

FCC Test Report

FCC ID: 2AOAF-160

Product: Wireless Charger

Trade Name: +TYLT

Model Number: QIVMS15BK-T

Family Model: WP23

Report No.: S22070603501001

Prepared for

TYLT, inc.

685 Cochran St. Suite 200, Simi Valley, California 93065, United States

Prepared by

Shenzhen NTEK Testing Technology Co., Ltd.

1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street,
Bao'an District, Shenzhen P.R. China

Tel: 400-800-6106, 0755-2320 0050 / 2320 0090

Website: <http://www.ntek.org.cn>

TEST RESULT CERTIFICATION

Applicant's name.....: TYLT, inc.
Address.....: 685 Cochran St. Suite 200 Simi Valley CA93065 US
Manufacturer's Name.....: Shenzhen Goodwin Technology Co., Ltd.
Address.....: 4/F, Building A, Huayuan Industrial Park, Fenghuang NO.1
Industral Area, Fuyong, Bao'an Dist, Shenzhen, China
Factory's Name 1.....: Shenzhen Goodwin Technology Co., Ltd.
Address.....: 4/F, Building A, Huayuan Industrial Park, Fenghuang NO.1
Industral Area, Fuyong, Bao'an Dist, Shenzhen, China
Factory's Name 2.....: GOLD CABLE VIET NAM COMPANY LIMITED
Address.....: Road D3, Part D, Pho Noi A Industrial Park, Lac Hong Commune,
VAN LAM DISTRICT, Hung Yen

Product description

Product name.....: Wireless Charger

Model and/or type reference .: QIVMS15BK-T

FCC part 15C

Standards.....: ANSI C63.10:2013

KDB 680106 D01 RF Exposure Wireless Charging App v03r01

This device described above has been tested by ShenzhenNTEK Testing Technology Co., Ltd., and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

This report shall not be reproduced except in full, without the written approval of ShenzhenNTEK Testing Technology Co., Ltd., this document may be altered or revised by Shenzhen NTEK Testing Technology Co., Ltd., personnel only, and shall be noted in the revision of the document.

The test results of this report relate only to the tested sample identified in this report.

Date of Test.....:

Date (s) of performance of tests.....: 06 Jul. 2022 ~ 14 Jul. 2022

Date of Issue.....: 15 Jul. 2022

Test Result.....: **Pass**

Testing Engineer : _____

Susan Li

(Susan Li)

Authorized Signatory : _____

Alex

(Alex Li)

Table of Contents

Page

1. TEST SUMMARY	4
1.1 FACILITIES AND ACCREDITATIONS	5
1.2 LABORATORY ACCREDITATIONS AND LISTINGS	5
1.3 MEASUREMENT UNCERTAINTY	5
2. GENERAL INFORMATION	7
2.1 GENERAL DESCRIPTION OF EUT	7
2.3 DESCRIPTION OF TEST SETUP	9
2.4 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL	10
2.5 MEASUREMENT INSTRUMENTS LIST	11
3. EMC EMISSION TEST	12
3.1 RADIATED EMISSION MEASUREMENT	12
3.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT	12
3.1.2 TEST PROCEDURE	13
3.1.3 TEST SETUP	14
3.1.4 TEST RESULTS	15
4. BANDWIDTH TEST	20
4.1 TEST PROCEDURE	20
4.2 TEST SETUP	20
4.3 TEST RESULT	21
5. ANTENNA APPLICATION	22
5.1 Antenna Requirement	22
5.2 Result	22

1. TEST SUMMARY

Test procedures according to the technical standards:

EMC Emission					
Standard	Test Item	FCC Rules	Limit	Judgment	Remark
FCC part 15C:2018 ANSI C63.10:2013	Conducted Emission	§15.207	Class B	N/A	
	Radiated Emission	§15.209	Class B	PASS	
	ANTENNA APPLICATION	§15.203	/	PASS	
	20dB BANDWIDTH	§15.215	Class B	PASS	

NOTE:

- (1)'N/A' denotes test is not applicable in this Test Report
- (2) For client's request and manual description, the test will not be executed.

1.1 FACILITIES AND ACCREDITATIONS

All measurement facilities used to collect the measurement data are located at
1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen 518126
P.R. China.

