DEKRA Certification, Inc.
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Sterling, VA 20164
United States of America

DEKRA

ACCREDITED
Test Lab
Cert 2764.01

FCC LISTED, REGISTRATION NUMBER: 2764.01

ISED LISTED REGISTRATION NUMBER: 23595-1

Test report No:
2670ERM.004

Test report

FCC Rules and Regulations CFR 47, Part 18, Subpart C (10-1-19Edition)
FCC Rules and Regulations CFR 47, Part 15, Subpart B (10-1-19 Edition)
&
ICES-001 ISSUE 4 – Update June (2006)
ICES-003 ISSUE 6 – Update April (2019)

(*) Identification of item tested	Qi Wireless Charger
(*) Trademark	Amphenol Tecvox
(*) Model and /or type reference	15W Wireless Charger
(*) Other identification of the product	FCC ID: 2AWLR-15WWC IC: 26295-15WWC
(*) Features	Qi 1.2.4, Basic & Extended Power Profiles (BPP, EPP)
Manufacturer	AMPHENOL TECVOX 4900 Bradford Drive Suite 1, Huntsville, Alabama 35805 USA.
Test method requested, standard	FCC Rules and Regulations CFR 47, Part 15, Subpart B (10-1-19 Edition) FCC Rules and Regulations CFR 47, Part 18, Subpart C (10-1-19 Edition) ICES-003 ISSUE 6 – Update April (2019) ICES-001 ISSUE 4 - Update June (2006)
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Domingo Galvez EMC&RF Lab Manager Digitally signed by Domingo Galvez DN: cn=Domingo Galvez, o=DEKRA Certification Inc., ou=Regulatory Lab, email=dgalvez@dekra.com, c=US Date: 2020.07.21 00:01:50 -04'00'
Date of issue	07-20-2020
Report template No	FDT08_22 (*) "Data provided by the client"

Index

Competences and guarantees

DEKRA Certification Inc. is a testing laboratory accredited by A2LA (The American Association for Laboratory Accreditation), to perform the tests indicated in the Certificate 2764.01

DEKRA Certification Inc. is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, DEKRA Certification Inc. has a calibration and maintenance program for its measurement equipment.

DEKRA Certification Inc. guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Certification at the time of performance of the test.

DEKRA Certification Inc. is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

General conditions

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA Certification Inc.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Certification Inc. and the Accreditation Bodies.

Uncertainty

Uncertainty (factor k=2) was calculated according to the DEKRA Certification internal document PODT000.

	Frequency (MHz)	U(k=2)	Units
Conducted emission	0,009 - 30	2.69	dB
Radiated emission	30-180	3.82	dB
	180-1000	2.61	dB
	1000-18000	2.92	dB
	18000-40000	2.15	dB

Data provided by the client

The test sample consist of 15W Qi Wireless Charger.

DEKRA declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

Usage of samples

Samples undergoing test have been selected by: The client.

Sample S/01 is composed of the following elements:

Control N. º	Description	Model	Serial N. º	Date of reception
2670/10	EMC Commercial sample 4	15W Wireless Charger	-	5/1/2020

Following Accessory devices were used with DUT for execution of Radiated and Conducted testing

Control Nº	Description	Model	Serial Nº	Date of reception
2670/11	Circuit Board	-	-	5/1/2020
2670/12	Harness Cable	-	-	5/1/2020
2670/14	NFC Card 1	A331R00	-	5/1/2020
2670/17	USB 2.0 Cable, Type A Plug to Mini Type B	-	-	5/1/2020

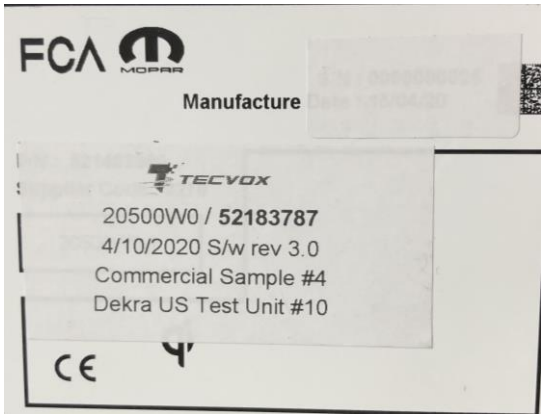
Sample S/01 was used in following testing: All the testing in Appendix A.

