

Alpha Design and Products, Inc.

ADDENDUM TO TEST REPORT 95441-8

**FM Transmitter Device
Model: ADnP_FMTX**

Tested To The Following Standards:

**FCC Part 15 Subpart C Section(s)
15.239**

Report No.: 95441-8A

Date of issue: June 6, 2014



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

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

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ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

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REPORT PREPARED BY:

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REPRESENTATIVE: Wali Roustia

Project Number: 95441

DATE OF EQUIPMENT RECEIPT:

May 14, 2014

DATE(S) OF TESTING:

May 14-15, 2014

Revision History

Original: Testing of the FM Transmitter Device, ADnP_FMTX to FCC Part 15 Subpart C Section 15.239.

Addendum A: During the certification evaluation the following modifications were requested to be added to the report: the Band Edge data, the antenna setup photo, the Dual Universal USB Car Charger setup photo, and detailed information on the modifications were added to the Conditions During Testing table.

Report Authorization

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



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

Test Facility Information



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

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

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.00.14
Immunity	5.00.07

Site Registration & Accreditation Information

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

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C

Test Procedure/Method	Description	Results
15.239(a)	Occupied Bandwidth	Pass
15.239(b)	RF Power Output	Pass
15.239(c)	Field Strength of Radiated Spurious Emissions and Band Edge	Pass

Conditions During Testing

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

Summary of Conditions
<ol style="list-style-type: none"> 1. FCC part 15.207 testing is not required for this EUT because it only employs battery power for operation. The EUT also does not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. 2. The EUT antenna position was adjusted to maximize emissions. The below shown picture indicates the antenna position which gives maximum emissions. 3. For all tests, a 12VDC power supply was used in conjunction with dual universal USB car charger. This USB car charger receives 12VDC input and outputs 5Vdc to the two USB ports. The EUT interface cable which has the ferrite molded onto it has a USB connector at the far end. The USB connector was connected to the USB car charger and receiving 5VDC for the EUT. Dual Universal USB Car Charger Manufacturer: Maxpower Intelligence, Inc. Model: USAMS3.1W 4. The audio input level used during testing was the maximum input for the EUT. Amplitude 0.7Vp-p. Frequency range 20Hz to 20kHz. Frequency range of modulation 22.5kHz to 68.25kHz.

Modification Test Setup Photos



Antenna Position



Dual Universal USB Car Charger

EQUIPMENT UNDER TEST (EUT)

EQUIPMENT UNDER TEST

FM Transmitter Device

Manuf: Alpha Design and Products, Inc.

Model: ADnP_FMTX

Serial: 146522130022

PERIPHERAL DEVICES

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

DC Power Supply

Manuf: Xantrex

Model: XTS 30-2X

Serial: 58738

Audio Source

Manuf: Apple

Model: iPod

Serial: C3VJPCKGF4K4

FCC PART 15 SUBPART C

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

15.239(a) Occupied Bandwidth

Test Setup / Conditions

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

Customer: **Alpha Design and Products, Inc.**

Specification: **15.239 (a) Emission Bandwidth**

Work Order #: **95441**

Date: 5/14/2014

Test Type: **Maximized Emissions**

Equipment: **FM Transmitter Device**

Manufacturer: Alpha Design and Products, Inc.

Tested By: S. Yamamoto

Model: ADnP_FMTX

S/N: 146522130022

Test Equipment:

Asset #	Description	Model	Calibration Date	Cal Due Date
02869	Spectrum Analyzer	E4440A	2/6/2013	2/6/2015
P04358	Cable	RG142	3/12/2014	3/12/2016

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
FM Transmitter Device*	Alpha Design and Products, Inc.	ADnP_FMTX	146522130022

Support Devices:

Function	Manufacturer	Model #	S/N
DC Power Supply	Xantrex	XTS 30-2X	58738
Audio Source	Apple	iPod	C3VJPCKGF4K4

Test Conditions / Notes:

The equipment under test (EUT) and support iPod are located adjacent to each other on the table top.
An external DC power supply is providing 12.0VDC to the EUT.
The iPod is providing audio to the input of the EUT.
The EUT is transmitting at rated maximum power.
The spectrum analyzer is used to measure the emission bandwidth of the EUT.

