Associated Broadcast Consultants

UK Band II FM Spectrum Planning

November 2017

Contents

1. Executive Summary

This paper examines the impact of Protection Ratios on FM Broadcast spectrum planning in the UK. These parameters determine not only the reliability of reception, but also the ultimate capacity of that spectrum to deliver radio services.

There are many opinions on both sides about Protection Ratios, but mostly to date they have been opinions, not facts. This paper therefore seeks to establish some relevant facts to permit a more informed debate.

The paper only considers the subject from a technical perspective. It is acknowledged that there might be considerable political hurdles to change, caused by the protective instincts of incumbents. Nevertheless we are encouraged by Ofcom's statement on its website:

The Communications Act says that Ofcom's principal duty is to further the interests of citizens and of consumers, where appropriate by promoting competition. Meeting this duty is at the heart of everything we do

We believe that this paper presents sufficient evidence to support a review of the planning parameters used for FM broadcast in the UK. We recommend the following actions are taken:

1. Consider the evidence presented in this document on face value as a technical proposal, on its technical merits, without being influenced by political considerations, current technical policy or incumbents' positions.
2. If technically valid, confirm, verify or investigate further (eg: what protection ratios do other broadcast regulators use, and how much discretion do they apply?)
3. Test the evidence – either by controlled trials, or inspection of situations where (accidentally or otherwise) the conditions for reduced protection ratios already exist in the UK.
4. Consider reducing co-channel protection ratio by 15 dB and 1st adjacent protection ratio by 22dB in a phased manner.
5. Review the evidence for divergence from ITU-R BS.412-9 for 10.6 to 10.8MHz relationships. If the evidence is not strong enough, revert to ITU-R BS.412-9 approach (-20dB PR on 10.7MHz only).
6. Implementation:
   - 6.1. NOT to consider re-planning frequencies of existing stations – this is unrealistic for such a mature technology as FM broadcast, and total benefit would be unlikely to outweigh total cost.
   - 6.2. NOT consider (yet) implementing on high power transmitters above (say) 500w – in order to minimise any widescale risk. Evaluate at a later date.
   - 6.3. Consider implementing new PR's for new services and technical change requests on low power transmitters below (say) 500w.
   - 6.4. Implement any reduction in PR's in more than one stage to minimise risk – maybe 6dB steps reduction over many months.

Background

1.1. Analogue

After more than 60 years use for radio broadcasting, demand for analogue Band II ("FM") spectrum in the UK remains strong. Yet in many areas, according to current Ofcom planning guidelines, the supply is apparently exhausted. In some areas, for the uninformed listener, this seems perplexing because they have very little listener choice.

It seems strange that for such a mature technology, the demand from potential applicants for new FM allocations for local radio does not seem to be diminishing; in fact, quite the reverse is true.

It is likely that part of the reason for this demand has been due to increasing regionalisation of local (commercial) radio services such that in overlap areas it is common to hear the same regional programming simulcast on many different frequencies, resulting in a reduction of listener choice and loss of "localness". Perhaps previous overspill coverage was valued by listeners to widen their choice? In parallel, cost pressure on the BBC is forcing them to regionalise their programming to ever larger areas, and re-broadcast national programming at some times of day. Such blatant duplication is arguably a waste of precious radio spectrum, not to mention the public subsidies and $C0_2$ emissions involved.

1.2. Digital

The advent of digital technologies has heralded revolutionary new ways to communicate. TV broadcasting harnessed this power when it completed the shift from analogue to digital in 2012. Overnight, viewer choice increased from 5 national channels to many dozens of new channels. The analogue to digital "switchover" for radio, however, has been far slower and arguably less successful.

Internet delivery is a growing option, but currently UK adoption is only around 8% (source RAJAR).

1.2.1. Incumbent DAB

Despite DAB being pioneered by the BBC in 1990, by 2017, total DAB listening has only reached about 36% (source: RAJAR). In the early stages of network rollout, the inevitable transmitter sparsity coupled with poor sensitivity of receivers resulted in a poor listener experience. Over time this situation has improved by power increases, transmitter densification, improved receivers, and greater adoption in cars, which are a favourable reception environment. Undoubtedly the resultant DAB network is a solid platform for national and sub-national broadcasters – but despite this success they see a need to simulcast on analogue FM almost everywhere.

However, the hoped-for cost savings of DAB multiplexes have not been delivered, at least for smaller broadcasters who are often quoted over £20k per year for a mono 64kbps broadcast channel which is cost-prohibitive for stations wishing to serve relatively small target communities, unless some form of subsidy were available. The result is that despite local demand, many local DAB muxes are running significantly below maximum capacity, and at reduced spectral efficiency – a net loss to UK plc.

1.2.2. Small Scale DAB

Pioneering work by Ofcom has shown the feasibility of much lower cost DAB transmission using open-source software – this low-cost solution has been labelled "Small Scale DAB" by Ofcom (SSDAB). The ten selected triallists seem to have ploughed a very successful direction, including the introduction of an alternative codec (HE-AACv2 or DAB+) which facilitates an increase in spectrum efficiency, delivering both better audio quality and more stations per DAB mux.

This technology is very interesting in urban and densely populated suburban areas where there is currently high unfulfilled demand from a number of radio stations who are unable to afford the services of of existing DAB providers, but are willing to share the cost of SSDAB. Indeed, in some situations this may reduce transmission costs below that of FM.

