
FCC Test Report

Report No.: AGC08073240703FR02

FCC ID : 2AEYD-BC47

APPLICATION PURPOSE : Original Equipment

PRODUCT DESIGNATION : Bluetooth FM Transmitter with Car Charger

BRAND NAME : N/A

MODEL NAME : BC47

APPLICANT : Shen Zhen Sailing Electronic Co., Ltd

DATE OF ISSUE : Aug. 21, 2024

STANDARD(S) : FCC Part 15 Subpart C §15.239

REPORT VERSION : V1.0

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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Aug. 21, 2024	Valid	Initial Release

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1. General Information

Applicant	Shen Zhen Sailing Electronic Co., Ltd
Address	29 Building, Baotian Industrial Zone Chen Tian, Xixiang Town, Bao An District, Shen Zhen, China
Manufacturer	SHEN ZHEN LEADINWAY TECHNOLOGY CO., LTD
Address	29Building, Baotian industrial District Chentian, Xixiang Town, Shenzhen, Guangdong, China
Factory	SHEN ZHEN LEADINWAY TECHNOLOGY CO., LTD
Address	29Building, Baotian industrial District Chentian, Xixiang Town, Shenzhen, Guangdong, China
Product Designation	Bluetooth FM Transmitter with Car Charger
Brand Name	N/A
Test Model	BC47
Date of receipt of test item	Jul. 29 2024
Date of Test	Jul. 29 2024~Aug. 21, 2024
Deviation from Standard	No any deviation from the test method
Condition of Test Sample	Normal
Test Result	Pass
Test Report Form No	AGCER-FCC-FMT-V1

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

Prepared By



Cici Li
(Project Engineer)

Aug. 21, 2024

Reviewed By



Calvin Liu
(Reviewer)

Aug. 21, 2024

Approved By



Max Zhang
Authorized Officer

Aug. 21, 2024

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2. Product Information

2.1 Product Technical Description

Frequency Band	88MHz-108MHz
Operation Frequency Range	88.1MHz-107.9MHz
Hardware Version	YHW-BC47-Power-V0.1 2024 05 27
Software Version	2853C_yhw(BC47)_HDQ_240712_V1.6_att
Modulation Type	FM
Number of channels	199(Channel spacing 100kHz)
Field Strength of Fundamental	46.72dBμV/m (PK)@3m
Antenna Designation	Spring Antenna
Antenna Gain	0dBi
Power Supply	DC 12V-24V

2.2 Test Frequency List

Operation Frequency Rang	Channel Number	Test Frequency (MHz)
88.1MHz-107.9MHz	1	88.10
	2	88.20
	--	--
	100	98.00
	101	98.10
	--	--
	198	107.80
	199	107.90

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2.3 Related Submittal(S) / Grant (S)

This submittal(s) (test report) is intended for FCC ID: **2AEYD-BC47**, filing to comply with Part 2, Part 15 of the Federal Communication Commission rules.

2.4 Test Methodology

The tests were performed according to following standards:

No.	Identity	Document Title
1	FCC 47 CFR Part 2	Frequency allocations and radio treaty matters; general rules and regulations
2	FCC 47 CFR Part 15	Radio Frequency Devices
3	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

2.5 Special Accessories

Not available for this EUT intended for grant.

2.6 Equipment Modifications

Not available for this EUT intended for grant.

2.7 Antenna Requirement

Standard Requirement
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.
EUT Antenna: The non-detachable antenna inside the device cannot be replaced by the user at will. The gain of the antenna is 0dBi.

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3. Test Environment

3.1 Address of The Test Laboratory

Laboratory: Attestation of Global Compliance (Shenzhen) Co., Ltd.

Address: 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

3.2 Test Facility

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

CNAS-Lab Code: L5488

Attestation of Global Compliance (Shenzhen) Co., Ltd. has been assessed and proved to follow CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories.)

A2LA-Lab Cert. No.: 5054.02

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to follow ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC-Registration No.: 975832

Attestation of Global Compliance (Shenzhen) Co., Ltd. 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 with Registration 975832.

IC-Registration No.: 24842(CAB identifier: CN0063)

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the Certification and Engineering Bureau of Industry Canada. The acceptance letter from the IC is maintained in our files with Registration 24842.

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3.3 Environmental Conditions

	Normal Conditions
Temperature range (°C)	15 - 35
Relative humidity range	20 % - 75 %
Pressure range (kPa)	86 - 106
Power supply	DC 12-24V

3.4 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%.

Item	Measurement Uncertainty
Uncertainty of Conducted Emission for AC Port	$U_c = \pm 2.9 \text{ dB}$
Uncertainty of Radiated Emission below 150kHz	$U_c = \pm 3.9 \text{ dB}$
Uncertainty of Radiated Emission below 30MHz	$U_c = \pm 4.9 \text{ dB}$
Uncertainty of Radiated Emission below 1GHz	$U_c = \pm 4.0 \text{ dB}$
Uncertainty of total RF power, conducted	$U_c = \pm 0.8 \text{ dB}$
Uncertainty of RF power density, conducted	$U_c = \pm 2.6 \text{ dB}$
Uncertainty of spurious emissions, conducted	$U_c = \pm 2 \%$
Uncertainty of Occupied Channel Bandwidth	$U_c = \pm 2.7 \%$

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3.5 List of Equipment Used

● Radiated Spurious Emission							
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
☐	AGC-EM-E046	EMI Test Receiver	R&S	ESCI	10096	2024-02-01	2025-01-31
☒	AGC-EM-E116	EMI Test Receiver	R&S	ESCI	100034	2024-05-24	2025-05-23
☒	AGC-EM-E061	Spectrum Analyzer	Agilent	N9010A	MY53470504	2024-05-28	2025-05-27
☒	AGC-EM-E086	Loop Antenna	ZHINAN	ZN30900C	18051	2024-03-05	2026-03-04
☒	AGC-EM-E001	Wideband Antenna	SCHWARZBECK	VULB9168	D69250	2023-05-11	2025-05-10
☒	AGC-EM-E029	Broadband Ridged Horn Antenna	ETS	3117	00034609	2024-03-31	2025-03-30
☒	AGC-EM-E082	Horn Antenna	SCHWARZBECK	BBHA 9170	#768	2023-09-24	2025-09-23
☒	AGC-EM-E146	Pre-amplifier	ETS	3117-PA	00246148	2024-08-03	2026-07-23
☒	AGC-EM-A119	2.4G Filter	SongYi	N/A	N/A	2024-05-23	2025-05-22
☒	AGC-EM-A138	6dB Attenuator	Eeatsheep	LM-XX-6-5W	N/A	2023-06-09	2025-06-08
☐	AGC-EM-A139	6dB Attenuator	Eeatsheep	LM-XX-6-5W	N/A	2023-06-09	2025-06-08

● Test Software					
Used	Equipment No.	Test Equipment	Manufacturer	Model No.	Version Information
☐	AGC-EM-S001	CE Test System	R&S	ES-K1	V1.71
☐	AGC-EM-S003	RE Test System	FARA	EZ-EMC	V.RA-03A
☒	AGC-EM-S004	RE Test System	Tonscend	TS ⁺ Ver2.1(JS32-RE)	4.0.0.0
☐	AGC-ER-S012	BT/WIFI Test System	Tonscend	JS1120-2	2.6
☒	AGC-EM-S011	RSE Test System	Tonscend	TS+-Ver2.1(JS36-RSE)	4.0.0.0

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4. System Test Configuration

4.1 EUT Configuration

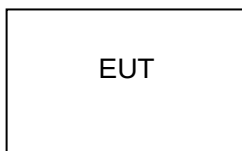
The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

4.2 EUT Exercise

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

4.3 Configuration of Tested System

Radiated Emission Configure:



4.4 Equipment Used in Tested System

The following peripheral devices and interface cables were connected during the measurement:

- ☒ Test Accessories Come From The Laboratory
☐ Test Accessories Come From The Manufacturer

No.	Equipment	Model No.	Manufacturer	Specification Information	Cable
1	DC 12V Battery	N/A	FengFan	N/A	--

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4.5 Summary of Test Results

Item	FCC Rules	Description of Test	Result
1	§15.203	Antenna Equipment	Pass
2	§15.239(b)	Field Strength of Fundamental	Pass
3	§15.209	Radiated Emission	Pass
4	§15.215(c)& 15.239(a)	20dB Bandwidth	Pass
5	§15.205(a)	Restricted Bands of Operation	Pass
6	§15.207	AC Power Line Conducted Emission	N/A

Note: 1.N/A means not applicable

Note: 2. The device under test is battery-powered and does not require evaluation of AC Power Line Conducted Emission.

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5. Description of Test Modes

Summary table of Test Cases	
Test Item	Equipment Type / Modulation
	Short Range Wireless Device/FM
Radiated & Conducted Test Cases	Mode 1: TX_88.1MHz_Low channel Mode 2: TX_98.00MHz_Middle channel Mode 3: TX_107.9MHz_High channel
AC Conducted Emission	N/A

Note:

1. Only the result of the worst case was recorded in the report, if no other cases.
2. The battery is full-charged during the test.
3. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
4. For Conducted Test method, a temporary antenna connector is provided by the manufacture.
5. The EUT was supplied by DC 12V and DC 24V. Only the worst test mode data (DC 12V) recorded in the test report.

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6. Field Strength of Fundamental and Radiated Emission

6.1 Provisions Applicable

15.209 Limit in the below table has to be followed:

Frequency (MHz)	Distance Meters	Field Strengths Limit	
		$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$
0.009 ~ 0.490	300	2400/F(kHz)	---
0.490 ~ 1.705	30	24000/F(kHz)	---
1.705 ~ 30	30	30	---
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	

Remark:

- 1) Emission level $\text{dB}\mu\text{V} = 20 \log$ Emission level $\mu\text{V/m}$
- 2) The smaller limit shall apply at the cross point between two frequency bands.
- 3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

Note: All modes were tested for restricted band radiated emission, the test records reported below are the worst result compared to other modes.

15.239(b) Limit in the below table has to be followed:

Fundamental Frequency	Field Strength of Fundamental (microvolts/meter)
88MHz-108MHz	250

6.2 Measurement Procedure

1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emission, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Place the measurement

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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.

7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

The following table is the setting of spectrum analyzer and receiver.

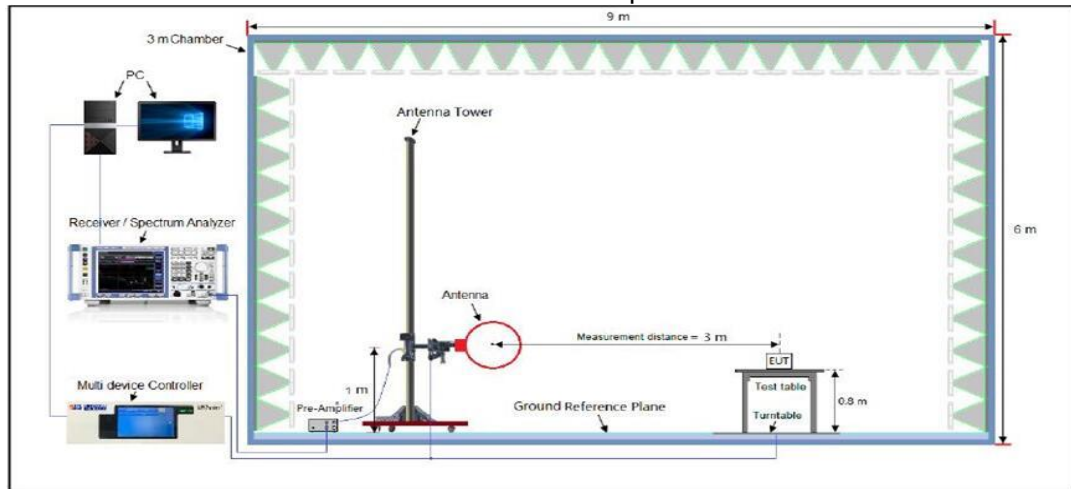
Spectrum Parameter	Setting
Start ~Stop Frequency	9kHz~150kHz/RB 200Hz for QP
Start ~Stop Frequency	150kHz~30MHz/RB 9kHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120kHz for QP
Start ~Stop Frequency	1GHz~26.5GHz 1MHz/3MHz for Peak, 1MHz/3MHz for Average

Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9kHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120kHz for QP

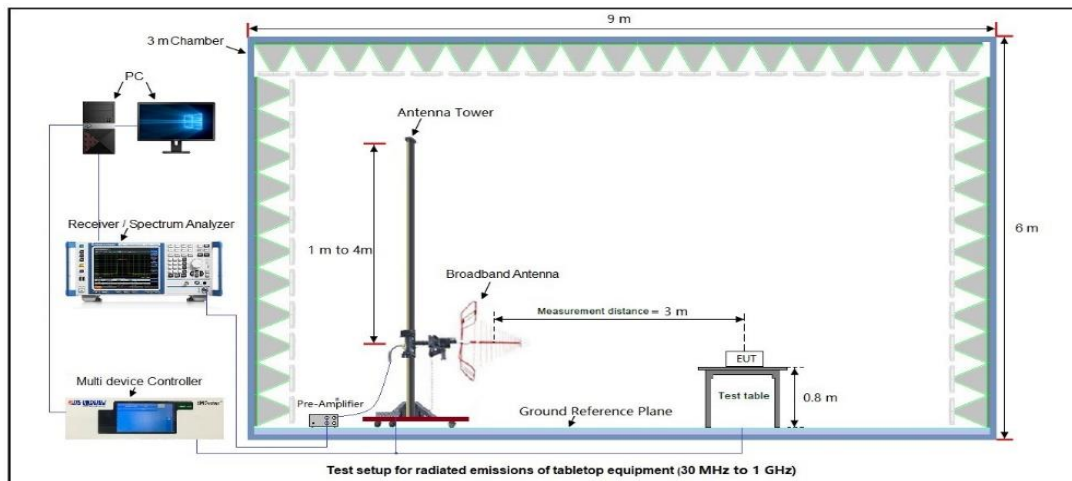
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6.3 Measurement Setup (Block Diagram Of Configuration)

Radiated Emission Test Setup 9kHz-30MHz



Radiated Emission Test Setup 30MHz-1000MHz



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6.4 Measurement Result

Field Strength of Fundamental

EUT Name	Bluetooth FM Transmitter with Car Charger		Model Name	BC47		
Temperature	23.1℃		Relative Humidity	57.7%		
Pressure	960hPa		Test Voltage	DC 12V		
Test Mode	Mode 1/2/3		Antenna	Horizontal/ Vertical		
Frequency MHz	Polarization	Measurement dB(uV/m) PK	Limit dB(uV/m) AV	Over dB	Pass/Fail	Detector
88.100	H	44.88	47.96	-3.08	Pass	PK
88.100	V	45.62	47.96	-2.34	Pass	PK
98.000	H	44.97	47.96	-2.99	Pass	PK
98.000	V	45.93	47.96	-2.03	Pass	PK
107.900	H	45.69	47.96	-2.27	Pass	PK
107.900	V	46.72	47.96	-1.24	Pass	PK

Field Strength of Band Edge Emission

Frequency MHz	Polarization	Measurement dB(uV/m) QP	Limit dB(uV/m) QP	Over dB	Pass/Fail	Detector
88.000	H	36.23	40	-3.77	Pass	QP
88.000	V	35.98	40	-4.02	Pass	QP
108.000	H	35.21	43.5	-8.29	Pass	QP
108.000	V	34.87	43.5	-8.63	Pass	QP

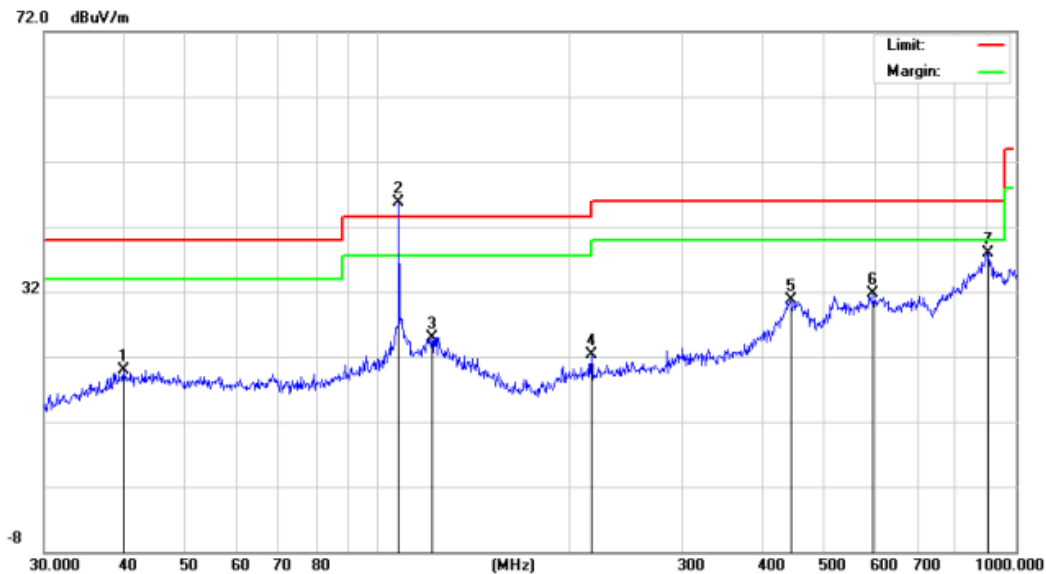
Note: The above two frequencies are the worst case for the band edge emission test.

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Attestation of Global Compliance(Shenzhen)Std & Tech Co., Ltd
Tel: +86-755 2523 4088 E-mail: agc@agccert.com Web: http://www.agccert.com/

Radiated Emission from 30MHz-1000MHz

EUT Name	Bluetooth FM Transmitter with Car Charger	Model Name	BC47
Temperature	23.1℃	Relative Humidity	57.7%
Pressure	960hPa	Test Voltage	DC 12V
Test Mode	Mode 3	Antenna	Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		39.9942	6.01	13.90	19.91	40.00	-20.09	peak
2	*	107.8876	29.41	16.28	45.69	43.50	2.19	peak
3		121.5486	8.61	16.31	24.92	43.50	-18.58	peak
4		216.0240	7.81	14.42	22.23	46.00	-23.77	peak
5		443.2943	5.73	24.98	30.71	46.00	-15.29	peak
6		597.2234	6.64	24.99	31.63	46.00	-14.37	peak
7		903.3094	6.57	31.34	37.91	46.00	-8.09	peak

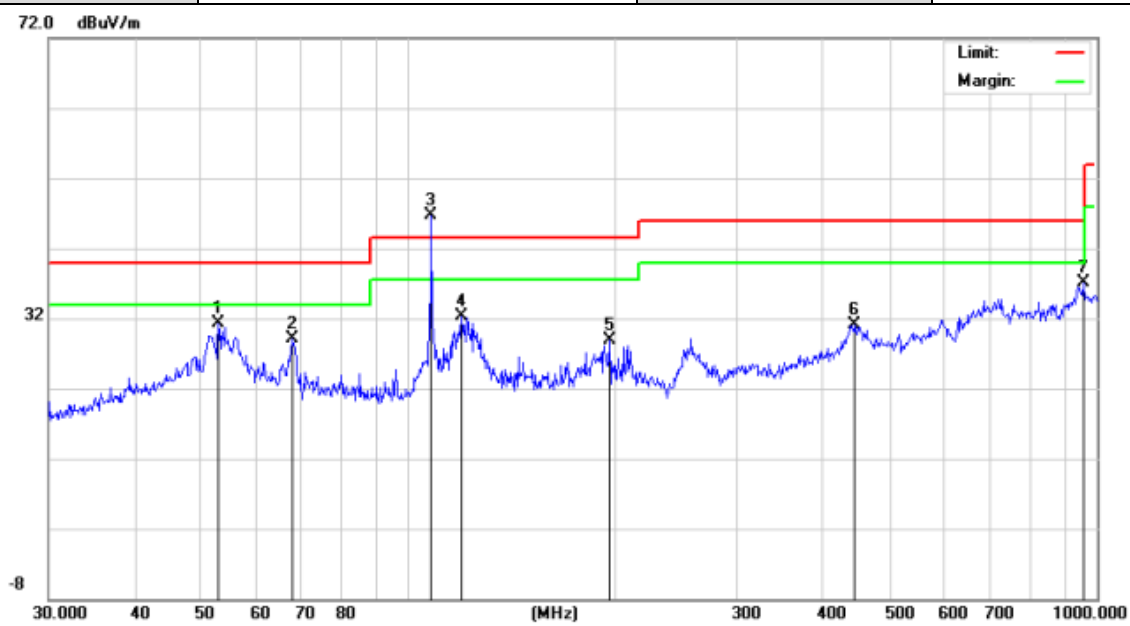
RESULT: Pass

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Radiated Emission from 30MHz ~1000MHz

EUT Name	Bluetooth FM Transmitter with Car Charger	Model Name	BC47
Temperature	23.1℃	Relative Humidity	57.7%
Pressure	960hPa	Test Voltage	DC 12V
Test Mode	Mode 3	Antenna	Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		52.9453	14.25	17.03	31.28	40.00	-8.72	peak
2		67.6751	12.00	17.02	29.02	40.00	-10.98	peak
3	*	107.8876	31.14	15.58	46.72	43.50	3.22	peak
4		119.4361	14.74	17.60	32.34	43.50	-11.16	peak
5		195.8220	10.89	18.03	28.92	43.50	-14.58	peak
6		444.8514	5.15	25.88	31.03	46.00	-14.97	peak
7		955.4381	6.75	30.38	37.13	46.00	-8.87	peak

RESULT: Pass

Note:

- Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.
- All test modes had been pre-tested. The mode 3 is the worst case and recorded in the report.
- The "Factor" value can be calculated automatically by software of measurement system.

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7. 20dB Bandwidth Measurement

7.1 Provisions Applicable

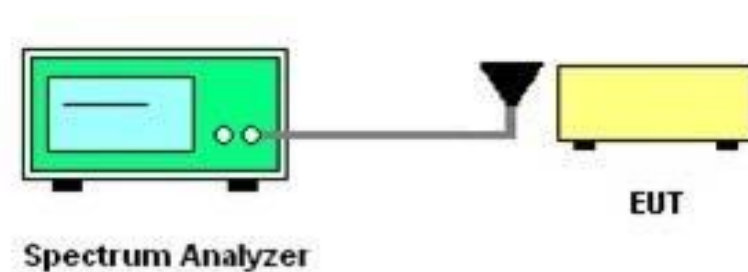
Emissions from the intentional radiator shall be confined within a band 200 kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the frequency range of 88–108 MHz

7.2 Measurement Procedure

Set the parameters of SPA as below:

1. Centre frequency = Operation Frequency
2. RBW=3KHz
3. VBW=10KHz
4. Span: 300kHz
5. Sweep time: Auto
6. For the occupied bandwidth measurements, the input signal shall be a 2.5 kHz tone.
 - ☐ The level of the tone shall be 16 dB higher than that required to produce a frequency deviation of 75 kHz, or 50% of the manufacturer's rated deviation, whichever is less.
 - ☒ Alternatively, in the event that a 16 dB increase cannot be achieved, the level of the tone shall be set to the manufacturer's maximum rated input to the modulator.
7. Set the EUT to continue transmitting mode. Allow the trace to stabilize. Use the "N dB down" function of SPA to define the bandwidth.
8. Record the plots and Reported.

7.3 Measurement Setup (Block Diagram of Configuration)

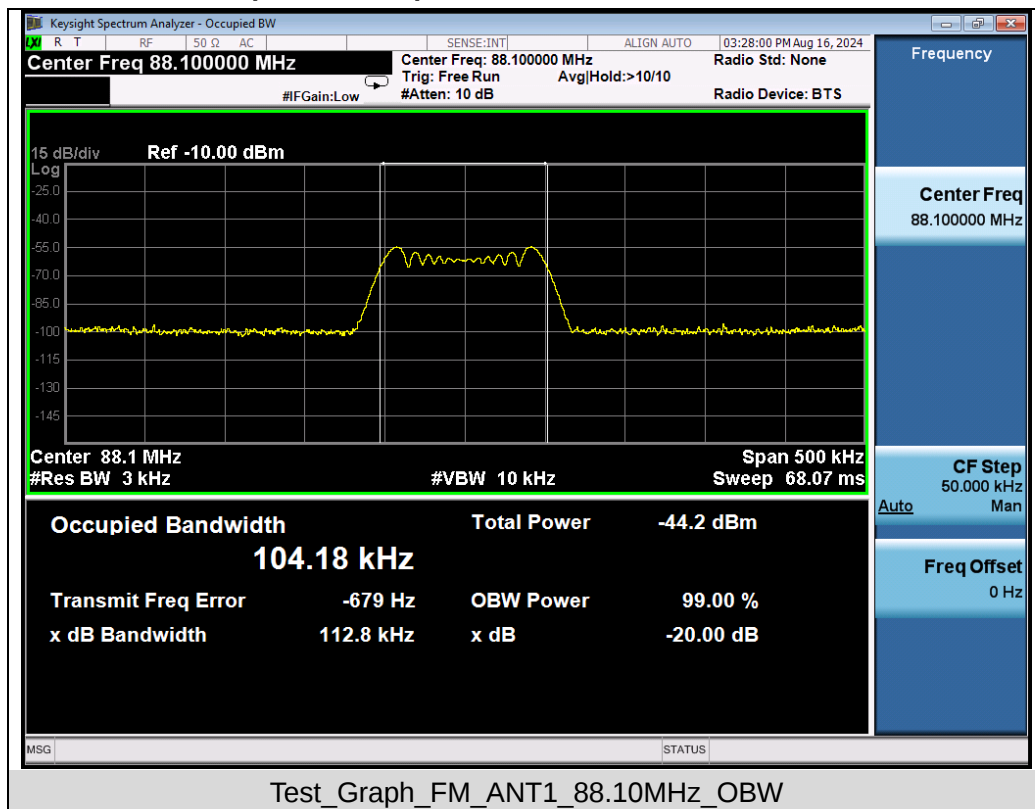


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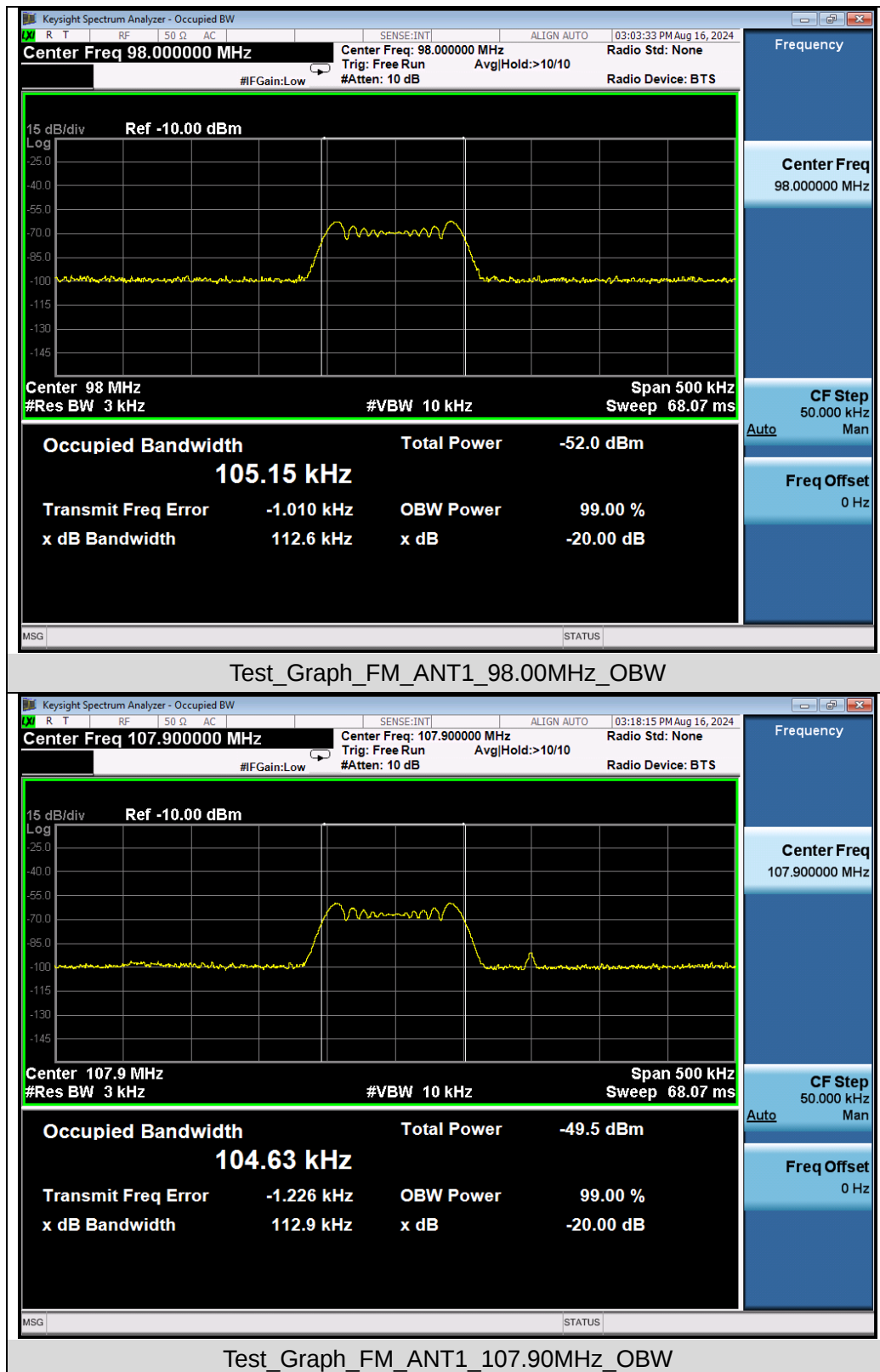
7.4 Measurement Result

Test Data of Bandwidth Measurement					
Test Mode	Test Channel (MHz)	99% Occupied Bandwidth (kHz)	-20dB Bandwidth (kHz)	Limits (kHz)	Pass or Fail
FM	88.10	104.18	112.8	200.00	Pass
FM	98.00	105.15	112.6	200.00	Pass
FM	107.90	104.63	112.9	200.00	Pass

Test Graphs of Occupied Bandwidth and -20dB Bandwidth



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8. AC Power Line Conducted Emission Test

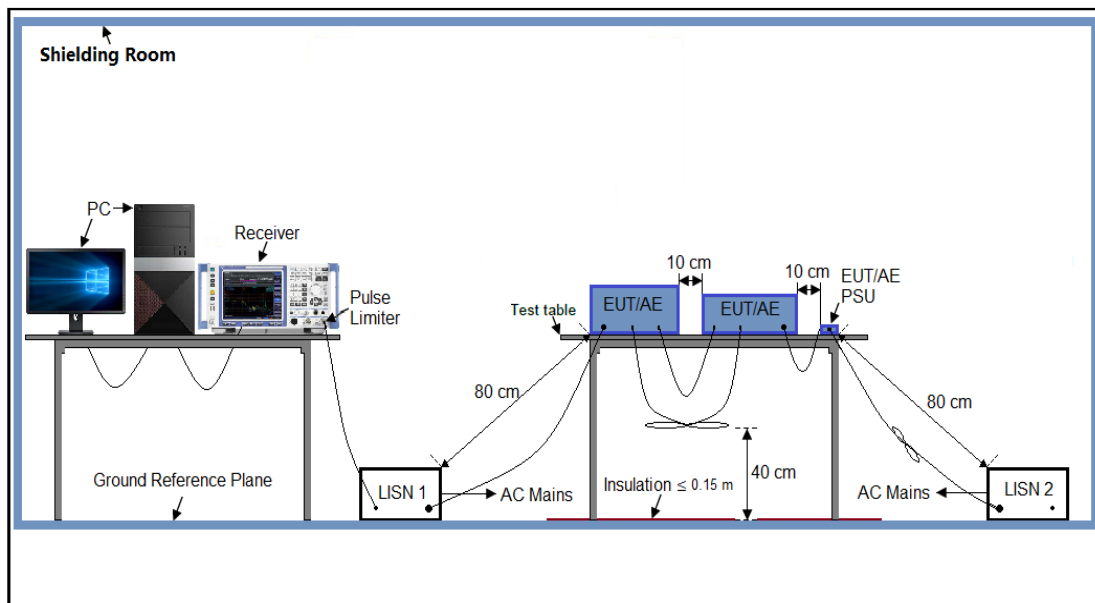
8.1 Measurement Limit

Frequency Range	Maximum RF Line Voltage	
	Q.P. (dB μ V)	Average (dB μ V)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note:

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

8.2 Measurement Setup (Block Diagram of Configuration)



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8.3 Preliminary Procedure of Line Conducted Emission Test

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. All support equipment received AC120V/60Hz power from a LISN, if any.
5. The EUT received DC 12-24V power from car battery
6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test mode(s) were scanned during the preliminary test.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

8.4 Final Procedure of Line Conducted Emission Test

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less – 2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case condition(s) was reported on the Summary Data page.

8.5 Measurement Result

Not Applicable

Note: This device is battery powered, there is no AC power supply

Appendix I: Photographs of Test Setup

Refer to the Report No.: AGC08073240703AP01

Appendix II: Photographs of Test EUT

Refer to the Report No.: AGC08073240703AP02

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

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