



TEST REPORT

**ETSI EN 301 489-1 V2.2.3 (2019-11)/
ETSI EN 301 489-3 V2.1.1 (2019-03)/
EN 55032:2015/ EN 55035:2017**

Report Reference No......: **HK2010142886-1ER**

Compiled by
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Approved 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 301 489-1 V2.2.3 (2019-11)/
ETSI EN 301 489-3 V2.1.1 (2019-03)/
EN 55032:2015/ EN 55035:2017**

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

Master TRF.....: Dated 2019-07

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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.....: **PASS**



TEST REPORT

Test Report No. :	HK2010142886-1ER	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, No.8 CaiYunRoad, LongCheng Street, LongGang District, 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

Test Result according to the standards on page 5:	Positive
----------------------------------------------------------	-----------------

The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test result without the written permission of the test laboratory.



**** Modified History ****

Revision	Description	Issued Data	Remark
Revision 1.0	Initial Test Report Release	2020/10/28	Jason Zhou

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



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1. TEST STANDARDS

The tests were performed according to following standards:

[ETSI EN 301 489-1 V2.2.3 \(2019-11\)](#)

ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU

[ETSI EN 301 489-3 V2.1.1 \(2019-03\)](#)

ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 246 GHz; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU

[EN 55032:2015](#) Electromagnetic compatibility of multimedia equipment – Emission Requirements

[EN 55035:2017](#) Electromagnetic compatibility of multimedia equipment – Immunity requirements



2. SUMMARY

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. Product Description

Name of EUT	RS485 to LoRaWAN Converter
Model(s) Number	RS485-LN
List Models	N/A
Difference description	N/A
Hardware version	V2.0
Software version	V2.0
Antenna Type	External Antenna



2.3. Equipment under Test

Power supply system utilised

Power supply voltage	:	<input type="radio"/> 120V / 60 Hz	<input type="radio"/> 115V / 60Hz
		<input type="radio"/> 12 V DC	<input type="radio"/> 24 V DC
		<input checked="" type="radio"/> Other (specified in blank below)	

DC 7-24V

2.4. Short description of the Equipment under Test (EUT)

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



2.5. EUT operation mode

The equipment under test was operated during the measurement under the following conditions:

Test Item	
EMI	
Mode 1	Running
EMS	
Mode 1	Running

2.6. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

- supplied by the manufacturer
- Supplied by the lab

<input checked="" type="radio"/> Power Cable	Length (m) :	/
	Shield :	/
	Detachable :	/

Adapter information
N/A



2.7. Performance level

The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test relative to a performance criteria defined by its manufacturer or the requestor of the test, or agreed between the manufacturer and the purchaser of the product. Examples of functions defined by the manufacturer to be evaluated during testing include, but are not limited to, the following:

- essential operational modes and states;
- tests of all peripheral access(hard disks, floppy disks, printers, keyboard, mouse, etc.);
- quality of software execution
- quality of data display and transmission
- quality of speech transmission

General performance criteria

- based on the used product standard
- based on the declaration of the manufacturer, requestor or purchaser
- performance criteria A for immunity tests with phenomena of a continuous nature;
- performance criteria B for immunity tests with phenomena of a transient nature;
- performance criteria C for immunity tests with power interruptions exceeding a certain time. The equipment shall meet the minimum performance criteria as specified in the following clauses.

Performance table

Table 1: Performance criteria

Criteria	During test	After test
A	Shall operate as intended. May show degradation of performance (see note 1). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance (see note 2). Shall be no loss of function. Shall be no loss of stored data or user programmable functions.
B	May show loss of function (one or more). May show degradation of performance (see note 1). No unintentional transmissions.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (see note 2). Shall be no loss of stored data or user programmable functions.
C	May be loss of function (one or more).	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (see note 2).
<p>NOTE 1: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.</p> <p>NOTE 2: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.</p>		

**Performance criteria for Continuous phenomena applied to Transmitters (CT)**

The performance criteria A shall apply.

Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an ACKnowledgement (ACK) or Not ACKnowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance criteria for Transient phenomena applied to Transmitters (TT)

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration, for which performance criteria C shall apply.

Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an acknowledgement (ACK) or not-acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance criteria for Continuous phenomena applied to Receivers (CR)

The performance criteria A shall apply.

Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

Performance criteria for Transient phenomena applied to Receivers (TR)

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration for which performance criteria C shall apply.

Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

2.8. Modifications

No modifications were implemented to meet testing criteria.



3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen HUAKE Testing Technology Co., Ltd.
1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street,
Bao'an District, Shenzhen, Guangdong, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 (2014) and CISPR Publication 22.

3.2. Environmental conditions

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

Temperature: 15-35 ° C

Humidity: 30-60 %

Atmospheric pressure: 950-1050mbar

3.3. Configuration of Tested System

Fig. 2-1 Configuration of Tested System

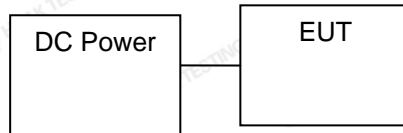


Table 2-1 Equipment Used in Tested System

No.	Product	Manufacturer	Model No.	FCC ID
1	DC Power	/	/	/



3.4. Test Description

ETSI EN 301 489-1/3 requirements		
Radiated Emission	ETSI EN 301 489-1 V2.2.3 (2019-11) Clause 7.1 EN 55032:2015 Annex A.2	PASS
Conducted Emission(AC Mains)	ETSI EN 301 489-1 V2.2.3 (2019-11) Clause 7.1	N/A
Conducted Emission(Telecommunication Ports)	ETSI EN 301 489-1 V2.2.3 (2019-11) Clause 7.1 EN 55032:2015 Annex A.3	N/A
Harmonic Current Emissions	ETSI EN 301 489-1 V2.2.3 (2019-11) Clause 7.1 EN IEC 61000-3-2:2019	N/A
Voltage Fluctuations and Flicker	ETSI EN 301 489-1 V2.2.3 (2019-11) Clause 7.1 EN IEC 61000-3-3:2013 + A1:2019	N/A
Electrostatic Discharge	ETSI EN 301 489-1 V2.2.3 (2019-11) Clause 7.2	PASS
RF Electromagnetic Field	ETSI EN 301 489-1 V2.2.3 (2019-11) Clause 7.2	PASS
Fast Transients Common Mode	ETSI EN 301 489-1 V2.2.3 (2019-11) Clause 7.2	N/A
RF Common Mode 0,15 MHz to 80 MHz	ETSI EN 301 489-1 V2.2.3 (2019-11) Clause 7.2	N/A
Transients and Surges	ETSI EN 301 489-1 V2.2.3 (2019-11) Clause 7.2	N/A
Voltage Dips and Interruptions	ETSI EN 301 489-1 V2.2.3 (2019-11) Clause 7.2	N/A
Surges, Line to Line and Line to Ground	ETSI EN 301 489-1 V2.2.3 (2019-11) Clause 7.2	N/A

Remark: The measurement uncertainty is not included in the test result.

3.5. 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 Dongguan Dongdian Testing Service Co.,Ltd quality system acc. 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 Dongguan Dongdian Testing Service Co.,Ltd is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	3.90dB	(1)
Radiated Emission	1~18GHz	4.28dB	(1)
Radiated Emission	18-40GHz	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.

**3.6. Equipments Used during the Test****CONDUCTED EMISSION**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	LISN	R&S	ENV216	HKE-002	Jun. 18, 2020	Jun. 17, 2021	1 year
2	LISN	R&S	ENV216	HKE-029	Jun. 18, 2020	Jun. 17, 2021	1 year
3	EMI Test Receiver	R&S	ESCI-7	HKE-010	Jun. 18, 2020	Jun. 17, 2021	1 year

RADIATED TEST SITE

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Broadband antenna	Schwarzbeck	VULB 9163	HKE-012	Jun. 18, 2020	Jun. 17, 2021	1 year
2	EMI Test Receiver	R&S	ESCI-7	HKE-010	Jun. 18, 2020	Jun. 17, 2021	1 year
3	Spectrum analyzer	Agilent	N9020A	HKE-048	Jun. 18, 2020	Jun. 17, 2021	1 year
4	Horn antenna	Schwarzbeck	9120D	HKE-013	Jun. 18, 2020	Jun. 17, 2021	1 year
5	Preamplifier	EMCI	EMC051845SE	HKE-015	Jun. 18, 2020	Jun. 17, 2021	1 year
6	Preamplifier	Agilent	83051A	HKE-016	Jun. 18, 2020	Jun. 17, 2021	1 year
7	Position controller	Taiwan MF	MF7802	HKE-011	Jun. 18, 2020	Jun. 17, 2021	1 year

HARMONICS AND FILCK

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Harmonic flicker tester	California Instruments	AC2000A	HKE-037	Jun. 18, 2020	Jun. 17, 2021	1 year

ESD

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	ESD device	Schloder	SESD 216	HKE-023	Jun. 18, 2020	Jun. 17, 2021	1 year

RS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Signal generator	Agilent	83630A	HKE-028	Jun. 18, 2020	Jun. 17, 2021	1 year
2	Hf antenna	Schwarzbeck	LB-180400-KF	HKE-031	Jun. 18, 2020	Jun. 17, 2021	1 year
3	Power amplifier	R&S	NTWPA-1060040E	HKE-035	Jun. 18, 2020	Jun. 17, 2021	1 year
4	Broadband antenna	Schwarzbeck	VULB 9163	HKE-012	Jun. 18, 2020	Jun. 17, 2021	1 year
5	Power amplifier	R&S	5225F	HKE-058	Jun. 18, 2020	Jun. 17, 2021	1 year

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SURGE, EFT/BURST, VOLTAGE INTERRUPTION/DIPS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Full-featured immunity tester	HTEC	HV1P16T	HKE-017	Jun. 18, 2020	Jun. 17, 2021	1 year
2	Group pulse coupling clamp	HTEC	H3C	HKE-024	Jun. 18, 2020	Jun. 17, 2021	1 year

INJECTION CURRENT

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Sensitivity Test System	LIONCEL	RIS-6091	HKE-110	Jun. 18, 2020	Jun. 17, 2021	1 year
2	Magnetic clamp	LIONCEL	CDN-M3-16	HKE-111	Jun. 18, 2020	Jun. 17, 2021	1 year

PFMF

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Power frequency magnetic field testing system	LIONCEL	PMF-801C-C	HKE-115	Jun. 18, 2020	Jun. 17, 2021	1 year

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4. TEST CONDITIONS AND RESULTS

4.1. REQUIREMENTS

4.1.1. Radiated Emission

LIMIT

Please refer to ETSI EN 301 489-1 Clause 8.2.3

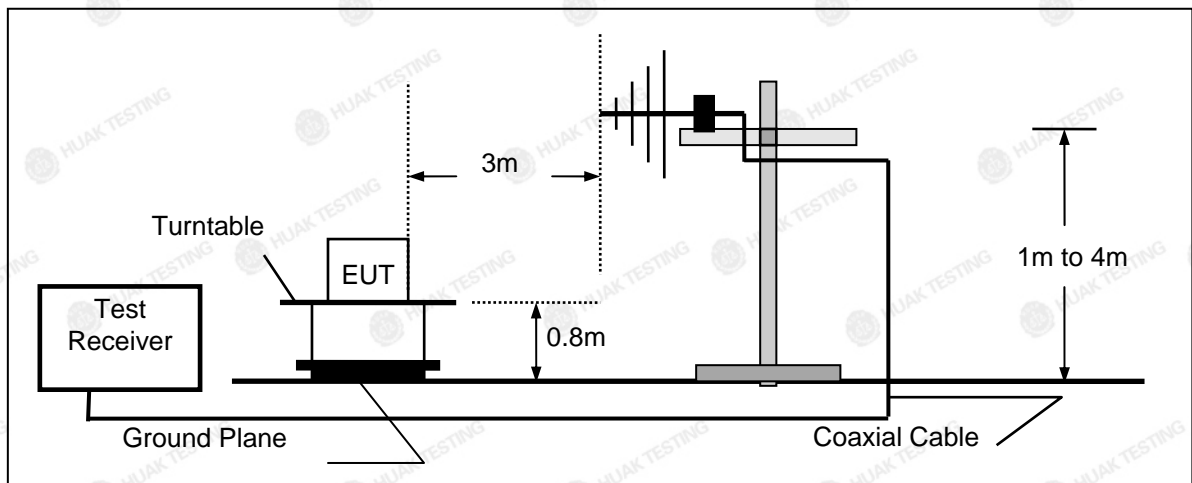
The ancillary equipment shall meet the class B limits given in CENELEC EN 55032 [1], annex A tables A.4 and A.5.

Alternatively, for ancillary equipment intended to be used exclusively in an industrial environment or telecommunication centres, the class A limits given in CENELEC EN 55032 [1], annex A tables A.2 and A.3 may be used.

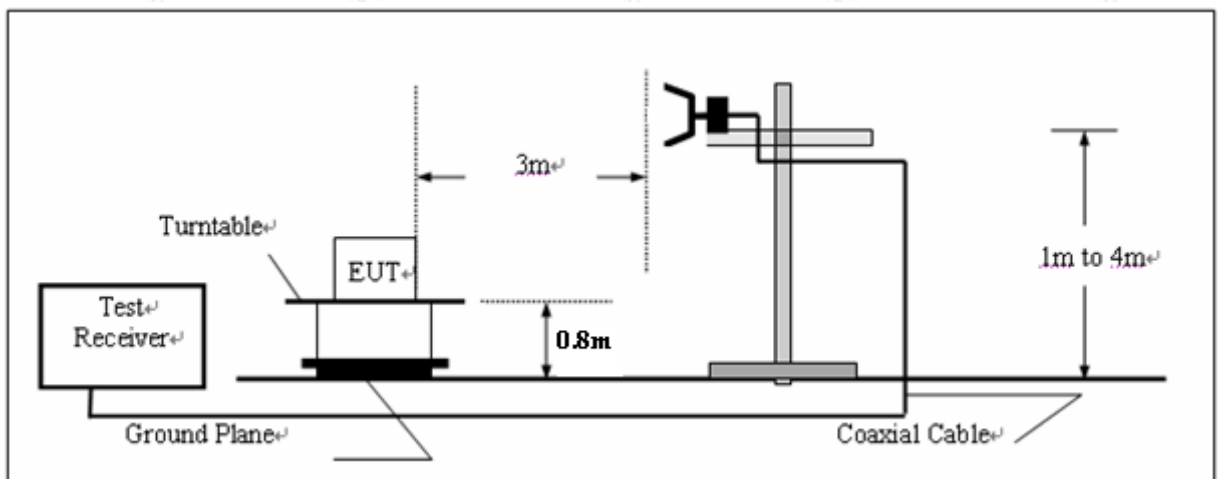
If EUT is also a FM Receiver, it shall meet CENELEC EN 55032 [3], annex A tables A.6

TEST CONFIGURATION

(a) Radiated Emission Test Set-Up, Frequency below 1000MHz



(b) Radiated Emission Test Set-Up, Frequency above 1000MHz





TEST PROCEDURE

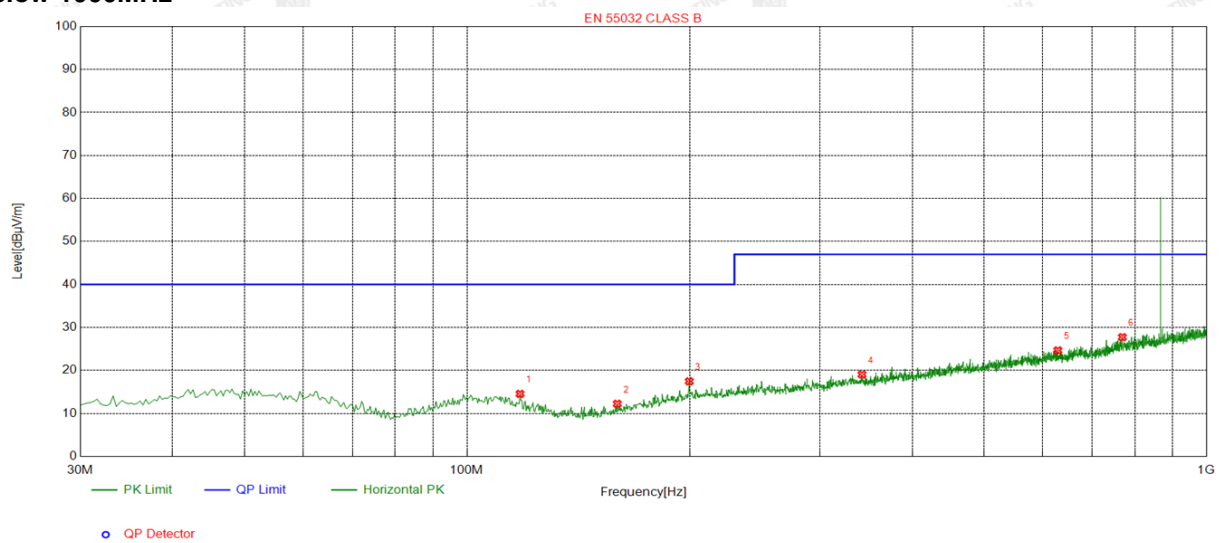
Please refer to ETSI EN 301 489-1 Clause 8.2.2 and The test method shall be in accordance with CENELEC EN 55032 [1], annex A.2. for the measurement methods.

