

# Annex 3: Spectrum recordings

## 1 Unwanted signals

### 1.1 FM Broadcast

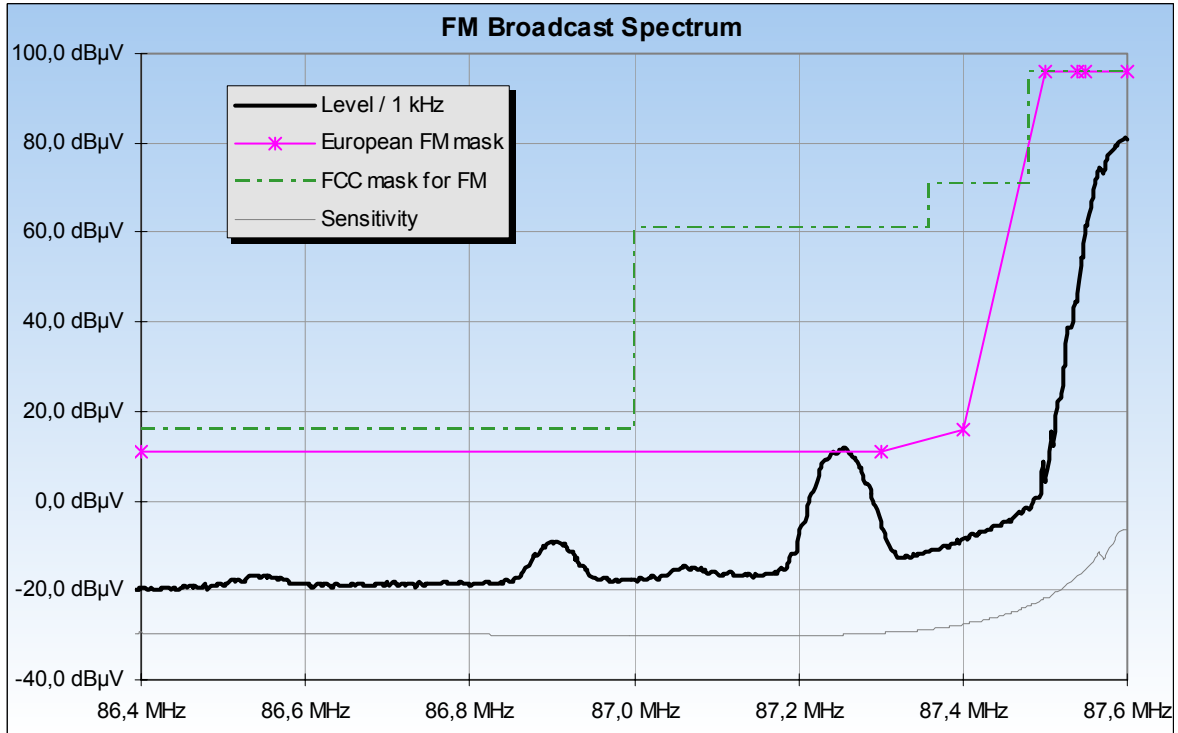


Fig. A3-1: High-dynamic spectrum recording of the lower sideband of the FM unwanted signal from the SU155 transmitter, modulated according to ITU-R BS.641.

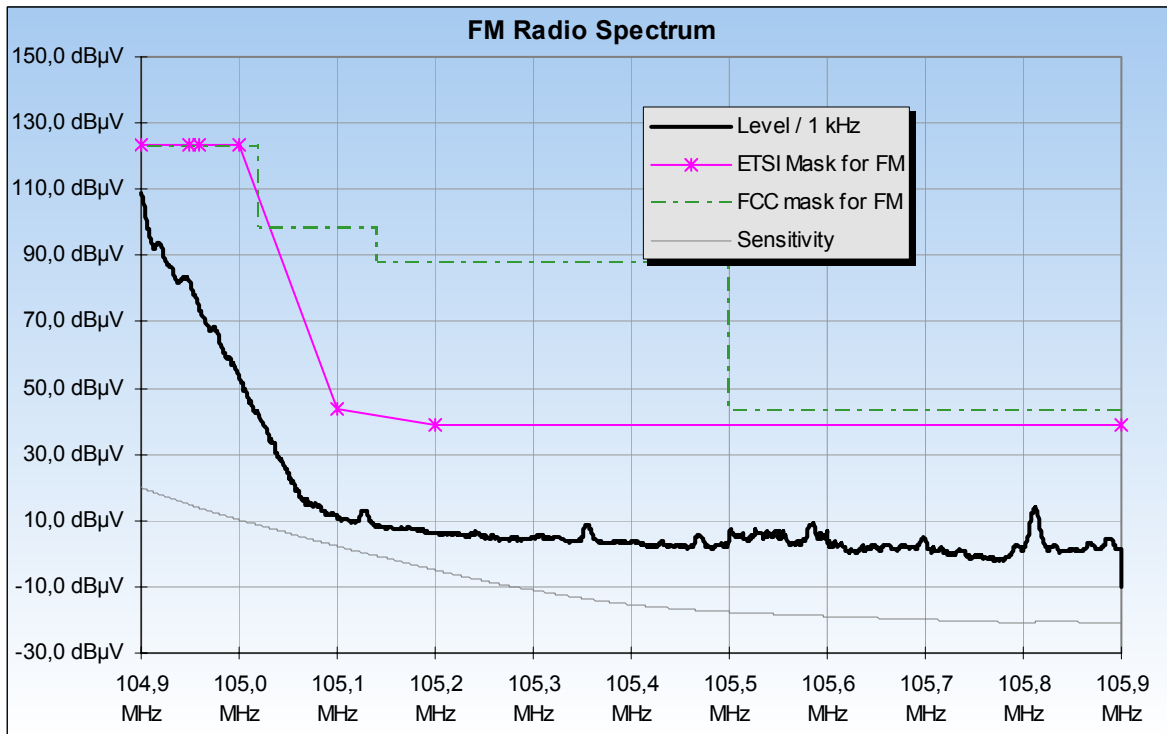


Fig. A3-2: High-dynamic spectrum recording of the lower sideband of the FM unwanted signal from the ITELCO transmitter, modulated according to ITU-R IS.1140.

