RF - TEST REPORT

Report Number	:	4840120503000C	Date of Issue:	November 27, 2020
Model	:	SRSC-M01		
Product Type	:	Smart Roller Shade controller		
Applicant	:	Lumi United technology Co., Ltd.		
Address	:	8th Floor, JinQi Wisdom Valley, No.1 Tangling Road, Liuxian Ave, Taoyuan Residential District, Nanshan District, Shenzhen, China.		
Manufacturer	:	Lumi United technology Co., Ltd.		
Address	:	8th Floor, JinQi Wisdom Valley, No.1 Tangling Road, Liuxian Ave, Taoyuan Residential District, Nanshan District, Shenzhen, China.		
Test Result	:	■ **Positive** ☐ **Negative**		
Total pages including Appendices	:	**37**		

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1 Report Version

Revision	Release Date	History/Memo.
1.0	November 27, 2020	Initial Release

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2 General Information

2.1 Notes

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Prepared by	2020-11-27	Zelin Gao	Zelin Gao
Project Engineer	Date	Name	Signature
Approved by	2020-11-27	Weisheng Jiang	Weisheng
Project Manager	Date	Name	Signature

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2.2 Testing Laboratory

Site 1

Company name:	TÜV SÜD Certification and Testing (China) Co., Ltd. – EMC-Lab
Company Address:	10# Huaxia Road (M), Dongting, Wuxi, 214100 P. R. China
Telephone:	+86 510 8820 3737
Fax:	+86 510 8820 3636

2.3 Details of Applicant

Client:	Lumi United technology Co., Ltd.
Address:	8th Floor, JinQi Wisdom Valley, No.1 Tangling Road, Liuxian Ave, Taoyuan Residential District, Nanshan District, Shenzhen, China.
Product Description:	Smart Roller Shade controller
Submitted Model No.:	SRSC-M01

2.4 Application Details

Date of receipt of order:	2020-10-24
Date of receipt of test item:	2020-11-09
Date of test:	2020-11-09

2.5 Applied Standard

APPLIED PRODUCT STANDARD **ETSI EN 300 328 V2.2.2 (2019-07)**
EN 50663:2017

2.6 Test Summary

Table1. Summary of results

Conformance requirement according to ETSI EN 300 328 V2.1.1 (2016-11)		**Result**	**Test Site**
Essential parameter	**Corresponding technical requirements**		
Transmitter requirements	4.3.1.2/4.3.2.2RF output power	PASS	Site 1
	4.3.2.3 Power Spectral Density	PASS	Site 1
	4.3.1.3/4.3.2.4 Duty Cycle, Tx-sequence, Tx-gap**	N/A	N/A
	4.3.1.4 Dwell time, Minimum Frequency Occupation and Hopping Sequence*	N/A	N/A
	4.3.1.5 Hopping Frequency Separation*	N/A	N/A
	4.3.1.6/4.3.2.5Medium Utilisation (MU) factor**	N/A	N/A
	4.3.1.7/4.3.2.6 Adaptivity	N/A	N/A
	4.3.1.8/4.3.2.7 Occupied Channel Bandwidth	PASS	Site 1
	4.3.1.9/4.3.2.8 Transmitter unwanted emissions in the out-of-band domain	PASS	Site 1
	4.3.1.10/4.3.2.9 Transmitter unwanted emissions in the spurious domain	PASS	Site 1
Receiver requirements	4.3.1.11/4.3.2.10 Receiver spurious emissions	PASS	Site 1
	4.3.1.12/4.3.2.11 Receiver Blocking	PASS	Site 1
	4.3.1.13/4.3.2.12 Geo-location capability***	N/A	N/A

NOTE1: Measurement taken is within the measurement uncertainty of measurement system.

NOTE2: "*"This requirement applies to all types of equipment using FHSS other than wide band modulations.

NOTE3:"**" This requirement does not apply to adaptive equipment unless operating in a non-adaptive mode.

NOTE4: "***" This requirement only applies to equipment with geo-location capability.

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3 Equipment Specification

3.1 General Description

The EUTs are ZigBee module with Zigbee Module.

3.2 EUT Identity

NOTE: Unless otherwise noted in the report, the functional boards installed in the units shall be selected from the below list, but not means all the functional boards listed below shall be installed in one unit.

3.2.1 Technical data

Description:	Smart Roller Shade controller
Models:	SRSC-M01
Hardware version	V1.0
Software version	V1.0
Rated input	AC 220-230V

Remark 1: The above EUT's information is declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

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3.3 Product Description –manufacturer description

3.3.1 Type of Tested Equipment

☐ Bluetooth	☐ IEEE 802.11	Other supply full details:___Zigbee_____	
☐Stand-alone	☐ Plug-in radio	☒Combined equipment	☐ Other

3.3.2 Extreme operating condition as declared by manufacturer

Power source description			
☒ **AC mains voltage**		☐ **DC voltage Nominal**	
Type of DC			
☐ Internal Power Supply	☐ External AC/DC Adapter	☐ Battery	☒ Other

EXTREME TEST VOLTAGE [manufacturer declared]		
VN = Nominal voltage [V]	VH = Max Voltage [V]	VL = Min Voltage [V]
230V	253V	187V

EXTREME TEMPERATURE RANGE [manufacturer declared]			
Environment class /Operating Temperature	**TL = Minimum Temperature [°C]**	**TN = Normal Temperature [°C]**	**TH = Maximum Temperature [°C]**
☐ **Outdoor and indoor usage**	**-20**	**25**	**55**
☐ **Indoor usage only**	0	25	35
☒ **Other [declared by manufacturer in UM]**	-10	25	40

3.3.3 Type of adaptivity used

☐ **Non-adaptive**	☒ **Adaptive**	☒ **LBT**	☐ **Non LBT**
	☐ **The system can operate in more than one adaptive mode**	☐ **System can operate both adaptive & non adaptive mode**	
	☐ **Frame Based Equipment**	☒ **Load Based Equipment**	
		CCA time implemented [uS]	>20
		q as referred by 4.3.2.5.2.2.2	4-32

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3.3.4 Antenna Assembles Profiles

Antenna Type	☐ **Integrated**	☒ **External**	
Temporary RF connector	☐ **Provided**	☒ **Not- provided**	
☒ **SISO - Single antenna equipment**		**Antenna gain [dBi] =**	**0 dBi**
☐ **MIMO - Multiple antenna without bean forming**		**Number of transmit antennas=**	**1**
☐ **MIMO/B - Multiple antenna with bean forming**		**Bean forming gain [dB] Y =**	**….**
Number of receive chains	**1**	☐ **Symmetrical power distribution**	
Number of transceive chains	**1**	☐ **Asymmetrical power distribution**	
☐ **Tx power control (TPC) (antenna connectorwith multiple power setting)**		**Nr. of different power level**	**…..**

3.4 Operating Frequency Range, Modulation and Throughput

Transmitter / Receiver Frequency Range (Tx/Rx)	
☒ **Range 1 : from : 2400 MHz To 2480 MHz**	
WLAN	**Zigbee**
Modulation type	**16-ary orthogonal modulation, O-QPSK PHY**
Channel Bandwidth [MHz]	**⩽5MHz**
Spatial Stream	**Single stream**
Data Rate	**250kbps MAX**

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3.5 Additional information

The transmitter can operate only:

☒ **Modulated**

☐ **Un-modulated**

ITU Class of emissions 1. 22

Duty Cycle: The transmitter is intended for

☐ **Continuous duty**

☐ **Intermittent duty**

☒ **Continuous operation possible for testing purposes**

About the EUT:

☒ **The equipment submitted are representative production models.**

☐ **If not, the equipment submitted are pre-production models.**

☐ **If preproduction equipment are submitted, the final production equipment will be identical in all respects with the equipment tested.**

☐ **If not, supply full details:**_____

3.6 Worst case operational mode as declared by supplier

Test	Operating mode
RF Output Power	Mode 1
Power spectral density	Mode 1
Duty cycle,Tx – Sequence, TX gap	N/A
Medium Utilisation	N/A
Adaptivity	Mode 1
Ocuppied Channel Bandwidth	Mode 1
Transmiter unwantd emision in OOB domanin	Mode 1
Transmiter unwantd emision in spurious domanin	Mode 1
Receiver spurious domanin	Mode 2
Receiver blocking	Mode 2

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4 General Test Conditions / Configurations

4.1 Test Sample

☒ The report applies to single model number.

☐ The report applies to several models. The practical measurements are performed using the model number of _____.

4.2 Test Modes

NOTE: Typical working modes for each IEEE 802.11 mode are selected to perform tests.

Test Mode	Test Modes Description
Mode 1	Transmitting
Mode 2	Receiving

4.3 Frequencies under Test

Test Mode	RF Channel		
	Lowest/Bottom (B)	**Middle (M)**	**Highest/Top (T)**
Zigbee	Ch No. 11 / 2405 MHz	Ch No. 18 / 2440MHz	Ch No. 26 / 2480 MHz

4.4 Test Setups

NOTE: See Appendix K for practical Test Setup Photos.

4.4.1 General Test Setup Configurations

Configuration	Description
Test Antenna Ports	Until declared, all Transmitter tests are performed at all antenna ports of the EUT; all Receiver tests are performed at all antenna ports.
Multiple RF Sources	Other non-WLAN RF source(s) (if applicable) of the EUT are disabled or shutdown during measurements for WLAN RF source, which is considered in the present report.

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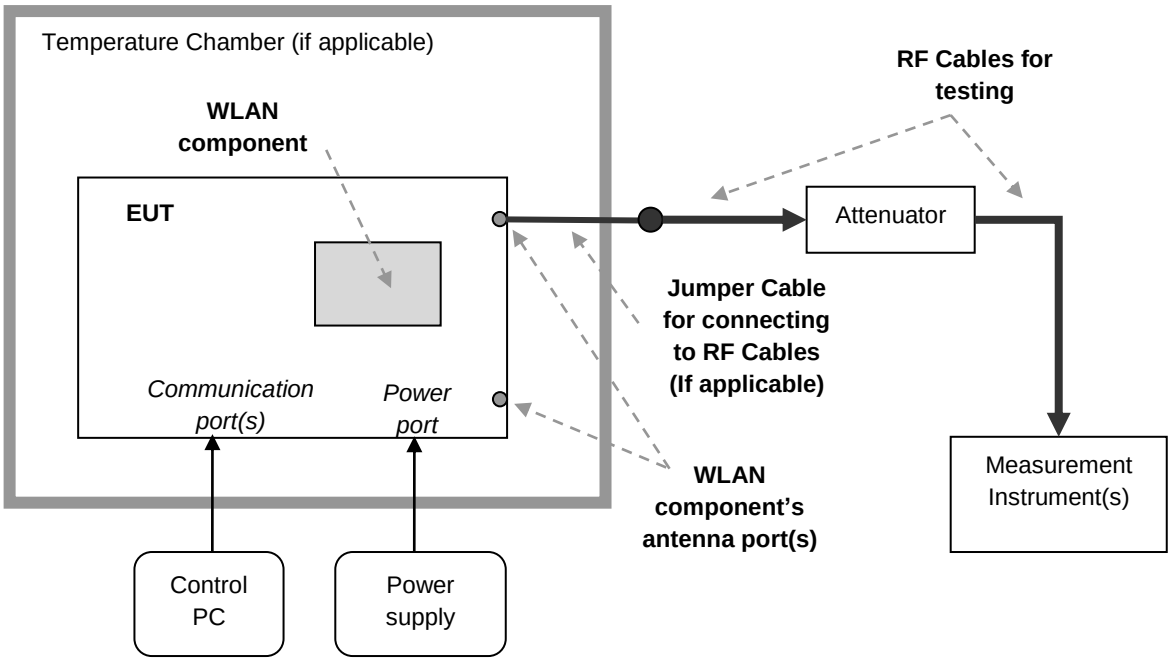
4.4.2 Test Setup for Conducted Measurements

The EUT (WLAN unit) is placed in a Temperature Chamber (if applicable), and is powered by a Power Supplier. An external Control PC associated with special software(s) is used to configure the EUT (WLAN unit) with the purpose of fulfilling the test requirements by EN standard.

The antenna port(s) of the EUT (WLAN unit) are connected to the Measurement Instrument(s) through an appropriate Attenuator. For the antenna port(s) which are not tested, appropriate 50 Ohm terminations are used.

