

EMC TEST REPORT

Product Name Display Port 1.4 AOC cable

Trade mark /

Model No. FTAB01, FTAB02, FTAB03, FTAB04, FTAB05, FTAB06, FTAB07,
FTAB08, FTAB09

Report No. CTB210924002E

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Date of Test(s) 2021-09-15 to 2021-09-24

Date of Issue 2021-09-28

Test Standard(s) EN 55032:2015+ A11:2020, EN 55035:2017/A11:2020

Test Result: Pass

In the configuration tested, the EUT complied with the standards specified above.

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Note: The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report shall not be reproduced except in full, without prior written approval of CTB. This document may be altered or revised by CTB, personnel only, and shall be noted in the revision of the document.

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1. Description of version

Report No.	Issue Date	Description	Approved
CTB210924002E	2021-09-28	Original	Valid

2. Test summary

Emission		
Requirement - Test	Test Method	Result
Conducted Emission	EN 55032	N/A
Radiated emissions at frequencies up to 1 GHz		PASS
Radiated emissions at frequencies above 1 GHz		N/A
Harmonic current emissions	EN IEC 61000-3-2	N/A
Voltage changes, voltage fluctuations and flicker	EN 61000-3-3	N/A
Immunity(EN 55035:2017/A11:2020)		
Requirement - Test	Test Method	Result
Electrostatic discharges (ESD)	IEC 61000-4-2	PASS
Continuous RF electromagnetic field disturbances	IEC 61000-4-3	PASS
Electrical fast transients/burst (EFT/B)	IEC 61000-4-4	N/A
Surges	IEC 61000-4-5	N/A
Continuous induced RF disturbances	IEC 61000-4-6	N/A
Power frequency magnetic field	IEC 61000-4-8	N/A
Voltage dips and interruptions	IEC 61000-4-11	N/A

Note: N/A is abbreviation for Not Applicable.

3. Measurement uncertainty

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard

Test	Parameters	Expanded Uncertainty (U_{Lab})
Conducted Emission	150 kHz to 30 MHz	± 3.2 dB
Radiated Emission	30 MHz to 1000 MHz	± 4.8 dB
Radiated Emission	1000 MHz to 6000 MHz	± 4.9 dB

uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %

4. General information

4.1. Description of EUT

Product name	Display Port 1.4 AOC cable
Trade Mark	/
Model	C 509-50 ML,
Serial No.	FTAB01, FTAB02, FTAB03, FTAB04, FTAB05, FTAB06, FTAB07, FTAB08, FTAB09
Model Difference	All model's the function, software and electric circuit are the same, only with a product color and model named different. Test sample model: C 509-50 ML.
Rated Power	N/A
Normal Testing Voltage	DC12V from PC
Configuration	☒ Table-top ☐ Floor-standing
The highest frequency of the internal sources of the EUT :	☒ less than 108 MHz, the measurement shall only be made up to 1 GHz. ☐ between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz. ☐ between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz. ☐ above 1 GHz, the measurement shall be made up to 6 GHz.
Adapter Information:	/

Note: The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

4.2. Description of accessory device

No.	Device Type	Brand	Model	Specification	Note
1	Keyboard	DELL	KB216t		
2	Mouse	DELL	MS116c		
3	PC	DELL	/		
4	Host	DELL	/		

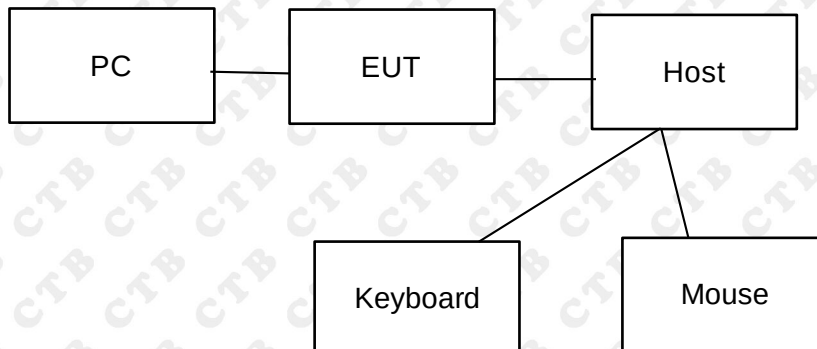
4.3. Test conditions

Temperature: 15-25°C

Relative Humidity: 30-60 %

Atmospheric pressure: 800hPa-1060hPa

4.4. Block diagram of EUT configuration



4.5. Operating condition of EUT

Operating condition	Mode 1*	Working	Test Voltage	DC12V
Note: This test covers all possible operating modes of the device, only the worst data are list in report. The worst data are shows (*) is the nearest standard limit which were recorded in this report.				

