

# Overview of the activities of Task Group 6/8

## COMPATIBILITY WITH OTHER PRIMARY SERVICES

## PURPOSE of RRC-04/05

Planning of terrestrial broadcasting in the VHF/UHF bands

### CONSTRAINTS:

Other primary services in the bands 174-230 MHz and 470-862 MHz →

Compatibility with other primary services

2 directions:

- other primary services interfered with by digital terrestrial broadcasting
- digital terrestrial broadcasting interfered with by other primary services

## MAIN ITEMS

- OTHER PRIMARY SERVICES IN THE BANDS 174-230 MHZ AND 470-862 MHZ
- INPUT INFORMATION NEEDED  $\hat{U}$  CHAPTER 9
- COMPATIBILITY CALCULATIONS  $\hat{U}$  CHAPTER 10
- PROTECTION CRITERIA

# OTHER PRIMARY SERVICES

## VHF band

- the fixed service (in Region 3 in the band 174-230 MHz)
- the mobile service (in Region 3 in the band 174-230 MHz; No. 5.235 of the RR: land mobile service in several countries in the band 174-223 MHz)
- the aeronautical radionavigation service (in Region 3 in the band 223-230 MHz; in several countries in different frequency ranges as per Nos. 5.247, 5.238, 5.240 and 5.245)

## OTHER PRIMARY SERVICES

### UHF band

- the fixed service (in Region 1 in the band 790-862 MHz; in Region 3 in the band 470-862 MHz)
- the mobile service (in Region 3 in the band 470-862 MHz; the mobile, except aeronautical mobile, service in the band 790-862 MHz in several countries as per No. 5.316)
- the radionavigation service (in Region 3 in the band 585-610 MHz; the aeronautical radionavigation service as per No.5.302 in the United Kingdom in the band 590-598 MHz and as per No. 5.312 in several countries in the band 645-862 MHz)

## OTHER PRIMARY SERVICES

### UHF band continued

- the radio astronomy service (in the band 606-614 MHz in the whole African Broadcasting Area as per No. 5.304 and in China as per No. 5.305; in the band 608-614 MHz in India as per No. 5.307)
- the broadcasting-satellite service (in the band 620-790 MHz as per No. 5.311)
- the mobile satellite, except aeronautical mobile–satellite, service (as per No. 5.319 in Russia, Belarus and Ukraine)

## INPUT INFORMATION NEEDED

consider for example a terrestrial or aeronautical station of an other primary service subjected to transmissions of digital terrestrial broadcasting

victim:       centre frequency  
              field strength to be protected  
              protection ratio (as a function of frequency separation)

....

interferer:  centre frequency  
              type of broadcasting system  
              radiated power (as a function of azimuth and polarisation)

....

Detailed information on the set of input data elements needed can be found in Chapter 9.

Detailed information on protection criteria as technical key elements can be found in Chapter 8.

# COMPATIBILITY CALCULATIONS

Input:

- Minimum field strength to be protected (50% of locations value)
- Nuisance field strength (50% of the locations value) = interfering field strength (50% of the locations value) + protection ratio (in some cases receiving antenna discrimination needs to be taken into account in addition)
- Combined location correction

Output:

Protection margin = minimum field strength to be protected – nuisance field strength – combined location correction



## PROTECTION CRITERIA

Protection ratio (as a function of frequency separation)

Field strength to be protected

HOW TO GET THIS INFORMATION ?

# PROTECTION CRITERIA

## Example

relocatable system of the fixed service interfered with by DVB-T

<b>Df (MHz)</b>	<b>-6.0</b>	<b>-5.0</b>	<b>-4.0</b>	<b>0.0</b>	<b>4.0</b>	<b>5.0</b>	<b>6.0</b>
<b>PR (dB)</b>	<b>-46</b>	<b>-39</b>	<b>7</b>	<b>11</b>	<b>7</b>	<b>-39</b>	<b>-46</b>

**Protection ratios of relocatable system (1 024 kbit/s) vs. DVB-T/8 MHz**

**Field strength to be protected: 35 dB( $\mu$ V/m)**

# PROTECTION CRITERIA

## Example

P-MP system of the fixed service interfered with by DVB-T

<b>Df (MHz)</b>	<b>-6.0</b>	<b>-4.2</b>	<b>-3.9</b>	<b>-3.4</b>	<b>0</b>	<b>3.4</b>	<b>3.9</b>	<b>4.2</b>	<b>6.0</b>
<b>PR (dB)</b>	<b>-65</b>	<b>-54</b>	<b>-4</b>	<b>-1</b>	<b>-1</b>	<b>-1</b>	<b>-4</b>	<b>-54</b>	<b>-65</b>

**Protection ratios of P-MP interfered with by DVB-T/8 MHz**

**Field strength to be protected: 18 dB( $\mu$ V/m)**

# PROTECTION CRITERIA

## Example

Narrowband (20/25 kHz) FM handhels operating in the frequency range 470-500 MHz interfered with by DVB-T (8 MHz)

For the most susceptible piece of equipment

<b>Df (MHz)</b>	<b>-4.2</b>	<b>-3.8</b>	<b>0.0</b>	<b>3.8</b>	<b>4.2</b>
<b>PR (dB)</b>	<b>-55</b>	<b>-17</b>	<b>-10</b>	<b>-17</b>	<b>-55</b>

For the least susceptible piece of equipment

<b>Df (MHz)</b>	<b>-4.2</b>	<b>-3.8</b>	<b>0.0</b>	<b>3.8</b>	<b>4.2</b>
<b>PR (dB)</b>	<b>-71</b>	<b>-20</b>	<b>-17</b>	<b>-20</b>	<b>-71</b>

Typical field strength to be protected: around 31 dB( $\mu$ V/m)

# PROTECTION CRITERIA

## Example

Protection ratios for DVB-T (8 MHz) interfered with by CW or narrowband FM

**Co-channel protection ratios (dB) for a DVB-T 8 MHz 64-QAM code rate 2/3 signal interfered with by a CW or a FM carrier (non-controlled frequency offset)**

<b>Unwanted signal: CW or FM carrier</b>	<b>Wanted signal: DVB-T, 8 MHz, 64-QAM, code rate 2/3</b>						
<b><math>\Delta f</math> (MHz)</b>	<b>-12</b>	<b>-4.5</b>	<b>-3.9</b>	<b>0</b>	<b>3.9</b>	<b>4.5</b>	<b>12</b>
<b>PR (dB)</b>	<b>-38</b>	<b>-33</b>	<b>-3</b>	<b>-3</b>	<b>-3</b>	<b>-33</b>	<b>-38</b>