



Test Report No.:
FCC2023-0035-RF

RF Test Report

EUT : **Oclean Wireless Charger**
MODEL : **WP02**
BRAND NAME : **Oclean**
APPLICANT : **Shenzhen Yunding Information Technology Co., Ltd.**
Classification Of Test : **N/A**




CVC Testing Technology Co., Ltd.



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Applicant		Name: Shenzhen Yunding Information Technology Co., Ltd. Address: 28G, Building 3, Dachong Business Center(Phase 3), No.18, Dachong 1st Road, Dachong Community, Yuehai Street, Nanshan District, Shenzhen City, Guangdong Province, China	
Manufacturer		Name: Shenzhen Yunding Information Technology Co., Ltd. Address: 28G, Building 3, Dachong Business Center(Phase 3), No.18, Dachong 1st Road, Dachong Community, Yuehai Street, Nanshan District, Shenzhen City, Guangdong Province, China	
Equipment Under Test		Product Name: Oclean Wireless Charger Model/Type: WP02 Brand Name: Oclean Serial NO.: N/A Sample NO.:4-1	
Date of Receipt.	2023.06.21	Date of Testing	2023.06.21~2023.07.09
Test Specification		Test Result	
FCC Part 15, Subpart C, Section 15.207, Section 15.209		PASS	
Evaluation of Test Result		The equipment under test was found to comply with the requirements of the standards applied. Seal of CVC Issue Date: 2023.07.13	
Tested by:  Lu Wei Ji Name Signature	Tested by:  Xu Zhen Fei Name Signature	Approved by:  Chen Hua Wen Name Signature	
Other Aspects: NONE.			
Abbreviations: OK, Pass= passed Fail = failed N/A= not applicable EUT= equipment, sample(s) under tested			

This test report relates only to the EUT, and shall not be reproduced except in full, without written approval of CVC.



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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FCC2023-0035-RF	Original release	2023.07.13



1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
FCC 15.203	Antenna Requirement	N/A	No antenna connector is used.
FCC 15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit.
FCC 15.209,15.205	Radiated Emissions	PASS	Meet the requirement of limit.
FCC 15.215 (c)	20dB Bandwidth Measurement	PASS	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	PASS	Meet the requirement of limit.



1.1 LIST OF TEST AND MEASUREMENT INSTRUMENTS

Test Equipment	Type/Mode	SERIAL NO.	Equipment No.	Manufacturer	Cal. Due
WIFI & Bluetooth Test System 1					/
Communication Shielded Room 1	4m*3m*3m	CRTDSWKSR44301	VGDS-0699	CRT	2024/04/24
Spectrum Analyzer	FSV40	101580	DZ-000238-3	R&S	2024/04/22
Comprehensive Test Instrument	CMW270	100304	DZ-000240-1	R&S	2023/12/06
Analog Signal Generator	SMB100A	181858	DZ-000238-2	R&S	2024/05/29
Vector Signal Generator	SGT100A	111661	DZ-000238-1	R&S	2024/05/29
RF Radio Frequency Switch	JS0806-2	19H9080187		Tonscend	2024/05/29
Programmable DC Power Supply	E3644A	MY58036222	DZ-000178	KEYSIGHT	2024/04/12
Radiation SpuriousTest System					/
3m Semi-Anechoic Chamber	FACT-4	ST08035	WKNA-0024	ETS	2024/12/12
Loop Antenna	FMZB1513	1513-170	EM-000384	SCHWARZBECK	2024/02/24
Spectrum Analyzer	N9010B	MY57470323	DZ-000174	KEYSIGHT	2024/02/22
EMI Test Receiver	N9038A-508	MY532290079	EM-000397	Agilent	2024/02/22
Broadband Antenna	VULB 9163	9163-530	EM-000342	SCHWARZBECK	2024/05/29
Waveguide Horn Antenna	HF906	360306/008	EM-000093	R&S	2024/02/24
Waveguide Horn Antenna	BBHA9170	00949	DZ-000209-2	SCHWARZBECK	2023/07/31
Preamplifier	BBV 9721	9721-050	DZ-000209-1	SCHWARZBECK	2024/05/29
5G Bandstop Filters	WRCJV12-4900-5100-5900-6100-50EE	851770	DZ-000186	WI	2023/12/06
Conducted emission					/
EMI Test Receiver	ESR3	102394	VG DY-0705	R&S	2024-02-22
LISN	NSLK 8127	8127644	VG DY-0150	SCHWARZBECK	2023-09-03
LISN	NSLK 8128	8128-316	VG DY-0149	SCHWARZBECK	2023-09-03
DC LISN	PVDC8301-017	PVDC8301#17	VG DY-0692	SCHWARZBECK	2023-10-07
LISN	NSLK 8129	8129-268	EM-000388	SCHWARZBECK	2024-02-22
Plus Limiter (#1)	VTSD 9561 F-N	00515	VG DY-0808	SCHWARZBECK	2024-03-03
Impedance Stabilization Network	ISN T800	27095	WKNE-0195	TESEQ	2023-09-03
ImpedanceStabilizationNetwork	NTFM8131	#184	EM-000498	SCHWARZBECK	2024-05-29
Voltage Probe	TK9420	9420-499	VG DY-0128	SCHWARZBECK	2024-02-22
Power Divider	4901.17.B	22643830	DB-0016	HUBER+SUHNER	2023-08-31
Video Signal Generator	GV-798+	151064920001	VGDS-0215	PROMAX	2024-05-29
AudioSignalGenerator	GAG-810	EK871591	EM-000309	GW	2023-12-06
Shielding Room(#1)	GP1A	001	WKNF-0001	LEINING	2024-08-07



1.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

No.	ITEM	FREQUENCY	UNCERTAINTY
1	Conducted Emissions	9kHz~30MHz	±2.66dB
2	Radiated Spurious Emissions	9KHz ~ 30MHz	±0.769dB
		30MHz ~ 1GMHz	±0.877dB
		1GHz ~ 18GHz	±0.777dB
		18GHz ~ 40GHz	±1.315dB

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

1.3 TEST LOCATION

The tests and measurements refer to this report were performed by EMC testing Lab. of CVC Testing Technology Co., Ltd.

CABID:CN0103

Address: No.3, TiantaiyiRoad, KaitaiAvenue, ScienceCity, Guangzhou, China

Post Code: 510663

Tel: 0755-23763060-8805

Fax: 0755-23763060

E-mail: sz-kf@cvc.org.cn

<http://www.cvc.org.cn>



2 GENERAL INFORMATION

2.1 GENERAL PRODUCT INFORMATION

PRODUCT	Oclean Wireless Charger
BRAND	Oclean
TEST MODEL	WP02
ADDITIONAL MODEL	N/A
FCC ID	2AN5D-WP02
POWER SUPPLY	DC 5V from USB host unit
MODULATION TYPE	ASK
OPERATING FREQUENCY	110KHz ~ 205KHz
ANTENNA TYPE	Coil Antenna
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	N/A
Remark: <ol style="list-style-type: none">1. For more detailed features description, please refer to the manufacturer's specifications or the User's Manual.2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.3. Please refer to the EUT photo document for detailed EUT photo (FCC2023-0035-E).	



2.2 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

FCC PART 15, Subpart C. Section 15.209,Section 15.207
ANSI C63.10-2013

All test items have been performed and recorded as per the above standards

2.3 DESCRIPTION OF SUPPORT UNITS

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.

Support Equipment							
NO	Description	Brand	Model No.	Serial Number	Supplied by		
1	Oclean WiFi Smart Sonic Electric Toothbrush	Oclean	V8100	N/A	Client		
Support Cable							
NO	Description	Quantity (Number)	Length (m)	Detachable (Yes/ No)	Shielded (Yes/ No)	Cores (Number)	Supplied by
-	-	-	-	-	-	-	-

3 TEST TYPES AND RESULTS

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 Limit

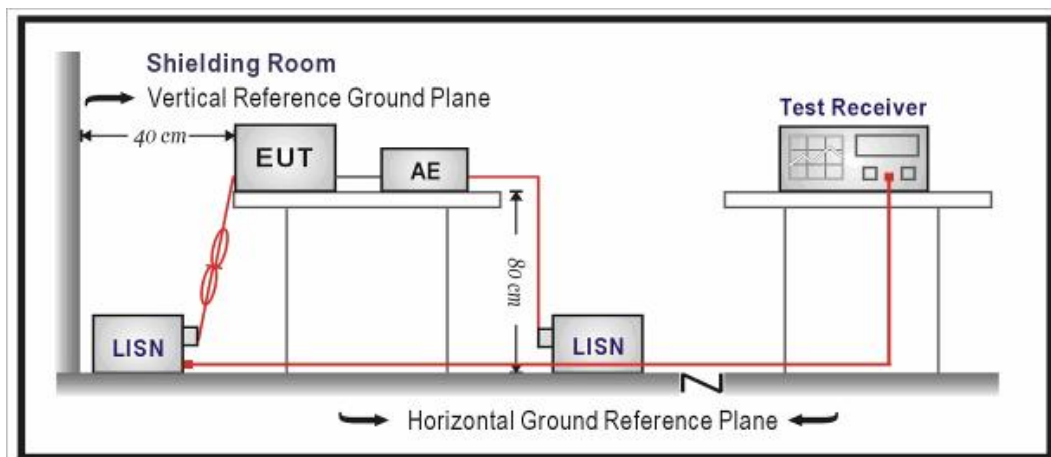
Frequency (MHz)	Conducted Limits(dB μ V)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46*
0.5 - 5	56	46
5 - 30	60	50

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

3.1.2 Measurement procedure

- The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the Test photographs) Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source. The equipment under test shall be placed on a support of non-metallic material, the height of which shall be 1.5m above the ground,
- The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
- Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

3.1.3 Test setup

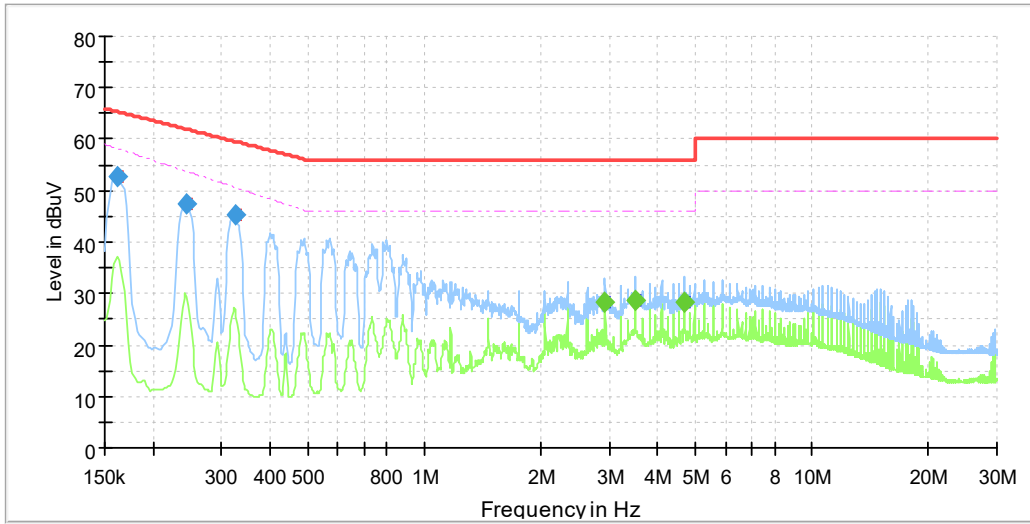




3.1.4 Test results

CONDUCTED WORST-CASE DATA:

Test Mode	Wireless charging	Frequency Range	150KHz ~ 30MHz
Test Voltage	DC 5V from WPT	PHASE	Line (L)
Environmental Conditions	28.4deg. C,53% RH	Tested By	Li Jialing

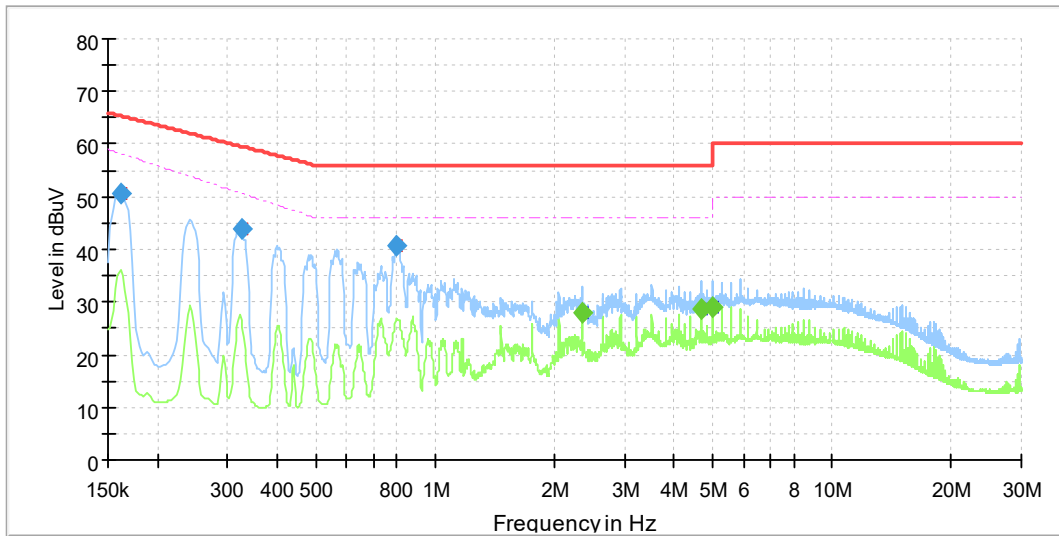


NO	Frequency (MHz)	QuasiPeak (dBuV)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr.Factor (dB)
1	0.161	52.7	---	65.4	12.7	L1	20.4
2	0.245	47.5	---	61.9	14.4	L1	20.4
3	0.326	45.4	---	59.6	14.2	L1	20.5
4	2.929	---	28.3	46.0	17.7	L1	20.7
5	3.514	---	28.6	46.0	17.4	L1	20.7
6	4.686	---	28.3	46.0	17.7	L1	20.6

Remark: The emission levels of other frequencies were very low against the limit.



Test Mode	Wireless charging	Frequency Range	150KHz ~ 30MHz
Test Voltage	DC 5V from WPT	PHASE	Line (L)
Environmental Conditions	28.4deg. C,53% RH	Tested By	Li Jialing



NO	Frequency (MHz)	QuasiPeak (dBuV)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr.Factor (dB)
1	0.161	50.7	---	65.4	14.7	N	20.5
2	0.326	44.0	---	59.6	15.5	N	20.6
3	0.798	40.7	---	56.0	15.3	N	20.6
4	2.346	---	27.8	46.0	18.2	N	20.8
5	4.693	---	28.8	46.0	17.2	N	20.6
6	4.985	---	28.9	46.0	17.1	N	20.6

Remark: The emission levels of other frequencies were very low against the limit.



3.2 RADIATED EMISSIONS

3.2.1 Limits

Test Standard: Part 15C

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a). Other emissions shall be at least 20dB below the highest level of the desired power.

FREQUENCIES (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

NOTE: 1. The lower limit shall apply at the transition frequencies.
NOTE: 2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
NOTE: 3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



3.2.2 Measurement procedure

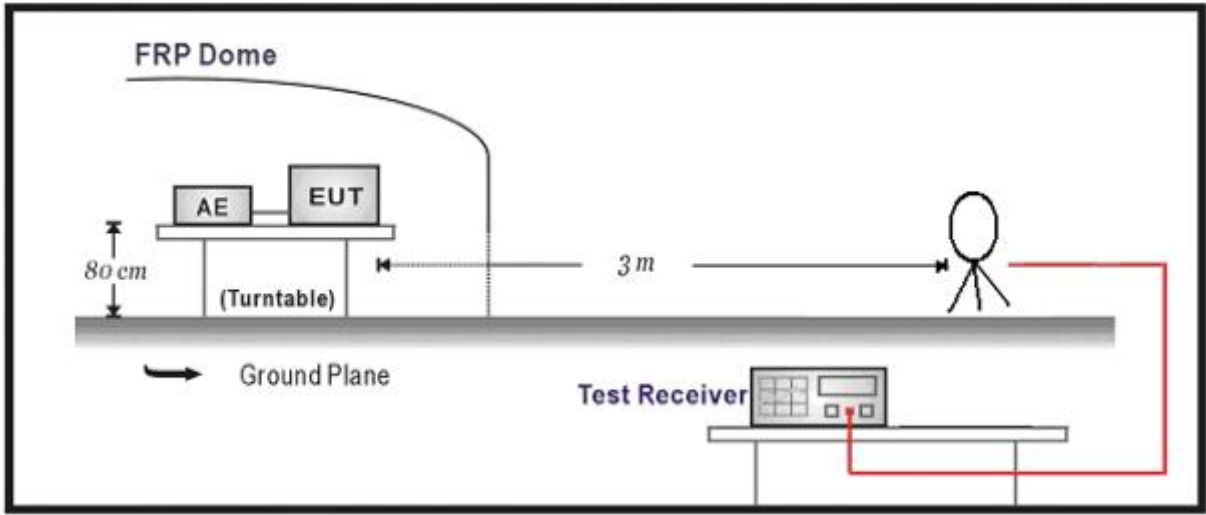
- a. The EUT was placed on the top of a rotating table 1.5 meters(above 1GHz) and 0.8 meters(below 1GHz) above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. For below 1GHz was used bilog antenna, and above 1GHz was used horn 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.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. For below 30MHz, a loop antenna with its vertical plane is place 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1m above the ground.
- g. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using fresh batteries. The turntable was rotated to maximize the emission level.

NOTE:

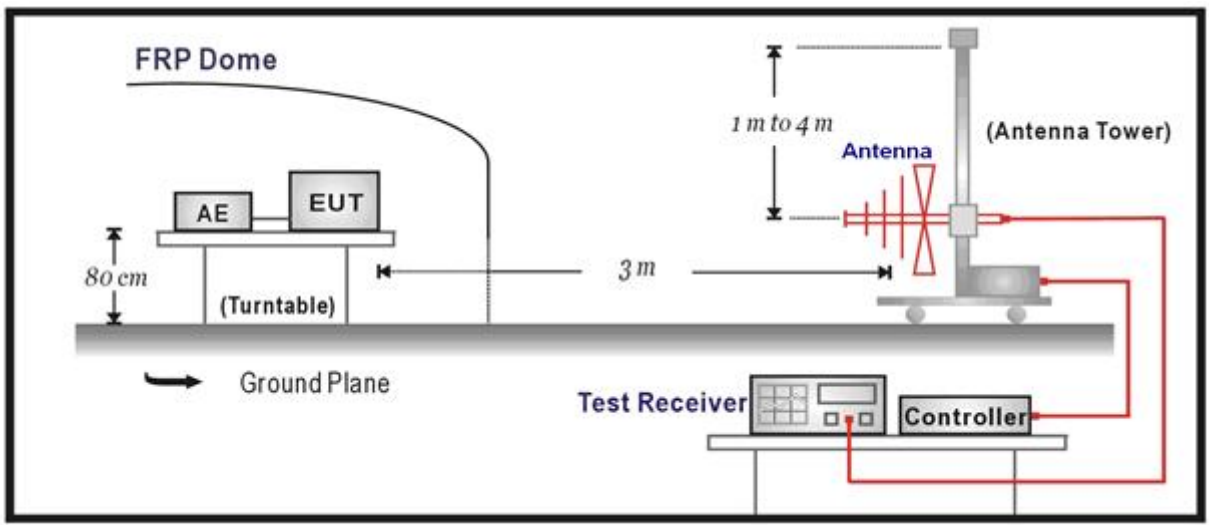
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz(Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.
5. The testing of the EUT was performed on all 3 orthogonal axes; the worst-case test configuration was reported on the file test setup photo.

3.2.3 Test setup

Below 30MHz Test Setup:



Below 1GHz Test Setup:



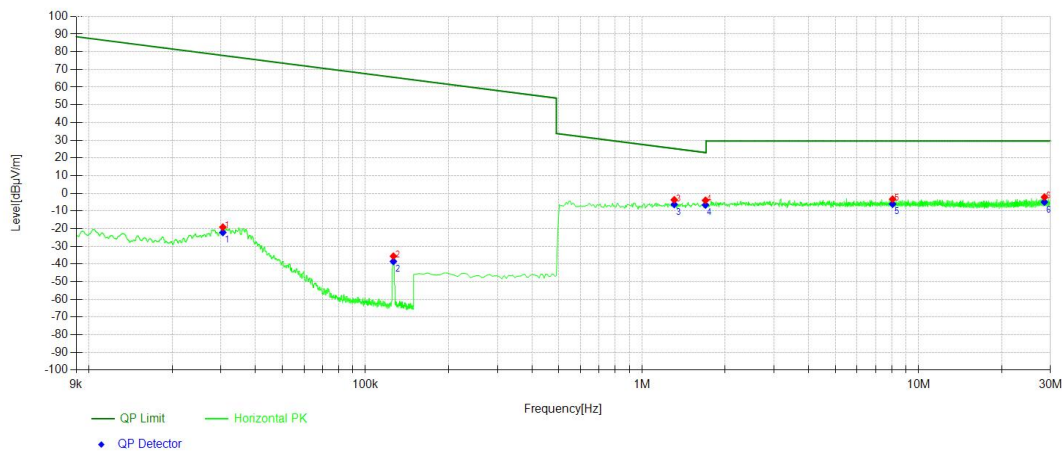


3.2.4 Test results

Results under test standard PART 15C:
9KHz ~ 30MHz WORST-CASE DATA:

Worst Test Mode	Wireless charging	Channel	/
Frequency Range	9kHz ~ 30MHz	Detector Function	Quasi-Peak (QP)

Horizontal

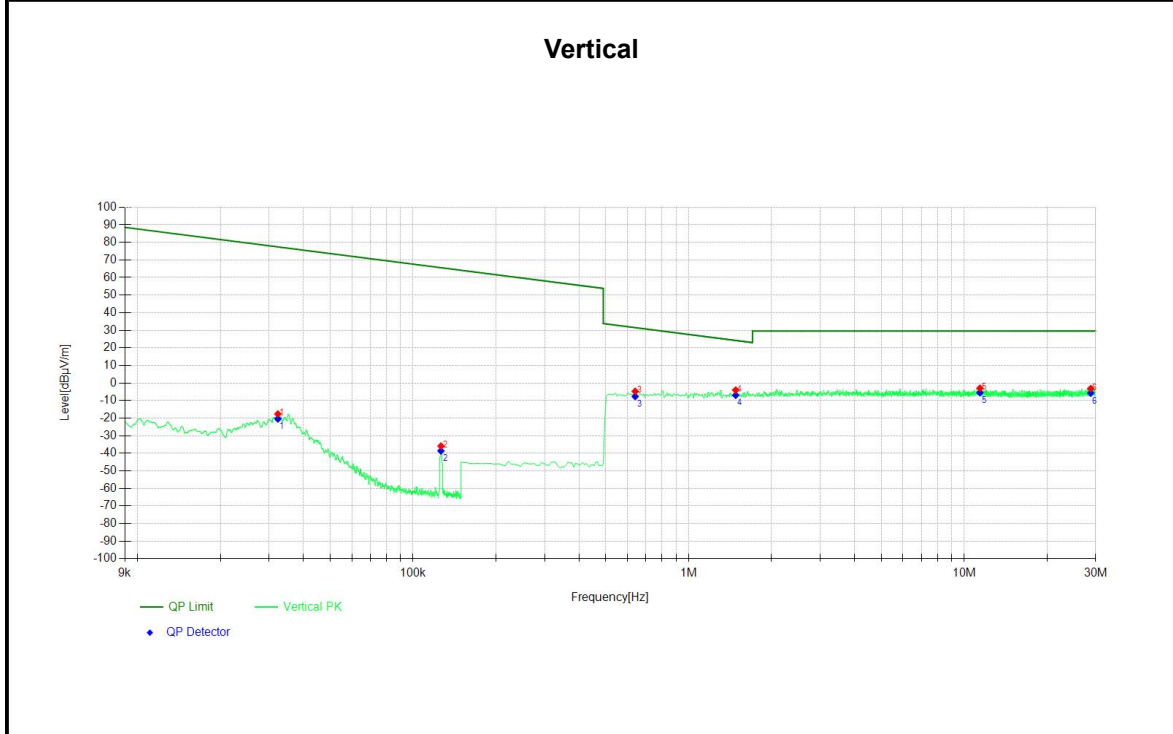


NO	Freq. [MHz]	Reading [dBuV/m]	Factor [dB]	Level [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [°]
1	0.0305	37.03	-59.18	-22.15	77.92	100.07	100	7
2	#0.1262	20.94	-59.49	-38.55	65.58	104.13	100	295
3	1.3084	12.68	-19.01	-6.33	25.27	31.60	100	8
4	1.6965	12.26	-18.89	-6.63	23.01	29.64	100	2
5	8.0618	13.2	-19.30	-6.10	29.55	35.65	100	18
6	28.543	14.7	-19.66	-4.96	29.54	34.50	100	251

- Remark:
1. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB/m).
 2. Factor (dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) + Distance factor(dB)
 3. Distance factor = $40 \cdot \log(\text{Reference measure distance}/\text{measure distance})$
 4. Margin(dB) = Limit[dBuV/m] - Level [dBuV/m]
 5. # mark means fundamental



Worst Test Mode	Wireless charging	Channel	/
Frequency Range	9kHz ~ 30MHz	Detector Function	Quasi-Peak (QP)



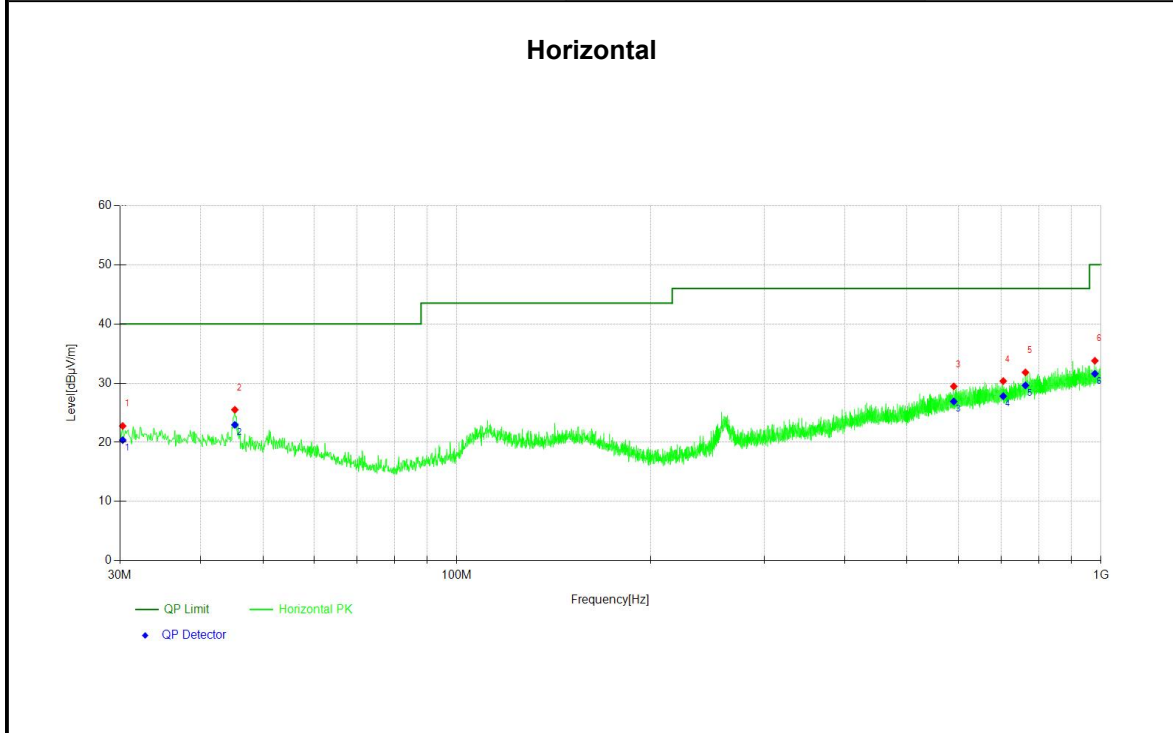
NO	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]
1	0.0323	41.50	-59.17	-17.67	77.41	95.08	100	25
2	#0.1262	23.60	-59.49	-35.89	65.59	101.48	100	286
3	0.6396	14.04	-18.81	-4.77	31.49	36.26	100	93
4	1.4816	14.89	-18.96	-4.07	24.19	28.26	100	242
5	11.4117	16.67	-19.63	-2.96	29.55	32.51	100	18
6	28.7938	16.34	-19.58	-3.24	29.54	32.78	100	9

Remark: 1. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB/m).
 2. Factor (dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) + Distance factor(dB)
 3. Distance factor =40*log(Reference measure distance/measure distance)
 4. Margin(dB) = Limit[dBuV/m] - Level [dBuV/m]
 5. # mark means fundamental



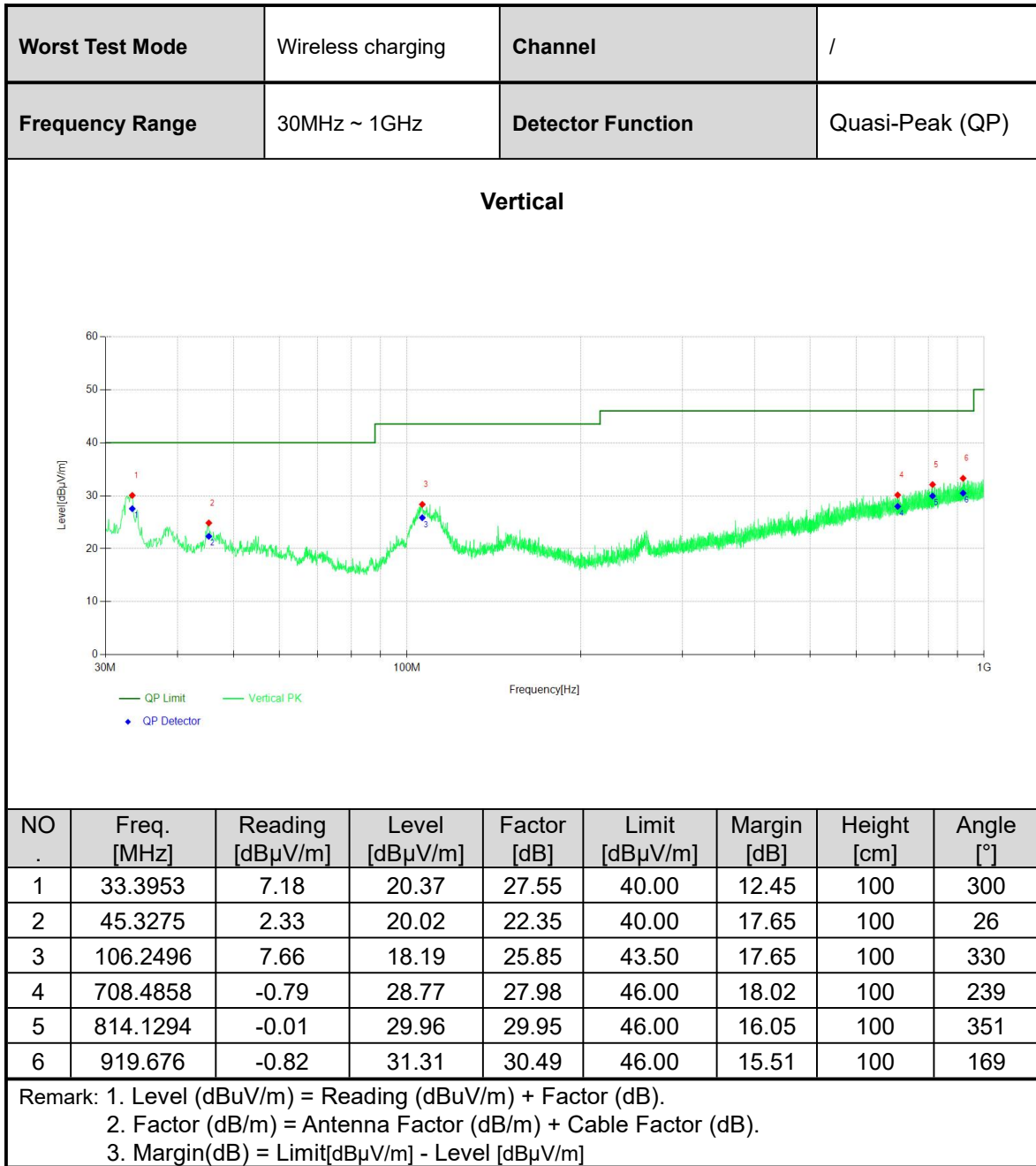
30MHz ~ 1GHz WORST-CASE DATA(FCC):

Worst Test Mode	Wireless charging	Channel	/
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)



NO	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]
1	30.291	0.16	20.22	20.38	40.00	19.62	100	138
2	45.2305	2.92	20.03	22.95	40.00	17.05	200	181
3	590.8131	-0.01	26.91	26.90	46.00	19.10	100	218
4	704.9935	-0.94	28.74	27.80	46.00	18.20	200	40
5	763.2963	0.12	29.50	29.62	46.00	16.38	100	300
6	978.3668	-0.01	31.60	31.59	50.00	18.41	100	6

Remark: 1. Level (dBµV/m) = Reading (dBµV/m) + Factor (dB).
 2. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. Margin(dB) = Limit[dBµV/m] - Level [dBµV/m]



3.3 20DB BANDWIDTH MEASUREMENT

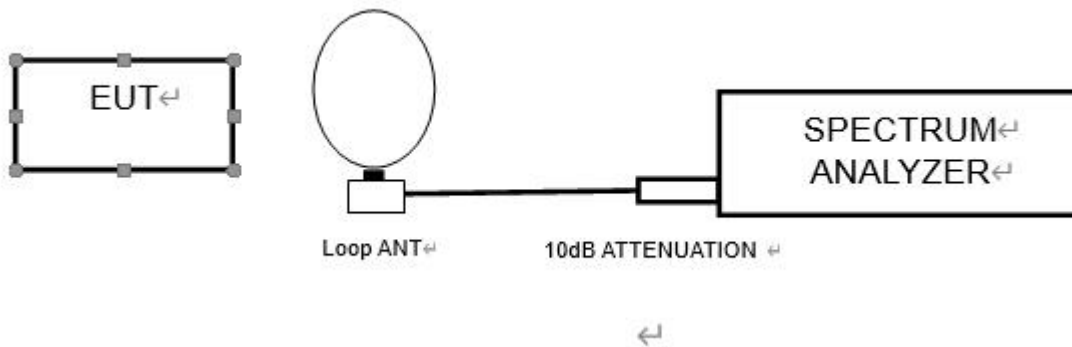
3.3.1 Limits of 20dB Bandwidth Measurement

The field strength of any emissions appearing between the band edges and out of band shall be attenuated at least 20 dB below the level of the unmodulated carrier or to the general limits in Section 15.209.

3.3.2 Measurement procedure

- a. . Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b. Turn on the EUT, then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- c. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
- d. Repeat above procedures until all frequencies measured were complete.

3.3.3 Test setup



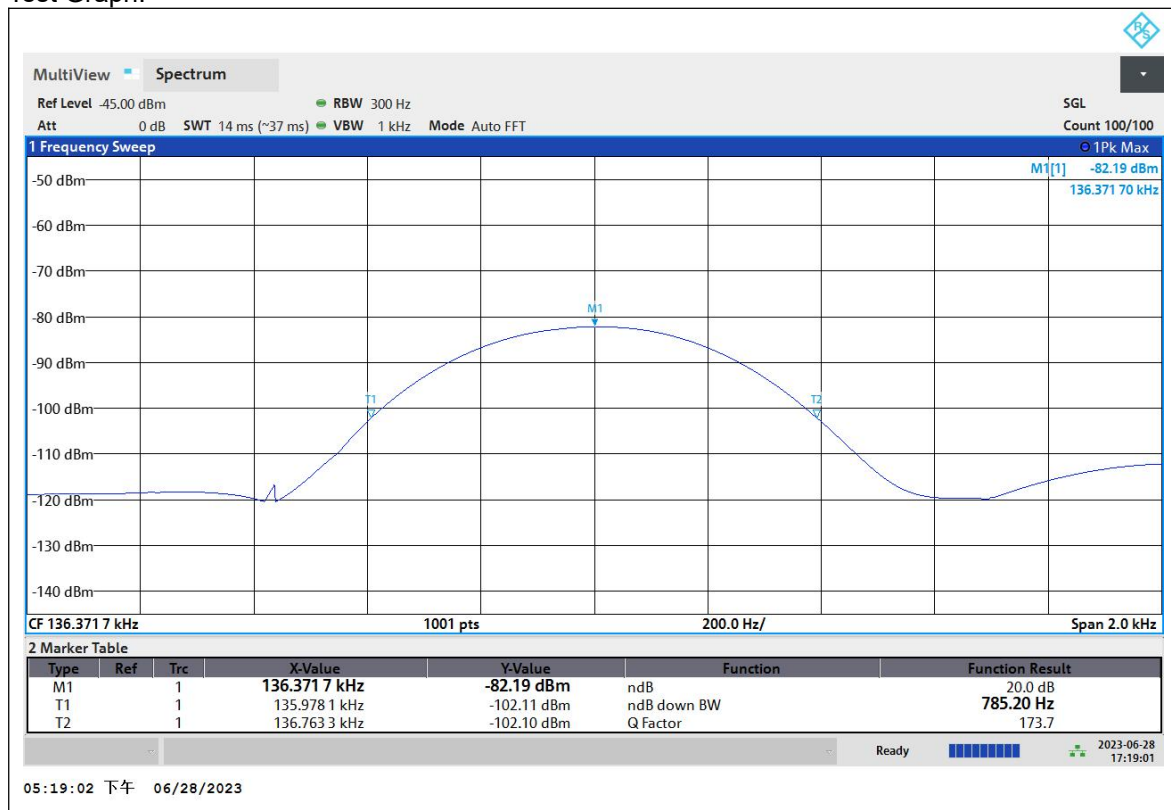


3.3.4 Test results

TEST MODE	CHANNEL FREQUENCY (KHz)	20dB BANDWIDTH (Hz)
Wireless Charging(5W)	136.371	785

Lower & Upper Test Frequency Point (MHz)	Test Frequency (KHz)	P/F
Lower	135.978	PASS
Upper	136.763	PASS

Test Graph:



3.4 OCCUPIED BANDWIDTH MEASUREMENT

3.4.1 Limits of Occupied Bandwidth Measurement

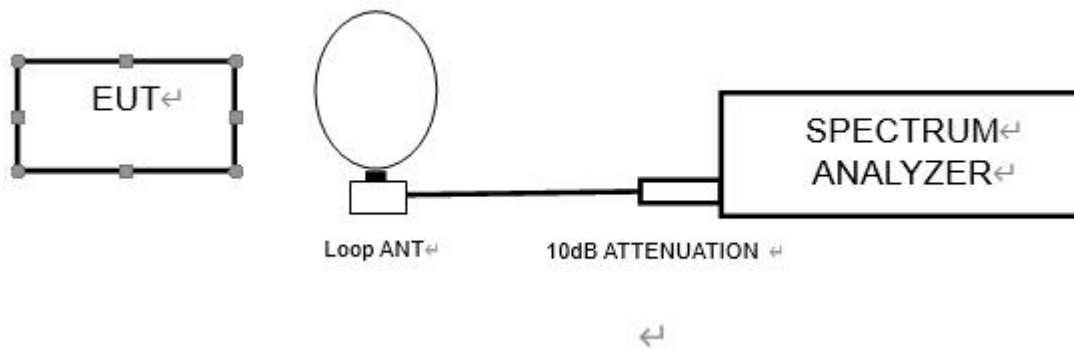
Report only

3.4.2 Measurement procedure

The resolution bandwidth shall be set to the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth.

Below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

3.4.3 Test setup



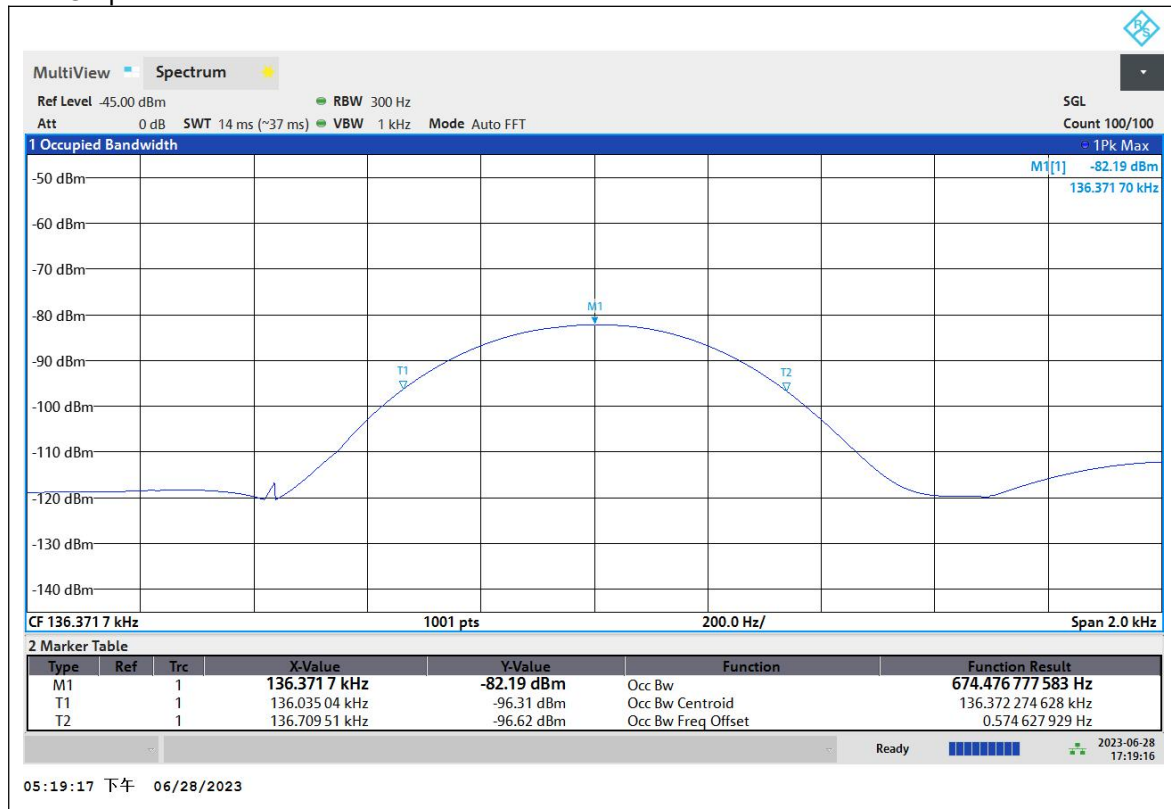


3.4.4 Test results

TEST MODE	CHANNEL FREQUENCY (KHz)	20dB BANDWIDTH (Hz)
Wireless Charging(7.5W) + Charging from Adapter	136.371	674

Lower & Upper Test Frequency Point (MHz)	Test Frequency (KHz)	P/F
Lower	136.035	PASS
Upper	137.709	PASS

Test Graph:





4 PHOTOGRAPHS OF TEST SETUP

Please refer to the attached file (Test Photos).



5 PHOTOGRAPHS OF THE EUT

Please refer to the attached file (External Photos report and Internal Photos).



Important

- (1) The test report is valid with the official seal of the laboratory and the signatures of Test engineer, Author and Reviewer simultaneously.
- (2) The test report is invalid if altered.
- (3) Any photocopies or part photocopies in the test report are forbidden without the written permission from the laboratory.
- (4) Objections to the test report must be submitted to the laboratory within 15 days.
- (5) Generally, commission test is responsible for the tested samples only.

Address of the laboratory:

CVC Testing Technology Co., Ltd.

Address: No.3, Tiantaiyi Road, Kaitai Avenue, Science City, Guangzhou, China

Post Code: 510663

Tel: 020-32293888

FAX: 020-32293889

E-mail: office@cvc.org.cn