

**ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
INTENTIONAL RADIATOR CERTIFICATION TO
FCC PART 15 SUBPART C REQUIREMENT**

OF

Fingerprint Lock

MODEL No.: DL30B, DL30DB

FCC ID: 2AJ9T-DL30

Trademark: N/A

REPORT NO: ES171027983W02

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VERIFICATION OF COMPLIANCE

Applicant:	ZKTECO CO., LTD. No.26, Pingshan 188 Industry zone, Tangxia Town, Dongguan City, Guangdong Province, China
Manufacturer:	ZKTECO CO., LTD. No.26, Pingshan 188 Industry zone, Tangxia Town, Dongguan City, Guangdong Province, China
Product Name:	Fingerprint Lock
Model Number:	DL30B, DL30DB
Serial Number:	N/A
File Number:	ES171027983W02

We hereby certify that:

The above equipment was tested by EMTEK(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 conducted and radiated emission limits of FCC Rules Part 15.207&15.209.

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

Date of Test : October 27, 2017 to November 27, 2017

Prepared by : 
Sevin Li/Editor

Reviewer : 
Joe Xia/Supervisor

Approved & Authorized Signer : 
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1. GENERAL INFORMATION

1.1 Product Description

Characteristics	Description
EUT Description	Fingerprint Lock
Model Number	DL30B, DL30DB (Note: These models are identical in circuitry and electrical, appearance, mechanical and physical construction; the differences is Lock tongue for trading purpose. We prepare DL30B for test.)
Device style	RFID
Modulation	ASK
Operating Frequency Range	125kHz
Number of Channels	1
Antenna Type	Coil Antenna
Antenna Gain	0dBi
Power supply	<input checked="" type="checkbox"/> DC 6V via 4*AA Batteries

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: 2AJ9T-DL30 filing to comply with Section 15.207&15.209 of the FCC Part 15 Subpart C Rules.

1.3 Test Methodology

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

1.4 Special Accessories

Not available for this EUT intended for grant.

1.5 Equipment Modifications

Not available for this EUT intended for grant.

1.6 Test Facility

Site Description
EMC Lab.

- : Accredited by CNAS, 2016.10.24
The certificate is valid until 2022.10.28
The Laboratory has been assessed and proved to be in compliance with CNAS-CL01: 2006(identical to ISO/IEC17025: 2005)
The Certificate Registration Number is L2291
- : Accredited by TUV Rheinland Shenzhen, 2010.5.25
The Laboratory has been assessed according to the requirements ISO/IEC 17025.
- : Accredited by FCC, August 03, 2017
Designation Number: CN1204
Test Firm Registration Number: 882943
- : Accredited by Industry Canada, November 24, 2015
The Certificate Registration Number is 4480A-2

2. System Test Configuration

2.1 EUT Configuration

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

2.2 EUT Exercise

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

2.3 Test Procedure

2.3.1 Radiated Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.10 (2013).

2.4 Limitation

(1) Radiated Emission

FCC Part 15, Subpart C Section 15.209 limit of radiated emission for frequency below 1000GHz. The emissions from an intentional radiator shall not exceed the field strength level specified in the following table:

FCC Part 15.209				
Frequency (MHz)	Field Strength Limitation		Field Strength Limitation Frequency tion at 3m Measurement Dist	
	(uV/m)	Dist	(uV/m)	(dBuV/m)
0.009 – 0.490	$2400 / F(\text{KHz})$	300m	$10000 * 2400/F(\text{KHz})$	$20\log 2400/F(\text{KHz}) + 80$
0.490 – 1.705	$24000 / F(\text{KHz})$	30m	$100 * 24000/F(\text{KHz})$	$20\log 24000/F(\text{KHz}) + 40$
1.705 – 30.00	30	30m	$100 * 30$	$20\log 30 + 40$
30.0 – 88.0	100	3m	100	$20\log 100$
88.0 – 216.0	150	3m	150	$20\log 150$
216.0 – 960.0	200	3m	200	$20\log 200$
Above 960.0	500	3m	500	$20\log 500$

15.205 Restricted bands of operation

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)

Remark: 1. Emission level in dBuV/m=20 log (uV/m)
 2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
 3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of § 15.205, and the emissions located in restricted bands also comply with 15.209 limit.

3. Summary of Test Results

FCC Rule	Description Of Test	Result
15.207	AC Power Conducted Emission	N/A _{Note}
15.209	Radiated Emission	Pass
Note: The EUT power supply is DC 6V via 4*AA batteries		

4. CONDUCTED EMISSION TEST

4.1 Applicable Standard

According to FCC Part 15.207(a)

4.2 Conformance Limit

Frequency(MHz)	Conducted Emission Limit	
	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.3 Test Configuration

Test according to clause 7.3 conducted emission test setup

4.4 Test Procedure

The EUT was placed on a table which is 0.8m above ground plane.

Maximum procedure was performed on the highest emissions to ensure EUT compliance.

Repeat above procedures until all frequency measured were complete.

4.5 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	Due. CAL
Test Receiver	Rohde & Schwarz	ESCS30	828985/018	May 20, 2017	May 19, 2018
L.I.S.N.	Schwarzbeck	NNLK8129	8129203	May 20, 2017	May 19, 2018
50Ω Coaxial Switch	Anritsu	MP59B	M20531	N/A	N/A

4.6 Test Result

N/A

The EUT power supply is DC 6V via 4*AA batteries, So this test item is not applicable.

5. Radiated Emission Test

5.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured was complete.

When spectrum scanned from 9KHz to 150KHz setting resolution bandwidth 200Hz and video bandwidth 1kHz.

EMI Test Receiver	Setting
Attenuation	Auto
RB	200Hz
VB	1kHz
Detector	QP
Trace	Max hold

When spectrum scanned from 150KHz to 30MHz setting resolution bandwidth 9 kHz and video bandwidth 30kHz.

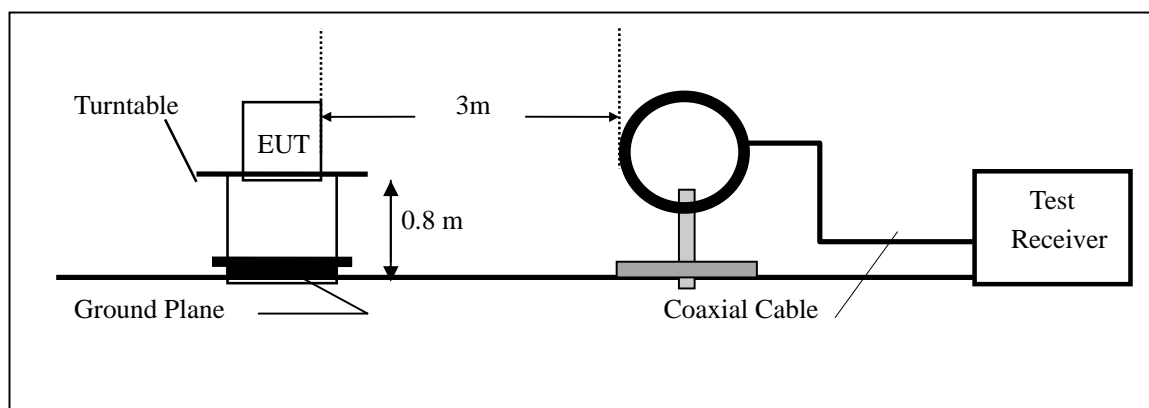
EMI Test Receiver	Setting
Attenuation	Auto
RB	9kHz
VB	30kHz
Detector	QP
Trace	Max hold

When spectrum scanned from 30 MHz to 1GHz setting resolution bandwidth 120 kHz and video bandwidth 300kHz.

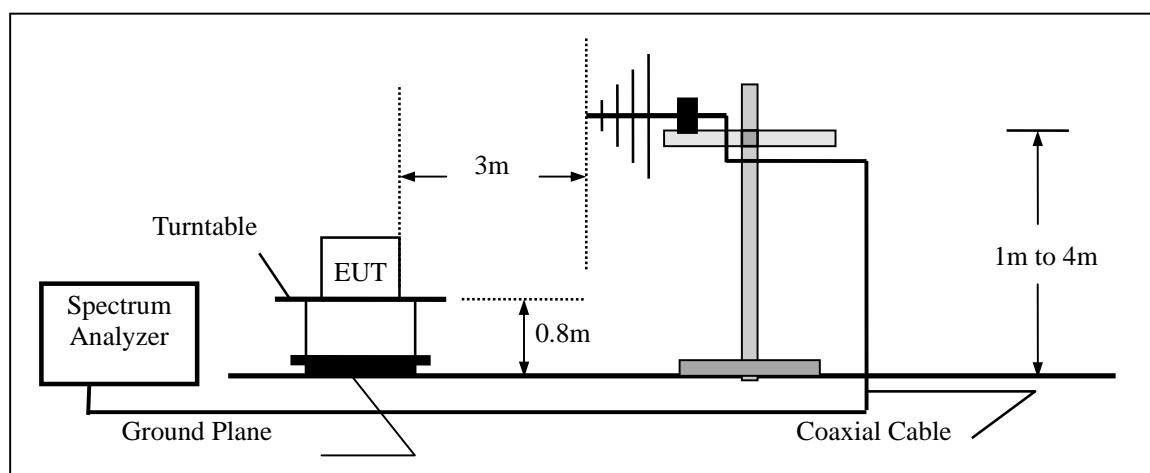
EMI Test Receiver	Setting
Attenuation	Auto
RB	120kHz
VB	300kHz
Detector	QP
Trace	Max hold

5.2 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



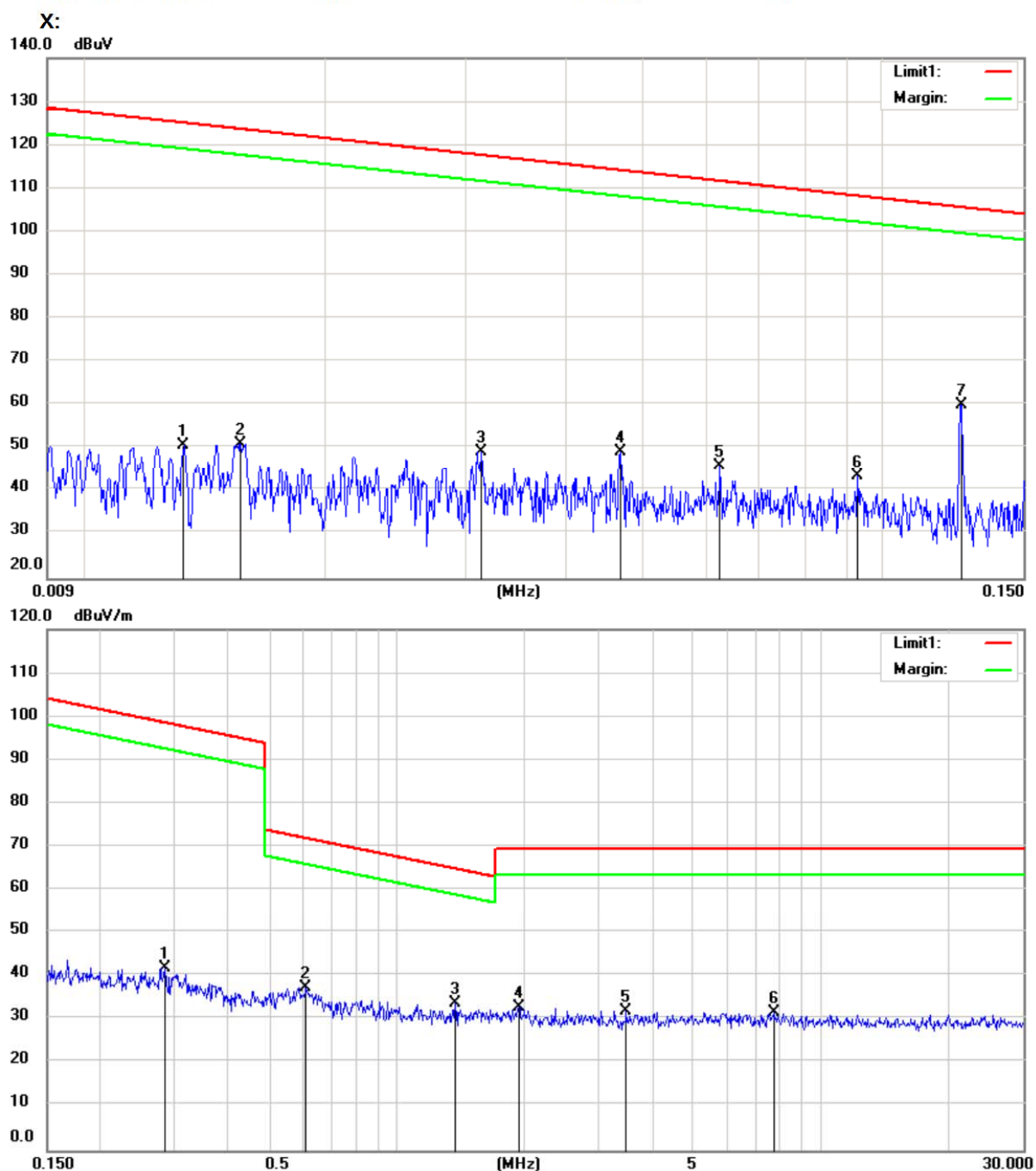
5.3 Measurement Equipment Used:

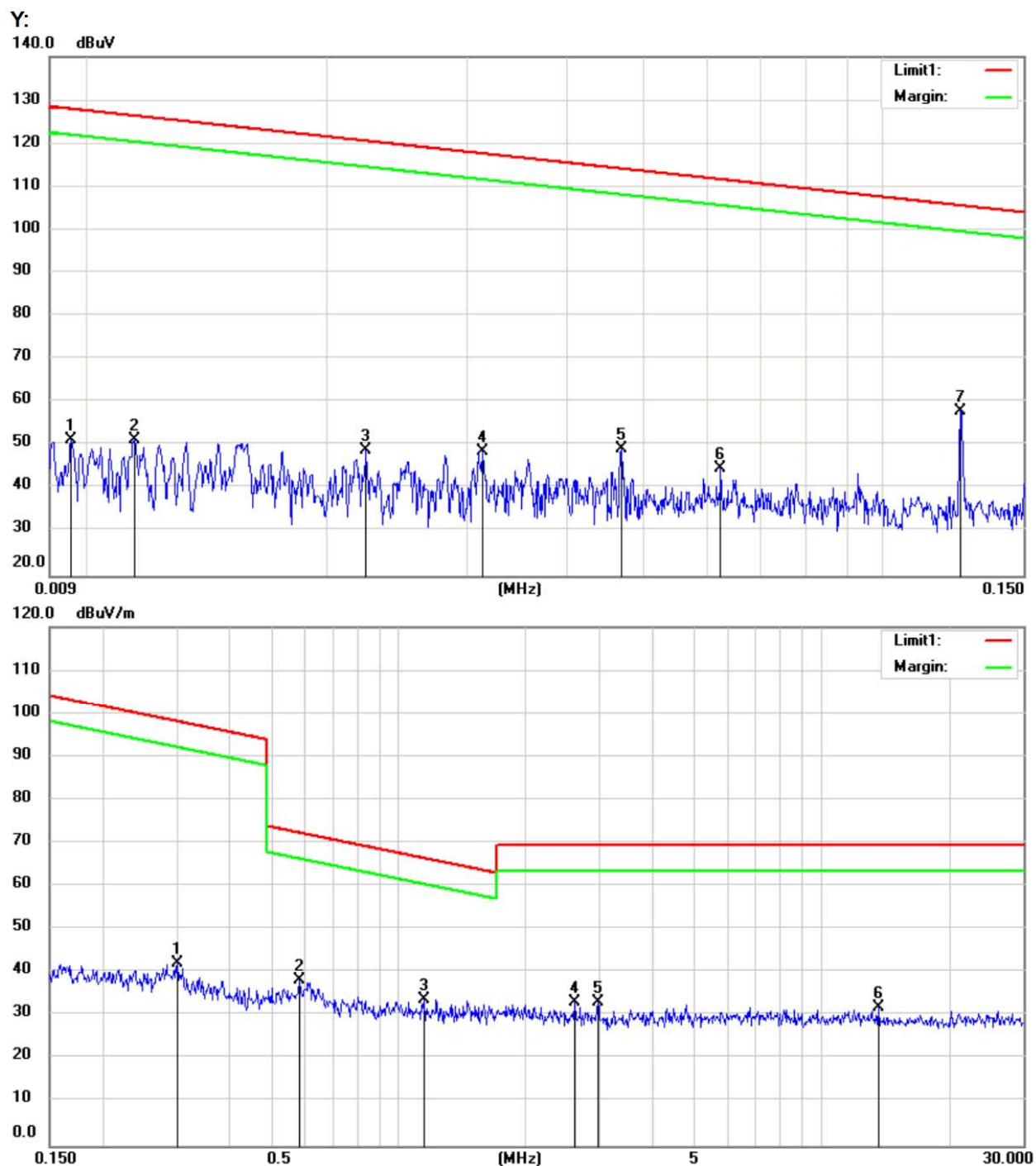
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	DUE CAL.
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	May 21, 2017	May 20, 2018
Pre-Amplifier	HP	8447F	2944A07999	May 20, 2017	May 19, 2018
Bilog Antenna	Schwarzbeck	VULB9163	142	May 20, 2017	May 19, 2018
Loop Antenna	ARA	PLA-1030/B	1029	May 20, 2017	May 19, 2018
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170399	May 21, 2017	May 20, 2018
Horn Antenna	Schwarzbeck	BBHA 9120	D143	May 20, 2017	May 19, 2018
Cable	Schwarzbeck	AK9513	ACRX1	May 21, 2017	May 20, 2018
Cable	Rosenberger	N/A	FP2RX2	May 21, 2017	May 20, 2018
Cable	Schwarzbeck	AK9513	CRPX1	May 21, 2017	May 20, 2018
Cable	Schwarzbeck	AK9513	CRRX2	May 21, 2017	May 20, 2018

5.4 Measurement Result

Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible Limit.

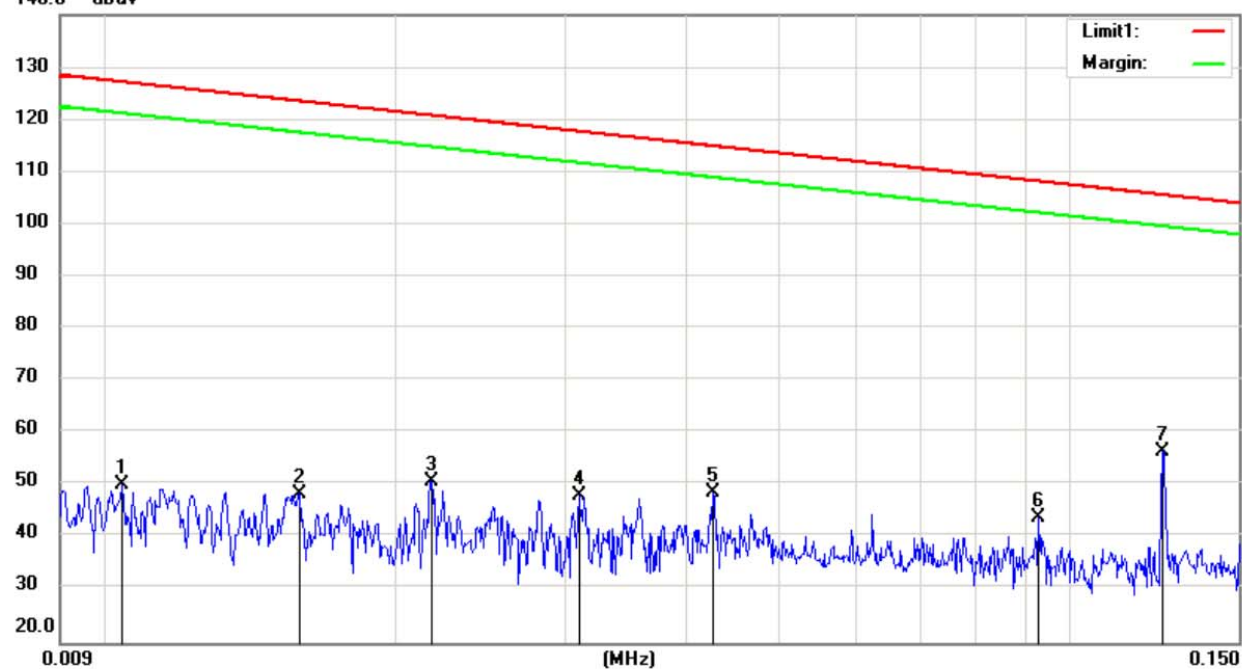
Operation Mode:	ON	Test Date :	November 12, 2017
Frequency Range:	9KHz~30MHz	Temperature :	24℃
Test Result:	PASS	Humidity :	53 %
Measured Distance:	3m	Test By:	KK



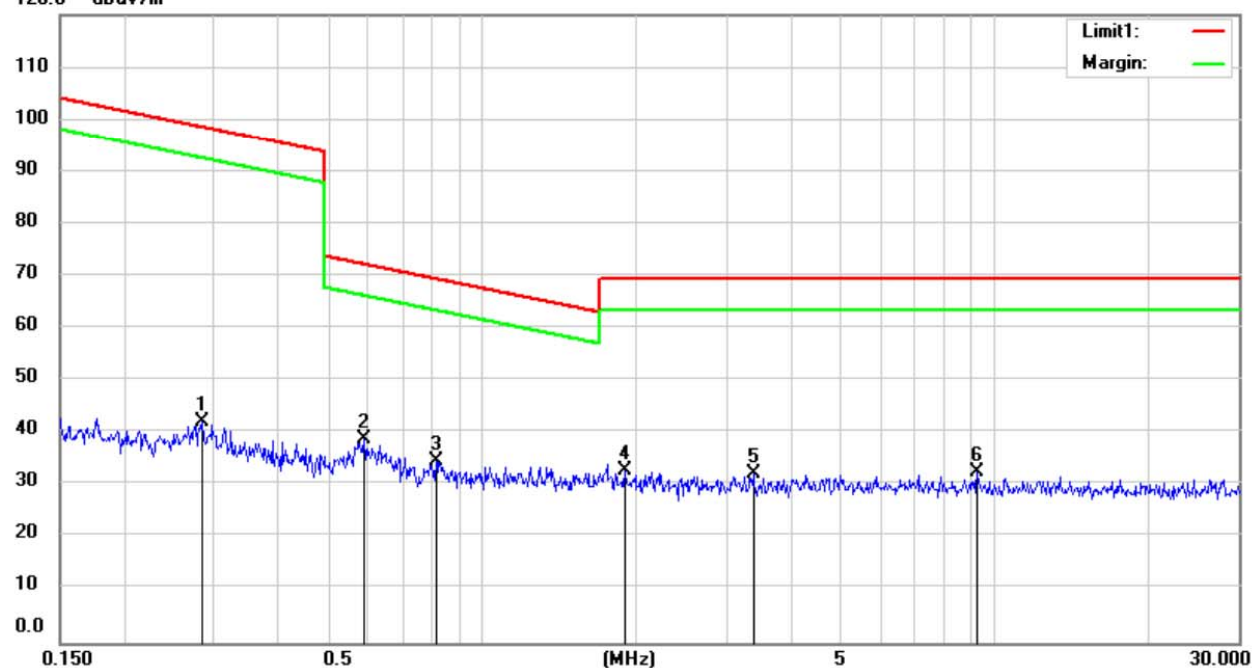


Z:

140.0 dBuV



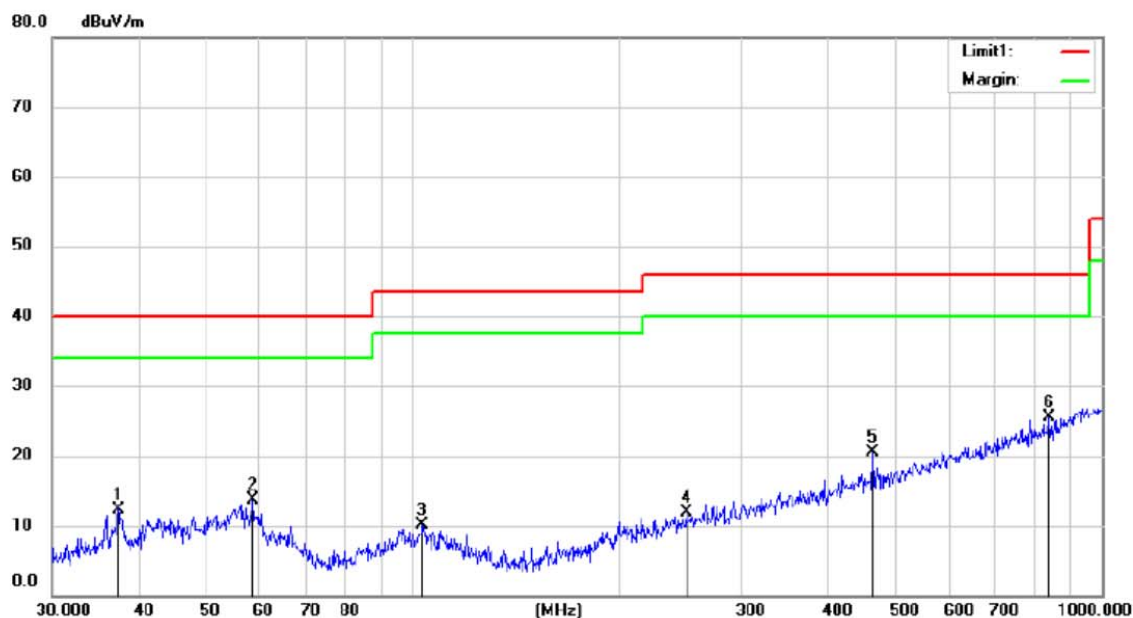
120.0 dBuV/m



Note: the Fundamental Emission is less than the spurious emission Limit, the bandage test is not need

Operation Mode: ON
 Frequency Range: 30~1000MHz
 Test Result: PASS
 Measured Distance: 3m

Test Date : November 12, 2017
 Temperature : 24°C
 Humidity : 53 %
 Test By: KK

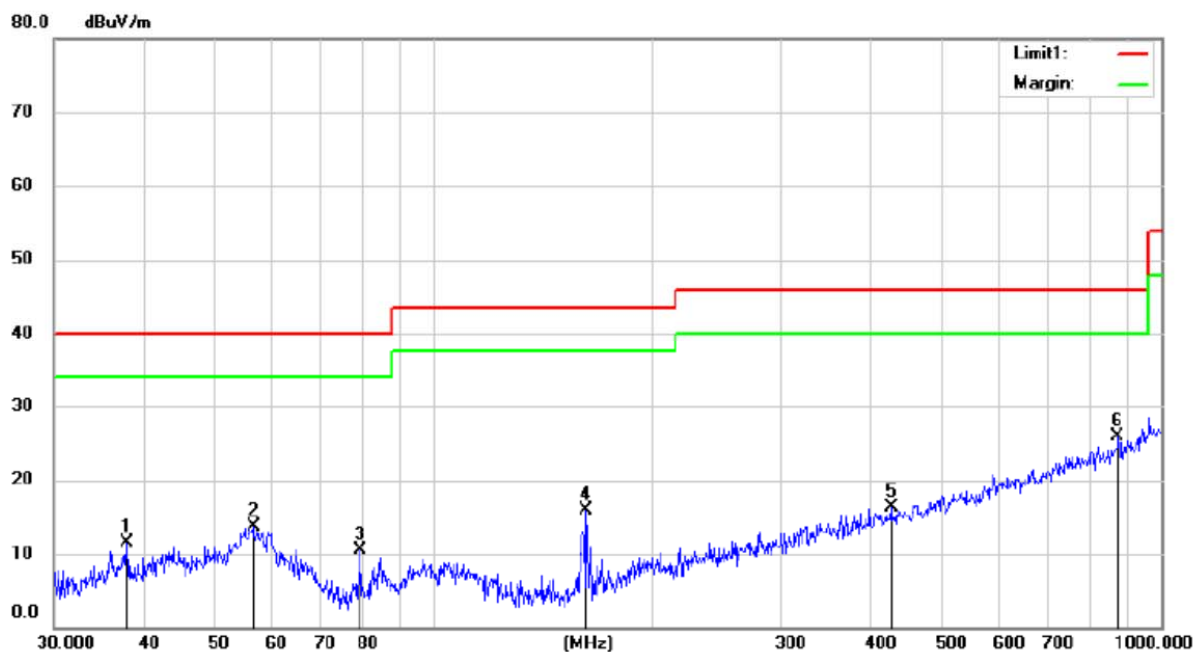


Site 3m Chamber #3 Polarization: **Horizontal** Temperature: 24 C
 Limit: (RE)FCC PART 15 CLASS B Power: DC 6V Humidity: 53 %
 Mode:125kHz TX
 Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table
		MHz	Level	Factor	ment			Height	Degree
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree
1		37.4164	28.28	-15.88	12.40	40.00	-27.60	QP	
2		58.6126	29.11	-15.45	13.66	40.00	-26.34	QP	
3		103.4421	25.83	-15.67	10.16	43.50	-33.34	QP	
4		249.4250	25.68	-13.77	11.91	46.00	-34.09	QP	
5		465.5994	28.83	-8.35	20.48	46.00	-25.52	QP	
6	*	839.1818	26.96	-1.44	25.52	46.00	-20.48	QP	

*:Maximum data x:Over limit !:over margin

Operator: LQZ



Site 3m Chamber #3

Polarization: **Vertical**

Temperature: 24 C

Limit: (RE)FCC PART 15 CLASS B

Power: DC 6V

Humidity: 53 %

Mode: 125kHz TX

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1		37.8121	27.19	-15.70	11.49	40.00	-28.51	QP		
2		56.3948	28.47	-14.83	13.64	40.00	-26.36	QP		
3		79.2425	30.27	-19.84	10.43	40.00	-29.57	QP		
4		162.0413	34.31	-18.37	15.94	43.50	-27.56	QP		
5		425.0280	25.21	-8.89	16.32	46.00	-29.68	QP		
6	*	872.1832	26.69	-0.71	25.98	46.00	-20.02	QP		

*:Maximum data x:Over limit !:over margin

Operator: LQZ

6. Antenna Application

Antenna Requirement

Standard	Requirement
FCC CRF Part 15.203	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 shall be considered sufficient to comply with the provisions of this section. 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

For intentional device, according to FCC 47 CFR Section 15.203, 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. if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Result

The EUT'S antenna is coil antenna, The antenna's gain is 0dBi and meets the requirement. and the antenna can't be replaced by the user, which in accordance to section 15.203.

The the antenna dimension: $0.02*2+0.04*2=0.12m < 0.625*\lambda (0.625*c/f=1500m)$, the detail see the internal Photo.