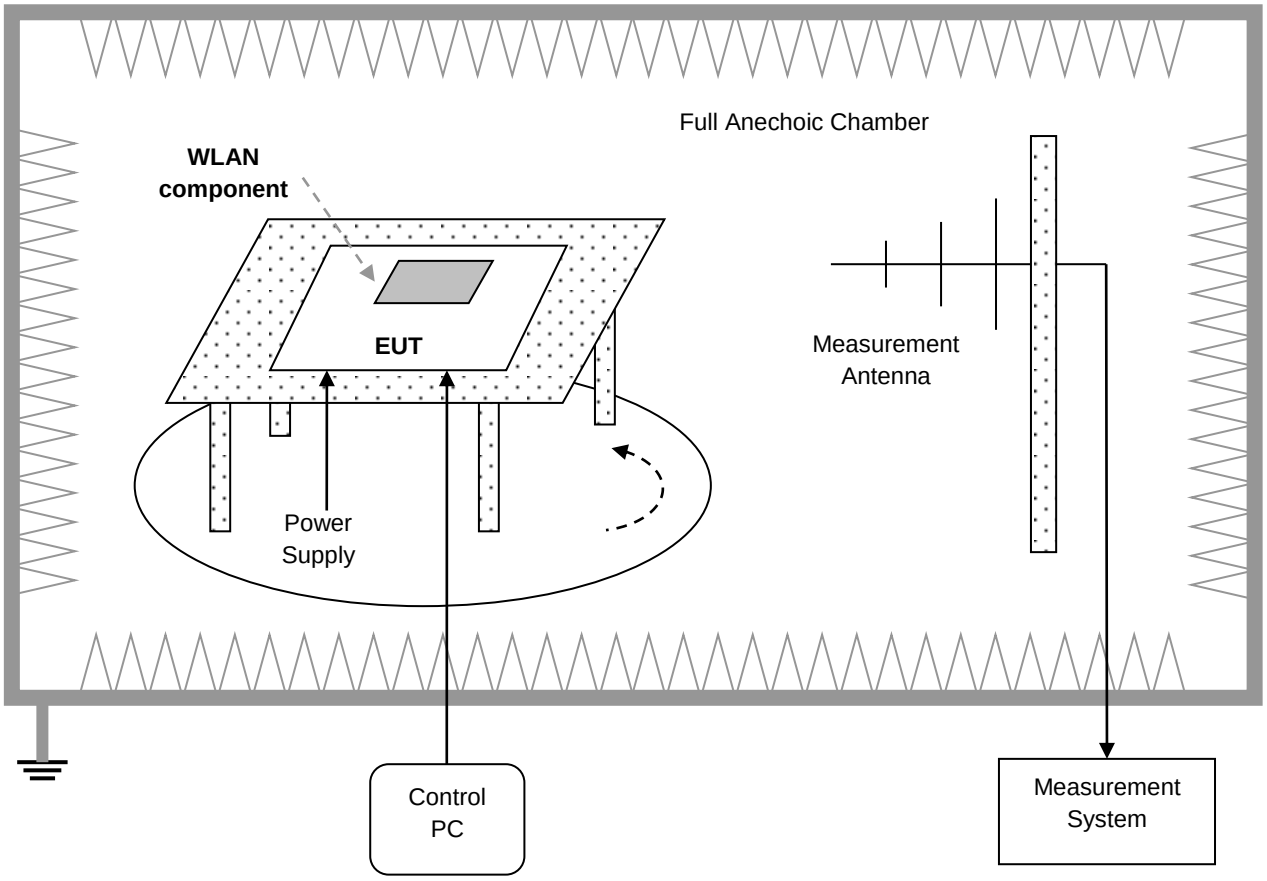
In addition, different setting options (e.g. Option 1) for Measurement Instrument(s) for conducted measurement methods can be used for some test items according to the EN standard. The selected option is specified in test conditions for each test case.



4.4.3 Test Setup for Radiated Measurements

The EUT (WLAN unit) is placed in a Fully Anechoic Chamber simulating the free-space conditions. The whole device is positioned on a non-conducting support and is powered by a Power Supplier. An external Control PC associated with special software(s) is used to configure the EUT (WLAN unit) with the purpose of fulfilling the test requirements by EN standards.

An appropriate Measurement Antenna (according to different test frequency ranges) with the distance of 3 m to the whole device is used to obtain maximum response from the whole device, which is rotated when measurement running. The measurement is performed with the Measurement Antenna in both horizontal and vertical polarization planes.



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4.5 Test Conditions

Test Case	Test Conditions	
	Configuration	**Description**
Equivalent Isotropic Radiated Power (EIRP)	**Measurement Method**	Conducted
	Power Level	Highest
	Test Conditions	NTNV, LTNV, HTNV
	Smart Antenna Systems	Ant 1
	Test Modes	Mode 1
	Test Frequency	L, M, H
Maximum EIRP Spectral Density	**Measurement Method**	Conducted, Option 1
	Power Level	Highest
	Test Conditions	NTNV
	Smart Antenna Systems	Ant 1
	Test Modes	Mode 1
	TX ON time (>10µs)	Fulfilled
	Test Frequency	L, M, H
Occupied Channel Bandwidth	**Measurement Method**	Conducted, Option 1
	Test Conditions	NTNV
	Smart Antenna Systems	Ant 1
	Test Modes	Mode 1
	Transmitter Mode	Operating
	Test Frequency	L, H
Transmitter unwanted emissions in the out-of-band domain	**Measurement Method**	Conducted, Option 1
	Test Conditions	NTNV
	Smart Antenna Systems	Ant 1
	Test Modes	Mode 1

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Test Case	Test Conditions	
	Configuration	**Description**
	Test Frequency	L, H
Transmitter unwanted emissions in the spurious domain	**Measurement Method**	Conducted, Option 1
	Test Conditions	NTNV
	Smart Antenna Systems	Ant 1
	Test Modes	Mode 1
	Transmitter Mode	Operating
	Test Frequency	L, H
Receiver Spurious Emissions	**Measurement Method**	Conducted, Option 1
	Test Conditions	NTNV
	Smart Antenna Systems	Ant 1
	Test Modes	Mode 2
	Receiver Mode	Continues Receiving
	Test Frequency	L, H
Receiver Blocking	**Measurement Method**	Conducted, Option 1
	Power Level	Highest
	Test Conditions	NTNV
	Smart Antenna Systems	Ant 1
	Test Modes	Mode 2
	Transmitter Mode	Operating
	Test Frequency	L, H

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5 Test Results

No.	Test Item	Test Result
1	4.3.2.2 RF output power	Appendix A
2	4.3.2.3 Power Spectral Density	Appendix B
3	4.3.2.4 Duty Cycle, Tx-sequence, Tx-gap	N/A
4	4.3.2.5 Medium Utilisation (MU) factor	N/A
5	4.3.2.6 Adaptivity	N/A
6	4.3.2.7 Occupied Channel Bandwidth	Appendix D
7	4.3.2.8 Transmitter unwanted emissions in the out-of-band domain	Appendix E
8	4.3.2.9 Transmitter unwanted emissions in the spurious domain_Radiated	N/A
9	4.3.2.9 Transmitter unwanted emissions in the spurious domain_Conducted	Appendix G
10	4.3.2.10 Receiver spurious emissions_Radiated	N/A
11	4.3.2.10 Receiver spurious emissions_Conducted	Appendix I
12	4.3.2.11 Receiver Blocking	Appendix J

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6 Test Requirements

6.1 RF output power

The equivalent isotropic radiated power (as EIRP) shall be equal to or less than -10 dBW (= 20 dBm). This limit shall apply for any combination of power level and intended antenna assembly.

