

Adjacent Area Co-ordination Triggers and Co-existence

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Purpose:

The paper illustrated in this presentation details an approach concerning inter-operator co-ordination triggers for co-frequency operation in adjacent BFWA licensed areas.

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- Why an alternative approach?
 - Probabilistic nature of the problem
 - Reducing the co-ordination burden
- Calculating and justifying co-ordination triggers
 - Distance and pfsd.
- Applying the co-ordination triggers
- Proposals for the Practice Document

Calculating the triggers

- Derive a distance trigger based on a worst case MCL calculation and an agreed acceptable level of interference at a victim.
- Apportion the “co-ordination distance” between the two adjacent areas.
- Calculate the pfsd test level at the mid point (boundary).
- Test and adjust for subscriber stations.

Testing the triggers

- Adequacy of the triggers tested in Monte Carlo style simulations.
- Simulates a multiple interferer environment.

Applying the triggers (1)

- The pfsd boundary limit is fixed.
- The co-ordination distance is EIRP dependant.
- Proposed procedure:
 - Based on EIRP calculate the co-ordination distance.
 - If deployment falls inside this region, calculate boundary pfsd and compare to fixed limit.

Continued:

Applying the triggers (2)

- If the boundary pfsd is exceeded then action required:
 - Either reduce the EIRP towards the boundary
 - Or negotiate with neighbouring operator.
- If the boundary pfsd is not exceeded then no action necessary - deploy.

Separation distance calculations

- Based on parameter values in Annex 1, MCL calculation used to derive separation distance.
- Acceptable level of interference equivalent to $I/N = -10\text{dB}$.
- Interference limit = -147dBW/MHz (at 28GHz).
- Result = 54km .

Boundary pfsd calculation

- Based on parameter values in Annex 1 and the separation distance, the boundary pfsd is calculated.
- The equivalent pfsd at the victim receiver = -112dBW/MHz/m^2 .
- Equivalent boundary pfsd (i.e, at 27.5km) = -102.5dBW/MHz/m^2 .

