FCC REPORT

Applicant:	Remote Tech LLC
Address of Applicant:	310 ALDER RD, DOVER DE 19904 USA
Equipment Under Test (EUT)	
Product Name:	Smart key
Model No.:	RT-SBHK4
FCC ID:	2AOKM-SB4
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.231
Date of sample receipt:	05 Aug., 2021
Date of Test:	05 Aug., to 29 Oct., 2021
Date of report issue:	29 Oct., 2021
Test Result:	PASS*

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Bruce Zhang
Laboratory Manager

2 Version

Version No.	Date	Description
00	*24 Sep., 2021*	*Original*
01	*29 Oct., 2021*	*1. Updated test data on page 18.* *2. Updated photo on page 28.* *3. Updated test data on page 13/14.*

Prepared By: Janet Wei ***Date:*** *29 Oct., 2021*

Test Engineer

Check By: Winner Zhang ***Date:*** *29 Oct., 2021*

Project Engineer

3 Contents

Page

4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
Field strength of the fundamental signal	15.231 (b)	Pass
Spurious emissions	15.231 (b)/15.209	Pass
20dB Bandwidth	15.231 (c)	Pass
Duration Time	15.231 (a)(1)	Pass
Conducted Emission	15.207	N/A

Remarks:

1. *Pass: The EUT complies with the essential requirements in the standard.*
2. *N/A: The EUT not applicable of the test item.*
3. *The cable insertion loss used by "RF Output Power" and other conduction measurement items is 0.5dB (provided by the customer).*

Test Method:	*ANSI C63.4-2014* *ANSI C63.10-2013*

5 General Information

5.1 Client Information

Applicant:	Remote Tech LLC
Address:	310 ALDER RD, DOVER DE 19904 USA
Manufacturer:	Remote Tech LLC
Address:	310 ALDER RD, DOVER DE 19904 USA

5.2 General Description of E.U.T.

Product Name:	Smart key
Model No.:	RT-SBHK4
Operation Frequency:	434MHz
Channel numbers:	1
Modulation type:	FSK
Antenna Type:	PCB antenna
Antenna gain:	4.7 dBi
Power supply:	DC 3V (CR2025 battery)
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

5.3 Test mode

Transmitting mode:	Keep the EUT in transmitting mode with modulation（new battery used）		
Pre-Test Mode:			
JYT has verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which was shown in this test report and defined as follows:			
Axis	X	Y	Z
Field Strength(dBuV/m)	71.33	71.54	72.19
Final Test Mode:			
According to ANSI C63.4 standards, the test results are both the “worst case” and “worst setup”: Z axis (see the test setup photo)			

5.4 Description of Support Units

N/A

5.5 Measurement Uncertainty

Parameter	Expanded Uncertainty (Confidence of 95%)
Radiated Emission (30MHz ~ 1GHz) for 3m SAC	4.45 dB
Radiated Emission (1GHz ~ 18GHz) for 3m SAC	5.34 dB
Radiated Emission (18GHz ~ 40GHz) for 3m SAC	5.34 dB

5.6 Additions to, deviations, or exclusions from the method

No

5.7 Laboratory Facility

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

- **FCC - Designation No.: CN1211**

JianYan Testing Group Shenzhen Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.

- **ISED – CAB identifier.: CN0021**

The 3m Semi-anechoic chamber of JianYan Testing Group Shenzhen Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: https://portal.a2la.org/scopepdf/4346-01.pdf

5.8 Laboratory Location

JianYan Testing Group Shenzhen Co., Ltd.
Address: No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China.
Tel: +86-755-23118282, Fax: +86-755-23116366
Email: info-JYTee@lets.com, Website: http://www.ccis-cb.com

5.9 Test Instruments list

Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
3m SAC	ETS	RFD-100	Q1984	04-14-2021	04-13-2024
BiConiLog Antenna	SCHWARZBECK	VULB9163	9163-1246	03-07-2021	03-06-2022
Biconical Antenna	SCHWARZBECK	VUBA 9117	9117#359	06-17-2021	06-17-2022
Horn Antenna	SCHWARZBECK	BBHA9120D	912D-916	03-07-2021	03-06-2022
Broad-Band Horn Antenna	SCHWARZBECK	BBHA9170	1067	04-02-2021	04-01-2022
Broad-Band Horn Antenna	SCHWARZBECK	BBHA9170	1068	04-02-2021	04-01-2022
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	03-03-2021	03-02-2022
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	03-03-2021	03-02-2022
Spectrum analyzer	Keysight	N9010B	MY60240202	11-27-2020	11-26-2021
Low Pre-amplifier	SCHWARZBECK	BBV9743B	00305	03-07-2021	03-06-2022
High Pre-amplifier	SKET	LNPA_0118G-50	MF280208233	03-07-2021	03-06-2022
Cable	Qualwave	JYT3M-1G-NN-8M	JYT3M-1	03-07-2021	03-06-2022
Cable	Qualwave	JYT3M-18G-NN-8M	JYT3M-2	03-07-2021	03-06-2022
Cable	Qualwave	JYT3M-1G-BB-5M	JYT3M-3	03-07-2021	03-06-2022
Cable	Bost	JYT3M-40G-SS-8M	JYT3M-4	04-02-2021	04-01-2022
EMI Test Software	Tonscend	TS+	Version:3.0.0.1		

