

EMC Test Report



Page: 1/55

The samples and sample by the applicant	information for the following tests are provided and confirmed
Address:	Kingsfordweg 151, 1043GR Amsterdam
Applicant Name:	Collection Design B.V.
Report No.:	DNT2409100260E1597-02534

Product Description: Portable Speaker Brand Name: STYLISTIC Tested Model: Speaker M **Electrical Rating:** Input: DC 5V **Received Date:** 2024-09-12 2024-09-12 ~ 2024-09-24 **Tested Date: Issued Date:** 2024-09-29 ETSI EN 301 489 -1 V2.2.3 (2019-11) **Test Standards:** Draft ETSI EN 301 489-17 V3.2.6 (2023-06) Pass

Test Result:

Prepared By:

Reviewed By:

Approved By:

Leolu mark un Meire Ann

(Test Engineer)

(Project Engineer)

(Manager)

Note: If there is any objection to the results in this report, please submit a written inquiry to the company within 15 days from the date of receiving the report. The test report is effective only with both signature and specialized stamp, and is issued by the company in accordance with the requirements of the "Conditions of Issuance of Test Reports" printed in the attached page. Unless otherwise stated, the results presented in this report only apply to the samples tested this time. Partial reproduction of this report is not allowed unless approved by the company in writing.

Test

Dongguan DN Testing Co., Ltd.

Tel:+86-769-88087383

ommon

Add: No. 1, West Fourth Street, Xingfa South Road, Wesha Compunity, Chang 'an Town, Dongguan City, Guangdong P.R.China Web: www.dn-testing.com

E-mail: service@dn-testing.com



Date: September 29, 2024

Page: 2 / 55

Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V2.0		2024-09-29	Original Report	



Date: September 29, 2024

Page: 3 / 55

TABLE of CONTENTS

F	{EPORT REVISE RECORD	2
S	SUMMARY OF TEST RESULT	4
1	GENERAL INFORMATION	5
	1.1. Applicant 1.2. Manufacturer	5
	1.3. General Description of EUT	5
	1.4. Support equipment List	6
	1.5. Support cable	6 6
	1.7 Modification of FUT	0
	1.8. Applied Standards	6
2	. TEST CONFIGURATION OF EQUIPMENT UNDER TEST	7
	2.1 Details of FUT Test Modes	7
	2.2. Connection of System Under Test	8
	2.3. EUT Operation Test Setup	8
3	. TEST CONDITIONS OF 301489 SERIES STANDARDS	9
	3.1. Special Conditions of Applied Standards for EUT	9
	3.2. Emission	9
	3.3. Immunity	9
4	. EMISSION MEASUREMENTS	10
	4.1. Radiated Emission Test	10
	4.2. Conducted Emission Test	18
	4.3 ASYMMETRIC MODE CONDUCTED EMISSIONS TEST	22
	4.4 HARMONIC CURRENT DISTURBANCE MEASUREMENT	26
	4.5 VOLTAGE FLUCTUATION AND FLICK MEASUREMENT	29
5	. IMMUNITY TESTS	31
	5.1. Requirements of Limit and EUT Performance Criteria for all Immunity Test Items	31
	5.2. Radio frequency electromagnetic field (RS) Test	37
	5.3. Electrostatic Discharge (ESD) Test (Refer to EN301 489-1 Section 9.3)	40
	5.4. Fast Transients, Common Mode (EFT/BURST) Test	43
	5.6. Voltage Dips and Interruptions	45 47
	5.7. Surges Test	
6	. MEASUREMENT UNCERTAINTY	52
7	. LIST OF MEASURING EQUIPMENT	53
8	APPENDIX & PHOTOGRAPHS OF FUT	55



SUMMARY OF TEST RESULT

CLAUSE (EN301489-1)	TEST ITEMS	TEST STANDARD	RESULT (PASS/FAIL)	REMARK	
	EMC E	mission Measurements	12 12	iz.	
8.2	Radiated Emission	EN 55032 : 2015+A11:2020 Class B	PASS	\bigcirc	
8.3 / 8.4 / 8.7	Conducted Emission	EN 55032 : 2015+A11:2020 Class B	PASS	-	
8.5	Harmonic Current Emissions	EN IEC 61000-3-2:2019+A1:2021	Not Required	<75W	
8.6	Voltage Fluctuations and Flicker	EN 61000-3-3:2013+A1:2019+A2:2021	Not Required	-	
	Er A	MC Immunity Tests	~ ~	~	
9.2	RF Electromagnetic Field	EN IEC 61000-4-3:2020	PASS	<u></u>	
9.3	Electrostatic Discharge	EN 61000-4-2:2009	PASS	-<	
9.4	Fast Transients, Common Mode	EN 61000-4-4:2012	PASS	0-	
9.5	Radio frequency, Common Mode	EN 61000-4-6:2014	PASS		
9.6	Transients and Surges in the vehicular environment	ISO 7637-2:2004	Not Required	<u> </u>	
9.7	Voltage Dips and Interruptions	EN IEC 61000-4-11:2020	PASS		
9.8	Surges	EN 61000-4-5:2014+A1:2017	PASS	<u> </u>	
Note: Not required	means after assessing, test items are not ne	ecessary to carry out.	\wedge		



Date: September 29, 2024

Page: 5 / 55

1. General Information

1.1.Applicant

Collection Design B.V.

1.2.Manufacturer

Nowgo International Co.,Ltd

1.3. General Description of EUT

Product	Portable Speak	Portable Speaker						
Model NO.	Speaker M	Speaker M						
Additional NO.	1		5					
Difference Description	1							
Nominal Voltage	Input: DC 5V							
	WLAN	1						
Modulation Type	Bluetooth	GFSK, π/4-DQPSK, 8DPSK	\sim					
	WLAN							
Operating Frequency	Bluetooth	2402MHz - 2480MHz						
I/O Ports	Refer to user's manual							
Accessory Devices	Refer to note as below							

NOTE:

1. The above EUT information is declared by manufacturer and for more detailed feature description, please refer to the manufacturer's specifications or user's manual.

2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.



Page: 6 / 55

1.4. Support equipment List

Manufacturer	Description	Model	Serial Number
Power adapter	HUAWEI	HW-100225C00	KC9302N2P05213

1.5. Support cable

Cable Description	Cable Description Length (m)		With / Without Ferrite		
USB cable	0.5	shielded	Without Ferrite		
	A. A.				

1.6.Product Specification of Equipment Under Test

Product Specification subjective to this standard					
Transmitter / Receiver Frequency Range 2400 MHz ~ 2483.5 MHz					
Geo-location capability	Not Supported				
Power Supply	Charging by DC 5V from adapter				

1.7.Modification of EUT

No modifications are made to the EUT during all test items.

1.8.Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of ETSI EN 301 489 -1 V2.2.3 (2019-11) and Draft ETSI EN 301 489-17 V3.2.6 (2023-06).



Date: September 29, 2024

Page: 7 / 55

2. Test Configuration of Equipment under Test

2.1. Details of EUT Test Modes

				Details of	Test line Item	S			
Radiated E	mission (Refer t	o EN301 48	9-1 Section 8.2	2)					
Mode 1	Charging	4	6		6				6
Mode 2	вт	L'	- A		- L	~	~	~	1
Conducted	Emission (Refe	r to EN301	489-1 Section	8.4)					
Mode 1	Charging	×							
Radio Freq	uency Electroma	agnetic Fie	ld (Refer to EN	301 489-1 Sec	tion 9.2)				
Mode 1	Charging	2	2	2	2	2	2	2	2
Mode 2	ВТ	\sim			\mathbf{O}				
Electrostat	ic Discharge (Re	efer to EN3	01 489-1 Sectio	on 9.3)					
Mode 1	Charging	~	X	~	X	X	κ.	X	~
Mode 2	BT	2	2	2	2	2	2	2	\sim
Fast Transi	ent, Common M	ode (Refer	to EN301 489-	1 Section 9.4)					
Voltage Dip	s and Interruption	ons (Refer	to EN301 489- [,]	Section 9.7)					
Surges (Re	fer to EN301 489	-1 Section	9.8)						
Mode 1	Charging	\sim	2	\sim	\sim	2	2	2	\sim
Radio Freq	uency, Common	Mode (Ref	er to EN301 48	9-1 Section 9.	5)				
Mode 1	вт	•	•	•	•	×	•	•	•
Remark: N/	Α	~	7	Å	7	λ.	Å	Å	7

Worst mode of all test items listed in section 2.1

Test items	Worst mode
Radiated Emission	1, 2
Conducted Emission	
Radio Frequency Electromagnetic Field	2
Electrostatic Discharge	2
Fast Transient, Common Mode	1
Radio Frequency, Common Mode	
Voltage Dips and Interruptions	
Surges	

Remark: Only data of worst mode (if test item has) was reported in test result.



2.2. Connection of System Under Test



2.3. EUT Operation Test Setup

The EUT was set in below conditions during EMI and EMS testing

Bluetooth (include Bluetooth Data Link and bluetooth headset)

Link with supported unit via Bluetooth radio function.
 Monitor the status of connection by checking the Bluetooth link performance without radio link drop.

Dongguan DN Testing Co., Ltd.

 Add: No. 1, West Fourth Street, Xingfa South Road, Wusha Community, Chang 'an Town, Dongguan City, Guangdong P.R.China

 Web: www.dn-testing.com
 Tel:+86-769-88087383

 E-mail: service@dn-testing.com



Date: September 29, 2024

Page: 9 / 55

3. Test Conditions of 301489 Series Standards

3.1. Special Conditions of Applied Standards for EUT

Below each section is special condition applied for each application of EUT.

3.2.Emission

EN301 489-17

No special conditions shall apply to UE in the scope of the present document.

3.3.Immunity

EN301 489-17

No special conditions are relevant for products covered in the present document.



Date: September 29, 2024

Page: 10 / 55

4. Emission Measurements

4.1.Radiated Emission Test

4.1.1. Limits for Radiated Emission Test

<Class B limit>

Table A.4-Requirements for radiated emissions at frequencies up to 1GHz for Class B equipment

Table Clause	Frequency Range		Measurement	Class B limits dB (µV/m)	
	(MHz)	Distance (m)	Detector Type/ Bandwidth	OATS/SAC	
A4.1 A4.2	30 ~ 230	10	Quasi Peak / 120 kHz	30	
	230 ~ 1000			37	
	30 ~ 230			40	
	230 ~ 1000	3		47	

Table A.5–Requirements for radiated emissions at frequencies above 1GHz for Class B equipment

	Frequency Range		Measurement	Class B limits dB(µV/m)	
Table Clause	(MHz)	Distance (m) Detector Type/ Bandwidth		FSOATS	
A5.1	1000 ~ 3000	3	Average / 1 MHz Peak / 1 MHz	50	
	3000 ~ 6000			54	
A5.2	1000 ~ 3000			70	
	3000 ~ 6000			74	

Conditional testing frequency:

Highest measured frequency	Highest measured frequency			
Fx ≦ 108 MHz	1 GHz			
108 MHz ≦ Fx ≦ 500 MHz	2 GHz			
500 MHz ≦ Fx ≦ 1 GHz	5 GHz			
Fx ≧ 108 MHz	5 x Fx up to a maximum or 6 GHz			

NOTE: For FM and TV broadcast receivers, Fx is determined from the highest frequency generated or used excluding the local oscillator and tuned frequencies.



4.1.2. Test Setup

< Frequency Range below 1GHz >



< Frequency Range above 1GHz >



Dongguan DN Testing Co., Ltd.



Date: September 29, 2024

Page: 12 / 55

<Radiated Emissions Setup Configuration>



4.1.3. Test Procedures

Frequency range 30MHz~1GHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from 1 meter to 4 meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1GHz.

Frequency range above 1GHz

- f. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- g. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- h. The height of antenna can be varied from 1 meter to 4 meters, the height of adjustment depends on the EUT height and the antenna 3dB beamwidth both, to detect the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- i. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- j. The test receiver/spectrum was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1GHz.



Cate: September 29, 2024

Page: 13 / 55

4.1.4. Test Result



Fina	I Data List								
NO	Freq. [MHz]	Factor[dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict
1	34.11616	-9.39	22.12	40.00	17.88	200	281	Horizontal	PASS
2	84.01174	- <mark>13.4</mark> 5	21.30	40.00	18.70	200	5	Horizontal	PASS
3	191.9692	-10.70	27.28	40.00	12.72	200	315	Horizontal	PASS
4	287.6540	-7.30	40.31	47.00	6.69	100	104	Horizontal	PASS
5	347.6208	-5.85	36.41	47.00	10.59	100	161	Horizontal	PASS
6	455.9058	-2.68	34.18	47.00	12.82	200	43	Horizontal	PASS

Dongguan DN Testing Co., Ltd.

 Add: No. 1, West Fourth Street, Xingfa South Road, Wusha Community, Chang 'an Town, Dongguan City, Guangdong P.R.China

 Web: www.dn-testing.com
 Tel:+86-769-88087383

 E-mail: service@dn-testing.com



Date: September 29, 2024

Page: 14 / 55



Fina	Final Data List											
NO	Freq. [MHz]	Factor[dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity	Verdict			
1	34.27604	-9.39	34.84	40.00	5.16	100	238	Vertical	PASS			
2	59.37108	-8.70	30.01	40.00	9.99	100	360	Vertical	PASS			
3	191.9692	-10.70	32.35	40.00	7.65	100	129	Vertical	PASS			
4	287.9823	-7.30	45.55	47.00	1.45	180	359.5	Vertical	PASS			
5	431.5356	-3.30	38.33	47.00	8.67	200	75	Vertical	PASS			
6	671.2734	1.75	33.19	47.00	13.81	100	71	Vertical	PASS			
C	21-	20 20				100	10 (A					

Dongguan DN Testing Co., Ltd.

 Add: No. 1, West Fourth Street, Xingfa South Road, Wusha Community, Chang 'an Town, Dongguan City, Guangdong P.R.China

 Web: www.dn-testing.com
 Tel:+86-769-88087383

 E-mail: service@dn-testing.com



Date: September 29, 2024

Page: 15 / 55



NO	Freq. [MHz]	Factor [dB]	PK Value [dBµV/m]	PK Limit [dBµV/m]	PK Margin [dB]	AV Value [dBµV/m]	AV Limit [dBµV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1191.51	-13.91	33.94	70.00	36.06	24.11	50.00	25.89	100	277	Horizontal
2	1657.56	-13.15	33.80	70.00	36.20	24.43	50.00	25.57	100	73	Horizontal
3	2251.62	-8.80	36.50	70.00	33.50	26.00	50.00	24.00	100	255	Horizontal
4	3100.21	-5.43	38.01	7 4 .00	35.99	27.69	54.00	26.31	100	50	Horizontal
5	4597.35	-1.59	40.73	74.00	33.27	29.22	54.00	24.78	100	353	Horizontal
6	4803.88	-1.51	40.07	74.00	33.93	29.35	54.00	24.65	100	0	Horizontal
		-									

Dongguan DN Testing Co., Ltd.



Date: September 29, 2024

Page: 16 / 55



PK Final Data List

NO	Freq. [MHz]	Factor [dB]	PK Value [dBµV/m]	PK Limit [dBµV/m]	PK Margin [dB]	AV Value [dBµV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle ["]	Polarity
1	1346.53	-13.67	34.77	70.00	35.23	23.34	50.00	26.66	100	360	Vertical
2	2013.60	-9.62	35.76	70.00	34.24	25.10	50.00	24.90	100	15	Vertical
3	2710.67	-7.14	38.27	70.00	31.73	26.66	50.00	23.34	100	87	Vertical
4	3424.24	-5.24	38.67	74.00	35.33	27.29	54.00	26.71	100	186	Vertical
5	4305.83	-2.20	40.15	74.00	33.85	29.65	54.00	24.35	100	230	Vertical
6	5211.42	-0.63	40.73	74.00	33.27	29.33	54.00	24.67	100	123	Vertical

Dongguan DN Testing Co., Ltd.



Page: 17 / 55

4.1.5. Setup Photographs





Dongguan DN Testing Co., Ltd.



Date: September 29, 2024

4.2.Conducted Emission Test

4.2.1. Limits for Conducted Emissions

Applicable to AC mains power ports								
Frequency Range (MHz)	Coupling Device	Detector Type / Bandwidth	Class B limits dB(µV)					
0.15~0.5	22	2 2 2	66~56					
0.5~5	AMN	Quasi Peak / 9 kHz	56					
5~30			60					
0.15~0.5	5. 5.	5° 5° 5°	56~46					
0.5~5	AMN	Average / 9 kHz	46					
5~30	2 2	6 2 2	50					

The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.

4.2.2. Test Setup



Note: 1.Support units were connected to second LISN. 2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

4.2.3. Test Procedure

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under Limit 20dB was not recorded.



Date: September 29, 2024

Page: 19 / 55

4.2.4. Test Results



Final Data List QP QP QP AV AV AV Factor Freq. NO. Value Limit Margin Value Limit Margin Verdict [MHz] [dB] [dBµV] [dBµV] [dBµV] [dBµV] [dB] [dB] 1 0.1643 9.90 30.21 65.24 35.03 16.37 55.24 38.87 PASS 2 0.8380 9.74 18.24 32.73 46.00 13.27 PASS 37.76 56.00 3 1.6743 9.73 40.99 56.00 15.01 36.15 46.00 9.85 PASS 2.5117 46.00 PASS 4 9.73 39.61 56.00 16.39 34.75 11.25 26.78 5 9.87 33.22 27.67 50.00 22.33 PASS 7.5416 60.00 6 19.6356 10.12 31.00 60.00 29.00 22.99 50.00 27.01 PASS

Result Level= Reading Level + LISN Factor + Cable Loss

Dongguan DN Testing Co., Ltd.



Date: September 29, 2024

Page: 20 / 55



Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict
1	0.1631	9.81	26.92	65.30	38.38	13.95	55.30	41.35	PASS
2	0.8379	9.78	41.50	56.00	14.50	37.46	46.00	8.54	PASS
3	1.6755	9.74	44.64	56.00	11.36	40.70	46.00	5.30	PASS
4	2.5138	9.82	43.29	56.00	12.71	39.39	46.00	6.61	PASS
5	5.0297	9.98	37.26	60.00	22.74	32.16	50.00	17.84	PASS
6	19.4253	10.05	33.45	60.00	26.55	26.09	50.00	23.91	PASS

Result Level= Reading Level + LISN Factor + Cable Loss



Date: September 29, 2024

Page: 21 / 55

4.2.5. Setup Photographs



Dongguan DN Testing Co., Ltd.



Report No.: DNT2409100260E1597-02534 Date: September 29, 2024 4.3 ASYMMETRIC MODE CONDUCTED EMISSIONS TEST

4.3.1 Limits for ASYMMETRIC MODE CONDUCTED Emissions

	Requirements for asymmet	ric mode conducted emis	sions from Class A equipme	ent	
Frequency range (MHz)	Coupling device	Detector type/ andwidth	Class A voltage limits dB(μV)	Class A current limits dB(µV)	
0.15 - 0.5		Quasi Peak /		\bigcirc \bigcirc	
0.5 — 30	AAN	9 kHz	87		
0.15 — 0.5		Average /	84-74	n/a	
0.5 — 30	AAN	9 kHz	74	\sim \sim	
0.15 - 0.5		Quasi Peak /	97-87	53-43	
0.5 — 30	CVP and current probe	9 kHz	87	43	
0.15 — 0.5		Average /	84-74	40-30	
0.5 — 30	CVP and current probe	9 kHz	74	30	
0.15 - 0.5		Quasi Peak /	\bigcirc \bigcirc	53-43	
0.5 — 30	Current probe	9 kHz		43	
0.15 - 0.5		Average /	n/a	40-30	
0.5 — 30	Current probe	9 kHz		30	

The choice of coupling device and measurement procedure is defined in Annex C.

AC mains ports that also have the function of a wired network port shall meet the limits given in Table A.9. The measurement shall cover the entire frequency range.

The application of the voltage and/or current limits is dependent on the measurement procedure used. Refer to Table C.1 for applicability. Testing is required at only one EUT supply voltage and frequency.

Applicable to ports listed above and intended to connect to cables longer than 3 m.



Date: September 29, 2024

Page: 23 / 55

	Requirements for asymmetric mode conducted emissions from Class B equipment										
•	Frequency range MHz	Coupling device	Detector type / Bandwidth	Class B voltage limits dB(μ V)	Class B current limits dB(µ V)						
	0.15 — 0.5		Quasi Peak /	84-74	,						
	0.5 — 30	AAN	9 kHz	74							
	0.15 - 0.5	\sim	Average /	74-64	n/a						
	0.5 — 30	AAN	9 kHz	64							
•	0.15 — 0.5		Quasi Peak /	84-74	40-30						
	0.5 - 30	CVP and current probe	9 kHz	74	30						
	0.15 — 0.5		Average /	74—64	30-20						
	0.5 — 30	CVP and current probe	9 kHz	64	20						
	0.15 - 0.5		Quasi Peak /	0 0	40-30						
	0.5 — 30	Current probe	9 kHz		30						
	0.15 - 0.5		Average /	n/a	30-20						
	0.5 - 30	Current probe	9 kHz		20						

The choice of coupling device and measurement procedure is defined in Annex C.

Screened ports including TV broadcast receiver tuner ports are measured with a common-mode impedance of 150 Ω . This is typically accomplished with the screen terminated by 150 Ω to earth.

AC mains ports that also have the function of a wired network port shall meet the limits given in Table A.10.

The measurement shall cover the entire frequency range.

The application of the voltage and/or current limits is dependent on the measurement procedure used. Refer to Table C.1 for applicability.

Measurement is required at only one EUT supply voltage and frequency.

Applicable to ports listed above and intended to connect to cables longer than 3 m.

NOTE:

The test result calculated as following:

Measurement Value = Reading Level + Correct Factor

Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor(if use)

Margin Level = Measurement Value – Limit Value



Page: 24 / 55

4.3.2 TEST SETUP

Cable Type: Balanced Unscreened, Screened or Coaxial







Cable Type: Balanced Unscreened, Unbalanced



Dongguan DN Testing Co., Ltd.



Date: September 29, 2024

Page: 25 / 55

4.3.3 Test Procedure

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m. The frequency range from 150 kHz to 30 MHz was searched.
 Emission levels under Limit 20dB was not recorded.
- d. For the actual test configuration, please refer to the related Item –EUT Test Photos.
- e. AAN, CP or CVP at least 80 cm from nearest part of EUT chassis.

NOTE:

- f. The communication function of EUT was executed and AAN was connected between EUT and associated equipment and the AAN was connected directly to reference ground plane.
 - Measure the voltage at the measurement port of the AAN.
 - Correct the measured voltage by adding the AAN voltage division factor.
 - Compare the corrected voltage with the limit(For AAN).
- g. Measure the current with a current probe and compare to the current limit(For CP).
- H. The current shall be measured with the current probe and the results compared with the current limits.
 - The voltage measured shall be corrected at each frequency of interest as follows:
 - if the current margin with respect to the current limit is ≤6 dB, the actual current margin shall be subtracted from the measured voltage;
 if the current margin with respect to the current limit is >6 dB, 6 dB shall be subtracted from the measured voltage.
 The adjusted voltage shall be compared with the applicable voltage limit.
 - Both the measured current and the corrected voltage shall be below the applicable current and voltage limits at all frequencies for the EUT to be deemed compliant with this publication. (For CVP)

4.3.4 Test Result

N/A

4.3.5 Setup Photographs

N/A

still



4.4 HARMONIC CURRENT DISTURBANCE MEASUREMENT

4.4.1 LIMITS

		EN 6	1000-3-2/IEC 61000-3	3-2		
Equipment Category	Harmonic Order n	Max. Permissible Harmonic Current A	Equipment Category	Harmonic Order n	Max Harn A	. Permissible nonic Current mA/w
	Odd	Harmonics			Odd Harmonics of	only
	3	2.30		3	2.30	3.4
	5	1.14		5	1.14	1.9
	7	0.77	Char D	7	0.77	1.0
	9	0.40	Class D	9	0.40	0.5
	11	0.33		11	0.33	0.35
Class A	13	0.21		13	0.21	0.30
	15≤n≤39	0.15 x 15/n		15≤n≤39	0.15 x 15/n	3.85/n
	Even I	Harmonics	\bigcirc	O		
	2	1.08				
	4	0.43				
	6	0.30				
	8≤n≤40	0.23 x 8/n				



Date: September 29, 2024

Page: 27 / 55

4.4.2 TEST PROCEDURE

- a. The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating Condition.
- b. The classification of EUT is according to EN 61000-3-2. The EUT is classified as follows:

Class A:

Balanced three-phase equipment, Household appliances excluding equipment as Class D, Tools excluding portable tools, Dimmers for incandescent

lamps, audio equipment, equipment not specified in one of the three other classes.

Class B:

Portable tools. Arc welding equipment which is not professional equipment.

Class C:

Lighting equipment.

Class D:

Equipment having a specified power less than or equal to 600W of the following types: Personal computers and personal computer monitors and television receivers.

The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the time necessary for the EUT to be exercised.

4.4.3 TEST SETUP

			5	Sr'	Voltage To E	Supply EUT
To AC Mains Power Supply		Power Analyzer & Power Source		EUT		
Non-Metallic Table-	0	ON C	JA'	Shi -	S S	d'il

For the actual test configuration, please refer to Appendix I: Photographs of Test Configuration.



Date: September 29, 2024

Page: 28 / 55

4.4.4 TEST ENVIRONMENT

Temperature		Relative Humidity	
Atmosphere Pressure	1 1 1		

4.4.5 TEST MODE

Pre-test Mode:	/	A l	2	A .	2	A.	2
Final Test Mode:	1	\bigcirc	$\mathcal{O}_{\mathcal{A}}$	\bigcirc	\mathcal{O}	\bigcirc	\bigcirc

Note: All test modes had been tested, but only the worst data recorded in the report.

4.4.6 TEST RESULTS

Not Applicable.

Note: The test should comply with the requirements of EN 61000-3-2. Because the EUT rated power is less than 75W, there is no need for Harmonics test to be performed according to EN 61000-3-2. For further details, please refer to Clause 7, Note 1 of EN 61000-3-2 which states: "For the following categories of equipment limits are not specified in this edition of the standard."

4.4.7 Setup Photographs

N/A





Report No.: DNT2409100260E1597-02534 Date: September 29, 2024

Page: 29 / 55

4.5 VOLTAGE FLUCTUATION AND FLICK MEASUREMENT

4.5.1 LIMITS

Test items	Limits (EN61000-3-3)	Descriptions
Pst	≤1.0, T _p =10 min	short-term flicker indicator
Pit	≤0.65, T _p =2 h	long-term flicker indicator
d _c	≤3.3 %	relative steady-state voltage change
d _{max}	≤4 %(or 6 % _{Note(1)} ,	maximum relative voltage change:
d(t)	<pre>/ 70 Note(2)) <3.3 %, more than 500 ms</pre>	relative voltage change characteristic

Note:

(1)6 % for equipment which is:

a. switched manually, or

b. switched automatically more frequently than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds), or manual restart, after a power supply interruption.

(2)7 % for equipment which is

a. attended whilst in use (for example: hair dryers, vacuum cleaners, kitchen equipment such as mixers, garden equipment such as lawn mowers, portable tools such as electric drills), or

b. switched on automatically, or is intended to be switched on manually, no more than twice per day, and also has either a delayed restart (the delay being not

less than a few tens of seconds) or manual restart, after a power supply interruption.



4.5.2 TEST PROCEDURE

- a. The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under normal Condition
- b. During the flick measurement, the measure time shall include that part of whole operation changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.
- c. Tests was performed according to the Test Condition/Assessment of Voltage Fluctuations

specified in Clause 6.0/4.0 of IEC/EN 61000-3-3 depend on which standard adopted for

compliance measurement.

d. All types of harmonic current and/or voltage fluctuation in this report are assessed by direct measurement using flicker-meter.

4.5.3 TEST SETUP



For the actual test configuration, please refer to Appendix I: Photographs of Test Configuration.

4.5.4 TEST ENVIRONMENT

Temperature	/	Relative Humidity	1
Atmosphere Pressure			

4.5.5 TEST MODE

Pre-test Mode:	1	A)	A'	A'	A'	A'	~
Final Test Mode:	/	\sim	\sim	\sim	\sim	\sim	\sim

Note: All test modes had been tested, but only the worst data recorded in the report.

4.5.6 TEST RESULTS

N/A

4.5.7 Setup Photographs

N/A



5. Immunity Tests

5.1.Requirements of Limit and EUT Performance Criteria for all Immunity Test Items

Test limit including test level, test frequency range, pulse type, test duration etc. equirements.

This section is intended to integrate requirements of limit, and required performance criteria for all immunity test Items.

In subsection 5.1.1, includes two parts:

1 Subsection 5.1.1.1 : Support ports list of EUT, accessary, and cable record, where EUT intended to use in. These information will be used for decide test items and test limit:

(1) Supported ports list of EUT: Because test limit are based on supported ports of EUT, this is necessary information.

table. Therefore anyone could distinguish requirements specified by standard or manufacturer from these tables.

- (2) Accessary : include adapter type and remark EUT has battery or not.
- (3) Cable record : includes cable type, cable length, indoor/outdoor. These parameters will decide tests shall be carrying out or not.

2 Subsection 5.1.1.2 : tables of immunity test level specified in EN301489 series standards and immunity test level specified by manufacturer. If immunity test level specified by manufacturer are higher/stronger than level specified in EN301489 series standards, they will be also record in this

In subsection 5.1.2, required performance criteria of EUT per EN301489 series standards. Integrated required performance criteria of EN301489 series standards, they are used for all immunity test of this report.



5.1.1. Test Limit

5.1.1.1 Information of supported ports of EUT, accessary, cable record where EUT intended to use in.

Supported ports of EUT are listed as below (symbol 🛛 means supported port):

Enclosure Port	× .	× .	× .	× .	× .	× .	· ·
Input AC power port	2	2	2	5	2	2	2
Input DC power port	O,	\bigcirc	\bigcirc	Ò,	\bigcirc	\bigcirc	\bigcirc
Telecommunication port	~	~	~	~	~	~	~
			~	~	~	~	

Accessory (symbol \boxtimes means have used with EUT during test)

	AC Adapter	Pins : 🛛 2pins 🗖 3pins
	DC Adapter	Cable Length : □ >3m 🛛 <3m
	□ Car charger	
\mathcal{D}^{*}	PoE adapter	O, O ,
	Battery	

As per above information, corresponded test limit (including test level, test frequency range, pulse type, test duration...etc. requirements) specified in below table 1~4 have been selected to carry out test in this report.

5.1.1.2 Tables of Immunity Test Level Specified in EN301 489 series standards and Immunity Test Level Specified by Manufacturer

When immunity test level specified by manufacturer are higher (stronger) than level specified in EN301489 series standards, they will be also record in this table. But if manufacturer doesn't specify immunity test level, "N/A" is filling in table and test level of all immunity test items are following requirements of EN301489 series standards.

Table 1 -	Enclosure	Port
-----------	-----------	------

Test item	Immunity test level specified in EN301489-1	Immunity test level specified by manufacturer
Electrostatic discharge (ESD)	± 2 kV, ± 4 kV contact	N/A
	± 2 kV, ± 4 kV, ± 8 kV air	N/A
Radio frequency electromagnetic field (RS)	3 V/m	N/A
	Frequency range : 80 MHz – 6 GHz	N/A
	Modulation: 80 % AM at 1 kHz	N/A



Date: September 29, 2024

Page: 33 / 55

Table 2 – Input AC Power Port

Test Item	Test Item Immunity test level specified in EN301489-1	
Fast transients, common mode (EFT)	± 1 kV 5 kHz repetition frequency	N/A
Surges Line-to-line	± 0,5 kV, ± 1 kV	N/A
Surges Line-to-ground	± 0,5 kV, ± 1 kV, ± 2 kV	N/A
Radio frequency, common mode (CS)	3 Vrms	N/A
	Frequency range: 0,15 MHz – 80 MHz	N/A
	Modulation: 80 % AM at 1 kHz	N/A
	0 % residual; 0,5 cycle , 50Hz Phase At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315°	2° 52° 52°
Voltage dips	0 % residual; 1 cycle , 50Hz Phase At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315°	N/A
	70 % residual; 25 cycles , 50Hz Phase At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315°	
Voltage interruptions	0 % residual; 250cycle , 50Hz	N/A

Table 3 – Input DC Power Port (not necessary performed on EUT of this report)

Test Item	Immunity test level specified in EN301489-1	Immunity Test level specified by manufacturer		
Fast transients, common mode (EFT)	± 0.5 kV 5 kHz repetition frequency When cable length >3m	N/A		
	3 Vrms When cable length >3m	N/A		
Radio requercy, common mode (CS)	Frequency range: 0,15 MHz – 80 MHz	N/A		
	Modulation: 80 % AM at 1 kHz	N/A		
Transients and surges in the vehicular environment	As specified in ISO 7637-2 : Pulse type : 1, 2a, 2b, 3a, 3b, 4 Level : III	N/A		

Dongguan DN Testing Co., Ltd.



02534 🔨 Date: September 29, 2024

Page: 34 / 55

 Table 4 –Telecommunication Port (not necessary performed on EUT of this report)

Test Item	Immunity test level specified in EN301489-1	Immunity Test level specified by manufacturer
Fast transients, common mode (EFT)	± 0.5 kV 5 kHz repetition frequency When cable length >3m	N/A
Surges Line-to-ground	± 0.5 kV for indoor cable When cable length >10m	N/A
	± 1 kV for outdoor cable	N/A
Radio frequency, common mode (CS)	3 Vrms When cable length >3m	N/A
	Frequency range: 0,15 MHz – 80 MHz	N/A
	Modulation: 80 % AM at 1 kHz	N/A

5.1.2. Required Performance Criteria of EUT per EN301489 series standards

Criteria	Performance criteria
CT/CR	During and after the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer when the apparatus is used as intended. At the conclusion of the test, the EUT shall operate as intended with no loss of user control functions or stored data, and the communication link shall have been maintained. In addition to confirming the above performance during a call, the test shall also be performed in idle mode, and the transmitter shall not unintentionally operate. The EUT shall operate as its intended operating condition during and after the test.
TT/TR	After the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer, when the apparatus is used as intended. At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link. At the conclusion of the total test comprising the series of individual exposures, the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communication link shall have been maintained. In addition to confirming the above performance during a call, the test shall also be performed in idle mode, and the transmitter shall not unintentionally operate.

Dongguan DN Testing Co., Ltd.



Page: 35 / 55

Performance requirements table of 301489-17

CLAUSE 6.2 of EN301489-17				
Criteria	During test	After test		
A	Shall operate as intended. (see note 1). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance (see note 3). Shall be no loss of function. Shall be no loss of stored data or user programmable functions.		
в	May show loss of function (one or more). May show degradation of performance (see note 2). Shall be no unintentional transmissions.	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.		
с	May be loss of function (one or more).	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no degradation of performance (see note 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 ifused 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.



Date: September 29, 2024

Page: 36 / 55

Criteria Performance criteria				
СТ	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.			
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.			
Π	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.			
TR	The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration fo which performance criteria C shall apply. Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. Ir 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.			



Report No.: DNT2409100260E1597-02534 Date: September 29, 2024 5.2.Radio frequency electromagnetic field (RS) Test

Page: 37 / 55

5.2.1. Test Setup



5.2.2. Test Instrument Setting

Frequency Step Size	1% increment
Modulation	80% AM (1kHz)
Dwell Time	3 seconds
Tested Antenna Height	1.55m

5.2.3. Test Procedures

The antenna is placed 3m away from the equipment. The required field strength is pre-calibrated and complies with the uniform field area requirement lay down in the IEC/EN 61000-4-3.



Date: September 29, 2024

Page: 38 / 55

5.2.4. Test Result

Test Standard	EN IEC 61000-4-3:2020
Product Standard	EN 301 489-1,EN 301 489-17
Test Frequency Range	80 MHz ~ 6 GHz
Test Level	3 V/m
Polarity	Horizontal and Vertical
Azimuth	0 °,90 °,180 °,270 °
Required Performance Criteria	CT/CR
Performance Criteria of EUT	CT/CR
Ambient Temperature	23.5°C
Relative Humidity	50%
Atmospheric Pressure	101.3kPa
Test Date	2024-9-18
Test Engineer	Leo Lu
Test Result	PASS

Dongguan DN Testing Co., Ltd.



5.2.5. Setup Photographs



80MH-6000MHz



Dongguan DN Testing Co., Ltd.



Page: 40 / 55

5.3. Electrostatic Discharge (ESD) Test (Refer to EN301 489-1 Section 9.3)

5.3.1. Test Setup



Ground Reference Plane

A distance of 1m minimum was provided between the EUT and the wall or any other metallic structure. In cases where this length exceeds the length necessary to apply the discharges to the selected points, the excess length shall, where possible, be placed non-inductively off the ground reference plane and shall not be less than 0.2m to other conductive parts in the test setup.

The coupling plane is placed parallel to, and positioned at a distance of 0,1 m from the EUT.

5.3.2. Test Instrument Setting

Tested number of air discharge is at least 10 discharges (in the most sensitive polarity). For contact discharge, tested number is at least 10 discharges. For the time interval between successive single discharges an initial value of 1 s is recommended.

Sweeping of the EUT with a grounded carbon fibre brush with bleeder resistors (for example, $2*470 \text{ k}\Omega$) in the grounding cable.

Ensure parameters of current waveform of an ESD generator is within specifications before test.



Date: September 29, 2024

5.3.3. Test Procedure

EUT and auxiliary instrument necessary to perform DIRECT and INDIRECT application of

discharges to the EUT, in the following manner:

CONTACT DISCHARGE to the conductive surfaces and to the coupling plane;

'AIR DISCHARGE at insulating surfaces.

a. Contact Discharges to the conductive surfaces and to coupling planes

In the case of contact discharges, the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

In the case of painted surface covering a conducting substrate, the following procedure shall be adopted :

- If the coating is not declared to be an insulating coating by the equipment manufacturer, then the pointed tip of the generator shall penetrate the coating so as to make contact with the conducting substrate.

- Coating declared as insulating by the manufacturer shall only be submitted to the air discharge.

- The contact discharge test shall not be applied to such surfaces.

b. Air Discharge to apertures and insulation surfaces:

In the case of air discharges, the round discharge tip of the discharge electrode shall be

approached as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator (discharge electrode) shall be removed from the EUT. The generator is then retriggered for a new single discharge. This procedure shall be repeated until the discharges are completed. In the case of an air discharge test, the discharge switch, which is used for contact discharge, shall be closed.

c. Ensure that the applied charge on the EUT has been dis-charged before next ESD pulse

5.3.4. Test Result

Test Standard	EN 61000-4-2:2009
Product Standard	EN 301 489-1,EN 301 489-17
EUT operated voltage during test	DC 5V by battery
Tested Louis	±2 / ±4 / ±8kV for air discharge
	±2 / ±4kV for contact discharge
Required Performance Criteria	TT/TR
Performance Criteria of EUT	TT/TR
Ambient Temperature	25℃
Relative Humidity	50%
Atmospheric Pressure	101.3kPa
Test Date	2024-9-18
Test Engineer	Eric Huang
Test Result	PASS

Dongguan DN Testing Co., Ltd.

 Add: No. 1, West Fourth Street, Xingfa South Road, Wusha Community, Chang 'an Town, Dongguan City, Guangdong P.R.China

 Web: www.dn-testing.com
 Tel:+86-769-88087383

 E-mail: service@dn-testing.com



Date: September 29, 2024

Page: 42 / 55

5.3.5. Setup Photographs





Dongguan DN Testing Co., Ltd.



5.4.Fast Transients, Common Mode (EFT/BURST) Test

5.4.1. Test Setup



The EUT was placed on a ground reference plane and was insulated from it by an insulating support about 0.1m thick. If the EUT is table-top equipment, it was located approximately 0.8m above the GRP. The GRP was a metallic sheet (copper or aluminum) of 0.25 mm, minimum thickness; other metallic may be used but they shall have at least 0.65 mm thickness.

5.4.2. Test Instrument Setting

Pulse repetition rate	Burst duration/ Burst period	Duration of test	
5kHz	15 ms / 300 ms	1 minute	

5.4.3. Test Procedure

- a. Both positive and negative polarity discharges were applied.
- b. The distance between any coupling devices and the EUT should be (0.5 0/+0.1) m for table-top equipment testing, and (1.0 ± 0.1) m for floor standing equipment.
- c. The duration time of each test sequential was 1 minute.
- d. Testing on signal input/output parts port is followed below requirements:
 - i. The coupling clamp is composed of a clamp unit for cable length more than 3 m, and it was placed on the GRP.
 - ii. Telecommunication port whose maximum cable length is less than 3 m in length are excluded Electrical Fast Transients / BURST test

Dongguan DN Testing Co., Ltd.



Date: September 29, 2024

Page: 44 / 55

5.4.4. Test Result

Test Standard	EN 61000-4-4:2012
Product Standard	EN 301 489-1,EN 301 489-17
EUT operated voltage during test	DC 5V from adapter by AC 230V/50Hz
Test Level	on AC Power Port : ±1 kV
Required Performance Criteria	TT/TR
EUT Performance	CT/CR
Ambient Temperature	23.5℃
Relative Humidity	50%
Atmospheric Pressure	101.3kPa
Test Date	2024-9-18
Test Engineer	Eric Huang
Test Result	PASS

5.4.5. Setup Photographs





Dongguan DN Testing Co., Ltd.



 Report No.: DNT2409100260E1597-02534
 Date: September 29, 2024

Page: 45 / 55

5.5.Radio frequency, Common mode (CS) Test

5.5.1. Test Setup

<CDN>



5.5.2. Test Instrument Setting

Frequency Step Size	1% increment	5	2	2	4
Modulation	80% AM (1kHz))`	\mathcal{O}^{*}	\bigcirc	\bigcirc
Dwell Time	3 seconds	2	7	2	

5.5.3. Test Procedures

a. The EUT shall be tested within its intended operating and climatic conditions.

- b. An artificial hand was placed on the hand-held accessory and connected to the ground reference plane.
- c. One of the CDNs not used for injection was terminated with 50Ω, providing only one return path. All other CDNs were coupled as decoupling networks.

d. The frequency range is swept from 150 kHz to 80 MHz, using the signal level established during the setting process and with a disturbance signal of 80 % amplitude. The signal is modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. Where the frequency is swept incrementally, the step size shall not exceed 1% of the preceding frequency value.

- e. The dwell time of the amplitude modulated carrier at each frequency shall not be less than the time necessary for the EUT to be exercised and to respond, but shall in no case be less than 0.5 s. The sensitive frequencies (e.g. clock frequencies) shall be analyzed separately.
- f. Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.



Date: September 29, 2024

Page: 46 / 55

5.5.4. Test Result

Test Standard	EN 61000-4-6:2014
Product Standard	EN 301 489-1,EN 301 489-17
EUT operated voltage during test	DC 5V from adapter by AC 230V/50Hz
Test Frequency Range	0.15 MHz ~ 80 MHz
Test Level	3 V rms
Test Method	CDN for Power port
Required Performance Criteria	CT/CR
Performance Criteria of EUT	CT/CR
Ambient Temperature	23.5℃
Relative Humidity	50%
Atmospheric Pressure	101.3kPa
Test Date	2024-9-18
Test Engineer	Eric Huang
Test Result	PASS

5.5.5. Setup Photographs



Dongguan DN Testing Co., Ltd.



5.6. Voltage Dips and Interruptions

5.6.1. Test Setup



5.6.2. Test Instrument Setting

Test of interval	10 sec
Waveform Rise (and Fall) Time	1 ~ 5 μs.
Duration	Sequence of 3 dips/interrupts.

5.6.3. Test Procedures

The EUT was tested for each selected combination of test levels and duration with a sequence of three dips/interruptions with intervals of 10s minimum (between each test event). Each representative mode of operation shall be tested. Abrupt changes in supply voltage shall occur at zero crossings of the voltage waveform.



Date: September 29, 2024

Page: 48 / 55

5.6.4. Test Result

Test Standard	EN IEC 61000-4-11:2020
Product Standard	EN 301 489-1,EN 301 489-17
EUT input voltage	DC 5V from adapter by AC 230V/50Hz
Requirements among Phase, Residual and Duration	As following table
Required Performance Criteria	TT/TR for Voltage Interruption TT/TR for Voltage Dips
Performance Criteria of EUT	CT/CR for Voltage Interruption CT/CR for Voltage Dips
Ambient Temperature	23.5°C
Relative Humidity	50%
Atmospheric Pressure	101.3kPa
Test Date	2024-9-18
Test Engineer	Eric Huang
Test Result	PASS

Test	Phase Angle	Residual (%)	Duration (ms)
		0%	10
Voltage Dips	0 °, 45 °, 90 °, 135 °, 180 °, 225 °, 270 °, 315 °	0%	20
		70%	500
Voltage Interruption	0 °	0%	5000



Date: September 29, 2024

Page: 49 / 55

5.6.5. Setup Photographs





Dongguan DN Testing Co., Ltd.



5.7.Surges Test

5.7.1. Test Setup

<Testing for power port >



5.7.2. Test Instrument Setting

Surge wave form (Tr/Th)	1,2/50 μs, for power port (if EUT supported) 10/700 μs, for signal port (if EUT supported)		
Number of impulses	For d.c. power ports and interconnection lines five positive and five negative surge impulses For a.c. power ports five positive and five negative impulses each at 0°, 90°, 180° and 270°		
Time between successive impulses	1 minute		

5.7.3. Test Procedure

a. For EUT power supply:

The surge is applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave. The power cord between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.

b. For test applied to unshielded unsymmetrically operated interconnection lines of EUT:

The surge was applied to the lines via the capacitive coupling. The coupling / decoupling networks didn't influence the specified functional

- conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.
- c. For test applied to unshielded symmetrically operated interconnection / telecommunication lines of EUT:

The surge was applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrestor was not specified. The interconnection line between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.

Date: September 29, 2024

Page: 51 / 55

5.7.4. Test Result

Test Standard	EN 61000-4-5:2014+A1:2017			
Product Standard	EN 301 489-1,EN 301 489-17			
EUT operated voltage during test	DC 5V from adapter by AC 230V/50Hz			
Test Level	on AC Power Port ±0.5 kV, ±1 kV,			
Required Performance Criteria	TT/TR for Power Port			
Performance Criteria of EUT	CT/CR for Power Port			
Ambient Temperature	23.5°C			
Relative Humidity	50%			
Atmospheric Pressure	101.3kPa			
Test Date	2024-9-18			
Test Engineer	Eric Huang			
Test Result	PASS			

5.7.5. Setup Photographs

<complex-block>

Dongguan DN Testing Co., Ltd.



6. Measurement Uncertainty

U	Incertainty of Conducted Emission Measurement (150 KHz ~ 30 MH	//Hz)	
	Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y))	2.7dB	

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y))	5.0dB

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 6000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y))	5.4dB



7. List of Measuring Equipment

Test Equipment for Conducted	d Emission		\rightarrow		$\lambda \rightarrow \lambda$
Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
Receiver	R&S	ESCI3	101152	2023-10-31	2024-10-30
LISN	R&S	ENV216	102874	2023-10-31	2024-10-30
ISN	R&S	ENY81-CA6	0295	2023-10-31	2024-10-30
Test Equipment for Radiated	Emission	× .	× ×	× .	<u> </u>
Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
Receiver	R&S	ESR7	102497	2023-10-31	2024-10-30
RF Cable	ETS-LINDGREN	RFC-NMS-100-NMS-3 50-IN		2023-10-31	2024-10-30
Log periodic antenna	ETS-LINDGREN	VULB 9168	01475	2023-10-31	2024-10-30
Horn Antenna	ETS-LINDGREN	3117	00252566	2023-10-31	2024-10-30
Preamplifier	Schwarzbeck	BBV9743B	00423	2023-10-31	2024-10-30
Preamplifier	ETS-LINDGREN	3117-PA	00252566	2023-10-31	2024-10-30
Test Equipment for ESD	\mathcal{A}	N 0		07 07	
Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
ESD Gun	TESEQ	NSG437	1240	2023-10-31	2024-10-30
		1	/	I	1
Test Equipment for EFT	<u> </u>	~	<u> </u>	~	К К
Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
Signal Generator	TESEQ	NSG3040	6002	2023-10-31	2024-10-30
Test Equipment for DIPS	5 5				\sim \sim
Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
Power failure simulator	3CTEST	PFS 2216S	ES049001322012	2023-10-31	2024-10-30
1	5		2		
Test Equipment for CS	$), \bigcirc, $	\bigcirc \bigcirc		\mathcal{O} , \mathcal{O}	\sim
Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
Generator	TESEQ	NSG4070	59501	2023-10-31	2024-10-30
6dB attenuator	TESEQ	75-A-MFN-06	0063373	2023-10-31	2024-10-30
CDN	TESEQ	MO16S	59085	2023-10-31	2024-10-30



Date: September 29, 2024

Page: 54 / 55

Test Equipment for RS	\sim	\sim \sim	\sim	\sim \sim		
Description	Manufacturer	Model	Serial Number	Cal Date	Due Date	
Transmit antenna (80M-1G)	R&S	HL046E	100258	2023-10-31	2024-10-30	
Transmit antenna (1G-6G)	R&S	STLP 9149	00517	2023-10-31	2024-10-30	
Generator	R&S	SMB 100A	114901	2023-10-31	2024-10-30	
Power amplifier (80M-1G)	R&S	BBA150 BC250	102983	2023-10-31	2024-10-30	
Power amplifier (0.69G-6G)	R&S	BBA150 D110E60	102981	2023-10-31	2024-10-30	
Toggle switch	R&S	OSP 120	101968	2023-10-31	2024-10-30	
2 2	2 2		\sim		<u>()</u>	
Test Equipment for Harmonic	/Flicker	$O_{j} O_{j}$		\bigcirc \bigcirc		
Description	Manufacturer	Model	Serial Number	Cal Date	Due Date	
Harmonic&Flicker Module	APS	LFZ-1-16	20006	2024-04-03	2025-04-02	
PACIFIC POWER SOURCE	APS	140AMX-UPC12/S	1792	2024-04-03	2025-04-02	
Test Equipment for Surges						
Description	Manufacturer	Model	Serial Number	Cal Date	Due Date	
Power Frequency Magnetic Field Immunity Test System	3CTEST	MFT400	ES046000122020	2023-10-31	2024-10-30	
Coupled decoupled network	3CTEST	TCXS111	TCXS22045989	2023-10-31	2024-10-30	

Note:

1. Test equipment calibration is traceable to the procedure of ISO17025.

2. N/A: No Calibration Required.



Date: September 29, 2024

Page: 55 / 55

8. Appendix A. Photographs of EUT





-End of the report-----

Dongguan DN Testing Co., Ltd.