



## RTT TECHNOLOGY TOPIC September 2014

### The Battle for Broadcast Bandwidth (2)

The news that the National Association of Broadcasters in the US is challenging the validity of the FCC plans to auction more TV spectrum provides the basis for this month's technology topic.

<http://www.nab.org/documents/newsRoom/pressRelease.asp?id=3483>

The NAB is questioning the methodology used by the FCC to predict the coverage loss incurred by a repacking of TV stations into a shrunken TV band with mobile broadband as an adjacent interferer.

Our February 2007 Technology Topic, The Battle for Broadcast Bandwidth, argued the case for a collaborative approach to reengineering the UHF band.

[http://www.rttonline.com/tt/TT2007\\_002.pdf](http://www.rttonline.com/tt/TT2007_002.pdf)

We suggested that broadcasters and the mobile broadband community had a common interest in improving the delivery economics of TV and internet access but that this could only be achieved through cooperation.

The regulators generally agreed and then constructed an adversarial auction process that guaranteed that any meaningful technical integration and efficient coexistence would be commercially impossible to achieve.

Seven years on, the proposed broadcast spectrum incentive auction in the US suggests that regulators remain either spectacularly out of touch or wilfully ignorant of present and evolving technical and commercial challenges and opportunities in the UHF band.

This month's topic explores these issues and the implications for TV and mobile broadband evolution in Europe and Asia.

#### **Read on**

#### **The US is different from the rest of the world both technically and commercially.**

TV in the US is delivered using the ATSC standard. This is a robust and technically well executed technology but is becoming increasingly sub scale relative to DVB T in rest of the world markets. This is making it increasingly hard to maintain R and D investment. 6 MHz channel spacing rather than the 8 MHz used in most other markets introduces additional band planning complexity.

Over time it is therefore inevitable that implementation of ATSC 2 and 3 will be slower than DVB T2 and T3. The user experience gains from the next two generations of TV demodulator and channel decoding will therefore not be available to the US consumer or at least will take longer to be realised.

The US broadcasters are also faced with two mobile broad band 'competitors' with a technically and commercially robust LTE offer. Band 17 (AT and T) and Band 13 (Verizon) are 10 by 10 MHz duplex bands where the channel bandwidth is equivalent to the pass band. This makes for a relatively ideal implementation of LTE in the UHF band with significantly better range performance (data reach) than LTE networks deployed into legacy bandwidth. The jury remains out as to

whether LTE B broadcast over supplementary downlink channels will be a success but in reality it doesn't really matter much – the existing networks work just fine.

AT and T and Verizon are financially strong, operating in a high ARPU market with a competitor (Sprint) compromised by poor technology choices (early support for Wi Max), over reliance on 2.5/2.6 GHz (yet another non-standard US band plan) and presently awkward plans to implement tri band LTE.

The FCC appears to be confident that an incentive auction for bandwidth between 600 and 700 MHz will bring new mobile broadband competitors into the market.

While this may be true in the short term, history suggests that the scale advantage of the incumbents makes a broader competitive market place unsustainable. The NAB is right to be nervous about an auction process that will result in a weakening of their position.

### **Europe is different both technically and commercially.**

While there is some debate about the rate of T2 adoption, it is certainly going to be faster than ATSC. DVB T is not a technology dead end and has some genuinely interesting development potential.

European mobile operators are also suffering from much lower capital returns than their US counterparts and whatever they might say in public are in practice not enthusiastic about the prospect of being expected to bid for additional mobile broadband bandwidth over and beyond existing Band 20 and Band 28 allocations.

These existing bands are also non ideal. Band 20 cannot be implemented efficiently in rest of the world markets with existing 850 networks which means that it is significantly sub scale and will become increasingly sub scale over time. Band 28 is being implemented (probably) as an APT (a) band but with higher OOB requirements. This is a regulatory win for the broadcasters but again guarantees that the band will be non-scale economic.

Last but not least, the European terrestrial broadcasters by and large have strong political support.

In the UK, the BBC is not as popular as the NHS but it is not far behind.

### **Asia is different again**

LTE uptake in Japan and Korea is particularly strong with high achieved ARPU. The Asia Pacific Telecommunity has produced an LTE 700 MHz band plan, APT (a) and (b) which potentially delivers 45 by 45 MHz of LTE bandwidth in Asia, Latin America and Africa. While this will be technically challenging, the sheer scale of these markets suggests that this will transform the delivery economics of LTE and the ARPU might be higher than expected as well.

Terrestrial TV is not unimportant in these markets but it is not unreasonable to expect LTE to become dominant in the 700 MHz band with TV consolidating into the lower end of the UHF band.

There are advantages to this.

TV receivers presently suffer from being broad band devices with typically a front end pass band of >300 MHz. This means that they often have poor sensitivity and limited dynamic range can result in front end compression. It would therefore be possible to produce a new generation of receivers with significantly better RF performance. The link budget would improve and this combined with second and third generation demodulation and channel coding could realise significant improvements in TV delivery economics and the user experience.

Single frequency networks would also help though would have coordination challenges particularly in Europe. The argument that less broadcast bandwidth produces less value is therefore only partially true and could be off set to a large extent by technology investment.

This brings us back to our start point. The NAB concern about the US incentive auction is understandable and it is questionable whether additional mobile broadband bandwidth below 700 MHz is either needed or desirable.

The US consumer would almost certainly benefit from a more closely coordinated approach to UHF band planning and LTE/TV integration but the auction process makes practical technical cooperation commercially difficult. The FCC would be well advised to park the whole project. Only lawyers will benefit.

European consumers have ended up with a far from ideal LTE 700/800 MHz band plan which will most likely become less scale economic over time. This together with continuing low EBITDA will dampen the appetite of the mobile broadband community for additional <700 MHz spectrum so the pressure for broadcasters to plan beyond existing limits should be relatively relaxed.

The APT (a) and (b) LTE 700 MHz band plan in Asia, Latin America and Africa will have a major beneficial impact on LTE delivery economics. This should not be considered a threat to the broadcasters but an opportunity to couple traditional one way delivery with bi directional value generation.

Our March 2014 technology topic, the North to South Transition, highlighted how 'middle earth' (countries either side of the equator) would increasingly dominate the global telecommunications economy.

[http://www.rttonline.com/tt/TT2014\\_003.pdf](http://www.rttonline.com/tt/TT2014_003.pdf)

The APT (a) and (b) LTE 700 MHz band plan integrated with DVB T2 consolidated below 700 MHz could well be an optimum solution technically and commercially both for mobile broadband and terrestrial TV and could be a useful benchmark against which US and European regulatory and technology policy could and should be compared.

### **About RTT Technology Topics**

RTT Technology Topics reflect areas of research that we are presently working on. We aim to introduce new terminology and new ideas to help inform present and future technology, engineering, market and business decisions. The first technology topic (on GPRS design) was produced in August 1998.

[http://www.rttonline.com/tt/TT1998\\_008.pdf](http://www.rttonline.com/tt/TT1998_008.pdf)

16 years on there are over 190 technology topics [archived on the RTT web site](#).

Do pass these Technology Topics and related links on to your colleagues, encourage them to join our [Subscriber List](#) and respond with comments.

---

### **Contact RTT**

[RTT](#), the [Jane Zweig Group](#) and [The Mobile World](#) are presently working on a number of research and forecasting projects in the mobile broadband, two way radio, satellite and broadcasting industry.

If you would like more information on this work then please contact [geoff@rttonline.com](mailto:geoff@rttonline.com)

**00 44 208 744 3163**