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Check List

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Subject：工程規格書/Engineering Specification	Doc. No.：
Project Code： Model Name： BM300	Rev.： 0
	Page： 1 OF
	Effective Date：

Change History

CICN NO#	Page	Rev.	Effective Date	Reason For Release
		0		First Released

Copy to (all contents)：

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Approved By ：

Prepare By：

Reviewed By

Dep.	Manager	Executor	Dep.	Manager	Executor
□SL			□QA		
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■PD			□AU		
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Check List

瑞特 *Rightest*®

Subject：工程規格書/Engineering Specification	Doc. No.：	
	Rev.：	0
Project Code： Model Name：BM300	Page： 2 OF	
	Effective Date：	

NCC 警語

「減少電磁波影響，請妥善使用」。

依據低功率電波輻射性電機管理辦法

第十二條 經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均 不得擅自變更頻率、加大功率或變更原設計之特性及功能。

第十四條 低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干 擾現象時，應立即停用，並改善至無干擾時方得繼續使用。
前項合法通信，指依電信法規定作業之無線電通信。 低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機 設備之干擾。」

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Check List

瑞特 *Rightest*®

Subject：工程規格書/Engineering Specification	Doc. No.：		
	Rev.：	0	
Project Code： Model Name： BM300	Page：	3 OF	
	Effective Date：		

FCC 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.

NOTE: 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 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.
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Label Instructions:
The outside of final products that contains this module device must display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains Transmitter Module FCC ID: [put FCC ID here]" or "Contains FCC ID: [put FCC ID here]." Any similar wording that expresses the same meaning may be used.

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Subject：工程規格書/Engineering Specification	Doc. No. :
Project Code： Model Name： BM300	Rev. : 0
	Page : 4 OF
	Effective Date :

Feature：

Item	Specification	Remark
Chip	DA14580	
Standard	Bluetooth V4.1	
RF band	2402 ~ 2480MHz	ISM band
Interface	UART	
RF Output Power	-20dBm ~0 dBm	
Sensitivity	>-93 dBm	

Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	12.25 (W) * 15.26 (L) * 1.9 (H)	mm

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Check List

瑞特 *Rightest*®

Subject：工程規格書/Engineering Specification	Doc. No.：	
	Rev.：	0
Project Code：　　 Model Name：BM300	Page： 5 OF	
	Effective Date：	

Absolute Maximum Ratings
Module

Item	Symbol	Condition	Min.	Max.	Unit
System Power Supply Voltage	VDD	-	-0.1	+3.6	V
Operating Temperature	TOP	-	-0	+50	℃
Storage Temperature	TST	-	-20	+70	℃
Storage Humidity	HD	Ta ≦ 40 ℃	20	80	%RH

DC Electrical Characteristics
Module   GND = 0V, Ta = 25℃

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply Voltage	VDD	-	2.5	3.0	3.3	V
Input Signal Voltage	VIH	-	0.84	-	-	V
	VIL	-	-	-	0.36	V
Output Signal Voltage	VOH	-	1.88	-	-	V
	VOL	-	-	-	0.47	V
Supply Current	IDD	VCC = 3.0V　*1	-			mA
		VCC = 3.0V　*2				uA

Subject：工程規格書/Engineering Specification	Doc. No.：		
	Rev.：	0	
Project Code： Model Name：BM300	Page：	6 OF	
	Effective Date：		

Pin Definition:

| Pin No	Symbol	Function Description	Note
1	BLE_ PCL	BLE_ PCL ，ON = L、OFF = H	
2	BLE_STATUS	BLE_STATUS ，ON = L、OFF = H	
3	P0.5	GPIO	
4	P0.4	GPIO	
5	BLE_RST	INPUT. Reset signal (active high). Must be connected to GND if not used.	
6	P1.2	GPIO	
7	SWDIO	This signal is the JTAG data I/O by default	
8	SWDCLK	This signal is the JTAG clock by default	
9	---	Dummy	
10	Wake up BLE	Wake up BLE ，ON = L、OFF = H	
11	VDD	Power supply for BLE. supply of 2.0V ~ 3.3V.	
12	GND	Ground	
13	---	Dummy	
14	---	Dummy	
15	BT_TX	UART data output pin，MCU data to BLE	
16	---	Dummy	
17	BT_RX	UART data input pin，BLE data to MCU	
18	GND	Ground	
19	P0.7	GPIO	
20	GND	Ground	
21	---	Dummy	
22	GND	Ground	
23	---	Dummy	
24	---	Dummy	
25	VPP	INPUT. This pin is used while OTP programming and testing. OTP programming: VPP = 6.8 V ± 0.25 V OTP Normal operation: leave VPP floating	
26	GND	Ground	

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Check List

瑞特 *Rightest*®

Subject：工程規格書/Engineering Specification	Doc. No. ：
	Rev. ： 0
Project Code： Model Name ： BM300	Page ： 7 OF
	Effective Date ：

Mechanical Diagram
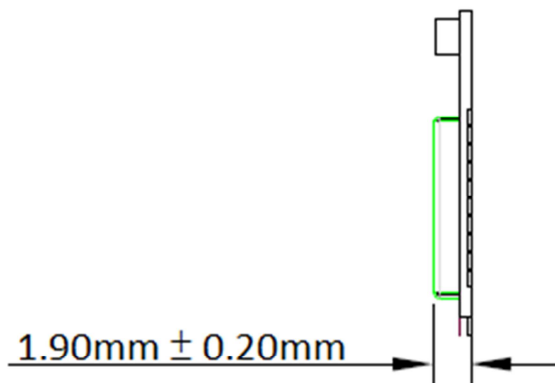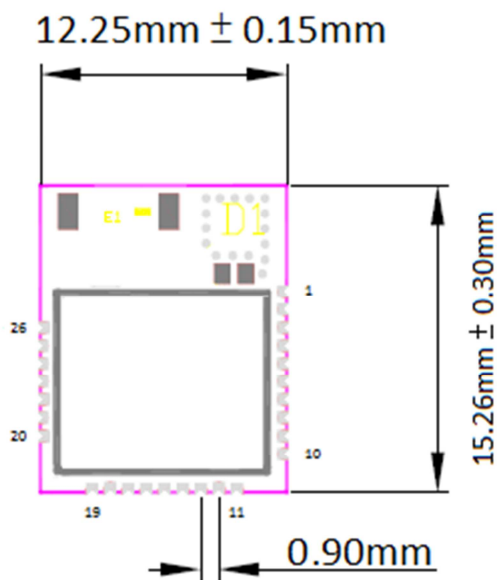
Subject：工程規格書/Engineering Specification	Doc. No.：	
	Rev.：	0
Project Code：　　Model Name：BM300	Page：	8　OF
	Effective Date：	

Block Diagram
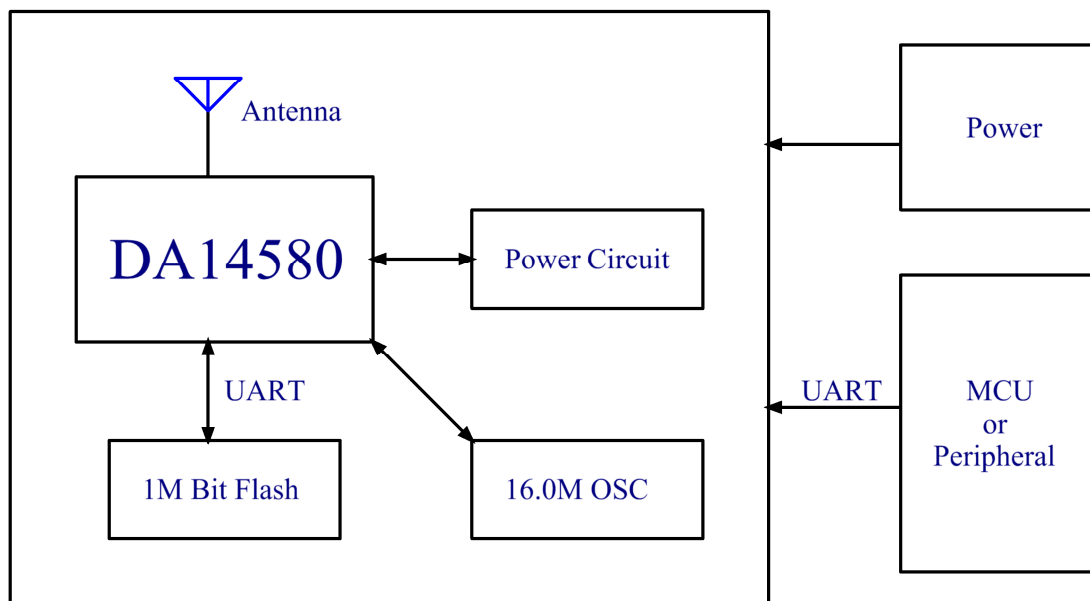
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Check List

瑞特 *Rightest*®

Subject：工程規格書/Engineering Specification	Doc. No.：	□□
	Rev.：	0
Project Code：□□ Model Name：BM300	Page：	9 OF
	Effective Date：	

Module Application Circuit:
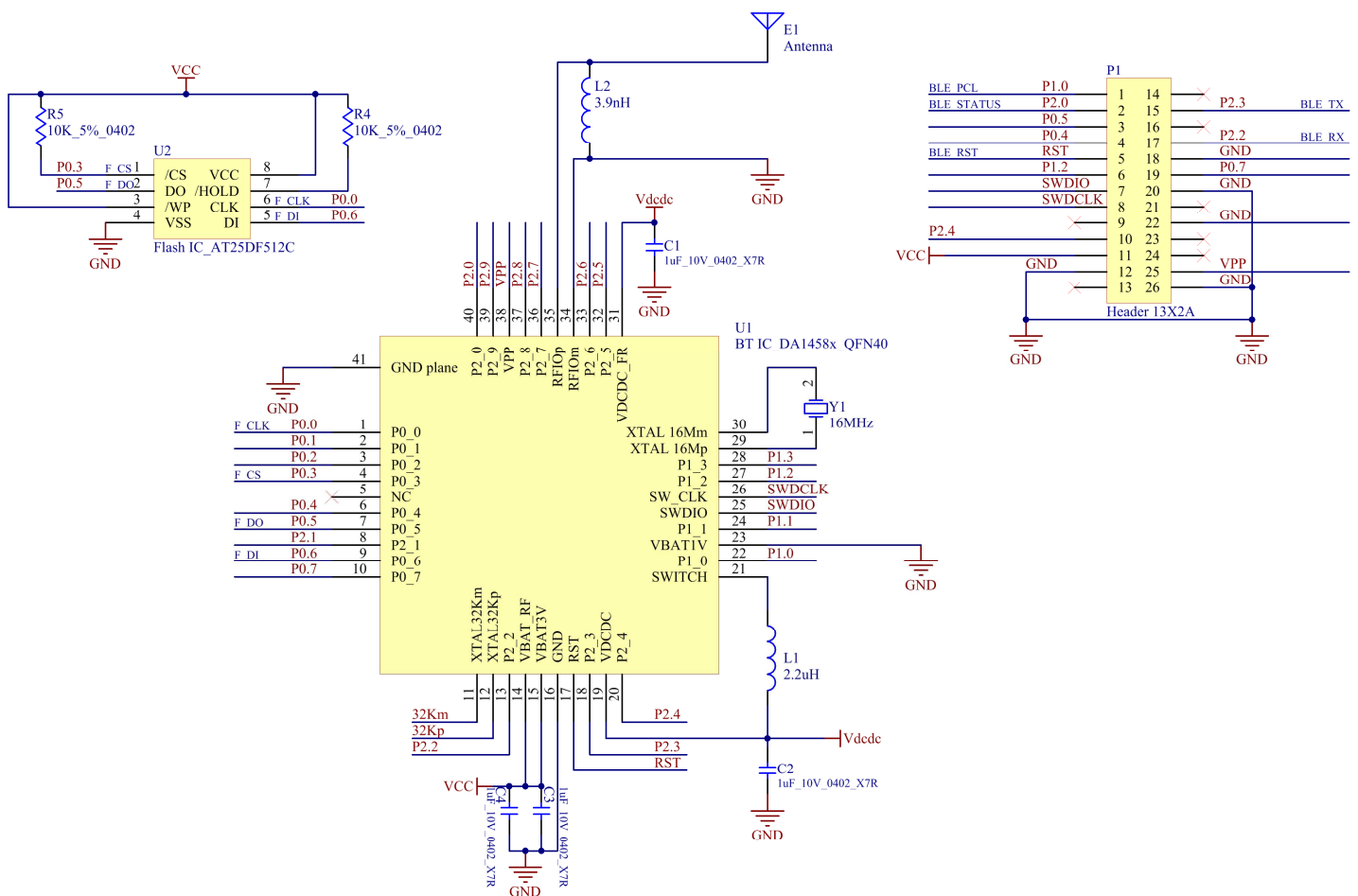
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Check List

瑞特 *Rightest*®

Subject：工程規格書/Engineering Specification	Doc. No. ：	
	Rev. ：	0
Project Code： Model Name ： BM300	Page ： 10 OF	
	Effective Date ：	

Module Bill of Material:

Item	Part No.	Designator	Comment
1	503-040000-0P0	U1	DA14580 / QFN 40
2	503-040000-0Q0	U2	MX25V1006E / USON 8L
3	502-021057-010	C1,C2,C3,C4	1uF / 10V / X5R /±10% / 0402
4	501-011032-020	R4, R5	10KΩ / ±5% / 0402
5	505-040000-2K0	L1	2.2uH±10%-1608
6	505-040000-2L0	L2	3.9nH±0.3nH-1005
7	505-020000-0B0	Y1	16 MHz/ FA-128
8	505-040000-0E0	E1	AT5020-B2R8HAA
9			

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Check List

瑞特 *Rightest*®

Subject：工程規格書/Engineering Specification	Doc. No.：
Project Code： Model Name：BM300	Rev.： 0
	Page： 11 OF
	Effective Date：

Software & Operation Mode

UART Configuration

Baud Rate	9600 bps
Start Bit	1
Data Bits	8
Stop Bits	1
Parity Bit	None

Timeout : 500 ms

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Check List

瑞特 *Rightest*®

Subject：工程規格書/Engineering Specification	Doc. No. ：	
Project Code： Model Name：BM300	Rev. ： 0
	Page ： 12 OF
	Effective Date ：

Instruction Set

Function	Instruction							
Set BGM Device ID Command	" { "	LEN	ID-1	ID-2	…	ID-n	CS	
	" } "	LEN	ID-1	ID-2	…	ID-n	CS	
Pairing	[	0x27	White List	CS				
	]	0xD8	Status Byte	CS				
Pair Completion	[	0x28	CS					
	]	0xD7	CS					
White List Full	[	0x29	CS					
	]	0xD6	CS					
Check BLE	]	0x5F	CS					
	[	0xA0	CS					
Clear White List	]	0x5B	CS					
	[	0xA4	Status Byte	CS				
Read BLE Flash	]	0x5A	indexL	indexH	CS			
	[	0xA5	indexL	indexH	data0	…	data9	CS
Write BLE Flash	]	0x59	indexL	indexH	data0	…	data9	CS
	[	0xA6	indexL	indexH	data0	…	data9	CS
BLE Flash writing area setting	]	0x58	Section Index	CS				
	[	0xA7	Section Index	CS				
Write BLE Flash End	]	0x57	CS					
	[	0xA8	CS					

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Check List

瑞特 *Rightest*®

Subject：工程規格書/Engineering Specification	Doc. No.：	
	Rev.：	0
Project Code： Model Name： BM300	Page：	13 OF
	Effective Date：	

Set BGM Device ID Command:

Byte Index	0	1	2	3	...	LEN+1	LEN+2
MCU to BLE Command	'}'	LEN	ID-1	ID-2	...	ID-n	CS
BLE to MCU Return Data	'{'	LEN	ID-1	ID-2	...	ID-n	CS

'}'   ： Header of MCU set command, ASCII Format.
'{'   ： Header of BLE return data. ASCII Format.
LEN   ： Length of BGM ID. HEX value.
ID-1 ~ ID-n ：   Unique ID of BGM. ASCII format.
　　　　　　　　Range   0x01 ~ 0x14 (1~20)
CS   ：   Checksum.
　　　　Checksum Byte = (Byte[0] + byte[1] + ... Byte[n]) & 0xFF

Pairing:

Byte Index	0	1	2	3
BLE to MCU Command	' ['	0x27	White List	CS
MCU to BLE Return Data	'] '	0xD8	Status Byte	CS

' ['   ： Header of BLE set command, ASCII Format.
'] '   ： Header of MCU return data. ASCII Format.
White List ：   paired quantity
Status Byte ：   0x00：Agree
　　　　　　　0x01：Deny
　　　　　　　0x02：Wait

Pair Completion

Byte Index	0	1	2
BLE to MCU Command	' ['	0x28	CS
MCU to BLE Return Data	'] '	0xD7	CS

BLE module pairing is completed

White List Full

Byte Index	0	1	2
BLE to MCU Command	' ['	0x29	CS
MCU to BLE Return Data	'] '	0xD6	CS

Whitelist is full and can no longer new pairing

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Check List

瑞特 *Rightest*®

Subject：工程規格書/Engineering Specification	Doc. No.：		
	Rev.：	0	
Project Code： Model Name： BM300	Page： 14 OF		
	Effective Date：		

Check BLE

Byte Index	0	1	2
MCU to BLE Command	'] '	0x5F	CS
BLE to MCU Return Data	' ['	0xA0	CS

MCU tested for BLE module function test

BLE normal operation, reply to 0xA0

Clear White List

Byte Index	0	1	2	3
MCU to BLE Command	'] '	0x5B	CS	
BLE to MCU Return Data	' ['	0xA4	Status Byte	CS

MCU command BLE clear Whitelist

Status Byte：   0x00：BLE reply, Whitelist Clear Completed

               0x01：BLE reply, Whitelist Cleanup failed

Read BLE Flash

Byte Index	0	1	2	3	4	...	13	14
MCU to BLE Command	'] '	0x5A	indexL	indexH	CS	...		
BLE to MCU Return Data	' ['	0xA5	indexL	indexH	data0	...	Data9	CS

Read BLE Flash

BLE 模組內可儲存資料 1200 筆

Flash 可存 1200 筆資料，每筆 10byte，index 範圍 0x0000~0x04AF

Write BLE Flash

Byte Index	0	1	2	3	4	...	13	14
MCU to BLE Command	'] '	0x59	indexL	indexH	data0	...	Data9	CS
BLE to MCU Return Data	' ['	0xA6	indexL	indexH	data0	...	Data9	CS

BLE Flash writing area setting

Byte Index	0	1	2	3
MCU to BLE Command	'] '	0x58	Section Index	CS
BLE to MCU Return Data	' ['	0xA7	Section Index	CS

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Check List

瑞特 *Rightest*®

Subject：工程規格書/Engineering Specification	Doc. No.：	
	Rev.：	0
Project Code：　　　Model Name：BM300	Page： 15 OF	
	Effective Date：	

Section Index： 0：
　　　　　　　 1：
　　　　　　　 2：

Write BLE Flash End

Byte Index	0	1	2	3
MCU to BLE Command	'] '	0x57	CS	
BLE to MCU Return Data	' ['	0xA8	CS	

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Check List

瑞特 *Rightest*®

Subject：工程規格書/Engineering Specification	Doc. No. ：	
	Rev. ：	0
Project Code ： Model Name ： BM300	Page ： 16 OF	
	Effective Date ：	