The award of 800 MHz and 2.6 GHz spectrum

Information Memorandum Update

Publication date: 12 November 2012

Important Notice

This update ("Update") is supplemental to, and should be read in conjunction with, the Information Memorandum dated 24 July 2012 ("Memorandum") (the Update and the Memorandum together the "Updated Memorandum"). The Updated Memorandum has been prepared by Ofcom in connection with the proposed award of Licences in the 800 MHz band, and the 2.6 GHz band by auction. Words and expressions used in this Update are as defined in Annex 10 of the Memorandum unless expressly defined in the Update.

The Award Process will be conducted in accordance with the Wireless Telegraphy (Licence Award) Regulations 2012 (the “Regulations”), made by Ofcom pursuant to powers under Section 14 of the Wireless Telegraphy Act 2006, and which will be available in due course on the Government’s legislation.gov.uk website. The Licences may be granted following a procedure set out in the Regulations.

Recipients of the Memorandum and/or the Update should note that only the Regulations will have statutory effect. Accordingly, in the event of any difference between the Updated Memorandum and the provisions of the Regulations, the Regulations are definitive and will prevail.

The Updated Memorandum has been prepared solely in connection with the proposed award of Licences in the 800 MHz band and the 2.6 GHz band by auction, and has been made available for information purposes only. The Updated Memorandum does not constitute an offer or invitation to participate in the Award Process, nor does it constitute the basis for any part of any contract which may be concluded in relation to the Award Process or in respect of any award of Licences. The Updated Memorandum shall not (nor shall any part of it) nor the fact of its distribution form the basis of, or be relied upon in connection with, or act as any inducement to enter into, any decision or commitment in respect of any award of Licences. The whole of the Updated Memorandum should be read. The Updated Memorandum is not intended to form any part of the basis of any investment decision or other evaluation or any decision to participate in the Award Process, and should not be considered as a recommendation by Ofcom or its advisers to any recipient of the Memorandum and/or the Update to participate in the Award Process. Each recipient of the Memorandum and/or the Update is recommended to seek its own advice from independent advisors and must make its own independent assessment of the potential value of a Licence after making such investigation as it may deem necessary in order to determine whether to participate in the Award Process.

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The Updated Memorandum contains or incorporates by reference "forward-looking statements" regarding the belief or current expectations of Ofcom and other Government or regulatory agencies about the Licences, the subject of the Licences and the Award Process described in the Updated Memorandum.

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Recipients of the Memorandum and/or the Update are encouraged to register their e-mail addresses with Ofcom so as to receive notifications of the publication of further information automatically, but it remains their responsibility to check the Ofcom Website for updates. Registration of address should be made by following the registration procedure at the relevant page on the Ofcom Website at: http://www.ofcom.org.uk/static/subscribe/radiospectrum.htm. Shortly before the commencement of the Award Process, the Ofcom Website will carry more detailed information about the Award Process.

Contents

Section 1

Background

1.1 On 24 July 2012 the Office of Communications ("Ofcom") published an Information Memorandum (the "Memorandum") that provided information for those parties considering bidding for a licence ("Licence") under the Wireless Telegraphy Act 2006 to establish or use stations for wireless telegraphy or to install or use apparatus for wireless telegraphy in one or more of the 800 MHz, 1800 MHz and 2.6 GHz bands ("the spectrum bands") in the United Kingdom[1].

1.2 At the same time we also published two further documents. They were:

- the Statement[2] setting out our policy decisions; and
- the Notice[3] of our proposal to make the Regulations.

1.3 In particular, the Memorandum:

- described the characteristics of the spectrum bands for which Licences are to be awarded;
- explained some factors that may affect Licensees' use of the spectrum bands;
- set out the spectrum lots that will be available in the Award Process and the Reserve Price for each lot;
- summarised some of the principal terms of the Licences that will be issued following completion of the Award Process, and provided at Annexes 1 and 2 draft templates of the Licences that will be issued; and
- provided certain further information in relation to the Award Process.

1.4 Paragraph 1.3 of the Memorandum noted that we would publish an update to the Memorandum towards the end of 2012. This document is that update (the "Update").

1.5 Unless otherwise stated, terms used in this Update are as defined in the Glossary at Annex 10 to the Memorandum.

1.6 The relevant section of our website for information on our spectrum award programme and the award of the Licences is http://stakeholders.ofcom.org.uk/spectrum/spectrum-awards/.

[1] http://stakeholders.ofcom.org.uk/spectrum/spectrum-awards/
[2] http://stakeholders.ofcom.org.uk/consultations/award-800mhz-2.6ghz/statement/
[3] http://stakeholders.ofcom.org.uk/consultations/notice-proposal-regulations/

Section 2

Updated information

The spectrum bands

Other emissions in the 2.6 GHz band

Ultra Wideband (UWB)

2.1 Paragraph 2.64 of the Memorandum summarised the then current position in relation to UWB. Since publication of the Memorandum the European Commission have issued a 5th Mandate on UWB to CEPT to look at new opportunities to implement UWB technology, in particular for road, rail and airborne applications.

Factors affecting use of the spectrum bands

DTT Clearance

2.2 The DTT licensees have informed Ofcom that they have instructed their supplier, Arqiva, to plan network changes according to an updated clearance timetable, with advancement of clearance dates for Oxford, Waltham, Angus and Rosneath main stations and their associated relays[4]. The dates change in relation to the timetable in the Memorandum as follows:

2.2.1 Oxford, Waltham, and their relays, have been advanced from October 2013 to May 2013.

2.2.2 Angus, Rosneath and their relays have been advanced from July and August 2013 respectively, to April 2013. The Torosay relays have also been advanced from August 2013 to April 2013.

2.3 The 2013 timetable for clearing DTT from channel 61 and 62 is set out in Ofcom's "Notice of transitional restrictions on Mobile Networks in the 800MHz band for protection of DTT in channels 61 and 62" (the "DTT Transitional Notice"), a copy of which was included at Annex 6 to the Memorandum. Annex 1 to the DTT Transitional Notice has been updated to include the changes in the DTT clearance timetable. There are also amendments to the ERP values for Ton Pentre, Dowlais, Beer, Beaminster, Penryn and Praa Sands. The updated annex is provided at Annex 1 to this Update.

2.4 Figures 3.2 and 3.3 in section 3.7 of the Memorandum illustrated where and when DTT stations will clear channels 61 and 62 respectively during 2013. These figures have been updated to reflect the changes in the DTT clearance timetable – see Annex 2, Figures A and B.

2.5 Ofcom wrote to the Rt Hon Maria Miller MP, the Secretary of State for Culture, Media and Sport, on 1 October 2012[5] stating that the changes above mean that there will in practice be no transitional restrictions affecting use of the 800 MHz band to deliver

[4] http://consumers.ofcom.org.uk/2012/10/delivering-4g-mobile-for-consumers/
[5] http://stakeholders.ofcom.org.uk/binaries/consultations/award-800mhz/statement/maria_miller_letter.pdf

4G services in England, Wales and Northern Ireland after early June 2013, and the remaining restrictions affecting Scotland will in practice be limited to the Highlands and Islands, and in particular are unlikely to affect the delivery of 4G services in Edinburgh and Glasgow.

2.6 The letter included illustrative maps showing areas where switch on of 800 MHz base stations would be prohibited during the first half of 2013, and areas where use of frequencies in the bottom half of the 800 MHz band (blocks 1, 2 and 3) are likely to be restricted in order to comply with the DTT Transitional Notice.

2.7 Ofcom has since undertaken additional work that shows that the transitional restrictions on use of frequencies in the top half of the 800 MHz band (blocks 4, 5 and 6) are likely to affect much smaller areas. More detail on this work is provided at Annex 3 to this Update.

2.8 We have subsequently discussed with the broadcasters and the DCMS a proposal to bring forward the completion of clearance of the Highlands and Islands sites from October 2013 to July/August 2013. We have confirmation from the DCMS that they have agreed that a grant should be made by them to the broadcasters to enable the final area of the UK in the Highlands and Islands of Scotland to be completed to this timetable. We will provide an update to Annex 6 to the Memorandum if this new timetable is agreed.

Emergency services in 862 to 863 MHz

Home Office system

2.9 In paragraph 3.21 of the Memorandum we said that we would provide an update before the start of the Award Process. There have been no changes to the Home Office's modification plans set out in paragraph 3.21 of the Memorandum.

Fire and Rescue Services

2.10 As explained at paragraphs 3.31 and 3.32 of the Memorandum, the solution (endorsed by the CFOA's National Operations Committee, the relevant CFOA Board Director and DCLG) involves FRS BA Telemetry users moving to 869.5 MHz (a frequency that is licence-exempt) in the short term before moving in the longer term to a dedicated new frequency.

2.11 FRS BA Telemetry users are currently expected to move to 869.5 MHz by the end of the first quarter of 2013.

2.12 The Working Group, including representatives from FRS and Department for Communities and Local Government, anticipates proposing recommendations to Chief Fire Officers for the long term move by the end of the first quarter of 2013. The timetable it is working to envisages that the longer term solution will be ready by early 2014 subject to finalising the frequencies to which FRS will move and taking into consideration suppliers' development and equipment certification.

Short range devices in 863 to 870 MHz

2.13 In paragraph 3.43 of the Memorandum we advised that we would be publishing a report on LTE user equipment. This report titled 'LTE User Equipment Coexistence with 862-870 MHz' is now available on the Ofcom website[6].

Radars in the S-Band

Changes relevant to the text of the Memorandum

2.14 In paragraph 3.54 of the Memorandum, we set out the status of the development of prototype radar modifications. We have now signed off modifications for all radar types except two. The remaining prototype modifications are due to be delivered by mid-December 2012.

2.15 In paragraph 3.62 of the Memorandum we stated that we intended to issue a notice to civil radar licensees requiring them to take steps to ensure that their radars can coexist with transmissions in the 2.6 GHz band by a backstop date. The notice has now been issued, and the backstop date set at 30 November 2015.

2.16 Table 3.4 of the Memorandum set out the civil and military radars that will need to be modified, by region. The entries in this table for Staxton Wold and Brizlee Wood are no longer required. The MOD has confirmed that these radars are being replaced by radars in other bands.

2.17 In paragraph 3.73 of the Memorandum we stated how the coordination procedures apply in relation to new radars. We have decided to include one additional paragraph in the proposed notice of coordination procedures (Annex 3 to the Memorandum) in relation to this matter. The additional paragraph will be inserted following paragraph 3.3 in Annex 3, and will be as follows:

"Should the parties be unable to agree a resolution to a coordination issue for a new radar at a particular airport, the parties may refer the matter to Ofcom and the CAA for assistance. Ofcom and the CAA, in consultation with the relevant parties, shall use their reasonable endeavours to agree between them and subsequently recommend a proportionate solution to the parties. Ofcom and the CAA recognise that radar operators and mobile operators are likely to have a shared interest in ensuring both aircraft safety through radar protection and availability of mobile coverage at airports. Should the parties be unwilling to accept any recommended solution Ofcom and the CAA would consider the extent to which statutory powers could be used to resolve the situation."

