Huawei Response
To the OFCOM Public Consultation
"Securing long term benefits from scarce spectrum resources"

Huawei welcomes the opportunity to share its views on the UHF IV and V frequency bands in the UK to support European regulators to meet the exploding demand for ubiquitous broadband connectivity in the forthcoming years.

In line with recent WRC-12 outcomes, Huawei believes that the future allocation of the 700MHz for Mobile services across Europe represents a great opportunity for the proper development of the mobile networks.

As for the remaining UHF spectrum below the future 700MHz band[1], Huawei recognizes that it may represent an interesting opportunity for opportunistic access to the available white spaces. Technical constraints which are related to the DTT spectrum utilization as well as to the need to ensure smooth coexistence will determine the most suitable type of technology and application.

Huawei believes that the frozen 500-600 MHz band could be used if necessary for the DTT and TVWS as long as it doesn't impact the timely availability and harmonisation of the 700 MHz for IMT.

Huawei is ready to timely deliver appropriate technologies for most efficient spectrum utilisation, and would like to contribute to the development of the required standards and clear European and national regulation targeting the widest possible harmonization also looking at any opportunistic uses that could further increase the spectrum efficiency.

Huawei greatly welcomes and supports OFCOM efforts on TVWS and 700 MHz and hopes that the following views could help in achieving quick and harmonised use of the spectrum throughout Europe and the whole Region 1.

[1] According to RESOLUTION COM5/10 (WRC 12) :"the lower edge of the allocation is subject to refinement at WRC 15, taking into account the ITU-R studies…. and the needs of countries in Region 1, in particular developing countries"

Future mobile broadband spectrum requirements

Question 1: Do you agree that meeting the future growth in demand for mobile broadband capacity will deliver significant benefits to citizens and consumers?

The recent traffic evolution has shown an increasing demand for new mobile broadband applications and the actual measured annual traffic has exceeded the forecasts carried out by the ITU-R and trade associations. The use of the video on an increasing number of diverse devices, the development of cloud computing, the need for capacity for new applications (e.g. emergency services, m-payments, smart grids, etc.) sustain a continuous demand for additional infrastructure and capacity for mobile broadband networks.

According to the Spectrum Value Partners study conducted at the beginning of 2008, as shown in the table hereafter, the allocation of an additional 100MHz to the Mobile radio communication service in a scenario with strong broadband demand leads to a remarkable NPV (Net Present Value).

Market Allocation	40 MHz	60 MHz	80 MHz	100 MHz	120 MHz	140 MHz	160 MHz	180 MHz	200 MHz
Scenario 1: 'Mobile makes headway'	167.1	176.9	180.6	183.6	185.7	186.9	187.5	188.1	188.4
Scenario 2: 'Mobile broadband takes off'	84.1	96.3	111.5	119.0	126.6	133.5	139.6	144.4	148.8
Scenario 3: 'Broadband is mobile'	70.0	96.6	144.4	159.8	174.3	190.3	205.9	220.3	232.2

Figure 1: Valuation of mobile UHF spectrum for Europe (€bn) (NPV)[2]

While various studies have consistently demonstrated that the development of the mobile broadband in new frequency bands brings significant contribution to the economies' GDP, the social benefits deriving by the utilization of mobile broadband services is evident and supported by European Commission Digital Agenda package.

[2] Getting the Most of the Digital Dividend - Allocating UHF spectrum to maximise the benefits for European society (March 2008)

Question 2: Do you agree that additional harmonised mobile broadband spectrum will play an important role in meeting the future growth in demand for mobile broadband capacity? What are your views on the overall quantity of harmonised spectrum that will be required to meet future demand? How does this compare with the expected increase in spectrum for mobile use discussed in this section?

As a consequence of the traffic growth, vendors like Huawei and operators are working to ensure that the mobile networks are updated as early as possible with the latest wireless network technologies (e.g. refarming of the available networks towards LTE and LTE-A) and topologies (i.e. rollout of small cells in heterogeneous networks). Technology evolution alone may not cope with the traffic increase; it needs to be complemented with availability of new frequency bands.

Huawei believes that the UK government decision to release 500 MHz of spectrum below 5 GHz in the upcoming years[3] is ambitious and appropriate, in line with other decisions taken by several other administrations worldwide.

The experience has shown the benefits that the availability of harmonised spectrum with deriving economies of scale may bring to the European society.

Huawei believes that the UK government decision to release 500 MHz of spectrum below 5 GHz in the upcoming years is ambitious but fundamental and that these efforts will fully match the need for harmonised bands which is the basis for the required economies of scale.

Question 3: Do you agree that additional harmonised spectrum provided by the 700 MHz band could play an important role in meeting the future growth in mobile broadband capacity?

The recent European digital dividend auctions have shown the interest from mobile broadband operators for lower frequencies which are particularly relevant for rural coverage and deep in-building penetration.

The 700 MHz band is key to ensure cost efficient rollouts in line with the European Commission Digital Agenda objectives: "Coordinate the technical and regulatory conditions applying to spectrum use and, where necessary, harmonise spectrum bands so that consumers would be able to use the same electronic devises across the EU" leading to the RSPP actions[4].

The 700MHz band will rely on smoother rollouts due to its contiguity to the 800MHz and 900MHz bands: existing LTE-800 and UMTS-900 sites will be reused and optimized technical solutions will be designed to ensure maximum synergies between the rollouts in these three nearly contiguous bands.

[3] "Britain's Superfast Broadband Future" from December 2010.
[4] http://ec.europa.eu/information_society/policy/ecomm/radio_spectrum/eu_policy/index_en.htm

The spectrum opportunities in the lower frequency bands are quite rare and the 700 MHz band represents the unique opportunity for the upcoming years. The 700 MHz band will not only bring additional capacity and additional coverage for the broadband services but it will also facilitate international exchanges being a frequency band plan that could potentially be used worldwide. It is already anticipated that this band will be quickly released and used in America, Asia and Africa facilitating the rise of economies of scale for the European customers.

Huawei strongly encourages preliminary work and rapid decisions at the European level to enable the European citizens to benefit from a nearly worldwide harmonisation of this frequency band. The European frequency arrangement:

- should as much as possible be aligned with decisions taken in other areas to drive the price of the equipments down, to increase the social and economical benefits for the Europeans
- is required to facilitate cross Border coordination within Europe and with neighbouring countries which are part of the GE-06 Agreement for example
- is required for the protection of the DTT and other incumbent users

In line with WRC-12 decisions for Region 1 and considering that this band is already allocated to Mobile and has been identified for IMT systems in other Regions, Huawei is of the view that the 700MHz band could be harmonised by re-using the band plan defined in APT or by defining a new band plan compatible with band plan defined in APT taking into account the administrations and operators constraints.

The 700 MHz band represents a unique opportunity being a low frequency band with the potential to become a widely harmonized band across the globe.

Question 4: Do you agree that the value of the role played by the 700 MHz band in meeting the future growth in mobile broadband capacity would be greater if it becomes available before other capacity enhancing techniques have been exhausted at existing mobile sites?

In spectrum requirement evaluations, it is commonly accepted that the best technology is used in the different frequency bands and that the refarming in different frequency band, from GSM/UMTS to LTE and LTE-A, could be authorised as quickly as possible. In other words a new frequency band will be used with the latest and most efficient technologies. Additional frequency bands are then always necessary even though the Regulator authorises the appropriate refarming as it is the case for the 900 and the 1800 MHz bands, mobile networks are regularly upgraded using the most efficient technologies.

Knowledge about timing of the availabilities of the new frequency bands facilitates the decisions on the refarming of different frequency bands, then facilitating the adoption of the latest most efficient technologies.

Question 5: What timing of 700MHz release would maximise the benefits associated with its use for mobile broadband?

As it has been shown in a study from Spectrum Value Partners prior WRC-07[5] for the digital dividend in the 800 MHz band for the deployment of mobile broadband, a 4-year delay would have led to a €20bn cost for the European economy. As it was the case for the 800 MHz, in the absence of the 700 MHz frequencies operators would need to cope with the traffic demands using other higher frequencies leading to denser and more expensive rollouts.

Moreover, standardisation of equipment compliant with the APT frequency arrangement is nearly finalised (to be approved in 3GPP plenary in June 2012) and products are already planned in other regions. Europe has the opportunity to quickly exploit this early availability of equipment deriving from the work in other Regions.

The European Administrations have the opportunity to make the 700 MHz available right after the decision of the Mobile allocation and IMT identification during the WRC-15. This would lead to a reasonable timing to maximise the benefits from this new band with the right balance between rapid availability and sufficient harmonisation.

Future DTT spectrum requirements

Question 6: Do you agree that DTT will continue to play an important role in providing universal low cost access to PSB content over at least the next decade?

Huawei recognises that the low cost DTT platform continues to play an important role to deliver free content television but Huawei strongly encourages the industry and OFCOM to consider all the delivery of television content across rapidly expanding alternative delivery means (e.g. ADSL, cable, satellite…) on more and more diverse devices or screens (tablets, connected televisions, smart phones…). TV content distribution over tablets is already revolutionising the content creation and consumption.

As mentioned in the present consultation the cable and/or satellite technologies have become the common mean to serve the main TV screens in UK homes TV receivers since the beginning of 2010. Moreover these alternative platforms also allow more flexible access to content for the end users; this is confirmed by the success of the BBC iPlayer for example.

