To Be Discontinued

W-LAN Module Data Sheet

Cypress WLAN Chipset + STMicro MCU

Sample P/N : LBWB1ZZYDZ-BTEMP-AYLA

MP P/N : LBWB1ZZYDZ-683

Preliminary
< Specification may be changed by Murata without notice >
Murata Manufacturing Co., Ltd.

The revision history of the product specification

Issued Date	Revision Code	Revision Page	Changed Items	Change Reason
Apr.18.2014			First Issue	
Jan. 11, 2017	A	P17	APPENDIX	Addition
Mar. 3. 2017	B	Cover, P3,P7	Changed IC Part Number	

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Please be aware that an important notice concerning availability, standard warranty and use in critical applications of Murata products and disclaimers thereto appears at the end of this specification sheet.

1. Scope

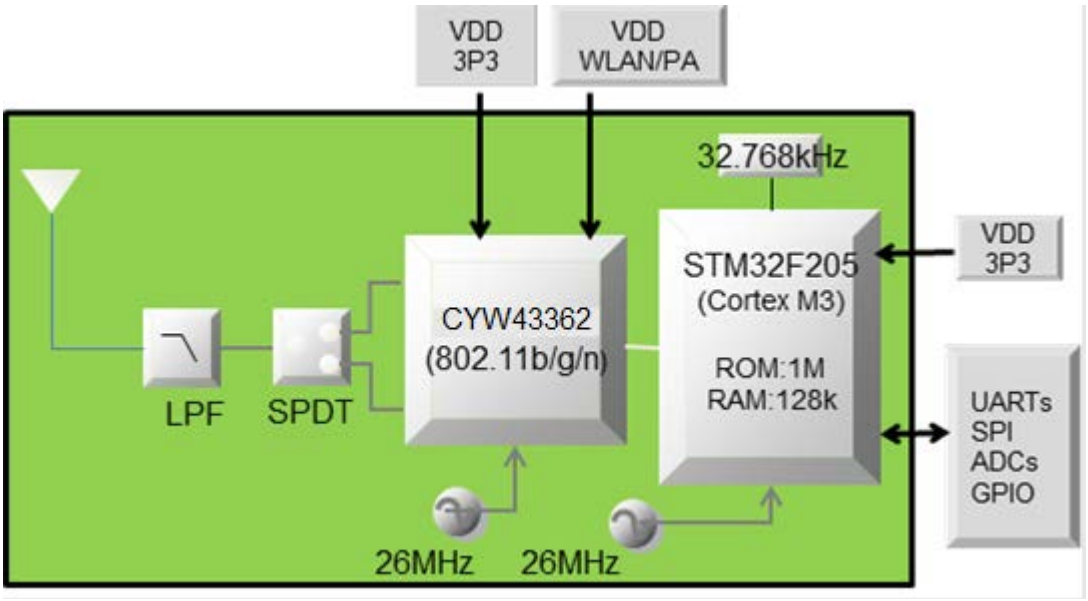
This specification is for the LBWB1ZVYDZ smart module that provides connectivity to the internet via WiFi with embedded OS that works with the Ayla cloud service.

- IC : Cypress/CYW43362(IEEE802.11b/g/n) + STMicro/STM32F205
- Reference Clock : Reference clock is embedded.
- RoHS : This module is compliant with the RoHS directive.

2. Part Number

Sample Part Number	MP Part Number
LBWB1ZZYDZ-BTEMP-AYLA	LBWB1ZZYDZ-683

3. Block Diagram



4. Certification Information

4.1. FCC/IC

FCC ID is VPYLBYD. And IC ID is 772C-LBYD.

FCC/IC ID is not marked on the module.
To make FCC/IC certification of the module valid on the customer's product, please refer to documents below:.
- Installation Manual of LBWA1ZVYDZ Certification.pdf
- LBWA1ZVYDZ Antenna Specification.pdf

4.2. TELEC

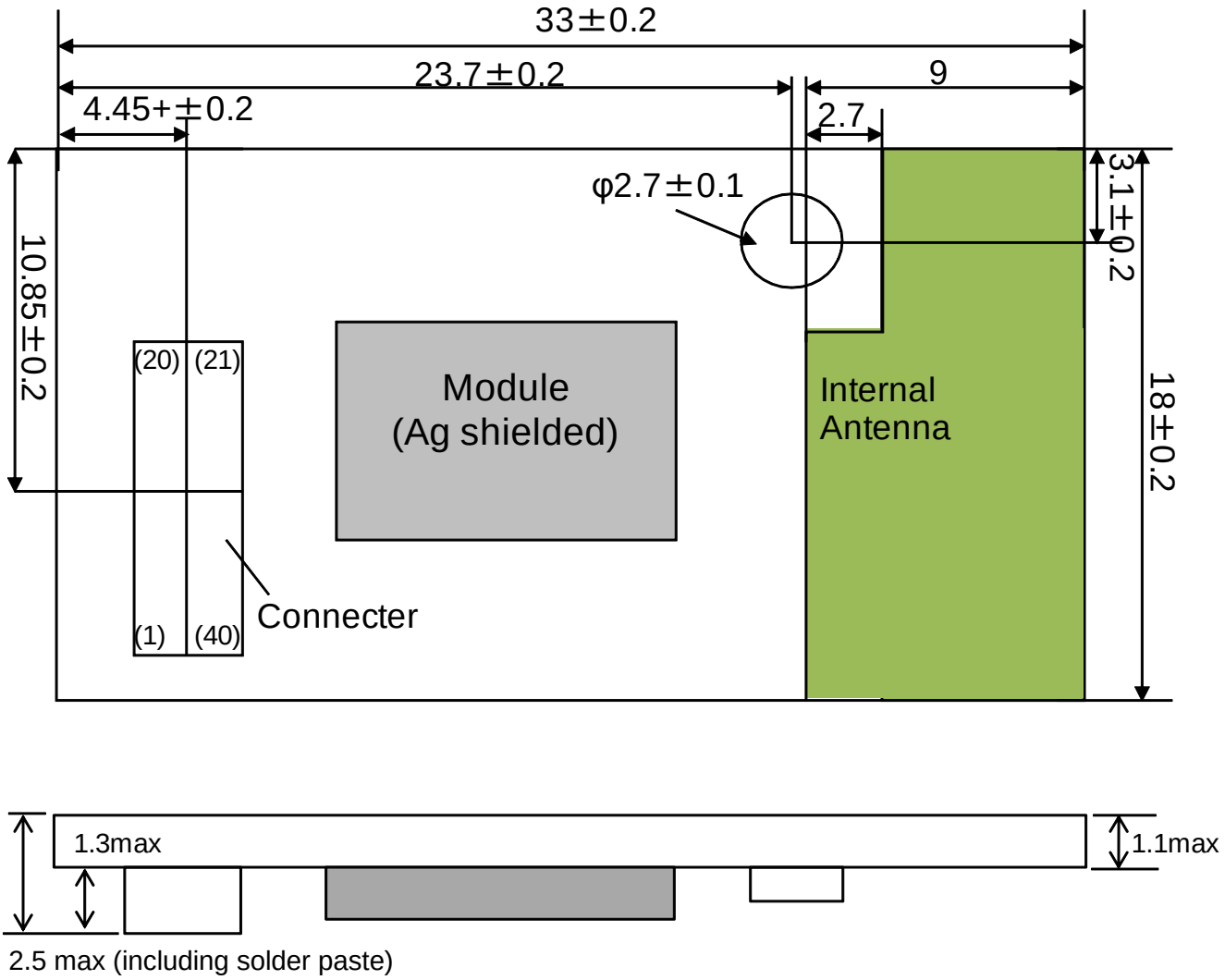
TELEC ID is 001-P00408 and marked on the module.

4.3. R&TTE

EN300328 v1.7.1 conducted test report is prepared.

5. Dimensions, Marking and Terminal Configurations

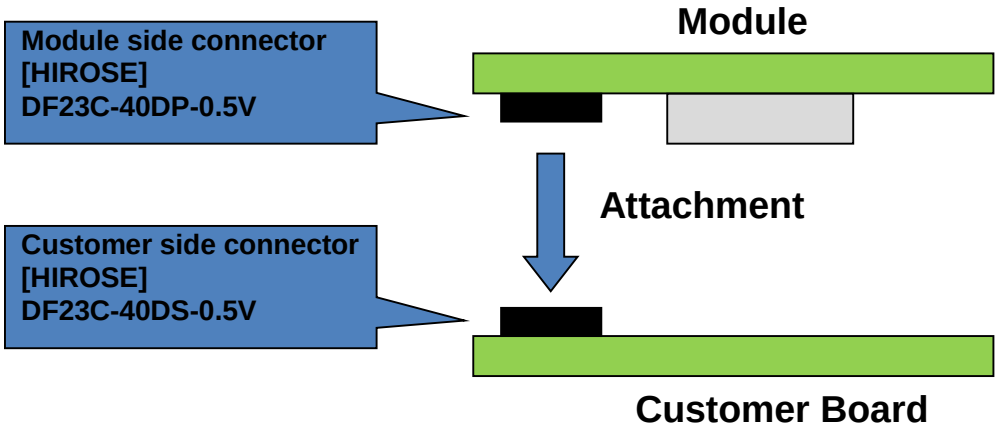
5.1. Dimension



(unit : mm)

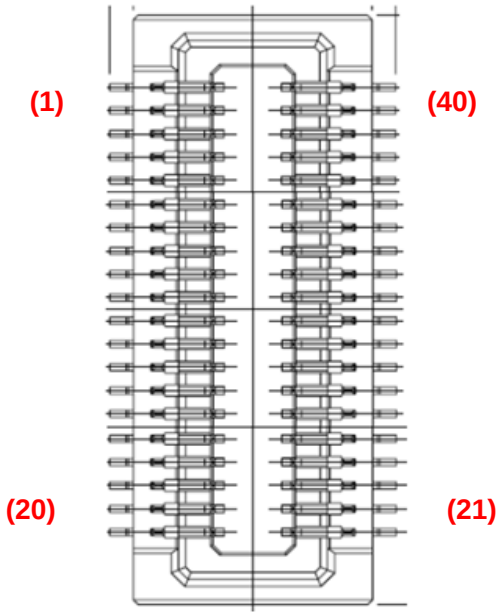
5.2. Connector

P/N: DF23C-40DP-0.5V (mounted on Murata module)
P/N: DF23C-40DS-0.5V (need to place on Customer board)
Maker: HIROSE Electric



5.3. Terminal Configurations

Terminal Configuration looked from a board implementation side of the customer



No.	Terminal Name	Type	Connection to MCU	Connection to WLAN IC	Description
1	GND	-	GND	GND	GND
2	M_NRST	I/O	NRST		MCU reset, internally pulled up
3	M_RTC_AF1(1)	I/O	PC13		RTC_AF1. NC if not in use.
4	M_GPIO8 (1) (2)	I/O	PC14		GPIO. NC if not in use.
5	M_GPIO9 (1) (2)	I/O	PC15		GPIO. NC if not in use.
6	GND	-	GND	GND	Ground
7	M_GPIO1	I/O	PB14		GPIO. NC if not in use.
8	M_GPIO2	I/O	PB15		GPIO. NC if not in use.
9	M_GPIO3	I/O	PB13		GPIO. NC if not in use.
10	GND	-	GND	GND	Ground
11	M_UART1_TX	O	PA9		UART Tx
12	M_UART1_RX	I	PA10		UART Rx
13	GND	-	GND	GND	Ground
14	GND	-	GND	GND	Ground
15	M_JTMS	I	PA13		JTAG Test Mode. NC if not in use.

16	M_NJTRST	I	PB4		JTAG Test Reset. NC if not in use.
17	M_JTDO	O	PB3		JTAG Test data Out. NC if not in use.
18	M_JTDI	I	PA15		JTAG Test data In. NC if not in use.
19	M_JTCK	I	PA14		JTAG Test Clock. NC if not in use.
20	W_VDD_WLAN	PI	-	SR_VDDBAT1/ SR_VDDBAT2	Power supply for WLAN IC
21	W_VDD_PA	PI	-	WRF_PA_VDD/ WRF_PADRV_ VDD	Power supply for Internal Power Amplifier
22	W_VDD_PA	PI	-		
23	MW_VDD_3P3	PI	VDD	VDDIO/VDDIO_ SD	Power supply for MCU VDD and Digital IO
24	M_BOOT0	I	BOOT0		10k ohm Pull down
25	M_UART1_CTS	I	PA11		UART CTS
26	M_UART1_RTS	O	PA12		UART RTS
27	GND	-	GND	GND	Ground
28	GND	-	GND	GND	Ground
29	GND	-	GND	GND	Ground
30	M_BOOT1	I	PB2/BOOT1		Do not connect
31	M_SPI1_SCK	O	PA5		SPI1 SCK for external flash memory. NC if not in use.
32	M_SPI1_MOSI	O	PA7		SPI1 MOSI for external flash memory. NC if not in use.
33	M_SPI1_MISO	I	PA6		SPI1 MISO for external flash memory. NC if not in use.
34	M_SPI1_NSS	O	PA4		SPI1 NSS for external flash memory. NC if not in use.
35	M_GPIO4	I/O	PA0-WKUP		GPIO. NC if not in use.
36	M_GPIO5	I/O	PA2		GPIO. NC if not in use.
37	M_GPIO6	I/O	PA3		GPIO. NC if not in use.
38	M_GPIO7	I/O	PA1		GPIO. NC if not in use.
39	GND	-	GND		Ground
40	GND	-	GND		Ground

(1) PC13, PC14 and PC15 are supplied through the power switch. Since the switch only sinks a limited amount of current (3 mA), the use of GPIOs PC13 to PC15 and in output mode is limited: the speed should not exceed 2 MHz with a maximum load of 30 pF and these I/Os must not be used as a current source (e.g. to drive an LED)

Main function after the first backup domain power-up. Later on, it depends on the contents of the RTC registers even after reset (because these registers are not reset by the main reset). For details on how to manage these I/Os, refer to the RTC register description sections in the STM32F205 reference manual, available from the STMicroelectronics website: www.st.com.

(2) FT = 5 V tolerant except when in analog mode or oscillator mode (for PC14 and PC15)

6. Absolute Maximum Rating

		min.	max.	unit
Storage Temperature		-40	85	deg.C
Supply Voltage	MW_VDD_3P3	-0.3	4	V
	W_VDD_PA	-0.3	6	V
	W_VDD_WLAN	-0.3	6	V

Stresses in excess of the absolute ratings may cause permanent damage. Functional operation is not implied under these conditions. Exposure to absolute ratings for extended periods of time may adversely affect reliability. No damage assuming only one parameter is set at limit at a time with all other parameters is set within operating condition.

7. Operating Condition

		min.	typ.	max.	unit
Operating Temperature Range(*1)		-40		85	deg.C
Specification Temperature Range		-20		70	deg.C
Supply Voltage	MW_VDD_3P3	2.4	3.3	3.6	V
	W_VDD_PA	2.3(*2)	3.3	4.8(*2) (*3)	V
	W_VDD_WLAN	2.3(*2)	3.3	4.8(*2) (*3)	V

[Note] All RF characteristics in this datasheet are defined by Specification Temperature Range

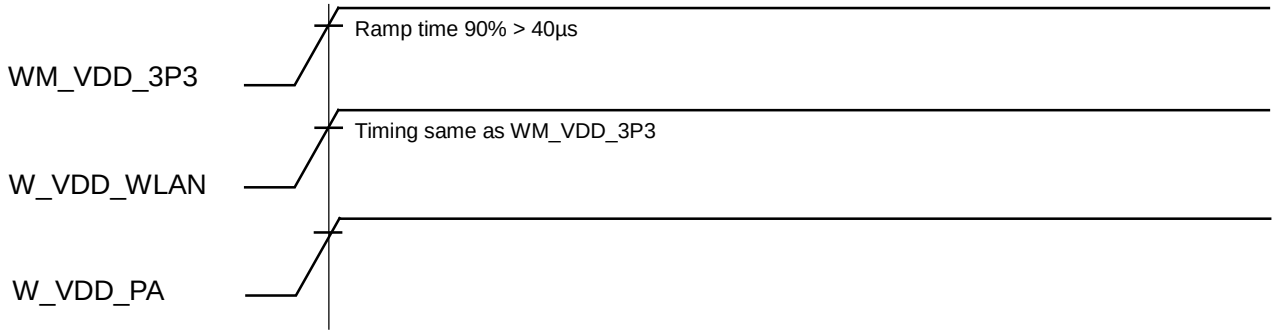
(*1) Functionality is guaranteed but specifications require derating at extreme temperatures.

(*2) The CYW43362 is functional across this range of voltage. RF performance is guaranteed only 3.0V < VDD_PA/WLAN < 4.8V

(*3) The maximum continuous voltage is 4.8V. Voltages up to 5.5V for up to 10 seconds, cumulative duration, over the lifetime of the device are allowed voltages as high 5.0V for up to 250 seconds, cumulative duration, over the lifetime of the device are allowed.

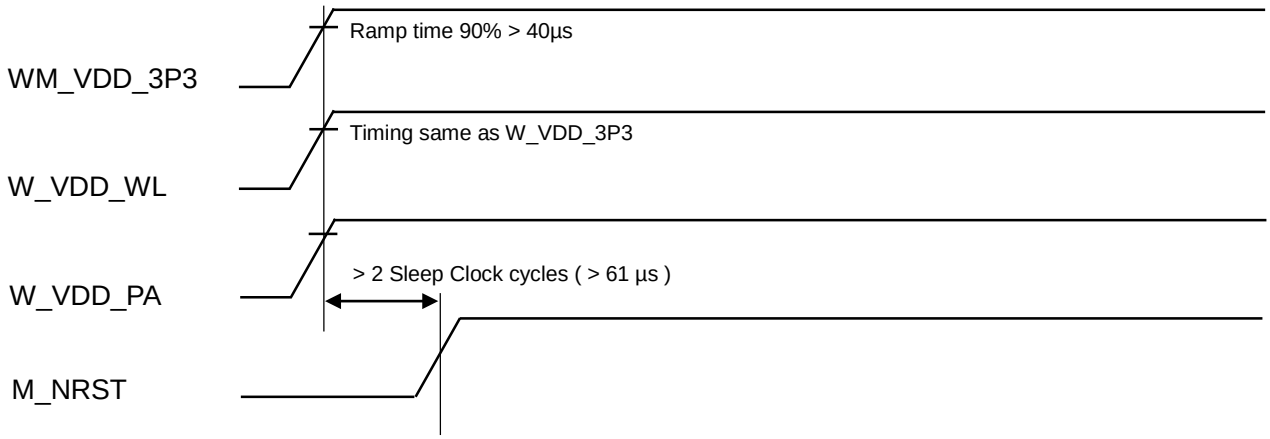
8. Power Up Sequence

8.1. Without NRST control



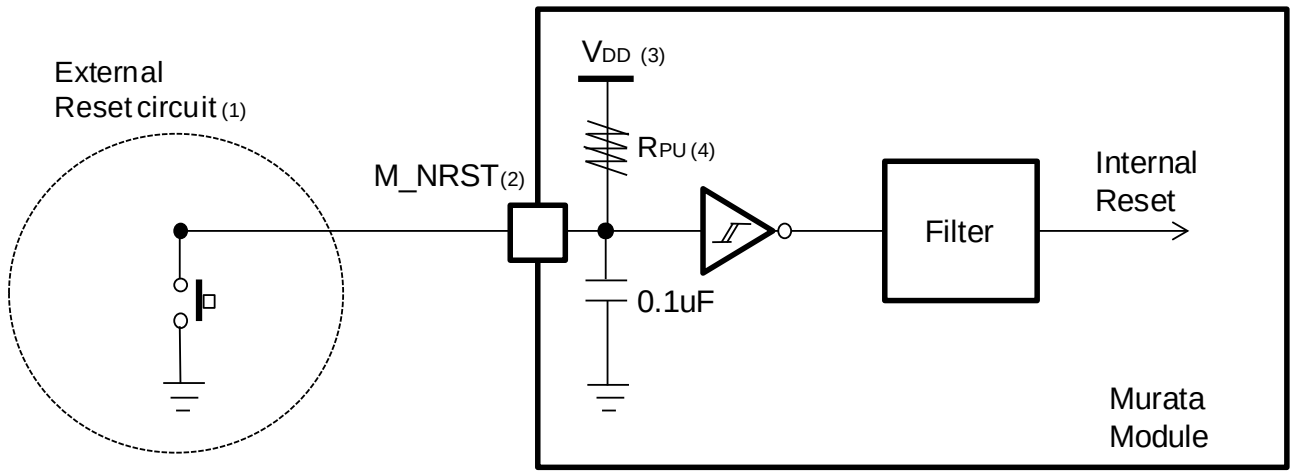
*Power down sequence is opposite sequence of power up.

8.2. With NRST control



*Power down sequence is opposite sequence of power up.

8.2.1. NRST circuit



(1) The reset network protects the device against parasitic resets.
(2) The use must ensure that the level on the NRST pin can go below the $V_{IL(NRST)}$ max level specified in below table. Otherwise the reset is not taken into account by the device.
(3) Vdd=3.3V(for the 1.8≦Vdd≦3.6 voltage range)
(4) RPU=40k ohm (for the 30≦RPU≦50kohm range)

9. RF Characteristics

9.1. RF Characteristics for IEEE802.11b (11Mbps mode unless otherwise specified.)

Conditions: 25deg.C, MW_VDD_3P3=W_VDD_WLAN=3.3V

Items	Contents			
Specification	IEEE802.11b			
Mode	DSSS / CCK			
Frequency	2400 - 2483.5MHz			
Data rate	1, 2, 5.5, 11Mbps			
Target Max Output Power	17.0dBm			
- DC Characteristics -	min.	Typ.	max.	Unit
1. DC current				
1) Tx mode (1024byte, 20usec interval)	-	365	440	mA
2) Rx mode	–	110	160	mA
- Tx Characteristics -	min.	Typ.	max.	Unit
2. Power Levels	15.0	17.0	19.0	dBm
3. Spectrum Mask				
1) 1st side lobes	-	-40	-30	dBr
2) 2nd side lobes	-	-55	-50	dBr
4. Power-on and Power-down ramp	-		2.0	usec
5. RF Carrier Suppression	15	23	-	dB
6. Modulation Accuracy (EVM)	-	23	35	%
7. Outband Spurious Emissions				
1) 30MHz to 1GHz (BW=100kHz)	-	-	-36	dBm
2) 1GHz to 12.75GHz (BW=100kHz)	-	-	-30	dBm
3) 1.8GHz to 1.9GHz (BW=100kHz)	-	-	-47	dBm
4) 5.15GHz to 5.3GHz (BW=100kHz)	-	-	-47	dBm
- Rx Characteristics -	min.	typ.	max.	Unit
8. Minimum Input Level Sensitivity				
1) 11Mbps (FER ≤ 8%)	-	-87	-76	dBm
9. Maximum Input Level (FER ≤ 8%)	-10	-	-	dBm
10. Adjacent Channel Rejection (FER ≤ 8%)	35	-	-	dB

9.2. RF Characteristics for IEEE802.11g (54Mbps mode unless otherwise specified.)

Conditions: 25deg.C, MW_VDD_3P3=W_VDD_WLAN=3.3V

Items	Contents			
Specification	IEEE802.11g			
Mode	OFDM			
Frequency	2400 - 2483.5MHz			
Data rate	6, 9, 12, 18, 24, 36, 48, 54Mbps			
Target Max Output Power	13.0dBm			
- DC Characteristics -	min.	Typ.	max.	Unit
1. DC current				
1) Tx mode (1024byte, 20usec interval)	-	280	360	mA
2) Rx mode	–	110	160	mA
- Tx Characteristics -	min.	typ.	max.	unit
2. Power Levels	11.0	13.0	15.0	dBm
3. Spectrum Mask				
1) 9MHz to 11MHz (0dB ~ -20dB)		-40	-20	dBr
2) 11MHz to 20MHz (-20dB ~ -28dB)		-43	-28	dBr
3) 20MHz to 30MHz (-28dB ~ -40dB)		-50	-40	dBr
4) 30MHz to 33MHz (-40dB)		-49	-40	dBr
4. Constellation Error (EVM)	-	-28.5	-25	dB
5. Outband Spurious Emissions				
1) 30MHz to 1GHz (BW=100kHz)	-	-	-36	dBm
2) 1GHz to 12.75GHz (BW=100kHz)	-	-	-30	dBm
3) 1.8GHz to 1.9GHz (BW=100kHz)	-	-	-47	dBm
4) 5.15GHz to 5.3GHz (BW=100kHz)	-	-	-47	dBm
- Rx Characteristics -	min.	typ.	max.	Unit
6. Minimum Input Level Sensitivity				
1) 54Mbps (PER ≤ 10%)	-	-73	-65	dBm
7. Maximum Input Level (PER ≤ 10%)	-20	-	-	dBm
8. Adjacent Channel Rejection (PER ≤ 10%)	-1	-	-	dB

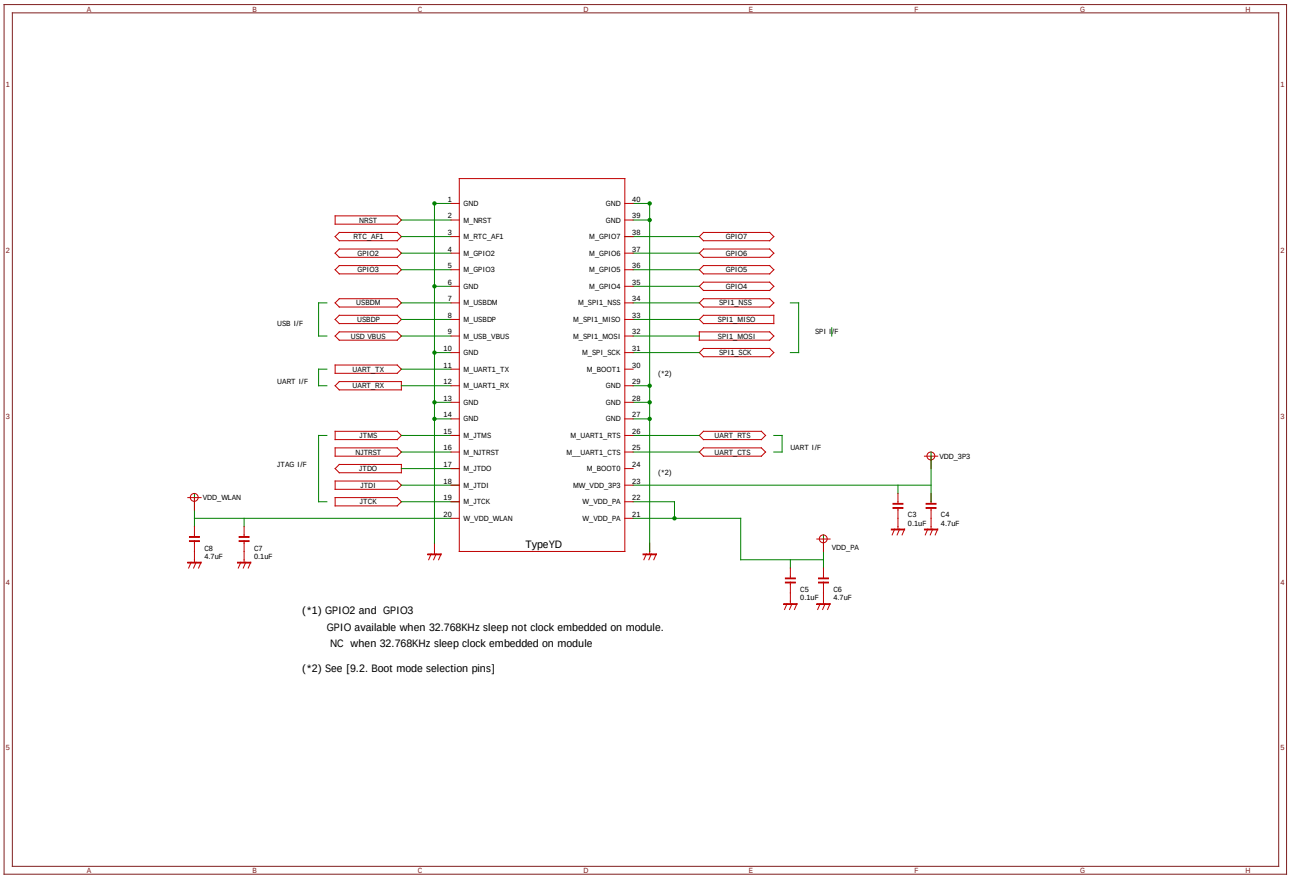
9.3. RF Characteristics for IEEE802.11n (65Mbps(MCS7) mode unless otherwise specified.)

Conditions: 25deg.C, MW_VDD_3P3=W_VDD_WLAN=3.3V

Items	Contents			
Specification	IEEE802.11n			
Mode	OFDM			
Frequency	2400 - 2483.5MHz			
Data rate	6.5, 13, 19.5, 26, 39, 52, 58.5, 65Mbps			
Target Max Output Power	12.0dBm			
- DC Characteristics -	min.	Typ.	max.	Unit
1. DC current				
1) Tx mode (1024byte, 20usec interval)	-	265	340	mA
2) Rx mode	–	110	160	mA
- Tx Characteristics -	min.	typ.	max.	Unit
2. Power Levels	10.0	12.0	14.0	dBm
3. Spectrum Mask				
1) 9MHz to 11MHz (0dB ~ -20dB)		-40	-20	dBr
2) 11MHz to 20MHz (-20dB ~ -28dB)		-43	-28	dBr
3) 20MHz to 30MHz (-28dB ~ -45dB)		-50	-45	dBr
4) 30MHz to 33MHz (-45dB)		-49	-45	dBr
4. Constellation Error (EVM)	-	-31	-27	dB
5. Outband Spurious Emissions				
1) 30MHz to 1GHz	-	-	-36	dBm
2) 1GHz to 12.75GHz	-	-	-30	dBm
3) 1.8GHz to 1.9GHz	-	-	-47	dBm
4) 5.15GHz to 5.3GHz	-	-	-47	dBm
- Rx Characteristics -	min.	typ.	max.	Unit
6. Minimum Input Level Sensitivity				
1) 65Mbps (PER ≤ 10%)	-	-70	-64	dBm
7. Maximum Input Level (PER ≤ 10%)	-20	-	-	dBm
8. Adjacent Channel Rejection (PER ≤ 10%)	-2	-	-	dB

10. Reference Circuit

10.1. Schematic

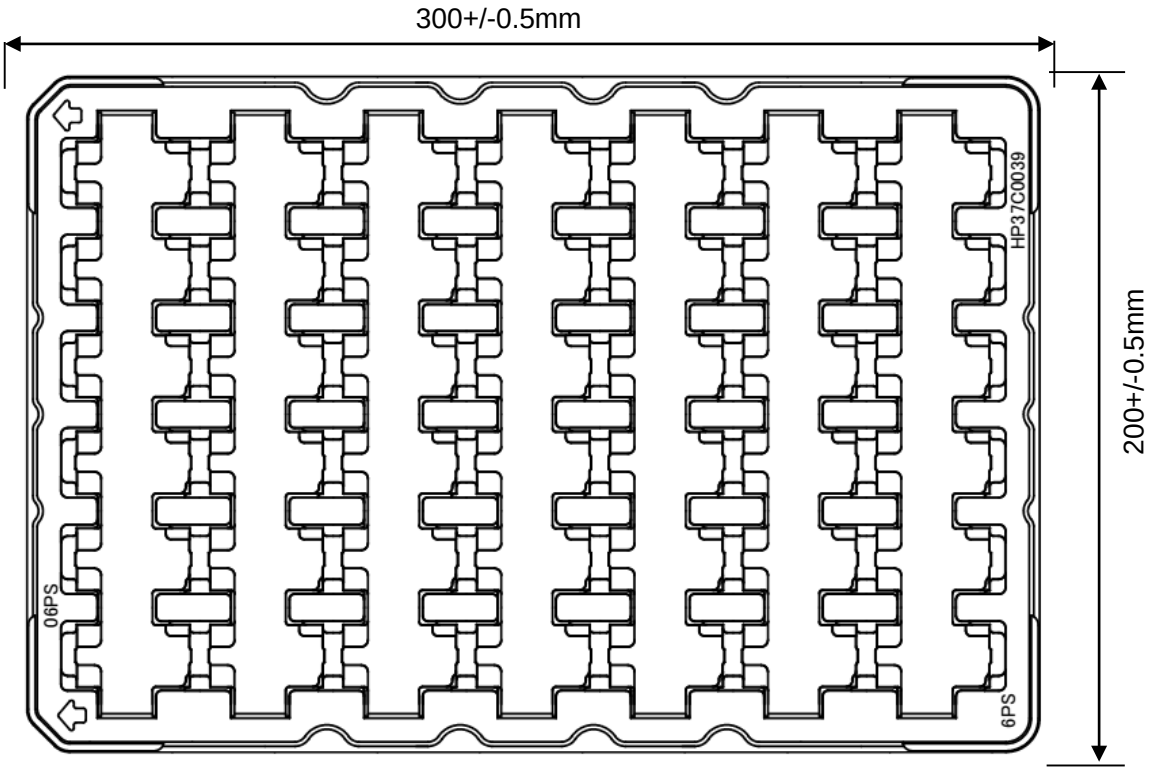


(*1) GPIO2 and GPIO3
GPIO available when 32.768KHz sleep not clock embedded on module.
NC when 32.768KHz sleep clock embedded on module

(*2) See [9.2. Boot mode selection pins]

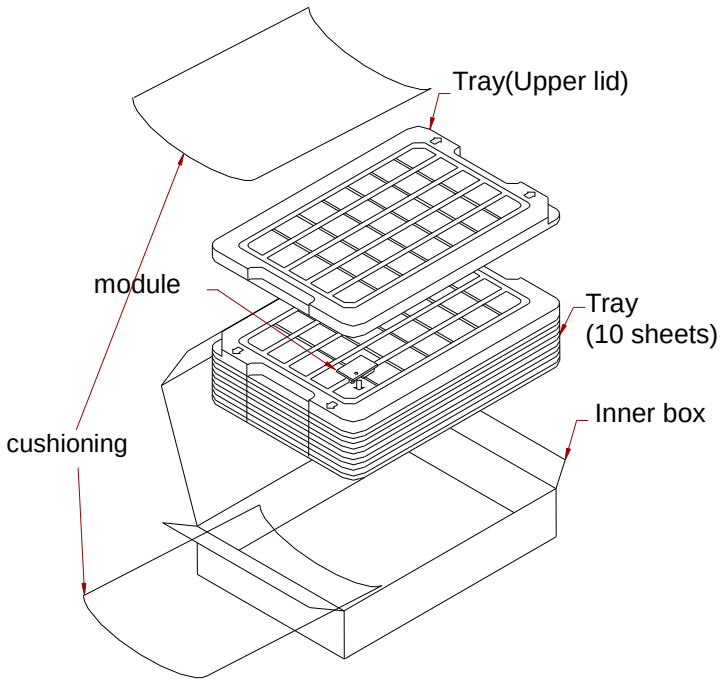
11. Packing

11.1. Tray

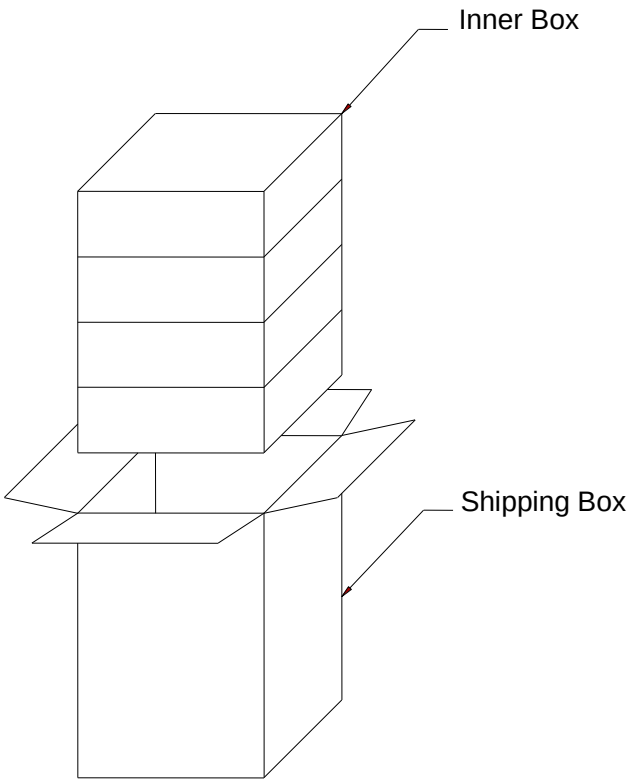


The module is placed in a pocket of the above tray with following rules.
- The module's metal shield contacts a tray' indentation
- Its chip antenna on the module is directing to an arrow on a tray.

11.2. Packing in a inner box



11.3. Shipping box



- Please keep any packaging below 40 deg.C until using it up, because a tray is potentially deformed with storage over the temperature.
- Please don't stack the shipping box over 1.5m height to avoid any physical problem.
- Four inner boxes is general number in a shipping box, but it may be dummy for some of inner boxes.
- One inner box has 420pcs as standard q'ty.
- MOQ is 1680pcs, which are constructed two inner boxes.

12. NOTICE

12.1. Storage Conditions:

- The product shall be stored in non corrosive gas (Cl_2, NH_3, SO_2, No_x, etc.).
- Any excess mechanical shock including, but not limited to, sticking the packing materials by sharp object and dropping the product, shall not be applied in order not to damage the packing materials.
- The product shall be stored without opening the packing under the ambient temperature from 5 to 35 °C and humidity from 20 ~ 70 %RH.
  (Packing materials, in particular, may be deformed at the temperature over 40 °C)

12.2. Handling Conditions:

- Be careful in handling or transporting products because excessive stress or mechanical shock may break products.
- Handle with care if products may have cracks or damages on their terminals, the characteristics of products may change. Do not touch products with bear hands that may result in poor solderability.

12.3. Operational Environment Conditions:

- Products are designed to work for electronic products under normal environmental conditions (ambient temperature, humidity and pressure). Therefore, products have no problems to be used under the similar conditions to the above-mentioned. However, if products are used under the following circumstances, it may damage products and leakage of electricity and abnormal temperature may occur.
  - In an atmosphere containing corrosive gas (Cl2, NH3, SOx, NOx etc.).
  - In an atmosphere containing combustible and volatile gases.
  - Dusty place.
  - Direct sunlight place.
  - Water splashing place.
  - Humid place where water condenses.
  - Freezing place.

- If there are possibilities for products to be used under the preceding clause, consult with Murata before actual use.

- As it might be a cause of degradation or destruction to apply static electricity to products, do not apply static electricity or excessive voltage while assembling and measuring.

12.4. Input Power Capacity:

- Products shall be used in the input power capacity as specified in this specifications.
- Inform Murata beforehand, in case that the components are used beyond such input power capacity range.

13. PRECONDITION TO USE OUR PRODUCTS

Please make sure that your product has been evaluated and confirmed from the aspect of the fitness for the specifications of our product when our product is mounted to your product.

All the items and parameters in this product specification/datasheet/catalog have been prescribed on the premise that our product is used for the purpose, under the condition and in the environment specified in this specification. You are requested not to use our product deviating from the condition and the environment specified in this specification.

Please note that the only warranty that we provide regarding the products is its conformance to the specifications provided herein. Accordingly, we shall not be responsible for any defects in products or equipment incorporating such products, which are caused under the conditions other than those specified in this specification.

WE HEREBY DISCLAIMS ALL OTHER WARRANTIES REGARDING THE PRODUCTS, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, THAT THEY ARE DEFECT-FREE, OR AGAINST INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS.

The product shall not be used in any application listed below which requires especially high reliability for the prevention of such defect as may directly cause damage to the third party's life, body or property. You acknowledge and agree that, if you use our products in such applications, we will not be responsible for any failure to meet such requirements.

Furthermore, YOU AGREE TO INDEMNIFY AND DEFEND US AND OUR AFFILIATES AGAINST ALL CLAIMS, DAMAGES, COSTS, AND EXPENSES THAT MAY BE INCURRED, INCLUDING WITHOUT LIMITATION, ATTORNEY FEES AND COSTS, DUE TO THE USE OF OUR PRODUCTS IN SUCH APPLICATIONS.

- Aircraft equipment.
- Aerospace equipment
- Undersea equipment.
- Power plant control equipment
- Medical equipment.
- Transportation equipment (vehicles, trains, ships, elevator, etc.).
- Traffic signal equipment.
- Disaster prevention / crime prevention equipment.
- Burning / explosion control equipment
- Application of similar complexity and/ or reliability requirements to the applications listed in the above.

We expressly prohibit you from analyzing, breaking, Reverse-Engineering, remodeling altering, and reproducing our product. Our product cannot be used for the product which is prohibited from being manufactured, used, and sold by the regulations and laws in the world.

We do not warrant or represent that any license, either express or implied, is granted under any our patent right, copyright, mask work right, or our other intellectual property right relating to any combination, machine, or process in which our products or services are used. Information provided by us regarding third-party products or services does not constitute a license from us to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from us under our patents or other intellectual property.

Please do not use our products, our technical information and other data provided by us for the purpose of developing of mass-destruction weapons and the purpose of military use.

Moreover, you must comply with "foreign exchange and foreign trade law", the "U.S. export administration regulations", etc.

Please note that we may discontinue the manufacture of our products, due to reasons such as end of supply of materials and/or components from our suppliers.

Customer acknowledges that Murata will, if requested by you, conduct a failure analysis for defect or alleged defect of Products only at the level required for consumer grade Products, and thus such analysis may not always be available or be in accordance with your request (for example, in cases where the defect was caused by components in Products supplied to Murata from a third party).

By signing on specification sheet or approval sheet, you acknowledge that you are the legal representative for your company and that you understand and accept the validity of the contents herein.

When you are not able to return the signed version of specification sheet or approval sheet within 90 days from receiving date of specification sheet or approval sheet, it shall be deemed to be your consent on the content of specification sheet or approval sheet.

Customer acknowledges that engineering samples may deviate from specifications and may contain defects due to their development status.

We reject any liability or product warranty for engineering samples.

In particular we disclaim liability for damages caused by

- the use of the engineering sample other than for evaluation purposes, particularly the installation or integration in the product to be sold by you,
- deviation or lapse in function of engineering sample,
- improper use of engineering samples.

We disclaims any liability for consequential and incidental damages.

If you can’t agree the above contents, you should inquire our sales.

APPENDIX

YD Installation Manual (FCC)

FCC ID of this product is as follows.

FCC ID:VPYLBYD

For OEM integration only – device cannot be sold to general public.
Therefore we will ask OEM to include the following statements required by FCC on the product and in the Installation manual Notice.

Contents
1. Antenna
2. Notice

1. Antenna

■Please perform the antenna design that followed the specifications of the antenna.

■About the signal line between an antenna and a module
It is a 50-ohm line design.
Fine tuning of return loss etc. can be performed using a matching network.
However, it is required to check "Class1 change" and "Class2 change" which the authorities define then.

The concrete contents of a check are the following three points.
1) It is the same type as the antenna type of antenna specifications.
2) An antenna gain is lower than a gain given in antenna specifications.
3) The emission level is not getting worse.

2. Notice

Please describe the following warning on the final product which contains this module.

Contains Transmitter Module FCC ID:VPYLBYD
or
Contains FCC ID:VPYLBYD

This device complies with Part 15 of FCC Rules and 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 this device.
Le présent appareil est conforme aux la partie 15 des règles de la FCC et 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.

Please describe the following warning to the manual.

FCC CAUTION Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

When installing it in a mobile equipment

This equipment complies with FCC/IC radiation exposure limits set forth for an uncontrolled environment and meets the FCC radio frequency (RF) Exposure Guidelines and RSS-102 of the IC radio frequency (RF) Exposure rules. This equipment should be installed and operated keeping the radiator at least 20cm or more away from person's body.
Cet équipement est conforme aux limites d'exposition aux rayonnements énoncées pour un environnement non contrôlé et respecte les règles les radioélectriques (RF) de la FCC lignes directrices d'exposition et d'exposition aux fréquences radioélectriques (RF) CNR-102 de l'IC. Cet équipement doit être installé et utilisé en gardant une distance de 20 cm ou plus entre le dispositif rayonnant et le corps.

When installing it in a portable equipment

The available scientific evidence does not show that any health problems are associated with using low power wireless devices. There is no proof, however, that these low power wireless devices are absolutely safe. Low power Wireless devices emit low levels of radio frequency energy (RF) in the microwave range while being used. Whereas high levels of RF can produce health effects (by heating tissue), exposure of low-level RF that does not produce heating effects causes no known adverse health effects. Many studies of low-level RF exposures have not found any biological effects. Some studies have suggested that some biological effects might occur, but such findings have not been confirmed by additional research. TypeYD has been tested and found to comply with FCC/IC radiation exposure limits set forth for an uncontrolled environment and meets the FCC radio frequency (RF) Exposure Guidelines and RSS-102 of the IC radio frequency (RF) Exposure rules.
Les connaissances scientifiques dont nous disposons n'ont mis en évidence aucun problème de santé associé à l'usage des appareils sans fil à faible puissance. Nous ne sommes cependant pas en mesure de prouver que ces appareils sans fil à faible puissance sont entièrement sans danger. Les appareils sans fil à faible puissance émettent une énergie radioélectrique (RF) très faible dans le spectre des micro-ondes lorsqu'ils sont utilisés. Alors qu'une dose élevée de RF peut avoir des effets sur la santé (en chauffant les tissus), l'exposition à de faibles RF qui ne produisent pas de chaleur n'a pas de mauvais effets connus sur la santé. De nombreuses études ont été menées sur les expositions aux RF faibles et n'ont découvert aucun effet biologique. Certaines études ont suggéré qu'il pouvait y avoir certains effets biologiques, mais ces résultats n'ont pas été confirmés par des recherches supplémentaires. TypeYD a été testé et jugé conforme aux limites d'exposition aux rayonnements énoncées pour un environnement non contrôlé et respecte les règles les radioélectriques (RF) de la FCC lignes directrices d'exposition et d'exposition aux fréquences radioélectriques (RF) CNR-102 de l'IC.

When this is put on Portable apparatus, SAR is necessary.
Class2 Permissive change/reassessment is necessary, too.

Note)
Portable equipment : Equipment for which the spaces between human body and antenna are used within 20cm.
Mobile equipment : Equipment used at position in which the spaces between human body and antenna exceeded 20cm.

YD Installation Manual (IC)

IC No. of this product is as follows.

IC : 772C-LBYD

For OEM integration only – device cannot be sold to general public.
Therefore we will ask OEM to include the following statements required by IC on the product and in the Installation manual Notice.

Contents
1. Antenna
2. Notice

1. Antenna

■Please perform the antenna design that followed the specifications of the antenna.

■About the signal line between an antenna and a module
It is a 50-ohm line design.
Fine tuning of return loss etc. can be performed using a matching network.
However, it is required to check "Class1 change" and "Class2 change" which the authorities define then.

The concrete contents of a check are the following three points.
1) It is the same type as the antenna type of antenna specifications.
2) An antenna gain is lower than a gain given in antenna specifications.
3) The emission level is not getting worse.

2. Notice

Please describe the following warning on the final product which contains this module.

Contains Transmitter Module IC: 772C-LBYD
or
Contains IC: 772C-LBYD

This device complies with Part 15 of FCC Rules and 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 this device.
Le présent appareil est conforme aux la partie 15 des règles de la FCC et 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.

Please describe the following warning to the manual.

When installing it in a mobile equipment

This equipment complies with FCC/IC radiation exposure limits set forth for an uncontrolled environment and meets the FCC radio frequency (RF) Exposure Guidelines and RSS-102 of the IC radio frequency (RF) Exposure rules. This equipment should be installed and operated keeping the radiator at least 20cm or more away from person's body.
Cet équipement est conforme aux limites d'exposition aux rayonnements énoncées pour un environnement non contrôlé et respecte les règles les radioélectriques (RF) de la FCC lignes directrices d'exposition et d'exposition aux fréquences radioélectriques (RF) CNR-102 de l'IC. Cet équipement doit être installé et utilisé en gardant une distance de 20 cm ou plus entre le dispositif rayonnant et le corps.

When installing it in a portable equipment

The available scientific evidence does not show that any health problems are associated with using low power wireless devices. There is no proof, however, that these low power wireless devices are absolutely safe. Low power Wireless devices emit low levels of radio frequency energy (RF) in the microwave range while being used. Whereas high levels of RF can produce health effects (by heating tissue), exposure of low-level RF that does not produce heating effects causes no known adverse health effects. Many studies of low-level RF exposures have not found any biological effects. Some studies have suggested that some biological effects might occur, but such findings have not been confirmed by additional research. TypeYD has been tested and found to comply with FCC/IC radiation exposure limits set forth for an uncontrolled environment and meets the FCC radio frequency (RF) Exposure Guidelines and RSS-102 of the IC radio frequency (RF) Exposure rules.
Les connaissances scientifiques dont nous disposons n'ont mis en évidence aucun problème de santé associé à l'usage des appareils sans fil à faible puissance. Nous ne sommes cependant pas en mesure de prouver que ces appareils sans fil à faible puissance sont entièrement sans danger. Les appareils sans fil à faible puissance émettent une énergie radioélectrique (RF) très faible dans le spectre des micro-ondes lorsqu'ils sont utilisés. Alors qu'une dose élevée de RF peut avoir des effets sur la santé (en chauffant les tissus), l'exposition à de faibles RF qui ne produisent pas de chaleur n'a pas de mauvais effets connus sur la santé. De nombreuses études ont été menées sur les expositions aux RF faibles et n'ont découvert aucun effet biologique. Certaines études ont suggéré qu'il pouvait y avoir certains effets biologiques, mais ces résultats n'ont pas été confirmés par des recherches supplémentaires. TypeYD a été testé et jugé conforme aux limites d'exposition aux rayonnements énoncées pour un environnement non contrôlé et respecte les règles les radioélectriques (RF) de la FCC lignes directrices d'exposition et d'exposition aux fréquences radioélectriques (RF) CNR-102 de l'IC.

When this is put on Portable apparatus, SAR is necessary.
Class2 Permissive change/reassessment is necessary, too.

Note)
Portable equipment : Equipment for which the spaces between human body and antenna are used within 20cm.
Mobile equipment : Equipment used at position in which the spaces between human body and antenna exceeded 20cm.