



Customer Reference No:1-4TS-37

Spectrum Licensing  
PO Box 1285  
Warrington, WA1 9GL

Direct Line: 020 7981 3131  
E-Mail: [spectrum.licensing@ofcom.org.uk](mailto:spectrum.licensing@ofcom.org.uk)

5 May 2021

Dear Sir/Madam,

**Shared Access (Low Power) - Licence**

Following your recent application for a Shared Access (Low Power) licence, please find enclosed your licence document which contains the terms and conditions governing the legal operation of your system. Please check the document carefully to ensure the licence meets your requirements. If you consider that it does not, you should contact Ofcom within one calendar month of the date of this letter at the address shown above.

At any time your installation may be inspected by Ofcom to make sure it complies with our requirements and does not cause interference to other users.

At a later date, if you wish to make any changes to your installation, you can apply to do so using an amendment form available from the Ofcom website ([www.ofcom.org.uk](http://www.ofcom.org.uk)). However, any changes to your radio system must not be carried out until you have received authorisation from Ofcom.

Similarly, if you make changes to the accounts address or any other contact address, please inform Ofcom immediately so that our records can be updated. Please always quote your Customer Account Number/Licence Number when contacting us.

Your licence is an important document. Please keep it - and any subsequent documents - in a safe place for future reference.

Ofcom's preferred method of payment is by direct debit and a direct debit mandate is available from the Ofcom website at <http://licensing.ofcom.org.uk/binaries/spectrum/business-radio/forms/dd.pdf> should you choose to pay by this method.

Yours faithfully,

Copies of this letter have been sent to:

Licensees : University Road SOUTHAMPTON SO17 1BJ

Contact : [REDACTED]

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Wireless Telegraphy Act 2006

## Shared Access (Low Power)

Sector/Class/Product:	615001 - Shared Access (Low Power) / Shared Access
Licence number:	1251134/1
Licensee:	University Of Southampton
Company Registration:	
Licensee Address:	University Road, SOUTHAMPTON, SO17 1BJ
Email:	
Date of Issue:	5 May 2021
Valid From:	05 May 2021
Payment Interval:	1 year

1. The Office of Communications (Ofcom) grants this wireless telegraphy licence ("the Licence") to **University Of Southampton** to establish, install and use wireless telegraphy stations and/or wireless telegraphy apparatus as described in the schedules to this Licence (together "the Radio Equipment") subject to the terms set out below.

### Licence Term

2. This Licence shall continue in force until revoked by Ofcom or surrendered by the Licensee or if it is a Short Term Licence, when it reaches its expiration date.

### Licence Revocation

3. Pursuant to schedule 1 paragraph 8 of the Wireless Telegraphy Act 2006 ("the Act"), Ofcom may not revoke this Licence under schedule 1 paragraph 6 of the Act except:
  - (a) at the request, or with the consent, of the Licensee;
  - (b) if there has been a breach of any of the terms of this Licence;
  - (c) in accordance with schedule 1 paragraph 8(5) of the Act;
  - (d) if it appears to Ofcom to be necessary or expedient to revoke the Licence for the purpose of complying with a direction by the Secretary of State given to Ofcom under section 5 of the Act or section 5 of the Communications Act 2003; and
  - (e) for reasons related to the management of the radio spectrum provided that in such a case the power to revoke may only be exercised after at least one month's notice is given in writing.
4. Ofcom may only revoke this Licence by notification in writing to the Licensee and in accordance with schedule 1 paragraphs 6, 6A and 7 of the Act.

## **Licence Variation**

5. Ofcom may only vary this Licence by notification in writing to the Licensee and in accordance with schedule 1 paragraphs 6, 6A and 7 of the Act.

## **Requirement to Commence and Maintain Transmission within 6 Months**

6. The Licensee must establish, install and use the Radio Equipment to commence regular wireless telegraphy transmissions in accordance with the provisions of this Licence within six months of the date that this Licence is issued, and maintain such transmissions thereafter.

## **Transfer**

7. This Licence may not be transferred. The transfer of rights and obligations arising by virtue of this Licence may however be authorised in accordance with regulations made by Ofcom under powers conferred by section 30 of the Act.<sup>1</sup>

## **Changes to Licensee Details**

8. The Licensee shall give prior notice to Ofcom in writing of any proposed changes to the Licensee's name, email address and/or address as recorded in paragraph 1 of this Licence.

## **Fees**

9. The Licensee shall pay to Ofcom the relevant fee(s) as provided in section 12 of the Act and the regulations made thereunder on or before the fee payment date shown above, or on or before such dates as are notified in writing to the Licensee.
10. If the Licence is surrendered, revoked or varied, no refund, whether in whole or in part, of any amount which is due under the terms of this Licence, may be payable in accordance with any regulations made by Ofcom under sections 12 and 13(2) of the Act will be made, except at the absolute discretion of Ofcom.

