Annex 3: Protection Ratio Measurement Results (A1/A2 Interference)

1 FM Broadcast as the interferer

1.1 FM Broadcast -> VOR reception

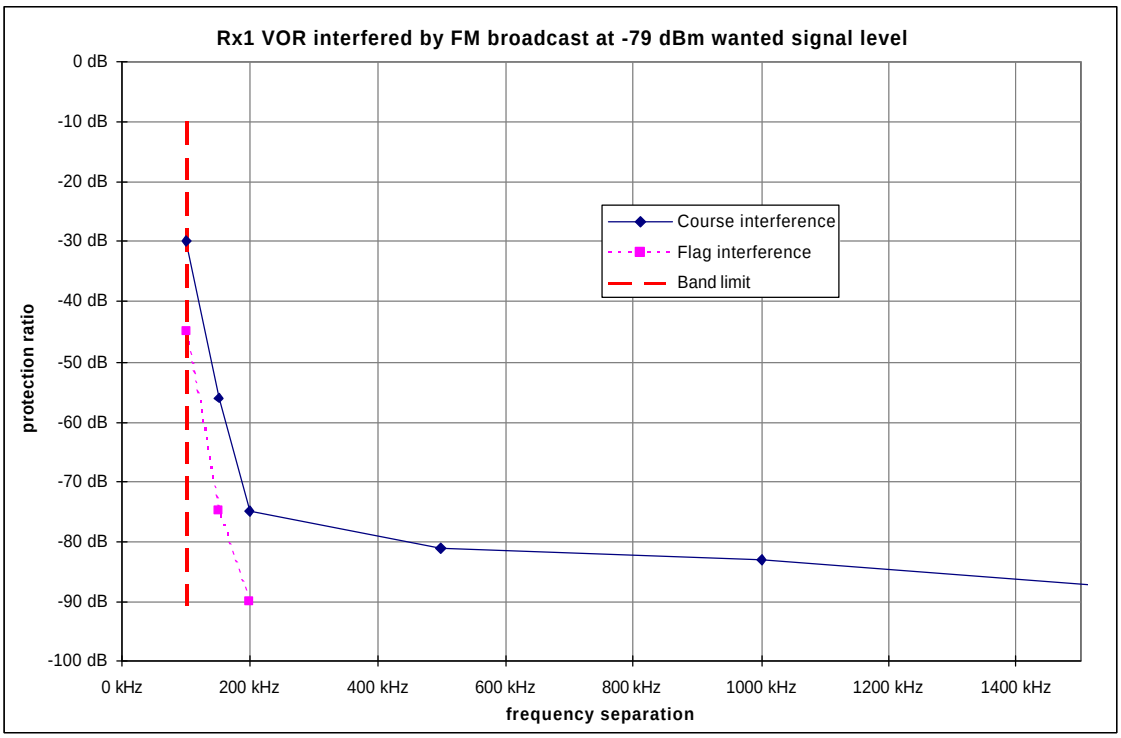
Rx:	**1**	**Collins ILS/VOR/MB-900**
Undist. Course dev.:	+/-2,25 mV	on analogur voltmeter, equals to 0.3° course deviation according to Rec IS.1140 5.4.1.1
Sensitivity Course:	-98 dBm	
Sensitivity Flag:	-107 dBm	

Unwanted:	**FM stereo, noise modulated according to ITU-R IS.1140**	
Frequency:	(variable)	(center)
Full level:	12 dBm	at 0 dB atten.

Wanted:	**VOR**
Frequency:	108,0 MHz
Level:	-79 dBm

Criteria: **FM Signal degrades course accuracy by more than 0.3° ("Course interference")**
FM Signal shows flag ("Flag interference")

unwanted		Course interference			Flag interference		
frequency	freq.-differ.	FM atten.	FM level	prot. ratio	FM-atten.	FM level	prot. ratio
107,900 MHz	100 kHz	61 dB	-49 dBm	-30 dB	46 dB	-34 dBm	-45 dB
107,850 MHz	150 kHz	35 dB	-23 dBm	-56 dB	16 dB	-4 dBm	-75 dB
107,800 MHz	200 kHz	16 dB	-4 dBm	-75 dB	1 dB	11 dBm	-90 dB
107,500 MHz	500 kHz	10 dB	2 dBm	-81 dB		> 12 dBm	< -91 dB
107,000 MHz	1000 kHz	8 dB	4 dBm	-83 dB			
106,000 MHz	2000 kHz	0 dB	12 dBm	-91 dB			
105,000 MHz	3000 kHz		> 12 dBm	< -91 dB			



1.2 FM broadcast -> ILS reception

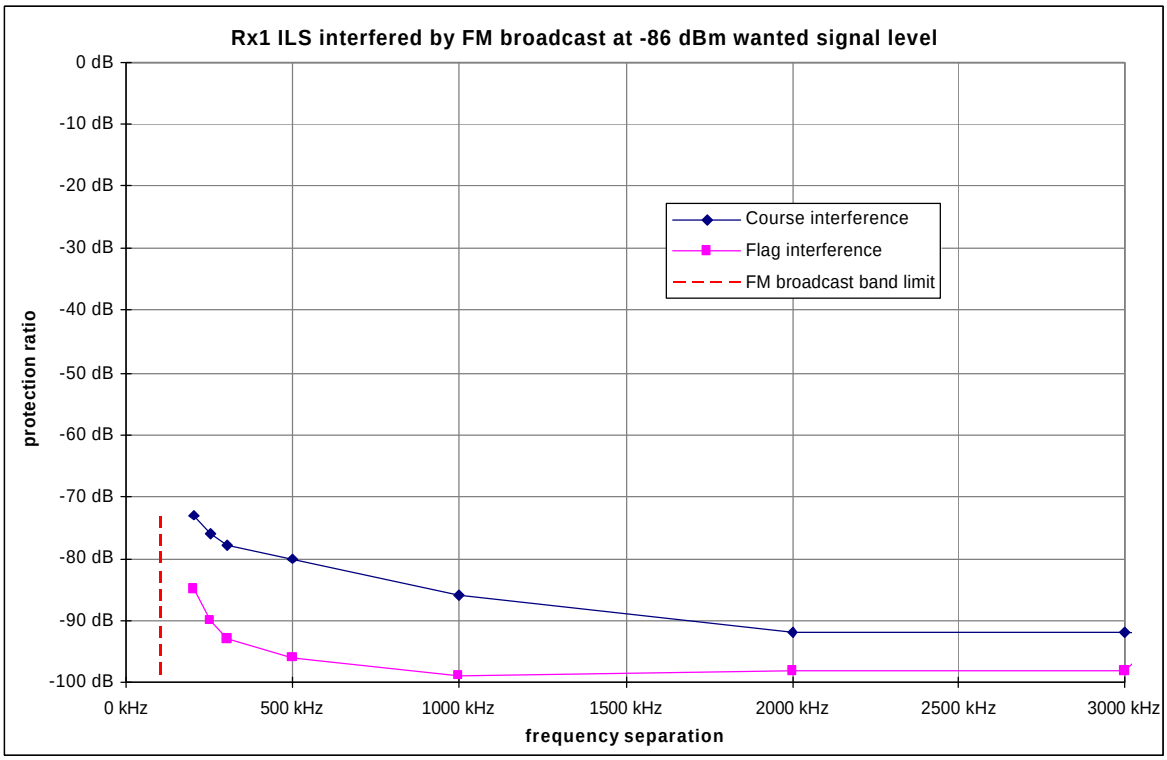
Rx:	**1**	**Collins ILS/VOR/MB-900**
Undist. Course dev.:	+/-2,25 mV	equals to 2 Sigma course deviation according to Rec IS.1140 5.3.1.1
Sensitivity Course:	-95 dBm	
Sensitivity Flag:	-102 dBm	

Unwanted:	**FM stereo, noise modulated according to ITU-R IS.1140**	
Frequency:	(variable)	(center)
Full level:	12 dBm	at 0 dB atten.