Temperature: 22°C, Humidity: 30%, Pressure: 100kPa

Site A

Test Data

15.239(b) RF Power Output

Test Conditions / Setup

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

Customer: **Alpha Design and Products, Inc.**

Specification: **15.239 (b) Carrier Emissions**

Work Order #: **95441**

Date: 5/14/2014

Test Type: **Maximized Emissions**

Time: 09:53:23

Equipment: **FM Transmitter Device**

Sequence#: 2

Manufacturer: Alpha Design and Products, Inc.

Tested By: S. Yamamoto

Model: ADnP_FMTX

S/N: 146522130022

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02869	Spectrum Analyzer	E4440A	2/6/2013	2/6/2015
T2	ANP05198	Cable-Amplitude 15 to 45degC (dB)	8268	12/11/2012	12/11/2014
T3	AN01995	Biconilog Antenna	CBL6111C	4/30/2014	4/30/2016
T4	AN00309	Preamp	8447D	3/12/2014	3/12/2016
T5	ANP05050	Cable	RG223/U	1/21/2013	1/21/2015

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
FM Transmitter Device*	Alpha Design and Products, Inc.	ADnP_FMTX	146522130022

Support Devices:

Function	Manufacturer	Model #	S/N
DC Power Supply	Xantrex	XTS 30-2X	58738
Audio Source	Apple	iPod	C3VJPCKGF4K4

Test Conditions / Notes:

The equipment under test (EUT) and support iPod are located adjacent to each other on the Styrofoam table top. An external DC power supply is providing 12.0VDC to the EUT.

The iPod is providing audio to the input of the EUT.

The EUT is transmitting at rated maximum power.

Temperature: 27°C, Humidity: 30%, Pressure: 100kPa.

Frequency range of measurement 100.0MHz to 100.2MHz. RBW=VBW=200kHz

Site A

Ext Attn: 0 dB

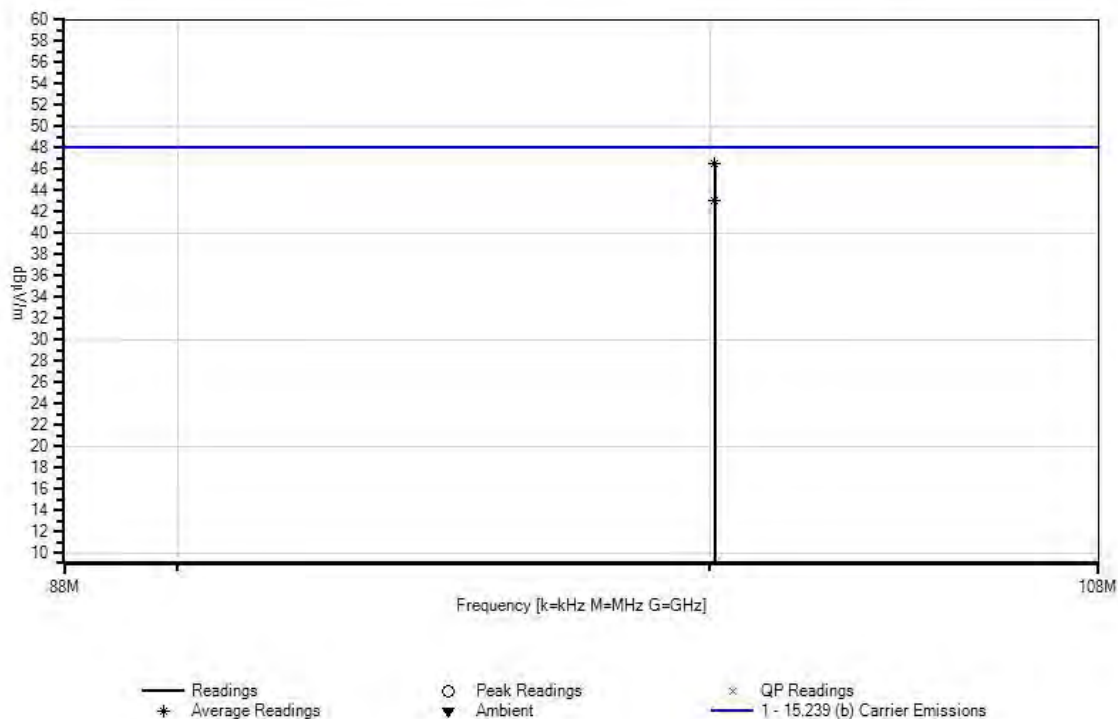
Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dB μ V	T1 T5 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	100.100M	62.5	+0.0	+1.7	+10.3	-28.1	+0.0	46.5	48.0	-1.5	Horiz
Ave			+0.1								
^	100.100M	67.7	+0.0	+1.7	+10.3	-28.1	+0.0	51.7	48.0	+3.7	Horiz
			+0.1								
3	100.100M	59.0	+0.0	+1.7	+10.3	-28.1	+0.0	43.0	48.0	-5.0	Vert
Ave			+0.1								
^	100.100M	64.8	+0.0	+1.7	+10.3	-28.1	+0.0	48.8	48.0	+0.8	Vert
			+0.1								

