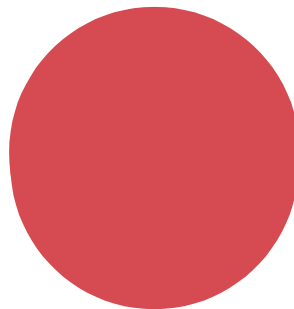


Information Memorandum

Annex L



**Border coordination agreements between
Denmark and Sweden (700 MHz and 900
MHz frequency bands)**



2018

Agreement between the Danish Energy Agency, and the Swedish Post and Telecom Authority concerning the use of the 700 MHz band (694- 790 MHz) for MFCN service

February 2016

Coordination agreement between MFCN and MFCN

This agreement is valid from the date of a potential Danish change of service to MFCN in the 700 MHz band. Denmark will inform Sweden as soon as a final date of the change of service is set.

1. Principles and definitions

- 1.1. The 700 MHz band, as referred to in this agreement, covers the frequencies from 694 MHz to 790 MHz, with the FDD arrangement, including SDL (Supplemental Downlink, up to 4x5 MHz in the duplex gap) in accordance with ECC Decision (15)01. The use of other arrangements such as TDD is not covered in this agreement.
- 1.2. This agreement is based on the concept of field strength levels and in the case when LTE systems are used preferential PCIs as defined in Annex 1.
- 1.3. This agreement covers the coordination of the base stations. The user equipment, or terminals, are allowed to be used on non-interfering basis, in accordance with ITU RR 4.4.
- 1.4. For the purpose of this agreement the border of Denmark and Sweden respectively is defined as the coastline, excluding the islands of Flakfortet, Middelgrund, Peberholmen and Saltholmen in Denmark and excluding the island of Ven in Sweden.
- 1.5. The latest version of ITU-R P.1546 "Method for point-to-area predictions for terrestrial services in the frequency range 30-3000 MHz" shall be used for predictions of field strength values.

2. Use of frequencies without coordination by administrations

- 2.1. Denmark may use the 700 MHz band without coordination with Sweden, if the predicted field strength produced by a base station does not exceed 54 dB(μ V/m)/5 MHz at a height of 1.5 m above the ground at the Swedish border or beyond.
- 2.2. Sweden may use the 700 MHz band without coordination with Denmark, if the predicted field strength produced by a base station does not exceed 54 dB(μ V/m)/5 MHz at a height of 1.5 m above the ground at the Danish border or beyond.
- 2.3. In case of using technologies with other channel bandwidths (BW) than 5 MHz, the predicted field strength E shall be adjusted by a factor in comparison with E_0 as defined in paragraphs 2.1 and 2.2:
$$E = E_0 + 10 \cdot \log_{10}(BW/5),$$
 where BW is measured in MHz.
- 2.4. The field strength values (see 2.1 and 2.2) in this agreement are based on a receiving antenna height of 1.5 m, 10% of the time and 50% of the locations.

3. Use of Physical-Layer Cell Identities (PCI) for LTE

- 3.1. In the case when LTE systems are used, PCI division, according to the table in Annex 1, may be used in border areas to improve coverage and service when channel centre frequencies are aligned. The PCIs are divided between the administrations according to the table

4. Coordination procedure

- 4.1. Establishment of agreements between operators shall be encouraged to the extent possible. Subject to agreement between operators other technical characteristics can be used, e.g. other field strength limits or propagation models.
- 4.2. Any case of interference shall as far as possible be resolved among the operators concerned. If not resolved, or in case of unequal access to the spectrum band, assistance might be sought from the administrations.

5. Revision and cancellation

- 5.1. This agreement may be revised upon mutual agreement of the two administrations.
- 5.2. This agreement may be cancelled with a notice of at least twelve months from any of the two parties.

6. Enter into force

- 6.1. This agreement is valid from the date of a potential Danish change of service to MFCN in the 700 MHz band.

This agreement has been drawn in two identical copies, one for Denmark and one for Sweden.

Place København

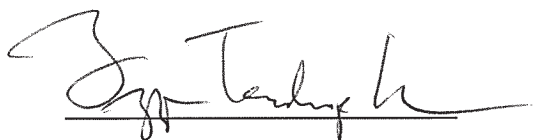
Place STOCKHOLM

Date 1/3 2016

Date 23/2-16

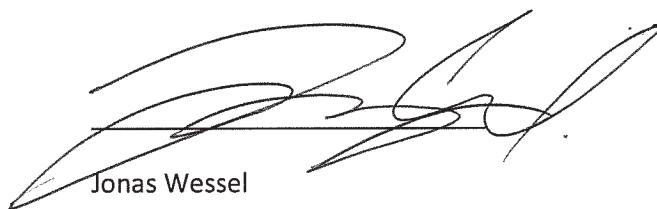
For the Danish Energy Agency

For the Swedish Post and Telecom Authority



Jeppe Tanderup Kristensen

Senior Adviser, Center for Telecoms



Jonas Wessel

Director of Spectrum Department

ANNEX 1

PREFERENTIAL PHYSICAL-LAYER CELL IDENTITIES (PCI) FOR LTE

PCI division, according to Table below, may be used in border areas to improve coverage and service when channel centre frequencies are aligned.

The PCIs are divided between the administrations according to the following table:

PCI	Set A 0 to 83	Set B 84 to 167	Set C 168 to 251	Set D 252 to 335	Set E 336 to 419	Set F 420 to 503
Country	Denmark	Denmark	Denmark	Sweden	Sweden	Sweden

Table. Preferential Physical-Layer Cell Identities (PCI) for LTE

*Agreement between
the National IT and Telecom Agency, Denmark
and
the National Post and Telecom Agency, Sweden
concerning the use of the frequency bands
880-915/925-960 MHz*

2010

*Agreement between the National IT and Telecom Agency, Denmark
and the National Post and Telecom Agency, Sweden concerning the use of the
frequency bands 880-915/925-960 MHz*

Section 1 – Use of GSM channels from 1. January 2011

1. Sweden may use the GSM channels marked S in the annex, as preferential channels, without coordination with Denmark, if the field strength of every single carrier produced by a base station does not exceed 36 dB μ V/m at the Danish coastline.
2. Denmark may use the GSM channels marked DNK in the annex, as preferential channels, without coordination with Sweden, if the field strength of every single carrier produced by a base station does not exceed 36 dB μ V/m at the Swedish coastline.
3. Sweden may use the GSM channels marked DNK in the annex, as preferential channels, without coordination with Denmark, if the field strength of every single carrier produced by a base station does not exceed 19 dB μ V/m at the Danish coastline.
4. Denmark may use the GSM channels marked S in the annex, as preferential channels, without coordination with Sweden, if the field strength of every single carrier produced by a base station does not exceed 19 dB μ V/m at the Swedish coastline.

Section 2 – General

1. Establishment of agreements between operators shall be encouraged to the extent possible. Subject to agreement between operators on other technical characteristics can be used, i.e. other field strength limits or propagation models.
2. For this agreement only, the coastline of Denmark is defined as excluding the islands of Middelgrund, Flakfortet, Saltholm and Peberholm and the coastline of Sweden shall be defined as excluding the island of Ven.
3. The above mentioned field strength values are to be calculated at a receiving antenna with height of 1.5 m and for 50 % of time and 50 % of location.
4. A complaint in case of interference shall be based on the median values of measurements of field strength performed at least two occasions over a range of at least 100 m of the tangent of the wave propagation of an interfering base station. Measurements of field strength shall refer to the coastline.
5. Any case of interference should as far as possible be resolved among operators concerned. If not resolved, or in case of unequal access to the frequency band (e.g. one operator being inhibited from planning coverage in a certain area) assistance might be sought from the administrations.


Section 3 – Revision and cancellation

1. This agreement may be revised or cancelled as desired by one of the administrations with a notice of three months.
2. In case this agreement is cancelled and new one is not reached co-ordination procedure will be based on ECC recommendation (05)08.

The Agreement will enter into force on 1. January 2011.

For the National IT and Telecom Agency
Denmark
22 November 2010.

For Post and Telecom Agency
Sweden
9 November 2010



Per V. Christensen



Urban Landmark

CH	center frequencies/MHz		preferential	DNK operator	S operator
	term	base			
975	E-GSM	880.2	925.2	S	TELIA ?
976	E-GSM	880.4	925.4	S	TELIA ?
977	E-GSM	880.6	925.6	S	TELIA ?
978	E-GSM	880.8	925.8	S	TELIA ?
979	E-GSM	881	926	S	TELIA ?
980	E-GSM	881.2	926.2	S	TELIA ?
981	E-GSM	881.4	926.4	S	TELIA ?
982	E-GSM	881.6	926.6	S	TELIA ?
983	E-GSM	881.8	926.8	S	TELIA ?
984	E-GSM	882	927	S	TELIA ?
985	E-GSM	882.2	927.2	S	TELIA ?
986	E-GSM	882.4	927.4	S	TELIA ?
987	E-GSM	882.6	927.6	S	TELIA ?
988	E-GSM	882.8	927.8	S	TELIA ?
989	E-GSM	883	928	S	TELIA ?
990	E-GSM	883.2	928.2	DNK	TELIA ?
991	E-GSM	883.4	928.4	DNK	TELIA ?
992	E-GSM	883.6	928.6	DNK	TELIA ?
993	E-GSM	883.8	928.8	DNK	TELIA ?
994	E-GSM	884	929	DNK	TELIA ?
995	E-GSM	884.2	929.2	DNK	TELIA ?
996	E-GSM	884.4	929.4	DNK	TELIA ?
997	E-GSM	884.6	929.6	DNK	TELIA ?
998	E-GSM	884.8	929.8	DNK	TELIA ?
999	E-GSM	885	930	DNK	TELIA Swefour
1000	E-GSM	885.2	930.2	DNK	TELIA Swefour
1001	E-GSM	885.4	930.4	DNK	TELIA Swefour
1002	E-GSM	885.6	930.6	DNK	TELIA Swefour
1003	E-GSM	885.8	930.8	DNK	TELIA Swefour
1004	E-GSM	886	931	DNK	TELIA Swefour
1005	E-GSM	886.2	931.2	DNK	TELIA Swefour
1006	E-GSM	886.4	931.4	DNK	TELIA Swefour
1007	E-GSM	886.6	931.6	DNK	TELIA Swefour
1008	E-GSM	886.8	931.8	DNK	TELIA Swefour
1009	E-GSM	887	932	DNK	TELIA Swefour
1010	E-GSM	887.2	932.2	DNK	TELIA Swefour
1011	E-GSM	887.4	932.4	DNK	TELIA Swefour
1012	E-GSM	887.6	932.6	DNK	TELIA Swefour
1013	E-GSM	887.8	932.8	DNK	TELIA Swefour
1014	E-GSM	888	933	S	TELIA Swefour
1015	E-GSM	888.2	933.2	S	TELIA Swefour
1016	E-GSM	888.4	933.4	S	TELIA Swefour
1017	E-GSM	888.6	933.6	S	TELIA Swefour
1018	E-GSM	888.8	933.8	S	TELIA Swefour
1019	E-GSM	889	934	S	TELIA Swefour
1020	E-GSM	889.2	934.2	S	TELIA Swefour
1021	E-GSM	889.4	934.4	S	TELIA Swefour
1022	E-GSM	889.6	934.6	S	TELIA Swefour
1023	E-GSM	889.8	934.8	S	TELIA Swefour
1024	E-GSM	890	935	S	TELIA Swefour

1	P-GSM	890.2	935.2	S	TELIA	Swefour
2	P-GSM	890.4	935.4	S	TELIA	Swefour
3	P-GSM	890.6	935.6	S	TELIA	Swefour
4	P-GSM	890.8	935.8	S	TELIA	Swefour
5	P-GSM	891	936	DNK	TELIA	Swefour
6	P-GSM	891.2	936.2	DNK	TELIA	Swefour
7	P-GSM	891.4	936.4	DNK	TELIA	Swefour
8	P-GSM	891.6	936.6	DNK	TELIA	Swefour
9	P-GSM	891.8	936.8	DNK	TELIA	guard
10	P-GSM	892	937	S	NEW	TeliaSonera
11	P-GSM	892.2	937.2	S	NEW	TeliaSonera
12	P-GSM	892.4	937.4	DNK	NEW	TeliaSonera
13	P-GSM	892.6	937.6	DNK	NEW	TeliaSonera
14	P-GSM	892.8	937.8	DNK	NEW	TeliaSonera
15	P-GSM	893	938	DNK	NEW	TeliaSonera
16	P-GSM	893.2	938.2	DNK	NEW	TeliaSonera
17	P-GSM	893.4	938.4	DNK	NEW	TeliaSonera
18	P-GSM	893.6	938.6	DNK	NEW	TeliaSonera
19	P-GSM	893.8	938.8	DNK	NEW	TeliaSonera
20	P-GSM	894	939	DNK	NEW	TeliaSonera
21	P-GSM	894.2	939.2	DNK	NEW	TeliaSonera
22	P-GSM	894.4	939.4	S	NEW	TeliaSonera
23	P-GSM	894.6	939.6	S	NEW	TeliaSonera
24	P-GSM	894.8	939.8	S	NEW	TeliaSonera
25	P-GSM	895	940	S	NEW	TeliaSonera
26	P-GSM	895.2	940.2	S	NEW	TeliaSonera
27	P-GSM	895.4	940.4	S	NEW	TeliaSonera
28	P-GSM	895.6	940.6	S	NEW	TeliaSonera
29	P-GSM	895.8	940.8	S	NEW	TeliaSonera
30	P-GSM	896	941	S	NEW	TeliaSonera
31	P-GSM	896.2	941.2	S	NEW	TeliaSonera
32	P-GSM	896.4	941.4	S	NEW	TeliaSonera
33	P-GSM	896.6	941.6	S	NEW	TeliaSonera
34	P-GSM	896.8	941.8	S	NEW	TeliaSonera
35	P-GSM	897	942	S	TDC	TeliaSonera
36	P-GSM	897.2	942.2	S	TDC	TeliaSonera
37	P-GSM	897.4	942.4	S	TDC	TeliaSonera
38	P-GSM	897.6	942.6	DNK	TDC	TeliaSonera
39	P-GSM	897.8	942.8	DNK	TDC	TeliaSonera
40	P-GSM	898	943	DNK	TDC	TeliaSonera
41	P-GSM	898.2	943.2	DNK	TDC	TeliaSonera
42	P-GSM	898.4	943.4	DNK	TDC	TeliaSonera
43	P-GSM	898.6	943.6	DNK	TDC	TeliaSonera
44	P-GSM	898.8	943.8	DNK	TDC	TeliaSonera
45	P-GSM	899	944	DNK	TDC	TeliaSonera
46	P-GSM	899.2	944.2	DNK	TDC	guard
47	P-GSM	899.4	944.4	DNK	TDC	TELE2
48	P-GSM	899.6	944.6	DNK	TDC	TELE2
49	P-GSM	899.8	944.8	DNK	TDC	TELE2
50	P-GSM	900	945	DNK	TDC	TELE2
51	P-GSM	900.2	945.2	DNK	TDC	TELE2
52	P-GSM	900.4	945.4	DNK	TDC	TELE2
53	P-GSM	900.6	945.6	DNK	TDC	TELE2
54	P-GSM	900.8	945.8	DNK	TDC	TELE2
55	P-GSM	901	946	DNK	TDC	TELE2
56	P-GSM	901.2	946.2	DNK	TDC	TELE2

57	P-GSM	901.4	946.4	DNK	TDC	TELE2
58	P-GSM	901.6	946.6	DNK	TDC	TELE2
59	P-GSM	901.8	946.8	DNK	TDC	TELE2
60	P-GSM	902	947	DNK	TDC	TELE2
61	P-GSM	902.2	947.2	S	TDC	TELE2
62	P-GSM	902.4	947.4	S	TDC	TELE2
63	P-GSM	902.6	947.6	S	TDC	TELE2
64	P-GSM	902.8	947.8	S	TDC	TELE2
65	P-GSM	903	948	S	TDC	TELE2
66	P-GSM	903.2	948.2	S	TDC	TELE2
67	P-GSM	903.4	948.4	S	TDC	TELE2
68	P-GSM	903.6	948.6	S	TDC	TELE2
69	P-GSM	903.8	948.8	S	TDC	TELE2
70	P-GSM	904	949	S	TDC	TELE2
71	P-GSM	904.2	949.2	S	TDC	TELE2
72	P-GSM	904.4	949.4	S	TDC	TELE2
73	P-GSM	904.6	949.6	S	TDC	TELE2
74	P-GSM	904.8	949.8	S	TDC	TELE2
75	P-GSM	905	950	S	TDC	TELE2
76	P-GSM	905.2	950.2	S	TDC	TELE2
77	P-GSM	905.4	950.4	S	TDC	TELE2
78	P-GSM	905.6	950.6	S	TDC	TELE2
79	P-GSM	905.8	950.8	DNK	TDC	TELE2
80	P-GSM	906	951	DNK	TELENOR	TELE2
81	P-GSM	906.2	951.2	DNK	TELENOR	TELE2
82	P-GSM	906.4	951.4	DNK	TELENOR	TELE2
83	P-GSM	906.6	951.6	DNK	TELENOR	guard
84	P-GSM	906.8	951.8	DNK	TELENOR	Telenor
85	P-GSM	907	952	DNK	TELENOR	Telenor
86	P-GSM	907.2	952.2	DNK	TELENOR	Telenor
87	P-GSM	907.4	952.4	DNK	TELENOR	Telenor
88	P-GSM	907.6	952.6	DNK	TELENOR	Telenor
89	P-GSM	907.8	952.8	DNK	TELENOR	Telenor
90	P-GSM	908	953	DNK	TELENOR	Telenor
91	P-GSM	908.2	953.2	DNK	TELENOR	Telenor
92	P-GSM	908.4	953.4	DNK	TELENOR	Telenor
93	P-GSM	908.6	953.6	DNK	TELENOR	Telenor
94	P-GSM	908.8	953.8	DNK	TELENOR	Telenor
95	P-GSM	909	954	DNK	TELENOR	Telenor
96	P-GSM	909.2	954.2	DNK	TELENOR	Telenor
97	P-GSM	909.4	954.4	DNK	TELENOR	Telenor
98	P-GSM	909.6	954.6	DNK	TELENOR	Telenor
99	P-GSM	909.8	954.8	DNK	TELENOR	Telenor
100	P-GSM	910	955	DNK	TELENOR	Telenor
101	P-GSM	910.2	955.2	DNK	TELENOR	Telenor
102	P-GSM	910.4	955.4	S	TELENOR	Telenor
103	P-GSM	910.6	955.6	S	TELENOR	Telenor
104	P-GSM	910.8	955.8	S	TELENOR	Telenor
105	P-GSM	911	956	S	TELENOR	Telenor
106	P-GSM	911.2	956.2	S	TELENOR	Telenor
107	P-GSM	911.4	956.4	S	TELENOR	Telenor
108	P-GSM	911.6	956.6	S	TELENOR	Telenor
109	P-GSM	911.8	956.8	S	TELENOR	Telenor
110	P-GSM	912	957	S	TELENOR	Telenor
111	P-GSM	912.2	957.2	S	TELENOR	Telenor
112	P-GSM	912.4	957.4	S	TELENOR	Telenor

113	P-GSM	912.6	957.6	S	TELENOR	Telenor
114	P-GSM	912.8	957.8	S	TELENOR	Telenor
115	P-GSM	913	958	S	TELENOR	Telenor
116	P-GSM	913.2	958.2	S	TELENOR	Telenor
117	P-GSM	913.4	958.4	S	TELENOR	Telenor
118	P-GSM	913.6	958.6	S	TELENOR	Telenor
119	P-GSM	913.8	958.8	S	TELENOR	Telenor
120	P-GSM	914	959	S	TELENOR	?
121	P-GSM	914.2	959.2	S	TELENOR	?
122	P-GSM	914.4	959.4	S	TELENOR	?
123	P-GSM	914.6	959.6	DNK	TELENOR	?
124	P-GSM	914.8	959.8	DNK	TELENOR	?