Vecow Co., Ltd.

TEST REPORT

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200500249TWN-001

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PAGES
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FCC Part 15B
TEST REPORT

Applicant:	**Vecow Co., Ltd.** **3F, No. 10, Jiankang Rd., Zhonghe Dist., New Taipei City, Taiwan**
Product:	**MTC-7000 Series Multi-touch panel pc**
Model No.:	**MTC-7XXX-XXX, MTC-7010W**
Brand Name:	**Vecow**
Test Standard:	**47 CFR FCC Part 15 Subpart B**
Test Method:	**FCC Procedure ANSI C63.4 (2014)**
Test By:	**Intertek Testing Services Taiwan Ltd.,** **Hsinchu Laboratory** **No. 11, Lane 275, Ko-Nan 1 Street, Chia-Tung Li,** **Shiang-Shan District, Hsinchu City, Taiwan**

Testing Laboratory
0597

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Revision History

Report No.	Issue Date	Revision Summary
200500249TWN-001	Jun. 10, 2020	Original report

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1. General Information

1.1 Identification of the EUT

Product:	MTC-7000 Series Multi-touch panel pc
Model No.:	MTC-7010W
Rated Power:	DC 24V from adapter
Power Cord:	3C × 0.75mm^2 × 2 meter unshielded cable
Sample receiving date:	May 22, 2020
Sample condition:	Workable
Testing date:	May 28, 2020 ~ Jun. 03, 2020

1.2 Adapter information

The EUT will be supplied with a power supply from below list:

No.	Model no.	Specification
Adapter	FSP120-AABN2	I/P: 100-240Vac, 50-60Hz, 1.8A O/P: 24Vdc, 5.0A, 120W

1.3 Additional information about the EUT

The customer confirmed MTC-7XXX-XXX is a series model to MTC-7010W (EUT), the different model numbers are served as marketing strategy.

For model: MTC-7XXX-XXX
The customer confirmed denote of “X” in model number as 0~9, A~Z, or blank for marketing purpose.

2. Test Summary

Emission			
Standard	**Test Type**	**Result**	**Remarks**
FCC Subpart B Section 15.107	Conducted Emission Test	PASS	Meet Class A Limit
FCC Subpart B Section 15.109	Radiated Emission Test	PASS	Meet Class A Limit

Note: Please note that the test results with statement of conformity, the decision rules which are based on: Safety Testing: the specification, standard or IEC Guide 115.
Other Testing: the specification, standard and not taking into account the measurement uncertainty.

3. Test Specifications

3.1 Standards

The following standards were applied for testing:

FCC standard: 47 CFR Part 15, Subpart B.
This part sets out the regulations under which an unintentional, or incidental Telecommunication, RADIO FREQUENCY DEVICES may be operated without an individual license.

ANSI C63.4-2014: American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

3.2 Test Facility accreditation

Intertek Testing Services Taiwan Ltd., Hsinchu Laboratory is accredited in respect of laboratory and the accreditation criterion is ISO/IEC 17025.

Certification	Bureau	Code	Accreditation Criteria
Accreditation Certificate	TAF	0597	ISO/IEC 17025
	BSMI	SL2-IS-E-0024 SL2-IN-E-0024 SL2-A1-E-0024 SL2-R2-E-0024 SL2-R1-E-0024 SL2-L1-E-0024	ISO/IEC 17025
Site Filling Code :	FCC	93910	Test facility list & NSA Data
	IC	2042D-1, 2042D-2	Test facility list & NSA Data
	VCCI	R-1534 C-1618 T-11586 G-10049	Test facility list & NSA Data

3.3 Classification of ITE

Class A digital device. A digital device that is marketed for use in a commercial, industrial or business environment, exclusive of a device which is marketed for use by the general public or is intended to be used in the home.

Class B digital device. A digital device that is marketed for use in a residential environment notwithstanding use in commercial, business and industrial environments. Examples of such devices include, but are not limited to, personal computers, calculators, and similar electronic devices that are marketed for use by the general public.

3.4 Mode of operation during the test

The EUT was supplied with DC 24 V from adapter. (Test voltage: 120Vac, 60Hz)

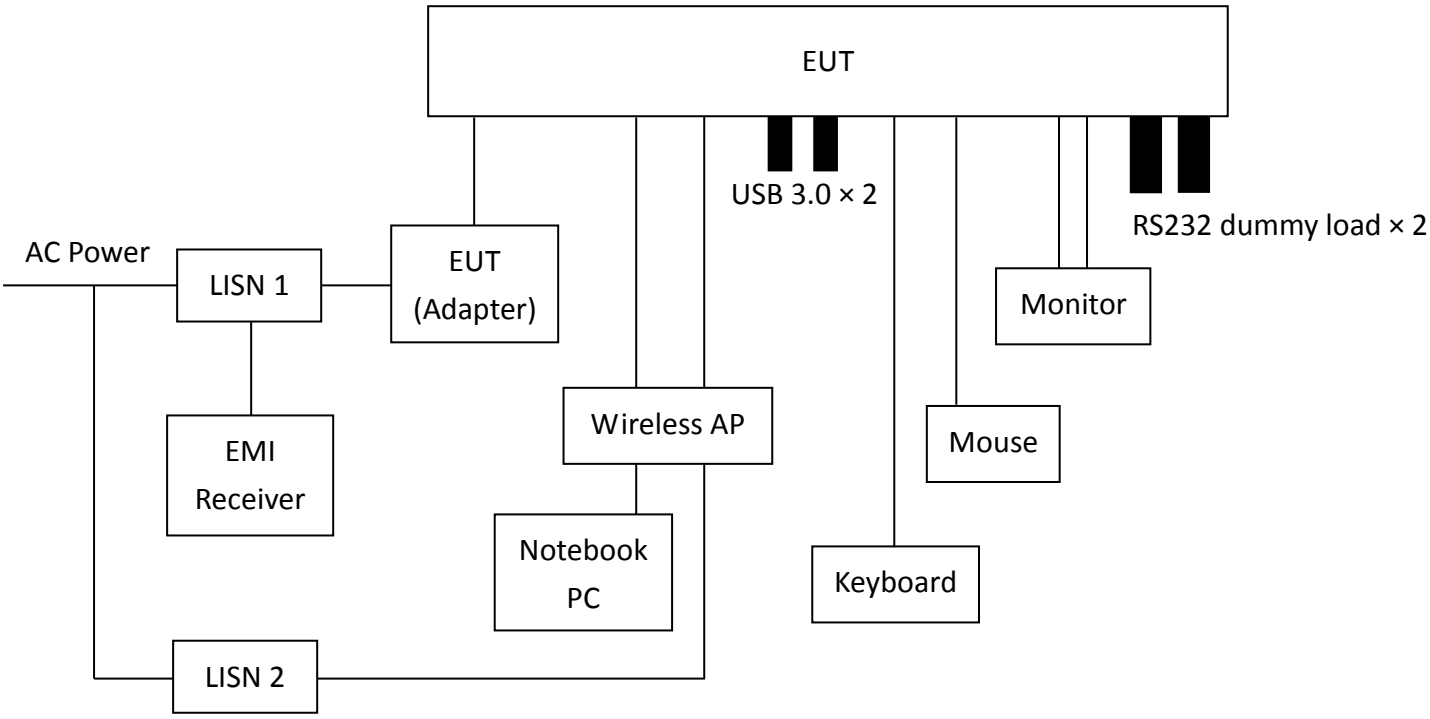
1. The EUT was setup in full load condition.
2. Ethernet port 1 & 2 connected to the WAP.
3. Power ON EUT, executed “ping command” at EUT and WAP & Notebook PC and connected each other.
4. EUT executed "Burn in" & Play color bar.
5. Start test.

