# TEST REPORT

## ETSI EN 301 489-1 V2.2.3 (2019-11)
## ETSI EN 301 489-17 V3.2.4 (2020-09)
## EN 55032: 2015+AC:2016+A11:2020/EN 55035: 2017+A11:2020
## EN IEC 61000-3-2:2019/EN 61000-3-3:2013+A1:2019

| | |
|---|---|
| **Report Reference No**..... : | **HTT202302300E-1** |
| Compiled by ( position+printed name+signature).. : | **Ervin Xu** |
| Supervised by ( position+printed name+signature).. : | **Bruce Zhu** |
| Approved by ( position+printed name+signature).. : | **Kevin Yang** |
| Date of issue..... : | **Feb.24,2023** |
| **Testing Laboratory Name.....:** | **Shenzhen HTT Technology Co., Ltd.** |
| Address..... : | **1F, B Building, Huafeng International Robotics Industrial Park, Gushu, Xixiang Street, Bao'an District, Shenzhen** |
| **Applicant's name :** | **SHENZHEN COMISO DIGITAL TECHNOLOGY LIMITED** |
| Address..... : | **12/F,XinLong Technology Park,SongGang Town, BaoAn District,ShenZhen City,China** |
| **Test specification** | |
| Standard..... : | **ETSI EN 301 489-1 V2.2.3 (2019-11)<br>ETSI EN 301 489-17 V3.2.4 (2020-09)<br>EN 55032: 2015+AC:2016+A11:2020/EN 55035: 2017+A11:2020<br>EN IEC 61000-3-2:2019/EN 61000-3-3:2013+A1:2019** |
| **Test item description.....:** | Bluetooth wireless speaker |
| Trade Mark.....: | COMISO |
| Manufacturer.....: | SHENZHEN COMISO DIGITAL TECHNOLOGY LIMITED<br>12/F,XinLong Technology Park,SongGang Town,<br>BaoAn District,ShenZhen City,China |
| Model/Type reference..... : | X26L |
| Serial Model.....: | Signature Speaker |
| Ratings.....: | DC 3.7V/6000mAh From Battery and DC 5V/2A From External Circuit |
| Result.....: | **PASS** |

# TEST REPORT

| Test Report No. : | HTT202302300E-1 | Feb.24,2023<br>Date of issue |
|---|---|---|

| | | |
|---|---|---|
| Equipment under Test | : | Bluetooth wireless speaker |
| Model Name | : | X26L |
| Serial Model | : | Signature Speaker |
| Trade Mark | : | COMISO |
| **Applicant** | : | **SHENZHEN COMISO DIGITAL TECHNOLOGY LIMITED** |
| Address | : | 12/F,XinLong Technology Park,SongGang Town, BaoAn District,ShenZhen City,China |
| **Manufacturer** | : | **SHENZHEN COMISO DIGITAL TECHNOLOGY LIMITED** |
| Address | : | 12/F,XinLong Technology Park,SongGang Town, BaoAn District,ShenZhen City,China |

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

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.

# Contents

# 1. TEST STANDARDS

The tests were performed according to following standards:

ETSI EN 301 489-1 V2.2.3 (2019-11)–ElectroMagnetic Compatibility (EMC) tandard for radio equipment and services;Part 1: Common technical requirements;Harmonised Standard for ElectroMagnetic Compatibility

ETSI EN 301 489-17 V3.2.4 (2020-09)–ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard for ElectroMagnetic Compatibility

EN 55032: 2015+AC:2016+A11:2020 Electromagnetic compatibility of multimedia equipment - Emission Requirements

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

EN IEC 61000-3-2:2019 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+A1:2019 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 ≤ 16 A per phase and not subject to conditional connection.

# 2. SUMMARY

## 2.1. General Remarks

| | | |
|---|---|---|
| Date of receipt of test sample | : | Feb.20,2023 |
| | | |
| Testing commenced on | : | Feb.20,2023 |
| | | |
| Testing concluded on | : | Feb.24,2023 |

## 2.2. Product Description

| | |
|---|---|
| Product Name: | Bluetooth wireless speaker |
| Model: | X26L |
| Trade Mark: | COMISO |
| Power: | DC 3.7V/6000mAh From Battery and DC 5V/2A From External Circuit |

| **BR+EDR** | |
|---|---|
| Operation frequency: | 2402MHz-2480MHz |
| Modulation Type: | GFSK,8DPSK,π/4DQPSK |
| Channel separation: | 1MHz |
| Channel number: | 79 |

## 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.

| Test Mode | Description |
|---|---|
| Mode 1 | BT Mode |
| Mode 2 | Charging Mode |

Pre-scan above all test mode, found below test mode which it was worse case mode.

| Test item | Test mode (Worse case mode) |
|---|---|
| EMI | Mode 1 |
| EMS | Mode 1 |

## 2.4. EUT configuration

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

● - supplied by the manufacturer
○ - supplied by the lab

| | | | |
|---|---|---|---|
| ○ | / | M/N: | / |
| | | 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

