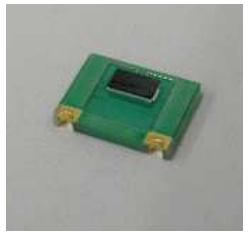
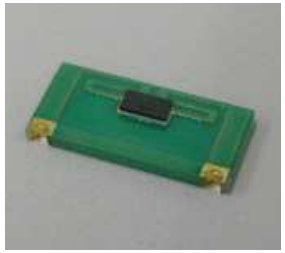
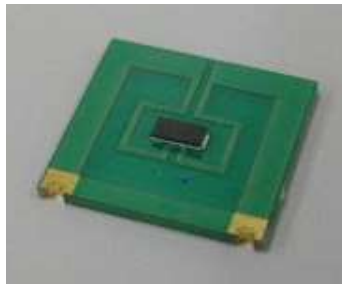
MAGICSTRAP®

How to use
mini PCB sample

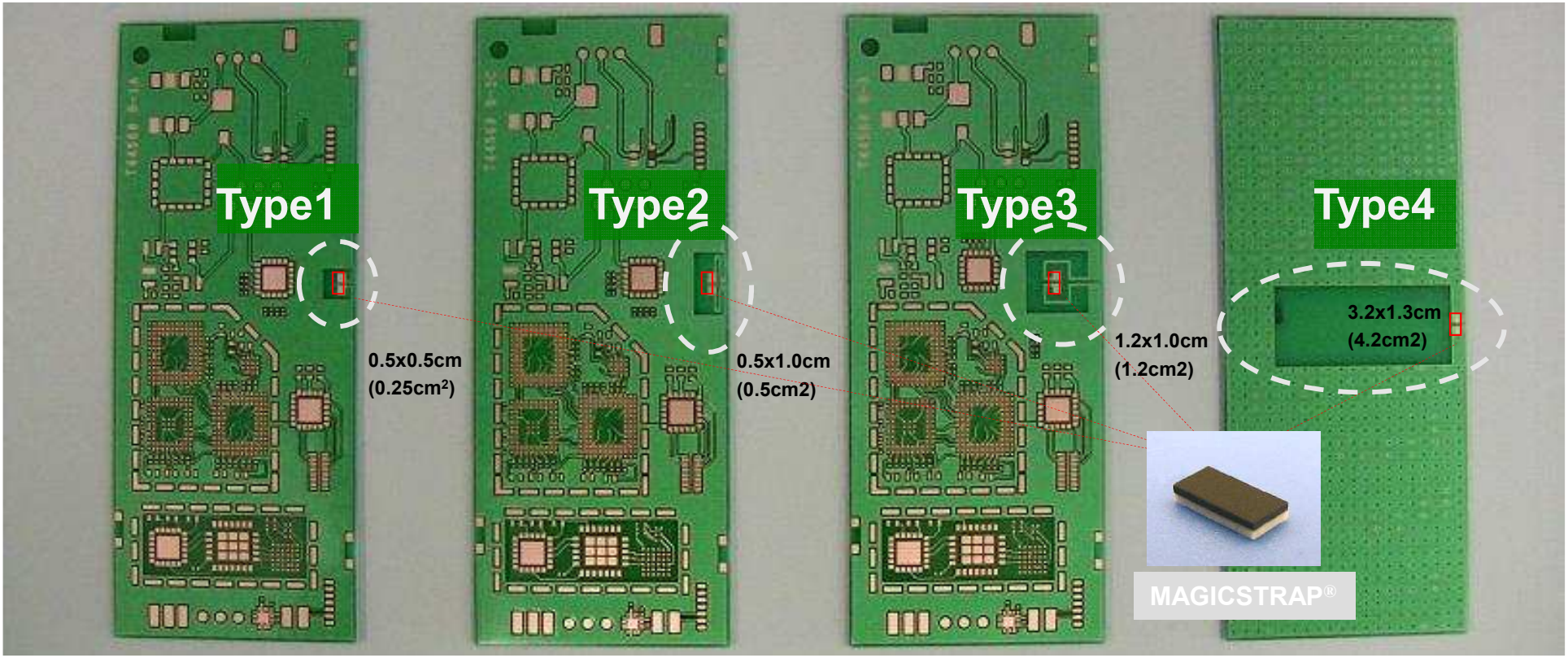






muRata
Innovator in Electronics

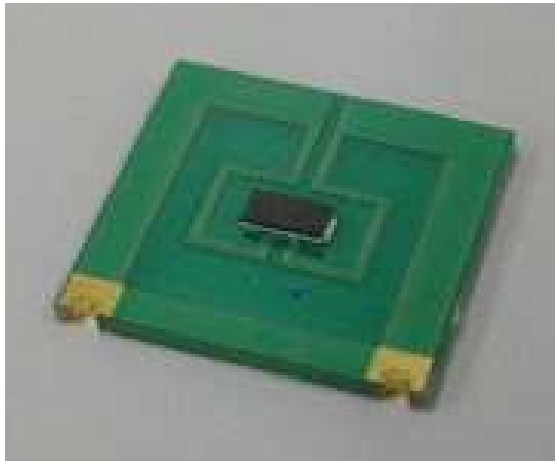
Easy estimation of tag performance



Basically Murata recommends to apply one of the 4 recommended antenna patterns to your PCB when using the MAGICSTRAP®.
We understand that you might want to gather some practical experience or test possible performance before touching the layout of your PCB and adding one of these patterns permanently.
Therefore we have developed a solution, which enables you to do first steps. We call this solution mini PCB.

All Rights Reserved, Copyright© Murata Manufacturing Co., Ltd.

Magic mini PCB



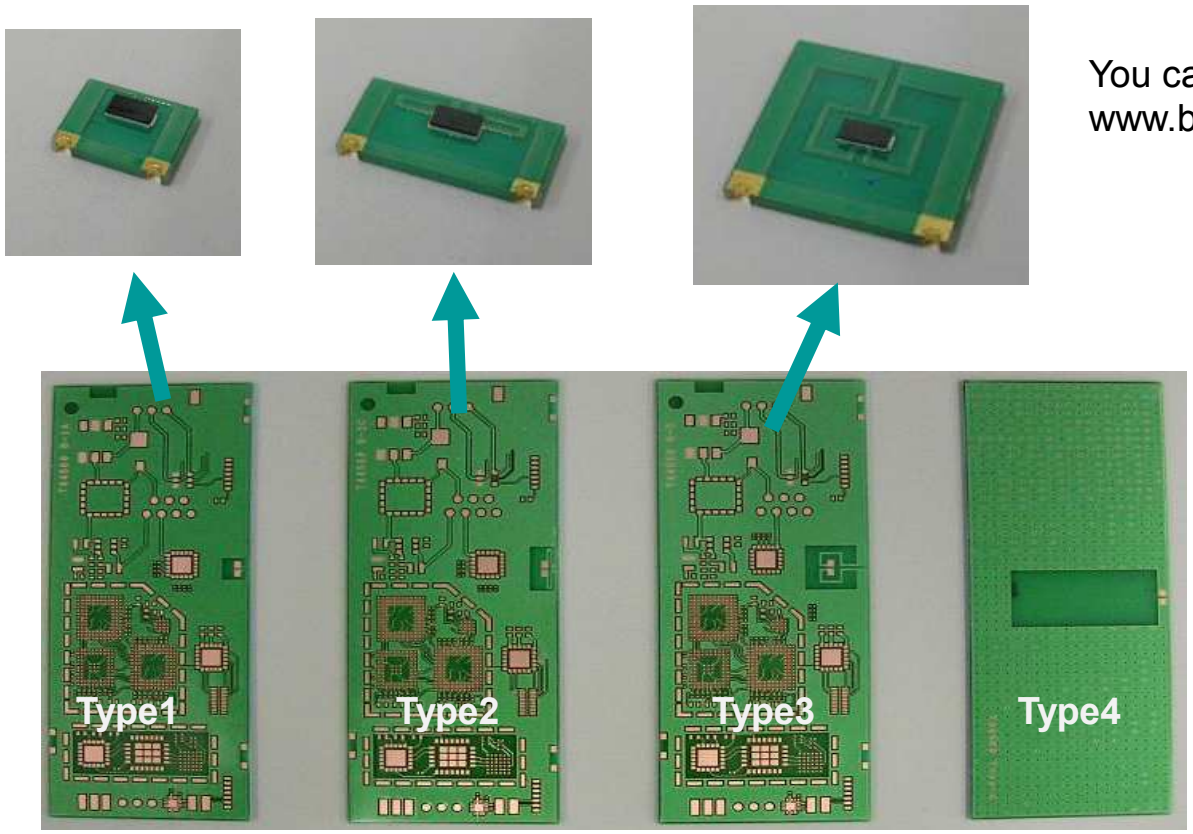
Order here:
www.beta-layout.com

This isone of the mini PCBs which consists of an antenna matching pattern on which a MAGICSTRAP®is already mounted. It has two terminals for the connection to the ground plane of your PCB.

All Rights Reserved, Copyright© Murata Manufacturing Co., Ltd.

Link to free antenna pattern

There are three available types of mini PCB, corresponding to three of the four recommended MAGICSTRAP® antenna patterns.

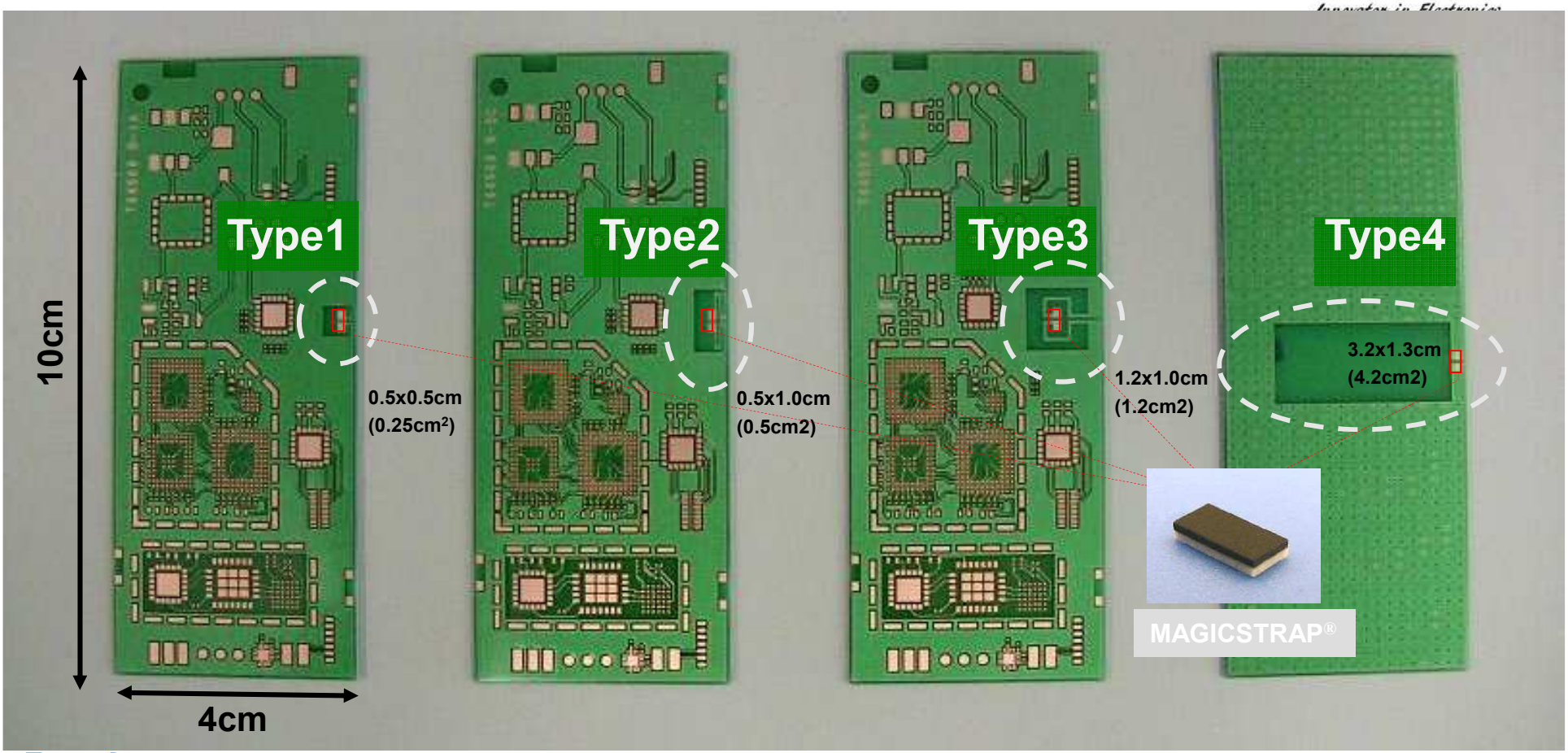


You can order these mini PCBs from www.beta-layout.com

The four patterns form a compromise between board space requirement and achieveable read range. That means, pattern 1 will require least board space but will also show the smallest read range. Pattern 3 will give you bigger range.

All Rights Reserved, Copyright© Murata Manufacturing Co., Ltd.

4 Types of reference antenna on PCB



Read range

(at 4W EIRP, 915MHz, with 6dBi directivity antenna and circularly polarized wave)

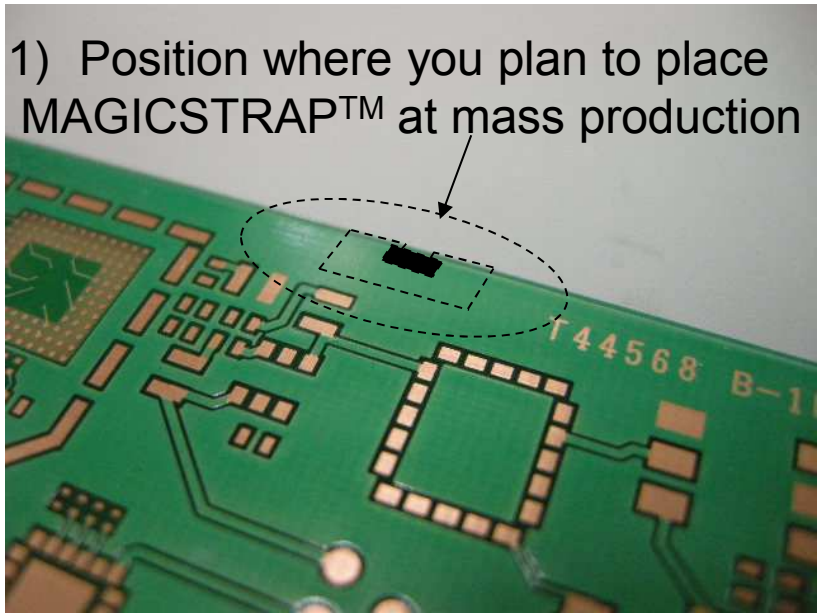
0.7m	1.6m	3.6m	5m

These are the ranges you can reach with the 4 PCBs under the given specifics. R/W power and PCB size and shape and should give you a first rough indication of the performance differences between the 4 designs.

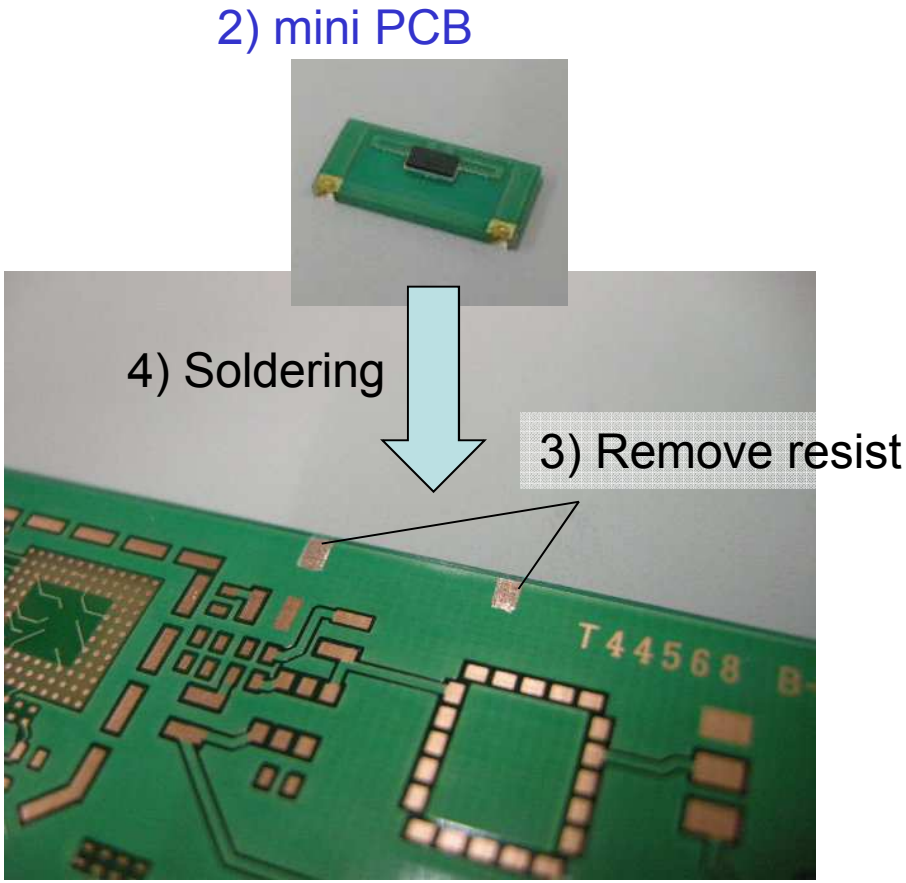
All Rights Reserved, Copyright© Murata Manufacturing Co., Ltd.

How to apply the mini PCB

Please simply attach the **mini PCB** to your PCB.
This is an easy way to get a first estimation of RFID tag performance by using MAGICSTRAP® in combination with one of the recommended antenna patterns.
The mini PCB should ideally used at the location, where you plan to later integrate the MAGICSTRAP® antenna pattern in your layout.

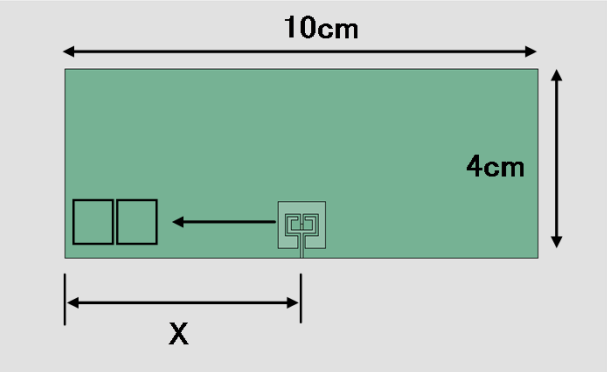


You can of course compare the performance of different locations on your PCB, if you place it differently on additional PCBs.



All Rights Reserved, Copyright© Murata Manufacturing Co., Ltd.

Finding the right location

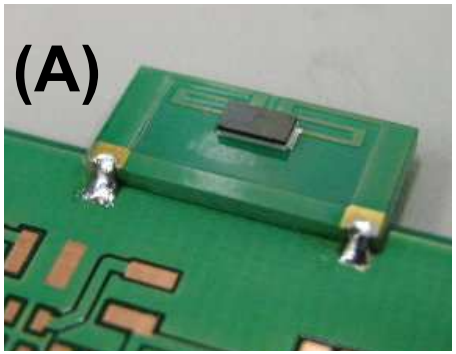


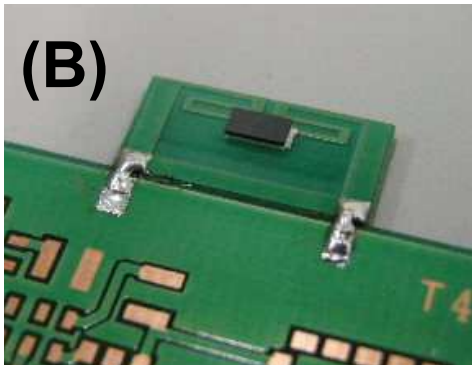
length X [cm]	Read Range [m]
5	3.6
2	2.5
1	1.6

MAGICSTRAP® should be mounted as close as possible to the middle of the PCB. Maximum read range will be achieved in MAGICSTRAP® is mounted at the center of the longer side of the PCB. The same is valid for the mounting position of the mini PCB.

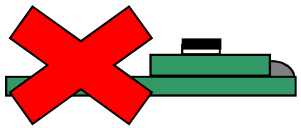
All Rights Reserved, Copyright© Murata Manufacturing Co., Ltd.

Example of horizontal attachment





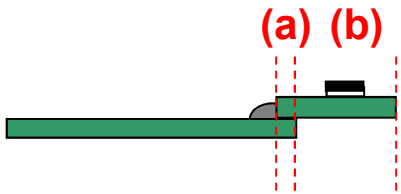
Bad example

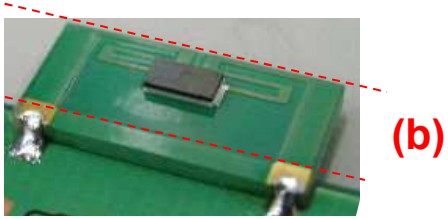


Please DON'T stack on main PCB

Both examples (A) and (B) will show similar sensitivity and polarity.
Mini PCBs are sensitive to the environment underneath, so please don't place metal under mini PCB or don't stack mini PCB on main PCB.

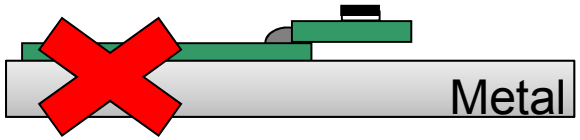
Overlapping area
In case of attachment (A), please limit the overlapping area (a) to the minimum for best perfomance. Moving the area (b) over the main PCB, will cause a shielding effect and reduce the possible communication distance, worst case down to zero.





All Rights Reserved, Copyright© Murata Manufacturing Co., Ltd.

Measurement Precautions



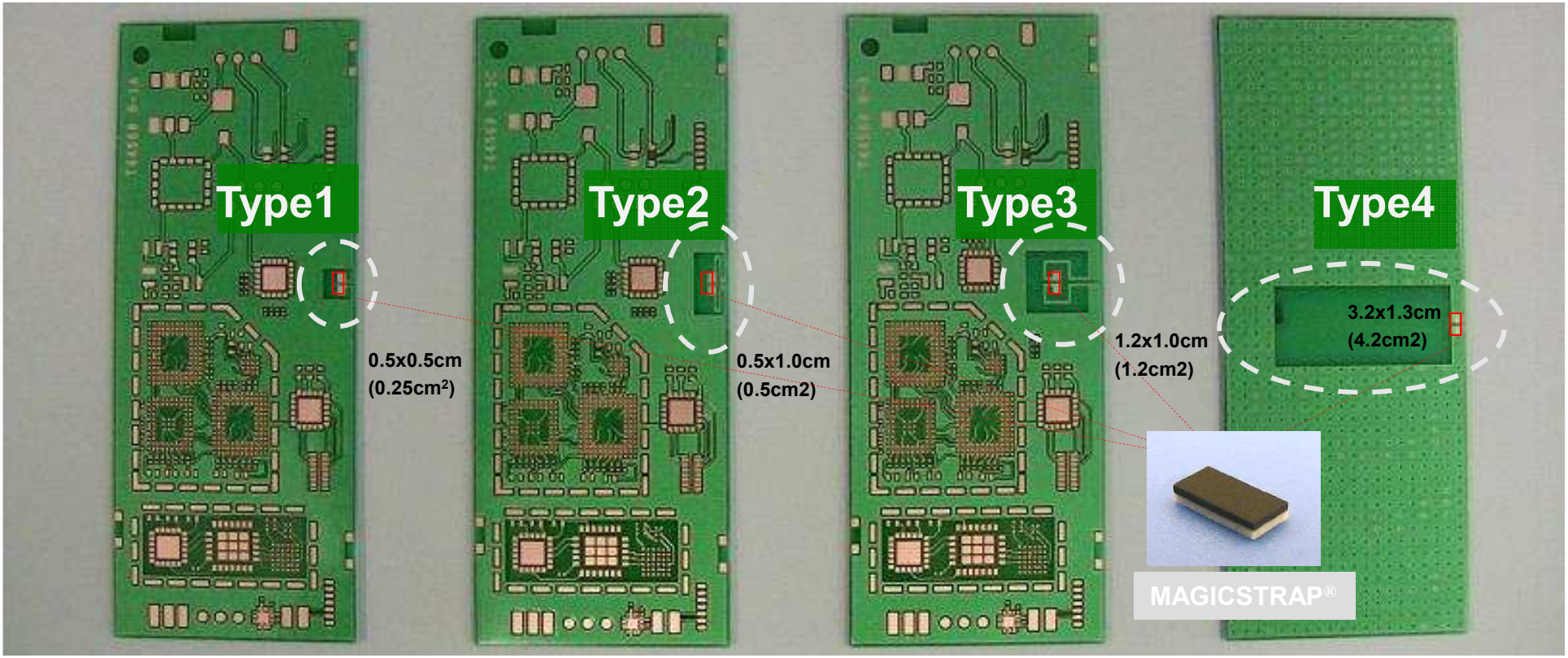
Please DON'T place on metal

Bad example

- Metal environment
  - Please do not place the PCB with the connected mini PCB on or close to metal. This will drastically reduce the read range performance and could lead to not being able to communicate with the Magicstrap.
- Single Read
  - In case you want to be sure to communicate with one MAGICSTRAP® only, make sure that there is no other RFID Tag present in the field of your reader. Due to the nature of UHF RFID, any tag in the field of the reader antenna will be detected. If you want to test bulk read function of course, place as many tags in the field as you want.
  - Of course you can also ensure communication with one MAGICSTRAP® when using its close coupling feature, which we call „antennaless", while using a reader with a loop antenna. For more details, pls see the application notes called „antennaless" MAGICSTRAP® and the relevant video on the Murata website.

All Rights Reserved, Copyright© Murata Manufacturing Co., Ltd.

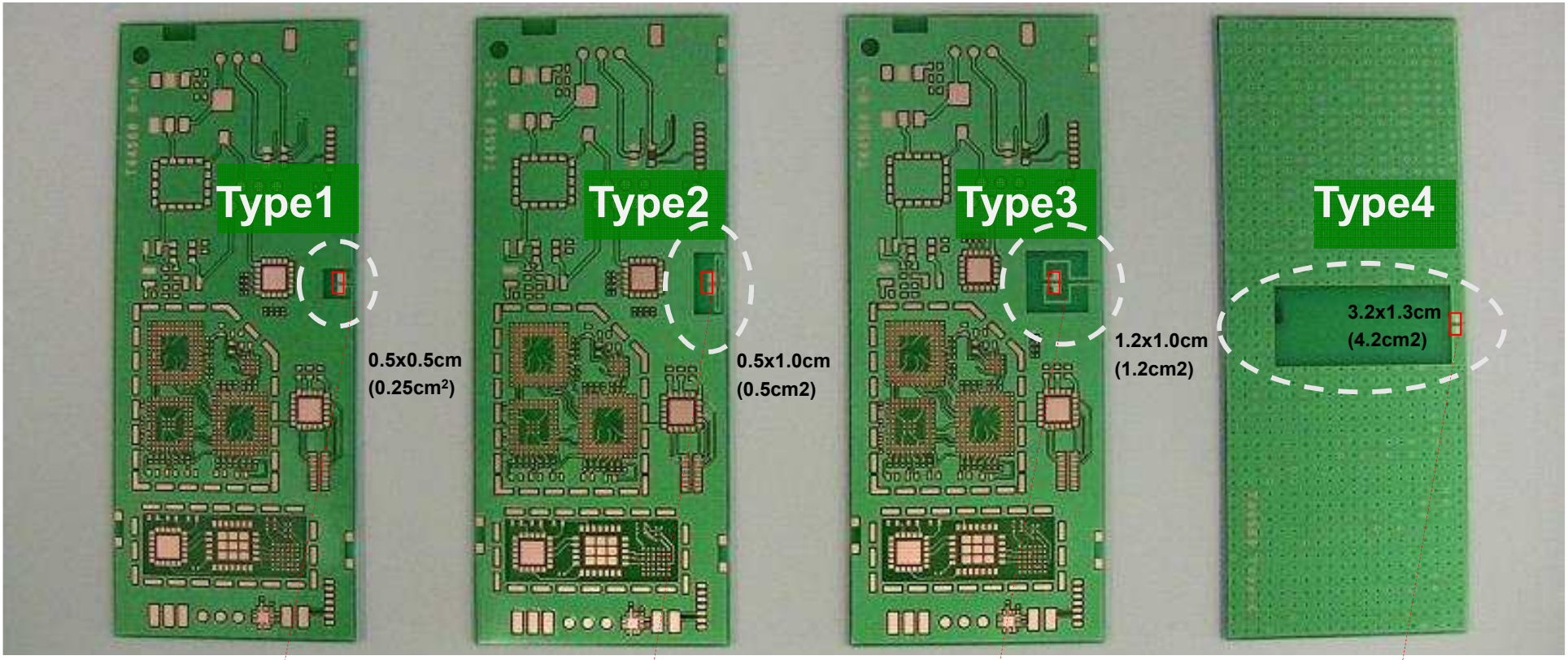
Conclusion



The results of the actual measurements with your board, should help you to determine which pattern you should apply to your board. These antenna patterns will give you enough range in most of the cases. In case you are not satisfied with the result or need a longer performance due to a particular reason, an improvement can be achieved by a custom antenna design. (See also the presentation of Dr. Iliev of Kathrein on our website). Please contact one of our partners for custom antenna design support, if necessary.

All Rights Reserved, Copyright© Murata Manufacturing Co., Ltd.

Order Information



Corresponding MAGICSTRAP® Partnumbers

Each of the above antenna designs requires a particular MAGICSTRAP® partnumber. Please make sure that you order the correct corresponding part number.

All Rights Reserved, Copyright© Murata Manufacturing Co., Ltd.

For further information, please visit:

http://www.murata.com/products/rfid/index.html

All Rights Reserved, Copyright© Murata Manufacturing Co., Ltd.