

FCC Test Report

Applicant : Shenzhen Leaderment Technology Co.,Ltd.

Address : 1st Floor,Building 24,Longcheng Industrial
Zone Gaofeng Community,Dalang
Street,Longhua District, shenzhen, 518109,
China

Product Name : Car Wireless FM Transmitter

Report Date : Aug. 31, 2023



Shenzhen Anbotek Compliance Laboratory Limited

Shenzhen Anbotek Compliance Laboratory Limited

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TEST REPORT

Applicant : Shenzhen Leaderment Technology Co.,Ltd.
Manufacturer : Shenzhen Leaderment Technology Co.,Ltd.
Product Name : Car Wireless FM Transmitter
Model No. : SW-XC725, SW-XC727, SW-XC961, SW-XC962, SW-XC963, SW-XC964,
SW-XC965, SW-XC966, SW-XC967, SW-XC968, SW-XC969
Trade Mark : SYNCWIRE
Input: 12-14V= 6A
Rating(s) : USB-A Output: 5V= 2.4A
USB-B Output: 5V= 3A, 9V= 3A, 12V= 3A(MAX 36W)
Test Standard(s) : **FCC Part15 Subpart C, Section 15.239**
Test Method(s) : **ANSI C63.10: 2020**

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart C requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of receipt

Jun. 09, 2023

Date of Test

Jun. 09 ~ Jul. 20, 2023

Prepared by

Nian Xiu Chen

(Nianxiu Chen)

Approved & Authorized Signer

Kingkong Jin

(Kingkong Jin)



Revision History

Report Version	Description	Issued Date
R00	Original Issue.	Aug. 31, 2023



1. General Information

1.1. Client Information

Applicant	:	Shenzhen Leaderment Technology Co.,Ltd.
Address	:	1st Floor,Building 24,Longcheng Industrial Zone Gaofeng Community,Dalang Street,Longhua District, shenzhen, 518109, China
Manufacturer	:	Shenzhen Leaderment Technology Co.,Ltd.
Address	:	1st Floor,Building 24,Longcheng Industrial Zone Gaofeng Community,Dalang Street,Longhua District, shenzhen, 518109, China
Factory	:	Shenzhen Leaderment Technology Co.,Ltd.
Address	:	1st Floor,Building 24,Longcheng Industrial Zone Gaofeng Community,Dalang Street,Longhua District, shenzhen, 518109, China

1.2. Description of Device (EUT)

Product Name	:	Car Wireless FM Transmitter
Model No.	:	SW-XC725, SW-XC727, SW-XC961, SW-XC962, SW-XC963, SW-XC964, SW-XC965, SW-XC966, SW-XC967, SW-XC968, SW-XC969 (Note: All samples are the same except the model number, so we prepare "SW-XC725" for test only.)
Trade Mark	:	SYNCWIRE
Test Power Supply	:	DC 12V
Test Sample No.	:	1-2-1(Normal Sample), 1-2-2(Engineering Sample)
Adapter	:	N/A
RF Specification		
Operation Frequency	:	88.1~107.9MHz
Number of Channels	:	199 Channels
Channel Separation	:	100KHz
Modulation Type	:	FM
Antenna Type	:	Ceramic Antenna
Remark: 1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.		



1.3. Auxiliary Equipment Used During Test

Description	Rating(s)
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1.4. Description of Test Configuration

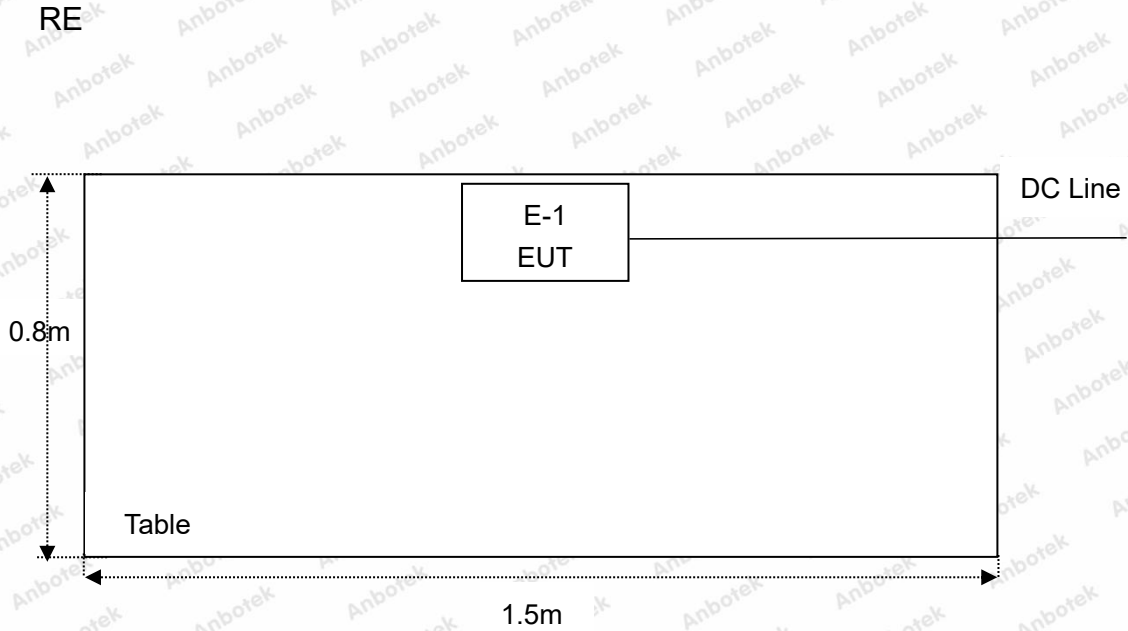
Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
1	88.10	51	93.10	101	98.10	151	103.10
2	88.20	52	93.20	102	98.20	152	103.20
3	88.30	53	93.30	103	98.30	153	103.30
4	88.40	54	93.40	104	98.40	154	103.40
5	88.50	55	93.50	105	98.50	155	103.50
.....
49	92.90	99	97.90	149	102.90	199	107.90
50	93.00	100	98.00	150	103.00		

Note:

1. The engineering test program was provided and the EUT was programmed to be in continuously transmitting mode.
2. EUT was tested with channel 1, 101 and 199.



1.5. Description Of Test Setup



1.6. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	Rohde & Schwarz	ENV216	100055	Oct. 23, 2022	1 Year
2.	Three Phase V-type Artificial Power Network	CYBERTEK	EM5040DT	E215040DT001	Jul. 05, 2023	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Oct. 13, 2022	1 Year
4.	EMI Test Receiver	Rohde & Schwarz	ESR26	101481	Oct. 23, 2022	1 Year
5.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Oct. 22, 2022	1 Year
6.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Oct. 13, 2022	1 Year
7.	EMI Preamplifier	SKET Electronic	LNPA-0118G-45	SKET-PA-002	Oct. 13, 2022	1 Year
8.	Double Ridged Horn Antenna	SCHWARZBECK	BBHA 9120D	02555	Oct. 16, 2022	3 Year
9.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	345	Oct. 23, 2022	3 Year
10.	Loop Antenna	Schwarzbeck	FMZB1519B	00053	Oct. 23, 2022	1 Year
11.	Horn Antenna	A-INFO	LB-180400-KF	J211060628	Oct. 23, 2022	1 Year
12.	Pre-amplifier	SONOMA	310N	186860	Oct. 23, 2022	1 Year
13.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
14.	MXA Spectrum Analysis	KEYSIGHT	N9020A	MY53280032	Oct. 13, 2022	1 Year
15.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Oct. 13, 2022	1 Year
16.	Signal Generator	Agilent	E4421B	MY41000743	Oct. 13, 2022	1 Year
17.	DC Power Supply	IVYTECH	IV3605	1804D360510	Oct. 22, 2022	1 Year
18.	Constant Temperature Humidity Chamber	ZHONGJIAN	ZJ-KHWS80B	N/A	Oct. 19, 2022	1 Year
19.	Power Meter	Agilent	N1914A	MY50001102	Oct.26, 2022	1 Year



1.7. Measurement Uncertainty

Radiation Uncertainty	:	Ur = 3.9 dB (Horizontal)
		Ur = 3.8 dB (Vertical)
Conduction Uncertainty	:	Uc = 3.4 dB

1.8. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 184111

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No. 184111.

ISED-Registration No.: 8058A

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A.

Test Location

Shenzhen Anbotek Compliance Laboratory Limited.

1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518102



2. Summary of Test Results

Standard Section	Test Item	Result
15.203	Antenna Requirement	PASS
15.207	Conducted Emission	N/A
15.205/15.209/15.239	Spurious Emission	PASS
15.239 (c)	Band Edge Emission	PASS
15.239 (a)	Occupied Bandwidth	PASS
Remark: "N/A" is an abbreviation for Not Applicable.		