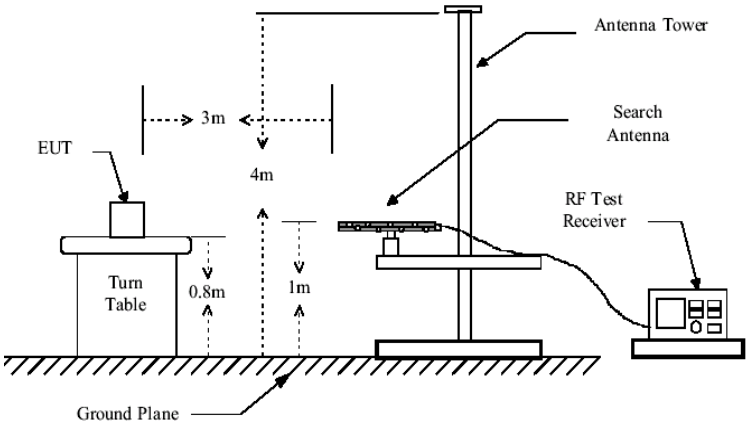
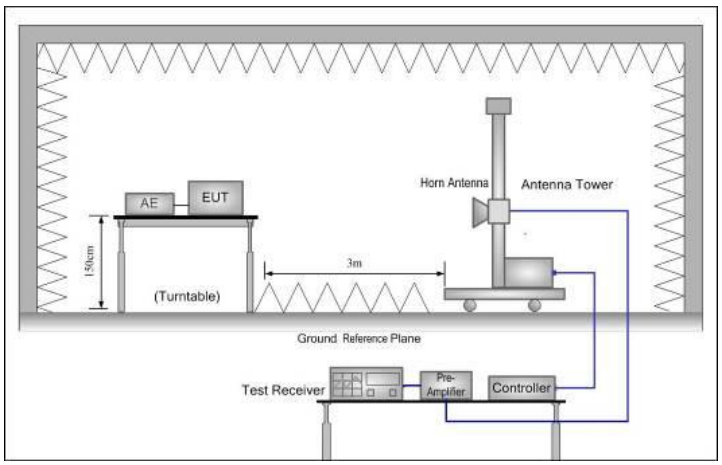
6 Test results and Measurement Data

6.1 Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203
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 be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.	
E.U.T Antenna:	
The EUT make use of a PCB antenna, The typical gain of the antenna is 4.7dBi.	

6.2 Radiated Emission

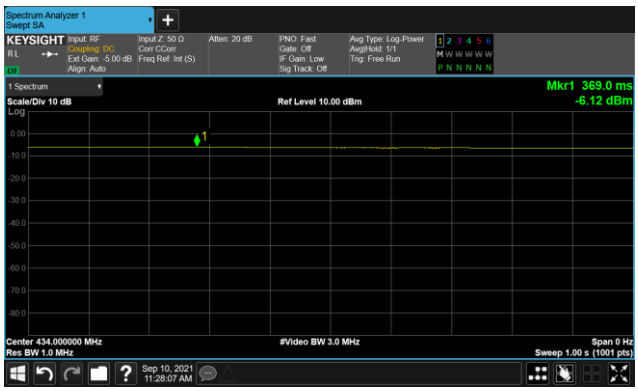
<table>
<tr><td>Test Requirement:</td><td colspan="5">FCC Part15 C Section 15.231(a) and 15.209</td></tr>
<tr><td>Test Frequency Range:</td><td colspan="5">30MHz to 5000MHz</td></tr>
<tr><td>Test site:</td><td colspan="5">Measurement Distance: 3m (Semi-Anechoic Chamber)</td></tr>
<tr><td rowspan="4">Receiver setup:</td><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120kHz</td><td>300kHz</td><td>Quasi-peak Value</td></tr>
<tr><td>Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td rowspan="3">Limit:
(Field strength of the fundamental signal)</td><td colspan="2">Frequency</td><td colspan="2">Limit (dBuV/m @3m)</td><td>Remark</td></tr>
<tr><td colspan="2" rowspan="2">434MHz</td><td colspan="2">80.83</td><td>Average Value</td></tr>
<tr><td colspan="2">100.83</td><td>Peak Value</td></tr>
<tr><td rowspan="8">Limit:
(Spurious Emissions)</td><td colspan="2">Frequency</td><td colspan="2">Limit (dBuV/m @3m)</td><td>Remark</td></tr>
<tr><td colspan="2">30MHz-88MHz</td><td colspan="2">40.0</td><td>Quasi-peak Value</td></tr>
<tr><td colspan="2">88MHz-216MHz</td><td colspan="2">43.5</td><td>Quasi-peak Value</td></tr>
<tr><td colspan="2">216MHz-960MHz</td><td colspan="2">46.0</td><td>Quasi-peak Value</td></tr>
<tr><td colspan="2">960MHz-1GHz</td><td colspan="2">54.0</td><td>Quasi-peak Value</td></tr>
<tr><td colspan="2" rowspan="2">Above 1GHz</td><td colspan="2">54.0</td><td>Average Value</td></tr>
<tr><td colspan="2">74.0</td><td>Peak Value</td></tr>
<tr><td colspan="5">Or The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level whichever limit permits higher field strength.</td></tr>
<tr><td>Test Procedure:</td><td colspan="5">a. The EUT was placed on the top of a rotating table 0.8m(below 1GHz) /1.5m(above 1GHz) above the ground at a 3 meter chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</td></tr>
</table>

Test setup:	Below 1GHz  Above 1GHz 
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Pass

6.2.1 Field Strength Of The Fundamental Signal

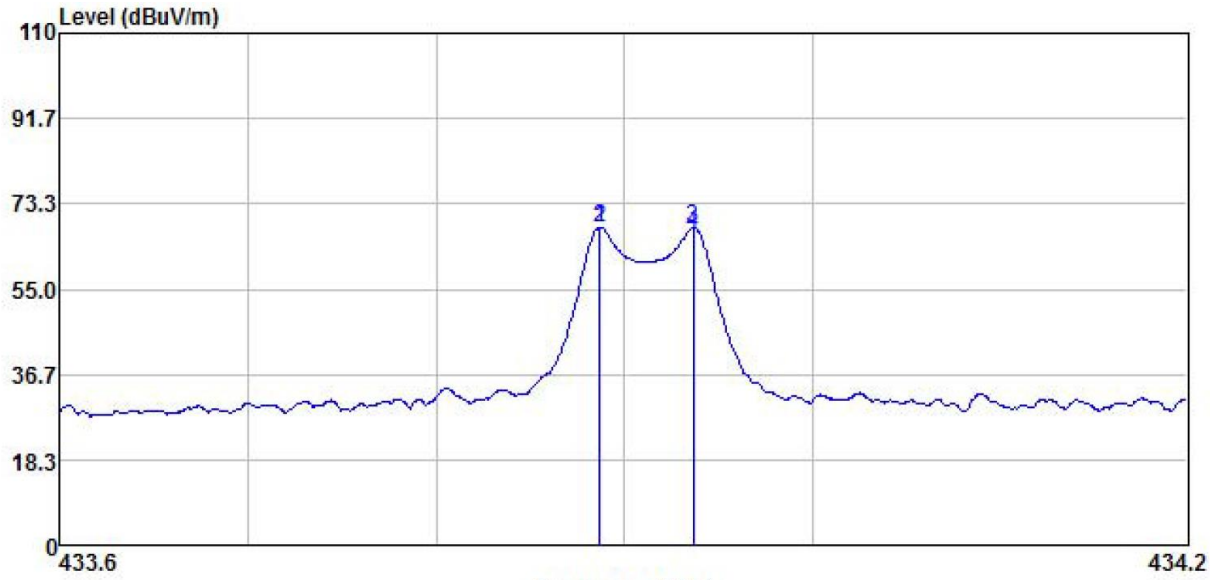
Peak value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor(dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
433.937	47.01	19.17	2.13	0.00	68.31	100.82	-32.51	Vertical
433.937	50.89	19.17	2.13	0.00	72.19	100.82	-28.63	Horizontal
Average value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor(dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
433.887	46.70	19.17	2.13	0.00	68	80.82	-12.82	Vertical
433.887	44.30	19.17	2.13	0.00	65.6	80.82	-15.22	Horizontal

T period:



Test Plots:

Product Name:	Smart key	Product Model:	RT-SBHK4
Test By:	Janet	Test mode:	Tx mode
Test Frequency:	434 MHz	Polarization:	Vertical
Test Voltage:	DC 3V	Environment:	Temp: 24℃ Huni: 57%

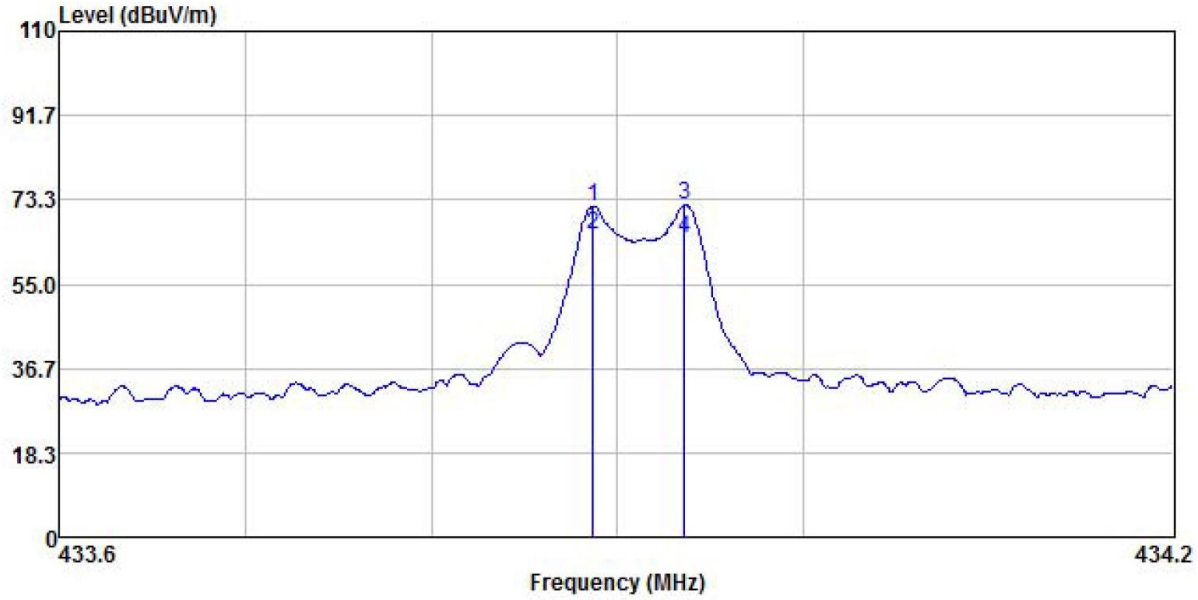


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	433.887	47.00	19.17	2.13	0.00	68.30	------	------	Peak
2	433.887	46.70	19.17	2.13	0.00	68.00	------	------	Average
3	433.937	47.01	19.17	2.13	0.00	68.31	------	------	Peak
4	433.937	45.80	19.17	2.13	0.00	67.10	------	------	Average

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*

Product Name:	Smart key	Product Model:	RT-SBHK4
Test By:	Janet	Test mode:	Tx mode
Test Frequency:	434 MHz	Polarization:	Horizontal
Test Voltage:	DC 3V	Environment:	Temp: 24℃ Huni: 57%



	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	433.887	50.73	19.17	2.13	0.00	72.03	------	------	Peak
2	433.887	44.30	19.17	2.13	0.00	65.60	------	------	Average
3	433.937	50.89	19.17	2.13	0.00	72.19	------	------	Peak
4	433.937	43.60	19.17	2.13	0.00	64.90	------	------	Average

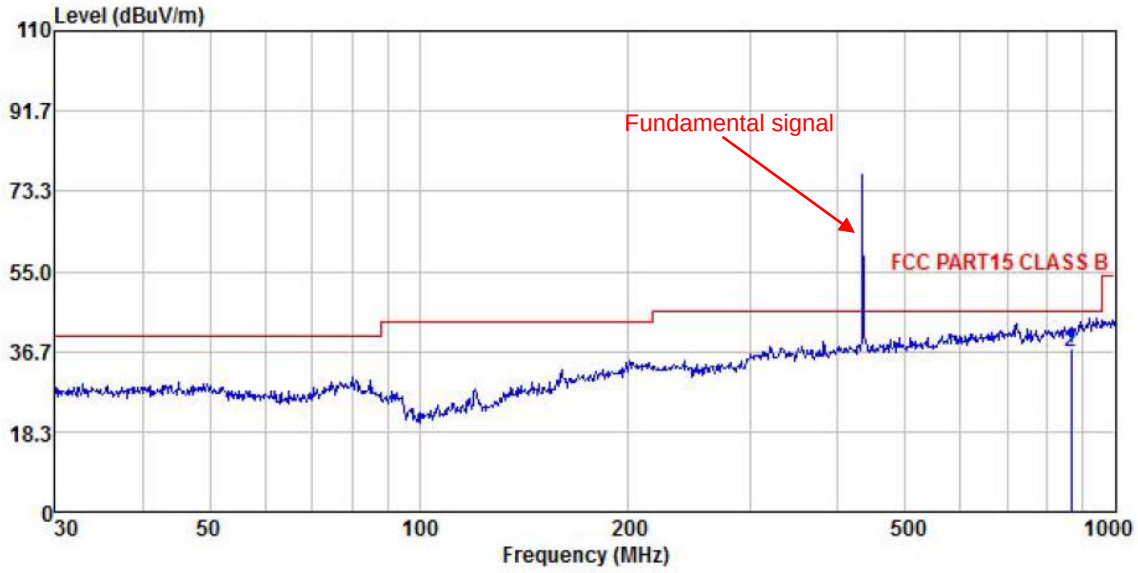
Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.

