

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 20, 2011

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

Dear Gary:

Enclosed is the Wireless Test Report for the Traxxas, LLP Remote 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 12770-10

Traxxas, LLP Remote 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 20, 2011

Reviewed by

Jeffrey A. Lenk President Written by

Layne Lueckemeyer Product Development Engineer

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NOTICE: (1) This Report must not be used to claim product endorsement, by NVLAP, NIST, the FCC or any other Agency. This report also does not warrant certification by NVLAP or NIST.

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⁽³⁾ The significance of this report is dependent on the representative character of the test sample submitted for evaluation and the results apply only in reference to the sample tested. The manufacturer must continuously implement the changes shown herein to attain and maintain the required degree of compliance.



Applicant: Traxxas, LLP

Applicant's Address: 1100 Klein Road

Plano, TX 75074

FCC ID: XVE-SA10044

Project Number: 12770-10

Test Dates: July 14 – 18, September 27, 2011

The **Traxxas Remote** was tested to and found to be in compliance with FCC 47 CFR Part 15 and IC RSS-210 issue 8.

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

Parameter	Frequency (MHz)		Level	Limit	Margin (dB)
Transmitter: Output Power @ 1 m	2426	-3.93 (lBm Conducted	30 dBm	-33.93
Transmitter: Radiated Spurious	Transmitter: Radiated Spurious 841.6 30.1 d			$35.6 dB\mu V/m$	-5.5
	Occup	oied Band	lwidth		
6 dB		20 dB			
890 kHz				1.48 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, LLP	Receiver Remote	XVE-SA10044		

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

1.7 Applicable Tests

Test	Rule
Power Line Conducted Emissions	15.207(a)
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 Power Line Conducted Emissions

2.2 Test Procedure

The EUT was configured and operated in a manner consistent with typical applications. The EUT power cord in excess of one meter was folded back and forth forming a bundle 30 to 40 cm long in the approximate center of the cable. Power supply cords for the peripheral equipment were powered from an auxiliary LISN. Excess interface cable lengths were separately bundled in a non-inductive arrangement at the approximate center of the cable with the bundle 30 to 40 centimeters in length. The conducted emissions were maximized, by varying the operating states and configuration of the EUT.

The tests were performed in an 8' x 8' RayProof modular shielded room. The EUT was placed on a non-metallic table 0.4 meters from a vertical metal reference plane and 0.8 meters from a horizontal metal reference plane. A drawing showing the test setup is given as Figure 2.1.1.

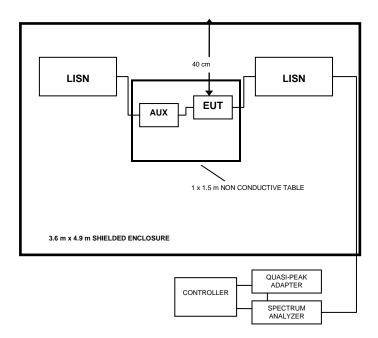


Figure 2.1.1 Conducted Emissions Test Setup

2.3 Test Criteria

The FCC Part 15 Class B conduction limits are given below.

Frequency	Conducted Limits (dBuV)				
(MHz)	Average	Quasi-Peak			
0.1550	66-56*	56 – 46*			
.50 - 5	56	46			
5 – 30	60	50			

The tighter limit shall apply at the edge between two frequency bands.

2.4 Test Results

Conducted emissions measurements for the EUT were taken on September 27, 2011, and the EUT was found to be in compliance with applicable requirements.

Table 2.4.1 Conducted Emissions Test Equipment – Bandwidth and Measurement Time Used for Testing

Professional Testing, EMI, Inc.							
Test Method:			loise Emissions from Low-Voltage				
10001110011001			Iz to 40 GHz" (incorporated by				
	FCC Part 15.107 - Code of Fo	FCC Part 15.107 - Code of Federal Regulations Part 47, Subpart B - Unintentional Radiators,					
In accordance with:	Conducted Emissions Limits						
Section:	15.107						
Test Date(s):	9/27/2011	EUT Serial #:	n/a				
Customer:	Traxxas	EUT Part #:	n/a				
Project Number:	12770-10	Test Technician:	Dave Kohutek				
Purchase Order #:	GMD110707-2	Supervisor:	Jason Haley				
Equip. Under Test:	Remote Transceiver	Witness' Name:	n/a				

Conducted Emissions Bandwidth and Measurement Time Used for Testing									
Frequency Band Start (MHz)	Frequency Band Stop (MHz)	Number of ranges used	Measurement Time per Range						
0.01	0.15	0.3	7	Five 1 second sweeps					
0.15	30	9	20	Five 1 second sweeps					

^{*}Notes:

^{*}Decreases with the logarithm of the frequency

^{1.} The settings above are specifically calculated for the HP856X series of spectrum analyzers, which have 1000 data points per range.

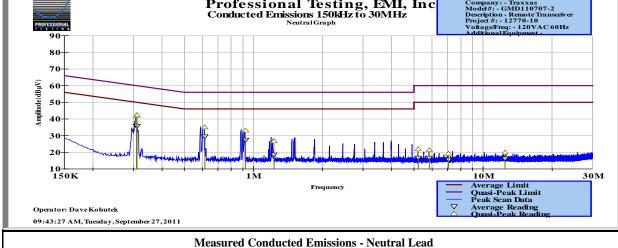
^{2.} The measurement receiver resolution bandwidth setting was 300Hz for Quasi-peak measurements from 10-150kHz.

^{3.} The measurement receiver resolution bandwidth setting was 9kHz for Quasi-peak measurements from 0.15-30MHz.

