

Coexistence challenges in the UHF band

Overview of CEPT/ECC actions

Bruno ESPINOSA
European Communications Office (ECO)

- **Reminder about 800 MHz actions**
 - Technical conditions for MFCN
 - Technical conditions for PMSE
 - Coexistence MFCN-SRDs
- **700 MHz actions**
 - Framework
 - Channel arrangements for MFCN, alternative options
 - Technical conditions for MFCN
 - Technical conditions for PMSE
 - Alternative options
 - Draft ECC Decision
- **Long term vision for the UHF band**

800 MHz – Technical conditions for MFCN

CEPT Report 30 (10/2009)

- Basis for regulations EC Decision 2010/267/EU and ECC/DEC/(09)03
- Technical conditions for MFCN – Block-Edge Mask
 - Coexistence between MFCN
 - Conditions to protect broadcasting below 790 MHz
 - included in BEM for BS and TS
 - guidance on mitigation techniques for interference on a case-by-case basis
 - Preferred frequency arrangement

790-791	791-796	796-801	801-806	806-811	811-816	816-821	821- 832	832-837	837-842	842-847	847-852	852-857	857-862
Guard band	Downlink						Duplex gap	Uplink					
1 MHz	30 MHz (6 blocks of 5 MHz)						11 MHz	30 MHz (6 blocks of 5 MHz)					

ECC Report 148 (06/2010) - performance of DVB-T receivers in the presence of interference from LTE




800 MHz – Technical conditions for PMSE

Conditions for the use of the duplex gap for PMSE – wireless microphones:

- Initial studies in CEPT Report 30, refined in CEPT Report 50 and Addendum (2013)
- Implemented in EC Decision 2014/641/EU
- Block-Edge Masks for the coexistence with MFCN in adjacent bands:
 - In-block e.i.r.p in 823-826/826-832 MHz
 - Out-of-block power limits
- Mitigation techniques to address interference from MFCN into wireless microphones (in particular from Terminals in close vicinity)

800 MHz – Coexistence MFCN - SRDs

ECC Report 207 - Adjacent band co-existence of SRDs in the band 863-870 MHz with LTE below 862 MHz

- Possible interference from LTE UE into SRDs (distance < 10m)
- Blocking effect  improvement of SRD receivers (categories as defined in ETSI EN 300 220)
- LTE unwanted emissions falling into the band of SRDs  reduction of OoB emissions in LTE standard
- Measurements  OoB emissions of LTE terminals order of 15-20 dB below the mask specification in current standards

CEPT/ECC invited ETSI to update the harmonised standards accordingly

700 MHz - framework

- CEPT Report 53 (28/11/2014) in response to EC Mandate (task1 and 2): harmonised technical conditions for the 694 -790 MHz in the EU for the provision of wireless broadband and other uses
 - Channelling arrangements
 - Technical conditions for MFCN
 - Technical conditions for PMSE
 - Alternative options
- To be refined after WRC-15 (task 3)
- Impact to non-radio systems not studied. ECC to inform ETSI and CENELEC about new spectrum use in the band

700 MHz – channelling arrangements

- Based on FDD 2*30 MHz arrangement, compatible with the 800 MHz plan and also with the APT 700 MHz plan
- a: arrangement for MFCN

694-703	703-708	708-713	713-718	718-723	723-728	728-733	733-738	738-743	743-748	748-753	753-758	758-763	763-768	768-773	773-778	778-783	783-788	788-791
Guard band	Uplink						Gap	SDL (A)				Downlink				Guard band		
9 MHz	30 MHz (6 blocks of 5 MHz)						5 MHz	20 MHz (zero up to four blocks of 5 MHz)				30 MHz (6 blocks of 5 MHz)				3 MHz		

SDL (Supplemental Downlink) option:

“The zero up to four blocks of 5 MHz approach” for SDL provides flexibility for combining different options



700 MHz – channelling arrangements

- b. Alternative options

Options under consideration											
Frequency bands (MHz)	694-703		703-733	733-738		738-743	743-748	748-753	753-758	758-788	788-791
	694-698	698-703		733-736	736-738						
PMSE	PMSE		MFCN Uplink (see figure 1)	PMSE				MFCN downlink (see figure 1)			
PPDR (2x5MHz) FDD		PPDR UL							PPDR DL		
PPDR (2x3MHz) FDD				PPDR UL							PPDR DL
M2M (2x3MHz) FDD				M2M							M2M
PPDR (2 [2 X 5 MHz] / 2x10 MHz) FDD					PPDR UL				PPDR DL		
Block size (MHz)	4MHz	5 MHz			3 MHz	2MHz	5 MHz		5 MHz	5 MHz	5 MHz

options might be combined with each other and/or with the usage of a number of MFCN SDL blocks in order to provide flexibility for administrations depending on their needs.



