FCC CFR47 PART 15 SUBPART C
IC RSS-210
CERTIFICATION
TEST REPORT

FOR

WATER DETECTOR

MODEL NUMBER: DTECT-100

FCC ID: VKG-0016641284
IC: 7204A-D100C

REPORT NUMBER: 07U11046-1B1

ISSUE DATE: AUGUST 16, 2007

Prepared for
DTECTION
7252 CLAIREMONT MESA BLVD
SAN DIEGO, CA 92111, USA

Prepared by
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	06/20/07	Initial Issue	T. Chan
B	07/26/07	Corrected High Frequency Emissions Sheet on Page 23	T. Chan
1	08/16/07	Corrected FCC ID.	S. Radecki

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: DTECTION
7252 CLAIREMONT MESA BLVD
SAN DIEGO, CALIFORNIA 92111, USA

EUT DESCRIPTION: WATER DETECTOR

MODEL: DTECT-100

SERIAL NUMBER: 2000240EA

DATE TESTED: JUNE 12-14, 2007

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 15 SUBPART C	NO NON-COMPLIANCE NOTED
IC RSS-210 ISSUE 5	NO NON-COMPLIANCE NOTED

Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:

THU CHAN
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

Tested By:

THANH NGUYEN
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 2 and FCC CFR 47 Part 15, IC RSS-210 and IC RSS-212.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://www.ccsemc.com.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Radiated Emission, 30 to 200 MHz	+/- 3.3 dB
Radiated Emission, 200 to 1000 MHz	+4.5 / -2.9 dB
Radiated Emission, 1000 to 2000 MHz	+4.5 / -2.9 dB
Radiated Emission, 30 to 200 MHz	+/- 3.3 dB
Radiated Emission Above 2000 MHz	+/- 4.3 dB
Power Line Conducted Emission	+/- 2.9 dB

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The Dtec-100 System is a pro-active water detection system that provides uninterrupted surveillance and sends a call-to-action when a water intrusion event is detected- even if no one is present at the time of occurrence.
The Dtect-100 System consists of two types of components: Base Station (RX) and Detector (TX) Build by Dtection Company.

5.2. SOFTWARE AND FIRMWARE

To activate continuous transmission, press Cancel and Register button at Base station and Register button at Detector.

The firmware use to test is Firmware TX FCC 02

5.3. MODIFICATIONS

The Transmitter is modified to pass under the limit as the following:

1. Replaced C4 from 1.8pf to 12pf.
2. L2 from 390 to 270nH
3. L1 from 270 to 22uH
4. Added 56nH between U1 and L1 etc.

5.4. WORST-CASE CONFIGURATION AND MODE

The worst-case is determined by X, Y, and Z-axis. The highest measured output power was at X-axis (Lay down the EUT on back side faced to the table.)

5.5. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

EUT is stand alone unit

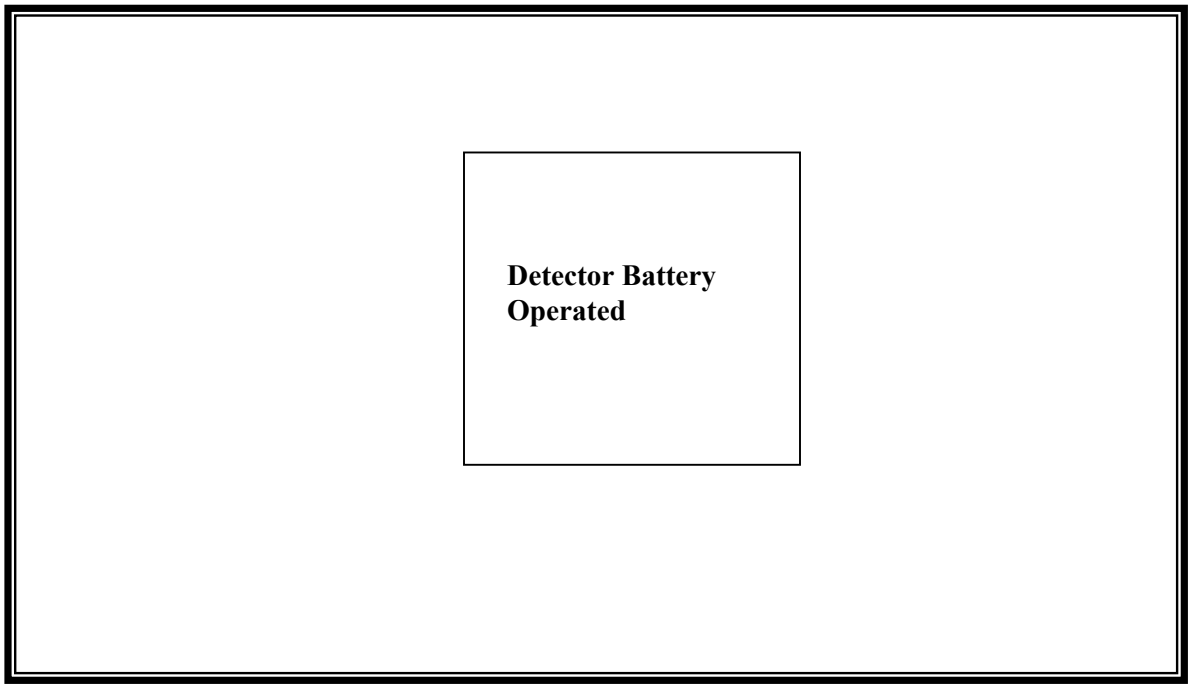
I/O CABLES

EUT is stand alone unit

TEST SETUP

The Detector is stand-alone unit and is battery operated.
.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**Cal Due**
Antenna, Bilog 30 MHz ~ 2 Ghz	Sunol Sciences	JB1	A0022704	08/13/07
Preamplifier, 1300 MHz	Agilent / HP	8447D	1937A02062	01/23/08
Spectrum Analyzer, 1.8 GHz	Agilent / HP	8591A	3009A00791	10/12/07
Spectrum Analyzer 3 Hz ~ 44 GHz	Agilent / HP	E4446A	US42070220	11/26/07
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	2238	39560

7. LIMITS AND RESULTS

7.1. 20dB BANDWIDTH

LIMIT

§15.231 (c) & IC RSS-210 Issue 6 A1.1.3
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

The transmitter output is connected to the spectrum analyzer.

20dB Bandwidth: The RBW is set to 100 KHz. The VBW is set to 100 KHz. The sweep time is coupled. Bandwidth is determined at the points 20 dB down from the modulated carrier.

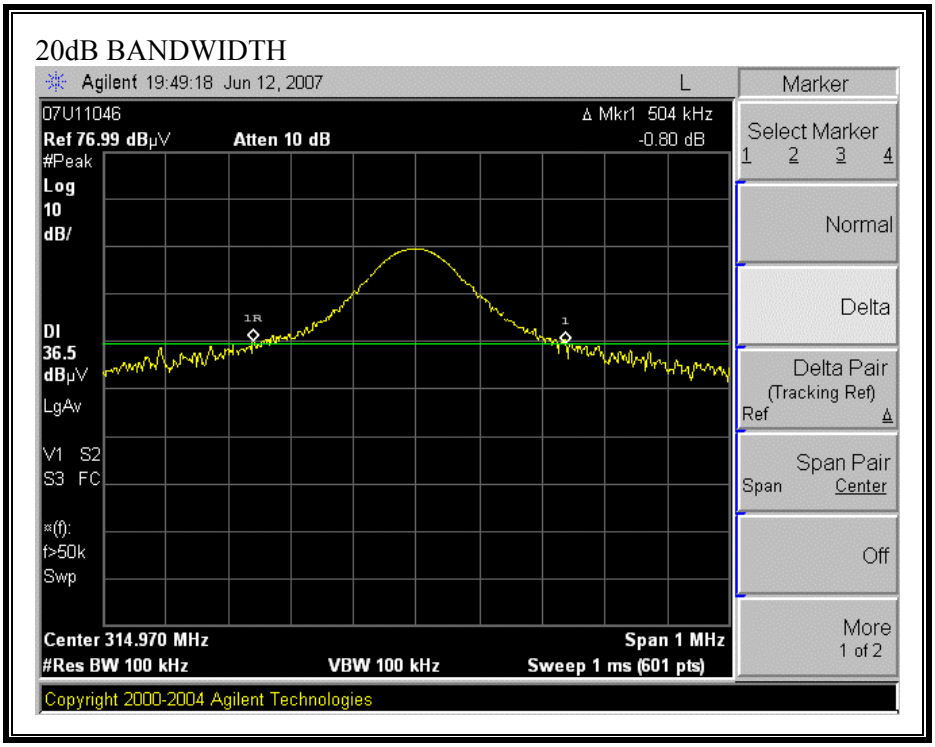
RESULTS

No non-compliance noted:

20dB Bandwidth

Frequency (MHz)	20dB Bandwidth (KHz)	Limit (KHz)	Margin (KHz)
315	504	787.5	-283.5

20dB BANDWIDTH



7.2. MAXIMUM MODULATION PERCENTAGE (M %)

LIMIT

§15.35 (c) & IC RSS-Gen Issue 1 §4.3
The measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer or radiated field strength. The RBW is set to 100 kHz and the VBW is set to 100 kHz. The sweep time is coupled and the span is set to 0 Hz. The number of pulses is measured and calculated in a 100 ms scan.

CALCULATION:

Average Reading = Peak Reading (dBuV/m)+ 20log (Duty Cycle), Where Duty Cycle is
(# of long pulses * long pulse width) + (# of short pulses * short pulse width) / 100 or T

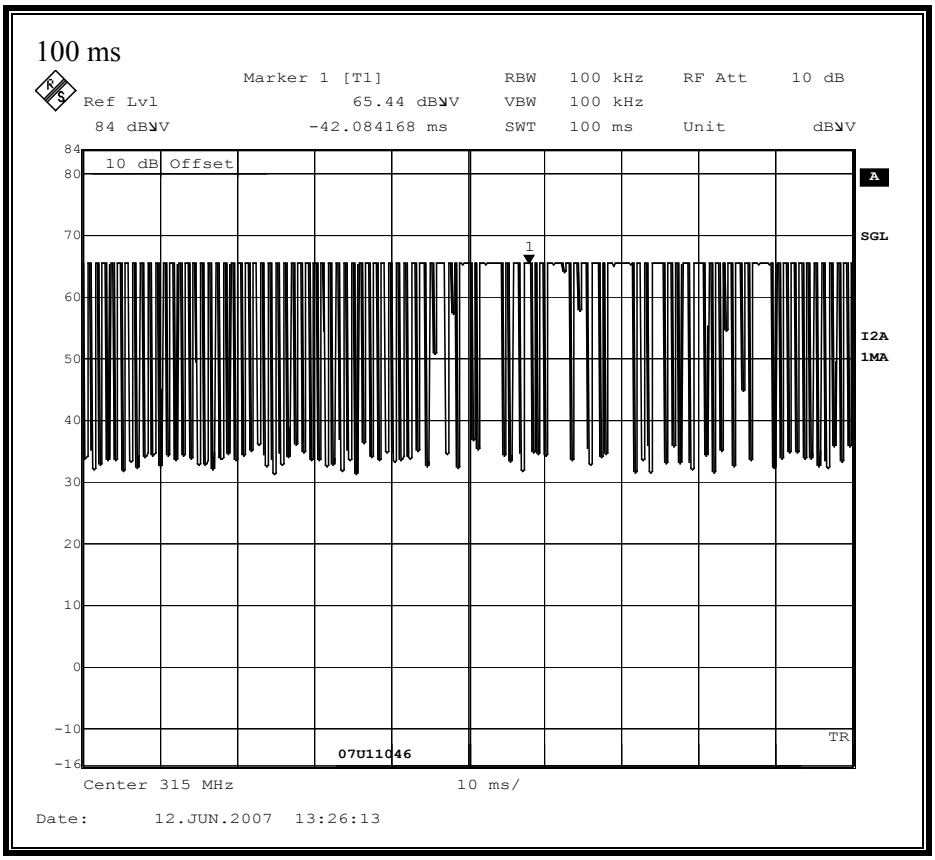
RESULTS

No non-compliance noted:

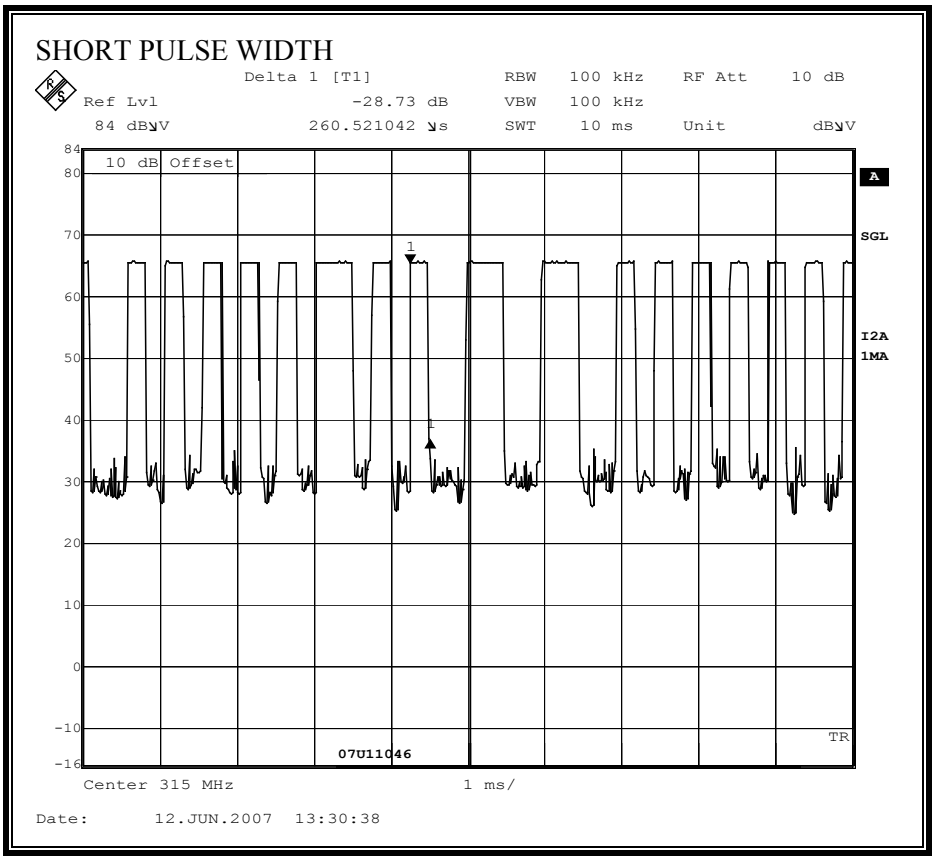
MAXIMUM MODULATION PERCENTAGE

One Period (ms)	Long Pulse Width (ms)	# of Long Pulses	Short Width (ms)	# of Short Pulses	Duty Cycle	% Duty Cycle
100	0.501002	29	0.26	136	0.500	50.0

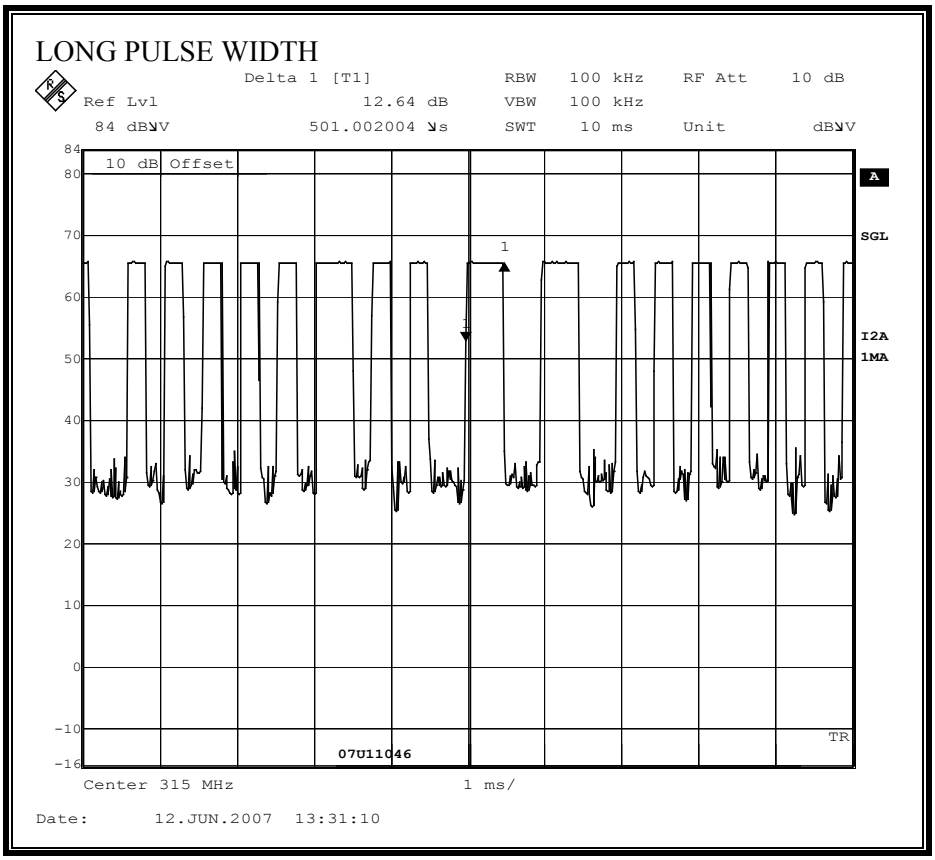
100 ms



SHORT PULSE WIDTH



LONG PULSE WIDTH



7.3. LESS THAN 5 SECONDS PLOT

LIMIT

§15.231 (a) (1) & RSS210 A1.1.1 (1)
A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.
(a) (2) a transmitter activated automatically shall cease transmission within 5 seconds after activation.

TEST PROCEDURE

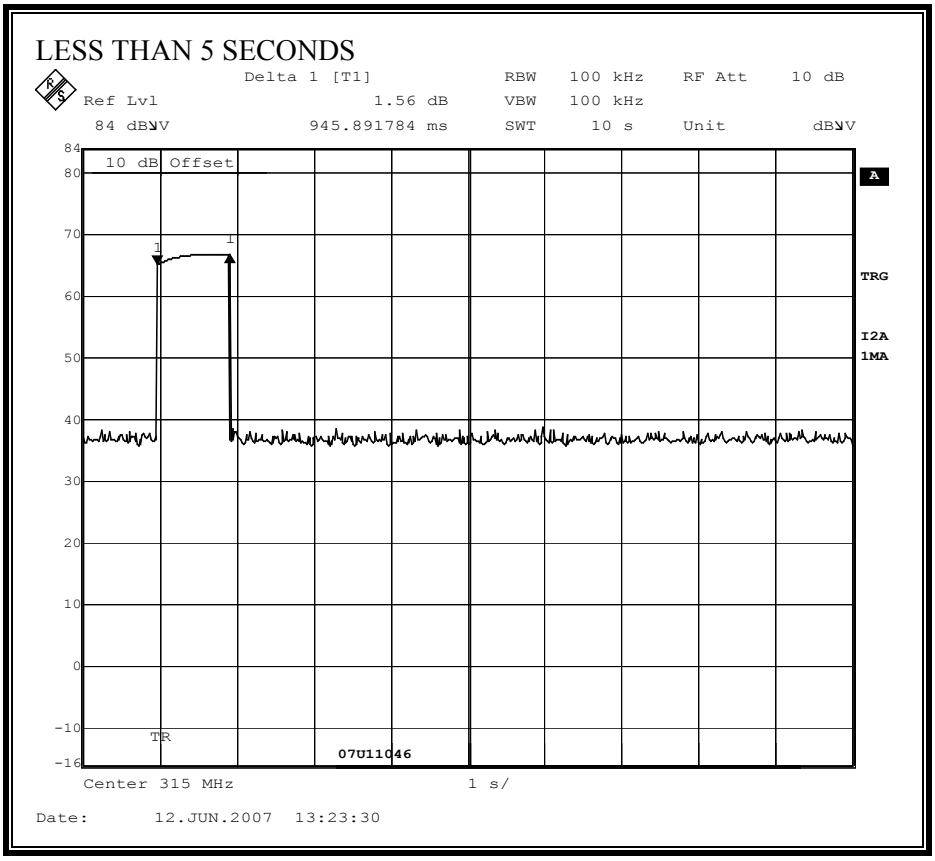
The transmitter output is connected to a spectrum analyzer or radiated field strength. The RBW is set to 100 kHz and the VBW is set to 100 kHz. The sweep time is set to 10 seconds and the span is set to 0 Hz.

RESULTS

No non-compliance noted:

Transmission begins approximately 0.9 seconds after activation and transmission ceases approximately 1.9 seconds after activation.

LESS THAN 5 SECONDS



7.4. RADIATED EMISSIONS

7.4.1. TRANSMITTER RADIATED SPURIOUS EMISSIONS

LIMITS

§15.231 (b) In addition to the provisions of § 15.205, the field strength of emissions from Intentional radiators operated under this section shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental Frequency (microvolts/meter)	Field Strength of Spurious Emissions (microvolts/meter)
40.66 - 40.70	2,250	225
70 - 130	1,250	125
130 - 174	1,250 to 3,750[1]	125 to 375[1]
174 - 260	3,750	375
260 - 470	3,750 to 12,500[1]	375 to 1,250[1]
Above 470	12,500	1,250

[1] Linear interpolation

§15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])
13.36 - 13.41			

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

[2] Above 38.6

§15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

RSS210 Table 4 same as limits FCC applied above.

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and -6dB duty cycle for average measurements.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

FUNDAMENTAL HARMONICS AND SPURIOUS EMISSIONS 30 – 1000 MHz

COMPLIANCE Certification Services
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Project #:	07U11046
Report #:	07U11046-1
Date& Time:	06/13/07
Test Engr:	Thanh Nguyen
Company:	Dtection
EUT Description:	Water Detector
Test Configuration :	Tranmitter w/ battery
Type of Test:	FCC 15.231b
Mode of Operation:	Transmitting Continuous

M% = ((t1+t2+t3+...)/T) * 66.83% = 50.0%

Av Reading = Pk Reading + 20*log(M%)
20 * log (M%) = -6.02

Freq. (MHz)	Pk Rdg (dBuV)	Av Rdg (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Pk Level (dBuV/m)	Av Level (dBuV/m)	Pk Limit FCC_B	Av Limit FCC_B	Pk Margin (dB)	Avg Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)
Fundamental (Y-Position)														
315.00	48.06	42.04	14.25	1.91	0.00	64.22	58.20	95.62	75.62	-31.40	-17.42	3mV	0.00	1.00
315.00	58.58	52.56	14.25	1.91	0.00	74.74	68.72	95.62	75.62	-20.88	-6.90	3mH	0.00	1.00
Fundamental (X Position)														
315.00	49.49	43.47	14.25	1.91	0.00	65.65	59.63	95.62	75.62	-29.97	-15.99	3mV	0.00	1.00
315.00	60.86	54.84	14.25	1.91	0.00	77.02	71.00	95.62	75.62	-18.60	-4.62	3mH	0.00	1.00
Fundamental (Z Position)														
315.00	51.78	45.76	14.25	1.91	0.00	67.94	61.92	95.62	75.62	-27.68	-13.70	3mV	0.00	1.00
315.00	51.66	45.64	14.25	1.91	0.00	67.82	61.80	95.62	75.62	-27.80	-13.82	3mH	0.00	1.00
Harmonics Below 1 GHz at X position (EUT lay down)														
630.00	59.96	53.94	19.68	2.78	32.02	50.40	44.38	75.62	55.62	-25.22	-11.24	3mV	0.00	1.00
630.00	53.11	47.09	19.68	2.78	32.02	43.55	37.53	75.62	55.62	-32.07	-18.09	3mH	0.00	1.00
945.00	46.42	40.40	23.16	3.46	30.79	42.25	36.23	75.62	55.62	-33.37	-19.39	3mV	0.00	1.00
945.00	55.81	49.79	23.16	3.46	27.90	54.53	48.51	75.62	55.62	-21.09	-7.11	3mH	0.00	1.00

HARMONICS AND SPURIOUS EMISSIONS ABOVE 1GHz

High Frequency Measurement
Compliance Certification Services, Fremont 5 meter Chamber A

Company: Dtection
Project #: 07U11046
Date:06/13/2007
Test Engineer: Thanh Nguyen
Configuration: EUT with Battery
Mode: Transmit

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T60; S/N: 2238 @3m	T34 HP 8449B			FCC 15.205

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
		Gordon 203134001		

Peak Measurements
RBW=VBW=1MHz
Average Measurements
Duty Cycle -6dB

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
1.260	3.0	61.3	55.3	26.1	3.3	-37.9	0.0	0.0	52.8	46.8	75.6	55.6	-22.8	-8.8	H
1.575	3.0	51.3	45.3	26.9	3.7	-37.5	0.0	0.0	44.4	38.4	74.0	54.0	-29.6	-15.6	H
1.889	3.0	52.2	46.2	27.7	4.2	-37.0	0.0	0.0	47.0	41.0	75.6	55.6	-28.6	-14.6	H
2.205	3.0	48.3	42.3	28.3	4.6	-36.6	0.0	0.0	44.5	38.5	74	54	-29.5	-15.5	H
2.520	3.0	42.2	36.2	28.9	4.9	-36.2	0.0	0.0	39.8	33.8	75.6	55.6	-35.8	-21.8	Noise floor
2.835	3.0	42.4	36.4	29.9	5.2	-36.0	0.0	0.0	41.5	35.5	74	54	-32.5	-18.5	H
3.150	3.0	40.3	34.3	30.8	5.5	-35.8	0.0	0.0	40.8	34.8	75.6	55.6	-34.8	-20.8	Noise floor
1.260	3.0	56.0	50.0	26.1	3.3	-37.9	0.0	0.0	47.5	41.5	75.6	55.6	-28.1	-14.1	V
1.575	3.0	47.4	41.4	26.9	3.7	-37.5	0.0	0.0	40.6	34.6	75.6	55.6	-35.0	-21.0	V
1.889	3.0	49.8	43.8	27.7	4.2	-37.0	0.0	0.0	44.6	38.6	75.6	55.6	-31.0	-17.0	V
2.205	3.0	45.2	39.2	28.3	4.6	-36.6	0.0	0.0	41.5	35.5	74	54	-32.5	-18.5	V
2.520	3.0	41.7	35.7	28.9	4.9	-36.2	0.0	0.0	39.3	33.3	75.6	55.6	-36.3	-22.3	Noise floor
2.835	3.0	44.3	38.3	29.9	5.2	-36.0	0.0	0.0	43.4	37.4	74	54	-30.6	-16.6	V
3.150	3.0	42.3	36.3	30.8	5.5	-35.8	0.0	0.0	42.8	36.8	75.6	55.6	-32.8	-18.8	V

Rev. 5.1.6

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		