[5] Assessing the impact of an early decision on digital dividend spectrum allocation (16th October 2007)

Question 7: Do you agree that, absent major changes in available spectrum, DTT would continue to remain attractive to viewers and deliver important benefits to citizens and consumers over at least the next decade?

The 65 millions DTT TV receivers which have been sold up to 2011 do not represent the actual number of active DTT receivers as a significant portion of the TV sets are already receiving content from alternative TV platforms other than DVB-T. The OFCOM figures in section 4.8 tend to show that the situation is much more diverse: more and more alternative popular ways to receive TV contents as recognised in the section 4.30 and these alternative ways are growing as they are more suitable to watch modern non-linear television on TV sets, laptops and popular tablets.

Question 8: What are your views on the future technical evolution of the DTT platform? Are there other relevant factors affecting future DTT spectrum requirements that we should consider as we develop an approach to secure benefits from UHF band IV and V over the long term?

In some EU countries, the HD/3D TV content is already largely available on ADSL, fibre or satellite. Moreover, TV channels will be broadcasted through the free-to-air DTT platform using the current DVB-T technology and more spectrum efficient SFN DVB-T2. The introduction of the DVB-T2 in parallel with the other television platforms will undoubtedly lead to another switch-over to accommodate all TV channels in HD and will temporarily reduce the spectrum resources available for UHF services. If the DVB-T2 can accommodate all the future broadcasting demand, the simulcast period should be as short as possible to authorise new identification of 700 MHz for IMT and new applications in interleaved spectrum below 700 MHz.

It is particularly important that changes are anticipated as much as possible especially when they are simultaneously impacting planned applications in the same frequency band like DTT and in TVWS interleaved spectrum. Most of the TVWS availabilities were assessed in DVB-T only environment without any simulcast period. Some objectives in terms of number of TV channels, quality, coverage and timing for DTT services as well as minimal spectrum efficiency need to be clarified as soon as possible. There is a clear need to provide the industry with clear indications on the priorities and requirements between the different services and applications that could target the UHF spectrum (DVB-T2, TV WSDs and of course LTE in the 700 MHz).

Question 9: Do you agree that a longer term approach to secure benefits from UHF band IV and V should consider how to safeguard benefits delivered by the DTT platform?

Huawei also believes that the long term different uses of the television should be adapted to the new demands (including non-linear, HD/3D, interactive television programmes) on all the available delivery platforms (including satellite, ADSL, Fibre etc.) not necessarily in the UHF IV & V bands.

The needs of the DTT platforms should surely be supported in the upcoming decade. It is now key to quantify such requirements while taking into account the end user decreasing interest towards traditional TV services across the UHF bands and the parallel take up of alternative end user devices and distribution means (cable, satellite, xDSL, FTTx).

Other uses of UHF bands IV and V

Question 10: Are there other material factors affecting the future requirements of PMSE that we should consider as we develop an approach to secure long term benefits from UHF band IV and V?

There are demands in alternative bands for the PMSE outside the UHF band. The work of the CEPT PT FM51 should be taken into account. The difference between commercial and non commercial PMSE usage in the UHF band should also be considered. It should also be considered that PMSE does not require an allocation according to the demand in the UHF interleaved spectrum for example.

Question 11: Are there other material factors affecting the future requirements of Local TV that we should consider as we develop an approach to secure long term benefits from UHF band IV and V?

The local television requirements could be part of the overall National Television requirements, there seems to be no need to consider the local needs separately from the overall broadcasting needs. However, denser networks are required to efficiently re-use the same frequency as much as possible leading to DTT SFN Networks.

Question 12: Are there other material factors affecting the future requirements of WSD applications that we should consider as we develop an approach to secure long term benefits from UHF band IV and V?

Huawei looks with interest at the work that Ofcom is carrying out and promoting in order to ensure the timely operation of WSD in the UHF band.

Within the ongoing evaluation of the opportunities for the LTE-TDD technology in the TVWS, Huawei has assessed the availabilities of the TVWS channels in several countries and in the UK in particular showing significantly fewer available TVWS channels in Europe than in USA for example. Huawei strongly recommends that the spectrum requirements of candidate applications and for the DTT in particular should be defined as soon as possible. The clarity of requirements and pragmatic decisions enable vendors and industry stakeholders to understand if and how all 700 MHz, DTT, PMSE and TV WSD requirements can be accommodated in UHF IV & V bands. Whether interleaved TV UHF spectrum is used to complement broadband coverage or for indoor offload of mobile networks traffic, there may be ways to exploit the TVWSs in the frequency range below the future 700MHz band.

Huawei has conducted several studies on the availabilities of the TVWS for different kinds of applications until the 700 MHz can be released for mobile broadband applications. These studies clearly show fewer TVWS availabilities in Europe than in some areas outside Europe.

