



## TEST REPORT

ETSI EN 301 489-1 V2.2.3 (2019-11)/

ETSI EN 301 489-3 V2.3.2 (2023-01)/

ETSI EN 301 489-17 V3.3.1 (2024-09)/

ETSI EN 301 489-52 V1.2.1 (2021-11)/

EN 55032:2015 + A1:2020 + A11:2020/ EN 55035:2017 + A11:2020

Report Reference No. .... : HK2503261504-1ER

Compiled by

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Jason Zhou

Date of issue ..... : 2025/04/30

Representative Laboratory Name .... : Shenzhen HUAKE 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 ..... : EDA Technology Shanghai Co.,Ltd

Address ..... : Building 29, Shengchuang Enterprise Park, No.1661 Jialuo Road,  
Jiading District, Shanghai, PRC

## Test specification:

Standard..... : ETSI EN 301 489-1 V2.2.3 (2019-11)/  
ETSI EN 301 489-3 V2.3.2 (2023-01)/  
ETSI EN 301 489-17 V3.3.1 (2024-09)/  
ETSI EN 301 489-52 V1.2.1 (2021-11)/  
EN 55032:2015 + A1:2020 + A11:2020/  
EN 55035:2017 + A11:2020

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

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

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Product Name..... : Outdoor LoRa Gateway

Trade Mark..... : EDA

Product Model..... : ED-GWL2110

Serial Model ..... : N/A

Hardware Version ..... : V1.1

Software Version..... : V2.0

Rating..... : DC 48V From POE Power

Result..... : PASS



## TEST REPORT

Test Report No. :	HK2503261504-1ER	2025/04/30
		Date of issue

Product Name : Outdoor LoRa Gateway

Product Model : ED-GWL2110

Serial Model : N/A

Applicant : EDA Technology Shanghai Co.,Ltd

Address : Building 29, Shengchuang Enterprise Park, No.1661 Jialuo Road,  
Jiading District, Shanghai, PRC

Manufacturer : EDA Technology Shanghai Co.,Ltd

Address : Building 29, Shengchuang Enterprise Park, No.1661 Jialuo Road,  
Jiading District, Shanghai, PRC

Test Result according to the standards on page 5:	PASS
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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	2025/04/30	Jason Zhou



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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 V2.3.2 (2023-01)**

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

**ETSI EN 301 489-17 V3.3.1 (2024-09)**

ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard for ElectroMagnetic Compatibility

**ETSI EN 301 489-52 V1.2.1 (2021-11)**

ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 52: Specific conditions for Cellular Communication Mobile and portable (UE) radio and ancillary equipment; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU

**EN 55032:2015 + A1:2020 + A11:2020** Electromagnetic compatibility of multimedia equipment – Emission Requirements

**EN 55035:2017 + A11:2020** Electromagnetic compatibility of multimedia equipment – Immunity requirements



## 2. SUMMARY

### 2.1. General Remarks

Date of receipt of test sample	:	2025/03/26
Testing commenced on	:	2025/03/26
Testing concluded on	:	2025/04/30

### 2.2. Product Description

Name of EUT	Outdoor LoRa Gateway
Model(s) Number	ED-GWL2110
List Models	N/A
Difference description	N/A
Hardware version	V1.1
Software version	V2.0
Antenna Type	External Internal



### 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 48V From POE Power

### 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	
<b>EMI</b>	
Mode 1	Running
<b>EMS</b>	
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 type="radio"/>	Power Cable	Length (m) :	/
<input type="radio"/>		Shield :	/
<input type="radio"/>		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.</p> <p>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. Information 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

Testing Laboratory Authorization:  
A2LA Accreditation Code is 4781.01.  
FCC Designation Number is CN1229.  
Canada IC CAB identifier is CN0045.  
CNAS Registration Number is L9589.

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

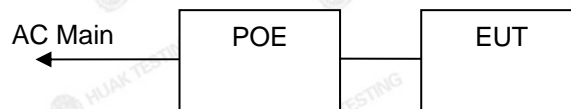


Table 2-1 Equipment Used in Tested System

No.	Product	Manufacturer	Model No.	FCC ID
1	POE	N/A	GRT-POE20-480050A	/





### 3.4. Test Description

ETSI EN 301 489-1/-3/-17/-52 requirements		
Radiated Emission	ETSI EN 301 489-1 V2.2.3 (2019-11) Clause 7.1 EN 55032:2015 + A1:2020 + A11:2020 Annex A.2	PASS
Conducted Emission( AC Mains)	ETSI EN 301 489-1 V2.2.3 (2019-11) Clause 7.1 EN 55032:2015 + A1:2020 + A11:2020 Annex A.3	PASS
Conducted Emission( Telcommunication Ports)	ETSI EN 301 489-1 V2.2.3 (2019-11) Clause 7.1 EN 55032:2015 + A1:2020 + A11:2020 Annex A.3	PASS
Harmonic Current Emissions	ETSI EN 301 489-1 V2.2.3 (2019-11) Clause 7.1 EN IEC 61000-3-2:2019 + A1:2021 + A2:2024	N/A
Voltage Fluctuations and Flicker	ETSI EN 301 489-1 V2.2.3 (2019-11) Clause 7.1 EN 61000-3-3:2013 + A1:2019 + A2:2021	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	PASS
RF Common Mode 0,15 MHz to 80 MHz	ETSI EN 301 489-1 V2.2.3 (2019-11) Clause 7.2	PASS
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	PASS

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 Shenzhen HUAKE Testing Technology 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 Shenzhen HUAKE Testing Technology 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	5.54dB	(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	Feb. 19, 2025	Feb. 18, 2026	1 year
2	LISN	R&S	ENV216	HKE-059	Feb. 19, 2025	Feb. 18, 2026	1 year
3	EMI Test Receiver	R&S	ESR	HKE-005	Feb. 19, 2025	Feb. 18, 2026	1 year
4	ISN	ETC	08-06-BAC-022-02	HKE-062	Feb. 19, 2025	Feb. 18, 2026	1 year
5	Conduction test software	Tonscend	JS32-CE 2.5.0.6	HKE-081	/	/	/

**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	Feb. 21, 2024	Feb. 20, 2026	2 year
2	EMI Test Receiver	R&S	ESR-7	HKE-010	Feb. 19, 2025	Feb. 18, 2026	1 year
3	Spectrum analyzer	Agilent	N9020A	HKE-048	Feb. 19, 2025	Feb. 18, 2026	1 year
4	Horn antenna	Schwarzbeck	9120D	HKE-013	Feb. 21, 2024	Feb. 20, 2026	2 year
5	Preamplifier	Schwarzbeck	EMC051845SE	HKE-015	Feb. 19, 2025	Feb. 18, 2026	1 year
6	Preamplifier	Agilent	83051A	HKE-016	Feb. 19, 2025	Feb. 18, 2026	1 year
7	Position controller	Taiwan MF	MF7802	HKE-011	Feb. 19, 2025	Feb. 18, 2026	1 year
8	Radiation test software	Tonscend	JS32-RE 5.0.0	HKE-082	/	/	/

**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	Feb. 19, 2025	Feb. 18, 2026	1 year

**ESD**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	ESD device	TESEQ	NSG437	HKE-023	Feb. 19, 2025	Feb. 18, 2026	1 year

**RS**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Power amplifier	micotop	MPA-80-1000-250	HKE-142	Feb. 19, 2025	Feb. 18, 2026	1 year
2	Power amplifier	micotop	MPA-1000-6000-100	HKE-143	Feb. 19, 2025	Feb. 18, 2026	1 year
3	Power Meter	KEYSIGHT	E4419B	HKE-144	Feb. 19, 2025	Feb. 18, 2026	1 year
4	Vector signal generator	KEYSIGHT	N5182B	HKE-124	Feb. 19, 2025	Feb. 18, 2026	1 year
5	Field strength probe	NARDA	EP601	HKE-146	Feb. 19, 2025	Feb. 18, 2026	1 year
6	High gain antenna	Schwarzbeck	STPL9129	HKE-147	Feb. 20, 2024	Feb. 19, 2026	2 year
7	RS Test Software	Tonscend	JS35-RS 5.0.0	HKE-186	/	/	/

**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	TESEQ	NSG3060	HKE-036	Feb. 19, 2025	Feb. 18, 2026	1 year
2	Group pulse coupling clamp	TESEQ	CDN 8014	HKE-024	Feb. 19, 2025	Feb. 18, 2026	1 year

**INJECTION CURRENT**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Sensitivity Test System	SCHLODER	CDG6000	HKE-033	Feb. 19, 2025	Feb. 18, 2026	1 year
2	Magnetic clamp	TESEQ	KEMA 801	HKE-114	Feb. 19, 2025	Feb. 18, 2026	1 year
3	Coupling decoupling network	TESEQ	CDN-M2+M3	HKE-032	Feb. 19, 2025	Feb. 18, 2026	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	Feb. 19, 2025	Feb. 18, 2026	1 year



## 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

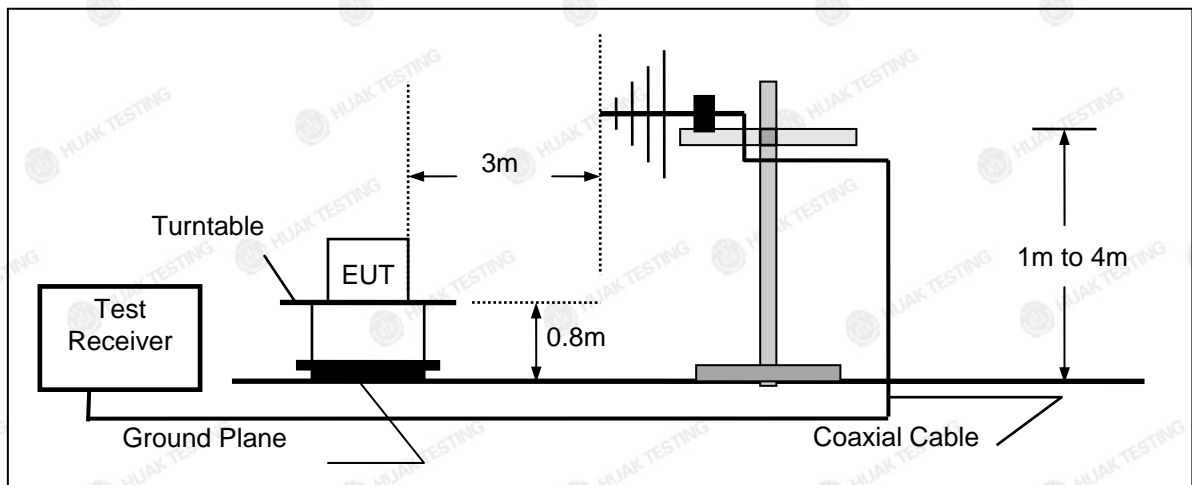
The ancillary equipment shall meet the class B limits given in CENELEC EN 55032 [1], annex A tables A.4 and A.5.

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.

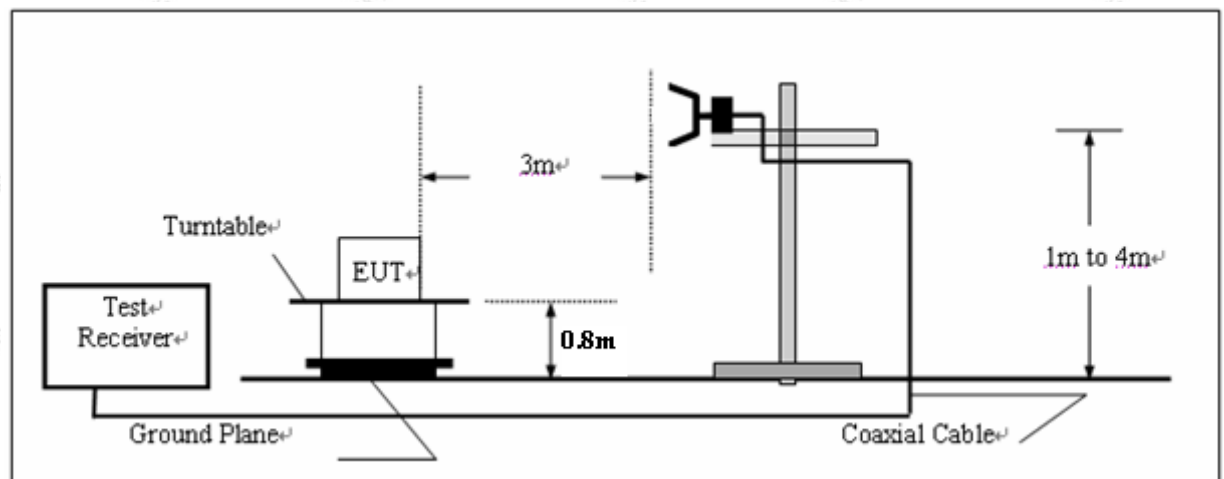
If EUT is also a FM Receiver, it shall meet CENELEC EN 55032 [3], annex A tables A.6

##### 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

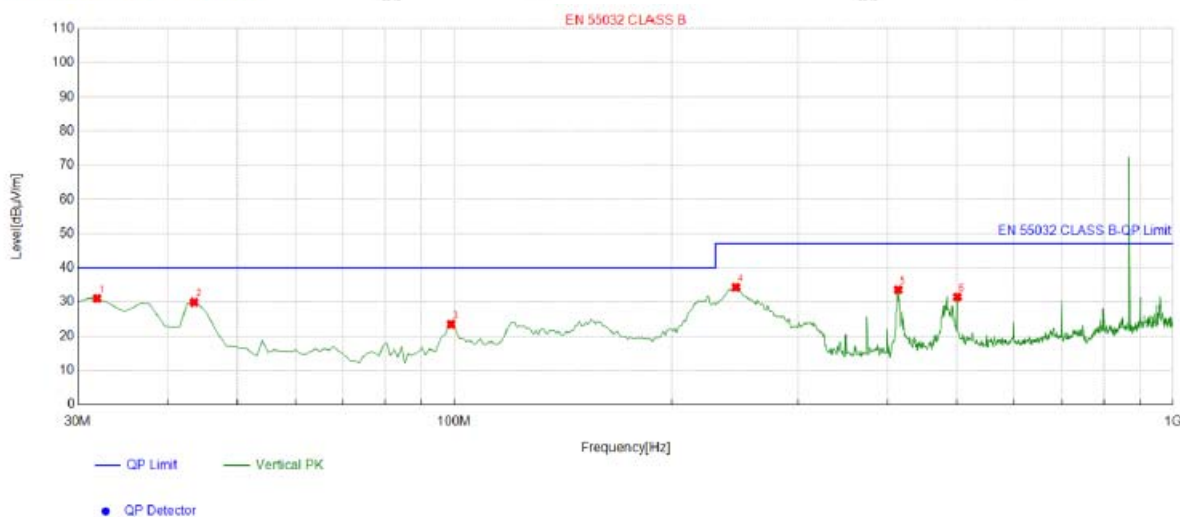
### Below 1000MHz



### Suspected List

NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	30.970971	-15.75	45.98	30.23	40.00	9.77	100	297	Horizontal
2	125.15515	-16.61	39.38	22.77	40.00	17.23	100	117	Horizontal
3	156.22622	-17.78	45.53	27.75	40.00	12.25	100	153	Horizontal
4	248.46846	-13.36	49.43	36.07	47.00	10.93	100	149	Horizontal
5	413.53353	-9.39	42.65	33.26	47.00	13.74	100	329	Horizontal
6	484.41441	-7.98	37.43	29.45	47.00	17.55	100	199	Horizontal



**Suspected List**

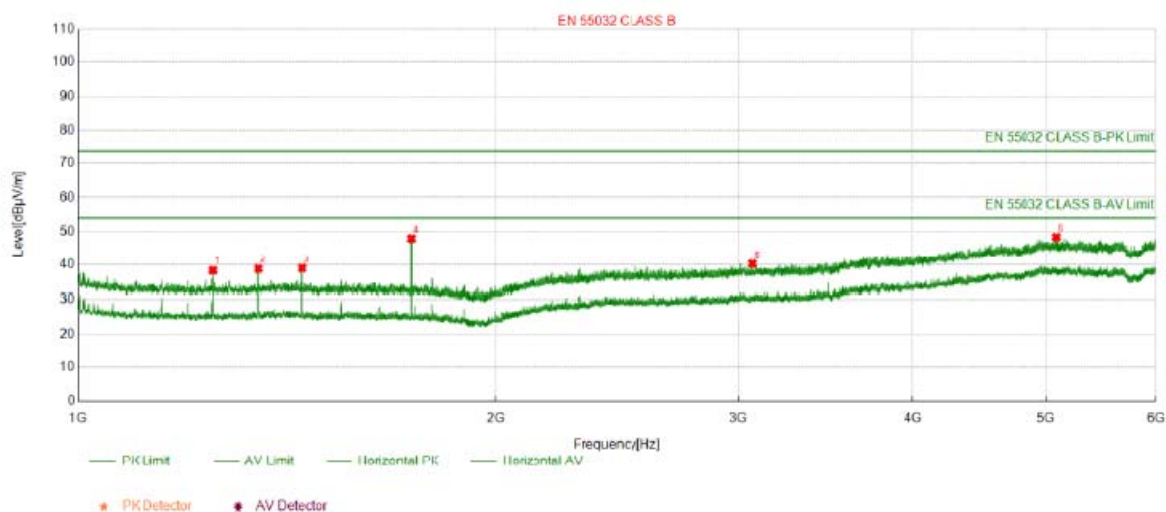
NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	31.941942	-15.76	46.81	31.05	40.00	8.95	100	4	Vertical
2	43.593594	-13.30	43.22	29.92	40.00	10.08	100	350	Vertical
3	98.938039	14.83	38.34	23.51	40.00	16.49	100	350	Vortical
4	245.55555	-13.20	47.58	34.38	47.00	12.62	100	350	Vertical
5	413.53353	-9.39	42.99	33.60	47.00	13.40	100	198	Vertical
6	490.94095	8.17	39.66	31.49	47.00	15.51	100	69	Vortical

**Remark:**

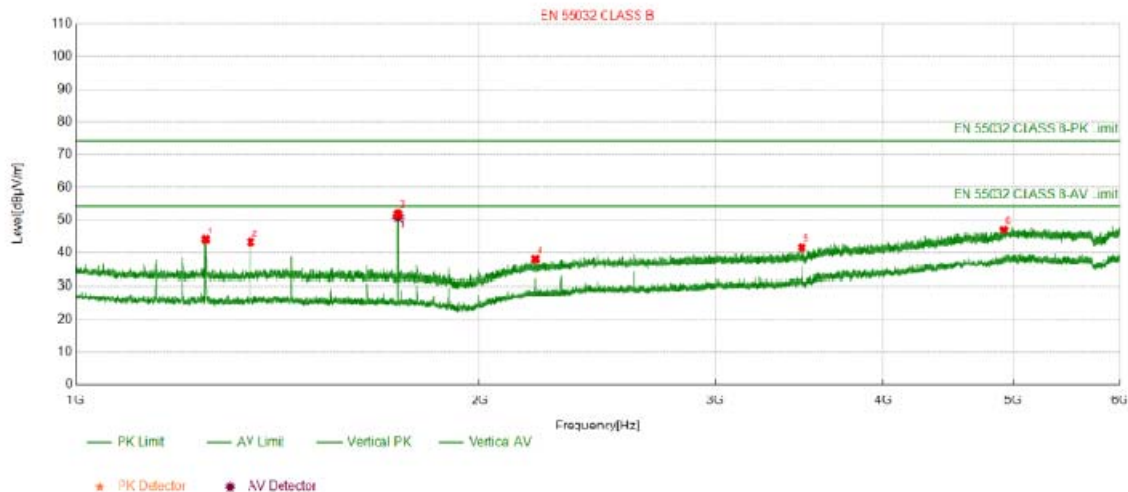
Factor = Cable loss + Antenna factor – Preamplifier; Level = Reading + Factor; Margin = Limit – Level;



## Radiated Emission From 1 GHz to 6 GHz



Suspected Data List								
NO.	Freq. [MHz]	PK Level [dBμV/m]	Factor [dB]	PK Limit [dBμV/m]	PK Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1250.025	38.37	-19.30	74.00	35.63	100	48	Horizontal
2	1349.834	38.84	-18.93	74.00	35.16	100	1	Horizontal
3	1449.644	38.98	-18.71	74.00	35.02	100	169	Horizontal
4	1739.073	47.96	-18.40	74.00	26.04	100	327	Horizontal
5	3069.906	40.28	-13.12	74.00	33.72	100	168	Horizontal
6	5083.708	48.36	-4.93	74.00	25.64	100	72	Horizontal



## Suspected Data List

NO.	Freq. [MHz]	PK Level [dBμV/m]	Factor [dB]	PK Limit [dBμV/m]	PK Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1250.025	43.91	-19.30	74.00	30.09	100	2	Vertical
2	1350.235	43.07	-18.92	74.00	30.93	100	310	Vertical
3	1739.073	51.69	-18.40	74.00	22.31	100	166	Vertical
4	2199.719	38.09	-15.67	74.00	35.91	100	161	Vertical
5	3477.947	41.46	-12.47	74.00	32.54	100	82	Vertical
6	4920.492	46.86	-5.47	74.00	27.14	100	351	Vertical

## PK Final Data List

NO	Freq. [MHz]	Factor [dB]	PK Value [dBμV/m]	PK Limit [dBμV/m]	PK Margin [dB]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1739.07	-18.40	51.80	74.00	22.20	50.99	54.00	3.01	100	166	Vertical

### Remark:

Factor = Cable loss + Antenna factor – Preamplifier; Level = Reading + Factor; Margin = Limit – Level;





#### 4.1.2. Conducted Emission (AC Mains)

##### LIMIT

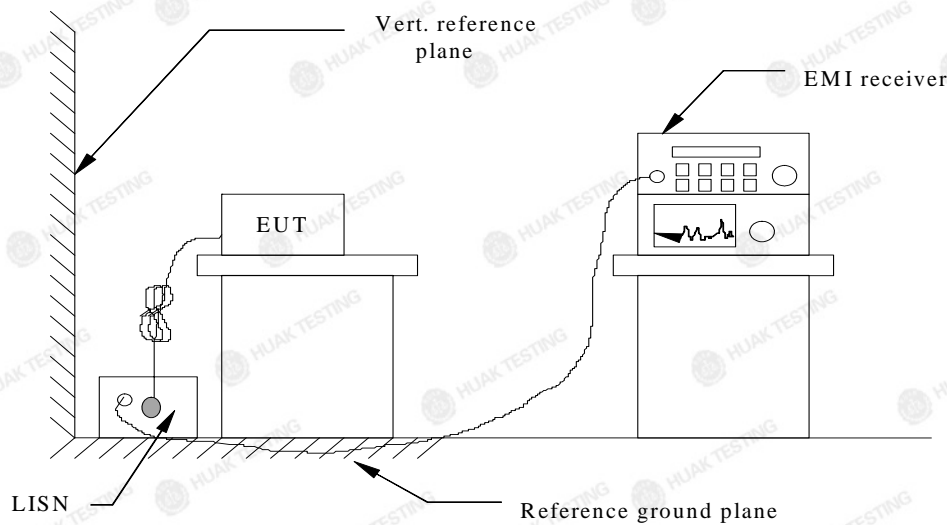
Please refer to ETSI EN 301 489-1 Clause 8.4.3