5. List of Test and Measurement Instruments

Radiated Emission Measurement					
No.	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA 9120D	1911	2021.11.01
2	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	869	2021.11.01
3	Amplifier	Agilent	8449B	3008A01838	2021.09.27
4	Amplifier	HP	8447E	2945A02747	2021.09.27
5	EMI TEST RECEIVER	ROHDE&SCHWARZ	ESPI7	100362	2021.09.27
6	Coaxial cable	ETS	RFC-SNS-100-NMS-80 NI	/	2021.09.27
7	Coaxial cable	ETS	RFC-SNS-100-NMS-20 NI	/	2021.09.27
8	Coaxial cable	ETS	RFC-SNS-100-SMS-20 NI	/	2021.09.27
9	Coaxial cable	ETS	RFC-NNS-100-NMS-300 NI	/	2021.09.27
10	EZ-EMC	Frad	EMC-con3A1.1	/	/

Electrostatic Discharge Test					
No.	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	ESD Simulator	TESTQ	NSG437	329	2021.09.27

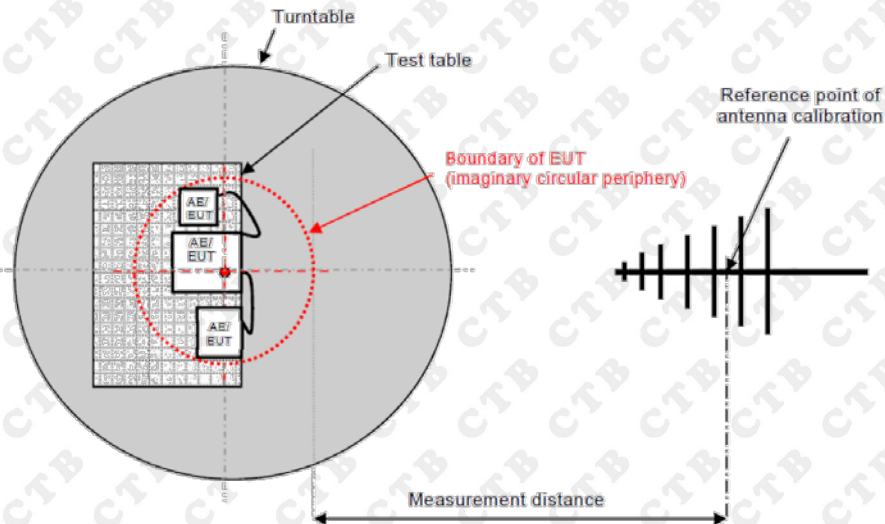
Radio frequency electromagnetic field					
No.	Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Signal Generator	Agilent	N5181A	2106070101	2021.09.27
2	Stacked Double Log.-Per. Antenna	SKET	STLP 9129 Plus	2106070106	2021.09.27
3	Switch Controller	SKET	RFSU-DC18 G-4C	2106070105	2021.09.27
4	RF Power Meter	Agilent	U2001	2106070102	2021.09.27
5	E-Field Probe	Narda	EP-601	2106070107	2021.09.27
6	Power Amplifier	SKET	HAP-80M01G -250W	2106070103	2021.09.27
7	Power Amplifier	SKET	HAP-01G 06G-75W	2106070104	2021.09.27
8	Audio Analysis	R&S	UPV	2106070116	2021.09.27
9	Audio Output Matching Network	SKET	RCO Network	2106070117	2021.09.27
10	Test Software	SKET	/	/	/

6. Emission

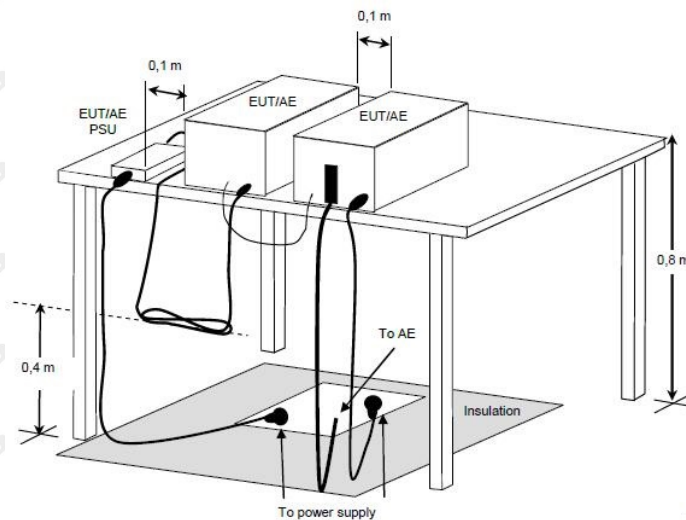
6.1. Radiated emissions

6.1.1. Block diagram of test setup

Measurement distance



For table-top equipment



6.1.2. Limit

Requirements for radiated emissions at frequencies up to 1 GHz for class A equipment

Frequency range MHz	Measurement			Class B limits dB(μV/m)
	Facility	Distance m	Detector type / bandwidth	
30 to 230	SAC	3	Quasi Peak / 120 kHz	50
230 to 1 000				57

Requirements for radiated emissions at frequencies above 1 GHz for class A equipment

Frequency range MHz	Measurement			Class B limits dB(μV/m)
	Facility	Distance m	Detector type / bandwidth	
1 000 to 3 000	FSOATS	3	Average / 1MHz	56
3 000 to 6 000				60
1 000 to 3 000		3	Average / 1MHz	76
3 000 to 6 000				80

Requirements for radiated emissions at frequencies up to 1 GHz for class B equipment

Frequency range MHz	Measurement			Class B limits dB(μV/m)
	Facility	Distance m	Detector type / bandwidth	
30 to 230	SAC	3	Quasi Peak / 120 kHz	40
230 to 1 000				47

Requirements for radiated emissions at frequencies above 1 GHz for class B equipment

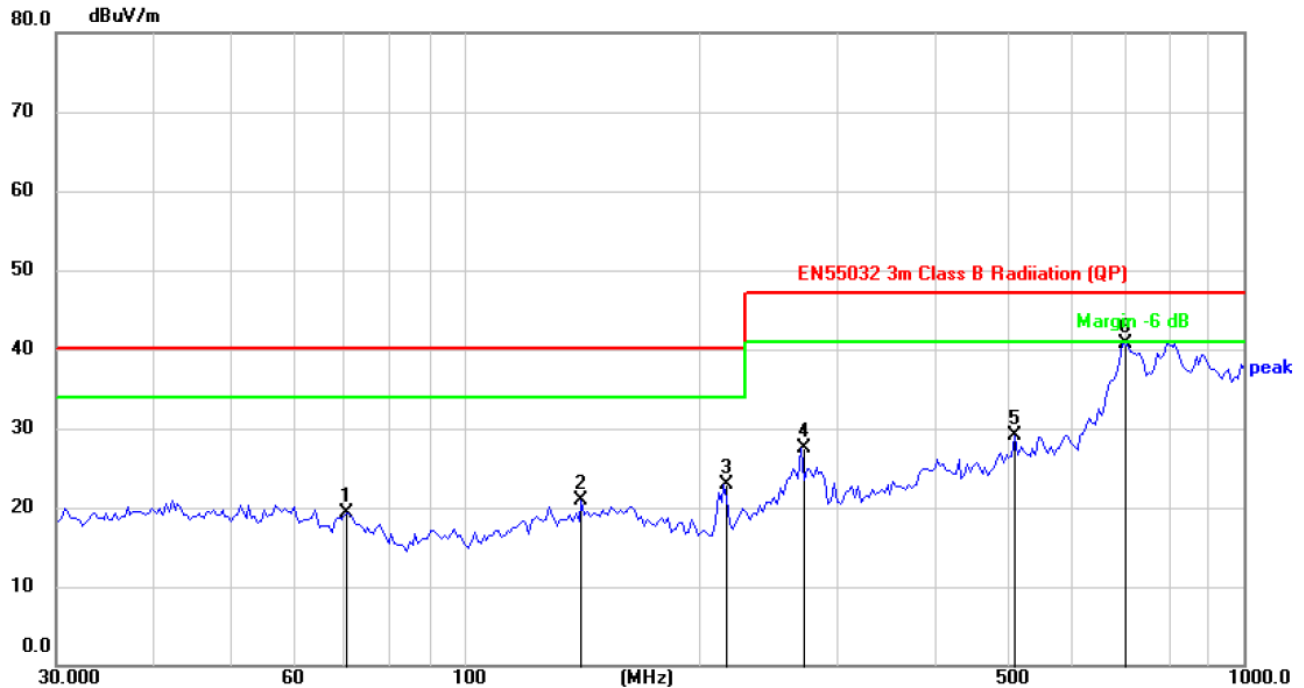
Frequency range MHz	Measurement			Class B limits dB(μV/m)
	Facility	Distance m	Detector type / bandwidth	
1 000 to 3 000	FSOATS	3	Average / 1MHz	50
3 000 to 6 000				54
1 000 to 3 000		3	Average / 1MHz	70
3 000 to 6 000				74

6.1.3. Test procedure

1. The measurement was performed in a semi-anechoic chamber.
2. The distance from EUT to receiving antenna is 3 meters.
3. Measurement was performed according to clause 7.3 of CISPR 16-2-3.

6.1.4. Test results

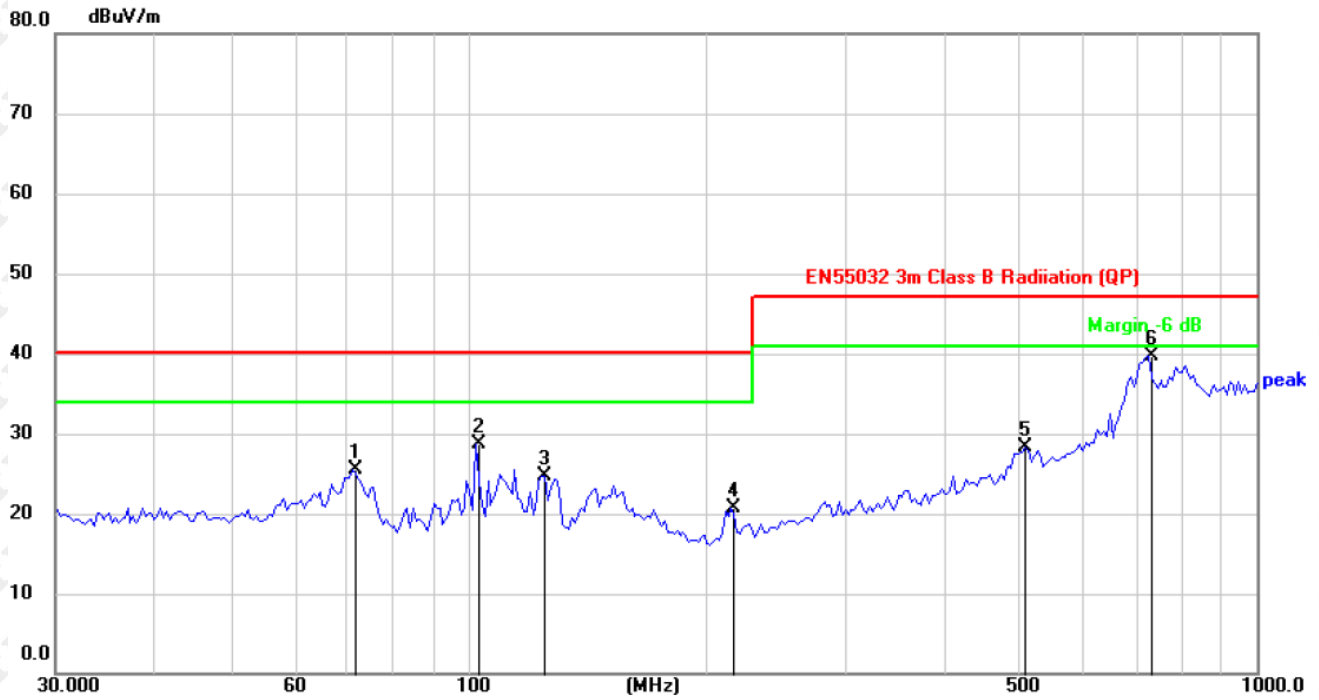
Polarization: H



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1		70.8315	29.14	-9.84	19.30	40.00	-20.70	QP		
2		141.5777	28.23	-7.28	20.95	40.00	-19.05	QP		
3		215.6456	32.42	-9.42	23.00	40.00	-17.00	QP		
4		270.8493	35.00	-7.53	27.47	47.00	-19.53	QP		
5		509.1501	31.06	-2.03	29.03	47.00	-17.97	QP		
6	*	698.0796	37.94	2.76	40.70	47.00	-6.30	QP		

Note: Result=Reading+Factor
Over Limit=Result-Limit

Polarization: V



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1		71.4552	35.48	-9.96	25.52	40.00	-14.48	QP		
2		102.3597	38.92	-10.15	28.77	40.00	-11.23	QP		
3		124.1330	33.14	-8.40	24.74	40.00	-15.26	QP		
4		215.6456	30.16	-9.42	20.74	40.00	-19.26	QP		
5		509.1501	30.34	-2.03	28.31	47.00	-18.69	QP		
6	*	729.3583	36.58	3.15	39.73	47.00	-7.27	QP		

Note: Result=Reading+Factor
Over Limit=Result-Limit

7. Immunity

Performance criteria

Performance criterion A

The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss function is allowed below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

Performance criterion B

The equipment shall continue to operate as intended after the test. No degradation of performance or loss function is allowed below a performance level specified by the manufacturer, when the equipment is used as intended. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from equipment if used as intended.

Performance criterion C

Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by operation of the controls.

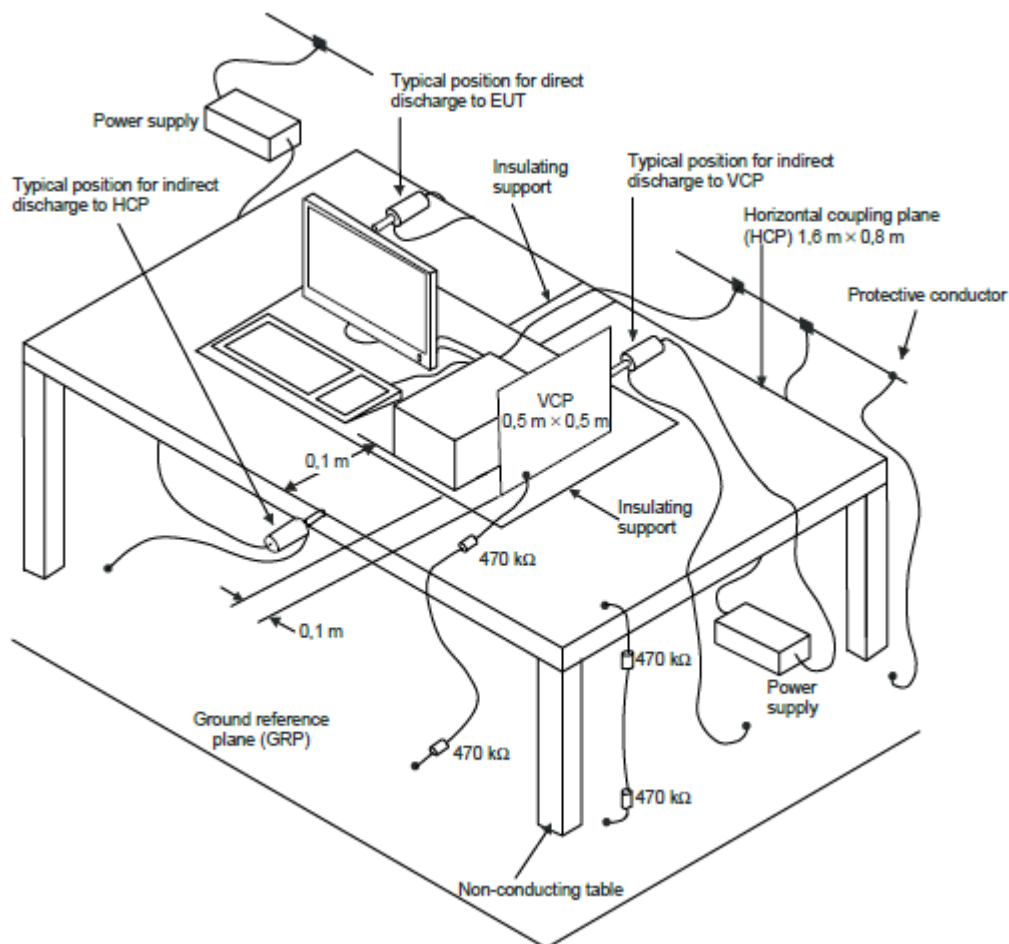
7.1. Electrostatic discharges (ESD)

7.1.1. Test standard and Levels

Environmental phenomenon	Test specifications	Basic standard
Electrostatic discharge	8 kV air discharge	IEC 61000-4-2
	4 kV contact discharge	

7.1.2. Block diagram of test setup

For table-top equipment



7.1.3. Test Procedure

1. Air discharge:

This test is done on a non-conductive surface. 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 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

2. Contact discharge:

All the procedure shall be same as Section 1. except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

3. Indirect discharge for horizontal coupling plane

At least 20 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

4. Indirect discharge for vertical coupling plane

At least 20 single discharge 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.

7.1.4. Test Result

Discharge Method	Discharge Position	Voltage ($\pm$ kV)	Min. No. of Discharge per polarity (Each Point)	Required Criterion	Performance Criterion
Contact Discharge	Conductive Surfaces	4	10	B	A
	Indirect Discharge HCP	4	10	B	A
	Indirect Discharge VCP	4	10	B	A
Air Discharge	Slots, Apertures, and Insulating Surfaces	8	10	B	A
Note*: N/A					

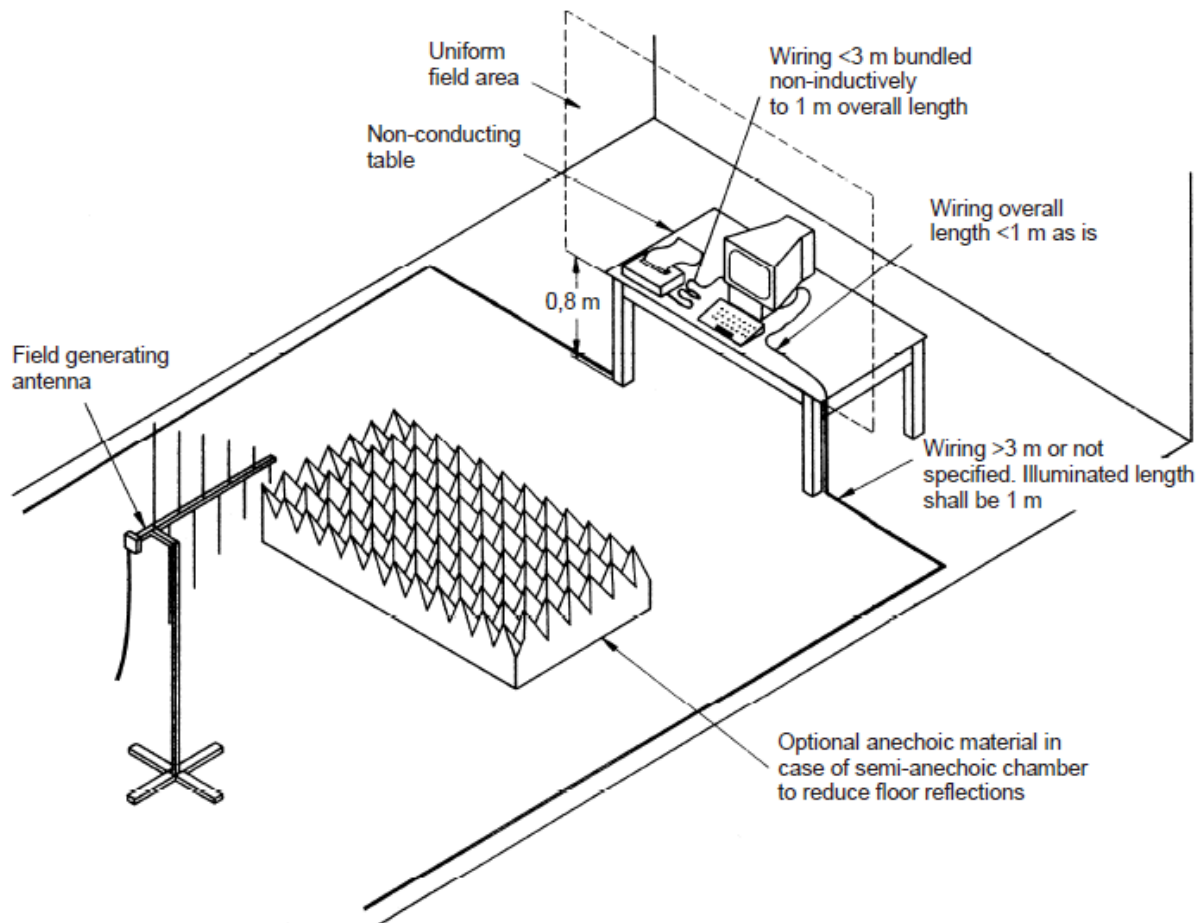
7.2. Electromagnetic field

7.2.1. Test standard and Levels

Characteristics	Test levels	Test levels	Basic standard
Frequency range	80 MHz to 1000 MHz,	1800MHz, 2600MHz, 3500MHz, 5000MHz	IEC 61000-4-3
Test level	3 V/m (unmodulated)	1 V/m (unmodulated)	
Modulation	1 kHz, 80 % AM, sine wave	1 kHz, 80 % AM, sine wave	

7.2.2. Block diagram of test setup

For table-top equipment



7.2.3. Test Procedure

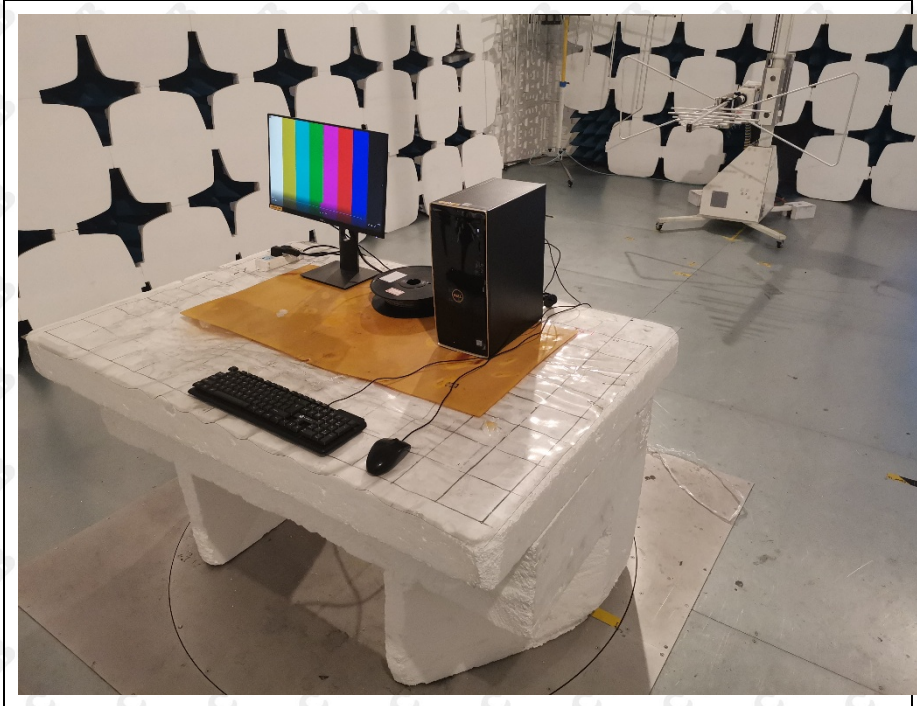
1. Measurement was performed in full-anechoic chamber.
2. Measurement procedure was applied according to EN 61000-4-3 clause 8.
3. The test method and equipment was specified by EN 61000-4-3.

7.2.4. Test Result

Frequency range [MHz]	Test Level [V/m]	Polarization	EUT Face	Required Criterion	Performance Criterion
80 to 1000, 1800, 2600, 3500, 5000	3	Horizontal & Vertical	Front/ Rear	A	A
			Right/ Left	A	A
			Top/ Underside	A	A
Note*: N/A					

8. Photographs of test setup

Radiated Emission

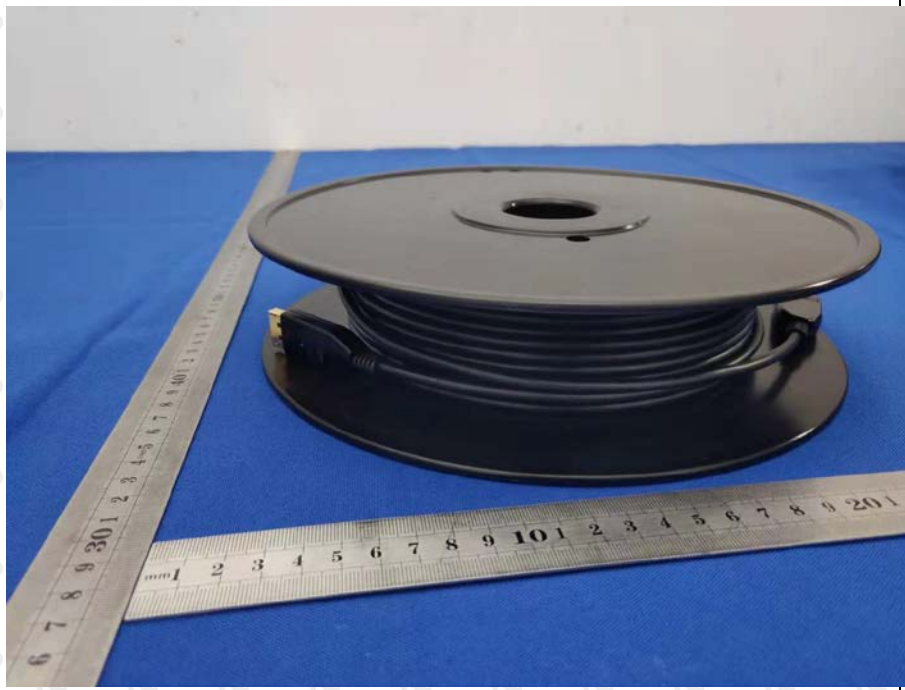
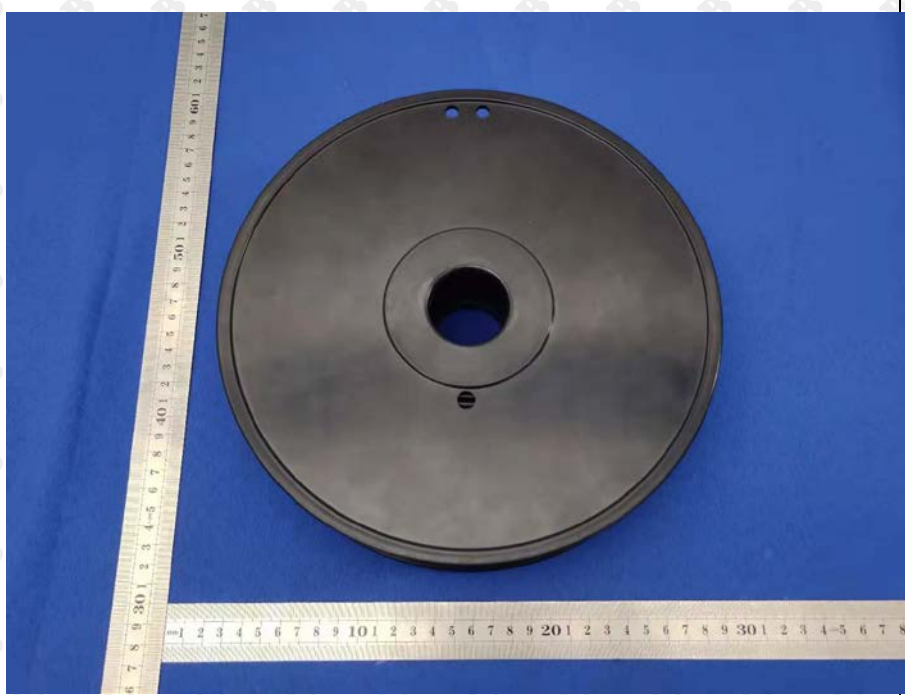


Electrostatic discharges



9. Photographs of EUT

EUT photo 1



EUT photo 2



EUT photo 3



End of report