Table 2.4.2 Conducted Emissions Test Equipment

1 able 2.4	1.2 Conducted	Ellissions re	st Equipment					
		Profess	sional Testing, EMI, Inc.					
Test Method	d: Electi	rical and Electroni	thods of Measurement of Radio-Noise c Equipment in the Range of 9 kHz to	o 40 GHz" (incorpo	orated by			
	FCC	Part 15.107 - Code	of Federal Regulations Part 47, Subj	oart B - Unintentio	nal Radiators,			
In accordan	ice with: Cond	ucted Emissions L	imits					
Section:	Section: 15.107							
Test Date(s)): 9/27/2	2011	EUT Serial #:	n/a				
Customer: Traxxas EUT Part #: n/a								
Project Nun	nber: 12770	-10	Test Technician:	Dave Kohutek				
Purchase Order #: GMD110707-2 Supervisor: Jason Haley								
Equip. Und	Equip. Under Test: Remote Transceiver Witness' Name: n/a							
	Con	ducted Emissions Te	est Equipment List	Page:	1 of 1			
T	ile! Software Versio	n: 4.1.A.	0, April 14, 2009, 11:01:00PM					
	Test Profile:	Profil	e#: CE_2010.til, dated December 16, 201	10				
Asset#	Manufacturer	Model	Equipment Nomenclature	Serial Number	Calibration Due Date			
1129	HP	8568B	Spectrum Analyzer 100Hz-1.5GHz	2140A01754	10/5/2011			
1629	HP	85662A	Spec Anal Display for AN1129	3001A18433	N/A			
1277	HP	85650A	Quasi Peak Adapter	2811A01117	11/11/2011			
1173	PTI	PTI 100k HPF Filter, High Pass, 100kHz		none	1/25/2012			
1087	PTI	PTI-ALF4	Attenuator Limiter Filter	none	4/18/2012			
C109	HP	None	Cable, BNC, 19"	none	6/21/2012			
C107	Pomona	RG-58	Cable, BNC, 10.5'	none	6/21/2012			
C108	Pomona	RG-223	Cable, BNC, 5.5'	none	6/21/2012			
939	EMCO	3825/2	LISN, 10kHz-100MHz	9603-2521	11/8/2011			

			Profess	ional Te	sting, EN	MI, Inc.			
Test Method	1:				ent of Radio-No			nge Electrical a	nd Electronic
In accordan	ce with:	FCC Part 15.1 Limits	07 - Code of Fo	ederal Regulati	ions Part 47, Su	bpart B - Unin	tentional Radi	ators, Conduct	ed Emissions
Section:		15.107							
Test Date(s)	:	9/27/2011			EUT Serial	#:	n/a		
Customer:		Traxxas			EUT Part #:		n/a		
Project Nun	ıber:	12770-10			Test Technic	cian:	Dave Kohut	ek	
Purchase O	rder #:	GMD11070'	7-2		Supervisor:		Jason Haley	7	
Equip. Und	er Test:	Remote Tra	nsceiver		Witness' Na	me:	n/a		
	Condu	cted Emission	s Test Results	S Data Sheet -	Neutral Lead	[Pa	ge: 1	of 2
EU	T Line Volta	ige:	120	VAC	EUT	Line Freque	ncy:	60	Hz
Frequency Measured (MHz)	Peak Detector Reading (dBµV)	Quasi-peak Detector Reading (dBµV)	Quasi-peak Detector Limit (dBµV)	Quasi-peak Detector Margin (dB)	Quasi-peak Detector Test Results	Average Detector Reading (dBµV)	Average Detector Limit (dBµV)	Average Detector Margin (dB)	Average Detector Test Result
0.30946	42.5	42.1	60	-17.9	PASS	35.8	50	-14.2	PASS
0.3103	42.5	42.3	60	-17.7	PASS	35.8	50	-14.2	PASS
0.31115	42.5	42.3	59.9	-17.6	PASS	35.8	49.9	-14.2	PASS
0.6142	37.1	35.1	56	-20.9	PASS	29.4	46	-16.6	PASS
0.9245	35.3	33.2	56	-22.8	PASS	27.4	46	-18.6	PASS
1.2278	35.2	26.7	56	-29.3	PASS	18.5	46	-27.5	PASS
5.2234	28	21.9	60	-38.1	PASS	16.6	50	-33.4	PASS
5.0250	28.1	21.5	60	-38.5	PASS	16.7	50	-33.3	PASS
5.8359			60	-40.8	PASS	15.5	50	-34.5	PASS
7.0783	27.2	19.2	00	10.0					
	27.2	19.2	60	-40	PASS	16.1	50	-33.9	PASS



Average Limit Quasi-Peak Limit Peak Scan Data Average Reading Quasi-Peak Reading

			Profess	sional Te	sting, EN	AI, Inc.			
Fest Method	l:				ent of Radio-No z" (incorporated			age Electrical a	nd Electronic
In accordan	ce with:	FCC Part 15. Limits	107 - Code of F	ederal Regulati	ions Part 47, Su	bpart B - Unin	tentional Radi	ators, Conduct	ed Emissions
Section:		15.107							
Test Date(s)	<u>: </u>	9/27/2011			EUT Serial		n/a		
Customer:	_	Traxxas			EUT Part #:		n/a	_	
Project Nun		12770-10	 		Test Technic	cian:	Dave Kohut		
Purchase Or		GMD11070			Supervisor:		Jason Haley	7	
Equip. Unde	er rest:	Remote Tra	ansceiver		Witness' Na	me:	n/a		
	Conducte	d Emissions	Test Results D	ata Sheet - Ph	ase Lead (Lin	e 1)	Pa	ge: 2	of 2
EU	T Line Volta	age:	120	VAC	EUT	Line Freque	ency:	60	Hz
Frequency Measured (MHz)	Peak Detector Reading (dBµV)	Quasi-peak Detector Reading (dBµV)	Quasi-peak Detector Limit (dBµV)	Quasi-peak Detector Margin (dB)	Quasi-peak Detector Test Results	Average Detector Reading (dBµV)	Average Detector Limit (dBµV)	Average Detector Margin (dB)	Average Detector Test Result
0.30928	51.4	50.8	60	-9.2	PASS	42.8	50	-7.2	PASS
0.30929	51.4	50.8	60	-9.2	PASS	42.8	50	-7.2	PASS
0.30958	51.5	50.8	60	-9.2	PASS	42.8	50	-7.2	PASS
0.6159	44.7	43.8	56	-12.2	PASS	35.5	46	-10.5	PASS
0.9226	41.8	40.8	56	-15.2	PASS	33.4	46	-12.6	PASS
1.8461	38.2	36.3	56	-19.7	PASS	28.2	46	-17.8	PASS
5.838	31.8	28.1	60	-31.9	PASS	20.7	50	-29.3	PASS
6.1445	31	26.8	60	-33.2	PASS	19.9	50	-30.1	PASS
7.9907 9.2133	28.8	20.3	60	-39.7 -36.9	PASS PASS	16.2 17.9	50 50	-33.8 -32.1	PASS PASS
PROFESSIONA 90	2		Profe: Conduct	ssional T	Testing, 1	EMI, Inc	Description Project #: Voltage/Fr	: - Traxxas GMD110707-2 - Remote Transce - 12770-10 req: - 120VAC 60: IEquipment -	
80-									
70	-								
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207						7 7 7	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	studies as a second	to had activitied
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Measured Conducted Emissions - Phase Lead (Line 1)

