

## Background to Transfinite

Transfinite is an independent UK company, with an excellent track record of consultancy support, study work and software development. We specialise in products and services to analyse compatibility between radiocommunications systems and their use of the radio spectrum. Our tools have a particular emphasis on interference analysis, spectrum management and frequency co-ordination. Our study work has encompassed a wide range of communications systems including both terrestrial and satellite services.

We have experience in a range of relevant technologies including:

- Propagation models, including P.452, P.1546, P.1812, P.2001 and Hata/COST 231. We have worked with the UK's leading propagation experts to ensure our implementations are vigorously tested
- Interference analysis, including a very wide range of metrics (I, I/N, C/I, C/(N+I), EPFD, PFD, field strength etc.) and methodologies (static, dynamic, Monte Carlo, area, combinatorial etc.)
- Coverage prediction of a range of services including broadcasting and mobile and modelling of many others including fixed, satellite, radar, science, astronomy etc.
- Monte Carlo analysis and the Schwartz and Yeh methodology
- Storing gridded coverage data sets for use in planning, for example during planning of Business Radio applications
- Development of interference analysis and coverage tools including optimisation, user interface design, testing, training and support
- Integration with GIS data including terrain and land use databases, including high resolution surface databases to model urban areas

We have also developed web based radio spectrum management tools including the Visualyse Spectrum Manager (SM). Visualyse SM provides all the necessary features to support issuing of licences including application, processing, search and display, technical analysis, management, reporting and engineering.

Visualyse SM uses an architecture that integrates an assignment databases with a scalable generic interference analysis computation engine and display results interactively on web pages with overlaid GIS data, as shown in the figure below.

Visualyse SM

Internal Admin

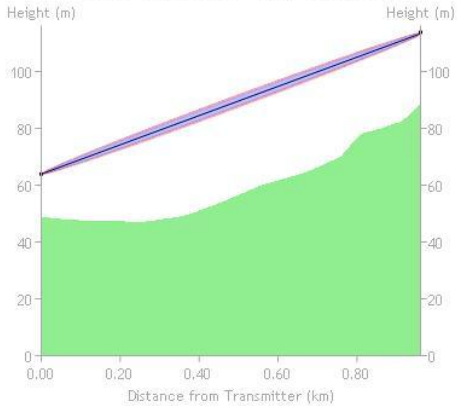
HomeSettingsLog OffHelp

### Check Link Path and Locations

On this we check that the path between the two sites is not obstructed by terrain. In addition we check there is no terrain obstruction in the Fresnel zone either side of the radio path which could degrade performance. Note this tool checks for terrain but not for buildings or vegetation.

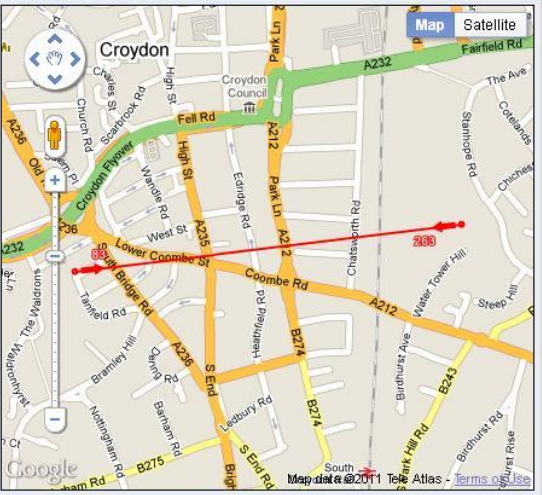
#### Path profile

<-- Office - Water tower --> Freq = 28333000000



Height (m)

Distance from Transmitter (km)



Map Satellite

Frequency for Fresnel Zone:

Please check the map, link distance and path profile look correct.  
Path is 0.961 km and a simple terrain analysis suggests it is line of sight.

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## Response to Questions

### *General Comment*

We welcome Ofcom's approach as identified in this document as an example of forward planning and giving notice to industry and interested parties.

