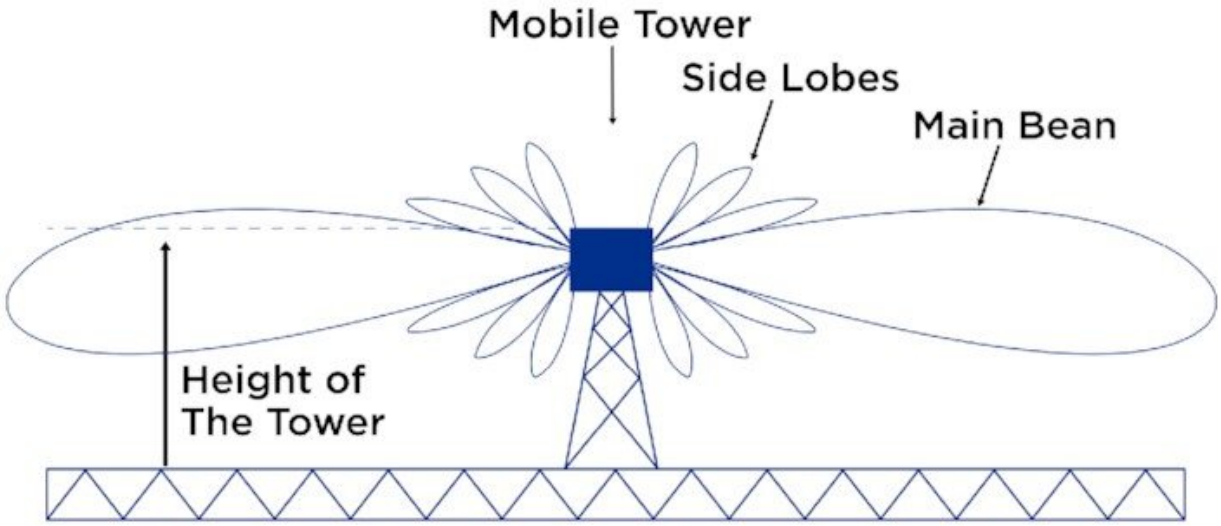
Advanced aliens could soon detect life on Earth, say scientists

May 2 2023, by Jessica Marsh



Radiation pattern of a typical mobile tower antenna. Credit: *Monthly Notices of the Royal Astronomical Society* (2023). DOI: 10.1093/mnras/stad378

Aliens on nearby stars could detect Earth through radio signals leaked from the planet, new research suggests.

Scientists from The University of Manchester and the University of Mauritius used crowd sourced data to simulate radio leakage from mobile towers to determine what alien civilizations might detect from various nearby stars, including Barnard's star, six light years away from Earth.

The research, published in the *Monthly Notices of the Royal Astronomical Society* journal, found that only more technologically advanced civilizations would be able to detect the current levels of mobile tower radio leakage from Earth. However, as most alien civilizations are likely to have more sensitive receiving systems and as we move towards more powerful broadband systems on Earth, the detectability of humans from other intelligent beings will become more and more likely.

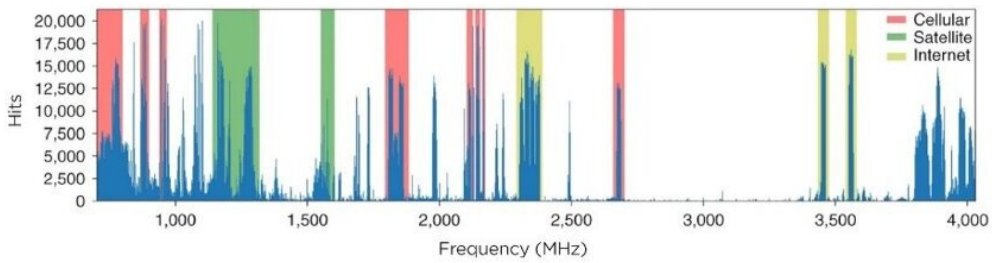
Professor Mike Garrett, Team Leader of the project and Director of Jodrell Bank Centre for Astrophysics at The University of Manchester, said, "I've heard many colleagues suggest that the Earth has become increasingly radio quiet in recent years—a claim that I always contested."

"Although it's true we have fewer powerful TV and radio transmitters today, the proliferation of mobile communication systems around the world is profound. While each system represents relatively low radio powers individually, the integrated spectrum of billions of these devices is substantial."

"Current estimates suggest we will have more than one hundred thousand satellites in low Earth orbit and beyond before the end of the decade. The Earth is already anomalously bright in the radio part of the spectrum; if the trend continues, we could become readily detectable by any advanced civilization with the right technology."

The models, which demonstrate the signals that aliens may receive from Earth, were generated by Ramiro Saide, an intern at the Search for Extra-terrestrial Intelligence (SETI) Instution's Hat Creek Radio Observatory and M.Phil student at The University of Mauritius.

Figure 2. A histogram of total hits (signals likely to be associated with radio frequency interference) as a function ...



The modulation of the radio leakage generated by mobile communication towers on the Earth as it rotates on its axis, as might be measured by an observer located at Barnard's star. Note the contribution made by the continent of Africa and other developing regions. Credit: Oxford University Press

The simulations also show that the Earth's mobile radio signature includes a substantial contribution from developing countries, including Africa, which the scientists say is an exciting development and highlights its success in bypassing the landline stage of development and moving directly into the digital age.

Dr. Nalini Heeralall-Issur, Saide's supervisor and Associate Professor at the University of Mauritius, said, "Every day we learn more about the characteristics of exoplanets via space missions like Kepler and the Transiting Exoplanet Survey Satellite, with further insights from the James Webb Space Telescope. I believe that there's every chance advanced civilizations are out there, and some may be capable of

observing the human-made radio leakage coming from planet Earth."

Next, the research team is keen to extend their research to include other contributors to the Earth's radio leakage signature, such as powerful civilian and military radars, new digital broadcast systems, Wi-Fi networks, individual mobile handsets and the swarm of satellite constellations now being launched into low Earth orbit, such as Elon Musk's Starlink system.

More information: Ramiro C Saide et al, Simulation of the Earth's radio-leakage from mobile towers as seen from selected nearby stellar systems, *Monthly Notices of the Royal Astronomical Society* (2023). DOI: 10.1093/mnras/stad378

Provided by University of Manchester