Wanted:	**ILS**	0.093 course deflection
Frequency:	108,1 MHz	
Level:	-86 dBm	

Criteria:
FM Signal degrades course accuracy by more than 0.3° ("Course interference")
FM Signal shows flag ("Flag interference")

unwanted frequency	freq.-differ.	Course interference			Flag interference		
		DRM atten.	DRM level	prot. ratio	DRM-atten.	DRM level	prot. ratio
107,900 MHz	200 kHz	25 dB	-13 dBm	-73 dB	13 dB	-1 dBm	-85 dB
107,850 MHz	250 kHz	22 dB	-10 dBm	-76 dB	8 dB	4 dBm	-90 dB
107,800 MHz	300 kHz	20 dB	-8 dBm	-78 dB	5 dB	7 dBm	-93 dB
107,600 MHz	500 kHz	18 dB	-6 dBm	-80 dB	2 dB	10 dBm	-96 dB
107,100 MHz	1000 kHz	12 dB	0 dBm	-86 dB	-1 dB	13 dBm	-99 dB
106,100 MHz	2000 kHz	6 dB	6 dBm	-92 dB		12 dBm	-98 dB
105,100 MHz	3000 kHz	6 dB	6 dBm	-92 dB		12 dBm	-98 dB
103,100 MHz	5000 kHz	2 dB	10 dBm	-96 dB		> 8 dBm	< -94 dB
98,100 MHz	10000 kHz		> 8 dBm	< -94 dB			



2 FMeXtra as the interferer

2.1 FMeXtra -> VOR reception

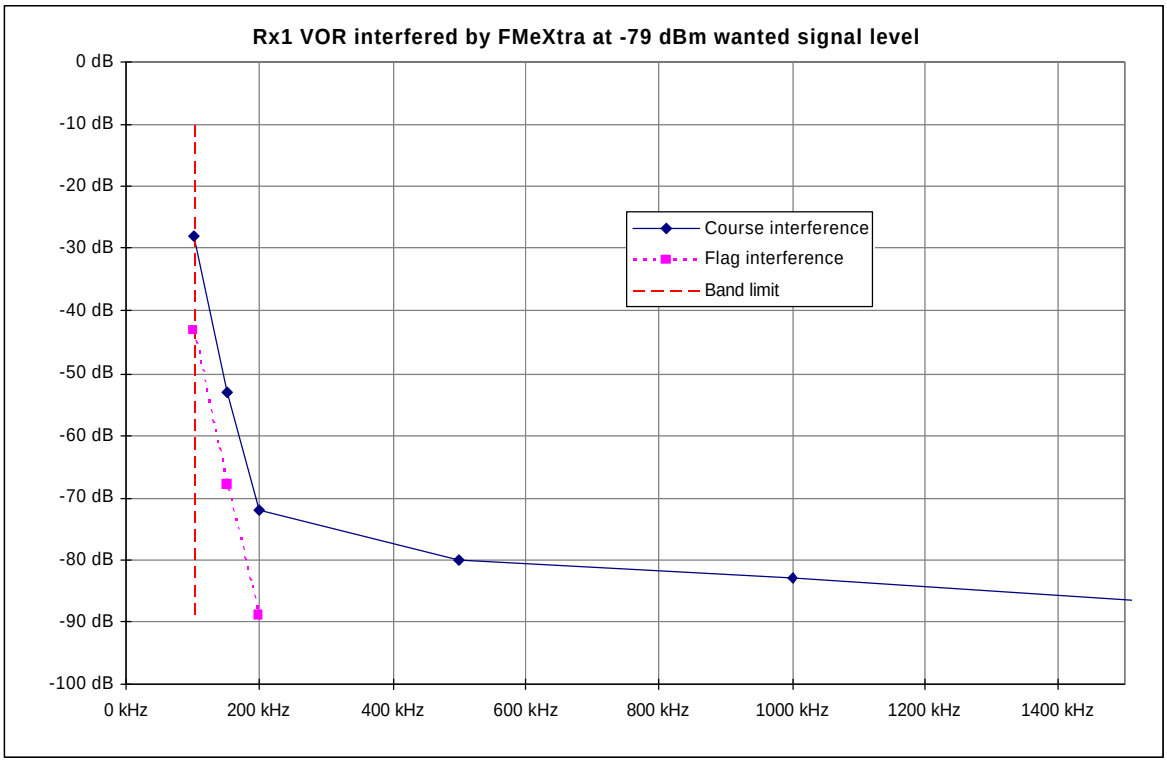
Rx:	**1**	**Collins ILS/VOR/MB-900**
Undist. Course dev.:	+/-2,25 mV	equals to 0.3° course deviation according to Rec IS.1140 5.4.1.1
Sensitivity Course:	-98 dBm	
Sensitivity Flag:	-107 dBm	