| | | |
|---|---|---|
| **Emission Measurement** | | |
| Radiated Emission | ETSI EN 301 489-1 V2.2.3 (2019-11)<br>ETSI EN 301 489-17 V3.2.4 (2020-09))<br>EN 55032: 2015+AC:2016+A11:2020 | PASS |
| Conducted Emission( AC Mains) | ETSI EN 301 489-1 V2.2.3 (2019-11)<br>ETSI EN 301 489-17 V3.2.4 (2020-09)<br>EN 55032: 2015+AC:2016+A11:2020 | PASS |
| Harmonic Current Emissions | ETSI EN 301 489-1 V2.2.3 (2019-11)<br>ETSI EN 301 489-17 V3.2.4 (2020-09)<br>EN IEC 61000-3-2:2019 | N/A |
| Voltage Fluctuations and Flicker | ETSI EN 301 489-1 V2.2.3 (2019-11)<br>ETSI EN 301 489-17 V3.2.4 (2020-09)<br>EN 61000-3-3:2013+A1:2019 | N/A |
| **Immunity Measurement** | | |
| Electrostatic Discharge | ETSI EN 301 489-1 V2.2.3 (2019-11)<br>ETSI EN 301 489-17 V3.2.4 (2020-09)<br>EN 55035: 2017+A11:2020 | PASS |
| RF Electromagnetic Field | ETSI EN 301 489-1 V2.2.3 (2019-11)<br>ETSI EN 301 489-17 V3.2.4 (2020-09)<br>EN 55035: 2017+A11:2020 | PASS |
| Fast Transients Common Mode | ETSI EN 301 489-1 V2.2.3 (2019-11)<br>ETSI EN 301 489-17 V3.2.4 (2020-09)<br>EN 55035: 2017+A11:2020 | PASS |
| RF Common Mode 0,15 MHz to 80 MHz | ETSI EN 301 489-1 V2.2.3 (2019-11)<br>ETSI EN 301 489-17 V3.2.4 (2020-09)<br>EN 55035: 2017+A11:2020 | PASS |
| Voltage Dips and Interruptions | ETSI EN 301 489-1 V2.2.3 (2019-11)<br>ETSI EN 301 489-17 V3.2.4 (2020-09)<br>EN 55035: 2017+A11:2020 | PASS |
| Surges | ETSI EN 301 489-1 V2.2.3 (2019-11)<br>ETSI EN 301 489-17 V3.2.4 (2020-09)<br>EN 55035: 2017+A11:2020 | 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 | 3.45 dB | (1) |
| Radiated Emission | 1~6GHz | 3.54 dB | (1) |
| Conducted Disturbance | 0.15~30MHz | 2.66 dB | (1) |
| Harmonic current emission | / | 0.634% | (1) |
| Voltage fluctuations & flicker | / | 0.780% | (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 | Rohde & Schwarz | ESCS30 | 845550/030 | 2022/05/23 | 2023/05/22 |
| 2 | Artificial Mains | Rohde & Schwarz | ESH3-Z5 | 100181 | 2022/05/23 | 2023/05/22 |
| 3 | Attenuator | Robinson | 6810.17A | 6810.17A | 2022/05/23 | 2023/05/22 |
| 4 | Cable Line | Robinson | Z302S-NJ-BNCJ-1.5M | 18126545 | 2022/05/23 | 2023/05/22 |
| 5 | EMI Test Receiver | Rohde & Schwarz | ESCI7 | 100920 | 2022/05/23 | 2023/05/22 |
| 6 | Composite logarithmic antenna | SCHWARZBECK | VULB 9168 | 00931 | 2022/05/29 | 2023/05/28 |
| 7 | Horn Antenna | SCHWARZBECK | BBHA9120D | 01990 | 2022/05/29 | 2023/05/28 |
| 8 | low frequency Amplifier | Sonoma Instrument | 310 | 323089 | 2022/05/23 | 2023/05/22 |
| 9 | high-frequency Amplifier | HP | 8449B | P180313003 | 2022/05/23 | 2023/05/22 |
| 10 | System-Controller | CCS | N/A | N/A | N/A | N/A |
| 11 | Turn Table | CCS | N/A | N/A | N/A | N/A |
| 12 | Antenna Tower | CCS | N/A | N/A | N/A | N/A |
| 13 | RF Line | Robinson | ZT26-NJ-NJ-0.6M | 18126549 | 2022/05/23 | 2023/05/22 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 14 | RF Line | Robinson | ZT26-NJ-SMAJ-2M | 18126550 | 2022/05/23 | 2023/05/22 |
| 15 | RF Line | Robinson | ZT26-NJ-SMAJ-0.6M | 18126548 | 2022/05/23 | 2023/05/22 |
| 16 | RF Line | Robinson | ZT26-NJ-SMAJ-8.5M | 18126547 | 2022/05/23 | 2023/05/22 |
| 17 | Electric Power Analyzer | EVERFINE | PF6000 | P619086TF14 11112 | 2022/05/26 | 2023/05/25 |
| 18 | Harmonics& Flicker Testing Power Source | EVERFINE | HFS-1000 | P624484TM14 11115 | 2022/05/23 | 2023/05/22 |
| 19 | ESD Simulators | LIONCEL | ESD-202A | 0180801 | 2022/05/26 | 2023/05/25 |
| 20 | ESD Gun | LIONCEL | N/A | N/A | 2022/05/26 | 2023/05/25 |
| 21 | Signal Generator | Maconi | 2022D | 119246/003 | 2022/06/09 | 2023/06/08 |
| 22 | Power Amplifier | M2S | A00181-1000 | 9801-112 | 2022/06/09 | 2023/06/08 |
| 23 | Power Amplifier | M2S | AC8113/800-250A | 9801-179 | 2022/06/09 | 2023/06/08 |
| 24 | Power Antenna | SCHAFFNER | CBL6140A | 1204 | 2022/06/09 | 2023/06/08 |
| 25 | EFT&Surge Tester | LIONCEL | LSE-545CB | 0180601 | 2022/05/23 | 2023/05/22 |
| 26 | Specialized Isolated Voltage Regulator For Surge | EVERFINE | GT2502 | P185365CM53 91123 | 2022/05/23 | 2023/05/22 |
| 27 | Coupling Clamp | LIONCEL | EFTC | 018071809 | 2022/05/23 | 2023/05/22 |
| 28 | Signal Generator | Maconi | 2022D | 119246/003 | 2022/06/09 | 2023/06/08 |
| 29 | Power Amplifier | M2S | A00181-1000 | 9801-112 | 2022/06/09 | 2023/06/08 |
| 30 | CDN | MEB | M3-8016 | 003683 | 2022/06/09 | 2023/06/08 |
| 31 | Dips Tester | LIONCEL | VSD-1102 | 0181202 | 2022/05/23 | 2023/05/22 |
| 33 | Voltage-Stabilized Source | LIONCEL | RGL-220 | 0180901 | 2022/05/23 | 2023/05/22 |
| 34 | Voltage-Stabilized Source | LIONCEL | RGL-220 | 0180902 | 2022/05/23 | 2023/05/22 |

The calibration interval is 1 year.

# 4. TEST CONDITIONS AND RESULTS

## 4.1. EMISSION

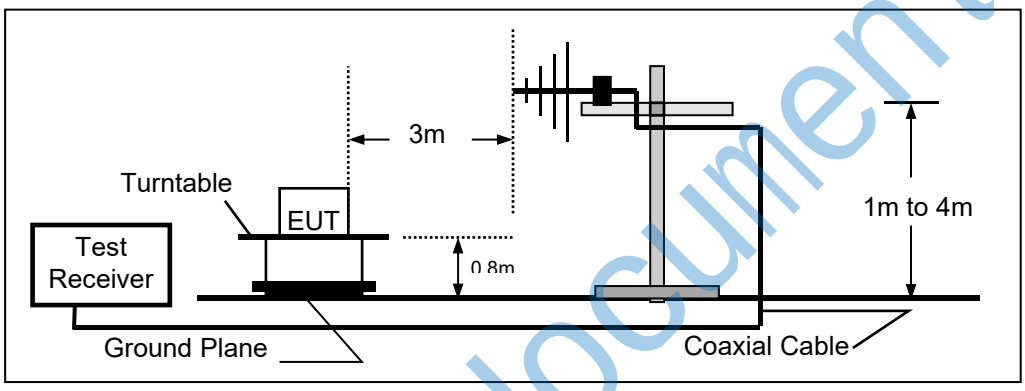
### 4.1.1. Radiated Emission

**LIMIT**

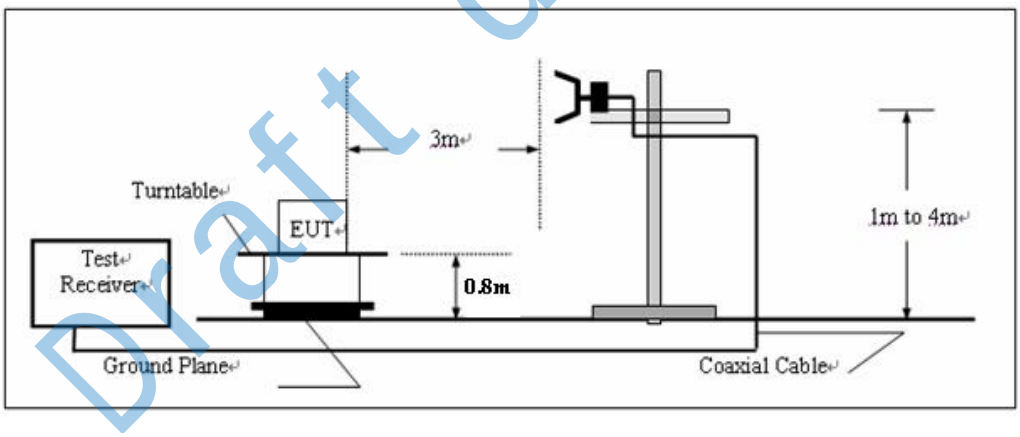
Please refer to ETSI EN301489-1 Clause 8.2.3, Table 4 and EN55032 Annex A, Table A.2,A.3, and Class B

**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

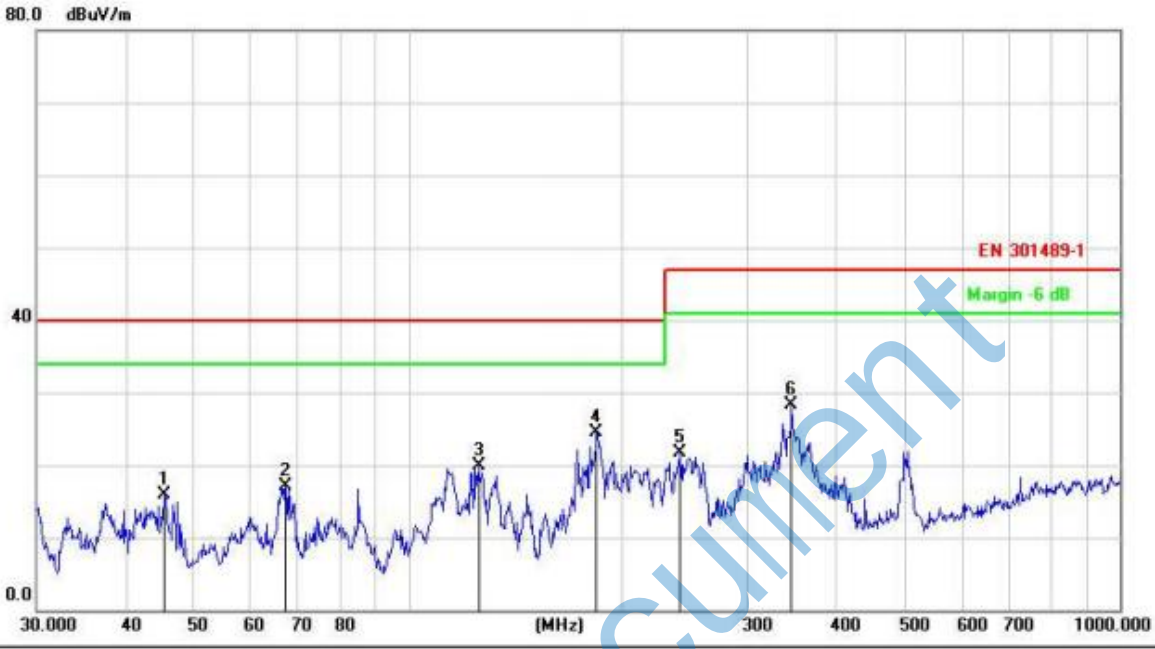
**TEST RESULTS**

**Passed**

Please refer to the below test data:

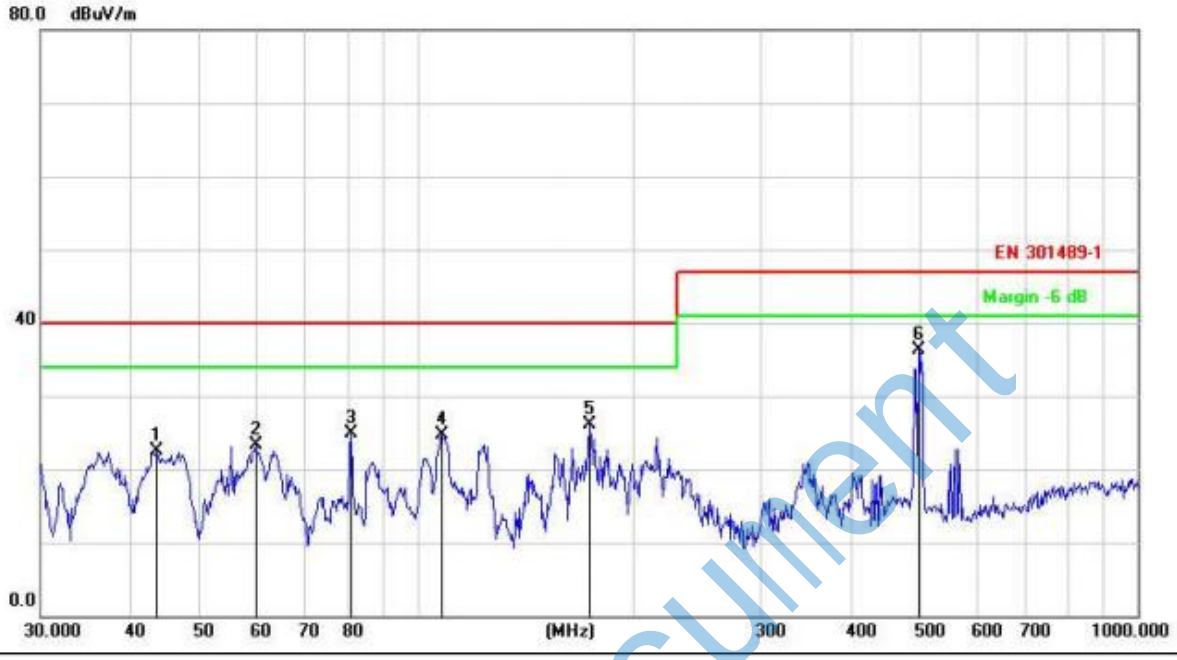
30-1000MHz

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




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dB/m | dB | Detector | cm | degree | Comment |
| 1 | | 45.3755 | 33.84 | -17.92 | 15.92 | 40.00 | -24.08 | peak | | | |
| 2 | | 67.2022 | 36.74 | -19.60 | 17.14 | 40.00 | -22.86 | peak | | | |
| 3 | | 125.4457 | 39.49 | -19.57 | 19.92 | 40.00 | -20.08 | peak | | | |
| 4 | * | 183.8440 | 43.22 | -18.66 | 24.56 | 40.00 | -15.44 | peak | | | |
| 5 | | 240.8304 | 40.94 | -19.19 | 21.75 | 47.00 | -25.25 | peak | | | |
| 6 | | 345.5952 | 46.23 | -17.91 | 28.32 | 47.00 | -18.68 | peak | | | |

| Test mode: | Mode 1 | Polarization | Vertical |
|---|---|---|---|




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dB/m | dB | Detector | cm | degree | Comment |
| 1 | | 43.5057 | 40.62 | -18.19 | 22.43 | 40.00 | -17.57 | peak | | | |
| 2 | | 59.6493 | 41.97 | -18.74 | 23.23 | 40.00 | -16.77 | peak | | | |
| 3 | | 80.9275 | 45.72 | -20.86 | 24.86 | 40.00 | -15.14 | peak | | | |
| 4 | | 108.2667 | 44.87 | -20.26 | 24.61 | 40.00 | -15.39 | peak | | | |
| 5 | | 173.2051 | 42.86 | -16.81 | 26.05 | 40.00 | -13.95 | peak | | | |
| 6 | * | 495.9344 | 51.16 | -14.94 | 36.22 | 47.00 | -10.78 | peak | | | |