Question 13: Aside from WSDs, are there other innovative ways in which to use UHF bands IV and V to deliver services and, therefore, material benefits to users

Question 14: Are there other material factors affecting the future requirements of emergency services applications that we should be aware of as we develop an approach to secure long term benefits from UHF band IV and V?

The 700 MHz band for IMT usage would also benefit to possible PPDR users. However, as it is already the case in some of the mobile operators licenses, specific regulatory conditions could be agreed among the regulator, the operators and the PPDR entities to efficiently share broadband capacity when and where needed.

In addition, 450 MHz bands could also be considered for a harmonisation for the broadband PPDR in the context of the WRC-15 AI#1.3.

Securing long term benefits for citizens and consumers

Question 15: Do you agree that the approach that is most likely to secure significant benefits from UHF band IV and V over the long term is one that enables the release of the 700 MHz band for mobile broadband whilst also ensuring the role of the DTT platform is safeguarded?

Huawei certainly agrees with the expected social and economic benefits when releasing the 700 MHz band for the mobile broadband and is very active in the standardisation of LTE equipment for this band in 3GPP. Options 2 and 3 can certainly be considered at the European level depending on the specific national DTT situations and on the evolutions of the television content consumption (e.g. non linear televisions, tablets, etc…). Some countries are not using the DTT as main TV platform whilst other countries will rely on DTT as for the longer term.

At this stage we can anticipate that this choice is made voluntarily based on country's TV requirements and borders coordination constraints as already implemented with the successful release of the 800 MHz band.

The main important point is an early start of the negotiations among different countries including the African countries for a coordinated or harmonised plan to release this prime spectrum for the mobile broadband communications including the complex border coordination aspects.

Huawei encourages early borders coordination among European administrations and neighbouring administrations outside Europe possibly before WRC-15

Question 16: Do you believe there is a material risk that the DTT platform will have insufficient spectrum to continue to deliver important benefits (including providing universal low cost access to PSB content) if the 600MHz band is not used for DTT when the after clearance of the 700 MHz band?

There is no doubt that the continuity of the DTT service should be maintained and that end users should have access to this free universal content utilizing the distribution platforms and devices of their choice.

Question 17: Do you believe that using the 600 MHz band for DTT after clearing the 700 MHz band would reduce the risk that the DTT platform will not be able to continue to provide important citizen and consumer benefits?

In Huawei's view, the ease of access to television content is more important than the delivery platform in a specific frequency band. However, the use of the 600 MHz for DTT in the UK when releasing 700 MHz across Europe can help in maintaining the DTT service and will be driven by the borders coordination.

Question 18: Do you agree that the future benefits for citizens and consumers of enabling the release of the 700 MHz band whilst maintaining the role of DTT are likely to outweigh the loss in benefits of the 600 MHz band not being able to be used for other services in the long term?

Huawei agrees.

Question 19: Have we identified correctly the possible short-term uses of the 600 MHz spectrum? Are there other short-term uses we should consider?

No other uses envisaged.

Question 20: Which option(s) for releasing 600 MHz in the short term would maximise its value whilst supporting our proposed longer term objectives?

During the transition period required to migrate services from 700 to 600 MHz band, the 600MHz band could also be used for TVWS applications. This is likely to require appropriate regulatory conditions for the database operation to ensure that this temporary situation would not delay any DTT reshuffling and the release of 700 MHz for IMT systems.

The wider impacts of changing the use of the 700MHz band

Question 21: Do you agree that the wider impacts of a future change of use of the 700MHz band could be managed to prevent them having a detrimental impact on consumers and the services operating in this band? Proposed approach for securing future benefits and next steps

Question 22: Do you agree that the approach set out in this consultation is likely to secure significant benefits for citizens and consumers over the long term?

Releasing the 700 MHz for IMT mobile communications would indeed maximise the benefits of mobile communications while reshuffling the 600 MHz for DTT and eventually enabling some alternative services in TVWS during the transition period.

In Huawei's view, considering the European mobile broadband demands as well as the standardisation, development cycles and the national authorisations processes, we strongly encourage the DTT and TVWS devices spectrum requirements to be finalised as early as possible.

Question 23: Have we correctly identified the main areas of future work that could follow this consultation process subject to its outcome?

Huawei believes that the context of the consultation covers sufficient areas and topics in this domain. We envisage a growing momentum behind the re-farming and re-using of the 700 MHz band and we hope that this consultation will pave the way for early release of 700 MHz band for IMT Services.

In our view the licensing conditions for services using TVWS for example before the release of the 700 MHz must be carefully taken into account to prevent any possible delay in the re-shuffling and re-farming of this 700 MHz band, when Europe release this band.