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10 and CISPR
Publication 22.

1.2 LABORATORY ACCREDITATIONS AND LISTINGS

Site Description

- CNAS-Lab. : The Certificate Registration Number is L5516.
- IC-Registration : The Certificate Registration Number is 9270A-1.
- FCC- Accredited : Test Firm Registration Number:463705.
Designation Number: CN1184
- A2LA-Lab. : The Certificate Registration Number is 4298.01
This laboratory is accredited in accordance with the recognized
International Standard ISO/IEC 17025:2005 General requirements for
the competence of testing and calibration laboratories.
This accreditation demonstrates technical competence for a defined
scope and the operation of a laboratory quality management system
(refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009).
- Name of Firm : Shenzhen NTEK Testing Technology Co., Ltd.
- Site Location : 1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang
Street, Bao'an District, Shenzhen 518126 P.R. China.

1.3 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a
standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of
approximately **95 %**.

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 2.80\text{dB}$
2	RF power, conducted	$\pm 0.16\text{dB}$
3	Spurious emissions, conducted	$\pm 0.21\text{dB}$
4	All emissions, radiated(30MHz~1GHz)	$\pm 2.64\text{dB}$
5	All emissions, radiated(1GHz~6GHz)	$\pm 2.40\text{dB}$
6	All emissions, radiated(> 6GHz)	$\pm 2.52\text{dB}$
7	Temperature	$\pm 0.5^{\circ}\text{C}$
8	Humidity	$\pm 2\%$
9	All emissions, radiated(9KHz~30MHz)	$\pm 6\text{dB}$
10	Occupied bandwidth	$\pm 2\%$

Revision History

[illegible]

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product Feature and Specification	
Equipment	Wireless Charger
Trade Name	TYLT
FCC ID	2AOAF-160
Model No.	QIVMS15BK-T
Family Model	WP23
Model Difference	All models are the same circuit and RF module, except the model name.
Operating Frequency	110.5kHz~205kHz
Modulation Technique	ASK
Antenna Type	Induction coil
Power Rating	Input: 5.0V/2A,9.0V/2A,12V/1.67A Output: 15W (Max)
Battery	N/A
HW Version	N/A
SW Version	N/A

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

EUT Exercise

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

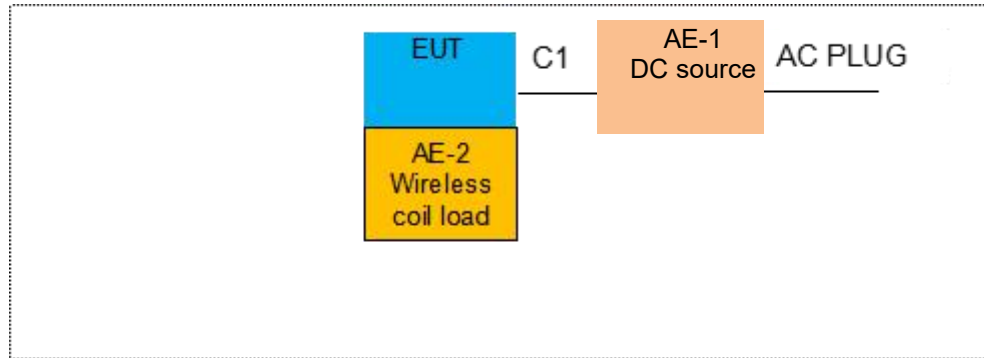
The following summary table is showing all test modes to demonstrate in compliance with the standard.

Test Cases	
Test Item	Data Rate/ Modulation
Radiated Test Cases	Mode 1: Max load

Note: Wireless output 15W(Max) full load, half load and no load mode has been tested. But the Max Load mode is the worst mode, and only this mode was presented in this report.

2.3 DESCRIPTION OF TEST SETUP

For Radiated Test Cases



2.4 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Brand	Model/Type No.	Series No.	Note
AE-1	DC power	N/A	N/A	N/A	Peripherals
AE-2	Wireless Coil load	N/A	N/A	N/A	Peripherals

Item	Cable Type	Shielded Type	Ferrite Core	Length	Note
C-1	Power Cable	YES	NO	1.0m	

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) “YES” means “shielded”“with core”; “NO” means “unshielded”“without core”.

