

## ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT INTENTIONAL RADIATOR CERTIFICATION

**Product Name** : WEATHER STATION  
**Model Name** : KW9010-2TH, 47007TX  
**FCC ID** : X6I-9010TH  
**Trade Name** : N/A  
**Report Number** : SZEE100128262125-1  
**Date** : Mar. 03, 2010

Standards	Results
<input checked="" type="checkbox"/> FCC Part15C: 2009	Pass

Prepared for:  
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CENTRE TESTING INTERNATIONAL CORPORATION**

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*N/A means not applicable*

## 1. GENERAL INFORMATION

**Applicant & Address:** CARRIN ELECTRONICS COMPANY LIMITED  
UNIT 2105-2106, TOWER A, REGENT CENTRE, 63 WO  
YI HOP ROAD, KWAI CHUNG, HONG KONG

**Manufacturer & Address:** CARRIN ELECTRONICS COMPANY LIMITED  
UNIT 2105-2106, TOWER A, REGENT CENTRE, 63 WO  
YI HOP ROAD, KWAI CHUNG, HONG KONG

**Equipment Under Test:** WEATHER STATION

**Model Name:** KW9010-2TH, 47007TX

**FCC ID:** X6I-9010TH

**Operated Frequency:** 433.92MHz

**Trade Name:** N/A

**Serial Number:** N/A

**Technical Data:** DC 3V

**Model Deviation:** The two models above are identical in accordance with client's requirements. The test model is KW9010-2TH, and all the test results are applicable to 47007TX.

**Date of test:** Jan. 05, 2010 to Mar. 03, 2010

**Condition of Test Sample:** Normal

The above equipment was tested by Centre Testing International Corporation for compliance with the requirements set forth in the FCC Part15.231 and 15.209 and the measurement procedure according to FCC requirements and ANSI C63.4.

The test results of this report relate only to the tested sample identified in this report.

Prepared by :

Christy Chen

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Reviewed by :

Louisa Lu

Louisa Lu

Approved by :

Jim Zhang

Jim Zhang  
Manager



Date

: Mar. 03, 2010

## 2. TEST SUMMARY

Clause	Test Item	Rule	Result
6	20dB bandwidth	FCC Part15.231(c)	PASS
7	Time measurement	FCC Part15.231	PASS
8	Radiated Emission	FCC Part15.231 (e) & FCC Part15.209(a)	PASS

Note: The power supply of EUT is by battery.

## 3. MEASUREMENT UNCERTAINTY

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

Measurement items	Uncertainty
Radiated Emissions	4.6 dB

## 4. PRODUCT INFORMATION

Items	Description
Rating	DC 3V
Equipments Class	Security/Remote Control Transmitter
Modulation	ASK
Frequency Range	433.92MHz
Channel Number	1
Antenna	Integral PCB Antenna

## 5. TEST EQUIPMENT

Equipment	Manufacturer	Model Number	Serial Number	Due Date
Receiver	R&S	ESCI	100435	08/25/2010
Spectrum Analyzer	Agilent	E4443A	MY45300910	01/19/2011
Biconilog Antenna	ETS-LINGREN	3142C	920250	01/19/2011
Horn Antenna	ETS-LINDGREN	3117	00057407	06/07/2010
Loop Antenna	ETS-LINDGREN	6502	00071730	09/22/2010
Multi device Controller	ETS-LINGREN	2090	00057230	01/19/2011
3M Chamber & Accessories	ETS-LINDGREN	FACT-3	N/A	01/19/2011

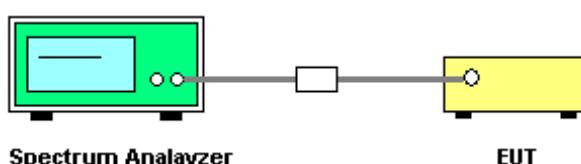
## 6. 20DB BANDWIDTH MEASUREMENT

### 6.1 LIMITS

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.

As the center frequency for the device operating is 433.92MHz, thus, the 20dB bandwidth limit is 1.08MHz.

### 6.2 BLOCK DIAGRAM OF TEST SETUP

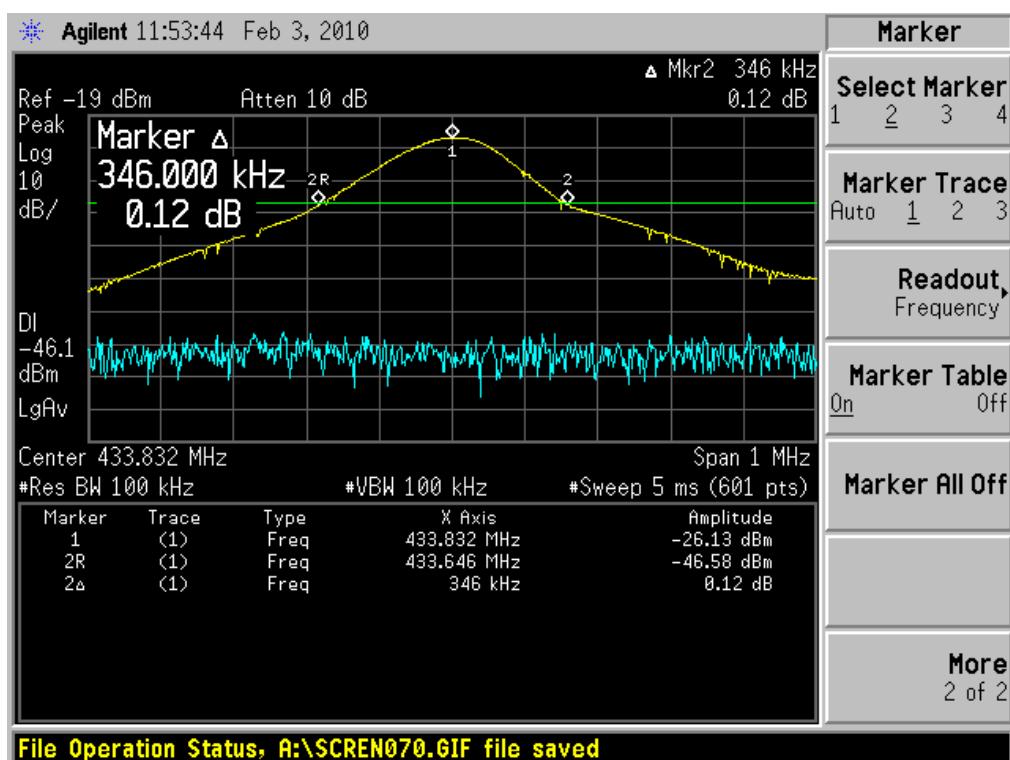


### 6.3 TEST PROCEDURE

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set spectrum analyzer's RBW and VBW to applicable value with Peak in Max Hold.
3. A PEAK output reading and 20dB BW function in spectrum analyzer were taken.

### 6.4 TEST RESULT

Channel	Frequency (MHz)	20dB BW (MHz)	Limit (MHz)	Result (Pass / Fail)
1	433.920	0.346	1.08	Pass

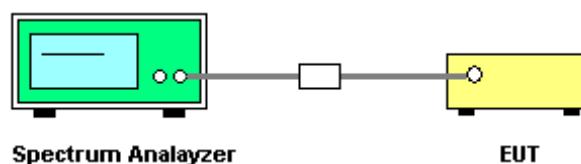


## 7. TIME MEASUREMENT

### 7.1 LIMITS

Devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

### 7.2 BLOCK DIAGRAM OF TEST SETUP



### 7.3 TEST PROCEDURE

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set the center frequency is 433.92MHz and set the Span is 0Hz.
3. Set spectrum analyzer's RBW and VBW to applicable value with Peak.
4. Read the transmission time and silent time from the spectrum analyzer directly.

### 7.4 TEST RESULT

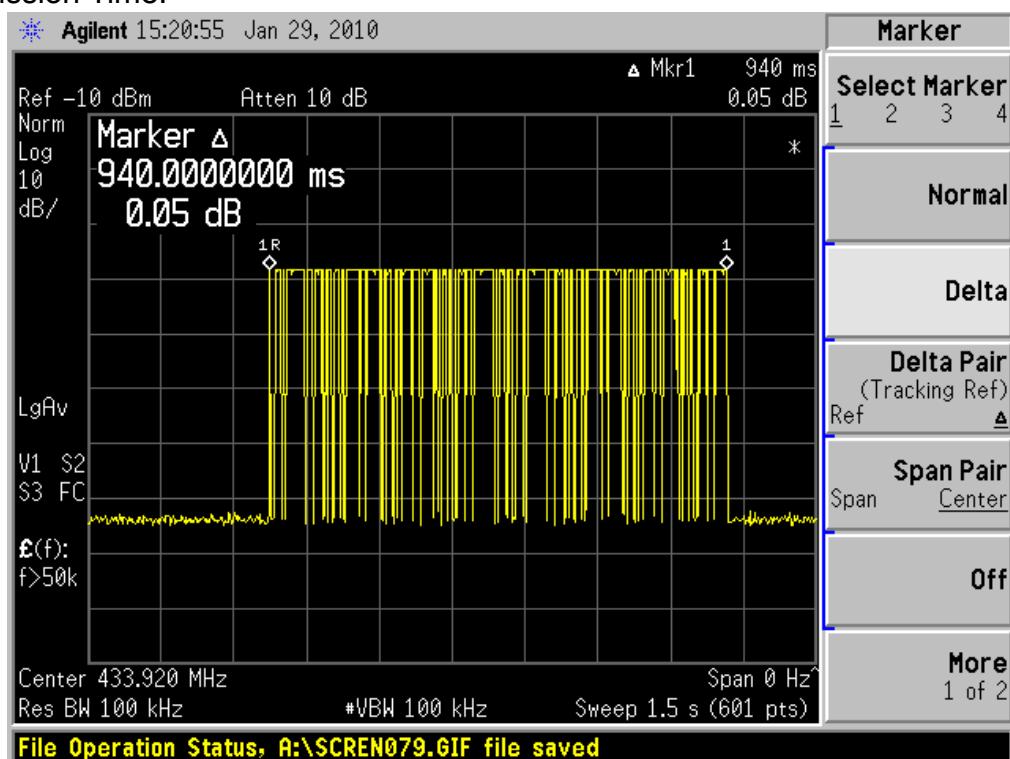
Transmission Time:

Frequency (MHz)	Transmission (Turn on) (s)	Limit (s)	Result (Pass / Fail)
433.920	0.940	1	Pass

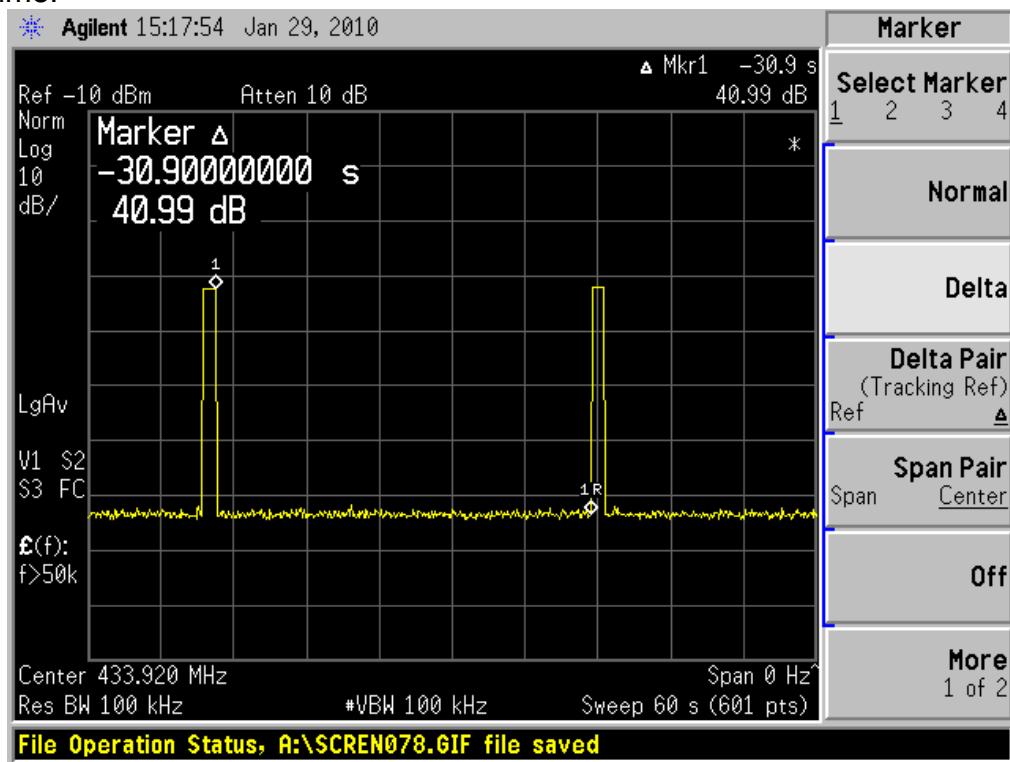
Silent Time:

Frequency (MHz)	Transmission (Turn off) (s)	Limit (s)	Result (Pass / Fail)
433.920	30.9	> Turn on*30 Times & >10s	Pass

## Transmission Time:



## Silent Time:



## 8. RADIATED EMISSIONS MEASUREMENT

### 8.1 LIMITS

FCC Part15.209(a):

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meter)
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

FCC Part15.231(e):

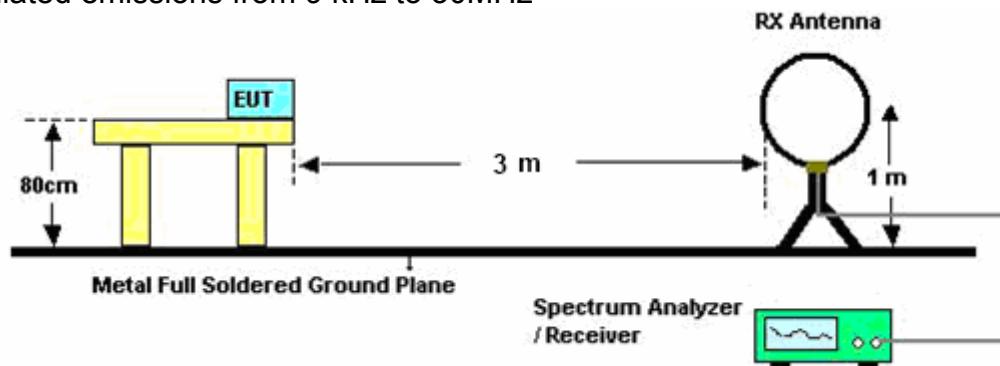
Fundamental Frequency (MHz)	Field Strength of Fundamental microvolts/m at 3 metres, (watts, e.i.r.p.)	Field Strength of Unwanted Emissions microvolts/m at 3 metres
260-470	1500 to 5000*	150 to 500

\* Linear interpolation with frequency F in MHz:

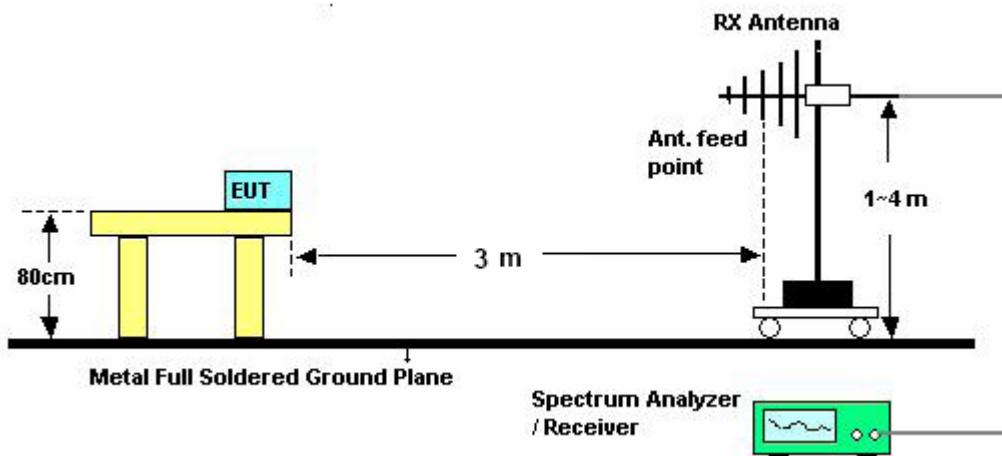
For 260-470 MHz: FS (microvolts/m) = (16.67 x F)-2833.33.

### 8.2 BLOCK DIAGRAM OF TEST SETUP

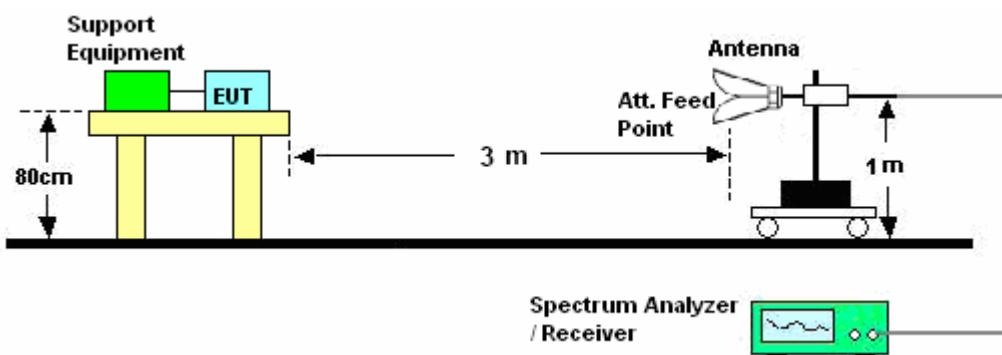
For radiated emissions from 9 kHz to 30MHz



For radiated emissions from 30 - 1000MHz



For radiated emissions above 1GHz



### 8.3 TEST PROCEDURE

#### A. 30 - 1000MHz

- The EUT was placed on the top of a turntable 0.8 meters above the ground in the chamber, 3 meters away from the antenna (wideband antenna), which was mounted on the top of a variable-height antenna tower. The maximum values of the field strength are recorded by adjusting the polarizations of the test antenna and rotating the turntable.
- 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 turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test frequency analyzer system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

#### B. Below 30MHz and Above 1GHz

- The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 1 meter away from the antenna (loop antenna). The maximum values of the field strength are recorded by adjusting the polarizations of the test antenna and rotating the turntable.
- For each suspected emission, the EUT was arranged to its worst case and then turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test frequency analyzer system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

## 8.4 TEST RESULT

Table 1: Test data of Radiated Emissions, 30MHz ~ 5GHz

Frequency (MHz)	Polarization (H/V)	Emission_PK (dB $\mu$ V/m)	AV factor (dB)	Final Emission_AV (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)		Result (P/F)
					PK	AV	
433.9200*	H	78.70	-16.98	61.72	92.87	72.87	P
433.9200*	V	89.00	-16.98	72.02	92.87	72.87	P
867.8400**	H	55.76	-16.98	38.78	72.87	52.87	P
867.8400**	V	59.86	-16.98	42.88	72.87	52.87	P
1301.7600**	H	40.87	-16.98	23.89	72.87	52.87	P
1301.7600**	V	53.71	-16.98	36.73	72.87	52.87	P
1735.6800**	H	58.58	-16.98	41.60	72.87	52.87	P
1735.6800**	V	63.33	-16.98	46.35	72.87	52.87	P
2169.6000**	H	52.27	-16.98	35.29	72.87	52.87	P
2169.6000**	V	58.71	-16.98	41.73	72.87	52.87	P
2603.5200**	H	56.90	-16.98	39.92	72.87	52.87	P
2603.5200**	V	---	---	---	72.87	52.87	---
3037.4400**	H	60.40	-16.98	43.42	72.87	52.87	P
3037.4400**	V	50.57	-16.98	33.59	72.87	52.87	P
3471.3600**	H	56.58	-16.98	39.60	72.87	52.87	P
3471.3600**	V	47.71	-16.98	30.73	72.87	52.87	P
3905.2800**	H	48.55	-16.98	31.57	72.87	52.87	P
3905.2800**	V	---	---	---	72.87	52.87	---
4339.2000**	H	48.33	-16.98	31.35	72.87	52.87	P
4339.2000**	V	---	---	---	72.87	52.87	---

**Note 1:**

\*: Fundamental Frequency; \*\*: Field Frequency of Unwanted Emissions

**Note 2:**

Limit dB $\mu$ V/m @3m = Limit dB $\mu$ V/m @300m+ 80

Limit dB $\mu$ V/m @3m = Limit dB $\mu$ V/m @30m + 40

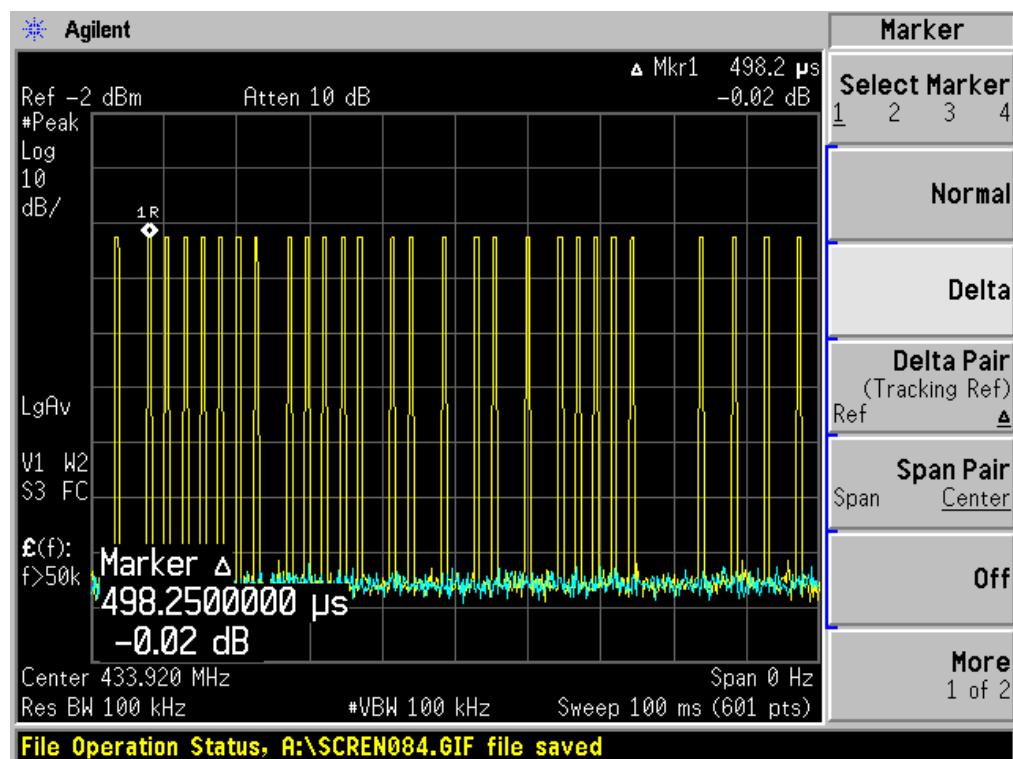
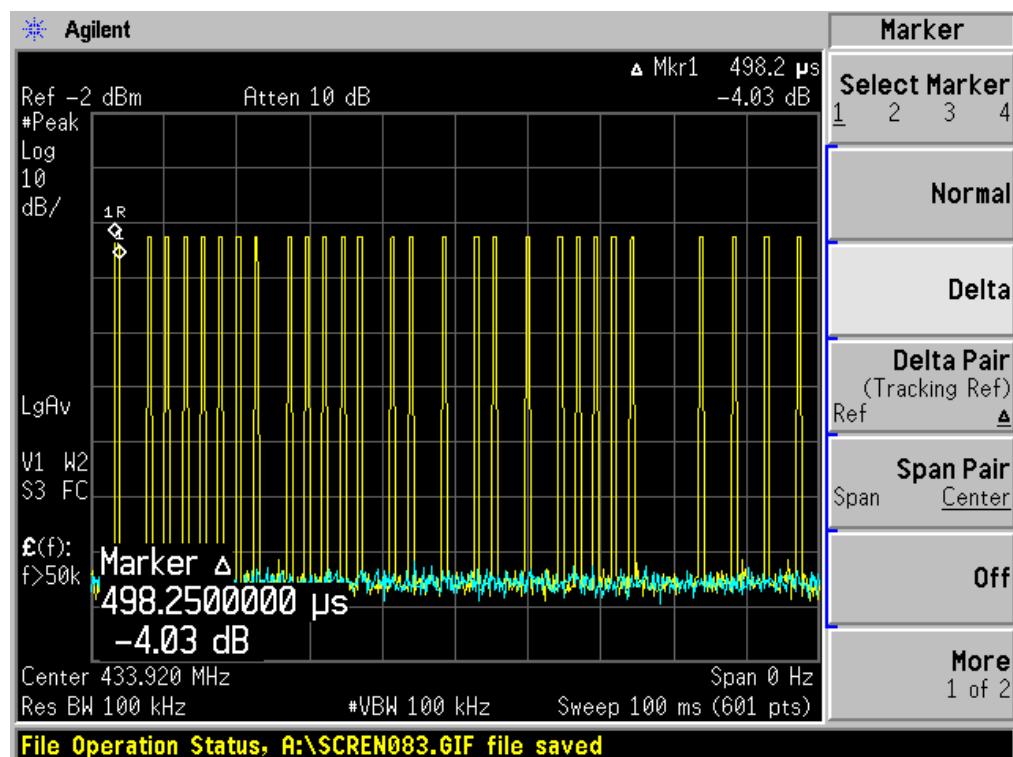
**Note 3:**

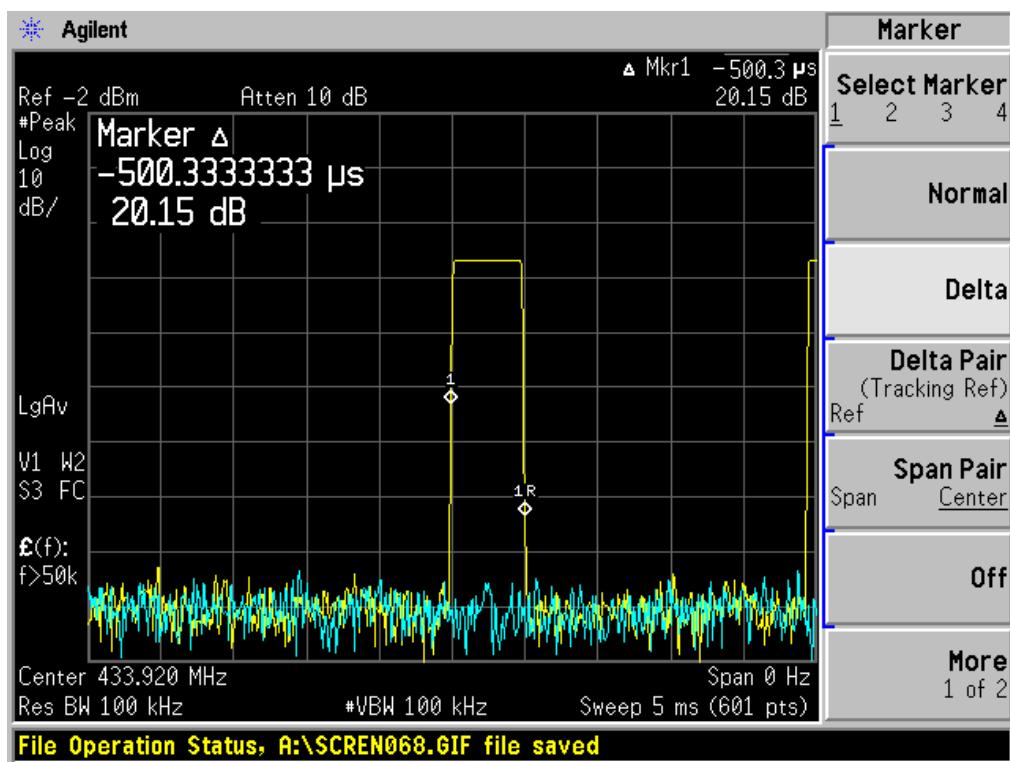
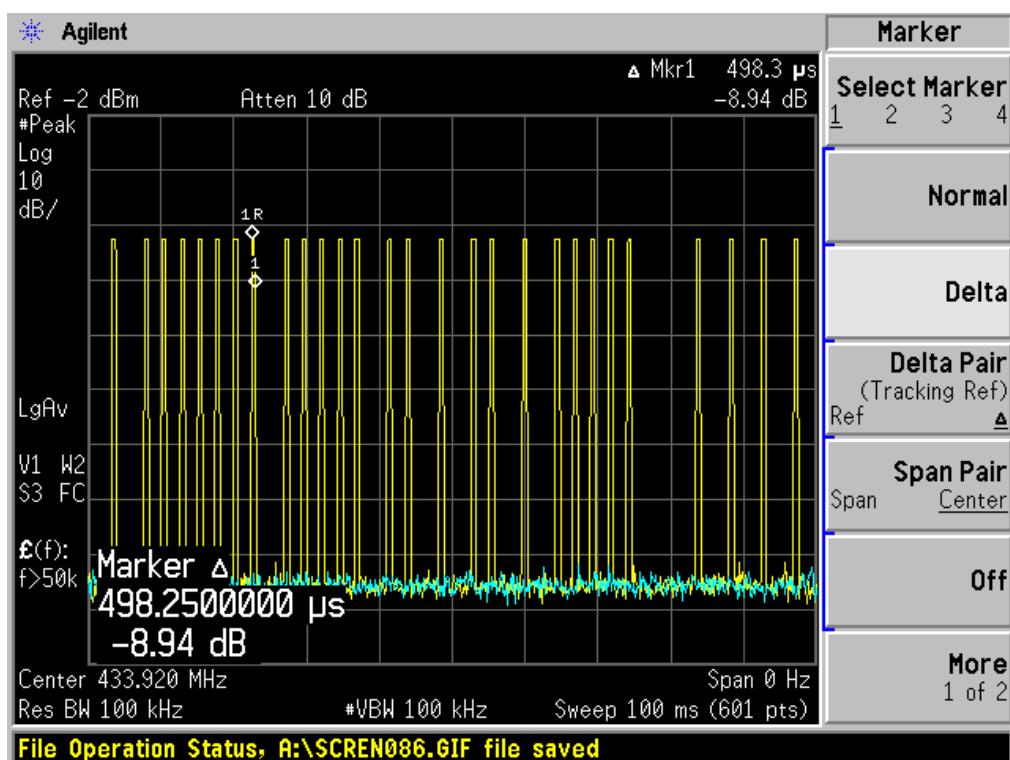
The transmitter periodically sends a different series of characters, but each packet period (100msec) never exceeds a series of 6 long (0.525msec) and 22 short (0.500msec) pulses. Assuming any combination of short and long pulses may be obtained due to encoding the worst case transmit duty cycle would be considered (6x0.525msec) + (22x0.500msec) per 100msec=14.15% duty cycle.

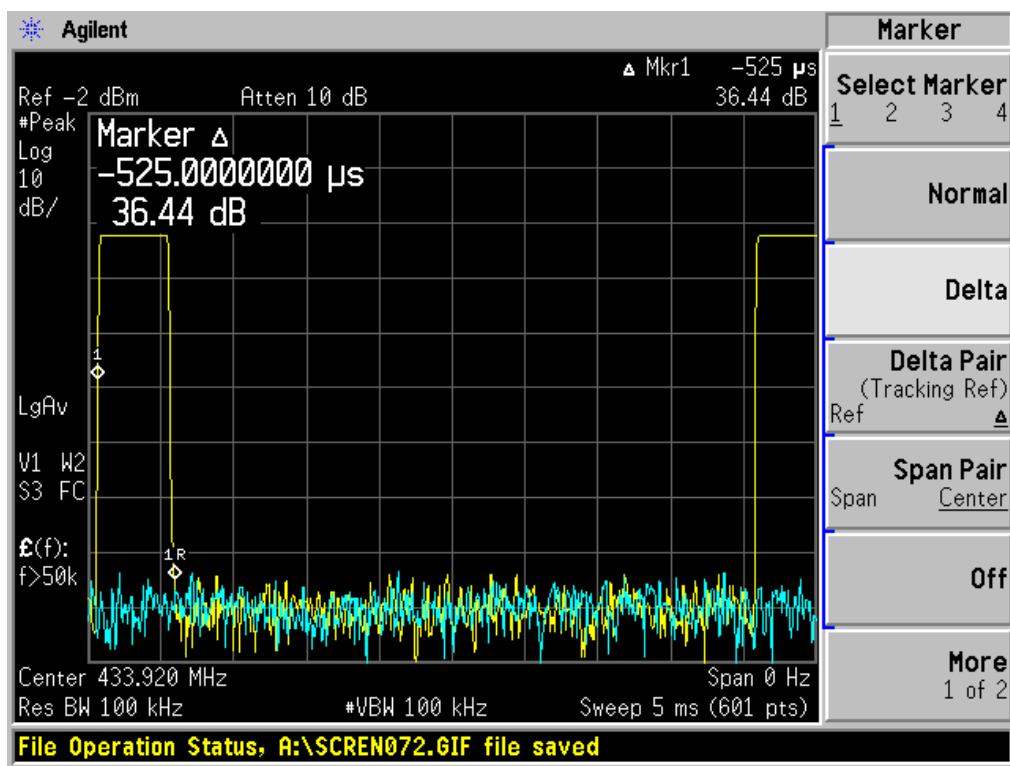
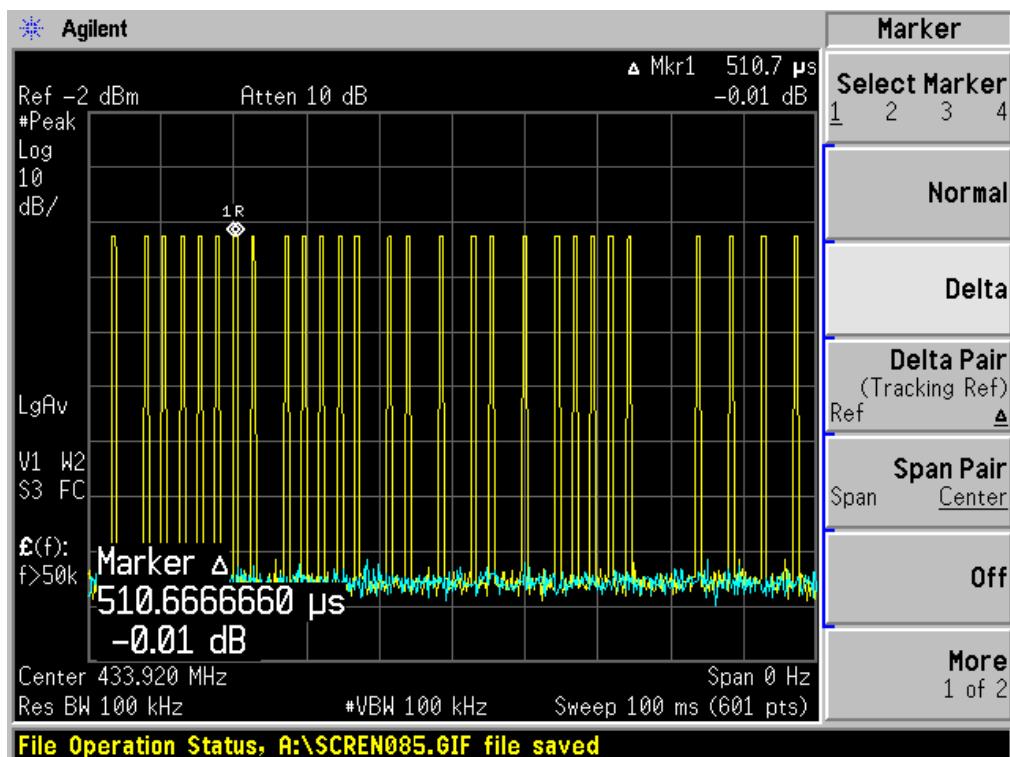
Duty Cycle Correction =  $20 \log_{10} 0.145 = -16.98\text{dB}$

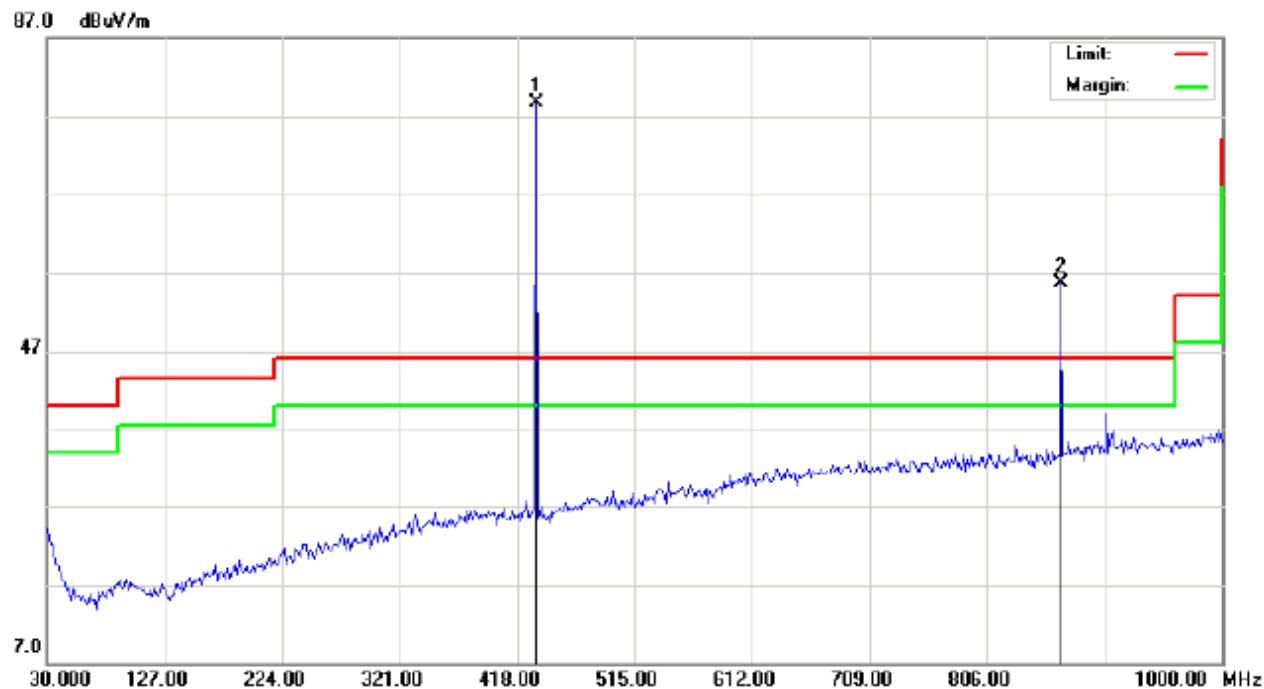
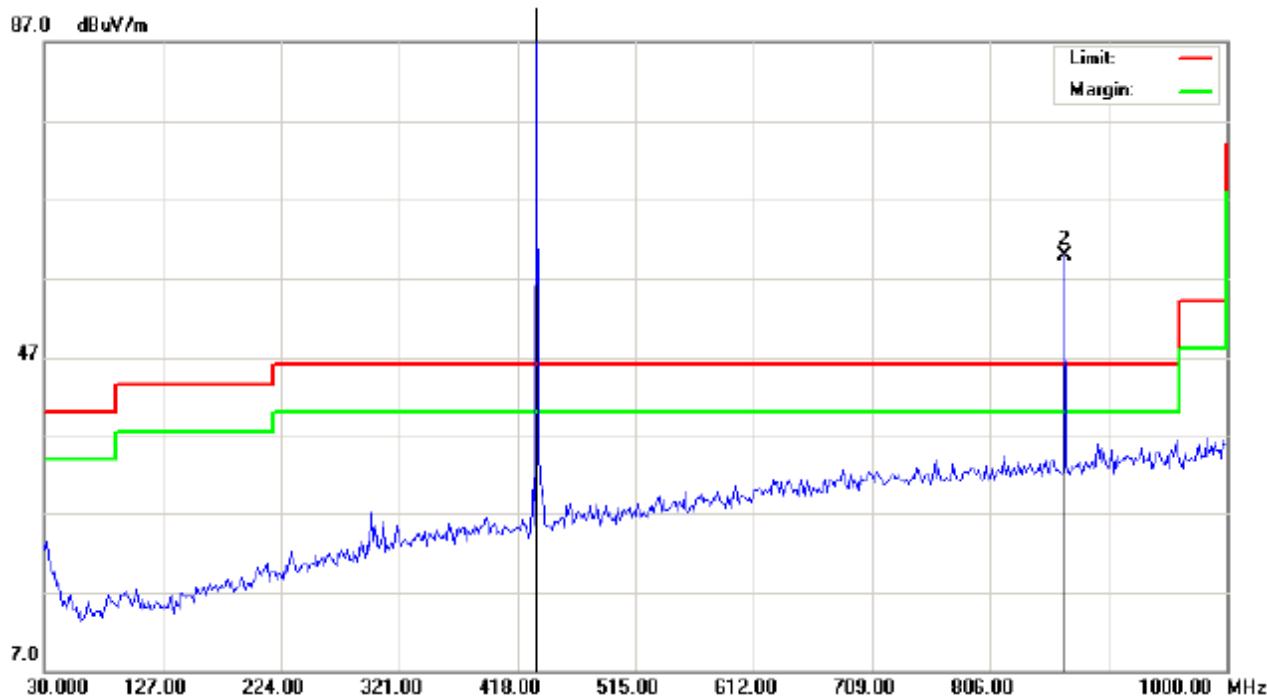
The following plots showed the characteristics of the pulse train for one of these functions.

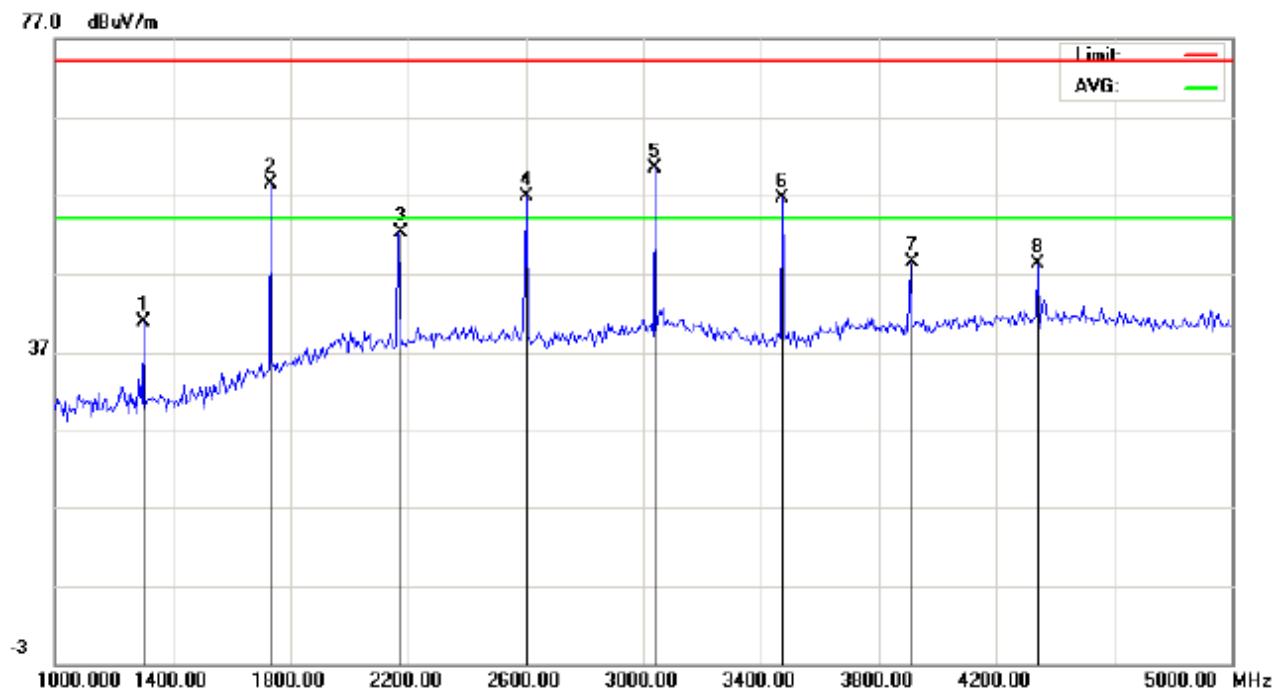
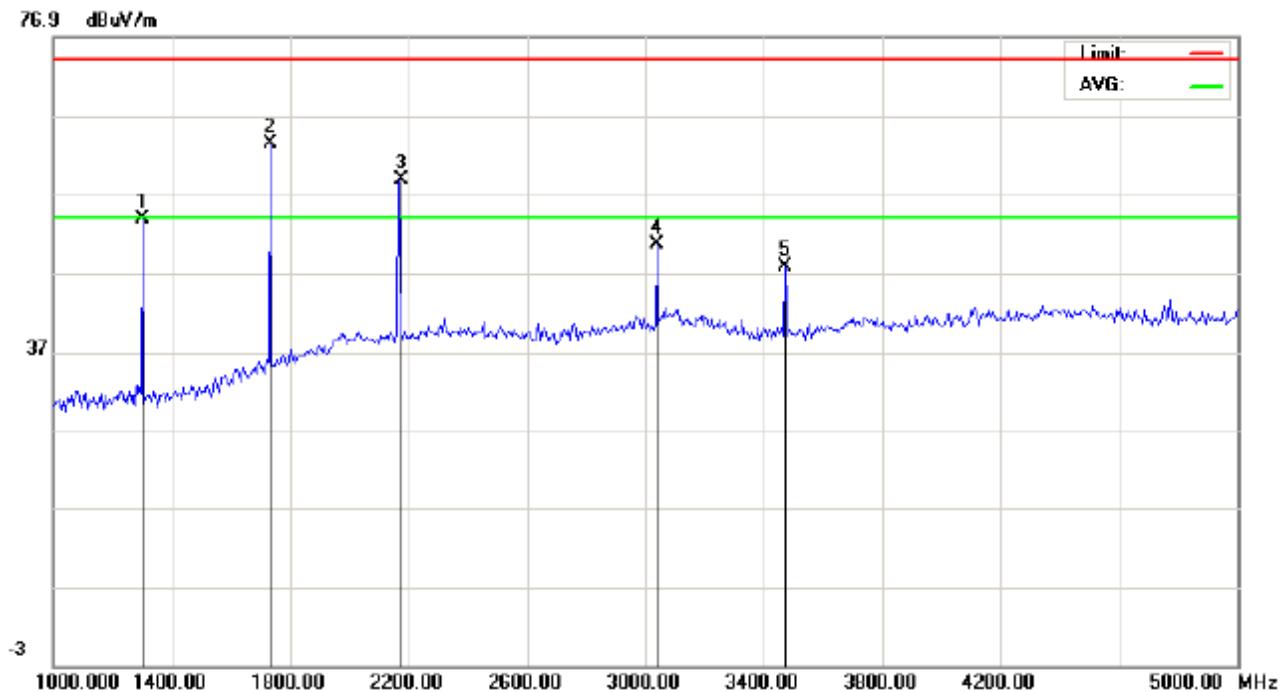
## The plots of duty cycle:





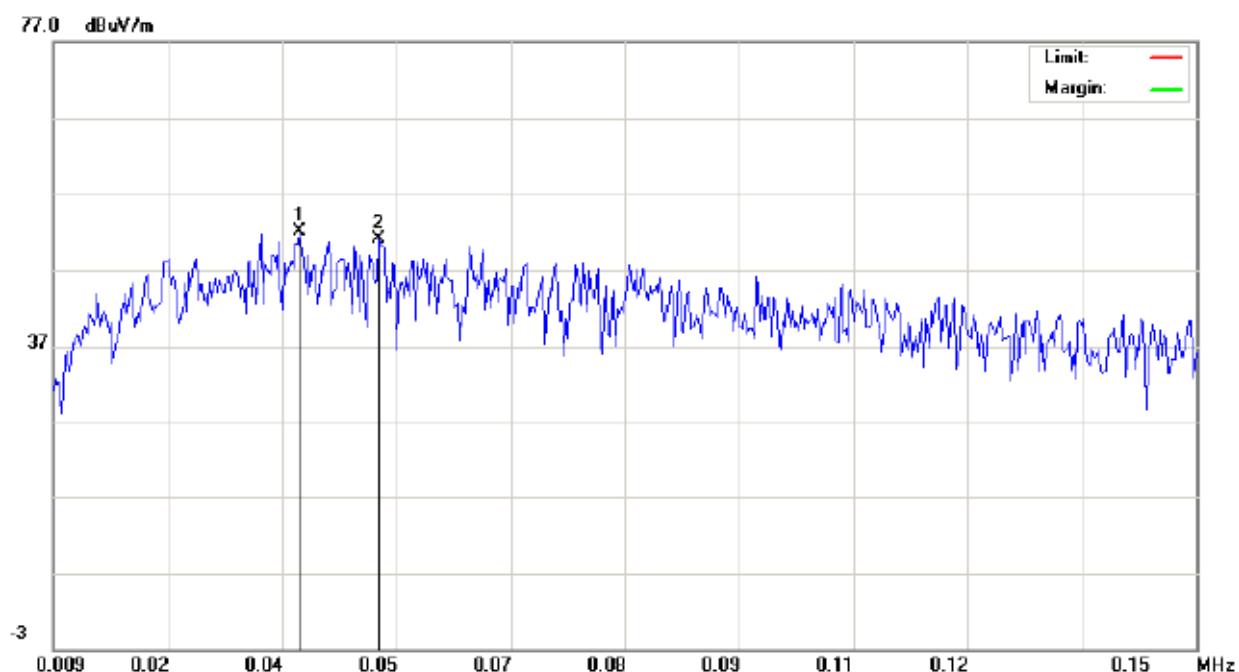


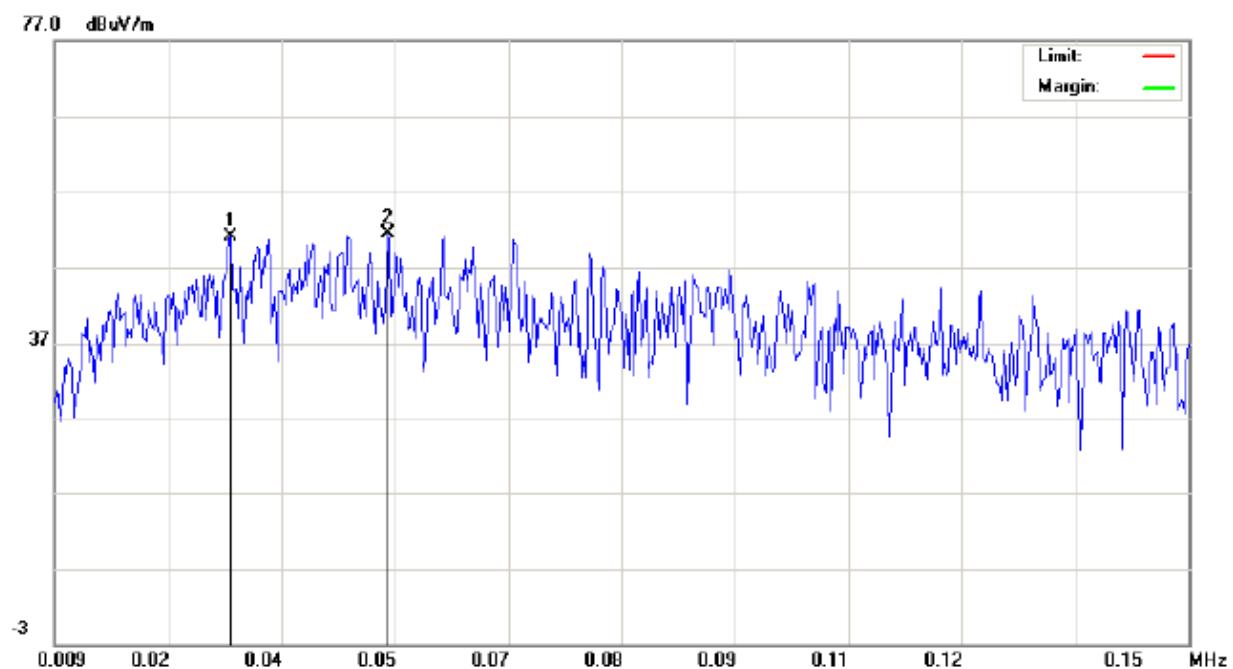
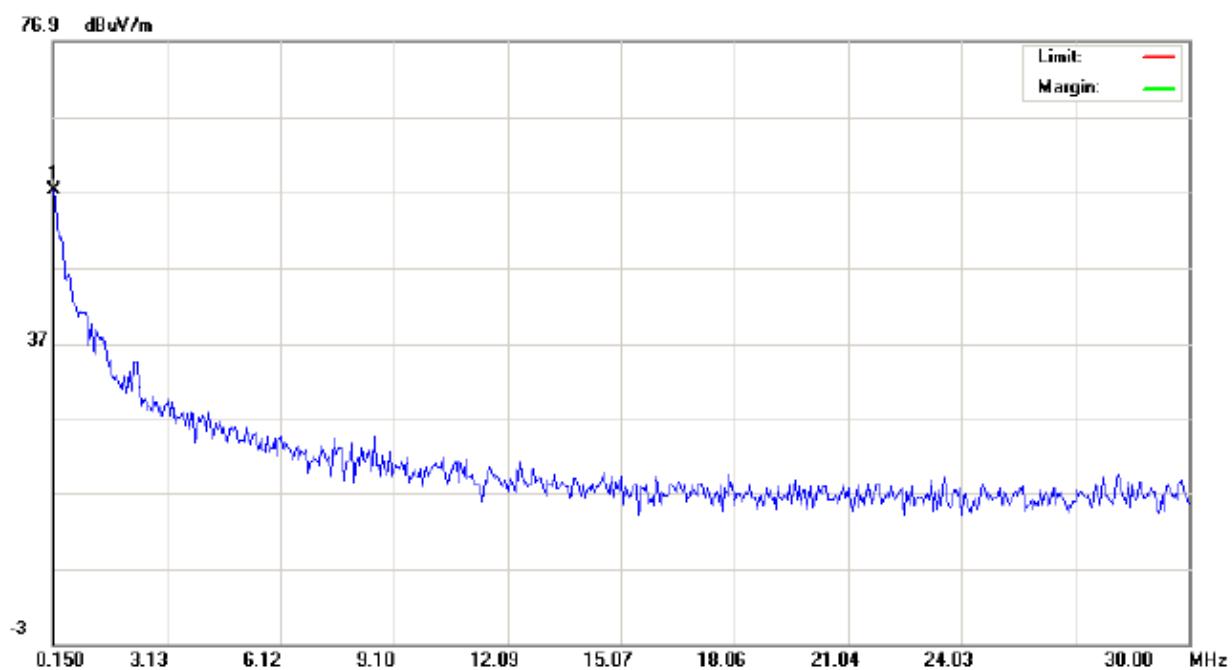
**Figure 1: Test figure of radiated emission, 30MHz ~ 1GHz, 3m distance**
**H:**

**V:**


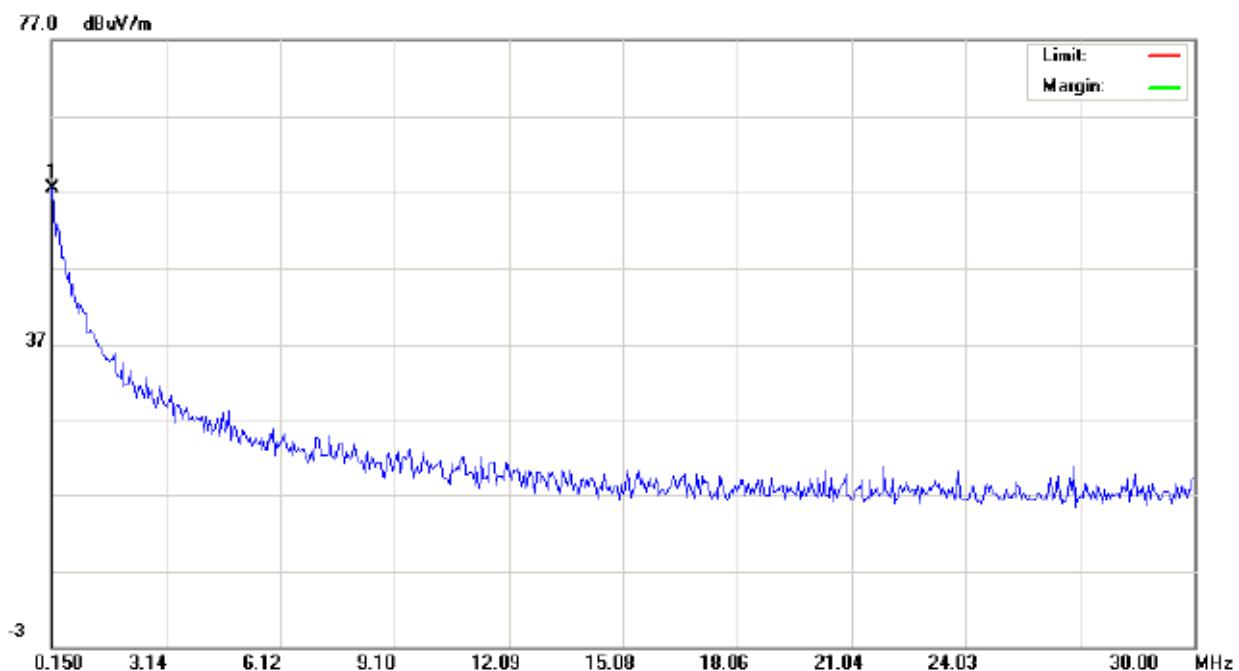
**Figure 2: Test figure of radiated emission, above 1GHz, 3m distance**
**H:**

**V:**


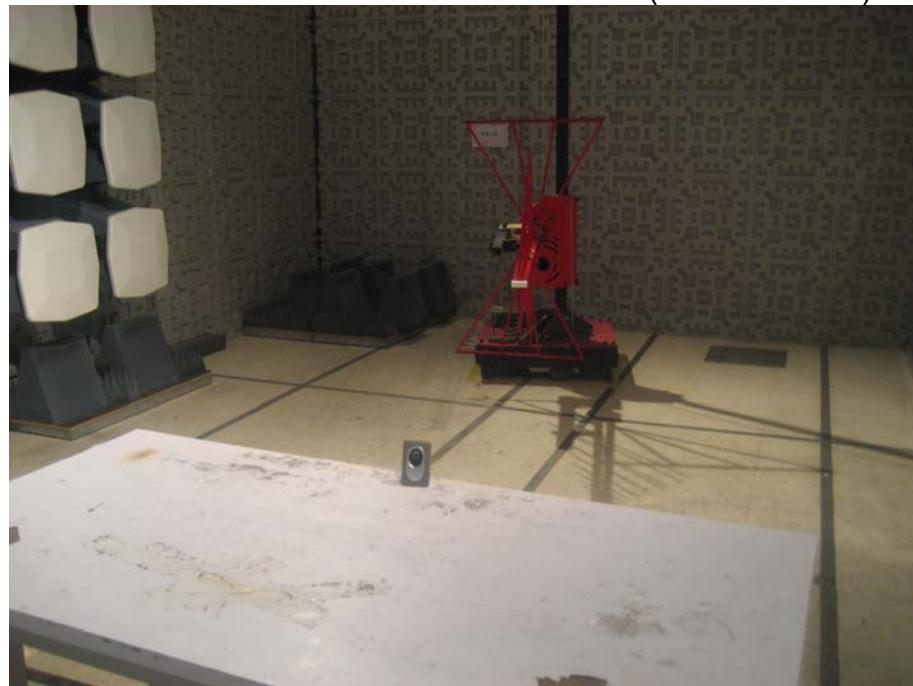
**Table 2: Test data of Radiated Emissions, 9kHz ~ 30MHz**

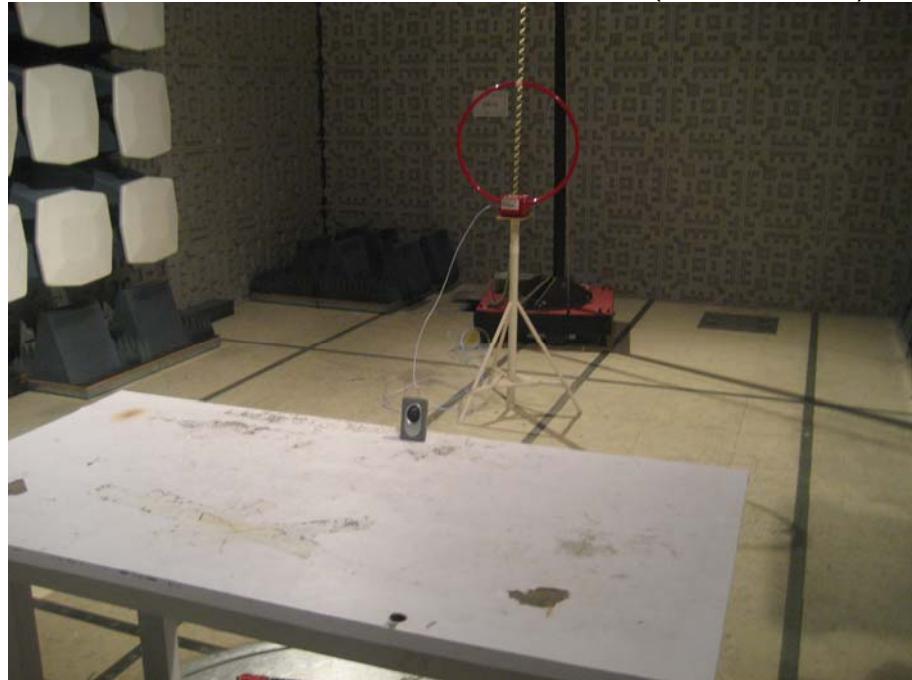
Frequency (kHz)	Measurement _peak (dB $\mu$ V/m)	Limit_AV_3m (dB $\mu$ V/m)	Result (P/F)	Polarization (H/V)	Measurement Distance
39.3	52.18	115.72	P	H	3m
49.2	51.15	113.76	P	H	3m
150.0	57.15	104.08	P	H	3m
30.9	51.14	117.81	P	V	3m
50.4	51.47	113.56	P	V	3m
150.0	57.55	104.08	P	V	3m

**Figure 3: Test figure of radiated emission, 9kHz ~ 150kHz, 3m distance****H:**

**V:****Figure 4: Test figure of radiated emission, 150kHz ~ 30MHz, 3m distance****H:**

**V:**

**APPENDIX 1 PHOTOGRAPHS OF TEST SETUP****TEST SETUP OF RADIATED EMISSION (30MHz -1GHz)****TEST SETUP OF RADIATED EMISSION (above1GHz)**

**TEST SETUP OF RADIATED EMISSION (below 30MHz)**

**APPENDIX 2 EXTERNAL PHOTOGRAPHS OF EUT**

View of external EUT-1



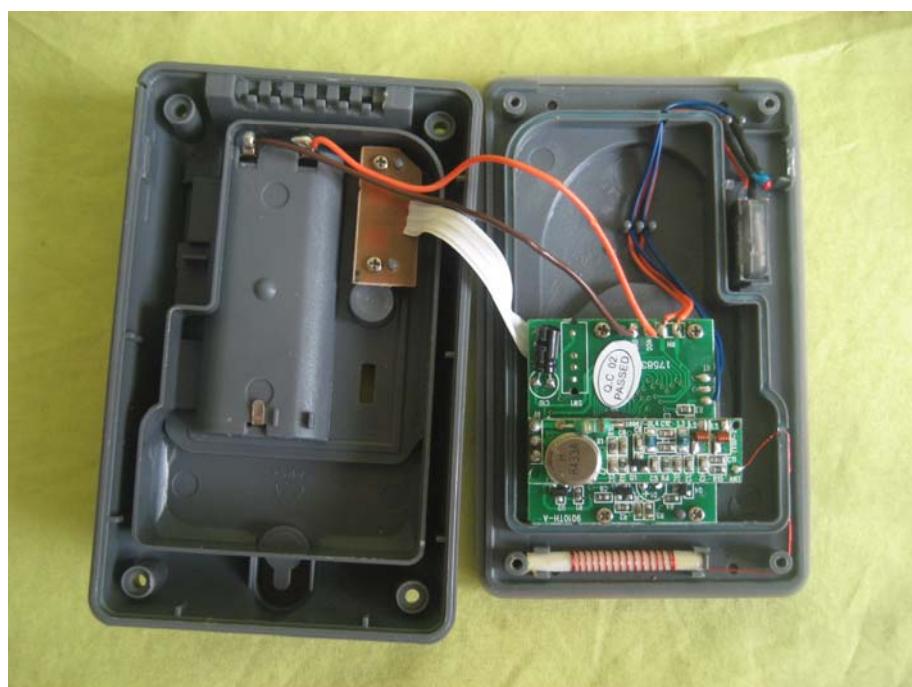
View of external EUT-2



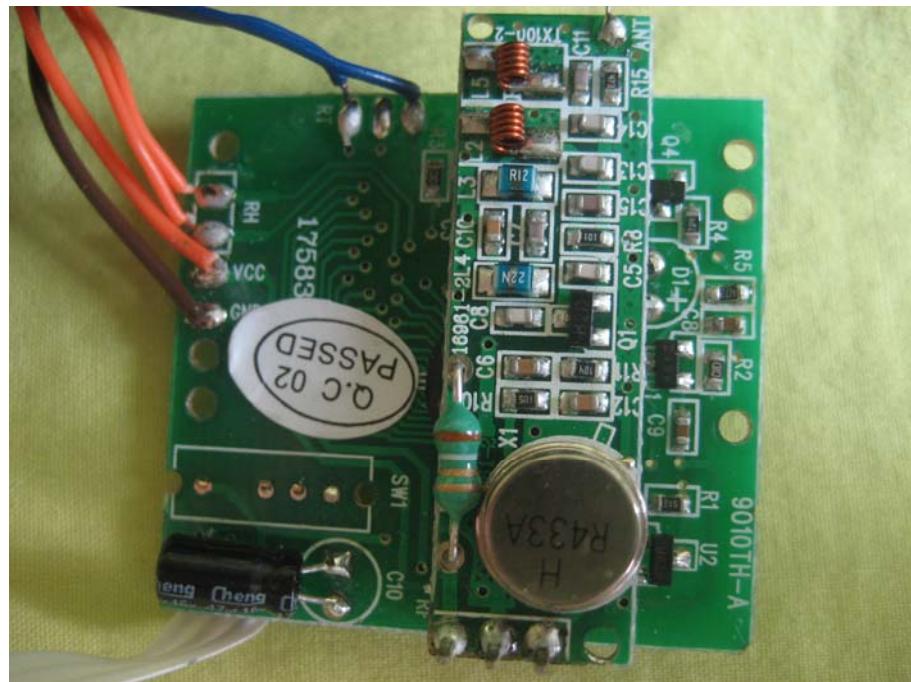
View of external EUT-3

**APPENDIX 3 INTERNAL PHOTOGRAPHS OF EUT**

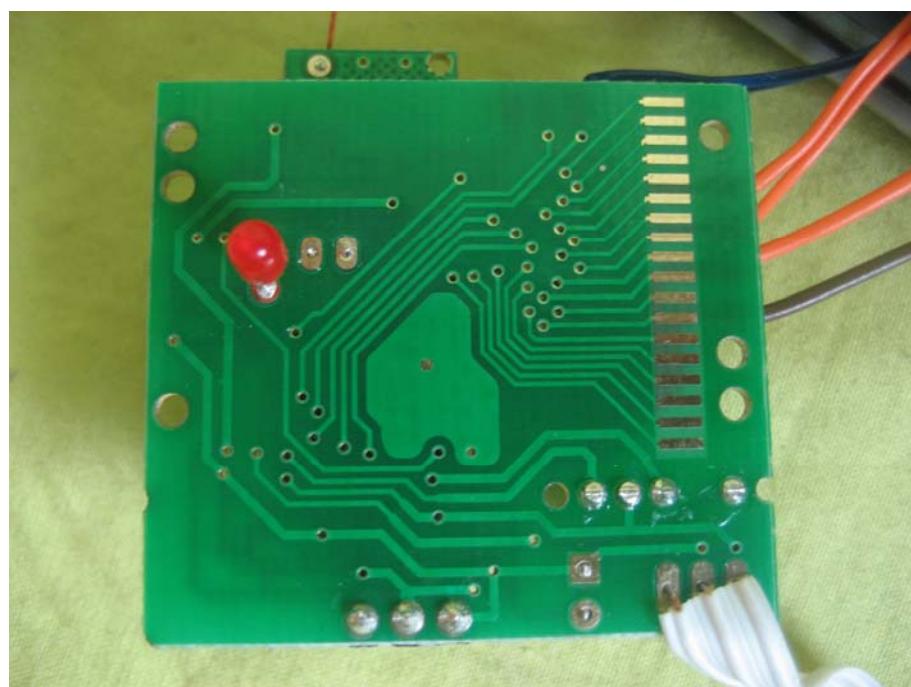
View of internal EUT-1



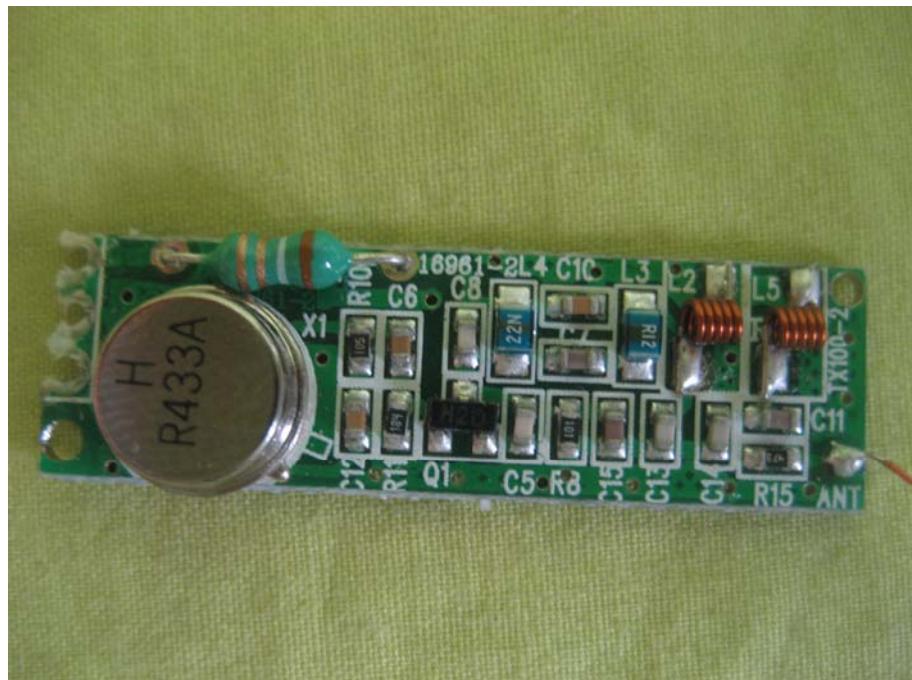
View of internal EUT-2



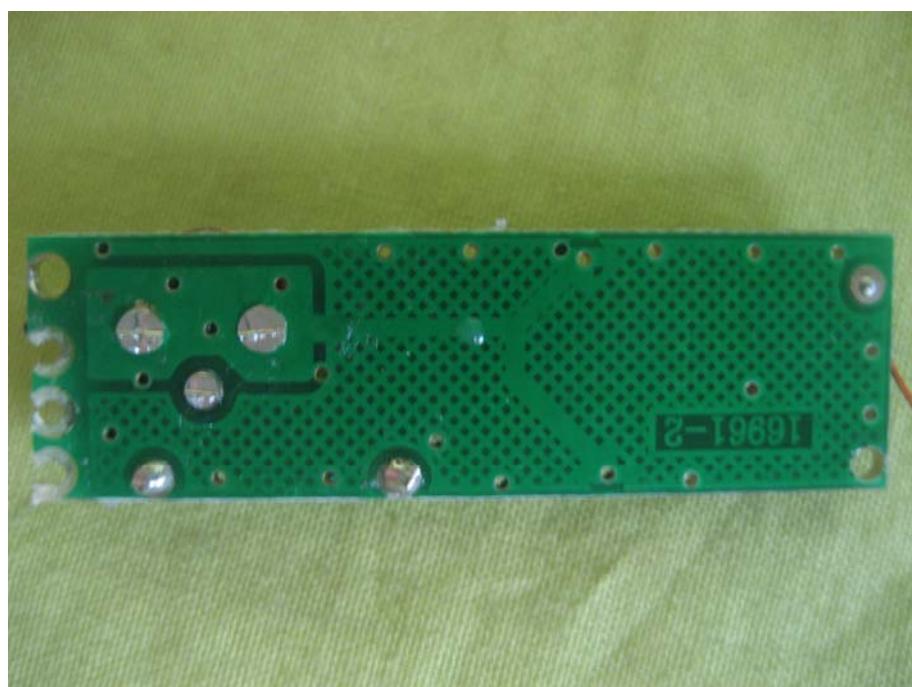
### View of internal EUT-3



## View of internal EUT-4



View of internal EUT-5



View of internal EUT-6

----- End of report -----