3.5 Peripherals equipment

Peripherals	Brand	Model No.	Serial No.	Description of Data Cable
Notebook PC	HP	HSTNN-Q96C	5CD8021S9J	N/A
Monitor	DELL	P2210t	CN-0R945K-74445-0BA-588S	1. Shielded Display cable 1.8meter 2. Shielded DVI cable 1.5 meter
Wireless AP	BUFFALO	WZR-AGL300NH	44000000000000	Unshielded RJ-45 cable 6 meter
Keyboard	ViewSonic	VS10230	P80053802065	N/A
Mouse	HP	M-UAE96		N/A
USB 3.0	Kingston	DTSE9G2/8GB	PR180707B003589-0000288	N/A
USB 3.0	Kingston	DTSE9G2/8GB	PR180707B003589-0000090	N/A
RS232 dummy load × 2	N/A	N/A	N/A	N/A

4. Conducted Emission Test

4.1 Test Procedure



The EUT along with its peripherals were placed on a 1.0 meter(W)×1.5meter(L) and 0.8 meter in height wooden table and the EUT was adjusted to maintain a 0.4meter space from a vertical reference plane. The EUT was connected to power mains through a Artificial Mains Network (LISN), which provided 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room.
The excess power cable between the EUT and the AMN was bundled. All connecting cables of EUT and peripherals were moved to find the maximum emission

4.2 Test Equipment

Test Equipment	Brand	Model No.	Serial No.	Calibration Date	Next Calibration Date
EMI Test Receiver	R&S	ESR-7	101232	2020/01/18	2021/01/16
LISN	R&S	ENV216	101160	2019/07/17	2020/07/15
LISN	R&S	ESH3-Z5	835239/023	2019/09/23	2020/09/21
CON-2 Cable	SUHNER	EMCCFD300-BM-NM-6000	170502	2020/04/30	2021/04/29
Test software	Audix	e3	V4.20040112L	NCR	NCR

Note: No Calibration Required (NCR).

4.3 Conducted Emission Limit

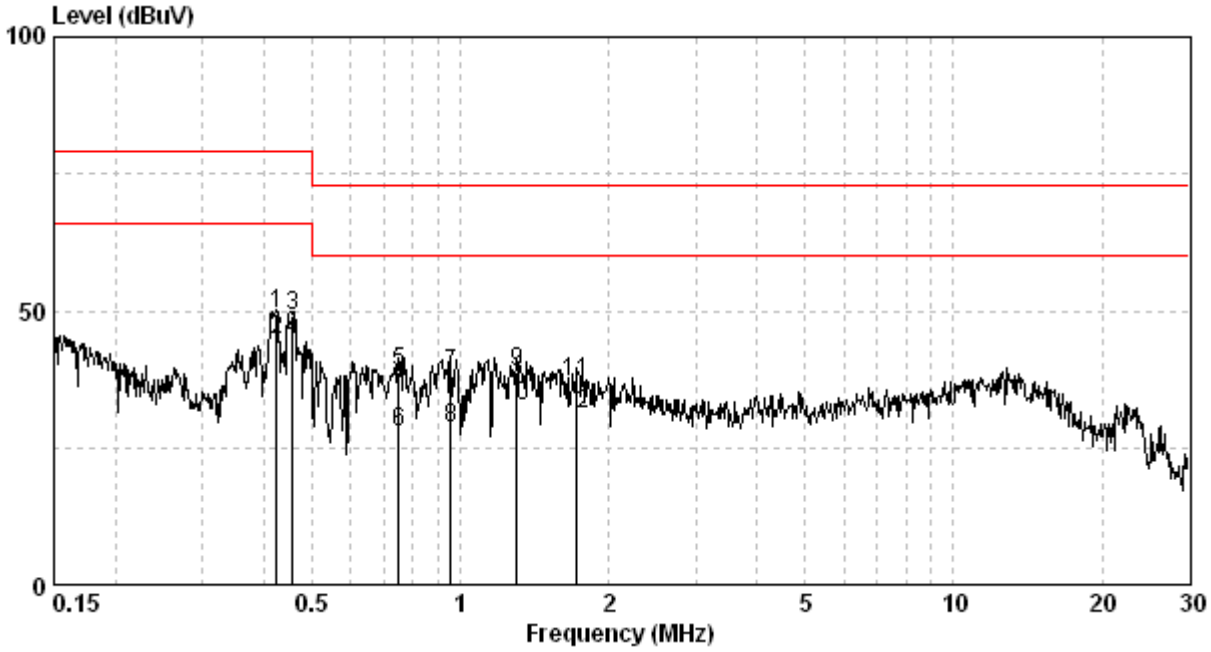
Frequency (MHz)	Maximum RF Line Voltage	
	Class A Equipment (dBµV)	
	Q.P.	Avg.
0.15~0.50	79	66
0.50~30.00	73	60

4.4 Conducted Emission Data

Phase:	Live Line			
Temperature:	24	℃	Model No.:	MTC-7010W
Relative Humidity:	58	%	Test Date:	May 29, 2020
Atmospheric Pressure:	1008	hPa	Remark:	N/A

Frequency (MHz)	Corr. Factor (dB)	Reading QP (dBuV)	Level QP (dBuV)	Limit QP (dBuV)	Reading AV (dBuV)	Level AV (dBuV)	Limit AV (dBuV)	Margin (dB) QP	Margin (dB) AV
0.424	9.78	39.50	49.28	79.00	34.76	44.54	66.00	-29.72	-21.46
0.456	9.79	39.41	49.20	79.00	34.79	44.58	66.00	-29.80	-21.42
0.751	9.81	28.92	38.72	73.00	17.93	27.73	60.00	-34.28	-32.27
0.958	9.81	28.76	38.57	73.00	18.70	28.51	60.00	-34.43	-31.49
1.303	9.82	28.93	38.74	73.00	22.78	32.60	60.00	-34.26	-27.40
1.725	9.83	27.34	37.17	73.00	21.22	31.05	60.00	-35.83	-28.95

