

## TEST REPORT

### FCC Rules Part 15.225

**Report Reference No.....: MTEB23080212 -R**

**FCC ID..... : 2A397-HS520U**

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.....: **Aug.17,2023**

**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 .....: Self-Checkout Terminal**

Trade Mark .....: Histone

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

Model/Type reference.....: HS520U( The product appearance has different colors)

Listed Models .....: N/A

Modulation Type .....: ASK

Operation Frequency.....: 13.56MHz

Hardware Version.....: GM-11

Software Version .....: HSKBU206H

Rating .....: 100-120V~/200-240V~, 50/60Hz, 3A/1.7A

Result.....: PASS

**TEST REPORT**

Equipment under Test : Self-Checkout Terminal

Model /Type : HS520U

Listed Models : N/A

Remark : N/A

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>1.</b>	<b><u>REVISION HISTORY .....</u></b>	<b>4</b>
<b>2.</b>	<b><u>TEST STANDARDS .....</u></b>	<b>5</b>
<b>3.</b>	<b><u>SUMMARY .....</u></b>	<b>6</b>
3.1.	General Remarks	6
3.2.	Product Description	6
3.3.	Equipment Under Test	6
3.4.	Short description of the Equipment under Test (EUT)	6
3.5.	EUT operation mode	6
3.6.	Block Diagram of Test Setup	6
3.7.	Test Item (Equipment Under Test) Description*	7
3.8.	Auxiliary Equipment (AE) Description	7
3.9.	Antenna Information*	7
3.10.	EUT configuration	7
3.11.	Modifications	7
<b>4.</b>	<b><u>TEST ENVIRONMENT .....</u></b>	<b>8</b>
4.1.	Address of the test laboratory	8
4.2.	Environmental conditions	8
4.3.	Test Description	9
4.4.	Statement of the measurement uncertainty	9
4.5.	Equipments Used during the Test	10
<b>7.</b>	<b><u>TEST CONDITIONS AND RESULTS .....</u></b>	<b>11</b>
7.1.	AC Power Conducted Emission .....	11
7.2.	Radiated Emission .....	18
7.3.	20dB Bandwidth .....	29
7.4.	FREQUENCY TOLERANCE .....	30
<b>8.</b>	<b><u>TEST SETUP PHOTOS OF THE EUT .....</u></b>	<b>32</b>
	<b><u>EXTERNAL AND INTERNAL PHOTOS OF THE EUT .....</u></b>	<b>35</b>

## 1. Revision History

Revision	Issue Date	Revisions	Revised By
00	2023-08-17	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	:	2023.07.25
Testing commenced on	:	2023.07.26
Testing concluded on	:	2023.08.17

#### 3.2. Product Description

Product Name:	Self-Checkout Terminal
Model/Type reference:	HS520U
Power Supply:	100-120V~/200-240V~, 50/60Hz, 3A/1.7A
Testing sample ID:	MTYP02271-2273
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 checked="" type="radio"/> 120V / 60Hz
		<input type="radio"/> 12 V DC	<input type="radio"/> 24 V DC
		<input type="radio"/> Other (specified in blank below)	

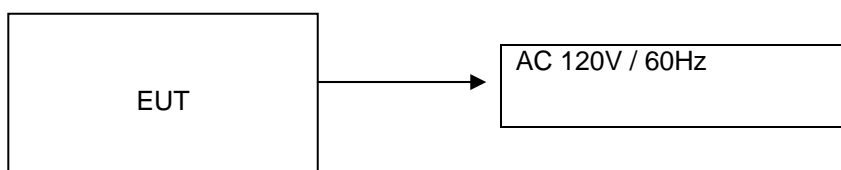
#### 3.4. Short description of the Equipment under Test (EUT)

This is a Self-Checkout Terminal 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	/	/	/	/	/
EUT B	/	/	/	/	/
EUT C	/	/	/	/	/

\*: 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

<input checked="" type="radio"/>	ADAPTER 1	M/N:	/
		Manufacturer:	/
<input checked="" type="radio"/>	ADAPTER 2	M/N:	/
		Manufacturer:	/
<input checked="" type="radio"/>	ADAPTER 3	M/N:	/
		Manufacturer:	/

### 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.

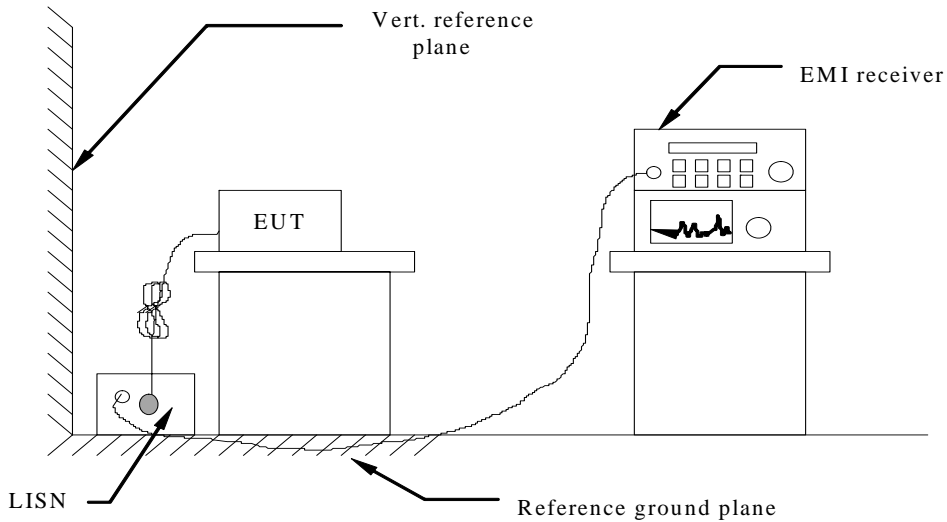
Item	Equipment	Manufacturer	Model No.	Serial No.	Firmware versions	Last Cal.	Cal. Interval
1.	L.I.S.N.	R&S	ENV216	100093	/	2023/03/17	1 Year
2	Three-phase artificial power network	Schwarzback Mess	NNLK8129	8129178	/	2023/03/17	1 Year
3.	Receiver	R&S	ESCI	100492	V3.0-10-2	2023/03/17	1 Year
4	Receiver	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.

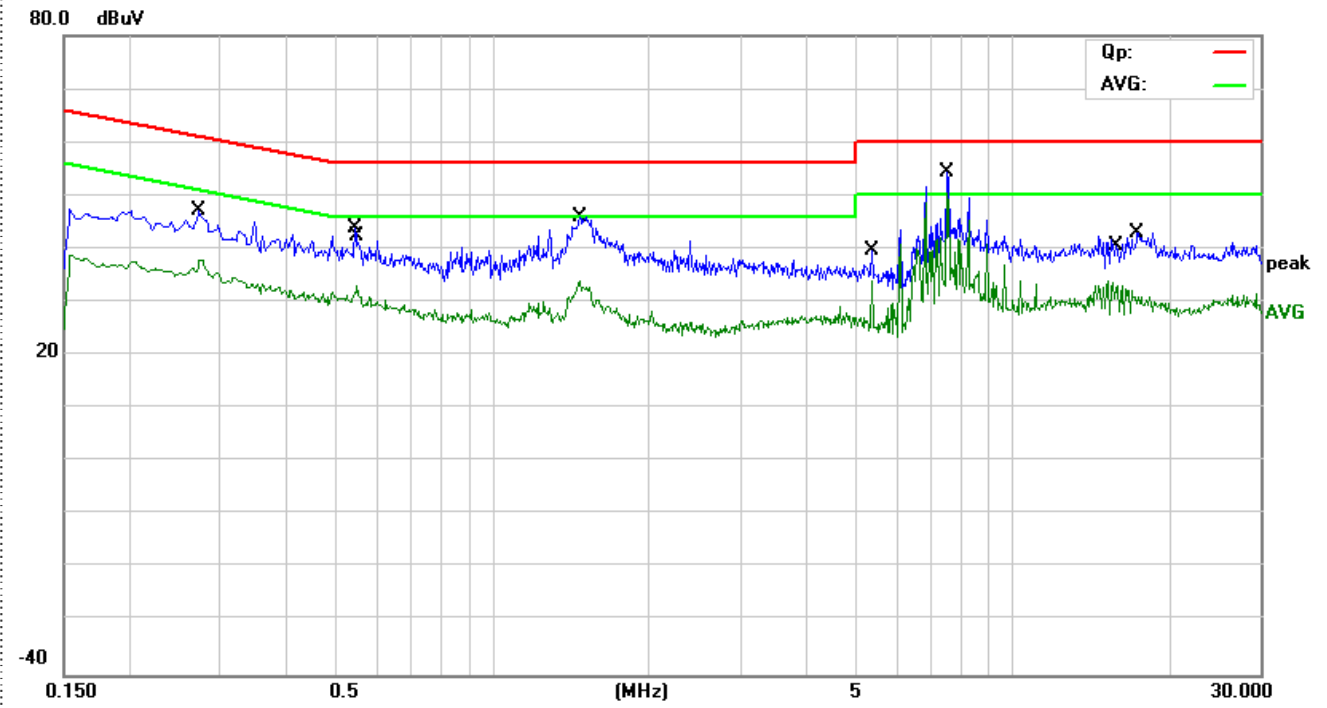
#### AC Power Conducted Emission Limit

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

Frequency (MHz)	Maximum RF Line Voltage	
	Quasi-Peak Level dB( $\mu$ V)	Average Level dB( $\mu$ V)
0.15 ~ 0.50	66 ~ 56*	56 ~ 46*
0.50 ~ 5.00	56	46
5.00 ~ 30.00	60	50