CKC Laboratories, Inc. Date: 5/14/2014 Time: 09:53:23 Alpha Design and Products, Inc. WO#: 95441
15.239 (b) Carrier Emissions Test Distance: 3 Meters Sequence#: 2 Ext ATTN: 0 dB



Test Setup Photos



15.239(c) Field Strength of Radiated Spurious Emissions and Band Edge

Test Conditions / Setup

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

Customer: **Alpha Design and Products, Inc.**

Specification: **15.239(c)/15.209 Radiated Emissions**

Work Order #: **95441**

Date: 5/14/2014

Test Type: **Maximized Emissions**

Time: 13:27:38

Equipment: **FM Transmitter Device**

Sequence#: 3

Manufacturer: Alpha Design and Products, Inc.

Tested By: S. Yamamoto

Model: ADnP_FMTX

S/N: 146522130022

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02869	Spectrum Analyzer	E4440A	2/6/2013	2/6/2015
T2	ANP05198	Cable-Amplitude 15 to 45degC (dB)	8268	12/11/2012	12/11/2014
T3	AN01995	Biconilog Antenna	CBL6111C	4/30/2014	4/30/2016
T4	AN00309	Preamp	8447D	3/12/2014	3/12/2016
T5	ANP05050	Cable	RG223/U	1/21/2013	1/21/2015
	AN00849	Horn Antenna	3115	3/18/2014	3/18/2016
	AN00786	Preamp	83017A	6/20/2012	6/20/2014
	AN03239	Cable	32022-2-29094K-24TC	10/30/2013	10/30/2015
	ANP05421	Cable	Sucoflex 104A	1/8/2014	1/8/2016
	ANP05563	Cable	ANDL-1-PNMN-48	8/7/2012	8/7/2014
T6	AN00314	Loop Antenna	6502	6/29/2012	6/29/2014

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
FM Transmitter Device*	Alpha Design and Products, Inc.	ADnP_FMTX	146522130022

Support Devices:

Function	Manufacturer	Model #	S/N
DC Power Supply	Xantrex	XTS 30-2X	58738
Audio Source	Apple	iPod	C3VJPCCKGF4K4

Test Conditions / Notes:

The equipment under test (EUT) and support iPod are located adjacent to each other on the Styrofoam table top.
 An external DC power supply is providing 12.0VDC to the EUT.
 The iPod is providing audio to the input of the EUT.
 The EUT is transmitting at rated maximum power.

Temperature: 28°C, Humidity: 30%, Pressure: 100kPa

Frequency range of measurement 9kHz to 1003MHz. 9kHz to 150kHz RBW=VBW=200Hz; 150kHz to 30MHz RBW=VBW=9kHz; 30MHz to 1000MHz RBW=VBW=120kHz; above 1000MHz RBW=VBW=1MHz
 Site A.

