



Huawei response to the Ofcom consultation on Future use of the 700MHz band

Question 1: Have we correctly identified and characterised the potential costs set out above, and what other costs – if any – should be taken into account in our assessment?

AND

Question 2: What evidence, whether qualitative or quantitative, should we obtain and/or take into account in assessing each of these potential costs? Please identify any sources of specific evidence to which we should have regard.

Huawei believes that the primary potential costs have been identified. The studies and audits required on consumer equipment replacement to upgrade installations will be a key element of accurate costing. A seamless transition of DTT is essential especially considering that large costs will be incurred by the DTT industry and consumers.

It is also essential when considering costs and benefits to consider the bigger picture. An Analysis Mason report for DCMS on the “Impact of radio spectrum on the UK economy and factors influencing future spectrum demand” estimates that spectrum accounts for £52bn of economic value to the UK each year, of which £30bn relates to benefits derived from the use of mobile services alone.

In considering this, Ofcom needs to incentivize the changes needed because many of the costs are not incurred by the beneficiaries of the 700 MHz clearance.

Question 3: Have we correctly identified and characterised the potential benefits set out above, and what other benefits – if any – should be taken into account in our assessment?

Huawei believes that the primary potential benefits have been identified, and would like to reiterate the response to Question 1 & 2 regarding the estimated benefits to the economy from the use of mobile services.

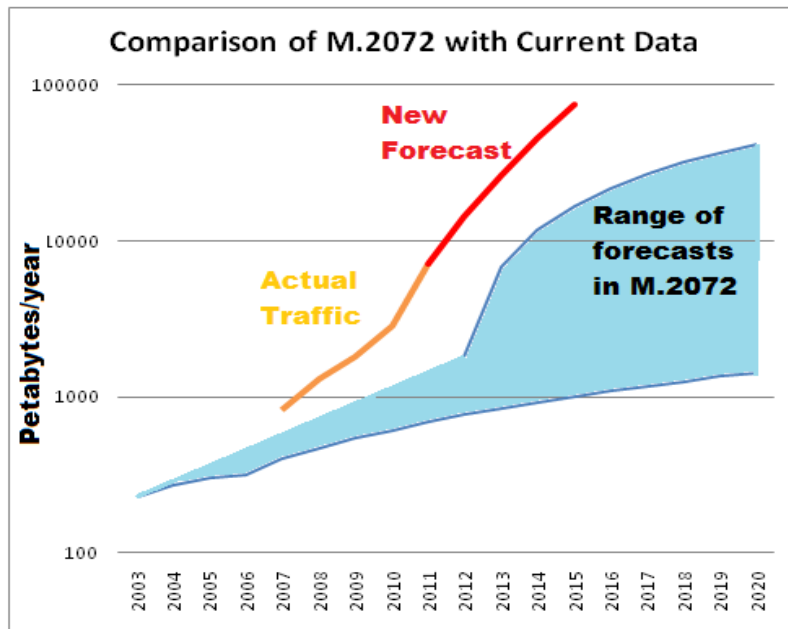
Question 4: What evidence, whether qualitative or quantitative, should we obtain and/or take into account in assessing each of these potential benefits? Please identify any sources of specific evidence to which we should have regard.

Question 5: In particular, what is your view of the likely future demand for additional sub-1 GHz spectrum for the provision of mobile data services, and what evidence supports this view?

Mobile data service is a foundation for economic growth, job creation, global competitiveness and a better way of life. Especially IMT, it could support various applications such as voice/video

call, mobile TV and Machine type communication anywhere and anytime. IMT is also the key enabler for broadband PPDR, education and health care.

The recent mobile telecommunication market developments in Report ITU-R M.2243 indicate that the market forecasts prior to WRC-07 might have underestimated the actual market development. The actual market-related parameters values should thus be higher than those used in ITU-R Report M.2072.



From Huawei point of view, it is now commonly forecasted that the growth of mobile data traffic by 2020 will be in the order of 1000 times larger than the volume in 2011.

The realwireless study for Ofcom on "the future UK spectrum demand for terrestrial mobile broadband applications" also shows similar mobile data traffic orders of forecasted increase.

To meet such a requirement, the EC Radio Spectrum Policy Program (RSPP) addresses the target of a minimum of 1200MHz spectrum should be available by 2015.

The agreement has been achieved by the IMT industry at ITU-R WP5D:

- Frequencies below 1 GHz have favorable propagation characteristics that allow broadband wireless coverage to be provided over large areas with fewer cells compared to higher frequency band which reduces network infrastructure costs.
- Lower frequencies, particularly below 1 GHz, are used for the macro network and allow for reliable outdoor and indoor coverage as these frequency ranges also offer favorable building penetration of radio signals.

To provide a good coverage in the dense urban areas, the spectrum below 1GHz is a key spectrum. We note that in the dense urban area, the end user is able to access to several solutions to get a high throughput internet connection (Mobile access => LTE, UMTS; Nomadic or fixed access => WiFi, ADSL, Cable, fiber...). In rural area, the average

throughput is quite a bit lower, especially for the fixed access. In this case, an option to improve the throughput in rural areas is to use the spectrum below 1GHz.

Generally, the radio technologies are less expensive to deliver a good service or a service adapted to the new and future requests from the end user (Ultra-HD TV, 3D, Mobility ...) than the cable/fiber when it is necessary to make a new network.

- A dynamic use of the spectrum. The spectrum could be used by the linear TV, and, soon after, could be used by the non-linear TV service.
- The LTE broadcast technology is able to provide the same services as the DVB-T => advertising based and pay-per-view models can both be accommodated. Other innovative models can also be easily facilitated through the adoption of LTE eMBMS
- The border coordination is limited at around 10km (several 100km for the DVB-T with high towers)
- The SFN network (no guard band between carriers and between radio sites)
- A fixed or mobile service.

Regarding the efficient use of spectrum, we note that the LTE and DVB-T standards are based on the same air interface modulation and medium access scheme: OFDM.

Question 6: Should we place different weights on some costs and benefits than on others, for example depending on whether costs would be borne by consumers, DTT operators, or mobile operators?

Huawei believes that it could be beneficial if some different weights were given to some costs and benefits. For example, it is anticipated that future mobile network and handset costs will reduce, thereby reducing the cost of accessing mobile services for consumers. However the costs borne by consumers should be given a different weight. The costs for consumer equipment replacement could be extremely high especially in suburban and rural areas where the take up of cable and satellite has been low.

We think also that the administration could improve the new services to the end customers, e.g. the spectrum cost could include a variable to take into account the benefits of new services to the end customer.

Question 7: Do you have any other comments on the work we are currently undertaking on potential costs and benefits?

Huawei's preference would be for options that are harmonized with 3GPP Band 28 (APT 700MHz band plan). This would mean that a device designed according to the 3GPP Band 28 (lower duplexer) could potentially operate in UK and Europe, like in Asia, Africa, Latin America, Middle East (Middle East has already decided to implement the CEPT 800MHz band plan and the lower duplexer of the APT-700MHz band plan¹). To increase the mass market, it will be most widely supported by vendors if 55MHz duplex gap and -25dBm/8MHz OOB value could be respected during 700MHz spectrum assignment in UK. We can note that the protection level of the OOB has been studied in APT to protect the TV services. If UK decides a stronger OOB level, automatically, the UK will lose the mass market and the end user will lose the possibility of having low cost terminals. Those options that are harmonized with even a portion of 3GPP Band

¹ http://www.tra.gov.ae/news_UAE_TRA_ANNOUNCES_700_MHZ_BAND_PLAN_FOR_MOBILE_BROADBAND-514-1.php

28 (lower duplexer) could facilitate the simplified design of mobile equipment which could increase economies of scale and reduce cost to the users as well as reducing the deployment costs of the network itself.

Maximizing the economic benefits of the single European market needs coordination on a European scale. A topic on the use of the frequency band 694-790 MHz in Region 1 is under discussion in EU and ITU-R. Huawei supports ITU-R to consider the harmonization and compatibility with 3GPP Band 28 during WRC-15 AI1.2 study in Region 1. It will also facilitate the border coordination between Region 1 and Region 3 countries where APT 700 MHz band plan has been deployed if the Region 1 country would take the same allocation. Huawei is studying the possibility to increase of 3MHz the bandwidth of the lower duplexer. The first technical possibilities seem right. So, the definition of the lower duplexer and by consequence the band plan could be:

- Up link => 703MHz to 736MHz
- Down link => 758MHz to 791MHz

In this case, the bandwidth for commercial mobile networks will be of 2*33MHz.

