

EMC TEST REPORT

Equipment USB Type-C Male to RJ45 Female , 0.2m,1 Gbit
Trademark N/A
Model No. FSW06AP
Report No. CTB200724020EX
Applicant Full Strike Ltd.
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Test Standard(s) EN 55032:2015, EN 55035:2017
EN 61000-3-2:2014, EN 61000-3-3:2013

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

Producer :  , Date : Jul. 25, 2020
Lisa Deng / Engineer
Signatory :  , Date : Jul. 25, 2020
Sherwin / Director

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.

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
0	Jul. 25, 2020	Initial Issue	All Page	Sherwin Qian

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1. TEST SUMMARY

Emission			
Requirement - Test	Test Method	Limit	Result
Conducted Emission	EN 55032:2015	Class B	PASS
Radiated emissions at frequencies up to 1 GHz		Class B	PASS
Radiated emissions at frequencies above 1 GHz		Class B	N/A
Harmonic current emissions	EN 61000-3-2:2014	Class A	N/A
Voltage changes, voltage fluctuations and flicker	EN 61000-3-3:2013	Clause 5	N/A
Immunity (EN 55035:2017)			
Requirement - Test	Test Method	Performance criteria	Result
Electrostatic discharges (ESD)	EN 61000-4-2:2009	B	PASS
Electromagnetic field	EN 61000-4-3:2006+A1:2008+A2:2010	A	PASS
Electrical fast transients/burst (EFT/B)	EN 61000-4-4:2004+A1:2010	B	N/A
Surges	EN 61000-4-5:2006	B	N/A
Conducted RF	EN 61000-4-6:2009	A	N/A
Power frequency magnetic field	EN 61000-4-8:2010	A	N/A
Voltage dips and Short interruptions	EN 61000-4-11:2009+A1:2010	B & C	N/A

Remark: N/A is abbreviation for Not Applicable.

The test was carried out in all the test modes, only the worst data are list in report.

2. GENERAL INFORMATION

2.1. Description of EUT

Equipment	USB Type-C Male to RJ45 Female , 0.2m,1 Gbit
Trademark	N/A
Model Name	FSW06AP
Serial No.	Not labeled
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: FSW06AP.
Rated Power Supply	5V \pm 0.5A
Rated Power	N/A
Normal Testing Voltage	DC 5V
Configuration	<input checked="" type="checkbox"/> Table-top <input type="checkbox"/> Floor-standing
Accessory Device	Laptop
Cable Supplied	N/A

Note:

1. Other Accessory Device List and Details

Description	Manufacturer	Model	Note
Laptop	DELL	Vostro 5490	-

External I/O Cable

Cable Description	Shielded Type	Ferrite Core	Length(m)	Note
-	<input type="checkbox"/> Shielded <input type="checkbox"/> Non-shielded	<input type="checkbox"/> Yes <input type="checkbox"/> No		

2. 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.

2.2. Operating condition of EUT

Test mode	Description
1	Working
2	
3	
4	

2.3. Test conditions

Temperature: 15-35°C

Relative Humidity: 30-60 %

Atmospheric pressure: 800hPa-1060hPa

2.4. Block diagram of EUT configuration



3. FACILITIES

3.1. Test Facility

CTB-LAB

Floor 1&2, Building A, No. 26 of Xinhe Road, Xinqiao Street, Baoan District, Shenzhen China

3.2. Test Instruments

Radiated Emission Measurement (Test software: EZ-EMC Ver. FA-03A2 RE)

Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA 9120D	1911	20201102
2	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	869	20201102
3	Amplifier	Agilent	8449B	3008A01838	20201101
4	Amplifier	HP	8447E	2945A02747	20201101
5	EMI TEST RECEIVER	ROHDE&SCHWARZ	ESPI7	100362	20201101
6	Coaxial cable	ETS	RFC-SNS-10 0-NMS-80 NI	/	20201101
7	Coaxial cable	ETS	RFC-SNS-10 0-NMS-20 NI	/	20201101
8	Coaxial cable	ETS	RFC-SNS-10 0-SMS-20 NI	/	20201101
9	Coaxial cable	ETS	RFC-NNS-10 0-NMS-300 NI	/	20201101

Electrostatic Discharge Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	ESD Simulator	TESTQ	NSG437	329	20201030

RF electromagnetic field Test

Item	Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Signal Generator	Agilent	N5182A	MY47420195	2020.10.30
2	Log-Bicon Antenna	Schwarzbeck	VULB9161	9128ES-128	2020.10.30
3	Power Amplifier	AR	150W1000M1	342526	2020.10.30
4	Microwave Horn Antenna	AR	AT4002A	322279	2020.10.30
5	Power Amplifier	AR	25S1G4A	321116	2020.10.30

4. Measurement uncertainty

The following table is for the measurement uncertainty, which is calculated as per the document CISPR 16-4.

Test	Parameters	Expanded Uncertainty (U_{Lab})	Expanded Uncertainty (U_{Cispr})
Conducted Emission	Level Accuracy: 150kHz to 30MHz	± 1.22 dB	± 3.6 dB
Radiated Emission	Level Accuracy: 30MHz to 1000 MHz	± 3.67 dB	± 5.2 dB
Radiated Emission	Level Accuracy: Above 1000MHz	± 4.79 dB	N/A

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

5. Emission

5.1. Conducted Emission

5.1.1. Limit

Requirements for conducted emissions from the AC mains power ports of Class A equipment

Frequency range MHz	Coupling device	Detector type / bandwidth	Class A limits dB(μ V)
0,15 to 0,5	AMN	Quasi Peak / 9 kHz	79
0,5 to 30			73
0,15 to 0,5		Average / 9 kHz	66
0,5 to 30			60

Requirements for conducted emissions from the AC mains power ports of Class B equipment

Frequency range MHz	Coupling device	Detector type / bandwidth	Class B limits dB(μ V)
0,15 to 0,5	AMN	Quasi Peak / 9 kHz	66 to 56
0,5 to 5			56
5 to 30			60
0,15 to 0,5		Average / 9 kHz	56 to 46
0,5 to 5			46
5 to 30			50

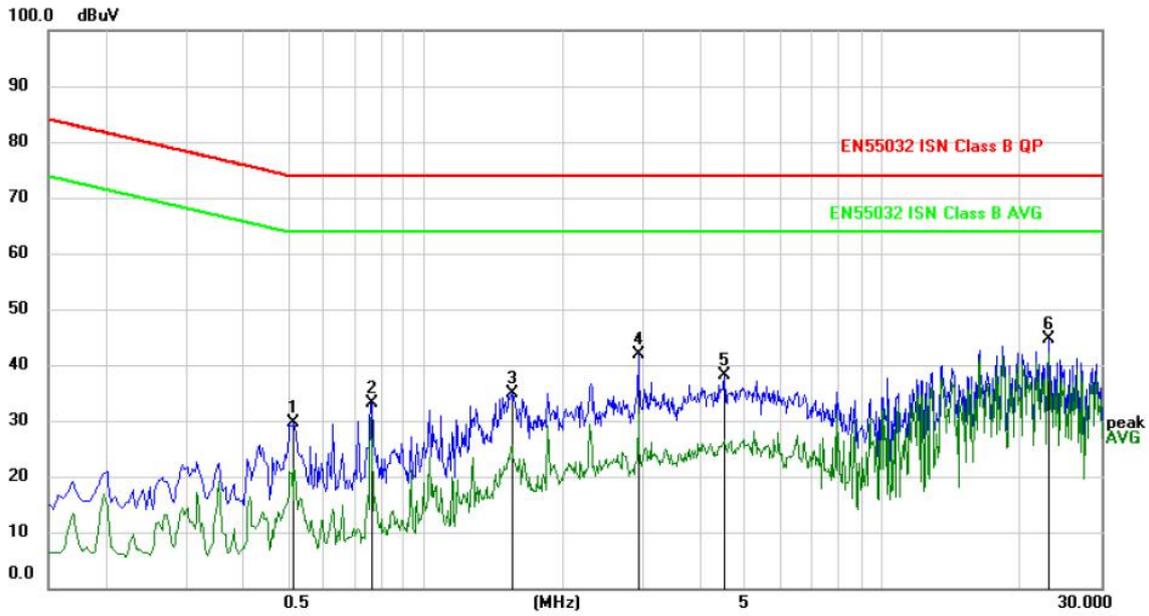
Requirements for asymmetric mode conducted emissions from Class A equipment

Frequency range MHz	Coupling device	Detector type / bandwidth	Class A limits dB(μ V)
0,15 to 0,5	AAN	Quasi Peak / 9 kHz	97 to 87
0,5 to 30			87
0,15 to 0,5		Average / 9 kHz	84 to 74
0,5 to 30			74

Requirements for asymmetric mode conducted emissions from Class B equipment

Frequency range MHz	Coupling device	Detector type / bandwidth	Class B limits dB(μ V)
0,15 to 0,5	AAN	Quasi Peak / 9 kHz	84 to 74
0,5 to 30			74
0,15 to 0,5		Average / 9 kHz	74 to 64
0,5 to 30			64

Network port mode:



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector
1		0.5180	19.52	10.23	29.75	74.00	-44.25	peak
2		0.7660	23.04	10.21	33.25	74.00	-40.75	peak
3		1.5460	24.82	10.13	34.95	74.00	-39.05	peak
4		2.9260	31.70	10.26	41.96	74.00	-32.04	peak
5		4.5140	27.78	10.45	38.23	74.00	-35.77	peak
6	*	23.1299	33.77	10.76	44.53	74.00	-29.47	peak

5.2. Radiated emissions

5.2.1. Limit

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

Frequency range MHz	Measurement			Class B limits dB(μ V/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(μ V/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

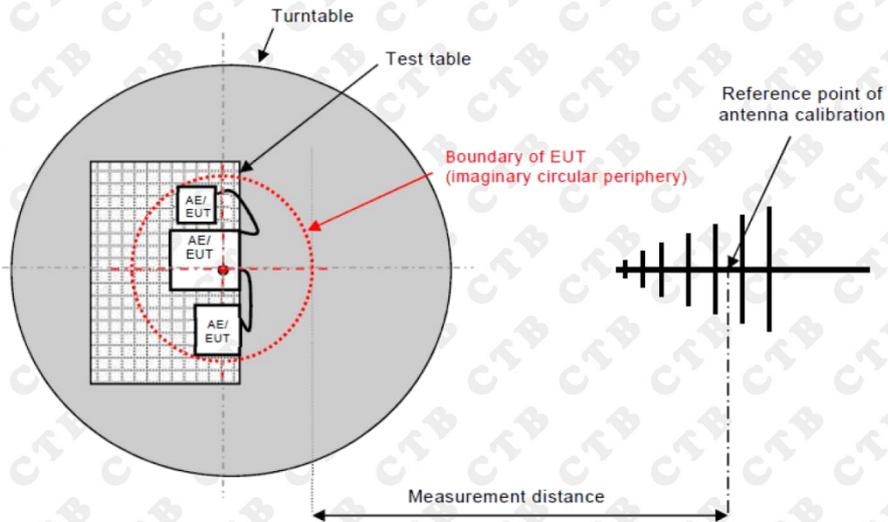
Frequency range MHz	Measurement			Class B limits dB(μ V/m)
	Facility	Distance m	Detector type / bandwidth	
30 to 230	SAC	3	Quasi Peak / 120 kHz	40
230 to 1 000				47

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

Frequency range MHz	Measurement			Class B limits dB(μ V/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

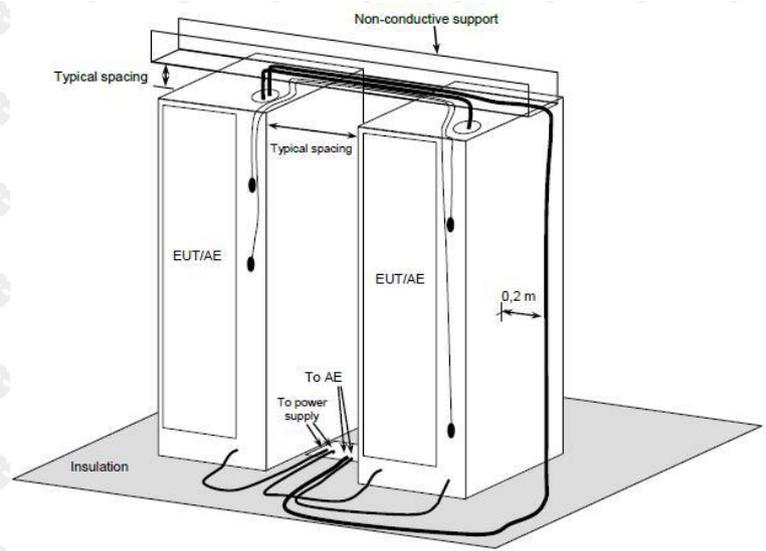
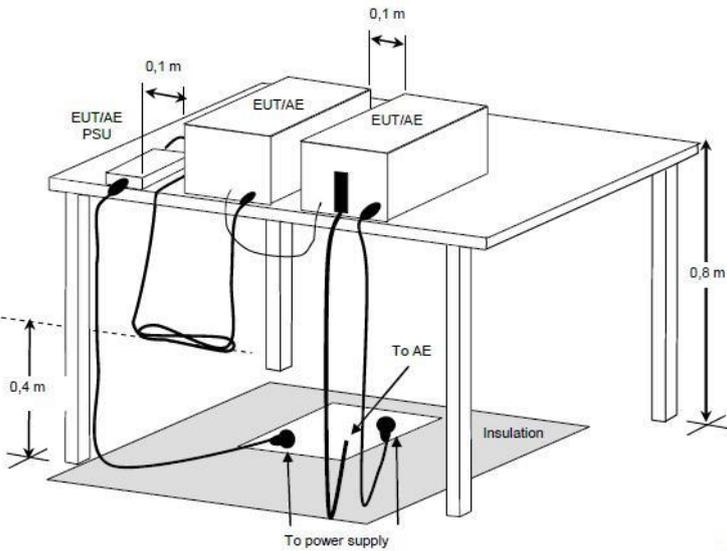
5.2.2. Block diagram of test setup

Measurement distance



For table-top equipment

For floor standing equipment



5.2.3. Test procedure

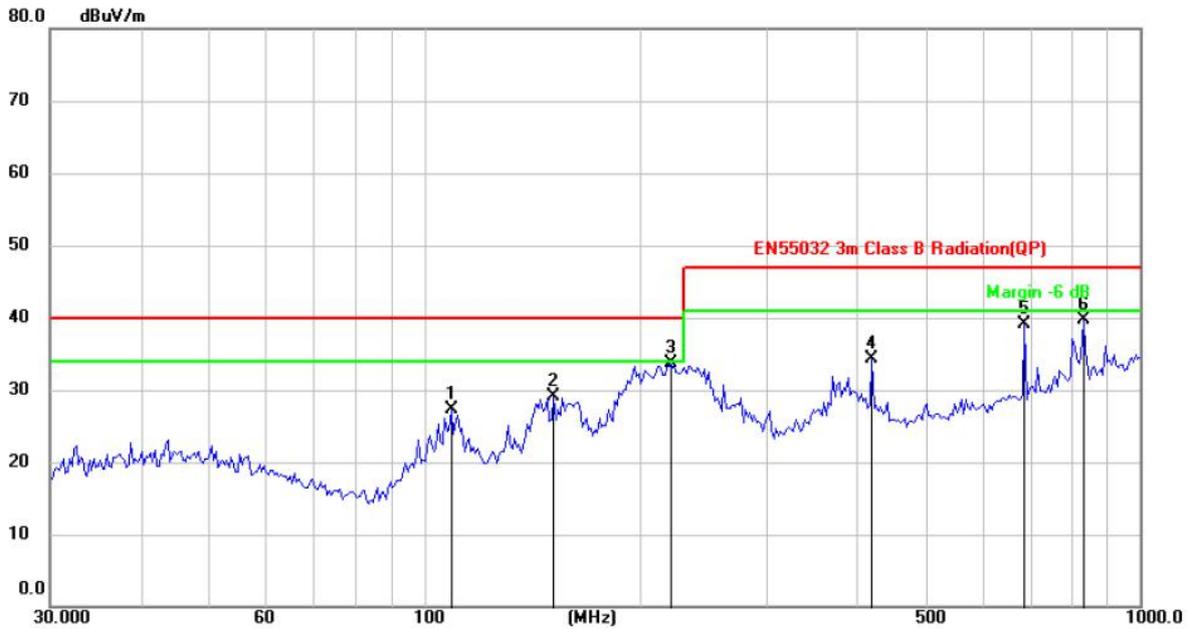
The measurement was performed in a semi-anechoic chamber. The distance from EUT to receiving antenna is 3 meters. Measurement was performed according to clause 7.3 of CISPR 16-2-3.

5.2.4. Test results

PASS

Please refer to the following page.

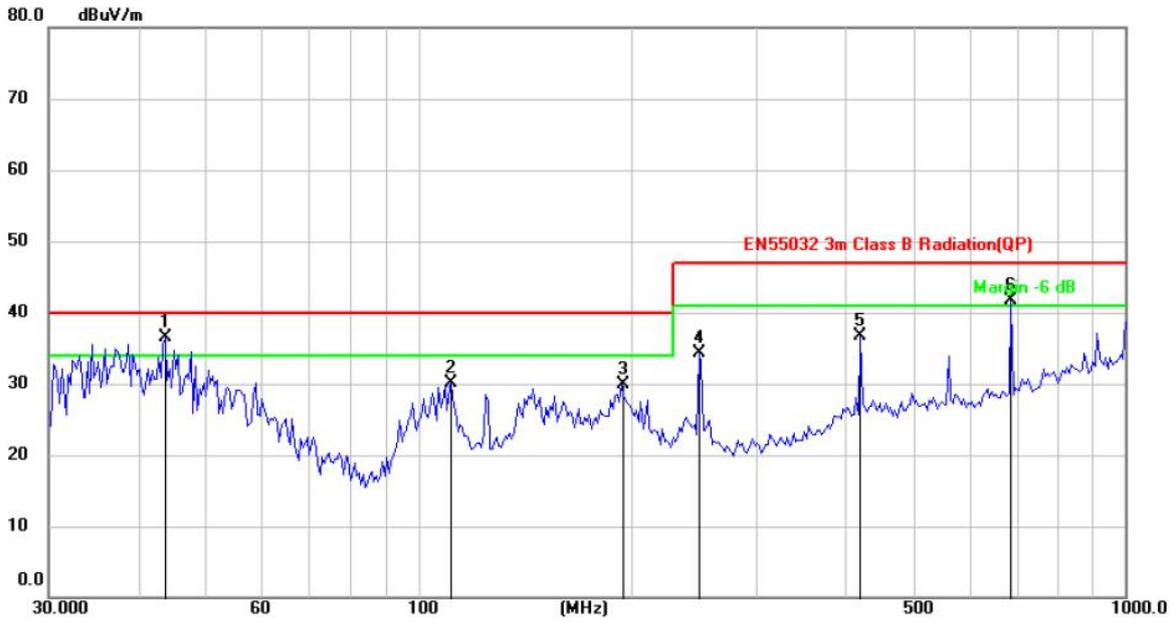
Polarization: H



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Margin dB	Detector
1		109.0286	35.80	-8.51	27.29	40.00	-12.71	peak
2		151.5972	35.36	-6.30	29.06	40.00	-10.94	peak
3	*	219.8449	41.92	-8.15	33.77	40.00	-6.23	peak
4		422.0577	36.04	-1.70	34.34	47.00	-12.66	peak
5		689.5644	35.45	3.59	39.04	47.00	-7.96	peak
6		833.3171	33.51	6.17	39.68	47.00	-7.32	peak

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

Polarization: V



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Detector
		MHz	dBuV	dB	dBuV/m	dB/m	dB	
1	*	43.8119	42.26	-5.77	36.49	40.00	-3.51	peak
2		111.3468	38.38	-8.34	30.04	40.00	-9.96	peak
3		193.7728	39.00	-9.05	29.95	40.00	-10.05	peak
4		249.4250	41.23	-6.87	34.36	47.00	-12.64	peak
5		422.0577	38.50	-1.70	36.80	47.00	-10.20	peak
6	!	689.5644	38.10	3.59	41.69	47.00	-5.31	peak

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

6. 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.

6.1. Electrostatic discharges (ESD)

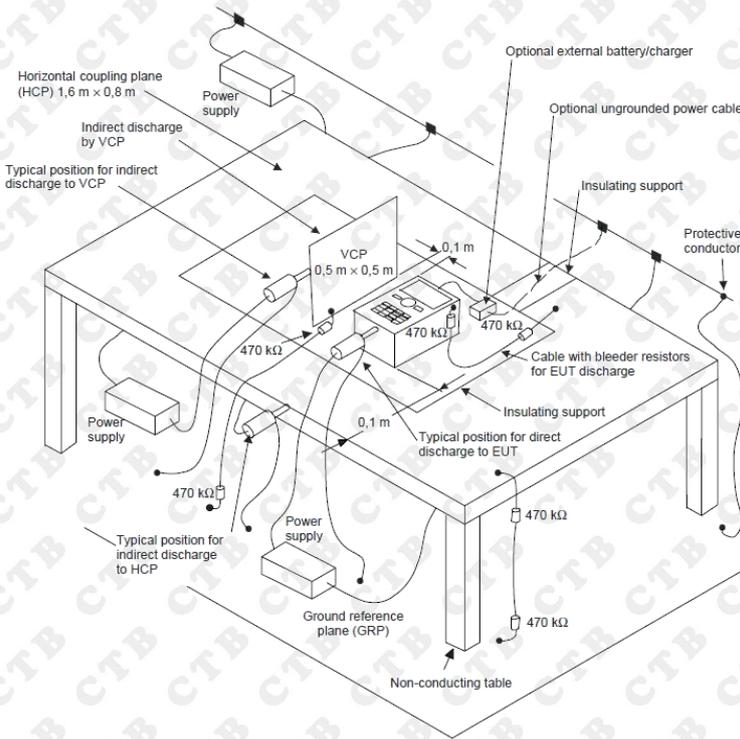
6.1.1. Test Levels and Performance Criterion

Characteristics	Test levels
Air discharge	±8 kV
Contact discharge	±4 kV

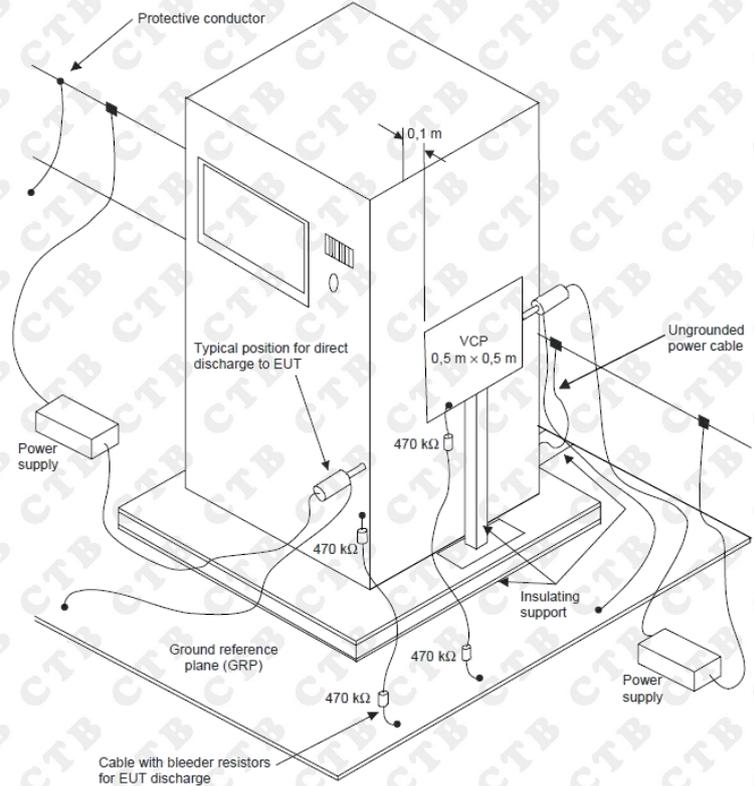
Performance criterion: **B**

6.1.2. Test setup

For table-top equipment



For floor standing equipment



6.1.3. Test Procedure

Measurement was performed in shielded room.
 Measurement procedure was applied according to EN 61000-4-2 clause 8.
 The test method and equipment were specified by EN 61000-4-2.

6.1.4. Test Result

PASS
 Please refer to the following page.

No.	Location of discharge	Polarity	Discharge	Number of discharges	Test level kV	Result
1	HCP top side	P&N	C	25	4	PASS
3	HCP bottom side	P&N	C	25	4	PASS
5	VCP right side	P&N	C	25	4	PASS
7	VCP left side	P&N	C	25	4	PASS
9	Points on conductive surface	P&N	C	25	4	PASS
10	Points on non-conductive surface	P&N	A	10	8	PASS
HCP = Horizontal coupling plate VCP = Vertical coupling plate N = Negative P = Positive A = Air discharge C = Contact discharge						

6.2. Electromagnetic field

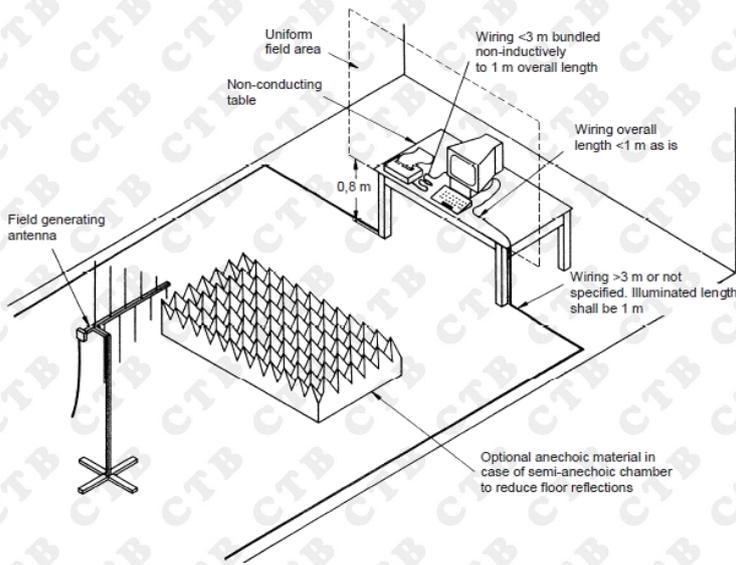
6.2.1. Test Levels and Performance Criterion

Characteristics	Test levels	Test levels
Frequency range	80 MHz to 1 000 MHz,	1 800MHz, 2 600MHz, 3 500MHz, 5 000MHz
Test level	3 V/m (unmodulated)	1 V/m (unmodulated)
Modulation	1 kHz, 80 % AM, sine wave	1 kHz, 80 % AM, sine wave

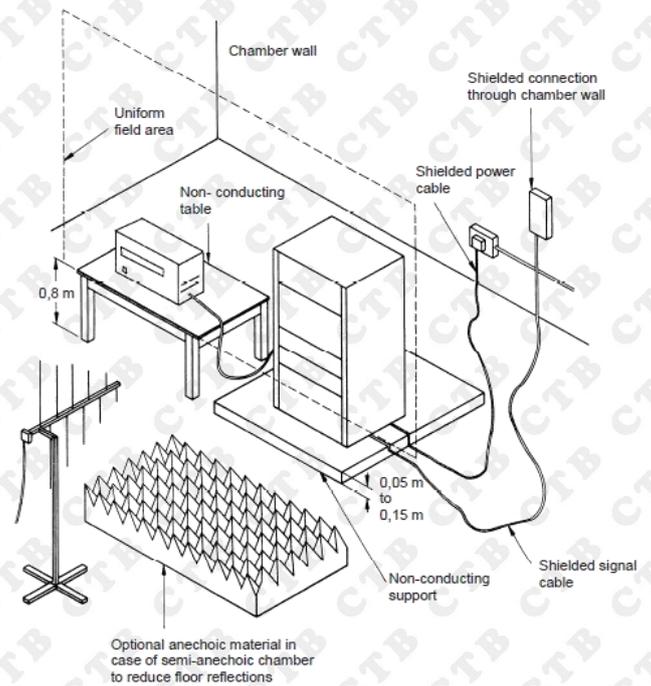
Performance criterion: **A**

6.2.2. Test setup

For table-top equipment



For floor standing equipment



6.2.3. Test Procedure

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

6.2.4. Test Result

PASS

Enclosure	Horizontal	Vertical
Front	PASS	PASS
Right Side	PASS	PASS
Left Side	PASS	PASS
Rear	PASS	PASS

7. Photographs of test setup

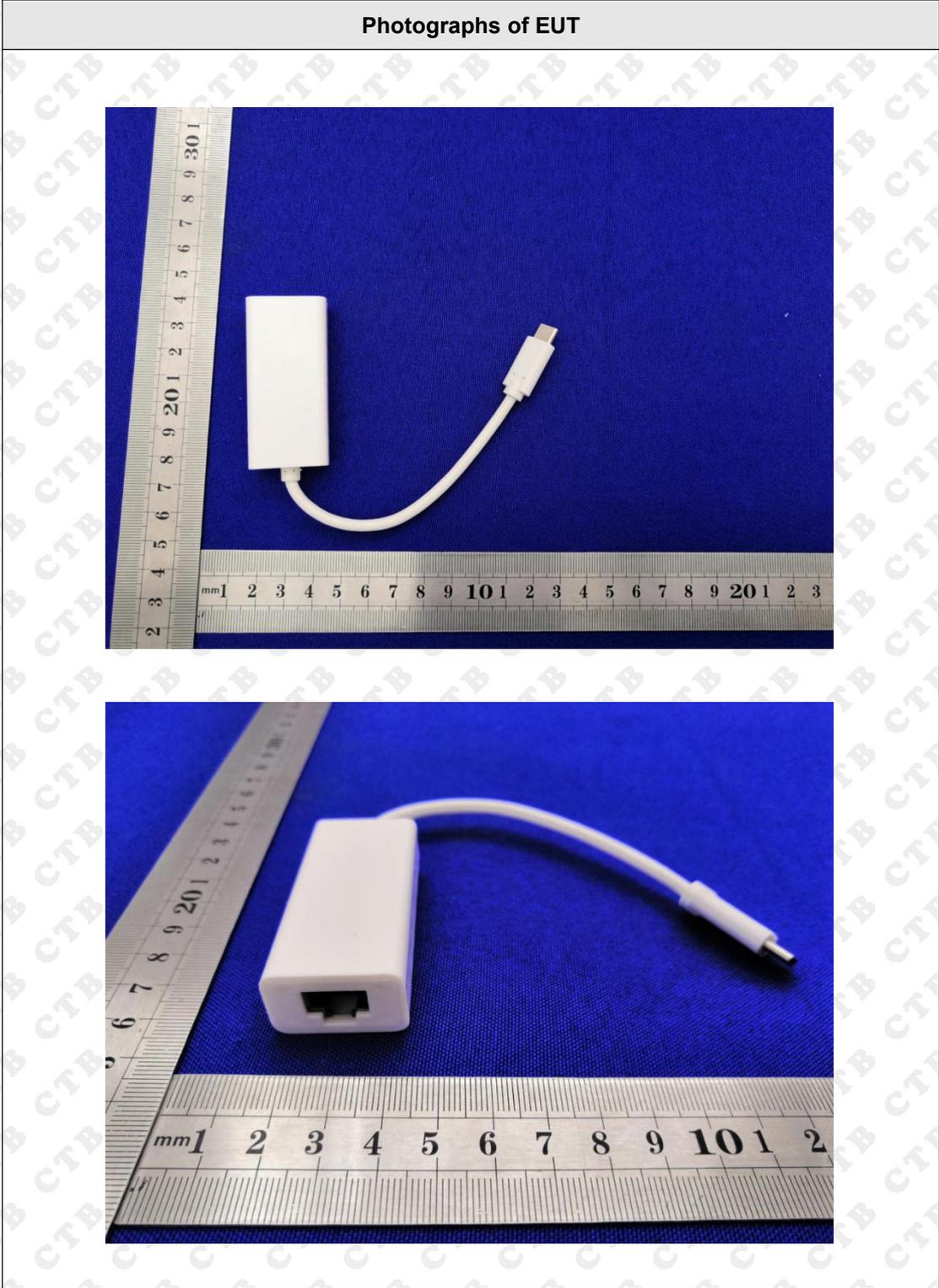
Photograph of test setup for Conducted Emission



Photograph of test setup for Radiated Emission



8. Photographs of EUT



End of report