TPS

Telecom Policy Services Ltd.

UK Business Radio
- Points to be Addressed

Foreword

This document examines the UK Business Radio sector with focus on points that challenge both customers, the industry and which do need to be addressed.

The document lists points that need to be addressed to ensure that the user community can be assured of continuing support for their operations.

Whilst many of the points to be addressed raised within this White Paper have their origins in regulation and enforcement, some are matters capable of being addressed through industry action.

Executive Summary

The Original version of this document (April 2018) listed points that were on the agenda at that time. However, since April, there has been some significant progress made in several areas. But, other points have risen in importance, not only for the future health of the industry but also to address the efficiency issues that are surfacing in some cases due to the lack of data services that can support the operations. This issue of the document therefore provides an update of the April situation.

In common with several other countries, the UK has a long tradition of addressing operational communications through professional radiocommunications (known as Business Radio in the UK). These operational communications are mostly in support of important operational objectives that may arise from simple business need, legal obligations or be matters of safety. Users of these business radio systems readily understand and appreciate the benefits of improvements to their operations. The result is that the use of Business Radio in the UK is already in more extensive than some other countries.

However, the drive for ever-better operational efficiency, more awareness of safety matters and even increases in regulatory obligations drive the user to seek more capable radiocommunications. In the UK this has resulted in the rapid increase in the deployment of data service on the business radio systems. The demand for better data schemes is therefore expected to rapidly increase.

TPS notes that the benefits that the Business Radio service provides users could be much greater were factors that impede the ability of the industry to deploy more services to be removed.

These impediments range from commercial points that arise from regulation through to lack of user awareness of their need for services of this kind (however provided) via skills shortages. This document lists many of these factors as points for consideration (see below). TPS also considers that the impact of the individual points varies and therefore the desirability of fixing the issue also varies. What is certain though is that, together, these points represent a significant loss of user value which, in view of the uses to which these services are put, probably reflects on value to the UK also.

In short, it is highly desirable that these points are addressed and resolved as soon as possible.

TPS acknowledges that in virtually every case, the point is quite complex and there may be a number of ways the point could be remedied. Therefore, as each point is briefly discussed within this document, the reader is invited to make a contribution via email.

Table of Contents

Points to be Addressed

This section in an alphabetical list of the most important points that need to be addressed so that the BR industry in the UK can better address the needs of users and thus be assured of a healthy future.

Against each point is a score between 1 and 10, with 10 being the most important rating, indicating the current importance of the point as perceived by TPS.

Readers are invited to comment on these points. An email link is provided against each item for convenience.

A Review of Propagation Model Used for Licensing – Score: 2

There are examples of interference problems arising from the failure of the current propagation model used by Ofcom to identify all potential interference situations. The current propagation model used by Ofcom when assigning licences is primarily intended for broadcast. Furthermore, the clutter model is not comprehensive.

There are well-established alternative propagation models that can, theoretically provide more accurate results.

There has been a comprehensive review of these models conducted by Transfinite. However, the outcome of the review was to stay with the current model.

One identified implication of the review was that a lot more clutter information would need to be included in the licence assignment prediction in order that these new models make a useful improvement.

TPS notes that the current level of interference arising from the use of the current model is fairly low and so the score is set low. However, as BR continues to grow, it can be expected that the incidence of interference from this source will also grow. The score is therefore expected to rise.

TPS therefore takes the view that another Review should be conducted in the light of continued increase of both numbers of BR systems and the amount of air-traffic they generate.

Comments on this Statement

Applicability of General Safety Legislation (Workers) – Score: 5

Business Radio systems have great potential to improve the safety of workers and/or improve the response to an accident once it has occurred. However, many users believe that the provision of an absolute minimum of worker protection and recovery arrangements means that there is no need to include the opportunities for radio systems to improve worker safety.

The current law is very clear on work equipment safety in the context of actual dangers through use and also in relation to predictable situations. But it is not clear what that really means in terms of what is needed.

Resilient radiocommunications could well have a larger future role, especially in the light of increasing lone-worker situations.

