1601 North A.W. Grimes Blvd., Suite B
Round Rock, TX 78665
e-mail: info@ptitest.com
(512) 244-3371 Fax: (512) 244-1846

October 19, 2011

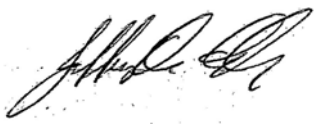
Gary DeWitt
Traxxas, LLP
1100 Klein Road
Plano, TX 75074

Dear Gary:

Enclosed is the Wireless Test Report for the Traxxas, LLP Vehicle Transceiver. This report can be used to demonstrate compliance with FCC requirements for wireless devices in the United States.

If you have any questions, please contact me.

Sincerely,



Jeffrey A. Lenk
President

Enclosure

Project 12769-10

# Traxxas, LLP
# Vehicle Transceiver

# Wireless Certification Report

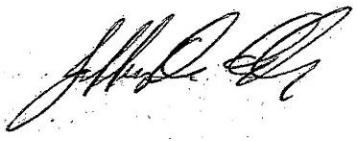
Prepared for:
Traxxas, LLP
1100 Klein Road
Plano, TX 75074

By

Professional Testing (EMI), Inc.
1601 N. A.W. Grimes Blvd., Suite B
Round Rock, Texas 78665

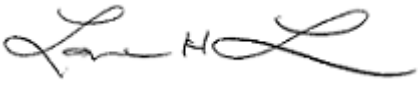
October 19, 2011
Revised November 2, 2011

Reviewed by



Jeffrey A. Lenk
President

Written by



Layne Lueckemeyer
Product Development Engineer

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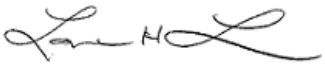
| | |
|---|---|
| Applicant: | Traxxas, LLP |
| Applicant's Address: | 1100 Klein Road<br>Plano, TX 75074 |
| FCC ID: | XVE-SA10046 |
| Project Number: | 12769-10 |
| Test Dates: | July 14 – 18, 2011 |

The **Traxxas Vehicle Transceiver** was tested to and found to be in compliance with FCC 47 CFR Part 15.

The highest emissions generated by the above equipment are listed below:

| Parameter | Frequency (MHz) | Level | Limit | Margin (dB) |
|---|---|---|---|---|
| Transmitter: Output Power @ 1 m | 2406 | 3.64 dBm Conducted | 30 dBm | -26.36 |
| Transmitter: Radiated Spurious | 841.6 | 30.1 dBµV/m @ 10 m | 35.6 dBµV/m | -5.5 |
| **Occupied Bandwidth** | | | | |
| **6 dB** | | **20 dB** | | |
| 960 kHz | | 1.55 MHz | | |

I, Layne Lueckemeyer, for Professional Testing (EMI), Inc., being familiar with the FCC rules and test procedures have reviewed the test setup, measured data, and this report. I believe them to be true and accurate.



Layne Lueckemeyer
Product Development Engineer

This report has been reviewed and accepted by Traxxas, LLP The undersigned is responsible for ensuring that this device will continue to comply with the FCC rules.

_____

Representative of Traxxas, LLP

# 1.0 Introduction

## 1.2 Scope

This report describes the extent of the equipment under test (EUT) conformance to the intentional radiator requirements of the United States.

Professional Testing (EMI), Inc. (PTI), follows the guidelines of NIST for all uncertainty calculations, estimates, and expressions thereof for EMC testing. The procedure of ANSI C63.4: 2009 were utilized for making all emissions measurements.

## 1.3 EUT Description

The Traxxas 2.4GHz transceiver is a single board system with an 8 bit micro controller used to control the Cypress CYRF6936/7936 radio module. The radio module has an integrated power amplifier (PA) that is firmware selectable from -35dbm to +4dbm in 8 steps. The radio operates in the unlicensed Worldwide Industrial, Scientific, and medical (ISM) band (2.400GHz to 2.438Ghz), in Direct Sequence Spread Spectrum (DSSS) mode.

The EUT was tested while in a continuous transmit mode. The EUT was tuned to a low, middle, and high channel to perform power, occupied bandwidth, and harmonic tests. The EUT was tuned to a middle channel to perform spurious tests. The EUT continuously transmitted at maximum power. The system tested consisted of the following:

| Manufacturer | Model | FCC ID Number |
|---|---|---|
| Traxxas, Inc. | Vehicle Transceiver | XVE-SA10046 |

The following rules apply to the operation of the EUT:

| Guidelines | FCC Rules Part 15 |
|---|---|
| Transmitter Characteristics | 15.247 |
| Spurious Radiated Power | 15.209 |
| Antenna Requirement | 15.203 |

## 1.4 Modifications

No modifications were made to the EUT during the performance of the test program.

## 1.5 Test Site

Measurements were made at the PTI semi-anechoic facility designated Site 45 (FCC 459644, IC 3036B-1) in Austin, Texas. This site is registered with the FCC under Section 2.948 and Industry Canada per RS-212, and is subsequently confirmed by laboratory accreditation (NVLAP). The test site is located at 11400 Burnet Road, Austin, Texas, 78758, while the main office is located at 1601 N. A.W. Grimes Blvd., Suite B, Round Rock, Texas, 78665.

## 1.6 Applicable Documents

| Document | Title | Release |
|---|---|---|
| ANSI C63.4 | American National Standard for Methods of Measurement of Radio-Noise Emissions from Low Voltage Electrical and Electronic Equipment | 2009 |
| ANSI C63.10 | American National Standard for Testing Unlicensed Wireless Devices | 2009 |
| 47 CFR | Part 15 – Radio Frequency Devices Subpart C -Intentional Radiators | |
| KDB Publication No. 718828 | Guidance on Measurements for Digital Transmission Systems (47 CFR 15.247) | 2011 |

## 1.7 Applicable Tests

| Test | Rule |
|---|---|
| Output Power | 15.247(b)(3) |
| Occupied Bandwidth | 15.247(a)(2) |
| Power Spectral Density | 15.247(e) |
| Radiated Emissions, Harmonic, Spurious, Fundamental, Band Edge | 15.205(a), 15.209(a), 15.247(d) |
| Antenna Requirements | 15.203 |

# 2.0 Output Power

Output power measurements were made on selected fundamental transmit frequencies of the EUT for the lowest, most center, and highest transmit frequency.

## 2.2 Test Procedure

The EUT was placed on a non-conductive table 0.8 meters above the ground plane. The table was centered on a motorized turntable, which allows 360-degree rotation. For measurements of the fundamental signal, the output antenna was connected directly to the input of a spectrum analyzer. When necessary, external attenuation was utilized. A spectrum analyzer with peak detection was used to find the maximum output power. The Measurement Procedure PK1 from KDB718828 was used to measure output power of the fundamental.

A diagram showing the test setup is given as Figure 2.1.1.

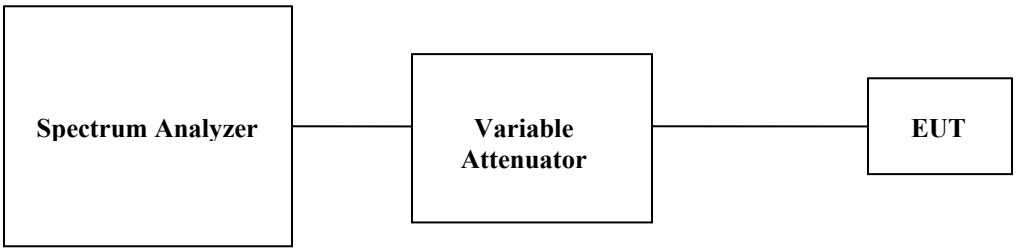



**Figure 2.1.1: Ouptut Power Test Setup**

## 2.3 Test Criteria

The maximum output power is 1 W for devices operating in the frequency range 2400 -2483.5 MHz according to FCC 15.247.

## 2.4 Test Results

Conducted measurements of the output power level for the EUT were taken on July 18, 2011, and the EUT was found to be in compliance with applicable requirements.

**Calculations:**
Cable Loss (dB) = 1.87
External Attenuation (dB) = 0
Antenna gain (dBi) = 0.5
Total = 2.37
E.I.R.P. calculated by adding Cable Loss + External Attenuation + Antenna gain to Measured Power

**Table 2.3.1: Output Power, Occupied Bandwidth, PSD Measurements Test Equipment**

| Professional Testing, EMI, Inc. | | | |
|---|---|---|---|
| **In accordance with:** | **FCC 47 CFR 15 Subpart C** | | |
| | **Section 15.247** | | |
| **Test Date(s):** | **7/15/2011** | **EUT Serial #:** | **N/A** |
| **Customer:** | **Traxxas** | **EUT Part #:** | **N/A** |
| **Project Number:** | **12769-10** | **Test Technician:** | **Layne Lueckemeyer** |
| **Purchase Order #:** | **GMD110707-1** | **Supervisor:** | **Larry Finn** |
| **Equip. Under Test:** | **Receiver Remote** | **Witness' Name:** | **Chris Russell** |

| Test Equipment List | | | | | Page: 1 of 1 |
|---|---|---|---|---|---|
| **Asset#** | **Manufacturer** | **Model** | **Equipment Nomenclature** | **Serial Number** | **Calibration Due Date** |
| C117 | Times Microwave | SLU18-SMSM-05.00F | Cable, RF, SMA-SMA, 60", Brown | none | 9/22/2011 |
| 856 | Narda | 702-60 | Attenuator, Step, 60dB, DC-12.4GHz | 4105 | CBU |
| ALN-077 | Rohde & Schwarz | FSP30 | Spectrum Analyzer | 100218 | 12/22/2012 |
| C046 | N/A | N/A | Cable Coax, SMA-N, 0.9m | none | CBU |

## Table 2.3.2: Output Power Test Results

| Professional Testing, EMI, Inc. | | | |
|---|---|---|---|
| In accordance with: | FCC 47 CFR 15 Subpart C | | |
| | Section 15.247 | | |
| Test Date(s): | 7/15/2011 | EUT Serial #: | N/A |
| Customer: | Traxxas | EUT Part #: | N/A |
| Project Number: | 12769-10 | Test Technician: | Layne Lueckemeyer |
| Purchase Order #: | GMD110707-1 | Supervisor: | Larry Finn |
| Equip. Under Test: | Vehicle Transceiver | Witness' Name: | Chris Russell |

| Transmit Power Test Results Data Sheet | | | | Page: | 1 | of | 1 |
|---|---|---|---|---|---|---|---|
| EUT Line Voltage: | 6.1 | VDC | EUT Line Frequency: | N/A | | Hz | |

| EUT Mode of Operation: | Lowest Frequency 2407 MHz | | | |
|---|---|---|---|---|
| Test Conditions | Measured Power (dBm) | E.I.R.P. (dBm) | Limit (dBm) | Margin (dB) |
| Tnom +20 ºC | 1.27 | 3.64 | 30 | -26.36 |
| **EUT Mode of Operation:** | **Middle Frequency 2426 MHz** | | | |
| **Test Conditions** | **Measured Power (dBm)** | **E.I.R.P. (dBm)** | **E.I.R.P. Limit (dBm)** | **Margin (dB)** |
| Tnom +20 ºC | 0.84 | 3.21 | 30 | -26.79 |
| **EUT Mode of Operation:** | **Highest Frequency 2453 MHz** | | | |
| **Test Conditions** | **Measured Power (dBm)** | **E.I.R.P. (dBm)** | **E.I.R.P. Limit (dBm)** | **Margin (dB)** |
| Tnom +20 ºC | 0.83 | 3.20 | 30 | -26.80 |

# 3.0 Occupied Bandwidth

Occupied bandwidth measurements were performed on the EUT to determine compliance with FCC 15.247.

## 3.2 Test Procedure

The occupied bandwidth was measured with a spectrum analyzer connected to a double-ridged guide horn while the EUT was operating in continuous transmit mode at the appropriate center frequency. The analyzer center frequency was set to the EUT carrier frequency.

Display line and marker delta functions were used to measure the occupied bandwidth of the EUT. However, the 20 dB bandwidth is referenced to a peak power measurement taken at the entire bandwidth or more for RBW, then using 1% RBW for the 20 dB bandwidth.
A diagram showing the test setup is given as Figure 2.1.1.

## 3.3 Test Criteria

The minimum 6 dB occupied bandwidth for the EUT is 500 kHz as stated in 15.247(a)(2). The 20 dB bandwidth must be measured and reported for the FCC.

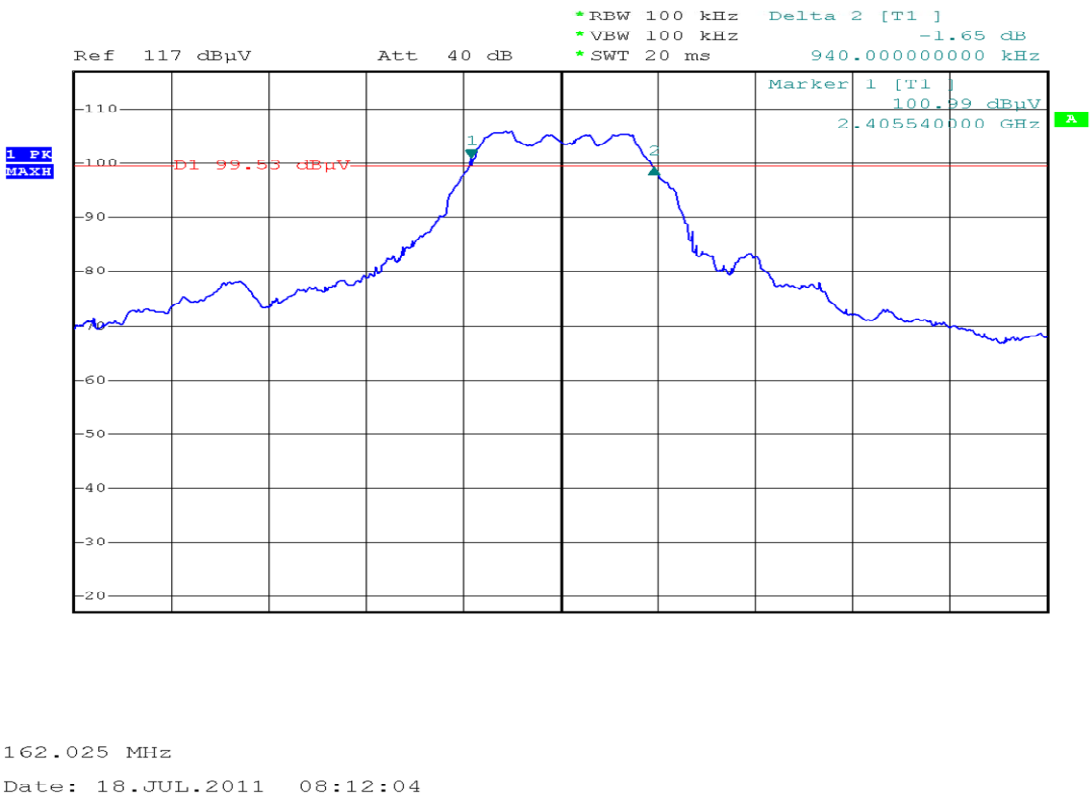
## 3.4 Test Results

Occupied bandwidth measurements were taken on July 18, 2011, and the EUT was found to be in compliance with applicable requirements. Test equipment used to perform this test is given in Tables 2.3.1.

**Table 3.3.1: Low Channel 6 dB Occupied Bandwidth Test Results**

| Professional Testing, EMI, Inc. | | | |
|---|---|---|---|
| **In accordance with:** | **FCC 47 CFR 15 Subpart C** | | |
| | **Section 15.247** | | |
| **Test Date(s):** | **7/18/2011** | **EUT Serial #:** | **n/a** |
| **Customer:** | **Traxxas** | **EUT Part #:** | **n/a** |
| **Project Number:** | **12769-10** | **Test Technician:** | **Layne Lueckemeyer** |
| **Purchase Order #:** | **GMD110707-1** | **Supervisor:** | **Jason Haley** |
| **Equip. Under Test:** | **Vehicle Tranceiver** | **Witness' Name:** | **Chris Russell** |

| Radiated Emissions Test Results Data Sheet - Horizontal Antenna Polarity > 1GHz | | | Page: | 1 | of | 1 |
|---|---|---|---|---|---|---|
| **EUT Line Voltage:** | **6** | **VDC** | **EUT Line Frequency:** | **N/A** | | **Hz** |
| **EUT Mode of Operation:** | | | **Transmit Low Channel** | | | |

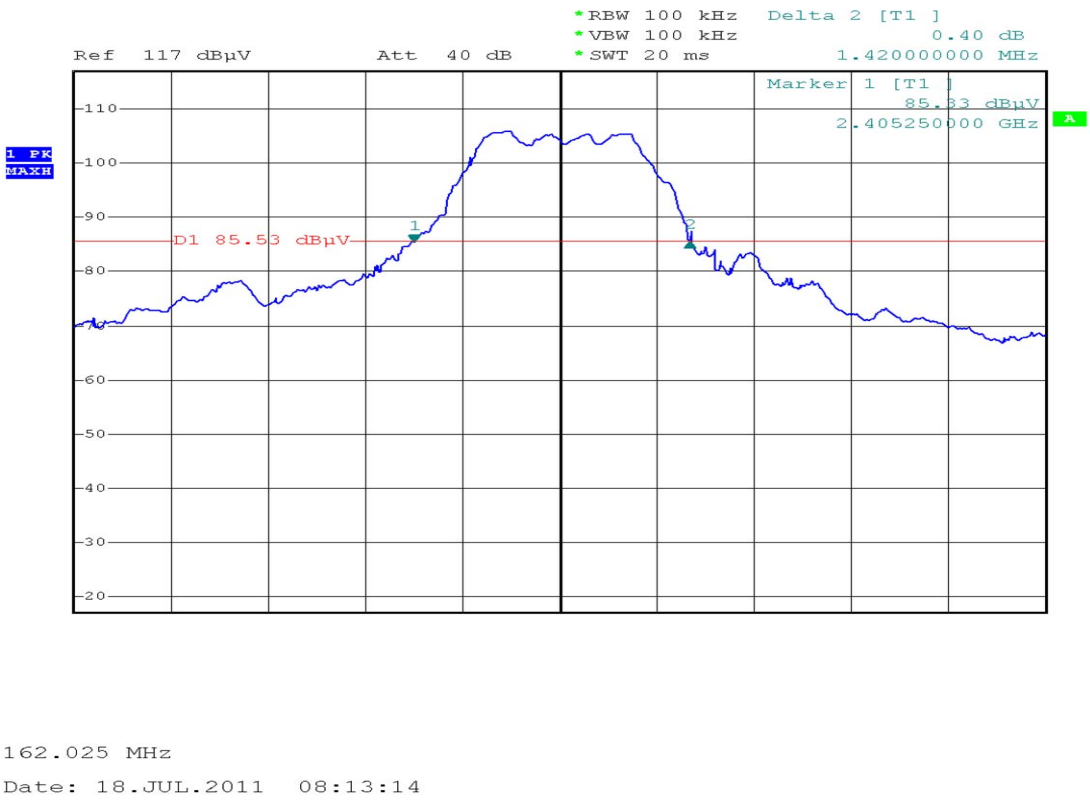



**6 dB Occupied Bandwidth**

**Table 3.3.2: Low Channel 20 dB Occupied Bandwidth Test Results**

| Professional Testing, EMI, Inc. | | | |
|---|---|---|---|
| **In accordance with:** | **FCC 47 CFR 15 Subpart C** | | |
| | **Section 15.247** | | |
| **Test Date(s):** | **7/18/2011** | **EUT Serial #:** | **n/a** |
| **Customer:** | **Traxxas** | **EUT Part #:** | **n/a** |
| **Project Number:** | **12769-10** | **Test Technician:** | **Layne Lueckemeyer** |
| **Purchase Order #:** | **GMD110707-1** | **Supervisor:** | **Jason Haley** |
| **Equip. Under Test:** | **Vehicle Tranceiver** | **Witness' Name:** | **Chris Russell** |

| Radiated Emissions Test Results Data Sheet - Horizontal Antenna Polarity > 1GHz | | | Page: | 1 | of | 1 |
|---|---|---|---|---|---|---|
| **EUT Line Voltage:** | **6** | **VDC** | **EUT Line Frequency:** | **N/A** | | **Hz** |
| **EUT Mode of Operation:** | | | **Transmit Low Channel** | | | |

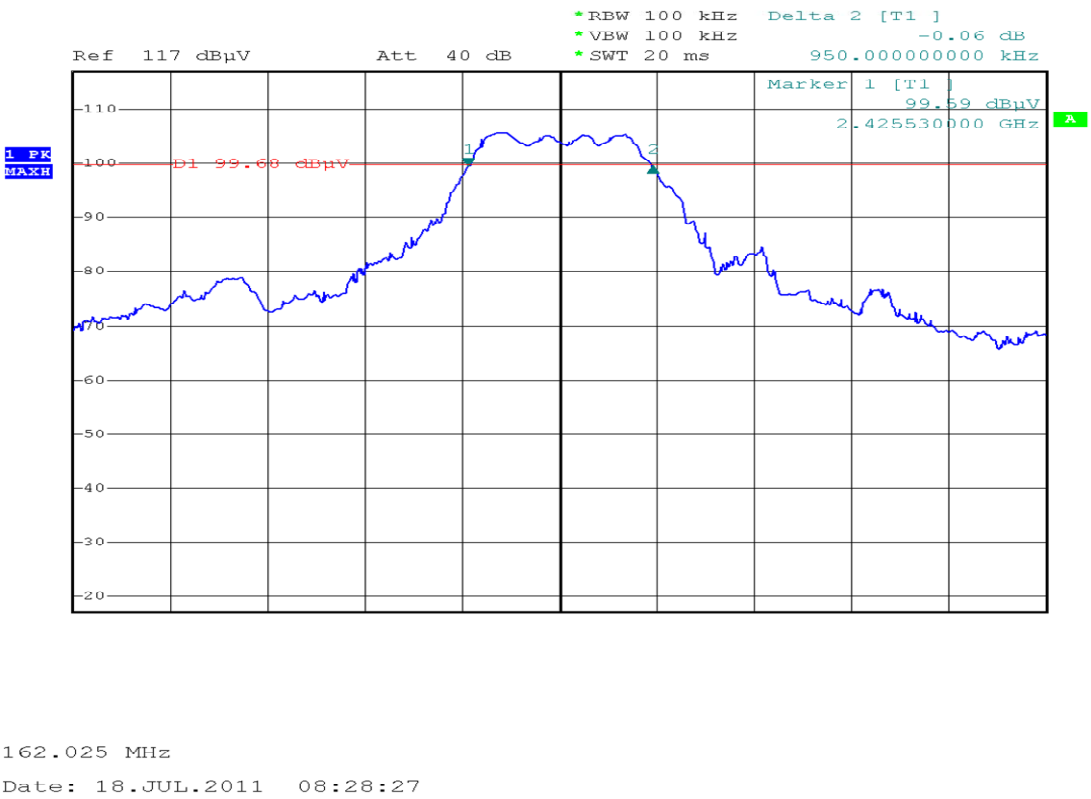



**20 dB Occupied Bandwidth**

**Table 3.3.3: Mid Channel 6 dB Occupied Bandwidth Test Results**

| Professional Testing, EMI, Inc. | | | |
|---|---|---|---|
| **In accordance with:** | **FCC 47 CFR 15 Subpart C** | | |
| | **Section 15.247** | | |
| **Test Date(s):** | **7/18/2011** | **EUT Serial #:** | **n/a** |
| **Customer:** | **Traxxas** | **EUT Part #:** | **n/a** |
| **Project Number:** | **12769-10** | **Test Technician:** | **Layne Lueckemeyer** |
| **Purchase Order #:** | **GMD110707-1** | **Supervisor:** | **Jason Haley** |
| **Equip. Under Test:** | **Vehicle Tranceiver** | **Witness' Name:** | **Chris Russell** |

| Radiated Emissions Test Results Data Sheet - Horizontal Antenna Polarity > 1GHz | | | Page: | 1 | of | 1 |
|---|---|---|---|---|---|---|
| **EUT Line Voltage:** | **6** | **VDC** | **EUT Line Frequency:** | **N/A** | | **Hz** |
| **EUT Mode of Operation:** | | | **Transmit Mid Channel** | | | |




**6 dB Occupied Bandwidth**

**Table 3.3.4: Mid Channel 20 dB Occupied Bandwidth Test Results**

| Professional Testing, EMI, Inc. | | | |
|---|---|---|---|
| **In accordance with:** | **FCC 47 CFR 15 Subpart C** | | |
| | **Section 15.247** | | |
| **Test Date(s):** | **7/18/2011** | **EUT Serial #:** | **n/a** |
| **Customer:** | **Traxxas** | **EUT Part #:** | **n/a** |
| **Project Number:** | **12769-10** | **Test Technician:** | **Layne Lueckemeyer** |
| **Purchase Order #:** | **GMD110707-1** | **Supervisor:** | **Jason Haley** |
| **Equip. Under Test:** | **Vehicle Tranceiver** | **Witness' Name:** | **Chris Russell** |

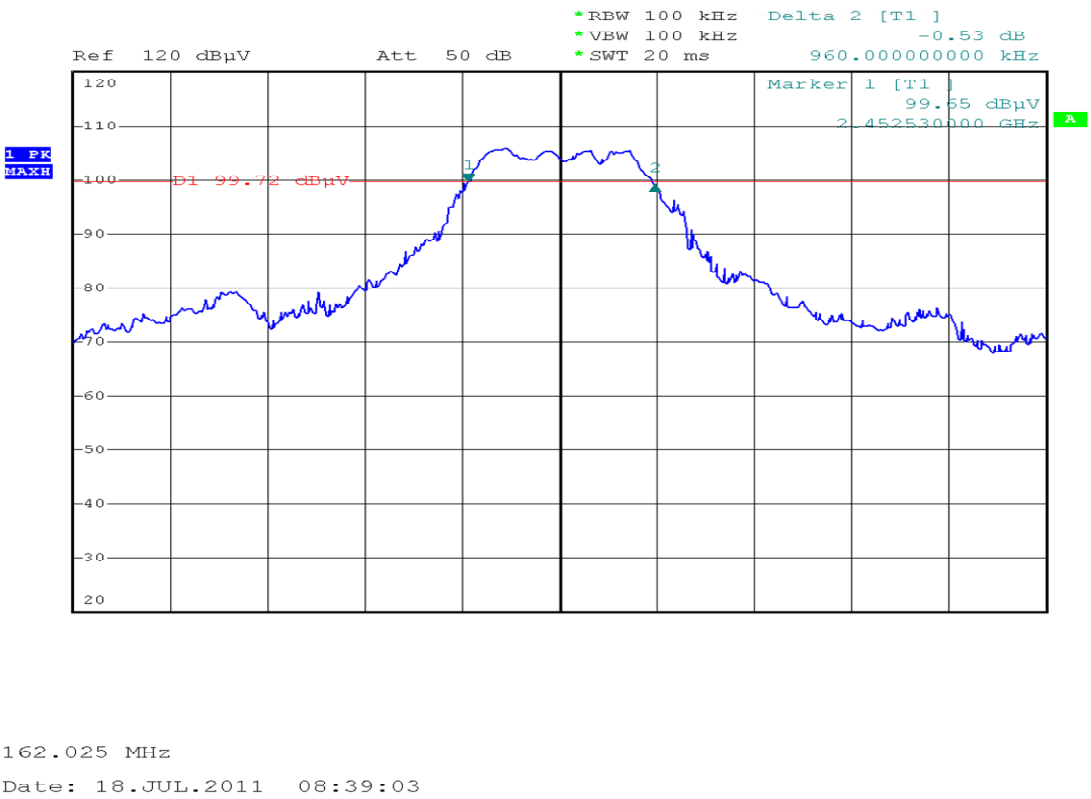
| Radiated Emissions Test Results Data Sheet - Horizontal Antenna Polarity > 1GHz | | | Page: | 1 | of | 1 |
|---|---|---|---|---|---|---|
| **EUT Line Voltage:** | **6** | **VDC** | **EUT Line Frequency:** | **N/A** | | **Hz** |
| **EUT Mode of Operation:** | | | **Transmit Mid Channel** | | | |


**20 dB Occupied Bandwidth**

**Table 3.3.5: High Channel 6 dB Occupied Bandwidth Test Results**

| Professional Testing, EMI, Inc. | | | |
|---|---|---|---|
| **In accordance with:** | **FCC 47 CFR 15 Subpart C** | | |
| | **Section 15.247** | | |
| **Test Date(s):** | **7/18/2011** | **EUT Serial #:** | **n/a** |
| **Customer:** | **Traxxas** | **EUT Part #:** | **n/a** |
| **Project Number:** | **12769-10** | **Test Technician:** | **Layne Lueckemeyer** |
| **Purchase Order #:** | **GMD110707-1** | **Supervisor:** | **Jason Haley** |
| **Equip. Under Test:** | **Vehicle Tranceiver** | **Witness' Name:** | **Chris Russell** |

| Radiated Emissions Test Results Data Sheet - Horizontal Antenna Polarity > 1GHz | | | Page: | 1 | of | 1 |
|---|---|---|---|---|---|---|
| **EUT Line Voltage:** | **6** | **VDC** | **EUT Line Frequency:** | **N/A** | | **Hz** |
| **EUT Mode of Operation:** | | | **Transmit High Channel** | | | |

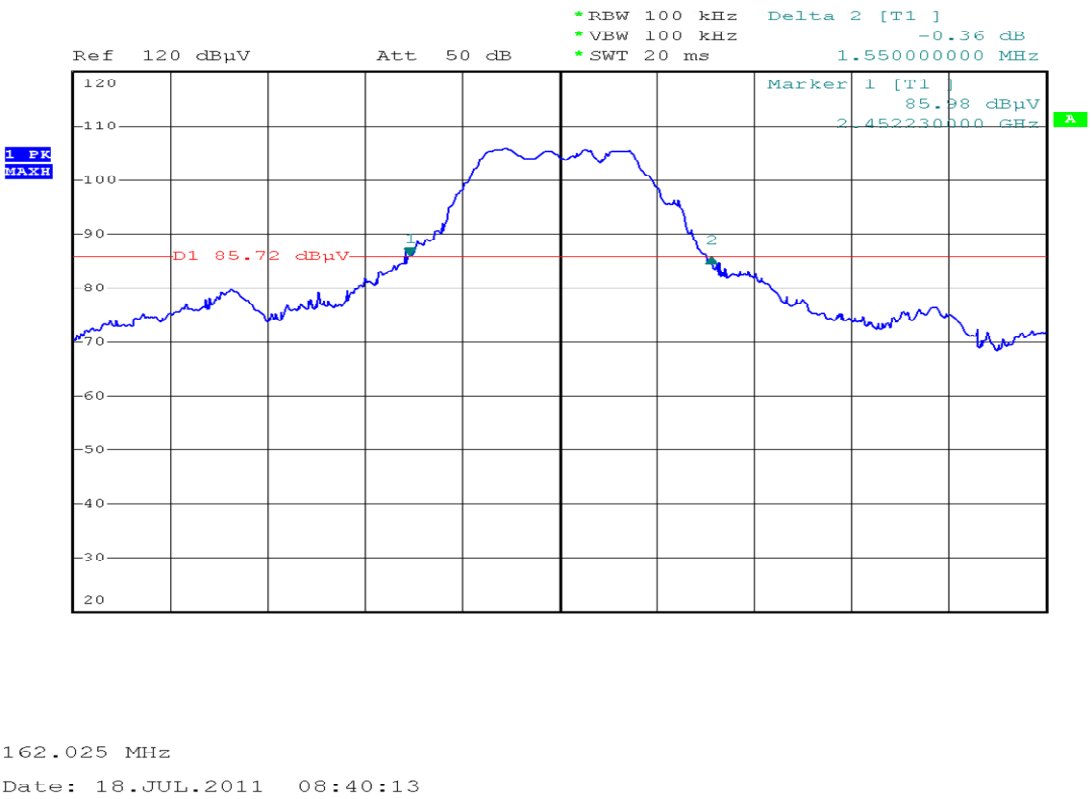



**6 dB Occupied Bandwidth**

**Table 3.3.6: High Channel 20 dB Occupied Bandwidth Test Results**

| Professional Testing, EMI, Inc. | | | |
|---|---|---|---|
| **In accordance with:** | **FCC 47 CFR 15 Subpart C** | | |
| | **Section 15.247** | | |
| **Test Date(s):** | **7/18/2011** | **EUT Serial #:** | **n/a** |
| **Customer:** | **Traxxas** | **EUT Part #:** | **n/a** |
| **Project Number:** | **12769-10** | **Test Technician:** | **Layne Lueckemeyer** |
| **Purchase Order #:** | **GMD110707-1** | **Supervisor:** | **Jason Haley** |
| **Equip. Under Test:** | **Vehicle Tranceiver** | **Witness' Name:** | **Chris Russell** |

| Radiated Emissions Test Results Data Sheet - Horizontal Antenna Polarity > 1GHz | | | Page: | 1 | of | 1 |
|---|---|---|---|---|---|---|
| **EUT Line Voltage:** | **6** | **VDC** | **EUT Line Frequency:** | **N/A** | | **Hz** |
| **EUT Mode of Operation:** | | | **Transmit High Channel** | | | |




**20 dB Occupied Bandwidth**

# 4.0 Power Spectral Density

Power spectral density measurements were performed on the EUT to determine compliance with FCC 15.247(e) and RSS-210.

## 4.2 Test Procedure

The fundamental emission of the EUT is maximized and the spectrum analyzer is tuned to the highest point as measured in max-hold with peak detection. The analyzer is then centered on the maximum peak and set with the following parameters: RBW = 3 kHz, VBW > RBW, span = 300 kHz, and sweep time = 100s. The peak level is obtained after the sweep completes. The Measurement Procedure PKPSD from KDB718828 was used to measure the PSD. A diagram showing the test setup is given as Figure 2.1.1.

## 4.3 Test Criteria and Methodology

According to section FCC 15.247(d) the maximum power spectral density is +8 dBm in any 3 kHz bandwidth.

The calculation for deriving power spectral density is as follows:

**Calculations:**
Cable Loss (dB) = 1.87
External Attenuation (dB) = 0
Antenna gain (dBi) = 0.5
Total = 2.37
E.I.R.P. calculated by adding Cable Loss + External Attenuation + Antenna gain to Measured Power

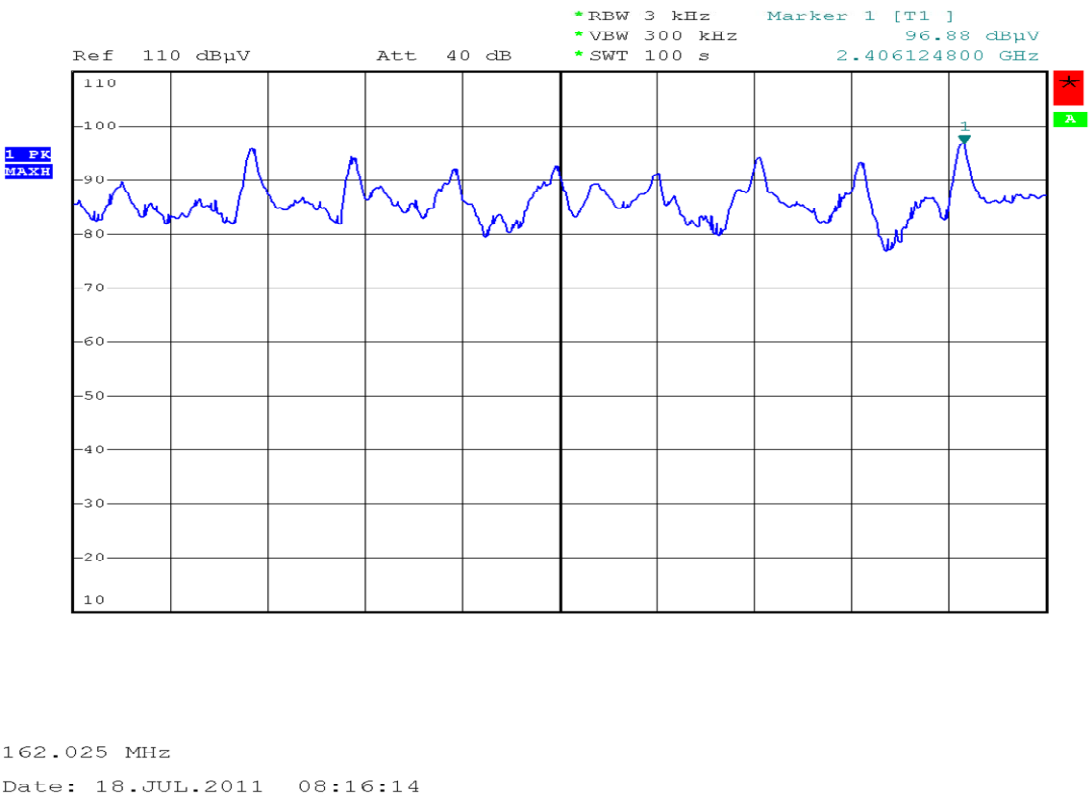
## 4.4 Test Results

Power spectral density measurements were taken on July 18, 2011, and the EUT was found to be in compliance with applicable requirements. Test equipment used to perform this test is given in Table 2.3.1.

**Table 4.3.1 Power Spectral Density – Low Channel - Test Results**

| Professional Testing, EMI, Inc. | | | |
|---|---|---|---|
| **In accordance with:** | **FCC 47 CFR 15 Subpart C** | | |
| | **Section 15.247** | | |
| **Test Date(s):** | **7/18/2011** | **EUT Serial #:** | **n/a** |
| **Customer:** | **Traxxas** | **EUT Part #:** | **n/a** |
| **Project Number:** | **12769-10** | **Test Technician:** | **Layne Lueckemeyer** |
| **Purchase Order #:** | **GMD110707-1** | **Supervisor:** | **Jason Haley** |
| **Equip. Under Test:** | **Vehicle Tranceiver** | **Witness' Name:** | **Chris Russell** |

| Radiated Emissions Test Results Data Sheet - Horizontal Antenna Polarity > 1GHz | | | Page: | 1 | of | 1 |
|---|---|---|---|---|---|---|
| **EUT Line Voltage:** | **6** | **VDC** | **EUT Line Frequency:** | **N/A** | | **Hz** |
| **EUT Mode of Operation:** | | | **Transmit Low Channel** | | | |



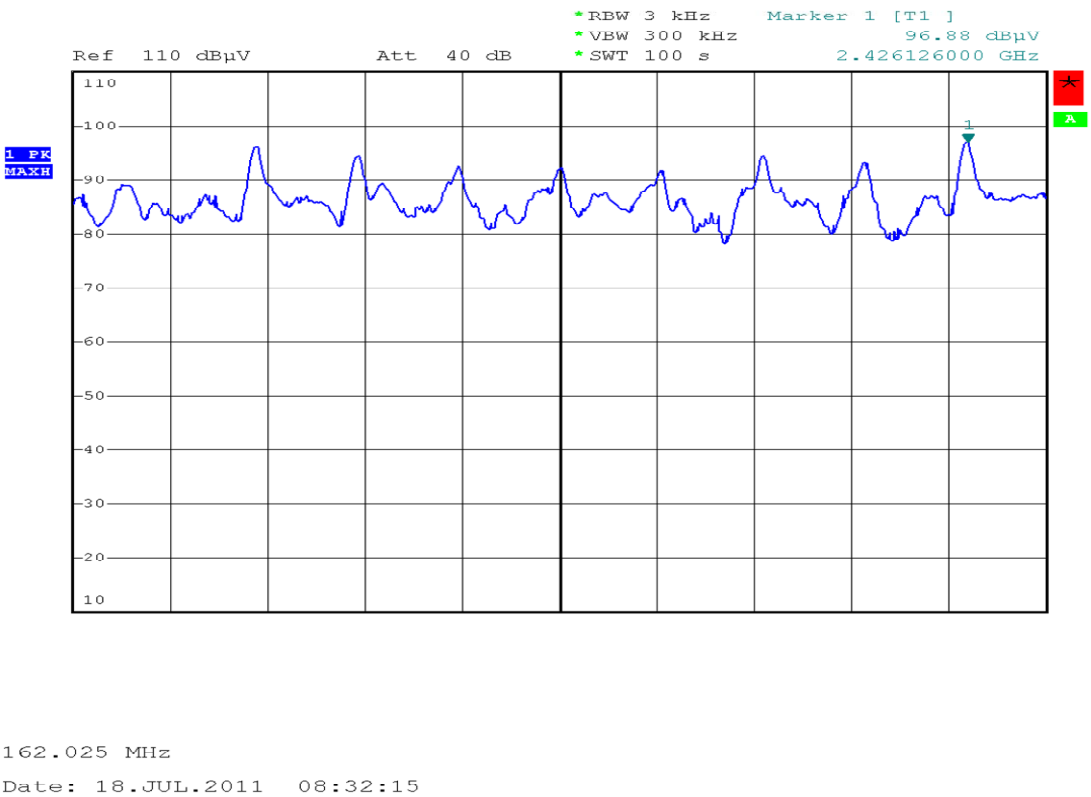

**PSD Low**

| Frequency (MHz) | E.I.R.P (dBm / 3 kHz) | Limit (dBm / 3 kHz) |
|---|---|---|
| 2406 | -7.7 | 8 |

**Table 4.3.2 Power Spectral Density – Mid Channel - Test Results**

| Professional Testing, EMI, Inc. | | | |
|---|---|---|---|
| **In accordance with:** | **FCC 47 CFR 15 Subpart C** | | |
| | **Section 15.247** | | |
| **Test Date(s):** | **7/18/2011** | **EUT Serial #:** | **n/a** |
| **Customer:** | **Traxxas** | **EUT Part #:** | **n/a** |
| **Project Number:** | **12769-10** | **Test Technician:** | **Layne Lueckemeyer** |
| **Purchase Order #:** | **GMD110707-1** | **Supervisor:** | **Jason Haley** |
| **Equip. Under Test:** | **Vehicle Tranceiver** | **Witness' Name:** | **Chris Russell** |

| Radiated Emissions Test Results Data Sheet - Horizontal Antenna Polarity > 1GHz | | | Page: | 1 | of | 1 |
|---|---|---|---|---|---|---|
| **EUT Line Voltage:** | **6** | **VDC** | **EUT Line Frequency:** | **N/A** | | **Hz** |
| **EUT Mode of Operation:** | | | **Transmit Mid Channel** | | | |



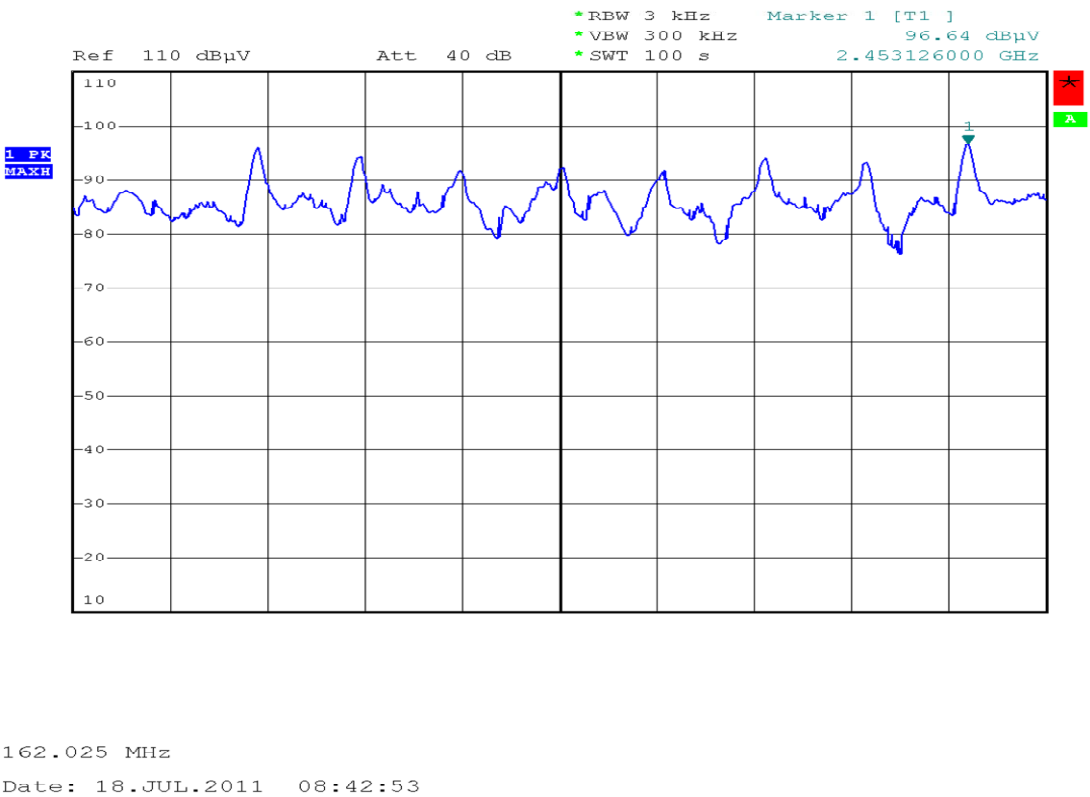

**PSD Mid**

| Frequency (MHz) | E.I.R.P (dBm / 3 kHz) | Limit (dBm / 3 kHz) |
|---|---|---|
| 2426 | -7.7 | 8 |

**Table 4.3.3 Power Spectral Density – High Channel - Test Results**

| Professional Testing, EMI, Inc. | | | |
|---|---|---|---|
| **In accordance with:** | **FCC 47 CFR 15 Subpart C** | | |
| | **Section 15.247** | | |
| **Test Date(s):** | **7/18/2011** | **EUT Serial #:** | **n/a** |
| **Customer:** | **Traxxas** | **EUT Part #:** | **n/a** |
| **Project Number:** | **12769-10** | **Test Technician:** | **Layne Lueckemeyer** |
| **Purchase Order #:** | **GMD110707-1** | **Supervisor:** | **Jason Haley** |
| **Equip. Under Test:** | **Vehicle Tranceiver** | **Witness' Name:** | **Chris Russell** |

| Radiated Emissions Test Results Data Sheet - Horizontal Antenna Polarity > 1GHz | | | Page: | 1 | of | 1 |
|---|---|---|---|---|---|---|
| **EUT Line Voltage:** | **6** | **VDC** | **EUT Line Frequency:** | **N/A** | | **Hz** |
| **EUT Mode of Operation:** | | | **Transmit High Channel** | | | |




**PSD High**

| Frequency (MHz) | E.I.R.P (dBm / 3 kHz) | Limit (dBm / 3 kHz) |
|---|---|---|
| 2453 | -8.0 | 8 |

# 5.0 Band Edge Spurious Emissions

Band edge spurious emissions measurements were performed on the EUT to determine compliance to FCC 15.247(d).

