



# TEST REPORT

## ETSI EN 300 220-1 V3.1.1 (2017-02) & ETSI EN 300 220-2 V3.2.1 (2018-06)

Report Reference No.: HK2010142886-2ER

Compiled by  
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Date of issue: 2020/10/28

Representative Laboratory Name : Shenzhen HUAK Testing Technology Co., Ltd.

Address: 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Applicant's name: Shenzhen Dragino technology development co., LTD.

Address: Room 202, Block B, BaoChengTai industrial park, No.8 CaiYunRoad, LongCheng Street, LongGang District, Shenzhen 518116, China

### Test specification:

Standard : **ETSI EN 300 220-1 V3.1.1 (2017-02) & ETSI EN 300 220-2 V3.2.1 (2018-06)**

TRF Originator : Shenzhen HUAK Testing Technology Co., Ltd.

Master TRF : Dated 2017-05

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Test item description : RS485 to LoRaWAN Converter

Trade Mark : Dragino

Model/Type reference : RS485-LN

Listed Models : N/A

Hardware Version : V2.0

Software Version : V2.0

Rating : DC 7-24V

Result : **Positive**



# TEST REPORT

<b>Test Report No. :</b>	<b>HK2010142886-2ER</b>	2020/10/28
		Date of issue

Equipment under Test : RS485 to LoRaWAN Converter

Model /Type : RS485-LN

Listed Models : N/A

**Applicant** : Shenzhen Dragino technology development co., LTD.

Address : Room 202, Block B, BaoChengTai industrial park,  
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Shenzhen 518116, China

**Manufacturer** : Shenzhen Dragino technology development co., LTD.

Address : Room 202, Block B, BaoChengTai industrial park,  
No.8 CaiYunRoad, LongCheng Street, LongGang District,  
Shenzhen 518116, China

<b>Test Result</b>	<b>PASS</b>
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The test report merely corresponds to the test sample.  
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**1.1 TEST STANDARDS**

The tests were performed according to following standards:

[ETSI EN 300 220-1 V3.1.1 \(2017-02\)](#)—Short Range Devices (SRD) operating in the frequency range 25 MHz to 1 000 MHz; Part 1: Technical characteristics and methods of measurement

[ETSI EN 300 220-2 V3.2.1 \(2018-06\)](#)—Short Range Devices (SRD) operating in the frequency range 25 MHz to 1 000 MHz; Part 2: Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU for non specific radio equipment

**1.2 Test Description**

Clause	Test Parameter	Condition	Result
<b>All equipment conformance requirements</b>			
4.2.1	Operating frequency	Apply to all equipment	PASS
4.2.2	Unwanted emissions in the spurious domain	Apply to all equipment	PASS
<b>Transmitters conformance requirements</b>			
4.3.1	Effective Radiated Power	Apply to transmitters	PASS
4.3.2	Maximum e.r.p. spectral density	Apply to transmitters using annex B bands I, L. Apply to transmitters using DSSS or wideband techniques other than FHSS modulation, in annex C band X.	N/A
4.3.3	Duty Cycle	Apply to all transmitters except EUT with polite spectrum access (described in clause 4.5) where permitted in annex B, table B.1 or annex C, table C.1 or any NRI.	PASS
4.3.4	Occupied Bandwidth	Apply to all transmitters.	PASS
4.3.5	Tx Out of Band Emissions	Apply to all transmitters with OCW > 25 kHz.	PASS
4.3.6	Transient power	Transient power applies to all transmitters.	PASS
4.3.7	Adjacent Channel Power	Apply to all transmitters with OCW ≤ 25 kHz.	N/A
4.3.8	TX behaviour under Low Voltage Conditions	Apply to battery powered EUT.	PASS
4.3.9	Adaptive Power Control	Apply to all EUT with adaptive power control using annex C band AA.	N/A
4.3.10	FHSS equipment	Apply to all FHSS equipment.	N/A
4.3.11	Short term behaviour	Apply to EUT for operation in bands where T <sub>on</sub> or T <sub>off</sub> limits are specified in annex C, table C.1 or NRI.	N/A
<b>Receivers conformance requirements</b>			
4.4.1	RX sensitivity	Apply to EUT with polite spectrum access instead of duty cycle where permitted by table B.1 in annex B, or table C.1 in annex C or any NRI.	N/A
4.4.2	Blocking	Apply to all receivers	N/A
<b>Polite spectrum access conformance requirement</b>			
4.5.2	Clear Channel Assessment threshold	Apply to EUT with polite spectrum access instead of duty cycle where permitted by table B.1 in annex B, or table C.1 in annex C or any NRI.	N/A
4.5.3	Polite spectrum access timing parameters	Apply to EUT with polite spectrum access instead of duty cycle where permitted by table B.1 in annex B, or table C.1 in annex C or any NRI.	N/A
4.5.4	Adaptive Frequency Agility	Apply to EUT with AFA.	N/A

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### 1.3 Test Facility

#### 1.3.1 Address of the test laboratory

**Shenzhen HUAKE Testing Technology Co., Ltd.**

Add. : 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

### 1.4 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“and is documented in the Beide (Shenzhen) Product Service Limitedacc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Beide (Shenzhen) Product Service Limitedfor Products Quality is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	3.90dB	(1)
Radiated Emission	Above 1GHz	4.28dB	(1)
Conducted Disturbance	0.15~30MHz	2.71dB	(1)

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



## 2 GENERAL INFORMATION

### 2.1 General Remarks

Date of receipt of test sample	:	2020/10/14
Testing commenced on	:	2020/10/14
Testing concluded on	:	2020/10/28

### 2.2 Environmental conditions

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

<b>Temperature</b>	NT: Normal Temperature	25°C
	HT: High Temperature	40°C
	LV: Low Temperature	-10°C
<b>Voltage</b>	NV: Normal Voltage	DC 24V
	HV: High Voltage	DC 26.4V
	LV: Low Voltage	DC 21.6V
<b>Other</b>	Relative Humidity	55 %
	Air Pressure	101 kPa

### 2.3 General Description of EUT

Product Name:	RS485 to LoRaWAN Converter	
Model/Type reference:	RS485-LN	
List model	N/A	
Model Diff:	N/A	
Power supply:	DC 7-24V	
<b>Wireless technology</b>		
Frequency band:	865-868MHz, 868.0-868.6MHz	
Operating frequency:	867.3MHz, 868.1MHz, 868.3MHz	
Modulation type:	FSK	
Operating channel width:	125KHz	
Maximum RF power:	N/A	
Spread spectrum method:	<input checked="" type="checkbox"/> Duty cycle <input type="checkbox"/> Polite spectrum access	
Receiver category:	<input type="checkbox"/> Category 1:	Category 1 is a high performance level of receiver. In particular to be used where the operation of a SRD may have inherent safety of human life implications.
	<input type="checkbox"/> Category 1.5:	Category 1.5 is an improved performance level of receiver category 2.
	<input type="checkbox"/> Category 2:	Category 2 is standard performance level of receiver.
	<input checked="" type="checkbox"/> Category 3:	Category 3 is a low performance level of receiver. Manufacturers have to be aware that category 3 receivers are not able to work properly in case of coexistence with some services such as a mobile radio service in adjacent bands. The manufacturer shall provide another mean to overcome the weakness of the radio link or accept the failure.
Antenna type:	External antenna	

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Note: For more details, refer to the user's manual of the EUT.

## 2.4 Description of Test Modes and Test Frequency

The EUT has been tested under typical operating condition. The user can control the EUT for staying in continuous transmitting & receiving mode for testing.



2.5 Equipments Used during the Test

Effective radiated power & Spurious Emissions						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Cal.Due
1	Spectrum analyzer	Agilent	N9020A	HKE-048	2020/06/18	2021/06/17
2	Receiver	R&S	ESCI 7	HKE-010	2020/06/18	2021/06/17
3	Broadband antenna	Schwarzbeck	VULB 9163	HKE-012	2020/06/18	2021/06/17
4	Horn antenna	Schwarzbeck	9120D	HKE-013	2020/06/18	2021/06/17
5	Spectrum analyzer	R&S	FSP40	HKE-025	2020/06/18	2021/06/17
6	Preamplifier	EMCI	EMC0518 45SE	HKE-015	2020/06/18	2021/06/17
7	Preamplifier	Agilent	83051A	HKE-016	2020/06/18	2021/06/17
8	Power meter	Agilent	E4419B	HKE-085	2020/06/18	2021/06/17

Blocking						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Cal.Due
1	Spectrum Analyzer	Agilent	N9020	HKE-048	2020/06/18	2021/06/17
2	Wireless Communication Test Set	R&S	CMW500	HKE-027	2020/06/18	2021/06/17

PSD & TX Transient & OOB & OBW & Duty cycle & Adjacent channel power						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Cal.Due
1	Spectrum Analyzer	Agilent	N9020	HKE-048	2020/06/18	2021/06/17

TX behaviour under low voltage conditions						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Cal.Due
1	Spectrum Analyzer	Agilent	N9020	HKE-048	2020/06/18	2021/06/17

The calibration interval is one year.The calibration interval is one year.

2.6 Modifications

No modifications were implemented to meet testing criteria.





### **3 TEST CONDITIONS AND RESULTS**

#### **3.1 All equipment conformance requirements**

##### **3.1.1 Operating frequency**

###### **Limit**

The manufacturer may declare either one or more operating frequencies and operating channels. Operating channel(s) shall be entirely within operational frequency bands allowed by annexes B, C or any NRI.

###### **Manufacturer Declaration**

<b>Parameters</b>	<b>Value</b>	<b>Note</b>
Operational Frequency band	865-868MHz (Refer to Annex B .L & M)	Declared by the manufacturer
Nominal Operating Frequency	868MHz	Declared by the manufacturer
Operating Channel width	125KHz	Declared by the manufacturer

**3.1.2 Unwanted emissions in the spurious domain**

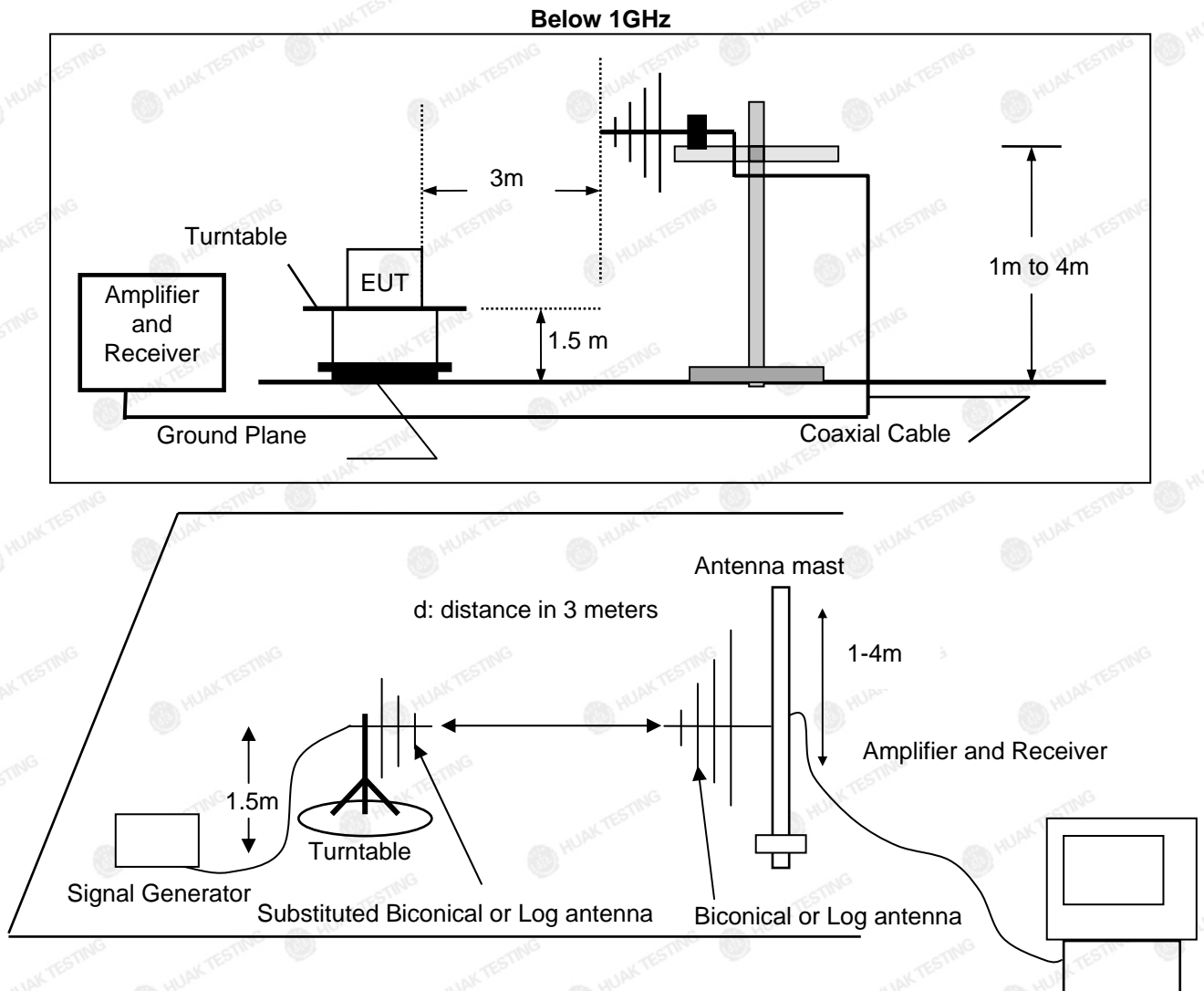
**Limit**

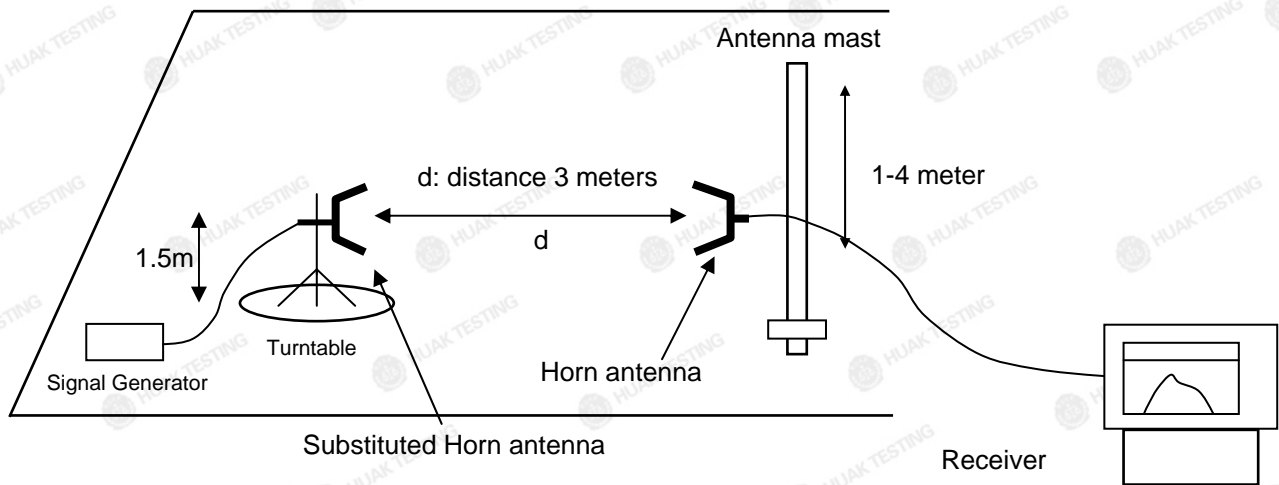
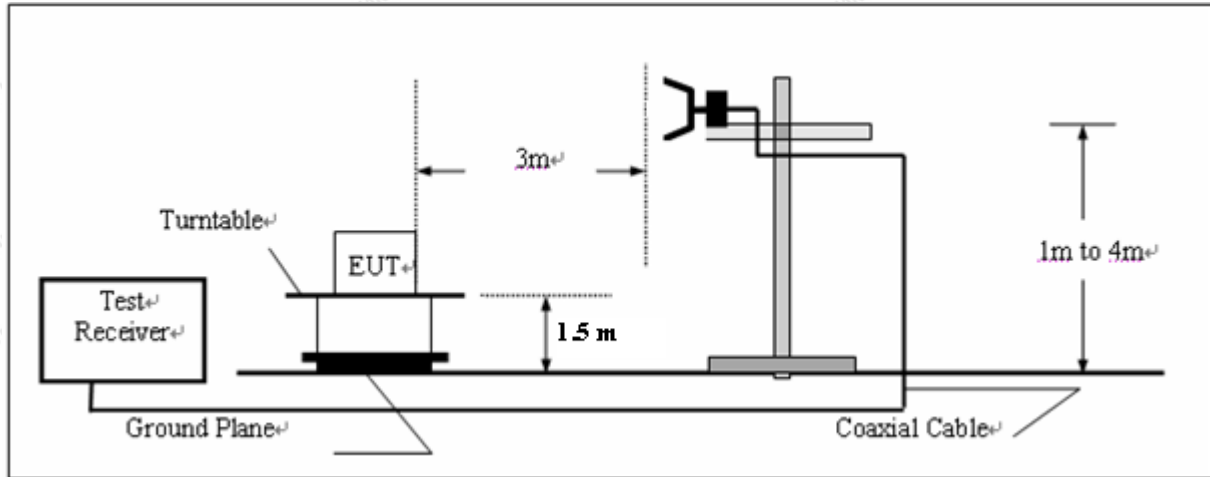
The power of any unwanted emission in the spurious domain shall not exceed the values given as bellow

**Spurious domain emission limits**

Frequency	47 MHz to 74 MHz 87,5 MHz to 118 MHz 174 MHz to 230 MHz 470 MHz to 790 MHz	Other frequencies below 1 000 MHz	Frequencies above 1 000 MHz
State			
TX mode	-54 dBm	-36 dBm	-30 dBm
RX and all other modes	-57 dBm	-57 dBm	-47 dBm

**Test Configuration**



**Above 1GHz****Test Procedure**

1. Please refer to ETSI EN 300 220-1 V3.1.1 (2017-02) Sub-clause 4 for the test conditions.
2. Please refer to ETSI EN 300 220-1 V3.1.1 (2017-02) Sub-clause 5.9.3.3 for the measurement method.



Remark: Measurement frequency from 25MHz to 6GHz and recorded worst at below:

**TX mode**

Fre. (MHz)	ANT. Pol.	Result (dBm)	Limit	Margin	Conclusion
<b>Below 1GHz:</b>					
159.30	V	-71.50	-36	-35.50	PASS
275.89	V	-78.64	-36	-42.64	PASS
389.05	V	-73.68	-36	-37.68	PASS
439.52	V	-75.96	-36	-39.96	PASS
497.17	V	-74.96	-54	-20.96	PASS
847.78	V	-75.06	-54	-21.06	PASS
170.93	H	-76.05	-54	-22.05	PASS
224.02	H	-77.93	-54	-23.93	PASS
312.22	H	-72.29	-36	-36.29	PASS
442.81	H	-77.10	-36	-41.10	PASS
604.34	H	-77.21	-54	-23.21	PASS
791.83	H	-73.01	-54	-19.01	PASS
Note: 1. Cable loss and antenna gain was combined in the calculated result. 2. Other point of the measurements are below 20dB from the limit.					





Fre. (MHz)	ANT. Pol.	Result (dBm)	Limit	Margin	Conclusion
<b>Below 1GHz:</b>					
1271.33	V	-54.46	-30	-24.46	PASS
1464.36	V	-53.58	-30	-23.58	PASS
2505.38	V	-57.13	-30	-27.13	PASS
2427.86	V	-52.81	-30	-22.81	PASS
3499.94	V	-51.71	-30	-21.71	PASS
3840.37	V	-57.65	-30	-27.65	PASS
1223.72	H	-55.52	-30	-25.52	PASS
1555.36	H	-51.19	-30	-21.19	PASS
2406.62	H	-52.26	-30	-22.26	PASS
2653.87	H	-50.09	-30	-20.09	PASS
3575.97	H	-52.74	-30	-22.74	PASS
3817.99	H	-57.40	-30	-27.40	PASS
Note: 1. Cable loss and antenna gain was combined in the calculated result. 2. Other point of the measurements are below 20dB from the limit.					

**RX mode**

N/A

EUT only have transmitter function.

Note: "--"Other emission levels were very low against the limit and not reported.

### 3.2 Transmitters conformance requirements

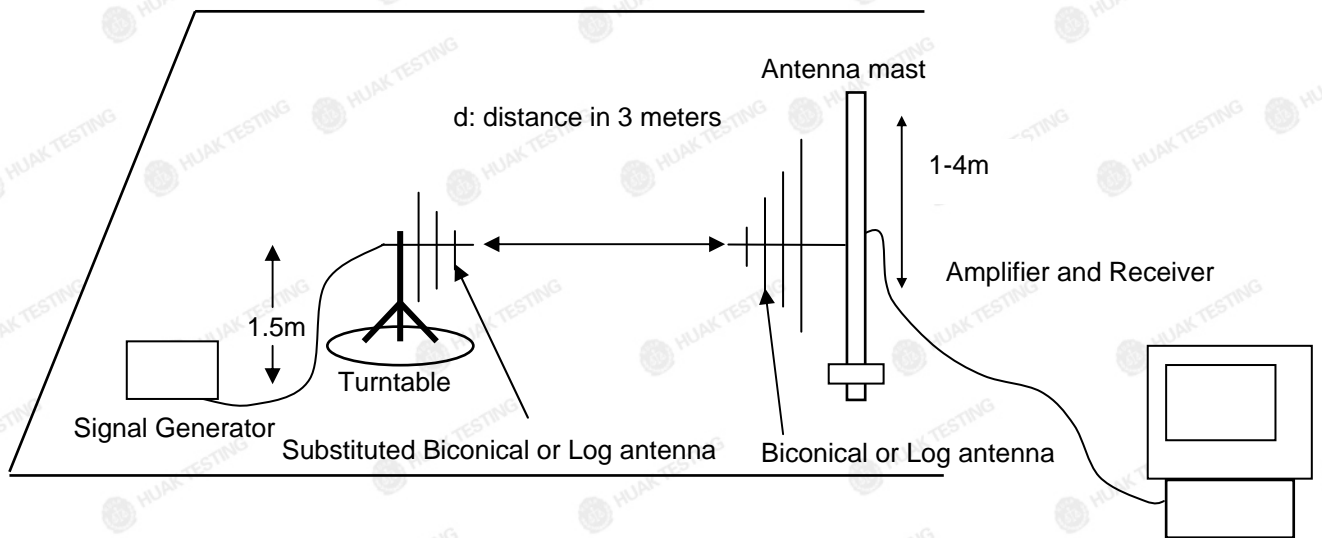
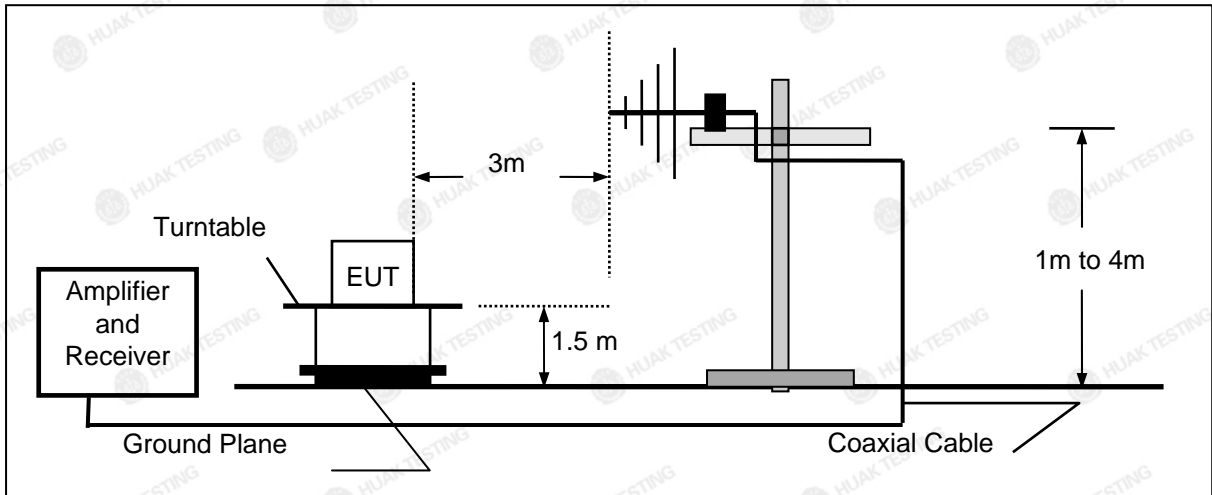
#### 3.2.1 Effective Radiated Power

##### Limit

The effective radiated power shall not be greater than the value allowed in annexes B or C for the chosen operational frequency band(s):

Frequency range	Radiated power, e.r.p
865-868MHz	≤ 25 mW

##### Test Configuration



##### Test Procedure

1. Please refer to ETSI EN 300 220-1 V3.1.1 (2017-02) Sub-clause 4 for the test conditions.
2. Please refer to ETSI EN 300 220-1 V3.1.1 (2017-02) Sub-clause 5.2.2.2 for the measurement method.



**Test Results**

**867.3**

Tests	ERP (dBm)	Limit (mW/dBm)	Tem.	Vol.	Result
Measured radiated power (dBm)	12.82	25/14	TN	VN	Pass
	12.36	25/14	TL	VL	Pass
	12.41	25/14	TH	VH	Pass
	12.69	25/14	TL	VH	Pass
	12.33	25/14	TH	VL	Pass

**868.1**

Tests	ERP (dBm)	Limit (mW/dBm)	Tem.	Vol.	Result
Measured radiated power (dBm)	12.46	25/14	TN	VN	Pass
	12.79	25/14	TL	VL	Pass
	12.44	25/14	TH	VH	Pass
	12.48	25/14	TL	VH	Pass
	12.60	25/14	TH	VL	Pass

**868.3**

Tests	ERP (dBm)	Limit (mW/dBm)	Tem.	Vol.	Result
Measured radiated power (dBm)	12.62	25/14	TN	VN	Pass
	12.79	25/14	TL	VL	Pass
	12.54	25/14	TH	VH	Pass
	12.77	25/14	TL	VH	Pass
	12.46	25/14	TH	VL	Pass

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**3.2.2 Duty cycle**

**Limit**

The Duty Cycle at the operating frequency shall not be greater than values in annex B or any NRI for the chosen operational frequency band(s).

Frequency range	Duty cycle
865-868MHz	≤ 0,1 % duty cycle or polite spectrum access

**Test Results**

N/A

Note: Since the duty cycle limit is up to 100% for the device, it is deemed to comply without testing



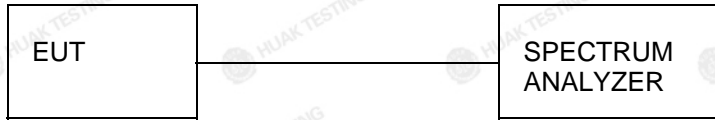


3.2.3 Occupied Bandwidth

Limit

The occupied bandwidth of the EUT according to ETSI EN 300 220-1 [1], clause 5.6.2 shall comply with the limits in annex B or any NRI for the chosen operational frequency band(s).

Test Configuration



Test Procedure

1. Please refer to ETSI EN 300 220-1 V3.1.1 (2017-02) Sub-clause 4 for the test conditions.
2. Please refer to ETSI EN 300 220-1 V3.1.1 (2017-02) Sub-clause 5.6.3.4 for the measurement method.

Test Results

867.3

Test CONDITION		Frequency Range	
Temperature	Voltage	Low Frequency(MHz)	High Frequency(MHz)
25°C	DC 24V	867.2225	867.3725
-10°C	DC 26.4V	867.2371	867.3864
	DC 22.6V	867.2352	867.3825
40°C	DC 26.4V	867.2259	867.3832
	DC 22.6V	867.2269	867.3821
Messured frequcies(Lowset and Highest)		867.2225	867.3864
Limit		FL>865	FH<868

868.1

Test CONDITION		Frequency Range	
Temperature	Voltage	Low Frequency(MHz)	High Frequency(MHz)
25°C	DC 24V	868.0341	868.1753
-10°C	DC 26.4V	868.0412	868.1813
	DC 22.6V	868.0514	868.1759
40°C	DC 26.4V	868.0361	868.1806
	DC 22.6V	868.0514	868.1772
Messured frequcies(Lowset and Highest)		868.0341	868.1813
Limit		FL>868	FH<868.6

868.3

Test CONDITION		Frequency Range	
Temperature	Voltage	Low Frequency(MHz)	High Frequency(MHz)
25°C	DC 24V	867.2253	868.3756
-10°C	DC 26.4V	867.2459	868.3805
	DC 22.6V	867.2216	868.3744
40°C	DC 26.4V	867.2315	868.3742
	DC 22.6V	867.2419	868.3819
Messured frequcies(Lowset and Highest)		867.2216	868.3819
Limit		FL>868	FH<868.6

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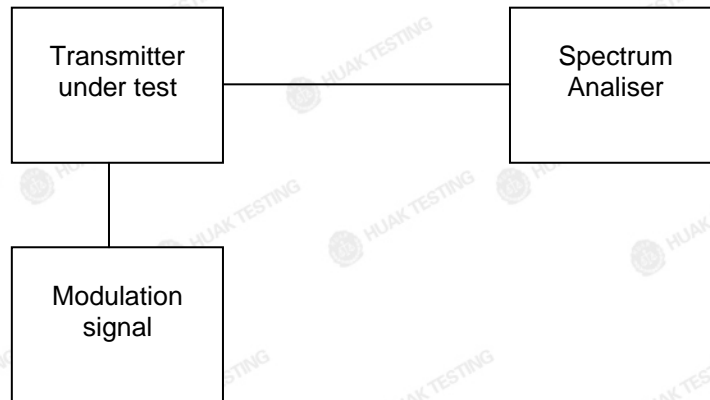
Transient power

Limit

The transient power shall not exceed the values given in Table below:

Absolute offset from centre frequency	RBW <sub>REF</sub>	Peak power limit applicable at measurement points
≤ 400 kHz	1 kHz	0 dBm
> 400 kHz	1 kHz	-27 dBm

Test Configuration



Test Procedure

1. Please refer to ETSI EN 300 220-1 V3.1.1 (2017-02) Sub-clause 4 for the test conditions.
2. Please refer to ETSI EN 300 220-1 V3.1.1 (2017-02) Sub-clause 5.10.3.2 for the measurement method.

Test Results

867.3

Measurement points	Measurement Power (dBm)	Limit	Test result
-0.5 x OCW - 3kHz	-4.37	0	PASS
0.5 x OCW + 3kHz	-4.85	0	PASS
-12.5 kHz or -OCW	-10.39	0	PASS
+12.5 kHz or +OCW	-13.06	0	PASS
-0.5 x OCW - 400kHz	-28.43	-27	PASS
0.5 x OCW + 400kHz	-27.97	-27	PASS
-0.5 x OCW -1200kHz	-44.35	-27	PASS
0.5 x OCW + 1200kHz	-37.91	-27	PASS

868.1

Measurement points	Measurement Power (dBm)	Limit	Test result
-0.5 x OCW - 3kHz	-5.22	0	PASS
0.5 x OCW + 3kHz	-4.16	0	PASS
-12.5 kHz or -OCW	-11.03	0	PASS
+12.5 kHz or +OCW	-12.22	0	PASS
-0.5 x OCW - 400kHz	-28.02	-27	PASS
0.5 x OCW + 400kHz	-27.07	-27	PASS
-0.5 x OCW -1200kHz	-43.44	-27	PASS
0.5 x OCW + 1200kHz	-38.20	-27	PASS

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Measurement points	Measurement Power (dBm)	Limit	Test result
-0.5 x OCW - 3kHz	-4.76	0	PASS
0.5 x OCW + 3kHz	-3.20	0	PASS
-12.5 kHz or -OCW	-10.56	0	PASS
+12.5 kHz or +OCW	-11.58	0	PASS
-0.5 x OCW - 400kHz	-27.75	-27	PASS
0.5 x OCW + 400kHz	-26.48	-27	PASS
-0.5 x OCW -1200kHz	-43.15	-27	PASS
0.5 x OCW + 1200kHz	-39.09	-27	PASS

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**3.2.4 Tx Out of Band Emissions**

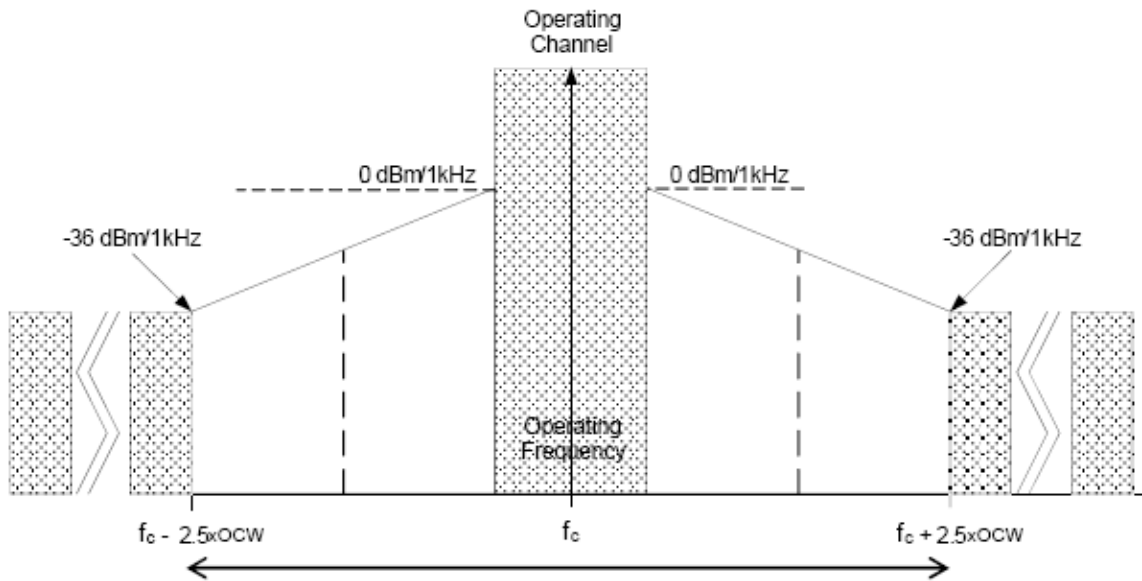
**Limit**

The EUT emissions level in OOB domains for the Operating Channel and the Operational Frequency Band shall be less or equal to Table 15 spectrum mask.

**Table 15: Emission limits in the Out Of Band domains**

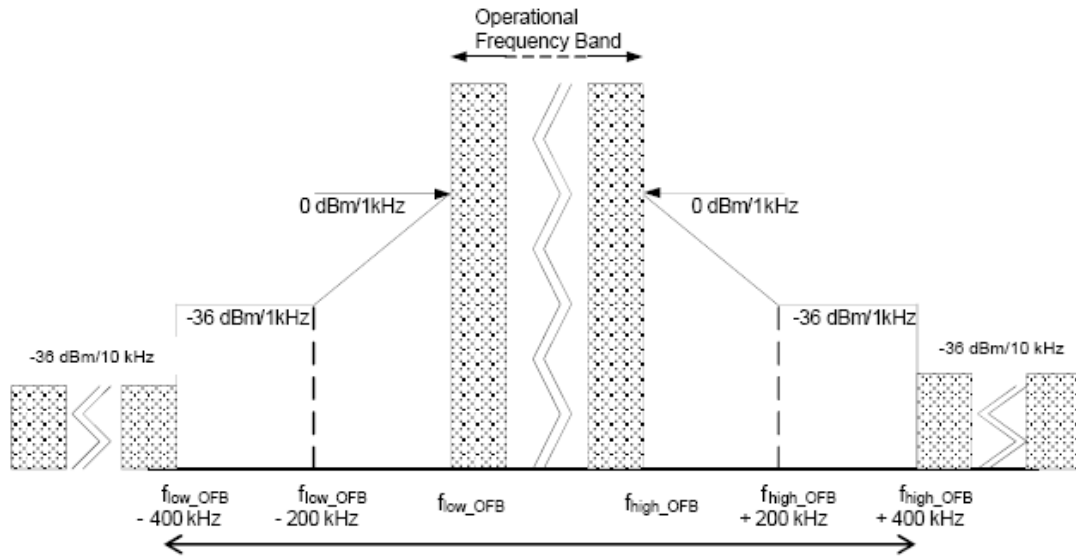
Domain	Frequency Range	RBW <sub>REF</sub>	Max power limit
OOB limits applicable to Operational Frequency Band (See Figure 6)	$f \leq f_{low\_OFB} - 400 \text{ kHz}$	10 kHz	-36 dBm
	$F_{low\_OFB} - 400 \text{ kHz} \leq f \leq f_{low\_OFB} - 200 \text{ kHz}$	1 kHz	-36 dBm
	$f_{low} - 200 \text{ kHz} \leq f < f_{low\_OFB}$	1 kHz	See Figure 6
	$f = f_{low\_OFB}$	1 kHz	0 dBm
	$f = f_{high\_OFB}$	1 kHz	0 dBm
	$F_{high\_OFB} < f \leq f_{high\_OFB} + 200 \text{ kHz}$	1 kHz	See Figure 6
	$F_{high\_OFB} + 200 \text{ kHz} \leq f \leq f_{high\_OFB} + 400 \text{ kHz}$	1 kHz	-36 dBm
OOB limits applicable to Operating Channel (See Figure 5)	$F_{high\_OFB} + 400 \text{ kHz} \leq f$	10 kHz	-36 dBm
	$f = f_c - 2.5 \times \text{OCW}$	1 kHz	-36 dBm
	$f_c - 2.5 \times \text{OCW} \leq f \leq f_c - 0.5 \times \text{OCW}$	1 kHz	See Figure 5
	$f = f_c - 0.5 \times \text{OCW}$	1 kHz	0 dBm
	$f = f_c + 0.5 \times \text{OCW}$	1 kHz	0 dBm
	$f_c + 0.5 \times \text{OCW} \leq f \leq f_c + 2.5 \times \text{OCW}$	1 kHz	See Figure 5
	$f = f_c + 2.5 \times \text{OCW}$	1 kHz	-36 dBm

NOTE: f is the measurement frequency.  
 $f_c$  is the Operating Frequency.  
 $F_{low\_OFB}$  is the lower edge of the Operational Frequency Band.  
 $F_{high\_OFB}$  is the upper edge of the Operational Frequency Band.  
 OCW is the operating channel bandwidth.



**Figure 5: Out Of Band Domain for Operating Channel with reference BW**





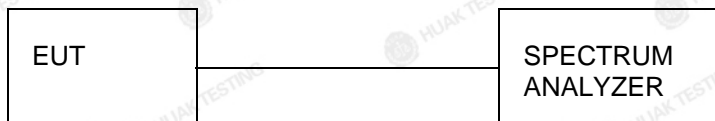
**Figure 6: Out Of Band Domain for Operational Frequency Band with reference BW**

Specific limits apply at frequencies immediately above and below the Operational Frequency Band as shown in Figure 6.

NOTE:  $f_{low\_OFB}$  is the lower edge of the Operational Frequency Band.

$f_{high\_OFB}$  is the upper edge of the Operational Frequency Band.

### Test Configuration



### Test Procedure

1. Please refer to ETSI EN 300 220-1 V3.1.1 (2017-02) Sub-clause 4 for the test conditions.
2. Please refer to ETSI EN 300 220-1 V3.1.1 (2017-02) Sub-clause 5.11.3.2 for the measurement method.



**Test Results**

867.3

Voltage Supply(Vdc)	Measurement Power (dBm)	Limit
f-15kHz	-46.11	0
f+15kHz	-35.80	0
-0.5 x OCW - 400kHz	-67.09	-36
0.5 x OCW + 400kHz	-63.28	-36
-0.5 x OCW -1200kHz	-72.90	-36
0.5 x OCW + 1200kHz	-69.14	-36

868.1

Voltage Supply(Vdc)	Measurement Power (dBm)	Limit
f-15kHz	-45.66	0
f+15kHz	-35.70	0
-0.5 x OCW - 400kHz	-66.82	-36
0.5 x OCW + 400kHz	-63.84	-36
-0.5 x OCW -1200kHz	-73.96	-36
0.5 x OCW + 1200kHz	-68.43	-36

868.3

Voltage Supply(Vdc)	Measurement Power (dBm)	Limit
f-15kHz	-44.78	0
f+15kHz	-35.34	0
-0.5 x OCW - 400kHz	-67.07	-36
0.5 x OCW + 400kHz	-63.09	-36
-0.5 x OCW -1200kHz	-73.69	-36
0.5 x OCW + 1200kHz	-68.07	-36

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**3.2.5 ADJACENT CHANNEL POWER**

**Limit**

**Table 26: Adjacent channel power limits for transmitters with OCW ≤ 25 kHz**

		Adjacent Channel power integrated over 0,7 x OCW	Alternate Adjacent Channel power integrated over 0,7 x OCW
OCW < 20 kHz	Normal test conditions	-20 dBm	-20 dBm
	Extreme test conditions	-15 dBm	-20 dBm
OCW ≥ 20 kHz	Normal test conditions	-37 dBm	-40 dBm
	Extreme test conditions	-32 dBm	-37 dBm

**Test Configuration**



**Test Procedure**

3. Please refer to ETSI EN 300 220-1 V3.1.1 (2017-02) Sub-clause 4 for the test conditions.
4. Please refer to ETSI EN 300 220-1 V3.1.1 (2017-02) Sub-clause 5.11.3.2 for the measurement method.

**Test Results**

N/A

EUT OCB is more zhen 25kHz.

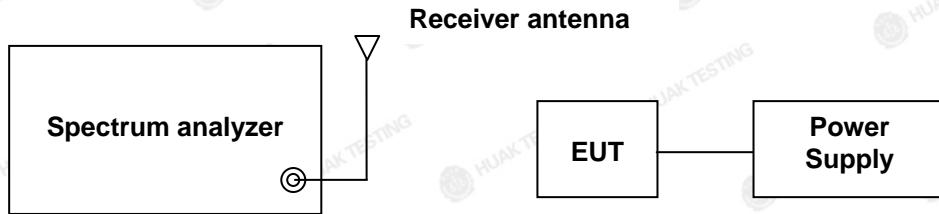
**3.2.6 TX behaviour under Low Voltage Conditions**

**Limit**

The equipment shall either:

- a) remain in the Operating Channel OC without exceeding any applicable limits (e.g. Duty Cycle); or b) reduce its effective radiated power below the Spurious Emission limits without exceeding any applicable limits (e.g. Duty Cycle); or
- c) shut down, (ceasing function); as the voltage falls below the manufacturers declared operating voltage.

**Test Configuration**



**Test Procedure**

- 5. Please refer to ETSI EN 300 220-1 V3.1.1 (2017-02) Sub-clause 4 for the test conditions.
- 6. Please refer to ETSI EN 300 220-1 V3.1.1 (2017-02) Sub-clause 5.12.3.2 for the measurement method.

**Test Results**

867.3

Voltage Supply(V)	Measurement Frequency(MHz)
DC 7.0V	867.295
DC 6.3V	867.294
DC 6.0V	No emission

868.1

Voltage Supply(V)	Measurement Frequency(MHz)
DC 7.0V	868.094
DC 6.3V	868.092
DC 6.0V	No emission

868.3

Voltage Supply(V)	Measurement Frequency(MHz)
DC 7.0V	868.297
DC 6.3V	868.294
DC 6.0V	No emission





### 3.3 Receivers conformance requirements

#### 3.3.1 Blocking

##### Limit

The blocking levels at the specified frequency offsets shall be equal to or greater than the limits show in below tables for each receiver category.

Limits for receiver category 3

Requirement	Limits
	Receiver category 3
Blocking at $\pm 2$ MHz from OC edge $f_{high}$ and $f_{low}$	$\geq -80$ dBm
Blocking at $\pm 10$ MHz from OC edge $f_{high}$ and $f_{low}$	$\geq -60$ dBm
Blocking at $\pm 5$ % of Centre Frequency or 15 MHz, whichever is the greater	$\geq -60$ dBm

Limits for receiver category 2

Requirement	Limits
	Receiver category 2
Blocking at $\pm 2$ MHz from OC edge $f_{high}$ and $f_{low}$	$\geq -69$ dBm
Blocking at $\pm 10$ MHz from OC edge $f_{high}$ and $f_{low}$	$\geq -44$ dBm
Blocking at $\pm 5$ % of Centre Frequency or 15 MHz, whichever is the greater	$\geq -44$ dBm

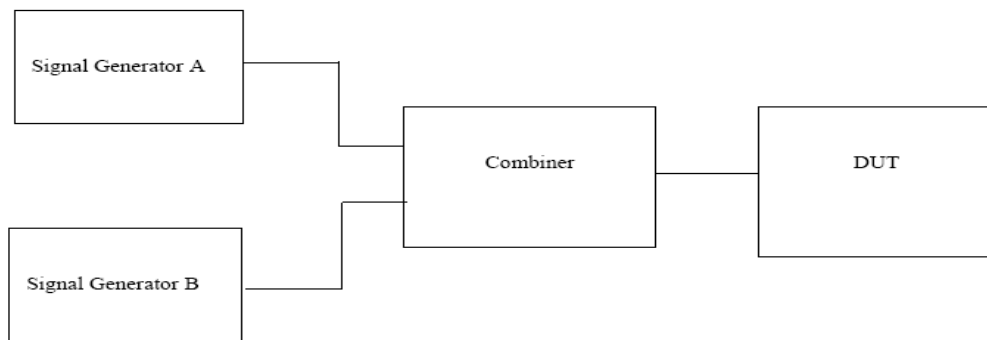
Limits for receiver category 1.5

Requirement	Limits
	Receiver category 1.5
Blocking at $\pm 2$ MHz from OC edge $f_{high}$ and $f_{low}$	$\geq -43$ dBm
Blocking at $\pm 10$ MHz from OC edge $f_{high}$ and $f_{low}$	$\geq -33$ dBm
Blocking at $\pm 5$ % of Centre Frequency or 15 MHz, whichever is the greater	$\geq -33$ dBm

Limits for receiver category 1

Requirement	Limits
	Receiver category 1
Blocking at $\pm 2$ MHz from Centre Frequency	$\geq -20$ dBm
Blocking at $\pm 10$ MHz from Centre Frequency	$\geq -20$ dBm
Blocking at $\pm 5$ % of Centre Frequency or 15 MHz, whichever is the greater	$\geq -20$ dBm

#### Test Configuration



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1. Please refer to ETSI EN 300 220-1 V 2.4.1 (2012-05) Sub-clause 6 for the test conditions.
2. Please refer to ETSI EN 300 220-1 V 2.4.1 (2012-05) Sub-clause 8.4.2 for the measurement method.

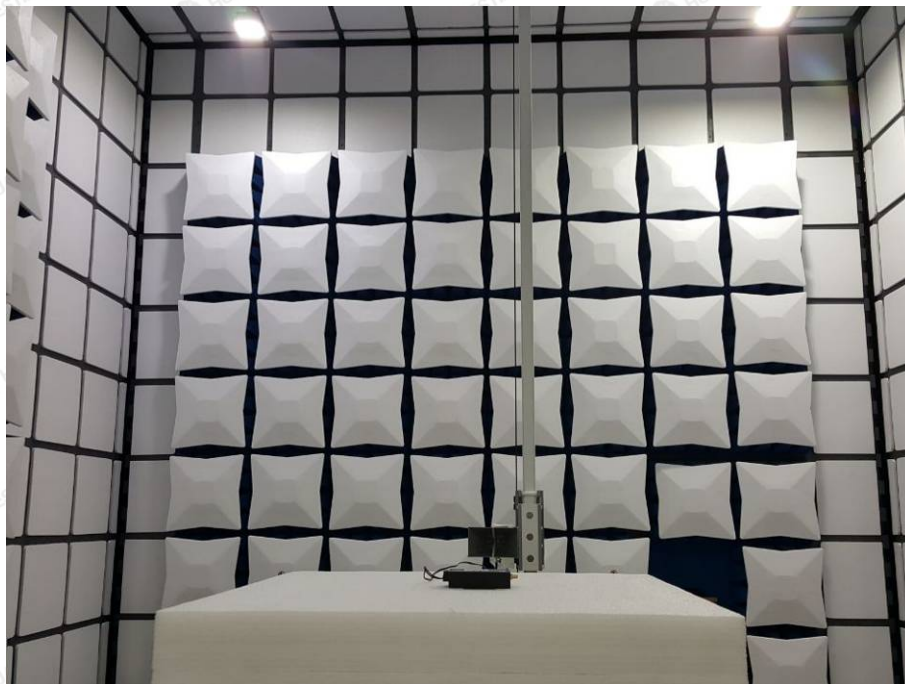
**TEST RESULTS**

N/A

EUT only have transmitter function.