TPS takes the view that resilient radiocommunications should be included in the safety plans of many operations, both as a means of preventing accidents and as an improvement to managing the incident once it has occurred.   What is therefore needed is that safety guidance is modified to include the use of resilient radiocommunications where appropriate.

Comments on this Statement

Apprentices and Trainees – Score: 7

Industry participants frequently note the difficulty in getting young staff in to work. There are several problems:

Schools do not foster an interest in technical subjects and higher education neither prepares engineers for the real world in terms of realistic career aspirations or properly equips them with the necessary knowledge to do the job.

The Apprentice Scheme is viewed by some as overly-bureaucratic and limited.

There isn't a convenient training course system established for radiocommunications (as there is for plumbing, for example).

TPS is concerned by this shortfall as it is clear that any industry needs a steady flow of capable young people entering it.

How this might be addressed is not clear. It may require a multi-faceted approach with many institutions. Furthermore, a recognised series of qualifications needs to be created.

Comments on Apprentices and Trainees

Balancing the Clear Need for Control vs Traffic Capacity – Score: 4

A large number of the users of Business Radio are either subject to formal obligations or, for reasons of the necessity of maintaining high operational efficiency, they need very high resilience systems. A typical policy approach to this is have total or almost total control of their radiocommunications system(s).

As one of the key concerns about achieving very high resilience is whether they have unfettered access to the radio spectrum. This is usually solved by seeking exclusive channels.

Obviously, the number of exclusive channels available will continue to diminish as BR continues to grow and especially as more and more low-speed data traffic is required.

Thus, the opportunity to have total control could become in conflict with the desire to support more traffic and the desire to have more customers.

TPS sees this as a potentially very serious problem under the current spectrum access arrangements. It is not clear what the best solution is. Some commentators take the view that data should be delivered via LTE on the public mobile networks. TPS is concerned that this may not actually be as simple as that.

Comments on Balancing the Clear Need for Control vs Traffic Capacity

CE Marking of 'One-Off' Devices – Score: 3

Following the introduction of the recent Market Access Conformity regulatory package upgrades, many suppliers have changed their policies to only providing supplementary equipment from established providers.

This means they avoid the conformity costs that will be incurred were they to continue to provide the necessary supplementary equipment from their own resources.

However, it appears that some users have specific requirements that are not included in the functionality of any single unit taken from the range of standard products, making such an approach more difficult.

It is further the case that some ancillary equipment is tiny. Thus, the standard equipment implies a significant cost increase.

TPS notes that whilst the number of such instances may be relatively low (making the modification of the standard equipment uneconomical), it may be worth some market actors deriving some mechanism to accommodate these special units more efficiently within the market access regulation.

Comments on CE Marking of 'One-Off' Devices

Channel Access Protocol for Low Speed Data – Score: 5

The clear increase in the amount of data traffic and the associated expectation that this will continue to grow, implies that the existing BR spectrum arrangements will not be able to cope with demand in the relatively near future.

Off-loading to the public services will certainly be an option for many users. However, some users will have a very strong desire to have high-resilience data services under their control. This raises the likelihood of a need for special arrangements to carry this load on specific, designated channels.

One of the most likely ways forward is to define some national channels as Data-Only" channels. Working on the assumption that all critical data communication has greater flexibility in the time domain than voice (say), these data channels could carry a very large amount of data traffic, given a suitable channel access protocol and appropriate regulatory and spectrum management changes.

TPS believes that whatever the changes are that will be necessary to accommodate these user requirements, they need to be done as soon as possible to maximise the business potential for the industry and achieve the greatest possible user gains. Certainly, the more data on BR channels, the less other communication they can carry. There is a further concern that the uncoordinated introduction of data onto the channels could result in an overall loss of business for the sector.

One of the most important prerequisites for the successful introduction of such a coordination policy is to have a suitable channel access protocol for use on the data channel. Furthermore, such an approach could have international implications.

Comments on Channel Access Protocol for Low Speed Data

Construction Site Entry Card – Score: 7

Many radiocommunications systems are installed in construction sites or even qualify as construction activities in their own right. Entry onto site is often restricted to individuals having the correct card.

TPS feels that it would benefit industry actors were all such arrangements made easier.

Comments on a Construction Site Entry Card

Customers' Understanding of the Significance of Resilience – Score: 7

It appears that many customers do not have a mechanism whereby they can assess the operational improvements of having a resilient radiocommunications system.

Instead, they make their purchasing decision on initial price with no consideration of either the life-time costs as system failures occur or of the negative impact of efficiency gains that failed to be fully realised. This has resulted in a situation where there is surprisingly large opportunity for low-end system provision with frequent poor outcomes.

Whilst this is obviously just market forces at work, the frequent failures becoming known does give the whole industry a bad reputation.

In this it is important to recognise that many users believe they do not need very high resilience solutions at the time of the purchase. However, it is noticeable that when it fails, these same customers are shocked that it could fail in such a way. What is needed is a way that discussions can be conducted with customers so that they understand and appreciate the subject of resilience and are thereby much better able to accurately quantify their requirements.

Comments on Understanding Resilience

Data-Only Channels (Low Speed Data) – Score: 7

Recognising the rapidly increasing demand for data service in addition to voice and also the increase in the amount of data needed, it seems clear that access to channels that can carry this data traffic is becoming an increasing necessity.

The issue is that there is no radio spectrum available to be allocated for such a use. The question is, which part of the spectrum should the industry target for these channels and how to make them behave in a manner consistent with the high availability that business radio needs?

Extremely high frequency bands would provide excellent results for in-building (single room) service. But what of on-site or wide area service?

Comments on Data-Only Channels

Equivalence of Business Access – Score: 9 – Big Change Since April

TPS Ltd. acknowledges the significant progress made since April to reduce the cycle-time to receive a technically assigned licence. It is now believed that, whilst there are a few exceptions, most licences are received within the legal limit of 42 days and often sooner than that.

Having delays as they were prior to this date brought the tendency amongst the user community to accept a lower quality radio communications solution over no solution at all, even though they would later regret it.

Acknowledging the excellent progress made with the existing process, TPS would suggest that all licence assignment activities be placed on-line with a cycle-time in the order of a day or two. This implies a change to the law as well as a change to assignment systems.

Comments on Equivalence of Business Access to Market

Formalised Definitions of Criticality – Score: 8

There is a lot of confusion over the definition of criticality. This has lead to confusion over how the system behaves in various situations. But, recently, there is a marked increase in the claims that a system is "Mission-Critical" (say) on the basis that it includes some features that are often found in a true Mission-Critical system. There being no serious attempt to make it actually Mission-Critical. This causes confusion and could be dangerous. The criticality of a system is not about whether it has a specific call-type but on how important it is that the system supports the desired operations in the environment at the time it is needed. Clearly there are strong links to the subject of resilience.

TPS believes that it is time to have the terms rigorously defined so that the customer is not mislead.

The key terms (with notes) are:

Business-Critical	Facilities and services are Business-Critical if their use is needed to achieve overall operational efficiency improvements. Typically, these types of services may positively impact the operational cost lines to improve the performance of the entity in a highly competitive sector of enterprise. In the general case, the facilities that are classed as Business-Critical may be only a sub-set of the facilities the user has at their disposal. Others may be "Best-Efforts" grade etc.
Mission-Critical	Facilities and services are Mission-Critical if their use is essential in the achievement of an operation. That is, if the radiocommunications fail, so does the operation. Obviously, if the operation has a big impact on the overall success of the entity, the radiocommunications are very important to that entity. If the operation is less important, any failure in the radiocommunications is correspondingly reduced in impact. In common with Business-Critical usage, the professionals may have other facilities also available to them that are not so critical.
Safety-Related	Facilities and services are Safety-Related if they affect the likelihood of an injury or even death of a person taking place and/or subsequently affect the ability to perform the necessary actions after such an accident. This is a notoriously difficult area under law due to the inclusion of the concept that the incident that resulted in injury/death could reasonably be predicted. The current trend towards lower staff levels (even the introduction of lone-working in places where it has not been so before) has clearly increased the importance of being able to summon help when incapacitated, lying on the floor. This directly affects the correct choice of equipment where such accidents may occur (the number of which is also increasing).

Comments on Definitions of Criticality

Independent Management of Digital ID Codes – Score: 6

Digital services on business radio channels are not currently centrally managed. A proposal is in preparation that will allow Ofcom to manage them to some extent, but it may be considered a stop-gap measure.

In the public cellular world, the industry manages itself through the GSM-A.

TPS believes this approach may prove necessary for the business radio field also.

One problem of having an industry approach is that much equipment is already operating in the field. It will not be possible to have a clean start to any such process. However, at present the numbers are still low and so the number of actual problems experienced remains modest.

A second problem (and possibly the most severe, is that without regulatory change, there is no way of ensuring that installers will actually abide by a voluntary ID Code Management System.

Comments on the Independent Management of Digital ID Codes

Industry Listing – Score: 3

The business radio industry is mostly formed of a large number of companies of varying size. Whilst some are extremely large (particularly in the supply sector), some are quite small.

No opportunity should be missed to promote the company, irrespective of size and so TPS proposes that a listing of all companies, together with their preferred area of operation be made available.

What is to be included in this listing is a matter of choice.

Moreover, how such a listing should be promoted is another question. Clearly, some organisations will be keen to avoid high costs. Others will prioritise reach.

Comments on Industry Listing

Industry-Specific Recognised Training – Score: 6

There are several providers of training that cover professional radiocommunication. Furthermore, many suppliers offer excellent training on their products and how to put them together into full solutions. None of this training is formally recognised.

TPS believes that the problems of staff recruitment and getting a steady supply of interested young people will only get worse until the profession is well enough recognised that it be included in the school syllabus (for example). The number of benefits to the industry could be large.

Therefore, it is proposed that a formalised training course be constructed and go through the acceptance procedures for vocational training, up to and including degree-level and beyond[1].

Comments on Industry-Specific Recognised Training

Notification in Case of Disasters (like Flooding etc.) – Score: 4

Business Radio system controllers have, in the past, been required to inform relevant Government and other bodies/organisations so that their services can be made use of if disasters such as floods occur, if necessary.

In the 2017 Statement, this obligation has been reversed so that all government bodies can contact service providers to ensure that their services can be used in the event of a disaster.

The problem is, those Government bodies may not have access to lists of such systems to provoke them to make contact.

TPS considers that it would be helpful if such systems were made known to the Government offices on a voluntary basis. This would also promote business radio solutions in general amongst this important customer group. At the very least, some press-worthy articles could result.

Comments on Notification in Case of Disasters (like Flooding etc.)

Protected Content - Score 8

The increase in emphasis on data protection, most recently (but not exclusively) arising from the introduction of the General Data Protection Regulations (GDPR) has focussed attention on the desirability of protecting the content of radiocommunications.

---

[1] NVQ levels 6, 7 & 8 apply to degree level equivalence and beyond to post graduate and Doctorates.

In essence, this may well result in a very significant rise in the use of cryptographic coding.

There are significant increases in operational complexity on crypto. Not the least, a whole new layer of procedure relating to the administration and control of keys.

Nevertheless, many users may feel they are forced down this route.

Comments on Protected Content

Proximate Transmitters and Who Has to Change – Score: 5

There have already been several instances of radio systems being deployed very close to existing base station sites. So close in fact that the level of interference has resulted in one or both systems being rendered inoperable.

In many cases, the deployment was believed to be 'legal' because it was done under a licence-type that does not obviously prevent such an act. However, this is not actually the case. No-one is allowed to establish a radiocommunication service that causes harmful interference to protected services.

It could be expected that common sense would prevent this. In situations where this happens inadvertently, the offending party should be expected to move. Very often this is not the case. Blank refusals to act responsibly are regrettably common.

