

HWL-C21A User Manual

Infineon CYW88273 WLAN module with Built-in Antenna

REV 1.2

Hanwha NxMD

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Summary

This datasheet presents the general performance and specifications of HWL-C21A IEEE 802.11a/b/g/n/ac Wireless LAN module with Built-in Antenna.

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1 General Description

1.1 Functional Description

HWL-C21A Module provides the highest level of integration for Automotive and IoT systems with integrated Dual-band IEEE 802.11ac WLAN MAC/baseband/radio MAC/baseband/radio, and integrated Power Management Unit.

WLAN interfaces to host processor through a PCIe v3.0 Gen1 or SDIO 3.0 interface.

HWL-C21A is based on Infineon CYW88273 solution. CYW88273 is qualified to operate across Automotive Grade 3 (-40°C to +85°C) temperature range. It is also AEC Q-100 tested and manufactured in ISO9001/IATF16949 certified fabrication facilities.

1.2 Features

WLAN

- IEEE 802.11ac compliant
- Support for MCS8 VHT20 in 20 MHz channels for up to 86.7 Mbps
- Supports 20, 40, and 80MHz channels with optional SGI (256QAM modulation)
- Full IEEE 802.11a/b/g/n legacy compatibility with enhanced performance

Interfaces

- PCIe mode complies with PCI Express base specification revision 3.0 for x1 lane and power management running at Gen1 speed(Optional)
- Supports standard SDIO v3.0 host interface. Backward compatible with SDIO v2.0 host interface

General

- Compact dimension: 16.0±0.10 x 12.0±0.10 mm / Height : 2.50 mm max.
- RoHS compliant

1.3 Applications

- Automotive
- High-performance Infotainment and Telematics

2 Dimension and Pin Assignments

2.1 Mechanical Dimension

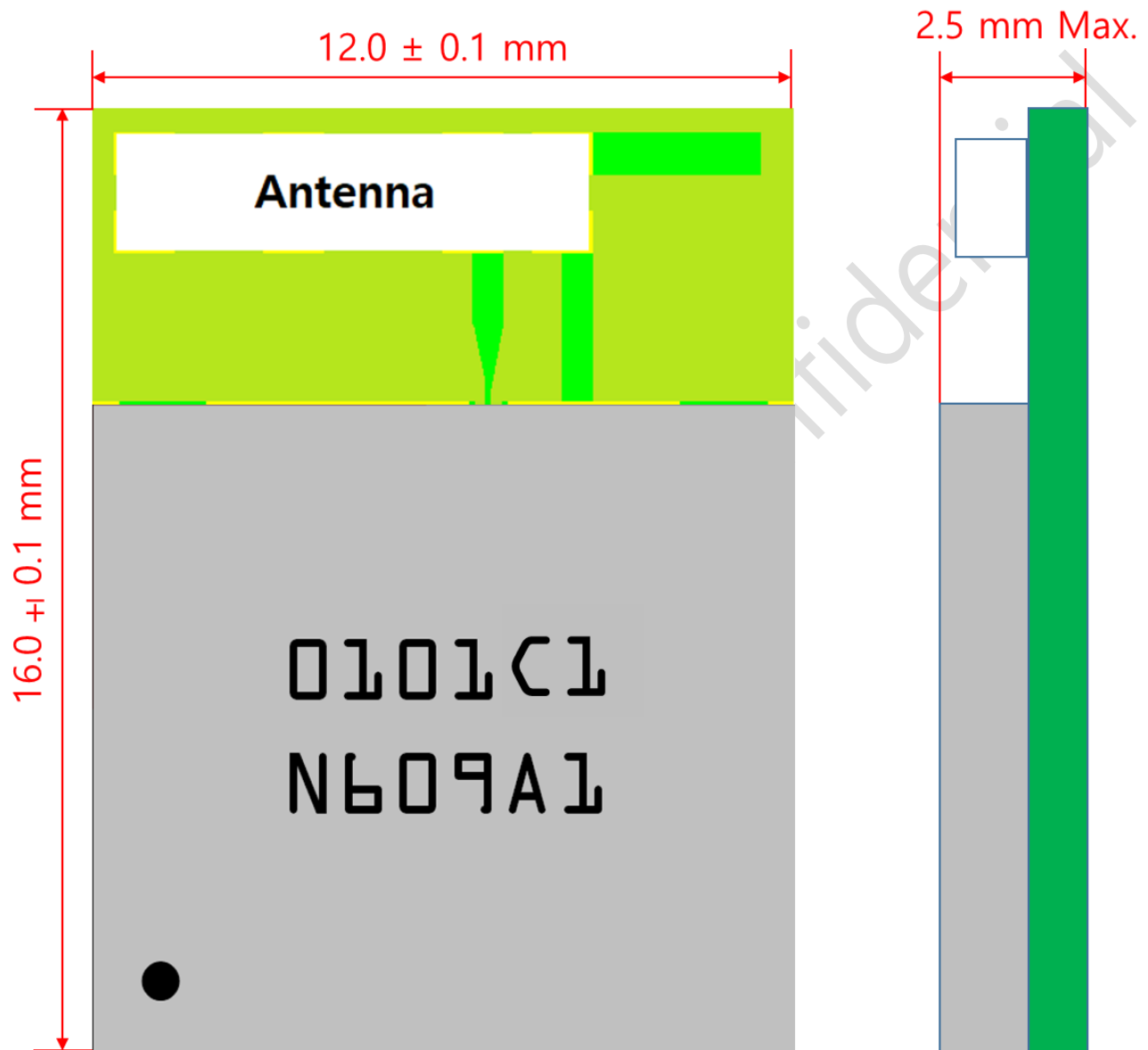


Figure 2-1 HWL-C21A Mechanical Dimension (Top & Side view)

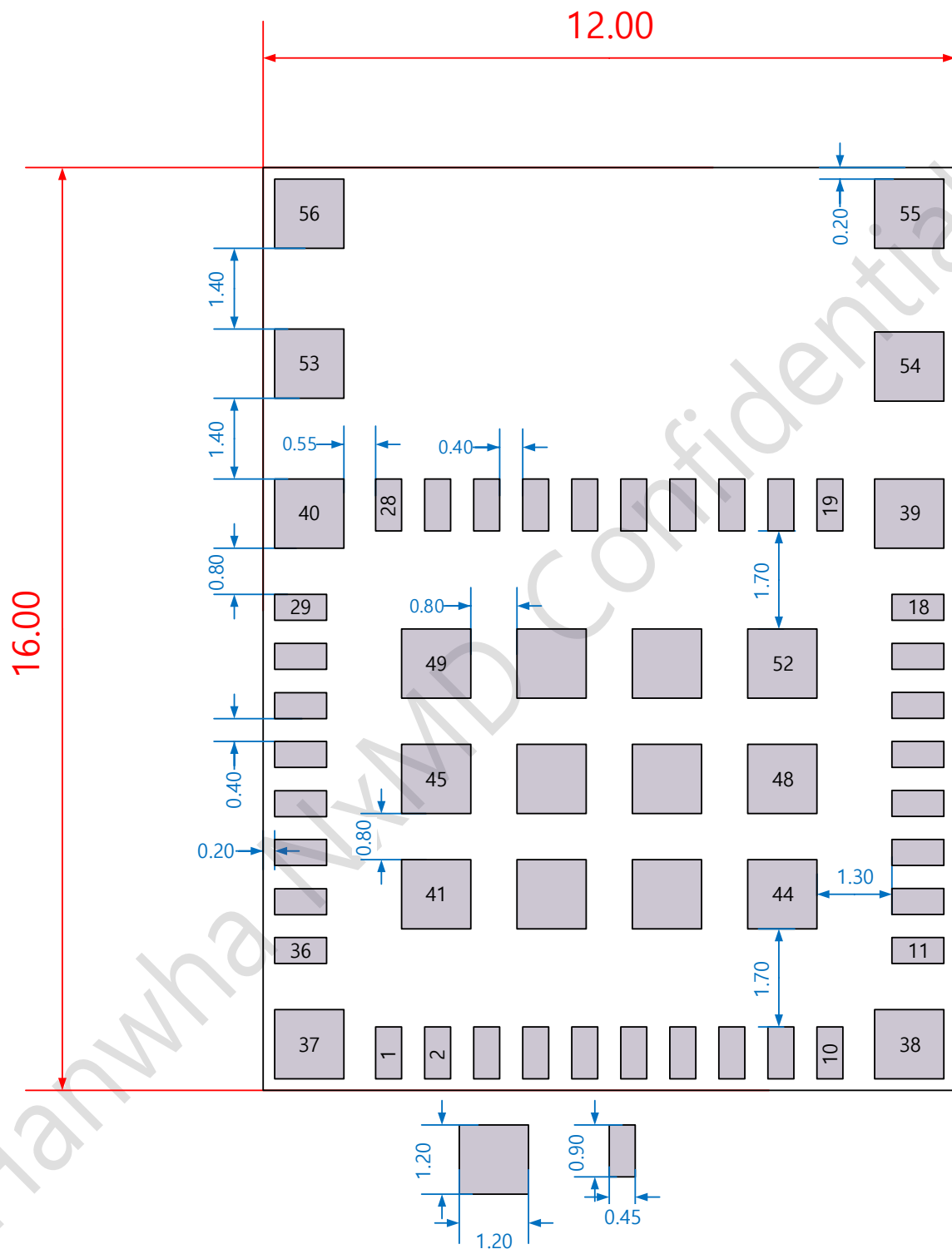


Figure 2-2 HWL-C21A Bottom Pad Dimension (Top View)

2.2 Pin Assignments

Pin No.	Pin Description	Pin No.	Pin Description	Pin No.	Pin Description
1	PCIE_CLK_N	21	GND	41	GND
2	PCIE_CLK_P	22	GND	42	GND
3	GND	23	NC	43	GND
4	PCIE_TD_N	24	GND	44	GND
5	PCIE_TD_P	25	GND	45	GND
6	GND	26	PCIE_PME_L	46	GND
7	PCIE_RD_N	27	PCIE_RST_L	47	GND
8	PCIE_RD_P	28	PCIE_CLK_REQ_L	48	GND
9	GND	29	GND	49	GND
10	VBAT	30	GND	50	GND
11	NC	31	SDIO_CMD	51	GND
12	NC	32	SDIO_DATA_1	52	GND
13	WL_REG_ON	33	SDIO_DATA_2	53	NC
14	GND	34	SDIO_DATA_0	54	NC
15	VIO	35	SDIO_CLK	55	NC
16	GND	36	SDIO_DATA_3	56	NC
17	STRAP_1	37	GND		
18	STRAP_0	38	GND		
19	GND	39	GND		
20	LPO_IN	40	GND		

Figure 2-3 HWL-C21A Pin Assignments

3 Pin Descriptions

Table 3-1 Pin Descriptions

Pin#	Signal Name	Type	Connection to IC Pin	Power Domain	Description
WLAN PCI Express Interface					
27	PCIE_RST_L	I(PU)	PERST_L	-	PCIE System Reset. This input is the PCIE reset as defined in the PCIE base specification version 1.1
26	PCIE_PME_L	OD	PCIE_PME_L	-	PCI power management event output. Used to request a change in the device or system power state. The assertion and de-assertion of this signal is asynchronous to the PCIE reference clock. This signal has an open-drain output structure, as per the PCI Bus Local Bus Specification, revision 2.3
28	PCIE_CLKREQ_N	OD	PCIE_CLKREQ_N	-	PCIE clock request signal which indicates when the REFCLK to PCIE interface can be gated. 1= the clock can be gated 0= the clock is requested
1	PCIE_CLK_N	I	PCIE_REFCLKN_IN	-	PCIE Differential Clock inputs
2	PCIE_CLK_P	I	PCIE_REFCLKP_IN:	-	
4	PCIE_TD_N	O	PCIE_TDN	-	PCIE Transmitter differential pair
5	PCIE_TD_P	O	PCIE_TDP	-	
7	PCIE_RD_N	I	PCIE_RDN	-	PCIE Receiver differential pair
8	PCIE_RD_P	I	PCIE_RDP	-	
WLAN SDIO Interface					
36	SDIO_DATA3	I/O	SDIO_DATA_3	VDDIO	SDIO data line 3
33	SDIO_DATA2	I/O	SDIO_DATA_2	VDDIO	SDIO data line 2
35	SDIO_CLK	I	SDIO_CLK	VDDIO	SDIO Clock Input
32	SDIO_DATA1	I/O	SDIO_DATA_1	VDDIO	SDIO data line 1
34	SDIO_DATA0	I/O	SDIO_DATA_0	VDDIO	SDIO data line 0
31	SDIO_CMD	I/O	SDIO_CMD	VDDIO	SDIO Command Line
PCIE/SDIO Interface selection					
18	STRAP_0	I	STRAP_0	VDDIO	SDIO selection; 0 = 3.3V(v2.0), 1 = 1.8V(v3.0) For SDIO v2.0 VIO = 3.3V needed.
17	STRAP_1	I	STRAP_1	VDDIO	Mode selection; 0 = SDIO, 1 = PCIE
LPO (Sleep Clock)					
20	LPO_IN	I	LPO_IN	-	External sleep clock input (32.768kHz) If you need to avoid "Bring-up issue", please use external LPO.

GPIOs and Miscellaneous					
13	WL_REG_ON	I	WL_REG_ON	VDDIO	Used by the PMU to power up or power down the internal CYW88273 regulators used by the chip. When de-asserted, this pin holds the chip in reset. This pin has an internal 200 kΩ pull-down resistor that is enabled by default. It can be disabled through programming
Power Supplies					
10	VBAT	I	SR_VDDBAT LDO_VDDBAT VDDIO_RF	-	Battery supply for CBUCK/LDO power stage
15	VIO	I	VDDIO	-	1.8V supply for WLAN I/O
Ground					
3	GND	-	VSS	-	Ground
6	GND	-	VSS	-	Ground
9	GND	-	VSS	-	Ground
14	GND	-	VSS	-	Ground
16	GND	-	VSS	-	Ground
19	GND	-	VSS	-	Ground
21	GND	-	VSS	-	Ground
22	GND	-	VSS	-	Ground
24	GND	-	VSS	-	Ground
25	GND	-	VSS	-	Ground
29	GND	-	VSS	-	Ground
30	GND	-	VSS	-	Ground
37	GND	-	VSS	-	Ground
38	GND	-	VSS	-	Ground
39	GND	-	VSS	-	Ground
40	GND	-	VSS	-	Ground
41	GND	-	VSS	-	Ground
42	GND	-	VSS	-	Ground
43	GND	-	VSS	-	Ground
44	GND	-	VSS	-	Ground
45	GND	-	VSS	-	Ground
46	GND	-	VSS	-	Ground
47	GND	-	VSS	-	Ground
48	GND	-	VSS	-	Ground
49	GND	-	VSS	-	Ground
50	GND	-	VSS	-	Ground

51	GND	-	VSS	-	Ground
52	GND	-	VSS	-	Ground
NC					
11	NC	-	NC		Do not connect any signal
12	NC	-	NC		Do not connect any signal
23	NC	-	NC	-	Do not connect any signal
53	NC	-	NC	-	Do not connect any signal
54	NC	-	NC	-	Do not connect any signal
55	NC	-	NC	-	Do not connect any signal
56	NC	-	NC	-	Do not connect any signal

FCC Statement

FCC Part 15.19 Statements:

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.

FCC Part 15.105 statement(Class B)

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 or more 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 Part 15.21 statement

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 must not be co-located or operating in conjunction with any other antenna or transmitter.

Modular Approval Statement

Regulatory notice to host manufacturer according to KDB 996369 D03 OEM Manual

This module has been granted modular approval as below listed FCC rule parts.

-FCC Rule parts 15C(15.247) and 15E (15.407)

Summarize the specific operational use conditions

- The OEM integrator should use equivalent antennas which is the same type and equal or less gain than an antenna listed below this instruction manual.
- This module does not comply with FCC 15.207. Therefore this module can only be installed in devices designed for vehicle use and powered by a vehicular battery, not by public utilities (AC power)

This module does not have its own power supply regulation. Therefore, Host product in which this module is installed must have the capability to provide the rated power supply as described in installation manual. And it should be followed the testing guide lines for this power supply regulation below.

- Measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

RF exposure considerations

-The module has been certified for integration into products only by OEM integrators under the following condition:

-The antenna(s) must be installed such that a minimum separation distance of at least 20 cm is maintained between the radiator (antenna) and all persons at all times.

-The transmitter module must not be co-located or operating in conjunction with any other antenna or transmitter except in accordance with FCC multi-transmitter product procedures.

-Mobile use

As long as the three conditions above are met, further transmitter testing will not be required.

OEM integrators should provide the minimum separation distance to end users in their end-product manuals.

Antennas list

This module is certified with the following integrated antenna.

-. Max. Antenna gain: 1.84 dBi (WiFi 2.4 GHz), 1.43 dBi (UNII-1), 1.66 dBi (UNII-2A,2C), -0.10 dBi (UNII-3)/ Ant. Type: Dielectric Chip Antenna

Any new antenna type, higher gain than listed antenna should be met the requirements of FCC rule 15.203 and 2.1043 as permissive change procedure.

End Product Labeling

The module is labeled with its own FCC ID and IC Certification Number. If the FCC ID and IC Certification Number are not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. In that case, the final end product must be labeled in a visible area with the following:

"Contains FCC ID: 2BFGU-WLC21SSAK00

"Contains IC: 32218-WLC21SSAK00

Information on test modes and additional testing requirements

-OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, additional transmitter in the host, etc.).

Additional testing, Part 15 Subpart B disclaimer

-The final host product also requires Part 15 subpart B compliance testing with the modular transmitter installed to be properly authorized for operation as a Part 15 digital device.

ISED Statement

Licensed-exempt Statement

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
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.

RF Exposure Statement (MPE)

The antenna(s) must be installed such that a minimum separation distance of at least 20 cm is maintained between the radiator (antenna) and all persons at all times.

l'exposition aux RF L'antenne (ou les antennes) doit être installée de façon à maintenir à tout instant une distance minimum de au moins 20 cm entre la source de radiation (l'antenne) et toute personne physique.

End Product Labeling

Étiquetage du produit final (IC)

Le module est étiqueté avec sa propre identification FCC et son propre numéro de certification IC. Si l'identification FCC et le numéro de certification IC ne sont pas visibles lorsque le module est installé à l'intérieur d'un autre dispositif, la partie externe du dispositif dans lequel le module est installé devra également présenter une étiquette faisant référence au module inclus. Dans ce cas, le produit final devra être étiqueté sur une zone visible avec les informations suivantes :

Contient module émetteur IC : 32218-WLC21SSAK00

Installation Restriction

This module does not comply with RSS-GEN Sec 8.8 AC power line requirements. Therefore this module can only be installed in devices designed for vehicle use and powered by a vehicular battery, not by public utilities (AC power).

This module does not have its own power supply regulation. Therefore, Host product in which this module is installed must have the capability to provide the rated power supply as described in installation manual. And it should be followed the testing guide lines for this power supply regulation below.

-. Measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

Restriction d'Installation

Ce module n'est pas conforme aux exigences de la ligne de courant alternatif de la section 8.8 de RSS-GEN.

Par conséquent, ce module peut uniquement être installé dans des dispositifs destinés à être utilisés dans des véhicules et alimentés par une batterie de véhicule, et non par des services publics (courant alternatif). Ce module n'a pas sa propre régulation de l'alimentation électrique. Par conséquent, le produit hôte dans

lequel ce module est installé doit avoir la capacité de fournir l'alimentation nominale comme décrit dans le manuel d'installation. Et il doit suivre les lignes directrices de test pour cette régulation de l'alimentation ci-dessous.

Les mesures de la variation de la puissance d'entrée ou du niveau de signal rayonné de la composante de fréquence fondamentale de l'émission, selon le cas, doivent être effectuées avec la tension d'alimentation variée entre 85 % et 115 % de la tension nominale d'alimentation.

Pour les équipements fonctionnant sur batterie, les tests d'équipement doivent être réalisés en utilisant une batterie neuve.