2.18 The protected radar list is annexed to the draft notice of coordination procedures (Annex 3 to the Memorandum). We have been notified of changes to this list and a revised list is attached to this Update at Annex 4.

Work to accelerate the availability of the 2.6 GHz band

2.19 On 1 October 2012, Ofcom wrote to the Rt Hon Maria Miller MP, the Secretary of State for Culture, Media and Sport, to summarise the progress made to bring forward

[6] http://stakeholders.ofcom.org.uk/binaries/consultations/award-800mhz/statement/lte-coexistence.pdf?utm_source=updates&utm_medium=email&utm_campaign=lte-coexistence

the date when competitive 4G services can be offered in the UK using 800 MHz and 2.6 GHz spectrum[7].

2.20 In relation to 2.6 GHz availability, the letter stated that we have identified a potential re-phasing of the civil and military radar modification plan that might allow 4G base stations using frequencies in the 2.6 GHz band to operate in London from no later than the end of Q2 2013. This is three months earlier than the current plans would otherwise allow. We have shared this initial technical analysis with the MOD, DfT and CAA.

2.21 The letter noted that confirmation of the practical feasibility of this plan is not possible in the near future, not least until the MOD has completed the current procurement of a supplier for its radar modifications.

The Licences

Draft schedules to template licence

2.22 In respect of the draft schedules to the licence template published in Annex 2 of the Memorandum, please see Section 7 of the 'Statement on the making of regulations in connection with the award of 800 MHz and 2.6 GHz spectrum bands'[8]. Revised copies of the template licence schedules are shown in Annexes 5 to 9 of this Update.

Coverage obligation

2.23 We have published an update to the coverage obligation compliance verification methodology document that was published alongside the Memorandum.[9] The updated document provides some clarifications regarding the coverage obligation verification methodology and the use of the propagation model ITU-R Recommendation P.1812-2.

The Licences – Conditions relating to DTT Coexistence

2.24 The arrangements for the management of interference from 4G deployment in the 800 MHz band into the frequency bands used for DTT require licensees to establish an entity which provides information and support to DTT consumers to a level specified by Government. Those arrangements are described in detail in the Statement[10].

2.25 The 800 MHz licensees will be required to ensure that the appropriate entity (referred to as MitCo) is formed no more than 6 weeks after the licences are issued. Since we published our Statement and the accompanying Memorandum, EE, Telefónica, H3G and Vodafone have entered into a Shareholders' Agreement and formed a related jointly controlled company called Digital Mobile Spectrum Limited to carry out the role of MitCo. They have appointed Andrew Pinder as interim chairman of the company. If any party that is considering bidding for an 800 MHz licence wishes to see the Shareholders' Agreement they should contact Digital Mobile Spectrum Limited directly by contacting mitco@andrewpinder.com.

[7] http://stakeholders.ofcom.org.uk/binaries/consultations/award-800mhz/statement/maria_miller_letter.pdf
[8] http://stakeholders.ofcom.org.uk/consultations/notice-proposal-regulations/statement
[9] http://stakeholders.ofcom.org.uk/binaries/consultations/award-800mhz/statement/4GCov-verification.pdf
[10] http://stakeholders.ofcom.org.uk/consultations/award-800mhz-2.6ghz/statement/

2.26 As previously envisaged, Mitco will be funded by the successful bidders for 800 MHz spectrum in the forthcoming auction and provisions exist in the Shareholders' Agreement relating to Digital Mobile Spectrum Limited to make sure that any party other than EE, Telefónica, H3G and Vodafone that wins some of the 800 MHz spectrum in the auction can promptly join the company on the same basis as those existing shareholders. Similarly, the Shareholders' Agreement provides that any of the existing shareholders of Digital Mobile Spectrum Limited will exit the company in the event that they do not win 800 MHz spectrum.

2.27 In parallel, DCMS is establishing the Oversight Board which will, *inter alia*, monitor compliance with the various Key Performance Indicators relating to DTT coexistence that are specified in the licences. As part of this process, DCMS has appointed David Hendon as Chairman of an Interim Oversight Board for the period up to 31 March 2013, by which time it expects to have made formal appointments to the permanent Oversight Board.

Spectrum packaging and Reserve Prices

The 1800 MHz lot

2.28 In March 2010 the European Commission approved the merger between T-Mobile and Orange in the UK. One condition of the Commission's approval was that the merged operator EE would divest 2x15 MHz of the spectrum it held in the 1800 MHz band. This spectrum could be divested through a private sale to a single purchaser or unconditionally offered for sale as part of this award or another spectrum award. EE announced on 29 August 2012 that it had agreed to transfer this 2x15 MHz of spectrum to H3G. The trade of the relevant spectrum to H3G was completed on 8 November 2012 in accordance with the Wireless Telegraphy (Mobile Spectrum Trading) Regulations 2011 (SI 1507/2011). This lot will not therefore be included in the Auction.

The Award Process

Electronic Bidding System

2.29 In section 7 of the Memorandum, we provided some indicative timings for the auction process. To assist potential applicants/bidders we will be publishing a guidance document which will set out our current position on the timing of the auction process, and will therefore supersede the equivalent information provided in section 7 of the Memorandum.

Associated issues

Other spectrum awards

2010-2025 MHz

2.30 In paragraph 8.19 of the Memorandum, we refer to the Commission developing a draft mandate to CEPT to undertake studies on the harmonised technical conditions for this band in the EU. The Commission has now developed the above draft mandate. titled 'Draft Mandate to CEPT to undertake studies on the harmonised technical conditions for the 1900-1920 MHz and 2010-2025 MHz frequency bands in the EU (RSCOM12-17 rev 3). This document is available on the European Commission website.

872-876 MHz and 917-921 MHz

2.31 In paragraph 8.20 of the Memorandum we said that Ofcom's work on the release of this spectrum was on hold. The current position is that we are developing our plans for the release of this band and expect to provide an update on the Ofcom Website[11] before the end of 2012.

Public sector spectrum

2.32 Since publication of the Memorandum, the MOD has published an update in relation to sharing its spectrum[12].

[11] http://stakeholders.ofcom.org.uk/spectrum/spectrum-awards/
[12] http://www.mod.uk/DefenceInternet/AboutDefence/WhatWeDo/ScienceandTechnology/Spectrum/

Annex 1

DTT Transmitters using channel 61 or channel 62 in 2013

NGR X	National Grid Reference Eastings
NGR Y	National Grid Reference Northings
ERP kW	Effective Radiated Power in kilowatts
Site Ht m	Site Height above ordnance datum in metres
Ant Ht m	Antenna Height above ground level in metres
Pol	Polarisation: H = Horizontal, V = Vertical.

Transmitter Name	NGR X	NGR Y	Channel	ERP kW	Site Ht m	Ant Ht m	Pol	Clearance Month
Burry Port	244930	201960	61	0.002	77	15.8	V	Mar 2013
Ebbw Vale	315990	208820	62	0.1	442	62.2	V	Mar 2013
Llangeinor	290530	188660	62	0.038	306	47.4	V	Mar 2013
Taffs Well	312370	184850	62	0.0104	149	37	V	Mar 2013
Ynysowen	308204	199282	62	0.016	342	24	V	Mar 2013
Tonypandy	298690	192490	62	0.002	224	34	V	Mar 2013
Fernhill	303072	199347	62	0.002	159	16	V	Mar 2013
Mynydd Bach	316851	192624	61	0.05	312	48	V	Mar 2013
Machen Upper	321120	189764	62	0.0072	151	28	V	Mar 2013
Brecon	305457	228755	61	0.2	223	48	V	Mar 2013
Ton Pentre	296040	195590	61	0.016	323	46.8	V	Mar 2013
Monmouth	352620	212770	62	0.046	194	23	V	Mar 2013
Abercynon	309375	195238	61	0.002	174	17	H	Mar 2013
Tynewydd	293152	199334	62	0.004	247	28	V	Mar 2013
Dowlais	307300	208850	61	0.0026	397	23	V	Mar 2013
Tonyrefail	300941	187464	62	0.004	165	28	V	Mar 2013
Gellifendigaid	307000	193500	62	0.0024	199	15.8	H	Mar 2013
South Maesteg	286000	189700	62	0.002	137	14	V	Mar 2013
Mendip	356437	148835	61	100	303	288	H	Mar 2013
Washford	305800	140990	62	0.0124	42	43.3	V	Mar 2013
Countisbury	274840	150080	62	0.042	302	15.6	H	Mar 2013
Hutton	336113	158867	62	0.04	73	37	V	Mar 2013
Portishead	345882	176417	62	0.0074	85	25	V	Mar 2013
Clearwell	357450	208460	62	0.002	207	34	V	Mar 2013
Woodcombe	295100	145800	62	0.01	79	16	V	Mar 2013
Kilve	314300	142500	62	0.003	101	17.4	H	Mar 2013
Halesowen	397100	282600	61	0.0025	150	15.4	V	Apr 2013
Keighley	406895	444380	61	2	305	51	V	Apr 2013
Winter Hill	366053	414463	61	100	439	287	H	Apr 2013
Winter Hill	366053	414463	62	100	439	287	H	Apr 2013
Selkirk	350060	629411	62	10	290	232.4	H	Apr 2013
Innerleithen	332550	636820	61	0.016	238	28	V	Apr 2013
Angus	339486	740784	61	10	312	234.6	H	Apr 2013
Grandtully	291700	752700	61	0.002	122	5.5	V	Apr 2013
Lochearnhead	259495	722727	61	0.002	138	12	V	Apr 2013

