Guidelines for design in of module MLE-N2

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1 General Guidelines

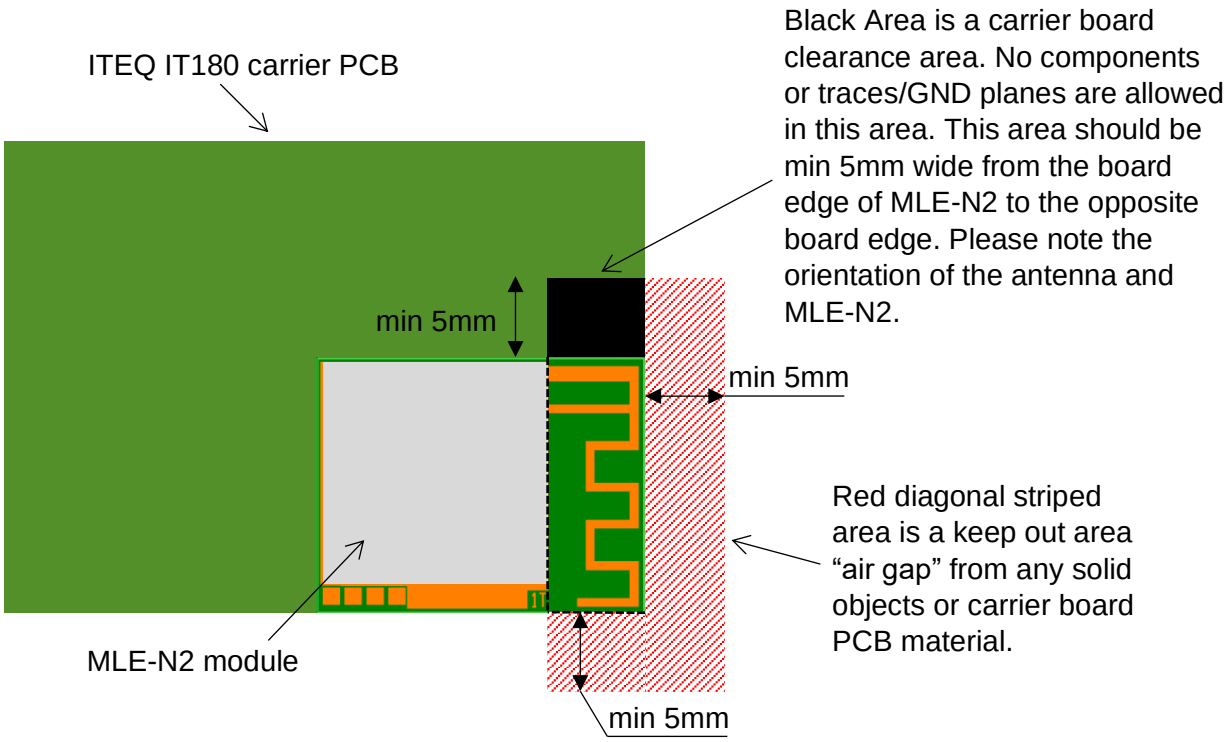
- MLE-N2 has been tested on 1.6mm carrier boards of the brands ITEQ IT180 and Isola 370HR. For optimal performance it is recommended to use those for the carrier board design or a PCB with similar specification.
  http://www.iteq.com.tw/wp-content/uploads/2016/09/IT-180-datasheet-201409.pdf
  https://www.isola-group.com/pcb-laminates-prepreg/370hr/
- Avoid routing any non-isolated conductors, ground layers or vias underneath MLE-N2 in the top layer as vias or conductors on MLE-N2 might get short circuited otherwise.

2 Guidelines for optimum antenna performance

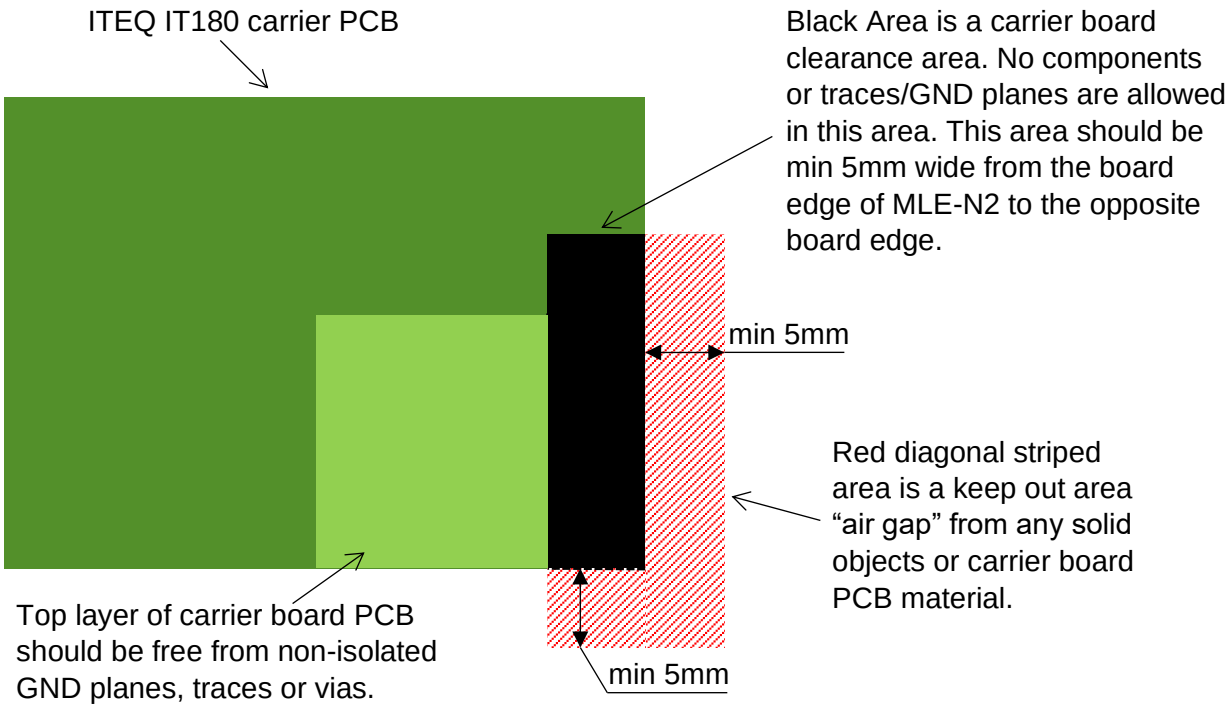
The MLE-N2 module has a built in highly effective inverted F antenna optimized for wall mount applications.

2.1 Carrier board design

For optimum performance of the MLE-N2 antenna the carrier board PCB should be designed so that following dimensions are met:

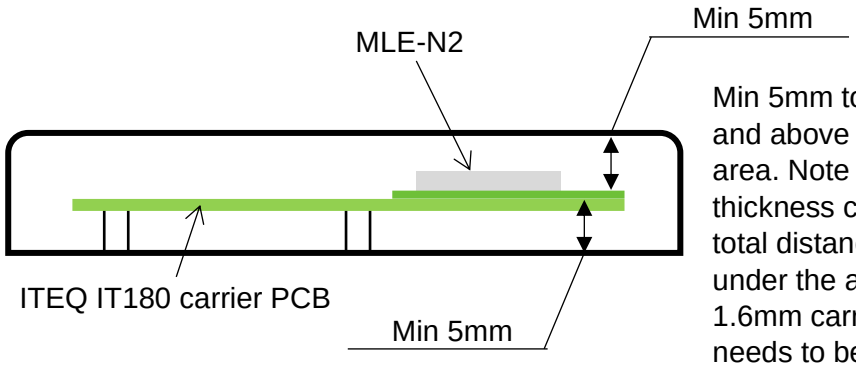


Board design example



Board design without MLE

2.2 Guidelines for mounting in enclosure



Min 5mm to solid objects under and above MLE-N2 antenna area. Note that carrier board thickness can be included in the total distance to solid objects under the antenna. I.e. for a 1.6mm carrier board standoffs needs to be min 3.4mm

3 Compliance information

3.1 FCC information

3.1.1 Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

• Reorient or relocate the receiving antenna.
• Increase the separation between the equipment and receiver.
• Connect the equipment into an outlet on a circuit different from that to which the receiver is
• connected.
• Consult the dealer or an experienced radio/TV technician for help.

FCC Caution

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) This device must accept any interference received, including interference that may cause undesired operation.

3.1.2 FCC Declaration of Conformity

We LumenRadio AB, Svangatan 2B, 41668 Gothenburg, Sweden, declare under our sole responsibility that Mira MLE-N2 comply with Part 15 of FCC Rules.

3.1.3 FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This device is intended only for OEM integrators under the following conditions:

(1) The antenna must be installed such that 20 cm is maintained between the antenna and users, and

(2) The transmitter module may not be co-located with any other transmitter or antenna,

IMPORTANT NOTE:

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

3.1.4 End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 20cm may be maintained between the antenna and users. The final end product must be labelled in a visible area with the following: “Contains FCC ID: XRSMLEN201”.

3.1.5 Manual Information to the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user’s manual of the end product which integrates this module.

3.2 Industry Canada statement

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.
Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.
Caution Exposure:
This device meets the exemption from the routine evaluation limits in section 2.5 of RSS102 and users can obtain Canadian information on RF exposure and compliance.
Le dispositif répond à l'exemption des limites d'évaluation de routine dans la section 2.5 de RSS102 et les utilisateurs peuvent obtenir des renseignements canadiens sur l'exposition aux RF et le respect.
This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.
Cet équipement doit être installé et utilisé avec une distance minimale de 20 centimètres entre le radiateur et votre corps.
The final end product must be labeled in a visible area with the following:
The Industry Canada certification label of a module shall be clearly visible at all times when installed in the host device, otherwise the host device must be labelled to display the Industry Canada certification number of the module, preceded by the words “Contains transmitter module”, or the word “Contains”, or similar wording expressing the same meaning, as follows:
Contains transmitter module IC: 8879A-MLEN201
where 8879A- MLEN201 is the module’s certification number.

3.3 CE

Mira MLE-N2 comply with the Essential Requirements of RED (Radio Equipment Directive) of the European Union (2014/53/EU). Mira MLE-N2 meet the ETSI EN 300 328 V2.2.2 conformance standards for radio performance.

3.4 Compliance Marking, FCC & Industry Canada

CRMX modules are FCC certified radio module that carries a “Modular” grant CRMX radio modules complies to the “Intentional Radiator” portion (Part 15c) for FCC certification: Part 15.247 Transmitter tests. An end product, incorporating a CRMX module, does not require additional testing or authorization for the CRMX transmitter (or transceiver, in the case of RDM or Flex products). Host end products can use the FCC ID of the certified module as the FCC ID of the host end product. A label displaying the CRMX module’s FCC ID must be affixed and visible on the host end product for approval FCC IDs are required for host end products with radio transmitters.