*Q1: Do you have any comments on our proposed approach to ensuring a low probability of harmful interference to DTT services? Please state your reasons for your comments.*

Answer: It seems comprehensive but there could well be steps to reduce the complexity of the algorithm. The methodology used should be studied as part of the UHF and VHF spectrum planning tool and alternatives considered. This could require further measurements and propagation research.

*Q2: Do you have any comments on our proposed approach to ensuring a low probability of harmful interference to PMSE services? Please state your reasons for your comments.*

Answer: Alternative methods to analyse compatibility and interference could be considered that are both simpler and yet able to take account of the actual frequency used by the PMSE service rather than assuming it is in the first adjacent channel

*Q3: Do you have any comments on our proposed approach to ensuring a low probability of harmful interference to 4G services above the UHF TV band? Please state your reasons for your comments.*

Answer: no comment

*Q4: Do you have any comments on our proposed approach to ensuring a low probability of harmful interference to services below the UHF TV band? Please state your reasons for your comments.*

Answer: no comment

*Question T1: Do you have any comments on our proposal to cap the maximum in-block EIRP of all WSDs at 36 dBm/(8 MHz)?*

Answer: no comment

*Question T2: Do you have any comments on our proposed approach for calculating WSD emission limits, as expressed in Equation (4.3), in relation to DTT coexistence calculations?*

Answer: See answers to questions 1 and 2

*Question T3: Do you have any comments on our proposed approach for dealing with the uncertainty in the locations of DTT receivers in relation to DTT calculations?*

Answer: See answers to questions 1 and 2

*Question T4: Do you have any comments on our proposed target of a 10% likelihood of a 1 dB rise in the noise-plus-interference floor at the edge of DTT coverage?*

Answer: no comment

*Question T5: Do you have any comments on our proposed approach for calculating coupling gains in relation to DTT calculations?*

Answer: no comment

*Question T6: Do you have any comments on our proposed protection ratios in relation to DTT calculations?*

Answer: no comment

*Question T7: Do you have any comments on our proposed approach for dealing with the uncertainty in the locations of WSDs in relation to DTT calculations?*

Answer: See answers to questions 1 and 2

*Question T8: Do you have any comments on our proposed approach for calculating WSD emission limits, as expressed in Equation (5.2), in relation to PMSE coexistence calculations?*

Answer: See answers to questions 1 and 2

*Question T9: Do you have any comments on the PMSE wanted signal power levels that we propose in relation to coexistence calculations?*

Answer: no comment

*Question T10: Do you have any comments on our proposed approach for calculating coupling gains in relation to PMSE calculations*

Answer: no comment

*Question T11: Do you have any comments on our proposed approach for dealing with the uncertainty in the locations of WSDs in relation to PMSE calculations?*

Answer: no comment

*Question T12: Do you have any comments on our proposed approach for dealing with the uncertainty in the locations of PMSE receivers in relation to PMSE calculations?*

Answer: no comment

*Question T13: Do you have any comments on our proposed approach for the derivation of WSD-PMSE coupling gains for non-geolocated slaves in relation to PMSE calculations?*

Answer: no comment

*Question T14: Do you have any comments on our proposed protection ratios in relation to PMSE calculations?*

Answer: no comment

*Question T15: Do you have any comments on our assessment that a margin for uncertainties in radio propagation is not necessary given the proposed parameters for derivation of coupling gains in relation to PMSE coexistence calculations?*

Answer: There could be benefits in undertaking further propagation research to address questions raised by the TV white space device analysis

*Question T16: Do you have any comments on our proposed WSD emission limits in relation to PMSE use in channel 38?*

Answer: no comment

*Question T17: Do you have any comments on our proposal not to permit WSDs to operate in channel 60?*

Answer: no comment

*Question T18: Do you have any comments on our proposal that, if the unwanted emissions limit (over 230-470 MHz) in the draft ETSI standard (EN 301 598) is tightened by 8 dB, there should be no further restrictions on the operation of WSDs in relation to services below the UHF TV band?*

Answer: no comment

*Question T19: Do you have any comments on our proposal that, if unwanted emissions limit (over 230-470 MHz) in the draft ETSI standard (EN 301 598) is not changed, there should be restrictions on the in-block powers of WSDs in channels 21 to 23?*

Answer: no comment