SGS-CSTC Standards Technical Services Ltd.

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FCC REPORT

Application No. :	SZEM1309005190ET
Applicant:	Super Leader Industrial Ltd.
Manufacturer:	Super Leader Industrial Ltd.
Product Name:	R/C BOAT with charger and recharge battery (FULL FUNCTION) / R/C BOAT(FULL FUNCTION)
Model No.(EUT):	14881
Add Model No.:	14881TRU, 14881S, 14881N
FCC ID:	O9FRCB14881
Standards:	47 CFR Part 15, Subpart C (2012)
Date of Receipt:	2013-09-13
Date of Test:	2013-09-17
Date of Issue:	2013-11-22
Test Result:	**PASS ***

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

Authorized Signature:

Jack Zhang
EMC Laboratory Manager

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. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.
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.

2 Test Summary

Test Item	Test Requirement	Test method	Result
Radiated Emission	47 CFR Part 15, Subpart C Section 15.227	ANSI C63.10 (2009)	PASS
Occupied Bandwidth	47 CFR Part 15, Subpart C Section 15.215	ANSI C63.10 (2009)	PASS

Remark:

Model No.: 14881, 14881TRU, 14881S, 14881N

Only the Model 14881 was tested, since the electrical circuit design, layout, components used and internal wiring were identical for all above models. Only different on Item number.

3 Contents

Page

1 COVER PAGE 1

2 TEST SUMMARY 2

3 CONTENTS 3

4 GENERAL INFORMATION 4

4.1 CLIENT INFORMATION 4
4.2 GENERAL DESCRIPTION OF EUT 4
4.3 TEST ENVIRONMENT AND MODE 4
4.4 DESCRIPTION OF SUPPORT UNITS 5
4.5 TEST LOCATION 5
4.6 TEST FACILITY 6
4.7 DEVIATION FROM STANDARDS 6
4.8 ABNORMALITIES FROM STANDARD CONDITIONS 6
4.9 OTHER INFORMATION REQUESTED BY THE CUSTOMER 6
4.10 EQUIPMENT LIST 7

5 TEST RESULT & MEASUREMENT DATA 9

5.1 ANTENNA REQUIRMENT 9
5.2 RADIATED EMISSIONS 10
5.3 OCCUPIED BANDWIDTH 21-22

4 General Information

4.1 Client Information

Applicant:	Super Leader industrial Ltd.
Address of Applicant:	Room 9, 5/F., Blk A, Wah Sang Industrial Bldg, 14-18 Wong Chuk Yeung St, Fo Tan, Shantin, N.T. Hong Kong
Manufacturer:	Super Leader industrial Ltd.

4.2 General Description of EUT

Product Name:	R/C BOAT with charger and recharge battery (FULL FUNCTION) / R/C BOAT(FULL FUNCTION)
Model No.:	14881, 14881TRU, 14881S, 14881N
Sample Type:	Portable production
Operation Frequency:	27.145MHz
Channel Number:	1
Antenna Type:	Dedicated
Modulation Type:	ASK
Country of Origin:	CHINA
Country of Destination:	EUROPE, USA
Labeled Age Grading:	3+
Power Supply:	9.0V DC (9.0V * 1 “6F22” Size Battery) for Tx
Test Voltage:	DC 9.0V new battery for Tx

4.3 Test Environment and Mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	51 % RH
Atmospheric Pressure:	1005 mbar
Test mode:	
Transmitting mode:	Keep transmitter at operation mode.

4.4 Description of Support Units

The EUT has been tested independent unit.

4.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch E&E Lab,

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.6 Test Facility

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

- **CNAS (No. CNAS L2929)**

  CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab 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.

- **VCCI**

  The 3m Semi-anechoic chamber, Full-anechoic Chamber and Shielded Room (7.5m x 4.0m x 3.0m) of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2197, G-416, T-1153 and C-2383 respectively.

- **FCC – Registration No.: 556682**

  SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen 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.: 556682.

- **Industry Canada (IC)**

  Two 3m Semi-anechoic chambers of SGS-CSTC Standards Technical Services Co., Ltd. have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1 & 4620C-2.

4.7 Deviation from Standards

None.

4.8 Abnormalities from Standard Conditions

None.

4.9 Other Information Requested by the Customer

None.

4.10 Equipment List

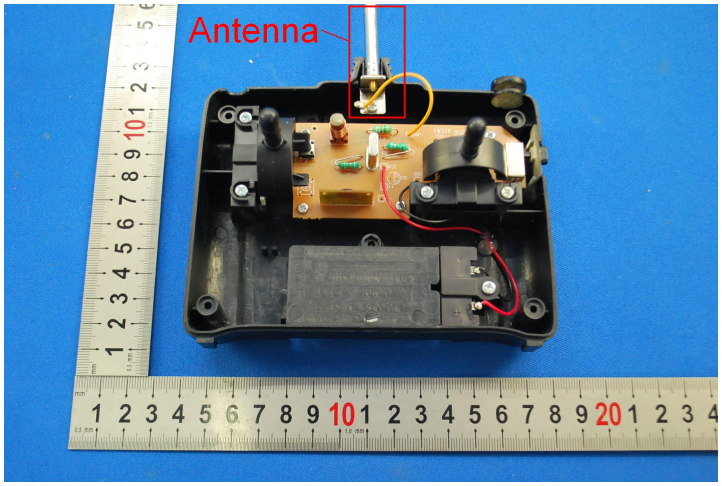
RE in Chamber					
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Due date (yyyy-mm-dd)**
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEL0017	2014-06-10
2	EMI Test Receiver	Rohde & Schwarz	ESIB26	SEL0023	2014-05-16
3	EMI Test software	AUDIX	E3	SEL0050	N/A
4	Coaxial cable	SGS	N/A	SEL0027	2014-05-29
5	Coaxial cable	SGS	N/A	SEL0189	2014-05-29
6	Coaxial cable	SGS	N/A	SEL0121	2014-05-29
7	Coaxial cable	SGS	N/A	SEL0178	2014-05-29
8	BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEL0015	2013-10-24
9	Double-ridged horn (1-18GHz)	ETS-LINDGREN	3117	SEL0006	2013-10-24
10	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEL0053	2014-05-16
11	Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEL0168	2013-10-24
12	Barometer	ChangChun	DYM3	SEL0088	2014-05-24
13	DC Power Supply	Zhao Xin	RXN-305D	SEL0117	2013-10-24
14	Humidity/ Temperature Indicator	Shanhai Qixiang	ZJ1-2B	SEL0103	2013-10-24
15	Signal Generator	Rohde & Schwarz	SMY01	SEL0155	2013-10-24
16	Signal Generator (10M-27GHz)	Rohde & Schwarz	SMR27	SEL0067	2014-05-16
17	Loop Antenna	Beijing Daze	ZN30401	SEL0203	2014-06-04

Conducted Emission					
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Due date (yyyy-mm-dd)**
1	Shielding Room	ZhongYu Electron	GB-88	SEL0042	2014-06-10
2	LISN	Rohde & Schwarz	ENV216	SEL0152	2013-10-24
3	LISN	ETS-LINDGREN	3816/2	SEL0021	2014-05-16
4	8 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T8-02	SEL0162	2013-11-10
5	4 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T4-02	SEL0163	2013-11-10
6	2 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T2-02	SEL0164	2013-11-10
7	EMI Test Receiver	Rohde & Schwarz	ESCI	SEL0022	2014-05-16
8	Coaxial Cable	SGS	N/A	SEL0025	2014-05-29
9	DC Power Supply	Zhao Xin	RXN-305D	SEL0117	2013-10-24
10	Humidity/ Temperature Indicator	Shanhai Qixiang	ZJ1-2B	SEL0103	2013-10-24
11	Barometer	Chang Chun	DYM3	SEL0088	2014-05-24

Note: The calibration interval is one year, all the instruments are valid.

5 Test Result & Measurement Data

5.1 Antenna Requirment

Standard Requirement:	47 CFR Part 15C 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.	
EUT Antenna:	

5.2 Radiated Emissions

Test Requirement:	47 CFR Part 15C Section 15.227
Test Method:	ANSI C63.10: 2009
Test Site:	3m (Semi-Anechoic Chamber)
ERP Limit:	Carrier Power will not exceed 80dBuV/m at 3m (Average).

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
30MHz-1GHz	Quasi-peak	100 kHz	300kHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

Limit:

Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
0.490MHz-.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-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3

Note: 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.

Test Procedure:

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. 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 (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. 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. g. 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:	

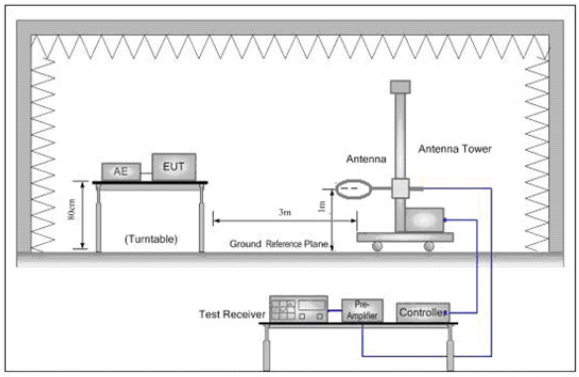


Figure 1. Below 30MHz

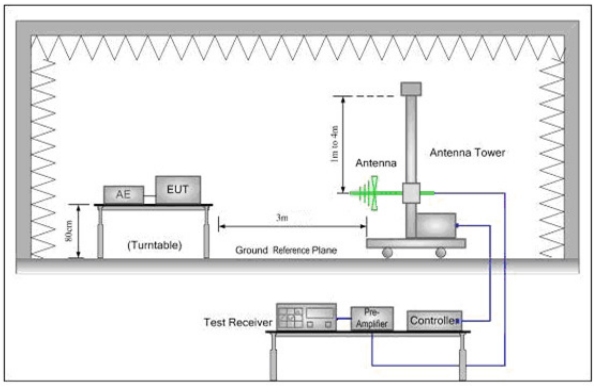


Figure 2. 30MHz to 1GHz

Test Mode:	Transmitting mode
Instruments Used:	Refer to section 4.10 for details
Test Result:	Pass

27.145MHz Mode

Test Procedure: For testing performed with the loop antenna, testing was performed in accordance to ANSI C63.10: 2009. The center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane.

Test Result:

Intentional emission

Test Frequency (MHz)	Peak (dBμV/m)		Limits (dBμV/m)	Margin (dB)	
	Vertical	Horizontal		Vertical	Horizontal
27.145	79.95	70.56	100.00	-20.05	-29.44

Test Frequency (MHz)	Average (dBμV/m)		Limits (dBμV/m)	Margin (dB)	
	Vertical	Horizontal		Vertical	Horizontal
27.145	57.10	47.71	80.00	-22.90	-32.29

PDCF Calculate Formula:
Average value=Peak value + PDCF(pulse desensitization correction factor)
PDCF=20 log(Duty cycle)= -22.85dB
Duty cycle= T on time / T period = 0.072
Ton time = 7.2ms
T period = 100ms

Remark:

The 3 Codes (A, B, C) are identical on duty cycle, different on Pulse Code

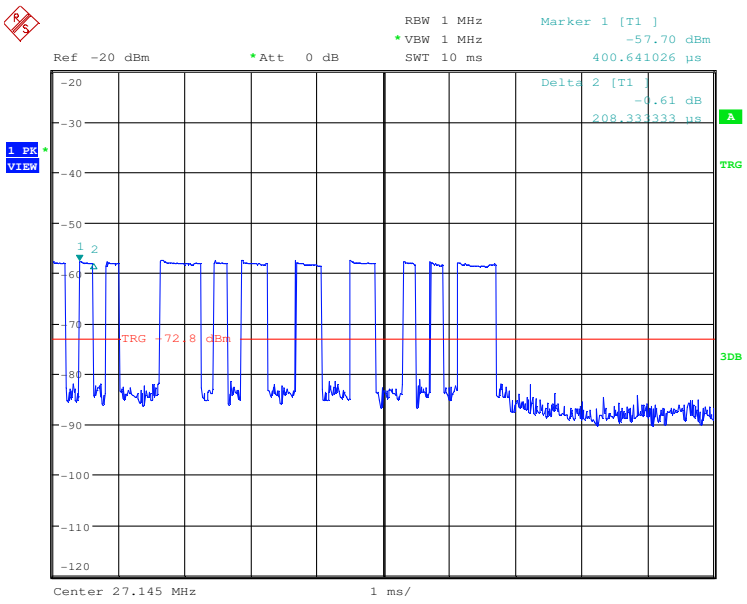
Code A:

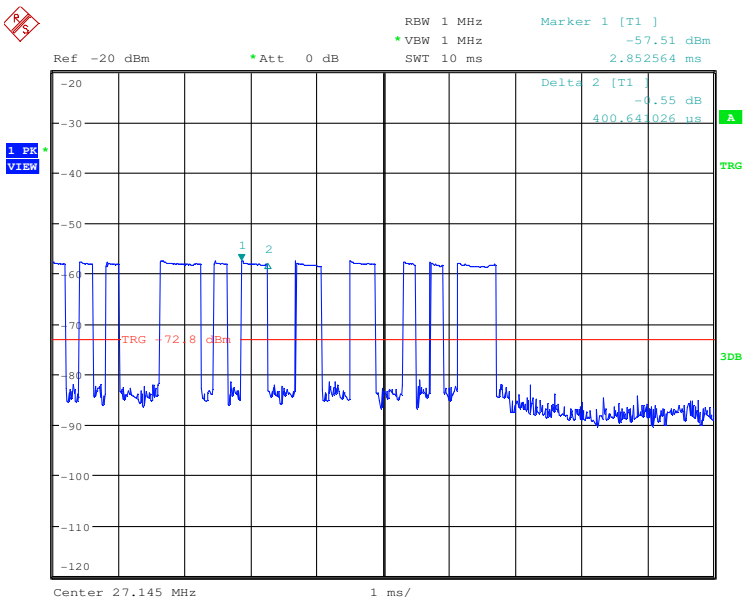
Ton time = 2*(6*T1+3*T2+2*T3)=7.2ms

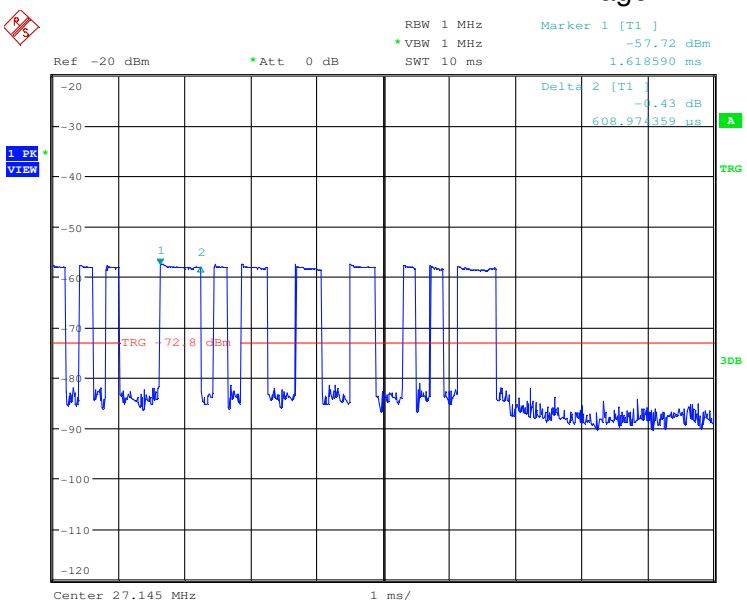
T1=0.2ms

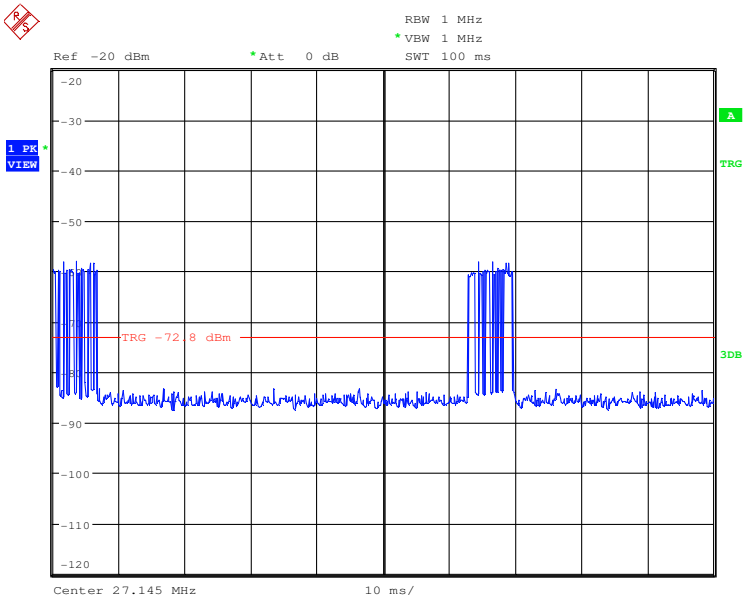
T2=0.4ms

T3=0.6ms









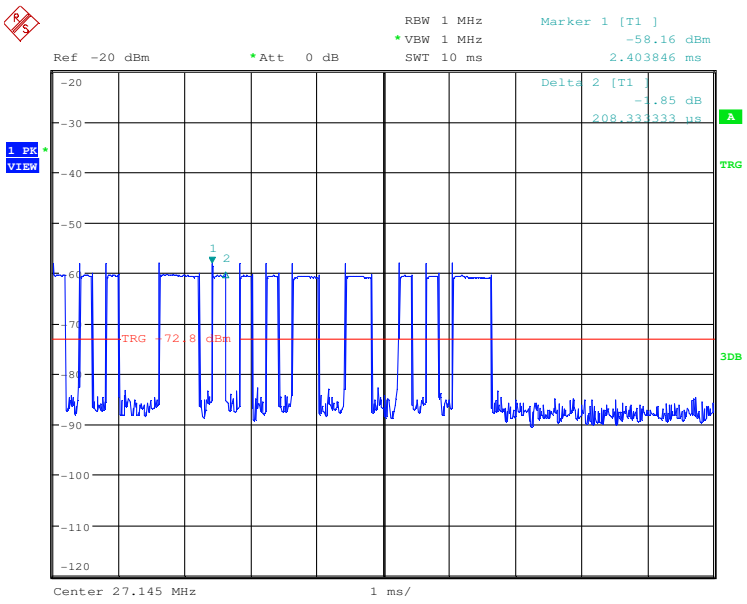
Code B:

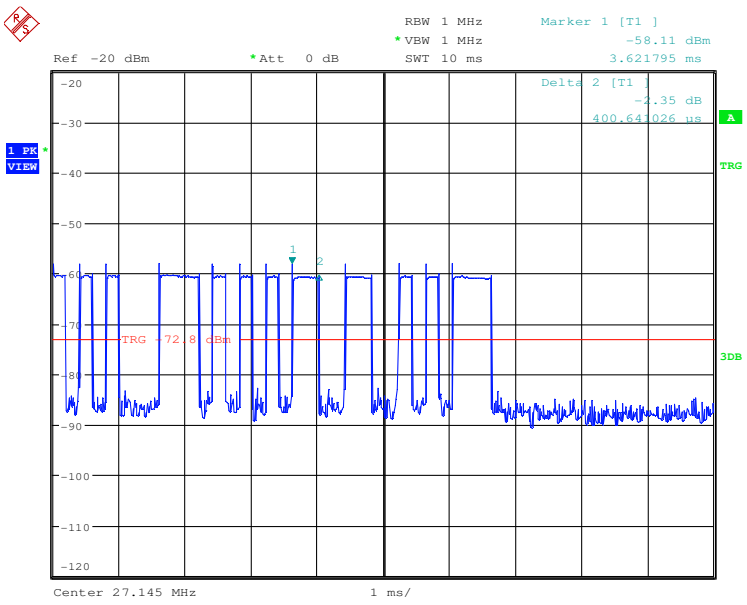
Ton time = 2*(8*T1+2*T2+2*T3)=7.2ms

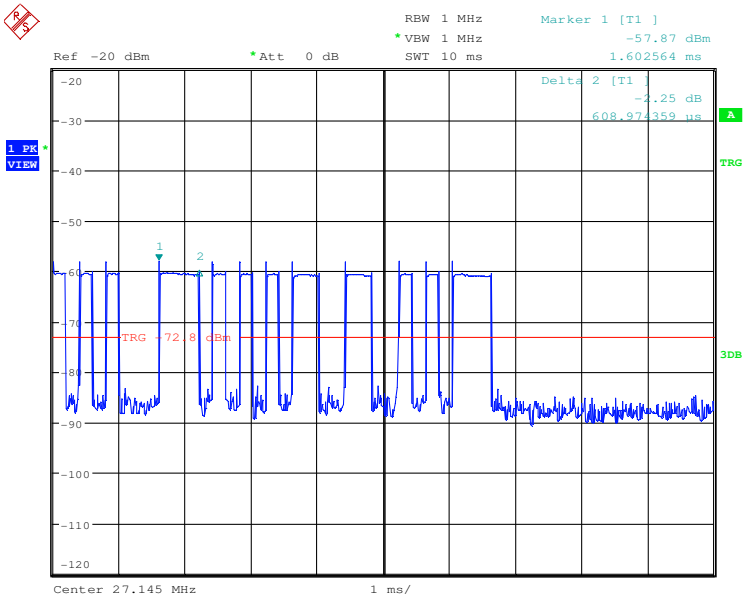
T1=0.2ms

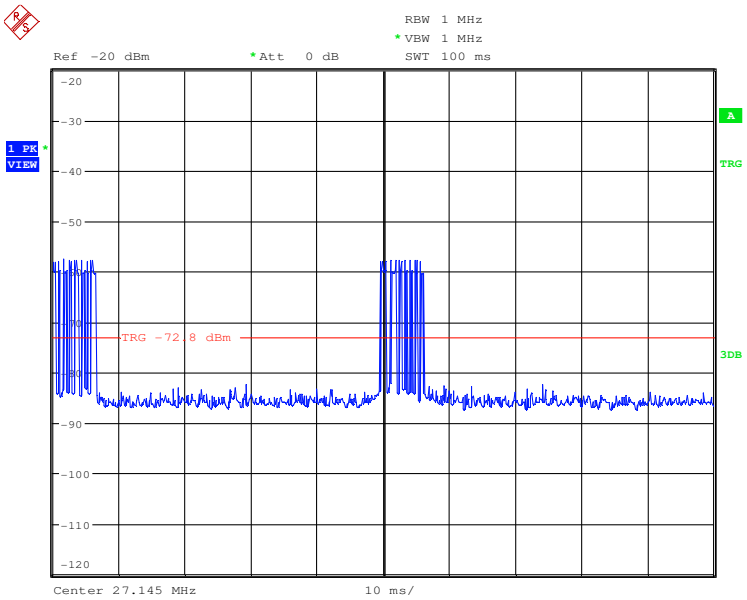
T2=0.4ms

T3=0.6ms









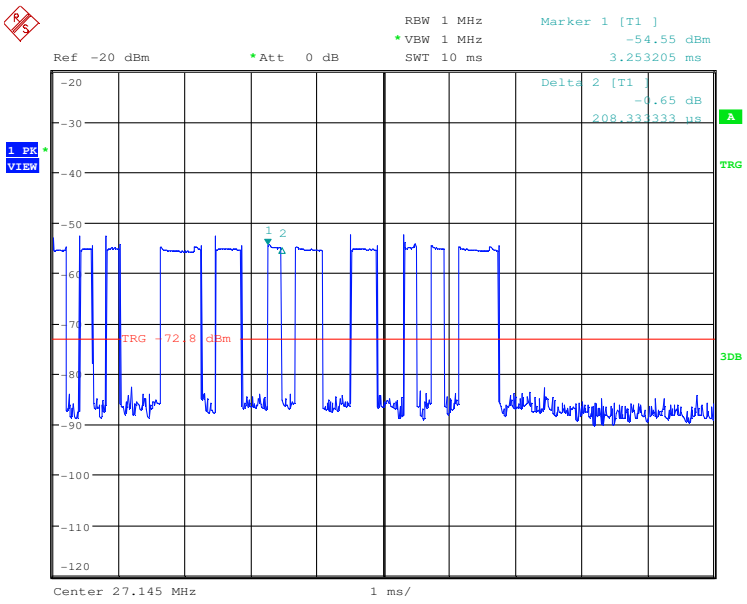
Code C:

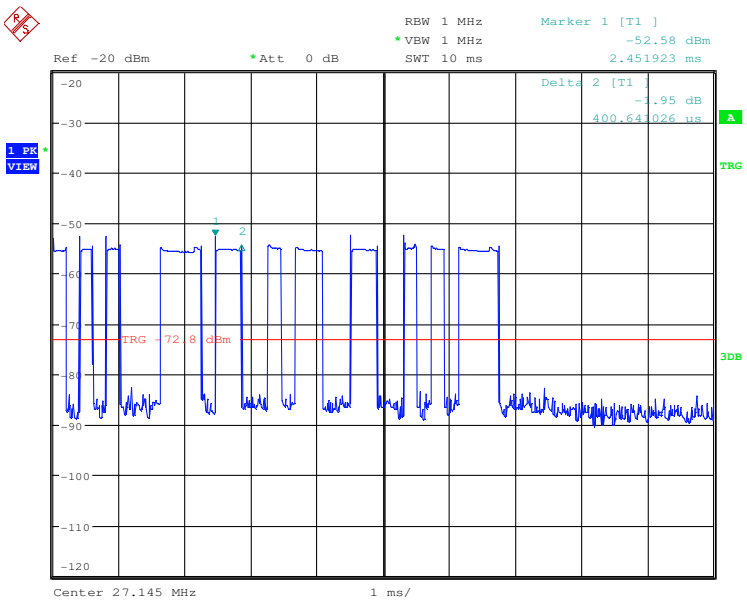
Ton time = 2*(6*T1+3*T2+2*T3)=7.2ms

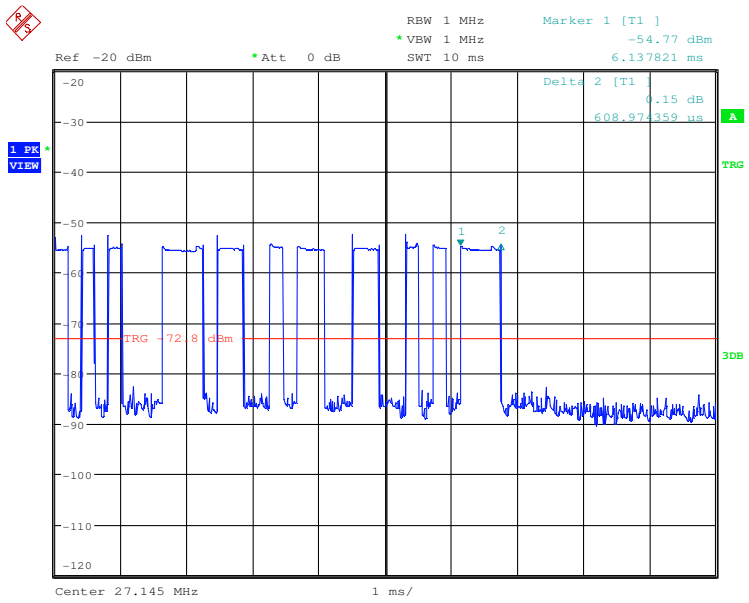
T1=0.2ms

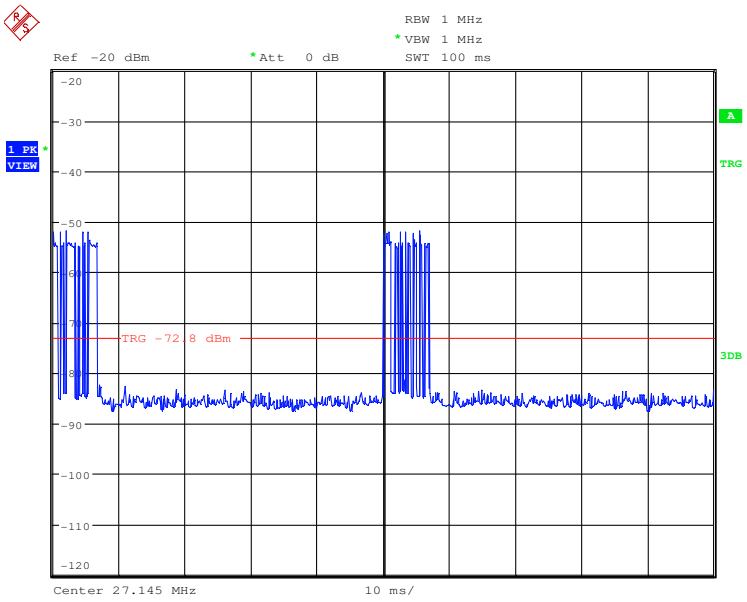
T2=0.4ms

T3=0.6ms



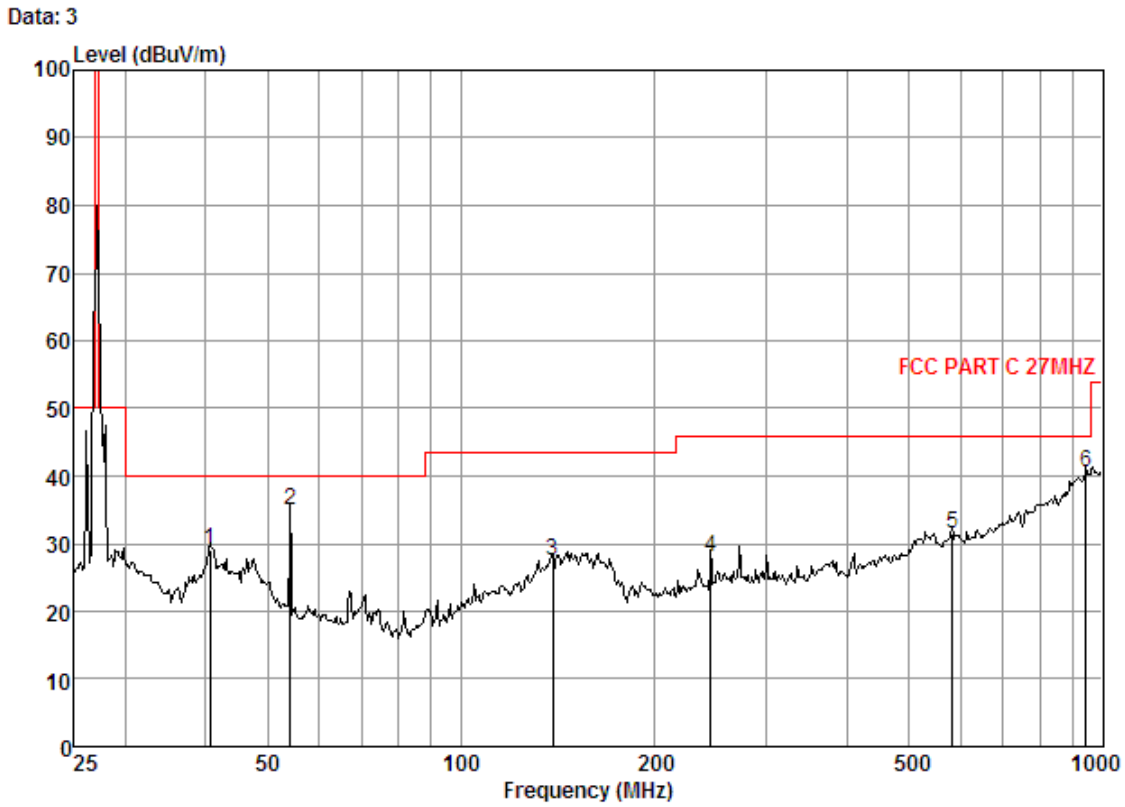






Out of Band Emissions

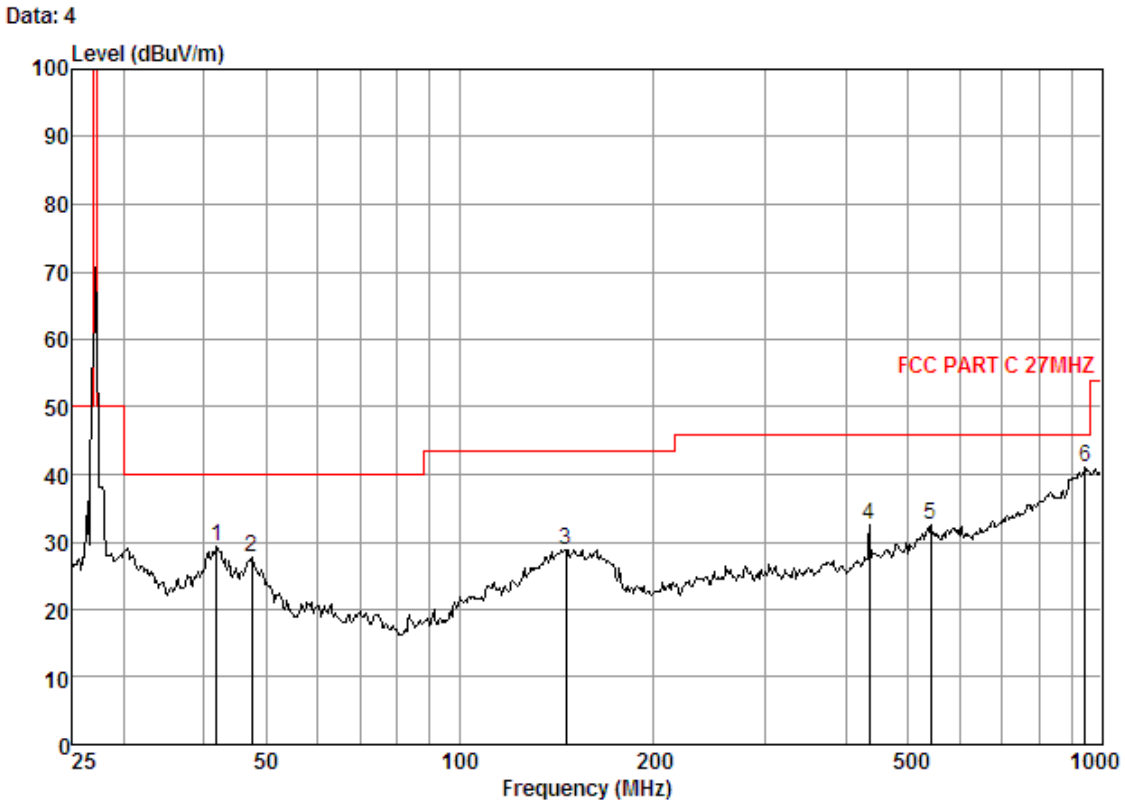
Vertical



Condition: FCC PART C 27MHZ 3m 3142C VERTICAL
Job No. : 5190ET
Mode : TX ON

	Freq	Cable Loss	Antenna Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	40.68	14.32	11.02	27.32	31.02	29.04	40.00	-10.96
2	54.25	11.54	6.68	27.28	43.91	34.85	40.00	-5.15
3	138.96	14.67	8.54	26.96	31.26	27.51	43.50	-15.99
4	245.25	11.23	8.00	26.55	35.38	28.06	46.00	-17.94
5	583.58	11.29	15.26	27.57	32.46	31.44	46.00	-14.56
6	942.69	11.26	20.87	26.58	34.92	40.47	46.00	-5.53

Horizontal



Condition: FCC PART C 27MHZ 3m 3142C HORIZONTAL
Job No. : 5190ET
Mode : TX ON

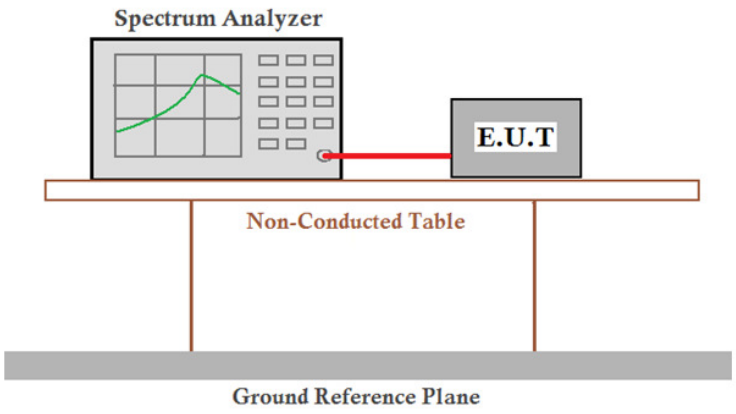
	Freq	Cable Loss	Antenna Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	41.90	14.16	10.74	27.31	31.65	29.24	40.00	-10.76
2	47.50	16.99	8.38	27.30	29.54	27.61	40.00	-12.39
3	146.33	14.58	9.07	26.93	32.16	28.88	43.50	-14.62
4	434.44	10.38	12.10	27.35	37.30	32.43	46.00	-13.57
5	542.07	11.27	14.72	27.63	34.14	32.50	46.00	-13.50
6	942.69	11.26	20.87	26.58	35.54	41.09	46.00	-4.91

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 + Antenna Factor + Cable Factor – Preamplifier Factor

2) The disturbance below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

5.3 Occupied Bandwidth

Test Requirement:	47 CFR Part 15C Section 15.215 (C)
Test Method:	ANSI C63.10: 2009
Limit:	Operation within the band 26.960 – 27.280 MHz
Requirement :	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 20dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equip compliance with the 20dB attenuation specification may base on measurement at the intentional radiator's antenna output terminal unless the intentional radiator uses a permanently attached antenna, in which case compliance shall be.deomonstrated by measuring the radiated emissions.
Test Setup:	
Test Mode:	Transmitter mode
Instruments Used:	Refer to section 4.10 for details
Test Result:	Pass

Test Result: