



TEST REPORT

**Draft ETSI EN 301 489-1 V2.2.0 (2017-03)/ 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**

Report Reference No......: **TZ190500709-RE**

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Date of issue.....: 2019/6/14

Testing Laboratory Name.....: Shenzhen Tongzhou Testing Co.,Ltd

Address: 1th Floor, Building 1, Haomai High-tech Park, Huating Road 387,
Dalang Street, Longhua, Shenzhen, China

Applicant's name.....:

Address

Test specification:

Standard: **Draft ETSI EN 301 489-1 V2.2.0 (2017-03)/ 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**

TRF Originator.....: Shenzhen Tongzhou Testing Co.,Ltd

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Test item description: Bluetooth Headphone

Trade Mark

Model/Type reference.....:

Listed Models

Hardware Version.....: V1.0

Software Version: V1.0

Rating: DC 3.7V by battery charged from adapter

Result.....: **Positive**





TEST REPORT

Test Report No. :	TZ190500709-RE	2019/6/14
		Date of issue

Equipment under Test : Bluetooth Headphone

Model /Type :

Listed Models :

Applicant :

Address :

Manufacturer :

Address :

Test Result according to the standards on page 5:	Positive
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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	2019/6/14	Andy Zhang



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1. TEST STANDARDS

The tests were performed according to following standards:

[Draft ETSI EN 301 489-1 V2.2.0 \(2017-03\)](#)

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

[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 (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 ≤ 16 A per phase and not subject to conditional connection



2. SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	2019/6/6
Testing commenced on	:	2019/6/6
Testing concluded on	:	2019/6/14

2.2. Product Description

Name of EUT	Bluetooth Headphone
Model(s) Number	H10
List Models	RH05
Difference description	All the same except for the model name
Hardware version	V1.0
Software version	V1.0
Antenna Type	Integral

Wireless Type	Working Frequency	Modulation Type
Bluetooth	2402MHz-2480MHz	GFSK, $\pi/4$ DQPSK, 8DQPSK



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 type="radio"/>	Other (specified in blank below)		

DC 3.7V by battery charged from adapter

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

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

Serial number: Prototype



2.5. EUT operation mode

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

Test Item	
EMI	
Mode 1	Bluetooth Link(TX)
Mode 2	Charging
Mode 3	Aiexa+Mobile Phone

EMS	
Mode 1	Bluetooth Link(TX)
Mode 2	Charging
Mode 3	Aiexa+Mobile Phone

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	Model:	GKYPG0200050EU2
		Manufacturer:	GuaiKaiYuan
●	Mobile Phone	Model:	vivo V3
		Manufacturer:	vivo

2.7. Performance level

For Draft ETSI EN 301 489-1 V2.2.0 (2017-03)

Refer to clause 6 Performance criteria

For Draft ETSI EN 301 489-17 V3.2.0 (2017-03)

Refer to clause 6 Performance criteria

2.8. Modifications

No modifications were implemented to meet testing criteria.

2.9. NOTE

Function	Test Standards	Reference Report
Bluetooth	ETSI EN 300 328 V2.1.1 (2016-11)	TZ190500709-EDR
EMC	Draft ETSI EN 301 489-1 V2.2.0 (2017-03) 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	TZ190500709-RE
EMF	EN 62479: 2010	TZ190500709-EMF



3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen Tongzhou Testing Co.,Ltd
1th Floor, Building 1, Haomai High-tech Park, Huating Road 387, Dalang Street, Longhua, 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:

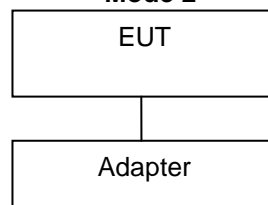
Temperature:	<u>15-35 ° C</u>
Humidity:	<u>30-60 %</u>
Atmospheric pressure:	<u>950-1050mbar</u>

3.3. Configuration of Tested System

**Fig. 2-1 Configuration of Tested System
Mode 1**



Mode 2



Mode 3

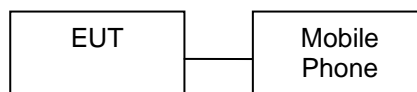


Table 2-1 Equipment Used in Tested System

No.	Product	Manufacturer	Model No.	FCC ID



3.4. Test Description

Draft ETSI EN 301 489-1/-17/-19/-52 requirements		
Radiated Emission	Draft ETSI EN 301 489-1 V2.2.0 (2017-03) Clause 7.1 EN 55032: 2015 Annex A.2	PASS
Conducted Emission(AC Mains)	Draft ETSI EN 301 489-1 V2.2.0 (2017-03) Clause 7.1 EN 55032: 2015 Annex A.3	PASS
Conducted Emission(Telecommunication Ports)	Draft ETSI EN 301 489-1 V2.2.0 (2017-03) Clause 7.1 EN 55032: 2015 Annex A.3	PASS
Harmonic Current Emissions	Draft ETSI EN 301 489-1 V2.2.0 (2017-03) Clause 7.1 EN 61000-3-2: 2014	N/A
Voltage Fluctuations and Flicker	Draft ETSI EN 301 489-1 V2.2.0 (2017-03) Clause 7.1 EN 61000-3-3: 2013	PASS
Electrostatic Discharge	Draft ETSI EN 301 489-1 V2.2.0 (2017-03) Clause 7.2	PASS
RF Electromagnetic Field	Draft ETSI EN 301 489-1 V2.2.0 (2017-03) Clause 7.2	PASS
Fast Transients Common Mode	Draft ETSI EN 301 489-1 V2.2.0 (2017-03) Clause 7.2	PASS
RF Common Mode 0,15 MHz to 80 MHz	Draft ETSI EN 301 489-1 V2.2.0 (2017-03) Clause 7.2	PASS
Transients and Surges	Draft ETSI EN 301 489-1 V2.2.0 (2017-03) Clause 7.2	N/A
Voltage Dips and Interruptions	Draft ETSI EN 301 489-1 V2.2.0 (2017-03) Clause 7.2	PASS
Surges, Line to Line and Line to Ground	Draft ETSI EN 301 489-1 V2.2.0 (2017-03) Clause 7.2	PASS

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

3.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen Tongzhou Testing Co.,Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Tongzhou Testing Co.,Ltd is reported:

Test	Range	Measurement Uncertainty	Notes
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	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	100849/003	2019/1/3	2020/1/2
2	Artificial Mains	ROHDE & SCHWARZ	ENV 216	101333-IP	2019/1/3	2020/1/2
3	EMI Test Software	ROHDE & SCHWARZ	ESK1	N/A	N/A	N/A
4	Wideband Radio Communication Tester	R&S	CMW500	103974	2019/1/3	2020/1/2

Radiated emission						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due
1	Test Receiver	R&S	ESCI-7	100849/003	2019/1/3	2020/1/2
2	wideband Antenna	schwarzbeck	VULB 9163	958	2018/11/20	2020/11/19
3	Horn Antenna	schwarzbeck	9120D-1141	1574	2018/11/20	2020/11/19
4	Amplifier	schwarzbeck	BBV 9743	209	2019/1/3	2020/1/2
5	Amplifier	Tonscend	TSAMP-0518SE	--	2019/1/3	2020/1/2
6	Postional Controller	MF	MF7802	--	--	--
7	Coaxial Cable	HUBER+SUHNER	RG214	N/A	2019/1/3	2020/1/2
8	Wideband Radio Communication Tester	R&S	CMW500	103974	2019/1/3	2020/1/2
9	Horn Antenna	ETS	3117	00218874	2019/1/3	2020/1/2

Voltage Fluctuation and Flicker						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due
1	Harmonic & Flicker tester	EMC PARTNER	HARMONICS 1000	439263	2019/1/3	2020/1/2
2	Wideband Radio Communication Tester	R&S	CMW500	103974	2019/1/3	2020/1/2



Electrostatic Discharge						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due
1	ESD Simulator	TESEQ	NSG 437	976	2019/1/5	2020/1/4
2	Wideband Radio Communication Tester	R&S	CMW500	103974	2019/1/3	2020/1/2

RF Electromagnetic Field						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due
1	Signal Generator	IFR	2032	203002/100	2018/9/20	2019/9/19
2	AMPLIFIER	AR	150W1000	301584	2018/9/20	2019/9/19
3	DUAL DIRECTIONAL COUPLER	AR	DC6080	301508	2018/9/20	2019/9/19
4	POWER HEAD	AR	PH2000	301193	2018/9/20	2019/9/19
5	POWER METER	AR	PM2002	302799	2018/9/20	2019/9/19
6	TRANSMITTING AERIAL	AR	AT1080	28570	2018/9/20	2019/9/19
7	POWER AMPLIFIER	AR	25S1G4A	0325511	2018/9/20	2019/9/19
8	DUAL DIRECTIONAL COUPLER	AR	DC7144A	0325100	2018/9/20	2019/9/19
9	TRANSMITTING AERIAL	AR	AT4002A	0324848	2018/9/20	2019/9/19
10	Wideband Radio Communication Tester	R&S	CMW500	103974	2019/1/3	2020/1/2
11	Audio Analyzer	R&S	UPA	SB4037	2019/1/3	2020/1/2

