Annex 3 A

Determination of the correction factor for the permissible interference field strength at different nominal frequencies in the Land Mobile Service.

1. Determination of the correction factor for the permissible interference field strength at different nominal frequencies in the Land Mobile Service.

The correction factor for the permissible interfering field strength at different nominal frequencies of the transmitting channel causing the interference and the receiving channel experiencing interference is determined by formulas.
The curves for narrow band systems, derived from measurements of a few radio stations in the 1990's, are replaced by normalized equations. For TETRA and wideband systems other normalized equations have been developed. For these new systems, the following designated normalized equations should be used.

2. Definitions for all Systems

Ω	normalized frequency
Delta f	frequency difference between interferer and victim [Hz]
B1	occupied bandwidth of the system with the higher bandwidth [Hz]
B2	occupied bandwidth of the system with the lower bandwidth [Hz]
$a_{corr\text{-}B1}$	correction factor in case B1 = B2 [dB]
$a_{corr\text{-}Sinus}$	correction factor in case the interferer is a sine (unmodulated) carrier [dB]
a_{corr}	resulting correction factor [dB]

For all cases below (except for 4.3 TETRA versus TETRA case) the following interpolation equation is valid:

Ω = Delta f / B1 where B1 ≥ B2

$\mathbf{a_{corr} = a_{corr\text{-}Sinus} - [a_{corr\text{-}Sinus} - a_{corr\text{-}B1}] * B2/B1}$ (An upper limit of 70 dB should be applied.)

3. Narrowband Systems (without TETRA Systems)

For cases including narrowband systems i.e. with a bandwidth ≤ **25 kHz** the following formulas should be used.

a_{corr} for interferer with identical bandwidth:

$a_{corr\text{-}B1} = 0$ dB for $\Omega < 0.5$

$a_{corr\text{-}B1} = (47\Omega - 24)$ dB for $0.5 \leq \Omega \leq 1$

$a_{corr\text{-}B1} = (80\Omega - 55)$ dB for $1 < \Omega \leq 1.3$

$a_{corr\text{-}B1} = (38\Omega)$ dB for $\Omega > 1.3$

a_{corr} for sine interferer:

$a_{corr\text{-}Sinus} = 0$ dB for $\Omega < 0.5$

$a_{corr\text{-}Sinus} = (88\Omega - 44)$ dB for $0.5 \leq \Omega \leq 1.3$

$a_{corr\text{-}Sinus} = (12\Omega + 55)$ dB for $\Omega > 1.3$

4. TETRA versus other Narrowband Systems

For cases where a TETRA system (designation of emission: 25K0G7W) is interfering with or interfered by a narrowband system with a bandwidth ≤ **25 kHz** the following formulas should be used.

4.1 TETRA = Interferer

a_{corr} for interferer with identical bandwidth:

$a_{corr\text{-}B1} = 0$ dB	for $\Omega < 0{,}5$
$a_{corr\text{-}B1} = (32\Omega - 16)$ dB	for $0.5 \leq \Omega \leq 1$
$a_{corr\text{-}B1} = (112\Omega - 96)$ dB	for $1 < \Omega \leq 1.4$
$a_{corr\text{-}B1} = (41\Omega)$ dB	for $\Omega > 1.4$

a_{corr} for sine interferer:

$a_{corr\text{-}Sinus} = 0$ dB	for $\Omega < 0.4$
$a_{corr\text{-}Sinus} = (50\Omega - 21)$ dB	for $0.4 \leq \Omega \leq 0.7$
$a_{corr\text{-}Sinus} = (225\Omega - 145)$ dB	for $0.7 < \Omega \leq 1$
$a_{corr\text{-}Sinus} = (-20\Omega + 100)$ dB	for $\Omega > 1$

4.2 TETRA = Victim

a_{corr} for interferer with identical bandwidth:

$a_{corr\text{-}B1} = 0$ dB	for $\Omega < 0{,}45$
$a_{corr\text{-}B1} = (55\Omega - 23)$ dB	for $0.45 \leq \Omega \leq 0.63$
$a_{corr\text{-}B1} = (180\Omega - 100)$ dB	for $0.63 < \Omega \leq 0.93$
$a_{corr\text{-}B1} = (12.5\Omega + 57)$ dB	for $\Omega > 0.93$

a_{corr} for sine interferer:

$a_{corr\text{-}Sinus} = 0$ dB	for $\Omega < 0.45$
$a_{corr\text{-}Sinus} = (225\Omega - 101)$ dB	for $0.45 \leq \Omega \leq 0.7$
$a_{corr\text{-}Sinus} = (13\Omega + 58$ dB	for $\Omega > 0.7$

4.3 TETRA versus TETRA (25 kHz)

Between TETRA systems (designation of emission: 25K0G7W), the correction factor (a_{corr}) for different frequency offsets (Δf) is given by the following formulas:

a_{corr} = 0 dB	for Δf < 25 kHz
a_{corr} = 45 dB	for 25 kHz ≤ Δf ≤ 50 kHz
a_{corr} = 70 dB	for Δf > 50 kHz

5. Wideband Systems

For cases where systems with a bandwidth **≥ 200 kHz** are involved the following formulas should be used.

a_{corr} for interferer with identical bandwidth:

$a_{corr\text{-}B1}$ = 0 dB	for Ω < 0.5
$a_{corr\text{-}B1}$ = (33.3Ω – 16.7) dB	for 0.5 ≤ Ω ≤ 2
$a_{corr\text{-}B1}$ = (10Ω + 30) dB	for Ω > 2

a_{corr} for sine interferer:

$a_{corr\text{-}Sinus}$ = 0 dB	for Ω < 0,5
$a_{corr\text{-}Sinus}$ = (66.7Ω – 33.3) dB	for 0.5 ≤ Ω ≤ 1.25
$a_{corr\text{-}Sinus}$ = (20Ω + 25) dB	for 1.25 < Ω ≤ 1.75
$a_{corr\text{-}Sinus}$ = (4.8Ω + 51.6) dB	for Ω > 1.75

6. For Systems with a Bandwidth > 25 kHz and < 200 kHz

For cases where the highest bandwidth B_x, of at least one of the two systems involved is > 25 kHz and < 200 kHz the correction factor should be evaluated using the following interpolation formula:

$$a_{Bx} = a_{NB} + \frac{a_{WB} - a_{NB}}{200 - 25} * (B_x - 25)$$

With:

B_x: *Bandwidth of the system in the range* > 25kHz *and* < 200kHz

a_{NB}: *correction in dB calculated based on the narrowband formula*

a_{WB}: *correction in dB calculated based on the wideband formula*

a_{Bx}: *resulting correction in dB*

The correction factors a_{NB} and a_{WB} are calculated according paragraphs 3 and 5.