## 1.2 DRM120

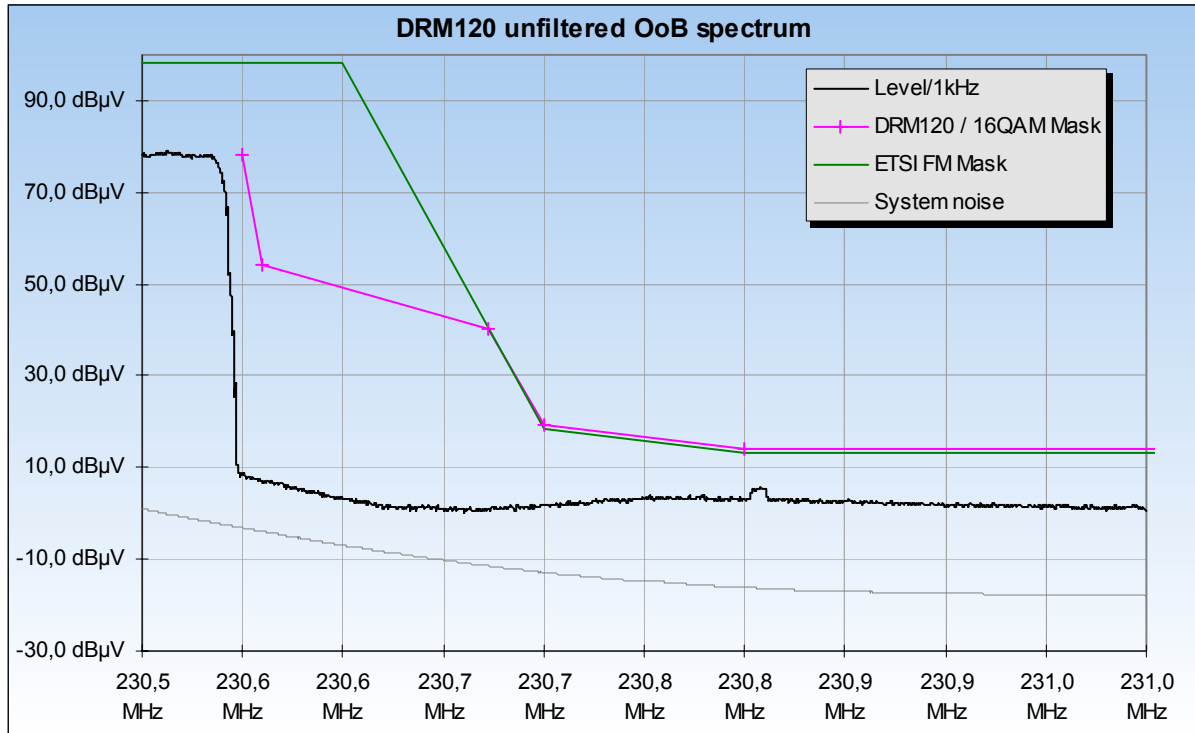


Fig. A3-3: High-dynamic spectrum recording of the upper sideband of the DRM120 **unfiltered** unwanted signal

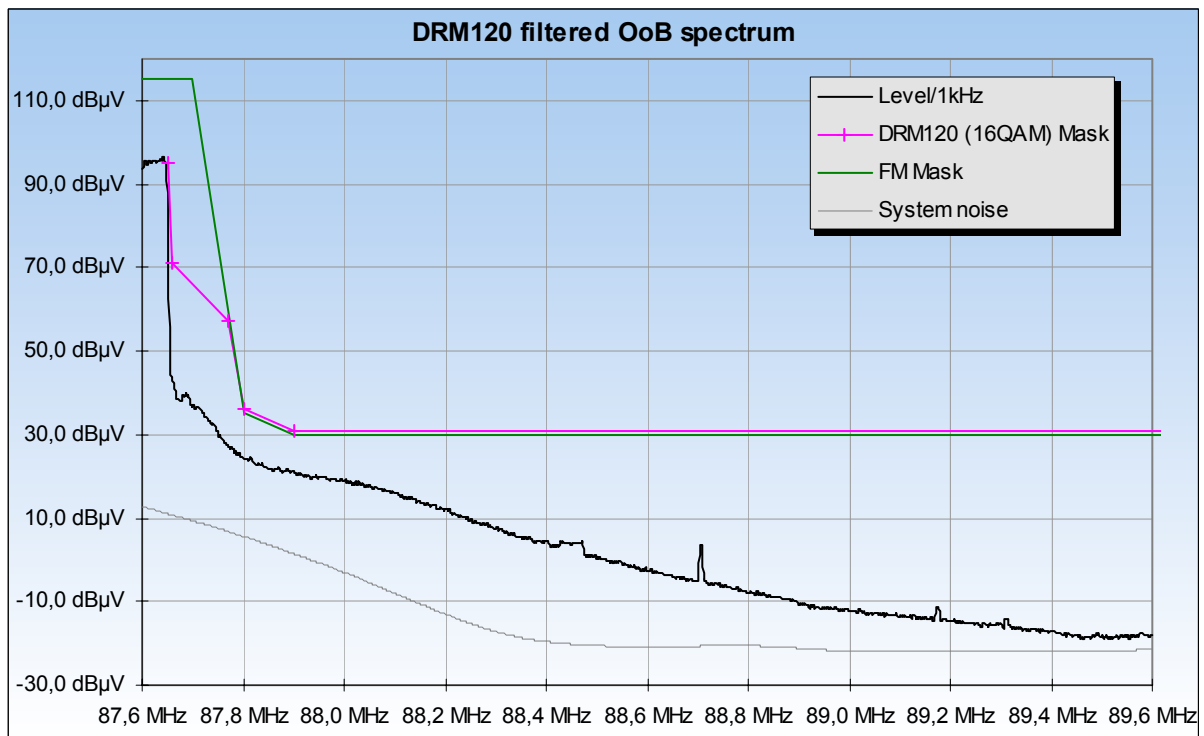


Fig. A3-4: High-dynamic spectrum recording of the upper sideband of the DRM120 **filtered** unwanted signal

### 1.3 DRM+

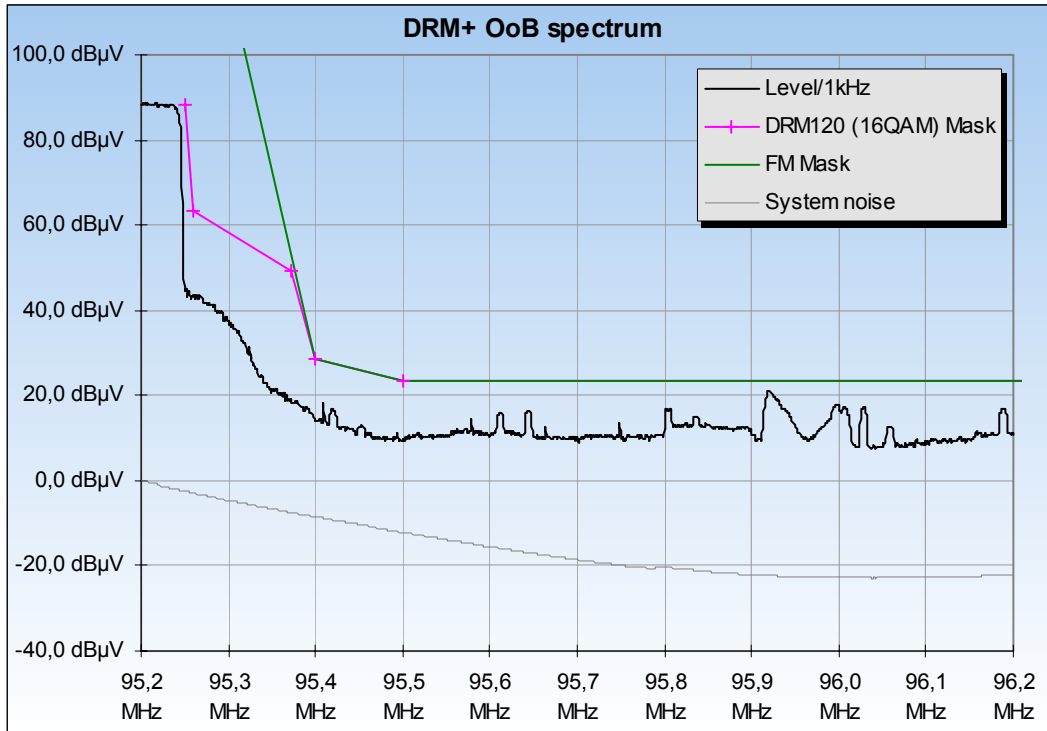


Fig. A3-5: High-dynamic spectrum recording of the upper sideband of the DRM+ unwanted signal

### 1.4 HD-Radio

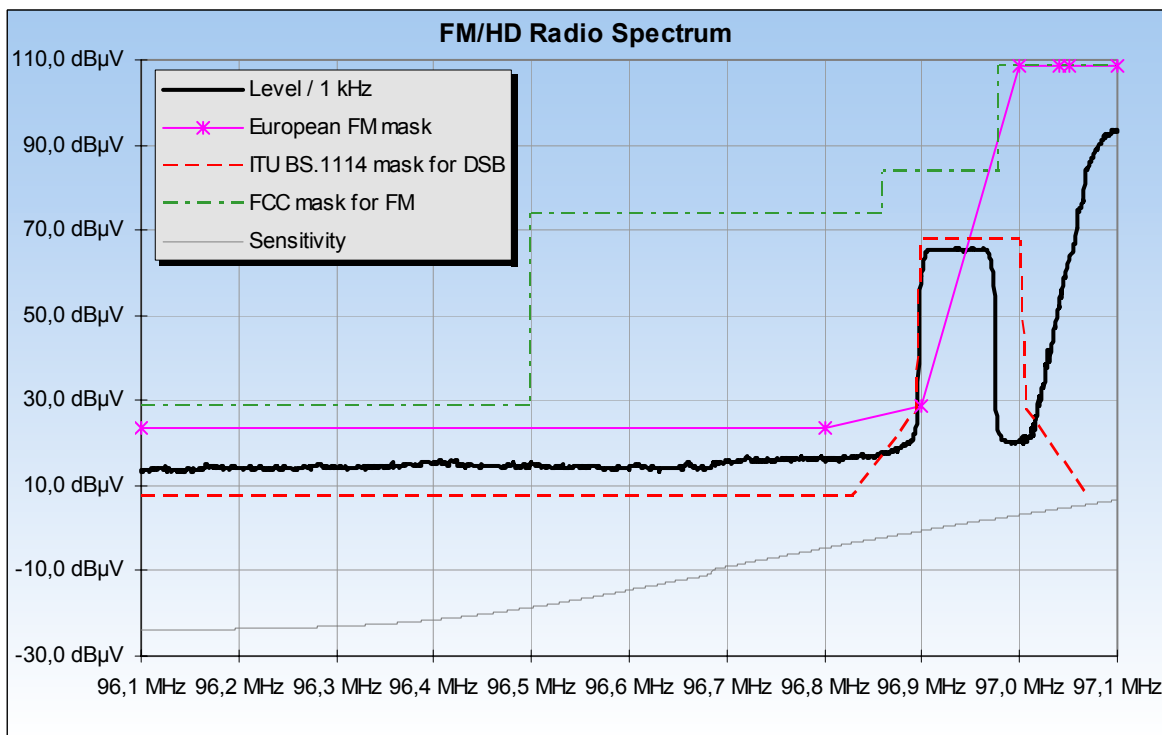


Fig. A3-6: High-dynamic spectrum recording of the lower sideband of the HD-Radio unwanted signal