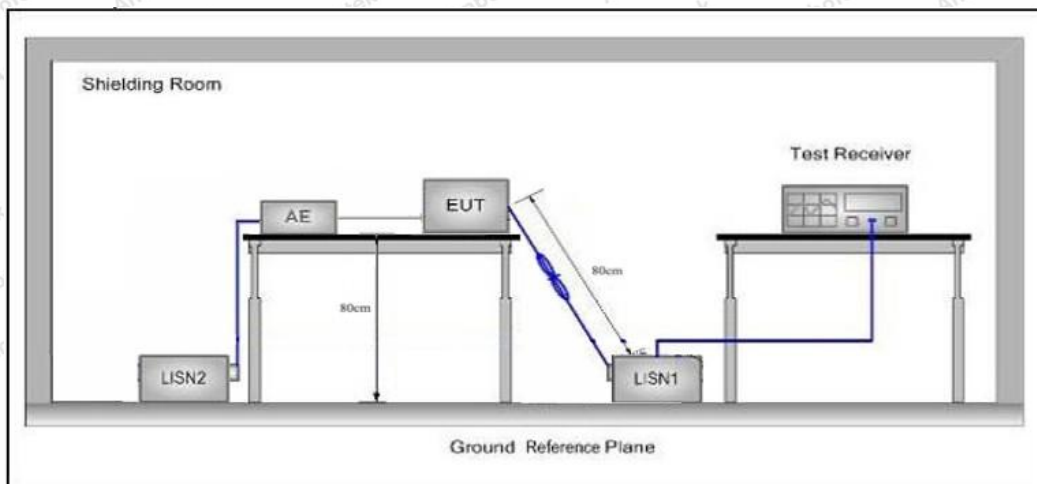
3. Conducted Emission Test

3.1. Test Standard and Limit

Test Standard	FCC Part15 Section 15.207		
Test Limit	Frequency	Maximum RF Line Voltage (dBuV)	
		Quasi-peak Level	Average Level
	150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
	500kHz~5MHz	56	46
	5MHz~30MHz	60	50

Remark: (1) *Decreasing linearly with logarithm of the frequency.
 (2) The lower limit shall apply at the transition frequency.

3.2. Test Setup



3.3. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.10: 2020 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

3.4. Test Data

This device is a car charging, which is intended to be installed on a vehicle only, not connet to the public utility under normal use.15.207 test is exempted.



4. Radiation Spurious Emission and Band Edge

4.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.205, 15.209 and 15.239				
Test Limit	Frequency (MHz)	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz~0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz~1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz~30MHz	30	-	-	30
	30MHz~88MHz	100	40.0	Quasi-peak	3
	88MHz~216MHz	150	43.5	Quasi-peak	3
	216MHz~960MHz	200	46.0	Quasi-peak	3
	960MHz~1000MHz	500	54.0	Quasi-peak	3
	Above 1000MHz	500	54.0	Average	3
-		74.0	Peak	3	

Remark:

(1)The lower limit shall apply at the transition frequency.

(2) 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

According to §15.239(a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Emission Level (dBuV/m)=20log Emission Level(uV/m)

The field strength of emission limits have been calculated in below table:

Fundamental Frequency (MHz)	Field Strength of Fundamental (dBuV/m)@3m
88.1-107.9	48 (AVG)
	68 (Peak)

NOTE:

- The lower limit shall apply at the transition frequencies.
- Emission level (dBuV/m) = 20 log Emission level (uV/m).
- FCC part15.239(b) The field strength of any emissions within the permitted 200 KHz band shall not exceed 250 microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in Section 15.35 for limiting peak emissions apply.



4.2. Test Setup

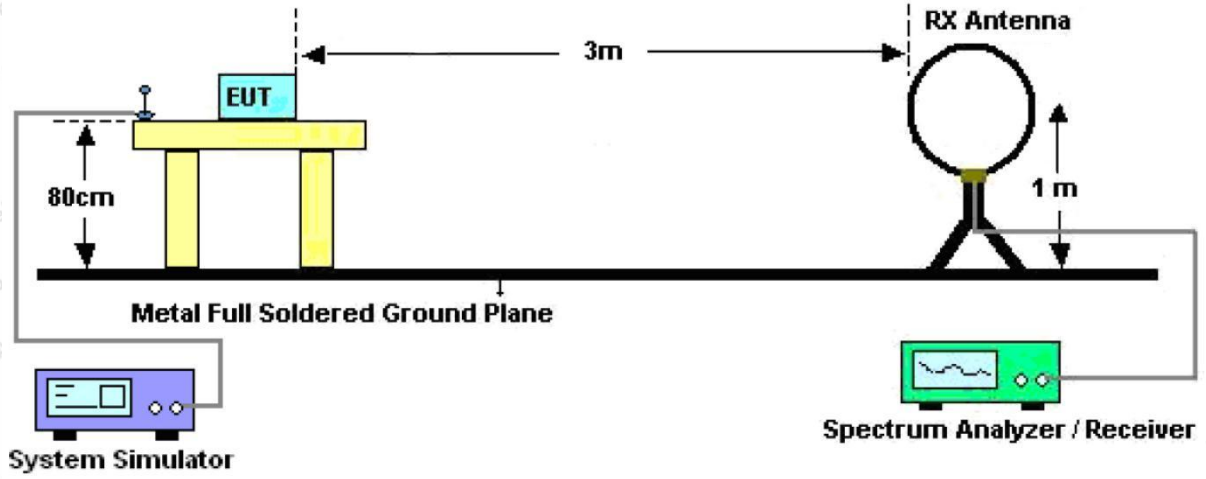


Figure 1. Below 30MHz

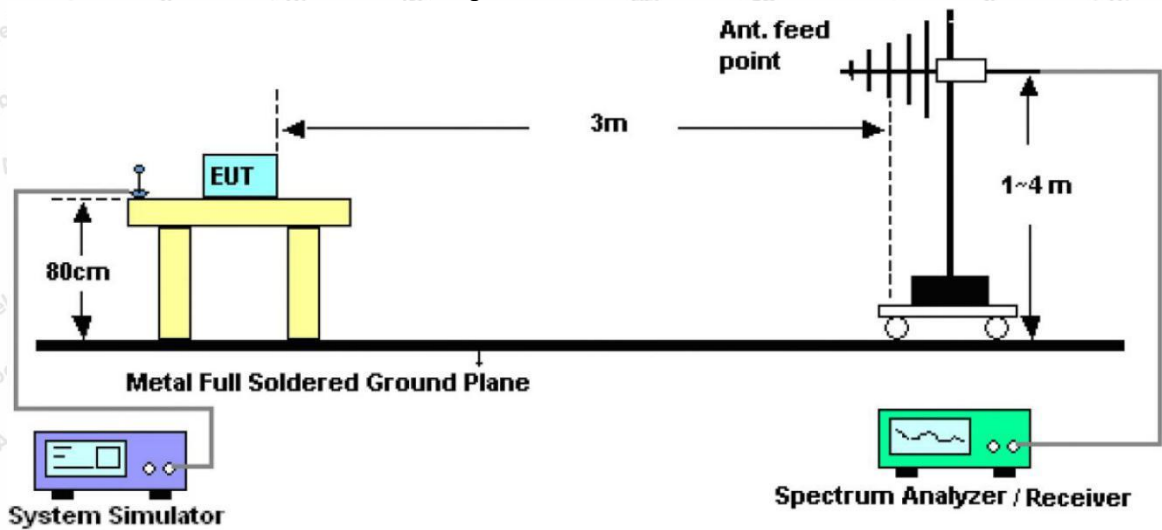


Figure 2. 30MHz to 1GHz



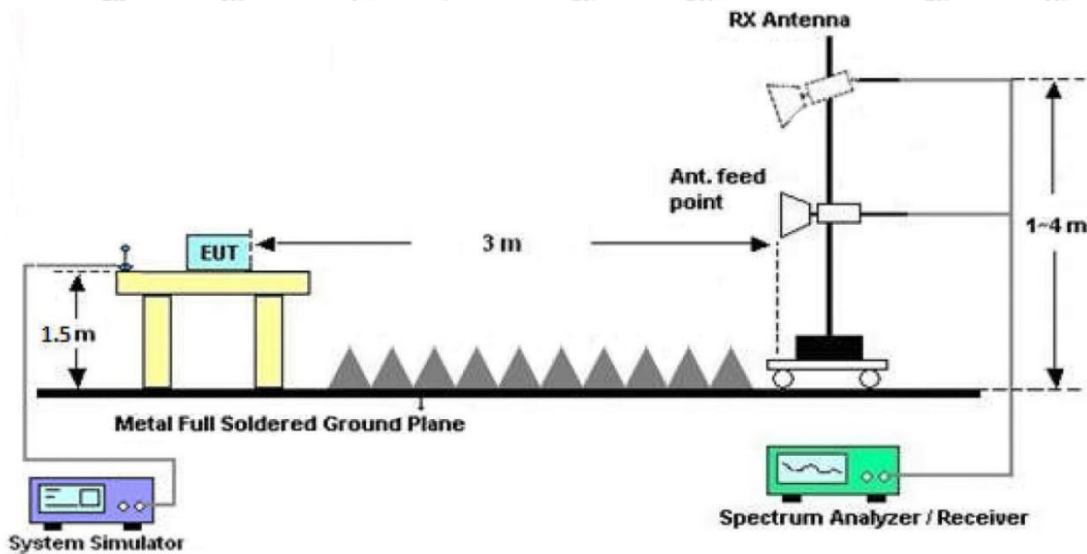


Figure 3. Above 1 GHz

4.3. Test Procedure

For below 1GHz: The EUT is placed on a turntable, which is 0.8m above the ground plane.

For above 1GHz: The EUT is placed on a turntable, which is 1.5m above the ground plane.

The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Rotated the EUT through three orthogonal axes to determine the maximum emissions, both horizontal and vertical polarization of the antenna are set on test. The EUT is tested in 9*6*6 Chamber. The device is evaluated in xyz orientation.

For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

For 9kHz to 150kHz, Set the spectrum analyzer as:

RBW = 200Hz, VBW = 1kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 150kHz to 30MHz, Set the spectrum analyzer as:

RBW = 9KHz, VBW = 30kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.



For 30MHz to 1000MHz, Set the spectrum analyzer as:

RBW = 120kHz, VBW = 360kHz, Detector = Quasi-Peak, Trace mode = Max hold, Sweep = auto couple.

For above 1GHz, Set the spectrum analyzer as:

RBW = 1MHz, VBW = 1MHz, Detector = Peak, Trace mode = Max hold, Sweep = auto couple.

RBW = 1MHz, VBW = 10Hz, Detector = Average, Trace mode = Max hold, Sweep = auto couple.

4.4. Test Data

PASS

During the test, Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the X-axis is the worst case.

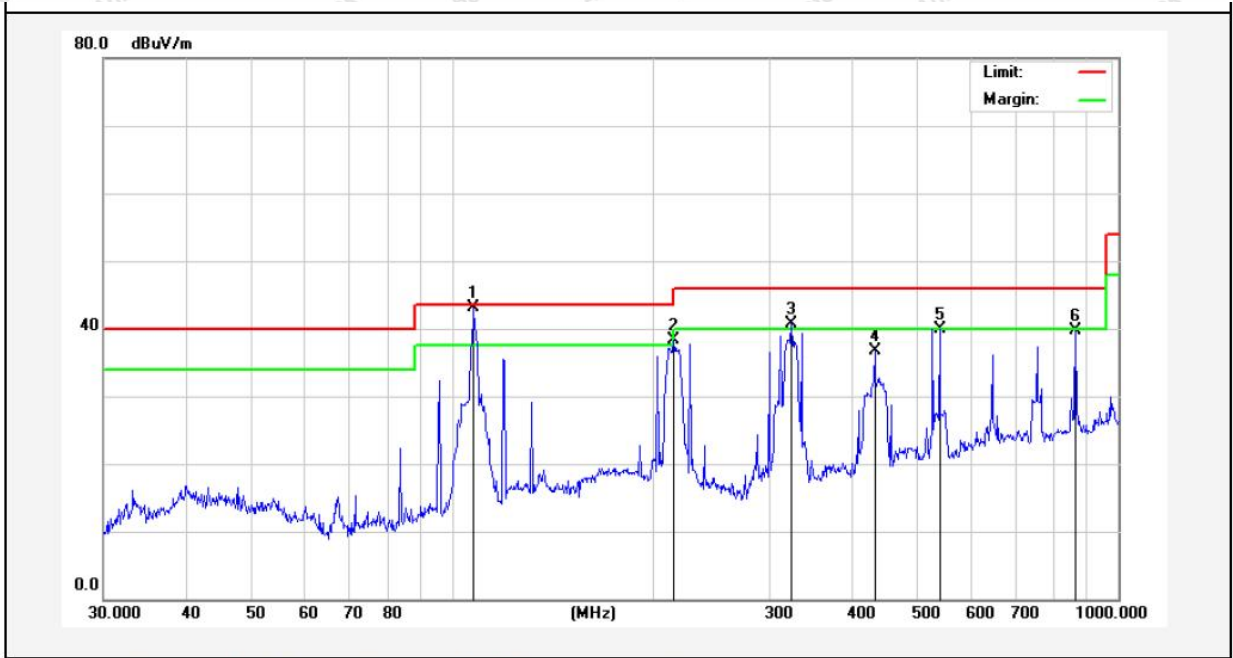
The test results of 9kHz-30MHz was attenuated more than 20dB below the permissible limits, so the results don't record in the report.

During the test, pre-scan all the modes, and found the High CH (107.9MHz) which is the worst case, only the worst case is recorded in the report.



Test Results (30~1000MHz)

Test Mode: High CH (107.9MHz)
 Power Source: DC 12V
 Polarization: Horizontal
 Temp.(°C)/Hum.(%RH): 23.0°C/45%RH

