

Anhang B: Liste der Parameterwerte für das Kostenmodul

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BTS / NodeB / eNodeB

Sites

Year	Description	Macrocell	Microcell	Picocell
2019	Sharing factor (reflecting the impact on investment due to sharing of a site with other operators)	100%	100%	100%
2020	Sharing factor (reflecting the impact on investment due to sharing of a site with other operators)	100%	100%	100%
2021	Sharing factor (reflecting the impact on investment due to sharing of a site with other operators)	100%	100%	100%
2022	Sharing factor (reflecting the impact on investment due to sharing of a site with other operators)	100%	100%	100%

Year	Average investment for, in EUR	Macrocell	Microcell	Picocell
2019	Construction per site	147.396	132.992	132.992
2019	Hybrid site upgrade	46.053	36.437	36.437
2020	Construction per site	150.344	135.651	135.651
2020	Hybrid site upgrade	46.974	37.166	37.166
2021	Construction per site	153.351	138.364	138.364
2021	Hybrid site upgrade	47.914	37.909	37.909
2022	Construction per site	156.418	141.132	141.132
2022	Hybrid site upgrade	48.872	38.667	38.667

Mobile Basestations for events

Year	Mobile Basestations for events	Number of units	Invest per unit (in EUR)
2019	GSM/EDGE	10	48.519
2019	UMTS/HSPA	15	38.065
2019	GSM/EDGE/UMTS/HSPA	empty	empty
2019	LTE	5	38.455
2020	GSM/EDGE	10	49.490
2020	UMTS/HSPA	15	38.826
2020	GSM/EDGE/UMTS/HSPA	empty	empty
2020	LTE	5	39.224
2021	GSM/EDGE	10	50.480
2021	UMTS/HSPA	15	39.603
2021	GSM/EDGE/UMTS/HSPA	empty	Empty
2021	LTE	5	40.009
2022	GSM/EDGE	10	51.489
2022	UMTS/HSPA	15	40.395
2022	GSM/EDGE/UMTS/HSPA	empty	empty
2022	LTE	5	40.809

GSM/EDGE equipment Investment in €

Year	Description	Investment, in EUR
2019	Macrocell 1-sector BTS equipment	19.413
2019	Macrocell 2-sector BTS equipment	24.877
2019	Macrocell 3-sector BTS equipment	30.158
2019	Microcell 3-sector BTS equipment	24.339
2019	Picocell 3-sector BTS equipment	19.187
2019	Pure 2G repeaters for highway and railway tunnels	15.917
2019	Overlay of BTS equipment (2-Band)	26.340
2019	Overlay of BTS equipment (3-Band)	28.809
2019	Max. distance between repeaters in tunnels (in km):	1,14
2020	Macrocell 1-sector BTS equipment	18.830
2020	Macrocell 2-sector BTS equipment	24.130
2020	Macrocell 3-sector BTS equipment	29.253
2020	Microcell 3-sector BTS equipment	23.609
2020	Picocell 3-sector BTS equipment	18.611
2020	Pure 2G repeaters for highway and railway tunnels	15.440
2020	Overlay of BTS equipment (2-Band)	25.550
2020	Overlay of BTS equipment (3-Band)	27.945
2020	Max. distance between repeaters in tunnels (in km):	1,14
2021	Macrocell 1-sector BTS equipment	18.266
2021	Macrocell 2-sector BTS equipment	23.406
2021	Macrocell 3-sector BTS equipment	28.376
2021	Microcell 3-sector BTS equipment	22.901
2021	Picocell 3-sector BTS equipment	18.053
2021	Pure 2G repeaters for highway and railway tunnels	14.977
2021	Overlay of BTS equipment (2-Band)	24.783
2021	Overlay of BTS equipment (3-Band)	27.106
2021	Max. distance between repeaters in tunnels (in km):	1,14
2022	Macrocell 1-sector BTS equipment	17.718
2022	Macrocell 2-sector BTS equipment	22.704
2022	Macrocell 3-sector BTS equipment	27.524
2022	Microcell 3-sector BTS equipment	22.214
2022	Picocell 3-sector BTS equipment	17.511
2022	Pure 2G repeaters for highway and railway tunnels	14.527
2022	Overlay of BTS equipment (2-Band)	24.040
2022	Overlay of BTS equipment (3-Band)	26.293
2022	Max. distance between repeaters in tunnels (in km):	1,14

UMTS/HSPA equipment

Year	Description	Investment, in EUR
2019	Macrocell NodeB equipment without carriers	21.339
2019	Microcell NodeB equipment without carriers	20.224
2019	Picocell NodeB equipment without carriers	18.934
2019	Macrocell sector	12.994
2019	Microcell sector	11.491
2019	Picocell sector	9.981
2019	Pure 3G repeaters for highway and railway tunnels	15.744
2019	Max. distance between repeaters in tunnels (in km):	1,1
2020	Macrocell NodeB equipment without carriers	20.699
2020	Microcell NodeB equipment without carriers	19.617
2020	Picocell NodeB equipment without carriers	18.366
2020	Macrocell sector	12.604
2020	Microcell sector	11.146
2020	Picocell sector	9.681
2020	Pure 3G repeaters for highway and railway tunnels	15.271
2020	Max. distance between repeaters in tunnels (in km):	1,1
2021	Macrocell NodeB equipment without carriers	20.078
2021	Microcell NodeB equipment without carriers	19.029
2021	Picocell NodeB equipment without carriers	17.815
2021	Macrocell sector	12.226
2021	Microcell sector	10.812
2021	Picocell sector	9.391
2021	Pure 3G repeaters for highway and railway tunnels	14.813
2021	Max. distance between repeaters in tunnels (in km):	1,1
2022	Macrocell NodeB equipment without carriers	19.475
2022	Microcell NodeB equipment without carriers	18.458
2022	Picocell NodeB equipment without carriers	17.281
2022	Macrocell sector	11.859
2022	Microcell sector	10.487
2022	Picocell sector	9.109
2022	Pure 3G repeaters for highway and railway tunnels	14.369
2022	Max. distance between repeaters in tunnels (in km):	1,1

LTE equipment

Year	Description	Investment, in EUR
2019	Macrocell NodeB equipment without carriers	24.937
2019	Microcell NodeB equipment without carriers	23.708
2019	Picocell NodeB equipment without carriers	22.312
2019	Macrocell sector	14.645
2019	Microcell sector	13.083
2019	Picocell sector	11.520
2020	Macrocell NodeB equipment without carriers	24.189
2020	Microcell NodeB equipment without carriers	22.997
2020	Picocell NodeB equipment without carriers	21.643
2020	Macrocell sector	14.206
2020	Microcell sector	12.690
2020	Picocell sector	11.175
2021	Macrocell NodeB equipment without carriers	23.463
2021	Microcell NodeB equipment without carriers	22.307
2021	Picocell NodeB equipment without carriers	20.993
2021	Macrocell sector	13.780
2021	Microcell sector	12.309
2021	Picocell sector	10.839
2022	Macrocell NodeB equipment without carriers	22.759
2022	Microcell NodeB equipment without carriers	21.638
2022	Picocell NodeB equipment without carriers	20.363
2022	Macrocell sector	13.366
2022	Microcell sector	11.940
2022	Picocell sector	10.514

Year	Description	Investment, in EUR
2019	Reduction on GSM/EDGE/UMTS/HSPA/LTE investment in case of hybrid equipment	0%
2020	Reduction on GSM/EDGE/UMTS/HSPA/LTE investment in case of hybrid equipment	0%
2021	Reduction on GSM/EDGE/UMTS/HSPA/LTE investment in case of hybrid equipment	0%
2022	Reduction on GSM/EDGE/UMTS/HSPA/LTE investment in case of hybrid equipment	0%

Year	Description	Investment, in EUR
2019	Average investment for TRX (2G):	1.449
2019	Average investment for carrier (3G):	1.800
2020	Average investment for TRX (2G):	1.405
2020	Average investment for carrier (3G):	1.746
2021	Average investment for TRX (2G):	1.363
2021	Average investment for carrier (3G):	1.693
2022	Average investment for TRX (2G):	1.322
2022	Average investment for carrier (3G):	1.643

Year	Description	Investment, in EUR
2019	Investment in Upgrades 2X2 MIMO for LTE	20.652
2019	Investment in Upgrades 4X4 MIMO for LTE	17.151
2019	Investment in Upgrades CA for LTE	21.020
2019	Investment in Upgrades MIMO for HSPA+	38.065
2020	Investment in Upgrades 2X2 MIMO for LTE	20.032
2020	Investment in Upgrades 4X4 MIMO for LTE	16.637
2020	Investment in Upgrades CA for LTE	20.389
2020	Investment in Upgrades MIMO for HSPA+	36.923
2021	Investment in Upgrades 2X2 MIMO for LTE	19.431
2021	Investment in Upgrades 4X4 MIMO for LTE	16.138
2021	Investment in Upgrades CA for LTE	19.777
2021	Investment in Upgrades MIMO for HSPA+	35.815
2022	Investment in Upgrades 2X2 MIMO for LTE	18.848
2022	Investment in Upgrades 4X4 MIMO for LTE	15.653
2022	Investment in Upgrades CA for LTE	19.184
2022	Investment in Upgrades MIMO for HSPA+	34.741

Kernnetz

Core Sites

Year	Description	
2019	Sharing factor (reflecting the impact on investment due to sharing of a site with other operators):	100%
2020	Sharing factor (reflecting the impact on investment due to sharing of a site with other operators):	100%
2021	Sharing factor (reflecting the impact on investment due to sharing of a site with other operators):	100%
2022	Sharing factor (reflecting the impact on investment due to sharing of a site with other operators):	100%
2019	Average investment per core site:	775.281
2020	Average investment per core site:	790.786
2021	Average investment per core site:	806.602
2022	Average investment per core site:	822.734

MGW

Year	Description	1
2019	Investment in material and installation per MediaGateway:	372.102
2019	Average investment per type 1 port:	2.361
2019	Average investment per type 2 port:	3.483
2019	Investment per E1 port, facing interconnection at Media Gateway:	463
2019	Investment per Ethernet based type 1 port, facing interconnection:	2.337
2019	Investment per Ethernet based type 2 port, facing interconnection:	3.020
2020	Investment in material and installation per MediaGateway:	360.939
2020	Average investment per type 1 port:	2.290
2020	Average investment per type 2 port:	3.379
2020	Investment per E1 port, facing interconnection at Media Gateway:	449
2020	Investment per Ethernet based type 1 port, facing interconnection:	2.267
2020	Investment per Ethernet based type 2 port, facing interconnection:	2.929
2021	Investment in material and installation per MediaGateway:	350.111
2021	Average investment per type 1 port:	2.221
2021	Average investment per type 2 port:	3.277
2021	Investment per E1 port, facing interconnection at Media Gateway:	436
2021	Investment per Ethernet based type 1 port, facing interconnection:	2.199
2021	Investment per Ethernet based type 2 port, facing interconnection:	2.841
2022	Investment in material and installation per MediaGateway:	339.608
2022	Average investment per type 1 port:	2.155
2022	Average investment per type 2 port:	3.179
2022	Investment per E1 port, facing interconnection at Media Gateway:	423
2022	Investment per Ethernet based type 1 port, facing interconnection:	2.133
2022	Investment per Ethernet based type 2 port, facing interconnection:	2.756

Label Edge Router

Year	Description	1	2
2019	Investment in material and installation per LER unit of type i:	244.294	316.611
2019	Average investment per type 1 port:	1.044	799
2019	Average investment per type 2 port:	9.857	6.291
2019	Average investment per type 3 port:	14.988	11.330
2019	Average investment per type 4 port:	27.588	22.985
2020	Investment in material and installation per LER unit of type i:	236.965	307.113
2020	Average investment per type 1 port:	1.012	775
2020	Average investment per type 2 port:	9.561	6.102
2020	Average investment per type 3 port:	14.538	10.990
2020	Average investment per type 4 port:	26.761	22.295
2021	Investment in material and installation per LER unit of type i:	229.856	297.900
2021	Average investment per type 1 port:	982	752
2021	Average investment per type 2 port:	9.275	5.919
2021	Average investment per type 3 port:	14.102	10.660
2021	Average investment per type 4 port:	25.958	21.626
2022	Investment in material and installation per LER unit of type i:	222.960	288.963
2022	Average investment per type 1 port:	953	729
2022	Average investment per type 2 port:	8.996	5.742
2022	Average investment per type 3 port:	13.679	10.340
2022	Average investment per type 4 port:	25.179	20.977

Label Switch Router

Year	Description	1	2
2019	Investment in material and installation per LSR unit of type i:	329.323	408.873
2019	Average investment per type 1 port:	1.699	1.699
2019	Average investment per type 2 port:	41.090	41.090
2019	Average investment per type 3 port:	46.320	46.320
2019	Average investment per type 4 port:	58.283	58.283
2020	Investment in material and installation per LSR unit of type i:	319.443	396.606
2020	Average investment per type 1 port:	1.648	1.648
2020	Average investment per type 2 port:	39.857	39.857
2020	Average investment per type 3 port:	44.930	44.930
2020	Average investment per type 4 port:	56.534	56.534
2021	Investment in material and installation per LSR unit of type i:	309.860	384.708
2021	Average investment per type 1 port:	1.599	1.599
2021	Average investment per type 2 port:	38.661	38.661

Year	Description	1	2
2021	Average investment per type 3 port:	43.582	43.582
2021	Average investment per type 4 port:	54.838	54.838
2022	Investment in material and installation per LSR unit of type i:	300.564	373.167
2022	Average investment per type 1 port:	1.551	1.551
2022	Average investment per type 2 port:	37.502	37.502
2022	Average investment per type 3 port:	42.275	42.275
2022	Average investment per type 4 port:	53.193	53.193

HLR

Year	Description	1
2019	Investment in material and installation per HLR functionality:	10.825.383
2020	Investment in material and installation per HLR functionality:	10.500.622
2021	Investment in material and installation per HLR functionality:	10.185.603
2022	Investment in material and installation per HLR functionality:	9.880.035

AUC

Year	Description	1
2019	Investment per Authentication Centre	249.569
2020	Investment per Authentication Centre	242.082
2021	Investment per Authentication Centre	234.819
2022	Investment per Authentication Centre	227.775

EIR

Year	Description	1
2019	Investment in material and installation per EIR:	1.013.435
2020	Investment in material and installation per EIR:	983.032
2021	Investment in material and installation per EIR:	953.541
2022	Investment in material and installation per EIR:	924.935

SMSC

Year	Description	1
2019	Investment in material and installation per SMSC unit:	3.003.078
2020	Investment in material and installation per SMSC unit:	2.912.986
2021	Investment in material and installation per SMSC unit:	2.825.596
2022	Investment in material and installation per SMSC unit:	2.740.829

SGSN

Year	Description	1
2019	Investment in material and installation, per SGSN unit:	1.693.277
2019	Average investment per type 1 port:	3.753
2019	Average investment per type 2 port:	4.001
2020	Investment in material and installation, per SGSN unit:	1.642.479
2020	Average investment per type 1 port:	3.640
2020	Average investment per type 2 port:	3.881
2021	Investment in material and installation, per SGSN unit:	1.593.205
2021	Average investment per type 1 port:	3.531
2021	Average investment per type 2 port:	3.765
2022	Investment in material and installation, per SGSN unit:	1.545.408
2022	Average investment per type 1 port:	3.425
2022	Average investment per type 2 port:	3.652

GGSN

Year	Description	1
2019	Investment in material and installation per GGSN unit:	2.265.127
2019	Average investment per type 1 port:	1.238
2019	Average investment per type 2 port:	6.123
2020	Investment in material and installation per GGSN unit:	2.197.173
2020	Average investment per type 1 port:	1.201
2020	Average investment per type 2 port:	5.939
2021	Investment in material and installation per GGSN unit:	2.131.258
2021	Average investment per type 1 port:	1.165
2021	Average investment per type 2 port:	5.761
2022	Investment in material and installation per GGSN unit:	2.067.320
2022	Average investment per type 1 port:	1.130
2022	Average investment per type 2 port:	5.588

MediaGateway / TRAU

Year	Description	
2019	Number of TRAU installed	163,5
2020	Number of TRAU installed	163,5
2021	Number of TRAU installed	163,5
2022	Number of TRAU installed	163,5

Year	Description	
2019	Average investement per TRAU unit, in EUR	79.099
2020	Average investement per TRAU unit, in EUR	76.726
2021	Average investement per TRAU unit, in EUR	74.424
2022	Average investement per TRAU unit, in EUR	72.192

SAE Gateway

Year	Description	
2019	Investment in SAE Gateway	1.532.548
2020	Investment in SAE Gateway	1.486.571
2021	Investment in SAE Gateway	1.441.974
2022	Investment in SAE Gateway	1.398.715

Year	Description	
2019	Average investment per type 1 port	1.649
2019	Average investment per type 2 port	8.171
2020	Average investment per type 1 port	1.600
2020	Average investment per type 2 port	7.926
2021	Average investment per type 1 port	1.552
2021	Average investment per type 2 port	7.688
2022	Average investment per type 1 port	1.505
2022	Average investment per type 2 port	7.458

IC Interface

Year	Description	
2019	Investment in interconnection interface:	517.813
2020	Investment in interconnection interface:	502.279
2021	Investment in interconnection interface:	487.210
2022	Investment in interconnection interface:	472.594

Network Management System

Year	Description	
2019	Investment in Network management system:	105.186.977
2020	Investment in Network management system:	102.031.368
2021	Investment in Network management system:	98.970.427
2022	Investment in Network management system:	96.001.314

Intelligent network (IN)

Year	Description	
2019	Investment in Intelligent network:	2.156.730
2020	Investment in Intelligent network:	2.092.029
2021	Investment in Intelligent network:	2.029.268
2022	Investment in Intelligent network:	1.968.390

MSC Call Server

Year	Description	
2019	Average investment for MSC call server unit:	1.450.564,17
2020	Average investment for MSC call server unit:	1.407.047,24
2021	Average investment for MSC call server unit:	1.364.835,82
2022	Average investment for MSC call server unit:	1.323.890,75

Mobility Management Entity (MME)

Year	Description	
2019	Investment in MME	1.714.309,75
2020	Investment in MME	1.662.880,45
2021	Investment in MME	1.612.994,04
2022	Investment in MME	1.564.604,22

IMS Media Gateway

Year	Description	
2019	Investment in IMS Media Gateway	642.129,41
2020	Investment in IMS Media Gateway	622.865,52
2021	Investment in IMS Media Gateway	604.179,56
2022	Investment in IMS Media Gateway	586.054,17

Year	Description	
2019	Average investment per type 1 port	3.382
2019	Average investment per type 2 port	5.208
2019	Investment per E1 port, facing interconnection at Media Gateway:	709
2019	Investment per Ethernet based type 1 port, facing interconnection:	3.577
2019	Investment per Ethernet based type 2 port, facing interconnection:	4.622
2020	Average investment per type 1 port	3.281
2020	Average investment per type 2 port	5.052
2020	Investment per E1 port, facing interconnection at Media Gateway:	687
2020	Investment per Ethernet based type 1 port, facing interconnection:	3.470
2020	Investment per Ethernet based type 2 port, facing interconnection:	4.484
2021	Average investment per type 1 port	3.182
2021	Average investment per type 2 port	4.900
2021	Investment per E1 port, facing interconnection at Media Gateway:	667
2021	Investment per Ethernet based type 1 port, facing interconnection:	3.366
2021	Investment per Ethernet based type 2 port, facing interconnection:	4.349
2022	Average investment per type 1 port	3.087
2022	Average investment per type 2 port	4.753
2022	Investment per E1 port, facing interconnection at Media Gateway:	647
2022	Investment per Ethernet based type 1 port, facing interconnection:	3.265
2022	Investment per Ethernet based type 2 port, facing interconnection:	4.219

IP Multimedia Subsystem (IMS-Platform)

Year	Description	
2019	Investment in IMS Platform	17.655.659,19
2020	Investment in IMS Platform	17.125.989,41
2021	Investment in IMS Platform	16.612.209,73
2022	Investment in IMS Platform	16.113.843,44

