JRC Response to the Consultation on

More Radio Spectrum for the Internet of Things

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KEY POINTS

- JRC welcomes the opportunity to respond to this consultation regarding this unused VHF Low Band and Band I spectrum.
- JRC suggests that the term Machine-to-Machine (M2M) should be interpreted widely and not assumed to be technology specific
- JRC highlights that the utilities have been operating Resilient Machine to Machine (RM2M) systems for over 50 years.
- JRC highlights that the electricity utilities typically use the 400 MHz UHF band for their RM2M systems because of the lower noise floor in this spectrum when compared with VHF spectrum. The problem being that the occasional electrical discharges from sub-stations, power lines, etc, are a source of very low-level radio interference to nearby VHF band radio receivers so self-interference may result if VHF channels are used.
- JRC understands that the lower VHF spectrum suffers higher levels of noise floor interference than the VHF Mid Band and High Band spectrum.
- JRC highlights that tropospheric propagation may result in harmful interference to UK systems from its European neighbours. This may result in VHF Band I not being suitable as part of a resilient system.
- JRC highlights that, whilst access to more spectrum in bands below 1 GHz is needed by the power utilities if they are to fulfil their regulatory obligations to maintain secure and sustainable supplies of electricity and gas, and to restore supplies in a timely manner when those supplies are interrupted for any reason, the proposed Band I and VHF Low Band spectrum may not be suitable.
- JRC agrees that the current Business Radio licence products, e.g. Area Defined licences, may be suitable for M2M systems within this Band I and VHF spectrum.
- JRC notes that the lengths and inefficiencies of antennas typically used within this spectrum may be an issue for handheld equipment.
- JRC notes that, like other bands, there may be interference issues if wide-band systems are assigned adjacent to 12.5 / 25 kHz systems.

Consultation questions and JRC's responses

Q1a. Do you agree that the spectrum we have identified (in figures 4.2 and 4.3 above) is suitable for M2M applications for remote and rural locations?

JRC agrees that this spectrum could be used for narrow band machine to machine (M2M) systems but is mindful of the problems of a relatively high noise floor and the potential interference issues caused by intermittent tropospheric propagation. So, whilst the communications distances may be greater than, say, low power short-range UHF / GHz M2M systems, these two issues could limit the anticipated working range of systems operating within these two bands.

Q1b. Please provide as much information as possible on likely applications.

JRC highlights that, with the potential noise floor and interference issues, it has not traditionally been expected that this spectrum is suitable for resilient machine to machine (RM2M) systems.

JRC highlights, however, that this expectation may change if trials within the utility industry of new digital equipment prove successful.

Q2. Do you agree with our analysis that encouraging new IoT uses in the bands 55.75625-60 MHz, 62.75625-64.8 MHz and 64.8875-66.2 MHz, 70.5-71.5 MHz and 80.0-81.5 MHz should still leave sufficient spectrum to meet demands for Business Radio in the VHF range?

JRC agrees that limiting the proposed M2M / IoT systems to VHF Low Band and Band I will not impact existing and future systems assigned within VHF Mid Band or VHF High Band.

JRC understands that VHF Low Band (and Band I?) is occasionally used for wide-area PMR systems. The channels in which they operate will need to be protected from co-channel and adjacent channel interference from M2M / IoT systems, especially around the remote boundaries of the PMR systems.

Q3a. Do you think the conditions associated with the current range of BR licences available now should change to facilitate new IoT services uses?

JRC considers that no changes are necessary because the current range of Business Radio licence products should be sufficient for most narrow band radio systems, including M2M / IoT systems, using these bands.

JRC recommends that, to minimise potential hoarding / warehousing scenarios, the channels should be assigned on a first-come first-served basis. JRC recommends that the existing Administrative Incentive Pricing (AIP) should apply to fees in these bands.

JRC suggests that potential major system owners would primarily seek Area Defined licences in VHF Low band because of the following three advantages:

- Wide Area Defined licences should ensure that their systems can be sufficiently well planned so as to maximise frequency re-use and minimise the risk of co-channel interference from adjacent UK systems;

- Area Defined licences are preferred because the processing of individual Technically Assigned licences is likely to be time consuming, and involve significant administrative costs to Ofcom, e.g. to process international co-ordinations, and perhaps unnecessarily delay the deployment of systems; and

- Low Band would be preferred because there is not a formal VHF Low Band MoU agreement between the UK and its neighbours. This means that licensees may independently predict and confirm their own coverage areas instead of using the Post Issue Support Process (see OfW64) that is necessary for Band I, Band III, and UHF 1 systems. (The Post Issue Support Process requires Area Defined licence holders to notify Ofcom if they are not able to independently predict and confirm that any proposed system will not cause harmful interference to other UK services or those of neighbouring administrations.).

JRC understands that, in addition to national co-ordination requirements, any proposed UK VHF Low Band system should not breach the interference threshold requirements of the Harmonised Calculation Agreement (HCM) MoU. Proposed systems that breach the relevant level may need to undergo a lengthy international co-ordination process.

JRC uses industry standard radio planning software so it is well placed to independently predict and confirm the coverage of the systems that it manages.

Q3b If you do, what should these changes be?

JRC suggests that there is a potential for innovative higher modulation level equipment to be used in some of these narrow band channels.

JRC suggests that this spectrum could also be used for innovative wider bandwidth systems. These systems could be licensed using multiples of 12.5 kHz channels with a licence fee proportionate to the number of 12.5 kHz channels. (Wide-band users will also need to licence any guard-band spectrum that is required to stop the system from interfering with adjacent 12.5 kHz systems.)

JRC suggests that, for Technically Assigned licences and Post Issue Support of Area Defined licences, it may be necessary for Ofcom to update its licensing software to take into consideration the increased wanted to unwanted ratios and other planning criteria that the above innovative wide-band equipment may require.

Q4. Do you think we should create a new licence product specifically for IoT services?

JRC suggests that existing Business Radio Technically Assigned and Area Defined licences will be suitable for narrow band M2M / IoT systems.

JRC suggests that Exclusive Use channels will be needed for systems that need instant and / or constant access (e.g. data links) whereas Shared Use channels may be used when only occasional access is required.

JRC suggests that only Area Defined licences should be made available for systems intending to operate innovative wide-band systems because of the potential cost to Ofcom to update its licensing software, etc. NB: the licenced spectrum should include any guard-band requirements needed to prevent the wide-band system interfering with any adjacent systems.

The Joint Radio Company Ltd (JRC):

JRC Ltd is a wholly owned joint venture between the UK electricity and gas industries specifically created to manage the radio spectrum allocations for these industries used to support operational, safety and emergency communications.

JRC manages blocks of VHF and UHF spectrum for Private Business Radio applications, telemetry & tele-control services and network operations. JRC created and manages a national cellular plan for co-ordinating frequency assignments for a number of large radio networks in the UK.

The VHF and UHF frequency allocations managed by JRC support telecommunications networks to keep the electricity and gas industries in touch with their field engineers throughout the country. These networks provide comprehensive geographical coverage to support the installation, maintenance and repair of plant in all weather conditions on a 24 hour/365 days per year basis.

JRC's Scanning Telemetry Service is used by radio based Supervisory Control and Data Acquisition (SCADA) networks which control and monitor safety critical gas and electricity industry plant and equipment throughout the country. These networks provide resilient and reliable communications at all times to unmanned sites and plant in remote locations to maintain the integrity of the UK's energy generation, transmission and distribution.

JRC manages the microwave licenses for the majority of UK gas and electricity transmission and distribution businesses. JRC protects these microwave links and the above UHF telemetry links from potential interference from wind turbines, and advises wind farm developers on mitigation methods to avoid interference with all forms of radio communication services.

JRC also undertakes radio consultancy work associated with critical national infrastructure radio services, and participates in European and international regulatory consultation groups.

JRC works with the Energy Networks Association's Future Energy Networks Groups assessing ICT implications of Smart Networks, Smart Grids & Smart Meters. Internationally, JRC supports or participates with global utility telecoms organisations under the umbrella of the Global Utility Telecom Council:

- US Utility Telecom Council (UTC)
- European Utility Telecom Council (EUTC)
- Latin American Utility Telecom Council (UTCAL)
- Canadian Utility Telecom Council (UTCC)
- African Utility Telecom Council (AUTC)

ENDS

Cover sheet for response to an Ofcom consultation

BASIC DETAILS

Consultation title: More Radio Spectrum for the Internet of Things

To (Ofcom contact): Stephen.Jones@ofcom.org.uk

Name of respondent: Adrian Grilli

Representing (self or organisation/s): The Joint Radio Company Ltd (JRC)

Address (if not received by email): as received by email

CONFIDENTIALITY

Please tick below what part of your response you consider is confidential, giving your reasons why:

Nothing: ☑ Name/contact details/job title: *Nick Woollard, Nicholas.Woollard@jrc.co.uk Project Manager*

Whole response: Organisation: *JRC*

Part of the response: If there is no separate annex, which parts?

If you want part of your response, your name or your organisation not to be published, can Ofcom still publish a reference to the contents of your response (including, for any confidential parts, a general summary that does not disclose the specific information or enable you to be identified)?

JRC would prefer the contents of the annex to remain confidential until otherwise agreed.

DECLARATION

I confirm that the correspondence supplied with this cover sheet is a formal consultation response that Ofcom can publish. However, in supplying this response, I understand that Ofcom may need to publish all responses, including those which are marked as confidential, in order to meet legal obligations. If I have sent my response by email, Ofcom can disregard any standard e-mail text about not disclosing email contents and attachments.

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Name Adrian Grilli Signed (if hard copy)