

FCC & IC REPORT

Applicant: Remote Tech LLC

Address of Applicant: 310 ALDER RD, DOVER DE 19904 USA

Equipment Under Test (EUT)

Product Name: keyless transmitter

Model No.: RT-AC439H

FCC ID: 2AOKM-AC4

Canada IC: 24223-AC4

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.231
RSS-Gen Issue 5 March 2019 Amendment 1
RSS-210 Issue 10 December 2019 Annex A Section A.1

Date of sample receipt: 14 May, 2020

Date of Test: 15 May, to 04 Jun., 2020

Date of report issue: 08 Jun., 2020

Test Result: PASS*

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

Authorized Signature:



Bruce Zhang
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

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2 Version

Version No.	Date	Description
00	08 Jun., 2020	Original

Prepared By:

Yao Wu

Test Engineer

Date:

08 Jun., 2020

Check By:

Winner Zhang

Project Engineer

Date:

08 Jun., 2020

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4 Test Summary

Test Item	Section in CFR 47		Result
	FCC	IC	
Antenna requirement	FCC Part 15.203	RSS-GEN 6.8	Pass
Field strength of the fundamental signal	FCC Part 15.231 (b)	RSS-210 Annex A Section A.1.2 (a)	Pass
Spurious emissions	FCC Part 15.231 (b)/15.209	RSS-GEN Section 6.13 RSS-210 Annex A Section A.1.2 (b)	Pass
20dB Bandwidth 99% Occupy Bandwidth	FCC Part 15.231 (c)	RSS-GEN Section 6.7 RSS-210 Annex A Section A.1.3	Pass
Duration time	FCC Part 15.231 (a)(1)	RSS-210 Annex A Section A.1.1 (a)	Pass
Frequency stability	/	RSS-GEN Section 8.11	Pass
Conducted Emission	FCC Part 15.207	RSS-GEN Section 8.8	N/A
<p><i>Remark:</i></p> <ol style="list-style-type: none"> <i>Pass: The EUT complies with the essential requirements in the standard.</i> <i>N/A: The EUT not applicable of the test item.</i> <i>The cable insertion loss used by "RF Output Power" and other conduction measurement items is 0.5dB (provided by the customer).</i> 			
Test Method:	ANSI C63.4-2014 ANSI C63.10-2013		

5 General Information

5.1 Client Information

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

5.2 General Description of E.U.T.

Product Name:	keyless transmitter
Model No.:	RT-AC439H
Operation Frequency:	313.85MHz
Channel numbers:	1
Modulation type:	FSK
Antenna Type:	PCB antenna
Antenna gain:	0 dBi
Power supply:	DC 3V (CR2032 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)		
Pre-Test Mode:			
CCIS 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)	74.25	72.41	73.58
Final Test Mode:			
According to ANSI C63.4:2014 standards, the test results are both the “worst case” and “worst setup”: X axis (see the test setup photo)			

5.4 Measurement Uncertainty

Parameters	Expanded Uncertainty
Radiated Emission (9kHz ~ 30MHz)	±3.12 dB (k=2)
Radiated Emission (30MHz ~ 1000MHz)	±4.32 dB (k=2)
Radiated Emission (1GHz ~ 18GHz)	±5.16 dB (k=2)
Radiated Emission (18GHz ~ 40GHz)	±3.20 dB (k=2)

5.5 Description of Support Units

N/A

5.6 Laboratory Facility

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

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

Shenzhen Zhongjian Nanfang Testing 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 Shenzhen Zhongjian Nanfang Testing 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 17025:2005 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>

5.7 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd.
 Address: No.110~116, Building B, Jinyuan Business Building, Xixiang Road, Bao'an District, Shenzhen, Guangdong, China
 Tel: +86-755-23118282, Fax: +86-755-23116366
 Email: info@ccis-cb.com, Website: http://www.ccis-cb.com

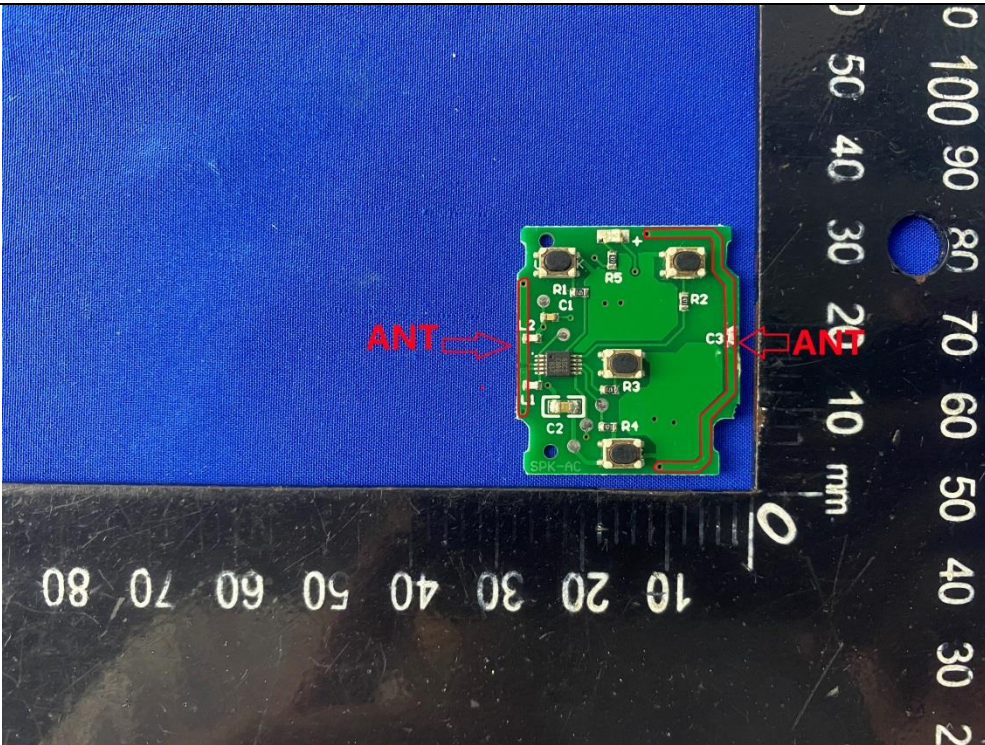
5.8 Test Instruments list

Radiated Emission:					
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
3m SAC	SAEMC	9m*6m*6m	966	07-22-2017	07-21-2020
Loop Antenna	SCHWARZBECK	FMZB1519B	00044	03-18-2020	03-17-2021
BiConiLog Antenna	SCHWARZBECK	VULB9163	497	03-18-2020	03-17-2021
Horn Antenna	SCHWARZBECK	BBHA9120D	916	03-18-2020	03-17-2021
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170582	11-18-2019	11-17-2020
EMI Test Software	AUDIX	E3	6.110919b	N/A	N/A
Pre-amplifier	HP	8447D	2944A09358	03-18-2020	03-17-2021
Pre-amplifier	CD	PAP-1G18	11804	03-18-2020	03-17-2021
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	03-18-2020	03-17-2021
Spectrum analyzer	Rohde & Schwarz	FSP40	100363	11-18-2019	11-17-2020
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	03-18-2020	03-17-2021
Cable	ZDECL	Z108-NJ-NJ-81	1608458	03-18-2020	03-17-2021
Cable	MICRO-COAX	MFR64639	K10742-5	03-18-2020	03-17-2021
Cable	SUHNER	SUCOFLEX100	58193/4PE	03-18-2020	03-17-2021

Conducted Emission:					
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (mm-dd-yy)	Cal. Due date (mm-dd-yy)
EMI Test Receiver	Rohde & Schwarz	ESCI	101189	03-18-2020	03-17-2021
Pulse Limiter	SCHWARZBECK	OSRAM 2306	9731	03-18-2020	03-17-2021
LISN	CHASE	MN2050D	1447	03-18-2020	03-17-2021
LISN	Rohde & Schwarz	ESH3-Z5	8438621/010	07-21-2017	07-20-2020
Cable	HP	10503A	N/A	03-18-2020	03-17-2021
EMI Test Software	AUDIX	E3	6.110919b	N/A	N/A

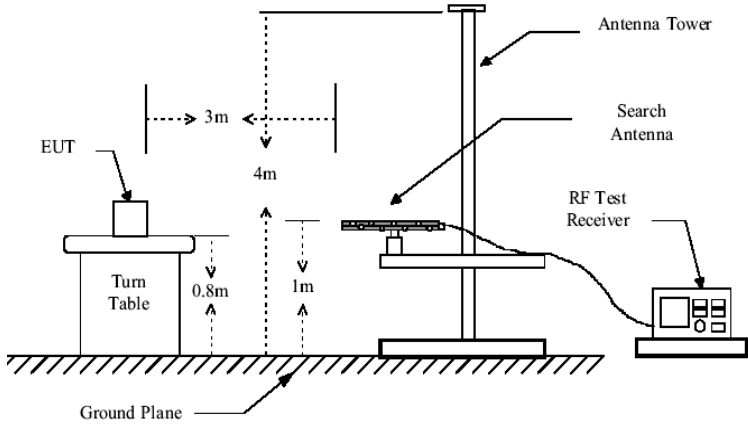
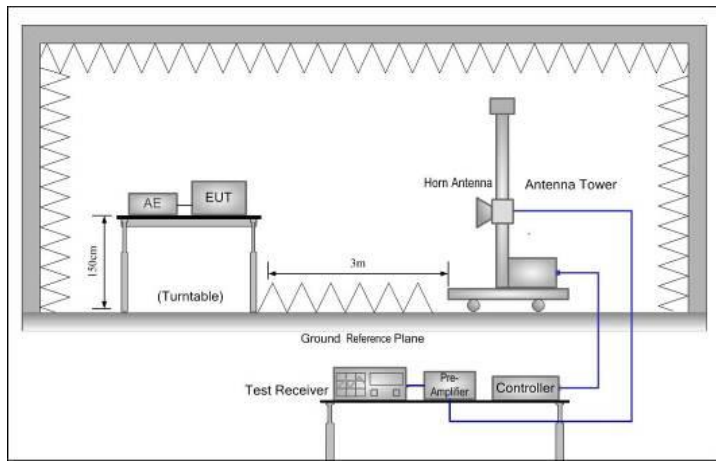
6 Test results and Measurement Data

6.1 Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203
<p><i>15.203 requirement:</i> <i>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.</i></p>	
E.U.T Antenna:	
<p>The EUT make use of an PCB antenna, The typical gain of the antenna is 0dBi.</p>	
	

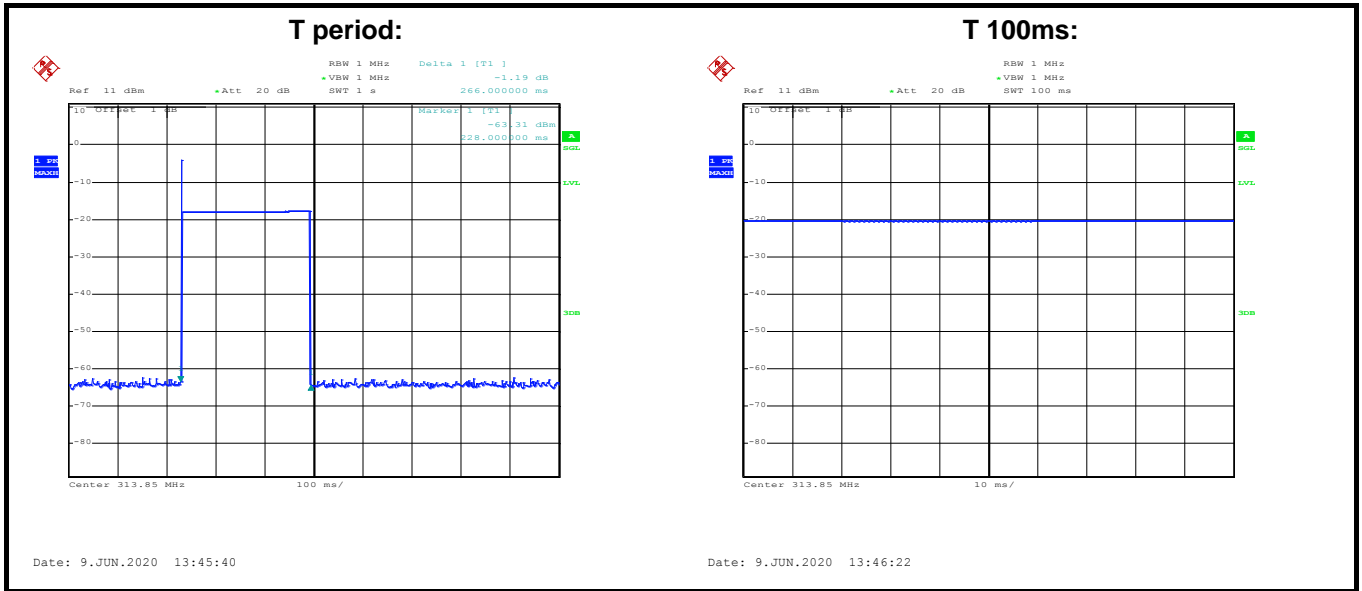
6.2 Radiated Emission

Test Requirement:	FCC Part15 C Section 15.231(b) and 15.209 RSS-210 Annex A Section A.1.2				
Test Method:	ANSI C63.4:2014				
Test Frequency Range:	30MHz to 5000MHz				
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
Limit: (Field strength of the fundamental signal)	Frequency	Limit (dBuV/m @3m)		Remark	
	313.85MHz	75.5		Average Value	
		95.5		Peak Value	
Limit: (Spurious Emissions)	Frequency	Limit (dBuV/m @3m)		Remark	
	30MHz-88MHz	40.0		Quasi-peak Value	
	88MHz-216MHz	43.5		Quasi-peak Value	
	216MHz-960MHz	46.0		Quasi-peak Value	
	960MHz-1GHz	54.0		Quasi-peak Value	
	Above 1GHz	54.0		Average Value	
		74.0		Peak Value	
Or The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level whichever limit permits higher field strength.					
Test Procedure:	<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>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.</p>				

<p>Test setup:</p>	<p>Below 1GHz</p>  <p>Above 1GHz</p> 
<p>Test Instruments:</p>	<p>Refer to section 5.8 for details</p>
<p>Test mode:</p>	<p>Refer to section 5.3 for details</p>
<p>Test results:</p>	<p>Pass</p>

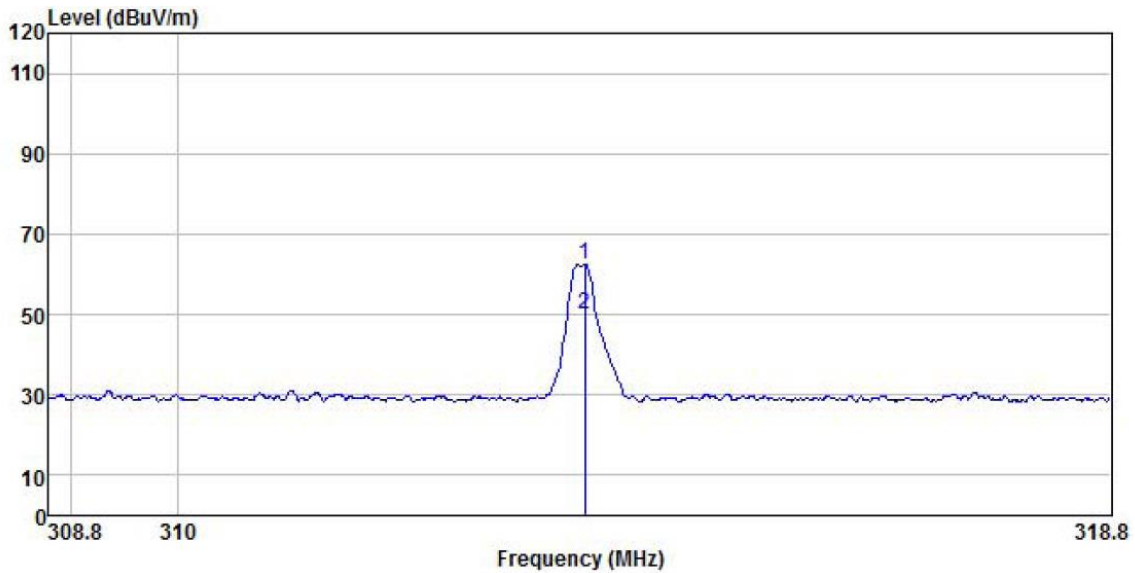
6.2.1 Field Strength Of The Fundamental Signal

Peak value							
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
313.85	40.90	18.73	2.98	62.61	95.55	-32.94	Vertical
313.85	52.54	18.73	2.98	74.25	95.55	-21.30	Horizontal
Average value							
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
313.85	28.20	18.73	2.98	49.91	75.55	-25.64	Vertical
313.85	45.90	18.73	2.98	67.61	75.55	-7.94	Horizontal
Calculate Formula:		Average value = Peak value + Duty Cycle Factor					
		Duty cycle factor = $20\log(\text{Duty cycle})$					
		Duty cycle = on time/100 milliseconds or period, whichever is less					
Test data:		T on time =100(ms)					
		T period = 266(ms)>100(ms)					
		Duty cycle = 100%					
		Duty cycle factor = $20\log(\text{Duty cycle}) = 0$					



Test Plots:

Product Name:	keyless transmitter	Product Model:	RT-AC439H
Test By:	Yaro	Test mode:	Tx mode
Test Frequency:	313.85 MHz	Polarization:	Vertical
Test Voltage:	DC 3V	Environment:	Temp: 24°C Humi: 57%

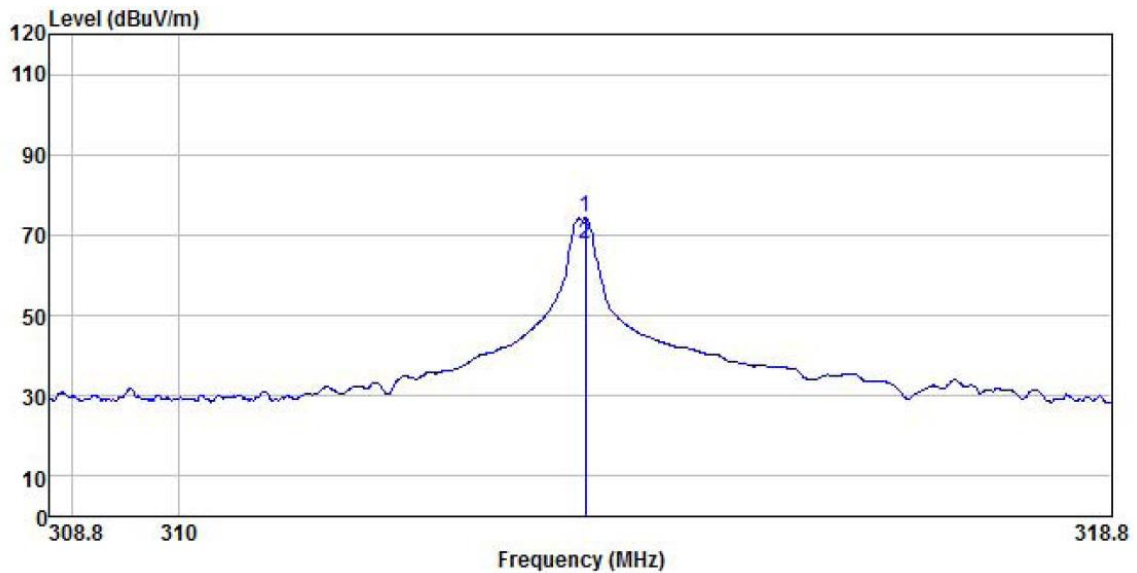


	Read Freq	Antenna Level	Antenna Factor	Cable Loss	Aux Factor	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	313.810	40.90	18.73	2.98	0.00	0.00	62.61	-----	-----	Peak
2	313.810	28.20	18.73	2.98	0.00	0.00	49.91	-----	-----	Average

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor.

Product Name:	keyless transmitter	Product Model:	RT-AC439H
Test By:	Yaro	Test mode:	Tx mode
Test Frequency:	313.85 MHz	Polarization:	Horizontal
Test Voltage:	DC 3V	Environment:	Temp: 24°C Humi: 57%



	Freq	Read Level	Antenna Factor	Cable Loss	Aux Factor	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	313.810	52.54	18.73	2.98	0.00	0.00	74.25	-----	-----	Peak
2	313.810	45.90	18.73	2.98	0.00	0.00	67.61	-----	-----	Average

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor.

6.2.2 Spurious Emissions

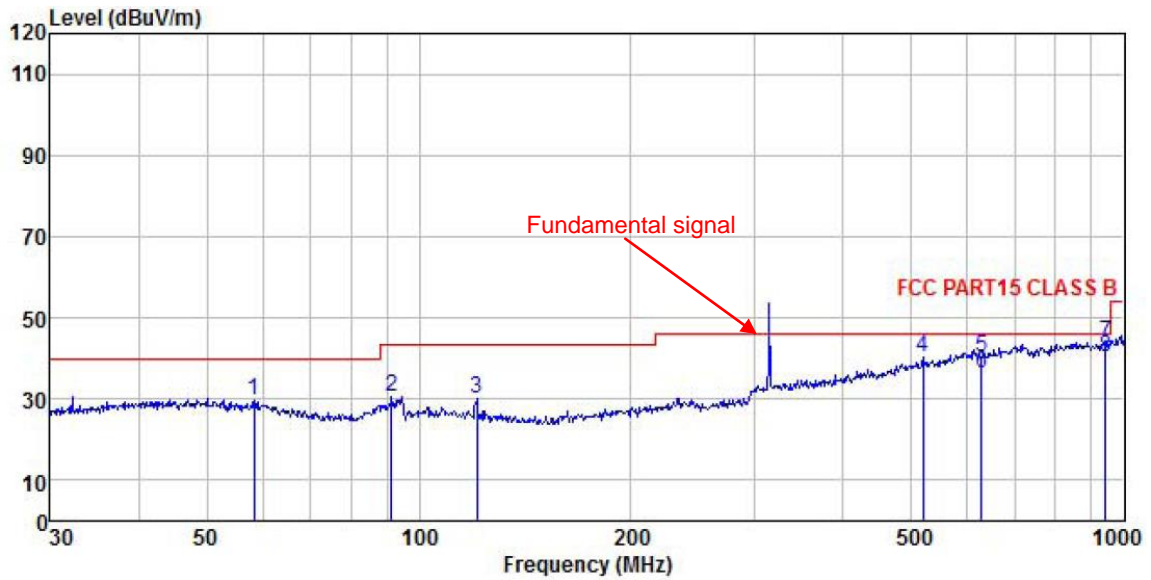
Below 1GHz (30MHz-1000MHz)								
Peak value								
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
627.70	16.47	20.01	3.90	0.00	40.38	75.55	-35.17	Vertical
941.55	17.12	22.77	4.13	0.00	44.02	75.55	-31.53	Vertical
627.70	17.52	20.01	3.90	0.00	41.43	75.55	-34.12	Horizontal
941.55	16.27	22.77	4.13	0.00	43.17	75.55	-32.38	Horizontal
Average value								
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
627.70	12.39	20.01	3.90	0.00	36.30	55.55	-19.25	Vertical
941.55	13.54	22.77	4.13	0.00	40.44	55.55	-15.11	Vertical
627.70	13.52	20.01	3.90	0.00	37.43	55.55	-18.12	Horizontal
941.55	12.41	22.77	4.13	0.00	39.31	55.55	-16.24	Horizontal

Above 1GHz									
Peak value									
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable Loss (dB)	Aux Factor (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1255.40	45.20	24.60	3.40	1.23	41.05	33.38	75.55	-42.17	Vertical
1569.25	48.05	24.96	3.81	1.39	41.03	37.18	74.00	-36.82	Vertical
1883.10	44.96	25.55	4.21	1.55	41.42	34.85	75.55	-40.70	Vertical
2196.95	45.68	26.54	4.50	1.64	41.68	36.68	75.55	-38.87	Vertical
2510.80	45.16	27.33	4.84	1.70	41.90	37.13	75.55	-38.42	Vertical
2824.65	45.65	28.02	5.15	1.83	41.63	39.02	74.00	-34.98	Vertical
3138.50	45.42	28.49	5.40	1.98	41.43	39.86	75.55	-35.69	Vertical
1255.40	46.24	24.60	3.40	1.23	41.05	34.42	75.55	-41.13	Horizontal
1569.25	45.52	24.96	3.81	1.39	41.03	34.65	74.00	-39.35	Horizontal
1883.10	45.17	25.55	4.21	1.55	41.40	35.08	75.55	-40.47	Horizontal
2196.95	45.54	26.54	4.50	1.64	41.68	36.54	75.55	-39.01	Horizontal
2510.80	46.02	27.33	4.84	1.70	41.90	37.99	75.55	-37.56	Horizontal
2824.65	46.21	28.02	5.15	1.83	41.64	39.57	74.00	-34.43	Horizontal
3138.50	45.44	28.49	5.40	1.98	41.44	39.87	75.55	-35.68	Horizontal

Average value									
Frequency (MHz)	Read Level (dBuV/m)	Antenna Factor (dB/m)	Cable Loss (dB)	Aux Factor (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1255.40	40.15	24.60	3.40	1.23	41.05	28.33	55.55	-27.22	Vertical
1569.25	43.57	24.96	3.81	1.39	41.03	32.70	54.00	-21.30	Vertical
1883.10	40.01	25.55	4.21	1.55	41.42	29.90	55.55	-25.65	Vertical
2196.95	40.29	26.54	4.50	1.64	41.68	31.29	55.55	-24.26	Vertical
2510.80	40.37	27.33	4.84	1.70	41.90	32.34	55.55	-23.21	Vertical
2824.65	40.31	28.02	5.15	1.83	41.63	33.68	54.00	-20.32	Vertical
3138.50	40.28	28.49	5.40	1.98	41.43	34.72	55.55	-20.83	Vertical
1255.40	40.15	24.60	3.40	1.23	41.05	28.33	55.55	-27.22	Horizontal
1569.25	40.51	24.96	3.81	1.39	41.03	29.64	54.00	-24.36	Horizontal
1883.10	40.61	25.55	4.21	1.55	41.40	30.52	55.55	-25.03	Horizontal
2196.95	40.52	26.54	4.50	1.64	41.68	31.52	55.55	-24.03	Horizontal
2510.80	41.13	27.33	4.84	1.70	41.90	33.10	55.55	-22.45	Horizontal
2824.65	41.20	28.02	5.15	1.83	41.64	34.56	54.00	-19.44	Horizontal
3138.50	40.52	28.49	5.40	1.98	41.44	34.95	55.55	-20.60	Horizontal

Test Plots:

Product Name:	keyless transmitter	Product Model:	RT-AC439H
Test By:	Yaro	Test mode:	Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Vertical
Test Voltage:	DC 3V	Environment:	Temp: 24°C Humi: 57%

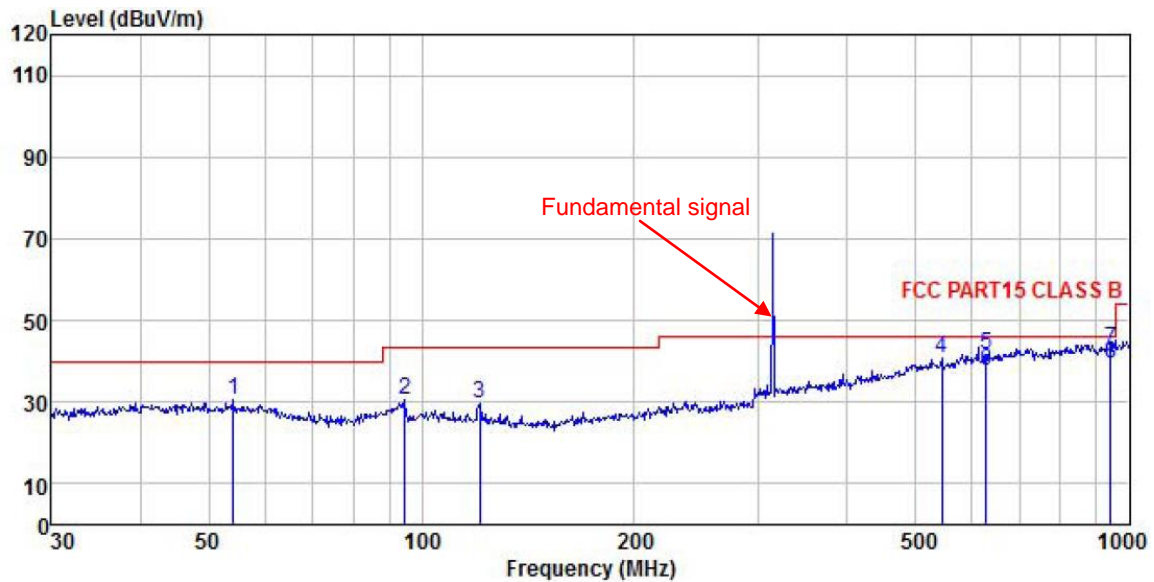


	Read Freq	Antenna Level	Antenna Factor	Cable Loss	Aux Factor	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	58.407	17.35	10.96	1.37	0.00	0.00	29.68	40.00	-10.32	QP
2	91.495	19.24	9.47	2.03	0.00	0.00	30.74	43.50	-12.76	QP
3	120.699	17.25	10.82	2.18	0.00	0.00	30.25	43.50	-13.25	QP
4	519.065	17.06	19.48	3.72	0.00	0.00	40.26	46.00	-5.74	QP
5	627.274	16.47	20.01	3.90	0.00	0.00	40.38	46.00	-5.62	Peak
6	627.274	12.39	20.01	3.90	0.00	0.00	36.30	46.00	-9.70	Average
7	942.131	17.12	22.77	4.13	0.00	0.00	44.02	46.00	-1.98	Peak
8	942.131	13.54	22.77	4.13	0.00	0.00	40.44	46.00	-5.56	Average

Remark:

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

Product Name:	keyless transmitter	Product Model:	RT-AC439H
Test By:	Yaro	Test mode:	Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Horizontal
Test Voltage:	DC 3V	Environment:	Temp: 24°C Humi: 57%

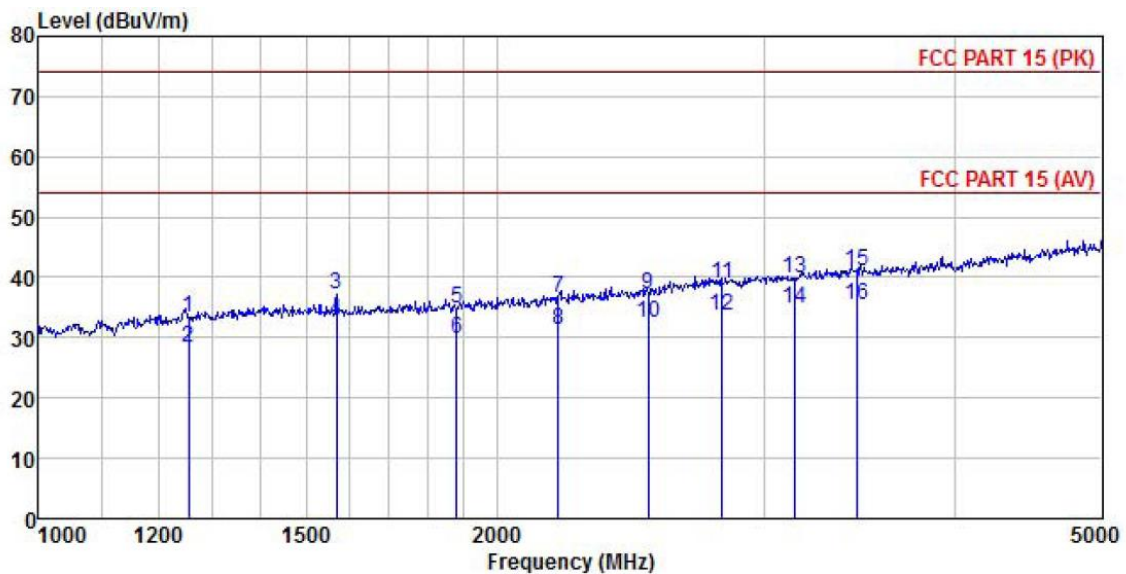


	Read Freq	Antenna Level	Cable Factor	Aux Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	54.261	17.56	11.58	1.34	0.00	30.48	40.00	-9.52	QP
2	94.760	19.22	9.41	2.01	0.00	30.64	43.50	-12.86	QP
3	120.699	16.76	10.82	2.18	0.00	29.76	43.50	-13.74	QP
4	543.274	17.49	19.57	3.85	0.00	40.91	46.00	-5.09	QP
5	627.274	17.52	20.01	3.90	0.00	41.43	46.00	-4.57	Peak
6	627.274	13.52	20.01	3.90	0.00	37.43	46.00	-8.57	Average
7	942.131	16.27	22.77	4.13	0.00	43.17	46.00	-2.83	Peak
8	942.131	12.41	22.77	4.13	0.00	39.31	46.00	-6.69	Average

Remark:

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

Product Name:	keyless transmitter	Product Model:	RT-AC439H
Test By:	Yaro	Test mode:	Tx mode
Test Frequency:	1 GHz ~ 5 GHz	Polarization:	Vertical
Test Voltage:	DC 3V	Environment:	Temp: 24°C Humi: 57%

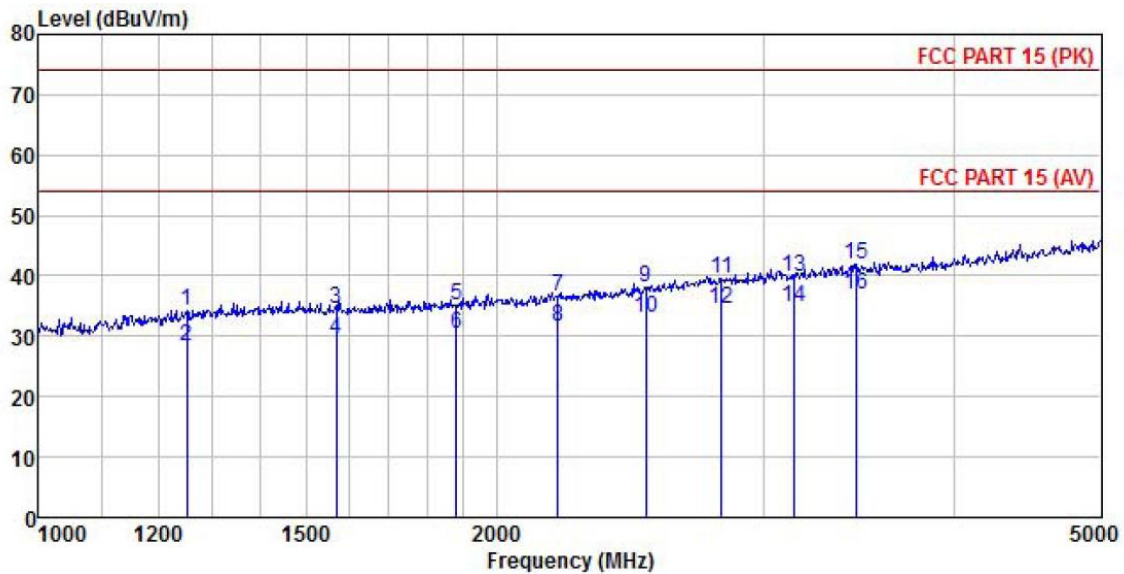


	Freq	ReadAntenna	Cable	Aux	Preamp	Level	Limit	Over	Remark
	MHz	Level	Factor	Loss	Factor	Factor	Line	Limit	
		dBuV	dB/m	dB	dB	dB	dBuV/m	dBuV/m	dB
1	1254.743	45.20	24.60	3.40	1.23	41.05	33.38	74.00	-40.62 Peak
2	1254.743	40.15	24.60	3.40	1.23	41.05	28.33	54.00	-25.67 Average
3	1569.320	48.05	24.96	3.81	1.39	41.03	37.18	74.00	-36.82 Peak
4	1569.320	43.57	24.96	3.81	1.39	41.03	32.70	54.00	-21.30 Average
5	1882.328	44.96	25.55	4.21	1.55	41.40	34.87	74.00	-39.13 Peak
6	1882.328	40.01	25.55	4.21	1.55	41.40	29.92	54.00	-24.08 Average
7	2196.829	45.68	26.54	4.50	1.64	41.68	36.68	74.00	-37.32 Peak
8	2196.829	40.29	26.54	4.50	1.64	41.68	31.29	54.00	-22.71 Average
9	2514.837	45.16	27.33	4.84	1.70	41.90	37.13	74.00	-36.87 Peak
10	2514.837	40.37	27.33	4.84	1.70	41.90	32.34	54.00	-21.66 Average
11	2814.736	45.65	28.02	5.15	1.83	41.65	39.00	74.00	-35.00 Peak
12	2814.736	40.31	28.02	5.15	1.83	41.65	33.66	54.00	-20.34 Average
13	3140.275	45.42	28.49	5.40	1.98	41.44	39.85	74.00	-34.15 Peak
14	3140.275	40.28	28.49	5.40	1.98	41.44	34.71	54.00	-19.29 Average
15	3453.082	45.82	28.68	5.70	2.17	41.41	40.96	74.00	-33.04 Peak
16	3453.082	40.36	28.68	5.70	2.17	41.41	35.50	54.00	-18.50 Average

Remark:

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

Product Name:	keyless transmitter	Product Model:	RT-AC439H
Test By:	Yaro	Test mode:	Tx mode
Test Frequency:	1 GHz ~ 5 GHz	Polarization:	Horizontal
Test Voltage:	DC 3V	Environment:	Temp: 24°C Humi: 57%

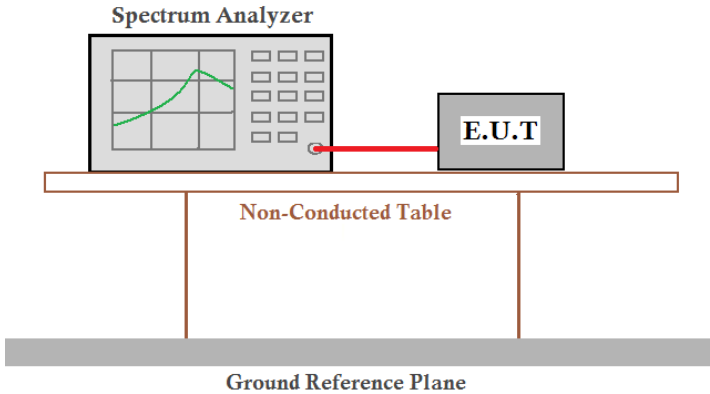


	Freq	Read Level	Antenna Factor	Cable Loss	Aux Factor	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	1250.711	46.24	24.56	3.39	1.23	41.05	34.37	74.00	-39.63	Peak
2	1250.711	40.15	24.56	3.39	1.23	41.05	28.28	54.00	-25.72	Average
3	1569.320	45.52	24.96	3.81	1.39	41.03	34.65	74.00	-39.35	Peak
4	1569.320	40.51	24.96	3.81	1.39	41.03	29.64	54.00	-24.36	Average
5	1882.328	45.17	25.55	4.21	1.55	41.40	35.08	74.00	-38.92	Peak
6	1882.328	40.61	25.55	4.21	1.55	41.40	30.52	54.00	-23.48	Average
7	2196.829	45.54	26.54	4.50	1.64	41.68	36.54	74.00	-37.46	Peak
8	2196.829	40.52	26.54	4.50	1.64	41.68	31.52	54.00	-22.48	Average
9	2510.793	46.02	27.33	4.84	1.70	41.90	37.99	74.00	-36.01	Peak
10	2510.793	41.13	27.33	4.84	1.70	41.90	33.10	54.00	-20.90	Average
11	2814.736	46.21	28.02	5.15	1.83	41.65	39.56	74.00	-34.44	Peak
12	2814.736	41.20	28.02	5.15	1.83	41.65	34.55	54.00	-19.45	Average
13	3140.275	45.44	28.49	5.40	1.98	41.44	39.87	74.00	-34.13	Peak
14	3140.275	40.52	28.49	5.40	1.98	41.44	34.95	54.00	-19.05	Average
15	3453.082	46.75	28.68	5.70	2.17	41.41	41.89	74.00	-32.11	Peak
16	3453.082	41.62	28.68	5.70	2.17	41.41	36.76	54.00	-17.24	Average

Remark:

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

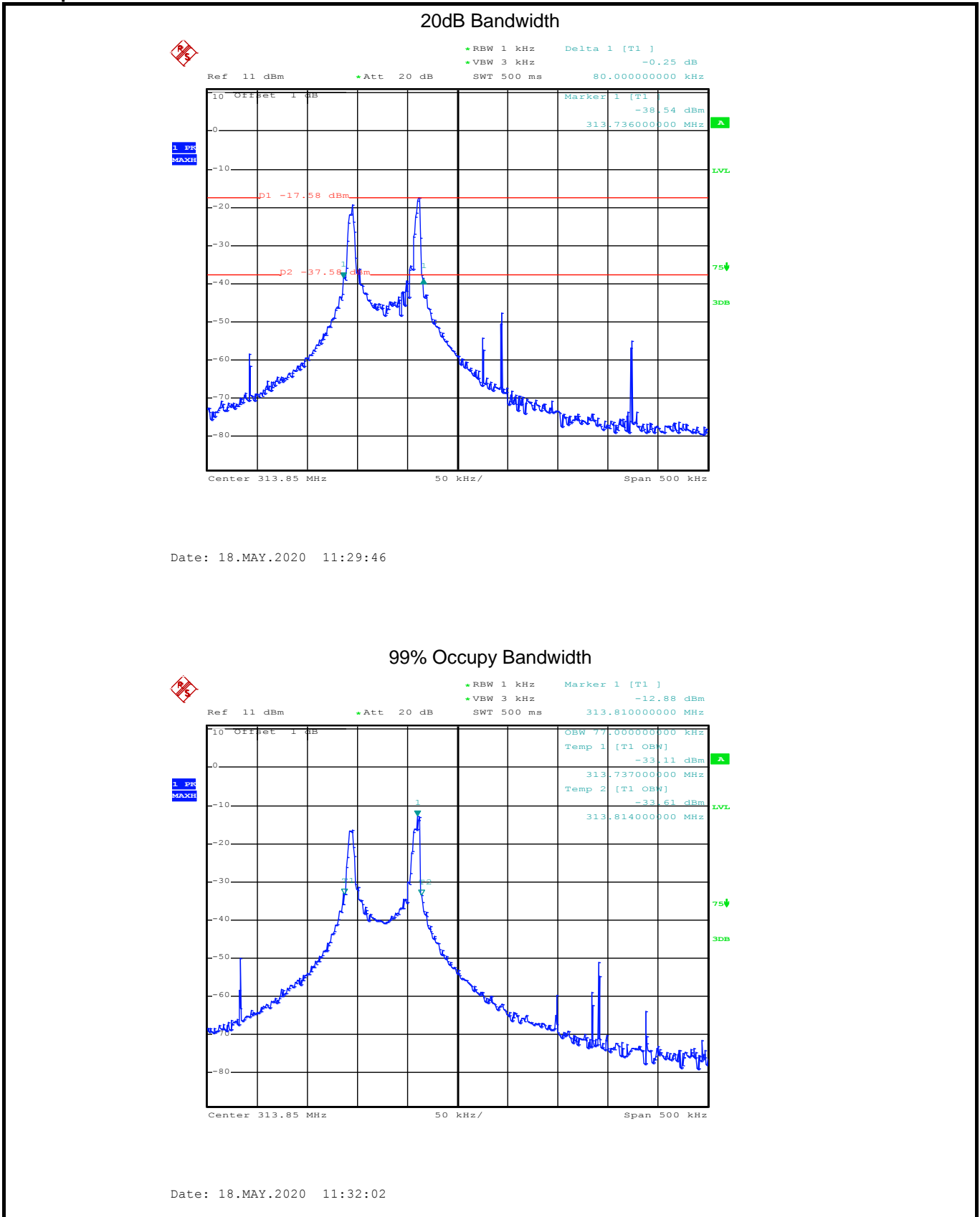
6.3 Occupy Bandwidth

Test Requirement:	FCC Part15 C Section 15.231 (c) RSS-210 Annex A Section A.1.3
Test Method:	ANSI C63.4:2014
Receiver setup:	RBW=1kHz, VBW=3kHz, detector: Peak
Limit:	FCC: 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. IC: The 99% bandwidth of momentarily operated devices shall be less or equal to 0.25% of the centre frequency for devices operating between 70 MHz and 900 MHz. For devices operating above 900 MHz, the 99% bandwidth shall be less or equal to 0.5% of the centre frequency.
Test Procedure:	<ol style="list-style-type: none"> 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:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 5.7 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data

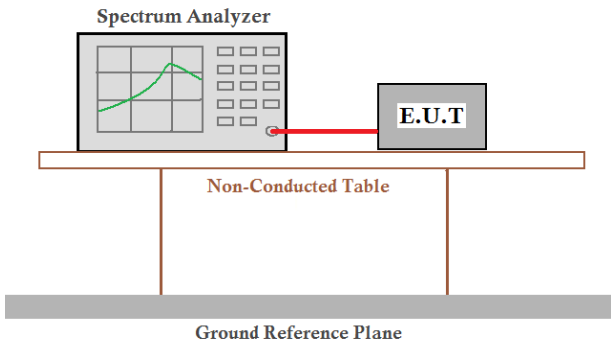
20dB Bandwidth (MHz)	99% Occupy Bandwidth (MHz)	Limit (MHz)	Results
0.080	0.077	0.784625	Pass
Note: 1. Limit= Fundamental frequency×0.25%=313.85×0.25%=0.784625			

Test plot as follows:



99% Occupy Bandwidth

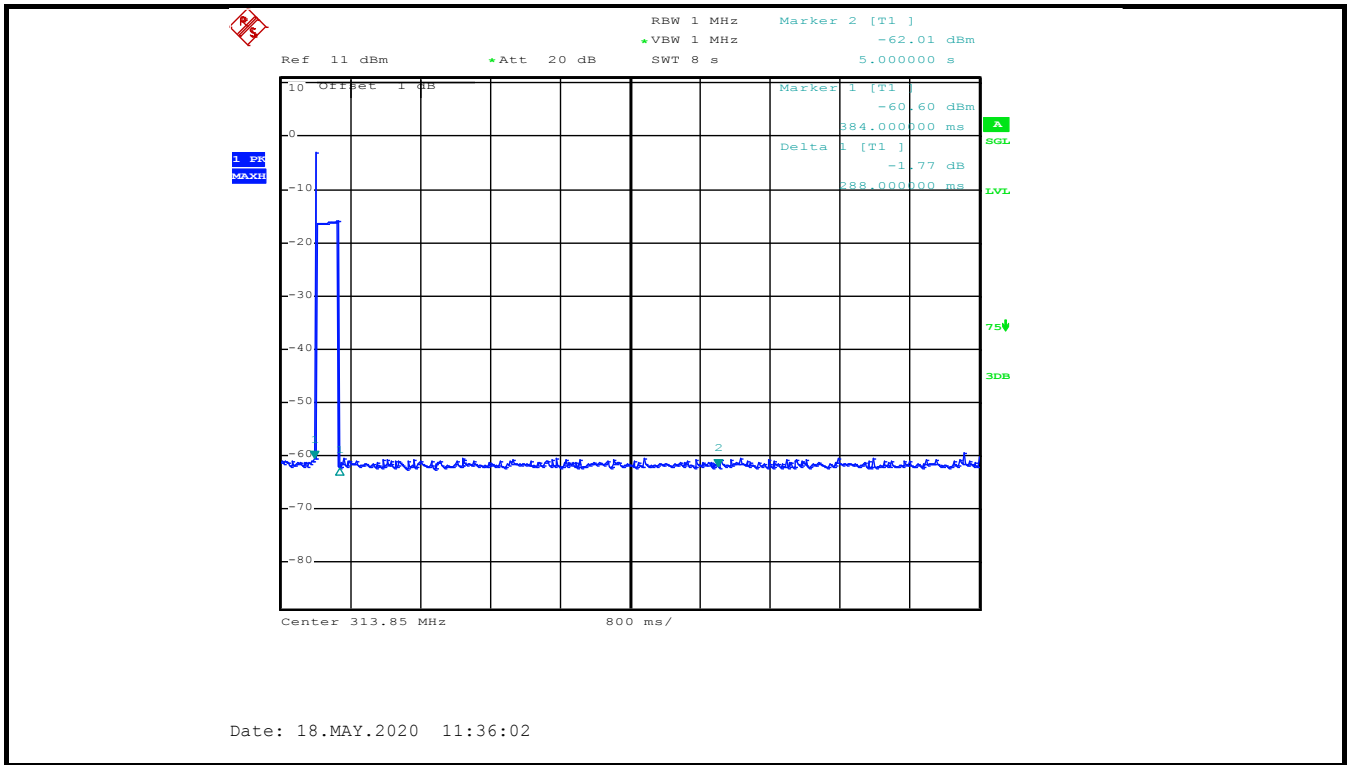
6.4 Duration Time

Test Requirement:	FCC Part15 C Section 15.231 (a) (1) RSS-210 Annex A Section A.1.1 (a)
Test Method:	ANSI C63.4:2014
Receiver setup:	RBW=100kHz, VBW=300kHz, span=0Hz, detector: Peak
Limit:	Not more than 5 seconds
Test mode:	Transmitting mode
Test Procedure:	<ol style="list-style-type: none"> 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:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 5.7 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data

Duration time (second)	Limit (second)	Result
0.288	<5.0	Pass

Test plot as follows:



6.5 Frequency Stability

Test Requirement:	RSS-GEN Section 8.11
Limit:	kept within at least the central 80% of its permitted operating frequency band.
Test setup:	<p style="text-align: center;">Temperature Chamber</p> <p style="text-align: center;">Spectrum analyzer Att. EUT</p> <p style="text-align: center;">Variable Power Supply</p> <p>Note : Measurement setup for testing on Antenna connector</p>
Test procedure:	<ol style="list-style-type: none"> 1. The EUT is installed in an environment test chamber with external power source. 2. Set the chamber to operate at 50 centigrade and external power source to output at nominal voltage of EUT. 3. A sufficient stabilization period at each temperature is used prior to each frequency measurement. 4. When temperature is stabled, measure the frequency stability. 5. The test shall be performed under -30 to 50 centigrade and 85 to 115 percent of the nominal voltage. Change setting of chamber and external power source to complete all conditions.
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed

Measurement Data:

Voltage vs. Frequency Stability

Test conditions		Measurement Frequency (MHz)	Limit (MHz)
Temp(°C)	Voltage(ac)		
20	3.2V	313.811	281 ~ 449
	3.0V	313.803	
	2.5V	313.786	

Note: EUT stops working when the supply voltage is lower than DC 2.5V.

Temperature vs. Frequency Stability

Test conditions		Frequency(MHz)	Limit (MHz)
Voltage(dc)	Temp(°C)		
3 V	-20	313.784	281 ~ 449
	-10	313.795	
	0	313.811	
	10	313.808	
	20	313.803	
	30	313.805	
	40	313.790	
	50	313.785	

Test plot as follows (worst case):