Fast transients common mode						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due
1	Ultra Compact Simulator	HTEC	HCOMPACT 7	162904	2019/1/3	2020/1/2
2	Coupling Clamp	H3C	HTEC	162908	2019/1/3	2020/1/2
3	Wideband Radio Communication Tester	R&S	CMW500	103974	2019/1/3	2020/1/2

Surges, line to line and line to ground						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due
1	Ultra Compact Simulator	HTEC	HCOMPACT 7	162904	2019/1/3	2020/1/2
2	Wideband Radio Communication Tester	R&S	CMW500	103974	2019/1/3	2020/1/2



RF common mode 0,15 MHz to 80 MHz						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due
1	Signal Generator	IFR	2023A	202304/060	2018/9/20	2019/9/19
2	Amplifier	AR	75A250	302205	2018/9/20	2019/9/19
3	Dual Directional Coupler	AR	DC2600	302389	2018/9/20	2019/9/19
4	6db Attenuator	EMTEST	ATT6/75	0010230A	2018/9/20	2019/9/19
5	EM CLAMP	LÜTHI	EM101	335625	2018/9/20	2019/9/19
6	CDN	EMTEST	CDN M3	0802-03	2018/9/20	2019/9/19
7	Wideband Radio Communication Tester	R&S	CMW500	103974	2019/1/3	2020/1/2
8	Audio Analyzer	R&S	UPA	SB4037	2019/1/3	2020/1/2

Voltage Dips and Interruptions						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due
1	Ultra Compact Simulator	HTEC	HCOMPACT 7	162904	2019/1/3	2020/1/2
2	Voltage Dips and interruption Simulator	HTEC	HV1P16T	162907	2019/1/3	2020/1/2
3	Wideband Radio Communication Tester	R&S	CMW500	103974	2019/1/3	2020/1/2

4. TEST CONDITIONS AND RESULTS

4.1. REQUIREMENTS

4.1.1. Radiated Emission

LIMIT

Please refer to Draft ETSI EN 301 489-1 Clause 8.2.3

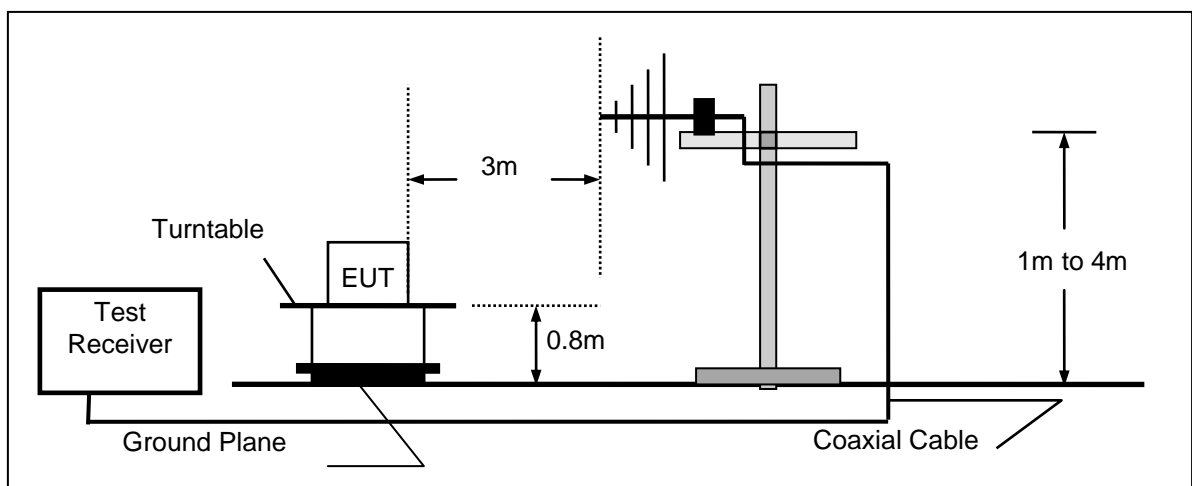
The ancillary equipment shall meet the class B limits given in CENELEC EN 55032 [1], annex A tables A.4 and A.5.

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.

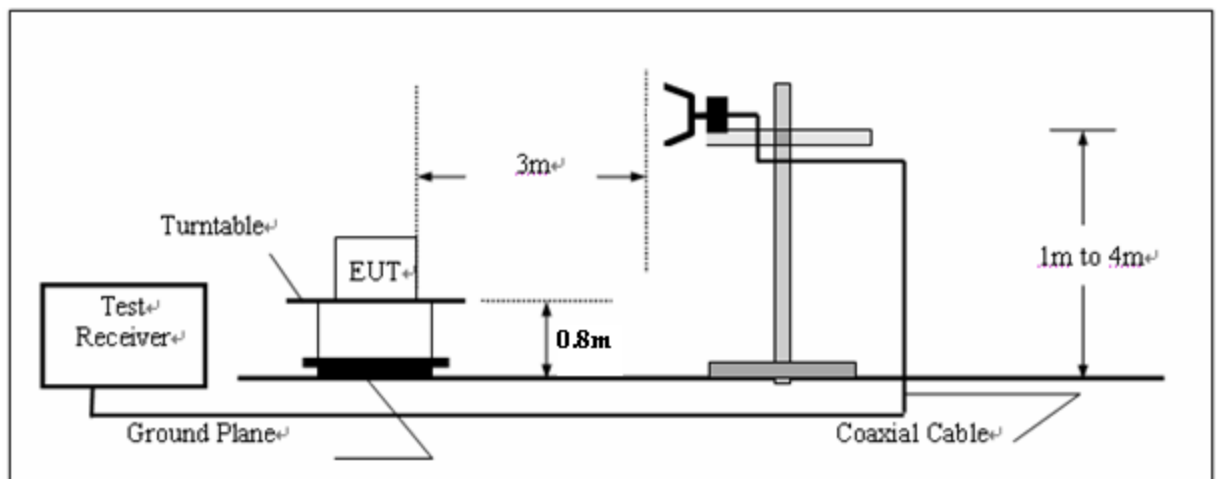
If EUT is also a FM Receiver, it shall meet CENELEC EN 55032 [3], annex A tables A.6

TEST CONFIGURATION

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



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



TEST PROCEDURE



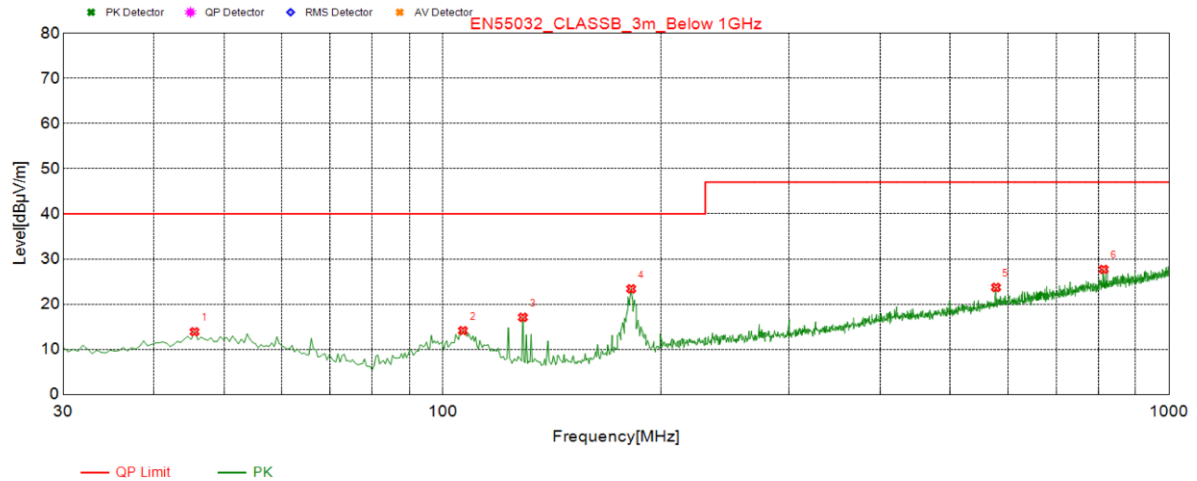
Please refer to Draft ETSI EN 301 489-1 Clause 8.2.2 and The test method shall be in accordance with CENELEC EN 55032 [1], annex A.2. for the measurement methods.

Climatic conditions

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

TEST RESULTS

Worst Case: Mode 1 **Below 1000MHz**

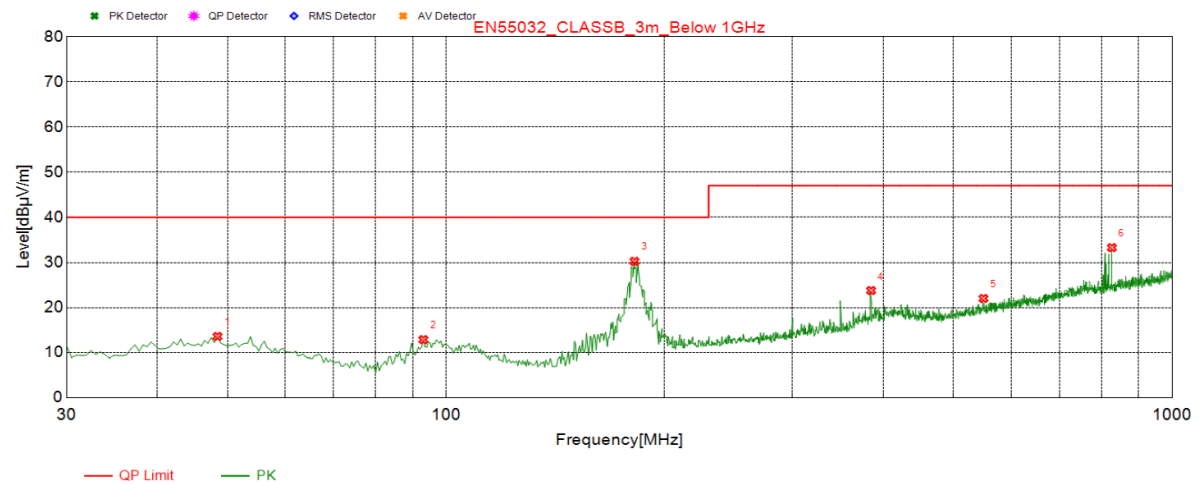


Suspected List

NO.	Freq. [MHz]	Result Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle[°]	Polarity
1	45.520	13.88	-13.94	40.00	26.12	100	210	Vertical
2	106.630	14.13	-16.00	40.00	25.87	100	92	Vertical
3	128.940	17.07	-18.92	40.00	22.93	200	290	Vertical
4	181.805	23.38	-17.28	40.00	16.62	200	257	Vertical
5	578.050	23.69	-6.14	47.00	23.31	100	281	Vertical
6	813.275	27.71	-2.65	47.00	19.29	200	346	Vertical

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]	Result Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	48.430	13.58	-14.10	40.00	26.42	100	336	Horizontal
2	93.050	12.85	-17.16	40.00	27.15	300	327	Horizontal
3	181.805	30.24	-17.28	40.00	9.76	100	347	Horizontal
4	385.020	23.74	-10.45	47.00	23.26	100	62	Horizontal
5	549.920	21.94	-6.83	47.00	25.06	100	65	Horizontal
6	826.370	33.22	-2.41	47.00	13.78	100	137	Horizontal

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)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (KHz)	Height (cm)	Pol	Azimuth (deg)
1310.20	43.68	---	70	26.32	100	1000	100	V	18
1485.26	41.77	---	70	28.23	100	1000	100	V	286
2564.32	45.21	---	70	24.79	100	1000	100	H	200
2463.76	46.28	---	70	23.72	100	1000	100	H	282
3059.57	47.78	---	74	26.22	100	1000	100	V	220
3177.94	48.13	---	74	25.87	100	1000	100	H	54

4.1.2. Conducted Emission (AC Mains)

LIMIT

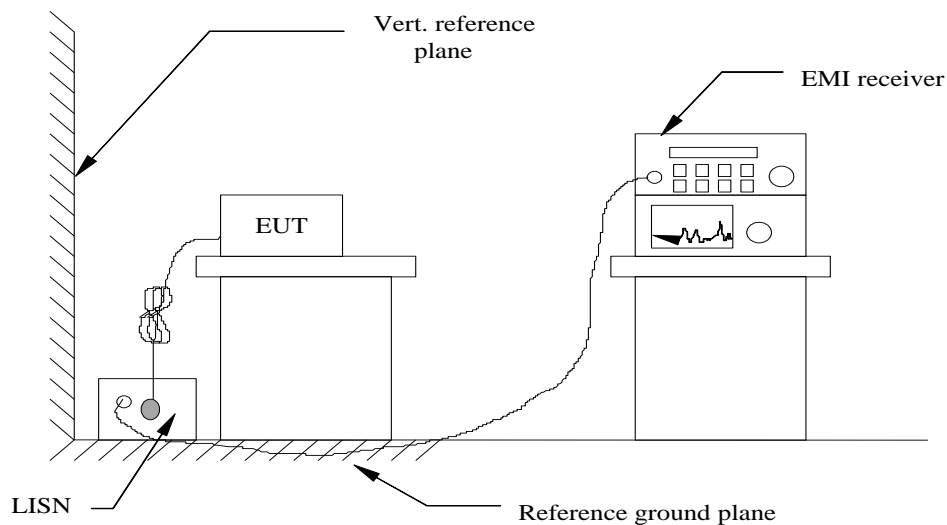
Please refer to Draft ETSI EN 301 489-1 Clause 8.4.3

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

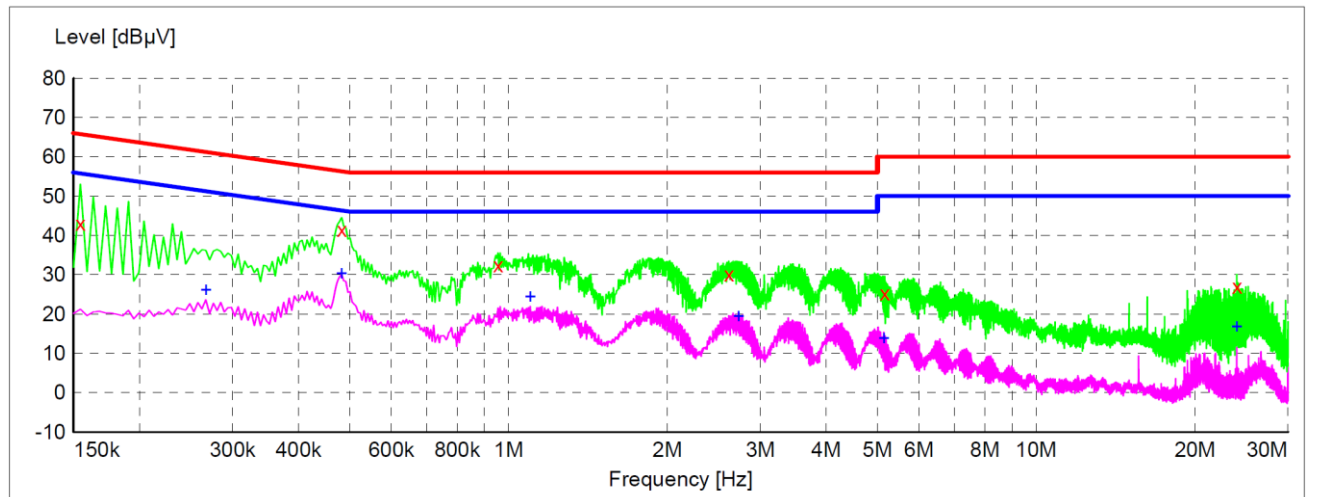
Please refer to Draft ETSI EN 301 489-1 Clause 8.4.2 for the measurement methods.

Climatic conditions

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

TEST RESULTS

Note: Only Mode 2 apply to this test.

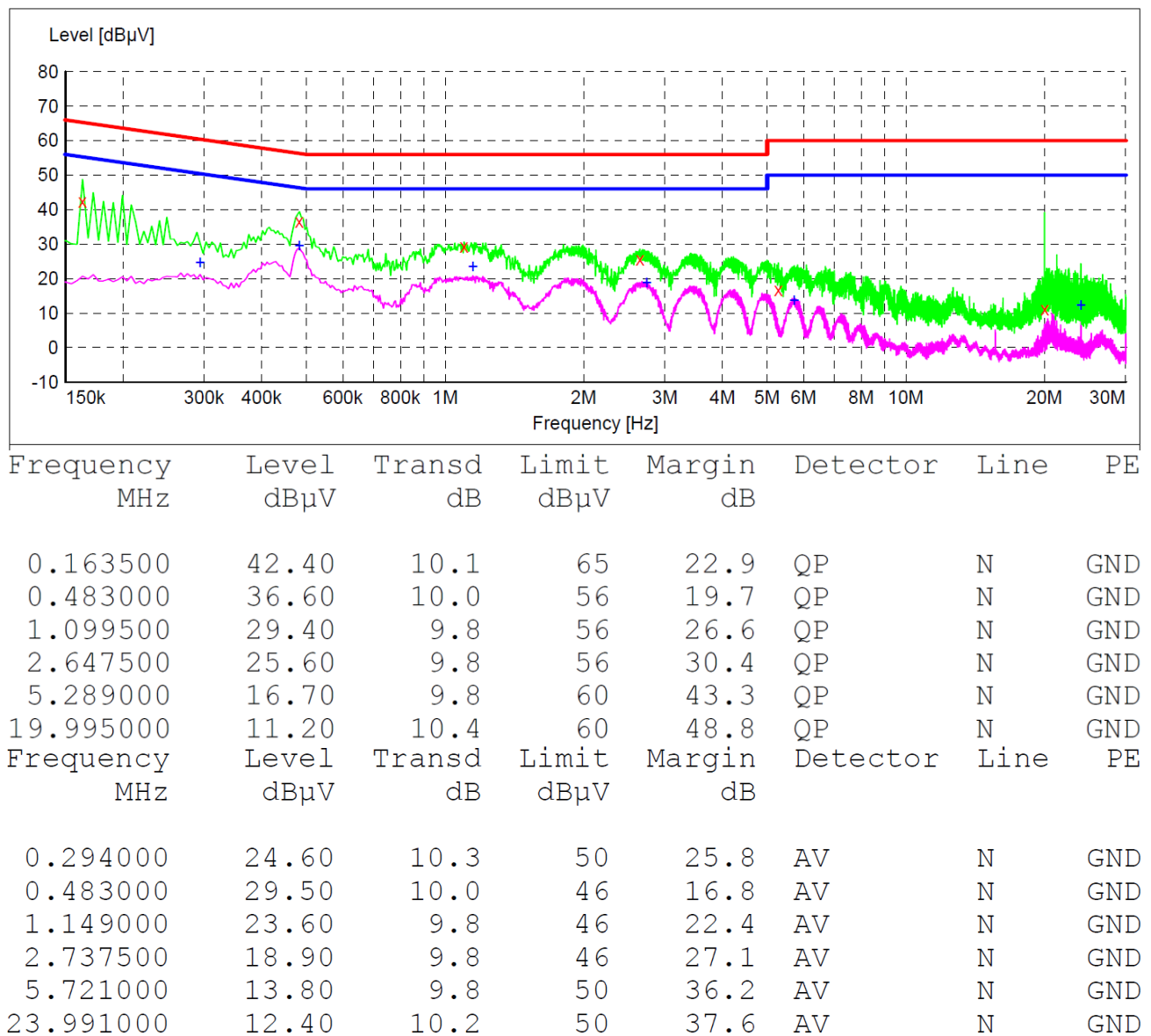


Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.154500	43.00	9.9	66	22.8	QP	L1	GND
0.483000	41.40	10.0	56	14.9	QP	L1	GND
0.955500	32.40	9.8	56	23.6	QP	L1	GND
2.616000	30.10	9.8	56	25.9	QP	L1	GND
5.163000	25.30	9.8	60	34.7	QP	L1	GND
23.991000	27.00	10.2	60	33.0	QP	L1	GND
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.267000	26.00	10.4	51	25.2	AV	L1	GND
0.483000	30.20	10.0	46	16.1	AV	L1	GND
1.099500	24.30	9.8	46	21.7	AV	L1	GND
2.728500	19.30	9.8	46	26.7	AV	L1	GND
5.140500	13.70	9.8	50	36.3	AV	L1	GND
23.986500	16.70	10.2	50	33.3	AV	L1	GND

Note: 1. Result Level = Read Level + LISN Factor + Pulse Limiter Factor + Cable loss.

2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz), Step size: 4 kHz, Scan time: auto.



Note: 1. Result Level = Read Level + LISN Factor + Pulse Limiter Factor + Cable loss.

2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.

3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz), Step size: 4 kHz, Scan time: auto.

4.1.3. Conducted Emission (Telecommunication Ports)

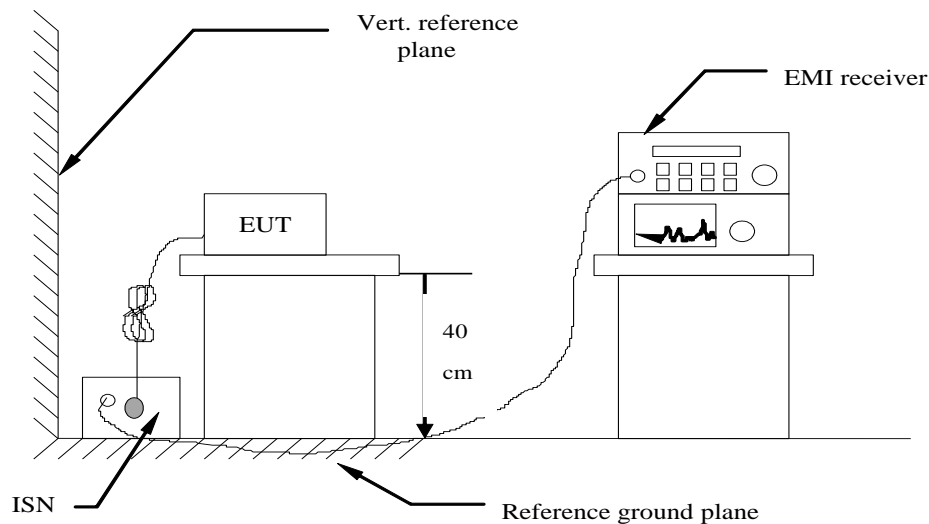
LIMIT

Please refer to Draft 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 Draft 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

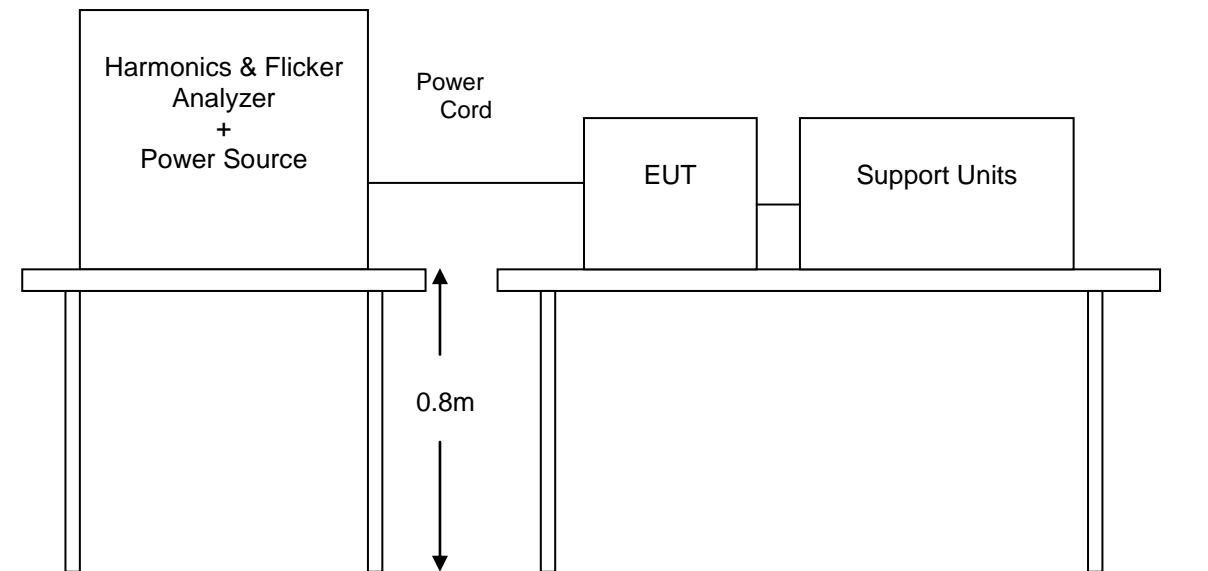
Not applicable

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

Not applicable (<75W)



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

Standard used:	EN/IEC 61000-3-3 Flicker
Short time (Pst):	10 min
Observation time:	120 min (12 Flicker measurements)
Customer:	Dongguan Fulun Electronic Co.,Limited
Mains supply voltage:	AC 230V/50Hz
Ambient Temperature:	25°C
Humidity:	51%
E. U. T.:	Bluetooth Headphone M/N: H10
Date of test:	2019/6/6
Tester:	Sam

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

Maximum Flicker results

	EUT values	Limit	Result
Pst	0.028	1.00	PASS
Plt	0.028	0.65	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.127	4.00	PASS
dt [s]	0.000	0.50	PASS

Detail Flicker data



Flicker measurement 1	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.127	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 2	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.093	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 3	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.093	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 4	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.091	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 5	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.092	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 6	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.095	4.00	PASS
dt [s]	0.000	0.50	PASS



Flicker measurement 7	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.091	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 8	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.094	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 9	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.093	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 10	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.094	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 11	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.095	4.00	PASS
dt [s]	0.000	0.50	PASS

Flicker measurement 12	EUT values	Limit	Result
Pst	0.028	1.00	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.093	4.00	PASS
dt [s]	0.000	0.50	PASS

4.1.6. Electrostatic Discharge

LIMIT

Please refer to EN 61000-4-2

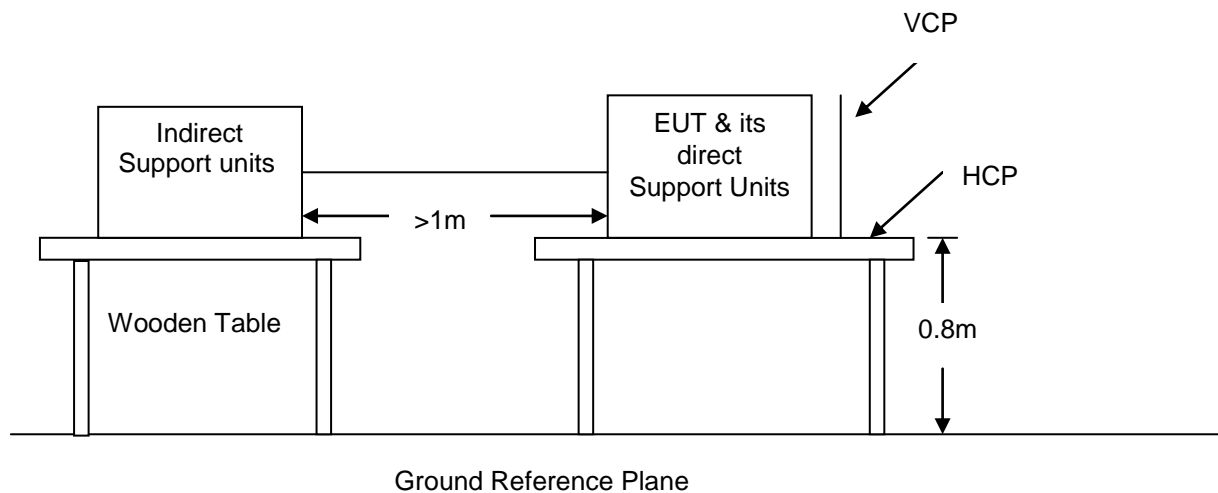
SEVERITY LEVELS OF ELECTROSTATIC DISCHARGE

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

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

Performance criterion: **B**

Test Configuration



Test procedure

Please refer to Draft ETSI EN 301 489-1 Clause 9.3.2 and EN 61000-4-2 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	50	Pass	B	-
	±4	50	Pass	B	-
	±8	50	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

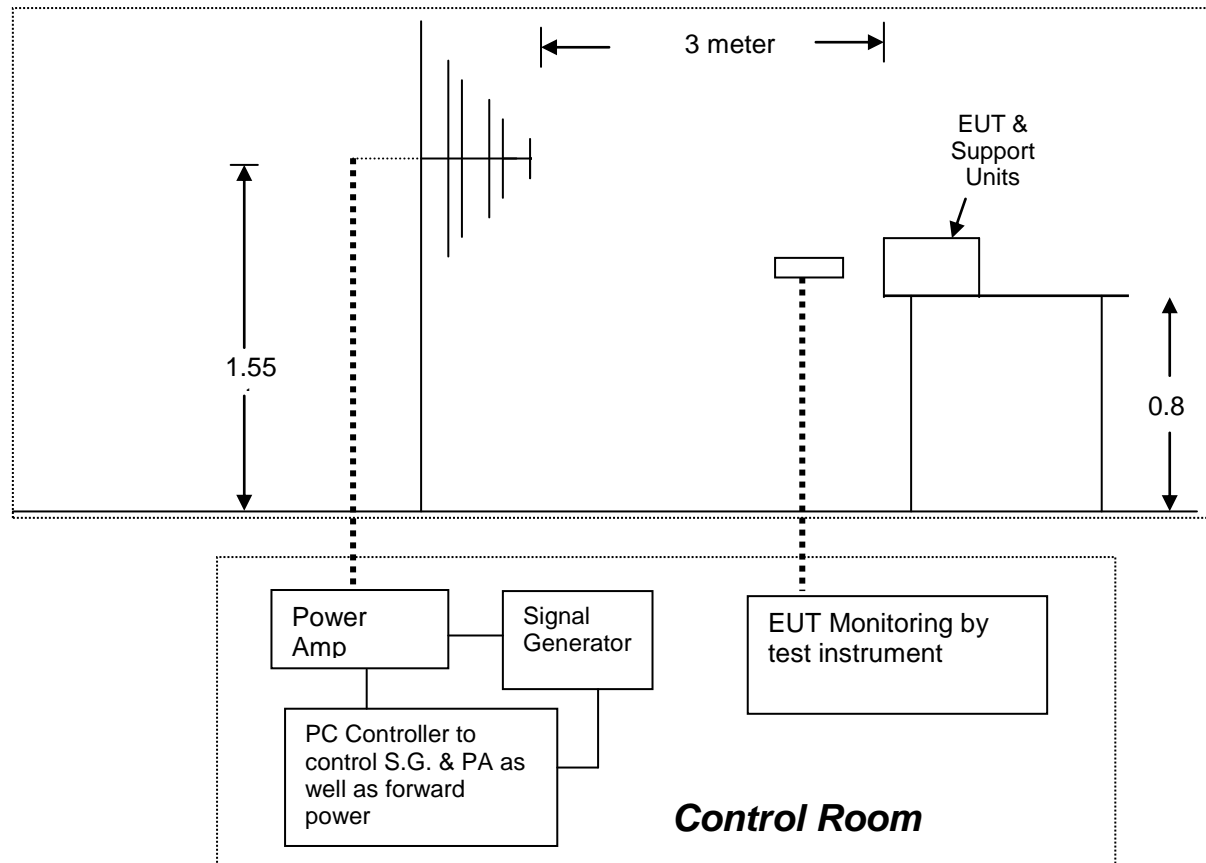
Contact Discharge		Air Discharge	
○	Metallic Screws	○	Plastic Screws
●	Metallic Case	●	Plastic Case(gap)
○	Metallic Connect ports	●	Plastic Connect Ports
○	Metallic Junctions	●	Plastic Junctions
○	Others (Antenna Port)	○	Others

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 Draft 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**☒ Result of Final Tests (Operating Mode & Standby (Receiving) Mode)**

	Freq. Range (MHz)	Field	Modulation	Polarity	Position	Mode	Result (Pass/Fail)
1	80-1000	3V/m	Yes	H / V	Front	Normal Operating	Pass
	1000-6000	3V/m	Yes	H / V	Front		Pass
2	80-1000	3V/m	Yes	H / V	Right	Normal Operating	Pass
	1000-6000	3V/m	Yes	H / V	Right		Pass
3	80-1000	3V/m	Yes	H / V	Back	Normal Operating	Pass
	1000-6000	3V/m	Yes	H / V	Back		Pass
4	80-1000	3V/m	Yes	H / V	Left	Normal Operating	Pass
	1000-6000	3V/m	Yes	H / V	Left		Pass

☒ Result of Final Tests(EN 55035)**☒ Swept Test**

Freq. Range (MHz)	Field	Modulation	Polarity	Position	Mode	Result (Pass/Fail)
80-1000	3V/m	Yes	H / V	Front	Normal Operating	PASS
80-1000	3V/m	Yes	H / V	Right	Normal Operating	PASS
80-1000	3V/m	Yes	H / V	Back	Normal Operating	PASS
80-1000	3V/m	Yes	H / V	Left	Normal Operating	PASS

☒ Spot Test

Freq. Range (MHz)	Field	Modulation	Polarity	Position	Mode	Result (Pass/Fail)
1800, 2600, 3500, 5000	3V/m	Yes	H / V	Front	Normal Operating	PASS
1800, 2600, 3500, 5000	3V/m	Yes	H / V	Right	Normal Operating	PASS
1800, 2600, 3500, 5000	3V/m	Yes	H / V	Back	Normal Operating	PASS
1800, 2600, 3500, 5000	3V/m	Yes	H / V	Left	Normal Operating	PASS

PERFORMANCE CRITERIA

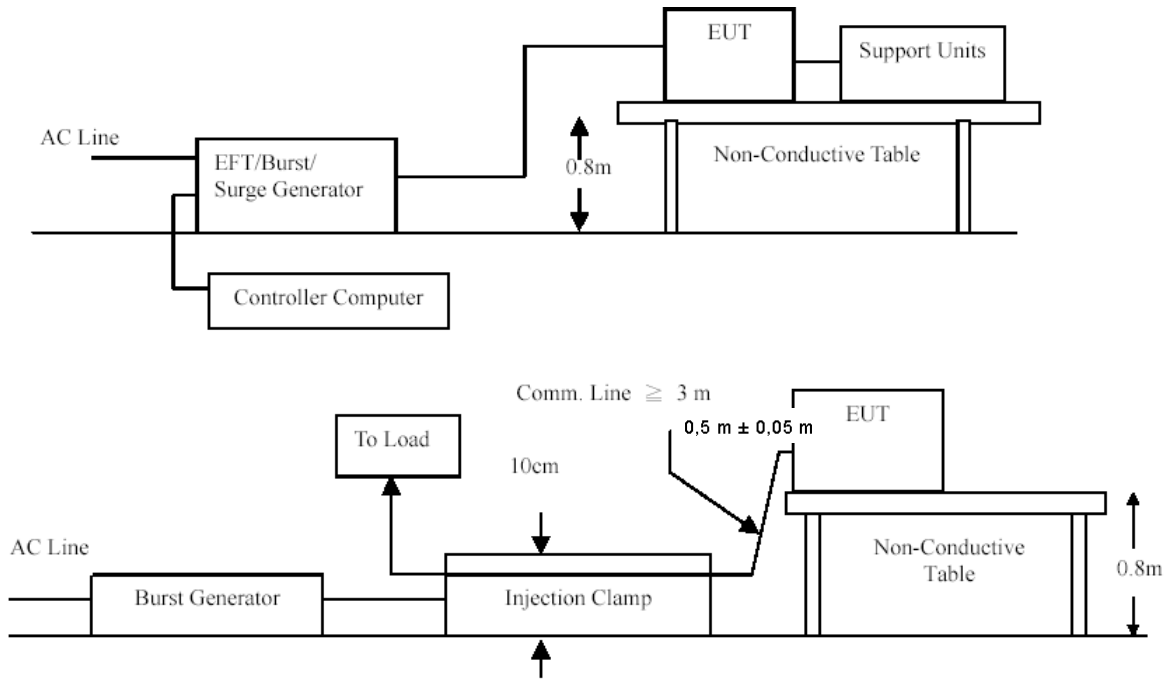
Criteria requested	<input checked="" type="checkbox"/> A / <input type="checkbox"/> B / <input type="checkbox"/> C
Criteria meet	<input checked="" type="checkbox"/> A / <input type="checkbox"/> B / <input type="checkbox"/> C

4.1.8. Fast Transients Common Mode

LIMIT

Please refer to EN 61000-4-4

TEST CONFIGURATION



TEST PROCEDURE

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

Climatic conditions

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

TEST RESULTS

☒ Results of Final Tests (Operating Mode)

Impulse Frequency: 5 kHz

Tr/Th: 5/50ns

Burst Duration: 15ms

Burst Period: 300ms

Test duration: 120s



Injection Line	Voltage (kV)	Injected Method	Result (Pass / Fail)
<input checked="" type="checkbox"/> Line	± 1	Direct	Pass
<input checked="" type="checkbox"/> Neutral	± 1	Direct	Pass
<input type="checkbox"/> PE	± 1	Direct	Pass
<input checked="" type="checkbox"/> Line + Neutral	± 1	Direct	Pass
<input type="checkbox"/> L + PE	± 1	Direct	Pass
<input type="checkbox"/> N + PE	± 1	Direct	Pass
<input type="checkbox"/> L + N + PE	± 1	Direct	Pass
<input type="checkbox"/> RJ45 port (LAN cable)	± 0.5	Clamp	Pass
<input type="checkbox"/> RJ11 port (Line cable)	± 0.5	Clamp	Pass

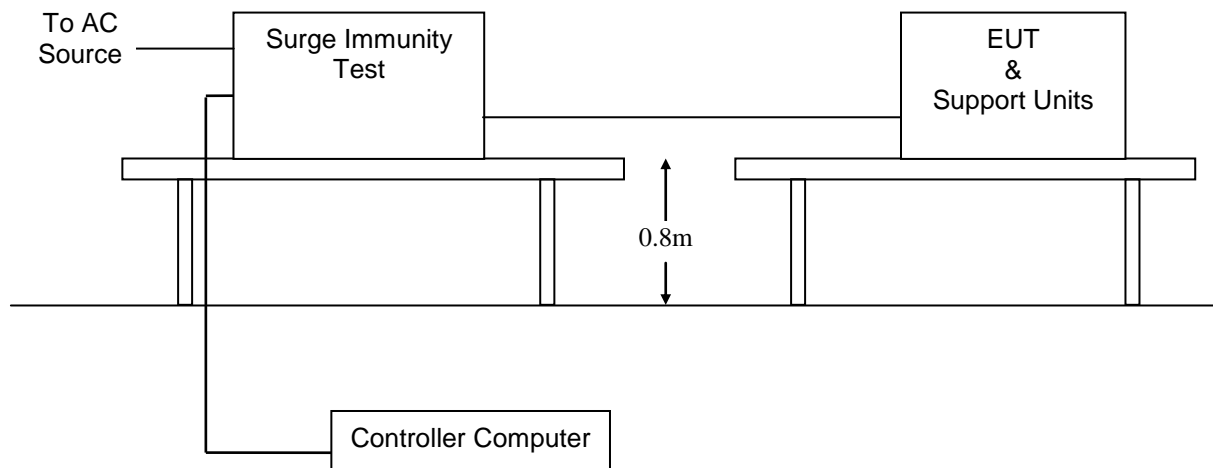
PERFORMANCE CRITERIA	
Criteria requested	<input type="checkbox"/> A / <input checked="" type="checkbox"/> B / <input type="checkbox"/> C
Criteria meet	<input type="checkbox"/> A / <input checked="" type="checkbox"/> B / <input type="checkbox"/> C

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

Climatic conditions

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

TEST RESULTS

☒ Results of Final Tests (Operating Mode)

Voltage Waveform: 1.2/50 us

Current Waveform: 8/20 us

Polarity: Positive/Negative

Phase angle: 0°, 90°, 180°, 270°

Coupling Line	Voltage (kV)	Polarity	Coupling Method	Result (Pass/Fail)
<input checked="" type="checkbox"/> Line + Neutral	1	Pos./ Neg.	Capacitive	Pass
<input type="checkbox"/> L + PE	2	Pos./ Neg.	Capacitive	Pass
<input type="checkbox"/> N + PE	2	Pos./ Neg.	Capacitive	Pass
<input type="checkbox"/> T, R-Ground	0.5	Pos./ Neg.	Capacitive	Pass
<input type="checkbox"/> RJ45 port (LAN)	0.5	Pos./ Neg.	Capacitive	Pass
<input type="checkbox"/> RJ11 port (Line cable)	0.5	Pos./ Neg.	Capacitive	Pass

PERFORMANCE CRITERIA

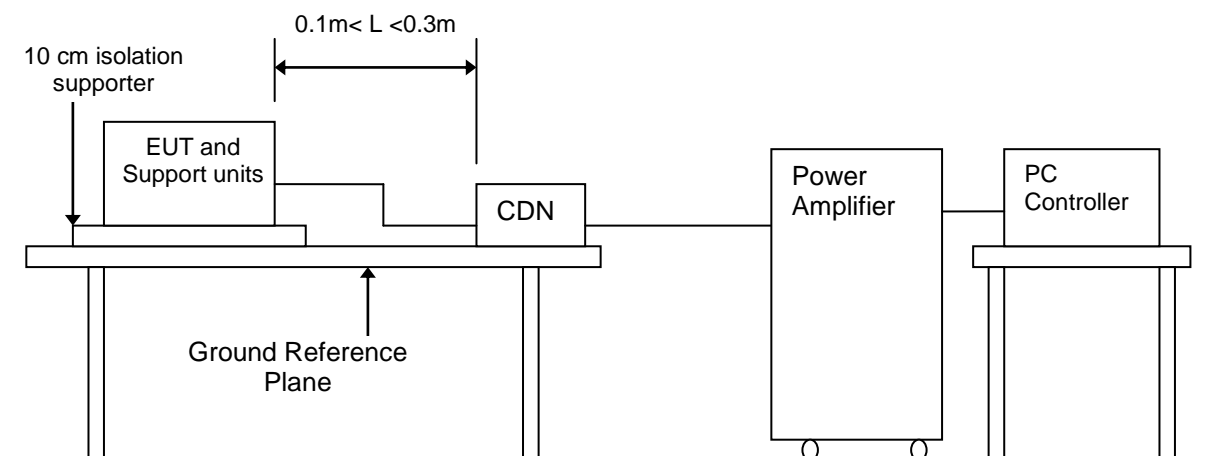
Criteria requested	<input type="checkbox"/> A / <input checked="" type="checkbox"/> B / <input type="checkbox"/> C
Criteria meet	<input type="checkbox"/> A / <input checked="" type="checkbox"/> B / <input type="checkbox"/> C

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 Draft 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 conditions

☒ Results of Final Tests (Operating Mode)

Frequency Range: 0.15MHz~80MHz

Frequency Step: 1% of fundamental

Dwell time: 1 Sec.

☒ **80% A.M., 1 kHz Sine wave (Field Strength: 3 V/m)**

☒ **Coupling type:** ☒ **CDN** / ☐ **RF Current Probe** / ☒ **EM CLAMP (LÜTHI)**

Range (MHz)	Field	Modulation	Injected Position	Result (Pass/Fail)
0.15-80	3V	Yes	LAN/AC Main/ Line cable	Pass

☒ **Results of Final Tests (EN 55035)**

Range (MHz)	Field	Modulation	Injected Position	Result (Pass/Fail)
0.15-10	3V	Yes	AC Main	Pass
10-30	3V – 1V	Yes	AC Main	Pass
30-80	1V	Yes	AC Main	Pass

PERFORMANCE CRITERIA

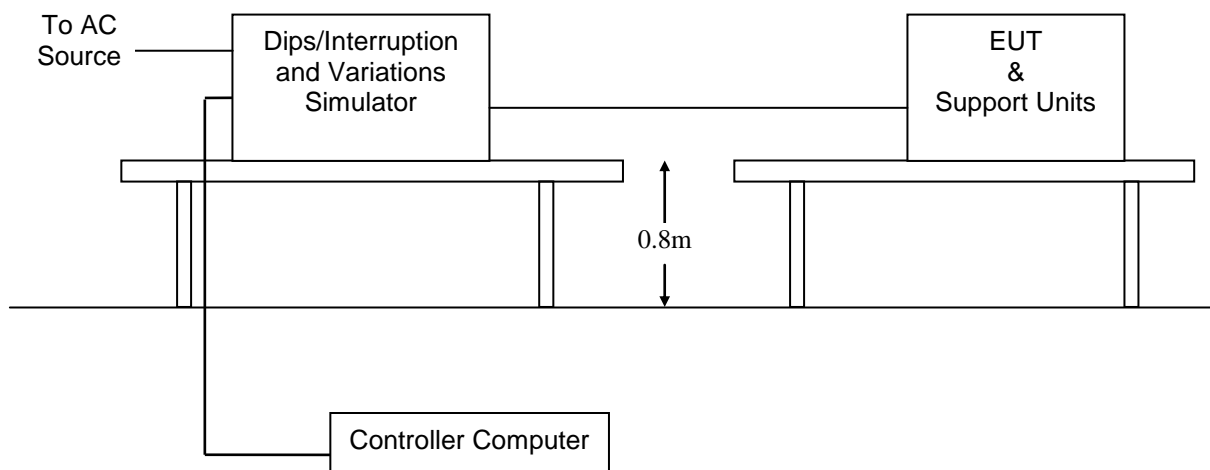
Criteria requested	<input checked="" type="checkbox"/> A / <input type="checkbox"/> B / <input type="checkbox"/> C
Criteria meet	<input checked="" type="checkbox"/> A / <input type="checkbox"/> B / <input type="checkbox"/> C

4.1.11. Voltage Dips and Interruptions

LIMIT

Please refer to EN 61000-4-11

TEST CONFIGURATION



TEST PROCEDURE

Please refer to Draft 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

Test conditions

☒ Interruption at phase angles of 0, 45, 90, 135, 180, 225, 270 and 315 degree in a 10 sec-interval.