Test sample description

<table>
<tr><td rowspan="4">Ports…… :</td><td rowspan="2" colspan="2">Port name and description</td><td colspan="3">Cable</td></tr>
<tr><td>Specified max length [m]</td><td>Attached during test</td><td>Shielded</td></tr>
<tr><td colspan="2">LIN</td><td>40m</td><td>☒</td><td>☐</td></tr>
<tr><td colspan="2"></td><td></td><td>☐</td><td>☐</td></tr>
<tr><td colspan="2"></td><td></td><td>☐</td><td>☐</td></tr>
<tr><td>Supplementary information to the ports…… :</td><td colspan="5"></td></tr>
<tr><td rowspan="6">Rated power supply .....:</td><td rowspan="2" colspan="2">Voltage and Frequency</td><td colspan="5">Reference poles</td></tr>
<tr><td>L1</td><td>L2</td><td>L3</td><td>N</td><td>PE</td></tr>
<tr><td>☐</td><td>AC:</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td></tr>
<tr><td>☐</td><td>AC:</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td></tr>
<tr><td>☒</td><td colspan="5">DC: Fuse limited (10A) 13.6V Battery</td></tr>
<tr><td>☐</td><td colspan="5">DC:</td></tr>
<tr><td>Rated Power .....:</td><td colspan="6"></td></tr>
<tr><td>Clock frequencies .....:</td><td colspan="6">127.778KHz, 20MHz, 27.12MHz, 100MHz</td></tr>
<tr><td>Other parameters.....:</td><td colspan="6"></td></tr>
<tr><td>Software version .....:</td><td colspan="6">3.0.0</td></tr>
<tr><td>Hardware version.....:</td><td colspan="6">13</td></tr>
<tr><td>Dimensions in cm (W x H x D)....:</td><td colspan="6">98 x 125.25 x 44.43mm</td></tr>
<tr><td rowspan="5">Mounting position.....:</td><td>☐</td><td colspan="5">Table top equipment</td></tr>
<tr><td>☐</td><td colspan="5">Wall/Ceiling mounted equipment</td></tr>
<tr><td>☐</td><td colspan="5">Floor standing equipment</td></tr>
<tr><td>☐</td><td colspan="5">Hand-held equipment</td></tr>
<tr><td>☒</td><td colspan="5">Other: Automotive</td></tr>
</table>

Modules/parts .....:	Module/parts of test item	Type	Manufacturer
Accessories (not part of the test item) .....:	Description	Type	Manufacturer
Documents as provided by the applicant.....:	Description	File name	Issue date
	Product Sheet	20500W0 Wireless Charger Product Sheet-Internal.pdf	02-04-2020
	User Guide	20500W0 Wireless Charger Product User Guide-Internal.pdf	12-18-2019
	Block Diagram	20500W0 Wireless Charger Product Block Diagram-Internal.pdf	12-18-2019

Copy of marking plate:



Identification of the client

AMPHENOL TECVOX

4900 BRADFORD DRIVE SUITE 1, HUNTSVILLE, ALABAMA 35805 USA.

Testing period and place

Test Location	DEKRA Certification, Inc
Date (start)	05-19-2020
Date (finish)	06-19-2020

Document history

Report number	Date	Description
2670ERM.004	07-20-2020	First release

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

In the semi anechoic chamber, the following limits were not exceeded during the test.

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

In the chamber for conducted measurements, the following limits were not exceeded during the test:

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 30 % Max. = 60 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

Remarks and comments

The tests have been performed by the technical personnel: Koji Nishimoto & Lourdes María Valverde Malagón.

Testing verdicts

Not applicable :	N/A
Pass :	P
Fail :	F
Not measured :	N/M

Summary

Emission Test FCC Part 15 / ICES 003			
Report Section	**Requirement – Test case**	**Verdict**	**Remark**
A.1.	Radiated emission electromagnetic field test (0.009-30 MHz**)**	P	N/A
A.1.	Radiated emission electromagnetic field test (30 MHz – 1000 MHz)	P	N/A
A.1.	Radiated emission electromagnetic field test (1 GHz – 18 GHz)	P	N/A
-	Radiated emission electromagnetic field test (18 GHz – 40 GHz)	N/A	Refer 1
-	Conducted emission test (150 kHz to 30 MHz)	N/A	Refer 2
Supplementary information and remarks: 1) As per standard 47 CFR §15.33 due to the highest frequency generated or used in the device is above 1000MHz the upper frequency of measurement range is up to 5th harmonic of the highest frequency or 40GHz, whichever is lower. 2) DUT is DC powered			

Emission Test FCC Part 18 / ICES 001			
Report Section	**Requirement – Test case**	**Verdict**	**Remark**
B.1.	Radiated emission electromagnetic field test (0.009-30 MHz**)**	P	N/A
-	Radiated emission test (30 MHz – 1000 MHz)	N/A	Refer 1
-	Radiated emission test (1 GHz – 18 GHz)	N/A	Refer 1
-	Conducted emission test (150 kHz to 30 MHz)	N/A	Refer 2
Supplementary information and remarks: 1) As per standard 47 CFR 18.309 due to the highest frequency generated or used in the device is below 500MHz the upper frequency of measurement range is up to 10th harmonic of the highest frequency or 1,000 MHz, whichever is higher. 2) DUT is DC powered			

List of equipment used during the test

CONTROL NUMBER	DESCRIPTION	MANUFACTURER	MODEL	LAST CALIBRATION	NEXT CALIBRATION
0980	Preamplifier	BONN ELEKTRONIK	BLNA0360-01N	2019/08	2021/08
0981	Preamplifier	BONN ELEKTRONIK	BLMA 0118-2A	2018/10	2020/10
0982	Preamplifier	BONN ELEKTRONIK	BLMA1840-1M	2018/10	2020/10
1012	EMI Test Receiver	Rohde & Schwarz	ESR26	2019/12	2021/12
1056	HORN ANTENNA	ETS LINDGREN	3116C	2020/01	2023/01
1058	Horn Antenna	ETS LINDGREN	3115	2020/05	2023/05
1064	Biconilog Antenna	ETS LINDGREN	3142E	2018/01	2021/01
1108	Ethernet SNMP Thermometer- CR room	HW GROUP	HWg-STE Plain	2020/07	2022/07
1179	Semi anechoic Absorber Lined Chamber	Frankonia	SAC 3 plus “L”	N/A	N/A

Appendix A:
Test results **FCC Part 15 /ICES 003**

Appendix A Content

DESCRIPTION OF THE OPERATION MODES

The operation modes described in this paragraph constitute a functionality of the sample under test for itself. Every operation mode takes failure criteria for the immunity test that they were applying to it and a monitoring to guarantee performance of the same ones.

The operation modes used by the samples to which the present report refers, are shown in the following table:

OPERATION MODE	DESCRIPTION
OM#01*	DUT on. DC Powered 12Vdc, • NFC and WPT in Idle mode

*Worst configurations detected

A.1.RADIATED EMISSION. ELECTROMAGNETIC FIELD TEST

LIMITS:	Product standard:	FCC CFR 47, Part 15, Subpart B (10-1-19 Edition), Secs. 15.109 & ICES-003 Issue 6 – Update April (2017)
	Test standard:	FCC CFR 47, Part 15, Subpart B (10-1-19 Edition), Secs. 15.109 & ICES-003 Issue 6 – Update April (2017)

Part 15B Limits of interference Class B
The applied limit for radiated emissions, 3 m distance, according with the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (10-01-19 Edition), Secs. 15.109 & ICES-003 Issue 6 – Update April (2017) in the frequency range 30 MHz to 40 GHz for class B equipment.

Frequency range (MHz)	QP Limit for 3 m	
	(μV/m)	(dBμV/m)
30 to 88	100	40
88 to 216	150	43.5
216 to 960	200	46
Above 960	500	54

Frequency range (MHz)	AVG Limit for 3 m		PK Limit for 3 m (1)
	(μV/m)	(dBμV/m)	(dBμV/m)
Above 1000	500	54	74

Frequencies above 1 GHz, the limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test, as per §15.35(b

TEST SETUP

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at a distance of 3 m for the frequency range 30-1000 MHz (Bilog antenna) and 1-18GHz (Double ridge horn antennas). A distance of 1m is used for the frequency range 18-40 GHz (Double ridge horn antennas).

For radiated emissions in the range 18-40 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360º and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

TEST SETUP (Cont)	

Radiated setup < 1 GHz

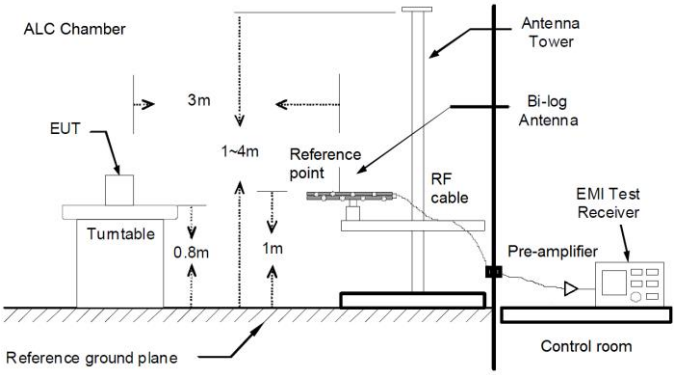


Fig A1: Generic setup for measurements from 30 to 1000MHz

Radiated setup > 1 GHz

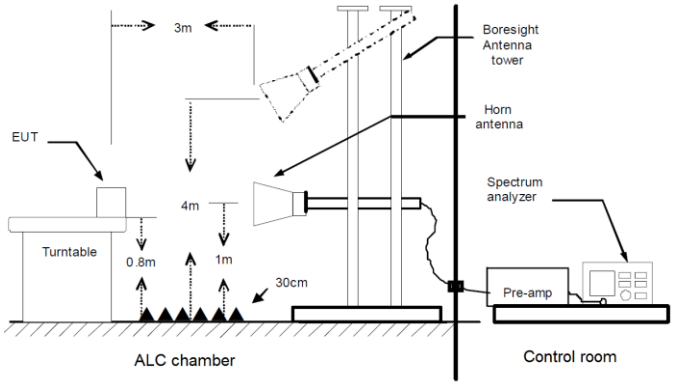


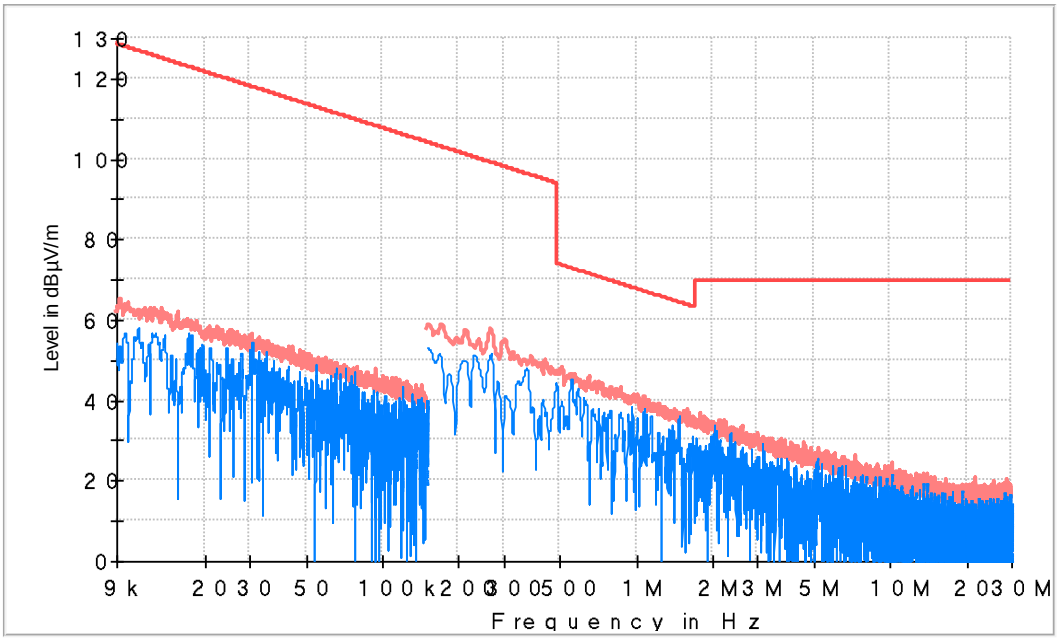
Fig A2: Generic setup for measurements from 1 to 18GHz (Analyzer outside the chamber)