2.5 MEASUREMENT INSTRUMENTS LIST

RadiationTest equipment

	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Spectrum Analyzer	Agilent	E4407B	MY45108040	2022.04.06	2023.04.05	1 year
2	Spectrum Analyzer	Agilent	N9020A	MY49100060	2022.06.16	2023.06.15	1 year
4	Test Receiver	R&S	ESPI7	101318	2022.04.06	2023.04.05	1 year
5	Bilog Antenna	TESEQ	CBL6111D	31216	2022.03.30	2023.03.29	1 year
6	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	2020.05.11	2023.05.10	3 year
7	Amplifier	EMC	EMC051835 SE	980246	2022.06.17	2023.06.16	1 year
8	Amplifier	MITEQ	TTA1840-35-HG	177156	2022.06.17	2023.06.16	1 year
9	Loop Antenna	ARA	PLA-1030/B	1029	2022.06.16	2023.06.15	1 year
10	Test Cable (9KHz-30MHz)	N/A	R-01	N/A	2019.08.6	2022.08.05	3 year
11	Test Cable (30MHz-1GHz)	N/A	R-02	N/A	2019.08.6	2022.08.05	3 year

3. EMC EMISSION TEST

3.1 RADIATED EMISSION MEASUREMENT

3.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table 15.209(a):

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

15.205 Restricted bands of operation

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)
13.36-13.41			

Notes

- (1) Measurement was performed at an antenna to the closed point of EUT distance of meters.
- (2) Emission level (dBuV/m)=20log Emission level (uV/m).
- (3) Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of 15.205, and the emissions located in restricted bands also comply with 15.209 limit.
- (4) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector

3.1.2 TEST PROCEDURE

Test Arrangement for Radiated Emissions up to 1 GHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at an accredited test facility. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna (Blow 30M, use loop antenna), and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

Note: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for quasi-peak detection (QP) at frequency below 1GHz.

During the radiated emission test, the Spectrum Analyzer was set with the following configurations:

Use the following receiver/spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW=200Hz for 9KHz to 150KHz,

RBW=9kHz for 150KHz to 30MHz,

RBW=120KHz for 30MHz to 1GHz

VBW $\geq 3 \times$ RBW

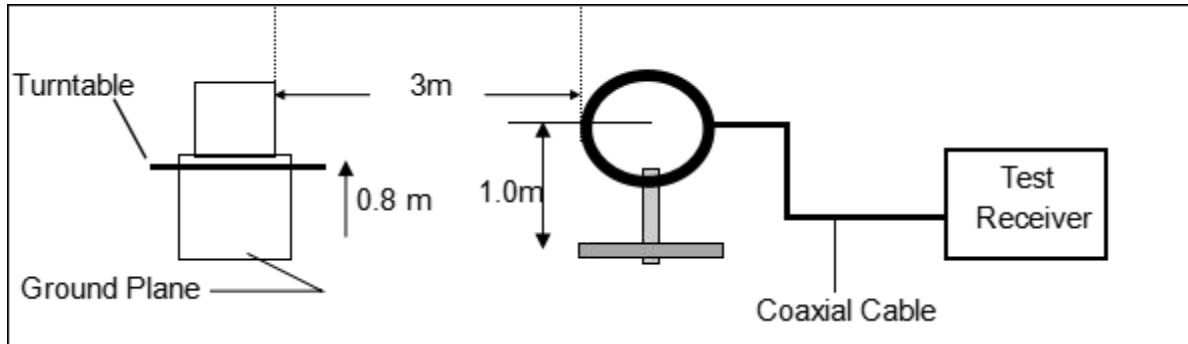
Sweep = auto

Detector function = QP

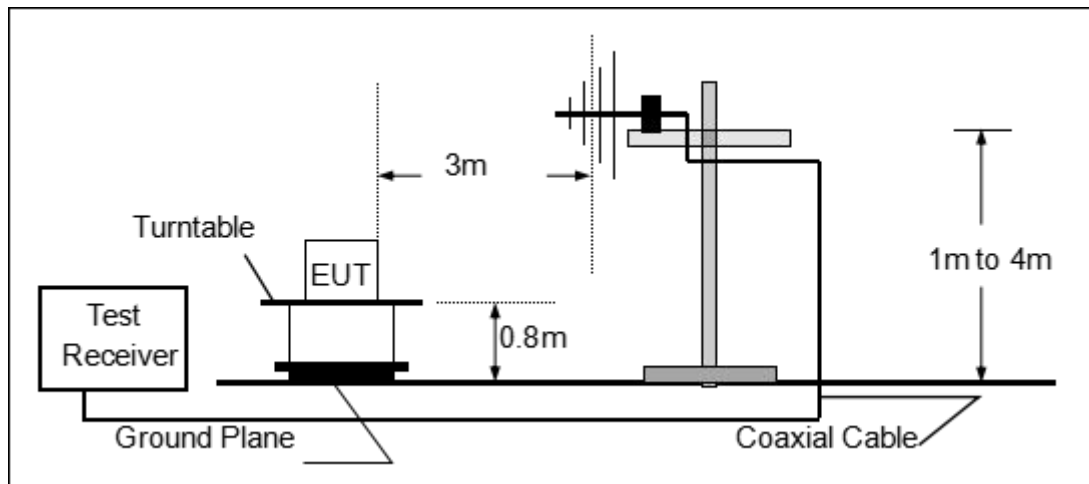
Trace = max hold

3.1.3 TEST SETUP

(a) For Radiated Emission Test Set-Up, Frequency Below 30MHz



(b) For Radiated Emission 30~1000MHz



3.1.4 TEST RESULTS

TEST RESULTS(9KHz~30MHz)

Note:

EUT:	Wireless Charger	Model Name. :	QIVMS15BK-T
Temperature:	24℃	Relative Humidity:	54%
Pressure:	1010 hPa	Test Power :	DC 24V from battery
Test Mode :	Max Load	Polarization:	X

Frequency (MHz)	Ant.Pol.	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
0.078	X	42.35	109.8	-67.41	Avg
