

FCC PART 15C TEST REPORT FOR CERTIFICATION

On Behalf of

mophie LLC

mophie 2-in-1 wireless charging stand+watch

Model Number: WRLS-STAND-WATCH-A

FCC ID: 2ACWB-2IN1A

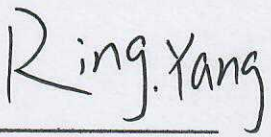
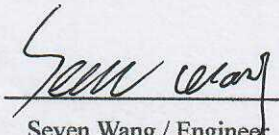
Prepared for:	mophie LLC
	6244 Technology Ave. Kalamazoo, MI49009 United States of America
Prepared By:	EST Technology Co., Ltd.
	Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China
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Report Number:	ESTE-R2005113
Date of Test:	May. 21~27, 2020
Date of Report:	May. 28, 2020

TABLE OF CONTENTS

Description	Page
TEST REPORT VERIFICATION	3
1. GENERAL INFORMATION.....	4
1.1. Description of Device (EUT)	4
2. SUMMARY OF TEST	5
2.1. Summary of test result.....	5
2.2. Test Facilities.....	6
2.3. Measurement uncertainty	7
2.4. Assistant equipment used for test	7
2.5. Block Diagram.....	7
2.6. Test Mode.....	8
2.7. Test Equipment List	8
3. RADIATED EMISSION	9
3.1. Limit	9
3.2. Test Setup	10
3.3. Spectrum Analyzer Setting.....	11
3.4. Test Procedure	11
3.5. Test Result	12
4. AC POWER LINE CONDUCTED EMISSIONS	18
4.1. Limit	18
4.2. Test Setup	18
4.3. Spectrum Analyzer Setting.....	18
4.4. Test Procedure	18
4.5. Test Result	19
5. ANTENNA REQUIREMENTS.....	23
5.1. Limit	23
5.2. Test Result	23
6. TEST SETUP PHOTO.....	24
7. EUT PHOTO	26

EST Technology Co., Ltd.

Applicant:	mophie LLC		
Address:	6244 Technology Ave. Kalamazoo, MI49009 United States of America		
Manufacturer:	mophie LLC		
Address:	6244 Technology Ave. Kalamazoo, MI49009 United States of America		
E.U.T:	mophie 2-in-1 wireless charging stand+watch		
Model Number:	WRLS-STAND-WATCH-A		
Power Supply:	Input: DC 19V/1.3A Output (Qi): 7.5W Output (Magnetic Charger): 5W Output (USB-A): DC 5V/1.0A		
Trade Name:	mophie	Serial No.:	-----
Date of Receipt:	May. 21, 2020	Date of Test:	May. 21~27, 2020
Test Specification:	FCC Part 15 Subpart C ANSI C63.10:2013		
Test Result:	The device described above is tested by EST Technology Co., Ltd. The measurement results were contained in this test report and EST Technology Co., Ltd. was assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliance with the FCC Rules and Regulations Part 15 Subpart C requirements. This report applies to above tested sample only and shall not be reproduced in part without written approval of EST Technology Co., Ltd.		
Prepared by:	Reviewed by:	Date: May 28, 2020 Approved by:	
 Ring Yang / Assistant	 Seven Wang / Engineer	 Iceman Hu / Manager	
Other Aspects:	None.		
Abbreviations: OK/P=passed fail/F=failed n.a/N=not applicable E.U.T=equipment under tested			
This test report is based on a single evaluation of one sample of above mentioned products ,It is not permitted to be duplicated in extracts without written approval of EST Technology Co., Ltd.			

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Product Name	:	mophie 2-in-1 wireless charging stand+watch
Model Number	:	WRLS-STAND-WATCH-A
Operation Frequency	:	110.5 to 326.5 kHz
Max Wireless Charge Power	:	12.5W
Max Field Strength of Fundamental	:	71.51dBuV/m
Modulation Type	:	FSK
Antenna Type	:	Induction coil
Sample Type	:	Prototype production

Note:

For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

2. SUMMARY OF TEST

2.1. Summary of test result

Report Section	Description of Test Item	FCC Standard Section	Results
3	Radiated Emission	15.205 15.209	PASS
4	AC Power Line Conducted Emissions	15.207	PASS
5	Antenna Requirement	15.203	PASS

Note:

1. “N/A” denotes test is not applicable in this test report

2.2. Test Facilities

EMC Lab

: Certificated by CNAS, CHINA
Registration No.: L5288
Date of registration: November 13, 2017

Certificated by FCC, USA
Designation Number: CN1215
Test Firm Registration Number: 722932
Date of registration: November 21, 2017

Certificated by A2LA, USA
Registration No.: 4366.01
Date of registration: November 07, 2017

Certificated by Industry Canada
CAB identifier No.: CN0035
Date of registration: January 04, 2019

Certificated by VCCI, Japan
Registration No.: R-13663; C-14103
Date of registration: July 25, 2017
This Certificate is valid until: July 24, 2020

Certificated by TUV Rheinland, Germany
Registration No.: UA 50413872 0001
Date of registration: July 31, 2018

Certificated by TUV/PS, Shenzhen
Registration No.: SCN1017
Date of registration: January 27, 2011

Certificated by Intertek ETL SEMKO
Registration No.: 2011-RTL-L2-64
Date of registration: April 28, 2011

Certificated by Nemko, Hong Kong
Registration No.: 175193
Date of registration: May 4, 2011

Name of Firm : EST Technology Co., Ltd.

Site Location : Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China

2.3. Measurement uncertainty

Test Item	Uncertainty
Uncertainty for Conduction emission test	$\pm 3.48\text{dB}$
Uncertainty for spurious emissions test (30MHz-1GHz)	$\pm 4.60\text{ dB(Polarize: H)}$
	$\pm 4.68\text{ dB(Polarize: V)}$
Uncertainty for spurious emissions test (1GHz to 18GHz)	$\pm 4.96\text{dB}$
Uncertainty for radio frequency	7×10^{-8}
Uncertainty for conducted RF Power	0.20dB
Uncertainty for Power density test	0.26dB

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

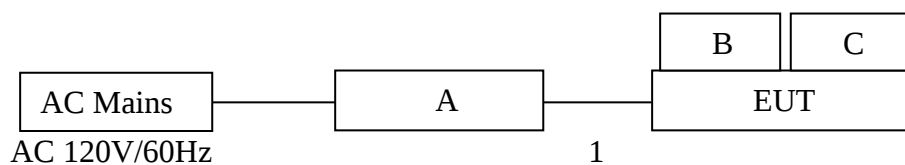
2.4. Assistant equipment used for test

Item	Equipment	Brand	Model Name/Type No.	FCC ID	Series No.
A	Adapter	mophie	PYS-000133	N/A	581920071061
B	Load	N/A	ESTRFWXCZF101	N/A	N/A
C	Apple Watch	Apple	A1889	N/A	FH7WJ1Z8J6GV

Item	Shielded Type	Ferrite Core	Length	Note
1	NO	NO	1.5m	DC Cable

2.5. Block Diagram

For radiated emissions test: EUT was placed on a turn table, which is 0.8 meter high above ground.



(EUT: mophie 2-in-1 wireless charging stand+watch)

2.6. Test Mode

The test mode was selected for the final test as listed below.

Test Item	Test Mode
Radiated Emission	Wireless Charging with Empty Load
	Wireless Charging with Half Load
	Wireless Charging with Full Load
AC Power Line Conducted Emissions	Wireless Charging with Empty Load
	Wireless Charging with Half Load
	Wireless Charging with Full Load

Note:

1. The Full Load is worst case, will be recorded in the report.

2.7. Test Equipment List

For AC Power Line Conducted Emissions Test						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESHS30	EST-E001	LISAI	June 14,19	1 Year
Artificial Mains Network	Rohde & Schwarz	ENV216	EST-E002	LISAI	June 14,19	1 Year
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	EST-E078	LISAI	June 14,19	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A

For Radiated Emission Test(9kHz-30MHz)						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESR7	EST-E047	LISAI	June 14,19	1 Year
Active Loop Antenna	SCHWABE ECK	FMZB 1519B	EST-E054	LISAI	June 14,19	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A
9kHz-30MHz Cable	N/A	EST-001	N/A	N/A	N/A	N/A

For Radiated Emission Test (30MHz-1000MHz)						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESR7	EST-E047	LISAI	June 14,19	1 Year
Bilog Antenna	Teseq	CBL 6111D	EST-E034	LISAI	June 14,19	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A
30-1000MHz Cable	N/A	EST-002	N/A	N/A	N/A	N/A

3. RADIATED EMISSION

3.1. Limit

15.209 Radiated emission limits

Frequency (MHz)	Field Strength($\mu\text{V/m}$)	Distance(m)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Note:

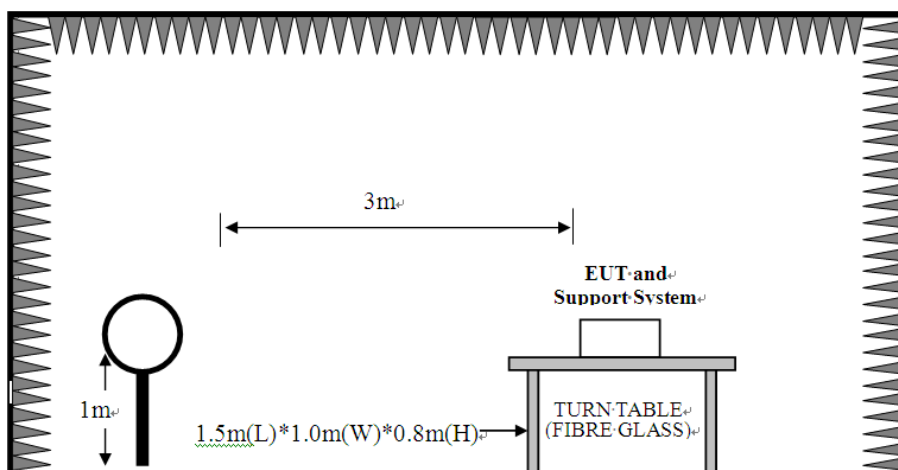
1. Emission level $\text{dB}\mu\text{V} = 20 \log \text{Emission level } \mu\text{V/m}$.
2. The smaller limit shall apply at the cross point between two frequency bands.
3. Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or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