Transmitter Name	NGR X	NGR Y	Channel	ERP kW	Site Ht m	Ant Ht m	Pol	Clearance Month
Rosneath VP	225847	681196	61	2	105	111	V	Apr 2013
Rosneath HP	225847	681196	61	0.008	105	107	H	Apr 2013
Kinlochleven	217820	762980	62	0.0024	273	24	V	Apr 2013
Onich VP	201700	761800	61	0.0034	69	15	V	Apr 2013
Onich HP	201700	761800	61	0.0009	69	17	H	Apr 2013
Loch Feochan	186100	725600	61	0.0082	110	18	V	Apr 2013
Kilmelford	181650	710060	62	0.015	251	46.1	V	Apr 2013
Rumster Forest	319780	938540	62	10	217	237	H	Apr 2013
Tacolneston	613055	295727	62	100	64	199	H	May 2013
Salisbury	413646	128521	62	2	103	50	V	May 2013
Olivers Mount	504014	486916	61	1	151	42	V	May 2013
Carmel	257685	215339	61	10	255	156	H	May 2013
Pontardawe	273277	203785	61	0.025	156	48	V	May 2013
Huntshaw Cross	252760	122075	62	20	200	159	H	May 2013
Ilfracombe	250703	146495	61	0.056	203	48	V	May 2013
Oxford	456714	210540	62	50	135	160	H	May 2013
Waltham	480942	323331	61	50	141	301	H	May 2013
Belper	433714	346255	62	0.006	190	31.4	V	May 2013
Stanton Moor	424566	363726	62	0.4	302	50	V	May 2013
Liverton	281160	73441	62	0.0025	152	20	V	Jun 2013
Kingskerswell	287240	68243	62	0.002	61	30	V	Jun 2013
Beer	323025	89677	62	0.003	93	30	V	Jun 2013
Beaminster	349080	102493	62	0.0038	163	37	V	Jun 2013
Dawlish	295100	77280	62	0.02	103	36	V	Jun 2013
Pennsylvania	293469	94889	61	0.002	110	21	V	Jun 2013
Bincombe Hill	368740	84880	62	0.0064	160	10	V	Jun 2013
Preston	370700	83300	61	0.02	49	8	V	Jun 2013
Plympton	253080	55533	61	0.4	113	50	V	Jun 2013
Newton Ferrers	254507	47575	62	0.002	72	35	V	Jun 2013
Modbury	266050	51407	62	0.002	64	12	H	Jun 2013
Port Isaac	199890	80500	62	0.05	68	18	V	Jun 2013
North Hessary Tor	257810	74200	62	0.0025	508	70	V	Jun 2013
Southway	247820	59920	62	0.002	103	17	V	Jun 2013
St Austell	200800	53560	62	0.25	188	52	V	Jun 2013
Penryn	178710	33450	62	0.0044	73	34.3	V	Jun 2013
Truro	183580	44200	61	0.0044	58	29	V	Jun 2013
Helston	165140	27590	61	0.002	71	36.8	V	Jun 2013
Praa Sands	157200	28400	62	0.01	68	29.5	V	Jun 2013
Scalloway	439840	1139750	62	0.0058	72	27.7	V	Sep 2013
Swinster	444020	1172700	62	0.32	135	27.7	V	Sep 2013
Weisdale	437980	1151290	61	0.012	229	46	V	Sep 2013
Fodderty	251180	860660	61	0.024	186	37.8	V	Oct 2013
Inverness	266710	844780	62	0.0066	22	18	V	Oct 2013
Craigellachie	326251	844357	61	0.014	180	47	V	Oct 2013
Balblair Wood	259320	895270	62	0.0166	220	32.7	V	Oct 2013
Avoch	270200	855500	61	0.002	71	16.7	V	Oct 2013
Peterhead	411150	845280	62	0.1	42	50	V	Oct 2013
Gartley Moor	354630	832610	61	0.44	416	50	V	Oct 2013
Tullich	337900	798400	62	0.014	454	46.9	V	Oct 2013
Gourdon	382700	770900	62	0.002	20	8	V	Oct 2013
Scoval VP	118140	851440	62	0.032	243	47	V	Oct 2013
Scoval HP	118140	851440	62	0.132	243	15	H	Oct 2013

Annex 2

Updated Figures Showing Provisional Clearance Timetable for Channel 61 and 62

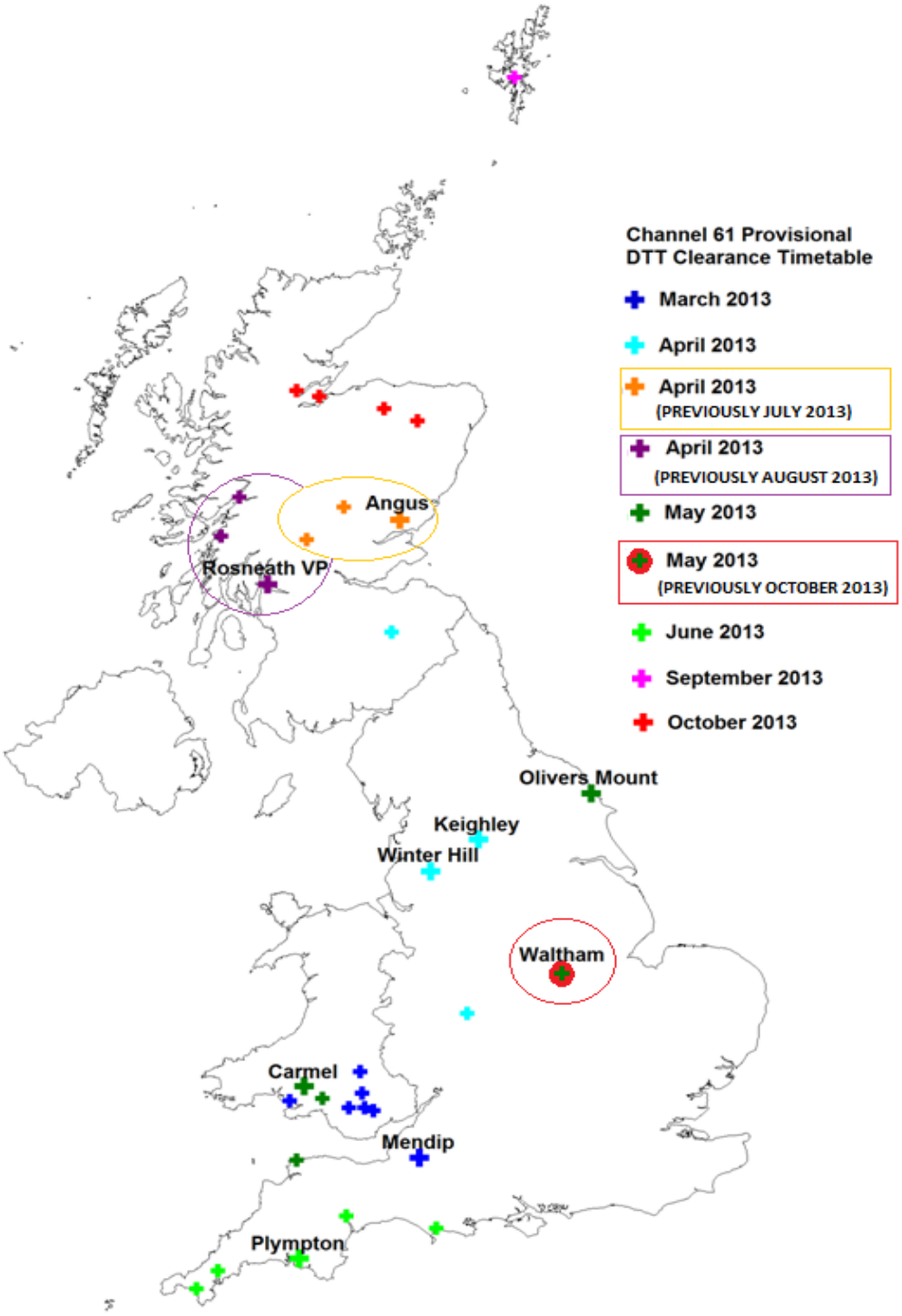


Figure A (3.2 in the Memorandum): DTT Channel 61 Clearance in 2013
(Main stations are the labelled larger crosses)

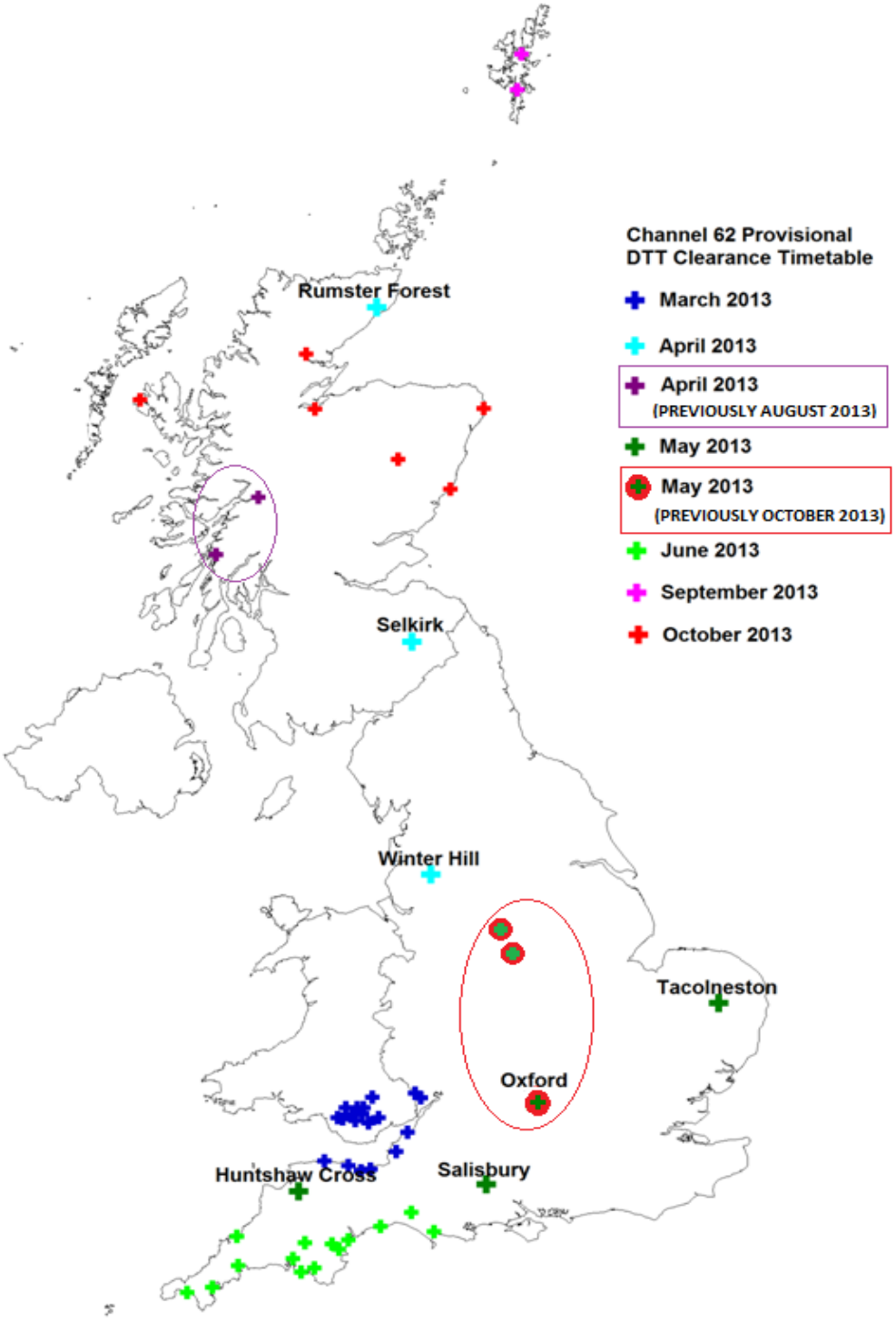


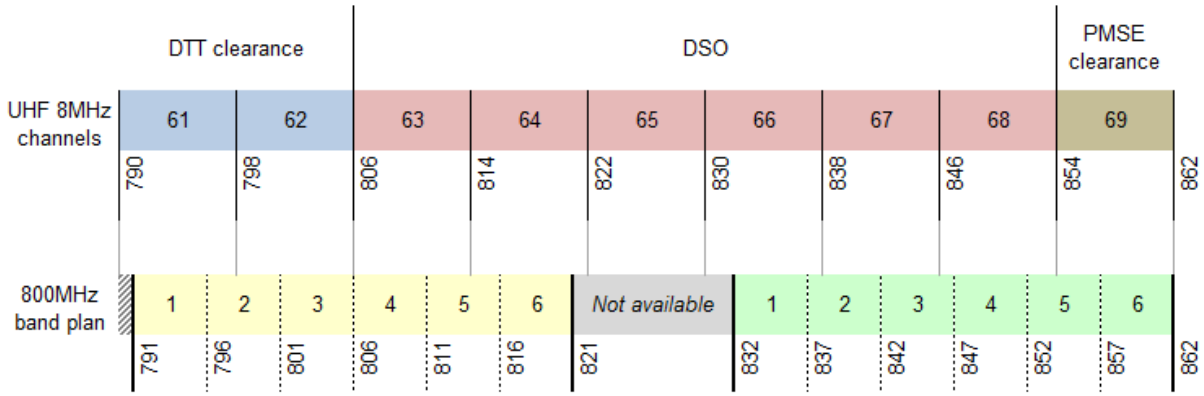
Figure B (3.3 in the Memorandum): DTT Channel 62 Clearance in 2013
(Main stations are the labelled larger crosses)

Annex 3

Indicative estimates of impact of transitional restrictions on deployment in blocks 4, 5 and 6

A3.1 Figure 1 shows how the blocks for mobile use in the 800 MHz band align with the UHF channels currently used for DTT and PMSE. Blocks 4, 5 and 6 are in the bottom half of the 800 MHz band.