	Test Level (% UT)	Reduction (%)	Duration		Criterion
			Peiod	ms	
Voltage Dips	0	100%	0.5	10	B
	0	100%	1	20	B
	70	30%	25	500	B
Voltage Interruption	0	100%	250	5000	C

Note: The duration with a sequence of three dips/interruptions with a minimum interval of 10 s between each test event. The test level is $U_T=100V$ and $U_T=240V$.

☒ **Results of Final Tests (Operating Mode)****U_T=100V**☒ *Voltage Dips*

Test Level (% UT)	Reduction (%)	Duration		Observation	Criterion
		Peiod	ms		
0	100%	0.5	10	Normal	A
0	100%	1	20	Normal	A
70	30%	25	500	Normal	B

☒ *Interruptions*

Test Level (% UT)	Reduction (%)	Duration		Observation	Criterion
		Peiod	ms		
0	100%	250	5000	Normal	C

U_T=240V☒ *Voltage Dips*

Test Level (% UT)	Reduction (%)	Duration		Observation	Criterion
		Peiod	ms		
0	100%	0.5	10	Normal	A
0	100%	1	20	Normal	A
70	30%	25	500	Normal	A

☒ *Interruptions*

Test Level (% UT)	Reduction (%)	Duration		Observation	Criterion
		Peiod	ms		
0	100%	250	5000	Normal	C

5. Test Set-up Photos of the EUT

Radiated Emission (30MHz-1GHz)



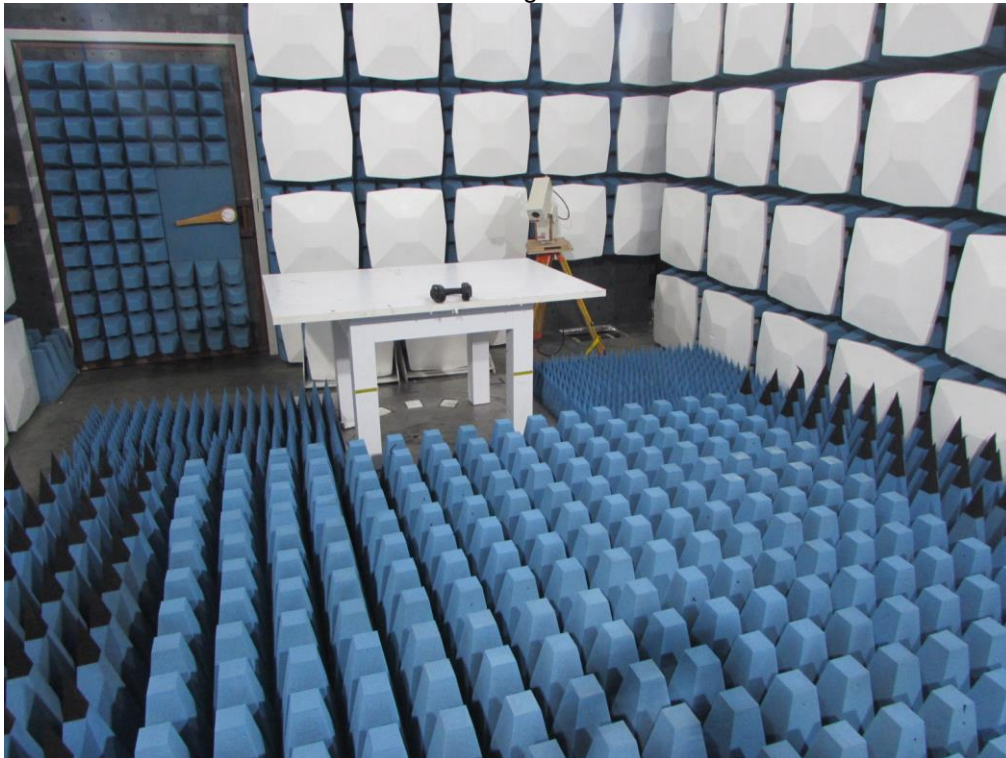
Radiated Emission (1GHz-6GHz)



Conducted Emission (AC Mains)