6.2 Maximum EIRP Spectral Density

For wide band modulations other than FHSS (e.g. DSSS, OFDM, etc.), the maximum e.i.r.p. spectral density (as PD) is limited to 10 mW per MHz (= 10 dBm/MHz).

6.3 Adaptivity

The equipment used Non-LBT based Detect and Avoid mechanism shall comply with the requirements defined in clause 4.3.2.6.2.2

LBT based Detect and Avoid mechanism: This mechanism defines 2 types of adaptive equipment using wide band modulations and that uses an LBT based Detect and Avoid mechanism: Frame Based Equipment and Load Based Equipment. The kind of the equipment shall comply with the requirements defined in clause 4.3.2.6.3.2

Short Control Signalling Transmissions: The transmissions used by adaptive equipment to send control signals (e.g. ACK/NACK signals, etc.) without sensing the operating channel for the presence of other signals. Adaptive equipment may or may not have Short Control Signalling Transmissions. If implemented, the limit of Short Control Signalling Transmissions of adaptive equipment using wide band modulations shall have a maximum duty cycle of 10 % within an observation period of 50 ms.

6.4 Occupied Channel Bandwidth

The Occupied Channel Bandwidth shall fall completely within the band given in table 1.

In addition, for non-adaptive equipment using wide band modulations other than FHSS and with e.i.r.p. greater than 10 dBm, the occupied channel bandwidth shall be less than 20 MHz.

Table 1: Service frequency bands

	Service frequency bands
Transmit	2 400 MHz to 2 483,5 MHz
Receive	2 400 MHz to 2 483,5 MHz

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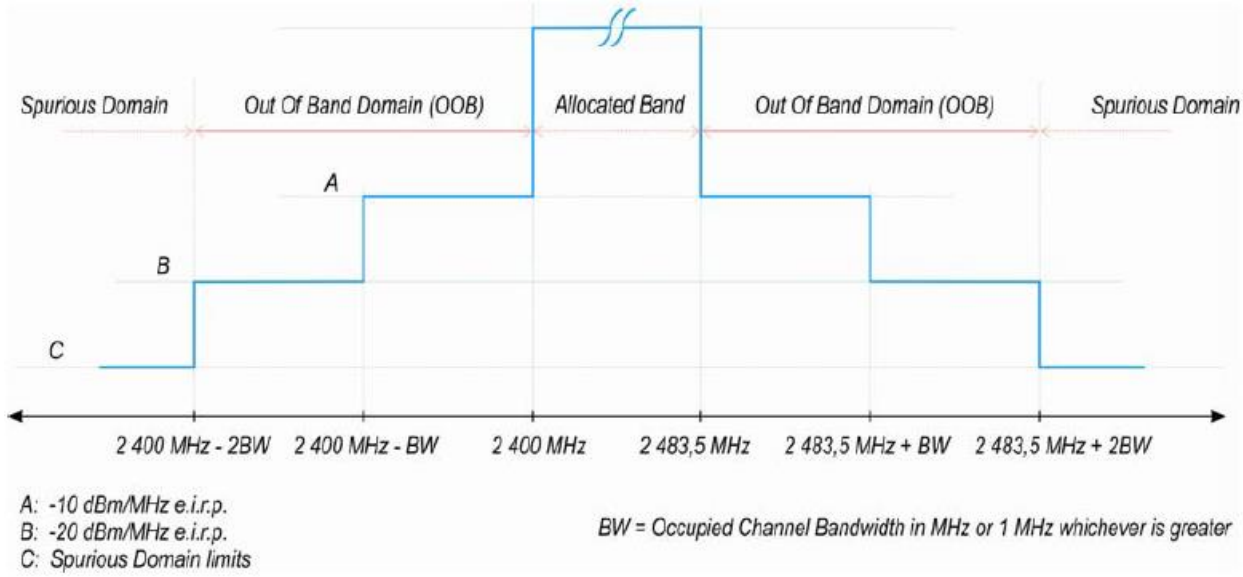
6.5 Transmitter unwanted emissions in the out-of-band domain

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



NOTE: Within the 2 400 MHz to 2 483.5 MHz band, the Out-of-band emissions are fulfilled by compliance with the Occupied Channel Bandwidth requirement in clause 4.3.2.7.

6.6 Transmitter Spurious Emissions

The spurious emissions of the transmitter shall not exceed the values in following tables in the indicated bands.

Frequency Range	Limit When Operating	Limit When in Standby
30MHz to 47MHz	-36dBm	-57 dBm
47MHz-74MHz	-54dBm	-57 dBm
74MHz-87.5MHz	-36dBm	-57 dBm
87.5MHZ-118MHz	-54dBm	-57 dBm
118MHz-174MHz	-36dBm	-57 dBm
174MHz-230MHz	-54dBm	-57 dBm
230MHz-470MHz	-36dBm	-57 dBm
470MHz-694MHz	-54dBm	-57 dBm
694MHz-1GHz	-36dBm	-57 dBm
Above 1GHz to 12.75GHz	-30dBm	-47 dBm

NOTE: The above limit values apply to narrowband emissions, e.g. as caused by local oscillator leakage. The measurement bandwidth for such emissions may be as small as necessary to achieve a reliable measurement result.

6.7 Receiver Spurious Emissions

The spurious emissions of the receiver shall not exceed the values in following tables in the indicated bands.

Frequency Range	Limit
30 MHz to 1 GHz	-57 dBm
1 GHz to 12.75 GHz	-47 dBm

Note: The above limit values apply to narrowband emissions, e.g. as caused by local oscillator leakage. The measurement bandwidth for such emissions may be as small as necessary to achieve a reliable measurement result.

6.8 Receiver Blocking

While maintaining the minimum performance criteria as defined in clause 4.3.2.11.3, the blocking levels at specified frequency offsets shall be equal to or greater than the limits defined for the applicable receiver category provided in table 14, table 15 or table 16.

Table 14 contains the Receiver Blocking parameters for Receiver Category 1 equipment.

Table 14: Receiver Blocking parameters for Receiver Category 1 equipment

Wanted signal mean power from companion device (dBm) (see notes 1 and 4)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 4)	Type of blocking signal
(-133 dBm + 10 × $\log_{10}$(OCBW)) or -68 dBm whichever is less (see note 2)	2 380 2 504	-34	CW
(-139 dBm + 10 × $\log_{10}$(OCBW)) or -74 dBm whichever is less (see note 3)	2 300 2 330 2 360 2 524 2 584 2 674		

NOTE 1: OCBW is in Hz.

NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to P_{min} + 26 dB where P_{min} is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.

NOTE 3: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to P_{min} + 20 dB where P_{min} is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.

NOTE 4: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.

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Table 15 contains the Receiver Blocking parameters for Receiver Category 2 equipment.

Table 15: Receiver Blocking parameters receiver Category 2 equipment

Wanted signal mean power from companion device (dBm) (see notes 1 and 3)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 3)	Type of blocking signal
(-139 dBm + 10 × $\log_{10}$(OCBW) + 10 dB) or (-74 dBm + 10 dB) whichever is less (see note 2)	2 380 2 504 2 300 2 584	-34	CW
NOTE 1: OCBW is in Hz. NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to P_{min} + 26 dB where P_{min} is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal. NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.			

Table 16 contains the Receiver Blocking parameters for Receiver Category 3 equipment.

Table 16: Receiver Blocking parameters receiver Category 3 equipment

Wanted signal mean power from companion device (dBm) (see notes 1 and 3)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 3)	Type of blocking signal
(-139 dBm + 10 × $\log_{10}$(OCBW) + 20 dB) or (-74 dBm + 20 dB) whichever is less (see note 2)	2 380 2 504 2 300 2 584	-34	CW
NOTE 1: OCBW is in Hz. NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to P_{min} + 30 dB where P_{min} is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal. NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.			

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7 Apendix H:Estimation of Exposure of Human to Electromagnetic Fields

According with EN 50663:2017 clause 6, Equipment complying with the requirements for the general public is deemed to comply with the requirements for workers without further testing if it can be demonstrated using routes B, C or D that the available antenna power and/or the average total radiated power is less than or equal to the values of Pmax. The peak output power is 9.77 mW; it is less than the limit 20mW which list in the table 1, so the equipment complies with EMF basic restrictions in EN 50663:2017.

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8 Main Test Instruments

	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
C	RF test system	R&S	TS8997	487/391835	2020/12/23

Conducted RF tests –C

- RF output power
- Power Spectral Density
- Adaptivity &Receiver Blocking
- Occupied Channel Bandwidth
- Transmitter unwanted emissions OOB
- Transmitter unwanted emissions in the spurious domain_Conducted
- Receiver spurious emissions_Conducted
- Receiver Blocking

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9 System Measurement Uncertainty

For the test methods, according to the harmonized standard and conformance testing standard, the measurement uncertainty figures shall be calculated in accordance with TR 100 028 and shall correspond to an expansion factor (coverage factor) k = 1.96 (which provides a confidence level of 95 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty for Radiated Spurious Emission 30MHz-1000MHz	±3.49dB(Horizontal), ±3.50dB(Vertical)
Uncertainty for Conducted RF test	Power level test involved: 2.04dB Frequency test involved:1.1×10^{-7}

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10 Appendix A: RF output power

NOTE 1: In this Appendix, EIRP [dBm] = A [dBm] + 10*log (1/X) [dB] + G [dBi]. Where, A = Average Power, X = Duty Cycle and G = Antenna Gain. The Jumper Cable Loss (JCL) (if applicable) and Test Path Loss (TPL) were calculated into A.

NOTE 2: For measurements on smart antenna systems (devices with multiple transmit chains), the test is performed at each chain, and then combined into a final result. The result is the calculated linear sum of each chain (as Ant sum).

(1) Common Parameter

Test Mode	Power Level Setting defined by Manufacturer	X [%]	G [dBi]
Transmitting 2405 MHz	20	100	0
Transmitting 2450 MHz	20	100	0
Transmitting 2480 MHz	20	100	0

(2) Test Result

Normal Conditions- AC 230V (Temperature 25°C)

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)	EIRP Power (dBm)	Limit (dBm)	Result
Ant 0						
Mode1	11	2405	9.3	9.3	20	Pass
	18	2440	9.4	9.4	20	Pass
	26	2480	9.7	**9.7**	20	Pass

Note: EIRP Power (dBm) = RF Output Power (dBm) + Antenna Gain (dBi).

Extreme Conditions- AC 253V (Temperature -10°C)

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)	EIRP Power (dBm)	Limit (dBm)	Result
Ant 0						
Mode 1	11	2405	9.5	9.5	20	Pass
	18	2440	9.6	9.6	20	Pass
	26	2480	9.9	9.9	20	Pass

Note: EIRP Power (dBm) = RF Output Power (dBm) + Antenna Gain (dBi).

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Extreme Conditions- AC 187V (Temperature 40°C)

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)	EIRP Power (dBm)	Limit (dBm)	Result
Ant 0						
Mode 1	11	2405	9.1	9.1	20	Pass
	18	2440	9.2	9.2	20	Pass
	26	2480	9.4	9.4	20	Pass

Note: EIRP Power (dBm) = RF Output Power (dBm) + Antenna Gain (dBi).

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11 Appendix B: Maximum EIRP Spectral Density

NOTE 1: In this Appendix, PD [dBm/MHz] = D [dBm/MHz] + 10*log (1/X) [dB] + G [dBi]. Where, D = Spectral Power Density, X = Duty Cycle and G = Antenna Gain. The Jumper Cable Loss (JCL) (if applicable) and Test Path Loss (TPL) were calculated into D.

NOTE 2: For measurements on smart antenna systems (devices with multiple transmit chains), the test is performed at each chain, and then combined into a final result. The result is the calculated linear sum of each chain (as Ant sum).

(1) Common Parameter

Test Mode	Power Level Setting defined by Manufacturer	X [%]	G [dBi]
Transmitting 2405 MHz	20	100	0
Transmitting 2450 MHz	20	100	0
Transmitting 2480 MHz	20	100	0

(2) Test Result

Mode	Channel	Freq. (MHz)	EIRP Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
Ant 0					
Mode 1	11	2405	7.694	10	Pass
	18	2440	7.425	10	Pass
	26	2480	7.827	10	Pass

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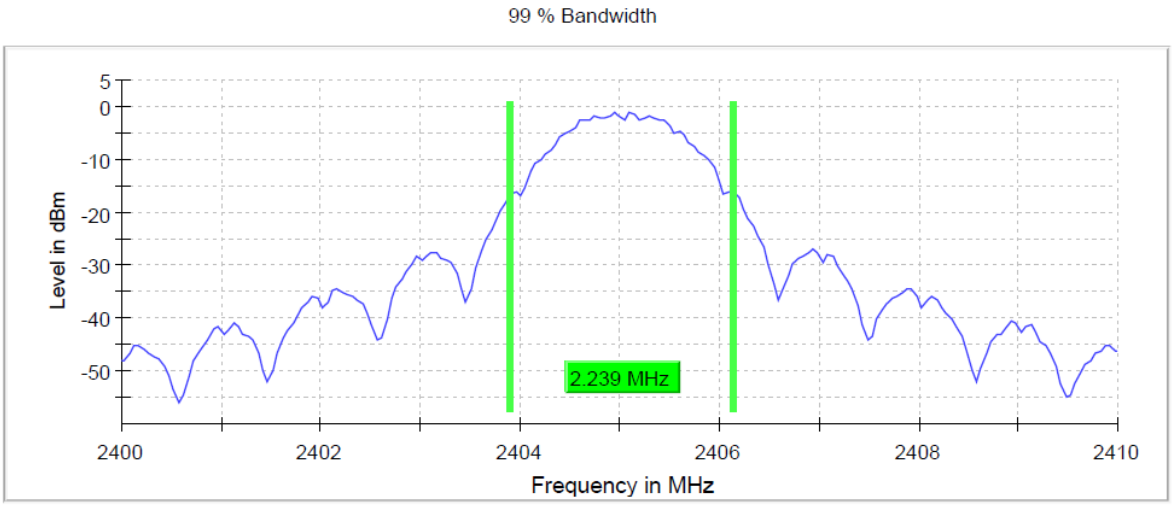
12 Appendix D: Occupied Channel Bandwidth

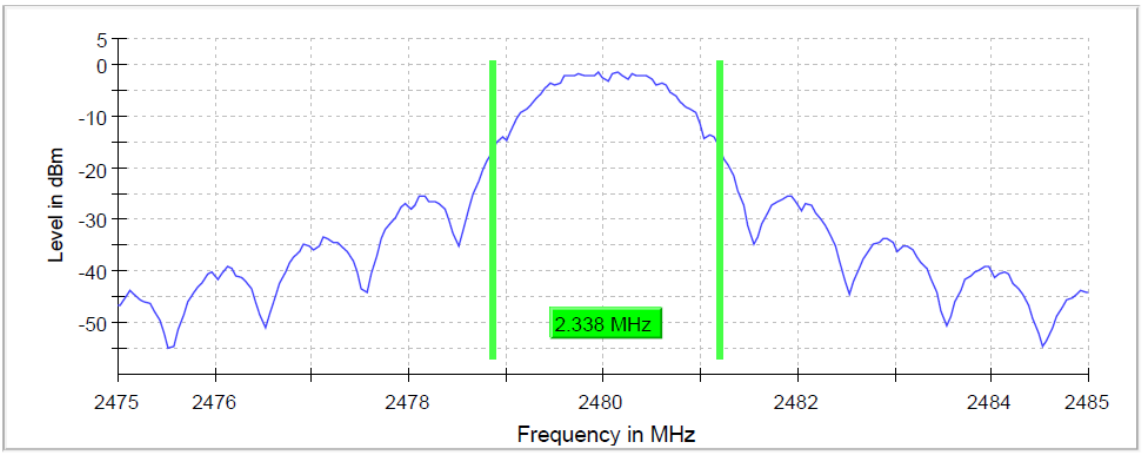
Test Result

Test Mode	Channel No.	Frequency (MHz)	99% Bandwidth (MHz)	Frequency Range (MHz)	Limit (MHz)	Result
Ant 0						
Mode 1	11	2405	2.239	2403.86	>2400	Pass
	26	2480	2.338	2478.86	<2483.5	Pass

2405MHz



2480MHz



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13 Appendix E: Transmitter unwanted emissions in the out-of-band domain

Test condition:	Test frequency (MHz)	Test segment (MHz)	Max. Reading (dBm/MHz)	Limit (dBm/MHz)
NTNV	2405	2400-BW to 2400	-40.9	-10
		2400-2BW to 2400-BW	-60.2	-20
	2480	2483.5 to 2483.5+BW	-60.6	-10
		2483.5+BW to 2483.5+2BW	-33.0	-20

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14 Appendix G: Transmitter Spurious Emissions – Conducted Mode

NOTE 1: The whole testing range is from “30 MHz to 12.75 GHz” is divided into 2 parts according to the test site settings, which are:
- Part 1: Test range of “30 MHz to 1GHz”,
- Part 2: Test range of “1 GHz to 12.75 GHz”.

NOTE 2: In this Appendix, X = Duty Cycle and G = Antenna Gain. The test path transducer was directly calculated into results for each test range.

(1) Common Parameter

Test Mode	Power Level Setting defined by Manufacturer	X [%]	G [dBi]
Transmitting 2405 MHz	20	100	0
Transmitting 2440 MHz	20	100	0
Transmitting 2480 MHz	20	100	0

(2) Test Result

Note: The test results for testing range of “30 MHz to 12.75 GHz” showed as below is **the WORST case for all Test Modes and Channels**.The detected values which are noise floor or below the limit 20dB will not be recorded.

Channel	Invested Frequency Range(MHz)	Frequency (MHz)	Detector	Measure Level (dBm)	Limit (dBm)	Margin (dB)
11	30-1000	832.58	PK	-65.6	-54	11.6
	1000-12750	4812.64	PK	-44.1	-30	14.1
26	30-1000	N/A	PK	N/A	N/A	>20
	1000-12750	4959.13	PK	-38.9	-30	8.9

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15 Appendix I: Receiver Spurious Emissions-Conducted Mode

NOTE 1: The whole testing range is from “30 MHz to 12.75 GHz” is divided into 2 parts according to the test site settings, which are:
- Part 1: Test range of “30 MHz to 1 GHz”,
- Part 2: Test range of “1 GHz to 12.75 GHz”.

NOTE 2: In this Appendix, X = Duty Cycle and G = Antenna Gain. The test path transducer was directly calculated into results for each test range.

(1) Common Parameter

Test Mode	Power Level Setting defined by Manufacturer	X [%]	G [dBi]
Transmitting 2405 MHz	20	100	0
Transmitting 2440 MHz	20	100	0
Transmitting 2480 MHz	20	100	0

(2) Test Result

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)
11	30-1000	--	--	--	-57	>20
	1000-12750	--	--	--	-47	>20
26	30-1000	--	--	--	-57	>20
	1000-12750	--	--	--	-47	>20

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16 Appendix J: Receiver Blocking

Receiver Category 1

Test Condition	Test Mode	Test Channel	Ant	Wanted signal Level[dBm]	Freq [MHz]	CW Level [dBm]	PER [%]	Limit [%]	Verdict
NTNV	2	2412	Ant1	-68	2380	-34	0	<=10	PASS
NTNV	2	2412	Ant1	-74	2300	-34	0	<=10	PASS
NTNV	2	2412	Ant1	-74	2330	-34	0	<=10	PASS
NTNV	2	2412	Ant1	-74	2360	-34	0	<=10	PASS
NTNV	2	2472	Ant1	-68	2504	-34	0	<=10	PASS
NTNV	2	2472	Ant1	-74	2524	-34	0	<=10	PASS
NTNV	2	2472	Ant1	-74	2584	-34	0	<=10	PASS
NTNV	2	2472	Ant1	-74	2674	-34	0	<=10	PASS

Receiver Category 2

Test Condition	Test Mode	Test Channel	Ant	Wanted signal Level[dBm]	Freq [MHz]	CW Level [dBm]	PER [%]	Limit [%]	Verdict
NTNV	2	2405	Ant1	N/A	2380	-34	N/A	<=10	N/A
NTNV	2	2405	Ant1	N/A	2300	-34	N/A	<=10	N/A
NTNV	2	2480	Ant1	N/A	2504	-34	N/A	<=10	N/A
NTNV	2	2480	Ant1	N/A	2584	-34	N/A	<=10	N/A

Receiver Category 3

Test Condition	Test Mode	Test Channel	Ant	Wanted signal Level[dBm]	Freq [MHz]	CW Level [dBm]	PER [%]	Limit [%]	Verdict
NTNV	2	2402	Ant1	N/A	2380	-34	N/A	<=10	N/A
NTNV	2	2402	Ant1	N/A	2300	-34	N/A	<=10	N/A
NTNV	2	2480	Ant1	N/A	2504	-34	N/A	<=10	N/A
NTNV	2	2480	Ant1	N/A	2584	-34	N/A	<=10	N/A

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17 Appendix K: Test Setup Photos

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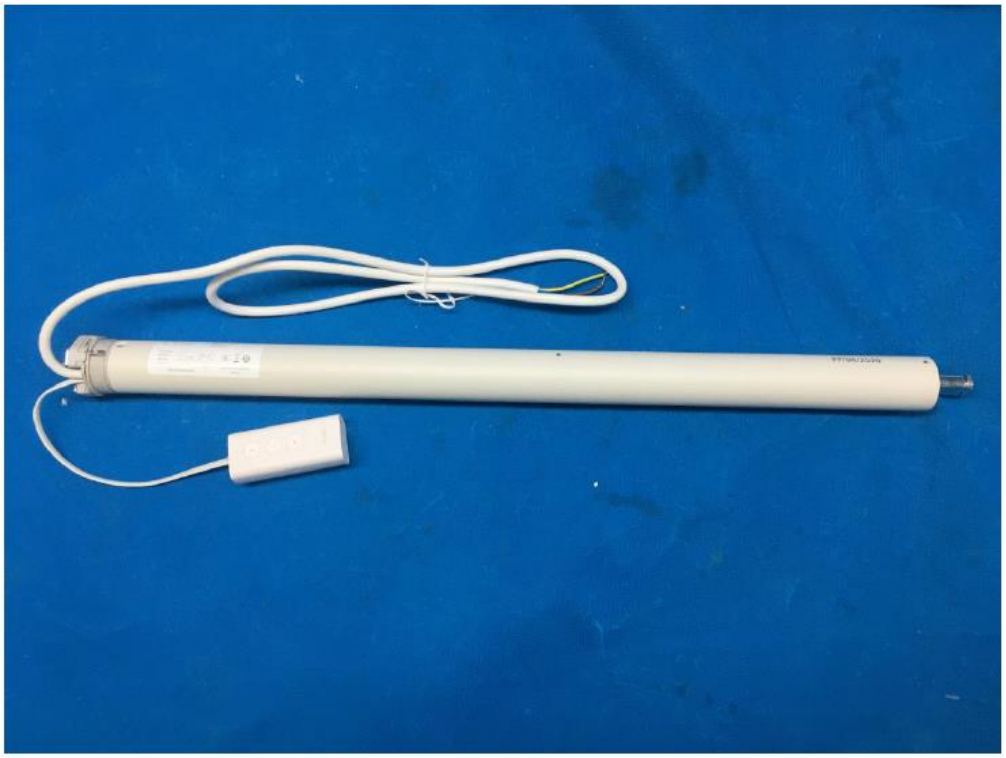
18 Appendix L: Photographs of EUT



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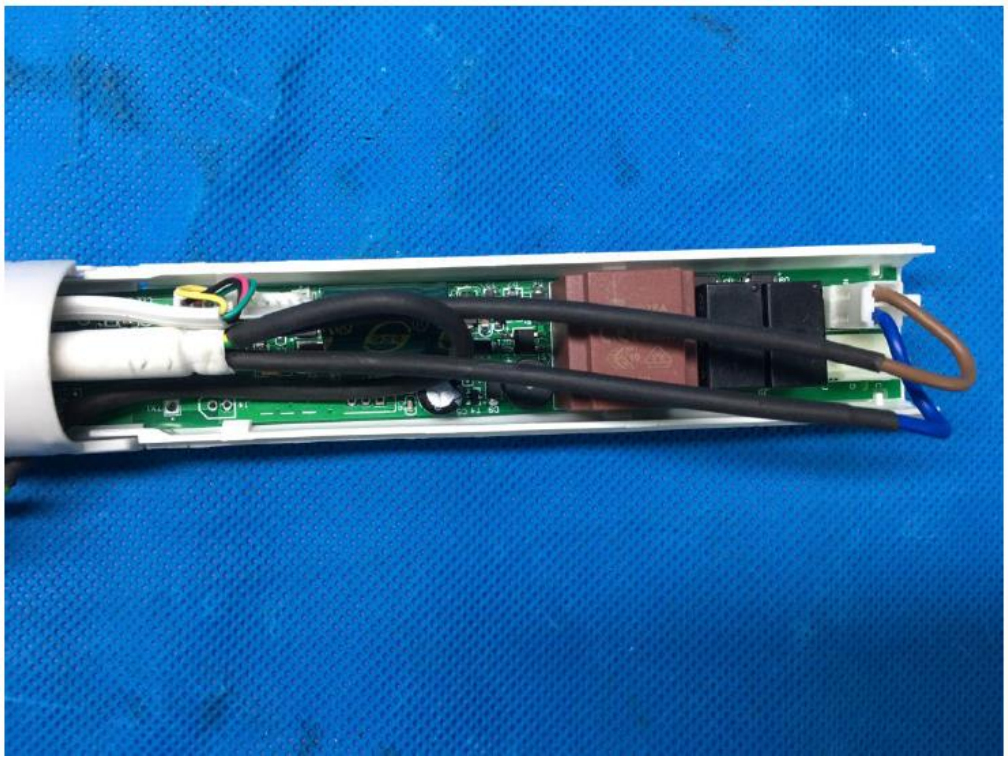

