

## TEST REPORT

**Report Number: 101310487MIN-003**

**Project Number: G101310487**

**Testing performed on the  
Wireless Door / Window Sensor models:  
TX-1012-01-1 / TX-1012-01-2**

**FCC ID: B4Z-983-UDWS  
Industry Canada ID: 1175C-983UDWS**

**to  
47 CFR Part 15. 231:2010  
RSS- 210, Issue 8, 2010  
RSS-Gen, Issue 3, 2010  
47 CFR, Part 15:2010, §15.109, Class / ICES-003, Issue 5:2012**

**For  
UTC Fire & Security Americas Corporation, Inc.**

Test Performed by:  
Intertek Testing Services NA, Inc.  
7250 Hudson Blvd., Suite 100  
Oakdale, MN 55128 USA

Test Authorized by:  
UTC Fire & Security Americas Corporation, Inc.  
1275 Red Fox Road  
Arden Hills, MN 55112 USA

Prepared by: Richard Blonigen  
Richard Blonigen

Date: September 6, 2013

Reviewed by: Simon Khazon  
Simon Khazon

Date: September 6, 2013

*This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.*



TABLE OF CONTENTS

**1.0 GENERAL DESCRIPTION..... 3**

1.1 Product Description; Test Facility.....4

1.3 Environmental conditions .....5

1.4 Measurement uncertainty.....6

1.5 Field Strength Calculation .....6

**2.0 TEST SUMMARY..... 7**

**3.0 TEST CONDITIONS AND RESULTS..... 8**

3.1 Transmitter deactivation time .....8

3.2 Transmitter field strength of emissions ..... 11

3.2.1 Average correction factor calculation ..... 16

3.3 Bandwidth of Emissions .....20

3.4 Transmitter power line conducted emissions .....23

3.5 Receiver/digital device radiated emissions .....24

3.6 Digital device conducted emissions .....28

**4.0 TEST EQUIPMENT..... 29**

## 1.0 GENERAL DESCRIPTION

<b>Model:</b>	TX-1012-01-1 / TX-1012-01-2
<b>Type of EUT:</b>	Wireless Door / Window Sensor, Wireless Security Devices
<b>FCC ID:</b>	B4Z-983-UDWS
<b>Industry Canada ID:</b>	1175C-983UDWS
<b>Related Submittal(s) Grants:</b>	None
<b>Company:</b>	UTC Fire & Security Americas Corporation, Inc.
<b>Customer:</b>	Mr. Rick Conner
<b>Address:</b>	1275 Red Fox Road Arden Hills, MN 55112 USA
<b>Phone:</b>	(651) 779-4824
<b>Fax:</b>	(651) 779-4884
<b>e-mail:</b>	<a href="mailto:Rick.Conner@FS.UTC.com">Rick.Conner@FS.UTC.com</a>
<b>Test Standards:</b>	<input checked="" type="checkbox"/> 47 CFR, Part 15:2010, §15.231 <input checked="" type="checkbox"/> RSS-210, Issue 8, 20010 <input checked="" type="checkbox"/> RSS-Gen, Issue 3, 2010 <input checked="" type="checkbox"/> 47 CFR, Part 15:2010, §15.109, Class B <input checked="" type="checkbox"/> ICES-003, Issue 5:2012 <input type="checkbox"/> Other
<b>Type of radio:</b>	<input checked="" type="checkbox"/> Stand -alone <input type="checkbox"/> Module <input type="checkbox"/> Hybrid
<b>Date Sample Submitted:</b>	July 23, 2013
<b>Test Work Started:</b>	July 23, 2013
<b>Test Work Completed:</b>	September 5, 2013
<b>Test Sample Conditions:</b>	<input type="checkbox"/> Damaged <input type="checkbox"/> Poor (Usable) <input checked="" type="checkbox"/> Good



## 1.1 Product Description; Test Facility

<b>Product Description:</b>	Periodic Transmitter
<b>Operating Frequency</b>	319.5 MHz
<b>Modulation:</b>	FSK
<b>Emission Designator:</b>	76K0K1D
<b>Antenna(s) Info:</b>	Integral
<b>Antenna Installation:</b>	<input type="checkbox"/> User <input type="checkbox"/> Professional <input type="checkbox"/> Factory
<b>Transmitter power configuration:</b>	<input checked="" type="checkbox"/> Internal battery <input type="checkbox"/> External power source <input type="checkbox"/> 120VAC <input checked="" type="checkbox"/> 3 VDC Lithium coin-cell battery <div></div> Amp. <input type="checkbox"/> 50Hz <input type="checkbox"/> 60Hz
<b>Special Test Arrangement:</b>	None
<b>Test Facility Accreditation:</b>	A2LA (Certificate No. 1427.01)
<b>Test Methodology:</b>	Measurements performed according to the procedures in ANSI C63.10-2009

## 1.2 EUT Configuration

The equipment under test was operated during the measurement under the following conditions:

- ☒ - Standby
- ☒ - Normal Mode
- ☒ - Continuous modulated
- ☐ - Test program (customer specific)
- ☐ -

### Operating modes of the EUT:

No.	Description
1	The transmitter was programmed to transmit continuously, or in normal mode

### Cables:

No.	Type	Length	Designation	Note
1	None			

### Support equipment/Services:

No.	Item	Description
1	None	

**General notes:** The Models TX-1012-01-1 TX-1012-01-2 are totally identical with the different plastic enclosure color (white and brown); the Model TX-1012-01-1 (white color) samples were tested

## 1.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

☒ Normal

Temperature: 15-35 ° C

Humidity: 30-60 %

Atmospheric pressure: 86-106 kPa

## 1.4 Measurement uncertainty

The expanded uncertainty ( $k = 2$ ) for radiated emissions from 30 to 1000 MHz has been determined to be:  $\pm 4$  dB at 10m and  $\pm 5.4$  dB at 3m

The expanded uncertainty ( $k = 2$ ) for conducted emissions from 150 kHz to 30 MHz has been determined to be:  
 $\pm 2.6$  dB

## 1.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured emissions reading on the EMI Receiver.

The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where: FS = Field Strength in dB( $\mu$ V/m)

RA = Receiver Amplitude in dB( $\mu$ V)

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB( $m^{-1}$ )

AG = Amplifier Gain in dB

Assume a receiver reading of 48.1 dB( $\mu$ V) is obtained. The antenna factor of 7.4 dB( $m^{-1}$ ) and cable factor of 1.6 dB is added and amplifier gain of 16.0 dB is subtracted giving field strength of 41.1 dB( $\mu$ V/m).

$$RA = 48.1 \text{ dB}(\mu\text{V})$$

$$AF = 7.4 \text{ dB}(m^{-1})$$

$$CF = 1.6 \text{ dB}$$

$$AG = 16.0 \text{ dB}$$

$$FS = RA + AF + CF - AG$$

$$FS = 48.1 + 7.4 + 1.6 - 16.0$$

$$FS = 41.1 \text{ dB}(\mu\text{V}/\text{m})$$

## 2.0 TEST SUMMARY

Referring to the performance criteria and the operating mode during the tests specified in this report, the equipment complies with the requirements according to the following standards.

TEST SPECIFICATION	TEST PARAMETERS	RESULT
15.231(a) / RSS-210 A1.1.1(a)	Transmitter deactivation time	Pass
15.231(e) / RSS-210 A1.1.2	Transmitter field strength at fundamentals	Pass
15.231(e) / RSS-210 A1.1.2	Transmitter spurious emissions field strength	Pass
15.231(c) / RSS-210 A1.1.3	Bandwidth of the emission	Pass
15.207/RSS-Gen 7.2.2	Transmitter Power Line conducted emissions	N/A
15.109/ICES-003/ RSS-Gen 4.10	Receiver/digital device radiated emissions	Pass
15.107/ ICES-003	Digital device conducted emissions	N/A

