

CLASSIFICATION Einstufung	PRODUCT SPECIFICATION (for Supply) Produktspezifikation (zur Lieferung)	No. DS-2341-xxx-102	REV. 06
SUBJECT Thema	WIDEBAND TRANSCEIVER MODULE bidirektionales breitbandiges Funkmodul	PAGE Seite	1 of 19
CUSTOMER'S CODE PAN2341	MATSUSHITA'S CODE ENW59605NA1	DATE Datum	16.03.2005

# Application for Production

Applicant / Manufacturer      Matsushita Electronic Components (Europe) GmbH  
Hardware                              Zeppelinstrasse 19  
    21337 Lüneburg  
    Germany

Applicant / Manufacturer      No software is included.  
Software

Contents                              Approval for Mass Production

Customer

CHECKED / APPROVED:

DATE:	NAME:	SIGNATURE:

NOTE:

AT LEAST ONE SET OF APPROVED SPECIFICATIONS SHOULD BE RETURNED TO THE ADDRESS OF THE ISSUING PARTY.

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PRELIMINARY

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## 1. SCOPE Umfang

This product specification applies to the TRANSCEIVER MODULE ENW59605NA1.  
The used transceiver is the CC1000 from the norwegian company Chipcon [www.chipcon.com](http://www.chipcon.com).  
Diese Produktionspezifikation bezieht sich auf das bidirektionale Funkmodul ENW59605NA1.  
Der verwendete Transceiver ist der CC1000 der norwegischen Firma Chipcon.

## 2. HISTORY FOR THIS DOCUMENT Versionsverwaltung dieses Dokumentes

Revision Version	Date Datum	Modification / Remarks Änderungen / Bemerkungen
01	20.06.2003	Initial DRAFT version 01
02	07.07.2004	Add chapter Table of Contents and chapter 11, 12 and 14.
03	07.10.2004	Change the operating temperature range from +55°C to +85°C Revised the Labelling Drawing (now with legible serial number, not only in barcode) Revised the Ordering Information (no changes for ENW5x605NA1)
04	01.02.2005	Add chapter Cautions, please read it very carefully.
05	28.02.2005	Change the operating temperature range from -40°C to +85°C to -20°C to +70°C (customer demand). Add chapter 26. Data Sheet Status.
06	16.03.2005	Add chapter RoHS Declaration, revised chapter Soldering Temperature-Time Profile (for reflow soldering) and revised chapter Packaging.

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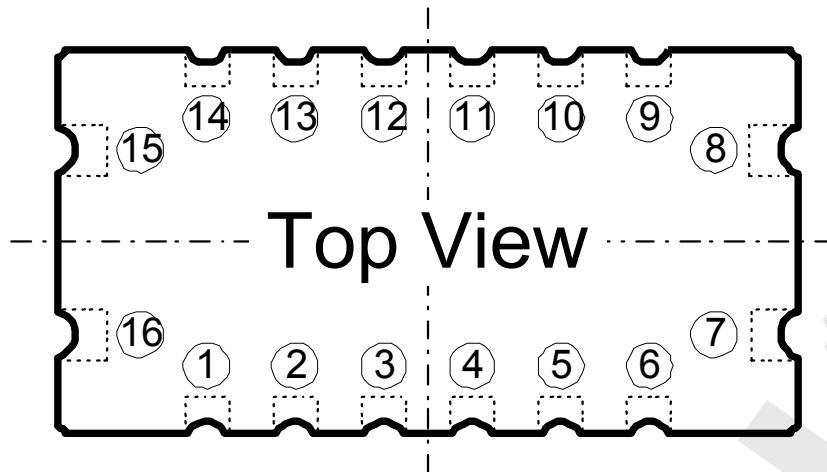
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### 3. TERMINAL LAYOUT Anschlußbelegung



Pin no.	Pin Name	Pin Type	Description
1	VCC	supply	Power supply +3Vdc
2	CHP_OUT (LOCK)	analog output	Charge pump current output, The pin can also be used as PLL Lock indicator. Output is high when PLL is in lock.
3	DCLK	digital output	Data clock for data in both receive and transmit mode
4	DIO	digital input/output	Data input/output. Data input in transmit mode. Data output in receive mode.
5	GND	ground	ground connection (0Vdc)
6	GND	ground	ground connection (0Vdc)
7	GND	ground	ground connection (0Vdc)
8	GND	ground	ground connection (0Vdc)
9	PALE	digital input	Programming address latch enable for 3-wire bus. Internal pull-up.
10	RSSI	analog output	The pin can be used as RSSI, If not used, the pin should be left open (not connected).
11	PDATA	digital input/output	Programming data for 3-wire bus. Programming data input for write operation, programming data output for read operation
12	PCLK	digital input	Programming clock for 3-wire bus
13	GND	ground	ground connection (0Vdc)
14	ANT	antenna	single ended antenna connection
15	GND	ground	ground connection (0Vdc)
16	GND	ground	ground connection (0Vdc)

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#### 4. KEY PARTS LIST

Liste der Schlüsselkomponenten

Part Name Teilenummer	Material Material
P.W.Board Leiterplatte	Glass cloth epoxide resin with gold plating (FR4) FR4 mit Goldauflage
Casing Deckel	Tin plate (CuNi18Zn20) Feinblech
ISM-IC part name ISM IC Name	CC1000 (Chipcon www.chipcon.com) All notice are based on Datasheet (rev. 2.2) 2004-04-22

#### 5. TEST CONDITIONS

Meßbedingungen

Measurements shall be made under room temperature and humidity unless otherwise specified.  
Messungen unter normalen Bedingungen, Abweichungen sind gesondert notiert.

