# RJE Technologies, Inc.

**TEST REPORT FOR**

## Pool Safety Alarm
## Model: Safety Turtle

**Tested To The Following Standards:**

**FCC Part 15 Subpart C Section(s)**
**15.249**

**Report No.: 96218-4**

**Date of issue: December 1, 2014**

ACCREDITED
Testing Certificates:
803.01, 803.02, 803.05, 803.06

**This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of EMC testing for CKC Laboratories, Inc.**

**We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.**



Testing the Future
CKC LABORATORIES, INC.

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# ADMINISTRATIVE INFORMATION

## Test Report Information

**REPORT PREPARED FOR:**

RJE Technologies, Inc.
15375 Barranca Parkway I-112
Irvine, CA 92618

REPRESENTATIVE: Corinne Zemla

**REPORT PREPARED BY:**

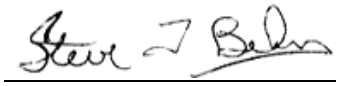
Terri Rayle
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 96218

**DATE OF EQUIPMENT RECEIPT:** November 18, 2014
**DATE(S) OF TESTING:** November 18, 2014

## Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the sample equipment tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.



***Steve Behm***
***Director of Quality Assurance & Engineering Services***
***CKC Laboratories, Inc.***

# Test Facility Information

Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):
CKC Laboratories, Inc.
110 Olinda Place
Brea, CA 92823

# Software Versions

| CKC Laboratories Proprietary Software | Version |
|---|---|
| EMITest Emissions | 5.00.14 |
| Immunity | 5.00.07 |

# Site Registration & Accreditation Information

| Location | CB # | TAIWAN | CANADA | FCC | JAPAN |
|---|---|---|---|---|---|
| Brea A | US0060 | SL2-IN-E-1146R | 3082D-1 | 90473 | A-0147 |

# SUMMARY OF RESULTS

## Standard / Specification: FCC Part 15 Subpart C

| Test Procedure | Description | Modifications* | Results |
|---|---|---|---|
| 15.31(e) | Voltage Variation | NA | Pass |
| | | | |
| 15.215(c) | Occupied Bandwidth | NA | Pass |
| | | | |
| 15.249(a) | RF Power Output | NA | Pass |
| | | | |
| 15.249(b) | Field Strength of Harmonics | NA | Pass |
| | | | |
| 15.249(d) | Radiated Spurious Emissions and Band Edge | NA | Pass |
| | | | |

# Modifications*/Conditions During Testing

This list is a summary of the conditions noted for or modifications made to the equipment during testing.

| Summary of Conditions |
|---|
| No modifications were made during testing. |
| |

***Modifications listed above must be incorporated into all production units.**

# EQUIPMENT UNDER TEST (EUT)

## EQUIPMENT UNDER TEST

**Pool Safety Alarm**
Manuf: RJE Technologies, Inc.
Model: Safety Turtle
Serial: NA

## PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

**DC Power Supply**
Manuf: Xantrex
Model: XTS30-2X
Serial: 58738

# FCC PART 15 SUBPART C

This report contains EMC emissions test results under United States Federal Communications Commission (FCC) CFR 47 Section 15 Subpart C requirements for Intentional Radiators.

## 15.31(e) Voltage Variations

## Test Conditions / Setup / Data

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714 993-6112

Customer: **RJE Technologies, Inc.**
Specification: **15.31(e)**
Work Order #: **96218** Date: 11/18/2014
Test Type: **Maximized Emissions**
Equipment: **Pool safety alarm** Sequence#: 1
Manufacturer: RJE Technologies, Inc. Tested By: S. Yamamoto
Model: Safety Turtle
S/N: NA

***Test Equipment*:**

| ID | Asset # | Description | Model | Calibration Date | Cal Due Date |
|---|---|---|---|---|---|
| T1 | AN02672 | Spectrum Analyzer | E4446A | 8/14/2013 | 8/14/2015 |
| T2 | ANP05198 | Cable-Amplitude 15 to 45degC (dB) | 8268 | 12/11/2012 | 12/11/2014 |
| T3 | AN01995 | Biconilog Antenna | CBL6111C | 4/30/2014 | 4/30/2016 |

***Equipment Under Test* (* = EUT):**

| Function | Manufacturer | Model # | S/N |
|---|---|---|---|
| Pool safety alarm* | RJE Technologies, Inc. | Safety Turtle | NA |

***Support Devices:***

| Function | Manufacturer | Model # | S/N |
|---|---|---|---|
| DC Power Supply | Xantrex | XTS30-2X | 58738 |

***Test Conditions / Notes:***

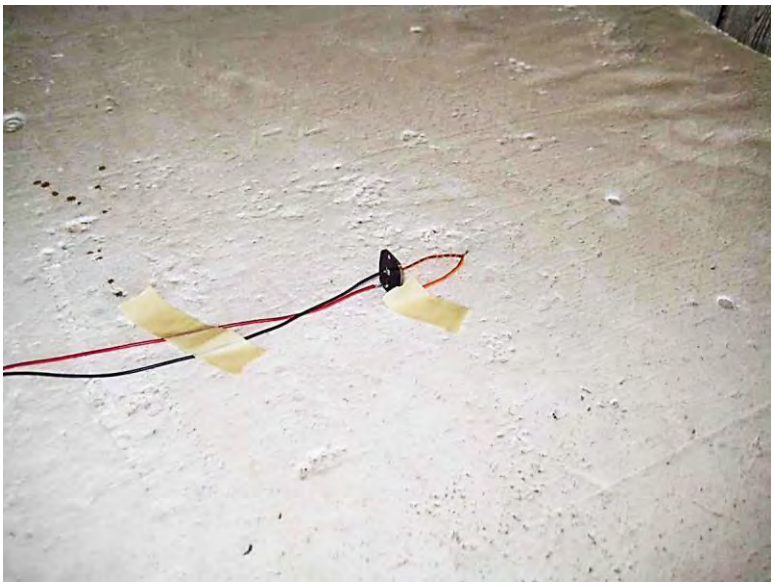
The EUT is a standalone on the Styrofoam table top.
The EUT is powered from an external DC power supplying output 3.0VDC.
The EUT transmits solely on a single channel 915 MHz.
The relay is wired closed so the EUT is in a continuous transmitting mode.
The EUT is positioned in three different axes and data is taken in each axis.

Fundamental emissions of this data sheet represent worst case emission levels for each axis and antenna polarity. Frequency range of data sheet 915.0 to 915.05MHz. RBW=VBW=120kHz.

Temperature: 23°C
Relative Humidity: 30%
Pressure: 100kPa

Site A
An external power supply set at 3.0VDC was utilized to simulate a new battery.
The actual battery used in the EUT is a 3.0VDC CR2032 battery.

## Test Photo



# 15.215(c) Occupied Bandwidth

## Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714 993-6112

Customer: **RJE Technologies, Inc.**
Specification: **15.215 Occupied Bandwidth**
Work Order #: **96218** Date: 11/18/2014
Test Type: **Maximized Emissions**
Equipment: **Pool safety alarm** Sequence#: 1
Manufacturer: RJE Technologies, Inc. Tested By: S. Yamamoto
Model: Safety Turtle
S/N: NA

***Test Equipment*:**

| ID | Asset # | Description | Model | Calibration Date | Cal Due Date |
|---|---|---|---|---|---|
| T1 | AN02672 | Spectrum Analyzer | E4446A | 8/14/2013 | 8/14/2015 |
| T2 | ANP05198 | Cable-Amplitude 15 to 45degC (dB) | 8268 | 12/11/2012 | 12/11/2014 |
| T3 | AN01995 | Biconilog Antenna | CBL6111C | 4/30/2014 | 4/30/2016 |

***Equipment Under Test* (* = EUT):**

| Function | Manufacturer | Model # | S/N |
|---|---|---|---|
| Pool safety alarm* | RJE Technologies, Inc. | Safety Turtle | NA |

***Support Devices:***

| Function | Manufacturer | Model # | S/N |
|---|---|---|---|
| DC Power Supply | Xantrex | XTS30-2X | 58738 |

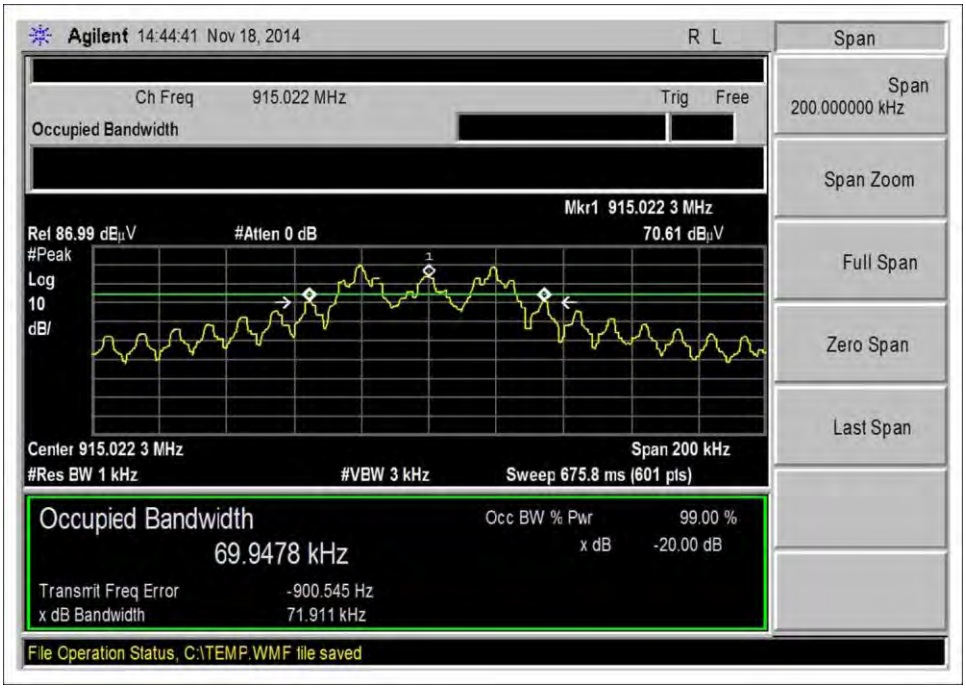
***Test Conditions / Notes:***

The EUT is a standalone on the Styrofoam table top.
The EUT is powered from an external DC power supplying output 3.0VDC.
The EUT transmits solely on a single channel 915 MHz.
The relay is wired closed so the EUT is in a continuous transmitting mode.

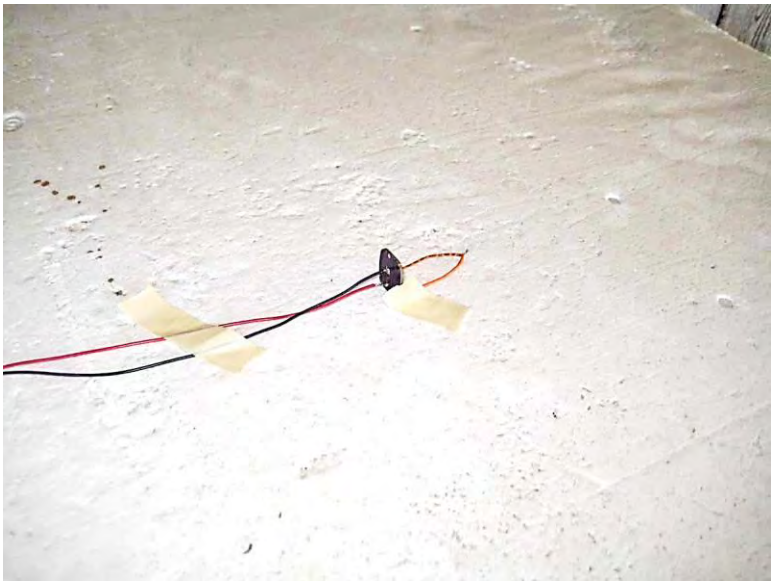
Temperature: 23°C
Relative Humidity: 30%
Pressure: 100kPa

Site A

## Test Data




## Test Setup Photo



# 15.249(a) RF Power Output

## Test Setup / Conditions / Data

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • 7149936112

Customer: **RJE Technologies, Inc.**
Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**
Work Order #: **96218** Date: 11/18/2014
Test Type: **Maximized Emissions** Time: 09:30:32
Equipment: **Pool safety alarm** Sequence#: 1
Manufacturer: RJE Technologies, Inc. Tested By: S. Yamamoto
Model: Safety Turtle
S/N: NA

***Test Equipment*:**

| ID | Asset # | Description | Model | Calibration Date | Cal Due Date |
|---|---|---|---|---|---|
| T1 | AN02672 | Spectrum Analyzer | E4446A | 8/14/2013 | 8/14/2015 |
| T2 | ANP05198 | Cable-Amplitude 15 to 45degC (dB) | 8268 | 12/11/2012 | 12/11/2014 |
| T3 | AN01995 | Biconilog Antenna | CBL6111C | 4/30/2014 | 4/30/2016 |

***Equipment Under Test* (* = EUT):**

| Function | Manufacturer | Model # | S/N |
|---|---|---|---|
| Pool safety alarm* | RJE Technologies, Inc. | Safety Turtle | NA |

***Support Devices:***

| Function | Manufacturer | Model # | S/N |
|---|---|---|---|
| DC Power Supply | Xantrex | XTS30-2X | 58738 |

***Test Conditions / Notes:***

The EUT is a standalone on the Styrofoam table top.
The EUT is powered from an external DC power supplying output 3.0VDC.
The EUT transmits solely on a single channel 915 MHz.
The relay is wired closed so the EUT is in a continuous transmitting mode.
The EUT is positioned in three different axes and data is taken in each axis.

Fundamental emissions of this data sheet represent worst case emission levels for each axis and antenna polarity. Frequency range of data sheet 915.0 to 915.05MHz. RBW=VBW=120kHz.

Temperature: 23°C
Relative Humidity: 30%
Pressure: 100kPa

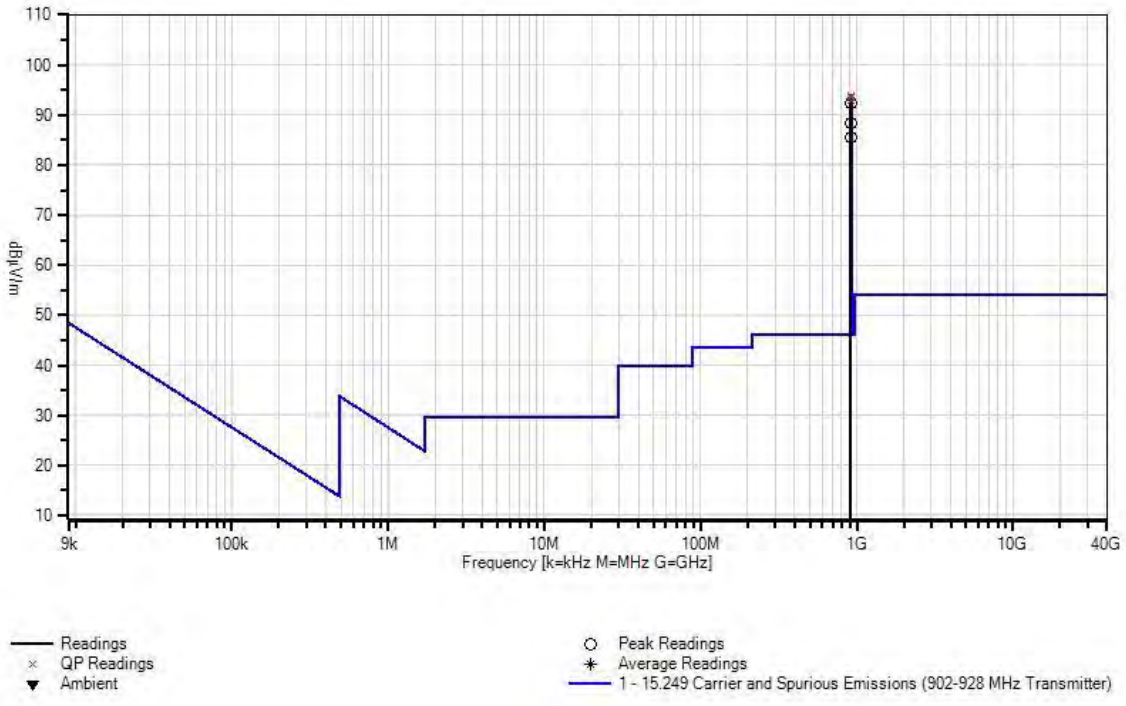
Site A

Ext Attn: 0 dB

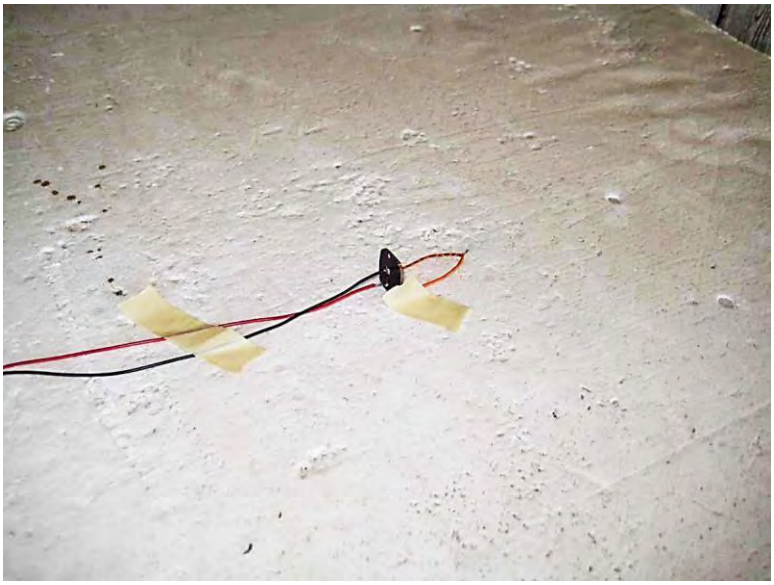
***Measurement Data:*** Reading listed by margin. Test Distance: 3 Meters

| # | Freq MHz | Rdng dBµV | T1 dB | T2 dB | T3 dB | dB | Dist Table | Corr dBµV/m | Spec dBµV/m | Margin dB | Polar Ant |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 915.000M QP | 64.1 | +0.0 | +5.9 | +23.7 | | +0.0 | 93.7 | 94.0 | -0.3 | Horiz |
| 2 | 915.046M QP | 64.0 | +0.0 | +5.9 | +23.7 | | +0.0 | 93.6 | 94.0 | -0.4 | Horiz |
| 3 | 915.005M QP | 63.4 | +0.0 | +5.9 | +23.7 | | +0.0 | 93.0 | 94.0 | -1.0 | Horiz |
| ^ | 915.000M | 64.3 | +0.0 | +5.9 | +23.7 | | +0.0 | 93.9 | 94.0 | -0.1 | Horiz |
| ^ | 915.046M | 64.3 | +0.0 | +5.9 | +23.7 | | +0.0 | 93.9 | 94.0 | -0.1 | Horiz |
| ^ | 915.005M | 63.6 | +0.0 | +5.9 | +23.7 | | +0.0 | 93.2 | 94.0 | -0.8 | Horiz |
| 7 | 915.004M | 62.7 | +0.0 | +5.9 | +23.7 | | +0.0 | 92.3 | 94.0 | -1.7 | Vert |
| 8 | 915.041M | 58.8 | +0.0 | +5.9 | +23.7 | | +0.0 | 88.4 | 94.0 | -5.6 | Vert |
| 9 | 915.038M | 55.8 | +0.0 | +5.9 | +23.7 | | +0.0 | 85.4 | 94.0 | -8.6 | Vert |

CKC Laboratories, Inc. Date: 11/18/2014 Time: 09:30:32 RJE Technologies, Inc. WO#: 96218
15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter) Test Distance: 3 Meters Sequence#: 1 Ext ATTN: 0 dB



## Test Setup Photo



# 15.249(b) Field Strength of Harmonics

## Test Conditions / Setup / Data

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714 993-6112

Customer: **RJE Technologies, Inc.**
Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**
Work Order #: **96218** Date: 11/18/2014
Test Type: **Maximized Emissions** Time: 10:46:25
Equipment: **Pool safety alarm** Sequence#: 2
Manufacturer: RJE Technologies, Inc. Tested By: S. Yamamoto
Model: Safety Turtle
S/N: NA

***Test Equipment*:**

| ID | Asset # | Description | Model | Calibration Date | Cal Due Date |
|---|---|---|---|---|---|
| | AN02672 | Spectrum Analyzer | E4446A | 8/14/2013 | 8/14/2015 |
| T1 | ANP05421 | Cable | Sucoflex 104A | 1/8/2014 | 1/8/2016 |
| T2 | ANP06661 | Cable | LDF1-50 | 4/15/2014 | 4/15/2016 |
| T3 | AN00786 | Preamp | 83017A | 4/25/2014 | 4/25/2016 |
| T4 | ANP06543 | Cable | 32022-29094K-29094K-24TC | 11/20/2013 | 11/20/2015 |
| T5 | AN03169 | High Pass Filter | HM1155-11SS | 7/30/2013 | 7/30/2015 |
| T6 | AN00849 | Horn Antenna | 3115 | 3/18/2014 | 3/18/2016 |

***Equipment Under Test* (* = EUT):**

| Function | Manufacturer | Model # | S/N |
|---|---|---|---|
| Pool safety alarm* | RJE Technologies, Inc. | Safety Turtle | NA |

***Support Devices:***

| Function | Manufacturer | Model # | S/N |
|---|---|---|---|
| DC Power Supply | Xantrex | XTS30-2X | 58738 |

***Test Conditions / Notes:***

The EUT is a standalone on the Styrofoam table top.
The EUT is powered from an external DC power supplying output 3.0VDC.
The EUT transmits solely on a single channel 915 MHz.
The relay is wired closed so the EUT is in a continuous transmitting mode.
The EUT is positioned in three different axes and data is taken in each axis.

Harmonic emissions of this data sheet represent worst case emission levels for each axis and antenna polarity. Frequency range of data sheet 1800 to 10000MHz. RBW=VBW=1MHz.

Temperature: 23°C
Relative Humidity: 30%
Pressure: 100kPa

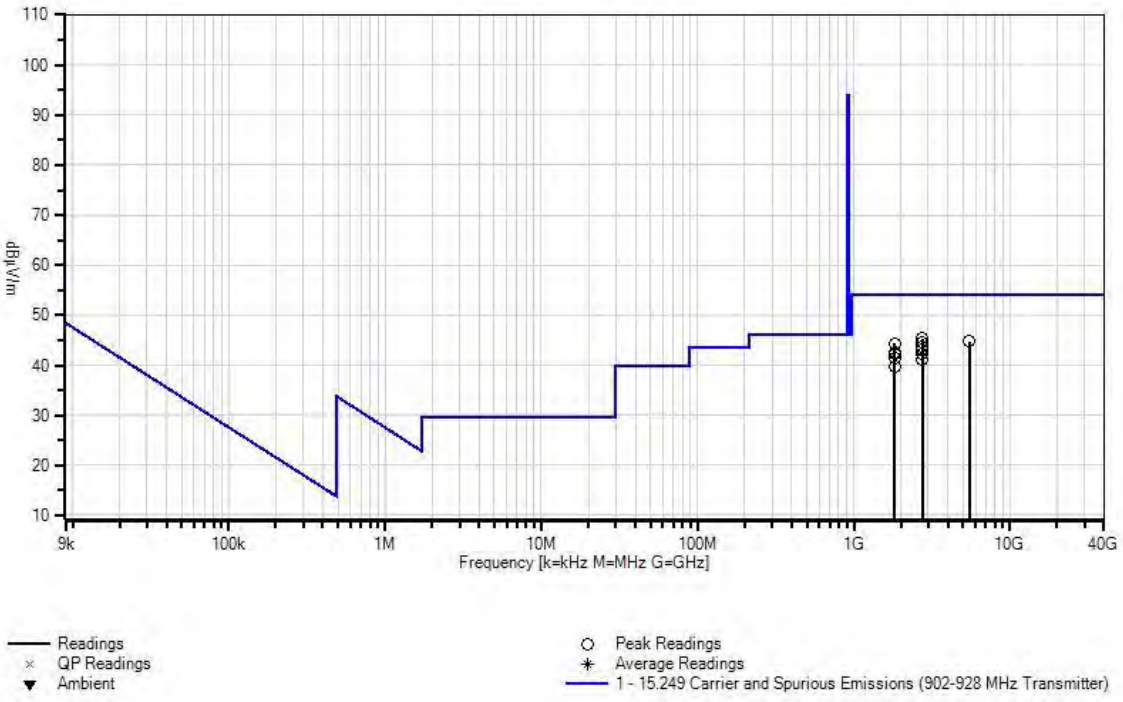
Site A

Ext Attn: 0 dB

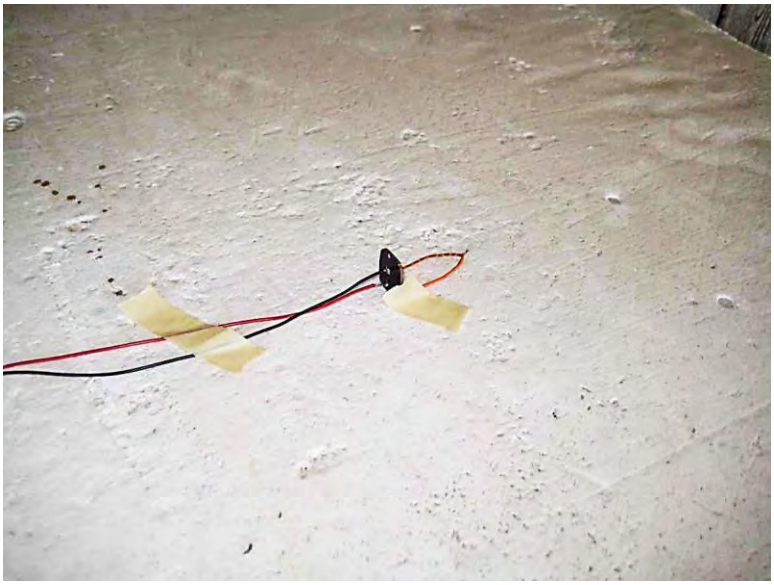
***Measurement Data:*** Reading listed by margin. Test Distance: 3 Meters

| # | Freq | Rdng | T1<br>T5 | T2<br>T6 | T3 | T4 | Dist | Corr | Spec | Margin | Polar |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBµV | dB | dB | dB | dB | Table | dBµV/m | dBµV/m | dB | Ant |
| 1 | 2745.126M | 51.4 | +1.4<br>+0.2 | +4.4<br>+26.4 | -38.9 | +0.5 | +0.0 | 45.4 | 54.0 | -8.6 | Horiz |
| 2 | 5490.268M | 42.2 | +2.1<br>+0.2 | +6.5<br>+31.0 | -37.9 | +0.7 | +0.0 | 44.8 | 54.0 | -9.2 | Vert |
| 3 | 2745.129M | 50.5 | +1.4<br>+0.2 | +4.4<br>+26.4 | -38.9 | +0.5 | +0.0 | 44.5 | 54.0 | -9.5 | Horiz |
| 4 | 1830.084M | 53.2 | +0.8<br>+0.3 | +3.5<br>+24.4 | -38.3 | +0.4 | +0.0 | 44.3 | 54.0 | -9.7 | Horiz |
| 5 | 2745.005M | 49.6 | +1.4<br>+0.2 | +4.4<br>+26.4 | -38.9 | +0.5 | +0.0 | 43.6 | 54.0 | -10.4 | Horiz |
| 6 | 2745.167M | 49.0 | +1.4<br>+0.2 | +4.4<br>+26.4 | -38.9 | +0.5 | +0.0 | 43.0 | 54.0 | -11.0 | Vert |
| 7 | 1829.995M | 51.4 | +0.8<br>+0.3 | +3.5<br>+24.4 | -38.3 | +0.4 | +0.0 | 42.5 | 54.0 | -11.5 | Horiz |
| 8 | 1830.042M | 51.4 | +0.8<br>+0.3 | +3.5<br>+24.4 | -38.3 | +0.4 | +0.0 | 42.5 | 54.0 | -11.5 | Vert |
| 9 | 2744.998M | 48.3 | +1.4<br>+0.2 | +4.4<br>+26.4 | -38.9 | +0.5 | +0.0 | 42.3 | 54.0 | -11.7 | Vert |
| 10 | 1830.085M | 51.1 | +0.8<br>+0.3 | +3.5<br>+24.4 | -38.3 | +0.4 | +0.0 | 42.2 | 54.0 | -11.8 | Vert |
| 11 | 1830.083M | 50.4 | +0.8<br>+0.3 | +3.5<br>+24.4 | -38.3 | +0.4 | +0.0 | 41.5 | 54.0 | -12.5 | Horiz |
| 12 | 2745.008M | 47.1 | +1.4<br>+0.2 | +4.4<br>+26.4 | -38.9 | +0.5 | +0.0 | 41.1 | 54.0 | -12.9 | Vert |
| 13 | 1829.997M | 48.7 | +0.8<br>+0.3 | +3.5<br>+24.4 | -38.3 | +0.4 | +0.0 | 39.8 | 54.0 | -14.2 | Vert |

CKC Laboratories, Inc. Date: 11/18/2014 Time: 10:46:25 RJE Technologies, Inc. WO#: 96218
15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter) Test Distance: 3 Meters Sequence#: 2 Ext
ATTN: 0 dB



## Test Setup Photo



# 15.249(d) / 15.209 Radiated Spurious Emissions and Band Edge

## Test Conditions / Setup / Data

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714 993-6112

Customer: **RJE Technologies, Inc.**
Specification: **15.249(d)/15.209 Radiated Emissions**
Work Order #: **96218** Date: 11/18/2014
Test Type: **Maximized Emissions** Time: 14:41:03
Equipment: **Pool safety alarm** Sequence#: 3
Manufacturer: RJE Technologies, Inc. Tested By: S. Yamamoto
Model: Safety Turtle
S/N: NA

***Test Equipment*:**

| ID | Asset # | Description | Model | Calibration Date | Cal Due Date |
|---|---|---|---|---|---|
| | AN02672 | Spectrum Analyzer | E4446A | 8/14/2013 | 8/14/2015 |
| | ANP05421 | Cable | Sucoflex 104A | 1/8/2014 | 1/8/2016 |
| | ANP06661 | Cable | LDF1-50 | 4/15/2014 | 4/15/2016 |
| | AN00786 | Preamp | 83017A | 4/25/2014 | 4/25/2016 |
| | ANP06543 | Cable | 32022-29094K-29094K-24TC | 11/20/2013 | 11/20/2015 |
| | AN03169 | High Pass Filter | HM1155-11SS | 7/30/2013 | 7/30/2015 |
| | AN00849 | Horn Antenna | 3115 | 3/18/2014 | 3/18/2016 |
| T1 | AN00309 | Preamp | 8447D | 3/12/2014 | 3/12/2016 |
| T2 | AN01995 | Biconilog Antenna | CBL6111C | 4/30/2014 | 4/30/2016 |
| T3 | ANP05050 | Cable | RG223/U | 1/21/2013 | 1/21/2015 |
| T4 | ANP05198 | Cable-Amplitude 15 to 45degC (dB) | 8268 | 12/11/2012 | 12/11/2014 |
| | AN00314 | Loop Antenna | 6502 | 7/2/2014 | 7/2/2016 |

***Equipment Under Test* (* = EUT):**

| Function | Manufacturer | Model # | S/N |
|---|---|---|---|
| Pool safety alarm* | RJE Technologies, Inc. | Safety Turtle | NA |

***Support Devices:***

| Function | Manufacturer | Model # | S/N |
|---|---|---|---|
| DC Power Supply | Xantrex | XTS30-2X | 58738 |

***Test Conditions / Notes:***

The EUT is a standalone on the Styrofoam table top.
The EUT is powered from an external DC power supplying output 3.0VDC.
The EUT transmits solely on a single channel 915 MHz.
The relay is wired closed so the EUT is in a continuous transmitting mode.
The EUT is positioned in three different axes and data is taken in each axis.

Spurious emissions of this data sheet represent worst case emission levels for each axis and antenna polarity. Frequency range of data sheet 0.009 to 10000MHz.
0.009 - 0.15MHz, RBW=VBW=0.2kHz. 0.15 - 30MHz, RBW=VBW=9kHz.
30 - 1000MHz, RBW=VBW=120kHz. 1000 - 10000MHz, RBW=VBW=1MHz.

Temperature: 23°C
Relative Humidity: 30%
Pressure: 100kPa

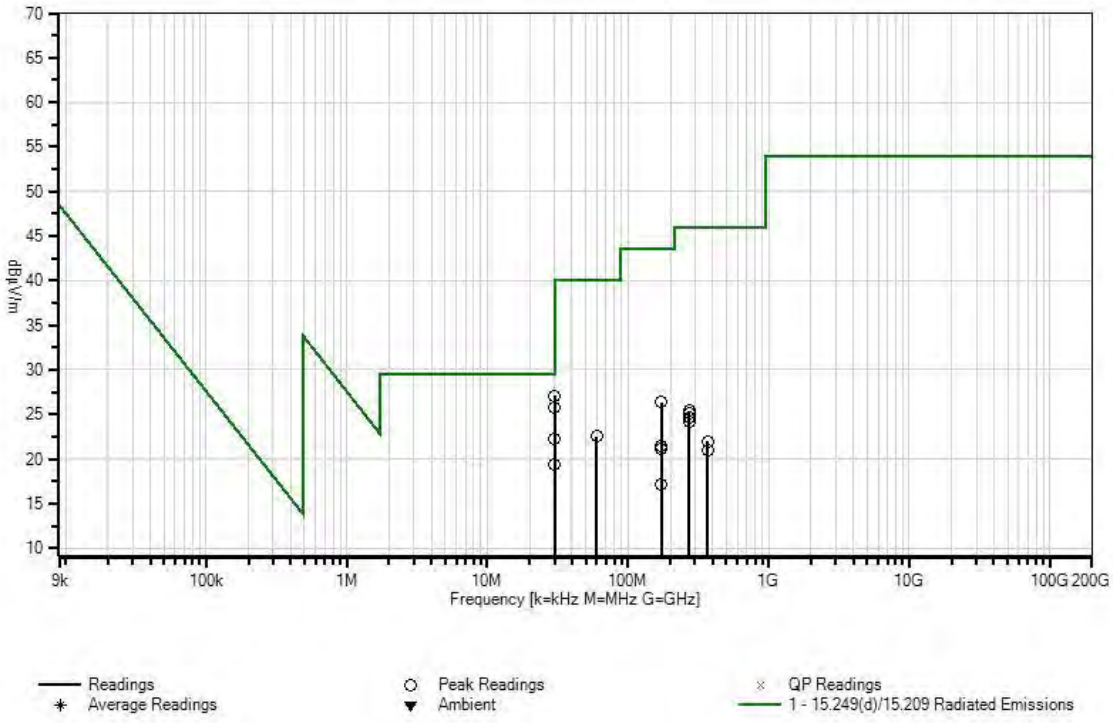
Site A

Ext Attn: 0 dB

***Measurement Data:*** Reading listed by margin. Test Distance: 3 Meters

| # | Freq MHz | Rdng dBµV | T1 dB | T2 dB | T3 dB | T4 dB | Dist Table | Corr dBµV/m | Spec dBµV/m | Margin dB | Polar Ant |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 30.050M | 35.8 | -28.2 | +18.6 | +0.0 | +0.9 | +0.0 | 27.1 | 40.0 | -12.9 | Vert |
| 2 | 30.001M | 34.4 | -28.2 | +18.6 | +0.0 | +0.9 | +0.0 | 25.7 | 40.0 | -14.3 | Vert |
| 3 | 172.261M | 42.5 | -28.0 | +9.4 | +0.2 | +2.3 | +0.0 | 26.4 | 43.5 | -17.1 | Vert |
| 4 | 60.092M | 43.5 | -28.2 | +5.8 | +0.1 | +1.3 | +0.0 | 22.5 | 40.0 | -17.5 | Vert |
| 5 | 30.006M | 31.0 | -28.2 | +18.6 | +0.0 | +0.9 | +0.0 | 22.3 | 40.0 | -17.7 | Horiz |
| 6 | 30.000M | 28.1 | -28.2 | +18.6 | +0.0 | +0.9 | +0.0 | 19.4 | 40.0 | -20.6 | Vert |
| 7 | 270.733M | 37.1 | -28.0 | +13.0 | +0.3 | +3.0 | +0.0 | 25.4 | 46.0 | -20.6 | Horiz |
| 8 | 270.583M | 36.9 | -28.0 | +13.0 | +0.3 | +3.0 | +0.0 | 25.2 | 46.0 | -20.8 | Vert |
| 9 | 270.721M | 36.4 | -28.0 | +13.0 | +0.3 | +3.0 | +0.0 | 24.7 | 46.0 | -21.3 | Vert |
| 10 | 270.755M | 35.8 | -28.0 | +13.0 | +0.3 | +3.0 | +0.0 | 24.1 | 46.0 | -21.9 | Vert |
| 11 | 172.296M | 37.5 | -28.0 | +9.4 | +0.2 | +2.3 | +0.0 | 21.4 | 43.5 | -22.1 | Horiz |
| 12 | 172.300M | 37.2 | -28.0 | +9.4 | +0.2 | +2.3 | +0.0 | 21.1 | 43.5 | -22.4 | Vert |
| 13 | 369.127M | 30.5 | -27.9 | +15.6 | +0.3 | +3.5 | +0.0 | 22.0 | 46.0 | -24.0 | Vert |
| 14 | 369.219M | 29.4 | -27.9 | +15.6 | +0.3 | +3.5 | +0.0 | 20.9 | 46.0 | -25.1 | Vert |
| 15 | 172.222M | 33.3 | -28.0 | +9.4 | +0.2 | +2.3 | +0.0 | 17.2 | 43.5 | -26.3 | Vert |

CKC Laboratories, Inc. Date: 11/18/2014 Time: 14:41:03 RJE Technologies, Inc. WO#: 96218
15.249(d)/15.209 Radiated Emissions Test Distance: 3 Meters Sequence#: 3 Ext ATTN: 0 dB



# Band Edge

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714 993-6112

Customer: **RJE Technologies, Inc.**
Specification: **Band Edge Compliance**
Work Order #: **96218** Date: 11/18/2014
Test Type: **Maximized Emissions**
Equipment: **Pool safety alarm** Sequence#: 1
Manufacturer: RJE Technologies, Inc. Tested By: S. Yamamoto
Model: Safety Turtle
S/N: NA

***Test Equipment*:**

| ID | Asset # | Description | Model | Calibration Date | Cal Due Date |
|---|---|---|---|---|---|
| T1 | AN02672 | Spectrum Analyzer | E4446A | 8/14/2013 | 8/14/2015 |
| T2 | ANP05198 | Cable-Amplitude 15 to 45degC (dB) | 8268 | 12/11/2012 | 12/11/2014 |
| T3 | AN01995 | Biconilog Antenna | CBL6111C | 4/30/2014 | 4/30/2016 |

***Equipment Under Test* (* = EUT):**

| Function | Manufacturer | Model # | S/N |
|---|---|---|---|
| Pool safety alarm* | RJE Technologies, Inc. | Safety Turtle | NA |

***Support Devices:***

| Function | Manufacturer | Model # | S/N |
|---|---|---|---|
| DC Power Supply | Xantrex | XTS30-2X | 58738 |

