Adjacent Area Co-ordination Triggers and Co-existence

Document Number:
IEEE 802.16.2p-00/19
Date Submitted:
2000-09-14
Source:

Barry Lewis	Voice:	+44 20 7211 0313
Radiocommunications Agency	Fax:	+44 20 7211 0323
Wyndham House	E-mail:	barry.lewis@ra.gsi.gov.uk
189 Marsh Wall, London, E14 9SX		

Venue:
Session #9, Denver
Base Document:
IEEE 802.16.2c-00/19r1
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.
Notice:

Release:

IEEE Patent Policy:

Adjacent Area Co-ordination 802162c-00/19rev1

Barry Lewis

Radiocommunications Agency

London

802.16.2 Session 9, Sept 2000.

Doc 802.16.2c-00/19r1

- 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 seperation distance.
- Acceptable level of interference equivalent to I/N = -10dB.
- 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/m2.
- Equivalent boundary pfsd (i.e, at 27.5km) = -102.5dBW/MHz/m2.

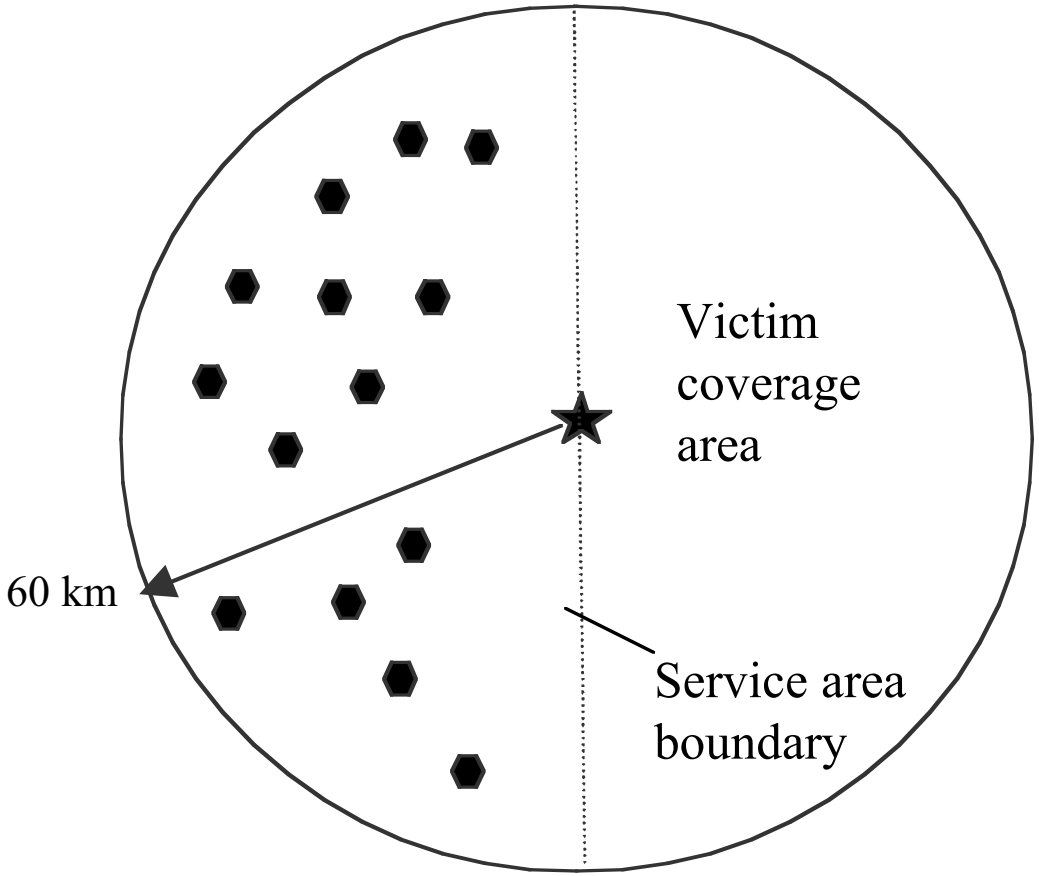
Co-ordination Triggers

- 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 = 0.01per km2
  - Max range 60km from victim but not all visible.
  - EIRP towards boundary in accordance with guidelines.
  - BS Antenna downtilt assumed.

Interference Scenario



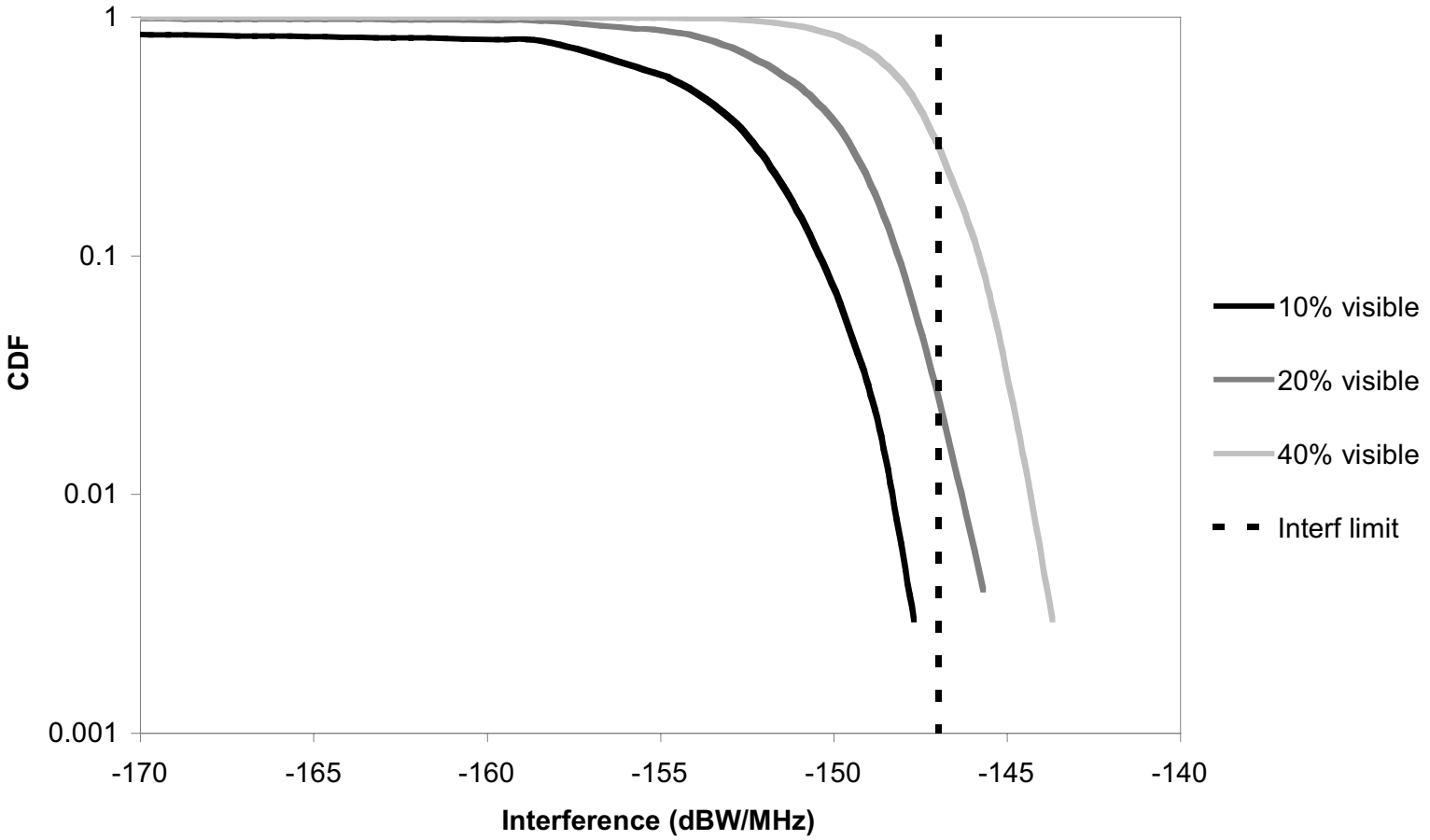
Victim

Interferers (randomly distributed at a density of .009 per km^2)

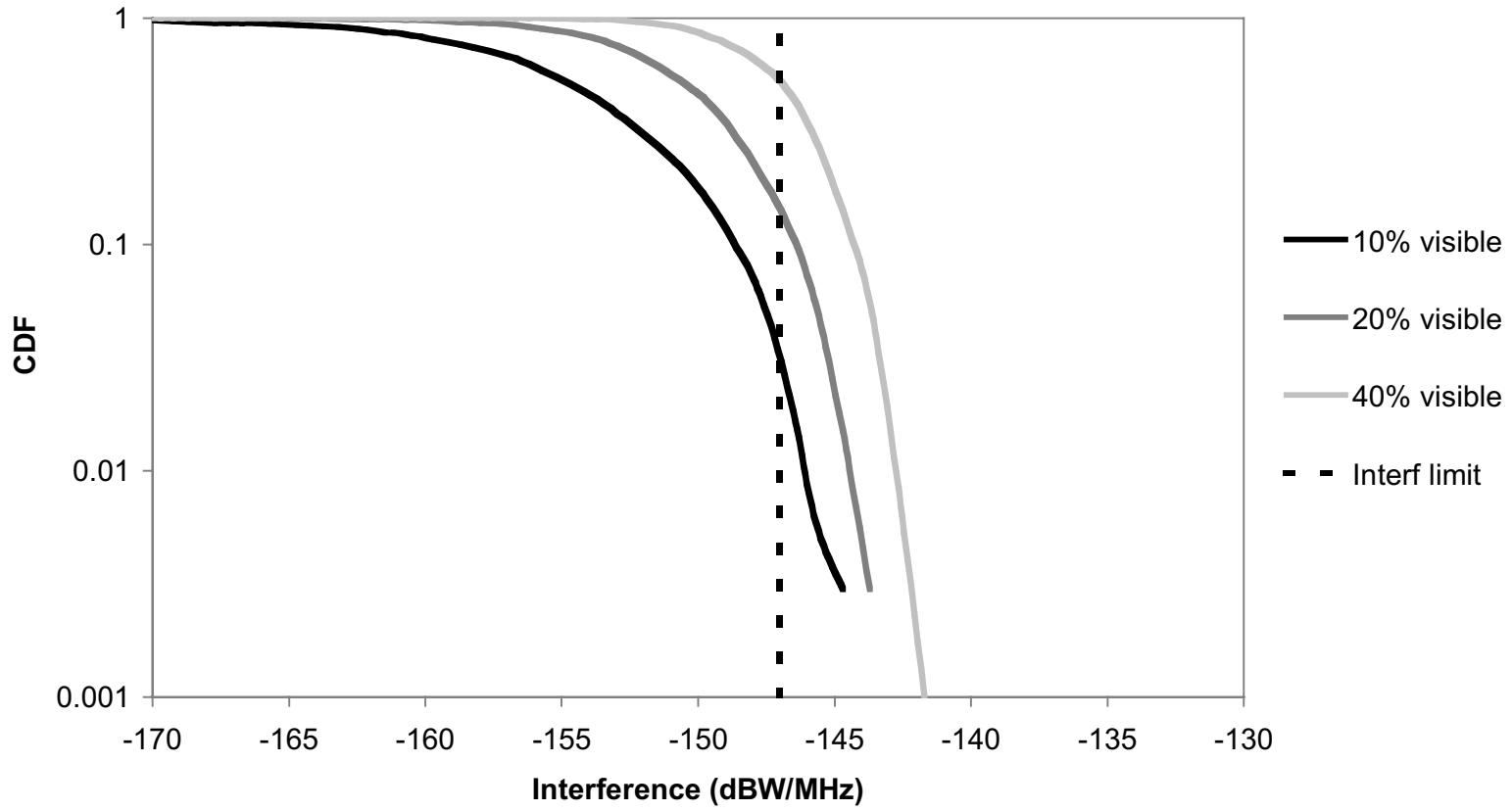
Interference Scenario

- 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.