## 5.2 Test Procedure

The EUT was placed on a non-conductive table 0.8 meters above the ground plane. The table was centered on a motorized turntable, which allows 360-degree rotation. For measurements of the fundamental signal, a measurement antenna was positioned at a distance of 1 meter as measured from the closest point of the EUT. Rotating the EUT maximized the emissions.

The spectrum analyzer was set for peak detection using a 300 kHz resolution bandwidth. The span is set wide enough to show the band edge and the edge of the emission of the screen. Measurement is made at the band edge using the marker delta method while transmitting on the channels nearest the band edge to determine if the EUT meets the test criteria. A diagram showing the test setup is given as Figure 2.1.1.

## 5.3 Test Criteria

According to FCC 15.247(d) and RSS-210 the band edge spurious emissions must be 20 dB below the highest peak in the operating band in any 100 kHz bandwidth. If the frequency falls in the restricted bands of 15.205 the maximum permitted average must be below the field strength listed in 15.209.

Alternatively, the band edge spurious emissions will meet criteria if they are attenuated below the limits specified in FCC 15.209.

## 5.4 Test Results

Band edge spurious emissions measurements were taken on July 15, 2011, and the EUT was found to be in compliance with applicable requirements. Test equipment used to perform this test is given in Tables 2.3.1.

**Table 6.3.1 Band Edge Spurious Emissions Test Results Data Sheet**

| Professional Testing, EMI, Inc. | | | |
|---|---|---|---|
| In accordance with: | FCC 47 CFR 15 Subpart C | | |
| | Section 15.247 | | |
| Test Date(s): | 7/18/2011 | EUT Serial #: | n/a |
| Customer: | Traxxas | EUT Part #: | n/a |
| Project Number: | 12769-10 | Test Technician: | Layne Lueckemeyer |
| Purchase Order #: | GMD110707-1 | Supervisor: | Jason Haley |
| Equip. Under Test: | Vehicle Tranceiver | Witness' Name: | Chris Russell |

| Band Edge Spurious Emissions | | | | | |
|---|---|---|---|---|---|
| EUT Line Voltage: | 6 | VDC | EUT Line Frequency | n/a | Hz |
| EUT Mode of Operation: | | | Transmit | | |

| Frequency Measured (MHz) | Recorded Level (dB) | Limit (dB) down from fundamental | Margin (dB) | Detector Function | RBW / VBW |
|---|---|---|---|---|---|
| 2400 | -30.59 | -20 | -10.59 | Peak | 300 kHz / 300 kHz |
| 2483.5 | -37.58 | -20 | -17.58 | Peak | 300 kHz / 300 kHz |

**Table 6.3.2 Band Edge Spurious Emissions (Restricted Bands) Test Results Data Sheet**

| Professional Testing, EMI, Inc. | | | |
|---|---|---|---|
| In accordance with: | FCC 47 CFR 15 Subpart C | | |
| | Section 15.247 | | |
| Test Date(s): | 7/18/2011 | EUT Serial #: | n/a |
| Customer: | Traxxas | EUT Part #: | n/a |
| Project Number: | 12769-10 | Test Technician: | Layne Lueckemeyer |
| Purchase Order #: | GMD110707-1 | Supervisor: | Jason Haley |
| Equip. Under Test: | Vehicle Tranceiver | Witness' Name: | Chris Russell |

| Band Edge Spurious Emissions (Investigated Restricted Bands at 2390 and 2483.5 MHz) | | | | | |
|---|---|---|---|---|---|
| EUT Line Voltage: | 6 | VDC | EUT Line Frequency | n/a | Hz |
| EUT Mode of Operation: | | | Transmit | | |

| Frequency Measured (MHz) | Recorded Level (dBuV) | Amplifier Gain (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Corrected Level (dBµV/m) | Limit Level (dBµV/m) | Margin (dB) | Detector Function |
|---|---|---|---|---|---|---|---|---|
| 2390 | 45.6 | 26.4 | 28.1 | 2.8 | 50.1 | 83.5 | -33.4 | Peak Hold |
| 2390 | 35.7 | 26.4 | 28.1 | 2.8 | 40.2 | 63.5 | -23.3 | Average |
| 2483.5 | 44.9 | 24.4 | 29.0 | 2.8 | 52.3 | 83.5 | -31.2 | Peak Hold |
| 2483.5 | 35.9 | 24.4 | 29.0 | 2.8 | 43.3 | 63.5 | -20.2 | Average |

# 6.0 Out of Band Spurious Emissions

Out of band spurious/harmonic emissions measurements were performed on the EUT to determine compliance to FCC sections 15.247(d), 15.209.

## 6.2 Test Procedure

The EUT was placed on a non-conductive table 0.8 meters above the ground plane. The table was centered on a rotating turntable at a distance of 10 meters from the measurement antenna.

For spurious emissions below 1 GHz, quasi-peak detection was used with a resolution bandwidth of 120 kHz. All measurements below 1 GHz were normalized to 3 meters using a 20 dB/decade distance extrapolation. The emissions were maximized by rotating the EUT and raising and lowering the measurement antenna from 1 to 4 meters.

Spurious/harmonic emissions above 1 GHz peak were measured with average and peak detection with a resolution bandwidth of 1 MHz and measured at a distance of 1 meter. Average detection was used to determine compliance of the EUT if the peak did not meet the average limit. Non-harmonic emissions must satisfy the average limit and the peak limit (20 dB above average). Above 1 GHz, testing was completed at the transmit frequency to determine compliance. A diagram showing the test setup is given as Figure 6.1.1.

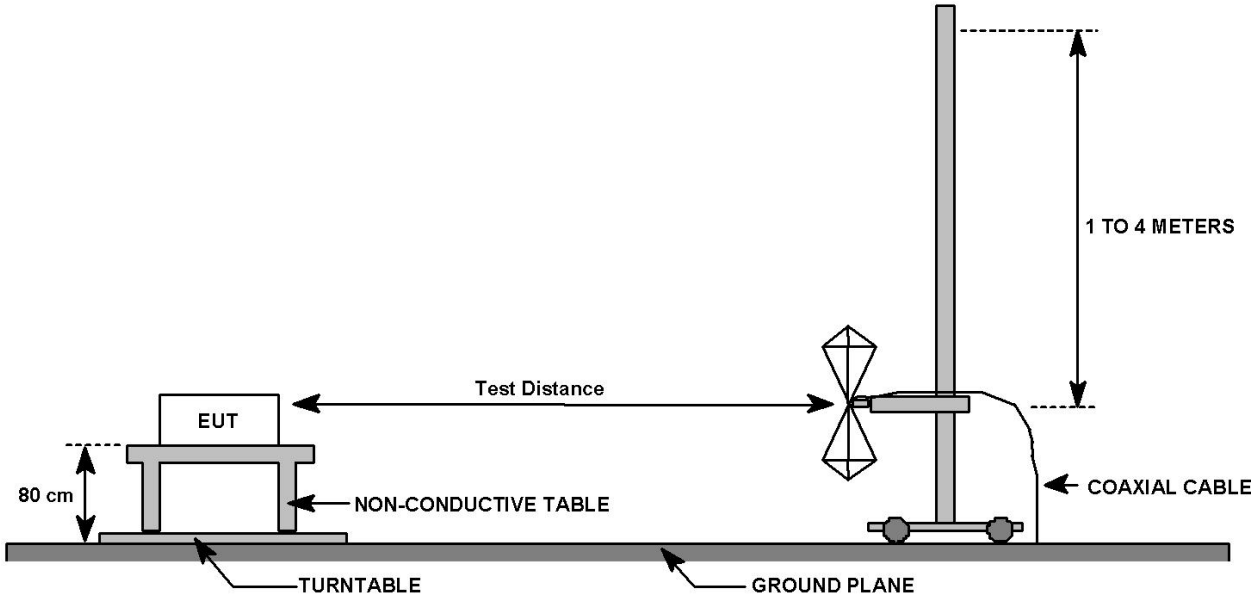



**Figure 6.1.1 Radiated Emissions Test Setup**

## 6.3 Test Criteria

The radiated limits of FCC 15.209 are shown below. The limits specified are at 3 meters. The limits are quasi-peak for emissions below 1 GHz and average for emissions above 1 GHz. Also above 1 GHz, the peak limit is 20 dB above the average limit.

| Frequency MHz | Specification Distance (Meters) | Field Strength (dBuV/m) | Test Distance (Meters) | Field Strength (dBuV/m) |
|---|---|---|---|---|
| 30 to 88 | 3 | 40.0 | 10 | 29.5 |
| 88 to 216 | 3 | 43.5 | 10 | 33 |
| 216 to 960 | 3 | 46.0 | 10 | 35.5 |
| Above 960 | 3 | 54.0 | 1 | 63.5 |

## 6.4 Test Results

Out of band spurious emissions measurements were taken on July 14, 2011, and the EUT was found to be in compliance with applicable requirements. Test equipment used to perform this test is given in Tables 6.3.1.

## Table 6.3.1 Out of Band Spurious Emissions Test Equipment

| Professional Testing, EMI, Inc. | | | |
|---|---|---|---|
| **Test Method:** | **ANSI C63.4–2003: "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" (incorporated by** | | |
| **In accordance with:** | **FCC Part 15.109 - Code of Federal Regulations Part 47, Subpart B - Unintentional Radiators, Radiated Emissions Limits** | | |
| **Section:** | **15.109** | | |
| **Test Date(s):** | **7/14/2011** | **EUT Serial #:** | **n/a** |
| **Customer:** | **Traxxas** | **EUT Part #:** | **n/a** |
| **Project Number:** | **12769-10** | **Test Technician:** | **Layne Lueckemeyer** |
| **Purchase Order #:** | **GMD110707-1** | **Supervisor:** | **Jason Haley** |
| **Equip. Under Test:** | **Vehicle Tranceiver** | **Witness' Name:** | **Chris Russell** |

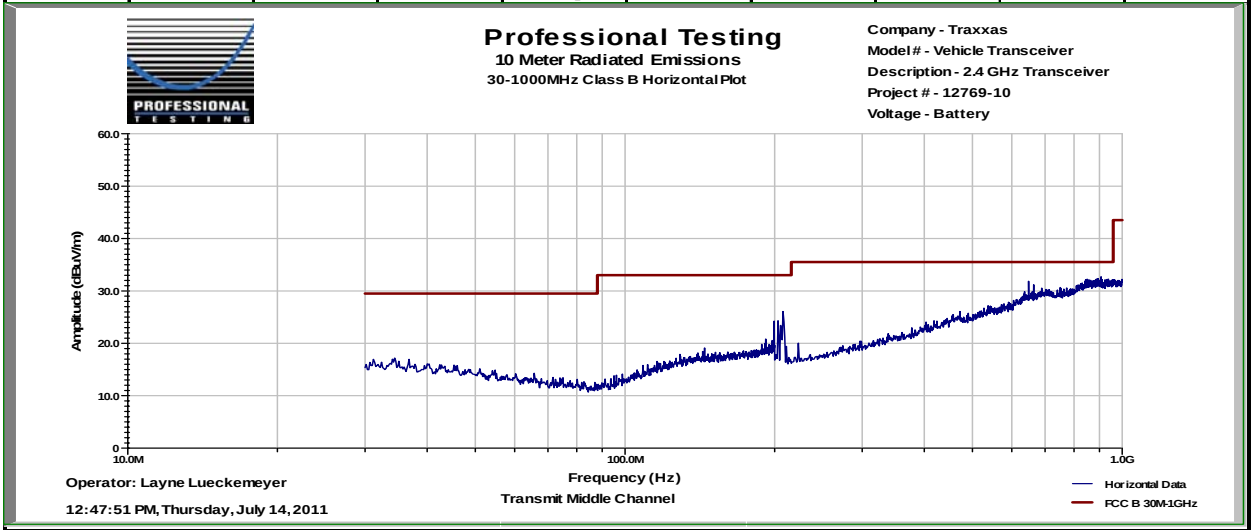
| Radiated Emissions Test Equipment List | | | | Page: | 1 of 1 |
|---|---|---|---|---|---|
| **Tile! Software Version:** | **3.4.K.11, June 7, 2006, 07:49:00 PM** | | | | |
| **Test Profile:** | **Radiated Emissions_updated_12-16-10.til** | | | | |
| **Asset#** | **Manufacturer** | **Model** | **Equipment Nomenclature** | **Serial Number** | **Calibration Due Date** |
| 1509A | Braden | N/A | TDK 10M Chamber, NSA < 1 GHz | DAC-012915-005 | 8/10/2011 |
| 1278 | HP | 85650A | Quasi Peak Adapter | 2811A01147 | 7/28/2011 |
| 1834 | HP | 85662A | Spec Anal Dsply | 2349A06182 | N/A |
| 1145 | HP | 8568B | Spectrum Analyzer 100Hz-1.5GHz | 2517A01821 | 7/28/2011 |
| 0238 | HP | 85685A | RF Preselector | 2887A00841 | 7/27/2011 |
| 1497 | EMCO | 3108 | Antenna, Bi Con, 30-300MHz | 2121 | 8/4/2011 |
| 0085 | HP | 85650A | Quasi-Peak Adapter CISPR | 3033A01458 | 7/28/2011 |
| 1526 | HP | 85662A | Spec Anal Dsply for AN 1525 | 2403A07220 | N/A |
| 1525 | HP | 8566B | Spectrum Analyzer 100Hz-22GHz | 2532A02126 | 6/7/2012 |
| 1035 | HP | 85685A | RF Preselector | 2901A00891 | 4/13/2012 |
| 1486 | EMCO | 3147 | Antenna, Log Periodic, .2-5GHz | 9112-1052 | 8/4/2011 |
| C026 | N/A | RG214 | Cable Coax, N-N, 25m | none | 8/10/2011 |
| C027 | N/A | RG214 | Cable Coax, N-N, 25m | none | 8/10/2011 |
| 1455 | HP | 8447D | Preamp | 2944A06787 | 5/8/2012 |
| 0586 | HP | 8447D | Preamp | 1726A011364 | 12/14/2011 |
| 1509B | Braden | N/A | TDK 10M Chamber, VSWR > 1 GHz | DAC-012915-005 | 4/7/2012 |
| 1594 | Miteq | AFS4-01001800 | Amplifier, 1-26.5GHz, 42dB | none | 1/28/2012 |
| 1529 | Miteq | AFS4-01001800 | Amplifier, 1-26.5GHz, 36dB | none | 7/16/2011 |
| C030 | N/A | 0 | Cable Coax, N-N, 30m | none | 3/21/2012 |
| 1780 | ETS-Lindgren | 3117 | Antenna, DRG Horn, 1 - 18 GHz | 1110313 | 1/14/2012 |
| 948 | EMCO | 3301B | Antenna, Rod, Active, 30Hz-50MHz | 29784 | 9/15/2011 |

**Table 6.3.2: Out of Band Spurious Emissions Test Results, 30 MHz to 1 GHz, Horizontal Polarization**

| Professional Testing, EMI, Inc. | | | |
|---|---|---|---|
| **Test Method:** | ANSI C63.4–2003: "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" | | |
| **In accordance with:** | FCC Part 15.109 - Code of Federal Regulations Part 47, Subpart B - Unintentional Radiators, Radiated Emissions Limits | | |
| **Section:** | 15.109 | | |
| **Test Date(s):** | 7/14/2011 | **EUT Serial #:** | n/a |
| **Customer:** | Traxxas | **EUT Part #:** | n/a |
| **Project Number:** | 12769-10 | **Test Technician:** | Layne Lueckemeyer |
| **Purchase Order #:** | GMD110707-1 | **Supervisor:** | Jason Haley |
| **Equip. Under Test:** | Vehicle Tranceiver | **Witness' Name:** | Chris Russell |

| Radiated Emissions Test Results Data Sheet - Horizontal Antenna Polarity ≤ 1GHz | | | Page: | 1 | of | 1 |
|---|---|---|---|---|---|---|
| **EUT Line Voltage:** | Battery | Vrms | **EUT Line Frequency:** | n/a | | Hz |
| **EUT Mode of Operation:** | | | Transmit Middle Channel | | | |

| Frequency Measured (MHz) | Test Distance (Meters) | EUT Direction (Degrees) | Antenna Height (Meters) | Detector Function | Recorded Amplitude (dBµV) | Corrected Level (dBµV/m) | Limit Level (dBµV/m) | Margin (dB) | Test Results |
|---|---|---|---|---|---|---|---|---|---|
| 31.53 | 10 | 1 | 1 | Quasi-peak | 21.8 | 9.4 | 29.5 | -20.1 | Pass |
| 156.31 | 10 | 1 | 1 | Quasi-peak | 21.6 | 10.7 | 33.1 | -22.4 | Pass |
| 199.83 | 10 | 1 | 1 | Quasi-peak | 21.4 | 12.1 | 33.1 | -21.0 | Pass |
| 566.4 | 10 | 1 | 1 | Quasi-peak | 26.8 | 25.0 | 35.6 | -10.6 | Pass |
| 841.6 | 10 | 1 | 1 | Quasi-peak | 26.1 | 30.1 | 35.6 | -5.5 | Pass |
| 993.6 | 10 | 1 | 1 | Quasi-peak | 26.5 | 31.8 | 43.5 | -11.7 | Pass |



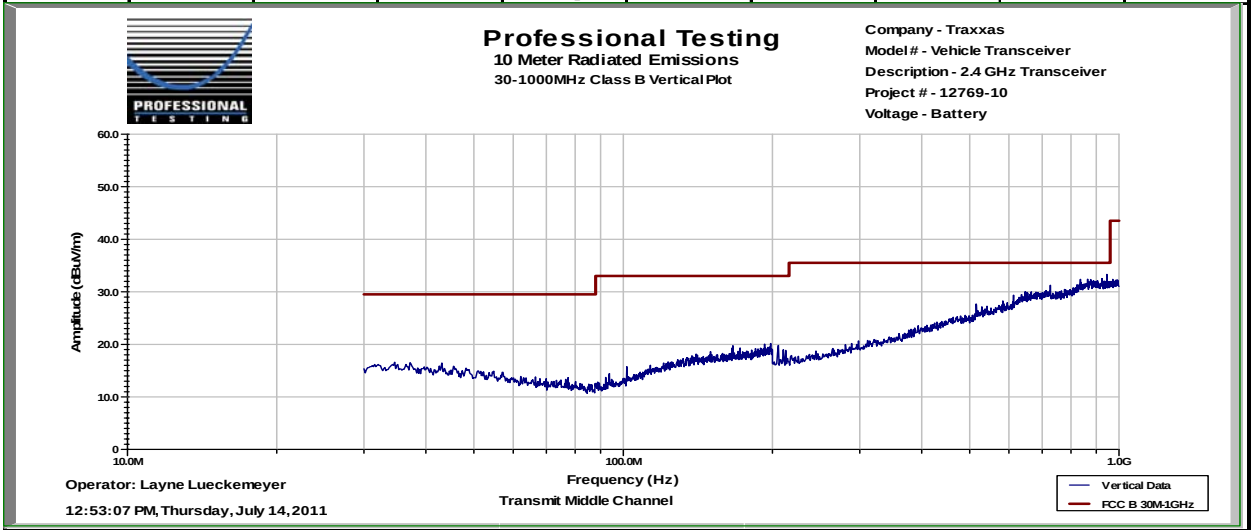

**30MHz to 1GHz, Horizontal Polarity**

**Table 6.3.3: Out of Band Spurious Emissions Test Results, 30 MHz to 1 GHz, Vertical Polarization**

| Professional Testing, EMI, Inc. | | | |
|---|---|---|---|
| **Test Method:** | ANSI C63.4–2003: "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" | | |
| **In accordance with:** | FCC Part 15.109 - Code of Federal Regulations Part 47, Subpart B - Unintentional Radiators, Radiated Emissions Limits | | |
| **Section:** | 15.109 | | |
| **Test Date(s):** | 7/14/2011 | **EUT Serial #:** | n/a |
| **Customer:** | Traxxas | **EUT Part #:** | n/a |
| **Project Number:** | 12769-10 | **Test Technician:** | Layne Lueckemeyer |
| **Purchase Order #:** | GMD110707-1 | **Supervisor:** | Jason Haley |
| **Equip. Under Test:** | Vehicle Tranceiver | **Witness' Name:** | Chris Russell |

| Radiated Emissions Test Results Data Sheet - Vertical Antenna Polarity ≤ 1GHz | | | Page: | 1 | of | 1 |
|---|---|---|---|---|---|---|
| **EUT Line Voltage:** | Battery | Vrms | **EUT Line Frequency:** | n/a | | Hz |
| **EUT Mode of Operation:** | | | Transmit Middle Channel | | | |

| Frequency Measured (MHz) | Test Distance (Meters) | EUT Direction (Degrees) | Antenna Height (Meters) | Detector Function | Recorded Amplitude (dBµV) | Corrected Level (dBµV/m) | Limit Level (dBµV/m) | Margin (dB) | Test Results |
|---|---|---|---|---|---|---|---|---|---|
| 31.53 | 10 | 1 | 1 | Quasi-peak | 21.8 | 9.4 | 29.5 | -20.1 | Pass |
| 156.31 | 10 | 1 | 1 | Quasi-peak | 21.6 | 10.7 | 33.1 | -22.4 | Pass |
| 199.83 | 10 | 1 | 1 | Quasi-peak | 21.4 | 12.1 | 33.1 | -21.0 | Pass |
| 566.4 | 10 | 1 | 1 | Quasi-peak | 26.8 | 25.0 | 35.6 | -10.6 | Pass |
| 841.6 | 10 | 1 | 1 | Quasi-peak | 26.1 | 30.1 | 35.6 | -5.5 | Pass |
| 993.6 | 10 | 1 | 1 | Quasi-peak | 26.5 | 31.8 | 43.5 | -11.7 | Pass |



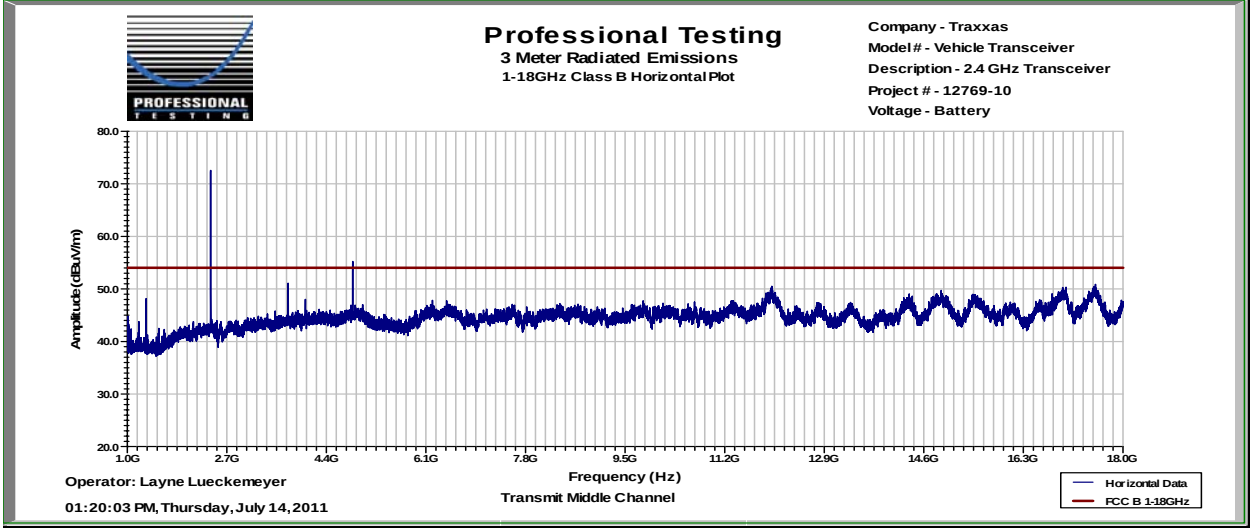

**30MHz to 1GHz, Vertical Polarity**

**Table 6.3.4: Out of Band Spurious Emissions Test Results, 1 GHz to 18 GHz, Horizontal Polarization**

| Professional Testing, EMI, Inc. | | | |
|---|---|---|---|
| **Test Method:** | **ANSI C63.4–2003: "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz"** | | |
| **In accordance with:** | **FCC Part 15.109 - Code of Federal Regulations Part 47, Subpart B - Unintentional Radiators, Radiated Emissions Limits** | | |
| **Section:** | **15.109** | | |
| **Test Date(s):** | **7/14/2011** | **EUT Serial #:** | **n/a** |
| **Customer:** | **Traxxas** | **EUT Part #:** | **n/a** |
| **Project Number:** | **12769-10** | **Test Technician:** | **Layne Lueckemeyer** |
| **Purchase Order #:** | **GMD110707-1** | **Supervisor:** | **Jason Haley** |
| **Equip. Under Test:** | **Vehicle Tranceiver** | **Witness' Name:** | **Chris Russell** |

| Radiated Emissions Test Results Data Sheet - Horizontal Antenna Polarity > 1GHz | | | Page: | 1 | of | 1 |
|---|---|---|---|---|---|---|
| **EUT Line Voltage:** | **6** | **VDC** | **EUT Line Frequency:** | **n/a** | | **Hz** |
| **EUT Mode of Operation:** | | | **Transmit Middle Channel** | | | |

| Frequency Measured (MHz) | Test Distance (Meters) | EUT Direction (Degrees) | Antenna Height (Meters) | Detector Function | Recorded Amplitude (dBµV) | Corrected Level (dBµV/m) | Limit Level (dBµV/m) | Margin (dB) | Test Results |
|---|---|---|---|---|---|---|---|---|---|
| 1324.475 | 3 | 72 | 1 | Average | 66.8 | 30.3 | 54.0 | -23.6 | Pass |
| 3527.195 | 3 | 49 | 1 | Average | 64 | 34.1 | 54.0 | -19.8 | Pass |
| 3749 | 3 | 27 | 1 | Average | 64.5 | 35.6 | 54.0 | -18.3 | Pass |
| 4852.675 | 3 | 49 | 1 | Average | 64.1 | 37.3 | 54.0 | -16.7 | Pass |
| 9122 | 3 | 1 | 1 | Average | 31.3 | 11.3 | 54.0 | -42.7 | Pass |



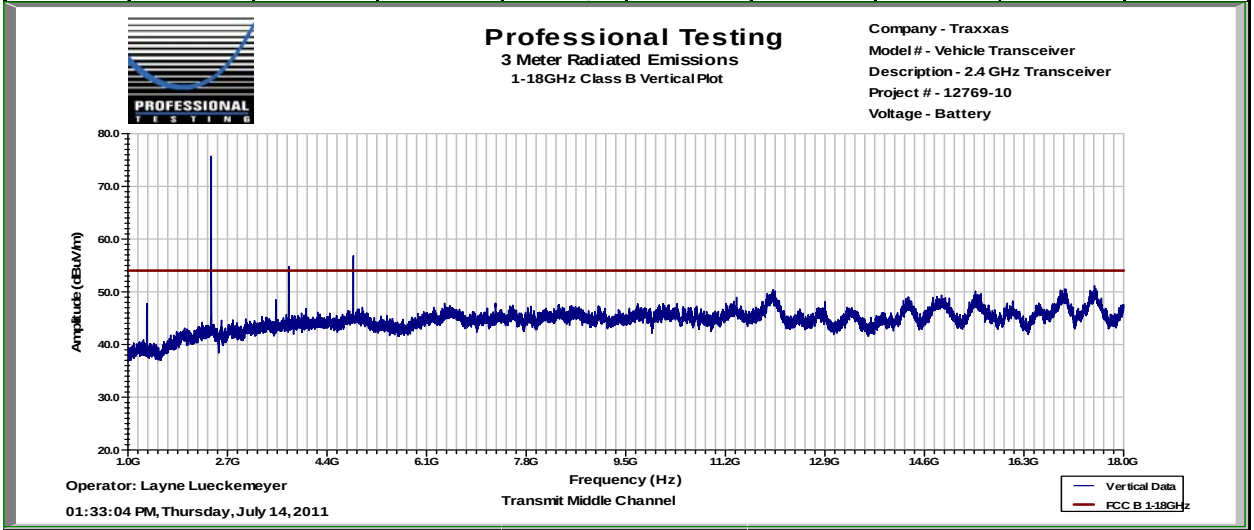

**1GHz to 18GHz, Horizontal Polarity**

**Table 6.3.5: Out of Band Spurious Emissions Test Results, 1 GHz to 18 GHz, Vertical Polarization**

| Professional Testing, EMI, Inc. | | | |
|---|---|---|---|
| **Test Method:** | ANSI C63.4–2003: "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz" | | |
| **In accordance with:** | FCC Part 15.109 - Code of Federal Regulations Part 47, Subpart B - Unintentional Radiators, Radiated Emissions Limits | | |
| **Section:** | 15.109 | | |
| **Test Date(s):** | 7/14/2011 | **EUT Serial #:** | n/a |
| **Customer:** | Traxxas | **EUT Part #:** | n/a |
| **Project Number:** | 12769-10 | **Test Technician:** | Layne Lueckemeyer |
| **Purchase Order #:** | GMD110707-1 | **Supervisor:** | Jason Haley |
| **Equip. Under Test:** | Vehicle Tranceiver | **Witness' Name:** | Chris Russell |

| Radiated Emissions Test Results Data Sheet - Vertical Antenna Polarity > 1GHz | | | Page: | 1 | of | 1 |
|---|---|---|---|---|---|---|
| **EUT Line Voltage:** | 6 | VDC | **EUT Line Frequency:** | n/a | | Hz |
| **EUT Mode of Operation:** | | | Transmit Middle Channel | | | |

| Frequency Measured (MHz) | Test Distance (Meters) | EUT Direction (Degrees) | Antenna Height (Meters) | Detector Function | Recorded Amplitude (dBµV) | Corrected Level (dBµV/m) | Limit Level (dBµV/m) | Margin (dB) | Test Results |
|---|---|---|---|---|---|---|---|---|---|
| 1324.475 | 3 | 83 | 1 | Average | 67.4 | 30.9 | 54.0 | -23.0 | Pass |
| 3527.195 | 3 | 203 | 1 | Average | 64.5 | 34.6 | 54.0 | -19.3 | Pass |
| 3749 | 3 | 116 | 1 | Average | 64.1 | 35.2 | 54.0 | -18.7 | Pass |
| 4852.675 | 3 | 130 | 1 | Average | 64.3 | 37.5 | 54.0 | -16.5 | Pass |
| 9122 | 3 | 1 | 1 | Average | 31.3 | 11.3 | 54.0 | -42.7 | Pass |




1GHz to 18GHz, Vertical Polarity

**Table 6.3.6: Out of Band Spurious Emissions Test Results, 18 GHz to 25 GHz, Horizontal and Vertical Polarizations**

| PROJECT # | DATE | CLASS | DISTANCE | ANTENNA | RBW | VBW | DETECTOR |
|---|---|---|---|---|---|---|---|
| 12769-10 | July 14, 2011 | FCC B | 1 m | Horn | 1 MHz | 1 MHz | Average |
| **COMMENT** | Transmitting 2406 MHz<br>Harmonics and spurious investigated up to 25 GHz | | | | | | |

**Horizontal Polarization**

| Frequency Measured (MHz) | EUT Direction (Degrees) | Antenna Height (Meters) | Recorded Level (dBµV) | Amplifier Gain (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Corrected Level (dBµV/m) | Limit Level (dBµV/m) | Margin (dB) | Detector Function |
|---|---|---|---|---|---|---|---|---|---|---|
| 19.248 | Noise | Floor | 39.7 | 43.2 | 36.6 | 8.8 | 41.9 | 63.5 | -21.6 | Avg |
| 21.654 | Noise | Floor | 40.3 | 41.8 | 36.9 | 9.5 | 44.9 | 63.5 | -18.6 | Avg |
| 24.060 | Noise | Floor | 42.6 | 42.2 | 37.1 | 10.4 | 47.9 | 63.5 | -15.6 | Avg |

**Vertical Polarization**

| Frequency Measured (MHz) | EUT Direction (Degrees) | Antenna Height (Meters) | Recorded Level (dBµV) | Amplifier Gain (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Corrected Level (dBµV/m) | Limit Level (dBµV/m) | Margin (dB) | Detector Function |
|---|---|---|---|---|---|---|---|---|---|---|
| 19.248 | Noise | Floor | 39.7 | 43.2 | 36.6 | 8.8 | 41.9 | 63.5 | -21.6 | Avg |
| 21.654 | Noise | Floor | 40.3 | 41.8 | 36.9 | 9.5 | 44.9 | 63.5 | -18.6 | Avg |
| 24.060 | Noise | Floor | 42.6 | 42.2 | 37.1 | 10.4 | 47.9 | 63.5 | -15.6 | Avg |

**Result = Pass**

**Table 6.3.7: Out of Band Spurious Emissions Test Results, 18 GHz to 25 GHz, Horizontal and Vertical Polarizations**

| PROJECT # | DATE | CLASS | DISTANCE | ANTENNA | RBW | VBW | DETECTOR |
|---|---|---|---|---|---|---|---|
| 12769-10 | July 14, 2011 | FCC B | 1 m | Horn | 1 MHz | 1 MHz | Average |
| **COMMENT** | Transmitting 2426 MHz<br>Harmonics and spurious investigated up to 25 GHz | | | | | | |

**Horizontal Polarization**

| Frequency Measured (MHz) | EUT Direction (Degrees) | Antenna Height (Meters) | Recorded Level (dBµV) | Amplifier Gain (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Corrected Level (dBµV/m) | Limit Level (dBµV/m) | Margin (dB) | Detector Function |
|---|---|---|---|---|---|---|---|---|---|---|
| 19.408 | Noise | Floor | 39.7 | 43.5 | 36.5 | 6.7 | 39.4 | 63.5 | -24.1 | Avg |
| 21.834 | Noise | Floor | 40.3 | 40.6 | 36.9 | 10.4 | 46.9 | 63.5 | -16.6 | Avg |
| 24.26 | Noise | Floor | 42.6 | 42.2 | 37.2 | 10.3 | 47.8 | 63.5 | -15.7 | Avg |

**Vertical Polarization**

| Frequency Measured (MHz) | EUT Direction (Degrees) | Antenna Height (Meters) | Recorded Level (dBµV) | Amplifier Gain (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Corrected Level (dBµV/m) | Limit Level (dBµV/m) | Margin (dB) | Detector Function |
|---|---|---|---|---|---|---|---|---|---|---|
| 19.408 | Noise | Floor | 39.7 | 43.5 | 36.5 | 6.7 | 39.4 | 63.5 | -24.1 | Avg |
| 21.834 | Noise | Floor | 40.3 | 40.6 | 36.9 | 10.4 | 46.9 | 63.5 | -16.6 | Avg |
| 24.26 | Noise | Floor | 42.6 | 42.2 | 37.2 | 10.3 | 47.8 | 63.5 | -15.7 | Avg |

**Result = Pass**

**Table 6.3.8: Out of Band Spurious Emissions Test Results, 18 GHz to 25 GHz, Horizontal and Vertical Polarizations**

| PROJECT # | DATE | CLASS | DISTANCE | ANTENNA | RBW | VBW | DETECTOR |
|---|---|---|---|---|---|---|---|
| 12769-10 | July 14, 2011 | FCC B | 1 m | Horn | 1 MHz | 1 MHz | Average |
| **COMMENT** | Transmitting 2453 MHz<br>Harmonics and spurious investigated up to 25 GHz | | | | | | |

**Horizontal Polarization**

| Frequency Measured (MHz) | EUT Direction (Degrees) | Antenna Height (Meters) | Recorded Level (dBµV) | Amplifier Gain (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Corrected Level (dBµV/m) | Limit Level (dBµV/m) | Margin (dB) | Detector Function |
|---|---|---|---|---|---|---|---|---|---|---|
| 19.624 | Noise | Floor | 39.7 | 43.7 | 36.5 | 8.2 | 40.8 | 63.5 | -22.7 | Avg |
| 22.077 | Noise | Floor | 40.3 | 40.5 | 37.1 | 9.4 | 46.3 | 63.5 | -17.2 | Avg |
| 24.530 | Noise | Floor | 42.6 | 42.1 | 37.2 | 10.1 | 47.8 | 63.5 | -15.7 | Avg |

**Vertical Polarization**

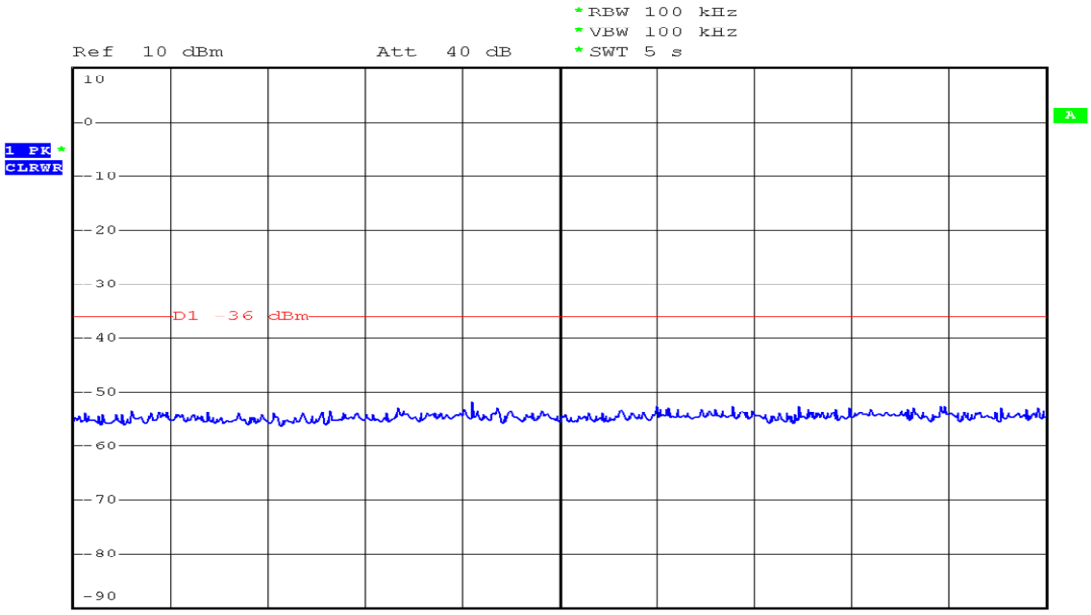
| Frequency Measured (MHz) | EUT Direction (Degrees) | Antenna Height (Meters) | Recorded Level (dBµV) | Amplifier Gain (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Corrected Level (dBµV/m) | Limit Level (dBµV/m) | Margin (dB) | Detector Function |
|---|---|---|---|---|---|---|---|---|---|---|
| 19.624 | Noise | Floor | 39.7 | 43.7 | 36.5 | 8.2 | 40.8 | 63.5 | -22.7 | Avg |
| 22.077 | Noise | Floor | 40.3 | 40.5 | 37.1 | 9.4 | 46.3 | 63.5 | -17.2 | Avg |
| 24.530 | Noise | Floor | 42.6 | 42.1 | 37.2 | 10.1 | 47.8 | 63.5 | -15.7 | Avg |

**Result = Pass**

**Table 6.3.9: Antenna Port Out of Band Spurious Emissions Test Results, 30 MHz to 1 GHz**

| Professional Testing, EMI, Inc. | | | |
|---|---|---|---|
| **In accordance with:** | **FCC 47 CFR 15 Subpart C** | | |
| | **Section 15.247** | | |
| **Test Date(s):** | **7/18/2011** | **EUT Serial #:** | **n/a** |
| **Customer:** | **Traxxas** | **EUT Part #:** | **n/a** |
| **Project Number:** | **12769-10** | **Test Technician:** | **Layne Lueckemeyer** |
| **Purchase Order #:** | **GMD110707-1** | **Supervisor:** | **Jason Haley** |
| **Equip. Under Test:** | **Vehicle Tranceiver** | **Witness' Name:** | **Chris Russell** |

| **Radiated Emissions Test Results Data Sheet - Horizontal Antenna Polarity ≤ 1GHz** | | | **Page:** | **1** | **of** | **1** |
|---|---|---|---|---|---|---|
| **EUT Line Voltage:** | **6** | **VDC** | **EUT Line Frequency:** | **n/a** | | **Hz** |
| **EUT Mode of Operation:** | | | **Transmit Middle Channel** | | | |

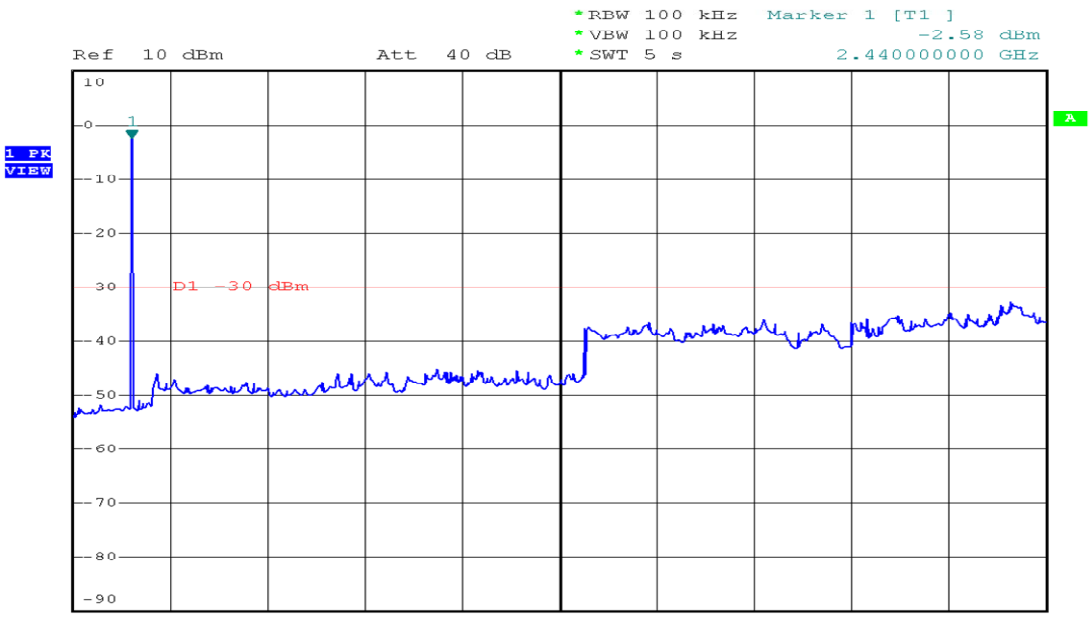



**30MHz to 1GHz**

**Table 6.3.10: Antenna Port Out of Band Spurious Emissions Test Results, 1 to 25 GHz**

| Professional Testing, EMI, Inc. | | | |
|---|---|---|---|
| **In accordance with:** | **FCC 47 CFR 15 Subpart C** | | |
| | **Section 15.247** | | |
| **Test Date(s):** | **7/18/2011** | **EUT Serial #:** | **n/a** |
| **Customer:** | **Traxxas** | **EUT Part #:** | **n/a** |
| **Project Number:** | **12769-10** | **Test Technician:** | **Layne Lueckemeyer** |
| **Purchase Order #:** | **GMD110707-1** | **Supervisor:** | **Jason Haley** |
| **Equip. Under Test:** | **Vehicle Tranceiver** | **Witness' Name:** | **Chris Russell** |

| **Radiated Emissions Test Results Data Sheet - Horizontal Antenna Polarity ≤ 1GHz** | | | **Page:** | **1** | **of** | **1** |
|---|---|---|---|---|---|---|
| **EUT Line Voltage:** | **6** | **VDC** | **EUT Line Frequency:** | **n/a** | | **Hz** |
| **EUT Mode of Operation:** | | | **Transmit Middle Channel** | | | |




**1GHz to 25 GHz**

## 7.0 Antenna Requirements

An antenna evaluation was performed on the EUT to determine compliance with FCC section 15.203.

### 7.2 Evaluation Procedure

The design of the EUT antenna was evaluated for conformance to engineering requirements for gain and to prevent substitution of unapproved antennae. Gain of the antenna was assessed by reviewing the antenna manufacturer's data sheet.

### 7.3 Evaluation Criteria

The antenna design must meet at least one of the following criteria:

a) Antenna is permanently attached to the unit.
b) Antenna must use a unique type of connector to attach to the EUT.
c) Unit must be professionally installed. Installer shall be responsible for verifying that the correct antenna is employed with the unit.

### 7.4 Evaluation Results

The Traxxas Vehicle Transceiver met the criteria of this rule by virtue of having an internal antenna inaccessible to the user. Therefore, the EUT is compliant.

**End of Report**

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