15.205 Restricted frequency band

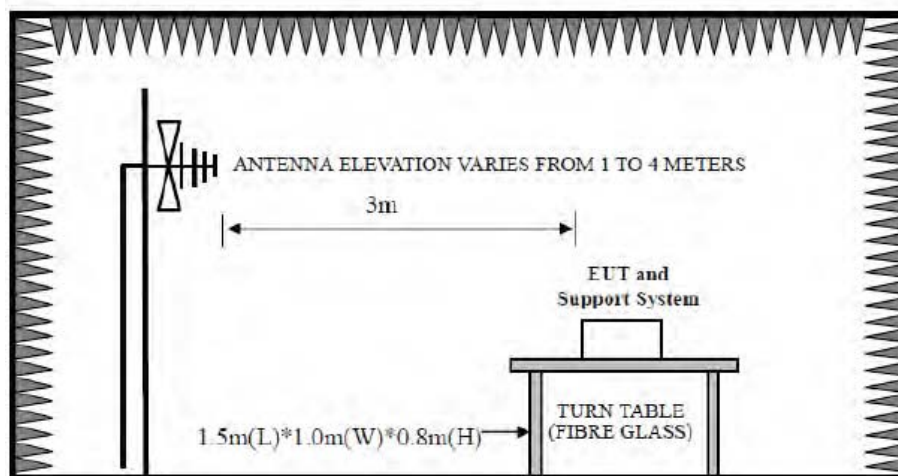
MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 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	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	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)

3.2. Test Setup

9kHz~30MHz



30~1000MHz



3.3. Spectrum Analyzer Setting

For 9KHz-150KHz

Spectrum Parameters	Setting
RBW	300Hz(for Peak&AVG)/CISPR 200Hz(for QP)
VBW	300Hz(for Peak&AVG)/CISPR 200Hz(for QP)
Start frequency	9KHz
Stop frequency	150KHz
Sweep Time	Auto
Detector	PEAK/QP/AVG
Trace Mode	Max Hold

For 150KHz-30MHz

Spectrum Parameters	Setting
RBW	9KHz
VBW	9KHz
Start frequency	150KHz
Stop frequency	30MHz
Sweep Time	Auto
Detector	QP
Trace Mode	Max Hold

For 30MHz-1000MHz

Spectrum Parameters	Setting
RBW	120KHz
VBW	300KHz
Start frequency	30MHz
Stop frequency	1000MHz
Sweep Time	Auto
Detector	QP
Trace Mode	Max Hold

3.4. Test Procedure

- EUT was placed on a turn table, which is 0.8 meter high above ground.
- EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower.
- Set the EUT transmit continuously with maximum output power.
- Spectrum analyzer setting parameters in accordance with section 3.3.
- The turn table can rotate 360 degrees to determine the position of the maximum emission level.
- For below 30MHz test, the center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates both horizontal and vertical polarization to find out the maximum emission level.
- For above 30MHz test, the antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.
- Record the results in the test report.

Note:

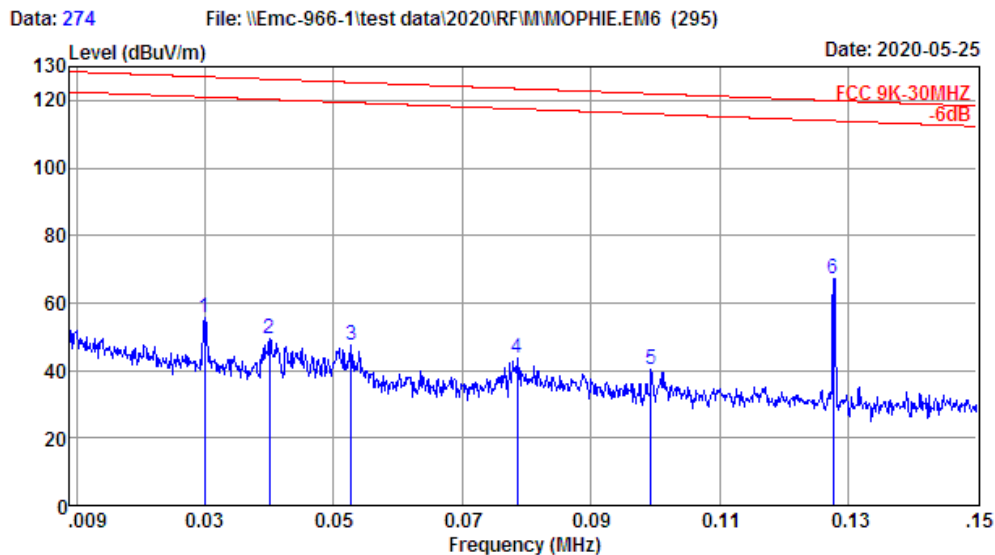
- For emissions below 30MHz, if peak level comply with average limit, then the average level is deemed to comply with average limit.
- For emissions below 30MHz, if peak level comply with QP limit, then the QP level is deemed to comply with QP limit.
- The frequency 127.7kHz are fundamental frequency For 7.5W, 326.5kHz are fundamental frequency For 5W,

3.5. Test Result

Radiated Emission Below 30MHz

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Site no. : 1# 966 Chamber Data no. : 274
 Dis. / Ant. : 3m FMZB 1519B Ant. pol. : VERTICAL
 Limit : FCC 9K-30MHz
 Env. / Ins. : Temp:25.4';Humi:52%;Press:101.52kPa
 Engineer : Carlos
 EUT : mophie 2-in-1 wireless charging stand+
 watch
 Power : DC 19V From Adapter Input AC 120V/60Hz
 M/N : WRLS-STAND-WATCH-A
 Test Mode : TX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.0300	20.42	0.10	34.98	55.50	127.00	71.50	Peak
2	0.0400	20.42	0.10	28.66	49.18	126.28	77.10	Peak
3	0.0527	20.42	0.10	27.10	47.62	125.36	77.74	Peak
4	0.0785	20.29	0.10	23.43	43.82	123.50	79.68	Peak
5	0.0994	20.24	0.10	19.74	40.08	122.00	81.92	Peak
6	0.1277	20.25	0.10	47.00	67.35	119.95	52.60	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

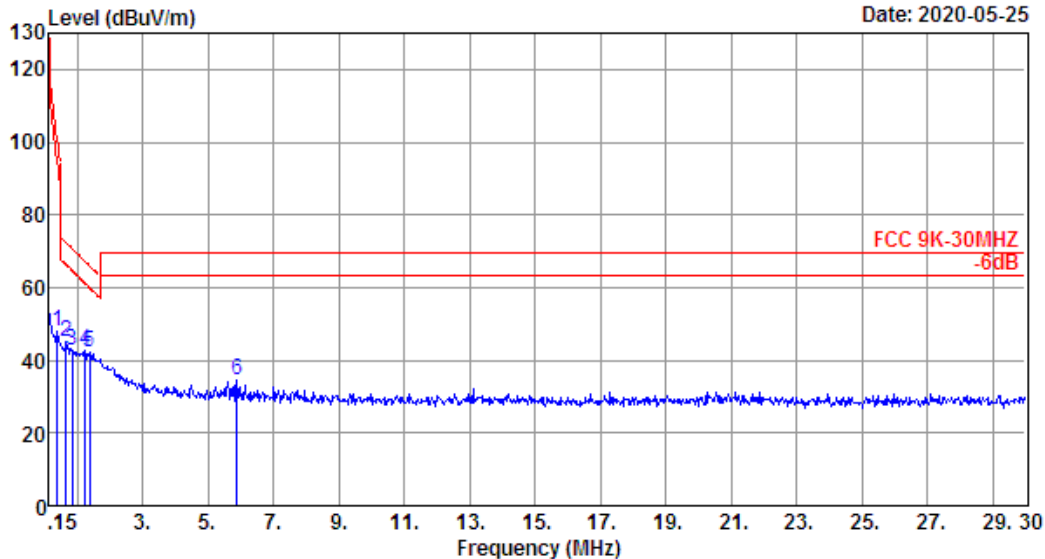
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Data: 275

File: \\Emc-966-1\\test data\\2020\\RF\\M\\MOPHIE.EM6 (295)

Date: 2020-05-25



Site no. : 1# 966 Chamber Data no. : 275
 Dis. / Ant. : 3m FMZB 1519B Ant. pol. : VERTICAL
 Limit : FCC 9K-30MHZ
 Env. / Ins. : Temp:25.4';Humi:52%;Press:101.52kPa
 Engineer : Carlos
 EUT : mophie 2-in-1 wireless charging stand+
 watch
 Power : DC 19V From Adapter Input AC 120V/60Hz
 M/N : WRLS-STAND-WATCH-A
 Test Mode : TX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.3888	20.08	0.10	27.91	48.09	101.10	53.01	Peak
2	0.6575	20.06	0.10	24.95	45.11	72.31	27.20	Peak
3	0.8664	20.01	0.10	22.69	42.80	70.44	27.64	Peak
4	1.2545	20.02	0.10	22.45	42.57	66.99	24.42	Peak
5	1.3739	20.03	0.10	22.20	42.33	65.92	23.59	Peak
6	5.8812	20.00	0.12	14.57	34.69	69.54	34.85	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