Figure 1: UHF Channels and 800 MHz band plan



A3.2 In our letter to Maria Miller of 1 October 2012[13] we presented indicative maps in a timeline showing how DTT will be progressively cleared out of the 800 MHz band and therefore how the transitional restrictions affecting use of the 800 MHz band to deliver 4G Services will gradually disappear. In the current timeline, some areas in the Highlands and Islands will still be using DTT in 800 MHz until early October 2013.

A3.3 The letter included illustrative maps showing areas where switch on of 800 MHz base stations would be prohibited during the first half of 2013, and areas where use of frequencies in the bottom half of the 800 MHz band (**blocks 1, 2 and 3**) are likely to be restricted in order to comply with the DTT Transitional Notice.

A3.4 We have since undertaken additional work examining the impact of the transitional restrictions in **blocks 4, 5 and 6**. We used an example area around Aberdeen, where deployment in blocks 1, 2 and 3 is likely to be prevented ahead of full clearance by October 2013, as these areas would be within the indicative buffer.

Work undertaken relating to blocks 4, 5 and 6

A3.5 We have estimated the potential interference that a notional deployment of LTE in blocks 4, 5 and 5, ahead of full clearance, may cause to DTT reception by using a set of locations and powers which are typical of existing mobile deployments in the

[13] http://stakeholders.ofcom.org.uk/binaries/consultations/award-800mhz/statement/maria_miller_letter.pdf

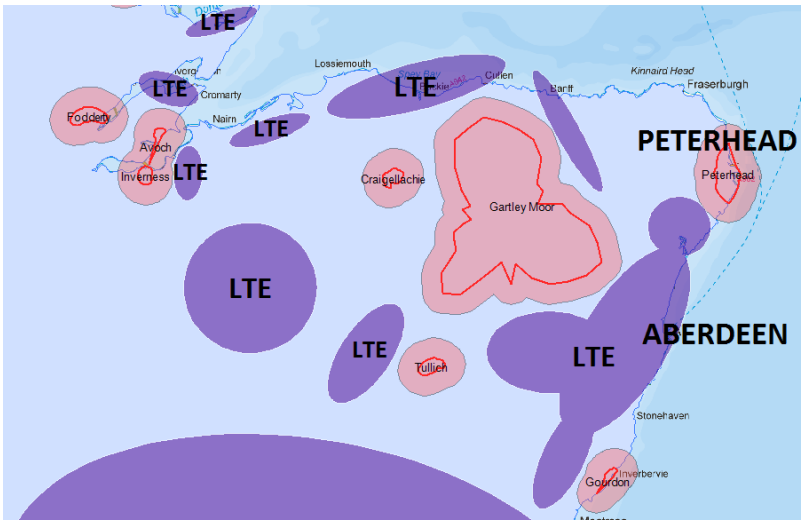
area in and around Aberdeen. We used the technical parameters published with the Memorandum to assess outcomes.

A3.6 The results suggest that a network based upon a typical mobile deployment in and around Aberdeen would be feasible, ahead of clearance of neighbouring transmitters, provided that mobile base stations were no closer than 5km from areas where the 800 MHz is being used for TV (indicated in solid red line).

A3.7 These results are strictly indicative only. The actual potential for LTE to cause interference to DTT may vary depending on the exact LTE base station locations and transmission powers that an 800 MHz operator chooses to deploy.

A3.8 Figure 2 shows the results in a map. Solid lines shows areas where 800 MHz will be in use for DTT until summer 2013 and therefore deployment of 800 MHz base stations is prohibited. Pink areas show an indicative buffer zone where deployment is likely to be affected by transitional restrictions. Purple areas show the location of the notional LTE network we used in the simulation.

Figure 2 Notional deployment around Aberdeen in blocks 4, 5 and 6 - indicative results



A3.9 For comparison, Figure 3 shows the same area around Aberdeen, with an indication of where use of blocks 1, 2 and 3 is likely to be restricted in order to comply with the DTT Transitional Notice.

Figure 3 Comparable picture for blocks 1, 2 and 3 – Indicative results

Annex 4

Protected radar list

List of military and civil radar sites to be protected

A4.1 The radar sites which these coordination procedures apply to are listed in table 1 below.

A4.2 This list was issued on 6 November 2012.

Table 1

Name	Location	Post Code	Remediated
Allanshill radar station	Postcode nearest to the site	AB43 7LS	No
Belfast City Airport	Sydenham by-Pass Belfast	BT3 9JH	No
Belfast International	Belfast	BT29 4AB	No
Birmingham International Airport	Diamond House Birmingham	B26 3QJ	No
Blackpool Airport	Squires Gate Lane Blackpool	FY4 2QS	No
Bournemouth International Airport	Hurn, Christchurch Dorset	BH23 6SE	No
Bristol Airport	Control Tower Building Bristol	BS48 3DY	No
Cambridge Airport	Newmarket Road Cambridge	CB5 8RX	No
Cardiff International Airport	Rhoose, Barry South Glamorgan	CF62 3BD	No
Coventry Airport	Siskin Parkway West Middlemarch Business Park Coventry	CV3 4PB	No
Cromer radar station	Postcode nearest to the site	NR27 0NQ	No
Cumbernauld wind farm	1 Waterloo Street Glasgow	G2 6AY	No

Durham Tees Valley Airport	Darlington County Durham	DL2 1LU	No
East Midlands International Airport	Castle Donington Derby	DE74 2SA	No
Edinburgh Airport	Edinburgh Lothian	EH12 9DN	No
Exeter & Devon Airport	Clyst Honiton Exeter	EX5 2BD	No
Farnborough Aerodrome	Farnborough Hampshire	GU14 6XA	No
Glasgow Airport	Paisley Strathclyde	PA3 2ST	No
Glasgow Prestwick Inter Airport	Prestwick Ayrshire	KA9 2PL	No
Hawarden Airport	Broughton Chester North Wales	CH4 0DR	No
Hibaldstow radar station	New Control Tower Oglet Lane Hale Village Liverpool	L24 5RJ	No
Humberside Airport	Kirmington Ulceby South Humberside	DN39 6YH	No
Inverness Airport	Inverness	IV2 7JB	No
Kincardine radar station	Postcode nearest to the site	FK10 4BJ	No
Leeds Bradford International Airport	Yeadon Leeds	LS19 7TU	No
Liverpool Airport	Liverpool	L24 1YD	No
London Gatwick Airport	West Sussex	RH6 0NP	No
London Heathrow Airport	Hounslow Middlesex	TW6 2QW	No
Stansted Airport	Stansted Essex	CM24 1QW	No
Manchester Airport	Manchester	M90 1QX	No
Manchester Airport (future system)	Manchester	M90 1QX	No

Manston Airport	Manston Ramsgate Kent	CT12 5BP	No
Newcastle International Airport	Woolsington Newcastle upon Tyne	NE13 8BZ	No
Newquay Cornwall Airport	Carloggas St. Mawgan Newquay Cornwall	TR8 4RQ	No
Norwich Airport	Amsterdam Way Norwich	NR6 6JA	No
Oxford Airport	Langford Lane Kidlington Oxfordshire	OX5 1RA	No
Robin Hood Airport	Hayfield Lane Doncaster South Yorkshire	DN9 3XA	No
Southampton International Airport	Southampton Hampshire	SO18 2NL	No
London Southend Airport	Southend-on-Sea Essex	SS2 6YF	No
St Annes radar station	North Houses Lane Lytham St Annes	FY8 4NU	No
Sumburgh Airport	Virkie Shetland	ZE3 9JP	No
Aberporth	Parcllyn Cardigan Ceredigion	SA43 2BU	No
Albermarle Barracks	Ouston, Newcastle Upon Tyne	NE15 0RF	No
Benbecula Airfield	Benbecula, Outer Hebrides	HS7 5LW	No
Benson	Wallingford Oxon	OX10 6AA	No
Boscombe Down	Salisbury Wiltshire	SP4 OJF	No
Brize Norton	Oxford	OX18 3LX	No
Brizlee Wood	Alnwick Northumberland	NE66 3HX	No
Cawdor Barracks (RAF Brawdy)	Postcode nearest to the site.	SA62 6NN	No
Coningsby	Lincoln	LN4 4SY	No
Cosford	Wolverhampton	WV7 3EX	No

Cosford T101	Wolverhampton	WV7 3EX	No
Cosford Tac	Wolverhampton	WV7 3EX	No
Cranwell	Sleaford Lincs	NG34 8HB	No
Culdrose	Helston Cornwall	TR12 7RH	No
Hartland Point	Postcode nearest to the site.	EX39 6AU	No
Honington	Bury St Edmunds Suffolk	IP31 1EE	No
Lakenheath	Brandon Suffolk	IP27 9PN	No
Leeming	Northallerton North Yorkshire	DL7 9NJ	No
Leuchars	Leuchars Fife	KY16 0JX	No
Linton-on-Ouse	York North Yorkshire	YO30 2AJ	No
Lossiemouth	Lossiemouth Moray	IV31 6SD	No
Manorbier	Tenby Dyfed	SA70 7SH	No
Marham	King's Lynn Norfolk	PE33 9NP	No
Middle Wallop	Stockbridge Hampshire	SO20 8DY	No
Odiham	Hook Hampshire	RG29 1QT	No
Otterburn Barracks	Northumberland Postcode nearest to the site.	NE19 1NX	No
Portland	Portland Dorset	DT5 1EQ	No
Portreath	Redruth Cornwall	TR16 4RA	No
RAF Boulmer	Alnwick Northumberland	NE66 3JF	No
RAF Kirton-in-Lindsay	Gainsbourough, Licolnshire	DN21 4HY	No
Robertson Barracks	Swanton Morley, Norfolk	NR20 4TX	No
Saxa Vord	Haroldswick, Unst Shetland Islands, Outer Hebrides	ZE2 9TJ	No
Scampton	Lincoln	LN1 2ST	No
Shawbury	Shrewsbury Shropshire	SY4 4DZ	No

Spadeadam BH	Gilsland , Brampton, Cumbria	CA8 7AT	No
Spadeadam DWF	Postcode nearest to the site.	NE48 1ER	No
St Kilda Airwatch	There is no postcode available		No
St Kilda Seawatch	There is no postcode available		No
Staxton Wold	Scarborough North Yorkshire	YO12 4TJ	No
Thorny Island	Emsworth, Hampshire	PO10 8DH	No
RRH Trimingham	Trimingham, Norfolk	NR11 8HY	No
Topcliffe	Thirsk North Yorkshire	YO7 3QE	No
Valley	Holyhead Isle of Anglesey	LL65 3NY	No
Waddington	Lincoln Lincolnshire	LN5 9NB	No
Wembury Point	Postcode nearest to the site.	PL9 0BG	No
West Freugh	Stranraer Wigtownshire	DG9 9DN	No
Wittering	Peterborough	PE8 6HB	No
Yeovilton	Ilchester Somerset	BA22 8HT	No

Annex 5

Template licence schedule for the 800 MHz band without coverage obligation

Draft schedule: licences for the 800 MHz band without coverage obligation

SCHEDULE [ ] TO LICENCE NUMBER: [xxxxxx]

Schedule Date: **[xxxxxx]**

Licence category: **Spectrum Access Licence (790 – 862 MHz)**

1. Description of Radio Equipment

References in this Schedule to the Radio Equipment are references to any wireless telegraphy station or wireless telegraphy apparatus that is established, installed and/or used under this Schedule.

2. Interface Requirements for the Radio Equipment

Use of the Radio Equipment shall be in accordance with the following Interface Requirement:

IR 2090: Terrestrial systems capable of providing electronic communications services in the 800 MHz band

3. Special conditions relating to the Radio Equipment

a) Subject to paragraph 3(b) of this Schedule, during the period that this Licence remains in force, unless consent has otherwise been given by Ofcom, the Licensee shall compile and maintain accurate written records of the following details relating to the Radio Equipment:

i) postal address (including post code);

ii) National Grid Reference, to at least 1 metre resolution;

iii) antenna height (above ground level), type, and boresight bearing east of true north (if applicable); and

iv) radio frequencies which the Radio Equipment uses

and the Licensee must produce these records if requested by any person authorised by Ofcom.

b) The conditions relating to the keeping of records contained in sub-paragraphs 3(a)(ii) and (iii) of this Schedule shall not apply in respect of femtocell equipment and smart/intelligent low power repeater equipment.

c) The Licensee shall submit to Ofcom copies of the records detailed in sub-paragraph 3(a) above at such intervals as Ofcom may notify to the Licensee.

d) The Licensee shall provide to:

i) Ofcom;

ii) the entity established in accordance with paragraphs 2.1 – 2.2 of the "*Notice of DTT interference mitigation procedures required under spectrum access licences for the 800 MHz band"* notified to it by Ofcom in accordance with paragraph 4 of this Schedule; and/or

iii) the Oversight Board

in such manner and at such times as they may reasonably require, such documents or other information as they may require for the purposes of taking steps to mitigate interference to users of the electromagnetic spectrum in the 470-790 MHz band, or to make recommendations to Ofcom or Government with respect to such steps being taken.

4. Co-ordination at frequency and geographical boundaries and compliance with other procedures relating to interference

The Licensee shall ensure that the Radio Equipment is operated in compliance with such co-ordination procedures as may be notified to the Licensee by Ofcom from time to time. The Licensee shall also ensure that it complies with any other procedures relating to the mitigation of interference as may be notified to the Licensee by Ofcom from time to time.

5. International cross-border coordination

The Licensee shall ensure that the Radio Equipment is operated in compliance with such cross-border co-ordination and sharing procedures as may be notified to the Licensee by Ofcom from time to time.

6. Permitted Frequency Blocks

Subject to the emissions permitted under paragraph 8 of this Schedule, the Radio Equipment may only transmit within the following frequency bands (the "Permitted Frequency Blocks"):

Downlink frequencies	Uplink frequencies
[791 to 811 MHz]	[832 to 852 MHz]

7. Maximum power within the Permitted Frequency Blocks

The power transmitted in the Permitted Frequency Blocks shall not exceed:

a) Downlink frequencies

	Maximum EIRP
Radio Equipment	61dBm/(5 MHz) EIRP*

* The maximum EIRP relates to the EIRP of a specific piece of Radio Equipment irrespective of the number of transmit antennas.

b) Uplink frequencies[14]

Radio Equipment	**Maximum mean power**
Fixed or installed Radio Equipment	23dBm EIRP*
Mobile or nomadic Radio Equipment	23dBm TRP*

* The maximum mean power relates to the EIRP or TRP of a specific piece of Radio Equipment irrespective of the number of transmit antennas.

8. Maximum power outside the Permitted Frequency Blocks

For transmissions on the downlink frequencies, the EIRP emanating from the Radio Equipment transmissions at any frequency outside the Permitted Frequency Blocks shall not exceed the higher (least stringent) of (a) the baseline requirements and (b) the transition requirements for that frequency.

Baseline requirements

Frequency range	**Maximum mean EIRP**	**Measurement bandwidth**
832 to 862 MHz	−49.5 dBm*	5 MHz

* The maximum EIRP relates to the EIRP of a specific piece of Radio Equipment irrespective of the number of transmit antennas.

Transition requirements

Frequency range (within the range 791MHz to 821MHz only)	**Maximum mean EIRP**	**Measurement bandwidth**
−10 to −5 MHz from lower block edge	18 dBm*	5 MHz
−5 to 0 MHz from lower block edge	22 dBm*	5 MHz
0 to +5 MHz from upper block edge	22 dBm*	5 MHz
+5 to +10 MHz from upper block edge	18 dBm*	5 MHz
Remaining downlink frequencies	11 dBm*	1 MHz

* The maximum EIRP applies per antenna (for one to four antennas).

[14] Consumer user equipment will be authorised by means of a licence exemption under section 8 of the Wireless Telegraphy Act 2006

Transition requirements

Frequency range	Maximum mean EIRP	Measurement bandwidth
790 to 791 MHz	17.4 dBm*	1 MHz
821 to 832 MHz	15 dBm*	1 MHz

* The maximum EIRP applies per antenna (for one to four antennas).

Baseline requirements

Frequency range	In-block EIRP, P, dBm/(10 MHz)**	Maximum mean EIRP in frequency range	Measurement bandwidth
470 to 790 MHz	P ≥ 59	0 dBm*	8 MHz
	36 ≤ P < 59	(P−59) dBm*	8 MHz
	P < 36	−23 dBm*	8 MHz

* The maximum EIRP relates to the EIRP of a specific piece of Radio Equipment irrespective of the number of transmit antennas.
** This is the in-block EIRP measured in a bandwidth of 10MHz.

9. Interpretation of terms in this schedule

In this Schedule:

a) "dBm" means the power level in decibels (logarithmic scale) referenced against 1milliwatt (i.e. a value of 0dBm is 1 milliwatt);

b) "EIRP" means the equivalent isotropically radiated power. This is the product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna (absolute or isotropic gain);

c) "femtocell" means Radio Equipment transmitting on the downlink frequencies, which operates at a power not exceeding 20dBm EIRP per carrier, and which is or will be used only by and under the control of the Licensee, following the establishment of a telecommunications link between the femtocell and a network of the Licensee;

d) "Fixed or installed" means used or installed at specific fixed points;

e) "IR" means a United Kingdom Radio Interface Requirement published by Ofcom in accordance with Article 4.1 of Directive 1995/5/EC of the European Parliament and of the Council on radio equipment and telecommunications terminal equipment (RTTE) and the mutual recognition of their conformity.

f) "lower block edge" means, in relation to each Permitted Frequency Block, the lowest frequency in that Permitted Frequency Block;

g) "measurement bandwidth" means the size of an individual spectrum segment within the specified frequency range that is used to measure compliance with the specified power limit;

h) “mobile or nomadic” means intended to be used while in motion or during halts at unspecified points;

i) “Oversight Board” has the meaning given to it in the “*Notice of DTT interference mitigation procedures required under spectrum access licences for the 800 MHz band”* notified to the Licensee under paragraph 4 of this Schedule;

j) “Permitted Frequency Blocks” has the meaning given to it in paragraph 6 of this Schedule;

k) “smart/intelligent low power repeater” means a repeater which operates with power not exceeding 24dBm EIRP per carrier, which may be established by customers of the Licensee who have written agreements with the Licensee and:

- The Licensee has ultimate control of the repeater, i.e. each individual repeater can be disabled remotely by the Licensee;
- The repeater operates only on the Licensee’s frequencies and with their valid Public Land Mobile Network Identifier;
- Must not cause undue interference to other spectrum users; and
- The repeater only transmits on the uplink frequencies when actively carrying a call (voice, video or data) or signalling from serviced handsets.

l) “TRP” means the total radiated power. This is the integral of the power transmitted in different directions over the entire radiation sphere;

m) “upper block edge” means, in relation to each Permitted Frequency Block, the highest frequency in that Permitted Frequency Block.

Annex 6

Template licence schedule for the 800 MHz band with coverage obligation

Draft schedule: licence for the 800 MHz band with coverage obligation

SCHEDULE [ ] TO LICENCE NUMBER: [xxxxxx]

Schedule Date: **[xxxxxx]**

Licence category: **Spectrum Access Licence (790 – 862 MHz)**

1. Description of Radio Equipment

References in this Schedule to the Radio Equipment are references to any wireless telegraphy station or wireless telegraphy apparatus that is established, installed and/or used under this Schedule.

2. Interface Requirements for the Radio Equipment

Use of the Radio Equipment shall be in accordance with the following Interface Requirement:

IR 2090: Terrestrial systems capable of providing electronic communications services in the 800 MHz band

3. Special conditions relating to the Radio Equipment

a) Subject to paragraph 3(b) of this Schedule, during the period that this Licence remains in force, unless consent has otherwise been given by Ofcom, the Licensee shall compile and maintain accurate written records of the following details relating to the Radio Equipment:

i) postal address (including post code);

ii) National Grid Reference, to at least 1 metre resolution;

iii) antenna height (above ground level), type, and boresight bearing east of true north (if applicable); and

iv) radio frequencies which the Radio Equipment uses

and the Licensee must produce these records if requested by any person authorised by Ofcom.

b) The conditions relating to the keeping of records contained in sub-paragraphs 3(a)(ii) and (iii) of this Schedule shall not apply in respect of femtocell equipment and smart/intelligent low power repeater equipment.

c) The Licensee shall submit to Ofcom copies of the records detailed in sub-paragraph 3(a) above at such intervals as Ofcom may notify to the Licensee.

d) The Licensee shall provide to:

i) Ofcom;

ii) the entity established in accordance with paragraphs 2.1 – 2.2 of the "*Notice of DTT interference mitigation procedures required under spectrum access licences for the 800 MHz band"* notified to it by Ofcom in accordance with paragraph 4 of this Schedule; and/or

iii) the Oversight Board

in such manner and at such times as they may reasonably require, such documents or other information as they may require for the purposes of taking steps to mitigate interference to users of the electromagnetic spectrum in the 470-790 MHz band, or to make recommendations to Ofcom or Government with respect to such steps being taken.

4. Co-ordination at frequency and geographical boundaries and compliance with other procedures relating to interference

The Licensee shall ensure that the Radio Equipment is operated in compliance with such co-ordination procedures as may be notified to the Licensee by Ofcom from time to time. The Licensee shall also ensure that it complies with any other procedures relating to the mitigation of interference as may be notified to the Licensee by Ofcom from time to time.

5. International cross-border coordination

The Licensee shall ensure that the Radio Equipment is operated in compliance with such cross-border co-ordination and sharing procedures as may be notified to the Licensee by Ofcom from time to time.

6. Coverage Obligation

a) The Licensee shall by no later than 31 December 2017 provide, and thereafter maintain, an electronic communications network that is capable of providing, with 90% confidence, a mobile telecommunications service with a sustained downlink speed of not less than 2 megabits per second when that network is lightly loaded, to users:

i) in an area within which at least:

a. 98% of the population of the United Kingdom lives, and

b. 95% of the population of each of England, Wales, Scotland and Northern Ireland lives; and

ii) at indoor locations that meet the condition specified in paragraph 6(b)(ii) of this Schedule, which are within any residential premises within the area specified in paragraph 6(a)(i) of this Schedule.

b) For the purposes of paragraph 6(a)(ii) of this Schedule:

i) the service must be provided using radio equipment which is not situated inside the relevant residential premises; and

ii) the condition referred to is that the radio signal propagation loss from the outside of the building to the location inside the building does not exceed:

a. 13.2dB for radio signals in the frequency ranges 791MHz – 821MHz and 832MHz – 862MHz;

b. 13.7dB for radio signals in the frequency ranges 880MHz – 915MHz and 925MHz – 960MHz;

c. 16.5dB for radio signals in the frequency ranges 1710MHz – 1785MHz and 1805MHz – 1880MHz;

d. 17.0dB for radio signals in the frequency ranges 1900MHz – 1980MHz and 2110MHz – 2170MHz;

e. 17.9dB for radio signals in the frequency range 2500MHz – 2690MHz;

f. any other propagation loss notified to the Licensee by Ofcom in respect of radio signals in any other frequency band.

7. Assessment of compliance with coverage obligation

Ofcom will assess the Licensee's compliance with paragraph 6 of this Schedule by reference to the document "*4G Coverage Obligation Compliance Verification Methodology: LTE"* published by Ofcom, or such other documents as Ofcom may notify to the Licensee.

8. Permitted Frequency Blocks

Subject to the emissions permitted under paragraph 10 of this Schedule, the Radio Equipment may only transmit within the following frequency bands (the "Permitted Frequency Blocks"):

Downlink frequencies	**Uplink frequencies**
811 to 821 MHz	852 to 862 MHz

9. Maximum power within the Permitted Frequency Blocks

The power transmitted in the Permitted Frequency Blocks shall not exceed:

a) Downlink Frequencies

	Maximum EIRP

Radio Equipment	61dBm/(5 MHz) EIRP*

* The maximum EIRP relates to the EIRP of a specific piece of Radio Equipment irrespective of the number of transmit antennas.

b) Uplink Frequencies[15]

Radio Equipment	**Maximum mean power**
Fixed or installed Radio Equipment	23dBm EIRP*
Mobile or nomadic Radio Equipment	23dBm TRP*

* The maximum mean power relates to the EIRP or TRP of a specific piece of Radio Equipment irrespective of the number of transmit antennas.

10. Maximum power outside the Permitted Frequency Blocks

For transmissions on the downlink frequencies, the EIRP emanating from the Radio Equipment transmissions at any frequency outside the Permitted Frequency Blocks shall not exceed the higher (least stringent) of (a) the baseline requirements and (b) the transition requirements for that frequency.

Baseline requirements

Frequency range	**Maximum mean EIRP**	**Measurement bandwidth**
832 to 862 MHz	−49.5 dBm*	5 MHz

* The maximum EIRP relates to the EIRP of a specific piece of Radio Equipment irrespective of the number of transmit antennas.

Transition requirements

Frequency range (within the range 791MHz to 821MHz only)	**Maximum mean EIRP**	**Measurement bandwidth**
−10 to −5 MHz from lower block edge	18 dBm*	5 MHz
−5 to 0 MHz from lower block edge	22 dBm*	5 MHz
0 to +5 MHz from upper block edge	22 dBm*	5 MHz
+5 to +10 MHz from upper block edge	18 dBm*	5 MHz
Remaining downlink frequencies	11 dBm*	1 MHz

* The maximum EIRP applies per antenna (for one to four antennas).

[15] Consumer user equipment will be authorised by means of a licence exemption under section 8 of the Wireless Telegraphy Act 2006

Transition requirements

Frequency range	Maximum mean EIRP	Measurement bandwidth
790 to 791 MHz	17.4 dBm*	1 MHz
821 to 832 MHz	15 dBm*	1 MHz

* The maximum EIRP applies per antenna (for one to four antennas).

Baseline requirements

Frequency range	In-block EIRP, P, dBm/(10 MHz)**	Maximum mean EIRP in frequency range	Measurement bandwidth
470 to 790 MHz	P ≥ 59	0 dBm*	8 MHz
	36 ≤ P < 59	(P−59) dBm*	8 MHz
	P < 36	−23 dBm*	8 MHz

* The maximum EIRP relates to the EIRP of a specific piece of Radio Equipment irrespective of the number of transmit antennas.
** This is the in-block EIRP measured in a bandwidth of 10MHz.

11. Interpretation of terms in this schedule

In this Schedule:

a) “dBm” means the power level in decibels (logarithmic scale) referenced against 1milliwatt (i.e. a value of 0dBm is 1 milliwatt);

b) “EIRP” means the equivalent isotropically radiated power. This is the product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna (absolute or isotropic gain);

c) “femtocell” means Radio Equipment transmitting on the downlink frequencies, which operates at a power not exceeding 20dBm EIRP per carrier, and which is or will be used only by and under the control of the Licensee, following the establishment of a telecommunications link between the femtocell and a network of the Licensee;

d) “Fixed or installed” means used or installed at specific fixed points;

e) "IR" means a United Kingdom Radio Interface Requirement published by Ofcom in accordance with Article 4.1 of Directive 1995/5/EC of the European Parliament and of the Council on radio equipment and telecommunications terminal equipment (RTTE) and the mutual recognition of their conformity.

f) “lower block edge” means, in relation to each Permitted Frequency Block, the lowest frequency in that Permitted Frequency Block;

g) “measurement bandwidth” means the size of an individual spectrum segment within the specified frequency range that is used to measure compliance with the specified power limit;

h) “mobile or nomadic” means intended to be used while in motion or during halts at unspecified points;

i) “Oversight Board” has the meaning given to it in the “*Notice of DTT interference mitigation procedures required under spectrum access licences for the 800 MHz band”* notified to the Licensee under paragraph 4 of this Schedule;

j) “Permitted Frequency Blocks” has the meaning given to it in paragraph 8 of this Schedule;

k) “smart/intelligent low power repeater” means a repeater which operates with power not exceeding 24dBm EIRP per carrier, which may be established by customers of the Licensee who have written agreements with the Licensee and:

- The Licensee has ultimate control of the repeater, i.e. each individual repeater can be disabled remotely by the Licensee;
- The repeater operates only on the Licensee’s frequencies and with their valid Public Land Mobile Network Identifier;
- Must not cause undue interference to other spectrum users; and
- The repeater only transmits on the uplink frequencies when actively carrying a call (voice, video or data) or signalling from serviced handsets.

l) “TRP” means the total radiated power. This is the integral of the power transmitted in different directions over the entire radiation sphere;

m) “upper block edge” means, in relation to each Permitted Frequency Block, the highest frequency in that Permitted Frequency Block.

Annex 7

Template licence schedule for standard power licences for the 2.6 GHz band (paired spectrum)

Draft Schedule: standard power licences for the 2.6 GHz band (paired spectrum)

SCHEDULE [ ] TO LICENCE NUMBER: [xxxxxx]

Schedule Date: **[xxxxxx]**

Licence category: **Spectrum Access Licence (2500 MHz – 2690 MHz)**

1. Description of Radio Equipment

References in this Schedule to the Radio Equipment are references to any wireless telegraphy station or wireless telegraphy apparatus that is established, installed and/or used under this Schedule.

2. Interface Requirements for the Radio Equipment

Use of the Radio Equipment shall be in accordance with the following Interface Requirement:

> IR 2072: Terrestrial systems capable of providing electronic communications services in the band 2500 to 2690 MHz

3. Special conditions relating to the Radio Equipment

a) Subject to paragraph 3(b) of this Schedule, during the period that this Licence remains in force, unless consent has otherwise been given by Ofcom, the Licensee shall compile and maintain accurate written records of the following details relating to the Radio Equipment:

   i) postal address (including post code);

   ii) National Grid Reference, to at least 1 metre resolution;

   iii) antenna height (above ground level), type, and boresight bearing east of true north (if applicable); and

   iv) radio frequencies which the Radio Equipment uses

   and the Licensee must produce these records if requested by any person authorised by Ofcom.

b) The conditions relating to the keeping of records contained in sub-paragraphs 3(a)(ii) and (iii) of this Schedule shall not apply in respect of femtocell equipment and smart/intelligent low power repeater equipment.

c) The Licensee shall submit to Ofcom copies of the records detailed in sub-paragraph 3(a) above at such intervals as Ofcom may notify to the Licensee.

4. Co-ordination at frequency and geographical boundaries

The Licensee shall ensure that the Radio Equipment is operated in compliance with such co-ordination procedures as may be notified to the Licensee by Ofcom from time to time.

5. International cross-border coordination

The Licensee shall ensure that the Radio Equipment is operated in compliance with such cross-border co-ordination and sharing procedures as may be notified to the Licensee by Ofcom from time to time.

6. Permitted Frequency Blocks

Subject to the emissions permitted under paragraph 8 of this Schedule, the Radio Equipment may only transmit within the following frequency bands (the "Permitted Frequency Blocks"):

Downlink frequencies	**Uplink frequencies**
[2620 to 2690 MHz]	[2500 to 2570 MHz]

7. Maximum power within the Permitted Frequency Blocks

The power transmitted in the Permitted Frequency Blocks shall not exceed:

a) Downlink frequencies

	Maximum EIRP
Radio Equipment	61dBm/(5 MHz) EIRP

b) Uplink frequencies[16]

Radio Equipment	**Maximum mean power**
Mobile or nomadic Radio Equipment	31dBm/(5 MHz) TRP
Fixed or installed Radio Equipment	35dBm/(5 MHz) EIRP

[16] Consumer use equipment will be authorised by means of a licence exemption under section 8 of the Wireless Telegraphy Act 2006

8. Maximum power outside the Permitted Frequency Blocks

For transmissions on the downlink frequencies, the EIRP emanating from the Radio Equipment transmissions at any frequency outside the Permitted Frequency Blocks shall not exceed the higher (least stringent) of (a) the baseline requirements and (b) the block specific requirements for that frequency.

(a) Baseline requirements

Frequency range	**Maximum mean EIRP**	**Measurement bandwidth**
2500 to 2615 MHz	−45dBm	1 MHz
2615 to 2700 MHz	4dBm	1 MHz
2700 to 3100 MHz	−45dBm	1 MHz

(b) Block-specific requirements

Frequency range	**Maximum mean EIRP**	**Measurement bandwidth**
Start of band (2500 MHz) to −5 MHz from lower block edge	Baseline requirement level	
−5 MHz to −1 MHz from lower block edge	4dBm	1 MHz
−1 MHz to −0.2 MHz from lower block edge	$3 + 15(\Delta_F+0.2)$ dBm	30 kHz
−0.2 MHz to 0 MHz from lower block edge	3dBm	30 kHz
0 MHz to 0.2 MHz from upper block edge	3dBm	30 kHz
0.2 MHz to 1 MHz from upper block edge	$3 - 15(\Delta_F-0.2)$ dBm	30 kHz
1 MHz to 5 MHz from upper block edge	4dBm	1 MHz
5 MHz from upper block edge to end of band (2690 MHz)	Baseline requirement level	
Where: Δ_F is the frequency offset from the relevant block edge (in MHz)		

9. Interpretation of terms in this Schedule

In this Schedule:

a) “dBm” means the power level in decibels (logarithmic scale) referenced against 1milliwatt (i.e. a value of 0dBm is 1 milliwatt);

b) "EIRP" means the equivalent isotropically radiated power. This is the product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna (absolute or isotropic gain);

c) "femtocell" means Radio Equipment transmitting on the downlink frequencies, which operates at a power not exceeding 20dBm EIRP per carrier, and which is or will be used only by and under the control of the Licensee, following the establishment of a telecommunications link between the femtocell and a network of the Licensee;

d) "Fixed or installed" means used or installed at specific fixed points;

e) "IR" means a United Kingdom Radio Interface Requirement published by Ofcom in accordance with Article 4.1 of Directive 1995/5/EC of the European Parliament and of the Council on radio equipment and telecommunications terminal equipment (RTTE) and the mutual recognition of their conformity;

f) "lower block edge" means, in relation to each Permitted Frequency Block, the lowest frequency in that Permitted Frequency Block;

g) "measurement bandwidth" means the size of an individual spectrum segment within the specified frequency range that is used to measure compliance with the specified power limit;

h) "mobile or nomadic" means intended to be used while in motion or during halts at unspecified points;

i) "Permitted Frequency Blocks" has the meaning given to it in paragraph 6 of this Schedule;

j) "smart/intelligent low power repeater" means a repeater which operates with power not exceeding 24dBm EIRP per carrier, which may be established by customers of the Licensee who have written agreements with the Licensee and:

- The Licensee has ultimate control of the repeater, i.e. each individual repeater can be disabled remotely by the Licensee;
- The repeater operates only on the Licensee's frequencies and with their valid Public Land Mobile Network Identifier;
- Must not cause undue interference to other spectrum users; and
- The repeater only transmits on the uplink frequencies when actively carrying a call (voice, video or data) or signalling from serviced handsets.

k) "TRP" means the total radiated power. This is the integral of the power transmitted in different directions over the entire radiation sphere; and

l) "upper block edge" means, in relation to each Permitted Frequency Block, the highest frequency in that Permitted Frequency Block.

Annex 8

Template licence schedule for licences in the 2.6 GHz band (unpaired spectrum)

Draft schedule : licences for the 2.6 GHz band (unpaired spectrum)

SCHEDULE [ ] TO LICENCE NUMBER: [xxxxxx]

Schedule Date: **[xxxxxx]**

Licence category: **Spectrum Access Licence (2500 MHz – 2690 MHz)**

1. Description of Radio Equipment

References in this Schedule to the Radio Equipment are references to any wireless telegraphy station or wireless telegraphy apparatus that is established, installed and/or used under this Schedule.

2. Interface Requirements for the Radio Equipment

Use of the Radio Equipment shall be in accordance with the following Interface Requirement:

IR 2072: Terrestrial systems capable of providing electronic communications services in the band 2500 to 2690 MHz

3. Special conditions relating to the Radio Equipment

a) Subject to paragraph 3(b) of this Schedule, during the period that this Licence remains in force, unless consent has otherwise been given by Ofcom, the Licensee shall compile and maintain accurate written records of the following details relating to the Radio Equipment:

i) postal address (including post code);

ii) National Grid Reference, to at least 1 metre resolution;

iii) antenna height (above ground level), type, and boresight bearing east of true north (if applicable); and

iv) radio frequencies which the Radio Equipment uses

and the Licensee must produce these records if requested by any person authorised by Ofcom.

b) The conditions relating to the keeping of records contained in sub-paragraphs 3(a)(ii) and (iii) of this Schedule shall not apply in respect of femtocell equipment and smart/intelligent low power repeater equipment.

c) The Licensee shall submit to Ofcom copies of the records detailed in sub-paragraph 3(a) above at such intervals as Ofcom may notify to the Licensee.

4. Co-ordination at frequency and geographical boundaries

The Licensee shall ensure that the Radio Equipment is operated in compliance with such co-ordination procedures as may be notified to the Licensee by Ofcom from time to time.

5. International cross-border coordination

The Licensee shall ensure that the Radio Equipment is operated in compliance with such cross-border co-ordination and sharing procedures as may be notified to the Licensee by Ofcom from time to time.

6. Permitted Frequency Blocks

Subject to the emissions permitted under paragraph 8 of this Schedule, the Radio Equipment may only transmit within the following frequency bands (the "Permitted Frequency Blocks"):

Unrestricted frequencies (uplink and downlink):	[2575 to 2615 MHz]
Restricted frequencies (uplink and downlink):	[2570 to 2620 MHz]

7. Maximum power within the Permitted Frequency Blocks

For downlink transmissions, the power transmitted in the Permitted Frequency Blocks shall not exceed:

	Maximum EIRP
Radio Equipment in unrestricted frequencies	61dBm/(5 MHz) EIRP
Radio Equipment in restricted frequencies	25dBm/(5 MHz) EIRP

For uplink transmissions, the power transmitted in the Permitted Frequency Blocks shall not exceed[17]:

Radio Equipment	**Maximum mean power**
Mobile or nomadic Radio Equipment	31dBm/(5 MHz) TRP
Fixed or installed Radio Equipment	35dBm/(5 MHz) EIRP

[17] Consumer user equipment will be authorised by means of a licence exemption under section 8 of the Wireless Telegraphy Act 2006

8. Maximum power outside the Permitted Frequency Blocks

Unrestricted frequencies

For downlink transmissions on unrestricted frequencies, the EIRP emanating from the Radio Equipment transmissions at any frequency outside the Permitted Frequency Blocks shall not exceed the higher (least stringent) of (a) the baseline requirements and (b) the block specific requirements.

(a) Baseline requirements

Frequency range	**Maximum mean EIRP**	**Measurement bandwidth**
2500 to 2615 MHz	−45dBm	1 MHz
2615 to 2700 MHz	4dBm	1 MHz
2700 to 3100 MHz	−45dBm	1 MHz

(b) Block-specific requirements

Frequency range	**Maximum mean EIRP**	**Measurement bandwidth**
Start of band (2500 MHz) to −5 MHz from lower boundary of unrestricted frequencies	Baseline requirement level	
−5 MHz to −1 MHz from lower boundary of unrestricted frequencies	4dBm	1 MHz
−1 MHz to −0.2 MHz from lower boundary of unrestricted frequencies	$3 + 15(\Delta_F+0.2)$ dBm	30 kHz
−0.2 MHz to 0 MHz from lower boundary of unrestricted frequencies	3dBm	30 kHz
0 MHz to 0.2 MHz from upper boundary of unrestricted frequencies	3dBm	30 kHz
0.2 MHz to 1 MHz from upper boundary of unrestricted frequencies	$3 − 15(\Delta_F−0.2)$ dBm	30 kHz
1 MHz to 5 MHz from upper boundary of unrestricted frequencies	4dBm	1 MHz
5 MHz from upper boundary of unrestricted frequenciesto end of band (2690 MHz)	Baseline requirement level	
Where: Δ_F is the frequency offset from the relevant boundary of unrestricted frequencies (in MHz)		

Restricted frequencies

For downlink transmissions on restricted frequencies, the EIRP emanating from the Radio Equipment transmissions at any frequency outside the Permitted Frequency Blocks shall not exceed the higher (least stringent) of (a) the baseline requirements and (if applicable) (b) the alternative block-specific requirements:

(a) Baseline requirements

Frequency range	**Maximum mean EIRP**	**Measurement bandwidth**
2500 to 2615 MHz	−45dBm	1 MHz
2615 to 2700 MHz	4dBm	1 MHz
2700 to 3100 MHz	−45dBm	1 MHz

(b) Alternative block-specific requirements

The following block-specific requirements apply to base stations with outdoor antennas meeting the conditions in paragraph 9, and to base stations with indoor antennas, subject to the "*Notice of coordination procedure for the licences covering the 2.6 GHz band – Deployment of mobile electronic communication networks in unpaired restricted blocks and in spectrum adjacent to unpaired restricted blocks*" notified by Ofcom to the Licensee:

Frequency range	**Maximum mean EIRP**	**Measurement bandwidth**
Start of band (2500 MHz) to −5 MHz from lower edge of restricted frequencies	−22dBm	1 MHz
−5 MHz to −1 MHz from lower boundary of restricted frequencies	−18dBm	1 MHz
−1 MHz to −0.2 MHz from lower boundary of restricted frequencies	$-19 + 15(\Delta_F+0.2)$ dBm	30 kHz
−0.2 MHz to 0 MHz from lower boundary of restricted frequencies	−19dBm	30 kHz
0 MHz to 0.2 MHz from upper boundary of restricted frequencies	−19dBm	30 kHz
0.2 MHz to 1 MHz from upper boundary of restricted frequencies	$-19 - 15(\Delta_F-0.2)$ dBm	30 kHz
1 MHz to 5 MHz from upper boundary of restricted frequencies	−18dBm	1 MHz
5 MHz from upper boundary of restricted frequencies to end of band (2690 MHz)	−22dBm	1 MHz
Where: Δ_F is the frequency offset from the relevant boundary of restricted frequencies (in MHz)		

9. Antenna height limit for base stations using alternative block specific EIRP limits

The highest point of outdoor antenna systems of base stations using the alternative block-specific EIRP limits shall be no more than 12m above ground level.