Climatic conditions

- ambient temperature : 25 °C
relative humidity: 55%
atmospheric pressure: 960 mbar

TEST RESULTS

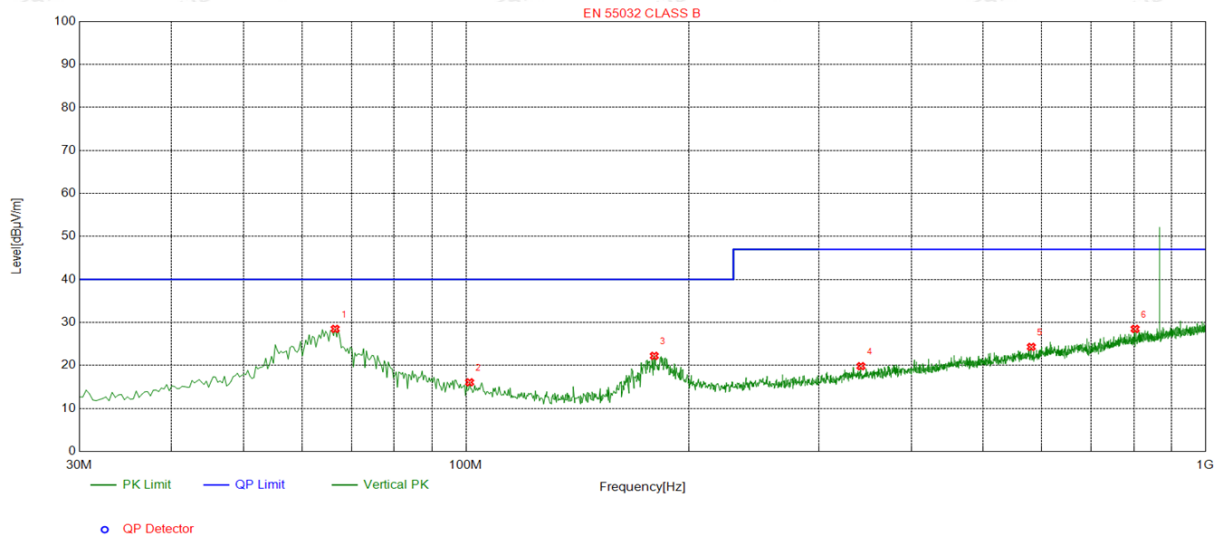
Below 1000MHz



Suspected List

Table with 10 columns: NO., Freq. [MHz], Factor [dB], Reading [dBµV/m], Level [dBµV/m], Limit [dBµV/m], Margin [dB], Height [cm], Angle [°], Polarity. Contains 6 rows of data.

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Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBµV/m]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	66.5489	-16.80	45.29	28.49	40.00	11.51	100	67	Vertical
2	101.1571	-15.40	31.46	16.06	40.00	23.94	100	19	Vertical
3	179.7533	-16.87	39.09	22.22	40.00	17.78	100	173	Vertical
4	342.1207	-11.65	31.46	19.81	47.00	27.19	100	23	Vertical
5	581.4672	-6.62	30.92	24.30	47.00	22.70	100	111	Vertical
6	803.3478	-3.07	31.55	28.48	47.00	18.52	100	342	Vertical

Remark:

Factor = Cable loss + Antenna factor – Pre-amplifier; Level = Reading + Factor; Margin = Limit – Level;

Radiated Emission From 1 GHz to 6 GHz

Frequency (MHz)	PK (dBuV/)	Average (dBuV/m)	MaxPeak Limit (dBuV/m)	Limit Average (dBuV/m)	Margin PK (dB)	Margin AC (dB)	Pol	Azimuth (deg)
1843.63	47.14	---	70	50	22.86	---	V	107
1904.30	44.06	---	70	50	25.94	---	H	163
2262.62	40.43	---	70	50	29.57	---	V	212
2272.28	47.77	---	70	50	22.23	---	H	210
3832.91	48.81	---	74	54	25.19	---	V	249
3927.18	45.97	---	74	54	28.03	---	H	199

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4.1.2. Conducted Emission (AC Mains)

LIMIT

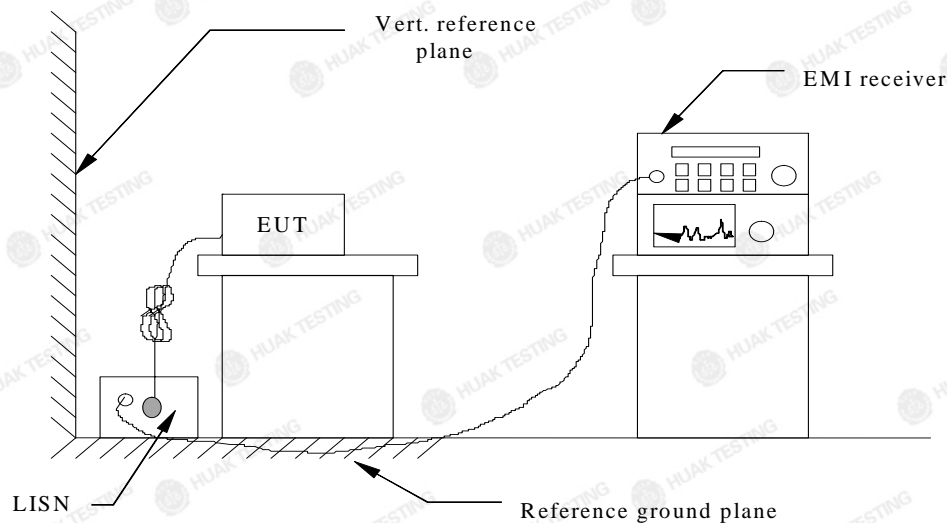
Please refer to ETSI EN 301 489-1 Clause 8.4.3

The equipment shall meet the class B limits given in CENELEC EN 55032 [1], annex A table A.10.

Alternatively, for equipment intended to be used in an industrial environment or a telecommunication centre, the class A limits given in CENELEC EN 55032 [1], annex A table A.9 can be used.

If EUT is also a FM Receiver, it shall meet CENELEC EN 55032 [3], annex A tables A.13

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 8.4.3 and EN 55032 Clause 5 for the measurement methods.

Climatic conditions

- ambient temperature : 25 °C
- relative humidity: 55%
- atmospheric pressure: 960 mbar

TEST RESULTS

EUT is test by DC power supply, so this test report is not applicable.

4.1.3. Conducted Emission (Telecommunication Ports)

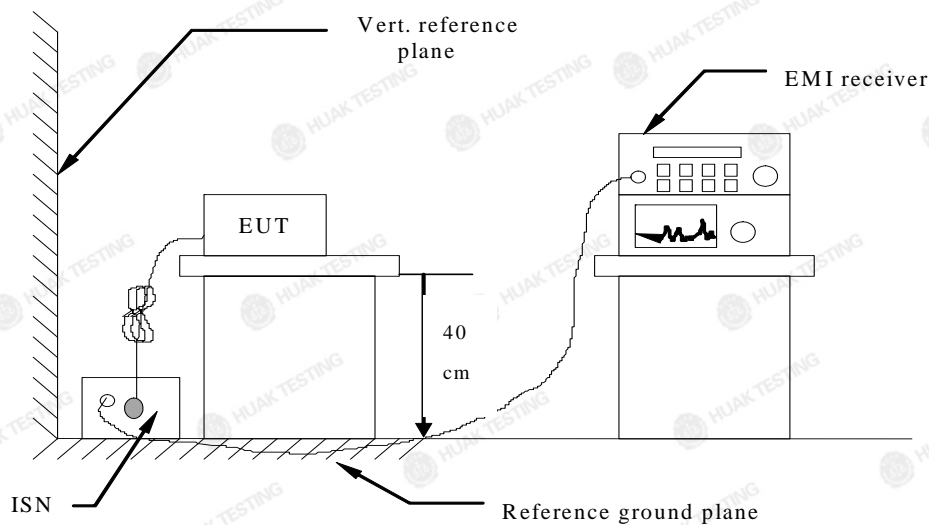
LIMIT

Please refer to ETSI EN 301 489-1 Clause 8.7.3

The wired network ports shall meet the class B limits given in CENELEC EN 55032 [1], annex A table A.12.

Alternatively, for equipment intended to be used exclusively in an industrial environment or a telecommunication centre, the class A limits given in CENELEC EN 55032 [1] annex A table A.11 can be used.

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 8.7.2 and The test method shall be in accordance with CENELEC EN 55032 [1], annex A.3. for the measurement methods.

Climatic conditions

- ambient temperature : 25 °C
- relative humidity: 55%
- atmospheric pressure: 960 mbar

TEST RESULTS

Not applicable

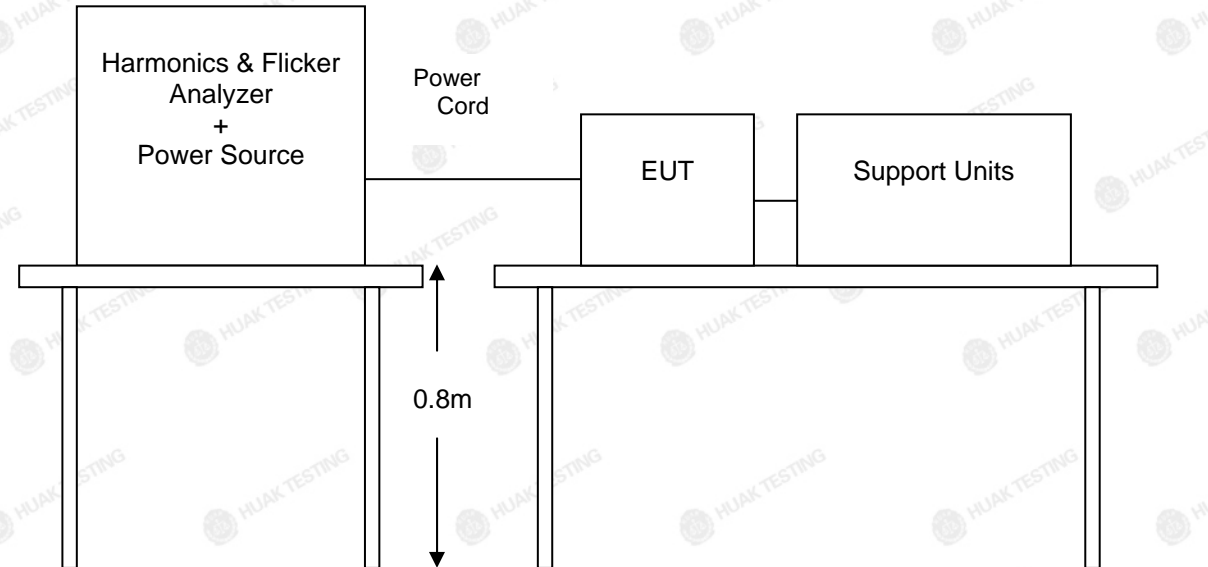


4.1.4. Harmonic Current Emission

LIMIT

Please refer to EN 61000-3-2

TEST CONFIGURATION



TEST PROCEDURE

Please refer to EN 61000-3-2 for the measurement methods.

Climatic conditions

- ambient temperature : 25 °C
- relative humidity: 55%
- atmospheric pressure: 960 mbar

TEST RESULTS

EUT is test by DC power supply, so this test report is not applicable.



4.1.5. Voltage Fluctuation and Flicker

LIMIT

Please refer to EN 61000-3-3

TEST CONFIGURATION

Same as the configuration of the Harmonic Current Emission.

TEST PROCEDURE

Please refer to EN 61000-3-3 for the measurement methods.

Climatic conditions

- ambient temperature : 25 °C
- relative humidity: 55%
- atmospheric pressure: 960 mbar

TEST RESULTS

EUT is test by DC power supply, so this test report is not applicable.

4.1.6. Electrostatic Discharge

LIMIT

Please refer to EN 61000-4-2

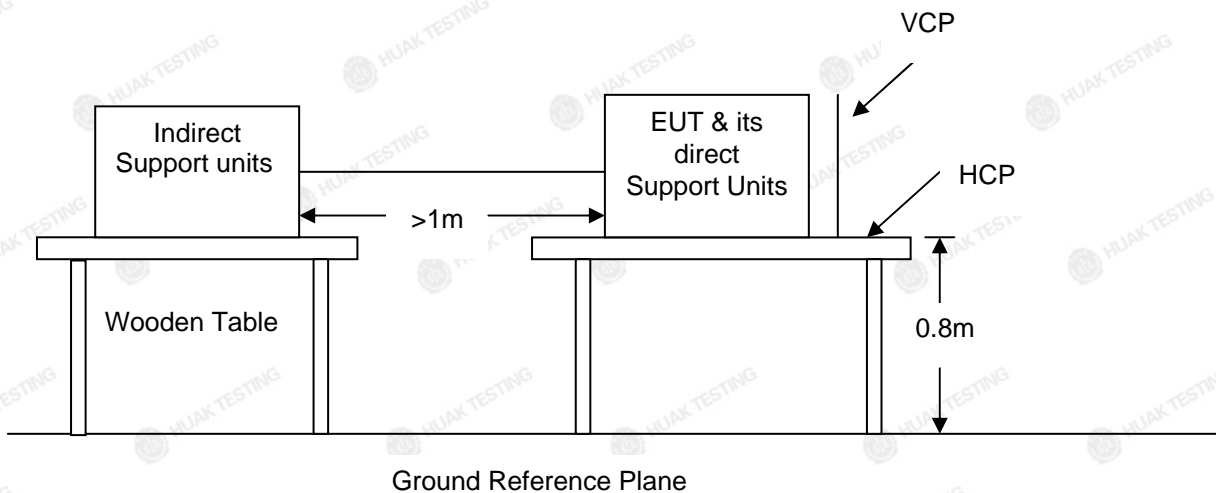
SEVERITY LEVELS OF ELECTROSTATIC DISCHARGE

Test level: Contact Discharge at $\pm 2KV, \pm 4KV$ Air Discharge at $\pm 2KV, \pm 4KV, \pm 8KV$

Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1	2	2
2	4	4
3	6	8
4	8	15
X	Special	Special

Performance criterion: **B**

Test Configuration



Test procedure

Please refer to ETSI EN 301 489-1 Clause 9.3.2 and EN 61000-4-2 for the measurement methods.

If EUT is also a FM Receiver, it shall refer to EN 55020:2007/A11:2011 Clause 5.9 for the measurement methods.



Contact Discharge:

The ESD generator is held perpendicular to the surface to which the discharge is applied and the tip of the discharge electrode touch the surface of EUT. Then turn the discharge switch. The generator is then re-triggered for a new single discharge and repeated at least 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed

Air Discharge:

Air discharge is used where contact discharge can't be applied. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated at least 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

Indirect discharge for horizontal coupling plane:

At least 10 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT.

Indirect discharge for vertical coupling plane:

At least 10 single discharges shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

Climatic conditions

- ambient temperature : 25°C
- relative humidity: 55%
- atmospheric pressure: 960 mbar

Description of the Electrostatic Discharges (ESD)

Point of Discharge	Applied Voltage (KV)	Total No. of Discharge (Each Point)	Results	Criteria Level	Remark
Air Test Point	±2	20	Pass	B	-
	±4	20	Pass	B	-
	±8	20	Pass	B	-
Contact Discharge Test Points	±2	50	Pass	B	
	±4	50	Pass	B	
VCP (4 sides)	±2	50	Pass	B	-
	±4	50	Pass	B	-
HCP (4 sides)	±2	50	Pass	B	-
	±4	50	Pass	B	-

The requirements are **Fulfilled**

Performance Criterion: **B**

Remarks: The ancillary equipment's specification for an acceptable level of performance or degradation of performance during and/or after the ESD tests.



Contact Discharge		Air Discharge	
<input type="radio"/>	Metallic Screws	<input type="radio"/>	Plastic Screws
<input type="radio"/>	Metallic Case	<input checked="" type="radio"/>	Plastic Case(gap)
<input checked="" type="radio"/>	Metallic Connect ports	<input checked="" type="radio"/>	Plastic Connect Ports
<input checked="" type="radio"/>	Metallic Junctions	<input checked="" type="radio"/>	Plastic Junctions
<input type="radio"/>	Others (Antenna Port)	<input type="radio"/>	Others

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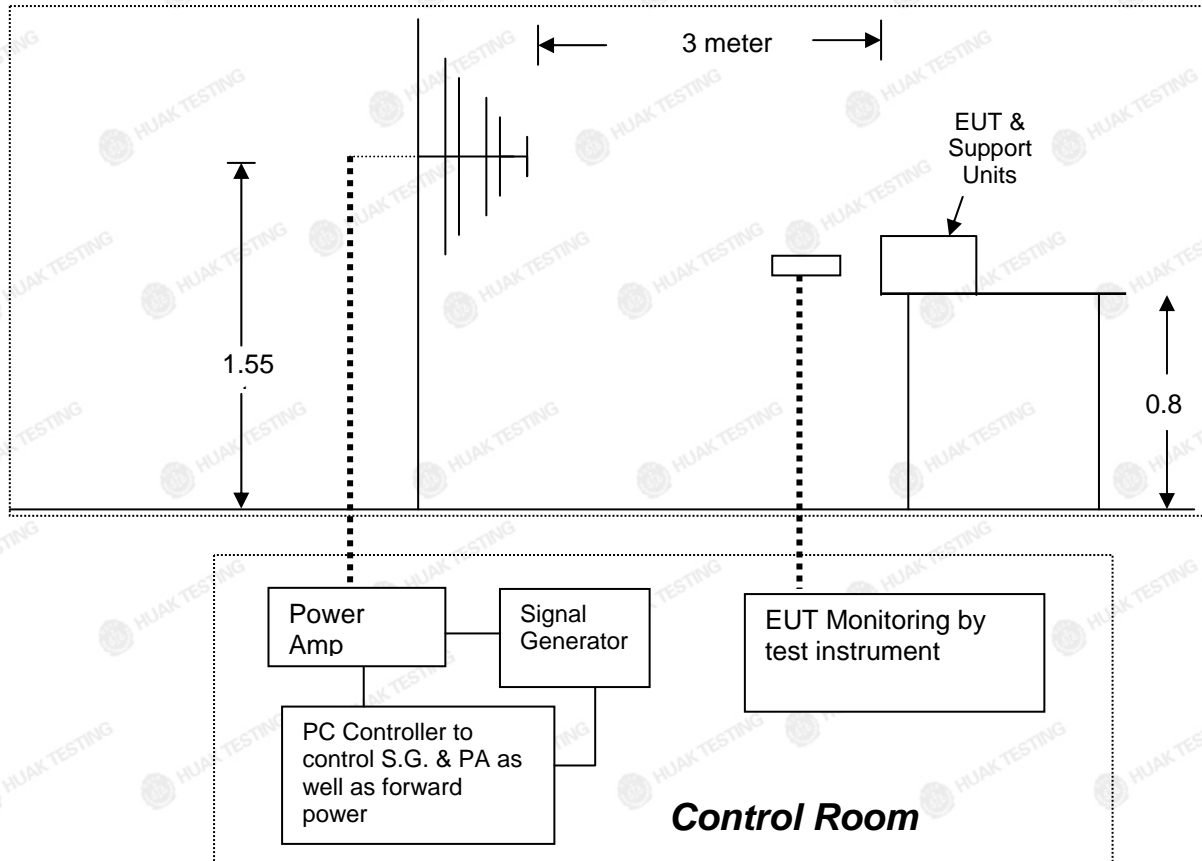
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4.1.7. RF Electromagnetic Field

LIMIT

Please refer to EN 61000-4-3

Test Configuration



Test Levels of RF Electromagnetic Field

Test level: RF Field Strength: 3V/m

Level	RF Field Strength(V/m)
1	1
2	3
3	10
X	Special

Performance criterion: **A**

TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.2.2 and EN 61000-4-3 for the measurement methods.



Climatic conditions

- ambient temperature : 25 °C
- relative humidity: 55%
- atmospheric pressure: 960 mbar

TEST RESULTS

	Freq. Range (MHz)	Field	Modulation	Polarity	Position	Mode	Result (Pass/Fail)
1	80-6000	3V/m	Yes	H / V	Front	Normal Operating	Pass
	1800(±1%), 2600(±1%), 3500(±1%), 5000(±1%)	3V/m	Yes	H / V	Front		Pass
2	80-6000	3V/m	Yes	H / V	Right	Normal Operating	Pass
	1800(±1%), 2600(±1%), 3500(±1%), 5000(±1%)	3V/m	Yes	H / V	Right		Pass
3	80-6000	3V/m	Yes	H / V	Back	Normal Operating	Pass
	1800(±1%), 2600(±1%), 3500(±1%), 5000(±1%)	3V/m	Yes	H / V	Back		Pass
4	80-6000	3V/m	Yes	H / V	Left	Normal Operating	Pass
	1800(±1%), 2600(±1%), 3500(±1%), 5000(±1%)	3V/m	Yes	H / V	Left		Pass

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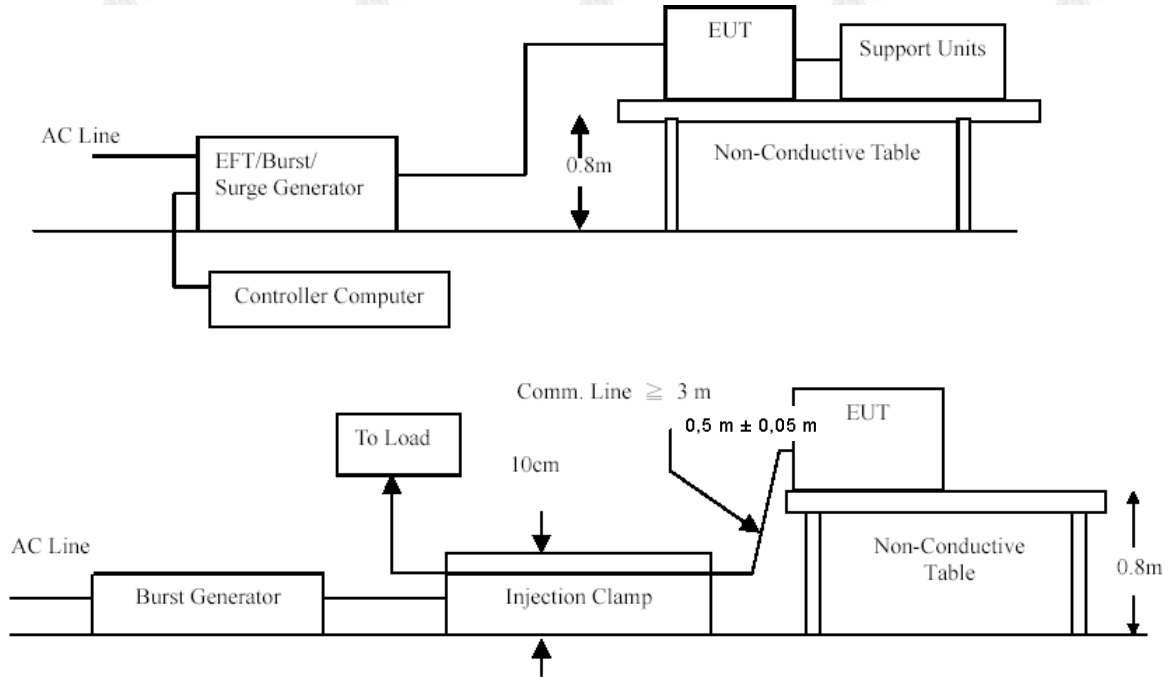


4.1.8. Fast Transients Common Mode

LIMIT

Please refer to EN 61000-4-4

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.4.2 and EN 61000-4-4 for the measurement methods.

If EUT is also a FM Receiver, it shall refer to EN 55020:2007/A11:2011 Clause 5.6 for the measurement methods.

Climatic conditions

- ambient temperature : 25 °C
- relative humidity: 55%
- atmospheric pressure: 960 mbar

TEST RESULTS

EUT is test by DC power supply, so this test report is not applicable.

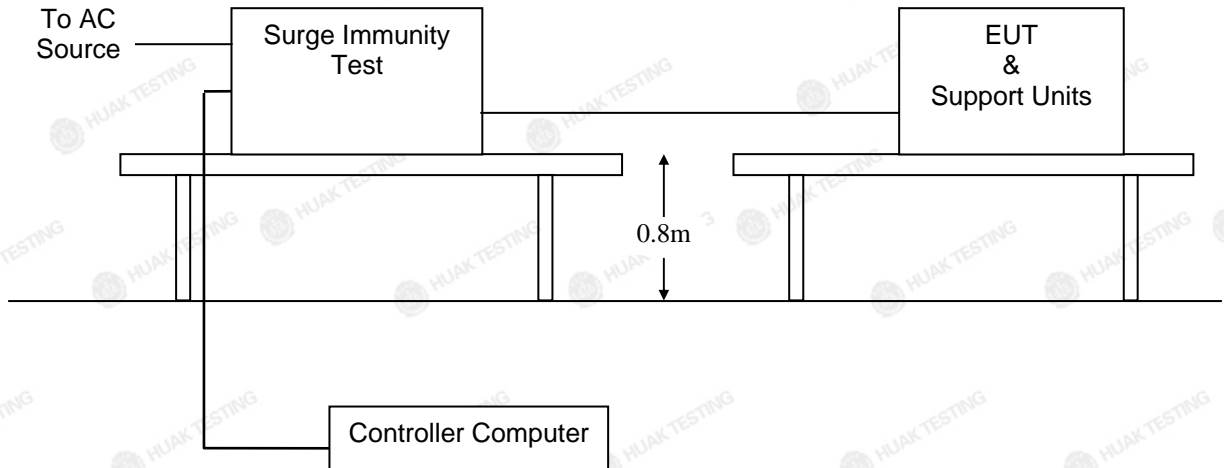


4.1.9. Surges, Line to Line and Line to Ground

LIMIT

Please refer to EN 61000-4-5

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.4.2 and EN 61000-4-5 for the measurement methods.

Climatic conditions

- ambient temperature : 25 °C
- relative humidity: 55%
- atmospheric pressure: 960 mbar

TEST RESULTS

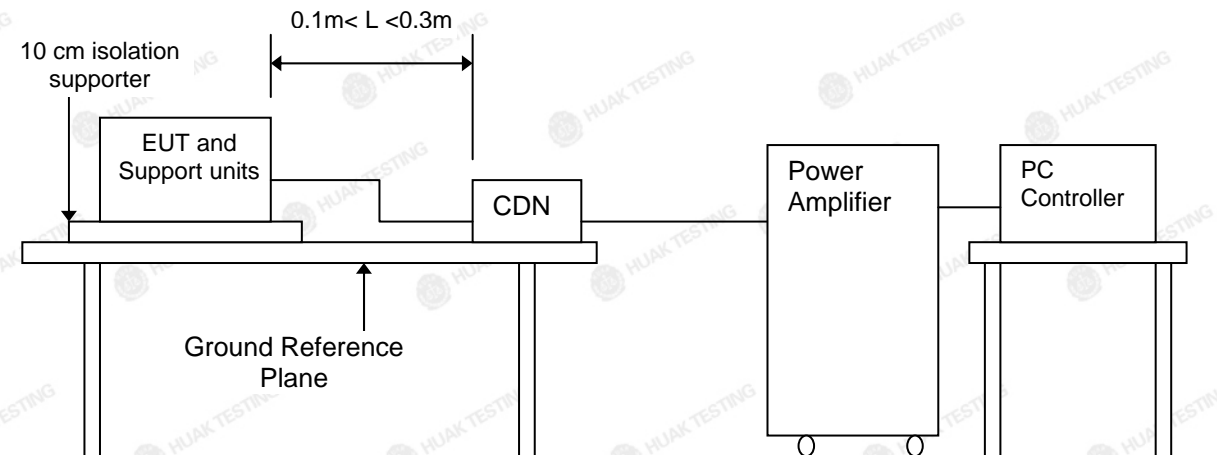
EUT is test by DC power supply, so this test report is not applicable.

4.1.10. RF- Common Mode 0.15MHz to 80MHz

LIMIT

Please refer to EN 61000-4-6

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.5.2 and EN 61000-4-6 for the measurement methods.

Climatic conditions

- ambient temperature : 25 °C
- relative humidity: 55%
- atmospheric pressure: 960 mbar

TEST RESULTS

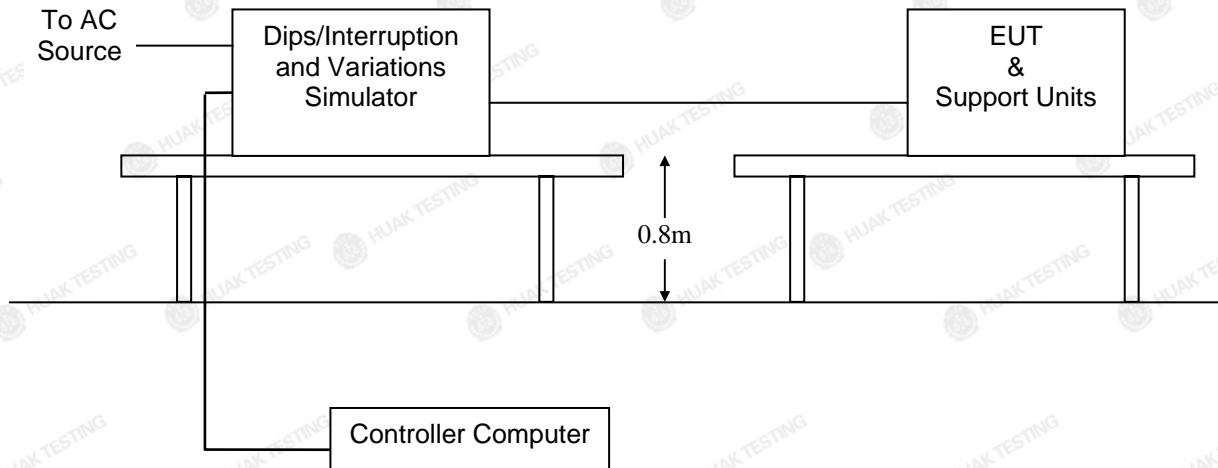
EUT is test by DC power supply, so this test report is not applicable.

4.1.11. Voltage Dips and Interruptions

LIMIT

Please refer to EN 61000-4-11

TEST CONFIGURATION



TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.7.2 and EN 61000-4-11 for the measurement methods

Climatic conditions

- ambient temperature : 25 °C
- relative humidity: 55%
- atmospheric pressure: 960 mbar

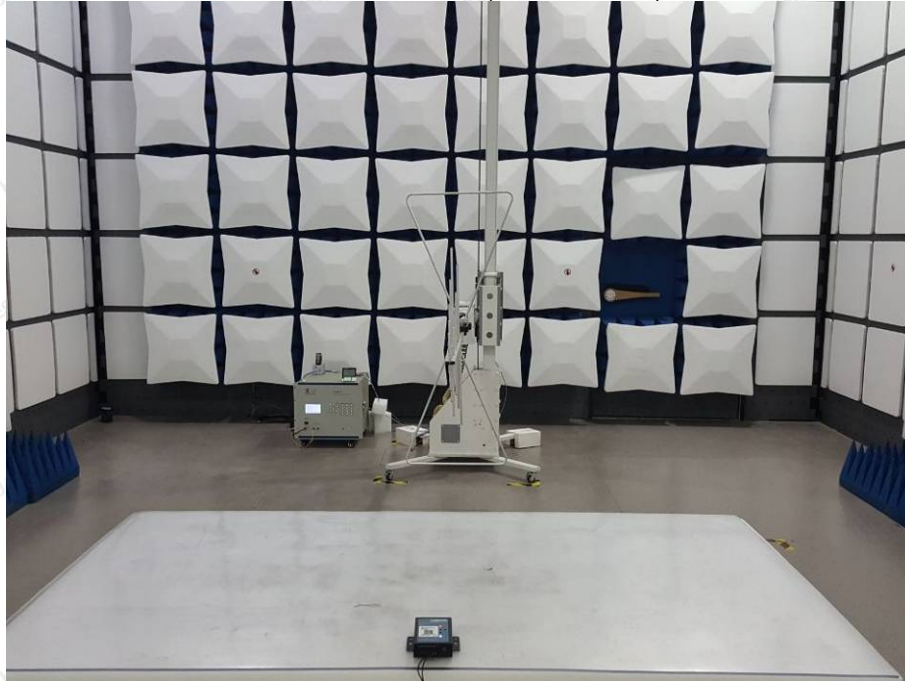
TEST RESULTS

EUT is test by DC power supply, so this test report is not applicable.

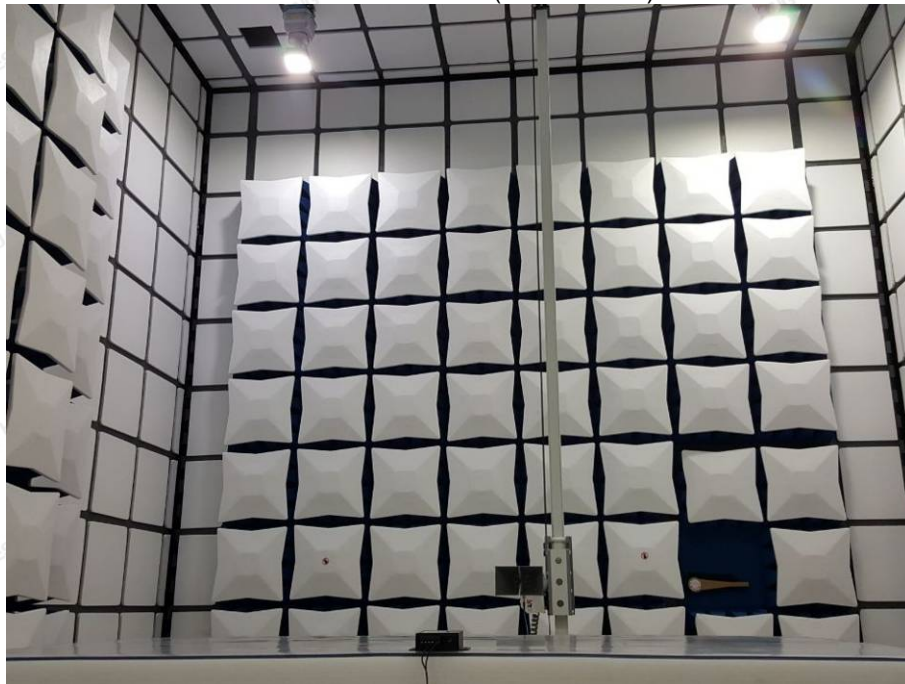


5. Test Set-up Photos of the EUT

Radiated Emission (30MHz-1GHz)



Radiated Emission (1GHz-6GHz)



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Electrostatic Discharge



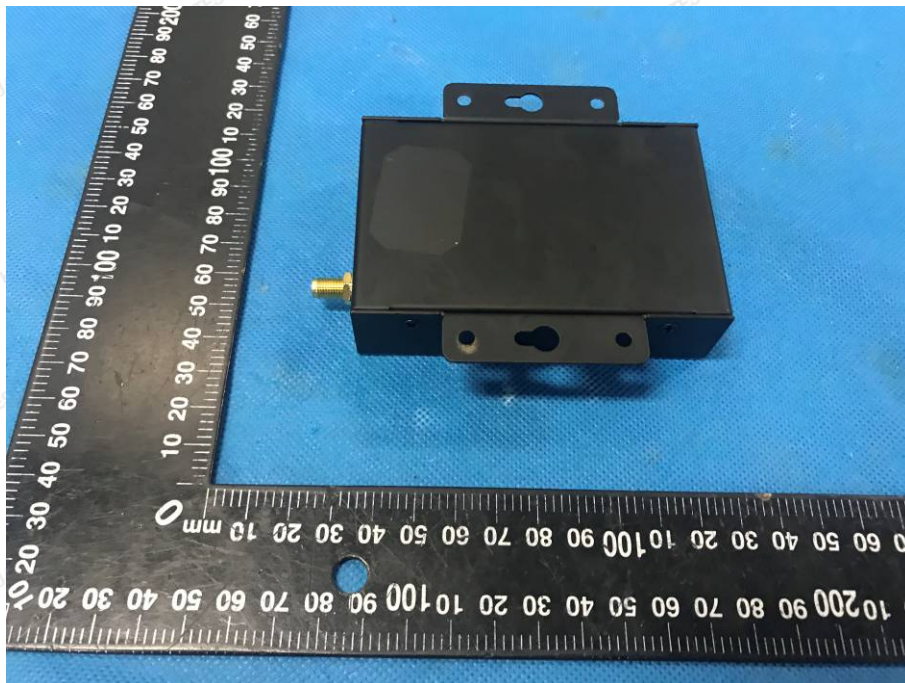
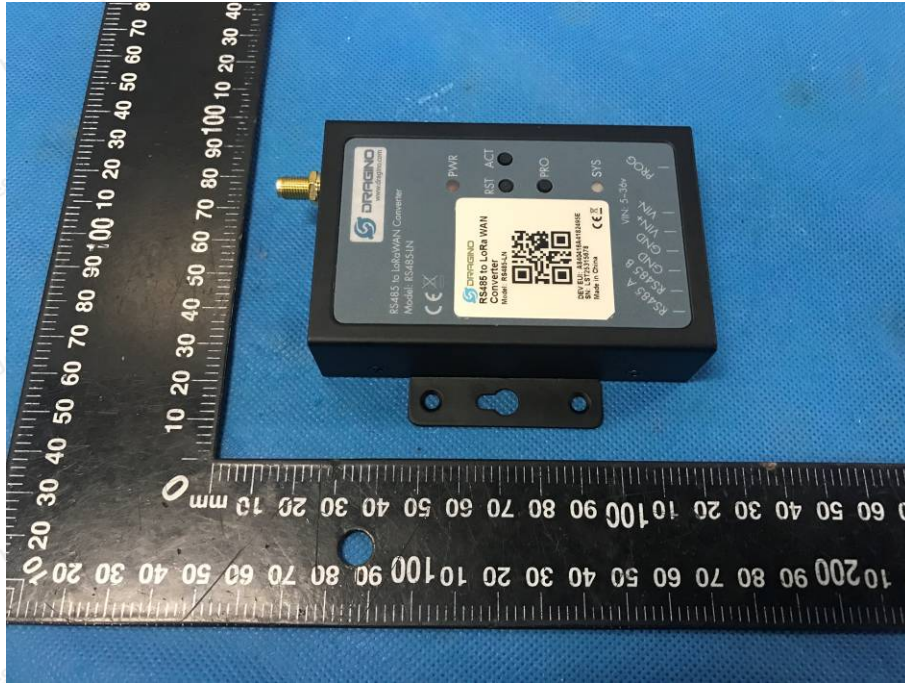
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6. PHOTOS OF THE EUT



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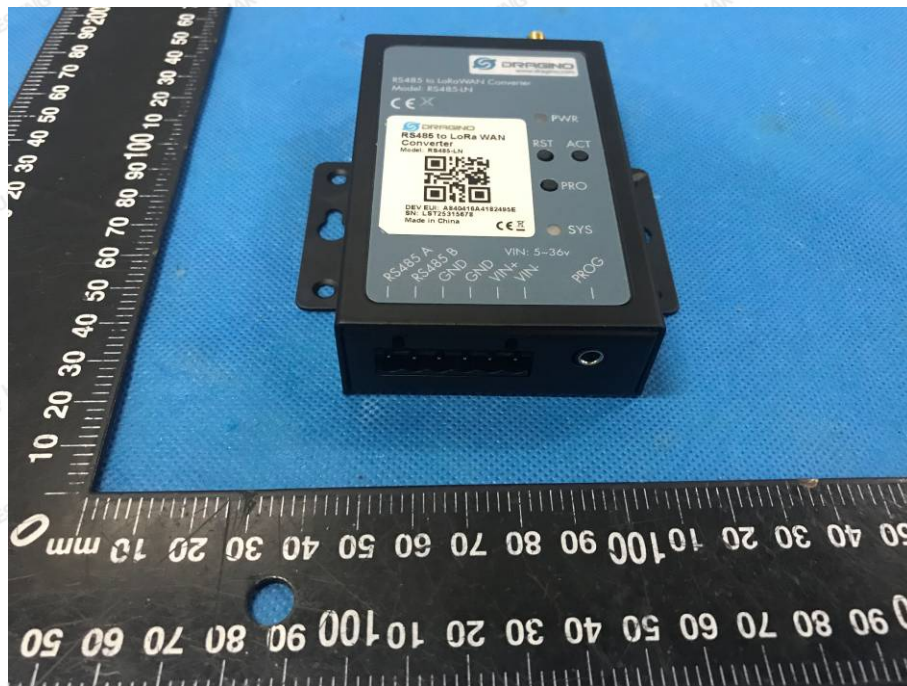
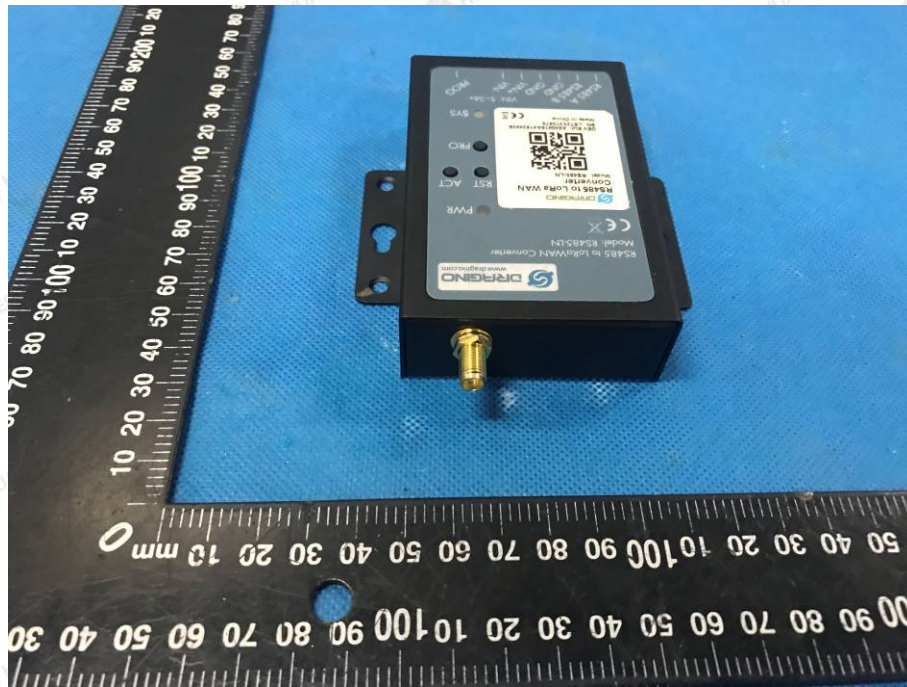
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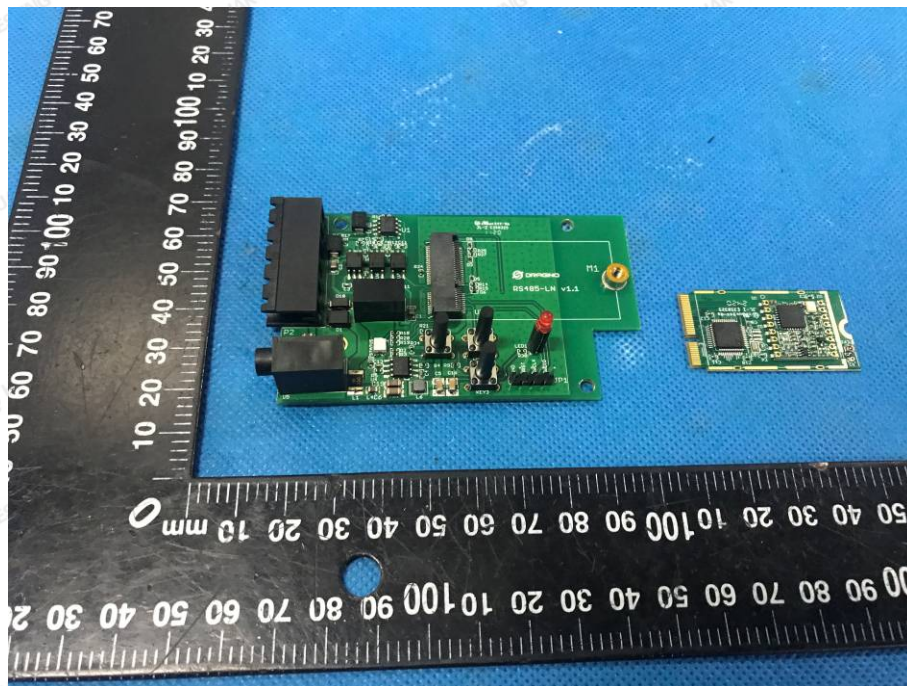
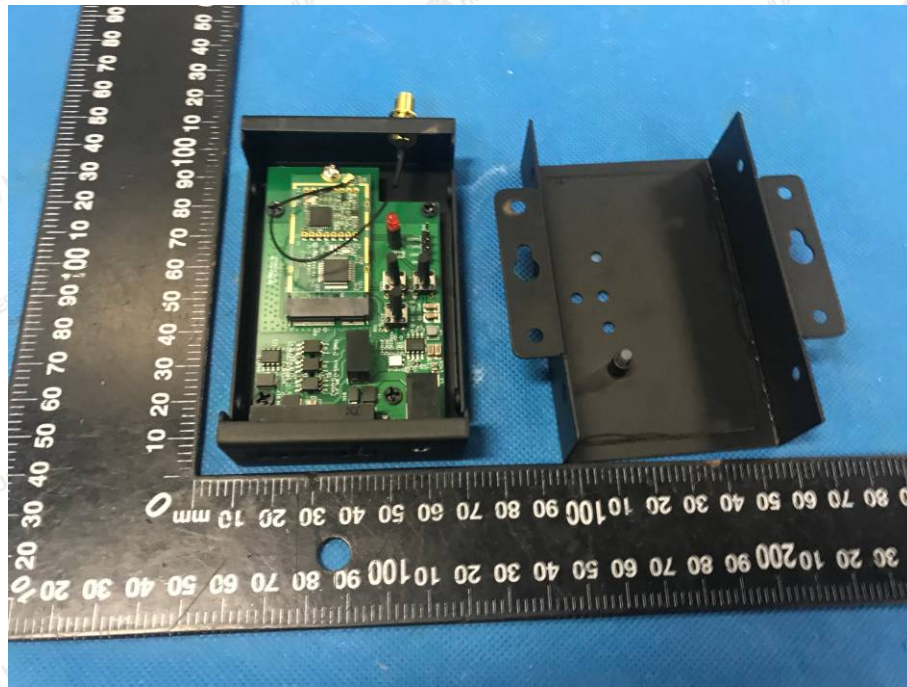
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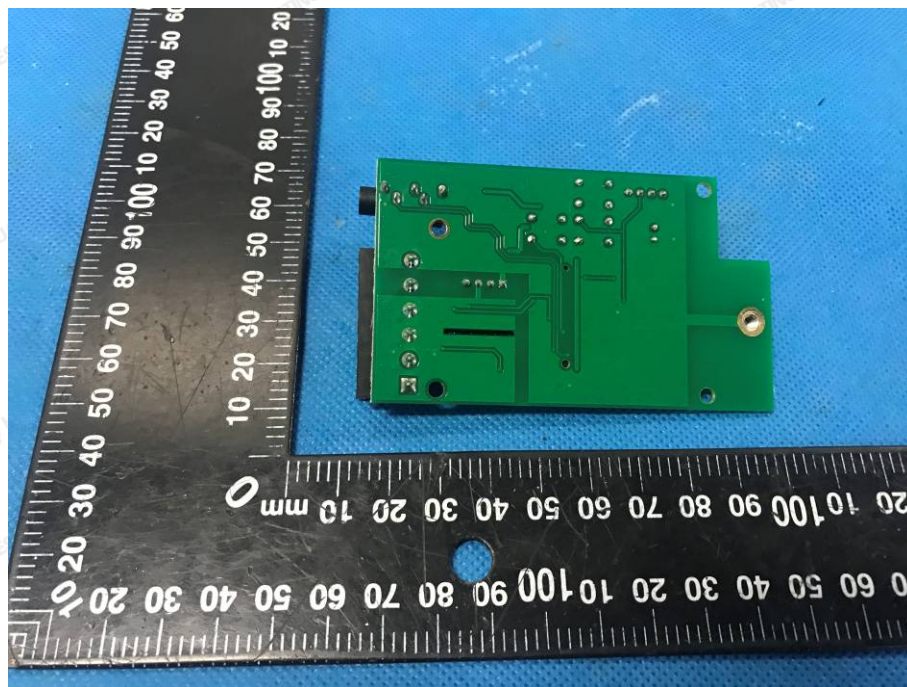
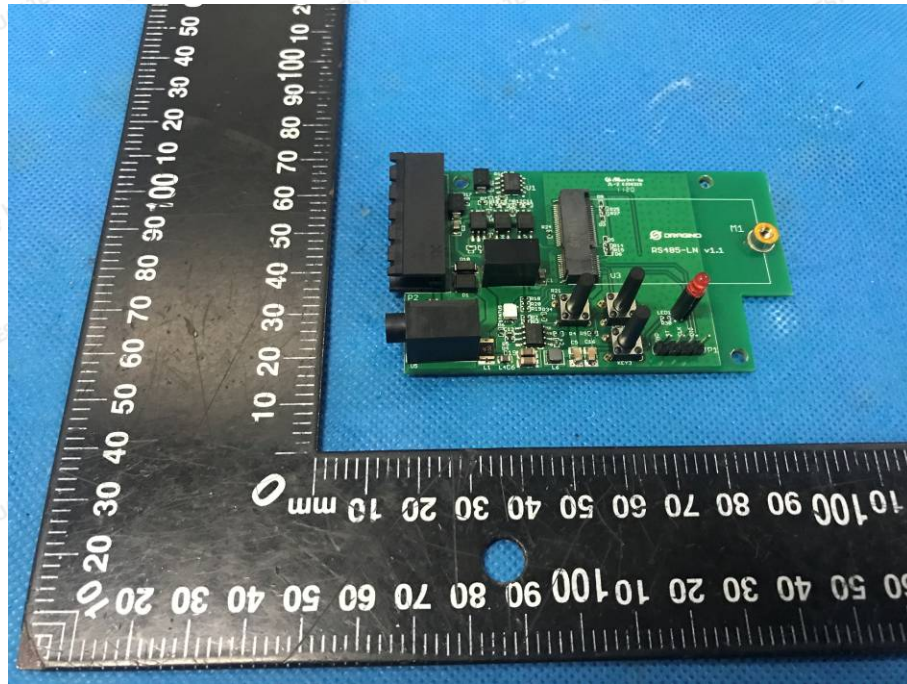
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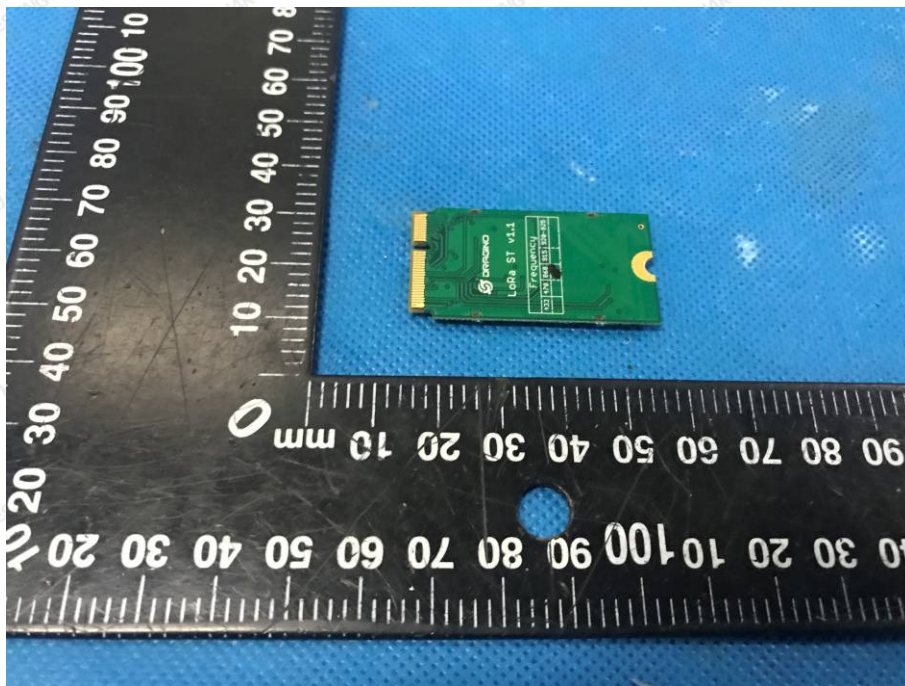
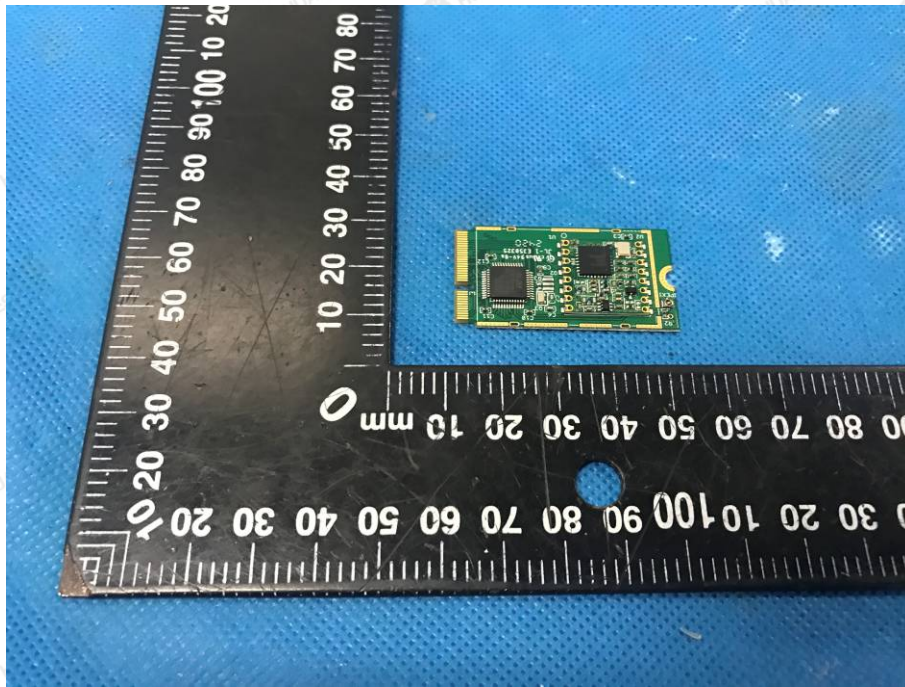
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.....**End of Report**.....