0.116	X	53.14	106.32	-53.18	Avg
0.643	X	30.95	71.44	-40.49	QP
3.854	X	33.81	69.54	-35.73	QP
4.688	X	36.54	69.54	-33.00	QP
16.951	X	37.63	69.54	-31.91	QP

Note:

Below 30MHz, Pre-test the X, Y, Z axis to find X axis is worst case, so only record X axis test data.

X: Field strength which this device generates since the position of the charging coil and loop antenna differ by 0 degrees.

Y: Field strength which this device generates since the position of the charging coil and loop antenna differ by 90 degrees.

Z: Field strength which this device generates since the position of the charging coil and loop antenna differ by 180 degrees.

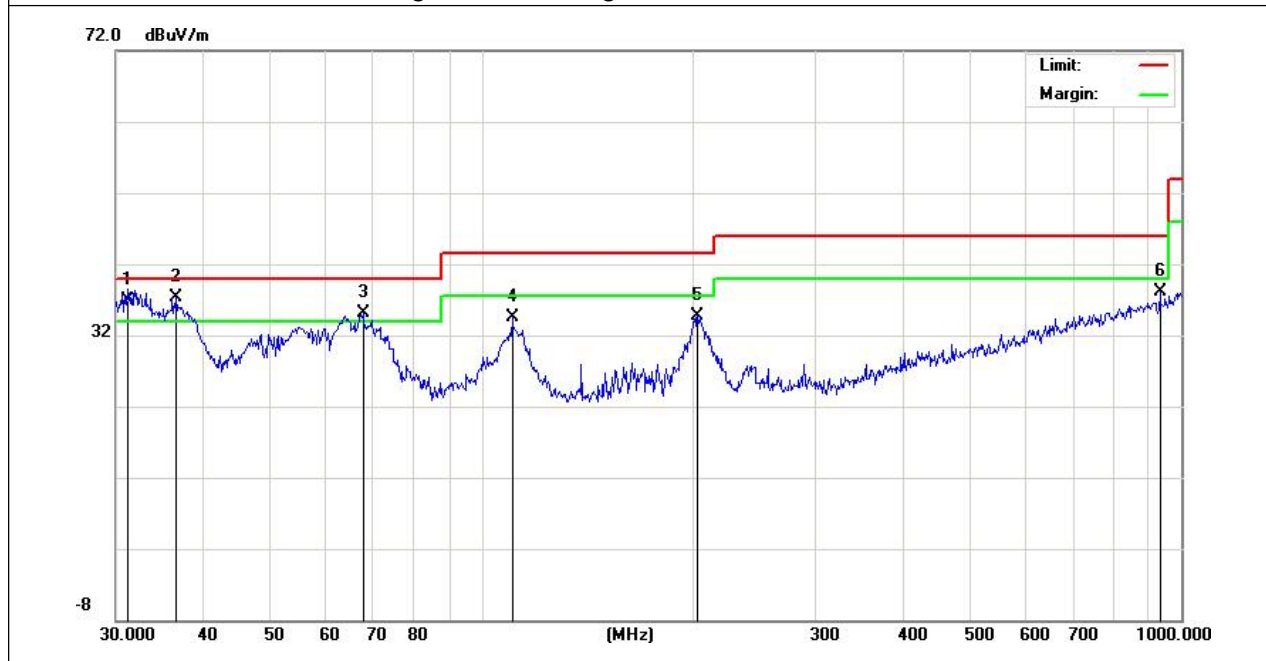
TEST RESULTS(30MHz ~1000MHz)

