

FCC Test Report

Report No.: AGC02037180102FE06

FCC ID : 2AIL4-BH194A
APPLICATION PURPOSE : Original Equipment
PRODUCT DESIGNATION : Bluetooth FM Transmitter
BRAND NAME : N/A
MODEL NAME : BH194A, F-227BT, BH194B, BH194C, F-224BT
CLIENT : VTIN TECHNOLOGY Co., Limited
DATE OF ISSUE : Mar. 26, 2018
STANDARD(S) : FCC Part 15.239
REPORT VERSION : V1.3

Attestation of Global Compliance (Shenzhen) Co., Ltd

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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Mar. 05, 2018	Invalid	Initial release
V1.1	1st	Mar. 16, 2018	Invalid	Update the comments.
V1.2	2nd	Mar. 22, 2018	Invalid	Update the comments.
V1.3	3rd	Mar. 26, 2018	Valid	Update the comments.

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1. VERIFICATION OF CONFORMITY

Applicant	VTIN TECHNOLOGY Co.,Limited
Address	Unit D,16/F,One Capital Place,18 Luard Road,Wan Chai,Hong Kong
Manufacturer	Shenzhen DAZA Innovation Technology Company Limited
Address	G Building 102 202 3F,No. 6 Xinmu Avenue, Xinmu Community, Pinghu Longgang District,Shenzhen,China
Product Designation	Bluetooth FM Transmitter
Brand Name	N/A
Test Model	BH194A
Series Model	F-227BT, BH194B, BH194C, F-224BT
Difference description	All the same, except for the model name and shape.
Date of test	Jan. 30, 2018 to Mar. 05, 2018
Deviation	None
Condition of Test Sample	Normal
Report Template	AGCRT-US-BR/RF (2013-03-01)

We hereby certify that:

The above equipment was tested by Dongguan Precise Testing Service Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC part 15.239.

Tested By



Steven Zhou(Zhou Pengyun)

Mar. 16, 2018

Reviewed By



Forrest Lei(Lei Yonggang)

Mar. 26, 2018

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2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

A major technical description of EUT is described as following

Operation Frequency	88.1MHz-107.9MHz
Modulation	FM
Number of channels	199(Channel spacing 100kHz)
Hardware Version	F-231BT-CW6621E-QN8027-V5
Software Version	F231_BH194A_6621E_V59_SP0CF8B812_beat12
Antenna Designation	Coil Antenna
Power Supply	INPUT:DC 12V-24V OUTPUT:DC 5V 3A MAX

NOTE: 1. About the EUT, please refer to User's Manual.

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3. MEASUREMENT UNCERTAINTY

Uncertainty of Conducted Emission, $U_c = \pm 3.2$ dB

Uncertainty of Radiated Emission below 1GHz, $U_c = \pm 3.9$ dB

4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Transmitting mode(Low channel)
2	Transmitting mode(Middle channel)
3	Transmitting mode(High channel)

Note:

1. All the requirements have been tested by modulating the transmitter with a 2.5 kHz tone at a fixed level which set to the manufacturer's maximum rated input to the modulator.
2. Only the result of the worst case was recorded in the report, if no other cases.

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5. SYSTEM TEST CONFIGURATION

5.1. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	Bluetooth FM Transmitter	Pinmi	2AIL4-BH194A	EUT
2	Battery	SAIL	12V 60Ah 356A	A.E
3	Battery	SAIL	12V 60Ah 356A	A.E

5.2. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
15.239	Field Strength of Fundamental and Spurious Emission	Compliant
15.215	Bandwidth	Compliant
15.209	Line Conducted Emission	N/A

Note: N/A means it's not applicable to this item.

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6. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2F., Bldg.2, No.1-4, Chaxi Sanwei Technical Industrial Park, Gushu, Xixiang, Bao'an District B112-B113, Bldg.12, Baoan Bldg Materials Center, No.1 of Xixiang Inner Ring Road, Baoan District, Shenzhen 518012
NVLAP Lab Code	600153-0
Designation Number	CN5028
Test Firm Registration Number	682566
Description	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by National Voluntary Laboratory Accreditation program, NVLAP Code 600153-0

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	Jun.20, 2017	Jun.19, 2018
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec.08, 2017	Dec.07, 2018
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep.20, 2017	Sep.19, 2018
preamplifier	ChengYi	EMC184045SE	980508	Sep.15, 2017	Sep.14, 2018
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May 18, 2017	May 17, 2019
Broadband Preamplifier	SCHWARZBECK	BBV 9718	9718-205	Jun.20, 2017	Jun.19, 2018
ANTENNA	SCHWARZBECK	VULB9168	D69250	Sep.28, 2017	Sep.27, 2018
Loop Antenna	A.H.Systems,Inc	SAS-562B	--	Mar.01, 2018	Feb.28, 2020

