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Datasheet

BTM44x

Version 3.6

REVISION HISTORY

Revision	Date	Description	Approved By
1.0	9/10/2011	Initial Release	Jonathan Kaye
1.1	04/2012	Up to Build 240	Jonathan Kaye
2.0	08/2012	General Formatting	Jonathan Kaye
3.0	01/14/2013	Reformatting, Updates to FCC/IC Statements, Updates to Mechanical Specs	Jonathan Kaye
3.1	09 Dec 2013	A. Dobbing's signature added to DoC	Jonathan Kaye
3.2	02 Feb 2014	Separated document into two docs: User Guide and Hardware Integration Guide	Jonathan Kaye
3.3	06 Feb 2014	Updated Bluetooth SIG Qualification section	Jonathan Kaye
3.4	18 Aug 2014	Updated shipping tray image and added module package dimension image.	Jonathan Kaye
3.5	3 Sept 2014	Updated EU Declaration of Conformity for BTM441 / BTM443	Jonathan Kaye
3.6	18 Aug 2016	Changed from *Hardware Integration Guide* to *Datasheet*	Sue White

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1 PRODUCT DESCRIPTION

The BTM44x Bluetooth® modules from Laird Technologies have been designed to meet the needs of developers who wish to add robust, short range Bluetooth data connectivity to their products. They are based on the market leading Cambridge Silicon Radio BC04 chipset, providing exceptionally low power consumption with outstanding range. They support the latest Bluetooth® Version 2.1 Specification, providing the important advantage of Secure Simple Pairing, which improves security and enhances the ease of use for end customers.

With physical sizes as small as 12.5 x 18.0mm and best of class, low-power operation, these modules are the ideal choice for applications where designers need both performance and minimum size. For maximum flexibility in systems integration, the modules are designed to support a separate power supply for I/O.

To aid product development and integration, Laird Technologies has integrated a complete Bluetooth protocol stack within the modules, including support for multiple Bluetooth Profiles. The modules are fully qualified as Bluetooth End Products, allowing designers to integrate them within their own products with no further Bluetooth Qualification. They can then list and promote their products on the Bluetooth website free of charge.

Support for Serial Port Profile (SPP), Human Interface Device (HID) profile and Health Device Profile (HDP) are included in the module. The support of the Bluetooth Sig's Health Device Profile makes this the ideal module for development of Continua compliant medical and wellness devices. By default the Health Device Profile supports the ISO/IEEE 11073-10415 device specialization for weigh scales, but additional specializations for glucose and thermometer are available with more upon request.

Communication is available to the module over a serial UART utilizing either a custom Multi-point Packet Protocol API or comprehensive AT commands. Combined with a low cost developer's kit, this ensures that the choice of Laird Technologies modules guarantees the fastest route to market.

1.1 Features and Benefits

- Bluetooth® v2.1+EDR
- Adaptive Frequency Hopping to cope with interference from other wireless devices
- Secure Simple Pairing support
- External or internal antenna options
- Comprehensive AT interface for simple programming
- Alternate Packet based interface for complex programming
- Bluetooth® END Product Qualified
- Compact size
- Class 2 output – 4dBm
- Low power operation
- UART interface

1.2 Applications

- Embedded Devices
- Phone Devices
- Phone Accessories
- Security Devices
- Medical and Wellness Devices
- Automotive Applications

1.3 Bluetooth® Profiles Supported

- Serial Port Profile (SPP)
- Human Interface Device (HID) Profile Host and device supported
- Health Device Profile (HDP): Agent supported
- IEEE Device Specialization 11073-10415 (Weight Scale)
- IEEE Device Specialization 11073 - 10408 (Thermometer)
- IEEE Device Specialization 11073 – 10417 (Glucose)

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2 HARDWARE SPECIFICATIONS

2.1 Pin Definitions

Table 1: Pin definitions

	Signal	Description	Voltage Specification
1	Unused		
2	GND		
3	UART_CTS	Clear to Send I/P	VUSB
4	UART_RXD	Receive data I/P	VUSB
5	UART_RTS	Request to Send O/P	VUSB
6	UART_TXD	Transmit data O/P	VUSB
7	GND		
8	SPI_CSB	SPI bus chip select I/P	VIO
9	SPI_MISO	SPI bus serial O/P	VIO
10	SPI_MOSI	SPI bus serial I/P	VIO
11	SPI_CLK	SPI bus clock I/P	VIO
12	VDD_USB	USB & UART supply voltage	
13	VDD_IO	I/O supply voltage	
14	VDD_IN	Main supply voltage	
15	GND		
16	PCM_IN	PCM Data I/P	VIO
17	PCM_SYNC	PCM sync I/P	VIO
18	PCM_CLK	PCM clock I/P	VIO
19	PCM_OUT	PCM Data O/P	VIO
20	RESET	Module reset I/P	See note 2
21	GPIO4	I/O for host- BT_Active BT_State	VIO
22	GPIO2 / UART_DCD	I/O for host	VIO
23	GND		
24	Unused		
25	Unused	See note 3	
26	Unused	See note 3	
27	Unused	See note 3	
28	GND	See note 3	
29	ANT (BTM440 / 442 only)	Antenna connection (50 ohm matched)	See note 3
30	GND	See note 3	
31	Unused	See note 3	
32	Unused	See note 3	
33	Unused	See note 3	
34	Unused	See note 3	

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	Signal	Description	Voltage Specification
35	Unused	See note 3	
36	Unused	See note 3	
37	Unused	See note 3	
38	Unused		
39	Unused		
40	Unused		
41	GND		
42	GPIO1 / UART_RI	I/O for host	VIO
43	GPIO7 / UART_DTR	I/O for host	VIO
44	GPIO8 / UART_DSR	I/O for host	VIO
45	GND		
46	D-	Not used for AT module variants	VUSB
47	D+	Not used for AT module variants	VUSB
48	GPIO6	I/O for host- RF_Active	VIO
49	GPIO5	I/O for host – WLAN_Active	VIO
50	GPIO3	I/O for host – BT_Priority	VIO

Notes:

Unused pins may have internal connections and must not be connected.

Reset input is active low. Input is pulled up to VDD_IN via 22k. Minimum reset pulse width is 5ms.

Pins 25-37 should be left not connected on modules with integrated antenna (BTM441/3)

Pins 8 – 11 (SPI related) are only for Laird internal production purposes.

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2.3 Physical Specifications

Table 2: Physical Specifications

Categories	Feature	Implementation
Physical	Dimensions	12.5mm x 18.0 x 3.4mm (BTM440 / 442) 12.5mm x 24.0mm x 3.4mm (BTM441/3)
		12.5mm x 22.0 x 3.4mm (BTM441 / 443)
	Weight	3 grams
Environmental	Operating Temperature	-40°C to +85°C
	Storage Temperature	-40°C to +85°C
Miscellaneous	Lead free	Lead-free and RoHS compliant

2.4 Electrical Specifications

Table 3: Electrical Specifications

Categories	Feature	Implementation
Wireless Specification	Bluetooth®	Version 2.1+EDR
	Transmit Class	Class 2
	Frequency	2.402 – 2.480 GHz
	Channels	79 channels Frequency Hopping Adaptive Frequency Hopping
	Max Transmit Power	+4 dBm at antenna pad (BTM440/2) +4 dBmi from integrated antenna (BTM441/3)
	Min Transmit Power	-27 dBm at antenna pad (BTM440/2) -27 dBmi from integrated antenna (BTM441/3)
	Receive Sensitivity	-84 dBm
	Range	30 m
	Data Transfer Rate	Up to 350 kbps

2.5 Operational Specifications

Table 4: Operational Specifiations

Recommended Operating Conditions	MIN	MAX
VDD_USB (USB compatibility not required)	1.7	3.6
VDD_USB (USB compatibility required)	3.1	3.6
VDD_IO	1.7	3.3
VDD_IN	3.0	3.3

2.6 Voltage Parameters

Table 5: Voltage Parameters (VUSB)

Logic Levels (VUSB)	MIN	TYP	MAX
INPUT VOLTAGE LEVELS			
V_{ih}	0.7VDD_USB		

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Logic Levels (VUSB)	MIN	TYP	MAX
V_{il} 2.7<VDD_USB<3.0	-0.4		+0.8
1.7<VDD_USB<1.9	-0.4		+0.4
OUTPUT VOLTAGE LEVELS (1.7<VDD_USB<1.9)			
V_{oh} (Iout = -4mA)	VDD_USB – 0.4		
V_{ol} (Iout = 4mA)			0.4
OUTPUT VOLTAGE LEVELS (2.7<VDD_USB<3.0)			
V_{oh} (Iout = -4mA)	VDD_USB – 0.2		
V_{ol} (Iout = 4mA)			0.2

Note: VDD_USB must be connected to power the USB and UART interfaces.

Table 6: Voltage Parameters (VIO)

Logic Levels (VIO)	MIN	TYP	MAX
INPUT VOLTAGE LEVELS			
V_{ih}	0.7VDD_IO		
V_{il} 2.7<VDD_IO<3.0	-0.4	+0.8	
1.7<VDD_IO<1.9	-0.4	+0.4	
OUTPUT VOLTAGE LEVELS (1.7 < VDD_IO < 1.9)			
V_{oh} (Iout = -4mA)	VDD_IO – 0.4		
V_{ol} (Iout = 4mA)		0.4	
OUTPUT VOLTAGE LEVELS (2.7 < VDD_IO < 3.0)			
V_{oh} (Iout = -4mA)	VDD_IO – 0.2		
V_{ol} (Iout = 4mA)		0.2	

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2.7 I/O Details

Table 7: I/O Details

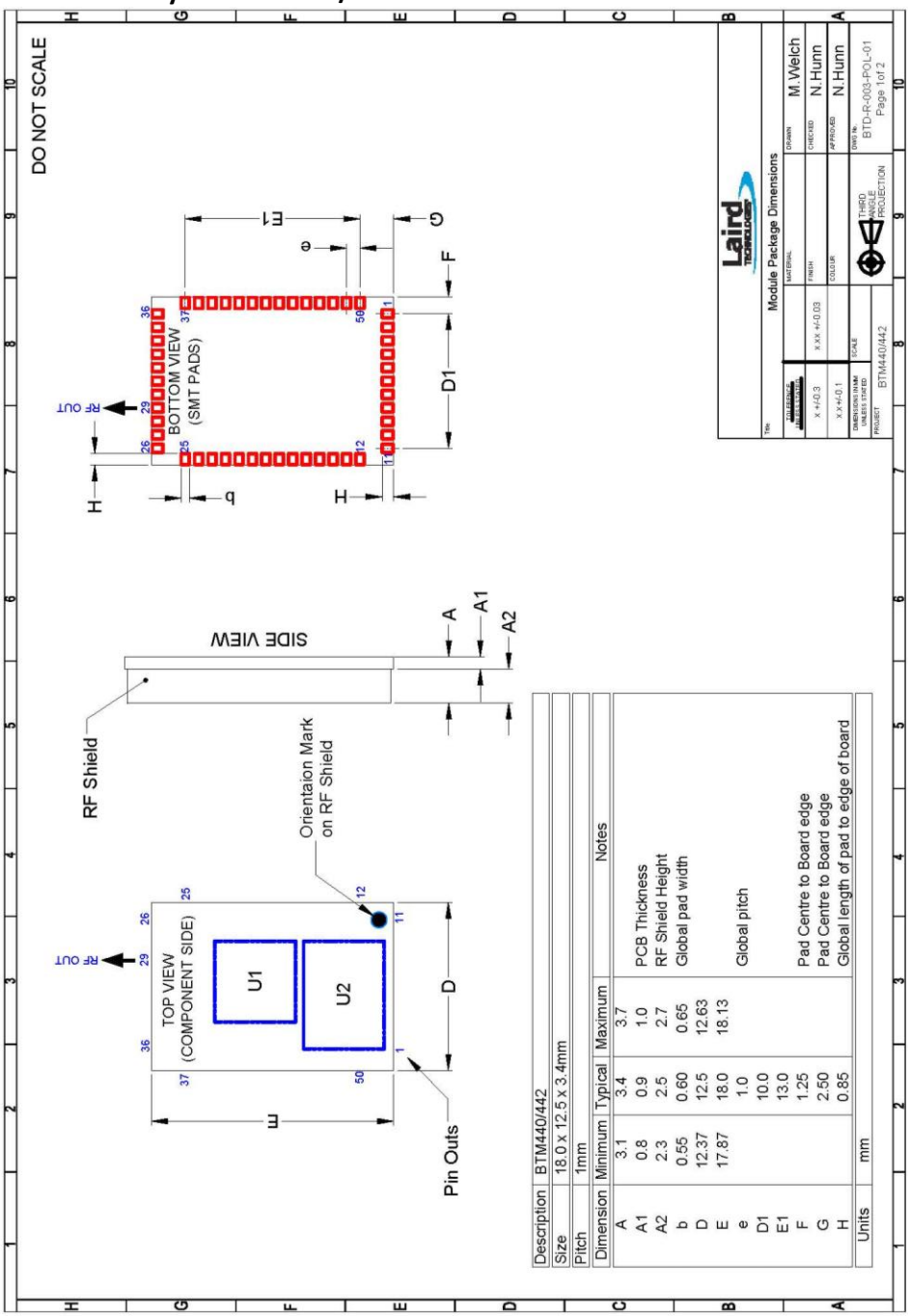
Categories	Feature	Implementation
Command Interface	AT Instructions set	Comprehensive control of connection and module operation S Registers for non-volatile storage of parameters
UART Interface	Baud Rate	AT Mode Default Baud Rate: 9600 bps MP Mode Default Baud Rate: 115,200 bps
Supply Voltage	Supply	3.0V – 3.3V DC
	I/O	1.7V – 3.3V DC (independent of Supply)
	USB & UART	1.7V – 3.6V DC (independent of Supply)
Coexistence / Compatibility	WLAN (802.11)	2-wire and 3-wire hardware coexistence schemes supported
Connections	Interface	Surface Mount Pads
	External Antenna (BTM440/2)	Pad for 50 Ohm antenna
Approvals	Bluetooth	Qualified as an END product
	FCC	Limited Modular Approval (BTM440/2) Full Modular Approval (BTM441/3)
	Industry Canada (IC)	Limited Modular Approval (BTM440/2) Full Modular Approval (BTM441/3)
	CE & R&TTE	Meets CE and R&TTE requirements
Miscellaneous	Lead free	Lead-free and RoHS compliant
	Warranty	1-Year Warranty
Development Tools	Development Kit	Development board and software tools DVK-BTM440/2 Dev Kit with BTM440/2 module fitted DVK-BTM441/3 Dev Kit with BTM441/3 module fitted

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3 MECHANICAL CONSIDERATIONS

Mechanical Layout - BTM440/442 Mechanical Details



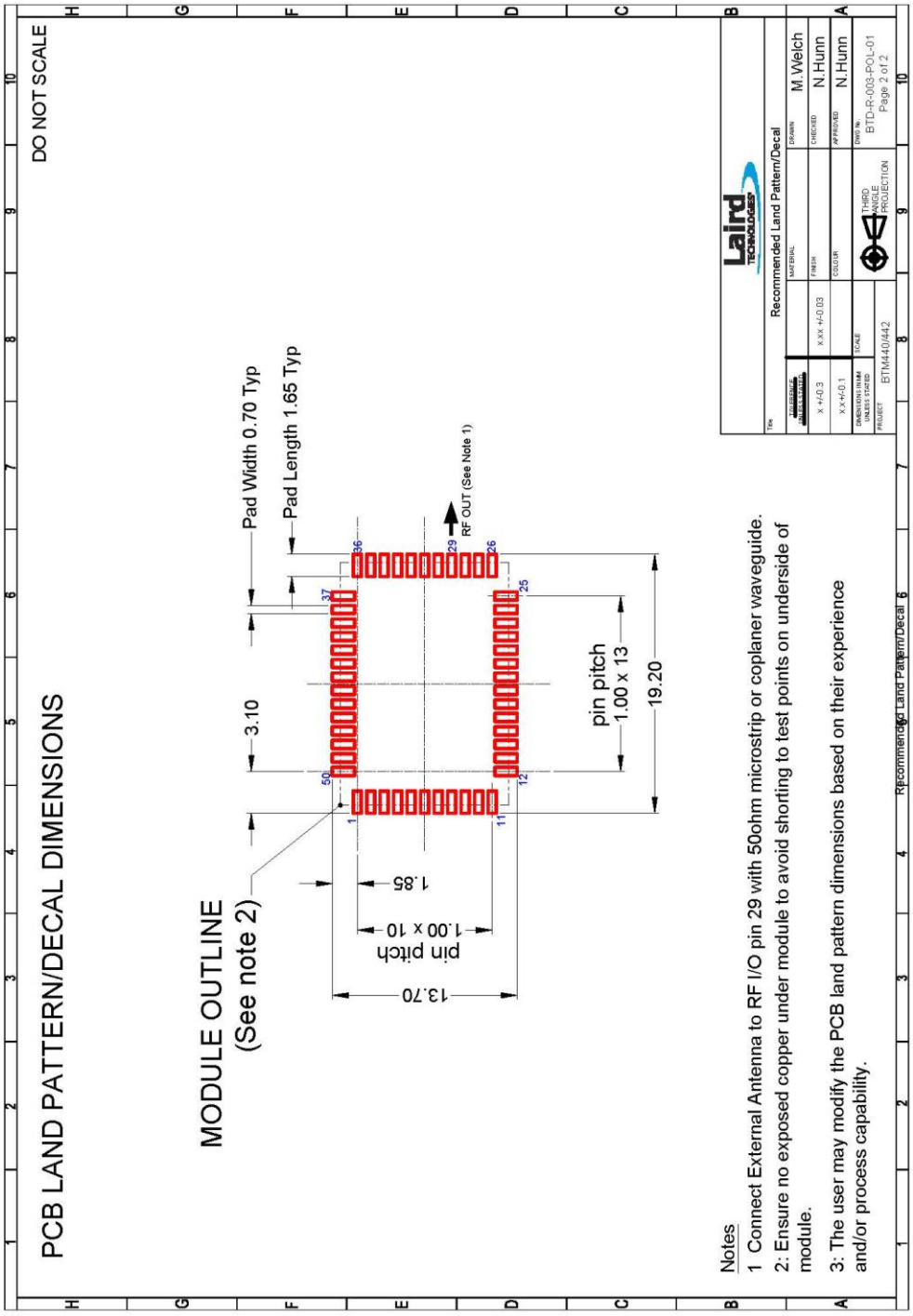
Module Keep-Out Area: An area of 1.5mm around the module should be reserved as a keep-out area. No other components should be placed in this area.

Note: Development Kit Schematics for this product can be accessed from the the BTM44x product page.

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Mechanical layout - BTM440/442 Mechanical Details



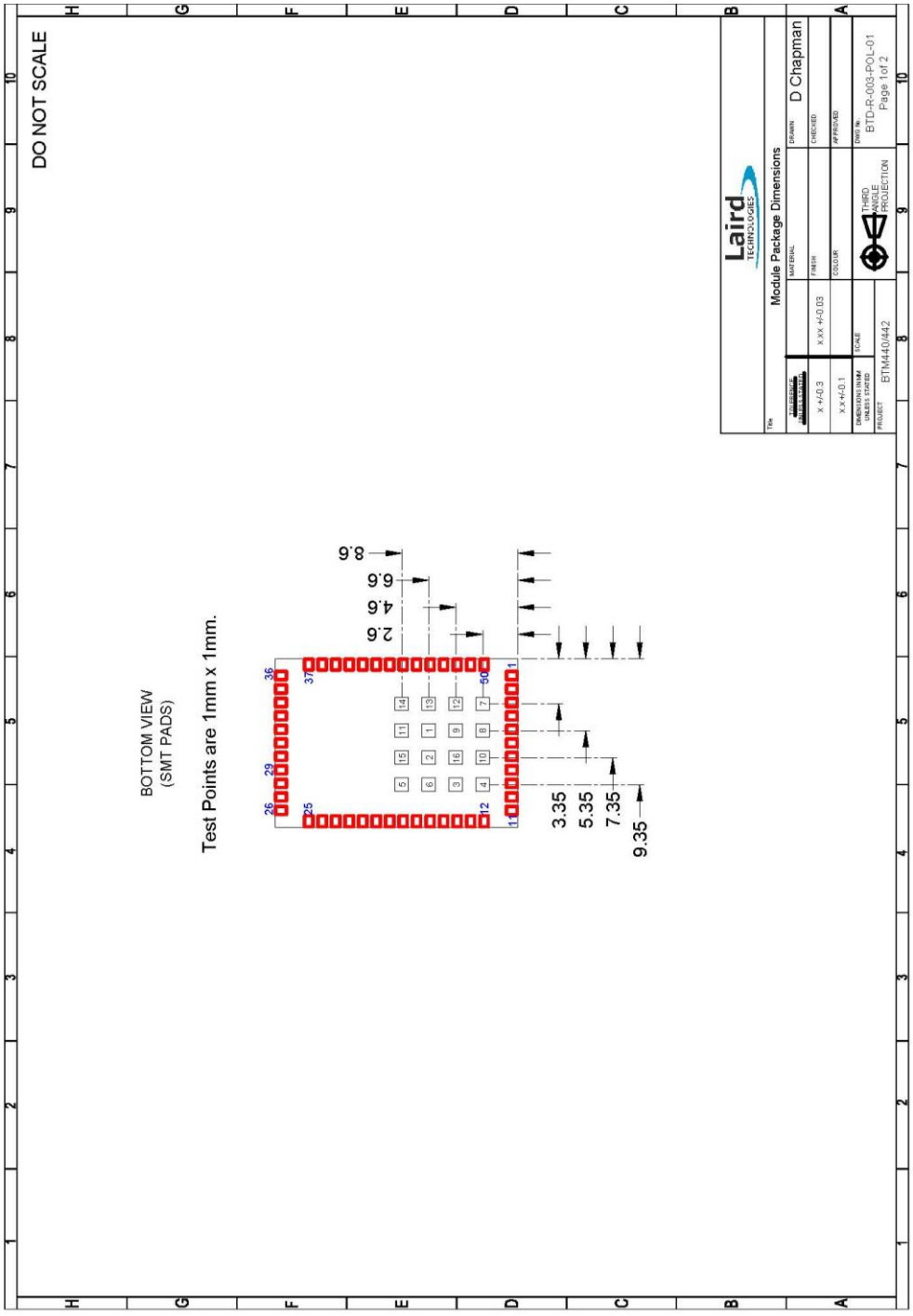
Module Keep-Out Area: An area of 1.5mm around the module should be reserved as a keep-out area. No other components should be placed in this area.

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Mechanical layout - BTM440/442 Mechanical Details

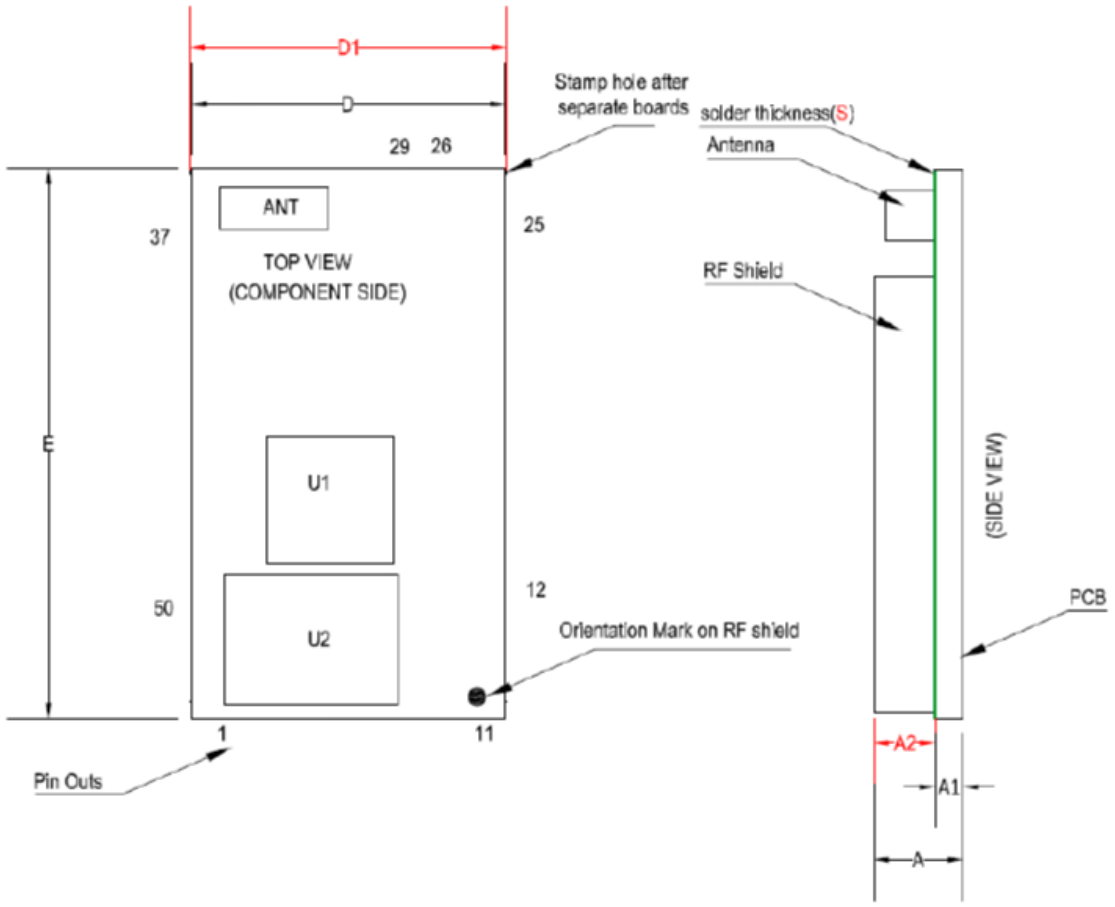


WARNING: Test point dimensions are for reference only. *DO NOT* make electrical connections to these test points, this will void the warranty. Laird does not recommend routing on the top layer underneath the module.

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Mechanical layout - BTM441/443 Mechanical Details



Description	BTM4X1			
Size	22.0x12.5x3.0495mm			
Pitch	1mm			
Dimension	Minimum	Typical	Maximum	Notes
A	2.822mm	3.0495mm	3.277mm	1)A is consist of A1 and A2 2)A2 include solder and shield 3)D1 measured on stamp hole location after depanelization
A1	0.8mm	0.9mm	1.0mm	
A2	2.022mm	2.1495mm	2.277mm	
D	12.37mm	12.5mm	12.63mm	
D1	12.37mm	12.5mm	13.03mm	
E	21.87mm	22.0mm	22.13mm	

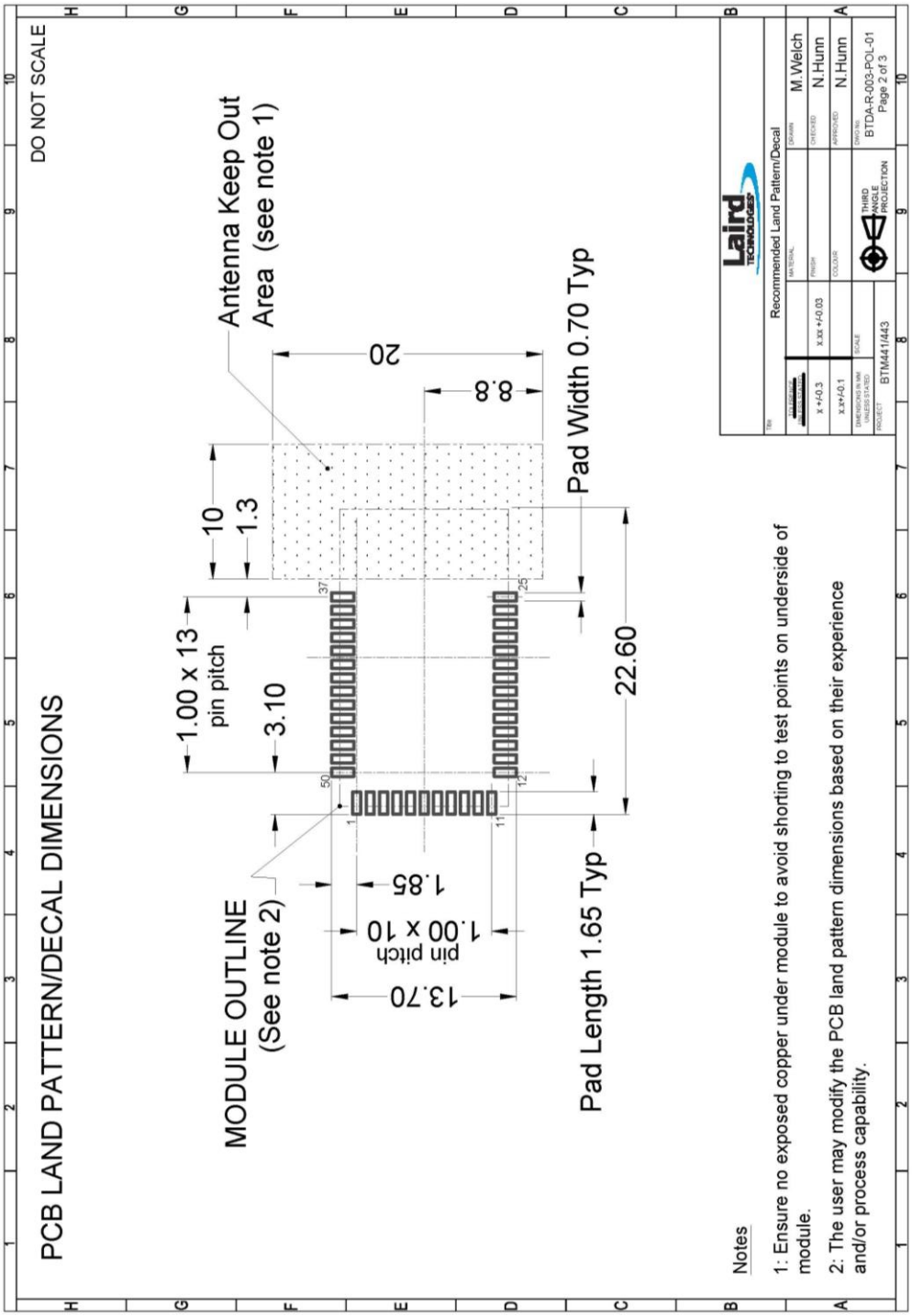
Module Keep-Out Area: An area of 1.5mm around the module should be reserved as a keep-out area. No other components should be placed in this area.

Note: Development Kit Schematics for this product can be accessed from the BTM44x product page.

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Mechanical layout - BTM441/443 Mechanical Details



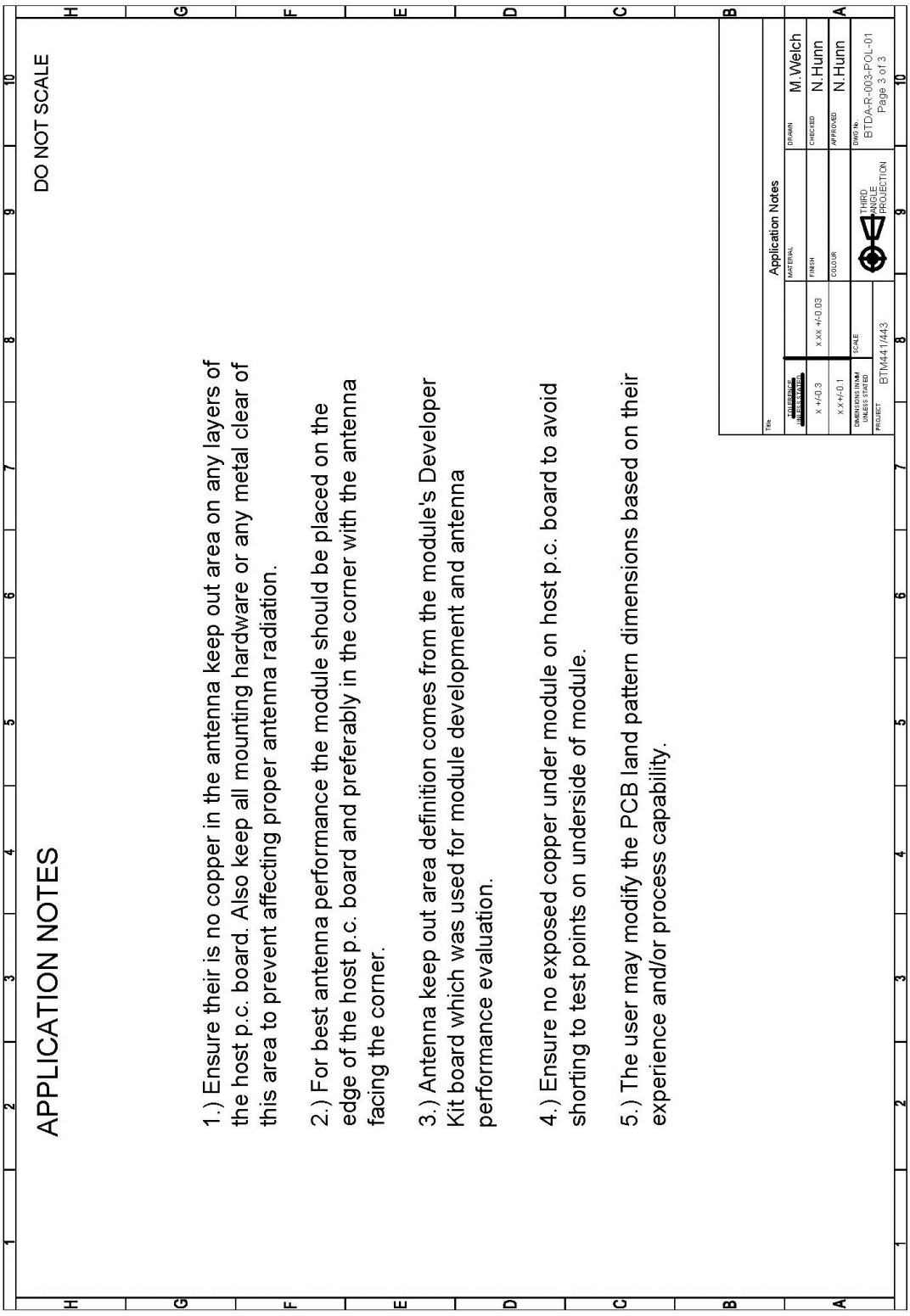
Module Keep-Out Area: An area of 1.5mm around the module should be reserved as a keep-out area. No other components should be placed in this area.

Note: Development Kit Schematics for this product can be accessed from the following link: DVK Schematics – BTM44x

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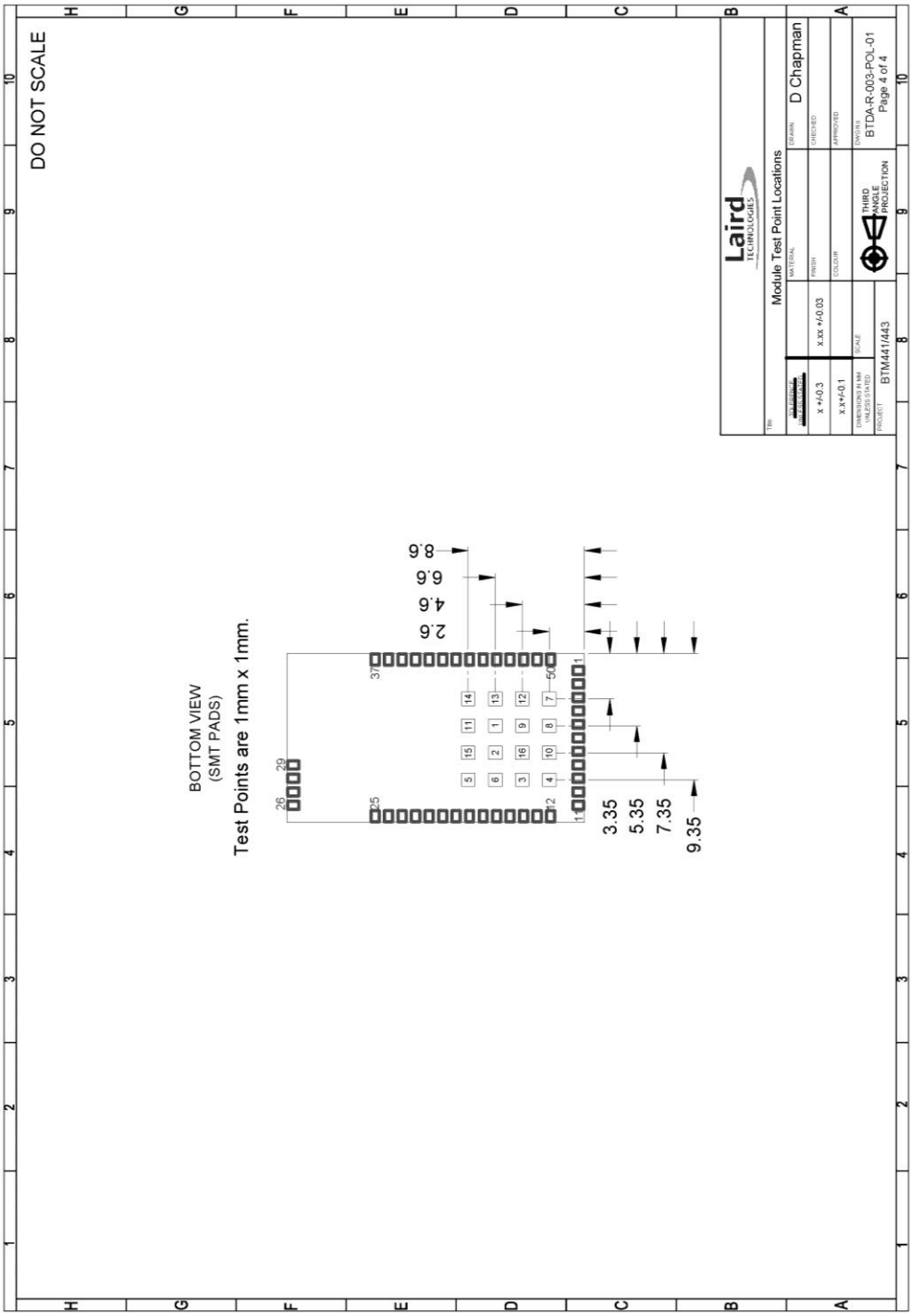
Mechanical layout - BTM441/443 Mechanical Details



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Mechanical layout - BTM441/443 Mechanical Details



WARNING: Test point dimensions are for reference only. *DO NOT* make electrical connections to these test points, this will void the warranty. Laird does not recommend routing on the top layer underneath the module.

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4 FCC Regulatory Statements

4.1 FCC and Industry Canada Statements

The OEM's final equipment user manual must show the following statement:

> This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

4.1.1 Considerations for OEM Integration

Changes or modifications not expressly approved by Laird Technologies could void the user's authority to operate the equipment.

Designers should note the distinction that the FCC makes regarding portable and mobile devices. Mobile devices are defined as products that are not used closer than 20cm to the human body, whereas portable devices can be used closer that 20cm to the body. A device may be used in portable exposure conditions with no restrictions on host platforms when the averaged output power is less than the low power threshold for an uncontrolled environment ≤ 60/f(GHz) i.e. 25mW for a 2.4Ghz device. The Maximum Power Exposure for the BTM44x has been evaluated and found to comply with the low power threshold for an uncontrolled environment. Refer to FCC document KDB 447498 for more information on RF exposure procedures and equipment authorization policies for mobile and portable devices.

The BTM44x comply with the FCC RF radiation exposure limits set forth for an uncontrolled environment. This device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter except in accordance with FCC multi-transmitter product procedures. These procedures could require RF exposure evaluation to be re-evaluated on the complete product.

The installer of this module into host equipment must ensure his equipment complies with the FCC RF Exposure requirements set forth in 47 CFR 2.1091 or 2.1093

The BTM44x comply with the RSS-102RF radiation exposure limits set forth for an uncontrolled environment. If this device and its antenna is co-located or operating in conjunction with any other antenna or transmitter RF exposure evaluation should be re-evaluated on the complete product by a qualified test house.

The installer of this module into host equipment must ensure his equipment complies with the Industry Canada RSS-102 RF Exposure requirements.

BTM440 / BTM442

These modules hold a limited modular approval. Approval with any other antenna configuration or layout other than that approved will necessitate additional radiated emission testing to be performed.

The modules were approved with the following antenna:

RF Solutions: ANT-24G-WHJ-SMA 0dBi

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4.1.3 FCC Labeling requirement

4.1.3.1 BTM440 / BTM442

If the FCC ID is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: “Contains Transmitter Module FCC ID: PI4410B” or “Contains FCC ID: PI4410B”. Any similar wording that expresses the same meaning may be used.

4.1.3.2 BTM441 / BTM443

If the FCC ID is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: “Contains Transmitter Module FCC ID: PI4411B” or “Contains FCC ID: PI4411B.” Any similar wording that expresses the same meaning may be used.

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5 DECLARATIONS OF COMPLIANCE

5.1 EU Declaration of Conformity – BTM440 / BTM442

Manufacturer:	Laird Technologies
Product:	BTM440/2
EU Directive:	RTTE 1995/5/EC
Conformity Assessment:	Annex IV

5.1.1 Reference standards used for presumption of conformity:

Article Number:	Requirement	Reference standard(s):
3.1a	Health and Safety	EN 60950-1:2006
3.1b	Protection requirements with respect to electromagnetic Compatibility	EN 301 489-1 V1.8.1 EN 301 489-17 2.1.1 Emissions: EN55022:2006/A1:2000/A2:2006(ClassB) Immunity: EN61000-4-2:1995/A1:1998/A2:2001 EN61000-4-3:2002/A1:2002
3.2	Means of the efficient use of the radio frequency spectrum	EN 300 328 V1.7.1 (2006-10)

5.1.2 Declaration:

We, Ezurio Ltd, declare under our sole responsibility that the essential radio test suites have been carried out and that the above product to which this declaration relates is in conformity with all the applicable essential requirements of Article 3 of the EU Directive 1995/5/EC, when used for its intended purpose.

Place of Issue:	Ezurio Ltd dba Laird Technologies Saturn House, Mercury Park Wooburn Green HP100HH, United Kingdom tel: +44 (0)1628 858 940 fax: +44 (0)1628 528 382
Date of Issue:	October 2009
Name of Authorised Person:	gineering Manager
Signature:	

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5.2 EU Declaration of Conformity – BTM441 / BTM443

Manufacturer:	Laird
Product:	BTM410 / BTM411 / BTM420 / BTM421 / BTM430 / BTM431 / BTM441 / BTM443 / BTM461
EU Directive:	RTTE 1995/5/EC
Conformity Assessment:	Annex IV

5.2.1 Reference Standards used for Presumption of Conformity

Article Number	Requirement	Reference standard(s)
3.1a	Health and Safety	EN 60950-1:2005 (2nd Ed); +Am1:2009 +Am2:2013 EN 60950-1:2006+A11+a1:2010+A12:2011+A2:2013
3.1a	RF Exposure	EN 62479:2010
3.1b	Protection requirements with respect to electromagnetic compatibility	EN 301 489-1 V1.9.2 (2011-09) EN 301 489-17 V2.2.1 (2012-09) Emissions: EN55022:2010 /AC:2011 (ClassB) Immunity: EN61000-4-2:2009 EN61000-4-3:2006 /A1:2008 /A2:2010
3.2	Means of the efficient use of the radio frequency spectrum	EN 300 328 V1.8.1 (2012-06)

5.2.2 Declaration:

We, Laird, declare under our sole responsibility that the essential radio test suites have been carried out and that the above product to which this declaration relates is in conformity with all the applicable essential requirements of Article 3 of the EU Directive 1995/5/EC, when used for its intended purpose.

Place of Issue:	Laird 11160 Thompson Ave. Lenexa, KS 66219
Date of Issue:	October 2009
Name of Authorized Person:	Daniel Waters / Certifications Specialist
Signature:	

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6 Bluetooth Approvals

6.1 Subsystem Combinations

This application note covers the procedure for generating a new Declaration ID for a Subsystem combination on the Bluetooth SIG website. In the instance of subsystems, a member can combine two or more subsystems to create a complete Bluetooth End Product solution.

Subsystem listings referenced as an example:

Design Name	Owner	Declaration ID	Link to listing on the SIG website
BTM44x	Laird	B016072	https://www.bluetooth.org/tpg/QLI_viewQDL.cfm?qid=16072
Interface Express subsystem	Cambridge Consultants Ltd	B017578	https://www.bluetooth.org/tpg/QLI_viewQDL.cfm?qid=17578

6.2 Assumptions

This procedure assumes that the member is simply combining two subsystems to create a new design, without any modification to the existing, qualified subsystems. This is achieved by using the Listing interface on the Bluetooth SIG website. Figure 1 shows the basic subsystem combination of a controller and host subsystem. The Controller provides the RF/BB/LM and HCI layers, with the Host providing L2CAP, SDP, GAP, RFCOMM/SPP and any other specific protocols and profiles existing in the Host subsystem listing. The design may also include a Profile Subsystem.

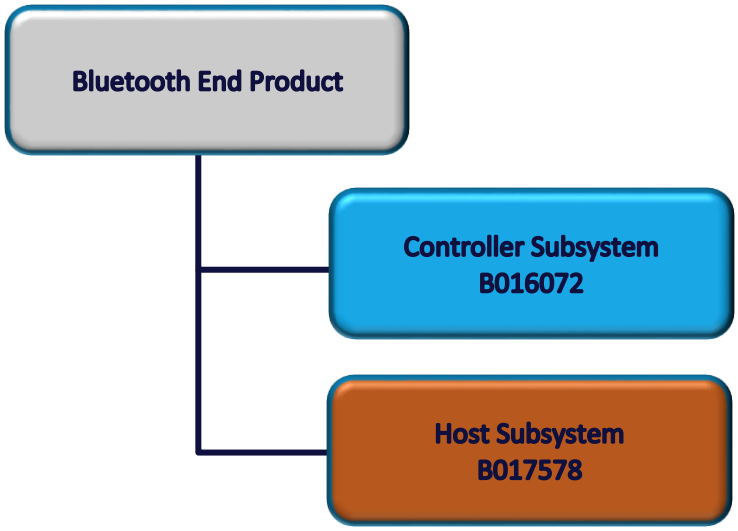


Figure 1: Basic subsystem combination of a controller and host subsystem

The Qualification Process requires each company to registered as a member of the Bluetooth SIG – www.bluetooth.org

The following link provides a link to the Bluetooth Registration page:
https://www.bluetooth.org/login/register/

For each Bluetooth Design it is necessary to purchase a Declaration ID. This can be done before starting the new qualification, either through invoicing or credit card payment. The fees for the Declaration ID depend on your

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membership status, please refer to the following webpage:
https://www.bluetooth.org/en-us/test-qualification/qualification-overview/fees

For a detailed procedure of how to obtain a new Declaration ID for your design, please refer to the following SIG document:
https://www.bluetooth.org/DocMan/handlers/DownloadDoc.ashx?doc_id=283698&vId=317486

To start the listing, go to: https://www.bluetooth.org/tpg/QLI_SDoc.cfm

In step 1, select **Reference a Qualified Design** and enter the Declaration IDs of each subsystem used in the End Product design. You can then select your pre-paid Declaration ID from the drop down menu or go to the Purchase Declaration ID page, (please note that unless the Declaration ID is pre-paid or purchased with a credit card, it will not be possible to proceed until the SIG invoice is paid.

Once all the relevant sections of step 1 are finished, complete steps 2, 3, and 4 as described in the help document. Your new Design will be listed on the SIG website and you can print your Certificate and DoC.

For further information please refer to the following training material:
https://www.bluetooth.org/en-us/test-qualification/qualification-overview/listing-process-updates

6.3 Additional Assistance

Please contact your local sales representative or our support team for further assistance:

Laird Technologies Connectivity Products Business Unit
Support Centre: http://ews-support.lairdtech.com

Email: wireless.support@lairdtech.com

Phone: Americas: +1-800-492-2320 Option 2
Europe: +44-1628-858-940
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Web: http://www.lairdtech.com/bluetooth

7 Ordering Information

Part Number	Description
BTM440	Bluetooth MP Data Module (external antenna)
BTM441	Bluetooth MP Data Module (with integrated antenna)
BTM442	Bluetooth AT Data Module (external antenna)
BTM443	Bluetooth AT Data Module (with integrated antenna)
DVK – BTM440	Development board with BTM440 module soldered in place
DVK – BTM442	Development board with BTM442 module soldered in place

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8 Application Note for Surface Mount Modules

8.1 Introduction

Laird Technologies surface mount modules are designed to conform to all major manufacturing guidelines. This application note is intended to provide additional guidance beyond the information that is presented in the User Manual. This Application Note is considered a living document and will be updated as new information is presented.

The modules are designed to meet the needs of several commercial and industrial applications. The modules are designed to be easily manufactured and conform to current automated manufacturing processes.

8.2 Shipping

Modules are shipped in ESD (Electrostatic Discharge) safe trays that can be loaded into most manufacturers pick and place machines. Layouts of the trays are provided in Figures 8 and 9.

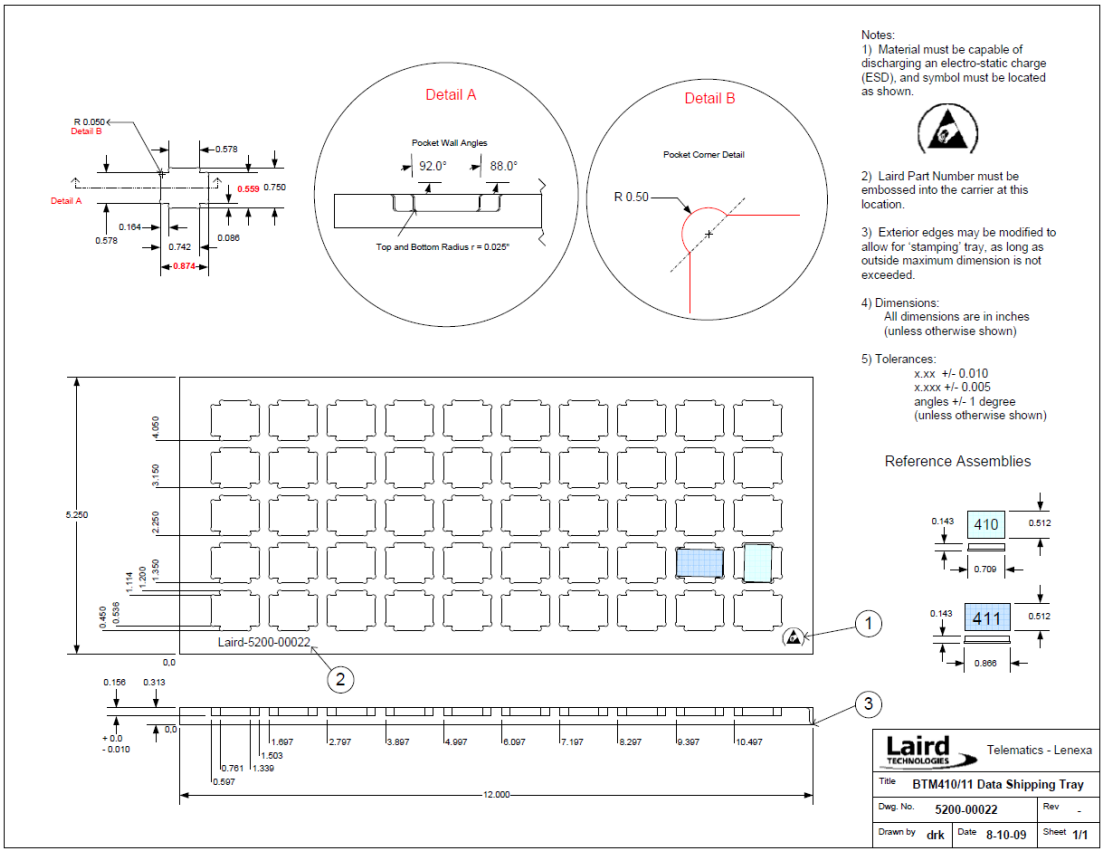


Figure 8: BTM44x Shipping Tray Details

8.3 Reflow Parameters

Laird Technologies surface mount modules are designed to be easily manufactured including reflow soldering to a PCB. Ultimately it is the responsibility of the customer to choose the appropriate solder paste and to ensure oven temperatures during reflow meet the requirements of the solder paste. Laird Technologies' surface mount modules conform to J-STD-020D1 standards for reflow temperatures.

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IMPORTANT: During reflow, modules should not be above 260°C and not for more than 30 seconds.

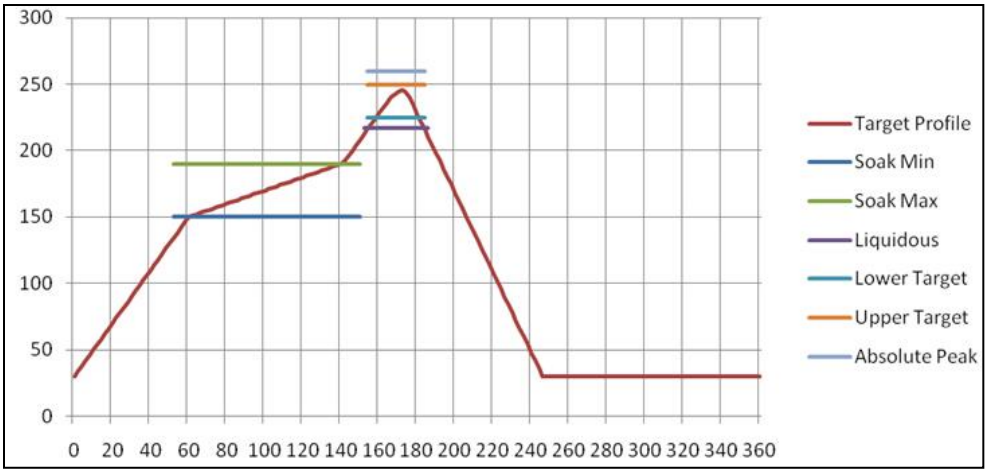


Figure 10: Recommended Reflow Temperature

Temperatures should not exceed the minimums or maximums presented in Table 21.

Table 8: Recommended Maximum and minimum temperatures

Recommended Max & Min's Specification	Value	Unit
Temperature Inc./Dec. Rate (max)	3	°C / Sec
Temperature Decrease rate (goal)	2-3	°C / Sec
Soak Temp Increase rate (goal)	.5 - 1	°C / Sec
Flux Soak Period (Min)	60	Sec
Flux Soak Period (Max)	90	Sec
Flux Soak Temp (Min)	150	°C
Flux Soak Temp (max)	190	°C
Time Above Liquidous (max)	60	Sec
Time Above Liquidous (min)	20	Sec
Time In Target Reflow Range (goal)	30	Sec
Time At Absolute Peak (max)	30	Sec
Liquidous Temperature (SAC305)	217	°C
Lower Target Reflow Temperature	225	°C
Upper Target Reflow Temperature	250	°C
Absolute Peak Temperature	260	°C

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9 REFERENCES

[1] “Bluetooth Specification Version 2.1 + EDR [vol3]”, 26 July 2007

http://www.bluetooth.com/Bluetooth/Technology/Building/Specifications/

(click on “Core Specification v2.1 + EDR”)

[2] “Serial Port Profile“ Specification

http://www.bluetooth.com/Bluetooth/Technology/Works/SPP.htm

(link at the bottom of page “Need more? View the Serial Port Profile (SPP)”)

[3] “Bluetooth Assigned Numbers”

http://www.bluetooth.com/Bluetooth/Technology/Building/Specifications/

select “Items per page: ALL”, go to end of page, there click on “Assigned Numbers – Baseband”, for a complete list of Profile UUIDs: click on “Assigned Numbers – Service Discovery”

[4] Class of Device Generator: this link might be helpful for creating a particular CoD

http://bluetooth-pentest.narod.ru/software/bluetooth_class_of_device-service_generator.html

Caution: this tool allows selection of more than one minor device classes, so make sure that only one minor device class is select and verify the result with [3] anyway.

[5] “Bluecore 4 External” Data Sheet, Cambridge Silicon Radio (CSR)

http://www.csrsupport.com (log in or new account required)

[6] “Winbond 681360 Codec Board User Guide”, Ezurio Application Note

[7] “BTM44x AppNote: Getting Started”

[8] “BTM44x AppNote: Firmware Upgrade”

[9] “BTM44x AppNote: Throughput Analysis”

[10] “BTM44x AppNote: Health Device Profile”

[11] “BTM44x AppNote: Latency Optimization”

[12] “BTM44x AppNote: RF Testing”

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10 GLOSSARY OF TERMS

Term		Description
A2DP	:	Advanced Audio Distribution Profile
ACL	:	Asynchronous Connection-Oriented Link
ADC	:	Analogue to Digital Converter
AGHFP	:	Audio Gateway Hands-Free Profile
AT	:	Command prefix, 'Attention'
AVRCP	:	Audio/Video Remote Control Profile
BISM	:	Bluetooth Intelligent Serial Module
CoD	:	Class Of Device (also referred to as "device class")
Codec	:	Device capable of encoding / decoding an analogue / digital signal
DAC	:	Digital to Analogue Converter
DSP	:	Digital Signal Processor
DUN	:	Dial-Up Network Profile
EIR	:	Extended Inquiry Response
eSCO	:	Enhanced Synchronous Connection Oriented Link (used for Audio)
FTP	:	File Transfer Profile
GOEP	:	Generic Object Access Exchange Profile
GPIO	:	General Purpose Input Output
HF	:	Hands-free Role of Hands-free Profile ("Hands-free Unit")
HFG	:	Audio Gateway Role of Hands-free Profile ("Hands-free Gateway")
HFP	:	Hands Free Profile
HID	:	Human Interface Device Profile
HS	:	Headset Role of Headset Profile ("Headset")
HSG	:	Audio Gateway Role of Headset Profile ("Headset Gateway")
HSP	:	Headset Profile
I/O (IO)	:	Input/Output
Mic	:	Microphone
MITM	:	Man In The Middle
OPP	:	Object Push Profile
PBAP	:	Phone Book Access Profile
PT	:	PASS THROUGH Command
PWM	:	Pulse Width Modulation
SBC	:	Sub Band Codec
SCO	:	Synchronous Connection Oriented Link (used for Audio)
SLC	:	Service Level Connection
SPP	:	Serial Port Profile
SSO	:	Serial Stream Oriented
SSP	:	Secure Simple Pairing
SUI	:	SUBUNIT INFO Command
Sxxx	:	S-Register No. xxx
TDL	:	Trusted Device List
UART	:	Universal Asynchronous Receiver / Transmitter
UI	:	UNIT INFO Command

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11 Related Documents and Files

The following additional BTM44x technical documents are also available from the Laird BTM44x product page under the Documentation tab:

- Product Brief
- User Manual
- Firmware Release Notes
- Development Kit Schematics

Application Notes

- Getting Started
- Firmware Upgrade
- Throughput Analysis
- Health Device Profile
- Latency Optimization
- RF Testing

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