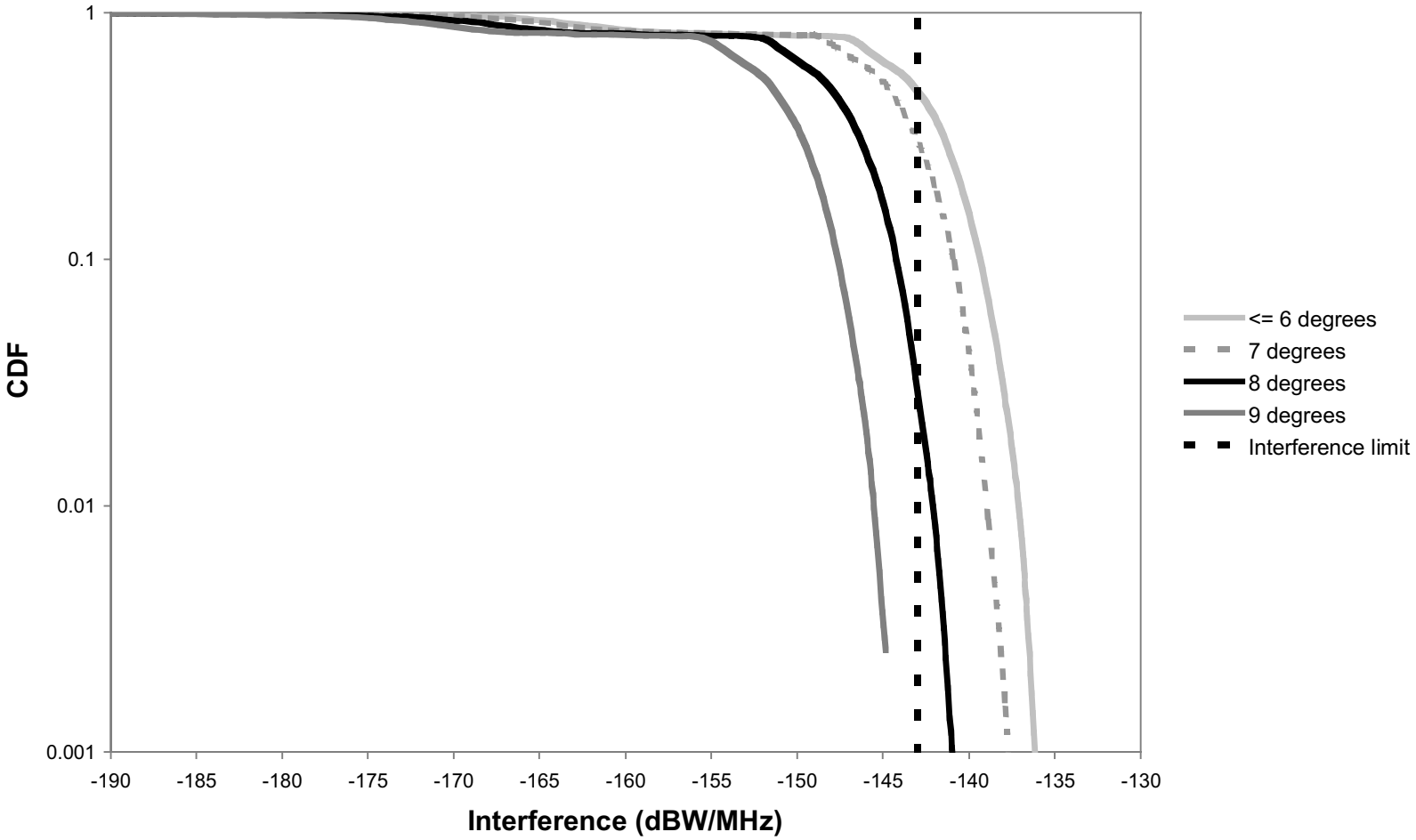
Results BS - BS



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.