal for PUCCH.....	48
5.5.2.2.1	Reference signal sequence.....	48
5.5.2.2.2	Mapping to physical resources .....	50
5.5.3	Sounding reference signal.....	51
5.5.3.1	Sequence generation.....	51
5.5.3.2	Mapping to physical resources.....	51
5.5.3.3	Sounding reference signal subframe configuration.....	54
5.6	SC-FDMA baseband signal generation .....	55
5.7	Physical random access channel.....	56
5.7.1	Time and frequency structure .....	56
5.7.2	Preamble sequence generation.....	62
5.7.3	Baseband signal generation.....	65
5.8	Modulation and upconversion .....	66
6	Downlink.....	67
6.1	Overview .....	67
6.1.1	Physical channels.....	67
6.1.2	Physical signals.....	67
6.2	Slot structure and physical resource elements .....	68
6.2.1	Resource grid .....	68
6.2.2	Resource elements .....	69
6.2.3	Resource blocks .....	70
6.2.3.1	Virtual resource blocks of localized type .....	70
6.2.3.2	Virtual resource blocks of distributed type .....	70
6.2.4	Resource-element groups.....	72
6.2.4A	Enhanced Resource-Element Groups (EREGs) .....	72
6.2.5	Guard period for half-duplex FDD operation .....	73
6.2.6	Guard Period for TDD Operation .....	73
6.2.7	Narrowbands.....	73
6.2.8	Guard period for narrowband retuning .....	73
6.3	General structure for downlink physical channels.....	73
6.3.1	Scrambling.....	74
6.3.2	Modulation.....	75
6.3.3	Layer mapping .....	75
6.3.3.1	Layer mapping for transmission on a single antenna port.....	75
6.3.3.2	Layer mapping for spatial multiplexing .....	76
6.3.3.3	Layer mapping for transmit diversity .....	77
6.3.4	Precoding .....	77
6.3.4.1	Precoding for transmission on a single antenna port.....	77
6.3.4.2	Precoding for spatial multiplexing using antenna ports with cell-specific reference signals .....	77
6.3.4.2.1	Precoding without CDD .....	78
6.3.4.2.2	Precoding for large delay CDD .....	78
6.3.4.2.3	Codebook for precoding and CSI reporting.....	79
6.3.4.3	Precoding for transmit diversity .....	80
6.3.4.4	Precoding for spatial multiplexing using antenna ports with UE-specific reference signals.....	81
6.3.5	Mapping to resource elements .....	81
6.4	Physical downlink shared channel.....	82
6.4.1	Physical downlink shared channel for BL/CE UEs .....	83
6.5	Physical multicast channel .....	85
6.6	Physical broadcast channel.....	85
6.6.1	Scrambling.....	85
6.6.2	Modulation.....	85
6.6.3	Layer mapping and precoding .....	85
6.6.4	Mapping to resource elements .....	86
6.7	Physical control format indicator channel .....	87
6.7.1	Scrambling.....	87
6.7.2	Modulation.....	87
6.7.3	Layer mapping and precoding .....	88
6.7.4	Mapping to resource elements .....	88
6.8	Physical downlink control channel.....	88
6.8.1	PDCCH formats.....	88
6.8.2	PDCCH multiplexing and scrambling .....	89