700 MHz – Technical conditions for MFCN

- Block-Edge Mask for BS and TS
 - Power requirements for BS for the coexistence between MFCN, covering also MFCN in the 800 MHz plan.
 - Power requirements for duplex gap and guard bands (BS and TS)
 - Conditions for the coexistence with broadcasting below 694 MHz
 - -23 dBm/8 MHz per cell for BS
 - -42 dBm/8 MHz for TS
 - guidance on mitigation techniques for interference on a case-by-case basis
 - In-block limit: not mandatory for BS (64 dBm/5 MHz per antenna suggested), 23 dBm for TS.
 - Additional requirements for TS (MFCN coexistence) to be considered in ETSI harmonised standards
- BEM for BS applicable for SDL in the duplex gap. Further studies ongoing when SDL is combined with other options.
- BEM (BS and TS) applicable for commercial mobile networks and also for PPDR operating in the paired FDD arrangement with similar assumptions

700 MHz – Technical conditions for PMSE

- Conditions for the use of the duplex gap 733-758 MHz for PMSE – wireless microphones (also applicable below 703 MHz)
- Detailed studies in ECC Report 221, summarised in CEPT Report 53
- Block-Edge Masks for PMSE for the coexistence with MFCN (including SDL) in adjacent bands:
 - In-block and Out-of-block power limits
 - Body worn and hand held microphones
 - Possible refinement with different body loss assumptions
- Mitigation techniques (PMSE set up) to address interference from MFCN into wireless microphones (in particular from Terminals in close vicinity).

700 MHz – alternative options

- Broadband PPDR:
 - Subject to national decision
 - Set of options currently under study for the use of guard band and duplex gap at 700 MHz.
 - 2 x 5 MHz (698-703 / 753-758 MHz); 2x 3 MHz (733-736 / 788-791 MHz); 2 X 10 MHz (733-743 / 748-758 MHz); 2 X 2 X 5 MHz (733-738 / 748-753 MHz and 738-743/ 753-758 MHz)
 - Compatibility studies under development
- Machine-to-Machine communications: under consideration in 733-736 and 788-791 MHz. Compatibility studies expected.

700 MHz – Draft ECC Decision

Draft ECC Decision(15)CC: Harmonised technical conditions for MFCN in the band 694-790 MHz

- Based on CEPT Report 53
- Under public consultation (12/01/15) <http://www.cept.org/ecc/tools-and-services/ecc-consultation>
- includes a paired frequency arrangement (FDD 2x30 MHz) and an optional unpaired frequency arrangement (SDL)
- optional element to allow administrations to implement zero up to four blocks for Supplemental Downlink (SDL)
- optional element within the MFCN frequency arrangement provides flexibility for administrations to choose between different options, including 'non MFCN' options such as PPDR, PMSE, M2M, for the use of the duplex gap of the MFCN FDD 2x 30 MHz
- Least restrictive technical conditions for MFCN.

Long term vision for the UHF band

- ECC Report 224 (November 2014) – long term vision for the 470-694 MHz band
- Describes the potential evolution of services, technology and networks
- Assesses a number of possible scenarios falling into 4 classes
 - **Class A:** Primary usage of the band by existing and future DVB terrestrial networks
 - **Class B:** Hybrid usage of the band by downlink LTE and/or DVB terrestrial networks
 - **Class C:** Hybrid usage of the band by conventional two-way (uplink and downlink) LTE mobile broadband and/or DVB terrestrial networks
 - **Class D:** Usage of the band by future communication technologies

More information at
www.cept.org/ecc

Thanks for your attention