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7. RADIATED EMISSION

7.1. MEASUREMENT PROCEDURE

- 1) For tabletop measurements of radiated emissions from a device that directly injects an FM signal into a vehicle's wiring system through the CLA socket, the EUT arrangement shall be as depicted in below figure.
- 2) A representative sample of the transmitting CLA (EUT) shall be placed on an approved test tabletop 80 cm above the OATS or semi-anechoic chamber ground plane floor, along with a vehicle battery, the FM source device, and all associated peripherals and interconnecting cables.
- 3) The EUT shall be connected to the vehicle battery with a 12 AWG or 14 AWG diameter twisted pair cable of 1 m in length. The twisted pair cable shall have a minimum of 12 turns, and care shall be taken to confirm that the twists go all the way to both ends of the cable.
- 4) A socket may be attached to the CLA side of the twisted pair for easier connection to the EUT, or the wires may be connected directly to the CLA positive and negative terminals.
- 5) All peripherals and devices shall be spaced 10 cm apart along the back edge of the table surface. The EUT shall be placed next to the vehicle battery, and the twisted pair cable shall be draped off the back of the test tabletop, i.e., not placed on the tabletop. All other cables used to connect the EUT to the peripherals and to the FM source device shall be placed on the test tabletop in a random fashion.
- 6) For measurements of FM transmitters, it is important that the prescan and final measurement procedures are followed to find maximum emissions.
- 7) For all measurements, the EUT settings that can be controlled by the end user, and that can affect the FM modulated signal, shall be adjusted to maximum settings.
- 8) The tabletop setup radiated emissions measurement shall be repeated with the device transmitting at the center of the transmitting band and at both band edges.

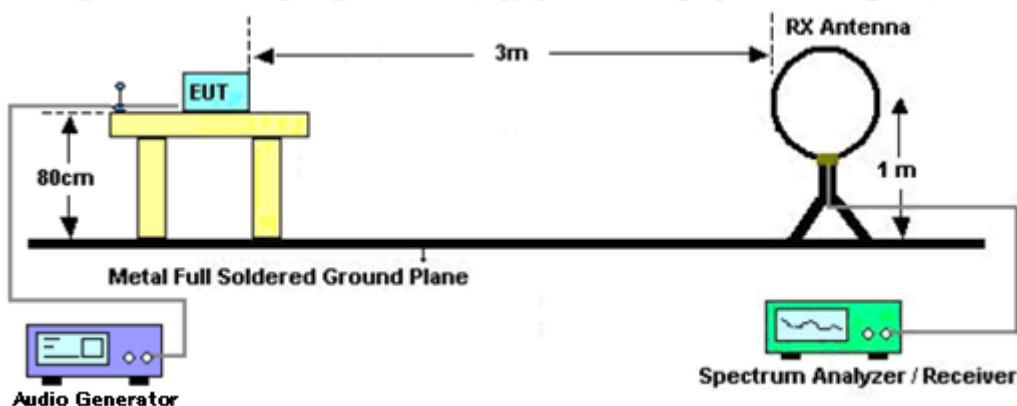
The following table is the setting of spectrum analyzer and receiver.

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

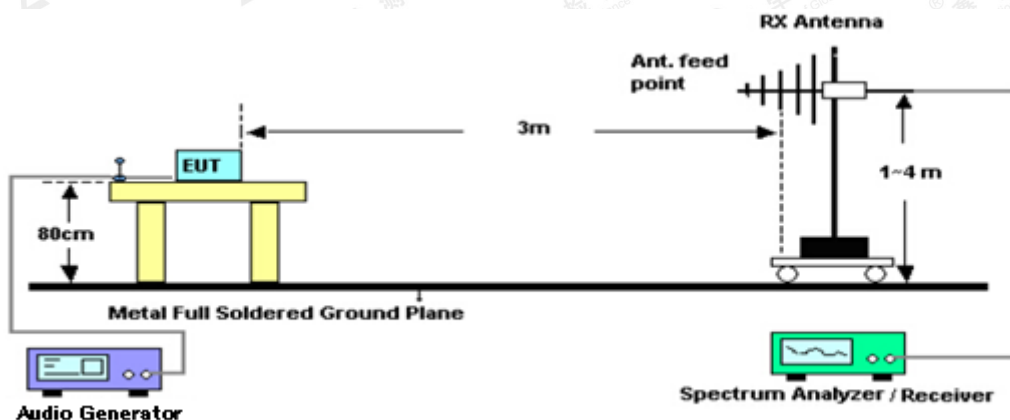
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7.2. TEST SETUP

Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



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7.3. TEST RESULT FOR FIELD STRENGTH OF FUNDAMENTAL

Frequency MHz	Polarization	Level dB(uV/m) PK	Limit dB(uV/m) PK	Margin dB	Pass/Fail	Detector
88.100	H	46.57	67.96	-21.39	Pass	PK
88.100	V	46.32	67.96	-21.64	Pass	PK
98.000	H	43.25	67.96	-24.71	Pass	PK
98.000	V	40.17	67.96	-27.79	Pass	PK
107.900	H	42.52	67.96	-25.44	Pass	PK
107.900	V	43.29	67.96	-24.67	Pass	PK
Frequency MHz	Polarization	Level dB(uV/m) AV	Limit dB(uV/m) AV	Margin dB	Pass/Fail	Detector
88.100	H	42.59	47.96	-5.37	Pass	AV
88.100	V	40.18	47.96	-7.78	Pass	AV
98.000	H	44.29	47.96	-3.67	Pass	AV
98.000	V	43.42	47.96	-4.54	Pass	AV
107.900	H	45.38	47.96	-2.58	Pass	AV
107.900	V	42.14	47.96	-5.82	Pass	AV

7.4. TEST RESULT FOR FIELD STRENGTH OF BAND EDGE EMISSION

Frequency MHz	Polarization	Level dB(uV/m) QP	Limit dB(uV/m) QP	Margin dB	Pass/Fail	Detector
88.000	H	32.69	40.00	-7.31	Pass	QP
88.000	V	37.51	40.00	-2.49	Pass	QP
108.000	H	30.78	43.50	-12.72	Pass	QP
108.000	V	35.45	43.50	-8.05	Pass	QP

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

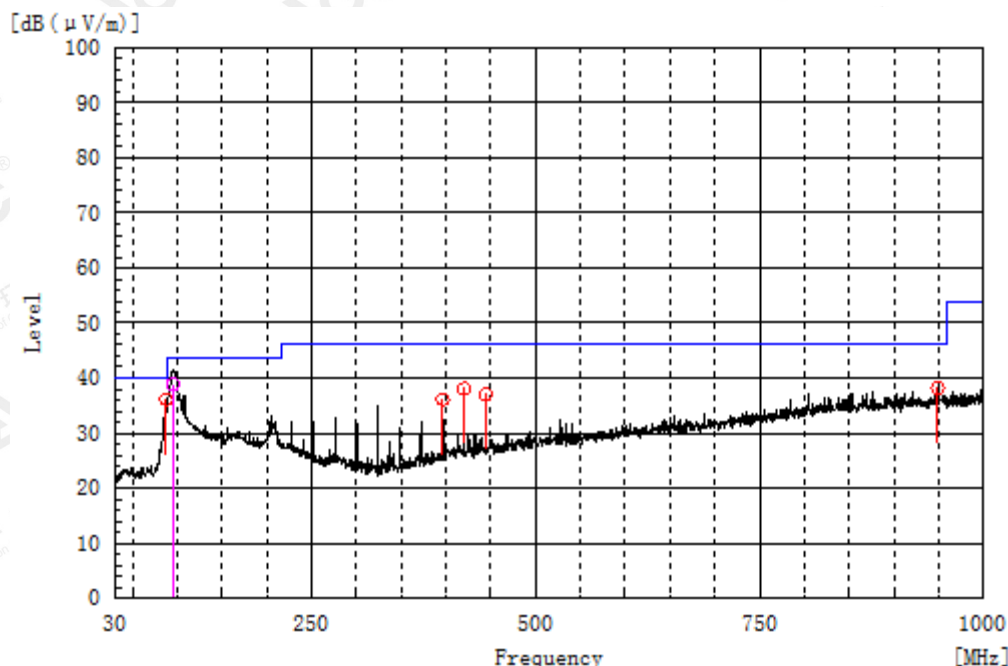
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7.5. TEST RESULT FOR SPURIOUS EMISSION

RADIATED EMISSION BELOW 30MHz

No emission found between lowest internal used/generated frequencies to 30MHz.

RADIATED EMISSION BELOW 1GHZ-Horizontal



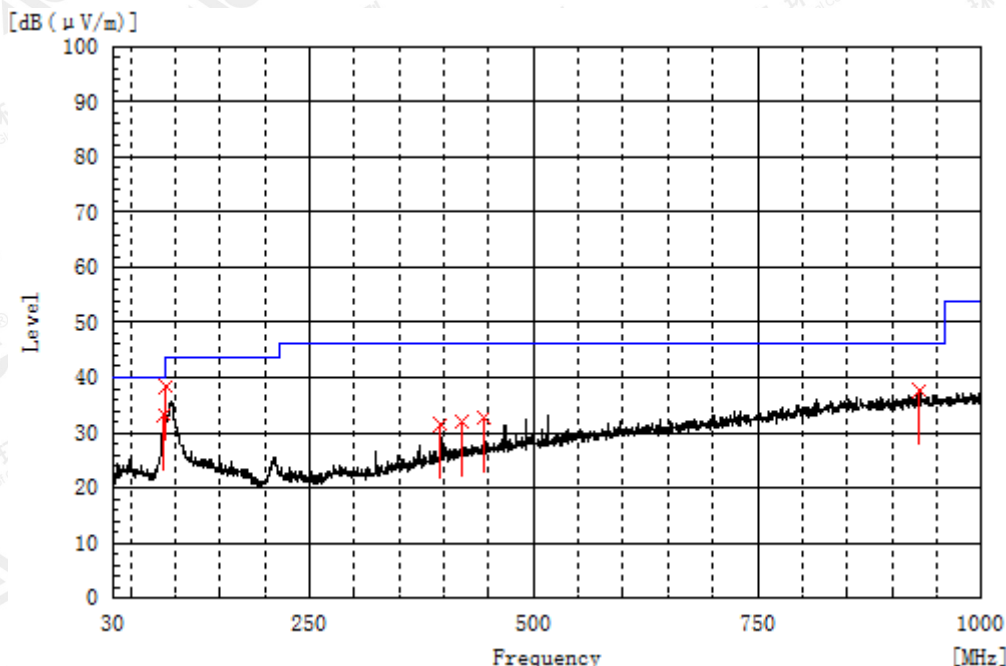
Frequency MHz	Polarization	Reading dB(uV)	Factor dB (1/m)	Level dB(uV/m) PK	Limit dB(uV/m) QP	Margin dB	Pass/Fail	Height cm	Angle deg
87.230	H	23.9	12.3	36.2	40.0	3.8	Pass	200.0	186.1
396.175	H	15.4	20.7	36.1	46.0	9.9	Pass	100.0	297.1
419.940	H	16.7	21.4	38.1	46.0	7.9	Pass	100.0	282.7
444.190	H	15.1	22.0	37.1	46.0	8.9	Pass	200.0	280.3
949.075	H	7.5	30.7	38.2	46.0	7.8	Pass	100.0	109.5

Frequency MHz	Polarization	Reading dB(uV) QP	Factor dB (1/m)	Level dB(uV/m) QP	Limit dB(uV/m) QP	Margin dB	Pass/Fail	Height cm	Angle deg
94.990	H	26.2	12.7	38.9	43.5	4.6	Pass	200.0	36.9

RESULT: PASS

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RADIATED EMISSION BELOW 1GHZ-Vertical



Frequency MHz	Polarization	Reading dB(uV)	Factor dB (1/m)	Level dB(uV/m) PK	Limit dB(uV/m) QP	Margin dB	Pass/Fail	Height cm	Angle deg
87.230	V	21.0	12.3	33.3	40.0	6.7	Pass	150.0	257.3
89.170	V	26.2	12.3	38.5	43.5	5.0	Pass	150.0	350.3
396.175	V	10.8	20.7	31.5	46.0	14.5	Pass	150.0	144.7
419.940	V	10.6	21.4	32.0	46.0	14.0	Pass	100.0	141.9
444.190	V	10.7	22.0	32.7	46.0	13.3	Pass	100.0	113.9
931.130	V	7.2	30.5	37.7	46.0	8.3	Pass	150.0	337.5

RESULT: PASS

Note:

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

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8. BANDWIDTH

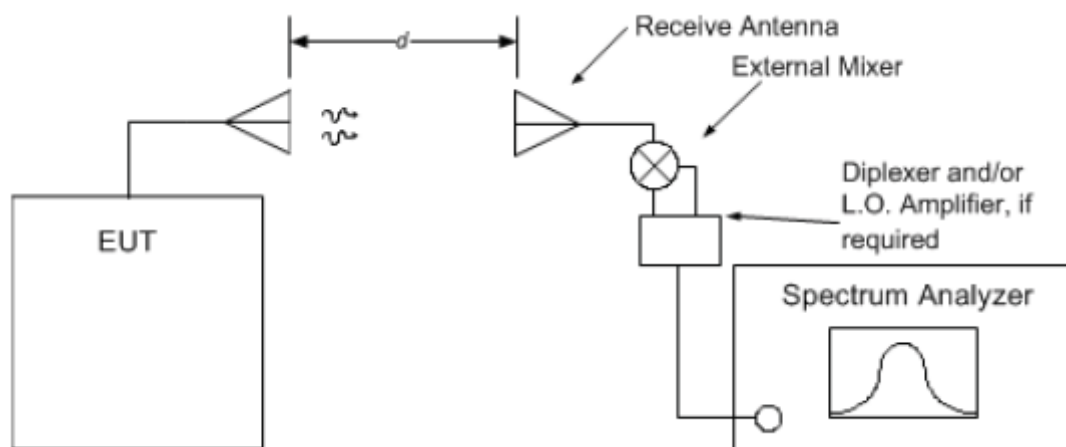
8.1. MEASUREMENT PROCEDURE

- 1) Span equal to approximately two times to three times the EBW, centered on the carrier frequency.
- 2) RBW, as specified in the requirement.
- 3) VBW, as specified in the requirement, or $VBW \geq RBW$ if not specified
- 4) Sweep = auto.
- 5) Detector function = peak.
- 6) Trace = max hold.
- 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.

NOTE: For the purposes of 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.

8.2. TEST SETUP

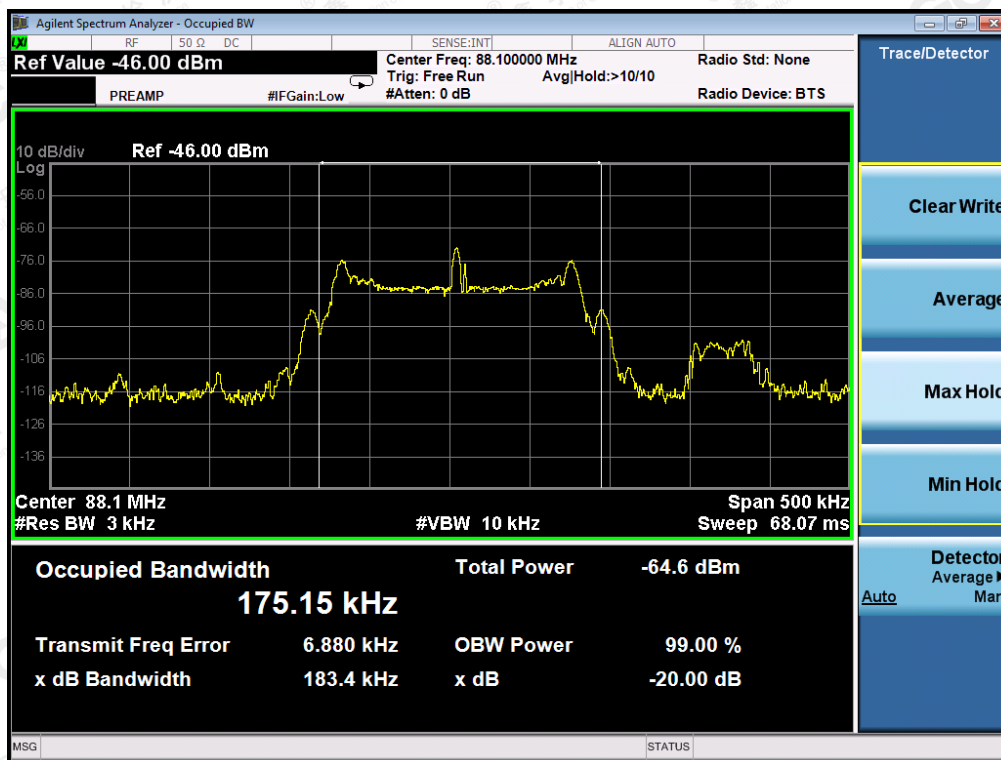


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8.3. TEST RESULT

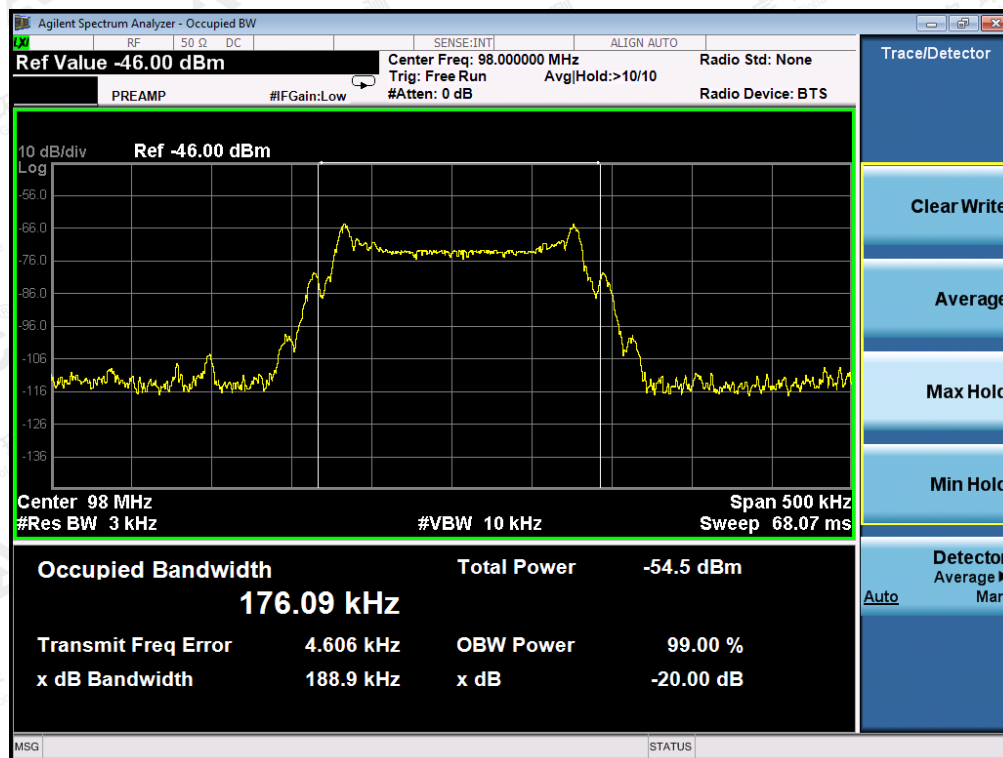
Channel	Channel Frequency(MHz)	-20dB bandwidth (kHz)	Limit(kHz)
Low	88.1	183.4	200
Middle	98.0	188.9	200
High	107.9	176.6	200

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

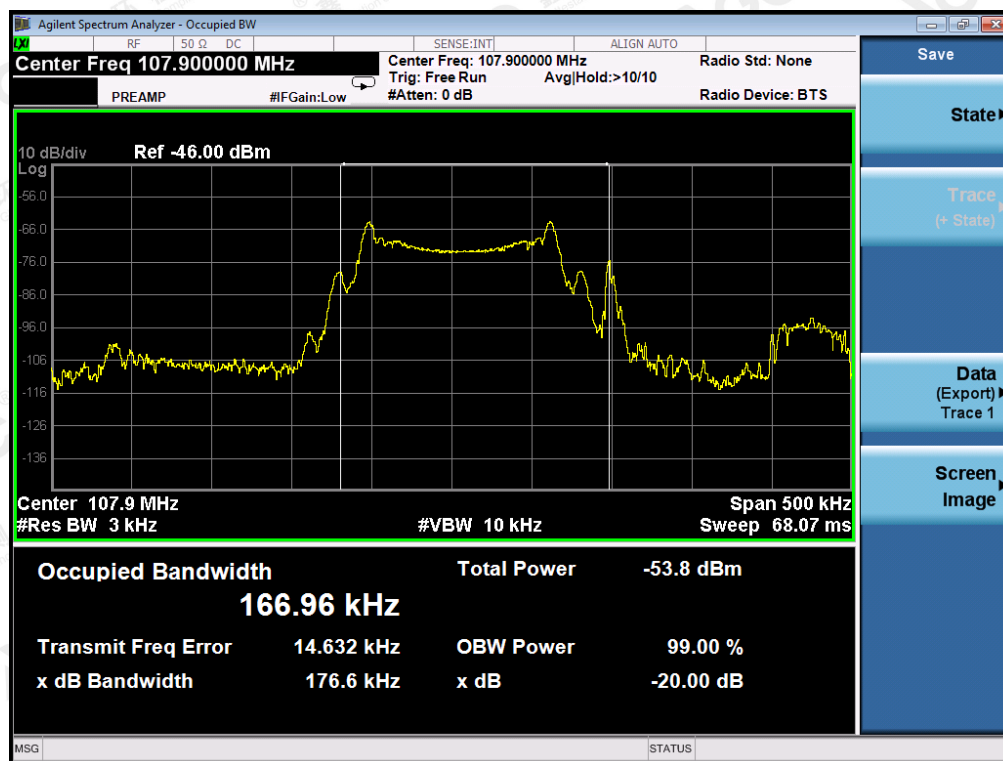


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TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

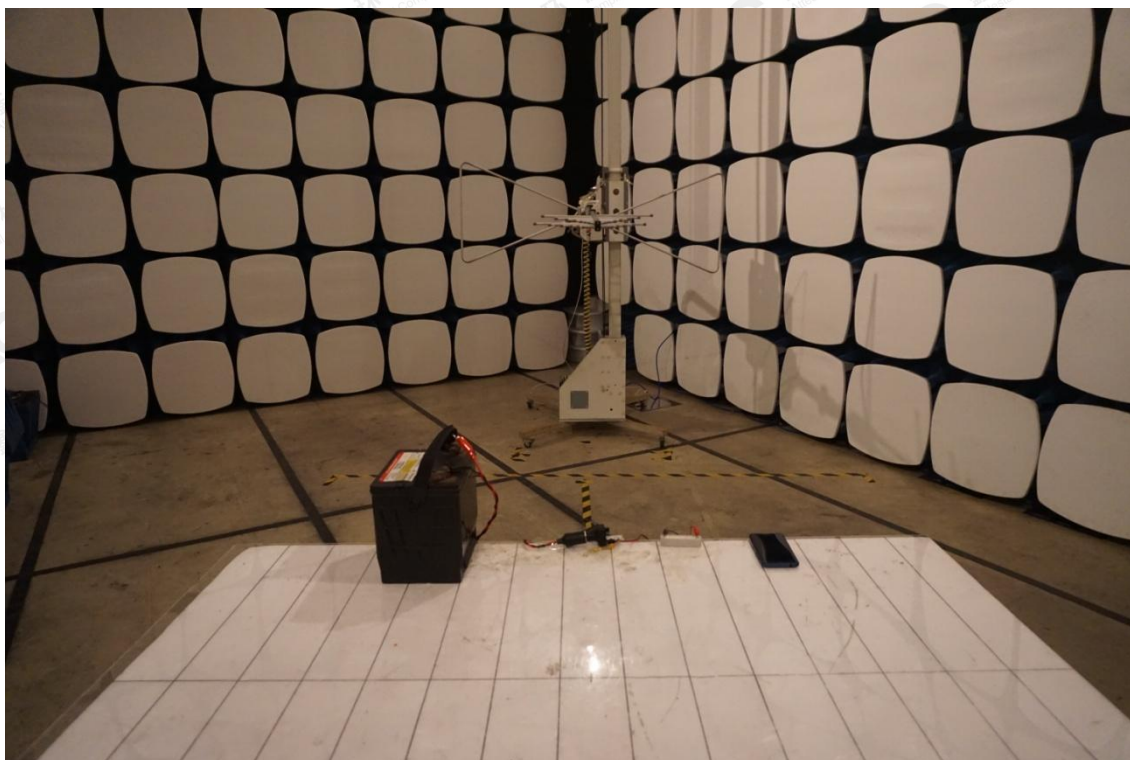


TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



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APPENDIX A: PHOTOGRAPHS OF TEST SETUP
RADIATED EMISSION TEST SETUP BELOW 1G



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APPENDIX B: PHOTOGRAPHS OF EUT

TOP VIEW OF EUT



BOTTOM VIEW OF EUT



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FRONT VIEW OF EUT



BACK VIEW OF EUT



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LEFT VIEW OF EUT



RIGHT VIEW OF EUT

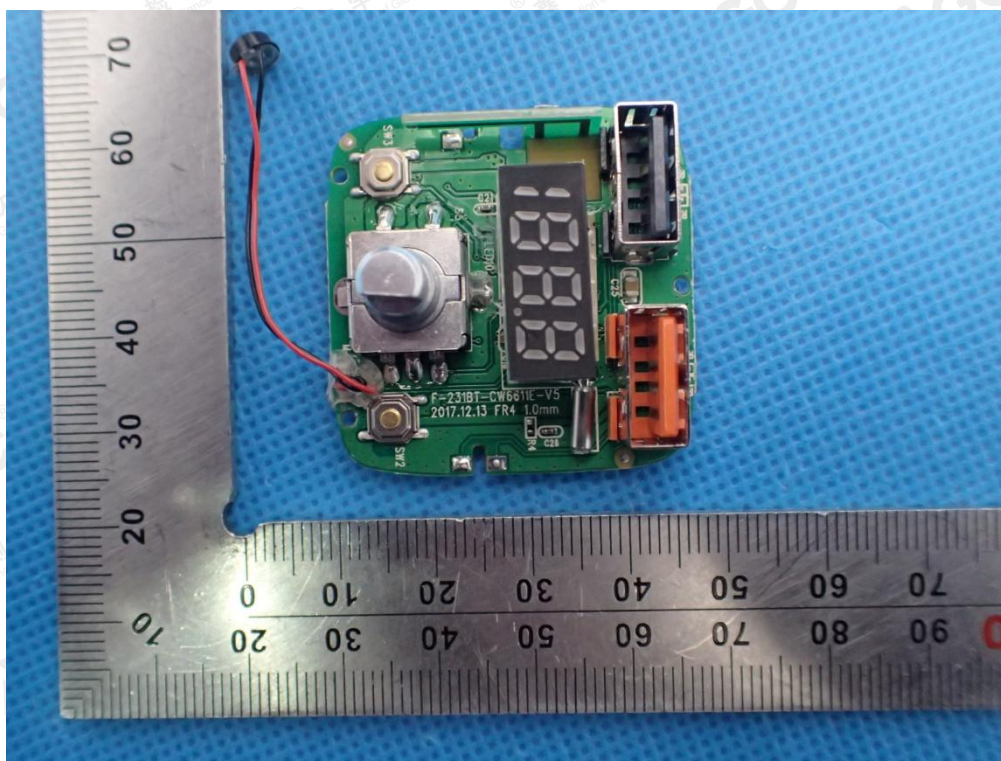


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OPEN VIEW OF EUT

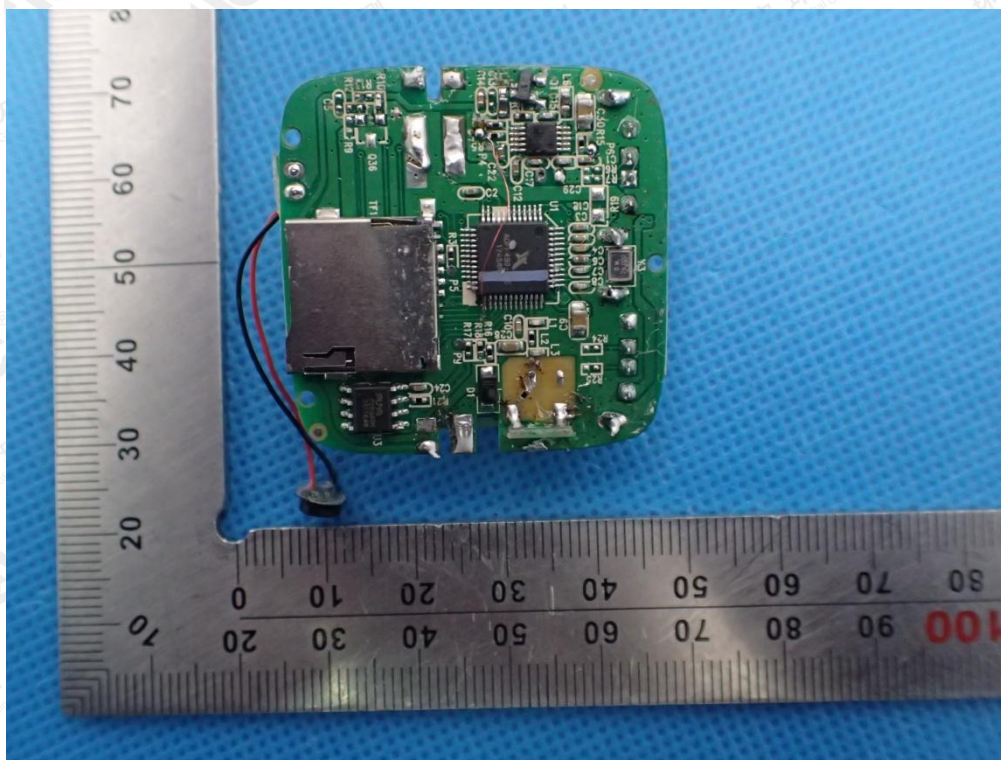


INTERNAL VIEW OF EUT-1

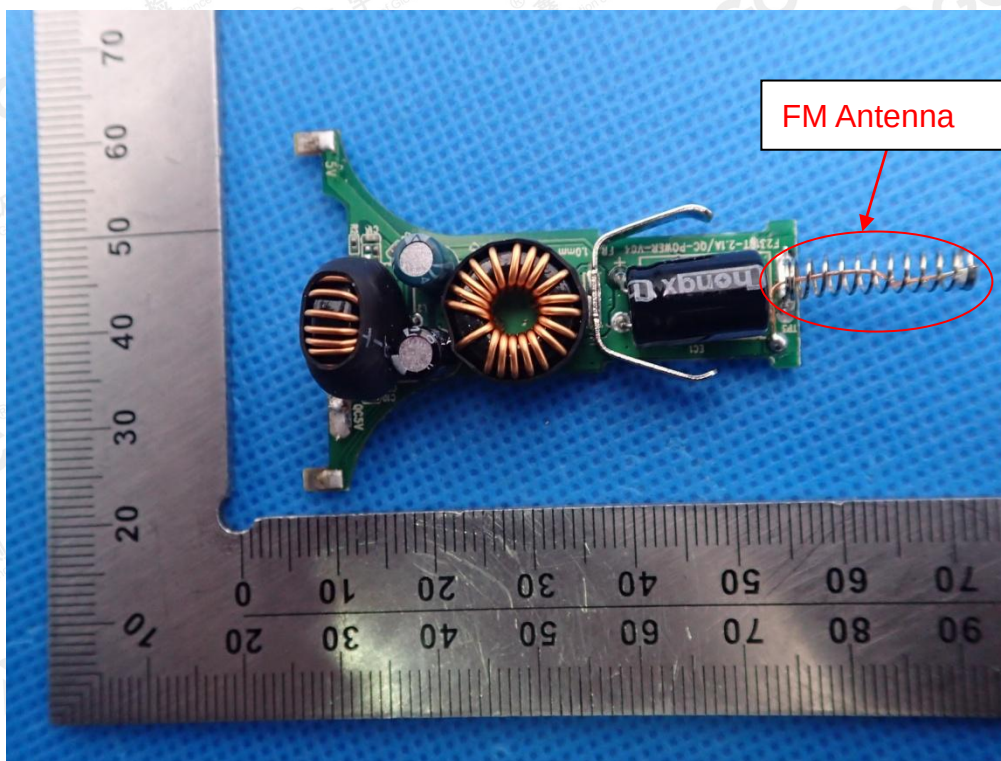


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INTERNAL VIEW OF EUT-2

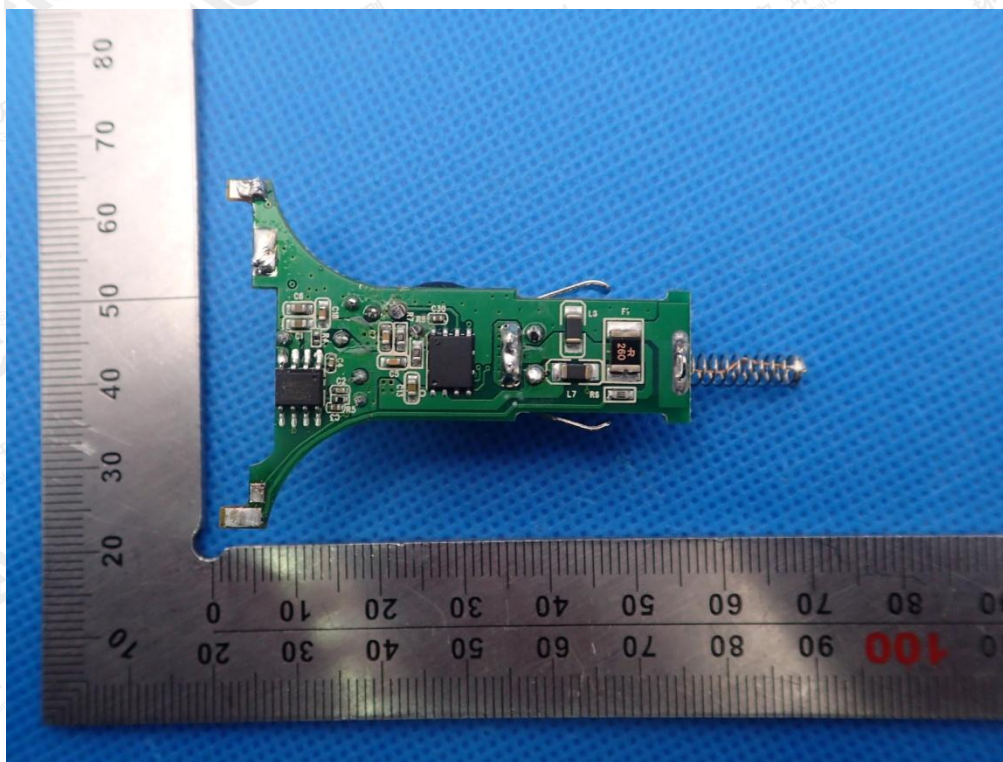


INTERNAL VIEW OF EUT-3

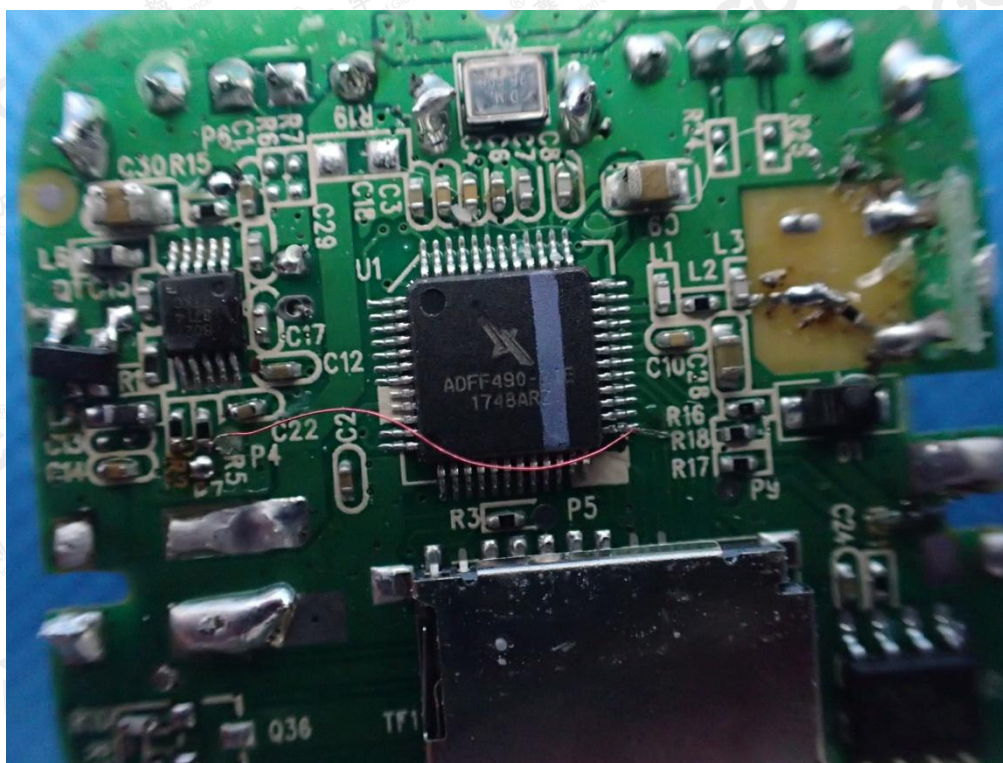


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INTERNAL VIEW OF EUT-4



INTERNAL VIEW OF EUT-5



----END OF REPORT----

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