

FCC Test Report

Applicant : Secukey Technology Co.,Ltd.

Address : Floor 5, Building 13, Longbi Industrial Park,
Longgang District, Shenzhen, China

Product Name : Access Control

Report Date : Sept. 14, 2024



Shenzhen Anbotek Compliance Laboratory Limited

Shenzhen Anbotek Compliance Laboratory Limited

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TEST REPORT

Applicant : Secukey Technology Co.,Ltd.
Manufacturer : Secukey Technology Co.,Ltd.
Product Name : Access Control
Model No. : D-5198A-KPX
Trade Mark : Secukey
Rating(s) : Input: 12~28V AC/DC
Test Standard(s) : FCC Part15 Subpart C, Paragraph 15.209
Test Method(s) : ANSI C63.10: 2020

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 FCC Part 15 Subpart C 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

Aug. 20, 2024

Date of Test

Aug. 20, 2024 to Sept. 02, 2024

Prepared By

Tu Tu Hong

(TuTu Hong)

Approved & Authorized Signer

Edward Pan

(Edward Pan)



Revision History

Report Version	Description	Issued Date
R00	Original Issue.	Sept. 14, 2024



1. General Information

1.1. Client Information

Applicant	:	Secukey Technology Co.,Ltd.
Address	:	Floor 5, Building 13, Longbi Industrial Park, Longgang District, Shenzhen, China
Manufacturer	:	Secukey Technology Co.,Ltd.
Address	:	Floor 5, Building 13, Longbi Industrial Park, Longgang District, Shenzhen, China
Factory	:	Secukey Technology Co.,Ltd.
Address	:	Floor 5, Building 13, Longbi Industrial Park, Longgang District, Shenzhen, China

1.2. Description of Device (EUT)

Product Name	:	Access Control
Test Model No.	:	D-5198A-KPX
Trade Mark	:	Secukey
Test Power Supply	:	DC 28V
Test Sample No.	:	1-2-1(Normal Sample), 1-2-2(Engineering Sample)
Adapter	:	N/A

RF Specification

Operation Frequency	:	125kHz
Number of Channel	:	1 Channel
Modulation Type	:	FSK
Antenna Type	:	Inductive loop coil Antenna

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

Description	Rating(s)
-	-

1.4. Description of Test Configuration

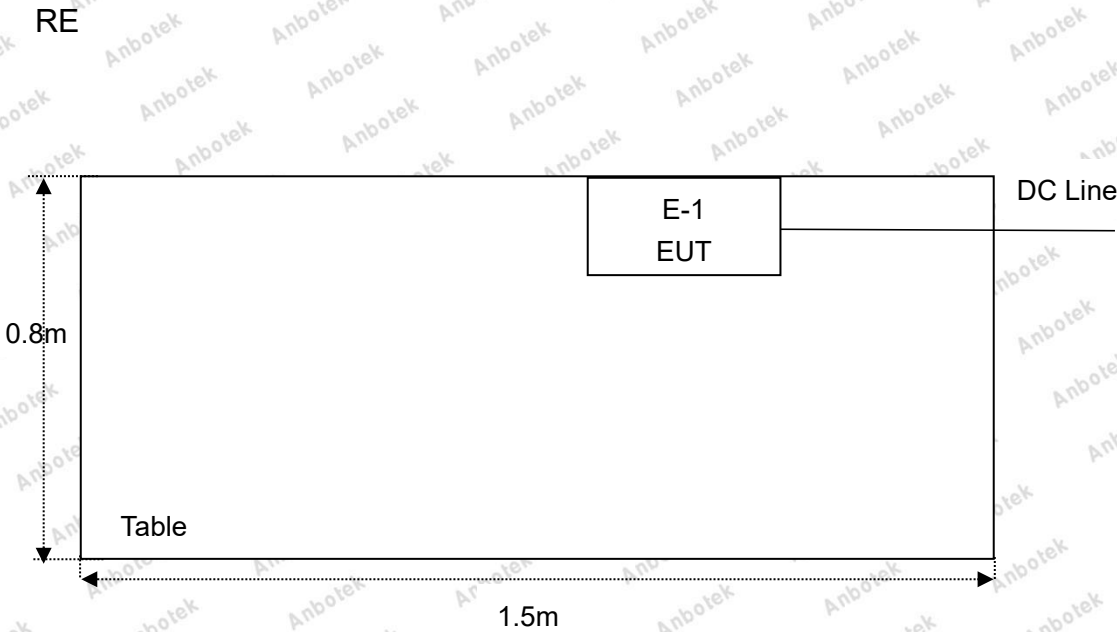
Channel	Freq. (kHz)	Channel	Freq. (kHz)	Channel	Freq. (kHz)	Channel	Freq. (kHz)	Channel	Freq. (kHz)
01	125								

Note:

1. During the test, the EUT was keeping continuous transmission.



1.5. Description Of Test Setup



1.6. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	Rohde & Schwarz	ENV216	100055	Jan. 18, 2024	1 Year
2.	Three Phase V-type Artificial Power Network	CYBERTEK	EM5040DT	E215040DT001	Jan. 17, 2024	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Jan. 17, 2024	1 Year
4.	EMI Test Receiver	Rohde & Schwarz	ESR26	101481	Jan. 23, 2024	1 Year
5.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Oct. 12, 2023	1 Year
6.	EMI Preamplifier	SKET Electronic	LNPA-0118G -45	SKET-PA-002	Jan. 17, 2024	1 Year
7.	Double Ridged Horn Antenna	SCHWARZBECK	BBHA 9120D	02555	Oct. 16, 2022	3 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	345	Oct. 23, 2022	3 Year
9.	Loop Antenna	Schwarzbeck	FMZB1519B	00053	Oct. 12, 2023	1 Year
10.	Horn Antenna	A-INFO	LB-180400- KF	J211060628	Oct. 12, 2023	1 Year
11.	Pre-amplifier	SONOMA	310N	186860	Jan. 17, 2024	1 Year
12.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
13.	MXA Spectrum Analysis	KEYSIGHT	N9020A	MY53280032	Oct. 12, 2023	1 Year
14.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Oct. 12, 2023	1 Year
15.	Signal Generator	Agilent	E4421B	MY41000743	Oct. 12, 2023	1 Year
16.	DC Power Supply	IVYTECH	IV3605	1804D360510	Oct. 20, 2023	1 Year
17.	Constant Temperature Humidity Chamber	ZHONGJIAN	ZJ-KHWS80 B	N/A	Oct. 16, 2023	1 Year



1.7. Measurement Uncertainty

Parameter	Uncertainty
Conducted emissions (AMN 150kHz~30MHz)	3.8dB
Occupied Bandwidth	925Hz
Conducted Spurious Emission	1.24dB
Radiated spurious emissions (Below 30MHz)	3.53dB
Radiated spurious emissions (30MHz~1GHz)	Horizontal: 3.92dB; Vertical: 4.52dB
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.	

1.8. Description of Test Facility

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

FCC-Registration No.: 434132

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. 434132.

ISED-Registration No.: 8058A

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A.

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 Anbotech 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.

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



2. Summary of Test Results

Standard Section	Test Item	Result
FCC Part 15, Paragraph 15.207	Conducted Emission Test	N/A
FCC Part 15, Paragraph 15.209(a)(f)	Spurious Emission	PASS
FCC Part 15, Paragraph15.203	Antenna Requirement	PASS
15.215(c)	20dB Occupied Bandwidth	PASS

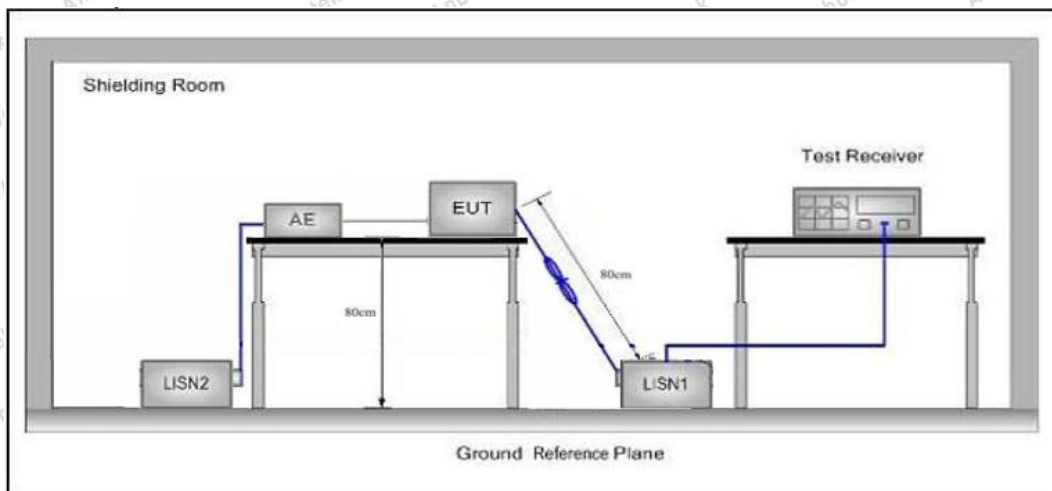


3. Conducted Emission Test

3.1. Test Standard and Limit

Test Standard	FCC Part15 Section 15.207		
Test Limit	Frequency	Maximum RF Line Voltage (dBuV)	
		Quasi-peak Level	Average Level
	150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
	500kHz~5MHz	56	46
	5MHz~30MHz	60	50
Remark: (1) *Decreasing linearly with logarithm of the frequency. (2) The lower limit shall apply at the transition frequency.			

3.2. Test Setup



3.3. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.10: 2020 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

3.4. Test Data

Not applicable for DC power device.



4. Radiation Spurious Emission and Band Edge

4.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.209 and 15.205				
Test Limit	Frequency (MHz)	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz~0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz~88MHz	100	40.0	Quasi-peak	3
	88MHz~216MHz	150	43.5	Quasi-peak	3
	216MHz~960MHz	200	46.0	Quasi-peak	3
	960MHz~1000MHz	500	54.0	Quasi-peak	3
	Above 1000MHz	500	54.0	Average	3
		-	74.0	Peak	3

Remark:

(1)The lower limit shall apply at the transition frequency.

(2) 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

4.2. Test Setup

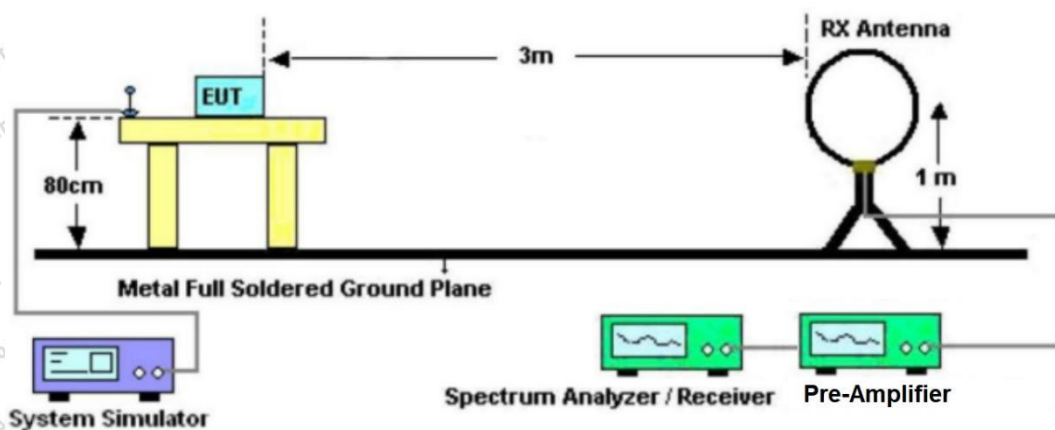


Figure 1. Below 30MHz



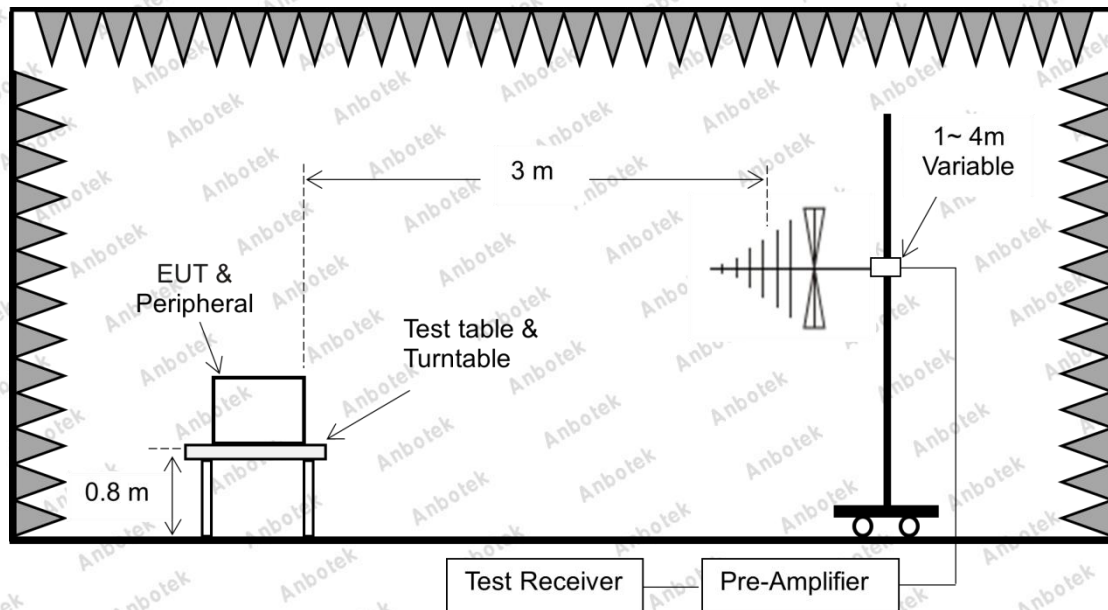


Figure 2. 30MHz to 1GHz

4.3. Test Procedure

For below 1GHz: The EUT is placed on a turntable, which is 0.8m above the ground plane.

For above 1GHz: The EUT is placed on a turntable, which is 1.5m above the ground plane.

The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Rotated the EUT through three orthogonal axes to determine the maximum emissions, both horizontal and vertical polarization of the antenna are set on test. The EUT is tested in 9*6*6 Chamber. The device is evaluated in xyz orientation.

For 9kHz to 150kHz, Set the spectrum analyzer as:

RBW = 200Hz, VBW = 1kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 150kHz to 30MHz, Set the spectrum analyzer as:

RBW = 9KHz, VBW = 30kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 30MHz to 1000MHz, Set the spectrum analyzer as:

RBW = 100kHz, VBW = 300kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

4.4. Test Data

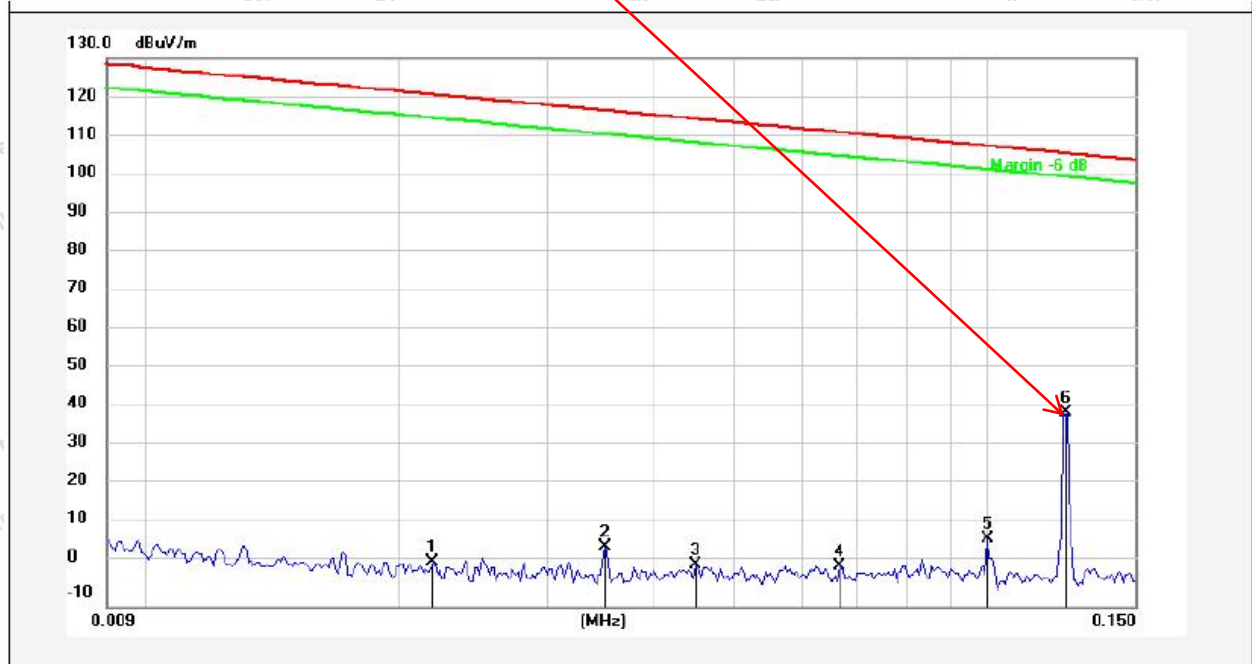
PASS

During the test, Pre-scan all kind of the place mode (coplane, coaxial), and found the coplane is the worst case.



Test Results (9KHz~0.15MHz)

Test Mode: TX
Power Source: DC 28V
Polarization: coplane
Temp.(°C)/Hum.(%RH): 23.5°C/49%RH
Fundamental

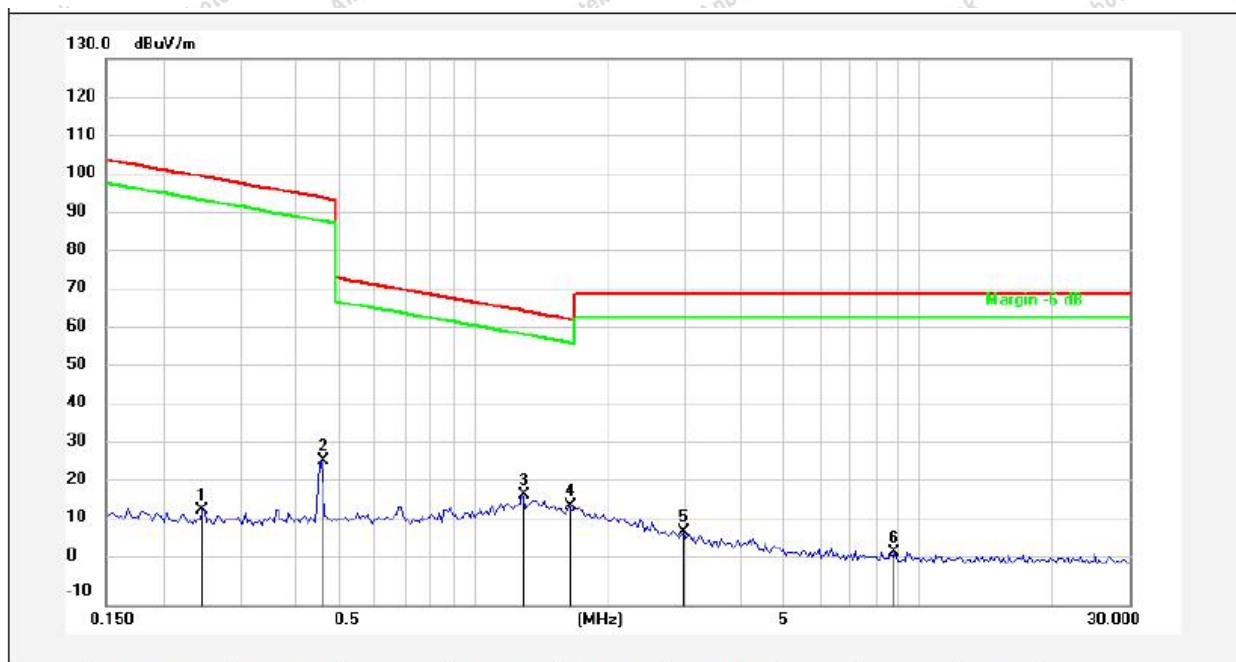


No.	Freq. (MHz)	Reading (dBuV)	Factor ()	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	0.0218	-18.81	20.33	1.52	120.67	-119.15	peak			
2	0.0350	-15.43	20.49	5.06	116.58	-111.52	peak			
3	0.0449	-19.92	20.46	0.54	114.43	-113.89	peak			
4	0.0666	-19.98	20.38	0.40	111.03	-110.63	peak			
5	0.1000	-12.91	20.29	7.38	107.52	-100.14	peak			
6	0.1232	19.25	20.34	39.59	105.72	-66.13	peak			



Test Results (0.15MHz~30MHz)

Test Mode: TX
Power Source: DC 28V
Polarization: coplane
Temp.(°C)/Hum.(%RH): 23.5°C/49%RH



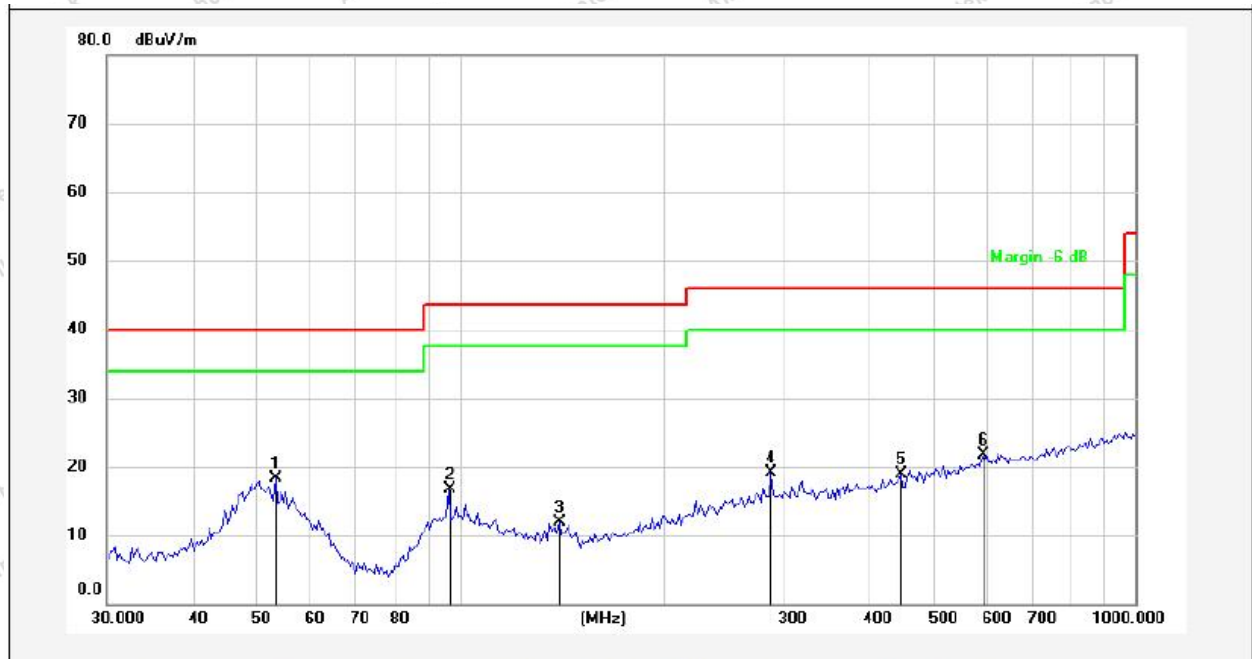
No.	Freq. (MHz)	Reading (dBuV)	Factor ()	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	0.2468	-6.00	20.30	14.30	99.72	-85.42	peak			
2	0.4564	6.58	20.27	26.85	94.41	-67.56	peak			
3	1.2892	-2.18	20.26	18.08	65.42	-47.34	QP			
4	1.6450	-4.99	20.27	15.28	63.31	-48.03	QP			
5	2.9776	-11.52	20.31	8.79	69.50	-60.71	QP			
6	8.8692	-16.98	20.50	3.52	69.50	-65.98	QP			

Remark: According to FCC PART 15.209 (d), the emission limits for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz, Radiated emission limits in these three bands are based on measurements employing an average detector.



Test Results (30~1000MHz)

Test Mode: TX
Power Source: DC 28V
Polarization: Horizontal
Temp.(°C)/Hum.(%RH): 20.3°C/46%RH

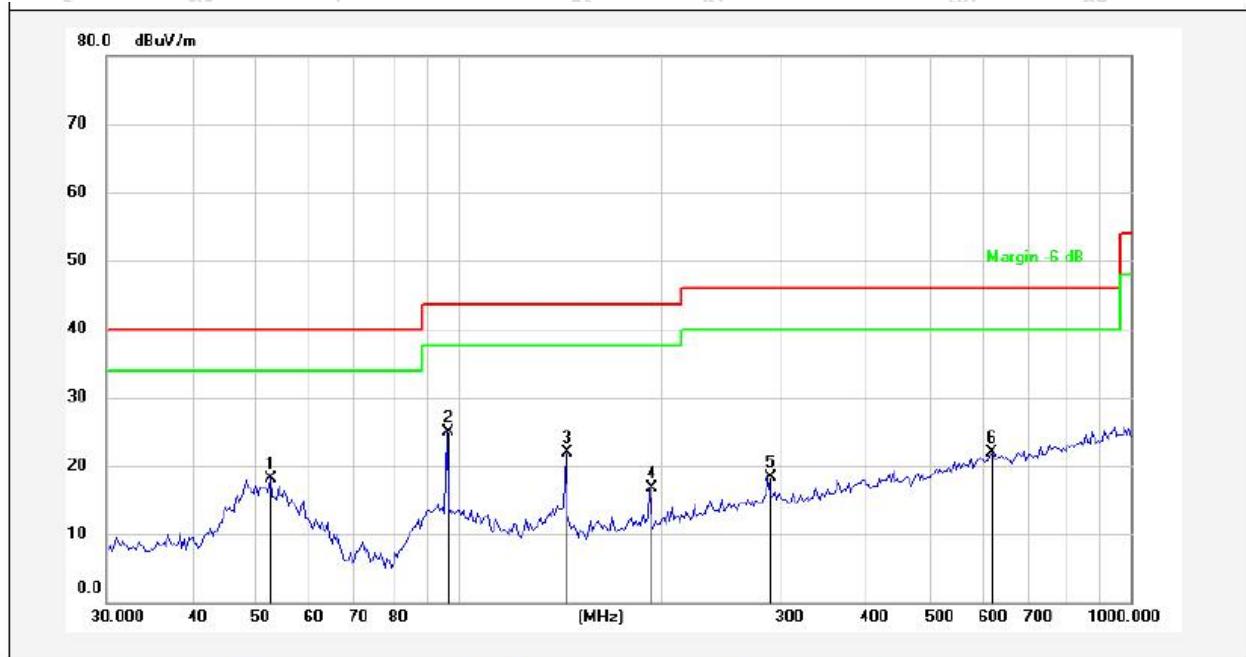


No.	Freq. (MHz)	Reading (dBuV)	Factor ()	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	53.3179	33.97	-15.64	18.33	40.00	-21.67	QP			
2	96.0986	35.52	-18.80	16.72	43.50	-26.78	QP			
3	140.3420	32.77	-20.96	11.81	43.50	-31.69	QP			
4	289.0020	36.57	-17.41	19.16	46.00	-26.84	QP			
5	449.5557	33.43	-14.51	18.92	46.00	-27.08	QP			
6	595.1327	33.59	-11.92	21.67	46.00	-24.33	QP			



Test Results (30~1000MHz)

Test Mode: TX
Power Source: DC 28V
Polarization: Vertical
Temp.(°C)/Hum.(%RH): 20.3°C/46%RH



No.	Freq. (MHz)	Reading (dBuV)	Factor ()	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	52.5753	33.45	-15.29	18.16	40.00	-21.84	QP			
2	96.0986	43.76	-18.80	24.96	43.50	-18.54	QP			
3	144.3348	44.92	-22.95	21.97	43.50	-21.53	QP			
4	192.4186	37.00	-20.26	16.74	43.50	-26.76	QP			
5	289.0021	35.79	-17.41	18.38	46.00	-27.62	QP			
6	620.7096	33.56	-11.72	21.84	46.00	-24.16	QP			

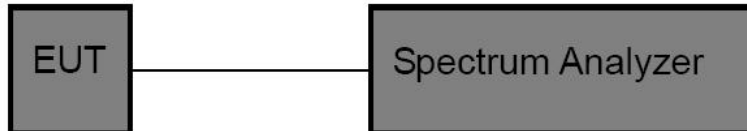


5. 20DB Occupy Bandwidth Test

5.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.215(c)
Test Limit	N/A

5.2. Test Setup



5.3. Test Procedure

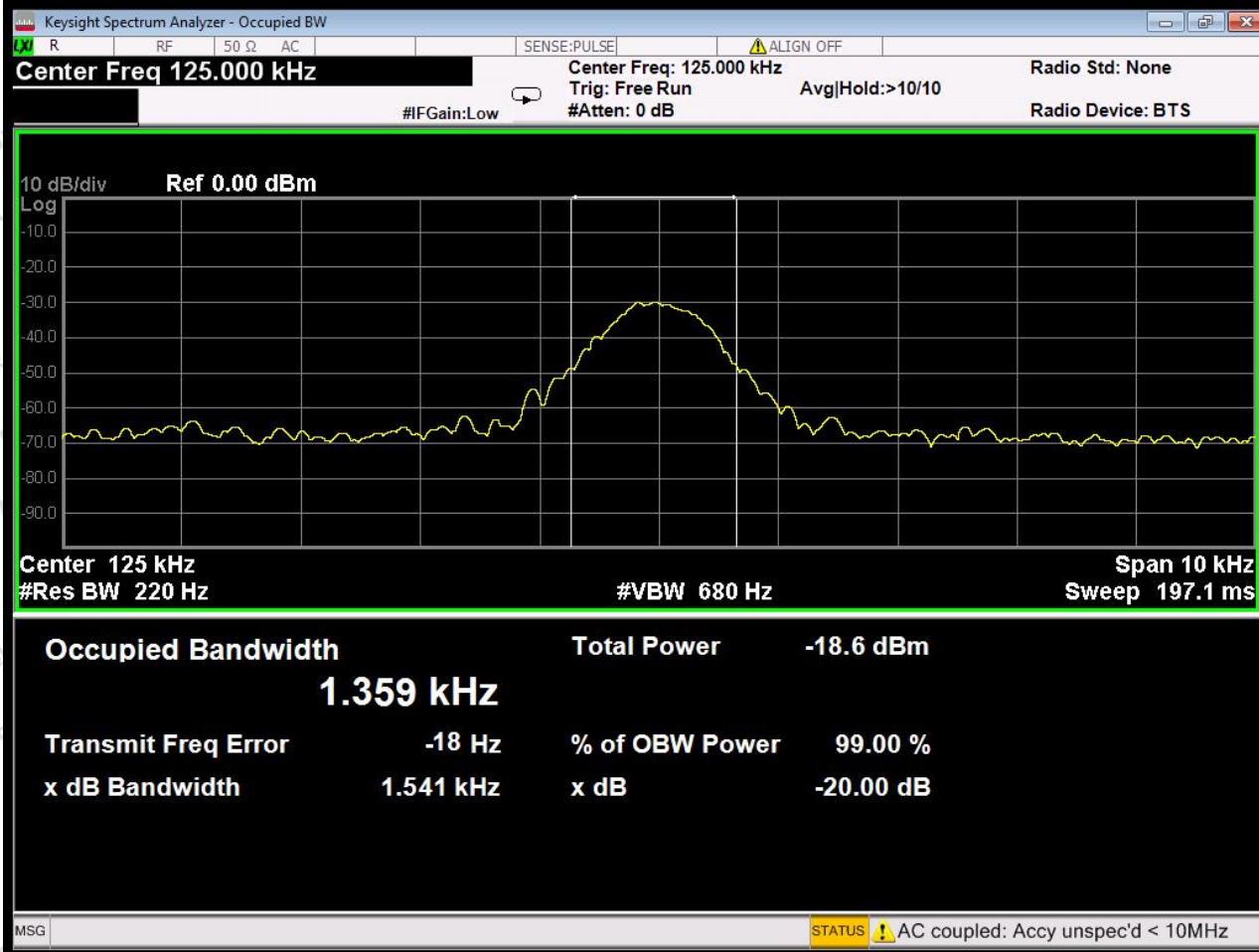
The bandwidth of the fundamental frequency was measured by spectrum analyzer with 3kHz RBW and VBW $\geq$ 3*RBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.



5.4. Test Data

Test Item	: 20dB Bandwidth	Test Mode	: Continuously transmitting
Test Voltage	: DC 28V	Temperature	: 23.5℃
Test Result	: PASS	Humidity	: 49%RH

Freq. (kHz)	Bandwidth (kHz)	Results
125	1.541	PASS



6. Antenna Requirement

6.1. Test Standard and Requirement

Test Standard	FCC Part15 Section 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

6.2. Antenna Connected Construction

The antenna is a Inductive loop coil Antenna which permanently attached It complies with the standard requirement.



APPENDIX I -- TEST SETUP PHOTOGRAPH

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

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 -----

