Ham Radio License Manual and Tech Q&A – Errata and Corrections

The following material supports or corrects the following publications:

HRLM 4th edition – All Printings
Tech Q&A 7th edition – First Printing

Determine the version of the manual you are using by referring to the first page of the preface inside your copy. Look for the text box with the copyright information where you'll also find the edition and printing information. (If the edition number is not followed by printing information, the book is the first printing.) The ARRL wishes to thank readers who sent feedback about errors.

New items added in this version of the document are in red.

The current question pool for the Technician Class license took effect on July 1, 2018.

Question Pool Changes

None

SUPPLEMENTAL INFORMATION

Ham Radio License Manual

Page 3-3 – Figure 3-2 should not be tried as an actual construction project. It is only a description of voltage and current. A real ammeter would probably be damaged without any resistance in the circuit to limit current from the battery. "Do not try this at home!"

Page 4-16 – The quad antenna should be mentioned in the discussion of directional beam antennas.

- In the second paragraph, the final sentence should read, "The most widely used type of beam antennas used by hams are *Yagis* in **Figure 4.12** and *quads* and the *dish* antennas mentioned below. (Yagis are named for one of the antennas inventors and quads are basically Yagis with elements made of square wire loops instead of straight tubing.)"
- The final paragraph on the page should begin, "As frequency increases and the size of Yagi and quad elements become smaller, it becomes more difficult to construct practical antennas. At frequency above 1 GHz, a different style of directional antenna becomes practical – the *dish* seen in **Figure 4.14**. **[T9A06]**"

Page 4-16 – Regarding the use of horizontally polarized antennas, the frequency of use makes a big difference in ground (or surface) wave propagation. For MF and LF broadcasting systems operating below 3 MHz a surface wave (or ground wave) should be vertically polarized, thus the usual broadcasting vertical tower antenna.

In the upper HF and VHF/UHF bands used by Technicians, however, the situation is different. The ground is generally very lossy and vertically polarized waves quickly attenuated. In addition, reflection of horizontally polarized waves from the surface of the ground is more effective than vertically polarized waves. So horizontal polarization is preferred for long-distance communication at these frequencies.

Interestingly, vertical polarization is preferred for VHF/UHF FM communications because of the simpler antennas that are required. This was a choice made back in the early days of public safety and commercial FM voice systems which operated in the upper HF and lower VHF spectrum. That convention has not changed over the years even though a horizontally polarized antenna might result in better range. The difference is easily made up by amplification, however.

Page 5-8 – Commercial FM-only transceivers have limiting circuits that prevent overdeviation caused by speaking too loudly. Your voice may become distorted but it won't cause interference. Multimode rigs with adjustable microphone gain may allow overmodulation, however. Read your owner's manual to learn the proper operating procedure for your radio. Questions T2B05 and T7B01 have been referred to the NCVEC Question Pool Committee for re-evaluation.

Page 5-12 – The most prevalent form of amateur mesh networking has become the Amateur Radio Emergency Data Network or AREDN. You can find out more about it at www.arednmesh.org. This technology is evolving rapidly so there may be more systems and adaptations of it before the question pool expires in 2022.

Page 6-16 – In the discussion of radiograms, the preamble and address are treated as a single unit. Formal traffic handling, such as described by the NTS manual, consider the preamble and address to be separate parts of the message.

Page 6-24 – The exam's correct answer for question T8B02 (B) indicates that blocking access by other users is the effect of using higher-than-necessary transmit power. The text addresses the answer by noting the satellite's relay (downlink) transmitter solar and battery power is limited. The link is weak between the correct answer and the book's discussion. The original question was written when available power on the satellite and received signal strength for any particular user were closely linked. Those satellites used transponders that received a band segment on the uplink band, converted it to the downlink band, and re-transmitted it. Since the downlink transmitter only had so much power available, loud signals often suppressed the others. Power limiting technology called "LEILA" (amsat-uk.org/tag/phase-4a) was developed in response. In addition, many current satellites are basically FM repeaters with no link between uplink and downlink signal strength - you either capture the repeater's receiver or you don't – and

output power is fixed. The decision was made to give reasoning that was correct but at the sacrifice of a clear link to the question's required answer.

Page 8-3 — The exception for unidentified transmissions also applies to space stations.

Tech Q&A

T1D11 – See item for Page 8-3 above.

T8B02 – See item for Page 6-24 above.

ERRATA

Ham Radio License Manual

Page 1-20 – The last sentence of the second paragraph below the blue box should read, "You can print a copy…"

Page 2-4 – The AM broadcast band actually extends from 535 to 1705 kHz. This also applies to Figure 2.4. In Figure 2.4, the horizontal axis represents signal frequency.

Page 2-6 — At the bottom of the page, the second denominator of the equation for wavelength should read "*f* in megahertz × 1,000,000 hertz per megahertz" instead of "*f* in megahertz".

Page 3-2 and 3-3 – The question identifiers for T5D15 and T5D16 should be swapped in the text. The reference to Figure 3.2A at the bottom of page 3-2 should be to Figure 3.3A.

Page 3-2 – On the final line, the reference to Figure 3.2A should be to Figure 3.3A on page 3-3.

Page 3-6 – The answers for example questions T5D05 and T5D06 should have units of Ω, not W. The Ω symbol was incorrectly translated to capital-W by the print preparation software.

Page 3-7 – The example for question T5C11 should read:

$I = P / E = 120 \text{ W} / 12 \text{ V} = 10 \text{ A}$

Page 3-9 – In the caption for Figure 3.9, the word "coiled" should be "coil."

Page 4-4 – Add the word "Earth" at the end of the caption for Figure 4.2.

Page 5-13 – In packet radio, the checksum follows the data (also referred to in the master specification as "Info") and is not part of the header preceding the data.

Page 6-23 – In the blue box, change “maymake” to “may make.”

Page 7-5 – Exam elements may be taken in any order although most VECs require they be taken in numeric order: Element 2, Element 3, then Element 4.

Page 7-17 – In Table 7.5, Group C should be shown as available to both General and Technician license classes.

Page 8-5 – In the explanation for the answer to question T1F06, add the word “slant” to the list of acceptable indicators for the slash mark. Rule 97.119(c) allows “any suitable word” to be used to denote the slash mark.

Page 11-21 – For question T3A09, the page reference should be 4-6.

Tech Q&A

T1E11 – the question should read “Who does the FCC presume to be the control operator of an amateur station, unless documentation to the contrary is in the station records? All answers are the FCC rule reference are correct.

T5C11 – the solution should read:

$I = P / E$ = 120 W / 12 V = 10 A

T5D15 and T5D16 – explanations and correct answers got scrambled in all current printings of the Q&A manual. The questions should look like this:

T5D15 What is the voltage across each of two components in series with a voltage source?

A. The same voltage as the source
B. Half the source voltage
C. It is determined by the type and value of the components
D. Twice the source voltage

C When components are connected in series with a source of voltage, the voltage divides between the components, depending on their type and value. [*Ham Radio License Manual*, page 3-3]

T5D16 What is the voltage across each of two components in parallel with a voltage source?

A. It is determined by the type and value of the components
B. Half the source voltage
C. Twice the source voltage
D. The same voltage as the source

D When components are connected in parallel with a source of voltage the voltage across each is the same as that of the source. See question T5A13. [*Ham Radio License Manual*, page 3-2]