6.8.3	Modulation.....	89
6.8.4	Layer mapping and precoding .....	89
6.8.5	Mapping to resource elements .....	89
6.8A	Enhanced physical downlink control channel .....	90
6.8A.1	EPDCCH formats .....	90
6.8A.2	Scrambling .....	92
6.8A.3	Modulation.....	92
6.8A.4	Layer mapping and precoding .....	92
6.8A.5	Mapping to resource elements .....	92
6.8B	MTC physical downlink control channel .....	93
6.8B.1	MPDCCH formats .....	93
6.8B.2	Scrambling .....	94
6.8B.3	Modulation.....	95
6.8B.4	Layer mapping and precoding .....	95
6.8B.5	Mapping to resource elements .....	95
6.9	Physical hybrid ARQ indicator channel .....	97
6.9.1	Modulation.....	98
6.9.2	Resource group alignment, layer mapping and precoding.....	99
6.9.3	Mapping to resource elements .....	100
6.10	Reference signals.....	102
6.10.1	Cell-specific Reference Signal (CRS).....	102
6.10.1.1	Sequence generation.....	103
6.10.1.2	Mapping to resource elements.....	103
6.10.2	MBSFN reference signals .....	105
6.10.2.1	Sequence generation.....	105
6.10.2.2	Mapping to resource elements.....	105
6.10.3	UE-specific reference signals associated with PDSCH .....	107
6.10.3.1	Sequence generation.....	108
6.10.3.2	Mapping to resource elements.....	109
6.10.3A	Demodulation reference signals associated with EPDCCH or MPDCCH.....	114
6.10.3A.1	Sequence generation.....	114
6.10.3A.2	Mapping to resource elements.....	115
6.10.4	Positioning reference signals .....	116
6.10.4.1	Sequence generation.....	116
6.10.4.2	Mapping to resource elements.....	117
6.10.4.3	Positioning reference signal subframe configuration .....	118
6.10.5	CSI reference signals .....	118
6.10.5.1	Sequence generation.....	119
6.10.5.2	Mapping to resource elements.....	119
6.10.5.3	CSI reference signal subframe configuration .....	125
6.11	Synchronization signals.....	125
6.11.1	Primary synchronization signal (PSS) .....	125
6.11.1.1	Sequence generation.....	125
6.11.1.2	Mapping to resource elements.....	126
6.11.2	Secondary synchronization signal (SSS) .....	126
6.11.2.1	Sequence generation.....	126
6.11.2.2	Mapping to resource elements.....	128
6.11A	Discovery signal .....	129
6.12	OFDM baseband signal generation .....	129
6.13	Modulation and upconversion .....	130
7	Generic functions .....	131
7.1	Modulation mapper .....	131
7.1.1	BPSK .....	131
7.1.2	QPSK .....	131
7.1.3	16QAM .....	131
7.1.4	64QAM .....	132
7.1.5	256QAM .....	133
7.2	Pseudo-random sequence generation.....	135
8	Timing .....	135
8.1	Uplink-downlink frame timing .....	135

9	Sidelink.....	136
9.1	Overview .....	136
9.1.1	Physical channels.....	136
9.1.2	Physical signals.....	136
9.1.3	Handling of simultaneous sidelink and uplink/downlink transmissions .....	136
9.2	Slot structure and physical resources.....	137
9.2.1	Resource grid .....	137
9.2.2	Resource elements .....	137
9.2.3	Resource blocks .....	138
9.2.4	Resource pool .....	138
9.2.5	Guard period .....	138
9.3	Physical Sidelink Shared Channel.....	138
9.3.1	Scrambling .....	138
9.3.2	Modulation.....	138
9.3.3	Layer mapping .....	139
9.3.4	Transform precoding.....	139
9.3.5	Precoding .....	139
9.3.6	Mapping to physical resources.....	139
9.4	Physical Sidelink Control Channel.....	140
9.4.1	Scrambling .....	140
9.4.2	Modulation.....	140
9.4.3	Layer mapping .....	140
9.4.4	Transform precoding.....	140
9.4.5	Precoding .....	140
9.4.6	Mapping to physical resources.....	140
9.5	Physical Sidelink Discovery Channel.....	141
9.5.1	Scrambling .....	141
9.5.2	Modulation.....	141
9.5.3	Layer mapping .....	141
9.5.4	Transform precoding.....	141
9.5.5	Precoding .....	141
9.5.6	Mapping to physical resources.....	141
9.6	Physical Sidelink Broadcast Channel.....	141
9.6.1	Scrambling .....	141
9.6.2	Modulation.....	142
9.6.3	Layer mapping .....	142
9.6.4	Transform precoding.....	142
9.6.5	Precoding .....	142
9.6.6	Mapping to physical resources.....	142
9.7	Sidelink Synchronization Signals.....	142
9.7.1	Primary sidelink synchronization signal .....	142
9.7.1.1	Sequence generation.....	142
9.7.1.2	Mapping to resource elements.....	143
9.7.2	Secondary sidelink synchronization signal .....	143
9.7.2.1	Sequence generation.....	143
9.7.2.2	Mapping to resource elements.....	143
9.8	Demodulation reference signals .....	143
9.9	SC-FDMA baseband signal generation .....	144
9.10	Timing .....	144
10	Narrowband IoT .....	145
10.1	Uplink.....	145
10.1.1	Overview .....	145
10.1.1.1	Physical channels .....	145
10.1.1.2	Physical signals .....	145
10.1.2	Slot structure and physical resources .....	146
10.1.2.1	Resource grid .....	146
10.1.2.2	Resource elements.....	146
10.1.2.3	Resource unit.....	147
10.1.3	Narrowband physical uplink shared channel .....	147
10.1.3.1	Scrambling .....	147
10.1.3.2	Modulation .....	147

