Test Report No.: FC120907N023

TEST REPORT

Applicant	Zhuhai FTZ Oplink Communications, Inc.
Address:	#29, #30 Lianfeng Ave, Free Trade Zone, Zhuhai, Guangdong, China 519030

Manufacturer or Supplier	Smart Electronic Industrial (Dong Guan) Co., Ltd.
Address	Qing Long Road, Long Jian Tian-Cun, Huang Jiang-Zhen, Dong Guan, Guang Dong, China
Product:	Remote control
Brand Name:	N/A
Model:	RMC1300
Additional Model & Model Difference:	NA
Date of tests:	Sep. 11, 2012~ Sep. 13, 2012

the tests have been carried out according to the requirements of the following standards:

☒ **FCC Part 15, Subpart C (Section 15.231)**

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Prepared by Glyn He Project Engineer / EMC Department	Approved by Sam Tung Manager / EMC Department
Glyn	Date: Sep. 13, 2012

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
Original release	N/A	Sep. 13, 2012

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.231)			
STANDARD SECTION	**TEST TYPE AND LIMIT**	**RESULT**	**REMARK**
§15.203	Antenna Requirement	PASS	Compliant
§15.207 (a)	AC Power Conducted Emission	N/A	N/A
§15.209 §15.231(b)	Radiated Emission	PASS	Compliant
§15.231 (a)	Deactivation Testing	PASS	Compliant
§15.231(c)	Emission Bandwidth Measurement	PASS	Compliant

2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.94dB
Radiated emissions	30MHz ~ 1000MHz	3.6419dB
	1GHz ~ 18GHz	2.2dB
	18GHz ~ 40GHz	1.94dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Remote control
MODEL NO.	RMC1300
FCC ID	OS3RMC01
NOMINAL VOLTAGE	DC 12V from Battery
MODULATION TYPE	OOK
OPERATING FREQUENCY	433.92MHz
NUMBER OF CHANNEL	1
ANTENNA TYPE	Integral PCB Antenna
I/O PORTS	N/A

NOTE:

a. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

b. For the test results, the EUT had been tested with all conditions. But only the worst case was showed in test report.

3.2 DESCRIPTION OF TEST MODES

The EUT was tested under the following modes' the final worst mode were marked in boldface and recorded in this report.

FREQUENCY	TEST MODES
433.92MHz	Transmitting

3.3 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO					DESCRIPTION
	RE ≥ 1G	RE < 1G	PLC	EB	DT	
-	√	√	-	√	√	-

Where **RE ≥ 1G:** Radiated Emission above 1GHz **RE < 1G:** Radiated Emission below 1GHz
PLC: Power Line Conducted Emission **EB:** 20dB Bandwidth measurement
DT: Deactivation Time measurement

POWER LINE CONDUCTED EMISSION TEST:

☐ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☐ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1	1	OOK

RADIATED EMISSION TEST (ABOVE 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations.

☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1	1	OOK

RADIATED EMISSION TEST (BELOW 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations.

☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1	1	OOK

EMISSION BANDWIDTH MEASUREMENT:

☒Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations.

☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1	1	OOK

DEACTIVATION TIME MEASUREMENT:

☒Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations.

☒ Following channel(s) was (were) selected for the final test as listed below.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE
1	1	OOK

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
PLC	N/A	N/A	N/A
RE≥1G	26deg. C, 60%RH	DC 12V By Battery	Venless long
RE<1G	26deg. C, 60%RH	DC 12V By Battery	Venless long
EB	28deg. C, 63%RH	DC 12V By Battery	Glyn He
DT	28deg. C, 63%RH	DC 12V By Battery	Glyn He

3.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.231)
ANSI C63.4-2009

All test items have been performed and recorded as per the above standards.

3.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	N/A	N/A	N/A	N/A	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A

4. TEST TYPES AND RESULTS

4.1 RADIATED EMISSION MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

According to §15.231(b), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emission (microvolts/meter)
40.66–40.70	2,250	225
70–130	1,250	125
130–174	[1]1,250 to 3,750	[1]125 to 375
174–260	3,750	375
260–470	[1]3,750 to 12,500	[1]375 to 1,250
Above 470	12,500	1,250

NOTE:

1. [1] Linear interpolations.
2. The lower limit shall apply at the transition frequencies.
3. Emission level (dBuV/m) = 20 log Emission level (uV/m).
4. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Spectrum Analyzer Agilent	E4446A	MY46180622	May 02, 12	May 01, 13
Test Receiver ROHDE & SCHWARZ	ESVD	847398/003	May 15,12	May 14,13
Bilog Antenna TESEQ	CBL 6111D	27089	July 16,12	July 15,13
Horn Antenna EMCO	3117	00062558	Oct.19,11	Oct.19,12
10m Semi-anechoic Chamber ETS-LINDGREN	21.4m*12.1m*8.8m	NSEMC006	Mar. 24,12	Mar. 23,13
RF Cable IMRO	IMRO-400	10m Cable 1#10m	May 16,12	May 15,13
RF Cable IMRO	IMRO-400	10m Cable 2#3m	May 16,12	May 15,13
Signal Amplifier EMCI	EMC330	980095	Nov 07,11	Nov 07,12
Signal Amplifier HP	8449B	3008A00409	May 31,12	May 30,13
RF Cable DRAKA	M06/25-RG102	10m Cable 2#	May 16,12	May 15,13
Test software	ADT_Radiated_V7.6.15	N/A	N/A	N/A

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA and NIM/CHINA.

2. The test was performed in Dongguan Chamber 10m.

3. The horn antenna are used only for the measurement of emission frequency above 1GHz if tested.

4.1.3 TEST PROCEDURES

The basic test procedure was in accordance with ANSI C63.4 (section 12).

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters Semi-anechoic chamber room. 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 height of antenna 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.

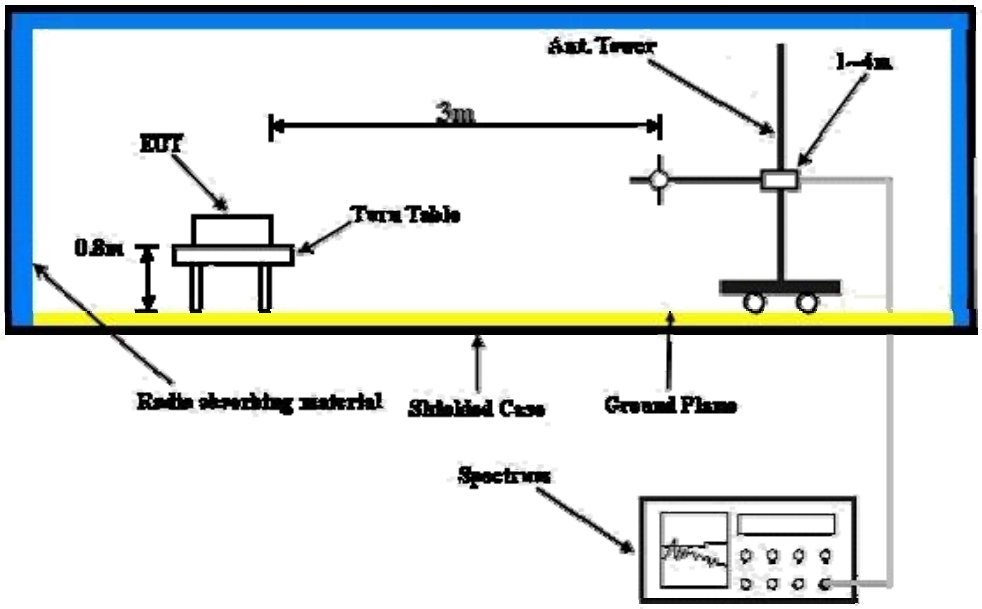
e. The test-receiver system was set to peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using fresh batteries. The turntable was rotated to maximize the emission level.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT OPERATING CONDITIONS

a. Placed the EUT on the testing table.
b. Enable EUT under transmission condition continuously at specific channel frequency.

4.1.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA: Transmitting

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	133.47 PK	12.75	0.71	13.46	43.5	-30.04	252	154
2	379.2 PK	17.07	6.61	23.68	46	-22.32	300	25
3	433.92 PK	18.77	63.45	82.22	100.8	-18.58	300	0
	433.92 AV	-	-	71.83	80.8	-8.97	-	-
4	523.08 PK	20.58	1.33	21.91	46	-24.09	300	222
5	637.87 PK	23.17	0.29	23.46	46	-22.54	320	358
6	867.84 PK	26.03	21.53	47.56	80.8	-33.24	350	46
	867.84 AV	-	-	37.17	60.8	-23.63	-	-
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	133.47 PK	12.75	2.12	14.87	43.5	-28.63	100	257
2	299.98 PK	15.05	2.39	17.44	46	-28.56	100	281
3	379.2 PK	17.07	4.85	21.92	46	-24.08	100	332
4	433.92 PK	18.77	65.21	83.98	100.8	-16.82	100	0
	433.92 AV	**-**	**-**	**73.59**	**80.8**	**-7.21**	**-**	**-**
5	487.52 PK	20.09	3.53	23.62	46	-22.38	100	347
6	867.84 PK	26.03	21.98	48.01	80.8	-32.79	100	0
	867.84 AV	-	-	37.62	60.8	-23.18	-	-

NOTE:

1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) at frequency below 1GHz.
2. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
3. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
4. Margin value = Emission level – Limit value.
5. Fundamental AV value =PK Emission +20*log(duty cycle)Where the duty factor is calculated from following formula:20 log (Duty cycle) = 20 log (17.23 ms / 56.96 ms) = -10.39 dB Please see page 16 for plotted duty.

ABOVE 1GHz WORST-CASE DATA: Transmitting

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	1301.75 PK	9.85	16.23	26.08	74	-47.92	226	105
	1301.75 AV	-	-	15.72	54	-38.28	-	-
2	1735.65 PK	11.97	20.98	32.95	74	-41.05	221	326
	1735.65 AV	-	-	22.59	54	-31.41	-	-
3	2169.68 PK	14.01	23.98	37.99	74	-36.01	235	25
	2169.68 AV	-	-	27.63	54	-26.37	-	-
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	1301.77	9.15	19.27	28.42	74	-45.58	100	339
	1301.77	-	-	18.06	54	-35.94	-	-
2	1735.62	12.48	18.01	30.49	74	-43.51	100	286
	1735.62	-	-	20.13	54	-33.87	-	-
3	2169.62	16.72	17.47	34.19	74	-39.81	100	316
	2169.62	-	-	23.83	54	-30.17	-	-

NOTE:

6. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz for Peak detection (PK) at frequency above 1GHz.
7. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
8. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
9. Margin value = Emission level – Limit value.
10. Fundamental AV value =PK Emission +20*log(duty cycle)Where the duty factor is calculated from following formula:20 log (Duty cycle) = 20 log (17.23 ms / 56.96 ms) = -10.39 dB Please see page 16 for plotted duty.

Duty Cycle:

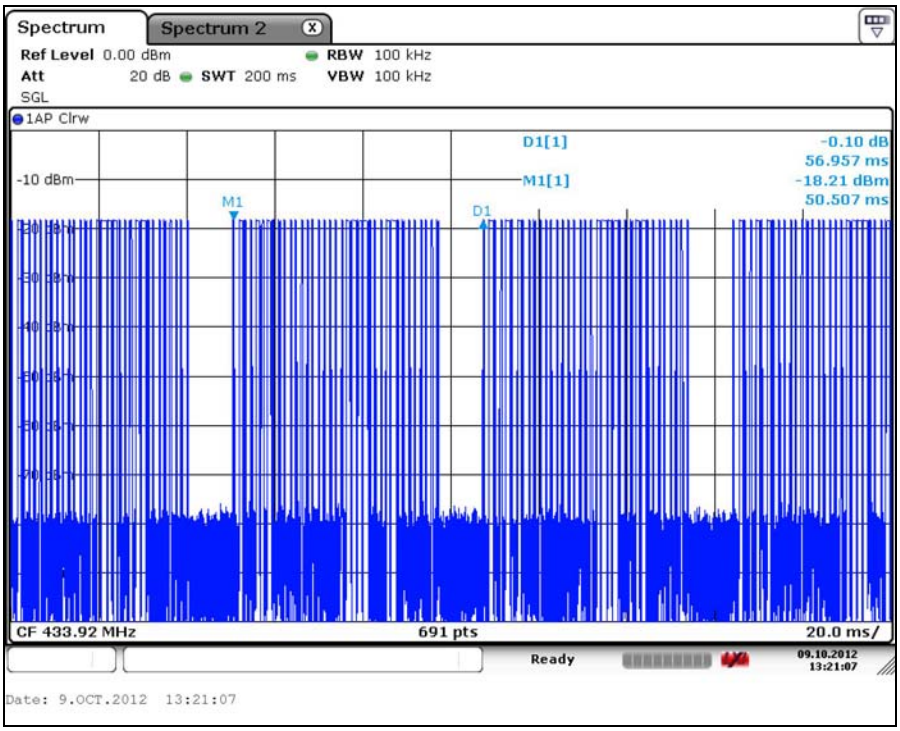
Tp = 56.96ms

Ton = Ton1 * Number + Ton2 * Number = 0.95*9+0.31*28=17.23ms

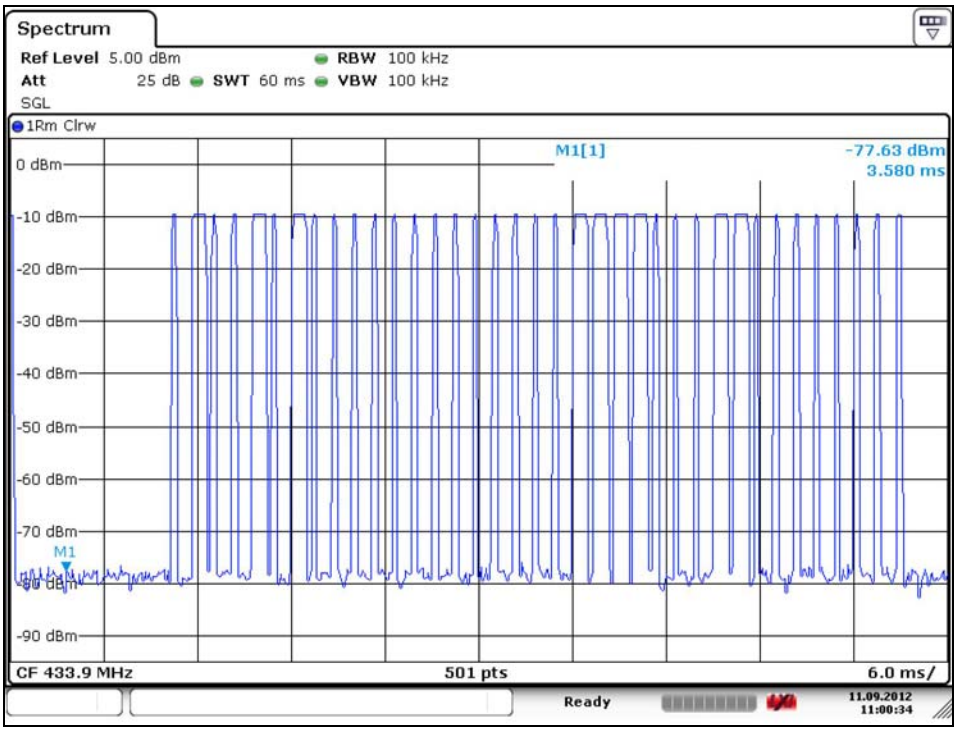
Duty Cycle = Ton / Tp * 100% = 17.23/56.96 = 30.25%

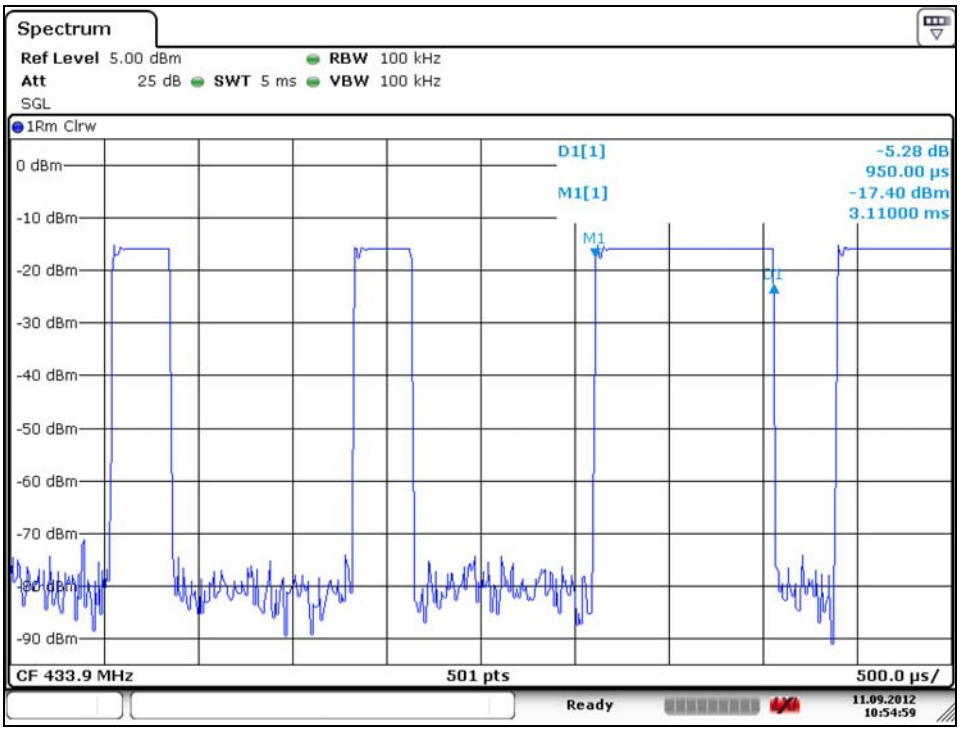
Factor = 20*Log (Ton/Tp) = -10.39

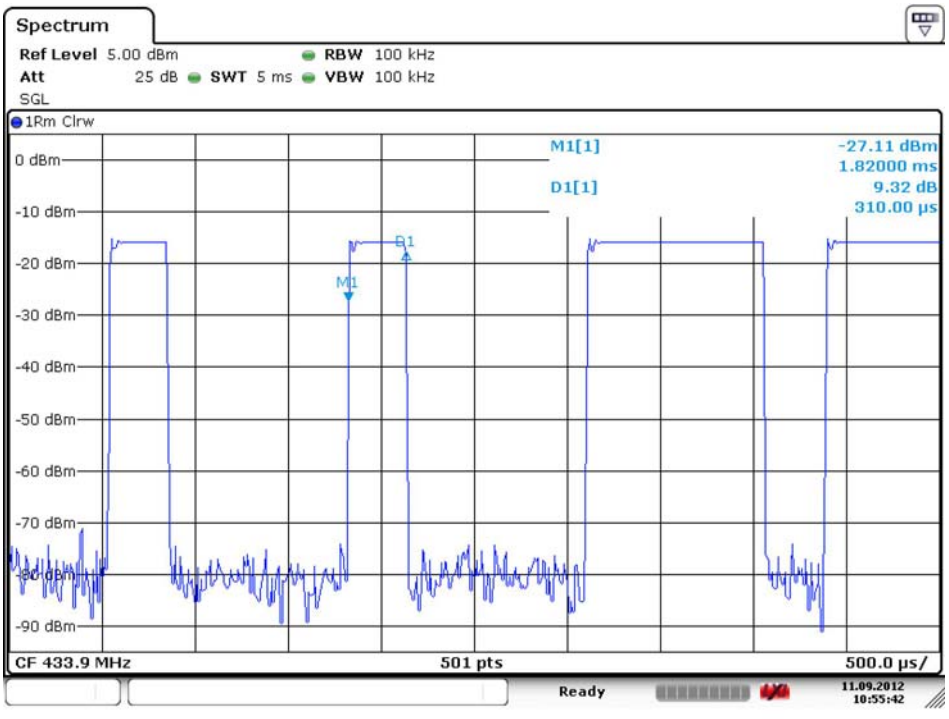
Tp



Ton= *0.95*9+0.31*28=17.23ms*






Spectrum
Ref Level 5.00 dBm
RBW 100 kHz
Att 25 dB SWT 5 ms VBW 100 kHz
SGL
1Rm Clrw
M1[1]
-27.11 dBm
1.82000 ms
D1[1]
9.32 dB
310.00 µs
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
D1
M1
CF 433.9 MHz
501 pts
500.0 µs/
Ready
11.09.2012
10:55:42

4.2 20dB BANDWIDTH MEASUREMENT

4.2.1 LIMITS OF 20dB BANDWIDTH MEASUREMENT

According to FCC 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. Bandwidth is determined at the points 20 dB down from the modulated carrier.

Limit=Fundamental Frequency×0.25%=433.9×0.25%=1084.75kHz

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Spectrum Analyzer Rohde&Schwarz	FSV7	102331	Nov 25,11	Nov 24,12
Bilog Antenna TESEQ	CBL 6111D	27089	July 16,12	July 15,13
10m Semi-anechoic Chamber ETS-LINDGREN	21.4m*12.1m*8.8m	NSEMC006	Mar. 24,12	Mar. 23,13
RF Cable IMRO	IMRO-400	10m Cable 1#10m	May 16,12	May 15,13
RF Cable IMRO	IMRO-400	10m Cable 2#3m	May 16,12	May 15,13
Signal Amplifier EMCI	EMC330	980095	Nov 07,11	Nov 07,12
RF Cable DRAKA	M06/25-RG102	10m Cable 2#	May 16,12	May 15,13
Test software	ADT_Radiated_V7.6.15	N/A	N/A	N/A

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA and NIM/CHINA

2. The test was performed in Dongguan Chamber RF

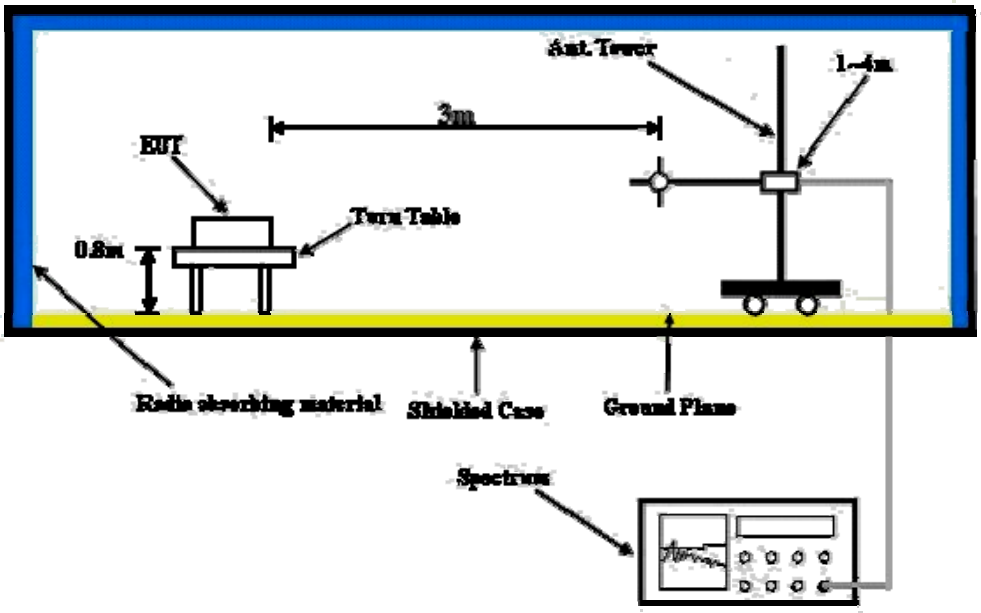
4.2.3 TEST PROCEDURE

The spectrum analyzer was receiving the maximum emission level. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



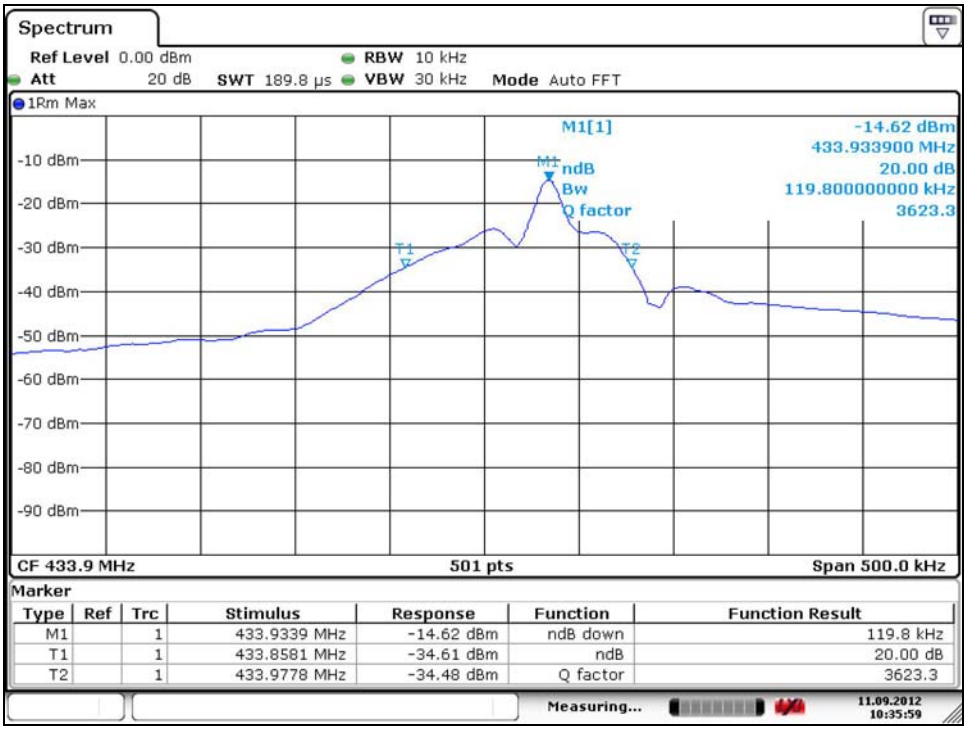
4.2.6 EUT OPERATING CONDITIONS

a. Placed the EUT on the testing table.
b. Enable EUT under transmission condition continuously at specific channel frequency.

4.2.7 TEST RESULTS

FREQUENCY (MHz)	20dB BANDWIDTH (kHz)	MAXIMUM LIMIT (kHz)	PASS/FAIL
433.92	119.80	1084.75	PASS

Test Data:



4.3 DEACTIVATION TEST

4.3.1 LIMITS OF DEACTIVATION TEST

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.
15.231 (a)(2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Spectrum Analyzer Rohde&Schwarz	FSV7	102331	Nov 25,11	Nov 24,12
Bilog Antenna TESEQ	CBL 6111D	27089	July 16,12	July 15,13
10m Semi-anechoic Chamber ETS-LINDGREN	21.4m*12.1m*8.8m	NSEMC006	Mar. 24,12	Mar. 23,13
RF Cable IMRO	IMRO-400	10m Cable 1#10m	May 16,12	May 15,13
RF Cable IMRO	IMRO-400	10m Cable 2#3m	May 16,12	May 15,13
Signal Amplifier EMCI	EMC330	980095	Nov 07,11	Nov 07,12
RF Cable DRAKA	M06/25-RG102	10m Cable 2#	May 16,12	May 15,13
Test software	ADT_Radiated_V7.6.15	N/A	N/A	N/A

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA and NIM/CHINA

2. The test was performed in Dongguan Chamber RF

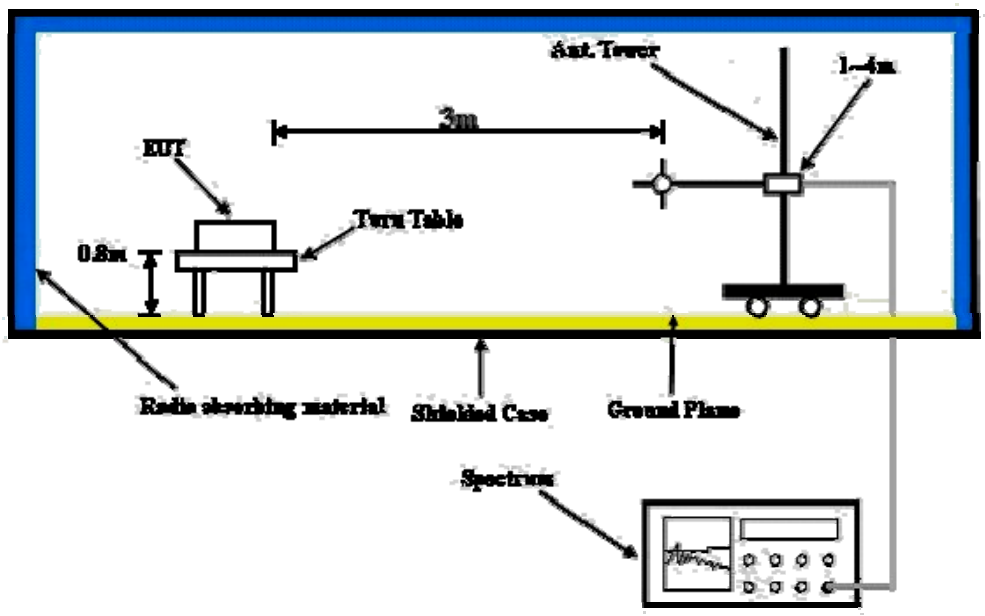
4.3.3 TEST PROCEDURE

With the EUT's antenna attached, the EUT's output signal was received by the test antenna, which was connected to the spectrum analyzer. Set the center frequency to 433.92MHz, than set the spectrum analyzer to Zero Span for the release time reading. During the testing, the transmission duration was measured and recorded.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation.

4.3.5 TEST SETUP



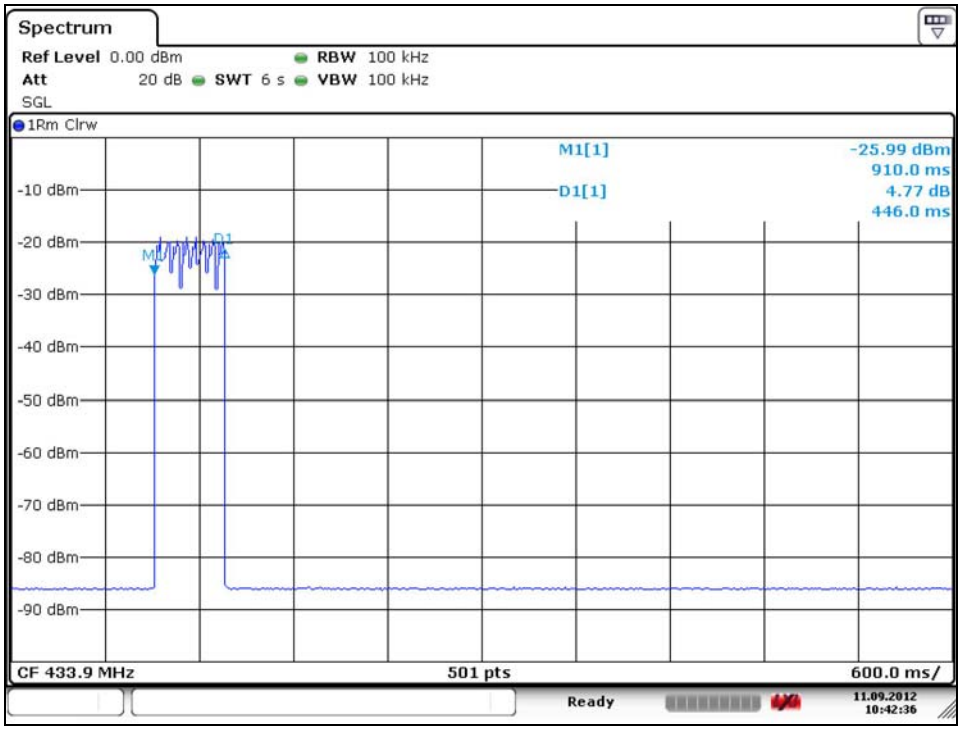
4.3.6 EUT OPERATING CONDITIONS

a. Placed the EUT on the testing table.
b. Enable EUT under transmission condition continuously at specific channel frequency.

4.3.7 TEST RESULTS

PUSH BUTTON	FREQUENCY (MHz)	MAXIMUM LIMIT (sec)	PASS/FAIL
1	433.92	5	PASS

The plots of test results are attached as below.



5 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

6 APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

---END---