





Report No.: FR040114AW

# **FCC Radio Test Report**

FCC ID : 2AA7Y-MOSHIQI006

Equipment : Lounge Q Wireless Charging Stand

Brand Name : moshi

Model Name : 99MO022218

Applicant : Aevoe Inc.

3F, No. 42, Sec. 2, Zhongshan N. Rd., Zhongshan

Dist., Taipei City 104, Taiwan

Manufacturer : Powergene Technology Co., Ltd. Taiwan Branch

1F-5, No.1, Wuquan 1st Rd., Xinzhuang Dist.,

**New Taipei City, Taiwan** 

Standard : 47 CFR FCC Part 15.209

The product was received on Apr. 01, 2020, and testing was started from Apr. 08, 2020 and completed on Jun. 11, 2020. We, SPORTON INTERNATIONAL INC. Hsinhua Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. Hsinhua Laboratory, the test report shall not be reproduced except in full.

Approved by: Allen Lin

SPORTON INTERNATIONAL INC. Hsinhua Laboratory

No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.)

TEL: 886-3-327-3456 FAX: 886-3-327-0973

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# History of this test report

Report No.	Version	Description	Issued Date
FR040114AW	01	Initial issue of report	Jun. 08, 2021
FR040114AW	02	Applicant address was revised This report is the latest version replacing for the report issued on Jun. 08, 2021	Sep. 22, 2021

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# **Summary of Test Result**

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Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
1.1.2	15.203	Antenna Requirement	PASS	-
3.1	15.207	AC Power-line Conducted Emissions	PASS	-
3.2	15.209	Transmitter Radiated Emissions	PASS	-
3.3	15.215(c)	Emission Bandwidth	PASS	-

#### **Declaration of Conformity:**

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

### **Comments and Explanations:**

None.

Reviewed by: Sam Tsai

Report Producer: Ann Hou

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# 1 General Description

# 1.1 Information

### 1.1.1 General Information

Wireless Power Transfer General Information				
Frequency Range	Modulation Mode	Charging Freq. (kHz)	Field Strength (dBuV/m)	
122-145 kHz	ASK	127.398	76.63	
Power Transfer Method	Output power from each primary coil	That may have multiple primary coils	Charging Method	
Magnetic induction and only single primary coil	<15W	No	Client directly contact	
Note 1: Field strength performed peak level at 3m.				

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#### 1.1.2 Antenna Information

_				
	Antenna Category			
	Equipment placed on the market without antennas			
$\boxtimes$	Integral antenna (antenna permanently attached)			
	☐ Temporary RF connector provided			
	No temporary RF connector provided Transmit chains bypass antenna and soldered temporary RF connector provided for connected measurement. In case of conducted measurements the transmitter shall be connected to the measuring equipment via a suitable attenuator and correct for all losses in the RF path.			
	External antenna (dedicated antennas)			

Antenna General Information			
No.	Ant. Type		
1	Integral	Wireless charging antenna coils	

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## 1.1.3 EUT Information

	Identify EUT				
WPC Chip		Brand Name : SHANDONG ZHONGRUI ELECTRONICS CO., LTD Model Name : ZR-TX-010			
		Operational Condition			
EU	T Power Type	From AC Adapter			
		Type of EUT			
$\boxtimes$	Stand-alone				
	Combined (EUT where	e the radio part is fully integrated within another device)			
	Combined Equipment - Brand Name / Model No.:				
	Plug-in radio (EUT inte	ended for a variety of host systems)			
	Host System - Brand Name / Model No.:				
	Other:				
1.1.4	4 Test Signal Dut	y Cycle			
<u> </u>		Operated Mode for Worst Duty Cycle			
$\boxtimes$	Operated normally mode for worst duty cycle				
	Operated test mode fo	r worst duty cycle			
		Test Signal Duty Cycle (x)			
$\boxtimes$	100%				

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# 1.2 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

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- 47 CFR FCC Part 15
- ANSI C63.10-2013

The following reference test guidance is not within the scope of accreditation of TAF:

- KDB 680106 D01 RF Exposure Wireless Charging Apps v03r01
- KDB 414788 D01 v01r01

## 1.3 Testing Location Information

Test Lab. : Sporton International Inc. Hsinhua Laboratory				
	ADD: No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan (R.O.C.)			
(TAF: 3785)	<b>TEL</b> : 886-3-327-3456			
	Test site Designation No. TW3785 with FCC.			
Test Condition			Test Date	
AC Conduction	CO04-HY	Jeff	23.5~26.3°C / 51~62%	11/Jun/2020
RF Conducted	TH01-HY	Barry	24.2~25.3°C / 55~61%	13/Apr/2020
Radiated Emission	03CH03-HY	Jeff	23.5~25.2°C /52~61%	08/Apr/2020~13/Apr/2020
Wen 33rd. St. ADD: No.14-1, Ln. 19, Wen 33rd St., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)				
(TAF: 3785)	(TAF: 3785) TEL: 886-3-318-0787 FAX: 886-3-318-0287			
Test site Designation No. TW0008 with FCC.				

## 1.4 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	0.9 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	2.4 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.7 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.0 dB	Confidence levels of 95%
Temperature	0.41 °C	Confidence levels of 95%
Humidity	3.4 %	Confidence levels of 95%

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# 2 Test Configuration of EUT

# 2.1 Test Condition

Condition Item Abbreviation/Remark		Remark
Tnom Vnom	Tnom	20°C
-	Vnom	120V

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# 2.2 The Worst Case Configuration

Mode	Field Strength (dBuV/m at 3 m)	Charger Frequencies (kHz)
WPC	76.63	127.398

Note.1: Wireless charger were performed all charging conditions including variable loading and non-charging operation, the worst mode is full charging loading.

Note.2: Wireless charger frequencies are variable frequency range (122-145 kHz) and depend on charging loading.

# 2.3 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests		
Tests Item AC power-line conducted emissions		
Condition AC power-line conducted measurement for line and neutral		
Operating Made	СТХ	
Operating Mode		

The Worst Case Mode for Following Conformance Tests				
Tests Item	ransmitter Radiated Emissions, Emission Bandwidth			
Test Condition	Radiated measurement			
Operating Mode	CTX			
Operating Mode				
	Z Plane			
Orthogonal Planes of EUT				

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# 2.4 Support Equipment

	Support Equipment – AC Conduction					
No.	No. Equipment Brand Name Model Name FCC ID					
1	iPhone	APPLE	A1905	-		
2	AC adapter	Moshi	42W	-		

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Note: Support equipment No.2 was provided by customer.

	Support Equipment – Conducted					
No.	No. Equipment Brand Name Model Name FCC ID					
1	iPhone	APPLE	A1905	-		
2	AC adapter	Moshi	42W	-		

Note: Support equipment No.2 was provided by customer.

	Support Equipment – Radiated						
No.	No. Equipment Brand Name Model Name FCC ID						
1	iPhone	APPLE	A1905	-			
2	AC adapter	Moshi	42W	-			

Note: Support equipment No.2 was provided by customer.

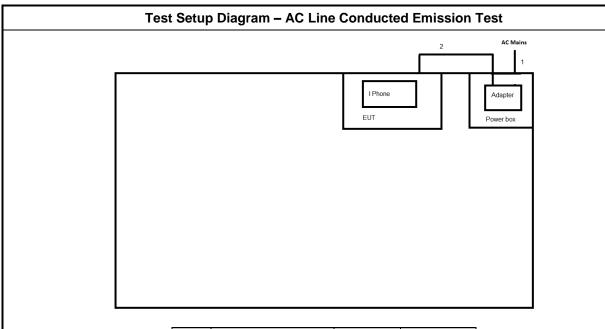
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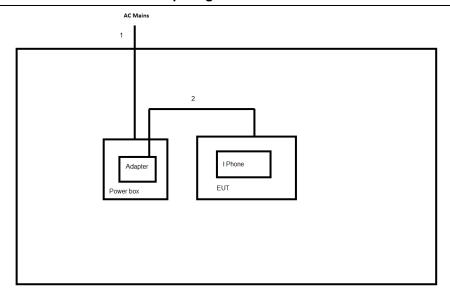


#### 2.5 **Test Setup Diagram**



Item	Connection	Shielded	Length(m)
1	AC Power cable	No	1.8
2	USB Cable	Yes	1.2

#### **Test Setup Diagram - Radiated Test**



Item	Connection	Shielded	Length(m)
1	AC Power cable	No	1.8
2	USB Cable	Yes	1.2

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# 3 Transmitter Test Result

# 3.1 AC Power-line Conducted Emissions

#### 3.1.1 AC Power-line Conducted Emissions Limit

AC Power-line Conducted Emissions Limit					
Frequency Emission (MHz) Quasi-Peak Average					
0.15-0.5	66 - 56 *	56 - 46 *			
0.5-5	56	46			
5-30	60	50			

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### 3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

#### 3.1.3 Test Procedures

	Test Method				
$\boxtimes$	Refer as ANSI C63.10-2013, clause 6.2 for AC power-line conducted emissions.				
$\boxtimes$	If A	C conducted emissions fall in operating band, then following below test method confirm final result.			
		Accept measurements done with a suitable dummy load replacing the antenna under the following conditions:  (1) Perform the AC line conducted tests with the antenna connected to determine compliance with FCC 15.207 limits outside the transmitter's fundamental emission band;  (2) Retest with a dummy load to determine compliance with FCC 15.207 limits within the transmitter's fundamental emission band.			
		For a device with a permanent antenna operating at or below 30 MHz, accept measurements done with a suitable dummy load, in lieu of the permanent antenna under the following conditions: (1) Perform the AC line conducted tests with the permanent antenna to determine compliance with the FCC 15.207 limits outside the transmitter's fundamental emission band; (2) Retest with a dummy load in lieu of the permanent antenna to determine compliance with the FCC 15.207 limits within the transmitter's fundamental emission band.			