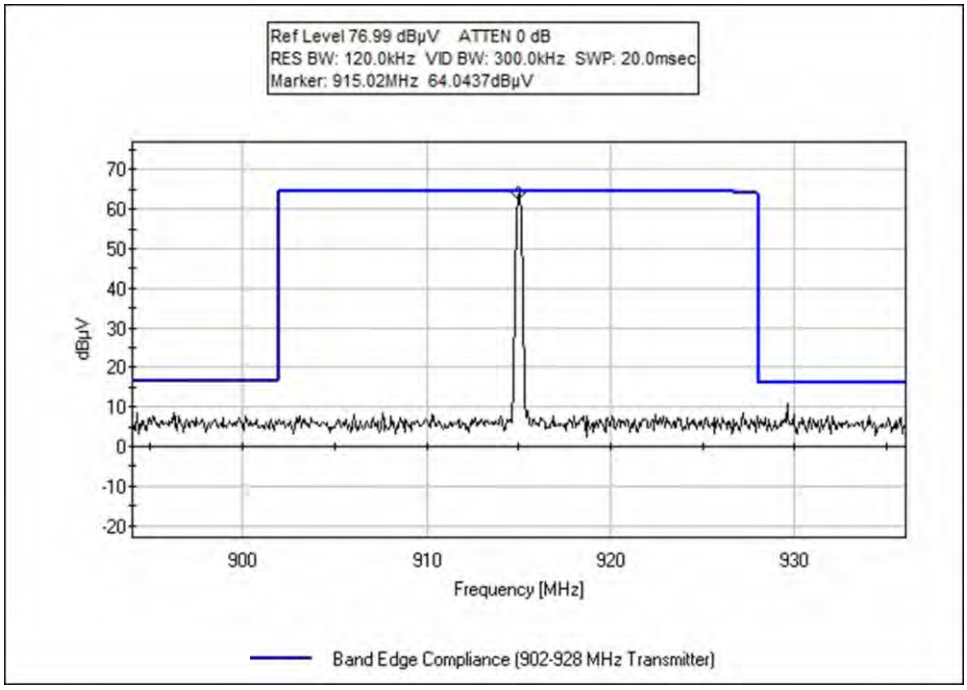
***Test Conditions / Notes:***

The EUT is a standalone on the Styrofoam table top.
The EUT is powered from an external DC power supplying output 3.0VDC.
The EUT transmits solely on a single channel 915 MHz.
The relay is wired closed so the EUT is in a continuous transmitting mode.

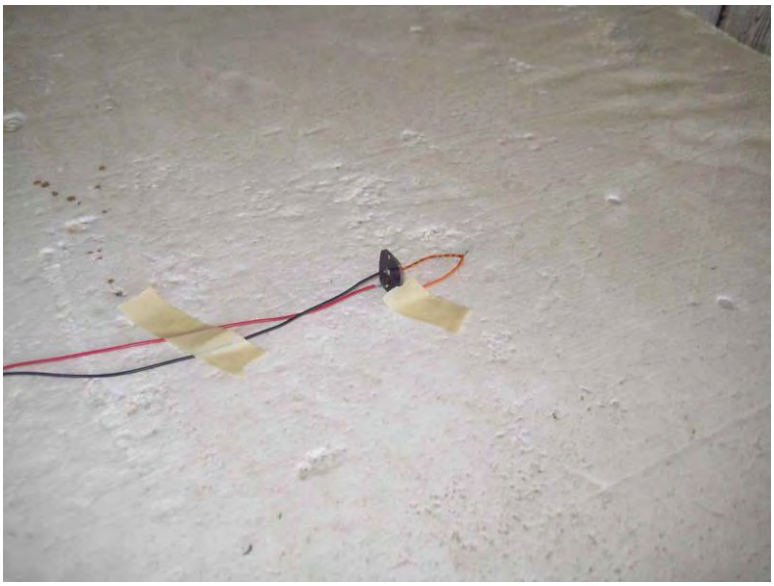
Temperature: 23°C
Relative Humidity: 30%
Pressure: 100kPa

Site A

## Test Data




## Test Setup Photo



# SUPPLEMENTAL INFORMATION

## Measurement Uncertainty

| Uncertainty Value | Parameter |
|---|---|
| 4.73 dB | Radiated Emissions |
| 3.34 dB | Mains Conducted Emissions |
| 3.30 dB | Disturbance Power |

The reported measurement uncertainties are calculated based on the worst case of all laboratory environments from CKC Laboratories, Inc. test sites. Only those parameters which require estimation of measurement uncertainty are reported. The reported worst case measurement uncertainty is less than the maximum values derived in CISPR 16-4-2. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k=2. Compliance is deemed to occur provided measurements are below the specified limits.

## Emissions Test Details

**TESTING PARAMETERS**

Unless otherwise indicated, the following configuration parameters are used for equipment setup: The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

**CORRECTION FACTORS**

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dBµV/m, the spectrum analyzer reading in dBµV was corrected by using the following formula. This reading was then compared to the applicable specification limit.

| SAMPLE CALCULATIONS | | |
|---|---|---|
| | Meter reading | (dBµV) |
| + | Antenna Factor | (dB) |
| + | Cable Loss | (dB) |
| - | Distance Correction | (dB) |
| - | Preamplifier Gain | (dB) |
| = | Corrected Reading | (dBµV/m) |

**TEST INSTRUMENTATION AND ANALYZER SETTINGS**

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. Unless otherwise specified, the following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

| MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE | | | |
|---|---|---|---|
| TEST | BEGINNING FREQUENCY | ENDING FREQUENCY | BANDWIDTH SETTING |
| CONDUCTED EMISSIONS | 150 kHz | 30 MHz | 9 kHz |
| RADIATED EMISSIONS | 9 kHz | 150 kHz | 200 Hz |
| RADIATED EMISSIONS | 150 kHz | 30 MHz | 9 kHz |
| RADIATED EMISSIONS | 30 MHz | 1000 MHz | 120 kHz |
| RADIATED EMISSIONS | 1000 MHz | >1 GHz | 1 MHz |

**SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS**

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "positive peak" detector mode. Whenever a "quasi-peak" or "average" reading was recorded, the measurement was annotated with a "QP" or an "Ave" on the appropriate rows of the data sheets. In cases where quasi-peak or average limits were employed and data exists for multiple measurement types for the same frequency then the peak measurement was retained in the report for reference, however the numbering for the affected row was removed and an arrow or carrot ("^") was placed in the far left-hand column indicating that the row above takes precedence for comparison to the limit. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

**Peak**

In this mode, the spectrum analyzer or receiver recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature called "peak hold," the measurement device had the ability to measure intermittent or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

**Quasi-Peak**

Quasi-peak measurements were taken using the quasi-peak detector when the true peak values exceeded or were within 2 dB of a quasi-peak specification limit. Additional QP measurements may have been taken at the discretion of the operator.

**Average**

Average measurements were taken using the average detector when the true peak values exceeded or were within 2 dB of an average specification limit. Additional average measurements may have been taken at the discretion of the operator. If the specification or test procedure requires trace averaging, then the averaging was performed using 100 samples or as required by the specification. All other average measurements are performed using video bandwidth averaging. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point the measuring device is set into the linear mode and the scan time is reduced.