Transfinite Systems Ltd
6C Rathbone Square
24 Tanfield Road
Croydon CR0 1BT
United Kingdom

Professor William Webb
Ofcom
Riverside House
2a Southwark Bridge Road
London SE1 9HA

9th February 2010

Dear William,

Transfinite Systems Ltd is pleased to submit this response to the discussion document "Digital Dividend: Geolocation for Cognitive Access".

Transfinite welcomes the interest by Ofcom in White Space devices. This is a rapidly changing area which we feel would benefit from Ofcom sponsored research.

If you have any questions regarding this response please do not hesitate to contact us.

Yours sincerely,

John Pahl

Transfinite Systems Ltd

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.

Recently we were involved in the auction of spectrum in the 10 – 40 GHz bands and were successful, gaining a licence in the 28 GHz band. We intend to operate as a band manager providing access to our spectrum via a web based software solution called Visualyse Spectrum Manager (SM).

Visualyse SM provides all the necessary features to support issuing of licences including:

• Licence application
• Licence processing
• Licence search and display
• Technical analysis
• Management and reporting
• Engineering

Visualyse SM can offer users the ability to apply for licences via a web based portal as shown in the figure below.

This technology would be readily extended to provide a database tool to manage white space devices.

General Comments

Transfinite welcomes this discussion document on White Space devices. This is a rapidly changing area which we feel would benefit from Ofcom sponsored research.

This response includes our initial considerations of the topics covered and as noted we feel that further analysis would be required before giving a definitive statement.

It is noted how the regulator defines the framework that enables the market to operate and so a degree of intervention would be required. Developments within other countries are worth taking into account, in particular the approach taken by the US as described in FCC's ET Docket No. 04-186 and responses.

One key decision would be whether to have a fixed set of device classes that can either use a channel or not or to permit flexible device types that are given a permitted transmit power in return.

For example the FCC methodology is based upon two classes, fixed with transmit power 4 W outdoor and personal with in most circumstances100 mW indoor operation. This type of classification would greatly simplify management of the database. It is likely that equipment will be standardized on a global basis and so there could be benefits in such an approach.

Q1: Should we suggest only high level parameters, leaving further work to industry, or should we seek to set out full details of parameters to be exchanged?

Answer: Recent work within the US benefited from a degree of direction by the regulator in defining the scope for white space device database. A similar approach could be used in the UK, with details decided within industry, particularly if there are draft interface specifications available from other countries.

Q2: Should both closed and open approaches be allowed? Should there be any additional requirements on the providers of closed databases?

Answer: While both could have benefits, an approach based upon an independent third party would ensure that there are no conflicts of interest.

Q3: What information should be provided to the database? Are our assumptions about fields and default values appropriate?

Answer: A number of approaches could be considered depending upon the level of detail and accuracy required. For example the coverage of broadcast stations in the US can be defined:

Either: using the protected coverage area polygons downloadable from the FCC web site

Or: derived using a propagation model from the transmitter characteristics and a minimum field strength

The advantage of the former is it is a common definition. The downside is that it was generated using a low resolution propagation model that does not use full information about the terrain.

Q4: Should the translation from transmitter location to frequency availability be performed in the database or in the device?

Answer: The translation should be undertaken in the database and not the device

Q5: Have we outlined an appropriate information set for the database to provide to the device? Can industry be expected to develop the detailed protocols?

Answer: this information could be developed by industry once a framework has been agreed

Q6: Is a two-hourly update frequency an appropriate balance between the needs of licence holders and of cognitive device users?

Answer: Two hourly updates are appropriate for channels that might need to consider use by PMSE users in particular radio microphones. However for channels in which the only transmitters to consider are broadcasting other time periods could be considered e.g. until midnight.

Q7: Is there benefit to devices receiving a time validity along with any database request and to act accordingly?

Answer: Yes, it would allow more flexible assignment methodologies

Q8: What role could push technology play?

Answer: Current thinking suggests that push technology is not required, particularly if the device is given time information so it can identify when it could be beneficial to "re-apply".

Q9: Do you have any comments on the suggested approach to implementing the database for DTT?

Answer: It is not clear that the best approach is based upon 200 kHz channel – it might be better to use the DTT channel plan. In addition it could be better to use simplified field strength and geodetic data rather than C/I ratios, in a similar way to the approach to constraints used by the FCC.

Further information on how data on DTT planning would be required – such as whether the information would be available as protected polygons or would have to be generated using a propagation model. If so the propagation model should be one that is standardised, accurate, and based upon publically available algorithms and databases.

TRANSFINITE
SYSTEMS

We suggest that one such model would be the one defined within Recommendation ITU-R P.1812. This model could also be used to work out the separation distances required between white space devices and a DTT field strength contour.

It is more likely that mass market white space devices will fall into specific categories. With such standardised device types the rules as to where they could be deployed could be more readily defined.

Q10: Do you have any comments on the suggested approach to implementing the database for PMSE?

Answer: Similar comments to above. As set of white space database rules would be defined for each class of PMSE device, and information about their location, frequencies and duration of activity passed to the white space database manager(s).

Q11: Do you believe it is practical to implement such a database?

Answer: yes, particularly with a resolution of 8 MHz i.e. one channel rather than 200 kHz.

Q12: Is it appropriate for third parties to host the database? If so should there be any constraints? If not, who should host the database instead?

Answer: The best approach is via third parties that are independent of both the licensed users (e.g. DTT) and also manufacturers and users of cognitive devices. It could be acceptable for there to be more than one – e.g. if one class of device has different requirements to another. The third party should also ensure the information gathered (e.g. during registration or during database requests) is kept confidential and not used for purposes other than for which it was collected.

Q13: How can any costs best be met?

Answer: the best approach is likely to be via device registration, though careful financial planning would be necessary to ensure that there is cover for the likely lifetime of the devices.

Q14: What are the difficulties and expected costs to licence holders in providing the necessary information to the database? Could this information be provided in any other way?

Answer: this information should be available already and Ofcom has the statutory right to request that data from licence holders. There would be benefits in a "clearing house" function to distribute data to possibly multiple database managers.

TRANSFINITE
SYSTEMS