TPS believes that this already worrying issue will get worse as the service gets more popular. Something must be done to clarify the rules so that enforcement can more easily take action to resolve these issues.

Comments on Proximate Transmitters and Who Has to Change

Quality of Site Engineering – Score: 7

The majority of business radio system installers have the technical ability to perform an installation to a sufficient standard that the user can expect good performance for the life of the system.

But, it is believed that there is a sizeable number of practitioners within the industry who do not have either the necessary skills, the resources or even the desire to perform an installation to an acceptable standard. In some cases, the installation has been conducted by someone with no radio knowledge at all. The results can be shockingly awful, with radio systems that may not work, hardly at all, leaking roofs on buildings, flagrant contraventions of safety law and any number of other serious problems.

TPS is convinced that these practitioners are damaging the reputation of the whole industry.

The FCS has a Site Engineering Code of Practice[2] but the enforcement of the clauses has proved extremely difficult. Ofcom's policy of inspecting all sites before use has been cut back for many years. In addition, the enforcement teams do not have the staff to police this.

A different approach is needed. Several options are available.

Comments on the Quality of Site Engineering

Recognition of the Profession – Score: 7

---

[2] FCS 1331

There is a view that many of the problems faced by business radio stem from the fact that the professional radiocommunications is not recognised as a profession. Thus, it is viewed as a small niche of all radiocommunications. This means that the value proposition of professional radiocommunications is not taken into consideration until it is too late to stop some problem having an unwelcome impact on operations.

Comments on Recognition of the Profession

Resilience Requirements Capture – Score: 7

Many operational environments now rely on excellent communications to maintain the required levels of efficiency and even to achieve the allotted task at all.

Users generally understand the direct link between the radio working properly, in accordance with requirements and the success of operations. Discussions with these customers are made simpler as a result.

But, when it comes to specifying the requirements that, together, will formulate the resilience performance, this is can be much more difficult for some.

Some steps have been made by the FCS towards developing a top-level capture tool for resilience[3]. Even so, there may still be significant difficulty in practice.

TPS believes that there is a need to help customers analyse their operational requirements to establish what specifications to add into their requirements documents.

Certainly, when it comes to discussions between customers and potential suppliers, resilience is an excellent way for the customer to differentiate between suppliers who know how to make a system that is capable of supporting Mission-Critical use (say) and those who are less so.

Comments on Resilience Requirements Capture

Repetitive Data on Shared Channels – Score: 8

Business Radio has several allocations of radio spectrum. The problem is that a large proportion of the resource is very difficult to use (unless you have a specialist application). The result of this is that the UHF and VHF bands are very much more popular for business radio deployments. Because many of the factors such as a very high noise floor, that make lower bands difficult, are now probably beyond recovery in many geographical areas.

In reality then, the amount of usable radio spectrum available to the business radio service is very much less that it would appear at first.

Taking this into account, the use of these UHF & VHF bands must be very carefully controlled or else there will be a serious loss of business potential for the industry and problems for the users who cannot get a licence where they need to have their operations.

This has been an increasing concern for some years. However, with the rise in data air-traffic, there is much greater focus on this than before.

Some data traffic takes the form of repetitive pulses. These transmission structures can (and increasingly do) preclude the use of that channel by sharers. Clearly, this is not desirable overall even though the person causing the interference may be unaware of the fact.

It may be considered useful to deploy such data schemes only on exclusive channels.

---

[3] Link to FCS Code of Practice

Comments on Repetitive Data on Shared Channels

Resilient Data Systems – Score: 6

The rise in importance of data systems to support operations has, over recent months, become clear. Many industry actors consider that public systems, offer an unparalleled opportunity to off-load these data communication air-traffic loads onto other systems. This may imply a great future for multi-mode user equipment.

However, there is a growing concern that, as with everything, customers placing extreme reliance on their radiocommunications may require a very much higher level of resilience and/or control than it would be reasonable to expect from consumer communications systems like the public mobile networks.

This potential market sector is currently not well defined. Neither is the technology or overall system route by which such a demand could be addressed.

There are very large differences in capability between a true mission-critical data system and the current consumer schemes. This fact must concern the aware customer. However, it should also be noted that in this safety-conscious and legalistic environment, sooner or later, there will be pressure to change from this direction as well as from operational considerations.

Comments on Resilient Data Systems

Resilient Wideband and Broadband Systems – Score: 2

It is not clear that there is currently any strong user demand for highly resilient wideband and broadband service. However, TPS believes this is a potential demand for the future. Other data schemes are clearly already in demand at high resilience levels and they are growing daily. Why should this trend not extend to wideband and broadband service in the future?

The reason for the inclusion of this point in this paper is the considerable difficulty that will be experienced in satisfying any such future demand.

Comments on Resilient Wideband and Broadband Systems

Skilled Staff – Score: 8

The industry has, for some time, been experiencing difficulty in obtaining skilled staff.

It appears that this shortage isn't limited to one or two skill-sets. It is seen right across the entire range of skills that are needed. It extends across the whole age range as well.

Many industry actors have noted that in addition to the lack of skills, there may also be an all too common problem with a poor work ethic amongst candidates.

Some industry actors consider this a very serious issue.

TPS believes that to some extent at least, this is an issue starting at school. Thus, any solution must encompass a comprehensive range of actions.

Comments on Skilled Staff

Standardised Human Exposure Limit Prediction – Score: 6

Many customers now include terms in in their tenders that are related to safety of the radio systems arising from concerns over exposure to radio waves.

This subject is rarely understood and so the tender simply asks for a guarantee that the radio system will be within the accepted limits.

It is acknowledged that this is a very difficult subject in practice. But, more to the point, there is the fundamental problem that this request for a guarantee of safety in the tender effectively requires a prediction of the performance. Whereas the vast majority of the guidance and other documentation refers to taking measurements of the system once it has been installed.

Clearly, what is needed is some accepted way of predicting the exposure levels and thus demonstrating that they will be within the limits.

Today, the ICNIRP limits are under review and they might come under review again in the future. Thus, the ideal solution might be a calculation based on the current reference level that produces a standardised output that is recognised.

Comments on Standardised Human Exposure Limit Prediction

Supporting More Air-Traffic on BR Frequencies – Score: 7

Outside London, business radio has managed very well with the spectrum it already has. Even within London, the congestion has been related to the licence assignment process rather than being an actual issue in the field.

Going forward, it is expected that the amount of air-traffic will rise steadily to the point that the existing allocations will not be adequate. More so for truly Mission-Critical communications.

Having usage that is sufficiently low to permit call attempt success rates consistent with Mission-Critical operation for a totally uncoordinated user population may not be a sustainable model in the medium term (and even less so in the long term).

Industry will likely be faced with a need to change its operating paradigm.

Clearly there are several choices on future routes and opinions will vary on which should be followed.

Individual supply companies may seek to address this issue in different ways. The compatibility between approaches will be important.

Comments on Getting More Air-Traffic on BR Frequencies

User Awareness Programme – Score: 7

Many users are fully aware of their legal obligations for performance, ethical behaviour and responsibilities towards safety and a number of other matters. In general, these users do adopt business radio solutions where necessary.

However, for a variety of reasons, there are a very large number of organisations that do not fully appreciate their situation. Amongst this large group there is a significant number who would benefit from having a business radio solution for some of their operational communications.

TPS believes that there may be merit in having a concerted programme to increase the awareness of the implications of obligations and the consequential desirability of adopting high-resilience solutions.

Comments on a User Awareness Programme

Closing Remarks

Business Radio in the UK provides a specialised radiocommunications solution that supports many operations.

However, several points remain that should be addressed which would greatly increase the value the user community (and therefore the whole UK) could gain.

None of the points are particularly easy to address but some are considerably more important than others. Indeed, some of the points raised are very important indeed. However, you, the readers are the best judge of that.

Please do use the contact links to provide your views on any of the points you see as important to you and even if you think there are other points not currently listed.

TPS believes that all these points are capable of solution, given effort.

Please feel free to contact Tim to discuss further.