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Report No.: SHEM140800198203

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1 Cover Page

FCC REPORT

Application No.:	SHEM1408001982RF
Applicant:	RIDEMAKERZ LLC.
FCC ID:	2ACX9503082
Equipment Under Test (EUT): NOTE: The following sample(s) submitted was/were identified on behalf of the client as	
Product Name:	RC Transmitters
Model No.(EUT):	503082 Transmitter 49 Mhz Green
Standards:	FCC Part 15.235: 2013
Date of Receipt:	August 07, 2014
Date of Test:	August 13, 2014
Date of Issue:	August 18, 2014
Test Result:	Pass*

*In the configuration tested, the EUT detailed in this report complied with the standards specified above.



Tony Wu

E&E Section Manager

SGS-CSTC (Shanghai) Co., Ltd.

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. 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.



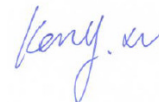
The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00		August 18, 2014		Original

Authorized for issue by:				
Engineer		Eddy Zong _____ Print Name		 _____ Print Name
Clerk		Susie Liu _____ Print Name		 _____ Print Name
Reviewer		Kenx Xu _____ Print Name		 _____ Print Name

3 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	FCC Part 15, Subpart C Section 15.203	---	PASS
AC Power Line Conducted Emission	FCC Part 15, Subpart C Section 15.207	ANSI C63.10 (2009) Section 6.2	N/A*
Field Strength of the Fundamental Signal	FCC Part 15, Subpart C Section 15.235	ANSI C63.10 (2009) Section 6.3.1	PASS
Radiated Emissions	FCC Part 15, Subpart C Section 15.209 and Section 15.235	ANSI C63.10 (2009) Section 6.12	PASS
20dB Bandwidth	FCC Part 15, Subpart C Section 15.215	ANSI C63.10 (2009) Section 6.9	PASS

Note:* Please refer to Section 7.2 of this report for details.

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5 General Information

5.1 Client Information

Applicant: RIDEMAKERZ LLC.
Address of Applicant: 8191 Strawberry Lane, Suite 3, Falls Church, VA 22042, USA
Manufacturer: Not supplied by the client.
Address of Manufacturer: Not supplied by the client.
Factory: Win Bright Manufacturing Ltd.
Address of Factory: Foreign Economic District, Shang Ling Village, Heng Li Town, Dongguan City, Guangdong Province, PRC

5.2 General Description of E.U.T.

Product Description: Portable product
Battery: Battery Type: ZINC CHLORIDE
Model No.: 9V 6F22
Technical Spec: DC 9V
Remark: Supply the EUT with a new charged battery during the testing.

5.3 Technical Specifications:

Operation Frequency: 49.860 MHz
Modulation Type: AM
Antenna Type: Integral antenna

5.4 E.U.T Operation Mode

Test Mode	Description of Test Mode
Engineering mode:	Keep EUT working in continuously transmitting mode.
Remark: 1. The EUT antenna is extended 2. The final measurement is performed in worst case emission of which key and switch combination. (Band 1, moving backward)	

5.5 Test Environment

Operating Environment:	
Temperature:	24.0 °C
Humidity:	52 % RH
Atmospheric Pressure:	100.8 kPa

5.6 Description of Support Units

The EUT has been tested independently.

5.7 Test Location

All tests were performed at:
SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. E&E Lab
No.588 West Jindu Road, Songjiang District, Shanghai, China. 201612.
Tel: +86 21 6191 5666
Fax: +86 21 6191 5678
No tests were sub-contracted.

5.8 Test Facility

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

- **CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing. Date of expiry: 2017-07-14.

- **FCC – Registration No.: 402683**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered and fully described in a report filed with the Federal Communications Commission (FCC). The acceptance letter from the FCC is maintained in our files. Registration No.: 402683, Expiry Date: 2015-02-22.

- **Industry Canada (IC) – IC Assigned Code: 8617A**

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 8617A-1. Expiry Date: 2017-06-18.

- **VCCI (Member No.: 3061)**

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-3868 and C-4336 respectively. Date of Registration: 2012-05-29. Date of Expiry: 2015-05-28.

6 Equipments List

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due date
1	EMI test receiver	Rohde & Schwarz	ESCS30	100086	2014-02-14	2015-02-13
2	Line impedance stabilization network	SCHWARZBECK	NSLK8127	8127-490	2014-02-14	2015-02-13
3	Line impedance stabilization network	ETS	3816/2	00034161	2014-02-14	2015-02-13
4	Spectrum Analyzer	Rohde & Schwarz	FSP-30	2705121009	2014-02-14	2015-02-13
5	EMI test receiver	Rohde & Schwarz	ESU40	100109	2014-02-14	2015-02-13
6	Active Loop Antenna (9kHz to 30MHz)	Rohde & Schwarz	FMZB 1519	1519-034	2014-03-19	2015-03-18
7	Broadband UHF-VHF ANTENNA (25MHz to 2GHz)	SCHWARZBECK	VULB9168	9168-313	2014-02-14	2015-02-13
8	Ultra broadband antenna (25MHz to 3GHz)	Rohde & Schwarz	HL562	100227	2013-10-09	2014-10-08
9	Horn Antenna (1GHz to 18GHz)	Rohde & Schwarz	HF906	100284	2014-02-14	2015-02-13
10	Horn Antenna (1GHz to 18GHz)	SCHWARZBECK	BBHA9120D	9120D-679	2014-07-28	2015-07-27
11	Horn Antenna (14GHz to 40GHz)	SCHWARZBECK	BBHA 9170	BBHA9170373	2014-02-14	2015-02-13
12	Pre-amplifier (9KHz – 2GHz)	LNA6900	TESEQ	71033	2014-02-14	2015-02-13
13	Pre-amplifier (1GHz – 26.5GHz)	Rohde & Schwarz	SCU-F0118-G40-BZ4-CSS(F)	10001	2014-02-14	2015-02-13
14	Pre-amplifier (14GHz – 40GHz)	Rohde & Schwarz	SCU-F1840-G35-BZ3-CSS(F)	10001	2014-02-14	2015-02-13
15	Tunable Notch Filter	Wainwright instruments GmbH	WRCT800.0/8 80.0-0.2/40-5SSK	9	2014-06-02	2015-06-01
16	High pass Filter	FSCW	HP 12/2800-5AA2	19A45-02	2014-06-02	2015-06-01
17	High-low temperature cabinet	Suzhou Zhihe	TL-40	50110050	2014-04-13	2015-04-12
18	AC power stabilizer	WOCEN	6100	51122	2014-06-02	2015-06-01
19	DC power	QJE	QJ30003SII	611145	2014-06-02	2015-06-01
20	Signal Generator (Interferer)	Agilent	SMR40	100555	2014-02-14	2015-02-13
21	Signal Generator (Blocker)	Rohde & Schwarz	SMJ100A	02.20.360.142	2014-02-14	2015-02-13
22	Splitter	Anritsu	MA1612A	M12265	/	/
23	Coupler	e-meca	803-S-1	900-M01	/	/

7 Test results and Measurement Data

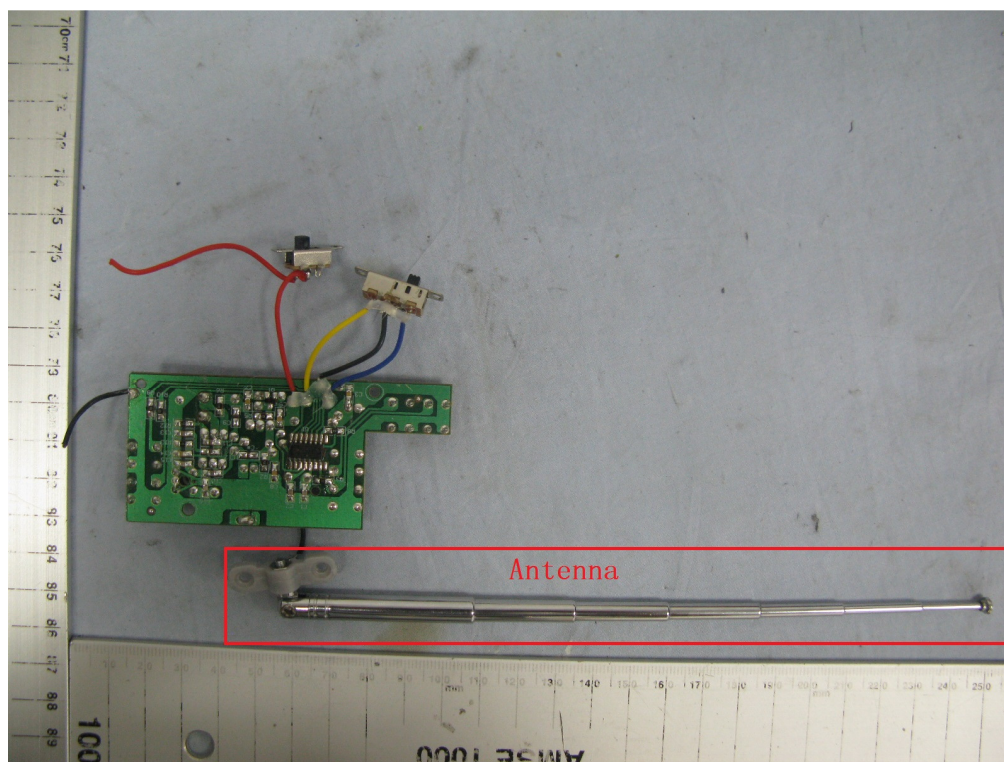
7.1 Antenna Requirement

Standard 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.

EUT Antenna:

The antenna is integrated and no consideration of replacement.

Antenna Configuration:



7.2 Conducted Emissions

Frequency Range: 150 KHz to 30 MHz

Class/Severity: Class B

Limit:

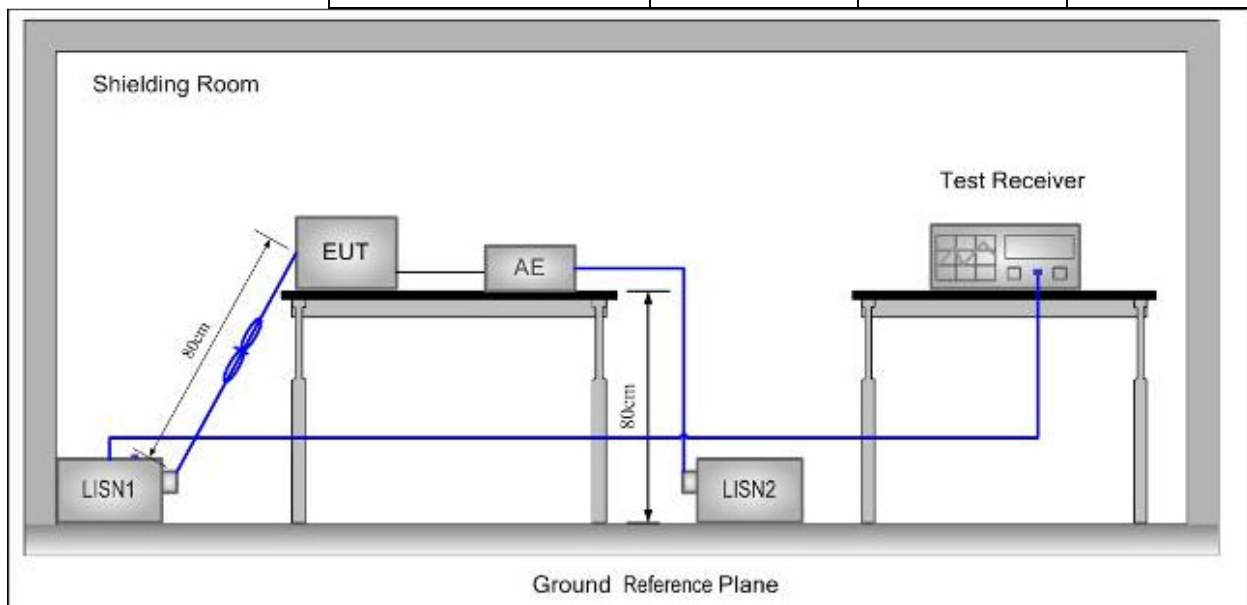
Frequency range MHz	Class B Limits: dB (μV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Note1: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50MHz.
Note2: The lower limit is applicable at the transition frequency.

Test site/setup:

Test instrumentation set-up:

Frequency Range	Detector	RBW	VBW
9KHz to 150Hz	Quasi-peak	200Hz	500Hz
150KHz to 30MHz	Quasi-peak	9kHz	30kHz



Test Procedure:

1. The mains terminal disturbance voltage was measured with the EUT in a shielded room.
2. The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN, which was bonded to the ground reference plane in the same way as the LISN for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
3. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference

plane, but separated from metallic contact with the ground reference plane by 0.1m of insulation.

4. The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance was between the closest points of the LISN and the EUT. The mains lead of EUT excess 0.8m was folded back and forth parallel to the lead so as to form a horizontal bundle with a length between 0.3m and 0.4m. All other units of the EUT and associated equipment were at least 0.8 m from the LISN.

Test Result: N/A

Test Data:

This EUT is powered by battery only; therefore the AC Conducted Emission test is not applicable.

7.3 Radiated Emissions

Test Site:

Measurement Distance: 3m (Semi-Anechoic Chamber)

Receiver Setup:

Frequency (MHz)	RBW	VBW	Detector
0.009-0.015	200Hz	1KHz	Quasi-peak
0.015-30	9kHz	30KHz	Quasi-peak
30-1000	120 kHz	300KHz	Quasi-peak

Note: The emission limits shown in the above table are based on measurement instrumentation employing a CISPR quasi-peak detector. For the frequency bands 9~90 kHz, 110~490 kHz and above 1000 MHz, the radiated emission limits are based on measurements employing an average detector.

Limit:

a. Spurious Emissions(9KHz – 1GHz)

Frequency (MHz)	Field strength (μV/m)	Measurement distance (m)	Limit @3m (dBμV/m)
0.009-0.490	2400/F(kHz)	300	128.5 ~ 93.8
0.490-1.705	24000/F(kHz)	30	73.8 ~63.0
1.705-30	30	30	69.5
30-88	100	3	40.0
88-216	150	3	43.5
216-960	200	3	46.0
960-1000	500	3	54.0

The field strength of any emissions appearing between the band edges and up to 10 kHz above and below the band edges shall be attenuated at least 26 dB below the level of the unmodulated carrier

b. Field Strength of the Fundamental Signal

Frequency	Limit (dBuV/m)	Remark
49.860 MHz	100	Peak
	80	Average

NOTE:

(1) For test distance other than what is specified, but fulfilling the requirements of section 15.31(f) (2) the field strength is calculated by adding additionally an extrapolation factor of 40dB/decade (inverse linear distance for field strength measurements).

So the Distance Extrapolation Factor in dB is $40 \cdot \log(D_{\text{TEST}} / D_{\text{SPEC}})$

where D_{TEST} = Test Distance and D_{SPEC} = Specified Distance.

Field strength limit (dBμV/m)@test distance= Field strength limit (dBμV/m)@specified distance -Distance Extrapolation Factor

(2) The lower limit shall apply at the transition frequencies.

Test Procedure:

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna

- tower.
- 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.
 - 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
 - The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
 - 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.
 - The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.

Test Setup:

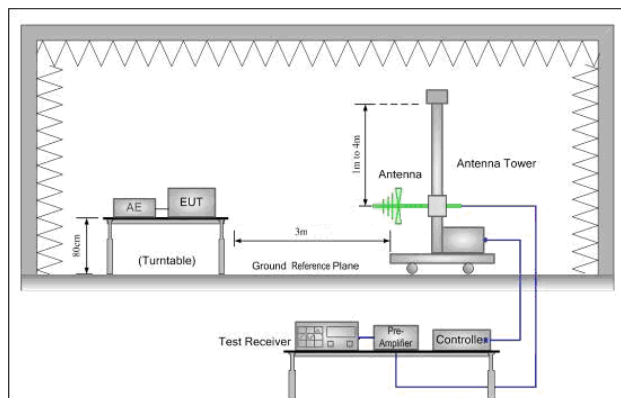


Figure 1. Below 30MHz

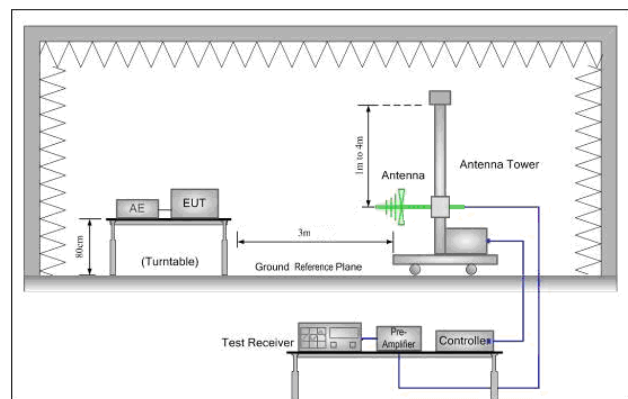


Figure 2. 30MHz to 1GHz

Test Results: Pass

7.3.1 Field Strength of the Fundamental Signal

Measurement Data

Frequency (MHz)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization	Detector
49.860	60.24	80	-19.76	H	Peak
49.860	56.62	80	-23.38	V	Peak

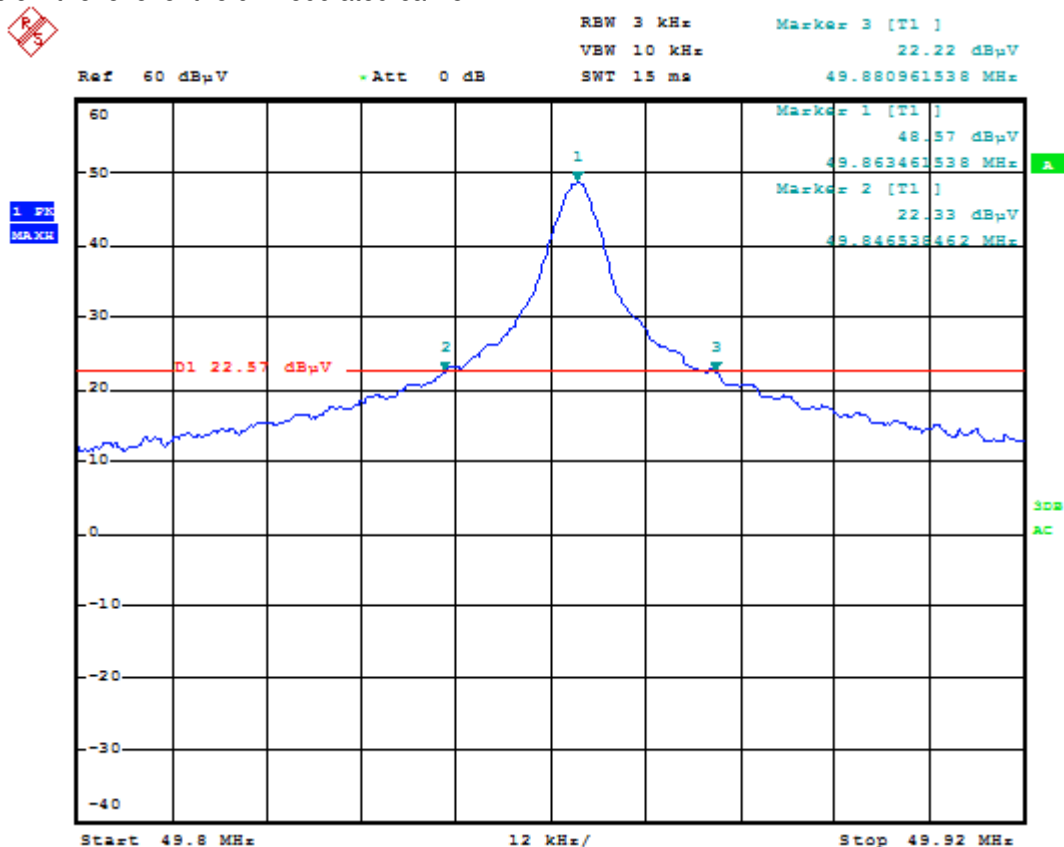
Remark:

- The basic equation with a sample calculation is as follows: Over Limit = Level - Limit Line.
- If the Peak value below the AV Limit, the AV test doesn't perform for this submission.

7.3.2 Spurious Emissions

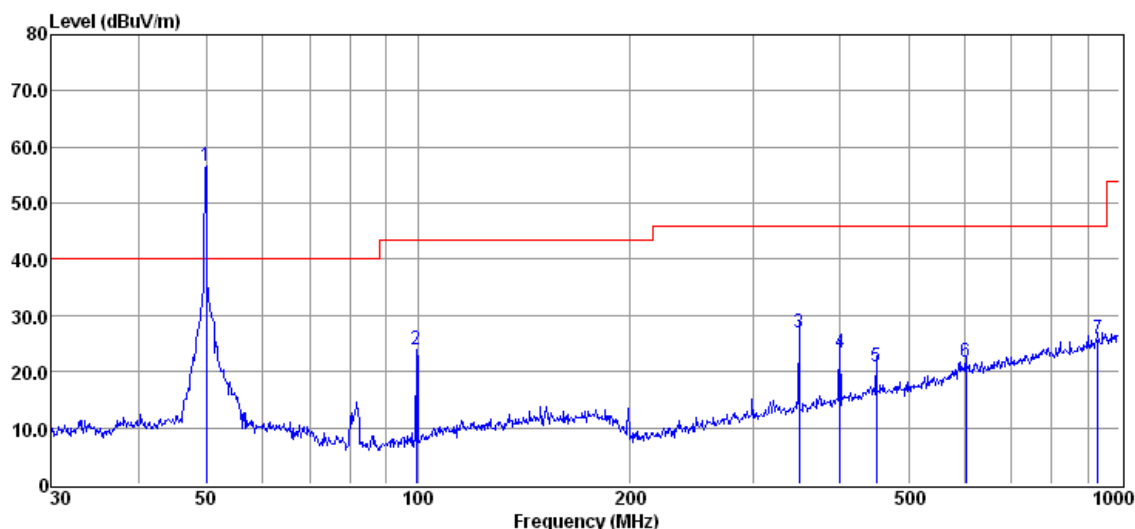
Band Edges:

The field strength of any emissions appearing between the 49.81 to 49.91MHz shall be attenuated at least 26 dB below the level of the unmodulated carrier



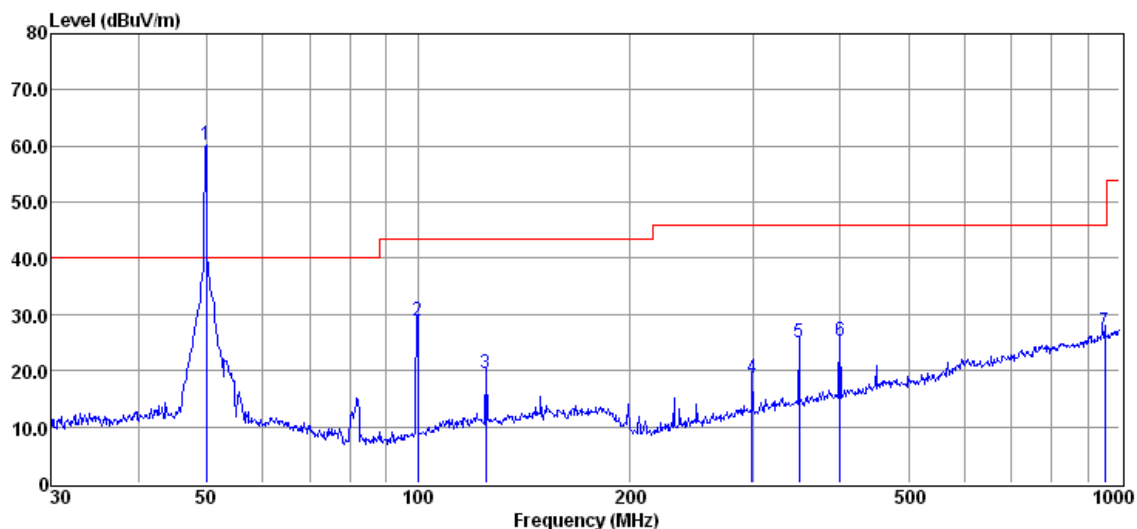
30MHz-1GHz:

Vertical



Item	Freq.	Read Level	Antenna Factor	Preamplifier Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1	49.881	67.18	12.72	23.69	0.41	56.62	N/A	Operating Frequency	
2	99.528	37.41	9.16	23.66	0.91	23.82	43.50	-19.68	QP
3	349.250	35.43	13.19	23.69	1.96	26.89	46.00	-19.11	QP
4	399.030	30.72	14.29	23.70	2.18	23.49	46.00	-22.51	QP
5	449.556	26.18	16.10	23.72	2.32	20.88	46.00	-25.12	QP
6	603.539	23.20	19.56	23.81	2.74	21.69	46.00	-24.31	QP
7	932.271	23.01	23.27	23.94	3.51	25.85	46.00	-20.15	QP

Horizontal



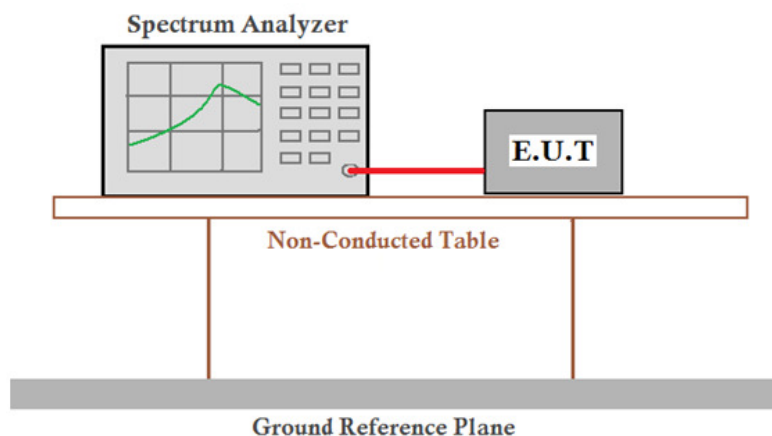
Item	Freq.	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Result Level	Limit Line	Over Limit	Detector
(Mark)	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
1	49.881	70.80	12.72	23.69	0.41	60.24	N/A	Operating Frequency	
2	99.878	42.44	9.16	23.66	0.93	28.87	43.50	-14.63	QP
3	125.007	30.91	11.15	23.65	1.06	19.47	43.50	-24.03	QP
4	299.316	28.84	11.70	23.67	1.89	18.76	46.00	-27.24	QP
5	349.250	33.60	13.19	23.69	1.96	25.06	46.00	-20.94	QP
6	399.030	32.61	14.29	23.70	2.18	25.38	46.00	-20.62	QP
7	952.094	23.60	23.70	23.94	3.58	26.94	46.00	-19.06	QP

Remark:

- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level = Receiver Reading Level + Antenna Factor + Cable Factor – Preamplifier Factor
- 2) If Peak Result comply with AV limit, AV Result is deemed to comply with QP limit
- 3) No any other emissions level which are attenuated less than 20dB below the limit. According to 15.31(o), the amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this Part. Hence there no other emissions have been reported.

7.4 20dB Bandwidth

Test Setup:



Frequency Range:

Operation within the band 49.82-49.90 MHz

Requirements:

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §15.217 through §15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the 20 dB bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

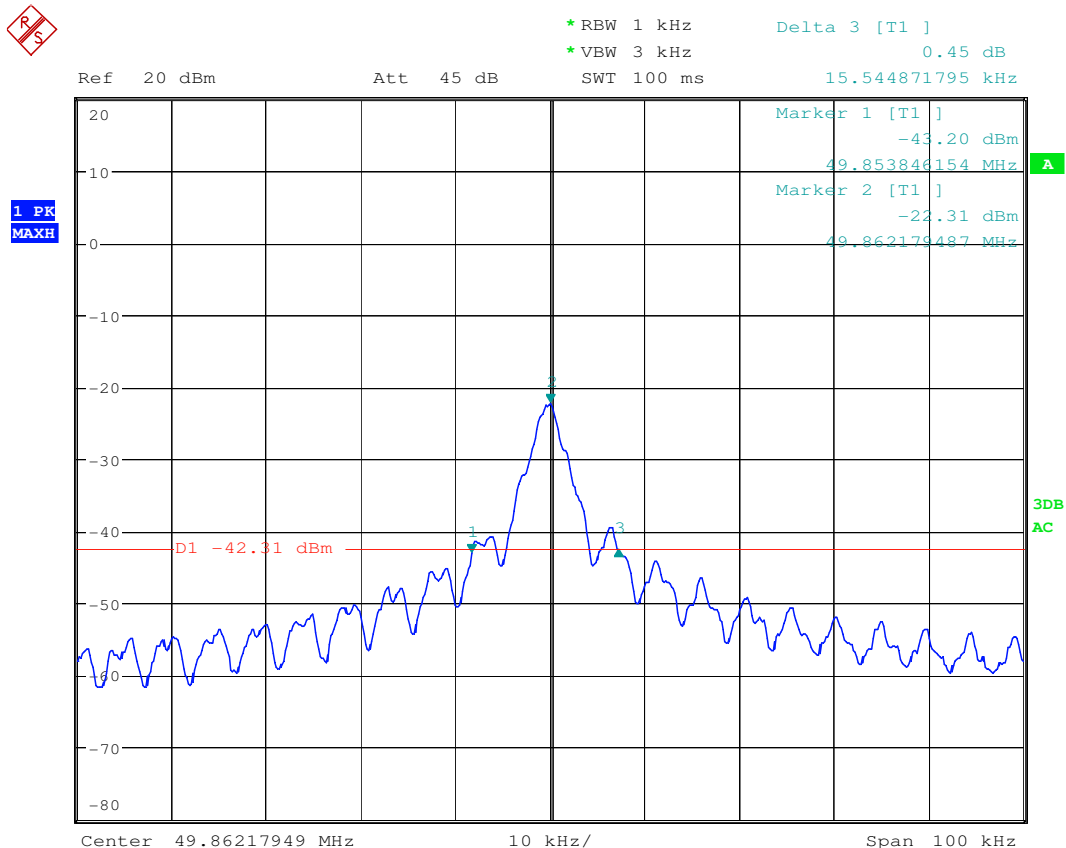
Test Result:

Pass

Measurement Data:

Operation Frequency	Frequency (MHz)	20dB Bandwidth (kHz)	Result
F _{Lowest}	49.853846	15.545	Pass
F _{Highest}	49.869391		Pass

Test plot as follows:





8 Test Setup Photographs

Refer to the < 503082 Transmitter 49 Mhz Green _Test Setup Photos-FCC >

9 EUT Constructional Details

Refer to the < 503082 Transmitter 49 Mhz Green _External Photos-FCC> & < 503082 Transmitter 49 Mhz Green _Internal Photos-FCC>.

--End of the Report--