

Ofcom's EMF licence condition - What you need to know as an aeronautical radio user

This guide provides an overview of what you need to do to comply with Ofcom's EMF¹ licence condition. More detail is provided in our "[Guidance on EMF Compliance and Enforcement](#)".

Step 1 - Do I need to comply?

The purpose of the EMF licence condition is to ensure that your antenna is sufficiently far away from areas where members of the general public may be present when you are transmitting. It does not require you to protect yourself or workers from EMF.

You only need to comply if members of the general public can get close to the antenna on your aircraft or on the airfield, e.g. if you carry passengers on your plane.

Which radio type do you use?

- VHF radio – **see point A**
- Transponder – **see point B**
- Other radio equipment – **please proceed to step 2**

Please note: you do not need to carry out a compliance check for Distance Measuring Equipment (DME). This is because this equipment only transmits at a very low duty cycle and its average power will mean that compliance distances will be very small (typically 5 cm or less). It is very unlikely that members of the general public will get closer than this distance to the antenna whilst it is transmitting.

A – VHF radio

These radios may either be permanently installed to the airframe with an external antenna or a handheld unit temporarily connected to the airframe.

They operate in the frequency band of 118-136 MHz and typically have power levels of less than 6 Watts for handheld equipment and up to 25 Watts for permanently installed equipment.

- If you only use handheld equipment, you do not need to comply and do not need to take any further action in relation to your VHF radio.
- If you use fixed equipment with an external antenna and a radiated power of 25 Watts, and you transmit for less than **25%** of the time in any six minute period (i.e. less than 1 minute and 30 seconds), you do not need to comply and do not need to take any further action in relation to your VHF radio.

We expect that there should be very few situations where operators would need to transmit for more than 25% of the time. The CAA's [Radiotelephony Manual](#) emphasises the need for clarity and brevity in transmissions. However, if you consider that you may routinely need to transmit for more

¹ Electromagnetic fields (EMF)

than 25% of the time in non-emergency situations², you should carry out a compliance check. If this is the case, **please proceed to Step 2.**

B- Transponder

These devices transmit on 1090 MHz (in response to an interrogation from a ground station). Aircraft transponders generally have a nominal output power of up to 260 Watts, with a typical antenna gain of 3dB. However, they transmit very short pulsed signals with a duty cycle of about 0.55% (i.e. it only transmits for 0.55% of the time). This means that the average radiated power of this equipment is in the region of 4-5 Watts.

Ofcom has calculated that, in the absence of a ground plane, the compliance distance for this equipment would be in the region of 26cm. However, the presence of an antenna ground plane will mean that compliance distances will be very small (typically much less than 10 cm).

In most cases therefore, you will not need to take any further action in relation to your transponder.

If, however, you:

- do not have an antenna ground plane installed AND
- the transponder antenna is located less than 26cm from a passenger who is a member of the general public,

you will need to carry out a compliance check. If this is the case, **please proceed to Step 2.**

² Compliance is not required in emergency situations – please see page 8 for further details.

Step 2 - Carrying out a compliance check

The purpose of a compliance check is to understand whether the antenna of your equipment is far enough away from people when you are transmitting. There are a number of ways to carry out a compliance check including:

- Using Ofcom's EMF calculator
- Using manufacturer instructions

The methods included in this guide are the simplest methods and require no detailed specialist knowledge. Other methods for checking compliance are presented in section 6 of our detailed "[Guidance on EMF Compliance and Enforcement](#)". However, these require a more detailed technical understanding of the radio equipment and EMF.

Using Ofcom's EMF calculator

One simple way to check compliance is to use [Ofcom's EMF calculator](#).

The calculator requires the following input parameters:

- Maximum radiated power
- Maximum transmission time in any 6 minute period
- Frequency of operation (MHz)

If you know these parameters, enter them in the calculator. If you do not know these parameters or are unsure, you should obtain this information from your equipment manual or from the manufacturer or seek professional advice.

Understanding your maximum transmission time

The 'maximum transmission time in a six minute period' is used to calculate the average power of your radio equipment. We use six minutes because this is the averaging period defined in the relevant EMF guidelines published by ICNIRP. You should estimate how much time you would typically transmit for during a busy period³. For example, if you usually transmit short messages of up to ten seconds but may do this up to e.g. six times in a busy six minute period, you should use a maximum transmission time of 1 minute (6 x 10 seconds).

