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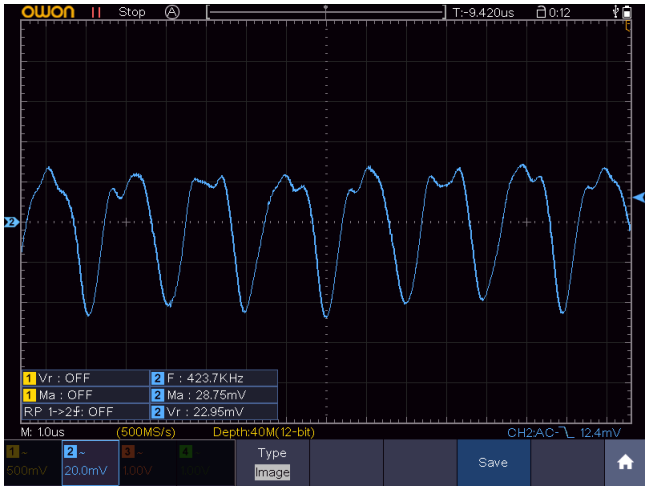
EMF Survey and Mitigation Services
EMI / RFI Assessment
Active Magnetic Shielding Systems
Consulting on Low-EMF Construction

LifiMAX Notes and Observations

Light Emissions and Flicker

Visible - There are no light emissions from this device within the human visual spectrum, so there is no flicker that could be detected and processed by the human visual system.

Invisible - the human eye is sensitive to light within the spectral range of 380 - 750 nm (typical), with the range extended somewhat beyond these limits in a few individuals. The light sensor used for this testing is sensitive across a range of 430 - 1100 nm. This broader range means that it responds well to infrared emissions that the human eye cannot detect. 1100 nm is within the near infrared region. The image below shows some of the infrared emissions from the device under test. The RF testing detailed in the next section suggests that there are additional higher frequency signal components superimposed on this light waveform, but they would be beyond the frequency range of the flicker sensor.



Infrared Flicker Waveform

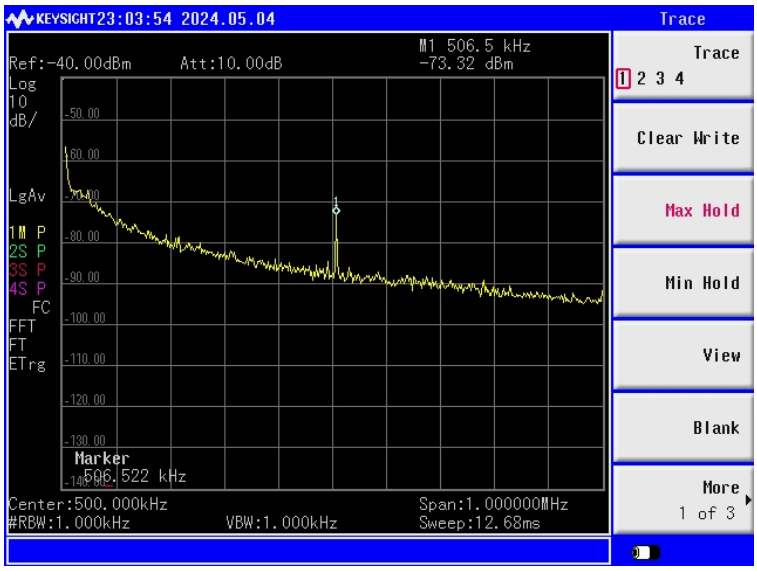
Infrared Photo of Access Point

RF Emissions

Electric - There are no RF electric field emissions from this device at levels that would constitute any concern from an exposure or interference standpoint.

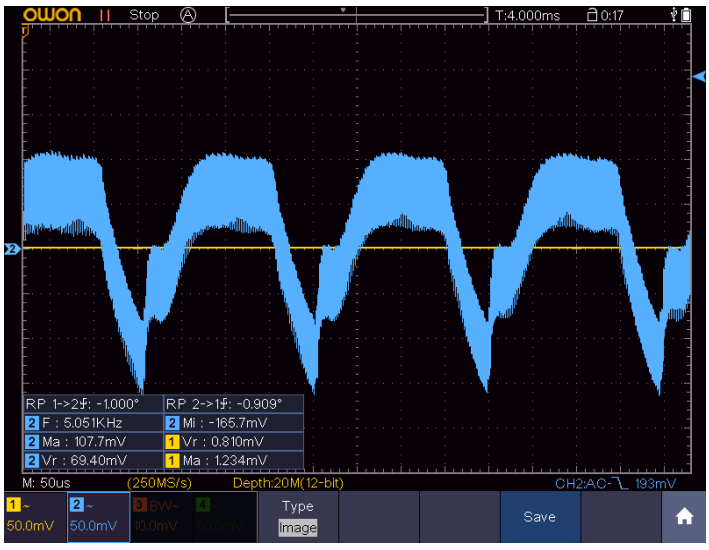
Magnetic - RF magnetic field emissions were readily detected from this device using three different types of equipment:

1) **Keysight model N9342C RF spectrum analyzer, used with near-field magnetic loop probe.**
This instrument detected a clear spectral peak in the 500 kHz region as shown in the screen capture below.

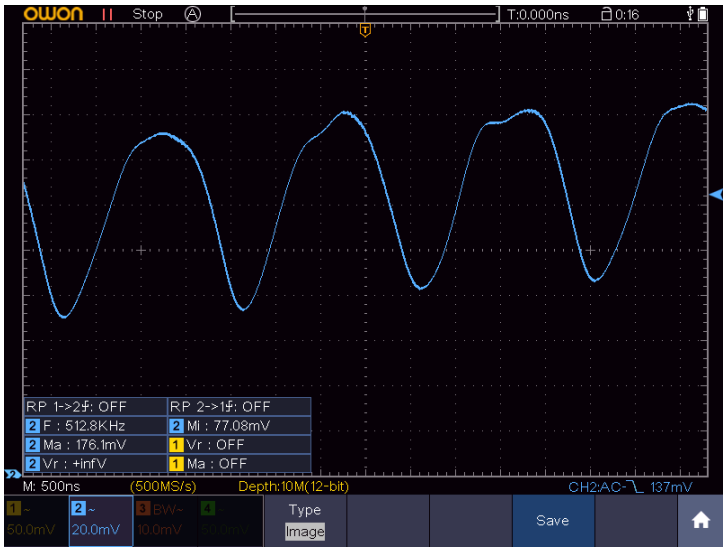


Magnetic RF Spectrum from 0 - 1 MHz

2) Monitor Industries model 44A magnetic transient meter (frequency response 1.5 kHz to 1.5 MHz).
The sensor coil for this instrument was placed in close proximity to the access point. Signal output of the meter was fed into an oscilloscope for waveform observation and frequency identification.



5 kHz Pulse Pattern (Magnetic)



500 kHz Signal Superimposed on 5 kHz Pulses

FFT Spectrum of Magnetic Emissions showing a Peak around 500 kHz

3) **Portable AM radio.**
This device is commonly used by practitioners such as building biologists who work to create low EMF healthy environments. It is actually a highly sensitive magnetic field detector within the AM radio band of 530 - 1710 kHz. For this application, it is generally responding to harmonics of signals at lower frequency ranges. Emissions from the access point were audible at 2 meters away.

Summary and Conclusions

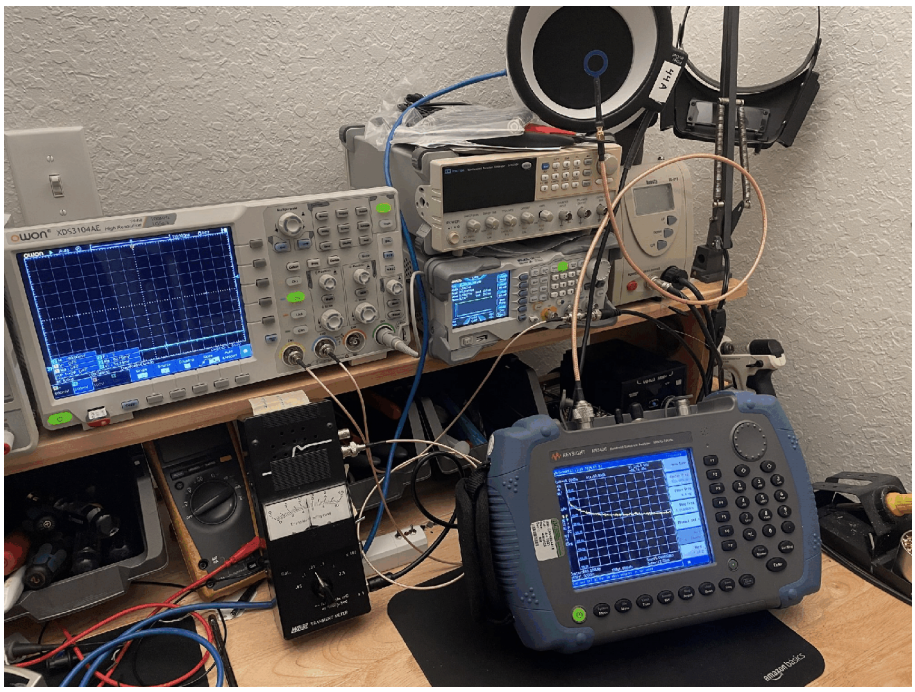
The magnetic field RF emissions from the access point (main unit) may be strong enough to elicit an adverse response from some electrically sensitive individuals within 2 meters of the unit. However, they are quite small, specifically less than 1 nT (0.01 mG) at 1 meter distance. This measurement was limited by background levels in the test environment. This is many orders of magnitude lower than the RF emissions from a Wi-Fi router (which is primarily an electric field emission).

The RF emissions from this device are not intentional in the sense that they would be used for signal transmission or the transfer of data. Rather, they appear to be incidental magnetic radiation from the circuitry within the unit. Revised circuit board layout and/or shielding would likely address these undesired emissions.

Emissions from the USB dongle are discernible with careful testing but they are completely overshadowed by emissions from the laptop to which it is connected. This should not represent an exposure concern.

There are no issues of concern with light flicker from the device as it operates outside the range of the human eye.

If someone needs or wants wireless internet and can deal with the line-of-sight limitation of the LiFi technology, this product may represent an acceptable option, as long as adequate distance can be maintained between the main unit and occupied space.



Part of the Test Setup used for this work

Magnetic Sensors