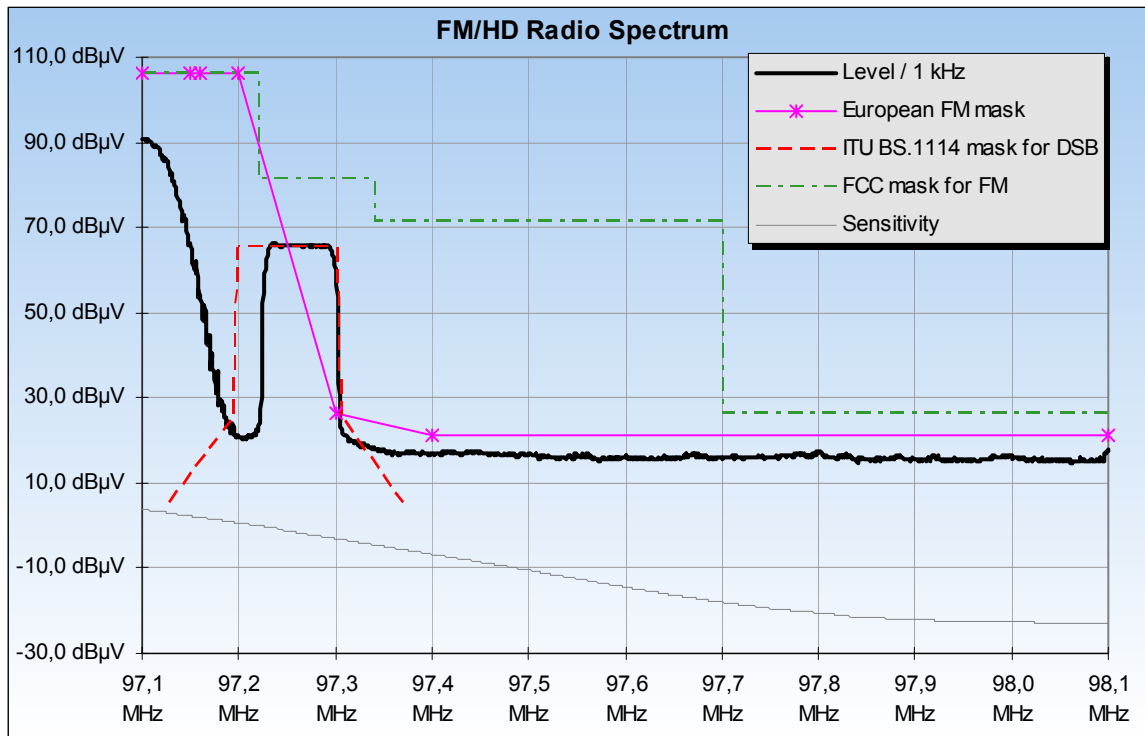


Fig. A3-7: High-dynamic spectrum recording of the upper sideband of the HD-Radio unwanted signal

## 2 Spectrum recordings at the point of beginning interference

The following figure shows a spectrum recording of a situation for DRM120 and FM broadcast as interferers into FM broadcast reception with 200 kHz frequency separation where the S/N interference for Rx1 just begins. The wanted FM signal is to the left on 87.6 MHz, the unwanted signals (FM broadcast and DRM120) are to the right at 87.8 MHz:

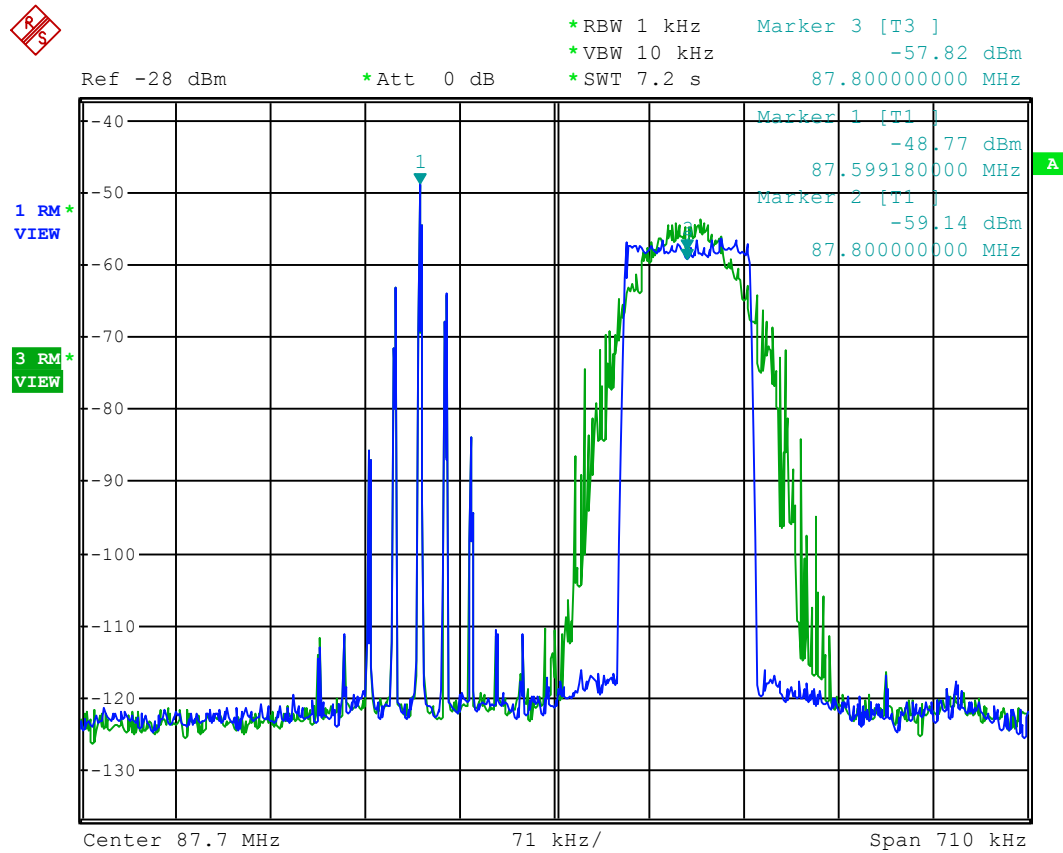


Fig. A3-8: FM stereo interfered by DRM120 (blue trace) and FM broadcast (green trace) at the point of beginning interference for Rx1.

The following figure shows the situation for DRM120 filtered interfering with BOS receiver 1 at the beginning of the SINAD interference. To enable inband measurements the Frequency of the interfering DRM120 signal was set to 87.250 MHz. The frequency of the wanted signal is 200 kHz lower on 87.055. The protection ratio of -74 dB at this offset is already uncritical, this spacing is still less than the most critical real situation where the interferer is on 87.6 MHz (lowest broadcast channel) and the wanted signal on 87.255 MHz (channel 509, the highest BOS channel in the 4m band in Germany) and the frequency spacing would be 345 kHz.

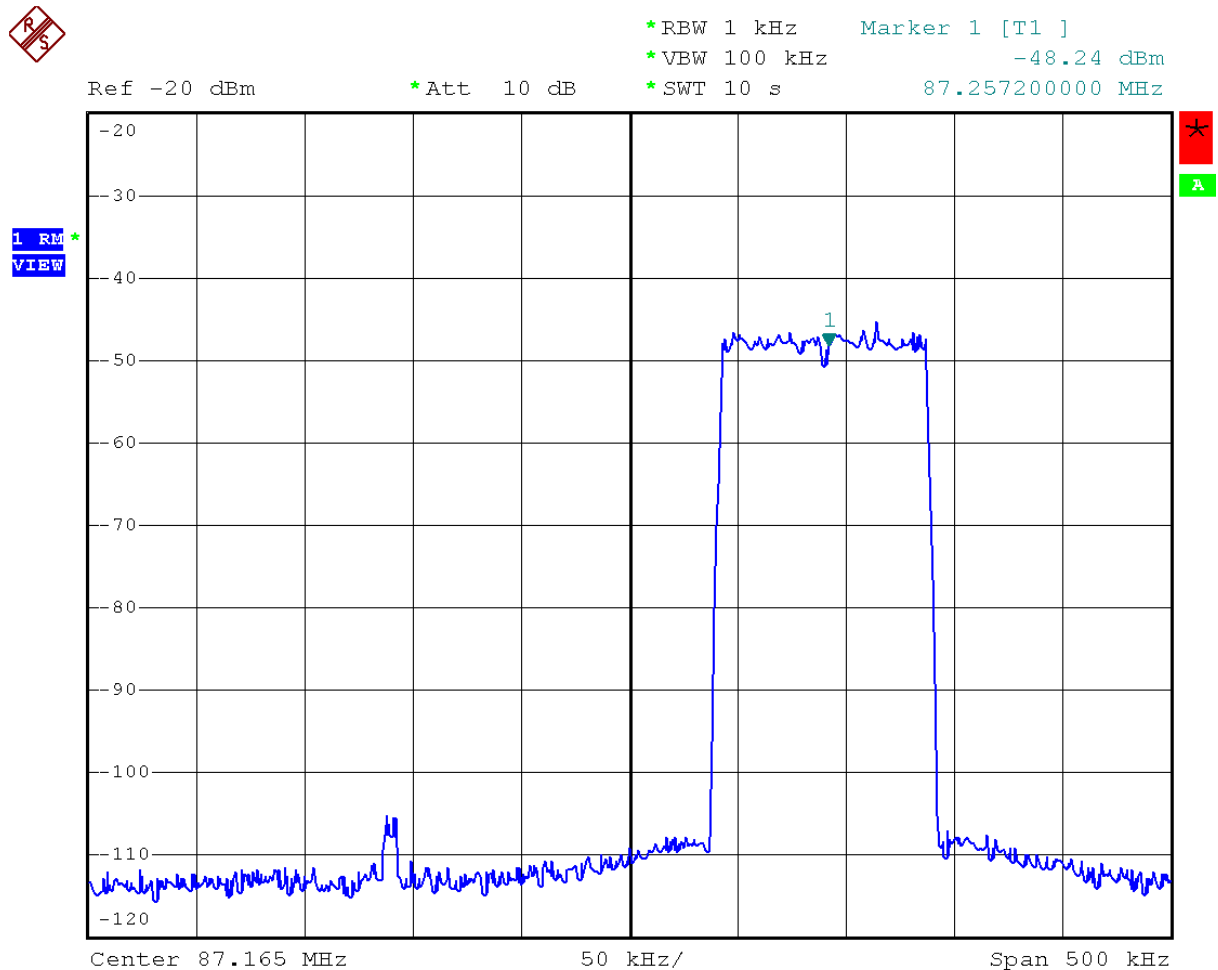


Fig. A3-9: Narrowband FM / BOS interfered by DRM120 filtered at the point of beginning SINAD interference for Rx1.

The following spectrum recording shows a situation with DRM120 filtered as the interferer against ILS localizer reception at the beginning of interference. The DRM120 signal is on 107.9 MHz, the VOR signal is on 108.0 MHz.

