## Three's response to Ofcom's consultation: Future authorisation of the 1900-1920 MHz band

## **Non-confidential**

#### Date 19/05/2024

This is a non-confidential version. Confidential redactions are marked with  $[\gg]$ .



### **Executive Summary.**

Three welcomes the opportunity to respond to Ofcom's consultation on the future authorisation of the 1900-1920 MHz band.

It is a well-established engineering fact that the coexistence of FDD and TDD systems in adjacent spectrum bands can result in harmful interference, primarily due to out-of-band emissions. This interference can significantly degrade mobile signal quality, ultimately impacting the user experience.

To mitigate such interference, a guard band is typically implemented between TDD and FDD spectrum. While Ofcom is not currently proposing any use for the 1915-1920 MHz, the Consultation indicates that Ofcom remains open to authorising low-power use in this frequency range in the future.

Our view is that the 1915-1920 MHz band should be permanently reserved as a guard band. This would mitigate interference from potential Future Railway Mobile Communication System (FRMCS) deployments and Emergency Services Networks (ESN) gateways operating in the 1900-1915 MHz band, thereby protecting mobile uplink transmissions in the FDD spectrum above 1920 MHz.

We note that Ofcom's coexistence analysis places significant reliance on the assumption that MNOs will implement additional filtering with enhanced receiver selectivity to mitigate interference between FRMCS/ESN gateways and the FDD uplink spectrum (1920-1980 MHz). The cost of deploying such filters is high and would impose a substantial financial burden on MNOs.

We therefore ask Ofcom to place coordination requirements on FRMCS and ESN gateways licensees, rather than placing the full burden on MNOs. Coordination would ensure targeted deployment of filters only where interference is likely, reducing unnecessary costs.

Our responses to the Consultation questions are provided in the section below.

# Response to Ofcom's specific questions.

**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?

Three has no comments.

**Question 2:** Do you agree with our identification of FRMCS as the optimal use of the 1900–1910 MHz spectrum?

Three has no comments.

**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?

Three has no comments.

**Question 4**: Are you aware of any low power use cases suitable for the 1915–1920 MHz spectrum?

We do not believe that any low-power use is suitable for this band. The optimal and most effective use of the 1915-1920 MHz spectrum is as a guard band to protect against interference from FRMCS and ESN gateways in the 1900-1915 MHz spectrum into FDD mobile deployments above 1920 MHz.

When TDD equipment is operating in proximity<sup>1</sup> to FDD equipment without an appropriate guard band and out-of-band emission limits, the downlink and uplink transmission from TDD can interfere with the uplink transmission from FDD. Interference will occur even when equipment is transmitting at low power, if the base stations are in proximity. This interference can lead to degraded signal strength quality and impact negatively the overall service customers experience. A guard band is therefore necessary to mitigate this interference.

Ofcom's technical proposals for FRMCS coexistence rely on ECC report 318, which assumes a 10 MHz separation between FRMCS and FDD mobile deployments above 1920 MHz. In light of the potential ESN gateway use in 1910-1915 MHz, the likelihood of interference increases, further justifying the need for a dedicated guard band.

<sup>&</sup>lt;sup>1</sup> The risk of interference differs with proximity. Although the greatest risk is when the equipment is in close proximity, there retains significant risk even at larger distances.

International evidence also supports our view that it is necessary to leave a guard band between adjacent TDD and FDD spectrum:

- In Europe, CEPT approved ECC Decision 20(2)<sup>2</sup> harmonising the use of unpaired 1900-1910 MHz for Railway Mobile radio (RMR) use, which includes FRMCS as well as GSM-R. Our understanding is that 1910-1920 MHz (10 MHz) is used as a guard band to protect FDD spectrum above 1920 MHz.
- Infocomm Media Development Authority of Singapore (IMDA)<sup>3</sup> has proposed a guard band between TDD 1900 MHz and FDD 2100 MHz and has intended to set aside 5 MHz for this purpose.
- In the 2.6GHz band Vodafone's TDD spectrum (2570-2595MHz) sits next to EE's 2.6GHz FDD spectrum (2640-2690 MHz downlink paired with 2520- 2570MHz uplink). Although Vodafone owns 5MHz (2570-2575), our understanding is that its RAN vendor has advised that the 2570-2575MHz cannot be used for mobile, and it has to be set aside as a guard band to protect the uplink of the 2.6GHz paired spectrum.

**Question 5:** Do you have any comments on our proposed authorisation approach for FRMCS?

Three has no comments.

**Question 6:** Do you have any views on our proposed non-technical conditions for the new FRMCS licence?

Three has no comments.

**Question 7**: Do you have any views on our proposed licensing process for the FRMCS licence?

Three has no comments.

**Question 8:** Are you aware of any uses that can coexist with FRMCS without creating a risk of harmful interference? If so, please provide evidence.

Three has no comments.

**Question 9:** Do you agree with our proposed approach for authorising ESN gateways in 1910–1915 MHz?

Three has no comments.

<sup>&</sup>lt;sup>2</sup> <u>ECC Decision (20)02</u> <sup>3</sup> <u>Microsoft Word - Consultation Paper for 800 MHz (16May19)(final).docx</u>

**Question 10:** Do you have any views on our proposed non-technical licence terms for the ESN gateways licence?

Three has no comments.

**Question 11:** Do you have any views on our proposed licensing process for the ESN gateway licence?

Three has no comments.

**Question 12:** Are you aware of any uses that can coexist with ESN Gateways without causing risk of harmful interference? If so, please provide evidence.

Three has no comments.

**Question 13:** Do you have any comments on our assessment of the coexistence of FRMCS in 1900–1910 MHz with existing DECT and FDD uplinks?

We believe Ofcom's reliance on ECC report 318 overlooks the cost and practical challenges associated with its recommendations. The report suggests that interference from FRMCS can be mitigated by enhancing selectivity in FDD base station receivers – effectively requiring the addition of filters at each mobile site.

[**≻**]⁴.

Given this, we recommend that:

- Ofcom reserve the 1915-1920 MHz as a guard band, rather than allocating it for low power use in the future; and
- Ofcom to put in coordination requirements on FRMCS deployments near mobile base stations using 1920-1980 MHz spectrum. Specifically, FRMCS base stations located near mobile sites should:
  - Notify near MNO prior to deployment; and
  - Limit their EIRP toward mobile sites through antenna down tilt or power reduction.

**Question 14:** Do you have any comments on our assessment of the coexistence of ESN Gateways in 1910–1915 MHz with existing DECT and FDD uplinks?

We do not believe that the assumption of enhanced filtering on FDD base stations will sufficiently protect against interference from ESN gateways. While such filtering may provide some level of protection, its effectiveness is uncertain given that the location and radiation pattern of ESN gateways are unknown. Unlike FRMCS base stations, which are generally deployed along railway tracks, ESN gateways can be installed in a wide range of locations and may transmit in various directions to serve users.

As a result, we would be required to upgrade all sites where we have deployed 1920-1934.9 MHz spectrum with additional filtering to ensure enhanced selectivity. This would impose a significant cost burden on us. We therefore ask Ofcom to place coordination requirements on ESN gateway deployments – similar to those we proposed in response to question 13 for FRMCS base stations – to ensure they do not impact mobile networks operating above 1920 MHz.

Furthermore, we note that additional filtering alone is not sufficient to protect FDD uplinks from interference. A guard band should also be used in combination with filtering to ensure protection against interference.

**Question 15:** Do you have any comments on our assessment of the coexistence of ESN Gateways in 1910–1915 MHz with FRMCS in 1900–1910 MHz?

Three has no comments.

**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?

Three has no comments.

**Question 17:** Do you have any comments on our proposed technical licence conditions for FRMCS and ESN gateways?

As set out in our response above, we recommend that Ofcom:

- Impose coordination requirements on both FRMCS and ESN gateway deployments near mobile base stations operating in the 1920-1980 MHz range.
- Require mitigation measures (e.g. antenna downtilt, reduced EIRP) to minimise risk of interference.

These measures would ensure a fair distribution of responsibility among new and existing licensees and prevent a disproportionate cost burden on MNOs.

**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 costbased fees were applied; and, therefore, that an AIP fee is appropriate? Please provide any evidence to support your position.

Three has no comments.

**Question 19:** Do you agree with our approach to fees, including fee level and adjustments? Please provide any evidence to support your position.

Three has no comments.