Is your station EMR safe?

How to check your station for electromagnetic radiation safety compliance

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Schedule 1

Schedule 1—Conditions about electromagnetic energy

(section 16)

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2 Condition – compliance with electromagnetic energy standard

Condition – general case

(1) A person must not operate an amateur station if the radiofrequency field produced by the station exceeds the reference levels for general public exposure at a place accessible to a member of the general public.

In the amateur radio Class licence – formally called "Radiocommunications (Amateur Stations) Class Licence 2023" – Schedule 1 sets out the conditions that operators must ensure that their stations comply with. Schedule 1 runs from page 11 through 17. That's 20% of the entire licence conditions!

ANYONE with a passing interest in radio communications would be aware of the public's concern about radiation safety, especially from mobile phones and their base stations. Over the past 20 years, that level of concern has promoted the development of EMR safety standards in many countries, and those standards became mandatory elements of their radiocommunications regulation.

As authorised users of the radio spectrum, we radio amateurs need to take notice.

Even though there have been numerous studies done around the world and in Australia, the effects of EMR exposure are not clear and study results about possible negative impacts have been conflicting. The impact of moderate exposure to EMR fields on the human body is not conclusive.

Regardless of this, the scientific consensus remains that high levels of EMR can produce thermal effects (heating of tissues) and electrostimulation of the nervous system at frequencies below 10MHz. With inconclusive evidence, it's not surprising that conservative safety limits with large health safeguards were set by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA – which is responsible for radiation protection and nuclear safety in Australia).

However, in 2024 the World Health Organisation (WHO) commissioned a systematic review into the potential health effects of EMR. A systematic review is one where all available research on a topic is identified and amalgamated to provide a comprehensive overview, with transparency and reproducibility.

Associate Professor Ken Karipidis, the Assistant Director of Health Impact Assessment at ARPANSA, led the review and, in their public statement, ARPANSA state:

"it is the most comprehensive and up-to-date assessment of the evidence to date" and "we can be more confident that exposure to radio waves from wireless technology is not a human health hazard."

Further, the review found "no association between mobile phone use and head cancers," and "the findings of this systematic review align with previous research conducted by ARPANSA showing that although the use of wireless technology has massively increased in the last 20 years, there has been no rise in the incidence of brain cancers".

However, importantly for us radio amateurs, the study authors also note: *". . some caution should be taken when interpreting their results about exposure to base stations and*

EMR – Electromagnetic Radiation is also commonly called **EME** – Electromagnetic Energy, or Electromagnetic Emissions.

broadcasting antennas due to the small number of studies."

So, where does all this leave amateur radio and how on earth do we work out if our station complies, or not?

What can we do?

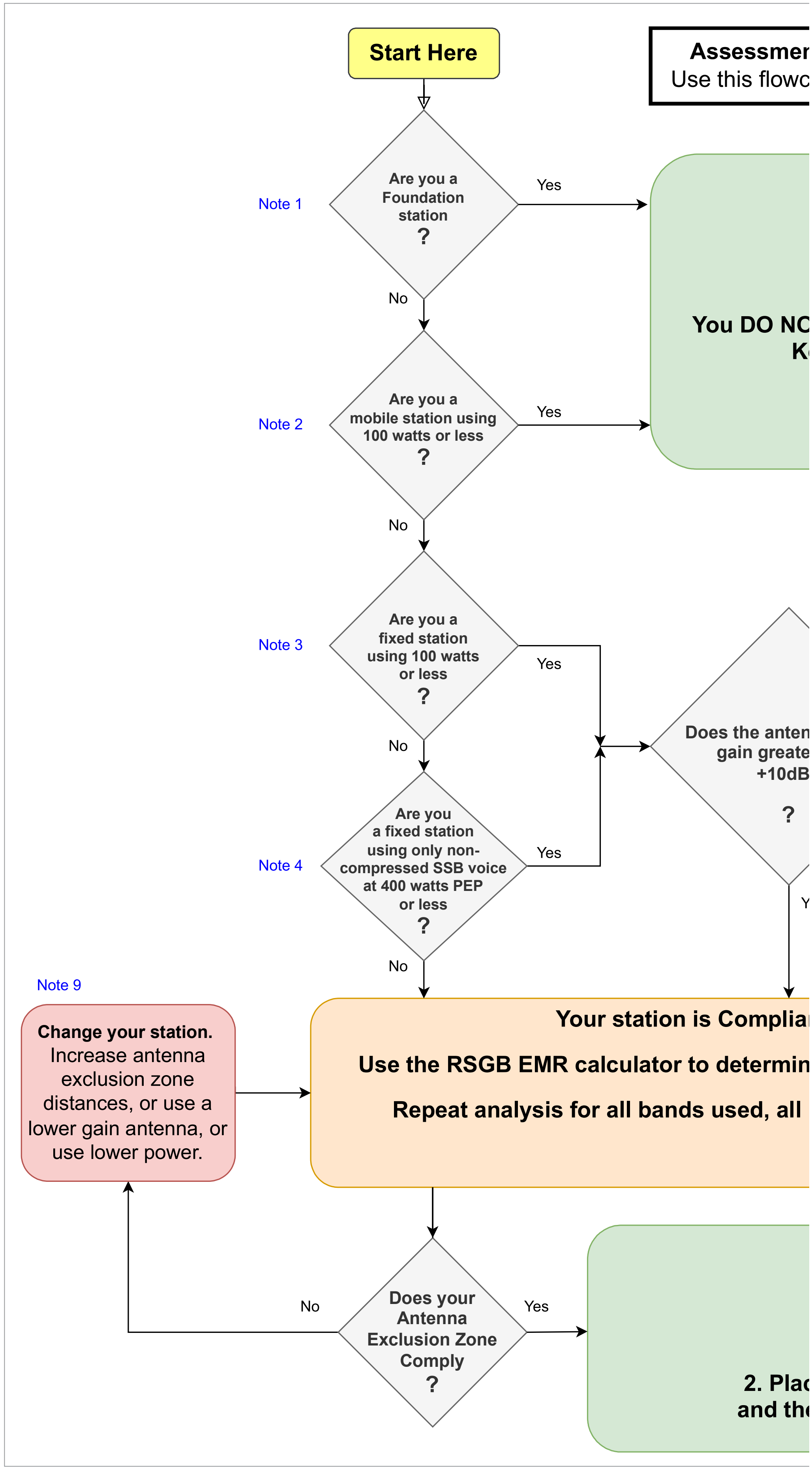
ARPANSA EMR protection standards are complex, to say the least. Exposure limits within the standard vary greatly, depending on the operating frequency, the classification of the user as an 'aware' or 'non-aware' person, the part/s of the body being exposed, and the method used to determine exposure.

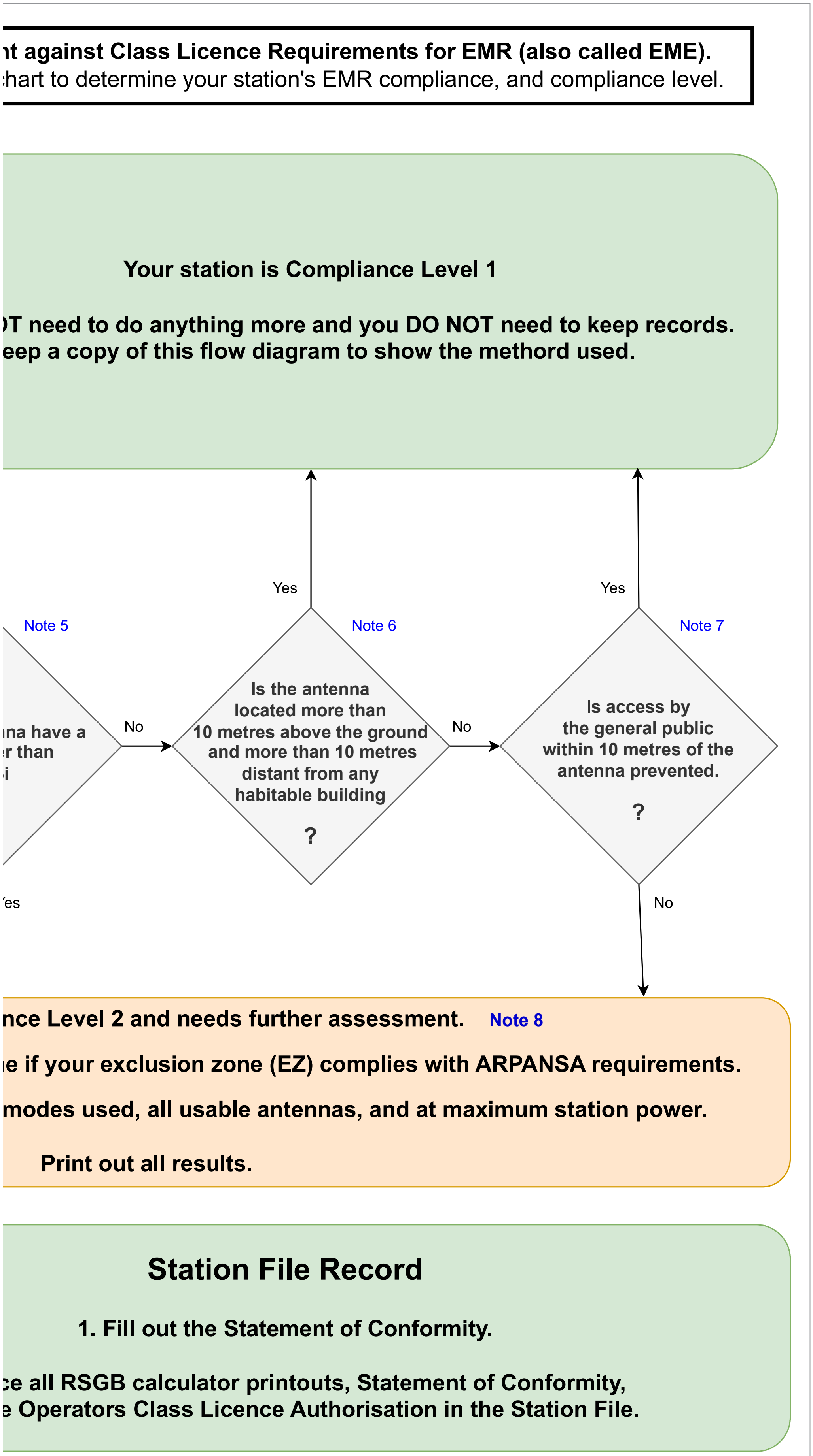
Well, help is at hand – the WIA's Education Committee, in consultation with the Spectrum Strategy Committee, have developed an **easy-to-use EMR Flowchart** – reproduced here on **pages 34-35** – that enables you to quickly determine your station's EMR compliance.

