Ofcom consultation document response from Continental Compliance Limited, with particular focus on safety of life applications.

In response to the Ofcom document: 'Consultation and information on technical licence conditions for 800 MHz and 2.6 GHz spectrum and related matters' Published by Ofcom June 2nd 2011. (Our DOC A)

1. Introduction

Although with a much wider scope, the Ofcom consultation document invites responses from industry and SRD (Short Range Device wireless users) regarding the coexistence of proposed mass market cellular broadband data equipment (800 MHz LTE) in the UK and 863 to 870MHz short range device (SRD) band licence exempt users.

Our responses here are primarily related to safety of life SRD applications, typified by Social Alarms.

Related documents referenced in the above Consultation Document and commissioned by Ofcom:
'Investigation on the receiver characteristics of SRD equipment in the 863 – 870 MHz band' published June 2011 from Aegis Systems Ltd and ERA Technology. (Our DOC B)

'Short Range Devices operating in the 863 - 870 MHz frequency band published August 2010 from Aegis. (Our DOC C)

The above documents from Ofcom take a position, with significant caveats, that 869 MHz Social Alarm SRD performance will typically suffer only small degradation from the new cellular radio deployment. Quote Doc A paragraph 3.10 "… undue interference from terminal stations appears unlikely"

With due respect to the Aegis report (DOC B), we consider the Ofcom analysis is grossly misleading and based on incredibly optimistic reading of the data. Also, some data is faulty or outdated and requires correction.

2. Technical parameters and assumptions in the Aegis report we highlight for review:

2.1 The report measures the Social Alarm RX threshold sensitivity at -108dBm. The EN 300 220 Class 1 and Category 1 mandatory minimum limit is -107dBm. The vast majority of the 869MHz Social Alarm receivers currently installed in the UK from all manufacturers achieve better than -113dBm, at least 5dB better than presented in the Aegis data.

2.2 The LTE UE mask limit at 869 MHz as presented in EN 301 908-13 v5.2.1 May 2011 is -11.5dBm/1MHz. This is the document referenced in Ofcom DOC A above. The Aegis protection distance analysis using simulated interference (Doc B Paragraph D.2) uses ECC/DEC/(09)03 limits, some 8.5dB lower in level.

2.3 Multiple LTE UE will present increased interference power at the Social Alarm receiver. Social Alarm users and future LTE users will be in close proximity to one another in urban areas. It is quite conceivable that 10 or 20 LTE users would be operating within a 20m radius of a Social Alarm receiver. The resulting interference power and required protection distances increase significantly.

2.4 There is a constant theme in both DOC A and DOC B that a typical scenario is for a relatively low number of resource blocks and reduced LTE UE ERP. With 2 million installed Social Alarms in the UK, conservatively judged to become 3 million by 2013 (DOC C), it is outrageously optimistic to make that assumption the base scenario for judging protection distances? A much more plausible assumption would be for heavily loaded LTE traffic to be encountered quite frequently in some areas. LTE is promoted as a mainstream broadband conduit for mass market portable devices? Social Alarms need to be reliable in terms of working first time, on demand.

3. Aegis protection distance estimate adjustments

3.1 Whilst a typical 869 MHz Social Alarm transmitter demonstrates approximately -10dBm ERP in an EN 300 220 test, this reduces dramatically when operated at floor level, enveloped by a fallen user. In some cases a transmitter in these circumstances at a distance of 25m from the base unit (user with transmitter in the garden for example) will provide a signal of approximately -105dBm to the receiver. This example is given to demonstrate that a 10dB threshold margin is overly generous. The manufacturer's user specification most probably doesn't include that much latitude. We would suggest using the 3dB data as provided by Aegis (DOC B) D.2 page 77. A 10dB margin would require user range specification revision by the manufacturer.

3.2 The spectral mask limit in EN 301 908-13 v5.2.1 adds approximately 8.5dB to the interference level used in the Aegis tests. At a rough estimate, this approximately doubles the protection distances that are presented. Multiple LTE UE will potentially add another 10dB, multiplying the presented Aegis protection distances by a factor of 4 or more.

3.3 Elevated LTE UE, in high rise buildings for example, will enjoy a significantly reduced path loss to the victim Social Alarm receiver and protection distances will multiply significantly.

3.4 The C/I data appears to be based on a Social Alarm threshold sensitivity of -108dBm. The actual sensitivity will be found to be better typically than -113dBm. This will further increase the required protection distances.

3.5 As discussed in 2.4 and 3.1 above, the data with 20dB threshold margin and a low number of RB at low ERP are totally inappropriate when considering how safety critical Social Alarm systems are engineered and co located in huge numbers with future LTE users. This data is not helpful and the conclusions drawn from it not at all representative of the most probable outcome. A 3dB threshold margin is needed and heavily loaded LTE systems with UE at high ERP will be common place in the same environments occupied by Social Alarms users.

3.6 Social Alarm systems with external gain antennas are not considered. These require significantly greater protection distances.

3.7 LTE UE out of channel emissions performance for product to be marketed over the next several years for the UK systems remains uncertain. Similar current generation LTE UE product is available and public domain FCC test reports show emissions only 10dB below the EN limit requirements. The most reliable reference we have is in the EN limits. It would seem folly not to use these when estimating required protection distances. A Social Alarm transmitter user in distress needs the system to work on demand, first time, anywhere in the UK, at any time. Assuming low RB use and reduced UE ERP is simply not good enough. Taking on board the above arguments, 'safe' protection distances of approximately 100m are indicated.

4. Conclusions

4.1 Our reading of the situation is at odds to that presented in the Ofcom Consultation and the Aegis technical report. The required LTE UE protection distances are as large (by greater than an order of magnitude) as to 'clearly' obsolete the UK 869 MHz Social Alarm frequency allocation for the current generation of equipment.

4.2 The move from exclusively wired Social Alarm systems for the elderly and infirm to include radio based products took place in the UK around 1982. Importantly at the time, a significant focus was placed on the relative reliability, wired and wireless. Was wireless good enough? Well engineered and reliable wireless (radio) systems resulted and have been deployed since. The Ofcom analysis in the June 2011 consultation on the impact of 800 MHz LTE UE on current generation 869 MHz Social Alarm systems is faulty and if used unchecked as input for determining future mitigation strategy, seriously endangers millions of users. Social Alarm systems provide peace of mind to millions of infirm people in the UK. They also regularly save lives.