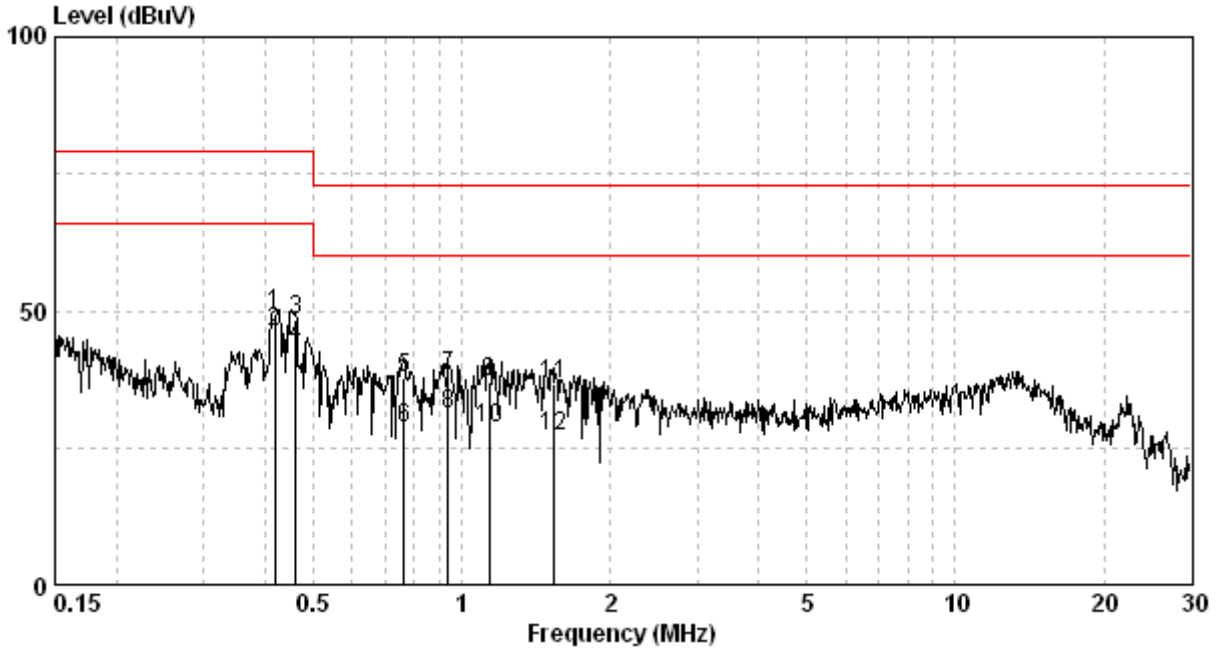
Remark:
1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Level (dBuV) = Corr. Factor (dB) + Reading (dBuV)
3. Margin (dB) = Level (dBuV) – Limit (dBuV)



Phase:	Neutral Line			
Temperature:	24	℃	Model No.:	MTC-7010W
Relative Humidity:	58	%	Test Date:	May 29, 2020
Atmospheric Pressure:	1008	hPa	Remark:	N/A

Frequency (MHz)	Corr. Factor (dB)	Reading QP (dBuV)	Level QP (dBuV)	Limit QP (dBuV)	Reading AV (dBuV)	Level AV (dBuV)	Limit AV (dBuV)	Margin (dB) QP	Margin (dB) AV
0.419	9.78	39.66	49.44	79.00	36.38	46.16	66.00	-29.56	-19.84
0.461	9.79	38.43	48.22	79.00	33.83	43.62	66.00	-30.78	-22.38
0.763	9.81	27.74	37.55	73.00	18.88	28.70	60.00	-35.45	-31.30
0.938	9.82	28.14	37.96	73.00	21.39	31.21	60.00	-35.04	-28.79
1.135	9.82	27.22	37.04	73.00	18.70	28.53	60.00	-35.96	-31.47
1.535	9.83	26.98	36.81	73.00	17.30	27.13	60.00	-36.19	-32.87

Remark:
1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Level (dBuV) = Corr. Factor (dB) + Reading (dBuV)
3. Margin (dB) = Level (dBuV) – Limit (dBuV)

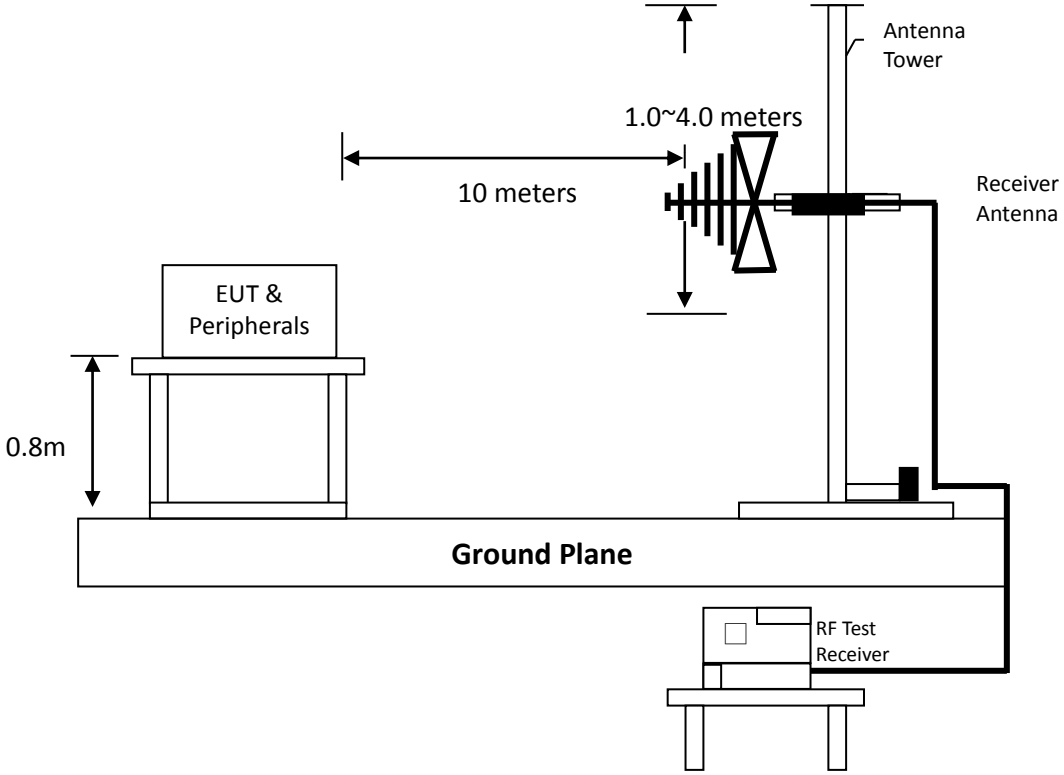


5. Radiated Emission Test

5.1.1 Test Procedure from 30 MHz to 1000 MHz

The figure below shows the test setup, which is utilized to make these measurements.

Side View



Radiated testing was performed at a 10 meters open area test site. The equipment under test was placed on a turntable top 0.8 meter above ground. The table was 360 degrees to determine the position of the highest radiation. EUT is set 10 meters from the EMI receiving antenna, which is mounted on a variable height mast. The antenna height is varied between one meter and four meters above ground to find the maximum value of the field strength. Both horizontal polarization and vertical polarization of the antenna was set to conduct the measurement.