"In many rural areas SSDAB is not a good solution for local radio"

However, in many rural areas SSDAB is not a good solution for local radio. In these areas population is low, sparse and distributed across population centres over a wide area. This is exacerbated by the higher frequency of DAB transmissions (200MHz) versus analogue FM (100MHz) which means that for a given power, and antenna height, DAB transmitters cover a far smaller area than FM. This smaller coverage area makes it very challenging to fill a small area DAB mux with services in rural areas, with subsequent knock-on for the economics.

On the other hand, in very remote areas there is a chance that the BBC, and maybe commercial operators, would take opportunistic benefit of a SSDAB mux and/or there may be specific grants available. This is a special case where local interest and economic benefit coincide.

But considering intermediate rural areas, could your average small rural market town support more than one "Radio Local"? We suggest the answer in most situations is "No!". It follows that SSDAB is not an appropriate solution for such areas. It would mean that the full cost of a SSDAB installation would often have to be supported by a single station – which is definitely more expensive than FM. Moreover, that DAB Mux would occupy 5-10 times more spectrum than the same service would on FM. Is that an efficient use of radio spectrum?

Therefore, it seems that DAB is probably a good solution for urban and suburban areas, and possibly remote areas where national broadcasters are obliged to provide a universal service. But for intermediate rural areas, between large population centres, FM is probably the most appropriate technology to use for the time being.

Given that these intermediate rural areas are underserved with local radio (where arguably it is more important to minimise isolation and maximise community cohesion), the question then becomes how to deliver adequate FM spectrum for these areas? One option would be to accelerate Digital switchover in urban areas to release FM spectrum for use in surrounding rural areas. But if there is a strong, defendable reason to maintain FM simulcasts of DAB stations in urban areas, an obvious way forward is to review FM planning parameters which dictate frequency re-use (and number of FM transmitters possible in a given area).

Upsetting the status-quo in this way is always controversial. But one must consider if the end-goal of delivering massive social gain through local radio provision on analogue FM outweighs the inertia against change which is likely to be driven the interests of incumbents, who are anyway actively advocating a change to digital formats like DAB.

In the following sections we investigate the subject in more detail, and the potential of changing the planning parameters used when planning FM services in the UK – in particular "protection ratios".

2. Drivers for Review of FM Planning Parameters

The intensity of re-use of Band II (FM) spectrum is essentially set by the planning parameters used and the laws of Physics. The latter cannot be changed, but the former could be, if there is sufficient evidence to do so.

"It is essential that any Regulator bases its decisions upon sound scientific evidence"

It is essential that any Regulator bases its decisions upon sound scientific evidence so that it can robustly defend its decisions if challenged. But that is not to say the rules cannot be changed, provided there is enough scientific evidence to support and/or mitigate the changes.

One example of this is the recent trend to boost motorway capacity using 4-lane working without a hard-shoulder. This was unthinkable on safety grounds several decades ago, yet common practice now. In future years it is likely that more road capacity will be delivered by autonomous vehicles which will reduce the "protection distance" between vehicles. This example of changing the status-quo leads us to question whether an alternative approach could be considered to reduce the "protection ratios" use in FM spectrum planning, reducing the protection distance (ratios) between radio stations.

The Planning Parameters currently used in the UK are the same ones devised near the beginning on Band II broadcasting in the 1950s. The implicit assumptions of these planning parameters seem rather anachronistic compared with typical listener behaviour in the 21st Century – for example:

- They are based upon the selectivity of radios built in the 1950s using valves and tuneable, discrete components. Modern FM transistor receivers, often using surface-mount technology, typically have far better selectivity (the ability to filter out a wanted signal from nearby unwanted signals).
- Receive antenna height of 10m (33 ft) above ground level is assumed – how many people have that?
- A large directional antenna (which gives up to 12dB discrimination against interfering signals) is assumed.
- No account for modern receiver design with digital signal processing that improves reception and selectivity
- No audio processing as used by modern stations. This boosts average audio volume and can help mitigate or mask interference.
- No account for "listening diversity". In the 1950s the service may only have been available on FM, so interference aspects were more important. In today's world, many services are simultaneously available on multiple other FM frequencies, DAB, Satellite, Online….

The purpose of this paper is to examine if there is any scope to change the existing UK FM Planning parameters, in a scientifically valid way, to boost FM spectrum utilisation. This would permit more innovation, choice and competition in the UK radio broadcasting landscape.

