

Reykjavík, 15. nóvember 2016

Póst- og fjarskiptastofnun
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108 Reykjavík

PÓST- OG FJARSKIPTASTOFNUN	
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Efni: Drög að skilmálum vegna tíðniuppboðs

Vísað er til samráðsskjals Póst- og fjarskiptastofnunar (hér eftir „PFS“), dags. 11. október 2016, þar sem stofnunin óskar eftir athugasemdum vegna fyrirhugaðs útboðs á tíðniheimildum á 700 MHz, 2100 MHz og 2600 MHz tíðnisviðinu og skilmála stofnunarinnar vegna þeirra. Með erindi þessu vill Síminn koma á framfæri athugasemdum og eru þær settar fram undir viðeigandi kaflaheiti í samræmi við framsetningu PFS.

Síminn vill fyrst taka fram ósk sína að PFS skoði þann möguleika að dreifa greiðslum vegna tíðniuppboða, eins og tíðkast t.d. í Finnlandi¹ og Frakklandi², enda ljóst að kostnaður getur orðið töluverður auk þess sem árleg gjöld fyrir tíðniheimildir eru farin að hafa talsverð áhrif. Síminn telur a.m.k. vert að taka slíkar greiðsluaðferðir vegna tíðniuppboða til frekari skoðunar og meta hvort önnur úrræði séu tæk til að ná sama markmiði.

Varðandi skilmála PFS í tengslum við hið fyrirhugaða útboð vill Síminn einkum koma þeirri tillögu á framfæri að stofnunin miði fremur við í skilmálum útboðslýsingar að markaðsaðila beri að ná **99% útbreiðslu á a.m.k. 5 árum**, að því gefnu að fallið verði frá þeim uppbyggingarkröfum sem tilgreindar eru varðandi annars vegar fjölda og staðsetningu senda (gr. 3.2.2.3.) og hins vegar ljósleiðaratengingar (gr. 3.2.2.2.), sbr. frekari umfjöllun í fylgiskjali 1. Er Síminn þeirrar skoðunar að ef erfitt er að leggja fjárhagslegt mat á kröfur gætu þær virkað fráhrindandi fyrir markaðsaðila. Betra væri að setja kröfurnar fram með þeim hætti að auðvelt sé að áætla kostnað vegna þeirra. Engu að síður hefur Síminn sett fram athugasemdir í fylgiskjali 1 varðandi drög PFS að skilmálum útboðslýsingarinnar (þ. á m. varðandi gr. 3.2.2.2. og 3.2.2.3.). Leggur Síminn þó áherslu á að það sé í samræmi við þróun útboðsaðferða á Norðurlöndunum og ákjósanlegast fyrir markaðsaðila, eftirlitsstjórnvöld og neytendur, að miða við 99% útbreiðslu innan hæfilegs tímafrests fremur en uppbyggingarkröfur og kröfur um ljósleiðaratengingar. Með þeim hætti verður unnt að ná markmiði PFS varðandi hámarksútbreiðslu auk þess sem kröfur útboðsins verða skýrari þar sem markaðsaðilar hafa þá tækni á að meta væntanlegan kostnað vegna útbreiðslunnar á eigin forsendum.

¹ Útboðslýsing og skilmálar finnska samgöngu- og fjarskiptaráðuneytisins á tíðniheimildum á 700 MHz tíðnibandinu, vegna fyrirhugaðs tíðniútboðs þann 24. nóvember 2016.

² Heimild: *Analysys Mason. Spectrum Newsletter*. Apríl 2016.

Með þessu móti, þ.e. með skýrum og einföldum kröfum, verður tíðnileyfi áhugaverðar og væntanlega verðmætara fyrir markaðsaðila.

Loks þykir Símanum einnig vert að minnast á að þjónusta eða kostnaður PFS vegna Símans hefur ekki aukist vegna aukinna tíðniheimilda - þvert á móti er það *aukin notkun á ólöglegum búnaði* sem truflar fjarskipti sem valda auknum kostnaði. Síminn telur eðlilegt að sá sem ber ábyrgð á ólöglegum búnaði greiði fyrir eftirlit og kostnað PFS sem af því hlýst. Er því eðlilegt að PFS skoði möguleg úrræði sem gætu verið til þess fallin að draga úr kostnaði fjarskiptafyrirtækja vegna aðgerða sem tengjast þeim ekki og PFS geti innheimt þá aðila sem bera ábyrgðina beint.

Óski PFS frekari gagna eða upplýsinga frá Símanum mun Síminn leitast við að veita þær upplýsingar eins hratt og kostur er.

Virðingarfyllst,
f.h. Símans hf.


Helga G. Kjartansdóttir, lögfræðingur

Fylgiskjöl:

1. Athugasemdir Símans við drög að skilmálum vegna tíðniuppboðs.
2. Útboðslýsing og skilmálar finnska samgöngu- og fjarskiptráðuneytisins á tíðniheimildum á 700 MHz tíðnibandinu, vegna fyrirhugaðs tíðniútboðs þann 24. nóvember 2016.
3. Kynning fjarskiptafyrirtækisins *Telefónica* í Þýskalandi á ráðstefnu Digital Exclusive Club í Brussel þann 10. september 2015.
4. Fréttatilkynning *ARCEP* í Frakklandi varðandi skilmála 700 MHz tíðniútboðs, dags. 19. júní 2015.

Athugasemdir Símans við drög PFS að uppboðsskilmálum vegna tíðniuppboðs.

Athugasemdir Símans eru settar fram undir sömu köflum og komu fram í drögum PFS vegna tíðniskilmála.

2. Skilyrði fyrir þátttöku í uppboði

Síminn telur vert að PFS skoði að setja einhverjar takmarkanir á heimildir á þátttöku aðila sem hafa ekki staðið við núgildandi tíðniheimildir eða hafa ekki nýtt tíðniheimildir með skilvirkum hætti. Gætu slíkar takmarkanir falið í sér að aðilum sé bönnuð þátttaka eða takmörkuð með öðrum hætti, t.d. með því að slíkum aðila sé bannað að bjóða í tilteknar heimildir eða geti aðeins fengið minni tíðniheimildir en aðrir.

Í öllu falli er mikilvægt að aðilar geti ekki tekið tíðniheimildir í gíslingu og að PFS hafi skýrar heimildir til þess að taka tíðniheimildir af aðilum sem hafa augljóslega enga þekkingu á rekstri fjarskipta eða sýni með athöfnum sínum að það blasir við að tíðniheimild verði ekki tekin í notkun.

3 Uppboðsandlag

3.2 Tíðniheimildir á 700 MHz tíðnisviðinu

3.2.2 Útbreiðslu og uppbyggingarkröfur

Síminn gerir athugasemdir við fyrirhugaðar kröfur PFS í gr. 3.2.2.2. og 3.2.2.3. og telur að þær séu meiriháttar hindrun við að tíðniheimildirnar séu nýttar á skilvirkan hátt og jafnvel geti verið þess valdandi að tíðniheimildirnar verði ekki notaðar.

Síminn áréttar að almenn útbreiðslukrafa er íþyngjandi og kostnaðarsöm í framkvæmd sem hefur bein áhrif á verðlagningu þjónustunnar. Væntar tekjur sem fylgja útbreiðslu eru þess eðlis að markaðslegar forsendur eru vart fyrir hendi að teknu tilliti til þess gífurlega kostnaðar sem hver viðbót um 1% eftir 95% útbreiðslu hefur í för með sér. Sérstaklega áriðandi er að kostnaður við uppbyggingu sé fyrirsjáanlegur, raunhæfur m.t.t. tekna og samkeppni, og að tímasetningar séu þess eðlis að uppbygging geti átt sér stað með eðlilegum hraða og þar með eðlilegum kostnaði. Of skammur tímarammi eykur kostnað og kemur í veg fyrir svigrúm aðila til að stýra uppbyggingu með skilvirkum hætt.

Síminn vill ennfremur vekja athygli á því að fjárfesting í búnaði sem er óþarfur er sóun á fjármunum og þjóðhagslega óhagkvæm. Hluti af samfélagslegri ábyrgð fyrirtækja er að haga fjárfestingum sínum með skynsamlegum hætti. Útskipting á búnaði sem þegar nær þeim hraða sem óskað er eftir er tilgangslaus. Að leyfa fyrirtæki að ráða hvenær það skiptir eða breytir búnaði er lykilatriði í því að fyrirtæki hagi sér með samfélagslega ábyrgum hætti. Sem dæmi um sóun í formi óþarfa fjárfestinga má nefna að tæki eru flutt um hafið eða með flugi sem ekki er þörf á og/eða að tæki eru ekin með bifreiðum sem ella væri ekki þörf á. Allt framangreint felur í sér sóun á eldsneyti sem er samfélagslega óábyrgt. Þá er

um að ræða umferð um vegakerfið sem er ónauðsynleg. Einnig er verið að setja starfsfólk í verkefni sem hefur enga þýðingu fyrir notendur. Í staðinn væri hægt að einblína á meiri uppbyggingu þar sem þörf væri fyrir að nýta tíðniheimildina, t.d. á stöðum sem hafa ekki þegar útbreiðslu.

3.2.2.1 Almennar kröfur til útbreiðslu og hraða háhraða farnetsþjónustu

Síminn telur mikilvægt að aðlaga tímasetningar á útbreiðslukröfum m.t.t. úthlutunar tíðniheimildar, þannig að fyrstu útbreiðslukröfu 95% verði að vera náð 18 mánuðum eftir úthlutun, í stað 31. desember 2017, og seinni hluta útbreiðslu verði miðuð við fimm ár eftir úthlutun, í stað 31. desember 2022.

Síminn telur það jákvætt að PFS gefi það skýrlega til kynna hvaða útbreiðslu þurfi að ná einungis með 700 MHz tíðnisviðinu. Hins vegar er óraunhæft og felur í sér dýrari uppbyggingu að styðjast við 70% sem er skaðlegt fyrir neytendur og í andstöðu við markmið fjarskiptalaga um hagkvæm fjarskipti. Þau fyrirtæki sem t.d. hafa þegar byggt upp kerfi sem er nálægt útbreiðslukröfunum þyrftu að fara hraðar í að skipta út búnaði til þess að mæta kröfum sem hefur enga þýðingu gagnvart notendum. Hafi fyrirtæki náð útbreiðslukröfunum þá ætti að vera nægilegt að 50% af útbreiðslukröfunum sé náð með 700 MHz tíðnisviðinu eftir fimm ár eða seinni hluta útbreiðslukrafna, þ.e. fimm árum eftir úthlutun. Síminn bendir á að sambærilega kröfu er ekki að finna í öðrum tíðniheimildum, s.s. 800 MHz tíðniheimildinni.

Síminn bendir á að PFS þurfi að gæta samræmis við umfjöllun um gagnahraða, þ.e. í ákveðnum tilfellum er talað um niðurhal auk upphals, í öðrum tilvikum er fjallað um hraða að lágmarki og loks er einnig fjallað um að ná ákveðnum hraða. Síminn telur hagkvæmustu lausnina vera þá að miða ekki við neinar hraðakröfur, líkt og gert er í Finnlandi um þessar mundir vegna útboðs á sama tíðnisviði. Í fyrsta lagi er almennt ekki algengt á Norðurlöndunum eða annars staðar í Evrópu að slík skilyrði séu sett í skilmála af þessum toga, m.t.t. þróunarinnar undanfarin ár. Í öðru lagi liggur ekki fyrir hvaða aðferð skuli nota til að mæla hraða af þessum toga þar sem margar mögulegar aðferðir eru nefndar í drögum PFS. Telur Síminn a.m.k. nauðsynlegt að eftirlitsaðili skilgreini með skýrum hætti fyrirfram með hvaða hætti hann muni mæla hraða svo markaðsaðili geti tekið upplýsta afstöðu til þess hvort hann geti og muni uppfylla skilyrðin. Sé svo ekki gert er ótækt fyrir markaðsaðila að vita hvort hann uppfylli skilmála PFS ef forsendur útreikninga liggja ekki fyrir. Telji PFS engu að síður að útboðið eigi að styðjast við slíka kröfu leggur Síminn til að frekar verði miðað við ákveðinn gagnahraða í tilteknum tilvikum, t.d. að vegna 2x20MHz tíðnibandsins mætti miða við að niðurhalshraði væri um 10-20 Mb/s sem næðist í 90% tilvika við eðilegar aðstæður og gæfi endanotenda góða upplifun. Einnig mætti miða við að hraði sambands við sendi (e. *transmission backhaul*) væri að jafnaði ekki lægri en væntur hámarkshraði hvers sendistaðar.

3.2.2.2 Sértaekar kröfur um uppbyggingu háhraðanets í strjálbýli

Síminn skorar á PFS að falla frá kröfum sem settar eru fram um uppbyggingu í strjálbýli undir kafla 3.2.2.2., en Síminn telur slík skilyrði vera óljós, óraunhæf og óhagstæð. Þess í

stað telur Síminn að krafa ætti að koma fram í skilmálum útboðs um að markaðsaðila beri að ná 99% útbreiðslu á a.m.k. 5 árum. Framangreind tillaga tekur þó mið af því að fallið verði frá uppbyggingarkröfum um sendastaði (sbr. umfjöllun neðar um gr. 3.2.2.3) og um ljósleiðaratengingar (gr. 3.2.2.2.). Hefur framangreind aðferð, þ.e. að miða við 99% útbreiðslu á tilteknu tímabili fremur en sértækar uppbyggingarkröfur, t.d. verið notuð í uppboði finnska samgöngu- og fjarskiptaráðuneytisins vegna sömu tíðniheimildar sem fer fram þann 24. nóvember næstkomandi, sbr. fylgiskjal nr. 2.

Í eftirfarandi umfjöllun verða raktar athugasemdir Símans við núverandi drög PFS að skilmálum í gr. 3.2.2.2., og hvers vegna framangreind tillaga um 99% útbreiðslu á a.m.k. 5 árum sé líklegri til að ná markmiði útboðsins, þ.e. hámarksútbreiðslu.

Í fyrsta lagi telur Síminn óraunhæft að setja kvaðir á markaðsaðila að byggja upp á svæði sem hefur verið metið með þeim hætti að ríkið þurfi að grípa inn í með stuðningi við ljósleiðara. Með hliðsjón af samfélagslegri ábyrgð, soun fjármuna í offjárfestingu og búnaði sem er ekki eiginleg þörf fyrir m.t.t. kostnaðar blasir við að krafan er bæði óraunhæf og óskynsamleg.

Í öðru lagi, og í raun það mikilvægasta, eru kröfurnar með öllu óskilgreindar í þeim skilningi að það liggur ekkert fyrir um umfang eða hugsanlegan kostnað sem gæti lent á markaðsaðilum. Krafan felur í sér að aðili eigi að samþykkja að uppfylla skyldur sem PFS ákveði *síðar* - með engum takmörkunum hvað kostnað varðar. Það er lykilatriði að þegar skyldur eru skilgreindar þá séu þær skýrar og fyrirsjáanlegar þannig að aðilar geti gert sér grein fyrir þýðingu þeirra þegar þeir samþykkja að gangast undir þær. Krafan samkvæmt þessum kafla skortir gagnsæi og fyrirsjáanleika. Lykilatriði í rekstri allra fjarskiptafyrirtækja er að hafa sýn á kostnaði félagsins til lengri tíma. Síminn hefur reyndar þá skoðun að skyldur sem þessar, sem eru ákveðnar *síðar* eigi sér ekki lagastoð. Séu lagðar skyldur á ákveðin réttindi er augljóst að þau verða að vera ljós fyrirfram.

Í ljósi framangreinds er það mat Símans að nauðsynlegt sé að skilgreina *fyrirfram* kröfurnar varðandi uppbyggingu háhraðanets í strjálbýli. Þá telur Síminn að eðlilegt og raunhæft sé að miða við útbreiðslu á tilteknu tímabili, eins og áður segir, fremur en að tilgreina fjölda sendistaða og mögulegan stuðning við ljósleiðara. Ætti aðferðin sem notuð er, til að ná skilyrði um útbreiðslu innan tiltekins tíma, að vera í höndum fjarskiptafélagsins sem kvaðirnar hvíla á. Skyldi sú staða koma upp að markaðsaðili telji sér ekki fært að ná tilgreindri útbreiðslu gæti og ætti ríkið að stíga inn í ferlið og aðstoða við uppbyggingu m.t.t. þeirra rúmu heimilda sem ríkið hefur til að bjóða fram slíka aðstoð, líkt og gert var í háhraðaverkefninu.

Með hliðsjón af ofangreindu telur Síminn raunhæft og málefnalegt að miða í þessum efnum við 99% útbreiðslu á a.m.k. 5 árum, eins og miðað er við í áðurnefndu útboði finnska samgöngu- og fjarskiptaráðuneytisins. Þó ber að árétta að í hinu finnska útboði er krafa gerð um að útbreiðslan náist innan þriggja ára en fjarskiptafyrirtæki þarf aftur á móti einungis að ná að lágmarki 35% af íbúum á sitt kerfi innan þess tíma, sem stafar einkum af samstarfi fjarskiptafyrirtækja í norður og austur Finnlandi. Því telur Síminn raunhæft að miða fremur við 5 ár ef sambærilegt skilyrði á ekki við um útboð PFS. Þá ætti 99%

útbreiðsla að vera hæfileg ef tekið er mið af því fjarskiptaneti sem markaðsaðili hefur þegar sett á laggirnar. Framangreind tillaga Símans miðast þó við að fallið verði frá öðrum kröfum varðandi aðferðir útbreiðslu, svo sem fjölda eða staðsetningu sendistaða og ljósleiðaratengingar, sbr. gr. 3.2.2.2. og 3.2.2.3 í útboðsskilmálum PFS, enda með öllu óþarfar ef markaðsaðili skuldbindur sig til að ná útbreiðslu innan tiltekins tíma, sbr. einnig athugasemdir neðar varðandi gr. 3.2.2.3. Jafnframt er vert að benda á að útbreiðslukrafan fyrir íbúa í Frakklandi fyrir 700 MHz leyfið er 98% í janúar 2027 og 99,6% árið 2030¹. Í Þýskalandi – eina landið fyrir utan Frakkland þar sem búið er að bjóða út 700 MHz leyfi – er krafan 98% af heimilum innan þriggja ára frá úthlutun leyfisins, en aðeins 97% í hverju sambandsríki í Þýskalandi².

Loks gerir Síminn athugasemd við að PFS setji fram kröfur um tímasetningar varðandi lok uppbyggingar. Til dæmis gerir PFS þá kröfu að uppbygging verði kláruð 1. júlí hvert ár, en eins og PFS er kunnugt um eru, vor, sumar og byrjun hausts, æskilegustu mánuðirnir til að sinna uppbyggingu. Því blasir við að allar kröfur hljóta að taka mið af því að þeim sé náð fyrir lok árs en ekki um mitt sumar, ella er komið í veg fyrir að júlí, ágúst og september séu nýttir til uppbyggingar. Óskynsamlegar tímasetningar leiða til óskynsamlegrar fjárfestingar og leggur Síminn því til að PFS taki a.m.k. tilgreindar kröfur um tímasetningar til endurskoðunar, sé ekki unnt að falla frá þeim að öllu leyti.

Sjái PFS sér ekki fært að falla frá kröfum í gr. 3.2.2.2. gæti orðið vandséð fyrir Símann að undirgangast þær skyldur sem myndu felast í 700 MHz tíðnileyfinu, nema áætlaður kostnaður vegna þessara krafna liggi fyrir í skilmálum útboðsins – hvort sem breytingar hafi verið gerðar á kröfum um tímasetningar eða ekki.

3.2.2.3 Kröfur um uppbyggingu og hraða háhraðanets utan byggðar

Líkt og að framan greinir er það tillaga Símans að breyta ætti kröfum útboðsins á þann veg að útbreiðsla nái 99% innan a.m.k. 5 ára, þannig að fyrirtæki hafi möguleika á því að klára uppbyggingu í lok árs 2022. Þetta gerir fyrirtækjum kleift að fjárfesta í búnaði sem fellur inn í eðlilega uppfærslu og endurnýjun á búnaði fjarskiptafyrirtækja. Þetta samrýmist einnig finnska útboðinu, þar sem lögð er áhersla á að ekki séu lagðar íþyngjandi kröfur á fjarskiptafyrirtæki, því þau hafi þegar byggt upp 3G og 4G kerfi sem ná 99% íbúa Finnlands. Því byggjast 700 MHz kröfunar á því að nýta núverandi sendistaði í 3G og 4G kerfum fjarskiptafyrirtækjanna.

Þá getur verið flókið tæknilega að bjóða upp á reiki á þessum forsendum sem PFS tilgreinir í drögum sínum. Mun skynsamlegra er að nýta gjald af tíðniheimildum til þess að styrkja uppbyggingu á þessum stöðum í stað þess að setja kröfur á markaðsaðila sem ekki eru raunhæfar. Síminn áréttar að með því að færa kröfuna upp í 99% þá er ekki þörf á að setja þessi skilyrði, sem eru mjög erfið að uppfylla.

¹ Fréttatilkynning ARCEP í Frakklandi, dags. 19. júní 2015.

² Kynning *Telefónica* í Þýskalandi á ráðstefnu Digital Exclusive Club í Brussel þann 10. september 2015.

Einnig vill Síminn benda á að á flestum þessum stöðum sem PFS hefur valið dugar vel að hafa 3G eða GSM þjónustu. Ekki fæst séð hvaða þörf sé á LTE þjónustu á öllum stöðum ef það er á annað borð nægileg netþjónusta og/eða farsímasamband. Síminn minnir á að uppbygging á nýjum stöðum felur í sér rask og orku sem þarf að vera forsendur fyrir að mæta.

Í þeim tilvikum sem PFS telur engu að síður þörf á að krefjast uppbyggingar á tilteknum stöðum telur Síminn að besta leiðin til þess sé að óska úthlutunar úr fjarskiptasjóði. Kostnaður við rekstur staðanna getur verið verulegur og numið tugum milljóna, án þess að miklar tekjur komi á móti.

3.2.4 Lágmarks kröfur um gæði háhraða farnetsþjónustu

Síminn gerir athugasemd við þær ströngu kröfur sem PFS miðar við vegna gæðamælinga, einkum hin víðtæku dagsektarúrræði. Telur Síminn vert að benda á að slík íþyngjandi stjórnvaldsákvörðun, um álagningu dagsekta, ætti ávallt að vera síðasta úrræði sem eftirlitsstjórnvald grípur til. Ætti því slíkt úrræði einungis að koma til greina ef fyrirtæki hefur fengið kost á að gera úrbætur til að mæta kröfum eftirlitsstjórnvaldsins og að loknum málefnalegum og raunhæfum fresti til andmæla fyrirhugaðri dagsektarákvörðun. Sé útséð, að liðnum framangreindum fresti, að fyrirtæki ætli ekki að mæta kröfunum þá fyrst geti komið til skoðunar að beita dagsektum. Samrýmist framangreint betur hagsmunum almennings og neytenda, sem og meginreglum stjórnsýslulaga um meðalhóf og andmælarétt.

3.4 Tíðniheimildir á 2600 MHz tíðnisviðinu

Eina athugasemd Símans varðandi 2600 MHz tíðnisviðið er að Síminn telur að lengja ætti gildistímann í 15 ár með hliðsjón af norrænni framkvæmd, en almennt er leyfistíminn á 2600 MHz tíðnisviðinu lengri á Norðurlöndunum en PFS miðar við í útboðsskilmálum sínum.

Í Danmörku er miðað við tímabilið frá júní 2010 til maí 2030, eða alls 20 ár. Í Noregi er leyfistíminn tilgreindur frá janúar 2008 til desember 2022, eða alls 15 ár. Þá er í Finnlandi miðað við tímabilið mars 2015 til desember 2033, alls 18 ár, og í Svíþjóð við tímabilið maí 2008 til desember 2023, alls einnig 15 ár. Telur Síminn því málefnalegt og sanngjarnt að miða við sambærilegt tímabil, þ.e. 15 ár, þegar kemur að tíðniheimild á 2600 MHz tíðnisviðinu³.

3.5 Hámarksúthlutun á tíðniheimildum A-K

3.5.2 Sérstakar takmarkanir á 700 MHz tíðnisviðinu

Síminn vill geta þess að nú þegar eru ónotuð 50% af 800 MHz og ef PFS ætlar að úthluta því til annarra félaga eins og t.d. Vodafone, eins og mátti skilja af svörum PFS í umfjöllun Morgunblaðsins, þá þarf slíkt að koma fram fyrir útboðið. Um er að ræða stóran hluta af

³ Heimild: *Analysys Mason. Spectrum Auction Tracker*. Ágúst 2016.

Því tíðnisviði sem fellur undir að vera lægra en 1 GHz og því æskilegt að það liggi fyrir hvað verður um tíðnibandið þar sem ljóst er að 365 miðlar hf. mun ekki nýta það ef eitthvað er að marka það sem fram hefur komið opinberlega.

Þá liggur það einnig fyrir að Nova og Vodafone hafa í reynd rétt til nýtingar á fleiri tíðniheimildum en þeim hefur verið úthlutað og þar af leiðandi rétt að tekið sé af skarið að þeim sé ekki heimilað að fá meira en það sem þau hafa rétt til nýtingar á. Samkvæmt tíðniheimildum Vodafone er félagið rétthafi að 2x10 MHz á 800 bandi og hefur samkvæmt tíðniheimildinni rétt til að nota 2x5 MHz á 800 bandi Nova. Félagið hefur þá rétt til nýtingar á grundvelli tíðniheimildar samtals 2x15 MHz á 800 bandi. Sama gildir um 900 MHz tíðnisviðið þar sem félagið hefur rétt á grundvelli úthlutaðrar tíðniheimildar til notkunar á samtals 2x20 MHz (2x15 MHz af eigin heimild og 2x5 MHz af heimild Nova). Félagið hefur því nýtingarrétt af samtals 2x35 MHz tíðniheimildum á „undir 1 GHz“-tíðnisviðinu. Eftir útboð er hámarksnýtingarréttur 2x40 MHz á tíðnum undir 1 GHz þar sem aðeins er hægt að kaupa minnst 2x10 MHz. Væri Vodafone þá komið með 2x45 MHz, en það er meira en hámarksnýtingarrétturinn. Þegar af þeirri ástæðu ætti Vodafone að vera óheimil þátttaka í 700 MHz tíðniútboðinu.



INVITATION FOR APPLICATIONS FOR FREQUENCY BAND ALLOCATION
Telecom operating licences for the spectrum 703–733 MHz and 758–788 MHz

The Government hereby invites applications for telecom operating licences for the spectrum 703–733 MHz and 758–788 MHz pursuant to section 7 of the Information Society Code (917/2014). The licences will be granted through an auction process as provided for in section 11 of the Code.

Any enterprise or organisation wishing to participate in the auction shall sign up with FICORA no later than 7 November 2016 as specified in FICORA regulation M64.

Further information on operating licences and the application procedure is available on the website of the Ministry of Transport and Communications at www.lvm.fi/taajuushuutokauppa and on the FICORA website at <https://www.viestintavirasto.fi/taajuudet/radiotaajuuksienkaytto/taajuushuutokauppa.html>.

FURTHER INFORMATION ON THE APPLICATION PROCEDURE AND OPERATING LICENCES

Telecom operating licences for the spectrum 703–733 MHz and 758–788 MHz

The Government hereby invites applications for telecom operating licences for the spectrum 703–733 MHz and 758–788 MHz pursuant to section 7 of the Information Society Code (917/2014). The licences will be issued pursuant to the procedure specified in section 11 of the Information Society Code and in the Government Decree on Radio Spectrum Auctions (840/2016), hereinafter the Auction Decree. Further provisions on the auction procedure are given in FICORA regulation M64. The licences will be issued based on the outcome of the auction.

The purpose of the licences to be issued includes, as provided for in section 1 of the Information Society Code, fostering the supply and use of electronic communications services and to secure efficient use of radio frequencies. Another aim is to improve the nationwide availability, quality and capacity of high-speed wireless broadband connections in Finland.

The spectrum that the licences concern is provided for in section 9 of the Government Decree on Radio Frequency Usage and the Frequency Plan (1246/2014). FICORA will grant the licence holder a frequency reservation pursuant to sections 41 and 45 of the Information Society Code. FICORA will further grant the licence holder a radio licence pursuant to section 40 of the Code after the operator has paid the first instalment of the licence fee. Terms and conditions for frequency band usage may be included in a radio licence granted by FICORA as per section 42 of the Code.

The auction will begin on 24 November 2016. The practical arrangements of the auction are the responsibility of FICORA. Under section 13 of the Information Society Code, only one enterprise of a corporate group may participate in the auction. No cooperation concerning the auction is allowed between parties participating in the auction. Any enterprise or organisation wishing to participate in the auction shall sign up with FICORA no later than 7 November 2016 as specified in FICORA regulation M64. Also, such an enterprise or organisation shall pay the EUR 50,000 participation fee as provided for in section 286 of the Information Society Code and set in section 5 of the Auction Decree.

Under section 2 of the Auction Decree, a total of six 2 x 5 MHz frequency pairs will be auctioned off in the 703–733 MHz and 758–788 MHz spectrum. No more than two 2 x 5 MHz frequency pairs will be allocated to any individual enterprise or organisation. An enterprise or organisation that has made the highest valid bids for multiple frequency pairs will be granted a single licence covering all those frequency pairs.

Under section 4 of the Auction Decree, the starting price in the auction is EUR 11 million per each 5 MHz frequency pair. Under subsection 11, FICORA announces the auction concluded after a bidding round during which no new bids have been placed for any frequency pair or frequency band. The highest valid bid placed for each frequency pair or frequency band at the conclusion of the auction wins the auction. After the auction has ended, FICORA will inform the Ministry of Transport and Communications of its outcome.

