

## TEST REPORT

### FCC Rules Part 15.225

**Report Reference No.....: MTEB23050227**

**FCC ID..... : 2A397-HK568**

Compiled by  
( position+printed name+signature)..: File administrators Alisa Luo



Supervised by  
( position+printed name+signature)..: Test Engineer Sunny Deng



Approved by  
( position+printed name+signature)..: Manager Yvette Zhou



Date of issue.....: **June 19, 2023**

**Representative Laboratory Name .: Shenzhen Most Technology Service Co., Ltd.**

Address .....: No.5, 2nd Langshan Road, North District, Hi-tech Industrial Park,  
Nanshan, Shenzhen, Guangdong, China.

**Applicant's name.....: QINGDAO HISTONE INTELLIGENT COMMERCIAL SYSTEM CO., LTD.**

Address .....: Wisdom Valley, No.8 Shengshui Road, Laoshan District, Qingdao  
City, China

**Test specification/ Standard .....: FCC Rules Part 15.225**

TRF Originator.....: Shenzhen Most Technology Service Co., Ltd.

**Shenzhen Most Technology Service Co., Ltd. All rights reserved.**

This publication may be reproduced in whole or in part for non-commercial purposes as long as the Shenzhen Most Technology Service Co., Ltd. is acknowledged as copyright owner and source of the material. Shenzhen Most Technology Service Co., Ltd. takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

**Test item description .....: POS COMPUTER**

Trade Mark .....: Histone

Manufacturer .....: QINGDAO HISTONE INTELLIGENT COMMERCIAL SYSTEM  
CO., LTD.

Model/Type reference.....: HK568

Listed Models .....: HK568 J6412

Modulation Type.....: ASK

Operation Frequency.....: 13.56MHz

Hardware Version.....:	J6412
Software Version .....	MEHL0401
Rating .....	DC 24V by Adapter 24V <sub>DC</sub> , 2.5A, 60W (by Adapter 1: 100-240V <sub>AC</sub> , 50/60Hz, 2.0A(GM60-240250-F)) 24V <sub>DC</sub> , 2.5A, 60W (by Adapter 2: 100-240V <sub>AC</sub> , 50-60Hz, 1.8A(FSP060-DAAN3)) 24V <sub>DC</sub> , 5A, 120W (by Adapter 3: 100-240V <sub>AC</sub> , 50-60Hz, 1.8A(FSP120-AAAN3))
Result.....:	<b>PASS</b>

**TEST REPORT**

Equipment under Test : POS COMPUTER

Model /Type : HK568

Listed Models : HK568 J6412

Remark : All models are identical to each other, except model name.

Applicant : QINGDAO HISTONE INTELLIGENT COMMERCIAL SYSTEM CO., LTD.

Address : Wisdom Valley, No.8 Shengshui Road, Laoshan District, Qingdao City, China

Manufacturer : QINGDAO HISTONE INTELLIGENT COMMERCIAL SYSTEM CO., LTD.

Address : Wisdom Valley, No.8 Shengshui Road, Laoshan District, Qingdao City, China

<b>Test Result:</b>	<b>PASS</b>
---------------------	-------------

The test report merely corresponds to the test sample.  
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

## Contents

<b><u>1.</u></b>	<b><u>REVISION HISTORY .....</u></b>	<b><u>5</u></b>
<b><u>2.</u></b>	<b><u>TEST STANDARDS .....</u></b>	<b><u>6</u></b>
<b><u>3.</u></b>	<b><u>SUMMARY .....</u></b>	<b><u>7</u></b>
3.1.	General Remarks	7
3.2.	Product Description	7
3.3.	Equipment Under Test	7
3.4.	Short description of the Equipment under Test (EUT)	8
3.5.	EUT operation mode	8
3.6.	Block Diagram of Test Setup	8
3.7.	Test Item (Equipment Under Test) Description*	8
3.8.	Auxiliary Equipment (AE) Description	8
3.9	Antenna Information*	8
3.10.	EUT configuration	9
3.11.	Modifications	9
<b><u>4.</u></b>	<b><u>TEST ENVIRONMENT .....</u></b>	<b><u>10</u></b>
4.1.	Address of the test laboratory	10
4.2.	Environmental conditions	10
4.3.	Test Description	11
4.4.	Statement of the measurement uncertainty	11
4.5.	Equipments Used during the Test	12
<b><u>7.</u></b>	<b><u>TEST CONDITIONS AND RESULTS .....</u></b>	<b><u>13</u></b>
7.1.	AC Power Conducted Emission .....	13
7.2.	Radiated Emission.....	20
7.3.	20dB Bandwidth .....	31
7.4.	FREQUENCY TOLERANCE .....	32
<b><u>8.</u></b>	<b><u>TEST SETUP PHOTOS OF THE EUT .....</u></b>	<b><u>33</u></b>
<b><u>9.</u></b>	<b><u>EXTERNAL AND INTERNAL PHOTOS OF THE EUT .....</u></b>	<b><u>37</u></b>

## 1. Revision History

Revision	Issue Date	Revisions	Revised By
00	2023-05-19	Initial Issue	Alisa Luo

## **2 . TEST STANDARDS**

The tests were performed according to following standards:

The tests were performed according to following standards:

**FCC Rules Part 15.225:** Operation within the band 13.110-14.010 MHz.

**ANSI C63.10:2013 :** American National Standard for Testing Unlicensed Wireless Devices

**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 40GHz  
Range of 9 kHz to 40GHz

### 3. SUMMARY

#### 3.1. General Remarks

Date of receipt of test sample	:	2022.04.26
Testing commenced on	:	2022.04.27
Testing concluded on	:	2022.05.08

#### 3.2. Product Description

Product Name:	POS COMPUTER
Model/Type reference:	HK568
Power Supply:	DC 24V by Adapter 24V $\Rightarrow$ ,2.5A,60W (by Adapter 1: 100-240V~,50/60Hz,2.0A(GM60-240250-F)) 24V $\Rightarrow$ ,2.5A,60W (by Adapter 2: 100-240V~,50-60Hz,1.8A(FSP060-DAAN3)) 24V $\Rightarrow$ ,5A,120W (by Adapter 3: 100-240V~, 50-60Hz,1.8A(FSP120-AAAN3))
Testing sample ID:	MTYP03182-3184
Modulation:	ASK
Operation frequency:	13.56MHZ
Channel number:	1 (declared by the client)

#### 3.3. Equipment Under Test

##### Power supply system utilised

Power supply voltage	:	<input type="radio"/> 230V / 50 Hz	<input type="radio"/> 120V / 60Hz
		<input type="radio"/> 12 V DC	<input type="radio"/> 24 V DC
		<input checked="" type="radio"/> Other (specified in blank below)	

DC 24V by Adapter  
24V $\Rightarrow$ ,2.5A,60W  
(by Adapter 1: 100-240V~,50/60Hz,2.0A(GM60-240250-F))  
24V $\Rightarrow$ ,2.5A,60W  
(by Adapter 2: 100-240V~,50-60Hz,1.8A(FSP060-DAAN3))  
24V $\Rightarrow$ ,5A,120W  
(by Adapter 3: 100-240V~, 50-60Hz,1.8A(FSP120-AAAN3))

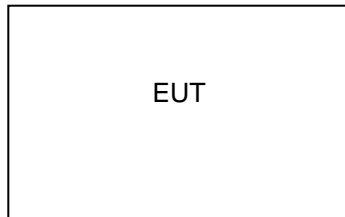
### 3.4. Short description of the Equipment under Test (EUT)

This is a POS COMPUTER For more details, refer to the user's manual of the EUT.

### 3.5. EUT operation mode

Channel	Freq.(MHz)	Note(Modulation Type)
1	13.56MHz	ASK

### 3.6. Block Diagram of Test Setup



### 3.7. Test Item (Equipment Under Test) Description\*

Short designation	EUT Name	EUT Description	Serial number	Hardware status	Software status
EUT A	POS COMPUTER	HK568(second display: 15.6 inch)	/	J6412	MEHL0401
EUT B	POS COMPUTER	HK568(second display: 10.1 inch)	/	J6412	MEHL0401
EUT C	POS COMPUTER	HK568(second display: VFD)	/	J6412	MEHL0401

\*: declared by the applicant. According to customers information EUTs A and B are the same devices. Only the secondary screen size is different

### 3.8. Auxiliary Equipment (AE) Description

AE short designation	EUT Name (if available)	EUT Description	Serial number (if available)	Software (if used)
AE 1	/	/	/	/
AE 2	-	/	/	/

### 3.9 Antenna Information\*

Short designation	Antenna Name	Antenna Type	Frequency Range	Serial number	Antenna Peak Gain
Antenna 1	---	/	/	---	/
Antenna 2	/	/	/	/	/

\*: declared by the applicant.



### 3.10. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - Supplied by the lab

●	ADAPTER	M/N:	FSP120-AAAN3(Adapter 3)
		Manufacturer:	FSP Group Inc.
●	ADAPTER	M/N:	FSP060-DAAN3(Adapter 2)
		Manufacturer:	FSP Group Inc.
●	ADAPTER	M/N:	GM60-240250-F(Adapter 1)
		Manufacturer:	FOSHAN SHUNDE GUANYUDA POWER SUPPLY CO.,LTD

### 3.11. Modifications

No modifications were implemented to meet testing criteria.

## 4. TEST ENVIRONMENT

### 4.1. Address of the test laboratory

#### **Shenzhen Most Technology Service Co., Ltd.**

No.5, 2nd Langshan Road, North District, Hi-tech Industrial Park, Nanshan, Shenzhen, Guangdong, China.  
The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.4:2014 and CISPR 16-1-4:2010 SVSWR requirement for radiated emission above 1GHz.

#### **Test Facility**

The test facility is recognized, certified, or accredited by the following organizations:

#### **FCC-Registration No.: 0031192610**

Shenzhen Most Technology Service Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

#### **A2LA-Lab Cert. No.: 6343.01**

Shenzhen Most Technology Service Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

### 4.2. Environmental conditions

Radiated Emission:

Temperature:	23 ° C
Humidity:	48 %
Atmospheric pressure:	950-1050mbar

Conducted testing:

Temperature:	24 ° C
Humidity:	45 %
Atmospheric pressure:	950-1050mbar

### 4.3. Test Description

FCC and IC Requirements		
FCC Part 15.203	Antenna Requirement	PASS
FCC Part 15.207	AC Power Conducted Emission	PASS
FCC Part 15.209&15.205 (a) &15.225(a,b,c,d)	Spurious Emissions	PASS
FCC Part 15.215 (c) &15.225	20dB Occupied Bandwidth	PASS
FCC Part 15.225(e)	Frequency Tolerance	PASS

Remark:

1. The measurement uncertainty is not included in the test result.
2. NA = Not Applicable; NP = Not Performed

### 4.4. Statement of the measurement uncertainty

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

Hereafter the best measurement capability for Shenzhen Most Technology Service Co., Ltd. is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.10 dB	(1)
Radiated Emission	1~18GHz	4.32 dB	(1)
Radiated Emission	18-40GHz	5.54 dB	(1)
Conducted Disturbance	0.15~30MHz	3.12 dB	(1)

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

#### 4.5. Equipments Used during the Test

5.

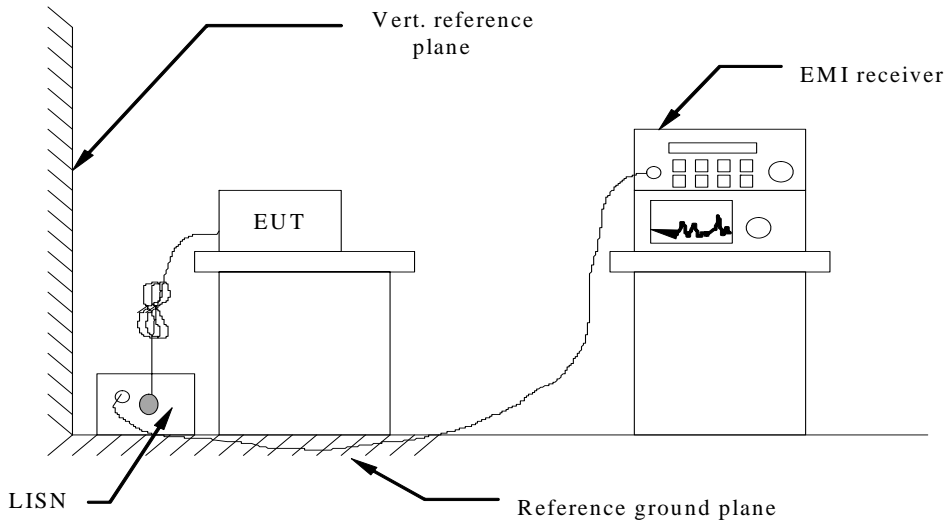
Item	Equipment	Manufacturer	Model No.	Serial No.	Firmware versions	Last Cal.	Cal. Interval
1.	L.I.S.N.	R&S	ENV216	100093	/	2023/03/17	1 Year
2	Three-phase artificial power network	Schwarzback Mess	NNLK8129	8129178	/	2023/03/17	1 Year
3.	Receiver	R&S	ESCI	100492	V3.0-10-2	2023/03/17	1 Year
4	Receiver	R&S	ESPI	101202	V3.0-10-2	2023/03/17	1 Year
5	Spectrum analyzer	Agilent	9020A	MT-E306	A14.16	2023/03/17	1 Year
6	Bilong Antenna	Sunol Sciences	JB3	A121206	/	2023/03/17	1 Year
7	Horn antenna	HF Antenna	HF Antenna	MT-E158	/	2023/03/17	1 Year
8	Loop antenna	Beijing Daze	ZN30900B	/	/	2023/03/17	1 Year
9	Horn antenna	R&S	OBH100400	26999002	/	2023/03/17	1 Year
10	Wireless Communication Test Set	R&S	CMW500	/	CMW-BASE-3.7.21	2023/03/17	1 Year
11	Spectrum analyzer	R&S	FSP	100019	V4.40 SP2	2023/03/17	1 Year
12	High gain antenna	Schwarzbeck	LB-180400KF	MT-E389	/	2023/03/17	1 Year
13	Preamplifier	Schwarzbeck	BBV 9743	MT-E390	/	2023/03/17	1 Year
14	Pre-amplifier	EMCI	EMC051845S E	MT-E391	/	2023/03/17	1 Year
15	Pre-amplifier	Agilent	83051A	MT-E392	/	2023/03/17	1 Year
16	High pass filter unit	Tonscend	JS0806-F	MT-E393	/	2023/03/17	1 Year
17	RF Cable(below1GHz)	Times	9kHz-1GHz	MT-E394	/	2023/03/17	1 Year
18	RF Cable(above 1GHz)	Times	1-40G	MT-E395	/	2023/03/17	1 Year
19	RF Cable (9KHz-40GHz)	Tonscend	170660	N/A	/	2023/03/17	1 Year

6. Note: The Cal.Interval was one year.

## 7. TEST CONDITIONS AND RESULTS

### 7.1. AC Power Conducted Emission

#### TEST CONFIGURATION



#### TEST PROCEDURE

- 1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2013.
- 2 Support equipment, if needed, was placed as per ANSI C63.10-2013
- 3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2013
- 4 The EUT received DC5V power, the adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5 All support equipments received AC power from a second LISN, if any.
- 6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
- 8 During the above scans, the emissions were maximized by cable manipulation.

#### AC Power Conducted Emission Limit

For unintentional device, according to RSS Gen 8.8 and § 15.207(a) Line Conducted Emission Limits is as following:

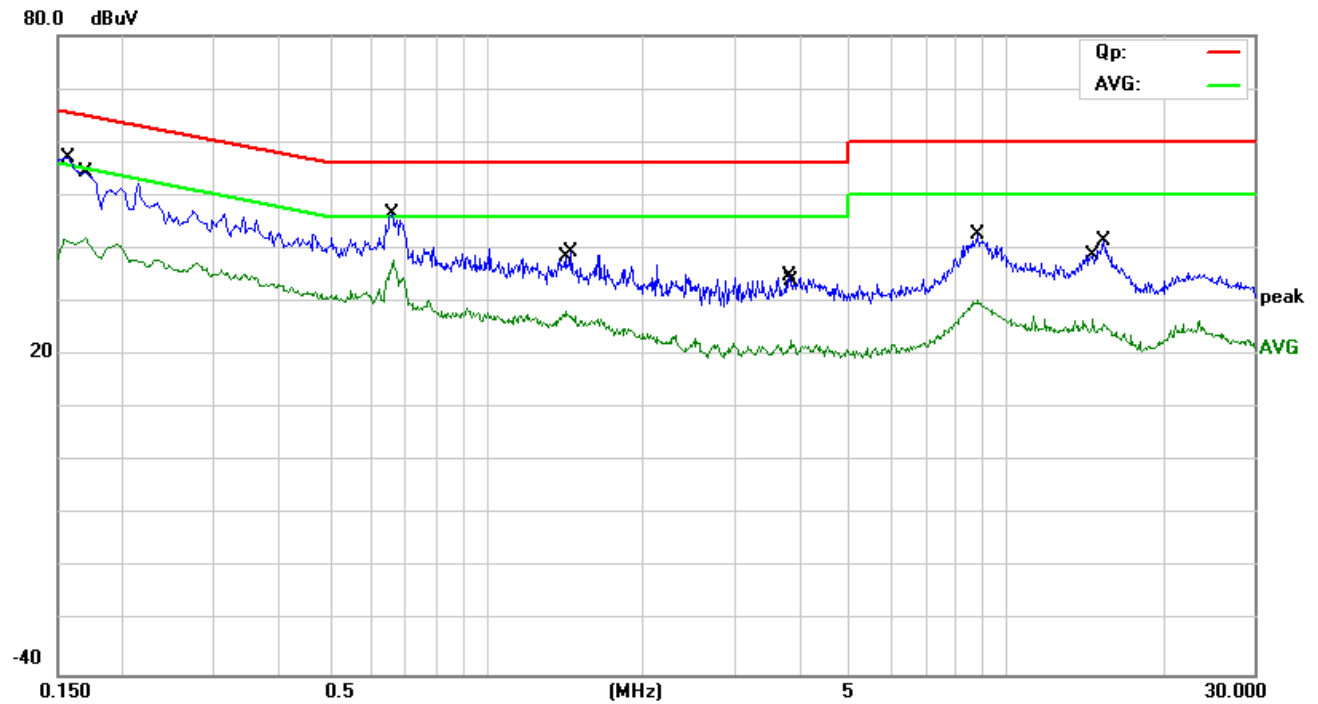
Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	79	66
5MHz ~ 30MHz	73	60

#### TEST RESULTS

Pass

Note : All test modes are performed, only the worst case is recorded in this report.

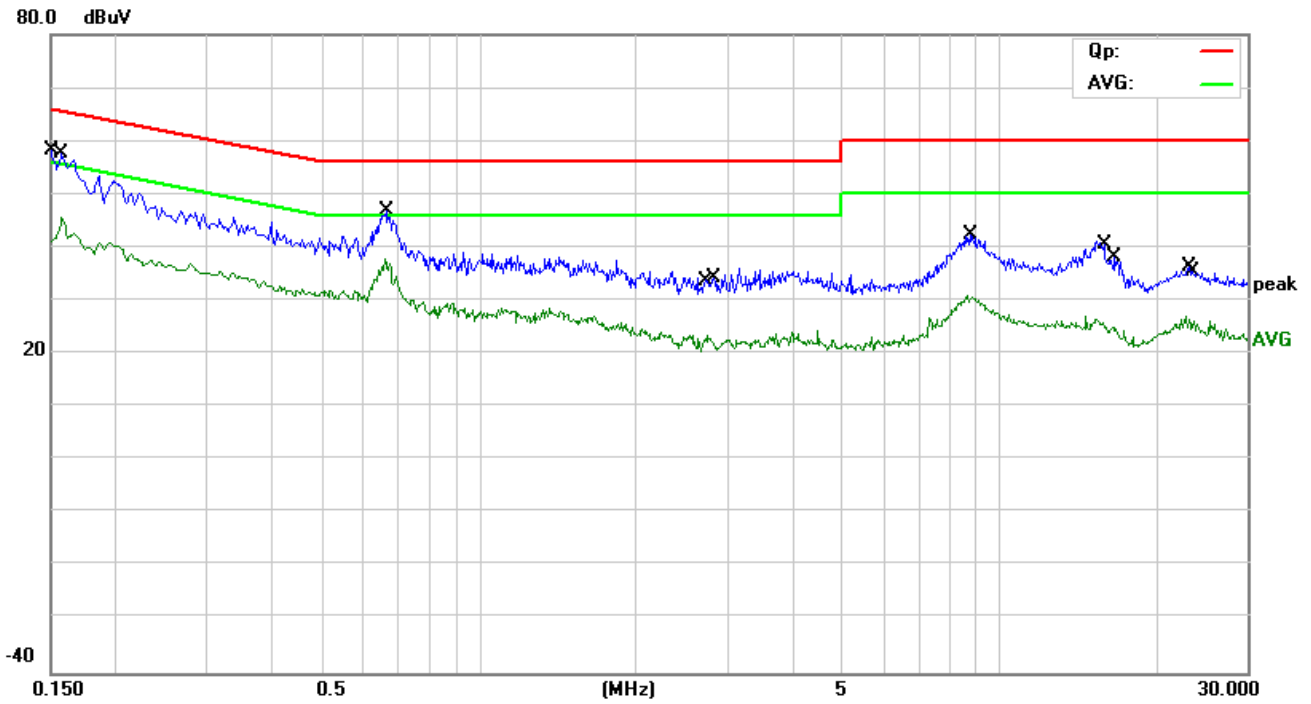
Power Supply	DC 24V by Adapter(Adapter 1)	Line	N
M/N:	HK568(second display: 15.6 inch)		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.1580	47.48	9.60	57.08	65.57	-8.49	QP	
2		0.1700	32.35	9.61	41.96	54.96	-13.00	AVG	
3		0.6580	36.93	9.60	46.53	56.00	-9.47	QP	
4	*	0.6620	28.31	9.60	37.91	46.00	-8.09	AVG	
5		1.4220	18.53	9.60	28.13	46.00	-17.87	AVG	
6		1.4620	29.63	9.60	39.23	56.00	-16.77	QP	
7		3.8300	25.22	9.62	34.84	56.00	-21.16	QP	
8		3.8660	13.09	9.62	22.71	46.00	-23.29	AVG	
9		8.6700	20.35	9.67	30.02	50.00	-19.98	AVG	
10		8.7940	32.85	9.67	42.52	60.00	-17.48	QP	
11		14.7460	16.98	9.70	26.68	50.00	-23.32	AVG	
12		15.4020	31.83	9.70	41.53	60.00	-18.47	QP	

\*:Maximum data    x:Over limit    !:over margin

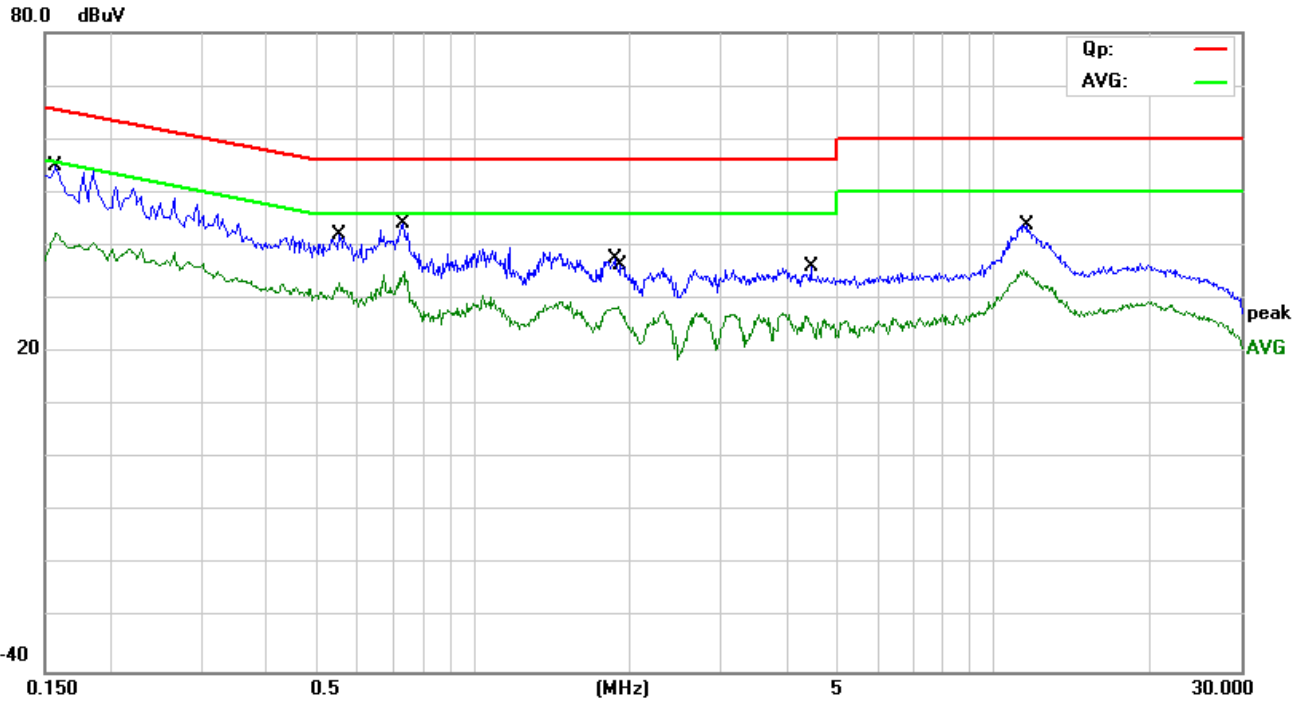
Power Supply	DC 24V by Adapter(Adapter 1)	Line	L
M/N:	HK568(second display: 15.6 inch)		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1500	48.52	9.60	58.12	66.00	-7.88	QP	
2		0.1580	36.05	9.60	45.65	55.57	-9.92	AVG	
3		0.6580	28.19	9.60	37.79	46.00	-8.21	AVG	
4		0.6620	37.34	9.60	46.94	56.00	-9.06	QP	
5		2.7580	13.92	9.61	23.53	46.00	-22.47	AVG	
6		2.8300	24.72	9.61	34.33	56.00	-21.67	QP	
7		8.7100	21.22	9.67	30.89	50.00	-19.11	AVG	
8		8.7780	32.66	9.67	42.33	60.00	-17.67	QP	
9		15.9460	30.98	9.71	40.69	60.00	-19.31	QP	
10		16.5260	15.25	9.71	24.96	50.00	-25.04	AVG	
11		23.1700	26.58	9.74	36.32	60.00	-23.68	QP	
12		23.6660	16.34	9.74	26.08	50.00	-23.92	AVG	

\*:Maximum data x:Over limit !:over margin

Power Supply	DC 24V by Adapter(Adapter 1)	Line	L
M/N:	HK568(second display: 10.1 inch)		

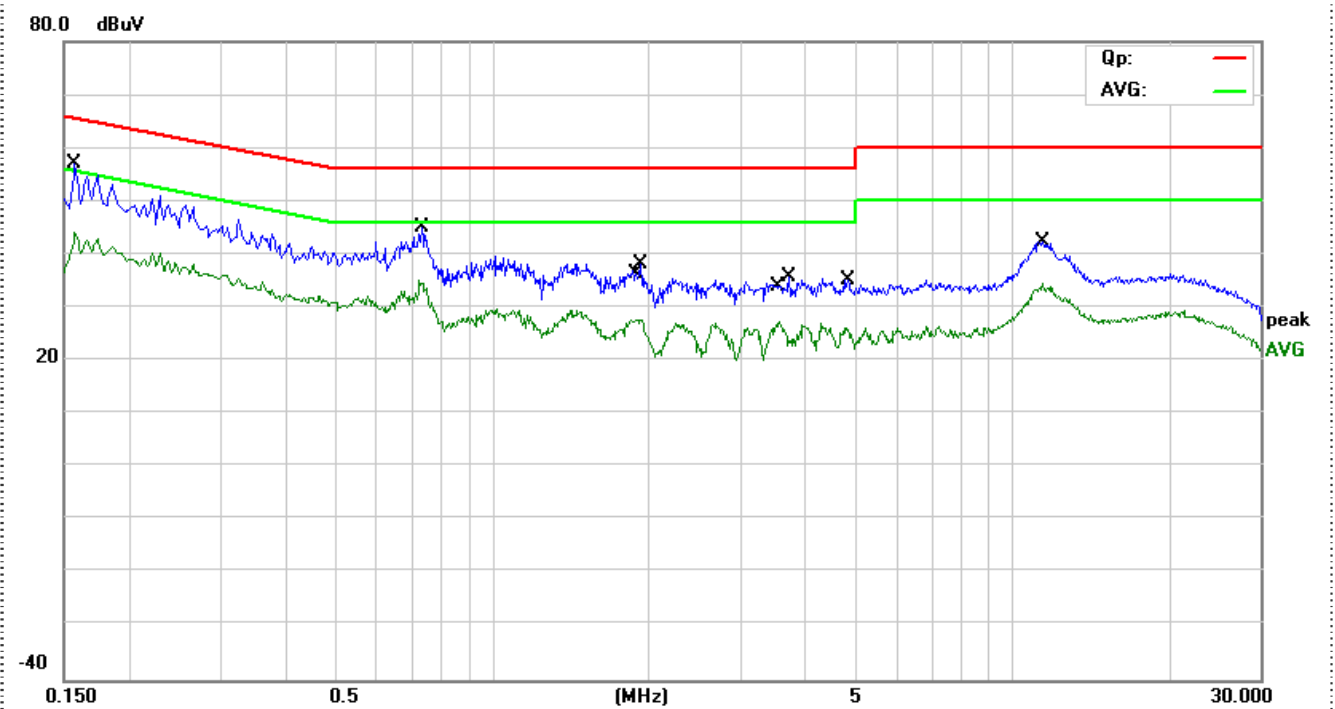


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1580	45.39	9.60	54.99	65.57	-10.58	QP	
2		0.1582	32.75	9.60	42.35	55.56	-13.21	AVG	
3		0.5540	32.36	9.59	41.95	56.00	-14.05	QP	
4		0.5540	23.32	9.59	32.91	46.00	-13.09	AVG	
5		0.7340	34.63	9.60	44.23	56.00	-11.77	QP	
6		0.7380	25.41	9.60	35.01	46.00	-10.99	AVG	
7		1.8700	27.90	9.60	37.50	56.00	-18.50	QP	
8		1.9060	18.85	9.60	28.45	46.00	-17.55	AVG	
9		4.3860	17.06	9.62	26.68	46.00	-19.32	AVG	
10		4.4580	26.29	9.62	35.91	56.00	-20.09	QP	
11		11.4740	25.63	9.69	35.32	50.00	-14.68	AVG	
12		11.6500	34.24	9.69	43.93	60.00	-16.07	QP	

\*:Maximum data    x:Over limit    !:over margin



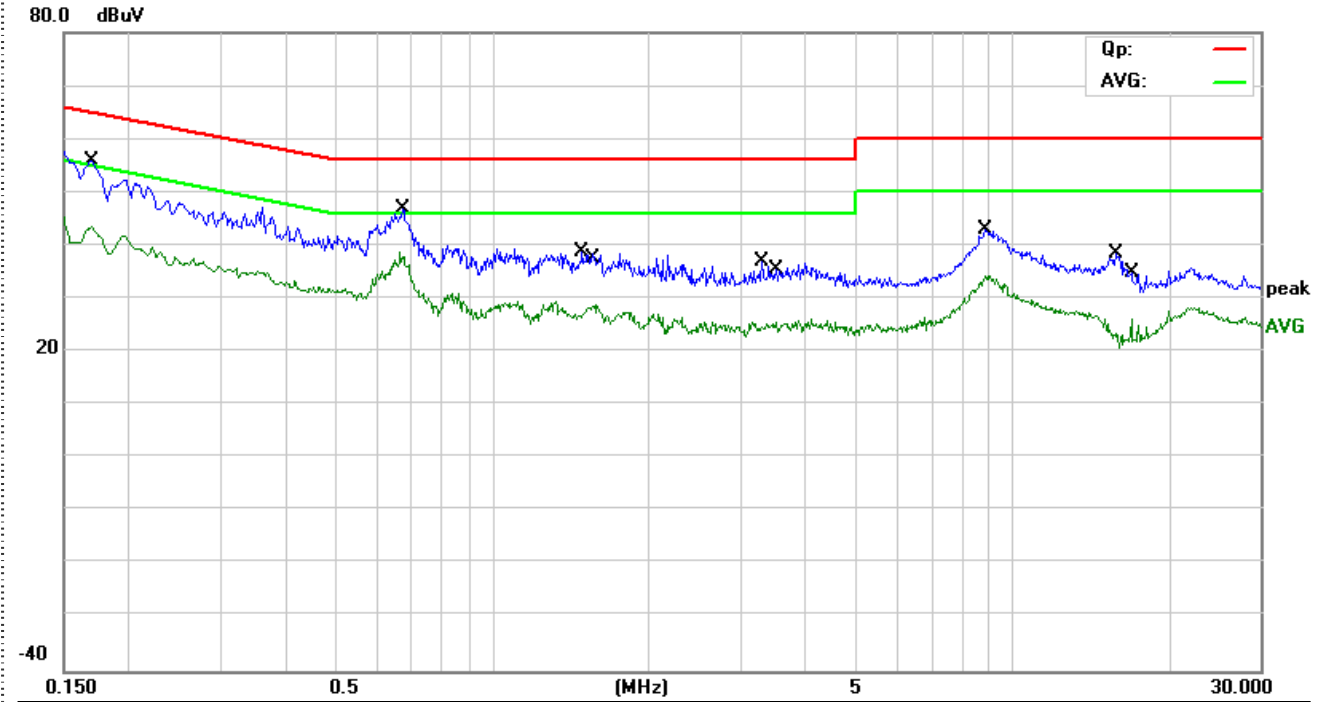
Power Supply	DC 24V by Adapter(Adapter 1)	Line	N
M/N:	HK568(second display: 10.1 inch)		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1580	47.53	9.60	57.13	65.57	-8.44	QP	
2		0.1580	34.45	9.60	44.05	55.57	-11.52	AVG	
3		0.7260	25.68	9.60	35.28	46.00	-10.72	AVG	
4		0.7340	35.34	9.60	44.94	56.00	-11.06	QP	
5		1.8940	18.18	9.60	27.78	46.00	-18.22	AVG	
6		1.9300	28.54	9.60	38.14	56.00	-17.86	QP	
7		3.5740	17.58	9.62	27.20	46.00	-18.80	AVG	
8		3.7260	26.17	9.62	35.79	56.00	-20.21	QP	
9		4.8100	16.55	9.63	26.18	46.00	-19.82	AVG	
10		4.8300	25.64	9.63	35.27	56.00	-20.73	QP	
11		11.4580	32.78	9.69	42.47	60.00	-17.53	QP	
12		11.4580	24.88	9.69	34.57	50.00	-15.43	AVG	

