MioCARE™

MiCor™ A100
Wearable ECG Recorder

User Manual

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Welcome

Thank you for purchasing MiCor A100. This document guides you through the successful setup of your device and familiarises you with the basic skills of using the device.

This device is designed to wear on the wrist and record the electrocardiograph (ECG) signals at any time. This device collects Lead 1 ECG signals. It is intended for use at home at any time by the adults who have the transient symptoms that may suggest cardiac conduction abnormalities or who want to monitor the cardiac functions.

By using the device, you agree voluntarily to the acquisition and transmission of the ECG signals.

Warning! You are not recommended to use this device if you have an implanted pacemaker.

Package contents

Check the items contained in the package carefully. You should have the following:

- MiCor A100 Wearable ECG Recorder
- Magnet Type USB charging cable
- Protection cover x 2
- *User Manual*

General precautions

- This device is not designed or intended for a complete diagnosis of your health conditions. This device should never be used as a basis for starting or modifying treatments without independent confirmations by medical examinations.
- Do not attempt self-diagnosis of the measurement results and analyses. Always consult your doctor.
- Do not use the recorded information for any purpose other than obtaining physiological information. Always consult your doctor for pathological observations.
- Consult your doctor before use if you have any pre-existing conditions that might be affected by your use of this device.
- Consult your doctor before beginning or modifying any exercise program.
- Do not wear your device while charging it.
- Do not charge your device while it is wet.

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- Take the device off from time to time to clean it and allow for your skin to be uncovered.
- Prolonged contact may contribute to skin irritation or allergies in some users. If you notice any signs of skin redness, swelling, itchiness, or other skin irritation, please discontinue. Continued use, even after symptoms subside, may result in renewed or increased irritation. If symptoms persist, consult your doctor.
- Disperse any static electricity from your body before using the device. To eliminate static electricity, use a small metal device to touch a grounded metal surface before touching it with your skin.
- Do not check call notifications or other data on the device's display while driving or in other situations where distractions could be hazardous.

Precautions about heart rate measurements

- If your finger and skin are dry, wipe them with a damp towel so that they are slightly moist.
- Heart rate measurements may not be possible for some people. Consult your doctor if you encounter such a problem.
- Do not use the device with a defibrillator or regulator.
- Do not use the device in an intensive care unit or operating room.
- Do not use the device in the presence of flammable anesthetics, drugs or pressurised oxygen (such as in a hyperbaric chamber, ultraviolet steriliser or oxygen tent).
- Do not take heart rate measurements in a location where the device will be exposed to strong electromagnetic forces, such as near an arc welder, high-power radio transmitter, etc.
- Do not take heart rate measurements if the electrodes are dirty. Clean them first.
- Do not use for any purpose other than obtaining physiological information.
- Do not use the device for serious and complex heart diseases.
- When using the device in a medical facility, use it under the supervision of your doctor.

Getting to know the device
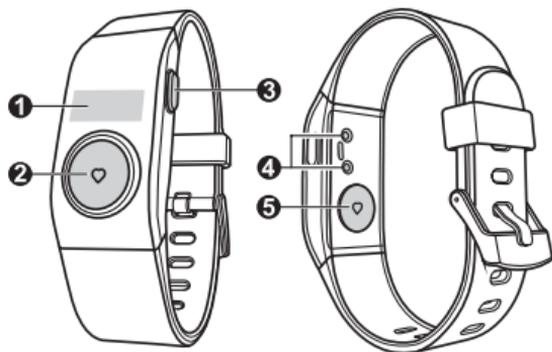
1. Display screen
2. ECG sensor
3. Mode key
4. Charger connector
5. ECG sensor

Charging the battery

1. Remove the protection cover.
2. Connect the USB charger to the device's charger connector.
3. Connect the USB connector of the charger to a power source (output: 5V DC/1A max).
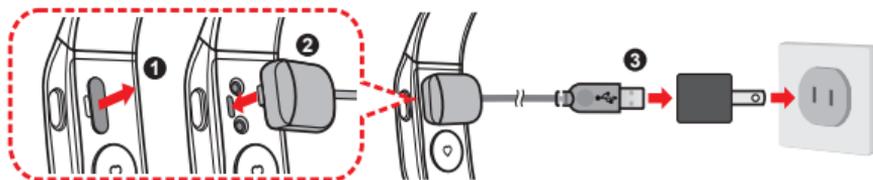
The device turns on automatically. The battery icon will appear and then disappear automatically in a few seconds. Charge the device until the battery is full ( ).

4. Replace the protection cover.

NOTE:
- You will be alerted when the battery power level is lower than 10%.
- When storing the product for a long period of time, be sure to fully charge the battery at least once every two weeks. Over discharge of the battery can affect the charging performance.
- The battery life depends on how you use the device.
- The battery will stop charging when the ambient temperature is less than 0°C (32°F) or more than 40°C (104°F).

Installing the MiCor A100 app

NOTE: Your phone needs to support the *Bluetooth*® Smart (Bluetooth low energy; BLE) feature to work with the device and MiCor A100 app.

The free MiCor A100 app is designed to work with the MiCor A100 wristband. The app provides information about the recorded ECG data and sleep activities.

Install the app on your phone (iOS 8.0 or higher; Android 5.0 or higher) from App Store or Google Play.

iOS

Android

Time settings and data synchronisation

Before using the device to record your ECG data for the first time, make sure of the correct time settings by connecting it to your phone and MiCor A100 app via *Bluetooth*® Smart.

1. Turn on the Bluetooth function on your phone.
2. Launch the MiCor A100 app and follow the prompts to complete the settings and your account.
   NOTE: Make sure to provide the correct personal information so that the calories can be calculated correctly accordingly.
3. Tap **Connect Device**. Read the tutorial and tap **Next**.
4. Press the Mode key on the device to make it discoverable for 10 seconds.

5. Select your device from the app's device list (by identifying the serial number that is printed on the back side of the device).

   NOTE: The app does not accept the same serial number to be used by different users.

6. Once the pairing is completed, the time settings and data will be synchronised.

NOTE:

- Data cannot be synchronised via *Bluetooth*® Smart when charging is in progress.
- If you change to a new phone, you need to first remove the pairing information on the old phone before pairing with the new phone: from the phone's list of paired devices in the Bluetooth settings, access the settings of your device and use the unpair/forget feature.

Getting familiar with the modes

Press the Mode key repeatedly to cycle through the various display modes: Time and Date > Heart Rate > Steps > Calories > Battery.

The screen of the device will be turned off automatically after 10 seconds of inactivity.
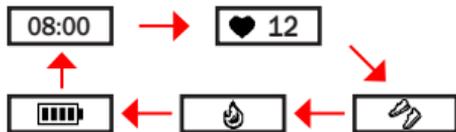
Time and Date mode: displays the current time and then the date.

Heart Rate (HR) mode: allows you to measure your heart rate and displays the amount of recorded ECG data on the device.

NOTE: You can enter the HR measurement mode at any time by keeping your thumb on the ECG sensor on the front of your device for 2 seconds.

 —— The amount of recorded ECG data

Steps mode: displays the total step count of the day.

**Calories mode:** displays the total calories burned of the day.

Battery mode: displays the battery power status and FCC ID (after 4 seconds of inactivity).

Wearing the device

Wear the device away from the top of the wrist bone, and keep it snug and in place. Make sure that the ECG (electrocardiography) sensor touches your skin for detecting your heart rate. To ensure proper blood circulation, do not over-tighten the device.
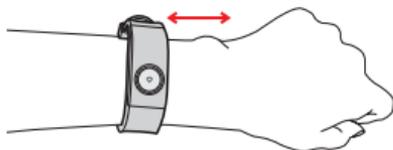
Measuring your heart rate

Follow this procedure to measure your heart rate:

1. With the ECG sensor on the back of your device touching your skin, press the Mode key to turn on the screen of your device.

2. Place the web of your palm around the wristband of your device, and keep your thumb on the ECG sensor on the front of your device for 2 seconds to enter the HR measurement mode.
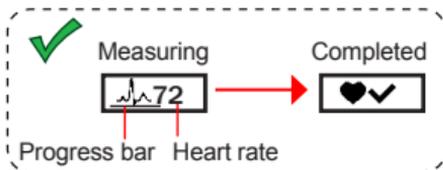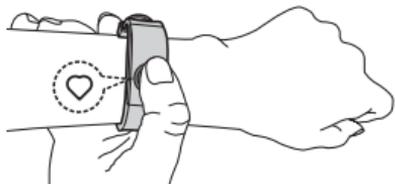
3. Keep touching the ECG sensor and do not move until your heart rate is detected. If your heart rate is not detected, make sure that your palm and thumb are placed properly and repeat the steps to try again.
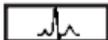
| ✖ | ᴧᴧ | Measuring is unstable. | ♥✖ | Measuring has failed. |
| | (Flashing) | | | |

The device stores up to 30 heart rate measurements that will be removed from the device once the device is synchronised with the MiCor A100 app on your phone. When prompted with the memory full icon (📇), connect the device with the MiCor A100 app for data synchronisation.

NOTE:
- The heart rate is calculated by using the auto-correlation method to calculate the real-time heart rate and then get the average heart rate with all real-time heart rates.
- If no heart beats are detected in the interval of 2 seconds, the interval is defined as a "PAUSE" in the ECG data.

Recording your activities

When you wear your device on the wrist, the device will automatically record your activities, such as walking. The activity data on the device will be reset to zero every midnight.

NOTE: The calories burned includes the basal metabolism and activities.

Sleep monitoring

Press and hold the Mode key for 3 seconds to enter the Sleep mode (🛌 ▶) that allows you to record and analyse your sleep quality.

To exit the Sleep mode, press and hold the Mode key for 3 seconds (🛌 ■). The recorded sleep time will be displayed briefly on the screen.

The sleep duration that will be recorded is up to 12 hours. Your device saves only one sleep record each day; a new record on the same day will replace the old one. Your sleep data can be synchronised and analysed by the MiCor A100 app.

NOTE: Only the Time and Date mode is supported in the sleep mode. Heart rate measurements are not supported in the sleep mode.

Using the MiCor A100 app

You can use the MiCor A100 app to view the recorded ECG and sleep data, and to change the device and account settings. The app also allows you to create multiple accounts, which can be very convenient for group monitoring.

Viewing the ECG data

After pairing and synchronising with your device, the app displays the user list (if multiple accounts are available). Select the desired account to access the ECG data list. Then select the desired item to view the detailed information.

The ECG data list displays your name and the entries of the ECG data. You can:
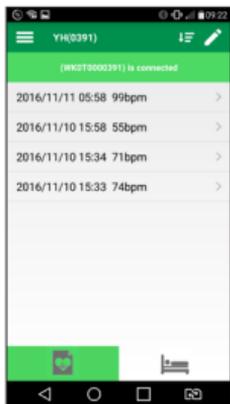
- When the device is connected, tap the Menu icon (≡) to:

  - Select **Sync now** to start synchronisation manually.
  - Select **Disconnect** to interrupt the connection to the device.
  - Select **Profile & Settings** to change the user configuration.
  - Select **Add New User** to add a new user to the app.
  - Select **Units** to change the display unit.

- Tap the Sort icon (🔁) to change the sorting method.

- Tap the Edit icon (🖊) to select item(s), select all items (▦) or delete selected item(s) (🗑).

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You can view the ECG waveform and make notes after selecting an entry from the list.
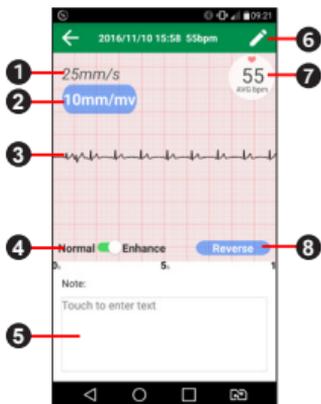
1. Recording speed of ECG
2. Gain selection button
   Tap to change the ECG waveform display as 10mm/mv (standard), 20mm/mv or 30mm/mv.
3. ECG waveform
   • Slide your fingertip horizontally across the screen to view the 30-second ECG trace.
   • Zoom in or zoom out of the waveform area by sliding your fingertips apart or together on the screen.
4. Filter
   You can change the ECG waveform to the Normal mode (original ECG waveform) or Enhanced mode (ECG waveform without noise).
5. Note
   Comments can be entered here.
6. Edit
   You can delete (🗑), send via email (✉) or print (🖨) the displayed data.
7. Average heart rate
8. Reverse
   Tap to flip the ECG waveform vertically.

Viewing the sleep data

Tap the Sleep icon ( ) to display the recorded sleep data.

1. Select the tab to display the recorded data of the day / week / month / year
2. Tap < / > to change to another date (week / month / year)
3. Start / end time of your sleep
4. Sleep duration
5. Toss and turn
6. Sleep quality

Configuring the MiCor A100 app

Adding a user

1. Tap the Menu icon (☰) on the ECG data list.
2. Tap **Add New User**.
3. When prompted, select **Yes** to disconnect the current device connection.
4. Follow the procedure in the "Time settings and data synchronisation" section to complete the user information.

Changing the device

If you need to take the heart rate measurements on a new device, you need to change the device connected to your account.

1. Tap the Menu icon (☰) on the ECG data list.
2. Tap **Profile & Settings**.
3. Tap the **Device S/N** option, then tap **Change Device** > **Yes**.
4. Follow the procedure in the "Time settings and data synchronisation" section to complete the device connection.

Changing the time and date format

1. Tap the Menu icon (☰) on the ECG data list.
2. Tap **Profile & Settings**.
3. You can change the time format and date format.

For more information

Safety information

Model: N507 (the model number of this device)

SN: WK0E####### (the serial number of this device)

📖 Follow instructions for use.

⚕ Type BF Applied Part - Electrically connected to patient but not directly to heart.

CE

CE 0044 CE: CE Conformity Marking.
0044: Notified body identification numbers. 0044 = TUV NORD GmbH

WEEE

🚮 This product must not be disposed of as normal household waste, in accordance with the EU directive for waste electrical and electronic equipment (WEEE - 2012/19/EU). Instead, it should be disposed of by returning it to the point of sale, or to a municipal recycling collection point.

IP27

An IP27 designation of the test specification standard means that the unit is protected against insertion of fingers, and is protected from immersion between 15 centimetres and 1 metre in depth. MiCor A100 is not IPX8 grade; water-pressure such as washing the unit with running water may cause damage to the unit and voids warranty.

Bluetooth

Bluetooth®
SMART

DID: D028865

Safety precautions

About charging

- Use only the charger supplied with your device. Use of another type of charger may result in malfunction and/or danger.
- This product is intended to be supplied by a LISTED Power Unit marked with "LPS", "Limited Power Source" and output rated + 5 V dc / 1 A.
- Use a specified battery in the equipment.

About the charger

- Do not use the charger in a high moisture environment. Never touch the charger when your hands or feet are wet.
- Allow adequate ventilation around the charger when using it to operate the device or charge the battery. Do not cover the charger with paper or other objects that will reduce cooling. Do not use the charger while it is inside a carrying case.
- Connect the charger to a proper power source. The voltage requirements are found on the product case and/or packaging.
- Do not use the charger if the cord becomes damaged.
- Do not attempt to service the unit. There are no serviceable parts inside. Replace the unit if it is damaged or exposed to excess moisture.
- Use an adapter that is complied with the IEC 60601-1 3.1 standard.

About the battery

- Use a specified battery in the equipment.
- CAUTION: This unit contains a non-replaceable internal Lithium Ion battery. The battery can burst or explode, releasing hazardous chemicals. To reduce the risk of fire or burns, do not disassemble, crush, puncture, or dispose of in fire or water.
- Important instructions (for service personnel only)
  - Caution: Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.
  - Replace only with the same or equivalent type recommended by the manufacturer.
  - The battery must be recycled or disposed of properly.
  - Use the battery only in the specified equipment.

Caring for your device

Taking good care of your device will ensure trouble-free operation and reduce the risk of damage.

- Keep your device away from excessive moisture and extreme temperatures.
- Avoid exposing your device to direct sunlight or strong ultraviolet light for extended periods of time.
- Do not place anything on top of your device or drop objects on your device.
- Do not drop your device or subject it to severe shock.
- Do not subject your device to sudden and severe temperature changes. This could cause moisture condensation inside the unit, which could damage your device. In the event of moisture condensation, allow the device to dry out completely before use.
- The screen surface can easily be scratched. Avoid touching it with sharp objects. Non-adhesive generic screen protectors designed specifically for use on portable devices with LCD panels may be used to help protect the screen from minor scratches.
- Use a soft, lint-free cloth to wipe the screen and the exterior of your device.
- Do not use paper towels to clean the screen.
- Never attempt to disassemble, repair or make any modifications to your device. Disassembly, modification or any attempt at repair could cause damage to your device and even bodily injury or property damage and will void any warranty.
- Do not store or carry flammable liquids, gases or explosive materials in the same compartment as your device, its parts or accessories.
- To discourage theft, do not leave the device and accessories in plain view in an unattended place.
- Overheating may damage the device.
- Do not use your device in a sauna or steam room.
- Do not place your device in a dishwasher, washing machine or dryer.
- Keep the device and its accessories out of reach of small children and pets to avoid choking hazards.
- Keep the ECG sensors clean. You can clean the sensor parts by wiping them with a soft cloth or a cotton swab.

Specifications

- Input impedance: > 10 M - Ohm
- Input dynamic range: +/- 200 mV
- Bandwidth: 0.1 - 40 Hz
- CMRR (Common Mode Rejection Ratio): > 60 dB
- A/D (analog-to-digital) conversion: 16 bit
- Sampling rate: 250 samples/second
- Measurement time: 30 seconds
- Display: 72 x 32 dot - OLED
- Input: Dry conduction electrodes
- Output: Bluetooth
- Power: Non-replaceable internal Lithium Ion battery
- Dimension: 45.6 x 21.4 x 11.3 mm (L x W x H)
- Weight: 24.5 g
- Environmental conditions:
    - Storage temperature: -25ºC - 70ºC
    - Operating temperature: 5ºC - 45ºC; ECG plate: 46ºC (Max.)
    - Humidity: 10% to 95%
    - Atmosphere pressure: 800 - 1013 hPa
- Measurement range: Average heart rate 30 - 240 bpm
- Operating altitude: 2000 m
- Expected service life: 1 year
- Charging clip:
    - Type: USB-port
    - Length: 20 cm
    - Output Current: 500 mA
    - Input Voltage: 5 V
    - Output Interface: Pogo Pin

Support

For the initial support, contact your doctor or the local authorised dealer.

Please regularly check the website http://miocare.mio.com/ for more information.

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Trademarks
All brand and product names are trademarks or registered trademarks of their
respective companies.
Disclaimer
The screenshots in this manual may differ between different operating systems and
software versions. You are recommended to download the latest User Manual of your
product from the manufacturer's website (http://miocare.mio.com/).

Specifications and documents are subject to change without notice. MiTAC does not
warrant this document is error-free. MiTAC assumes no liability for damage incurred
directly or indirectly from errors, omissions or discrepancies between the device and
the documents.
Notes
Not all models are available in all regions.
Depending upon the specific model purchased, the colour and look of your device and
accessories may not exactly match the graphics shown in this document.
(11/2016)

Guidance and manufacturer's declaration

Guidance and manufacturer's declaration – electromagnetic emissions		
The N507 is intended for use in the electromagnetic environment specified below.		
The customer or the user of the N507 should assure that it is used in such an environment.		
Emission test	Compliance	Electromagnetic environment – guidance
RF emissions CISPR 11	Group 1	The N507 uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class B	The N507 is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Compliance	

Guidance and manufacturer's declaration – electromagnetic immunity (1)			
The N507 is intended for use in the electromagnetic environment specified below. The customer or the user of the N507 should assure that it is used in such an environment.			
Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment – guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30 %.
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/ output lines	±2 kV for power supply lines Not applicable	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	±1 kV line(s) to line(s) ±2 kV line(s) to earth	±1 kV line(s) to line(s) Not applicable	Mains power quality should be that of a typical commercial or hospital environment.
Voltage Dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	<5% UT (>95% dip in UT) for 0,5 cycle 40% UT (60% dip in UT) for 5 cycles 70% UT (30% dip in UT) for 25 cycles <5% UT (>95% dip in UT) for 5 s	<5% UT (>95% dip in UT) for 0,5 cycle 40% UT (60% dip in UT) for 5 cycles 70% UT (30% dip in UT) for 25 cycles <5% UT (>95% dip in UT) for 5 s	Mains power quality should be that of a typical commercial or hospital environment. If the user of the N507. requires continued operation during power mains interruptions, it is recommended that the N507 be powered from an uninterruptible power supply or a battery.

Guidance and manufacturer's declaration – electromagnetic immunity (2)			
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	The N507 power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.
NOTE: UT is the a.c. mains voltage prior to application of the test level.			
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms	Portable and mobile RF communications equipment should be used no closer to any part of the N507 including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance: $d = 1,2 \sqrt{P}$ $d = 1,2 \sqrt{P}$ 80 MHz to 800 MHz $d = 2,3 \sqrt{P}$ 800 MHz to 2,5 GHz
Radiated RF IEC 61000-4-3	3 V/m 80MHz to 2,5 GHz	3 V/m	Where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in metres (m).

Guidance and manufacturer's declaration – electromagnetic immunity (3)				
			Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,[a] should be less than the compliance level in each frequency range.[b] Interference may occur in the vicinity of equipment marked with the following symbol: $((\cdot))$

NOTE 1: At 80 MHz and 800 MHz, the higher frequency range applies.

NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

a. Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the N507 is used exceeds the applicable RF compliance level above, the N507 should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the N507.

b. Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

Recommended separation distances between portable and mobile RF communications equipment and the N507

The N507 is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the N507 can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the N507 as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter m		
	150 kHz to 80 MHz $d = 1,2 \sqrt{P}$	80 MHz to 800 MHz $d = 1,2 \sqrt{P}$	800 MHz to 2,5 GHz $d = 2,3 \sqrt{P}$
0,01	0,12	0,12	0,23
0,1	0,38	0,38	0,73
1	1,2	1,2	2,3
10	3,8	3,8	7,3
100	12	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in metres (m) can be estimated using the equation applicable to the frequency of the transmitter, where p is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.