



# TEST REPORT

**Draft ETSI EN 301 489-1 V2.2.2 (2019-09)/ Draft ETSI EN 301 489-17 V3.2.0 (2017-03)/ EN 55032:2015/EN 55035:2017/EN 61000-3-2:2014/EN 61000-3-3:2013 + A1:2019**

Report Reference No.....: **HK1911072819-1ER**

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Date of issue.....: 2019/11/21

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

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

**Applicant's name**.....: INTEK DIGITAL INC

Address.....: 815, 8th Floor, Doosan Venture Daim Building,  
Heung-An Road #415, Anyang-City, Gyeonggi-Do, South Korea

**Test specification:**

Standard .....: **Draft ETSI EN 301 489-1 V2.2.2 (2019-09)/ Draft ETSI EN 301 489-17 V3.2.0 (2017-03)/EN 55032:2015/EN 55035:2017/EN 61000-3-2:2014/EN 61000-3-3:2013 + A1:2019**

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

Master TRF.....: Dated 2017-05

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**Test item description** .....: Set top box

Trade Mark .....: Sky vision

Model/Type reference.....: UHD 3000 HD+

Listed Models .....: N/A

Hardware Version.....: V2.0

Software Version .....: V2.0

Rating .....: DC 12V From Adapter

Result.....: **PASS**



# TEST REPORT

<b>Test Report No. :</b>	<b>HK1911072819-1ER</b>	2019/11/21
		Date of issue

Equipment under Test : Set top box

Model /Type : UHD 3000 HD+

Listed Models : N/A

Applicant : INTEK DIGITAL INC

Address : 815, 8th Floor, Doosan Venture Daim Building, Heung-An Road #415, Anyang-City, Gyeonggi-Do, South Korea

Manufacturer : INTEK DIGITAL INC

Address : 815, 8th Floor, Doosan Venture Daim Building, Heung-An Road #415, Anyang-City, Gyeonggi-Do, South Korea

<b>Test Result</b> according to the standards on page 5:	<b>Positive</b>
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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	2019/11/21	James Zhou



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## 1. TEST STANDARDS

The tests were performed according to following standards:

[Draft ETSI EN 301 489-1 V2.2.2 \(2019-09\)](#)

ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic Compatibility

[Draft ETSI EN 301 489-17 V3.2.0 \(2017-03\)](#)

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

[EN 61000-3-2:2014](#) Electromagnetic compatibility of multimedia equipment – Emission Requirements

[EN 61000-3-3:2013 + A1:2019](#) Electromagnetic compatibility of multimedia equipment – Emission Requirements





## 2. SUMMARY

### 2.1. General Remarks

Date of receipt of test sample	:	2019/11/07
Testing commenced on	:	2019/11/07
Testing concluded on	:	2019/11/21

### 2.2. Product Description

Name of EUT	Set top box
Model(s) Number	UHD 3000 HD+
List Models	N/A
Difference description	N/A
Hardware version	V2.0
Software version	V2.0
Antenna Type	Internal 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) <u>DC 12V From Adapter</u>	

### 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	Working
<b>EMS</b>	
Mode 1	Working

### 2.6. EUT configuration

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

- supplied by the manufacturer
- Supplied by the lab


Adapter information

Input : AC 100-240V, 50/60Hz 0.5A  
 Output : DC 12V/1.5A  
 Model : CYV108S120V1500E





### 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 HUAK Testing Technology Co., Ltd.  
1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park,  
Heping Community, Fuhai Street, Bao'an District, Shenzhen, 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

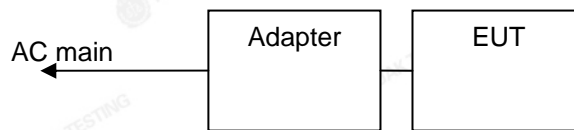


Table 2-1 Equipment Used in Tested System

No.	Product	Manufacturer	Model No.	FCC ID
/	/	/	/	/



**3.4. Test Description**

<b>ETSI EN 301 489-1/-17 requirements</b>		
Radiated Emission	Draft ETSI EN 301 489-1 V2.2.2 (2019-09) Clause 7.1 EN 55032: 2015 Annex A.2	PASS
Conducted Emission( AC Mains)	Draft ETSI EN 301 489-1 V2.2.2 (2019-09) Clause 7.1	PASS
Conducted Emission( Telecommunication Ports)	Draft ETSI EN 301 489-1 V2.2.2 (2019-09) Clause 7.1 EN 55032: 2015 Annex A.3	N/A
Harmonic Current Emissions	Draft ETSI EN 301 489-1 V2.2.2 (2019-09) Clause 7.1 EN 61000-3-2: 2014	N/A
Voltage Fluctuations and Flicker	Draft ETSI EN 301 489-1 V2.2.2 (2019-09) Clause 7.1 EN 61000-3-3: 2013	PASS
Conducted Emission (telecommunication)	Draft ETSI EN 301 489-1 V2.2.2 (2019-09) Clause 7.1	N/A
Electrostatic Discharge	Draft ETSI EN 301 489-1 V2.2.2 (2019-09) Clause 7.2	PASS
RF Electromagnetic Field	Draft ETSI EN 301 489-1 V2.2.2 (2019-09) Clause 7.2	PASS
Fast Transients Common Mode	Draft ETSI EN 301 489-1 V2.2.2 (2019-09) Clause 7.2	PASS
RF Common Mode 0,15 MHz to 80 MHz	Draft ETSI EN 301 489-1 V2.2.2 (2019-09) Clause 7.2	PASS
Transients and Surges	Draft ETSI EN 301 489-1 V2.2.2 (2019-09) Clause 7.2	N/A
Voltage Dips and Interruptions	Draft ETSI EN 301 489-1 V2.2.2 (2019-09) Clause 7.2	PASS
Surges, Line to Line and Line to Ground	Draft ETSI EN 301 489-1 V2.2.2 (2019-09) 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 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:

<b>Test</b>	<b>Range</b>	<b>Measurement Uncertainty</b>	<b>Notes</b>
Radiated Emission	30~1000MHz	4.24 dB	(1)
Radiated Emission	1~18GHz	5.16 dB	(1)
Radiated Emission	18-40GHz	5.54 dB	(1)
Conducted Disturbance	0.15~30MHz	3.39 dB	(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	Dec. 27, 2018	Dec. 26, 2019	1 year
2	LISN	R&S	ENV216	HKE-029	Dec. 27, 2018	Dec. 26, 2019	1 year
3	EMI Test Receiver	R&S	ESCI-7	HKE-010	Dec. 27, 2018	Dec. 26, 2019	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	Dec. 27, 2018	Dec. 26, 2019	1 year
2	EMI Test Receiver	R&S	ESCI-7	HKE-010	Dec. 27, 2018	Dec. 26, 2019	1 year
3	Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 27, 2018	Dec. 26, 2019	1 year
4	Horn antenna	Schwarzbeck	9120D	HKE-013	Dec. 27, 2018	Dec. 26, 2019	1 year
5	Preamplifier	EMCI	EMC051845SE	HKE-015	Dec. 27, 2018	Dec. 26, 2019	1 year
6	Preamplifier	Agilent	83051A	HKE-016	Dec. 27, 2018	Dec. 26, 2019	1 year
7	Position controller	Taiwan MF	MF7802	HKE-011	Dec. 27, 2018	Dec. 26, 2019	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	5001ix	HKE-037	Dec. 27, 2018	Dec. 26, 2019	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	Dec. 27, 2018	Dec. 26, 2019	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	Dec. 27, 2018	Dec. 26, 2019	1 year
2	Hf antenna	Schwarzbeck	LB-180400-KF	HKE-031	Dec. 27, 2018	Dec. 26, 2019	1 year
3	Power amplifier	R&S	NTWPA-1060040E	HKE-035	Dec. 27, 2018	Dec. 26, 2019	1 year
4	Broadband antenna	Schwarzbeck	VULB 9163	HKE-012	Dec. 27, 2018	Dec. 26, 2019	1 year
5	Power amplifier	R&S	5225F	HKE-058	Dec. 27, 2018	Dec. 26, 2019	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	Dec. 27, 2018	Dec. 26, 2019	1 year
2	Group pulse coupling clamp	HTEC	H3C	HKE-024	Dec. 27, 2018	Dec. 26, 2019	1 year

INJECTION CURRENT

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Integrated Conduction Sensitivity Test System	Schloder	CDG6000	HKE-033	Dec. 27, 2018	Dec. 26, 2019	1 year

PFMF

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Power frequency induction coil	HTEC Instruments Ltd.	HPFMF	HKE-049	Dec. 27, 2018	Dec. 26, 2019	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

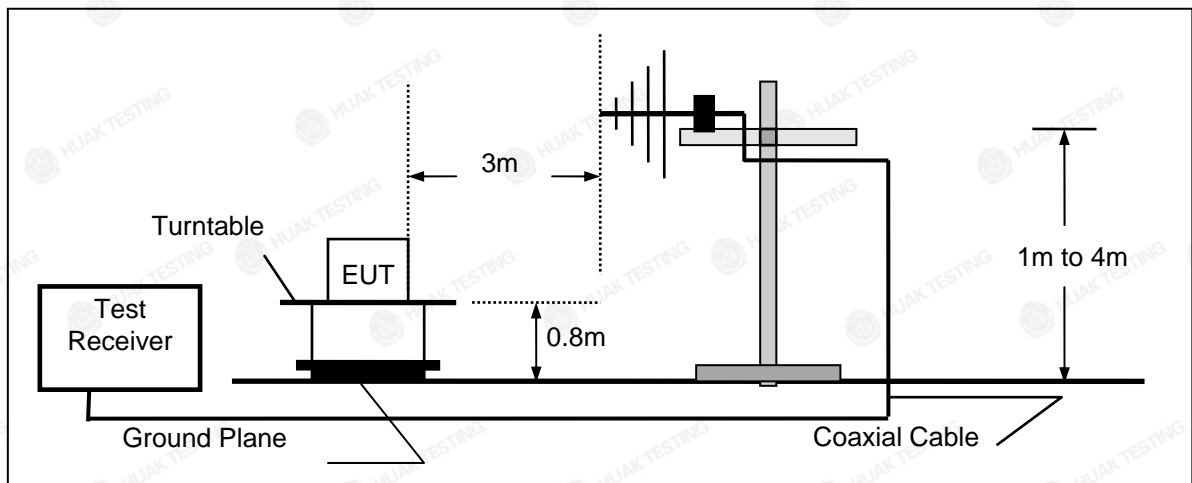
The ancillary equipment shall meet the class B limits given in CENELEC EN 55032 [1], annex A tables A.4 and A.5.

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.

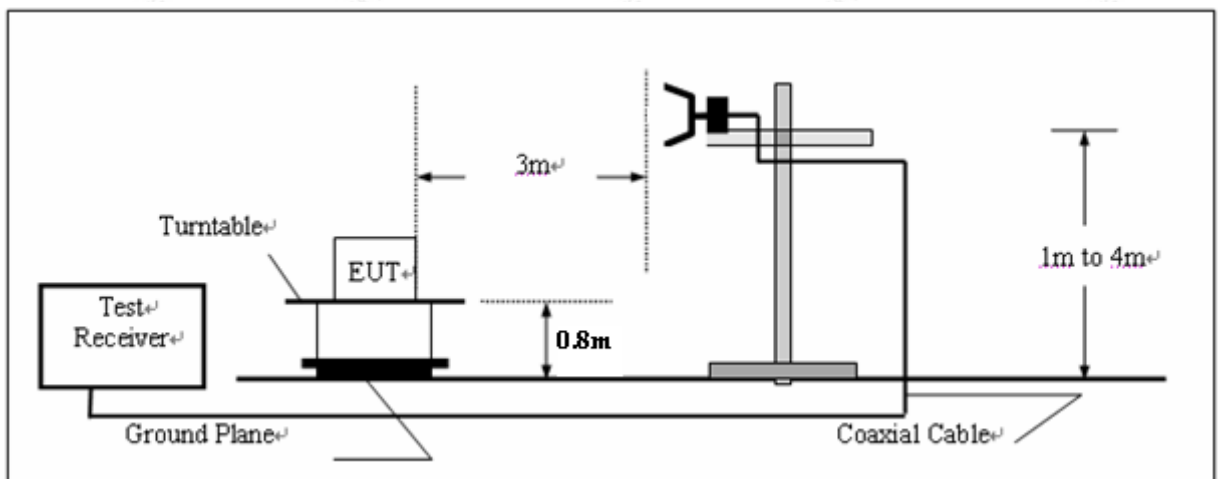
If EUT is also a FM Receiver, it shall meet CENELEC EN 55032 [3], annex A tables A.6

##### TEST CONFIGURATION

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



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





**TEST PROCEDURE**

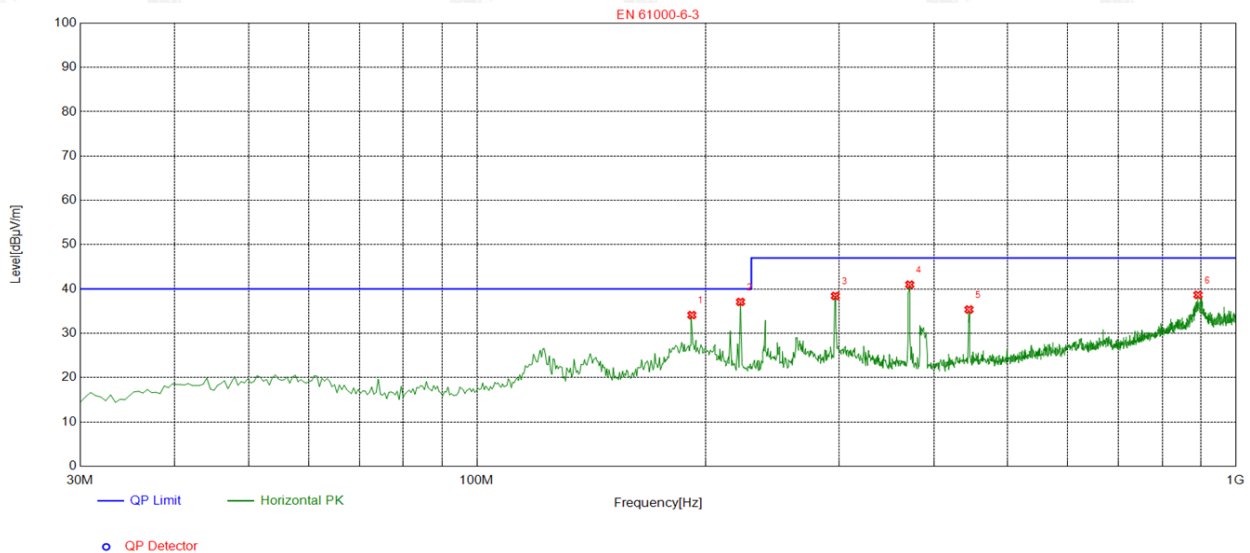
Please refer to ETSI EN 301 489-1 Clause 8.2.2 and The test method shall be in accordance with CENELEC EN 55032 [1], annex A.2. for the measurement methods.

**Climatic conditions**

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

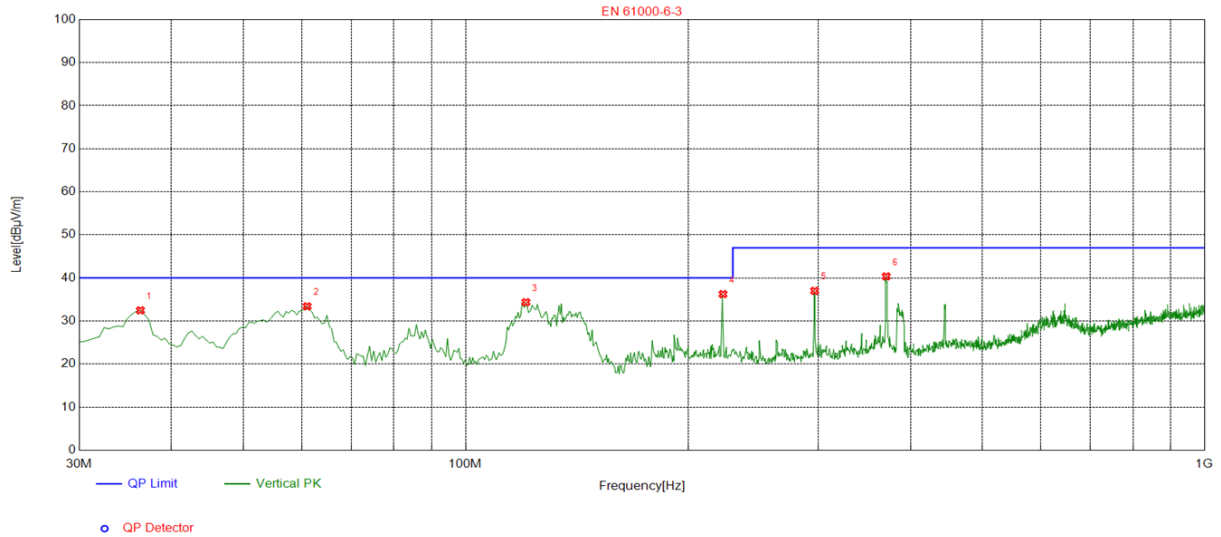
**TEST RESULTS**

**Below 1000MHz**



Suspected List								
NO.	Freq. [MHz]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	191.990	34.11	-15.82	40.00	5.89	100	66	Horizontal
2	222.545	37.08	-14.50	40.00	2.92	100	166	Horizontal
3	296.750	38.43	-12.77	47.00	8.57	100	97	Horizontal
4	371.925	40.98	-10.97	47.00	6.02	100	358	Horizontal
5	445.160	35.36	-9.20	47.00	11.64	100	220	Horizontal
6	891.845	38.66	-1.86	47.00	8.34	100	49	Horizontal

- Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.  
 2. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.



Suspected List								
NO.	Freq. [MHz]	Level [dBuV/m]	Factor [dB]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	36.3050	32.47	-15.73	40.00	7.53	100	128	Vertical
2	61.0400	33.40	-15.42	40.00	6.60	100	348	Vertical
3	120.695	34.36	-17.20	40.00	5.64	100	15	Vertical
4	223.030	36.24	-14.49	40.00	3.76	100	189	Vertical
5	296.750	36.99	-12.77	47.00	10.01	100	199	Vertical
6	370.955	40.35	-10.98	47.00	6.65	100	76	Vertical

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.  
 2. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

Radiated Emission From 1 GHz to 6 GHz

Frequency (MHz)	PK (dBuV/m)	Average (dBuV/m)	MaxPeak Limit (dBuV/m)	Limit Average (dBuV/m)	Margin PK (dB)	Margin AC (dB)	Pol	Azimuth (deg)
1976.58	49.08	---	70	50	20.92	---	V	315
1978.39	50.46	---	70	50	19.54	---	H	228
2262.51	44.98	---	70	50	25.02	---	V	178
2411.43	43.62	---	70	50	26.38	---	H	356
3936.46	48.28	---	74	54	25.72	---	V	130
3924.09	47.69	---	74	54	26.31	---	H	44

## 4.1.2. Conducted Emission (AC Mains)

### LIMIT

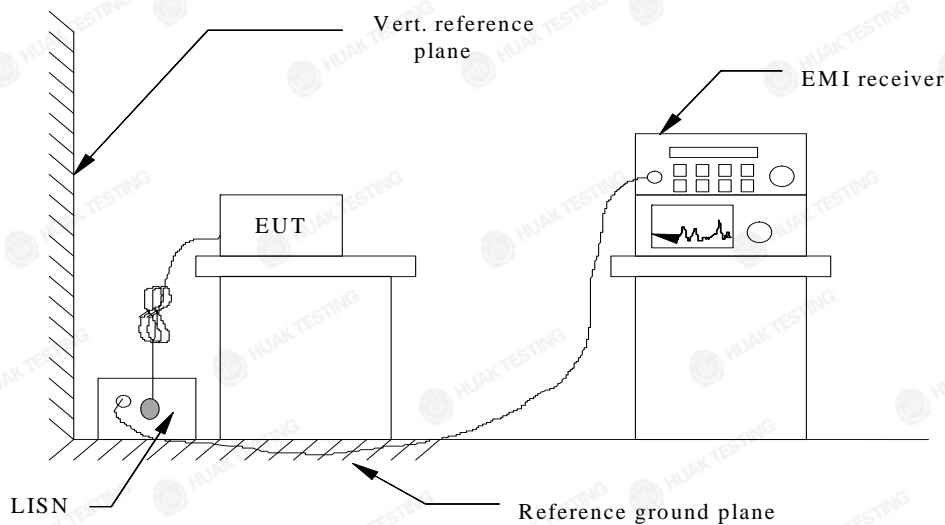
Please refer to ETSI EN 301 489-1 Clause 8.4.3

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



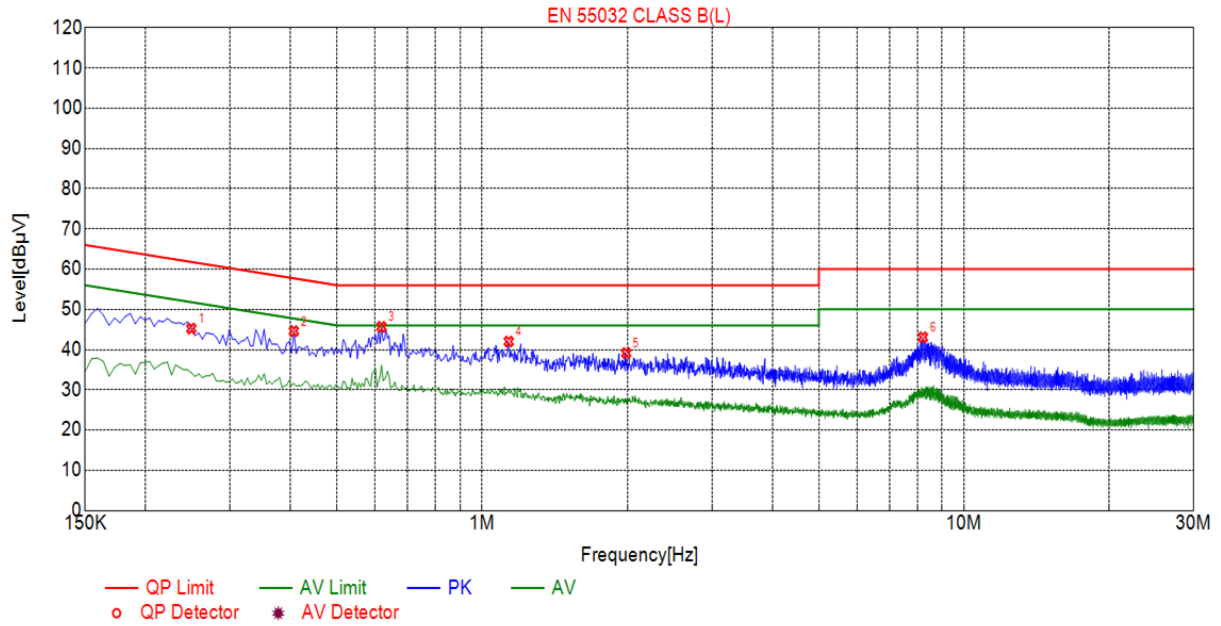
### TEST PROCEDURE

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



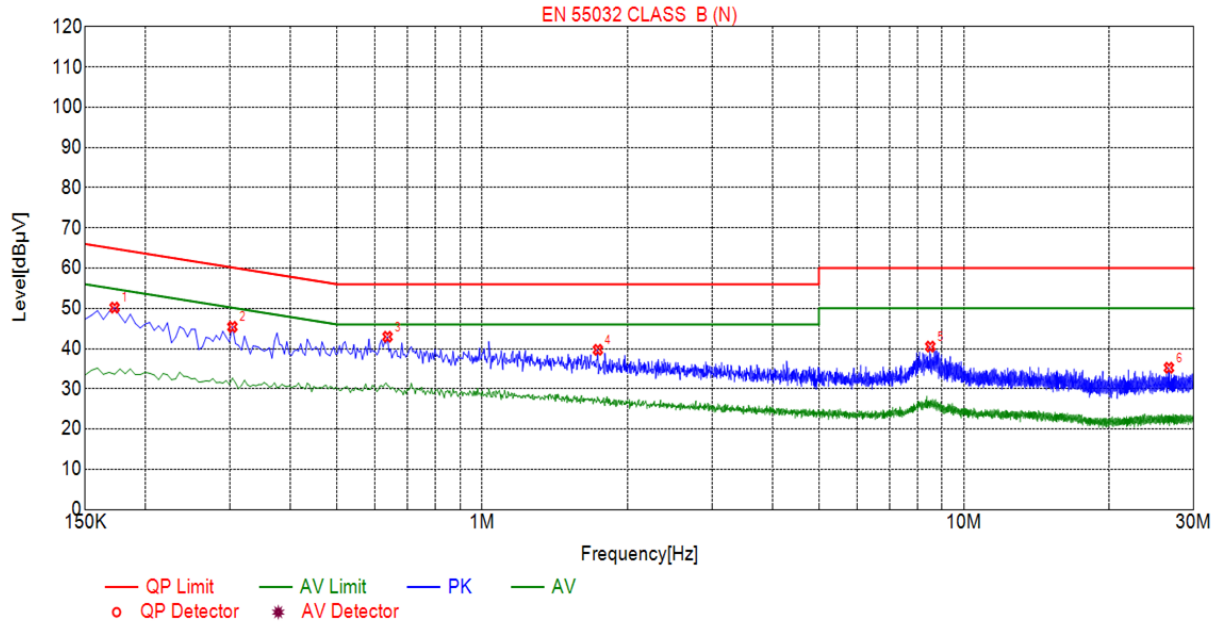


Suspected List						
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Detector
1	0.2490	45.23	10.04	61.79	16.56	PK
2	0.4065	44.59	10.03	57.72	13.13	PK
3	0.6180	45.66	10.05	56.00	10.34	PK
4	1.1355	42.00	10.09	56.00	14.00	PK
5	1.9905	39.14	10.14	56.00	16.86	PK
6	8.2185	43.07	10.14	60.00	16.93	PK

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Suspected List						
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Detector
1	0.1725	50.20	10.04	64.84	14.64	PK
2	0.3030	45.40	10.04	60.16	14.76	PK
3	0.6360	42.95	10.05	56.00	13.05	PK
4	1.7385	39.71	10.14	56.00	16.29	PK
5	8.5155	40.50	10.13	60.00	19.50	PK
6	26.6460	35.24	10.26	60.00	24.76	PK

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### 4.1.3. Conducted Emission (Telecommunication Ports)

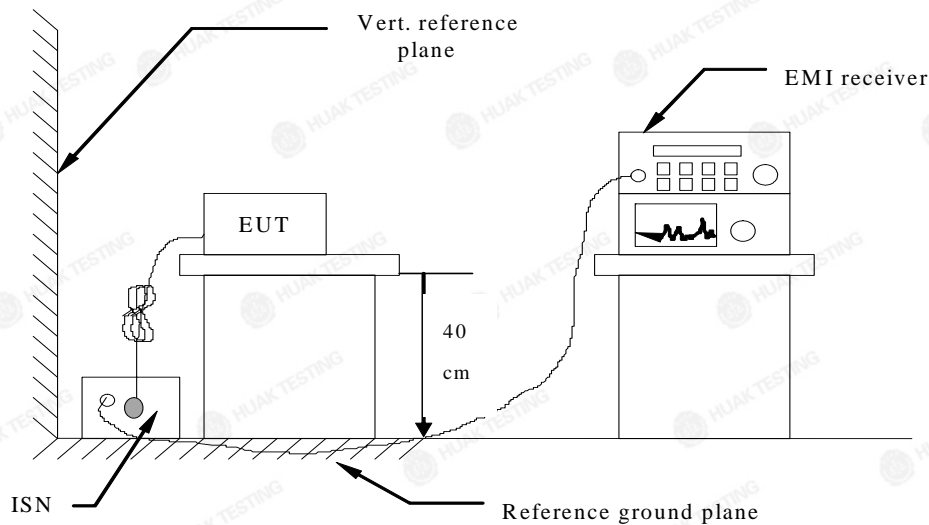
#### LIMIT

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

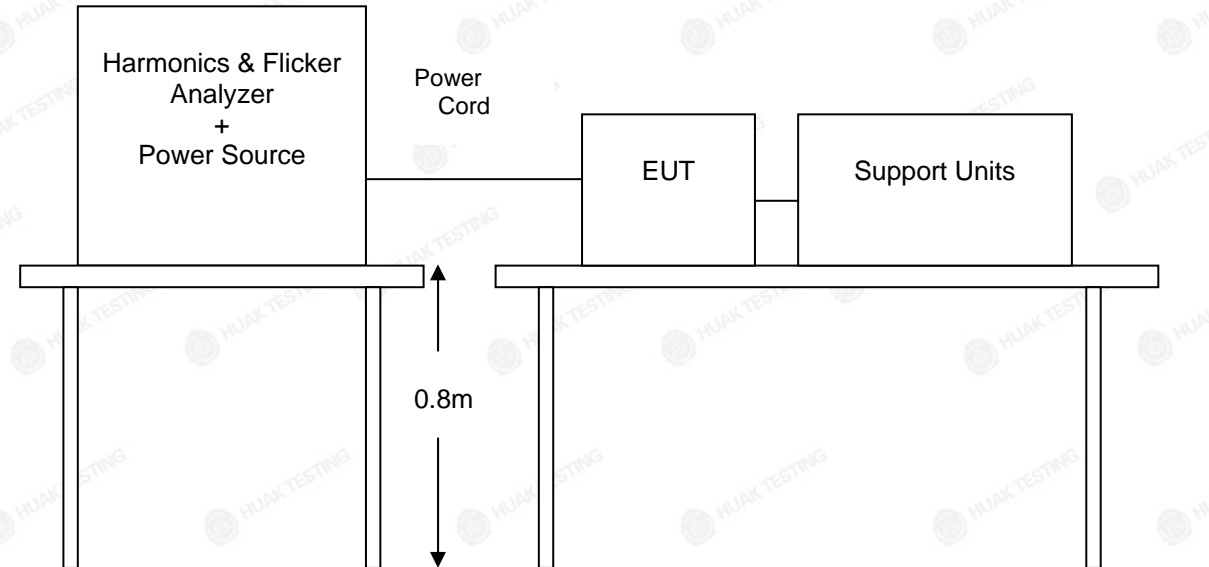
Not applicable

#### 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 Power is less than 75W, 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

Test Result	PASS
-------------	------

Test Parameter	Measurement Value	Limit	Remarks
$P_{st}$	0.055	1.0	Pass
$P_{lt}$	0.034	0.65	Pass
$T_{dt(s)}$	0.018	0.2	Pass
$d_{max}(\%)$	0.00%	4%	Pass
$d_c(\%)$	0.00%	3%	Pass



### 4.1.6. Electrostatic Discharge

#### LIMIT

Please refer to EN 61000-4-2

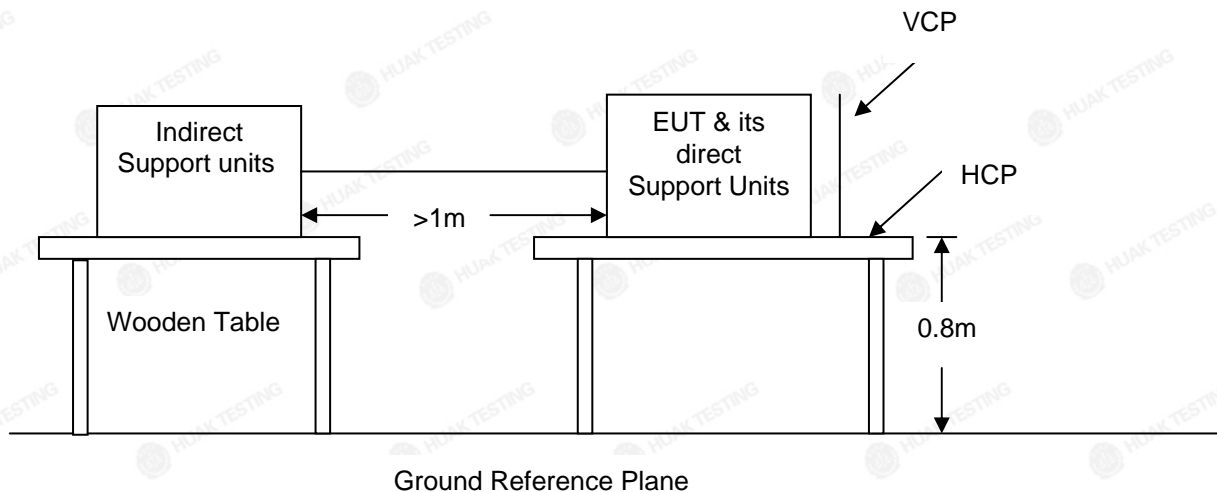
#### SEVERITY LEVELS OF ELECTROSTATIC DISCHARGE

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.

#### 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



**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.

**Description of Discharge Point**

Contact Discharge		Air Discharge	
○	<b>Metallic Screws</b>	○	<b>Plastic Screws</b>
○	<b>Metallic Case</b>	●	<b>Plastic Case(gap)</b>
●	<b>Metallic Connect ports</b>	●	<b>Plastic Connect Ports</b>
●	<b>Metallic Junctions</b>	●	<b>Plastic Junctions</b>
○	<b>Others (Antenna Port)</b>	○	<b>Others</b>

Note: EUT is a built-in product, don't need test contact discharger and air discharger.

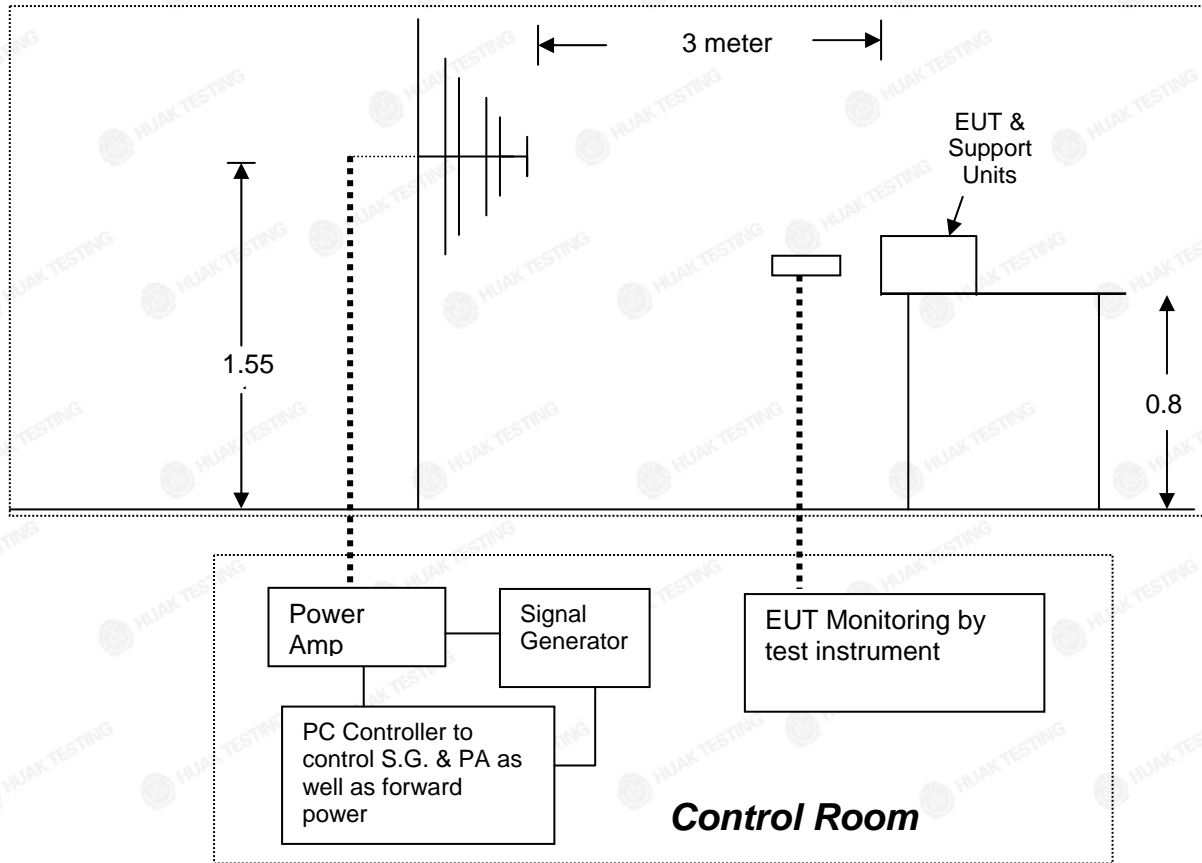
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**4.1.7. RF Electromagnetic Field**

**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	80-1000	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	80-1000	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	80-1000	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	80-1000	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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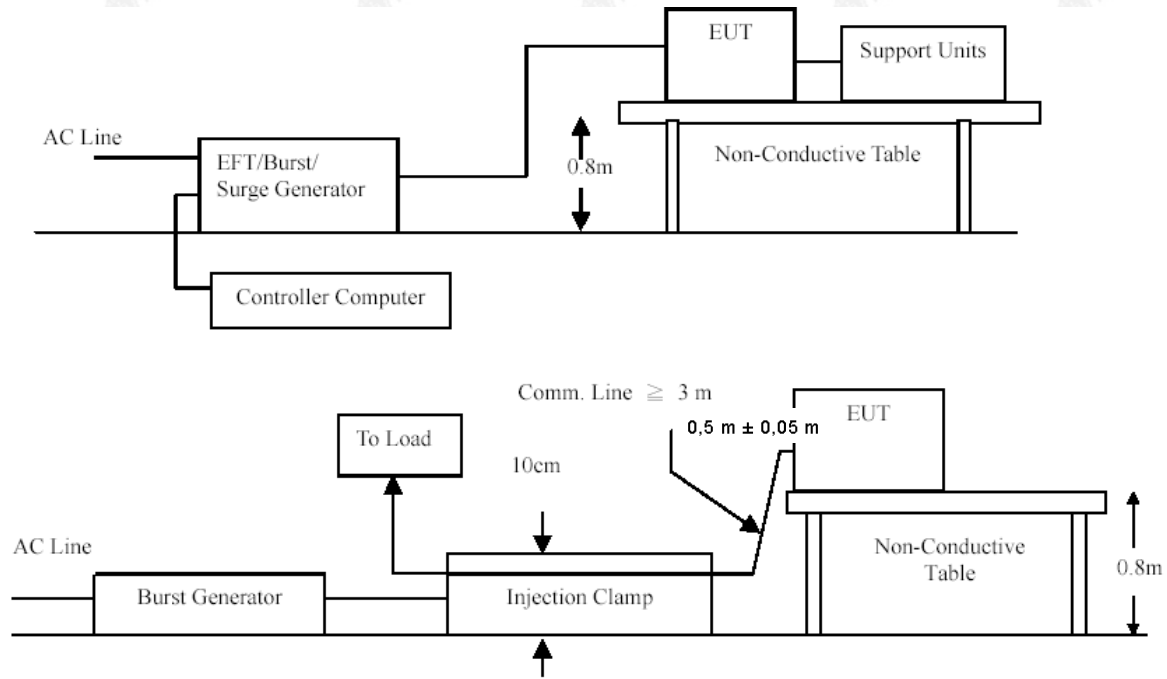
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#### 4.1.8. Fast Transients Common Mode

##### 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





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

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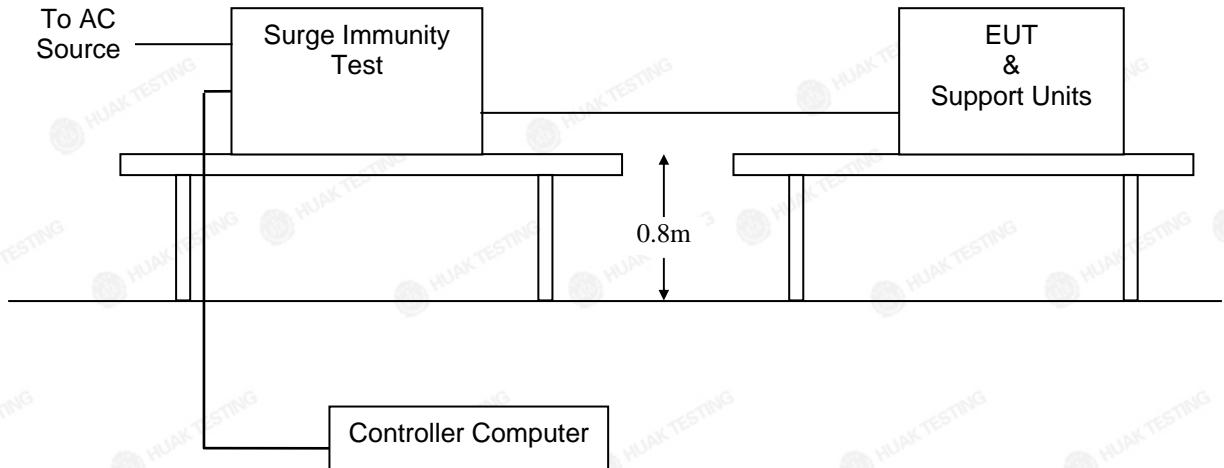


### 4.1.9. Surges, Line to Line and Line to Ground

#### 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°	A	A	A	A					B	PASS
		90°	A	A	A	A						
		180°	A	A	A	A						
		270°	A	A	A	A						
	L-PE	0°										
		90°										
		180°										
		270°										
	N-PE	0°										
		90°										
		180°										
		270°										
DC Line												
Signal Line												

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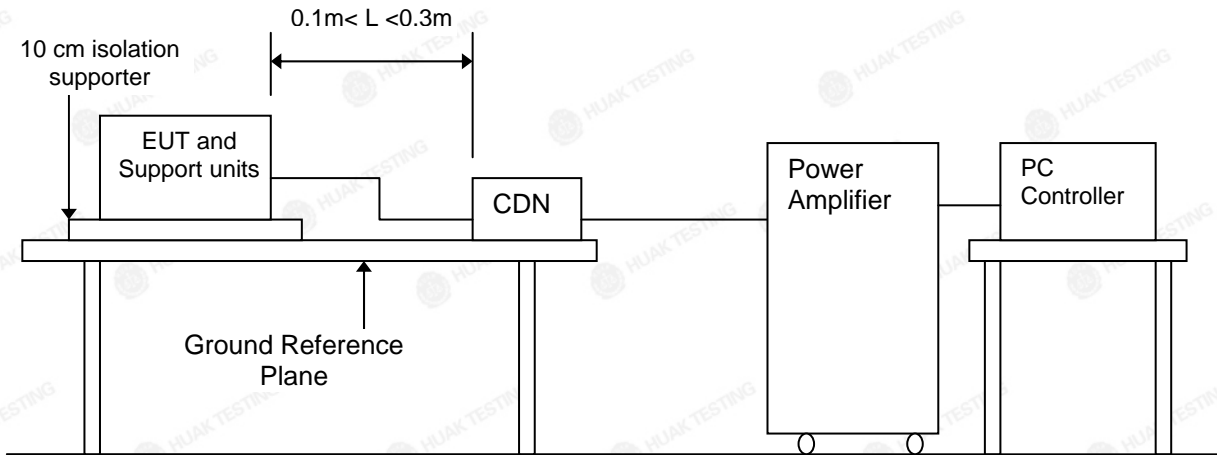
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**4.1.10. RF- Common Mode 0.15MHz to 80MHz**

**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**

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	A	PASS
Input/ Output DC. Power Port	0.15 --- 80		A	N/A	N/A
Signal Line	0.15 --- 80		A	N/A	N/A

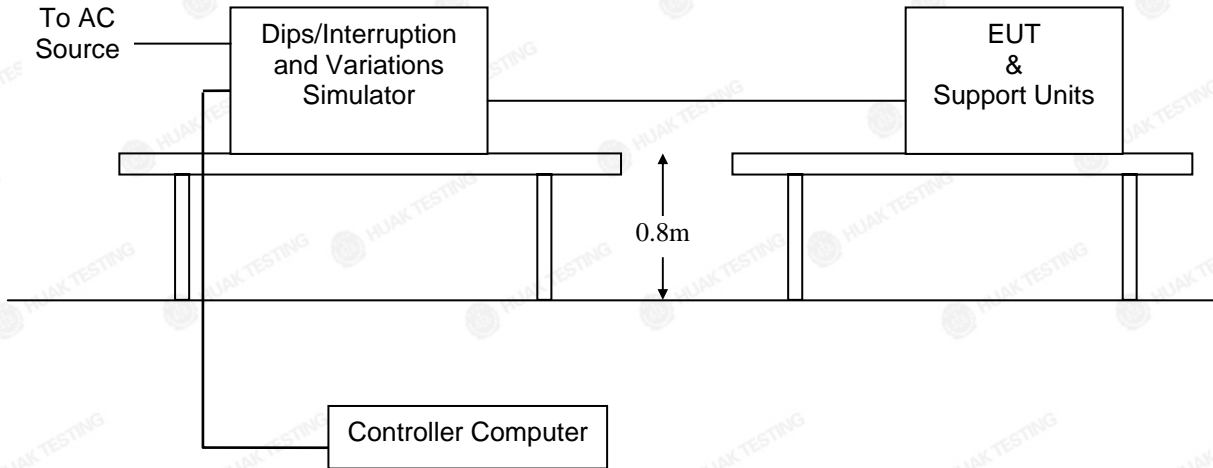
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**4.1.11. Voltage Dips and Interruptions**

**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**

Interruption & Dips	Duration (ms)	Perform Criteria	Results	Judgment
Voltage dip 0%	10	<b>B</b>	<b>A</b>	<b>PASS</b>
Voltage dip 0%	20	<b>B</b>	<b>A</b>	<b>PASS</b>
Voltage dip 70%	500	<b>B</b>	<b>A</b>	<b>PASS</b>
Voltage dip 0%	5000	<b>B</b>	<b>B</b>	<b>PASS</b>

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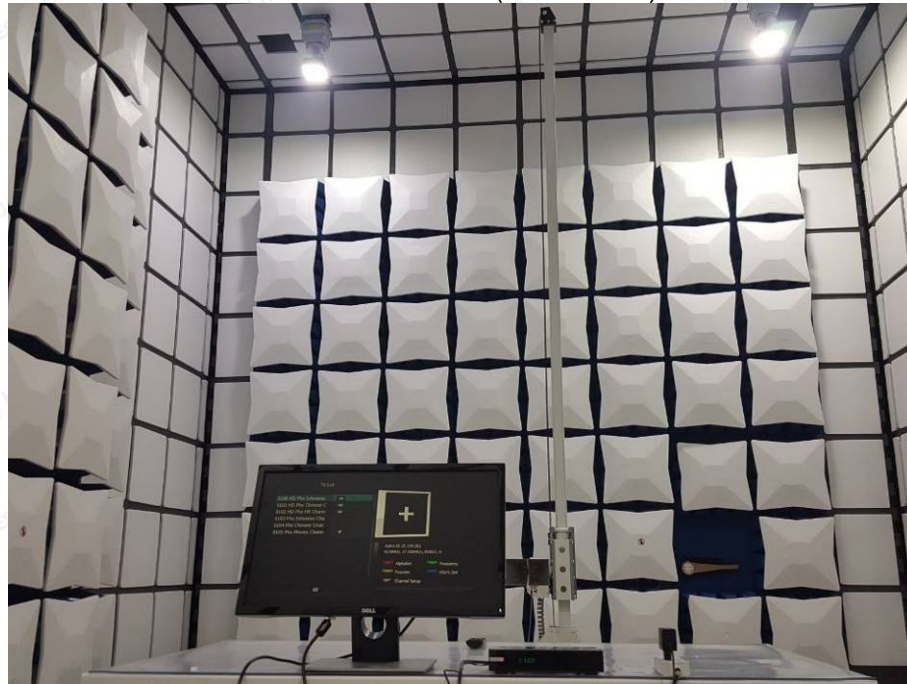


## 5. Test Set-up Photos of the EUT

Radiated Emission (30MHz-1GHz)



Radiated Emission (1GHz-6GHz)

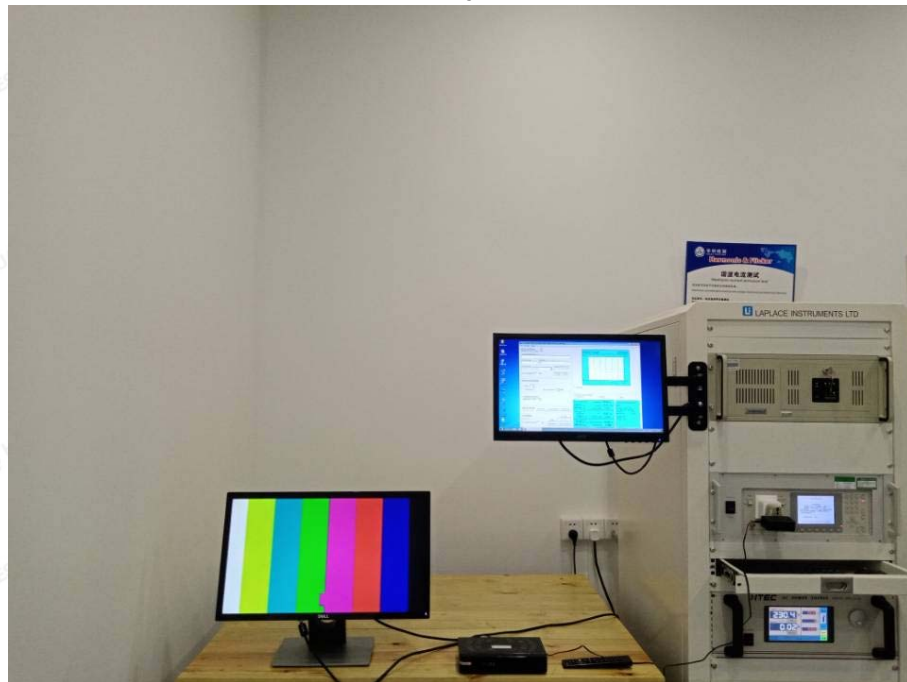




Conducted Emission



Flick



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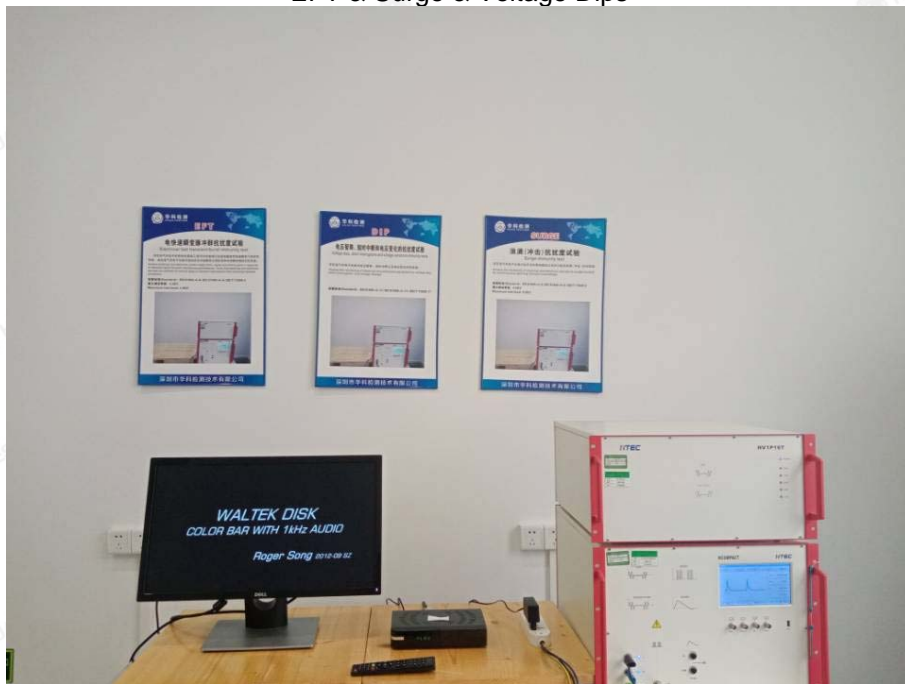
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### Electrostatic Discharge



### EFT & Surge & Voltage Dips



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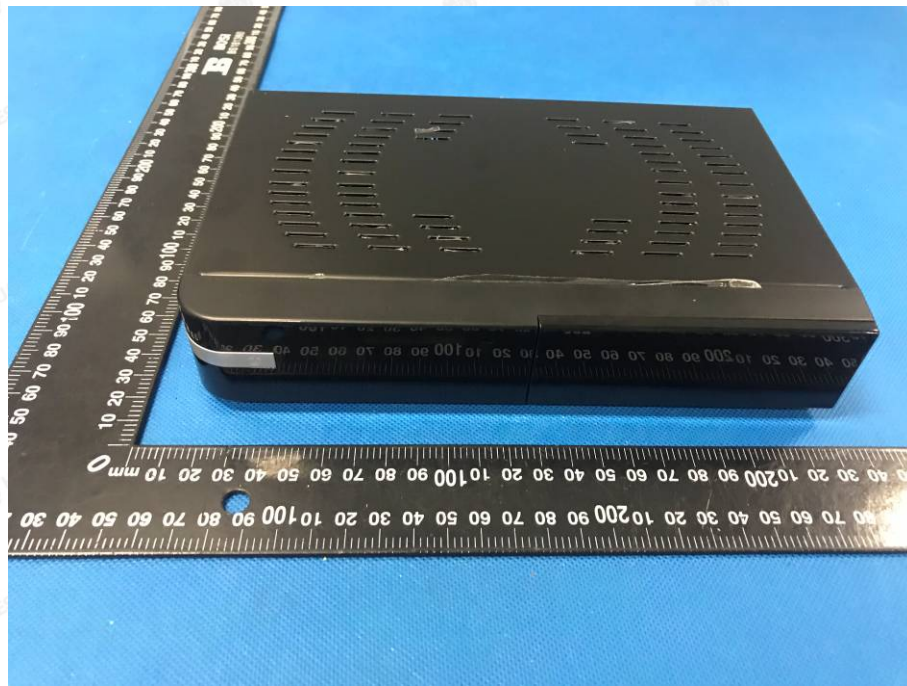
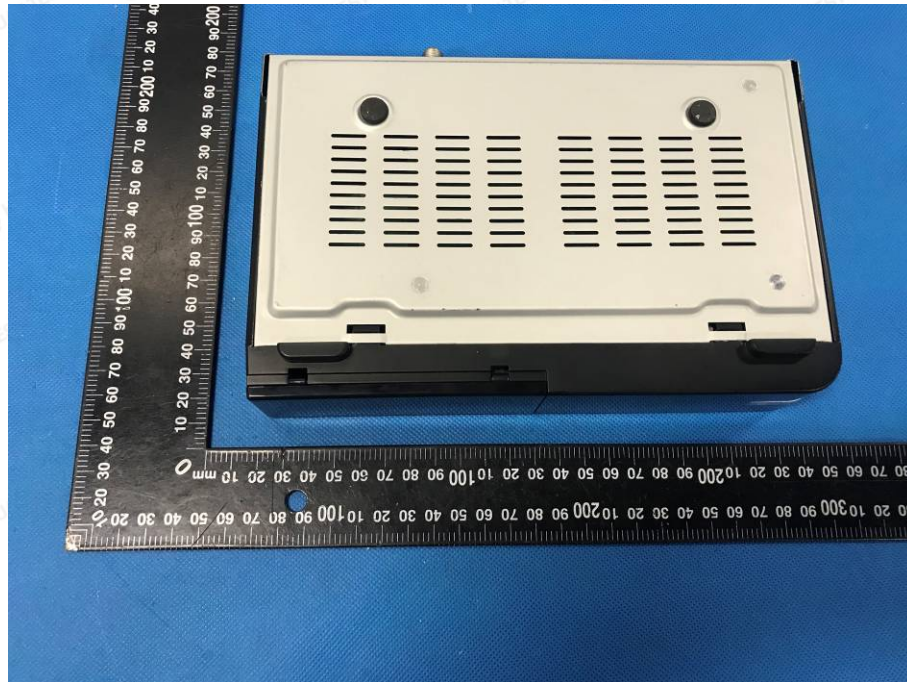
## 6. PHOTOS OF THE EUT



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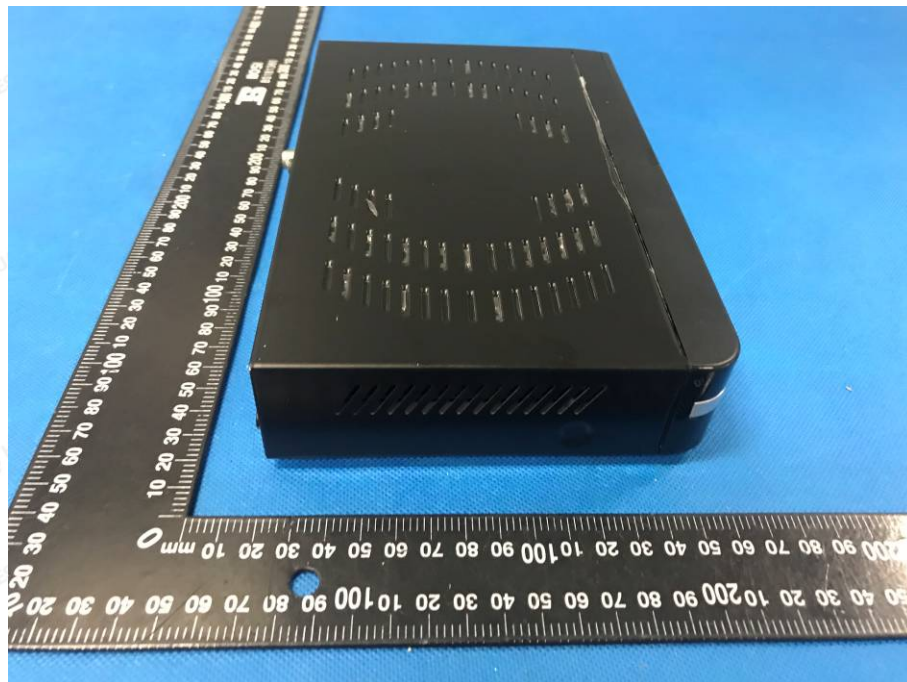


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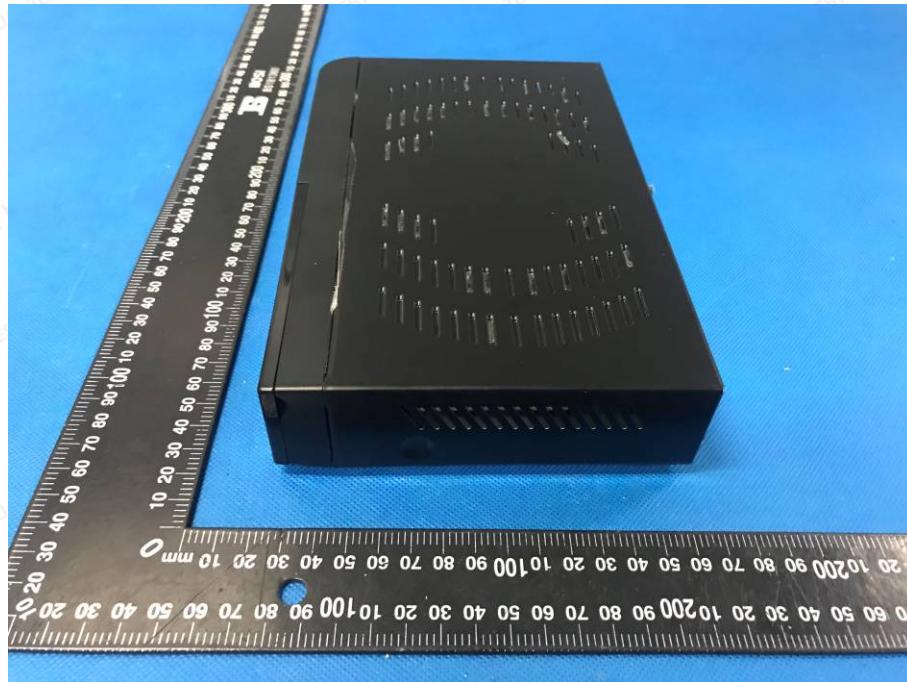




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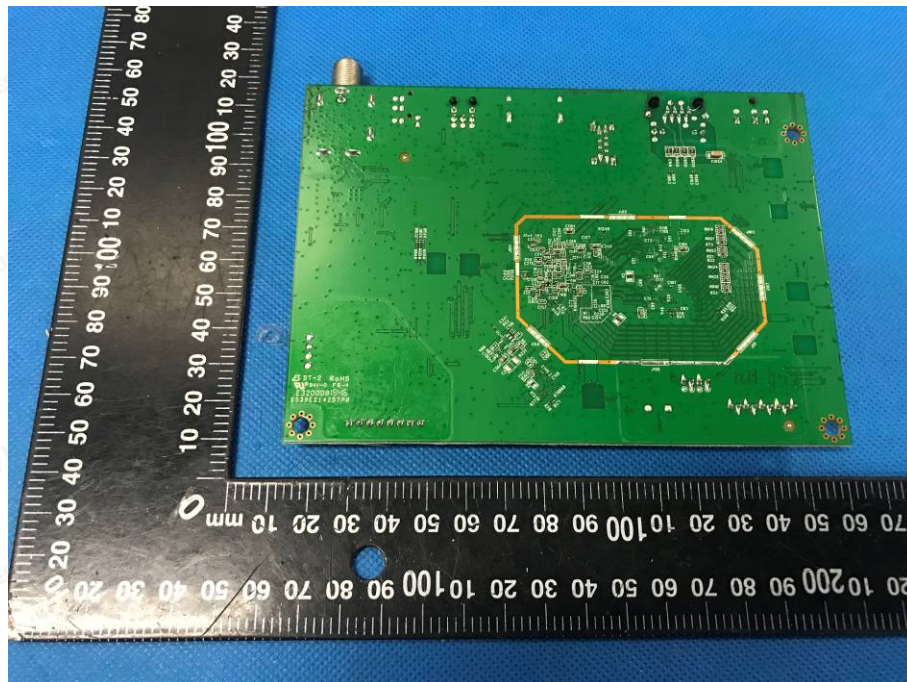
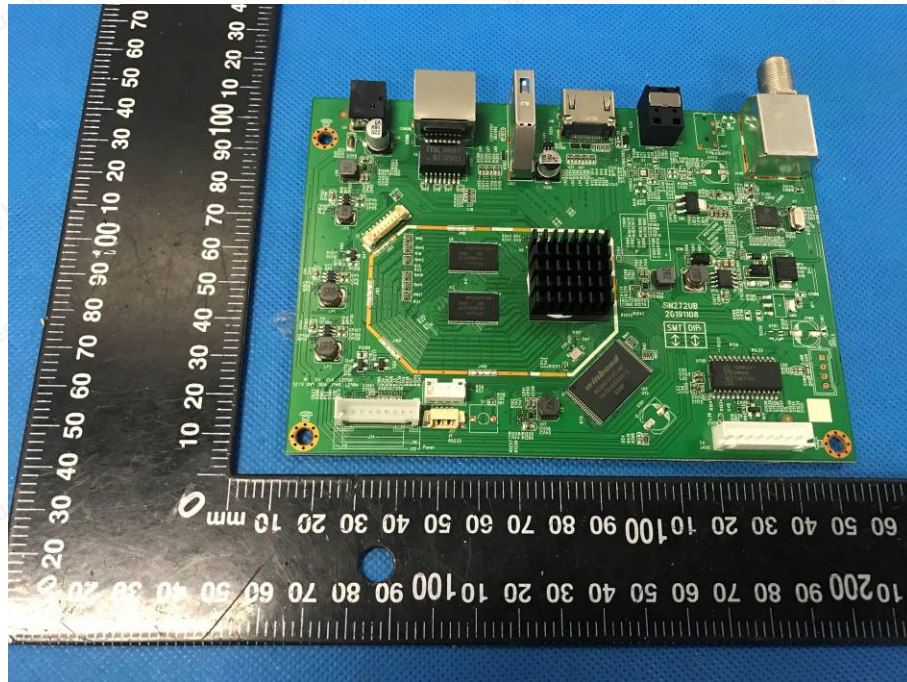


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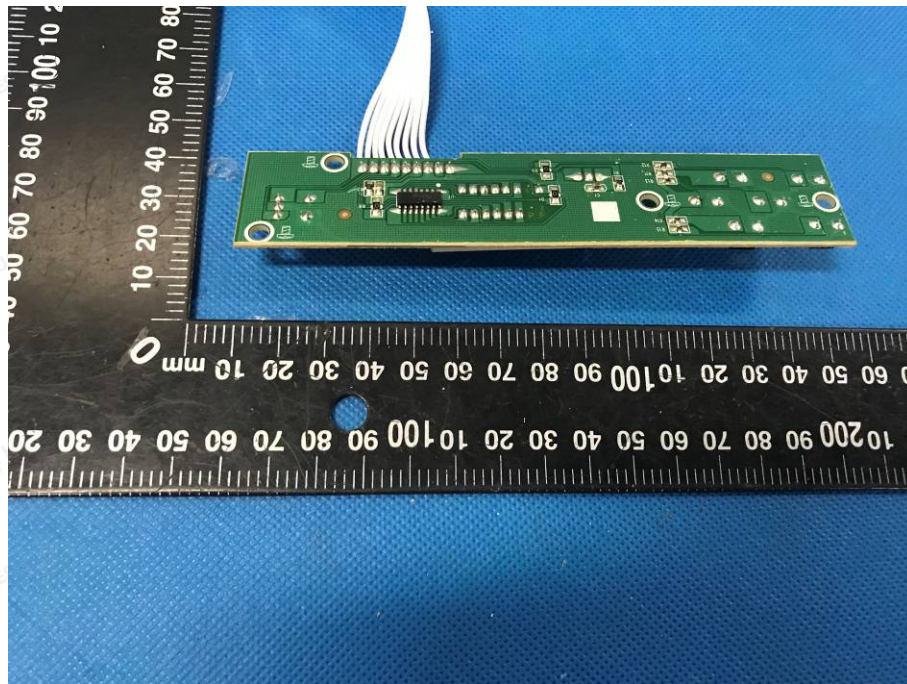
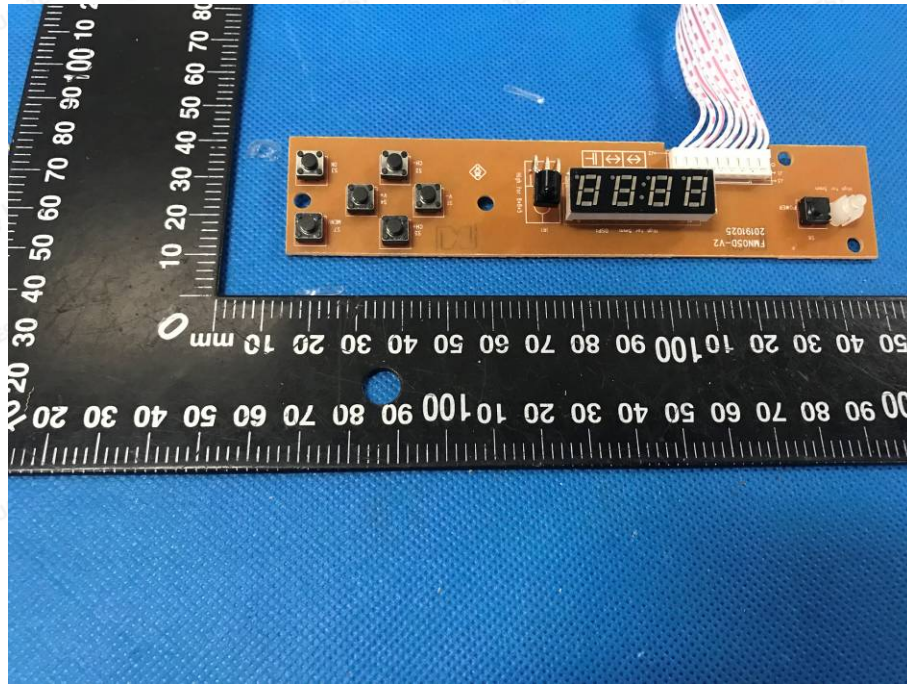


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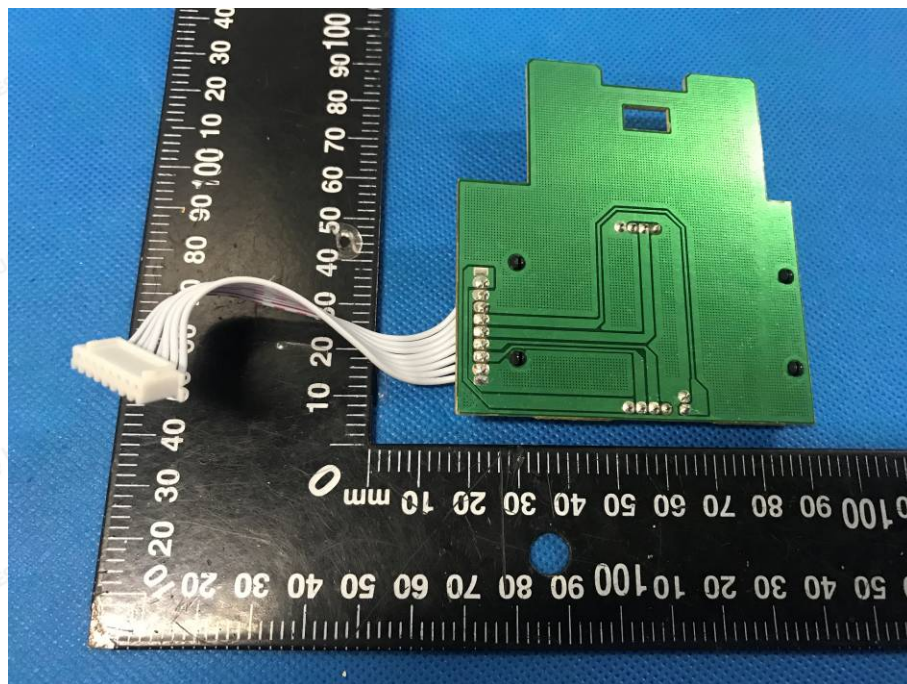
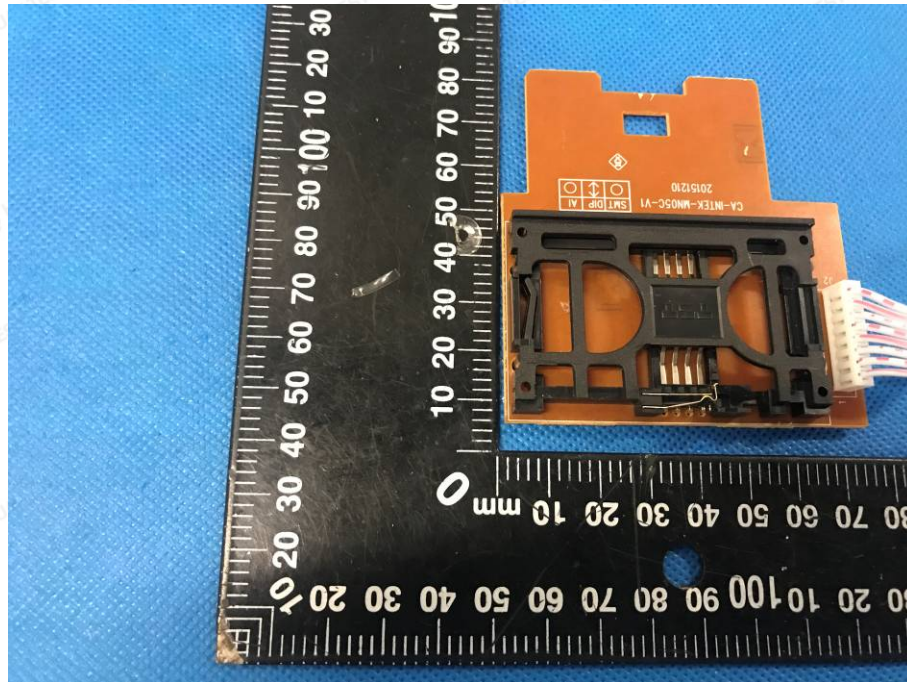


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