## **Radio Equipment Use**

11. The Licensee shall ensure that the Radio Equipment is established, installed and used only in accordance with the provisions specified in the schedules to this Licence. Any proposal to amend any detail specified in any of the schedules to this Licence must be agreed with Ofcom in advance and implemented only after this Licence has been varied or reissued accordingly.
12. The Licensee shall ensure that the Radio Equipment is operated in compliance with the terms of this Licence and is used only by persons who have been authorised in writing by the Licensee to do so and that such persons are made aware of, and of the requirement to comply with the terms of this Licence.

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<sup>1</sup> See Ofcom's website for the latest position on spectrum trading and the types of trade which are permitted.

## **Access and Inspection**

13. The Licensee shall permit any person authorised by Ofcom:

- (a) to have access to the Radio Equipment; and
- (b) to inspect this Licence and to inspect, examine and test the Radio Equipment,

at any and all reasonable times or, when in the opinion of that person an urgent situation exists, at any time, to ensure the Radio Equipment is being used in accordance with the terms of this Licence.

## **Modification, Restriction and Closedown**

14. Any person authorised by Ofcom may require the Radio Equipment or any part thereof, to be modified or restricted in use, or temporarily or permanently closed down immediately if in the opinion of the person authorised by Ofcom:

- (a) a breach of this Licence has occurred; and/or
- (b) the use of the Radio Equipment is, or may be, causing or contributing to undue interference to the use of other authorised radio equipment.

15. Ofcom may require any of the Radio Equipment to be modified or restricted in use, or temporarily closed down either immediately or on the expiry of such period as may be specified in the event of a national or local state of emergency being declared. Ofcom may only exercise this power after a written notice has been served on the Licensee or a general notice applicable to holders of a named class of licence has been published.

## **Geographical Boundaries**

16. Subject to the requirements of any coordination procedures notified to the Licensee pursuant to the schedules to this Licence, the Licensee is authorised to establish, install and use of base station equipment in the authorised base station deployment area set out in the schedules to this Licence and any terminals connecting to it.

## **Synchronisation Requirement**

17. Where synchronisation requirements are set out in Schedule 3 to this Licence, the Licensee must transmit within the transmission limits specified.

18. Where synchronisation requirements have not been specified, in the event that harmful interference arises, the Licensee shall endeavour to discuss and agree with the other licence holder(s) how to coordinate their use. If agreement between licence holders cannot be reached, Ofcom may notify the Licensee to comply with additional technical conditions relating to synchronisation requirements.

19. The Licensee must comply with such technical conditions relating to synchronisation requirement notified to it by Ofcom from time to time.

20. The Licensee accepts that they may need to alter or replace Radio Equipment in order to comply with any conditions notified from time to time.

### **Future Dynamic Spectrum Approach**

21. On 25 July 2019, Ofcom published a statement called *Enabling wireless innovation through local licensing* containing a spectrum management decision to enable shared access to spectrum supporting mobile technology. In that decision, Ofcom stated that it will assess whether it is appropriate to transition towards a Dynamic Spectrum Approach in order to provide users more access to spectrum by means of automatic database frequency assignment. The Licensee is therefore notified that Ofcom currently intends to vary this Licence in accordance with paragraph 5 from time to time in future, or may re-issue the Licence, to give effect to that decision.

### **Notification in Electronic Form**

22. The Licensee shall accept notifications and other related documents under this Licence electronically to the designated email address as recorded on the front page of this Licence. The Licensee must update Ofcom about changes to the designated email address in accordance with paragraph 8.

### **Interpretation**

23. In this Licence:
- (a) the establishment, installation and use of the Radio Equipment shall be interpreted as establishment and use of wireless telegraphy stations and installation and use of wireless telegraphy apparatus for wireless telegraphy as specified in section 8(1) of the Act;
  - (b) the expression “interference” shall have the meaning given by section 115 of the Act;
  - (c) the expressions “wireless telegraphy station” and “wireless telegraphy apparatus” shall have the meanings given by section 117 of the Act;
  - (d) the schedule(s) form part of this Licence together with any subsequent schedule(s) which Ofcom may issue as a variation to this Licence; and
  - (e) the Interpretation Act 1978 shall apply to the Licence as it applies to an Act of Parliament.

### **Issued by the Office of Communications (Ofcom)**

## Shared Access (Low Power)

### SCHEDULE 1 TO LICENCE 1251134/1

#### Description of Radio Equipment

1. References in this schedule(s) 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(s).

#### Interface Requirements for the Radio Equipment

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

IR 2103 Shared Access Low power.