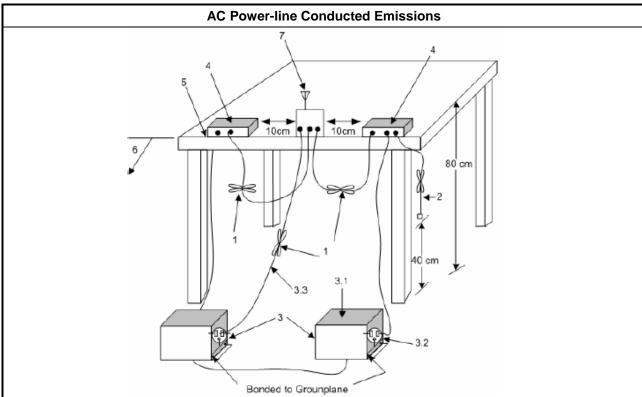
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### 3.1.4 Test Setup



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- 1—Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 cm to 40 cm long.
- 2—The I/O cables that are not connected to an accessory shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- 3—EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in  $50\Omega$ loads. LISN may be placed on top of, or immediately beneath, reference ground plane.
- 3.1—All other equipment powered from additional LISN(s).
- 3.2—A multiple-outlet strip may be used for multiple power cords of non-EUT equipment.
- 3.3—LISN at least 80 cm from nearest part of EUT chassis.
- 4—Non-EUT components of EUT system being tested.
- 5—Rear of EUT, including peripherals, shall all be aligned and flush with edge of tabletop.
- 6—Edge of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.
- 7—Antenna can be integral or detachable. If detachable, then the antenna shall be attached for this test.

#### 3.1.5 Test Result of AC Power-line Conducted Emissions

Refer as Appendix A

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**Transmitter Radiated Emissions** 3.2

#### 3.2.1 **Transmitter Radiated Emissions Limit**

Transmitter Radiated Emissions Limit						
Frequency Range (MHz) Field Strength (uV/m) Field Strength (dBuV/m) Measure Distance						
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300			
0.490~1.705	24000/F(kHz)	33.8 - 23	30			
1.705~30.0	30	29	30			
30~88	100	40	3			
88~216	150	43.5	3			
216~960	200	46	3			
Above 960	500	54	3			

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- Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).
- Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). The test report shall specify the extrapolation method used to determine compliance of
- Note 3: the frequency bands 9-90 kHz, 110-490 kHz measurements employing an average detector and other below 1GHz measurements employing a CISPR guasi-peak detector.

#### 3.2.2 **Measuring Instruments**

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Refer a test equipment and calibration data table in this test report.

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#### 3.2.3 **Test Procedures**

	Test Method
$\boxtimes$	Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1 GHz and test distance is 3m.
	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz the frequency bands 9-90 kHz, 110-490 kHz measurements employing an average detector and other below 30MHz measurements employing a CISPR quasi-peak detector. Test distance is 3 m.
	At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the requirements; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be following below methods.
	The results shall be extrapolated to the specified distance by making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor.
	The results shall be by using the square of an inverse linear distance extrapolation factor (40 dB/decade).
	For radiated measurement. Loop antenna was rotated about the horizontal and vertical axis and the equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted field strength level.
$\boxtimes$	The any unwanted emissions level shall not exceed the fundamental emission level.
	All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.
$\boxtimes$	KDB 414788 Open-Field Test Sites and Chamber Correlation Justification.
	Based on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in regulations; however, an attempt should be made to avoid making measurements in the near field.
	Open-field site and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

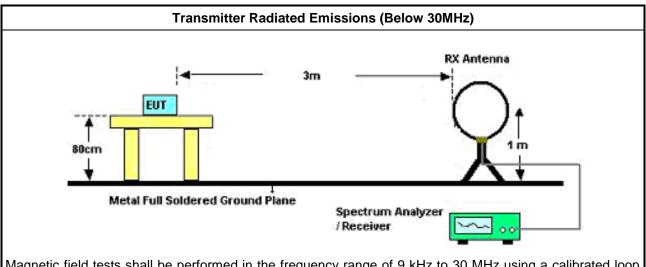
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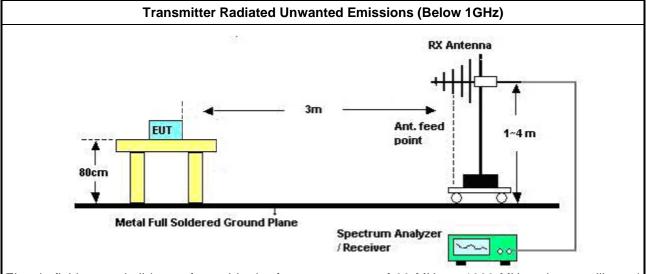
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### 3.2.4 Test Setup



Magnetic field tests shall be performed in the frequency range of 9 kHz to 30 MHz using a calibrated loop antenna.



Electric field tests shall be performed in the frequency range of 30 MHz to 1000 MHz using a calibrated bi-log antenna.

#### 3.2.5 Transmitter Radiated Emissions (Below 30MHz)

Refer as Appendix B.1

#### 3.2.6 Transmitter Radiated Emissions (Above 30MHz)

Refer as Appendix B.2

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## 3.3 Emission Bandwidth

#### 3.3.1 Emission Bandwidth Limit

Emission E	andwidth Limit
N/A	

#### 3.3.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

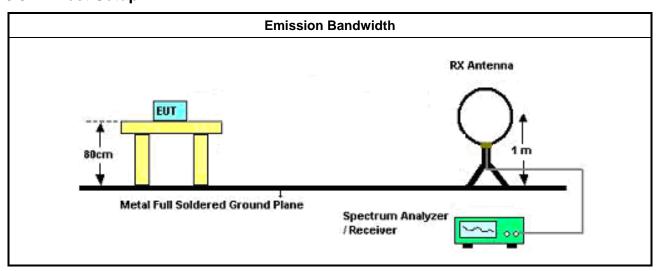
#### 3.3.3 Test Procedures

# Because the measured signal is CW or CW-like adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW.

**Test Method** 

For radiated measurement. Loop antenna was rotated about the horizontal and vertical axis and the equipment to be measured and the test antenna shall be oriented to obtain the maximum emitted field strength level.

#### 3.3.4 Test Setup



#### 3.3.5 Test Result of Emission Bandwidth

Refer as Appendix C

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# 4 Test Equipment and Calibration Data

#### **Instrument for AC Conduction**

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
EMC Receiver	R&S	ESR3	102051	9kHz ~ 3.6GHz	28/May/2019	27/May/2020
LISN	R&S	ENV216	101295	9kHz ~ 30MHz	05/Nov/2019	04/Nov/2020
RF Cable-CON	MTJ	RG142	CB002-CO	9kHz ~ 200MHz	23/Sep/2019	22/Sep/2020
AC POWER	APC	AFC-11005G	F310050055	47Hz~63Hz 5~300V	NCR	NCR
Impuls Begrenzer Pulse Limiter	SCHWARZBECK	VTSD 9561-F	9561-F041	9 kHz ~ 30 MHz	24/Sep/2019	23/Sep/2020

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NCR : Non-Calibration Require

#### **Instrument for Conducted Test**

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
Spectrum Analyzer	R&S	FSV 40	101013	10Hz~40GHz	19/Mar/2020	18/Mar/2021
Loop Antenna	TESEQ	HLA 6120	31244	9kHz ~ 30MHz	16/Mar/2020	15/Mar/2021

#### **Instrument for Radiated Test**

Instrument	Instrument Manufacturer		Serial No.	Spec.	Calibration Date	Calibration Due Date	
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz ~ 1GHz 3m	30/Aug/2019	29/Aug/2020	
Amplifier	HP	8447D	2944A08033	10kHz ~ 1.3GHz	22/Apr/2019	21/Apr/2020	
EMI Test Receiver	R&S	ESR3	102051	9kHz ~ 3.6GHz	28/May/2019	27/May/2020	
Bilog Antenna & 5dB Attenuator	SCHAFFNER / MTJ	CBL 6112D / MTJ6102-05	2723 / 2	30MHz ~ 1GHz	28/Feb/2020	27/Feb/2021	
Signal Analyzer	R&S	FSP40	100305	9kHz ~ 40GHz	10/Jun/2019	09/Jun/2020	
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz ~ 30MHz	20/Jul/2019	19/Jul/2020	
RF Cable-R03m	RF Cable-R03m Jye Bao		CB021	30MHz ~ 1GHz	18/Mar/2020	17/Mar/2021	
Loop Antenna	TESEQ	HLA 6120	31244	9k-30MHz	16/Mar/2020	15/Mar/2021	

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# **AC Power-line Conducted Emissions**

Appendix A

**Summary** 

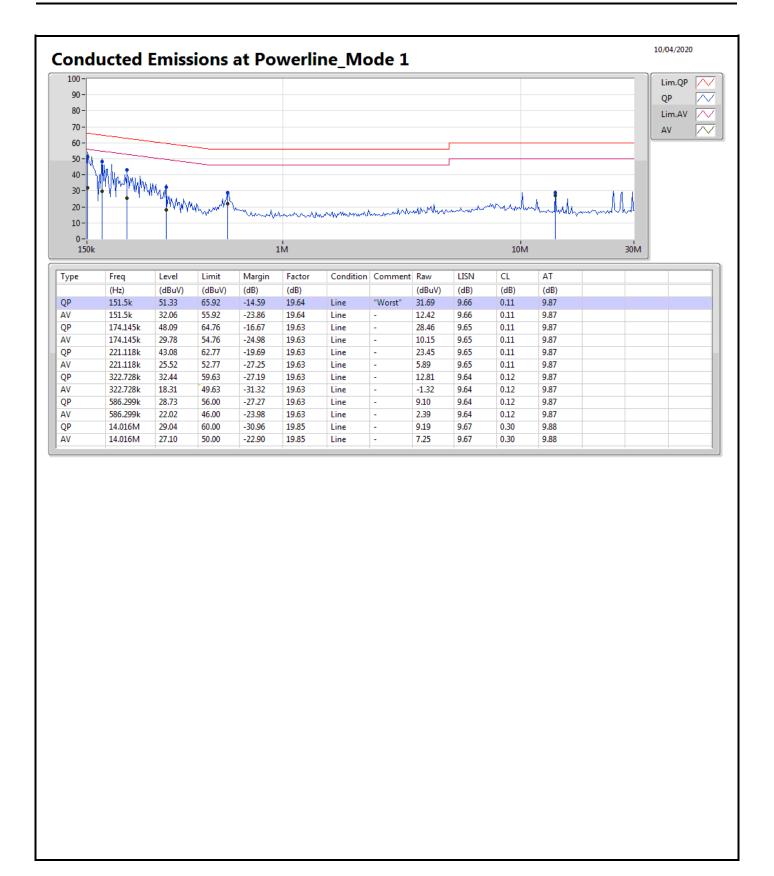
Mode	Туре	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition
Mode 1	QP	153.015k	51.53	65.83	-14.30	19.63	Neutral

**Mode Configure** 

Mode	Туре	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Factor (dB)	Condition	Comments
Mode 1	QP	151.5k	51.33	65.92	-14.59	19.64	Line	"Worst"
Mode 1	AV	151.5k	32.06	55.92	-23.86	19.64	Line	-
Mode 1	QP	174.145k	48.09	64.76	-16.67	19.63	Line	-
Mode 1	AV	174.145k	29.78	54.76	-24.98	19.63	Line	-
Mode 1	QP	221.118k	43.08	62.77	-19.69	19.63	Line	-
Mode 1	AV	221.118k	25.52	52.77	-27.25	19.63	Line	-
Mode 1	QP	322.728k	32.44	59.63	-27.19	19.63	Line	-
Mode 1	AV	322.728k	18.31	49.63	-31.32	19.63	Line	-
Mode 1	QP	586.299k	28.74	56.00	-27.26	19.64	Line	-
Mode 1	AV	586.299k	22.03	46.00	-23.97	19.64	Line	-
Mode 1	QP	14.016M	29.04	60.00	-30.96	19.85	Line	-
Mode 1	AV	14.016M	27.10	50.00	-22.90	19.85	Line	-
Mode 1	QP	153.015k	51.53	65.83	-14.30	19.63	Neutral	"Worst"
Mode 1	AV	153.015k	32.23	55.83	-23.60	19.63	Neutral	-
Mode 1	QP	202.177k	45.01	63.51	-18.50	19.62	Neutral	-
Mode 1	AV	202.177k	27.13	53.51	-26.38	19.62	Neutral	-
Mode 1	QP	251.653k	39.52	61.70	-22.18	19.63	Neutral	-
Mode 1	AV	251.653k	23.74	51.70	-27.96	19.63	Neutral	-
Mode 1	QP	346.008k	30.04	59.06	-29.02	19.62	Neutral	-
Mode 1	AV	346.008k	17.78	49.06	-31.28	19.62	Neutral	-
Mode 1	QP	586.299k	30.45	56.00	-25.55	19.63	Neutral	-
Mode 1	AV	586.299k	23.86	46.00	-22.14	19.63	Neutral	-
Mode 1	QP	14.016M	24.39	60.00	-35.61	19.89	Neutral	-
Mode 1	AV	14.016M	20.59	50.00	-29.41	19.89	Neutral	-

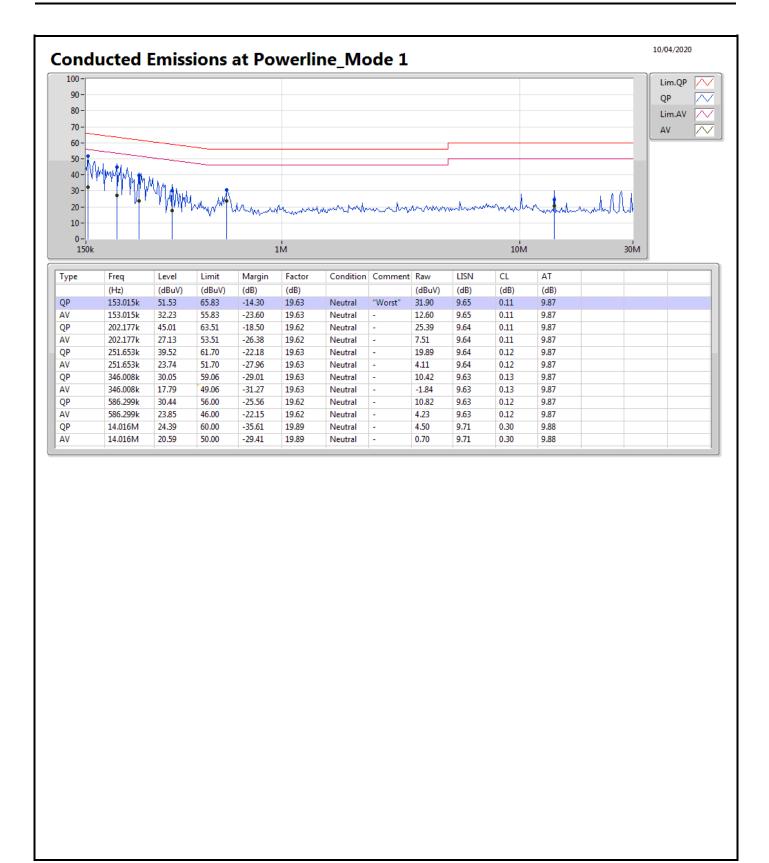
Remark: Page No. : A1 of A3

Level (dBuV/m) = Raw(Read Level) +LISN(LISN Factor) + CL(Cable Loss) + AT(Attenuator)



Remark: Page No. : A2 of A3

Level (dBuV/m) = Raw(Read Level) +LISN(LISN Factor) + CL(Cable Loss) + AT(Attenuator)



Remark: Page No. : A3 of A3

Level (dBuV/m) = Raw(Read Level) +LISN(LISN Factor) + CL(Cable Loss) + AT(Attenuator)



# Radiated Emissions below 30MHz

Appendix B.1

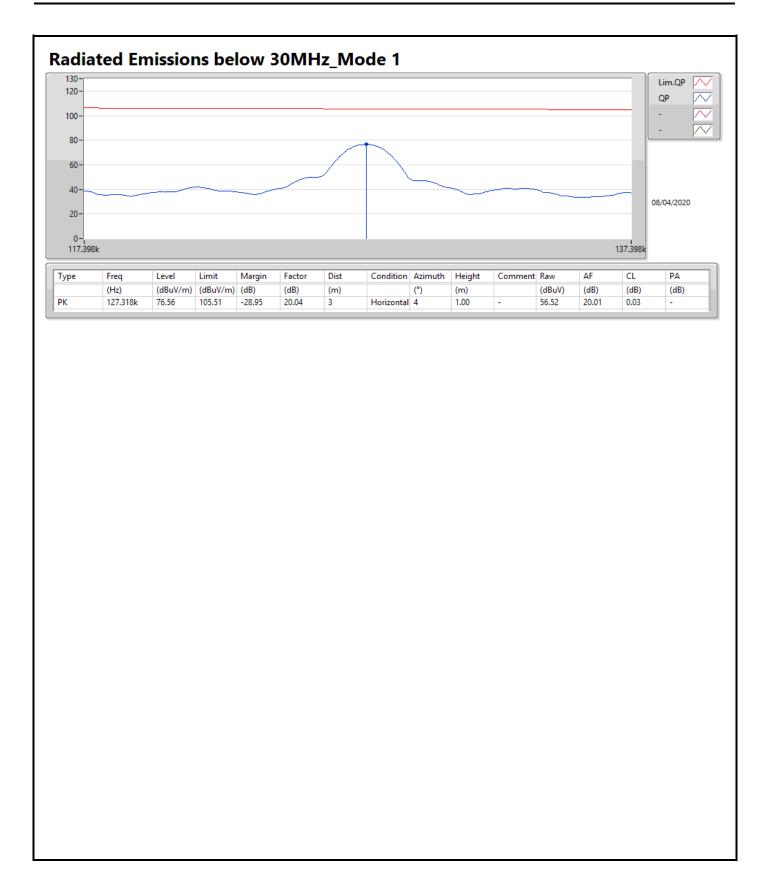
**Summary** 

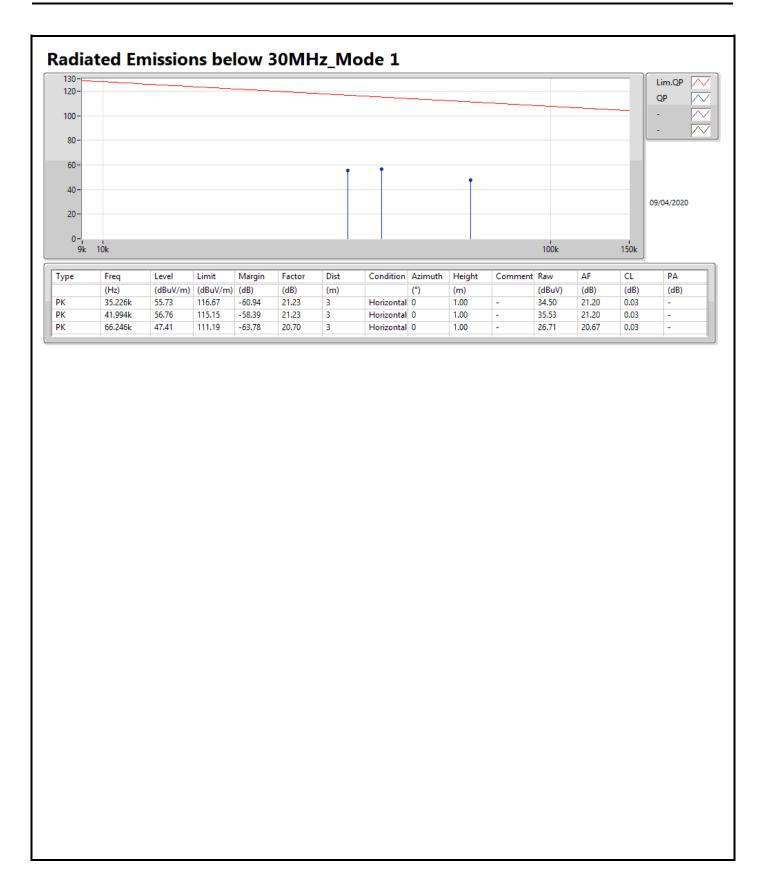
Mode	Result	Туре	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 1	Pass	PK	8.21M	43.27	69.54	-26.27	Horizontal

Remark: Page No. : B1 of B4

Level (dBuV/m) = Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA( Preamp Factor)

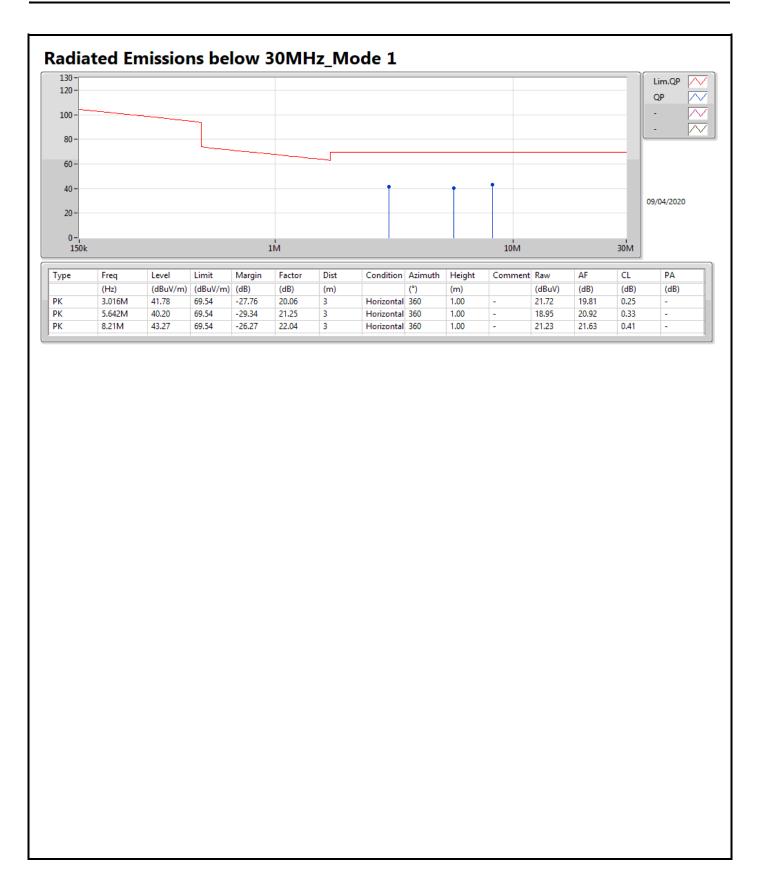
Report No. : FR040114AW





Remark : Page No. : B3 of B4

Level (dBuV/m) = Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA( Preamp Factor)



Remark: Page No. : B4 of B4

Level (dBuV/m) = Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA( Preamp Factor)



# Radiated Emissions above 30MHz

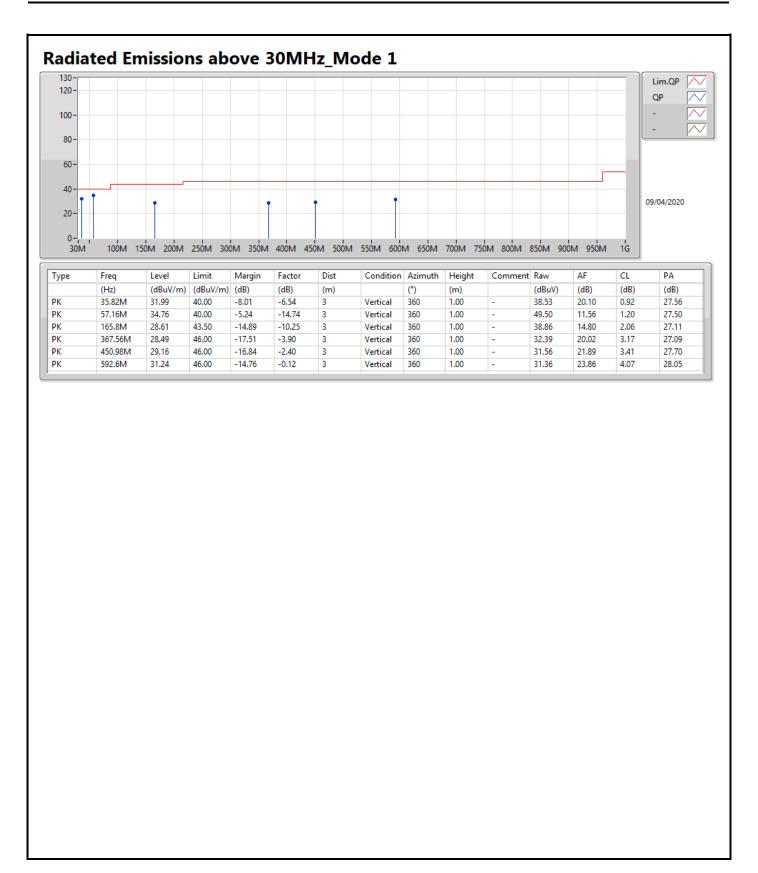
Appendix B.2

Summary

Mode	Result	Туре	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 1	Pass	QP	57.16M	36.04	40.00	-3.96	Horizontal

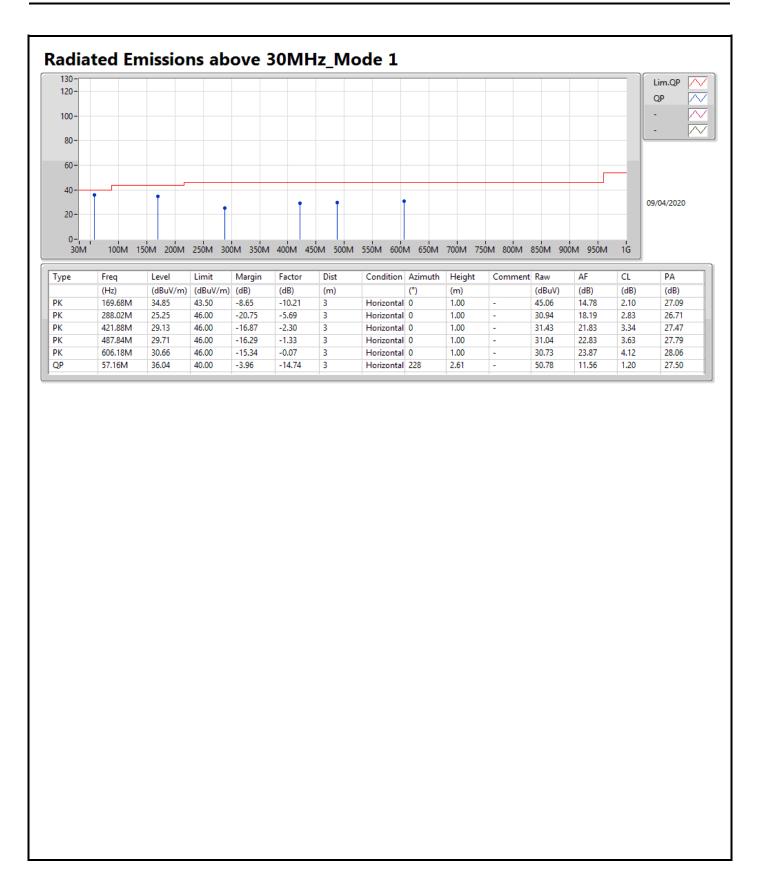
Remark: Page No. : B1 of B3

Level (dBuV/m) = Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA( Preamp Factor)



Remark: Page No. : B2 of B3

Level (dBuV/m) = Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA( Preamp Factor)



Remark: Page No. : B3 of B3

Level (dBuV/m) = Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA( Preamp Factor)



EBW Appendix C

**Summary** 

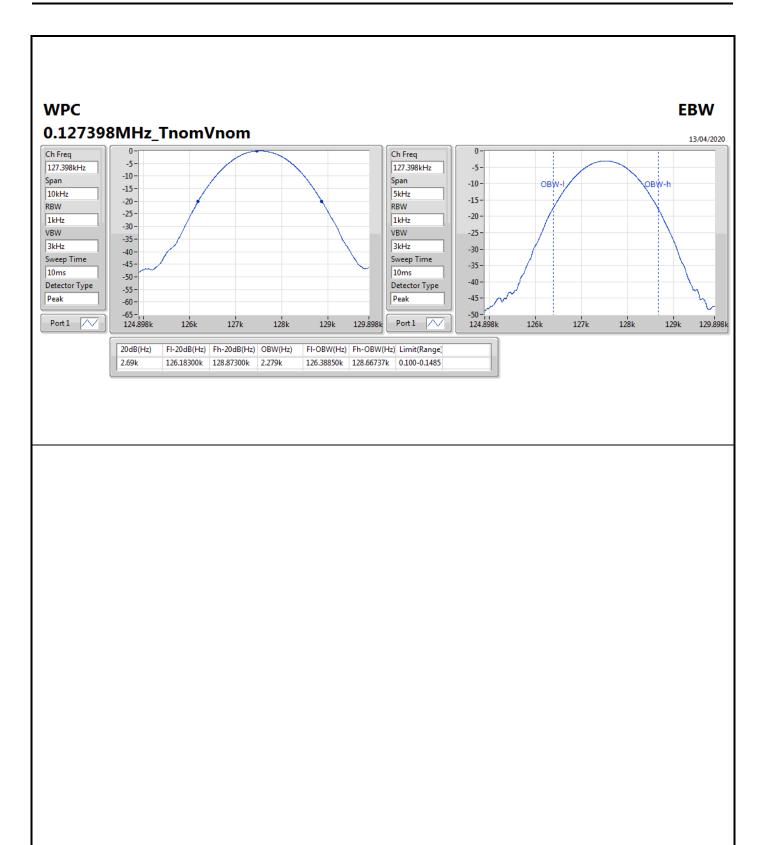
Mode	20dB	FI-20dB	Fh-20dB	OBW	Limit
	(Hz)	(Hz)	(Hz)	(Hz)	(Range)
122-145kHz	-	-	-	-	-
WPC	2.69k	126.18300k	128.87300k	2.279k	Inf

#### Result

Mode	Result	20dB (Hz)	FI-20dB (Hz)	Fh-20dB (Hz)	OBW (Hz)	FI-OBW (Hz)	Fh-OBW (Hz)	Limit (Range)
WPC	-	-	-	-	-	-	-	-
0.127398MHz_TnomVnom	Pass	2.69k	126.18300k	128.87300k	2.279k	126.38850k	128.66737k	Inf

SPORTON INTERNATIONAL INC. Page No. : C1 of C2

EBW Appendix C



SPORTON INTERNATIONAL INC. Page No. : C2 of C2