If the calculator indicates that 'No assessment is required':



Save the output (e.g. as a pdf, gif or screenshot) or print off a copy and keep this with your licence document or with your logbook. **No further action is required.**

If the calculator provides you with a compliance distance:



Proceed to Step 3

³ In some types of radio equipment (e.g. radar), the transmission time is automatic and not controlled by the end user. These types of radio often have a built-in duty cycle (or percentage of time transmitting) specified by the manufacturer, e.g. 5%. This may be specified in the equipment manual. If you know what this is, you can use this as the maximum transmission time. For example, a duty cycle of 5% would equate to a maximum transmission time of 0.3 minutes.

Using manufacturer instructions

For some types of equipment, the manufacturer of the equipment may provide instructions (either in paper form or online) on how to ensure compliance with the general public EMF limits (in the ICNIRP Guidelines). Instructions may be in the form of user manuals, equipment specifications or instructions for use.

If the instructions include information on EMF compliance distances:



You should review and follow these instructions in parallel with the instructions at Step 3 of this guide. **Proceed to Step 3.**

If the instructions indicate that the equipment is automatically compliant with the general public EMF limits (in the ICNIRP Guidelines):



You should keep the instructions with your licence document or with your logbook as your record of compliance and, once you have done this, **no further action is required.**

Step 3 - Maintaining the compliance distance

You need to ensure that the distance from the closest point of your antenna to any area where a member of the general public may be present when your radio equipment is transmitting is greater than the compliance distance.

The general public can include family, friends, passengers and paying customers, as well as other members of the general public of all ages⁴. None of these individuals should be exposed to EMF above the general public EMF limits. The general public may either be on public or private property including in an aircraft or next to it on the ground.

No further action is required if the only people able to get within the compliance distance are either:

- i) you (i.e. the licensee) or the owner, operator or installer of the equipment e.g. because the licensee is flying a one-seater aircraft; or
- ii) workers (i.e. persons already protected under health and safety legislation) e.g. airport ground staff.

Can you maintain the compliance distance without any further action?

YES – Proceed to step 4

NO – Proceed to step 3A

Step 3A – What should I do if I can't maintain the compliance distance?

There are a number of actions you could take:

- i. Using control measures to prevent members of the general public being exposed to EMF above the general public EMF limits.
- ii. Changing parameters, e.g. reducing radiated power or transmission time, and recalculating the compliance distance.
- iii. Moving equipment, e.g. moving the antenna to a different location.
- iv. In relation to transponders, install an antenna ground plane if you have not already done so.

i. Using control measures

Where it may be possible for a member of the general public to get closer to the antenna than the compliance distance, you could consider using a control measure. For example:

- Using warning signs on the equipment to prevent it being used for longer than the time assumed in your compliance calculation
 - For example: "This radio must not be used for more than a total of [insert number] minutes in any six minute period except when being used for emergency communications".

⁴ Further information on what we mean by the general public and the areas in which they may be present is set out in sections 4 and 5 of our detailed "[Guidance on EMF Compliance and Enforcement](#)".

- In larger aircraft, it may be possible to use warning signs directing people where not to sit or stand when you are transmitting

Further detail on control measures is available in paragraphs 6.27 – 6.30 of our detailed [“Guidance on EMF Compliance and Enforcement”](#).

ii. Changing parameters

Reducing power: Some users may be able to use a lower radiated power without impacting the practical usage of their radio.

You should only consider reducing power if it does not reduce the range of your radio below that which is needed for maintaining distress and safety related communications.

If you think it is possible to use reduced power, you can enter the reduced power in the calculator and recalculate the compliance distance. If this is successful, you can proceed to step 4.

Reducing transmission time: Some users who are using the radio for routine communications may be able to reduce the amount of time transmitting.

You should only consider this option if you are confident that it will not impact safety related communications. (NB: The EMF condition does not apply in emergency situations and there is no time limit on this sort of communications).

A reduction in the maximum amount of time that you transmit can also reduce the compliance distance or may even mean that you do not need to maintain a compliance distance at all.

If you think it is possible to reduce your transmission time, you can try entering a different transmission time in the calculator to understand the impact this has on the compliance distance.

If you decide that it is feasible to limit the use of the radio in this way, but think there is a risk that the radio may be used for longer than one minute in a 6 minute period, you could consider additionally using one of the control measures listed above under point i.

iii. Moving the antenna

Another option that may be possible in some circumstances is to move the antenna to a different location on the aircraft. However, changes to antenna locations require oversight by engineering professionals.

Proceed to Step 4

Step 4 – Keeping an appropriate compliance record

If you have used Ofcom's calculator

You should save the output (e.g. as a pdf, gif or screenshot) or print off a copy and keep this with your licence document or logbook.