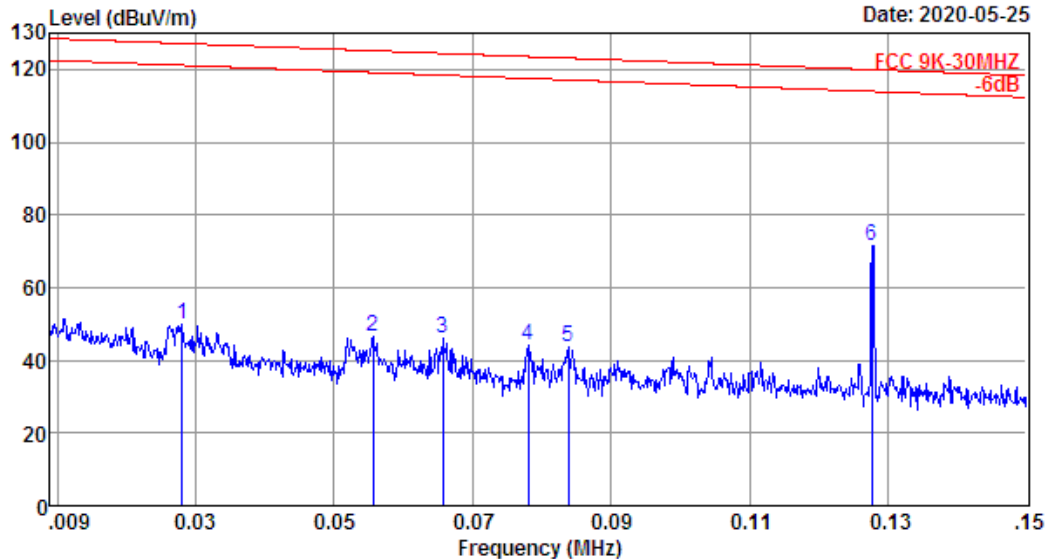
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Data: 284

File: \\Emc-966-1\test data\2020\RF\MMOPHIE.EM6 (295)

Date: 2020-05-25



Site no. : 1# 966 Chamber Data no. : 284
 Dis. / Ant. : 3m FMZB 1519B Ant. pol. : HORIZONTAL
 Limit : FCC 9K-30MHZ
 Env. / Ins. : Temp:25.4'; Humi:52%; Press:101.52kPa
 Engineer : Carlos
 EUT : mophie 2-in-1 wireless charging stand+
 watch
 Power : DC 19V From Adapter Input AC 120V/60Hz
 M/N : WRLS-STAND-WATCH-A
 Test Mode : TX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.0280	20.42	0.10	29.20	49.72	127.15	77.43	Peak
2	0.0557	20.29	0.10	26.31	46.70	125.15	78.45	Peak
3	0.0657	20.29	0.10	25.56	45.95	124.43	78.48	Peak
4	0.0781	20.29	0.10	23.89	44.28	123.53	79.25	Peak
5	0.0839	20.29	0.10	23.23	43.62	123.12	79.50	Peak
6	0.1277	20.25	0.10	51.16	71.51	119.95	48.44	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

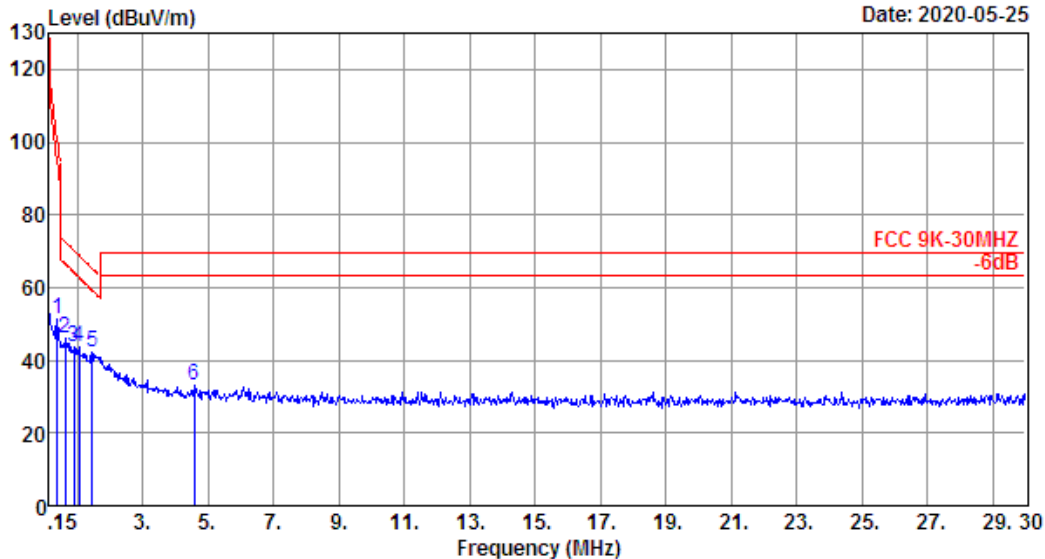
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Data: 285

File: \\Emc-966-1\\test data\\2020\\RF\\M\\MOPHIE.EM6 (295)

Date: 2020-05-25



Site no. : 1# 966 Chamber Data no. : 285
 Dis. / Ant. : 3m FMZB 1519B Ant. pol. : HORIZONTAL
 Limit : FCC 9K-30MHz
 Env. / Ins. : Temp:25.4'; Humi:52%; Press:101.52kPa
 Engineer : Carlos
 EUT : mophie 2-in-1 wireless charging stand+
 watch
 Power : DC 19V From Adapter Input AC 120V/60Hz
 M/N : WRLS-STAND-WATCH-A
 Test Mode : TX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.3888	20.08	0.10	31.21	51.39	101.10	49.71	Peak
2	0.6276	20.06	0.10	26.07	46.23	72.57	26.34	Peak
3	0.8963	20.01	0.10	23.66	43.77	70.18	26.41	Peak
4	1.0754	20.02	0.10	23.41	43.53	68.58	25.05	Peak
5	1.4634	20.01	0.10	22.16	42.27	65.12	22.85	Peak
6	4.5977	20.03	0.12	12.97	33.12	69.54	36.42	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

Radiated Emission Above 30MHz

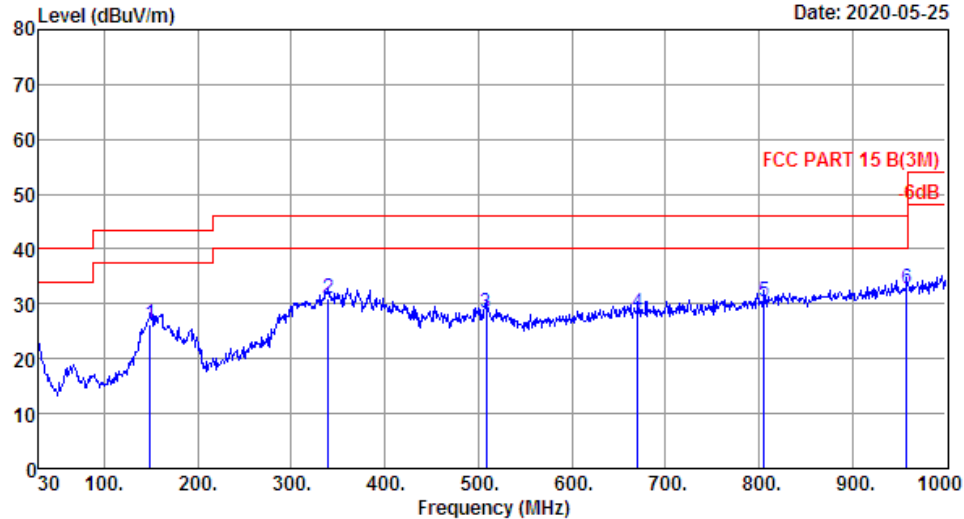
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Data: 251

File: \\Emc-966-1\test data\2020\RF\MMOPHIE.EM6 (295)

Date: 2020-05-25



Site no. : 1# 966 Chamber Data no. : 251
 Dis. / Ant. : 3m 37062 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15 B(3M)
 Env. / Ins. : Temp:25.4';Humi:52%;Press:101.52kPa
 Engineer : Carlos
 EUT : mophie 2-in-1 wireless charging stand+
 watch
 Power : DC 19V From Adapter Input AC 120V/60Hz
 M/N : WRLS-STAND-WATCH-A
 Test Mode : TX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	149.31	11.62	1.09	13.58	26.29	43.50	17.21	QP
2	339.43	14.69	2.05	14.11	30.85	46.00	15.15	QP
3	508.21	18.46	2.70	7.14	28.30	46.00	17.70	QP
4	670.20	21.70	3.23	3.55	28.48	46.00	17.52	QP
5	806.00	23.08	3.62	3.81	30.51	46.00	15.49	QP
6	958.29	24.68	4.60	3.41	32.69	46.00	13.31	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

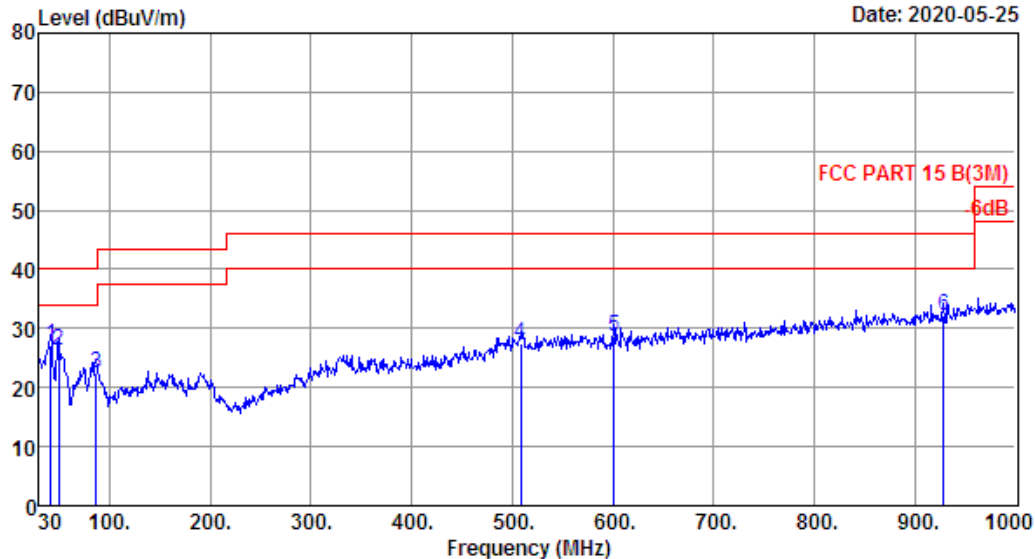
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Data: 252

File: \\Emc-966-1\\test data\\2020\\RF\\M\\MOPHIE.EM6 (295)

Date: 2020-05-25



Site no. : 1# 966 Chamber Data no. : 252
 Dis. / Ant. : 3m 37062 Ant. pol. : VERTICAL
 Limit : FCC PART 15 B(3M)
 Env. / Ins. : Temp:25.4'; Humi:52%; Press:101.52kPa
 Engineer : Carlos
 EUT : mophie 2-in-1 wireless charging stand+
 watch
 Power : DC 19V From Adapter Input AC 120V/60Hz
 M/N : WRLS-STAND-WATCH-A
 Test Mode : TX Mode

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	41.64	11.50	0.23	15.33	27.06	40.00	12.94	QP
2	49.40	8.90	0.28	17.02	26.20	40.00	13.80	QP
3	86.26	8.50	0.76	13.26	22.52	40.00	17.48	QP
4	508.21	18.46	2.70	6.29	27.45	46.00	18.55	QP
5	601.33	20.42	2.99	5.28	28.69	46.00	17.31	QP
6	928.22	24.08	4.13	4.05	32.26	46.00	13.74	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. Margin= Limit - Emission Level.
 3. The emission levels that are 20dB below the official limit are not reported.

4. AC POWER LINE CONDUCTED EMISSIONS

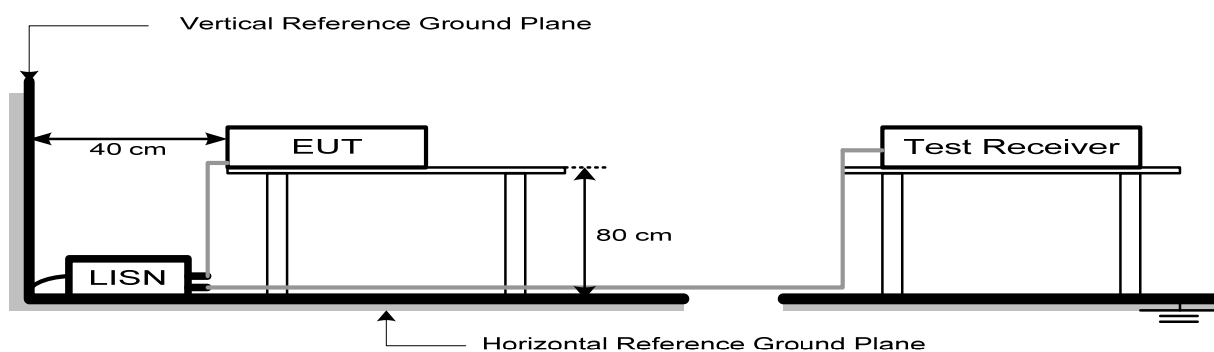
4.1. Limit

Frequency			Maximum RF Line Voltage	
			Quasi-Peak Level dB(μ V)	Average Level dB(μ V)
150kHz	~	500kHz	66 ~ 56*	56 ~ 46*
500kHz	~	5MHz	56	46
5MHz	~	30MHz	60	50

Note:

1. * Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

4.2. Test Setup



4.3. Spectrum Analyzer Setting

Spectrum Parameters	Setting
RBW	9KHz
VBW	9KHz
Start frequency	150KHz
Stop frequency	30MHz
Sweep Time	Auto
Detector	QP/AVG
Trace Mode	Max Hold

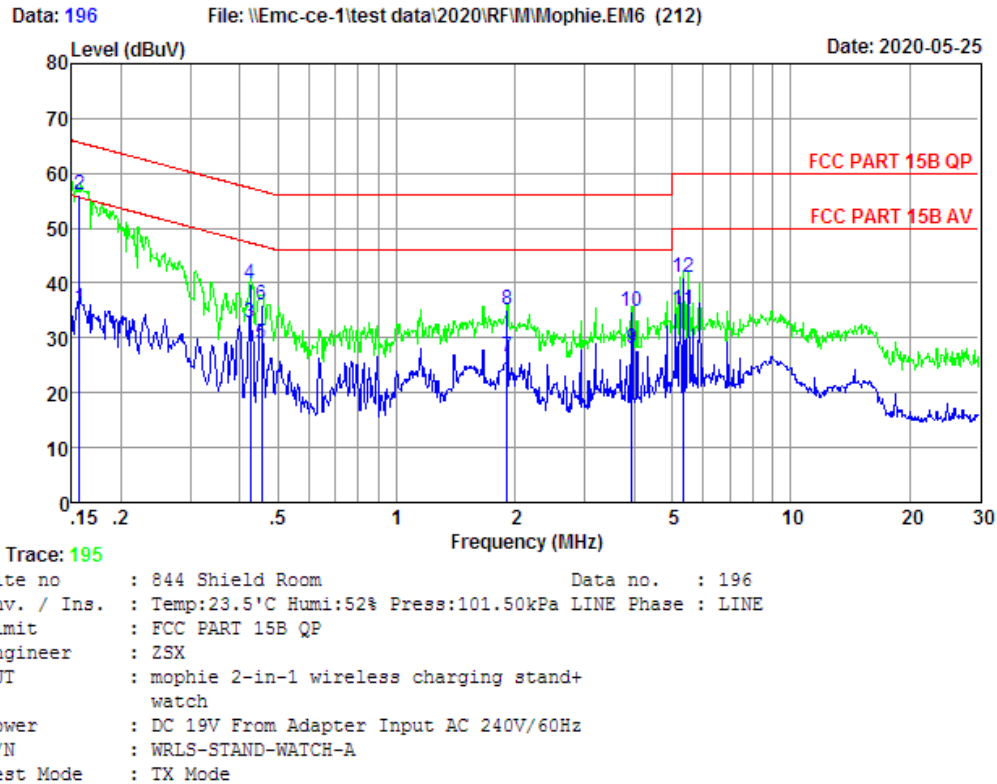
4.4. Test Procedure

- a. The EUT was placed on a non-metallic table, 80cm above the ground plane.
- b. The EUT Power connected to the power mains through a line impedance stabilization network.
- c. Provides a 50 ohm coupling impedance for the EUT (Please refer the block diagram of the test setup and photographs).
- d. Set the EUT transmit continuously with maximum output power.
- e. Spectrum analyzer setting parameters in accordance with section 4.3.
- f. The AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.10: 2013 on Conducted Emission Test.
- g. Record the results in the test report.

4.5. Test Result

EST Technology

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	Freq. (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.1565	9.79	9.69	16.07	35.55	55.65	20.10	Average
2	0.1565	9.79	9.69	36.52	56.00	65.65	9.65	QP
3	0.4260	9.88	9.92	12.90	32.70	47.33	14.63	Average
4	0.4260	9.88	9.92	19.93	39.73	57.33	17.60	QP
5	0.4539	9.91	9.92	9.23	29.06	46.80	17.74	Average
6	0.4539	9.91	9.92	16.16	35.99	56.80	20.81	QP
7	1.9080	9.80	9.96	6.84	26.60	46.00	19.40	Average
8	1.9080	9.80	9.96	15.34	35.10	56.00	20.90	QP
9	3.9430	9.86	9.99	8.09	27.94	46.00	18.06	Average
10	3.9430	9.86	9.99	15.05	34.90	56.00	21.10	QP
11	5.3615	9.86	10.01	15.16	35.03	50.00	14.97	Average
12	5.3615	9.86	10.01	21.25	41.12	60.00	18.88	QP

Remarks: 1. Emission Level= LISN Factor + Cable Loss + Reading.
 2. Margin=Limit - Emission Level.
 3. If the average limit is met when using a quasi-peak detector,
 the EUT shall be deemed to meet both limits and measurement
 with average detector is unnecessary.

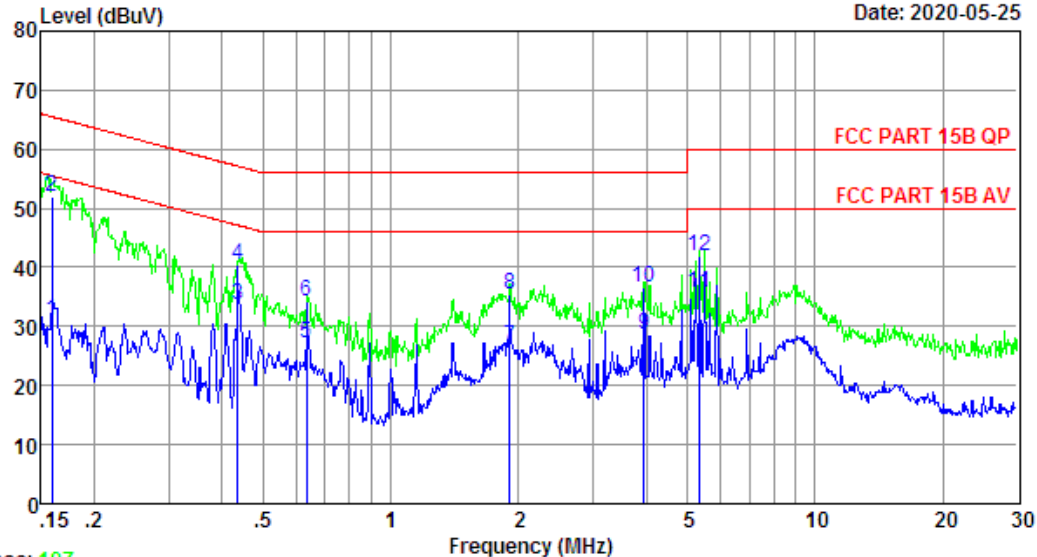
EST Technology

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Data: 198

File: \\Emc-ce-1\\test data\\2020\\RF\\MM\\Mophie.EM6 (212)

Date: 2020-05-25



Trace: 197

Site no : 844 Shield Room Data no. : 198
 Env. / Ins. : Temp:23.5°C Humi:52% Press:101.50kPa LINE Phase : NEUTRAL
 Limit : FCC PART 15B QP
 Engineer : ZSX
 EUT : mophie 2-in-1 wireless charging stand+ watch
 Power : DC 19V From Adapter Input AC 240V/60Hz
 M/N : WRLS-STAND-WATCH-A
 Test Mode : TX Mode

	Freq. (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.1590	9.62	9.69	11.60	30.91	55.52	24.61	Average
2	0.1590	9.62	9.69	32.74	52.05	65.52	13.47	QP
3	0.4351	9.77	9.92	14.08	33.77	47.15	13.38	Average
4	0.4351	9.77	9.92	20.64	40.33	57.15	16.82	QP
5	0.6338	9.76	9.92	7.46	27.14	46.00	18.86	Average
6	0.6338	9.76	9.92	14.46	34.14	56.00	21.86	QP
7	1.9080	9.68	9.96	6.83	26.47	46.00	19.53	Average
8	1.9080	9.68	9.96	15.75	35.39	56.00	20.61	QP
9	3.9430	9.87	9.99	8.91	28.77	46.00	17.23	Average
10	3.9430	9.87	9.99	16.86	36.72	56.00	19.28	QP
11	5.3615	9.86	10.01	15.95	35.82	50.00	14.18	Average
12	5.3615	9.86	10.01	21.95	41.82	60.00	18.18	QP

Remarks: 1. Emission Level= LISN Factor + Cable Loss + Reading.
 2. Margin=Limit - Emission Level.
 3. If the average limit is met when using a quasi-peak detector,
 the EUT shall be deemed to meet both limits and measurement
 with average detector is unnecessary.

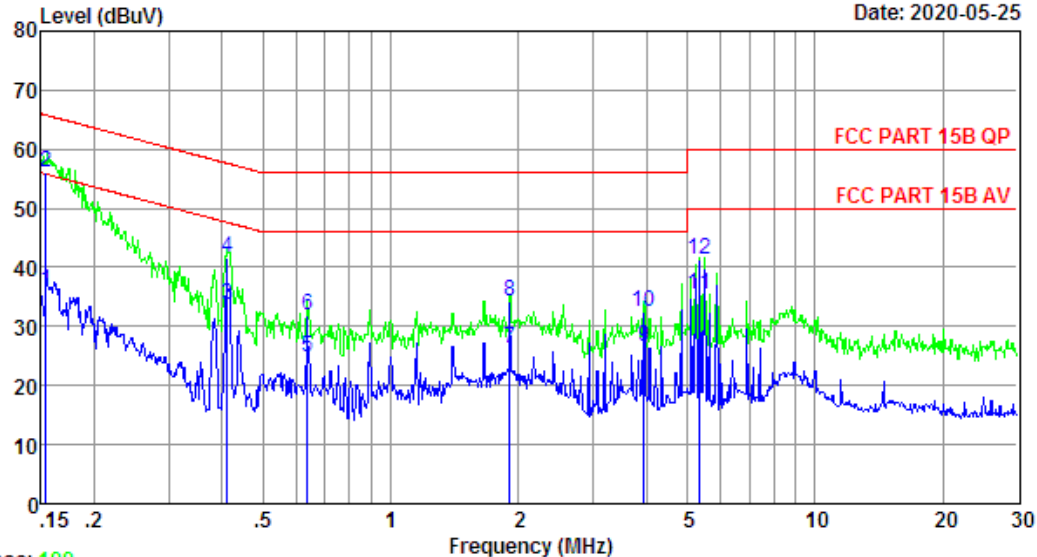
EST Technology

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Data: 200

File: \\Emc-ce-1\\test data\\2020\\RF\\MMophie.EM6 (212)

Date: 2020-05-25



Trace: 199
Site no : 844 Shield Room Data no. : 200
Env. / Ins. : Temp:23.5'C Humi:52% Press:101.50kPa LINE Phase : LINE
Limit : FCC PART 15B QP
Engineer : ZSX
EUT : mophie 2-in-1 wireless charging stand+ watch
Power : DC 19V From Adapter Input AC 120V/60Hz
M/N : WRLS-STAND-WATCH-A
Test Mode : TX mode

	Freq. (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.1540	9.79	9.69	16.62	36.10	55.78	19.68	Average
2	0.1540	9.79	9.69	36.73	56.21	65.78	9.57	QP
3	0.4127	9.84	9.92	13.99	33.75	47.59	13.84	Average
4	0.4127	9.84	9.92	21.77	41.53	57.59	16.06	QP
5	0.6372	9.84	9.92	5.01	24.77	46.00	21.23	Average
6	0.6372	9.84	9.92	12.14	31.90	56.00	24.10	QP
7	1.9080	9.80	9.96	6.47	26.23	46.00	19.77	Average
8	1.9080	9.80	9.96	14.56	34.32	56.00	21.68	QP
9	3.9430	9.86	9.99	6.86	26.71	46.00	19.29	Average
10	3.9430	9.86	9.99	12.74	32.59	56.00	23.41	QP
11	5.3615	9.86	10.01	15.68	35.55	50.00	14.45	Average
12	5.3615	9.86	10.01	21.42	41.29	60.00	18.71	QP

Remarks: 1. Emission Level= LISN Factor + Cable Loss + Reading.
2. Margin=Limit - Emission Level.
3. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

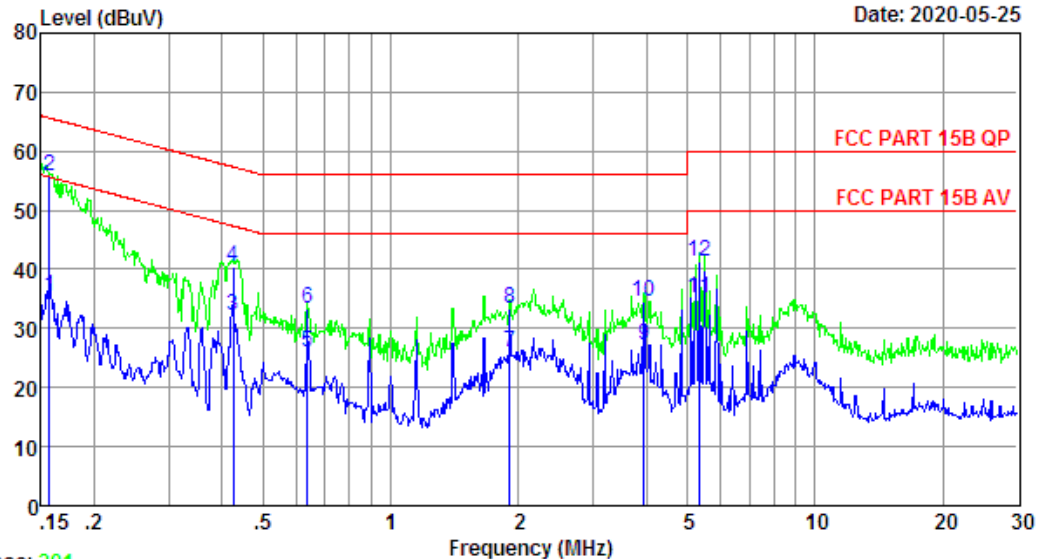
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Data: 202

File: \\Emc-ce-1\\test data\\2020\\RF\\MMophie.EM6 (212)

Date: 2020-05-25



Trace: 201

Site no : 844 Shield Room Data no. : 202
 Env. / Ins. : Temp:23.5°C Humi:52% Press:101.50kPa LINE Phase : NEUTRAL
 Limit : FCC PART 15B QP
 Engineer : ZSX
 EUT : mophie 2-in-1 wireless charging stand+ watch
 Power : DC 19V From Adapter Input AC 120V/60Hz
 M/N : WRLS-STAND-WATCH-A
 Test Mode : TX Mode

	Freq. (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.1565	9.62	9.69	16.06	35.37	55.65	20.28	Average
2	0.1565	9.62	9.69	36.47	55.78	65.65	9.87	QP
3	0.4260	9.77	9.92	12.41	32.10	47.33	15.23	Average
4	0.4260	9.77	9.92	20.63	40.32	57.33	17.01	QP
5	0.6372	9.76	9.92	6.35	26.03	46.00	19.97	Average
6	0.6372	9.76	9.92	13.64	33.32	56.00	22.68	QP
7	1.9080	9.68	9.96	6.41	26.05	46.00	19.95	Average
8	1.9080	9.68	9.96	13.63	33.27	56.00	22.73	QP
9	3.9430	9.87	9.99	7.42	27.28	46.00	18.72	Average
10	3.9430	9.87	9.99	14.64	34.50	56.00	21.50	QP
11	5.3615	9.86	10.01	15.29	35.16	50.00	14.84	Average
12	5.3615	9.86	10.01	21.53	41.40	60.00	18.60	QP

Remarks: 1. Emission Level= LISN Factor + Cable Loss + Reading.
 2. Margin=Limit - Emission Level.
 3. If the average limit is met when using a quasi-peak detector,
 the EUT shall be deemed to meet both limits and measurement
 with average detector is unnecessary.

5. ANTENNA REQUIREMENTS

5.1. Limit

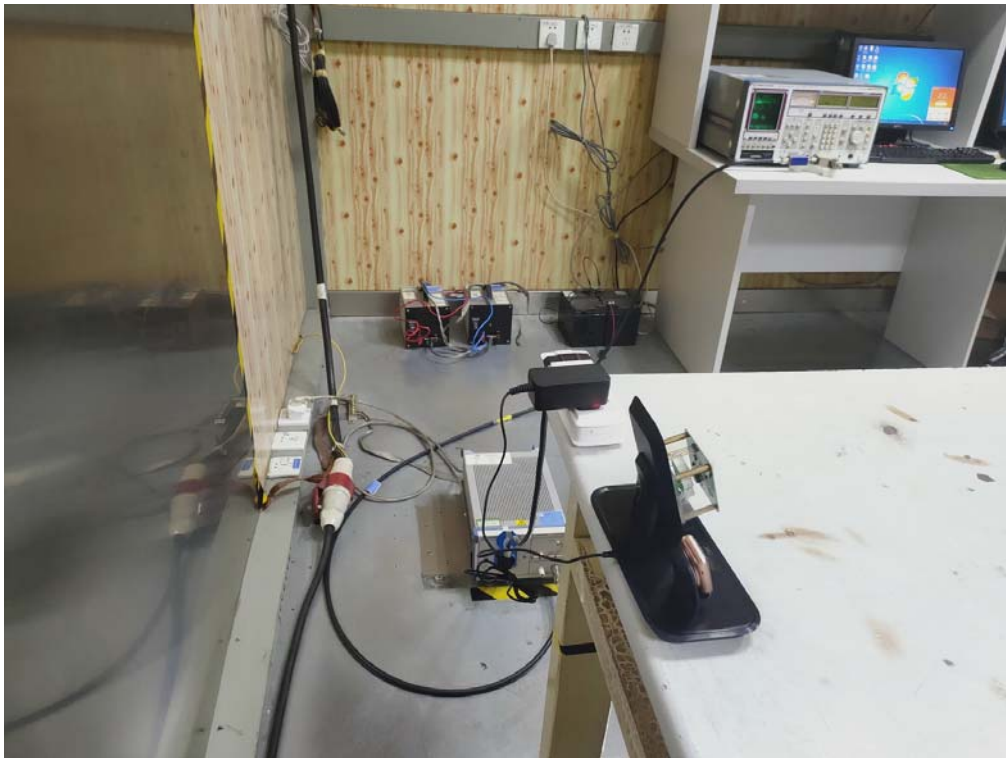
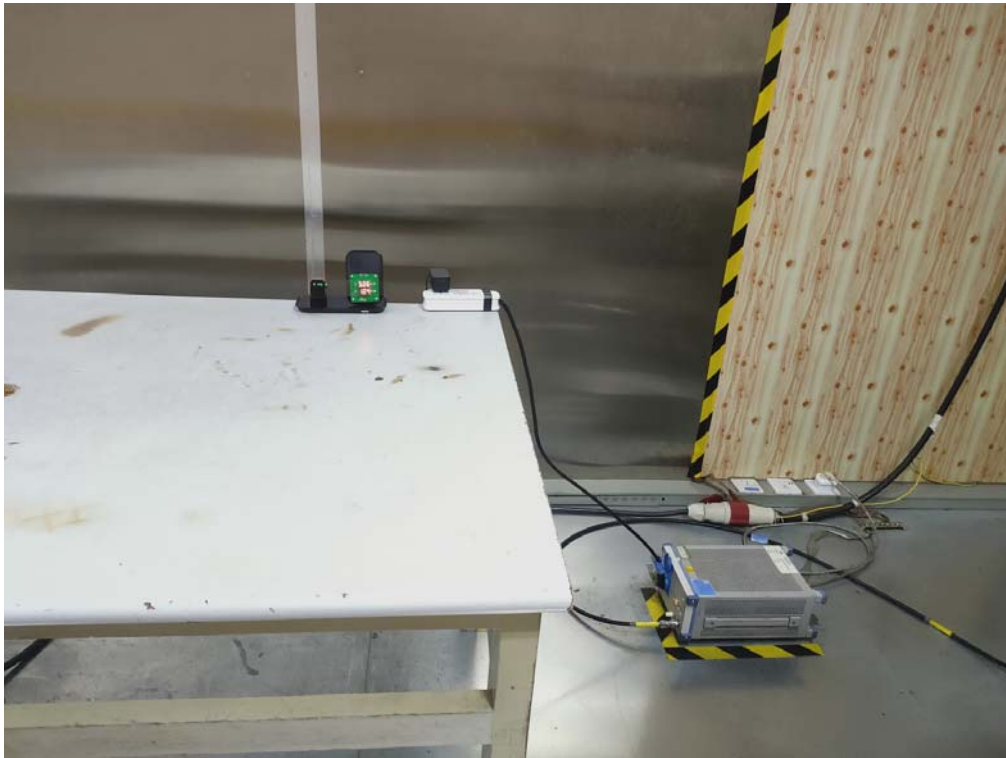
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§15.211, 15.213, 15.217, 15.219, 15.221, or §15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

5.2. Test Result

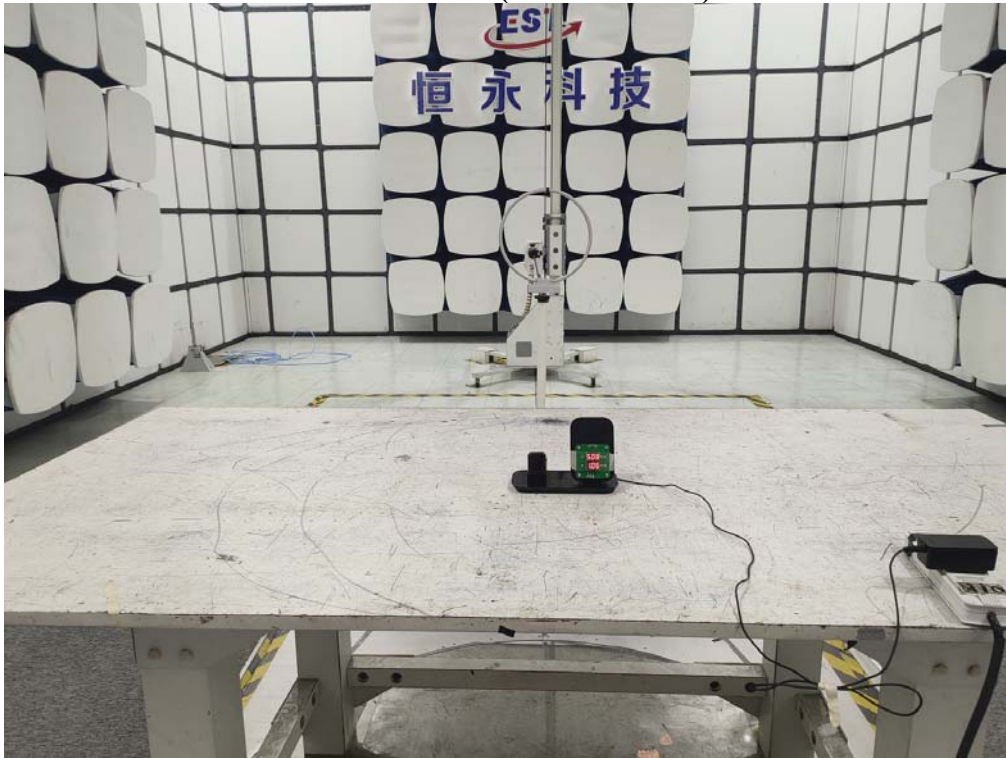
The antennas used for this product is coil antenna, so compliance with antenna requirements.
(Please refer to the EUT photo for details)

6. TEST SETUP PHOTO

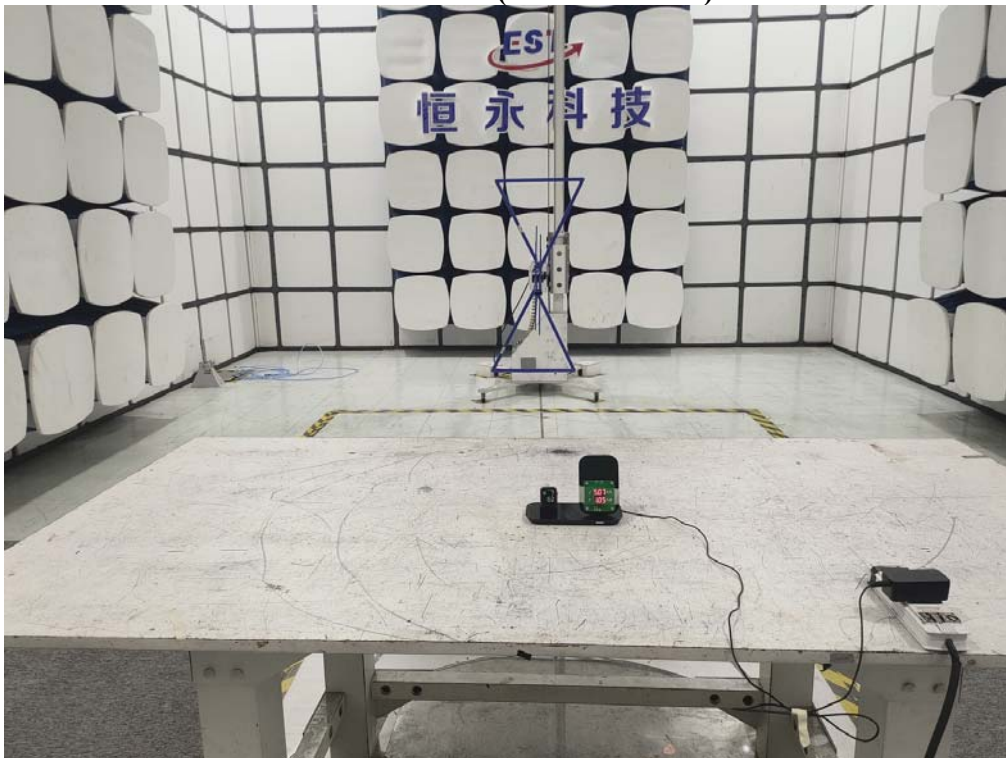
Conducted Emissions Test



Radiated Test (Below 30MHz)



Radiated Test (Above 30MHz)



7. EUT PHOTO

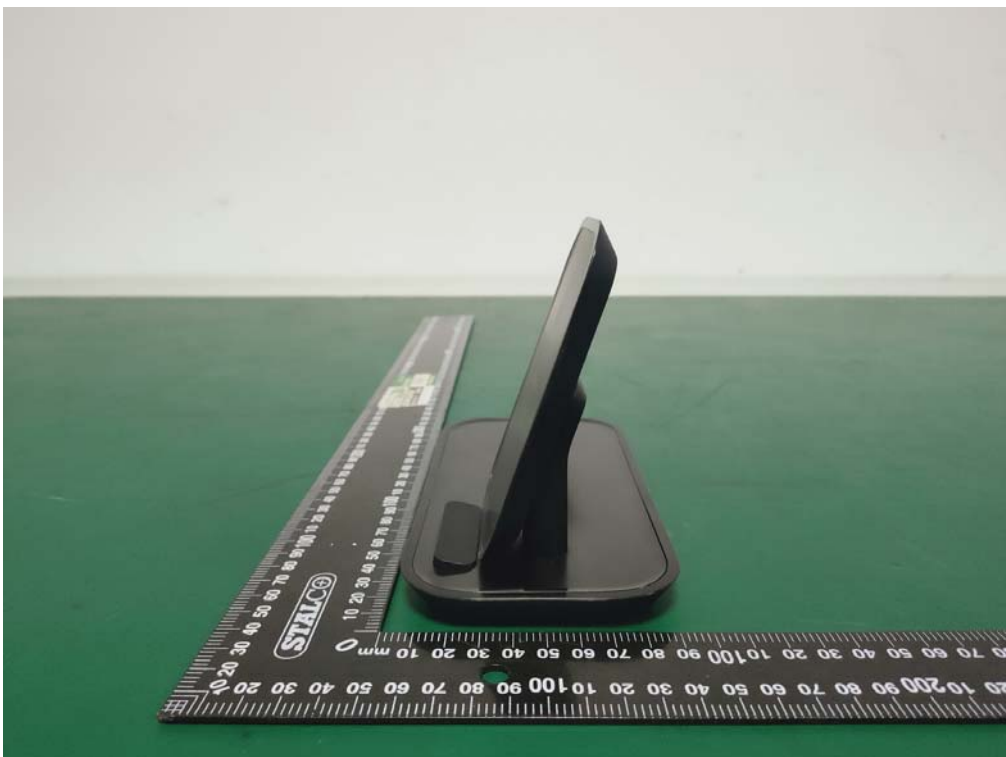
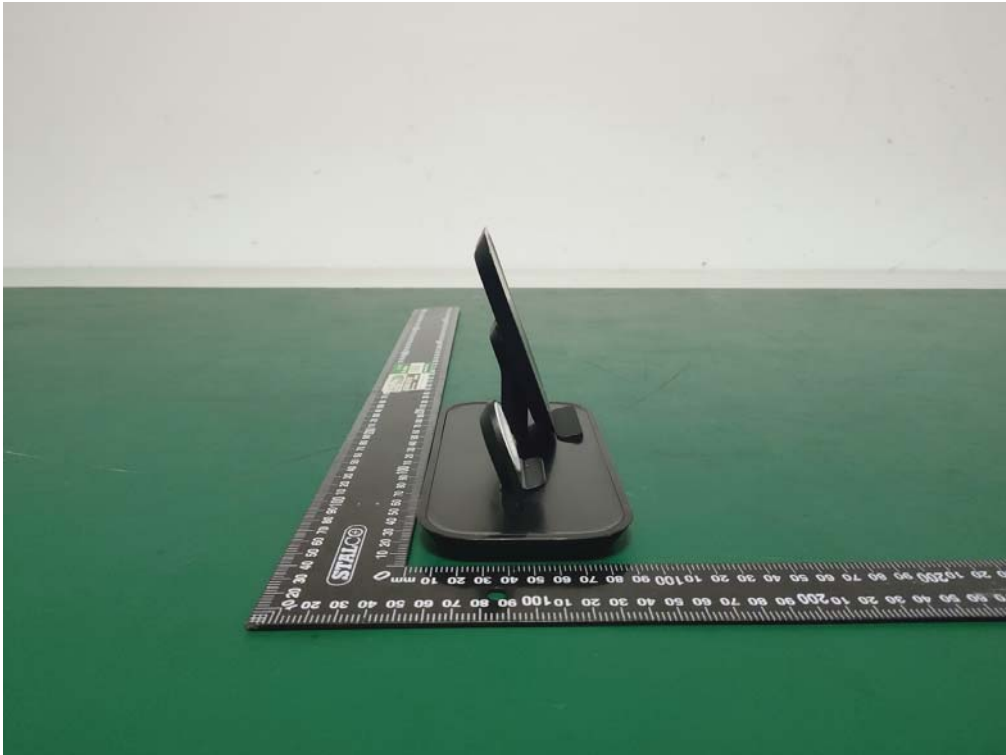
External Photos M/N: WRLS-STAND-WATCH-A



External Photos
M/N: WRLS-STAND-WATCH-A



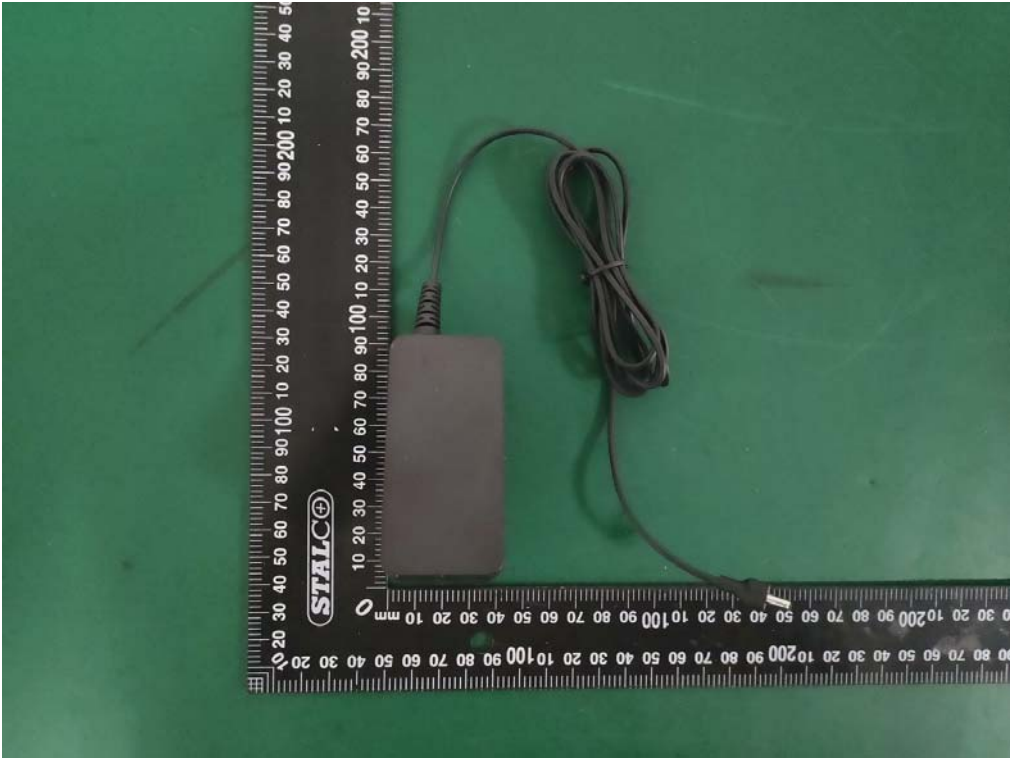
External Photos
M/N: WRLS-STAND-WATCH-A



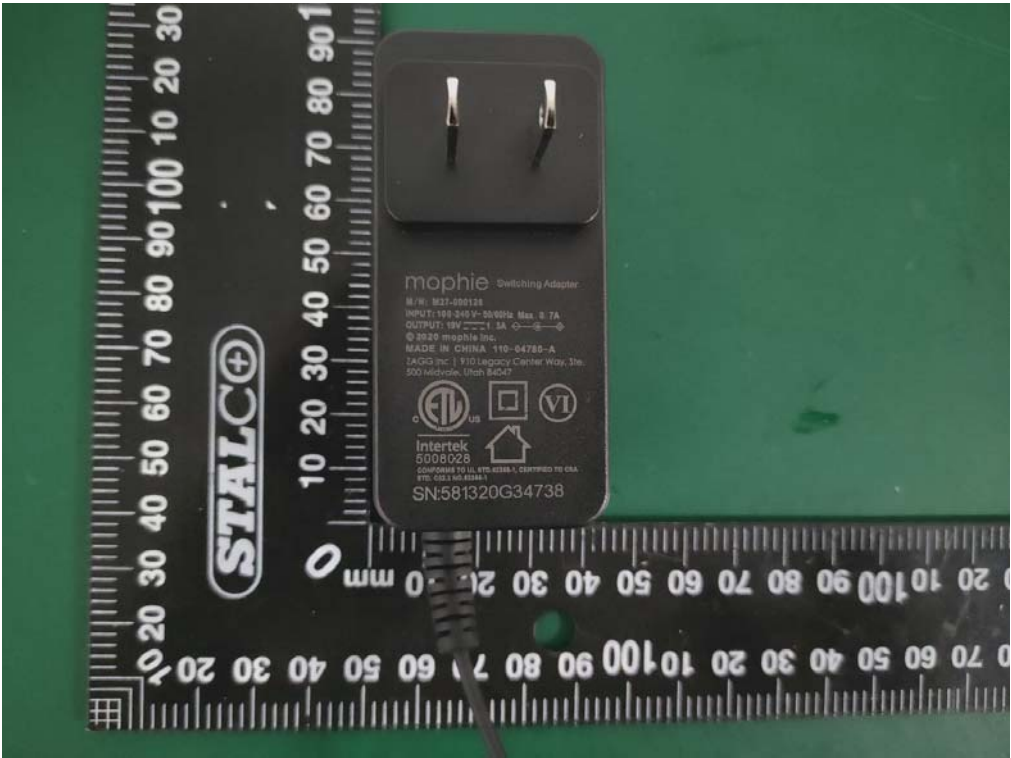
External Photos
M/N: WRLS-STAND-WATCH-A



Power Supply



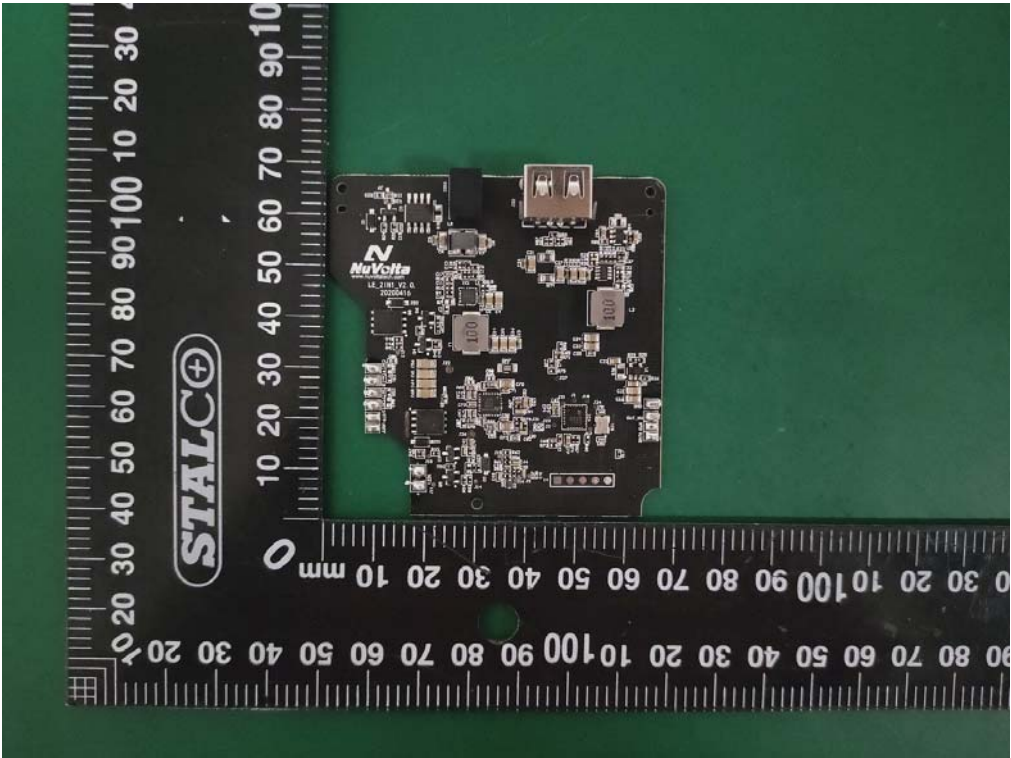
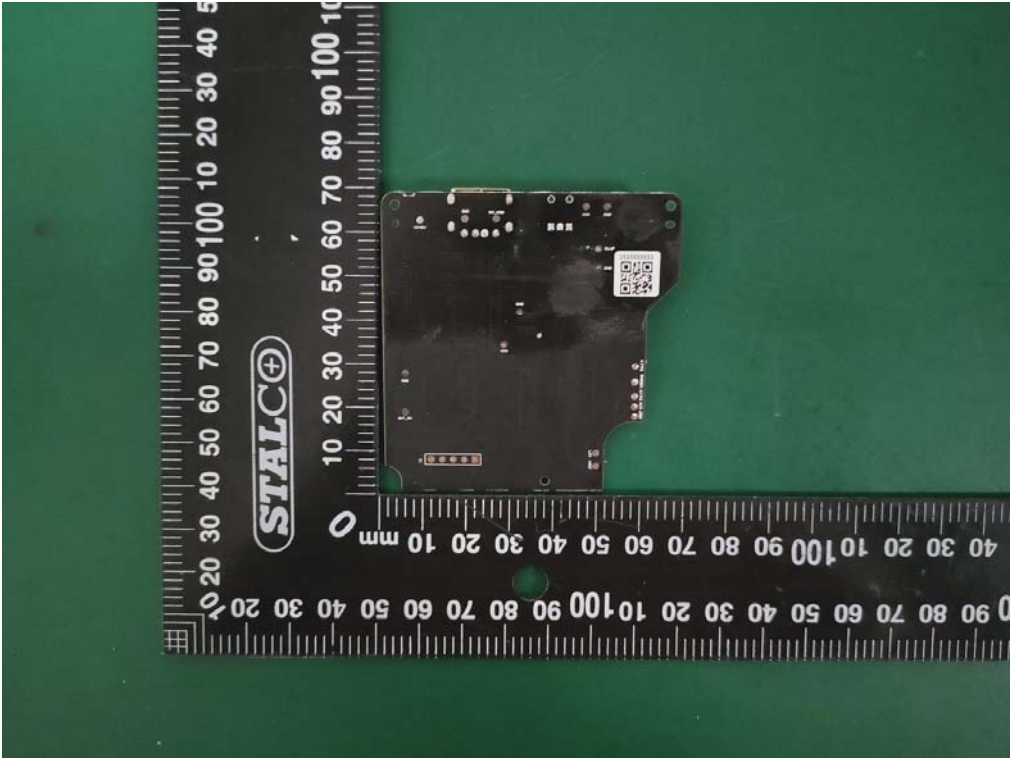
Power Supply



Internal Photos
M/N: WRLS-STAND-WATCH-A



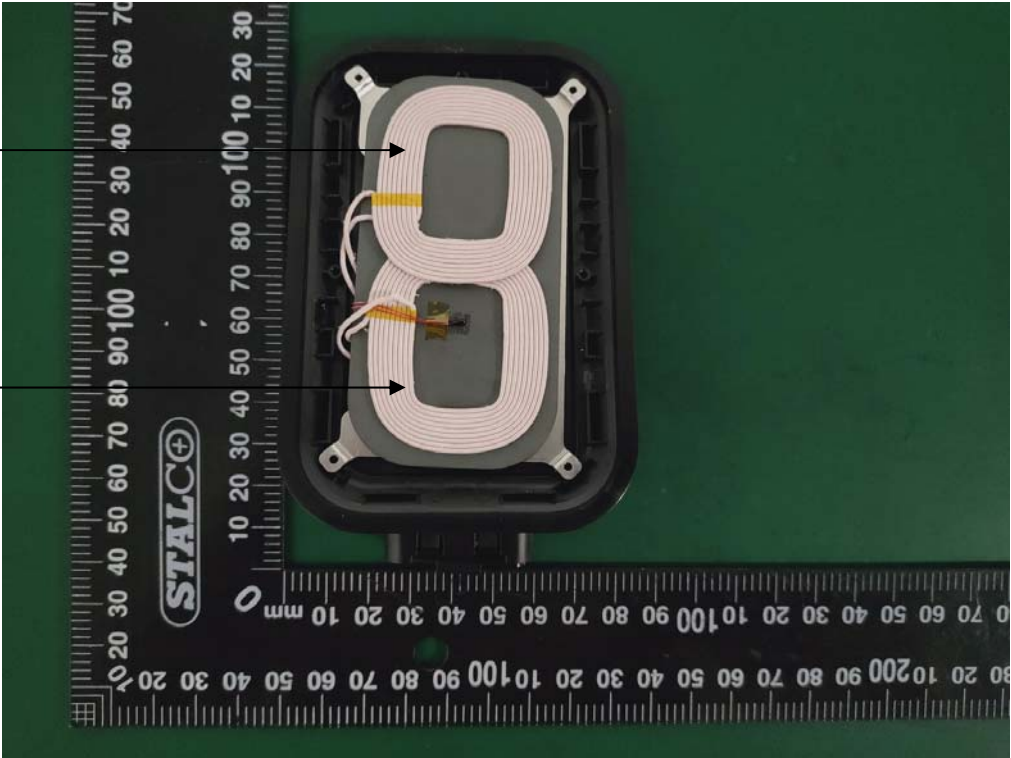
Internal Photos
M/N: WRLS-STAND-WATCH-A



Internal Photos
M/N: WRLS-STAND-WATCH-A

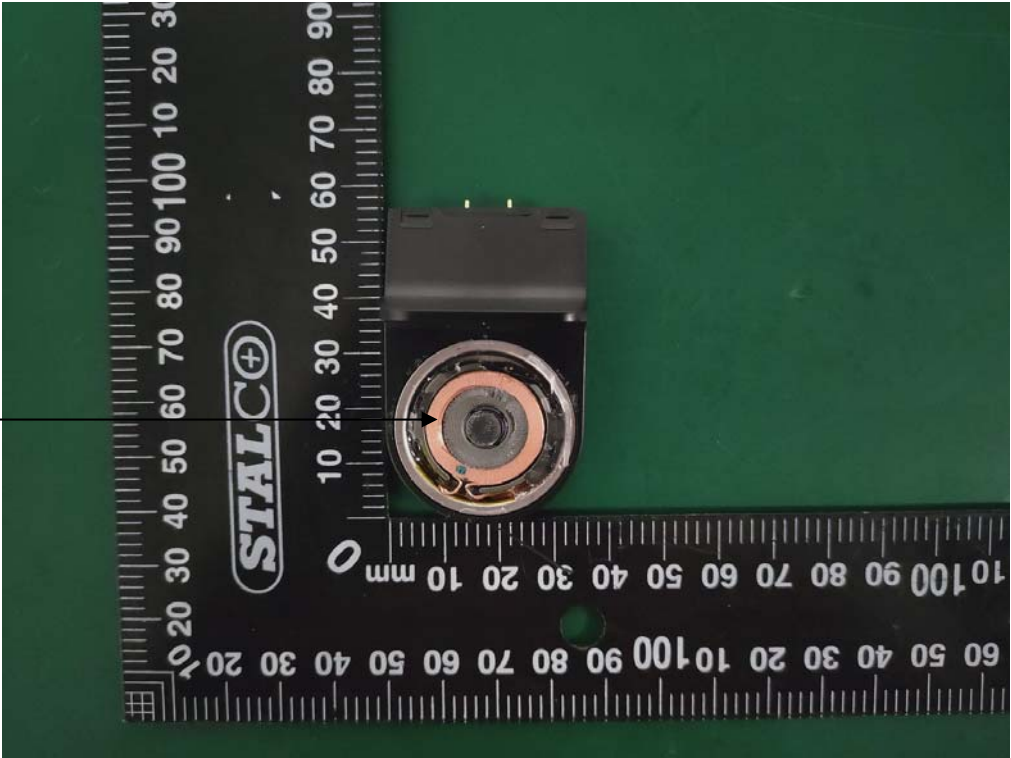
Coil
Antenna

Coil
Antenna



Internal Photos
M/N: WRLS-STAND-WATCH-A

Coil
Antenna



End of Test Report