FCC TEST REPORT

FCC ID: 2BF8D-ZDF-01

Report No.	:	SSP24040044-1E
Prepared For	:	Dongguan DF Electronics Co., LED.
Product Name	:	WIRELESS CAR CHARGER
Model Name	:	ZDF-01
FCC Rule	:	FCC Part 15 Subpart C
Date of Issue	:	2024-05-22
Prepared By	:	Shenzhen CCUT Quality Technology Co., Ltd.

Shenzhen CCUT Quality Technology Co., Ltd.
1F, Building 35, Changxing Technology Industrial Park, Yutang Street, Guangming District, Shenzhen, Guangdong, China; (Tel.:+86-755-23406590 website: www.ccuttest.com)

This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen CCUT Quality Technology Co., Ltd.

Test Report Basic Information

Applicant.....:	Dongguan DF Electronics Co., LED.
Address of Applicant.....:	Room 301, Building 5, No. 6, Tianxin Butterfly Road, Dongguan Huangjiang, Guangdong Province China
Manufacturer.....:	Dongguan DF Electronics Co., LED.
Address of Manufacturer.....:	Room 301, Building 5, No. 6, Tianxin Butterfly Road, Dongguan Huangjiang, Guangdong Province China
Product Name.....:	WIRELESS CAR CHARGER
Brand Name.....:	-
Main Model.....:	ZDF-01
Series Models.....:	See section 1.1 (Page 5)
Test Standard.....:	FCC Part 15 Subpart C ANSI C63.10-2013
Date of Test .....:	2024-04-18 to 2024-05-06
Test Result.....:	PASSED
Tested Engineer .....:	Colin Chen (Colin Chen)
Project Manager.....:	Lieber Ouyang (Lieber Ouyang)
Authorized Signatory.....:	Lahm Peng (Lahm Peng)

Shenzhen CCUT Quality Technology Co., Ltd. APPROVED

Note : This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen CCUT Quality Technology Co., Ltd.. All test data presented in this test report is only applicable to presented test sample.

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Revision History

Revision	Issue Date	Description	Revised By
V1.0	2024-05-22	Initial Release	Lahm Peng

1. General Information

1.1 Product Information

Product Name:	WIRELESS CAR CHARGER
Trade Name:	-
Main Model:	ZDF-01
Series Models:	ZDF-02, ZDF-03, ZDF-04, ZDF-05, ZDF-06, ZDF-07, ZDF-08, ZDF-09, ZDF-10, ZDF-11, ZDF-12, ZDF-13, ZDF-14, ZDF-15, DZF-16, ZDF-17, ZDF-18, ZDF-19, ZDF-20, ZDF-21, ZDF-22, ZDF-23, ZDF-24, ZDF-25, ZDF-26, ZDF-27, ZDF-28, ZDF-29, ZDF-30
Rated Voltage:	lnput:5V⎓2A, 9V⎓1.8A Wireless charging Output: 5W, 7.5W, 10W, 15W (MAX)
Power Adapter:	N/A
Battery:	-
Hardware Version:	V1.0
Software Version:	V1.0
Note 1: The test data is gathered from a production sample, provided by the manufacturer. Note 2: The color of appearance and model name of series models listed are different from the main model, but the circuit and the electronic construction are the same, declared by the manufacturer.	

Wireless Specification	
Wireless Standard:	Wireless charging
Operating Frequency:	Wireless charging Output:110.5kHz-205kHz
Modulation:	ASK
Antenna Gain:	0dBi
Type of Antenna:	Coil Antenna
Type of Device:	☐ Portable Device ☒ Mobile Device ☐ Modular Device

1.2 Test Setup Information

List of Test Modes		
Test Mode	Description	Remark
TM1	Wireless charging 15W	-
TM2	Wireless charging 10W	-
TM3	Wireless charging 7.5W	-
TM4	Wireless charging 5W	-

List and Details of Auxiliary Cable			
Description	Length (cm)	Shielded/Unshielded	With/Without Ferrite
-	-	-	-
-	-	-	-

List and Details of Auxiliary Equipment			
Description	Manufacturer	Model	Serial Number
Dummy load	-	DL01	-
Adapter	PISEN	TS-C137	6902957010559

1.3 Compliance Standards

Compliance Standards	
FCC Part 15 Subpart C	FEDERAL COMMUNICATIONS COMMISSION, RADIO FREQUENCY DEVICES, Intentional Radiators
All measurements contained in this report were conducted with all above standards	
According to standards for test methodology	
FCC Part 15 Subpart C	FEDERAL COMMUNICATIONS COMMISSION, RADIO FREQUENCY DEVICES, Intentional Radiators
ANSI C63.4-2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.
ANSI C63.10-2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
Maintenance of compliance is the responsibility of the manufacturer or applicant. Any modification of the product, which result is lowering the emission, should be checked to ensure compliance has been maintained.	

1.4 Test Facilities

Laboratory Name:	**Shenzhen CCUT Quality Technology Co., Ltd.** 1F, Building 35, Changxing Technology Industrial Park, Yutang Street, Guangming District, Shenzhen, Guangdong, China
CNAS Laboratory No.:	L18863
A2LA Certificate No.:	6893.01
FCC Registration No:	583813
ISED Registration No.:	CN0164
All measurement facilities used to collect the measurement data are located at 1F, Building 35, Changxing Technology Industrial Park, Yutang Street, Guangming District, Shenzhen, Guangdong, China.	

1.5 List of Measurement Instruments

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Conducted Emissions					
AMN	ROHDE&SCHWARZ	ENV216	101097	2023-07-31	2024-07-30
EMI Test Receiver	ROHDE&SCHWARZ	ESPI	100242	2023-07-31	2024-07-30
Radiated Emissions					
EMI Test Receiver	ROHDE&SCHWARZ	ESPI	100154	2023-07-31	2024-07-30
Spectrum Analyzer	KEYSIGHT	N9020A	MY48030972	2023-07-31	2024-07-30
Amplifier	SCHWARZBECK	BBV 9743B	00251	2023-07-31	2024-07-30
Amplifier	HUABO	YXL0518-2.5-45	--	2023-07-31	2024-07-30
Loop Antenna	DAZE	ZN30900C	21104	2023-08-07	2024-08-06
Broadband Antenna	SCHWARZBECK	VULB 9168	01320	2023-08-07	2024-08-06
Horn Antenna	SCHWARZBECK	BBHA 9120D	02553	2023-08-07	2024-08-06
Conducted RF Testing					
RF Test System	MWRFTest	MW100-RFCB	220418SQS-37	2023-07-31	2024-07-30
Spectrum Analyzer	KEYSIGHT	N9020A	ATO-90521	2023-07-31	2024-07-30

1.6 Measurement Uncertainty

Test Item	Conditions	Uncertainty
Conducted Emissions	9kHz ~ 30MHz	±1.64 dB
Radiated Emissions	9kHz ~ 30MHz	±2.88 dB
	30MHz ~ 1GHz	±3.32 dB
	1GHz ~ 18GHz	±3.50 dB
	18GHz ~ 40GHz	±3.66 dB
Occupied Bandwidth	9kHz ~ 26GHz	±4.0 %

2. Summary of Test Results

FCC Rule	Description of Test Item	Result
FCC Part 15.203	Antenna Requirement	Passed
FCC Part 15.207	Conducted Emissions	Passed
FCC Part 15.209	Radiated Emissions	Passed
FCC Part 15.215(c)	Occupied Bandwidth	Passed
Passed: The EUT complies with the essential requirements in the standard Failed: The EUT does not comply with the essential requirements in the standard N/A: Not applicable		

3. Antenna Requirement

3.1 Standard and Limit

According to FCC Part 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. 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.

3.2 Test Result

This product has an Coil antenna, fulfill the requirement of this section.

4. Conducted Emissions

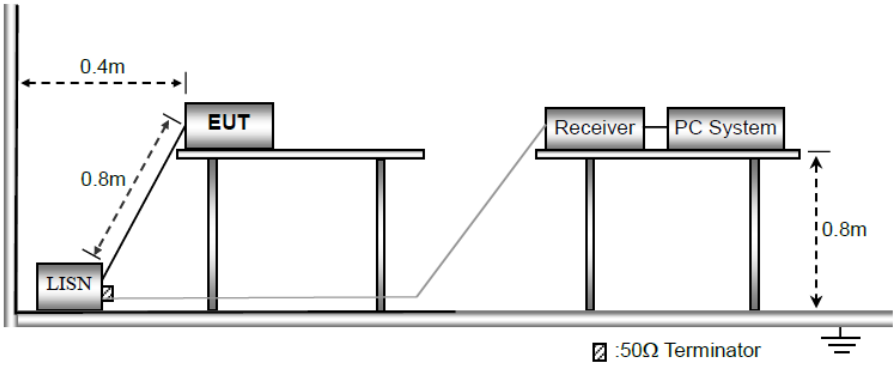
4.1 Standard and Limit

According to the rule FCC Part 15.207, Conducted emissions limit, the limit for a wireless device as below:

Frequency of Emission (MHz)	Conducted emissions (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50
Note 1: Decreases with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz Note 2: The lower limit applies at the band edges		

4.2 Test Procedure

Test is conducting under the description of ANSI C63.10 - 2013 section 6.2.



Test Setup Block Diagram

a) The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

b) The following is the setting of the receiver
Attenuation: 10dB
Start Frequency: 0.15MHz
Stop Frequency: 30MHz
IF Bandwidth: 9kHz

c) The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

d) 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 to 40 cm long.
e) I/O cables that are not connected to a peripheral 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.

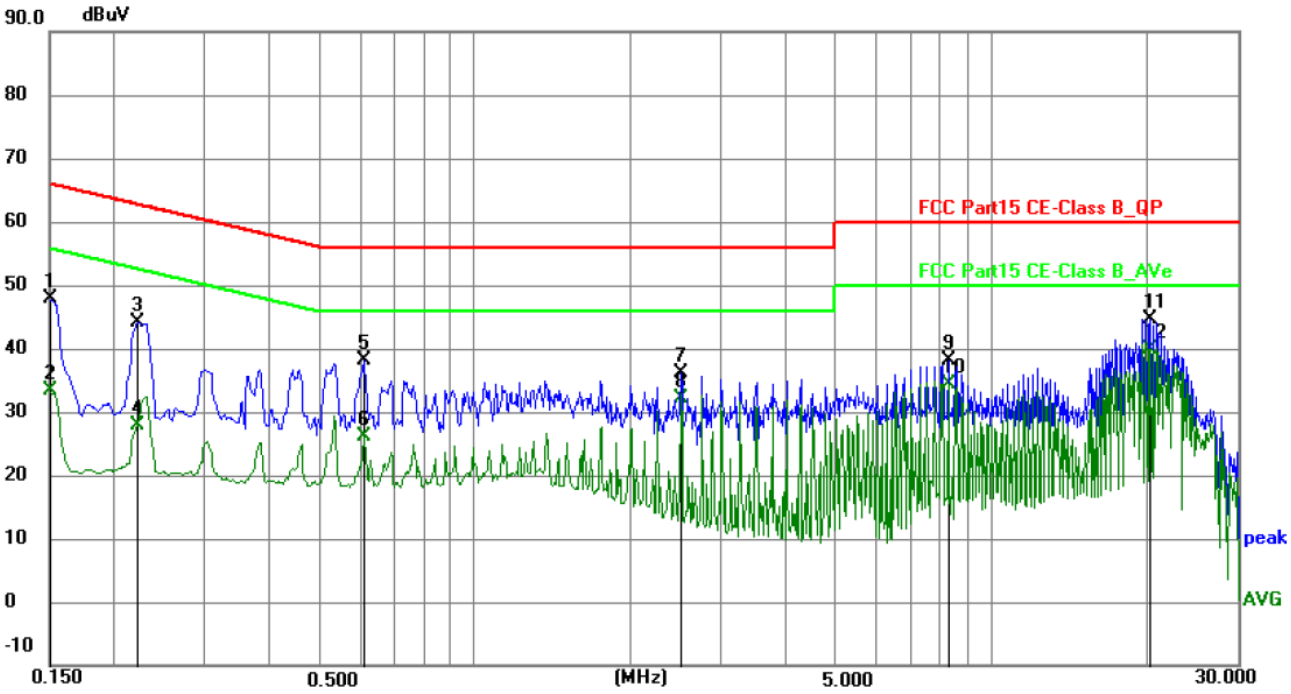
f) LISN is at least 80 cm from nearest part of EUT chassis.

g) For the actual test configuration, please refer to the related Item - photographs of the test setup.

4.3 Test Data and Results

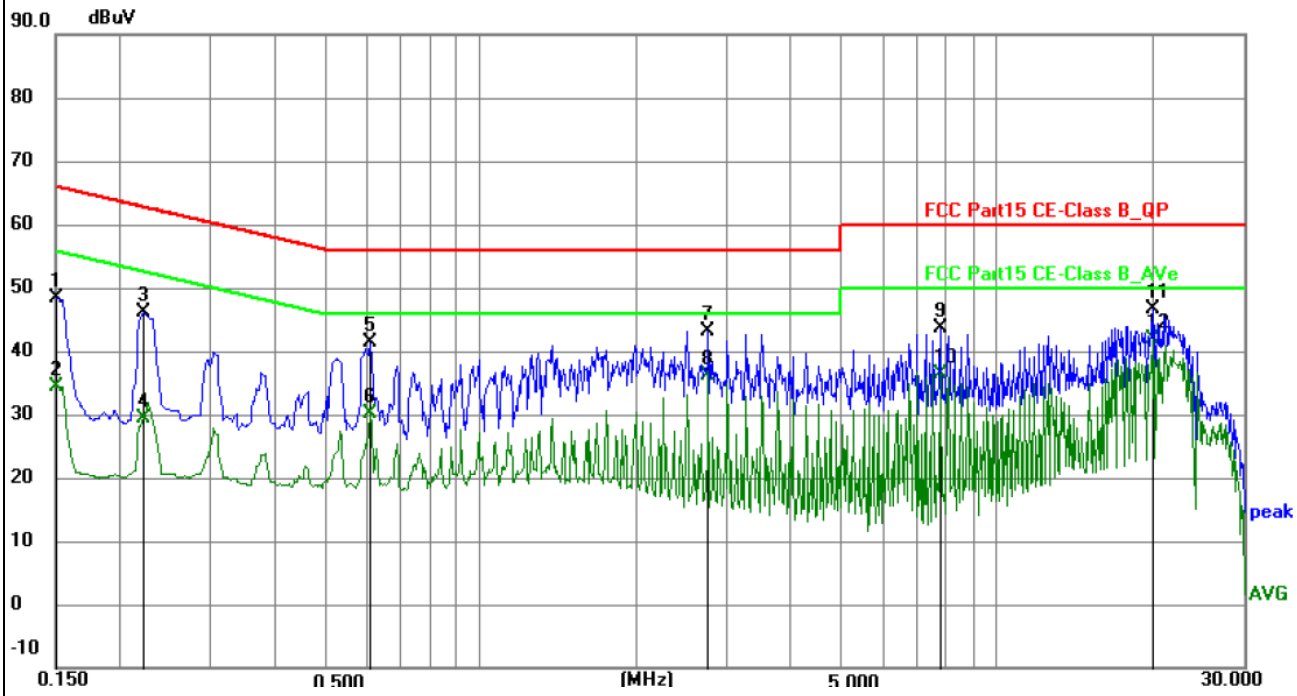
Based on all tested mode data, the EUT complied with the FCC Part 15.207 standard limit for a wireless device, and with the worst case TM1 as below:
Remark: Level = Reading + Factor, Margin = Level - Limit

Test Plots and Data of Conducted Emissions	
Tested Mode:	TM1
Test Voltage:	AC 120V/60Hz
Test Power Line:	Neutral
Remark:	



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1500	38.39	9.51	47.90	66.00	-18.10	QP	P	
2	0.1500	23.90	9.51	33.41	56.00	-22.59	AVG	P	
3	0.2220	34.59	9.63	44.22	62.74	-18.52	QP	P	
4	0.2220	18.36	9.63	27.99	52.74	-24.75	AVG	P	
5	0.6090	28.33	9.70	38.03	56.00	-17.97	QP	P	
6	0.6090	16.39	9.70	26.09	46.00	-19.91	AVG	P	
7	2.5125	25.93	10.08	36.01	56.00	-19.99	QP	P	
8	2.5125	22.09	10.08	32.17	46.00	-13.83	AVG	P	
9	8.2500	27.97	10.24	38.21	60.00	-21.79	QP	P	
10	8.2500	24.19	10.24	34.43	50.00	-15.57	AVG	P	
11	20.3595	34.26	10.40	44.66	60.00	-15.34	QP	P	
12 *	20.3595	29.36	10.40	39.76	50.00	-10.24	AVG	P	

Test Plots and Data of Conducted Emissions	
Tested Mode:	TM1
Test Voltage:	AC 120V/60Hz
Test Power Line:	Live
Remark:	



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1500	39.12	9.27	48.39	66.00	-17.61	QP	P	
2	0.1500	25.12	9.27	34.39	56.00	-21.61	AVG	P	
3	0.2220	37.01	9.20	46.21	62.74	-16.53	QP	P	
4	0.2220	20.16	9.20	29.36	52.74	-23.38	AVG	P	
5	0.6090	31.46	9.94	41.40	56.00	-14.60	QP	P	
6	0.6090	20.21	9.94	30.15	46.00	-15.85	AVG	P	
7	2.7554	33.08	10.09	43.17	56.00	-12.83	QP	P	
8	2.7554	25.99	10.09	36.08	46.00	-9.92	AVG	P	
9	7.7685	33.45	10.21	43.66	60.00	-16.34	QP	P	
10	7.7685	26.13	10.21	36.34	50.00	-13.66	AVG	P	
11	19.9995	36.17	10.54	46.71	60.00	-13.29	QP	P	
12 *	19.9995	31.23	10.54	41.77	50.00	-8.23	AVG	P	

5. Radiated Emissions

5.1 Standard and Limit

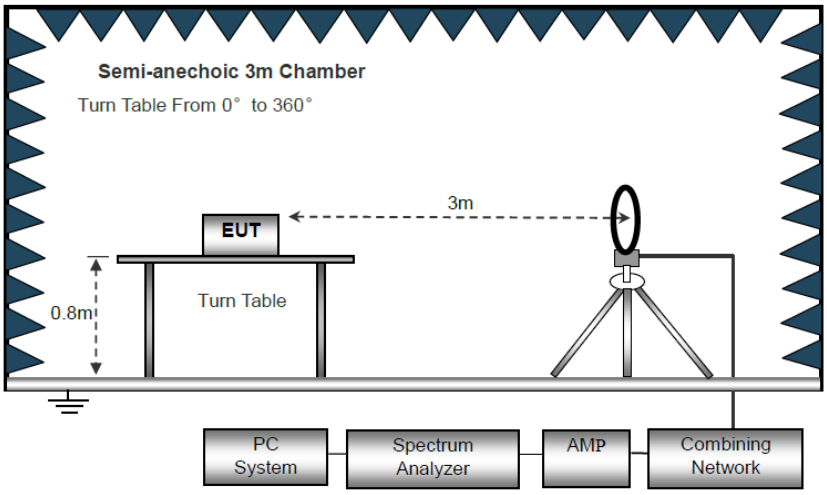
According to the rule FCC Part 15.209, Radiated emission limit for a wireless device as below:

Frequency of Emission (MHz)	Field Strength (micorvolts/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: The more stringent limit applies at transition frequencies.		

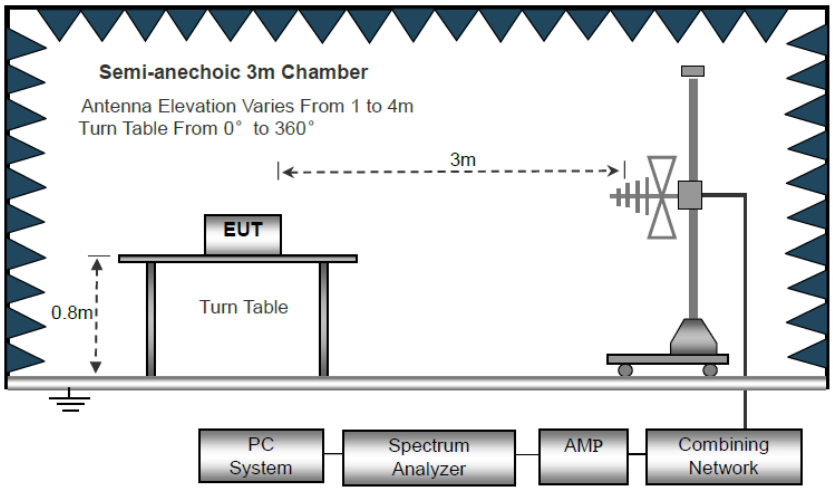
Note: Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

5.2 Test Procedure

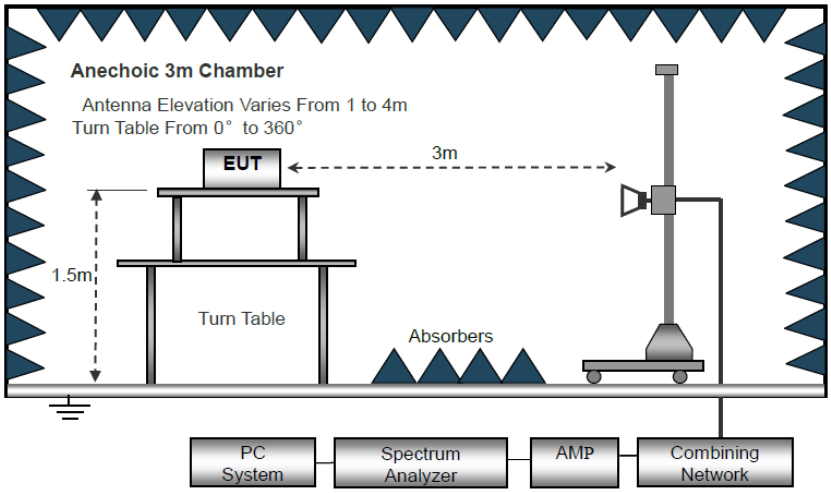
Test is conducting under the description of ANSI C63.10 - 2013 section 6.3 to 6.6.



Block Diagram of Radiated Emission Below 30MHz



Block Diagram of Radiated Emission From 30MHz to 1GHz



Block Diagram of Radiated Emission Above 1GHz

a) The EUT is placed on a turntable, which is 0.8m above ground plane for test frequency range below 1GHz, and 1.5m above ground plane for test frequency range above 1GHz.

b) EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.

c) Use the following spectrum analyzer settings:
Span = wide enough to fully capture the emission being measured
RBW = 1 MHz for f ≥ 1GHz, 100 kHz for f < 1 GHz, 10kHz for f < 30MHz
VBW ≥ RBW, Sweep = auto
Detector function = peak
Trace = max hold

d) Follow the guidelines in ANSI C63.4-2014 with respect to maximizing the emission by rotating the EUT, adjusting the measurement antenna height and polarization, etc. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, submit this data. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

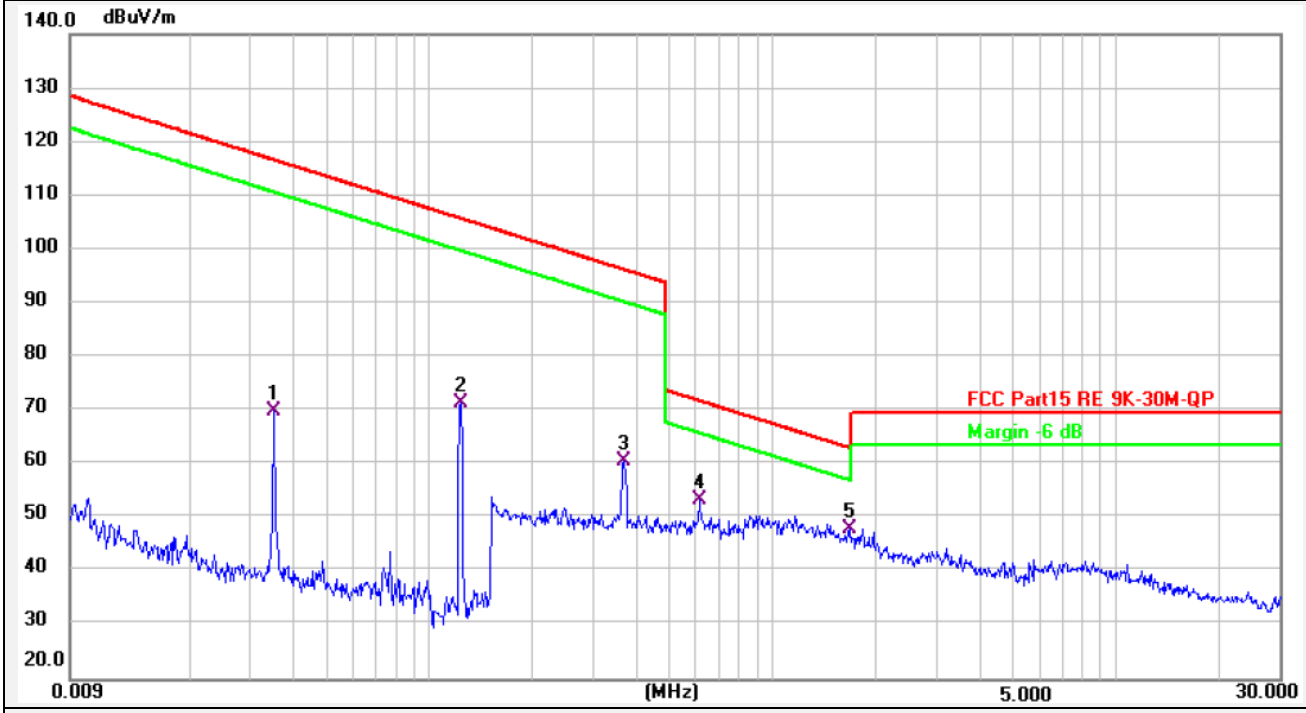
e) The peak level, once corrected, must comply with the limit specified in Section 15.209. Set the RBW = 1MHz, VBW = 10Hz, Detector = PK for AV value, while maintaining all of the other instrument settings.

f) For the actual test configuration, please refer to the related item - EUT test photos.

5.3 Test Data and Results

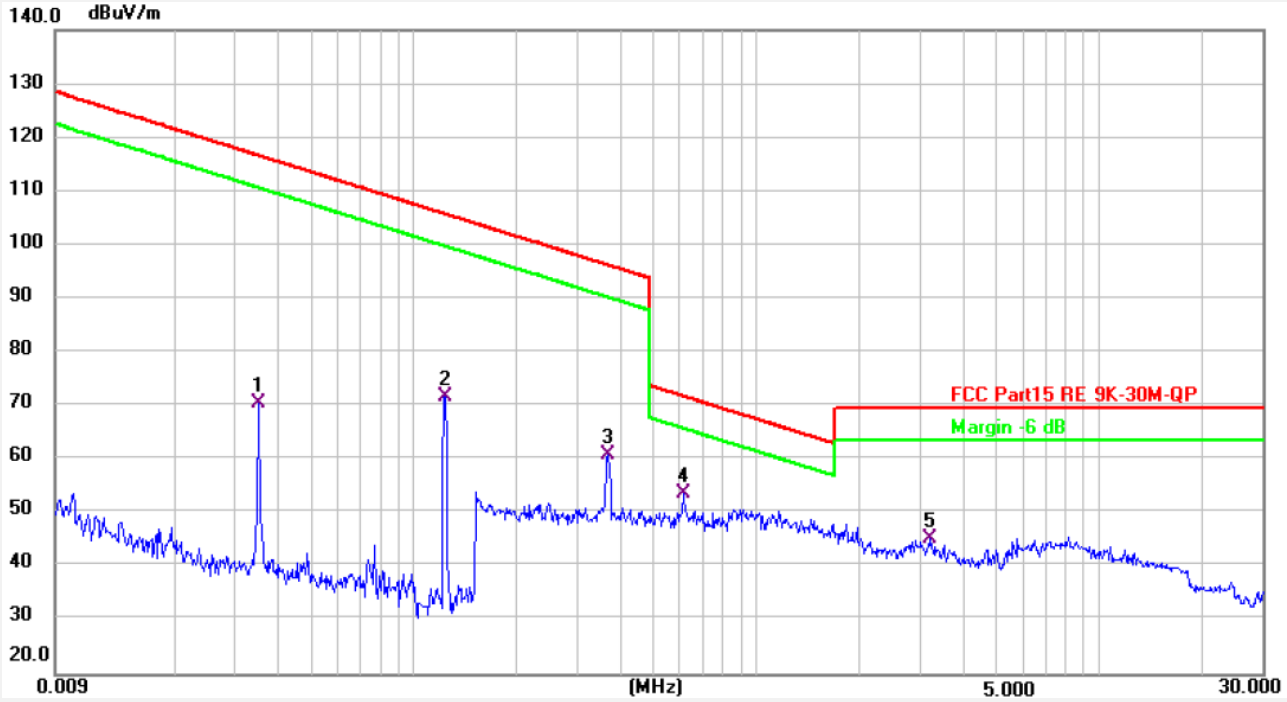
Based on all mode tested data, the EUT complied with the FCC Part 15.209 standard limit for a wireless device, and with the worst case TM1 as below:

Test Data of Radiated Emissions from9kHz to 30MHz			
Test Mode:	TM1	Phase:	Coplaner
Test Voltage:	DC 9V		
Remark:			



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	0.0352	41.21	28.77	69.98	116.66	-46.68	QP	100	257	P	
2	0.1228	46.36	24.97	71.33	105.81	-34.48	QP	100	35	P	
3	0.3672	35.76	24.76	60.52	96.30	-35.78	QP	100	243	P	
4	0.6107	28.79	24.54	53.33	71.89	-18.56	QP	100	76	P	
5 *	1.6713	23.20	24.76	47.96	63.13	-15.17	QP	100	46	P	

Test Mode:	TM1	Phase:	Coaxial
Test Voltage:	DC 9V		
Remark:			



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	0.0352	41.71	28.77	70.48	116.66	-46.18	QP	100	145	P	
2	0.1228	46.86	24.97	71.83	105.81	-33.98	QP	100	257	P	
3	0.3672	36.26	24.76	61.02	96.30	-35.28	QP	100	34	P	
4 *	0.6107	29.29	24.54	53.83	71.89	-18.06	QP	100	55	P	
5	3.1730	20.67	24.78	45.45	69.50	-24.05	QP	100	87	P	

Note:

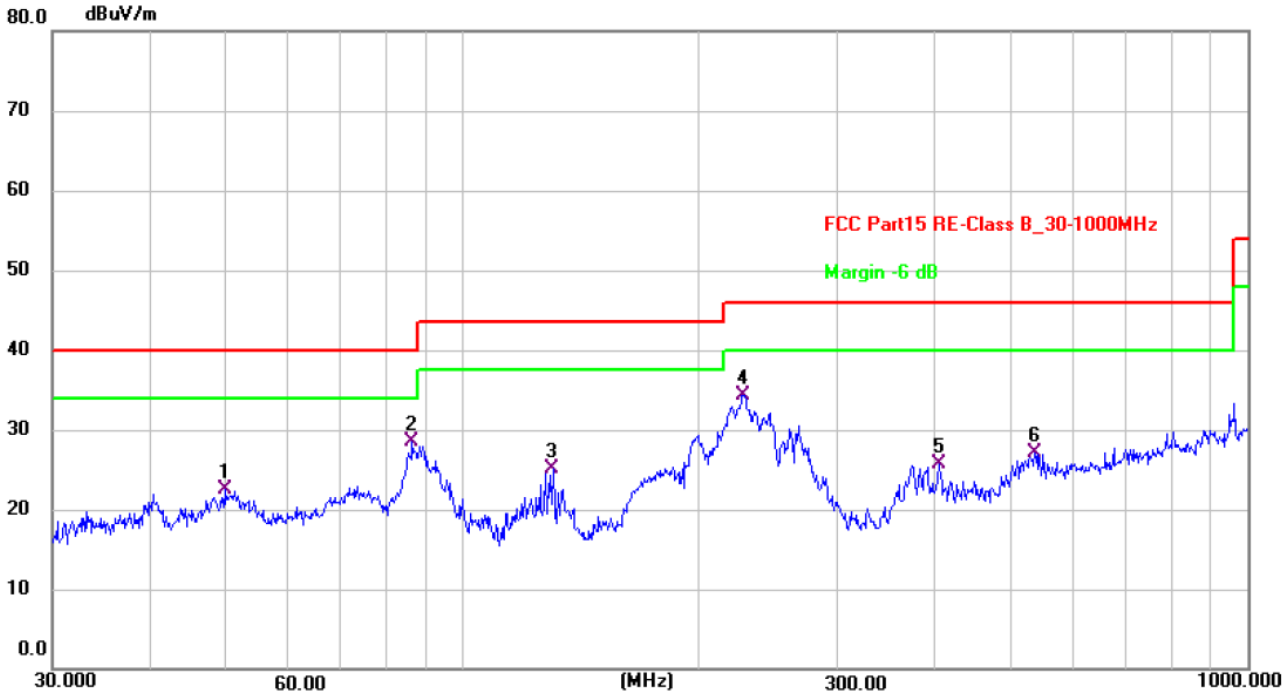
Pre-scan in the all of mode, the worst case in of was recorded.

Limit dBuV/m @3m = Limit dBuV/m @300m+ 80

Limit dBuV/m @3m = Limit dBuV/m @30m + 40

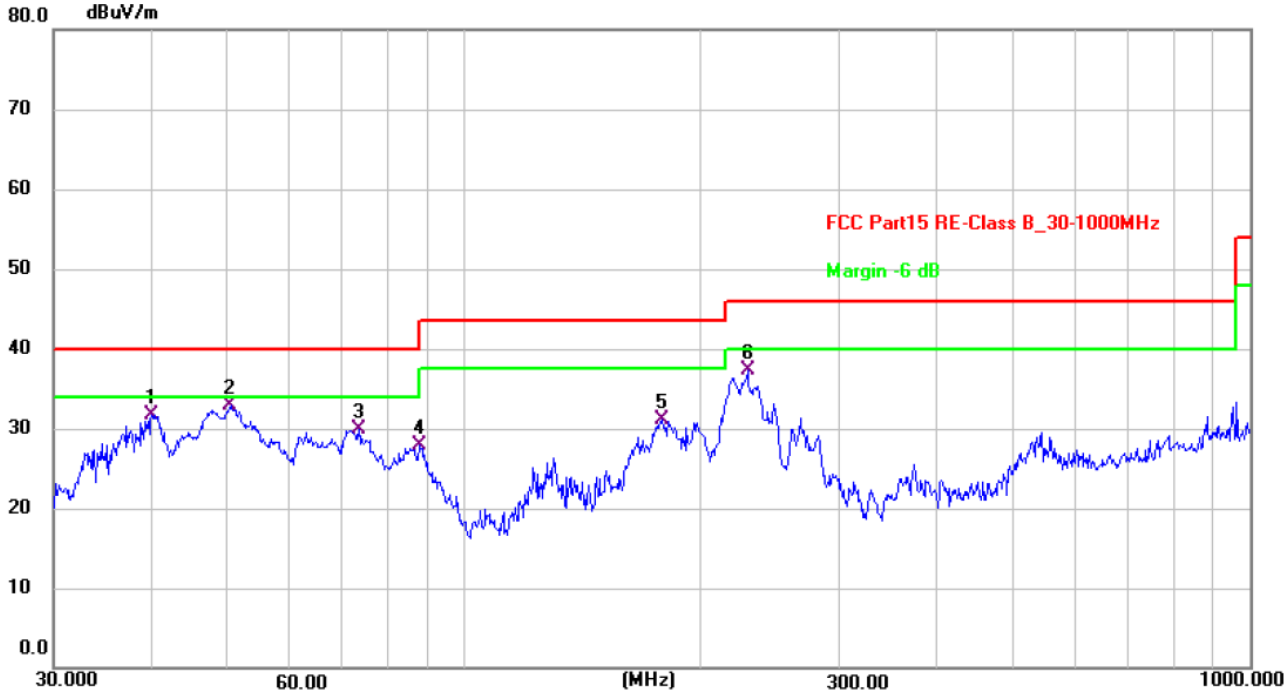
Margin = Reading - Limit.

Test Plots and Data of Radiated Emissions from30MHz to 1GHz	
Tested Mode:	TM1
Test Antenna Polarization:	Horizontal
Remark:	



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1 *	53.6932	41.81	-9.12	32.69	40.00	-7.31	QP	199	308	P	
2	116.9495	34.82	-10.96	23.86	43.50	-19.64	QP	199	73	P	
3	158.6677	37.53	-8.92	28.61	43.50	-14.89	QP	199	349	P	
4	175.6516	42.33	-10.19	32.14	43.50	-11.36	QP	199	349	P	
5	191.5545	38.80	-12.18	26.62	43.50	-16.88	QP	100	13	P	
6	744.8661	31.03	0.73	31.76	46.00	-14.24	QP	199	349	P	

Test Plots and Data of Radiated Emissions from30MHz to 1GHz	
Tested Mode:	TM1
Test Antenna Polarization:	Vertical
Remark:	



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	39.9942	39.63	-7.95	31.68	40.00	-8.32	QP	100	267	P	
2 *	50.4089	41.58	-8.74	32.84	40.00	-7.16	QP	100	319	P	
3	73.3593	41.69	-11.74	29.95	40.00	-10.05	QP	100	246	P	
4	87.7248	41.28	-13.39	27.89	40.00	-12.11	QP	100	257	P	
5	178.7584	41.72	-10.54	31.18	43.50	-12.32	QP	100	154	P	
6	229.2931	47.92	-10.63	37.29	46.00	-8.71	QP	100	348	P	

Note 1: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

Note 2: Testing is carried out with frequency rang 9kHz to the tenth harmonics. The measurements greater than

Note 3: For 9kHz-30MHz, Distance extrapolation factor =40 log (specific distance/test distance)(dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

Note 4: Level = Reading + Factor, Margin = Level – Limit.

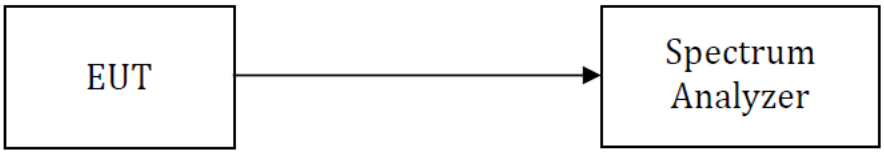
6. Occupied Bandwidth

6.1 Standard and Limit

According to 15.215 (c), intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

6.2 Test Procedure

According to the ANSI 63.10-2013, section 6.9, the emission bandwidth test method as follows.
1) Remove the antenna from the EUT and connect to the spectrum analyzer via a low loss RF cable.
2) Set the spectrum analyzer to any one measured frequency within its operating range.
3) Set RBW = 1% of the 20 dB bandwidth, VBW = RBW.
4) Set Sweep = Auto, Detector function = peak, Trace = max hold.
5) Set a reference level on the measuring instrument equal to the highest peak value.
6) Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
All the trace to stabilize, use the marker-to-peak function to set the marker to the peak of the emission, use the marker-delta function to measure and record the 20dB down and 99% bandwidth of the emission.

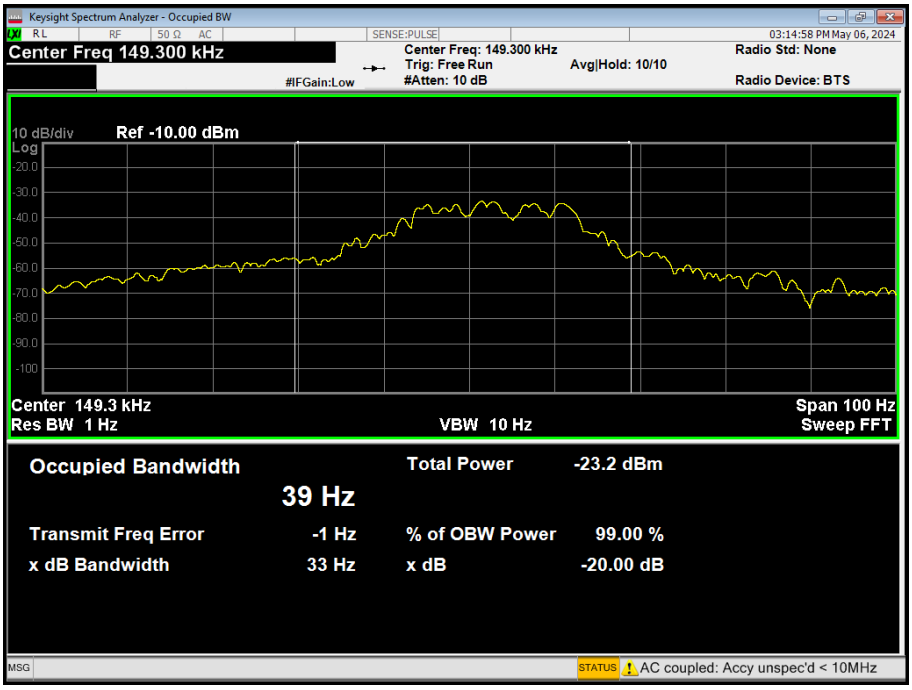


Test Setup Block Diagram

6.3 Test Data and Results

Test Frequency	20dB Bandwidth	99% Bandwidth
149.3kHz	33Hz	39Hz

Test Plots of Occupied Bandwidth



******* END OF REPORT *******