## 4 Test Setup Photos of the EUT



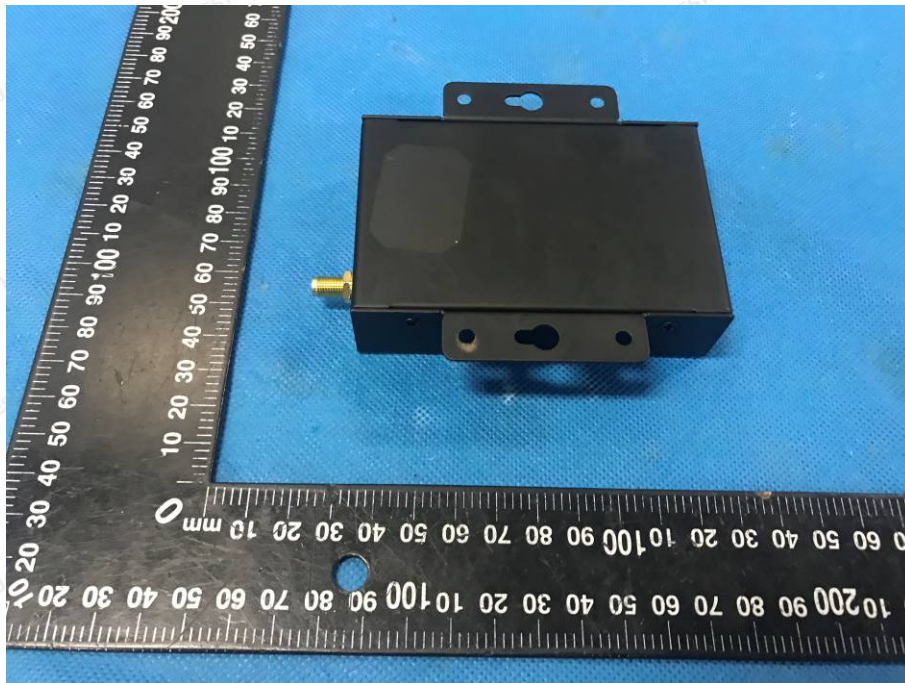
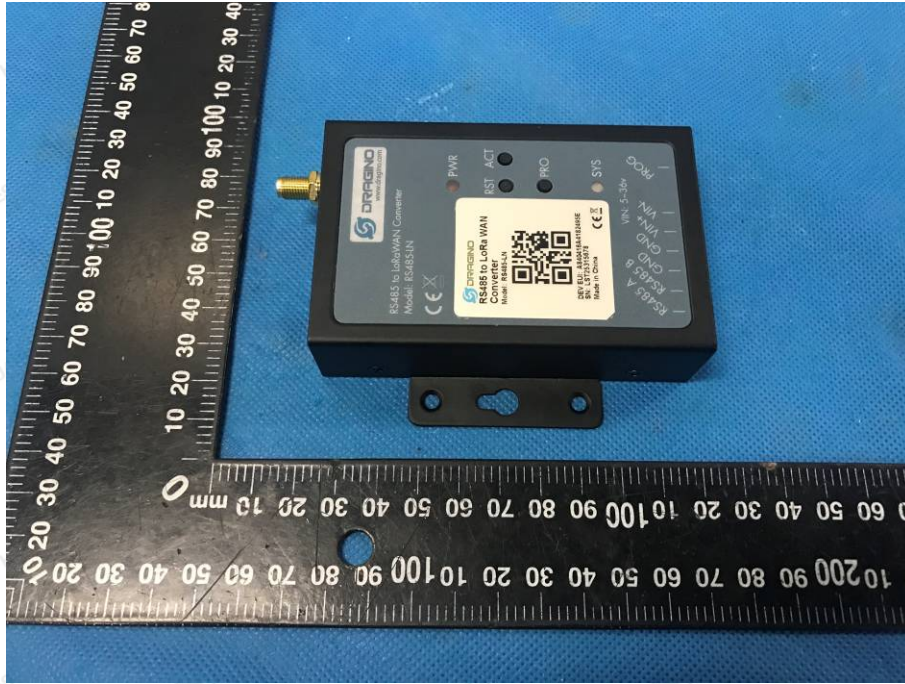
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## 5 External and Internal Photos of the EUT

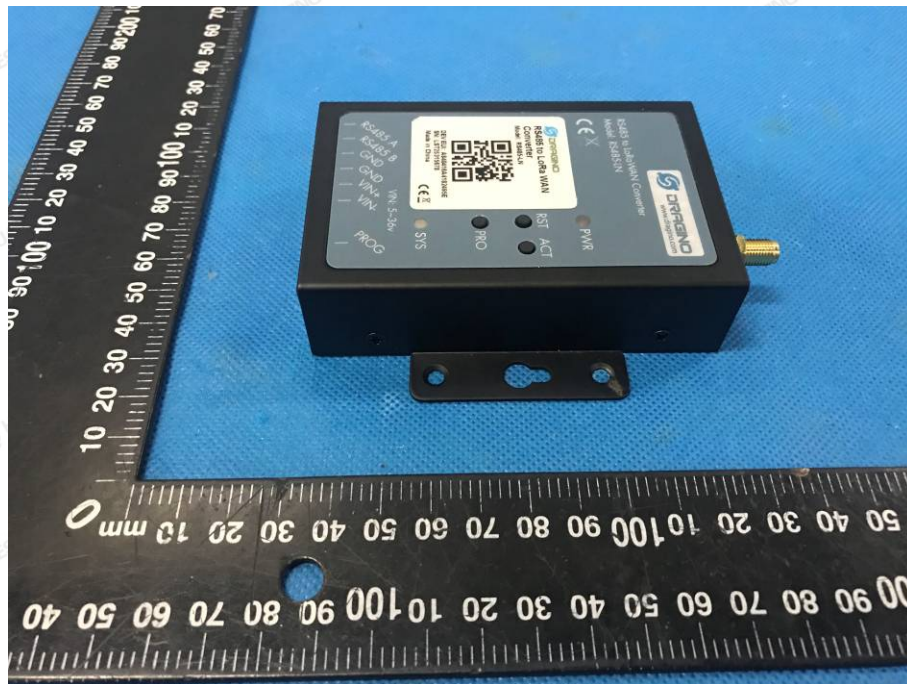


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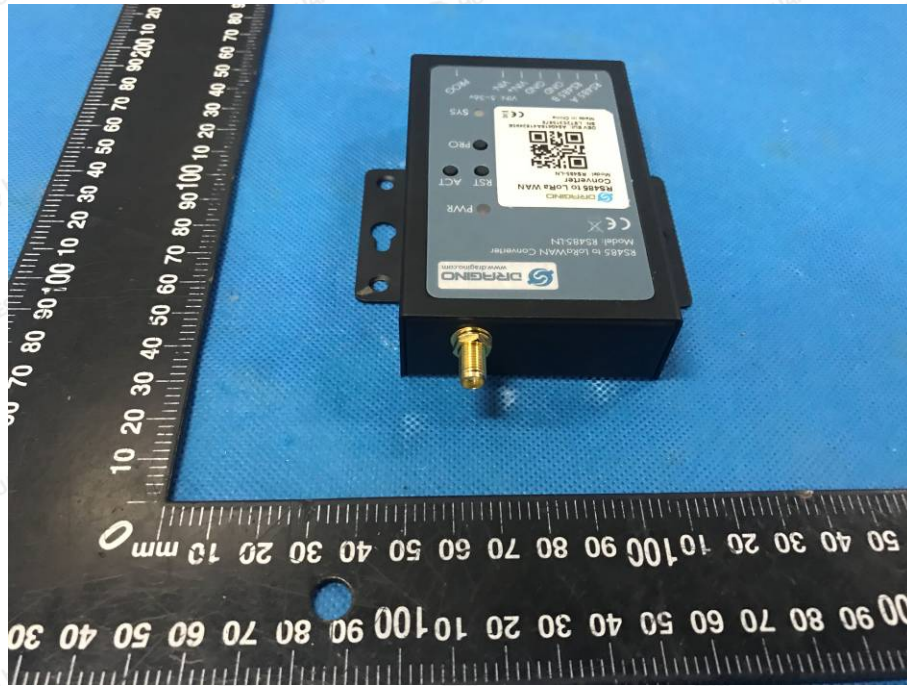




