Your response

Question	Your response
Question 1: Do you agree with our analysis of potential demand for the 1900 MHz band? Are you aware of any other potential demand for this spectrum, including any demand specific to Northern Ireland?	Yes, as noted in Ofcom's consultation document, 1900-1910 MHz has been internationally harmonised for Future Railway Mobile Communications System (FRMCS). Please refer to Network Rail's response to Ofcom's 2023 consultation on enabling future use of the unpaired 2100 MHz for confirmation of the railway's demand for this harmonised spectrum. In September 2021, the European Commission announced the harmonised use of the paired frequency bands 874.4-880.0MHz and 919.4-925.0MHz. This adds an additional 1.6MHz onto each of the existing GSMR 4MHz paired spectrum bands to cater for a 5MHz 5G spectrum requirement and has not been reflected correctly in section 3.6. The use of the 900MHz spectrum post GSMR switch off will enable efficient cell planning providing spectrum resilience to FRMCS services and increased capacity for new services to enhance railway operations.
Question 2: Do you agree with our identification of FRMCS as the optimal use of the 1900–1910 MHz spectrum?	Yes, Harmonising the spectrum is a goal of the World Radio congress and the railway has a very clearly defined use case for n100 and n101 across Europe and beyond.
Question 3: Do you agree with our identification of ESN Gateways as the optimal use of the 1910–1915 MHz spectrum in Great Britain? Do you agree that it is too early to identify an optimal use of the 1910–1915 MHz spectrum in Northern Ireland at present?	The allocation of 1910-1915 will introduce a known interference risk to the TDD 1900-1910 allocation. Compared with the other potential demands for 1910-1915 MHz identified in section 3.12, the temporary and sporadic use case of the ESN gateways would reduce the impact on critical railway services proposed for use in the 1900-1910 band. Network Rail would therefore agree that this use case is the optimal use for this spectrum from the perspective of the user of 1900-1910.
Question 4: Are you aware of any low power use cases suitable for the 1915–1920 MHz spectrum?	No

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Question 5: Do you have any comments on our proposed authorisation approach for FRMCS?	As stated in 4.4 deployment of FRMCS will vary over the next 15 years. Will authorisation from 2029 be linked to the full licence fee for that spectrum regardless of build out and usage plans over the 15 year period? See also response to Q8.
Question 6: Do you have any views on our proposed non-technical conditions for the new FRMCS licence?	NR agrees with the licence condition restricting the use to operational rail communications only. NR assumes that the restriction referred to in paragraph 4.7 relates only to the radio spectrum and the reference to the "Network" does not restrict the potential fixed infrastructure sharing for commercial purposes should this become a possible avenue to supplement the public purse investment in the railway. We would also like clarification on the definition of "operational" as from a railway perspective this would cover all existing and future use cases defined within the FRMCS specifications. This would cover potential on board communications by train operators and track side applications used by third parties e.g. maintenance or delivery contractors. It would not cover any commercial gain from the licenced spectrum.
Question 7: Do you have any views on our proposed licensing process for the FRMCS licence?	NR is supportive of the proposed licensing process. Please see our answer to question 6 regarding the need for clarification of the definition of operational rail communications services.
Question 8: Do Are you aware of any uses that can coexist with FRMCS without creating a risk of harmful interference? If so, please provide evidence.	Separated, potentially low power use cases in areas geographically separated from the railway could in theory share the same spectrum with little risk of interference. Co-ordination would still be required. Likewise, the roll out of 1900MHz nationally will take quite some time and may span ten years. With close co-ordination of the deployment plans, there will be areas of the country where FRMCS is not deployed for some time and potentially these areas could utilise the available spectrum on a short term basis but noting the primacy and obligations for the railway.

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	Also, as with GSMR, there is the potential for JOTS mast sharing if the correct controls are put in place. Whilst this does not share the spectrum it does share the infra-structure. It is proposed that additional JOTS testing with FRMCS is undertaken.
Question 9: Do you agree with our proposed approach for authorising ESN gateways in 1910–1915 MHz?	yes
Question 10: Do you have any views on our proposed non-technical licence terms for the ESN gateways licence?	no
Question 11: Do you have any views on our proposed licensing process for the ESN gateway licence?	no
Question 12: Are you aware of any uses that can coexist with ESN Gate-ways without causing risk of harmful interference? If so, please provide evi-dence.	no
Question 13: Do you have any com-ments on our assessment of the coex-istence of FRMCS in 1900–1910 MHz with existing DECT and FDD uplinks?	NR agrees with the OFCOM statements 6.14-6.20 and agree with the need for co-ordination. Additional attention in respect to DECT may be required for temporary outdoor events using DECT communica-tions in close proximity to the railway.
Question 14: Do you have any com-ments on our assessment of the coex-istence of ESN Gateways in 1910–1915 MHz with existing DECT and FDD up-links?	Answers to the following questions 15/16 are also rele-vant to this as the OFCOM proposed TDD frame struc-ture would be problematic. Interference would be mini-mised with a symmetrical frame structure and further mitigated if, as stated in 6.25, downlink traffic is mini-mised.
Question 15: Do you have any com-ments on our assessment of the coex-istence of ESN Gateways in 1910–1915 MHz with FRMCS in 1900–1910 MHz?	The 3GPP frame structure presented in table 6.1 is for LTE and does not reflect the FRMCS Frame structure now agreed at a pan-European level.

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	Also the sub carrier spacing for FRMCS has been defined as 30kHz and the proposal assumes a similar 15kHz SCS as per LTE. (see response to Q16 also) Pattern 0: ESN will suffer on slot 3 and 8 but FRMCS will not suffer Pattern 1: ESN will suffer on slot 3 and 8 but FRMCS will suffer in ESN slot 4 and 9 Pattern 2: ESN will not suffer but FRMCS will suffer in ESN slot 4 and 9 Pattern 3: ESN will suffer on slot 3 but FRMCS will suffer in ESN slot 7 and 9 Pattern 4: ESN will suffer on slot 3 but FRMCS will suffer in ESN slot 4, 7 and 9 Pattern 5: ESN will not suffer but FRMCS will suffer in ESN slot 4, 7 and 9 Pattern 6: ESN will suffer on slot 3 and 8 but FRMCS will suffer in ESN slot 9 From Table 6.1 FRMCS using Pattern 0 and ESN using Pattern 2, ESN will not be impacted at all while FRMCS will suffer 66% of its UL slots (4 out of 6 UL slots will be interfered by ESN downlink slots). If using the FRMCS pattern proposed by the ETSI RT committee* with 30kHz SCS, ESN will not be impacted at all while FRMCS will be susceptible to interference across 50% of its UL slots. We would propose / request that during the FRMCS proof of concept works, the ESN frame patterns are validated against the industry agreed FRMCS frame pattern to define the actual impact and potential mitigation guidance defined. [✂] *Ref. ETSI RT(23)088059 and RT(23)088063
Question 16: Do you have any comments on the feasibility of the additional mitigation measures we have identified, or additional suggestions for measures that could further reduce the likelihood and/or impact of interference?	Due the FRMCS 5G SCS being at 30kHz and ESN LTE at 15kHz, it would be impossible to achieve a fully synchronised TDD frame structure between the two configurations. We would agree with the additional mitigation measures suggested in non-synchronised working .

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Question 17: Do you have any comments on our proposed technical licence conditions for FRMCS and ESN gateways?	For the reasons detailed in the answers to questions 14-16, a symmetrical frame structure would be the preferred approach
Question 18: Do you agree with our provisional conclusion that there is likely to be excess demand for the 1900–1915 MHz band, in future, if cost-based fees were applied; and, therefore, that an AIP fee is appropriate? Please provide any evidence to support your position.	Please also see the response to Q19. As the proposal is for critical national usage and defined as non commercial, would this not preclude any demand regardless of the affordability of the licence thus making a cost based approach more appropriate. In reference to Q8 and sharing, a lower cost associated with a lower power licence in the areas outside of the railway interference limits could potentially lead to innovative usage in localised applications.
Question 19: Do you agree with our approach to fees, including fee level and adjustments? Please provide any evidence to support your position.	We agree that benchmarking is an appropriate methodology for setting fees, including a cost-based fee. With regards to the international benchmarking detailed in 7.15 we have conducted a benchmark exercise for the relative GSMR licence fees from a range of European Railway comparators and feel this provides a more direct like for like usage benchmark than table 7.1. Please see annex for details of our international benchmarking exercise. Of the fourteen respondents, most have a flat fee of which some are nominal administration fees and would suggest that “Cost Based fees” are more common. Two have a per kilometre fee structure, one has a per MHz fee and another has per site fees. The combination of these are similar in the approach stated in 7.29. but are higher fees than those in Europe (with the assumption fees for 1900 would be similar to that of existing 900Mhz GSMR fees). The proposed fee per MHz (£145,800) is more than ten times greater than Railway F at €145k/10Mhz. Comparing the two railways with a scaled fee based on route km’s as proposed in 7.29, these translate to €1.58m (£1.34m) and €1.3m (£1.1m) for the 10,000mile network coverage of Great Britain. Taking the per site fee of Railway N as €275 this would scale up to the equivalent of €825k (3000 sites) for today’s GSMR network and would obviously increase with the 1900MHz

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	densification requirements. Even at 6000 sites, it would still be less than the proposed FRMCS licence fee. We would request that these international benchmark results are considered when finalising the fee's.