What is White Space?

The term ‘White Space’ refers to portions of licensed radio spectrum that licensees do not use all of the time or in all geographical locations. Several regulators around the world are moving towards allowing unlicensed access to these frequencies, subject to the proviso that licensed transmissions are not adversely affected. By allowing access to these White Space frequencies, more effective and efficient use of the radio spectrum is envisaged.

Much of the excitement surrounding White Space stems from the discontinuation of analogue TV signals in several countries and the spectrum that will free up. Some of this spectrum may be licensed for other uses in the normal way – for example, in the UK, the ‘old’ TV Channels 61-69 (798-862MHz) have been assigned for LTE mobile use. But a good deal of the TV band (Channels 21-60 in the UK, 470-790MHz) will be designated ‘interleaved’ spectrum, meaning that unlicensed users may interleave their transmissions in the gaps (i.e. in the White Spaces) that exist between the licensed users’ transmissions.

Interleaving transmissions in this way is not without its technical challenges, though. It is imperative that the licensed (‘primary’) transmissions such as TV broadcasts are not degraded by interference caused by unlicensed (‘secondary’) transmissions, and it is necessary to ensure, therefore, that access is tightly regulated and controlled (White Spaces may be unlicensed, but access will need to be controlled).

Some of the early proposals for controlling access to White Space spectrum involved the use of ‘cognitive radio’ techniques, in which White Space Devices (WSDs) would sense their RF environment and would be able to automatically identify radio channels that they could use without causing degradation to primary transmissions. However, cognitive techniques like this are extremely difficult, especially in terms of the sensing sensitivity required and the likelihood of a WSD incorrectly identifying a channel as free when it is actually in use by a primary user.

In current proposals, therefore, the main mechanism for controlling access will involve the use of a database that will grant permission to WSDs to use particular radio channels. The details of database design and access methods are currently under discussion in a number of countries, but generally speaking, it is envisaged that WSDs will need to report their location to the database, and the database will use this information to determine what channels ought to be free in that particular location and at that particular time. The WSD may also be required to use some kind of cognitive technique such as spectral sensing to confirm that the channel granted by the database is indeed free.