

Representing the Communication Services Industry



**A Contribution towards the Impending
Ofcom Strategic 5-Year Plan for Spectrum**

Professional Radio Communications (Business Radio)

FCS – August 2012

Contact for response:

Chris Pateman, CEO, FCS

Federation of Communication Services Ltd
Burnhill Business Centre,
Provident House,
Burrell Row,
Beckenham, Kent
BR3 1AT
Tel: 020 8249 6363
E-mail: fcs@fcs.org.uk
Web: www.fcs.org.uk

Executive Summary

The FCS is pleased to provide an early contribution to the Ofcom Strategic Plan for Spectrum. This contribution focusses on the strategic issues that most directly affect the membership of the FCS.

The next 5 years is likely to be a transformational period for the professional radio industry. Many changes that have been recently introduced are starting to take effect; more changes are in progress which are also expected to change the way the industry does business in fundamental ways.

The rise of the influence of the European Union in spectrum matters will continue. This may force re-consideration of some policy principles to ensure proper alignment with the EU approaches. This is especially important in areas such as spectrum policy including considerations of social benefits rather than just narrow economic considerations. A similar impact may result from the current Communications Review.

The use of professional-grade radio communications is growing quickly in the UK. The customers are now showing greater awareness of a need for a higher quality of service and so are becoming much more demanding than before.

This demand is supporting an annual 20%+ growth in unit sales which it is believed will be sustained (or exceeded) for the entire period of the Strategic Plan. This represents at least a doubling of the workload placed on Ofcom compared to today by the end of the period.

Because professional radio communications are now able to support high-value applications, it is expected that the amount of over-the-air traffic generated by customers will also similarly rise. Thus the growth will be in both units and traffic. It is therefore expected that some bands will move towards saturation within the period of the Strategic Plan.

Efforts are underway to develop opportunities to use the currently under-utilised bands. These are based on specific technology variants being applied to specific purposes where the disadvantages of these bands are less manifest. It will be known if these are successful by the end of the period of the Strategic Plan.

Analogue technology (in particular MPT1327) remains a strong market force. This is expected to continue in to the long term. MPT1327 is hosted in Band III where there is little chance of other schemes being deployed. This may mean that some Band III spectrum may remain unused simply because there is only a limited portfolio of equipment available. As a consequence, there is good reason to re-consider classification of that band to low use.

The rise in high-value, high-occupancy services together with very modern technology, spectrally efficient trunking schemes such as Tier III DMR implies a spectrum management focus on mechanisms whereby more dedicated spectrum can be developed within the existing spectrum bands.

However, the need for ever-richer content is driving the industry towards considering wideband and broadband systems. There is no serious debate whether these are needed in the professional arena; the question is simply how much they are needed.

There is little chance seen of deploying wideband and broadband systems within the existing allocations and so further allocations will have to be sought. The current choice of band is severely limited due to the lack of equipment in bands other than the 700MHz band. Therefore consideration of assignments within the 700MHz band is proposed.

This contribution makes 14 top-level key points. Each key point has a significant amount of supporting detail that is expanded upon within this contribution. The key points are listed below.

The FCS looks forward to working with Ofcom to realise the changes necessary to underpin the continued contribution that professional radio communications makes to the UK.

Key Points Made in this Contribution

Point 1	There is evidence of a growing demand for higher quality radio communications services within the customer base.	5
Point 2	The FCS believes that within the period of the Strategic Plan, UK spectrum management principles will have to be aligned with the Radio Spectrum Policy Programme and consider important social values as well as narrow economic considerations.	7
Point 3	Ofcom work-load arising from new BR digital technology licences will at least double over next 5 years.	8
Point 4	The use of analogue technology will continue throughout the period of the Strategic Plan.	9
Point 5	The channels are not only becoming more scarce; the occupancy of the channels is expected to rise significantly.	10
Point 6	More dedicated spectrum will be required in the future.	11
Point 7	A centralised administration of Digital codes will be needed within the period of the strategic review.	11
Point 8	Ofcom will need to collect more management information within the period of the Strategic Plan. The implications of “Technology Neutrality” will have to be reconsidered.	12
Point 9	In order to maximize the utilisation of the band, future assignments should be organized to have compatible technologies located together.	13
Point 10	As the utilisation of the band increases, alignment between the licenced service area and the service area in use by the customer will be increasingly important. Users need to be aware of the licensed service area.	14
Point 11	Wideband and Broadband professional radio communications schemes will continue to grow in importance to customers. The extent of this growth is not known.	15
Point 12	The 700MHz band represents an excellent choice for high data rate professional communications.	16
Point 13	Industry is aware that there are several possible roles to be undertaken in future under a regime of co-regulation.	17
Point 14	The FCS is not convinced that it would be prudent to return all the radio spectrum to the common pool after the 2012 Olympics.	17

