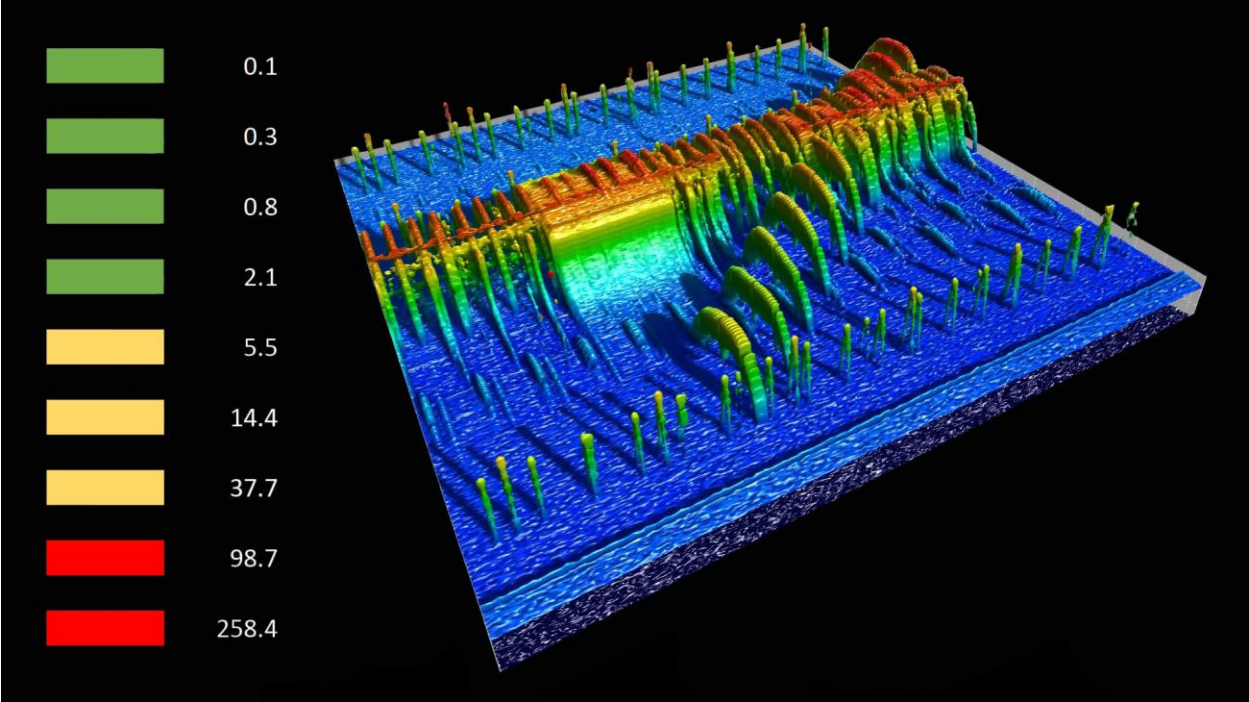


MRx Measurement Methods

by David Blake | Jul 15, 2021 | Firmware 1.1.77/78



Blakes and EnvroSens have expanded on the screening capabilities of our meters. Today there is no other EMF meter on the world market that offers the same screening functionality that this ultra-compact 3-in-1 EMF meter provides.

By incorporating nifty features into the new meters which are usually reserved for flagship spectrum analysers and EMF meters, we came up with the MRx firmware up-grade, M for Magnetic, R for Radio, and x for extended functions. The following measurement methods add a new and affordable standard in environmental screening for non-native EMF's.

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1. MRx Firmware Up-Grade Overview

The MRx measurement methods go over and above the standard RF, LFM and LFE techniques of screening environments. While the MRx Modes do not do away with using the traditional techniques of spot-checking non-native EMFs on the fly, it does add standalone monitoring capabilities that do not require additional devices or software. Using the new RF-X6 & LFM-X Modes will dramatically simplify monitoring environments.

1.1. Sound Signature (RF-Xs Mode)

Having the ability to record and listen to an RF environment is paramount. The 2021 MRx firmware has had its RF-Xs Sound Signature tweaked to give the meter a cleaner sound in low RF environments. This function helps users to determine what signal types are detected. Once you identify the signal(s) you can more easily choose the best course of action to reduce or eliminate the unwanted radiation.

1.2. Watch Your Six (RF-X6 Mode)

Our six-minute record function gives you the average peak radiation, and highest peak radiation levels via the meters LED light display once the session has completed its cycle. It will also give you a score based on your estimated total peak RF accumulated exposure time over the recorded six minutes. Duration, or dose is essential as in some environments the RF peak exposure is continuous, and in other places, less than a few seconds over six minutes of exposure.

Screening sensitive environments like government, military, and/or school properties without detection is now possible using the MRx functions. Users can easily conceal the meter on their body or out of sight and screen problematic RF hotspots to make better-informed decisions on which space is better suited for their radiation exposure and dosage. Without necessarily being onsite or having to handle the meter, it now makes it possible for EMF field or health professionals to quickly and remotely screen environments with clients. This new three score solution sets a new benchmark in RF screening.

(See more on the Three Score Solution below.)

1.3. Monitoring the PowerGrid (LFM-X Mode)

New to the extended Low-Frequency Mode is a function that records the power grid over twelve hours to assess environments for excessive dynamic magnetic fields. This LFM-X Mode will determine how consistent or erratic the power grid is by giving you both an average and peak field strength indication over the twelve-hour logged event.

This procedure usually takes place before the signing off of a property contract. Using this function will also tell you if your sleeping sanctuary or prospect property gets the Building Biology tick of approval.

Ideally, you would run the LFM-X Mode overnight as this is the most critical time to make sure you are sleeping in a low A/C 50/60Hz environment for extra restorative sleep.

1.4. MRx Calibration/Grading1.4. MRx Calibration/Grading

Without grading the meters before delivery, and loading them with suitable custom preset firmware, the MRx results would vary significantly between meters. We want our customers to have complete confidence that what they screen at home or work is the same as what all our meters measure across the board. There will always be variables to contend with in regards to any mass-produced electronic parts, and 3-in-1 EMF meters in the sub \$300 category. Not at the Blakes workshop, each meter goes through a rigorous test procedure to ensure continuity between meter readings is not compromised in the manufacturing process.

2. RF-Xs Overview (Sound Signature Mode)

When it comes to measuring EMF's, there is a saying, 'sound never lies.' Sound always tells you a story and can be used to identify anything from celestial bodies, the tone in someone's voice, and even the sound signature of a Radio Frequency transmission.

The RF-Xs Mode converts the voltage detected from nearby wireless antennas to sound, thus making it possible to sound out the source of unwanted or excessive microwave radiation. Each radio technology type has its own pattern, and the best way to learn about different RF characteristics and their sound signatures is to listen to individual devices. Try listening to Bluetooth or Wi-Fi from a wireless device or listening to the unique and disruptive sound from a wireless DECK phone, they are all quite different. Note that this test would need to be conducted away from cell phone towers as they overpower your lower-powered consumer wireless devices and make the sound signatures of your devices inaudible.

More expensive dedicated RF meters will have higher quality sound, but our meters sound signature will comfortably identify the main offenders.

2.1. RF-Xs Instructions

To activate RF-Xs Mode, follow these three steps.

2.1.1. Make sure the sound switch on the right side is set to ON and turn ON the meter followed by selecting RF MODE.

2.1.2. Quickly move the MODE switch down to LFE and back to RF twice, within two seconds. (LFE-RF-LFE-RF) Two lights will start blinking, one orange and one red. If no lights blink, you were not quick enough.

2.1.3. Then move the MODE switch down one click to LFM and back to RF. (RF-LFM-RF) RF-Xs Mode is now active, move towards a wireless device to listen.

3. RF-X6 Mode Overview – Watch Your Six

Digitally stacked and packed from one end of the RF spectrum to the other, today's RF environment does not look anything remotely like it did thirty years ago, not even three years ago. This unnaturally chopped RF spectrum requires a new approach and methodology of onsite field screening for the novice, and the new RF-X6 Mode does just that.

We are all most familiar with the standard RF Mode that measures the RF peak power density levels. This broadband measurement method is the easiest way to quickly determine the approximate power levels across a wide span of our RF spectrum at a flick of a switch. However, unlike some professional RF measurement equipment, like real-time spectrum analysers, this broadband measurement method does not take into account the total duration time of the peaks.

Real-time spectrum analysers can measure individual RF signals in busy RF environments with great accuracy. Better still, they can capture every peak or burst emitted within its selected frequency domain, giving real-time total accumulative peak exposure results—your peak dosage.

How the RF-X6 Mode simplifies the above process is by capturing five million samples within six minutes and giving you a score based on your total accumulated peak radiation time. ...*One green light for more than 0.1 seconds total exposure over six minutes, two green lights 0.3+ seconds, three green lights for over 0.8+ seconds, four green lights 2.1+ seconds, one orange light 5.5+ seconds, two orange lights 14.4+ seconds, three orange 37.7+ seconds, one red 98.7+ seconds, two red 258.4.*

When using RF-X6 Mode, you will find in some cases RF power levels can be the same corner to corner in the same room yet have quite the opposite results as far as the total accumulated peak radiation goes.

(See links below for the Bio Initiative and Building Biology recommended non-native EMF guidelines.)

3.1. Peak RF Radiation

The Radio Frequency (RF) peak microwave radiation that we focuses on is the data modulated onto the microwave carrier signals. This digitised transmission type sends bursts and pulses over the radio waves.

As an analogy, peaks are like clothes hanging from the clothesline. The wireless carrier wave(s) are the line(s), and the digitally modulated data ridding on the carrier wave(s) the washing. As pictured above, a Wi-Fi clothesline runs down the center of a 2.4GHz, 80MHz

wide window, with a Bluetooth clothesline weaving through the same frequency band. Even when using a professional RF meter to measure the above pictured scenario, you would only see constant values displayed in this type of RF environment. Still, as you can see from a snapshot in time broken down into milliseconds, the clothes on the lines, 'the beacon and pulses' are a series of peaks and not linear radiation like analog signals.

Our older analog RF signals like AM/FM radio and VHF TV were only clotheslines, no washing was hung out on these lines. The radio waves or clotheslines used were also much more narrow in spectrum width. All of today's analog radio stations could comfortably fit within that one 80MHz window pictured above, with plenty of space to spare.

If you think of a narrow slow-moving stream vs the Niagara Falls you will be getting close to what today's wireless environment looks like compared to what it did before the digital rollout.

In the early days of RF broadcasting, the governing New Zealand and Australian regulator bodies ruled that if you were going to use clotheslines, that only one article of clothing was permitted to be hung out at a time, no more than one item of clothing per minute. Technically speaking, this means no more than one pulse or burst per minute was allowed in wireless transmissions for known health concerns. This ruling was later done away with, and the stern health warnings ignored.

Today the worlds trillion-dollar communications industry regulates their own industry, and yet, still to this day, conveniently only acknowledge the heating effects of carrier waves/washing lines, totally disregarding the biological and neurological effects of the washing on their lines.

3.2. RF-X6 – Instructions (Six Minute Monitoring Mode)

To activate RF-X6 Mode follow these steps.

3.2.1. Turn on the meter and select RF Mode.

3.2.2. Quickly move the MODE switch down to LFE and back to RF twice, within two seconds. (LFE-RF-LFE-RF) The meter is now recording, or technically speaking, logging data. You should have two lights blinking, one orange and one red. If no orange and red lights started blinking you were not quick enough.

3.2.3. After six minutes the results will be displayed, flashing both the average and highest peak values for ten seconds. After a brief one second pause, the total accumulative peak duration score is displayed for ten seconds. This cycle will continue until the meter is switched off.

3.2.4. Advanced User Note: The long term RF-X logging session remains in effect if the meter is left on and both the short term/RF-X6 data captured and the long term data can be retrieved by connecting the meter to a Windows PC running the EnvroSens RF-X software.

3.3. Three Score Screening

EMF or health professionals will be able to remotely screen environments with clients by using the three score RF-X6 measurement method, as this tells its own story and will help in determining what they are dealing with in their RF environments, in terms of RF power levels and its peak density. Here is an example of how we have been sharing RF-X6 results between clients. The client will be able to relay, “bedroom one was a 1-2-4 and the second bedroom a 1-3-6 and the third bedroom results a 1-0-0.” The first number is the average peak power level taken over the six minutes, which is displayed via the Meters LEDs. The second number is the highest peak power level, and the third, the total peak accumulated radiation score.

3.4. RF-X6 Notes

3.4.1. Although it is not always possible, the best way to take a six-minute measurement is to move the meter in front of you in a large figure eight pattern while slowly twisting the meter back and forth with your wrist.

3.4.2. The full RF-X6 total accumulate peak radiation values from the last RF-X6 logging session can be retrieved when the meter is connected to the free Windows EnviroSense PC software. Here you can view the captured total accumulative peak duration individual power values, right the way down to a 100th of a second.

3.4.3. Data retrieval of the RF-X6 session is not available via EnviroSens Apple or Android software, only via PC/Windows.

4. LFM-X Mode Overview

The latest upgrade brings LFM-X Mode to the table, X for extended LFM Mode. (Low-Frequency Mode) Monitoring the power grids dynamic background magnetic fields is a necessary procedure in the EMF assessment process. 50/60Hz Magnetic fields from the power grid are the hardest EMFs to mitigate. In most cases, reducing or eliminating these fields is not possible, and therefore essential to monitor the grid before committing yourself to a property.

The LFM-X Mode does not need a PC or any other device connected to use this function. The average and highest-level A/C 50/60Hz magnetic fields are recorded and displayed on the meters LED light display after the twelve-hour logging session has been completed.

4.1. Instructions

To activate LFM-X Mode, follow these steps and make sure you have a fully charged battery before logging the twelve-hour event. (Only takes one hour to charge battery from flat.)

4.1.1. Turn on the meter and select RF.

4.1.2. Quickly move the MODE switch down to LFE Mode and back to RF Mode twice, within two seconds.

(RF-LFE-RF-LFE-RF) Two lights will start to blink, one orange, one red. If no lights flashed, you were not quick enough, as you only have a couple of seconds to activate.

4.1.3. Then move the mode switch down one click to LFM Mode. (RF-LFM) Now you will see the LED lights sweeping left to right, which will continue for 20 seconds, giving you time to position the meter in an upright position.
(USB Socket facing down.)

4.1.4. After activating the LFM-X Mode the meter cannot be moved, bumped, or touched for twelve hours, as the magnetic sensors are sensitive to the slightest touch.

4.1.5. After twelve hours, the average and highest recorded A/C 50/60Hz RMS magnetic field values from the power grid will be displayed. If no lights are displayed, no values were recorded, which means no magnetic fields were detected above 0.2 milliGauss (20nT) which is Building Biology's recommended sleeping area limit. You have up to 24 hours of battery life on LFM-X Mode, so will need to check the results before the meter battery goes flat.

4.2. Placement & Position

The meter must be mounted at 90 degrees in an upright position at least two meters away from electronics, appliances, or electrical cables. The meter can be placed almost anywhere for the LFM-X logging session. For example, you can setup the meter in a letterbox, tape it to a side of a tree or building structure.

4.3. Cost Savings

Usually, this type of monitoring service would cost upwards of \$500 to \$5000 for a professional EMF field analyst to run an onsite test. The LFM-X Mode monitoring method can easily be set up within seconds by anyone running the MRx firmware, no additional PC's or devices required. The 2020 firmware version 1.1.77 and above have the MRx features.

4.4. LFM-X Notes

4.4.1. The meter must be perfectly square/upright for the most accurate result and away from another magnetic fields.

4.4.2. A 90-degree angle/up-right position, will not work if you are under or overpower distribution/transmission lines. If this is the case, find the angle/axis on the meter in LFM Mode first with the highest reading and mount the meter in that axis/position for the twelve-hour logging session.

4.4.3. PC, Android, or Mac EnvroSens software can be used for more in-depth analytics. The Android version has GPS mapping capabilities if the connected Android device has GPS.

4.4.4. Ideally, you do not want to live or work in anything over 2mG/200nT, which is nothing over five LED lights. Pregnant mothers and children should not be exposed to long term

exposures of more than 1mG/100nT. Sleeping areas should be kept below 0.2mG/20nT.

4.4.5. When using the EnvroSens software, the LFM Mode magnetic field sensitivity is extended down to 0.01 mG/milliGauss on the connect models, which is much lower and accurate @50/60Hz than any other 3-in-1 EMF meters in the sub \$500 price range.