# Exhibit L: Spurious Radiated Emissions

# FCC ID: CGGAA2

# Harmonics and Spurious Radiated Emissions



## Justification

The individuals and/or the organization requesting the test provided the modes, configurations and settings available to evaluate. While scanning the radiated emissions, all of the EUT parameters listed below were investigated. This includes, but may not be limited to, antennas, tuned transmit frequency ranges, operating modes, and data rates.

| **Channels in Specified Band Investigated:** |
|---|
| Single |

| **Operating Modes Investigated:** |
|---|
| Typical |

| **Antennas Investigated:** |
|---|
| Single |

| **Data Rates Investigated:** |
|---|
| Typical |

| **Output Power Setting(s) Investigated:** |
|---|
| N/A |

| **Power Input Settings Investigated:** |
|---|
| 12VDC from alarm panel |

| **Other Settings Investigated:** |
|---|
| RCR-A (35ft range) |
| RCR-50 (50ft range, no change in output power – just a change pulse width) |

| **Frequency Range Investigated** | | | |
|---|---|---|---|
| Start Frequency | 30 MHz | Stop Frequency | 40 GHz |

| **Software\Firmware Applied During Test** | | | |
|---|---|---|---|
| Exercise software | Standard Production Software | Version | RCR Build 8 |
| Description | | | |
| Firmware | | | |

# Harmonics and Spurious Radiated Emissions



## Equipment Modifications

No EMI suppression devices were added or modified. The EUT was tested as delivered.

## EUT and Peripherals

| Description | Manufacturer | Model/Part Number | Serial Number |
|---|---|---|---|
| EUT #2 | Interlogix Inc. | RCR-50 | n/a |
| EUT #1 | Interlogix Inc. | RCR-A | n/a |
| DC Power Supply | Topward | TPS-2000 | 946425 |

## Cables

| Cable Type | Shield | Length (m) | Ferrite | Connection 1 | Connection 2 |
|---|---|---|---|---|---|
| DC Power | No | 2.0 | No | EUT | Power Supply |

**PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.**

## Measurement Equipment

| Description | Manufacturer | Model | Identifier | Last Cal | Interval |
|---|---|---|---|---|---|
| Spectrum Analyzer | Tektronix | 2784 | AAO | 03/08/2001 | 24 mo |
| Pre-Amplifier | Miteq | JSD4-18002600-26-8P | APU | 01/17/2000 | 36 mo |
| Antenna, Horn | EMCO | 3160-09 | AHG | 01/15/2000 | 36 mo |
| Antenna, Horn | EMCO | 3160-10 | AHI | 01/15/2000 | 36 mo |
| Pre-Amplifier | Miteq | JS4-26004000-40-SP | APV | 06/26/2000 | 36 mo |
| Pre-Amplifier | Miteq | AMF-4D-005180-24-10P | APC | 11/26/2001 | 12 mo |
| Pre-Amplifier | Amplifier Research | LN1000A | APS | 12/03/2001 | 12 mo |
| Antenna, Horn | EMCO | 3115 | AHC | 08/24/2001 | 12 mo |
| Antenna, Biconilog | EMCO | 3141 | AXE | 12/31/2001 | 12 mo |
| Spectrum Analyzer | Hewlett-Packard | 8566B | AAL | 03/19/2002 | 12 mo |
| Quasi-Peak Adapter | Hewlett-Packard | 85650A | AQF | 03/19/2002 | 12 mo |

## Test Description

**Requirement:** The field strength of harmonics and spurious radiated emissions shall meet the limits as defined in 47 CFR 15.249; which for this transmitter are equal to the limits of 15.209. If average emission measurements are employed, the provisions in 15.35 for averaging pulsed emissions and for limiting peak emissions apply.

# Harmonics and Spurious Radiated Emissions



**Configuration**: The EUT was configured for continous modulated operation at its single transmit frequency. The spectrum was scanned from 30 MHz to 40 GHz. While scanning, emissions from the EUT were maximized by rotating the EUT, adjusting the measurement antenna height and polarization, and manipulating the EUT in 3 orthogonal planes (per ANSI C63.4:1992).

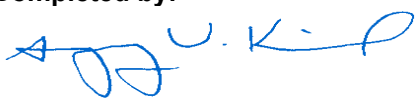
To derive average emission measurements, a pulse desensitization factor of -20 dB was utilized. This is the same factor that was used for the original application. The theoretical basis is explained in Hewlett Packard Application Note 150-2, "Spectrum Analysis…Pulsed RF". Since no changes have been made to duty cycle of the pulse modulation used in this device, the -20 dB factor still applies.

The pulse desensitization factor of -20 dB was added to the peak readings to mathematically derive the average levels. Above 1 GHz, peak measurements were made with a resolution bandwidth of 1 MHz and a video bandwidth of 1 MHz. Below 1 GHz, peak measurements were made with a resolution bandwidth of 120 kHz and a video bandwidth of 300 kHz.

## Bandwidths Used for Measurements

| Frequency Range (MHz) | Peak Data (kHz) | Quasi-Peak Data (kHz) | Average Data (kHz) |
|---|---|---|---|
| 0.01 – 0.15 | 1.0 | 0.2 | 0.2 |
| 0.15 – 30.0 | 10.0 | 9.0 | 9.0 |
| 30.0 – 1000 | 100.0 | 120.0 | 120.0 |
| Above 1000 | 1000.0 | N/A | 1000.0 |
| ***Measurements were made using the bandwidths and detectors specified. No video filter was used.*** | | | |

**Completed by:**



NORTHWEST
**EMC**

# OATS DATA SHEET

REV
df1.87
03/21/2002

| | | | | | |
|---|---|---|---|---|---|
| **EUT:** | RCR-A | | | **Work Order:** | ILGX0247 |
| **Serial Number:** | n/a | | | **Date:** | 4/19/02 11:47 |
| **Customer:** | Interlogix Inc. | | | **Temperature:** | |
| **Attendees:** | Fred Eggers, Feng Tang | **Tested by:** | | **Humidity:** | 0% |
| **Cust. Ref. No.:** | 274 | **Power:** | 12 Vdc | **Job Site:** | |

**TEST SPECIFICATIONS**

| | | | |
|---|---|---|---|
| **Specification:** | FCC 15.249 | **Year:** | 2001 |
| **Method:** | ANSI C63.4 | **Year:** | 2000 |

**SAMPLE CALCULATIONS**

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

**COMMENTS**

**EUT OPERATING MODES**

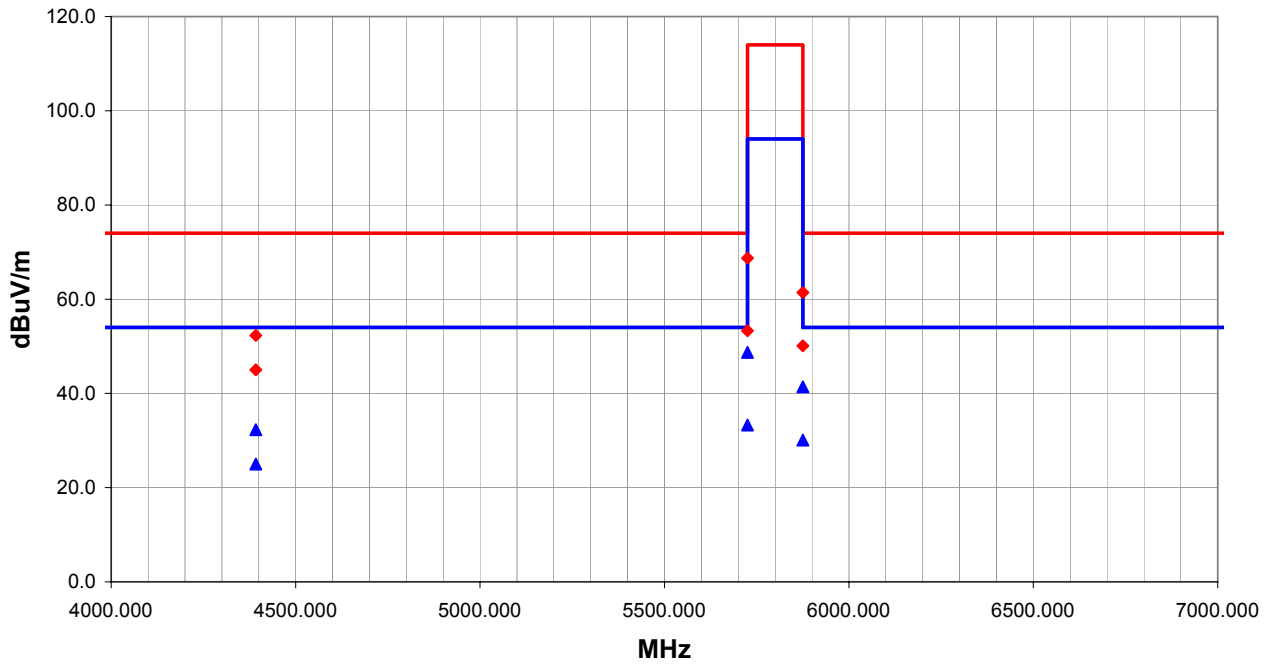
**DEVIATIONS FROM TEST STANDARD**

No deviations.

| RESULTS | Test Distance (m) | Run # |
|---|---|---|
| Pass | 3 | 2 |

**Other**

Tested By:




| Freq (MHz) | Amplitude (dBuV) | Factor (dB) | Azimuth (degrees) | Height (meters) | Pulse Desensitization Factor | External Attenuation (dB) | Polarity | Detector | Distance Adjustment (dB) | Adjusted dBuV/m | Spec. Limit dBuV/m | Compared to Spec. (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5725.000 | 61.6 | 7.1 | 13.0 | 1.3 | 20.0 | 0.0 | V-Horn | AV | 0.0 | 48.7 | 54.0 | -5.3 |
| 5875.000 | 54.3 | 7.1 | 0.0 | 1.3 | 20.0 | 0.0 | V-Horn | AV | 0.0 | 41.4 | 54.0 | -12.6 |
| 5725.000 | 46.2 | 7.1 | 76.0 | 1.3 | 20.0 | 0.0 | H-Horn | AV | 0.0 | 33.3 | 54.0 | -20.7 |
| 4392.000 | 47.6 | 4.7 | 29.0 | 1.1 | 20.0 | 0.0 | V-Horn | AV | 0.0 | 32.3 | 54.0 | -21.7 |
| 5875.000 | 43.0 | 7.1 | 19.0 | 1.2 | 20.0 | 0.0 | H-Horn | AV | 0.0 | 30.1 | 54.0 | -23.9 |
| 4392.000 | 40.3 | 4.7 | 297.0 | 1.2 | 20.0 | 0.0 | H-Horn | AV | 0.0 | 25.0 | 54.0 | -29.0 |
| 5725.000 | 61.6 | 7.1 | 13.0 | 1.3 | 0.0 | 0.0 | V-Horn | PK | 0.0 | 68.7 | 74.0 | -5.3 |
| 5875.000 | 54.3 | 7.1 | 0.0 | 1.3 | 0.0 | 0.0 | V-Horn | PK | 0.0 | 61.4 | 74.0 | -12.6 |
| 5725.000 | 46.2 | 7.1 | 76.0 | 1.3 | 0.0 | 0.0 | H-Horn | PK | 0.0 | 53.3 | 74.0 | -20.7 |
| 4392.000 | 47.6 | 4.7 | 29.0 | 1.1 | 0.0 | 0.0 | V-Horn | PK | 0.0 | 52.3 | 74.0 | -21.7 |
| 5875.000 | 43.0 | 7.1 | 19.0 | 1.2 | 0.0 | 0.0 | H-Horn | PK | 0.0 | 50.1 | 74.0 | -23.9 |
| 4392.000 | 40.3 | 4.7 | 297.0 | 1.2 | 0.0 | 0.0 | H-Horn | PK | 0.0 | 45.0 | 74.0 | -29.0 |

NORTHWEST
**EMC**

# OATS DATA SHEET

REV
df1.87
03/21/2002

| | | | | | |
|---|---|---|---|---|---|
| **EUT:** | RCR-A | | | **Work Order:** | ILGX0247 |
| **Serial Number:** | n/a | | | **Date:** | 4/19/02 14:51 |
| **Customer:** | Interlogix Inc. | | | **Temperature:** | 72 |
| **Attendees:** | Fred Eggers, Feng Tang | **Tested by:** | Greg Kiemel | **Humidity:** | 0% |
| **Cust. Ref. No.:** | 274 | **Power:** | 12 Vdc | **Job Site:** | EV01 |

**TEST SPECIFICATIONS**

| | | | |
|---|---|---|---|
| **Specification:** | FCC Part 15 Class B | **Year:** | 2000 |
| **Method:** | ANSI C63.4 | **Year:** | 1992 |

**SAMPLE CALCULATIONS**

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

**COMMENTS**

**EUT OPERATING MODES**

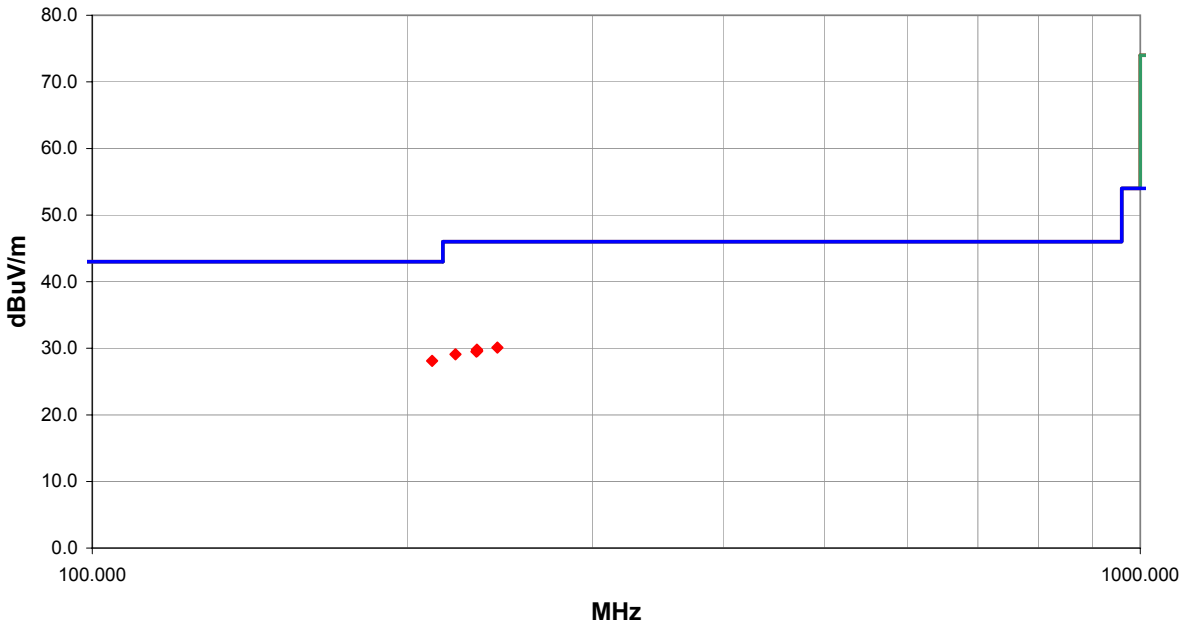
**DEVIATIONS FROM TEST STANDARD**

No deviations.

| RESULTS | Test Distance (m) | Run # |
|---|---|---|
| Pass | 3 | 5 |

**Other**

Tested By:




| Freq (MHz) | Amplitude (dBuV) | Factor (dB) | Azimuth (degrees) | Height (meters) | Distance (meters) | External Attenuation (dB) | Polarity | Detector | Distance Adjustment (dB) | Adjusted dBuV/m | Spec. Limit dBuV/m | Compared to Spec. (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 211.017 | 45.6 | -17.5 | 158.0 | 2.0 | 3.0 | 0.0 | H-Bilog | PK | 0.0 | 28.1 | 43.0 | -14.9 |
| 243.545 | 46.5 | -16.4 | 135.0 | 1.3 | 3.0 | 0.0 | H-Bilog | PK | 0.0 | 30.1 | 46.0 | -15.9 |
| 232.795 | 46.4 | -16.6 | 133.0 | 1.3 | 3.0 | 0.0 | H-Bilog | PK | 0.0 | 29.8 | 46.0 | -16.2 |
| 233.010 | 46.2 | -16.6 | 138.0 | 1.3 | 3.0 | 0.0 | H-Bilog | PK | 0.0 | 29.6 | 46.0 | -16.4 |
| 232.580 | 46.1 | -16.6 | 127.0 | 1.3 | 3.0 | 0.0 | H-Bilog | PK | 0.0 | 29.5 | 46.0 | -16.5 |
| 222.087 | 46.0 | -16.9 | 133.0 | 2.0 | 3.0 | 0.0 | H-Bilog | PK | 0.0 | 29.1 | 46.0 | -16.9 |

NORTHWEST
**EMC**

# OATS DATA SHEET

REV
df1.87
03/21/2002

| | | | | | |
|---|---|---|---|---|---|
| **EUT:** | RCR-50 | | | **Work Order:** | ILGX0247 |
| **Serial Number:** | n/a | | | **Date:** | 4/19/02 9:27 |
| **Customer:** | Interlogix Inc. | | | **Temperature:** | 72 |
| **Attendees:** | Fred Eggers, Feng Tang | **Tested by:** | Greg Kiemel | **Humidity:** | 35% |
| **Cust. Ref. No.:** | 274 | **Power:** | 12 Vdc | **Job Site:** | EV01 |

**TEST SPECIFICATIONS**

| | | | |
|---|---|---|---|
| **Specification:** | FCC Part 15 Class B | **Year:** | 2000 |
| **Method:** | ANSI C63.4 | **Year:** | 1992 |

**SAMPLE CALCULATIONS**

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

**COMMENTS**

**EUT OPERATING MODES**

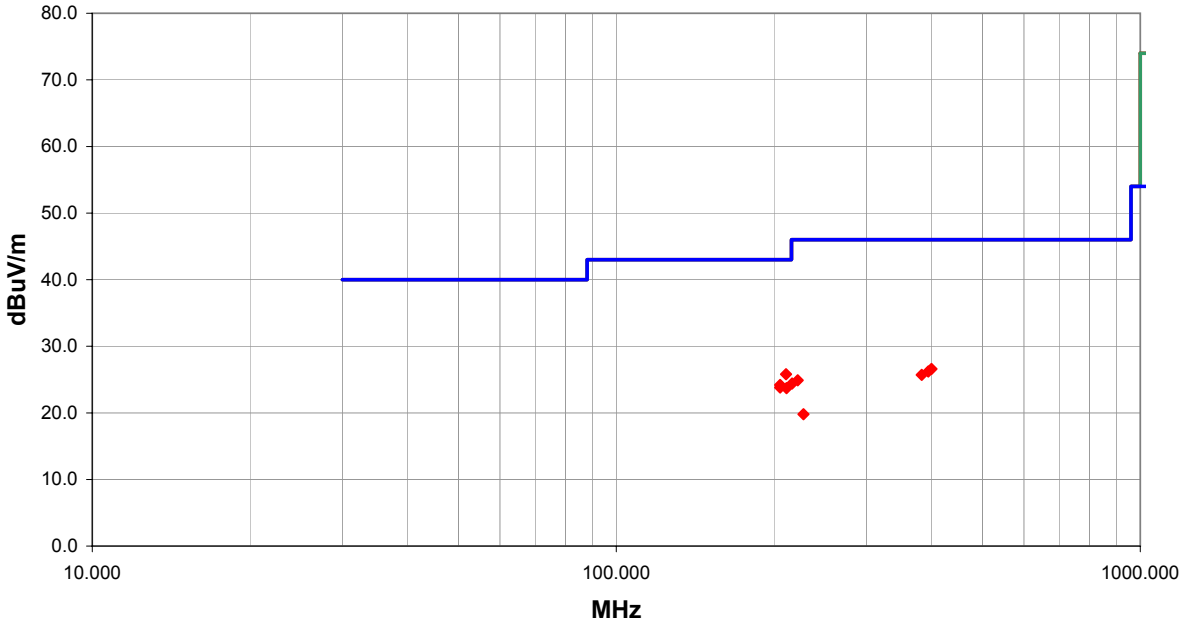
**DEVIATIONS FROM TEST STANDARD**

No deviations.