Contents

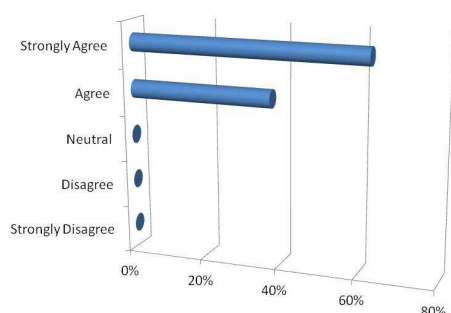
Executive Summary	2
Key Points Made in this Contribution	3
Introduction	5
THE IMPACT ON BR OF THE RSPP	6
5-YEAR PERSPECTIVE	7
Digital Technology	7
Analogue Technology.....	8
Over the Air Traffic (OTAT) Volumes	9
Dedicated Spectrum Demand Increase	10
High-Resilience Systems.....	10
The Administration of Numbers	11
Technology & Service Neutrality	11
Sub-Banding	12
Service Areas & Licence Information	13
Wideband & Broadband	14
Suitable bands for WB, BB & High-Resilience Professional Radio Communication	15
Co-regulation.....	16
Spectrum Returned from the Olympics	17
CONCLUSIONS.....	18
APPENDIX 1 – <i>Radio Spectrum under the 2003 Communications Act</i>	19

Introduction

The FCS is pleased to provide an early contribution to the Ofcom Strategic Plan for Spectrum. This contribution focusses on the strategic issues that most directly affect the membership of the FCS.

The next 5 years is likely to be a transformational period for the professional radio industry. Many changes that have been recently introduced are starting to take effect; more changes are in progress which are also expected to change the way the industry does business in fundamental ways.

Customers Becoming more demanding of Higher Quality Communications



However, the biggest impact arises from the customers themselves. The FCS membership reported in a recent survey that customers are becoming far more demanding of higher-quality communications. In this context “higher quality” is thought to have been judged in reference to public communications. So the message is that customers are now demanding something better than they can get from public systems for the professional applications. The FCS believes that the unique selling package of high-resilience, targeted features and operational capability is proving a winning mix.

This is a very strong message to the radiocommunications industry as a whole. It is confirmed by the fact that the professional radio communications sector, represented by the various forms of business radio, is experiencing strong growth overall.

Considering the importance of the services provided by BR to the country, this becomes a very important factor that should be included in the Ofcom 5-year Strategic Plan. This contribution is underpinned by the consequences of this customer demand on growth and pressure on spectrum resources.

Point 1 There is evidence of a growing demand for higher quality radio communications services within the customer base.

It is already very clear that there is not enough spectrum to support all the desired services in any area of the spectrum and in any sector. Over the period of interest for the 5-year Plan, this situation is widely expected to become significantly worse.

The physics of radio spectrum is such that different radio bands have characteristics that make some bands suitable for certain applications while other applications are more efficiently carried on different bands. There are some bands that because of their physical characteristics have very limited use at present. The FCS expects to see a drive to bring further bands into use over the next 5-years.

The next five years is likely to see the following strategic changes:

1. A continued growth of BR sales and new business amounting to double today’s sales by 2017.
2. A very significant rise in the public expectation of data carriage capability.
3. Very significant increases in over-the-air traffic driven by data, causing increased pressure on spectrum resources.

4. Increased calls for harmonised approaches in a variety of sectors.
5. Ongoing reservation of spectrum resources necessary to support future major events in the UK.
6. Increased emphasis on the deployment of properly resilient systems.
7. Greater influence from Europe in management matters.
8. The introduction of modest speed professional mobile wideband and broadband data.

The FCS membership represents the foremost body of industry expertise in the field of professional radio communications (Business Radio) in the UK. In preparation for this contribution, the membership was surveyed for their views on a small number of key points relating to the Strategic Plan. Throughout this document reference is made to the views expressed on each of the topics and relevant metrics presented.

THE IMPACT ON BR OF THE RSPP

It is clear that the current emphasis of the Radio Spectrum Policy Programme (RSPP) is towards deployment of radio communications systems that are capable of delivering “mobile broadband” to the consumer.

UK spectrum policy is based on narrow economic considerations. The use of competition in spectrum matters is almost the only management tool indicated in the Communications Act 2003. However, the RSPP specifically requires, in Article 3a, that the commission and member States shall:

“encourage efficient management and use of spectrum to best meet the increasing demand for use of frequencies reflecting the important social, cultural and economic value of spectrum;”

The Communications Act 2003 is currently under review and it is hoped that a different approach to spectrum management policy results¹. At least the new Act should require the regulator to act in the interests of the UK rather than just consumers.

UK assignment policy is understood to be that market mechanisms will be used unless they have been proved to fail in a particular instance. If proved to fail, a fall-back procedure provides that a Government Department is permitted to request radio spectrum if they can present a compelling business case for assignment by other means. This approach is not appropriate to professional radio and will have detrimental impacts on the UK. The reasons for this are well known. This contribution merely lists some of the more significant reasons why market approaches are not appropriate.

1. There may not be an auction of suitable spectrum² when needed.
2. No suitable spectrum may be available through other means such as leasing.
3. If professional users can make use of a band that happens to be under release through auction they may not have the ability to form a sufficient fund to bid at auction.
4. The limitations on the supply of suitable professional-grade equipment acts to significantly reduce the choice of radio spectrum band in which to operate. It is therefore relatively easy to

¹ See The FCS Response to the DCMS Communications Review, July 2011, Appendix 1. http://www.fcs.org.uk/my%20files/fcs_pdfs/responses/11-07-04_dcms_communications_review_fcs_response.pdf This Appendix is copied in full as Appendix 1 to this Contribution

² In many cases the choice of spectrum may be closely limited by equipment availability

use UK spectrum policy to establish a commercial monopoly through control of the available radio spectrum.

5. Government Departments cannot in general promote the case for spectrum for a particular group because it may be that the group has contracted out to a single entity representing their interests. Many sectors having public obligations are represented by a single spectrum entity. A Government dept undertaking to provide such a business case for spectrum assignment by other means could be taken to be promoting the commercial interests of that single entity and promoting a lock-in situation in favour of that position. Subsequent competition in that arena would be inhibited because no other entity could offer a service because there is no other radio spectrum available.
6. When spectrum for important public interest occasions is needed, market mechanisms are immediately seen to be ineffectual. This was comprehensively demonstrated in the case of the spectrum needed for the Olympics. Whilst spectrum holders were compensated for the spectrum they were encouraged to release to the Olympics, there was no suggestion that spectrum could be obtained by simply offering sufficient money to the holders that they would agree to the transfer.

Point 2 The FCS believes that within the period of the Strategic Plan, UK spectrum management principles will have to be aligned with the Radio Spectrum Policy Programme and consider important social values as well as narrow economic considerations.

5-YEAR PERSPECTIVE

The FCS has considered a number of topics and would advise that there are a number of impending developments that will have to be accommodated in any future business radio regulatory environment.

Digital Technology

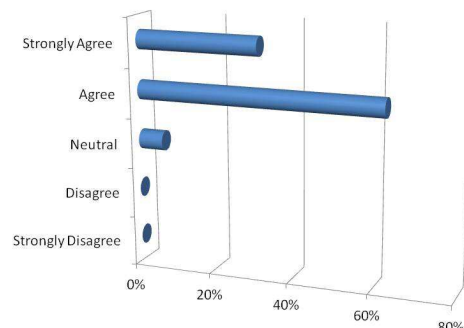
The FCS notes that the recent introduction of digital technologies has opened significant new opportunities for professional radio users and potential professional radio users to improve operational and commercial efficiency. The market has responded positively to this development over the last three years resulting in consecutive years of 20%+ growth in unit sales in this sector.

At the same time, over-the-air traffic volumes have increased because the digital equipment includes far more advanced operational facilities than ever before.

An early consequence of this is that the amount of licensing, administration and other activities undertaken by Ofcom in this arena has increased substantially.

The membership were surveyed to see if they considered that the growth in unit sales of digital forms of BR would be maintained for the period of the Ofcom 5-year Plan. The responses indicated that this was agreed (see Graph).

Growth in Digital Forms of BR will be over 20% for Next 5 Years



This means that the FCS membership believes that by the end of the 5-year period, the work-load currently on Ofcom will have doubled if current processes are maintained. In making this statement it is important that it is understood that the metrics indicate a doubling of new units and systems for new and existing customers.

Whilst some of these new digital systems will be accommodated by churn of existing licences, the impact on the Ofcom *Spectrum Licensing* service may not be mitigated by such churn. This is because the process of migration of many professional users may be that new systems will have to overlap with old systems to ensure critical services are maintained in the transition. Thus the user may have two licences until Acceptance Testing is complete and the old licence surrendered.

In this context, the FCS is keen to encourage Ofcom to undertake the collection of much greater technology and service data to assist management. See below.

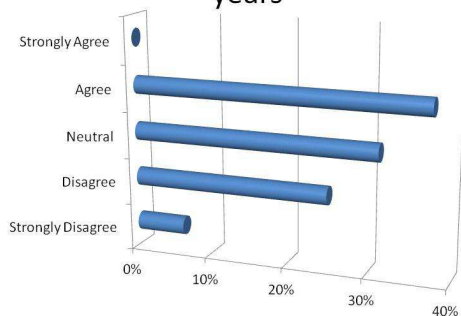
Point 3 Ofcom work-load arising from new BR digital technology licences will at least double over next 5 years.

Analogue Technology

The continued use of analogue technology would appear to be assured over this period. It is also predicted by the FCS membership that the existing systems may attract replacement sales.

Furthermore, there are some applications where analogue technology is significantly superior in some ways to current digital equipment³. The overall view of the membership is that analogue will at the very least continue to remain in use for the period of the Strategic Plan.

Sales of Analogue Equipment will Grow or be Maintained over Next 5 years



This does not discount the current resurgence in interest in MPT1327⁴ systems arising from the continued expansion of wide area services. MPT1327 is obviously popular and provides service to an increasing number of customers. The main impact of this type of use on Ofcom is the need to change the environment such that a national licensing approach can be taken. The current Band III loading being around only 50% of channels being assigned appears to indicate that the band should be classified as a **Low Usage Band**. Ofcom will be aware that there are a number of spectrum efficiency advantages to a National approach for such systems.

³ Control over latency is a good example.

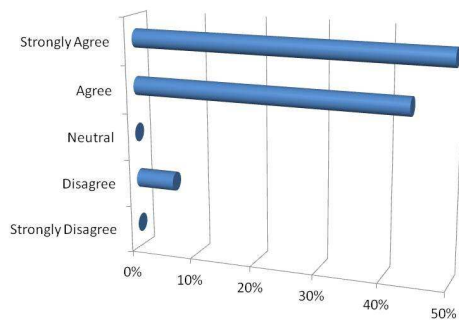
⁴ Whether MPT1327 is digital or analogue technology remains a topic of debate.

Point 4 The use of analogue technology will continue throughout the period of the Strategic Plan.

Over the Air Traffic (OTAT) Volumes

The FCS believes that the next 5 years will see a very significant increase in the volume of over-the-air traffic carried on professional systems.

Over the Air Traffic Volume will Grow in Next 5 Years



The amount of growth and the nature of that growth are difficult to predict. However, the FCS membership clearly takes the view that low-bandwidth services will remain a very strong component of the requirement. This is because of the nature of the requirement. Voice capability remains very important in mission-critical or business-critical systems. Data service is an added benefit. Wideband and broadband facilities have a rising importance, especially in certain key situations. But overall, they are not expected to challenge voice for overall supremacy within the period of the Strategic Plan.

This growth in OTAT is good news for the UK as it implies a significant improvement in the delivery of critical public interest services through efficiency gains, or better operational efficiency in other sectors.

“I think that the use of data will support new services and that this will vastly increase the over-the-air traffic”

For Ofcom there are important consequences of this growth. Much of the BR radio spectrum is licensed on a shared basis.

Growth in OTAT therefore increases the likelihood of saturation of the channel. This will appear to the user as clashing of the communications (probably taken as interference). Under the current arrangements, Ofcom can expect:

- Increasing demands to provide spectrum channels that are less congested;
- Disruption resulting in remedial measures including the relocation of entire systems to dedicated spectrum if they use GPS-based services and/or any other service that displays high channel occupancy.

At present the BR radio spectrum is experiencing increasing demand for new assignments. The recent policy changes in Ofcom have significantly improved the situation to the extent that licence applications are currently not refused on grounds of there being no more channels available for new assignments (which was a problem in urban areas particularly). However, it is recognised that these changes will provide only a brief period of respite from congestion. Other solutions must be found.

Shared channels are limited to two non-coordinated users. This may be conservative in certain cases. A higher sharing number would of course give rise to much more utilisation. However, noting the above growth in OTAT, there is a natural reluctance to simply raise the sharing number to 3 or 4 (or any other suitable number).

Point 5 The channels are not only becoming more scarce, but the occupancy of the channels is expected to rise significantly.

Dedicated Spectrum Demand Increase

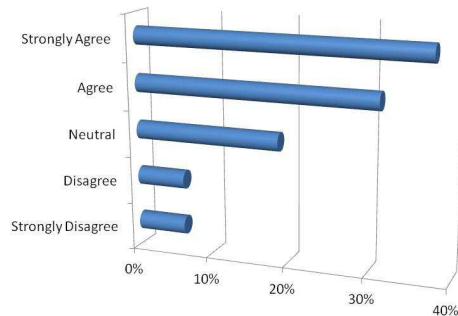
The increase in service richness will result in greater use of the radio system, thus driving occupancy. As noted above, some applications and services can exhibit very high occupancy (effectively 100% in cases).

One response is to deploy modern efficient technology. Most recently, tier III DMR has come available. Trunking technologies usually require at least one dedicated channel to control the communications. Thus they achieve great communications efficiency but require a dedicated channel to do so.

Considering these points, the FCS membership strongly believes that in future, there will be a need for more dedicated spectrum.

Generating additional dedicated spectrum resource within the existing spectrum resource is a serious challenge. Obviously, it implies significant changes in a range of policy areas, not the least of which is the information to be provided to Ofcom upon which decisions can be based.

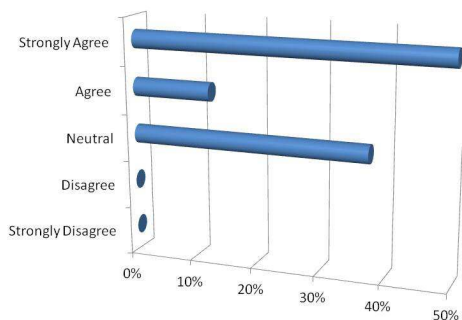
More Dedicated Spectrum will be Needed



High-Resilience Systems

As part of the considerations surrounding dedicated spectrum, it remains essential for some highly critical applications that dedicated spectrum is used.

Specific Spectrum for High resilience Services will be Needed



The FCS membership considered the likelihood of all critical services moving on to shared systems and found this to be very unlikely to be possible in reality.

Whilst the ability to back-off some of the critical users' less-critical communications to shared and/or public communications will always be required, the hard-core critical communications will remain on carefully controlled and fully resilient systems.

This presents a spectrum management problem in that the achievement of such high resilience

implies that not only is that spectrum to be used is dedicated to these communications but it must also be high quality.

Exactly how much such spectrum is needed is not currently clear. However, the FCS assumes this will be the subject of continued research by Ofcom.

Point 6 More dedicated spectrum will be required in the future.

The Administration of Numbers

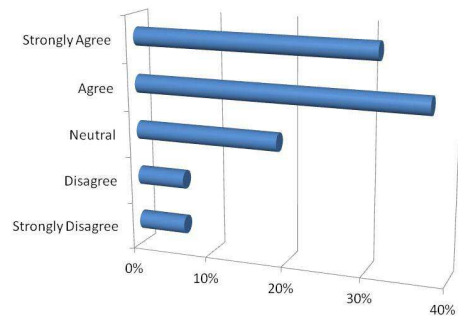
The system codes and unit identities remain uncoordinated by any central administration. As the utilization of the radio spectrum becomes more intense, the possibility of disruption through multiple assignments of digital codes rises. This is something that industry seeks to avoid and has developed the view that some means to coordinate the numbering is needed within the period of the Strategic Plan.

The FCS membership was asked to comment on this and gave a clear indication that a central administration function for digital codes will be needed. On balance there was a preference for Ofcom to perform this role.

The administration of the numbers has already been considered by Ofcom and rejected on the grounds that there are several different schemes and so no central single digital code assignment system is possible. Not even at system level.

It is clear that it is possible that industry develops a scheme to manage digital codes on a co-regulatory basis. However, this is far from being universally agreed as a correct way forward. Many stakeholders take the view that Ofcom is best placed to perform this function in terms of true independence.

Central Administration of Digital Codes will be Needed



Point 7 A centralised administration of Digital codes will be needed within the period of the Strategic Plan.

Technology & Service Neutrality

At present Ofcom does not collect information on terminal numbers, technologies or types of services in business radio. The policy to not collect such data is the UK response to the European legislative requirement for technology neutrality. However, the FCS believes this is an over-reaction.

The FCS notes that managing the radio spectrum to such tight tolerances as will be required over the period of the Strategic Plan without the essential information will prove extremely challenging. The FCS would further point out that the management of the radio spectrum in a technology neutral way is not the same as positioning the regulator such that they have no information upon which to base regulatory decisions.

The current interpretation that all information, including that which was provided to Ofcom in confidence, must be divulged to third parties on request remains problematic. The FCS urges that this interpretation be again challenged.

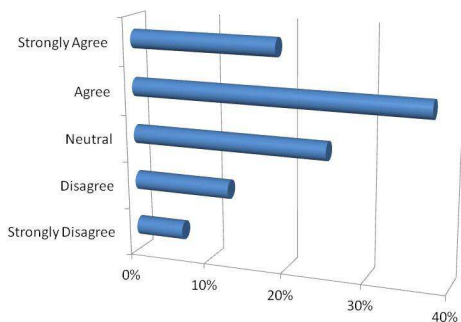
Nevertheless, as utilization becomes more prevalent, having compatible technologies as near-neighbours, high-occupancy applications on dedicated channels and other appropriate coordination measures will become essential within the period of the Strategic Plan.

Point 8 Ofcom will need to collect more management information within the period of the Strategic Plan. The implications of “Technology Neutrality” will have to be reconsidered.

Sub-Banding

The current practice of mixing technologies across the bands could result in significant efficiency losses due to incompatible system bandwidths. The FCS believes that such efficiency losses will be significant by the end of the period of the Strategic Plan.

Sub-Banding of Compatible Technologies will be Needed



The current system of overlaid channel bandwidths and wide area and on-site allocations all mixed in together in the same band and even on the same channel may result in excessive amounts of interference, especially as the utilisation increases to high values. If that happens, the current system will have to be replaced by sub-bands where, in the main, only compatible schemes that can co-exist are located close to each other.

The FCS is aware that this may involve a measure of re-farming. However, if the assignment process is adjusted at an early stage, such that

compatible technologies can be grouped, the amount of re-farming would be minimized.

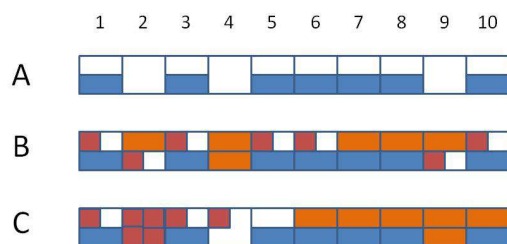
Ofcom have already studied this problem and have concluded that mixing different technologies is problematic and complex.

There are a number of problems associated with sub-banding that will have to be considered. For example, it is not clear how much of the band should be given over to any individual technology. The FCS recommends that no hard limit would be set.

It is considered useful to present an illustrative and very simple example of the direct benefit of sub-banding.

Example: A range of 10 shared channels is currently available for both 12.5kHz and 6.25kHz assignments. It currently has a fairly light utilization of 35% with all the current assignments being 12.5kHz technology (see line (A) in the diagram). The maximum number of assignments this range of channels can accommodate is 20 if the current policy of assignment to empty channels first and the sharing number limited at 2 is maintained. Again the technology choice between 12.5 and 6.25kHz does not affect the total capacity across the 10

Shared Channel Assignment (Sharing = 2)



channels (see line (B)) in the diagram. This is because the policy of assigning first to empty channels will quickly fill 2, 4 & 9⁵.

If the new assignments are ordered such that one technology takes up occupancy at one end of the 10-channel range and the other technology from the opposite end, the 10-channel range can accommodate more assignments (see line (C)). In this example there is room for up to a further 4, 6.25kHz assignments or 2, 12.5kHz assignments.

Thus by ordering into sub-bands this example shows an available capacity increase of 10-20% (technology dependent) without the need for any re-farming.

There are some concerns over any sub-band approach. For example, the policy should not result in any otherwise acceptable technology being excluded from the band. This is a potentially contentious area and any proposals for a policy may have to be consulted upon in detail before proceeding.

Point 9 In order to maximize the utilisation of the band, future assignments should be organized to have compatible technologies located together.

Service Areas & Licence Information

In considering the possible changes that would be necessary over the period of the Strategic Plan, the FCS looked at changes to the licence process whereby the exact coverage and sterilization area that was calculated when the licence was assigned would be provided with the licence.

It is understood that this may represent a significant increase in complexity for Ofcom. However, it may also provide a commensurate benefit.

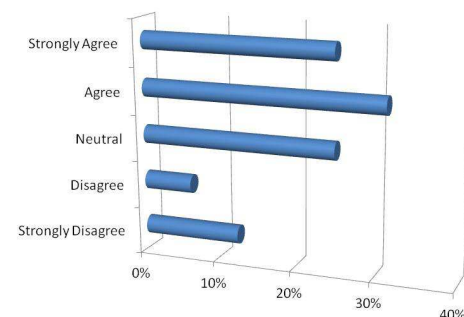
There have been cases where problems have arisen through misalignment of actual usable coverage area on the ground and the area considered for the purposes of the licence.

The correction process may be more efficient if all parties are aware from the outset what the intended coverage actually is.

It is noted that the case for such plots within large urban areas may be less strong. The benefits that can be derived from plots of short-range communications seem equally unlikely to be worthwhile.

How the plot would be provided was not discussed. However, some form of electronic solution is presumed as paper plots could be inefficient and costly.

Licensees will Need Plots of Service Area



⁵ No in-depth analysis is presented here. However, it is worth noting that for the purposes of assignment, each user is considered to occupy 50% of the capacity in the time domain. This means that only one 6.25kHz assignment can be added to a channel where a 12.5kHz assignment is or will be made.

Point 10 As the utilisation of the band increases, alignment between the licenced service area and the service area in use by the customer will be increasingly important. Users need to be aware of the licensed service area.

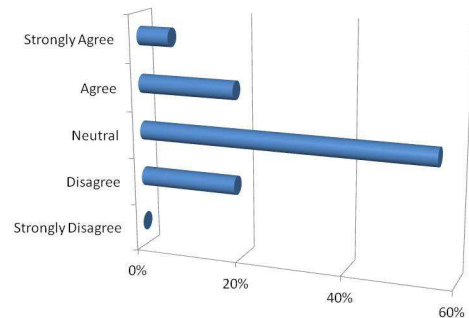
Wideband & Broadband

In preparing this contribution to the 5-year Strategic Plan, the FCS considered the likely advance of wideband and broadband services.

Typical wideband services are taken to be:

- a. Services, facilities and applications that by their very nature have to be supported by data rates in excess of 100kB/s;
- b. New wideband technologies that are able to carry multiple communications streams which are individually narrow band;
- c. Rich-content services that due to the low number of concurrent users require only wideband communication paths⁶.

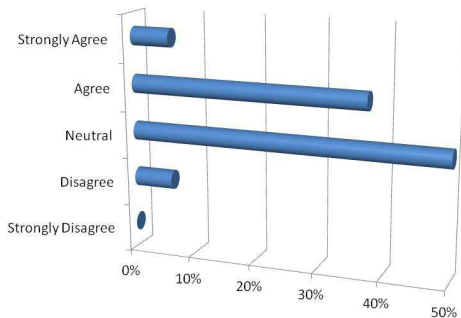
10% of all BR Communication will be Wideband



Typical professional broadband uses:

- a. Surveillance of critical remote stations (a strong need for this may be emerging);
- b. Identification – several concurrent users;
- c. Handling very large volumes of data.

Over 1% of all BR Communication will be Broadband



Whilst the FCS remains convinced that the demand for mission-critical voice communications will remain the most important service, other requirements are becoming apparent. This contribution considered not whether faster data-rates would be needed in the future but how much high data-rate communication there would be.

The FCS membership considered whether 10% of all communication would be wideband by the end of the period of the Strategic Plan. The membership could not form a clear opinion on this figure. However, that there would be

wideband communication facilities needed is not in doubt.

⁶ A 1/4VGA, adequate quality video can be carried on a data stream of around 500kB/s with appropriate levels of resilience, including FEC, using MPEG. Thus if the requirement is only for one such stream at any one time, the possibility exists that a wideband link could suffice. If more than one such stream is required, the use of wideband ceases to be viable and broadband technologies should be employed.

A very similar picture appeared in relation to the need for broadband communications facilities. In this case the membership was asked to consider if 1% of all communication would be broadband by the end of the period of the Strategic Plan. Although confirming that there would be a rising need for broadband service, the figure of 1% was not confirmed.

Point 11 Wideband and Broadband professional radio communications schemes will continue to grow in importance to customers. The extent of this growth is not known.

Suitable bands for WB, BB & High-Resilience Professional Radio Communication

The introduction of wideband, broadband high-bandwidth applications presents the UK professional radio communications industry with a severe problem. This is that the existing popular bands for business radio are already coming under strain due to excess demand. As noted above, this is set to double over the period of the Strategic Plan. In consequence there appears to be no serious possibility of hosting WB & BB communications in those bands.

Other bands available for professional radio communications have serious problems with equipment availability.

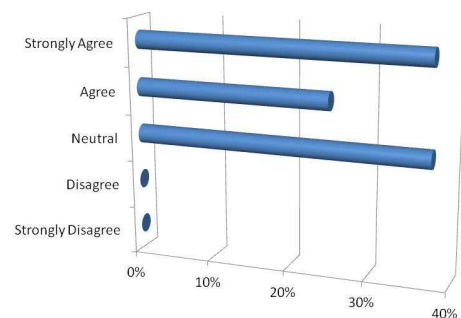
The low frequency bands remain unpopular due to physical constraints imposed by the physics of propagation. However, the FCS notes that very serious efforts are reported to be in progress to develop specialist equipment that could utilize these bands for selected applications.

Bands such as Band III SB 1 are currently not heavily used and could host much more communications. However, the FCS believes that the investment necessary to create a viable portfolio of product in this band would be considerable. As this band is available in the UK only, the business case for such an undertaking is challenging in the extreme.

In contrast, a lot of work is in progress in the USA to develop a complete portfolio of professional-grade broadband equipment based on LTE technology. The FCS therefore takes the strong view that the 700MHz band that was proposed at WRC12 would present an excellent location to deploy WB & BB professional radio communications in the UK also. Furthermore, it is unclear what other band could be considered.

It is further noted that the WRC timetable of actions agreed at the conference falls within the period of the Strategic Plan. So it is expected the use of a considerable part of the band for professional-grade radio communications will be included in the Ofcom Strategic Plan.

700MHz is Good for Short-Range, WB & BB Business Radio & Hi-Res Service



Point 12 The 700MHz band represents an excellent choice for high data rate professional communications.

Co-regulation

The process of introducing co-regulatory measures has already begun with the introduction of phase 1 of the Spectrum Leasing scheme. Over the period of the Strategic Plan, the FCS expects to see the environment for professional radio communications change significantly.

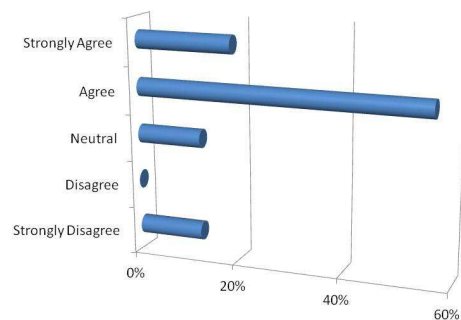
One consequence of this could be changes to business practices throughout the industry which result in a significant increase in complexity for regulators and spectrum managers. The competitive business models that will emerge over the life of the Strategic Plan could include a greater emphasis on complete solution provision for end user customers. The current practice of licensing in the name of the end user and authorizing agents may prove unsustainable. Instead a regime of leasing may be used in those instances when it is permitted. Otherwise, the customer may have to be satisfied with a complete solution sold on an individual basis with a spectrum licence obtained specifically for the purpose but held in the name of the provider not the final user.

The FCS anticipates changes to the WT Act itself within the life of the Strategic Plan. This is in addition to those dictated by the impending Communications Act.

The FCS believes it may be beneficial to discuss an increasing role for industry in the following areas:

1. Spectrum assignment through leasing.
2. Interference control through a variety of mechanisms from cooperative action through to better technology.
3. Numbering and identity management.
4. Aerial installation. This may include harmonized procedures for Health & Safety requirements.
5. Information and reporting.

A Greater Role for Industry Participation will be Needed



The FCS is conscious that co-regulation may carry certain risks for regulators and industry. These generally fall in to the categories of:

- a. Anti-competitive behaviour which may include customer lock-in enabled through spectrum shortages.
- b. Other forms of bias.
- c. Inaccuracy of information available to enforcement investigations.
- d. Conformity to regulation.

It is understood that destructive market distortions might arise from these concerns if left unaddressed. However, the FCS further notes that the existing environment for radio spectrum whereby it is possible

that total market dominance could theoretically be obtained by simply using market mechanisms to take control of all the radio spectrum is far worse⁷.

Point 13 Industry is aware that there are several possible roles to be undertaken in future under a regime of co-regulation.

Spectrum Returned from the Olympics and other holders

The FCS notes that significant spectrum resources are currently set aside for the Olympics. There has been much comment that this will be returned after the games are over.

The FCS remains of the view that some of the spectrum will be returned but there will be future events that call for smaller-scale national efforts to ensure their smooth and safe running. Even though the events may be taking place in different locations, these events may represent a case to maintain a significant capability on a permanent basis. Thus, it may be considered imprudent to return the entire amount of spectrum.

Examples:

2012	Olympics
2013	UEFA Champions League
2014	Commonwealth Games
2015	World Cup Rugby
2016	Cycling World Championships (at bid stage).

Even if all the radio spectrum were to be returned, it would only provide relief against the growth in demand for a period. The FCS therefore considers that the return of radio spectrum from the Olympics does not materially impact these considerations for the 5-year Strategic Plan.

Point 14 The FCS is not convinced that it would be prudent to return all the radio spectrum to the common pool after the 2012 Olympics.

In a similar manner, the current discussion relating to the future use of the spectrum returned from the Home Office is not expected to materially change the overall situation regarding extreme pressure on spectrum resources in the longer term.

⁷ It is stressed that the FCS does not believe that this has not yet been attempted because the fragmented nature of business radio would make this difficult to achieve in the short term.

CONCLUSIONS

The FCS has made a series of substantive points, backed by evidence, as contributions to the impending Ofcom Strategic 5-year Plan for radio spectrum.

14 key points have been proposed for consideration. However, it is recognised that each point has a wealth of important further detail that should also be considered, together with the implications of these points within Ofcom over the period of the Strategic Plan.

This contribution concludes as follows:

1. There is strong evidence that the UK radio communications customer base is both growing quickly and is now demanding a higher quality of communication. This certainly includes a much higher recognition of the need for resilient communications.
2. The growth seen in the digital business radio segment implies a doubling of workload for Ofcom by the end of the period of the Strategic Plan.
3. The absence of critical spectrum management information will have an increasingly negative effect.
4. It may be impossible to avoid major changes to assignment policy.
5. The amount of over-the-air traffic will rise significantly and have richer content. Wideband and broadband service will become more prominent than before.
6. The business structures within the industry are likely to significantly change over the period. The complexities of new go-to-market strategies, including sold-solution provision, from a regulatory perspective may imply several changes, including to the WT Act itself.
7. Industry expects to have to make provision for a rise in its role within a co-regulatory environment.
8. A significant amount of activity will be required to avoid the more serious impediments to future growth in the segment and loss of efficiency within the customer base.

The FCS would be very grateful for the opportunity to discuss these contributions to the Strategic Plan at some convenient time.

APPENDIX 1

RADIO SPECTRUM UNDER THE 2003 COMMUNICATIONS ACT

In considering the proposal to have radiocommunications transferred from the current Communications Act to a revised Wireless Telegraphy Act it is important to identify the problems seen in the current (2003) Communications Act.

The 2003 Communications Act established Ofcom as an all-encompassing regulator and gave detailed guidance on duties towards commercial / consumer segments but had almost no references to the essential professional uses of spectrum. Ofcom therefore has almost no duties towards the support of essential services necessary to the UK. Furthermore, the Act guides Ofcom to use competition and associated market mechanisms when managing the radio spectrum but with no account for fundamental differences between the various types of uses of the radio spectrum.

There is a very significant difference in the objectives for management of a market-sensitive segment of radio communications and the professional radio communications segment that we need in order to function as a modern society. The market-sensitive segment can obviously be managed by applying market principles even accepting that these may result in some spectrum being under-utilised. The stakeholders should be given the freedom to run profitable businesses based on the use of spectrum in a consumer environment under a fair competition regime.

However, in the case of spectrum that is used for essential tasks, the priority must be to make the resource meet as many of the needs as possible. The amount of radio spectrum available is already insufficient to meet all the needs that could be placed on it. The UK cannot afford spectrum to be used inefficiently. Therefore, the management of spectrum to ensure that maximum benefit for the UK can be delivered must be better directed than will be achieved through market forces in which large amounts of spectrum can be left unused for long periods.

Unfortunately, in almost the very first lines of the 2003 Communications Act, the guidance is towards managing the radio spectrum through the use of competition where appropriate⁸. The optimal use of spectrum is called for but there is no indication how this should be measured. Even though it is not explicitly stated, the Act definitely implies that the optimum use of spectrum is to be achieved through promoting competition.

It is therefore understandable that regulators will seek to use competition to manage the spectrum. This has inevitably led to a market-based approach to all radio spectrum assignment. "Optimal" appears to be judged only in terms of very narrow prices attached to spectrum in the belief that this will result in the spectrum being placed at the disposal of the entity that values it the most.

This approach has several fundamental flaws. These include that it does not address essential uses of spectrum that cannot be evaluated in monetary terms and it does not address situations where spectrum is used to provide support for other essential services that are of inestimable value but which

⁸ **3 General duties of OFCOM**

(1) It shall be the principal duty of OFCOM, in carrying out their functions—

(a) to further the interests of citizens in relation to communications matters; and

(b) to further the interests of consumers in relevant markets, where appropriate by promoting competition.

are not themselves directly linked to the use of spectrum. In neither case could our society manage without the resulting services⁹. Our citizens need electricity, water, buses, trains, trade through the ports and airports and a long list of other vital public needs.

In addition, regulation that promotes competition tends to fragment spectrum by parcelling it out to the contestants. If the spectrum is already in short supply, the amount of spectrum available to each successful bidder may be small. This limits the amount of service that each block of spectrum can provide and so in turn inhibits the benefits that can be delivered to the end users. This in turn undermines the overall business case. The use of market mechanisms for spectrum assignment may be appropriate for consumer applications but not for the large number of services of public interest that the UK will need for the foreseeable future.

The topics Ofcom needs to focus on are listed in the General Duties within the Act. Professional uses of spectrum are not specifically considered as part of Ofcom's duties beyond doing what is necessary to further the interests of citizens. That wording is far too vague to form the foundation of a coherent approach to address professional uses of spectrum that we all need to run smoothly. There is not even a specific duty to ensure the correct operation of a large number of critical services upon which we all rely.

The closest the Act comes to that essential function is that Ofcom should have regard to the desirability of preventing crime and disorder. In contrast, Ofcom are required to secure a wide range of television and radio service providers.

In contrast, the Wireless Telegraphy Act is based on completely different principles and is a much simpler instrument. It handles the matters that are essential to manage the spectrum to maximise the efficiency of use. It also provides the regulator with the necessary flexibility to make the correct decisions as they see fit. It does not seek to guide the regulator to use market mechanisms or any other approach. That decision is left to the regulator who has a duty to use the best approach.

Whilst the WT Act requires Ofcom to have due regard for competition in services that are provided using the radio spectrum, there is no requirement to use competition principles in the assignment of the spectrum itself. The Act even permits Ofcom to consider which duties are applicable and which are not. However, the WT Act does require that duties under the 2003 Communications Act take precedence over the duties under the WT Act in cases of conflict¹⁰. This at least will have to be changed. Therefore it is proposed that matters relating to the management of the radio spectrum can be handled with a modified WT Act and thus the proposed new Communications Act need not have provisions in respect of radio spectrum in it at all. This would permit the management of the radio spectrum to be sufficiently flexible that the regulators would feel empowered to take the most appropriate course of action depending on the need.

⁹ For a full discussion of the huge value of radiocommunications used in such applications see "The Strategic future of Business Radio", FCS, June 2010, http://www.fcs.org.uk/my%20files/fcs_pdfs/member%20groups/business%20radio/10-06-28_fcs_contribution_on_sfbr_publication_version.pdf

¹⁰ Section 3 (5) Where it appears to OFCOM that a duty under this section conflicts with one or more of their duties under sections 3 to 6 of the Communications Act 2003 (c. 21), priority must be given to their duties under those sections.