



TEST REPORT

Report Number: 3196556MIN-002

Project Number: 3196556

Testing performed on the
X001700-1 with Omnikey 5121+ RF Encoder
FCC ID: JZ2OMNI5121P
Industry Canada ID: 6019A-OMNI5121P
Class II Permissive Changes

to
47 CFR Part 15. 225:2008
RSS- 210, Issue 7, 2007


For
Fargo Electronics Inc.

Test Performed by:
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Oakdale, MN 55128

Test Authorized by:
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Date: January 8, 2010

Reviewed by: 
Simon Khazon

Date: January 8, 2010

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1.0 GENERAL DESCRIPTION

Model:	X001700-1 with Omnikey 5121+ RF Encoder
Type of EUT:	Printer with RF Encoder
Serial Number:	N/A
FCC ID:	JZ2OMNI5121P
Industry Canada ID:	6019A-OMNI5121P
Permissive Changes:	Class II Permissive Changes
Original Report:	3181459MIN-002 issued by Intertek, Oakdale, MN
Company:	Fargo Electronics Inc.
Customer:	Mr. Leon Gershenovich
Address:	6533 Flying Cloud Drive, Suite 100 Eden Prairie, MN 55344
Phone:	(952) 918-8622
Fax:	(952) 826-7949
Test Standards:	<input checked="" type="checkbox"/> 47 CFR, Part 15:2008, §15.225 <input checked="" type="checkbox"/> RSS-210, Issue 7, 2007 <input checked="" type="checkbox"/> RSS-Gen, Issue 2, 2007 <input type="checkbox"/> 47 CFR, Part 15:2008, §15.107 and §15.109, Class <input type="checkbox"/> Other
Type of radio:	<input checked="" type="checkbox"/> Stand -alone <input type="checkbox"/> Module <input type="checkbox"/> Hybrid
Date Sample Submitted:	December 3, 2009
Test Work Started:	December 3, 2009
Test Work Completed:	December 4, 2009
Test Sample Conditions:	<input type="checkbox"/> Damaged <input type="checkbox"/> Poor (Usable) <input checked="" type="checkbox"/> Good



1.1 Product Description; Test Facility

Product Description:	RFID Transmitter
Operating Frequency	13.56MHz
Modulation:	ASK
Emission Designator:	10K0A1D
Antenna(s) Info:	Integral Antenna
Antenna Installation:	<input type="checkbox"/> User <input type="checkbox"/> Professional <input checked="" type="checkbox"/> Factory
Permissive Changes Description:	Change was made to improve an antenna matching impedance
Transmitter Power Configuration:	<input type="checkbox"/> Internal battery <input type="checkbox"/> External power source <input checked="" type="checkbox"/> 100-240VAC <input type="checkbox"/> 230VAC <input type="checkbox"/> 400VAC <input type="checkbox"/> [REDACTED] VDC <input type="checkbox"/> Other: [REDACTED] [REDACTED] Amp. <input checked="" type="checkbox"/> 50-60Hz
Special Test Arrangement:	The transmitter was tested without a printer/host unit as a worst case, Conducted Emissions testing was performed at the printer AC port. Fargo Electronics Omnikey Test software v. 1.0.0 was used to run transmitter continuously.
Test Facility Accreditation:	A2LA (Certificate No. 1427.01)
Test Methodology:	Measurements performed according to the procedures in ANSI C63.4-2003

1.2 EUT Configuration

The equipment under test was operated during the measurement under the following conditions:

- ☐ - Standby
- ☒ - Continuous
- ☐ - Test program (customer specific)
- ☐ -

Operating modes of the EUT:

No.	Description
1	The EUT was programmed to transmit continuously at the maximum output power
2	

Cables:

No.	Type	Length	Designation	Note
1	USB cable	1'	USB connection to the Remote PC	
2				

Support equipment/Services:

No.	Item	Description
1	Laptop PC model Dell Latitude D610	Remote PC
2		

1.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

☒ Normal

Temperature: 15-35°C

Humidity: 30-60%

Atmospheric pressure: 86-106kPa

☒ Extreme

Temperature: -20 to +50°C

Primary Supply Voltage: ± 15%

1.4 Measurement uncertainty

The expanded uncertainty ($k = 2$) for radiated emissions from 30 to 1000 MHz has been determined to be: ± 4 dB at 10m and ± 5.4 dB at 3m

The expanded uncertainty ($k = 2$) for conducted emissions from 150 kHz to 30 MHz has been determined to be:
 ± 2.6 dB

1.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured emissions reading on the EMI Receiver.

The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where: FS = Field Strength in dB(μ V/m)

RA = Receiver Amplitude in dB(μ V)

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB(m^{-1})

AG = Amplifier Gain in dB

Assume a receiver reading of 48.1 dB(μ V) is obtained. The antenna factor of 7.4 dB(m^{-1}) and cable factor of 1.6 dB is added and amplifier gain of 16.0 dB is subtracted giving field strength of 41.1 dB(μ V/m).

$$RA = 48.1 \text{ dB}(\mu V)$$

$$AF = 7.4 \text{ dB}(m^{-1})$$

$$CF = 1.6 \text{ dB}$$

$$AG = 16.0 \text{ dB}$$

$$FS = RA + AF + CF - AG$$

$$FS = 48.1 + 7.4 + 1.6 - 16.0$$

$$FS = 41.1 \text{ dB}(\mu V/m)$$

General notes: None

2.0 TEST SUMMARY AND RATIONALE

Based on the nature of the transmitter changes (improve an antenna matching impedance), field strength of emissions within the band of operation and outside of band of operation were performed only.

Referring to the performance criteria and the operating mode during the tests specified in this report, the equipment complies with the requirements according to the following standards.

TEST SPECIFICATION	TEST PARAMETERS	RESULT
15.225(a)(b)(c) / RSS-210 A2.6(a)(b)(c)	Field strength within the band of operation	Pass
15.225(d) / RSS-210 A2.6(d)	Out of band emissions	Pass



3.0 TEST CONDITIONS AND RESULTS

3.1 Field strength within the band of operation

Test location: ☒ OATS ☐ Anechoic Chamber ☐ Other

Test distance: ☒ 10 meters ☐ 3 meters

Test result: **Pass**

Max. Emissions margin: 3.7dB below the limits

Notes: None

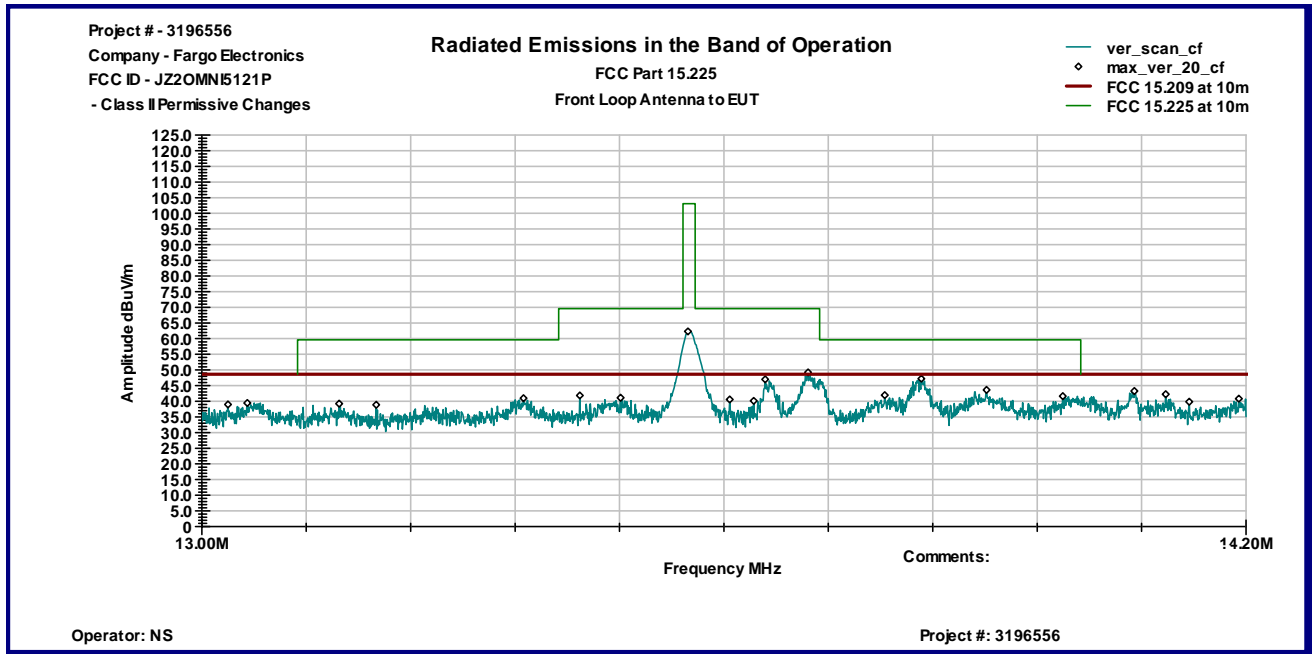
Date:	December 3-4, 2009	Result: Pass
Standard:	FCC 15.225(a)(b)(c) / RSS-210 A2.6(a)(b)(c)	
Tested by:	Norman Shpilsher	
Test Point:	Enclosure with antenna	
Operation mode:	See Page 5	
Note:		

Table 3.1.1

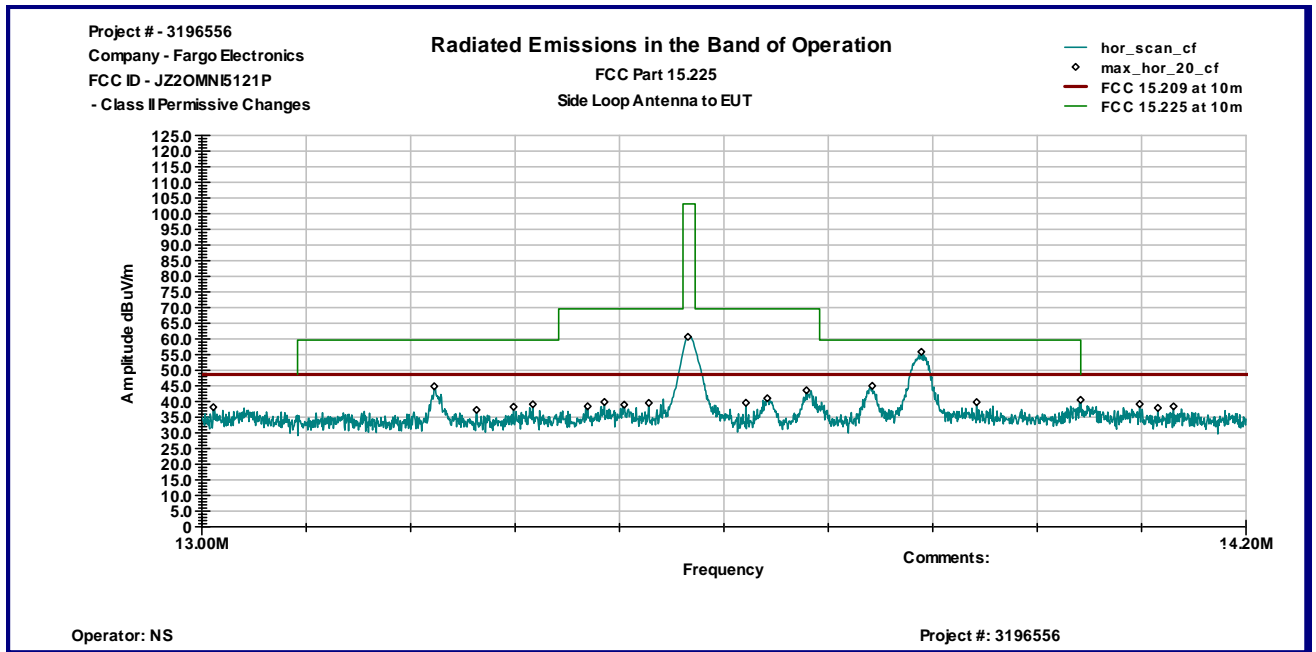
Frequency	Ant. Orientation	Peak Reading dB μ V	Ant.Factor dB 1/m	Total at 10m dB μ V/m	QP Limit dB μ V/m	Margin dB
13.37 MHz	Front	6.1	34.9	41.0	59.6	-18.6
13.434 MHz	Front	7.0	34.9	41.9	69.6	-27.7
13.559 MHz	Front	27.4	34.9	62.3	103.1	-40.8
13.647 MHz	Front	12.1	34.9	47.0	69.6	-22.6
13.697 MHz	Front	14.4	34.9	49.2	69.6	-20.4
13.785 MHz	Front	7.1	34.9	41.9	59.6	-17.7
13.827 MHz	Front	12.4	34.8	47.2	59.6	-12.4
13.902 MHz	Front	8.8	34.8	43.6	59.6	-16.0
13.989 MHz	Front	6.8	34.8	41.6	59.6	-18.0
13.267 MHz	Side	10.0	34.9	44.8	59.6	-14.8
13.38 MHz	Side	4.3	34.9	39.1	59.6	-20.5
13.559 MHz	Side	25.8	34.9	60.7	103.1	-42.4
13.695 MHz	Side	8.7	34.9	43.6	69.6	-26.0
13.77 MHz	Side	10.2	34.9	45.0	59.6	-14.6
13.827 MHz	Side	21.0	34.8	55.9	59.6	-3.7
14.01 MHz	Side	5.7	34.8	40.5	59.6	-19.1

Graph 3.1.1

Front antenna orientation



Side antenna orientation





3.2 Field strength outside of the band of operation

Test location: ☒ OATS ☒ Anechoic Chamber ☐ Other

Test distance: ☒ 10 meters ☒ 3 meters

Frequency range of measurements: 0.15MHz-1000MHz

Test result: **Pass**

Max. margin of spurious emissions: 2.6dB below the limits

Notes: The Emissions pre-test in frequency range from 150kHz to 30MHz was performed in the Anechoic chamber at 3m measurement distance (see Graphs 3.2.1); final measurements were performed in the Open Area Test Site at 10m measurement distance: no emissions above the ambient were detected.
The Emissions test in frequency range from 30MHz to 1GHz was performed in the Anechoic chamber at 3m measurement distance (see Table 3.2.1 and Graphs 3.2.2).

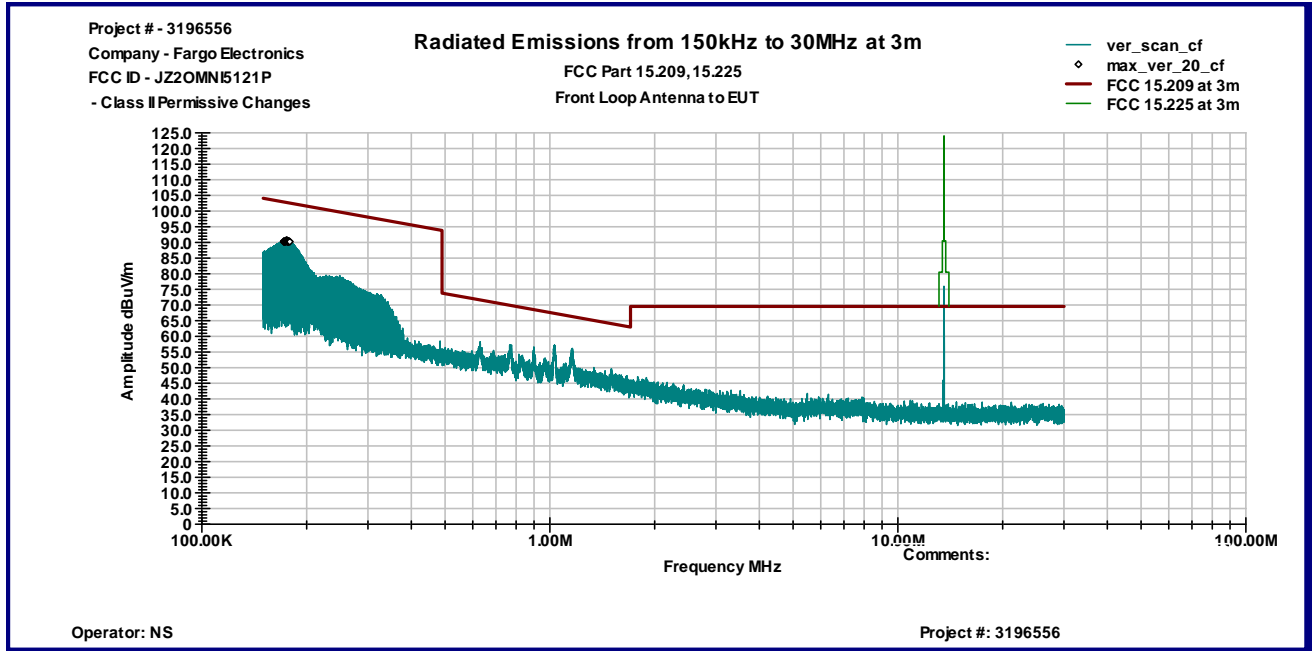
Date:	December 3-4, 2009	Result: Pass
Standard:	FCC 15.225(d) / RSS-210 A2.6(d)	
Tested by:	Norman Shpilsher	
Test Point:	Enclosure with antenna	
Operation mode:	See Page 5	
Note:		

Table 3.2.1

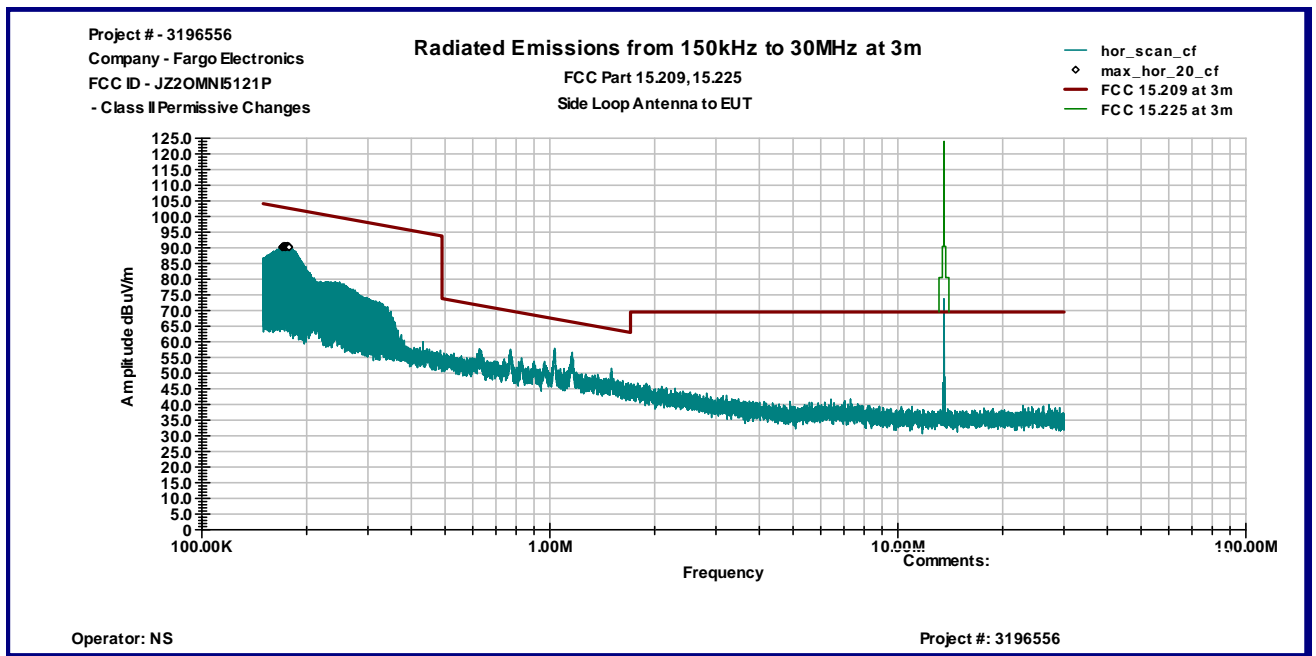
Frequency	Ant. Orientation	Peak Reading dBμV	Ant.Factor dB1/m	Total at 10m dBμV/m	QP Limit dBμV/m	Margin dB
27.12 MHz	Front	0.9	33.8	34.7	48.6	-13.9
27.12 MHz	Side	5.7	33.8	39.5	48.6	-9.1
Frequency	Ant. Polarization	Peak Reading dBμV	Ant.Factor dB1/m	Total at 3m dBμV/m	QP Limit dBμV/m	Margin dB
40.704 MHz	V	21.1	15.2	36.4	40.0	-3.7
67.848 MHz	V	22.6	7.2	29.8	40.0	-10.3
143.18 MHz	V	17.5	13.0	30.5	43.5	-13.0
250.18 MHz	V	16.9	14.5	31.4	46.0	-14.7
492.15 MHz	V	14.2	20.5	34.7	46.0	-11.4
503.83 MHz	V	15.4	20.6	36.1	46.0	-10.0
797.43 MHz	V	11.5	24.4	35.9	46.0	-10.1
40.704 MHz	H	12.1	15.2	27.3	40.0	-12.7
108.5 MHz	H	18.1	13.2	31.2	43.5	-12.3
144.02 MHz	H	21.4	13.0	34.4	43.5	-9.1
162.04 MHz	H	22.2	11.9	34.1	43.5	-9.4
250.18 MHz	H	21.7	14.5	36.2	46.0	-9.8
468.1 MHz	H	17.2	19.9	37.1	46.0	-9.0
479.92 MHz	H	21.2	20.2	41.3	46.0	-4.7
797.92 MHz	H	14.4	24.4	38.8	46.0	-7.3

Graph 3.2.1

Front antenna orientation

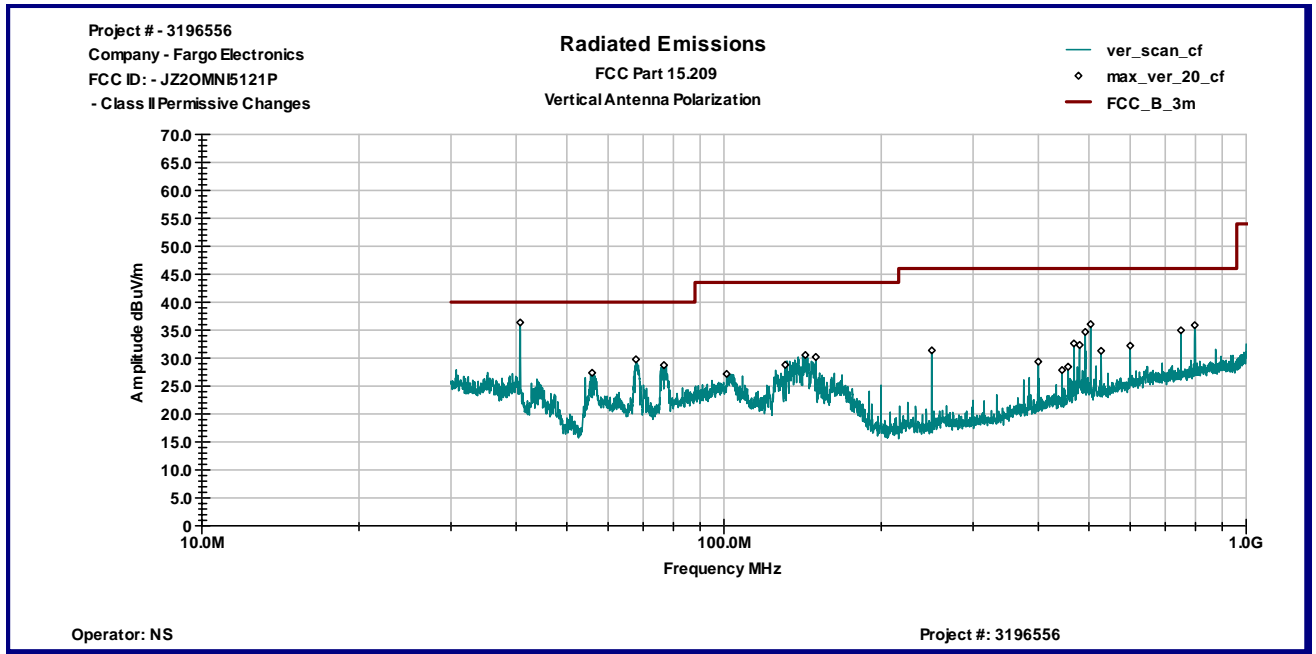


Side antenna orientation

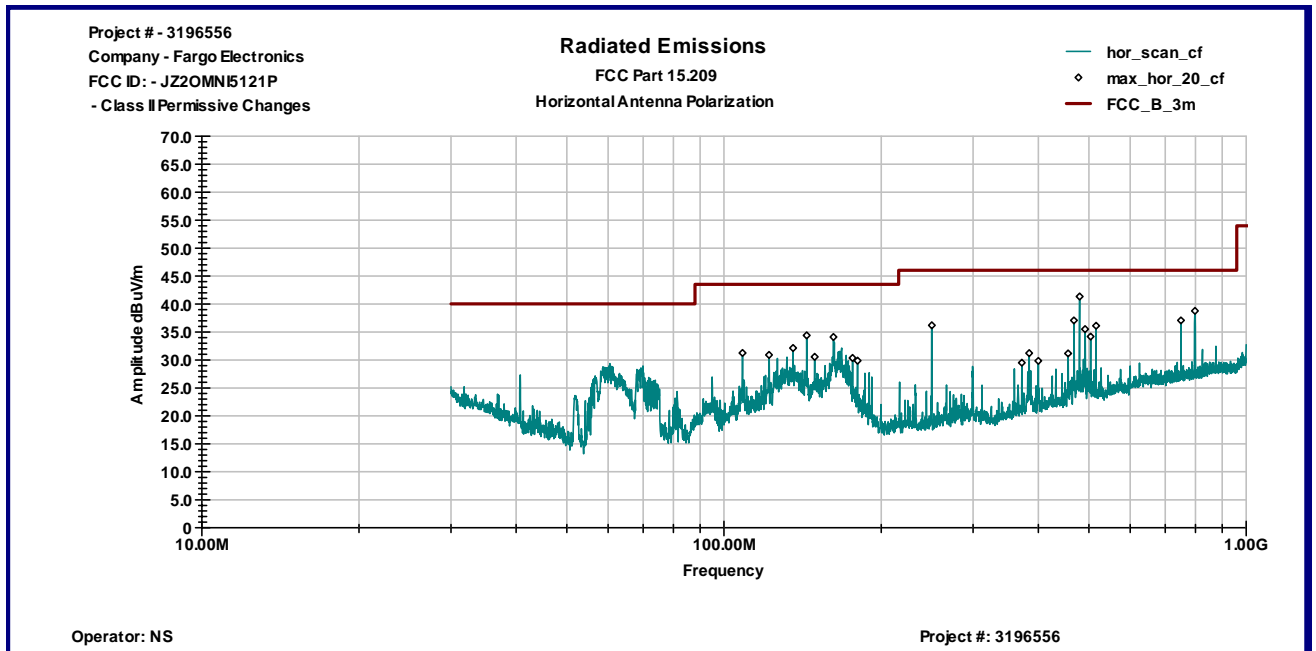


Graph 3.2.2

Vertical antenna polarization



Horizontal antenna polarization





4.0 TEST EQUIPMENT

DESCRIPTION	MANUFACTURER	MODEL	SERIAL NO.	INTERTEK ID	CAL DUE	USED
Receiver RF Section	HP	85462A	3549A00306	9995	02/27/2010	<input checked="" type="checkbox"/>
RF Filter Section	HP	85460A	3448A00276	9937	02/27/2010	<input checked="" type="checkbox"/>
Spectrum Analyzer	R & S	FSP 40	100024	12559	09/10/2010	<input type="checkbox"/>
Spectrum Analyzer	R & S	ESCI	100358	12909	05/18/2010	<input checked="" type="checkbox"/>
Spectrum Analyzer	Agilent	E7402A	MY44212200	12660	11/20/2010	<input type="checkbox"/>
Bicono-Log Antenna	Schaffner-Chase	CBL 6112 B	2468	14459	09/22/2010	<input checked="" type="checkbox"/>
Bicono-Log Antenna	Schaffner-Chase	CBL 6112 B	2630	14459	10/02/2010	<input type="checkbox"/>