Radio links

Year	Description	
2019	Licence charge per radio link (one off investment):	1.049,32
2020	Licence charge per radio link (one off investment):	1.049,32
2021	Licence charge per radio link (one off investment):	1.049,32
2022	Licence charge per radio link (one off investment):	1.049,32
2019	Annual price per 25 MHz (frequency cost for radio links):	6,13
2020	Annual price per 25 MHz (frequency cost for radio links):	6,13
2021	Annual price per 25 MHz (frequency cost for radio links):	6,13
2022	Annual price per 25 MHz (frequency cost for radio links):	6,13
2019	Share of radio links deployment between cell site and hub:	61,00%
2020	Share of radio links deployment between cell site and hub:	61,00%
2021	Share of radio links deployment between cell site and hub:	61,00%
2022	Share of radio links deployment between cell site and hub:	61,00%

Year	Description	1	2	3	4	5
2019	Investment per radio link of type i (Site - Hub)	9.037	9.037	9.699	9.699	10.447
2019	Investment per radio link of type i (hub - controller)	10.007	10.007	10.669	10.669	11.403
2019	Investment per radio link of type i (controller - core)	10.007	10.007	10.669	10.669	11.403
2019	Investment per repeater for radio link of type i	6.765	6.765	7.427	7.427	8.246
2020	Investment per radio link of type i (Site - Hub)	8.946	8.946	9.602	9.602	10.342
2020	Investment per radio link of type i (hub - controller)	9.907	9.907	10.562	10.562	11.289
2020	Investment per radio link of type i (controller - core)	9.907	9.907	10.562	10.562	11.289
2020	Investment per repeater for radio link of type i	6.698	6.698	7.353	7.353	8.163
2021	Investment per radio link of type i (Site - Hub)	8.857	8.857	9.506	9.506	10.239
2021	Investment per radio link of type i (hub - controller)	9.808	9.808	10.457	10.457	11.176
2021	Investment per radio link of type i (controller - core)	9.808	9.808	10.457	10.457	11.176
2021	Investment per repeater for radio link of type i	6.631	6.631	7.279	7.279	8.082
2022	Investment per radio link of type i (Site - Hub)	8.768	8.768	9.410	9.410	10.137

Year	Description	1	2	3	4	5
2022	Investment per radio link of type i (hub - controller)	9.710	9.710	10.352	10.352	11.065
2022	Investment per radio link of type i (controller - core)	9.710	9.710	10.352	10.352	11.065
2022	Investment per repeater for radio link of type i	6.564	6.564	7.206	7.206	8.001

Leased lines

Year		
2019	Discount for leased lines:	0%
2020	Discount for leased lines:	0%
2021	Discount for leased lines:	0%
2022	Discount for leased lines:	0%

Cell Site - Hub Links, Hub - controller links, Controller - core links (in case of star and in case of ring), Core links (in case of fully meshed and in case of ring)

Year		1	2	3	4	5
2019	Annual charge for the provision of a local link of type i	1.784	7.708	8.817	23.052	26.700
2020	Annual charge for the provision of a local link of type i	1.749	7.554	8.642	22.822	26.433
2021	Annual charge for the provision of a local link of type i	1.714	7.404	8.470	22.594	26.168
2022	Annual charge for the provision of a local link of type i	1.680	7.257	8.301	22.368	25.907
2019	Annual charge for the provision of a regional link of type i	1.395	8.103	7.514	22.696	25.269
2020	Annual charge for the provision of a regional link of type i	1.381	8.022	7.439	22.469	25.017
2021	Annual charge for the provision of a regional link of type i	1.367	7.942	7.364	22.245	24.767
2022	Annual charge for the provision of a regional link of type i	1.353	7.862	7.291	22.022	24.519
2019	Annual charge for the provision of a long distance link of type i	1.399	7.631	7.353	22.596	24.861
2020	Annual charge for the provision of a long distance link of type i	1.385	7.555	7.279	22.370	24.612
2021	Annual charge for the provision of a long distance link of type i	1.372	7.479	7.207	22.147	24.366
2022	Annual charge for the provision of a long distance link of type i	1.358	7.404	7.134	21.925	24.123
	De-tour factor	1,00				

Lizenzkosten (Fiktiv)

2019	License cost per year (700 MHz), in 2.5 MHz blocks:	3.898.897
2019	License cost per year (800 MHz), in 2.5 MHz blocks:	15.064.019
2019	License cost per year (900 MHz), in 2.5 MHz blocks:	4.495.167
2019	License cost per year (1500 MHz), in 2.5 MHz blocks:	963.298
2019	License cost per year (1800 MHz), in 2.5 MHz blocks:	5.624.656
2019	License cost per year (2100 MHz), in 5 MHz blocks:	23.360.604
2019	License cost per year (2600 MHz), in 5 MHz blocks:	930.643
2019	Administrative licences cost per year:	0
2020	License cost per year (700 MHz), in 2.5 MHz blocks:	3.539.003,43
2020	License cost per year (800 MHz), in 2.5 MHz blocks:	13.799.590,81
2020	License cost per year (900 MHz), in 2.5 MHz blocks:	4.080.233,65
2020	License cost per year (1500 MHz), in 2.5 MHz blocks:	874.379,79
2020	License cost per year (1800 MHz), in 2.5 MHz blocks:	5.105.463,43
2020	License cost per year (2100 MHz), in 5 MHz blocks:	26.234.399,47
2020	License cost per year (2600 MHz), in 5 MHz blocks:	852.527,49
2020	Administrative licences cost per year:	0
2021	License cost per year (700 MHz), in 2.5 MHz blocks:	3.539.003,43
2021	License cost per year (800 MHz), in 2.5 MHz blocks:	13.799.590,81
2021	License cost per year (900 MHz), in 2.5 MHz blocks:	4.080.233,65
2021	License cost per year (1500 MHz), in 2.5 MHz blocks:	874.379,79
2021	License cost per year (1800 MHz), in 2.5 MHz blocks:	5.105.463,43
2021	License cost per year (2100 MHz), in 5 MHz blocks:	6.538.719,43
2021	License cost per year (2600 MHz), in 5 MHz blocks:	852.527,49
2021	Administrative licences cost per year:	0
2022	License cost per year (700 MHz), in 2.5 MHz blocks:	3.539.003,43
2022	License cost per year (800 MHz), in 2.5 MHz blocks:	13.799.590,81
2022	License cost per year (900 MHz), in 2.5 MHz blocks:	4.080.233,65
2022	License cost per year (1500 MHz), in 2.5 MHz blocks:	874.379,79
2022	License cost per year (1800 MHz), in 2.5 MHz blocks:	5.105.463,43
2022	License cost per year (2100 MHz), in 5 MHz blocks:	6.538.719,43
2022	License cost per year (2600 MHz), in 5 MHz blocks:	852.527,49
2022	Administrative licences cost per year:	0

Lizenzkosten (WBB)

2019	License cost per year (700 MHz), in 2.5 MHz blocks:	3.539.003,43
2019	License cost per year (800 MHz), in 2.5 MHz blocks:	13.799.590,81
2019	License cost per year (900 MHz), in 2.5 MHz blocks:	4.080.233,65
2019	License cost per year (1500 MHz), in 2.5 MHz blocks:	874.379,79
2019	License cost per year (1800 MHz), in 2.5 MHz blocks:	5.105.463,43
2019	License cost per year (2100 MHz), in 5 MHz blocks:	121.804.906,07
2019	License cost per year (2600 MHz), in 5 MHz blocks:	852.527,49
2019	Administrative licences cost per year:	0
2020	License cost per year (700 MHz), in 2.5 MHz blocks:	3.539.003,43
2020	License cost per year (800 MHz), in 2.5 MHz blocks:	13.799.590,81
2020	License cost per year (900 MHz), in 2.5 MHz blocks:	4.080.233,65
2020	License cost per year (1500 MHz), in 2.5 MHz blocks:	874.379,79
2020	License cost per year (1800 MHz), in 2.5 MHz blocks:	5.105.463,43
2020	License cost per year (2100 MHz), in 5 MHz blocks:	121.804.906,07
2020	License cost per year (2600 MHz), in 5 MHz blocks:	852.527,49
2020	Administrative licences cost per year:	0
2021	License cost per year (700 MHz), in 2.5 MHz blocks:	3.539.003,43
2021	License cost per year (800 MHz), in 2.5 MHz blocks:	13.799.590,81
2021	License cost per year (900 MHz), in 2.5 MHz blocks:	4.080.233,65
2021	License cost per year (1500 MHz), in 2.5 MHz blocks:	874.379,79
2021	License cost per year (1800 MHz), in 2.5 MHz blocks:	5.105.463,43
2021	License cost per year (2100 MHz), in 5 MHz blocks:	6.538.719,43
2021	License cost per year (2600 MHz), in 5 MHz blocks:	852.527,49
2021	Administrative licences cost per year:	0
2022	License cost per year (700 MHz), in 2.5 MHz blocks:	3.539.003,43
2022	License cost per year (800 MHz), in 2.5 MHz blocks:	13.799.590,81
2022	License cost per year (900 MHz), in 2.5 MHz blocks:	4.080.233,65
2022	License cost per year (1500 MHz), in 2.5 MHz blocks:	874.379,79
2022	License cost per year (1800 MHz), in 2.5 MHz blocks:	5.105.463,43
2022	License cost per year (2100 MHz), in 5 MHz blocks:	6.538.719,43
2022	License cost per year (2600 MHz), in 5 MHz blocks:	852.527,49
2022	Administrative licences cost per year:	0

Allgemeine Kostenparameter

Traffic parameters

Year	Description	
2019 2020 2021 2022	Number of days per year:	250
2019	Percentage of busy hour traffic in relation to total day traffic:	0,0921
2019	Share of unbilled traffic:	0,1348
2020	Percentage of busy hour traffic in relation to total day traffic:	0,0921
2020	Share of unbilled traffic:	0,1348
2021	Percentage of busy hour traffic in relation to total day traffic:	0,0921
2021	Share of unbilled traffic:	0,1348
2022	Percentage of busy hour traffic in relation to total day traffic:	0,0921
2022	Share of unbilled traffic:	0,1348

Cost parameters

Year	Description	
2019	WACC:	4,42%
2020	WACC:	4,42%
2021	WACC:	4,42%
2022	WACC:	4,42%
2019 2020 2021 2022	Common cost mark-up:	36,09%
2019 2020 2021 2022	Fixed common cost:	0,00%

Abschreibungsdauer

Year	Network assets	Economic lifetime (in years)
	BTS / NodeB / HSPA / eNodeB	
2019 2020 2021 2022	Sites	15
2019 2020 2021 2022	Equipment	8
2019 2020 2021 2022	TRX / Carrier	8
	BSC / RNC	
2019 2020 2021 2022	BSC site	15
2019 2020 2021 2022	RNC site	15
2019 2020 2021 2022	BSC hardware	8
2019 2020 2021 2022	BSC software	8
2019 2020 2021 2022	RNC hardware	8
2019 2020 2021 2022	RNC software	8
2019 2020 2021 2022	BSC ports	8
2019 2020 2021 2022	RNC ports	8
2019 2020 2021 2022	PCU BSC	8

Year	Network assets	Economic lifetime (in years)
	Other core location equipment	
2019 2020 2021 2022	HLR	8
2019 2020 2021 2022	AUC	8
2019 2020 2021 2022	EIR	8
2019 2020 2021 2022	LER / LSR	8
2019 2020 2021 2022	SMSC	8
2019 2020 2021 2022	SGSN	8
2019 2020 2021 2022	GGSN	8
	Others	
2019 2020 2021 2022	IC interface	8
2019 2020 2021 2022	Network management system	8
2019 2020 2021 2022	IN	8
2019 2020 2021 2022	Aggregation systems	8
2019 2020 2021 2022	Aggregation systems ports	8
2019 2020 2021 2022	Radio links	8

Year	Network assets	Economic lifetime (in years)
	Other core location equipment	
2019 2020 2021 2022	SAE GW	8
2019 2020 2021 2022	MME	8
2019 2020 2021 2022	IMS MGW	8
2019 2020 2021 2022	IMS Platform	8
2019 2020 2021 2022	Upgrade 2x2 MIMO for LTE	5
2019 2020 2021 2022	Upgrade 2x2 MIMO for LTE	5
2019 2020 2021 2022	Upgrade CA LTE	5
2019 2020 2021 2022	Upgrade MIMO HSPA+	5

OPEX mark-up on direct investment

Year	Network segment	OPEX mark-up on direct investment
	BTS / NodeB / HSPA /eNodeB	
2019 2020 2021 2022	GSM/EDGE	13,50%
2019 2020 2021 2022	UMTS/HSPA	13,50%
2019 2020 2021 2022	LTE	13,50%
2019 2020 2021 2022	GSM/EDGE/UMTS/HSPA	13,50%
2019 2020 2021 2022	GSM/EDGE/LTE	13,50%
2019 2020 2021 2022	UMTS/HSPA/LTE	13,50%
2019 2020 2021 2022	GSM/EDGE/UMTS/HSPA/LTE	13,50%
	BSC / RNC	
2019 2020 2021 2022	BSC/PCU	13,50%
2019 2020 2021 2022	RNC	13,50%
2019 2020 2021 2022	MSC call server, MGW, TRAU and LER	13,50%
	MSC call server	
2019 2020 2021 2022	Media Gateway / TRAU	13,50%
2019 2020 2021 2022	LER / LSR	13,50%
2019 2020 2021 2022	Core sites	13,50%
	Other core location equipment	
2019 2020 2021 2022	HLR	13,50%

Year	Network segment	OPEX mark-up on direct investment
2019 2020 2021 2022	AUC	13,50%
2019 2020 2021 2022	EIR	13,50%
2019 2020 2021 2022	SMSC	13,50%
2019 2020 2021 2022	SGSN	13,50%
2019 2020 2021 2022	GGSN	13,50%
	Others	
2019 2020 2021 2022	IC interface	13,50%
2019 2020 2021 2022	Network management system	13,50%
2019 2020 2021 2022	IN	13,50%
2019 2020 2021 2022	Aggregation systems	13,50%
2019 2020 2021 2022	Radio links	13,50%
	Other core location equipment	
2019 2020 2021 2022	SAE GW	13,50%
2019 2020 2021 2022	MME	13,50%
2019 2020 2021 2022	IMS MGW	13,50%
2019 2020 2021 2022	IMS Platform	13,50%
2019 2020 2021 2022	Upgrade MIMO	13,50%
2019 2020 2021 2022	Upgrade CA	13,50%

Year	Network segment	OPEX mark-up on direct investment
2019 2020 2021 2022	Upgrade MIMO HSPA+	13,50%

BSC / RNC

Sites

Year		
2019	Sharing factor (reflecting the impact on investment due to sharing of a site with other operators):	100%
2020	Sharing factor (reflecting the impact on investment due to sharing of a site with other operators):	100%
2021	Sharing factor (reflecting the impact on investment due to sharing of a site with other operators):	100%
2022	Sharing factor (reflecting the impact on investment due to sharing of a site with other operators):	100%

