Japan Specified Radio Test Report

Report No.	:	**1812C50591612501**
Applicant	:	**Zenovate FZ-LLC**
Address	:	**FDBC3870 Compass Building, Al Shohada Road, AL Hamra Industrial Zone-FZ, Ras Al Khaimah, United Arab Emirates**
Product Name	:	**BLUETOOTH OPTICAL PROBE FOR SMART UTILITY METERS**
Report Date	:	**2025-12-09**

Shenzhen Anbotek Compliance Laboratory Limited

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Contents

1. General Information 6
1.1. Client Information 6
1.2. Description of Device (EUT) 6
1.3. Auxiliary Equipment Used During Test 7
1.4. Description of Test Configuration 7
1.5. Test Conditions 7
1.6. Test Voltage 8
1.7. Test Equipment List 9
1.8. Description of Test Facility 10
1.9. Disclaimer 10
1.10. Measurement Uncertainty 11
2. Summary of Test Results 12
3. Frequency Tolerance Test 13
3.1. Test Limit 13
3.2. Test Setup 13
3.3. Test Procedure 13
3.4. Test Data 13
4. Antenna Power Test 14
4.1. Test Limit 14
4.2. Test Setup 14
4.3. Test Configuration 14
4.4. Test Data 14
5. Occupied Bandwidth (99%) Test 15
5.1. Test Limit 15
5.2. Test Setup 15
5.3. Test Procedure 15
5.4. Test Data 15
6. Spread-Spectrum Bandwidth (90%) Test 16
6.1. Test Limit 16
6.2. Test Setup 16
6.3. Test Procedure 16
6.4. Test Data 16
7. Spurious Emissions Intensity Test 17
7.1. Test Limit 17
7.2. Test Setup 17
7.3. Test Procedure 17
7.4. Test Data 17
8. Interference Prevention Function 18
8.1. Test Limit 18
8.2. Test Setup 18

8.3. Test Configuration 18
8.4. Test Data 18
9. Secondary Radiated Emissions Test 19
9.1. Test Limit 19
9.2. Test Setup 19
9.3. Test Configuration 19
9.4. Test Data 19
10. Dwell Time Measurement 20
10.1. Test Limit 20
10.2. Test Setup 20
10.3. Test Configuration 20
10.4. Test Data 20
APPENDIX I -- TEST SETUP PHOTOGRAPH 21
APPENDIX II -- EXTERNAL PHOTOGRAPH 21
APPENDIX III -- INTERNAL PHOTOGRAPH 21

TEST REPORT

Applicant	:	Zenovate FZ-LLC
Manufacturer	:	Zenovate FZ-LLC
Product Name	:	BLUETOOTH OPTICAL PROBE FOR SMART UTILITY METERS
Model No.	:	OP-BTS-IEC, OP-BTS-ANSI, OP-BT-IEC, OP-BT-ANSI
Trade Mark	:	ZENOVATE, TESPRO
Rating(s)	:	Input: 5VDC Battery capacity: 3.7VDC, 1050mAh
Test Standard(s)	:	**MIC Notice No.88 Appendix No.43** **Article 2, paragraph 1, item 19**

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 MIC Notice No.88 Appendix No.43 and Certificate regulation article 2, paragraph 1, item 19 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	2025-11-14
Date of Test	2025-11-14 to 2025-11-18
Prepared By	Lene Chen (Lene Chen)
Approved & Authorized Signer	Hugo Chen (Hugo Chen)

Revision History

Report Version	Description	Issued Date
R00	Original Issue.	2025-12-09

1. General Information

1.1. Client Information

Applicant	:	Zenovate FZ-LLC
Address	:	FDBC3870 Compass Building, Al Shohada Road, AL Hamra Industrial Zone-FZ, Ras Al Khaimah, United Arab Emirates
Manufacturer	:	Zenovate FZ-LLC
Address	:	FDBC3870 Compass Building, Al Shohada Road, AL Hamra Industrial Zone-FZ, Ras Al Khaimah, United Arab Emirates
Factory	:	ZHUHAI ZENOVATE TECHNOLOGY LIMITED
Address	:	RM. 414-1, NO. 240, RENMIN RD.EAST, ZHUHAI, GUANGDONG PROV., CHINA

1.2. Description of Device (EUT)

Product Name	:	BLUETOOTH OPTICAL PROBE FOR SMART UTILITY METERS
Model No.	:	OP-BTS-IEC, OP-BTS-ANSI, OP-BT-IEC, OP-BT-ANSI (Note: All samples are the same except the model number and whether they are equipped with a display, so we prepare "OP-BTS-IEC" for test only.)
Trade Mark	:	ZENOVATE, TESPRO
Test Power Supply	:	DC 3.7V Battery inside
Test Sample No.	:	1-2-1(Normal Sample), 1-2-2(Engineering Sample)
Hardware Version	:	V3.08
Software Version	:	V4.4
Adapter	:	MODEL: LX050100 INPUT:100-240V~50/60Hz 0.35A OUTPUT:5V⎓ 1A
RF Specification		
Operation Mode	:	☒ BT BDR ☒ BT EDR
Operation Frequency	:	2402~2480MHz
Number of Channel	:	79 Channels
Modulation Type	:	GFSK, π/4-DQPSK, 8DPSK
Antenna Type	:	Ceramic Antenna
Antenna Gain(Peak)	:	4.3 dBi
Rated output Power	:	3mW/MHz Max.
Remark: (1) All of the RF specification are provided by customer. (2) 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

Title	Manufacturer	Model No.	Serial No.
/	/	/	/

1.4. Description of Test Configuration

The EUT has been tested under typical operating condition. The Applicant provides software to control the EUT for staying in continuous transmitting and receiving mode for testing.

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
00	**2402**	17	2419	34	2436	51	2453	68	2470
01	2403	18	2420	35	2437	52	2454	69	2471
02	2404	19	2421	36	2438	53	2455	70	2472
03	2405	20	2422	37	2439	54	2456	71	2473
04	2406	21	2423	38	2440	55	2457	72	2474
05	2407	22	2424	**39**	**2441**	56	2458	73	2475
06	2408	23	2425	40	2442	57	2459	74	2476
07	2409	24	2426	41	2443	58	2460	75	2477
08	2410	25	2427	42	2444	59	2461	76	2478
09	2411	26	2428	43	2445	60	2462	77	2479
10	2412	27	2429	44	2446	61	2463	**78**	**2480**
11	2413	28	2430	45	2447	62	2464		
12	2414	29	2431	46	2448	63	2465		
13	2415	30	2432	47	2449	64	2466		
14	2416	31	2433	48	2450	65	2467		
15	2417	32	2434	49	2451	66	2468		
16	2418	33	2435	50	2452	67	2469		

Note: EUT was tested with channel 0, 39 and 78.

1.5. Test Conditions

	Normal Test Conditions
Temperature	24.7°C
Relative Humidity	50%
Pressure Range	101kPa

1.6. Test Voltage

Power Supply Voltage Fluctuation Test

Voltage Fluctuation Test	Normal Voltage	High Voltage +10% of Normal Voltage	Low Voltage -10% of Normal Voltage
DC 3.7V	DC 3.7V	DC 4.07V	DC 3.33V
Output To RF Module	DC 3.30V	DC 3.30V	DC 3.30V
Voltage Variation (%)	--	0.00%	0.00%

Note: Voltage Variation (%)=(Output high or Low Voltage - Output Normal Voltage)/ Output Normal Voltage* 100

For extreme voltage test, we have tested the relationship between the external power supply and RF IC power supply. Base on the test results, only the normal voltage was selected to perform all items.

1.7. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due Date
1	Spectrum Analyzer	Rohde & Schwarz	FSV40-N	102150	2025-04-25	2026-04-24
2	MXA Spectrum Analysis	KEYSIGHT	N9020A	MY50531823	2025-09-05	2026-09-04
3	MXG RF Vector Signal Generator	Agilent	N5182A	MY47420647	2025-01-14	2026-01-13
Note: The above test equipment is calibrated by Guangzhou LiSai Metrology & Test Co.,Ltd. Calibration method reference Article 24-2, Paragraph 4 of the Radio Act. (method c)						
4	Constant Temperature Humidity Chamber	ZHONGJIAN	ZJ-KHWS80B	N/A	2025-10-10	2026-10-09
Note: The test equipment is calibrated by GUANGZHOU NEM METROLOGY&TEST TECHNOLOGY CO.,LTD Calibration method reference Article 24-2, Paragraph 4 of the Radio Act. (method c)						
5	DC Power Supply	IVYTECH	IV3605	1804D360510	2025-09-05	2026-09-04
Note: The test equipment is calibrated by Centre Testing International Group Co., Ltd. (CTI) Calibration method reference Article 24-2, Paragraph 4 of the Radio Act. (method c)						
6	Oscilloscope	Tektronix	MDO3012	C020298	2025-09-30	2026-09-29
Note: The test equipment is calibrated by Ti Testing & Certification Group Co., Ltd. Shenzhen Branch Calibration method reference Article 24-2, Paragraph 4 of the Radio Act. (method c)						
Remark: (a) Callbration conducted by the National institute of infommation and Communications Technology (NiCT)in Japan (hereinafter referred to as "NICT") or a designated calbration agency under Article 102-18paragraph (1) in JRL. (b) Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Act(Act No. 51 of 1992). (c) Calilbration conducted in countries except Japan, which shall be equivalent to the calibration conductedby the NiCT or a designated calibration agency under Article 102-18 paragraph (1). (d) Calibration, etc, conducted by using measuring instruments and other equipment listed in the rightcolumn of appended table No. 3, which shall have been given any type of calbration, etc. listed abovefrom (a)1o (c) From JRL Article 24 .2, paragraph 4, Item 2						

1.8. Description of Test Facility

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

FCC-Registration No.: 279531

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. 279531.

Test Location

Shenzhen Anbotek Compliance Laboratory Limited.

Sogood Industrial Zone Laboratory & 1/F. of Building D, Sogood Science and Technology Park, Sanwei Community, Hangcheng Subdistrict, Bao'an District, Shenzhen, Guangdong, China.

1.9. Disclaimer

1. The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
2. The test report is invalid if there is any evidence and/or falsification.
3. The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
4. This document may not be altered or revised in any way unless done so by Anbotek and all revisions are duly noted in the revisions section.
5. Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
6. The authenticity of the information provided by the customer is the responsibility of the customer and the laboratory is not responsible for its authenticity.
7. The data in this report will be synchronized with the corresponding national market supervision and management departments and cross-border e-commerce platforms as required by regulatory agencies.

The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.

1.10. Measurement Uncertainty

Parameter	Uncertainty
Occupied Bandwidth	925Hz
Conducted Output Power	0.76dB
Conducted Spurious Emission	1.24dB
Frequency tolerance	74.60Hz
Dwell Time	2%
The measurement uncertainty and decision risk evaluated according to AB/WI-RF-F-032. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

2. Summary of Test Results

Test Standard	Description of Test	Result
MIC Notice No.88 Appendix No.43 Article 2 Paragraph 1 Item 19	Frequency Tolerance	Complies
	Antenna power	Complies
	EIRP	Complies
	Antenna Power Tolerance	Complies
	Occupied Bandwidth	Complies
	Spread Bandwidth	Just for report
	Spurious Emissions	Complies
	Interference prevention function	Complies
	Secondary Radiated Emissions	Complies
	Dwell Time	Complies
	Transmission Radiated Angle Width (3dB Beam Bandwidth)	N/A*
	Antenna Absolute Gain	Complies

Note:

(1) N/A is an abbreviation for Not Applicable.

(2) This device have more than 1 subcarrier in 1MHz, compliance with the requirement.

**: Application to EIRP more than 6.91dBm/MHz.*

3. Frequency Tolerance Test

3.1. Test Limit

Test Limit	±50 ppm

3.2. Test Setup

3.3. Test Procedure

Test Frequency= test channel
RBW=VBW=10kHz
Span=500kHz
Sweep time=Auto
Detector mode=Positive peak
Indication mode=Max hold

3.4. Test Data

PASS

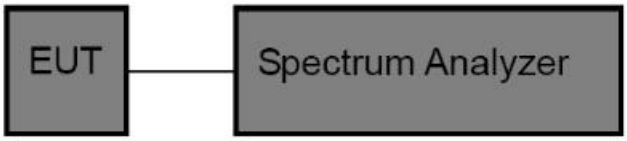
Please Refer to Appendix for Details.

4. Antenna Power Test

4.1. Test Limit

No.	Modulation Method	Frequency Range	Antenna Power	E.I.R.P
1.	FHSS(Compound method with DSSS or OFDM) (OBW within 83.5MHz)	2427-2470.75 MHz	3mW/MHz or less	6.91-16.91dBm/MHz
		2400-2483.5 MHz (except 2427-2470.75MHz)	10mW/MHz or less	12.14-22.14dBm/MHz
2.	DSSS (OBW within 26MHz)	2400 - 2483.5 MHz	10mW/MHz or less	12.14-22.14dBm/MHz
3.	OFDM (OBW within 26MHz)		10mW/MHz or less	12.14- - 22.14dBm/MHz
4.	OFDM (OBW 26-40MHz)		5mW/MHz or less	9.13-19.13dBm/MHz
5.	Other Digital methods (OBW within 26MHz)		10mW or less	12.14-22.14dBm
6.	Tolerance	+20%		

4.2. Test Setup



4.3. Test Configuration

1. Search Frequency of Peak Power
   Test Frequency: test channel,
   RBW=VBW=1MHz, Span=2400-2483.5MHz, Sweep time=Auto, Detector mode =Positive peak
2. Antenna power= Total power / Spread bandwidth

4.4. Test Data

Pass

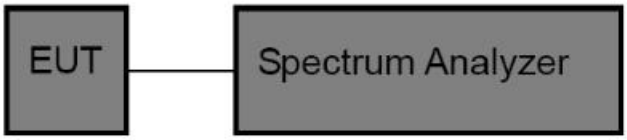
Please Refer to Appendix for Details.

5. Occupied Bandwidth (99%) Test

5.1. Test Limit

Modulation type	Limit
FH:	83.5MHz or less
FH + DS:	83.5MHz or less
FH + OFDM:	83.5MHz or less
OFDM:	With 20M Bandwidth: 26MHz or less With 40M Bandwidth: 26-40MHz
Others:	26MHz or less

5.2. Test Setup



5.3. Test Procedure

Non-hopping:

Test Frequency= test channel
RBW=VBW=1MHz
Span=5MHz
Sweep time=Auto
Detector mode=Positive peak
Indication mode=Max hold

Hopping:

Test Frequency=test channel
RBW=VBW=1MHz
Span=200MHz
Sweep time=Auto
Detector mode=Positive peak
Indication mode=Max hold

5.4. Test Data

PASS

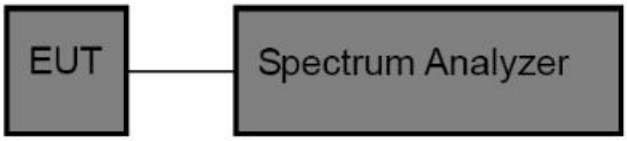
Please Refer to Appendix for Details.

6. Spread-Spectrum Bandwidth (90%) Test

6.1. Test Limit

Test Limit	N/A

6.2. Test Setup



6.3. Test Procedure

Test Frequency= test channel
RBW=VBW=1MHz
Span=200MHz
Sweep time=Auto
Detector mode=Positive peak
Indication mode=Max hold

6.4. Test Data

Pass

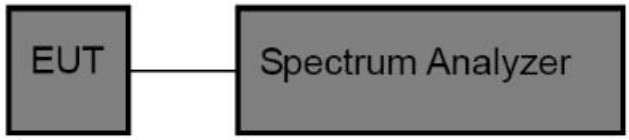
Please Refer to Appendix for Details.

7. Spurious Emissions Intensity Test

7.1. Test Limit

Frequency Range	Test Limit
≤2387MHz	≤2.5μW/MHz (-26dBm/MHz)
2387MHz to 2400MHz	≤25μW/MHz (-16dBm/MHz)
2483.5MHz to 2496.5MHz	≤25μW/MHz (-16dBm/MHz)
≥2496.5MHz	≤2.5μW/MHz (-26dBm/MHz)

7.2. Test Setup



7.3. Test Procedure

Test Frequency: test channel,
RBW=VBW=1MHz, Sweep time=Auto, Detector mode=Positive peak

7.4. Test Data

Pass

Please Refer to Appendix for Details.

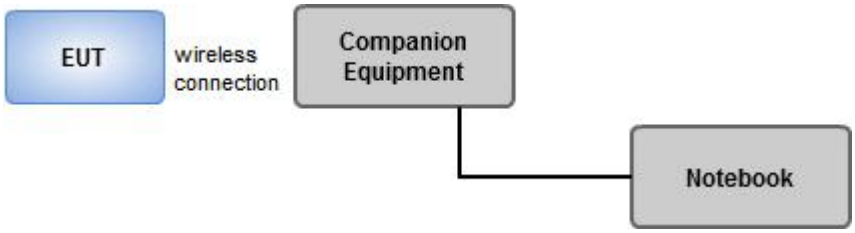
Note: SA set to from 2.4965GHz to 13GHz, plot shows from 2.497GHz to 13GHz as of SA's default format.

8. Interference Prevention Function

8.1. Test Limit

Test Limit	The identification code shall be 48 bits long

8.2. Test Setup



8.3. Test Configuration

1. Set EUT under operating mode and link up with companion equipment
2. Check communication status between EUT and companion equipment is normal
3. Record the max. reading.
4. Confirm the MAC address of EUT

8.4. Test Data

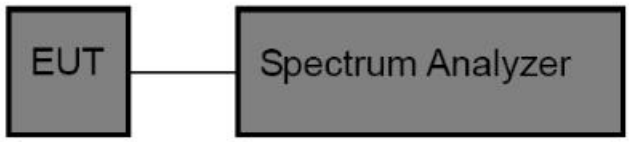
Test Mode	ID Code	Test Results
BDR+EDR	D7:8A:DC:2E:CB:D2	Complies

9. Secondary Radiated Emissions Test

9.1. Test Limit

Frequency Range	Test Limit
30~ 1000MHz	≤4.0nW (-54dBm)
1000~ 12500MHz	≤20nW (-47dBm)

9.2. Test Setup



9.3. Test Configuration

Test Frequency: test channel,
Below 1GHz, RBW=VBW=100kHz;
Above 1GHz, RBW=VBW=1MHz,
Sweep time=Auto, Detector mode=Positive peak

Adjust the spectrum analyzer configuration during final testing:Set the spectrum analyzer at the secondary launch measurement as follows.Center frequency secondary firing frequency Sweep frequency width span = 0Hz. If the resolution bandwidth is less than 1 GHz, it is 100 kHz and 1 MHz for 1 GHz or more Same as video bandwidth resolution bandwidth Minimum time guaranteed sweep time measurement accuracy Sweep mode single sweep Detection mode samples or RMS
Any emissions identified during the sweeps exceeds 1/10 of applicable limit, shall be individually measured using RMS detector and compared to the limits

9.4. Test Data

Pass

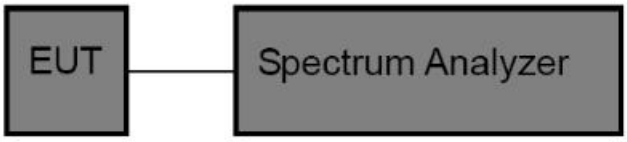
Please Refer to Appendix for Details.

10. Dwell Time Measurement

10.1. Test Limit

Test Limit	0.4 second or less

10.2. Test Setup



10.3. Test Configuration

Test Frequency: test channel,

RBW=1MHz, VBW=3MHz, Span=0MHz, Detector mode=Positive peak

Total Dwell Time = On time Burst x On time Burst number in 31.6s

31.6=(0.4 x Number of hopping channels) [Notes]

a. Numerical Coefficient (0.4) is a dimensionless number defined in the technical standard

10.4. Test Data

Pass

Please Refer to Appendix for Details.

APPENDIX I -- TEST SETUP PHOTOGRAPH

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

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 ----------