

FCC Test Report

Report No.: AGC10423170803FE06

FCC ID : 2ADSH-UMV3BTZU
APPLICATION PURPOSE : Original Equipment
PRODUCT DESIGNATION : Universal Module V3
BRAND NAME : Danalock
MODEL NAME : UMV3-BTZU
CLIENT : Poly-Control ApS
DATE OF ISSUE : Jan. 19, 2018
STANDARD(S) : FCC Part 15.247
TEST PROCEDURE(S)
REPORT VERSION : V1.0

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	/	Jan. 19, 2018	Valid	Initial Release

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TABLE OF CONTENTS

1. VERIFICATION OF CONFORMITY	4
2. GENERAL INFORMATION	5
2.1. PRODUCT DESCRIPTION	5
2.2. TABLE OF CARRIER FREQUENCIES	5
2.3. RELATED SUBMITTAL(S) / GRANT (S)	6
2.4. TEST METHODOLOGY	6
2.5. SPECIAL ACCESSORIES	6
2.6. EQUIPMENT MODIFICATIONS	6
3. MEASUREMENT UNCERTAINTY	7
4. DESCRIPTION OF TEST MODES	8
5. SYSTEM TEST CONFIGURATION	9
5.1. CONFIGURATION OF EUT SYSTEM	9
5.2. EQUIPMENT USED IN EUT SYSTEM	9
5.3. SUMMARY OF TEST RESULTS	9
6. TEST FACILITY	10
7. RADIATED EMISSION	11
7.1. MEASUREMENT PROCEDURE	11
7.2. TEST SETUP	12
7.3. LIMITS AND MEASUREMENT RESULT	13
7.4. TEST RESULT	13
8. BAND EDGE EMISSION	19
8.1. MEASUREMENT PROCEDURE	19
8.2. TEST SET-UP	19
8.3. TEST RESULT	20
APPENDIX A: PHOTOGRAPHS OF TEST SETUP	24
APPENDIX B: PHOTOGRAPHS OF EUT	25

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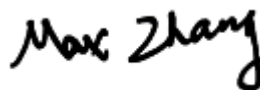
1. VERIFICATION OF CONFORMITY

Applicant	Poly-Control ApS
Address	Gammel Stillingvej 427C, DK-8462 Harlev J, Denmark
Manufacturer	Xiamen CMM CO., LTD.
Address	No.136 Xin Guang Road, Haicang District Xiamen city, Fujian Province, P.R. China
Product Designation	Universal Module V3
Brand Name	Danalock
Test Model	UMV3-BTZU
Date of test	Jan. 16, 2018 to Jan. 19, 2018
Deviation	None
Condition of Test Sample	Normal
Test Result	Pass
Report Template	AGCRT-US-BGN/RF

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) 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 15.247.

Tested by



Max Zhang(Zhang Yi)

Jan. 19, 2018

Reviewed by



Bart Xie(Xie Xiaobin)

Jan. 19, 2018

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2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

The EUT is designed as “Universal Module V3”. It is designed by way of utilizing the OQPSK technology to achieve the system operation.

A major technical description of EUT is described as following

Operation Frequency	2402-2480MHz
Modulation	GFSK(BLE)
Number of channels	40
Hardware Version	101-026_D1
Software Version	0.6.0
Antenna Designation	Fixed Antenna (Met 15.203 Antenna requirement)
Antenna Gain	3.1dBi
Power Supply	DC 12V

Note: The BLE module and Z-wave model can not transmit simultaneously.

2.2. TABLE OF CARRIER FREQUENCIES

Frequency Band	Channel Number	Frequency
2400~2483.5MHZ	1	2402 MHZ
	2	2404 MHZ
	3	2406 MHZ

	38	2476 MHZ
	39	2478 MHZ
	40	2480 MHZ

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2.3. RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for **FCC ID: 2ADSH-UMV3BTZU** filing to comply with the FCC PART 15.247 requirements.

2.4. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 (2013). Radiated testing was performed at an antenna to EUT distance 3 meters.

2.5. SPECIAL ACCESSORIES

Refer to section 5.2.

2.6. EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

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3. MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in measurement” (GUM) published by CISPR and ANSI.

- Uncertainty of Conducted Emission, $U_c = \pm 3.2$ dB
- Uncertainty of Radiated Emission below 1GHz, $U_c = \pm 3.9$ dB
- Uncertainty of Radiated Emission above 1GHz, $U_c = \pm 4.8$ dB

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4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Low channel TX(with active Z-wave)
2	Middle channel TX(with active Z-wave)
3	High channel TX(with active Z-wave)

Note:

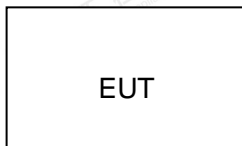
1. The EUT has been set to operate continuously on the lowest, middle and highest operation frequency Individually, and the eut is operating at its maximum duty cycle>or equal 98%
2. All modes under which configure applicable have been tested and the worst mode test data recording in the test report, if no other mode data.
3. For Radiated Emission, 3axis were chosen for testing for each applicable mode.

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5. SYSTEM TEST CONFIGURATION

5.1. CONFIGURATION OF EUT SYSTEM

Configure:



5.2. EQUIPMENT USED IN EUT SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	Universal Module V3	UMV3-BTZU	2ADSH-UMV3BTZU	EUT

5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.209	Radiated Emission	Compliant
§15.247	Band Edges	Compliant

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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
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
Active loop antenna (9K-30MHz)	A.H.	SAS-562B	N/A	Mar.01, 2016	Feb.28, 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

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7. RADIATED EMISSION

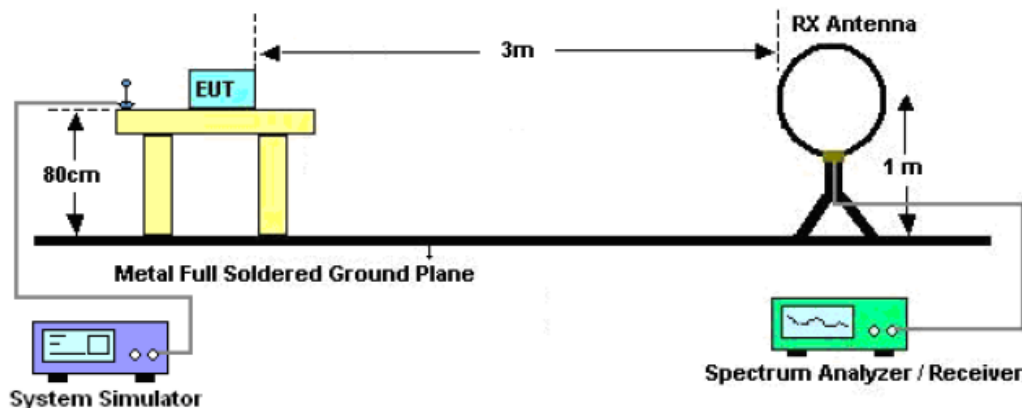
7.1. MEASUREMENT PROCEDURE

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 emissions, 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 VBW and 3MHz RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer. 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.
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.

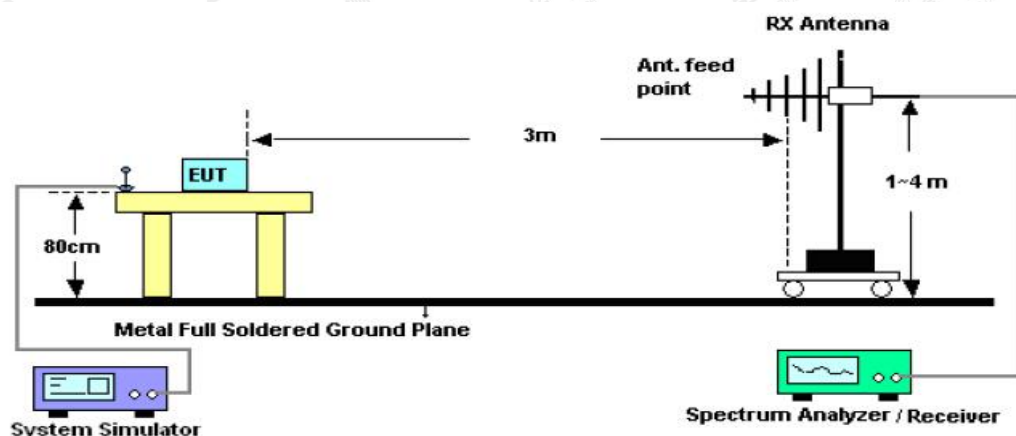
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7.2. TEST SETUP

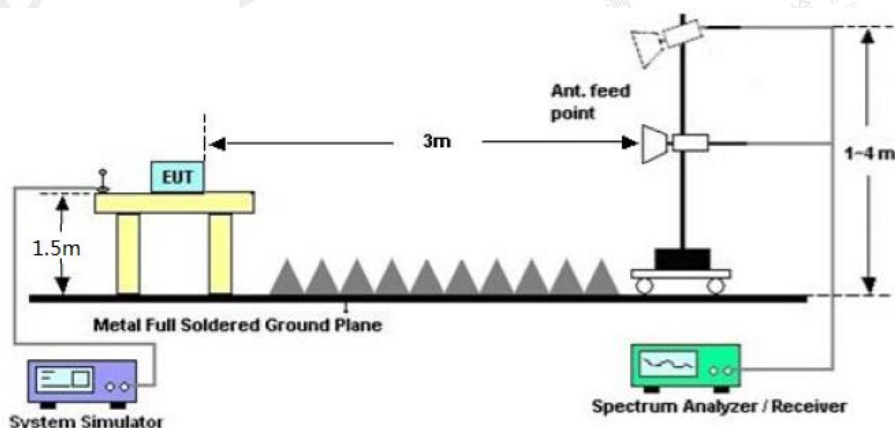
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



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7.3. LIMITS AND MEASUREMENT RESULT

FCC part 15.209 Limit in the below table has to be followed

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

7.4. TEST RESULT

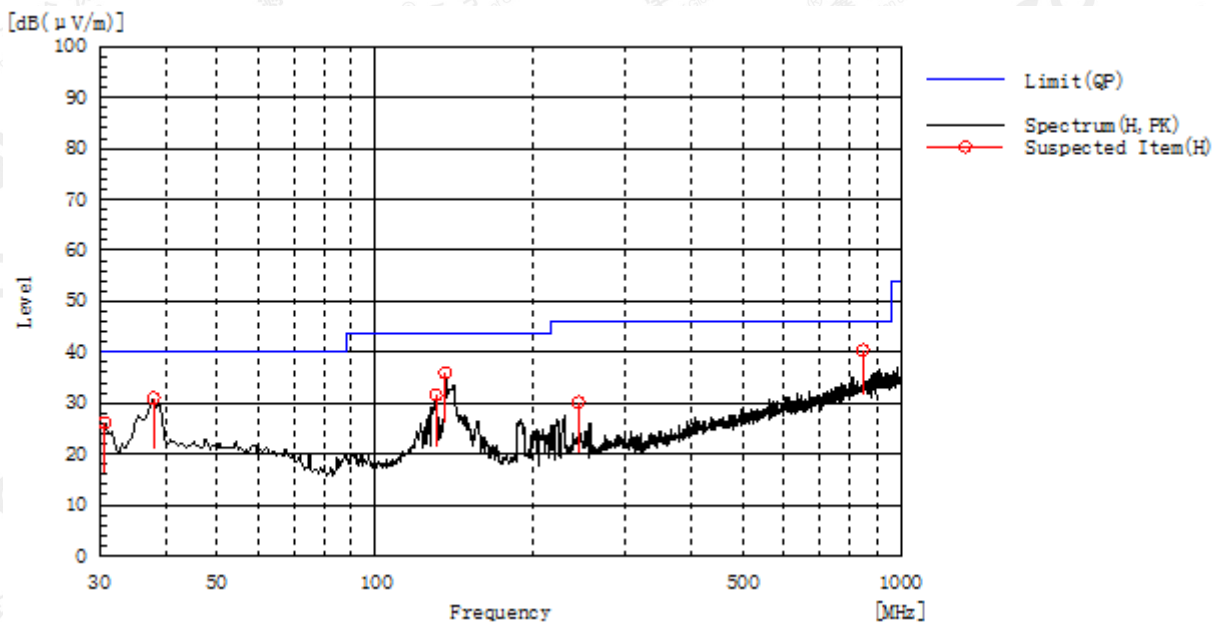
RADIATED EMISSION BELOW 30MHZ

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

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RADIATED EMISSION BELOW 1GHZ

EUT	UNIVERSAL MODULE V3	Model Name	UMV3-BTZU
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Horizontal

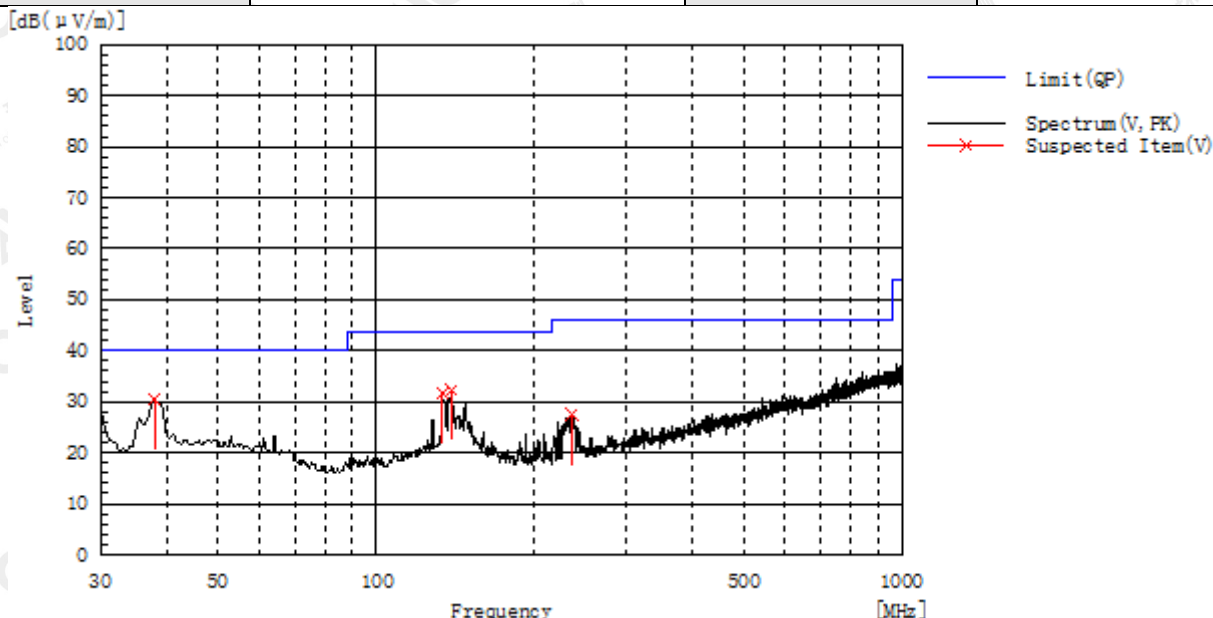


Frequency MHz	Polarization	Reading dB(uV)	Factor dB (1/m)	Level dB(uV/m) PK	Limit dB(uV/m) QP	Margin dB	Pass/Fail	Height cm	Angle deg
30.485	H	10.6	15.5	26.1	40.0	13.9	Pass	150.0	323.5
37.760	H	13.9	17.1	31.0	40.0	9.0	Pass	200.0	127.0
130.395	H	15.3	16.3	31.6	43.5	11.9	Pass	200.0	270.8
135.730	H	19.4	16.6	36.0	43.5	7.5	Pass	100.0	181.4
243.400	H	14.0	16.2	30.2	46.0	15.8	Pass	150.0	72.2
850.820	H	12.7	27.3	40.0	46.0	6.0	Fail	100.0	146.4

RESULT: PASS

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EUT	UNIVERSAL MODULE V3	Model Name	UMV3-BTZU
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	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
37.760	V	13.4	17.1	30.5	40.0	9.5	Pass	100.0	284.9
133.305	V	15.3	16.4	31.7	43.5	11.8	Pass	200.0	267.0
139.125	V	15.7	16.6	32.3	43.5	11.2	Pass	100.0	71.9
235.640	V	11.3	16.1	27.4	46.0	18.6	Pass	200.0	15.5

RESULT: PASS

Note:

1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.
2. The "Factor" value can be calculated automatically by software of measurement system.
3. All test modes had been pre-tested. The Mode 1 is the worst case and recorded in the report.

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RADIATED EMISSION ABOVE 1GHZ

EUT	UNIVERSAL MODULE V3	Model Name	UMV3-BTZU
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Horizontal

Frequency	Reading Level	Factor	Emission Level	Limit	Margin	Value type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
4802	42.22	7.12	49.34	74	24.66	Peak
4802	36.93	7.12	44.05	54	9.95	Average
7206	34.98	9.84	44.82	74	29.18	Peak
7206	30.28	9.84	40.12	54	13.88	Average

EUT	UNIVERSAL MODULE V3	Model Name	UMV3-BTZU
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical

Frequency	Reading Level	Factor	Emission Level	Limit	Margin	Value type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
4802	41.03	7.12	48.15	74	25.85	Peak
4802	35.72	7.12	42.84	54	11.16	Average
7206	34.6	9.84	44.44	74	29.56	Peak
7206	29.69	9.84	39.53	54	14.47	Average

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EUT	UNIVERSAL MODULE V3	Model Name	UMV3-BTZU
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 2	Antenna	Horizontal

Frequency	Reading Level	Factor	Emission Level	Limit	Margin	Value type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
4880	41.6	7.18	48.78	74	25.22	Peak
4880	35.94	7.18	43.12	54	10.88	Average
7320	34.71	9.86	44.57	74	29.43	Peak
7320	29.96	9.86	39.82	54	14.18	Average

EUT	UNIVERSAL MODULE V3	Model Name	UMV3-BTZU
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 2	Antenna	Vertical

Frequency	Reading Level	Factor	Emission Level	Limit	Margin	Value type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
4880	40.67	7.18	47.85	74	26.15	Peak
4880	35.49	7.18	42.67	54	11.33	Average
7320	34.29	9.86	44.15	74	29.85	Peak
7320	29.53	9.86	39.39	54	14.61	Average

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EUT	UNIVERSAL MODULE V3	Model Name	UMV3-BTZU
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Horizontal

Frequency	Reading Level	Factor	Emission Level	Limit	Margin	Value type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
4960	42.87	7.24	50.11	74	23.89	Peak
4960	36.3	7.24	43.54	54	10.46	Average
7440	38.63	9.92	48.55	74	25.45	Peak
7440	32.2	9.92	42.12	54	11.88	Average

EUT	UNIVERSAL MODULE V3	Model Name	UMV3-BTZU
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Vertical

Frequency	Reading Level	Factor	Emission Level	Limit	Margin	Value type
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	
4960	42.61	7.24	49.85	74	24.15	Peak
4960	35.9	7.24	43.14	54	10.86	Average
7440	38.26	9.92	48.18	74	25.82	Peak
7440	31.93	9.92	41.85	54	12.15	Average

RESULT: PASS

Note:

Other emissions from 1G to 25 GHz are considered as ambient noise. No recording in the test report.

Factor = Antenna Factor + Cable loss - Amplifier gain, Marin= Limit-Emission level.

The "Factor" value can be calculated automatically by software of measurement system.

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8. BAND EDGE EMISSION

8.1. MEASUREMENT PROCEDURE

Radiated restricted band edge measurements

The radiated restricted band edge measurements are measured with an EMI test receiver connected to the receive antenna while the EUT is transmitting

8.2. TEST SET-UP

same as 11.2

Note:

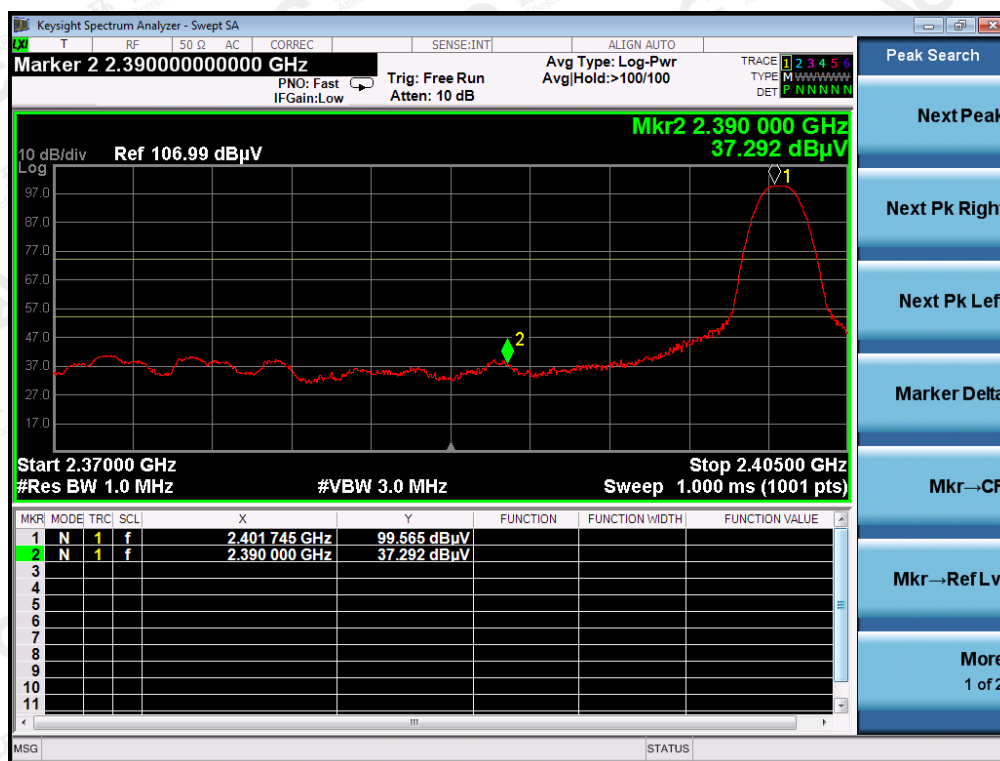
1. Factor=Antenna Factor + Cable loss - Amplifier gain. Field Strength=Factor + Reading level
2. The factor had been edited in the "Input Correction" of the Spectrum Analyzer. So the Amplitude of test plots is equal to Reading level plus the Factor in dB. Use the A dB(μV) to represent the Amplitude. Use the F dB(μV/m) to represent the Field Strength. So A=F.

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8.3. TEST RESULT

EUT	UNIVERSAL MODULE V3	Model Name	UMV3-BTZU
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Horizontal

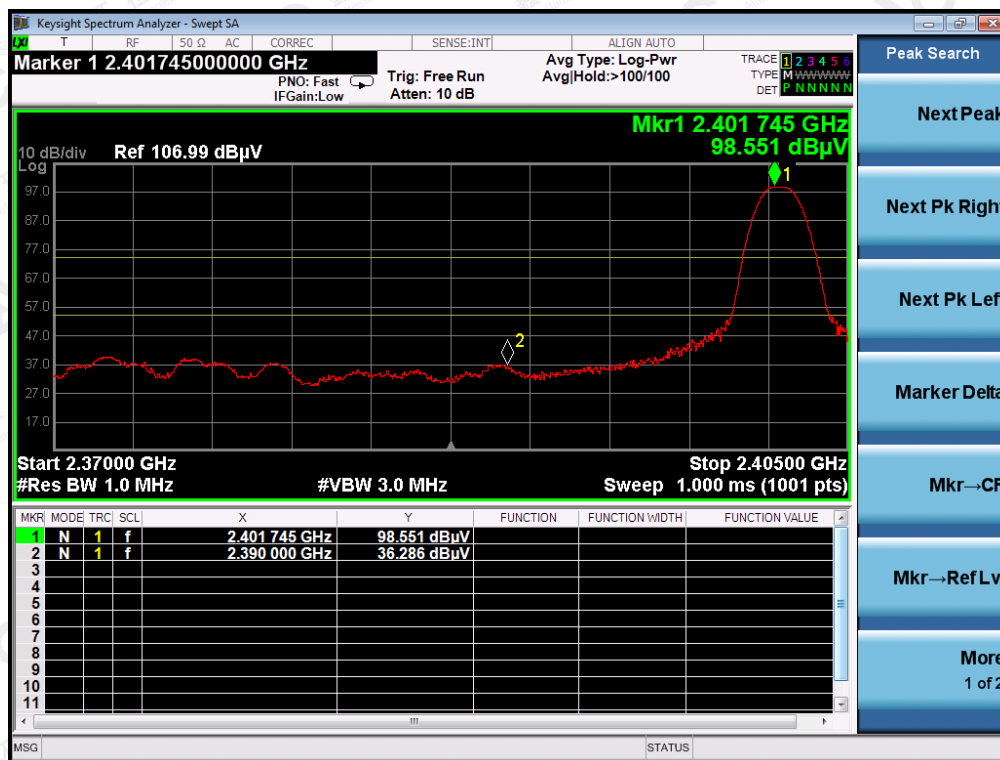
PK



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EUT	UNIVERSAL MODULE V3	Model Name	UMV3-BTZU
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical

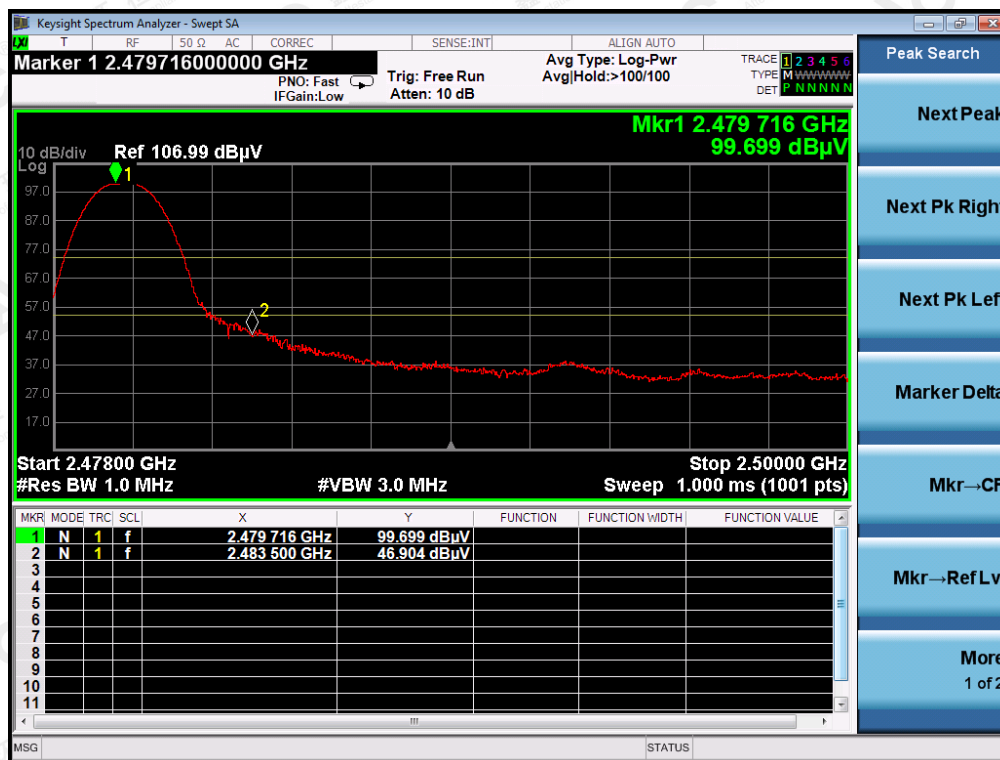
PK



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EUT	UNIVERSAL MODULE V3	Model Name	UMV3-BTZU
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Horizontal

PK



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EUT	UNIVERSAL MODULE V3	Model Name	UMV3-BTZU
Temperature	25°C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 3	Antenna	Vertical

PK

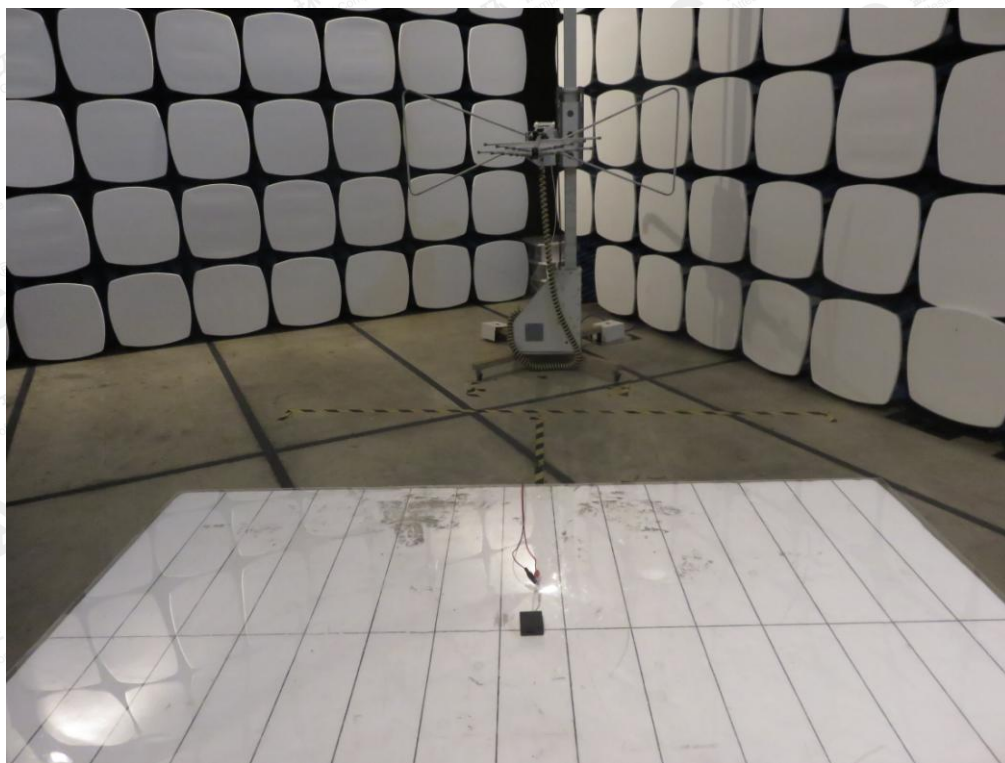


Note: The level of peak emission is less than the average limit, so the level of average emission need not to be tested.

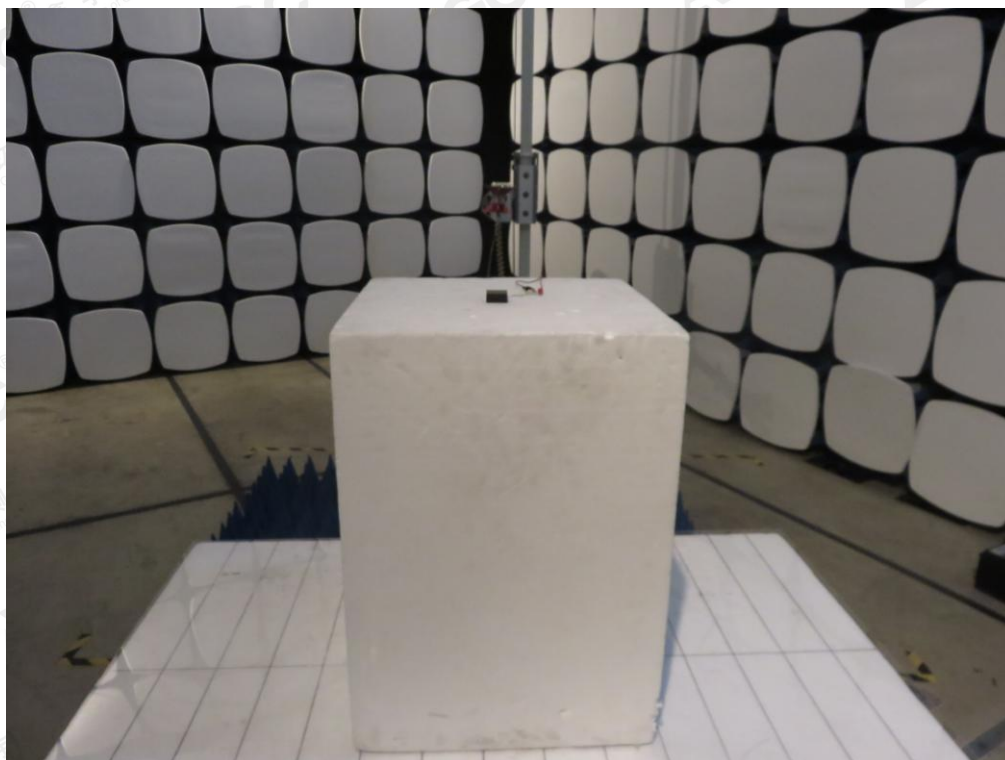
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APPENDIX A: PHOTOGRAPHS OF TEST SETUP

RADIATED EMISSION TEST SETUP BELOW 1GHZ



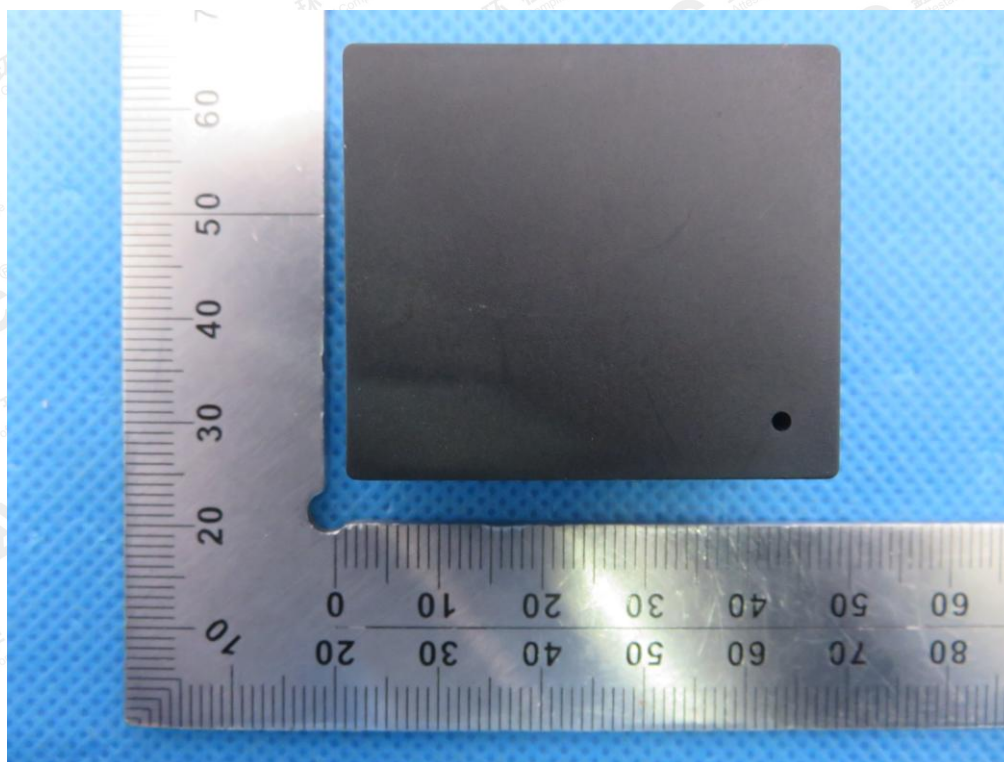
RADIATED EMISSION TEST SETUP ABOVE 1GHZ



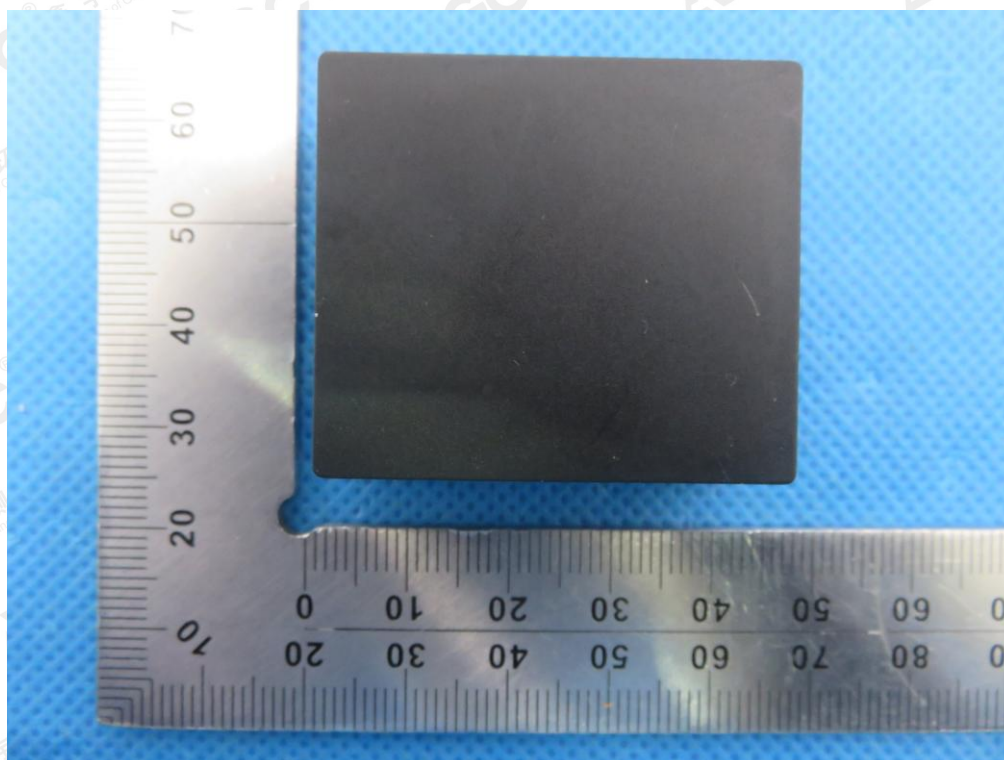
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APPENDIX B: PHOTOGRAPHS OF EUT

TOP VIEW OF EUT

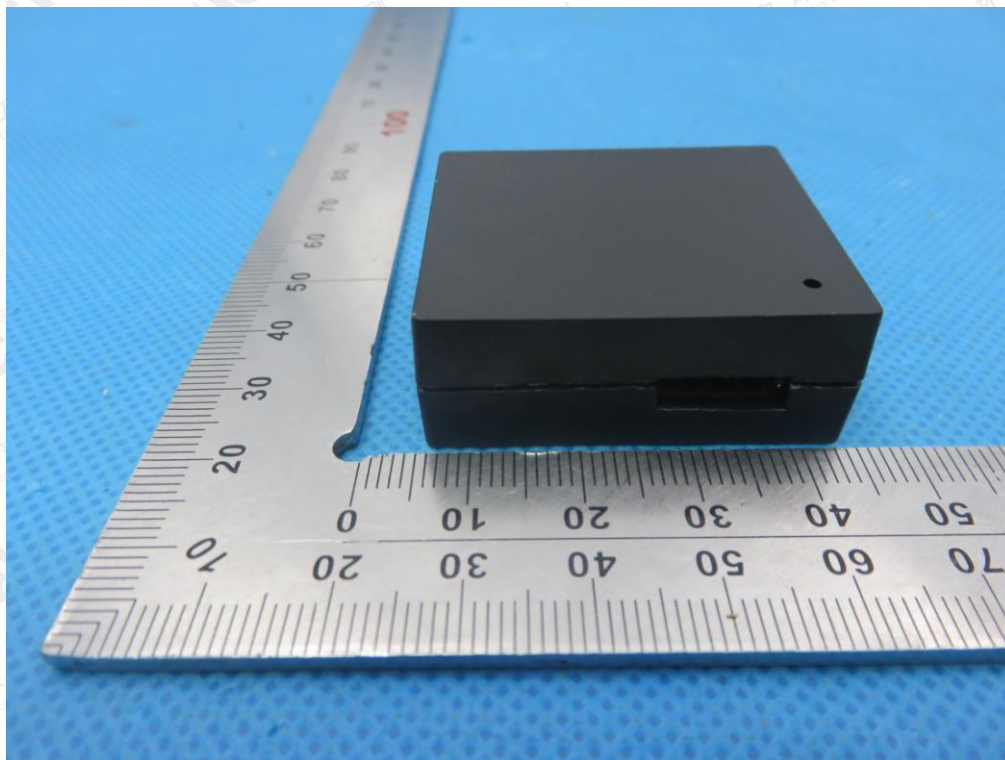


BOTTOM VIEW OF EUT

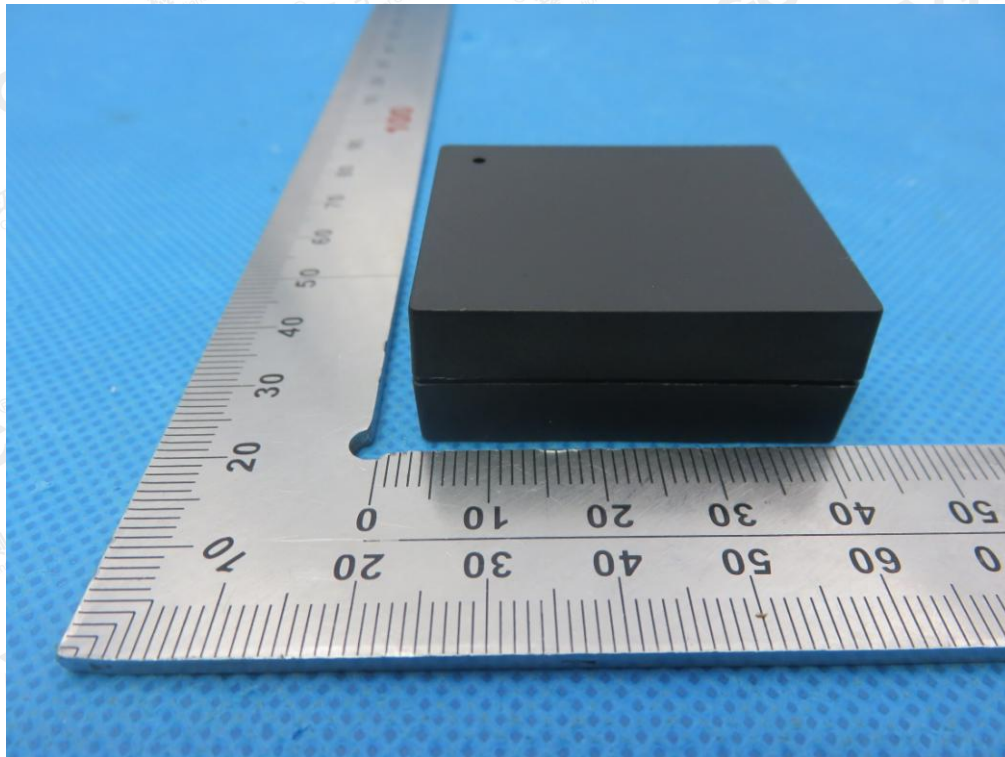


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FRONT VIEW OF EUT

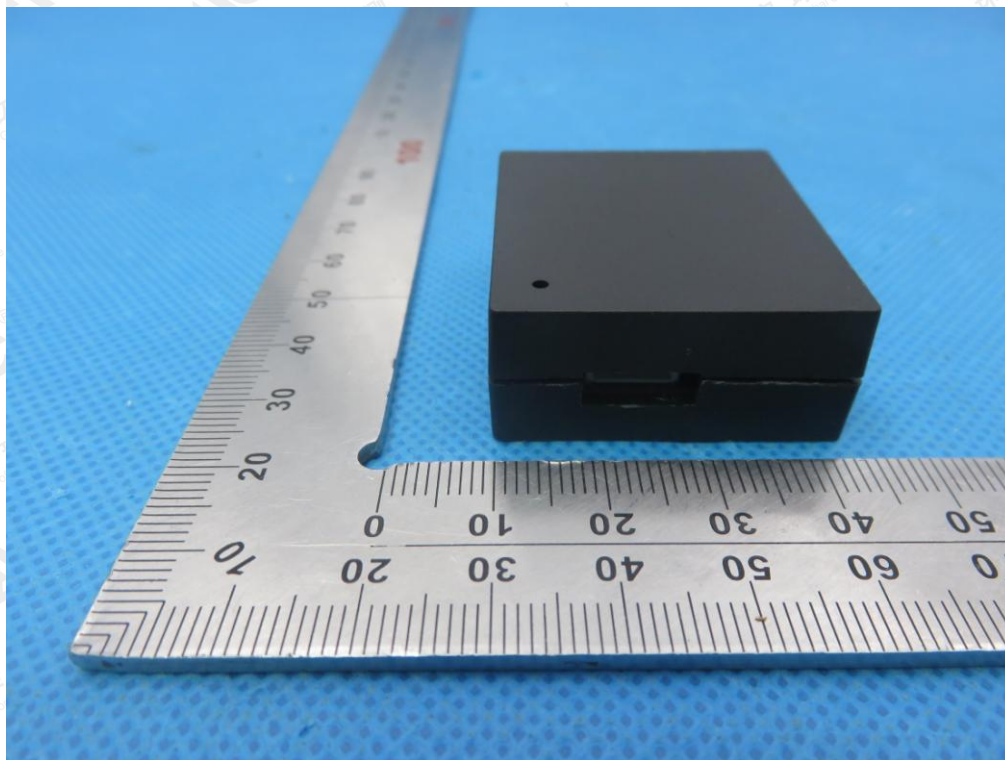


BACK VIEW OF EUT

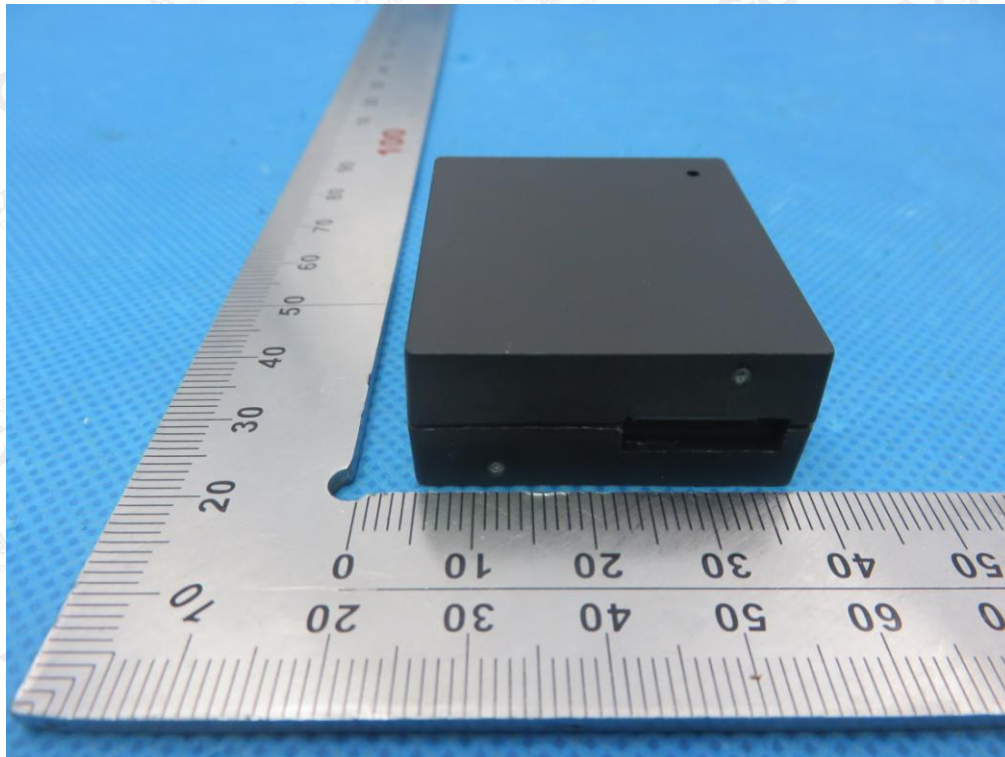


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LEFT VIEW OF EUT

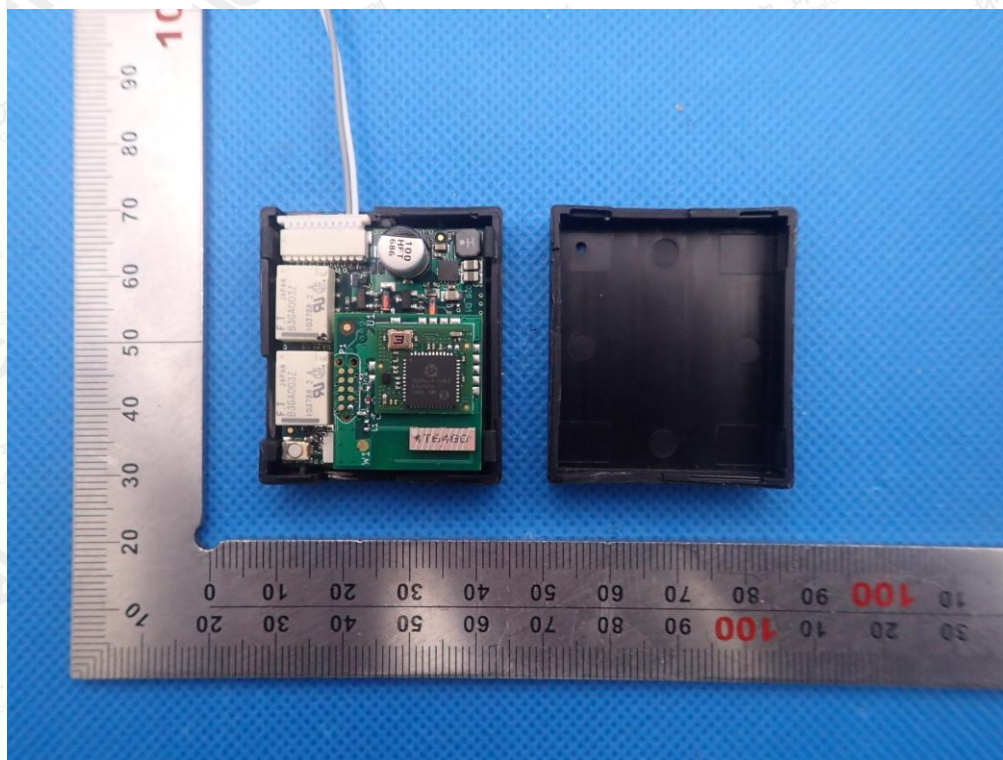


RIGHT VIEW OF EUT

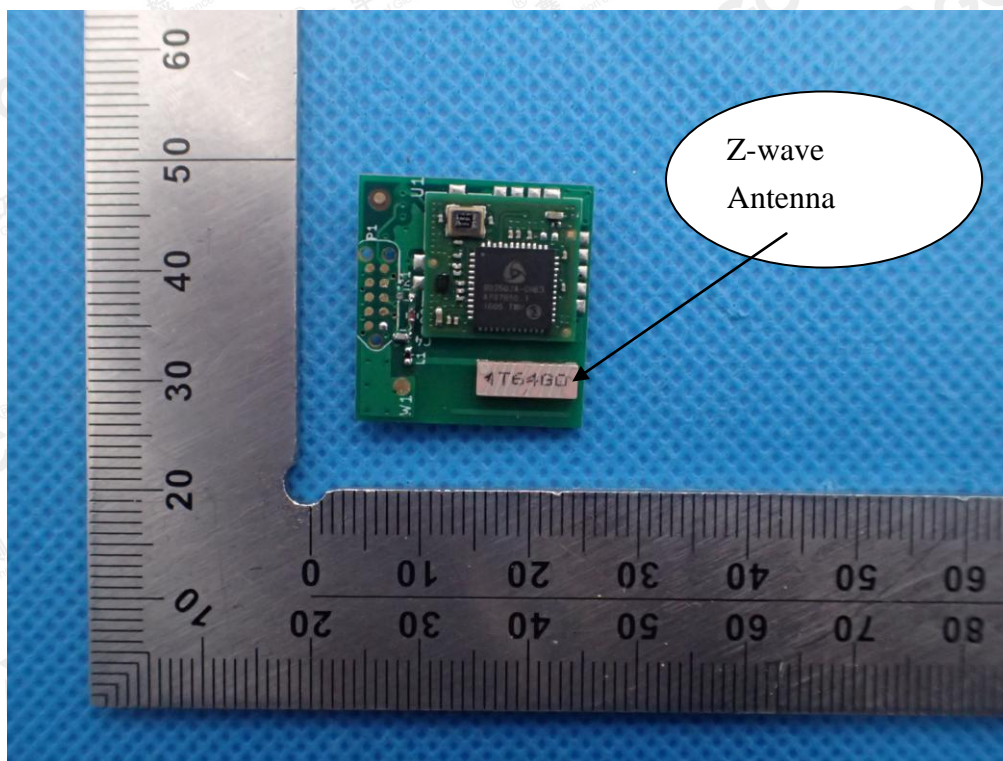


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OPEN VIEW OF EUT

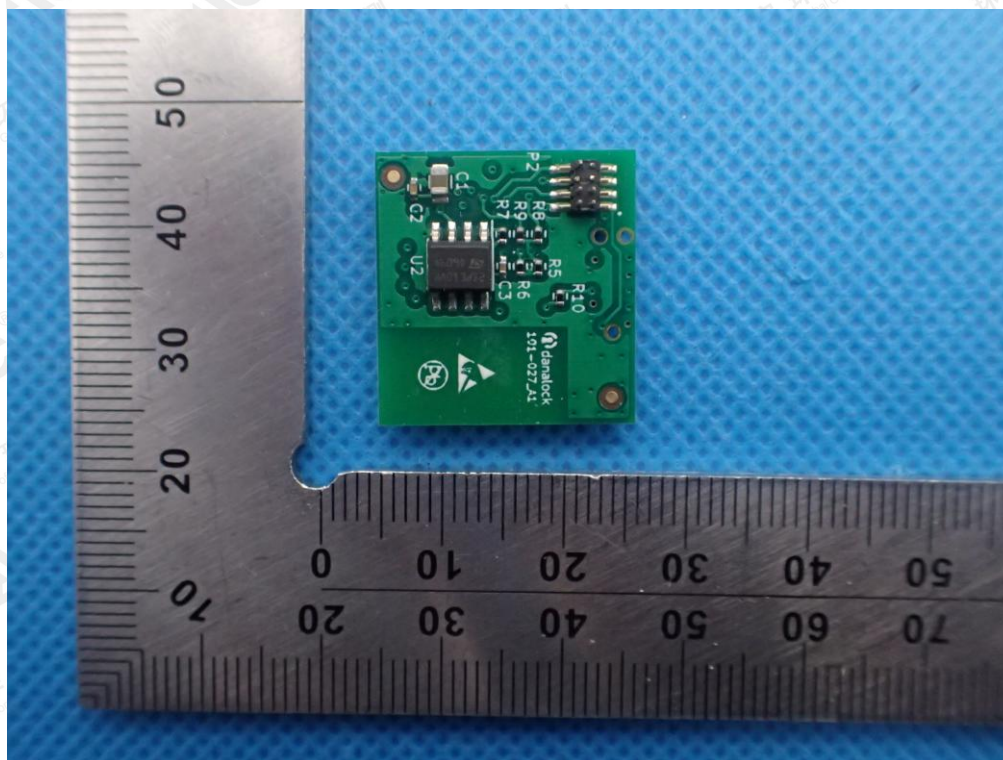


INTERNAL VIEW OF EUT-1

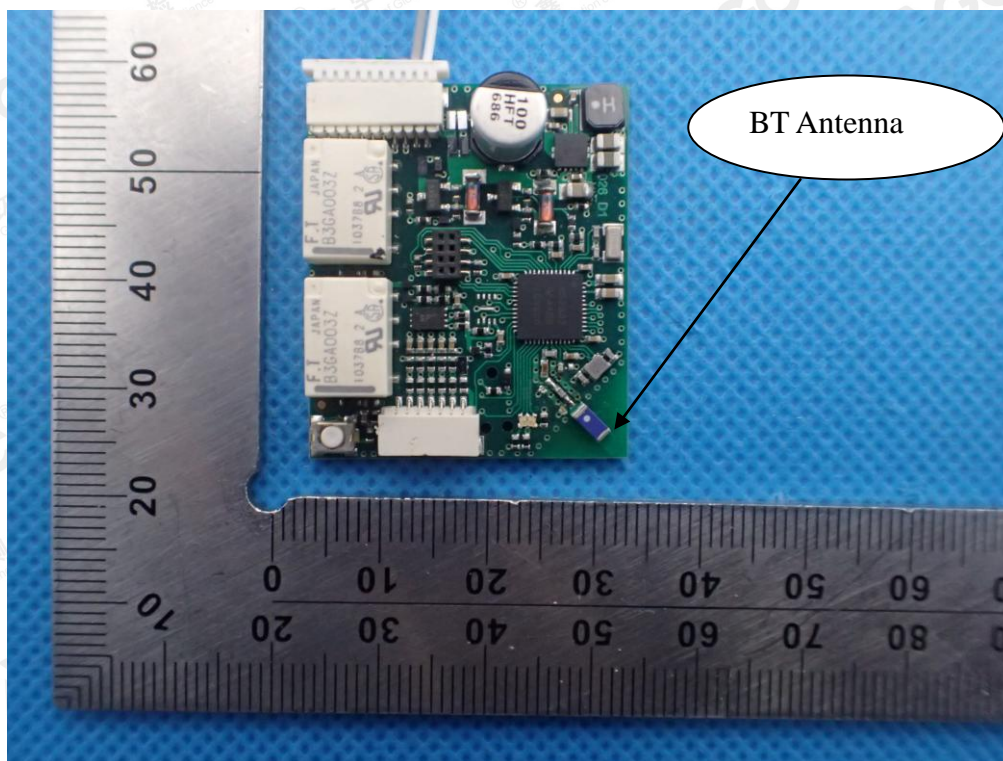


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INTERNAL VIEW OF EUT-2

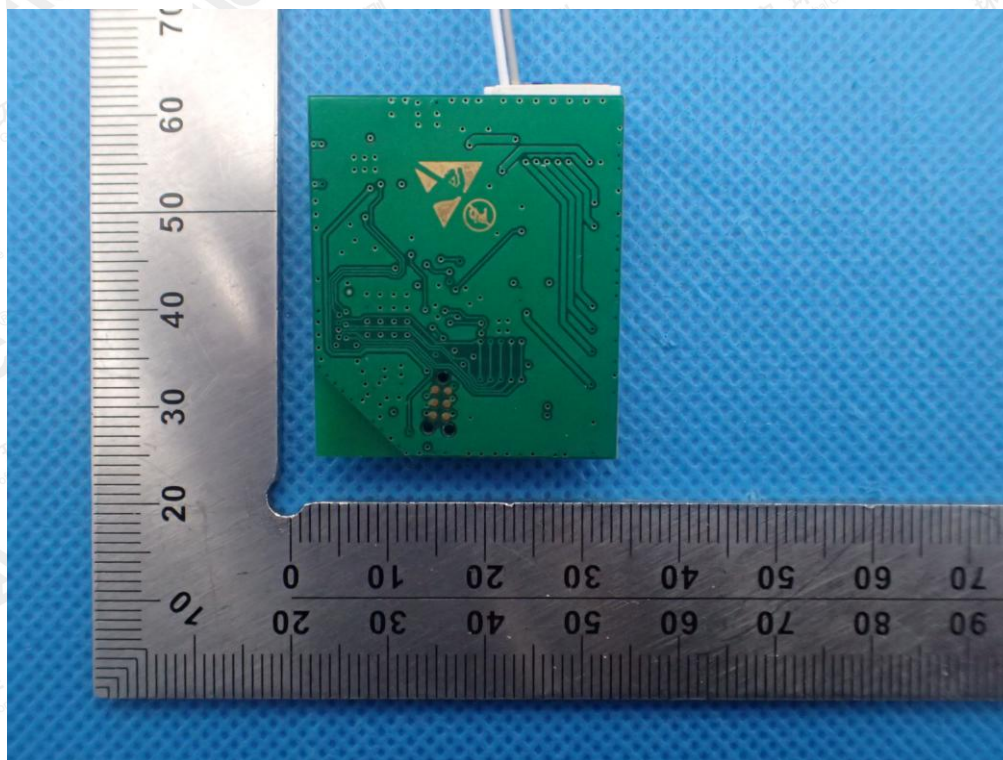


INTERNAL VIEW OF EUT-3



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INTERNAL VIEW OF EUT-4



----END OF REPORT----

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