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HIGH FREQUENCY PRODUCTS DIVISION Module Business PANASONIC ELECTRONIC DEVICES EUROPE GmbH		APPROVED genehmigt	CHECKED geprüft	DESIGNED erstellt	

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## 1. SCOPE OF THIS DOCUMENT

This application note applies to Panasonic's HCI, Class 1, Bluetooth®<sup>1</sup> module, series number: PAN1325. The Bluetooth chip used is the CC2560 from Texas Instruments ([http://focus.ti.com/pdfs/wtbu/cc2560\\_slyt377.pdf](http://focus.ti.com/pdfs/wtbu/cc2560_slyt377.pdf)).

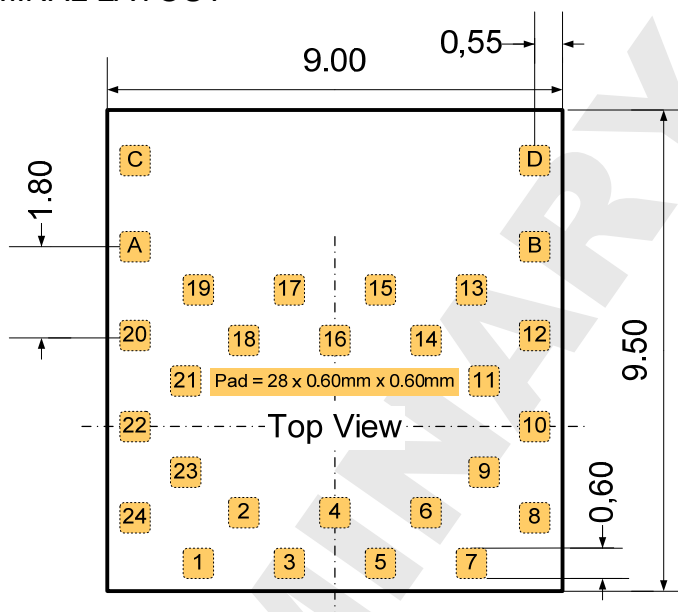
For more details please refer to PAN1315 specification [1].

<sup>1</sup> Bluetooth is a registered trademark of the Bluetooth Special Interest Group.

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## 2. DETAILED DESCRIPTION

### 2.1. PAN1325 TERMINAL LAYOUT



No	Pin Name	Pull at Reset	Def. Dir. <sup>1</sup>	I/O Type <sup>2</sup>	Description of Options (Common)
1	GND				Connect to Ground
2	TX_DBG	PU	O	2 mA	Logger output
3	HCI_CTS	PU	I	8 mA	HCI UART clear-to-send.
4	HCI_RTS	PU	O	8 mA	HCI UART request-to-send.
5	HCI_RX	PU	I	8 mA	HCI UART data receive
6	HCI_TX	PU	O	8 mA	HCI UART data transmit
7	AUD_FSYNC	PD	IO	4 mA	PCM frame synch. (NC if not used) Fail safe <sup>3</sup>
8	SLOW_CLK_IN	I			32.768-kHz clock in Fail safe
9	NC		IO		Not connected
10	MLDO_OUT	O			Main LDO output (1.8 V nom.)
11	CL1.5_LDO_IN	I			PA LDO input
12	GND				Connect to Ground
13	RF		IO		Bluetooth RF IO
14	GND				Connect to Ground
15	MLDO_IN		I		Main LDO input
16	nSHUTD	PD	I		Shutdown input (active low).
17	AUD_OUT	PD	O	4 mA	PCM data output. (NC if not used) Fail safe
18	AUD_IN	PD	I	4 mA	PCM data input. (NC if not used) Fail safe
19	AUD_CLK	PD	IO	HY, 4 mA	PCM clock. (NC if not used) Fail safe
20	GND				Connect to Ground
21	NC				EEPROM I <sup>2</sup> C SDA (Internal)
22	VDD_IO		PI		I/O power supply 1.8 V Nom
23	NC				EEPROM I <sup>2</sup> C SCL (Internal)
24	NC		IO		Not connected

<sup>1</sup> I = input; O = output; IO = bidirectional; P = power; PU = pulled up; PD = pulled down

<sup>2</sup> I/O Type: Digital I/O cells. HY = input hysteresis, current = typ. output current

<sup>3</sup> No signals are allowed on the IO pins if no VDD\_IO (Pin 22) power supplied, except pin 7, 8, 17-20.

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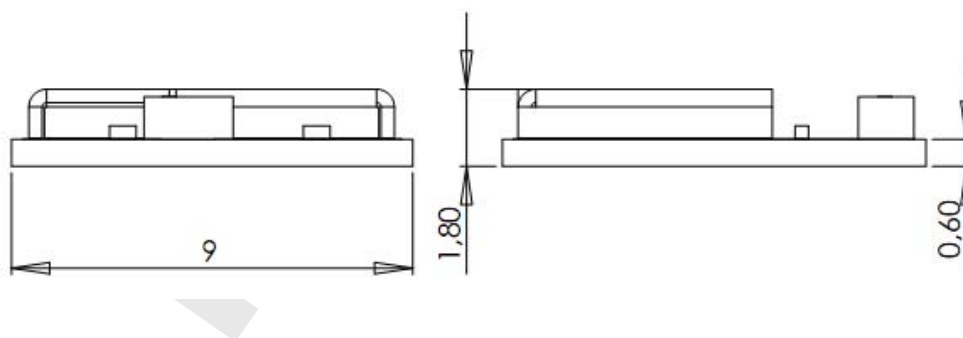
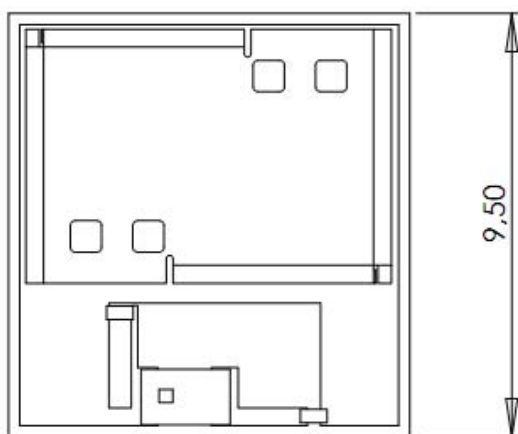
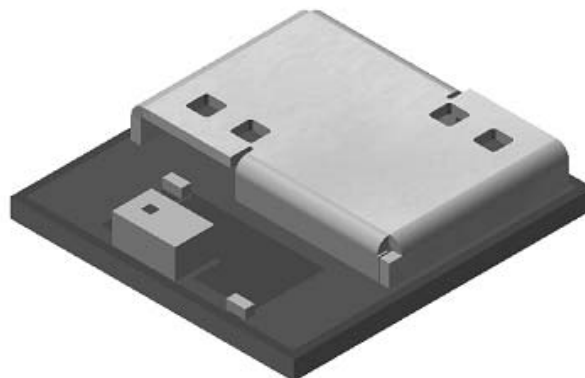
No	Pin Name	Pull at Reset	Def. Dir. <sup>1</sup>	I/O Type <sup>2</sup>	Description of Options (Common)
A	GND				Connect to Ground
B	GND				Connect to Ground
C	GND				Connect to Ground
D	GND				Connect to Ground

### 3. MODULE DIMENSION

No.	Item	Dimension	Tolerance	Remark
1	Width	9.50	± 0.20	
2	Lenght	9.00	± 0.20	
3	Height	1.80	± 0.20	With case

