



FCC TEST REPORT

Test report
On Behalf of
MPOW TECHNOLOGY CO. LIMITED
For
Wireless charging clock
Model No.: HM346A, YGH3170

FCC ID: 2AMH2-HM346A

Prepared for : MPOW TECHNOLOGY CO. LIMITED
HANG PONT COMMERCIAL BUILDING, 31 TONKIN STREET, CHEUNG
SHA WAN ROOM 603, 6/F KOWLOON HONG KONG.

Prepared By : Shenzhen HUAKE Testing Technology Co., Ltd.
1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai
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Date of Test: Aug. 20, 2018 ~ Aug. 28, 2018

Date of Report: Aug. 28, 2018

Report Number: HUAKE180827904E



TEST RESULT CERTIFICATION

Applicant's name : MPOW TECHNOLOGY CO. LIMITED
Address : HANG PONT COMMERCIAL BUILDING, 31 TONKIN STREET,
CHEUNG SHA WAN ROOM 603, 6/F KOWLOON HONG KONG.
Manufacture's Name : Shenzhen YuanGuangHao Electronics Co.,Ltd.
Address : No.7, LianYi Street,TangKeng Road,HengGang Town, Shenzhen,
P. R. China.

Product description

Trade Mark: N/A
Product name..... : Wireless charging clock
Model and/or type reference : HM346A
Serial Model YGH3170
Different description All the same except for the model name.

Standards : FCC Rules and Regulations Part 15 Subpart C Section 15.207,
15.209, 15.203
ANSI C63.10: 2013

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Date of Test

Date (s) of performance of tests..... : Aug. 20, 2018 ~ Aug. 28, 2018
Date of Issue..... : Aug. 28, 2018
Test Result..... : **Pass**

Testing Engineer :

(Gary Qian)

Technical Manager :

(Eden Hu)

Authorized Signatory :

(Jason Zhou)



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1. TEST SUMMARY

1.1 TEST PROCEDURES AND RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.203	Antenna Requirement	Compliant
§15.209	Radiated Emission	Compliant
§15.215	20dB bandwidth	Compliant
§15.207	Conducted Emission	Compliant

1.2 TEST FACILITY

Test Firm : Shenzhen HUAKE Testing Technology Co., Ltd.

Address : 1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park,
Fuhai Street, Bao'an District, Shenzhen City, China

Designation Number: : CN1229

Test Firm Registration Number : 616276

1.3 MEASUREMENT UNCERTAINTY

Measurement Uncertainty

Conducted Emission Expanded Uncertainty = 2.23dB, k=2

Radiated emission expanded uncertainty(9kHz-30MHz) = 3.08dB, k=2

Radiated emission expanded uncertainty(30MHz-1000MHz) = 4.42dB, k=2

Radiated emission expanded uncertainty(Above 1GHz) = 4.06dB, k=2



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Operation Frequency	177.6KHz
Maximum field strength	56.41dBuV/m(Peak)@3m
Number of channels	1
Antenna Designation	Integrated Antenna (Met 15.203 Antenna requirement)
Hardware Version	3170-5W-V1.1
Software Version	V1.0
Power Supply	DC5V

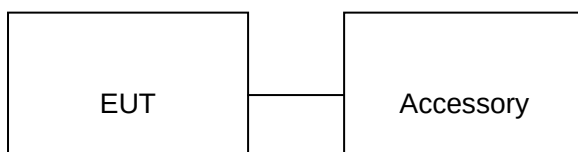


2.2 OPERATION OF EUT DURING TESTING

NO.	TEST MODE DESCRIPTION
1	Wireless charging Mode(Full load)
2	Wireless charging Mode(half load)
3	Wireless charging Mode(Null load)
Note: 1. The mode 1 was the worst case and only the data of the worst case record in this report.	