10. Interpretation of terms in this schedule

In this Schedule:

a) “dBm” means the power level in decibels (logarithmic scale) referenced against 1milliwatt (i.e. a value of 0dBm is 1 milliwatt);

b) “downlink transmission” means transmission from a base station to a terminal station;

c) “EIRP” means the equivalent isotropically radiated power. This is the product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna (absolute or isotropic gain);

d) “femtocell” means Radio Equipment transmitting on the downlink frequencies, which operates at a power not exceeding 20dBm EIRP per carrier, and which is or will be used

only by and under the control of the Licensee, following the establishment of a telecommunications link between the femtocell and a network of the Licensee;

e) "Fixed or installed" means used or installed at specific fixed points;

f) "IR" means a United Kingdom Radio Interface Requirement published by Ofcom in accordance with Article 4.1 of Directive 1995/5/EC of the European Parliament and of the Council on radio equipment and telecommunications terminal equipment (RTTE) and the mutual recognition of their conformity.

g) "measurement bandwidth" means the size of an individual spectrum segment within the specified frequency range that is used to measure compliance with the specified power limit;

h) "mobile or nomadic" means intended to be used while in motion or during halts at unspecified points;

i) "Permitted Frequency Blocks" has the meaning given to it in paragraph 6 of this this Schedule;

j) "smart/intelligent low power repeater" means a repeater which operates with power not exceeding 24dBm EIRP per carrier, which may be established by customers of the Licensee who have written agreements with the Licensee and:

- The Licensee has ultimate control of the repeater, i.e. each individual repeater can be disabled remotely by the Licensee;
- The repeater operates only on the Licensee's frequencies and with their valid Public Land Mobile Network Identifier;
- Must not cause undue interference to other spectrum users; and
- The repeater only transmits on the uplink frequencies when actively carrying a call (voice, video or data) or signalling from serviced handsets.

k) "TRP" means the total radiated power. This is the integral of the power transmitted in different directions over the entire radiation sphere; and

l) "uplink transmission" means transmission from a terminal station to a base station.

Annex 9

Template licence schedule for low power concurrent licences for the 2.6 GHz band (paired spectrum)

Draft schedule: low power concurrent licences for the 2.6 GHz band (paired spectrum)

SCHEDULE [ ] TO LICENCE NUMBER: [xxxxxx]

Schedule Date: **[xxxxxx]**

Licence category: **Spectrum Access Licence (2500 MHz – 2690 MHz)**

1. Description of Radio Equipment

References in this Schedule to the Radio Equipment are references to any wireless telegraphy station or wireless telegraphy apparatus that is established, installed and/or used under this Schedule.

2. Interface Requirements for the Radio Equipment

Use of the Radio Equipment shall be in accordance with the following Interface Requirement:

IR 2091: Low power concurrent terrestrial systems capable of providing electronic communications services in the band 2500 to 2690 MHz

3. Special conditions relating to the Radio Equipment

a) Subject to paragraph 3(b) of this Schedule, during the period that this Licence remains in force, unless consent has otherwise been given by Ofcom, the Licensee shall compile and maintain accurate written records of the following details relating to the Radio Equipment:

i) postal address (including post code);

ii) National Grid Reference, to at least 1 metre resolution;

iii) antenna height (above ground level), type, and boresight bearing east of true north (if applicable); and

iv) radio frequencies which the Radio Equipment uses

and the Licensee must produce these records if requested by any person authorised by Ofcom.

b) The conditions relating to the keeping of records contained in sub-paragraphs 3(a)(ii) and (iii) of this Schedule shall not apply in respect of femtocell equipment and smart/intelligent low power repeater equipment.

c) The Licensee must submit to Ofcom copies of the records detailed in sub-paragraph 3(a) above at such intervals as Ofcom may notify to the Licensee.

4. Co-ordination at frequency and geographical boundaries

The Licensee shall ensure that the Radio Equipment is operated in compliance with such co-ordination procedures as may be notified to the Licensee by Ofcom from time to time.

5. International cross-border coordination

The Licensee shall ensure that the Radio Equipment is operated in compliance with such cross-border co-ordination and sharing procedures as may be notified to the Licensee by Ofcom from time to time.

6. Code of practice on engineering coordination

a) The Licensee shall use best endeavours to agree with the Notified Licensees within six months of the date of issue of this Licence, engineering coordination principles to be set out in an industry Code of Practice on Engineering Coordination ("the Code of Practice").

b) The objective of the Code of Practice shall be to secure the efficient use of the radio spectrum such that stations for wireless telegraphy and apparatus for wireless telegraphy shall be established or installed, sited, used and transmit in a manner that will allow services in the Permitted Frequency Blocks, whether similar, competing or otherwise (including those offered by the Notified Licensees) to be employed in neighbouring premises (including premises on different floors in the same building).

c) In developing the Code of Practice the Licensee and the Notified Licensees shall at a minimum consider principles relating to:

   i) avoidance of interference by limiting transmission power to that which is no greater than necessary for service of customers;

   ii) selection of sites in a manner that will minimise the probability of interference arising;

   iii) siting of equipment within customer premises and at other sites in a manner that will minimise the probability of interference arising;

   iv) arrangements for communicating information between companies to facilitate engineering coordination;

   v) efficient use of radio frequency resources, using the minimum resources necessary to service customers; and

   vi) mitigation techniques to manage interference.

d) The Code of Practice shall be provided to Ofcom as soon as reasonably practicable after it is agreed.

e) The Licensee and the Notified Licensees may agree changes to the Code of Practice. When agreed, the revised Code of Practice must be provided to Ofcom as soon as reasonably practicable.

f) The Licensee shall use its best endeavours to adhere to the Code of Practice (as revised under sub-clause (e)) when establishing and using wireless telegraphy stations and installing and using wireless telegraphy apparatus.

g) If a Code of Practice is not agreed within six months as required by paragraph 6(a) above, or, where at any time the objective described in paragraph 6(b) above is in Ofcom's sole opinion not being secured, the Licensee shall adhere to the terms of a code of practice on engineering coordination containing any principles that Ofcom in its sole discretion deems necessary to secure that objective ("Ofcom's Code of Practice").

h) Any breach of Ofcom's Code of Practice shall constitute a breach of this Licence.

7. Permitted Frequency Blocks

Subject to the emissions permitted under paragraph 9 of this Schedule, the Radio Equipment may only transmit within the following frequency bands (the "Permitted Frequency Blocks"):

Downlink frequencies	**Uplink frequencies**
[2620 to 2690 MHz]	[2500 to 2570 MHz]

8. Maximum power within the Permitted Frequency Blocks

The power transmitted in the Permitted Frequency Blocks shall not exceed:

a) Downlink Frequencies

	Maximum EIRP
Radio Equipment	30dBm EIRP

b) Uplink Frequencies[18]

Radio Equipment	**Maximum mean power**
Mobile or nomadic Radio Equipment	23dBm TRP (total radiated power)
Fixed or installed Radio Equipment	23dBm EIRP

[18] Consumer user equipment will be authorised by means of a licence exemption under section 8 of the Wireless Telegraphy Act 2006

9. Maximum power outside the Permitted Frequency Blocks

For transmissions on the downlink frequencies, the EIRP emanating from the Radio Equipment transmissions at any frequency outside the Permitted Frequency Blocks shall not exceed the higher (least stringent) value of (a) the baseline requirements and (b) the block specific requirements for that frequency.

Baseline requirements

Frequency range	**Maximum mean EIRP**	**Measurement bandwidth**
2500 to 2615 MHz	−45dBm	1 MHz
2615 to 2700 MHz	4dBm	1 MHz
2700 to 3100 MHz	−45dBm	1 MHz

Block-specific requirements

Frequency range	**Maximum mean EIRP**	**Measurement bandwidth**
Start of band (2500 MHz) to −5 MHz from lower block edge	Baseline requirement level	
−5 MHz to −1 MHz from lower block edge	4dBm	1 MHz
−1 MHz to −0.2 MHz from lower block edge	$3 + 15(\Delta_F+0.2)$ dBm	30 kHz
−0.2 MHz to 0 MHz from lower block edge	3dBm	30 kHz
0 MHz to 0.2 MHz from upper block edge	3dBm	30 kHz
0.2 MHz to 1 MHz from upper block edge	$3 - 15(\Delta_F-0.2)$ dBm	30 kHz
1 MHz to 5 MHz from upper block edge	4dBm	1 MHz
5 MHz from upper block edge to end of band (2690 MHz)	Baseline requirement level	
Where: Δ_F is the frequency offset from the relevant block edge (in MHz)		

10. Antenna height

The highest point of an outdoor antenna system of any Radio Equipment shall not exceed a height of 12m above ground level.

11. Interpretation of terms in this schedule

In this Schedule:

a) “Code of Practice” has the meaning given to it in paragraph 6 of this Schedule;

b) “dBm” means the power level in decibels (logarithmic scale) referenced against 1milliwatt (i.e. a value of 0dBm is 1 milliwatt);

c) “EIRP” means the equivalent isotropically radiated power. This is the product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna (absolute or isotropic gain);

d) “femtocell” means Radio Equipment transmitting on the downlink frequencies, which operates at a power not exceeding 20dBm EIRP per carrier, and which is or will be used only by and under the control of the Licensee, following the establishment of a telecommunications link between the femtocell and a network of the Licensee;

e) “Fixed or installed” means used or installed at specific fixed points;

f) "IR" means a United Kingdom Radio Interface Requirement published by Ofcom in accordance with Article 4.1 of Directive 1995/5/EC of the European Parliament and of the Council on radio equipment and telecommunications terminal equipment (RTTE) and the mutual recognition of their conformity;

g) “lower block edge” means, in relation to each Permitted Frequency Block, the lower frequency in that Permitted Frequency Block;

h) “measurement bandwidth” means the size of an individual spectrum segment within the specified frequency range that is used to measure compliance with the specified power limit;

i) “mobile or nomadic” means intended to be used while in motion or during halts at unspecified points;

j) "Notified Licensees" means the holders of wireless telegraphy licences which relate to the Permitted Frequency Blocks that are notified to the Licensee by Ofcom from time to time;

k) “Ofcom’s Code of Practice” has the meaning given to it in paragraph 6 of this Schedule;

l) “Permitted Frequency Blocks” has the meaning given to it in paragraph 7 of this Schedule;

m) “smart/intelligent low power repeater” means a repeater which operates with power not exceeding 24dBm EIRP per carrier, which may be established by customers of the Licensee who have written agreements with the Licensee and:

- The Licensee has ultimate control of the repeater, i.e. each individual repeater can be disabled remotely by the Licensee;
- The repeater operates only on the Licensee’s frequencies and with their valid Public Land Mobile Network Identifier;
- Must not cause undue interference to other spectrum users; and

- The repeater only transmits on the uplink frequencies when actively carrying a call (voice, video or data) or signalling from serviced handsets.

n) “TRP” means the total radiated power. This is the integral of the power transmitted in different directions over the entire radiation sphere; and

o) “upper block edge” means, in relation to each Permitted Frequency Block, the highest frequency in that Permitted Frequency Block.