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### 3.1. MODULE DRAWING



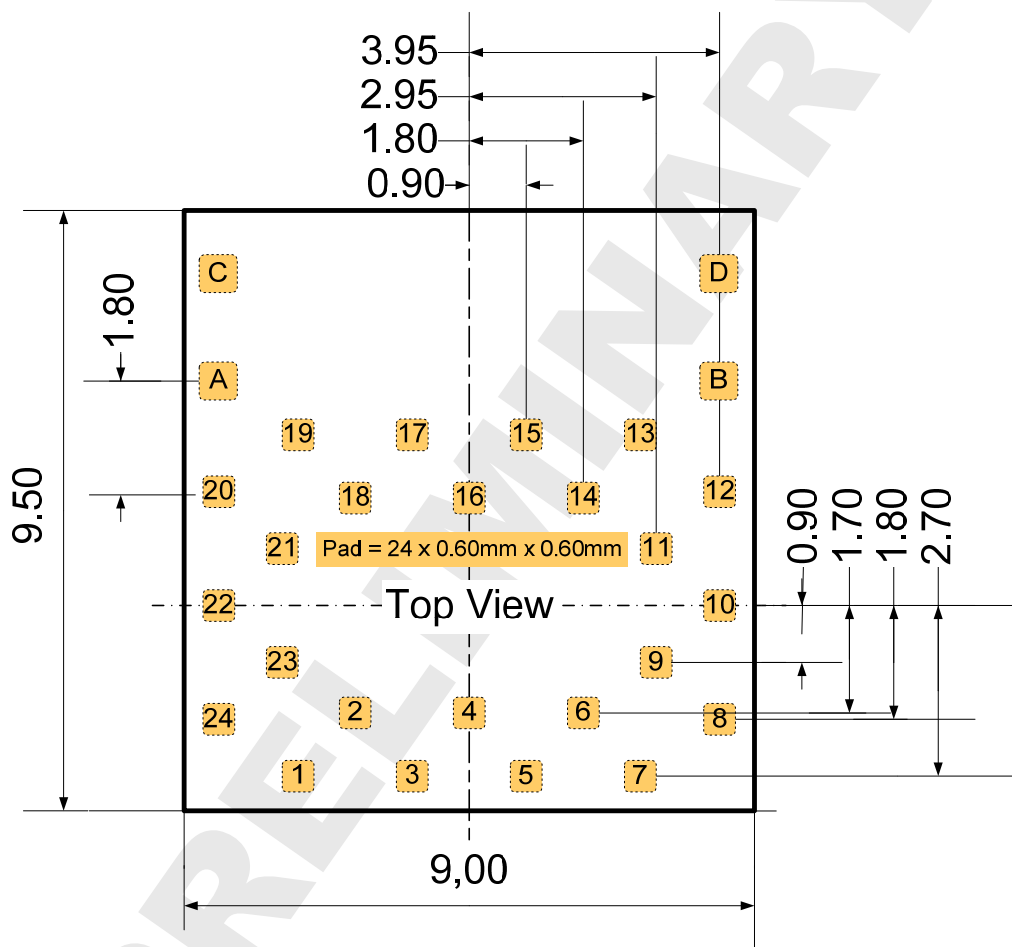
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#### 4. FOOTPRINT OF THE MODULE

All dimensions are in millimeters.

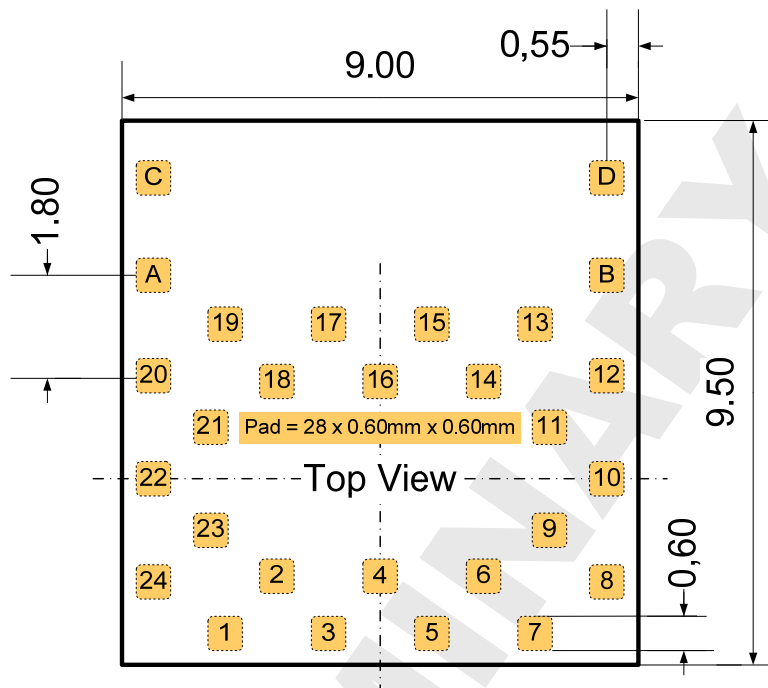
The outer dimensions have a tolerance of  $\pm 0.2\text{mm}$ .

The layout is symmetric to center. The inner pins (2,4,6,9,11,14,16,18,21,23) are shifted to the center by 1mm.



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#### 4.1. RECOMMENDED FOOT PATTERN



The land pattern dimensions above are meant to serve only as a guide. This information is provided without any legal liability.