| RESULTS | Test Distance (m) | Run # |
|---|---|---|
| Pass | 3 | 1 |

**Other**

Tested By:




| Freq (MHz) | Amplitude (dBuV) | Factor (dB) | Azimuth (degrees) | Height (meters) | Distance (meters) | External Attenuation (dB) | Polarity | Detector | Distance Adjustment (dB) | Adjusted dBuV/m | Spec. Limit dBuV/m | Compared to Spec. (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 210.812 | 43.3 | -17.5 | 60.0 | 1.0 | 3.0 | 0.0 | V-Bilog | PK | 0.0 | 25.8 | 43.0 | -17.2 |
| 205.482 | 41.9 | -17.7 | 360.0 | 1.0 | 3.0 | 0.0 | V-Bilog | PK | 0.0 | 24.2 | 43.0 | -18.8 |
| 205.482 | 41.5 | -17.7 | 223.0 | 2.0 | 3.0 | 0.0 | H-Bilog | PK | 0.0 | 23.8 | 43.0 | -19.2 |
| 211.222 | 41.2 | -17.5 | 215.0 | 2.0 | 3.0 | 0.0 | H-Bilog | PK | 0.0 | 23.7 | 43.0 | -19.3 |
| 399.417 | 38.6 | -12.0 | 96.0 | 1.4 | 3.0 | 0.0 | V-Bilog | PK | 0.0 | 26.6 | 46.0 | -19.4 |
| 393.827 | 38.3 | -12.1 | 101.0 | 1.2 | 3.0 | 0.0 | V-Bilog | PK | 0.0 | 26.2 | 46.0 | -19.8 |
| 382.647 | 37.9 | -12.2 | 92.0 | 1.7 | 3.0 | 0.0 | V-Bilog | PK | 0.0 | 25.7 | 46.0 | -20.3 |
| 221.882 | 41.8 | -16.9 | 311.0 | 1.0 | 3.0 | 0.0 | V-Bilog | PK | 0.0 | 24.9 | 46.0 | -21.1 |
| 216.552 | 41.6 | -17.2 | 321.0 | 1.0 | 3.0 | 0.0 | V-Bilog | PK | 0.0 | 24.4 | 46.0 | -21.6 |
| 227.622 | 36.5 | -16.7 | 153.0 | 2.0 | 3.0 | 0.0 | V-Bilog | PK | 0.0 | 19.8 | 46.0 | -26.2 |

NORTHWEST EMC

# OATS DATA SHEET

REV df1.87 03/21/2002

| | | | | | |
|---|---|---|---|---|---|
| EUT: | RCR-50 | | | Work Order: | ILGX0247 |
| Serial Number: | n/a | | | Date: | 4/19/02 13:37 |
| Customer: | Interlogix Inc. | | | Temperature: | 72 |
| Attendees: | Fred Eggers, Feng Tang | Tested by: | Greg Kiemel | Humidity: | 35% |
| Cust. Ref. No.: | 274 | Power: | 12 Vdc | Job Site: | EV01 |

**TEST SPECIFICATIONS**

| | | | |
|---|---|---|---|
| Specification: | FCC 15.249 | Year: | 2001 |
| Method: | ANSI C63.4 | Year: | 2000 |

**SAMPLE CALCULATIONS**

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

**COMMENTS**

**EUT OPERATING MODES**

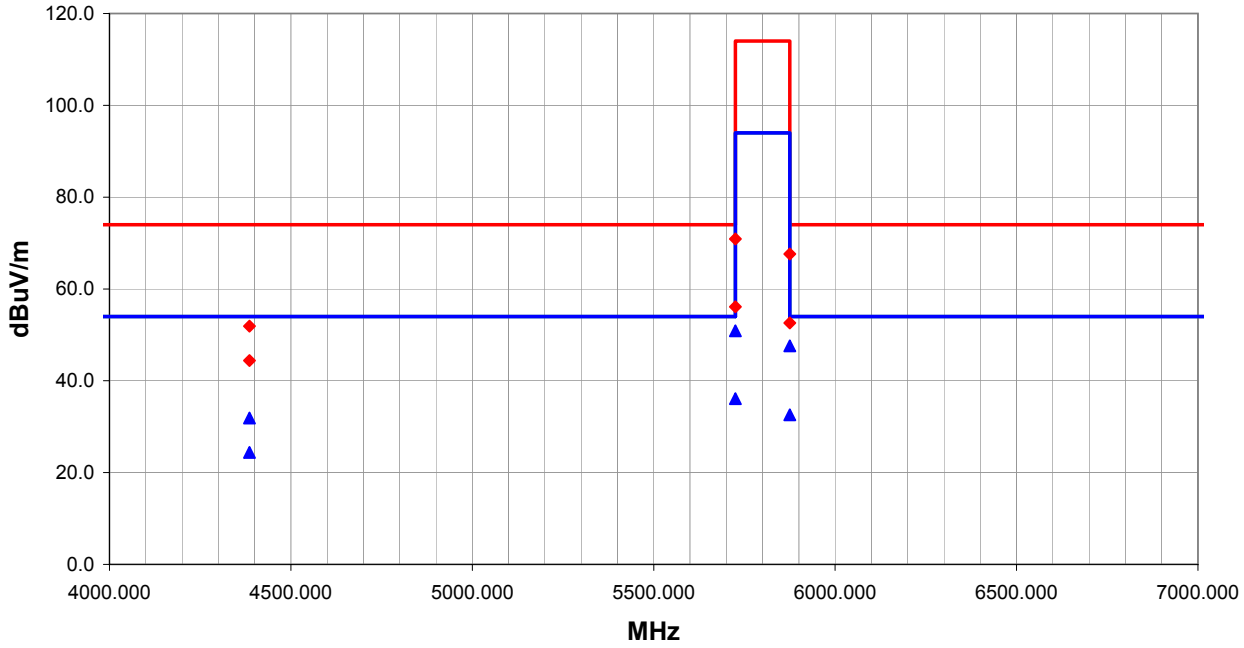
**DEVIATIONS FROM TEST STANDARD**

No deviations.

| RESULTS | Test Distance (m) | Run # |
|---|---|---|
| Pass | 3 | 3 |

Other

Tested By:




| Freq (MHz) | Amplitude (dBuV) | Factor (dB) | Azimuth (degrees) | Height (meters) | Pulse Desensitization Factor | External Attenuation (dB) | Polarity | Detector | Distance Adjustment (dB) | Adjusted dBuV/m | Spec. Limit dBuV/m | Compared to Spec. (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5725.000 | 63.8 | 7.1 | 25.0 | 1.4 | 20.0 | 0.0 | V-Horn | AV | 0.0 | 50.9 | 54.0 | -3.1 |
| 5875.000 | 60.5 | 7.1 | 36.0 | 1.1 | 20.0 | 0.0 | V-Horn | AV | 0.0 | 47.6 | 54.0 | -6.4 |
| 5725.000 | 49.0 | 7.1 | 63.0 | 1.6 | 20.0 | 0.0 | H-Horn | AV | 0.0 | 36.1 | 54.0 | -17.9 |
| 5875.000 | 45.5 | 7.1 | 67.0 | 1.3 | 20.0 | 0.0 | H-Horn | AV | 0.0 | 32.6 | 54.0 | -21.4 |
| 4386.000 | 47.2 | 4.7 | 30.0 | 1.3 | 20.0 | 0.0 | V-Horn | AV | 0.0 | 31.9 | 54.0 | -22.1 |
| 4386.000 | 39.7 | 4.7 | 326.0 | 1.6 | 20.0 | 0.0 | H-Horn | AV | 0.0 | 24.4 | 54.0 | -29.6 |
| 5725.000 | 63.8 | 7.1 | 25.0 | 1.4 | 0.0 | 0.0 | V-Horn | PK | 0.0 | 70.9 | 74.0 | -3.1 |
| 5875.000 | 60.5 | 7.1 | 36.0 | 1.1 | 0.0 | 0.0 | V-Horn | PK | 0.0 | 67.6 | 74.0 | -6.4 |
| 5725.000 | 49.0 | 7.1 | 63.0 | 1.6 | 0.0 | 0.0 | H-Horn | PK | 0.0 | 56.1 | 74.0 | -17.9 |
| 5875.000 | 45.5 | 7.1 | 67.0 | 1.3 | 0.0 | 0.0 | H-Horn | PK | 0.0 | 52.6 | 74.0 | -21.4 |
| 4386.000 | 47.2 | 4.7 | 30.0 | 1.3 | 0.0 | 0.0 | V-Horn | PK | 0.0 | 51.9 | 74.0 | -22.1 |
| 4386.000 | 39.7 | 4.7 | 326.0 | 1.6 | 0.0 | 0.0 | H-Horn | PK | 0.0 | 44.4 | 74.0 | -29.6 |