Your response

Question	Your response
Do you agree with our proposal to take steps to mitigate risks related to EMF and be in a position to hold licensees, installers and users to account if issues are identified? Please explain the reasons for your response.	The FCS is grateful for the opportunity to contribute to the work addressing fears over the safety of the public. The FCS understands that the current public concerns over the introduction of 5G infrastructure (as reported in the media) requires a response from Ofcom. We further recognise that along with other radiocommunications providers, we are already obligated to ensure that our systems follow the ICNIRP Guidelines (1998). Thus, adding a condition to the licence will make little technical difference to the solutions we provide. Obviously, Business Radio systems are very different from 5G systems and so the issues are also different. In the process of deploying a Business Radio solution, it is usually the case that the licence must be applied-for prior to any work commencing. This means that the installation does not actually exist at the time the licence application is made. As a result, compliance to the Guidelines cannot be attested on the basis of actual measurements. It can only be assured through of calculated predictions done at that stage. As defined in IR2044, Business Radio systems operate in the allocated bands and these are at much lower frequencies than 5G (Noting that there may be 5G systems operating in sub-1GHz bands). Many of the systems operate at frequencies of around 150MHz and 450MHz. That means they have wavelengths (λ) of 2m and 0.67m. Generally, the Reactive Near Zone is taken to extend to 3λ (6m and 2m, respectively). Due to the relatively low powers of the infrastructure units such as base stations and the fact that they often work in a intermittent or pulsed mode (there are periods when no

	communications are in progress), the majority will have very short compliance distances. Typically, the installed system has a compliance distance that is within the Reactive Near Field zone. As such, the fields cannot be accurately calculated in advance. Furthermore, any disturbance in the zone will change the field in the zone and so, once the system is installed, taking measurements that are meaningful is also extremely difficult, if not impossible. These problems are well understood and were addressed in FCS1331 (as noted in the consultation document). FCS1331 contains a series of tables which cross reference antenna gain, Tx power and distance to the point that compliance to the Guidance was achieved. The calculations were performed using the well-established field equations that now appear in IEC 62232, Edition 2.0 as B16 & B17. These field equations provide a conservative estimate, as also noted in the IEC standard (see page 115 et al). In 2013, for FCS1331, the FCS used far-field estimations, not because they were thought to be an accurate representation of the field that would be produced, but because the equations provide an upper bound on what could be expected. The FCS believes that this approach is equally valid to meet the needs of Ofcom in policy terms today. We propose to modify the FCS1331 tables to match the 10W limit and provide FCS members with an easy route to assuring compliance. A declaration by the installer that the installation has consulted the tables and determined that the fields fall within the Guidance at a stated exclusion distance that will be enforced by actions, would then provide Ofcom with the necessary proof that the issue has been addressed in the installation and that a solution found that meets the guidance. The FCS further notes that there has been a significant rise in the use of leaky feeder antennas when providing service indoors or in tunnels, mines and specific other cases. By

	definition, these systems are short range solutions as far as the user is concerned but the cable itself may be very long (in the extreme it could be kilometres). In general, the power radiated from any one section is very low and neighbouring sections are at such a distance that they don't materially contribute to the total field at that point. See Recommendation ITU-R M1075 for a brief summary. Cylindrical models could be utilised to confirm compliance (see IEC62232 B 4.2.1.1.3). However, compliance distances would again be small or zero.
Do you agree with our proposal (a) to include a condition in spectrum authorisations requiring compliance with the basic restrictions for general public exposure identified in the ICNIRP Guidelines; and (b) that this condition should apply to equipment operating at powers greater than 10 Watts?	Yes. The actions of some members of the public that are intended to damage radiocommunications installations could be extremely dangerous in the case of Business Radio systems. We would like this to be avoided. We would further note that at 10W, the compliance distances calculated for typical BR systems are so low that there is very little chance of the system not complying with the Guidance. If reference is to be made to the 2020 Guidance, the FCS notes that the reference level in that document must be met over a 30-minute averaging period (Table 5, Note 3). For BR systems, taking in to account the intermittent transmissions that are characteristic of the usage, the longer averaging period makes compliance distances even shorter. Taking the low probability of exceeding the Reference Levels in the Guidance, the stipulation that the antenna must be 2.2m above the public walkway (making the obvious assumption about how this would be applied in public concourses that are actually below-ground - as in the case of underground stations, for example), the further distance probably eliminates any risk to the public. In addition, BR systems are intended to support operations. As such their use is relied upon by the user. The user will seek to situate the system elements in such a way that it is unlikely they will suffer physical damage. This means

	the systems will be located in places where access to them is not available to the general public, adding still further to the distance between them and the general public. The FCS would suggest that point-to-point links often have very high gain antennas. By definition, any close-in subject will be situated off-bore of the main lobe at a location where the gain is much less and probably even negative. Thus, a 100W transmission off-bore may be in a direction that has a worse than -10dB gain. In such a case it meets the 10W threshold and so falls outside the compliance proposals, even at zero range. Furthermore, the link is likely to be deployed at some height above 2.2m. There may be an opportunity to reduce administration in such clear cases.
Do you agree with our proposed guidance on EMF compliance and enforcement? Please explain the reasons for your response.	The FCS would make the following contributions in relation to Annex 2 of the consultation. A2.1 The consultation notes the importance of Table 7 in point A2.7 (the reference is to the 1998 Guidance). The FCS wishes to clarify that it refers its work to that table. The FCS draws particular attention to notes 3 & 5 (under (a)) which reduce the compliance distances. If reference is made to the 2020 Guidance, the averaging is done over 30 minutes, not 6 minutes. This further reduces the compliance distances by up to a factor of five due to the intermittent nature of BR operations. Footnote 51 Noted. A2.12 Noted. A2.13 The FCS considers that these matters will be addressed right at the start of the system provision process in order to establish a suitable solution. This is especially true on Shared Sites as interference needs to be checked to ensure that the proposed solution will actually work to the desired operational requirements. In the course of that investigation, any signals from other transmitters that are large enough to be of

	consequence in the context of EMF will certainly be detected. A2.14 Noted. However, if in the course of the investigation into the suitability of a site for further deployments it is found that the site is already so close to the Reference levels in the Guidance, it may be prudent to advise Ofcom of that fact. A2.17 The FCS notes that access to sites can be difficult to arrange. Other sections Noted.