Unwanted:	**FM stereo + FMeXtra, noise modulated according to ITU-R IS.1140**	
Frequency:	(variable)	(center)
Full level:	12 dBm	at 0 dB atten.

Wanted:	**VOR**
Frequency:	108,0 MHz
Level:	-79 dBm

Criteria:
FM Signal degrades course accuracy by more than 0.3° ("Course interference")
FM Signal shows flag ("Flag interference")

unwanted		Course interference			Flag interference		
frequency	freq.-differ.	FM atten.	FM level	prot. ratio	FM-atten.	FM level	prot. ratio
107,900 MHz	100 kHz	63 dB	-51 dBm	-28 dB	48 dB	-36 dBm	-43 dB
107,850 MHz	150 kHz	38 dB	-26 dBm	-53 dB	23 dB	-11 dBm	-68 dB
107,800 MHz	200 kHz	19 dB	-7 dBm	-72 dB	2 dB	10 dBm	-89 dB
107,500 MHz	500 kHz	11 dB	1 dBm	-80 dB		> 8 dBm	< -87 dB
107,000 MHz	1000 kHz	8 dB	4 dBm	-83 dB			
106,000 MHz	2000 kHz	1 dB	11 dBm	-90 dB			
105,000 MHz	3000 kHz		> 8 dBm	< -87 dB			
103,000 MHz	5000 kHz						



2.2 FMeXtra -> ILS reception

Rx:	**1**	**Collins ILS/VOR/MB-900**
Undist. Course dev.:	+/-2,25 mV	equals to 2 Sigma course deviation according to Rec IS.1140 5.3.1.1
Sensitivity Course:	-95 dBm	
Sensitivity Flag:	-102 dBm	

Unwanted:	**FM stereo, noise modulated according to ITU-R IS.1140 with FM-Extra**	
Frequency:	(variable)	(center)
Full level:	12 dBm	at 0 dB atten.

Wanted:	**ILS**	0.093 course deflection
Frequency:	108,1 MHz	
Level:	-86 dBm	

Criteria:
FM Signal degrades course accuracy by more than 0.3° ("Course interference")
FM Signal shows flag ("Flag interference")

unwanted frequency	freq.-differ.	Course interference			Flag interference		
		DRM atten.	DRM level	prot. ratio	DRM-atten.	DRM level	prot. ratio
107,900 MHz	200 kHz	26 dB	-14 dBm	-72 dB	14 dB	-2 dBm	-84 dB
107,850 MHz	250 kHz	21 dB	-9 dBm	-77 dB	9 dB	3 dBm	-89 dB
107,800 MHz	300 kHz	19 dB	-7 dBm	-79 dB	5 dB	7 dBm	-93 dB
107,600 MHz	500 kHz	19 dB	-7 dBm	-79 dB	2 dB	10 dBm	-96 dB
107,100 MHz	1000 kHz	12 dB	0 dBm	-86 dB	-1 dB	13 dBm	-99 dB
106,100 MHz	2000 kHz	7 dB	5 dBm	-91 dB		> 8 dBm	< -94 dB
105,100 MHz	3000 kHz	7 dB	5 dBm	-91 dB			
103,100 MHz	5000 kHz	3 dB	9 dBm	-95 dB