

# FCC REPORT

**Applicant:** CARRIN ELECTRONICS COMPANY LIMITED

**Address of Applicant:** UNIT 2105~2106, TOWER A, REGENT CENTRE,  
63 WO YI HOP RD, KWAI CHUNG, HONG KONG

**Equipment Under Test (EUT)**

Product Name: WEATHER STATION

Model No.: KW9177, 47021TX

**FCC ID:** X6I-9177

**Applicable standards:** FCC CFR Title 47 Part 15 Subpart C Section 15.231:2010

**Date of sample receipt:** Nov. 18, 2011

**Date of Test:** Nov. 18-28, 2011

**Date of report issue:** Nov. 28, 2011

**Test Result :** PASS \*

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

Authorized Signature:



Stephen Guo  
Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the GTS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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## 2 Version

Version No.	Date	Description
00	Nov. 28, 2011	Original

**Prepared By:**

*Collin He*

**Date:**

Nov. 28, 2011

**Project Engineer**

**Check By:**

*Hans Hu*

**Date:**

Nov. 28, 2011

**Reviewer**

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## 4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
Field strength of the fundamental signal	15.231 (e)	Pass
Spurious emissions	15.231 (b)/15.209	Pass
20dB Bandwidth	15.231 (c)	Pass
Dwell time	15.231 (e)	Pass
Silent Period	15.231 (e)	Pass

*Pass: The EUT complies with the essential requirements in the standard.*

## 5 General Information

### 5.1 Client Information

Applicant:	CARRIN ELECTRONICS COMPANY LIMITED
Address of Applicant:	UNIT 2105~2106, TOWER A, REGENT CENTRE, 63 WO YI HOP RD, KWAI CHUNG, HONG KONG
Factory:	CARRIN ELECTRONICS COMPANY LIMITED
Address of Factory:	UNIT 2105~2106, TOWER A, REGENT CENTRE, 63 WO YI HOP RD, KWAI CHUNG, HONG KONG

### 5.2 General Description of E.U.T.

Product Name:	WEATHER STATION
Model No.:	KW9177, 47021TX
Operation Frequency:	433.96MHz
Modulation type:	ASK
Antenna Type:	integral antenna
Antenna gain:	2dBi
Power supply:	DC 3.0V (2x1.5 "AAA" Size)
Remark:	1. Only the model KW9177 was tested. KW9177, 47021TX are identical in the same PCB layout, interior structure and electrical circuits. The only differences are the model name and appearance color for commercial purpose. 2. The test battery is new battery.

### 5.3 Test mode

Transmitting mode:	Keep the EUT in transmitting mode with modulation.		
Pre-Test Mode:			
GTS has verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which was shown in this test report and defined as follows:			
Axis	X	Y	Z
Field Strength(dBuV/m)	62.34	69.18	65.79
Final Test Mode:			
According to ANSI C63.4 standards, the test results are both the “worst case” and “worst setup”: Y axis (see the test setup photo)			

## 5.4 Test Facility

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

**FCC —Registration No.: 600491**

Global United Technology 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 files. Registration 600491, July 20, 2010.

**Industry Canada (IC)**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-1.

## 5.5 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China

Tel: 0755-27798480

Fax: 0755-27798960

## 5.6 Other Information Requested by the Customer


None.

## 5.7 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	Mar. 30 2011	Mar. 29 2012
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Jul. 04 2011	Jul. 03 2012
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	Feb. 26 2011	Feb. 25 2012
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS208	June 30 2011	June 29 2012
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	Mar. 30 2011	Mar. 29 2012
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	Apr. 01 2011	Mar. 31 2012
9	Coaxial Cable	GTS	N/A	GTS211	Apr. 01 2011	Mar. 31 2012
10	Coaxial cable	GTS	N/A	GTS210	Apr. 01 2011	Mar. 31 2012
11	Coaxial Cable	GTS	N/A	GTS212	Apr. 01 2011	Mar. 31 2012
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	Jul. 04 2011	Jul. 03 2012
13	Amplifier(2GHz-20GHz)	HP	8349B	GTS206	Jul. 04 2011	Jul. 03 2012
14	Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 30 2011	June 29 2012
15	Band filter	Amindeon	82346	GTS219	June 30 2011	June 29 2012

## 6 Test results and Measurement Data

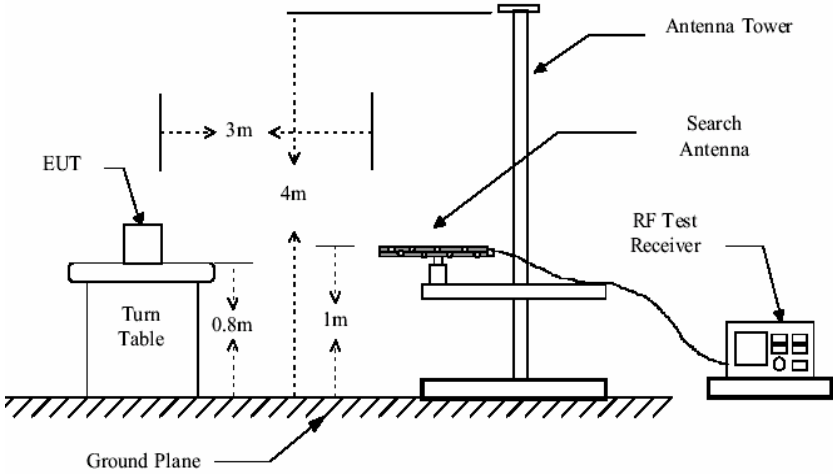
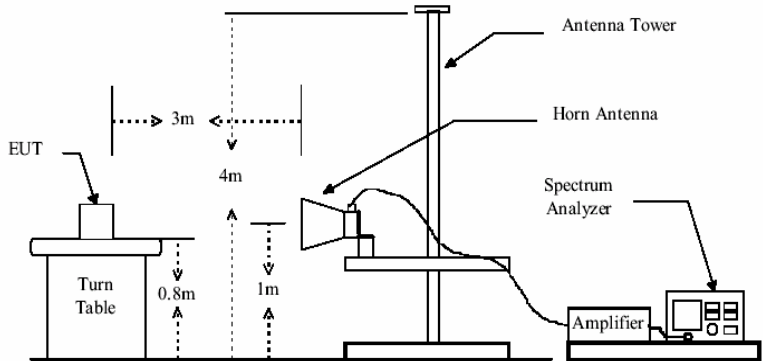
### 6.1 Antenna requirement:

<b>Standard requirement:</b>	FCC Part15 C Section 15.203
<p>15.203 requirement:  <i>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.</i></p>	
<b>E.U.T Antenna:</b>	
<p>The EUT make use of an integral antenna which permanently attached, The typical gain of the antenna is 2dBi.</p>	
	



## 6.2 Radiated Emission

Test Requirement:	FCC Part15 C Section 15.231(b) and 15.209				
Test Method:	ANSI C63.4:2003				
Test Frequency Range:	30MHz to 5000MHz				
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)				
Receiver setup:					
	Frequency	Detector	RBW	VBW	Remark
	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
Limit: (Field strength of the fundamental signal)					
	Frequency		Limit (dBuV/m @3m)		Remark
	433.96 MHz		72.87		Average Value
			92.87		Peak Value
Limit: (Spurious Emissions)					
	Frequency		Limit (dBuV/m @3m)		Remark
	30MHz-88MHz		40.00		Quasi-peak Value
	88MHz-216MHz		43.50		Quasi-peak Value
	216MHz-960MHz		46.00		Quasi-peak Value
	960MHz-1GHz		54.00		Quasi-peak Value
	Above 1GHz		54.00		Average Value
		74.00		Peak Value	
	Or The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level whichever limit permits a higher field strength.				
Test Procedure:	<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>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.</p>				

<p>Test setup:</p>	<p>Below 1GHz</p>  <p>Above 1GHz</p> 
<p>Test Instruments:</p>	<p>Refer to section 5.7 for details</p>
<p>Test mode:</p>	<p>Refer to section 5.3 for details</p>
<p>Test results:</p>	<p>Pass</p>

## Measurement Data

### 6.2.1 Field Strength Of The Fundamental Signal

#### Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
433.96	70.48	15.53	1.32	32.07	55.26	92.87	-37.61	Horizontal
433.96	84.40	15.53	1.32	32.07	69.18	92.87	-23.69	Vertical