3. FM Planning Parameters Explained

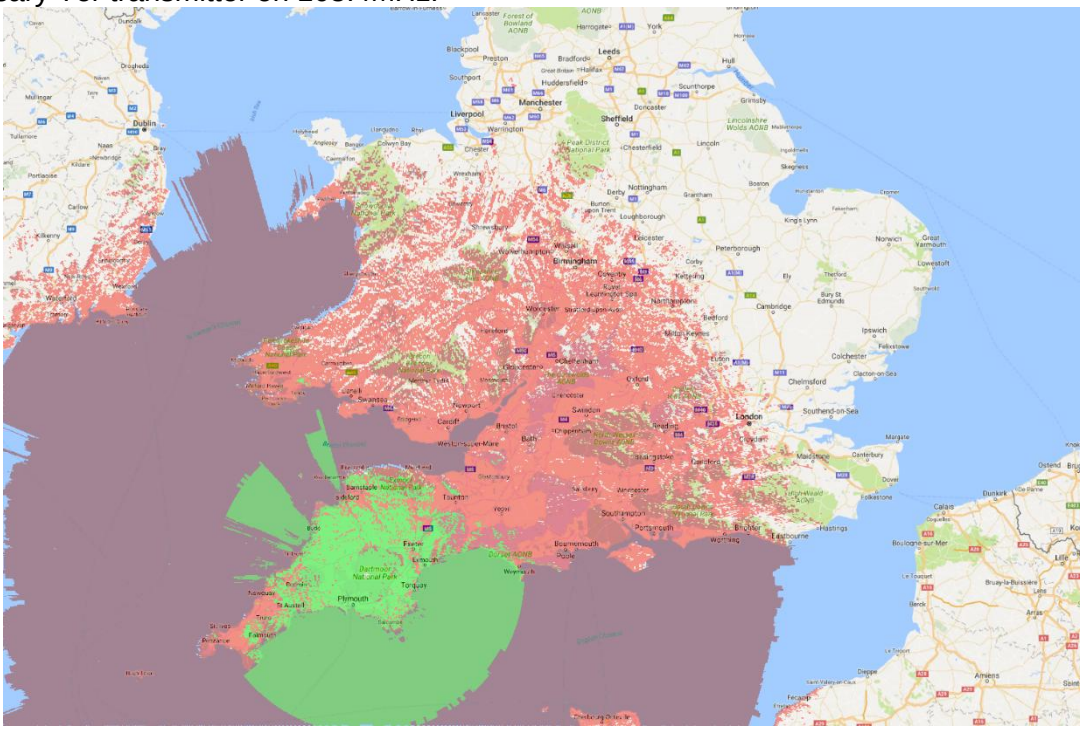
3.1. Introduction

The Guidelines that Ofcom uses to plan FM frequency allocations is evidence-based – using ITU Guidelines (ITU-R BS.412-9) that are based upon measurements conducted in the 1950's.

"A Station operating on 100MHz requires protection from interference from 99.6-100.4MHz and several other frequencies"

Fundamental to the guidelines are "Protection Ratios" (PR). These in effect dictate how much frequency-re-use is possible across our relatively small geographical area. There are PR's defined for Co (same) channel allocations, plus adjacent channels 1-4. ie: a Station operating on 100MHz requires protection from interference from 99.6-100.4MHz and several other frequencies. The co-channel PR for a stereo service is currently 45dB – effectively this is the required signal to noise ratio to deliver a "reliable" Stereo FM service as defined by ITU. That is to say towards the edge of the MCA of a station where the signal is 54dBµV/m, the co-channel interference should be less than (54 minus 45) 9dBµV/m - a very low signal indeed (in fact over 30,000 times lower).

This PR results in a very large "Interference" area surrounding any declared MCA of a station – it is a useful way to help non-technical people understand why the same frequency cannot be re-used too often. For example in the image below it indicates the service area (Green) and the co-channel Interference area (Red) of BBC Radio Devon from North Hessary Tor transmitter on 103.4MHz.



It can be seen that in addition to Devon, the interference area from this site (as defined by current protection ratios) effectively forbids the same frequency being re-used by any stations across most of Wales and large parts of southern England, the Midlands and south-east Ireland. It is interesting to note however that Bradley Stoke community radio in North Bristol is allocated 103.4MHz, with no apparent reception problems.

3.2. List of Key Planning Parameters

There are protection ratios defined for:

- Co (same) channel
- 1st adjacent
- 2nd adjacent
- 3rd adjacent
- 4th adjacent
- 10.7MHz image channel
- 10.6 and 10.8MHz adjacent image channels

These protection ratios are bi-directional, although they are often relaxed for Community radio services (in favour of incumbent commercial and BBC services) in order to deliver an FM allocation for a localised area – this manifests itself in the two level 64 and 54dBµV/m MCA maps used for Community Radio services – Purple area should comply with PR guidelines, Green area may not comply and is regarded as "best effort" coverage.

Many people in the radio industry hold an opinion that these Protection Ratios are excessively conservative. Indeed, there is some evidence that indicates that this may be true:

- It is not uncommon to find Ofcom FM frequency allocations that do not fully comply with these ratios, yet reception generally seems fine.
- Pirate stations have operated in contravention of these ratios for long periods of time, yet generally there is no interference to legal stations.
- There is some evidence that other countries manage to have greater frequency re-use – suggesting that they may use lower protection ratios, or exercise a greater degree of discretion in "shades of grey" allocation decisions.
- Some countries have published guidelines that confirm that they use MUCH lower protection ratios.
- A report commissioned by Ofcom indicates that in reality, radio receivers do not require such high protection ratios.
- In interference situations, unlike AM where signals audibly mix, FM is commonly regarded as benefitting from the "capture effect" – best described by Ofcom in document br_guidance.pdf "FM capture effect means that the radio will lock on to the strongest signal"

We investigate the evidence sources for the above list in the following section.

4. Evidence Supporting FM Reduced Protection Ratios

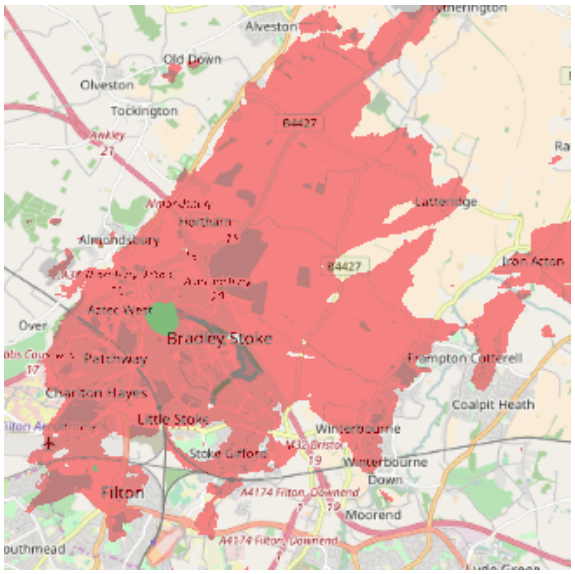
4.1. Current Allocations that do not comply

There are numerous examples where allocated frequencies of legal stations do not comply with the protection ratios detailed in Ofcom's analogue planning guidelines. The above example of BBC Radio Devon and Bradley Stoke Radio is just one.

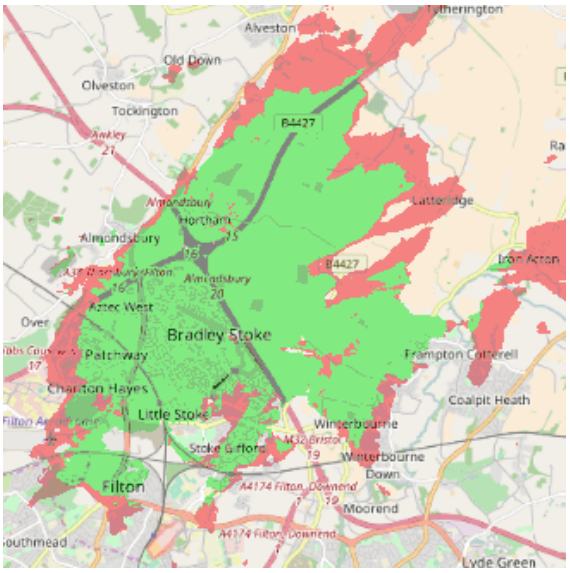
Given that there do not seem to be any reception problems for Bradley Stoke radio, it is possible to use this situation to assess the actual delivered protection ratio in Bradley Stoke and extrapolate this to what protection ratio is acceptable in practice. It follows that this could provide an indication of an appropriate protection ratio for use in other locations where FM frequencies are apparently unavailable.

"In practice, acceptable coverage is possible at co-channel protection ratios some 25dB (=x300) lower than those currently detailed in Ofcom's Analogue Planning Guidelines"

The two pictures below indicate the service area (green) and interfered area (red). Two different protection ratios used, Left: Ofcom 45dB, Right Arbitrary :20dB. NB: Only considers one source of interference – BBC Devon Hessary Tor.



45dB Protection ratio



20dB Protection Ratio

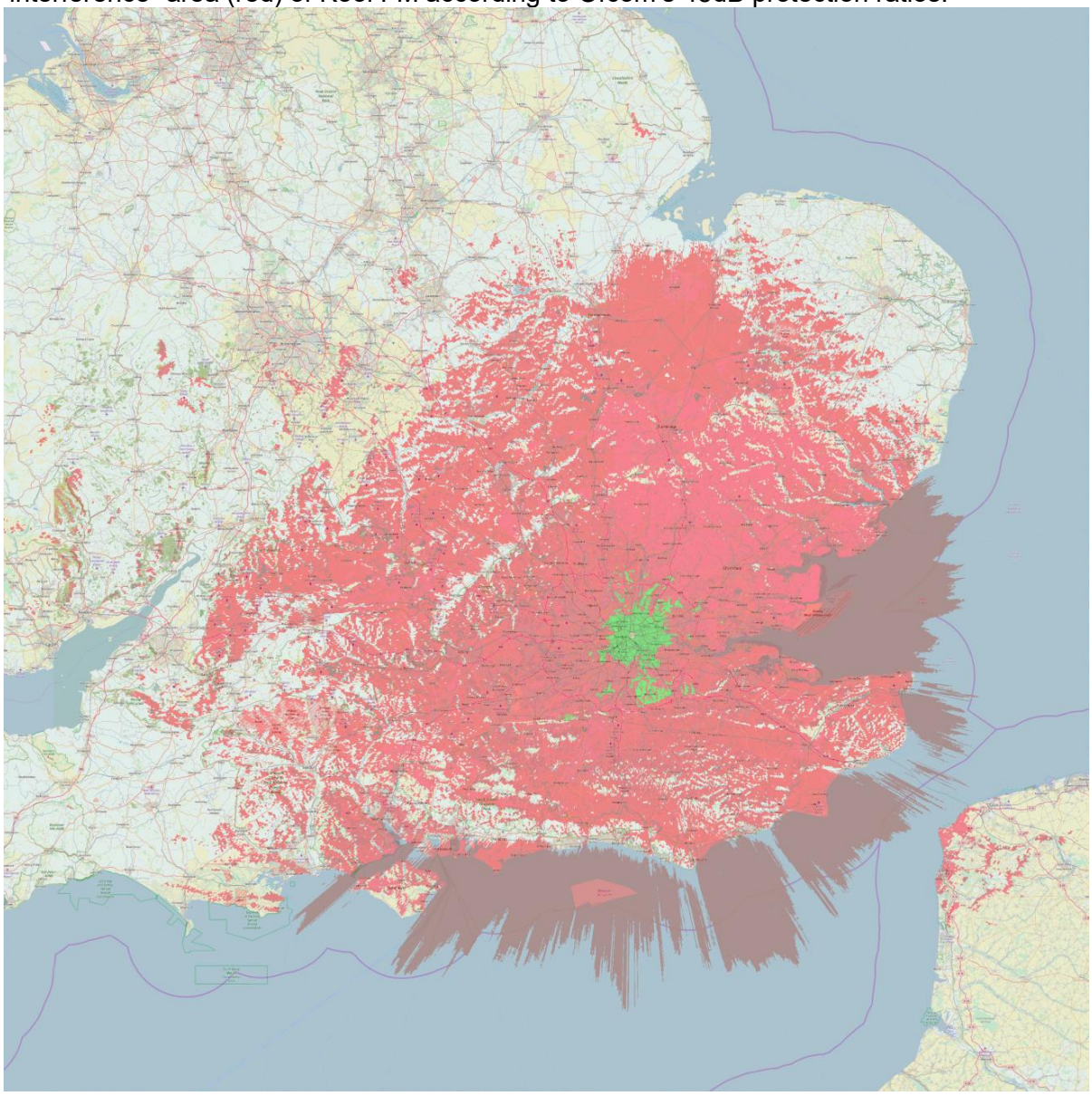
The green area on the left (as defined by 45dB protection ratio) is unrecognisable as the actual service area of Bradley Stoke Radio – indeed it would be most unsatisfactory if the actual service area were that small. In fact, actual perceived coverage of Bradley Stoke Radio is similar to the green area in the image on the right, which was predicted with a protection ratio of 20dB.

Although this sample of one is not conclusive evidence in itself, it shows that in practice, acceptable coverage is possible at co-channel protection ratios some 25dB (≈ x300) lower than those currently detailed in Ofcom's Analogue Planning Guidelines.

4.2. Pirate Stations that do not interfere

Pirate radio transmissions continue to exist. They have the potential to interfere with other licensed service and emergency services communications. For this reason stations are often raided and closed down. However there are stations that apparently do not cause interference because they are not removed and continue to transmit over very extended periods of time.

One example is Kool FM that has transmitted in London on 94.6MHz since 1991. Although it has been raided several times, for the majority of time its transmissions have continued unhindered. The image below illustrates the service area (Green) and co-channel "interference" area (red) of Kool FM according to Ofcom's 45dB protection ratios.

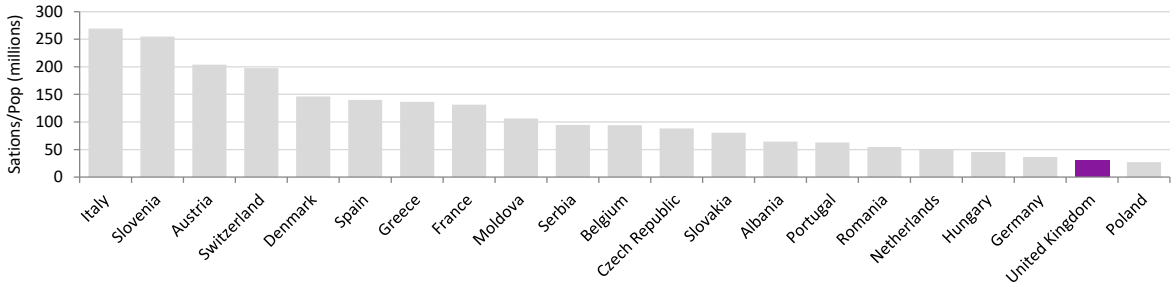


This interference area completely encompasses licensed stations on 94.6MHz (BBC Berkshire, Cabin Radio, Radio 4), as well as several adjacent channel stations (BBC 3CR, Saint FM, Radio 4). If this 45dB co-channel protection ratio really represents interference, it would seem surprising that Kool FM has been permitted to interfere to so many stations over

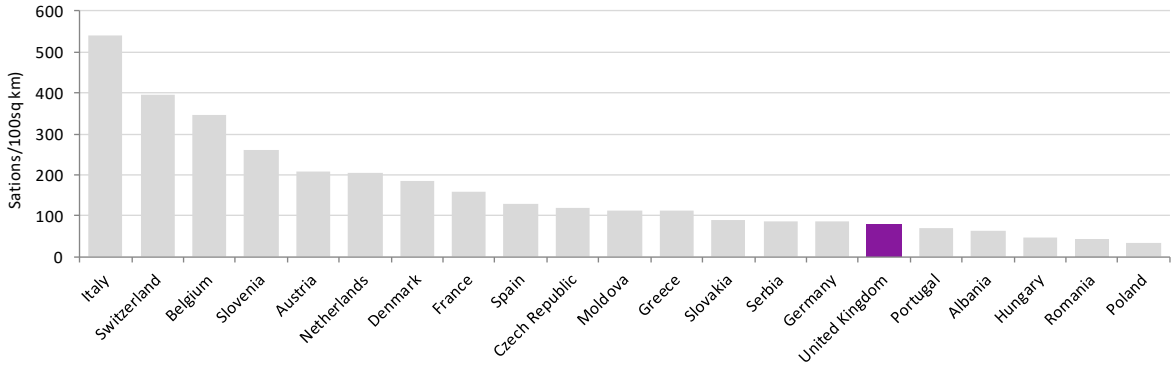
such a long period. In reality it seems that 45dB is far too cautious a figure, and that these stations have been able to happily coexist with Kool FM at lower protection ratios due to the FM capture effect which means that the radio will lock on to the strongest signal (Ofcom's own words), thus explaining the relaxed approach of the Regulator over many years.

4.3. Comparison with other ITU member States

Analysis indicates that FM frequency re-use in the UK is amongst the lowest in the EU. As can be seen from the chart below, the UK has far fewer FM stations (transmitters) per million population than most medium and large sized European countries: -



Of course, the above chart does not take into account the geographical size of countries. It could be argued that the UK is a very densely populated country, and hence FM frequency planning is more challenging. Yet an analysis by area (considering the number of FM transmitting stations per 100km square) also indicates the UK is not using its Band II spectrum resource as intensively as many other EU countries:



This simple analysis is not conclusive evidence of an overly conservative approach to FM frequency planning in the UK alone, but it adds an interesting, quantitative data point to the picture.

"If the UK took a similar approach to Italy, the UK could support 5 times as many transmitting stations as it currently does"

In comparison to Italy (broadly similar landmass and population) it indicates that potentially, if the UK took a similar approach to Italy, the UK could support 5 times as many transmitting stations as it currently does.

4.3.1. Planning Parameters used in other countries

Many countries follow the parameters defined by ITU in (ITU-R BS.412-9) – but perhaps it is possible that they exercise more discretion in how they are applied? For example, maybe they have a different threshold for the size considered for interfered area, or use different propagation models when predicting interference?

4.3.1.1. Co and Adjacent Channel Protection Ratios

There is some evidence that in some countries they have adopted different protection ratios – for example USA and Canada:

kHz Spacing	UK ITU BS412	USA CFR 73.215	Canada BPR-3
0	45	20	20
100	33		
200	7	6	6
300	-7		
400	-20	-40	-26

It would be interesting to examine what protection ratios, or judgement criteria are used in EU countries that exhibit much higher FM frequency re-use than the UK.

4.3.1.2. 10.7, 10.6 and 10.8MHz Protection

In this area Ofcom chooses to stray away from ITU recommendations and adopt an (even) more strict approach.

ITU-R BS.412-9 paragraph 2.4 recommends a protection ratio of -20dB for 10.7MHz relationships (only).

Ofcom RTPG358 rules extend protection to 10.6 and 10.8 MHz channels in addition to 10.7MHz. They also use an absolute level of 65dBµV/m (for 10.7) 80dBµV/m (for 10.6 and 10.8) instead of using a Protection Ratio. RTPG358 contains no explanation or evidence supporting this UK opt-out from ITU-R BS.412-9.

An examination of practice in other countries reveals a mixed practice. Some, like Germany appear to follow strict image channel protection. But others like France and Netherlands seem to ignore them. Take for example the Eiffel Tower broadcasting site which has a large number of co-located FM services. In the table below, channels marked in red have a 10.7MHz relationship, and those marked in orange have a 10.6 or 10.8 MHz relationship:-

MHz	RDS-PI	Station	Transmitter	Ant height (m)	Power kW	+10.7	-10.7
87.8	F201	France Inter	Paris/Tour Eiffel (75)	310m	10	98.5	
89	FE10	RFI Paris	Paris/Tour Eiffel (75)	310m	10	99.7	
89.9	F223	TSF Jazz	Paris/Tour Eiffel (75)	304m	10	100.6	
90.4	F218	Nostalgie	Paris/Tour Eiffel (75)	305m	10	101.1	
90.9	FE43	Chante France	Paris/Tour Eiffel (75)	305m	4	101.6	
91.3	F224	Chérie	Paris/Tour Eiffel (75)	305m	10	102	
91.7	F203	France Musique	Paris/Tour Eiffel (75)	310m	8	102.4	
92.1	F208	Mouv'	Paris/Tour Eiffel (75)	328m	8	102.8	
93.5	F202	France Culture	Paris/Tour Eiffel (75)	310m	8	104.2	
94.3	F22B	Radio Orient	Paris/Tour Eiffel (75)	304m	4	105	
96	F214	Skyrock	Paris/Tour Eiffel (75)	299m	10	106.7	
96.4	F227	BFM Business	Paris/Tour Eiffel (75)	291m	4	107.1	
96.9	FE45	Voltage	Paris/Tour Eiffel (75)	304m	4	107.6	
97.4	F226	Rire et Chansons	Paris/Tour Eiffel (75)	305m	4		
99.9	F20B	Sud Radio +	Paris/Tour Eiffel (75)	294m	4		89.2
100.3	F220	NRJ (Paris)	Paris/Tour Eiffel (75)	305m	10		89.6
100.7	FE32	Radio Notre Dame	Paris/Tour Eiffel (75)	291m	10		90
101.1	F221	Radio Classique	Paris/Tour Eiffel (75)	299m	10		90.4
101.5	F22A	Radio Nova	Paris/Tour Eiffel (75)	294m	10		90.8
101.9	F217	Fun Radio	Paris/Tour Eiffel (75)	304m	10		91.2
102.3	F21D	Ouï FM	Paris/Tour Eiffel (75)	299m	4		91.6
102.7	F225	MFM Radio	Paris/Tour Eiffel (75)	291m	10		92
103.1	F216	RMC	Paris/Tour Eiffel (75)	294m	10		92.4
103.5	F219	Virgin Radio	Paris/Tour Eiffel (75)	304m	10		92.8
103.9	F212	RFM	Paris/Tour Eiffel (75)	294m	10		93.2
104.3	F211	RTL	Paris/Tour Eiffel (75)	304m	10		93.6
104.7	F213	Europe 1	Paris/Tour Eiffel (75)	294m	10		94
105.1	F204	FIP (Paris)	Paris/Tour Eiffel (75)	310m	10		94.4
105.5	F206	France Info	Paris/Tour Eiffel (75)	310m	8		94.8
105.9	F215	RTL 2	Paris/Tour Eiffel (75)	294m	10		95.2
107.1	F20A	France Bleu 107.1	Paris/Tour Eiffel (75)	310m	10		96.4

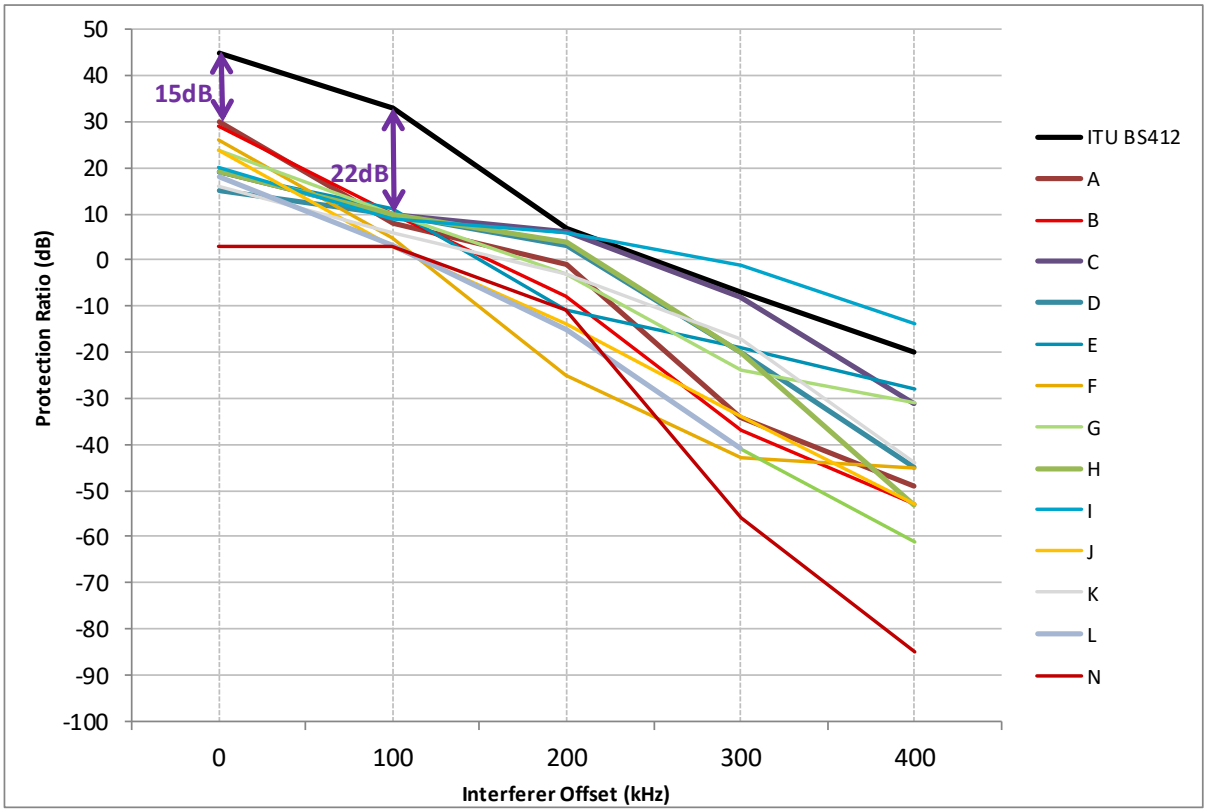
Given this evidence, one needs to consider why practice is so different across Europe, and who is right? Presumably radio receivers adhere to the same technical standards across Europe – so we should ask how are such channel relationships possible in one country, but not another?

4.4. Performance of modern radio receivers

Undoubtedly the technical performance of radio receivers has improved since the ITU planning parameters were originally defined. Surface mount construction has eliminated the need for many tuneable elements, and digital signal processing has enabled channel equalisation which can improve adjacent channel selectivity considerably.

A report by Aegis, commissioned by Ofcom in 2010 (ref 2305/FMC/R/1/2.0), measured the performance of a number of commercially available FM receivers. The results of these tests confirmed that current FM protection ratios seem overly cautious. Even the worst performing radio sets out-performed the Ofcom's Protection Ratios by 15dB for co-channel

and 22dB for 1st adjacent channel, as shown in the reproduction of “Figure 6.5: Receiver selectivity measurements”, from the report:-



5. Pros and Cons of Reducing FM Protection Ratios

Inevitably there are pros and cons of reducing the protection ratios used for planning FM services in the UK.

Pros

- Release more spectrum for new services – enhancing competition and listener choice
- Release more spectrum for power increases for services with inadequate coverage, improving the viability of small stations
- Increase social gain and reduced social isolation in targeted communities

Cons

- More interference for services operating with reduced protection ratios (the interference may not be perceptible)
- Inevitable political/commercial pressure from incumbent interests who see "listener choice" as a commercial threat.
- Reluctance to change policy on a "legacy" technology when there appear to be new alternatives (refer to section 1.2)

5.1. Potential (Positive) Impact of Reduced Protection Ratios

The protection ratios used to plan FM services have a direct impact on the amount of frequency-re-use that is possible in scientific terms – and hence limits the potential number of transmitting stations possible in a given amount of spectrum, in a given geographical area.

Currently there are 1934 FM transmitters in the UK, sharing 203 possible frequencies – meaning that average frequency re-use is 9.5. This status quo is based upon the current defined protection ratios.

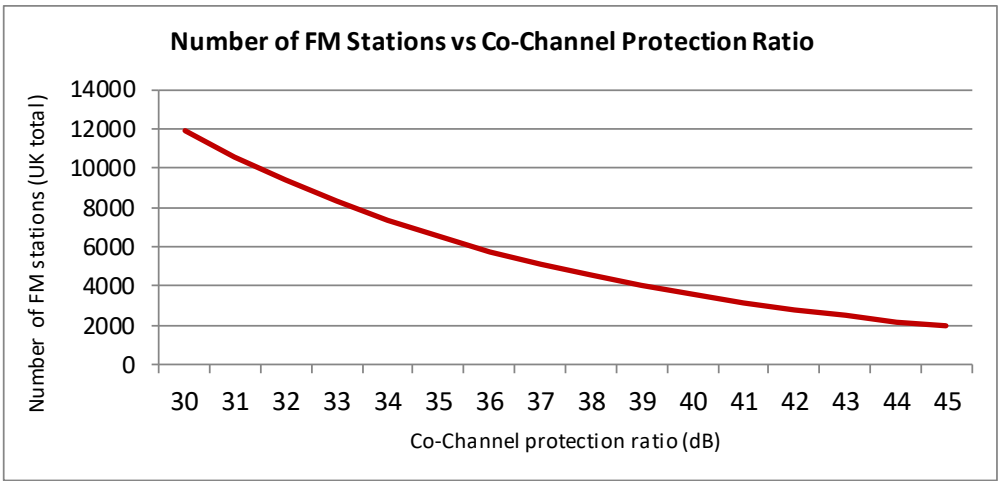
If we assume that the current FM spectrum is 100% utilised at current protection ratios, it is then possible to *estimate* a revised frequency re-use ratio K, and total possible transmitting stations at different protection ratios using the following formula:-

$$K = \frac{1}{3}\left(\frac{6C}{I}\right)^{\frac{2}{\alpha}}$$

Where:

C/I is linear value of Protection Ratio

α is path loss coefficient



This calculation tends to support the real-world FM utilisation figures displayed in section 4.3.

5.2. Potential (Negative) Impact of Reduced Protection Ratios

It is true to say that reducing Protection Ratios will increase interference, however it does not necessarily follow that the interference caused will be noticeable in practice. Some reasons for this are listed in Section 3.2, and detailed in Section 4.

6. Precedent for Change

The conclusion of this white paper advocates, for the reasons given in section 4, changing the planning parameters for FM spectrum planning in the UK away from the default ITU recommendations in ITU-R BS.412-9. For a regulator that takes evidence-based decisions this may appear to be risky, yet the precedent for diverging from ITU-R BS.412-9 has already been seen (Section4.3.1.2).

In policy RTPG 358, Ofcom apply a different criterion for 10.7MHz image channel protection ratio to that advised by the ITU in ITU-R BS.412-9. RTPG 358 details an absolute signal level instead of a protection ratio. Furthermore, it extends the required protection to 10.6 and 10.8MHz channels either side of the image channel. In a typical area that receives say 8 FM radio services, that sterilises an additional 16 channels over and above ITU recommendations.

This divergence in practice demonstrates that rigid adherence to ITU-R BS.412-9 parameters is not mandatory, and thus reconsideration of co and adjacent channel protection ratios is possible and valid.

7. Recommendations and Next Steps

Associated Broadcast Consultants consider that there is sufficient technical evidence to suspect that current Protection Ratios used for planning FM Broadcast services in the UK are overly restrictive. We have presented evidence and reasoning in this document to support that assertion.

Considering the continued strong demand for local services on FM, Associated Broadcast Consultants request that Ofcom consider the possibility of changing the parameters they use to plan FM broadcast spectrum across the UK. We believe that perception or fear of interference (or anti-competitive instincts of incumbents) should not stifle the ability of organisations to satisfy the clamour for truly local radio services.

Specifically, we recommend the following:

1. Consider the evidence presented in this document on face value as a technical proposal, on its technical merits, without being influenced by political considerations, current technical policy or incumbents' positions.
2. If technically valid, confirm, verify or investigate further (eg: what protection ratios do other broadcast regulators use, and how much discretion do they apply?)
3. Test the evidence – either by controlled trials, or inspection of situations where (accidentally or otherwise) the conditions for reduced protection ratios already exist in the UK.
4. Consider reducing co-channel protection ratio by 15 dB and 1st adjacent protection ratio by 22dB in a phased manner.
5. Review the evidence for divergence from ITU-R BS.412-9 for 10.6 to 10.8MHz relationships. If the evidence is not strong enough, revert to ITU-R BS.412-9 approach (-20dB PR on 10.7MHz only).
6. Implementation:
    - 6.1. NOT to consider re-planning frequencies of existing stations – this is unrealistic for such a mature technology as FM broadcast, and total benefit would be unlikely to outweigh total cost.
    - 6.2. NOT consider (yet) implementing on high power transmitters above (say) 500w – in order to minimise any widescale risk. Evaluate at a later date.
    - 6.3. Consider implementing new PR's for new services and technical change requests on low power transmitters below (say) 500w.
    - 6.4. Implement any reduction in PR's in more than one stage to minimise risk – maybe 6dB steps reduction over many months.

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