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



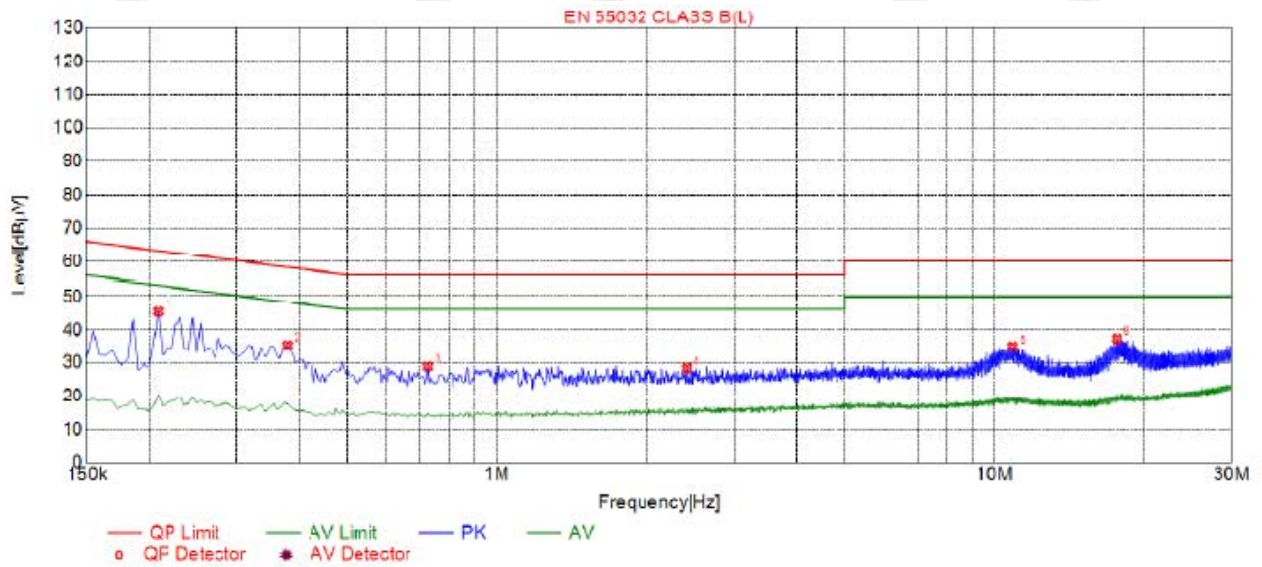
##### TEST PROCEDURE

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

##### Climatic conditions

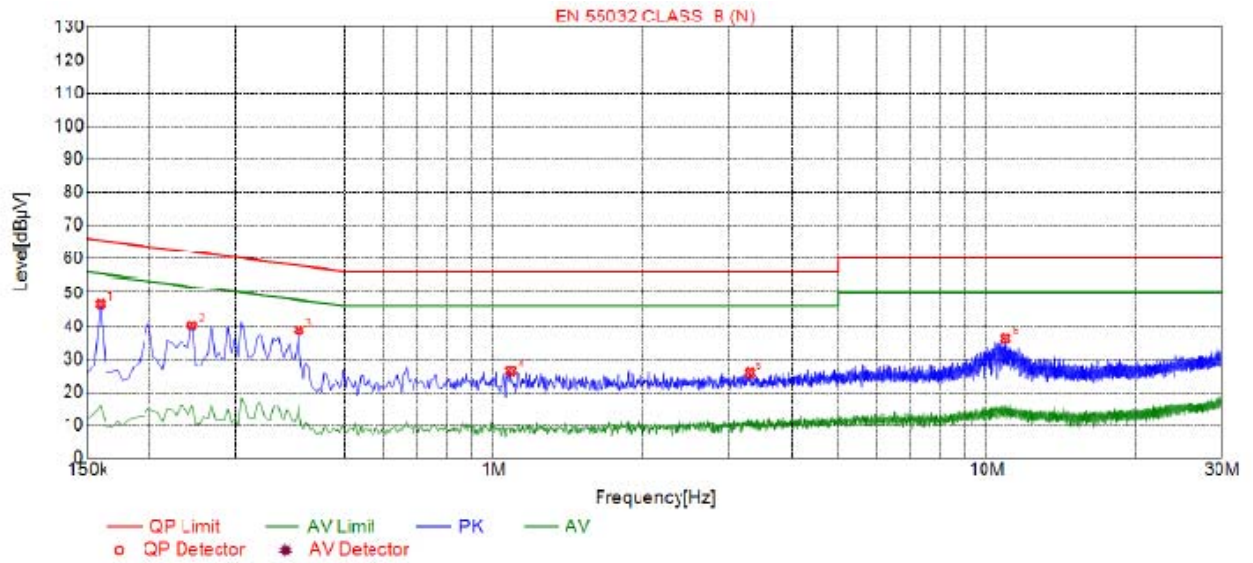
- ambient temperature : 25°C
- relative humidity: 55%
- atmospheric pressure: 960 mbar





### Suspected List

NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Reading [dBμV]	Detector	Type
1	0.2085	45.40	19.84	63.26	17.86	25.56	PK	L
2	0.3795	35.31	19.85	58.29	22.98	15.46	PK	L
3	0.7260	28.88	19.66	56.00	27.14	9.20	PK	L
4	2.4000	28.35	20.20	56.00	27.65	8.15	PK	I
5	10.8330	34.93	21.25	60.00	25.07	13.68	PK	L
6	17.5695	37.32	22.43	60.00	22.68	14.89	PK	L



### Suspected List

NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Reading [dBμV]	Detector	Type
1	0.1590	46.63	13.61	65.52	18.89	27.02	PK	N
2	0.2445	40.13	13.65	61.94	21.81	20.48	PK	N
3	0.4020	38.78	13.70	57.81	19.03	19.08	PK	N
4	1.0815	26.27	13.78	56.00	29.73	6.49	PK	N
5	3.3000	25.70	23.10	56.00	30.30	5.60	PK	N
6	10.8915	36.15	21.08	60.00	23.85	15.07	PK	N

Remark: Margin = Limit – Level

Correction factor = Cable lose + ISN insertion loss

Level=Test receiver reading + correction factor



### 4.1.3. Conducted Emission (Telecommunication Ports)

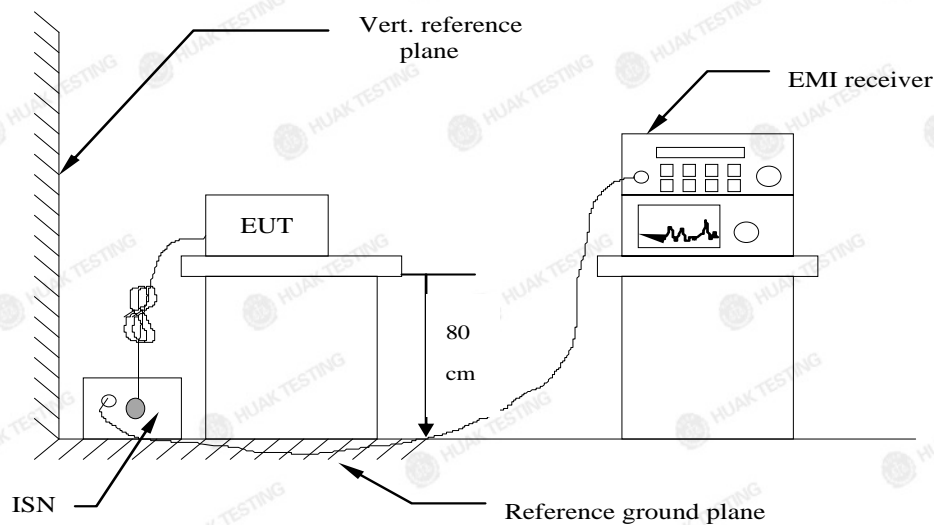
#### LIMIT

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



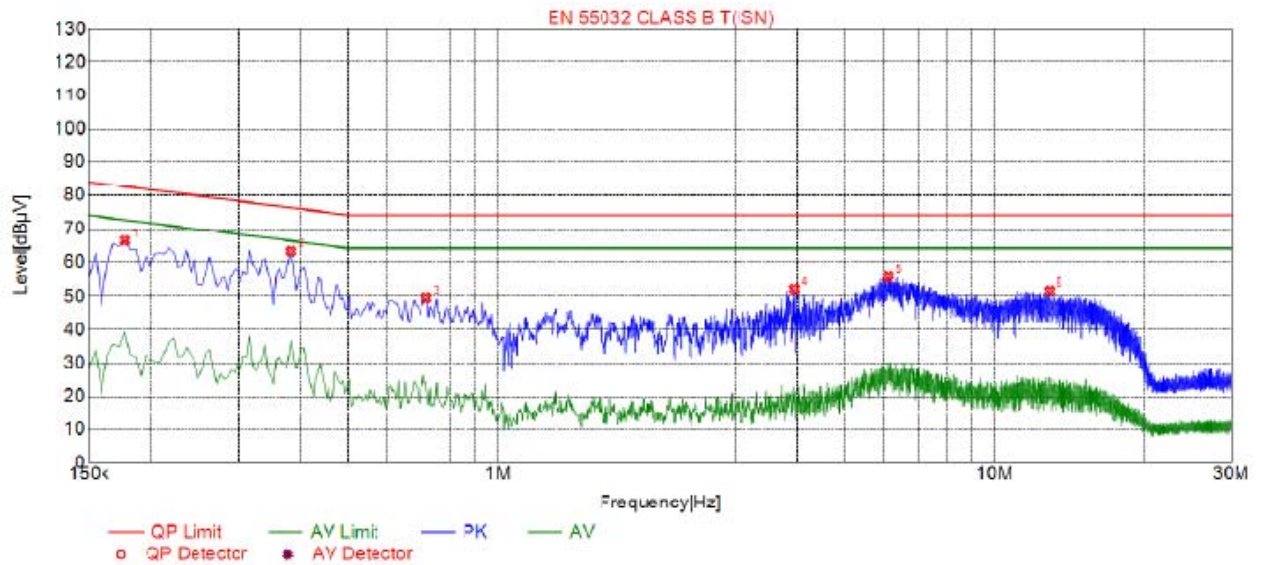
#### TEST PROCEDURE

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





### Suspected List

NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Reading [dBμV]	Detector	Type
1	0.1770	66.33	20.30	82.63	16.30	46.03	PK	ISN
2	0.3840	63.09	20.12	76.19	13.10	42.97	PK	ISN
3	0.7170	49.58	19.95	74.00	24.42	29.63	PK	ISN
4	3.9570	52.13	19.73	74.00	21.87	32.35	PK	ISN
5	6.1170	55.78	19.73	74.00	18.22	36.05	PK	ISN
6	12.8760	51.56	19.47	74.00	22.44	32.09	PK	ISN

Remark: Margin = Limit – Level

Correction factor = Cable lose + ISN insertion loss

Level=Test receiver reading + correction factor



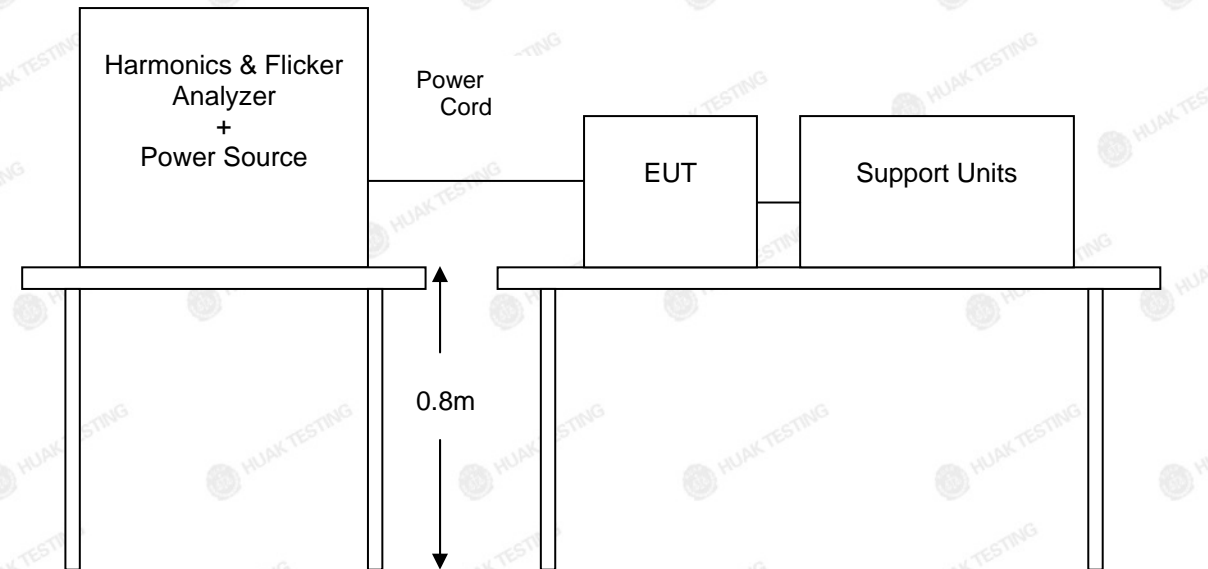


#### 4.1.4. Harmonic Current Emission

##### LIMIT

Please refer to EN IEC 61000-3-2

##### TEST CONFIGURATION



##### TEST PROCEDURE

Please refer to EN IEC 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 it 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 it is not applicable.