The bandwidth was set on the EMI meter 120 kHz.

The levels are quasi peak value readings. The frequency spectrum from 30 MHz to 1000 MHz was investigated.

5.1.2 Test Equipment

Test Equipment	Brand	Model No.	Serial No.	Calibration Date	Next Calibration Date
EMI Test Receiver	R&S	ESCS30	833364/011	2020/05/08	2021/05/07
Pre-Amplifier	EM	EM330	060654	2019/06/13	2020/06/11
Bi_log Hybrid Antenna	ETC	MCTD 2786B	BLB17J04019 & JB-5-019	2019/07/12	2020/07/10
OATS_1	Intertek	N/A	N/A	2020/04/16	2021/04/15
OATS-1 Cable	PEWC.	N / CFD400-NL	N/A	2020/04/30	2021/04/29
OATS-1 Cable	PEWC.	N / CFD400-NL	N/A	2020/04/30	2021/04/29
Test software	Audix	e3	V4.20040112L	NCR	NCR

Note: No Calibration Required (NCR).

5.1.3 Radiated Emission Limit

According to FCC 15.109, except for Class B digital device, the field strength of radiated emissions from a Class A digital device, as determined at a distance of 10 meters, shall not exceed the following:

Class A Radiated Emission Limits:

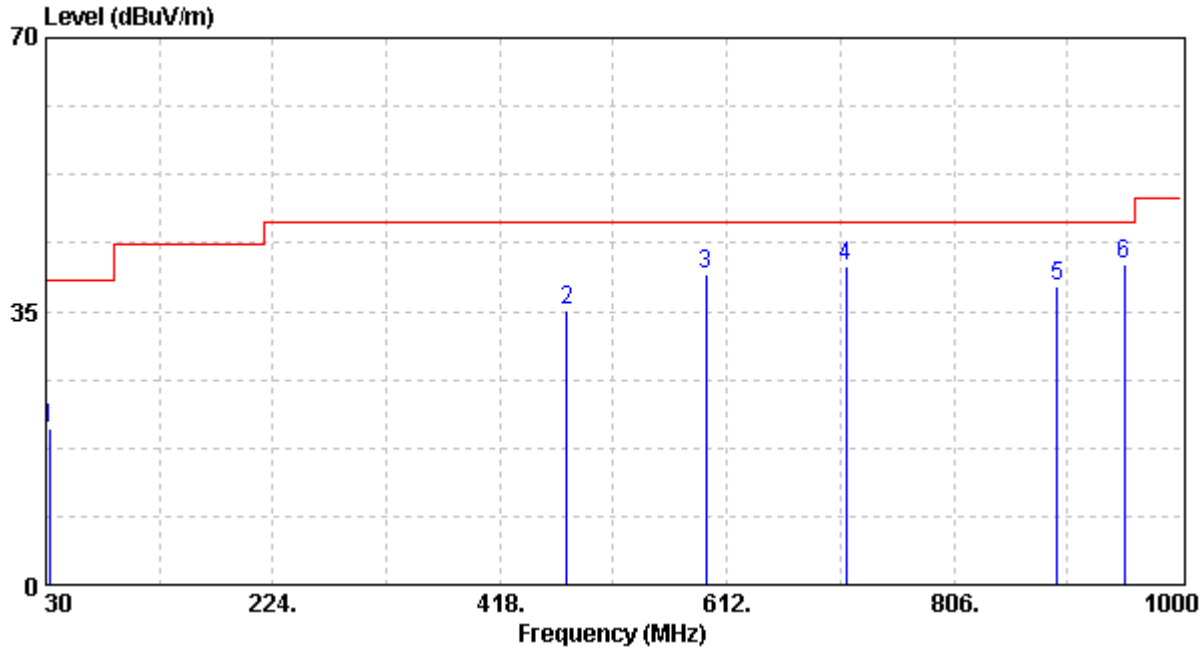
Frequency MHz	Radiated dBµV/m
30-88	39.0
88-216	43.5
216-960	46.5
Above 960	49.5

5.1.4 Radiated Emission Test Data from 30 MHz to 1000 MHz

Polarity:	Vertical			
Temperature:	30	℃	Model No.:	MTC-7010W
Relative Humidity:	63	%	Test Date:	Jun. 02, 2020
Atmospheric Pressure:	1005	hPa	Remark:	N/A

Freq	Pol/Phase	Factor	Read Level	Level	Limit Line	Over Limit	Remark
MHz		dB	dBuV	dBuV/m	dBuV/m	dB	
32.90	VERTICAL	-12.88	33.00	20.12	39.00	-18.88	QP
475.00	VERTICAL	-5.97	41.10	35.13	46.50	-11.37	QP
594.00	VERTICAL	-3.44	43.10	39.66	46.50	-6.84	QP
714.00	VERTICAL	-0.99	41.70	40.71	46.50	-5.79	QP
894.00	VERTICAL	1.69	36.50	38.19	46.50	-8.31	QP
952.00	VERTICAL	4.44	36.50	40.94	46.50	-5.56	QP

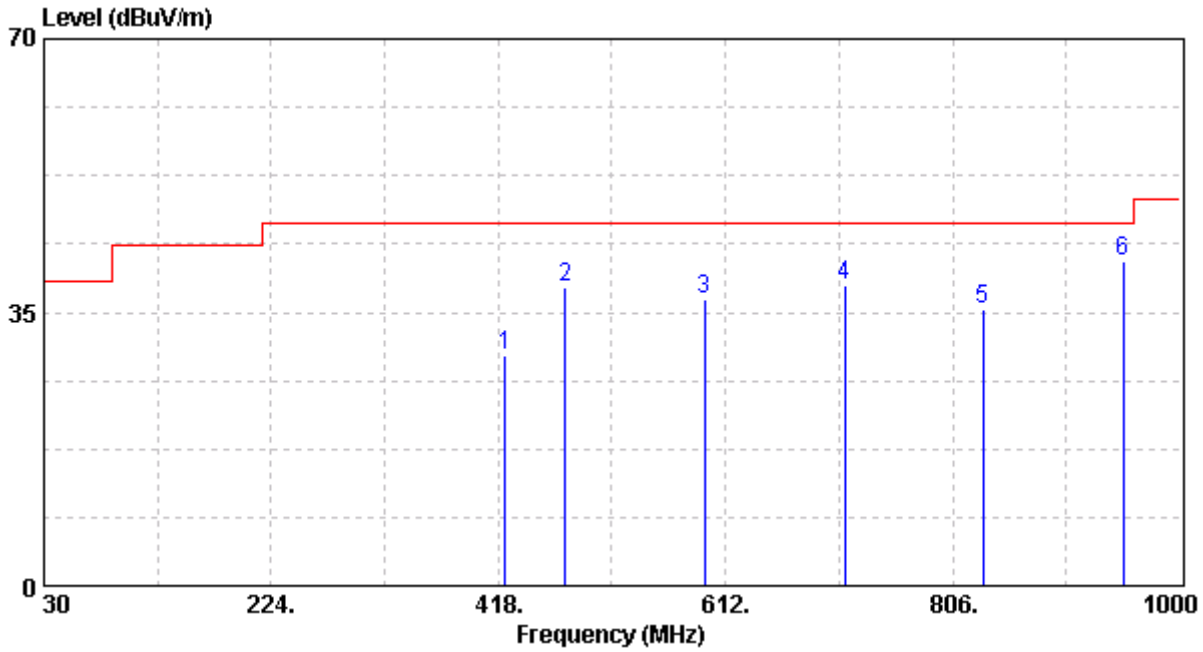
Remark:
1. Factor = Antenna Factor (dB/m) + Cable Loss (dB) – Amplifier Gain (dB)
2. Level (dBμV/m) = Factor (dB) + Read Level (dBμV)
3. Over Limit (dB) = Level (dBμV/m) – Limit Line (dBμV/m)



Polarity:	Horizontal			
Temperature:	30	℃	Model No.:	MTC-7010W
Relative Humidity:	63	%	Test Date:	Jun. 02, 2020
Atmospheric Pressure:	1005	hPa	Remark:	N/A

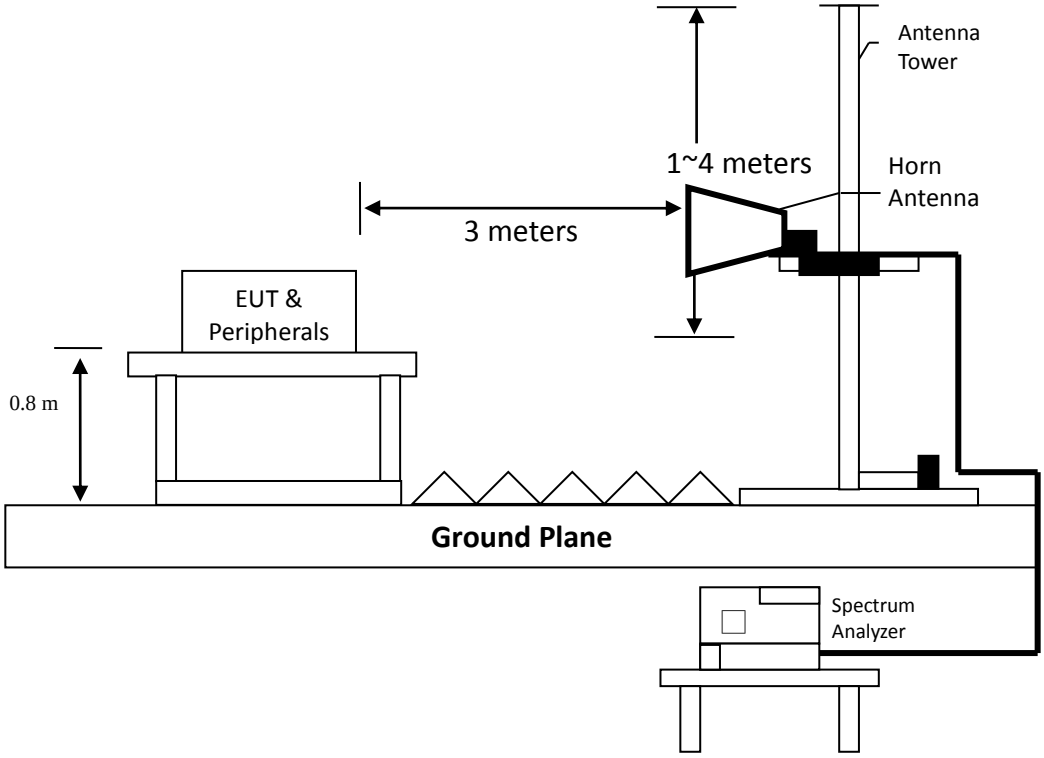
Freq	Pol/Phase	Factor	Read Level	Level	Limit Line	Over Limit	Remark
MHz		dB	dBuV	dBuV/m	dBuV/m	dB	
424.00	HORIZONTAL	-7.07	36.60	29.53	46.50	-16.97	QP
475.00	HORIZONTAL	-5.97	44.30	38.33	46.50	-8.17	QP
594.00	HORIZONTAL	-3.44	40.20	36.76	46.50	-9.74	QP
714.00	HORIZONTAL	-0.99	39.40	38.41	46.50	-8.09	QP
832.00	HORIZONTAL	0.93	34.50	35.43	46.50	-11.07	QP
952.00	HORIZONTAL	4.44	37.20	41.64	46.50	-4.86	QP

Remark:
1. Factor = Antenna Factor (dB/m) + Cable Loss (dB) – Amplifier Gain (dB)
2. Level (dBμV/m) = Factor (dB) + Read Level (dBμV)
3. Over Limit (dB) = Level (dBμV/m) – Limit Line (dBμV/m)



5.2.1 Test Procedure above 1 GHz

The figure below shows the test setup, which is utilized to make these measurements.



Radiated testing was performed at a 3 meters semi-anechoic chamber. The equipment under test were placed on a turntable top 0.8 meter above ground. The table was 360 degrees to determine the position of the highest radiation. EUT is set 3 meters from the EMI receiving antenna, which is mounted on a variable height mast. The antenna height is varied between one meter and four meters above ground to find the maximum value of the field strength. Both horizontal polarization and vertical polarization of the antenna was set to conduct the measurement.
The bandwidth was set on the EMI meter 1 MHz.
The levels are peak and average value readings. The frequency spectrum above 1 GHz was investigated.

5.2.2 Test Equipment

Test Equipment	Brand	Model No.	Serial No.	Calibration Date	Next Calibration Date
EMI Test Receiver	R&S	ESU40	100381	2020/05/29	2021/05/28
Horn Antenna	EMCO	3115	9906-5822	2020/05/07	2021/05/06
Pre-Amplifier	SCHWARZBECK	BBV9718	9718-004	2019/10/16	2020/10/14
966-1(A) Cable	SUHNER	SMA / SUCOFLEX 104	29510614	2020/04/13	2021/04/12
966-1(B) Cable	JUNFLON	SMA / J12J100880-00	AUG-26-08-001	2020/04/13	2021/04/12
966-1_3m Semi-Anechoic Chamber	966_1	CEM-966_1	N/A	2020/03/02	2021/03/01
Test software	Audix	e3	V4.20040112L	NCR	NCR

Note: No Calibration Required (NCR).

5.2.3 Radiated Emission Limit

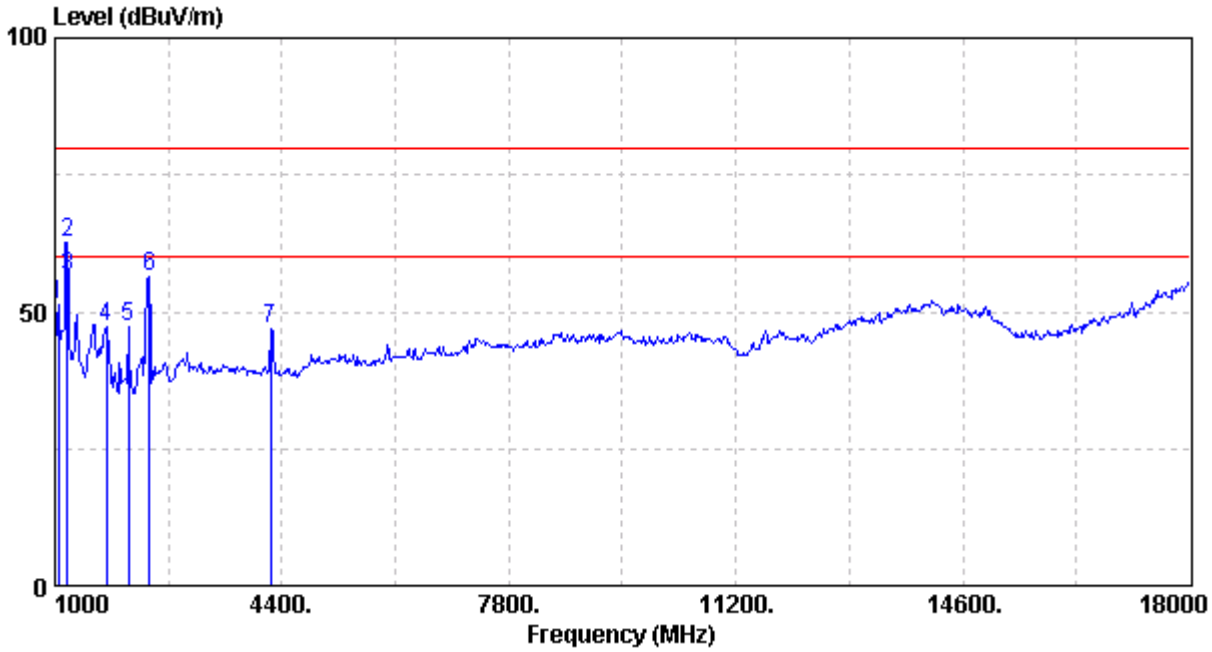
Frequency MHz	3m field limit, dBuV/m (Average)	3m field limit, dBuV/m (Peak)
Above 1000	60.0	80.0

5.2.4 Radiated Emission Test Data above 1 GHz

Polarity:	Vertical			
Temperature:	24	℃	Model No.:	MTC-7010W
Relative Humidity:	55	%	Test Date:	Jun. 03, 2020
Atmospheric Pressure:	1008	hPa	Remark:	N/A

Freq	Pol/Phase	Factor	Read Level	Level	Limit Line	Over Limit	Remark
MHz		dB	dBuV	dBuV/m	dBuV/m	dB	
1051.000	VERTICAL	-12.51	63.68	51.17	80.00	-28.83	Peak
1187.000	VERTICAL	-11.18	73.97	62.79	80.00	-17.21	Peak
1187.000	VERTICAL	-11.18	67.50	56.32	60.00	-3.68	Average
1765.000	VERTICAL	-7.92	55.33	47.41	80.00	-32.59	Peak
2105.000	VERTICAL	-6.39	53.67	47.29	80.00	-32.71	Peak
2411.000	VERTICAL	-4.32	60.57	56.25	80.00	-23.75	Peak
4230.000	VERTICAL	2.03	44.94	46.97	80.00	-33.03	Peak

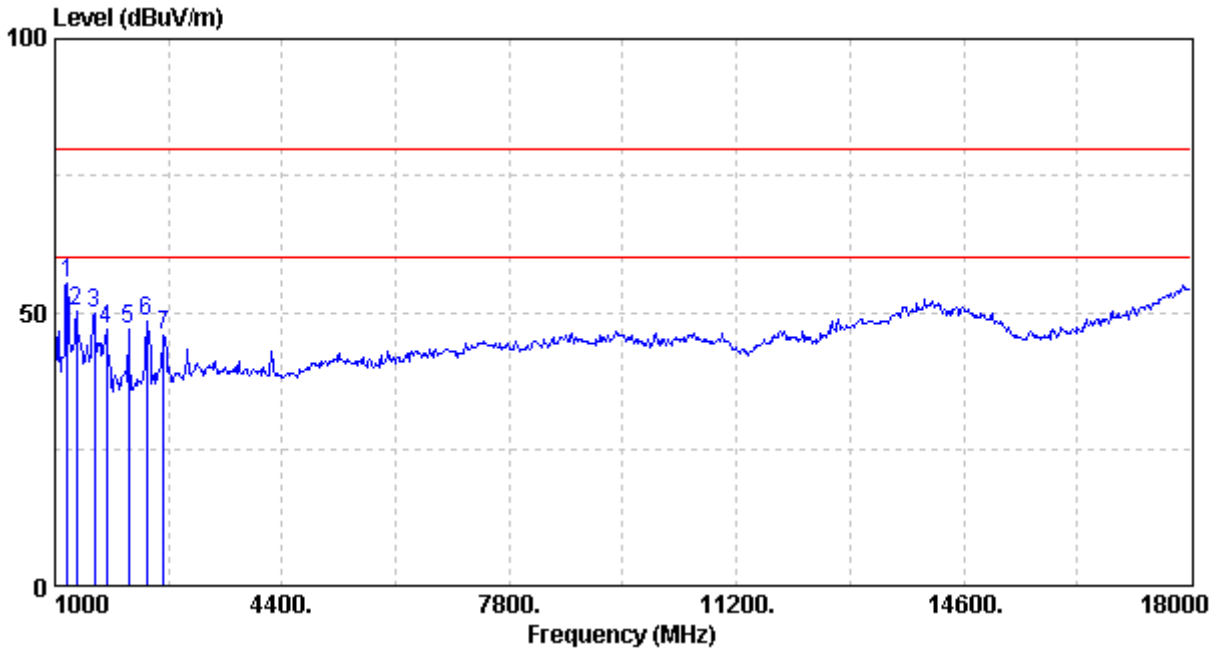
Remark:
1. Level (dBµV/m) = Factor (dB) + Read Level (dBµV)
2. Factor = Antenna Factor (dB/m) + Cable Loss (dB) – Amplifier Gain (dB)
(*The Amplifier Gain depended on measure equipment, see test equipment list.)
3. Over Limit (dB) = Level (dBµV/m) – Limit Line (dBµV/m)



Polarity:	Horizontal			
Temperature:	24	℃	Model No.:	MTC-7010W
Relative Humidity:	55	%	Test Date:	Jun. 03, 2020
Atmospheric Pressure:	1008	hPa	Remark:	N/A

Freq	Pol/Phase	Factor	Read Level	Level	Limit Line	Over Limit	Remark
MHz		dB	dBuV	dBuV/m	dBuV/m	dB	
1187.000	HORIZONTAL	-11.18	66.40	55.22	80.00	-24.78	Peak
1323.000	HORIZONTAL	-11.48	61.72	50.24	80.00	-29.76	Peak
1595.000	HORIZONTAL	-9.99	59.80	49.81	80.00	-30.19	Peak
1765.000	HORIZONTAL	-7.92	54.78	46.86	80.00	-33.14	Peak
2105.000	HORIZONTAL	-6.39	53.19	46.81	80.00	-33.19	Peak
2377.000	HORIZONTAL	-4.43	52.72	48.28	80.00	-31.72	Peak
2632.000	HORIZONTAL	-3.55	49.31	45.76	80.00	-34.24	Peak

Remark:
1. Level (dBμV/m) = Factor (dB) + Read Level (dBμV)
2. Factor = Antenna Factor (dB/m) + Cable Loss (dB) – Amplifier Gain (dB)
(*The Amplifier Gain depended on measure equipment, see test equipment list.)
3. Over Limit (dB) = Level (dBμV/m) – Limit Line (dBμV/m)

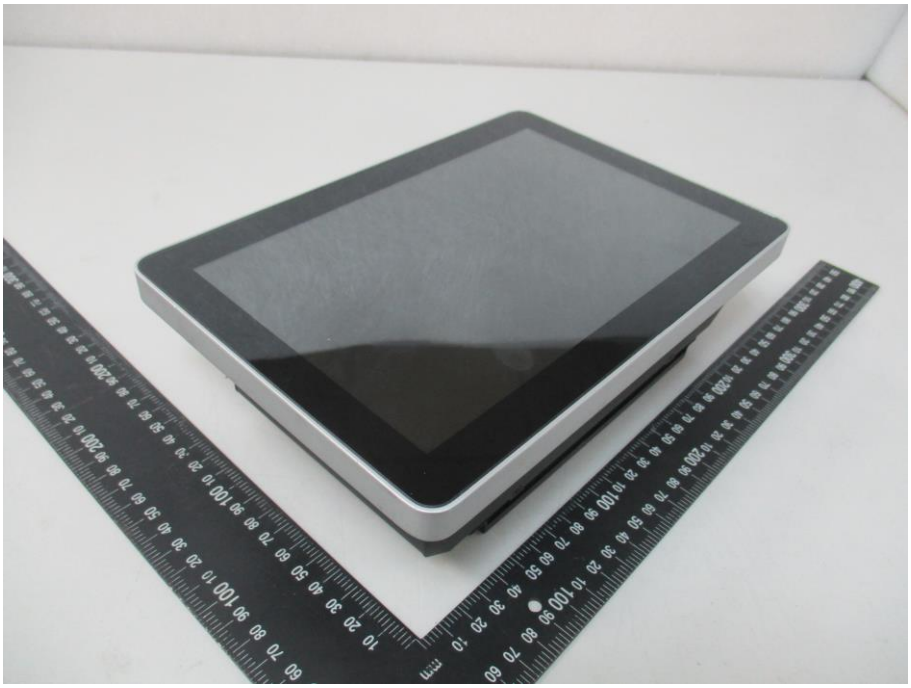


Appendix A: Uncertainty

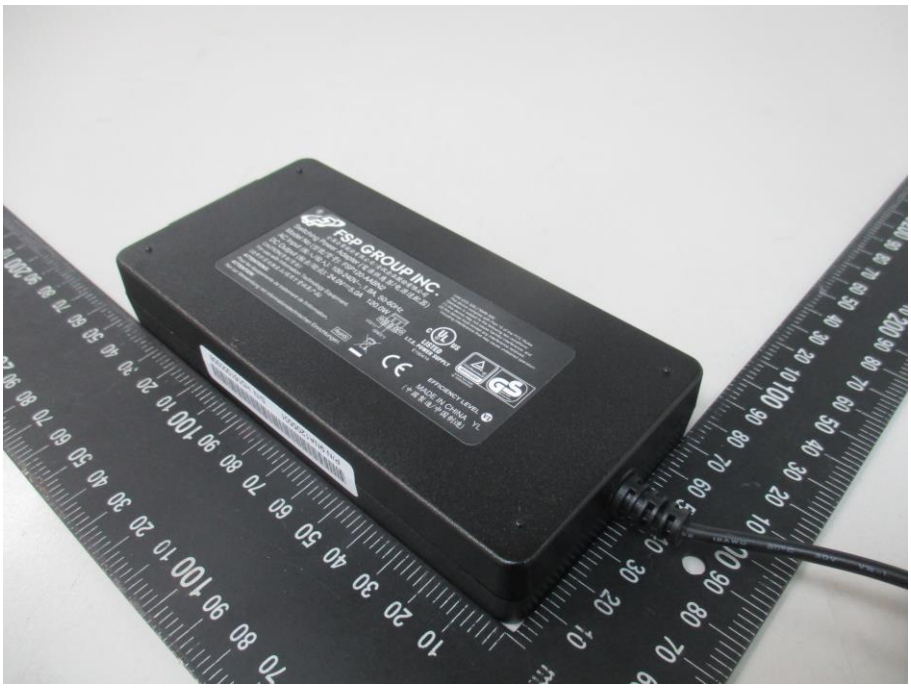
This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Item	Uncertainty
Conducted disturbance measurements at a mains port from 9 kHz to 30 MHz using a 50 Ω/50 µH +5Ω artificial mains network (AMN)	2.52 dB
Conducted disturbance measurements at a telecommunication port from 150 kHz to 30 MHz using an asymmetrical artificial network (AAN)	4.02 dB
Vertically polarized radiated disturbances from 30MHz~1GHz in a open area test site at a distance of 10m	4.90 dB
Horizontally polarized radiated disturbances from 30MHz~1GHz in a open area test site at a distance of 10m	4.89 dB
Vertically polarized radiated disturbances from 30MHz~1GHz in a semi-anechoic chamber at a distance of 3m	5.10 dB
Horizontally polarized radiated disturbances from 30MHz~1GHz in a semi-anechoic chamber at a distance of 3m	5.18 dB
Vertically polarized Radiated disturbances from 1GHz~18GHz in a semi-anechoic chamber at a distance of 3m	4.29 dB
Horizontally polarized Radiated disturbances from 1GHz~18GHz in a semi-anechoic chamber at a distance of 3m	4.29 dB

Appendix B1: External photo of EUT

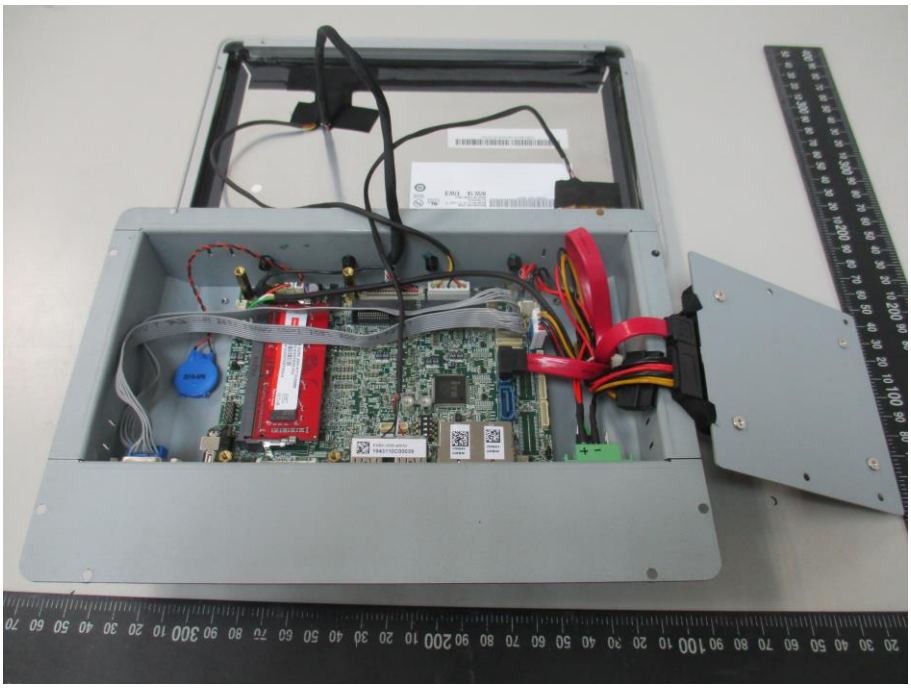



DC9V ~ DC48V
USB 3.0
USB 3.0
DVI
DP
COM 1
COM 2

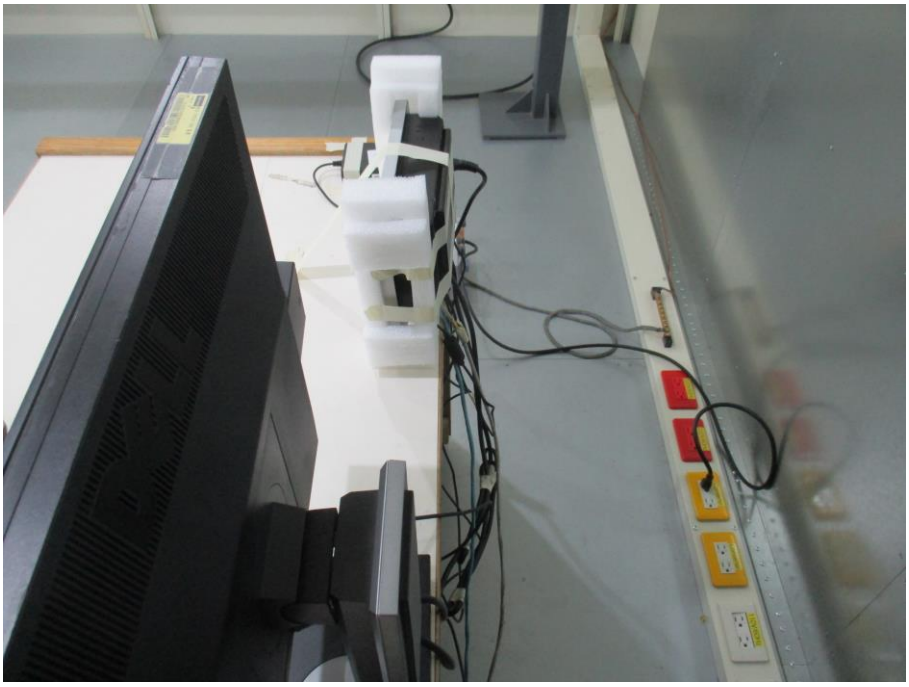

FSP GROUP INC.


FSP GROUP INC.
全漢企業股份有限公司/全汉企业股份有限公司
Switching Power Adapter (電源供應器/电源适配器)
Model No (型號/型号): FSP120-AABN2
AC Input (輸入/输入): 100-240V~,1.8A, 50-60Hz
DC Output (輸出/输出): 24.0V⎓5.0A 120.0W
CAUTION(警告/警告):
For use with Information Technology Equipment.
(適用於資訊類產品/适用于资讯类产品)
ATTENTIONS:
Pour les équipements de traitement de l'information.
ATTENTION:
Nur zur Verwendung mit informationstechnischen Einrichtungen.
VO(+)
GND(-)
RoHS
CAN ICES-3(B) / NMB-3(B)
This device complies with Part 15 of the FCC Rules.
Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received,
including interference that may cause undesired operation.
c UL us
LISTED
I.T.E. POWER SUPPLY
E190414
EFFICIENCY LEVEL VI
MADE IN CHINA YL
(中國製造/中国制造)

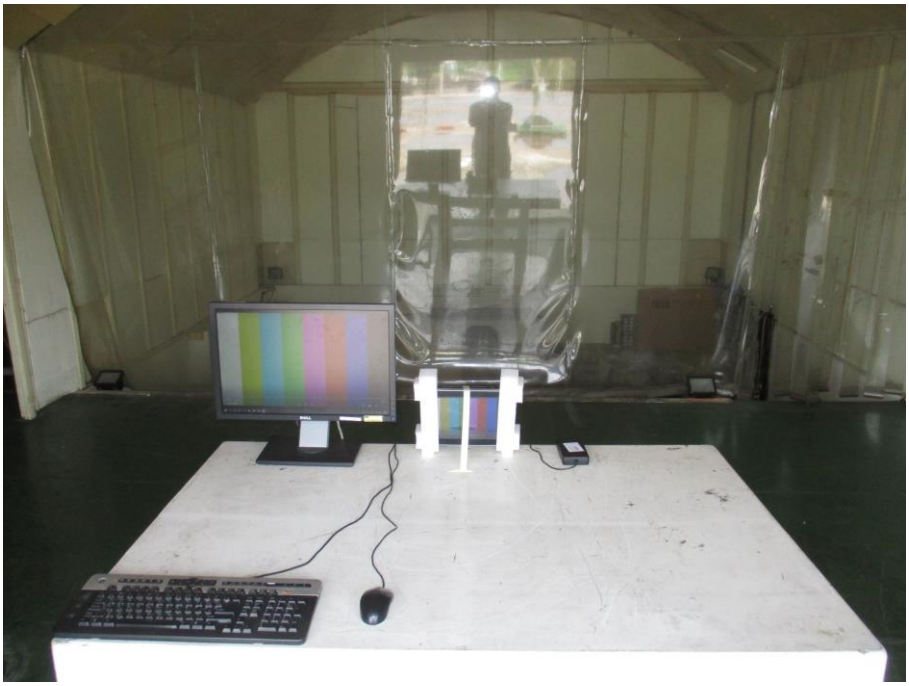
Appendix B2: Internal photo of EUT



Appendix C1: Conducted Emission Test Set-up



Appendix C2: Radiated Emission Test Set-up (Below 1 GHz)



Appendix C3: Radiated Emission Test Set-up (Above 1 GHz)