Pursuant to section 11 of the Information Society Code, the Government will grant a licence valid until 31 December 2033. The licence will be valid nationwide except for the Åland Islands.

Operations in the spectrum as per the operating licence may begin on 1 February 2017 when other use of the spectrum has ceased.

Licence holders are required to begin operations in practice under the licence within two years of the beginning of the licence period, unless the Government orders otherwise on application from the licence holder due to technical advancements or the general economic situation.

Under the licence terms and conditions, licence holders are required to remove disruptions caused by their operations to other regulation-compliant radio communications and to be liable for the labour and material costs of such removal of disruptions. 'Other regulation-compliant radio communications' means TV broadcasts and their reception. A licence holder is required, together with other licence holders in the same spectrum, to ensure that consumers are provided sufficient guidance and advisory services concerning the adoption of the broadband mobile communications network as regards potential disruptions to TV reception. Licence holders must publicise such advisory services in a sufficient and feasible way.

The network pursuant to the licence must be built so as to cover 99% of the population of mainland Finland within three years of the start of the licence period. The coverage requirement should be structured so as to ensure reasonable indoor coverage within the coverage area. 'Reasonable indoor coverage' means that the telecom operator's services must be available without additional cost to users in normal circumstances of use in users' permanent residences or enterprises' places of business. The licence holder is obliged to demonstrate availability of service if required.

The network pursuant to the licence must be built so that it covers all the main roads, secondary roads, regional roads and connecting roads in mainland Finland and the entire rail network owned by the State of Finland or managed and operated by a state-owned company.

A telecom operator's own network must cover at least 35% of the required coverage over the entire population. Joint network usage in areas beyond an operator's own network is not limited in any way.

When calculating coverage, the broadband mobile communications networks previously built by the licence holder using the 2.6 GHz, 1800 MHz and 800 MHz spectra are taken into account.

The coverage requirement does not apply to those geographical parts of mainland Finland where, for reasons due to Russian activities other than mobile communications, it is not at all possible to build a broadband mobile communications network. The requirement will be extended to all of mainland Finland as of such time as when the aforementioned restrictions are removed.

Licence holders should advise their subscribers in matters related to the licence terms and conditions such as network coverage and publicise information sufficiently and feasibly.

FICORA may issue more detailed regulations concerning the calculating of coverage areas pursuant to the licence and the implementation of the licence terms and conditions in practice.

A telecom operator that has been granted a licence pursuant to section 11 of the Information Society Code is liable to pay the licence fee provided for in section 287 of the Code. The licence fee is the highest valid bid in the auction as provided for in section 11 of the Information Society Code. The licence fee is to be paid in five equal annual instalments as of the issuing of the licence. FICORA will issue a decision on payment of the fee.

The licence holder must also pay the fees specified in the Decree of the Ministry of Transport and Communications on spectrum fees and other charges for radio management duties of FICORA (1222/2010).

The licence holder may transfer the licence to another operator as provided for in section 18 of the Information Society Code. A licence transfer may concern only some of the frequency bands covered by the licence. Under section 20 of the Code, the licence holder may, on approval by the Government, lease the right to use frequencies specified in the licence to another operator.

Under section 14 of the Information Society Code, the name and other information of the enterprise or organisation provided in the auction registration are not public before the conclusion of the auction process. Winning bids will be published after the auction ends. Any other bids submitted by the enterprise or organisation remain confidential. However, FICORA may publish the total in EUR of all bids submitted in any one round of the auction. Auction participants will also be informed of the number of bids submitted and the amount in EUR of the highest bid.

Further information

For further information on signing up for the auction, the auction procedure and participation fees, please contact Chief Specialist Pasi Toivonen and Legal Counsel Henriikka Rosti at FICORA. (firstname.lastname@ficora.fi)

For further information on the terms and conditions of operating licences and the granting of licences, please contact Senior Adviser Kaisa Laitinen and Coordinator Katariina Vuorela at the Ministry of Transport and Communications. (firstname.lastname@lvm.fi)

Auction of the 700 MHz spectrum

1. 700 MHz spectrum

The spectrum 703–733 MHz and 758–788 MHz has been allocated to wireless broadband in Finland as of the beginning of 2017. The Ministry announced in February 2016 that frequency bands for commercial use in mainland Finland would be auctioned off at the end of 2016.

This spectrum can be used for building 4G networks. The frequency bands enable increased capacity for high-speed wireless broadband networks. It is probable that the frequencies now being auctioned off will be used to augment existing 4G networks, increasing their capacity and speed.

2. Organising the spectrum auction

FICORA will auction off the spectrum at the end of 2016. The purpose of the auction is to ensure effective use of the spectrum. Another aim is to improve the nationwide availability, quality and capacity of high-speed wireless broadband connections in Finland. Allocating more frequency bands to wireless broadband will help ensure the continued availability of high-quality wireless broadband throughout Finland.

The auction is governed by the Information Society Code (917/2014), the Government Decree on auctioning radio frequencies (Appendices 3–4) and the FICORA regulation on the auction procedure. The terms and conditions of the licences to be granted are outlined in the licence application notice (Appendix 5) and FICORA terms and conditions for radio licences. The auction also requires an amendment to the Government Decree on Radio Frequency Usage and the Frequency Plan (hereinafter the Government Frequency Decree) (Appendices 6–7).

The auction decree would provide for the following, in keeping with the Information Society Code: the number of frequencies to be allocated, the maximum number of frequencies to be allocated per enterprise, the auction procedure to be used, the starting price of the frequencies being auctioned, the auction entry fee and the licence fee payment schedule. It is proposed that the Government Frequency Decree be amended simultaneously so as to specify in more detail the frequencies being auctioned off.

FICORA will conduct the auction over the public Internet using electronic software acquired through an international competitive tender.

The plan is to conduct the auction as a simultaneous ascending auction applying the *Simultaneous Multiple Round Auction* (SMRA) model, where all frequency pairs are auctioned off at the same time through multiple rounds of bidding. This auction procedure was used in Finland's two previous spectrum auctions in 2009 and 2013. Detailed provisions on the auction procedure will be issued in a FICORA regulation as per the Information Society Code.

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3. Frequency bands to be auctioned off

A total of 2 x 30 MHz frequencies may be allocated to broadband networks in the spectrum being auctioned.

These frequencies (2 x 30 MHz) will be auctioned off as 2 x 5 MHz frequency pairs, i.e. the auction will involve a total of six frequency pairs of 5 MHz each. Any individual enterprise may be allocated no more than two 5 MHz frequency pairs. The purpose of this limitation is to prevent restrictions on competition and concentrated control of frequency bands. There are thus sufficient frequency pairs for at least three enterprises. This would secure the future frequency needs of the currently existing national mobile communications networks, particularly outside urban areas. A 2 x 10 MHz frequency band may be effectively used by an enterprise to increase the capacity and speed of existing wireless broadband networks.

The spectrum (738–758 MHz) also contains four 5 MHz SDL channels (supplementary down-link), a total of 20 MHz in frequency bands that may be used for transmitting information (Internet content, images and video) from the network to terminal devices. SDL frequency bands provide additional future capacity for data transfer; this may be leveraged in offering better and faster connections to subscribers. However, current 4G networks cannot yet make use of SDL technology, and no compatible terminal devices are available at this time. No SDL frequencies have yet been allocated in any of the countries that have already conducted 700 MHz spectrum auctions. Therefore it is not feasible at this time to auction off the SDL frequency bands.

In Russia, the 700 MHz spectrum is used for aviation radio navigation and TV broadcasts. Frequency usage must be coordinated so that broadband use in Finland will not interfere with Russia's aforementioned usages of the spectrum, which are protected by international treaties. Finland and Russia have concluded a bilateral agreement on the coordination of aviation radio navigation and broadband usage. There is as yet no agreement to coordinate Russian TV broadcasts and Finnish broadband usage, and Russia has not indicated for how long it intends to use this spectrum for TV broadcasts.

Russian TV broadcasts impose restrictions on the use of this spectrum in Finland. The scope of these restrictions cannot yet be unambiguously defined, because there is no certainty as to the extent to which Russia will be using the spectrum for TV broadcasts. However, the disruptive effect can be mitigated in designing and building wireless broadband networks, particularly with the placement and orientation of base stations and their antennas.

The key security authorities have expressed their need for a wireless broadband service that would remain functional under all conceivable circumstances. The spectrum now being auctioned off is not sufficient in itself to secure the broadband needs of the public authorities, for reasons including but not limited to the usage restrictions referred to above. Therefore the spectrum is being auctioned off for commercial use.

Together with key security authorities and telecom operators the Ministry of Transport and Communications will start preparations in autumn 2016 to specify the requirements of the public authorities for network usage and to explore the required legislative amendments. The functions of certain public authorities could be secured with a broadband network that has sufficient capacity, is reliable and has comprehensive geographical coverage, being provided by one or more commercial telecom operators and using several frequency spectra and being cost-efficient for public finances; this could be in place around the year 2022. The aim is to create a mechanism where public authorities can, if necessary, cover the costs of a level of service exceeding commercial requirements. The necessary legislative

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amendments would be implemented so that they would be in place during the next round of granting frequency licences.

In addition to the above, 2 x 5 MHz frequencies could be left in reserve in the spectrum below the spectrum now subject to auction (698–703/753–758 MHz) for potential future allocation to the public authorities if necessary.

There will also be 2 x 3 MHz frequency pairs above the spectrum subject to auction (733–736/788–791 MHz) that may in the future be allocated to communication between machines and devices (M2M).

4. Auction fees

Enterprises use allocated frequencies for conducting a profitable business. Auctioning off frequencies guarantees that the government will receive fair compensation for making highly valuable allocations from a limited range of frequencies to commercial use. In Finland, auction prices have in the past not been invoiced all at once but in several instalments over the licence period. In Finland, auctions have not affected service prices or other business investments by telecom operators.

FICORA will incur costs from the auction, for instance from the procurement of the auction software at about EUR 150,000. In order to cover the costs of the auction, enterprises signing up for the auction are required to pay an entry fee of EUR 50,000.

Also, any enterprise that successfully bids for frequencies in the auction shall be obliged to pay the licence fee, which will be equal to the highest accepted bid. The proposed starting price in the auction is EUR 15 million per each 5 MHz frequency pair. Therefore, if all frequencies are sold, the auction should return revenue of at least EUR 90 million. However, this amounts to only about one tenth of 1% of the annual turnover of the telecom operators, factored over the entire licence period.

The starting price was set taking into account parameters such as the estimated economic value of the frequencies, the usability of the frequencies in view of the restrictions caused by Russian usage, and the length of the licence period.

The starting price was set with reference to hammer prices in auctions of similar spectra (700 MHz and 800 MHz) elsewhere in Europe. These two spectra are virtually identical in their technical properties, although in the 700 MHz spectrum there is better penetration of building materials and broader base station coverage. Nevertheless, the technical differences between the spectra are negligible. On the other hand, the value of the 700 MHz is compromised by the fact that in practice its frequencies will mainly serve to add capacity to existing networks.

Also, current restrictions on use caused by Russian usage of the frequencies as described above reduce the current economical value of the frequencies in Finland. The aforementioned restrictions and the uncertainty in the timetable of the spectrum becoming available were taken into account in determining the starting price for the auction.

In European 700 MHz and 800 MHz spectrum auctions, the average hammer price has been EUR 0.51 per MHz per person in the country's population. Applying this average gives a starting price of EUR 28 million for one frequency pair in Finland. In view of the restrictions described above, the proposed starting price is EUR 15 million for one frequency pair. If the restrictions

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caused by Russian usage were to be removed through frequency coordination before the adopting of the auction decree, the starting price might be increased accordingly.

Licence fees will be required to be paid in five equal annual instalments, as with the spectrum auction held in 2013.

5. Terms and conditions of the licence (Appendix 4)

Licence period

Operations in the spectrum as per the operating licence may begin on 1 January 2017 when other use of the spectrum has ceased. The spectrum is currently used for TV broadcasts. The auction is to be held towards the end of 2016 (probably in November or December), after which the Government will grant the licences based on the outcome of the auction. The licence period will begin on the date of granting the licences at the latest.

Under the Information Society Code, a licence may be issued for a fixed period of up to 20 years (section 16). It would be expedient if these licences were to expire at the same time as the 800 MHz licences granted in 2013; thus, the 700 MHz licences would be granted for a period ending on 31 December 2033, i.e. for 17 years. This would enable licences for several spectra to be granted concurrently in the future.

Licence holders would be required to begin operations in practice under the licence within two years of the beginning of the licence period, unless the Government orders otherwise on application from the licence holder due to technical advancements or the general economic situation.

Building obligations

The network pursuant to the licence would be required to be built so as to cover 99% of the population of mainland Finland within three years of the start of the licence period. The coverage requirement should be structured so as to ensure reasonable indoor coverage within the coverage area. 'Reasonable indoor coverage' means that the telecom operator's services must be available without additional cost to users in normal circumstances of use in users' permanent residences or enterprises' places of business. The licence holder would be obliged to demonstrate availability of service if required. The network pursuant to the licence would be required to be built so that it covers all the main roads, secondary roads, regional roads and slip roads in mainland Finland and Finland's entire rail network. When calculating coverage, the broadband mobile communications networks previously built by the licence holder using the 2.6 GHz, 1800 MHz and 800 MHz spectra would be taken into account.

The 4G networks of the established telecom operators currently already cover about 97% of the population of mainland Finland. It is required in the licences granted for the 800 MHz spectrum on the basis of the auction in 2013 that the TeliaSonera network must cover 99% of the population by the end of 2018 and that the DNA and Elisa networks must each cover 97% of the population by the same date. According to statements from the operators themselves, their 4G networks will be quicker to build and more comprehensive than their 3G networks, which currently cover about 99% of the population. Therefore the requirement of 99% coverage for the 700 MHz network by the end of 2019 is reasonable, particularly considering that when calculating coverage, the broadband mobile communications networks previously built by the licence holders using the 2.6 GHz, 1800 MHz and 800 MHz spectra will be taken into account.

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The 3G networks of the telecom operators (900 MHz spectrum) cover the road network of mainland Finland (main roads, secondary roads, regional roads and slip roads), according to information supplied by them to FICORA. The operators' 4G networks (800 MHz) do not yet fully cover the road network in northern and eastern Finland. However, telecom operators can build a 4G network covering the entire roadwork without unreasonable additional costs, because they can make use of existing masts and facilities.

It should be noted with regard to the requirement for coverage over the road network that it is not necessarily possible to get a signal inside a vehicle without an external antenna, because a vehicle chassis attenuates mobile network signals. Terrain and trees can also attenuate signal reception in a vehicle. Notwithstanding the above, including this licence condition would be essential for the purposes of future road traffic functions such as traffic automation, and it is very likely that vehicles of the future will contain components improving signal reception within the vehicle.

Established telecom operators already have 4G coverage over almost all of Finland's rail network. Their 3G networks (900 MHz) cover the rail network completely. Therefore requiring comprehensive coverage for their 4G networks would not impose unreasonable additional costs on them. It should be noted, however, that this requirement would only apply to outdoor coverage; signal reception on board trains requires the installation of repeaters, which is subject to separate agreement between the transport operator and the telecom operator. Data transmitted over the mobile communications network can be shared within a train through a WLAN. The rail network coverage requirement could prompt investments in the repeaters required for signal reception on board trains.

The coverage requirement would not apply to those geographical parts of mainland Finland where, for reasons due to Russian activities other than mobile communications, it is not at all possible to build a broadband mobile communications network. The requirement would be extended to all of mainland Finland as of such time as when the aforementioned restrictions are removed. However, telecom operators may build their networks using the 1800 MHz, 2.6 GHz and 800 MHz spectra.

FICORA may issue more detailed regulations concerning the calculating of coverage areas pursuant to the licence and the implementation of the licence terms and conditions in practice.

The licence terms and conditions would allow for joint building of networks. A telecom operator's own network would be required to cover at least 35% of the required population coverage, but joint use of a network outside the own network area would not be limited in any way. A similar condition was included in the licences for the 800 MHz spectrum auctioned off in 2013, and Teli-Sonera and DNA accordingly went ahead and established a network joint venture, Suomen Yhteisverkko, which is building 4G networks in northern and eastern Finland. DNA and Sonera use the Yhteisverkko mobile communications network in providing their respective services to their subscribers. A joint network enables faster and more comprehensive telecom services for subscribers in sparsely populated areas. Taking into account Finland's large geographical area and how low the population density is in the majority of the country, it is not necessarily feasible from the perspective of the national economy to build redundant networks with comprehensive regional coverage. The Finnish Competition and Consumer Authority has approved the joint network project, under certain conditions.

Removing disruptions

Under the licence terms and conditions, licence holders would be required to remove disruptions caused by their operations to other regulation-compliant radio communications and to be liable for the labour and material costs of such removal of disruptions. 'Other regulation-compliant ra-

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radio communications' means TV broadcasts and their reception. A licence holder would be required, together with other licence holders in the same spectrum, to ensure that consumers are provided sufficient guidance and advisory services concerning the adoption of the broadband mobile communications network as regards potential disruptions to TV reception. Licence holders must publicise such advisory services in a sufficient and feasible way.

TV broadcasts occupy a spectrum below the 700 MHz wireless broadband. In the technical planning of frequency allocation, a protective frequency band between the TV broadcast spectrum and the wireless broadband spectrum was defined to ensure non-disruption of TV broadcasts. However, disruptions may occur in certain situations despite this, particularly in cases where a TV receiver is in close proximity to a base station. Disruptions may be removed for instance by using filters or by making adjustments to the LTE network. Consumers must be able to receive TV broadcasts without disruption even after the adjacent spectrum is taken into use for wireless broadband. A similar condition was included in the licences for the 800 MHz spectrum auctioned off in 2013. Licence holders are liable for the costs e.g. of signal filtration as referred to above and for any labour and material costs incurred in adjusting the TV reception system.

In 2014, DNA, Elisa and TeliaSonera set up a joint project entitled 'Taajuustalkoot' in accordance with the 800 MHz licence terms and conditions. This project provides an advisory service to consumers in situations where the building of a wireless broadband network has caused disruptions in TV reception. This advisory service has worked well, troubleshooting disruptions to TV reception by 800 MHz wireless broadband networks in individual households.

Other consumer advice

Licence holders should advise their subscribers in matters related to the licence terms and conditions such as network coverage and publicise information sufficiently and feasibly. Subscribers should be able to obtain information e.g. about network coverage both on the operator's website and from customer service. Operators must also publicise information on potential disruptions to TV reception as described above, their removal and any required solutions to ensure indoor coverage.

6. Impact of the auction

Auctions were previously conducted in Finland in 2009 (for the 2.5 GHz spectrum) and in 2013 (for the 800 MHz spectrum). The frequencies auctioned were mainly bid for and won by the established national telecom operators DNA, TeliaSonera and Elisa. In Finland, auctions have not had an impact on the market structure or competition situation in mobile communications services. Spectrum auctions have also not led to a decline in telecom operators' other business investments. Auctions are a market-driven means for allocating frequencies while generating revenue for the government and being a transparent procedure.

The introduction of the 800 MHz spectrum auctioned off in 2013 has improved the quality and availability of high-speed wireless broadband connections throughout Finland, particularly in sparsely populated areas. Mobile communications prices have not significantly changed following the auctions. In practice, therefore, consumers have received more and better services than before for the same price.

The three established telecom operators have used the 800 MHz spectrum auctioned off in 2013 to build 4G networks that enable high-speed wireless data transfer. The building and introduction of these networks have progressed rapidly. At the moment, the networks cover more than 97% of the population. The introduction of the 700 MHz spectrum now to be auctioned off from the

Id Versionumero

Ministry of Transport and Communications	Office Eteläesplanadi 16 (Registry) FI-00100 Helsinki	Postal address PO Box 31 FI-00023 Government Finland	Telephone +358 295 16001	www.lvm.fi firstname.lastname@lvm.fi kirjaamo@lvm.fi
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beginning of 2017 will further improve the availability, quality and speed of wireless broadband connections.

If all the frequencies are sold, the revenue generated for the government will be at least EUR 90 million. This represents only about three tenths of 1% of the annual mobile communications turnover of the telecom operators, factored over the licence period.

7. Publicity

The Ministry of Transport and Communications and FICORA will publicise the preparation, opening and closing of the auction in accordance with the auction rules. Auction notifications, documents and timetables will be published on the Ministry's website at www.lvm.fi/taajuushuutokauppa and on the FICORA website at www.viestintavirasto.fi/taajuudet/radiotaajuuksienkaytto/taajuushuutokauppa.

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Wireless broadband in the 700MHz band - Europe after the German auction

The 700 MHz award process in Germany

10.9.15 Digital Executive Club - Brussels

Dirk Grewe

Director Regulatory Affairs

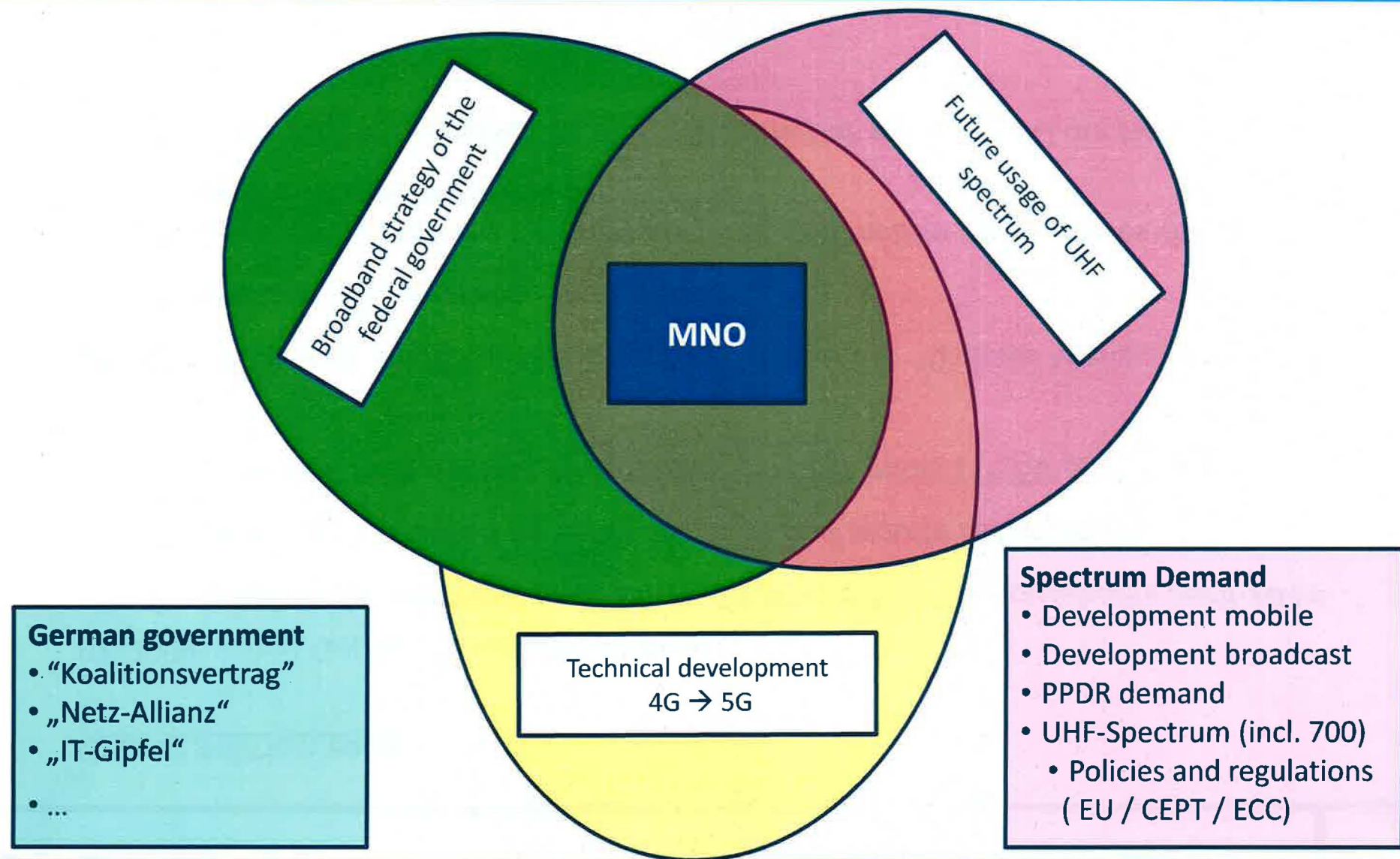
Telefónica Germany

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Agenda

The 700 MHz award process in Germany

1. 700 MHz in the context of the German broadband strategy
2. 2015 auction for 700 / 900 / 1500 / 1800 MHz usage rights
3. Coverage obligations
4. Migration of existing services and availability of 700 MHz spectrum for mobile
5. After the German 700 MHz award process



Overall political goals

02/2009: Initial German broadband strategy

- *1 Mbit/s for everyone until 2010, 50 Mbit/s for 75% households until 2014*
- *Goals to be reached by using all fixed and mobile technologies*
- *Early 800 MHz auction to help reaching the goals (1st EU auction)*

08/2014: Update of initial German broadband strategy in “Digitale Agenda 2014-2017”

- *50 Mbit/s for everyone until 2018*
- *Goals to be reached by using all fixed and mobile technologies (including by broadband state aid programs)*
- *Early 700 MHz auction to help reaching the goals (1st EU auction)*

Corresponding BNetzA proceedings (“Projekt 2016”)

02/2012: MWC-12 identifies 700 MHz spectrum for mobile on co-primary basis

05/2012: BNetzA envisages to include 700 MHz spectrum in ongoing proceedings concerning 900 / 1800 MHz legacy spectrum

06/2013: BNetzA intends to auction expiring 900 / 1800 MHz with newly available 700 (and 1500 MHz usage rights)

07/2013-08/2014: Announcement and approval of Telefónica Deutschland / E-Plus merger

12/2014: Political consensus between German government, federal states and broadcasters to include 700 MHz in envisaged auction, based on:

- Financial agreement to split (700 MHz) auction revenue 50/50 between Bund + Länder
- Financial compensation for migration of PMSE users
- Implementation transition-period for migration DVB-T → DVB/T2

01/2015: Final BNetzA decision to auction 700, 900, 1500 and 1800 MHz usage rights

03/2015: BNetzA admits DT, TEF.DE and VF to participate in 2015 spectrum auction

2015 auction for 700/900/1500/1800 MHz usage rights

2

Auction details:

- From 27.5.-19.6.2015: SMR auction with 3 admitted bidders (DT, TEF.DE + VF)
- Tough bidding competition during 181 rounds on 16 bidding days
- **Total auction prices: 5.081.236.000 €**

700 MHz details:

- 2 x 30 MHz were auctioned in 6 blocks à 2x5 MHz
- Reserve price per 2 x 5 MHz: 75 million €
- Lowest block ("700-A"): Concrete Allocation (due to usage restrictions)
- Other blocks ("700-B" to "700-F"): Abstract Allocation
- **Total amount of 700 MHz prices: 1.000.445.000 €**

Frequenzbereich	Block	Ausstattung	Höchstbieter	Höchstgebot (€ in Tsd.)
700 MHz (gepaart)	700 A	2x5 MHz konkret	TEF DE	166.397
	700 B	2x5 MHz abstrakt	Vodafone	165.509
	700 C	2x5 MHz abstrakt	TEF DE	166.847
	700 D	2x5 MHz abstrakt	Telekom	166.567
	700 E	2x5 MHz abstrakt	Telekom	171.649
	700 F	2x5 MHz abstrakt	Vodafone	163.476

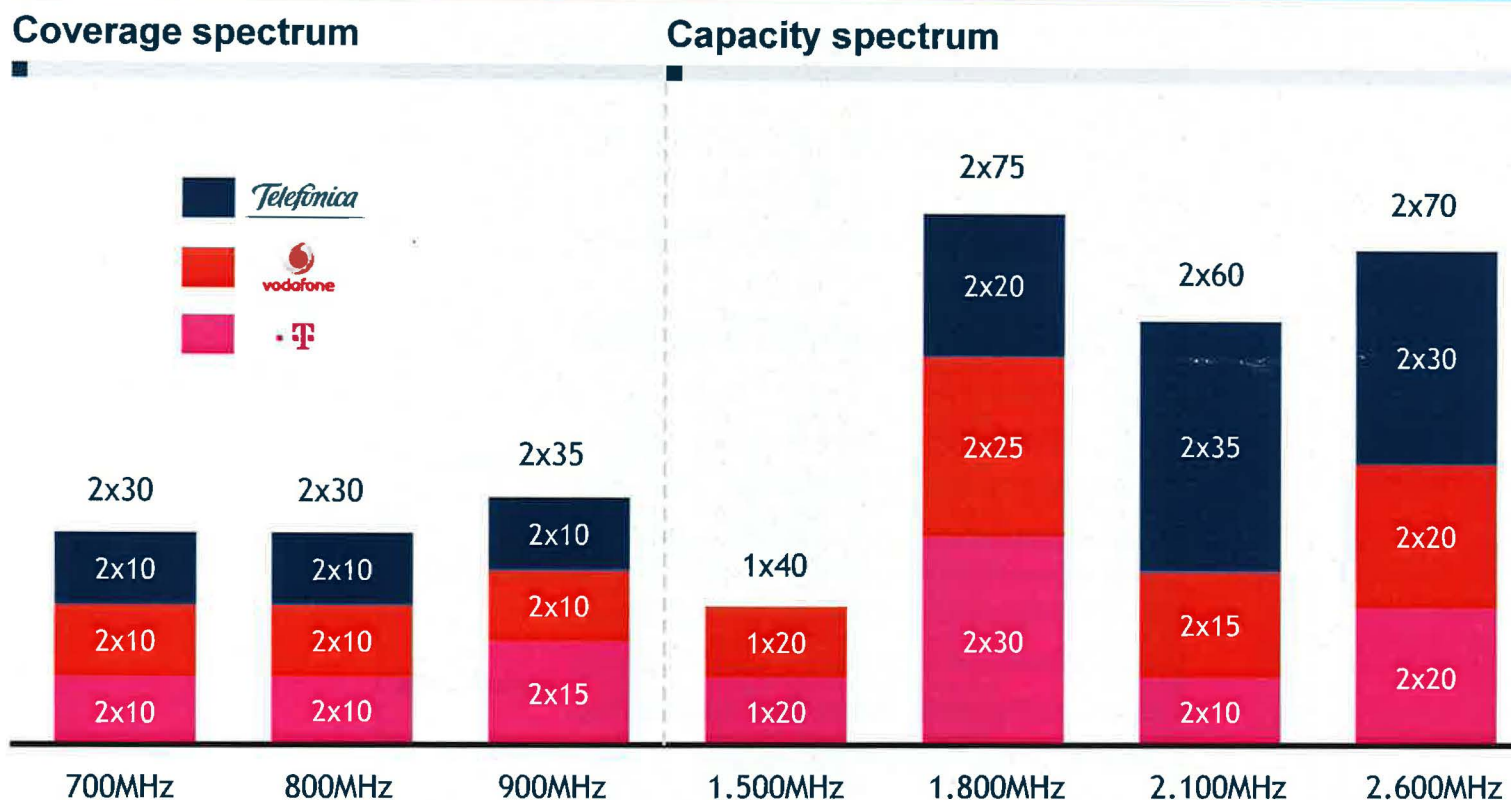
2015 auction for 700/900/1500/1800 MHz usage rights

2

Rundenergebnis der Runde 181				
Frequenzbereich	Block	Ausstattung	Höchstbieter	Höchstgebot (€ in Tsd.)
700 MHz (gepaart)	700 A	2x5 MHz konkret	TEF DE	166.397
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	700 D	2x5 MHz abstrakt	Telekom	166.567
	700 E	2x5 MHz abstrakt	Telekom	171.649
	700 F	2x5 MHz abstrakt	Vodafone	163.476
900 MHz (gepaart)	900 A	2x5 MHz konkret	TEF DE	195.520
	900 B	2x5 MHz abstrakt	Vodafone	211.807
	900 C	2x5 MHz abstrakt	Vodafone	203.298
	900 D	2x5 MHz abstrakt	Telekom	183.671
	900 E	2x5 MHz abstrakt	Telekom	180.968
	900 F	2x5 MHz abstrakt	Telekom	180.465
	900 G	2x5 MHz abstrakt	TEF DE	189.958
1,8 GHz (gepaart)	1800 A	2x5 MHz abstrakt	Vodafone	237.494
	1800 B	2x5 MHz abstrakt	Telekom	248.054
	1800 C	2x5 MHz abstrakt	Vodafone	258.247
	1800 D	2x5 MHz abstrakt	Vodafone	248.133
	1800 E	2x5 MHz abstrakt	Telekom	248.101
	1800 F	2x5 MHz abstrakt	Vodafone	255.967
	1800 G	2x5 MHz abstrakt	TEF DE	239.228
	1800 H	2x5 MHz abstrakt	Telekom	248.784
	1800 I	2x5 MHz abstrakt	TEF DE	240.288
	1800 J	2x5 MHz konkret	Vodafone	180.153
1,5 GHz (ungepaart)	1500 A	1x5 MHz abstrakt	Vodafone	40.939
	1500 B	1x5 MHz abstrakt	Vodafone	40.939
	1500 C	1x5 MHz abstrakt	Vodafone	40.919
	1500 D	1x5 MHz abstrakt	Telekom	42.964
	1500 E	1x5 MHz abstrakt	Vodafone	42.961
	1500 F	1x5 MHz abstrakt	Telekom	39.011
	1500 G	1x5 MHz abstrakt	Telekom	40.961
	1500 H	1x5 MHz abstrakt	Telekom	40.961
Summe aller gehaltenen Höchstgebote (€ in Tsd.)				5.081.236
Zahlungsverpflichtung aufgrund zurückgenommener Höchstgebote (€ in Tsd.)				0
Summe (€ in Tsd.)				5.081.236

Post-auction spectrum holdings

2



Paired 700, 800, 900, 1.800, 2.100, 2.600 and new 1.500 download spectrum shown. Unpaired 2.100 and 2.600 not shown.

MNO-specific coverage obligation:

Within 3 years of spectrum allocation:

- 50 Mbit/s download speed per antenna sector so that 10 Mbit/s download speed is reached in / at
 - at least 98% of nationwide households AND
 - at least 97% of the households within every federal state AND
 - all main traffic routes

Obligations can be fulfilled with any spectrum (not only 700 MHz)

BNetzA auction decision (28.01.2015):

- 700 MHz partly available as of mid-2017
- 700 MHz full availability around mid-2019
- Annex 7 describes phased national approach incl. simulcast phase
- Annex 8 describes info re DVB-T usage in neighbouring countries

Kanal 49 bis 60 – AUT (Österreich)

Status	Rundfunksender	Kanal	ERP in dBW	Administration	Längengrad	Breitengrad
B	Ehrwald 1	49	25,0	AUT	010E58 59.000	47N25 13.000
B	Gries Sellrain	49	15,0	AUT	011E09 21.000	47N11 25.000
B	Holzgau	49	23,0	AUT	010E22 21.000	47N15 42.000
B	Imst 1	49	22,5	AUT	010E45 22.000	47N12 20.000

Rundfunksenderliste Deutschland

Frequenznutzungen des terrestrischen digitalen Fernsehfunks im Frequenzbereich 694 MHz bis 790 MHz (Kanäle 49 bis 60)

Deutschland – Stand Januar 2015

Phasen

Phase 1	Ballungsraum-Regionen	
	Simulcast DVB-T2 vorlaufend	01.05.2016 – 28.03.2017
	Simulcast DVB-T nachlaufend	28.03.2017 – 31.12.2017
	DVB-T2 temporär	28.03.2017 – 01.07.2019
Phase 2a	Regionen mit Mittelzentren	
	Simulcast DVB-T nachlaufend	24.10.2017 – 01.07.2018
	DVB-T2 temporär	24.10.2017 – 01.07.2019
Phase 2b	Regionen mit Mittelzentren	
	Simulcast DVB-T nachlaufend	13.03.2018 – 31.12.2018
	DVB-T2 temporär	13.03.2018 – 01.07.2019
Phase 3	Fläche	
	DVB-T2 final	ab 31.12.2018
Meilenstein I		01.05.2016
Meilenstein II		28.03.2017
Meilenstein III		24.10.2017
Meilenstein IV		13.03.2018
Meilenstein V		31.12.2018

MWC-15

Final 700 MHz assignment for mobile on co-primary basis

Cross-border issues

- BNetzA discusses with neighboring countries to quickly dedicate 700 MHz for mobile to prevent interference in border regions
- EU policy deadline would be helpful that 700 MHz band shall asap be made available for mobile in entire EU

700 MHz payment terms

“Pay when available” rule in 700 MHz award processes might help to speed-up in-country band clearance for mobile

Telefónica

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700 MHZ BAND

ARCEP submits its methods of allocation and terms of use for 700 MHz frequencies to the Electronic communications advisory committee, for its opinion

Paris, 19 June 2015

The increasing use of the mobile internet brought about by the growing ubiquity of smartphones and tablets, and the launch of 4G, is driving an exponential increase in traffic on cellular networks. To be able to keep pace with this increase in consumption, it is vital that operators be allocated new frequency bands, and particularly bands in the lower frequencies whose propagation properties are especially well suited to the task.

It is within this environment, and thanks to recent improvements to digital terrestrial television (DTT) compression standards, that the Government decided to free up the 700 MHz band and to allocate 2x30 MHz of spectrum to mobile operators.

This band will be freed up progressively across the country, between April 2016 and June 2019. A bill on "the second digital dividend, and ongoing upgrades to digital terrestrial television" is currently being debated in Parliament, and will entrench the process in law.

As a result, based on the priorities set by the ministers responsible for digital affairs, and in accordance with the regulatory objectives assigned to it by law, ARCEP is responsible for proposing the allocation methods for these frequencies and the terms and conditions under which mobile operators can use them. The procedure is then set in motion by the ministers. ARCEP is responsible for putting this procedure into place, and for allocating frequencies to operators.

Call for applications to be launched in July

Yesterday, on Thursday, 18 June, ARCEP submitted its draft decisions on the future assignment and allocation of the 700 MHz band to the members of the Electronic communications advisory committee, CCCE (*commission consultative des communications électroniques*) for their opinion.

These draft decisions are the result of a year of preparatory work carried out in tandem with market stakeholders and the ministers responsible for digital affairs. They are a follow-up to the "Strategic review of spectrum for superfast mobile" (*Revue stratégique du spectre pour le très haut débit mobile*) that was submitted for consultation last December.

Once it has received the CCCE opinion, ARCEP plans on adopting its final proposal in early July, so that the ministers responsible for digital affairs can issue the call for applications later in the month.

Several objectives attached to the planned allocation procedure

The ministers responsible for digital affairs have set several priorities in terms of monetising intangible State assets, regional development, investment and the preservation of fair and effective competition.

As concerns the **monetisation** of intangible State **assets**, ARCEP has worked with the ministers to establish a procedure that takes the form of a multiple round ascending auction. The auction will begin with a reserve price, set by the ministers, of 416 million euros for a block of 2x5 MHz, or 2.5 billion euros for the entire band. A detailed description of the procedure can be found in Appendix 1.

In accordance with a request made by the ministers and Parliament during recent parliamentary debates (on a bill on growth and business, a bill on the second digital dividend and ongoing upgrades to digital terrestrial television, and on the work being done by the High Commission for public postal and electronic communications services (*Commission supérieure du service public des postes et des communications électroniques*), the procedure takes utmost account of **digital regional development** priorities.

The procedure therefore includes coverage obligations that are as strong as those attached to the 800 MHz band. There are particularly strong demands for deployment of the 700 MHz band in rural areas, in addition to 800 MHz band frequencies, to be able to improve the quality of 4G services in these areas over time and to prepare for the potential development of 5G services on these bands.

In addition, the call for applications includes new obligations aimed at improving mobile data availability on-board **everyday trains** (TER, RER, Transilien). These obligations will be completed by a more detailed quality of service audit for all railway lines (including TGV high-speed trains) and underground lines, to encourage operators to increase the quality of service they provide. Coverage obligations are detailed in Appendix 2.

The procedure is also meant to **stimulate investment**, by enabling every player to achieve a fair share of the mobile market. The band was therefore divided into six blocks of 2×5 MHz, so that spectrum can be allocated to a large number of candidates. These blocks can be combined to allow the candidates to provide their customers with the highest connection speeds possible. However, to encourage heavy use of this frequency band and to limit imbalances between operators, a single candidate cannot acquire more than three blocks (i.e. 2×15 MHz) in the 700 MHz band, and will not be able to exceed a limit of 2×30 MHz of low frequency spectrum, i.e. in the 700 MHz, 800 MHz and 900 MHz bands combined. Lastly, the type of auction being planned allows the candidates to fully manage the outcome: they can choose to continue or to stop their bidding at any point in time, knowing how much spectrum they will be allocated.

Frequencies due to be allocated before the end of 2015

Once the call for applications has been launched, candidates will have until the end of Q3 2015 to file their applications. ARCEP plans to conduct the auction in the fourth quarter of the year, and to award the licences to the winning candidates before the end of 2015.

Annex 1 - Description of the French 700 MHz band allocation process

The 700 MHz band will be allocated through a multi-round ascending auction, described hereunder.

1. Main auction

Six 2×5 MHz blocks will be auctioned at the same time with a single unit price. Throughout the procedure, ARCEP, as the auctioneer, will gradually increase this unit price.

At the beginning of the first round, ARCEP asks the bidders about the amount of blocks they are willing to buy at the reserve price (416 million euros each).

At the beginning of each subsequent round, ARCEP increases the unit price for each 2×5 MHz block by 5 million euros (1). The bidders then submit the number of blocks they are willing to buy at this price. They can either maintain their demand, relative to the previous round, or reduce it by one block. Bidders are not allowed to increase their demand, or reduce it by more than one block at a time.

Throughout the auction, bidders are subjected to a spectrum cap:

- they are not allowed to bid on more than three blocks ;
- their demand, should it be satisfied, cannot lead them to hold more than 2×30 MHz of lower band spectrum (700 MHz, 800 MHz and 900 MHz).

When the aggregate demand (i.e. the sum of all the bidders' demands) reaches six, the auction ends and the blocks are allocated at the round price.

For instance:

- The demands of the bidders evolves as follows :

o Bidder A is bidding on three blocks at 416 million euros each. At 421 million euros, it is still bidding on three blocks. And so forth until the price reaches 486 million euros for each block, at which point bidder A reduces its demand to two blocks.

o Bidder B is bidding on three blocks at 416 million euros. At 426 million euros, it reduces its demand to two blocks. At 501 million euros, it is bidding on just one block.

o Bidder C is bidding on three blocks at 416 million euros. At 446 million euros, it reduces its demand to two blocks. At 486 million euros, it is bidding on just one block.

o Bidder D is bidding on three blocks at 416 million euros. At 466 million euros, it reduces its demand to two blocks.

- As a result:

o At 416 million euros for each block, aggregate demand is 12.

o At 426 million euros, it decreases to 11.

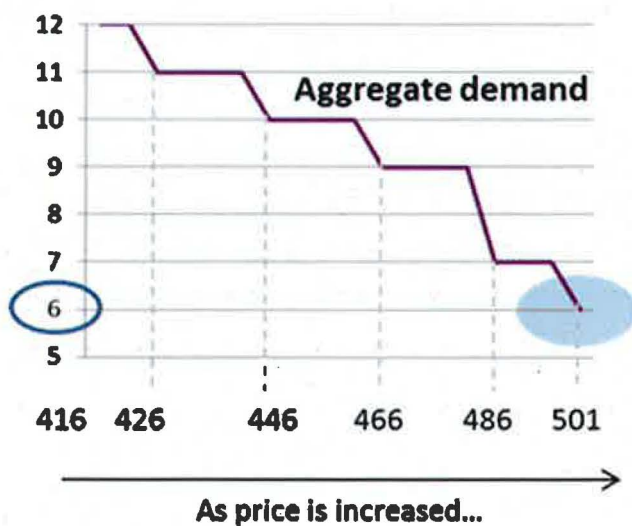
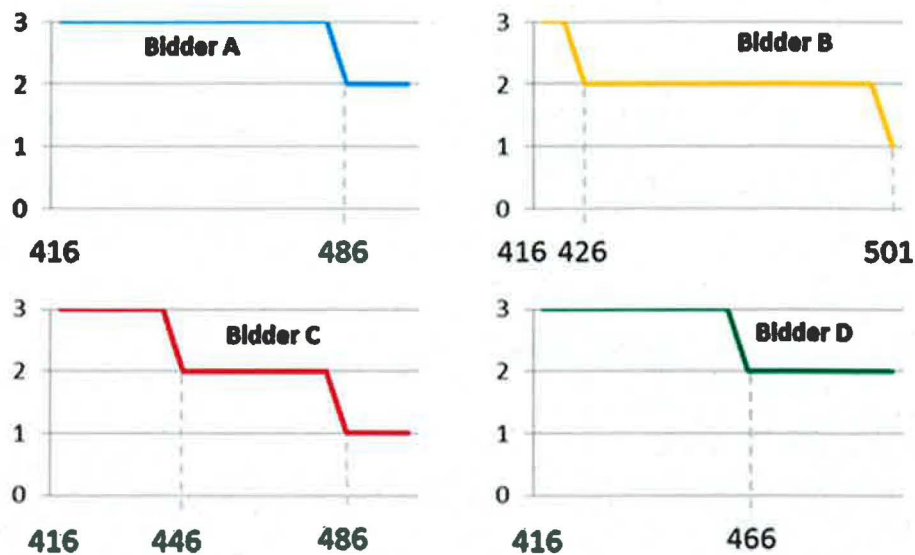
o At 446 million euros, it decreases to 10.

o At 466 million euros, it decreases to 9.

o At 486 million euros, it decreases to 7.

o At 501 million euros, it reaches 6.

- Bidder A wins 2 blocks. Bidder B wins 1 block. Bidder C wins 1 block. Bidder D wins 2 blocks. All bidders pay 501 million euros for each block they won.



... the aggregate demand of bidders decreases

In the unlikely event that the demand should decrease below 6 (which would mean several bidders reduced their demand on the same round), an ad-hoc tie-breaking mechanism allows the determination of the winners. All 6 blocks will be allocated at the end of the auction.

2. Positioning auction

After the main auction, the winners, their respective allotment and the final price of the blocks are all known. However, even though ARCEP guarantees contiguous allocations, the positioning of the winners within the band must be determined: leftmost, rightmost, in the middle...



In order to do so, ARCEP runs a single round sealed bid positioning auction: each winner submits a list, in order of decreasing preference, of positions within the band and a price it is willing to pay to get its preferred position within the band. ARCEP then sorts the winners in order of decreasing bid first and meets their preferences if

possible. The winners pay the amount they submitted if they get their preferred position and nothing if they get their last choice. Should a winner get an intermediate choice of positioning, it pays an intermediate amount.

For instance :

- The main auction results are as follows: Bidder A wins 2 blocks. Bidder B wins 1 block. Bidder C wins 1 block. Bidder D wins 2 blocks. Consequently, there is a total of four possible positions within the band, numbered from 1, for the leftmost position, to 4, for the rightmost position.

- The winners submit the following bids :

- o Bidder A bids 50 million euros for the following positioning list: 1, then 2, then 3, then 4.
- o Bidder B bids 40 million euros for the following positioning list: 2, then 1, then 3, then 4.
- o Bidder C bids 30 million euros for the following positioning list: 1, then 2, then 3, then 4.
- o Bidder D bids 20 million euros for the following positioning list: 1, then 2, then 3, then 4.

- The result of the positioning auction is as follows :

- o Bidder A gets position 1 for 50 million euros.
- o Bidder B gets position 2 for 40 million euros.
- o Bidder C gets position 3 for 10 million euros (a third of what it bid).
- o Bidder D gets position 4 and pays nothing for this position.

3. Frequency payment

Winners pay, for a 20 years license, the sum of the amount bid on the main auction and the amount resulting from the positioning auction. This total amount is paid in four equal instalments: the first is paid at the license delivery; the subsequent three are paid annually. Licensees will also be required to pay annually an amount equal to 1% of the turnover attributable to these frequencies.?

Annex 2 - Coverage obligations

Obligation		T ₁ + 5 years (late 2020)	17 january 2022	17 january 2027	T ₁ + 15 years (late 2030)
	Metropolitan population			98%	99,6%
	Main roads				100%
	Population in each metropolitan department			90%	95%
	Population in the « prioritary deployment zone » (18% of population, 63% of territory)	40%		92%	97,7%
	City centers in the « White Zones » program (1% of population, 3300 city centers)			100%	
	Regional rail roads : nationwide coverage		60%	80%	90%
	Regional rail roads : coverage in each region			60%	80%

T1 = license delivery date

(1) This amount needs to be confirmed, it is chosen here in order to illustrate the auction

Obligation		T ₁ + 5 years (late 2020)	17 january 2022	17 january 2027	T ₁ + 15 years (late 2030)
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