#### Special conditions relating to the Radio Equipment

3. This Licence authorises the use of the Radio Equipment within the Permitted Frequency Band and the Licensee warrants that the Radio Equipment is capable of transmitting across the Permitted Frequency Band.
4. However, the Licensee is only authorised to transmit on the Permitted Channel Centre Frequency within the Permitted Frequency Band, as set in Schedule 2 to this Licence or as notified to the Licensee by Ofcom from time to time.
5. The Licensee must comply with any change to the Permitted Channel Centre Frequency notified by Ofcom within the timescale indicated in the notification.
6. 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:
  - (a) For all base stations the:
    - I. Postal address (including post code); and
    - II. Antenna height (above ground level) and type; and
  - (b) For all fixed/ installed terminals the:
    - I. Postal address (including post code);
    - II. National Grid Reference (to 1m resolution); and
    - III. Antenna height (above ground level), type, and boresight bearing east of true north (if applicable); and
  - (c) For all mobile and nomadic terminals in the 3.8 - 4.2 GHz band the postal address (including post code) of where it will be used.
7. The Licensee shall submit to Ofcom in such manner and within such period as specified by Ofcom, such other information in relation to the Radio Equipment, or any wireless telegraphy station or wireless telegraphy apparatus, which the Licensee is planning to

use, as Ofcom may from time to time request. Such information may include, but is not limited to, information in relation to the radio frequency, transmitted power and date of first use for wireless telegraphy stations or wireless telegraphy apparatus to be established, installed or used within such timeframe and in such areas as Ofcom may reasonably request.

8. The use of the Radio Equipment is not permitted airborne.

### **Coordination at frequency and geographical boundaries**

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

### **Cooperation between Licensees**

10. In addition to complying with the specific transmission terms, conditions and limitations set out in this Licence, the Licensee must liaise and co-operate with other holders of other Spectrum Access Low/Medium Power licences (if necessary adjusting transmission power and other technical parameters of transmission) in such a way that harmful interference is not caused by one network deployment to that of another Licensee within the band.

### **Interpretation of terms in this schedule**

11. In this schedule:
  - (a) "Fixed or installed" means used or installed at specific fixed points;
  - (b) "Indoor" or "indoors" means inside premises which have a ceiling or a roof; and except for any doors, windows or passageways, are wholly enclosed;
  - (c) "IR" means a United Kingdom Radio Interface Requirement notified by Ofcom in accordance with Article 8 of Directive 2014/53/EU of the European Parliament and of the Council on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment (known as the Radio Equipment Directive);
  - (d) "mobile or nomadic" means intended to be used while in motion or during halts at unspecified points;
  - (e) "outdoor" or "outdoors" means anywhere that is not indoor;
  - (f) "Permitted Channel Centre Frequency" means the frequency assigned by Ofcom that is the midpoint between the upper and lower channel edge frequencies; and
  - (g) "Permitted Frequency Band" means the frequency range within which Ofcom will assign the Permitted Channel Centre Frequency.



## Shared Access (Low Power)

### SCHEDULE 2 TO LICENCE NUMBER: 1251134/1

<b>Transmitter(s)</b>	
Authorised Base Station Deployment Area	Area of 50 m radius from the following location: SU 42419 15483
Station Name/Address	BUILDING 59, UNIVERSITY OF SOUTHAMPTON  HIGHFIELD SOUTHAMPTON SO17 1BJ
Deployment Location	Outdoor
Permitted Frequency Band	1871.7 - 1880 MHz
Permitted Channel Centre Frequency Tx	1878.35 MHz
Permitted Channel Centre Frequency Rx	1783.35 MHz
Permitted Channel Frequency Bandwidth	3.30 MHz
Antenna Height (Metres)	2

## Maximum power (EIRP) / Maximum power within the Permitted Frequency Channel

### 1800 MHz shared spectrum

1. When transmitting, the licensee must transmit within the limits set out below.

Radio Equipment	Band	Maximum Power	
Base Station	1876.7-1880 MHz	24 dBm / carrier (up to 3 MHz) EIRP	
		<b>Frequency offset from the lower frequency of the band edge</b>	<b>Maximum Mean EIRP density</b>
		0 to 0.05 MHz	-33.6 + 153.3 x $\Delta FL^*$ dBm / kHz
		0.05 to 0.1 MHz	-26 + 60 x ( $\Delta FL^* - 0.05$ ) dBm / kHz
		0.1 to 0.2 MHz	-23 + 230 x ( $\Delta FL^* - 0.1$ ) dBm / kHz
		0.2 to 3.2 MHz	24 dBm / carrier
		3.2 to 3.3 MHz	-23 + 230 x (3.3 - $\Delta FL^*$ ) dBm / kHz
		* Note: $\Delta FL$ in MHz is the offset from the lower edge of the permitted frequency band at 1876.7 MHz (it has values in the range 0 to +0.2 MHz and +3.2 to +3.3MHz)	
Fixed / installed terminal station	1781.7 - 1785 MHz	23 dBm EIRP	
Mobile or nomadic terminal station	1781.7 - 1785 MHz	23 dBm TRP	

