





<b>TEST REPORT</b>	
<b>ETSI EN 301 489-1 V2.2.3 (2019-11)</b> <b>ETSI EN 301 489-17 V3.2.2 (2019-12)</b> <b>EN 55032:2015/EN55035:2017</b> <b>EN 61000-3-2:2014/EN 61000-3-3:2013</b>	
Report Reference No.....:	HTT202012207E-1
Compiled by ( position+printed name+signature)...	Jack Chen 
Supervised by ( position+printed name+signature)...	Owen Hu 
Approved by ( position+printed name+signature)...	Kevin Yang 
Date of issue.....:	Dec.18,2020
<b>Testing Laboratory Name .....</b>	<b>Shenzhen HTT Technology Co., Ltd.</b>
Address .....	1F, B Building, Huafeng International Robotics Industrial Park, Gushu, Xixiang Street, Bao'an District, Shenzhen
<b>Applicant's name :</b>	<b>Dong guan jin qi Technology CO.,LTD</b>
Address .....	4 <sup>th</sup> Floor, Building B, Building 5, Jewelry City Cultural Industrial Park, No.568, Huanchang North Road, Changping Town, Dongguan, Guangdong
<b>Test specification</b>	
Standard .....	ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI EN 301 489-17 V3.2.2 (2019-12) EN 55032:2015/EN55035:2017 EN 61000-3-2:2014/EN 61000-3-3:2013
<b>Test item description .....</b>	Bluetooth Keyboard
Trade Mark .....	KPH
Manufacturer .....	Dong guan jin qi Technology CO.,LTD 4 <sup>th</sup> Floor, Building B, Building 5, Jewelry City Cultural Industrial Park, No.568, Huanchang North Road, Changping Town, Dongguan, Guangdong
Model/Type reference.....:	KPH-030
Serial Model.....:	KPH-A56, KPH-A58, KPH-Z15, KPH-Z09, KPH-Z23, KPH-Z24, KPH-Z18, KPH-Z19, KPH-Z20
Ratings .....	Charge input: DC 5V,0.5A Battery: DC 3.7V, 1500mAh
Result.....:	<b>PASS</b>





## TEST REPORT

<b>Test Report No. :</b>	<b>HTT202012207E-1</b>	Dec.18,2020
		Date of issue

Equipment under Test : Bluetooth Keyboard

Model Name : KPH-030

Serial Model : KPH-A56, KPH-A58, KPH-Z15, KPH-Z09, KPH-Z23, KPH-Z24, KPH-Z18, KPH-Z19, KPH-Z20

Trade Mark : KPH

**Applicant** : Dong guan jin qi Technology CO.,LTD  
Address : 4<sup>th</sup> Floor, Building B, Building 5, Jewelry City Cultural Industrial Park, No.568, Huanchang North Road, Changping Town, Dongguan, Guangdong

**Manufacturer** : Dong guan jin qi Technology CO.,LTD  
Address : 4<sup>th</sup> Floor, Building B, Building 5, Jewelry City Cultural Industrial Park, No.568, Huanchang North Road, Changping Town, Dongguan, Guangdong

<b>Test Result</b>	<b>PASS</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.



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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 for ElectroMagnetic Compatibility  
Draft ETSI EN 301 489-17 V3.2.2 (2019-12)—ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard for ElectroMagnetic Compatibility  
EN55032:2015 Electromagnetic compatibility of multimedia equipment - Emission Requirements  
EN 55035:2017 Electromagnetic compatibility of multimedia equipment - Immunity requirements  
EN 61000-3-2: 2014 Electromagnetic compatibility (EMC) -- Part 3-2: Limits - Limits for harmonic current emissions (equipment input current up to and including 16 A per phase)  
EN 61000-3-3: 2013 Electromagnetic compatibility (EMC) -- Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current  $\leq 16$  A per phase and not subject to conditional connection.



## 2. SUMMARY

### 2.1. General Remarks

Date of receipt of test sample	:	Dec.14,2020
Testing commenced on	:	Dec.14,2020
Testing concluded on	:	Dec.18,2020

### 2.2. Product Description

Product Name:	Bluetooth Keyboard
Model:	KPH-030
Trade Mark:	KPH
Power:	Charge input: DC 5V,0.5A Battery: DC 3.7V, 1500mAh

#### **BLE**

Operation frequency:	2402MHz-2480MHz
Modulation Type:	GFSK
Channel separation:	2MHz
Channel number:	40



### 2.3. DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	BT Mode
Mode 2	Charging mode

For Conducted Test	
Final Test Mode	Description
Mode 1	BT Mode

For Radiated Test	
Final Test Mode	Description
Mode 1	BT Mode

Pretest Mode	Description
Mode 1	BT Mode

### 2.4. 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"/>	/	M/N:	/
<input type="checkbox"/>		Manufacturer:	/

### 2.5. Modifications

No modifications were implemented to meet testing criteria.



### **3. TEST ENVIRONMENT**

#### **3.1. Address of the test laboratory**

**Shenzhen HTT Technology Co., Ltd.**

1F, B Building, Huafeng International Robotics Industrial Park, Gushu, Xixiang Street, Bao'an District, Shenzhen

#### **3.2. Environmental conditions**

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

Normal Temperature:	25°C
Relative Humidity	55 %
Air Pressure	989 hPa



### 3.3. Test Description

<b>Emission Measurement</b>		
Radiated Emission	ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI EN 301 489-17 V3.2.2 (2019-12) EN 55032:2015	PASS
Conducted Emission( AC Mains)	ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI EN 301 489-17 V3.2.2 (2019-12) EN 55032:2015	PASS
Harmonic Current Emissions	ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI EN 301 489-17 V3.2.2 (2019-12) EN 61000-3-2:2014	N/A
Voltage Fluctuations and Flicker	ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI EN 301 489-17 V3.2.2 (2019-12) EN 61000-3-3:2013	N/A
<b>Immunity Measurement</b>		
Electrostatic Discharge	ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI EN 301 489-17 V3.2.2 (2019-12) EN55035:2017	PASS
RF Electromagnetic Field	ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI EN 301 489-17 V3.2.2 (2019-12) EN55035:2017	PASS
Fast Transients Common Mode	ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI EN 301 489-17 V3.2.2 (2019-12) EN55035:2017	PASS
RF Common Mode 0,15 MHz to 80 MHz	ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI EN 301 489-17 V3.2.2 (2019-12) EN55035:2017	PASS
Voltage Dips and Interruptions	ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI EN 301 489-17 V3.2.2 (2019-12) EN55035:2017	PASS
Surges	ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI EN 301 489-17 V3.2.2 (2019-12) EN55035:2017	PASS

Remark:1. N/A means "not applicable".