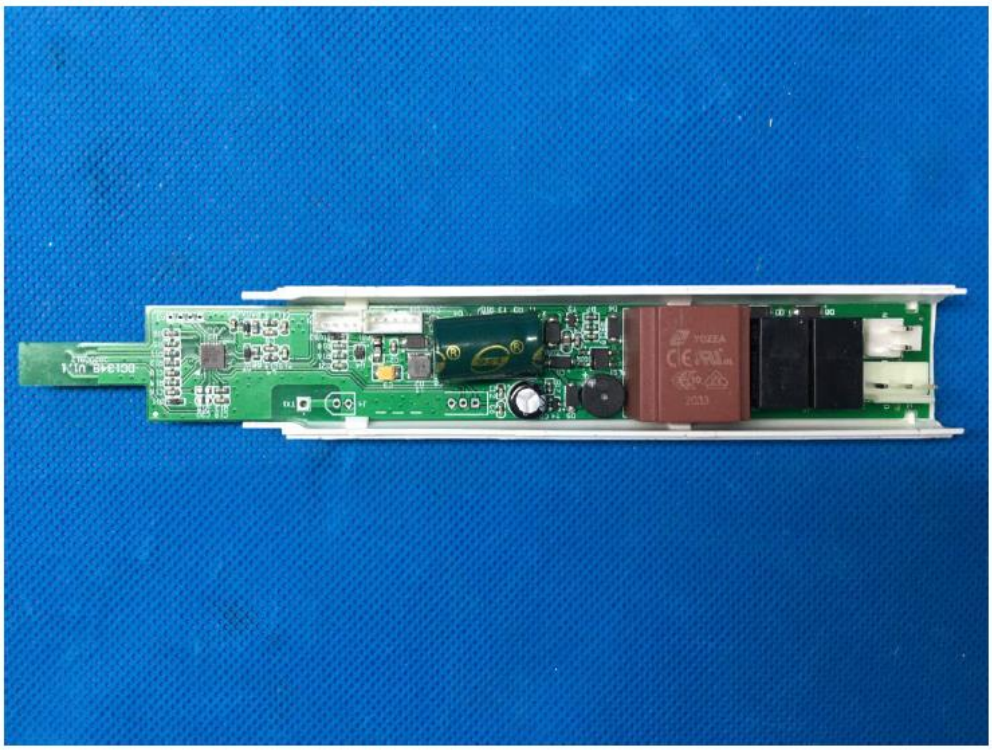

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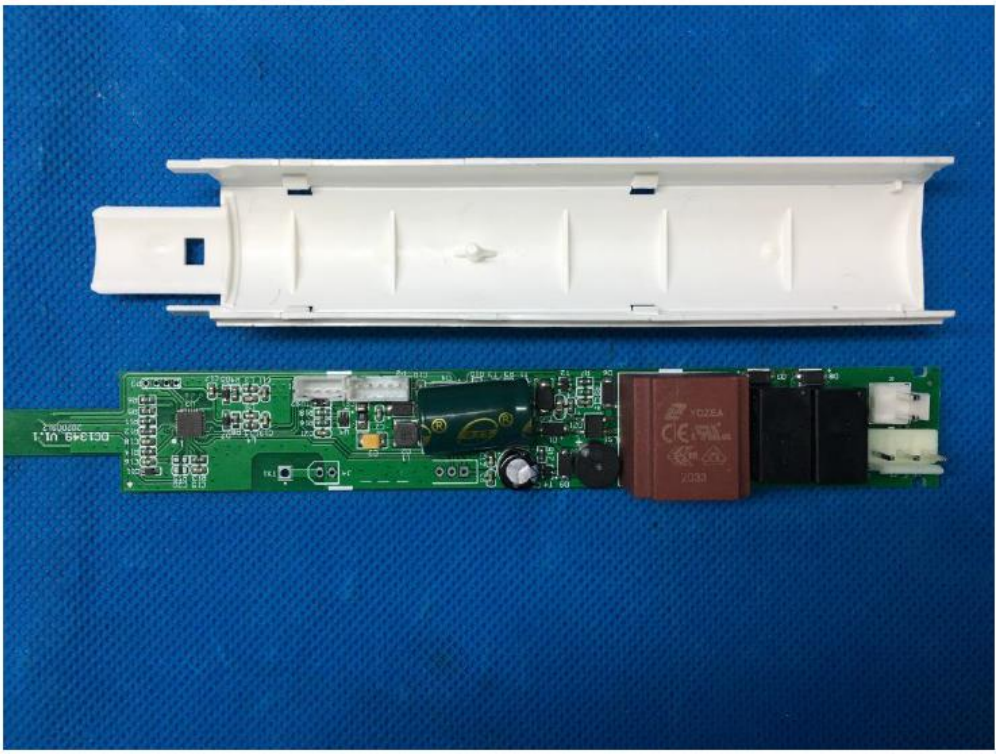

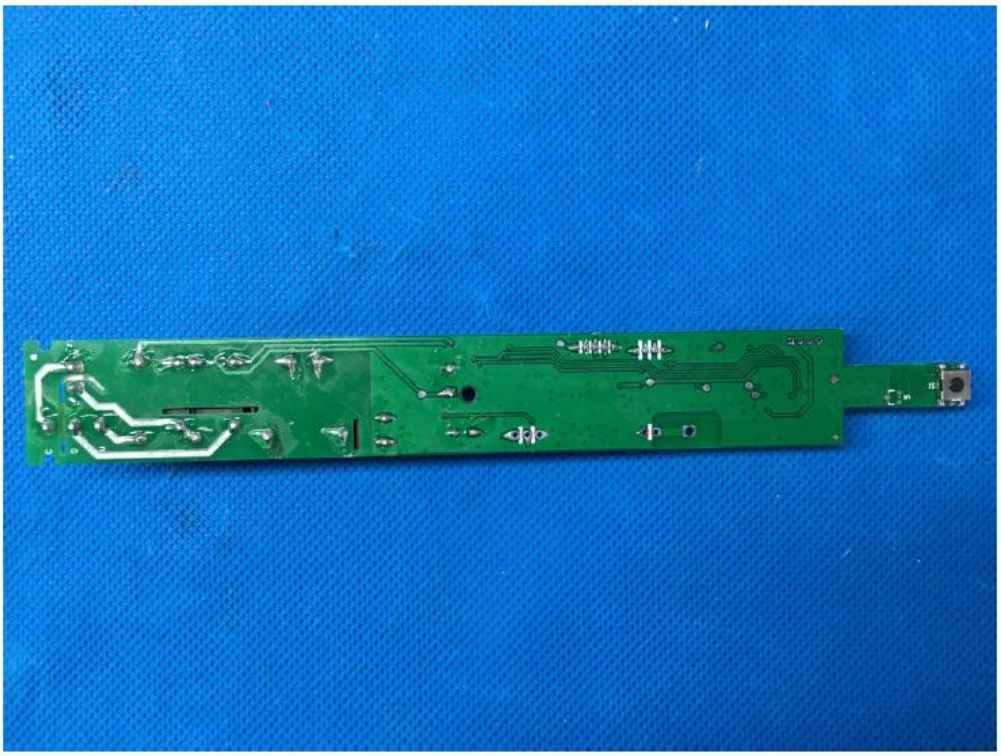

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