#### Average value:

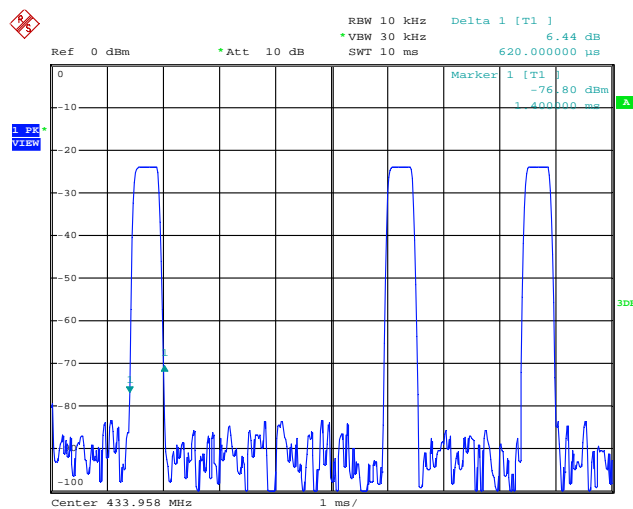
Frequency (MHz)	Level (dBuV/m)	Duty cycle factor	Average value (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
433.96	55.26	-15.52	39.74	72.87	-33.13	Horizontal
433.96	69.18	-15.52	53.66	72.87	-19.21	Vertical

#### Average value:

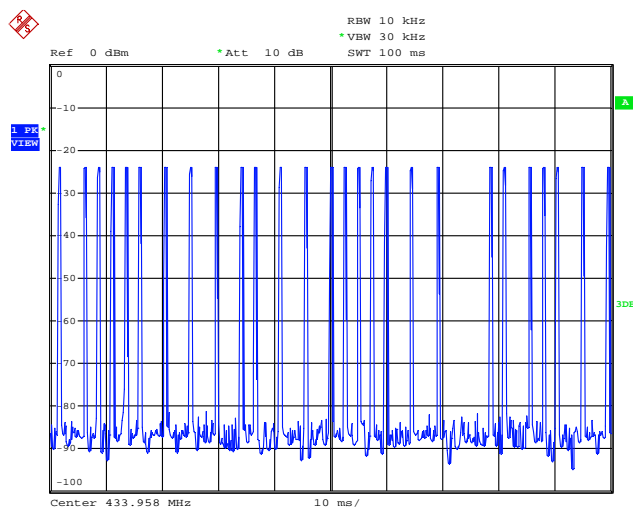
Calculate Formula:	Average value=Peak value + Duty Cycle Factor
	Duty cycle factor=20 log(Duty cycle)
	Duty cycle= T on time / T period
Test data:	Ton time = 27*620(us) =16.74 (ms)
	T period =100ms
	Duty cycle=16.74%
	Duty Cycle Factor = 20 log(Duty cycle)= -15.52

Test plot as follows:

On time / pulse:



Pulse numbers / 100ms:



## 6.2.2 Spurious Emissions

Below 1GHz:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
44.43	36.56	13.55	0.29	32.08	18.32	40.00	-21.68	Horizontal
60.28	36.94	12.69	0.36	31.95	18.04	40.00	-21.96	Horizontal
105.64	37.30	12.63	0.50	31.72	18.71	43.50	-24.79	Horizontal
226.89	36.88	11.51	0.82	32.28	16.93	46.00	-29.07	Horizontal
867.92	34.88	20.78	2.12	31.47	26.31	52.87	-26.56	Horizontal
33.21	37.18	12.31	0.22	32.23	17.48	40.00	-22.52	Vertical
51.66	37.73	13.18	0.32	32.01	19.22	40.00	-20.78	Vertical
97.46	36.92	13.00	0.47	31.71	18.68	43.50	-24.82	Vertical
261.98	37.26	12.13	0.95	32.29	18.05	46.00	-27.95	Vertical
867.92	38.25	20.78	2.12	31.47	29.68	52.87	-23.19	Vertical

## Above 1GHz:

Peak value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1301.88	41.98	24.59	2.74	34.58	34.73	74.00	-39.27	Horizontal
1735.84	42.50	26.54	3.25	34.66	37.63	74.00	-36.37	Horizontal
2169.80	42.56	29.21	3.65	34.76	40.66	74.00	-33.34	Horizontal
2603.76	43.20	31.94	3.97	34.89	44.22	74.00	-29.78	Horizontal
3037.72	43.32	32.86	4.40	35.01	45.57	74.00	-28.43	Horizontal
1301.88	41.34	24.59	2.74	34.58	34.09	74.00	-39.91	Vertical
1735.84	41.84	26.66	3.25	34.66	37.09	74.00	-36.91	Vertical
2169.80	43.47	29.21	3.63	34.76	41.55	74.00	-32.45	Vertical
2603.76	42.86	31.94	3.97	34.89	43.88	74.00	-30.12	Vertical
3037.72	43.87	32.86	4.40	35.01	46.12	74.00	-27.88	Vertical

Average value:						
Frequency (MHz)	Level (dBuV/m)	Duty cycle factor	Average value (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
1301.88	34.73	-15.52	19.21	54.00	-34.79	Horizontal
1735.84	37.63	-15.52	22.11	54.00	-31.89	Horizontal
2169.80	40.66	-15.52	25.14	54.00	-28.86	Horizontal
2603.76	44.22	-15.52	28.70	54.00	-25.30	Horizontal
3037.72	45.57	-15.52	30.05	54.00	-23.95	Horizontal
1301.88	34.09	-15.52	18.57	54.00	-35.43	Vertical
1735.84	37.09	-15.52	21.57	54.00	-32.43	Vertical
2169.80	41.55	-15.52	26.03	54.00	-27.97	Vertical
2603.76	43.88	-15.52	28.36	54.00	-25.64	Vertical
3037.72	46.12	-15.52	30.60	54.00	-23.40	Vertical

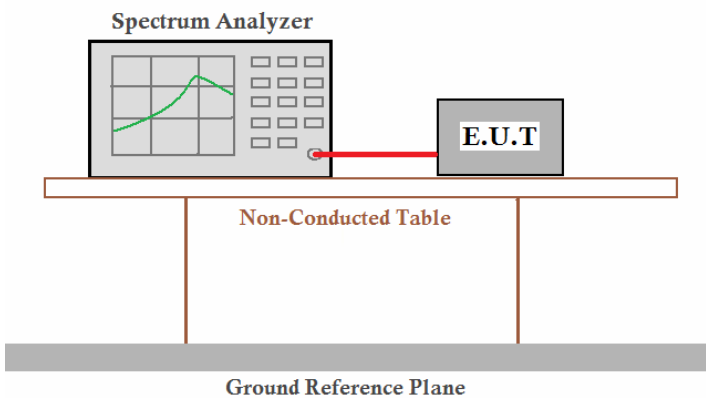
Remark:

Peak Limit=Average Limit+20dB

Average value=Peak value + Duty cycle factor

Duty cycle factor=20 log (Duty cycle)

## 6.3 20dB Bandwidth

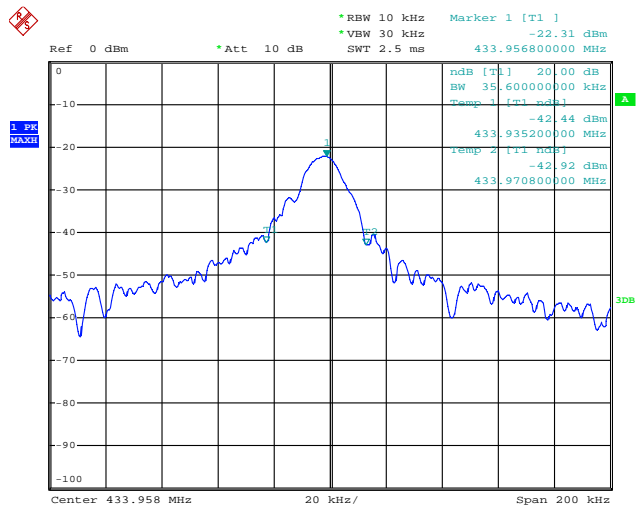
Test Requirement:	FCC Part15 C Section 15.231 (c)
Test Method:	ANSI C63.4:2003
Receiver setup:	RBW=10KHz, VBW=30KHz, detector: Peak
Limit:	The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz For devices operating above 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.
Test Procedure:	<ol style="list-style-type: none"> <li>1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT.</li> <li>2. Set the EUT to proper test channel.</li> <li>3. Max hold the radiated emissions, mark the peak power frequency point and the -20dB upper and lower frequency points.</li> <li>4. Read 20dB bandwidth.</li> </ol>
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Test mode:	Refer to section 5.3 for details
Test Instruments:	Refer to section 4.7 for details
Test results:	Passed

### Measurement Data

20dB bandwidth (MHz)	Limit (MHz)	Results
0.0356	1.085 MHz	Pass

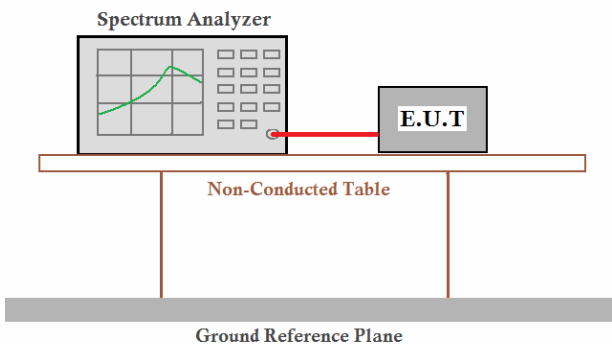
Note: Limit= Fundamental frequency $\times$ 0.25%=433.960 $\times$ 0.25%=1.085MHz

Test plot as follows:





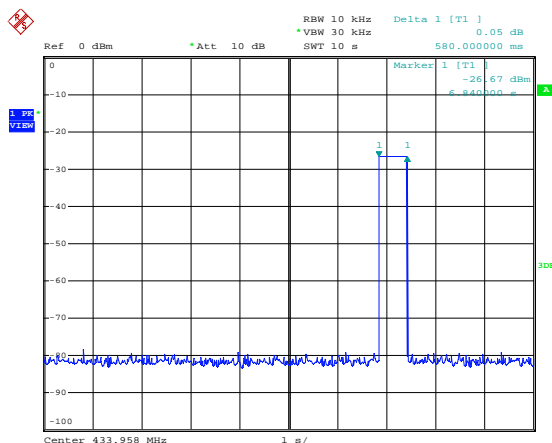
## 6.4 Dwell time:

Test Requirement:	FCC Part15 C Section 15.231 (e)
Test Method:	ANSI C63.4:2003
Receiver setup:	RBW=10KHz, VBW=30KHz, span=0Hz, detector: Peak
Limit:	Not more than 1 seconds
Test mode:	Transmitting mode
Test Procedure:	<ol style="list-style-type: none"> <li>1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT.</li> <li>2. Set the EUT to proper test channel.</li> <li>3. Single scan the transmit, and read the transmission time.</li> </ol>
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 4.7 for details
Test results:	Passed

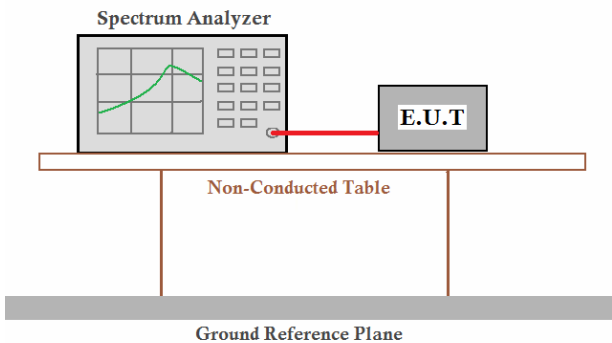
### Measurement data:

Dwell time (second)	Limit (second)	Result
0.580	<1.0	Pass

### Test plot as follows:



## 6.5 Silent period:

Test Requirement:	FCC Part15 C Section 15.231 (e)
Test Method:	ANSI C63.4:2003
Receiver setup:	RBW=10KHz, VBW=30KHz, span=0Hz, detector: Peak
Limit:	at least 30 times the duration of the transmission and more than 10 seconds
Test mode:	Transmitting mode
Test Procedure:	<ol style="list-style-type: none"> <li>1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT.</li> <li>2. Set the EUT to proper test channel.</li> <li>3. Single scan the transmit, and read the transmission time.</li> </ol>
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer and an E.U.T. (Equipment Under Test) are connected by a red cable. They are positioned on a 'Non-Conducted Table'. Below the table is a 'Ground Reference Plane'.</p>
Test Instruments:	Refer to section 4.7 for details
Test results:	Passed

### Measurement data:

Silent period (second)	Limit (second)	Result
32.40	>10 or 30*0.58	Pass

### Test plot as follows:

