

Regulatory Position on Uncontrolled Interference from Proximate Transmitters

Dear Member,

In the previous briefing Note on Further Details on the Uncontrolled Interference from Proximate Transmitters, the technical overview of the problem that will certainly affect all members was outlined. It emerged in the conference call that followed the issue of the Briefing Note that there was no disagreement on the technical facts. However, the FCS expressed heightened concern over this issue because members will certainly want to explore commercial opportunities afforded by the rise of IoT business and also maintain the existing business streams. Thus a position is sought that establishes a mutually compatible regulatory environment. A position that results in severe disruption to services of interest to FCS members or which results in the withdrawal of IoT services due to complaints from other sectors, is very much to be avoided.

In the conference call, there was complete agreement that FCS members can be expected to cooperate with each other as it is obviously in their interests to do so. However, it was also pointed out that non-members may be less willing to cooperate (unfortunately, examples have already been encountered).

Since then, there is some early indication that this problem may already be being experienced by some mobile operators. We can expect them to also take legal steps accordingly.

As it appears clear that mere Guidance will be insufficient, the FCS currently plans to advocate a change in Ofcom Enforcement Policy and practice to ensure that mutual coexistence can be achieved. The following appears to be the overall position from a regulatory and enforcement perspective. These basic facts will be used in discussions with Ofcom.

Furthermore, we anticipate a need to modify the ETSI Harmonised Standards or develop new ones to include the necessary arrangements to address Proximate Transmitters.

It is important that FCS members are kept informed on this action.

The EU Legislative Position on Short-Range Device Licence-Exempt Bands close to BR Interests

Spectrum Bands

The Licence-exempt bands are established by EU legislation in Decision 2006/771 (as revised by 2011/829). In summary, they are limited to 868 to 870MHz for the higher power (500mW) applications or bands around 434MHz for lower power.

Note: Under the EU Directives these bands can only be made available on a non-interference-basis¹.

The position in the UK is far more complex. **IRs 2030/1&2** specifies many more bands for licence-exempt uses. Many of the bands permit only low power. However, several have provision for 500mW transmissions. Only these high power entries in sectors that are felt to be subject to change are listed in the following two tables.

Members will notice there are no entries on comments on the frequency band not on transmit power. Members will further notice that the reference standard in all cases is EN 300 220. This is the standard discussed in the previous Briefing Note.

These bands are not all identified in the UK Frequency Allocation Table. Doubtless, that document will have to be updated in the future from the current (2013) version.

It is further noted that even IR 2030 does not yet list the recently opened BR bands 55-68 MHz, 70.5-71.5 MHz and 80.0-81.5 MHz for IoT applications. Neither does it refer to the 872 to 876MHz band. Ofcom plan to issue a new licensing arrangement covering these applications. The proposed power levels to be permitted are not yet entirely clear.

Members will note that the forthcoming LoRa applications in the 868 to 868.6MHz range will be subject to a 25mW limit under the current arrangements.

Viz:

¹Article 3.1: Member States shall designate and make available, on a non-exclusive, non-interference and non-protected basis, the frequency bands for the types of short-range devices, subject to the specific conditions and by the implementation deadline, as laid down in the Annex to this Decision.

Definition: 'non-interference and non-protected basis' means that no harmful interference may be caused to any radio communications service and that no claim may be made for protection of these devices against harmful interference originating from radio communications services.

Interface Number/Notification number/Date	Normative Part								Informative Part
	Application	Comments to application	Frequency band	Comments to Frequency band	Transmit power / Power density	Comment to Transmit power / Power density	Channelling	Channel access and occupation rules	Reference
IR2030/1/19 2010/0168/UK Oct 2010	Non-specific short-range devices	Equipment may be used airborne	869.40-869.65 MHz		500 mW e.r.p.		Channel spacing 25 kHz Consecutive channels may be combined where a larger bandwidth is required, due to the modulation of the signal, up to the maximum sub-band frequency allocation.	Techniques to access spectrum and mitigate interference that provide at least equivalent performance to the techniques described in harmonised standards adopted under Directive 1999/5/EC must be used. This can include for example Listen Before Talk. Alternatively a duty cycle limit of 10 % may be used.	EN 300 220

Interface Number/Notification number/Date	Normative Part								Informative Part
	Application	Comments to application	Frequency band	Comments to Frequency band	Transmit power / Power density	Comment to Transmit power / Power density	Channelling	Channel access and occupation rules	
IR2030/2/1 2010/0168/UK Oct 2010	Industrial/ Commercial Telemetry and Tele- command	Use is limited to remote meter reading. Equipment may be used airborne	169.4 – 169.475 MHz		500mW e.r.p.		Channel Bandwidth ≤ 50kHz	Duty cycle limit 10%	EN 300 220
IR2030/2/2 2010/0168/UK Oct 2010	Industrial/ Commercial Telemetry and Tele- command	Use is limited to asset tracking and tracing Equipment may be used airborne	169.4 – 169.475 MHz		500mW e.r.p.		Channel Bandwidth ≤ 50kHz	Duty cycle limit 1%	EN 300 220
IR2030/2/6 2010/0168/UK Oct 2010	Industrial/ Commercial Telemetry and Tele- command	Music and speech are only permitted when using a digitised signal	458.5 - 458.95 MHz		500 mW e.r.p.		Channel Spacing 12.5 kHz Channel numbers 1 to 25 inclusive and 28 to 31 inclusive and 33 to 35 inclusive are available with a channel centre		EN 300 220

Interface Number/Notification number/Date	Normative Part							Interface Informative Part	
Cont'd	Application	Comments to application		Application	Comments to application		Application	Comments to application	
IR2030/2/7 2010/0168/UK Oct 2010	Industrial/ Commercial Telemetry and Tele-command	Music and speech are only permitted when using a digitised signal	458.5 - 458.95 MHz		500 mW e.r.p.		Channel Spacing 25 kHz Channel numbers 1 to 12 inclusive and 14 to 15 inclusive and 17 are available with a channel centre		EN 300 220

Legal / Regulatory

As noted above, Article 3.1 of the Decision makes it clear that the bands can only be used if the use does not cause interference.

The WT ACT 2006 in sections 54 & 55 appears to make it duty of Ofcom to manage the spectrum for the avoidance of Harmful Interference and to enforce that such interference does not occur. However, it is fully appreciated that enforcement officers need a clear standard to refer to.

Thus with the transmission mask noted in EN 300 220 (repeated here for convenience) and with a lack of any other relevant clause in that standard, It is clear that the deployment of transmitters close to other services will certainly result in harmful interference² and thus will be subject to enforcement action once technical work is completed to establish the performance.

Following a brief survey of some recently introduced schemes, it appears that the suggested operational ranges for some of these IoT applications is 3-6km. Thus this is not a short-range device at all despite it being classed as such under the regulation. The sterilization range of these devices is not known.

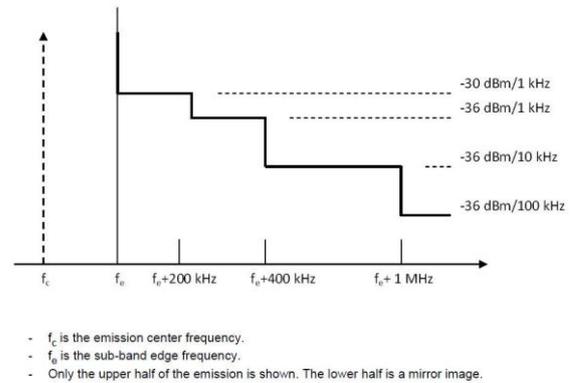


Figure 7: Emission levels

What are the Commercial Exposures?

As numbers increase, FCS members will of course experience significant reduction in the service levels they can offer their customers in the BR sector. As this could be considered one of the prime GTM strategies for BR, this is potentially catastrophic.

However, it appears similarly true that members seeking to participate in new initiatives in the IoT sector will be similarly affected and there may be nowhere else to go because the transmitters seen to-date appear to emit high levels of sideband noise over a wide frequency range. For example, the LoRa standard (802.15.4) that is the subject of intense interest (quite rightly so) is currently characterized in the UK as a 25mW band at 868 to 868.6MHz. It is therefore very close to the much higher-power (500mW) band for non-specific short range devices at 869.4 to 869.65MHz (above). Without adequate filtering of the non-specific devices, the members' LoRa systems could be vulnerable. This is made more problematic because the LoRa devices operating in the LE bands are not protected³.

² It is noted that EN 300 086 considers that equipment used in a Base Station role (I.E. not moving) must meet a 30dB tougher specification for Transmitter Intermodulation (see 7.7.3).

³ The band pass filter on the transmission of the non-specific short range device may thus be a preferred option.

On a pragmatic point, it is felt likely that the enormity of this issue and the likely initial response of Ofcom make it probable that some time may elapse before effective enforcement can be expected. By that time, there may be a lot of deployment already in place and the problem could have risen in severity significantly. The industry is advised to pay particular attention to this and supply Ofcom with as much case evidence as possible to raise the priority within their enforcement groups.

Possible Industry Remedies in the Short Term

Going forward, there appears to be at least two possibilities:

1. That the deployment is re-located to another location that is beyond the range at which the problem occurs. Ideally, this is ensured at the design stage and before deployment.
2. That a suitable band-pass filter is added to the transmitter output

Please can I remind you that you are specifically and kindly asked and encouraged to actively participate in this work as it progresses.

Tim

Tim Cull

Head of Business Radio

Federation of Communication Services

Mobile: +44 (0)771 149 0702

Email: tcull@fcs.org.uk

FCS Website - <http://www.fcs.org.uk>



FCS Ltd.
Burnhill Business Centre
Provident House
Burrell Row
Beckenham, Kent
BR3 1AT

The Federation of Communication Services Limited
Companies House Reg. no. 2749617
VAT No. 611 911 473