You should also visit the Education Committee's new website at **www.education.wia.org.au**. Click on the 'For WIA Radio Clubs' tab on the top of the homepage and it will take you to an information page where you will find a section on "EMR Compliance Training."

Take a look through the PowerPoint presentation, try the EMR flowchart and flowchart notes, and have a play around with the RSGB's **EMR calculator**.

This online tool enables you to analyse your station's 'EMR performance' and determine what you might need to do to meet the compliance requirements.





The RSGB EMR calculator is accepted by the ACMA for this use.

Compliance can be easy

Most amateurs, especially those running a maximum of 100 Watts output on HF with horizontal antennas positioned 10 metres or more above the ground will find their station fully complies with the EMR standards and nothing more needs to be done. Foundation stations running 10 Watts or less comply, and mobile stations running 100 Watts or less, also comply automatically, regardless of the antenna used.

Stations running over 100 Watts, or stations using antennas with any radiating elements less than 10 metres high (i.e. low horizontal antennas and most vertical or single wire antennas) will need to do a little more analysis using the on-line EMR calculator. Many of these stations will still comply without needing modification.

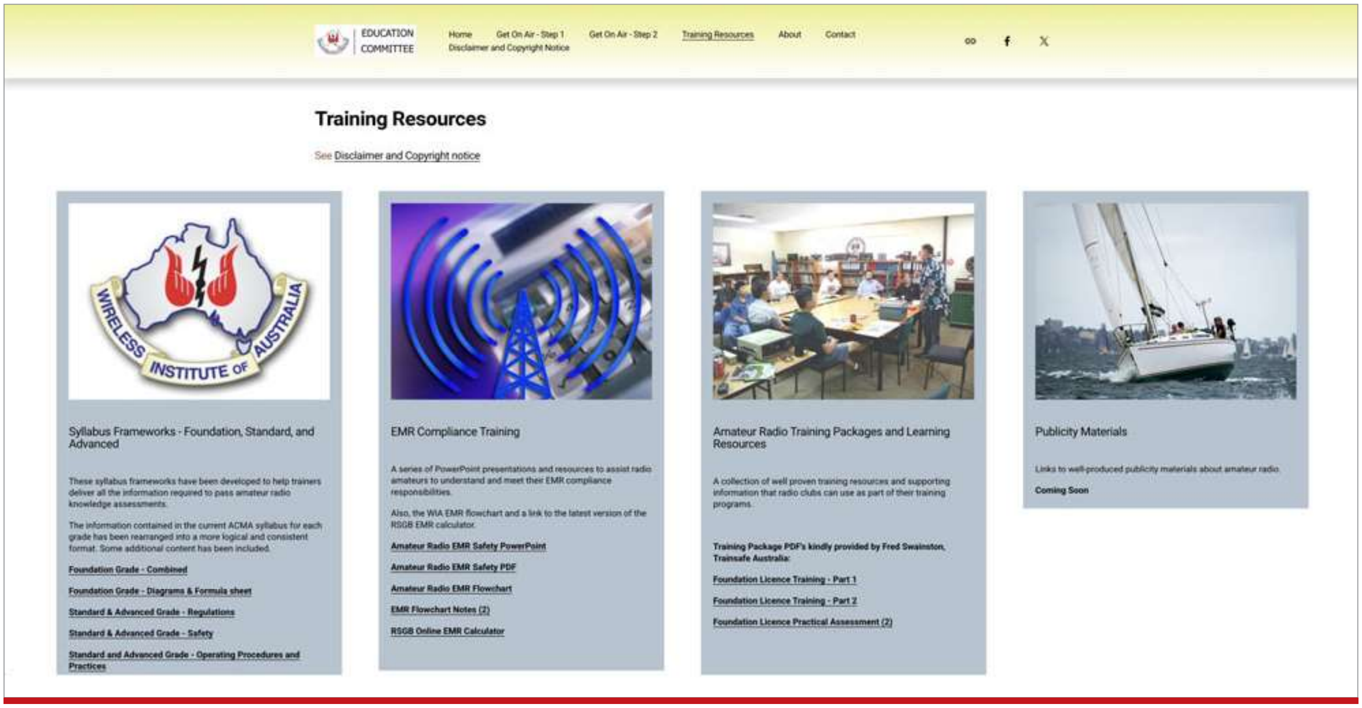
Doesn't comply? Don't panic!