#### TEST RESULTS

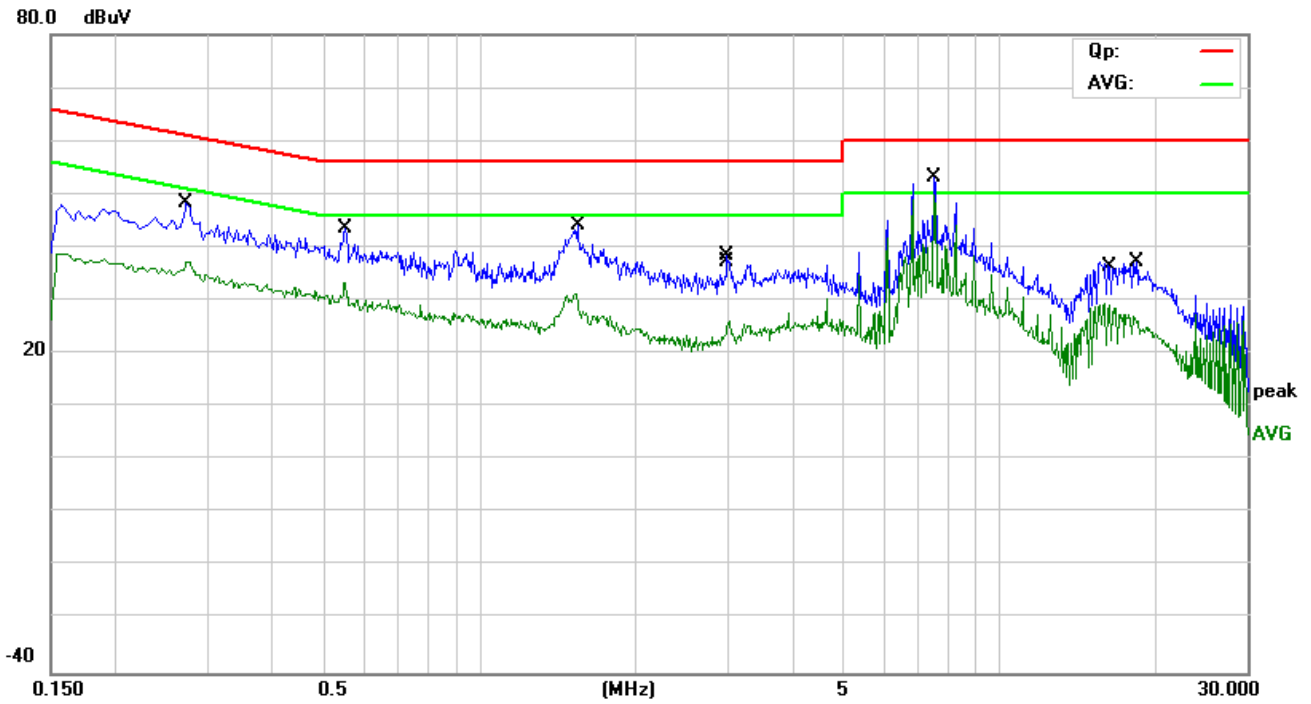
Power Supply	AC 120V / 60Hz	Line	L
M/N:		HS520U	



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.2740	37.41	9.60	47.01	61.00	-13.99	QP	
2		0.2740	28.29	9.60	37.89	51.00	-13.11	AVG	
3		0.5460	34.33	9.59	43.92	56.00	-12.08	QP	
4		0.5500	23.34	9.59	32.93	46.00	-13.07	AVG	
5		1.4740	36.47	9.60	46.07	56.00	-9.93	QP	
6		1.4740	24.29	9.60	33.89	46.00	-12.11	AVG	
7		5.3740	30.03	9.63	39.66	60.00	-20.34	QP	
8		5.3740	24.37	9.63	34.00	50.00	-16.00	AVG	
9		7.5220	44.83	9.66	54.49	60.00	-5.51	QP	
10	*	7.5220	36.70	9.66	46.36	50.00	-3.64	AVG	
11		15.9380	23.37	9.71	33.08	50.00	-16.92	AVG	
12		17.3900	33.18	9.71	42.89	60.00	-17.11	QP	

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

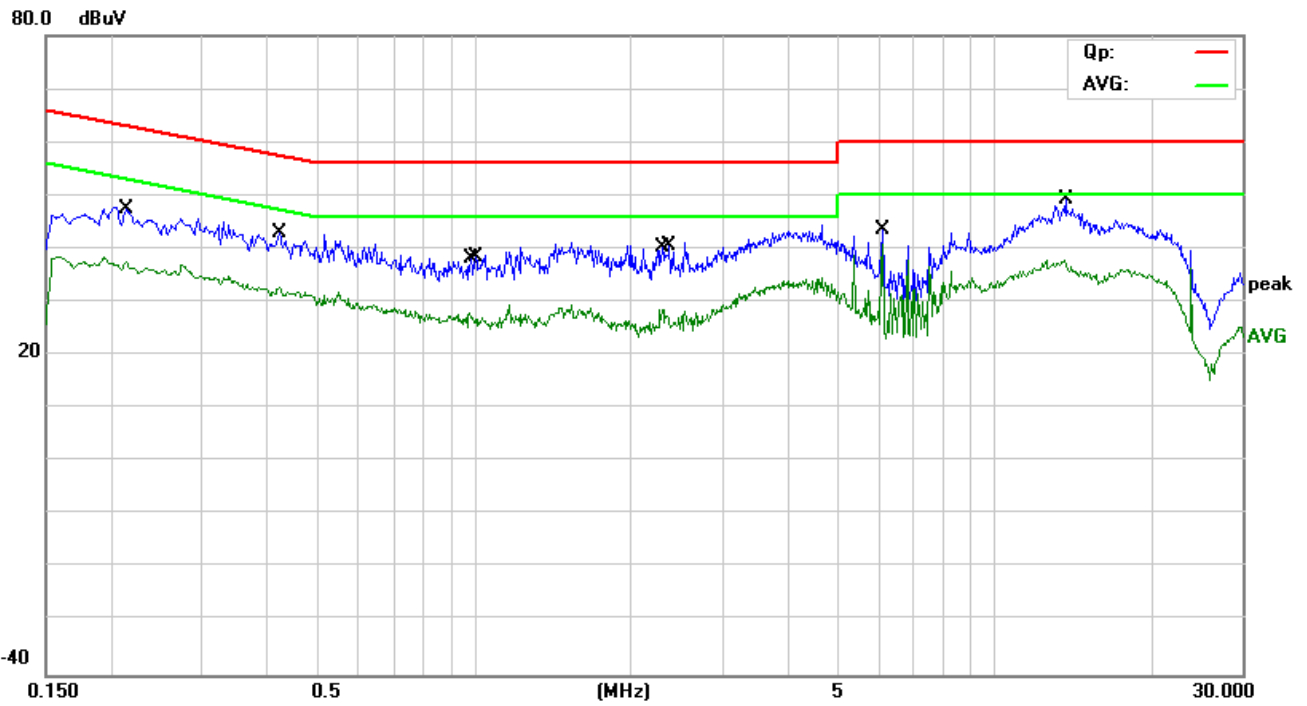
Power Supply	AC 120V / 60Hz	Line	N
M/N:		HS520U	



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.2743	38.43	9.60	48.03	60.99	-12.96	QP	
2		0.2743	27.77	9.60	37.37	50.99	-13.62	AVG	
3		0.5540	34.03	9.59	43.62	56.00	-12.38	QP	
4		0.5540	23.74	9.59	33.33	46.00	-12.67	AVG	
5		1.5340	21.75	9.60	31.35	46.00	-14.65	AVG	
6		1.5500	34.45	9.60	44.05	56.00	-11.95	QP	
7		3.0060	28.79	9.61	38.40	56.00	-17.60	QP	
8		3.0260	16.57	9.61	26.18	46.00	-19.82	AVG	
9		7.5220	43.46	9.66	53.12	60.00	-6.88	QP	
10	*	7.5220	37.10	9.66	46.76	50.00	-3.24	AVG	
11		16.3820	19.00	9.71	28.71	50.00	-21.29	AVG	
12		18.3820	27.48	9.72	37.20	60.00	-22.80	QP	