Ext Attn: 0 dB

Measurement Data:

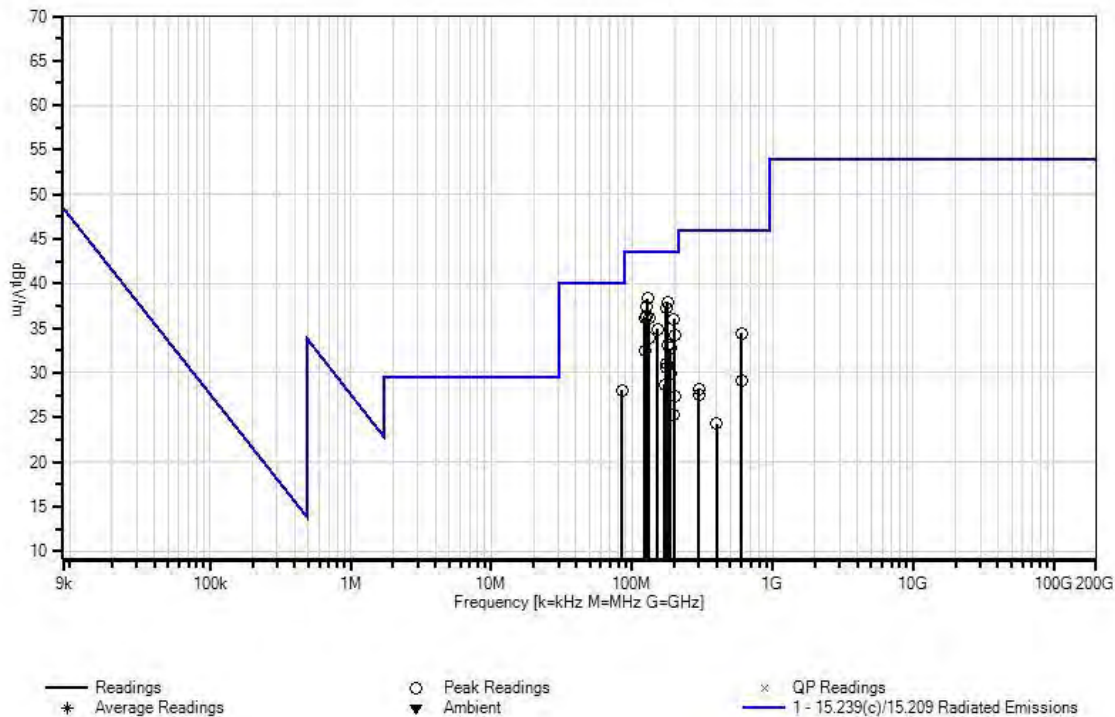
Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dBμV	T1 T5 dB	T2 T6 dB	T3 dB	T4 dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	129.310M	52.9	+0.0 +0.1	+1.9 +0.0	+11.6	-28.1	+0.0	38.4	43.5	-5.1	Horiz
2	179.756M	54.3	+0.0 +0.2	+2.3 +0.0	+9.0	-28.0	+0.0	37.8	43.5	-5.7	Vert
3	127.166M	52.0	+0.0 +0.1	+1.9 +0.0	+11.6	-28.1	+0.0	37.5	43.5	-6.0	Horiz
4	174.318M	53.5	+0.0 +0.2	+2.3 +0.0	+9.3	-28.0	+0.0	37.3	43.5	-6.2	Vert
5	127.466M	50.9	+0.0 +0.1	+1.9 +0.0	+11.6	-28.1	+0.0	36.4	43.5	-7.1	Vert
6	122.680M	50.7	+0.0 +0.1	+1.9 +0.0	+11.6	-28.1	+0.0	36.2	43.5	-7.3	Horiz
7	132.380M	50.6	+0.0 +0.1	+2.0 +0.0	+11.5	-28.1	+0.0	36.1	43.5	-7.4	Horiz
8	198.309M	52.2	+0.0 +0.2	+2.5 +0.0	+9.1	-28.0	+0.0	36.0	43.5	-7.5	Vert
9	151.640M	49.7	+0.0 +0.2	+2.1 +0.0	+10.9	-28.0	+0.0	34.9	43.5	-8.6	Vert
10	200.197M	50.5	+0.0 +0.2	+2.5 +0.0	+9.1	-28.0	+0.0	34.3	43.5	-9.2	Vert
11	131.366M	48.3	+0.0 +0.1	+2.0 +0.0	+11.6	-28.1	+0.0	33.9	43.5	-9.6	Vert
12	179.400M	49.7	+0.0 +0.2	+2.3 +0.0	+9.0	-28.0	+0.0	33.2	43.5	-10.3	Horiz
13	188.460M	49.1	+0.0 +0.2	+2.4 +0.0	+9.0	-28.0	+0.0	32.7	43.5	-10.8	Vert
14	123.249M	47.0	+0.0 +0.1	+1.9 +0.0	+11.6	-28.1	+0.0	32.5	43.5	-11.0	Vert
15	600.599M	37.0	+0.0 +0.4	+4.6 +0.0	+19.9	-27.5	+0.0	34.4	46.0	-11.6	Horiz
16	85.090M	46.2	+0.0 +0.1	+1.6 +0.0	+8.2	-28.1	+0.0	28.0	40.0	-12.0	Horiz
17	174.182M	47.2	+0.0 +0.2	+2.3 +0.0	+9.3	-28.0	+0.0	31.0	43.5	-12.5	Horiz