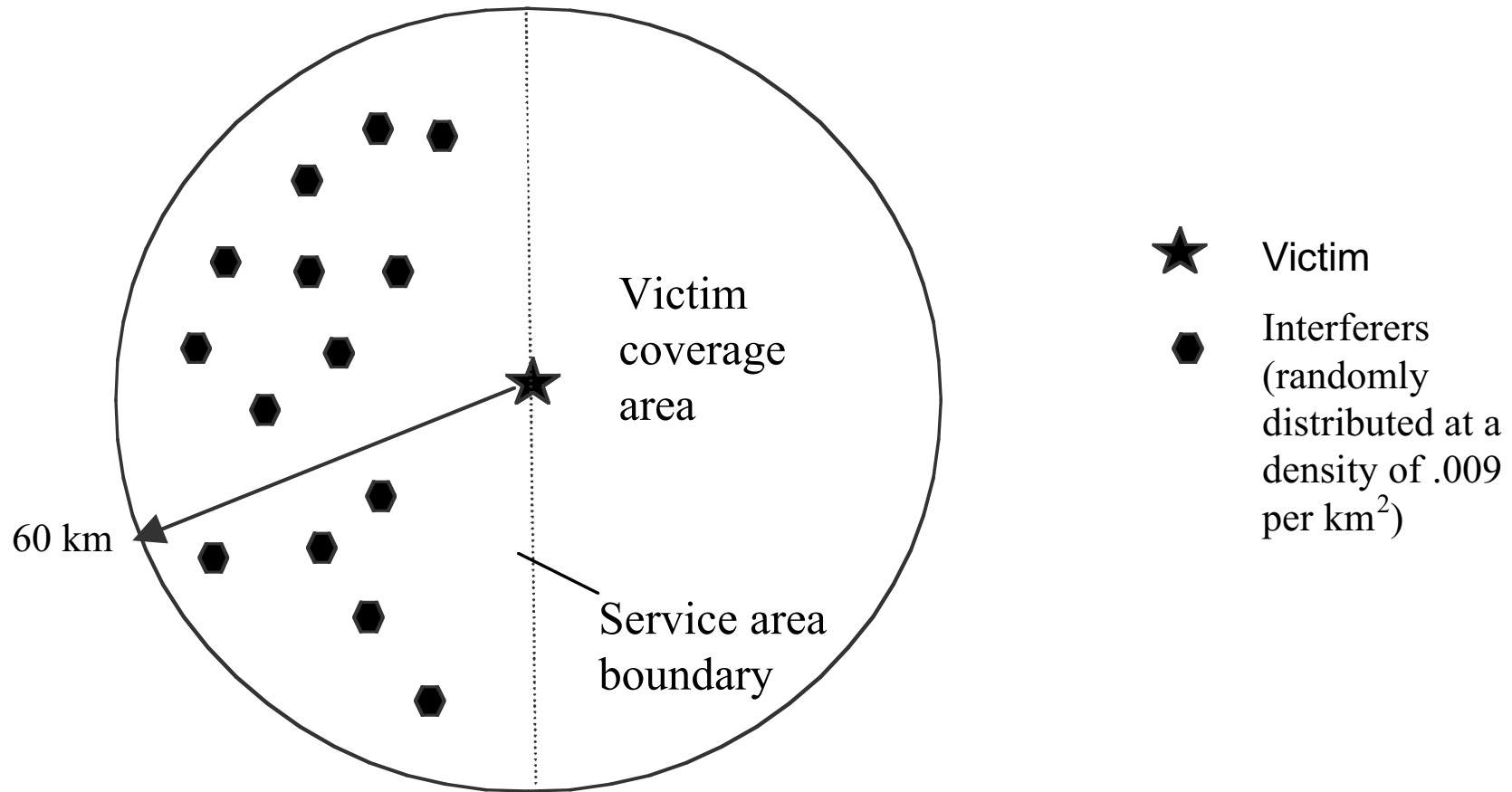
Co-ordination Triggers

- Boundary pfsd;
 - -102.5dBW/MHz/m² at 28GHz
 - -98.5 dBW/MHz/m² at 40GHz
- Co-ordination distance:
 - Base Station at 28GHz = 27.5km (18km)
 - Subscriber station at 28GHz = 16km (10km)
 - 18km and 16km resp. for the 40GHz band.

Testing the pfd trigger levels

- Monte Carlo style simulations detailed in Annex 2.
- Key assumptions:
 - Density of interferers = 0.01 per km²
 - Max range 60km from victim but not all visible.
 - EIRP towards boundary in accordance with guidelines.
 - BS Antenna downtilt assumed.

