Bluetooth Qualification
RF Test Report

Report No.: MTi220705003-01BT1

Date of issue: July 21, 2022

Product name:	BLE Module
Model(s):	WT5010-Sx, WT5110-Sx, WT05511A-Sx
Applicant:	Wireless-Tag Technology Co., Ltd
Address:	801, Block A, Building 6, Shenzhen International Innovation Valley, Dashi Road, Xili Community, Xili Street, Nanshan District, Shenzhen
Date of Test:	July 21, 2022 – July 21, 2022

Shenzhen Microtest Co., Ltd.
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PRODUCT INFORMATION

Applicant's name:	Wireless-Tag Technology Co., Ltd
Address:	801, Block A, Building 6, Shenzhen International Innovation Valley, Dashi Road, Xili Community, Xili Street, Nanshan District, Shenzhen
Manufacture's Name:	Wireless-Tag Technology Co., Ltd
Address:	801, Block A, Building 6, Shenzhen International Innovation Valley, Dashi Road, Xili Community, Xili Street, Nanshan District, Shenzhen
Product name:	BLE Module
Trademark:	Wireless-tag
Model name:	WT5010-Sx, WT5110-Sx, WT05511A-Sx

Tested by:	Lemon Zhang	July 21, 2022
Reviewed by:	Leon Chen	July 21, 2022
Approved by:	Tom Xue	July 21, 2022

1 General Description

1.1 Feature of equipment under test (EUT)

Product name:	BLE Module
Model name:	WT5010-Sx
Series model:	WT5110-Sx, WT05511A-Sx
Difference of series model:	Model naming differences
Operating frequency:	2402-2480MHz
Core Specification Version:	V5.0
Modulation type:	GFSK
Power Supply:	DC 3.3V from Battery
Adapter information:	N/A
Sample Description:	Low power bluetooth

1.2 Identification of the equipment under test (EUT)

Hardware Version:	v1.0
Software Version:	v1.0

2 Summary of Test Result

Test procedures according to the technical standards:

No.	Amount of test item	Test standard	Test result	Remark
1	10	RF-PHY.TS.p15	Pass	WT5010-Sx
2	10	RF-PHY.TS.p15	Pass	WT5110-Sx

3 Applied Specification

EUT has been tested according to the applied reference document given in the following table.

Type of Test Spec	Revision	Revision Date
TCRL	TCRL_Core_2021-1	2021-07-13
RF-PHY Test Spec	RFPHY.TS.p16	2021-07-13

4 Test Facilities and Accreditations

4.1 Test laboratory

Test laboratory:	Shenzhen Microtest Co., Ltd.
Laboratory location:	101, No. 7, Zone 2, Xinxing Industrial Park, Fuhai Avenue, Xinhe Community, Fuhai Street, Bao' an District, Shenzhen, Guangdong, China.
CNAS Registration No.:	L5868
Telephone:	(86-755)88850135
Fax:	(86-755)88850136

4.2 Environmental conditions

Temperature:	15ºC~35ºC
Humidity	20%~75%

5 List of test equipment

Test Equipment list:

No.	Name	Model	Serial No.	Manufacturer	Calibration date	Expiration date
1	ESG VEC70R SIGNAL GENERATOR	E4438C	MY48050538	Agilent	2021/06/02	2022/06/01
2	MAX Signal Analyzer	N9030A	SER-MY51350296	Agilent	2021/06/02	2022/06/01
3	Bluetooth Tester	MT8852B	1303003	Anritsu	2021/06/02	2022/06/01
4	Analog Signal Generator	E8257D	MY42080403	Agilent	2021/06/02	2022/06/01
5	RTSB-A Switch Unit	--	--	CTTL-SYSTEMS	/	/

Test Software list:

Item	Software name	Manufacturer	Model	Version
1	The system software	TTL	RTSB-A	V3.0.0

6 Test Result

6.1 Test Case

Method of measurement: See RFPHY.TS.p16

WT5010-S1

No.	Test Case Identifier	Description	Category	Verdict
1	TP/TRM-LE/CA/ BV-01-C	Output power	A	Pass
2	TP/TRM-LE/CA/ BV-03-C	In-band emissions	A	Pass
3	TP/TRM-LE/CA/ BV-05-C	Modulation characteristics	A	Pass
4	TP/TRM-LE/CA/ BV-06-C	Carrier frequency offset and drift	A	Pass
5	TP/RCV-LE/CA/ BV-01-C	Receiver sensitivity	A	Pass
6	TP/RCV-LE/CA/ BV-03-C	C/I and receiver selectivity performance	A	Pass
7	TP/RCV-LE/CA/ BV-04-C	Blocking performance	A	Pass
8	TP/RCV-LE/CA/ BV-05-C	Intermodulation performance	A	Pass
9	TP/RCV-LE/CA/ BV-06-C	Maximum input signal level	A	Pass
10	TP/RCV-LE/CA/ BV-07-C	PER Report Integrity	A	Pass

WT5110-S1

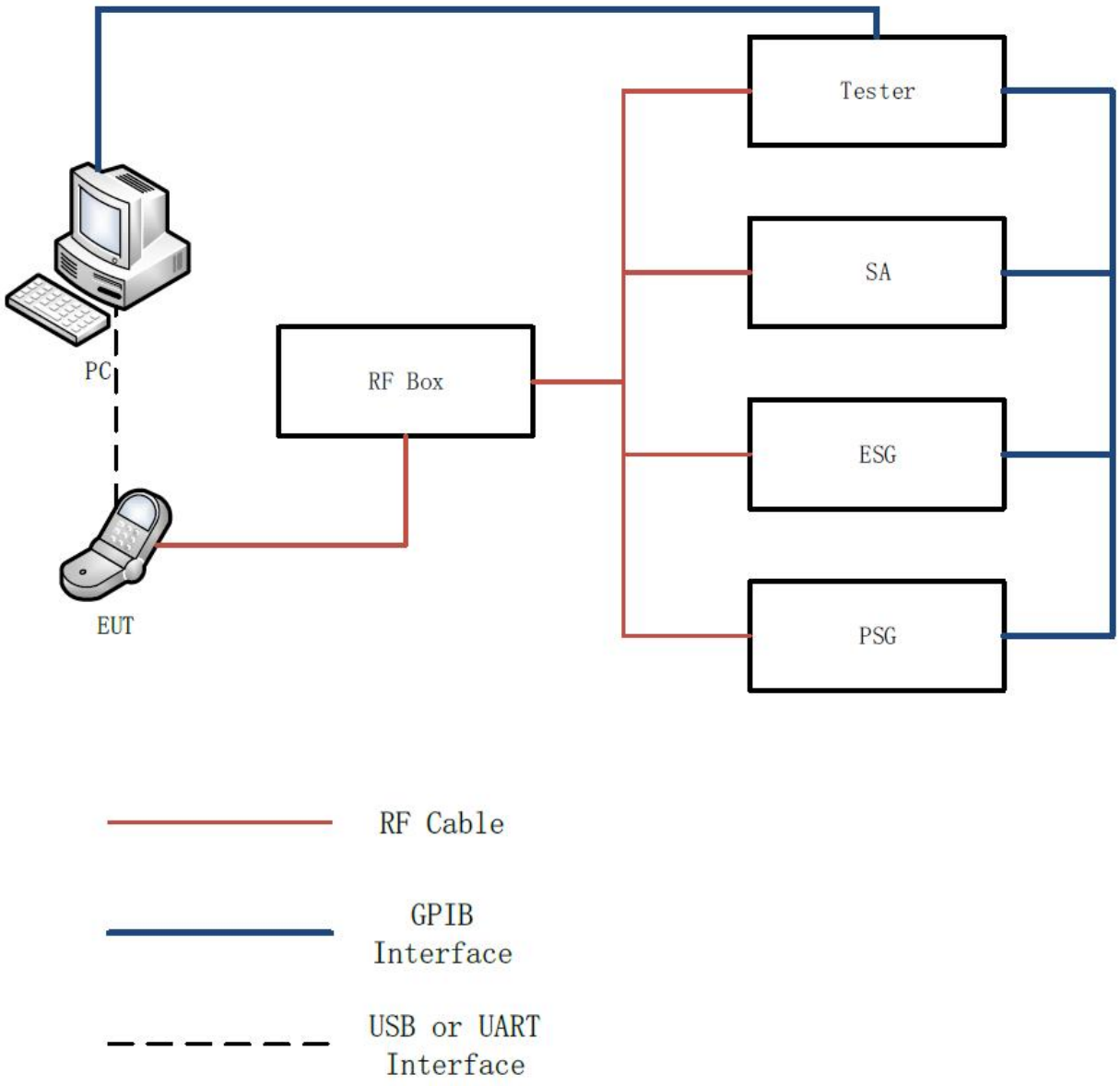
No.	Test Case Identifier	Description	Category	Verdict
1	TP/TRM-LE/CA/ BV-01-C	Output power	A	Pass
2	TP/TRM-LE/CA/ BV-03-C	In-band emissions	A	Pass
3	TP/TRM-LE/CA/ BV-05-C	Modulation characteristics	A	Pass
4	TP/TRM-LE/CA/ BV-06-C	Carrier frequency offset and drift	A	Pass

5	TP/RCV-LE/CA/ BV-01-C	Receiver sensitivity	A	Pass
6	TP/RCV-LE/CA/ BV-03-C	C/I and receiver selectivity performance	A	Pass
7	TP/RCV-LE/CA/ BV-04-C	Blocking performance	A	Pass
8	TP/RCV-LE/CA/ BV-05-C	Intermodulation performance	A	Pass
9	TP/RCV-LE/CA/ BV-06-C	Maximum input signal level	A	Pass
10	TP/RCV-LE/CA/ BV-07-C	PER Report Integrity	A	Pass

Annex A: Deviations from Prescribed Test Methods

No deviation from prescribed test methods in RFPHY.TS.p16

Annex B: Test Setup



Annex C: ICS/IXIT

Table 1: LE RF Capabilities

Item	Capability	Core Spec Reference	Status	Support [Yes] or [No]	
1	LE Transmitter (Non-connectable, Broadcaster)	Specification of the Bluetooth System, Physical Layer Specification (PHY) Volume 6, Part A, Version 4.0 or later	C.1	Yes	--
2	LE Receiver (Non-connectable, Observer)	Specification of the Bluetooth System, Physical Layer Specification (PHY) Volume 6, Part A, Version 4.0 or later	C.1	Yes	--
3	LE Transceiver (Connectable, Peripheral/Central)	Specification of the Bluetooth System, Physical Layer Specification (PHY) Volume 6, Part A, Version 4.0 or later	C.1	Yes	--
4	LE 2M PHY	Specification of the Bluetooth System, Physical Layer Specification (PHY) Volume 6, Part A, Version 5.0 or later	C.2	--	No
5	Stable Modulation Index - Transmitter	Specification of the Bluetooth System, Physical Layer Specification (PHY) Volume 6, Part A, Version 5.0 or later	C.3	--	No
6	Stable Modulation Index - Receiver	Specification of the Bluetooth System, Physical Layer Specification (PHY) Volume 6, Part A, Version 5.0 or later	C.4	--	No
7	LE Coded PHY	Specification of the Bluetooth System, Physical Layer Specification (PHY) Volume 6, Part A, Version 5.0 or later	C.2	--	No

Note：

C.1: Mandatory to support at least one of these capabilities.

C.2: Optional IF SUM ICS 21/16 "Core 5.0" AND RF PHY 1/3 "LE Transceiver" are supported, otherwise Excluded.

C.3: Optional IF SUM ICS 21/16 "Core 5.0" AND (RF PHY 1/1 "LE Transmitter" OR RF PHY 1/3 "LE Transceiver") are supported, otherwise Excluded.

C.4: Optional IF SUM ICS 21/16 "Core 5.0" AND (RF PHY 1/2 "LE Receiver" OR RF PHY 1/3 "LE Transceiver") are supported, otherwise Excluded.

Table 2: LE Test Interface Capabilities

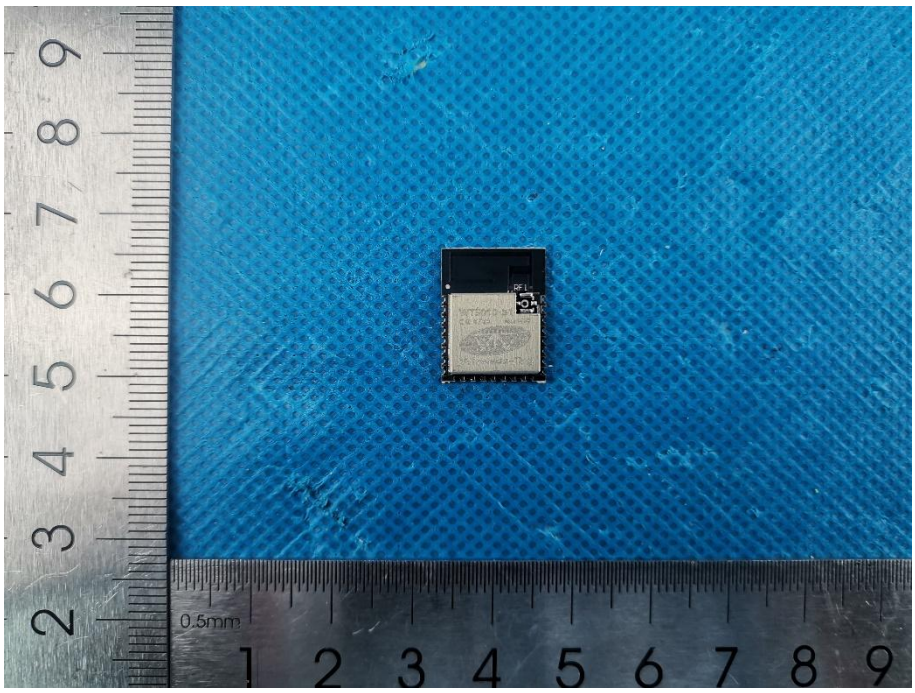
Item	Capability	Core Spec Reference	Status	Support [Yes] or [No]	
1	HCI Test Interface	Specification of the Bluetooth System, Direct Test Mode, Volume 6, Part F, Version 4.0 or later	C.1	Yes	
2	UART Test Interface	Specification of the Bluetooth System, Direct Test Mode, Volume 6, Part F, Version 4.0 or later	C.1		No
Note： *C.1: Mandatory to support at least one of thesecapabilities.*					

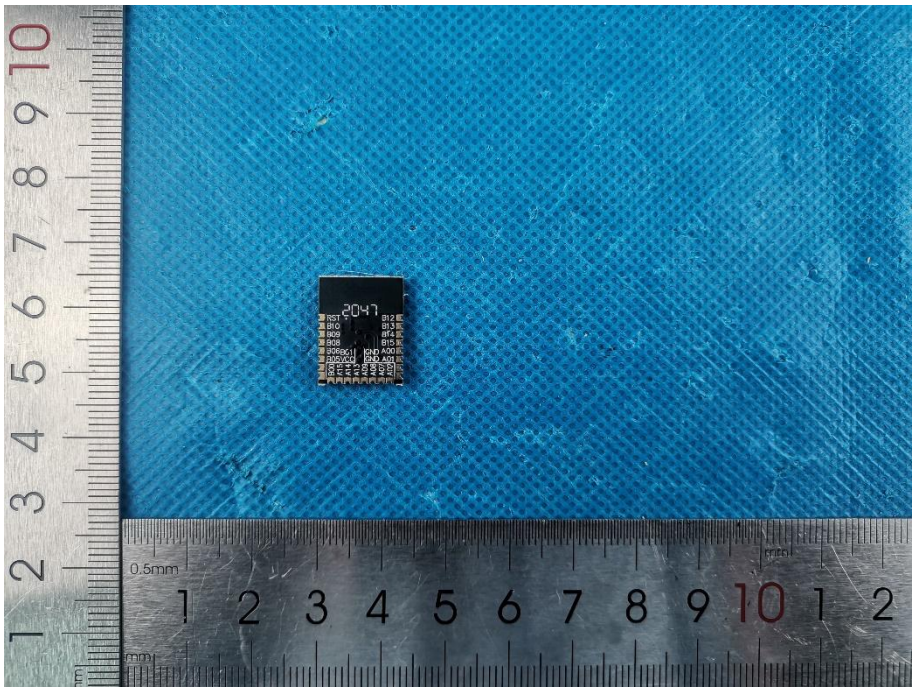
Table 3: RF-PHY PIXIT

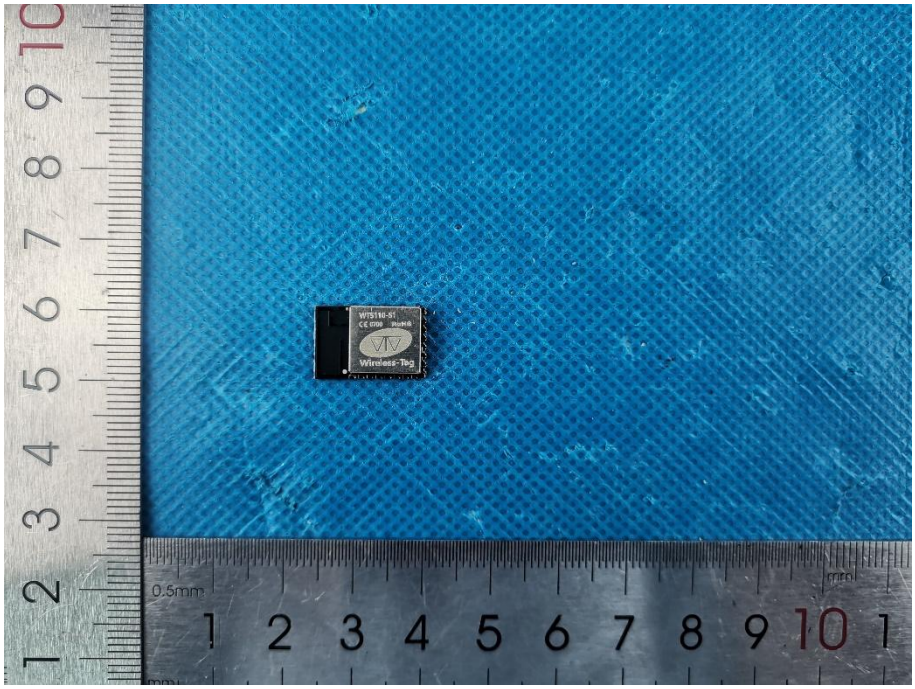
IXIT Reference	Identifier	Sub-Identifier (Optional)	Value	Units
RF-PHY:P1:1	In band Image	Low frequency	3	MHz
RF-PHY:P1:2	frequency	Middle frequency	3	MHz
RF-PHY:P1:3		High frequency	3	MHz
RF-PHY:P2:1	Value n for	Low frequency	5	Integer
RF-PHY:P2:2	Intermodulation	Middle frequency	5	Integer
RF-PHY:P2:3	test	High frequency	5	Integer
RF-PHY:P4	Power source voltage	Nominal (NOC)	3.3	V
RF-PHY:P5	Normal operating temperature	Nominal (NOC)	-45~85	ºC
RF-PHY:P6:1	Operating air	Maximum	85	%
RF-PHY:P6:2	humidity range	Minimum	35	%
RF-PHY:P6:3	(relative)	Air humidity level for NOC tests	55	%
RF-PHY:P7:1	Test interface	HCI or 2-wire UART	HCI	--
RF-PHY:P7:2	implementation	Data rate	9600	bps
RF-PHY-PHY:P8	Antenna gain	--	2	dBi
RF-PHY:P9:1	Maximum TX packet length	37 - 255	37	Bytes
RF-PHY:P9:2	Maximum RX packet length	37 - 255	37	Bytes
RF-PHY:P9:3	Maximum TX packet length 2M	37 - 255	N/A	Bytes
RF-PHY:P9:4	Maximum TX packet length S=2	37 - 255	N/A	Bytes
RF-PHY:P9:5	Maximum TX packet length S=8	37 - 255	N/A	Bytes
RF-PHY:P9:6	Maximum RX packet length 2M	37 - 255	N/A	Bytes
RF-PHY:P9:7	Maximum RX packet length S=2	37 - 255	N/A	Bytes
RF-PHY:P9:8	Maximum RX packet length S=8	37 - 255	N/A	Bytes
RF-PHY:P10:1	Maximum TX mode output power	-20 to 10 (CSA5 unsupported) -20 to 20 (CSA5 supported)	N/A	dBm
RF-PHY:11:1	Inband Image	Low frequency	N/A	MHz
RF-PHY:11:2	Frequency (2Ms/s)	Middle frequency	N/A	MHz
RF-PHY:11:3		High frequency	N/A	MHz

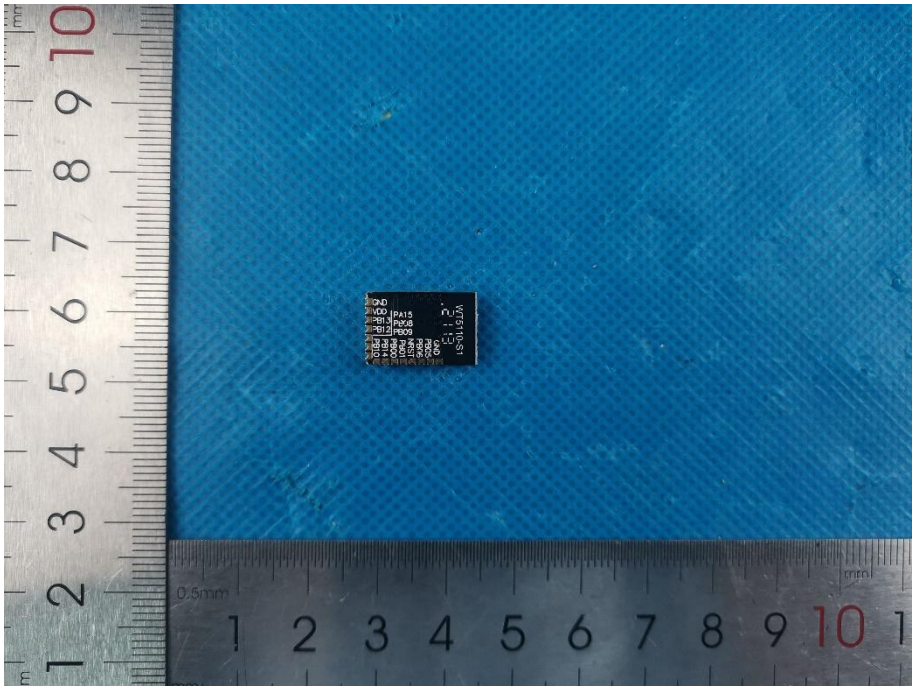
RF-PHY:12:1 RF-PHY:12:2 RF-PHY:12:3	Value n for Intermodulation test (2Ms/s)	Low frequency Middle frequency High frequency	N/A N/A N/A	Integer Integer Integer
RF-PHY:13:1 RF-PHY:13:2 RF-PHY:13:3	Inband Image Frequency (Stable Modulation Receiver)	Low frequency Middle frequency High frequency	N/A N/A N/A	MHz MHz MHz
RF-PHY:14:1 RF-PHY:14:2 RF-PHY:14:3	Value n for Intermodulation test (Stable Modulation Receiver)	Low frequency Middle frequency High frequency	N/A N/A N/A	Integer Integer Integer
RF-PHY:15:1 RF-PHY:15:2 RF-PHY:15:3	Inband Image Frequency (Stable Modulation Receiver, 2Ms/s)	Low frequency Middle frequency High frequency	N/A N/A N/A	MHz MHz MHz
RF-PHY:16:1 RF-PHY:16:2 RF-PHY:16:3	Value n for Intermodulation test (Stable Modulation Receiver, 2Ms/s)	Low frequency Middle frequency High frequency	N/A N/A N/A	Integer Integer Integer

Photographs of the Test Setup









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