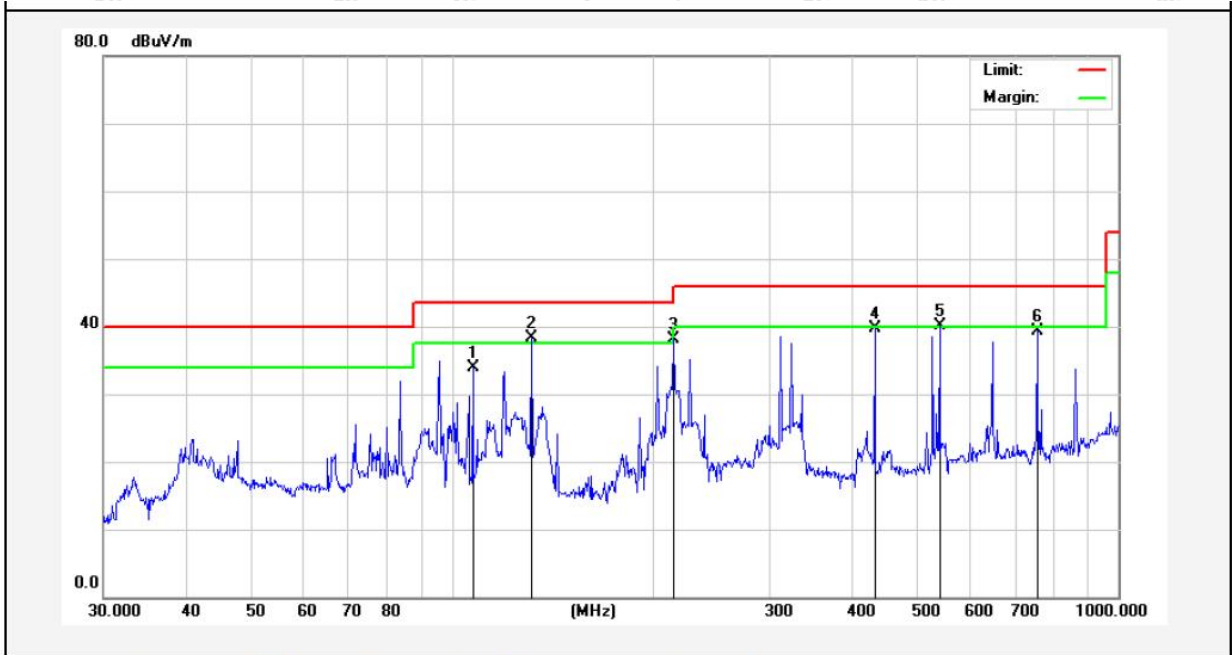


No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	107.9000	65.89	-22.71	43.18	/	/	peak			
2	215.2675	60.31	-22.08	38.23	43.50	-5.27	QP			
3	323.3204	57.36	-16.62	40.74	46.00	-5.26	QP			
4	431.0316	52.52	-15.73	36.79	46.00	-9.21	QP			
5	539.4773	52.09	-12.18	39.91	46.00	-6.09	QP			
6	863.0561	46.84	-7.16	39.68	46.00	-6.32	QP			



Test Results (30~1000MHz)

Test Mode: High CH (107.9MHz)
 Power Source: DC 12V
 Polarization: Vertical
 Temp.(°C)/Hum.(%RH): 23.0°C/45%RH



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	107.9000	51.63	-17.78	33.85	/	/	peak			
2	131.7572	59.86	-21.59	38.27	43.50	-5.23	QP			
3	215.2675	57.34	-19.14	38.20	43.50	-5.30	QP			
4	431.0316	53.77	-13.97	39.80	46.00	-6.20	QP			
5	539.4773	52.02	-11.86	40.16	46.00	-5.84	QP			
6	755.3872	48.47	-9.13	39.34	46.00	-6.66	QP			



Test Result For Field Strength of Fundamental

Horizontal							
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Pass/Fail
88.10	64.05	-22.27	41.78	68.00	-26.22	Peak	Pass
88.10	61.82	-22.27	39.55	48.00	-8.45	AV	Pass
98.10	66.19	-21.44	44.75	68.00	-23.25	Peak	Pass
98.10	65.42	-21.44	43.98	48.00	-4.02	AV	Pass
107.90	65.89	-22.71	43.18	68.00	-24.82	Peak	Pass
107.90	62.89	-22.71	40.18	48.00	-7.82	AV	Pass
Vertical							
Frequency (MHz)	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Pass/Fail
88.10	54.99	-17.94	37.05	68.00	-30.95	Peak	Pass
88.10	53.13	-17.94	35.19	48.00	-12.81	AV	Pass
98.10	56.97	-16.81	40.16	68.00	-27.84	Peak	Pass
98.10	55.74	-16.81	38.93	48.00	-9.07	AV	Pass
107.90	51.63	-17.78	33.85	68.00	-34.15	Peak	Pass
107.90	53.14	-17.78	35.36	48.00	-12.64	AV	Pass

Test Result For Field Strength of Band Edge Emission

Frequency (MHz)	Polarization	Read Level (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Pass/Fail
88.00	V	54.66	-17.96	36.70	40.00	-3.30	QP	Pass
88.00	H	54.13	-22.26	31.87	40.00	-8.13	QP	Pass
108.00	V	56.76	-17.86	38.90	43.50	-4.60	QP	Pass
108.00	H	58.92	-22.81	36.11	43.50	-7.39	QP	Pass

Note:

1. Level=Read Level+Factor



Test Result (1~25GHz)

Test Mode: 107.9MHz					Test channel: Highest			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
1080.00	32.70	34.04	6.58	34.09	39.23	74.00	-34.77	V
1188.00	29.36	37.11	7.73	34.50	39.70	74.00	-34.30	V
1296.00	30.66	39.31	9.23	34.79	44.41	74.00	-29.59	V
1404.00	*	*	*	*	*	74.00	*	V
1512.00	*	*	*	*	*	74.00	*	V
1080.00	36.63	34.04	6.58	34.09	43.16	74.00	-30.84	H
1188.00	30.62	37.11	7.73	34.50	40.96	74.00	-33.04	H
1296.00	29.48	39.31	9.23	34.79	43.23	74.00	-30.77	H
1402.70	*	*	*	*	*	74.00	*	H
1510.60	*	*	*	*	*	74.00	*	H
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
1080.00	23.12	34.04	6.58	34.09	29.65	74.00	-44.35	V
1188.00	20.63	37.11	7.73	34.5	30.97	74.00	-43.03	V
1296.00	20.06	39.31	9.23	34.79	33.81	74.00	-40.19	V
1404.00	*	*	*	*	*	74.00	*	V
1512.00	*	*	*	*	*	74.00	*	V
1080.00	27.29	34.04	6.58	34.09	33.82	74.00	-40.18	H
1188.00	21.51	37.11	7.73	34.5	31.85	74.00	-42.15	H
1296.00	19.06	39.31	9.23	34.79	32.81	74.00	-41.19	H
1402.70	*	*	*	*	*	74.00	*	H
1510.60	*	*	*	*	*	74.00	*	H

Remark:

1. Level = Read level + Antenna Factor + Cable Loss – Preamp Factor
2. All the conditions have been tested. It is found that 107.9MHz is the worst mode, and the data in the report only reflects the worst mode.
3. “*” means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.