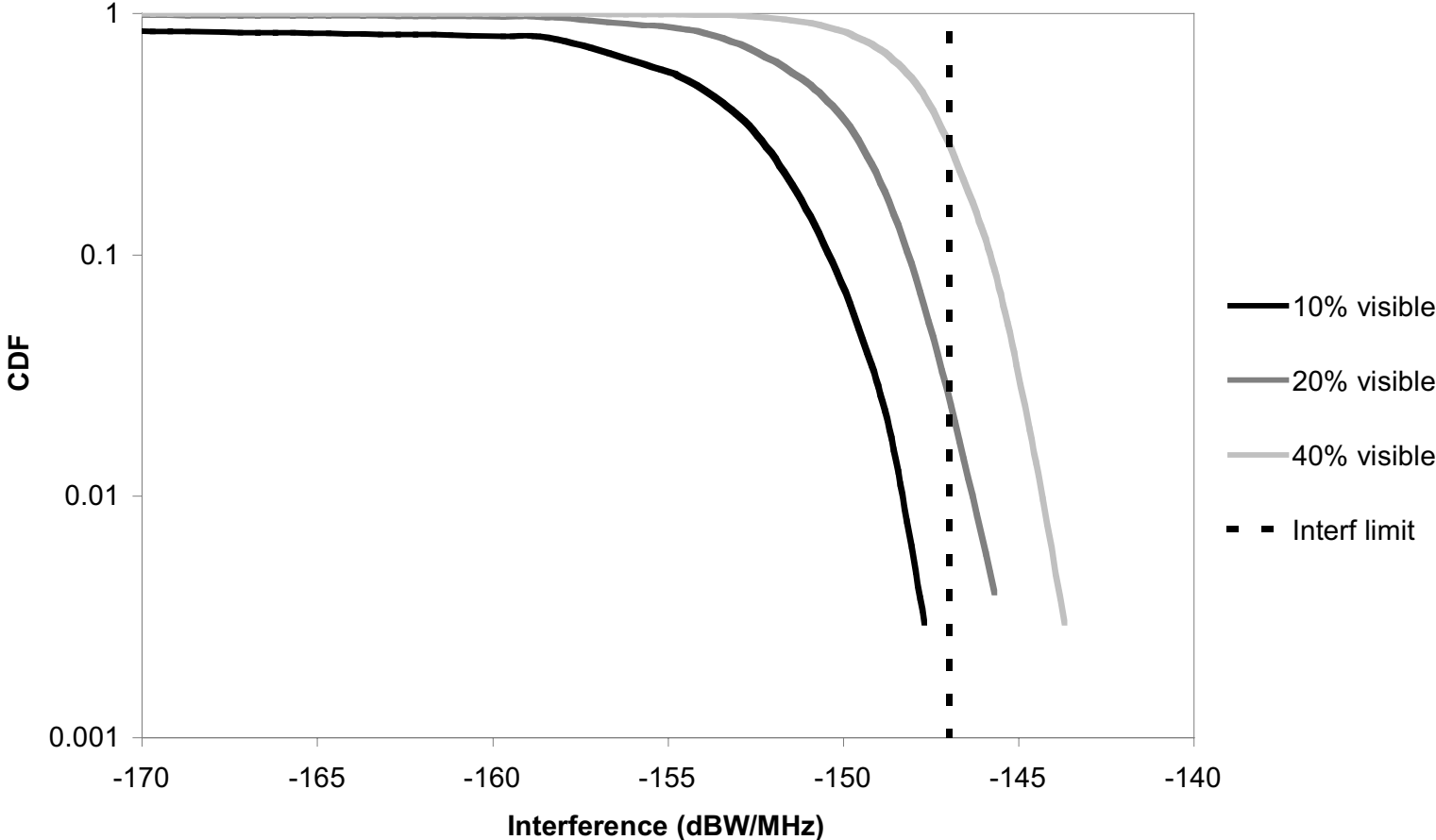
Interference Scenario



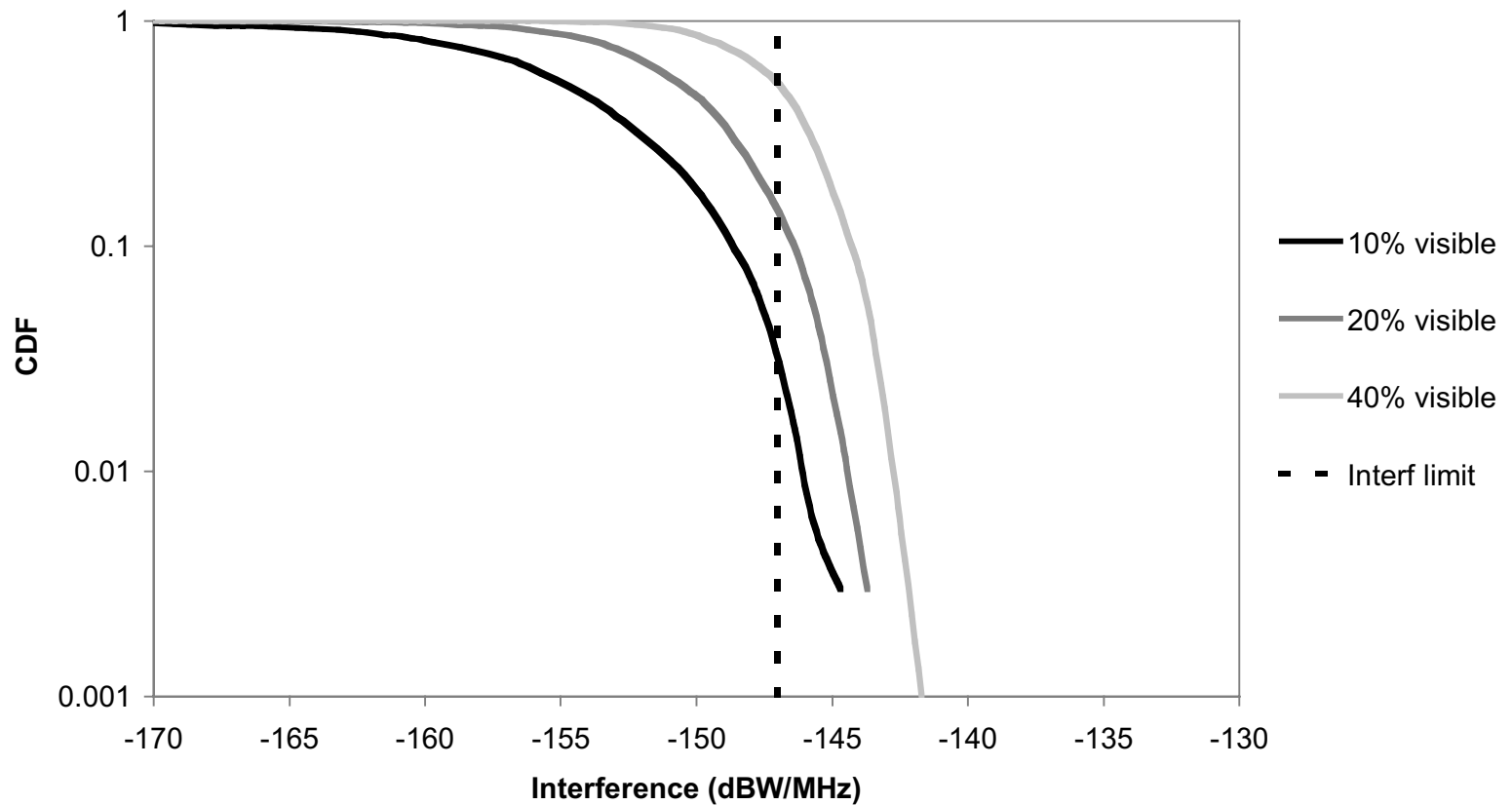
Interference Scenario

- Victim station located at service area boundary - worst case!
- Shielding assumed in order to operate at the boundary (9dB - See Annex 4).
- Results presented assuming either 10%, 20% or 40% of potential interferers visible.

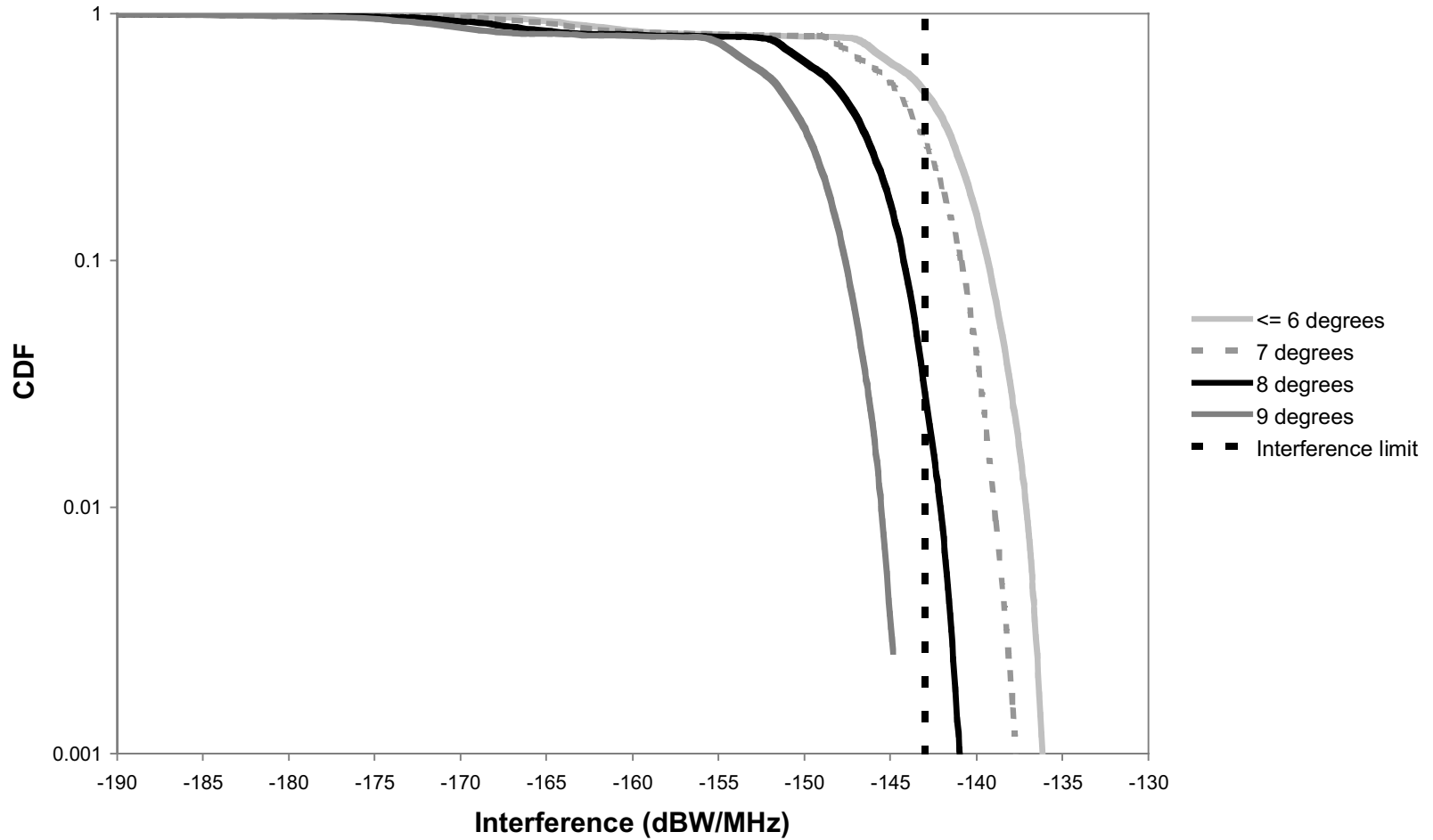
Results BS - BS



Results BS - TS



Result sensitivity



Proposals for Practice Doc.

- Generalise Rec 1 providing a choice of I/N.
- Rec. 2 includes distance as an option for initial trigger.
- Remove pfsd and co-ordination process specific recommendations 5 and 6 (Section 7 refers).
- New section proposed for Section 7.