

Coordination agreement relating to DTT in the band 470 – 694 MHz between Finland and Sweden

Background

Finland and Sweden have decided to use the frequency band 694 – 790 MHz for electronic communication services other than broadcasting in the future. The intention during the negotiations has been to find a common final planning solution enabling at least six DTT layers in each country in band 470-694 MHz.

Changes to the GE06 Plan and subsequent associated bilateral agreements

Allotments added

The following Allotments are accepted by the Finnish Communications Regulatory Authority and the Swedish Post and Telecom Authority respectively as additions to the GE06 Plan. If the allotment bears no remark, implementation conditions according to ANNEX 1 of this agreement apply.

Finland

ANJALANKOSKI	26	44		
ESPOO	39	43		
EURAJOKI	37	42		
FISKARS	39	43		
HAAPAVESI	33	40	44	
IISALMI	28	31	32	
INARI	47			
JOUTSENO	41	44		
JYVÄSKYLÄ	27	28		
KARIGASNIEMI	32	41		
KERIMÄKI	26	41		
KIIHTELYSVAARA	23			
KOLI	48			
KRUUNUPYY	25	28	35*	40
KUOPIO	32	41		
KUTTANEN	24	25	40	41
LAHTI	37	42		
LAPUA	25	33		
MIKKELI	25	41		
OULU	22	25		
PERNAJA	24	35		
PIHTIPUDAS	27	29	31	
POSIO	23	35	36	
PYHÄTUNTURI	35	42	47	
PYHÄVUORI	25	40		
ROVANIEMI	25	28	33	
RUKA	34	35		
TAIVALKOSKI	24	36	47	
TAMMELA	31	35		
TAMPERE	24	43	44	
TERVOLA	24	33		

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TURKU	33	36	41	44	47
UTSJOKI	32	41			
VAASA	25	33	40	45*	48
VUOTO	23	32	34		
VUOKATTI	23	35	48		
YLLÄS	25	28	33	38	
ÄHTÄRI	24	36	40	42	

* The channel is used for low power transmissions (Regional network in Ostrobothnia)

Additionally, allotments in Finnish areas with constraints in frequency planning listed in Annex 2 are accepted by the Finnish Communications Regulatory Authority and the Swedish Post and Telecom Authority respectively as additions to the GE06 Plan.

Finnish assignments with characteristics according to ANNEX 3 of this agreement are accepted by Sweden as implementation of the above mentioned allotments and could be implemented without coordination.

Sweden

ARVIDSJAUR	25	37			
BOLLNAES	31	43			
BORLAENGE	32	44	45		
EMMABODA	26	36			
FILIPSTAD	24	46			
GAELLIVARE					
GAEVLE	26	43			
HUDIKSVALL	29	43			
KALIX	21	39	45	48	
KIRUNA					
KISA	23	30	38	42	43
LYCKSELE	35				
MORA					
MOTALA	26	41	43	44	45
NORRKOEPING	34	43	47		
PAJALA	26	32			
SKELLEFTEAA	29	31			
SOLLEFTEAA	21				
STOCKHOLM	21	32	45		
STORUMAN	26	35			
SUNDSVALL	21	24	26		
SVEG	33				
TAASJOE	25	32			
UPPSALA	24	26	29	30	
VISBY	22	31			
VAENNAES	27	29	43		
VAESTERVIK	27	38			
VAESTERAAS	35	36			
AANGE	25	35	38	40	

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AELVSBYB	45				
OEREBRO	33	38			
OERNSKOELDSVIK	24	31			
OESTERSUND	22	32	36	38	42
OESTHAMMAR	24	30			
OEVERKALIX	21	26	35	39	

Swedish assignments with characteristics according to ANNEX 4 of this agreement are accepted by Finland as implementation of the above mentioned allotments and could be implemented without coordination.

Assignments to be Modified

The following Assignments are to be Modified in the GE06 Plan no later than 2016-12-31.

Sweden

AdminUniqueID	Assignment	Channel	MOD Action
S-DT1-20034	Bollnäs	29	ERP MOD from 53 dBW to 47 dBW
S-DT1-20130	Hudiksvall/Forsa	44	ERP MOD from 53 dBW to 47 dBW

Allotments to be Suppressed

The following Allotments are to be Suppressed from the GE06 Plan no later than 2016-12-31.

Finland

ANJALANKOSKI					
ESPOO	35				
EURAJOKI					
FISKARS	31				
HAAPAVESI	31				
IISALMI					
INARI					
JOUTSENO					
JYVÄSKYLÄ					
KARIGASNIEMI					
KERIMÄKI					
KIIHTELYSVAARA					
KOLI					
KRUUNUPYY	27				
KUOPIO					
KUTTANEN					
LAHTI					
LAPUA	24				
MIKKELI					
PELLO					
PERNAJA					
PIHTIPUDAS					

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POSIO					
PYHÄTUNTURI					
PYHÄVUORI					
ROVANIEMI	26				
RUKA					
TAIVALKOSKI					
TAMMELA					
TAMPERE					
TERVOLA					
TURKU					
UTSJOKI					
VAASA	31*				
VUOKATTI					
YLLÄS					
ÄHTÄRI					

* The channels has been used for low power transmissions (Regional network in Ostrobothnia)

Sweden

ARVIDSJAUR					
BOLLNAES					
BORLAENGE					
EMMABODA					
FILIPSTAD					
GAELLIVARE					
GAEVLE	32				
HUDIKSVALL					
KALIX					
KIRUNA					
KISA					
LYCKSELE					
MORA					
MOTALA					
NORRKOEPING					
PAJALA					
SKELLEFTEAA					
SOLLEFTEAA					
STOCKHOLM					
STORUMAN					
SUNDSVALL					
SVEG					
TAASJOE					
UPPSALA					
VISBY					
VAENNAES					
VAESTERVIK					
VAESTERAAS					
AANGE					

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AELVSBY					
OEREBRO					
OERNSKOELDSVIK	25	42			
OESTERSUND					
OESTHAMMAR					
OEVERKALIX					

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Revision and cancellation

Revision to this agreement can only be made if both parties agree.

The agreement may be cancelled with a notice of at least twelve (12) months from any of the two (2) parties.

Entry into force

This agreement will enter into force upon the signature of both parties.

Place

HELSINKI

Date

4.11.2016

For the Finnish Communications
Regulatory Authority

Place

Stockholm

Date

October 18th 2016

For the Swedish Post and
Telecom Authority

Jarmo Ilme

Director

Spectrum Management, Ficora

Pia Högset

Head of Section for Spectrum Development

Spectrum Department, PTS

ANNEX 1 – Implementation conditions

Interfering field strength requiring coordination

If the cumulative interfering field strength exceeds the values listed in Table 1 below on the boundary of any co-channel allotment in the GE06 Plan, coordination with the other party is needed.

For affected DVB-T allotments the $E_{\max \text{ int}}$ in Table 1 should be used (irrespective of the technical characteristics of the plan entry).

DVB-T interfered by DVB-T for 650 MHz

Assumed reception case	Portable outdoor reception (RPC2)
Reference location probability	95 %
Reference C/N [dB]	19
Reference $(E_{\text{med}})_{\text{ref}}$ [dB μ V/m] at 650 MHz	78
CF	12.8
Implementation margin (IM)	3
$E_{\max \text{ int}}$ [dB μ V/m] at 650 MHz	49

Table 1 $E_{\max \text{ int}}$ for DVB-T interfered by DVB-T

In UHF the value should be adjusted with respect to frequency with $30 \cdot \log(f/f_{650})$, f in MHz.

Derivation maximum allowable interfering field strength

The maximum allowable interfering field strength, $E_{\max \text{ int}}$, at any test point given by the input requirement is calculated as follows:

$$E_{\max \text{ int}} = E_{\text{med}} + f_{\text{corr}} - CF - PR + IM$$

where

E_{med} is the minimum median equivalent field strength (in dB μ V/m) for 650 MHz;

f_{corr} is the frequency correction (in dB)

for the protection of DVB-T in UHF, given by $30 \cdot \log(f/f_{650})$, f in MHz

CF is the combined location correction factor: $CF = q \sqrt{(\sigma_w^2 + \sigma_i^2)}$;

q is the distribution factor;

σ_w is the standard deviation of the lognormal distribution of the wanted signal (in dB);

σ_i is the standard deviation of the lognormal distribution of the interfering signal (in dB);

PR is the appropriate protection ratio;

When the interfering system is of the same type as the wanted one, PR is equal to C/N for the wanted system's RPC. PR and C/N are taken from Addendum 12 to Document 7-E, input from CEPT to RRC-06.

IM is the implementation margin (in dB).

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ANNEX 2 -Allotments in Finnish areas with constraints in frequency planning

Allotments within coordination distance with Sweden

Allotment name	Channels
ANJALANKOSKI	35, 36, 43, 47
ESPOO	22, 23, 36, 41, 47
INARI	23, 31, 34, 41
IISALMI	33, 41
JOUTSENO	33, 42, 43
KARIGASNIEMI	25, 29, 31, 34, 47
KOLI	30, 35, 38, 42
KUOPIO	33, 44
LAHTI	29, 36, 41, 44
PERNAJA	22, 44, 47
POSIO	24, 28, 32, 33, 34, 38, 41, 42, 48
PYHÄTUNTURI	22, 28, 31, 36, 38
RUKA	23, 24, 32, 38, 41, 42
TAIVALKOSKI	28, 41, 48
UTSJOKI	23, 25, 29
VUOKATTI	24, 38, 41, 42, 47
VUOTSO	29, 41, 42, 47

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ANNEX 3 – Finnish assignments

This annex lists Finnish assignments with characteristics that are accepted by Sweden and could be implemented without coordination.

Allotment name	Main Tx name	Lat (North)	Long (East)	Altitude (m a.s.l)	Antenna height (m a.g.l)	ERP [dBW]	Ant (D/ND)
ANJALANKOSKI	Anjalankoski	6728515.002	502541.169	72	310	47,0	ND
ESPOO	Espoo	6673536.302	369097.877	44	313	47,0	ND
EURAJOKI	Eurajoki	6805659.915	216007.785	38	311	47,0	ND
FISKARS	Fiskars	6670558.177	305206.154	75	222	40,0	ND
HAAPAVESI	Haapavesi	7116689.369	415454.763	150	313	47,0	ND
IISALMI	Iisalmi	7055797.342	503700.898	203	110	44,8	ND
INARI	Inari	7637894.593	504949.074	360	214	40,8	ND
JOUTSENO	Joutseno	6778402.687	583017.055	103	204	47,0	ND
JYVÄSKYLÄ	Jyväskylä	6897976.329	429215.857	235	315	47,0	ND
KARIGASNIEMI	Karigasniemi	7702425.791	460283.017	617	67	30,0	ND
KERIMÄKI	Kerimäki	6875056.948	617884.060	99	311	47,0	ND
KIIHTELYSVAARA	Kiihtelysvaara	6924155.326	680976.791	207	110	44,8	ND
KOLI	Koli	6995768.960	640647.865	286	264	47,8	ND
KRUUNUPYY	Kruunupyy	7072225.777	327506.492	51	200	47,0	ND
KUOPIO	Kuopio	6956598.437	527679.611	190	314	47,0	ND
KUTTANEN	Enontekiö, Kuttanen	7595054.723	329279.283	409	115	30,0	ND
LAHTI	Lahti	6764445.831	420159.948	218	300	47,0	ND
LAPUA	Lapua	6987121.285	294788.680	127	312	47,0	ND
MIKKELI	Mikkeli	6828008.438	524709.120	148	203	47,0	ND
OULU	Oulu	7212804.523	445535.464	69	314	47,0	ND
PERNAJA	Pernaja	6715223.815	440382.196	45	172	40,0	ND
PIHTIPUDAS	Pihtipudas	7018434.821	432150.734	182	310	49,0	ND

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Allocation name	Main Tx name	Lat (North)	Long (East)	Altitude (m a.s.l.)	Antenna height (m a.g.l.)	ERP [dBW]	Ant (D/ND)
POSIO	Posio	7320367.379	528750.278	296	214	41,5	ND
PYHÄTUNTURI	Pyhäntunturi	7433807.420	509339.082	475	252	42,0	ND
PYHÄVUORI	Pyhävuori	6917674.904	222220.644	128	207	47,0	ND
ROVANIEMI	Rovaniemi	7381863.465	436548.201	191	190	39,5	ND
RUKA	Ruka	7339439.284	597037.430	465	114	39,5	ND
TAIVALKOSKI	Taivalkoski	7242740.535	563141.634	285	260	41,5	ND
TAMMELA	Tammela	6758987.775	331906.048	170	200	47,0	ND
TAMPERE	Tampere	6840482.872	334610.706	173	315	47,8	ND
TERVOLA	Tervola	7334837.879	396053.198	134	280	42,6	ND
TURKU	Turku	6702477.972	242907.784	44	310	50,0	ND except ch.41 and ch.44 D 8 dB/210-220
UTSJOKI	Utsjoki	7754422.378	502180.901	321	121	30,0	ND
VAASA	Vaasa	7020562.946	225335.839	19	117	40,0	ND
VUOKATTI	Vuokatti	7111695.685	561027.810	290	310	49,0	ND
VUOTSO	Vuotso	7547796.000	506086.181	385	72	36,0	ND
YLLÄS	Ylläs	7497275.493	381277.095	696	114	41,5	ND
YLLÄS	Pello	7411632.344	373232.122	309	96	38,5	ND
ÄHTÄRI	Ähtäri	6926178.553	351763.811	190	170	47,0	ND

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Regional network in Ostrobothnia

Alloftment name	Tx name	Lat (North)	Long (East)	Altitude (m a.s.l)	Antenna height (m a.g.l)	ERP [dBW]	Ant (D/ND)	Channel
VAASA	Maalahti	6988126.636	225815.687	20	100	21,6	ND	45
VAASA	Vähäkyrö	7001298.762	252567.799	14	63	22,3	ND	45
VAASA	Museigatan	7008242.495	228002.796	10	86	35,5	ND	45
VAASA	Oravainen	7028004.039	268540.527	3	63	24,3	ND	45
VAASA	Särkimo 2	7027424.107	251781.566	6	95	23,7	ND	45
VAASA	Kimo	7020374.644	272330.691	40	84	23,9	ND	45
VAASA	Särkimo 1	7027424.107	251781.566	6	84	23,9	ND	45
VAASA	Vöyri	7009164.635	261167.724	19	55	22,4	ND	45
KRUUNUPYY	Kaustinen	7049577.352	334908.864	89	83	24,1	ND	35
KRUUNUPYY	Kätölandet	7090058.150	296783.927	4	80	21,7	ND	35
KRUUNUPYY	Snåre	7062574.020	315154.830	31	92	29,7	ND	35
KRUUNUPYY	Forsby	7054504.557	295997.809	17	82	22,9	ND	35
KRUUNUPYY	Lillby	7045369.613	301085.798	30	73	24,0	ND	35
KRUUNUPYY	Hult	7067159.962	285756.760	7	68	24,1	ND	35
KRUUNUPYY	Juutas 1	7050362.409	276798.647	15	86	22,8	ND	35
KRUUNUPYY	Ekola	7030847.850	287076.573	28	68	22,1	ND	35
KRUUNUPYY	Juutas 2	7050362.409	276798.647	15	86	16,8	ND	35
KRUUNUPYY	Norrby	7070435.000	297757.000	7	61	24,1	ND	35

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ANNEX 4 – Swedish assignments

This annex lists Swedish assignments with characteristics that are accepted by Finland and could be implemented without coordination during 2016/2017.

Allotment	Assignment	Lat (North)	Long (East)	Altitude (m a.s.l)	Ant. height (m a.g.l)	ERP (dBW)	Ant (D/ND)
ARVIDSJÄUR	Arvidsjaur/Julträsk	65N32 05	018E59 38	751	322	47,0	ND
BOLLNAES	Bollnäs	61N29 03	016E12 56	423	310	47,0	ND
BORLAENGE	Borlänge	60N22 58	015E08 29	489	303	47,0	ND
EMMABODA	Emmaboda	56N46 24	015E35 00	206	313	47,0	ND
FILIPSTAD	Filipstad	59N40 58	014E07 39	290	304	47,0	ND
GAELLIVARE	Gällivare	67N06 00	020E36 53	745	145	47,0	ND
GAEVLE	Gävle	60N37 54	017E07 59	50	313	47,0	ND
HUDIKSVALL	Hudiksvall/Forsa	61N42 28	016E51 34	330	315	47,0	ND
KALIX	Kalix	65N56 12	023E31 12	91	313	47,0	ND
KIRUNA	Kiruna	67N50 05	020E11 32	675	216	47,0	ND
KISA	Kisa	57N57 29	015E35 33	246	317	47,0	ND
LYCKSELE	Lycksele	64N28 53	018E35 17	465	313	47,0	ND
MORA	Mora	61N01 04	014E17 53	535	313	47,0	ND
MOTALA	Motala	58N35 20	015E05 57	161	318	47,0	ND
NORRKÖPING	Norrköping	58N40 37	016E28 14	113	313	47,0	ND
PAJALA	Pajala	67N16 48	023E14 12	245	318	47,0	ND
SKELLEFTEÅ	Skellefteå	64N46 32	020E57 22	130	310	47,0	ND
SOLLEFTEÅ	Sollefteå/Multrä	63N15 12	017E27 12	390	275	47,0	ND
STOCKHOLM	Stockholm/Nacka	59N17 54	018E10 35	55	288	51,8	D (10-200°: 47 dBW)
STORUMAN	Storuman	65N03 59	016E56 39	548	313	47,0	ND
SUNDSVALL	Sundsvall	62N22 08	017E19 13	240	206	47,0	ND
SVEG	Sveg	61N55 28	014E18 56	710	313	47,0	ND
TAASJÖE	Täsjö	64N14 12	015E56 30	621	312	47,0	ND
UPPSALA	Uppsala/Vedyxa	59N51 25	017E46 48	37	219	47,0	ND

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Allotment	Assignment	Lat (North)	Long (East)	Altitude (m a.s.l.)	Ant. height (m a.g.l.)	ERP (dBW)	Ant (D/ND)
VISBY	Visby/Follingbo	57N35 35	018E22 36	78	248	47,0	ND
VAENNAES	Vännäs	63N50 28	019E49 35	245	312	47,0	ND
VAESTERVIK	Västervik	57N43 17	016E25 45	90	315	47,0	ND
VAESTERAAS	Västerås	59N38 38	016E24 12	42	313	47,0	ND
AANGE	Ånge	62N30 12	015E22 42	487	314	44,0	ND
AELVSBYIN	Älvsbyn	65N41 22	021E16 11	270	313	47,0	ND
OEREBRO	Örebro	59N25 47	015E03 07	254	303	47,0	ND
OERNSKOELDSVIK	Örnköldsvik/Ås	63N18 12	018E39 54	216	160	43,0	ND
OESTERSUND	Östersund	63N06 46	014E36 09	462	309	47,0	ND
OESTHAMMAR	Östhammar	60N15 50	018E04 33	45	320	47,0	ND
OEVERKALIX	Överkalix	66N18 13	022E51 31	104	316	47,0	ND

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