EUT:	Wireless Charger	Model Name. :	QIVMS15BK-T
Temperature:	24℃	Relative Humidity:	54%
Pressure:	1010 hPa	Test Power :	DC 24V from battery
Test Mode :	Max Load-Car Charger 2	Polarization:	Vertical

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
V	31.1798	11.39	25.61	37.00	40.00	-3.00	QP
V	36.6375	14.76	22.52	37.28	40.00	-2.72	QP
V	67.6751	22.11	13.05	35.16	40.00	-4.84	QP
V	110.5687	16.06	18.42	34.48	43.50	-9.02	QP
V	203.5228	18.31	16.39	34.70	43.50	-8.80	QP
V	932.2715	7.36	30.76	38.12	46.00	-7.88	QP

Remark:

Emission Level= Meter Reading+ Factor, Margin= Emission Level- Limit.

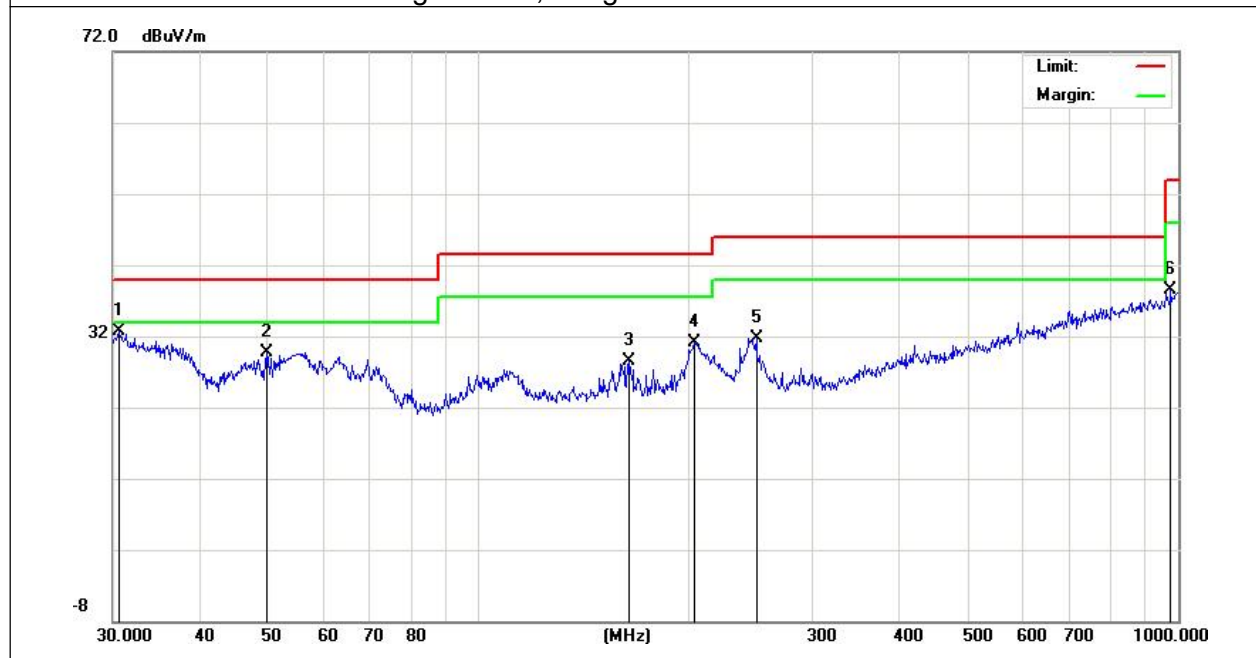


EUT:	Wireless Charger	Model Name. :	QIVMS15BK-T
Temperature:	24℃	Relative Humidity:	54%
Pressure:	1010 hPa	Test Power :	DC 24V from battery
Test Mode :	Max Load-Car Charger 2	Polarization:	Horizontal

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
H	30.6379	6.83	25.82	32.65	40.00	-7.35	QP
H	49.8814	14.37	15.28	29.65	40.00	-10.35	QP
H	164.3301	10.72	17.86	28.58	43.50	-14.92	QP
H	203.5228	14.77	16.39	31.16	43.50	-12.34	QP
H	249.4250	12.83	18.88	31.71	46.00	-14.29	QP
H	975.7529	6.98	31.58	38.56	54.00	-15.44	QP

Remark:

Emission Level= Meter Reading+ Factor, Margin= Emission Level- Limit.

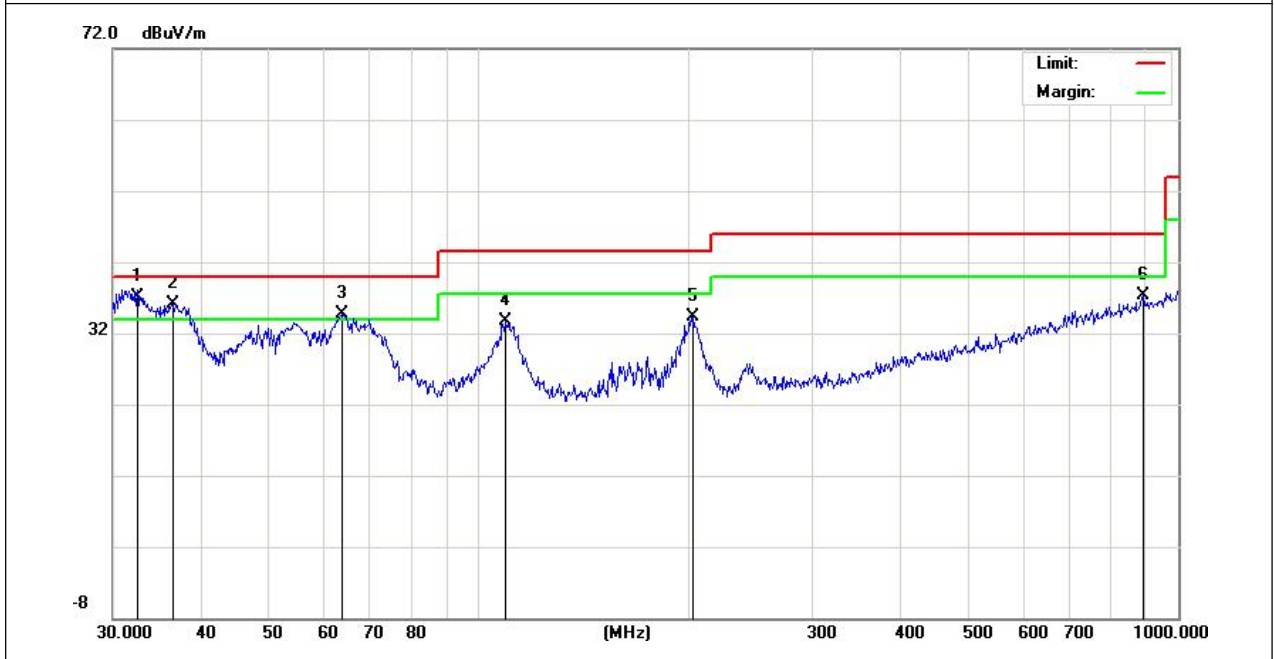


EUT:	Wireless Charger	Model Name. :	QIVMS15BK-T
Temperature:	24℃	Relative Humidity:	54%
Pressure:	1010 hPa	Test Power :	DC 24V from battery
Test Mode :	Max Load-Car Charger 1	Polarization:	Vertical

