Ofcom 1452-1492MHz Consultation – Westica Response

Variation of the Spectrum Access Licence for 1452-1492MHz and changes for fixed link use in the paired bands 1350-1375 MHz and 1492-1517 MHz

Consultation Questions

Question 1: Do you agree with: a) the technical analysis prepared by Qualcomm?

Westica does not agree with various parts of the technical analysis prepared by Qualcomm. In general terms the analysis has been completed allowing least restrictive technical conditions on the 1452-1492 license variation terms and most if not all changes being made to the existing licensed 1350-1375/1492-1517 point to point band.

Westica has objections to the following parts of the Qualcomm response:

- There is no consideration to the of the effect of the SDL base station OOB transmissions below 1452 in respect of interference to fixed link receivers operating from 1350 to 1375MHz. This has the potential to impact the upper channels of the lower half of fixed link band given that the receiver selectivity response is relatively flat away from the channel, whilst the SDL OOB EIRP limit is set to -20dB outside the band. This needs due consideration by Ofcom.
- Under section 5.2.1 intermodulation products are mentioned but then not considered further. Westica has significant practical experience of this type of issue on site with high power out of band transmitters in the same locality, with the high power transmitter mixing with licensed 1.4G links and then affecting other 1.4G links receivers, with the mixed signal being transmitted by the 1.4G antenna to the remote sites, and received locally. A field trial and measurement of real links in the presence of base stations is needed to evaluate this area, which will based on real life practical experience will be a significant problem. The SDL band will present more severe issues than current out of band transmitters as there is no out of band frequency rejection from the fixed link antenna. Westica believes the mixing takes place in the feed of the antenna, and this would then present to the local and remote receivers an unwanted co channel interference signal. No amount of filtering can stop this.
- The assumption in section 5.2.1.2 that generic preselect filters are designed to cope with T-DAB transmissions is invalid. Preselect filters are designed to meet the relevant ETSI specification which was 300-360 and is now 302-217. These refer on to ETSI 301-390 which sets a simple +30dB limit at the antenna port for the receiver immunity in section 7. In practice the on board preselect filters are better than that. Qualcomm have made no effort to understand what the characteristics of the pre-select filters used within the actual field-deployed and technically compliant radios used in the UK. In particular there is no mention of the Duplexor use in the existing products under section 5.2.1. The Duplexor use is mentioned later in section 16 and is discussed below.
- The assumption that various filters could be used to cover groups of channels does not take into account that products designed for the 1.4G band are supplied able to cover the whole band leading to easy stock and spares holding – this is a significant feature to most users, and alterations of spares holding has a cost burden on users. This is ignored throughout the study.
- The assumption in section 8 that the band from 1492 to 1498.5 is efficiently used in terms of being fully utilised is simply not true. Westica are currently rolling out a large network of radios for an electricity company and are still being allocated 2MHz channels 1, 2 and 3 which are in 1492 to 1498.5MHz. The latest one of these (1018668/2) was assigned to

channel one on 3rd December 2014. Removing the use of these channels will limit future fixed link assignments.

Section 8.1.2 states "It is proposed to adopt an approach based on site clearance where the FL user will be required to check that there is no BS within a certain coexistence distance in the main beam of the FL Rx when installing a new FL. This is consistent with the current FL deployment approach where FL users check LOS / Fresnel zone clearance when installing a new FL."
 This statement is wrong, as fixed link planning undertaken by users currently only looks at the boresight of the radio link, and makes no attempt to look at what is in the wider fixed link antenna beam pattern. To allow fixed link operators to do this they will peed to invest in

link antenna beam pattern. To allow fixed link operators to do this they will need to invest in new planning tools that give some antenna coverage capability, and be provided with accurate up to date location information for current and future SDL base stations. The Qualcomm study is silent on how this is to be managed and achieved. Currently the interference analysis for fixed links is done by OFCOM on a coordinated basis and the analysis of what gets into the fixed link antenna and receiver from other sources is done by OFCOM.

- The removal from use of the bottom 25% of the fixed link channels to allow Qualcomm to use two 20MHz channels seems to be suggested as the least restrictive for the license variation. It would be much fairer to only lose a small amount from the fixed links band and put some of the required guard band into the 1452-1492 band. A convenient split is to take 1MHz from the fixed links band and 5MHz from the SDL band, which still allows one 20MHz channel and three 5MHz channels to be used, and reserves the top 5MHz SDL channel as the guard band.
- Section 8.3.1.3 again completely fails to consider the effect of the base station on fixed link receivers operating in receive low on the 1350 to 1375MHz part of the fixed link band. These will likely also require additional base station filtering below the base station frequency and improved receiver selectivity.
- The conclusion that future fixed links must simply avoid by line of sight any base station does not explore what effect that will have on the ability to plan and provision future fixed links. For example, a base station placed on high ground at the entrance to a valley has the ability to stop any future 1.4GHz fixed links being used into and out of that valley area. This is likely to cause some issues for the primary users of the band which are security services for remote tetra backhaul, and power companies for power protection switching. The implementation of this license variation, with no coordinated control of where the SDL base stations are placed could lead to areas of the UK being denied any future1.4G fixed link access.
- The MCL Analysis conclusion that existing links can be protected by in critical cases adding additional receiver filtering fails to take into account that the 1dB receiver insertion loss will result in the link license needing to be updated to increase the EIRP from the far end. This process will involve OFCOM and is not guaranteed to result in an EIRP increase, and if the fixed link transmitter is already at maximum power the EIRP increase cannot be realised. No consideration at all is made of the need to pass the transmit frequency of the radio concerned which will be in the 1350 to 1375 band. All radios currently installed pass the transmit and receive frequencies on the same antenna port.
- Section 16 on implementing improved receiver filters for existing fixed links provides some examples, and mentions the need to pass the corresponding transmit frequency but does not present any details on how this might be done. The reality is that all fixed links currently installed will require a duplexor style external filter that passes both the high and low fixed link frequencies, as there is no access to the receiver only RF on the radios. Again no investigation or enquiries have been made about the actual radios being used currently, most of which have been supplied by Westica. The assumption that suitable filters can be

easily fitted on site is not valid. Any additional insertion loss will result in the link license needing updated and this fact is overlooked.

In section 17 suggestions for future fixed link additional filtering are made. The assumption seems to be that the additional filtering is simply added by the fixed link manufacturer. This does not take into account NRE costs, or testing and qualification costs for what will be a new product that is no longer simply an ETSI compatible radio. Current Westica products support the whole band with one transmit high radio and one transmit low radio. There is no attempt to address how this might be achieved with the new filtering requirements, and the cost and technical implications of doing so. Again this represents a failure to properly understand and evaluate the existing fixed link products. The expected physical size of the new duplexor means that such components are unlikely to be contained in the existing space envelope of current products resulting in a complete product redesign. Any solution that has different filters for different parts of the band produces a real cost and logistics issue in terms of product spares and support holdings for fixed link operators.

In summary we believe that there are several issues not adequately addressed within the proposal and that a field trial is needed to assess the real performance of the 1.4G fixed links in the presence of the SDL base station. Further investigation into suitable dual bandpass or duplexor filters that can be produced and installed is needed, as well as how practical and achievable it is to have future fixed links implement better filtering with minimal cost penalties.

Moving onto to the OFCOM assessment of the Qualcomm study.

Question 1: Do you agree with:

b) our assessment of the Qualcomm study and our resulting conclusions? Westica do not agree with OFCOMs assessment.

- The OFCOM assessment of the Qualcomm study does not investigate or consider any of the factors mentioned above, and seems not to reference the fact that adding insertion loss to existing links with improved filtering will require the link license to be reassessed to ensure that the relevant availability and interference margins are maintained.
- Qualcomm clearly have a potentially significant commercial interest in this whole matter, and their study and the subsequent OFCOM assessment seems to lean strongly towards the Qualcomm case. Ofcom's position within the document does not come across as a neutral position, and an independent study commissioned by OFCOM paid for by Qualcomm would have been a better approach.
- The consultation document states the following:

1.19 In light of the proposed licence variation, we intend to issue guidance to applicants for new fixed links. The guidance will make clear that fixed link licence applicants will need to ensure that they have taken appropriate action such that their intended fixed link path would be clear of SDL base stations. In practice, the fixed link operator will need to ensure that there is a clear path between the two ends of the link, as is consistent with standard line of sight link planning practice. The nature of the out-of-band limits on SDL means that this approach will be feasible, thereby avoiding the need for more complex coordination procedures involving access to SDL base station deployment data.

We believe that this represents a significant simplification of this issue. Antennas at 1.4GHz can have beamwidths up to 40° degrees wide, with 25° representing a typical deployment. Given these antenna beamwidths, it is entirely possible for users to check and obtain a positive result on a clear line of sight, but still have an SDL base station within the antenna aperture.

 In respect of ongoing use of both bands, we believe that a coordinated approach managed by OFCOM would be far more suitable and would allow some protection for fixed link operators. Section 3.3 of OFCOMs assessment is completely silent on how fixed link planners are to get details of SDL base station locations, which is needed to allow them to plan their links to avoid the base stations. This in itself is some form of coordination showing that a simple uncoordinated approach cannot work.

Additional Comments

a. The document states:

1.1.3 We are proposing to include a condition in the licence that requires the 1452-1492 MHz licensee to ensure that it does not cause undue interference in the adjacent fixed link band. The 1452-1492 MHz licensee would therefore be required to meet the costs of any additional measures to protect legacy fixed links (fixed links assignments in the 1492-1517 MHz band on or before the date of the licence variation) from interference (both in band and out of band) due to SDL use (e.g. use antenna down-tilt or pay for suitable filtering on the fixed link). To enable the 1452-1492 MHz licensee to comply with such obligations, we intend to make relevant information on existing fixed links available to it.

Of com make reference to use of filtering for protection on the fixed link. This raises the following issues:

- It is not made clear if Ofcom will support the necessary licence changes in order to support the additional insertion losses, and the costs of such an exercise seem to have been glossed over.
- The fixed link radio devices deployed at 1.4 are duplex systems, typically employing internal duplexers within a calibrated system.
 It is our belief that the only way to provide filters as proposed by Ofcom, on an already installed link, is install the filter after the single output port (antenna port). This inevitably leads to losses in both the transmit and the receive directions.
- This in turn means that Ofcom will have to re-licence the affected links with an increased EIRP to overcome the additional receiver losses.
- Additionally, there is no guarantee that all 'relicensed' links will have appropriate headroom to allow new EIRP levels to be reached by increasing the radio transmit output power, and therefore some users will face the consequence of changing antennas, with ensuing capital and installation costs together with potentially increased third-party costs for site rentals.
- The document seems to make the assumption that the only costs to an existing is the additional costs of filters, and does not reference any additional operational costs such as site visits for installation and re-commissioning, operational costs to the organisation of required outages, and necessary provision of alternatives in the event a link cannot be relicensed without major impact e.g. larger antennas.

b. Of com make reference to the intention to make all relevant information available to the SDL operator for all existing fixed links and would make the following comment.

• We are aware that certain operators, with duties and of national importance and corresponding national critical infrastructure, with existing 1.4GHz fixed links have requested of Ofcom that their information not be granted to third-parties. We believe Ofcom should already be aware of this issue, but we would be happy to facilitate direct contact with this organisation and Ofcom if necessary.

c. The consultation document states the following:

1.20 Any technical variations to existing links would be treated as new fixed link assignments for these purposes.

If all technical variation requests are treated as new links, this implies a potential situation whereby an operator chooses to deploy and SDL base station and offers to supply filters to the existing 1.4GHz fixed links user. In order to implement such filters, the existing licensee then needs to apply for a technical variation which is now treated as a new link assignment, thereby relieving the SDL operator of any obligations. This needs to be clarified accordingly.

d. We believe the document recognises that there is continued potential demand for 1.4GHz fixed links, but that there are some material flaws within the information presented regarding future demand for 1.4GHz fixed links as follows:

• The document states the following in paragraph 4.28.

4.28 One development that may have the opposite effect (tending to reduce demand for fixed links in the band) is that the use of fixed links in the 1.4 GHz band for emergency services will cease if the provision of emergency services communications migrates away from the current TETRA network to an LTE-based solution. The Home Office has just launched a competitive tender for contracts for the provision of new emergency service communications.

We do not believe that the loss of a TETRA network can be directly related to relinquishing of 1.4GHz links. We are aware of situations where the incumbent TETRA operator has sought to make use of the fixed links network which was deployed primarily for TETRA for additional purposes. We can envisage circumstances where the incumbent TETRA network operator would retain their radio transmission network as a commercial asset for the purposes of selling capacity to third-party applications.

We further envisage that the current TETRA operator will be one of the bidding parties for the aforementioned project, and would have uses for their existing transmission infrastructure in the event that they were successful.

Additionally, we are aware that at least one of the alternative bidders for this emergency services project is considering use of 1.4GHz links within their bid.

- We believe Ofcom fail to address a key issue in respect of immediate future demand for any new links within their proposed approach. It is suggested that as soon as a technical variation is granted, there would be an immediate requirement for any new fixed links to meet additional receiver selectivity performance. We believe the full consequences of this have not been considered by Ofcom, or have been glossed over by Ofcom. We consider the following points pertinent.
 - The products available on the market today have been designed against international standards, in line with ETS specifications ETS 302 217. The receivers are typically designed against these specifications in order to be applicable to an international marketplace.
 - The Qualcomm report seems to imply that the continued use of fixed links is as simple as addition of a filter or range of filters to existing products. We believe that the process is more complex than this.
 - Any such filters need to be designed, and tested, and Ofcom seem to have neglected to consider any non-recurring engineering costs within their dialogue on Opportunity Costs. Availability of any such filter(s) has an associated time to market, and the need for somebody to bear the costs of any such development.
 - As these filters ideally need ideally to operate on the receive side only of a duplex technology, this solution then imposes a re-design burden upon the manufacturers who would need to ensure that additional filtering is deployed within their systems in an integrated basis to present a fully calibrated solution.
 - Immediate imposition of additional receiver selectivity specifications has the potential to make all existing products on the market obsolete until such time as

they are re-designed or superseded to meet these 'non-standard' receiver selectivity characteristics. This presents the likelihood of leaving the users and potential users of 1.4GHz fixed links with little or no choice of product solutions immediately following such a technical variation which would seem to fail to meet the objective of protecting the ongoing use of the 1.4GHz band.