#### 4.1.6. Electrostatic Discharge

##### LIMIT

Please refer to EN 61000-4-2

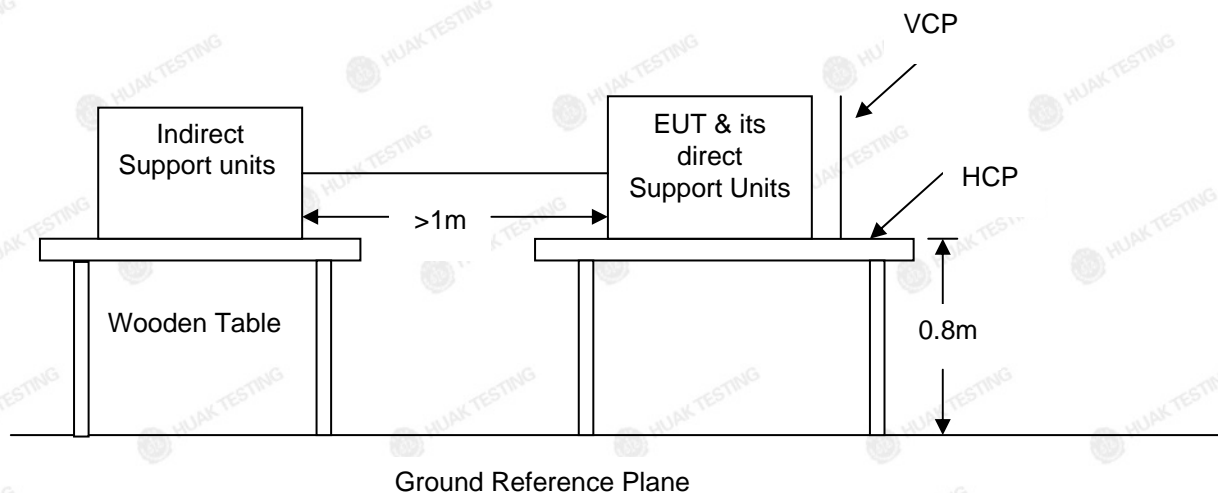
##### SEVERITY LEVELS OF ELECTROSTATIC DISCHARGE

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

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.

##### Test results

###### **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

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**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

**TEST RESULTS**

Mode	Air Discharge								Contact Discharge								Criterion	Result
Test level (kV)	4		8		10		15		2		4		6		8			
Test Location	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-		
HCP									A	A	A	A					B	PASS
VCP									A	A	A	A						PASS
Metallic parts									A	A	A	A						PASS
enclosure	A	A	A	A														PASS
slot	A	A	A	A														PASS

**Note:**

- 1) +/- denotes the Positive/Negative polarity of the output voltage.
- 2) Test condition:  
Direct / Indirect (HCP/VCP) discharges: Minimum 50 times (Positive/Negative) at each point. Air discharges: Minimum 10 times (Positive/Negative) at each point.
- 3) Test location(s) in which discharge (Air and contact discharge) to be applied illustrated by photos shown in next page(s)
- 4) The Indirect (HCP/VCP) discharges description of test point as following:  
1.left side 2.right side 3.front side 4.rear side
- 5) N/A - denotes test is not applicable in this test report



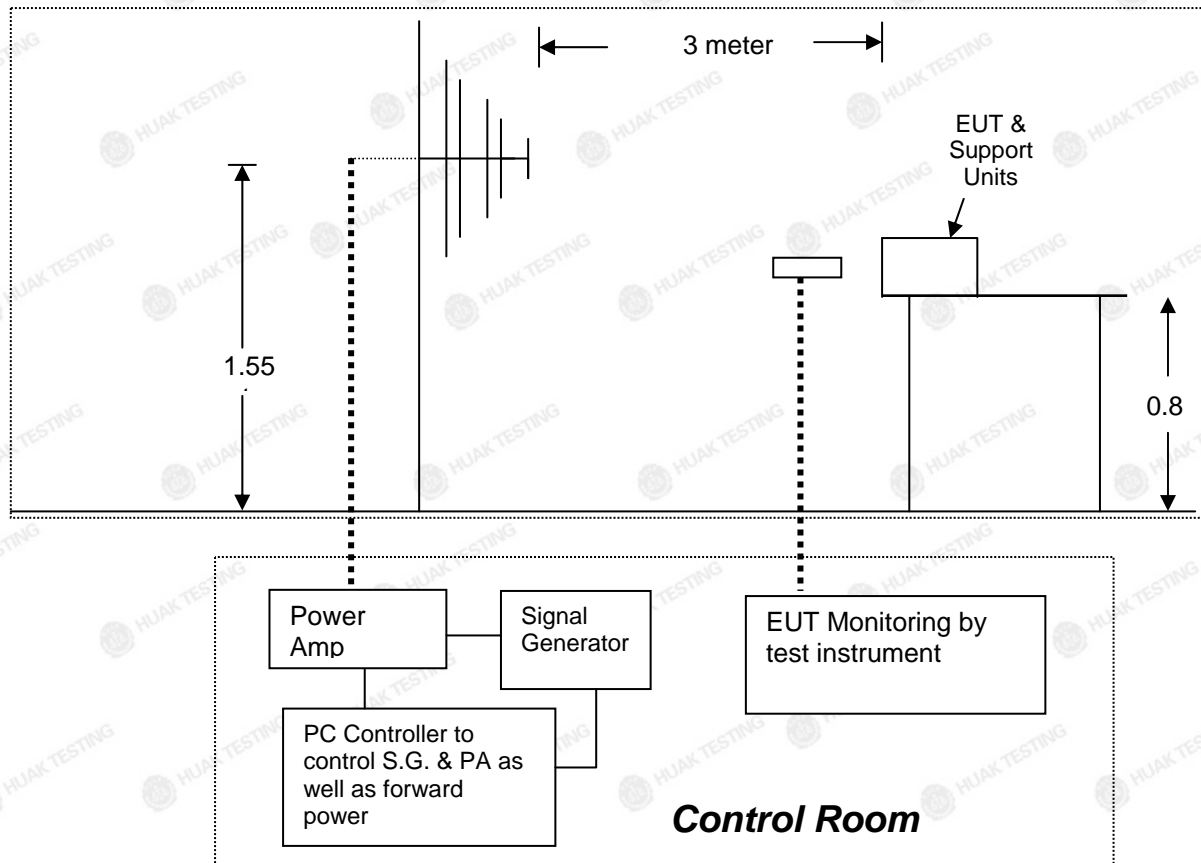


#### 4.1.7. RF Electromagnetic Field

##### LIMIT

Please refer to EN IEC 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 IEC 61000-4-3 for the measurement methods.

**Climatic conditions**

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

**TEST RESULTS**

Note: All the test modes completed for test. only the worst result of was reported.

	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



Test mode:	LTE Band 1	Frequency range:	80MHz~6GHz
------------	------------	------------------	------------

Throughput:

Freq. Range (MHz)	Field	Modulation Depth	Polarity	Throughput:(%)	Throughput Limit(%)	Result
80-6000	3V/m	80%	H / V	97.98	95	Pass

Test mode:	LTE Band 3	Frequency range:	80MHz~6GHz
------------	------------	------------------	------------

Throughput:

Freq. Range (MHz)	Field	Modulation Depth	Polarity	Throughput:(%)	Throughput Limit(%)	Result
80-6000	3V/m	80%	H / V	97.65	95	Pass

Test mode:	LTE Band 7	Frequency range:	80MHz~6GHz
------------	------------	------------------	------------

Throughput:

Freq. Range (MHz)	Field	Modulation Depth	Polarity	Throughput:(%)	Throughput Limit(%)	Result
80-6000	3V/m	80%	H / V	97.21	95	Pass

Test mode:	LTE Band 8	Frequency range:	80MHz~6GHz
------------	------------	------------------	------------

Throughput:

Freq. Range (MHz)	Field	Modulation Depth	Polarity	Throughput:(%)	Throughput Limit(%)	Result
80-6000	3V/m	80%	H / V	97.76	95	Pass



Test mode:	LTE Band 20	Frequency range:	80MHz~6GHz
------------	-------------	------------------	------------

Throughput:

Freq. Range (MHz)	Field	Modulation Depth	Polarity	Throughput:(%)	Throughput Limit(%)	Result
80-6000	3V/m	80%	H / V	97.09	95	Pass

Test mode:	LTE Band 28	Frequency range:	80MHz~6GHz
------------	-------------	------------------	------------

Throughput:

Freq. Range (MHz)	Field	Modulation Depth	Polarity	Throughput:(%)	Throughput Limit(%)	Result
80-6000	3V/m	80%	H / V	97.76	95	Pass

Test mode:	LTE Band 38	Frequency range:	80MHz~6GHz
------------	-------------	------------------	------------

Throughput:

Freq. Range (MHz)	Field	Modulation Depth	Polarity	Throughput:(%)	Throughput Limit(%)	Result
80-6000	3V/m	80%	H / V	97.54	95	Pass

Test mode:	LTE Band 40	Frequency range:	80MHz~6GHz
------------	-------------	------------------	------------

Throughput:

Freq. Range (MHz)	Field	Modulation Depth	Polarity	Throughput:(%)	Throughput Limit(%)	Result
80-6000	3V/m	80%	H / V	97.39	95	Pass



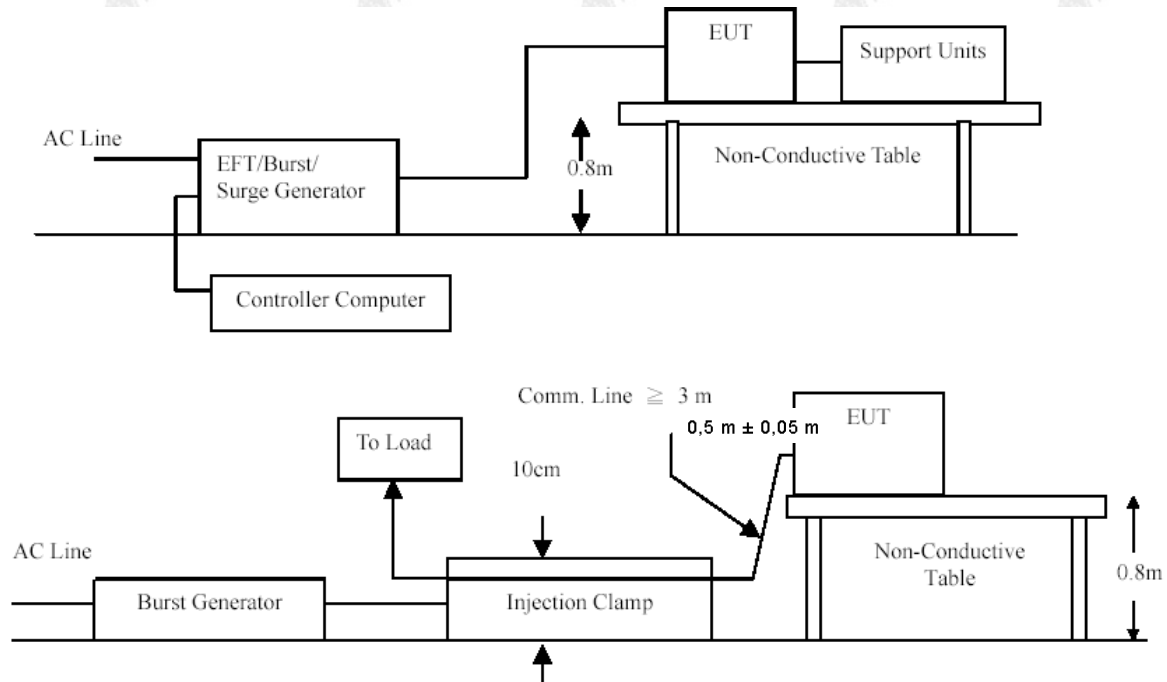


#### 4.1.8. Fast Transients Common Mode

##### 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



Coupling Line		Test level (kV)								Criterion	Result
		0.5		1		2		4			
		+	-	+	-	+	-	+	-		
AC line	L									B	
	N										
	PE										
	L+N										
	L+PE										
	N+PE										
	L+N+PE										
DC Line											
Signal Line		A	A								PASS

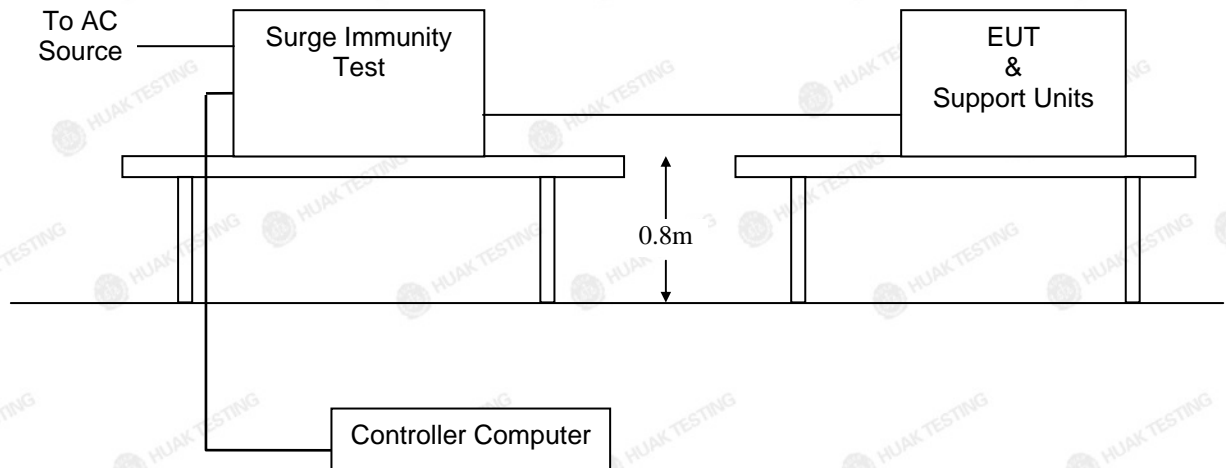


#### 4.1.9. Surges, Line to Line and Line to Ground

##### 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



Coupling Line			Test level								Criterion	Result
			0.5 kV		1 kV		2 kV		4 kV			
			+	-	+	-	+	-	+	-		
AC line	L-N	0°									B	
		90°										
		180°										
		270°										
	L-PE	0°										
		90°										
		180°										
		270°										
	N-PE	0°										
		90°										
		180°										
		270°										
DC Line												
Signal Line			A	A							PASS	



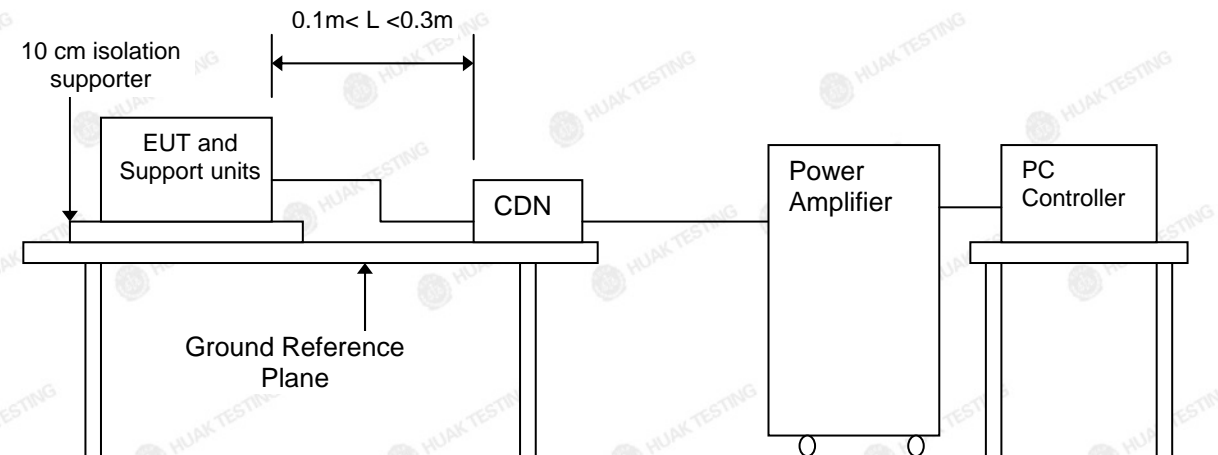


## 4.1.10. RF- Common Mode 0.15MHz to 80MHz

### LIMIT

Please refer to EN IEC 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

Test Ports (Mode)	Freq. Range MHz)	Field Strength	Perform. Criteria	Results	Judgment
Input/ Output AC. Power Port	0.15 ---80	3V(rms) AM Modulated 1000Hz, 80%	A	N/A	N/A
Input/ Output DC. Power Port	0.15 --- 80		A	N/A	N/A
Signal Line	0.15 --- 80		A	A	PASS



LTE Band 1					
Frequency	Antenna Polarity	Mode	Speech output Reference levels/RXQUAL Test Result	Speech output Reference levels/RXQUAL Limit	Result
0.15-80	H/V	Up Link /speech output	-64.46	-35	PASS
		Down Link/ speech output	-67.54	-35	PASS
		Down Link/ RXQUAL	0.0021	3	PASS

LTE Band 3					
Frequency	Antenna Polarity	Mode	Speech output Reference levels/RXQUAL Test Result	Speech output Reference levels/RXQUAL Limit	Result
0.15-80	H/V	Up Link /speech output	-64.87	-35	PASS
		Down Link/ speech output	-67.76	-35	PASS
		Down Link/ RXQUAL	0.0054	3	PASS

LTE Band 7					
Frequency	Antenna Polarity	Mode	Speech output Reference levels/RXQUAL Test Result	Speech output Reference levels/RXQUAL Limit	Result
0.15-80	H/V	Up Link /speech output	-64.98	-35	PASS
		Down Link/ speech output	-67.76	-35	PASS
		Down Link/ RXQUAL	0.0032	3	PASS

LTE Band 8					
Frequency	Antenna Polarity	Mode	Speech output Reference levels/RXQUAL Test Result	Speech output Reference levels/RXQUAL Limit	Result
0.15-80	H/V	Up Link /speech output	-64.90	-35	PASS
		Down Link/ speech output	-67.65	-35	PASS
		Down Link/ RXQUAL	0.0065	3	PASS

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LTE Band 20					
Frequency	Antenna Polarity	Mode	Speech output Reference levels/RXQUAL Test Result	Speech output Reference levels/RXQUAL Limit	Result
0.15-80	H/V	Up Link /speech output	-64.43	-35	PASS
		Down Link/ speech output	-67.23	-35	PASS
		Down Link/ RXQUAL	0.0055	3	PASS

LTE Band 28					
Frequency	Antenna Polarity	Mode	Speech output Reference levels/RXQUAL Test Result	Speech output Reference levels/RXQUAL Limit	Result
0.15-80	H/V	Up Link /speech output	-64.76	-35	PASS
		Down Link/ speech output	-67.32	-35	PASS
		Down Link/ RXQUAL	0.0021	3	PASS

LTE Band 38					
Frequency	Antenna Polarity	Mode	Speech output Reference levels/RXQUAL Test Result	Speech output Reference levels/RXQUAL Limit	Result
0.15-80	H/V	Up Link /speech output	-64.68	-35	PASS
		Down Link/ speech output	-67.87	-35	PASS
		Down Link/ RXQUAL	0.0065	3	PASS

LTE Band 40					
Frequency	Antenna Polarity	Mode	Speech output Reference levels/RXQUAL Test Result	Speech output Reference levels/RXQUAL Limit	Result
0.15-80	H/V	Up Link /speech output	-64.43	-35	PASS
		Down Link/ speech output	-67.21	-35	PASS
		Down Link/ RXQUAL	0.0077	3	PASS

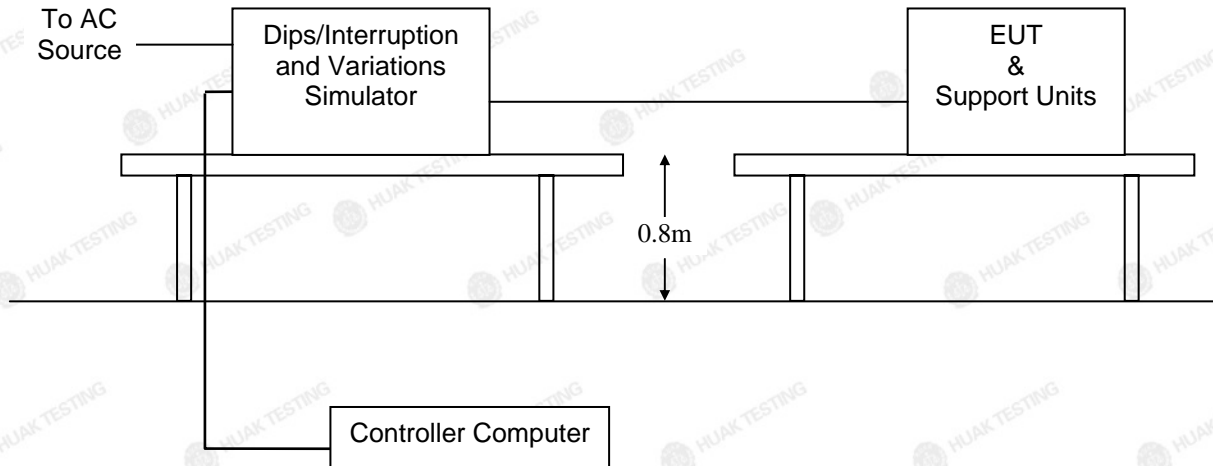


#### 4.1.11. Voltage Dips and Interruptions

##### LIMIT

Please refer to EN IEC 61000-4-11

##### TEST CONFIGURATION



##### TEST PROCEDURE

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

##### Climatic conditions

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

##### TEST RESULTS

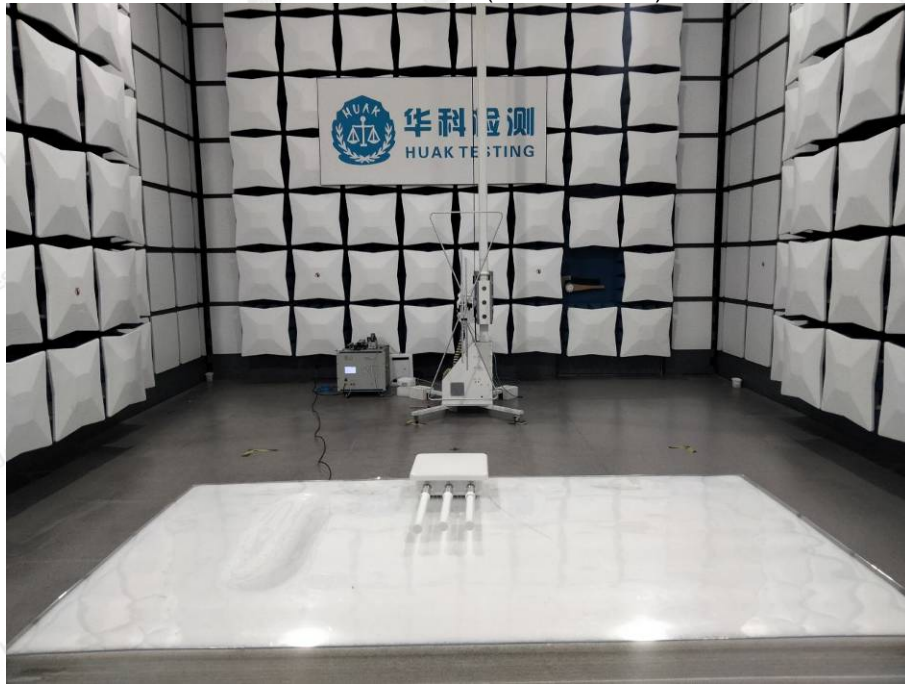
EUT is test by DC power supply, so it is not applicable.





## 5. Test Set-up Photos of the EUT

Radiated Emission (30MHz-1GHz)



Radiated Emission (1GHz-6GHz)



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Conducted Emission



Conducted Emission(Telcommunication Ports)





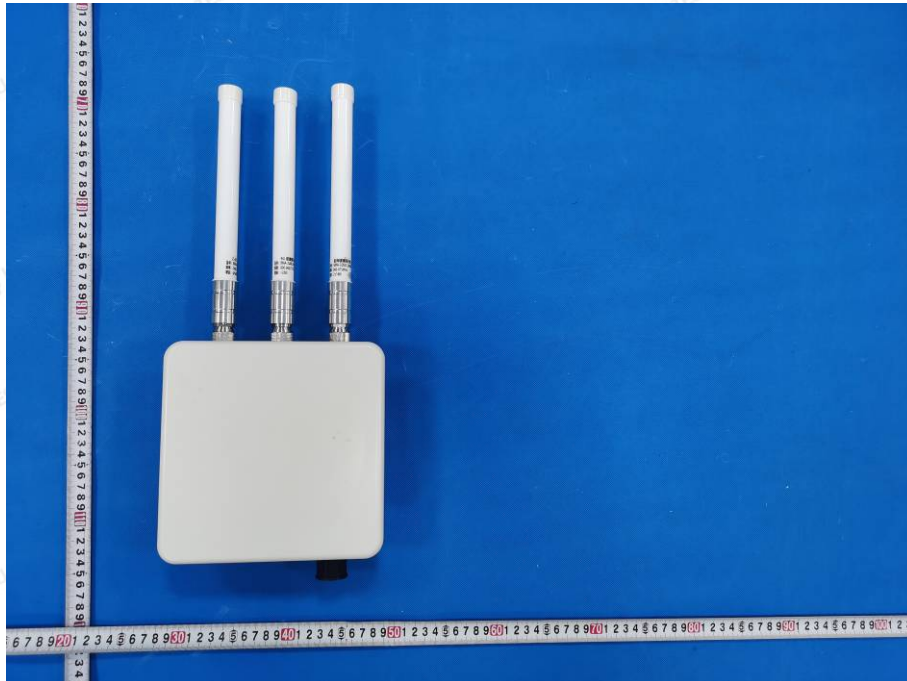
Electrostatic Discharge







## 6. PHOTOS OF THE EUT

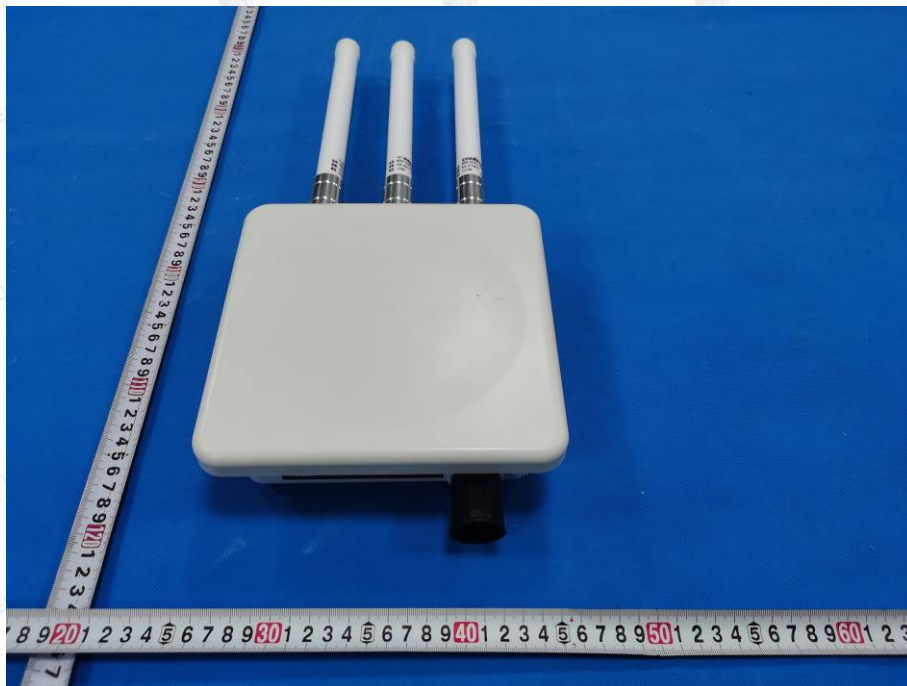
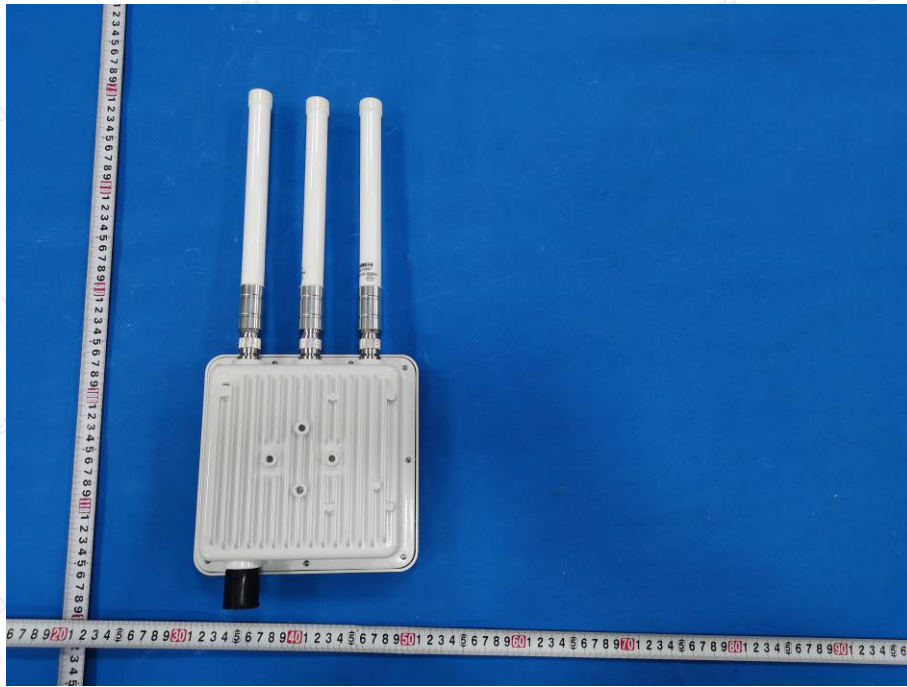


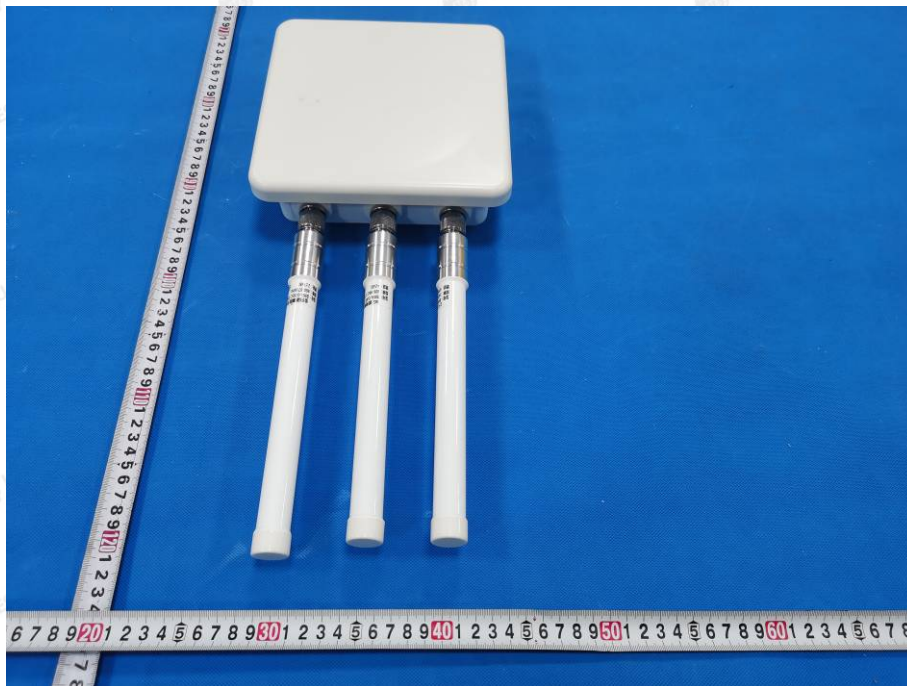
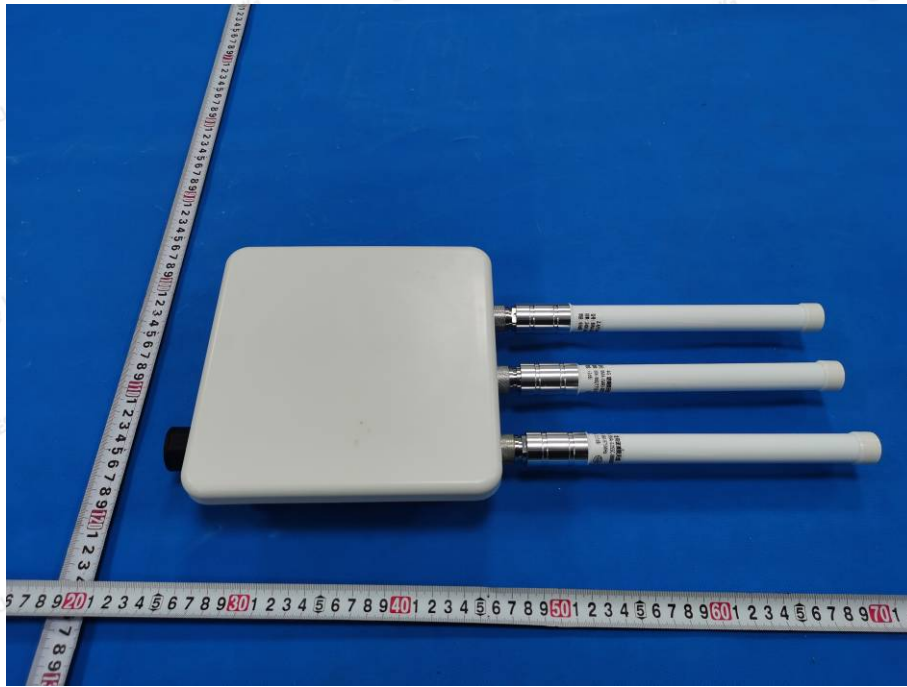
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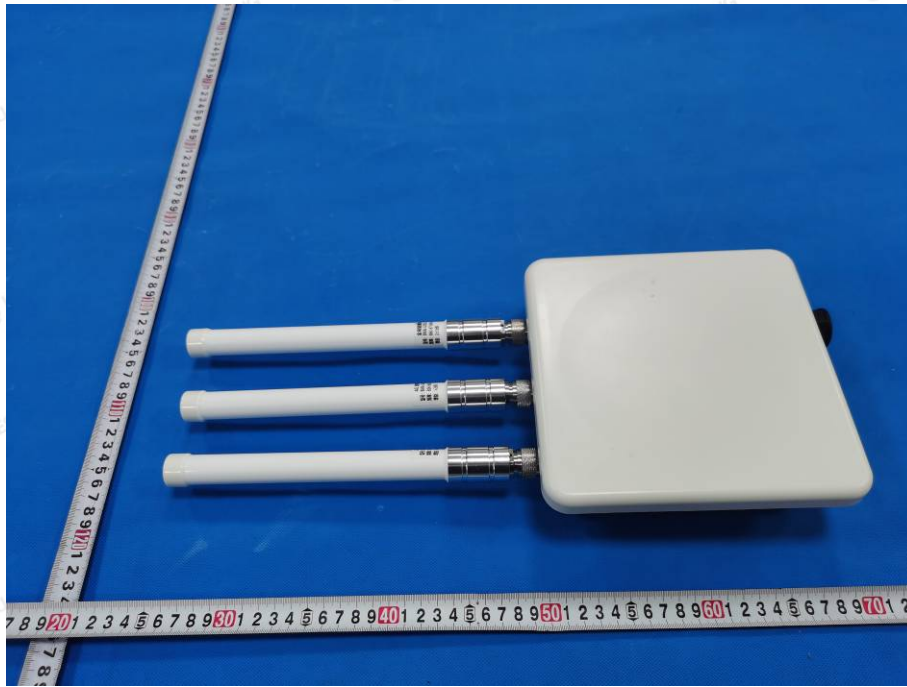
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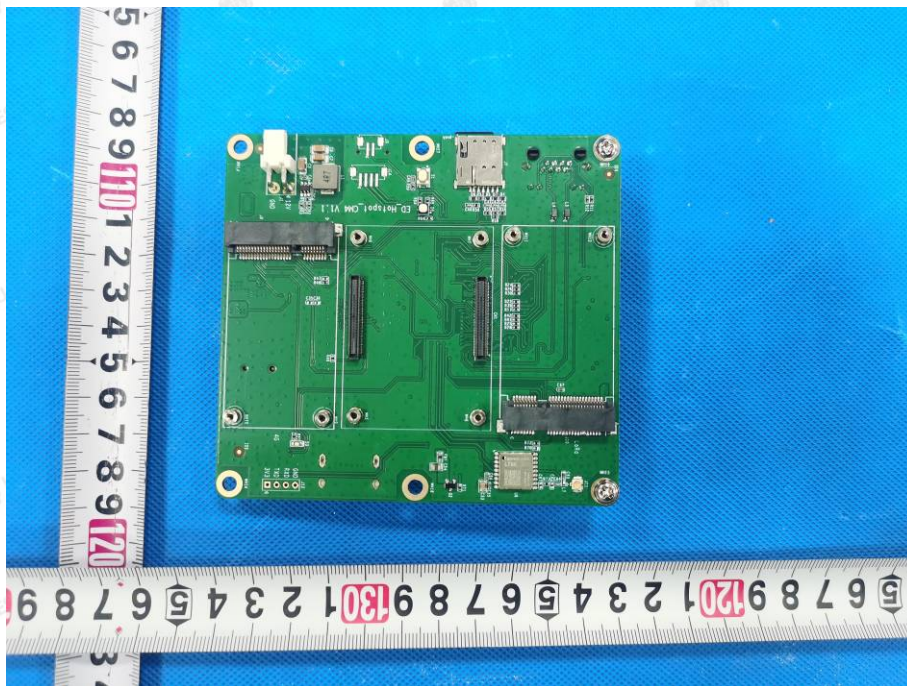
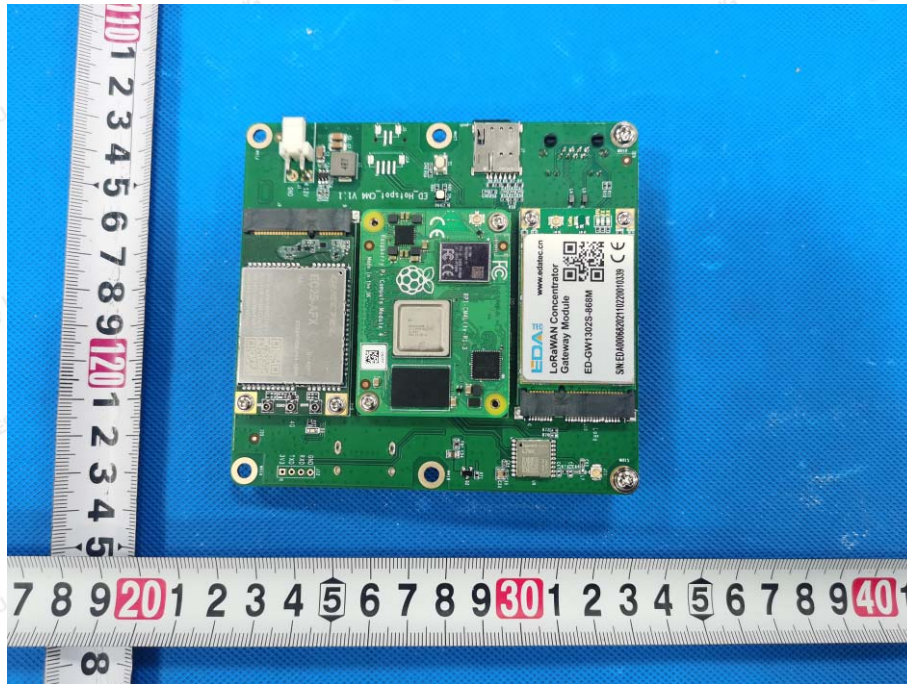




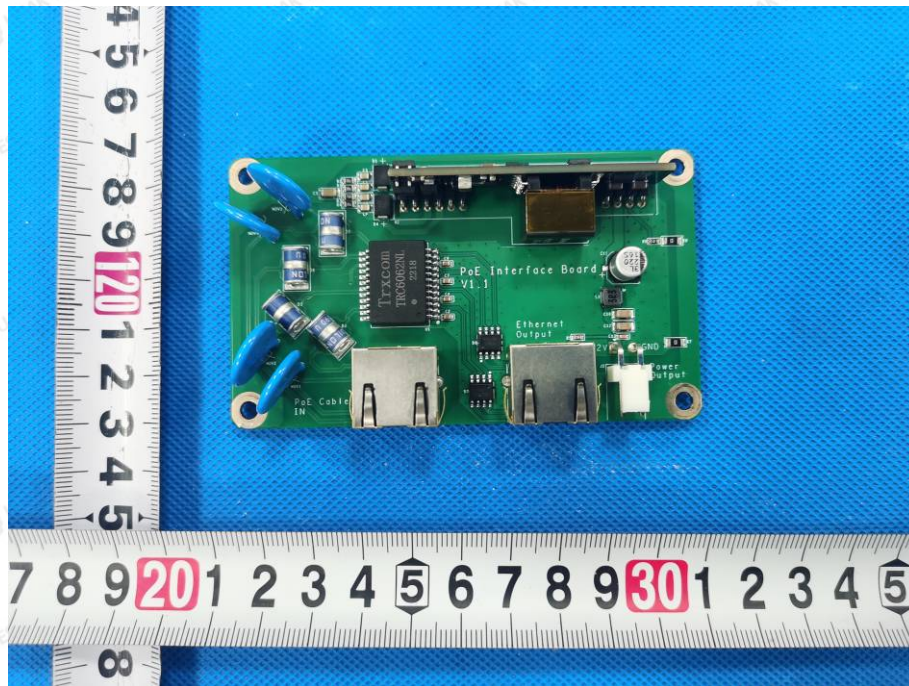
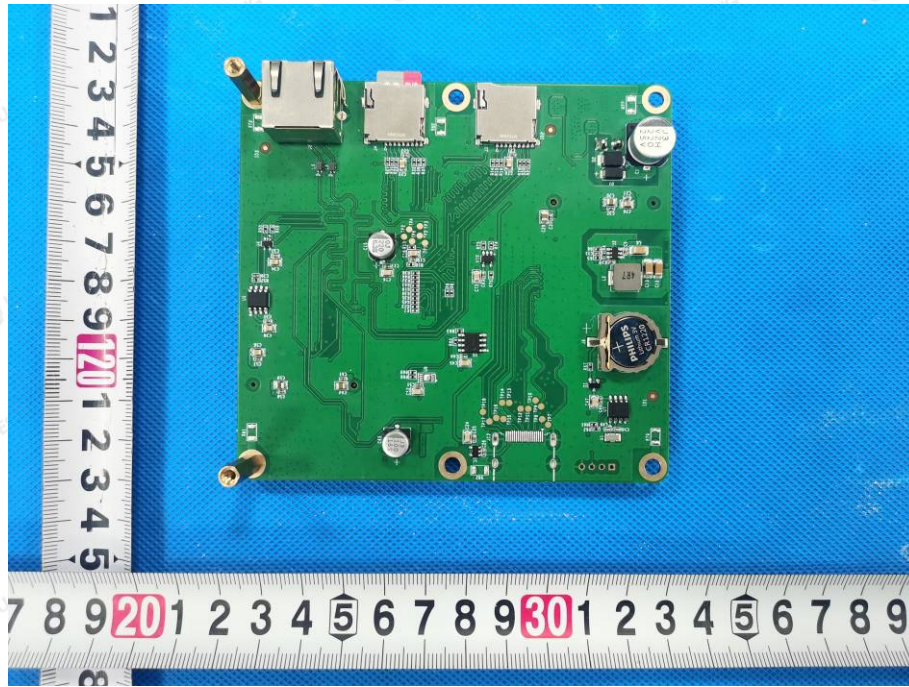




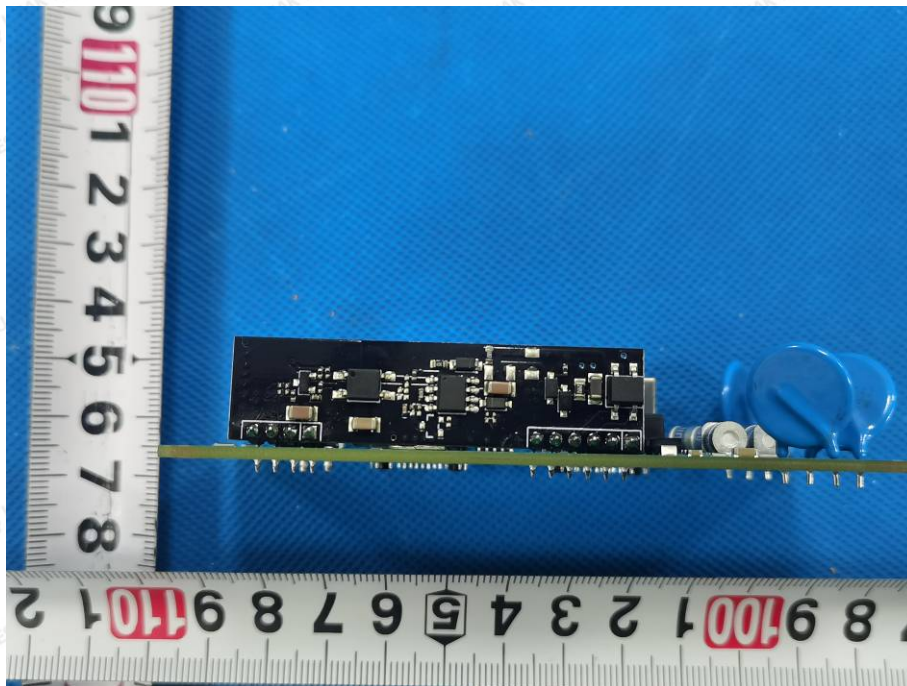
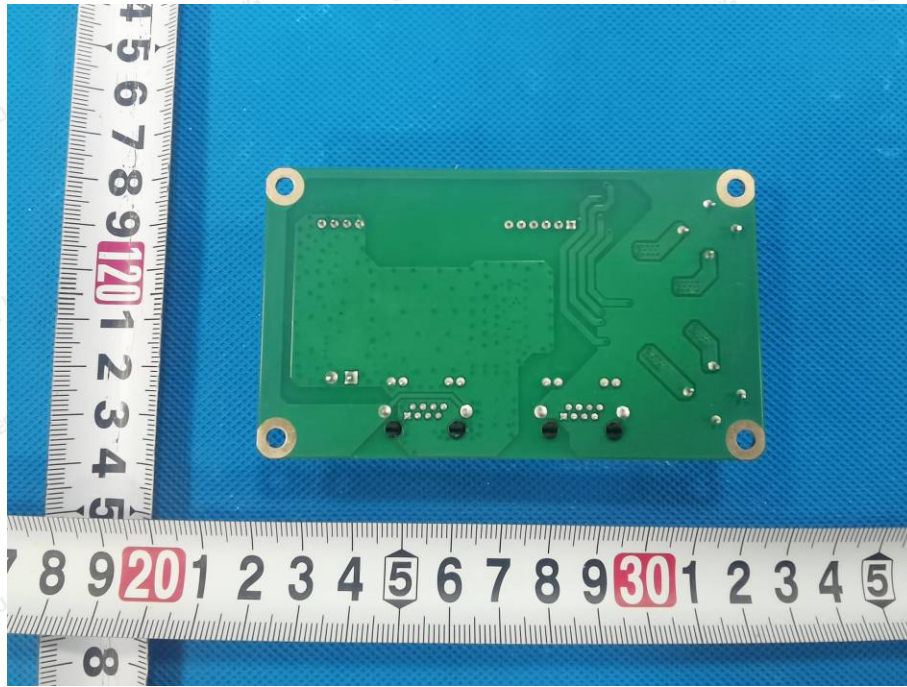




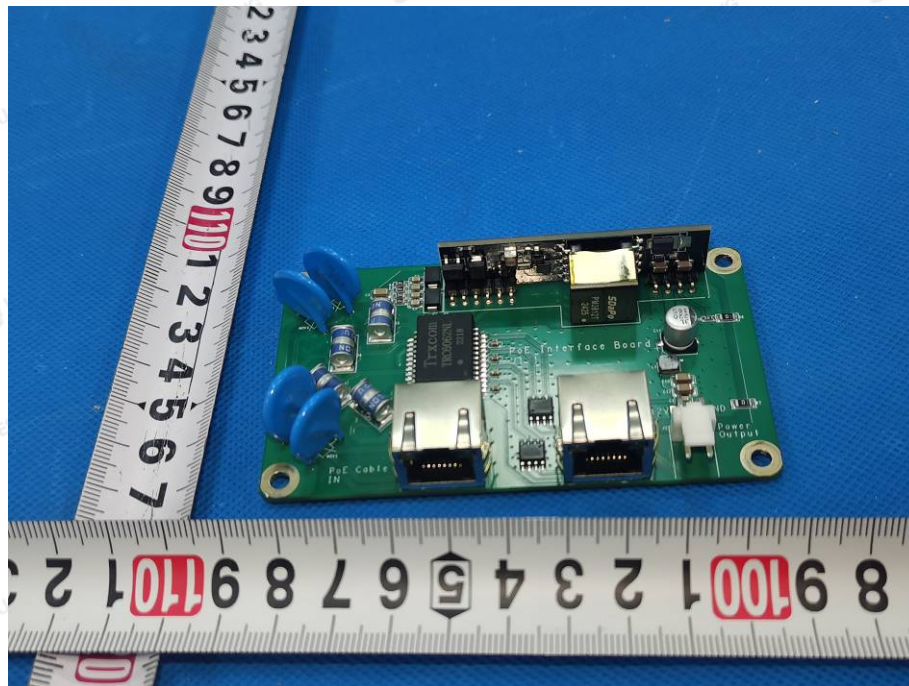




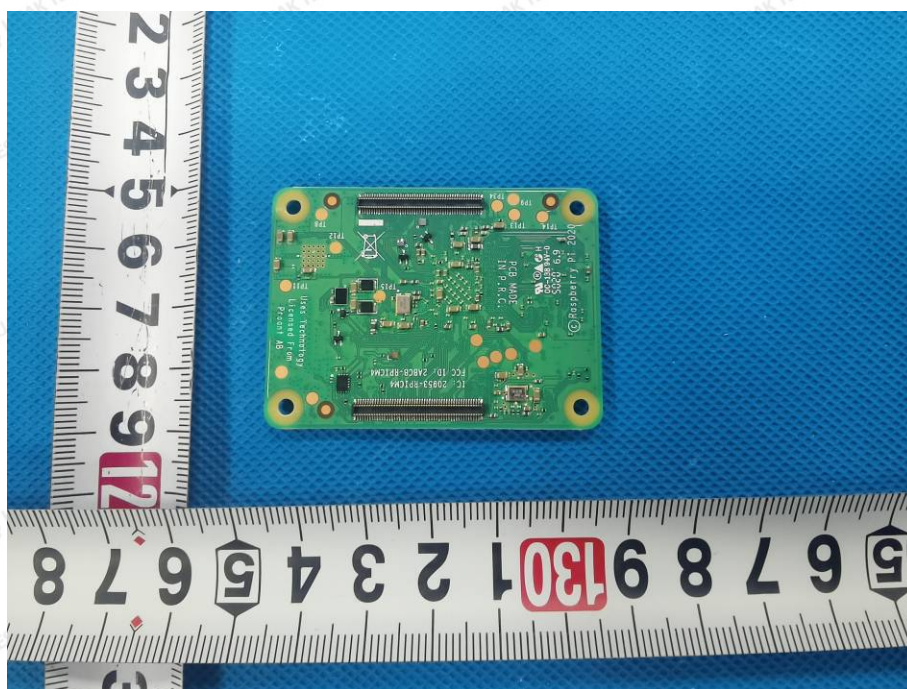




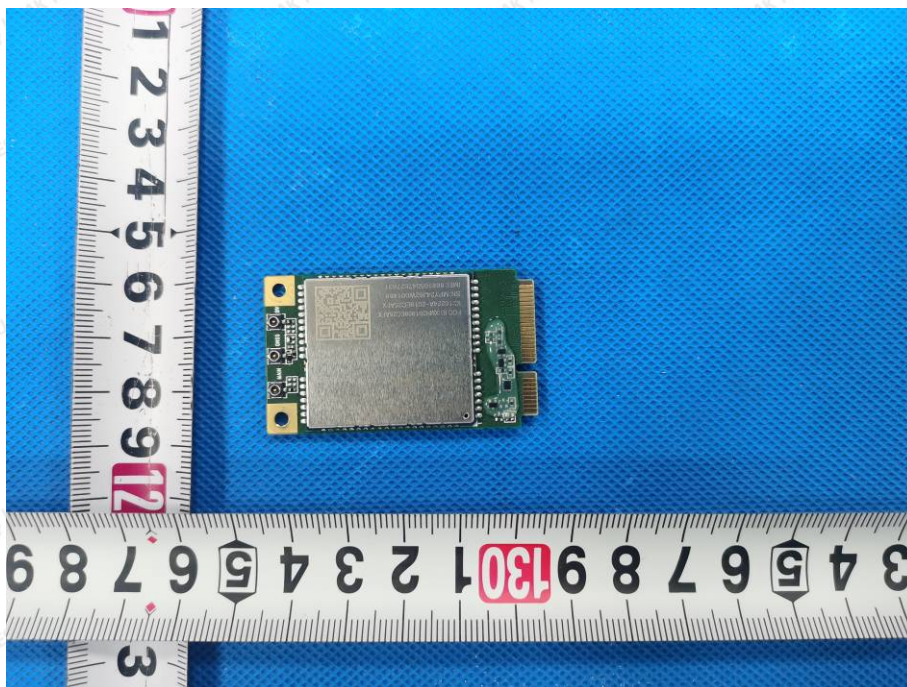
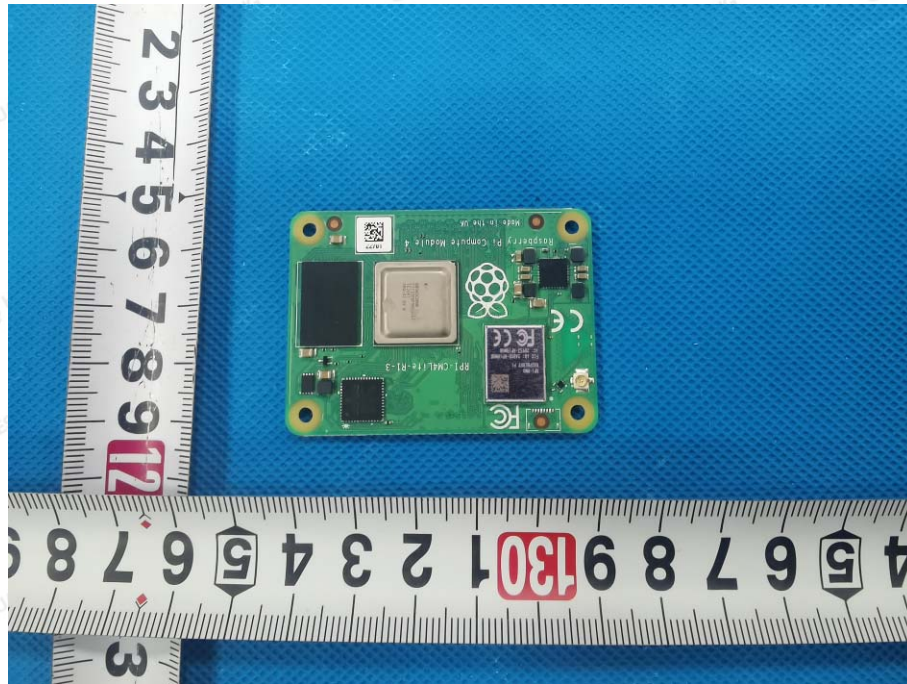


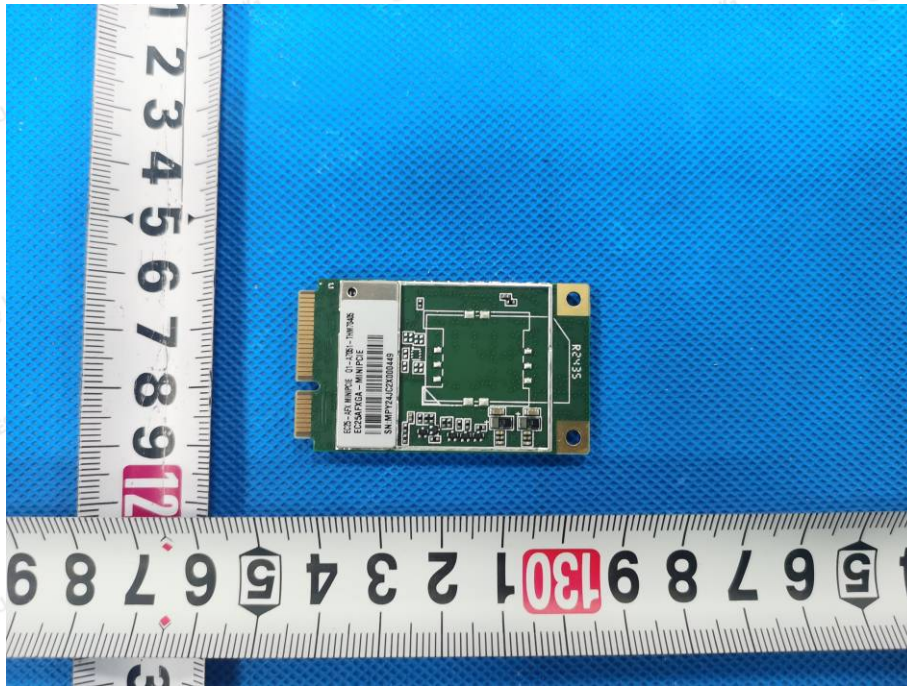












.....End of Report.....