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
V	32.5198	12.66	24.54	37.20	40.00	-2.80	QP
V	36.6375	13.56	22.52	36.08	40.00	-3.92	QP
V	63.7588	22.28	12.46	34.74	40.00	-5.26	QP
V	109.0286	15.66	18.12	33.78	43.50	-9.72	QP
V	202.8104	17.92	16.41	34.33	43.50	-9.17	QP
V	890.7278	6.88	30.41	37.29	46.00	-8.71	QP

Remark:

Emission Level= Meter Reading+ Factor, Margin= Emission Level- Limit.

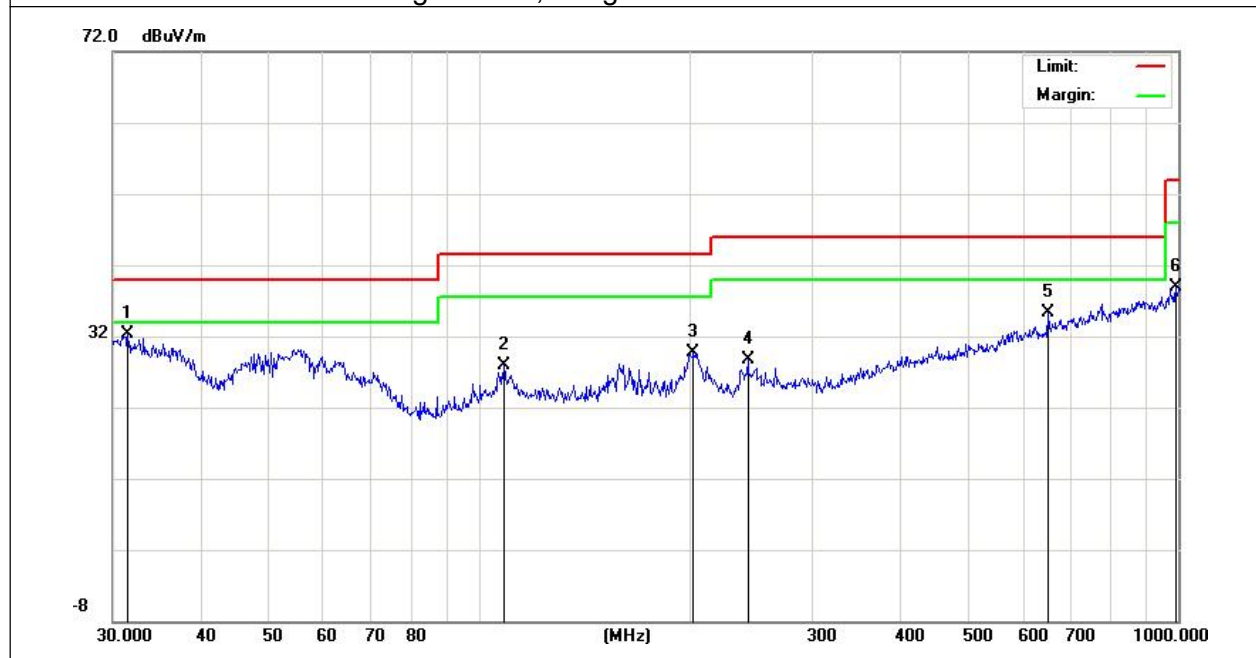


EUT:	Wireless Charger	Model Name. :	QIVMS15BK-T
Temperature:	24℃	Relative Humidity:	54%
Pressure:	1010 hPa	Test Power :	DC 24V from battery
Test Mode :	Max Load-Car Charger 1	Polarization:	Horizontal

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
H	31.5095	7.02	25.22	32.24	40.00	-7.76	QP
H	108.6470	9.82	18.18	28.00	43.50	-15.50	QP
H	202.8104	13.20	16.41	29.61	43.50	-13.89	QP
H	242.5253	10.25	18.40	28.65	46.00	-17.35	QP
H	651.9417	8.22	27.06	35.28	46.00	-10.72	QP
H	993.0114	7.35	31.64	38.99	54.00	-15.01	QP

Remark:

Emission Level= Meter Reading+ Factor, Margin= Emission Level- Limit.