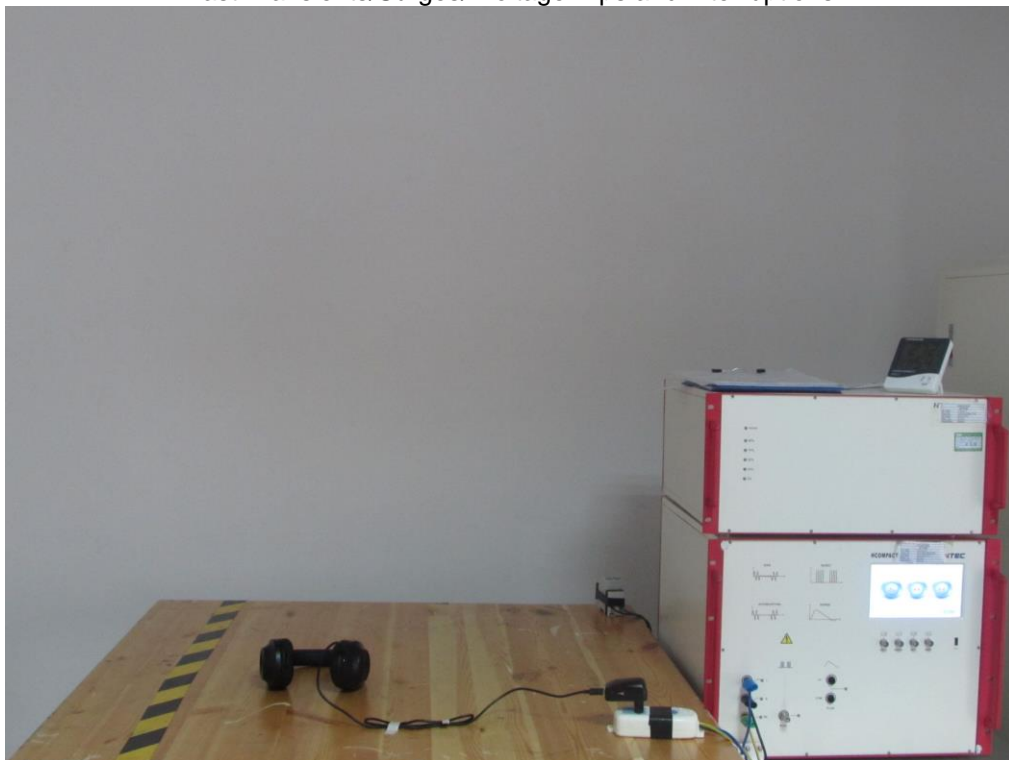
RF Electromagnetic Field



Electrostatic Discharge



Fast Transients/Surges/ Voltage Dips and Interruptions



6. PHOTOS OF THE EUT

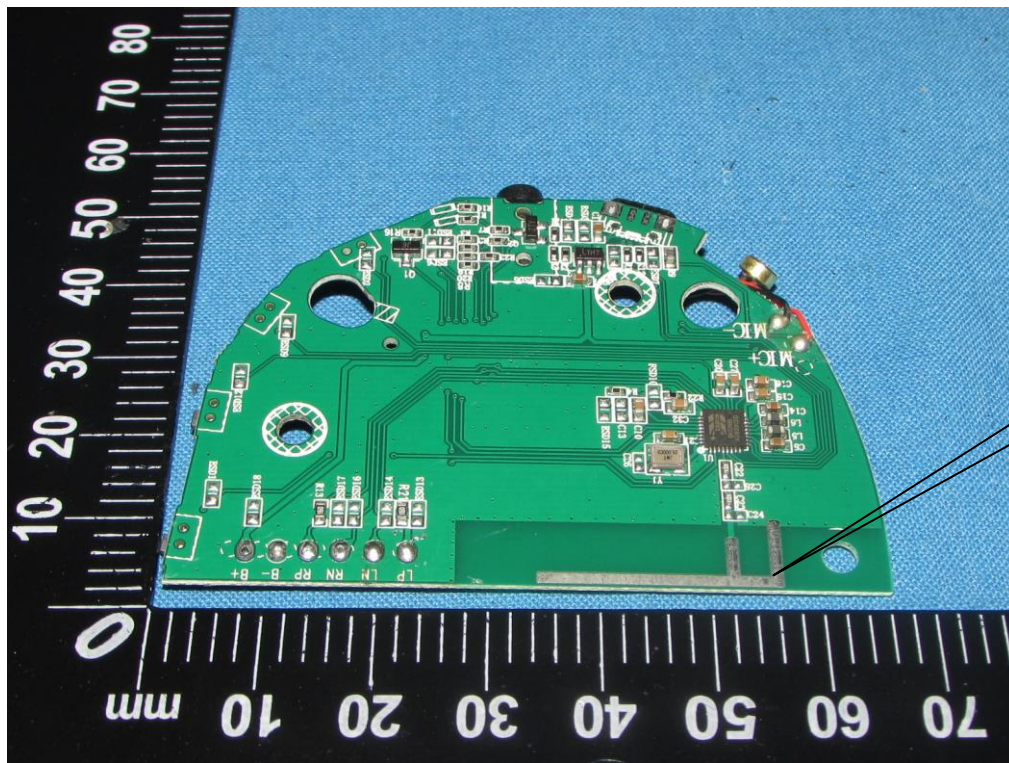
External photos



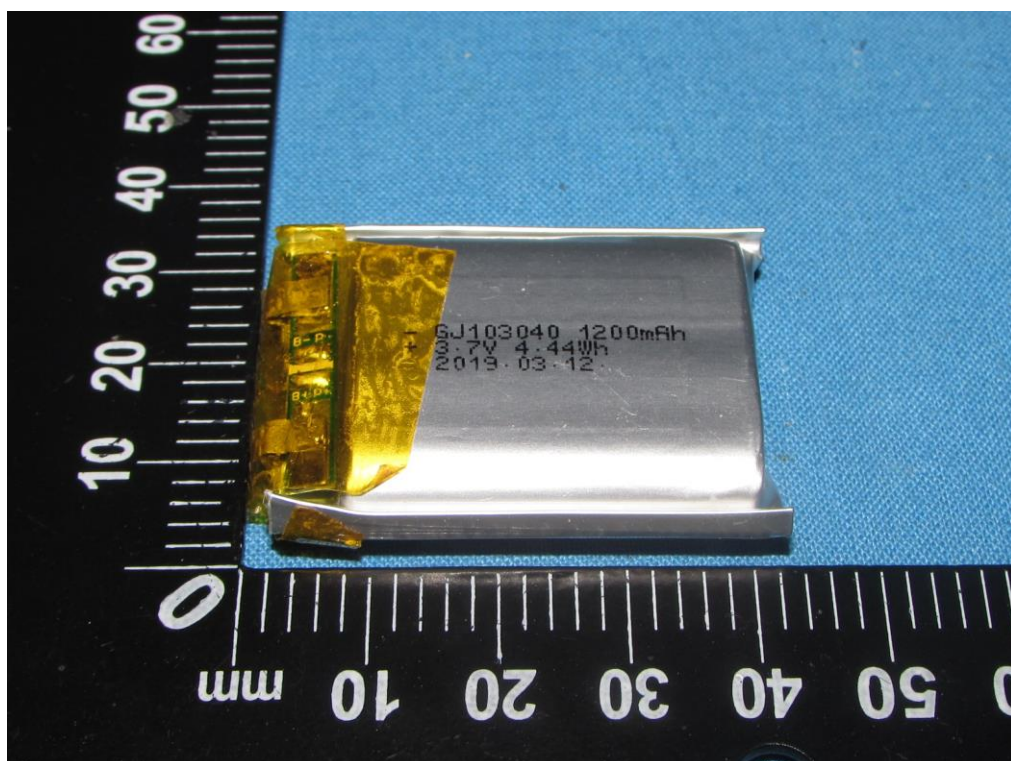
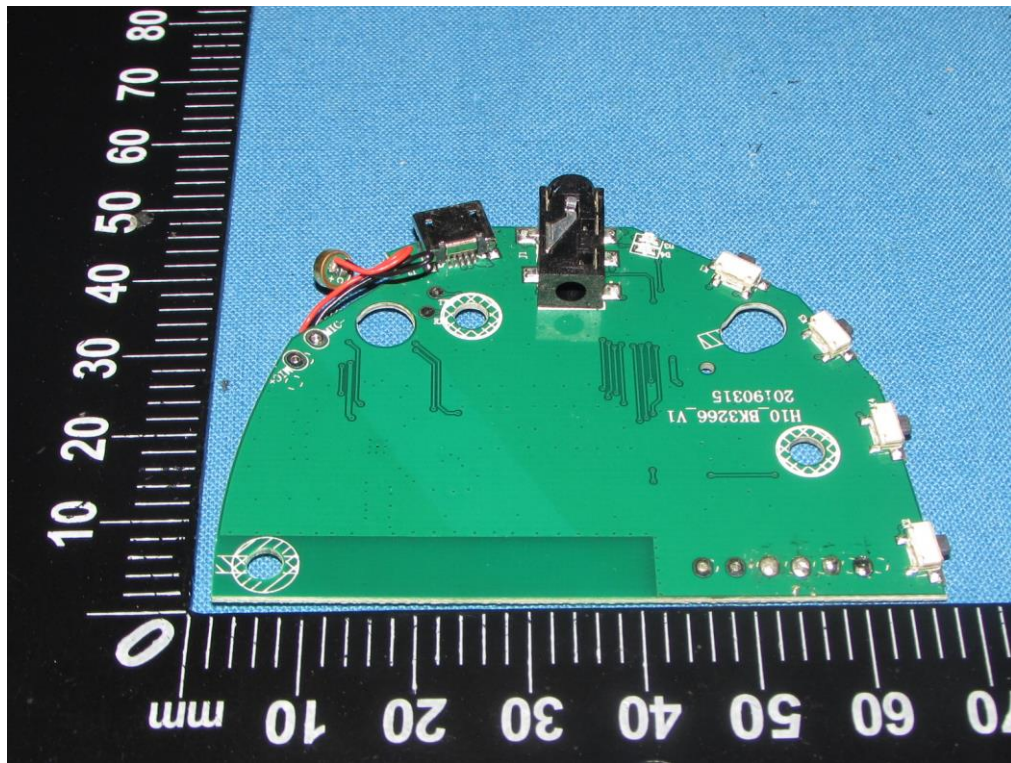


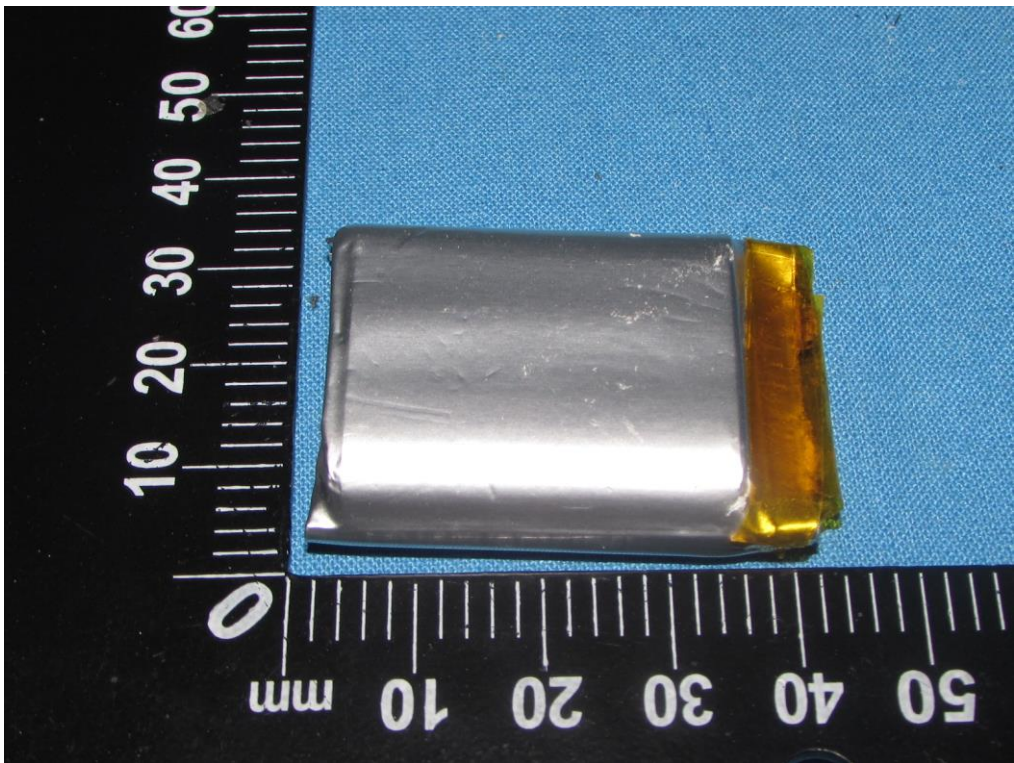


Internal Photos



Bluetooth
Antenna





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