



# Radio Wave Environment Testing is Easy for Anyone from the very first time!

I wonder how far the radio waves can reach in our site?

Are these the most suitable locations to install the wireless devices?

Parent



**Wireless Gateway**  
Model: WL40EW2TW-R/E  
NCC Taiwan Radio Wave Regulatory

You can easily test and confirm the conditions of radio wave environment by this test kit.

Preliminary radio wave environment test will assure you reliable functions of the wireless communications.

Child



**Wireless Gateway**  
Model: WL40MW1TW-R/E  
NCC Taiwan Radio Wave Regulatory

The above wireless devices are approved for use only in Taiwan.



The box and part photos are not of the actual products, provided for illustrative purposes only.

## 920 MHz ISM Band Wireless System Radio Wave Environment Test Kit

# INTRODUCTION

This quick manual provides users with instructions on the procedures of preliminary radio wave environment testing using the test kit, conducted before introducing the 920 MHz ISM Band Wireless System, including the judgment criteria of test results.

The testing is completed by two major tests as indicated below. Step-by-step procedures are explained at the bottom of this page.

## (1) Channel Noise Scan

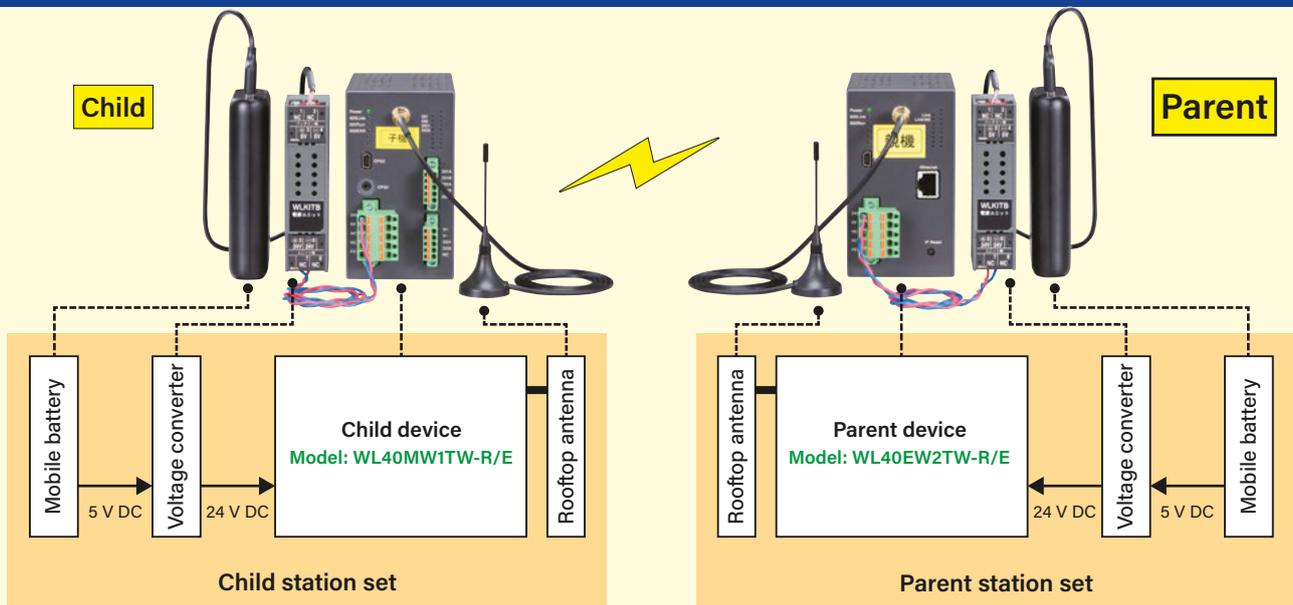
Measuring 920 MHz band radio waves at the sites to install the wireless devices, and confirming that there are no interfering radio waves and/or noises in the environment.

## (2) Communication Test

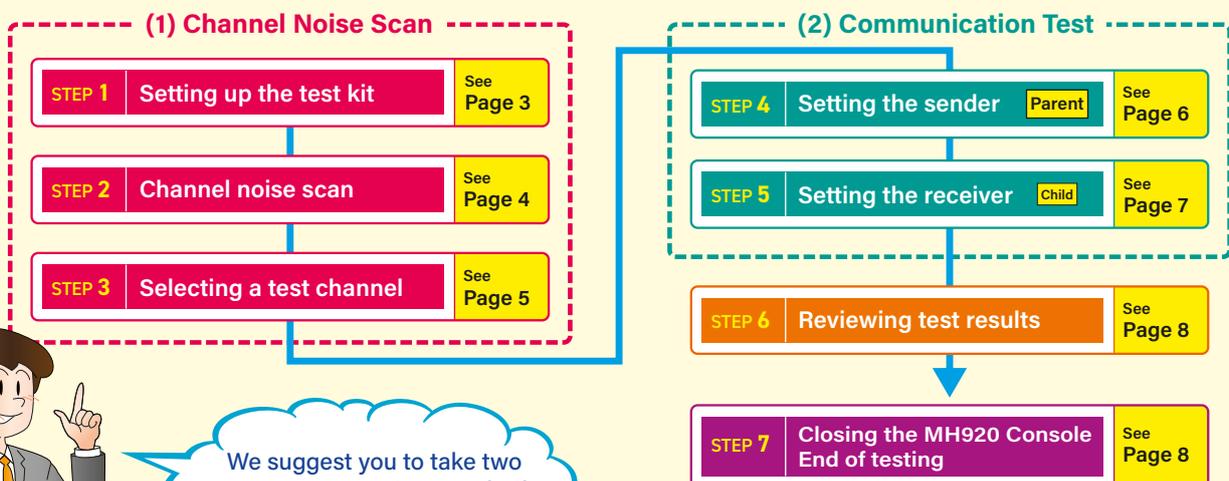
Conducting a communication test with a pair of wireless gateways to measure receiving levels and error rates, and confirming that there are no radio interference over the areas connecting the paired stations.

**Highly Recommended:** The preliminary radio wave environment testing will enhance the reliability of your wireless transmission system by ensuring it functioning in a stable environment.

# COMPONENT IDENTIFICATIONS



# GENERAL TEST PROCEDURE



We suggest you to take two or more persons to cover both test sites at once.

## GETTING READY

- ◆ Please prepare a PC to use in the test.
- ◆ Please download the application software for maintenance: MH920 Console International (Model: MH920CI) from the following website and install it in your PC.

[https://www.mgco.jp/download\\_w/dl\\_mh920ciE.html](https://www.mgco.jp/download_w/dl_mh920ciE.html)

Download site of  
the application software  
**2D CODE HERE**



- ▶ For the detailed instructions to install the MH920CI, please refer to the users manual of the Wireless Gateway, or consult with us.

✉ [hotline-intl@mgco.jp](mailto:hotline-intl@mgco.jp)

## STEP 1 Setting up the test kit

### 1 Let's move to the respective installation sites with the test kit.



In the test kit box, you will find two small boxes, each containing the parent and the child station set. Bring each to the respective installation sites.



### 2 Set up the test kit.

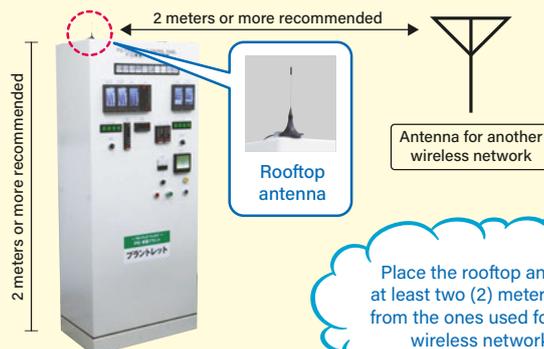


### 3 Set up the rooftop antenna.



Mount the rooftop antenna with a magnet onto a metal plate located at least two (2) meters above the ground, fifteen (15) centimeters apart from roofs or walls.

The mounting direction of both antennas of the parent and child devices must be aligned either in the vertical or in the horizontal.



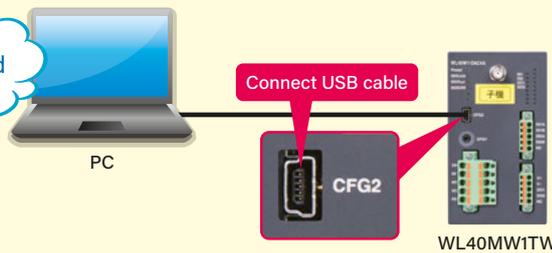
Place the rooftop antenna at least two (2) meters apart from the ones used for other wireless networks.

# STEP 2

# Channel noise scan

- 1 Connect the WL40MW1TW to the PC with a USB cable included in the kit.

Start a channel noise scan at the child device site.



- 2 Start the MH920 Console International on your PC.

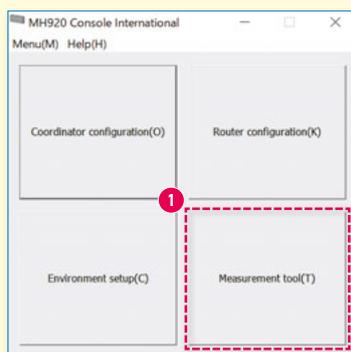


- 3 Choose a COM port.  
Select "Taiwan (TW)" from the list of countries.

Choose USB CDC Serial port or USB Serial device (COM\*\*)

Click OK to each message 7 → 8 → 9 following the country setting

- 4 Switch to "Channel noise scan mode"



Message dialogs after switching the mode

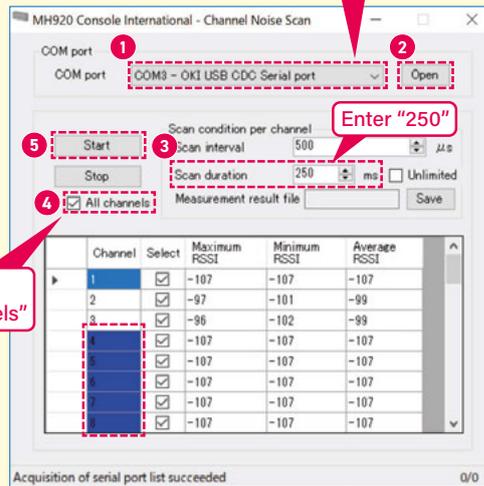
## 5 Execute a channel noise scan.

Choose USB CDC Serial port or USB Serial device (COM\*\*)

Those channel numbers in blue cells are suitable for a communication test.



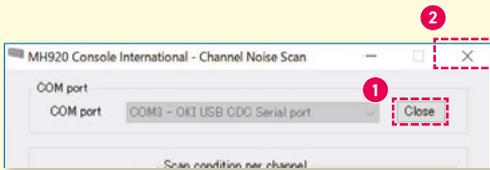
Check "All channels"



Each channel is scanned 500 times.



## 6 Close the Channel Noise Scan window.



## 7 Repeat the same procedure of channel noise scan for the parent device.

Move to the parent device site.

Setting up the kit

Please see Page 3

2 Set up the test kit.

Switching to the channel scan mode

Please see Page 4

4 Switch to "Channel noise scan mode"



# STEP 3 Selecting a test channel

Compare the test results and find one channel in which both parent and child devices show blue.

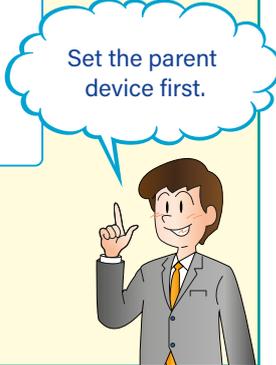
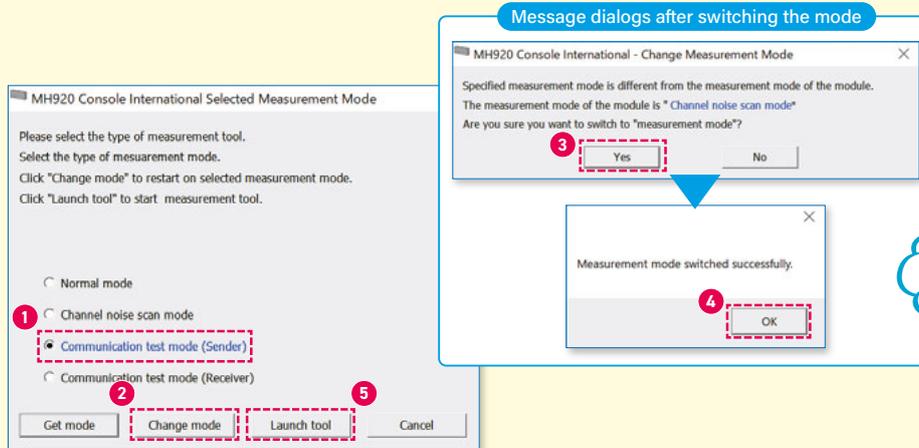


Child	Channel	Select	Maximum RSSI	Minimum RSSI	Average RSSI
	1	<input checked="" type="checkbox"/>	-107	-107	-107
	2	<input checked="" type="checkbox"/>	-97	-101	-99
	3	<input checked="" type="checkbox"/>	-96	-102	-99
	4	<input checked="" type="checkbox"/>	-107	-107	-107
	5	<input checked="" type="checkbox"/>	-107	-107	-107
Ch.5	6	<input checked="" type="checkbox"/>	-107	-107	-107
Ch.6	7	<input checked="" type="checkbox"/>	-107	-107	-107
	8	<input checked="" type="checkbox"/>	-107	-107	-107

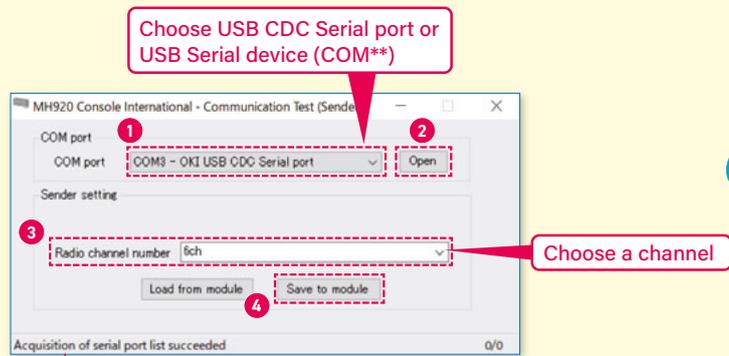
Parent	Channel	Select	Maximum RSSI	Minimum RSSI	Average RSSI
	1	<input checked="" type="checkbox"/>	-83	-89	-85
	2	<input checked="" type="checkbox"/>	-97	-101	-98
	3	<input checked="" type="checkbox"/>	-93	-101	-98
	4	<input checked="" type="checkbox"/>	-88	-90	-88
	5	<input checked="" type="checkbox"/>	-99	-102	-100
	6	<input checked="" type="checkbox"/>	-99	-102	-100
	7	<input checked="" type="checkbox"/>	-87	-94	-89
	8	<input checked="" type="checkbox"/>	-89	-97	-92

Channel 6 is selected in the following explanations according to the above test results.

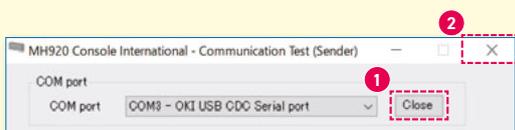
## 1 Open "Communication test (Sender)" window.



## 2 Set the parameters in "Communication test (Sender)" window.



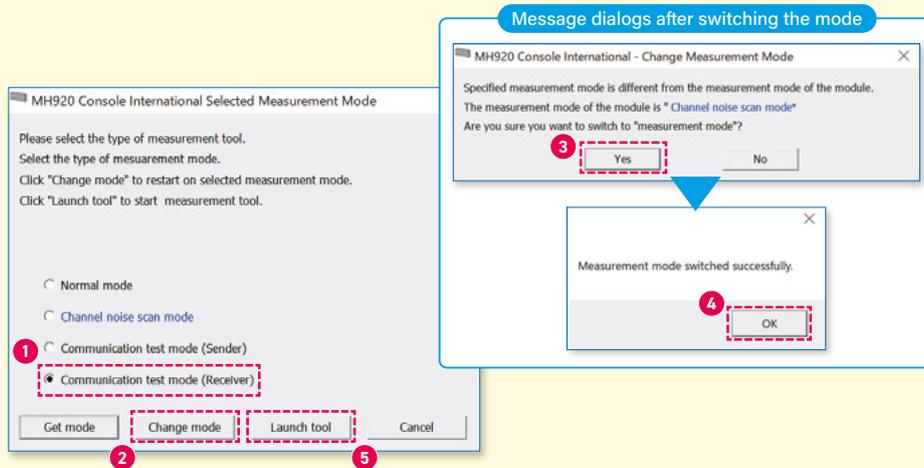
## 3 Close "Communication test (Sender)" window.



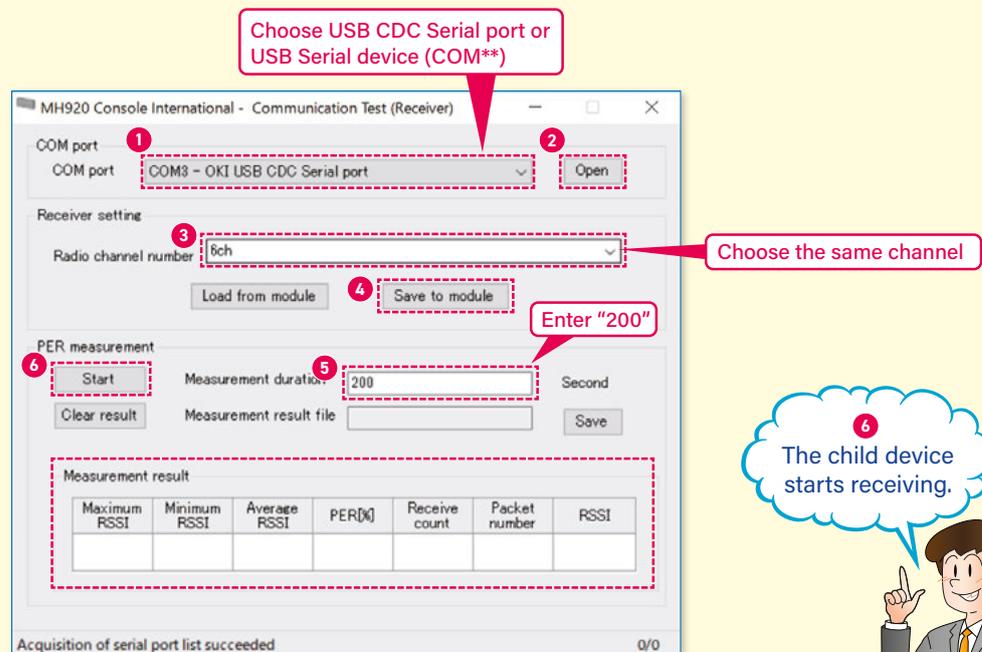
## 4 Move to the child device site.



**1** Open "Communication test (Receiver)" window.



**2** Set the parameters in "Communication test (Receiver)" window and start a communication test.



# STEP 6

# Reviewing test results

### Judgment Criteria

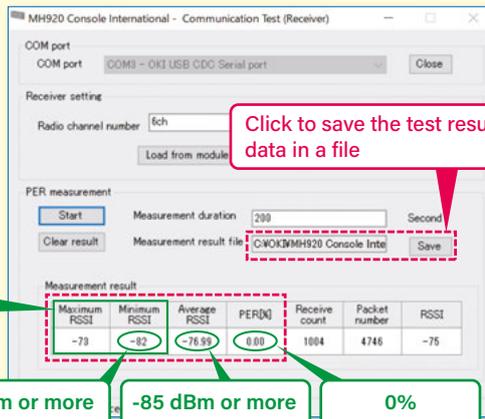
Measurement	Judgment criteria
Minimum RSSI	-95 dBm or more
Average RSSI	-85 dBm or more
PER [%]	0%
Radio wave fluctuation	30 dB or less

Radio wave fluctuation = Max. RSSI - Min. RSSI  
30 dB or less recommended

-95 dBm or more recommended

-85 dBm or more recommended

0% recommended



### What is dBm?

dBm is a unit of power level commonly used to express relatively small power levels such as radio wave. 1 mW is defined as 0 dBm. It is convenient to measure the power of system transmissions on a log scale, which can express both very large and very small values in a short form, as shown in the following examples:

1 pW = -90 dBm      1 mW = 0 dBm  
1 nW = -60 dBm      1 W = 30 dBm  
1 μW = -30 dBm      1 kW = 60 dBm

### Measurement Result Examples

	Maximum RSSI	Minimum RSSI	Average RSSI	PER[%]	Radio wave fluctuation
Good	-37	-51	-39.77	0.00	14
NG	-89	-102	-93.91	15.3	13
	-53	-84	-59.91	0.00	31

The results are judged as good when all four items meet the judgment criteria.

The test result data files are stored in a user-specified folder with the following file name:

#### File name

PER\_yymmdd-HHMMSS.csv  
yy: year, mm: month, dd: day,  
HH: hour, MM: minute, SS: second

#### Folder location (example)

C:\OKI\MH920 Console International\PER\_Log



Even if the test results are unsatisfactory, there may be solutions by adding child devices as relay points, thanks to the multihop relay functions of WL40 Series products.



Please consult us for more information.

# STEP 7

# Closing the MH920 Console - End of testing

**1** Close "Communication test (Receiver)" window.

**2** Exit the MH920 Console.

The radio wave environment testing is now finished. Thank you.