However, if you find your station doesn't comply – don't panic! The Education Committee website includes a range of suggestions about what to do, the most effective being to increase the "antenna exclusion zone" *so that people don't have access*.

Having assessed your station, you need to **keep records** that can be viewed by a Commonwealth officer. The Education Committee website also helps you with this.

History of the flowchart

From about 2003, Amateur radio licences were issued with a printed condition referring to the ARPANSA EMR standard. Similarly, the new *Radiocommunications (Amateur Stations) Class Licence 2023* (Part 3 Schedule 1), requires radio amateurs to assess their station for compliance with ARPANSA Standards, and to maintain supporting information subject to ACMA inspection.



You'll find what you need to know about your station's EMR safety, and related resources, on the WIA Education Committee's website under Training Resources – seen here.

In 2005, the Australian Communications and Media Authority (ACMA) replaced the Australian Communications Authority (ACA) and, as part of its remit, became responsible for ensuring that communications technologies, including radio transmitters and mobile cellphone networks, complied with the ARPANSA EMR safety standards.

An EMR clause was introduced as an added condition in Radiocommunications licences. Essentially, it required that operators of radiocommunications equipment, such as mobile phone towers, radio transmitters, and broadcast equipment, must demonstrate that their operations comply with the relevant ARPANSA standards. The EMR clause in radiocommunications licensing has become an important regulatory tool, including for Amateur Radio.

Two Australian radio amateurs working for the Australian Communications Authority (ACA –predecessor to the ACMA), Keith Malcom VK1KM (SK) and Gilbert Hughes VK1GH, together with another ACA officer, developed an "EMR Guideline" for Australian Amateur Radio stations in about 2003. This guideline allowed stations using antennas with all radiating elements 10 metres or more above ground, and a radiated power equal to or less than 100 Watts, to easily demonstrate compliance with EMR standards as required by their licence.

For reasons unknown, the EMR Guideline developed by Keith and Gilbert was not widely promoted at the time, perhaps because the ACA appeared to not actively enforce the condition in the amateur radio sphere. However, the lack of EMR safety awareness among radio amateurs was raised later when it became one of the issues (but not the only issue) when the ACMA decided not to allow Australian amateurs higher power privileges in 2010.

Fast forward to today – EMR is now high on the WIA's agenda. There are several reasons for this:

- firstly, we all want to keep our family, friends, and ourselves safe from any potential hazards associated with our hobby;
- secondly, EMR safety compliance is a condition of the Amateur Radio Class Licence, and was for many years under the previous Apparatus licences; and
- thirdly, the Australian radio amateur community is increasingly looking for higher power privileges for advanced-level amateurs.

As a precursor to arguing for higher power privileges, we need to be able to demonstrate that the Australian radio amateur community has a high level of EMR safety awareness and stations fully comply with the licence requirements for EMR safety. Even then, the path to higher power privileges is not going to be easy, or short.

Summary

Ensuring your station's compliance with EMR safety standards is vital for legal, safety, and operational reasons. The WIA's Education Committee has provided accessible tools and guidance to help you assess and maintain compliance.

By demonstrating a high level of safety awareness, the amateur radio community strengthens the case for future advancements while safeguarding everyone involved.

For more information and resources, visit www.education.wia.org.au.