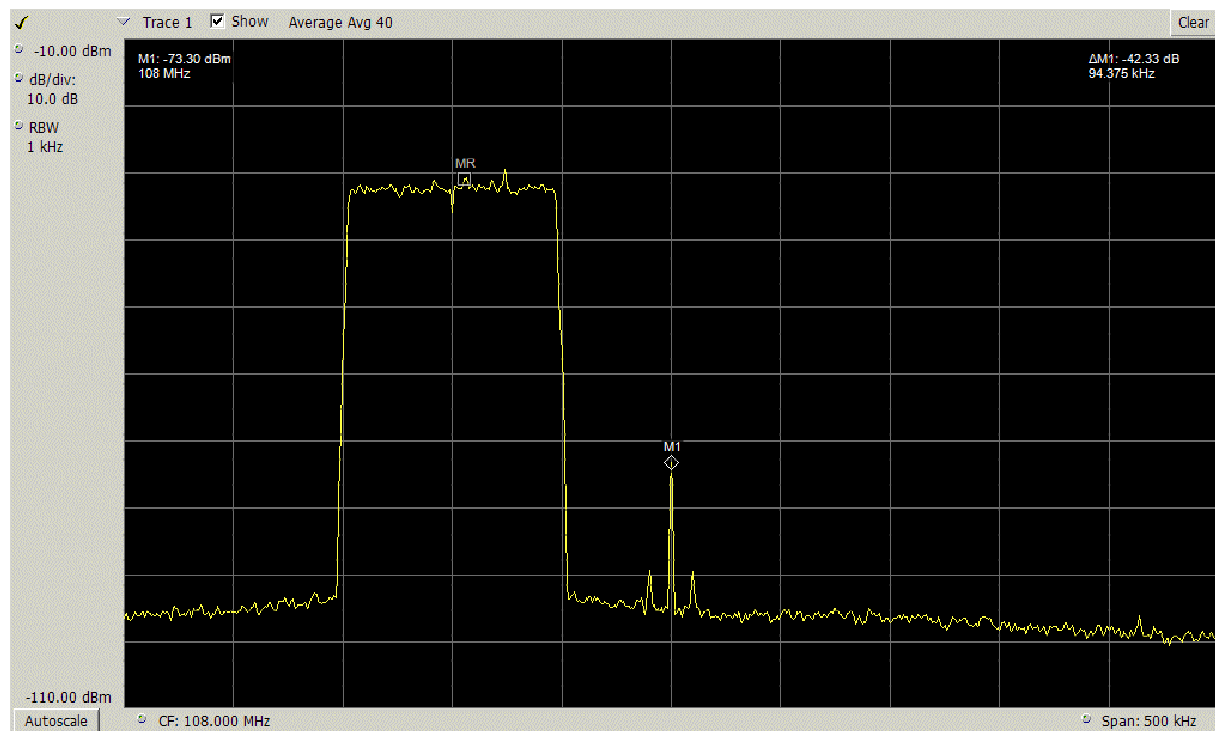


Fig. A3-10: Spectrum of wanted VOR and DRM120 filtered signals at the beginning of course interference.

The following spectrum recording shows a situation with DRM120 filtered as the interferer against ILS localizer reception at the beginning of interference. The DRM120 signal is on 107.9 MHz, the ILS signal is on 108.1 MHz.

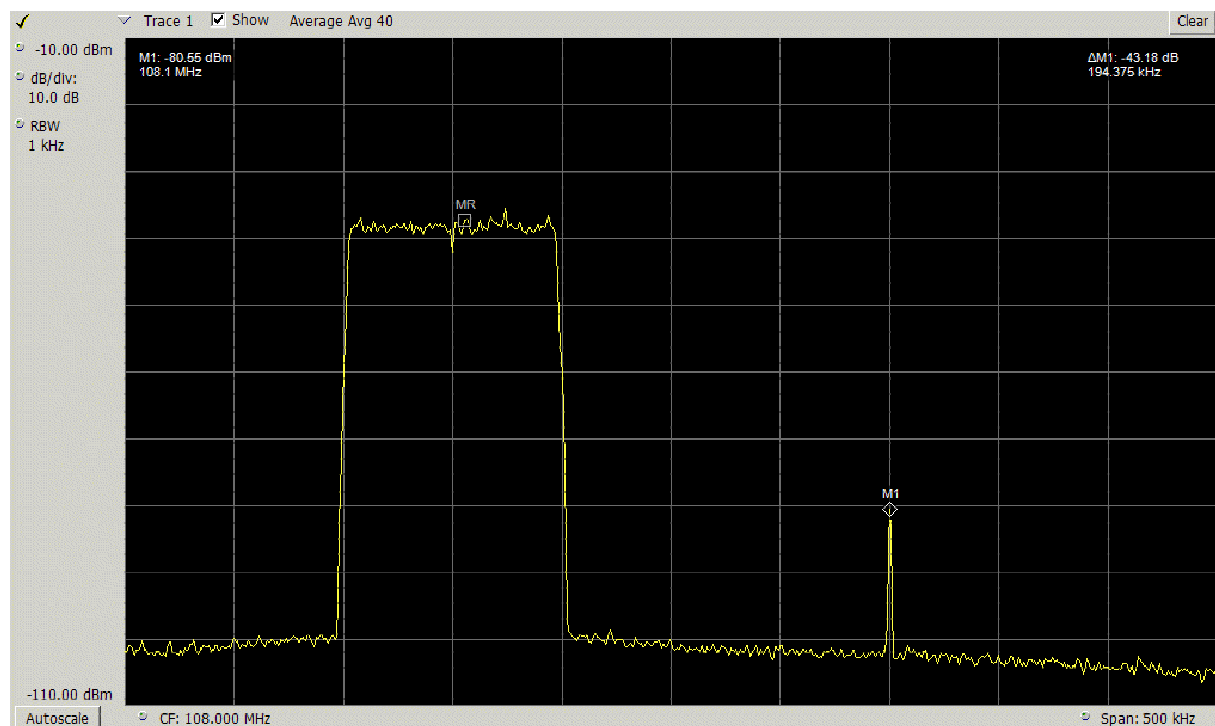


Fig. A3-11: Spectrum of wanted ILS and DRM120 filtered signals at the beginning of course interference.