If you have used any of the control measures mentioned in step 3A, you should also keep a record of this.

If you have used manufacturer instructions

You should keep the manufacturer's instructions on EMF compliance that you have followed with your licence document or logbook. You should also be able to demonstrate how you have followed the instructions.

If you have used any of the control measures mentioned in step 3A, you should also keep a record of this.

Once you have carried out your compliance assessment and kept (or saved) your record(s), **no further action is required.**

Further information on the type of records that can be used to demonstrate compliance are set out in section 12 of our detailed "[Guidance on EMF Compliance and Enforcement](#)".

Emergency situations

If your equipment is being used for either seeking help in an emergency, or responding to an emergency, you do not need to worry about compliance whilst the emergency is unfolding.

You will however need to make sure you comply when your equipment is being used in other non-emergency situations. Training exercises, for example, are not emergency situations. You will therefore need to ensure you comply with the general public EMF limits during any training exercises. However, if only workers may be exposed to EMF above the general public EMF limits, you will not need to take any further steps to comply.

Where equipment is used in an emergency situation, you do not need to worry about compliance for any routine/periodic testing of that equipment you need to carry out to ensure the equipment will work as required in the event of an emergency situation.

You do not need to keep a compliance record for any equipment you only use in an emergency situation.

Further information on when the emergency exemption applies is set out in section 13 of our detailed ["Guidance on EMF Compliance and Enforcement"](#).

Other questions about EMF compliance

How often do I need to check my equipment complies with the new rules?

You will only need to reassess compliance if you make changes to your equipment which is likely to increase the EMF exposure levels in any area where a member of the general public may be present. This could happen if, for example, you change or adjust the antenna or make other permanent technical changes to the equipment. If your equipment is mobile, this doesn't mean you need to repeat this assessment every time it moves from one location to another. However, you should always make sure that members of the general public are being kept beyond the compliance distance from the equipment's antenna when it is transmitting.

What if I am not present when equipment is used?

Just like any other licence condition, it is your responsibility to make sure you comply.

If you let a third party control radio equipment which you are responsible for under the terms of your licence, then you should consider how you can make sure they comply with the general public EMF limits. For example, you should consider if they need any specific training on EMF risks or whether you should use control measures outlined in Step 3A of this guide. You could also include contractual clauses relating to EMF compliance in any agreement you enter into authorising a third party to use your radio equipment.

What if I buy an aircraft? Can I presume any equipment is compliant?

If you buy an aircraft from someone who provides you with documentation relating to EMF compliance, you should make your own assessment of whether you consider it sufficient for you to comply with the general public EMF limits. You should take into account whether you intend to set up and operate the radio equipment in the same way as the previous owner and whether you intend to install any other radio equipment which may affect the compliance distance. You should also consider whether the previous owner's documentation is up to date and reflects the current setup and operation of the radio equipment.

What radio equipment do I need to take into account to ensure compliance?

You only need to ensure your own radio equipment complies with the general public EMF limits. Licensees are not required to take into account EMF from radio equipment on other aircraft or on the ground (outside their aircraft).

What will Ofcom do to assess compliance?

Ofcom's Spectrum Assurance Officers carry out spot checks to ensure that radio equipment is being operated in accordance with all the terms and conditions of licences.

The checks could come at any time, so it's important for you to make sure you can provide information which demonstrates you're complying with the rules.

If Ofcom finds the EMF from your equipment is above the general public EMF limits or if you cannot provide appropriate records demonstrating compliance to Ofcom, we may take enforcement action.

Ofcom's new EMF licence condition: Here's what you need to know as an aeronautical radio user

Further information on potential enforcement action and our approach to enforcement is set out in section 15 of our detailed "[Guidance on EMF Compliance and Enforcement](#)".

Feedback on this guide

This guide provides simplified guidance on how to check and demonstrate compliance with Ofcom's EMF licence condition. More detail is provided in our "[Guidance on EMF Compliance and Enforcement](#)".

If you think that any part of this guide is unclear or you have general feedback on this guide, you can email us at EMFImplementation@ofcom.org.uk. We will then review your feedback and may take account of this in future versions of this guide. However, we cannot provide individual responses to emails or provide bespoke advice on individual compliance queries.

Version History

The table below shows the version history of this guide. You should always check that you are using the most recent version of this guide when carrying out a compliance check. The most recent version of this guide will be the one published at this webpage:

<https://www.ofcom.org.uk/manage-your-licence/emf/compliance-and-enforcement-guidance>

Version number	Description	Publication date
V1.0	This version	17 June 2021