There will be also the possibility to increase the bandwidth but this possibility will be specific. There are two options:

1. Add two blocs:
 - Up Link => 694-703MHz
 - Down Link => 753-758MHz
2. Add SDL (Supplementary Down Link):
 - Around 10/15 MHz in the duplexer

Question 8: Have we correctly identified the costs and benefits that could vary depending on the timing of release, and the impact of those factors? Are there other costs and benefits which would vary depending on the timing of release of the 700 MHz band which we should take into account?

We would expect the typical life of consumer electrics, for example TV receivers, to be around 7 years. However, the life of an aerial is much more than “several years” and these tend to be replaced only when problems occur.

It is essential to ensure that the timing of the release of UK spectrum bands for mobile broadband services and the release of spectrum bands elsewhere in Europe fall within a relatively short and synchronised window. This is necessary in order to generate a mass-market for mobile communications devices for the 700 MHz band in ITU Region 1.

Question 9: How quickly could the 700 MHz band be released? What would be the impact on DTT infrastructure costs of releasing at the earliest possible time compared to a later time? What would be the factors which affect these costs?

The Ofcom Strategy Statement (November 2012) infers that migration from the 700MHz band could start from 2018. There will be a necessity for complicated bilateral negotiations, however it is apparent that other European regulators would like to proceed more rapidly.

As mentioned in our response to Question 1, it is estimated that each year the UK economy benefits enormously (£30bn) from the use of mobile services. This upward trend in benefits is very unlikely to slow over the next few years so we would advocate 2018 as the preferred start date.

We note that the UK administration has already been studying and started the deployment of the DVB-T2. This new technology is able to provide the same TV service as the DVB-T standard, but, with less spectrum.

In addition, if the digital radio is not deployed in the TV VHF band, some new TV channels could be moved into this VHF spectrum.

Earlier the work starts on the re-pacification of the TV, the lower the costs will be.

Question 10: How, and to what extent, are the costs for existing (PMSE) and potential (WSD) interleaved users of the 700 MHz band likely to vary depending on the timing of release? What would be the factors which affect these costs?

Reforming the 470 MHz to 790 MHz band for SFN TV broadcast would be both spectrally and economically efficient. But there would be very little white space available for use by PMSE users or by TV White Space (TVWS) systems. It is very unlikely that the regulator would deliberately engineer the inefficient use of spectrum in order to create white space spectrum for these users. The PMSE industry lacks the capability to pay a commercial rate for spectrum in the 470 MHz to 790 MHz frequency range, which indicates that without a government subsidy, it would need to vacate this spectrum band over the longer term. The PMSE sector is hugely important to the UK and its use of spectrum is of great importance to creative content production. The industry's requirements would have to be taken into consideration when any plans to reform the band were being considered. If the 470 MHz to 790 MHz band was extensively reformed, alternative spectrum for PMSE users would need to be identified. CEPT is already working to identify new spectrum that could be harmonised at a regional or global level for use by PMSE applications.

Question 11: Should we consider any other cost-related arguments / evidence in favour of an earlier or later release date?

It is essential to ensure that the timing of the release of UK spectrum bands for mobile broadband services and the release of spectrum bands elsewhere in Europe fall within a relatively short and synchronised window.

As a release timing example, Germany is proposing to make the 700MHz band available for commercial mobile broadband services from 2017. A public consultation² by the German Regulator, BNetzA was started in June 2013 on this proposal.

Question 12: What would be the impact on mobile broadband delivery and competition of releasing the 700 MHz band later rather than sooner?

As mentioned in our response to Question 5, it is now commonly forecasted that the growth of mobile data traffic by 2020 will be on the order of 1000 times larger than the volume in 2011. The effect of releasing the 700 MHz band later rather than sooner will compound the data traffic pressures that are expected to have built up by that time.

The realwireless study for Ofcom on “the future UK spectrum demand for terrestrial mobile broadband applications” details UK spectrum estimates for the future. In a ‘worst case’ scenario and the high demand (for spectrum) estimates are correct then much more spectrum will be required by 2018 - 2020. This is another reason for releasing the 700 MHz band sooner rather than later.

Question 13: Should we consider any other benefit-related arguments / evidence in favour of an earlier or later release date?

The date (2018) proposed by the European Commission seems a good and balance compromise.

Question 14: Is the range of potential dates for release likely to be wide enough to merit consideration of an incentive auction approach?

We have concerns over the effectiveness of using either incentive or overlay auction approaches in the way that Ofcom documents.

An efficient auction requires that bidders are able to reliably value the spectrum for themselves – and this becomes much more difficult as the interval between the licence award and availability increases. For this band, a traditional process of clearance, with the award in parallel or following, would produce a better outcome for all parties.

So, a classic process seems more adapted than the process where the incumbent users sell her spectrum, because:

- If the future EU-700 band plan is FDD, the operators will be obliged to get 2 specific blocks (duplex of 55MHz), one for the UL and a second block for the DL,
- The future EU-700MHz band plan will be probably not aligned on the current TV band plan. So, in some cases, the operators will be obliged to get 2 TV blocks (adjacent blocks to merge the both blocks)

This process seems difficult and could create more difficulties than it will resolve.

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www.bundesnetzagentur.de/cln_1912/SharedDocs/Pressemitteilungen/DE/2013/130624_MobilesBreitband.html?nn=265778 and www.bundesnetzagentur.de/SharedDocs/Downloads/DE/Sachgebiete/Telekomm

(This response also covers Questions 15 to 19)

Question 15: If so, what are the challenges to designing an effective incentive auction in this case, and how might these challenges be addressed?

Question 16: If we followed an incentive auction approach, how should we take account of wider costs and benefits – i.e. those not felt by participants in the auction?

Question 17: Do you have any views at this stage as to the parameters of an incentive auction, such as the default date and payment mechanism?

Question 18: Is there a version of the overlay auction approach which could be suitable for 700 MHz release?

Question 19: What are the benefits and risks of conducting an overlay auction in this case?

Question 20: Have we correctly identified and characterised the potential impact of 700 MHz release on consumers accessing DTT? What other impact – if any – should be taken into account in order to identify pre-emptive measures to reduce this impact?

This work is ongoing in ITU-R (JTG 4567) groups and in CEPT.

Huawei would like to highlight that, if the EU-700MHz band plan is based on the APT-700 band plan, the adjacent band to the TV receiver will be used by the LTE terminal. In this case, the distance between the terminal and the TV antenna is quite large (minimum 10m for the worst case). And, the power of the terminal 700MHz is quite low compared to the BTS 800MHz. This scenario should be the base for the compatibility studies and the Monte Carlo method should be the reference of the scenarios. It's the more average and realistic approach.

The compatibility between TV receivers and BTS-LTE at 700MHz will be probably better for OOB interference than the BTS-LTE at 800MHz because there is a large bandwidth/guard band of spectrum between the both systems.

For the indoor case (LTE terminal in the home), it is another issue about EMC, because the antenna is outside and at the top of the roof.

Question 21: Do you have any comments on the pre-emptive measures relevant to DTT identified above? Are there other pre-emptive measures we should be considering?

Question 22: Have we identified the correct measures to support consumer adoption of DVB-T2?

The HD TV is a clear and good option to accelerate the DVB-T2 deployment. Maybe, the possibility to use new spectrum (e.g TV VHF band if the digital radio is not deployed) is also a new opportunity for broadcasters. This new opportunity opens 2 new advantages:

- Provide new TV channels
- Provide the TV service with less radio sites (because the VHF band has a better coverage than UHF band). So, the cost of the network could be decreased.

Question 23: What regard, if any, should we have to wider technical evolution of the DTT platform, such as HEVC?

Question 24: Have we correctly identified and characterised the potential impact of 700 MHz release on PMSE users? What other impact – if any – should be taken into account in order to identify pre-emptive measures to mitigate this impact?

Question 25: Do you have any comments on the pre-emptive measures identified above? Are there other pre-emptive measures we should be considering?

Question 26: Do you have suggestions for how we can assess the impact on PMSE users and equipment if 700 MHz is no longer available for PMSE use?
