

A Proposed Structure for the Revised IR2044

A Contribution for the BRIG 16th November 2007

From the FCS Business Radio Group

Foreword

The impending revision of IR2044 (and the TFAC) is a matter of extreme importance to the Business Radio Industry. The FCS Business Radio Group- BRG- is therefore grateful for the opportunity to contribute to this process through the submission of this document to the BRIG Forum.

It is proposed that the structure of the current IR2044 is in need of significant change to align with the principles of technology and service neutrality and to further align with the needs of increased spectrum utilisation, the introduction of more flexible systems and to accommodate the outcomes of trading and liberalisation in which channels may be combined into blocks.

The FCS BRG notes that the appropriate characterisation of equipment through IR2044 might permit a re-appraisal of critical parameters in the licensing regime such as re-use distances, leading to improvements in the number of channels made available.

The New Structure

Many new Interface Regulations in the UK follow a pattern.

1. Contents sheet
2. References list
3. Foreword with standard legal declarations
4. The application of the minimum requirements which explains in standard text the legal basis of the requirements
5. A table of mandatory essential requirements
6. A table of informative statements on further technical points
7. Document history

As a pragmatic measure it is proposed that IR2044 follows this format.

It is proposed that BRIG specifically considers the references and the technical requirements in the mandatory and informative tables. The additional text is legal and regulatory information for completeness

References

It is proposed that the list contain only the harmonised standards. This would therefore mean that EN 301 166-1 would be excluded for example as would the DMR standard from ETSI and MPT1362.

However, note that listing ETSI standards as references in technology neutral spectrum is difficult (see further comments under the informative requirements table section)

Entries in the Tables - A Contribution

Mandatory requirements table

Frequency bands

It is proposed that that this table is re-arranged to list the bands, the duplex spacing arrangements (if any), simplex channels and assumptions on centre frequencies¹ all in one single table. Centre frequencies being defined at least for regulatory purposes are recommended to facilitate the characterisation of side-lobe performance and on-going trading.

Note that the addition of the classification of simplex implies TDD/TDMA operation. Nevertheless, it might be useful to clarify this absolutely with the inclusion of the TDD/TDMA words in this table.

A most critical part of the frequency definition table is a statement clarifying that equipment operating in the bands defined in the table as being for shared operation should be so constructed that they tolerate other users in the band and whether secondary trading will be applied. This matters as equipment not able to tolerate such operation should be discouraged and non-standard operation (such as non-adherence to the use of centre frequencies) has potential consequences on other users and indeed on the value of the spectrum held. However, this is accepted to be more of a matter for the TFAC which will be the subject of discussion under another document.

The frequency table should also outline the channel bandwidths for each band. This is important as separate channels for 12.5 and 6.25 kHz operation may be required. Thus a definition of the channel spacing applied in each band (even if it means sub-banding) will have to be included.

Finally, the table should, we believe, indicate whether individual licensing is required in the band or perhaps whether light licensing is used or even (in the future) no individual licensing at all. Clearly, under the new regime, it is not clear how area-defined licensing affects the band.

Service

A simple statement of MOBILE² should be inserted.

¹ Centre frequencies are determined by International agreement at CEPT under T/R 25-08 which, in the latest versions, has a simple formula that allows any centre frequency in any channel of any band to be determined. Centre frequencies are also very important in the definition of transmitter masks (see below).

² A note in capitals as MOBILE is taken in the ITU as meaning a primary or co-primary allocation to mobile services.

Application and Channel Modulation

It is proposed that the IR retains some mandatory limitation on guidance consistent with the principle of service neutrality. BRIG is recommended to consider **application** being stated to be something like:

“Narrow-band voice and data services with the possibility of concatenation of individual channels to permit enhanced data service delivery”

This is important for practical reasons as much of the spectrum is currently fragmented and likely to remain so for the foreseeable future. Thus narrow-band services are appropriate. This does not preclude the concatenation of a small number of channels to provide superior services if desired.

Channel modulation seems unsustainable and should be deleted.

Max Tx Power

The FCS BRG notes that the concepts of **Designated Service Area** and **Benchmark Spectrum Quality** may make irrelevant the concept of regulating transmitters by means of a permitted transmitted power at a specific antenna position, offering a coverage area directly. However, for the present time the regulation may require the traditional measures.

BRIG is invited to debate this

In summary, the current practice of licensing radio systems by defining power at the mast may have a short lifetime. This has huge potential consequences to the MASTS programme as well.