2.3 DESCRIPTION OF TEST SETUP

Configure :



Item	Equipment	Model No.	ID or Specification	Remark
1	Wireless electronic Load	--	Maximum power 10W	Support
2	Adapter	RHD10W050200ES	DC5V 2A	AE

**2.4 MEASUREMENT INSTRUMENTS LIST**

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	R&S	ENV216	HKE-002	Dec. 28, 2017	1 Year
2.	Receiver	R&S	ESCI 7	HKE-010	Dec. 28, 2017	1 Year
3.	RF automatic control unit	Tonscend	JS0806-2	HKE-060	Dec. 28, 2017	1 Year
4.	Spectrum analyzer	R&S	FSP40	HKE-025	Dec. 28, 2017	1 Year
5.	Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 28, 2017	1 Year
6.	Preamplifier	Schwarzbeck	BBV 9743	HKE-006	Dec. 28, 2017	1 Year
7.	EMI Test Receiver	Rohde & Schwarz	ESCI 7	HKE-010	Dec. 28, 2017	1 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	HKE-012	Dec. 28, 2017	1 Year
9.	Loop Antenna	Schwarzbeck	FMZB 1519 B	HKE-014	Dec. 28, 2017	1 Year
10.	Horn Antenna	Schwarzbeck	9120D	HKE-013	Dec. 28, 2017	1 Year
11.	Pre-amplifier	EMCI	EMC051845SE	HKE-015	Dec. 28, 2017	1 Year
12.	Pre-amplifier	Agilent	83051A	HKE-016	Dec. 28, 2017	1 Year
13.	EMI Test Software EZ-EMC	Tonscend	JS1120-B Version	HKE-083	Dec. 28, 2017	N/A
14.	Power Sensor	Agilent	E9300A	HKE-086	Dec. 28, 2017	1 Year
15.	Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 28, 2017	1 Year
16.	Signal generator	Agilent	N5182A	HKE-029	Dec. 28, 2017	1 Year
17.	Signal Generator	Agilent	83630A	HKE-028	Dec. 28, 2017	1 Year
18.	Shielded room	Shiel Hong	4*3*3	HKE-039	Dec. 28, 2017	3 Year



3. RADIATED EMISSION

3.1 TEST LIMIT

Standard FCC 15.209

Frequency (MHz)	Distance Meters	Field Strengths Limit	
		$\mu\text{V}/\text{m}$	$\text{dB}(\mu\text{V})/\text{m}$
0.009 ~ 0.490	300	$2400/F(\text{kHz})$	---
0.490 ~ 1.705	30	$24000/F(\text{kHz})$	---
1.705 ~ 30	30	30	---
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	Other: 74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	

Remark:

- (1) Emission level $\text{dB}\mu\text{V} = 20 \log$ Emission level $\mu\text{V}/\text{m}$
- (2) The smaller limit shall apply at the cross point between two frequency bands.
- (3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.



3.2. MEASUREMENT PROCEDURE

1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

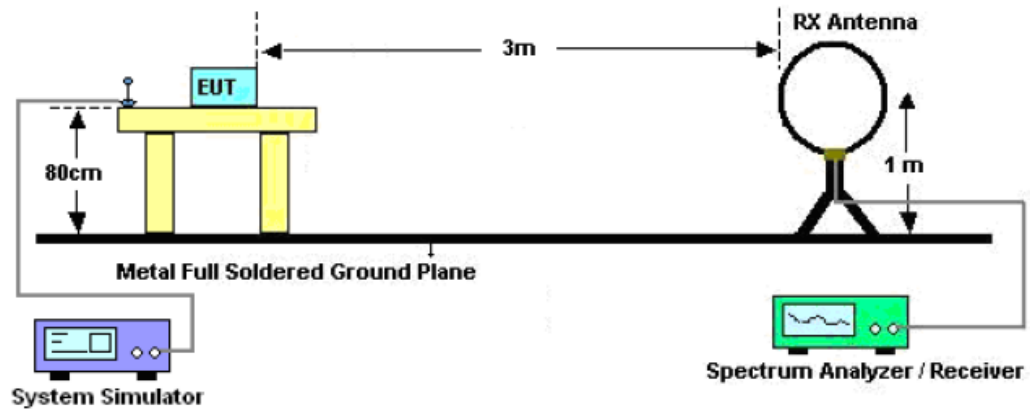
The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