TESTED SAMPLES:	S/01
TESTED OPERATION MODES:	OM#01
TEST RESULTS:	**CR**mmnnxx: CR, Radiation Condition; mm: Sample number; nn: Operation mode.,xx:Range,

CRmmnnxx	Description	Result
CR0101LR	Range: 9 KHz - 30 MHz Horizontal Polarization	P
CR0101LR	Range: 9 KHz - 30 MHz Vertical Polarization	P
CR0101LR	Range: 30 MHz - 1000 MHz Horizontal Polarization	P
CR0101LR	Range: 30 MHz - 1000 MHz Vertical Polarization	P
CR0101HR	Range: 1-18 GHz Horizontal Polarization	P
CR0101HR	Range: 1-18 GHz Vertical Polarization	P

Radiated Emission. CR0101LR-15

Project:	02670ERM004
Company:	TECVOX
Sample:	S/01
Operation mode:	OM#01
Description:	EUT ON. Idle mode. Power Supply: 12 VDC

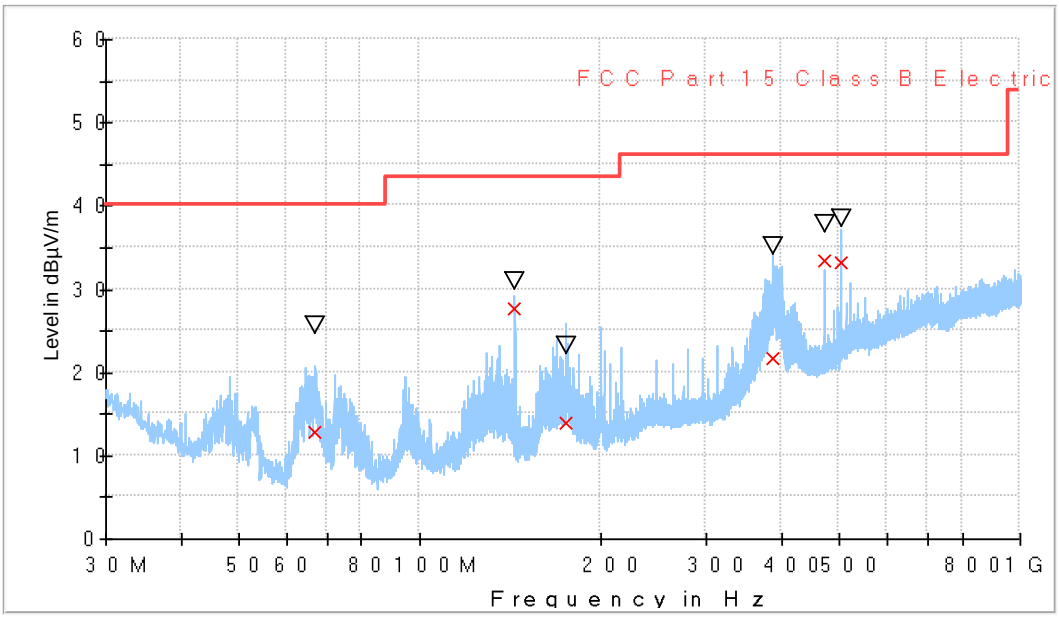


Final_Result

Frequency (MHz)	PK+_CLRWR (dBµV/m)	PK+_MAXH (dBµV/m)	Pol	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
0.269400	50.9	57.6	H	57.6	99.0
0.515165	33.8	48.3	H	25.1	73.4
1.608670	10.6	37.6	H	25.9	63.5

Radiated Emission. CR0101LR-15

Project:	02670ERM004
Company:	TECVOX
Sample:	S/01
Operation mode:	OM#01
Description:	EUT ON. Idle mode. Power Supply: 12 VDC