### Interpretation of terms in this schedule

2. In this schedule:

- “dBm” means the power level in decibels (logarithmic scale) referenced against 1milliwatt (i.e. a value of 0 dBm is 1 milliwatt);
- “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), measured during the “on” part of the transmission;
- “Fixed or installed” means used or installed at specific fixed points;
- “Indoor” or “indoors” means inside premises which have a ceiling or a roof; and except for any doors, windows or passageways, are wholly enclosed;
- “mobile or nomadic” means intended to be used while in motion or during halts at unspecified points;
- “NGR” means National Grid Reference;
- “outdoor” or “outdoors” means anywhere that is not indoor;

- (h) “Permitted Channel Centre Frequency” means the frequency assigned by Ofcom that is the midpoint between the upper and lower channel edge frequencies;
- (i) “Permitted Channel Frequency Bandwidth” means the total amount of spectrum assigned to the channel;
- (j) “Permitted Frequency Band” means the frequency range within which Ofcom will assign the Permitted Channel Centre Frequency; and
- (k) “TRP” means the total radiated power. This is the integral of the power transmitted in different directions over the entire radiation sphere, measured during the on part of the transmission.

## Shared Access (Low Power)

### SCHEDULE 3 TO LICENCE 1251134/1

## Maximum power of Radio Equipment outside the Permitted Frequency Channel

### 1800 MHz shared spectrum

- When transmitting, the Licensee must transmit within the limits set out below.

Frequency offset from the lower frequency of the band edge	Maximum mean EIRP density
-6.2 to -3.2 MHz	-55 dBm / kHz
-3.2 to 0 MHz	$-45 + 10 \times (\Delta FL^* + 0.2) / 3$ dBm / kHz
Frequency offset from the upper frequency of the band edge	Maximum mean EIRP density
0 to 0.05 MHz	$-23 - 60 \times \Delta FH^*$ dBm / kHz
0.05 to 0.1 MHz	$-26 - 153.3 \times (\Delta FH^* - 0.05)$ dBm / kHz
0.1 to 2.8 MHz	$-45 - 10 \times (\Delta FH^* + 0.2) / 3$ dBm / kHz
2.8 to 5.8 MHz	-55 dBm / kHz

\*Note:  $\Delta FL$  in MHz is the offset from the lower edge of the permitted frequency band at 1876.7 MHz (it has values in the range -3.2 to 0 MHz)  
 $\Delta FH$  in MHz is the offset from the upper edge of the permitted frequency band at 1880 MHz (it has values in the range 0 to 2.8 MHz)

## Interpretation of terms in this schedule

- In this schedule:
  - “dBm” means the power level in decibels (logarithmic scale) referenced against 1 milliwatt (i.e. a value of 0 dBm is 1 milliwatt);
  - “Downlink” means transmissions from a base station to a terminal station;
  - “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), measured during the “on” part of the transmission;
  - “Fixed or installed” means used or installed at specific fixed points;
  - “Indoor” or “indoors” means, inside premises which have a ceiling or a roof; and except for any doors, windows or passageways, are wholly enclosed;
  - “lower channel edge” means, in relation to each Permitted Frequency Channel, the lowest frequency in that Permitted Frequency Channel;
  - “mobile or nomadic” means intended to be used while in motion or during halts at unspecified points;
  - “outdoor” or “outdoors” means anywhere that is not indoor;

- (i) “PMax” is the maximum mean power for the base station in question, measured as EIRP per carrier and determined irrespective of the number of antennas;
- (j) “TDD” means the application of time-division multiplexing to separate outward and return signals;
- (k) “TD-LTE” means the TDD variant of LTE (Long Term Evolution or 4G technology);
- (l) “TRP” means the total radiated power. This is the integral of the power transmitted in different directions over the entire radiation sphere, measured during the on part of the transmission;
- (m) “Uplink” means transmissions from a terminal station to a base station; and
- (n) “upper channel edge” means, in relation to each Permitted Frequency Channel, the highest frequency in that Permitted Frequency Channel.