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

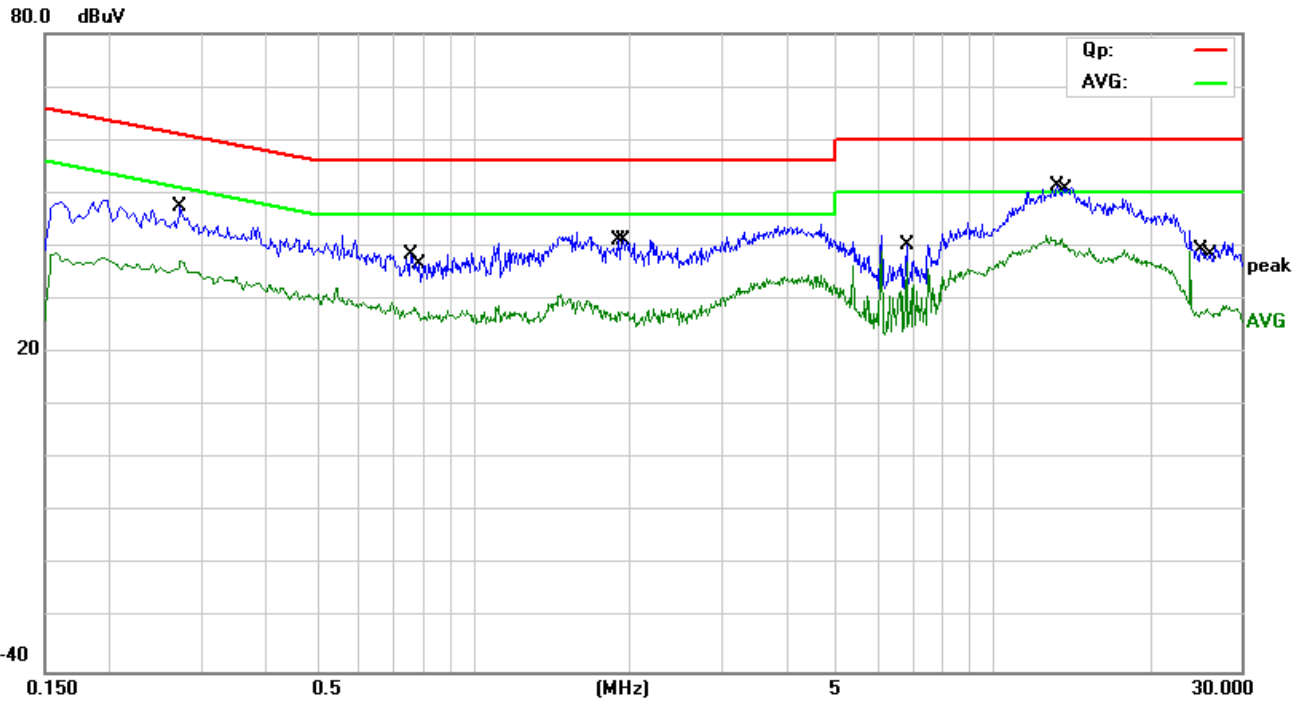
Power Supply	AC 120V / 60Hz	Line	L
M/N:	HS520U+Scanner Base		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.2140	37.76	9.60	47.36	63.05	-15.69	QP	
2		0.2140	28.03	9.60	37.63	53.05	-15.42	AVG	
3		0.4220	33.23	9.59	42.82	57.41	-14.59	QP	
4		0.4220	23.11	9.59	32.70	47.41	-14.71	AVG	
5		0.9860	17.49	9.60	27.09	46.00	-18.91	AVG	
6		1.0060	28.86	9.60	38.46	56.00	-17.54	QP	
7		2.3060	18.86	9.61	28.47	46.00	-17.53	AVG	
8		2.3740	30.87	9.61	40.48	56.00	-15.52	QP	
9		6.0900	33.84	9.64	43.48	60.00	-16.52	QP	
10	*	6.0900	31.10	9.64	40.74	50.00	-9.26	AVG	
11		13.6300	28.03	9.70	37.73	50.00	-12.27	AVG	
12		13.7580	39.57	9.70	49.27	60.00	-10.73	QP	

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

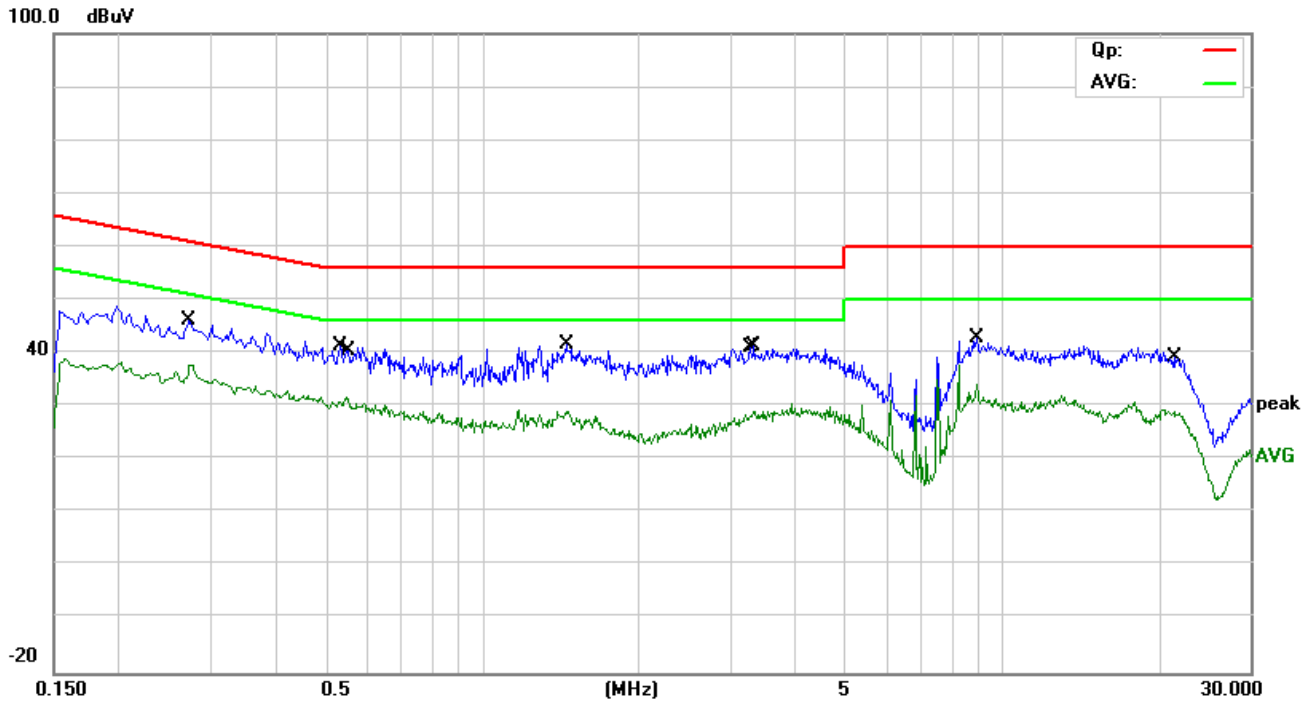
Power Supply	AC 120V / 60Hz	Line	N
M/N:	HS520U+Scanner Base		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.2740	37.86	9.60	47.46	61.00	-13.54	QP	
2		0.2740	27.56	9.60	37.16	51.00	-13.84	AVG	
3		0.7620	28.71	9.60	38.31	56.00	-17.69	QP	
4		0.7740	18.92	9.60	28.52	46.00	-17.48	AVG	
5		1.8980	18.11	9.60	27.71	46.00	-18.29	AVG	
6		1.9420	31.68	9.60	41.28	56.00	-14.72	QP	
7		6.8060	30.58	9.65	40.23	60.00	-19.77	QP	
8		6.8060	27.33	9.65	36.98	50.00	-13.02	AVG	
9	*	13.2980	41.62	9.70	51.32	60.00	-8.68	QP	
10		13.5660	31.62	9.70	41.32	50.00	-8.68	AVG	
11		25.1780	29.64	9.75	39.39	60.00	-20.61	QP	
12		25.8620	18.49	9.75	28.24	50.00	-21.76	AVG	

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

Power Supply	AC 120V / 60Hz	Line	L
M/N:	HS520U+RFID Base		

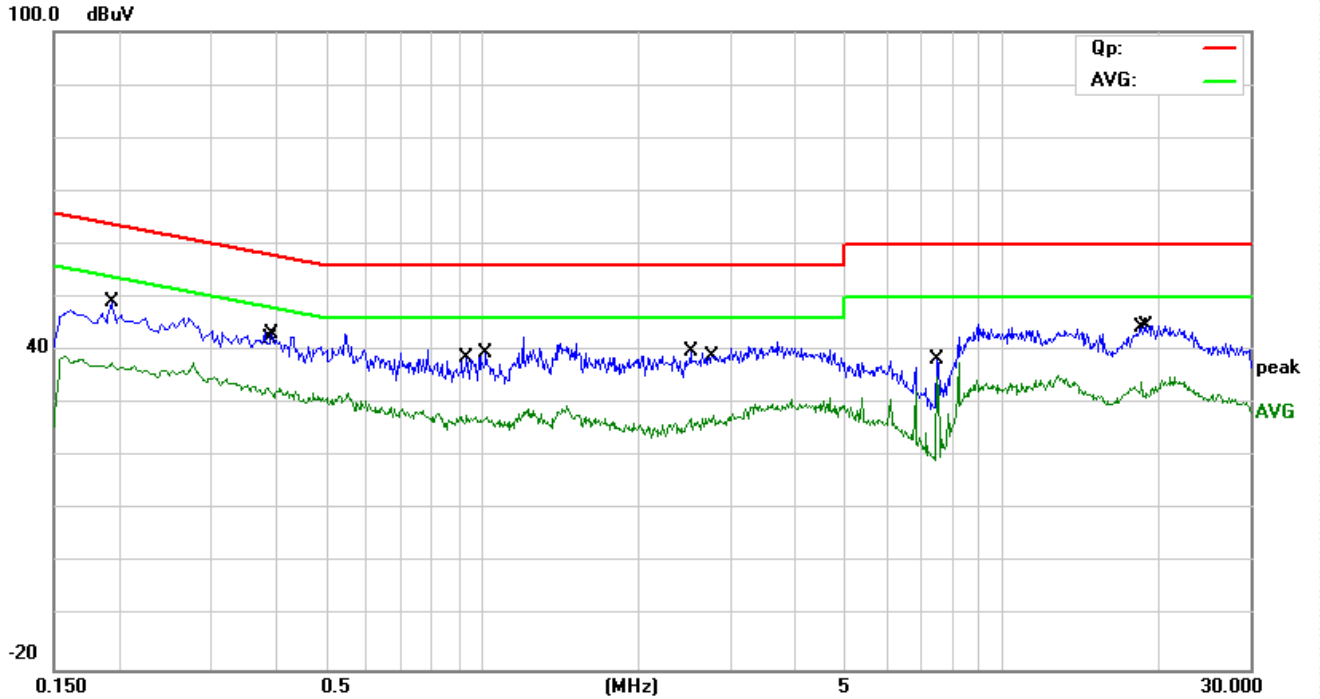


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.2740	36.67	9.60	46.27	61.00	-14.73	QP	
2	*	0.2740	28.08	9.60	37.68	51.00	-13.32	AVG	
3		0.5340	31.66	9.59	41.25	56.00	-14.75	QP	
4		0.5500	22.17	9.59	31.76	46.00	-14.24	AVG	
5		1.4540	31.92	9.60	41.52	56.00	-14.48	QP	
6		1.4620	19.48	9.60	29.08	46.00	-16.92	AVG	
7		3.2860	31.49	9.61	41.10	56.00	-14.90	QP	
8		3.3500	19.42	9.61	29.03	46.00	-16.97	AVG	
9		8.9540	33.23	9.68	42.91	60.00	-17.09	QP	
10		8.9540	24.41	9.68	34.09	50.00	-15.91	AVG	
11		21.4140	29.42	9.74	39.16	60.00	-20.84	QP	
12		21.4140	19.35	9.74	29.09	50.00	-20.91	AVG	

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



Power Supply	AC 120V / 60Hz	Line	N
M/N:	HS520U+RFID Base		



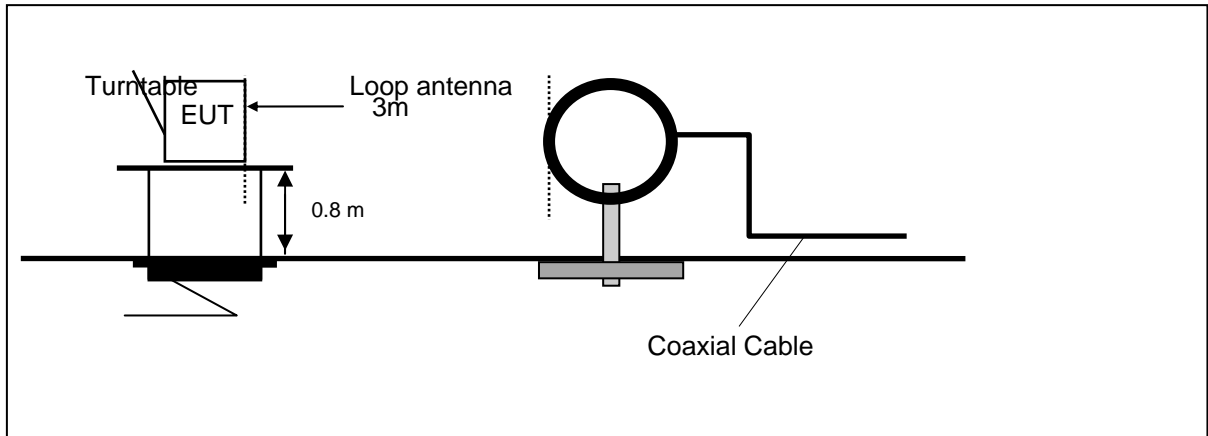
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1945	27.87	9.60	37.47	53.84	-16.37	AVG	
2		0.1955	37.69	9.60	47.29	63.80	-16.51	QP	
3		0.3860	23.39	9.59	32.98	48.15	-15.17	AVG	
4	*	0.3940	33.68	9.59	43.27	57.98	-14.71	QP	
5		0.9340	18.27	9.60	27.87	46.00	-18.13	AVG	
6		1.0180	29.84	9.60	39.44	56.00	-16.56	QP	
7		2.5260	30.11	9.61	39.72	56.00	-16.28	QP	
8		2.7940	18.21	9.61	27.82	46.00	-18.18	AVG	
9		7.5220	28.76	9.66	38.42	60.00	-21.58	QP	
10		7.5220	25.39	9.66	35.05	50.00	-14.95	AVG	
11		18.6100	24.37	9.72	34.09	50.00	-15.91	AVG	
12		18.9180	34.85	9.72	44.57	60.00	-15.43	QP	

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

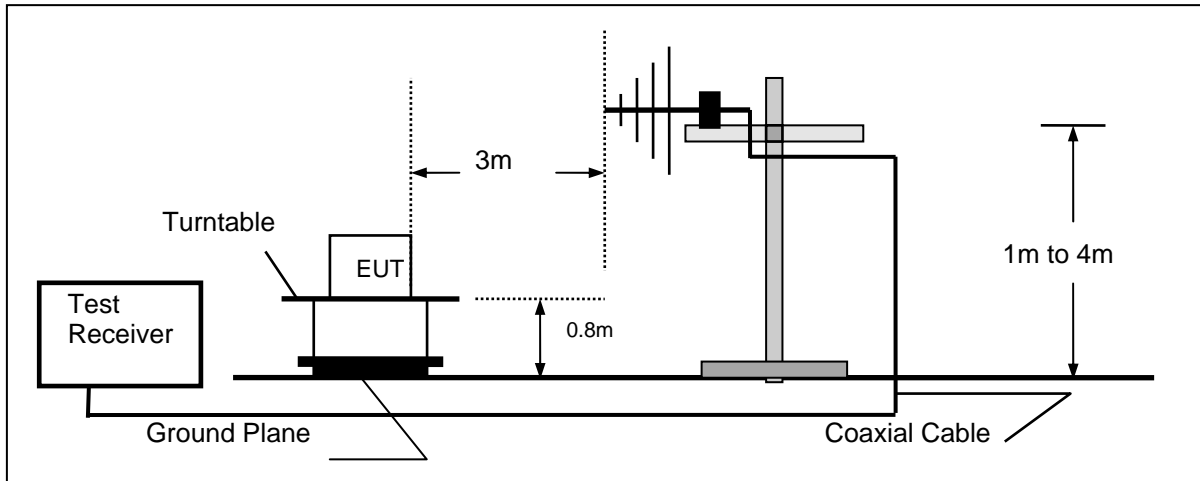
### 7.2. Radiated Emission

#### TEST CONFIGURATION

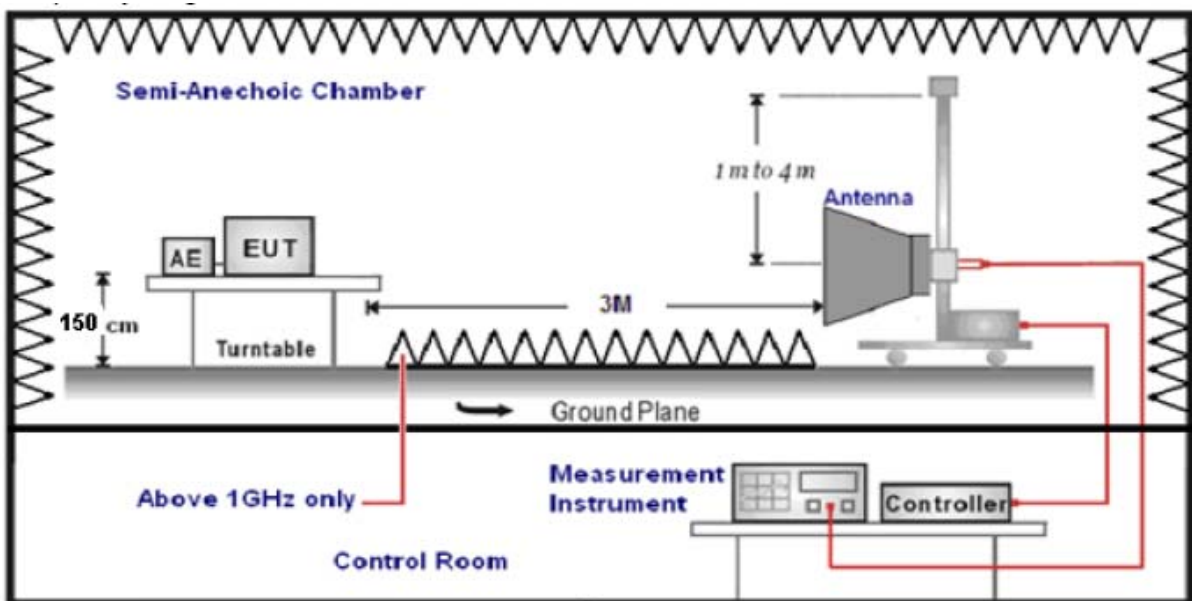
Frequency range 9 KHz – 30MHz



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	$20\log(2400/F(\text{KHz}))+40\log(300/3)$	$2400/F(\text{KHz})$
0.49-1.705	3	$20\log(24000/F(\text{KHz}))+40\log(30/3)$	$24000/F(\text{KHz})$
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**

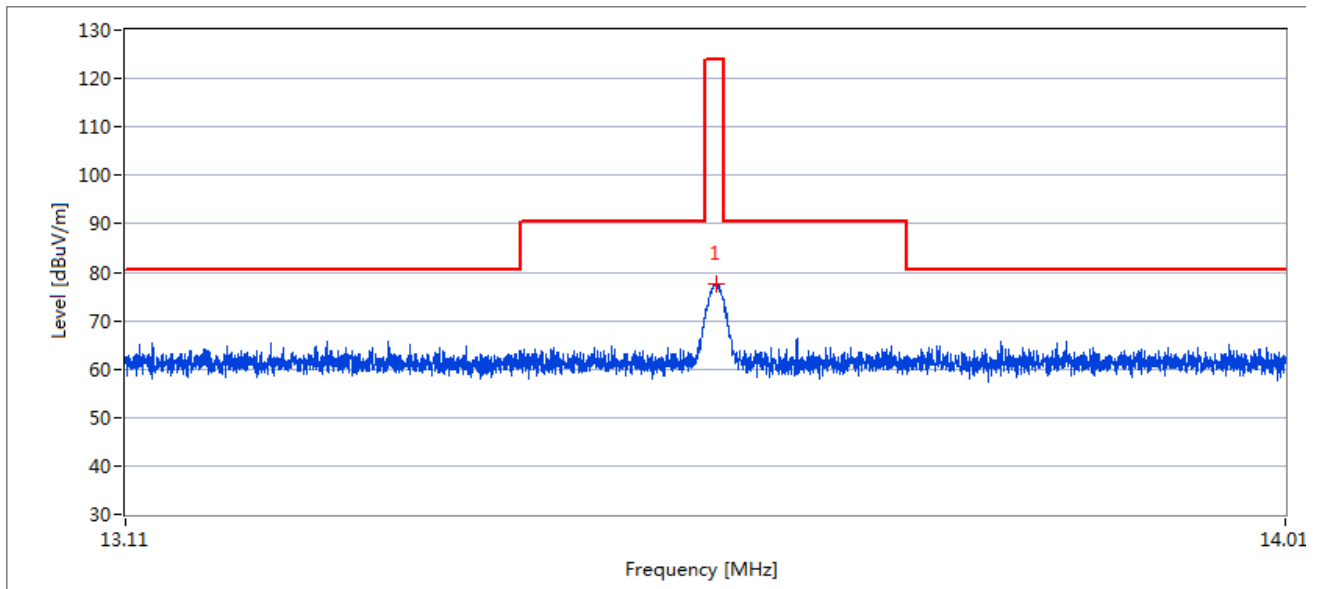
MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	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.

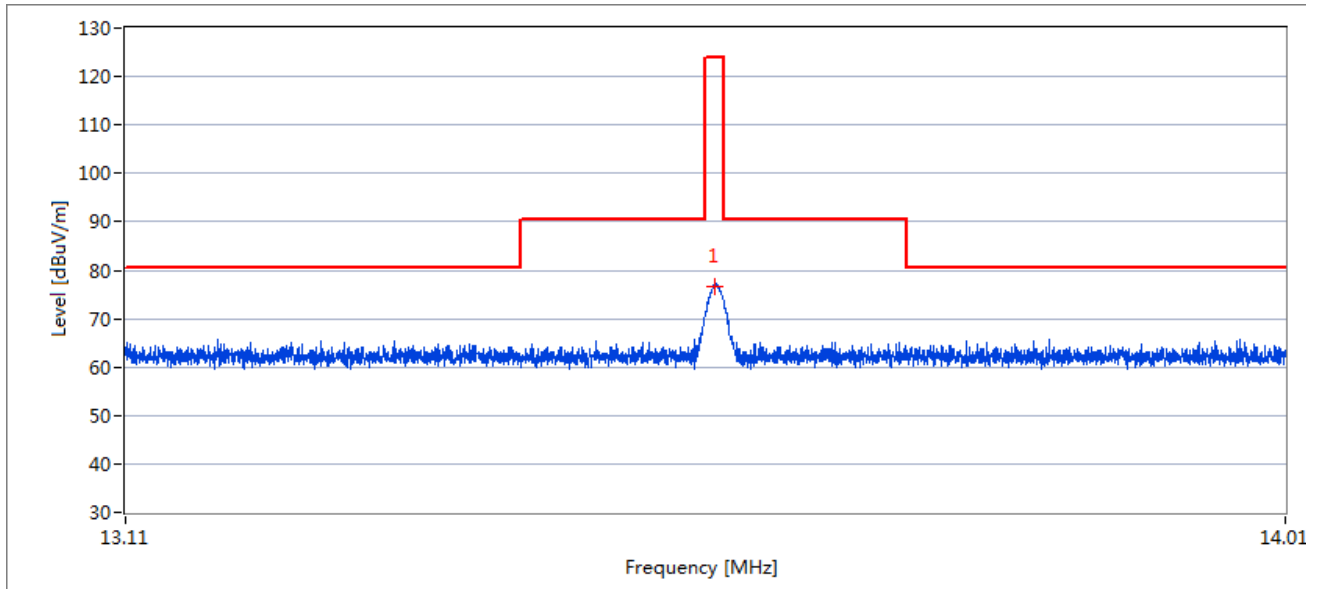
**TEST RESULTS (BELOW 30MHz)**

- 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.

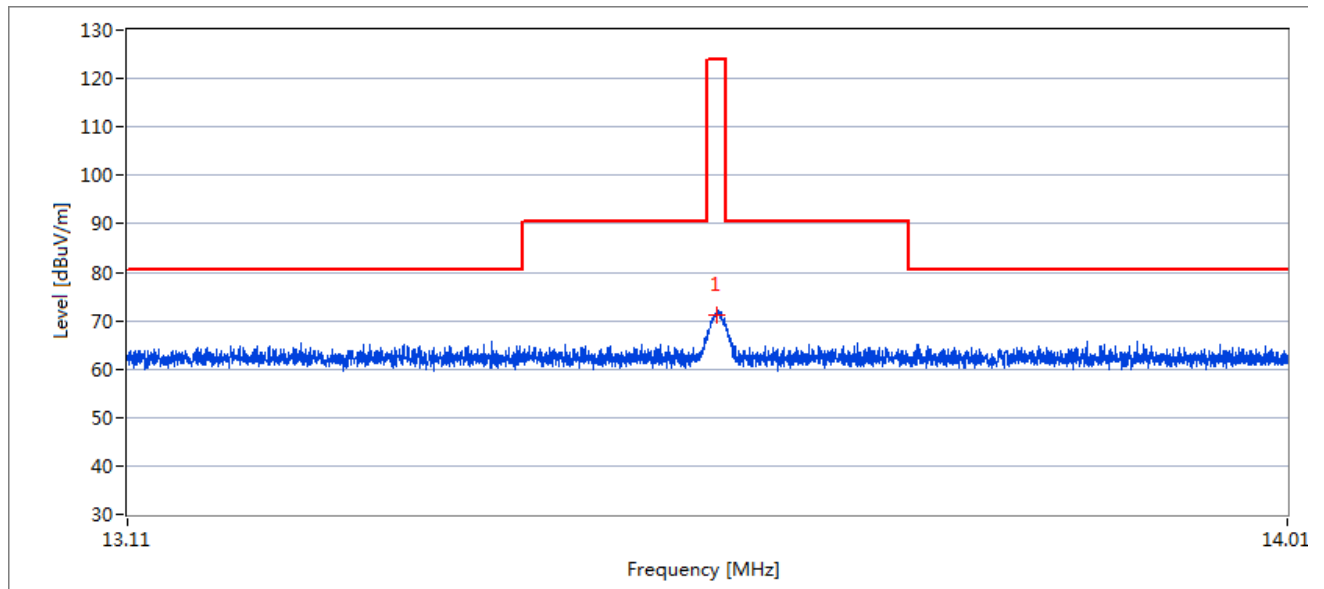


Frequency	Pre-scan Level MaxPeak	Final Test Level MaxPeak	Limit MaxPeak	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
13.56	78.1	78.1	124.0	45.8

Y



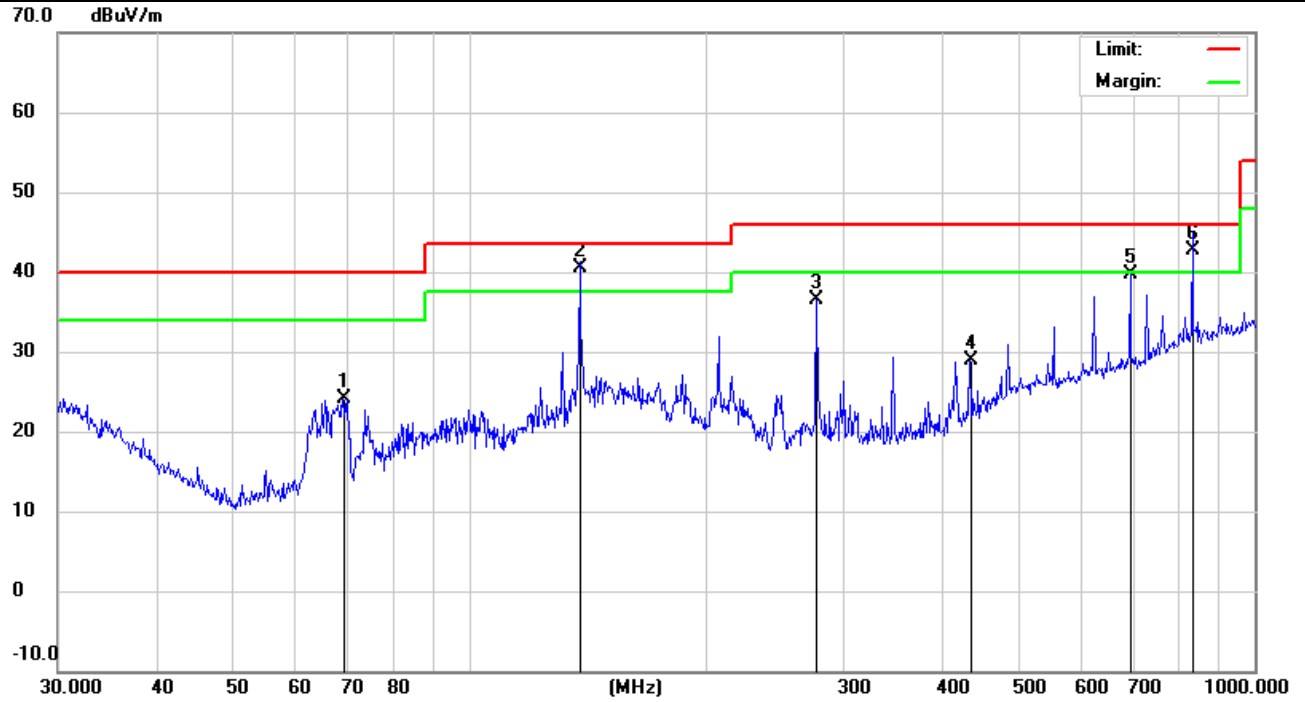
Frequency	Pre-scan Level MaxPeak	Final Test Level MaxPeak	Limit MaxPeak	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
13.56	77.8	77.8	124.0	46.5



Frequency	Pre-scan Level MaxPeak	Final Test Level MaxPeak	Limit MaxPeak	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
13.56	75.2	75.2	124.0	51.5

For 30MHz-1GHz

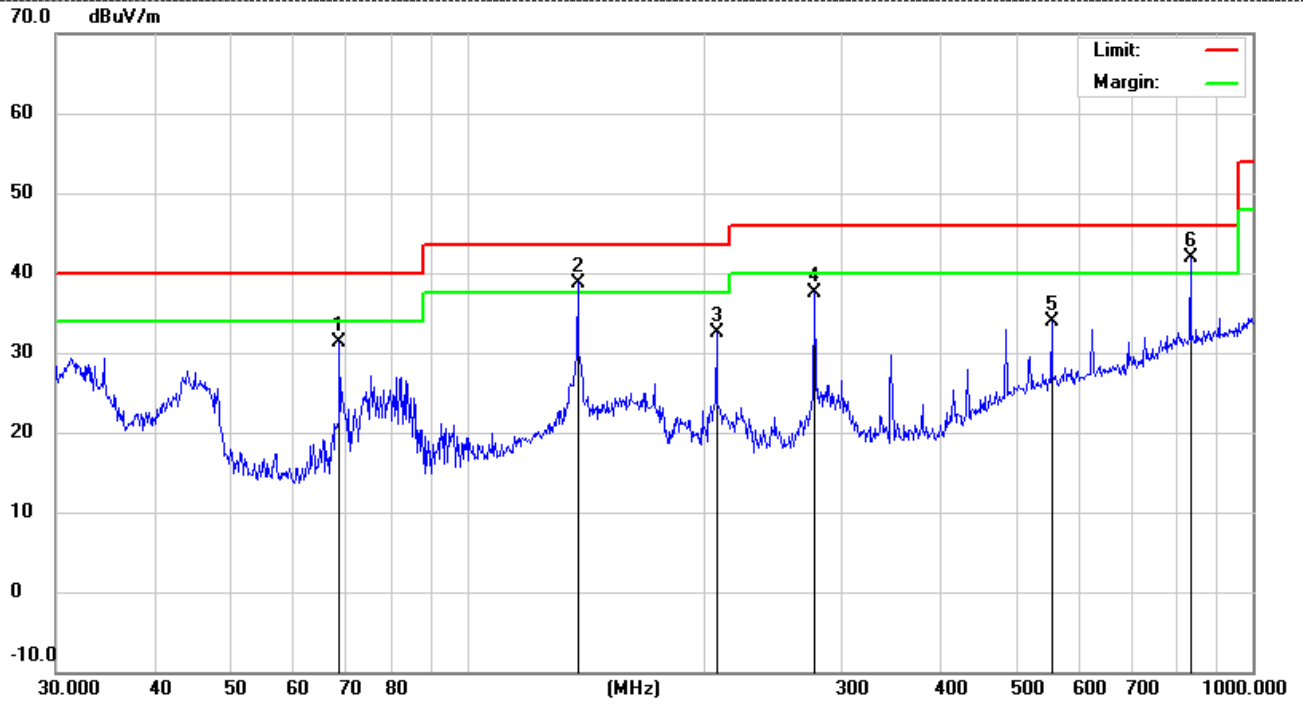
Power Supply	AC 120V / 60Hz	Polarization	Horizontal
M/N:		HS520U	



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measurement dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree	Comment
1		69.1141	14.85	9.24	24.09	40.00	-15.91	QP	200	10	
2	*	138.3873	24.10	16.36	40.46	43.50	-3.04	QP	200	40	
3		277.0935	21.76	14.72	36.48	46.00	-9.52	QP	200	90	
4		434.0651	9.78	19.21	28.99	46.00	-17.01	QP	200	120	
5		694.4174	14.74	25.03	39.77	46.00	-6.23	QP	200	200	
6	!	833.3171	14.52	28.27	42.79	46.00	-3.21	QP	200	300	

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

Power Supply AC 120V / 60Hz Polarization Vertical  
 M/N: HS520U

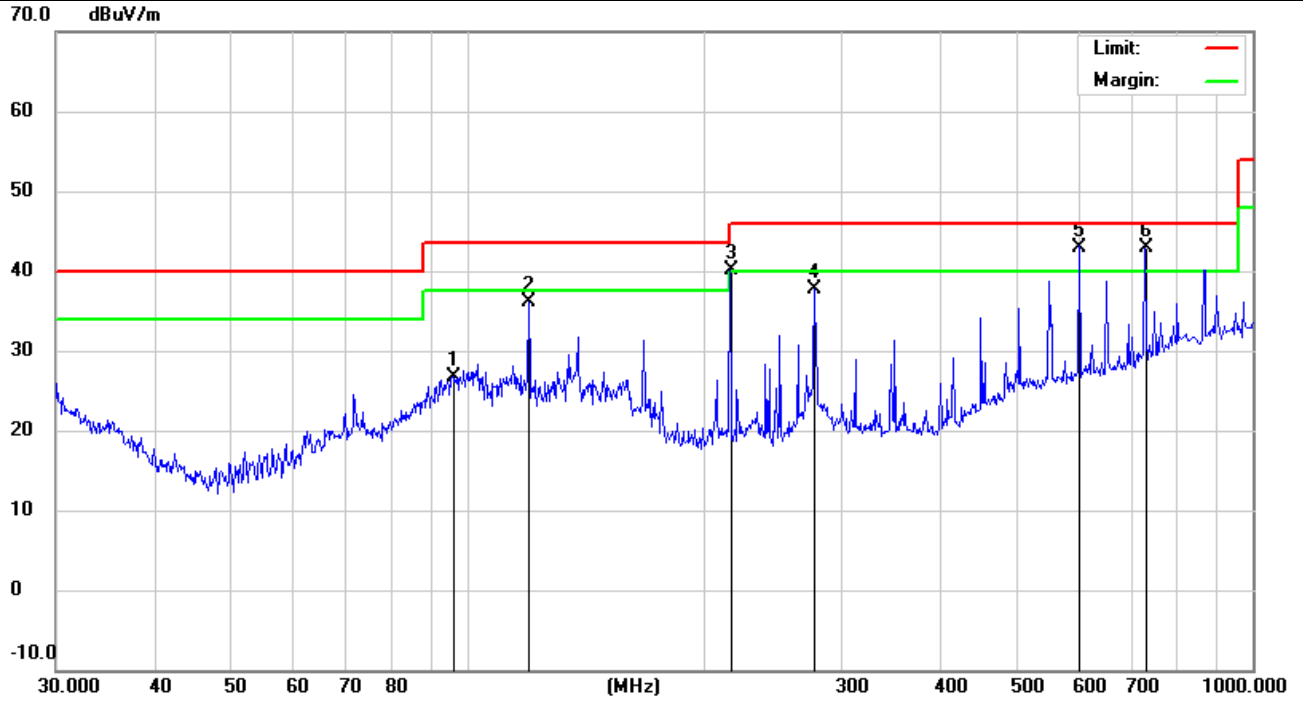


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree	Comment
1		68.8721	22.05	9.22	31.27	40.00	-8.73	QP	100	20	
2	!	138.3873	22.44	16.36	38.80	43.50	-4.70	QP	100	80	
3		207.8501	17.55	14.98	32.53	43.50	-10.97	QP	100	120	
4		277.0935	22.73	14.72	37.45	46.00	-8.55	QP	100	160	
5		554.8254	10.60	23.30	33.90	46.00	-12.10	QP	100	230	
6	*	833.3171	13.68	28.27	41.95	46.00	-4.05	QP	100	300	

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



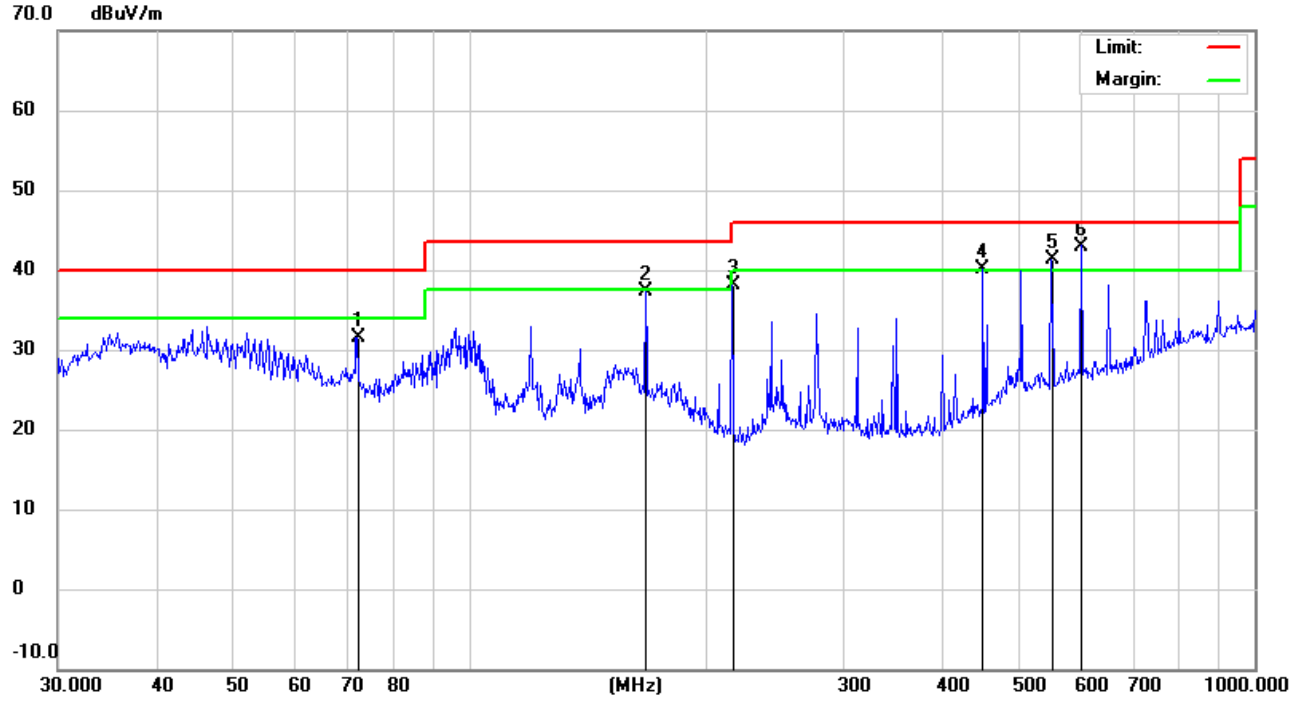
Power Supply	AC 120V / 60Hz	Polarization	Horizontal
M/N:	HS520U+Scanner Base		



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		96.0986	14.53	12.16	26.69	43.50	-16.81	QP	200	20
2		119.8556	20.39	15.78	36.17	43.50	-7.33	QP	200	70
3	!	216.0240	25.26	14.75	40.01	46.00	-5.99	QP	200	120
4		277.0935	22.95	14.72	37.67	46.00	-8.33	QP	200	200
5	*	601.4265	19.12	23.82	42.94	46.00	-3.06	QP	200	220
6	!	729.3583	16.93	25.92	42.85	46.00	-3.15	QP	200	300

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

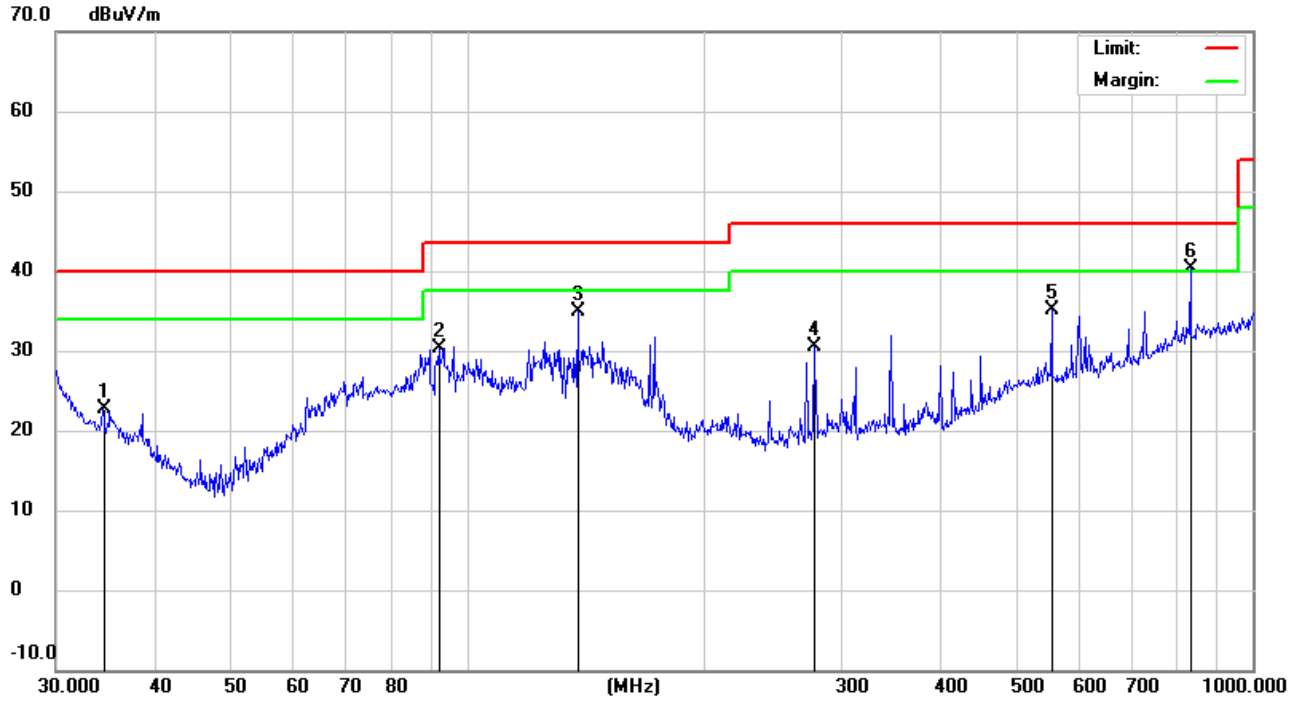
Power Supply AC 120V / 60Hz Polarization Vertical  
 M/N: HS520U+Scanner Base



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measurement dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree	Comment
1		72.0843	22.40	9.05	31.45	40.00	-8.55	QP	100	10
2		167.8242	20.25	17.04	37.29	43.50	-6.21	QP	100	90
3		216.0239	23.40	14.75	38.15	46.00	-7.85	QP	100	130
4	!	451.1350	20.01	20.11	40.12	46.00	-5.88	QP	100	200
5	!	550.9480	18.08	23.26	41.34	46.00	-4.66	QP	100	270
6	*	601.4265	19.10	23.82	42.92	46.00	-3.08	QP	100	320

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

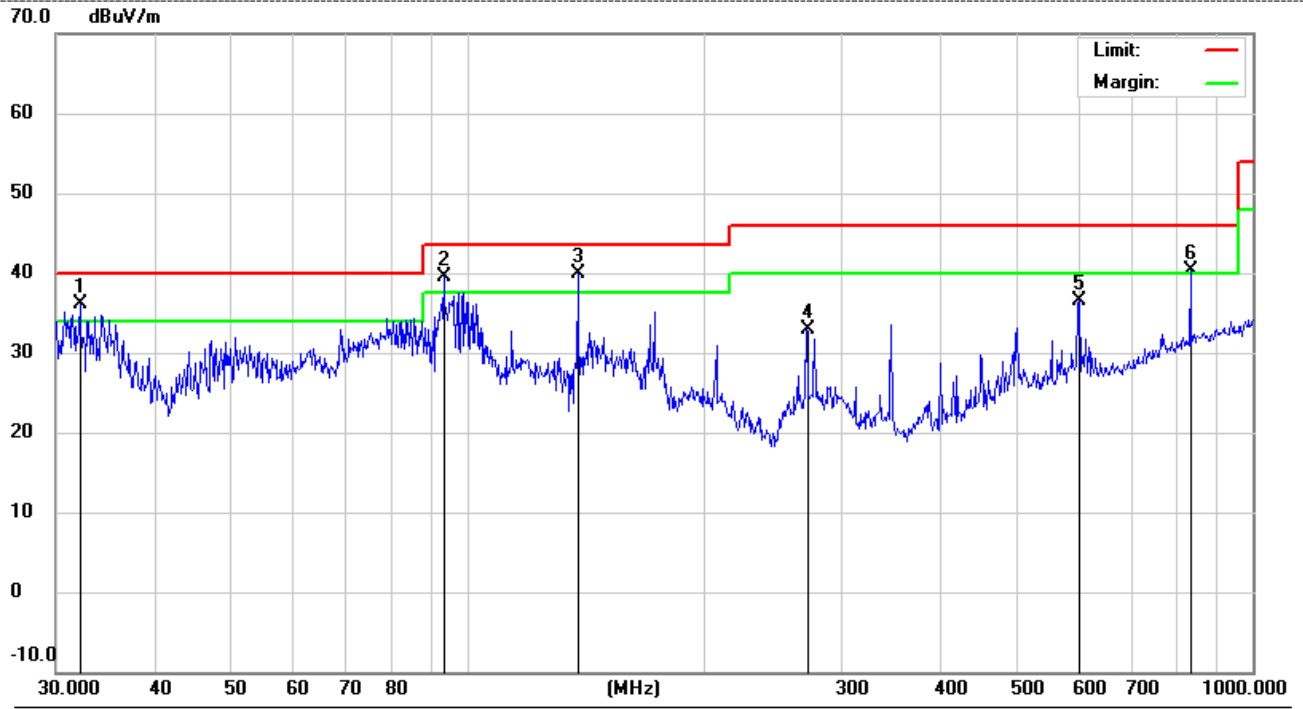
Power Supply	AC 120V / 60Hz	Polarization	Horizontal
M/N:	HS520U+RFID Base		



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		34.3964	4.86	17.91	22.77	40.00	-17.23	QP	200	10
2		92.1388	19.70	10.69	30.39	43.50	-13.11	QP	200	70
3		138.3873	18.49	16.36	34.85	43.50	-8.65	QP	200	180
4		277.0935	15.73	14.72	30.45	46.00	-15.55	QP	200	200
5		554.8254	11.83	23.30	35.13	46.00	-10.87	QP	200	310
6	*	833.3171	12.04	28.27	40.31	46.00	-5.69	QP	200	350

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

Power Supply AC 120V / 60Hz Polarization Vertical  
 M/N: HS520U+RFID Base

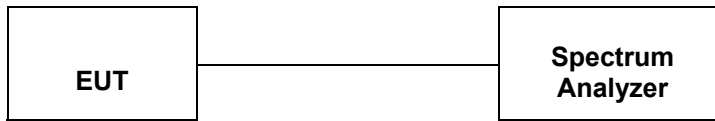


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree
1	!	32.1795	16.68	19.42	36.10	40.00	-3.90	100	50
2	!	93.4402	28.38	11.17	39.55	43.50	-3.95	100	80
3	*	138.3873	23.55	16.36	39.91	43.50	-3.59	100	120
4		270.3748	18.32	14.49	32.81	46.00	-13.19	100	220
5		601.4265	12.63	23.82	36.45	46.00	-9.55	100	300
6	!	833.3171	12.01	28.27	40.28	46.00	-5.72	100	330

\*: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.

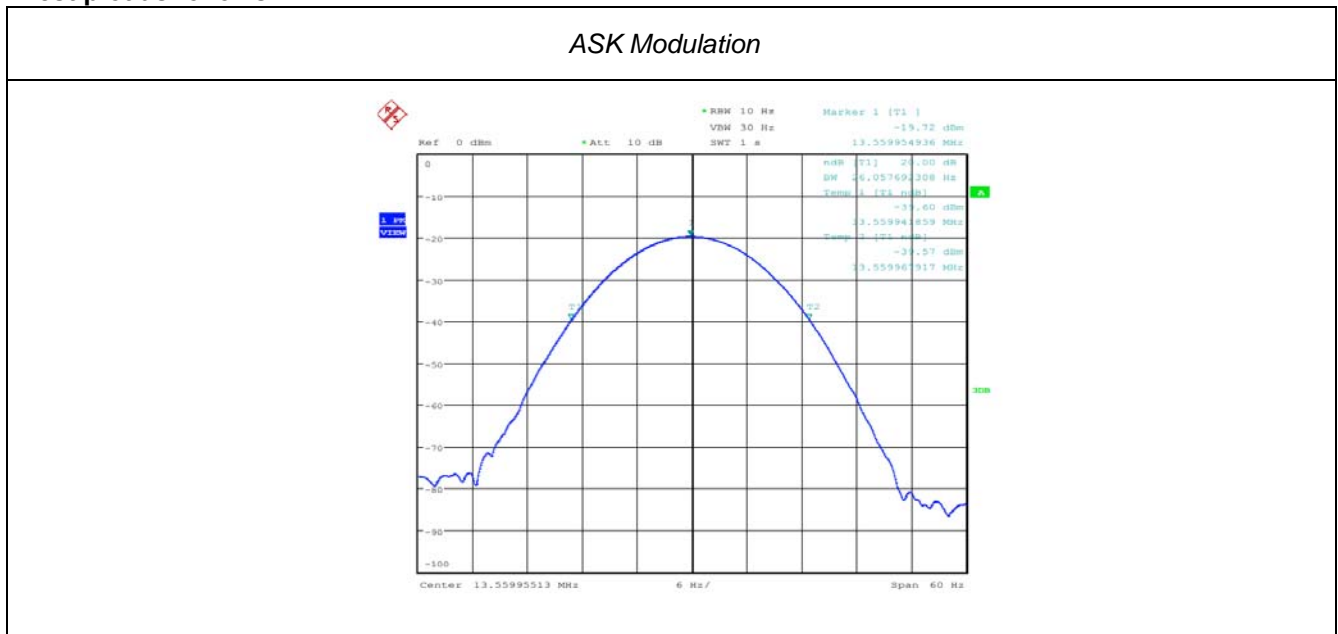
The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

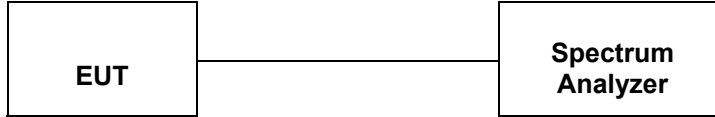
The occupied bandwidth (OBW), that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission

**TEST RESULTS**

Modulation	Channel Frequency (MHz)	20dB bandwidth (KHz)	Result
ASK	13.56	0.027	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	13.560043	0.000043	3.17	+/- 0.01%(100ppm)
	20	13.560063	0.000063	4.64	+/- 0.01%(100ppm)
	50	13.560027	0.000027	1.95	+/- 0.01%(100ppm)
AC 120V	-20	13.560069	0.000069	5.08	+/- 0.01%(100ppm)
	20	13.560046	0.000046	3.38	+/- 0.01%(100ppm)
	50	13.560070	0.000070	5.19	+/- 0.01%(100ppm)
AC 100V	-20	13.560063	0.000063	4.68	+/- 0.01%(100ppm)
	20	13.560040	0.000040	2.94	+/- 0.01%(100ppm)
	50	13.560058	0.000058	4.28	+/- 0.01%(100ppm)

**7.5. Antenna Requirement****Standard Applicable**

**For intentional device, according to FCC 225 CFR Section 15.203:**

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited

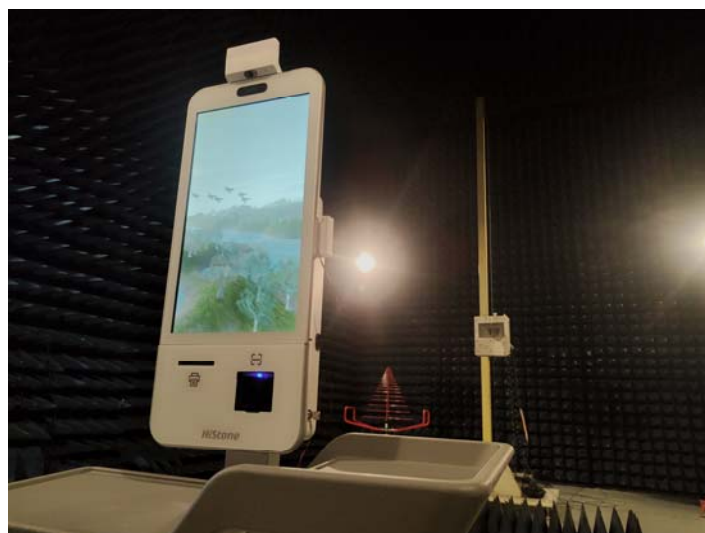
**Test Result:**

The directional gains of antenna used for transmitting is 3dBi, and the antenna is and PCB Antenna and no consideration of replacement. Please see EUT photo for details.

Results: Compliance.

## 8. Test Setup Photos of the EUT

HS520U

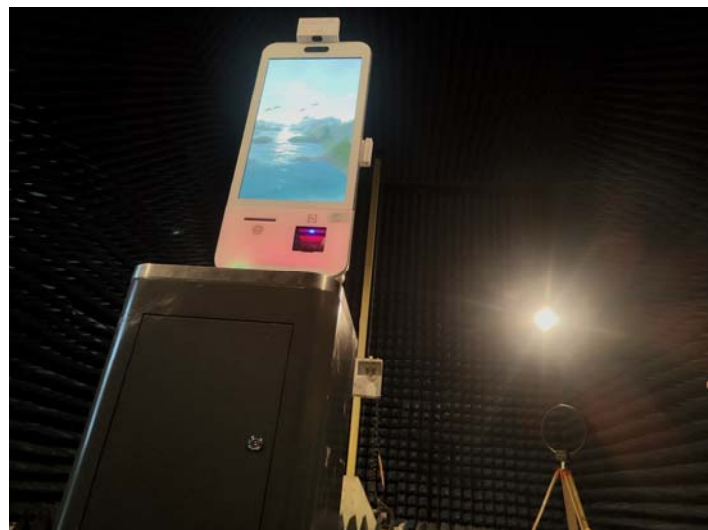




HS520U+RFID Base



S520U+Scanner Base



**External and Internal Photos of the EUT**

See related photo report.

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