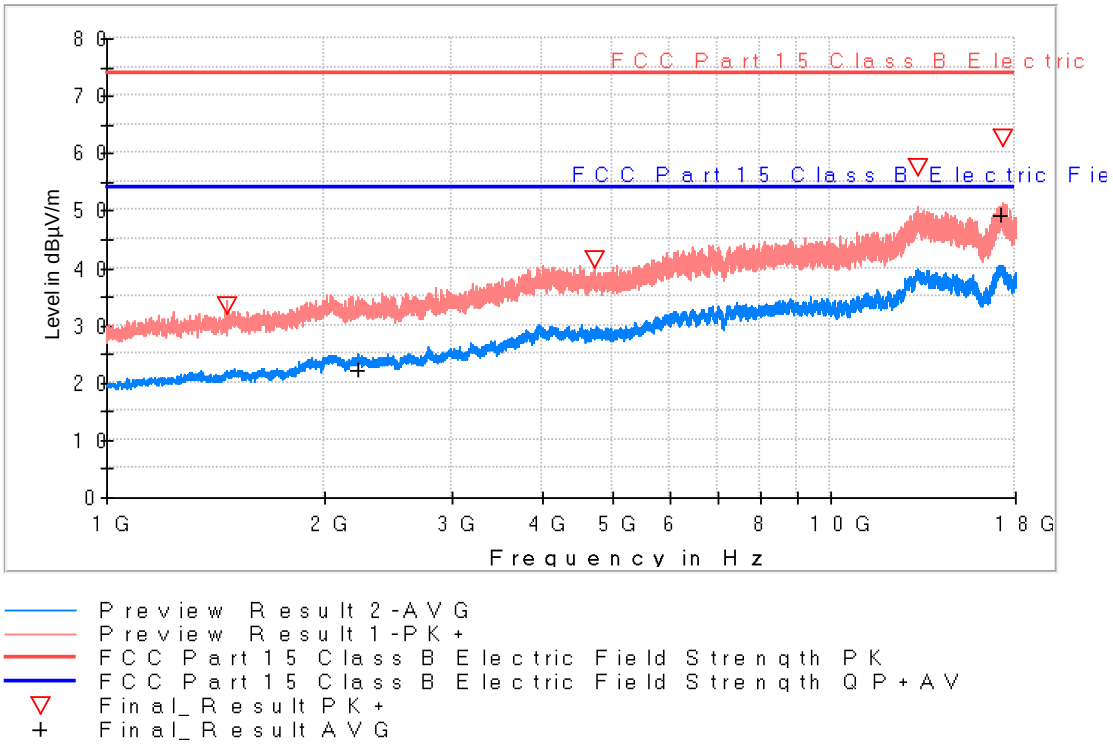


Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
66.740000	---	25.71	---	---	161.0	V	-60.0
66.740000	12.94	---	40.00	27.06	161.0	V	-60.0
144.000000	---	31.08	---	---	167.0	H	-56.0
144.000000	27.64	---	43.50	15.86	167.0	H	-56.0
175.490000	---	23.23	---	---	125.0	H	-96.0
175.490000	14.01	---	43.50	29.49	125.0	H	-96.0
387.490000	---	35.18	---	---	157.0	V	17.0
387.490000	21.80	---	46.00	24.20	157.0	V	17.0
472.030000	33.48	---	46.00	12.52	158.0	V	27.0
472.030000	---	37.91	---	---	158.0	V	27.0
504.070000	33.12	---	46.00	12.88	168.0	V	48.0
504.070000	---	38.53	---	---	168.0	V	48.0

Radiated Emission. CR0101HR-15

Project:	02670ERM004
Company:	TECVOX
Sample:	S/01
Operation mode:	OM#01
Description:	EUT ON. WPT and NFC in IDLE mode. Power supply 13.6 VDC.



Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
1465.650000	33.32	---	73.90	40.58	250.0	V	-139.0
2218.350000	---	22.30	53.90	31.60	220.0	V	160.0
4728.450000	41.36	---	73.90	32.54	187.0	V	21.0
13150.700000	57.46	---	73.90	16.44	140.0	H	-148.0
17164.450000	---	49.00	53.90	4.90	124.0	V	-155.0
17231.050000	62.56	---	73.90	11.34	195.0	V	-38.0

Appendix B:

Test results FCC Part 18 / ICES 001

Appendix B Content

DESCRIPTION OF THE OPERATION MODES

The operation mode described in this paragraph constitutes a functionality of the sample under test for itself.

The operation mode used by the samples to which the present report refers is shown in the following table:

OPERATION MODE	DESCRIPTION
OM#02	DUT on. DC Powered 12Vdc, • WPT in Charging/TX mode.

B.1. RADIATED EMISSION. ELECTROMAGNETIC FIELD MEASURE

LIMITS:	Product standard:	FCC Rules and Regulations CFR 47, Part 18, Subpart C (10-1-19 Edition) and ICES001
	Test standard:	FCC Rules and Regulations CFR 47, Part 18, Subpart C (10-1-19 Edition) and ICES001

According to 18.307, Field Strength limits mentioned as below,

Equipment	Operating frequency	RF Power generated by equipment (watts)	Field strength limit (uV/m)	Distance (meters)
Any type unless otherwise specified (miscellaneous)	Any ISM frequency	Below 500 500 or more	25 25 × SQRT(power/500)	300 [1]300
	Any non-ISM frequency	Below 500 500 or more	15 15 × SQRT(power/500)	300 [1]300
Industrial heaters and RF stabilized arc welders	On or below 5,725 MHz Above 5,725 MHz	Any Any	10 ([2])	1,600 ([2])
Medical diathermy	Any ISM frequency Any non-ISM frequency	Any Any	25 15	300 300
Ultrasonic	Below 490 kHz	Below 500 500 or more	2,400/F(kHz) 2,400/F(kHz) × SQRT(power/500)	300 [3]300
	490 to 1,600 kHz Above 1,600 kHz	Any Any	24,000/F(kHz) 15	30 30
Induction cooking ranges	Below 90 kHz On or above 90 kHz	Any Any	1,500 300	[4]30 [4]30

[1]Field strength may not exceed 10 µV/m at 1600 meters. Consumer equipment operating below 1000 MHz is not permitted the increase in field strength otherwise permitted here for power over 500 watts.
[2]Reduced to the greatest extent possible.
[3]Field strength may not exceed 10 µV/m at 1600 meters. Consumer equipment is not permitted the increase in field strength otherwise permitted here for over 500 watts.
[4]Induction cooking ranges manufactured prior to February 1, 1980, shall be subject to the field strength limits for miscellaneous ISM equipment.

Note 1: Limit 3m(dBµV/m) = Limit 300m(dBµV/m) + 40log(300m/3m) (Below 30MHz)
Note 2: This product is a wireless charger which operated at 111-148 KHz. So, it belongs to miscellaneous with non-ISM frequency.

TEST SETUP

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at a distance of 3 m for the frequency ranges of 9kHz to 30MHz (loop Antenna).

The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. EUT was also rotated 360º.

For Bilog antenna; the antenna height was varied from 1 to 4 meters to find the maximum radiated emission. Measurements were made in both horizontal and vertical planes of polarization.

For Loop antenna; The antenna orientation was varied along X, Y and Z axes to find Radiation emission Maxima.

The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

TEST SETUP (Cont.)	

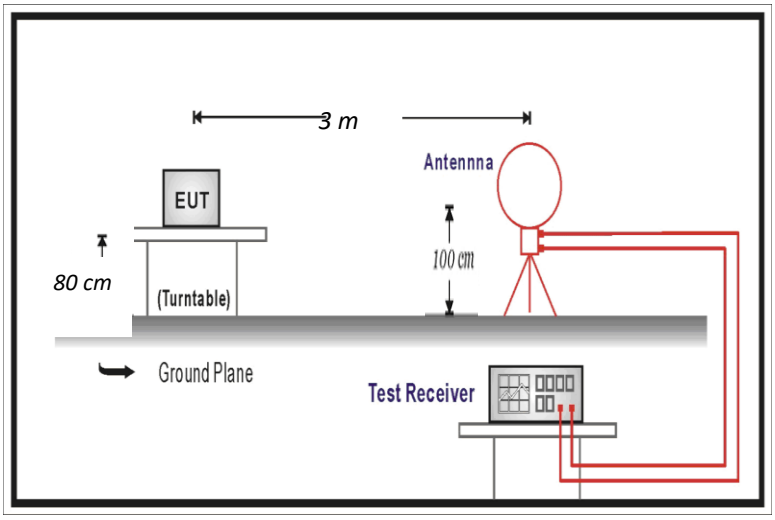


Fig B1.1: Generic setup for measurements from 9kHz to 30MHz

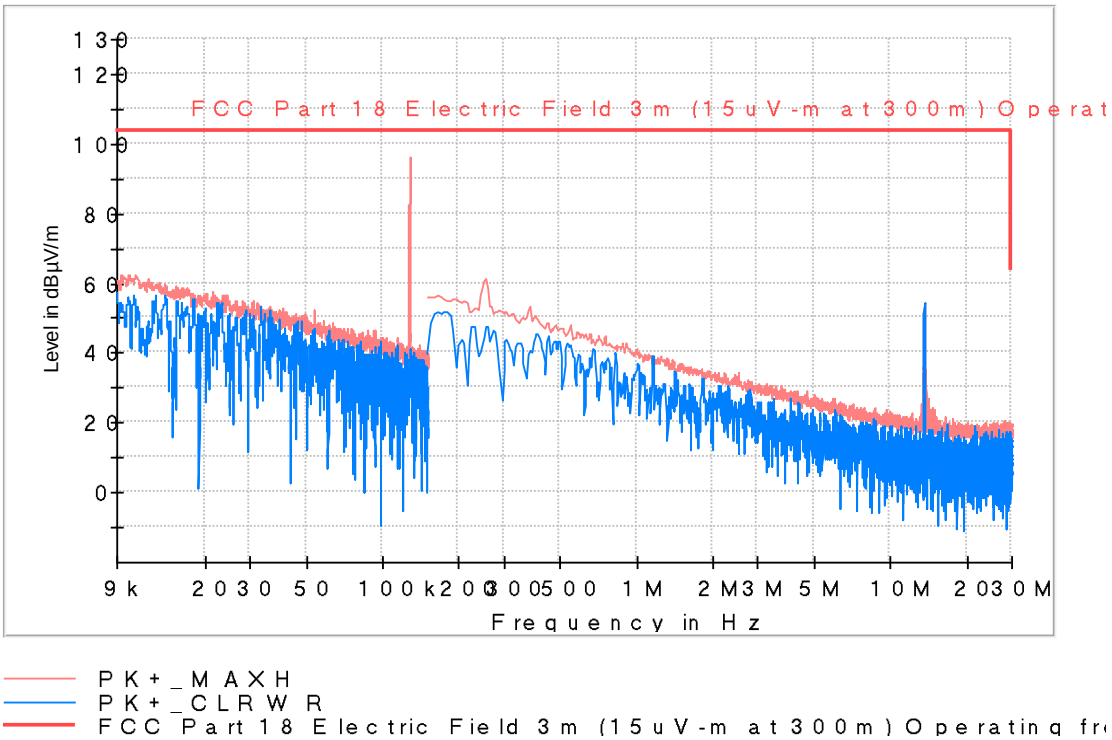
TESTED SAMPLE	S/01
TESTED OPERATION MODES:	OM#02
TEST RESULTS:	**CRmmnnRR_OO:** CR, Radiated Condition; mm: Sample number; nn: Operation mode; RR: Range; OO: Orientation

CRmmnnRR_OO	Description (FCC CFR 47, Part 18 / ICES 001)	Result
CR0101LR_OY-18*	Range: 0.009-30 MHz , Orientation Y	P

*Worst case orientation observed

Radiated Emission. CR0101LR_OY-18

Project:	02670ERM004
Company:	TECVOX
Sample:	S/01
Operation mode:	OM#02
Description:	EUT ON. WPT in TX/charging mode. Power supply 13.6 VDC. Yaxis measurement



Final_Result

Frequency (MHz)	PK+_CLRWR (dBµV/m)	PK+_MAXH (dBµV/m)	Pol	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)	Comment
0.053838	45.7	52.1	H	67.3	113.0	
0.127675	30.7	95.6	H	74.8	105.5	Fundamental WPT
0.249500	44.6	60.9	H	55.1	99.7	
0.383825	40.7	52.9	H	55.2	95.9	
2.513125	11.2	34.3	H	58.3	69.5	
13.557625	54.4	54.5	H	15.1	69.5	Fundamental NFC