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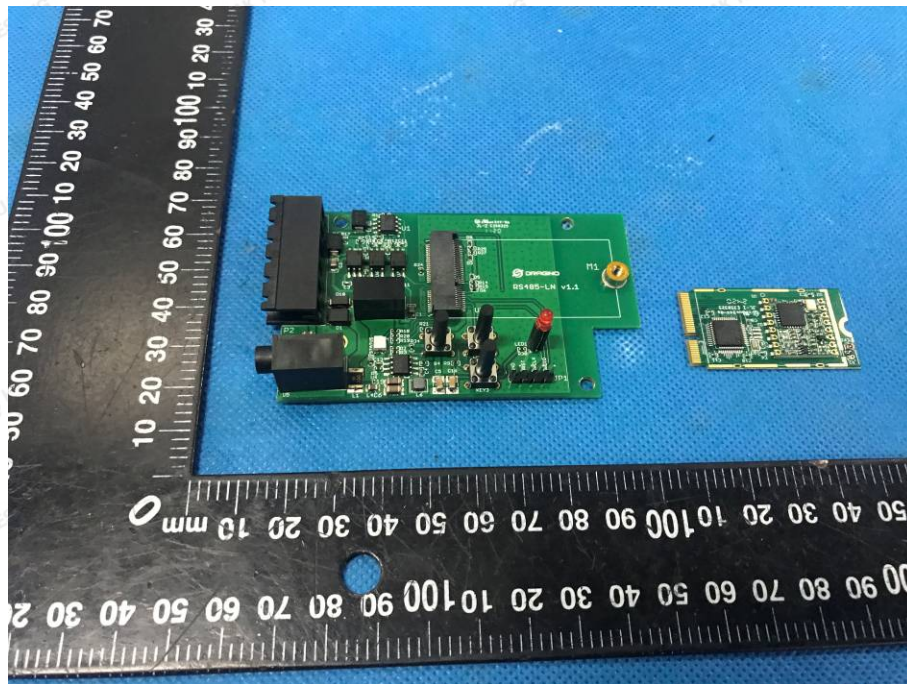
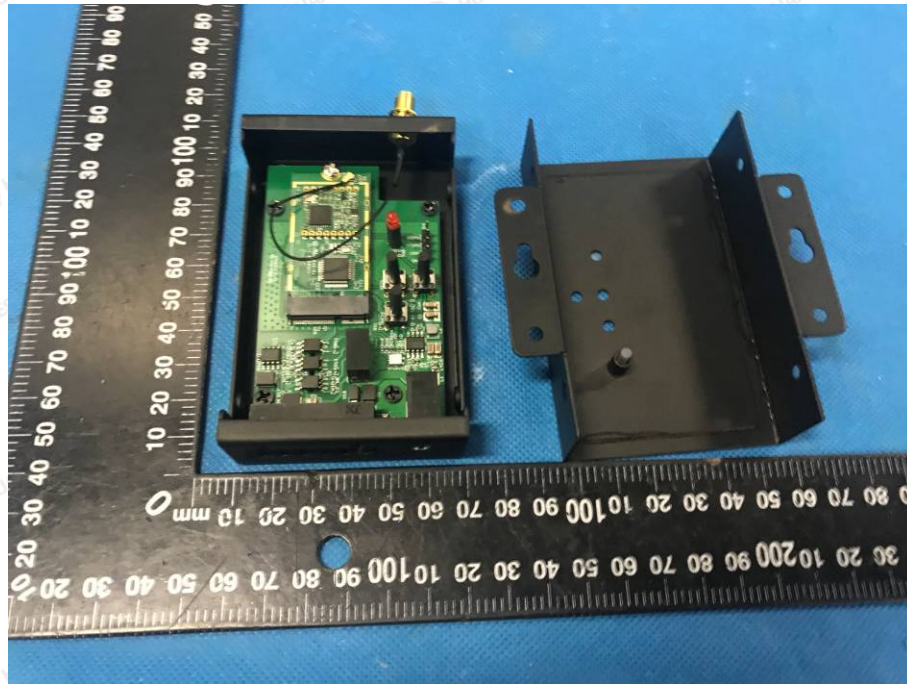


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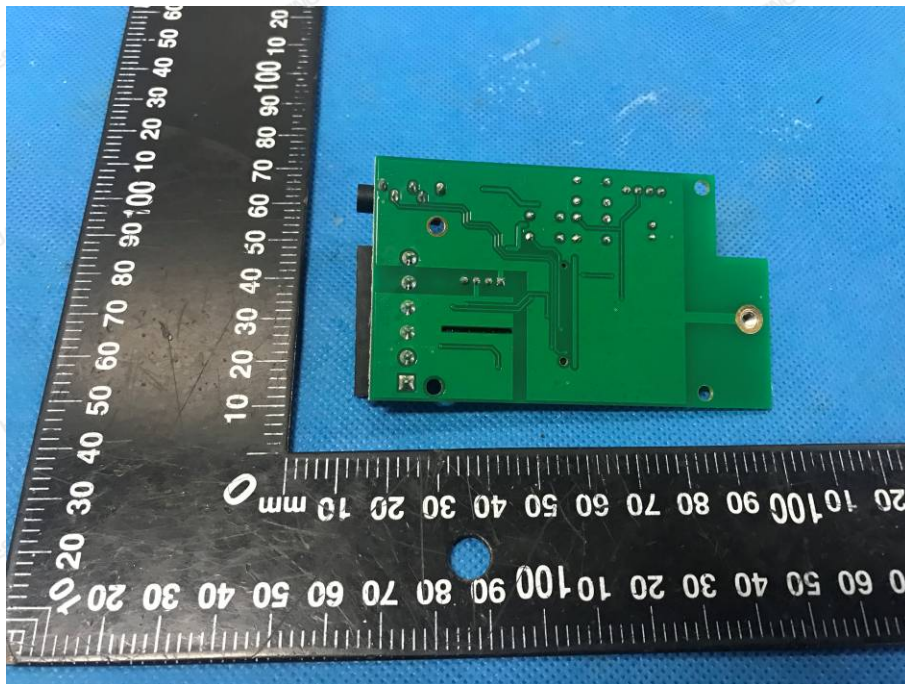


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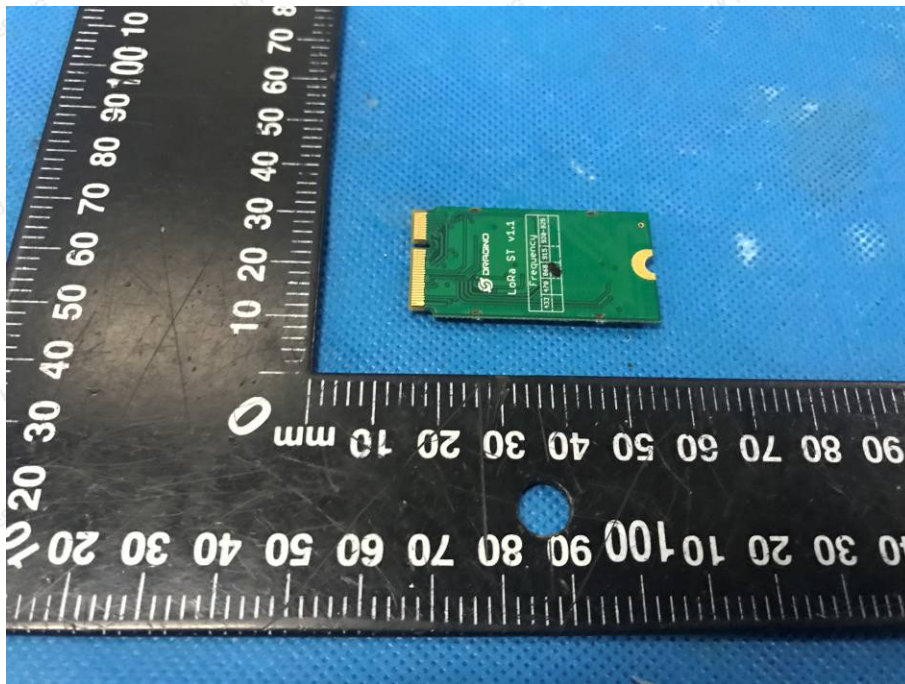
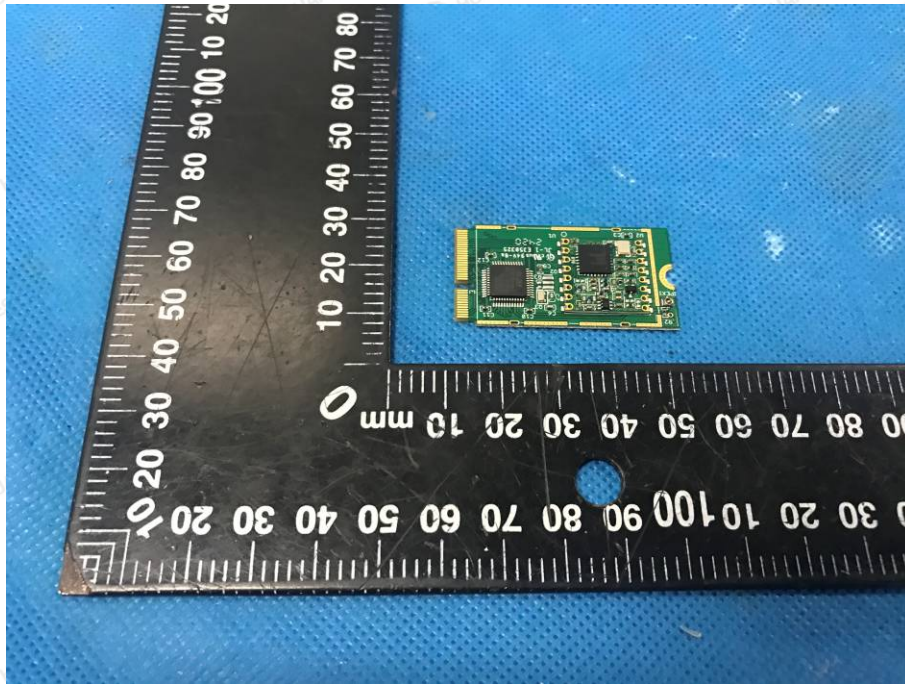


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.....End of Report.....