

RED

BT RF TEST REPORT

Prepared for :

TimeTec Computing Sdn Bhd

6, 8 & 10, Jalan BK 3/2, Bandar Kinrara, 47180 Puchong, Selangor, Malaysia

Prepared for : TimeTec Computing Sdn Bhd

6, 8 & 10, Jalan BK 3/2, Bandar Kinrara, 47180 Puchong, Selangor, Malaysia

Prepared By : Shenzhen WST Testing Co., Ltd.

87 Guangshen Road, Baocheng 11st Zone, Xin'an Street, Bao'an, Shenzhen, Guangdong, China

Date of Test: Jul. 01, 2018 ~ Jul. 10, 2018

Date of Report: Jul. 10, 2018

Report Number: WST18N070156-2ER

TEST RESULT CERTIFICATION

Applicant's name TimeTec Computing Sdn Bhd

Address : 6, 8 & 10, Jalan BK 3/2, Bandar Kinrara, 47180 Puchong,
Selangor, Malaysia

Manufacturer's Name.. TimeTec Computing Sdn Bhd

Address : 6, 8 & 10, Jalan BK 3/2, Bandar Kinrara, 47180 Puchong,
Selangor, Malaysia

Product description

Trade Mark: TimeTec

Product name : Smart Door Controller

**Model and/
or type reference** TimeTec BLE – 2, TimeTec BLE–3

Standards : ETSI EN 300 328 V2.1.1 (2016-11)

This device described above has been tested by WST, and the test results show that the equipment under test (EUT) is in compliance with the 2014/53/EU requirements. And it is applicable only to the tested sample identified in the report.

This report shall not be reproduced except in full, without the written approval of WST, this document may be altered or revised by WST, personal only, and shall be noted in the revision of the document.

Date of Test :

Date (s) of performance of tests: Jul. 01, 2018 ~ Jul. 10, 2018

Date of Issue : Jul. 10, 2018

Test Result : **Pass**

Testing Engineer :



(Sam Tan)

Technical Manager :



(John Li)

Authorized Signatory :



(Michael Ling)



Contents

1	GENERAL INFORMATION	6
1.1	RESPONSIBLE TESTING LABORATORY	6
1.2	GENERAL DESCRIPTION OF EUT	7
1.3	DESCRIPTION OF FAMILY MODEL NUMBERS	8
1.4	ACCESSORIES OF EUT	9
1.5	BLOCK DIAGRAM OF EUT CONFIGURATION FOR TEST	9
1.6	TEST ENVIRONMENT CONDITIONS	9
2	MEASUREMENT UNCERTAINTY	10
3	RF OUTPUT POWER	11
3.1	TEST EQUIPMENT	11
3.2	BLOCK DIAGRAM OF TEST SETUP	11
3.3	LIMITS	11
3.4	TEST PROCEDURE	11
3.5	TEST RESULT	11
4	POWER SPECTRAL DENSITY	13
4.1	TEST EQUIPMENT	13
4.2	BLOCK DIAGRAM OF TEST SETUP	13
4.3	LIMITS	13
4.4	TEST PROCEDURE	13
4.5	TEST RESULT	13
5	OCCUPIED CHANNEL BANDWIDTH	14
5.1	TEST EQUIPMENT	14
5.2	BLOCK DIAGRAM OF TEST SETUP	14
5.3	LIMITS	14
5.4	TEST PROCEDURE	14
5.5	TEST RESULT	14
6	TRANSMITTER UNWANTED EMISSIONS IN THE OUT-OF-BAND	15
6.1	TEST EQUIPMENT	15
6.2	BLOCK DIAGRAM OF TEST SETUP	15
6.3	LIMITS	15
6.4	TEST PROCEDURE	15
6.5	TEST RESULT	16
7	TRANSMITTER UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN	17
7.1	TEST EQUIPMENT	17
7.2	BLOCK DIAGRAM OF TEST SETUP	17
7.3	LIMITS	17
7.4	TEST PROCEDURE	18
7.5	TEST RESULT	18
8	RECEIVER SPURIOUS EMISSIONS	19
8.1	TEST EQUIPMENT	19
8.2	BLOCK DIAGRAM OF TEST SETUP	19
8.3	LIMITS	19
8.4	TEST PROCEDURE	19
8.5	TEST RESULT	19
9	RECEIVER BLOCKING	20
9.1	TEST EQUIPMENT	20

9.2	BLOCK DIAGRAM OF TEST SETUP.....	20
9.3	LIMITS	21
9.4	TEST PROCEDURE.....	21
9.5	TEST RESULT.....	21
10	TEST SETUP PHOTOGRAPH.....	22
10.1	RADIATED SPURIOUS EMISSION TEST SETUP.....	22
11	PHOTOS OF THE EUT	23

Test Summary

ETSI EN 300 328 V2.1.1:

Harmonized Standard EN300 328				
The following essential requirements and test specifications are relevant to the presumption of conformity under Article 3.2 of the R&TTE Directive				
No	Test Parameter	Clause No	Condition	Results
Transmitter Parameters				
1	RF Output Power	4.3.1.2 or 4.3.2.2	Apply all equipment	PASS
2	Power Spectral Density	4.3.2.3	Only for modulations other than FHSS	PASS
3	Duty Cycle ,Tx-Sequence, Tx-gap	4.3.1.3 or 4.3.2.4	Only for non-adaptive equipment	Only for ≥ 10 dBm and non-adaptive
4	Accumulated Transmit time, Frequency Occupation & Hopping Sequence	4.3.1.4	Only for FHSS equipment	Only for ≥ 10 dBm and non-adaptive
5	Hopping Frequency Separation	4.3.1.5	Only for FHSS	Only for ≥ 10 dBm and non-adaptive
6	Medium Utilisation	4.3.1.6 or 4.3.2.5	Only for non-adaptive equipment	Only for ≥ 10 dBm and non-adaptive
7	Adaptive	4.3.1.7 or 4.3.2.6	Only for adaptive equipment	Only for ≥ 10 dBm and non-adaptive
8	Occupied Channel Bandwidth	4.3.1.8 or 4.3.2.7	Apply all equipment	PASS
9	Transmitter unwanted emissions in the OOB domain	4.3.1.9 or 4.3.2.8	Apply all equipment	PASS
10	Transmitter unwanted emissions in the spurious domain	4.3.1.10 or 4.3.2.9	Apply all equipment	PASS
11	Receiver spurious emissions	4.3.1.11 or 4.3.2.10	Apply all equipment	PASS
12	Receiver Blocking	4.3.1.12 or 4.3.2.11	Apply all equipment	PASS
13	Geo-location capability	4.3.1.13 or 4.3.2.12	Only for equipment with geo-location capability	N/A
<p>Note: N/A is an abbreviation for Not Applicable and means this test item is not applicable for this device according to the technology characteristic of device.</p>				

1 General Information

1.1 Responsible Testing Laboratory

Shenzhen WST Testing Co., Ltd.

Address: 87 Guangshen Road, Baocheng 11st Zone, Xin'an Street, Bao'an, Shenzhen,
Guangdong, China

1.2 General Description of EUT

Product:	Smart Door Controller	
Model No.(EUT):	TimeTec BLE – 2	
Family Model No.:	TimeTec BLE–3	
Trade Mark:	TimeTec	
Hardware Version:	V1.0	
Software Version:	V1.0	
Antenna Type:	Internal Antenna for BT; Max Gain: 0dBi.	
Device Operating Configurations :		
Modulation Mode:	Bluetooth: GFSK	
	Bluetooth	2402-2480MHz

1.3 Description of family model numbers

Between the present Model Number: TimeTec BLE – 2

and the other family Model Number: TimeTec BLE-3

There are identical as following:

Printed Circuit Board (PCB); Hardware; Software; Enclosure; Internal structure;

There is difference as following:

Model Number and Skin color

1.4 Accessories of EUT

Description	Manufacturer	Model number	Parameter	
/	/	/	/	/

1.5 Block diagram of EUT configuration for test



The test software was used to control EUT work in Continuous TX mode, and select test channel, wireless mode as below table.

Tested mode for BLE mode , channel, information		
Mode	Channel	Frequency (MHz)
GFSK	CH0	2402
	CH19	2440
	CH39	2480

Note:

According exploratory test, EUT will have maximum output power in those data rate, so those data rate were used for all test.

1.6 Test environment conditions

During the measurement the environmental conditions were within the listed ranges:

	Normal Conditions	Extreme Conditions
Temperature range	21-25°C	-20°C and 55°C
Humidity range	40-75%	40-75%
Pressure range	86-106kPa	86-106kPa
Power supply	DC 12V	10.8V and 13.2V (0.9 and 1.1 times of nominal voltage)

Note1: The Extreme temperature range and extreme voltages are declared by the manufacturer.

2 Measurement uncertainty

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

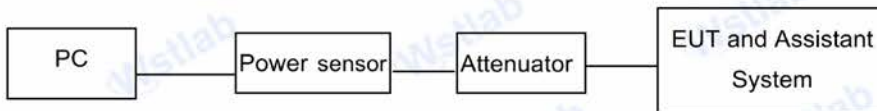
Test Item	Uncertainty
Occupied Channel Bandwidth	$\pm 1\%$
Uncertainty for radio frequency	1×10^{-9}
RF Output power, conducted	$\pm 0.6\text{dB}$
Power Spectral Density, Conducted	$\pm 1.2\text{dB}$
Unwanted Emissions, Conducted	$\pm 0.6\text{dB}$
Temperature	$\pm 0.2^\circ\text{C}$
Humidity	$\pm 1\%$
DC and Low frequency voltage	$\pm 0.5\%$
Time	$\pm 1\%$
Duty Cycle	$\pm 1\%$
Uncertainty for Unwanted Emission, Radiated (30MHz-1GHz)	2.12 dB (Polarize: V)
	2.42 dB (Polarize: H)
Uncertainty for Unwanted Emission, Radiated (1GHz to 13GHz)	2.08dB(Polarize: V)
	2.16dB (Polarize: H)

3 RF Output Power

3.1 Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Power sensor	Agilent Technologies Inc	U2021XA	1457313	2017/10/25	1 Year
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2017/10/25	1 Year
3	RF Cable	Micable	C10-01-01-1	100309	2017/10/25	1 Year

3.2 Block diagram of test setup



3.3 Limits

The RF output power is defined as the mean equivalent isotropically radiated power (e.i.r.p.) of the equipment during a transmission burst.

The maximum RF output power for adaptive Frequency Hopping equipment shall be equal to or less than 20 dBm.

3.4 Test Procedure

Connect each EUT's antenna output to power sensor by RF cable and attenuator.

3.5 Test Result

Test Conditions		EUT Mode	Burst Numbers	Pburst Values (dBm)	Antenna Gain (dBi)	RF Output Power (dBm)
Volt	Volt					
DC 12V	Noraml	GFSK CH0	10	0.54	0	0.54
		GFSK CH19	10	0.47	0	0.47
		GFSK CH39	10	0.36	0	0.36
DC 12V	55°C	GFSK CH0	10	0.51	0	0.51
		GFSK CH19	10	0.42	0	0.42
		GFSK CH39	10	0.39	0	0.39
DC 12V	-20°C	GFSK CH0	10	0.28	0	0.28
		GFSK CH19	10	0.18	0	0.18
		GFSK CH39	10	0.25	0	0.25

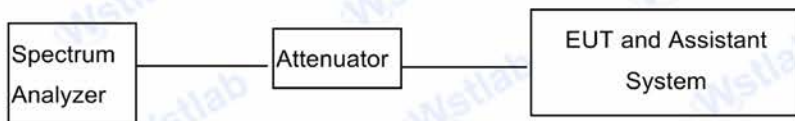
Note:RF Output power = Measured Highest Pburst Values + Antenna Gain

4 Power Spectral Density

4.1 Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum analyzer	R&S	FSU	1166.1660.26	2017/10/25	1 Y
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2017/10/25	1 Y
3	RF Cable	Micable	C10-01-01-1	100309	2017/10/25	1 Y

4.2 Block diagram of test setup



4.3 Limits

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 10dBm per MHz band during any time interval of continuous transmission.

4.4 Test Procedure

- (1) Connect EUT's antenna output to spectrum analyzer by RF cable.
- (2) Set the spectrum analyzer as follows:

Center frequency	DTS Channel center frequency
RBW:	10 kHz
VBW:	30 kHz
Detector Mode:	RMS
Sweep time:	auto
Trace mode	Max hold

4.5 Test Result

EUT Set Mode	Channel	Result(dBm/1MHz)
GFSK	CH0	-2.35
	CH19	-2.64
	CH39	-3.17
Limit: <10dBm/1MHz		Conclusion: PASS

5 Occupied Channel Bandwidth

5.1 Test equipment

Same with 4.1

5.2 Block diagram of test setup

Same with 4.2

5.3 Limits

The Occupied Channel Bandwidth for each hopping frequency shall fall completely within the band 2400MHz to 2483.5MHz for this device.

5.4 Test Procedure

- (1) Connect EUT's antenna output to spectrum analyzer by RF cable and attenuator.
- (2) Configure EUT work in lowest and highest hopping frequency.
- (3) Set the spectrum analyzer as follows:

Centre Frequency:	The centre frequency of the channel under test
Frequency Span:	2 × Occupied Channel Bandwidth
RBW:	~ 1 % of the span without going below 1 %
VBW:	3 × RBW
Detector Mode:	RMS
Sweep time:	1s
Trace Mode:	Max Hold

- (4) When the trace has completed, Use the 99% bandwidth function of the spectrum analyzer to measure the Occupied channel bandwidth of the EUT.

5.5 Test Result

EUT Set Mode	CH or Frequency	Low or Upper 99% bandwidth frequency(MHz)	99% Bandwidth(MHz)
GFSK	CH0	2401.318	1.068
	CH39	/	1.069
	CH78	2480.274	1.065
Limit: within the band 2400MHz to 2483.5MHz			Conclusion: Pass

6 Transmitter unwanted emissions in the out-of-band

6.1 Test equipment

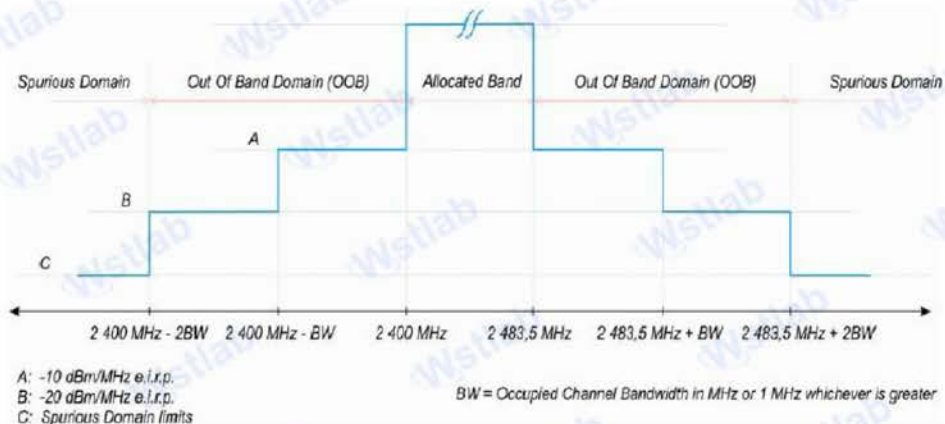
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum analyzer	R&S	FSU	1166.1660.26	2017/10/25	1 Y
2	Attenuator	Mini-Circuits	BW-S10W2	101109	2017/10/25	1 Y
3	RF Cable	Micable	C10-01-01-1	100309	2017/10/25	1 Y
4	Temperature controller	Dongguan Bell	BE-TH-150M3	201208153364	2017/10/25	1 Y

6.2 Block diagram of test setup

Same with 4.2

6.3 Limits

The transmitter unwanted emissions in the out-of-band domain but outside the allocated band, shall not exceed the values provided by the mask below:



6.4 Test Procedure

These measurements have to be performed at normal environmental conditions and shall be repeated at the extremes of the operating temperature range.

- (1) Connect EUT's antenna output to spectrum analyzer by RF cable and attenuator.
- (2) Configure EUT work in normal hopping mode.
- (3) Follow the test procedure description in EN 300 328 V2.1.1, measure out each bands e.i.r.p emissions.

6.5 Test Result

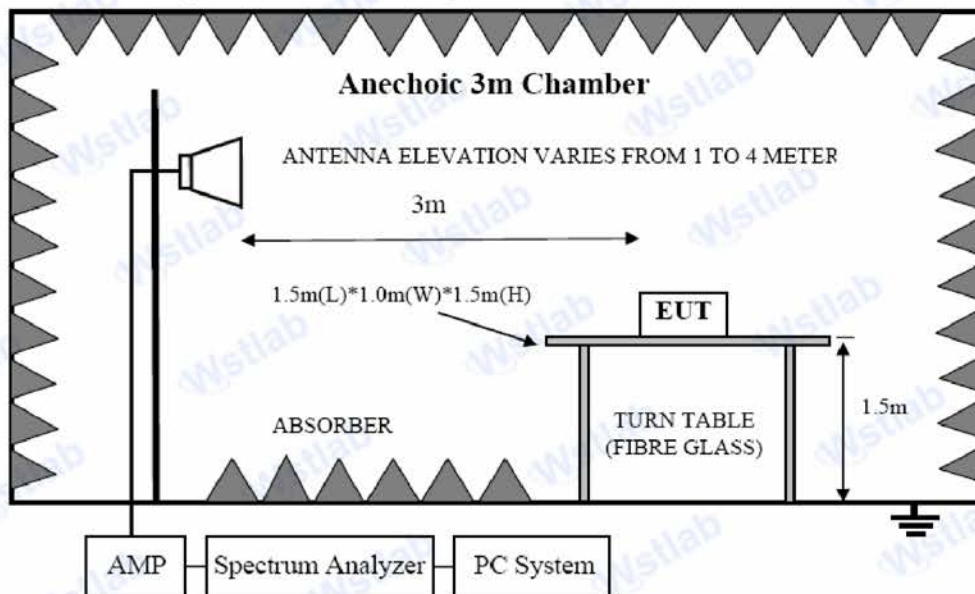
Test condition: Normal				
EUT Mode and basic information	Segment (Center Frequency)	Results Maximum Measured Level (dBm)	Limit(dBm)	Conclusion
GFSK: BW=1MHz	2400MHz-BW to 2400MHz	-51.35	-10	PASS
	2400-2BW to 2400-BW	-53.16	-20	PASS
	2483.5MHz to 2483.5MHz+BW	-46.04	-10	PASS
	2483.5MHz+BW to 2483.5MHz+2BW	-52.59	-20	PASS
Test condition: -20°C				
EUT Mode and basic information	Segment (Center Frequency)	Results Maximum Measured Level (dBm)	Limit(dBm)	Conclusion
GFSK: BW=1MHz	2400MHz-BW to 2400MHz	-52.74	-10	PASS
	2400-2BW to 2400-BW	-52.85	-20	PASS
	2483.5MHz to 2483.5MHz+BW	-49.44	-10	PASS
	2483.5MHz+BW to 2483.5MHz+2BW	-52.41	-20	PASS
Test condition: 55°C				
EUT Mode and basic information	Segment (Center Frequency)	Results Maximum Measured Level (dBm)	Limit(dBm)	Conclusion
GFSK: BW=1MHz	2400MHz-BW to 2400MHz	-53.66	-10	PASS
	2400-2BW to 2400-BW	-56.19	-20	PASS
	2483.5MHz to 2483.5MHz+BW	-46.29	-10	PASS
	2483.5MHz+BW to 2483.5MHz+2BW	-50.64	-20	PASS

7 Transmitter unwanted emissions in the spurious domain

7.1 Test equipment

EMI Test Receiver	R&S	ESU8	100316	2017/10/24	1Year
Spectrum analyzer	R&S	FSU26	1166.1660.26	2017/10/24	1Year
Trilog Broadband Antenna	Schwarzbeck	VULB9163	9163-462	2017/05/30	1 Year
Active Loop antenna	Schwarzbeck	FMZB-1519	1519-038	2017/10/24	1 Year
Double Ridged Horn Antenna	R&S	HF907	100276	2017/10/31	1 Year
Pre-amplifier	A.H.	PAM-0118	360	2017/08/18	1 Year
RF Cable	HUBSER	CP-X2	W11.03	2017/10/24	1Year
RF Cable	HUBSER	CP-X1	W12.02	2017/10/24	1 Year
MI Cable	HUBSER	C10-01-01-1M	1091629	2017/10/24	1 Year
Test software	Audix	E3	V 6.11111b	/	/

7.2 Block diagram of test setup



7.3 Limits

The transmitter unwanted emissions in the spurious domain shall not exceed the values given in below table.

Frequency range	Maximum power, e.r.p. (≤ 1 GHz) e.i.r.p. (> 1 GHz)	Bandwidth
30 MHz to 47 MHz	-36 dBm	100 kHz
47 MHz to 74 MHz	-54 dBm	100 kHz
74 MHz to 87,5 MHz	-36 dBm	100 kHz
87,5 MHz to 118 MHz	-54 dBm	100 kHz
118 MHz to 174 MHz	-36 dBm	100 kHz
174 MHz to 230 MHz	-54 dBm	100 kHz
230 MHz to 470 MHz	-36 dBm	100 kHz
470 MHz to 862 MHz	-54 dBm	100 kHz
862 MHz to 1 GHz	-36 dBm	100 kHz
1 GHz to 12,75 GHz	-30 dBm	1 MHz

7.4 Test Procedure

- (1) EUT was placed on a non-metallic table, 1.5m above the ground plane inside a semi-anechoic chamber.
- (2) Test antenna was located 3m from the EUT on an adjustable mast, and the antenna used as below table.

Test frequency range	Test antenna used
30MHz-1GHz	Trilog Broadband Antenna
1GHz-12.75GHz	Double Ridged Horn Antenna

- (3) Set EUT work in fixed channel transmitting mode.
- (4) All the emissions from 30MHz to 12.75GHz at 3m distance was measured and recorded with receive antenna in both vertical and horizontal and varied from 1 m to 4 m. in height above the reference ground plane, and rotating the turntable obtain the maximum signal strength., the test spectrum analyser was set as below

Frequency band	RBW	VBW	Detector mode
30MHz-1GHz	100KHz	300KHz	Peak
1GHz-12.75GHz	1MHz	3MHz	Peak

Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.

- (5) A correction values from a verified site calibration was used to calculate the spurious emissions of EUT.

7.5 Test result

EUT mode	Frequency	Spurious emissions level (dBm)	Limit	Conclusion
GFSK CH0	40.65MHz	-51.25	-36	PASS
	4.804GHz	-45.11	-30	PASS
GFSK CH39	40.36MHz	-47.71	-36	PASS
	4.960GHz	-41.32	-30	PASS

8 Receiver Spurious emissions

8.1 Test equipment

Same with 7.1

8.2 Block diagram of test setup

Same with 7.2

8.3 Limits

The spurious emissions of the receiver shall not exceed the values given in below table.

Frequency range	Maximum power e.r.p. (≤ 1 GHz) e.i.r.p. (> 1 GHz)	Measurement bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 12,75 GHz	-47 dBm	1 MHz

8.4 Test Procedure

- (1) Connect EUT's antenna output to spectrum analyzer by RF cable and attenuator.
- (2) Configure EUT work in testing mode.
- (3) Follow the test procedure description in EN 300 328 V2.1.1, measure out the transmitter unwanted spurious emissions.

8.5 Test result

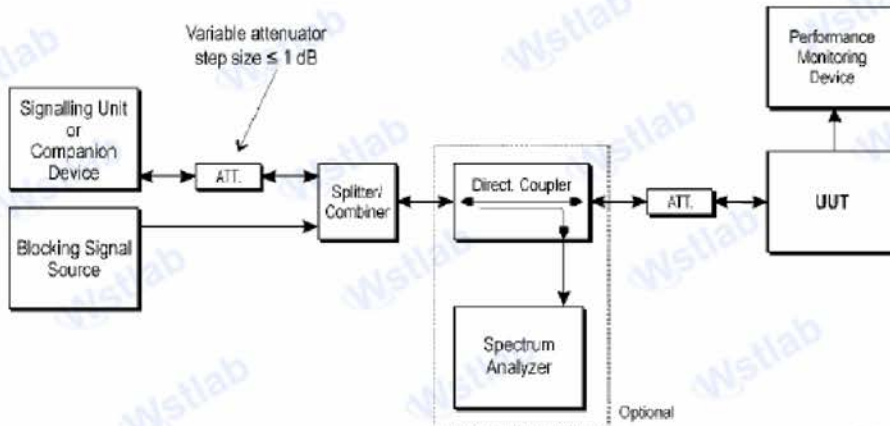
EUT mode	Frequency	Spurious emissions level (dBm)	Limit	Conclusion
Rx Mode	40.98MHz	-61.62	-57	PASS
	4.900GHz	-59.63	-47	PASS
Test frequency band: 30MHz-1GHz and 1GHz-12.75GHz				

9 Receiver Blocking

9.1 Test equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Spectrum analyzer	R&S	FSU26	1166.1660.2	2017/10/18	
2	Wideband Radio Communication tester	R&S	CMW500	155523	2017/12/20	1 Year
3	Vector Signal Generator	Agilent Technologies Inc	E8267D	MY5209874	2017/12/20	1 Year
4	Vector Signal Generator	Agilent Technologies Inc	N5182A	MY4818073	2017/12/20	1 Year
5	Power sensor	Agilent Technologies Inc	U2021XA	1457313	2017/10/25	1 Year
6	Power sensor	Agilent Technologies Inc	U2021XA	1457313	2017/10/25	1 Year
7	DC Power Source	MATRIS	MPS-3005L-3	D813058W	2017/10/25	1 Year
8	Attenuator	Mini-Circuits	BW-S10W2	101109	2017/10/25	1 Year
9	RF Cable	Micable	C10-01-01-1	100309	2017/10/25	1 Year
10	Test Software	JS Tonscend	JS1120-2	Ver.2.5	N/A	1 Year
11	USB Data acquisition	Agilent Technologies Inc	U2531A	TW5504350	N/A	1 Year
12	Auto control Unit	JS Tonscend	JS0806-2	158060010	N/A	1 Year

9.2 Block diagram of test setup



9.3 Limits

Table 7: Receiver Blocking parameters receiver category 2 equipment

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 2)	Type of blocking signal
$P_{\min} + 6$ dB	2 380 2 503,5	-57	CW
$P_{\min} + 6$ dB	2 300 2 583,5	-47	CW

NOTE 1: P_{\min} is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.

NOTE 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the levels have to be corrected by the actual antenna assembly gain.

Performance Criteria:

The minimum performance criterion shall be a PER less than or equal to 10 %.