1000-6000 MHz

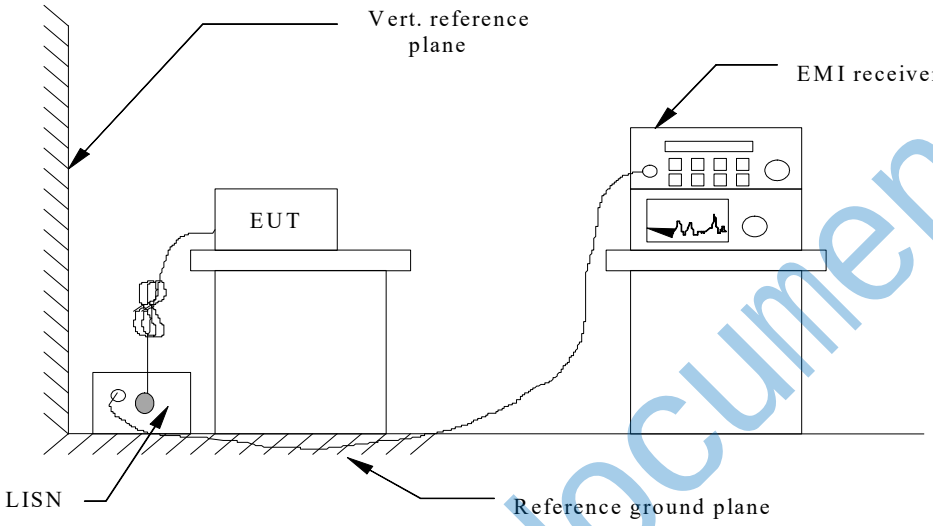
| Polar (H/V) | Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| V | 1327.56 | 56.59 | -17.52 | 39.07 | 70.00 | 30.93 | peak |
| V | 1327.75 | 53.66 | -17.47 | 36.19 | 70.00 | 33.81 | AVG |
| V | 1573.92 | 62.33 | -12.32 | 50.01 | 70.00 | 19.99 | peak |
| V | 1571.38 | 58.47 | -12.23 | 46.24 | 50.00 | 3.76 | AVG |
| V | 3325.56 | 66.75 | -10.52 | 56.23 | 74.00 | 17.77 | peak |
| V | 3325.52 | 55.71 | -10.41 | 45.30 | 54.00 | 8.70 | AVG |
| H | 1349.49 | 69.31 | -17.55 | 51.76 | 70.00 | 18.24 | peak |
| H | 1249.42 | 62.09 | -17.47 | 44.62 | 50.00 | 5.38 | AVG |
| H | 3524.32 | 65.49 | -12.63 | 52.86 | 70.00 | 17.14 | peak |
| H | 3524.42 | 46.47 | -12.32 | 34.15 | 50.00 | 15.85 | AVG |
| H | 4026.56 | 68.34 | -8.65 | 59.69 | 74.00 | 14.31 | peak |
| H | 4026.52 | 58.64 | -8.78 | 49.86 | 54.00 | 4.14 | 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**

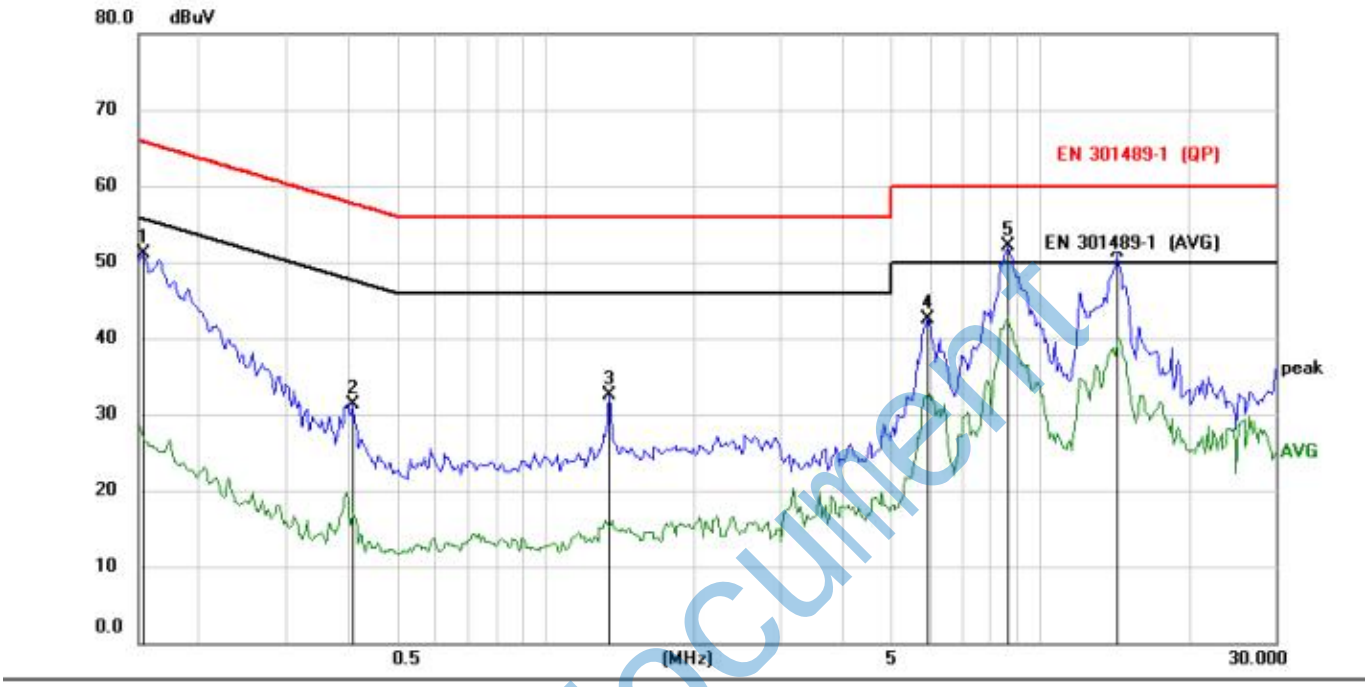
Please refer to ETSI EN 301 489-1 Clause 8.4.3 and EN55032 Annex A for the measurement methods.