Temperature	25 ± 10°C	Humidity	40 to 85%RH
Temperatur	25 ± 10°C	Luftfeuchtigkeit	40 to 85%RH

#### 6. ABSOLUTE MAXIMUM RATINGS

Absolute Grenzwerte

No.	Item Punkt	Symbol Zeichen	Absolute Maximum Ratings Absolute Grenzwerte	Unit Einheit
1	Supply voltage Versorgungsspannung	V <sub>cc</sub>	-0.3 to +5.0	V
2	Voltage on any pin Spannung an jedem Pin	V <sub>Pin</sub>	-0.3 to V <sub>cc</sub> +0.3	V
3	Storage temperature range Lagertemperatur	T <sub>stg</sub>	-40 to +85	°C
4	Operating temperature range Betriebstemperatur	T <sub>op</sub>	-20 to +70 <sup>(1)</sup>	°C
5	Input RF level Eingangs HF-Leistung	P <sub>max</sub>	10	dBm
6	Lead temperature Löttemperatur	T <sub>Death</sub>	tbd °C for t = tbd sec	°C
7	ESD on any pin ESD Festigkeit	V <sub>ESD</sub>	max 200V (except Pin 2 max 50V) (Mil. Std. 883E 3015 Human Body Model)	V

Note:

- (1) If your requirements are different, please ask your local distributor or send an e-mail to [wireless@ecom.panasonic.de](mailto:wireless@ecom.panasonic.de).

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## 7. ELECTRICAL REQUIREMENTS

Vcc = 3.0V, Tamb=Operating temp. range if nothing else stated

No Nr.	Item Punkt	Condition Bedingung	Limit / Grenzen			Unit Einheit
			Min	Typ	Max	
1	Frequency Range Frequenzbereich	Programmable in 250Hz steps. Programmierbar in 250Hz Schritten	860	868	915	MHz
2	Load impedance Ausgangsimpedanz	Measured with network analyzer in the frequency range at antenna pin		50		Ω
3	Output return loss Ausgangsanzpassung	Receive Mode to 50Ω load Transmit Mode to 50Ω load	-10 <sup>(2)</sup> -10 <sup>(2)</sup>			dBm
4	Supply voltage Versorgungsspannung	The typical voltage is recommended Vcc at voltage pin	2,7	3,0	3,3	Vdc
5	Ripple on Vcc AC Anteil auf Vcc	Ripple frequency ≥200kHz Ripple frequency <200kHz			1,0 0,2	mVpp

Note:

- (2) This should be optimized with the Rx and Tx match register.

## 8. ELECTRICAL CHARACTERISTICS

Vcc = 3.0V, Tamb=Operating temp. range if nothing else stated

No Nr.	Item Punkt	Condition Bedingung	Limit / Grenzen			Unit Einheit
			Min	Typ	Max	
1	Frequency accuracy Frequenzgenauigkeit	Without software calibration, crystal specification ±10ppm (25°C)	-10		+10	kHz
2	Transmit data rate Sendedatenrate	for details → CC1000 (p3; p14) Nähere Infos → CC1000 (S.3; S14)	0.6		76.8	kBaud
3	FSK separation Frequenzhub	for details → CC1000 (p3; p14) Nähere Infos → CC1000 (S.3; S14)	0		65	kHz
4	Max Output Power maximale Ausgangsleistung	Delivered to 50Ω load, the output power is programmable → CC1000 p29 table 10	+3,5	+4,5	+5,5	dBm
5	Receiver sensitivity Rx-Empfindlichkeit	for 76,8kBaud, ±20kHz separation, NRZ BER=10 <sup>-3</sup> → CC1000 p19 table 5f	-91	-95		dBm
6	Current consumption Stromverbrauch	Rx Mode (optimal Sensitivity)		12		mA
		Tx Mode at max output power	22	25	27	mA
		Power Down Mode (Oscillator off)		0,2	1,0	μA
7	Spurious level, except Harmonics Nebenaussendungen ohne Harmonische	Oscillator leakage fc-(+)150kHz (Depends on high or low local oscillator) others		-61	-57	dBm
8	Harmonics level Harmonische	2 <sup>nd</sup> (fc=868MHz) → 1736MHz		-55	-34	dBm
		3 <sup>rd</sup> (fc=868MHz) → 2604MHz		-44	-34	
		4 <sup>th</sup> (fc=868MHz) → 3472MHz		-55	-34	
9	RSSI dynamic range RSSI Bereich	this is an analog output signal → CC1000 p30	-105		-50	dBm

