Date	2025.06.16
Revision	1.01
Page	64
MSL Level	3

PRODUCT APPROVAL DATASHEET

PRODUCT	MCSLogic Bluetooth 5.4 Module
MODEL NAME	MB2710
MCSLogic P/N	

Checked By	Approved By	Company Seal

MCSLOGIC

Copyright © 2025 MCS LOGIC Limited. All rights reserved
Confidential

Revision History

Version	Date	Revision Description
1.0	24/04/22	First release
1.01	24/06/16	IC Certification ID is added

Copyright © 2025 MCS LOGIC Limited. All rights reserved
Confidential

Table of Contents

1. GENERAL DESCRIPTION 4
2. QUALITY 4
3. TEST 5
4. BLOCK DIAGRAM 5
5. PIN DESCRIPTIONS 6
6. MODULE SCHEMATIC 9
7. APPLICATION SCHEMATIC 10
8. ELECTRICAL CHARACTERISTICS 11
9. MODULE'S MARKING INFORMATION 12
10. MECHANICAL DIMENSION 13
11. BILL OF MATERIALS 17
12. PLANAR FIGURE OF PARTS 19
13. PACKING INFORMATION 20
    - *13.1 Tray 20*
    - *13.2 Packing process 20*
    - *13.3 Static Shield bag 22*
    - *13.4 OUTER BOX 23*
14. REFLOW PROFILE 24
15. PCB LAYOUT DIMENSION & MODULE POSITION GUIDE 25
16. PCB ANTENNA REPORT 27
17. QC PROCSS 29
18. RELIABILITY TEST 40
19. ENVIRONMENT REPORT 57

Copyright © 2025 MCS LOGIC Limited. All rights reserved
Confidential

1. General Description

MB2710 is a fully integrated Bluetooth module. It is based on BES2710IA-8X with specific interface design to meet customer needs.

MB2710 is compatible with Bluetooth specification version 5.4. It integrates RF, Baseband controller, etc., a completed Bluetooth subsystem.

Features :

- Operation Range (Class I) : 10 meters
- Operating Temperature Range : -20℃ ~ 75℃
- Operating BAT Range : 3.3V ~ 4.2V
- Internal Antenna
- Fully Compatible with Bluetooth Specification 5.4
- Dual-mode BT 5.4 with LE audio
- Support SPI, I2C,UART ,PWM and USB 2.0
- RoHS Compliant
- Module size (L×W×H): 35mm×20mm×3.05mm

Applications :

- Consumer Products

2. Quality

Quality should meet each condition which mentioned on this specification. However, the items which are not mentioned on this specification follow the inspection agreements and standards which are agree with both companies.

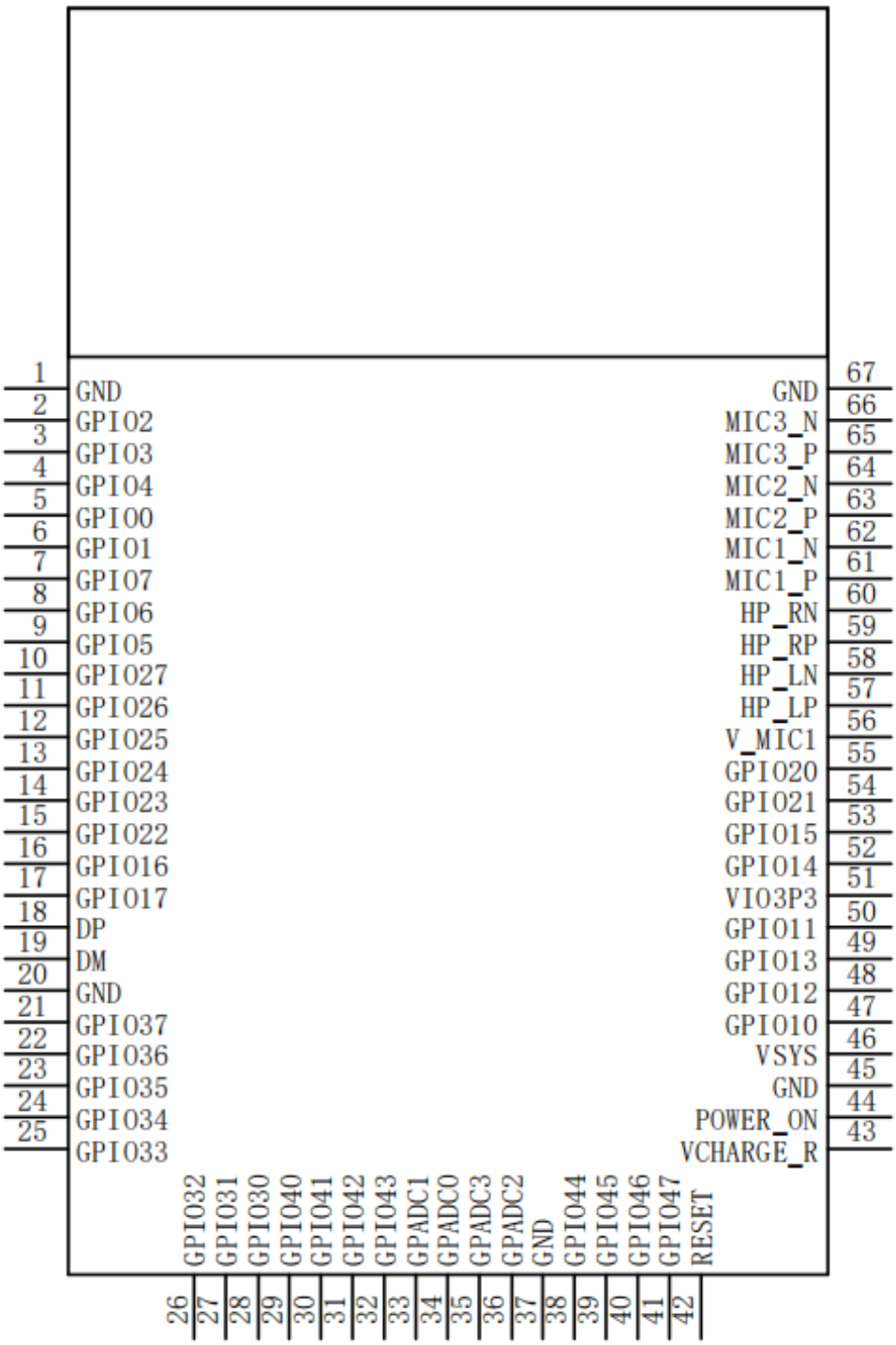
Copyright © 2025 MCS LOGIC Limited. All rights reserved
Confidential

3. Test

Electrical characteristics are tested for every products. However, if there are any objection in judgement, it should be treated with agreements of companies.

Copyright © 2025 MCS LOGIC Limited. All rights reserved
Confidential

5. Pin Descriptions



Copyright © 2025 MCS LOGIC Limited. All rights reserved
Confidential

No.	Name	Type	Description
1	GND	GND	Ground
2	GPIO2	I/O	UART1_DFT_RX / General purpose IO2
3	GPIO3	I/O	UART1_DFT_TX / General purpose IO3
4	GPIO4	I/O	General purpose IO4
5	GPIO0	I/O	General purpose IO0
6	GPIO1	I/O	General purpose IO1
7	GPIO7	I/O	I2C_SDA2 / General purpose IO7
8	GPIO6	I/O	I2C_SCL2 / General purpose IO6
9	GPIO5	I/O	General purpose IO5
10	GPIO27	I/O	General purpose IO27
11	GPIO26	I/O	General purpose IO26
12	GPIO25	I	Must be connected to ground.
13	GPIO24	I/O	General purpose IO24
14	GPIO23	I/O	UART0_DBG_TX / General purpose IO23
15	GPIO22	I/O	UART0_DBG_RX / General purpose IO22
16	GPIO16	I/O	General purpose IO16
17	GPIO17	I/O	General purpose IO17
18	DP	I/O	USB Data plus
19	DM	I/O	USB Data minus
20	GND	GND	Ground
21	GPIO37	I/O	General purpose IO37
22	GPIO36	I/O	General purpose IO36
23	GPIO35	I/O	General purpose IO35
24	GPIO34	I/O	General purpose IO34
25	GPIO33	I/O	General purpose IO33
26	GPIO32	I/O	General purpose IO32
27	GPIO31	I/O	General purpose IO31
28	GPIO30	I/O	General purpose IO30
29	GPIO40	I/O	I2S_BCK / General purpose IO40
30	GPIO41	I/O	I2S_LRCK / General purpose IO41
31	GPIO42	I/O	General purpose IO42
32	GPIO43	B	I2S_DATA / General purpose IO43
33	GPADC1	I	GPADC input channel 3 (Input voltage range : 0V ~ 1.5V)
34	GPADC0	I	GPADC input channel 2 (Input voltage range : 0V ~ 1.5V)
35	GPADC3	I	GPADC input channel 5 (Input voltage range : 0V ~ 1.5V)
36	GPADC2	I	GPADC input channel 4 (Input voltage range : 0V ~ 1.5V)
37	GND	GND	Ground
38	GPIO44	I/O	General purpose IO44
39	GPIO45	I/O	General purpose IO45
40	GPIO46	I/O	General purpose IO46
41	GPIO47	I/O	General purpose IO47
42	RESET	I	Chip reset pin, reset if high , The reset pulse width is 10ms (Input voltage range : 2.3V ~ 3.3V)
43	VCHARGE_R	I	Vbus voltage detector(Input voltage range: 4.8V ~ 5.5V)
44	POWER_ON	PI	Chip power on input (Input voltage range: 1.7V ~ 2.5V)
45	GND	GND	Ground

Copyright © 2025 MCS LOGIC Limited. All rights reserved
Confidential

46	VSYS	PI	System supply pin(Input voltage range: 3.3V ~ 4.2V)
47	GPIO10	I/O	General purpose IO10
48	GPIO12	I/O	General purpose IO12
49	GPIO13	I/O	General purpose IO13
50	GPIO11	I/O	General purpose IO11
51	VIO3P3	PO	Power supply for external devices, typically 3.3 V (Max current : 100mA)
52	GPIO14	I/O	General purpose IO14
53	GPIO15	I/O	General purpose IO15
54	GPIO21	I/O	I2C_SDA1 / General purpose IO21
55	GPIO20	I/O	I2C_SCL1 / General purpose IO20
56	V_MIC1	O	MIC BIAS1
57	HP_LP	O	Speaker output left, positive
58	HP_LN	O	Speaker output left, negative
59	HP_RP	O	Speaker output right, positive
60	HP_RN	O	Speaker output right, negative
61	MIC1_P	I	MIC CH0 P port
62	MIC1_N	I	MIC CH0 N port
63	MIC2_P	I	MIC CH1 P port
64	MIC2_N	I	MIC CH1 N port
65	MIC3_P	I	MIC CH2 P port
66	MIC3_N	I	MIC CH2 N port
67	GND	GND	Ground

Copyright © 2025 MCS LOGIC Limited. All rights reserved
Confidential

8. Electrical Characteristics

Conditions : Ta = 25 ℃, unless otherwise noted.

Absolute Maximum Ratings

Parameter	Min	Max	Unit
Power Supply Voltage : VSYS	3.2	5.0	V
Storage Temperature	-25	85	℃

Recommended Operating Conditions

Parameter	Min	Max	Unit
Power Supply Voltage	3.3	4.2	V
Operation Temperature	-20	75	℃

Current consumption

Operation Mode	Unit	Min	Typical	Max
Power off	uA	-	2	-
Working(ATE Test mode)	mA	-	5	-

RF Characteristics

Parameter	Conditions	Min	Typ	MAX	Units
Frequency Range	-	2402	-	2480	MHz
RX Sensitivity@1Mbps BLE	PER=30.8%	-	-96	-	dBm
RX Sensitivity@2Mbps BLE	PER=30.8%	-	-93	-	dBm
RX Sensitivity@1Mbps BT	BER=0.1%	-	-94	-	dBm
RX Sensitivity@ EDR 2Mbps	BER=0.01%	-	-93	-	dBm
RX Sensitivity@ EDR 3Mbps	BER=0.01%	-	-86	-	dBm
Transmit Output Power	BR(GFSK)	-	14	-	dBm
	EDR2(π/4-DQPSK)	-	14	-	dBm
	EDR3(8-DPSK)	-	14	-	dBm
	BLE 1M	-	8.5	-	dBm
	BLE 2M	-	8.5	-	dBm

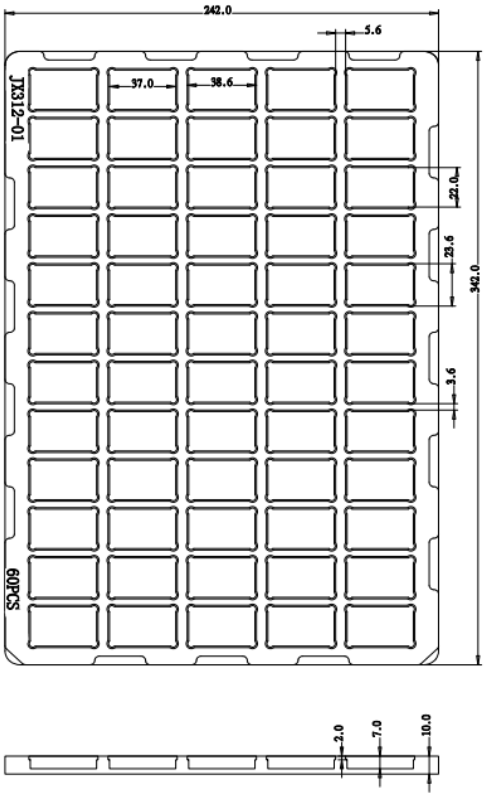
Copyright © 2025 MCS LOGIC Limited. All rights reserved
Confidential

Actual Data

MARK	Length (A)		Width (B)		PCB Thickness (I)		ASS'Y Thickness (J)	
Unit (mm) / Sample No.	35.00	0.30 / -0.30	20.00	0.30 / -0.30	1.00	0.15 / -0.15	3.05	0.30 / -0.30
#1	35.00		19.95		1.01		2.98	
#2	35.08		19.96		1.00		3.02	
#3	34.96		19.95		0.99		2.98	
#4	35.00		19.96		0.98		3.07	
#5	34.99		20.00		1.01		2.94	
#6	35.01		20.01		1.00		3.02	
#7	35.04		20.03		1.01		3.00	
#8	35.06		19.98		1.00		3.00	
#9	34.96		20.04		1.02		2.99	
#10	35.01		20.03		0.98		3.01	
#11	35.02		20.02		0.97		3.05	
#12	35.02		20.01		1.01		3.04	
#13	35.04		20.04		0.99		3.04	
#14	35.02		20.06		1.03		3.03	
#15	34.98		19.99		1.01		3.01	
#16	35.02		19.98		1.00		2.98	
#17	35.04		19.98		1.01		3.01	
#18	35.03		19.99		1.01		3.05	
#19	35.08		20.01		1.00		3.04	
#20	35.02		20.01		1.00		3.02	
#21	35.04		20.06		1.00		3.00	
#22	35.06		20.04		1.01		3.01	
#23	35.09		20.09		1.02		3.03	
#24	34.96		20.04		1.01		3.04	
#25	34.99		20.07		1.01		3.03	
#26	35.04		19.95		1.01		3.02	
#27	34.99		20.08		0.98		3.04	
#28	35.02		19.99		0.98		3.03	
#29	35.06		19.99		1.00		3.04	
#30	34.98		20.04		1.01		3.03	
MIN	34.96		19.95		0.97		2.94	
MAX	35.09		20.09		1.03		3.07	
AVG	35.02		20.01		1.00		3.02	
Judgment	PASS		PASS		PASS		PASS	

Copyright © 2025 MCS LOGIC Limited. All rights reserved
Confidential

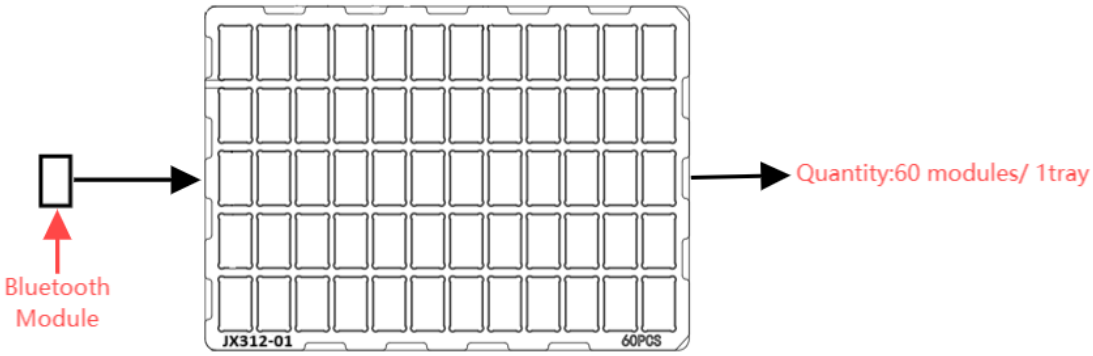
13. Packing Information



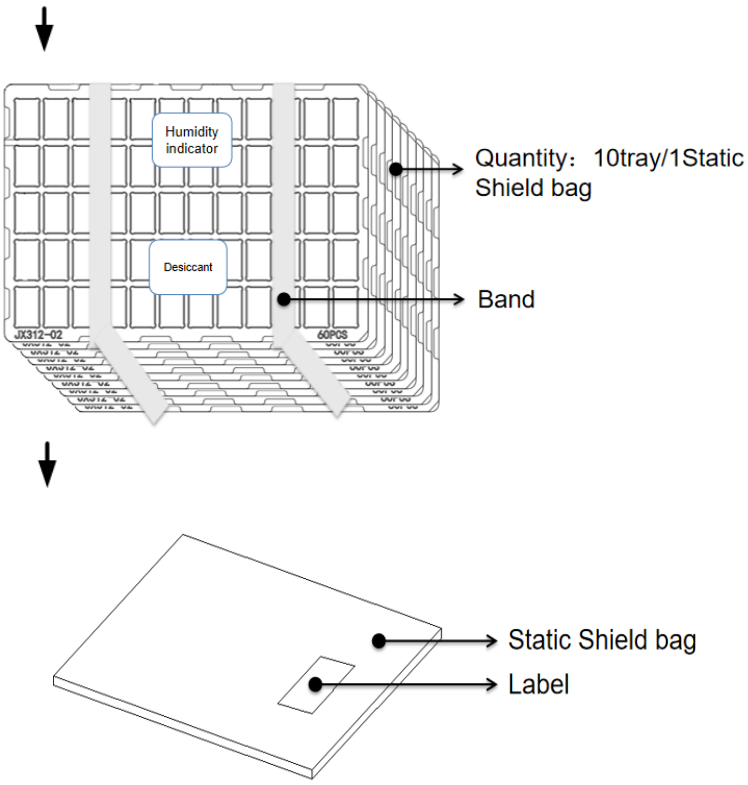
13.1 Tray

- Each tray has 60 units of products.

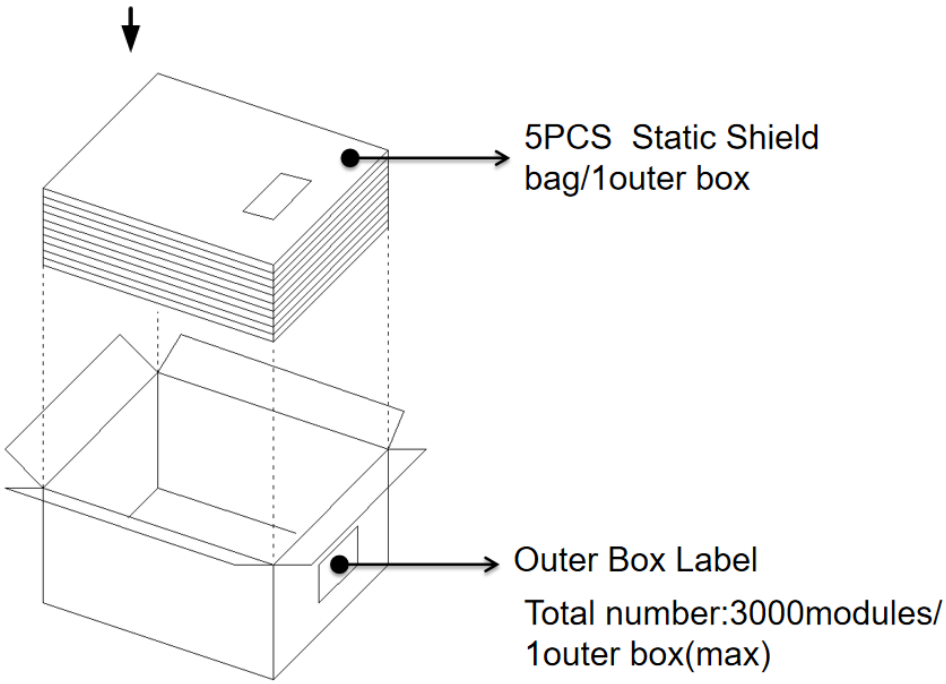
13.2 Packing process



Copyright © 2025 MCS LOGIC Limited. All rights reserved
Confidential



- Each Static Shield bag has 600 units of products.

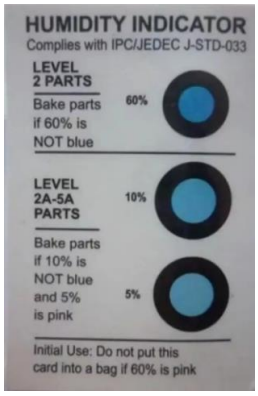


- Each Outer Box has 3000 units of products （max）.

Copyright © 2025 MCS LOGIC Limited. All rights reserved
Confidential

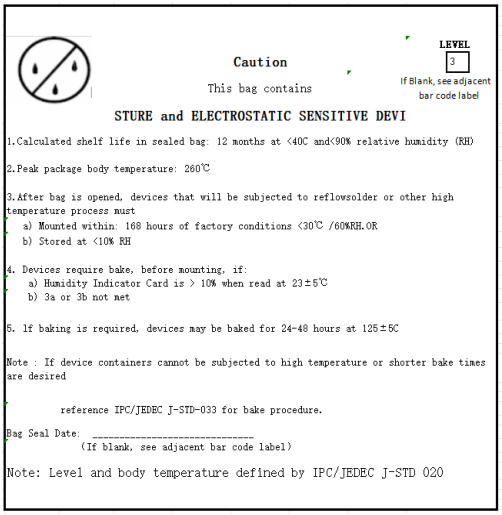
13.3 Static Shield bag

[HUMIDITY]



[DESICCANT]

[Moisture Sensitivity Level 3 Label]



Caution

This bag contains

LEVEL 3

If Blank, see adjacent bar code label

STURE and ELECTROSTATIC SENSITIVE DEVI

1.Calculated shelf life in sealed bag: 12 months at <40C and<90% relative humidity (RH)

2.Peak package body temperature: 260℃

3.After bag is opened, devices that will be subjected to reflowsolder or other high temperature process must
a) Mounted within: 168 hours of factory conditions <30℃ /60%RH.OR
b) Stored at <10% RH

4. Devices require bake, before mounting, if:
a) Humidity Indicator Card is > 10% when read at 23±5℃
b) 3a or 3b not met

5. If baking is required, devices may be baked for 24-48 hours at 125±5C

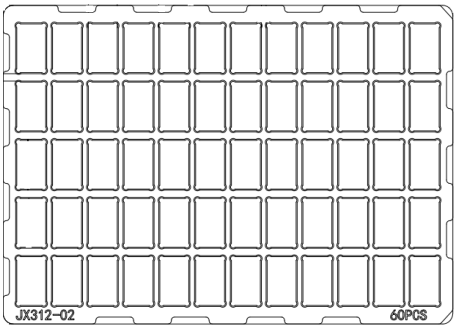
Note : If device containers cannot be subjected to high temperature or shorter bake times are desired

reference IPC/JEDEC J-STD-033 for bake procedure.

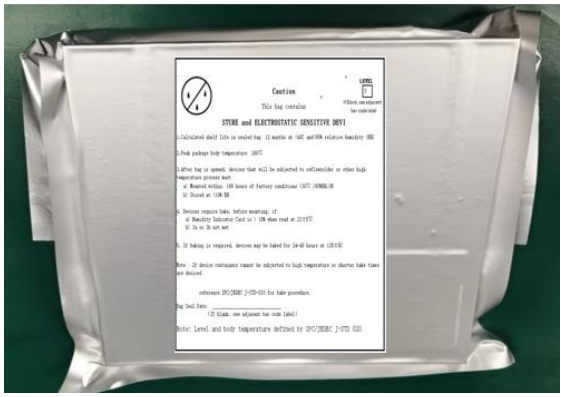
Bag Seal Date: _____
(If blank, see adjacent bar code label)

Note: Level and body temperature defined by IPC/JEDEC J-STD 020

[TOP of Trays]



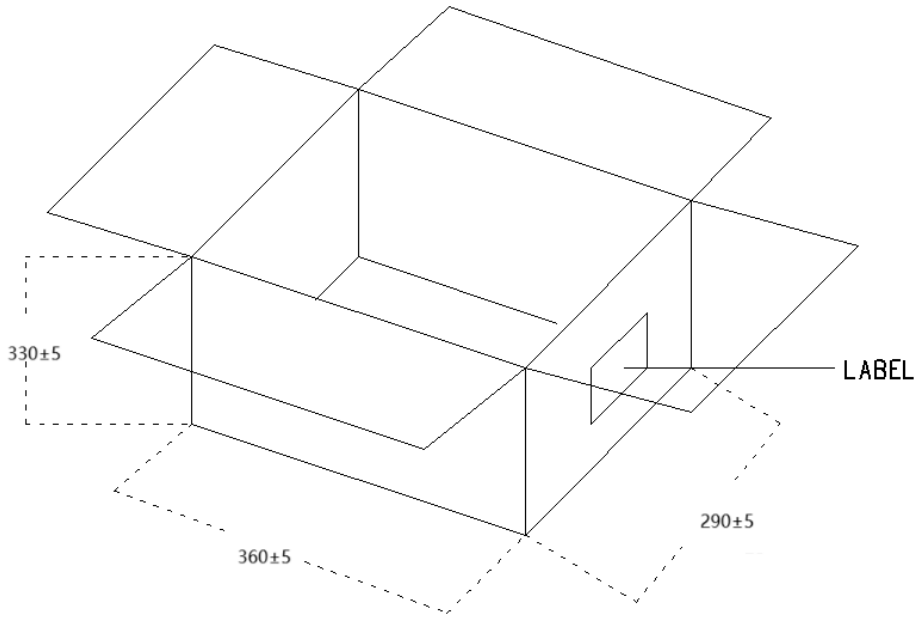
[Static Shield bag]



…

Copyright © 2025 MCS LOGIC Limited. All rights reserved
Confidential

13.4 OUTER BOX



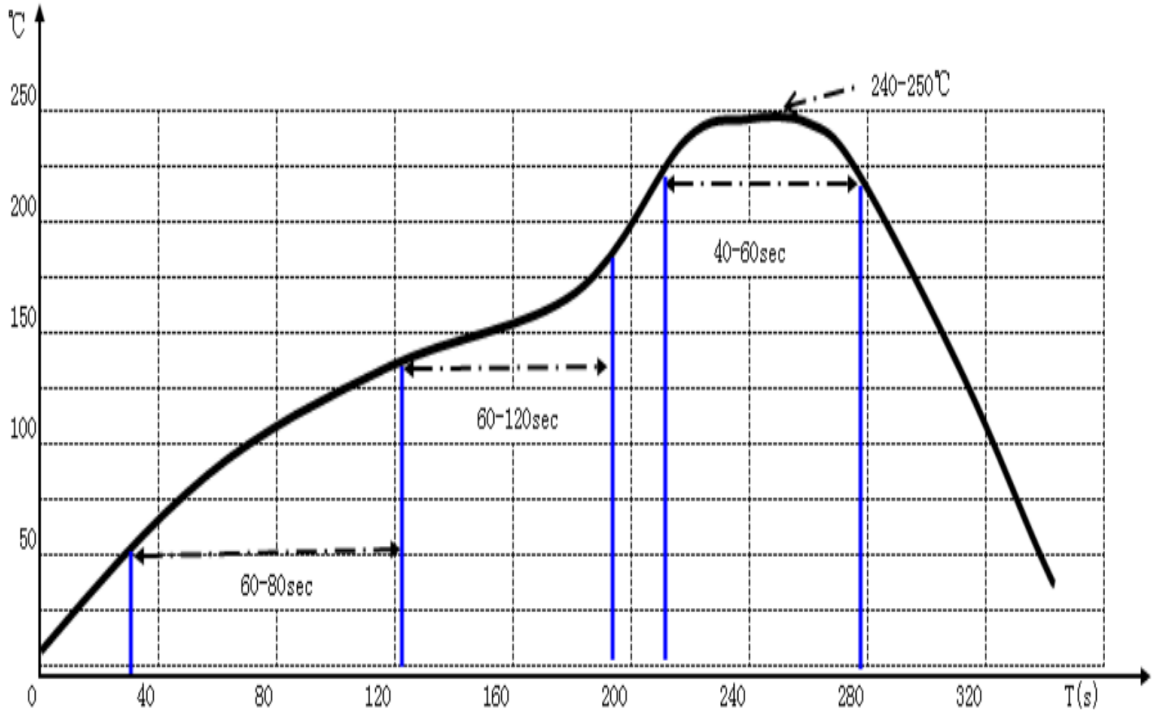
(Unit : mm)

No.	Label Description
①	Company
②	Customer
③	Model No & Part No.
④	Company Address
⑤	Quantity
⑥	Gross Weight(Kg)
⑦	Carton No.
⑧	Rohs

Copyright © 2025 MCS LOGIC Limited. All rights reserved
Confidential

14. Reflow Profile

Reflow Conditions : Pb-Free
Allowable reflow soldering times : 2times based on the below profile

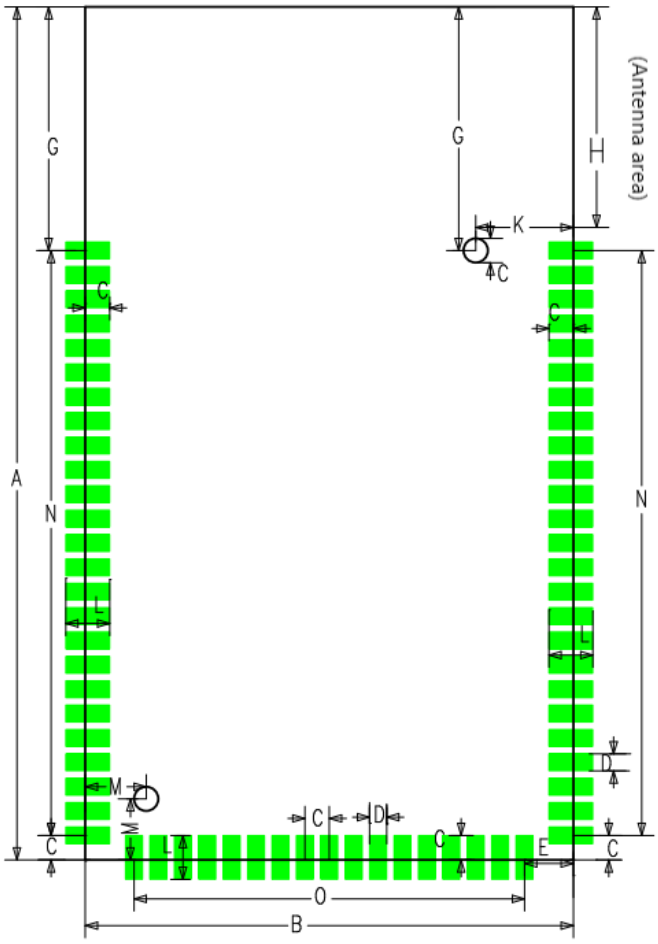


Copyright © 2025 MCS LOGIC Limited. All rights reserved
Confidential

15. PCB LAYOUT DIMENSION & Module position guide.

Ground & Shield CAN must not exist around Antenna area

LAYOUT DIMENSION



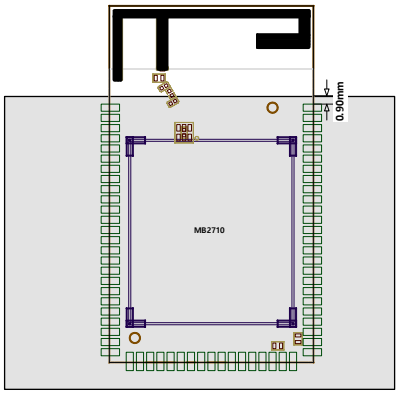
(Unit : mm)

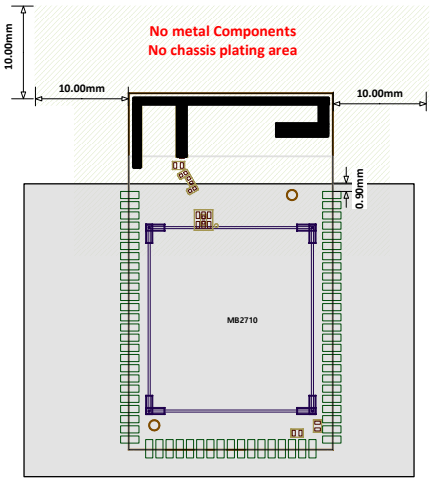
Mark	Dimension	Mark	Dimension	Mark	Dimension	Mark	Dimension	Mark	Dimension
A	35	B	20	C	1	D	0.7	E	2
G	10	H	9.3	K	4	L	1.8	M	2.5
N	24	O	16						

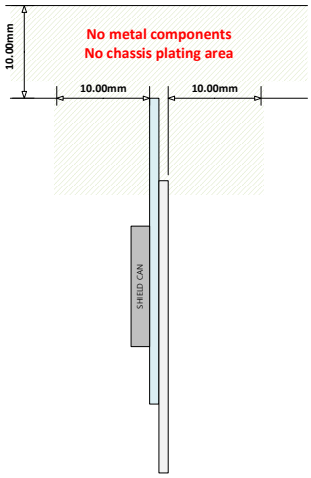
Stencil Guideline : 1.2mm
Land Pad Guideline : Module pad size is 1:1

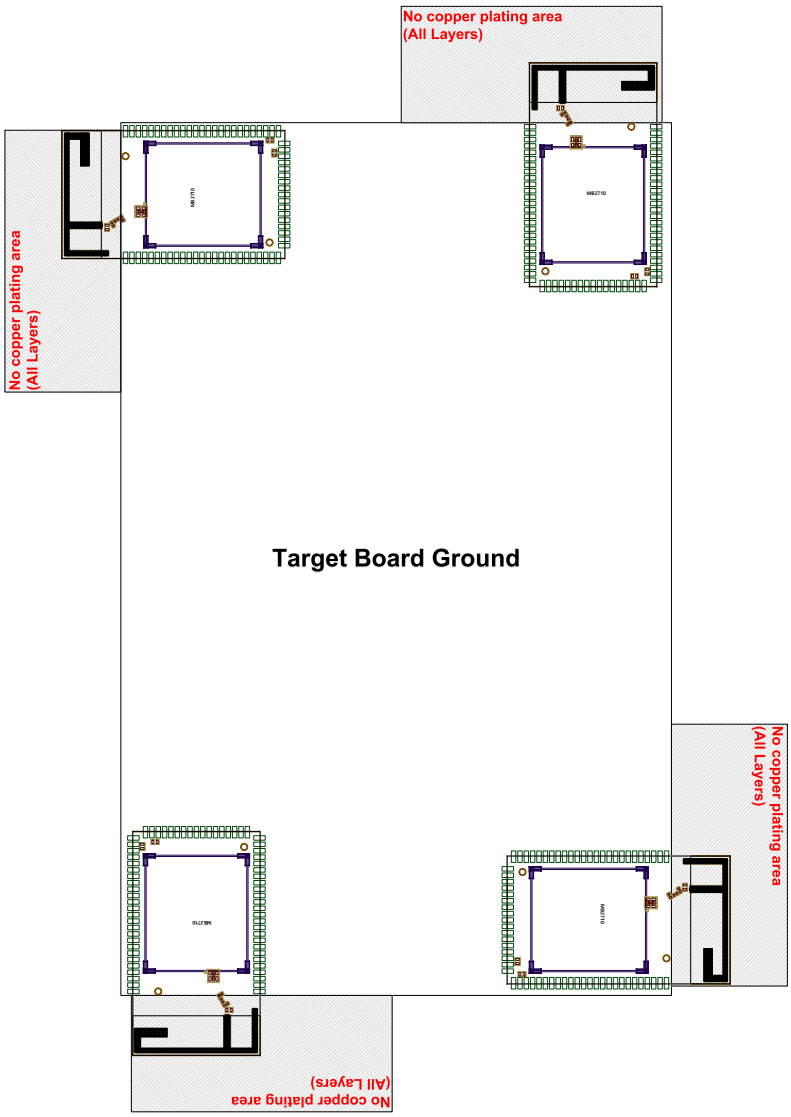
Copyright © 2025 MCS LOGIC Limited. All rights reserved
Confidential

Module position guide.





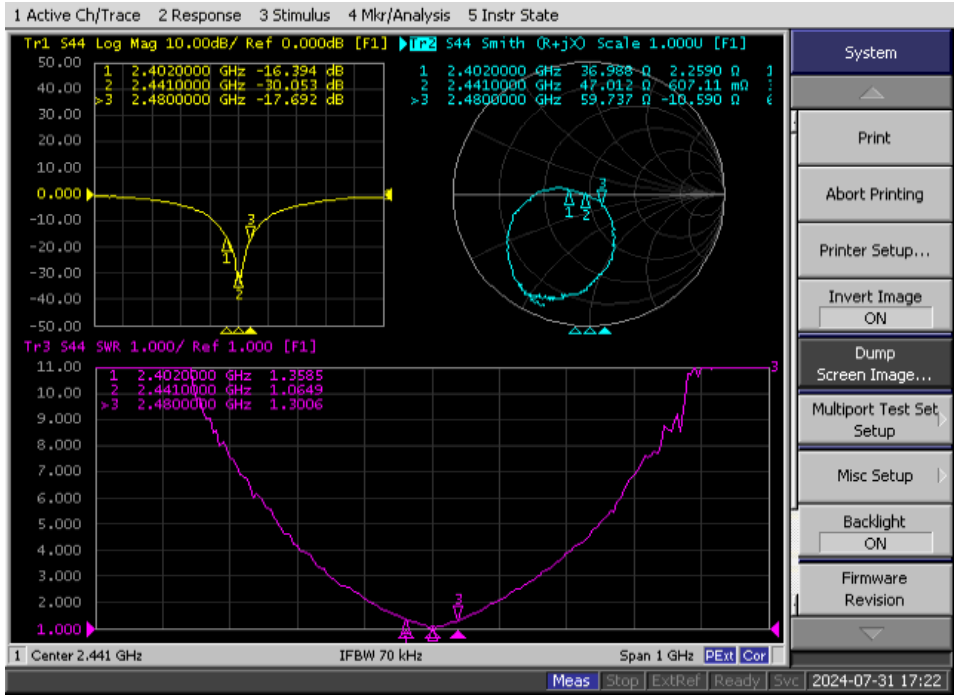


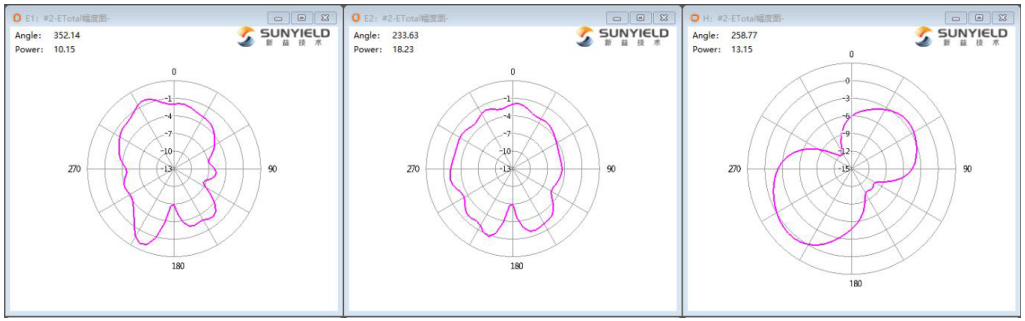


Copyright © 2025 MCS LOGIC Limited. All rights reserved
Confidential

16. PCB Antenna Report

VSWR

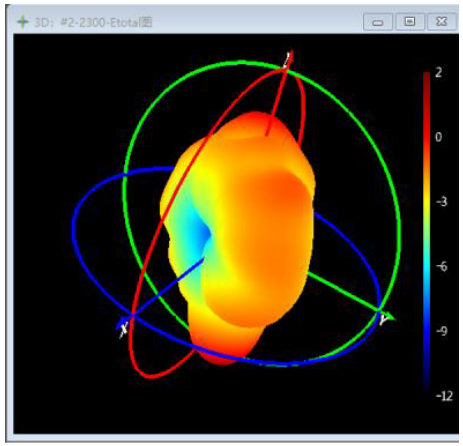




Copyright © 2025 MCS LOGIC Limited. All rights reserved

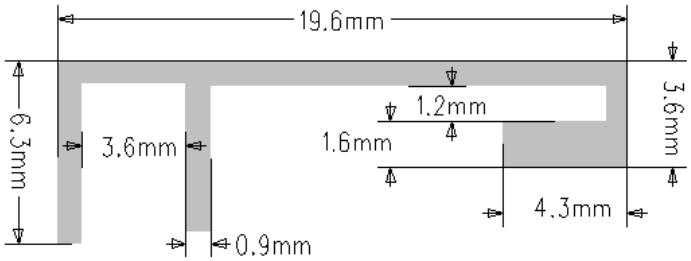
Confidential

Frenquency(MHz)	Gain(dBi)	Efficiency(dB)	Efficiency(%)
2400	1.71	-2.2	58.31
2410	1.62	-2.08	59.96
2420	1.69	-1.93	62.05
2430	1.73	-1.81	63.86
2440	1.72	-1.72	65.28
2450	1.64	-1.65	66.35
2460	1.6	-1.78	64.43
2470	1.54	-1.87	62.95
2480	1.48	-1.98	61.38
2490	1.3	-2.12	59.32



TRP / TIS

	Frenquency(MHz)	Power(dBm)
TRP	2402	8.57
	2441	8.95
	2480	8.78
	Frenquency(MHz)	**Sensitivity(dBm)**
TIS	2402	-92.95
	2441	-93.23
	2480	-93.14



Copyright © 2025 MCS LOGIC Limited. All rights reserved
Confidential

18. Reliability Test

(MCS Logic)	MB2710 Reliability Test Report	page 1 of 1

Test Description	Reliability test of Bluetooth module for production
Package type	
Date issued	

No	Test item	Test condition	instrument	sample	Trial/VERDICT
1	Appearance, Appearance	In accordance with the specification approval source, the test is carried out using visual/optical inspection equipment. Naked eye, light microscope	Naked eye, magnifying glass	5EA	PASS
2	performance (Performance)	Satisfies the electrical characteristic SPEC specified in the specification approval source.	RF Instrument (MT-8852B)	16EA	PASS
3	High-temperature load (high temperature load)	1. Temp: 75℃2. VCC = 3.3V. Duration: 200hrs4. Measurement condition : After leaving normal temperature for 2hrs, it must satisfy the electrical performance	RF Instrument (MT-8852B)	4EA	PASS
4	Heat resistant (hot resistance)	1. Temp: 85℃2. Duration: 96hrs3. Measurement condition : After leaving normal temperature for 2hrs, it must satisfy the electrical performance	RF Instrument (MT-8852B)	4EA	PASS
5	Cold-resistant (cold resistance)	1. Temp: -25℃2. Duration: 96hrs3. Measurement condition : After leaving normal temperature for 2hrs, it must satisfy the electrical performance	RF Instrument (MT-8852B)	4EA	PASS
6	Moisture resistance (moisture resistance)	1. Temp/Humidity: 40℃/95%2. Duration: 96hrs3. Measurement condition : After leaving normal temperature for 2hrs, it must satisfy the electrical performance	RF Instrument (MT-8852B)	4EA	PASS
7	Thermal shock (temperature cycle)	1. 1cycle: -45℃ ==> 125℃, 30 minute/step2. Repeat: 200 cycles3. Measurement condition : solder crack inspection	RF Instrument (MT-8852B)	2EA	PASS
8	Electrostatic ESD test (Electrostatic DischargeESD test)	1. Condition : Contact 2KV & Air 15KV 2. Number of Test : shoot 10 times/point3. Interval : 1 sec4. Point: shooting on data signals on I/F connector : It must satisfy the electrical performance	Electrostatic Generator (ESD-203A), RF Instrument (MT-8852B)	2EA	PASS
9	Electrostatic ESD limit test Electrostatic DischargeESD test (Limit test)	For samples determined to be OK after the ESD test is completed, step up by 2Kv up to 15Kv compared to the spec, and step up by 5Kv for 15Kv or more to check the limit point.	Electrostatic Generator (MT-8852B), RF Instrument (MT-8852B)	2EA	PASS
10	Hazardous substances	Tests are conducted according to the	N/A (Request from an external	1EA	PASS

Copyright © 2025 MCS LOGIC Limited. All rights reserved
Confidential

	(Hazardous Substances)	measurement standards for hazardous substances. (XRF, phthalates)	agency)		

Test items	Appearance, structure		
Test equipment	Naked eye, magnifying glass		
Test conditions	In accordance with the specification approval source, the test is carried out using visual/optical inspection equipment.		
Test methods and specifications	1. There should be no abnormalities in the soldering condition 2. There is no abnormality in the laser marking condition and it must be consistent with the product specifications. 3. There should be no scratches, foreign objects, damage, etc.		verdict
Initial value (Before)	x1	No abnormalities in appearance and structure	OK
	x2	No abnormalities in appearance and structure	OK
	x3	No abnormalities in appearance and structure	OK
	x4	No abnormalities in appearance and structure	OK
	x5	No abnormalities in appearance and structure	OK
After the test	x1	No abnormalities in appearance and structure	OK
	x2	No abnormalities in appearance and structure	OK
	x3	No abnormalities in appearance and structure	OK
	x4	No abnormalities in appearance and structure	OK
	x5	No abnormalities in appearance and structure	OK

Copyright © 2025 MCS LOGIC Limited. All rights reserved
Confidential

Test items	High-temperature load
Test equipment	RF Instrument (MT-8852B)
Test conditions	1. Environmental chamber setting: Set to 75 degrees / 200 hours.(Temperature chamber setup : 60deg/200 hour time) 2. After setting the power output setting of the power supply to 3.3V, connect the 3.3V power supply and Ground to the power of the power input ports in the module

Test Specification	Category	Output Power						Initial Carrier Frequency Tolerance						Carrier Frequency Drift						Modulation characteristics									Sensitivity BER			Verdict
	Channel	2402 (MHz)		2441 (MHz)		2480 (MHz)		2402 (MHz)		2441 (MHz)		2480 (MHz)		2402 (MHz)		2441 (MHz)		2480 (MHz)		2402 (MHz)			2441 (MHz)			2480 (MHz)			2402 (MHz)	2441 (MHz)	2480 (MHz)	
	Test Item	Pav	Pmax	Pav	Pmax	Pav	Pmax	df0_max	df0_min	df0_max	df0_min	df0_max	df0_min	fdr_max	drf_max	fdr_max	drf_max	fdr_max	drf_max	df1_avg	df2_rate	df2/df1	df1_avg	df2_rate	df2/df1	df1_avg	df2_rate	df2/df1	BERRY	BERRY	BERRY	
	Test Limit	0~13	< 23	0~13	< 23	0~13	< 23	≤ 35	≥ -35	≤ 35	≥ -35	≤ 35	≥ -35	≤ 40	≤ 20	≤ 40	≤ 20	≤ 40	≤ 20	140~175	≥ 99.9	≥ 0.8	140~175	≥ 99.9	≥ 0.8	140~175	≥ 99.9	≥ 0.8	≤ 0.1	≤ 0.1	≤ 0.1	
	Unit	dBm	dBm	dBm	dBm	dBm	dBm	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	(%)	-	KHz	(%)	-	KHz	(%)	-	(%)	(%)	(%)	
Initial value	x1	11.4	11.4	11.4	11.4	11.1	11.1	-1	-8.6	0.5	-9.6	-2.1	-8.9	-6	6.7	8	5.9	6	7.3	161.2	100	0.8	160.1	100	0.9	159.9	100	0.9	0	0	0	PASS
	x2	11.2	11.2	11.1	11.1	10.9	10.9	8.4	0.4	7.9	2.1	7.9	3	-7	5.4	6	6.7	-7	-5.8	160.7	100	0.8	159.5	100	0.9	159.1	100	0.9	0	0	0	PASS
	x3	11	11	11	11	10.7	10.7	10	2.3	9.1	1.1	7.8	2.4	6	5.6	8	5.9	8	6.3	160.6	100	0.8	159.7	100	0.9	158.8	100	0.9	0	0	0	PASS
	x4	11.1	11.2	11.3	11.3	10.9	10.9	10.5	4.2	6.3	2	4	-0.2	-7	5.2	7	6	10	6.9	160.2	100	0.9	159.3	100	0.9	158.7	100	0.9	0	0	0	PASS
	Avg	11.2	11.2	11.2	11.2	10.9	10.9	7.0	-0.4	6.0	-1.1	4.4	-0.9	-3.5	5.7	7.3	6.1	4.3	3.7	160.7	100	0.8	159.7	100	0.9	159.1	100	0.9	0	0	0	PASS
Late Values	x1	11.3	11.3	11.3	11.3	11	11.1	-3	-10.4	-4.4	-10.8	-3.9	-12.3	7	5.5	-6	6.3	8	6.1	161	100	0.8	160.2	100	0.9	159.9	100	0.9	0	0	0	PASS
	x2	11.1	11.1	11.1	11.1	10.9	10.9	7.2	1.9	7.6	2.1	6.1	1.3	7	5.8	8	6.1	7	6.7	160.7	100	0.8	159.7	100	0.9	159.3	100	0.9	0	0	0	PASS
	x3	11.1	11.1	11.1	11.1	10.8	10.9	6.4	0	4.6	0.4	5.2	-1.3	-7	4.6	10	5.5	7	6.5	159.9	100	0.9	159.6	100	0.9	159	100	0.9	0	0	0	PASS
	x4	10.9	11	11.1	11.1	10.7	10.7	5.8	2.3	6.2	-0.3	8.1	-0.6	-5	4.7	7	6.3	9	6.9	160.1	100	0.8	159.6	100	0.9	159.3	100	0.9	0	0	0	PASS
	Avg	11.1	11.1	11.2	11.2	10.9	10.9	4.1	-1.6	3.5	-2.2	3.9	-3.2	0.5	5.2	4.8	6.1	7.8	6.6	160.4	100	0.8	159.8	100	0.9	159.4	100	0.9	0	0	0	PASS

Copyright © 2025 MCS LOGIC Limited. All rights reserved

Confidential

Test items	Heat resistant
Test equipment	RF Instrument (MT-8852B)
Test conditions	Left in a high-temperature tank at a temperature of 85 degrees for 96 hours, measured after leaving at room temperature for 2 hours

Test Specification	Category	Output Power						Initial Carrier Frequency Tolerance						Carrier Frequency Drift						Modulation characteristics									Sensitivity BER			Verdict
	Channel	2402 (MHz)		2441 (MHz)		2480 (MHz)		2402 (MHz)		2441 (MHz)		2480 (MHz)		2402 (MHz)		2441 (MHz)		2480 (MHz)		2402 (MHz)			2441 (MHz)			2480 (MHz)			2402 (MHz)	2441 (MHz)	2480 (MHz)	
	Test Item	Pav	Pmax	Pav	Pmax	Pav	Pmax	df0_max	df0_min	df0_max	df0_min	df0_max	df0_min	fdr_max	drf_max	fdr_max	drf_max	fdr_max	drf_max	df1_avg	df2_rate	df2/df1	df1_avg	df2_rate	df2/df1	df1_avg	df2_rate	df2/df1	BERRY	BERRY	BERRY	
	Test Limit	0 ~ 13	< 23	0 ~ 13	< 23	0 ~ 13	< 23	≤ 35	≥ -35	≤ 35	≥ -35	≤ 35	≥ -35	≤ 40	≤ 20	≤ 40	≤ 20	≤ 40	≤ 20	140~175	≥ 99.9	≥ 0.8	140~175	≥ 99.9	≥ 0.8	140~175	≥ 99.9	≥ 0.8	≤ 0.1	≤ 0.1	≤ 0.1	
	Unit	dBm	dBm	dBm	dBm	dBm	dBm	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	(%)	-	KHz	(%)	-	KHz	(%)	-	(%)	(%)	(%)	
Initial value	x1	10.8	10.9	10.6	10.7	10.5	10.5	3.6	0.3	6.7	2.3	7.8	0.5	-3	3.3	5	3.6	4	-3.4	160	100	0.8	161.1	100	0.8	161	100	0.9	0	0	0	PASS
	x2	11.3	11.3	11.1	11.1	10.9	11	1.2	-2	3.7	-1.6	4.9	-1.4	-4	3.1	-4	-3.4	-5	3.9	160.5	100	0.8	160.9	100	0.8	161.1	100	0.9	0	0	0	PASS
	x3	11.2	11.3	11.1	11.1	11	11	2.5	-3.3	4.9	0.2	5.2	0.4	5	3.5	5	3.2	5	3.6	161.6	100	0.8	160.4	100	0.9	160.2	100	0.9	0	0	0	PASS
	x4	11.1	11.2	11	11	11	11	4.1	0.1	4.2	-0.4	3.3	0.6	-4	3.4	-5	3.4	-4	4.2	160.1	100	0.8	160	100	0.9	159.2	100	0.9	0	0	0	PASS
	Avg	11.1	11.2	11.0	11.0	10.9	10.9	2.9	-1.2	4.9	0.1	5.3	0.0	-1.5	3.3	0.3	1.7	0.0	2.1	160.6	100	0.8	160.6	100	0.9	160.4	100	0.9	0	0	0	PASS
Late Values	x1	10.9	11	10.8	10.9	10.7	10.7	3.5	-2.4	4.8	1.1	7.9	0.9	3	3.3	-4	-3	5	3.5	160.1	100	0.8	160.9	100	0.8	161.3	100	0.9	0	0	0	PASS
	x2	11.4	11.4	11.3	11.3	11.2	11.2	1.8	-2.9	1.9	-2.5	3.8	-2.3	5	2.6	5	4.4	5	3.4	160.4	100	0.8	160.2	100	0.8	161	100	0.9	0	0	0	PASS
	x3	11.3	11.3	11.3	11.3	11.2	11.2	2.4	-3	7.7	-1	6	-0.2	6	2.8	5	3.4	4	3.5	163.3	100	0.8	161.8	100	0.8	161.8	100	0.9	0	0	0	PASS
	x4	11	11	10.9	11	10.9	10.9	2.6	-3.2	4.7	-1.8	3.1	-0.6	-4	2.8	-5	3.3	7	3.6	159.7	100	0.8	160.1	100	0.9	159.5	100	0.9	0	0	0	PASS
	Avg	11.2	11.2	11.1	11.1	11.0	11.0	2.6	-2.9	4.8	-1.1	5.2	-0.6	2.5	2.9	0.3	2.0	5.3	3.5	160.9	100	0.8	160.8	100	0.8	160.9	100	0.9	0	0	0	PASS

Copyright © 2025 MCS LOGIC Limited. All rights reserved

Confidential

Test items	Cold-resistant
Test equipment	RF Instrument (MT-8852B)
Test conditions	Left in a low-temperature bath at -25 degrees Celsius for 96 hours, measured after leaving at room temperature for 2 hours

Test Specification	Category	Output Power						Initial Carrier Frequency Tolerance						Carrier Frequency Drift						Modulation characteristics									Sensitivity BER			Verdict
	Channel	2402 (MHz)		2441 (MHz)		2480 (MHz)		2402 (MHz)		2441 (MHz)		2480 (MHz)		2402 (MHz)		2441 (MHz)		2480 (MHz)		2402 (MHz)			2441 (MHz)			2480 (MHz)			2402 (MHz)	2441 (MHz)	2480 (MHz)	
	Test Item	Pav	Pmax	Pav	Pmax	Pav	Pmax	df0_max	df0_min	df0_max	df0_min	df0_max	df0_min	fdr_max	drf_max	fdr_max	drf_max	fdr_max	drf_max	df1_avg	df2_rate	df2/df1	df1_avg	df2_rate	df2/df1	df1_avg	df2_rate	df2/df1	BERRY	BERRY	BERRY	
	Test Limit	0 ~ 13	< 23	0 ~ 13	< 23	0 ~ 13	< 23	≤ 35	≥ -35	≤ 35	≥ -35	≤ 35	≥ -35	≤ 40	≤ 20	≤ 40	≤ 20	≤ 40	≤ 20	140~175	≥ 99.9	≥ 0.8	140~175	≥ 99.9	≥ 0.8	140~175	≥ 99.9	≥ 0.8	≤ 0.1	≤ 0.1	≤ 0.1	
	Unit	dBm	dBm	dBm	dBm	dBm	dBm	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	(%)	-	KHz	(%)	-	KHz	(%)	-	(%)	(%)	(%)	
Initial value	x1	11.1	11.1	10.9	10.9	10.8	10.8	3.5	-0.7	6.7	-2.3	5.8	0.2	4	2.9	6	3.6	6	3.8	161.9	100	0.8	161.8	100	0.8	162.1	100	0.9	0	0	0	PASS
	x2	11.1	11.2	11	11	11	11	2.5	-1.6	5.2	-1.7	1.3	-6	7	4.9	6	3.3	6	4	159.4	100	0.8	159.1	100	0.9	156.9	100	0.9	0	0	0	PASS
	x3	11.6	11.6	11.5	11.5	11.4	11.4	1.7	-0.7	4.3	-1.5	5.7	-0.9	6	3.1	4	3.2	5	3.5	161.6	100	0.8	162	100	0.8	162.5	100	0.9	0	0	0	PASS
	x4	11.7	11.7	11.5	11.5	11.4	11.4	4.6	-0.2	6.1	0.7	4.6	0.8	-3	3.6	-5	3.5	-6	3.6	160.8	100	0.8	161.1	100	0.8	160.5	100	0.9	0	0	0	PASS
	Avg	11.4	11.4	11.2	11.2	11.2	11.2	3.1	-0.8	5.6	-1.2	4.4	-1.5	3.5	3.6	2.8	3.4	2.8	3.7	160.9	100	0.8	161.0	100	0.8	160.5	100	0.9	0	0	0	PASS
Late Values	x1	11.2	11.3	11.2	11.2	11.1	11.1	2.4	-2.8	3.8	-1.7	7.4	1.3	5	-2.7	5	3.6	6	4.1	161.5	100	0.8	161.7	100	0.8	162.3	100	0.9	0	0	0	PASS
	x2	11.2	11.3	11.2	11.2	11.2	11.2	2.4	-1.8	2.5	-2.3	0.1	-4.8	7	3.7	5	3.5	6	3.8	159.1	100	0.8	158.5	100	0.9	156.9	100	0.9	0	0	0	PASS
	x3	11.8	11.8	11.7	11.8	11.7	11.7	1.5	-3.4	3.9	-0.5	3.6	1.5	5	2.5	6	-3.2	5	-3.6	162.3	100	0.8	162	100	0.8	162.3	100	0.9	0	0	0	PASS
	x4	11.8	11.8	11.7	11.7	11.6	11.6	3	-1.9	4.7	0.9	6.2	0.9	-5	2.9	-5	-3.2	-6	-3.4	160.8	100	0.8	161.1	100	0.8	161	100	0.9	0	0	0	PASS
	Avg	11.5	11.6	11.5	11.5	11.4	11.4	2.3	-2.5	3.7	-0.9	4.3	-0.3	3.0	1.6	2.8	0.2	2.8	0.2	160.9	100	0.8	160.8	100	0.8	160.6	100	0.9	0	0	0	PASS

Test items	Moisture resistance

Copyright © 2025 MCS LOGIC Limited. All rights reserved

Confidential

Test equipment	RF Instrument (MT-8852B)
Test conditions	Left for 96 hours in a constant temperature and humidity tank with a temperature of 40 degrees and a humidity of 95%, and measured after leaving at room temperature for 2 hours.

Test Specification	Category	Output Power						Initial Carrier Frequency Tolerance						Carrier Frequency Drift						Modulation characteristics									Sensitivity BER			Verdict
	Channel	2402 (MHz)		2441 (MHz)		2480 (MHz)		2402 (MHz)		2441 (MHz)		2480 (MHz)		2402 (MHz)		2441 (MHz)		2480 (MHz)		2402 (MHz)			2441 (MHz)			2480 (MHz)			2402 (MHz)	2441 (MHz)	2480 (MHz)	
	Test Item	Pav	Pmax	Pav	Pmax	Pav	Pmax	df0_max	df0_min	df0_max	df0_min	df0_max	df0_min	fdr_max	drf_max	fdr_max	drf_max	fdr_max	drf_max	df1_avg	df2_rate	df2/df1	df1_avg	df2_rate	df2/df1	df1_avg	df2_rate	df2/df1	BERRY	BERRY	BERRY	
	Test Limit	0 ~ 13	< 23	0 ~ 13	< 23	0 ~ 13	< 23	≤ 35	≥ -35	≤ 35	≥ -35	≤ 35	≥ -35	≤ 40	≤ 20	≤ 40	≤ 20	≤ 40	≤ 20	140~175	≥ 99.9	≥ 0.8	140~175	≥ 99.9	≥ 0.8	140~175	≥ 99.9	≥ 0.8	≤ 0.1	≤ 0.1	≤ 0.1	
	Unit	dBm	dBm	dBm	dBm	dBm	dBm	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	(%)	-	KHz	(%)	-	KHz	(%)	-	(%)	(%)	(%)	
Initial value	x1	11.8	11.8	11.7	11.7	11.6	11.6	1.5	-3.4	4.7	0.5	5.0	1.8	4.0	3.2	5.0	3.8	6.0	3.2	161.8	100	0.8	161.9	100	0.8	161.9	100	0.9	0	0	0	PASS
	x2	11.5	11.6	11.4	11.4	11.1	11.1	0.8	-5.9	2.1	-2.7	2.5	-1.1	6.0	-2.5	7.0	3.7	5.0	3.6	162.0	100	0.8	162.1	100	0.8	163.0	100	0.8	0	0	0	PASS
	x3	11.5	11.5	11.3	11.3	11.1	11.1	-2.1	-7.8	-2.0	-6.4	-0.5	-3.8	4.0	-2.4	5.0	3.1	5.0	3.8	162.2	100	0.8	161.9	100	0.8	163.8	100	0.8	0	0	0	PASS
	x4	11.6	11.6	11.5	11.5	11.3	11.3	1.8	-0.5	4.7	0.6	7.7	1.0	4.0	2.7	5.0	-3.3	5.0	-3.1	161.4	100	0.8	161.8	100	0.8	161.6	100	0.9	0	0	0	PASS
	x5	11.2	11.2	11.1	11.1	11.0	11.0	6.2	0.0	6.4	1.4	7.7	4.0	5.0	2.8	6.0	3.3	5.0	3.4	160.8	100	0.8	161.7	100	0.8	161.5	100	0.9	0	0	0	PASS
	Avg	11.5	11.6	11.4	11.4	11.2	11.2	1.6	-3.5	3.2	-1.3	4.5	0.4	4.6	0.8	5.6	2.2	5.2	2.2	161.6	100	0.8	161.9	100	0.8	162.4	100	0.9	0	0	0	PASS
Late Values	x1	11.8	11.8	11.7	11.7	11.4	11.4	-0.4	-5.8	3.5	-3.7	4.5	-0.4	5.0	6.1	9.0	5.5	10.0	6.5	159.8	100	0.8	161.7	100	0.8	161.7	100	0.8	0	0	0	PASS
	x2	11.6	11.7	11.5	11.5	11.2	11.2	-0.7	-6.9	1.8	-6.0	1.1	-3.4	7.0	4.3	8.0	6.0	9.0	6.1	161.9	100	0.8	162.2	100	0.8	162.9	100	0.8	0	0	0	PASS
	x3	11.7	11.8	11.5	11.5	11.3	11.3	-1.9	-8.4	-1.0	-8.6	-1.3	-8.4	6.0	4.1	10.0	5.7	7.0	6.3	163.3	100	0.8	161.1	100	0.9	162.5	100	0.9	0	0	0	PASS
	x4	11.8	11.8	11.6	11.7	11.5	11.5	1.4	-3.8	1.0	-2.2	6.5	-2.2	7.0	5.8	10.0	6.7	8.0	6.9	161.2	100	0.8	161.4	100	0.8	161.5	100	0.9	0	0	0	PASS
	x5	11.2	11.2	11.1	11.1	11.0	11.0	7.0	2.5	10.7	5.0	12.1	5.9	7.0	4.7	7.0	5.6	8.0	7.2	161.1	100	0.8	160.5	100	0.8	160.8	100	0.9	0	0	0	PASS
	Avg	11.6	11.7	11.5	11.5	11.3	11.3	1.1	-4.5	3.2	-3.1	4.6	-1.7	6.4	5.0	8.8	5.9	8.4	6.6	161.5	100	0.8	161.4	100	0.8	161.9	100	0.9	0	0	0	PASS

Copyright © 2025 MCS LOGIC Limited. All rights reserved

Confidential

Test items	Thermal shock
Test equipment	RF Instrument (MT-8852B)
Test conditions	Using a thermal shock tester, the temperature is -45 degrees 30 minutes and 125 degrees 30 minutes for 200 cycles in 1 cycle, and the presence of solder crack abnormalities is determined.

Test Specification	Category	Output Power						Initial Carrier Frequency Tolerance						Carrier Frequency Drift						Modulation characteristics									Sensitivity BER			Verdict
	Channel	2402 (MHz)		2441 (MHz)		2480 (MHz)		2402 (MHz)		2441 (MHz)		2480 (MHz)		2402 (MHz)		2441 (MHz)		2480 (MHz)		2402 (MHz)			2441 (MHz)			2480 (MHz)			2402 (MHz)	2441 (MHz)	2480 (MHz)	
	Test Item	Pav	Pmax	Pav	Pmax	Pav	Pmax	df0_max	df0_min	df0_max	df0_min	df0_max	df0_min	fdr_max	drf_max	fdr_max	drf_max	fdr_max	drf_max	df1_avg	df2_rate	df2/df1	df1_avg	df2_rate	df2/df1	df1_avg	df2_rate	df2/df1	BERRY	BERRY	BERRY	
	Test Limit	0 ~ 13	< 23	0 ~ 13	< 23	0 ~ 13	< 23	≤ 35	≥ -35	≤ 35	≥ -35	≤ 35	≥ -35	≤ 40	≤ 20	≤ 40	≤ 20	≤ 40	≤ 20	140~175	≥ 99.9	≥ 0.8	140~175	≥ 99.9	≥ 0.8	140~175	≥ 99.9	≥ 0.8	≤ 0.1	≤ 0.1	≤ 0.1	
	Unit	dBm	dBm	dBm	dBm	dBm	dBm	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	(%)	-	KHz	(%)	-	KHz	(%)	-	(%)	(%)	(%)	
Initial value	x1	11.8	11.8	11.7	11.7	11.5	11.6	2.4	-1.1	3.5	-1.0	1.1	-2.3	-3.0	3.3	-4.0	3.4	5.0	3.8	158.9	100	0.8	159.3	100	0.9	157.8	100	0.9	0	0	0	PASS
	x2	11.4	11.5	11.4	11.4	11.3	11.3	3.6	0.0	4.6	-0.8	6.3	1.3	4.0	-2.5	-4.0	3.8	-6.0	3.3	160.9	100	0.8	160.5	100	0.9	160.7	100	0.9	0	0	0	PASS
	Avg	11.6	11.6	11.5	11.6	11.4	11.4	3.0	-0.6	4.1	-0.9	3.7	-0.5	0.5	0.4	-4.0	3.6	-0.5	3.6	159.9	100	0.8	159.9	100	0.9	159.3	100	0.9	0	0	0	PASS
Late Values	x1	11.9	11.9	11.8	11.8	11.7	11.7	4.3	-1.2	3.2	-1.1	1.6	-3.9	5.0	3.5	-4.0	4.3	-5.0	3.0	159.2	100	0.8	159.0	100	0.9	157.4	100	0.9	0	0	0	PASS
	x2	11.6	11.7	11.6	11.6	11.5	11.5	2.2	-1.0	5.0	-0.2	5.5	1.3	-4.0	2.6	4.0	3.6	-5.0	3.6	161.3	100	0.8	161.4	100	0.8	161.1	100	0.9	0	0	0	PASS
	Avg	11.8	11.8	11.7	11.7	11.6	11.6	3.3	-1.1	4.1	-0.7	3.6	-1.3	0.5	3.1	0.0	3.9	-5.0	3.3	160.3	100	0.8	160.2	100	0.9	159.3	100	0.9	0	0	0	PASS

Solder Crack	x1	No abnormalities
	x2	No abnormalities

Test items	Electrostatic ESD test

Copyright © 2025 MCS LOGIC Limited. All rights reserved

Confidential

Test equipment	Electrostatic Generator (ESD-203A), RF Instrument (MT8852B)
Test conditions	- Contact 2KV & Air 15KV- Test method: interval 1 time per second (total 10 times) Applied part: Connector part where the actual data signal is connected (contact +- 20 times in total)

Test Specification	Category	Output Power						Initial Carrier Frequency Tolerance						Carrier Frequency Drift						Modulation characteristics									Sensitivity BER			Verdict
	Channel	2402 (MHz)		2441 (MHz)		2480 (MHz)		2402 (MHz)		2441 (MHz)		2480 (MHz)		2402 (MHz)		2441 (MHz)		2480 (MHz)		2402 (MHz)			2441 (MHz)			2480 (MHz)			2402 (MHz)	2441 (MHz)	2480 (MHz)	
	Test Item	Pav	Pmax	Pav	Pmax	Pav	Pmax	df0_max	df0_min	df0_max	df0_min	df0_max	df0_min	fdr_max	drf_max	fdr_max	drf_max	fdr_max	drf_max	df1_avg	df2_rate	df2/df1	df1_avg	df2_rate	df2/df1	df1_avg	df2_rate	df2/df1	BERRY	BERRY	BERRY	
	Test Limit	0 ~ 13	< 23	0 ~ 13	< 23	0 ~ 13	0 ~ 10	≤ 35	≥ -35	≤ 35	≥ -35	≤ 35	≥ -35	≤ 40	≤ 20	≤ 40	≤ 20	≤ 40	≤ 20	140~175	≥ 99.9	≥ 0.8	140~175	≥ 99.9	≥ 0.8	140~175	≥ 99.9	≥ 0.8	≤ 0.1	≤ 0.1	≤ 0.1	
	Unit	dBm	dBm	dBm	dBm	dBm	dBm	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	KHz	(%)	-	KHz	(%)	-	KHz	(%)	-	(%)	(%)	(%)	
Initial value	x1	11.6	11.6	11.6	11.6	11.6	11.6	2.5	-1.6	5.1	0.7	3.9	0.6	-5.0	2.7	6.0	2.9	5.0	3.5	160.7	100	0.8	161.2	100	0.8	162.3	100	0.9	0	0	0	PASS
	x2	11.1	11.1	11.0	11.1	11.0	11.0	2.5	-1.7	2.7	0.4	2.3	-2.6	7.0	3.3	6.0	3.4	5.0	4.8	157.9	100	0.9	157.9	100	0.9	156.7	100	0.9	0	0	0	PASS
	Avg	11.3	11.4	11.3	11.3	11.3	11.3	2.5	-1.7	3.9	0.6	3.1	-1.0	1.0	3.0	6.0	3.1	5.0	4.2	159.3	100	0.8	159.6	100	0.8	159.5	100	0.9	0	0	0	PASS
Late Values	x1	11.6	11.6	11.5	11.5	11.4	11.4	3.3	-1.8	3.4	1.1	6.8	1.8	4.0	-2.5	-5.0	3.5	4.0	3.6	160.7	100	0.8	161.2	100	0.8	161.8	100	0.9	0	0	0	PASS
	x2	11.0	11.0	11.0	11.0	11.0	11.0	3.5	-1.1	4.5	-0.8	5.2	-3.3	5.0	3.1	5.0	3.7	5.0	4.0	158.3	100	0.9	158.3	100	0.9	157.9	100	0.9	0	0	0	PASS
	Avg	11.3	11.3	11.3	11.3	11.2	11.2	3.4	-1.5	4.0	0.2	6.0	-0.8	4.5	0.3	0.0	3.6	4.5	3.8	159.5	100	0.8	159.8	100	0.8	159.9	100	0.9	0	0	0	PASS

Test items	Electrostatic ESD limit test
Test equipment	Electrostatic Generator (ESD-203A), RF Instrument (MT8852B)
Test conditions	For samples determined to be OK after the ESD test is completed, step up by 2Kv up to 15Kv compared to the spec, and step up by 5Kv for 15Kv or more to check the limit point.

	Test Limit	1.0	1.2	1.5	1.8	2	2.2	2.5					
	Unit	kV	kV	kV	kV	kV	kV	kV					
Limits	x1	OK	OK	OK	OK	OK	OK	NG					
	x2	OK	OK	OK	OK	OK	OK	NG					

Copyright © 2025 MCS LOGIC Limited. All rights reserved

Confidential

Test items		Hazardous substances											
Test equipment		Request for analysis by an external organization (HCT : Test report no. = WTH24H10250421C)											
Test conditions		Conduct tests based on hazardous substance measurement standards											
Test Specification	Category	RoHS						Phthalates				Note:	Verdict
	Test Item	Cadmium (Cd)	Lead(Pb)	Mercury(Hg)	Hexavalent Chromium (CrVI)	PBBs	PBDEs	DEHP	DBP	BBP	DIBP	(1) MDL = Method Detection Limit	
	Test Limit	100	1000	1000	1000	1000(sum)	1000(sum)	1000	1000	1000	1000	(2) mg/kg = ppm	
	MDL	2	2	2	0.1(metal)/8(others)	5	5	30	30	30	30	(3) N.D. = Not detected. (<MDL)	
	Unit	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	(4) BL = Below Limit by ED-XRF	
result	x1	BL	BL	BL	BL	BL	BL	ND	ND	ND	ND		PASS

Performance(RF Test Data)

Copyright © 2025 MCS LOGIC Limited. All rights reserved

Confidential

Category	Output Power									Initial Carrier Frequency Tolerance					
Verdict	Verification: maxium peak and average RF-output powerLimit: Pmax < - dBm, Pav < - dBm, Pmin > 0									Verification: transmitter carrier frequency accuracyLimits: df0_max <= 75.0 KHz, df0_min >= -75.0 KHz					
Channel	2402 (MHz)			2441 (MHz)			2480 (MHz)			2402 (MHz)		2441 (MHz)		2480 (MHz)	
Test Item	Pav	Pmax	Pmin	Pav	Pmax	Pmin	Pav	Pmax	Pmin	df0_max	df0_min	df0_max	df0_min	df0_max	df0_min
Test Limit	< 13	< 23	> 0	< 13	< 23	> 0	< 13	< 23	> 0	≤ 75	≥ -75	≤ 75	≥ -75	≤ 75	≥ -75
Unit	dBm	dBm	dBm	dBm	dBm	dBm	dBm	dBm	dBm	KHz	KHz	KHz	KHz	KHz	KHz
x1	11.47	11.48	11.45	11.25	11.26	11.24	10.90	10.91	10.89	0.4	-4	0.3	-4.7	-0.9	-4.3
x2	11.68	11.69	11.67	11.43	11.45	11.41	11.04	11.05	11.03	-0.9	-5.3	-0.9	-6.9	-0.8	-6.6
x3	12.13	12.14	12.11	11.95	11.96	11.92	11.63	11.64	11.62	-1.4	-4.5	-0.8	-5.3	-1.2	-6.4
x4	11.72	11.74	11.71	11.47	11.48	11.46	11.12	11.13	11.11	-6.8	-10.8	-7.2	-10.1	-6.0	-10.4
x5	11.34	11.35	11.32	11.03	11.05	11.01	10.65	10.68	10.63	-1.3	-6.1	-0.9	-7.0	-2.1	-6.1
x6	11.39	11.41	11.38	11.21	11.23	11.20	10.96	10.97	10.95	-2.3	-5.2	-2.6	-4.9	-0.8	-6.3
x7	11.49	11.50	11.48	11.30	11.31	11.28	10.96	10.98	10.95	-1.8	-5.0	-0.7	-5.6	0.4	-6.3
x8	11.61	11.63	11.59	11.37	11.38	11.35	11.03	11.04	11.01	-7.3	-10.1	-6.2	-11	-8	-10.4
x9	11.66	11.67	11.65	11.46	11.47	11.44	11.11	11.14	11.09	-1.4	-4	-0.1	-6.1	-0.3	-4.3
x10	11.98	12.00	11.98	11.71	11.73	11.69	11.37	11.38	11.36	-1.2	-5.3	-2.3	-6.2	-2.0	-9.1
x11	11.16	11.18	11.15	10.93	10.95	10.91	10.60	10.61	10.58	-1.3	-6.6	-0.8	-5.7	-1.0	-7.2
x12	11.30	11.32	11.28	11.09	11.10	11.08	10.83	10.85	10.82	-2.5	-4.7	-1.3	-9.3	-2.8	-6.7
x13	11.19	11.20	11.17	10.89	10.91	10.88	10.62	10.63	10.61	-1.7	-5.7	-1.4	-5.3	-1.3	-5.9
x14	12.07	12.08	12.06	11.82	11.84	11.79	11.47	11.49	11.46	-3.7	-6.8	-4.3	-7.1	-1.7	-6.7
x15	11.35	11.36	11.33	11.12	11.14	11.11	10.77	10.78	10.76	0.1	-4.3	0.4	-4.2	-0.7	-5.1
x16	11.82	11.84	11.81	11.61	11.63	11.59	11.29	11.30	11.28	-2.0	-5.2	-0.9	-6.0	-1.5	-5.5
Average	11.58	11.59	11.57	11.35	11.368	11.33	11.021	11.036	11.005	-2.19375	-5.85	-1.85625	-6.5875	-1.91875	-6.70625

Category	Carrier Frequency Drift	Modulation characteristics

Copyright © 2025 MCS LOGIC Limited. All rights reserved

Confidential

Verdict	Verification: transmitter center frequency drift within a packetLimits: abs(f_drift_max) <= 40.0KHz, abs(drift_rate_max) <= 20.0KHz/50 us						Verification: frequency deviation characteristicsLimits: 140.0KHz <= df1_avg <= 175.0KHz, df2_pass_rate >= 99.90%, df2/df1 >= 0.80								
Channel	2402 (MHz)		2441 (MHz)		2480 (MHz)		2402 (MHz)			2441 (MHz)			2480 (MHz)		
Test Item	fdr_max	drf_max	fdr_max	drf_max	fdr_max	drf_max	df1_avg	df2_rate	df2/df1	df1_avg	df2_rate	df2/df1	df1_avg	df2_rate	df2/df1
Test Limit	≤ 40	≤ 20	≤ 40	≤ 20	≤ 40	≤ 20	140~175	≥ 99.9	≥ 0.8	140~175	≥ 99.9	≥ 0.8	140~175	≥ 99.9	≥ 0.8
Unit	KHz	KHz	KHz	KHz	KHz	KHz	KHz	(%)	-	KHz	(%)	-	KHz	(%)	-
x1	5	2.69	6	-3.03	4	-3.08	162.5	100	0.81	163.1	100	0.81	163.1	100	0.82
x2	5	-2.66	5	2.81	6	3.71	163.0	100	0.80	162.8	100	0.81	162.6	100	0.82
x3	5	-2.91	6	3.14	4	3.71	163.0	100	0.81	164.2	100	0.80	163.4	100	0.82
x4	4	-2.68	7	3.03	5	3.11	163.5	100	0.80	163.6	100	0.81	164.3	100	0.81
x5	5	2.25	5	-3.55	7	3.26	162.2	100	0.81	161.8	100	0.82	161.6	100	0.84
x6	6	3.13	5	2.89	6	3.39	162.3	100	0.81	161.8	100	0.82	161.7	100	0.83
x7	5	2.37	5	2.94	6	3.60	163.1	100	0.80	163.1	100	0.81	162.5	100	0.83
x8	4	2.71	4	2.95	5	3.33	162.3	100	0.81	162.7	100	0.80	161.2	100	0.84
x9	6	-2.38	5	2.84	5	-3.50	162.0	100	0.82	161.3	100	0.83	161.6	100	0.84
x10	4	-2.35	6	2.68	6	-3.11	163.1	100	0.80	163.1	100	0.81	162.6	100	0.82
x11	5	2.80	6	3.05	5	-3.19	163.2	100	0.80	162.7	100	0.81	162.0	100	0.83
x12	5	-2.30	5	-3.23	5	-2.95	163.0	100	0.80	162.7	100	0.81	162.4	100	0.82
x13	4	-2.74	4	3.02	5	3.30	161.7	100	0.81	161.6	100	0.81	161.3	100	0.82
x14	5	-2.57	5	2.89	5	-3.11	162.4	100	0.81	161.7	100	0.82	162.1	100	0.83
x15	5	2.80	5	3.03	4	3.17	162.4	100	0.81	162.2	100	0.82	161.9	100	0.83
x16	6	2.19	6	-3.72	5	3.09	163.6	100	0.80	163.2	100	0.80	162.9	100	0.82
Average		0.021875	5.31	1.35	5.18	0.920625	162.70	100	0.80	162.6	100	0.811	162.32	100	0.82

Category	Power Density	Power Control

Copyright © 2025 MCS LOGIC Limited. All rights reserved

Confidential

Verdict	Verification: maxium RF-output power densityLimits: P_density < 20.00dBm per 100 KHz EIRP		Verification: TX power controlLimits: Pmin <= 4.00dBm Pst_min >= 2.00dB, Pst_max <= 8.00dB											
Channel	-		2402 (MHz)				2441 (MHz)				2480 (MHz)			
Test Item	P_density	freq.	Pmin	Pmax	Pst_min	Pst_max	Pmin	Pmax	Pst_min	Pst_max	Pmin	Pmax	Pst_min	Pst_max
Test Limit	< 20	-	≤ 4	≤ 23	≥ 2	≤ 8	≤ 4	≤ 23	≥ 2	≤ 8	≤ 4	≤ 23	≥ 2	≤ 8
Unit	dBm	MHz	dBm	dBm	dB	dB	dBm	dBm	dB	dB	dBm	dBm	dB	dB
x1	8.893	2420	-2.6	11.5	4.4	5.4	-2.5	11.3	4.3	5.1	-2.6	10.9	4.3	4.8
x2	8.507	2403	-2.3	11.7	4.3	5.3	-2.2	11.5	4.3	5.0	-2.3	11.1	4.3	4.8
x3	8.513	2421	-1.9	12.2	4.3	5.3	-1.8	12.0	4.3	5.1	-1.8	11.7	4.3	4.8
x4	8.281	2403	-2.3	11.8	4.4	5.4	-2.2	11.5	4.3	5.1	-2.2	11.1	4.3	4.8
x5	8.384	2410	-2.3	11.4	4.3	5.1	-2.3	11.1	4.3	4.8	-2.3	10.7	4.3	4.5
x6	8.010	2426	-2.3	11.4	4.2	5.3	-2.3	11.2	4.2	5.0	-2.2	11.0	4.2	4.7
x7	9.603	2404	-2.3	11.5	4.3	5.2	-2.3	11.3	4.3	5.0	-2.3	11.0	4.2	4.7
x8	8.997	2403	-2.3	11.6	4.3	5.3	-2.3	11.4	4.3	5.0	-2.3	11.1	4.3	4.7
x9	7.810	2413	-2.0	11.7	4.3	5.1	-1.9	11.5	4.2	4.9	-2.0	11.1	4.2	4.6
x10	8.418	2406	-2.8	11.2	4.3	5.3	-2.7	11.0	4.3	5.1	-2.7	10.6	4.2	4.8
x11	7.836	2406	-2.7	11.2	4.3	5.2	-2.7	11.1	4.3	5.2	-2.7	-10.8	4.3	4.8
x12	7.928	2407	-2.8	11.3	4.4	5.4	-2.7	11.1	4.4	5.2	-2.6	10.9	4.3	4.9
x13	10.475	2406	-2.9	11.2	4.4	5.4	-2.9	10.9	4.3	5.2	-3	10.7	4.3	4.9
x14	9.754	2406	-1.9	12.1	4.3	5.3	-1.9	11.8	4.4	5.1	-1.9	11.5	4.2	4.8
x15	10.050	2403	-2.4	11.4	4.3	5.2	-2.4	11.2	4.2	5.0	-2.4	10.8	4.2	4.7
x16	9.341	2405	-1.9	11.8	4.3	5.1	-1.8	11.6	4.3	4.9	-1.8	11.3	4.2	4.6
Average	8.8	2408.875	-2.35	11.5625	4.31	5.26	-2.30	11.34	4.29	5.04	-2.31	9.66	4.25	4.74

Category	TX Output Spectrum Freq. range	TX Output Spectrum -20dB Bandwidth
Verdict	Verification: operating frequency range are within the limits. Limits: f_l > 2400.00MHz, f_h <	Verification: operating frequency rangeLimits: |f_h - f_l| <= 1.000MHz (P_max >= 0dBm), |f_h - f_l| <= 1.500MHz (P_max < 0dBm)

Copyright © 2025 MCS LOGIC Limited. All rights reserved

Confidential

	2483.50MHz										
.											
Test Item	f_l(MHz)	f_h(MHz)	f_l	f_h	f_h-f_l	f_l	f_h	f_h-f_l	f_l	f_h	f_h-f_l
Test Limit	> 2400	< 2483.5	-	-	≤ 1	-	-	≤ 1	-	-	≤ 1
Unit	MHz	MHz	-	-	MHz	-	-	MHz	-	-	MHz
x1	2402.0	2480.1	2401.564	2402.428	0.864	2440.549	2441.427	0.878	2479.597	2480.470	0.873
x2	2401.9	2479.9	2401.600	2402.465	0.865	2440.558	2441.426	0.868	2479.565	2480.465	0.900
x3	2402.0	2480.0	2401.596	2402.447	0.851	2440.553	2441.462	0.909	2479.590	2480.464	0.874
x4	2401.9	2480.0	2401.596	2402.466	0.870	2440.558	2441.467	0.909	2479.596	2480.466	0.870
x5	2402.0	2480.0	2401.551	2402.465	0.914	2440.554	2441.465	0.911	2479.567	2480.488	0.921
x6	2402.0	2480.0	2401.557	2402.426	0.869	2440.546	2441.426	0.881	2479.597	2480.465	0.868
x7	2402.0	2480.0	2401.598	2402.465	0.867	2440.557	2441.470	0.913	2479.519	2480.443	0.924
x8	2402.0	2480.0	2401.500	2402.420	0.920	2440.555	2441.465	0.911	2479.551	2480.462	0.911
x9	2402.0	2480.0	2401.596	2402.473	0.877	2440.597	2441.466	0.869	2479.568	2480.424	0.856
x10	2402.0	2480.0	2401.549	2402.426	0.877	2440.583	2441.436	0.853	2479.598	2480.467	0.869
x11	2402.0	2480.0	2401.592	2402.462	0.870	2440.549	2441.463	0.914	2479.551	2480.462	0.912
x12	2402.0	2480.0	2401.570	2402.463	0.893	2440.595	2441.463	0.868	2479.595	2480.463	0.867
x13	2402.0	2480.0	2401.564	2402.464	0.900	2440.565	2441.424	0.859	2479.553	2480.446	0.893
x14	2401.9	2480.0	2401.595	2402.465	0.870	2440.553	2441.463	0.910	2479.585	2480.462	0.877
x15	2402.0	2480.0	2401.588	2402.441	0.853	2440.595	2441.458	0.863	2479.539	2480.423	0.884
x16	2402.0	2480.0	2401.593	2402.446	0.853	2440.554	2441.424	0.870	2479.536	2480.424	0.888
Average	2401.98125	2480	2401.57556	2402.451375	0.8758125	2440.5638125	2441.4503125	0.886625	2479.5691875	2480.455875	0.8866875

Copyright © 2025 MCS LOGIC Limited. All rights reserved

Confidential

			25								

Category	Sensitivity single slot packets (max. sensitivity at 0.1% BER < -70 dBm)											
Verdict	Verification: performance of the DUT receiver when presented with a non ideal signalLimits: bytes_received >= 200000, BER < 0.100%											
Channel	2402 (MHz)				2441 (MHz)				2480 (MHz)			
Test Item	bytes	error_bits	BER(%)	PER(%)	bytes	error_bits	BER(%)	PER(%)	bytes	error_bits	BER(%)	PER(%)
Test Limit	≥ 200K	-	< 0.1	< 0.1	≥ 200K	-	< 0.1	< 0.1	≥ 200K	-	< 0.1	< 0.1
Unit	-	-	%	%	-	-	%	%	-	-	%	%
x1	200010	0	0	0	200010	0	0	0	200010	0	0	0
x2	200010	0	0	0	200010	0	0	0	200010	0	0	0
x3	200010	0	0	0	200010	0	0	0	200010	0	0	0
x4	200010	0	0	0	200010	0	0	0	200010	0	0	0
x5	200010	0	0	0	200010	0	0	0	200010	0	0	0
x6	200010	0	0	0	200010	0	0	0	200010	0	0	0
x7	200010	0	0	0	200010	0	0	0	200010	0	0	0
x8	200010	0	0	0	200010	0	0	0	200010	0	0	0
x9	200010	0	0	0	200010	0	0	0	200010	0	0	0
x10	200010	0	0	0	200010	0	0	0	200010	0	0	0
x11	200010	0	0	0	200010	0	0	0	200010	0	0	0
x12	200010	0	0	0	200010	0	0	0	200010	0	0	0
x13	200010	0	0	0	200010	0	0	0	200010	0	0	0
x14	200010	0	0	0	200010	0	0	0	200010	0	0	0
x15	200010	0	0	0	200010	0	0	0	200010	0	0	0
x16	200010	0	0	0	200010	0	0	0	200010	0	0	0
Average	200010	0	0	0	200010	0	0	0	200010	0	0	0

Copyright © 2025 MCS LOGIC Limited. All rights reserved

Confidential

Category	Sensitivity multi slot packets (max. sensitivity at 0.1% BER < -70 dBm)											
Verdict	Verification: performance of the DUT receiver when presented with a non ideal signalLimits: bytes_received >= 200000, BER < 0.100%											
Channel	2402 (MHz)				2441 (MHz)				2480 (MHz)			
Test Item	bytes	error_bits	BER(%)	PER(%)	bytes	error_bits	BER(%)	PER(%)	bytes	error_bits	BER(%)	PER(%)
Test Limit	≥ 200K	-	< 0.1	< 0.1	≥ 200K	-	< 0.1	< 0.1	≥ 200K	-	< 0.1	< 0.1
Unit	-	-	%	%	dBm	-	%	%	-	-	%	%
x1	200010	0	0	0	200010	0	0	0	200010	0	0	0
x2	200010	0	0	0	200010	0	0	0	200010	0	0	0
x3	200010	0	0	0	200010	0	0	0	200010	0	0	0
x4	200010	0	0	0	200010	0	0	0	200010	0	0	0
x5	200010	0	0	0	200010	0	0	0	200010	0	0	0
x6	200010	0	0	0	200010	0	0	0	200010	0	0	0
x7	200010	0	0	0	200010	0	0	0	200010	0	0	0
x8	200010	0	0	0	200010	0	0	0	200010	0	0	0
x9	200010	0	0	0	200010	0	0	0	200010	0	0	0
x10	200010	0	0	0	200010	0	0	0	200010	0	0	0
x11	200010	0	0	0	200010	0	0	0	200010	0	0	0
x12	200010	0	0	0	200010	0	0	0	200010	0	0	0
x13	200010	0	0	0	200010	0	0	0	200010	0	0	0
x14	200010	0	0	0	200010	0	0	0	200010	0	0	0
x15	200010	0	0	0	200010	0	0	0	200010	0	0	0
x16	200010	0	0	0	200010	0	0	0	200010	0	0	0
Average												

Copyright © 2025 MCS LOGIC Limited. All rights reserved

Confidential

Category	Maximum Input Level (min. received signal at 0.1% BER > -20 dBm)											
Verdict	Verification: receiver performanceLimits: bytes_received >= 200000, BER < 0.100%											
Channel	2402 (MHz)				2441 (MHz)				2480 (MHz)			
Test Item	bytes	error_bits	BER(%)	PER(%)	bytes	error_bits	BER(%)	PER(%)	bytes	error_bits	BER(%)	PER(%)
Test Limit	≥ 200K	-	< 0.1	< 0.1	≥ 200K	-	< 0.1	< 0.1	≥ 200K	-	< 0.1	< 0.1
Unit	-	-	%	%	-	-	%	%	-	-	%	%
x1	200010	0	0	0	200010	0	0	0	200010	0	0	0
x2	200010	0	0	0	200010	0	0	0	200010	0	0	0
x3	200010	0	0	0	200010	0	0	0	200010	0	0	0
x4	200010	0	0	0	200010	0	0	0	200010	0	0	0
x5	200010	0	0	0	200010	0	0	0	200010	0	0	0
x6	200010	0	0	0	200010	0	0	0	200010	0	0	0
x7	200010	0	0	0	200010	0	0	0	200010	0	0	0
x8	200010	0	0	0	200010	0	0	0	200010	0	0	0
x9	200010	0	0	0	200010	0	0	0	200010	0	0	0
x10	200010	0	0	0	200010	0	0	0	200010	0	0	0
x11	200010	0	0	0	200010	0	0	0	200010	0	0	0
x12	200010	0	0	0	200010	0	0	0	200010	0	0	0
x13	200010	0	0	0	200010	0	0	0	200010	0	0	0
x14	200010	0	0	0	200010	0	0	0	200010	0	0	0
x15	200010	0	0	0	200010	0	0	0	200010	0	0	0
x16	200010	0	0	0	200010	0	0	0	200010	0	0	0
Average	200010	0	0	0	200010	0	0	0	200010	0	0	0

Copyright © 2025 MCS LOGIC Limited. All rights reserved

Confidential

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.
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This modular must be installed and operated with a minimum distance of 20 cm between the radiator and user body
If the FCC identification number 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: A3LMB2710 Or Contains FCC ID: A3LMB2710”
When the module is installed inside another device, the user manual of this device must contain below warning statements:1. 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.
2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.
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 modular transmitter installed.
The end user manual shall include all required regulatory information/warning as shown in this manual, include: This product must be installed and operated with a minimum distance of 20 cm between the radiator and user body.
This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada’s licence-exempt RSS(s). Operation is subject to the following two conditions: 1: This device may not cause interference. 2: This device must accept any interference, including interference that may cause undesired operation of the device.
L’émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d’Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L’exploitation est autorisée aux deux conditions suivantes : 1. L’appareil ne doit pas produire de brouillage; 2. L’appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d’en compromettre le fonctionnement.
Hereby, SAMSUNG ELECTRONICS CO. LTD. declares that the radio equipment type MB2710 is in compliance with Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address: www.samsung.com
European importers: Samsung, PO Box 12987, Dublin. IE or Yateley, GU46 6GG. UK

Copyright © 2025 MCS LOGIC Limited. All rights reserved
Confidential