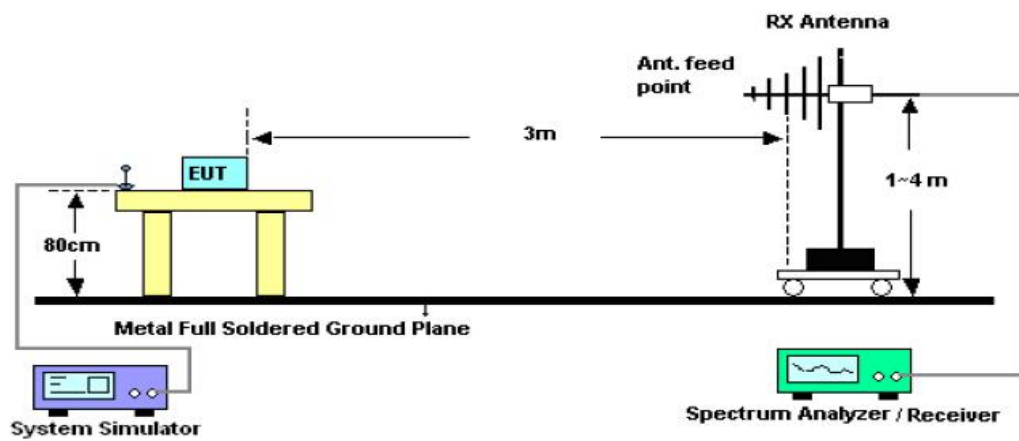
Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

3.3. TEST SETUP

Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



**3.4. TEST RESULT****RADIATED EMISSION BELOW 30MHZ**

Frequency MHz	Polarization	Reading dB(uV)	Factor dB (1/m)	Level dB(uV/m) Peak	Limit dB(uV/m) Average	Margin dB	Pass/Fail
0.1776	Face	46.01	10.4	56.41	102.62	46.21	Pass
0.1776	Side	37.93	10.4	48.33	102.62	54.29	Pass

Note: No other emissions found between lowest internal used/generated frequencies to 30MHz. The peak level of the emission is less than the average limit, so the average level shall be less than the limit without test.

**RADIATED EMISSION 30MHz- 1GHZ**

EUT :	Wireless charging clock	Model Name. :	HM346A
Temperature :	20 °C	Relative Humidity:	48%
Pressure :	1010 hPa	Test Voltage :	Normal
Test Mode :	Mode 1	Polarization :	Horizontal