Year		
2019	Average investment for site construction (BSC), in EUR:	150.593
2020	Average investment for site construction (BSC), in EUR:	153.604
2021	Average investment for site construction (BSC), in EUR:	156.676
2022	Average investment for site construction (BSC), in EUR:	159.810
2019	Average investment for site construction (RNC), in EUR:	150.593
2020	Average investment for site construction (RNC), in EUR:	153.604
2021	Average investment for site construction (RNC), in EUR:	156.676
2022	Average investment for site construction (RNC), in EUR:	159.810

Equipment

Year		1	2	3
2019	Hardware investment per BSC unit of type i:	398.042	495.239	434.331
2019	Software investment per BSC unit of type i:	157.940	147.378	139.738
2020	Hardware investment per BSC unit of type i:	386.101	480.382	421.301
2020	Software investment per BSC unit of type i:	153.202	142.957	135.546
2021	Hardware investment per BSC unit of type i:	374.518	465.970	408.662
2021	Software investment per BSC unit of type i:	148.606	138.668	131.479
2022	Hardware investment per BSC unit of type i:	363.283	451.991	396.402

Year		1	2	3
2022	Software investment per BSC unit of type i:	144.148	134.508	127.535
2019	Hardware investment per RNC unit of type i:	540.211	803.911	858.659
2019	Software investment per RNC unit of type i:	620.979	802.766	720.754
2020	Hardware investment per RNC unit of type i:	524.005	779.793	832.899
2020	Software investment per RNC unit of type i:	602.350	778.683	699.132
2021	Hardware investment per RNC unit of type i:	508.285	756.400	807.912
2021	Software investment per RNC unit of type i:	584.279	755.322	678.158
2022	Hardware investment per RNC unit of type i:	493.036	733.708	783.675
2022	Software investment per RNC unit of type i:	566.751	732.663	657.813

Ports

Year		1	2	3
2019	Average investment per E1 port installed at the BSC, in EUR:	2.438	2.438	2.438
2020	Average investment per E1 port installed at the BSC, in EUR:	2.365	2.365	2.365
2021	Average investment per E1 port installed at the BSC, in EUR:	2.294	2.294	2.294
2022	Average investment per E1 port installed at the BSC, in EUR:	2.225	2.225	2.225
2019	Average investment per type 1 port:	1.144	1.665	1.665
2019	Average investment per type 2 port:	3.185	3.705	3.705
2019	Average investment per type 3 port:	3.995	4.646	4.646
2019	Average investment per type 4 port:	3.995	4.646	4.646
2020	Average investment per type 1 port:	1.110	1.615	1.615
2020	Average investment per type 2 port:	3.090	3.594	3.594
2020	Average investment per type 3 port:	3.875	4.506	4.506
2020	Average investment per type 4 port:	3.875	4.506	4.506
2021	Average investment per type 1 port:	1.076	1.566	1.566
2021	Average investment per type 2 port:	2.997	3.486	3.486
2021	Average investment per type 3 port:	3.759	4.371	4.371
2021	Average investment per type 4 port:	3.759	4.371	4.371
2022	Average investment per type 1 port:	1.044	1.519	1.519
2022	Average investment per type 2 port:	2.907	3.382	3.382
2022	Average investment per type 3 port:	3.646	4.240	4.240
2022	Average investment per type 4 port:	3.646	4.240	4.240

PCU (only for BSC)

Year		1	2	3
2019	Average investment per packet control unit installed at BSC unit of type i:	11.236	12.181	12.181
2020	Average investment per packet control unit installed at BSC unit of type i:	10.899	11.815	11.815
2021	Average investment per packet control unit installed at BSC unit of type i:	10.572	11.461	11.461
2022	Average investment per packet control unit installed at BSC unit of type i:	10.254	11.117	11.117

Aggregation systems

Year		1	2	3
2019	Investment in Aggregation systems of type i (i = 1 to 10):	21.495	44.912	76.075
2020	Investment in Aggregation systems of type i (i = 1 to 10):	20.850	43.565	73.792
2021	Investment in Aggregation systems of type i (i = 1 to 10):	20.224	42.258	71.579
2022	Investment in Aggregation systems of type i (i = 1 to 10):	19.618	40.990	69.431
2019	Average investment per type 1 port:	241	302	479
2019	Average investment per type 2 port:	886	1.076	3.306
2019	Average investment per type 3 port:	5.956	6.737	9.917
2019	Average investment per type 4 port:	5.956	6.737	9.917
2020	Average investment per type 1 port:	234	293	465
2020	Average investment per type 2 port:	860	1.044	3.206
2020	Average investment per type 3 port:	5.777	6.535	9.619
2020	Average investment per type 4 port:	5.777	6.535	9.619
2021	Average investment per type 1 port:	227	284	451
2021	Average investment per type 2 port:	834	1.012	3.110
2021	Average investment per type 3 port:	5.604	6.339	9.331
2021	Average investment per type 4 port:	5.604	6.339	9.331
2022	Average investment per type 1 port:	220	276	438
2022	Average investment per type 2 port:	809	982	3.017
2022	Average investment per type 3 port:	5.436	6.149	9.051
2022	Average investment per type 4 port:	5.436	6.149	9.051