A New Section On Out of Band emissions (Block-Edge Mask)

The ETSI Norms EN 300 086 etc specify adjacent channel selectivity, spurs and emissions otherwise. These are referenced to a single channel with an absolutely defined centre frequency.

With the introduction of concatenation of channels, this regime simply doesn't work.

It is therefore suggested that BRIG defines a mask that represents the **minimum** requirements for roll-off and out of band emissions of all types, measured in a sensible way and specified in terms of a power density related to distance from the regulatory centre frequency or from the defined edge of the block.

There are many ways that this could be done. However, in the real world this is a non-trivial task and roll-offs tend to have to be started **before** the block edge. It is this fact that makes the definition of the centre frequency so critical for the purposes of the regulation.

As discussed above, such a regulated Tx mask will define the achievable performance of systems under the licence in matters such as re-use distances. Thus the concepts of **Designated Service Area** and **Benchmark Spectrum Quality** are directly driven from this mask. In particular, this concept may be one of the most important parameters in relation to the new licence categories such as Area-defined licences.

This is a critical matter for future customer satisfaction in the UK

Licensing regime

It is suggested that the BRIG considers moving this section to the informative requirements table.

Additional essential requirements

It is suggested that the BRIG consider carefully whether to propose the inclusion of mandatory forms of receiver protection in this section.

Informative Requirements Table

Frequency Planning Assumptions

A statement of where interested parties may find the planning assumptions appears appropriate. However, it implies that there will have to be a revised TFAC rather than simply embedding the policy and data in MASTS.

Licensing regime

It is proposed that this is a simple reference to the authorisation regime under UK law.

References

Although only an Informative section, the listing of references, were it to extend beyond HENs could present difficulties. It is thus proposed that this section contain merely a statement that the list of standards in the references section is used as the basis of the frequency planning of the band.

Remarks

This is a useful general purpose section that might essentially remain empty at this stage.

Notification Number

No comment on this as the whole Notification process for Brussels is currently under examination and may cease to exist by 2009.

Requirements Table Template

- For discussion at BRIG

Some sample data is included for demonstration purposes only

Table 3.1: Minimum equipment requirements for the use of Land Mobile Services operating in the frequency bands from 132.977kHz to 133.977kHz, 146.205kHz to 147.205kHz and 26.225MHz to 470.000MHz						
Mandatory (1-6)						
1	Frequency Band (or Bands)					
	Band	Mode	Channel Spacing	Share ?	Band-width	Licensing
	132.977 – 133.977 kHz					
	146.205 – 147.205 kHz					
	26.225 – 49.494 MHz					
	55.750 – 68.000 MHz					
	68.081 – 87.494 MHz					
	137.962 – 173.094 MHz					
	177.206 – 207.494 MHz				12.5kHz 25kHz	
	412.000 – 414.000 MHz	FDD uplink Paired with 422 to 424MHz		No		
	422.000 – ? MHz		12.5kHz			
	? - ? MHz		6.25kHz			
	? - ? MHz		12.5kHz			
	425.000 – 449.500 MHz					
	450.000 – 470.000 MHz					
2	Radio service		MOBILE			
3	Application		Narrow-band: voice and data services with the possibility of concatenation of channels to enhance data service delivery.			
4	Maximum transmit power limit ³		Base Stations 25kHz - 100Watts ERP 12.5kHz - 50Watts ERP 6.25kHz - 25Watts ERP Mobile Stations 25 & 12.5kHz - 25Watts ERP 6.25kHz - 12.5Watts			
5	Out of Band Emissions		TX Mask defined to be applicable to a single channel or a block of channels			

		$F_c + \frac{1}{2}BW = -3dBc$ $F_c + 1BW = -60dBc$ $>F_c + 2BW = -70dBc$
6	Additional essential requirements	Receivers should.....
Informative (7-10)		
7	Frequency planning assumptions	Ofcom Technical Frequency Assignment Criteria (TFAC) ³
8	Licensing Regime	Individual licence(Area Defined, Technically Assigned and Light Licences) and/or General Authorisation under the Wireless Telegraphy (Exemption) Regulations 2006 Statutory Instrument No.2994
9	Reference	R&TTE Directive See also list of references for guidance on the assumptions used for spectrum planning.
10	Remarks	- Authorisation from Ofcom may be needed to use some frequencies in the above frequency bands, as not all frequencies within these ranges are available for licensing.

³ We note this document is currently released for comment