18	176.049M	46.9	+0.0 +0.2	+2.3 +0.0	+9.2	-28.0	+0.0	30.6	43.5	-12.9	Horiz
19	186.309M	46.3	+0.0 +0.2	+2.4 +0.0	+9.0	-28.0	+0.0	29.9	43.5	-13.6	Horiz
20	171.682M	44.7	+0.0 +0.2	+2.3 +0.0	+9.5	-28.0	+0.0	28.7	43.5	-14.8	Horiz
21	200.202M	43.5	+0.0 +0.2	+2.5 +0.0	+9.1	-28.0	+0.0	27.3	43.5	-16.2	Horiz
22	600.599M	31.7	+0.0 +0.4	+4.6 +0.0	+19.9	-27.5	+0.0	29.1	46.0	-16.9	Vert
23	300.299M	39.3	+0.0 +0.3	+3.1 +0.0	+13.4	-27.9	+0.0	28.2	46.0	-17.8	Horiz
24	198.309M	41.4	+0.0 +0.2	+2.5 +0.0	+9.1	-28.0	+0.0	25.2	43.5	-18.3	Horiz
25	300.306M	38.7	+0.0 +0.3	+3.1 +0.0	+13.4	-27.9	+0.0	27.6	46.0	-18.4	Vert
26	400.400M	31.8	+0.0 +0.4	+3.6 +0.0	+16.4	-27.9	+0.0	24.3	46.0	-21.7	Horiz

CKC Laboratories, Inc. Date: 5/14/2014 Time: 13:27:38 Alpha Design and Products, Inc. WO#: 95441
15.239(c)/15.209 Radiated Emissions Test Distance: 3 Meters Sequence#: 3 Ext ATTN: 0 dB



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

Customer: **Alpha Design and Products, Inc.**

Specification: **15.239 (c) Band edge plots**

Work Order #: **95441**

Date: 6/5/2014

Test Type: **Band edge**

Time: 19:33

Equipment: **FM Transmitter Device**

Manufacturer: Alpha Design and Products, Inc.