66.9 dBuV/m

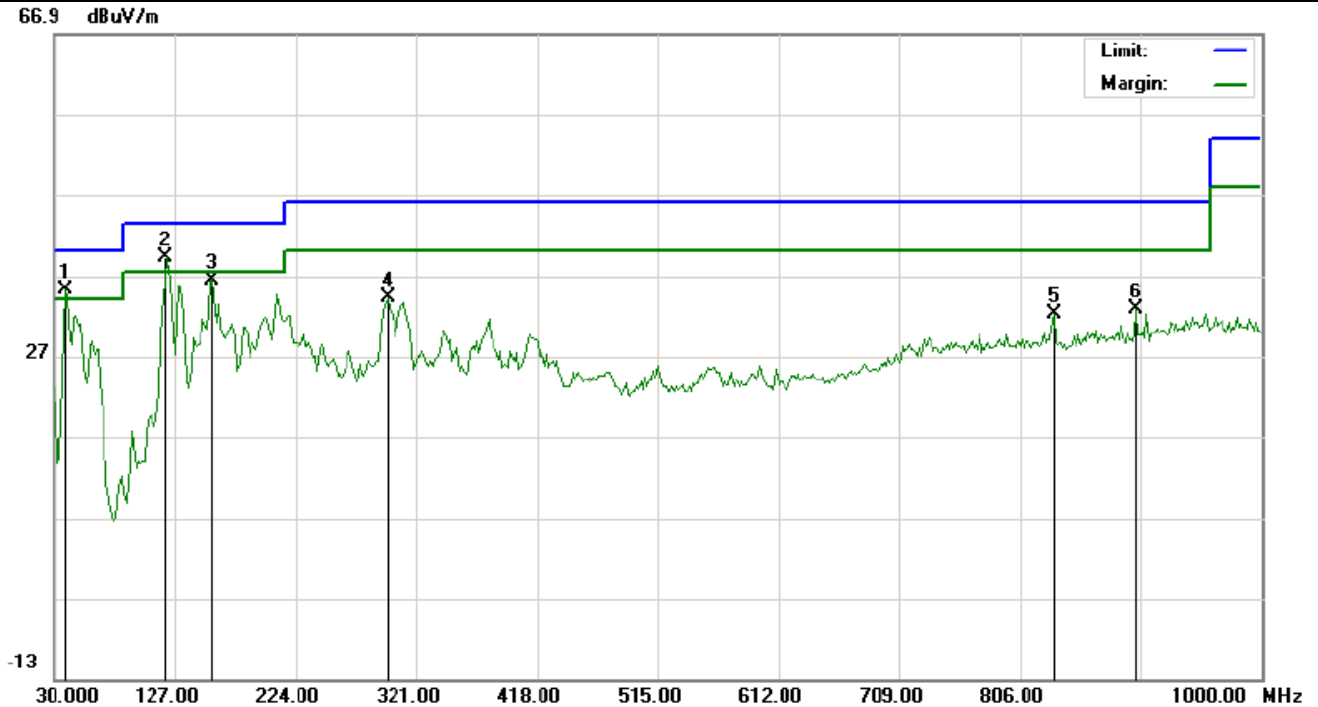


No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		52.6333	12.13	11.41	23.54	40.00	-16.46	peak			
2		117.3000	25.33	9.48	34.81	43.50	-8.69	peak			
3	*	215.9167	27.01	13.38	40.39	43.50	-3.11	peak			
4		377.5833	18.05	21.92	39.97	46.00	-6.03	peak			
5	!	831.8667	11.48	30.31	41.79	46.00	-4.21	peak			
6		907.8500	7.03	31.83	38.86	46.00	-7.14	peak			

RESULT: PASS



EUT :	Wireless charging clock	Model Name. :	HM346A
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	Normal
Test Mode :	Mode 1	Polarization :	Vertical



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	!	39.7000	26.64	8.51	35.15	40.00	-4.85	peak			
2	*	120.5332	32.08	7.08	39.16	43.50	-4.34	peak			
3		157.7167	21.18	15.32	36.50	43.50	-7.00	peak			
4		298.3666	18.89	15.36	34.25	46.00	-11.75	peak			
5		833.4832	4.80	27.31	32.11	46.00	-13.89	peak			
6		899.7667	4.25	28.60	32.85	46.00	-13.15	peak			

RESULT: PASS

Note:

Factor=Antenna Factor + Cable loss, Margin=Result-Limit.

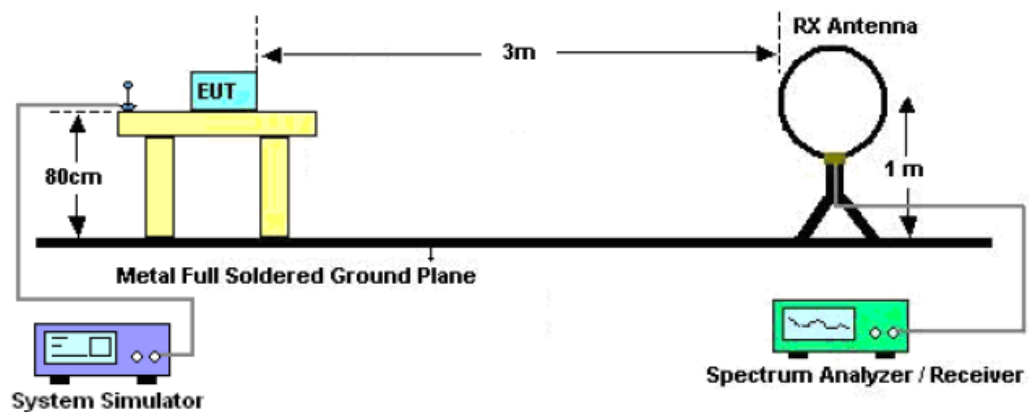
The "Factor" value can be calculated automatically by software of measurement system.

4. 20DB BANDWIDTH

4.1. MEASUREMENT PROCEDURE

1. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Set the EUT Work on operation frequency.
3. Set Span = approximately 2 to 5 times the 20 dB bandwidth, centered on a channel
The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW; Sweep = auto; Detector function = peak
4. Set SPA Trace 1 Max hold, then View.

4.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

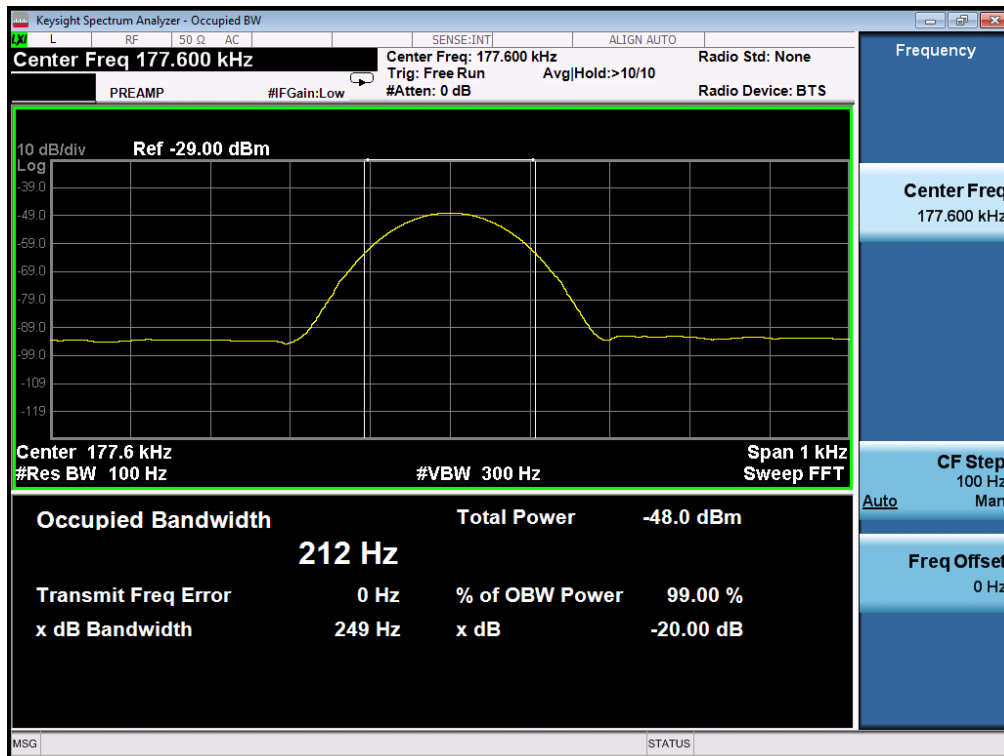


4.3. MEASUREMENT RESULTS

TEST ITEM	20DB BANDWIDTH
TEST MODULATION	FSK

Frequency (KHz)	Test Data (Hz)	Criteria
177.6	249	PASS

TEST PLOT OF BANDWIDTH



5. FCC LINE CONDUCTED EMISSION TEST

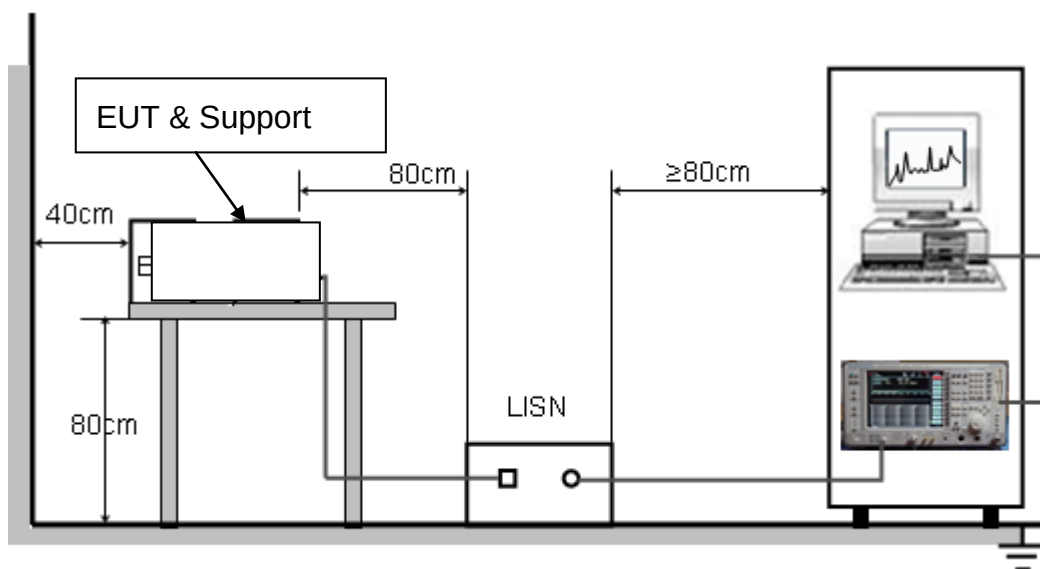
5.1. LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P.(dBuV)	Average(dBuV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50MHz.

5.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST





5.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When 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 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. All support equipments received AC120V/60Hz power from a LISN, if any.
5. The EUT received charging voltage by adapter which received 120V/60Hz power by a LISN..
6. The 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.
9. The test mode(s) were scanned during the preliminary test.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

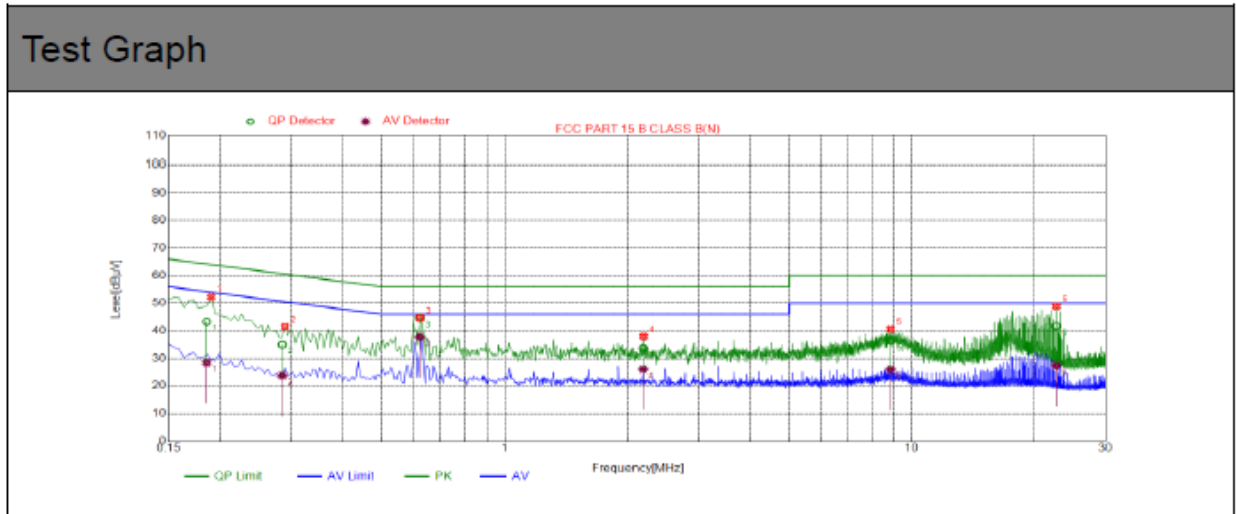
5.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case condition(s) was reported on the Summary Data page.



5.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

LINE CONDUCTED EMISSION TEST-L



Suspected List

NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Detector
1	0.1905	52.31	10.04	64.02	11.71	PK
2	0.2895	41.53	10.03	60.54	19.01	PK
3	0.6225	44.66	10.05	56.00	11.34	PK
4	2.1885	37.96	10.16	56.00	18.04	PK
5	8.8710	40.59	10.11	60.00	19.41	PK
6	22.7355	48.94	10.18	60.00	11.06	PK

Final Data List

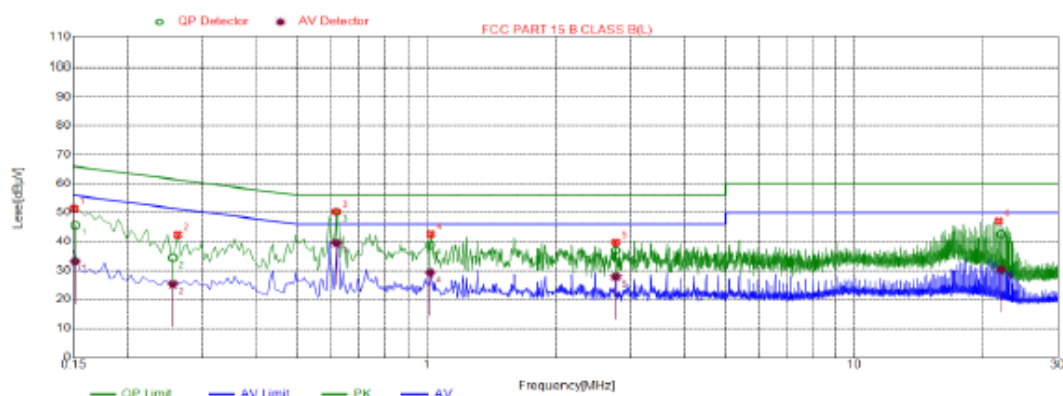
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]
1	0.1857	10.05	43.34	64.22	20.88	28.52	54.22	25.70
2	0.2851	10.04	35.02	60.67	25.65	23.76	50.67	26.91
3	0.6216	10.05	44.70	56.00	11.30	37.82	46.00	8.18
4	2.1834	10.16	33.68	56.00	22.32	26.08	46.00	19.92
5	8.8768	10.11	36.30	60.00	23.70	26.02	50.00	23.98
6	22.7026	10.18	41.73	60.00	18.27	27.38	50.00	22.62

RESULT: PASS



LINE CONDUCTED EMISSION TEST-N

Test Graph



Suspected List

NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Detector
1	0.1500	51.38	10.03	66.00	14.62	PK
2	0.2625	42.42	10.03	61.36	18.94	PK
3	0.6180	50.36	10.05	56.00	5.64	PK
4	1.0185	42.66	10.07	56.00	13.34	PK
5	2.7645	39.80	10.21	56.00	16.20	PK
6	21.8085	47.04	10.15	60.00	12.96	PK

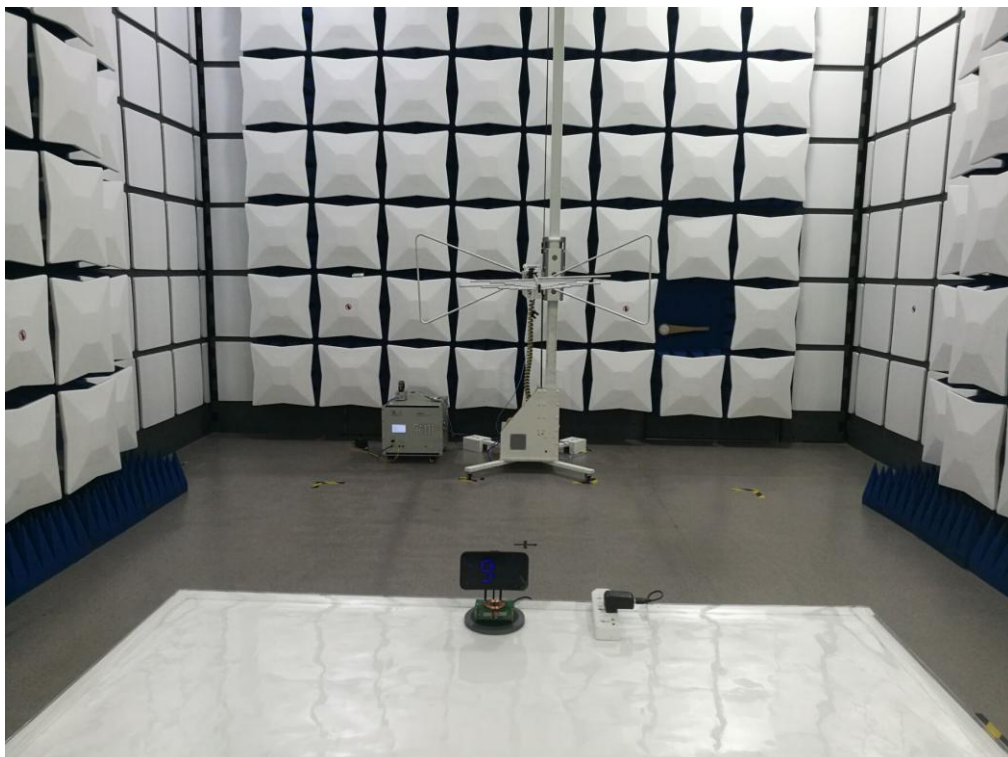
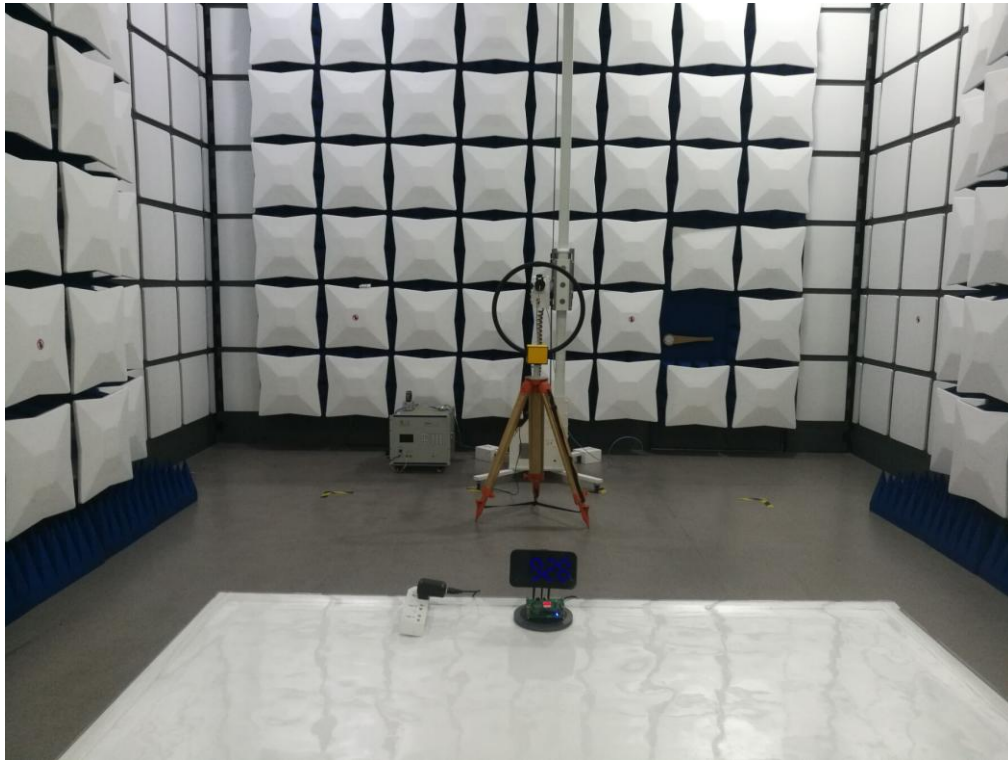
Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]
1	0.1510	10.03	45.69	65.94	20.25	33.12	55.94	22.82
2	0.2559	10.04	34.36	61.56	27.20	25.33	51.56	26.23
3	0.6184	10.05	50.28	56.00	5.72	39.63	46.00	6.37
4	1.0151	10.06	38.89	56.00	17.11	29.34	46.00	16.66
5	2.7647	10.21	37.02	56.00	18.98	27.86	46.00	18.14
6	22.0941	10.16	42.65	60.00	17.35	30.40	50.00	19.60

RESULT: PASS

6. PHOTOGRAPH OF TEST

Radiated Emission



Conducted Emission