4. BANDWIDTH TEST

4.1 TEST PROCEDURE

- 1). The transmitter output (antenna port) was connected to the spectrum analyzer in peak mode.
- 2). 20dB Bandwidth the resolution bandwidth of 300 Hz and the video bandwidth of 1 kHz were used.
- 3). Measured the spectrum width with power higher than 20dB below carrier.

4.2 TEST SETUP

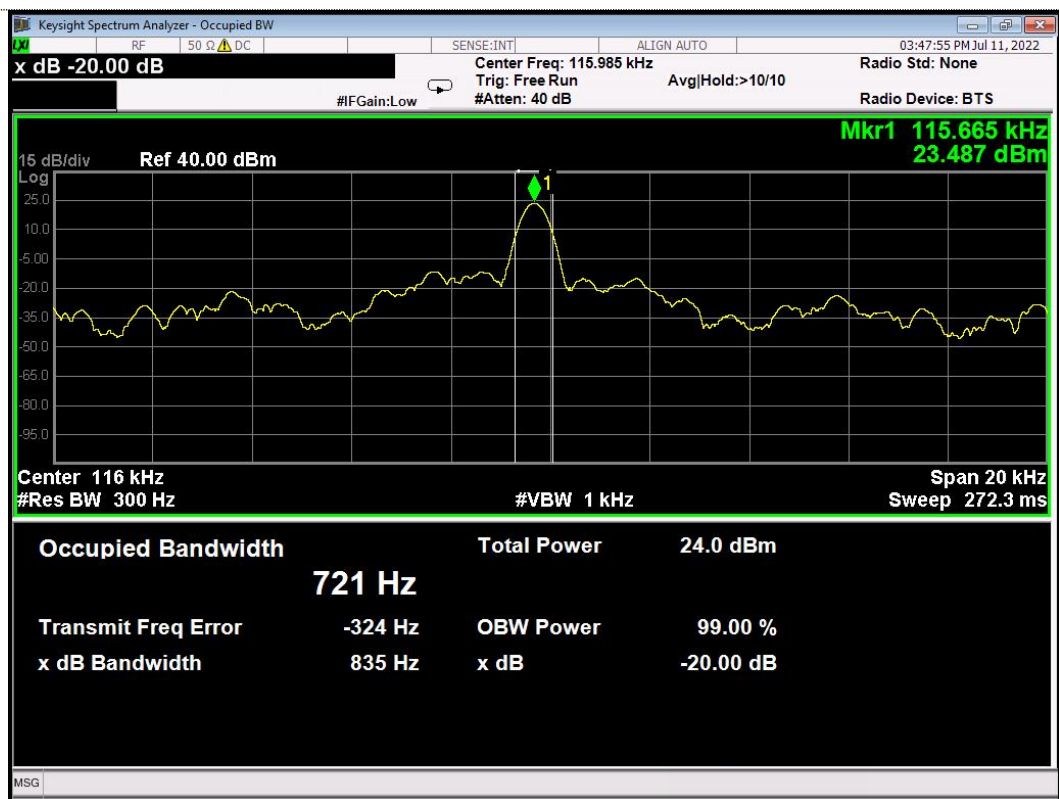


4.3 TEST RESULT

EUT:	Wireless Charger	Model Name. :	QIVMS15BK-T
Temperature:	24℃	Relative Humidity:	54%
Pressure:	1010 hPa	Test Mode :	Max Load
Test Power :	DC 24V from battery		

-20dB Bandwidth-a single frequency(Hz)	F _L (kHz)	F _H (kHz)
721	115.305	116.026

a single frequency



5. ANTENNA APPLICATION

5.1 Antenna Requirement

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

5.2 Result

The EUT antenna is permanent attached antenna. It complies with the standard requirement.

END REPORT