Horn Antenna	EMCO	3115	9507-4513	9936	03/04/2010	<input type="checkbox"/>
Horn Antenna	EMCO	3115	6579	15580	04/03/2010	<input type="checkbox"/>
Waveguide Horn Antenna	EMCO	3116	9904-2423	9705	08/06/2010	<input type="checkbox"/>
Loop Antenna	ETS	6512	00060486	19942	08/10/2010	<input checked="" type="checkbox"/>
LISN	Fischer Custom Communications	FCC-LISN-2 MOD.SD	316	9945	11/06/2010	<input type="checkbox"/>
LISN	Fischer Custom Communications	FCC-LISN-50-25-2	2014	9665	11/30/2010	<input type="checkbox"/>
Pre-Amplifier	MITEQ	AMF-5D-00501800-28-13P	1122951	13475	08/07/2010	<input type="checkbox"/>
Pre-Amplifier	MITEQ	AMF-6F-16002600-25-10P	1222383	MIN-0065	08/07/2010	<input type="checkbox"/>
Pre-Amplifier	MITEQ	AMF-6F-26004000-40-8P	13224444	MIN-0064	08/07/2010	<input type="checkbox"/>
Pre-Amplifier	HP	8447F OPT H64	3113A04974	9934	05/21/2010	<input type="checkbox"/>
System	TILE! Instrument Control		Ver. 3.4.K.29	15259	VBV	<input checked="" type="checkbox"/>