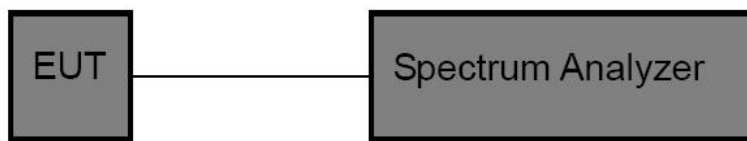


5. 20dB Occupy Bandwidth Test

5.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.239 (a)
Test Limit	According to FCC Part 15.239 (a): Emissions from the intentional radiator shall be confined within a band 200 kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the frequency range of 88-108 MHz.

5.2. Test Setup



5.3. Test Procedure

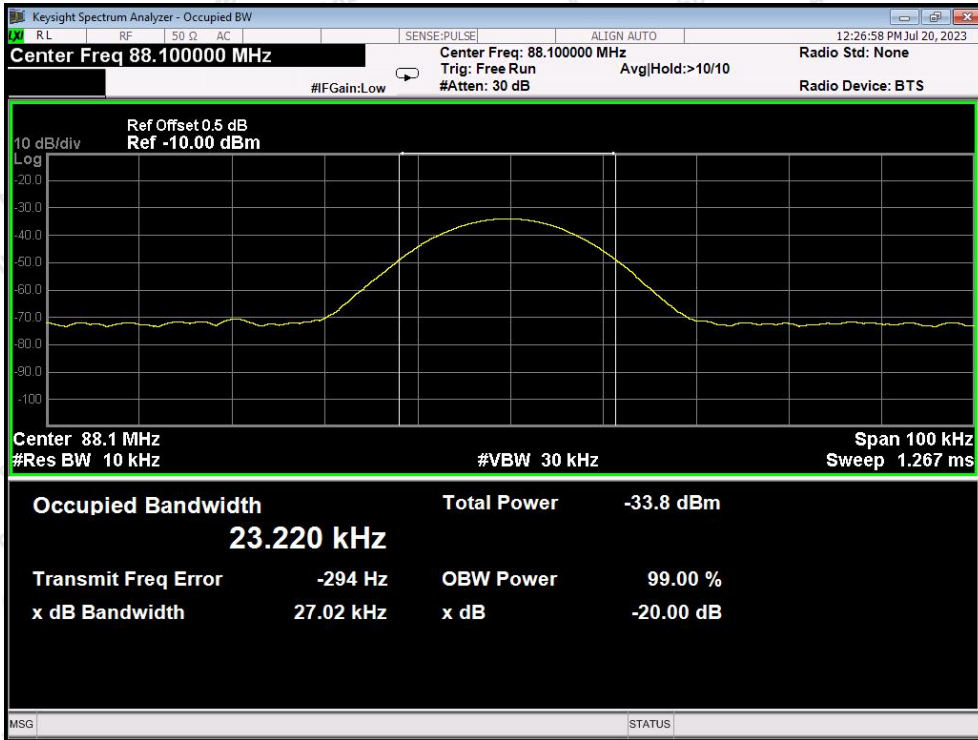
1. Place the EUT on the table and set it in the continuously transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as:
 - RBW = 1% to 5% of the OBW, VBW \geq 3*RBW,
 - Span= 2*OBW~5*OBW
 - Detector= Peak
 - Trace mode= Max hold.
 - Sweep- auto couple.
4. Mark the peak frequency and -20dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

5.4. Test Data

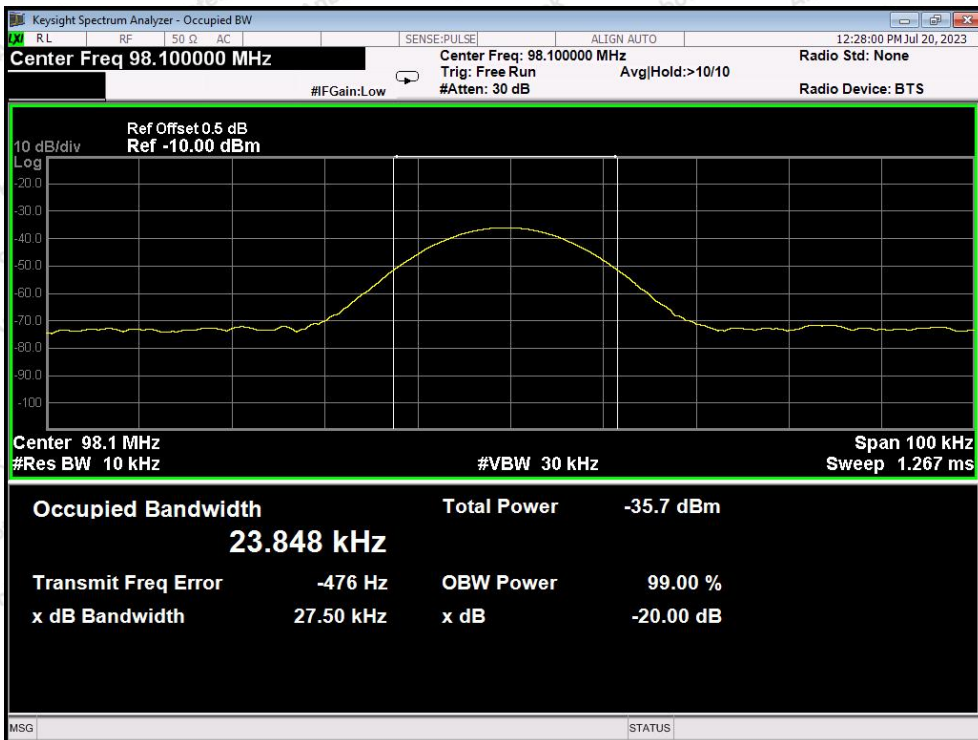
Test Item	: 20dB Bandwidth	Test Mode	: Continuously transmitting
Test Voltage	: DC 12V	Temperature	: 22.7℃
Test Result	: PASS	Humidity	: 55%RH

Test Channel	Frequency (MHz)	20 dBc Bandwidth (kHz)	Limit (kHz)
Low	88.1	27.02	200
Mid	98.1	27.50	200
High	107.9	27.22	200



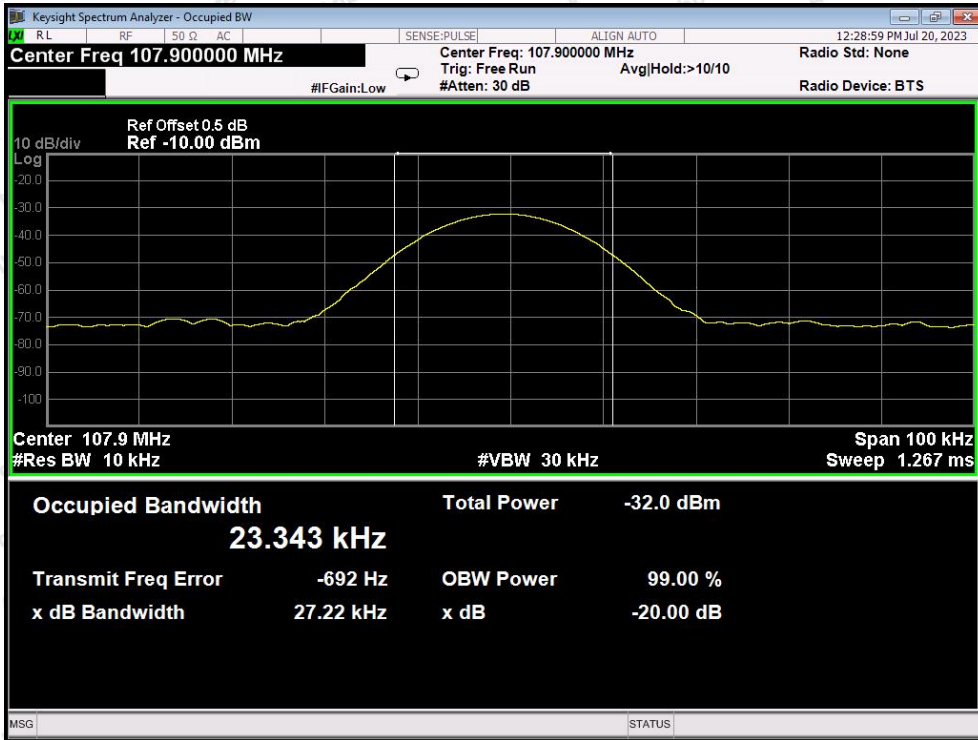


Low Channel



Mid Channel





High Channel



6. Antenna Requirement

6.1. Test Standard and Requirement

Test Standard	FCC Part15 Section 15.203
Requirement	1) 15.203 requirement: 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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

6.2. Antenna Connected Construction

The antenna is a Ceramic Antenna which permanently attached. It complies with the standard requirement.



APPENDIX I -- TEST SETUP PHOTOGRAPH

Please refer to separated files Appendix I -- Test Setup Photograph

APPENDIX II -- EXTERNAL PHOTOGRAPH

Please refer to separated files Appendix II -- External Photograph

APPENDIX III -- INTERNAL PHOTOGRAPH

Please refer to separated files Appendix III -- Internal Photograph

----- End of Report -----