9.4 Test Procedure

Refer to ETSI EN 300328 V2.1.1 clause 5.4.11.2.1

9.5 Test Result

Test Mode	Test Channel	Pmin [dBm]	Wanted signal Level [dB]	Freq [MHz]	CW Level [dBm]	PER [%]	Limit [%]	Verdict
GFSK	2402	-51.8	-49.8	2583.5	-47	2.70	<=10	PASS
GFSK	2402	-51.8	-49.8	2503.5	-57	1.84	<=10	PASS
GFSK	2402	-51.8	-49.8	2380	-57	0.99	<=10	PASS
GFSK	2402	-51.8	-49.8	2300	-47	0.99	<=10	PASS
GFSK	2480	-50.5	-47.8	2583.5	-47	0.20	<=10	PASS
GFSK	2480	-50.5	-47.8	2503.5	-57	0.10	<=10	PASS
GFSK	2480	-50.5	-47.8	2380	-57	0.10	<=10	PASS
GFSK	2480	-50.8	-47.8	2300	-47	0.20	<=10	PASS

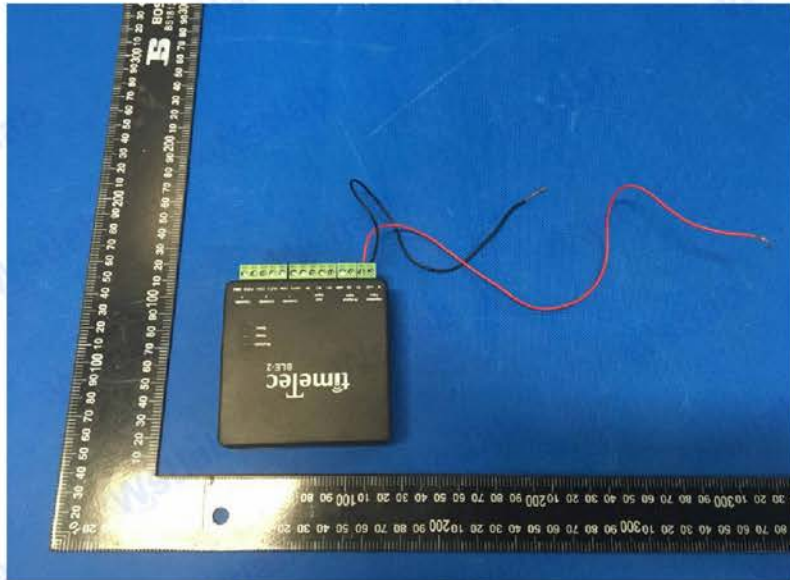
10 Test setup photograph

10.1 Radiated Spurious Emission test setup

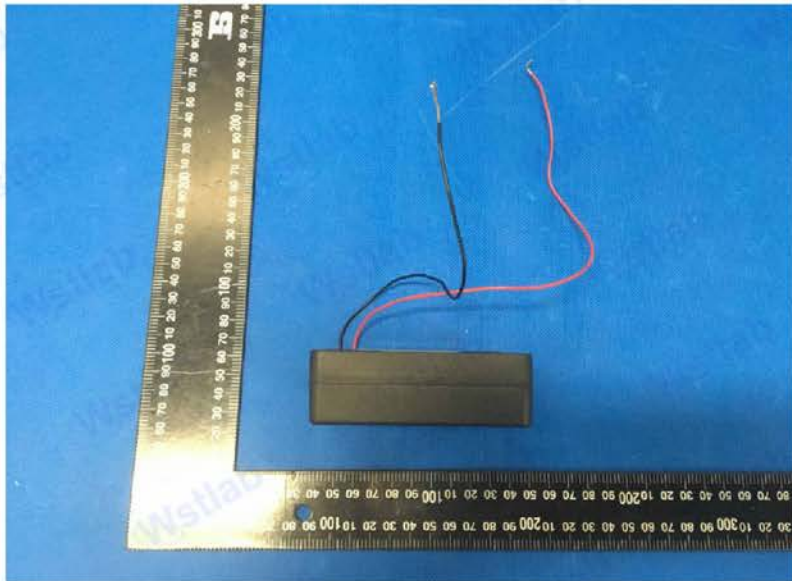


11 Photos of the EUT

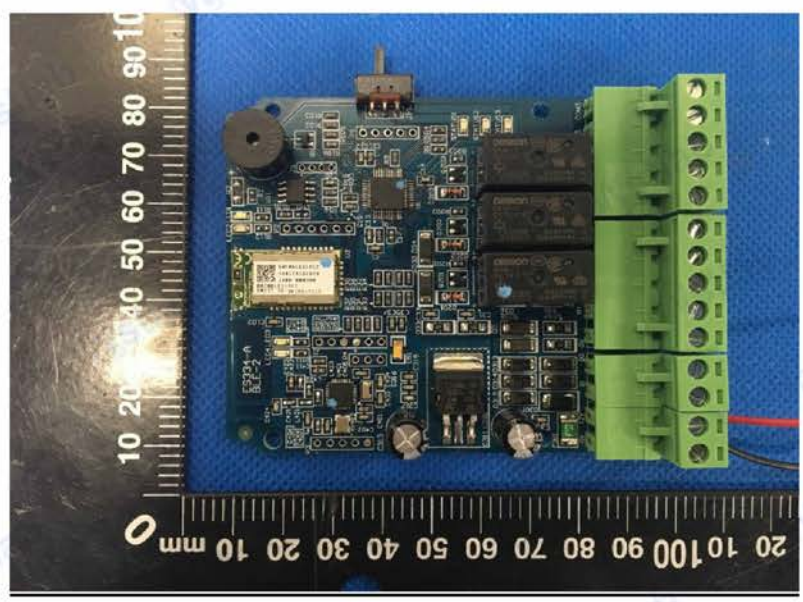
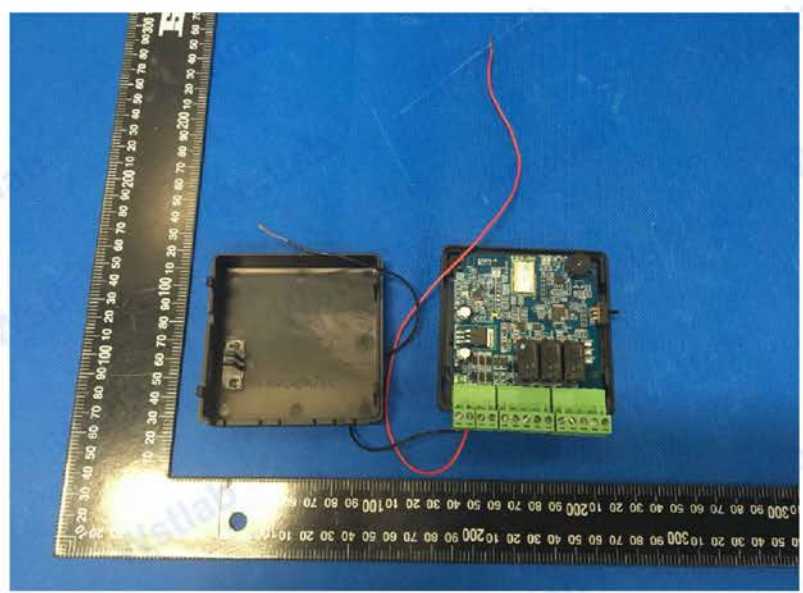
External Photos

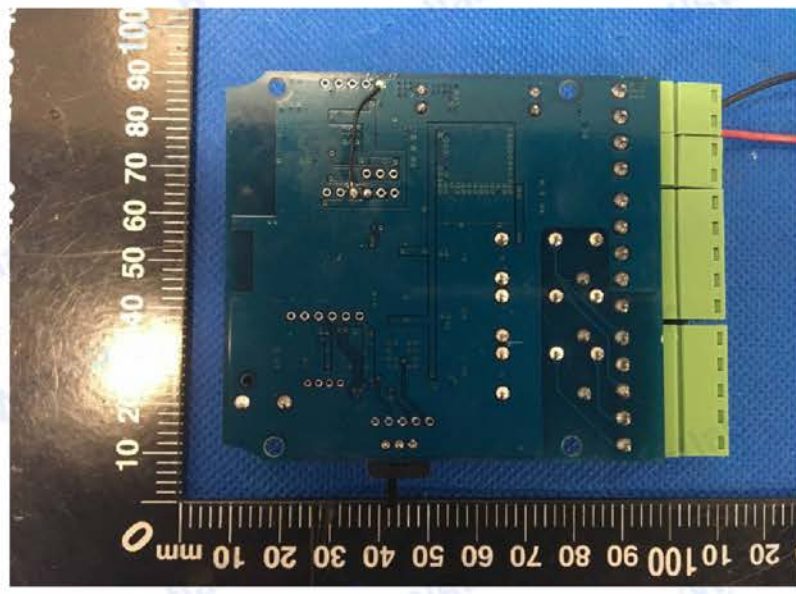






Internal Photos





.....**End of Report**.....