The following picture shows a situation with HD-Radio as the interferer to ILS localizer reception on F1 at the point of beginning interference due to intermodulation.

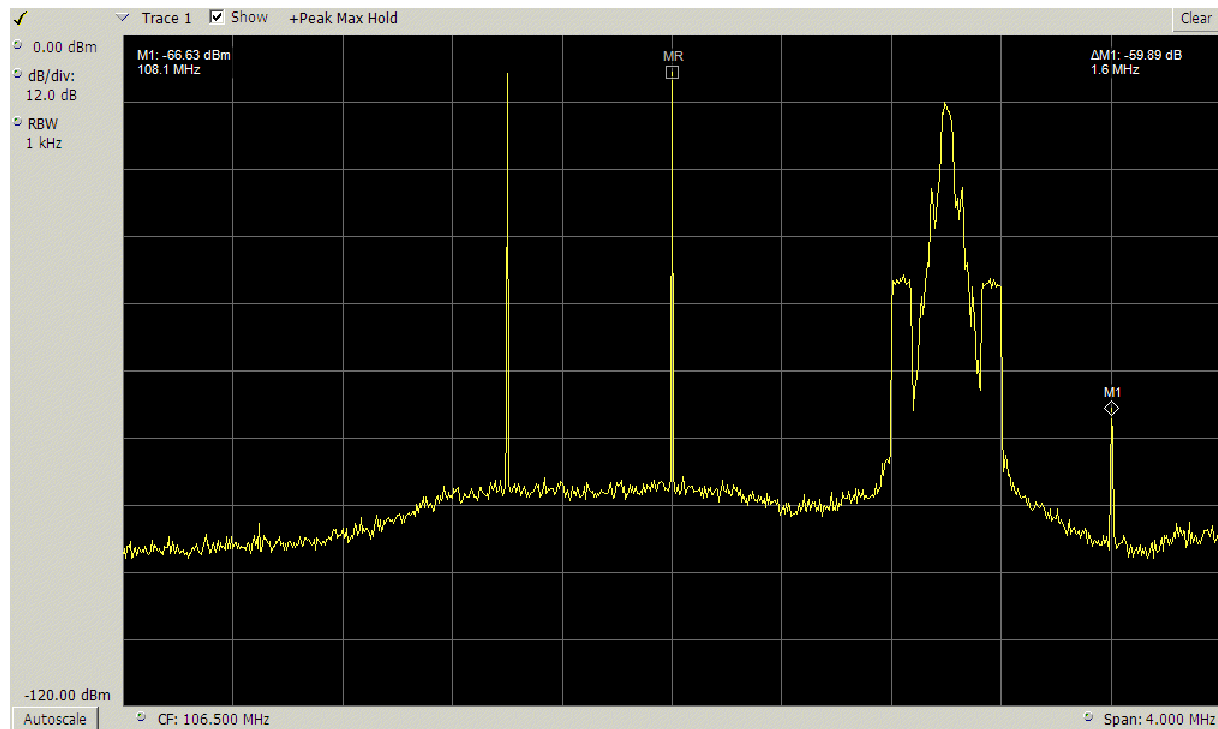



Fig. A3-12: ILS localizer in the presence of strong analogue broadcast and HD-Radio signals at the point of beginning interference, measured at point (1) in the block diagram in Fig. 42.

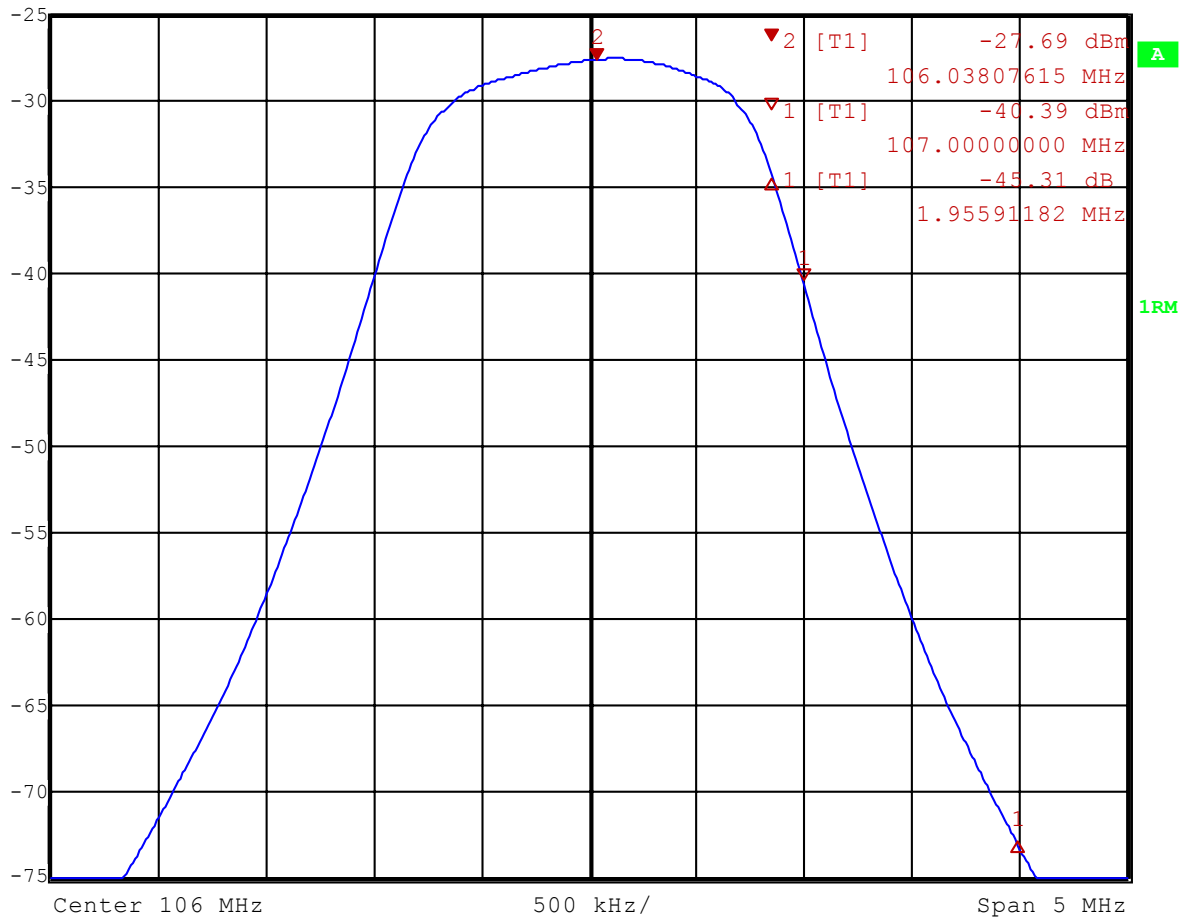
The frequencies in Fig. 46 are as follows:

- F0: 108.1 MHz ILS frequency and frequency of intermodulation product
- F1: 107.5 MHz HD-Radio
- F2: 106.5 MHz unmodulated carrier
- F3: 105.9 MHz unmodulated carrier



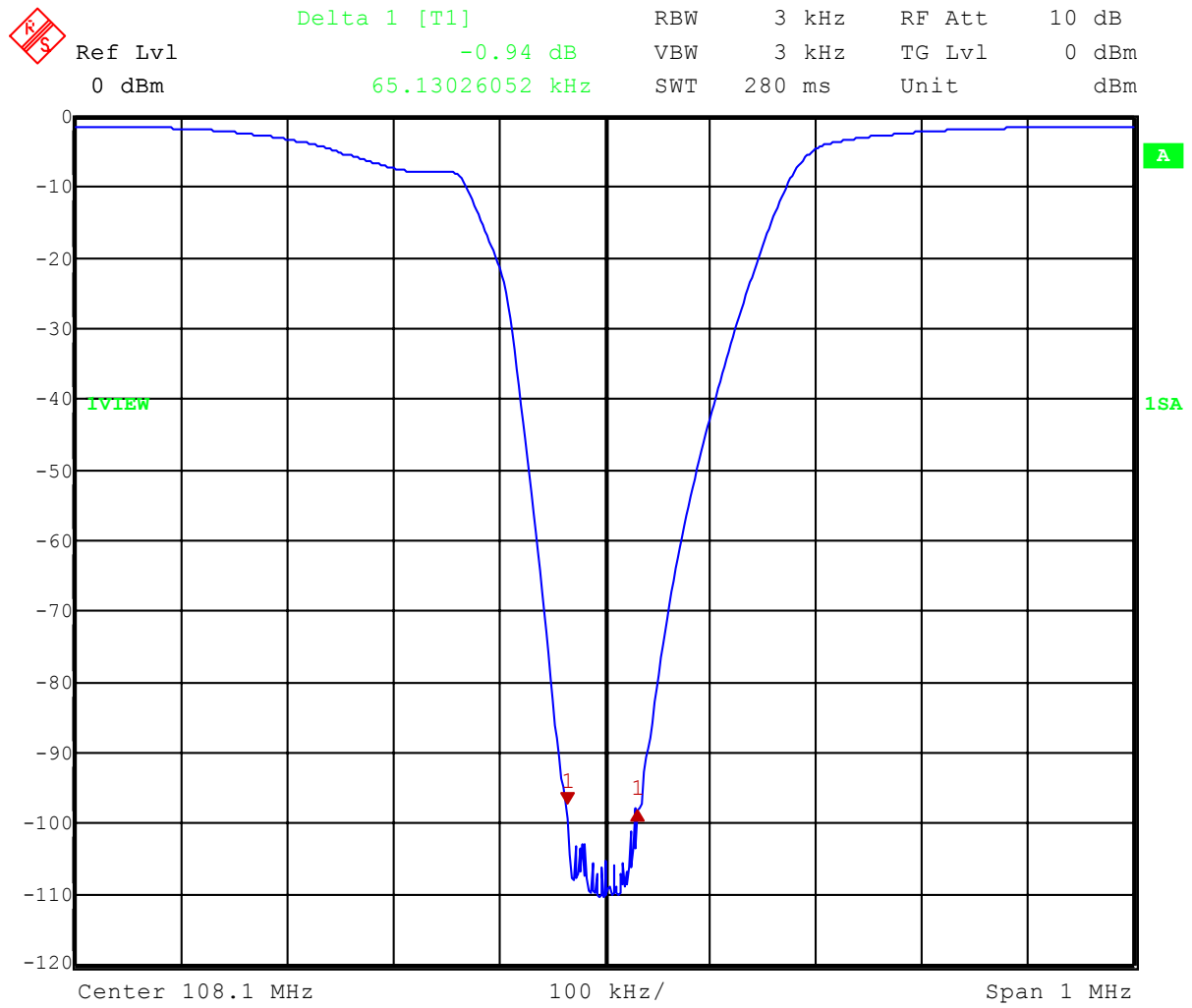
### 3 Filter attenuation curves


Marker 2 [T1]
RBW 5 kHz RF Att 10 dB  
Ref Lvl -25 dBm
-27.69 dBm
VBW 50 kHz TG Lvl -20 dBm  
-25 dBm
106.03807615 MHz
SWT 500 ms Unit dBm



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Fig. A3-13: Output shaping filter for the DRM120 filtered signal (No. 42 in Annex 1)



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Fig. A3-14: Notch filter for the high-dynamic spectrum recordings of the unwanted DRM120 signals (No. 43 in Annex 1)