**TEST RESULTS**

**Passed**

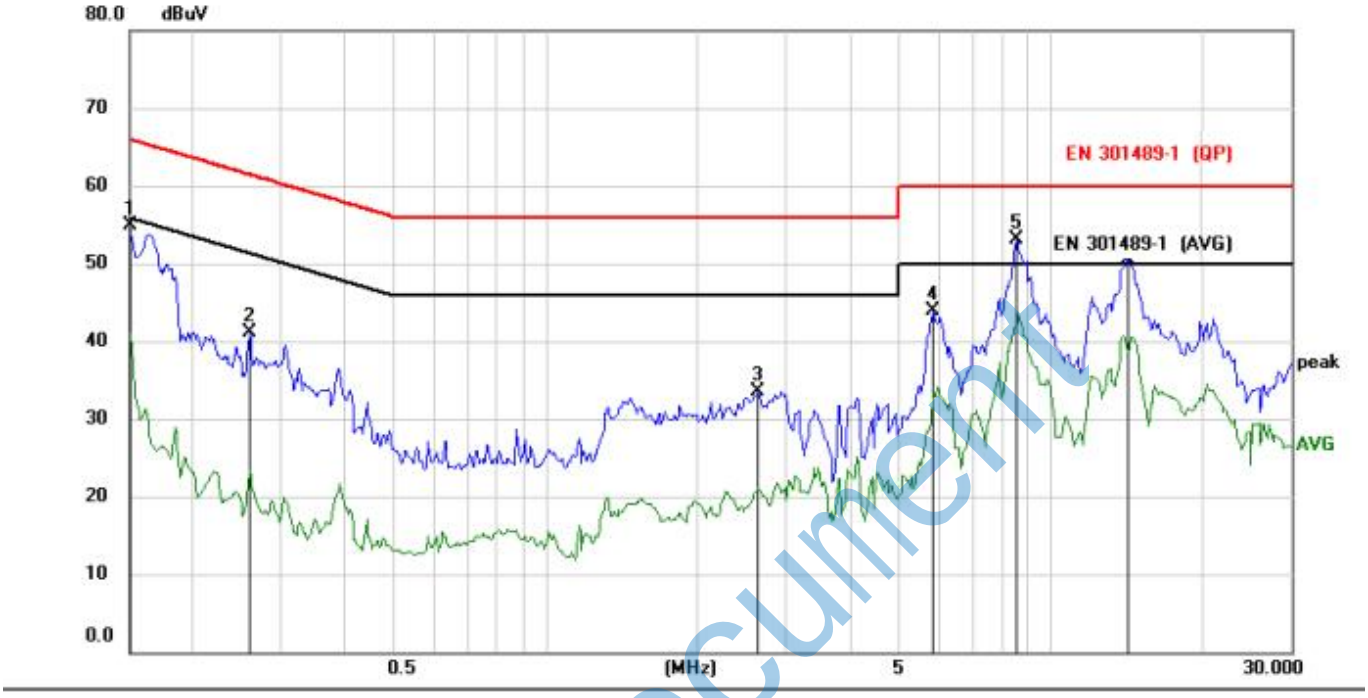
Please refer to the below test data:

| Test mode: | Mode 1 | Polarization | L |
|---|---|---|---|




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | | 0.1539 | 40.14 | 10.92 | 51.06 | 65.79 | -14.73 | peak | |
| 2 | | 0.4074 | 20.46 | 10.92 | 31.38 | 57.70 | -26.32 | peak | |
| 3 | | 1.3473 | 21.48 | 10.94 | 32.42 | 56.00 | -23.58 | peak | |
| 4 | | 5.9601 | 31.33 | 11.15 | 42.48 | 60.00 | -17.52 | peak | |
| 5 | * | 8.6082 | 40.78 | 11.29 | 52.07 | 60.00 | -7.93 | peak | |
| 6 | | 14.2983 | 39.86 | 11.44 | 51.30 | 60.00 | -8.70 | peak | |

| Test mode: | Mode 1 | Polarization | N |
|---|---|---|---|



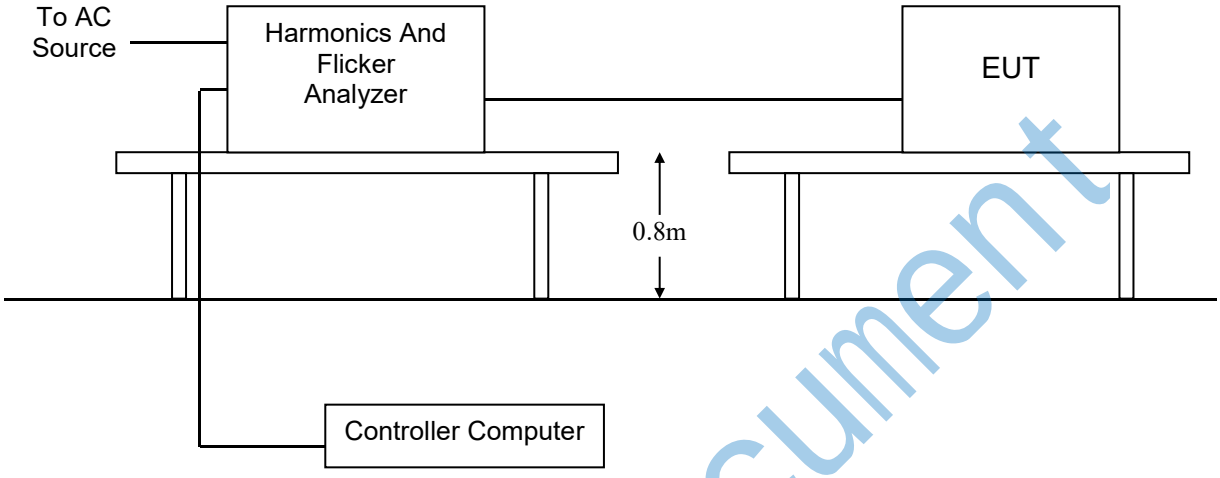

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | | 0.1500 | 44.00 | 10.92 | 54.92 | 66.00 | -11.08 | peak | |
| 2 | | 0.2590 | 30.16 | 10.92 | 41.08 | 61.46 | -20.38 | peak | |
| 3 | | 2.6381 | 22.51 | 11.00 | 33.51 | 56.00 | -22.49 | peak | |
| 4 | | 5.8430 | 32.68 | 11.15 | 43.83 | 60.00 | -16.17 | peak | |
| 5 | * | 8.5768 | 41.88 | 11.29 | 53.17 | 60.00 | -6.83 | peak | |
| 6 | | 14.2710 | 39.07 | 11.44 | 50.51 | 60.00 | -9.49 | 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**

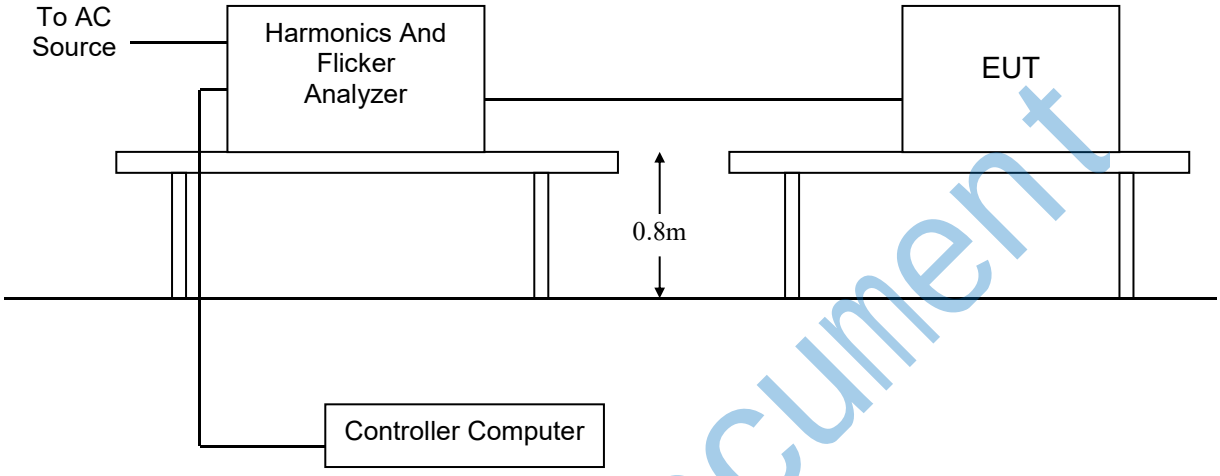
Note: The active input power of the EUT is less than 75W. No limits apply for equipment with an active input power up to and including 75W

## 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 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+A1:2019, 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 | Shall operate as intended.<br>(see note 1).<br>Shall be no loss of function.<br>Shall be no unintentional transmissions. | Shall operate as intended.<br>Shall be no degradation of performance (see note 3).<br>Shall be no loss of function.<br>Shall be no loss of stored data or user programmable functions. |
| B | May show loss of function (one or more).<br>May show degradation of performance<br>(see note 2).<br>Shall be no unintentional transmissions | Functions shall be self-recoverable.<br>Shall operate as intended after recovering.<br>Shall be no degradation of performance (see note 3).<br>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.<br>Shall operate as intended after recovering.<br>Shall be no degradation of performance (see note 3) |

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 toTransmitters (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.

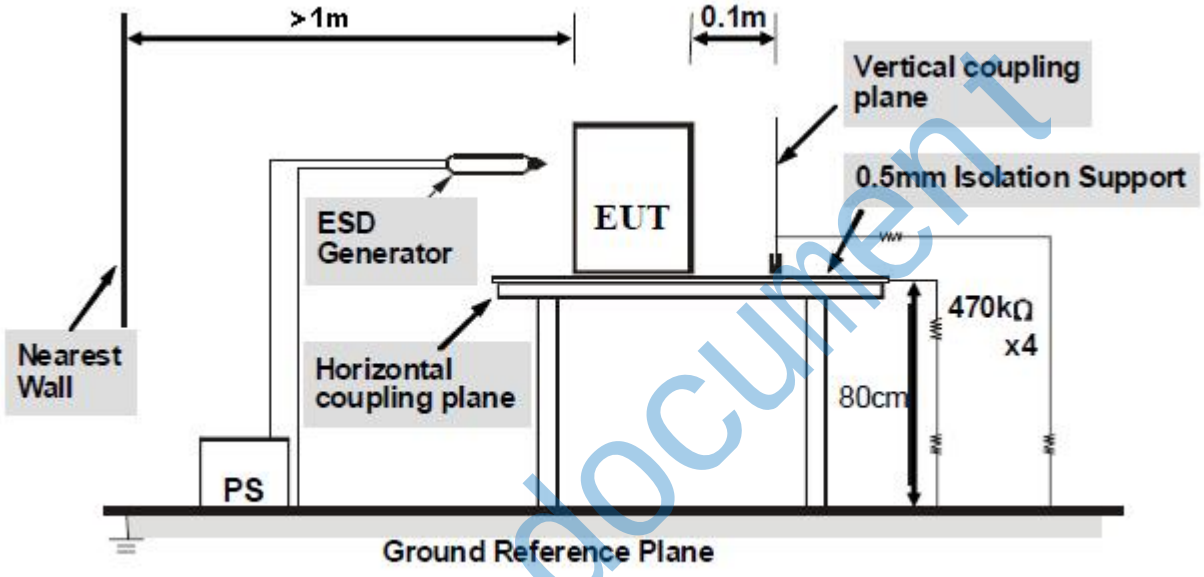
## 4.2.2. Electrostatic Discharge

**LIMIT**

**SEVERITY LEVELS OF ELECTROSTATIC DISCHARGE**

Test level: Contact Discharge at ±2KV, ±4KV Air Discharge at ±2KV, ±4KV, ±8KV

**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**

| **Direct discharge** | | | | |
|---|---|---|---|---|
| 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 | |
| **Indirect discharge** | | | | |
| 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

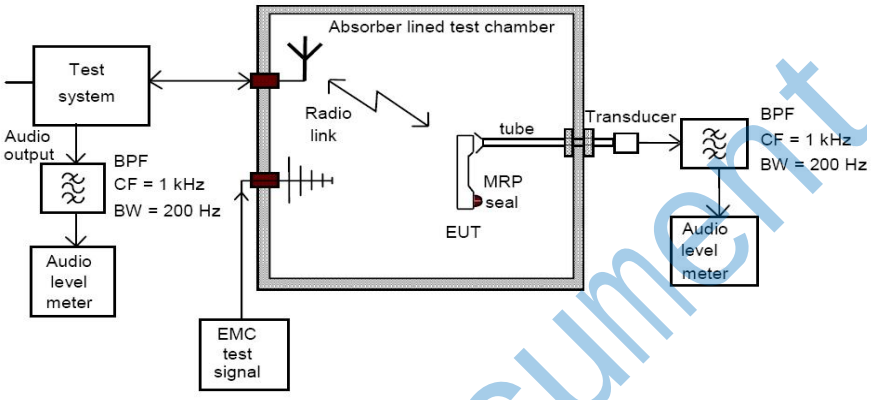
**PERFORMANCE CRITERION**

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

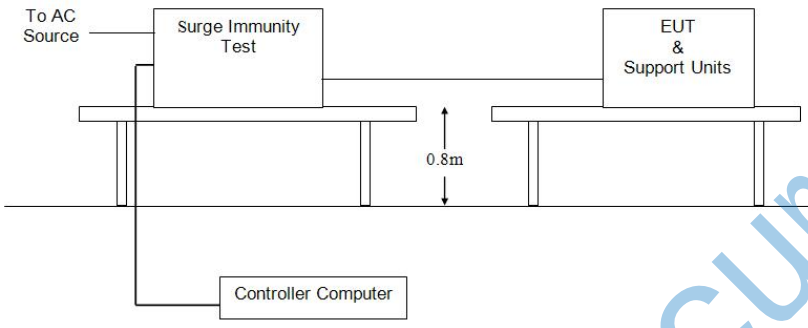
**TEST LEVEL**

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

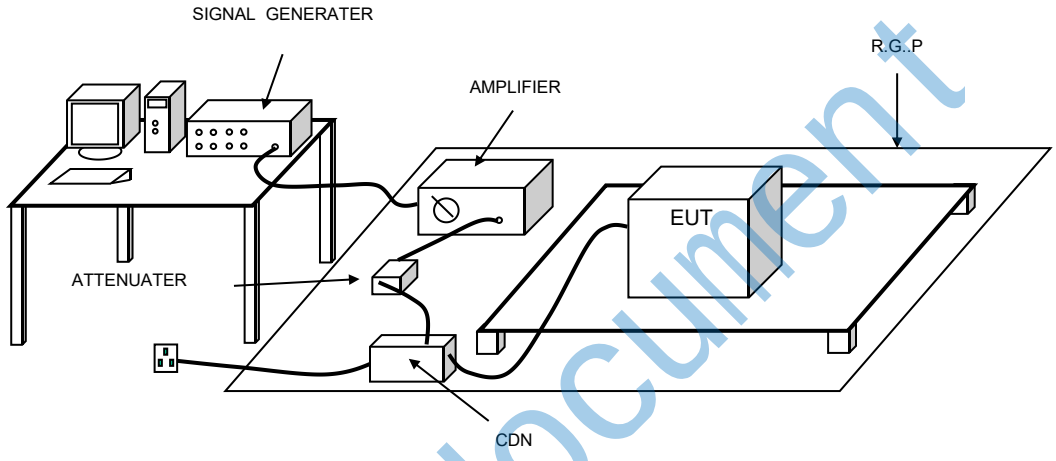
**PERFORMANCE CRITERION**

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,<br>80 % Amp. Mod,<br>1 % increment,<br>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**

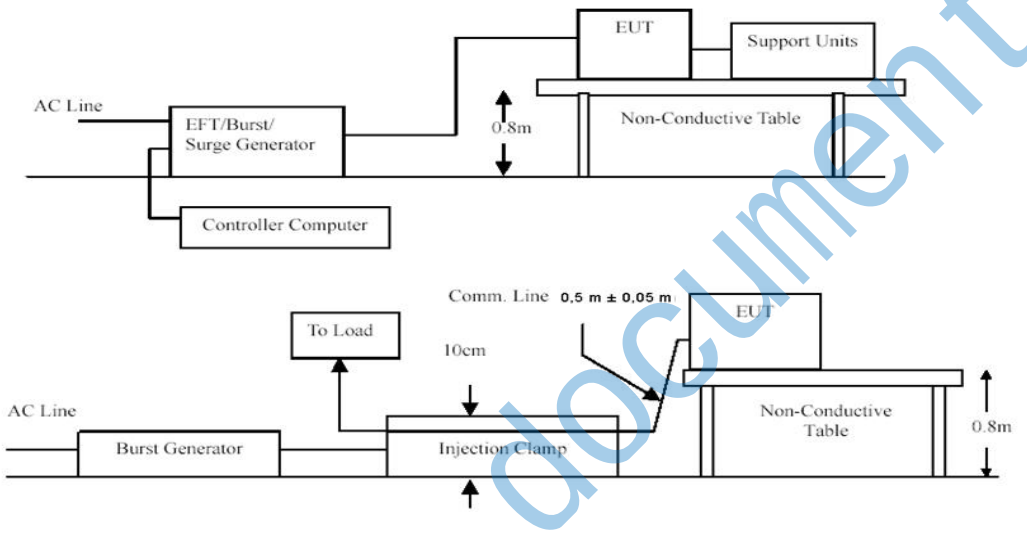
Criteria B

**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 (±kV) | Coupling Direct/Clamp | Observations (Performance Criterion) | Result |
|---|---|---|---|---|
| L | ±1 | Direct | A | Pass |
| N | ±1 | Direct | A | Pass |
| L-N | ±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**

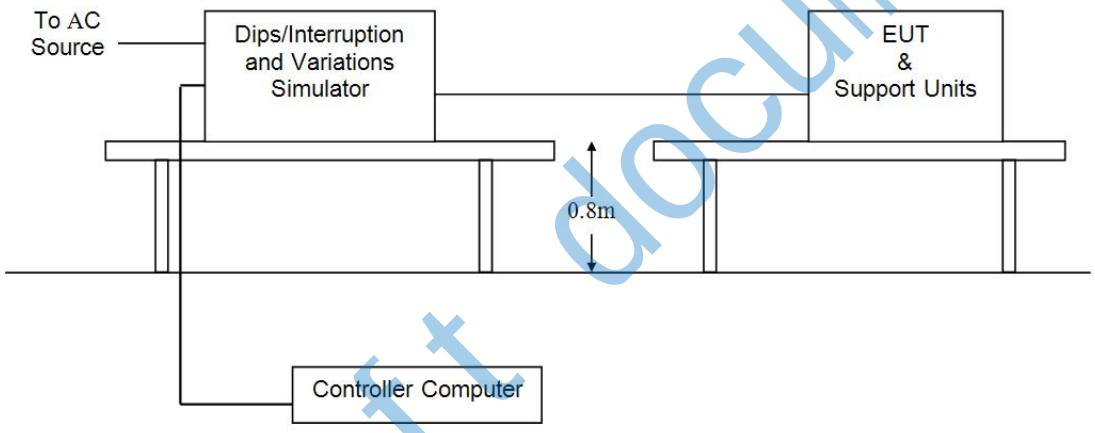
0% of VT(Supply Voltage) for 0.5 period

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 |

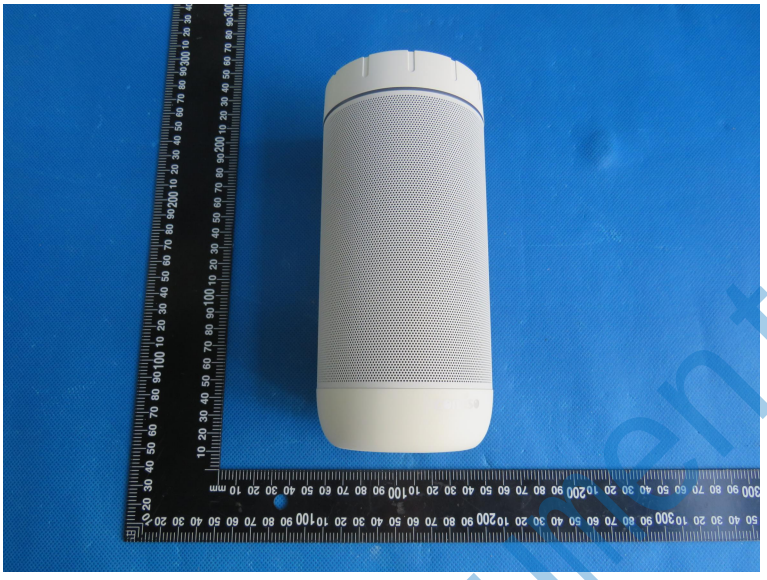
Remark :
A: No degradation in performance of the EUT was observed.
B: During the test, the power shut down, after the experiment, the function can automatically return to normal.

# 5. Test Set-up Photos of the EUT

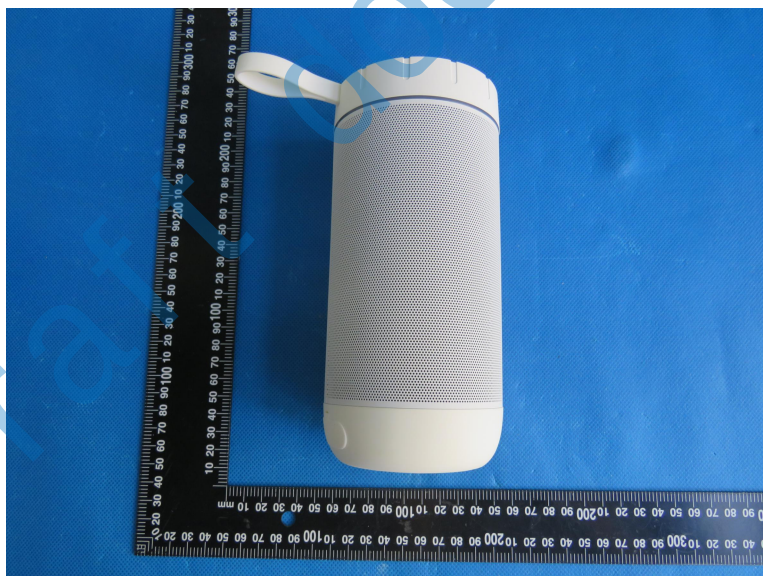
# 6. External and Internal Photos of the EUT

Overall view of the apparatus

Overall view of the apparatus

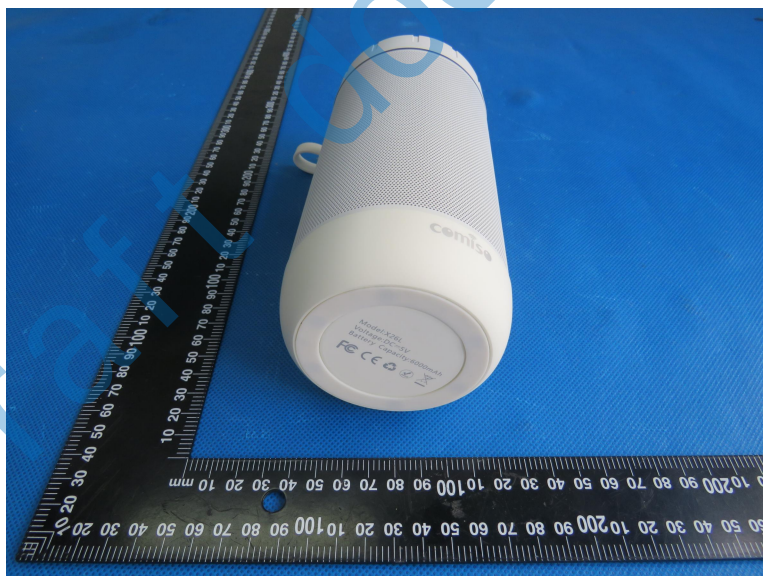


Overall view of the apparatus

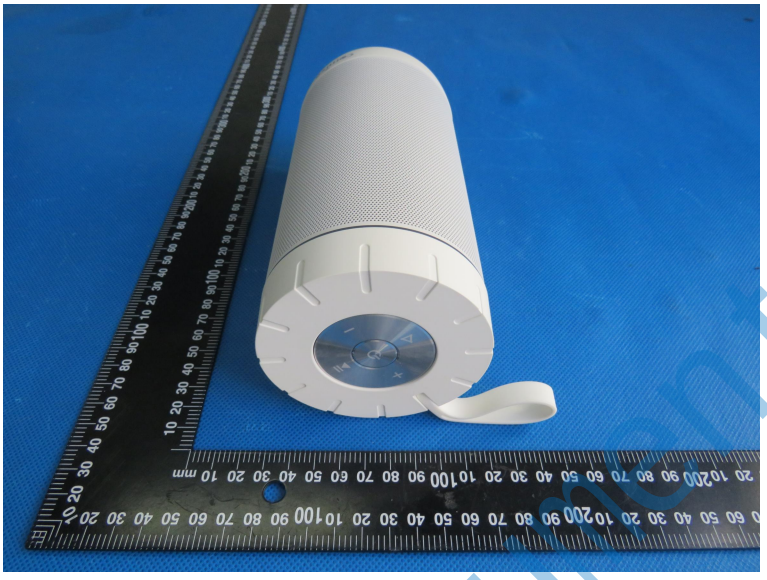


Overall view of the apparatus

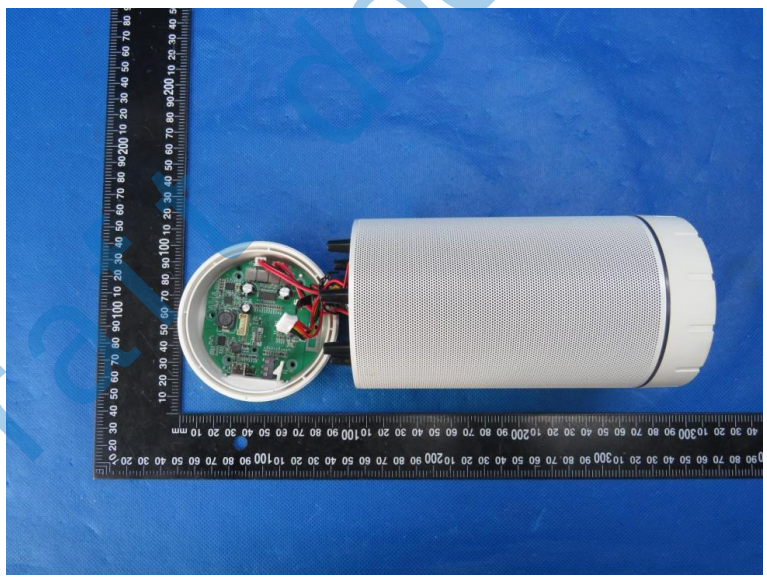
Overall view of the apparatus



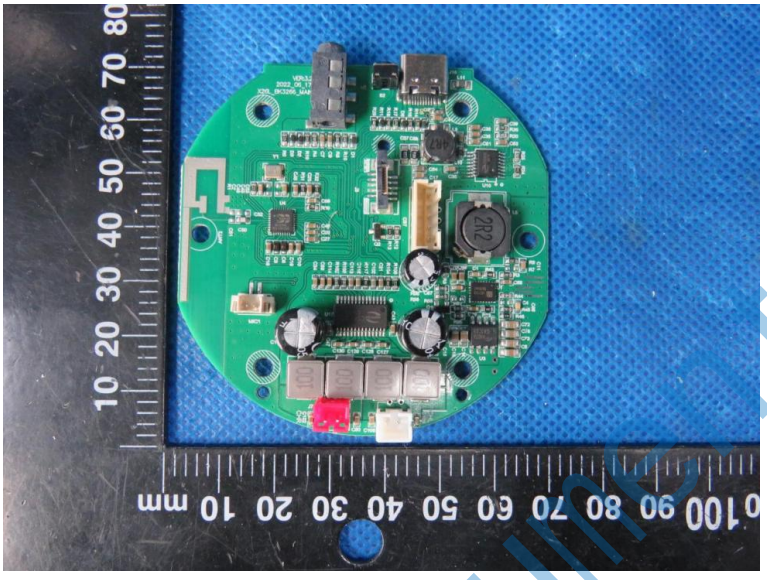
Overall view of the apparatus



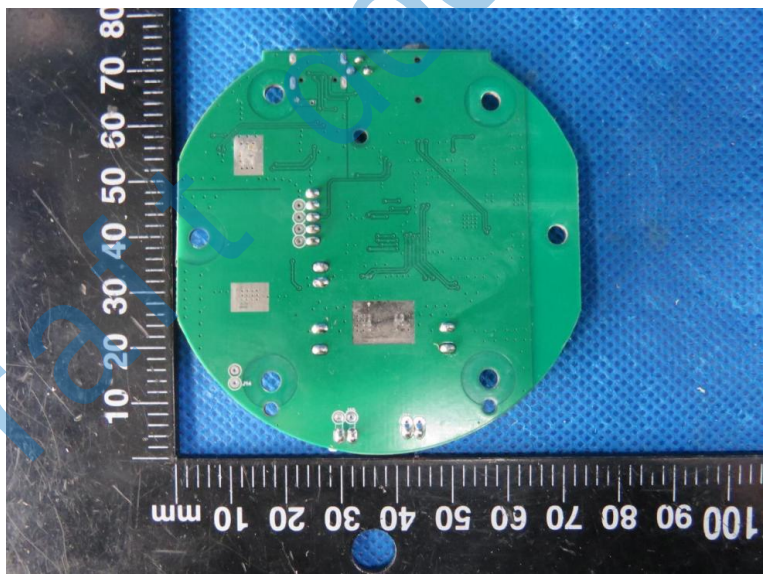
Overall view of the apparatus



Internal view of the apparatus



Internal view of the apparatus



Internal view of the apparatus

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