\*:Maximum data    x:Over limit    !:over margin

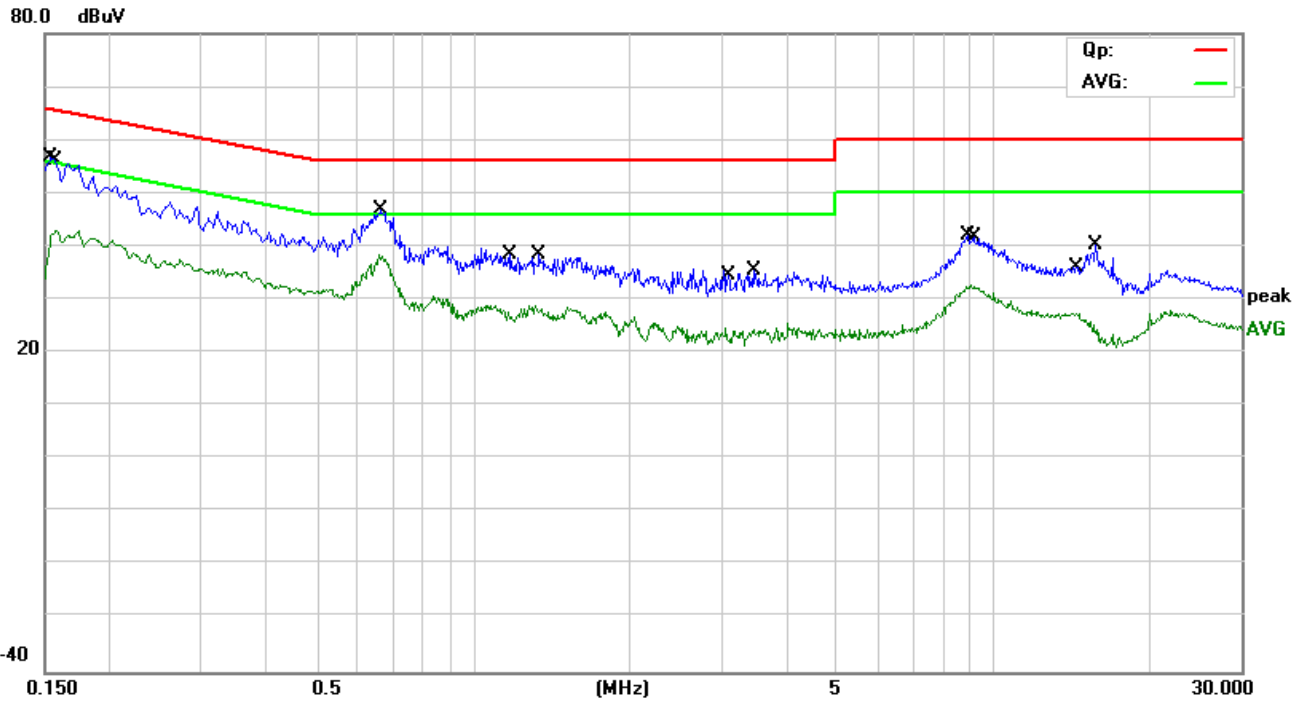
Power Supply	DC 24V by Adapter(Adapter 1)	Line	L
M/N:	HK568(second display: VFD)		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1700	46.35	9.61	55.96	64.96	-9.00	QP	
2		0.1700	33.80	9.61	43.41	54.96	-11.55	AVG	
3	*	0.6660	29.22	9.60	38.82	46.00	-7.18	AVG	
4		0.6740	37.27	9.60	46.87	56.00	-9.13	QP	
5		1.4940	29.03	9.60	38.63	56.00	-17.37	QP	
6		1.5820	19.28	9.60	28.88	46.00	-17.12	AVG	
7		3.3020	27.49	9.61	37.10	56.00	-18.90	QP	
8		3.5100	16.04	9.62	25.66	46.00	-20.34	AVG	
9		8.9140	33.16	9.68	42.84	60.00	-17.16	QP	
10		8.9140	24.57	9.68	34.25	50.00	-15.75	AVG	
11		15.8540	28.60	9.71	38.31	60.00	-21.69	QP	
12		16.9740	16.42	9.71	26.13	50.00	-23.87	AVG	

\*:Maximum data    x:Over limit    !:over margin

Power Supply	DC 24V by Adapter(Adapter 1)	Line	N
M/N:	HK568(second display: VFD)		



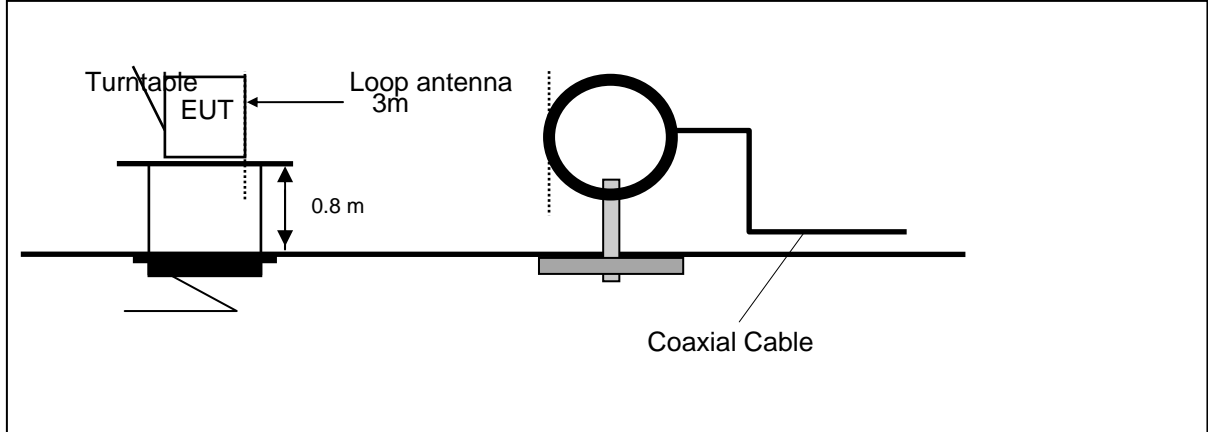
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1540	47.13	9.60	56.73	65.78	-9.05	QP	
2		0.1580	33.46	9.60	43.06	55.57	-12.51	AVG	
3	*	0.6580	28.80	9.60	38.40	46.00	-7.60	AVG	
4		0.6660	37.11	9.60	46.71	56.00	-9.29	QP	
5		1.1820	28.95	9.60	38.55	56.00	-17.45	QP	
6		1.3220	19.25	9.60	28.85	46.00	-17.15	AVG	
7		3.0580	14.93	9.61	24.54	46.00	-21.46	AVG	
8		3.4580	25.81	9.61	35.42	56.00	-20.58	QP	
9		8.9220	32.36	9.68	42.04	60.00	-17.96	QP	
10		9.0940	22.98	9.68	32.66	50.00	-17.34	AVG	
11		14.6060	17.59	9.70	27.29	50.00	-22.71	AVG	
12		15.7540	30.64	9.70	40.34	60.00	-19.66	QP	

\*:Maximum data    x:Over limit    !:over margin

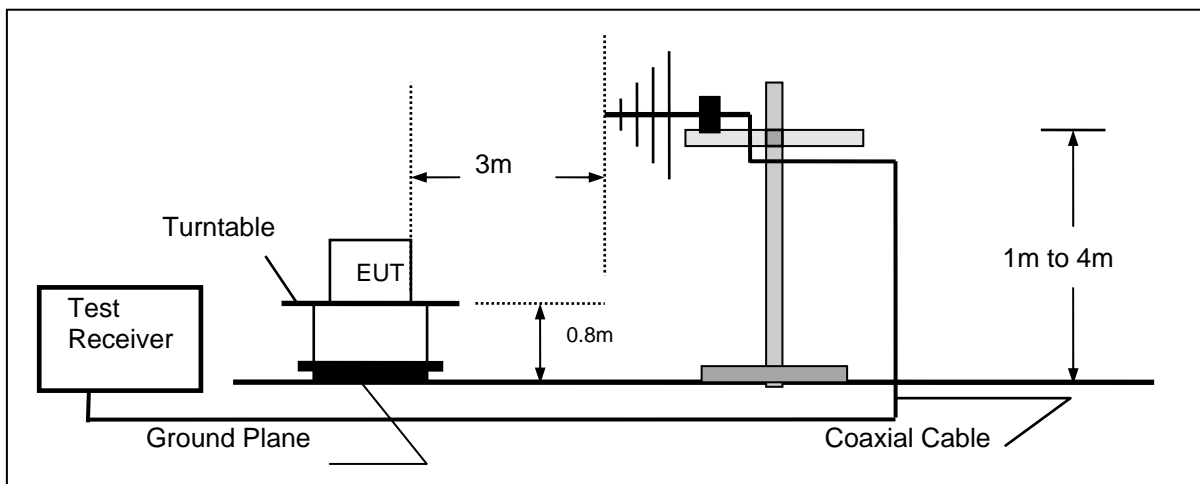
## 7.2. Radiated Emission

### TEST CONFIGURATION

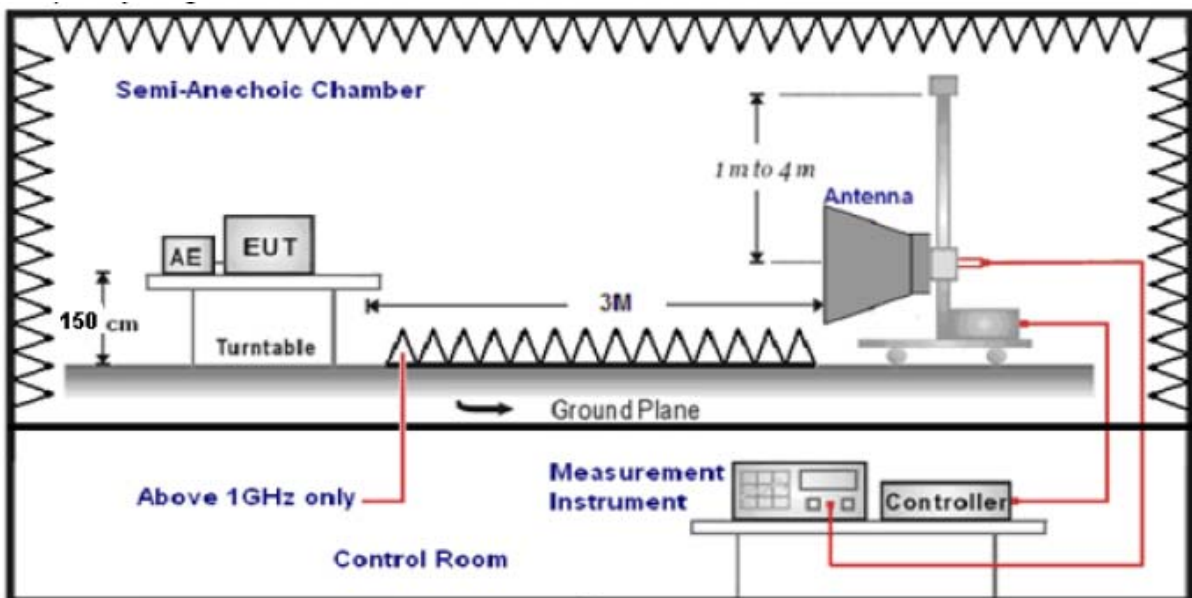
Frequency range 9 KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



**TEST PROCEDURE**

1. The EUT was placed on a turn table which is 0.8m above ground plane when testing frequency range 9 KHz –1GHz;the EUT was placed on a turn table which is 1.5m above ground plane when testing frequency range 1GHz – 25GHz.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. The EUT minimum operation frequency was 32.768KHz and maximum operation frequency was 2480MHz.so radiated emission test frequency band from 9KHz to 25GHz.
6. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Ultra-Broadband Antenna	3
1GHz-18GHz	Double Ridged Horn Antenna	3
18GHz-25GHz	Horn Antenna	1

7. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz, Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz, Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz, Sweep time=Auto	QP
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

**Field Strength Calculation**

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

$$Transd=AF +CL-AG$$

**RADIATION LIMIT**

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission out of authorized band shall not exceed the following table at a 3 meters measurement distance.

In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Except when the requirements applicable to a given device state otherwise, emissions from licence-exempt transmitters shall comply with the field strength limits shown in table below. Additionally, the level of any transmitter emission shall not exceed the level of the transmitter’s fundamental emission

Unwanted emissions that fall into restricted bands shall comply with the limits specified in RSS-Gen; and Unwanted emissions that do not fall within the restricted frequency bands shall comply either with the limits specified in the applicable RSS or with those specified in this RSS-Gen.

Frequency (MHz)	Distance (Meters)	Radiated (dB $\mu$ V/m)	Radiated ( $\mu$ V/m)
0.009-0.49	3	$20\log(2400/F(\text{KHz}))+40\log(300/3)$	2400/F(KHz)
0.49-1.705	3	$20\log(24000/F(\text{KHz}))+40\log(30/3)$	24000/F(KHz)
1.705-30	3	$20\log(30)+40\log(30/3)$	30
30-88	3	49.0	100
88-216	3	53.5	150
216-960	3	56.0	200
Above 960	3	64.0	500

**According to FCC Part 15.205,Rastricted bands**

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)
13.36-13.41			

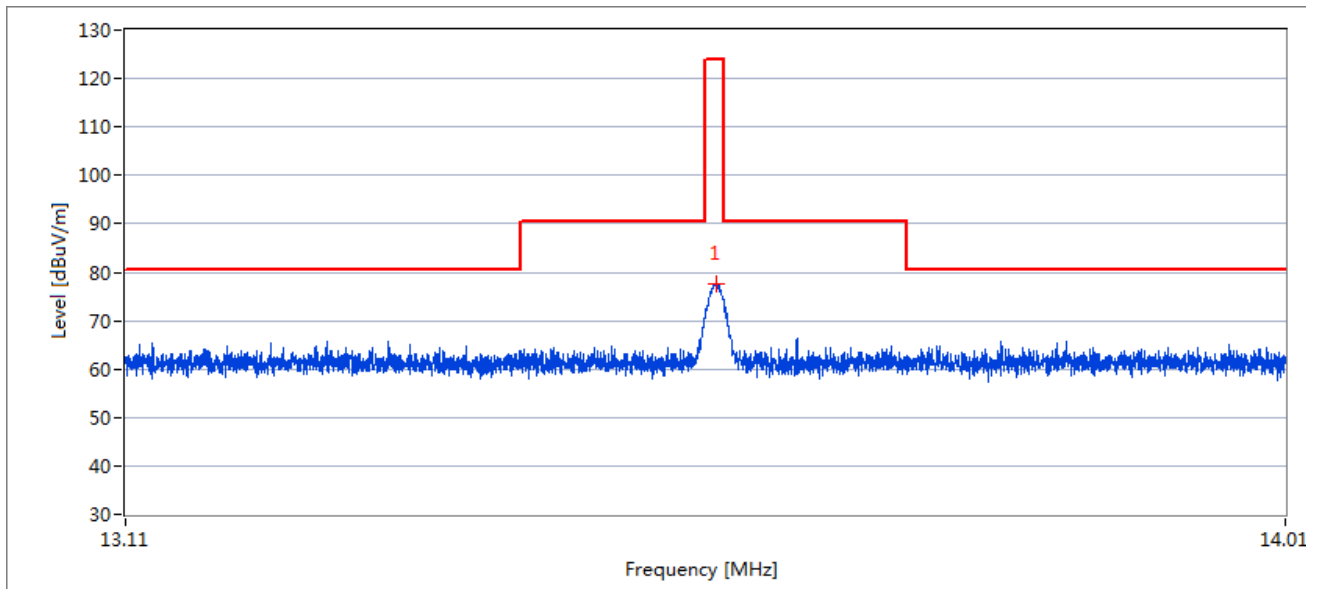
**LIMITS OF RADIATED EMISSION MEASUREMENT ( FCC 15.225)**

- (a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters, equal to 124dBuV/m at 3 meters.
- (b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters, equal to 90.5dBuV/m at 3 meters.
- (c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters, equal to 80.5dBuV/m at 3 meters..
- (d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

**TEST RESULTS (BELOW 30MHz)**

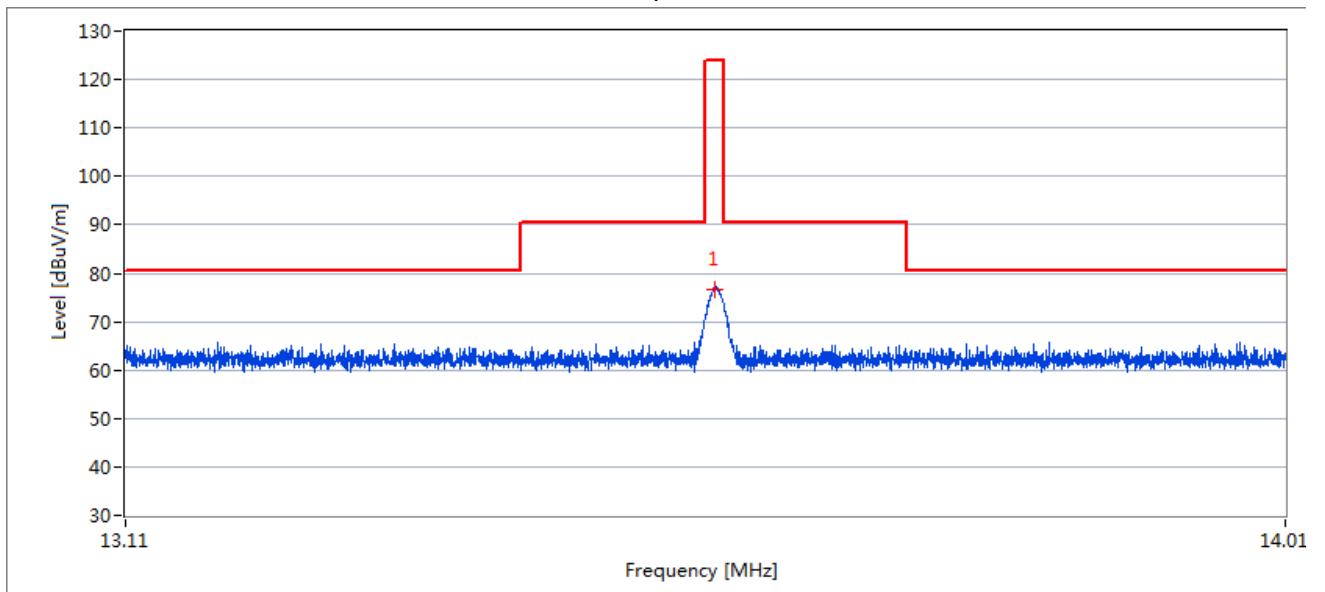
- 1: This test was performed with EUT in X, Y, Z position and the worse case was found when EUT in X position.
- 2: Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9 KHz to 30MHz and not recorded in this report.

**X**

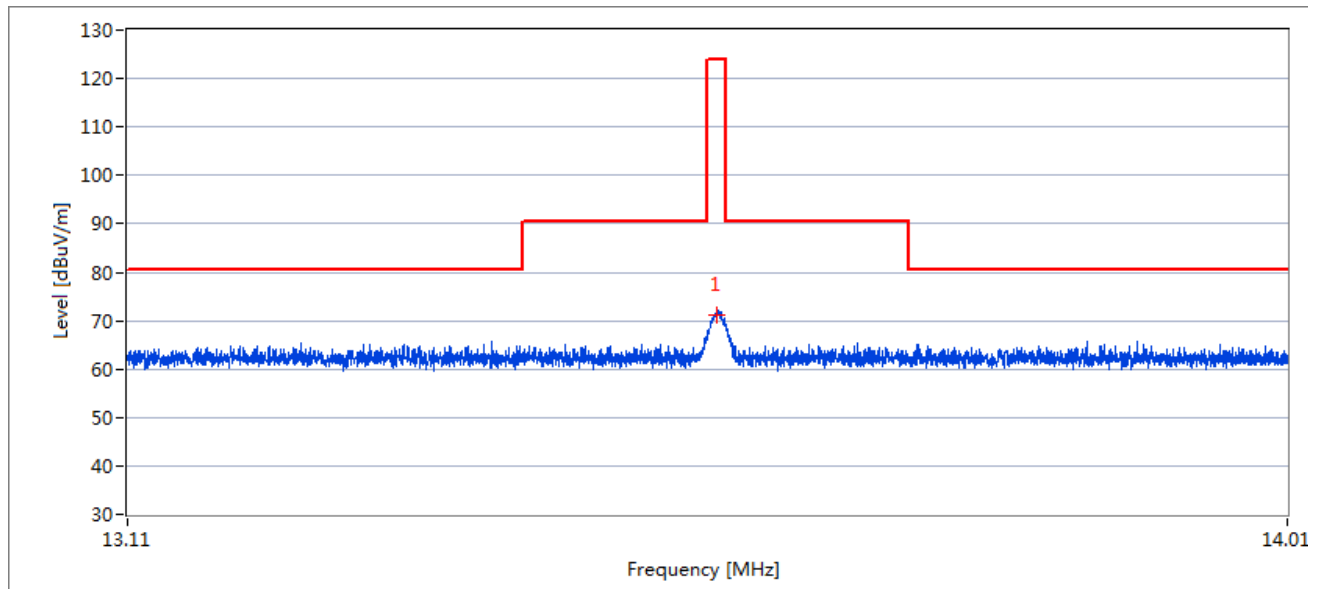


Frequency	Pre-scan Level MaxPeak	Final Test Level MaxPeak	Limit MaxPeak	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
13.56	78.8	78.8	124.0	45.8

Y



Frequency	Pre-scan Level MaxPeak	Final Test Level MaxPeak	Limit MaxPeak	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
13.56	76.4	76.4	124.0	46.5



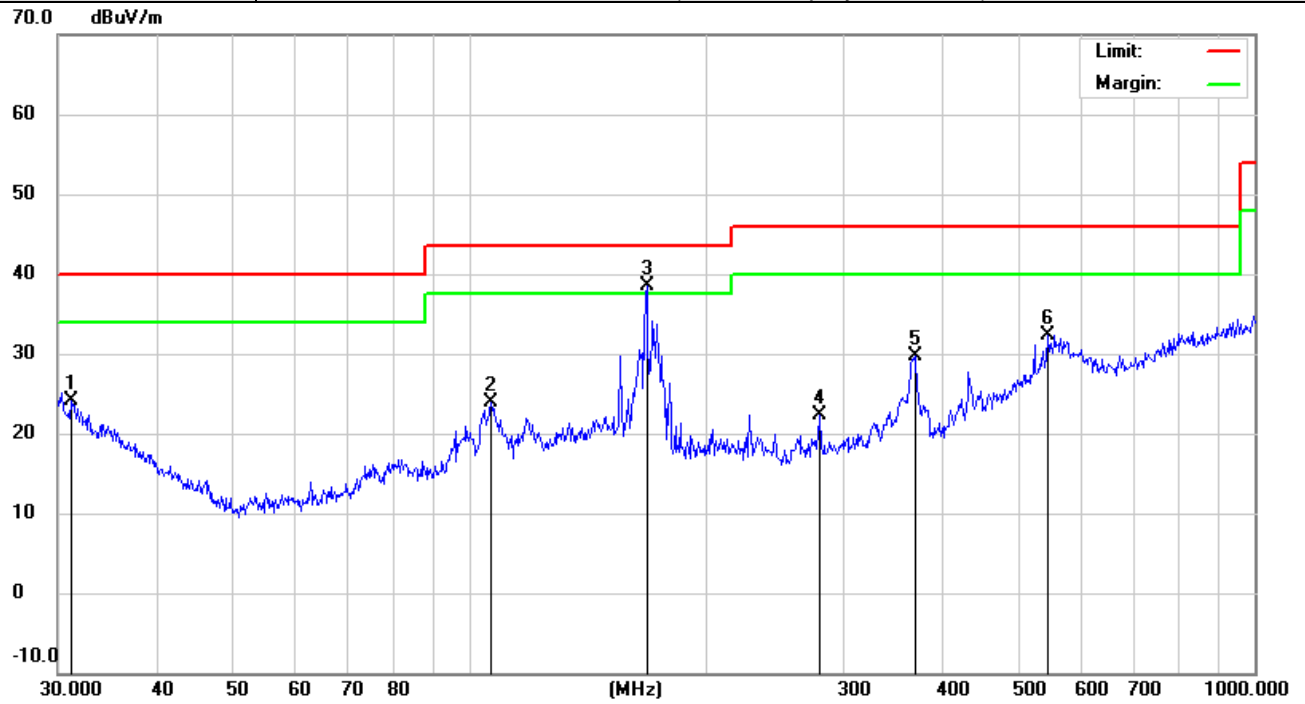
Frequency	Pre-scan Level MaxPeak	Final Test Level MaxPeak	Limit MaxPeak	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
13.56	73.8	73.8	124.0	51.5



For 30MHz-1GHz

Note : All test modes are performed, only the worst case is recorded in this report.

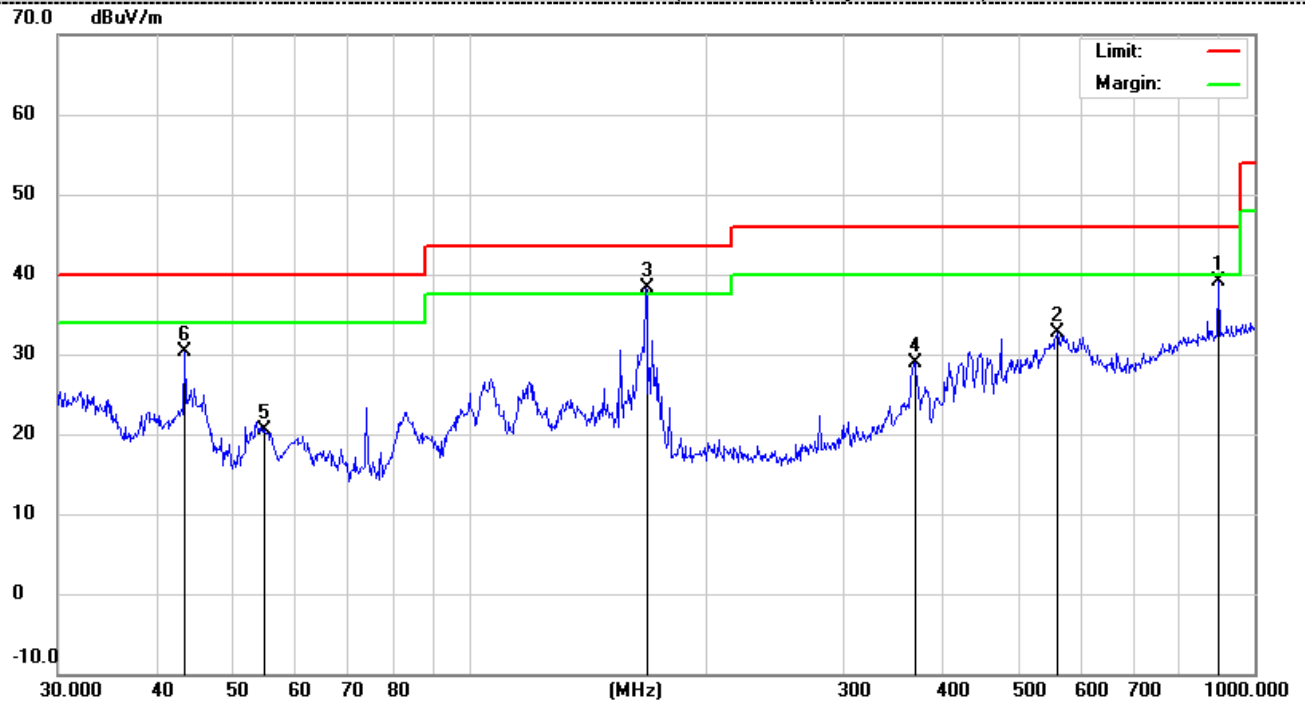
Power Supply	DC 24V by Adapter(Adapter 1)	Polarization	Horizontal
M/N:	HK568(second display: 15.6 inch)		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		31.1797	3.98	20.10	24.08	40.00	-15.92	200	198	
2		106.7587	9.48	14.34	23.82	43.50	-19.68	200	87	
3	*	168.4137	21.41	17.02	38.43	43.50	-5.07	200	301	
4		280.0237	7.41	14.82	22.23	46.00	-23.77	200	298	
5		369.4047	12.80	16.82	29.62	46.00	-16.38	200	210	
6		545.1825	9.11	23.20	32.31	46.00	-13.69	200	154	

\*:Maximum data    x:Over limit    !:over margin

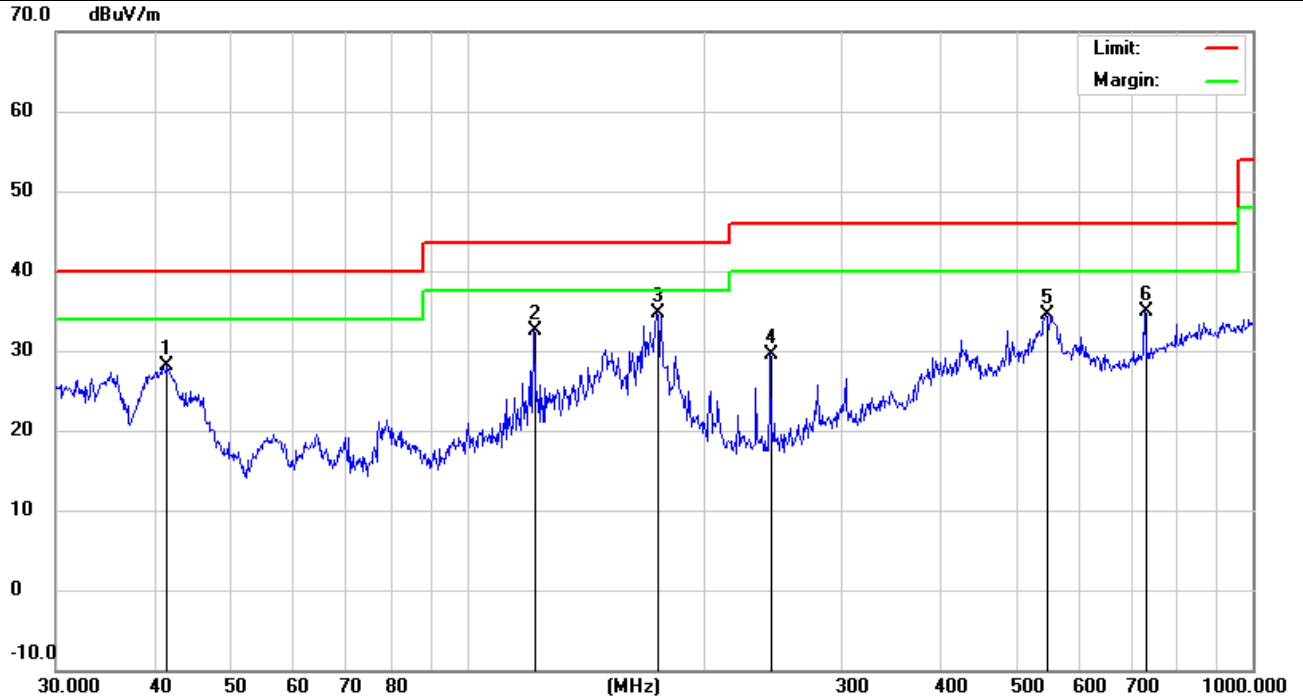
Power Supply DC 24V by Adapter(Adapter 1) Polarization Vertical  
 M/N: HK568(second display: 15.6 inch)



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree	Comment
1		900.1474	10.04	29.00	39.04	46.00	-6.96	QP	100	251	
2		560.6928	9.37	23.37	32.74	46.00	-13.26	QP	100	221	
3	*	167.8243	21.23	17.04	38.27	43.50	-5.23	QP	100	205	
4		369.4047	12.13	16.82	28.95	46.00	-17.05	QP	100	168	
5		54.8348	12.14	8.34	20.48	40.00	-19.52	QP	100	321	
6		43.5057	18.84	11.49	30.33	40.00	-9.67	QP	100	119	

\*:Maximum data    x:Over limit    !:over margin

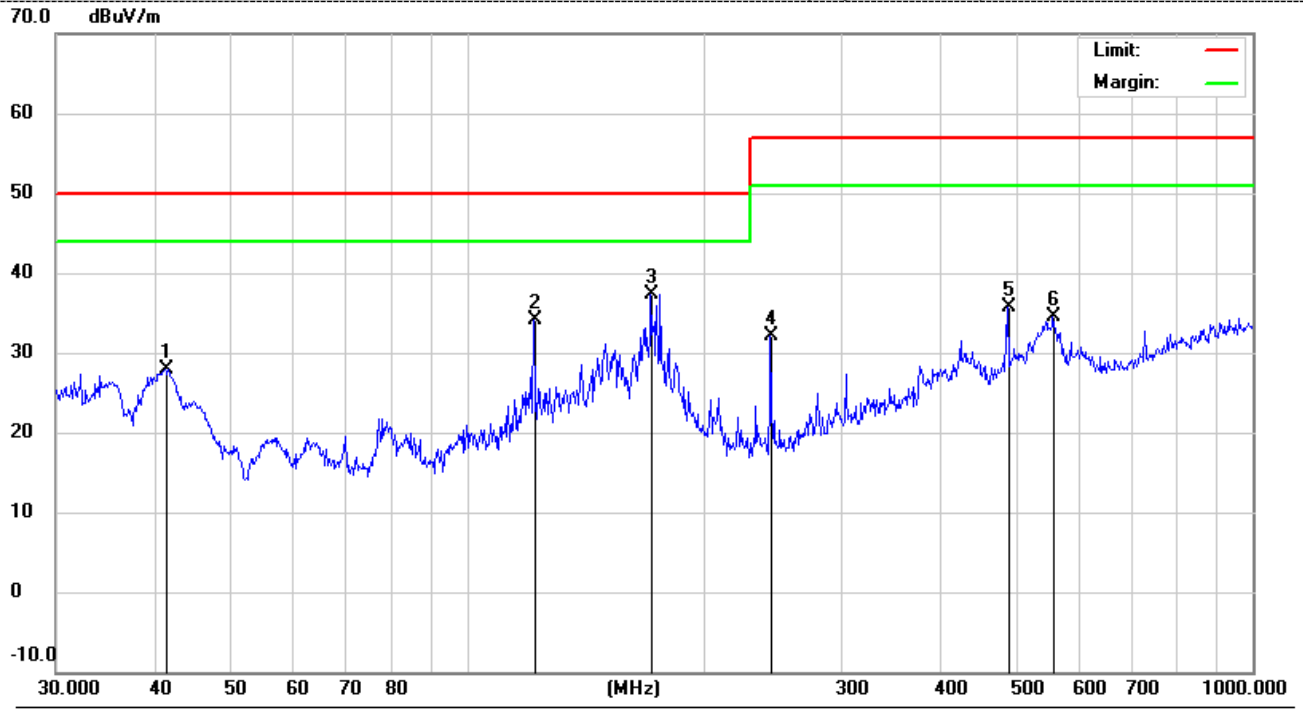
Power Supply	DC 24V by Adapter(Adapter 1)	Polarization	Horizontal
M/N:	HK568(second display: 10.1 inch)		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		41.5670	15.33	12.77	28.10	40.00	-11.90	QP	100	198
2		121.5486	16.55	15.86	32.41	43.50	-11.09	QP	100	114
3	*	174.4241	17.86	16.82	34.68	43.50	-8.82	QP	100	187
4		243.3772	15.45	13.99	29.44	46.00	-16.56	QP	100	250
5		545.1826	11.39	23.20	34.59	46.00	-11.41	QP	100	214
6		729.3583	8.96	25.92	34.88	46.00	-11.12	QP	100	264

\*:Maximum data    x:Over limit    !:over margin

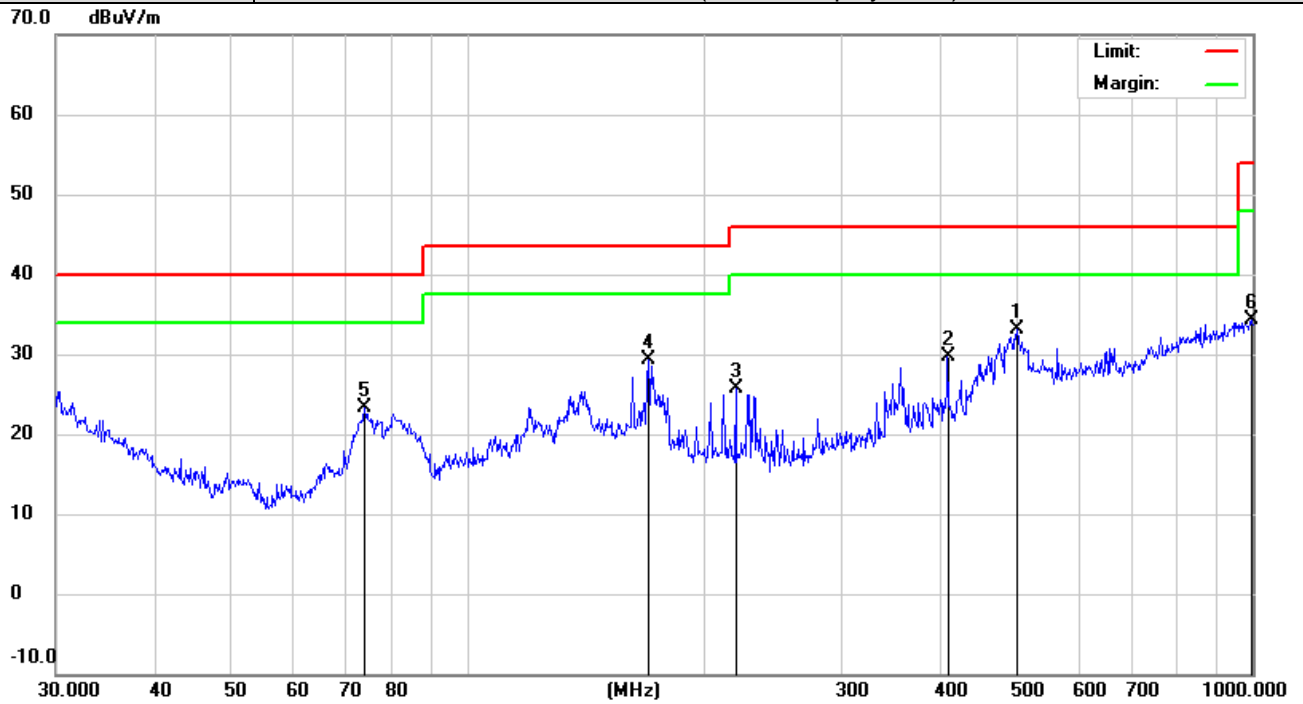
Power Supply DC 24V by Adapter(Adapter 1) Polarization Vertical  
 M/N: HK568(second display: 10.1 inch)



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree	Comment
1		41.2765	14.97	12.96	27.93	50.00	-22.07			QP
2		121.5486	18.30	15.86	34.16	50.00	-15.84			QP
3	*	171.3926	20.41	16.92	37.33	50.00	-12.67			QP
4		243.3772	18.18	13.99	32.17	57.00	-24.83			QP
5		487.3151	13.59	22.03	35.62	57.00	-21.38			QP
6		556.7744	11.13	23.32	34.45	57.00	-22.55			QP

\*:Maximum data    x:Over limit    !:over margin

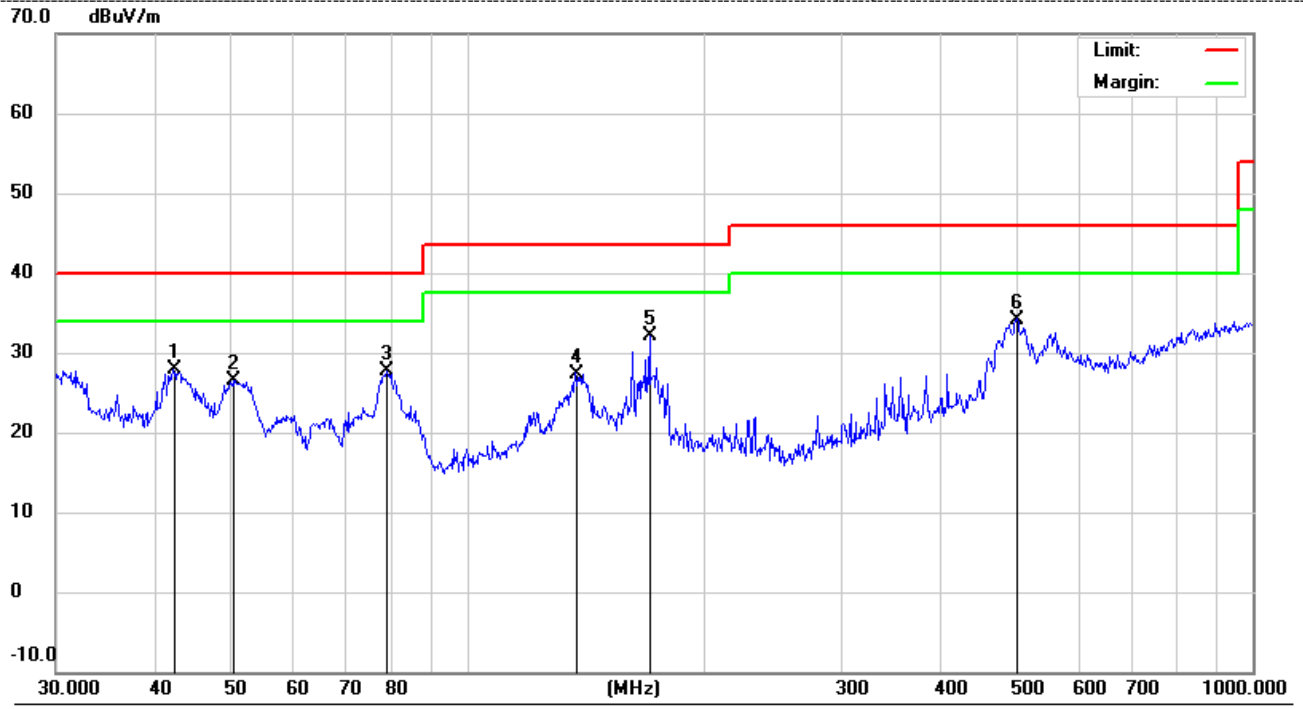
Power Supply	DC 24V by Adapter(Adapter 1)	Polarization	Horizontal
M/N:	HK568(second display: VFD)		



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	
1	*	501.1790	10.40	22.71	33.11	46.00	-12.89	QP	200	128
2		408.9459	11.86	17.87	29.73	46.00	-16.27	QP	200	146
3		219.8448	11.11	14.64	25.75	46.00	-20.25	QP	200	221
4		170.1947	12.26	16.96	29.22	43.50	-14.28	QP	200	268
5		74.1351	13.61	9.63	23.24	40.00	-16.76	QP	200	254
6		996.4995	4.42	29.96	34.38	54.00	-19.62	QP	200	203

\*:Maximum data    x:Over limit    !:over margin

Power Supply DC 24V by Adapter(Adapter 1) Polarization Vertical  
 M/N: HK568(second display: VFD)

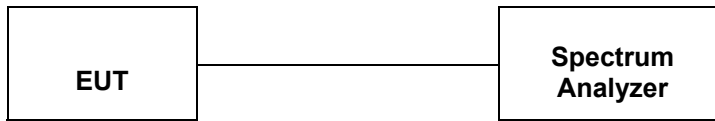


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree	Comment
1		42.3022	15.68	12.28	27.96	40.00	-12.04	QP	100	29	
2		50.4089	18.40	8.12	26.52	40.00	-13.48	QP	100	301	
3		79.2425	17.60	10.04	27.64	40.00	-12.36	QP	100	268	
4		137.4202	11.07	16.33	27.40	43.50	-16.10	QP	100	221	
5	*	170.7926	15.22	16.94	32.16	43.50	-11.34	QP	100	205	
6		501.1790	11.49	22.71	34.20	46.00	-11.80	QP	100	214	

\*:Maximum data    x:Over limit    !:over margin

**7.3. 20dB Bandwidth**

**TEST CONFIGURATION**



**TEST PROCEDURE**

The 20dB bandwidth and 99% bandwidth is measured with a spectrum analyzer connected via a receive antenna placed near the EUT while the EUT is operating in transmission mode.

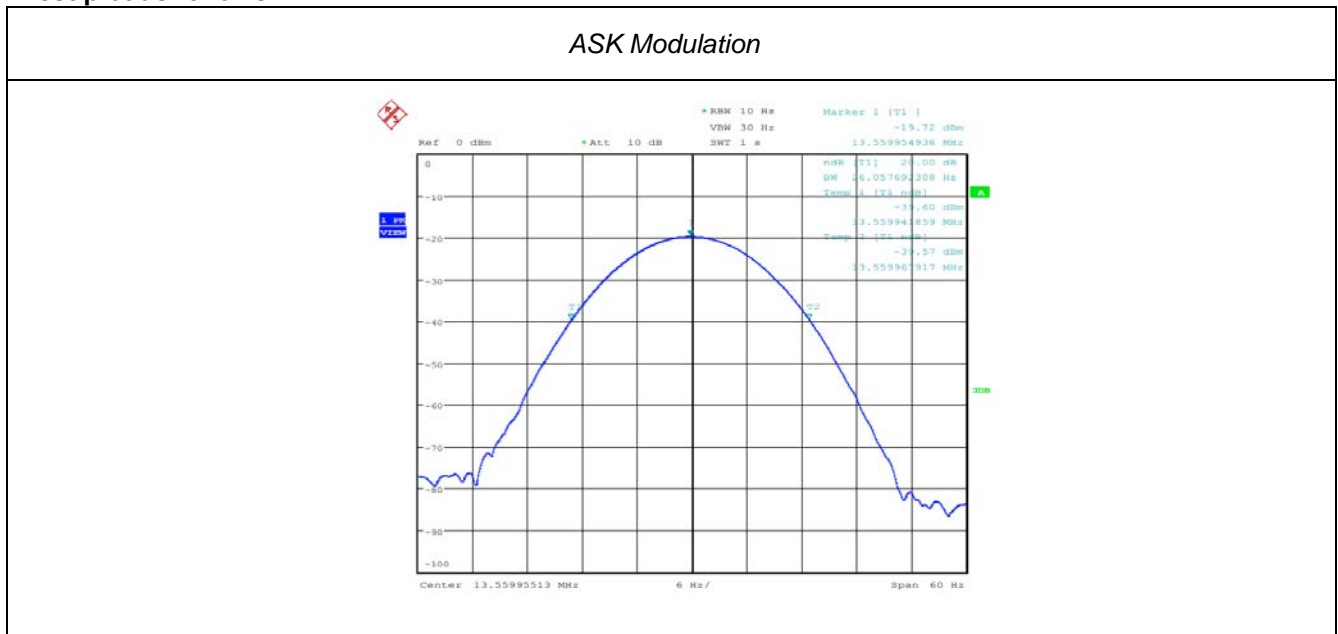
The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

The occupied bandwidth (OBW), that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission

**TEST RESULTS**

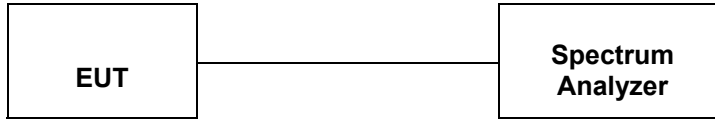
Modulation	Channel Frequency (MHz)	20dB bandwidth (KHz)	Result
ASK	13.56	0.0258	Pass

Test plot as follows:



## 7.4. FREQUENCY TOLERANCE

### TEST CONFIGURATION



### TEST PROCEDURE

The EUT was placed on a turn table which is 0.8m above ground plane.

Set EUT as normal operation

Set SPA Center Frequency = fundamental frequency, RBW, VBW= 10kHz, Span=100K

Set SPA Max hold. Mark peak.

### TEST RESULTS

Power Supply	Temperature(°C)	Measured Frequency (MHz)	Frequency Error (MHz)	Result(ppm)	Part 15.225 Limit
AC 240V	-20	13.56027	0.00027	1.99	+/- 0.01%(100ppm)
	20	13.56057	0.00057	4.20	+/- 0.01%(100ppm)
	50	13.56066	0.00066	4.86	+/- 0.01%(100ppm)
AC 120V	-20	13.56043	0.00043	3.17	+/- 0.01%(100ppm)
	20	13.56079	0.00079	5.82	+/- 0.01%(100ppm)
	50	13.56082	0.00082	6.04	+/- 0.01%(100ppm)
AC 100V	-20	13.56051	0.00051	3.76	+/- 0.01%(100ppm)
	20	13.56053	0.00053	3.90	+/- 0.01%(100ppm)
	50	13.56049	0.00049	3.61	+/- 0.01%(100ppm)



## 8. Test Setup Photos of the EUT

### Conducted Test Setup Photograph



HK568(second display: 15.6 inch)

### Conducted Test Setup Photograph



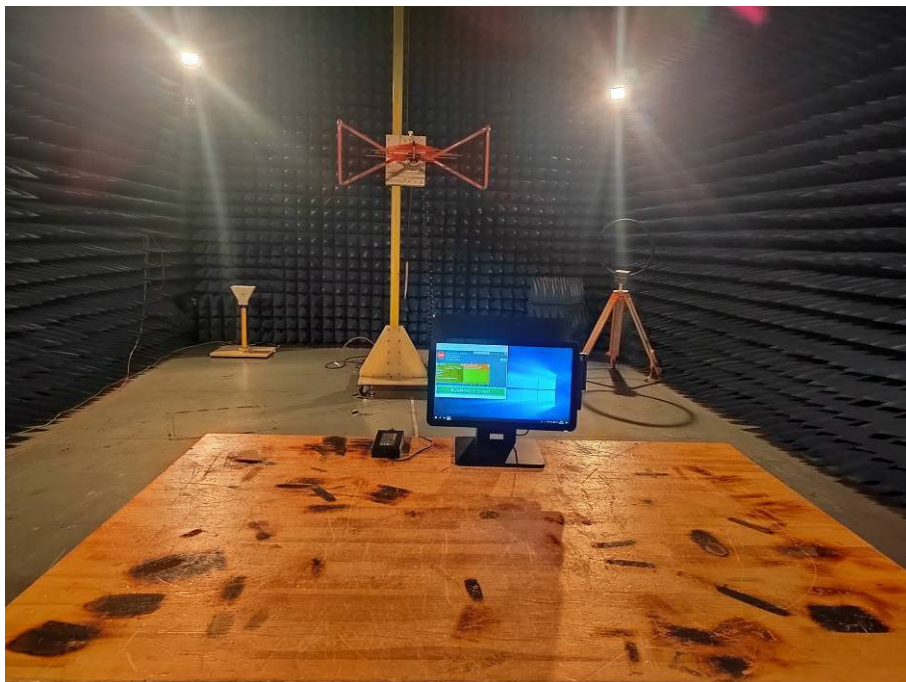
HK568(second display: 10.1 inch)

### Conducted Test Setup Photograph



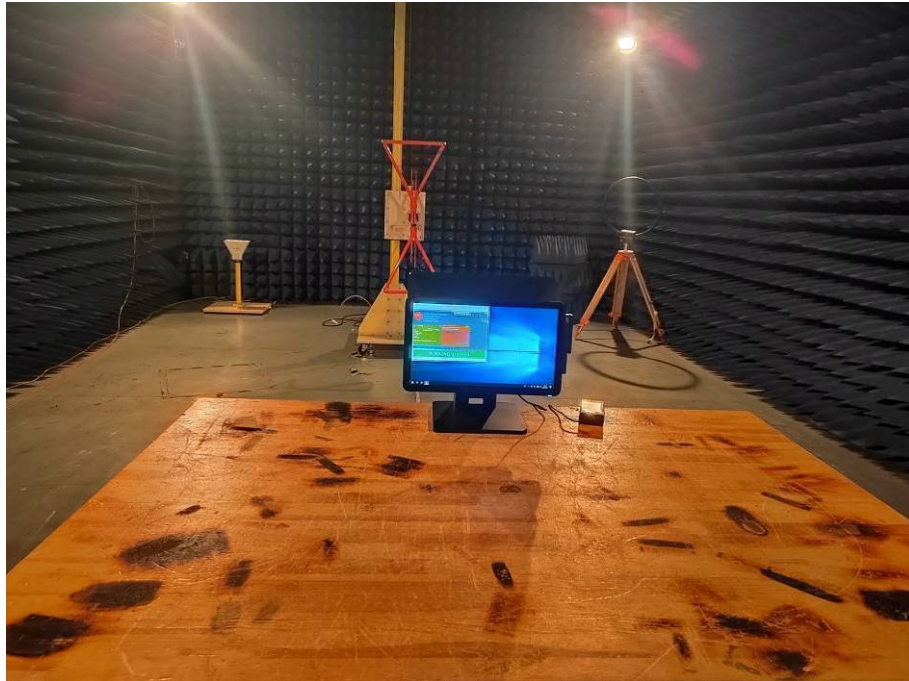
HK568(second display: VFD )

### Radiated Test Setup Photograph



HK568(second display: 15.6 inch)

### Radiated Test Setup Photograph



HK568(second display: 10.1 inch)

### Radiated Test Setup Photograph



HK568(second display: VFD )



## **9. External and Internal Photos of the EUT**

See related photo report.

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