

# **BT Classic and Low Energy Module 05010BTH**

## **Product Specification**

Document code	Date
FI020K0001v1040hUK	14/04/2023

## SYMBOLS



This symbol appears in the manual at points where warnings or particularly important instructions, essential for safe, correct operation of the device, are given.



This symbol appears in the manual at points where suggestions, additional information or other relevant notes are given.

## REVISION TABLE

Rev.	Date	Author	Reference	Description
1000	28/04/2022	DTP – SP	-	First emission
1010	06/07/2022	DTP – SF	-	Small corrections
1020	20/12/2022	DTP – SF	4.1, 4.2, 4.3	European Conformity to RED, FCC and ISED regulation
1030	24/01/2023	DTP – SF	3.9	Cautions
			4.2.1	FCC Integration Instructions
1040	14/04/2023	DTP – SF	2.3	Case Marking
			4.1	Standards Updated

## PURPOSE AND AUDIENCE

This Product Specification provides details on the functional, operational and electrical characteristics of the CEIA 05010BTH module, model 117569.

The product is referred to as “the 05010BTH” or “the module” within this document.

Read this manual carefully before using the module. Any use different from the one described in this manual is forbidden.



CEIA reserves the right to make changes to the content and module described in this manual, at any time and without prior notice. Indications of sizes and designs of module, therefore, have no binding character, but are given for information purposes only.

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## 1 OVERVIEW

CEIA 05010BTH (model 117569) is a dual-mode BT Basic Rate (BR), Enhanced Data Rate (EDR) and Low Energy (LE) module solution.

The BT Classic radio (BR/EDR) is a low power radio that streams data over 79 channels in the 2.4GHz frequency band. BT Classic is mainly used to enable wireless audio streaming and has become the standard radio protocol behind wireless speakers and headphones. The BT Classic radio also enables data transfer applications.

The BT Low Energy radio (LE) is designed for very low power operation. Transmitting data over 40 channels in the 2.4GHz frequency band, the BT LE radio provides developers a tremendous amount of flexibility to build products that meet the unique connectivity requirements of their market.

This device is a Host Controlled Interface (HCI) BT Radio Frequency (RF) module that contains also a single channel PCM CODEC.

The 05010BTH is BT 5.1 compliant and it offers best-in-class RF performance.

The CEIA module provides a complete wireless solution with integrated antenna and audio functionalities in a compact surface mount package.

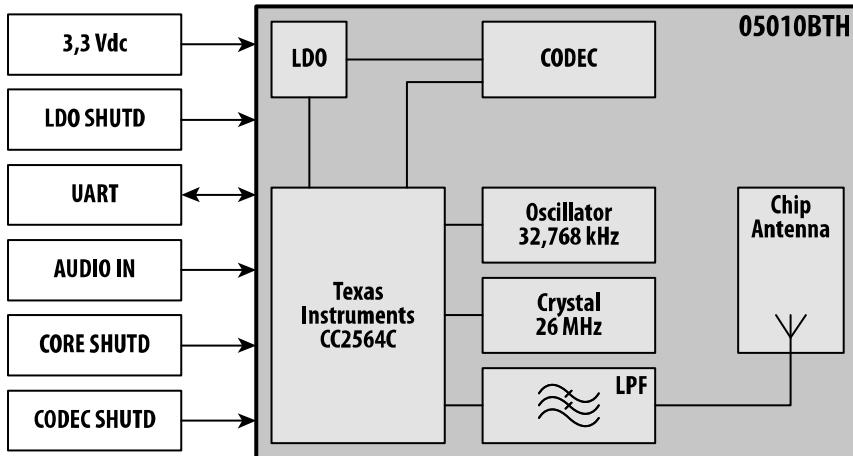
CEIA 05010BTH module does not contain any software ex works, i.e. software is provided by 3rd party suppliers only. The essential software resources can be found on the website of Texas Instruments <https://www.ti.com>.

## 1.1 Features

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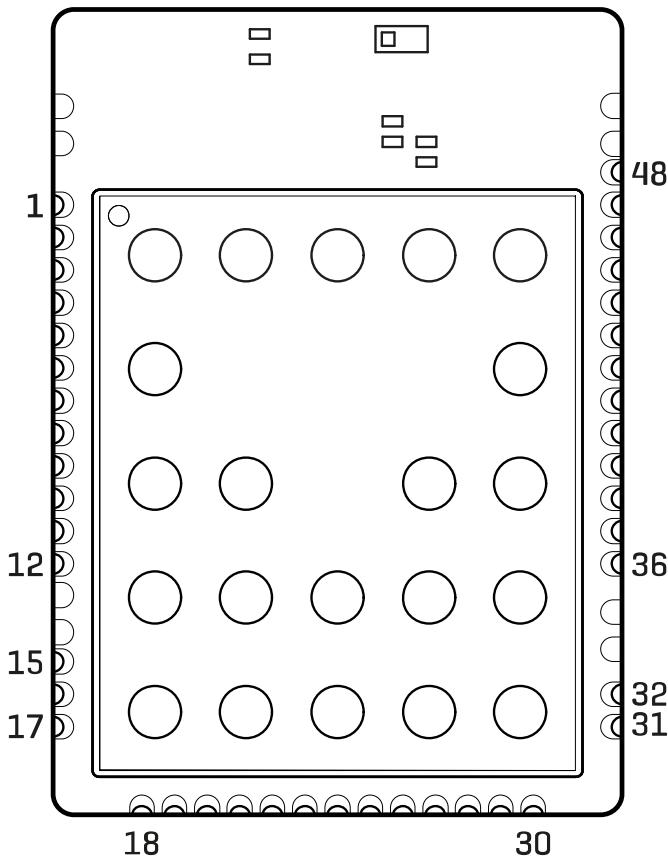
- Qualified for BT 5.1 specification
- IC Antenna onboard
  - *TDK Chip antenna ANT016008LCS2442MA1 (Frequency band 2.4 GHz, Gain +1.6 dBi)*
- Class 1 TX Out Power
- Shutdown to minimize Power Consumption
- Integrated LDO Regulator
- RoHS Compliant
- Profiles Supported: SPP-A2DP-AVRCP-HFP-HID-GATT-Several BLE profiles and services
- Based upon Texas Instruments CC2564C (refer to Texas Instruments document SWRS199B)
- Dimensions: 17.42 mm x 24.69 mm x 4.0 mm

## 1.2 Block diagram



## 1.3 Pin Configuration

### 1.3.1 Pin Assignment



*Top view*

### 1.3.2 Pin functions

No.	Pin Name	Pull at Reset	Def. Dir. <sup>1</sup>	I/O Type <sup>2</sup>	Description
1	3,3 Vdc		I		Main LDO input
2					
3	GND				Connect to Ground
4					
5-8					Not connected
9	CODEC_SHUTD	PD	I		CODEC Shutdown input (active low)
10	LDO_SHUTD	PU	I		LDO Shutdown input (active low)
11-14					Not connected
15	HCI_RX	PU	I	8 mA	HCI UART data receive
16	HCI_TX	PU	O	8 mA	HCI UART data transmit
17					Not connected
18	GND				Connect to Ground
19	CORE_SHUTD	PD	I		CC2564C Shutdown input (active low)
20	HCI_RTS	PU	O	8 mA	HCI UART request-to-send
21	HCI_CTS	PU	I	8 mA	HCI UART clear-to-send
22-30					Not connected
31	GND				Connect to Ground
32-38					Not connected
39	GND				Connect to Ground
40-42					Not connected
43	GND				Connect to Ground
44	AUDIO_IN		I		Analogic audio input
45-47					Not connected
48	GND				Connect to Ground

<sup>1</sup> I=Input; O=Output; I/O=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

## 1.4 BT features

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- BT 5.1 compliant
- Up to seven active devices
- Scatternet: up to three piconets simultaneously, one as master and two as slaves
- Up to two Synchronous Connection Oriented (SCO) links on the same piconet
- Support for all voice Air-Coding – Continuously Variable Slope Delta (CVSD), A-law,  $\mu$ -law, modified Subband Coding (mSBC), and transparent (uncoded)
- Provide an assisted mode for Handset Profile (HFP) 1.6 Wideband Speech (WBS) profile or Advanced Audio Distribution Profile (A2DP) profile to reduce host processing and power
- Support of multiple BT profiles with enhanced QoS
- Multiple sniff instances tightly coupled to achieve minimum power consumption
- Independent buffering for LE allows large numbers of multiple connections without affecting BR or EDR performance
- Built-in coexistence and prioritization handling for BR, EDR and LE
- Capabilities of link layer topology scatternet – can act concurrently as peripheral and central
- Network support for up to 10 devices
- Time line optimization algorithms to achieve maximum channel utilization

## 1.5 Interfaces

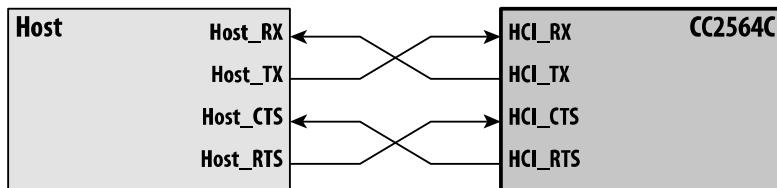
### 1.5.1 Host Controller Interface (HCI)

The CC2564C2 incorporates one UART module dedicated to the HCI transport layer. The HCI interface transports commands, events, ACL and synchronous data between the BT device and its host using HCI data packets. The device supports H4 (4-wires) protocol with hardware flow control. The maximum baud rate of the module is 4 Mbps.

After power up the baud rate is set for 115.2 kbps, irrespective of fast clock frequency. The baud rate can thereafter be changed with a vendor specific command. The device responds with a Command Complete Event (still at 115.2 kbps), after which the baud rate change occurs. The UART device includes the following features:

- Receiver detection of break, idle, framing, FIFO overflow and parity error conditions
- Transmitter underflow detection
- CTS/RTS hardware flow control (H4 protocol)

The UART interface includes four signals: TXD, RXD, CTS and RTS. Flow control between the host and the CC2564C is byte-wise by hardware.



When the UART Rx buffer of the CC2564C passes the “flow control” threshold, it will set the signal UART\_RTS high to stop transmission from the host.

When the UART\_CTS is set high, the CC2564C will stop its transmission on the interface. In case UART\_CTS is set high in the middle of transmitting a byte, the CC2564C will finish transmitting the byte and stop the transmission.

### **1.5.2 Audio/Voice CODEC interface**

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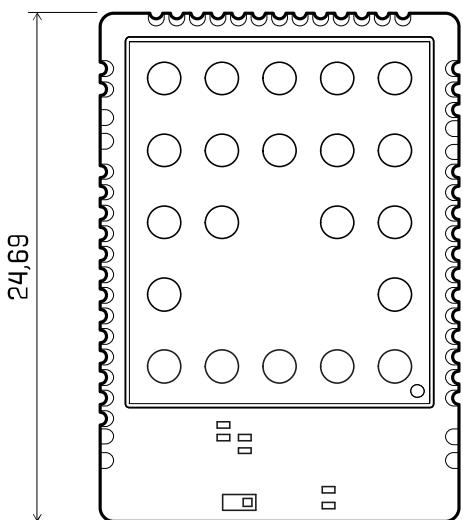
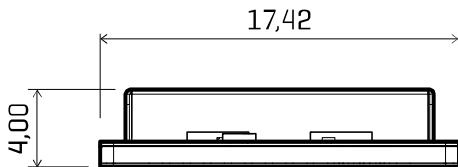
The internal CODEC is a single channel PCM CODEC. It includes Band limiting filter, A/D converter and Power Down function.

## **2 DESCRIPTION**

### **2.1 Dimensions**



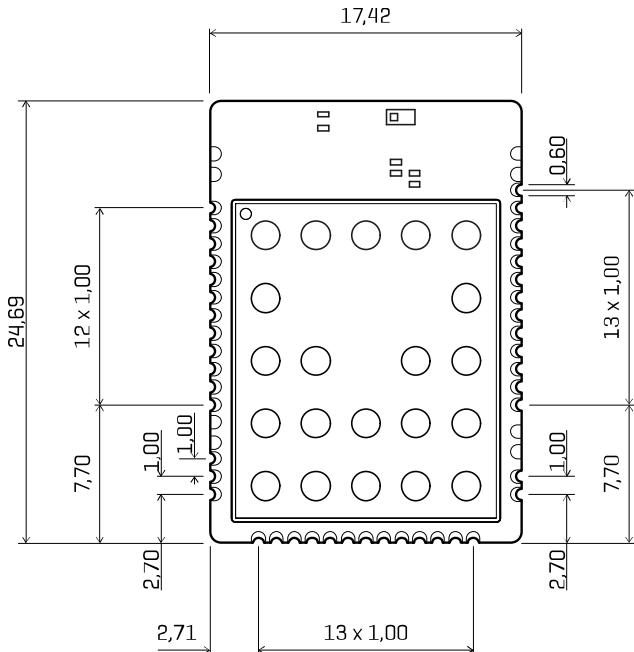
All dimensions are in millimetres.



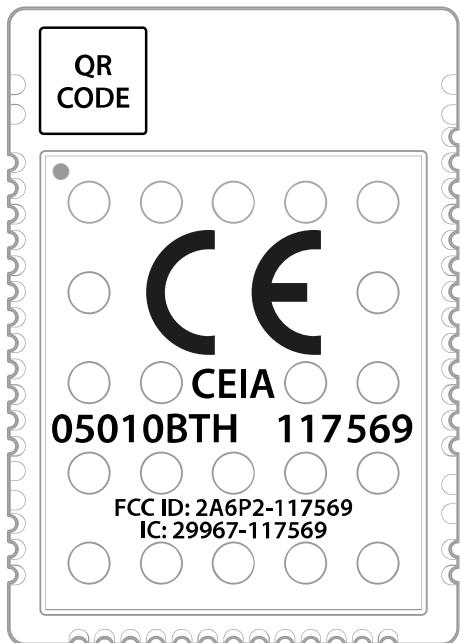
## 2.2 Footprint



All dimensions are in millimetres.



## 2.3 Case Marking



Marking on the device is made by laser engraving on the metal shield of the device itself

## 3 SPECIFICATION



All specifications are over temperature and process, unless indicated otherwise.

### 3.1 Default Test Conditions

- Temperature:  $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$
- Humidity: 40 to 85 % RH
- Supply voltage: 3.3V

### 3.2 Absolute Maximum Ratings



The maximum ratings may not be exceeded under any circumstances, not even momentarily or individually, as permanent damage to the module may result.



All parameters are measured as follows unless stated otherwise:  $\text{Vin} = 3.3\text{V}$

No.	See <sup>3</sup>	Min.	Max.	Unit
1	$\text{V}_{\text{IN}}$ (Pin 1)	-0.5	4.6	V
2	Audio_IN (Pin 44)	-0.3	$\text{V}_{\text{IN}}$	V
3	Input voltage to RF <sup>4</sup>	-0.5	2.1	V
4	Storage temperature range	-40	+125	$^{\circ}\text{C}$
5	ESD: Human Body Model (HBM). JEDEC 22-A114		500	V

<sup>3</sup> Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

<sup>4</sup> The module has an embedded antenna. If necessary an external connector can be soldered.

### 3.3 Recommended Operating Conditions

Symbol	Parameter	Condition	Min.	Max.	Unit
$V_{IN}$	Power Supply Voltage		3	3.6	V
$V_{IH}$	High-Level Input Voltage	Default	$0.65 \times V_{IN}$	$V_{IN}$	V
$V_{IL}$	Low-Level Input Voltage	Default	0	$0.35 \times V_{IN}$	V
	Operating ambient temperature range		-40	+85	°C

### 3.4 Static Current Consumption

No.	Characteristics	Min.	Typ.	Max.	Unit
1	Current consumption in Shutdown Mode		1	7	µA
2	Current consumption in Deep Sleep Mode		40	700	µA
3	Total I/O current consumption for Active Mode			1	mA
4	Current consumption during transmit DH5 full throughput		40		mA

### 3.5 Shutdown Requirements

Pin Name	Symbol	Parameter	Min.	Max.	Unit
CORE_SHUTD <sup>5</sup>	$V_{IH}$	Operation Mode Level	2	$V_{IN}$	V
	$V_{IL}$	Shutdown Mode Level	0	0.8	V
CODEC_SHUTD <sup>5</sup>	$V_{IH}$	Operation Mode Level	2	$V_{IN}$	V
	$V_{IL}$	Shutdown Mode Level	0	0.8	V
LDO_SHUTD <sup>6</sup>	$V_{IH}$	Operation Mode Level	0.85	2	V
	$V_{IL}$	Shutdown Mode Level	0.2	0.45	V

<sup>5</sup> An internal pull down retains shutdown mode when no external signal is applied to this pin.

<sup>6</sup> An internal pull up retains operation mode when no external signal is applied to this pin.

### 3.6 BT Wireless

#### BT Receiver: In-Band Signals

Characteristics	Condition	Min.	Typ.	Max.	Unit
Operation frequency range		2402		2480	MHz
Channel spacing			1		MHz
Sensitivity, Dirty Tx on <sup>7</sup>	GFSK, BER=0,1%		-90		dBm
	$\pi/4$ -DQPSK, BER=0,01%		-90		
	8DPSK, BER=0,01%		-82		
BER error floor at sensitivity +10dB, dirty Tx off	$\pi/4$ -DQPSK	1E-6	1E-7		
	8DPSK	1E-6			
Maximum usable input power	GFSK, BER=0,1%	-5			dBm
	$\pi/4$ -DQPSK, BER=0,1%	-10			
	8DPSK, BER=0,1%	-10			
Intermodulation characteristics	Level of interferers (for n=3, 4 and 5)	-36	-30		dBm
C/I performance <sup>8</sup> image = -1 MHz	GFSK, cochannel		8	10	dBm
	EDR, cochannel	$\pi/4$ -DQPSK	9.5	11	
		8DPSK	16.5	20	
	GFSK, adjacent $\pm 1$ MHz		-10	-5	
	EDR, adjacent $\pm 1$ MHz, (image)	$\pi/4$ -DQPSK	-10	-5	
		8DPSK	-5	-1	
	GFSK, adjacent +2 MHz		-38	-35	
	EDR, adjacent +2 MHz	$\pi/4$ -DQPSK	-38	-35	
		8DPSK	-38	-30	
	GFSK, adjacent -2 MHz		-28	-20	
	EDR, adjacent -2 MHz	$\pi/4$ -DQPSK	-28	-20	
		8DPSK	-22	-13	
	GFSK, adjacent $\geq  \pm 3 $ MHz		-45	-43	
	EDR, adjacent $\geq  \pm 3 $ MHz	$\pi/4$ -DQPSK	-45	-43	
		8DPSK	-44	-36	

<sup>7</sup> Sensitivity degradation up to 3 dB may occur for minimum and typical values where the BT frequency is a harmonic of the fast clock.

<sup>8</sup> Numbers show ratio of desired signal to interfering signal. Smaller numbers indicate better C/I performance.

Characteristics	Condition	Min.	Typ.	Max.	Unit
Rx mode LO leakage	$Fr_f = (\text{received RF} - 0.6 \text{ MHz})$		-63	-58	dBm

**BT Receiver: General Blocking**

Characteristics	Condition	Typ.	Unit
Blocking performance over full range, according to BT specification <sup>9</sup>	30 to 2000 MHz	-6	dBm
	2000 to 2399 MHz	-6	dBm
	2484 to 3000 MHz	-6	dBm
	3 to 12.75 GHz	-6	dBm

**BT Transmitter: GFSK**

Characteristics	Min.	Typ.	Max.	Unit
Maximum RF output power <sup>10</sup>		8	10	dBm
Power variation over BT band	-1		1	dB
Power variation over temperature (-40°C – 85°C)	-0.5		0.5	dB
Power variation over power supply (3V – 3.6V)	-0.1		0.1	dB
Gain control range		30		dB
Power control step		5		dB
Adjacent channel power $ M-N =2$		-45		dBm
Adjacent channel power $ M-N >2$		-50		dBm

**BT Transmitter: EDR**

Characteristics	Min.	Typ.	Max.	Unit
EDR output power <sup>11</sup>	$\pi/4$ -DQPSK	6	10	dBm
	8DPSK			
EDR relative power	-2		1	dB
Power variation over BT band	-1		1	dB
Power variation over temperature (-40°C – 85°C)	-0.5		0.5	dB
Power variation over power supply (3V – 3.6V)	-0.1		0.1	dB
Gain control range		30		dB
Power control step		5		dB
Adjacent channel power $ M-N =1$		-36		dBc

<sup>9</sup> Exceptions are taken out of the total 24 allowed in the BT specification.

<sup>10</sup> To modify maximum output power, use an HCI VS command.

<sup>11</sup> To modify maximum output power, use an HCI VS command.

Characteristics	Min.	Typ.	Max.	Unit
Adjacent channel power $ M-N =2$		-30		dBm
Adjacent channel power $ M-N >2$		-42		dBm

### BT Modulation: GFSK

Characteristics	Condition		Min.	Typ.	Max.	Unit
-20 dB bandwidth	GFSK			925		kHz
F1 avg	$\Delta f1avg$	Mod data=4 1s, 4 0s: 111100001111...		165		kHz
	$\Delta f2max \geq$ limit for at least 99.9% of all $\Delta f2max$	Mod data=1010101...		130		kHz
	$\Delta f2avg, \Delta f1avg$			88		%
Absolute carrier frequency drift	DH1		-25		25	kHz
	DH3 and DH5		-35		35	kHz
Drift rate					15	kHz/ 50 $\mu$ s
Initial carrier frequency tolerance			-75		75	kHz

### BT Modulation – EDR

Characteristics	Condition	Min.	Typ.	Max.	Unit
Carrier frequency stability				$\pm 5$	kHz
Initial carrier frequency tolerance				$\pm 75$	kHz
RMS DEVM <sup>12</sup>	$\pi/4$ -DQPSK		6%		
	8DPSK		6%		
99% DEVM <sup>12</sup>	$\pi/4$ -DQPSK			30%	
	8DPSK			20%	
Peak DEVM <sup>12</sup>	$\pi/4$ -DQPSK		14%		
	8DPSK		16%		

<sup>12</sup> Maximum performance refers to maximum TX power.

**BT LE Receiver: In-Band Signals**

Characteristics	Condition	Min.	Typ.	Max.	Unit
Operation frequency range		2402		2480	MHz
Channel spacing			2		MHz
Sensitivity, Dirty Tx on <sup>13</sup>	PER=30.8%; dirty Tx on		-92		dBm
Maximum usable input power	GMSK, PER=30.8%	-5			dBm
Intermodulation characteristics	Level of interferers (for n=3, 4 and 5)		-30		dBm
C/I performance <sup>14</sup> Image = -1 MHz	GMSK, cochannel		8		dB
	GMSK, adjacent $\pm 1$ MHz		-5		
	GMSK, adjacent $\pm 2$ MHz		-45		
	GMSK, adjacent -2 MHz		-22		
	GMSK, adjacent $\geq  \pm 3 $ MHz		-47		
Rx mode LO leakage	$F_{rf} = (\text{received RF: } 0.6 \text{ MHz})$		-63		dBm

**BT LE Receiver: General Blocking**

Characteristics	Condition	Typ.	Unit
Blocking performance over full range, according to BT LE specification <sup>15</sup>	30 to 2000 MHz	-15	dBm
	2000 to 2399 MHz	-15	
	2484 to 3000 MHz	-15	
	3 to 12.75 GHz	-15	

**BT LE Transmitter**

Characteristics	Typ.	Max.	Unit
RF output power <sup>16</sup>	8	10	dBm
Power variation over BT LE band		1	dB
Power variation over temperature (-40°C – 85°C)		0.5	dB
Power variation over power supply (3V – 3.6V)		0.1	dB
Adjacent channel power $ M-N =2$	-45		dBm
Adjacent channel power $ M-N >2$	-50		dBm

<sup>13</sup> Sensitivity degradation up to 3 dB may occur where the BT LE frequency is a harmonic of the fast clock.

<sup>14</sup> Numbers shows wanted signal-to-interfering signal ratio. Smaller numbers indicate better C/I performance.

<sup>15</sup> Exceptions are taken out of the total 10 allowed in the BT LE specification.

<sup>16</sup> To modify maximum output power, use an HCI VS command

## BT LE Modulation

Characteristics		Condition		Min.	Typ.	Max.	Unit			
$\Delta f1$ avg	Modulation characteristics	$\Delta f1$ avg	Mod data=4 1s, 4 0s: 111100001111...	240	250	260	kHz			
		$\Delta f2$ max $\geq$ limit for at least 99.9% of all $\Delta f2$ max	Mod data=1010101...	185	210		kHz			
		$\Delta f2$ avg, $\Delta f1$ avg		0.85	0.9					
Absolute carrier frequency drift				-25		25	kHz			
Drift rate						15	kHz/ 50ms			
Initial carrier frequency tolerance				-75		75	kHz			

## 3.7 CODEC Requirements

## Absolute Gain

Parameter	Conditions	Min.	Typ.	Max.	Unit
Analog input level	VFTN → DX	0dBm0@1020Hz		0.460	Vrms
Absolute transmit gain			-0.6	0.6	dB
Maximum overload level		3.14dBm0		0.660	Vrms

## Frequency response

Parameter	Conditions	Min.	Typ.	Max.	Unit
Transmit frequency response (A → D) VFTN → DX	Relative to: -10dBm0 1020Hz Tone	-55dBm0~50dBm0	-1.2	1.2	dB
		-50dBm0~40dBm0	-0.4	0.4	dB
		40dBm0~3dBm0	-0.2	-0.2	dB
	Relative to: 0dBm0 @1020Hz	0.05kHz		-30	dB
		0.06kHz		-26	dB
		0.2kHz	-1.8	0	dB
		0.3~3.0kHz	-0.15	0.15	dB
		3.4kHz	-0.8	0	dB
		4.0kHz		-14	dB

**Distortion (A-law,  $\mu$ -law)**

Parameter	Conditions	Min.	Typ.	Max.	Unit
Transmit signal to Distortion (A → D) VFTN → DX	1020Hz Tone	-40dBm0~−45dBm0	25		dB
		-30dBm0~−40dBm0	30		dB
		-40dBm0~−30dBm0	36		dB

**Distortion (Linear PCM)**

Parameter	Conditions	Min.	Typ.	Max.	Unit
Transmit signal to Distortion (A → D) VFTN → DX	1020Hz Tone 0dBm0 (C-message)		78		dB

**Noise**

Parameter	Conditions	Min.	Typ.	Max.	Unit
Idle channel noise (A → D) VFTN → DX	u-law, C-message		12	17	dBmC0
	A-law, Psophometric		-78	-73	dBm0p
	Linear, C-message		12	17	dBmC0

**Crosstalk**

Parameter	Conditions	Min.	Typ.	Max.	Unit
Transmit to receive VFTN → VR	VFTN 0dBm0@1020Hz DR = 0-code			-75	dB

**Analog input op-amp characteristics: AMPT**

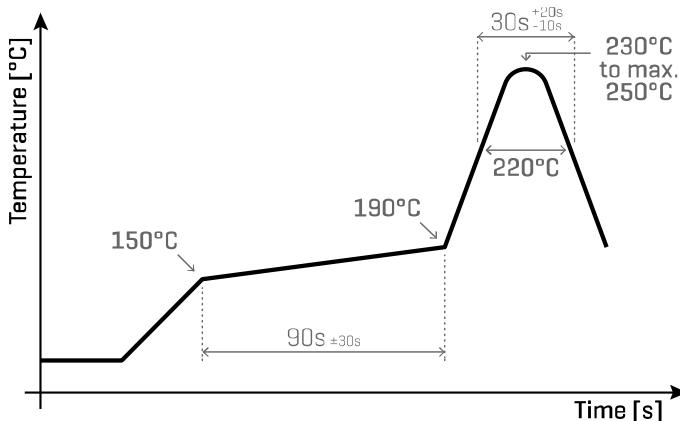
Parameter	Conditions	Min.	Typ.	Max.	Unit
Load resistance	AC load, including feedback resistance	10			k $\Omega$
Load capacitance				50	pF
Gain	Inverting amplifiers	-6		20	dB

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<sup>17</sup> Analog input is set to the analog ground level.

### 3.8 Recommended Soldering Profile

- Reflow permissible cycles: 2
- Opposite side reflow is prohibited due to module weight
- More than 75% of the soldering area shall be coated by solder
- The soldering profiles should be adhered to in order to prevent electrical or mechanical damage
- Soldering profile assumes lead-free soldering



## 3.9 Cautions



Failure to follow the guidelines set forth in this document may result in degrading of the module functions and damage to the module.

### 3.9.1 Design Notes

- Follow the conditions written in this specification, especially the control signals of this module.
- The supply voltage should abide by the maximum ratings.
- The supply voltage must be free of AC ripple voltage (for example from a battery or a low noise regulator output).
- This module should not be mechanically stressed when installed.
- Keep this module away from heat.
- Keep this module away from other high frequency circuits.
- Refer to the recommended pattern when designing a board.

### 3.9.2 Installation Notes

- Reflow soldering is possible twice based on the conditions set forth in [3.8 Recommended Soldering Profile](#). Set up the temperature at the soldering portion of this module according to this reflow profile.
- Carefully position the module so that the heat will not burn into printed circuit boards or affect other components that are susceptible to heat.
- Carefully locate the module, to avoid an increased temperature caused by heat generated by neighboring components.
- This module should not be mechanically stressed or vibrated when reflowed.

### **3.9.3 Usage Condition Notes**

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- Take measures to protect the module against static electricity.
- Follow the recommended condition ratings about the power supply applied to this module.
- These modules are intended for general purpose and standard use in general electronic equipment.

## 4 REGULATORY & CERTIFICATION



Manufacturers of devices incorporating this module shall evaluate compliance with applicable conducted emission and immunity tests.

### 4.1 European Conformity According to RED (2014/53/EU)

CEIA 05010BTH Module described in this Product Specification comply with the standards according to the following regulation with RED (2014/53/EU) articles:

3.1a Safety/Health: EN IEC 62368-1:2020 + A11:2020  
EN IEC 62311:2020

3.1b EMC: ETSI EN 301 489-1 V2.2.3  
Draft ETSI EN 301 489-17 V3.2.5

3.2 Radio: EN 300 328 V2.2.2 (2019-07)



The notified body IMQ S.p.A. (identification number 0051) performed the EU-type examination in compliance to Annex III Module B of the 2014/53/EU Directive and issued the EU-type examination Certificate No. 0051-RED-0136.

As a result of the conformity assessment procedure described in 2014/53/EU Directive, the end customer equipment should be labelled as follows:



CEIA 05010BTH Module in the specified reference design can be used in all countries of the European Economic Area (Member States of the EU, European Free Trade Association States [Iceland, Liechtenstein, Norway]), Monaco, San Marino, Andorra, and Turkey.



## 4.2 FCC Regulation



The 05010BTH Module 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.

The 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.

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by CEIA 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.



The OEM must ensure that FCC labelling requirements are met. This includes a clearly visible label on the outside of the OEM enclosure specifying the appropriate FCC identifier for this product as well as the FCC Notice above.

The FCC identifier is **FCC ID: 2A6P2-117569**.

This FCC identifier is valid for the 05010BTH Module.

The end product must in any case be labelled on the exterior with:  
"Contains FCC ID: 2A6P2-117569".



In accordance with FCC Regulation, the end customer has to assure that the device has a distance of more than 20 mm from the human body under all circumstances.

#### 4.2.1 Integration Instructions for Host Product Manufacturers According to “KDB 996369 D03”

Section	Topic and comment
2.2	<b>List of applicable FCC rules</b> FCC part 15.247 operation within the bands 902 MHz to 928 MHz, 2400 MHz to 2483.5 MHZ, and 5725 MHz to 5850 MHz
2.3	<b>Specific operational use conditions</b> Please refer to <a href="#">3.9 Cautions</a> .
2.4	<b>Limited module procedures</b> Not applicable. The module has a single-modular transmitter approval.
2.5	<b>Trace antenna designs</b> Not applicable. The module has a fixed ceramic chip antenna.
2.6	<b>RF exposure considerations</b> This device complies with FCC RF radiation exposure limit set forth for an uncontrolled environment. Please refer to <a href="#">4.2 FCC Regulation</a> . The host product manufacturer would provide the relative information to end user in their end-product manuals.
2.7	<b>Antennas</b> TDK chip antenna ANT016008LCS2442MA1 Frequency Band 2.4GHz, Gain +1.6dBi.
2.8	<b>Label and compliance information</b> For guidance regarding the required labeling please refer to <a href="#">4.2 FCC Regulation</a> .
2.9	<b>Information on test modes and additional testing requirements</b> Please study Desing Guide for the 05010BTH carefully. For the Desig Guide please refer to <a href="#">5 REFERENCE DESIGN</a> and <a href="#">6 PLACEMENT RECOMMENDATIONS</a> .
2.10	<b>Additional testing, Part 15 Subpart B disclaimer</b> The 05010BTH is only FCC authorized for the specific rule FCC part 15.247. The host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. The final host product still requires Part 15 Subpart B compliance testing with the 05010BTH installed.

## 4.3 ISED Regulation

The 05010BTH Module is licensed to meet the regulatory requirements of ISED.

License ID: **IC: 29967-117569**

Manufacturers of mobile, fixed or portable devices incorporating this module are advised to clarify any regulatory questions and ensure compliance for SAR and/or RF exposure limits. Users can obtain Canadian information on RF exposure and compliance from [www.ic.gc.ca](http://www.ic.gc.ca).



The 05010BTH Module complies with Canada RSS-GEN Rules. The device meets the requirements for modular transmitter approval as detailed in RSS-Gen.

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.



The OEM must ensure that IC labelling requirements are met. This includes a clearly visible label on the outside of the OEM enclosure specifying the appropriate IC identifier for this product as well as the IC Notice above. The IC identifier is **IC: 29967-117569**.



In accordance with the Radio Standard Specification RSS-102 (Issue 5 - March 2015), the end customer has to assure that the device has a distance of more than 20 mm from the human body under all circumstances.

#### 4.4 RoHS and REACH Declaration

The latest declaration of environmental compatibility (Restriction of Hazardous Substances, RoHS and Registration, Evaluation, Authorisation and Restriction of Chemicals, REACH) for supplied products is available on request.

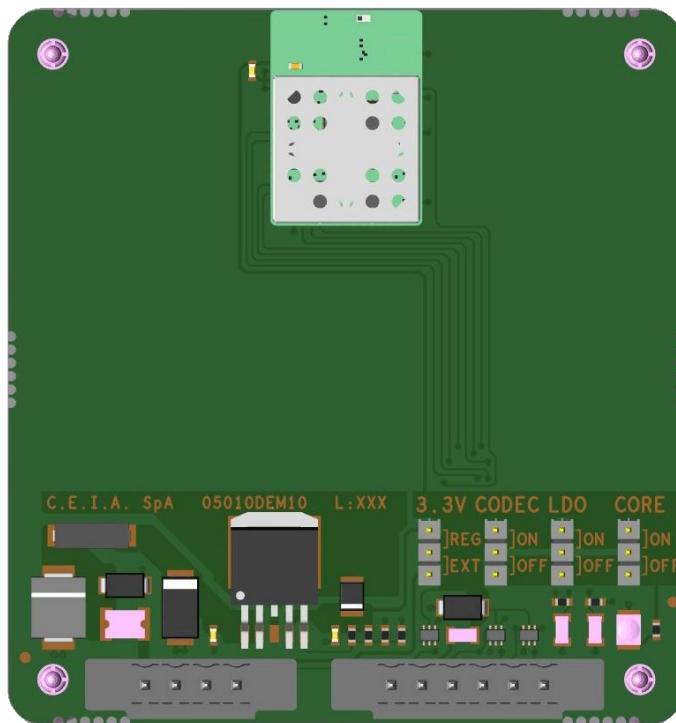


## 4.5 EU Declaration of Conformity

EU DECLARATION OF CONFORMITY	
(in accordance with EN ISO/IEC 17050-1:2010)	
DECLARATION DE CONFORMITÉ UE (conformément à la norme EN ISO/IEC 17050-1:2010) EU-KONFORMITÄTSERKLÄRUNG (nach EN ISO/IEC 17050-1:2010)	
DECLARACIÓN DE CONFORMIDAD UE (según EN ISO/IEC 17050-1:2010) DICHIARAZIONE DI CONFORMITÀ UE (in conformità con EN ISO/IEC 17050-1:2010)	
This declaration of conformity is issued under the sole responsibility of the manufacturer / La présente déclaration de conformité est établie sous la seule responsabilité du fabricant / Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller / La presente declaración de conformidad se expide bajo la exclusiva responsabilidad del fabricante / La presente dichiarazione di conformità è rilasciata sotto la responsabilità esclusiva del fabbricante	
<b>Manufacturer:</b> <b>CESTROZIONI ELETTRONICHE INDUSTRIALI AUTOMATISMI CEIA S.p.A.</b> <b>Fabricant / Hersteller / Fabricante / Costruttore:</b> <b>Zona industriale Viciomaggio 54</b> <b>52041 Viciomaggio Arezzo – ITALY</b>	
<b>Declares that the product</b> <b>déclare que ce produit / erklärt, daß das Produkt / declara que el producto / dichiara che il prodotto:</b>	
<b>Description</b> <b>2.4 GHz radio module</b> <b>Description / Beschreibung</b> <b>Module radio 2.4 GHz / 2.4-GHz-Funkmodul</b> <b>Description / descripción</b> <b>Módulo de radio de 2,4 GHz / Modulo radio 2,4 GHz</b>	
<b>Product name:</b> <b>05010BTH</b> <b>Nom du produit / Produktname</b> <b>Nombre del producto / Nome:</b>	
<b>Model:</b> <b>Modelé / Modell / Modelo / Modello:</b> <b>117569</b> <b>Product Options</b> <b>This declaration covers all options</b> <b>Options / options</b> <b>Cette déclaration est valable pour toutes les options / Diese Erklärung ist gültig für alle</b> <b>Opciones / opzioni:</b> <b>Esta declaración es válida para todas las opciones / Questa dichiarazione è valida per tutte le opzioni</b>	
<b>conforms to the following Product Specifications</b> <b>est conforme aux spécifications suivantes / folgenden Produktspezifikationen entspricht</b> <b>es conforme a las siguientes especificaciones / è conforme alle seguenti specifiche di prodotto:</b>	
<b>Radio Equipment Directive (RED) 2014/53/EU</b> <b>Art. 3.1(a)</b> <b>EN 62368-1:2014 + EN 62368-1:2014/A11:2017 + EN 62368-1:2014/AC:2015</b> Audio/video, information and communication technology equipment - Part 1: Safety requirements <b>EN 62311:2008</b> Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz - 300 GHz)	
<b>Art. 3.1(b)</b> <b>EN 301 489-1 v9.2.2 ElectroMagnetic compatibility and Radio spectrum Matters (ERM) - ElectroMagnetic Compatibility (EMC) standard for radio equipment and services - Part 1: Common technical requirements</b> <b>EN 301 489-17 v3.2.4 ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard for ElectroMagnetic Compatibility</b>	
<b>Art. 3.2</b> <b>EN 300 328 V2.2.2 Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz band; Harmonised Standard for access to radio spectrum</b>	
<b>Art. 3.3</b> <b>Not applicable</b>	
<b>This product complies with the requirements of the Radio Equipment Directive (RED) 2014/53/EU.</b> <b>Le produit est conforme aux dispositions de la directive 2014/53/UE concernant les équipements radioélectriques.</b> <b>Das Produkt entspricht den Bestimmungen der Richtlinie 2014/53/UE über Funkanlagen.</b> <b>El producto cumple con las disposiciones de la Directiva 2014/53/UE sobre equipos de radio.</b> <b>Il prodotto è conforme alle norme della direttiva RED 2014/53/UE sulle apparecchiature radio.</b>	
<b>RoHS Directive 2011/65/EU</b> <b>This product complies with the requirements of the RoHS Directive 2011/65/EU (RoHS 2) + (EU) 2015/863 (RoHS 3).</b> <b>Le produit ci-dessus répond aux exigences de la Directive 2011/65/UE (RoHS 2) + (UE) 2015/863 (RoHS 3) concernant les RoHS.</b> <b>Dieses Produkt entspricht den Anforderungen der RoHS-Norm 2011/65/EU (RoHS 2) + (EU) 2015/863 (RoHS 3).</b> <b>El producto indicado cumple los requisitos de la Directiva RoHS 2011/65/UE (RoHS 2) + (UE) 2015/863 (RoHS 3).</b> <b>Il prodotto è conforme alle norme della direttiva RoHS 2011/65/UE (RoHS 2) + (UE) 2015/863 (RoHS 3).</b>	
<b>For further information, please contact our Quality department or our representative of our suppliers regarding the presence of RoHS substance in the parts and materials. Our supplier contacts are available to make compliance with our chemical substance restrictions.</b> <b>CEIA also has internal system in place to ensure ongoing compliance and all laws and regulations. These system include standard operating procedures that ensure that product safety, EMC and environmental compliance requirements are followed an internal auditing process to ensure compliance with all standard operating procedures.</b>	
<b>The notified body IMO S.p.A. (identification number 0051) performed the EU-type examination in compliance to Annex III Module B of the 2014/53/EU Directive and issued the EU-type examination Certificate No. 0051-RED-xxxx.</b> <b>L'organisme notifié IMO S.p.A. (número d'identification 0051) a effectué l'examen UE de type conformément à l'annexe III module B de la directive 2014/53/UE et a délivré le certificat d'examen UE de type No. 0051-RED-xxxx.</b> <b>Die bewilligte Stelle IMO S.p.A. (Identifikationsnummer 0051) hat die EU-Baumusterprüfung gemäß Anhang III Modul B der Richtlinie 2014/53/EU durchgeführt und die EU-Baumusterprüfungsnachweis Nr. 0051-RED-xxxx ausgestellt.</b> <b>El organismo notificado IMO S.p.A. (número de identificación 0051) realizó el examen UE de tipo de conformidad con el Anexo III Módulo B de la Directiva 2014/53/UE y emitió el certificado de examen UE de tipo No. 0051-RED-xxxx.</b> <b>Lo organismo notificado IMO S.p.A. (número de identificación 0051) ha effettuato l'esame UE del tipo in conformità all'Allegato III Modulo B della Direttiva 2014/53/UE e ha rilasciato il Certificato di esame UE del tipo No. 0051-RED-xxxx.</b>	
<b>Signed for and on behalf of: / Signé par et au nom de: / Unterzeichnet für und im Namen von: / Firmado por y en nombre de: / Firmato in vece e per conto di:</b> <b>CEIA S.p.A. Zona industriale Viciomaggio 54 52041 Viciomaggio Arezzo – ITALY</b>	
 <b>Ing. Enrico Sorini</b>  <b>Lab. EMC Person in charge</b> <small>Resp. Laboratorio EMC / Verantwortlicher für EMC-Labor Resp. Laboratorio EMC / Resp. Lab. EMC</small>	

## 5 REFERENCE DESIGN

The CEIA card 05010DEM allows simplified evaluation of the key features of the module.



## 6 PLACEMENT RECOMMENDATIONS

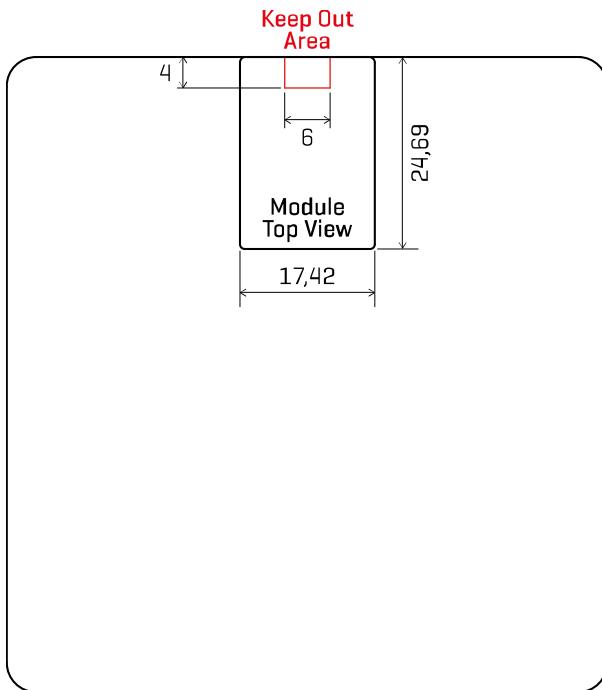


Do not place any ground plane under the red marked antenna area in any layer. The materials surrounding the module can affect the radiation pattern of the antenna.



Use a ground plane in the area surrounding the module wherever possible.

All dimensions are in millimetres.





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