10.1.3.3	Layer mapping .....	147
10.1.3.4	Transform precoding .....	147
10.1.3.5	Precoding .....	148
10.1.3.6	Mapping to physical resources .....	148
10.1.4	Demodulation reference signal .....	148
10.1.4.1	Reference signal sequence .....	148
10.1.4.1.1	Reference signal sequence for $N_{sc}^{RU} = 1$ .....	148
10.1.4.1.2	Reference signal sequence for $N_{sc}^{RU} > 1$ .....	149
10.1.4.1.3	Group hopping .....	150
10.1.4.2	Mapping to physical resources .....	151
10.1.5	SC-FDMA baseband signal generation .....	152
10.1.6	Narrowband physical random access channel .....	152
10.1.6.1	Time and frequency structure .....	152
10.1.6.2	Baseband signal generation .....	154
10.1.7	Modulation and upconversion .....	154
10.2	Downlink .....	154
10.2.1	Overview .....	154
10.2.1.1	Physical channels .....	154
10.2.1.2	Physical signals .....	155
10.2.2	Slot structure and physical resource elements .....	155
10.2.2.1	Resource grid .....	155
10.2.2.2	Resource elements .....	155
10.2.2.3	Guard period for half-duplex FDD operation .....	155
10.2.3	Narrowband physical downlink shared channel .....	155
10.2.3.1	Scrambling .....	155
10.2.3.2	Modulation .....	155
10.2.3.3	Layer mapping and precoding .....	155
10.2.3.4	Mapping to resource elements .....	156
10.2.4	Narrowband physical broadcast channel .....	156
10.2.4.1	Scrambling .....	156
10.2.4.2	Modulation .....	156
10.2.4.3	Layer mapping and precoding .....	157
10.2.4.4	Mapping to resource elements .....	157
10.2.5	Narrowband physical downlink control channel .....	157
10.2.5.1	NPDCCH formats .....	157
10.2.5.2	Scrambling .....	157
10.2.5.3	Modulation .....	157
10.2.5.4	Layer mapping and precoding .....	158
10.2.5.5	Mapping to resource elements .....	158
10.2.6	Narrowband reference signal (NRS) .....	158
10.2.6.1	Sequence generation .....	159
10.2.6.2	Mapping to resource elements .....	159
10.2.7	Synchronization signals .....	160
10.2.7.1	Narrowband primary synchronization signal (NPSS) .....	160
10.2.7.1.1	Sequence generation .....	160
10.2.7.1.2	Mapping to resource elements .....	161
10.2.7.2	Narrowband secondary synchronization signal (NSSS) .....	161
10.2.7.2.1	Sequence generation .....	161
10.2.7.2.2	Mapping to resource elements .....	162
10.2.8	OFDM baseband signal generation .....	162
10.2.9	Modulation and upconversion .....	163
	<b>Annex A (informative):      Change history .....</b>	<b>164</b>
	History .....	170

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## Foreword

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# 1 Scope

The present document describes the physical channels for evolved UTRA.

# 2 References

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- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
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- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 36.201: "Evolved Universal Terrestrial Radio Access (E-UTRA); LTE physical layer; General description".
- [3] 3GPP TS 36.212: "Evolved Universal Terrestrial Radio Access (E-UTRA); Multiplexing and channel coding".
- [4] 3GPP TS 36.213: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer procedures".
- [5] 3GPP TS 36.214: "Evolved Universal Terrestrial Radio Access (E-UTRA); Physical layer; Measurements".
- [6] 3GPP TS 36.104: "Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception".
- [7] 3GPP TS 36.101: "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception".
- [8] 3GPP TS 36.321, "Evolved Universal Terrestrial Radio Access (E-UTRA); Medium Access Control (MAC) protocol specification".
- [9] 3GPP TS 36.331, "Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC) Protocol specification"
- [10] 3GPP TS 36.304, "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) procedures in idle mode"

# 3 Symbols and abbreviations

## 3.1 Symbols

For the purposes of the present document, the following symbols apply:

- |            |  |
|------------|--|
| ( $k, l$ ) | Resource element with frequency-domain index $k$ and time-domain index $l$ |
|------------|--|