6.2.2 Spurious Emissions

Test Plots:

Product Name:	Smart key	Product Model:	RT-SBHK4
Test By:	Janet	Test mode:	Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Vertical
Test Voltage:	DC 3V	Environment:	Temp: 24℃ Huni: 57%

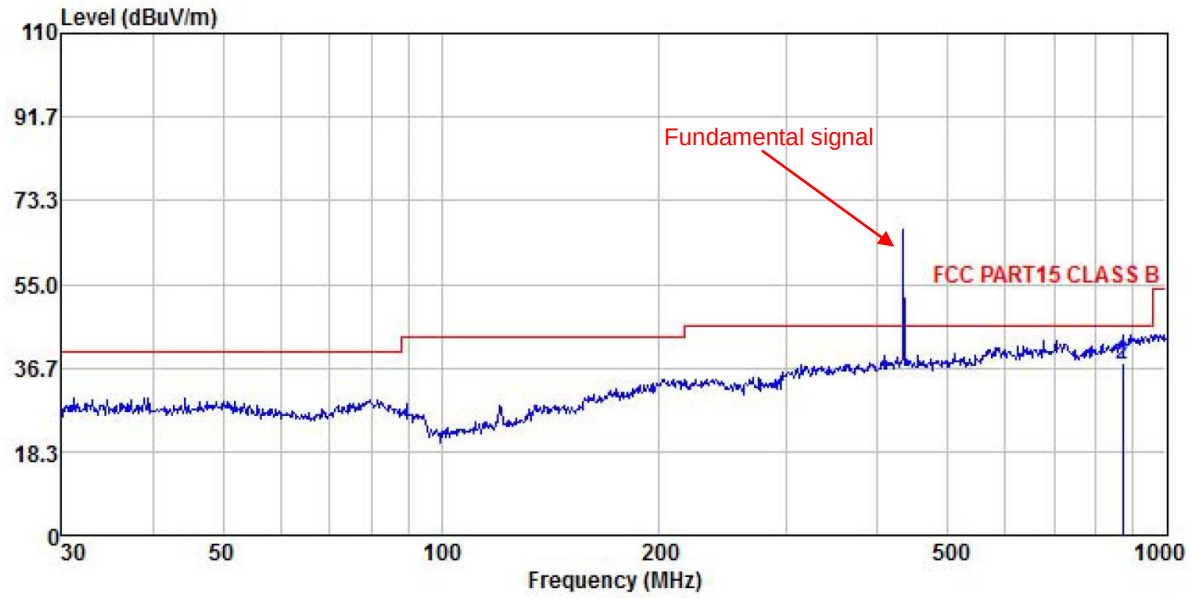


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	866.088	12.41	21.77	3.26	0.00	37.44	46.00	-8.56	Peak
2	866.088	11.37	21.77	3.26	0.00	36.40	46.00	-9.60	Average

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Product Name:	Smart key	Product Model:	RT-SBHK4
Test By:	Janet	Test mode:	Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Horizontal
Test Voltage:	DC 3V	Environment:	Temp: 24℃ Huni: 57%

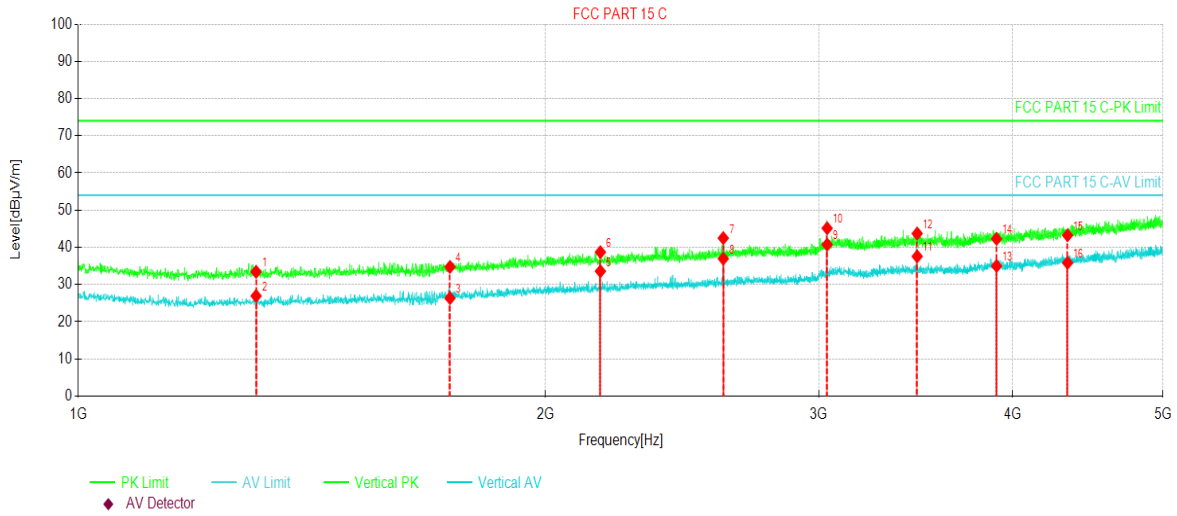


	Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	869.130	12.80	21.85	3.27	0.00	37.92	46.00	-8.08	Peak
2	869.130	12.40	21.85	3.27	0.00	37.52	46.00	-8.48	Average

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Product Name:	Smart key	Product Model:	RT-SBHK4
Test By:	Janet	Test mode:	Tx mode
Test Frequency:	1 GHz ~ 5 GHz	Polarization:	Vertical
Test Voltage:	DC 3V	Environment:	Temp: 24℃ Huni: 57%



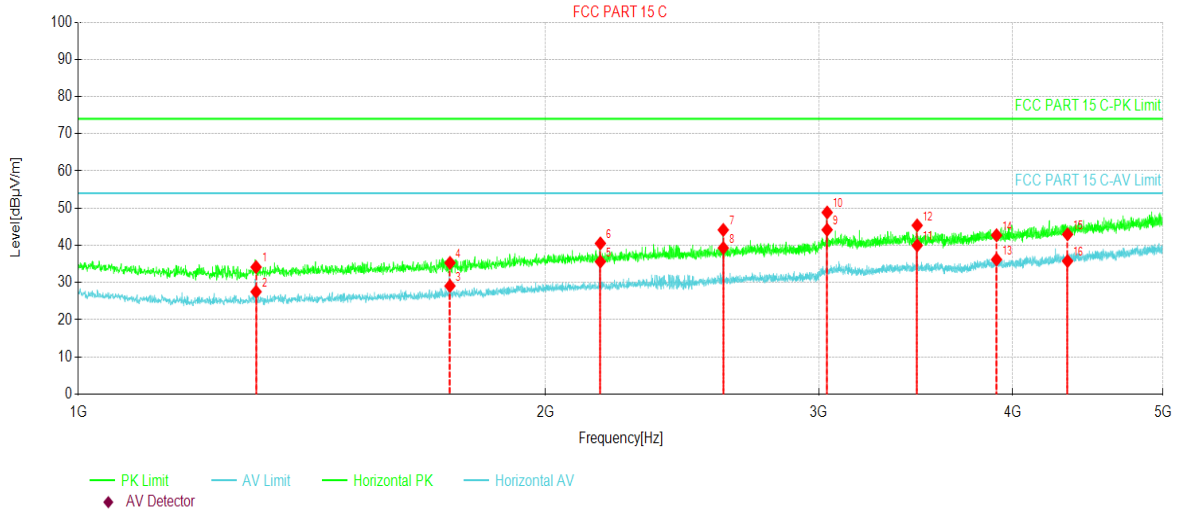
Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Trace	Polarity
1	1302.00	56.60	33.44	-23.16	74.00	40.56	PK	Vertical
2	1302.00	50.09	26.93	-23.16	54.00	27.07	AV	Vertical
3	1736.00	48.01	26.35	-21.66	54.00	27.65	AV	Vertical
4	1736.00	56.40	34.74	-21.66	74.00	39.26	PK	Vertical
5	2170.00	53.21	33.58	-19.63	54.00	20.42	AV	Vertical
6	2170.00	58.34	38.71	-19.63	74.00	35.29	PK	Vertical
7	2604.00	60.52	42.48	-18.04	74.00	31.52	PK	Vertical
8	2604.00	54.99	36.95	-18.04	54.00	17.05	AV	Vertical
9	3038.00	57.27	40.74	-16.53	54.00	13.26	AV	Vertical
10	3038.00	61.66	45.13	-16.53	74.00	28.87	PK	Vertical
11	3472.00	52.54	37.57	-14.97	54.00	16.43	AV	Vertical
12	3472.00	58.68	43.71	-14.97	74.00	30.29	PK	Vertical
13	3906.00	48.49	35.00	-13.49	54.00	19.00	AV	Vertical
14	3906.00	55.78	42.29	-13.49	74.00	31.71	PK	Vertical
15	4340.00	54.70	43.24	-11.46	74.00	30.76	PK	Vertical
16	4340.00	47.30	35.84	-11.46	54.00	18.16	AV	Vertical

Remark:

1. *Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

Product Name:	Smart key	Product Model:	RT-SBHK4
Test By:	Janet	Test mode:	Tx mode
Test Frequency:	1 GHz ~ 5 GHz	Polarization:	Horizontal
Test Voltage:	DC 3V	Environment:	Temp: 24℃ Huni: 57%



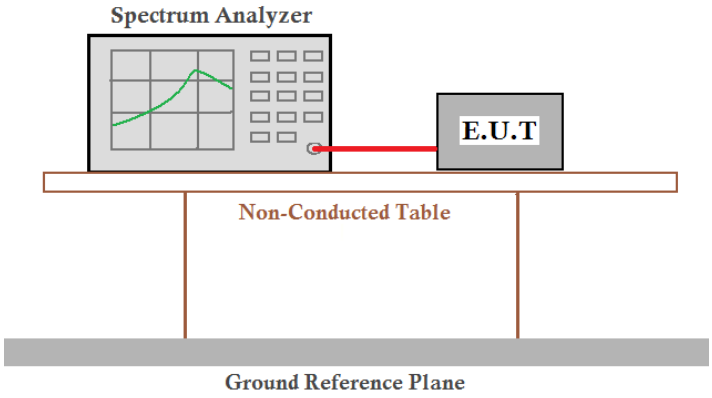
Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Trace	Polarity
1	1302.00	57.32	34.16	-23.16	74.00	39.84	PK	Horizontal
2	1302.00	50.69	27.53	-23.16	54.00	26.47	AV	Horizontal
3	1736.00	50.74	29.08	-21.66	54.00	24.92	AV	Horizontal
4	1736.00	56.95	35.29	-21.66	74.00	38.71	PK	Horizontal
5	2170.00	55.25	35.62	-19.63	54.00	18.38	AV	Horizontal
6	2170.00	60.16	40.53	-19.63	74.00	33.47	PK	Horizontal
7	2604.00	62.18	44.14	-18.04	74.00	29.86	PK	Horizontal
8	2604.00	57.33	39.29	-18.04	54.00	14.71	AV	Horizontal
9	3038.00	60.71	44.18	-16.53	54.00	9.82	AV	Horizontal
10	3038.00	65.36	48.83	-16.53	74.00	25.17	PK	Horizontal
11	3472.00	54.95	39.98	-14.97	54.00	14.02	AV	Horizontal
12	3472.00	60.34	45.37	-14.97	74.00	28.63	PK	Horizontal
13	3906.00	49.66	36.17	-13.49	54.00	17.83	AV	Horizontal
14	3906.00	56.21	42.72	-13.49	74.00	31.28	PK	Horizontal
15	4340.00	54.42	42.96	-11.46	74.00	31.04	PK	Horizontal
16	4340.00	47.24	35.78	-11.46	54.00	18.22	AV	Horizontal

Remark:

1. *Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor.*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

6.3 20dB Bandwidth

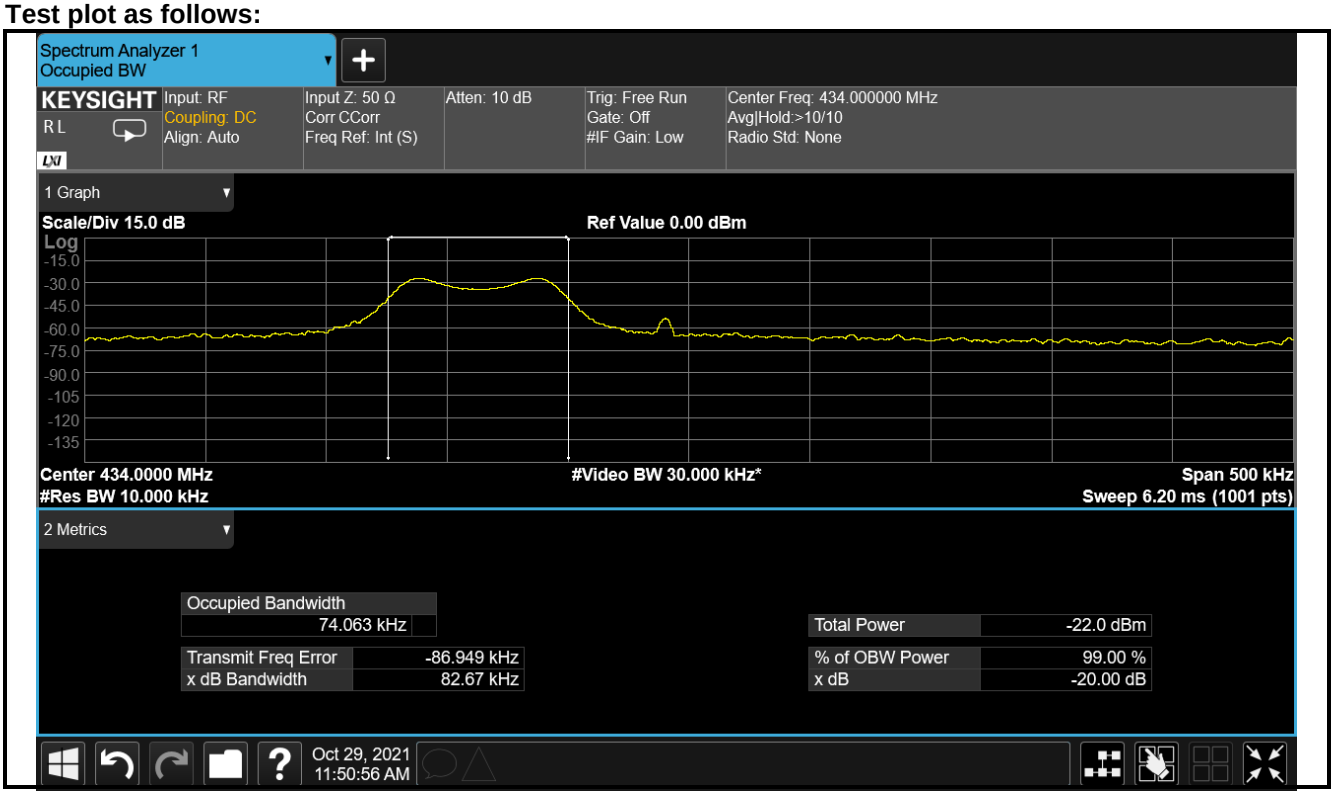
Test Requirement:	FCC Part15 C Section 15.231 (c)
Receiver setup:	RBW=1kHz, VBW=3kHz, detector: Peak
Limit:	The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.
Test Procedure:	1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT. 2. Set the EUT to proper test channel. 3. Max hold the radiated emissions, mark the peak power frequency point and the -20dB upper and lower frequency points. 4. Read 20dB bandwidth.
Test setup:	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data

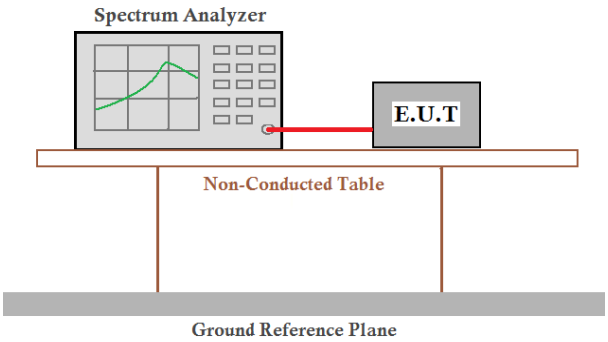
20dB bandwidth (MHz)	Limit (MHz)	Results
0.083	1.085	Passed

Note: Limit= Fundamental frequency×0.25%=434×0.25%=1.085MHz

Test plot as follows:



6.4 Duration Time

Test Requirement:	FCC Part15 C Section 15.231 (a)(1)
Receiver setup:	RBW=100kHz, VBW=300kHz, span=0Hz, detector: Peak
Limit:	Not more than 5 seconds
Test mode:	Transmitting mode
Test Procedure:	1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT. 2. Set the EUT to proper test channel. 3. Single scan the transmission, and read the transmission time.
Test setup:	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data

Duration time (second)	Limit (second)	Result
0.740	<5.0	Pass

Test plot as follows: