



TEST REPORT

Report Number: 100416520MIN-001
Project Number: G100416520

Testing performed on the
ITE, and
RIC 13

FCC ID: EOA-IRIS-HA
Industry Canada ID: 6903A-IRISHA

to
47 CFR Part 15. 249:2010
RSS- 210, Issue 8, 2010
Class II Permissive Changes

For
Starkey Laboratories Inc.

Test Performed by:
Intertek Testing Services NA, Inc.
7250 Hudson Blvd., Suite 100
Oakdale, MN 55128

Test Authorized by:
Starkey Laboratories, Inc.
6700 Washington Avenue South
Eden Prairie, MN 55344 USA

Prepared by: SKhazon
Simon Khazon

Date: July 7, 2011

Reviewed by: NShpilsher
Norman Shpilsher

Date: July 7, 2011

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to copy or distribute this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program. This report must not be used to claim product endorsement by A2LA, NIST nor any other agency of the U.S. Government.



TABLE OF CONTENTS

1.0	GENERAL DESCRIPTION	3
1.1	Product Description; Test Facility.....	4
1.3	Environmental conditions	5
1.4	Measurement uncertainty.....	6
1.5	Field Strength Calculation	6
2.0	TEST SUMMARY	7
3.0	TEST CONDITIONS AND RESULTS	8
3.1	Field strength of fundamental.....	8
3.2	Field strength of harmonics and spurious emissions	11
3.3	Receiver/digital device radiated emissions	27
4.0	TEST EQUIPMENT	32



1.0 GENERAL DESCRIPTION

Model:	RIC 13 ITE
Type of EUT:	Wi Series Hearing Aids
Serial Number:	N/A
FCC ID:	EOA-IRIS-HA
Industry Canada ID:	6903A-IRISHA
Class II Permissive Changes:	Different antenna(s) from the original certification is used.
Company:	Starkey Laboratories Inc.
Customer:	Mr. Ken Meyer
Address:	6700 Washington Avenue South Eden Prairie, MN 55344 USA
Phone:	(952) 947-4734
Fax:	(952) 828-9262
Email:	ken_meyer@starkey.com
Test Standards:	<input checked="" type="checkbox"/> 47 CFR, Part 15:2010, §15.249 <input checked="" type="checkbox"/> RSS-210, Issue 8, 2010 <input checked="" type="checkbox"/> RSS-Gen, Issue 3, 2010 <input checked="" type="checkbox"/> 47 CFR, Part 15:2010, §15.107 and §15.109, Class B <input type="checkbox"/> Other [REDACTED]
Type of radio:	<input checked="" type="checkbox"/> Stand -alone <input type="checkbox"/> Module <input type="checkbox"/> Hybrid
Date Sample Submitted:	May 19, 2011
Test Work Started:	May 19, 2011
Test Work Completed:	June 14, 2011
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:	Wi Series Hearing Aids
Operating Frequency	902-928 MHz
Number of Channels	11 Channels
Modulation:	FSK
Emission Designator:	323KFXD
Antenna(s) Info:	Integral
Antenna Installation:	<input type="checkbox"/> User <input type="checkbox"/> Professional <input checked="" type="checkbox"/> Factory
Transmitter Power Configuration:	<input checked="" type="checkbox"/> Internal battery <input type="checkbox"/> External power source <input type="checkbox"/> 120VAC <input type="checkbox"/> 230VAC <input type="checkbox"/> 400VAC <input checked="" type="checkbox"/> 1.3 VDC <input type="checkbox"/> Other: <input type="text"/> <input type="text"/> Amp. <input type="checkbox"/> 50Hz <input type="checkbox"/> 60Hz
Test Facility Accreditation:	A2LA (Certificate No. 1427.01)
Test Methodology:	Measurements performed according to the procedures in ANSI C63.10-2009

1.2 EUT Configuration

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

- Standby
- Continuous transmission in modulated mode
- Continuous standby/receive mode
- Test program (customer specific)
-

Operating modes of the EUT:

No.	Description
1	Testing consisted of lower, middle, and upper channel transmitting continuously with one channel being transmitted at a given time.
2	Standby / Receiving mode was used for FCC Part 15.109 and ICES-003 testing.

Cables:

No.	Type	Length	Designation	Note
1	None			
2				

Support equipment/Services:

No.	Item	Description
1	R & S SMR 20 Generator	Signal Source during FCC 15.109 testing

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: 86-106 kPa



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).

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

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

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

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

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

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

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

General notes:



2.0 TEST SUMMARY

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.

Model ITE

TEST SPECIFICATION	TEST PARAMETERS	RESULT
15.249(a) / RSS-210 A2.9(a)	Field strength of fundamental	Pass
15.249(a) / RSS-210 A2.9(a)	Field strength of harmonics and spurious emissions	Pass
15.109/ICES-003	Receiver/digital device radiated emissions	Pass

Model RIC 13

TEST SPECIFICATION	TEST PARAMETERS	RESULT
15.249(a) / RSS-210 A2.9(a)	Field strength of fundamental	Pass
15.249(a) / RSS-210 A2.9(a)	Field strength of harmonics and spurious emissions	Pass
15.109/ICES-003	Receiver/digital device radiated emissions	Pass

Notes: Both ITE and RIC 13 models utilize different antenna from the Original Certification; therefore, testing limited with Field Strength of Fundamental, Field Strength of Harmonics and Spurious Emissions, and Receiver/digital Device Radiated Emissions tests were performed for ITE and RIC 13 units per client request.
Both units were tested separately.



3.0 TEST CONDITIONS AND RESULTS

3.1 Field strength of fundamental

Test location: OATS Anechoic Chamber Other

Test distance: 10 meters 3 meters

Test result: **Pass**

Max. Emissions margin at fundamental: 19.9dB below the limits for model ITE
Max. Emissions margin at fundamental: 17.9dB below the limits for model RIC 13

Notes: Testing performed at low, middle and upper channels



Date:	May 19, 2011	Result: Pass
Standard:	FCC 15.249(a) / RSS-210 A2.9	
Tested by:	Uri Spector	
Test Point:	Enclosure with antenna	
Operation mode:	See Page 5	
Note:	Model ITE	

Table 3.1.1

Frequency MHz	Antenna		Ant. CF dB1/m	Cable loss dB	Pre-amp Gain (dB)	Peak Reading dBµV	Total @ 3m dBµV/m	Limit dBµV/m	Margin dB	Comments
	Polarity	Hts(cm)								
Channel 366										
906.64	V	176	21.9	3.6	0.0	48.1	73.7	94.0	-20.3	
906.64	H	182	21.9	3.6	0.0	43.0	68.6	94.0	-25.4	
Channel 393										
914.73	V	167	22.0	3.6	0.0	48.5	74.1	94.0	-19.9	
914.73	H	165	22.0	3.6	0.0	44.1	69.7	94.0	-24.3	
Channel 417										
922.00	V	108	22.0	3.7	0.0	48.2	73.9	94.0	-20.1	
922.00	H	168	22.0	3.7	0.0	44.3	70.0	94.0	-24.0	



Date:	June 10, 2011	Result: Pass
Standard:	FCC 15.249(a) / RSS-210 A2.9	
Tested by:	Ivaylo Nadarliyski	
Test Point:	Enclosure with antenna	
Operation mode:	See Page 5	
Note:	Model RIC 13	

Table 3.1.2

Frequency MHz	Antenna		Ant. CF dB1/m	Cable loss dB	Pre-amp Gain (dB)	Peak Reading dBµV	Total @ 3m dBµV/m	Limit dBµV/m	Margin dB	Comments
	Polarity	Hts(cm)								
Channel 353										
902.60	V	100	21.9	3.6	0.0	49.6	75.1	94.0	-18.9	
902.60	H	276	21.9	3.6	0.0	48.1	73.6	94.0	-20.4	
Channel 393										
914.80	V	147	22.0	3.6	0.0	49.4	75.0	94.0	-19.0	
914.80	H	260	22.0	3.6	0.0	48.2	73.8	94.0	-20.2	
Channel 434										
927.20	V	153	22.1	3.7	0.0	50.4	76.1	94.0	-17.9	
927.20	H	174	22.1	3.7	0.0	49.5	75.2	94.0	-18.8	



3.2 Field strength of harmonics and spurious emissions

Test location: OATS Anechoic Chamber Other

Test distance: 10 meters 3 meters

Frequency range of measurements: 30MHz-10GHz

Test result: **Pass**

Max. margin of harmonics and spurious emissions: 1.0 dB below the limits for model ITE

Max. margin of harmonics and spurious emissions: 2.0 dB below the limits for model RIC 13

Notes: No Spurious Emissions related to ITE transmitter unit were detected at the frequency range 30MHz-1000MHz. Tables 3.2.1-3.2.3 and Graphs 3.2.1-3.2.12 show Harmonics and Spurious emissions. Testing performed at low, middle and upper channels. Emissions at Fundamental frequencies were excluded from the Tables.



Date:	May 23, 2011	Result: Pass
Standard:	FCC 15.249(a) and (d) / RSS-210 A2.9	
Tested by:	Ivaylo Nadarliyski	
Test Point:	Enclosure with antenna	
Operation mode:	See Page 5	
Note:	Model ITE	

Table 3.2.1

Frequency MHz	Antenna		Ant. CF dB1/m	Cable loss dB	Pre-amp Gain (dB)	Average Reading dB μ V	Total @ 3m dB μ V/m	Limit dB μ V/m	Margin dB
	Polarity	Hts(cm)							
Channel 366									
2720.00	H	200	29.4	3.7	37.7	56.9	52.3	54.0	-1.7
Channel 393									
2744.24	H	193	29.5	3.7	37.7	57.3	52.8	54.0	-1.1
Channel 417									
2766.00	H	170	29.6	3.7	37.7	57.4	53.0	54.0	-1.0
2765.96	V	156	29.6	3.7	37.7	54.2	49.8	54.0	-4.2



Date:	June 10, 2011	Result: Pass
Standard:	FCC 15.249(a) and (d) / RSS-210 A2.9	
Tested by:	Ivaylo Nadarliyski	
Test Point:	Enclosure with antenna	
Operation mode:	See Page 5	
Note:	Model RIC 13	

Table 3.2.2

Frequency	Ant. Polarity	Peak Reading dB μ V	Ant.Factor dB1/m	Total at 3m dB μ V/m	QP Limit dB μ V/m	Margin dB
Channel 353						
30.351 MHz	V	3.9	20.1	24.0	40.0	-16.0
58.281 MHz	V	15.7	7.4	23.1	40.0	-16.9
58.448 MHz	V	17.1	7.4	24.5	40.0	-15.5
58.671 MHz	V	15.7	7.3	23.0	40.0	-17.0
458.27 MHz	V	8.2	19.9	28.1	46.0	-17.9
33.229 MHz	H	5.4	18.5	23.9	40.0	-16.1
868.9 MHz	H	9.2	25.1	34.3	46.0	-11.7
Channel 393						
33.194 MHz	V	5.6	18.6	24.2	40.0	-15.8
458.27 MHz	V	8.3	19.9	28.1	46.0	-17.9
917.69 MHz	V	10.7	25.5	36.2	46.0	-9.8
32.386 MHz	H	4.6	19.0	23.6	40.0	-16.4
132.43 MHz	H	10.2	13.8	24.0	43.5	-19.5
917.2 MHz	H	9.1	25.5	34.6	46.0	-11.4
Channel 434						
33.229 MHz	V	5.8	18.5	24.3	40.0	-15.7
458.27 MHz	V	8.2	19.9	28.1	46.0	-18.0
868.9 MHz	V	10.4	25.1	35.5	46.0	-10.5
33.194 MHz	H	6.2	18.6	24.7	40.0	-15.3
132.43 MHz	H	10.3	13.8	24.1	43.5	-19.4



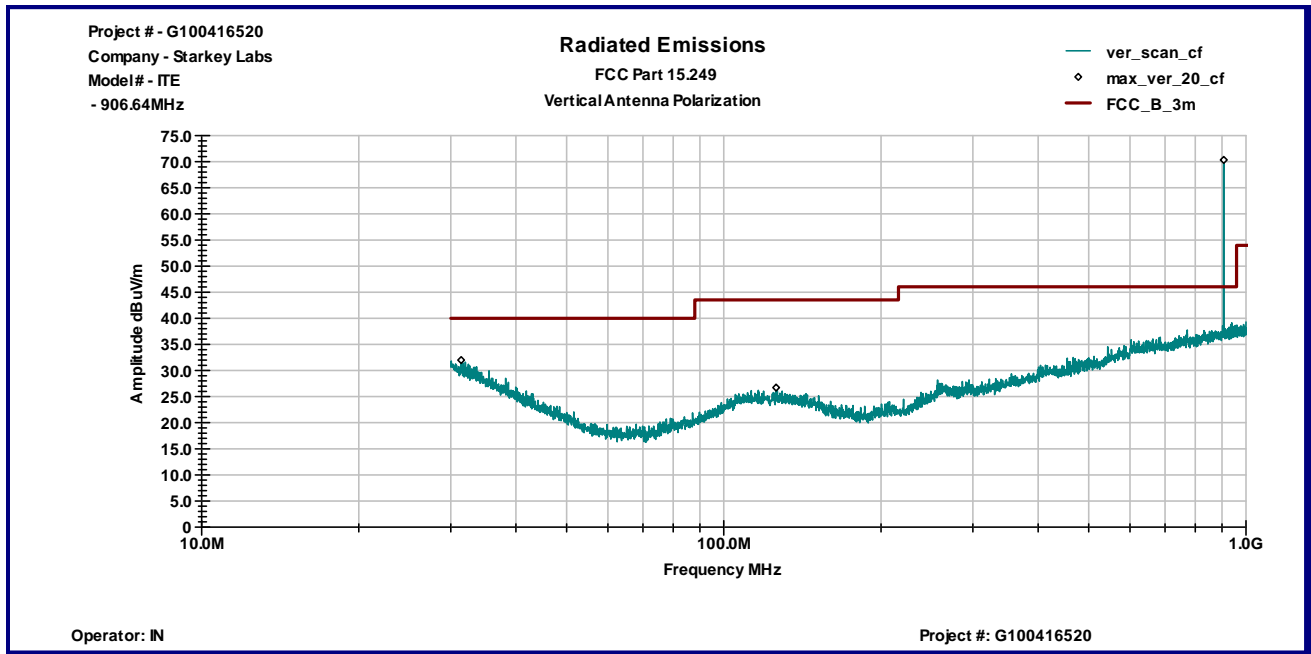
Date:	June 11, 2011	Result: Pass
Standard:	FCC 15.249(a) and (d) / RSS-210 A2.9	
Tested by:	Ivaylo Nadarliyski	
Test Point:	Enclosure with antenna	
Operation mode:	See Page 5	
Note:	Model RIC 13	

Table 3.2.3

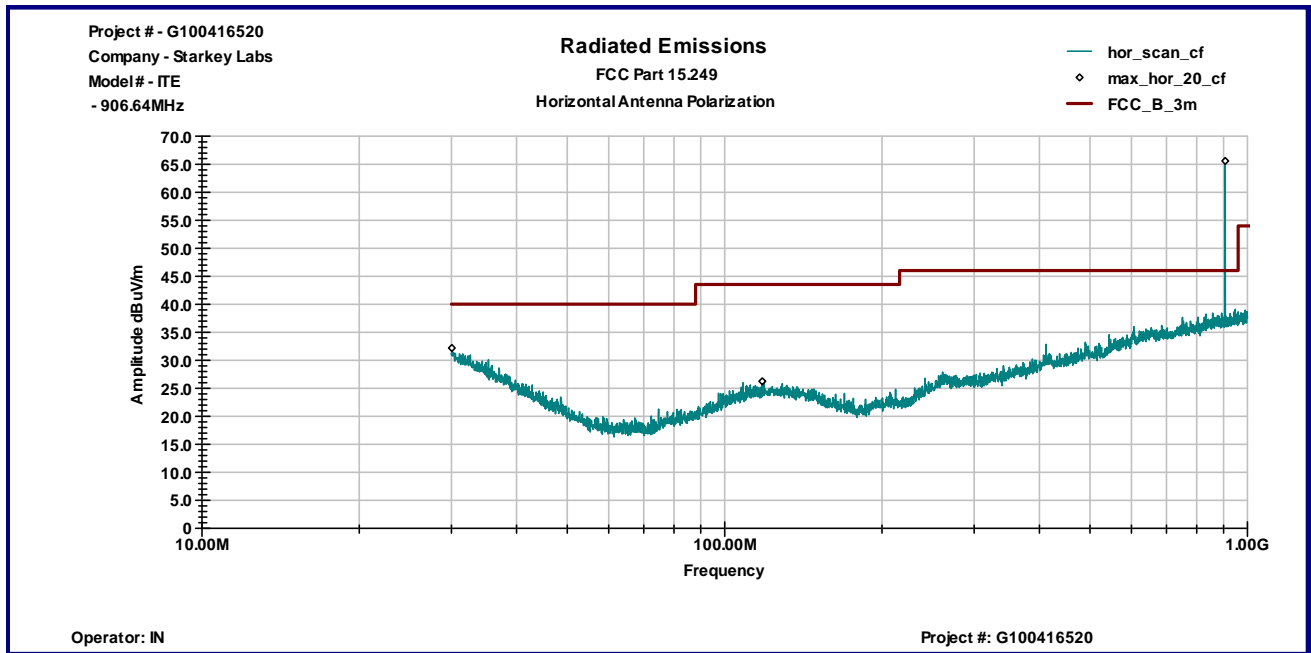
Frequency MHz	Antenna Polarity	Peak Reading dB μ V	Total C.F. dB1/m	Pre-Amp. Gain (dB)	Total at 3m dB μ V/m	Limit dB μ V/m	Margin dB
Channel 353							
1.806 GHz	V	56.6	29.7	38.6	47.7	54.0	-6.3
2.708 GHz	V	52.2	33.1	37.7	47.6	54.0	-6.4
4.514 GHz	V	48.8	37.6	36.8	49.6	54.0	-4.4
2.708 GHz	H	55.9	33.0	37.7	51.2	54.0	-2.8
4.514 GHz	H	50.0	37.6	36.8	50.8	54.0	-3.2
Channel 393							
1.83 GHz	V	57.3	29.8	38.5	48.6	54.0	-5.4
2.744 GHz	V	52.8	33.2	37.7	48.3	54.0	-5.7
4.574 GHz	V	50.6	37.7	36.8	51.4	54.0	-2.5
1.83 GHz	H	57.5	29.8	38.5	48.7	54.0	-5.3
2.744 GHz	H	55.3	33.1	37.7	50.6	54.0	-3.4
4.574 GHz	H	50.7	37.7	36.8	51.6	54.0	-2.4
9.718 GHz	H	36.0	45.2	35.4	45.9	54.0	-8.1
Channel 434							
1.856 GHz	V	57.9	30.0	38.5	49.3	54.0	-4.7
2.782 GHz	V	51.9	33.4	37.7	47.5	54.0	-6.5
4.636 GHz	V	50.9	37.8	36.8	52.0	54.0	-2.0
9.392 GHz	V	36.2	44.9	35.5	45.6	54.0	-8.4
1.856 GHz	H	60.1	29.9	38.5	51.5	54.0	-2.4
2.782 GHz	H	55.8	33.2	37.7	51.3	54.0	-2.7
4.636 GHz	H	50.5	37.8	36.8	51.5	54.0	-2.5
9.104 GHz	H	36.9	44.8	35.6	46.0	54.0	-7.9

Model ITE

Vertical antenna polarization

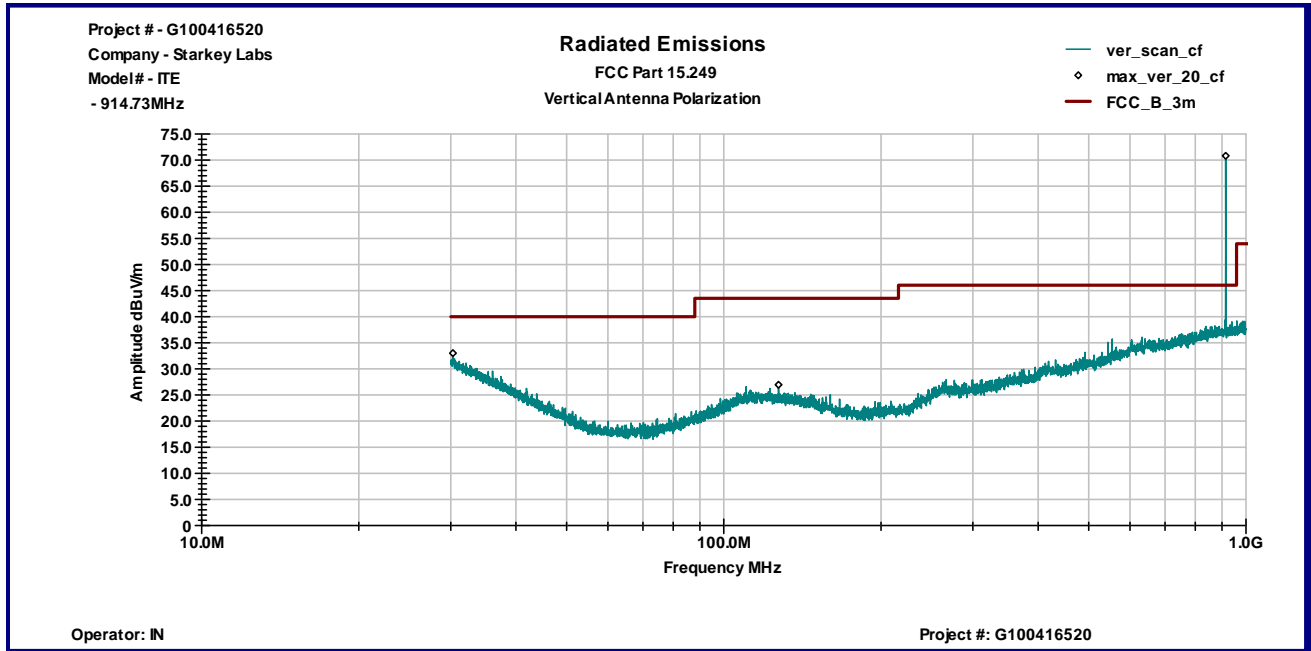


Horizontal antenna polarization

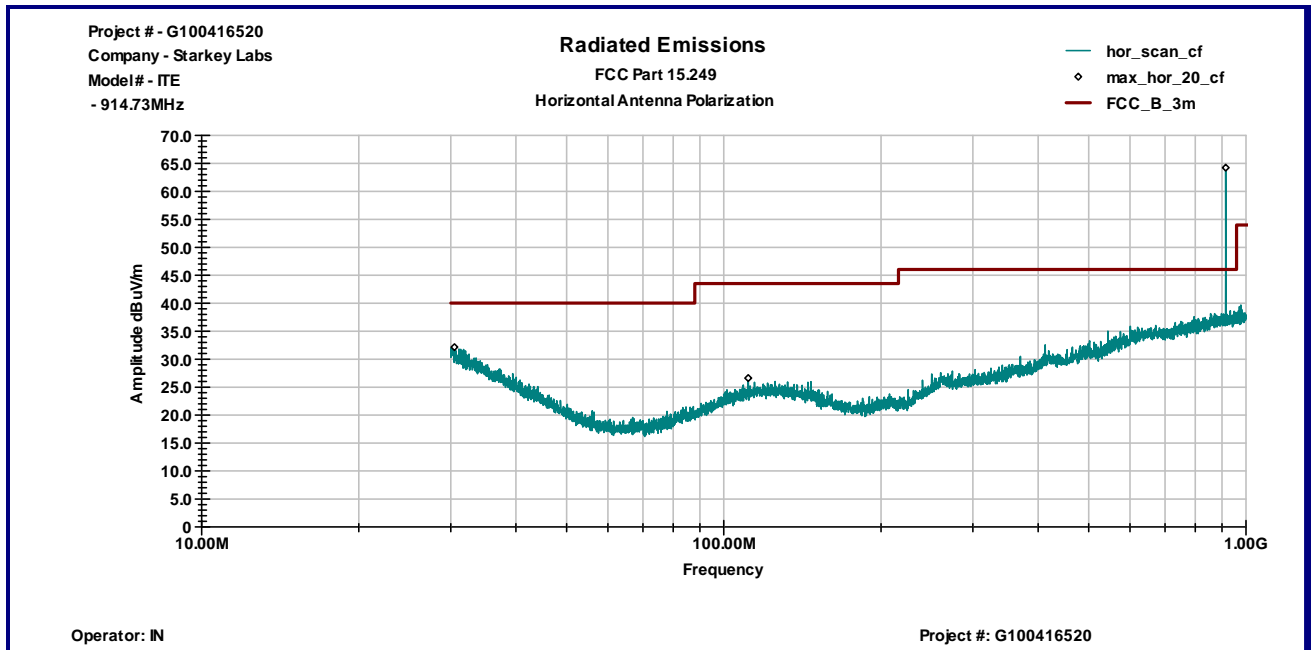


Graphs 3.2.1

Vertical antenna polarization

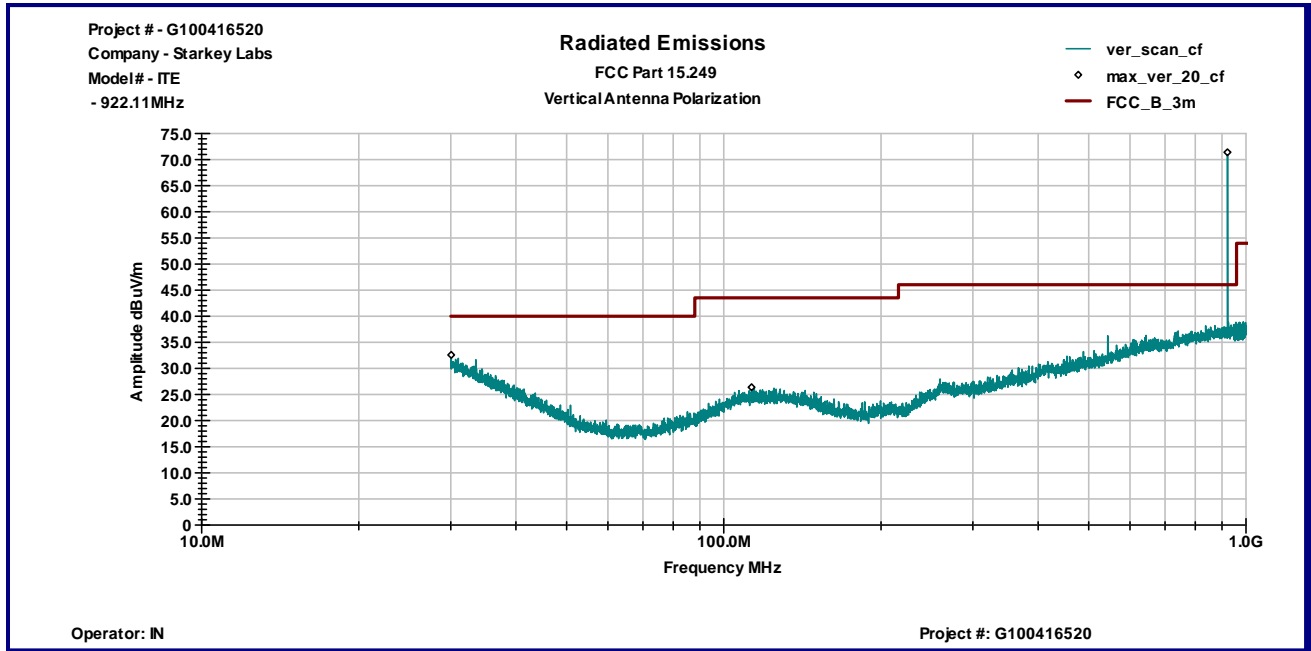


Horizontal antenna polarization

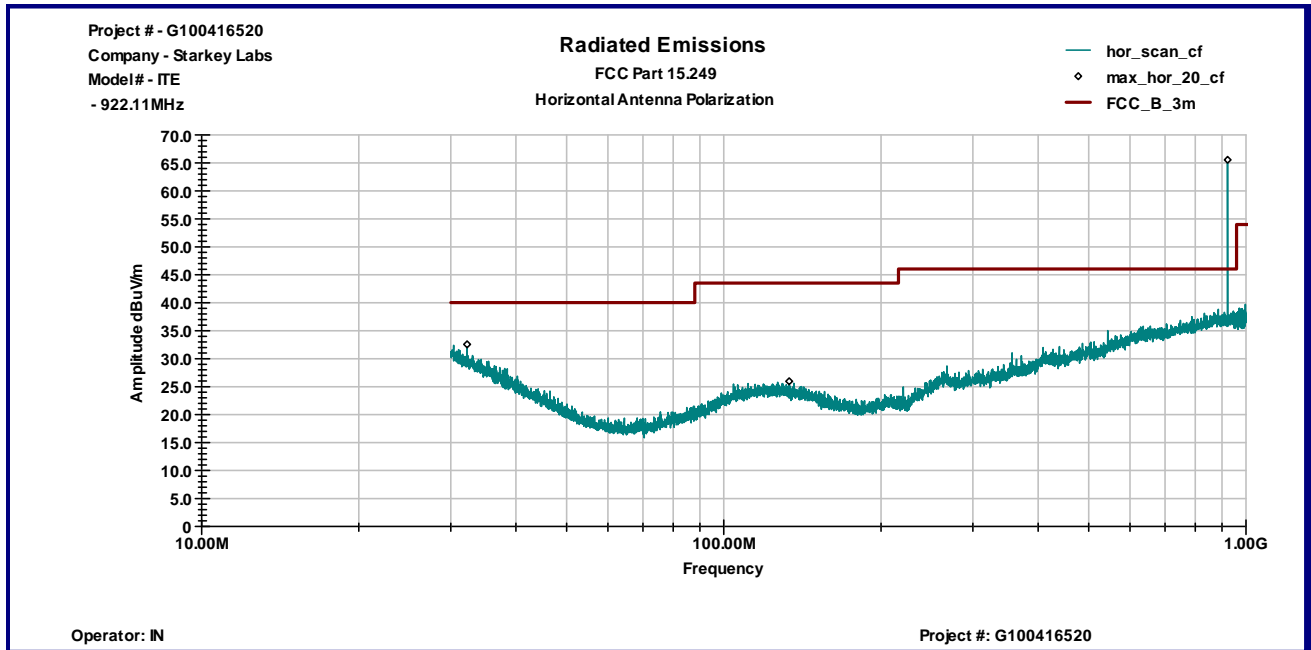


Graphs 3.2.2

Vertical antenna polarization

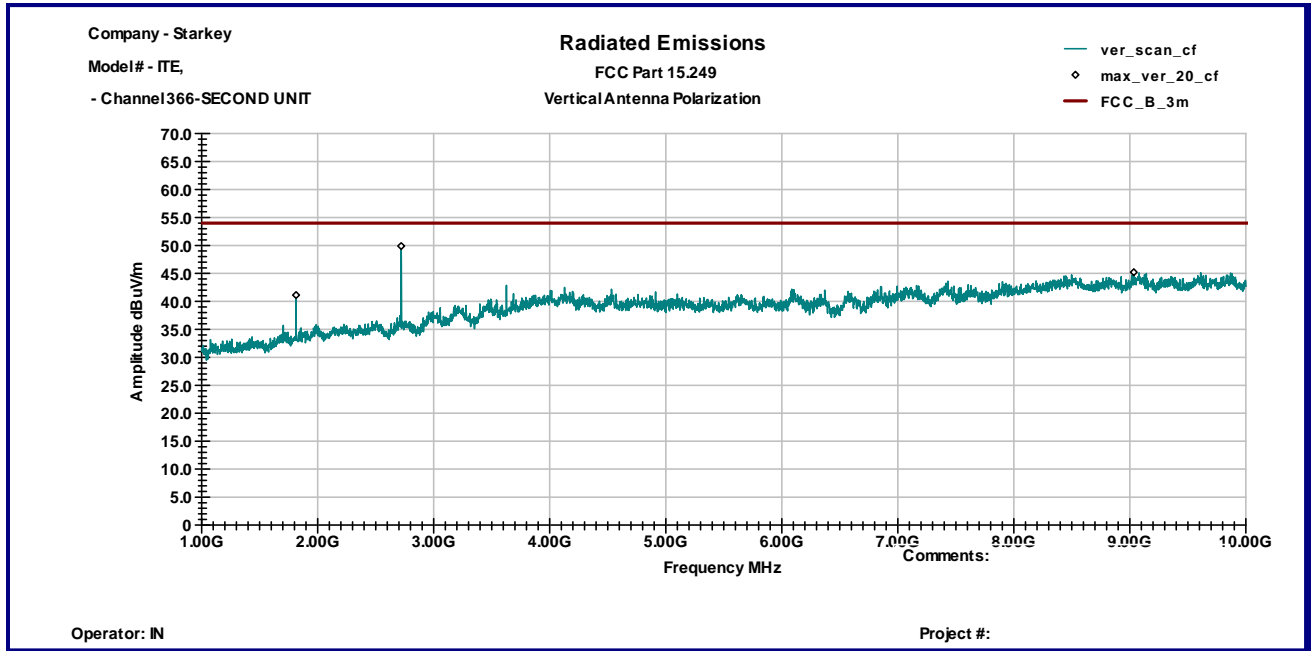


Horizontal antenna polarization

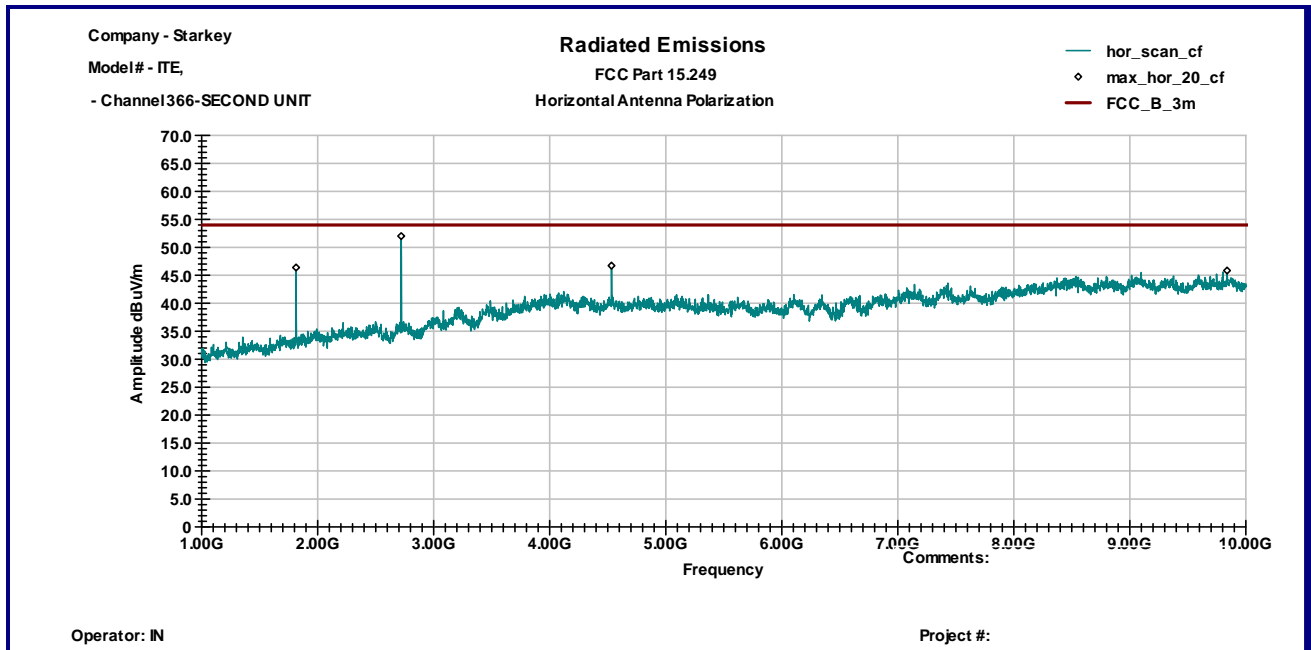


Graphs 3.2.3

Vertical antenna polarization



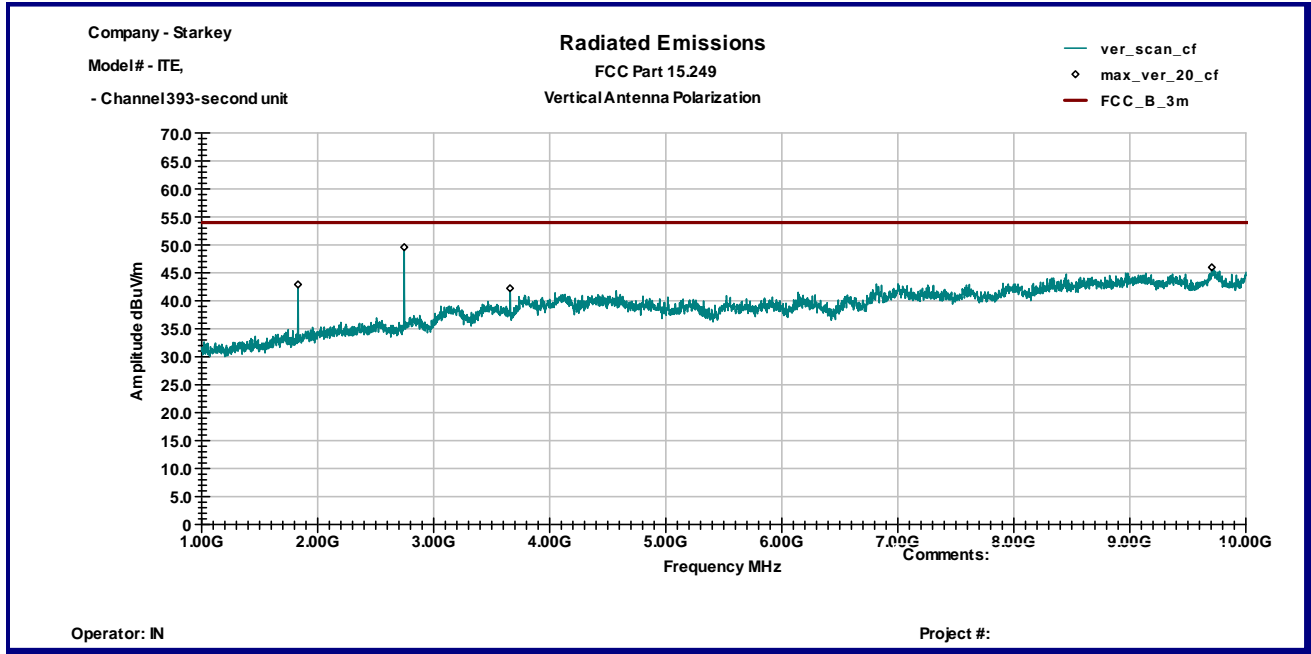
Horizontal antenna polarization



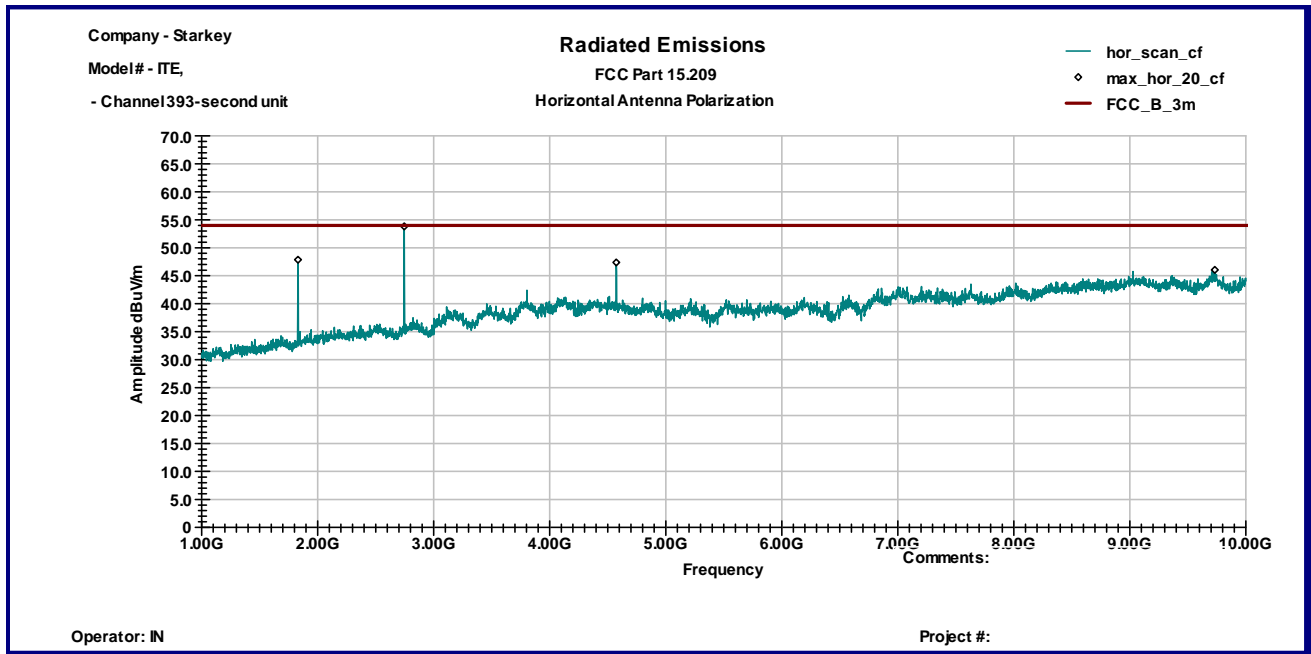
Graphs 3.2.4



Vertical antenna polarization

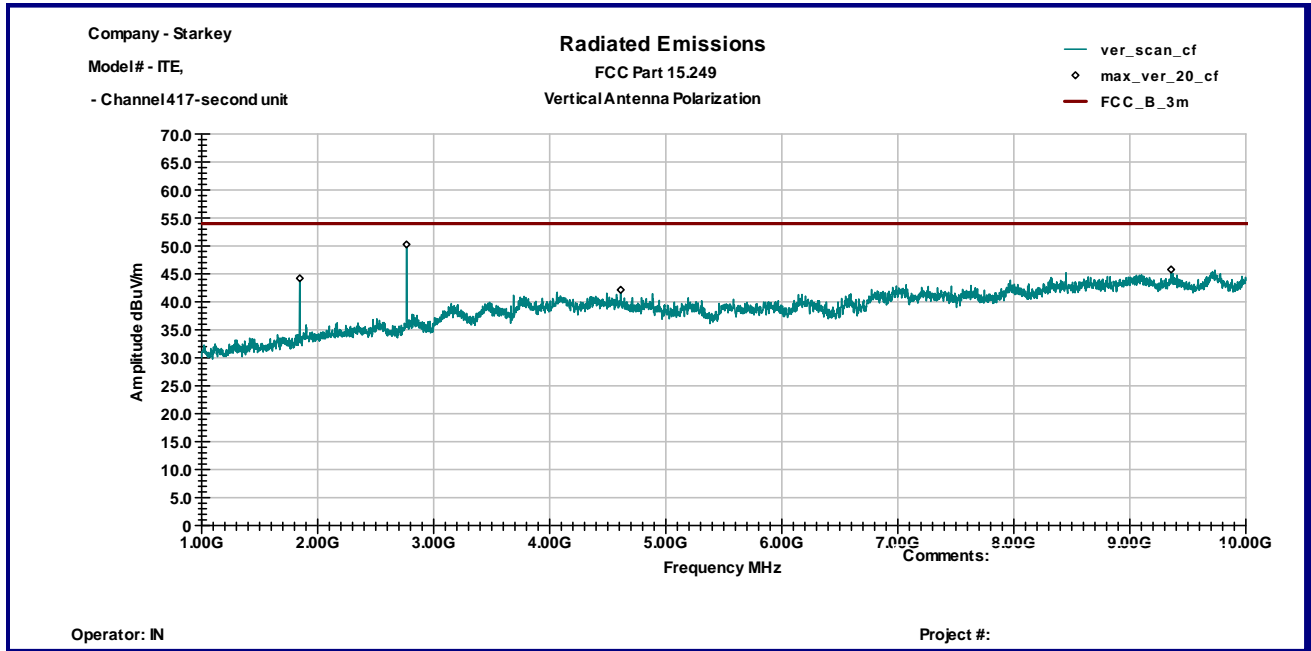


Horizontal antenna polarization

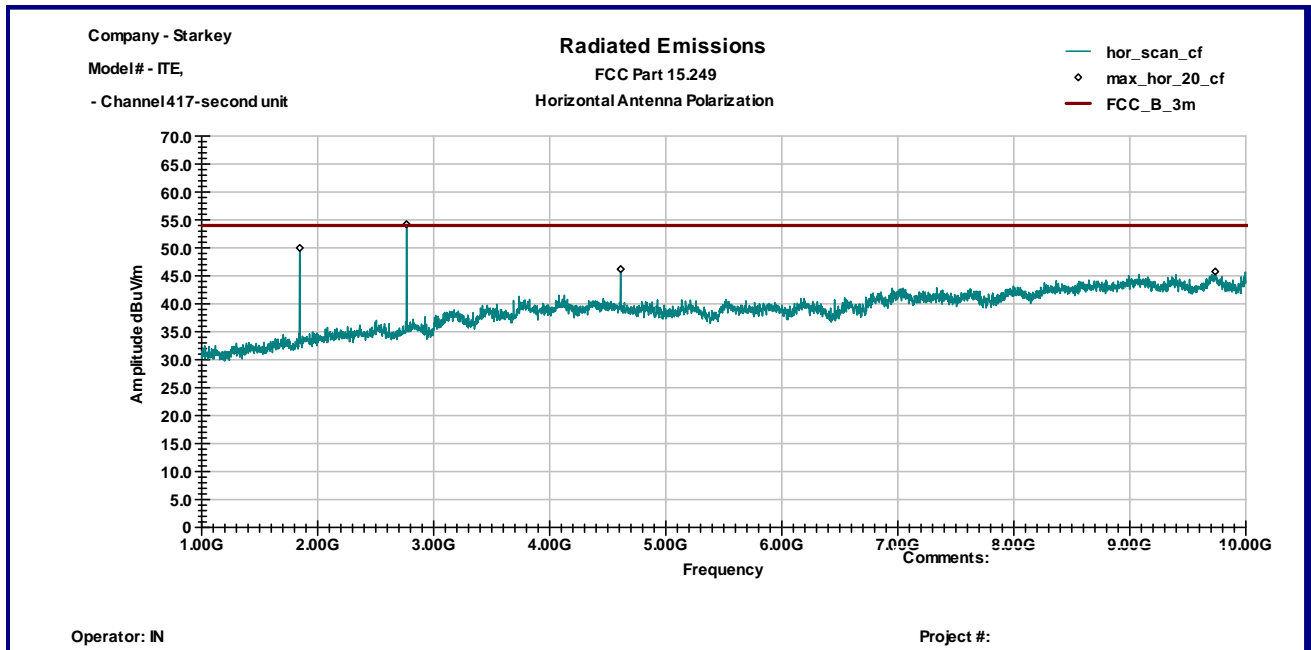


Graphs 3.2.5

Vertical antenna polarization



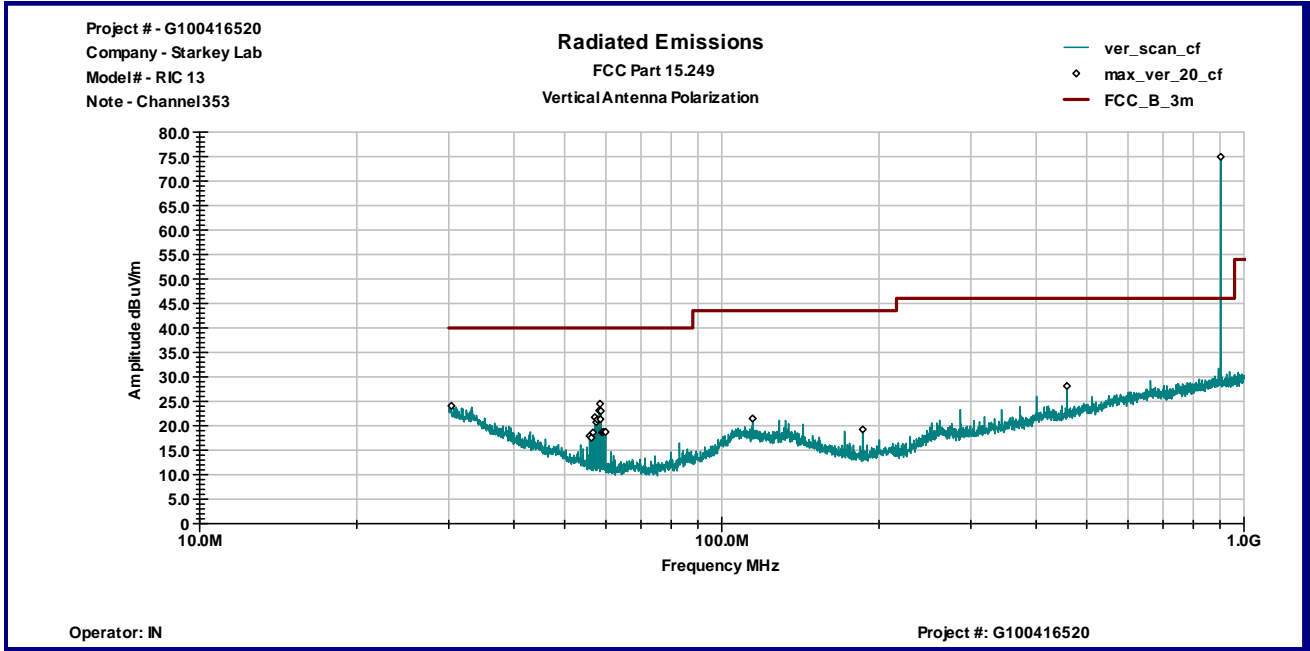
Horizontal antenna polarization



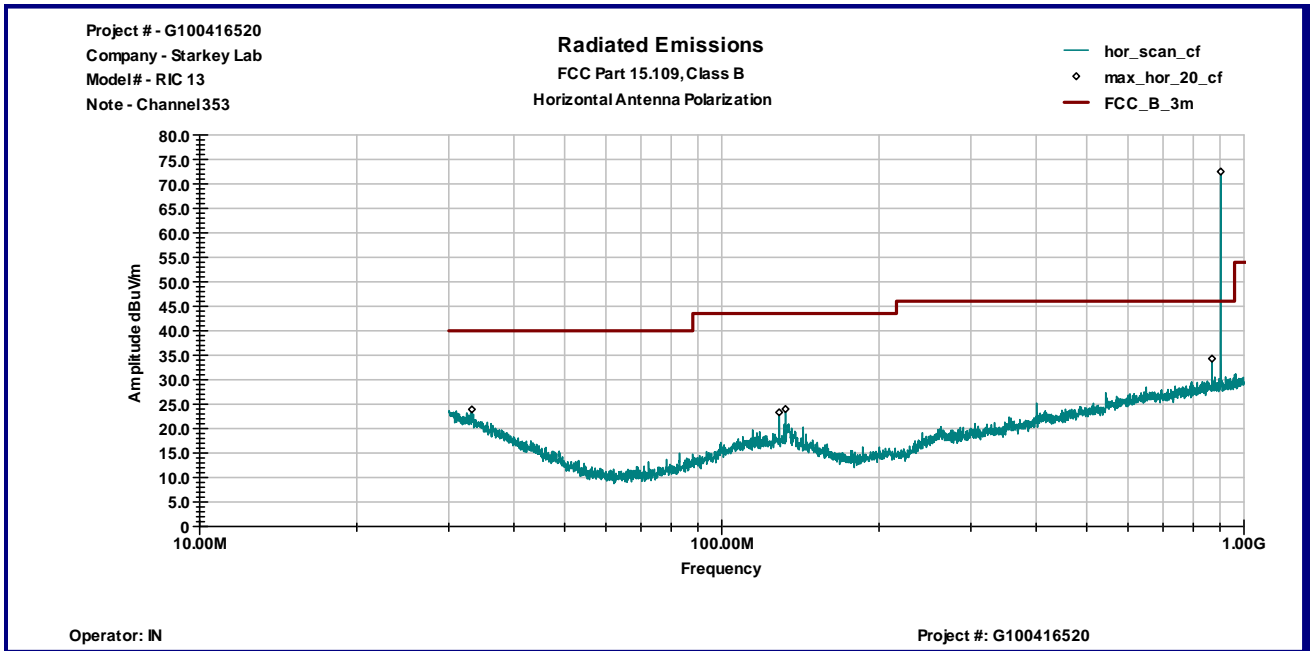
Graphs 3.2.6

Model RIC 13

Vertical antenna polarization

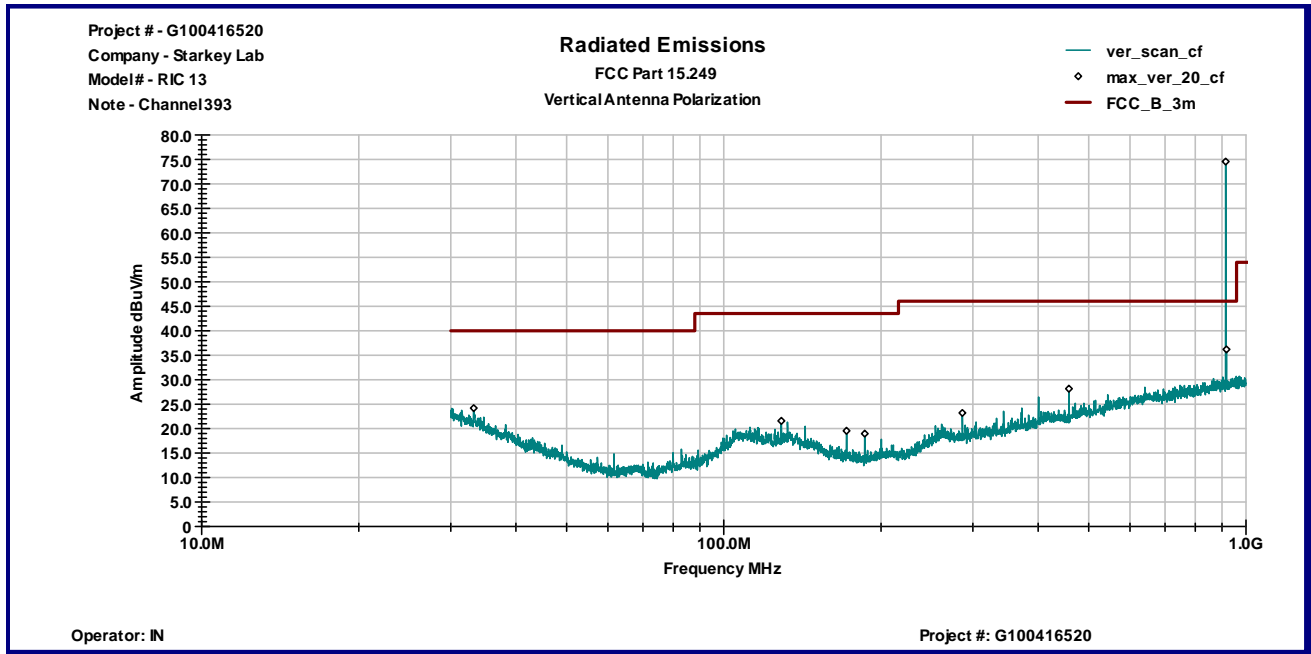


Horizontal antenna polarization

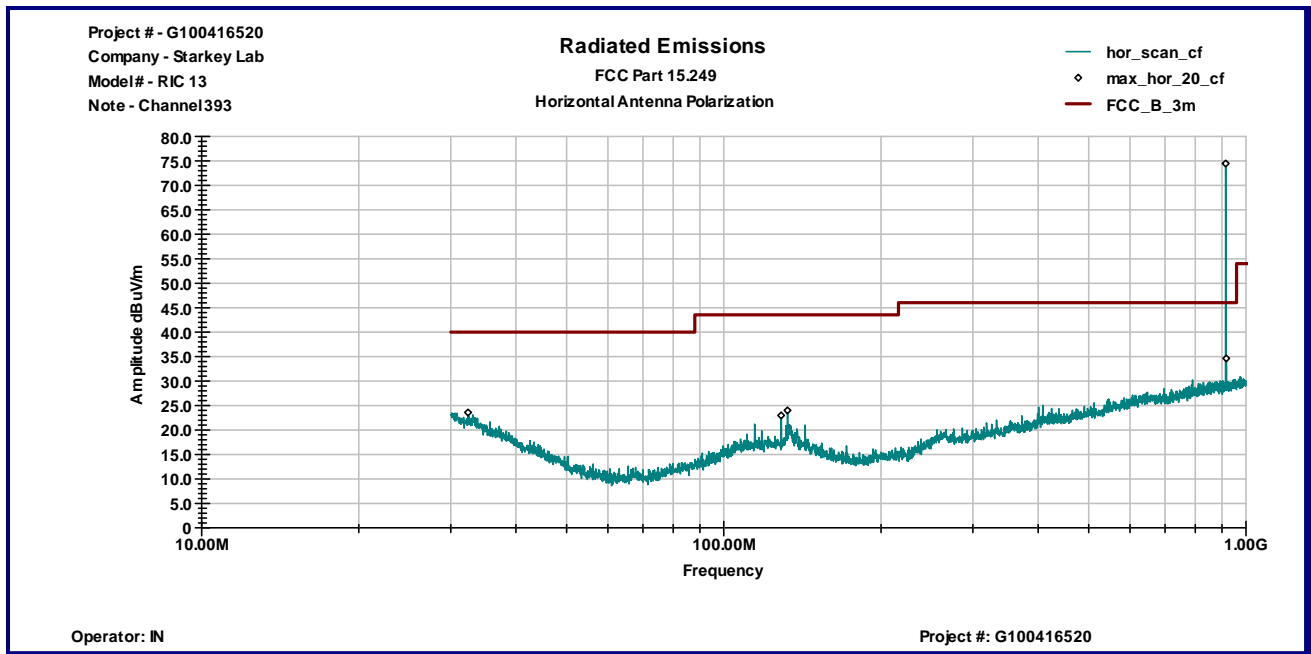


Graphs 3.2.7

Vertical antenna polarization

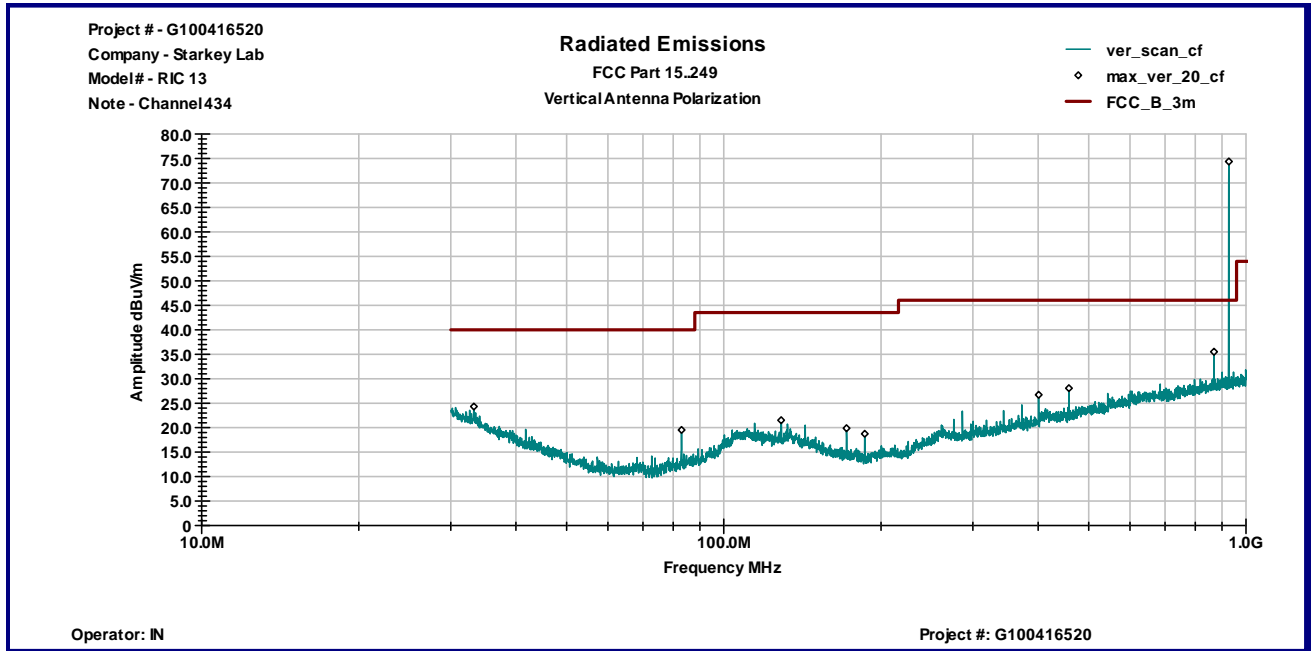


Horizontal antenna polarization

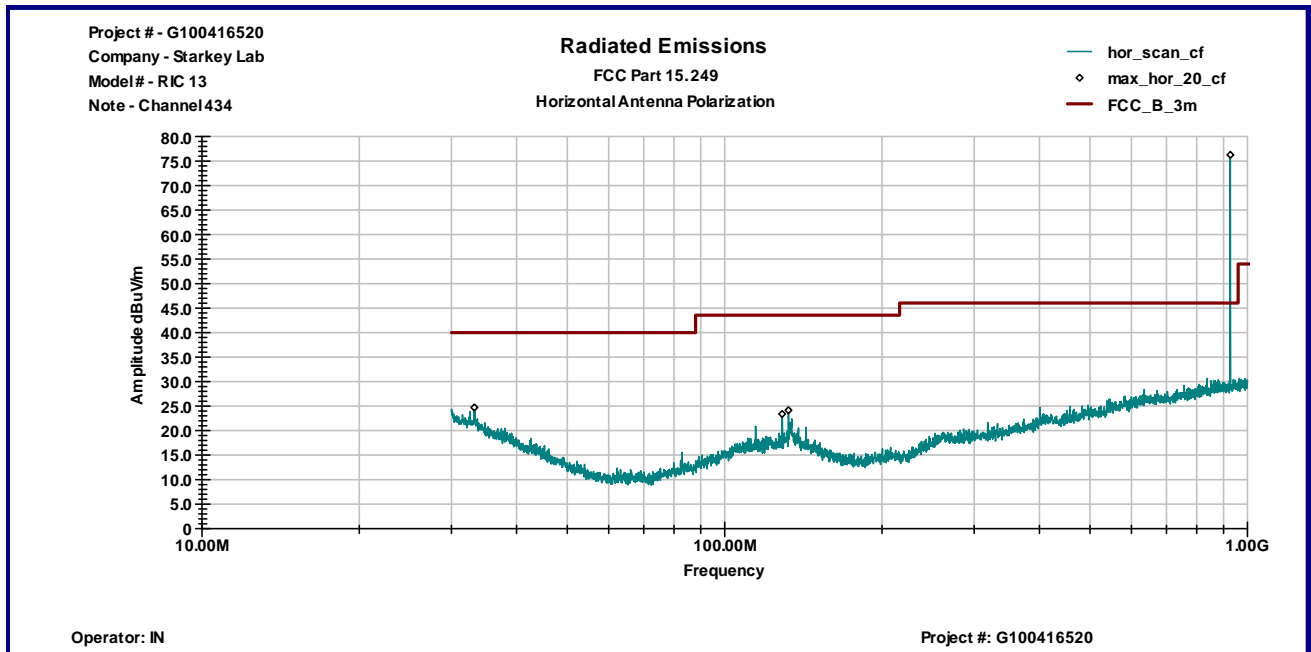


Graphs 3.2.8

Vertical antenna polarization

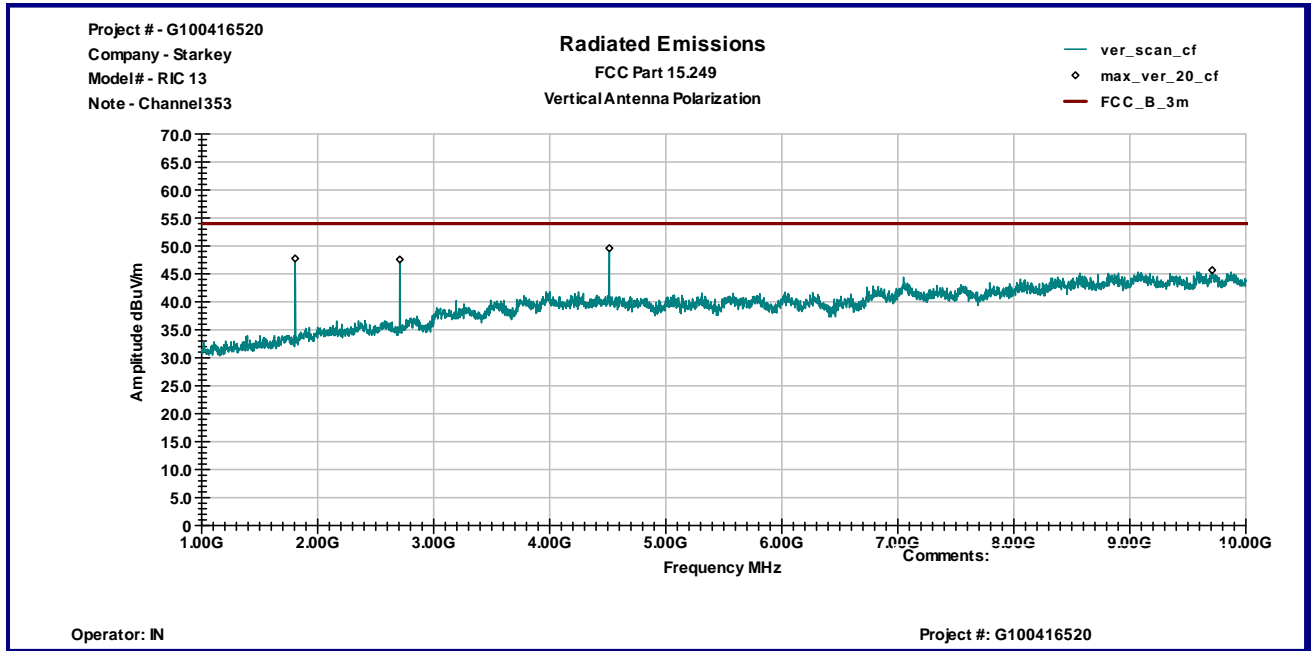


Horizontal antenna polarization

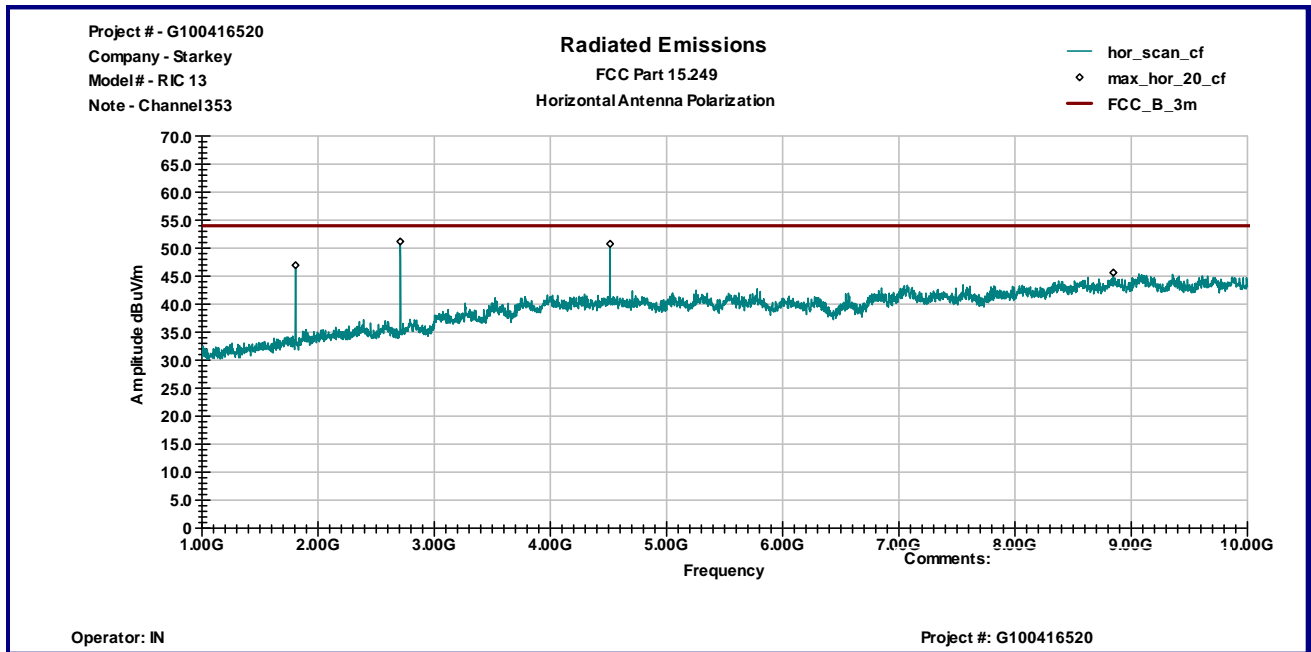


Graphs 3.2.9

Vertical antenna polarization



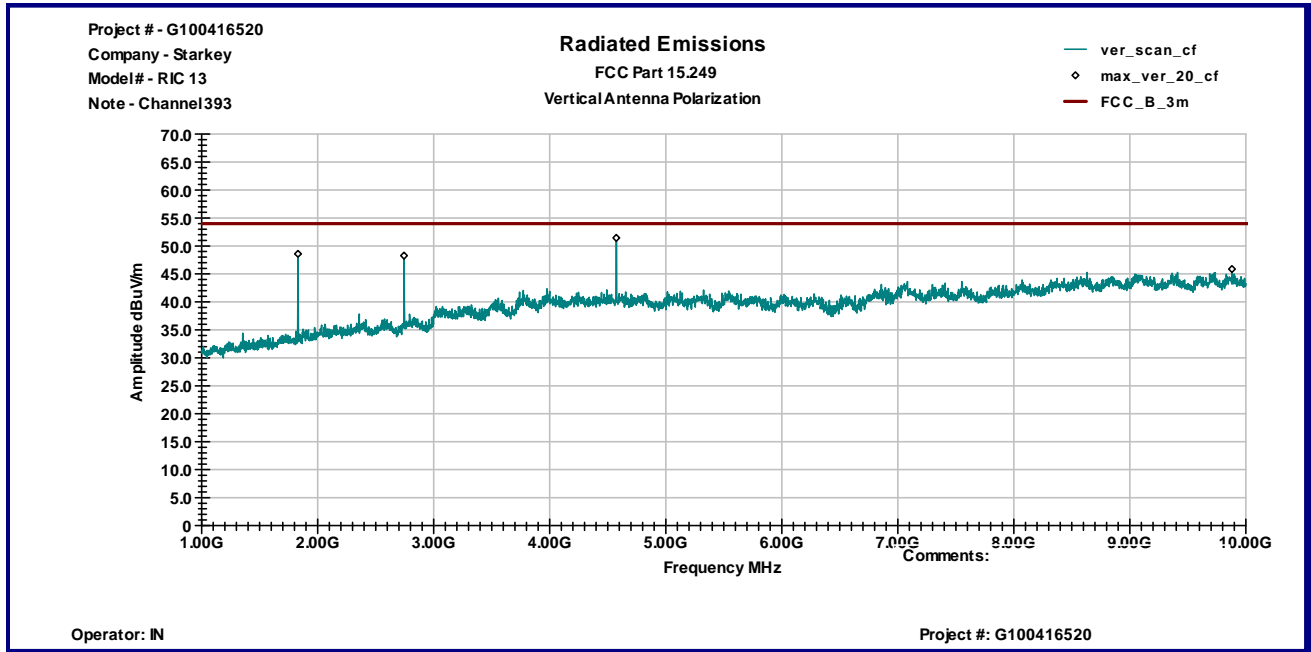
Horizontal antenna polarization



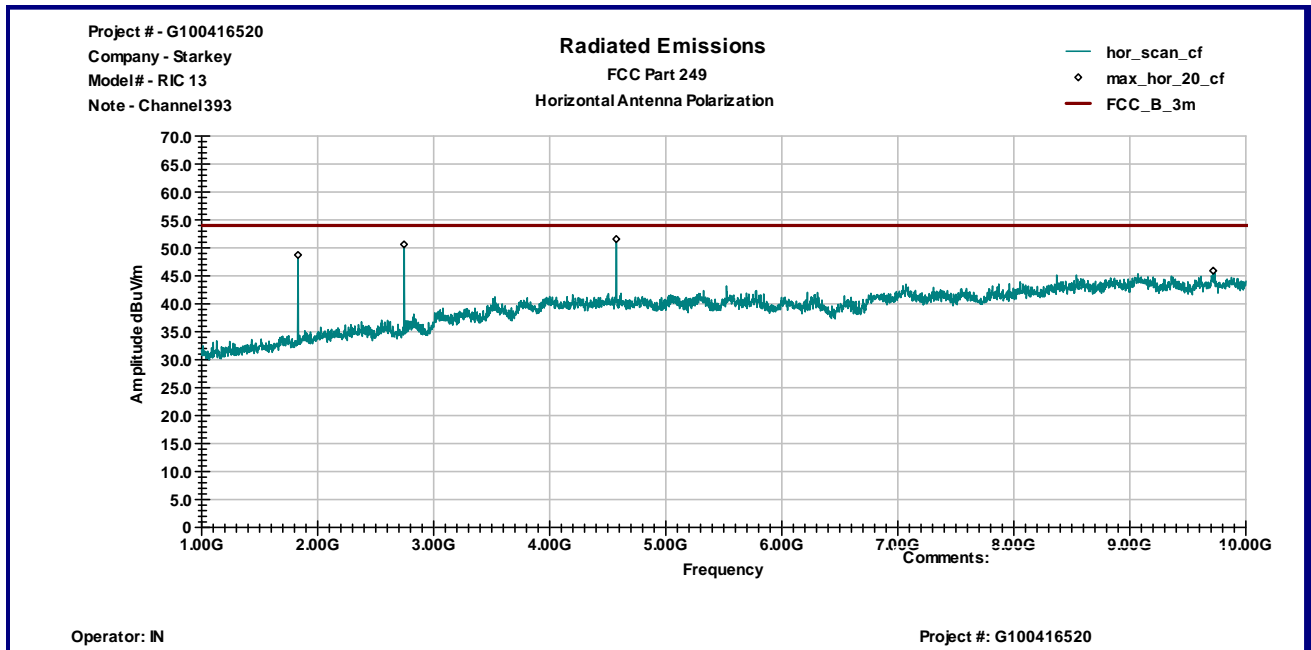
Graphs 3.2.10



Vertical antenna polarization

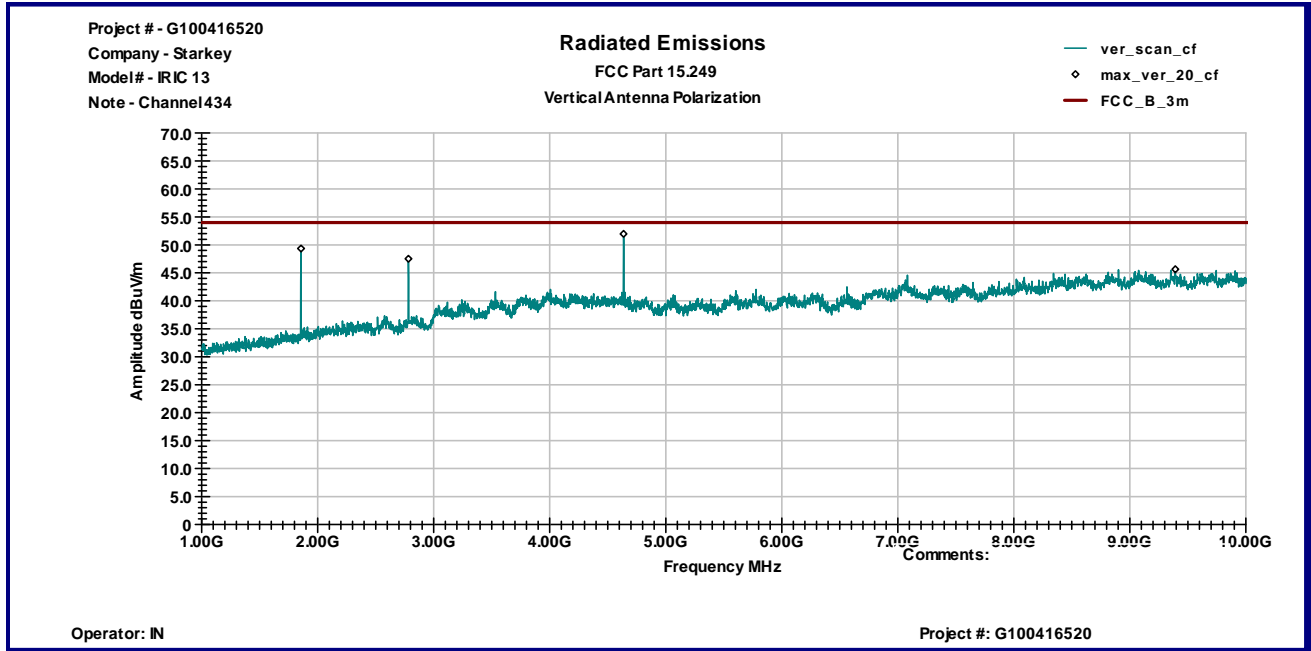


Horizontal antenna polarization

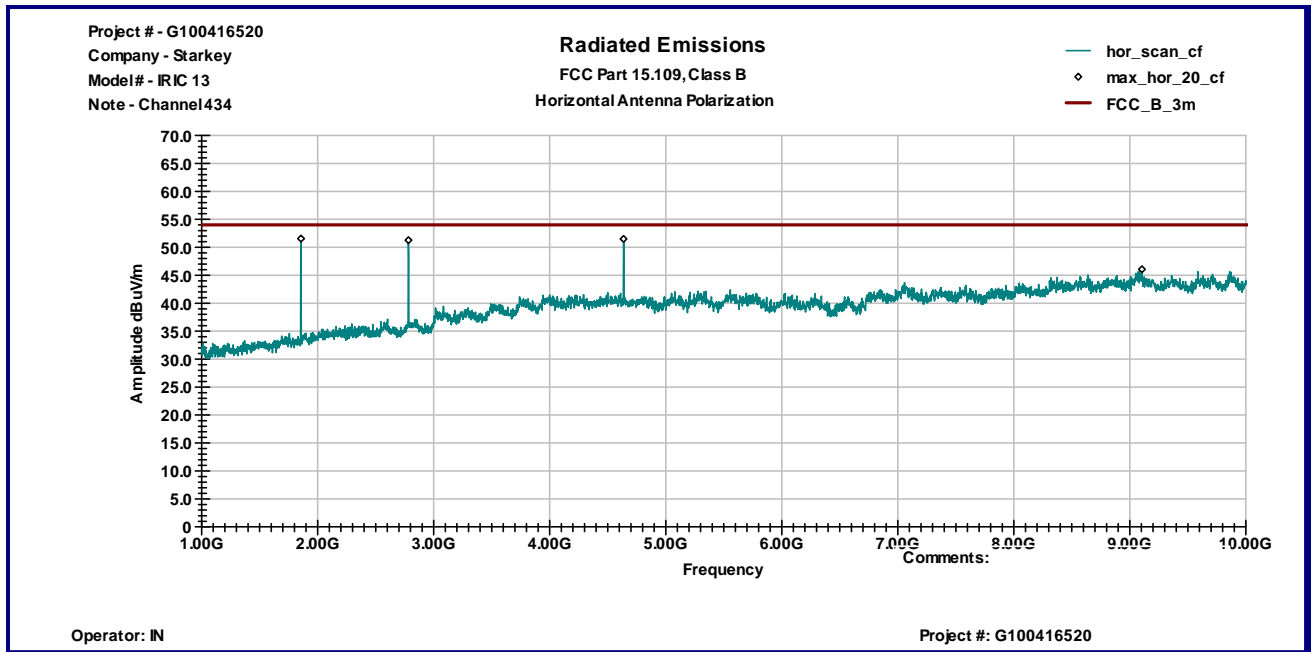


Graphs 3.2.11

Vertical antenna polarization



Horizontal antenna polarization



Graphs 3.2.12



3.3 Receiver/digital device radiated emissions

Test location: OATS Anechoic Chamber
Test distance: 10 meters 3 meters
Test result: Pass
Frequency range: 30MHz-5GHz
Max. Emissions margin: 13.6dB below the Limits

Notes: The Radiated Emissions test was performed in the Anechoic chamber at 3m measurement distance (see Table 3.3.1 and Graphs 3.3.1 - 3.3.4)

Date:	June 14, 2011	Result: Pass
Tested by:	Ivaylo Nadarliyski	
Standard:	FCC Part 15.109, Class B	
Test Point:	Enclosure	
Operation mode:	See page 5	
Note:	Unit RIC 13	

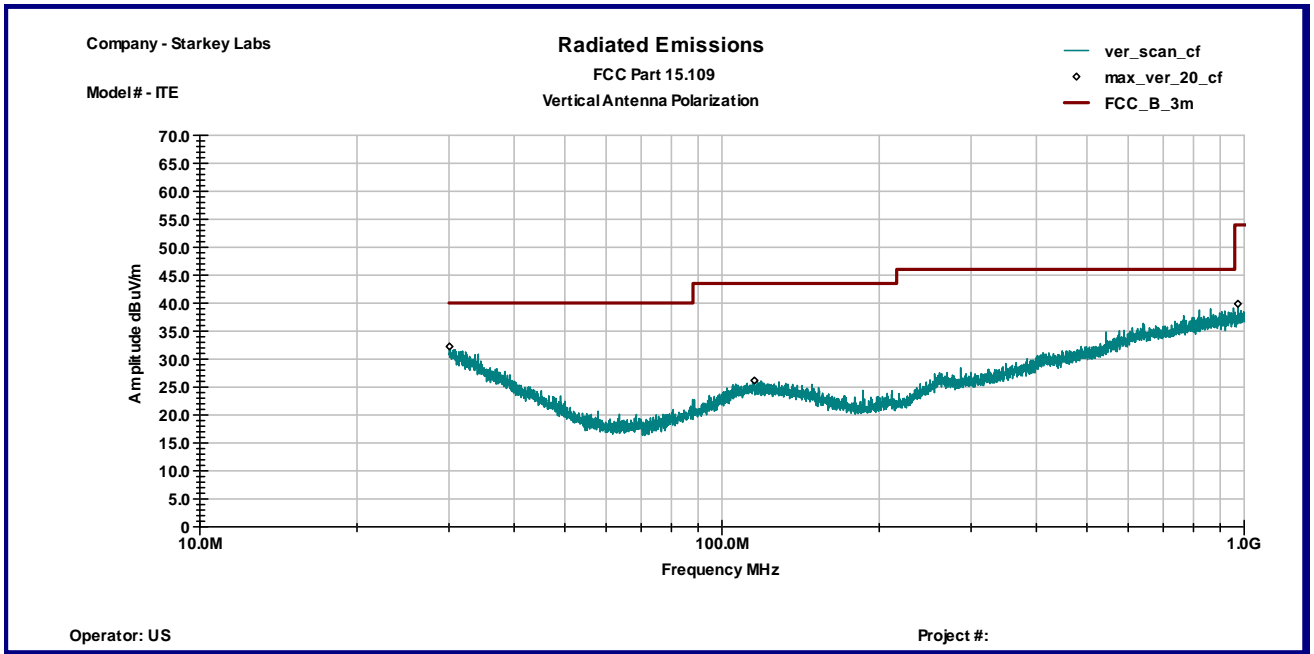
Table 3.3.1

Frequency	Ant. Polarity	Peak Reading dBµV	Ant.Factor dB1/m	Total at 3m dBµV/m	QP Limit dBµV/m	Margin dB
171.82 MHz	V	8.0	11.4	19.4	43.5	-24.1
186.21 MHz	V	7.9	11.3	19.1	43.5	-24.4
401.07 MHz	V	8.0	19.1	27.1	46.0	-19.0
868.9 MHz	V	7.3	25.1	32.4	46.0	-13.6
128.79 MHz	H	9.0	14.0	23.0	43.5	-20.5
132.43 MHz	H	10.0	13.8	23.8	43.5	-19.7

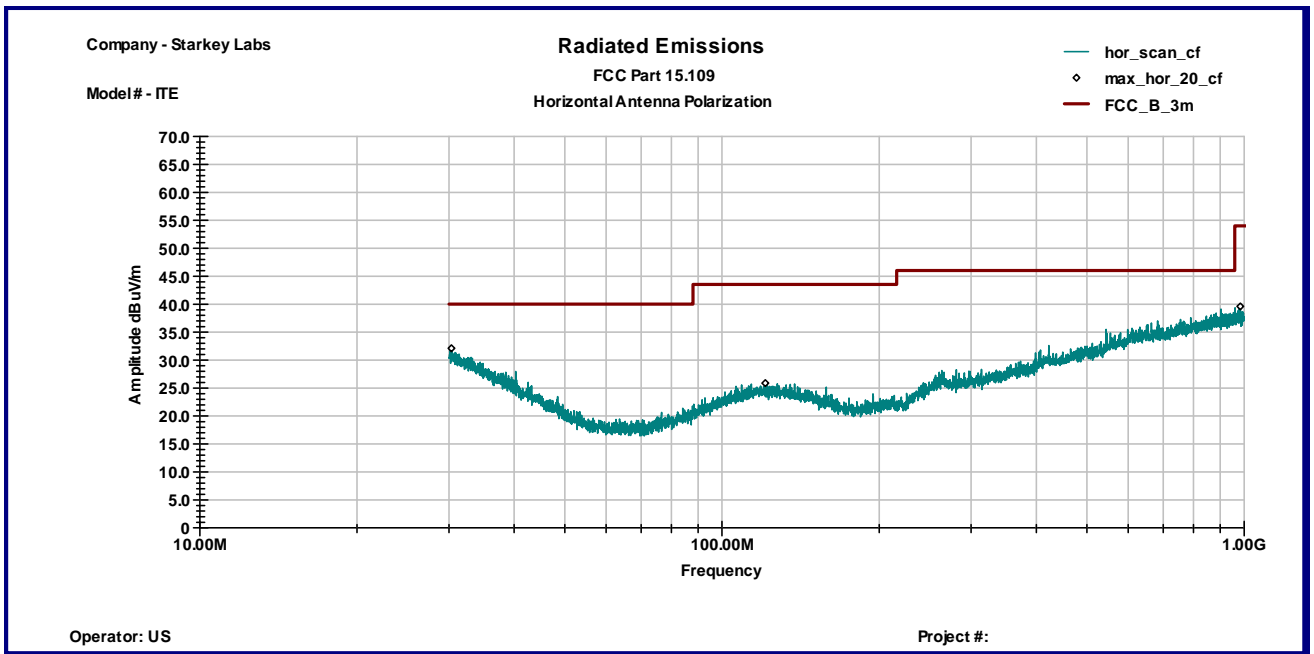


Model ITE

Vertical antenna polarization

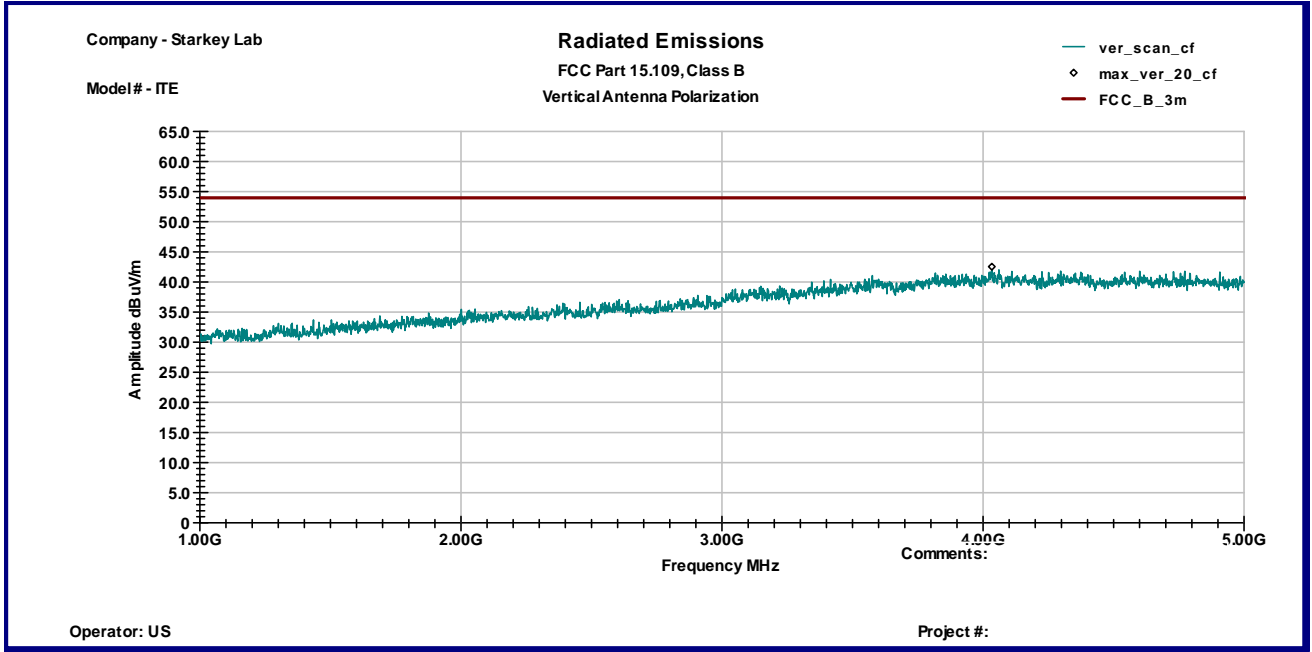


Horizontal antenna polarization

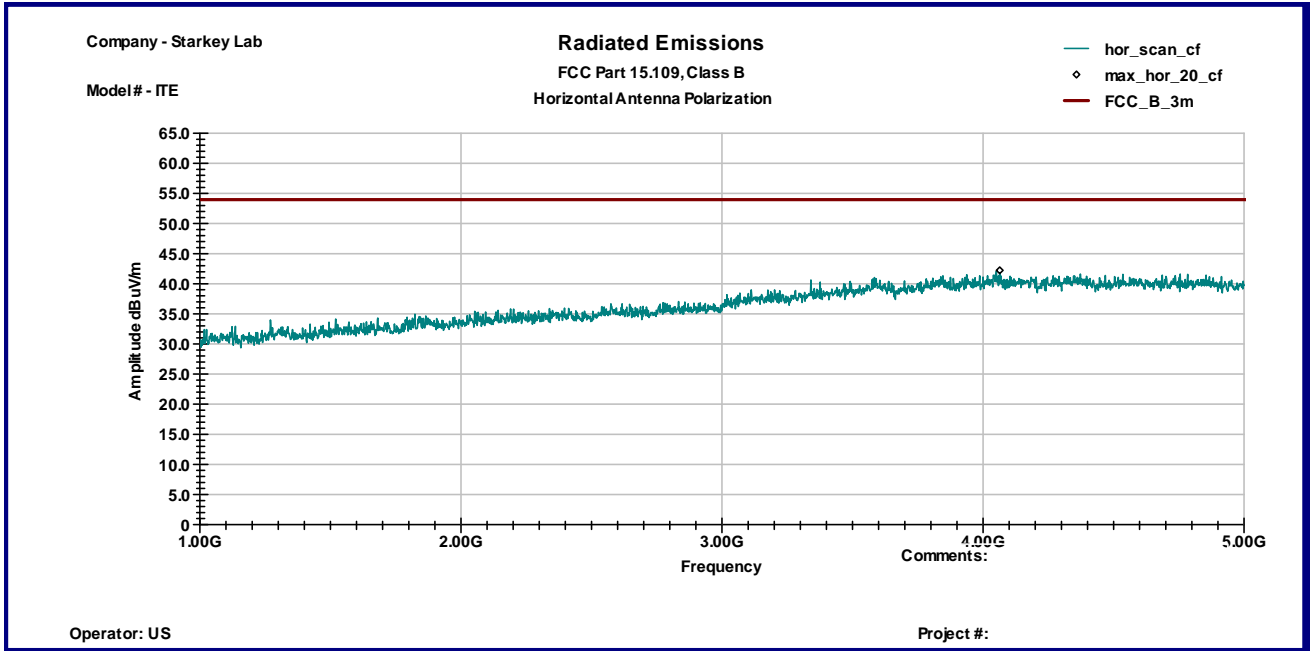


Graph 3.3.1

Vertical antenna polarization



Horizontal antenna polarization

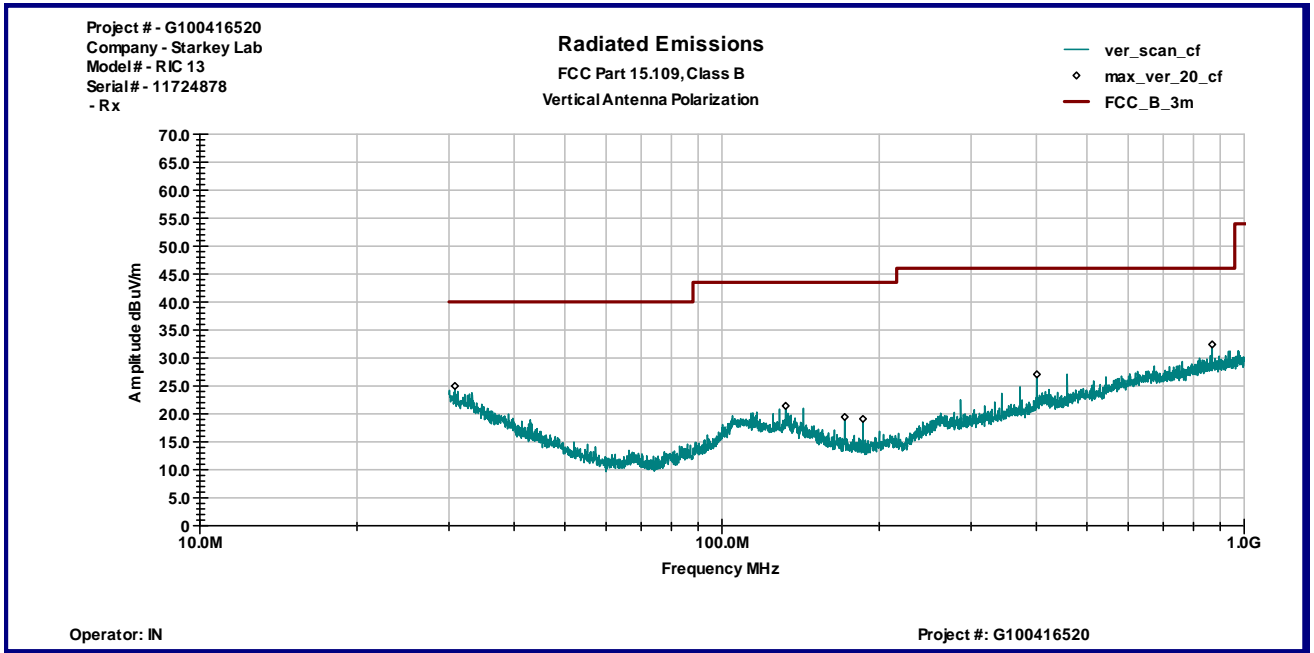


Graph 3.3.3

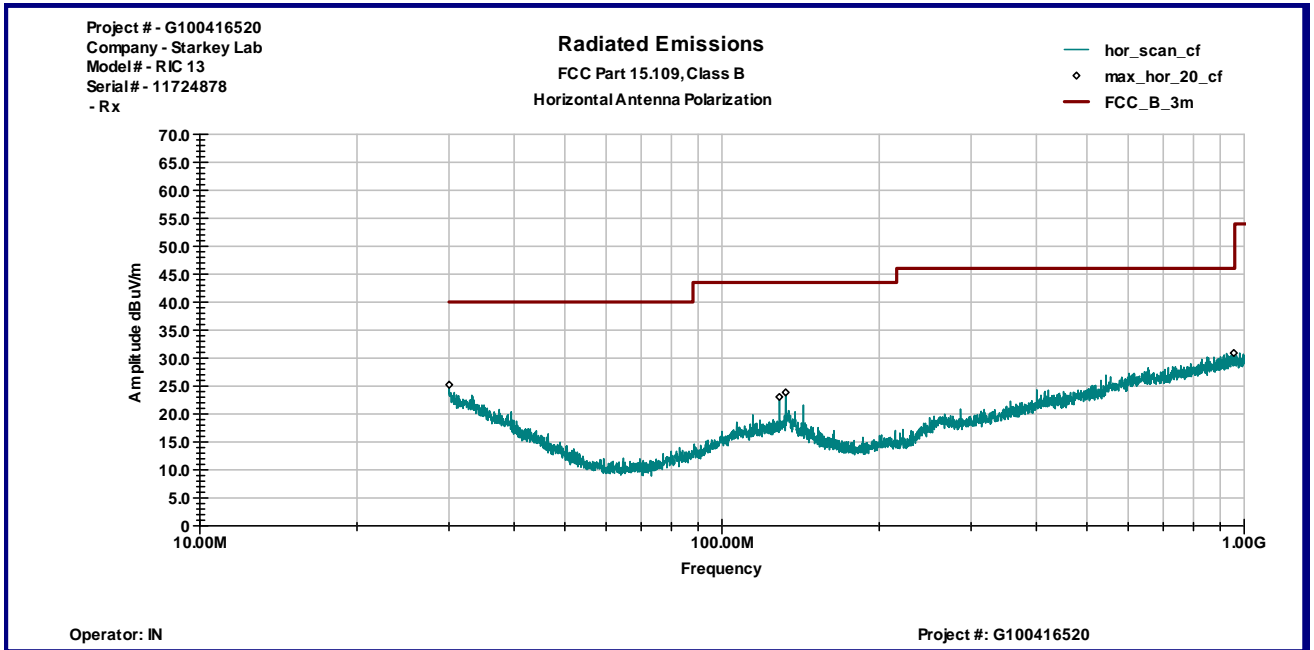


Model RIC 13

Vertical antenna polarization

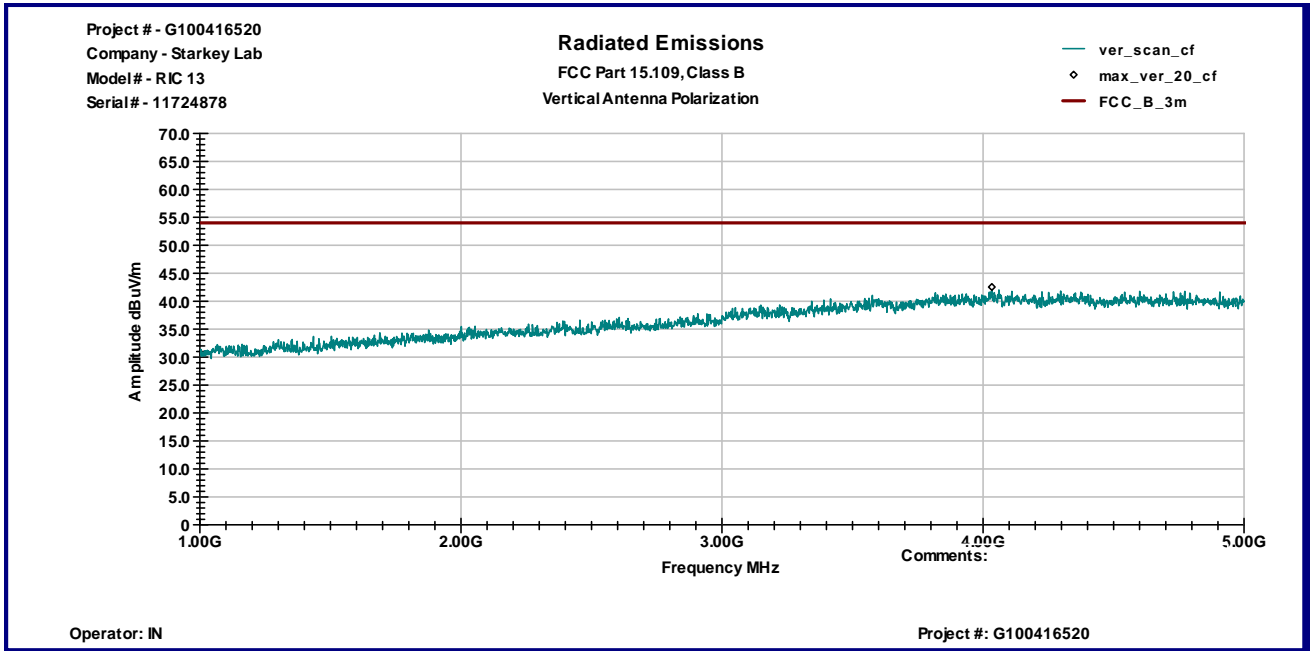


Horizontal antenna polarization

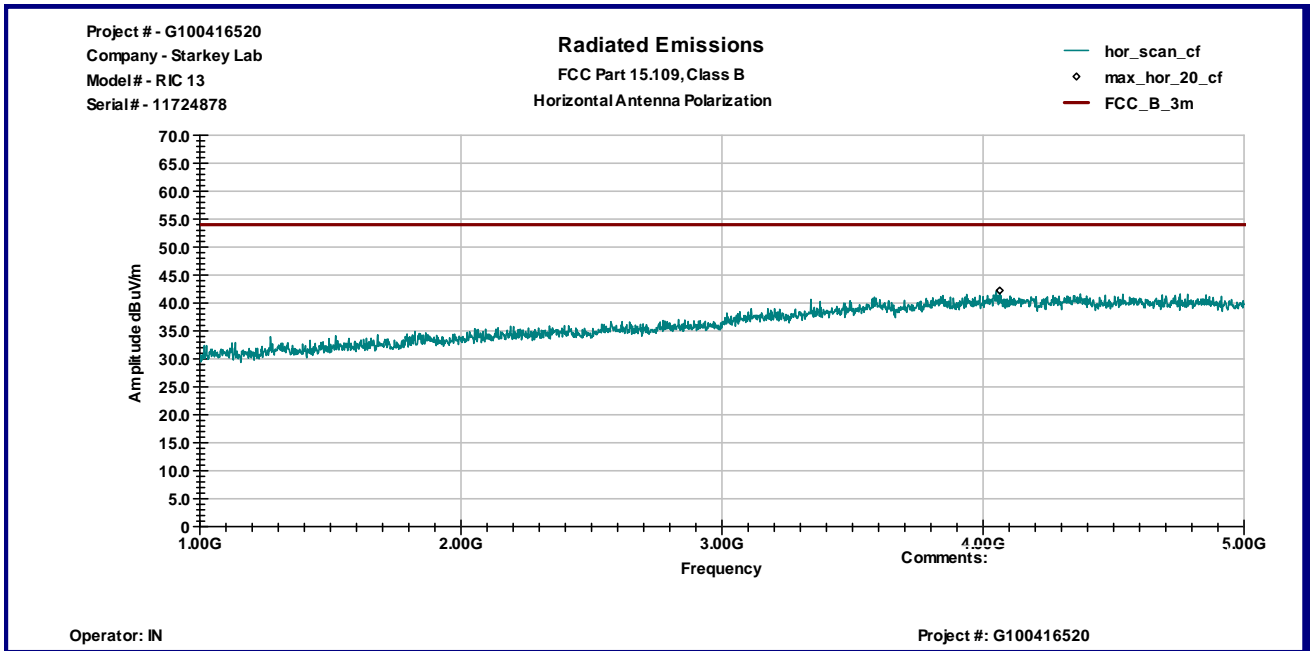


Graph 3.3.3

Vertical antenna polarization



Horizontal antenna polarization



Graph 3.3.4



4.0 TEST EQUIPMENT

DESCRIPTION	MANUFACTURER	MODEL	SERIAL NO.	INTERTEK ID	CAL DUE	USED
Spectrum Analyzer	R & S	FSP 40	100024	12559	12/07/2011	<input checked="" type="checkbox"/>
Spectrum Analyzer	R & S	ESCI	100358	12909	05/12/2012	<input checked="" type="checkbox"/>
Bicono-Log Antenna	Schaffner-Chase	CBL 6112 B	2468	9734	10/18/2011	<input checked="" type="checkbox"/>
Horn Antenna	EMCO	3115	9507-4513	9936	04/29/2012	<input checked="" type="checkbox"/>
High Pass Filter	Reactel	7HS-1G-S12	0223	15275	VBU	<input checked="" type="checkbox"/>
Pre-Amplifier	MITEQ	AMF-5D-00501800-28-13P	1122951	13475	10/06/2011	<input checked="" type="checkbox"/>
System	TILE! Instrument Control		Ver. 3.4.K.29	15259	VBU	<input checked="" type="checkbox"/>