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No Nr.	Item Punkt	Condition Bedingung	Limit / Grenzen			Unit Einheit
			Min	Typ	Max	
10	RSSI accuracy RSSI Genauigkeit	this is an analog output signal → CC1000 p30		±6		dB
11	RSSI linearity RSSI Linearität	this is an analog output signal → CC1000 p30		±2		dB
12	Crystal frequency Quarzfrequenz	→ CC1000 p32		14,7456		MHz

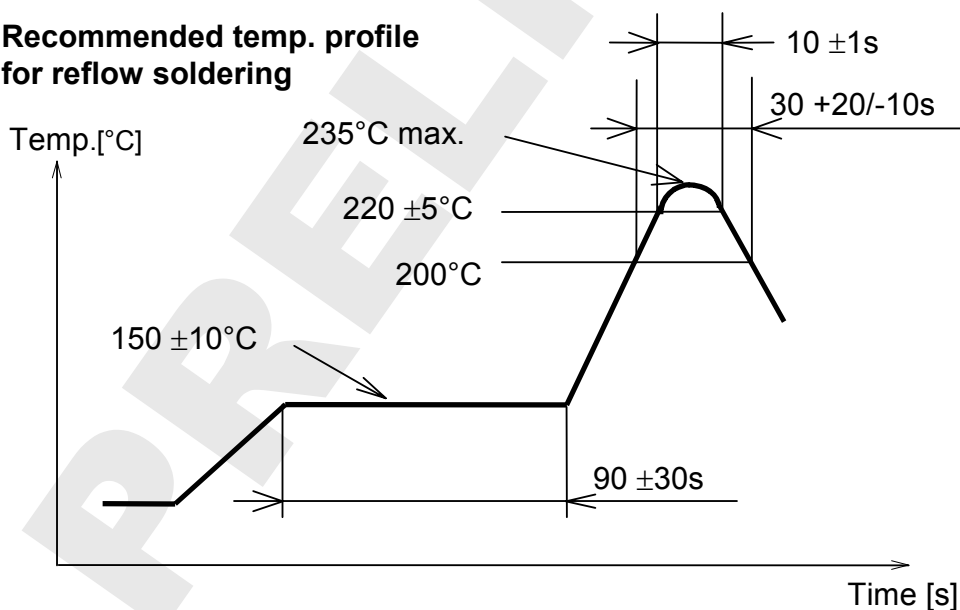
9. MECHANICAL REQUIREMENTS  
Mechanische Anforderungen

No.	Item Punkt	Limit Grenzwerte	Condition Bedingung
1	Solderability Lötbarkeit	More than 75% of the soldering area shall be coated by solder Mehr als 75% der Lötfläche soll mit Lötpaste bedeckt sein.	Reflow soldering with recommendable temperature profile
2	Resistance to soldering heat	It shall be satisfied electrical requirements and not be mechanical damage	250°C, 10s

10. SOLDERING TEMPERATURE-TIME PROFILE (FOR REFLOW SOLDERING)  
Temperatur-Zeit Profil für die Reflowlötung

10.1. FOR LEAD SOLDER

Recommended temp. profile  
for reflow soldering



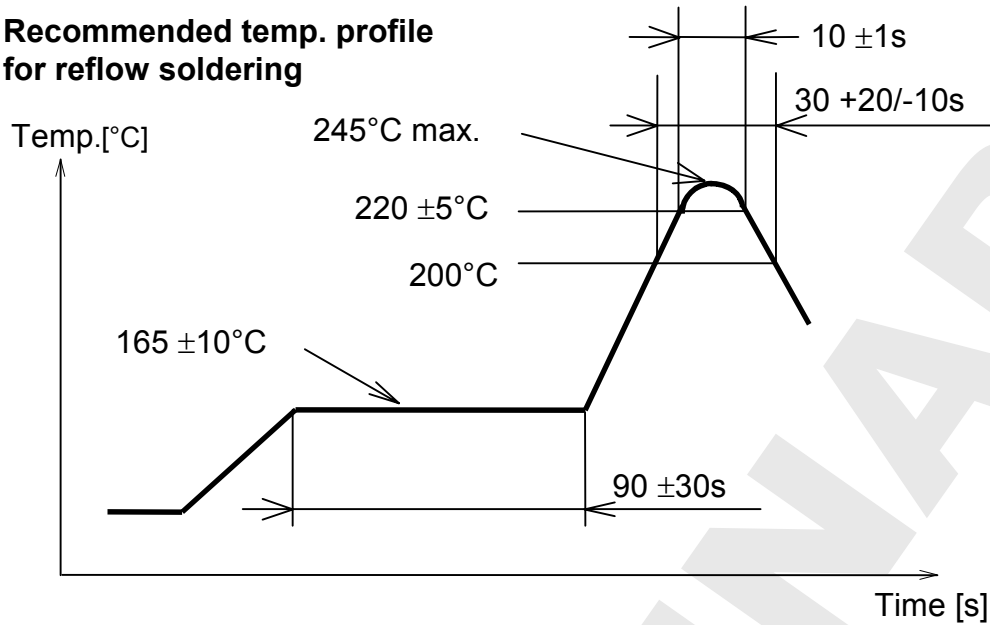
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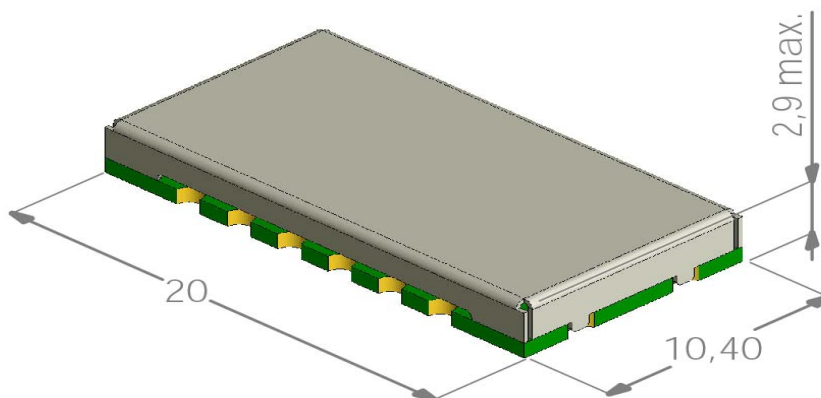
## 10.2. FOR LEAD FREE SOLDER (PRELIMINARY)

### Recommended temp. profile for reflow soldering



Reflow permissible cycle: 2  
 Zulässige Reflow Zyklen: 2  
 Opposite side reflow is prohibited due to module weight.  
 Überkopflötung ist nicht erlaubt

## 11. MODULE DRAWING (UNIT: MM) Mechanische Modulzeichnung (Einheit: mm)



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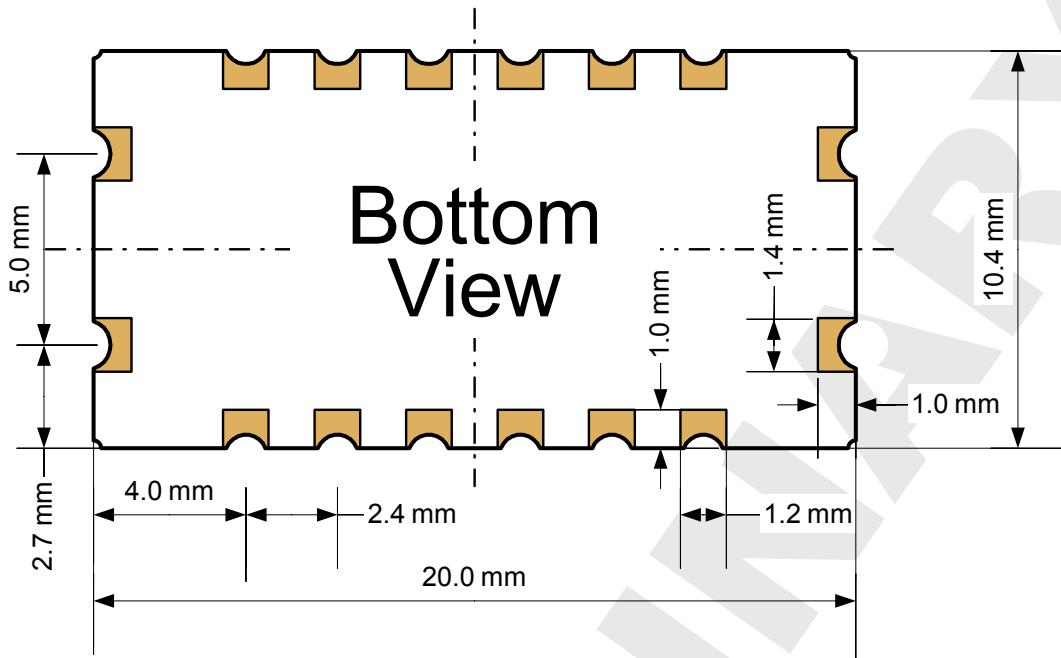
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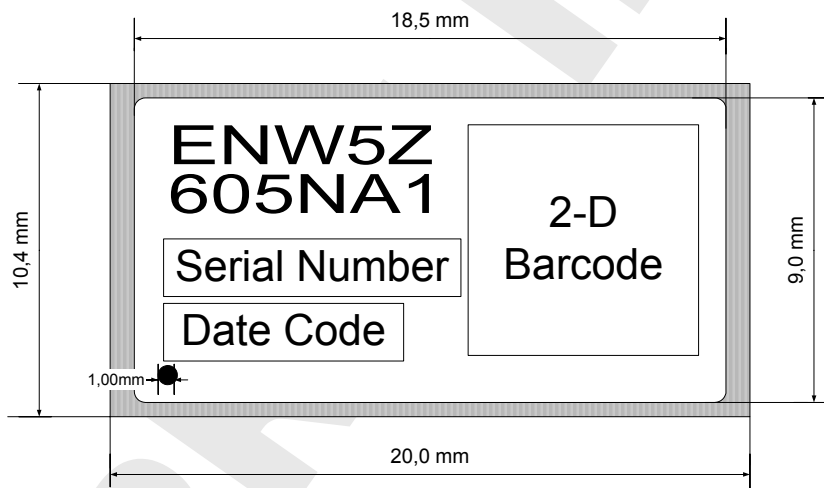
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12. FOOT PRINT OF THE MODULE  
Abmaße der Randkontaktierungen



13. LABELLING DRAWING  
Kennzeichnung des Modules durch Label

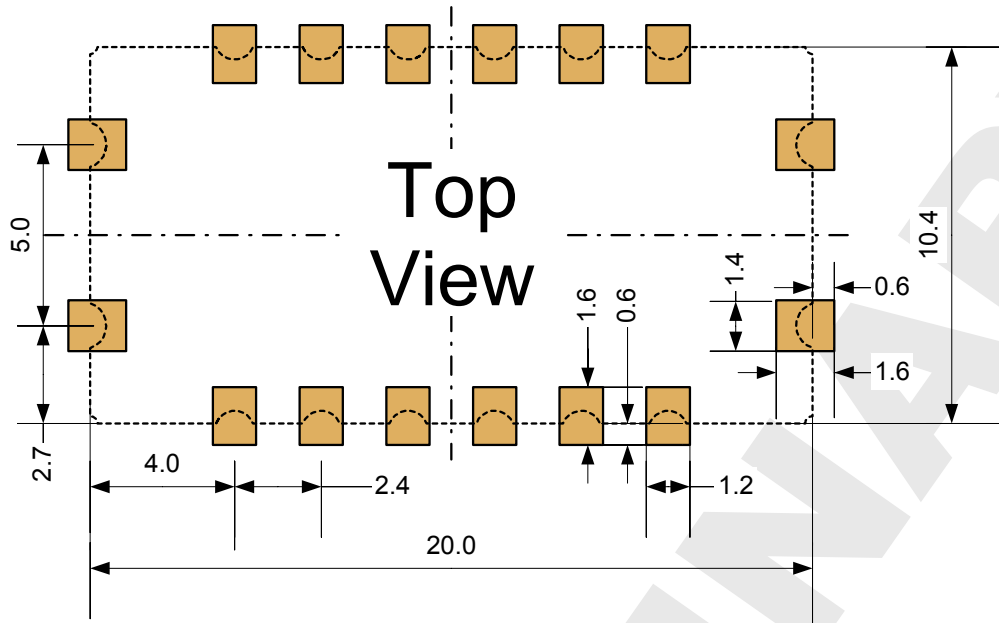


The part number (ENW...), the serial number and the date code are integrated in the 2D-Barcode.

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14. RECOMMENDED FOOT PATTERN (UNIT:MM)  
Empfohlenes Land Pattern (Einheit: mm)



If you have no experience about the land pattern, this figure can help you. But this is optimized for our production equipment, we can give no guarantee. We recommend the same dimension for the solder paste screen. The solder screen thickness depends on your production standard.

15. RELIABILITY TESTS  
Zuverlässigkeitstests

The measurement should be done after exposed to room temperature and humidity for 1hour.  
Die Messungen sollten erst nach einer Stunde Lagerung unter normalen Bedingungen erfolgen.

No.	Item Punkt	Grenzwerte	Bedingung
1	Vibration test	Electrical parameter should be in specification	a) Freq.:10~50Hz,Amplitude:1.5mm a) 20min. / cycle,1hrs. each of XYZ axis b) Freq.:30~100Hz, 6G b) 20min. / cycle,1hrs. each of XYZ axis
2	Shock test	the same as the above	Dropped onto hard wood from height of 50cm for 3 times
3	Heat cycle test	the same as the above	-40°C for 30min. and +85°C for 30min.; each temperature 300 cycles
4	Moisture test	the same as the above	+60°C, 90% RH, 300h
5	Low temp. test	the same as the above	-40°C, 300h
6	High temp. test	the same as the above	+85°C, 300h

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## 16. CONFIGURATION OVERVIEW

Übersicht zur allgemeinen Ansteuerung

See CHIPCON Datasheet CC1000 (rev. 2.1) 2002-04-19 page 10

## 17. CONFIGURATION SOFTWARE

Ansteuerungssoftware

See CHIPCON Datasheet CC1000 (rev. 2.1) 2002-04-19 page 10

For the first step please use the SmartRF® Studio Software from CHIPCON to learn more about the register settings or use our application, if you will make a simple rf connection

## 18. MICROCONTROLLER INTERFACE

Schnittstelle zum Microcontroller

See CHIPCON Datasheet CC1000 (rev. 2.1) 2002-04-19 page 13ff

## 19. FREQUENCY PROGRAMMING

Frequenzprogrammierung

See CHIPCON Datasheet CC1000 (rev. 2.1) 2002-04-19

## 20. APPLICATION GUIDELINES FOR USE IN EUROPEAN ISM BANDS

Applikationshinweise für die Benutzung des ISM Modules in Europa

The following documents will help you:

- CHIPCON Datasheet CC1000 (rev. 2.1) 2002-04-19
- CHIPCON Application Note AN001 SRD regulations for licence free transceiver operation
- Standards from the ETSI (European Telecommunication Standard Institute [www.etsi.org](http://www.etsi.org) for ISM Regulations ETSI EN300220-1 to 3.
- and of course, please ask the related product manager within Matsushita

## 21. CONFIGURATION REGISTERS

Konfigurierung der Registerinhalte

See CHIPCON Datasheet CC1000 (rev. 2.1) 2002-04-19 page 37ff

For optimal performance the following register should be set, if the register settings are not right, in some circumstances the module will lose their conformity to ETS300220.

- Rx\_Match Register Fhex
- Tx\_Match Register 0hex

It could be changed after the first production in higher volume.

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## 22. CAUTIONS

### Warnungen

#### 22.1. NOTES OF DESIGN

##### Designhinweise

- (1) The most critical point to get the EN300220 approval in the final design are the LO (Local Oszillator) leakage from the module PAN2341 in receive mode.  
Depending on the customer design, specially the length of the lines to the port pins 3 and 4 are critical without decoupling, because the frequency of the LO leakage can radiate from this lines.  
To avoid such problems, please use a capacitance e.g. 47p to 56p for a size 0603 or 82p for size 0402, which are mounted from this line to ground.  
These capacitance should be very close to the module and work as a short cut for the LO frequency.
- (2) Please follow the condition written in this specification.
- (3) This product should not be stressed when installed.
- (4) Please keep this product the module away from heat.
- (5) The supply voltage should not be exceeding or reverse, and should not carry noise and spike.
- (6) Please keep this product away from other high frequency circuits.
- (7) Please follow the condition written in this interface specification, about the control signals of this module.

#### 22.2. NOTES OF INSTALLATION

##### Verarbeitungshinweise

- (1) Reflow soldering is possible for twice on the condition in chapter 10.  
Please set up the temperature at the soldering portion of this product according to this reflow profile
- (2) This product should not be stressed or vibrated when reflowed.
- (3) Please keep the following conditions when you install this product for reparation by hand soldering.
- (4) Please do not wash this product.
- (5) Please refer to the recommended pattern when designing a board.
- (6) Please be careful about the distortion of shield case, when installing this product.

#### 22.3. NOTES OF USAGE CONDITIONS

##### Benutzerhinweise

- (1) Please take measure against static electricity.
- (2) Please do not use the fallen product.
- (3) Please do not put on damage and dirt to the pin , and don't touch the electric components (inside of shield case).
- (4) Please don't open the cover of this product, if there is something existing.
- (5) Please follow the condition written in the ratings , about the power supply instruments applied to this product.
- (6) Electrode peeling strength: Do not add pressure of more than 4.9N when soldered on PCB

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## 22.4. NOTES OF STORAGE

### Lagerhinweise

- (7) Storage period: Please check the adhesive strength of the embossed tape and soldering after 6 months of storage.
- (8) Please keep this product away from water, poisonous gas and corrosive gas.
- (9) This product should not be stressed or shocked when transported.
- (10) Please follow the specification when piling up the packed crate ( max. 10).

## 22.5. OTHER CAUTIONS

### Weitere Hinweise

- (1) This specification sheet is copyrighted. Please do not open it to the third party.
- (2) Please do not use this product of our company for another purpose.
- (3) Be sure to provide an appropriate fail-safe function on your product to prevent a second damage that may be caused by the abnormal function or the failure of our product.
- (4) This product has not been manufactured with any ozone chemical controlled under the Montreal Protocol.
- (5) When you have any question or uncertainty , both of you and Panasonic sincerely cope with it.

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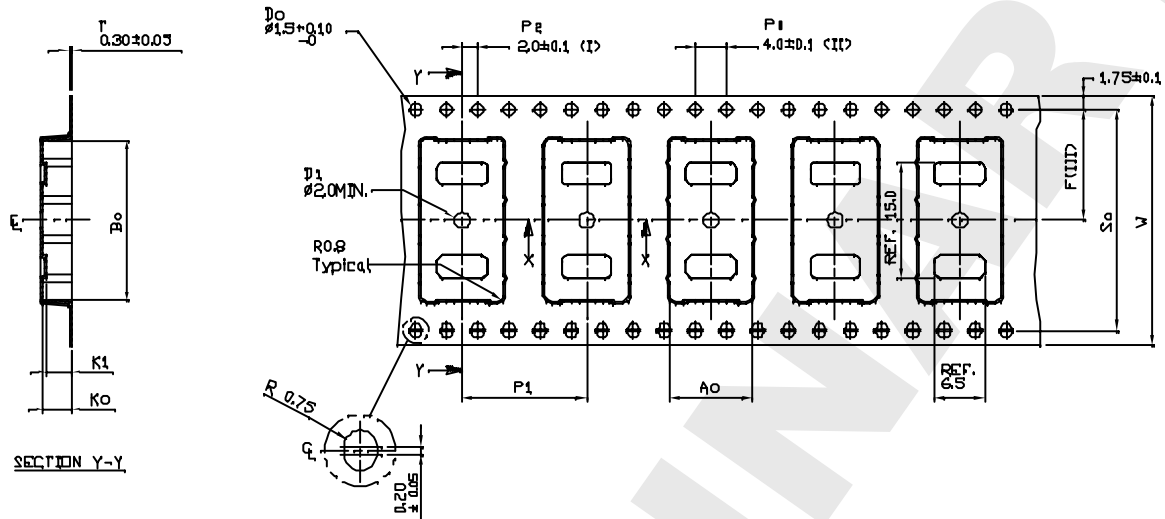
DESIGNED  
erstellt

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## 23. PACKAGING Verpackung

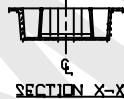
### 23.1. EMBOSSED TAPE / BLISTERGURT

(1) Dimension of the tape / Abmessungen des Gurtes (EIAJ-tbd)



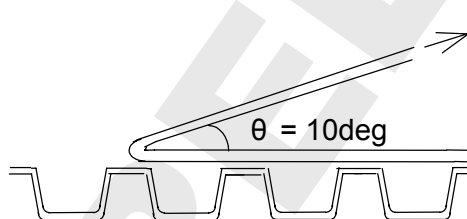
- (I) Measured from centreline of sprocket hole to centreline of pocket.  
 (II) Cumulative tolerance of 10 sprocket holes is  $\pm 0.20$ .  
 (III) Measured from centreline of sprocket hole to centreline of pocket.  
 (IV) Other material available.

ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED.



Ao	10.70	+/-0.1
Bo	20.30	+/-0.1
Ko	3.70	+/-0.1
K1	3.30	+/-0.1
F	14.20	+/-0.1
P1	16.00	+/-0.1
So	28.40	+/-0.1
W	32.00	+/-0.3

(2) Cover tape reel strength / Abzugskräfte Blistergurt Deckfolie



Force direction

Speed = 300mm/min.

Cover tape reel strength  
= 0.098 ~ 0.68N (10~70g)

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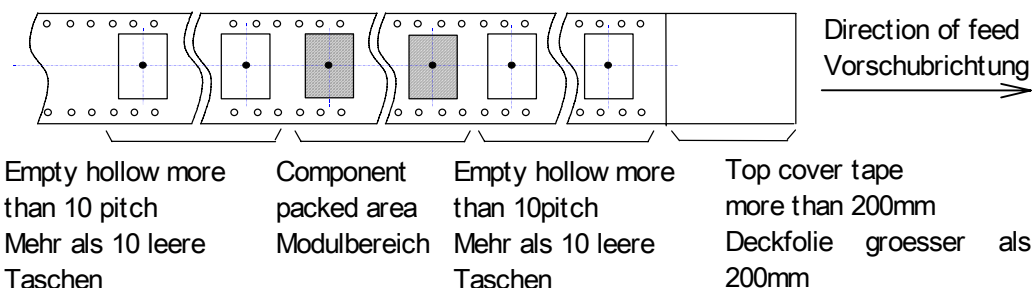
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### (3) Empty hollow / leere Taschen



Empty hollow in component packed area shall be less than two per reel and those hollows shall not be consecutive.

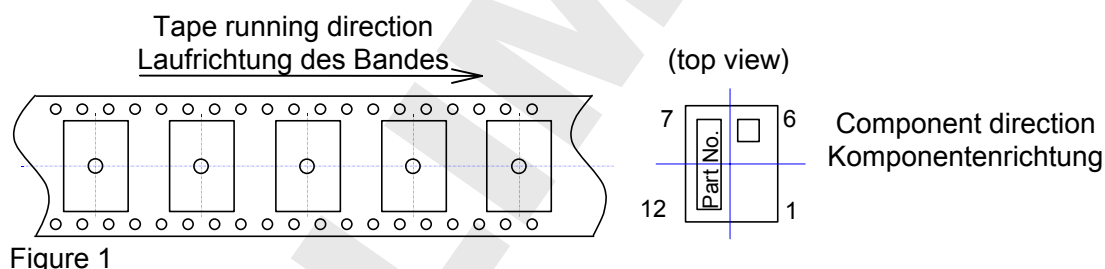
Es dürfen minimal 2 leere Taschen im Bereich der Komponenten vorhanden sein, diese dürfen aber nicht aufeinander folgen.

### 23.2. COMPONENT DIRECTION

#### Komponentenanordnung

Top cover tape shall not be found on reel holes and shall not stick out from reel.

Deckfolien darf nicht durch die Löcher der Spule und nicht außerhalb der Spule geführt werden.



### 23.3. REEL DIMENSION

#### Abmaße der Rolle

- (1) Quantity per reel : 500 pieces  
Anzahl pro Rolle : 500 Stück
- (2) Marking : Customer's part No. / Quantity / Lot No. and Our part# with bar-code shall be on the reel.  
Kennzeichnung : Kundennummer / Anzahl / Losnummer und unsere Komponentenummer als Barcode wird auf die Rolle gedruckt  
Refer to figure 2  
Bezugnehmend zur Zeichnung 2

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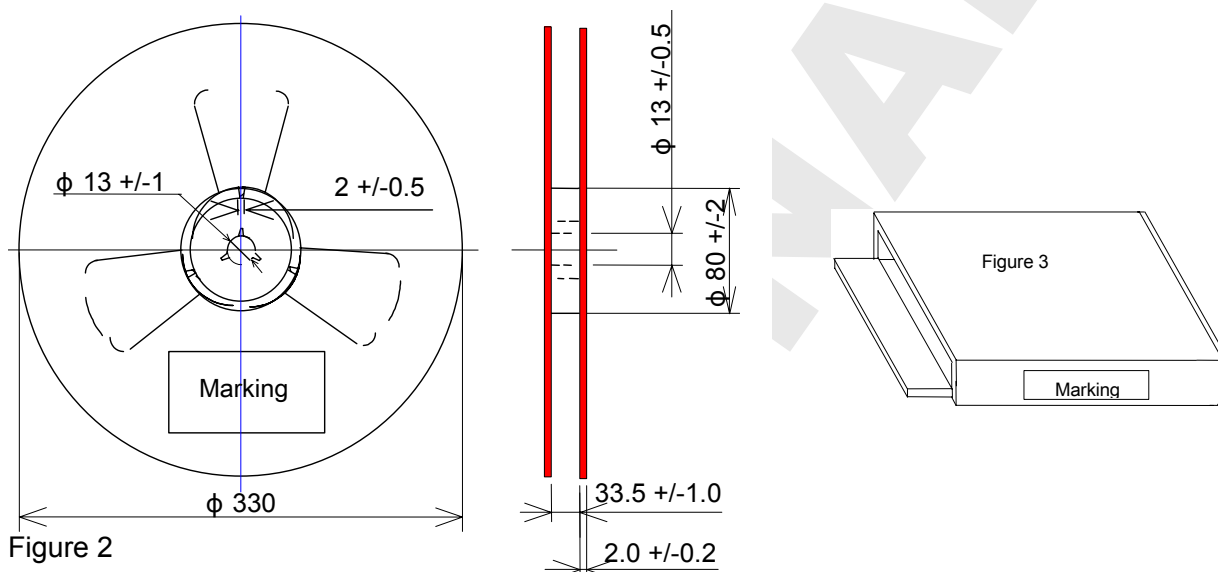


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## 23.4. PACKAGE

### Umverpackung

- (1) Package box : 1 or 2 reel (depends on quantity)  
Paketbox.: 1 oder 2 Rollen (abhängig von der Liefermenge)
- (2) Marking : Customer's part No. / Quantity / Lot No. and Our part# with bar-code shall be on the package box.  
Kennzeichnung : Kundennummer / Anzahl / Losnummer und unsere Komponentenummer als Barcode wird auf die Verpackung gedruckt  
Refer to figure 2 and 3  
Bezugnehmend zur Zeichnung 2 und 3



## 24. ORDERING INFORMATION

### Bestellinformationen

Ordering part number	Description	MOQ
ENW5Z605NA1	Engineering Sample PAN2341, Version 868 MHz & 915 MHz	1
ENW59605NA1	PAN2341, Version 868 MHz & 915 MHz	500

For other frequency please ask your local distributor or send an e-mail to [wireless@ecom.panasonic.de](mailto:wireless@ecom.panasonic.de).

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## 25. ROHS DECLARATION

### RoHS-Erklärung

Declaration of environmental compatibility for supplied products:

Hereby we declare to our best present knowledge based on declaration of our suppliers that this product do not contain by now the following substances which are banned by Directive 2002/95/EC (RoHS) or if contain a maximum concentration of 0,1% by weight in homogeneous materials for

- Lead and lead compounds
- Mercury and mercury compounds
- Chromium (VI)
- PBB (polybrominated biphenyl) category
- PBDE (polybrominated biphenyl ether) category

And a maximum concentration of 0,01% by weight in homogeneous materials for

- Cadmium and cadmium compounds

## 26. DATA SHEET STATUS

### Datenblatt Status

This data sheet contains data from the PRELIMINARY specification. Supplementary data will be published at a later date. Matsushita Components reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.

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

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## 27. GENERAL INFORMATION

### Allgemeine Informationen

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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 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.

Matsushita rejects any liability or product warranty for Engineering Samples. In particular, Matsushita 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.

Matsushita disclaims any liability for consequential and incidental damages.

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

## 28. LIFE SUPPORT POLICY

### Politik für Lebenserhaltungssysteme

This Matsushita 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. Matsushita customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Matsushita for any damages resulting.

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