### 3.0 TEST CONDITIONS AND RESULTS

#### 3.1 Transmitter deactivation time

**Maximum allowed deactivation time:** 5 sec

**Measured deactivation time:** less than 1 sec

**Measured time between transmission:** 56.6 min

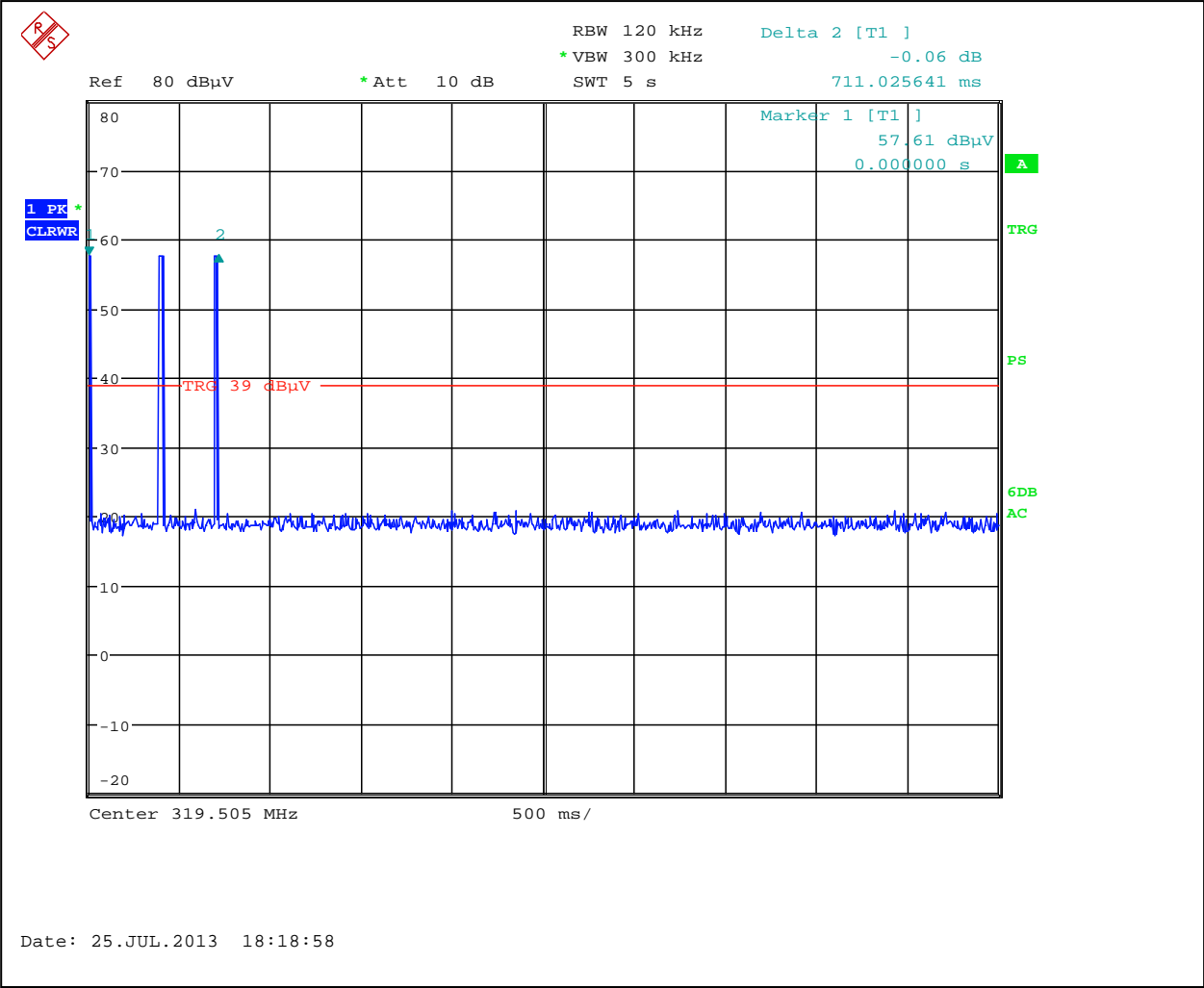
**Test result:** Pass

- Notes:**
1. Graph 3.1.1 shows deactivation time for normal mode transmission.
  2. Graph 3.1.2 shows time between transmissions for normal mode.
-



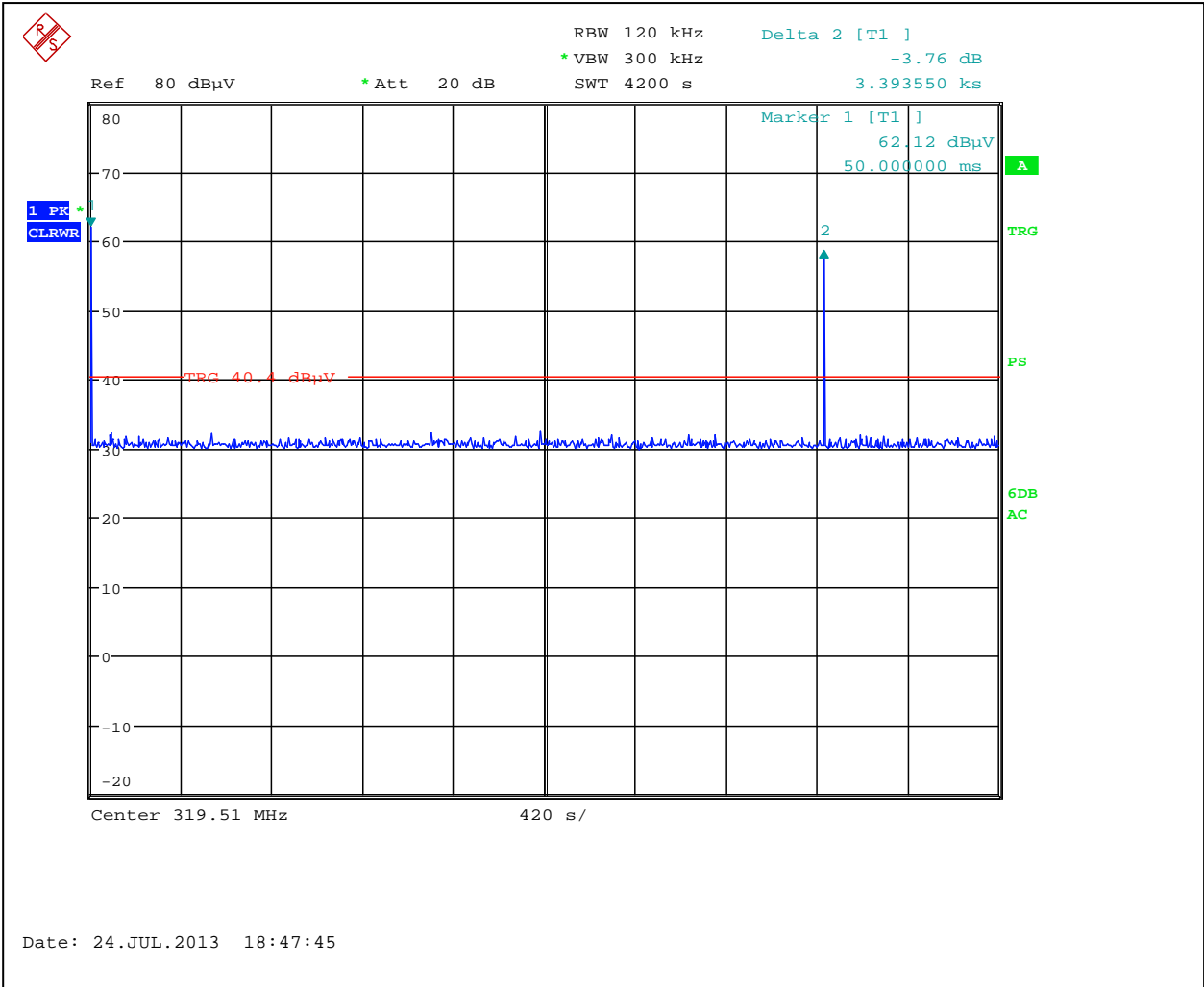


Graph 3.1.1





Graph 3.1.2





### 3.2 Transmitter field strength of emissions

**Test location:** ☐ OATS ☒ Anechoic Chamber ☐ Other

**Test distance:** ☐ 10 meters ☒ 3 meters

**Frequency range of measurements:** 30MHz-3300MHz

**Test result:** Pass

**Max. Emissions margin at fundamental:** 1.9 dB below the limits

**Max. margin of harmonics and spurious emissions:** 3.2 dB below the limits

**Notes:** None

---



<b>Date:</b>	July 23, 2013	<b>Result: Pass</b>
<b>Standard:</b>	FCC 15.231(e) / RSS-210 A1.1.2	
<b>Tested by:</b>	Richard Blonigen	
<b>Test Point:</b>	Field Strength at Fundamental	
<b>Operation mode:</b>	See Page 5	
<b>Note:</b>	none	

**Table 3.2.1**

Frequency MHz	Antenna		Ant. CF dB1/m	Cable loss dB	Pre-amp Gain (dB)	Peak Reading dBµV	Total @ 3m dBµV/m	Corr Factor dB	Limit dBµV/m	Margin dB	Comments
	Polarity	Hts(cm)									
			Emissions at Fundamental Frequency								
319.50	V	100	14.5	2.0	0.0	52.0	68.5	0.0	87.9	-19.4	Peak Value
319.50	H	100	14.5	2.0	0.0	68.9	85.4	0.0	87.9	-2.5	Peak Value
319.50	V	100	14.5	2.0	0.0	52.0	68.5	19.4	67.9	-18.8	AVG Value
319.50	H	100	14.5	2.0	0.0	68.9	85.4	19.4	67.9	-1.9	AVG Value

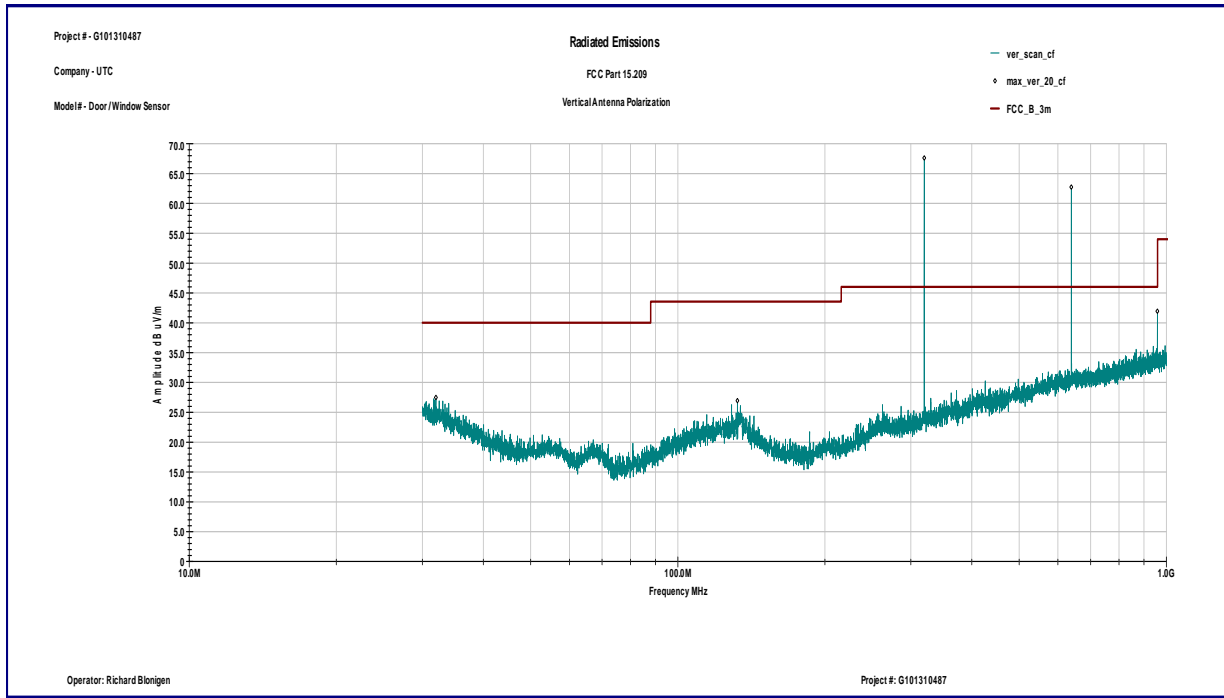
<b>Date:</b>	July 23, 2013	<b>Result: Pass</b>
<b>Standard:</b>	FCC 15.231(b) / RSS-210 A1.1.2	
<b>Tested by:</b>	Richard Blonigen	
<b>Test Point:</b>	Field Strength of Spurious Emissions	
<b>Operation mode:</b>	See Page 5	
<b>Note:</b>	none	

**Table 3.2.2**

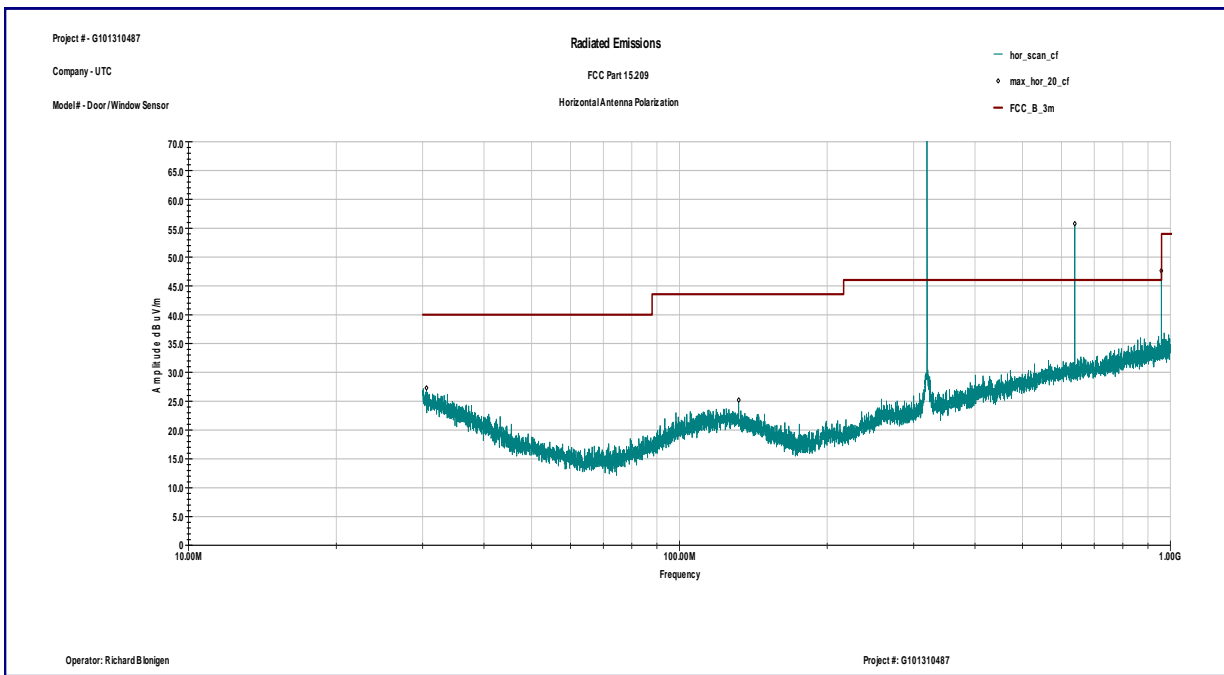
Frequency MHz	Antenna		Ant. CF dB1/m	Cable loss dB	Pre-amp Gain (dB)	peak Reading dBμV	Total @ 3m dBμV/m	Corr Factor dB	Limit dBμV/m	Margin dB	Comments
	Polarity	Hts(cm)									
Spurious and Harmonics Emissions					Fundamental Frequency (MHz):			319.50			
639.02	V	100	19.6	3.0	0.0	41.5	64.1	0.0	67.9	-3.8	Peak Value
958.53	V	164	22.1	3.7	0.0	14.6	40.4	0.0	67.9	-27.5	Peak Value
1278.00	V	126	24.6	2.2	42.9	50.5	34.3	0.0	67.9	-33.6	Peak Value
1597.00	V	163	25.6	2.4	43.1	54.6	39.5	0.0	67.9	-28.4	Peak Value
1917.00	V	225	26.9	2.6	43.4	61.8	47.8	0.0	67.9	-20.1	Peak Value
2236.50	V	183	27.8	2.8	43.5	45.6	32.8	0.0	67.9	-35.2	Peak Value
2556.00	V	150	28.7	3.0	43.5	46.2	34.4	0.0	67.9	-33.5	Peak Value
3195.00	V	119	30.6	3.4	43.7	38.9	29.1	0.0	67.9	-38.8	Peak Value
639.02	H	178	19.6	3.0	0.0	34.1	56.7	0.0	67.9	-11.2	Peak Value
958.52	H	146	22.1	3.7	0.0	21.7	47.5	0.0	67.9	-20.4	Peak Value
1278.00	H	109	24.6	2.2	42.9	49.9	33.7	0.0	67.9	-34.2	Peak Value
1597.50	H	207	25.6	2.4	43.1	57.3	42.2	0.0	67.9	-25.7	Peak Value
1917.00	H	208	26.9	2.6	43.4	70.6	56.6	0.0	67.9	-11.3	Peak Value
2236.50	H	209	27.8	2.8	43.5	62.3	49.5	0.0	67.9	-18.5	Peak Value
2556.00	H	189	28.7	3.0	43.5	51.7	39.9	0.0	67.9	-28.0	Peak Value
2875.60	H	147	29.7	3.2	43.7	52.3	41.5	0.0	67.9	-26.5	Peak Value
3195.00	H	173	30.6	3.4	43.7	51.3	41.5	0.0	67.9	-26.4	Peak Value
639.02	V	100	19.6	3.0	0.0	41.5	64.1	19.4	47.9	-3.2	AVG Value
958.53	V	164	22.1	3.7	0.0	14.6	40.4	19.4	47.9	-26.9	AVG Value
1278.00	V	126	24.6	2.2	42.9	50.5	34.3	19.4	47.9	-33.0	AVG Value
1597.00	V	163	25.6	2.4	43.1	54.6	39.5	19.4	47.9	-27.8	AVG Value
1917.00	V	225	26.9	2.6	43.4	61.8	47.8	19.4	47.9	-19.5	AVG Value
2236.50	V	183	27.8	2.8	43.5	45.6	32.8	19.4	47.9	-34.6	AVG Value
2556.00	V	150	28.7	3.0	43.5	46.2	34.4	19.4	47.9	-32.9	AVG Value
3195.00	V	119	30.6	3.4	43.7	38.9	29.1	19.4	47.9	-38.2	AVG Value
639.02	H	178	19.6	3.0	0.0	34.1	56.7	19.4	47.9	-10.6	AVG Value
958.52	H	146	22.1	3.7	0.0	21.7	47.5	19.4	47.9	-19.8	AVG Value
1278.00	H	109	24.6	2.2	42.9	49.9	33.7	19.4	47.9	-33.6	AVG Value
1597.50	H	207	25.6	2.4	43.1	57.3	42.2	19.4	47.9	-25.1	AVG Value
1917.00	H	208	26.9	2.6	43.4	70.6	56.6	19.4	47.9	-10.7	AVG Value
2236.50	H	209	27.8	2.8	43.5	62.3	49.5	19.4	47.9	-17.9	AVG Value
2556.00	H	189	28.7	3.0	43.5	51.7	39.9	19.4	47.9	-27.4	AVG Value
2875.60	H	147	29.7	3.2	43.7	52.3	41.5	19.4	47.9	-25.9	AVG Value
3195.00	H	173	30.6	3.4	43.7	51.3	41.5	19.4	47.9	-25.8	AVG Value

Graph 3.2.1

## Vertical antenna polarization

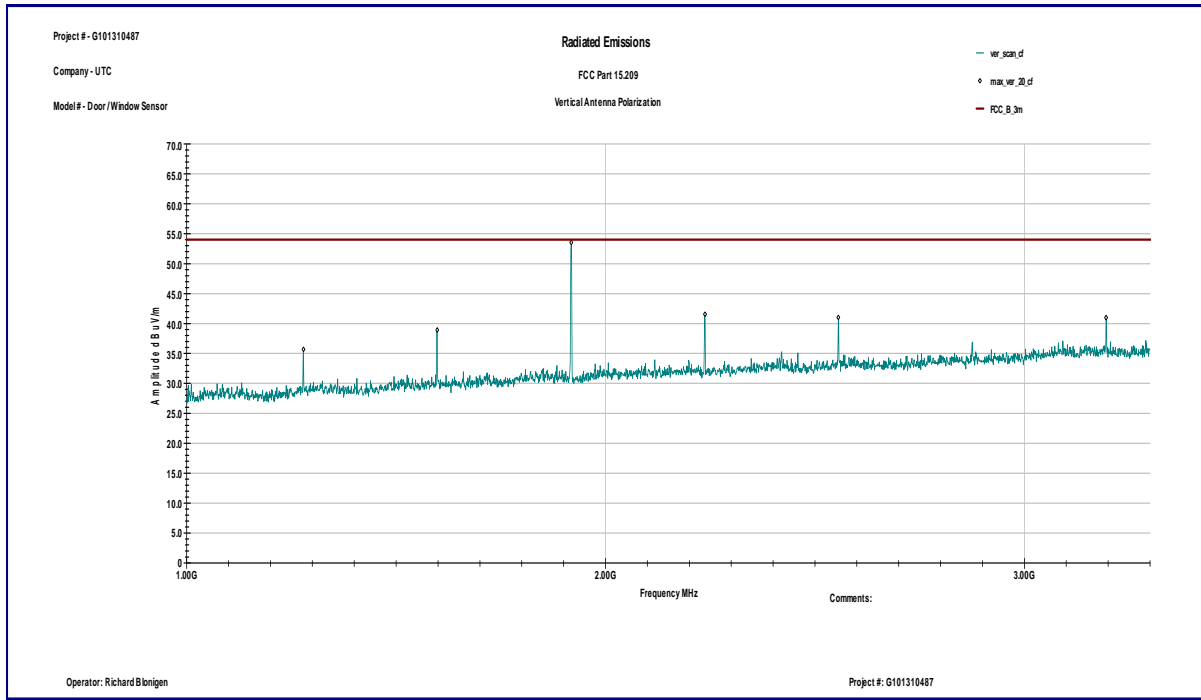


## Horizontal antenna polarization

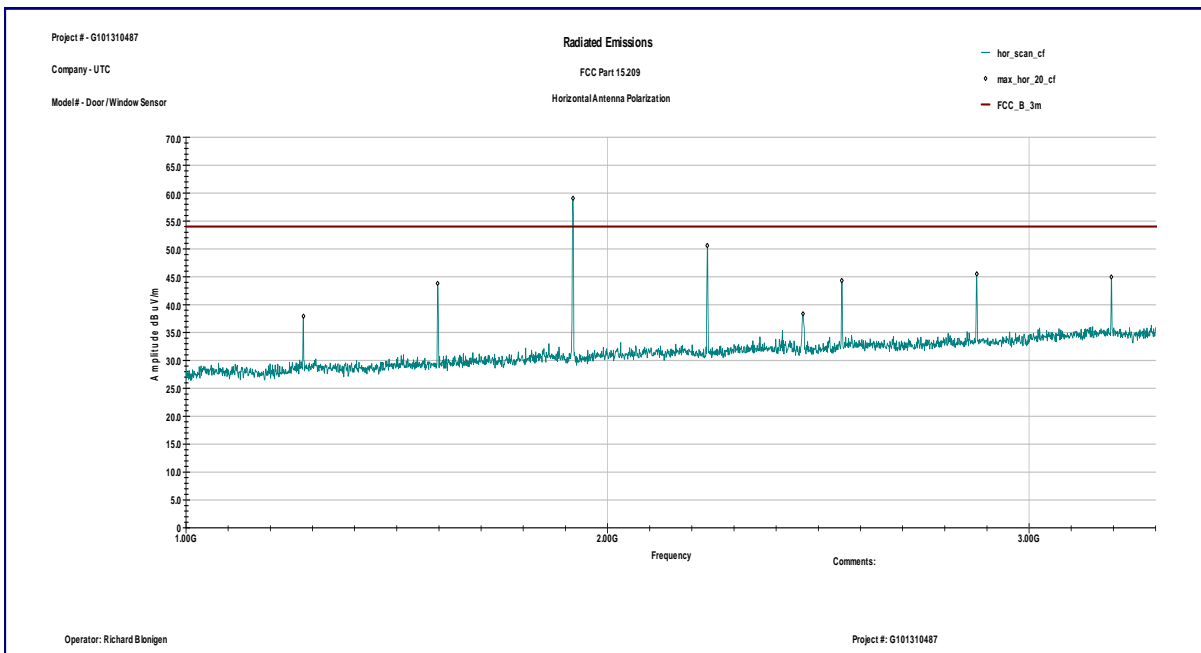


Graph 3.2.2

## Vertical antenna polarization



## Horizontal antenna polarization



### **3.2.1 Average correction factor calculation**

An Average correction factor is calculated by averaging one complete pulse train.

One complete pulse train, including blanking intervals = 19.0 ms

Time with field strength is in its maximum value (length of pulses) = 8.3 ms

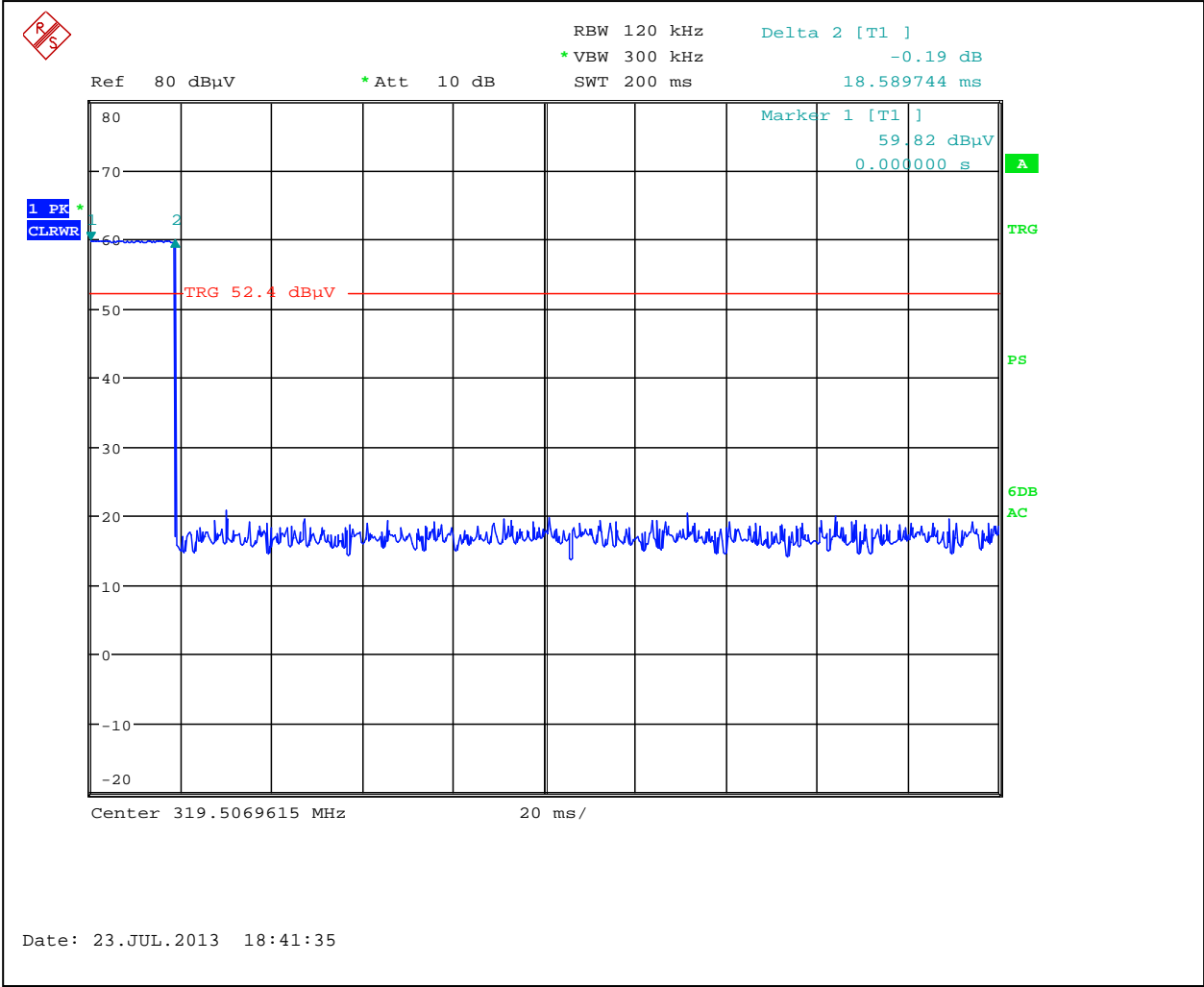
Average Correction Factor =  $20\text{Log}(8.3\text{ms}/100\text{ms}) = -19.4\text{dB}$

Graphs 3-2-3 to 3-2-5 are show pulse train timing.

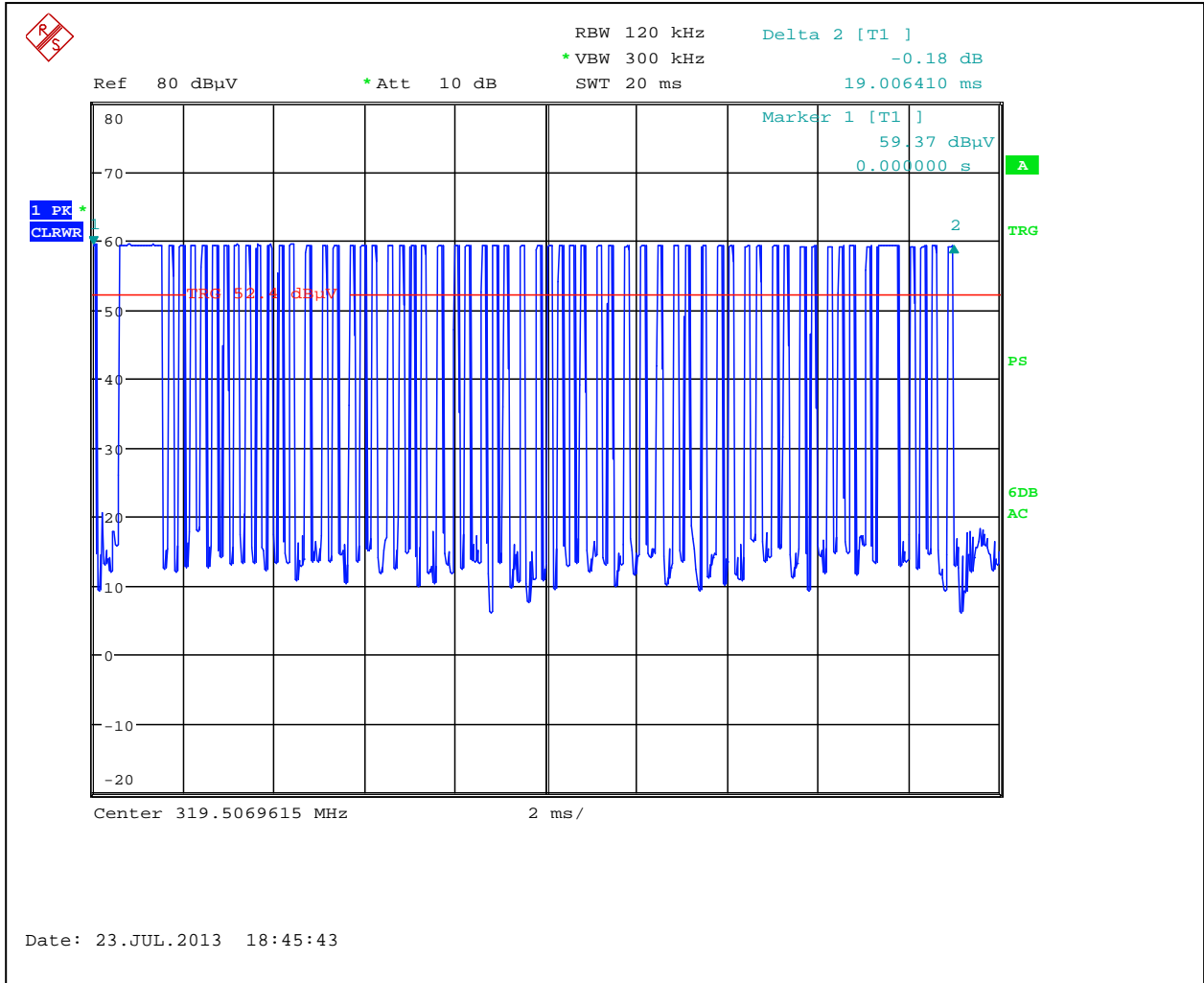




Graph 3.2.3

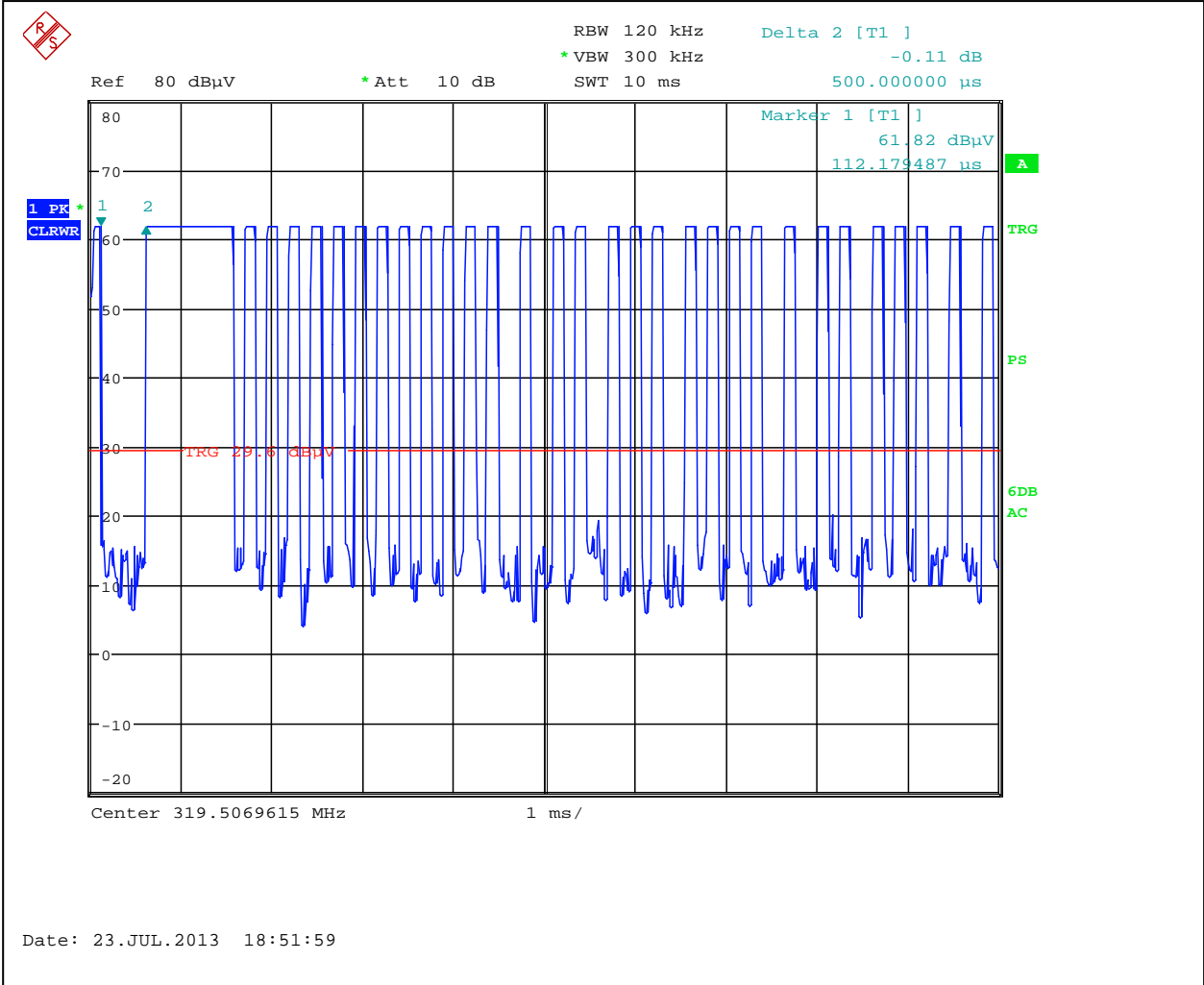


Graph 3.2.4





Graph 3.2.5



### 3.3 Bandwidth of Emissions

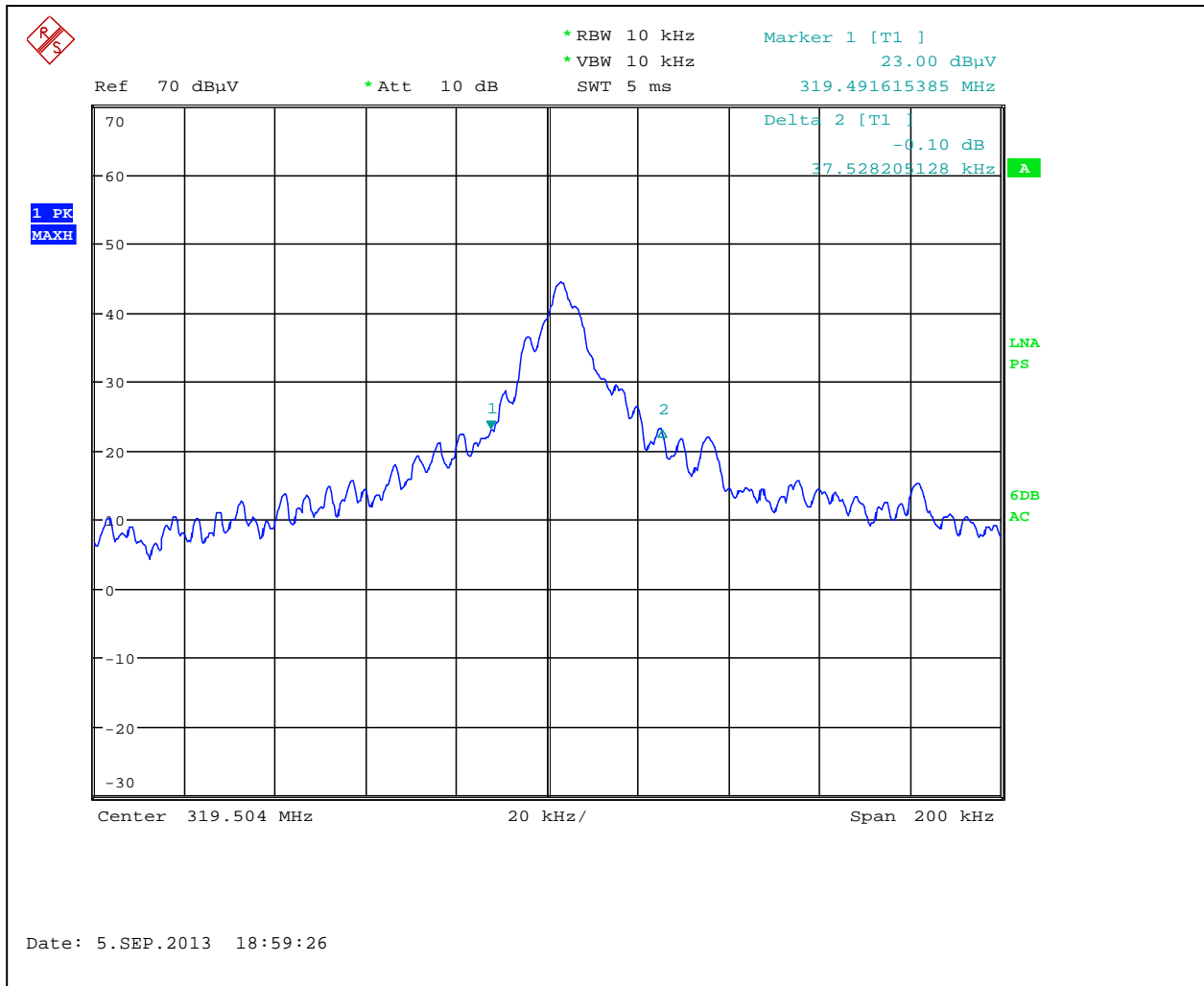
Center Frequency of operation MHz	Maximum allowed bandwidth kHz	Measured 20dB bandwidth kHz	Measured 99% bandwidth kHz	Result
319.5	798.75	37.52	76.00	Pass
Maximum allowed bandwidth:	<input checked="" type="checkbox"/> 0.25% of the centre operating frequency <input type="checkbox"/> 0.5% of the centre operating frequency			
RBW:	<input checked="" type="checkbox"/> 10kHz <input type="checkbox"/> 100kHz <input type="checkbox"/> other	kHz		
VBW:	<input checked="" type="checkbox"/> 30kHz <input type="checkbox"/> 300kHz <input type="checkbox"/> other	kHz		

Graphs 3-3-1 and 3-3-2 are show bandwidth of emissions

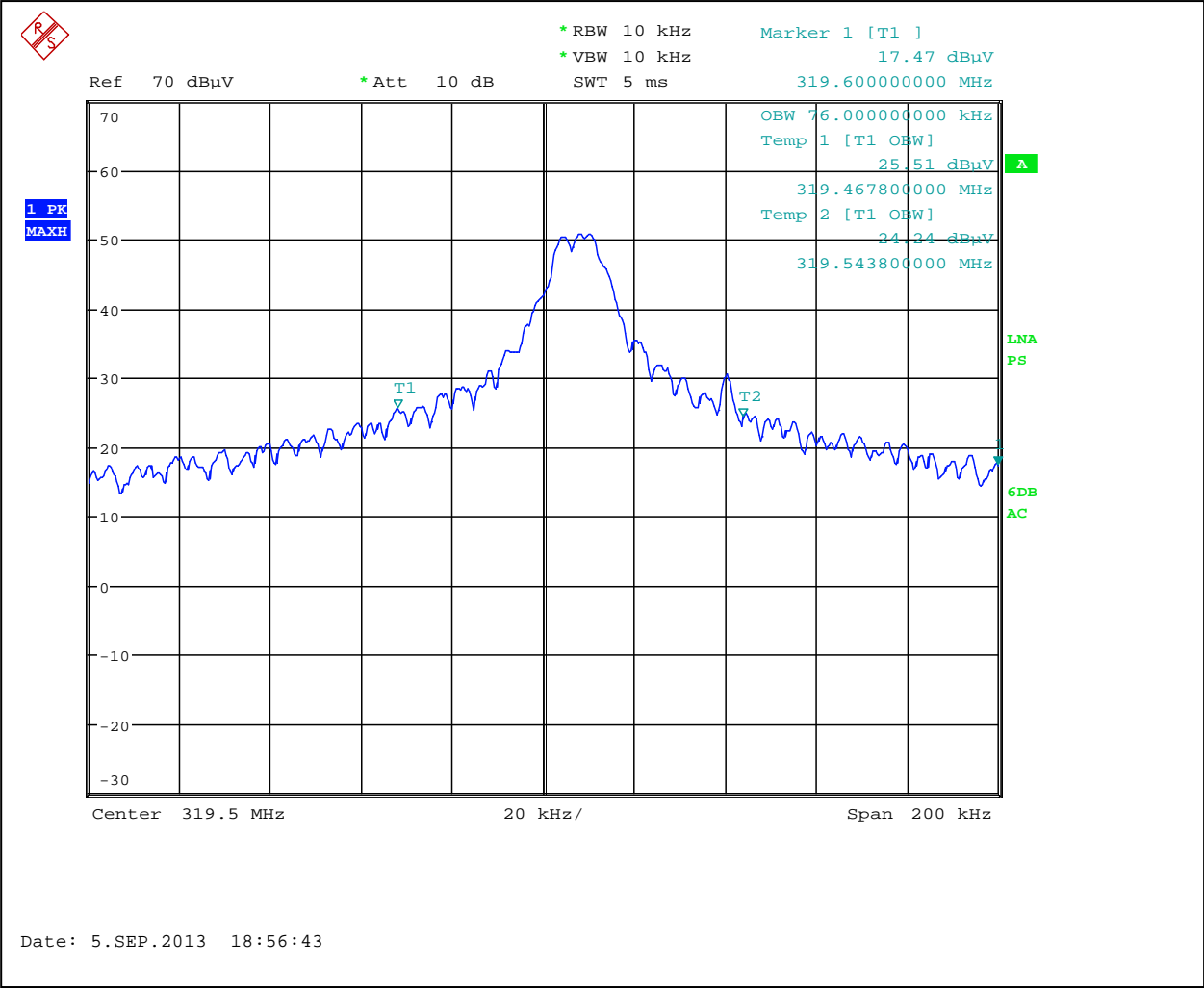
Notes:

---

Graph 3.3.1



Graph 3.3.2





### 3.4 Transmitter power line conducted emissions

**Test location:** ☐ OATS ☐ Anechoic Chamber ☐ Other

**Test result:** N/A

**Frequency range:** 0.15MHz-30MHz

**Max. Emissions margin:**  dB below the limits

**Notes:** It was determined from consideration of the electrical characteristics and usage of particular apparatus that Conducted Emissions testing is inappropriate and therefore unnecessary (as battery operated equipment).

---



### 3.5 Receiver/digital device radiated emissions

**Test location:** ☐ OATS ☒ Anechoic Chamber

**Test distance:** ☐ 10 meters ☒ 3 meters

**Test result:** **Pass**

**Frequency range:** 30MHz-2000MHz

**Max. Emissions margin:** 2.9 dB below the limits

**Notes:** The Radiated Emissions test was performed in the Anechoic chamber at 3m measurement distance (see Tables 3.5.1 and Graphs 3.5.1 – 3.5.2)

---



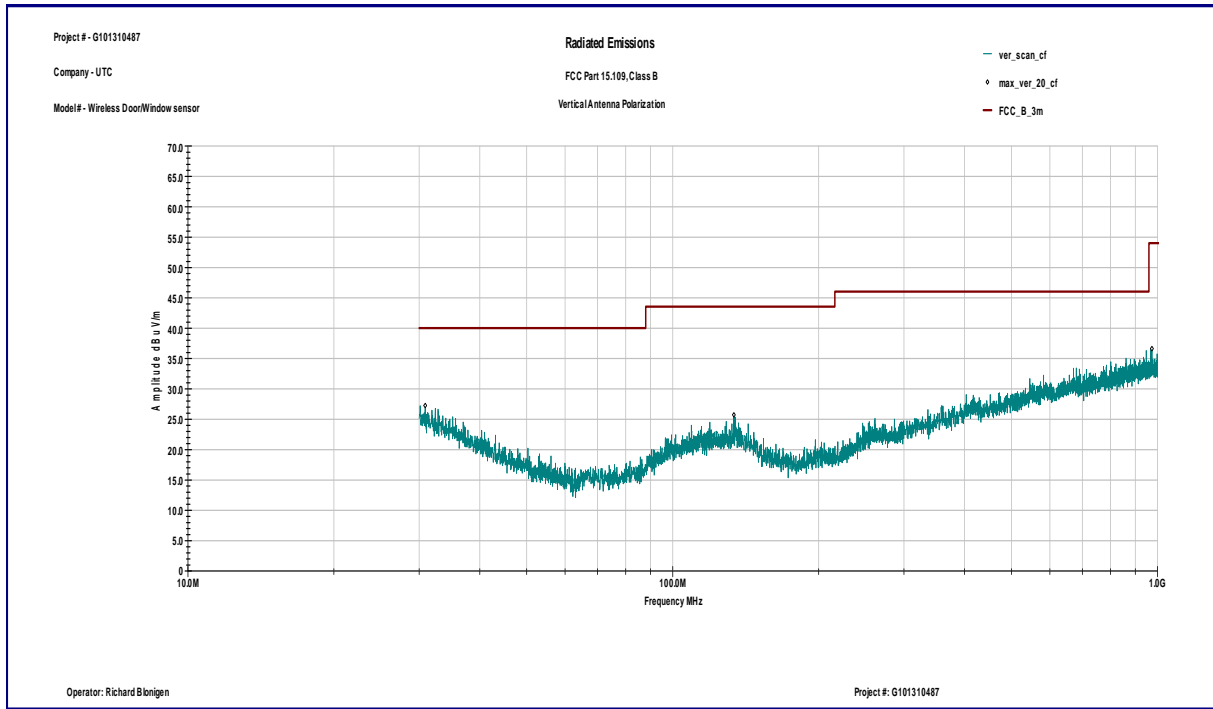
<b>Date:</b>	September 5, 2013	<b>Result: Pass</b>
<b>Standard:</b>	FCC Part 15.109, Class B	
<b>Tested by:</b>	Richard Blonigen	
<b>Test Point:</b>	Enclosure	
<b>Operation mode:</b>	See page 5	
<b>Note:</b>	None	

**Table 3.5.1**

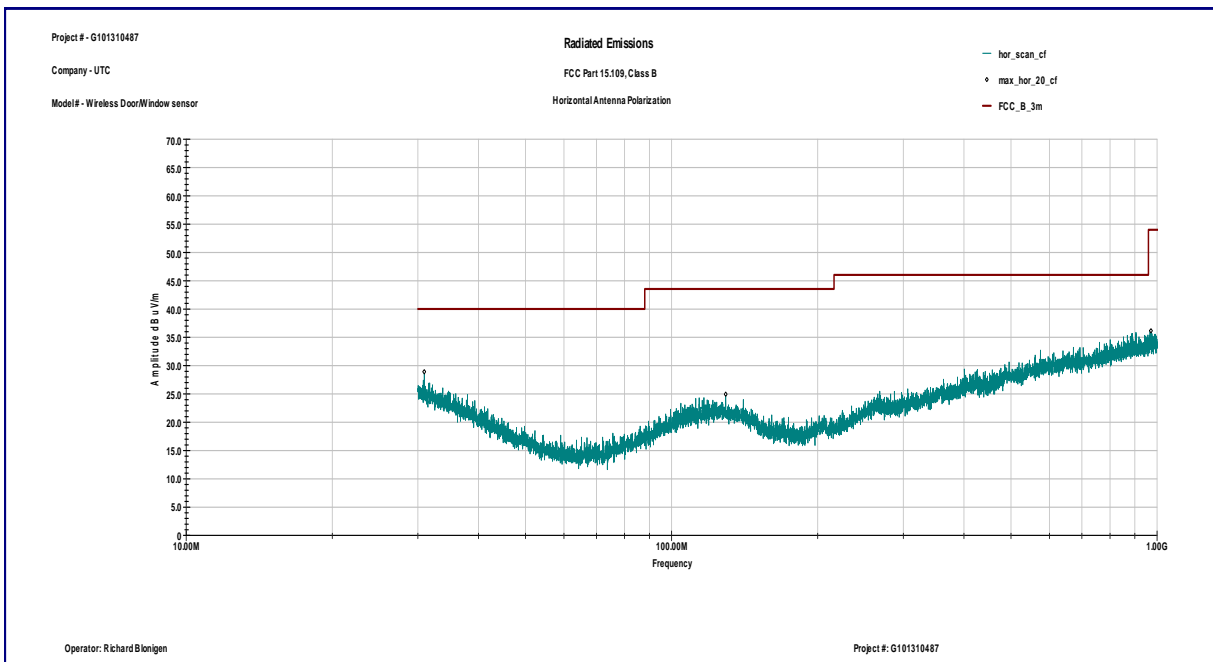
Frequency	Ant. Polarity	Peak Reading dB $\mu$ V	Total C.F. dB1/m	Total at 3m dB $\mu$ V/m	Limit dB $\mu$ V/m	Margin dB
30.866 MHz	V	7.5	19.7	27.3	40.0	-12.8
133.73 MHz	V	12.1	13.7	25.7	43.5	-17.8
974.18 MHz	V	10.6	26.1	36.6	54.0	-17.4
1.974 GHz	V	21.2	29.9	51.1	54.0	-2.9
30.93 MHz	H	9.2	19.7	28.9	40.0	-11.1
129.28 MHz	H	11.0	13.9	24.9	43.5	-18.6
971.41 MHz	H	10.2	26.0	36.1	54.0	-17.8
1.976 GHz	H	20.4	29.8	50.2	54.0	-3.8

Graph 3.5.1

## Vertical antenna polarization

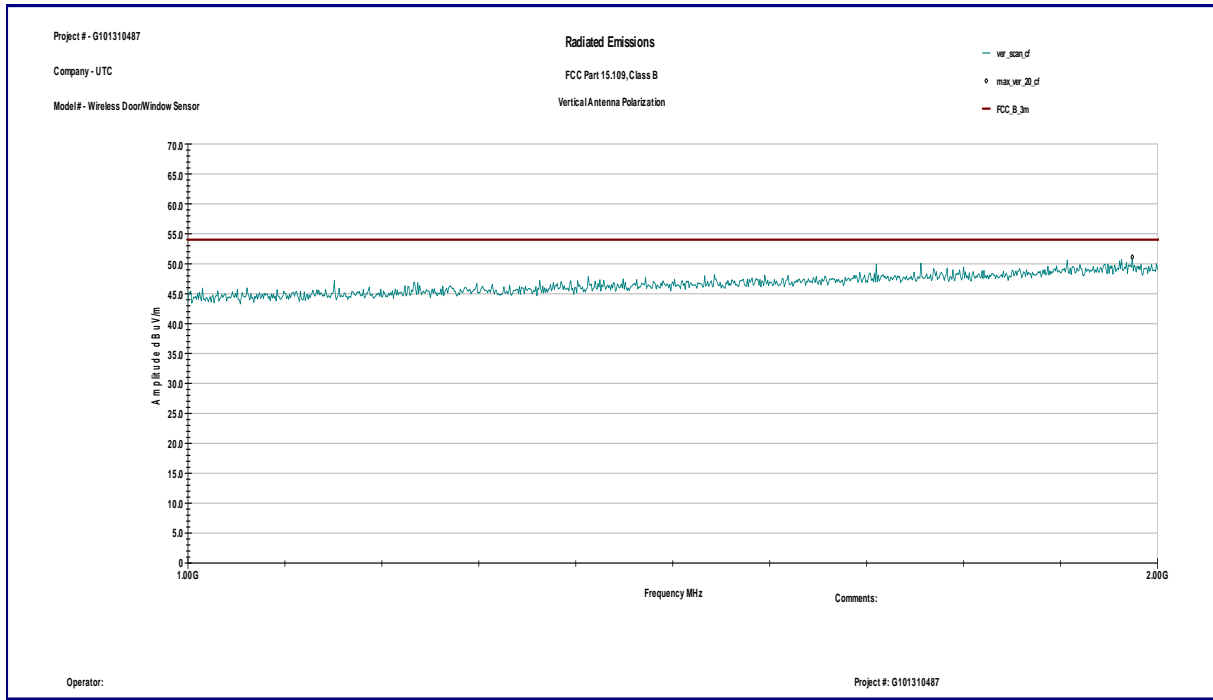


## Horizontal antenna polarization

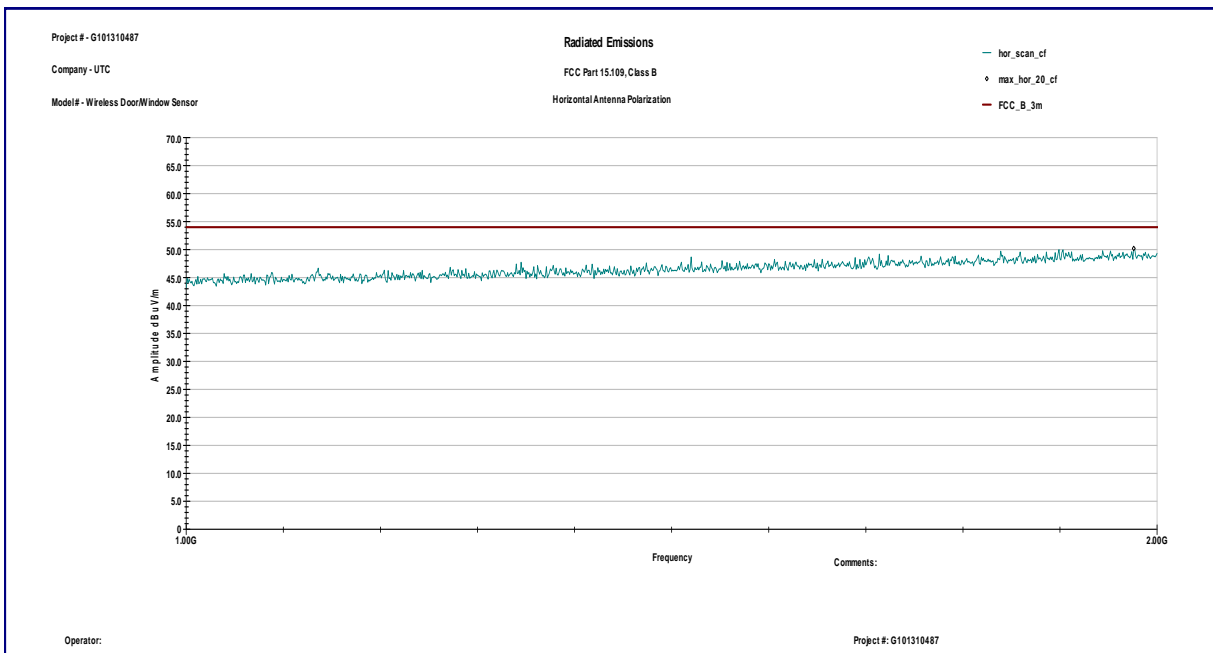


Graph 3.5.2

## Vertical antenna polarization



## Horizontal antenna polarization





### 3.6 Digital device conducted emissions

**Test location:** ☐ OATS ☐ Anechoic Chamber ☐ Other

**Test result:** N/A

**Frequency range:** 0.15MHz-30MHz

**Max. Emissions margin:**  dB below the limits

**Notes:** It was determined from consideration of the electrical characteristics and usage of particular apparatus that Conducted Emissions testing is inappropriate and therefore unnecessary (as battery operated equipment).

---



#### 4.0 TEST EQUIPMENT

DESCRIPTION	MANUFACTURER	MODEL	SERIAL NO.	INTERTEK ID	CAL DUE	USED
Spectrum Analyzer	R & S	FSP 40	100024	12559	11/29/2013	<input checked="" type="checkbox"/>
Spectrum Analyzer	R & S	ESU	100398	25283	12/19/2013	<input checked="" type="checkbox"/>
Bicono-Log Antenna	Schaffner-Teseq	CBL6112B	2468	9734	11/30/2013	<input checked="" type="checkbox"/>
Horn Antenna	EMCO	3115	9507-4513	9936*	05/28/2014	<input checked="" type="checkbox"/>
Pre-Amplifier	MITEQ	AMF-5D-00501800-28-13P	1122951	13475*	11/01/2013	<input checked="" type="checkbox"/>
System	Quantum Change	TILE! Instrument Control	Ver. 3.4.K.29	15259	VBV	<input checked="" type="checkbox"/>