10:01:17 AM, Tuesday, September 27, 2011

Table 2.4.5 Conducted Emissions Test Setup Photos

1 abic 2.4.5 Condu	icted Emissions Test Setup l	1 1101005
	Professional Te	esting, EMI, Inc.
Test Method:	Electrical and Electronic Equipment	asurement of Radio-Noise Emissions from Low-Voltage at in the Range of 9 kHz to 40 GHz" (incorporated by
In accordance with:		Regulations Part 47, Subpart B - Unintentional Radiators,
Section:	Conducted Emissions Limits 15.107	
Test Date(s):	9/27/2011	EUT Serial #: n/a
Customer:	Traxxas	EUT Part #: n/a
Project Number:	12770-10	Test Technician: Dave Kohutek
Purchase Order #:	GMD110707-2	Supervisor: Jason Haley
Equip. Under Test:	Remote Transceiver	Witness' Name: n/a
The state of the s		
CE V	View Rear of Table	CE View Front

3.0 Output Power

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

3.2 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. RBW used is recorded.

A diagram showing the test setup is given as Figure 3.1.1.

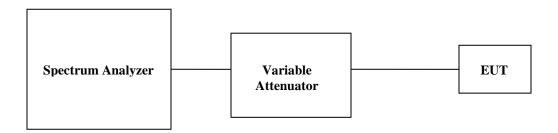


Figure 3.1.1: Ouptut Power Test Setup

3.3 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.

3.4 **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) = 1.87External Attenuation (dB) = 0Antenna gain (dBi) = 0.5Total = 2.37

E.I.R.P. calculated by adding Cable Loss + External Attenuation + Antenna gain to Measured Power

<u> 1 abie 3.3</u>	.1: Output Po	wer, Occupied	d Bandwi	idth, PSD Measure	ements Test Ed	quipment_		
		Profess	ional Te	esting, EMI, Inc.				
In accorda	ance with: FCC	47 CFR 15 Subpar	t C					
	Section	n 15.247						
Test Date(s)	: 7/15/2	011		EUT Serial #:	N/A			
Customer:	Traxx	as		EUT Part #:	N/A			
Project Nun	nber: 12769	-10		Test Technician:	Layne Lueckemeyer			
Purchase O	rder #: GMD	110707-1		Supervisor:	Larry Finn			
Equip. Und	er Test: Recei	ver Remote		Witness' Name:	Chris Russell			
		Test Equipme	ent List		Page:	1 of 1		
Asset#	Manufacturer	M. J.1				Calibration Due		
	Manufacturer	Model	Equip	oment Nomenclature	Serial Number	Date		
C117	Times Microwave	SLU18-SMSM- 05.00F		, SMA-SMA, 60", Brown	Serial Number			
		SLU18-SMSM-	Cable, RF			Date		
C117	Times Microwave	SLU18-SMSM- 05.00F	Cable, RF	, SMA-SMA, 60", Brown	none	Date 9/22/2011		

Table 3.3.2: Output Power Test Results

Table 3.3.2: Output Po	wer Test Results								
	Profession	al Testi	ng, EM	I, Inc.					
In accordance with:	FCC 47 CFR 15 Subpa	art C							
	Section 15.247								
Test Date(s):	7/15/2011		EUT Seria	l #: N/A					
Customer:	Traxxas		EUT Part	#: N/A					
Project Number:	12770-10		Test Techn	ician: Layn	e Luec	ckemeyer			
Purchase Order #:	GMD110707-1		Supervisor	: Larry	y Finn				
Equip. Under Test:	Receiver Remote		Witness' N	ame: Chris	Russe	ell			
Tr	ansmit Power Test Result	ts Data Shee	t		Pag	ge: 1	of	1	
EUT Line Voltage:	6.1	VDC	EUT Li	'A	Hz				
EUT Mode	e of Operation:		Lowest Frequency 2407 MHz						
Test Conditions	Measured Power (dBm)	E.I.R.P	. (dBm)	Margin (dB)					
Tnom +20 °C	-6.39	-4.	.02	30		-34.02			
EUT Mode	e of Operation:			Middle Freque	ency 24	26 MHz			
Test Conditions	Measured Power (dBm)	E.I.R.P	c. (dBm)	E.I.R.P. Limit (d	lBm)	Margi	n (dB)		
Tnom +20 °C	-6.30	-3.	.93	30		-33	.93		
EUT Mode	e of Operation:			Highest Freque	ency 24	453 MHz			
Test Conditions	Measured Power (dBm)	E.I.R.P	. (dBm)	E.I.R.P. Limit (d	lBm)	Margi	n (dB)		
Tnom +20 °C	-6.45	-4.	.08	30		-34	.08		

4.0 Occupied Bandwidth

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

4.2 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 3.1.1.

4.3 Test Criteria

The minimum 6 dB occupied bandwidth for the EUT is 500 kHz as stated in 15.247(a)(2) and RSS-210. The 20 dB bandwidth must be measured and reported for the FCC.

4.4 Test Results

Occupied bandwidth 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 3.3.1.

Table 4.3.1: Low Channel 6 dB Occupied Bandwidth Test Results

of Hz	
Hz	Hz

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		20 UD (Jecupica	Dan	uwiuii	Test Re	Suits				
			ssional	Test	ing, E	MI, In	ıc.				
In accordance with:	FCC 47 C	CFR 15 St	ıbpart C								
	Section 15										
Cest Date(s):	7/15/2011				UT Serial		N/A				
Customer:	Traxxas 12770-10				UT Part #		N/A	T1			
Project Number: Purchase Order #:	GMD110'	707-1			est Techn upervisor		<u>Layne</u> Larry	Lueckem	eyer		
Equip. Under Test:	Receiver				vitness' N			Russell			
T. F											
Radiated Emission	s Test Resul	lts Data Sl	neet - Horiz	ontal A	ntenna Po	larity > 10	GHz	Page:	1	of	1
EUT Line Voltage	e :	6	VDC		EUT Li	ne Freque	ncy:	N/A		Hz	
EUT	Mode of Op	eration:				Tr	ansmit Lo	w Channel			
				* VBW	100 kHz 100 kHz			.36 dB			
Ref 110 dBµ	<u> </u>	Att 4	0 dB	SWT	2.5 ms	Marker	.270000	000 MHz			
-100							79.	37 dBµV	A		
I I			~~~~	w~^^\			400000	000 012			
<u>км</u> * -90		 	/		\ 						
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80 D1 79	.73 dBµV−	VATA VAL			Park.						
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-50											
40											
-30											
2.0											
10		1									

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Table 4.3.3: Mid Channel 6 dB Occupied Bandwidth Test Results

		Profe	essional	l Test	<u>ing, E</u>	MI, In	ic.				
In accordance with:	FCC 47 (CFR 15 St	ıbpart C								
	Section 1										
'est Date(s):	7/15/2011	l			UT Seria		N/A				
Customer:	Traxxas				UT Part		N/A				
Project Number:	12770-10				est Techn			Lueckem	eyer		
Purchase Order #: Equip. Under Test:	GMD110 Receiver				ipervisor itness' N		Larry	Russell			
quip. Onder Test.	Receiver	Kemote			Tuicss IV	ame.	CIII IS	Russen			
Radiated Emissions	Test Resu	ılts Data Sl	heet - Horiz	zontal A	ntenna Po	larity > 10	GHz	Page:	1	of	1
EUT Line Voltage	:	6	VDC		EUT Li	ne Freque	ncy:	N/A		Hz	
EUT 1	Mode of O _l	peration:				Tr	ansmit M	id Channel			
					LOO kHz	Delta	2 [T1] -0	.76 dB			
Ref 110 dBul	r	Att 4	0 dB		2.5 ms	870		000 kHz			
110						Marker	1 [T1 94.	1 52 dBuV			
-100		+	1/\	~ /\	,	2			A		
D1 94	.1 dBµV—		7	~ /	<u> </u>						
-90											
-80		J. J.			<u> </u>						
		_///			1						
70	www.	***				1					
60						\ \hat{\sigma}	ham have	mm			
-50			-								
40											
-30-			<u> </u>								
-20											
10											

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Table 4.3.4: Mid Channel 20 dB Occupied Bandwidth Test Results

					1 Tes	ting, E	MI, Ir	ıc.				
In a	accordance with:	FCC 47 (CFR 15 Su	ıbpart C								
		Section 1										
	Date(s):	7/15/2011				EUT Seria		N/A				
	omer:	Traxxas				EUT Part		N/A				
	ect Number: chase Order #:	12770-10				Test Techn			Lueckeme	eyer		
	ip. Under Test:	GMD110 Receiver				Supervisor Witness' N		Larry	Russell			
'qu	p. Onder Test.	Receiver	Kemote			Withess IV	ame.	CIII IS	Russell			
]	Radiated Emissions	Test Resu	lts Data Sl	neet - Hori	zontal A	Antenna Po	larity > 1	GHz	Page:	1	of	1
	EUT Line Voltage		6	VDC		EUT Li	ne Freque	ency:	N/A		Hz	
	EUT N	Mode of O	eration:				Tı	ansmit M	id Channel			
					* VBW	100 kHz 100 kHz			.58 dB			
	Ref 110 dBµV		Att 4	0 dB	SWT	2.5 ms	Marker		000 MHz			
							Marker	80.	48 dBµV	A		
DV	-100			~~~	\sim		1	425330	DOO GHZ			
РK	-90					1						
			1									
	80 D1 80.	1 dBµV—	J. Way			1						
	-70		~ N			\~						
	~~~~						~~	Marina,				
	60	+						· \	when			
	-50											
	-40											
	-30											
	30											
	1		-									
	-20	1										
	10						1	1				

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Table 4.3.5: High Channel 6 dB Occupied Bandwidth Test Results

		<b>Profe</b>	<u>ssiona</u>	<u>l Tes</u>	ting, E	MI, In	ıc.				
In accordance with:	FCC 47 (	CFR 15 Su	ıbpart C								
	Section 1										
est Date(s):	7/15/2011				EUT Serial		N/A				
Customer:	Traxxas				EUT Part #		N/A				
roject Number:	12770-10				Test Techn			Lueckem	eyer		
urchase Order #: quip. Under Test:	GMD110 Receiver				Supervisor Vitness' N		Larry	Russell			
quip. Onder Test.	Receiver	Kemote			vittiess iv	ame.	CIIIIS	Kussen			
Radiated Emission	s Test Resu	lts Data Sh	ıeet - Hori	izontal A	Antenna Po	larity > 10	GHz	Page:	1	of	1
EUT Line Voltage	<b>:</b>	6	VDC		EUT Li	ne Freque	ency:	N/A		Hz	
EUT	Mode of O _l	peration:				Tra	ansmit Hi	gh Channel			
					100 kHz 100 kHz	Delta	2 [T1 ] -0	.38 dB			
Ref 110 dBµV	J	Att 4	0 dB	SWT	2.5 ms		.000000	000 kHz			
110						Marker	94.	16 dΒμV			
-100		1	1,1	War W	2	2	.452570	000 GHZ	A		
D1 93	.88 dBµV-		7								
		/			\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\						
-80		-			<del>  "\</del> n						
		and a			, vh.						
70	War whyt					my wa	, Mh.	İ			
60							~ M	Munem			
-50											
-40											
-40											
-30											
-20											
10											

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Table 4.3.6: High Channel 20 dB Occupied Bandwidth Test Results

				<u>ssional</u>	1 es	ung, E	IVII, In	ic.				
In a	ccordance with:			bpart C								
		Section										
	Date(s):	7/15/201				UT Serial		N/A				
	omer:	Traxxas				UT Part		N/A	T 1			
	ect Number: hase Order #:	12770-10 GMD11				est Techn upervisor			Lueckeme	eyer		
	p. Under Test:		Remote			upervisor Vitness' N		Larry	Russell			
'Yui	p. Onuci Test.	Receives	Kemote			vitticss iv	anic.	CIII IS	Kussen			
I	Radiated Emission	s Test Res	ults Data Sh	eet - Horiz	ontal A	ntenna Po	larity > 10	GHz	Page:	1	of	1
	EUT Line Voltage	e:	6	VDC		EUT Li	ne Freque	ncy:	N/A		Hz	
	EUT	Mode of O	peration:				Tra	ansmit Hi	gh Channel			
					<ul> <li>VBW</li> </ul>	100 kHz 100 kHz			.07 dB			
	Ref 110 dBµ	<u> </u>	Att 4	) dB	SWT	2.5 ms	Marker	.480000 1 [T1	000 MHz			
							Marker	79.	28 dBµV			
	-100			m	~~~~		2	.452340	000 GHz	A		
PK AKH	90											
						J. J.						
	80 D1 79	.88 dBµV	, MA			2						
			- Lave			1	<b>\</b>					
	70	What was					way	-arman				
	-60							_ , M	Munum			
	-50											
	-40											
	1.0											
	-30											
	-20					1	1					

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## **5.0** Power Spectral Density

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

#### **5.2** 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.

#### 5.3 Test Criteria and Methodology

According to section FCC 15.247(e) 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) = 1.87External Attenuation (dB) = 0Antenna gain (dBi) = 0.5Total = 2.37

E.I.R.P. calculated by adding Cable Loss + External Attenuation + Antenna gain to Measured Power

#### 5.4 Test Results

Power spectral density 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 Table 3.3.1.

**Table 5.3.1 Power Spectral Density – Low Channel - Test Results** 

						sting, E	MI, In	ıc.				
In a	ccordance witl	h: FCC	47 CFR 15	5 Subpart C	C							
			on 15.247									
	Date(s):	7/15/2				EUT Seria		N/A				
	omer:	Trax				EUT Part		N/A				
	ect Number:	12770				Test Techn			Lueckem	eyer		
	hase Order #: p. Under Test:		0110707-1 iver Remot	ta		Supervisor Witness' N		Larry	Russell			
'qu'	p. Onder Test.	Recei	vei Keino			Withess 1	ainc.	CIIIIS	Kussen			
]	Radiated Emissi	ons Test l	Results Data	a Sheet - Ho	rizontal	Antenna Po	larity > 10	GHz	Page:	1	of	1
	EUT Line Volta	ıge:	6	VD	С	EUT Li	ne Freque	ency:	N/A		Hz	
	EU	T Mode o	of Operation	n:			Tra	ansmit Lo	w Channel			
						3 kHz 300 kHz	Marker	1 [T1 ]	] 54 dBuV			
	Ref 110 dB	μV	Att	40 dB		100 s	2	.406024				
	110									*		
	100				+-					A		
PK AXH	-90					_						
	_ ^ _	$\Lambda$		,,	·	Ž,	Ι Λ					
	Por My	$H \setminus H \cup H$	many	$\sqrt{\sqrt{\sqrt{2}}}$	$+ - \checkmark$		$\forall \forall \lor \not$	hon ,				
	7.0	γ		W V		V	W	\mu_\	V			
	7.0											
	-60				+							
	50											
	-50											
	-40				+-							
	-30											
	-20											
	10											

Frequency	E.I.R.P	Limit
(MHz)	(dBm / 3 kHz)	(dBm / 3 kHz)
2406	-20.5	

ubic	5.3.2 Power	bpccu	ai Densi	ty – Mil	i Chai	11161 - 16	st Mesu	1113				
			Profe	ssiona	l Test	ing, E	MI, In	ıc.				
In acc	cordance with:	FCC 47	CFR 15 St	ubpart C								
		Section 1										
Test Da		7/15/201				UT Serial		N/A				
Custon	ner: t Number:	Traxxas 12770-10				UT Part # est Techn		N/A	Lueckem	ovor		
	ase Order #:	GMD11				upervisor		Larry		leyer		
	<b>Under Test:</b>	Receiver				itness' N			Russell			
Rac	diated Emission	s Test Resi	ults Data S	heet - Hori	izontal A	ntenna Pol	larity > 10	GHz	Page:	1	of	1
E	UT Line Voltage	e:	6	VDC		EUT Liı	ne Freque	ncy:	N/A		Hz	
	EUT	Mode of O	peration:				Tra	ansmit M	id Channe	l		
R	Ref 100 dBu	v	Att 3	0 dB	* RBW . * VBW . * SWT	300 kHz		1 [T1 86.	88 dBµV			
Γ	100									*		
- 1	90				. 1					A		
PK AXH	s. My	<b>\</b>   Λ	Ι Λ	1	My I	Mr. A	$\Delta \Lambda$	\				
	m N	A cor	, was	W \W		V			1 V			
	70											
-  -	-60											
Ī	-50											
-	-40											
L	-30											
- 1	-20											
L	-10											
	0	1				1	1	1				

Frequency	E.I.R.P	Limit
(MHz)	(dBm / 3 kHz)	(dBm / 3 kHz)
2426	-20.1	

**Table 5.3.3 Power Spectral Density – High Channel - Test Results** 

				essiona	l Tes	ting, E	MI, In	ic.				
In a	ccordance with:	FCC 4	7 CFR 15 S	Subpart C			•					
		Section	n 15.247									
	Date(s):	7/15/20				EUT Serial		N/A				
	omer:	Traxx				EUT Part #		N/A				
	ect Number: hase Order #:	12770-				est Techn			Lueckem	eyer		
	p. Under Test:		110707-1 ver Remote			upervisor Vitness' N		Larry	Russell			
'qui	p. Onuci Test.	Receiv	ei Kemote		V	VILICOS IN	anic.	CIII IS	Kussen			
F	Radiated Emissior	ıs Test R	esults Data S	Sheet - Hori	izontal A	antenna Po	larity > 10	GHz	Page:	1	of	1
	EUT Line Voltag	e:	6	VDC		EUT Li	ne Freque	ncy:	N/A		Hz	
	EUT	Mode of	Operation:				Tra	ınsmit Hiş	gh Channel			
						3 kHz 300 kHz	Marker	1 [T1 86.	] 73 dBµV			
	Ref 100 dBµ	V	Att	30 dB	* SWT	100 s	2	.453025	200 GHz			
	100									A		
	-90				٠, ;	7				A		
PK	Aso My	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	A	1 5 m	Vy J	4	$\mathcal{A}$		$\Lambda$			
	\www.a	A D	Vivor)	W V		1,0			~ \ <b>~</b>			
	-70	1										
	-60											
	-60											
	-50-											
	-40											
	-30											
	-20											
	-10											
	0				<u> </u>							

Frequency	E.I.R.P	Limit
(MHz)	(dBm / 3 kHz)	(dBm / 3 kHz)
2453	-20.3	

## **6.0** Band Edge Spurious Emissions

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

#### **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 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.

#### 6.3 Test Criteria

According to FCC 15.247(d) 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 Table 3

#### 6.4 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

		Hous Ellissions 1			~			
		<b>Professional T</b>	esting, l	EMI, In	с.			
In acco	rdance with:	FCC 47 CFR 15 Subp	art C					
		Section 15.247						
Test Date(s):		7/15/2011		<b>EUT Seria</b>	l #: N/A			
Customer:		Traxxas		EUT Part	#: N/A			
Project Number	er:	12770-10		Test Techn	nician: Layr	ne Lueckemeyer		
Purchase Orde	er #:	GMD110707-1		Supervisor	: Larr	y Finn		
Equip. Under '	Γest:	Receiver Remote		Witness' N	ame: Chri	s Russell		
		Band Edge Sp	ourious Emis	sions				
EU	T Line Voltage:	6	VDC	EUT Li	ine Frequency n/a Hz			
	EUT Mode of	Operation:			Transm	nit		
Frequency Measured (MHz)	Recorded Level (dB)	Limit (dB) down from fundamental	Margin (dB)		Detector Function	RBW / VBW		
2400	-36.15	-20	-16	5.15	Peak	300 kHz / 300 kHz		
	00.40		-10.13 Feak					
2483.5	-39.49	-20	-19	9.49	Peak	300 kHz / 300 kHz		

<u> Table 6.3</u>	<b>5.2 Band I</b>	Edge Spui	rious Em	<u>issions (R</u>	<u>lestricted</u>	Bands) T	est Resul	ts Data Sheet	
		]	Professi	onal Te	sting, E	MI, Inc.	,		
In accord	In accordance with: FCC 47 CFR 15 Subpart C								
	Section 15.247								
Test Date(s	s):	7/15/2011			<b>EUT Seria</b>	l #:	N/A		
<b>Customer:</b>	<del></del>				<b>EUT Part</b>	#:	N/A		
Project Nu	mber:	12770-10			Test Techn	nician:	Layne Lue	ckemeyer	
Purchase (	Order #:	GMD11070	7-1		Supervisor	:	Larry Finn		
Equip. Und	ip. Under Test: Receiver Remote Witness' Name: Chris Russell								
EUT I	Line Voltage:	: (	5	(Investigated		Bands at 239	y n	5 MHz) /a Hz	
	EUT N	Mode of Oper	ration:				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)	<b>Detector Function</b>	
2390	57.4	26.4	28.1	2.8	61.9	83.5	-21.6	Peak Hold	
2390	43.6	26.4	28.1	2.8	48.1	63.5	-15.4	Average	
2483.5	53.5	24.4	29.0	2.8	60.9	83.5	-22.6	Peak Hold	
2483.5	42.8	24.4	29.0	2.8	50.2	63.5	-13.3	Average	

## 7.0 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.

#### 7.2 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 7.1.1.

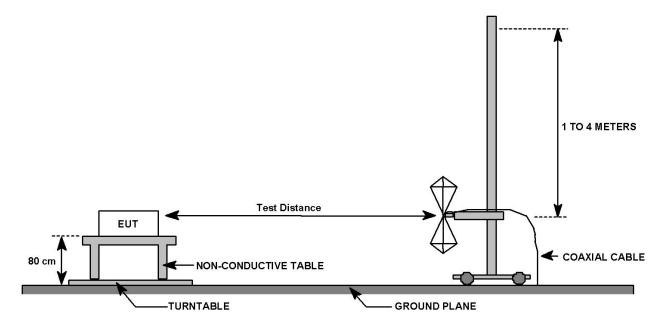


Figure 7.1.1 Radiated Emissions Test Setup

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#### 7.3 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

#### 7.4 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 7.3.1.

<b>Table 7.3</b>	.1 Out of Ban	d Spurious Er	missions Test Equipment						
		Profess	ional Testing, EMI, Inc.						
Test Method	۱۰		hods of Measurement of Radio-Nois		U				
	Electi		c Equipment in the Range of 9 kHz to of Federal Regulations Part 47, Sub						
In accordan		rart 15.109 - Code ited Emissions Lim	· · · · · · · · · · · · · · · · · · ·	part <b>b</b> - Unintention	nai Kauiators,				
Section:	15.109								
Test Date(s)			EUT Serial #:	n/a					
Customer:	Traxx		EUT Part #:	n/a					
Project Num Purchase On		0-10 110707-2	Test Technician: Supervisor:	Layne Lueckemey Jason Haley	er				
Equip. Unde		te Tranceiver	Witness' Name:	Chris Russell					
1.1.		liated Emissions Tes	<u> </u>	Page:	1 of 1				
Ti	ile! Software Versio	n: 34K	11, June 7, 2006, 07:49:00 PM						
	Test Profile:	Kadia	ted Emissions_updated_12-16-10.til		Calibration Due				
Asset#	Manufacturer	Model	Equipment Nomenclature	Serial Number	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				

Multiple Sweeps

**Table 7.3.2 Out of Band Spurious Emissions Test Equipment – Bandwidth and Measurement Time Used for Testing** 

	ne esca for resume							
Professional Testing, EMI, Inc.								
Test Method:	ANSI C63.4–2003: "Met Electrical and Electronic							
	FCC Part 15.109 - Code					<del>`</del>		
In accordance with:	Radiated Emissions Lim	its	, and the second	, •		ŕ		
Section:	15.109							
Test Date(s):	7/14/2011		EUT Serial	#: r	ı/a			
Customer:	Traxxas		EUT Part #	r	ı/a			
Project Number:	12770-10		Test Techni	cian: Layne Lueckemeyer				
Purchase Order #:	GMD110707-2		Supervisor:	J	ason Haley	7		
Equip. Under Test:	Remote Tranceiver		Witness' Na	me: (	Chris Russe	ell		
I	Radiated Emissions Bandwid	th and Meas	urement Time	Used for Testi	ng - Peak So	can		
Frequency Band Start (MHz)	Frequency Band Stop (MHz)		ndwidth Hz)	Number of ra	anges used	Measurement Time per Range		

0.15	30	9	6	Multiple Sweeps
30	200	120	1	Multiple 800mS Sweeps
200	1000	120	1	Multiple 800mS Sweeps
1000	18000	1000	17	Multiple Sweeps

0.3

#### *Notes:

0.009

- 1. The settings above are specifically calculated for the HP856X series of spectrum analyzers, which have 1000 data points per range.
- 2. The measurement receiver resolution bandwidth setting was 300Hz for Quasi-peak measurements from 9-150kHz.

0.15

- 3. The measurement receiver resolution bandwidth setting was 9kHz for Quasi-peak measurements from 0.15-30MHz.
- 4. The measurement receiver resolution bandwidth setting was 120kHz for Quasi-peak measurements from 30-1000MHz.
- 5. The measurement receiver resolution bandwidth setting was 1MHz for Average measurements from 1-18GHz.

Table 7.3.3: Out of Band Spurious Emissions Test Results, 30 MHz to 1 GHz, Horizontal Polarization

Polarizat	ion									
			Professi	onal Te	sting, E	MI, Inc	•			
Test Metho	od:			lethods of M						ow-
In accorda	ance with:	FCC Part	15.109 - Coo	Electronic le of Federa	l Regulatio					nal
			Radiated E	missions Li	mits					
Section:	`	15.109								
Test Date(s	s):	7/14/2011			EUT Serial EUT Part #		n/a n/a			
Customer: Project Nu	mhore	Traxxas 12770-10			Test Techn			Luce	kemeyer	
Purchase C		GMD11070	07-2		Supervisor		Jason 1			
Equip. Und		Remote Tr			Witness' N		Chris 1			
squipi ene	act Test.	Itemote 11	uncerver		TTELEGE IT	umer		TT CODD	VAI	
Radiate	ed Emissions	Test Result	s Data Sheet	- Horizontal	Antenna Po	larity ≤ 1GH	Iz	Pag	ge: 1	of 1
EUT I	Line Voltage	: Bat	tery	Vrms	EUT Li	ne Frequenc	y:	n/	a	Hz
	EUT N	Mode of Ope	ration:			Transı	mit Mid	dle Cl	hannel	
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit I (dBµV		Margin (dB)	Test Results
31.53	10	1	1	Quasi-peak	21.8	9.4	29.5	5	-20.1	Pass
156.31	10	1	1	Quasi-peak	21.6	10.7	33.1	1	-22.4	Pass
199.83	10	1	1	Quasi-peak	21.4	12.1	33.1	1	-21.0	Pass
566.4	10	1	1	Quasi-peak	26.8	25.0	35.6	6	-10.6	Pass
841.6	10	1	1	Quasi-peak	26.1	30.1	35.0		-5.5	Pass
993.6	10	1	1	Quasi-peak	26.5	31.8	43.5	5	-11.7	Pass
60.0	PROFESSIONAL Y E S Y I N 6		1	rofessiol 0 Meter Radiate -1000MHz Class	d Emissions	1 <b>9</b> M	company - T lodel # - Rei lescription - roject # - 12 loltage - Bat	mote Tra - 2.4 GH 2770-10	z Transceiver	
50.0 -										
40.0 (wy/ngp)										
30.0 -							and the same of th	inger bet the state of		
¥ 20.0		,,,		Andrew Construction of the	talifika da karanda da	HAMP TO A PARTY OF THE PARTY OF				
-	om r: Layne Lueckem 5 PM,Thursday,Ju	-		100.0 Frequen Transmit Middle CI	cy (Hz)	1	1	i		s zontal Data B 30M-1GHz
			30MH	Iz to 1GHz, I	Horizontal P	olarity				

Table 7.3.4: Out of Band Spurious Emissions Test Results, 30 MHz to 1 GHz, Vertical Polarization

			Professi	onal Te	esting, E	MI, Inc	•		
Test Metho	od:				Measuremen Equipment				ow-
In accord	ance with:	FCC Part		de of Federa	al Regulatio				nal
Section:		15.109							
Test Date(s	s):	7/14/2011			<b>EUT Serial</b>	l # <b>:</b>	n/a		
Customer:		Traxxas			EUT Part #		n/a		
roject Nu		12770-10			Test Techn		Layne Lue		
urchase C		GMD1107	-		Supervisor		Jason Hale		
Equip. Und	ler Test:	Remote Tr	anceiver		Witness' N	ame:	Chris Russ	sell	
Radia	ted Emission	ns Test Resu	lts Data Shee	et - Vertical	Antenna Pola	nrity ≤ 1GHz	z Pa	ige: 1	of 1
EUT I	Line Voltage	: Bat	tery	Vrms	EUT Li	ne Frequenc	y: n	/a	Hz
	EUT N	Mode of Ope	ration:			Transı	mit 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
60.0 ¬	PROFESSIONAL TESTING		1		onal Testil ted Emissions as B Vertical Plot	11 <b>9</b> ,	Company - Traxxa Model # - Remote Description - 2.4 G Project # - 12770- Oltage - Battery	Transceiver Hz Transceiver	
50.0 -									
(w//									
49.0 (W/Angp)								The second second	
90.0 - 20.0 - 20.0 -						Lundin i in terbishir	المتعرف والمتعرف والمتعدد والمتعدد		
10.0		P	manulanappe	reventaries de la company de l	and the state of t	- Likewith The Committee of the Committe			
0									
	DM	- ·		100	D.OM	<del>-                                    </del>		1.0	G
10.0	: Layne Luecken			Freque	ncy (Hz)				tical Data

Table 7.3.5: Out of Band Spurious Emissions Test Results, 1 GHz to 18 GHz, Horizontal Polarization

Professional Testing, EMI, Inc.  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"  FORE 115-120 G. Left Fold Control of Part 115-1	
Test Method: Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz"	
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	
Fest Date(s): 7/14/2011 EUT Serial #: n/a	
Customer: Traxxas EUT Part #: n/a	
Project Number: 12770-10 Test Technician: Layne Lueckemeyer	
Purchase Order #: GMD110707-2 Supervisor: Jason Haley	
Equip. Under Test: Remote 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	
Measured   Distance   Direction   Height   Amplitude   Level   "	est sults
4852 3 28 1 Average 64.9 38.1 54.0 -15.9 Pa	ass
7278 3 128 1 Average 58.6 34.8 54.0 -19.1 Pa	ass
	ass
	ass
	ass ass
Professional Testing 3 Meter Radiated Emissions 1-18GHz Class B Horizontal Plot  PROFESSIONAL  PROFESSIONAL  Output  Company - Traxxas Model # - Remote Transceiver Description - 2.4 GHz Transceiver Project # - 12770-10 Voltage - Battery	
70.0	
(W) 60.0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
20.0 \$\frac{1}{276}\$ 4.4G 6.1G 7.8G 9.5G 11.2G 12.9G 14.6G 16.3G 18.0G \\ Concreter   Dans    _	
Operator: Layne Lueckemeyer Frequency (nz) — Hor kortat Data  02:55:14 PM, Thursday, July 14,2011 — FCC B 148GHz	- 1
1GHz to 18GHz, Horizontal Polarity	

Table 7.3.6: Out of Band Spurious Emissions Test Results, 1 GHz to 18 GHz, Vertical Polarization

Polarizati	ion								
		]	Professi	onal Te	sting, E	MI, Inc	•		
Test Metho	od:							issions from L	ow-
								Iz to 40 GHz" B - Unintentio	nol
In accorda	ance with:		Radiated E			ns Part 47,	Subpart 1	b - Ummtentio	naı
Section:		15.109							
Test Date(s	s):	7/14/2011			<b>EUT Serial</b>		n/a		
Customer:		Traxxas			EUT Part #		n/a		
Project Nu		12770-10	~- ^		Test Techn			ueckemeyer	
Purchase C		GMD11070			Supervisor		Jason Ha		
Equip. Und	ier Test:	Remote Tr	anceiver		Witness' N	ame:	Chris Ru	isseii	
Radia	ted Emission	ns Test Resul	ts Data Shee	et - Vertical A	Antenna Pola	arity > 1GHz		Page: 1	of 1
EUT I	Line Voltage	: Bat	tery	Vrms	EUT Li	ne Frequenc	y:	n/a	Hz
	EUT N	Mode of Ope	ration:			Transı	nit Middle	e Channel	
Frequency Measured (MHz)	Test Distance (Meters)	EUT Direction (Degrees)	Antenna Height (Meters)	Detector Function	Recorded Amplitude (dBµV)	Corrected Level (dBµV/m)	Limit Lev (dBµV/n		Test Results
4852	3	123	1	Average	65.4	38.6	54.0	-15.4	Pass
7278	3	207	1	Average	58.9	35.1	54.0	-18.8	Pass
9702	3	256	1	Average	53.6	36.7	54.0	-17.2	Pass
11995	3	1	1	Average	49.8	38.3	54.0	-15.6	Pass
14800 16900	3	1	1	Average Average	48.7 50.3	38.8 41.4	54.0 54.0	-15.2 -12.6	Pass Pass
	PROFESSIONAL TESTING	1	P		nal Testii ed Emissions	ng ^C	Company - Trax Model# - Remo	xxas te Transceiver 4 GHz Transceiver 70-10	1 433
(dBuV/m)									
Amplitude (dE	A PART OF THE PART					<u> </u>	<b>\</b>	<b>~~~</b>	
20.0									
1.0 Operator	G 27G :: Layne Luecken is PM, Thursday, Ju	-	6.1G	7.8G 9.5 Frequen Transmit Middle C	ncy (Hz)	12.9G	14.6G		og tical Data CB 1-18GHz
			1GH	Iz to 18GHz,	Vertical Pol	arity			

Table 7.3.7: Out of Band Spurious Emissions Test Results, 18 GHz to 25 GHz, Horizontal and Vertical Polarizations

PROJECT#	DATE	CLASS	DISTANCE	ANTENNA	RBW	VBW	DETECTOR
12770-10	July 14, 2011	FCC B	1 m	Horn	1 MHz	1 MHz	Average
COMMENT		ng 2406 MHz and spurious i	nvestigated 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 7.3.8: Out of Band Spurious Emissions Test Results, 18 GHz to 25 GHz, Horizontal and Vertical Polarizations

PROJECT #	DA	TE	CLASS	DISTANCE	ANTENNA	RBW	VBW	DETECTOR
12770-10	July 1	4, 2011	FCC B	1 m	Horn	1 MHz	1 MHz	Average
COMMENT			tting 2426 cs and spur		d 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 7.3.9: Out of Band Spurious Emissions Test Results, 18 GHz to 25 GHz, Horizontal and Vertical Polarizations

PROJECT #	DATE	CLASS	DISTANCE	ANTENNA	RBW	VBW	DETECTOR
12770-10	July 14, 2011	FCC B	1 m	Horn	1 MHz	1 MHz	Average
COMMENT		tting 2453 cs and spur		d 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** 

abl	e 7.3.10	: Anten	na Po	rt Out	of Band	Spur	ious Emis	ssions T	est Re	sults, 30	to 100	0 MHz
				Prof	fessiona	l Te	sting, E	MI, In	ıc.			
In ac	ecordance				Subpart C							
Cest I	Date(s):		Section 7/15/201				EUT Serial	#•	N/A			
	mer:		raxxas				EUT Part #		N/A			
	ct Numbe	er: 1	2770-1	0			Test Techn			e Luecken	ıeyer	
	ase Orde		<u>5MD11</u>				Supervisor		Larry			
Lquip	o. Under '	Test: 1	<b>Receive</b>	r Remote			Witness' N	ame:	Chris	Russell		
]	EUT Line	Voltage:		6	VDC		EUT Li	ne Freque	ncy:	n/a		Hz
		EUT M	ode of C	)peration:				Trar	smit Mi	ddle Chanı	nel	
	Ref 10	dBm		* Att	30 dB		7 100 kHz 7 100 kHz 7 5 s			] 7.05 dBm 0000 MHz		
	10											
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PK *	10											
	20											
	30					_						
	40	D1 -36	dBm									
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	70											
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	-90											
52.	025 MHz	z										
ate	: 19.JU	JL.2011	08:	28:38								
					2	OMITT.	to 1CII-					
					3	UMHZ	to 1GHz					

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Table 7.3.11: Antenna Port Out of Band Spurious Emissions Test Results, 1 to 25 GHz

	Pı	rofessional	Test	ing, E	MI, In	ıc.		
n accordance with: I								
	Section 15.24	7	Ire	TIT C	ш.	TAT/A		
` /	7/15/2011 Traxxas			UT Serial UT Part #		N/A N/A		
	2770-10			est Techni			e Lueckemey	ver
urchase Order #: (	GMD110707-		St	ipervisor:		Larry	Finn	, -
quip. Under Test: I	Receiver Ren	ote	W	/itness' Na	ame:	Chris	Russell	
EUT Line Voltage:	6	VDC		EUT Lin	ne Freque	ncy:	n/a	Hz
EUT M	ode of Operat	ion:			Trai	nsmit Mi	ddle Channel	
			* VBW	LOO kHz	Marker	-11	.92 dBm	
Ref 10 dBm	* At	t 30 dB	*SWT 5	S S	2	.440000	0000 GHz	
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1								
I -								
PK								
10 1 T								
-10-1	<del>clB</del> m							
10 1 20	€iBm							
	<del>clE</del> m		~~		···. \	non	num.	
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	ciBm 	Munder	J~	y.M.		<u></u>	num.	
	clBm 	, Jungle way	<b></b>	y was		por	nemma	
	ciBm	, June June June June June June June June				por .	men'n	
	elBm	, made many	<u></u>			<u></u>	nama.	

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## **8.0** Antenna Requirements

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

#### **8.2** 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.

#### 8.3 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.

#### **8.4** Evaluation Results

The Traxxas Remote 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	Re	po	rt
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