Tested By: S. Yamamoto

Model: ADnP_FMTX

S/N: 146522130022

Test Equipment:

Asset #	Description	Model	Calibration Date	Cal Due Date
AN02869	Spectrum Analyzer	E4440A	2/6/2013	2/6/2015

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
FM Transmitter Device*	Alpha Design and Products, Inc.	ADnP_FMTX	146522130022

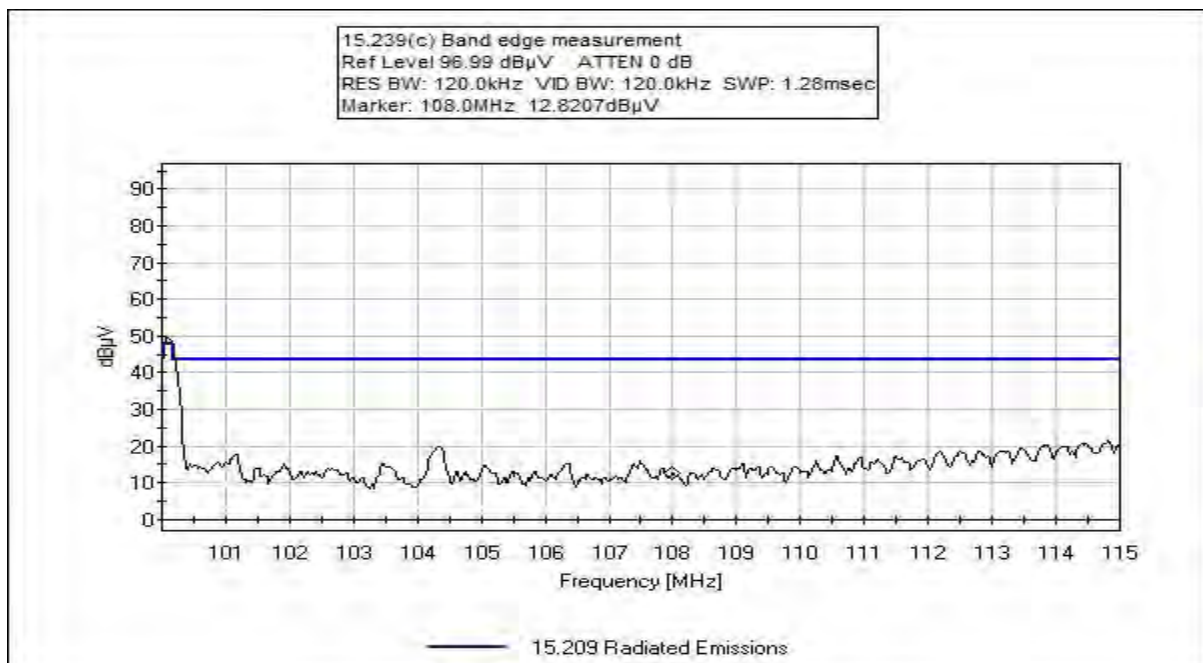
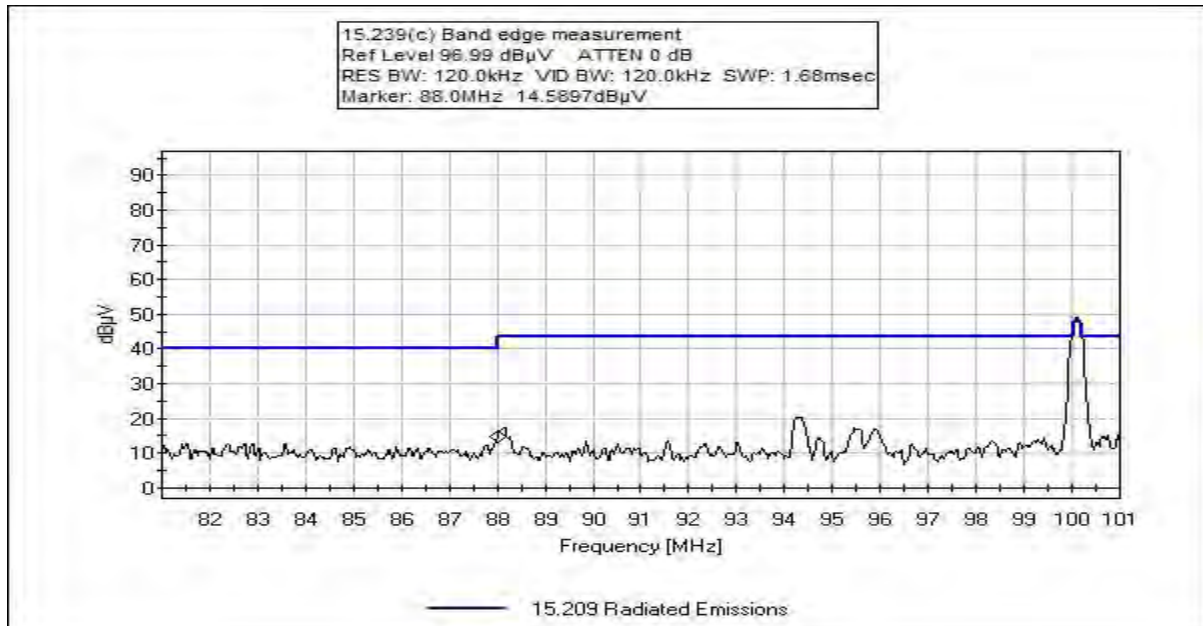
Support Devices:

Function	Manufacturer	Model #	S/N
DC Power Supply	Xantrex	XTS 30-2X	58738
Audio Source	Apple	iPod	C3VJPCKGF4K4

Test Conditions / Notes:

<p>The equipment under test (EUT) is located stand alone on the foam block.</p> <p>The support iPod and power supply are located away from the EUT.</p> <p>The external DC power supply is providing 12.0Vdc to the car to USB adapter.</p> <p>The adapter is providing 5Vdc to the EUT.</p> <p>The iPod is providing maximum audio input to the EUT.</p> <p>The EUT is transmitting at rated maximum power.</p> <p>Temperature: 22°C, Humidity: 37%, Pressure: 100kPa</p> <p>Frequency range of measurement 81 MHz to 115 MHz. RBW=VBW=120kHz.</p> <p>Site A.</p>
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Band Edge Test Plots



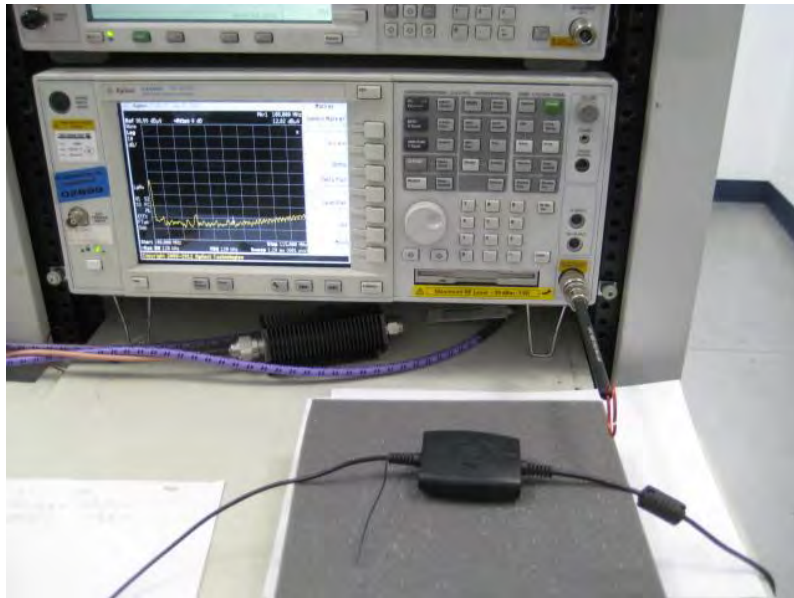
Test Setup Photos



Front View, Radiated Spurious



Back View



Band Edge

SUPPLEMENTAL INFORMATION

Measurement Uncertainty

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

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

Emissions Test Details

TESTING PARAMETERS

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

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

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

CORRECTION FACTORS

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

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

TEST INSTRUMENTATION AND ANALYZER SETTINGS

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

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

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

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

Peak

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

Quasi-Peak

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

Average

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