



International Certification Corp.

No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan Hsiang, Tao Yuan Hsien 333, Taiwan, R.O.C.

Tel: 886-3-271-8666

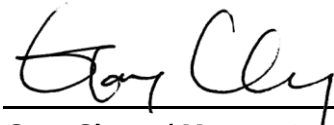
Fax: 886-3-318-0155

FCC Test Report

FCC ID : PRDMU20
Equipment : Wireless Mouse Z3000
Model No. : G39
Brand Name : ACROX / HP
Applicant : ACROX Technologies Co., Ltd.
Address : 4F., No.89, Minshan St., Neihu Dist., Taipei City 114
Standard : 47 CFR FCC Part 15.249
Received Date : Jun. 28, 2013
Tested Date : Jun. 28 ~ Jun. 29, 2013

We, International Certification Corp., would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.

Approved & Reviewed by:



Gary Chang / Manager





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Release Record

Report No.	Version	Description	Issued Date
FR362802	Rev. 01	Initial issue	Jul. 05, 2013



Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	N/A	N/A
15.249(a)	Field Strength of Fundamental	Meet the requirement of limit	Pass
15.247(a)(d)	Field Strength of Harmonics and Emissions Radiated outside of the Specified Frequency Bands	Meet the requirement of limit	Pass
15.203	Antenna Requirement	Meet the requirement of limit	Pass
Note: The EUT consumes DC power, therefore, conducted emission is not applicable.			



1 General Description

1.1.1 Specification of the Equipment under Test (EUT)

RF General Information				
Frequency Range (MHz)	Modulation	Ch. Freq. (MHz)	Channel Number	Channel Bandwidth (MHz)
2400-2483.5	FSK	2408-2474	1-34 [34]	2

1.1.2 Antenna Details

Ant. No.	Type	Gain (dBi)	Connector
1	PCB	-1.5532	N/A

1.1.3 EUT Operational Condition

Supply Voltage	☐ AC mains	☒ DC	
Type of DC Source	☐ Internal DC supply	☐ External DC adapter	☒ 1.5Vdc from battery (1.5Vdc AAAx1)

Note: The equipment tests are performed using a new battery.

1.1.4 Accessories

N/A

1.1.5 Channel List

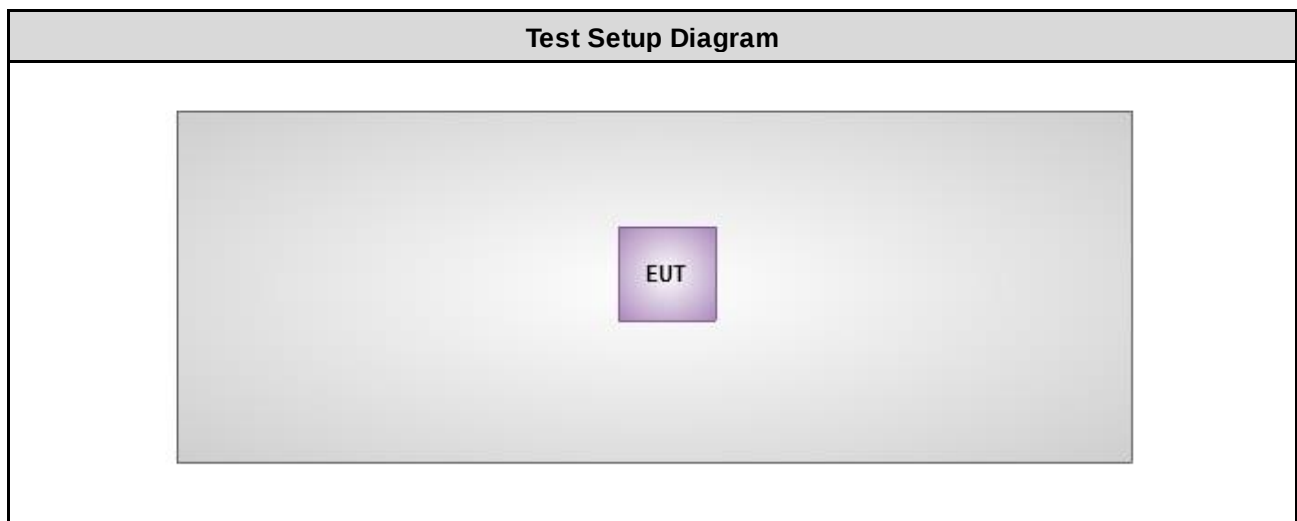
Frequency band (MHz)				2400~2483.5			
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2408	11	2428	21	2448	31	2468
2	2410	12	2430	22	2450	32	2470
3	2412	13	2432	23	2452	33	2472
4	2414	14	2434	24	2454	34	2474
5	2416	15	2436	25	2456	---	---
6	2418	16	2438	26	2458	---	---
7	2420	17	2440	27	2460	---	---
8	2422	18	2442	28	2462	---	---
9	2424	19	2444	29	2464	---	---
10	2426	20	2446	30	2466	---	---



1.2 Local Support Equipment List

Support Equipment List						
No.	Equipment	Brand	Model	S/N	FCC ID	Signal cable / Length (m)
1	---	---	---	---	---	---

1.3 Test Setup Chart





1.4 The Equipment List

Test Item	Radiated Emission above 1GHz				
Test Site	966 chamber1 / (03CH01-WS)				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
3m semi-anechoic chamber	CHAMPRO	SAC-03	03CH01-WS	Jan. 04, 2013	Jan. 03, 2014
Spectrum Analyzer	R&S	FSV40	101498	Jan. 24, 2013	Jan. 23, 2014
Receiver	ROHDE&SCHWARZ	ESR3	101658	Jan. 28, 2013	Jan. 27, 2014
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Jan. 11, 2013	Jan. 10, 2014
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Feb. 18, 2013	Feb. 17, 2014
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Jan. 14, 2013	Jan. 13, 2014
Amplifier	Burgeon	BPA-530	100219	Nov 28, 2012	Nov 27, 2013
Amplifier	Agilent	83017A	MY39501308	Dec. 18, 2012	Dec. 17, 2013
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16014/4	Dec. 25, 2012	Dec. 24, 2013
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Dec. 25, 2012	Dec. 24, 2013
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16139/4	Dec. 25, 2012	Dec. 24, 2013
RF Cable-R03m	Woken	CFD400NL-LW	CFD400NL-001	Dec. 25, 2012	Dec. 24, 2013
RF Cable-R10m	Woken	CFD400NL-LW	CFD400NL-002	Dec. 25, 2012	Dec. 24, 2013
control	EM Electronics	EM1000	60612	N/A	N/A
Note: Calibration Interval of instruments listed above is one year.					

Loop Antenna	R&S	HFH2-Z2	100330	Nov 15, 2012	Nov 14, 2014
Amplifier	MITEQ	AMF-6F-260400	9121372	Apr. 19, 2013	Apr. 18, 2015
Note: Calibration Interval of instruments listed above is two year.					



Test Item	RF Conducted				
Test Site	(TH01-WS)				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV 40	101063	Feb. 18, 2013	Feb. 17, 2014
TEMP&HUMIDITY CHAMBER	GIANT FORCE	GCT-225-40-SP-SD	MAF1212-002	Nov 29, 2012	Nov 28, 2013
Power Meter	Anritsu	ML2495A	1241002	Oct. 15, 2012	Oct. 14, 2013
Power Sensor	Anritsu	MA2411B	1027366	Oct. 24, 2012	Oct. 23, 2013
Signal Generator	R&S	SMB100A	175727	Jan. 14, 2013	Jan. 13, 2014
Radio Communication Analyzer	Anritsu	MT8820C	6201240341	Mar. 13, 2013	Mar. 12, 2014
Wideband Radio Communication Tester	R&S	CMW500	106070	Jan. 29, 2013	Jan. 28, 2014
Bluetooth Tester	R&S	CBT	100959	Jan. 09, 2013	Jan. 08, 2014
MXG-B RF Vector Signal Generator	Agilent	N5182B	MY53050081	Apr. 19, 2013	Apr. 18, 2014
Note: Calibration Interval of instruments listed above is one year.					

1.5 Test Standards

According to the specification of EUT, the EUT must comply with following standards and KDB documents.

47 CFR FCC Part 15.249

ANSI C63.10-2009

Note: The EUT has been tested and complied with FCC part 15B requirement. FCC Part 15B test results are issued to another report.

1.6 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor ($k=2$))

Measurement Uncertainty	
Parameters	Uncertainty
AC conducted emission	± 2.43 dB
Radiated emission	± 2.49 dB



2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
Radiated Emissions	03CH01-WS	25°C / 65%	Aska Huang
RF Conducted	TH01-WS	25°C / 65%	Aska Huang

➤ FCC site registration No.: 657002

➤ IC site registration No.: 10807A-1

2.2 The Worst Test Modes and Channel Details

Test item	Mode	Test Frequency (MHz)	Test Configuration
Field Strength of Fundamental	FSK	2408, 2440, 2474	---
Radiated Emissions (below 1GHz)	FSK	2440	---
Radiated Emissions (Above 1GHz)	FSK	2408, 2440, 2474	---



3 Transmitter Test Results

3.1 Radiated Emission

This section includes field strength of fundamental, field strength of harmonics and emissions radiated outside of the operating frequency bands.

3.1.1 Limit of field strength of fundamental and field strength of harmonics

Fundamental Frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	50
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

3.1.2 Limit of Unwanted Emissions

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Radiated emission limits in §15.209			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009–0.490	2400/F(kHz)	48.5 - 13.8	300
0.490–1.705	24000/F(kHz)	33.8 - 23	30
1.705–30.0	30	29	30
30–88	100	40	3
88–216	150	43.5	3
216–960	200	46	3
Above 960	500	54	3

Note 1:

Quasi-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit

Note 2:

Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.



3.1.3 Test Procedures

1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at a height of 0.8 m test table above the ground plane.
2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

Note:

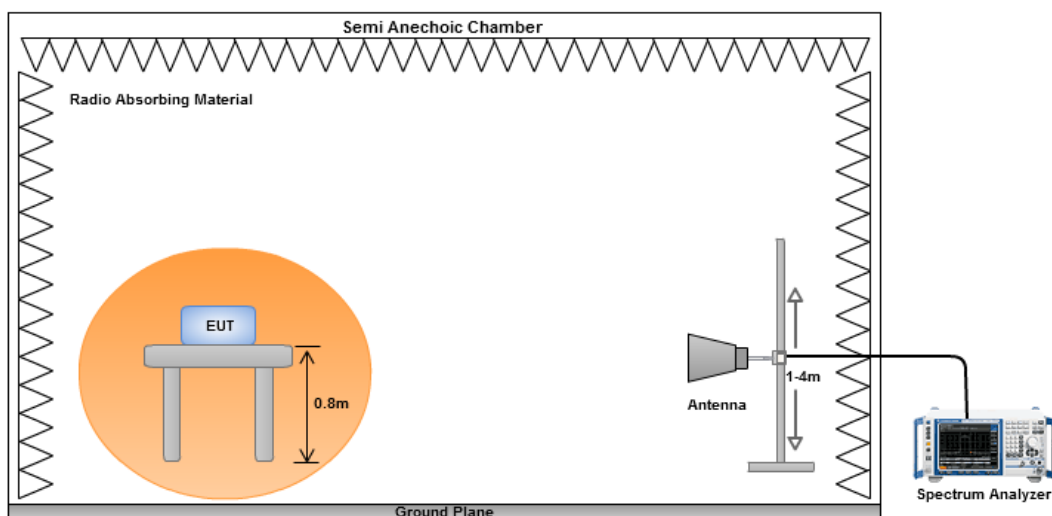
1. Radiated emission below 1GHz
120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission
Radiated emission above 1GHz / Peak value
2. RBW=1MHz, VBW=3MHz and Peak detector
Note : EUT is set to almost 100% duty cycle for test.
Radiated emission above 1GHz / Average value
The average value is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:

3.
$$20\log(\text{Duty cycle}) = 20\log \frac{7 * 0.16812 \text{ ms}}{100 \text{ ms}} = -38.6\text{dB}$$

Please see page 20 for plotted duty

Note : The duty cycle is measured under normal operating mode and maximum duty cycle condition

3.1.4 Test Setup





3.1.5 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Polarization	Horizontal		Test Freq. (MHz)		2440				
Level (dBuV/m) Frequency (MHz)									
	Freq.	Emission	Limit	Margin	SA	Factor	Remark	ANT	Turn
	MHz	level			reading			High	Table
		dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	41.64	13.55	40.00	-26.45	30.43	-16.88	Peak	---	---
2	119.24	14.29	43.50	-29.21	33.50	-19.21	Peak	---	---
3	348.16	16.83	46.00	-29.17	31.78	-14.95	Peak	---	---
4	359.80	17.62	46.00	-28.38	32.27	-14.65	Peak	---	---
5	511.12	19.61	46.00	-26.39	30.99	-11.38	Peak	---	---
6	704.15	22.86	46.00	-23.14	31.03	-8.17	Peak	---	---
Note 1: Emission Level (dBuV/m) = SAReading (dBuV/m) + Factor* (dB)									
*Factor includes antenna factor , cable loss and amplifier gain									
Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m)									



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Polarization	Vertical	Test Freq. (MHz)	2440																																																																						
Level (dBuV/m) Frequency (MHz) <table><tr><th></th><th>Freq. MHz</th><th>Emission level dBuV/m</th><th>Limit dBuV/m</th><th>Margin dB</th><th>SA reading dBuV</th><th>Factor dB</th><th>Remark</th><th>ANT High cm</th><th>Turn Table deg</th></tr><tr><td>1</td><td>30.00</td><td>16.53</td><td>40.00</td><td>-23.47</td><td>34.26</td><td>-17.73</td><td>Peak</td><td>---</td><td>---</td></tr><tr><td>2</td><td>42.61</td><td>15.25</td><td>40.00</td><td>-24.75</td><td>32.08</td><td>-16.83</td><td>Peak</td><td>---</td><td>---</td></tr><tr><td>3</td><td>355.92</td><td>16.36</td><td>46.00</td><td>-29.64</td><td>31.12</td><td>-14.76</td><td>Peak</td><td>---</td><td>---</td></tr><tr><td>4</td><td>371.44</td><td>17.80</td><td>46.00</td><td>-28.20</td><td>32.18</td><td>-14.38</td><td>Peak</td><td>---</td><td>---</td></tr><tr><td>5</td><td>482.02</td><td>19.40</td><td>46.00</td><td>-26.60</td><td>31.35</td><td>-11.95</td><td>Peak</td><td>---</td><td>---</td></tr><tr><td>6</td><td>511.12</td><td>21.48</td><td>46.00</td><td>-24.52</td><td>32.86</td><td>-11.38</td><td>Peak</td><td>---</td><td>---</td></tr></table>					Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg	1	30.00	16.53	40.00	-23.47	34.26	-17.73	Peak	---	---	2	42.61	15.25	40.00	-24.75	32.08	-16.83	Peak	---	---	3	355.92	16.36	46.00	-29.64	31.12	-14.76	Peak	---	---	4	371.44	17.80	46.00	-28.20	32.18	-14.38	Peak	---	---	5	482.02	19.40	46.00	-26.60	31.35	-11.95	Peak	---	---	6	511.12	21.48	46.00	-24.52	32.86	-11.38	Peak	---	---
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3.1.6 Transmitter Radiated Unwanted Emissions (Above 1GHz)

Polarization	Horizontal			Test Freq. (MHz)		2408																																																																																																																	
Level (dBuV/m) Frequency (MHz) <table><thead><tr><th></th><th>Freq. MHz</th><th>Emission level dBuV/m</th><th>Limit dBuV/m</th><th>Margin dB</th><th>SA reading dBuV</th><th>Factor dB</th><th>Remark</th><th>ANT High cm</th><th>Turn Table deg</th></tr></thead><tbody><tr><td>1</td><td>2382.00</td><td>23.18</td><td>54.00</td><td>-30.82</td><td>26.42</td><td>-3.24</td><td>Average</td><td>---</td><td>---</td></tr><tr><td>2</td><td>2382.00</td><td>61.78</td><td>74.00</td><td>-12.22</td><td>65.02</td><td>-3.24</td><td>Peak</td><td>---</td><td>---</td></tr><tr><td>3</td><td>2396.00</td><td>26.34</td><td>54.00</td><td>-27.66</td><td>29.53</td><td>-3.19</td><td>Average</td><td>---</td><td>---</td></tr><tr><td>4</td><td>2396.00</td><td>64.94</td><td>74.00</td><td>-9.06</td><td>68.13</td><td>-3.19</td><td>Peak</td><td>---</td><td>---</td></tr><tr><td>5</td><td>2408.00</td><td>61.67</td><td>94.00</td><td>-32.33</td><td>64.82</td><td>-3.15</td><td>Average</td><td>---</td><td>---</td></tr><tr><td>6</td><td>2408.00</td><td>100.27</td><td>114.00</td><td>-13.73</td><td>103.42</td><td>-3.15</td><td>Peak</td><td>---</td><td>---</td></tr><tr><td>7</td><td>4816.00</td><td>16.95</td><td>54.00</td><td>-37.05</td><td>12.66</td><td>4.29</td><td>Average</td><td>---</td><td>---</td></tr><tr><td>8</td><td>4816.00</td><td>55.55</td><td>74.00</td><td>-18.45</td><td>51.26</td><td>4.29</td><td>Peak</td><td>---</td><td>---</td></tr><tr><td>9</td><td>7224.00</td><td>28.90</td><td>54.00</td><td>-25.10</td><td>20.05</td><td>8.85</td><td>Average</td><td>---</td><td>---</td></tr><tr><td>10</td><td>7224.00</td><td>67.50</td><td>74.00</td><td>-6.50</td><td>58.65</td><td>8.85</td><td>Peak</td><td>---</td><td>---</td></tr></tbody></table> Note 1: Emission Level (dBuV/m) = SAReading (dBuV/m) + Factor* (dB) *Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m)											Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg	1	2382.00	23.18	54.00	-30.82	26.42	-3.24	Average	---	---	2	2382.00	61.78	74.00	-12.22	65.02	-3.24	Peak	---	---	3	2396.00	26.34	54.00	-27.66	29.53	-3.19	Average	---	---	4	2396.00	64.94	74.00	-9.06	68.13	-3.19	Peak	---	---	5	2408.00	61.67	94.00	-32.33	64.82	-3.15	Average	---	---	6	2408.00	100.27	114.00	-13.73	103.42	-3.15	Peak	---	---	7	4816.00	16.95	54.00	-37.05	12.66	4.29	Average	---	---	8	4816.00	55.55	74.00	-18.45	51.26	4.29	Peak	---	---	9	7224.00	28.90	54.00	-25.10	20.05	8.85	Average	---	---	10	7224.00	67.50	74.00	-6.50	58.65	8.85	Peak	---	---
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Polarization	Vertical	Test Freq. (MHz)	2408
Level (dBUV/m)			



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Polarization	Horizontal				Test Freq. (MHz)		2440																																																																																												
Level (dBUV/m) Frequency (MHz) <table><tr><th></th><th>Freq.</th><th>Emission</th><th>Limit</th><th>Margin</th><th>SA</th><th>Factor</th><th>Remark</th><th>ANT</th><th>Turn</th></tr><tr><th></th><th>MHz</th><th>level</th><th></th><th></th><th>reading</th><th></th><th></th><th>High</th><th>Table</th></tr><tr><th></th><th></th><th>dBUV/m</th><th>dBUV/m</th><th>dB</th><th>dBUV</th><th>dB</th><th></th><th>cm</th><th>deg</th></tr><tr><td>1</td><td>2440.00</td><td>62.62</td><td>94.00</td><td>-31.38</td><td>65.63</td><td>-3.01</td><td>Average</td><td>---</td><td>---</td></tr><tr><td>2</td><td>2440.00</td><td>101.22</td><td>114.00</td><td>-12.78</td><td>104.23</td><td>-3.01</td><td>Peak</td><td>---</td><td>---</td></tr><tr><td>3</td><td>4880.00</td><td>16.83</td><td>54.00</td><td>-37.17</td><td>12.43</td><td>4.40</td><td>Average</td><td>---</td><td>---</td></tr><tr><td>4</td><td>4880.00</td><td>55.43</td><td>74.00</td><td>-18.57</td><td>51.03</td><td>4.40</td><td>Peak</td><td>---</td><td>---</td></tr><tr><td>5</td><td>7320.00</td><td>28.02</td><td>54.00</td><td>-25.98</td><td>19.09</td><td>8.93</td><td>Average</td><td>---</td><td>---</td></tr><tr><td>6</td><td>7320.00</td><td>66.62</td><td>74.00</td><td>-7.38</td><td>57.69</td><td>8.93</td><td>Peak</td><td>---</td><td>---</td></tr></table>											Freq.	Emission	Limit	Margin	SA	Factor	Remark	ANT	Turn		MHz	level			reading			High	Table			dBUV/m	dBUV/m	dB	dBUV	dB		cm	deg	1	2440.00	62.62	94.00	-31.38	65.63	-3.01	Average	---	---	2	2440.00	101.22	114.00	-12.78	104.23	-3.01	Peak	---	---	3	4880.00	16.83	54.00	-37.17	12.43	4.40	Average	---	---	4	4880.00	55.43	74.00	-18.57	51.03	4.40	Peak	---	---	5	7320.00	28.02	54.00	-25.98	19.09	8.93	Average	---	---	6	7320.00	66.62	74.00	-7.38	57.69	8.93	Peak	---	---
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Polarization	Vertical		Test Freq. (MHz)		2440																																																																																											
Level (dBuV/m) 117 110 90 70 50 30 10 0 2 1 4 3 6 5 1000 4000 6000 8000 10000 12000 14000 16000 18000 20000 22000 25000 Frequency (MHz) FCC 15C 249(2.4G) FCC 15C 249(2.4G-AV) <table><tr><th></th><th>Freq.</th><th>Emission</th><th>Limit</th><th>Margin</th><th>SA</th><th>Factor</th><th>Remark</th><th>ANT</th><th>Turn</th></tr><tr><th></th><th>MHz</th><th>level</th><th></th><th></th><th>reading</th><th></th><th></th><th>High</th><th>Table</th></tr><tr><th></th><th></th><th>dBuV/m</th><th>dBuV/m</th><th>dB</th><th>dBuV</th><th>dB</th><th></th><th>cm</th><th>deg</th></tr><tr><td>1</td><td>2440.00</td><td>54.65</td><td>94.00</td><td>-39.35</td><td>57.66</td><td>-3.01</td><td>Average</td><td>---</td><td>---</td></tr><tr><td>2</td><td>2440.00</td><td>93.25</td><td>114.00</td><td>-20.75</td><td>96.26</td><td>-3.01</td><td>Peak</td><td>---</td><td>---</td></tr><tr><td>3</td><td>4880.00</td><td>13.58</td><td>54.00</td><td>-40.42</td><td>9.18</td><td>4.40</td><td>Average</td><td>---</td><td>---</td></tr><tr><td>4</td><td>4880.00</td><td>52.18</td><td>74.00</td><td>-21.82</td><td>47.78</td><td>4.40</td><td>Peak</td><td>---</td><td>---</td></tr><tr><td>5</td><td>7320.00</td><td>28.19</td><td>54.00</td><td>-25.81</td><td>19.26</td><td>8.93</td><td>Average</td><td>---</td><td>---</td></tr><tr><td>6</td><td>7320.00</td><td>66.79</td><td>74.00</td><td>-7.21</td><td>57.86</td><td>8.93</td><td>Peak</td><td>---</td><td>---</td></tr></table>								Freq.	Emission	Limit	Margin	SA	Factor	Remark	ANT	Turn		MHz	level			reading			High	Table			dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg	1	2440.00	54.65	94.00	-39.35	57.66	-3.01	Average	---	---	2	2440.00	93.25	114.00	-20.75	96.26	-3.01	Peak	---	---	3	4880.00	13.58	54.00	-40.42	9.18	4.40	Average	---	---	4	4880.00	52.18	74.00	-21.82	47.78	4.40	Peak	---	---	5	7320.00	28.19	54.00	-25.81	19.26	8.93	Average	---	---	6	7320.00	66.79	74.00	-7.21	57.86	8.93	Peak	---	---
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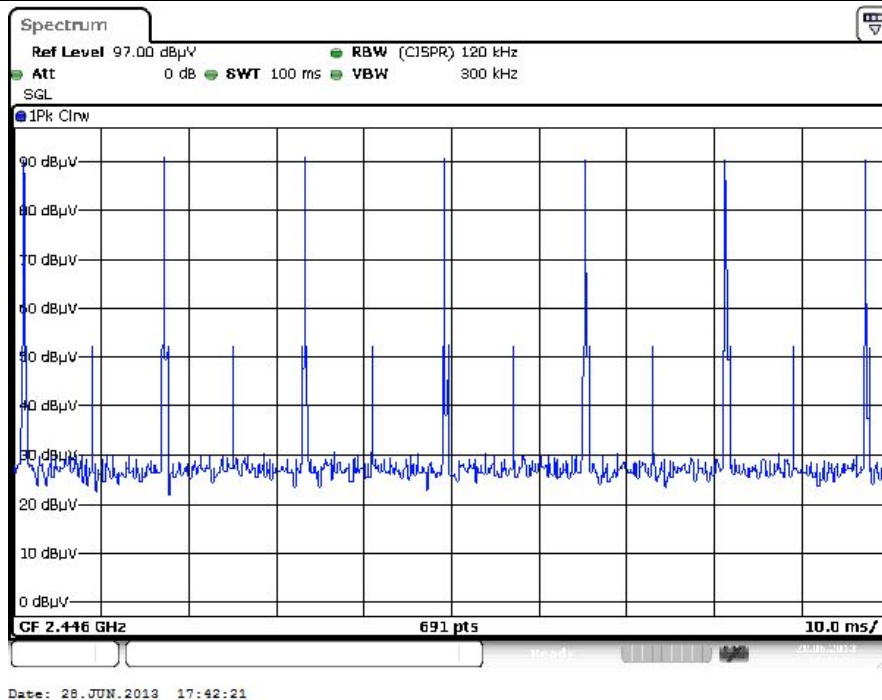
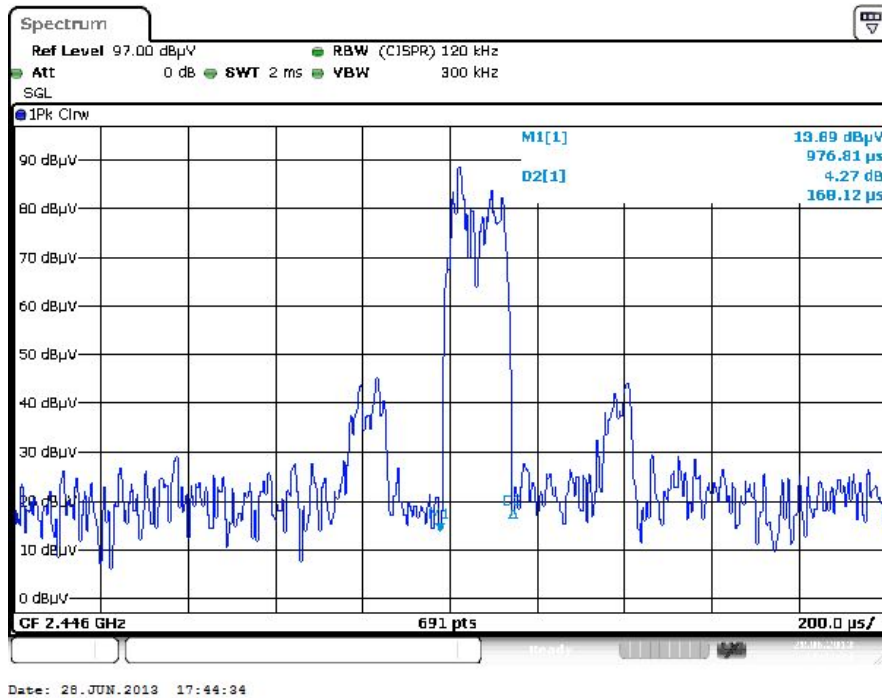
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$$20\log(\text{Duty cycle}) = 20\log \frac{7 \times 0.16812\text{ms}}{100\text{ ms}} = -38.6\text{dB}$$

==END==