FCC PART 15.231

EMI MEASUREMENT AND TEST REPORT

For

SecuraSeal Technologies LLC

705 SW 4th Place, Fort Lauderdale, FL 33312

FCC ID: O8DRF-829

June 4, 2012

This Report Concerns: Original Report	Equipment Type: RF Remote Control
Test Engineer:	Eric Li
Report No.:	BST12050465Y-1E-3
Receive EUT Date/Test Date:	May 25, 2012/ May 26-30, 2012
Reviewed By:	Christina Deng
Prepared By:	**Shenzhen BST Technology Co.,Ltd.** 3F,Weames Technology Building, No. 10 Kefa Road,Science Park, Nanshan District,Shenzhen,Guangdong,China Tel: 0755-26747751～3 Fax: 0755-26747751～3 ext.826

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1. GENERAL INFORMATION

1.1. Report information

1.1.1.This report is not a certificate of quality; it only applies to the sample of the specific product/equipment given at the time of its testing. The results are not used to indicate or imply that they are application to the similar items. In addition, such results must not be used to indicate or imply that BST approves recommends or endorses the manufacture, supplier or use of such product/equipment, or that BST in any way guarantees the later performance of the product/equipment.

1.1.2.The sample/s mentioned in this report is/are supplied by Applicant, BST therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture or any information supplied.

Additional copies of the report are available to the Applicant at an additional fee. No third part can obtain a copy of this report through BST, unless the applicant has authorized BST in writing to do so.

Test Facility -
The test site used to collect the radiated data is located on the address of
Shenzhen Certification Technology Service Co., Ltd
(FCC Registered Test Site Number: 197647) on
2F, Building B, East Area of Nanchang Second Industrial Zone, Gushu 2nd Road,
Bao'an District, shenzhen 518126, China
The Test Site is constructed and calibrated to meet the FCC requirements.

1.2. Measurement Uncertainty

Available upon request.

2. PRODUCT DESCRIPTION

2.1. EUT Description

Description : RF Remote Control

Trade Name : N/A

Applicant : SecuraSeal Technologies LLC
705 SW 4th Place, Fort Lauderdale, FL 33312

Manufacture : HangZhou Maycar Electronic Co.,LTD
Building 1, Hong Tu Road 15#, Binjiang, HangZhou, China

Model Number : RF-829

Frequency : 433.92MHz

Power Supply : DC 6V (“CR2016” batteries 2×)

2.2. Block Diagram of EUT Configuration

2.3. Support Equipment List

Name	Model No	S/N	Manufacturer	Used “√”
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2.4. Test Conditions

Temperature: 20~25℃
Relative Humidity: 50~63 %

3. FCC ID LABEL

FCC ID: O8DRF-829

Label Location on EUT

EUT View/ FCC ID Label Location

4. TEST RESULTS SUMMARY

FCC 15 Subpart C, Paragraph 15.231

FCC Rules	Description of Test	Result
Section 15.207	Conducted Emission	N/A
Section 15.231(b)	Radiated Emission	Compliant
Section 15.231(c)	20dB Bandwidth	Compliant
Section 15.231(a)(1)	Release Time Measurement	Compliant
Section 15.203	Antenna Requirement	Compliant

Remark: "N/A" means "Not applicable."
Statement: All testing was performed using the test procedures found in ANSI C63.4-2003.

Modifications

No modification was made.

5. TEST EQUIPMENT USED

Equipment/Facilities	Manufacturer	Model #	Serial no.	Date of Cal.	Cal. Interval
Cable	Resenberger	N/A	NO.1	Mar 10，2012	1 Year
Cable	SCHWARZBECK	N/A	NO.2	Mar 10，2012	1 Year
Cable	SCHWARZBECK	N/A	NO.3	Mar 10，2012	1 Year
LISN	Rohde＆Schwarz	ESH3-Z5	100305	Mar 10，2012	1 Year
50Ω Coaxial Switch	ANRITSU CORP	MP59B	6200283933	Mar 10，2012	1 Year
EMI Test Receiver	Rohde＆Schwarz	ESP13	100180	Oct.11,2011	1 Year
Spectrum Analyzer	Rohde＆Schwarz	FSP40	100273	Sep.10,2011	1 Year
3m Semi-Anechoic Chamber	Albatross Projects	9m×6m×6m	N/A	Feb.20,2012	1 Year
Signal Generator	FLUKE	PM5418 + Y/C	LO747012	Feb.20,2012	1 Year
Signal Generator	FLUKE	PM5418TX	LO738007	Feb.20,2012	1 Year
Loop Antenna	SCHWARZBECK	FMZB1516	113	Jan.30,2012	1 Year
Trilog-Super Broadband Antenna	SCHWARZBECK	VULB9161	9161-4079	Sep.22,2011	1 Year
Broad-Band Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-564	Sep.22,2011	1 Year
Ultra Broadband Antenna	Rohde＆Schwarz	HL-562	100110	June.15,2011	1 Year
AMN	Rohde＆Schwarz	ESH3-Z5	100196	Oct.11,2011	1 Year
AMN	Rohde＆Schwarz	ESH3-Z5	100197	Oct.11,2011	1 Year
Pulse Limiter	Rohde＆Schwarz	ESH3-Z2	N/A	N/A	N/A
Power Meter	Rohde＆Schwarz	NRVD	100041	Feb.20,2012	1 Year
EMI Test Receiver	Rohde＆Schwarz	ESCS30	100003	Feb.20,2012	1 Year
Coaxial Cable with N-connectors	SCHWARZBECK	AK9515H	95549	Sep.22,2011	1 Year
Radio Communication Test Set	Rohde＆Schwarz	CMS 54	846621/024	Feb.20,2012	1 Year
Modulation Analyzer	Hewlett-Packard	8901B	2303A00362	Feb.20,2012	1 Year
Absorbing clamp	Rohde＆Schwarz	MDS-21	N/A	Oct.11,2011	1 Year

6. CONDUCTED POWER LINE TEST

6.1. Test Equipment

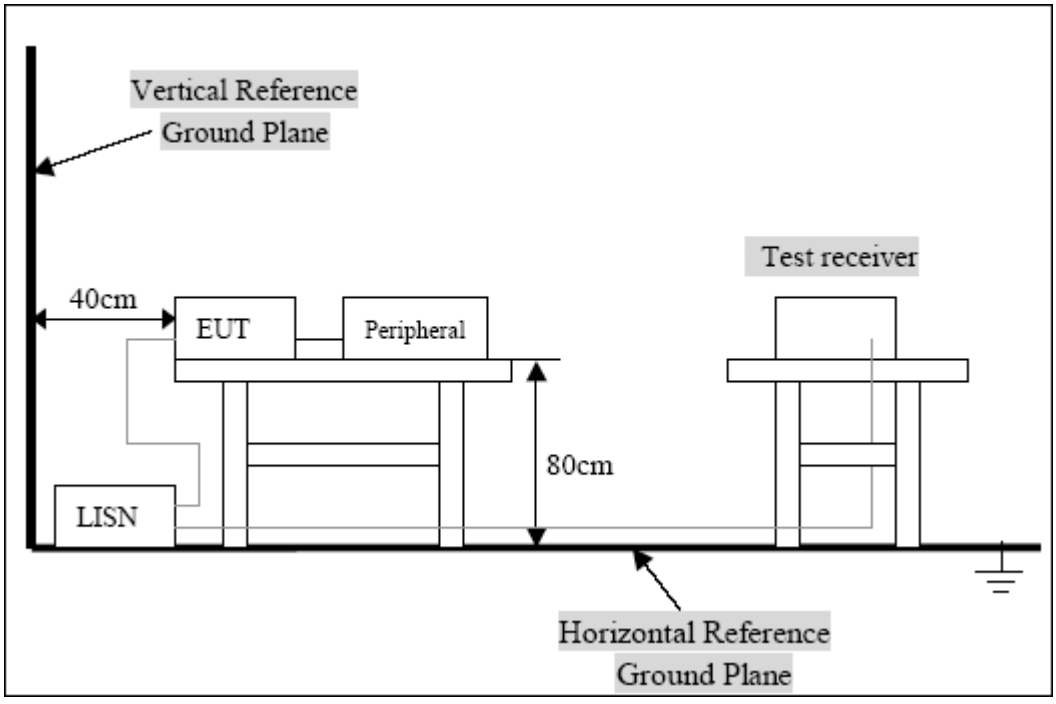
Please refer to section 5 this report.

6.2. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.).This provides a 50ohm/50uh coupling inpedance for the measuring equipment.The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uh coupling inpedance with 50ohm termination.

Both sides of A.C. Line are check for maximum conducted interference.In order to find the maximum emission,the relative positions of equipment and al of the interface cables must be changed according to ASIN C63.4:2003 on conducted measurement. Conducted emissions were invested over the frequency range from 0.15MHz to 30MH z using a receiver bandwidth of 9kHz.

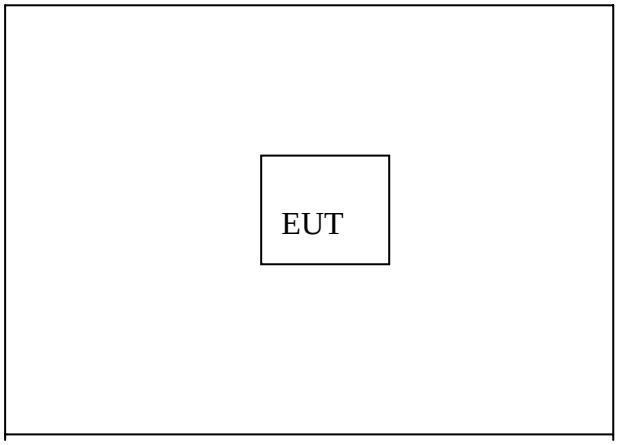
6.3. Test Setup



For the actual test configuration,Please refer to the related items-Photos of testing

6.4. EUT Operating Condition

Operating condition is according to ANSI C63.4-2003.
Setup the EUT and simulators as shown on follow.
Enable RF signal and confirm EUT active.
Modulate output capacity of EUT up to specification.



6.5. Conducted Power line Emission Limits

FCC Part 15 Paragraph 15.207 (dBuv)		
Frequency Range (MHZ)	Class A QP/AV	Class B QP/AV
0.15-0.5	79/66	65-56/56-46
0.5-5.0	73/60	56/46
5.0-30	73/60	60/50

Note: In the above table, the tighter limit applies at the band edges.

6.6. Conducted Power Line Test Result

N/A.

There is no connection to AC mains. Therefore, the test is not applicable and skipped.

7. RADIATION EMISSIONS

7.1. Test Equipment

Please refer to section 5 this report.

7.2. Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Calibrated Loop antenna is used as receiving antenna for frequencies below 30MHz, Calibrated Bilog antenna is used as receiving antenna for frequencies between 30 MHz and 1 GHz, Calibrated Horn antenna is used as receiving antenna for frequencies above 1000MHz. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4: 2003 on radiated emission measurement.

Through three orthogonal axes to determine which attitude and equipment arrangement produces the highest emission relative to the limit.

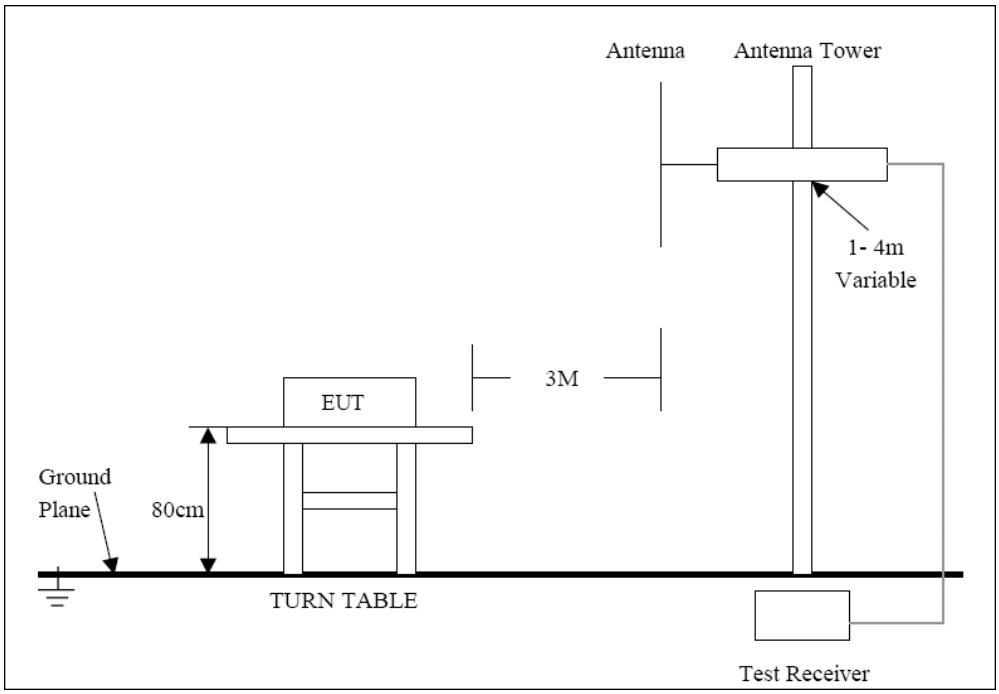
The bandwidth of test receiver is set at 120kHz in 30-1000MHz, and 1MHz in 1000-5000MHz.

The frequency range from 30MHz to 5000MHz is checked.

The final measurement are performed with Peak and Average detector.

Let the EUT work in TX mode measure it.

7.3. Radiated Test Setup



For the accrual test configuration,pleas refer to the related items-photos of Testing.

7.4. Radiated Emission Limit

7.4.1. Radiation Emission Measurement Limits According to FCC Part 15 Section 15.231(b)

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [Average] [μV/m]	Field Strength of Spurious Emission [Average] [μV/m]
40.66-40.70	2250	225
70-130	1250	125
130-174	1250-3750	125-375
174-260	3750	375
260-470	3750-12500	375-1250
Above 470	12500	1250

Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, uV/m at 3 meters = 56.81818(F)-6136.3636; for the band 260-470 MHz, uV/m at 3 meters = 41.6667(F)-7083.3333. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.

7.4.2. Restricted Band Radiation Emission Measurement Limits According to FCC part 15 Section 15.205 and Section15.209.

7.5. Radiated Emission Test Result

Date of Test:	May 30, 2012	Temperature:	25°C
EUT:	RF Remote Control	Humidity:	55%
Model No.:	RF-829	Power Supply:	6V DC ("CR2016" batteries 2×)
Test Mode:	TX	Test Engineer:	Eric Li

Frequency (MHz)	Average Factor	Result (dBμV/m)		Limit (dBμV/m)		Margin(dB)		Polarization
	(dB)	AV	PEAK	AV	PEAK	AV	PEAK	
433.760	**-10.7**	**64.68**	**75.38**	**80.8**	**100.8**	**-16.12**	**-25.42**	Horizontal
867.520	-10.7	51.16	61.86	60.8	80.8	-9.64	-18.94	
*1301.280	-10.7	47.64	58.34	54.0	74.0	-6.36	-15.66	
1735.040	-10.7	41.77	52.47	60.8	80.8	-19.03	-28.33	
2168.800	-10.7	43.99	54.69	60.8	80.8	-16.81	-26.11	
433.760	**-10.7**	**67.70**	**78.40**	**80.8**	**100.8**	**-13.10**	**-22.40**	Vertical
867.520	-10.7	53.32	64.02	60.8	80.8	-7.48	-16.78	
*1301.280	-10.7	49.57	60.27	54.0	74.0	-4.43	-13.73	
1735.040	-10.7	45.14	55.84	60.8	80.8	-15.66	-24.96	
2168.800	-10.7	45.43	56.13	60.8	80.8	-15.37	-24.67	

Note:

1. Emissions attenuated more than 20 dB below the permissible value are not reported.

2. *: Denotes restricted band of operation.

   Measurements were made using a peak detector and average detector. Any emission falling within the restricted bands of FCC Part 15 Section 15.205 were compliance with the emission limit of FCC Part 15 Section 15.209.

3. FCC Limit for Average Measurement = 41.6667(433.9)-7083.3333 = 10995.85μV/m =80.8dBμV/m

4. Average Factor: Refer to section 10.

8. 20DB OCCUPIED BANDWIDTH

8.1. Test Equipment

Please refer to Section 5 this report.

8.2. Test Procedure

1. The EUT was tested according C63.4-2003.The radiated test was performed at FCC Registration laboratory.
2. With the EUT's antenna attached, the EUT's 20dB Bandwidth power was received by the test antenna which was connected to the spectrum analyzer with the START and STOP frequencies set to the EUT's operation band.

8.3. FCC 15.231(c) 20dB Bandwidth Limit

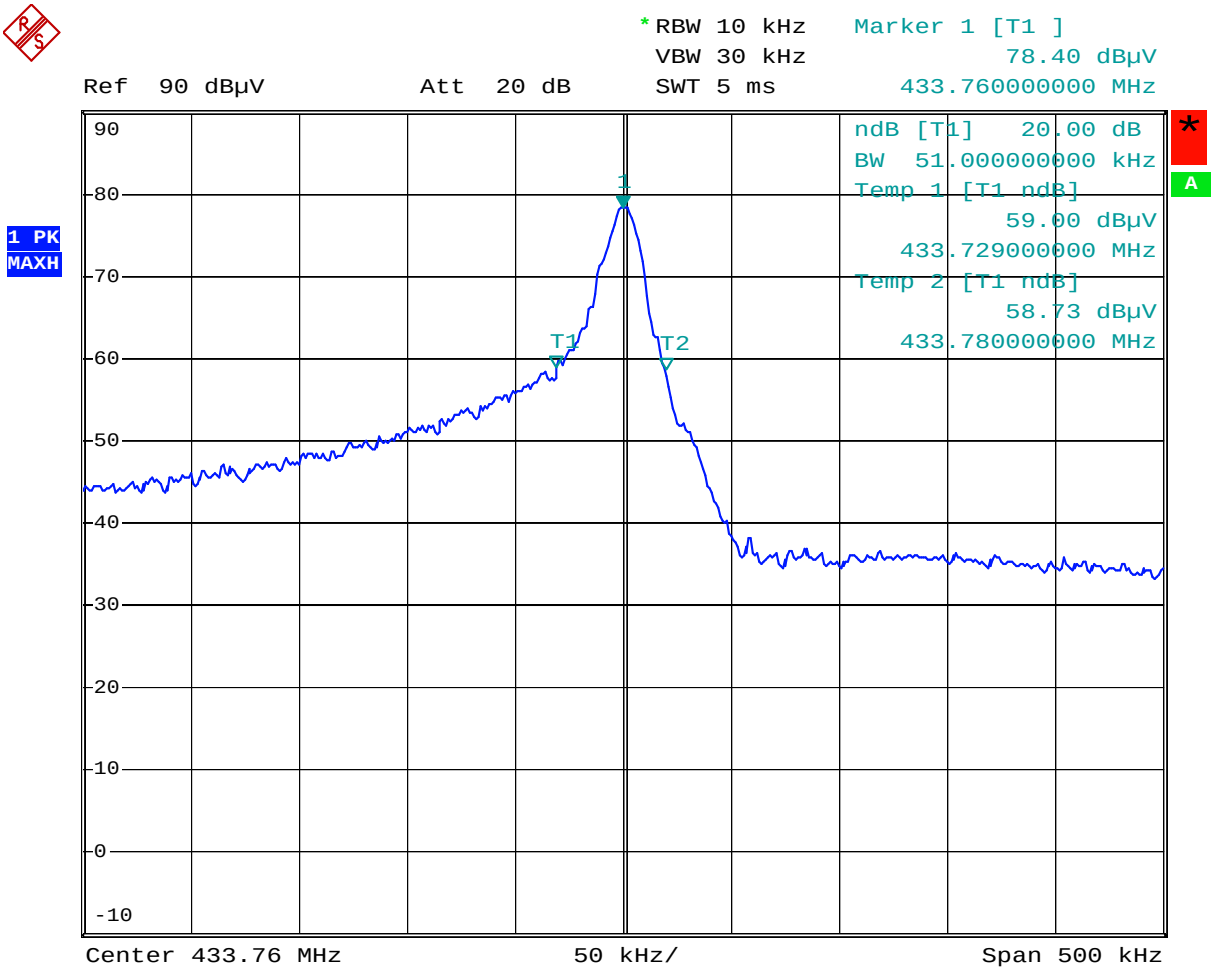
Per 15.231(c), The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. Therefore, the bandwidth of the emission limit is 433.9MHz×0.25% = 1.08MHz. Bandwidth is determined at the points 20 dB down from the modulated carrier.

8.4. Test Result

Temperature: 25℃ Humidity: 55%RH

Limit = 433.9MHz×0.25% = 1.08MHz

Test data: 51.0 kHz Test Result: PASS



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9. RELEASE TIME MEASUREMENT

9.1. Test Equipment

Please refer to Section 5 this report.

9.2. Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.
Set center frequency=433.760MHz
Set SPAN=0Hz
Set RBW=100kHz
Set VBW=300kHz
Set SWEET TIME=5s

9.3. Release time Requirement

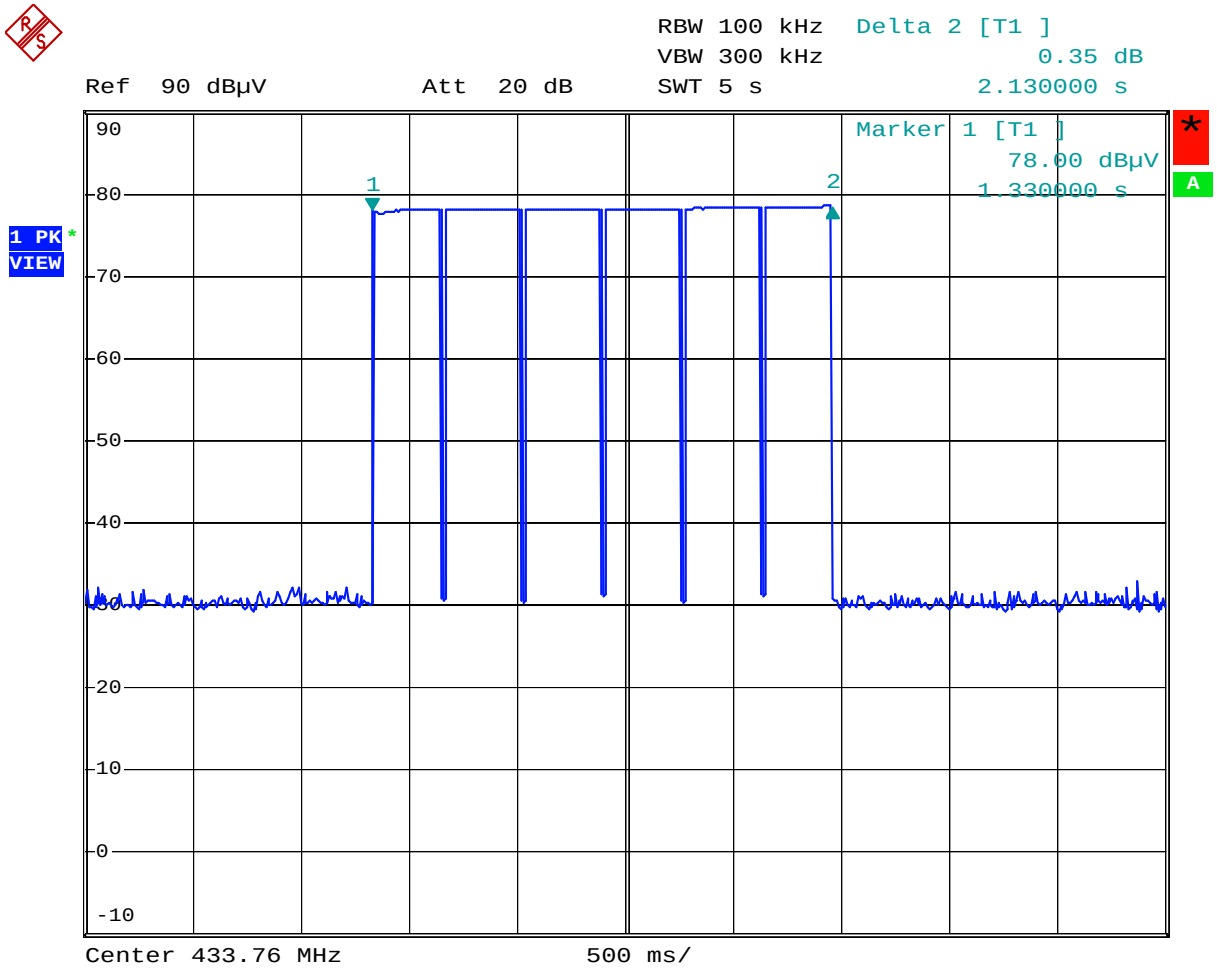
Per 15.231(a) (1), a manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

9.4. Test Result

Temperature: 25℃ Humidity: 55%RH

The transmitter transmitting time not more than 5 seconds

Test time: 2.13 s Test Result: PASS



10. AVERAGE FACTOR MEASUREMENT

10.1.Average factor Measurement according to ANSI 63.4: 2003

ANSI 63.4: 2003 Section 13.1.4.2 Devices transmitting pulsed emissions and subject to a limit requiring an average detector function for radiated emissions shall initially be measured with an instrument that uses a peak detector. A radiated emission measured with a peak detector may then be corrected to a true average using the appropriate factor for emission duty cycle. This correction factor relates the measured peak level to the average limit and is derived by averaging absolute field strength over one complete pulse train that is 0.1 s, or less, in length. If the pulse train is longer than 0.1 s, the average shall be determined from the average absolute field strength during the 0.1 s interval in which the field strength is at a maximum. Instructions on calculating the duty cycle of a transmitter with pulsed emissions are provided in ANSI 63.4 H.4, step j.

Average factor in dB = 20 log (duty cycle)

10.2.Test Procedure

1. The time period over which the duty cycle is measured is 100 milliseconds, or the repetition cycle, whichever is a shorter time frame. The worst case (highest percentage on) duty cycle is used for the calculation.
2. Set SPA Center Frequency = Fundamental frequency, RBW = 100kHz, VBW = 300kHz, Span = 0Hz.
3. Set EUT as normal operation.
4. Set SPA View. Delta Mark time.

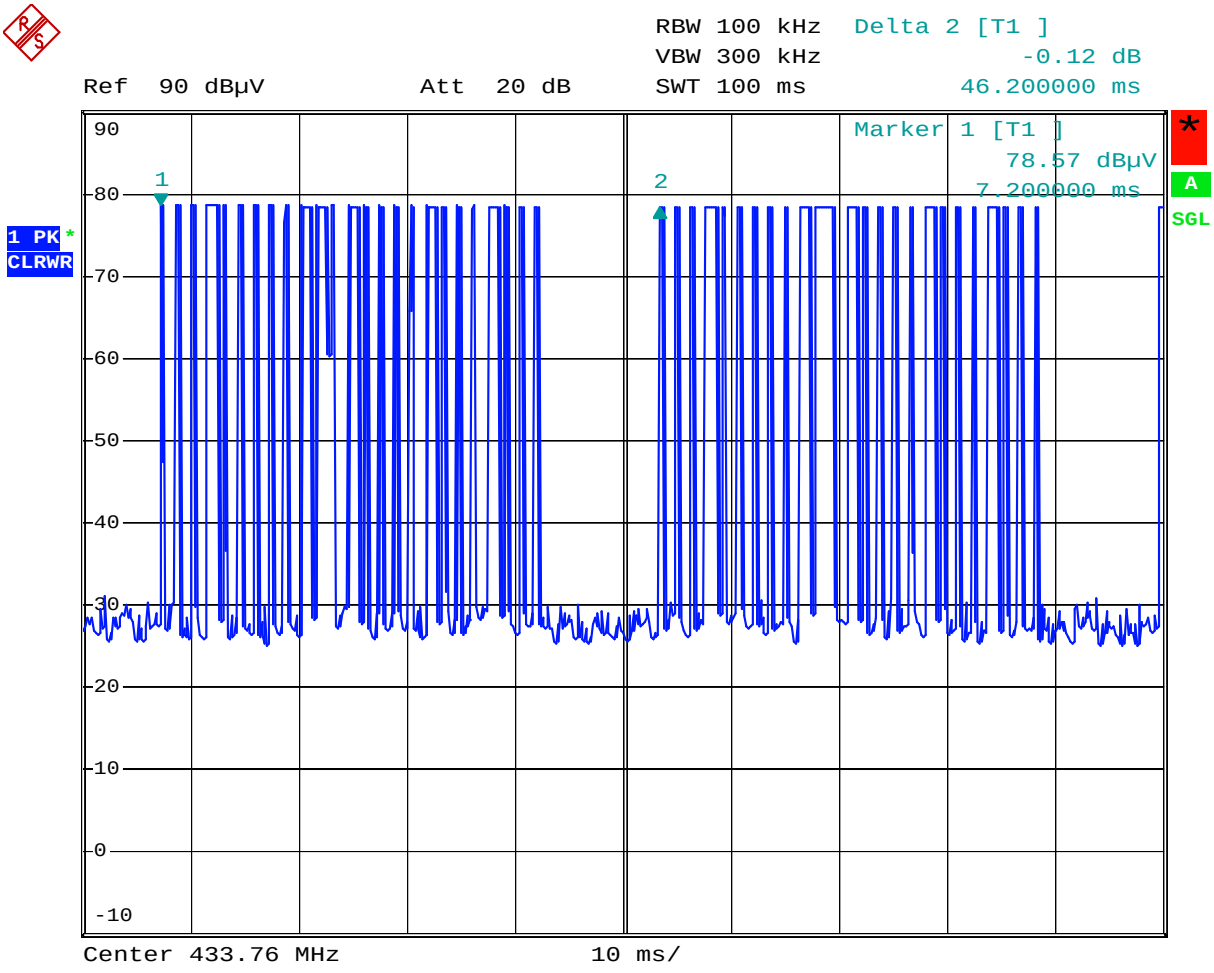
10.3.Measurement Result

The duty cycle is simply the on time divided by the period:

The duration of one cycle = 46.2ms
Effective period of the cycle = (6×1.10) + (19×0.36) ms= 13.44ms

DC = 13.44ms/46.2ms = 0.291

Therefore, the average factor is found by 20log0.291 = -10.7dB



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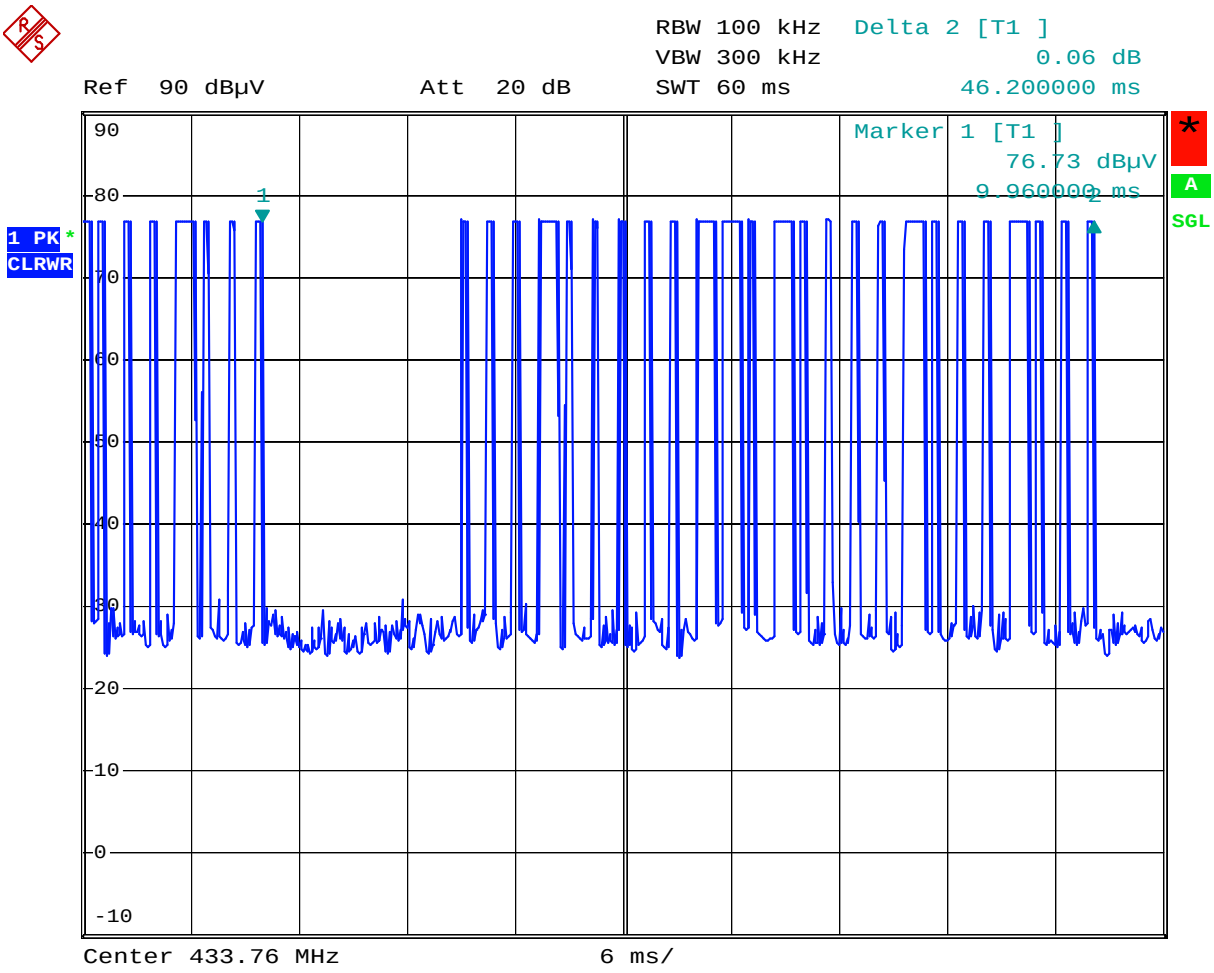
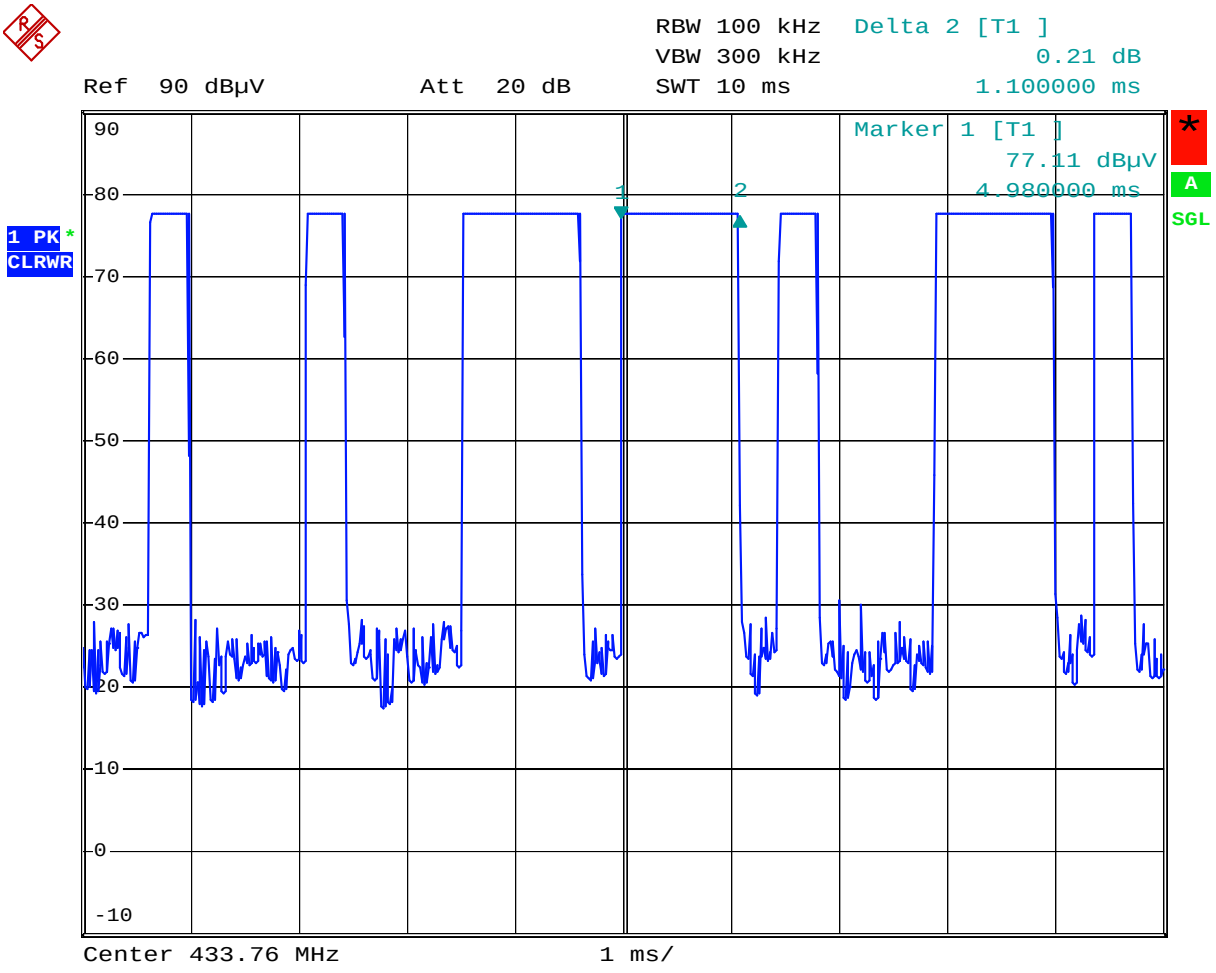
The graph shows the pattern of coding during the signal transmission.



The graph shows the pattern of coding during the signal transmission.
The duration of one cycle = 46.2ms.
It sums of 6 long ‘on’ signals and 19 short ‘on’ signals.



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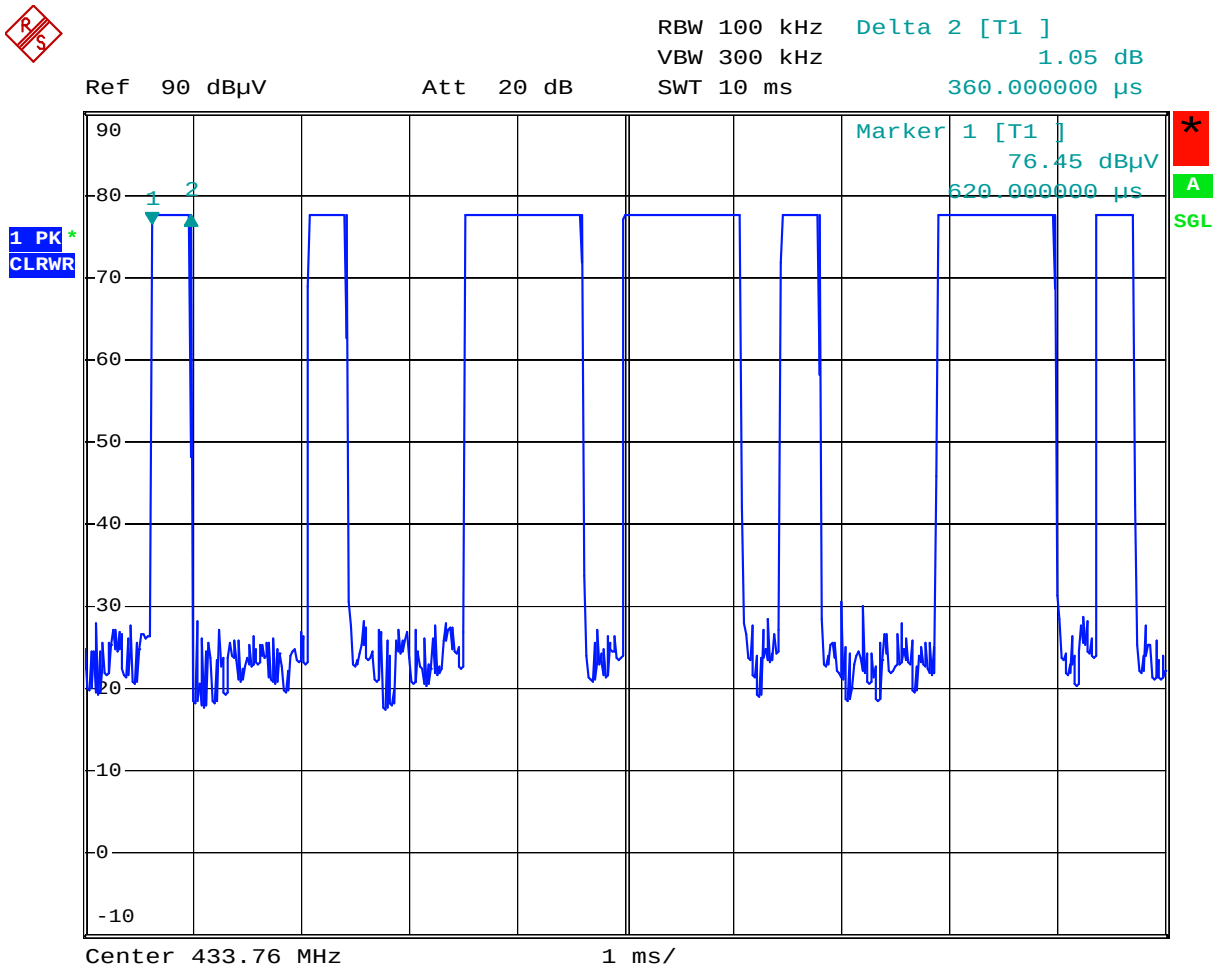
The graph shows the duration of long ‘on’ signal. From marker 1 to marker 2, duration is 1.10ms.



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The graph shows the duration of short ‘on’ signal. From marker 1 to marker 2, duration is 0.36ms.

11. ANTENNA REQUIREMENT

11.1. Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, 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.

11.2.Antenna Connected Construction

According to § 15.203, 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 shall be considered sufficient to comply with the provisions of this section. 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.

The antenna used for this product is a PCB antenna. The antenna is permanently attached. Refer to the product photo.

11.3. Result

Compliance