For the solder paste screen, use the same screen for the module. Solder paste screen cutouts (with slightly different dimensions) might be optimum depending on your soldering process. For example, the solder paste screen thickness chosen might have an effect. The solder screen thickness depends on your production standard -- 120µm to 150µm is recommended.

#### IMPORTANT:

In cases where a track or through hole via has to be located under the module, please make a note that it has to be kept away from PAN1325 bottom pads. The PAN1325 multilayer pcb contains an inner RF shielding plane, therefore no pcb shielding plane below the module is needed.

When using an onboard antenna, please place the antenna on the edge of your carrier board (if allowable).

Please refer to chapter 4.2.

If you have any questions on these points, please contact your local Panasonic representative.

Before releasing the layout, we recommend to send the schematic and layout for final check to [wireless@eu.panasonic.com](mailto:wireless@eu.panasonic.com).





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## 5. CAUTIONS

Failure to follow the guidelines set forth in this document may result in damage to the product and or degrading of the product's functionality.

### 5.1. DESIGN NOTES

- (1) Follow the conditions written in this specification, especially the control signals of this module.
- (2) The supply voltage has to be free of AC ripple voltage (for example from a battery or a low noise regulator output). For noisy supply voltages, provide a decoupling circuit (for example a ferrite in series connection and a bypass capacitor to ground of at least 47uF directly at the module).
- (3) This product should not be mechanically stressed when installed.
- (4) Keep this product away from heat. Heat is the major cause of decreasing the life of these products.
- (5) Avoid assembly and use of the target equipment in conditions where the products' temperature may exceed the maximum tolerance.
- (6) The supply voltage should not be exceedingly high or reversed. It should not carry noise and/or spikes.
- (7) Keep this product away from other high frequency circuits.

### 5.2. INSTALLATION NOTES

- (1) Reflow soldering is possible twice based on the conditions in chapter 15. Set up the temperature at the soldering portion of this product according to this reflow profile.
- (2) Carefully position the products so that their heat will not burn into printed circuit boards or affect the other components that are susceptible to heat.
- (3) Carefully locate these products so that their temperatures will not increase due to the effects of heat generated by neighboring components.
- (4) If a vinyl-covered wire comes into contact with the products, then the cover will melt and generate toxic gas, damaging the insulation. Never allow contact between the cover and these products to occur.
- (5) This product should not be mechanically stressed or vibrated when reflowed.
- (6) If a module repair requires hand soldering, follow the conditions described in this chapter.
- (7) Do not wash this product.
- (8) Refer to the recommended pattern when designing a board.
- (9) Pressing on parts of the metal cover or fastening objects to the metal will cause damage to the unit.

### 5.3. USAGE CONDITIONS NOTES

- (1) Take measures to protect the unit against static electricity. If pulses or other transient loads (a large load applied in a short time) are applied to the products, check and evaluate their operation before assembly on the final products.

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- (2) Do not use dropped products.
- (3) Do not touch, damage or soil the pins.
- (4) Follow the recommended condition ratings about the power supply applied to this product.
- (5) Electrode peeling strength: Do not add pressure of more than 4.9N when soldered on PCB.
- (6) Pressing on parts of the metal cover or fastening objects to the metal cover will cause damage.
- (7) These products are intended for general purpose and standard use in general electronic equipment, such as home appliances, office equipment, information and communication equipment.

#### 5.4. STORAGE NOTES

- (1) The module should not be stressed mechanically during storage.
- (2) Do not store these products in the following conditions or the performance characteristics of the product, such as RF performance will be adversely affected:
  - Storage in salty air or in an environment with a high concentration of corrosive gas, such as Cl<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>, SO<sub>2</sub>, or NO<sub>x</sub>
  - Storage in direct sunlight
  - Storage in an environment where the temperature may be outside the range of 5°C to 35°C range, or where the humidity may be outside the 45 to 85% range.
  - Storage of the products for more than one year after the date of delivery  
Storage period: Please check the adhesive strength of the embossed tape and soldering after 6 months of storage.
- (3) Keep this product away from water, poisonous gas and corrosive gas.
- (4) This product should not be stressed or shocked when transported.
- (5) Follow the specification when stacking packed crates (max. 10).

#### 5.5. SAFETY CAUTIONS

These specifications are intended to preserve the quality assurance of products and individual components.

Before use, check and evaluate the end product operation with the module installed. Abide by these specifications, without deviation when using this product. These products may short-circuit. If electrical shocks, smoke, fire, and/or accidents involving human life are anticipated when a short circuit occurs, then provide the following failsafe functions, as a minimum.

- (1) Ensure the safety of the whole system by installing a protection circuit and a protection device.
- (2) Ensure the safety of the whole system by installing a redundant circuit or another system to prevent a single fault causing an unsafe status.

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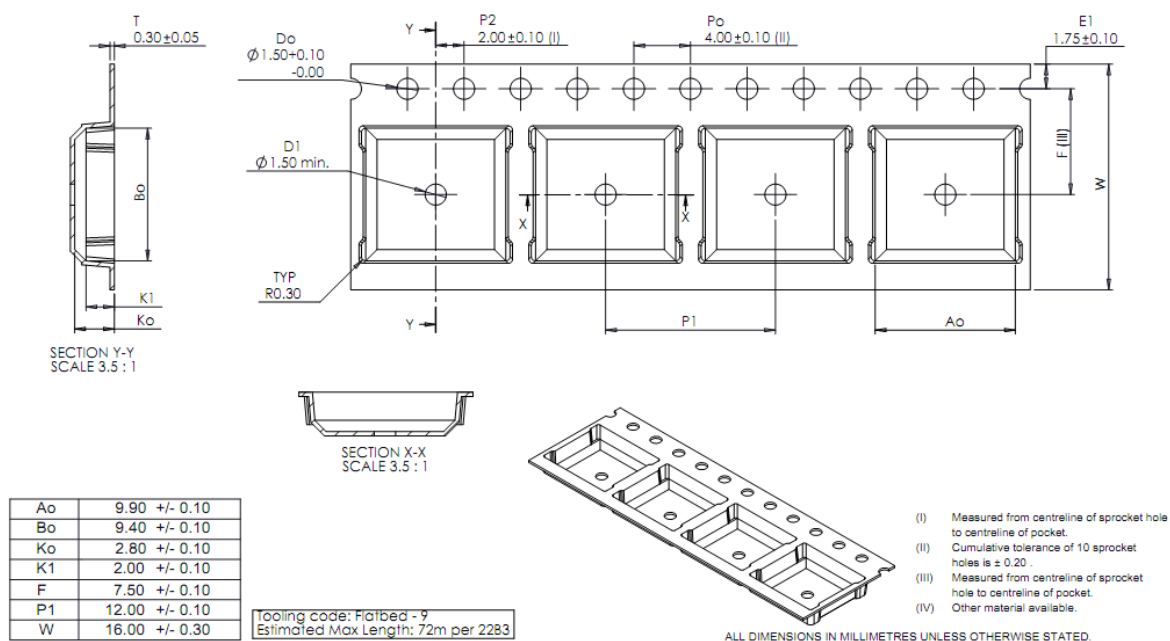
## 5.6. OTHER CAUTIONS

- (1) This specification sheet is copyrighted. Please do not disclose it to a third party.
- (2) Please do not use the products for other purposes than those listed.
- (3) Be sure to provide an appropriate fail-safe function on your product to prevent an additional damage that may be caused by the abnormal function or the failure of the product.
- (4) This product has been manufactured without any ozone chemical controlled under the Montreal Protocol.
- (5) These products are not intended for other uses, other than under the special conditions shown below. Before using these products under such special conditions, check their performance and reliability under the said special conditions carefully to determine whether or not they can be used in such a manner.
  - In liquid, such as water, salt water, oil, alkali, or organic solvent, or in places where liquid may splash.
  - In direct sunlight, outdoors, or in a dusty environment
  - In an environment where condensation occurs.
  - In an environment with a high concentration of harmful gas (e.g. salty air, HCl, Cl<sub>2</sub>, SO<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>, and NO<sub>x</sub>)
- (6) If an abnormal voltage is applied due to a problem occurring in other components or circuits, replace these products with new products because they may not be able to provide normal performance even if their electronic characteristics and appearances appear satisfactory.
- (7) When you have any question or uncertainty, contact Panasonic.

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## 6. PACKAGING

### 6.1. TAPE DIMENSION



## 7. DATA SHEET STATUS

This data sheet contains preliminary product specification. Panasonic reserves the right to change the specification without notice.

Preliminary product specification means also that the hardware has the engineering sample (ES) status.

Please consult the most recently issued data sheet before initiating or completing a design.

## 8. HISTORY FOR THIS DOCUMENT

Revision	Date	Modification / Remarks
0.1	04.11.2010	1 <sup>st</sup> preliminary version
0.2	01.12.2010	Deleted all chapters copied from PAN1315 Datasheet.

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## 9. RELATED DOCUMENTS

For an update, please search in the suitable homepage.

- [1] DS-1315-2420-102, November 2010:
- [2] CC2560 Product Bulletin: [http://focus.ti.com/pdfs/wtbu/cc2560\\_slyt377.pdf](http://focus.ti.com/pdfs/wtbu/cc2560_slyt377.pdf)
- [3] IAR Embedded Workbench Version 3+ for MSP430 User's Guide  
Rev. Q, 25 Nov 2009, [Link](#) for the download: <http://www.ti.com/lit/pdf/slau138>

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## 10. GENERAL INFORMATION

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This product description does not lodge the claim to be complete and free of mistakes.

Please contact the related product manager in every case.

If we deliver ES samples to the customer, these samples have the status Engineering Samples. This means, the design of this product is not yet concluded. Engineering Samples may be partially or fully functional, and there may be differences to be published Data Sheet.

Engineering Samples are not qualified and are not to be used for reliability testing or series production.

### **Disclaimer:**

Customer acknowledges that samples may deviate from the Data Sheet and may bear defects due to their status of development and the lack of qualification mentioned above.

Panasonic rejects any liability or product warranty for Engineering Samples. In particular, Panasonic disclaims liability for damages caused by

- the use of the Engineering Sample other than for Evaluation Purposes, particularly the installation or integration in an other product to be sold by Customer,
- deviation or lapse in function of Engineering Sample,
- improper use of Engineering Samples.

Panasonic disclaims any liability for consequential and incidental damages.

In case of any questions, please contact your local sales partner or the related product manager.

## 11. REGULATORY INFORMATION

### 11.1. FCC NOTICE



The device PAN1325, including the ceramic antenna (ENW89818A2JF) and also the SMD type PAN1315 (ENW89818C2JF), including with the antennas, which are listed in 11.5, complies with Part 15 of the FCC Rules. The device meets the requirements for modular transmitter approval as detailed in FCC public Notice DA00-1407.transmitter 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.

### 11.2. CAUTION



The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by Panasonic Electronic Devices Europe GmbH may void the user's authority to operate the equipment.

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

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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

### 11.3. LABELING REQUIREMENTS



The Original Equipment Manufacturer (OEM) must ensure that FCC labeling requirements are met. This includes a clearly visible label on the outside of the OEM enclosure specifying the appropriate Panasonic FCC identifier for this product as well as the FCC Notice above. The FCC identifier are **FCC ID: T7V1315**. In any case the end product must be labelled exterior with "Contains FCC ID: T7V1315"

### 11.4. ANTENNA WARNING



The related part number for this device is ENW89818C2JF (PAN1315 with SMD pad). This device is tested with a standard SMA connector and with the antennas listed below. When integrated in the OEMs product, these fixed antennas require installation preventing end-users from replacing them with non-approved antennas. Any antenna not in the following table must be tested to comply with FCC Section 15.203 for unique antenna connectors and Section 15.247 for emissions. The FCC identifier for this device with the antenna listed in item 1 are the same (FCC ID: T7V1315).

### 11.5. APPROVED ANTENNA LIST

Note: We are able to qualify your antenna and will add to this list as that process is completed.

Item	Part Number	Manufacturer	Frequency Band	Type	Gain (dBi)
1	2450AT43B100	Johanson Technologies	2.4GHz	Chip-Antenna	+1.3
2	LDA212G3110K	Murata	2.4GHz	Chip-Antenna	+0.9
3	4788930245	Würth Elektronik	2.4GHz	Chip-Antenna	+0.5

### 11.6. IC-CANADA

Due to the model size the IC identifier is displayed in the installation instruction.  
The IC ID is :216Q-1315.

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## 12. LIFE SUPPORT POLICY

This Panasonic product is not designed for use in life support appliances, devices, or systems where malfunction can reasonably be expected to result in a significant personal injury to the user, or as a critical component in any life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness. Panasonic customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Panasonic for any damages resulting.

PRELIMINARY