2.The measurement uncertainty is not included in the test result.





### 3.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“and is documented in the Shenzhen Shenzhen HTT Technology Co., Ltd. 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 HTT Technology Co., Ltd. for Products Quality is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.24 dB	(1)
Radiated Emission	1~18GHz	5.16 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.

### 3.5. Equipments Used during the Test

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Calibration Due Date
1	EMI Test Receiver	R&S	ESPI 3	101841-cd	2020/06/10	2021/06/09
2	Artificial Mains	ROHDE & SCHWARZ	ESH2-Z5	893606/008	2020/06/10	2021/06/09
3	Pulse Limiter	Agilent	11947A	3107A04120	2020/06/10	2021/06/09
4	EMI Test Receiver	ROHDE & SCHWARZ	ESCI 7	101102	2020/06/10	2021/06/09
5	Spectrum Analyzer	Agilent	N9020A	MY48010425	2020/06/10	2021/06/09
6	Spectrum Analyzer	R&S	FSV40	100019	2020/06/10	2021/06/09
7	Active Loop Antenna	Beijing Da Ze Technology Co.,Ltd.	ZN30900C	15006	2020/06/10	2021/06/09
8	By-log Antenna	SCHWARZBECK	VULB9163	000976	2020/06/10	2021/06/09
9	Double Ridged Horn Antenna (1~18GHz)	SCHWARZBECK	BBHA 9120D	01622	2020/06/10	2021/06/09
10	Horn Antenna (18GHz~40GHz)	Schwarzbeck	BBHA9170	791	2020/06/10	2021/06/09
11	Amplifier (30MHz~1GHz)	Schwarzbeck	BBV 9743	#202	2020/06/10	2021/06/09
12	Amplifier (1GHz~18GHz)	Taiwan Chengyi	EMC05184 5B	980355	2020/06/10	2021/06/09



13	Amplifier (26.5GHz~40GHz )	Schwarzbeck	BBV9179	9719-025	2020/06/10	2021/06/09
14	ESD Simulators	EMC Partner	ESD3000	ESD3000-1680	2020/06/10	2021/06/09
15	RF POWER AMPLIFIER	OPHIR	5225R	1079	2020/06/10	2021/06/09
16	RF POWER AMPLIFIER	OPHIR	5273F	1025	2020/06/10	2021/06/09
17	RF POWER AMPLIFIER	SKET	HAP_0306 G-50W	--	2020/06/10	2021/06/09
18	Stacked Broadband Log Periodic Antenna	SCHWARZBECK	STLP 9128	9128ES-112	2020/06/10	2021/06/09
19	Stacked Mikrowellen Log.- Per Antenna	SCHWARZBECK	STLP 9149	9149-594	2020/06/10	2021/06/09
20	Electric field probe	Narda S.TS./PMM	EP601	611WX90121	2020/06/10	2021/06/09
21	ESG Vector Signal Generator	Agilent	MY490726 27	E4594C	2020/06/10	2021/06/09
22	Power meter	Agilent	MY451044 93	E4602B	2020/06/10	2021/06/09
23	Power sensor	Agilent	MY414952 34	E7201H	2020/06/10	2021/06/09
24	Ultra Compact Simulator	EMC Partner	TRANSIEN T3000	TRA3000 F5-S- D-V-1527	2020/06/10	2021/06/09
25	Coupling Clamp	EMC Partner	CN- EFT1000	CN-EFT1000- 1574	2020/06/10	2021/06/09
26	Signal Line Coupling Network	EMC Partner	CN- R40C05	CN-R40C05- 1513	2020/06/10	2021/06/09
27	CS Test system	Frankonia	CIT-10-75	126B1333	2020/06/10	2021/06/09
28	6dB Attenuator	Frankonia	75-A-FFN- 06	1509	2020/06/10	2021/06/09
29	CDN	Frankonia	M2+M3	A2210239	2020/06/10	2021/06/09
30	Power Clamp	Frankonia	EMCL-20	132A1216	2020/06/10	2021/06/09
31	Harmonic and Flicker Analyzer	EMC Partner	HARMONI CS 1000	HAR1000-1P 230V-0221	2020/06/10	2021/06/09
32	RF Cable	HUBER+SUHNE R	RG214	N/A	2020/06/10	2021/06/09
33	Conducted Emission	Tonscend	JS32-CE	Ver 2.5	/	/
34	Radiated Emission	Tonscend	JS32-RE	Ver 2.5.1.8	/	/
35	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	103818	2020/06/10	2021/06/09

The calibration interval is 1 year.

## 4. TEST CONDITIONS AND RESULTS

### 4.1. EMISSION

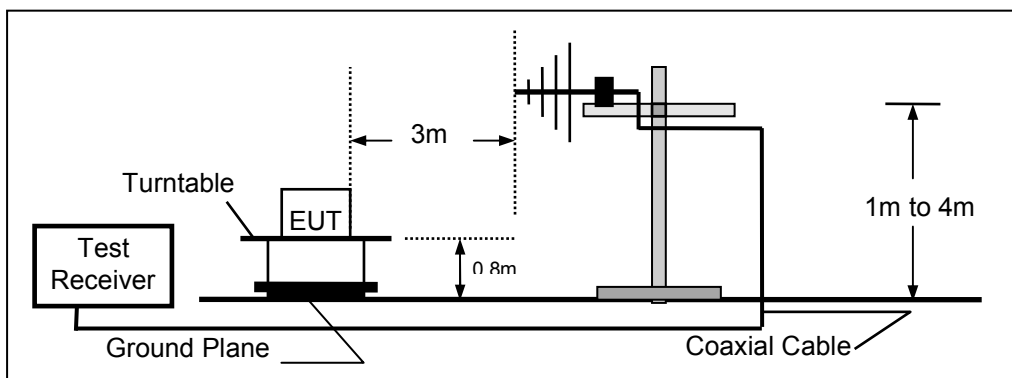
#### 4.1.1. Radiated Emission

##### LIMIT

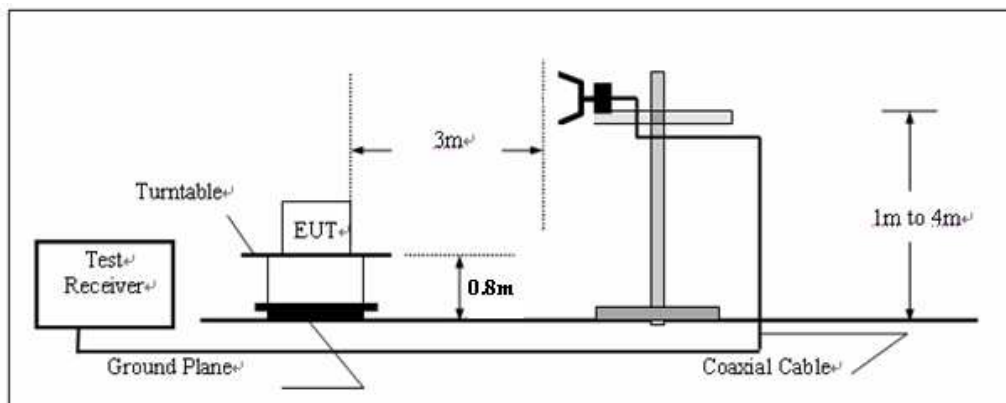
Please refer to ETSI EN301489-1 Clause 8.2.3, Table 4 and EN55032 Annex A, Table A.2,A.3, and Class B

##### 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 8.2.3 and EN55032 Annex A for the measurement methods

##### TEST RESULTS

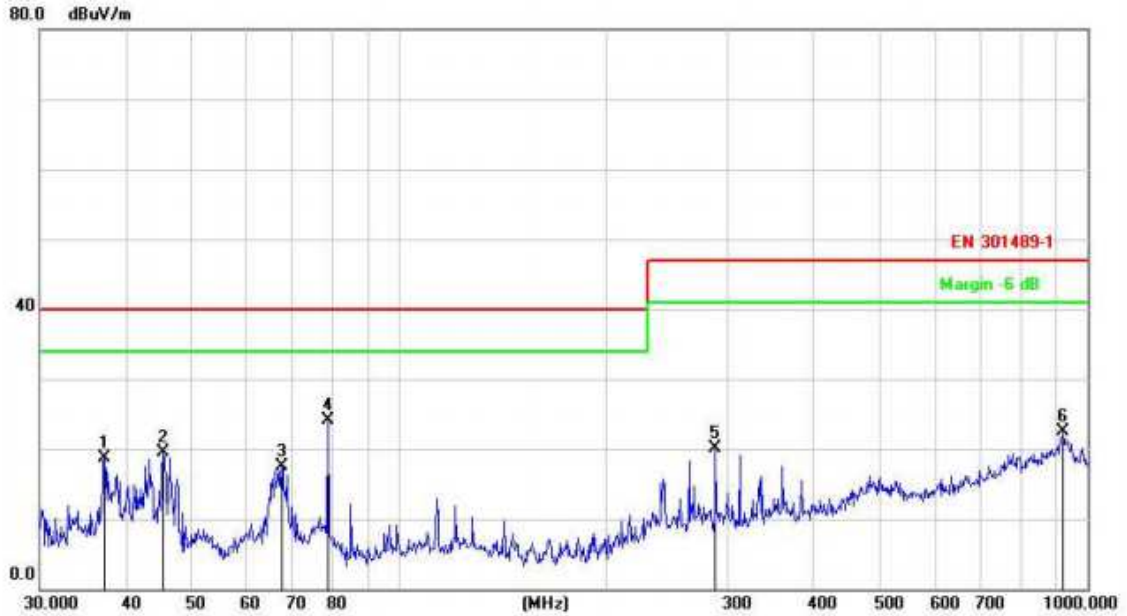
**Passed**

Please refer to the below test data:



30-1000MHz

Test mode:	Mode 1	Polarization	Horizontal
------------	--------	--------------	------------



Site LAB  
 Limit: EN 301489-1  
 EUT:  
 M/N:  
 Mode:  
 Note:

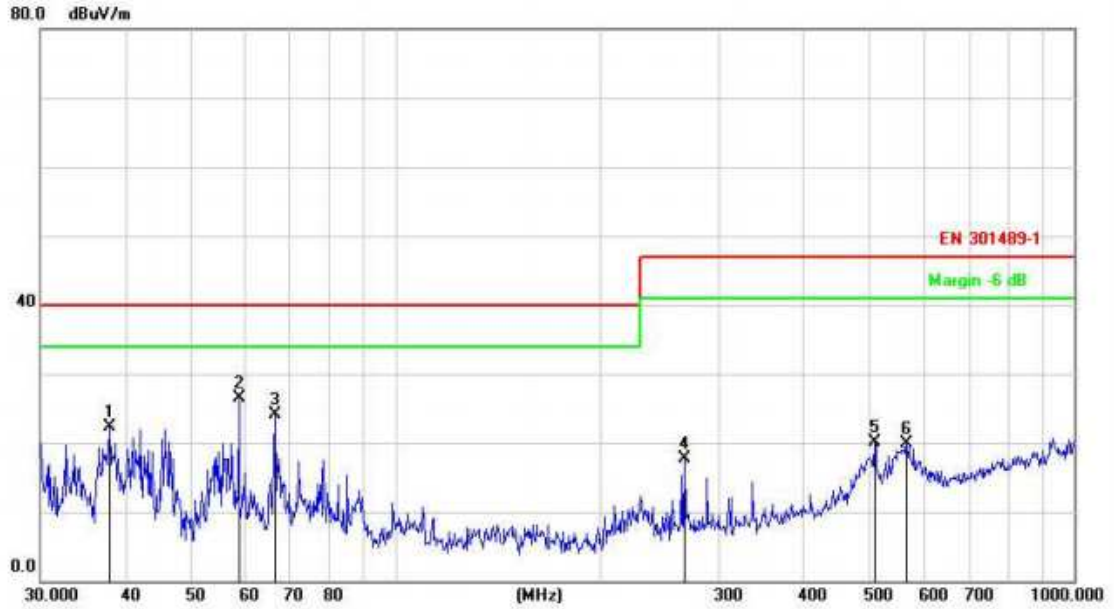
Polarization: *Horizontal*  
 Power:  
 Distance:

Temperature:  
 Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	cm	degree	Comment
1		37.2854	36.82	-18.14	18.68	40.00	-21.32			peak
2		45.3755	37.47	-17.92	19.55	40.00	-20.45			peak
3		67.4381	37.12	-19.63	17.49	40.00	-22.51			peak
4	*	78.6888	44.88	-20.69	24.19	40.00	-15.81			peak
5		287.9904	38.82	-18.70	20.12	47.00	-26.88			peak
6		922.5157	31.84	-9.31	22.53	47.00	-24.47			peak



Test mode: Mode 1 Polarization Vertical



Site LAB Polarization: **Vertical** Temperature:  
 Limit: EN 301489-1 Power: Humidity: %  
 EUT: Distance:  
 M/N:  
 Mode:  
 Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector	Antenna Height cm	Table Degree	Comment
1		37.9450	40.47	-18.10	22.37	40.00	-17.63	peak			
2	*	58.8185	45.18	-18.71	26.47	40.00	-13.53	peak			
3		66.4989	43.63	-19.52	24.11	40.00	-15.89	peak			
4		266.6089	36.89	-19.28	17.61	47.00	-29.39	peak			
5		508.2581	34.81	-14.65	20.16	47.00	-26.84	peak			
6		566.6221	33.71	-13.89	19.82	47.00	-27.18	peak			



1000-6000 MHz

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
V	1327.56	56.47	-17.52	38.95	70.00	31.05	peak
V	1327.75	53.62	-17.47	36.15	70.00	33.85	AVG
V	1573.92	62.47	-12.32	50.15	70.00	19.85	peak
V	1571.38	58.52	-12.23	46.29	50.00	3.71	AVG
V	3325.56	66.14	-10.52	55.62	74.00	18.38	peak
V	3325.52	55.49	-10.41	45.08	54.00	8.92	AVG
H	1349.49	69.63	-17.55	52.08	70.00	17.92	peak
H	1249.42	62.42	-17.47	44.95	50.00	5.05	AVG
H	3524.32	65.24	-12.63	52.61	70.00	17.39	peak
H	3524.42	46.53	-12.32	34.21	50.00	15.79	AVG
H	4026.56	68.62	-8.65	59.97	74.00	14.03	peak
H	4026.52	58.48	-8.78	49.70	54.00	4.30	AVG

**Remark:**

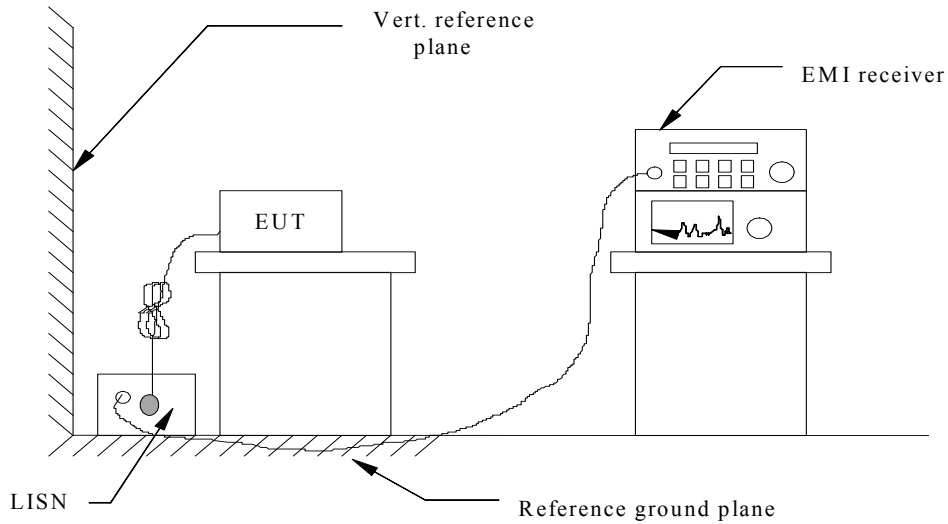
Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit

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

##### LIMIT

Please refer to ETSI EN301489-1 Clause 8.4.3, Table 8 and EN55032 Annex A, Table A.10, A.12

##### TEST CONFIGURATION



##### TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 8.4.3 and EN55032 Annex A for the measurement methods.

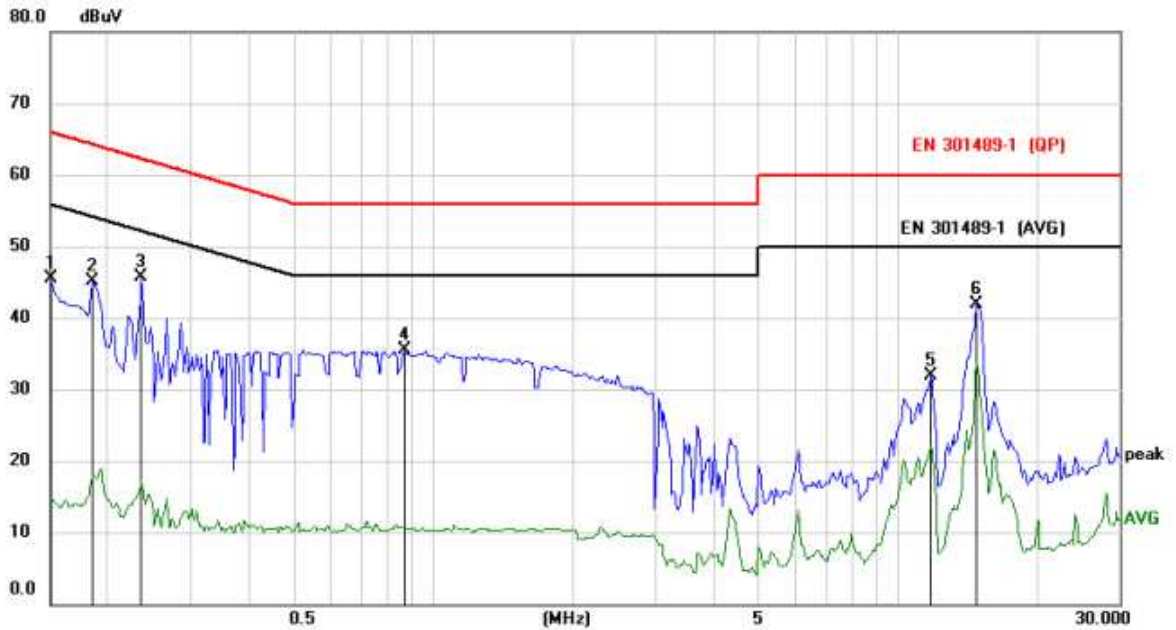
##### TEST RESULTS

**Passed**

Please refer to the below test data:



Test mode: Mode 1 Polarization L



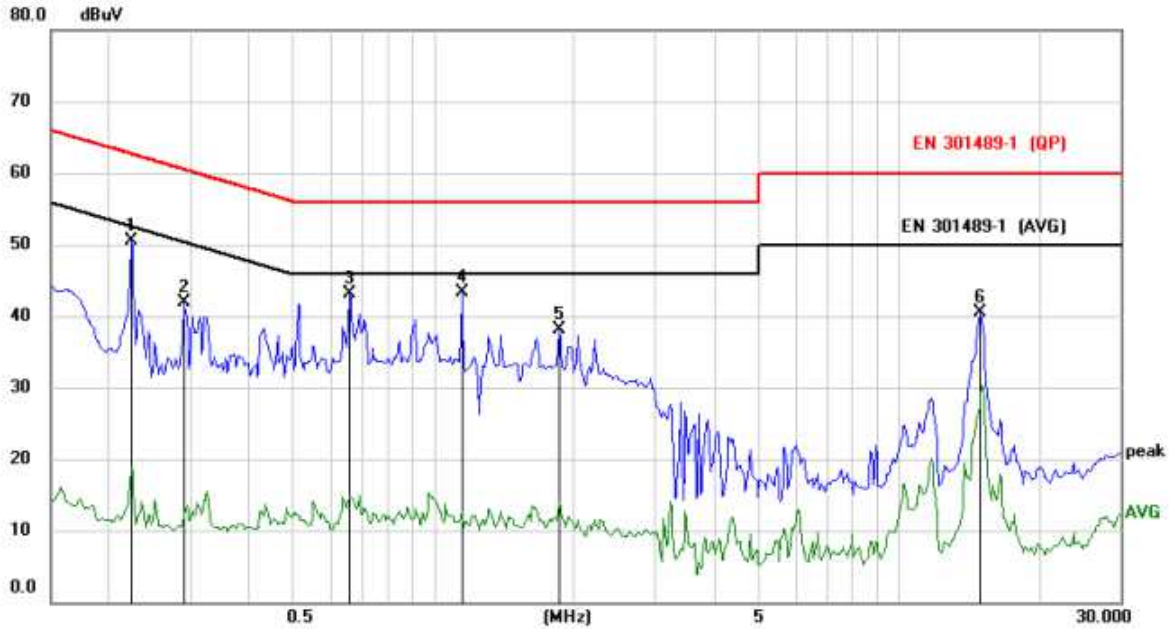
Site LAB Phase: **L1** Temperature: 26  
 Limit: EN 301489-1 (QP) Power: Humidity: 60 %  
 EUT:  
 M/N:  
 Mode:  
 Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1500	34.55	10.92	45.47	66.00	-20.53	peak	
2		0.1850	34.11	10.92	45.03	64.26	-19.23	peak	
3	*	0.2358	34.84	10.92	45.76	62.24	-16.48	peak	
4		0.8676	24.60	10.92	35.52	56.00	-20.48	peak	
5		11.7789	20.50	11.39	31.89	60.00	-28.11	peak	
6		14.8131	30.36	11.45	41.81	60.00	-18.19	peak	





Test mode: Mode 1 Polarization N



Site LAB Phase: *N* Temperature: 26  
 Limit: EN 301489-1 (QP) Power: Humidity: 60 %  
 EUT:  
 M/N:  
 Mode:  
 Note:

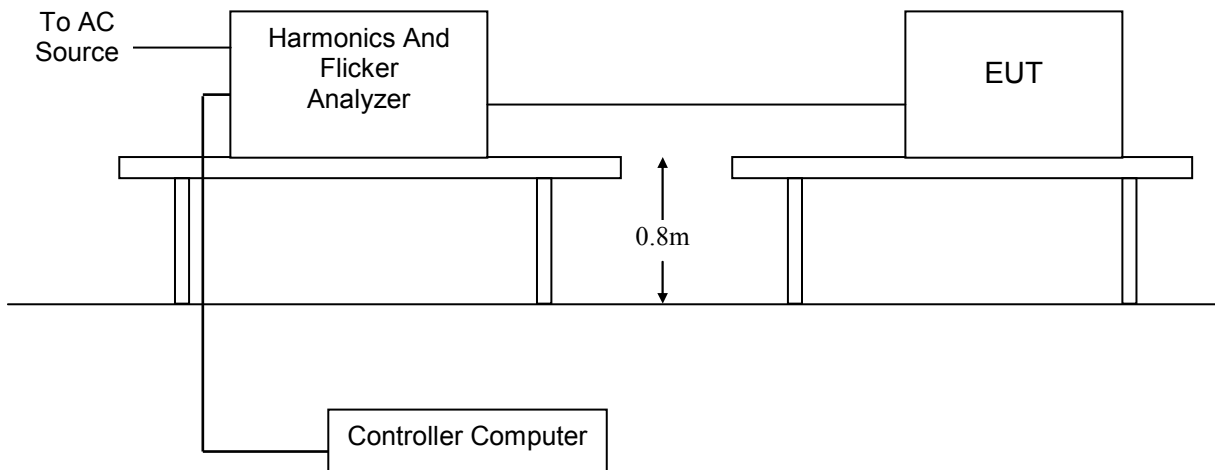
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.2241	39.67	10.92	50.59	62.67	-12.08	peak	
2		0.2904	30.89	10.92	41.81	60.51	-18.70	peak	
3		0.6609	32.14	10.92	43.06	56.00	-12.94	peak	
4		1.1484	32.38	10.92	43.30	56.00	-12.70	peak	
5		1.8621	27.12	10.96	38.08	56.00	-17.92	peak	
6		15.0510	29.14	11.46	40.60	60.00	-19.40	peak	

### 4.1.3. 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.

#### TEST RESULTS

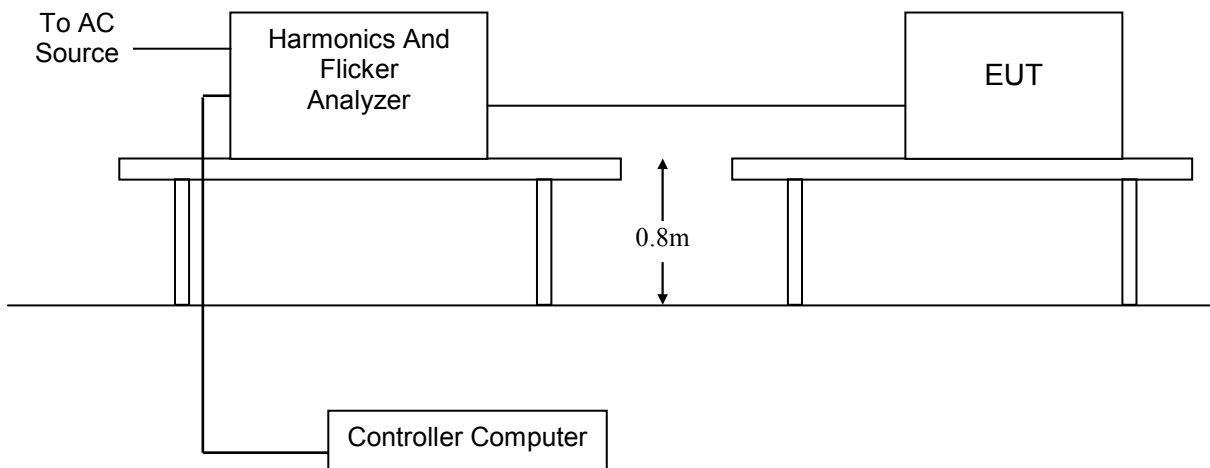
Note: The active input power of the EUT is less than 75W. No limits apply for equipment with an active input power up to and including 75W

#### 4.1.4. Voltage Fluctuation and Flicker

##### LIMIT

Please refer to EN 61000-3-3

##### TEST CONFIGURATION



##### TEST PROCEDURE

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

##### TEST RESULTS

The maximum input power of the EUT is less than 20W, which is unlikely to produce significant voltage fluctuation. Therefore, this test item is not applicable for the EUT.

See clause 6.1\*\*\* EN 61000-3-3:2013, clause 6.1: "... Tests need not be made on equipment which is unlikely to produce significant voltage fluctuations or flicker. ...".

## 4.2. IMMUNITY

### 4.2.1. Performance criteria

#### ■ ETSI EN301489-17

##### General performance criteria

- 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.

Criteria	During test	After test
A	<p>Shall operate as intended. (see note 1). Shall be no loss of function. Shall be no unintentional transmissions.</p>	<p>Shall operate as intended. Shall be no degradation of performance (see note 3). Shall be no loss of function. Shall be no loss of stored data or user programmable functions.</p>
B	<p>May show loss of function (one or more). May show degradation of performance (see note 2). Shall be no unintentional transmissions</p>	<p>Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3). Shall be no loss of stored data or user programmable functions.</p>
C	<p>May be loss of function (one or more).</p>	<p>Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (see note 3)</p>

##### NOTE 1:

Operate as intended during the test allows a level of degradation 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.

##### NOTE 2:

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.

##### NOTE 3:

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.

**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.

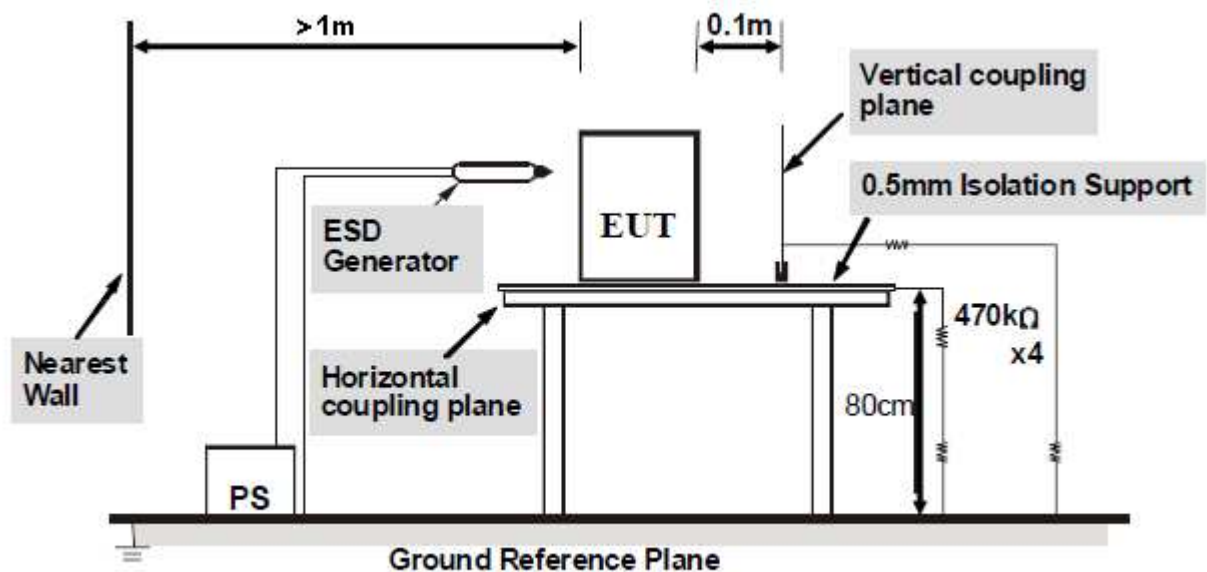
## 4.2.2. Electrostatic Discharge

### LIMIT

### SEVERITY LEVELS OF ELECTROSTATIC DISCHARGE

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

### TEST CONFIGURATION



### TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.3.2 , EN 55035 and EN 61000-4-2 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.



**TEST MODE**

Please reference to the section 2.3

**TEST RESULTS**

<b>Direct discharge</b>				
Type of discharge	Discharge voltage (KV)	Observations Performance	Criteria Level	Result
Contact discharge	±2	No degradation in performance of the EUT was observed (A)	B	Pass
	±4	A	B	
Air discharge	±2	A	B	
	±4	A	B	
	±8	A	B	
<b>Indirect discharge</b>				
Type of discharge	Discharge voltage (KV)	Observations Performance	Criteria Level	Result
HCP (6 sides)	±2	A	B	Pass
	±4	A	B	
VCP (4 sides)	±2	A	B	
	±4	A	B	

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

### 4.2.3. RF Electromagnetic Field

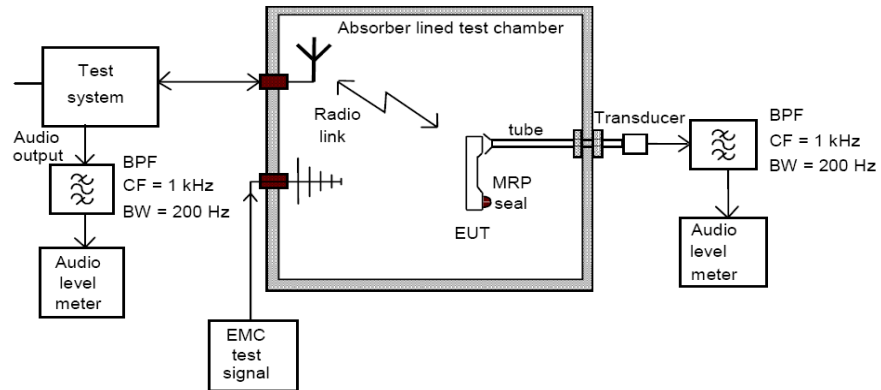
#### PERFORMANCE CRITERION

Criteria A

#### TEST LEVEL

3V/m (80%, 1kHz Amplitude Modulation)

#### TEST CONFIGURATION



#### TEST PROCEDURE

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

#### TEST MODE

Please reference to the section 2.3

#### TEST RESULTS

Frequency	Level	Modulation	Antenna Polarization	EUT Face	Observations (Performance Criterion)	Result
80MHz-6GHz	3 V/m	1 kHz, 80 % Amp. Mod, 1 % increment, dwell time=3seconds	V	Front	A	Pass
			H		A	Pass
			V	Rear	A	Pass
			H		A	Pass
			V	Left	A	Pass
			H		A	Pass
			V	Right	A	Pass
			H		A	Pass
			V	Top	A	Pass
			H		A	Pass
			V	Bottom	A	Pass
			H		A	Pass

Remark: A: No degradation in performance of the EUT was observed.



#### 4.2.4. Surges

##### PERFORMANCE CRITERION

Criteria B

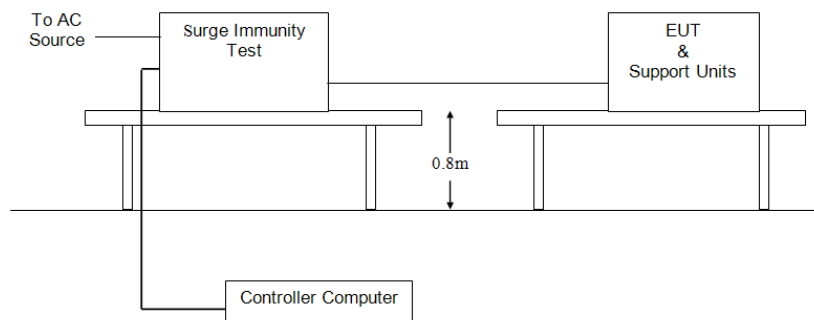
##### TEST LEVEL

1kV Line to Line: Differential mode

2kV Line to Ground: Common mode

(Voltage Waveform: 1.2/50 us; Current Waveform: 8/20 us)

##### TEST CONFIGURATION



##### TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.8.2 and EN 61000-4-5 for the measurement methods.

##### TEST MODE

Please reference to the section 2.3

##### TEST RESULTS

Location	Level(kV)	Pulse No	Surge Interval	Phase(deg)	Observations (Performance Criterion)	Result
L-N	± 1	5	60s	0°	A	Pass
				90°	A	Pass
				180°	A	Pass
				270°	A	Pass

Remark: A: No degradation in performance of the EUT was observed.

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

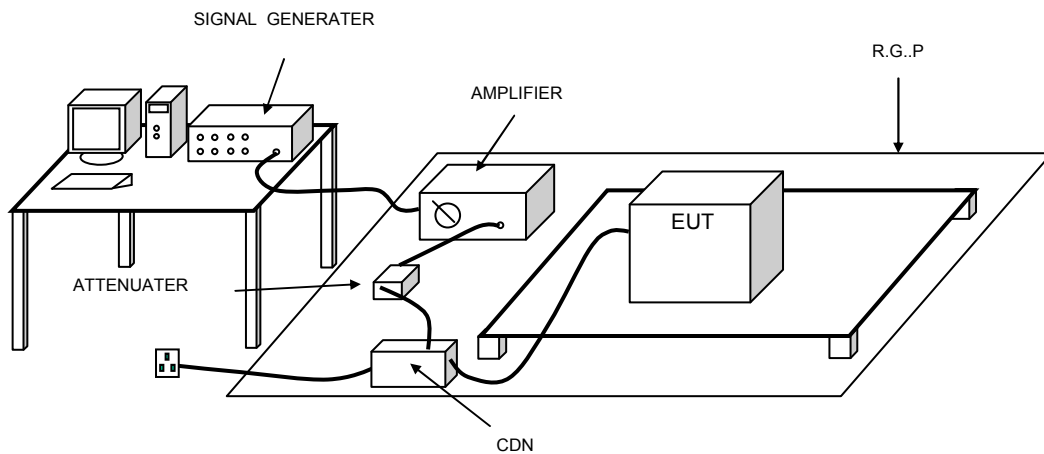
##### PERFORMANCE CRITERION

Criteria A

##### TEST LEVEL

3Vrms on AC main port (80%, 1kHz Amplitude Modulation)

##### 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.

##### TEST MODE

Please reference to the section 2.3

##### TEST RESULTS

Frequency	Injected Position	Level	Modulation	Observations (Performance Criterion)	Result
150kHz to 80MHz	AC Mains	3Vrms	1 kHz, 80 % Amp. Mod, 1 % increment, dwell time=3seconds	A	Pass

Remark: A: No degradation in performance of the EUT was observed

### 4.2.6. Fast Transients Common Mode

#### PERFORMANCE CRITERION

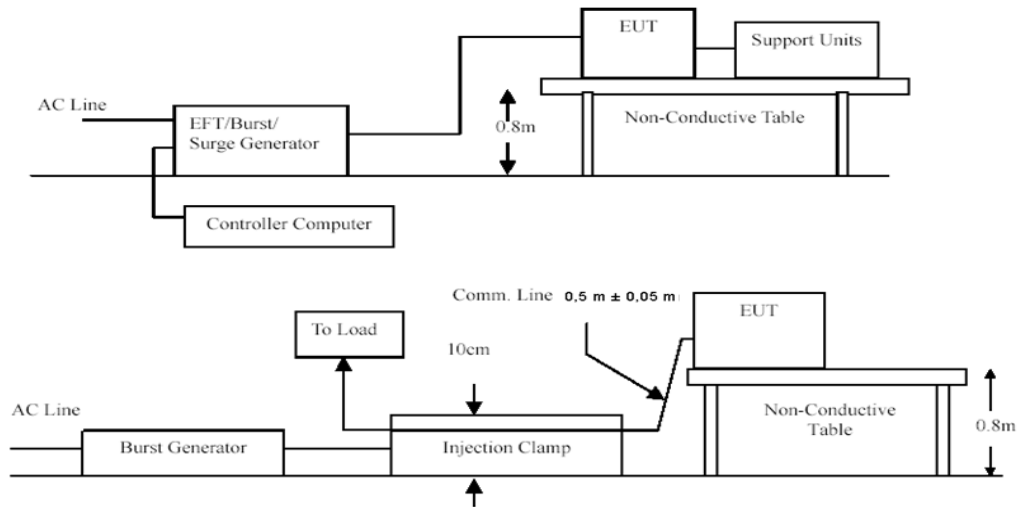
Criteria B

#### TEST LEVEL

1KV for AC main port

(Impulse Frequency: 5 kHz; Tr/Th: 5/50ns; Burst Duration: 15ms; Burst Period: 3Hz)

#### TEST CONFIGURATION



#### TEST PROCEDURE

Please refer to ETSI EN 301 489-1 Clause 9.4.2 , EN55035 and EN 61000-4-4 for the measurement methods.

#### TEST MODE

Please reference to the section 2.3

#### TEST RESULTS

Lead under Test	Level ( $\pm$ kV)	Coupling Direct/Clamp	Observations (Performance Criterion)	Result
L	$\pm 1$	Direct	A	Pass
N	$\pm 1$	Direct	A	Pass
L-N	$\pm 1$	Direct	A	Pass

Remark: A: No degradation in performance of the EUT was observed.

### 4.2.7. Voltage Dips and Interruptions

#### PERFORMANCE CRITERION

>95% VD, 0.5 period----Performance criterion: B

>95% VD, 1.0 period----Performance criterion: B

30% VD, 25 period----Performance criterion: C

>95% VI, 250 period----Performance criterion: C

#### TEST LEVEL

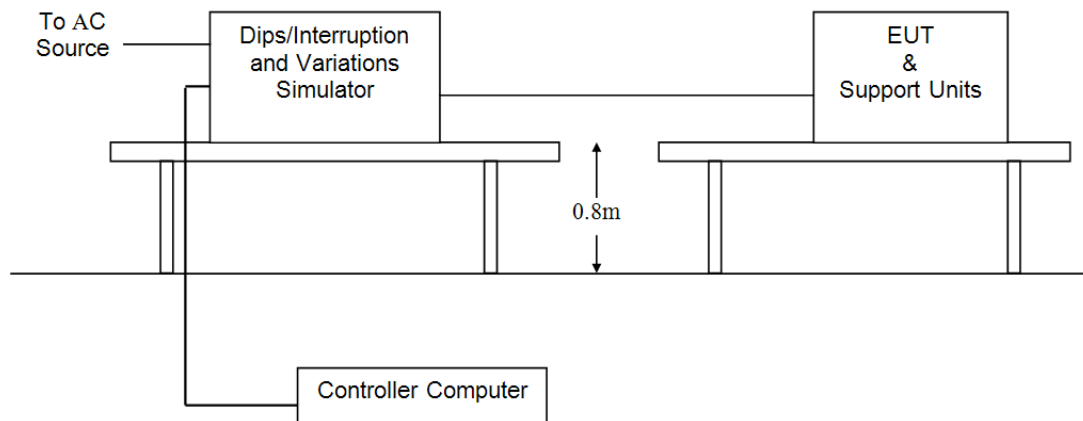
0% of VT(Supply Voltage) for 0.5 period

0% of VT(Supply Voltage) for 1.0 period

70% of VT(Supply Voltage) for 25 period

0% of VT(Supply Voltage) for 250 period

#### 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.

#### TEST MODE

Please reference to the section 2.3

#### TEST RESULTS

Test Level % UT	Duration (Periods)	Phase angle	No. of drop out	Time between dropout	Observations (Performance Criterion)	Result
0	0.5	0°, 90°, 180°, 270°	3	10s	A	Pass
0	1.0	0°, 90°, 180°, 270°	3	10s	A	Pass
70	25	0°, 90°, 180°, 270°	3	10s	A	Pass
0	250	0°, 90°, 180°, 270°	3	10s	B	Pass

Remark :

A: No degradation in performance of the EUT was observed.

B: During the test, the power shut down, after the experiment, the function can automatically return to normal.

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



## 6. External and Internal Photos of the EUT



1. Overall view of the apparatus



2. Overall view of the apparatus





3. Overall view of the apparatus

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