



TEST REPORT

Report Number: 100919847MIN-001

Project Number: G100919847

Testing performed on the
SPT-S3-70AWS-22-HP

to

47 CFR, Part 27:2010, Enclosure Spurious Radiated Emissions

For

ADC Telecommunications Inc. - a TE Connectivity Company

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

Test Authorized by:
ADC Telecommunications Inc.- a TE Connectivity
Company
541 E Trimble Road
San Jose, CA 95131 USA

Prepared by: Richard Blonigen
Richard Blonigen

Date: October 12, 2012

Reviewed by: Norman Shpilsher
Norman Shpilsher

Date: October 12, 2012

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1.0 DESCRIPTION OF THE SAMPLE (EUT)

Model:	SPT-S3-70AWS-22-HP
Type of EUT:	Booster
Operating Frequency Range:	728 – 757MHz (700 band) 2110 – 2155 MHz (AWS band)
Company:	ADC Telecommunications Inc. - a TE Connectivity Company
Customer:	Sue Cyr
Address:	541 E. Trimble Road San Jose, CA 95131 USA
Phone:	408-952-2445
Fax:	408-952-2645
e-mail:	sue.cyr@te.com
Test Standards:	☐ EN 55022:2006 +A1:2007, Class T ☐ EN 55011:2007 +A2:2007, Group T , Class T ☒ 47 CFR, Part 27:2010, Enclosure Spurious Radiated Emissions ☐ ICES-003, Issue 4:2004 ☐ EN 55014-1:2006 ☐ EN 61326-1:2006 ☐ Class T for Radiated and Conducted Emissions ☐ Basic Immunity Test Requirements ☐ Immunity Test Requirements for Industrial Locations ☐ EN 60601-1-2:2001 +A1:2006 ☐ EN 61000-6-3:2007 ☐ EN 61000-6-4:2007 ☐ EN 61000-3-2:2006 ☐ EN 61000-3-3:1995 +A1:2001 +A2:2006 ☐ EN 61000-6-1:2007 ☐ EN 61000-6-2:2005 ☐ EN 55024:1998 + A1:2001 + A2:2003
Date Sample Submitted:	October 11, 2012
Test Work Started:	October 11, 2012
Test Work Completed:	October 11, 2012
Test Sample Conditions:	☐ Damaged ☐ Poor (Usable) ☒ Good ☐ Prototype ☒ Production ☐ Used

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.

TEST STANDARD	TEST	RESULT
Part 27	Enclosure Spurious Radiated Emissions	Pass

2.1 Statement of the Measurement Uncertainty

Note: The measured result in this report is within the specification limits by more than the measurement uncertainty; the measured result indicates that the product tested complies with the specification limit.

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

3.0 EQUIPMENT UNDER TEST

3.1 Power Configuration

Rated voltage:	☐ 120VAC ☐ 230VAC ☐ 400VAC ☒ 54VDC from external support Power
Rated current:	Amp.
Rated frequency:	☐ 50Hz ☐ 60Hz
Number of phases:	☐ 1 Phase ☐ 3 Phases

3.2 EUT Configuration

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

- ☐ - Standby
- ☐ - Test program (H - Pattern)
- ☒ - Continuous Operation (see details below)
- ☐ - Specific test program
- ☐ -

Operating modes of the EUT:

No.	Description
1	Continuous transmitting at 729MHz, 742MHz, and 756MHz at -17dBm input power
2	Continuous transmitting at 2111MHz, 2132MHz, and 2154MHz at -11dBm input power

Cables:

No.	Type	Length	Designation	Note
1	Two RF coax	10m each	RF signal cables to the Support Equipment	

Support equipment/Services:

No.	Item	Description
1	Aeroflex IRF 3413	Signal Generator
2	Prism Host Unit p/n 1449226	Host Unit
3	IFEU p/n MR2216G7	54 V Power Supply
4	Prism DRU unit	DRU
5	Spectrum IFEU Unit	IFEU
6	Spectrum Main RAU	Remote Antenna

General notes: None

3.3 Environmental conditions

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

Temperature:	<u>15-35 ° C</u>
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Humidity:	<u>30-60 %</u>
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Atmospheric pressure:	<u>86-106 kPa</u>
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4.0 TEST CONDITIONS AND RESULTS

4.1 Enclosure Spurious Radiated Emissions

Description of the test location

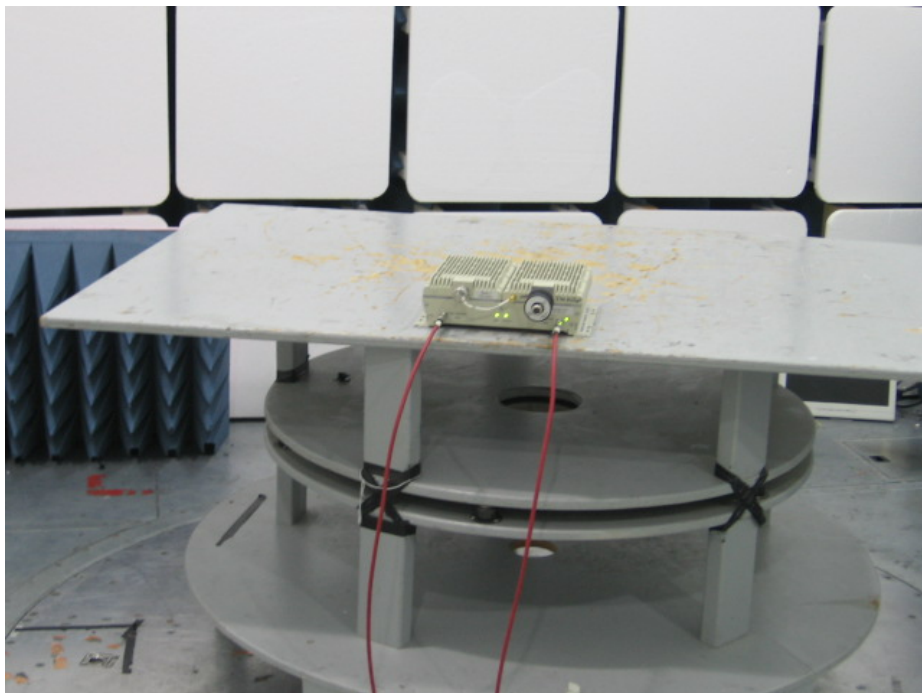
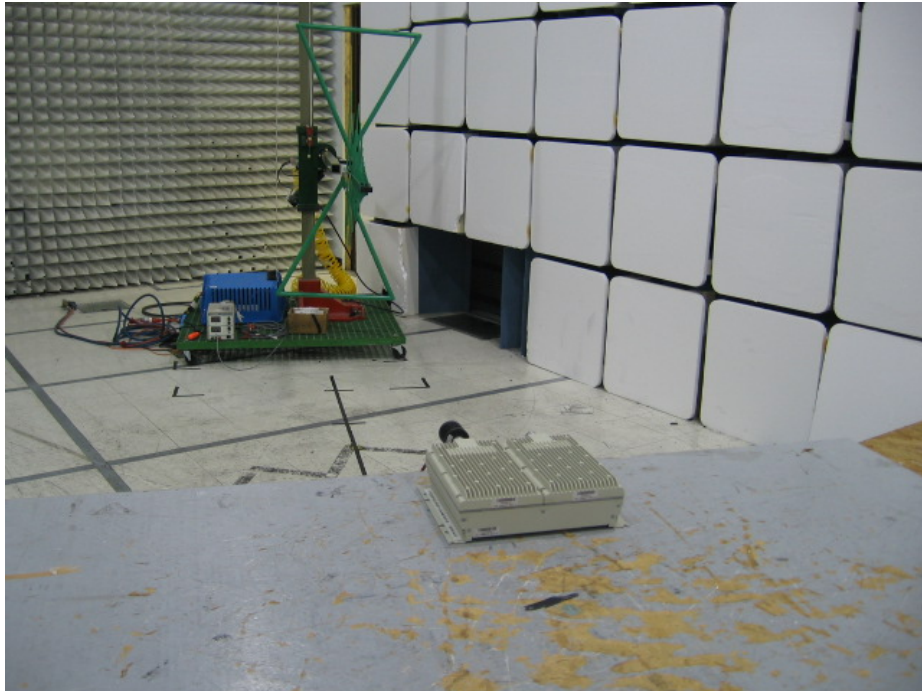
Test location: ☐ OATS ☒ Anechoic Chamber

Test distance: ☐ 10 meters ☒ 3 meters

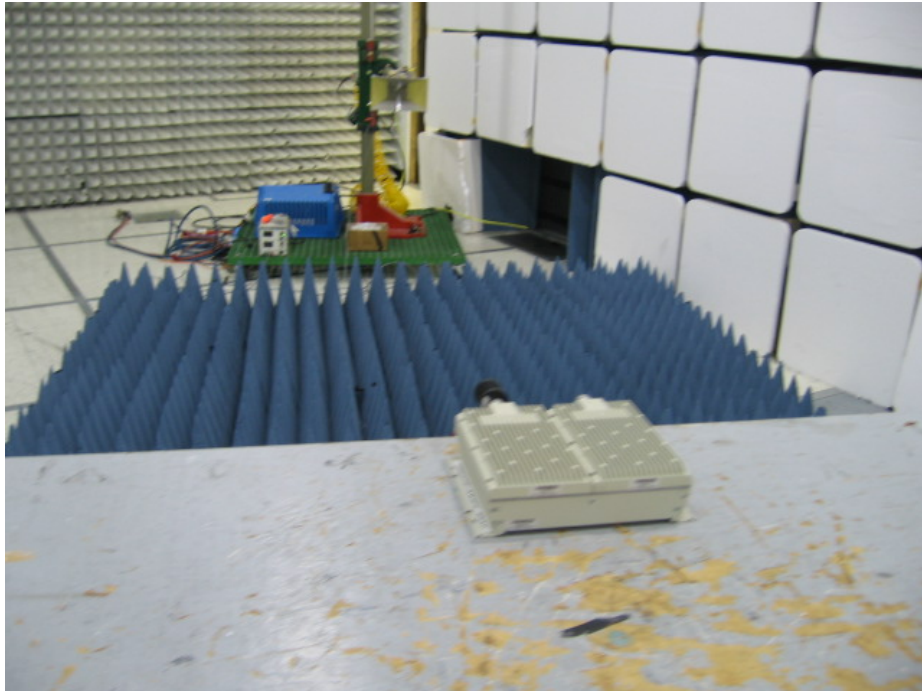
Test result: **Pass**

Frequency range: 30MHz-8GHz (700 Band)
30MHz-22GHz (AWS Band)

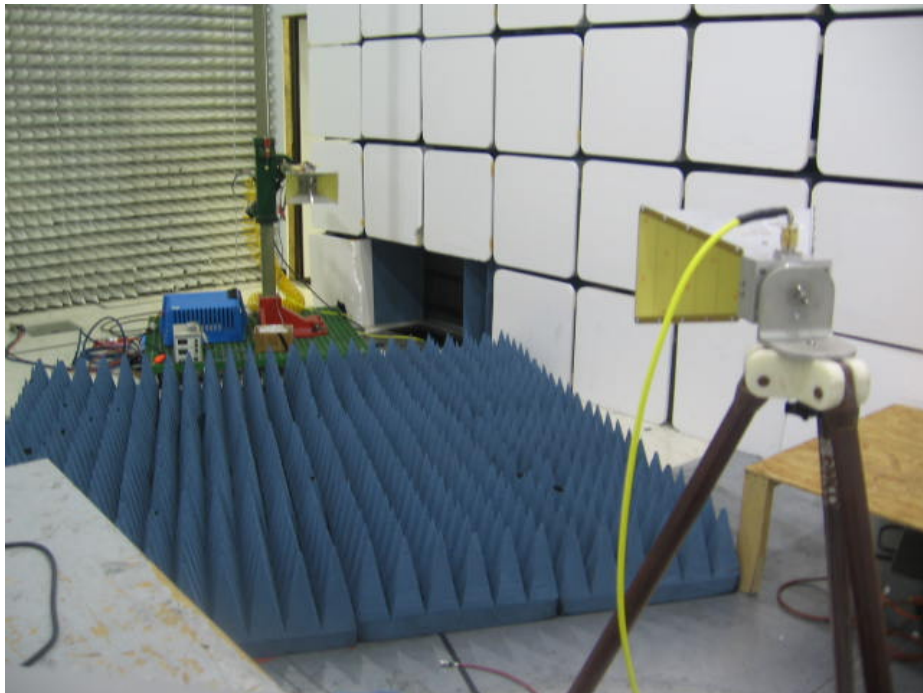
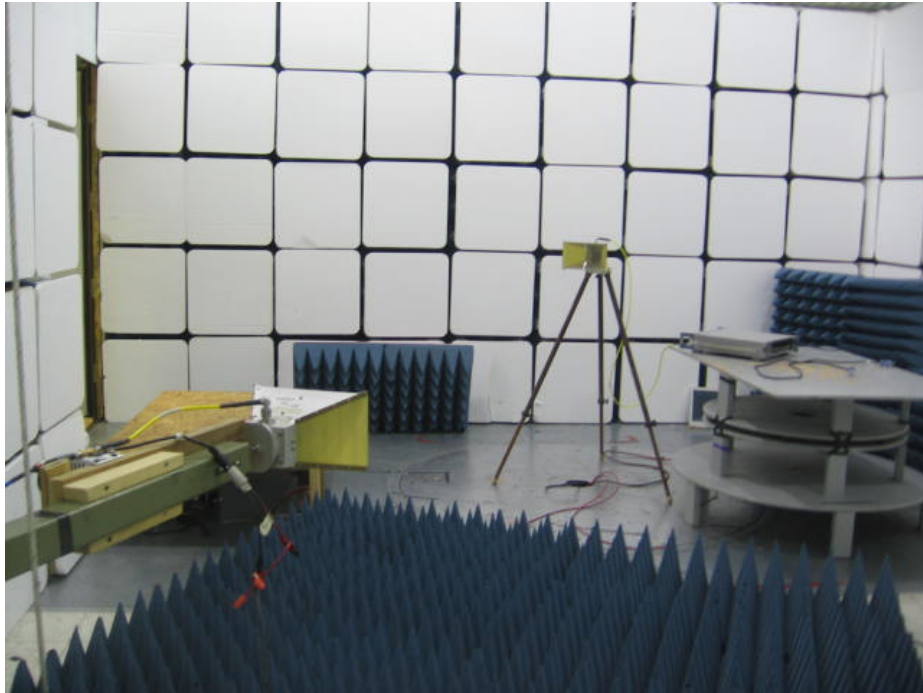
- Notes:**
1. The Radiated Emissions testing was performed in the Anechoic chamber at 3m measurement distance (see Table 1 & 2 and Graphs 1-30)
 2. The Spurious Radiated Power limits of -13dBm was correlated with field strength Reference Limit of 82.2dB μ V/m during field strength measurements at 3m measurement distance
 3. Emissions with margin less than 20dB below the reference limit were measured with substitution method (see Table 3)
 4. Emissions at operating frequencies were excluded from the Tables
-



Test Setup Photos



Test Setup Photo

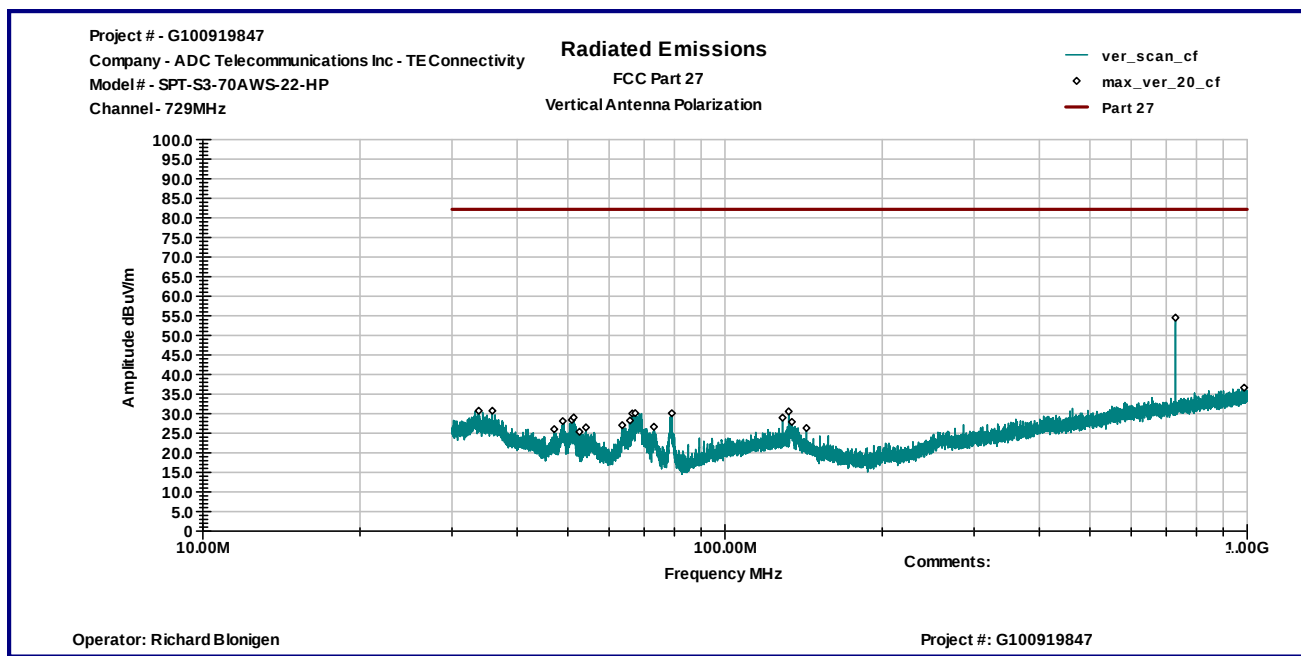


Test Setup Photos

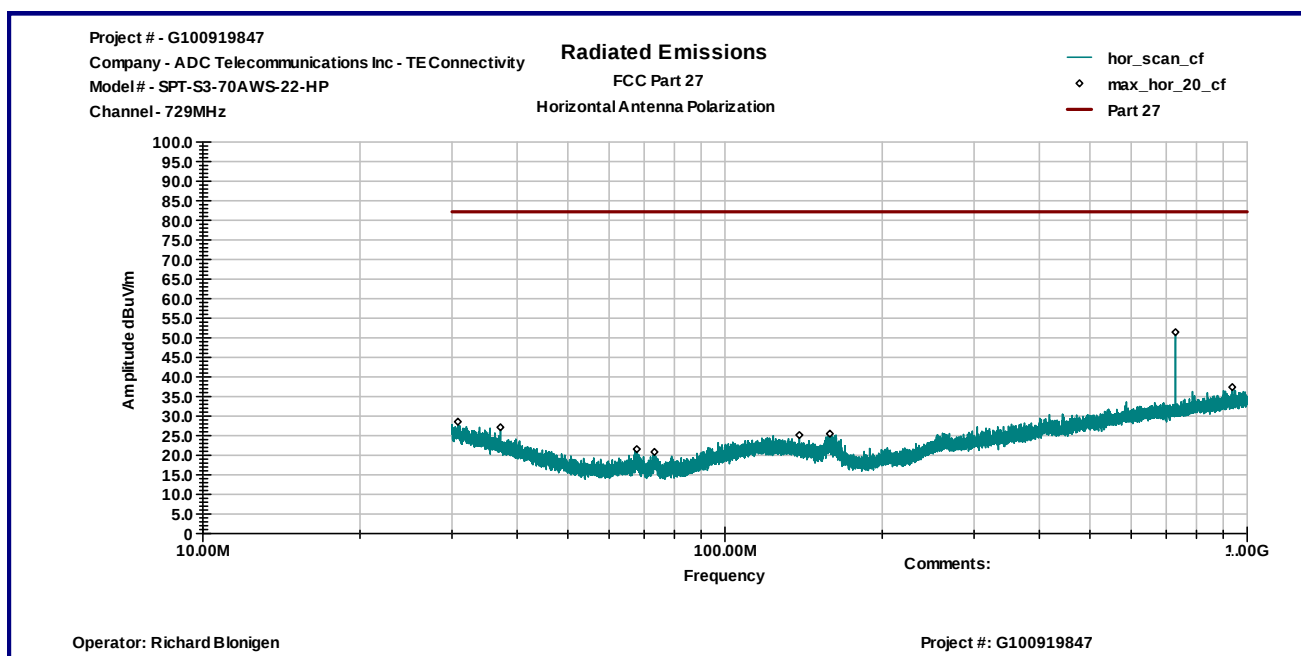
Date:	October 11, 2012	Result: Pass
Tested by:	Richard Blonigen	
Standard:	FCC Part 27	
Test Point:	Enclosure	
Operation mode:	See page 5	
Note:	Channels 728-756MHz Frequency Range 30MHz-8GHz	

Table 1

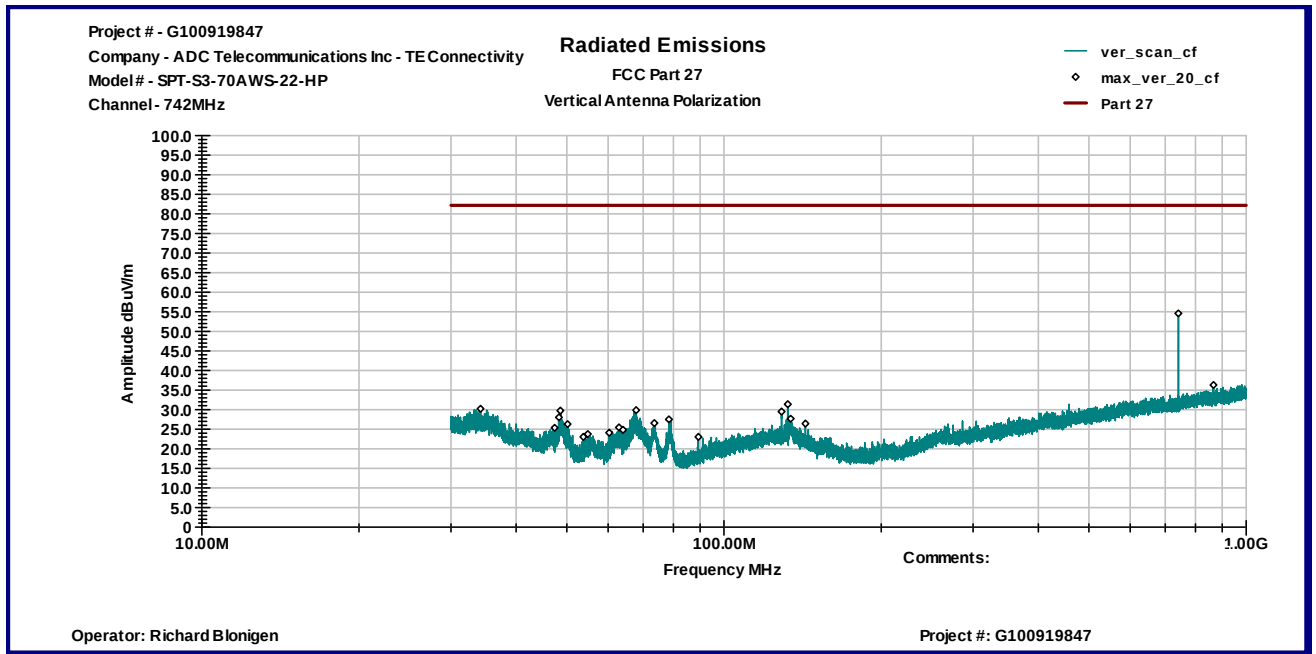
Frequency MHz	Antenna Polarity	Peak Reading dBμV	Total C.F. dB1/m	Pre-Amp. Gain (dB)	Total at 3m dBμV/m	Limit dBμV/m	Margin dB
Channel 729MHz							
33.751 MHz	V	12.7	18.0	0.0	30.7	82.2	-51.5
35.847 MHz	V	13.9	16.9	0.0	30.7	82.2	-51.5
66.45 MHz	V	23.0	7.0	0.0	30.0	82.2	-52.2
67.314 MHz	V	23.1	7.0	0.0	30.1	82.2	-52.1
987.04 MHz	V	10.5	26.2	0.0	36.6	82.2	-45.6
1.4573 GHz	V	53.3	27.5	43.0	37.7	82.2	-44.5
8.0 GHz	V	50.8	42.3	40.6	52.4	82.2	-29.8
30.782 MHz	H	8.8	19.8	0.0	28.6	82.2	-53.7
37.149 MHz	H	11.0	16.2	0.0	27.2	82.2	-55.1
158.8 MHz	H	13.4	12.2	0.0	25.5	82.2	-56.7
936.67 MHz	H	11.8	25.6	0.0	37.4	82.2	-44.8
7.9183 GHz	H	51.3	42.0	40.7	52.5	82.2	-29.7
Channel 742MHz							
34.184 MHz	V	12.4	17.8	0.0	30.2	82.2	-52.0
128.91 MHz	V	15.5	14.0	0.0	29.5	82.2	-52.7
132.49 MHz	V	17.6	13.8	0.0	31.4	82.2	-50.8
866.06 MHz	V	11.3	25.0	0.0	36.3	82.2	-45.9
1.483 GHz	V	58.6	27.6	43.0	43.2	82.2	-39.0
30.922 MHz	H	8.9	19.7	0.0	28.6	82.2	-53.7
111.96 MHz	H	11.9	13.7	0.0	25.6	82.2	-56.6
161.07 MHz	H	16.2	12.0	0.0	28.3	82.2	-54.0
165.39 MHz	H	14.2	11.8	0.0	26.0	82.2	-56.2
999.27 MHz	H	10.8	26.2	0.0	37.0	82.2	-45.2
7.9907 GHz	H	50.6	42.1	40.6	52.0	82.2	-30.2
Channel 756MHz							
31.788 MHz	V	10.7	19.1	0.0	29.8	82.2	-52.4
67.89 MHz	V	23.3	7.1	0.0	30.4	82.2	-51.8
132.49 MHz	V	17.3	13.8	0.0	31.1	82.2	-51.2
458.1 MHz	V	12.7	19.7	0.0	32.4	82.2	-49.8
837.95 MHz	V	16.8	24.6	0.0	41.4	82.2	-40.8
1.511 GHz	V	63.6	27.7	43.0	48.3	82.2	-33.9
7.9183 GHz	V	51.3	42.2	40.7	52.8	82.2	-29.4
30.391 MHz	H	8.9	20.0	0.0	28.9	82.2	-53.3
400.94 MHz	H	11.6	19.0	0.0	30.6	82.2	-51.7
412.57 MHz	H	10.7	19.7	0.0	30.4	82.2	-51.8
997.52 MHz	H	11.0	26.2	0.0	37.2	82.2	-45.0
1.5133 GHz	H	55.7	27.6	43.0	40.2	82.2	-42.0
7.9253 GHz	H	50.6	42.0	40.7	51.9	82.2	-30.3



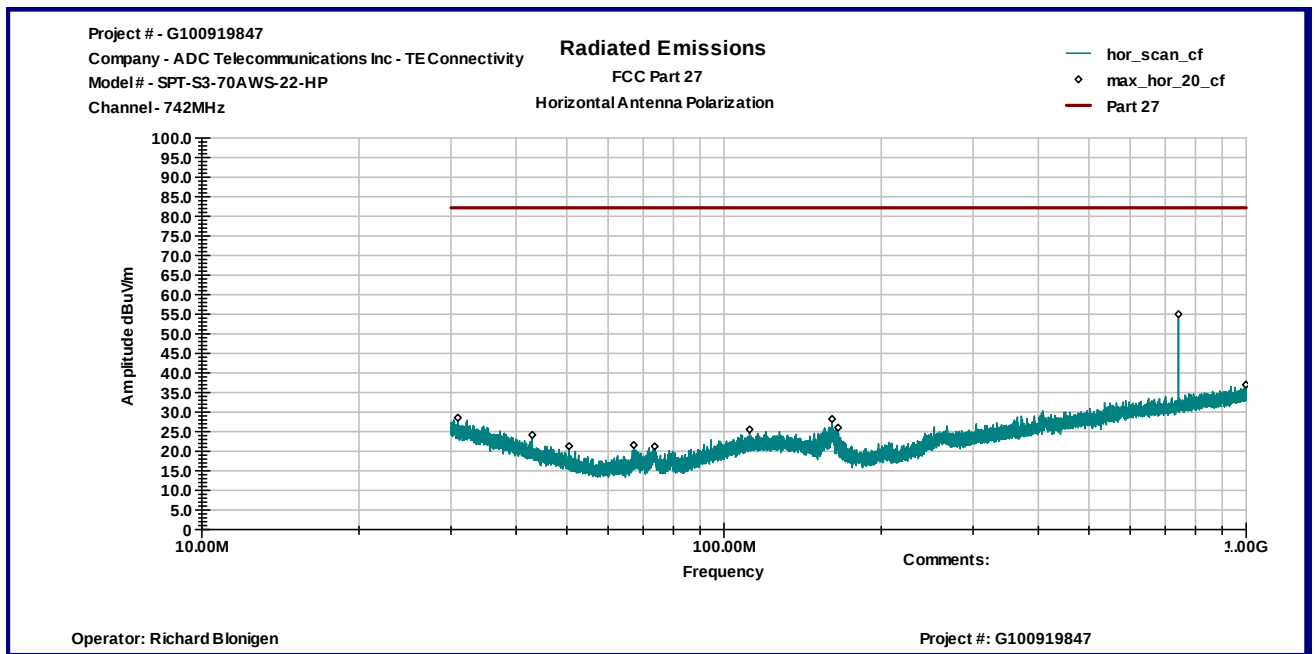
Graph 1



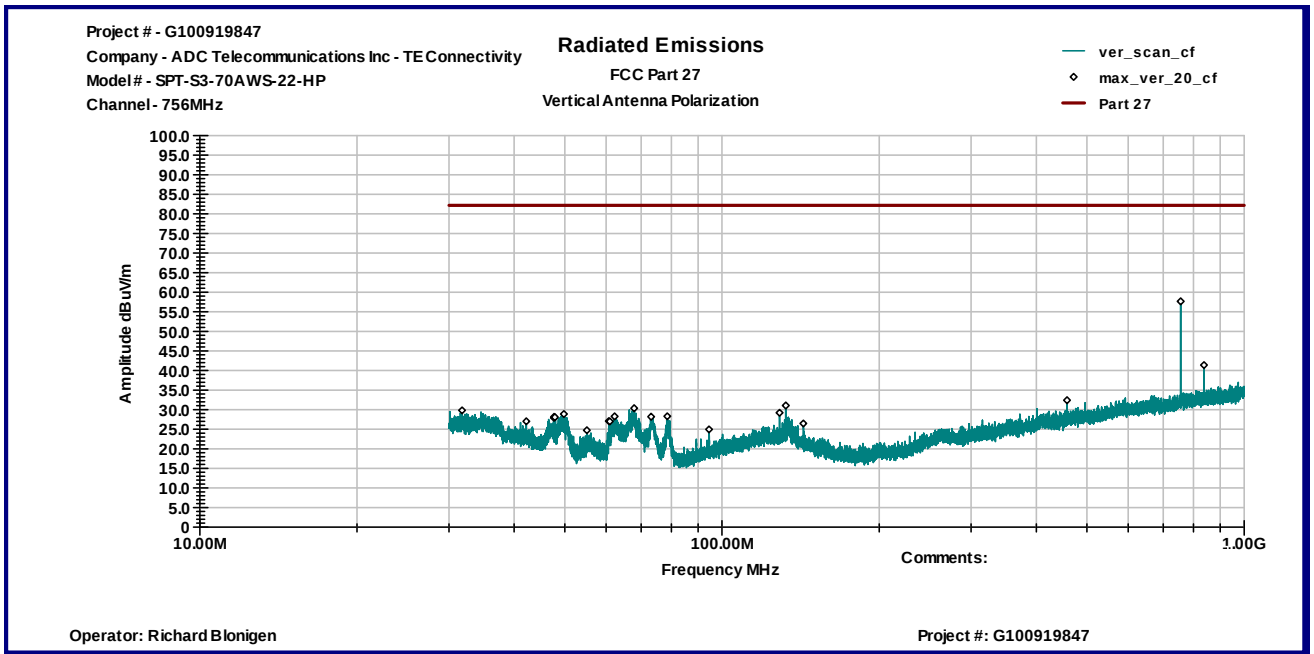
Graph 2



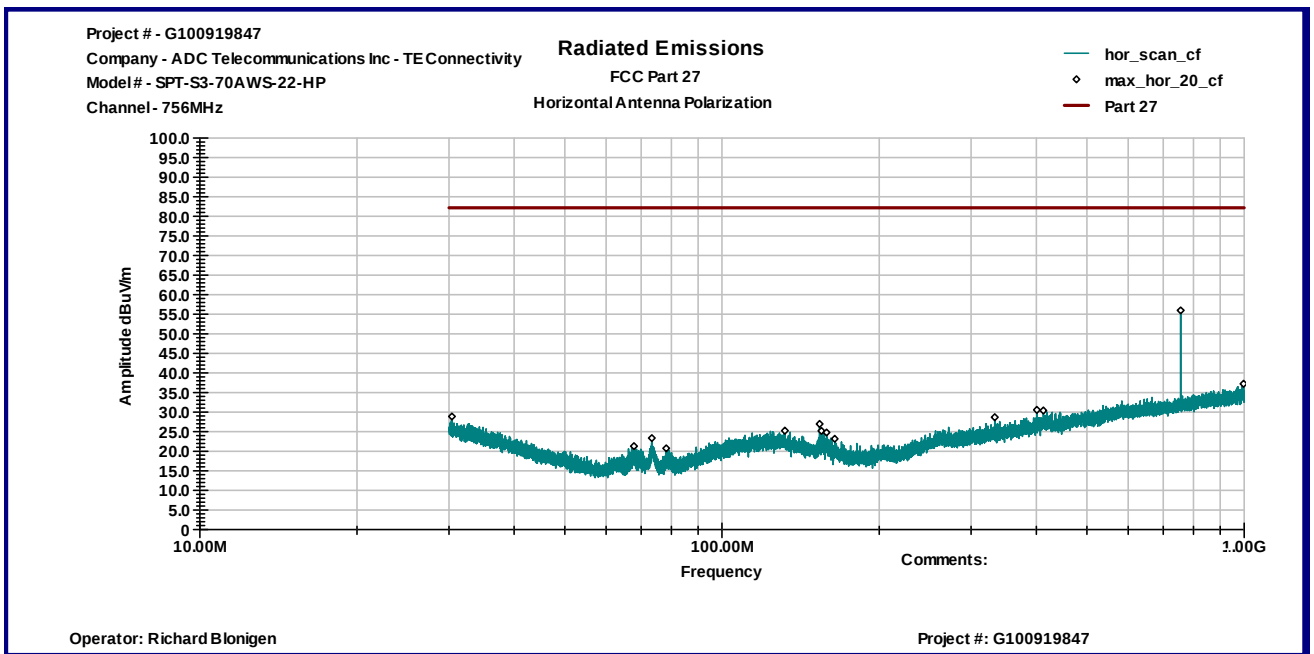
Graph 3



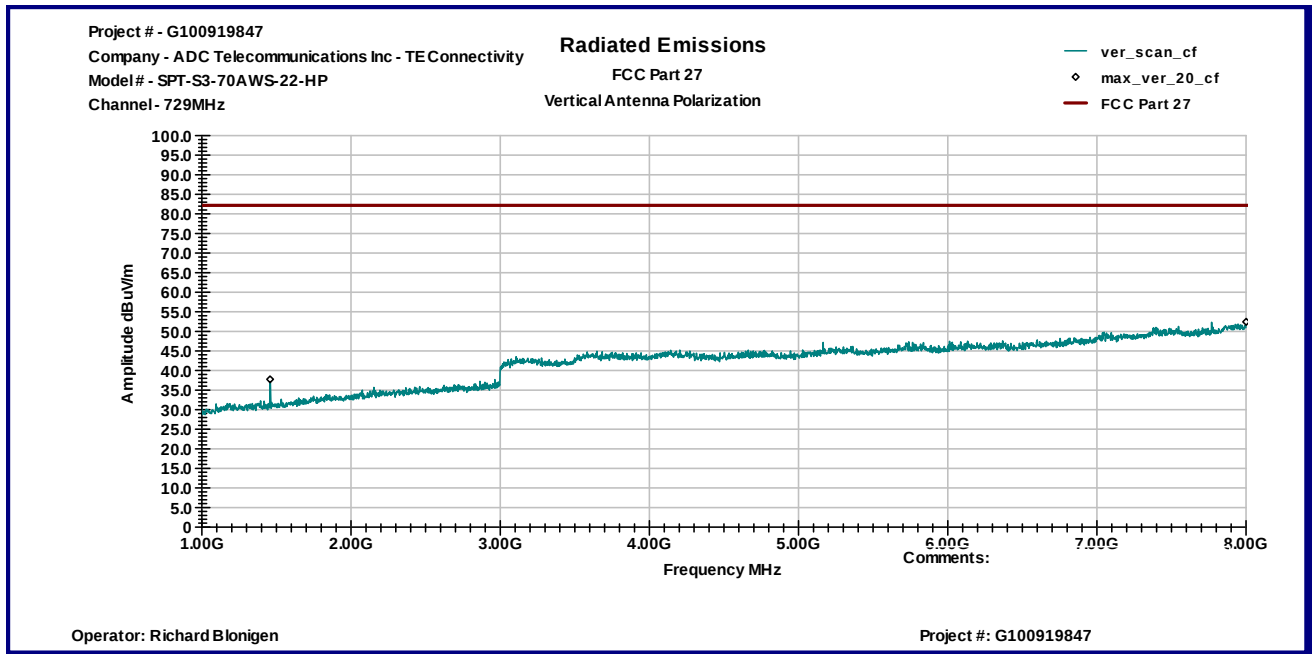
Graph 4



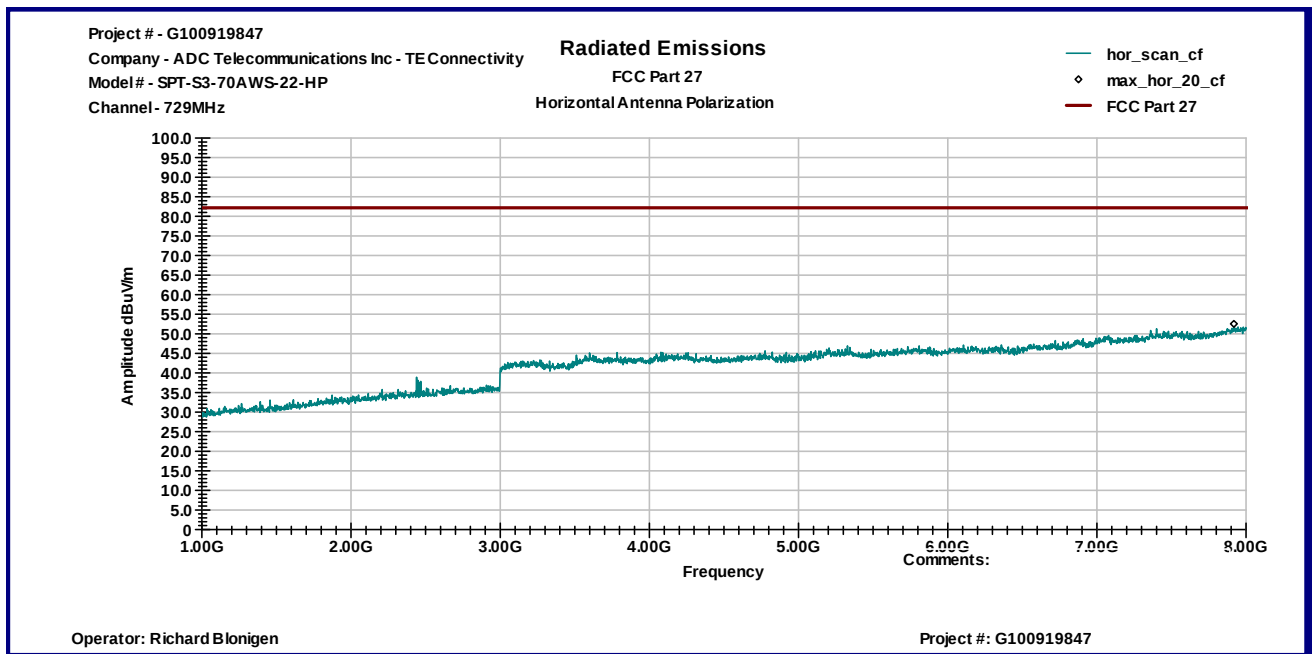
Graph 5



Graph 6



Graph 7



Graph 8

Project # - G100919847

Company - ADC Telecommunications Inc - TE Connectivity

Model# - SPT-S3-70AWS-22-HP

Channel - 742MHz

Radiated Emissions

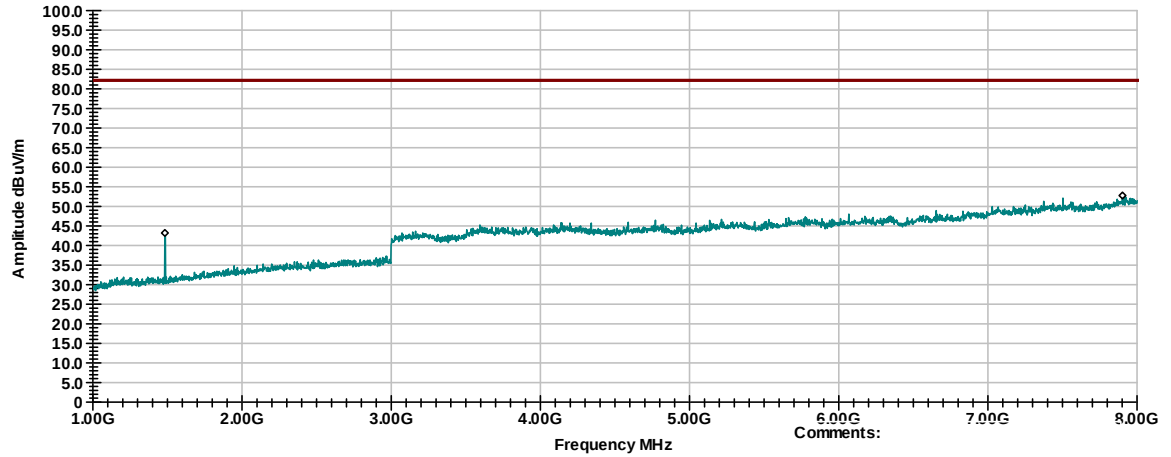
FCC Part 27

Vertical Antenna Polarization

ver_scan_cf

max_ver_20_cf

FCC Part 27



Operator: Richard Blonigen

Project #: G100919847

Graph 9

Project # - G100919847

Company - ADC Telecommunications Inc - TE Connectivity

Model# - SPT-S3-70AWS-22-HP

Channel - 742MHz

Radiated Emissions

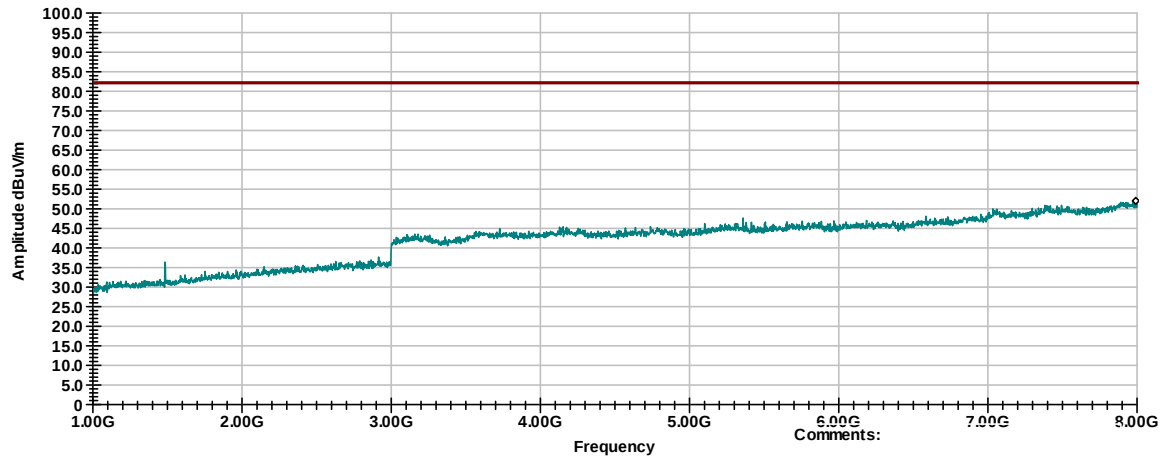
FCC Part 27

Horizontal Antenna Polarization

hor_scan_cf

max_hor_20_cf

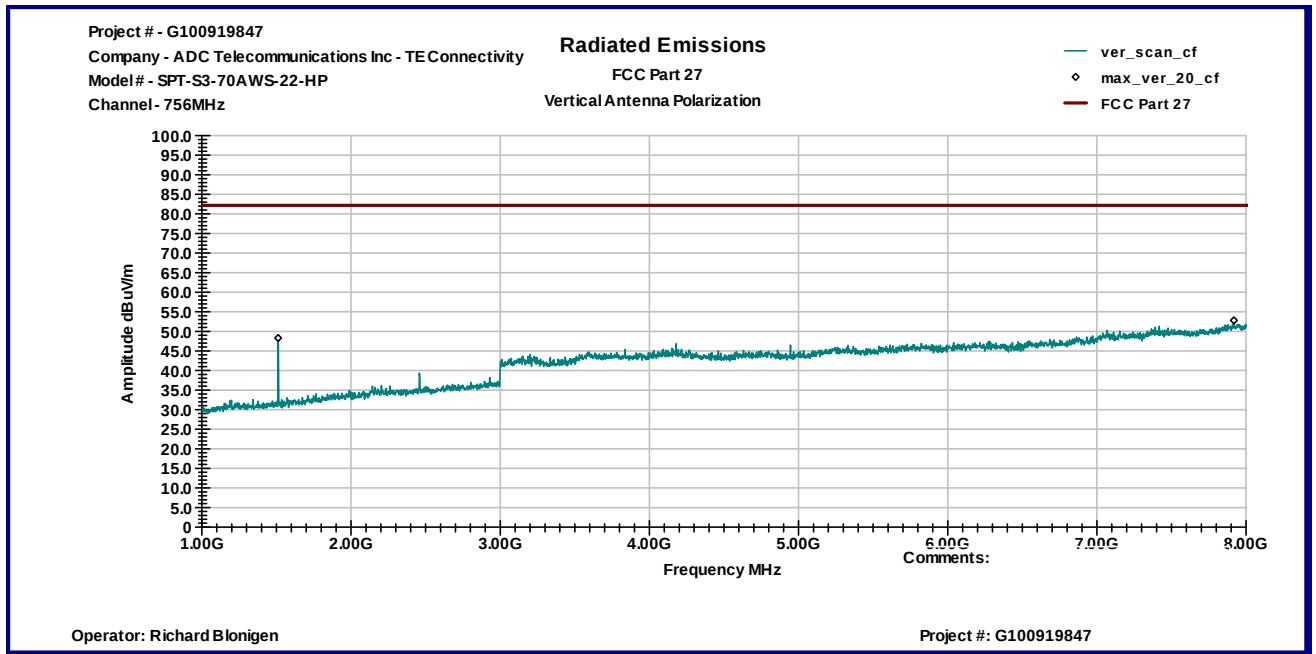
FCC Part 27



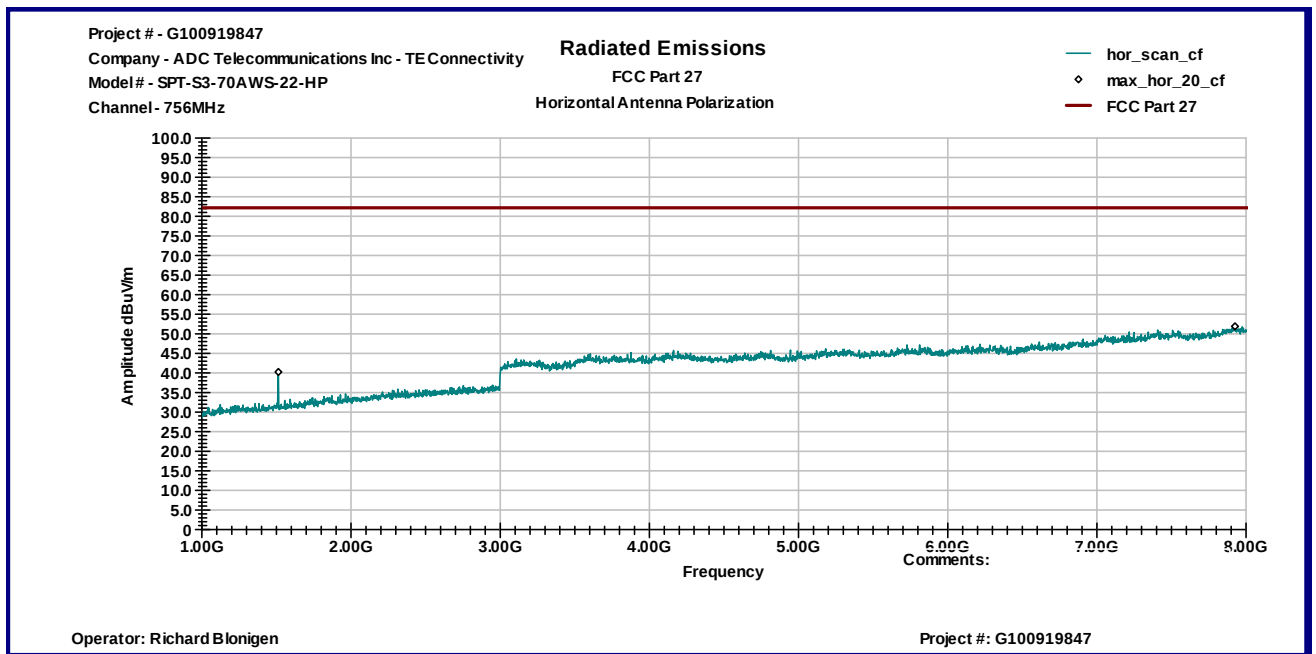
Operator: Richard Blonigen

Project #: G100919847

Graph 10



Graph 11



Graph 12

Date:	October 11, 2012	Result: Pass
Tested by:	Simon Khazon	
Standard:	FCC Part 27	
Test Point:	Enclosure	
Operation mode:	See page 5	
Note:	Channels 2110 – 2155 MHz Frequency Range 30MHz-22GHz	

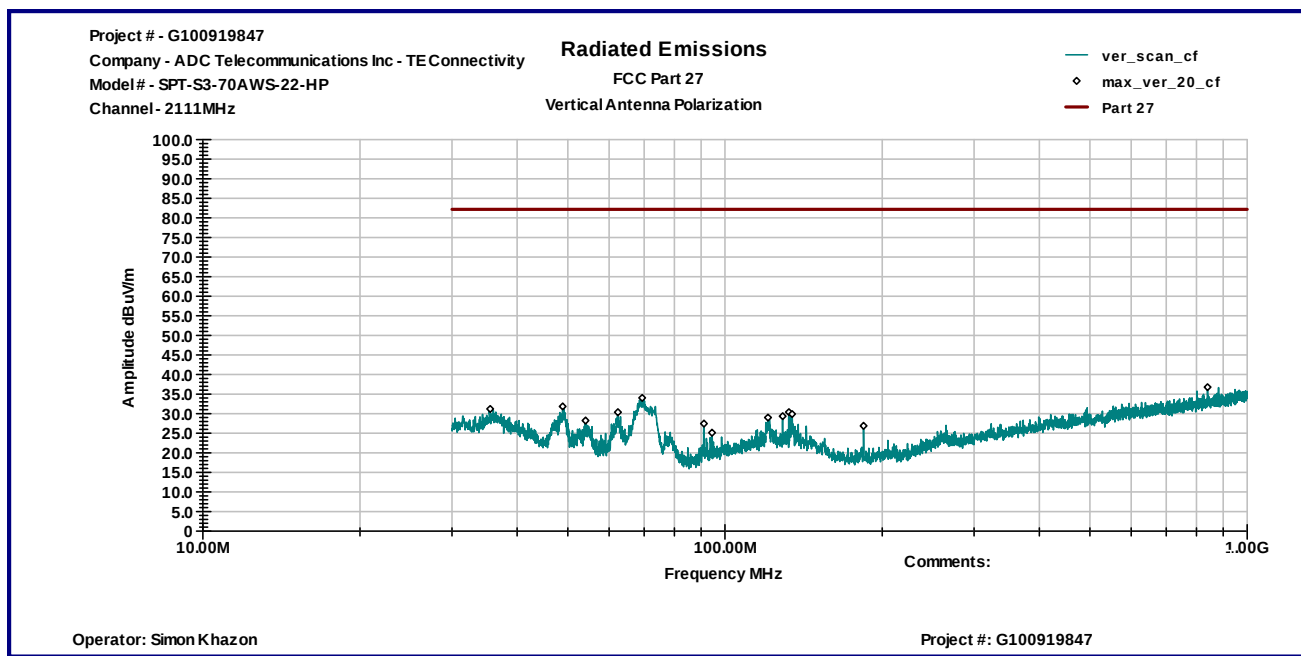
Table 2

Frequency MHz	Antenna Polarity	Peak Reading dBμV	Total C.F. dB1/m	Pre-Amp. Gain (dB)	Total at 3m dBμV/m	Limit dBμV/m	Margin dB
Channel 2111MHz							
69.408 MHz	V	26.8	7.2	0.0	34.0	82.2	-48.2
128.95 MHz	V	15.5	13.8	0.0	29.4	82.2	-52.9
132.53 MHz	V	16.6	13.8	0.0	30.4	82.2	-51.8
184.26 MHz	V	15.7	11.1	0.0	26.9	82.2	-55.3
4.2232 GHz	V	57.6	36.7	42.7	51.6	82.2	-30.6
30.658 MHz	H	8.1	20.0	0.0	28.0	82.2	-54.2
121.94 MHz	H	13.5	14.0	0.0	27.4	82.2	-54.8
184.26 MHz	H	17.5	11.1	0.0	28.6	82.2	-53.6
361.99 MHz	H	13.0	18.0	0.0	31.0	82.2	-51.2
970.65 MHz	H	10.2	26.2	0.0	36.4	82.2	-45.8
Channel 2132MHz							
69.408 MHz	V	27.66	7.19	0.0	34.85	82.2	-47.35
974.18 MHz	V	11.13	26.17	0.0	37.31	82.2	-44.89
4.264 GHz	V	65.51	36.66	42.6	59.57	82.2	-22.63
8.5276 GHz	V	58.82	43.05	40.3	61.57	82.2	-20.63
10.659 GHz	V	58.12	45.58	41.6	62.14	82.2	-20.06
12.795 GHz	V	59.05	46.2	41.8	63.45	82.2	-18.75
184.26 MHz	H	18.22	11.14	0.0	29.36	82.2	-52.84
340.87 MHz	H	14.05	17	0.0	31.04	82.2	-51.16
4.264 GHz	H	60.1	36.5	42.6	53.9	82.2	-28.3
8.5276 GHz	H	56.5	42.9	40.3	59.1	82.2	-23.1
10.659 GHz	H	58.4	45.4	41.6	62.2	82.2	-20.0
12.795 GHz	H	60.3	46.0	41.8	64.5	82.2	-17.7
Channel 2154MHz							
68.961 MHz	V	28.46	7.16	0.0	35.62	82.2	-46.58
91.121 MHz	V	17.03	10.38	0.0	27.42	82.2	-54.78
132.53 MHz	V	16.33	13.75	0.0	30.08	82.2	-52.12
134.25 MHz	V	15.06	13.73	0.0	28.79	82.2	-53.41
952.96 MHz	V	10.93	25.88	0.0	36.81	82.2	-45.39
4.3082 GHz	V	62.21	36.68	42.5	56.36	82.2	-25.84
31.801 MHz	H	9.13	19.33	0.0	28.46	82.2	-53.74
120.89 MHz	H	12.29	13.95	0.0	26.23	82.2	-55.97
184.26 MHz	H	18.18	11.14	0.0	29.32	82.2	-52.88
192.14 MHz	H	15.92	11.4	0.0	27.32	82.2	-54.88
986.91 MHz	H	10.57	26.24	0.0	36.81	82.2	-45.39
4.3082 GHz	H	58.23	36.51	42.5	52.2	82.2	-30

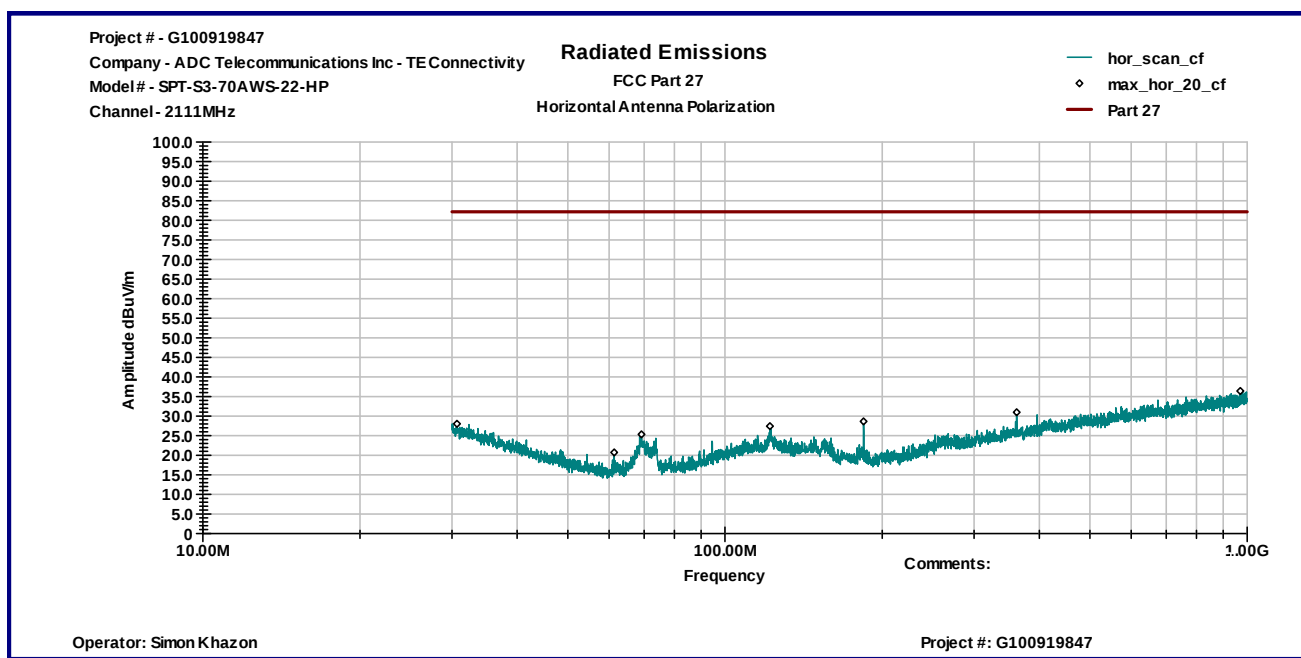
Date:	October 11, 2012	Result: Pass
Tested by:	Simon Khazon	
Standard:	FCC Part 27	
Test Point:	Enclosure	
Operation mode:	See page 5	
Note:	Substitution method	

Table 3

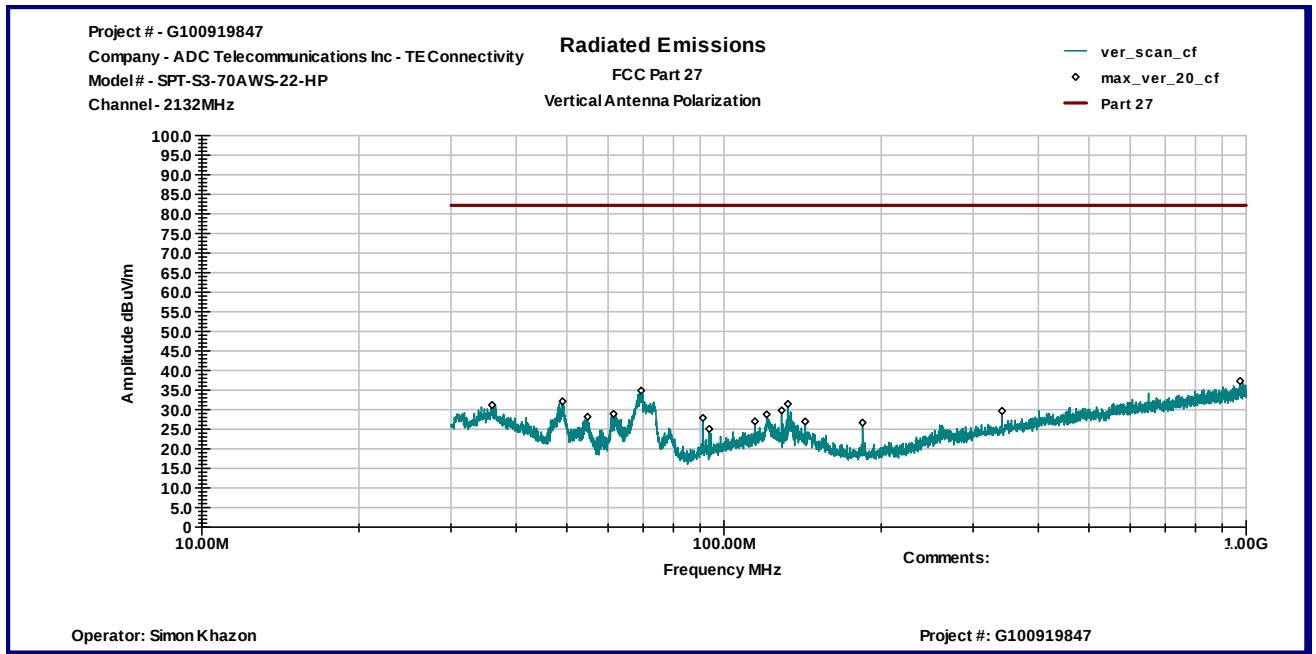
Frequency MHz	Antenna Polarity	Measured Emissions dBμV	Substitution Antenna Power dBm	Substitution Antenna Gain dBi	Cable Loss dB	Additional Loss/Gain dB	Emissions EIRP dBm	Limits dBm	Margin dB
2132MHz									
10660.00	H	58.4	-40.6	11.1	2.6	0.0	-32.2	-13.0	-19.2
12790.00	H	60.1	-39.6	12.7	2.9	0.0	-29.8	-13.0	-16.8
12790.00	V	59.3	-40.5	12.7	2.9	0.0	-30.7	-13.0	-17.7



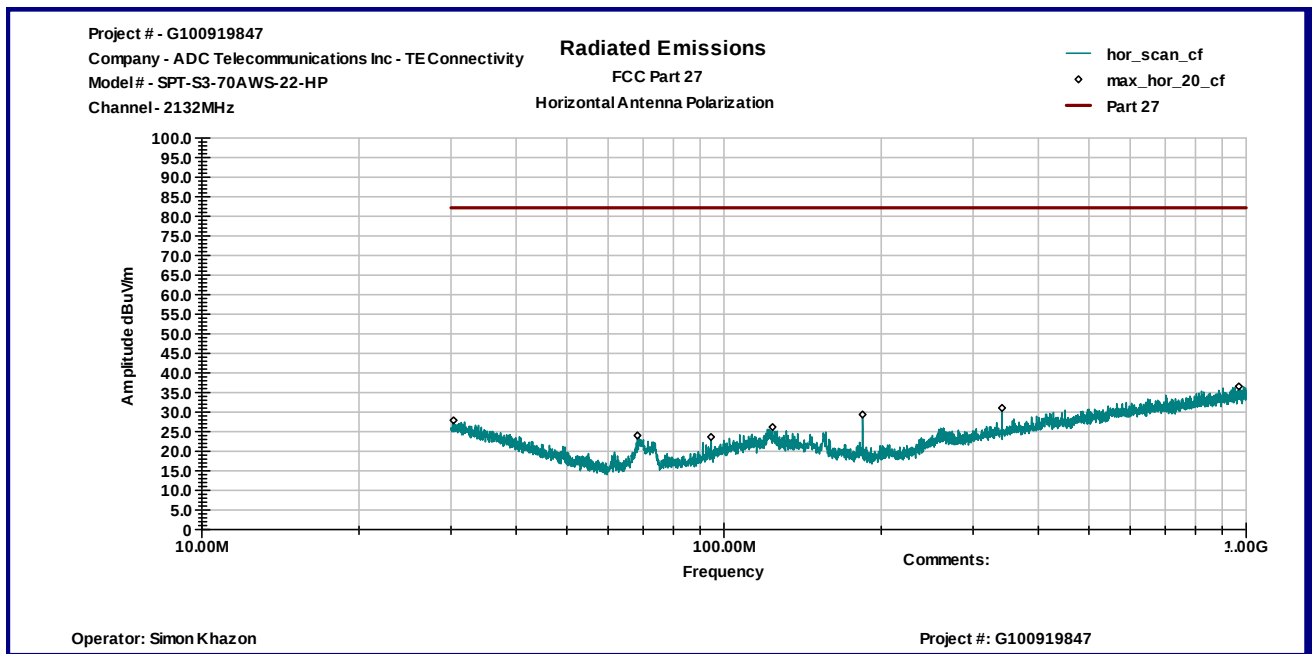
Graph 13



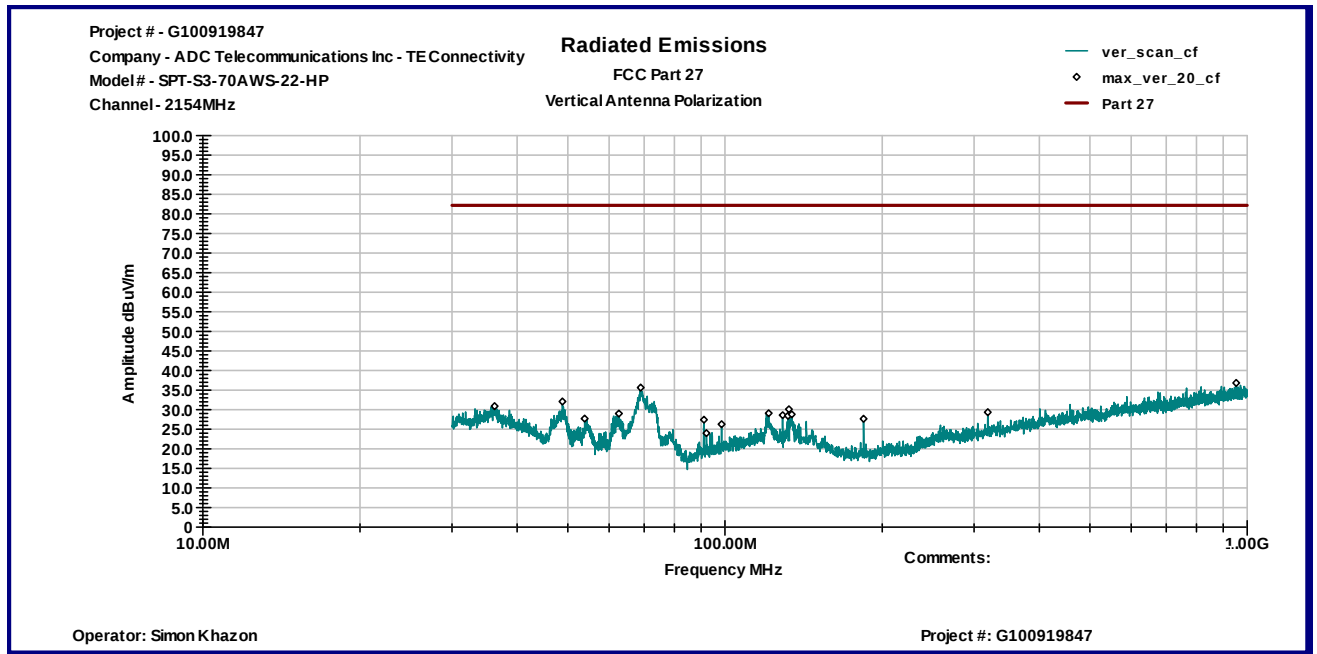
Graph 14



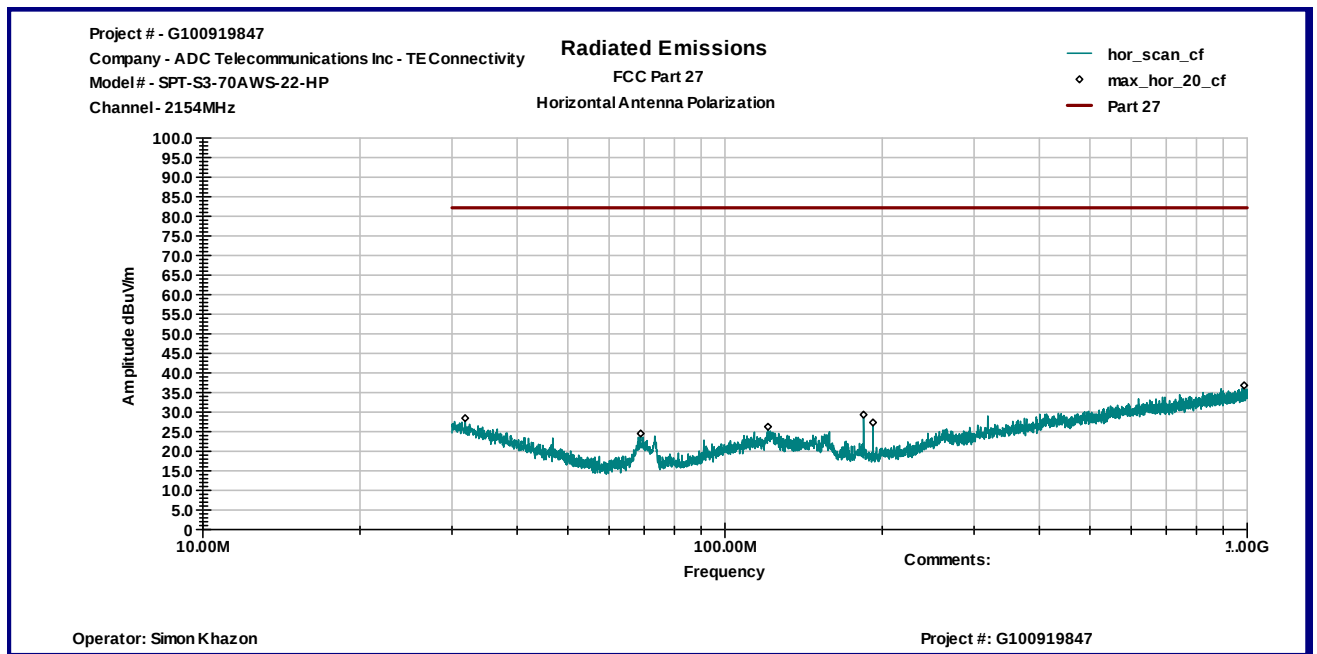
Graph 15



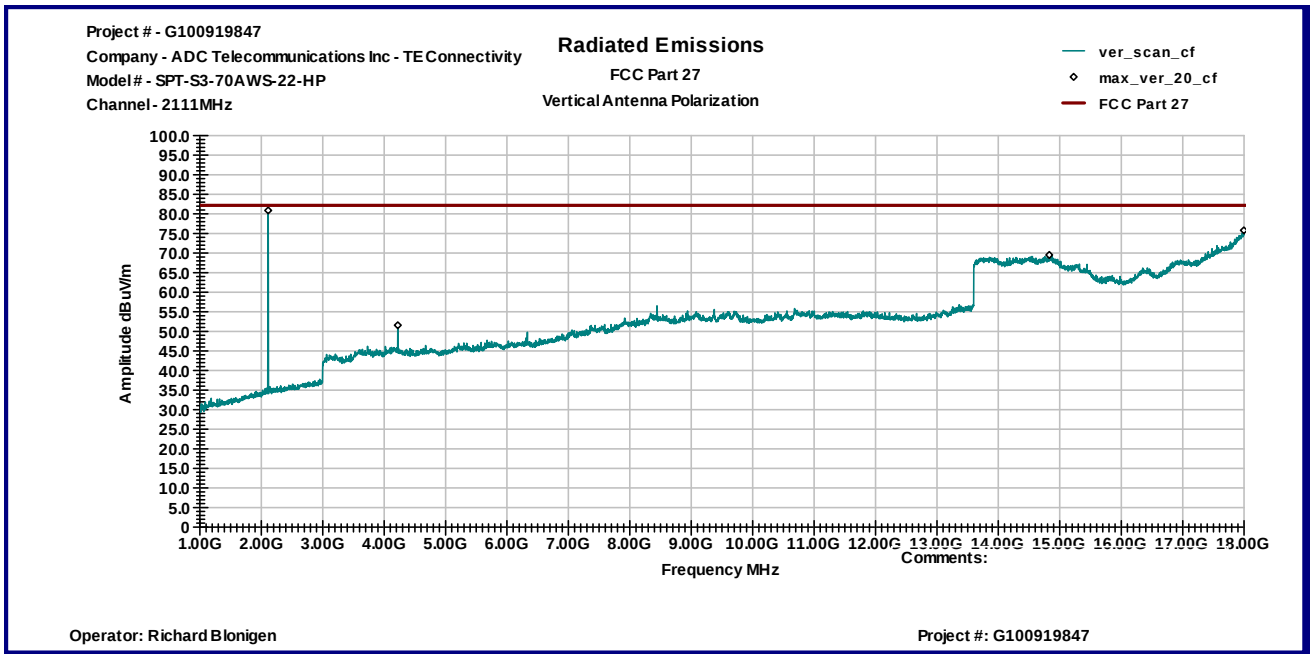
Graph 16



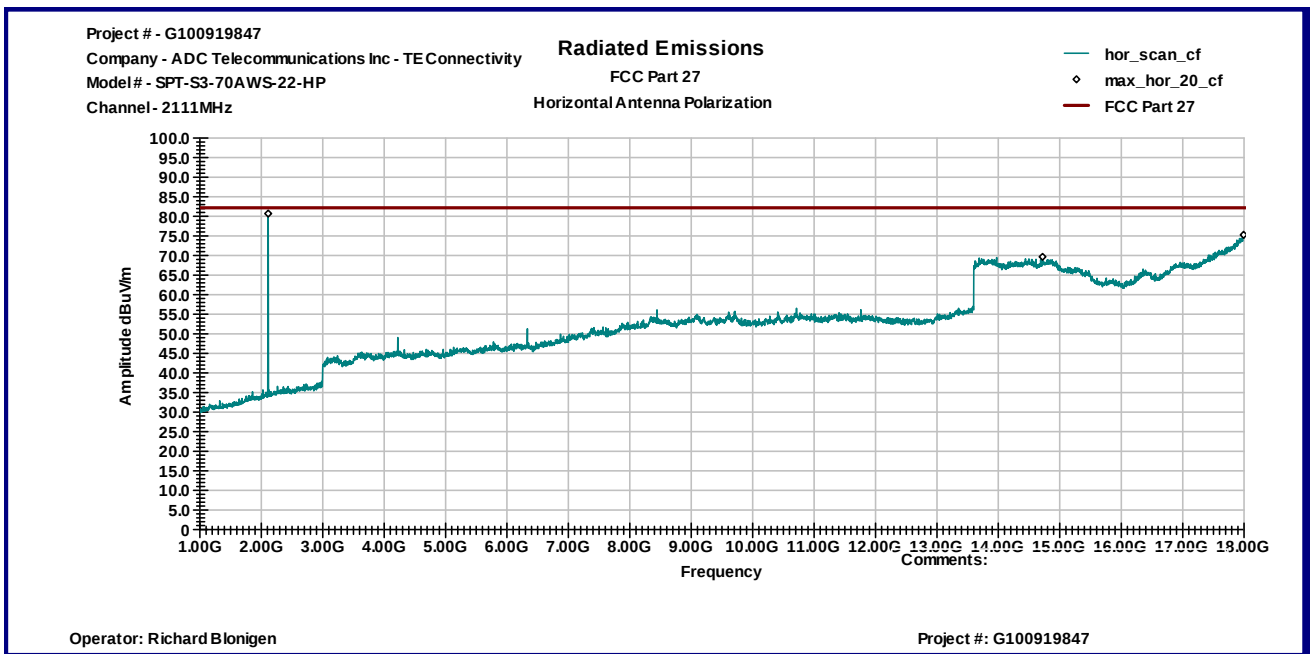
Graph 17



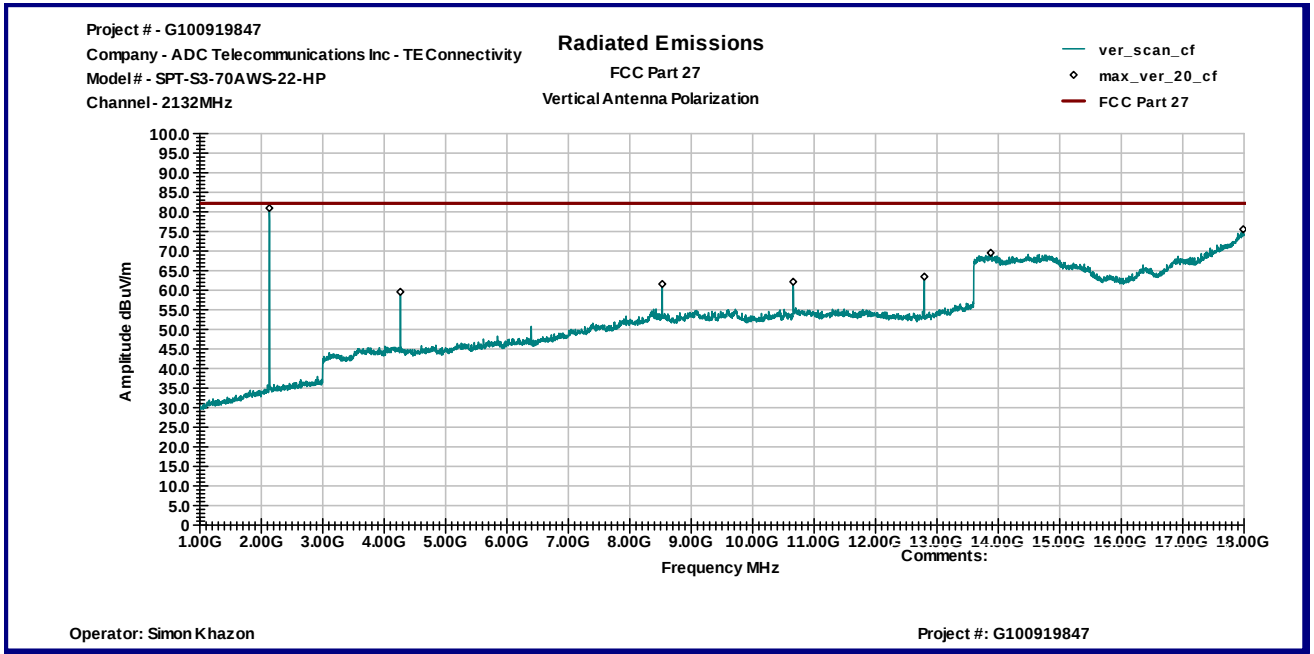
Graph 18



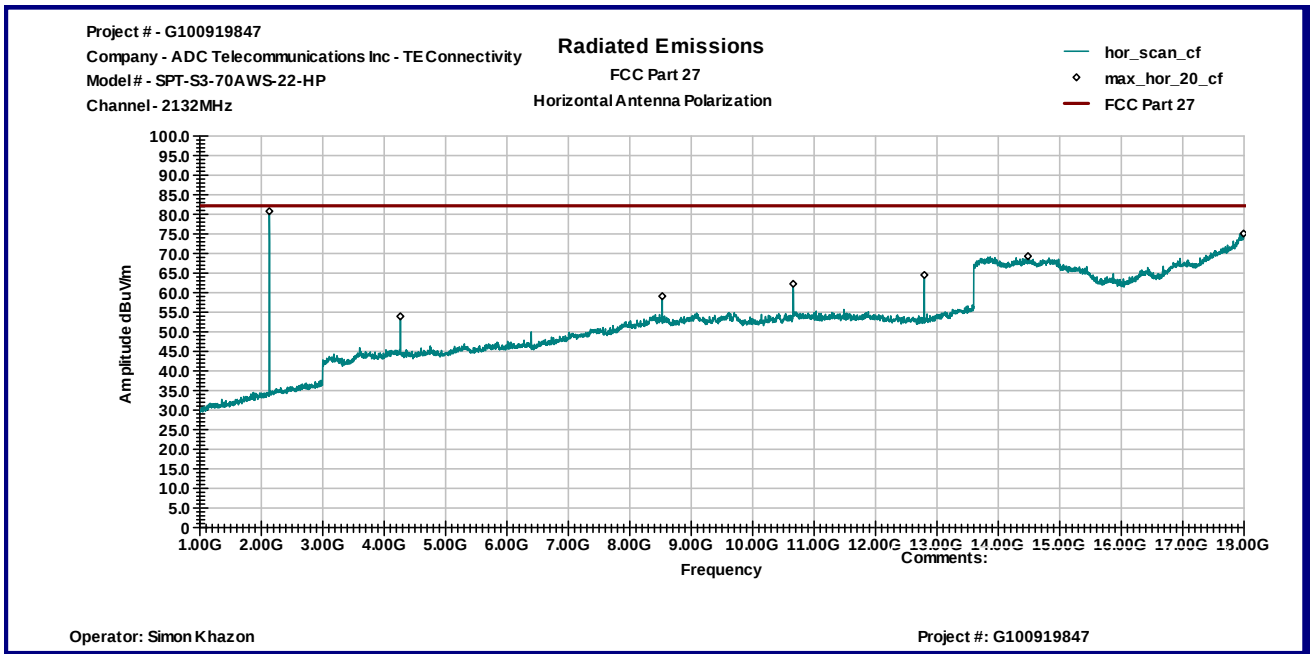
Graph 19



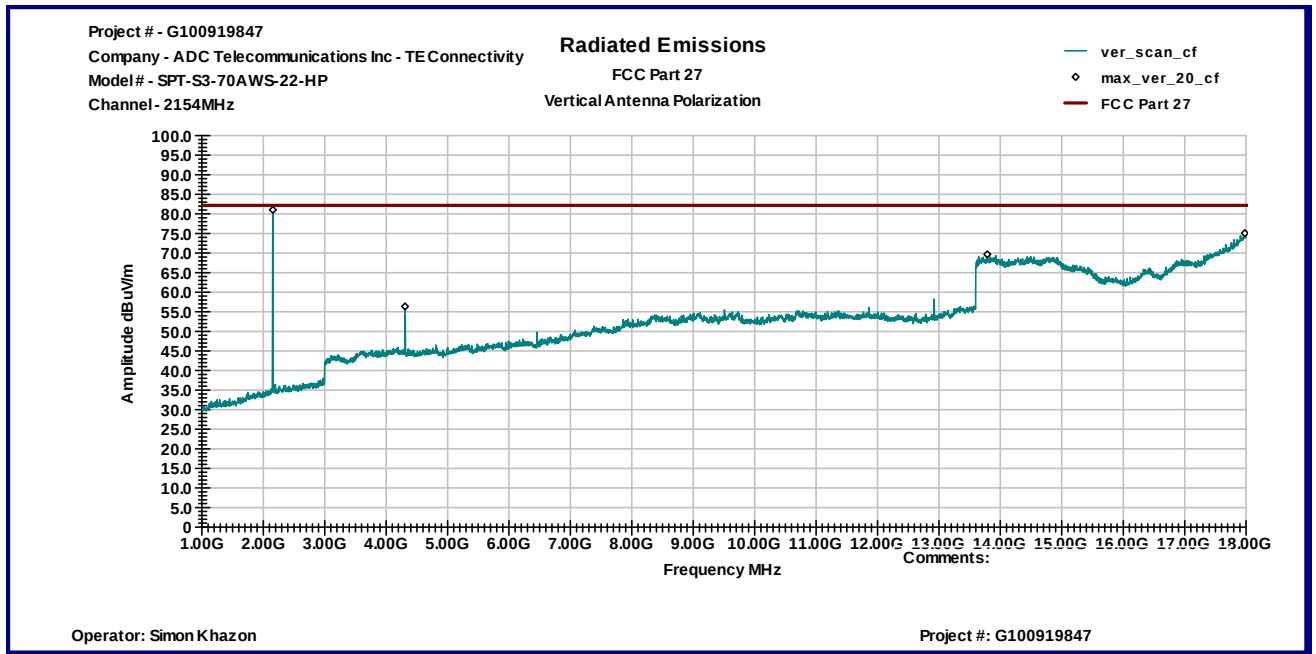
Graph 20



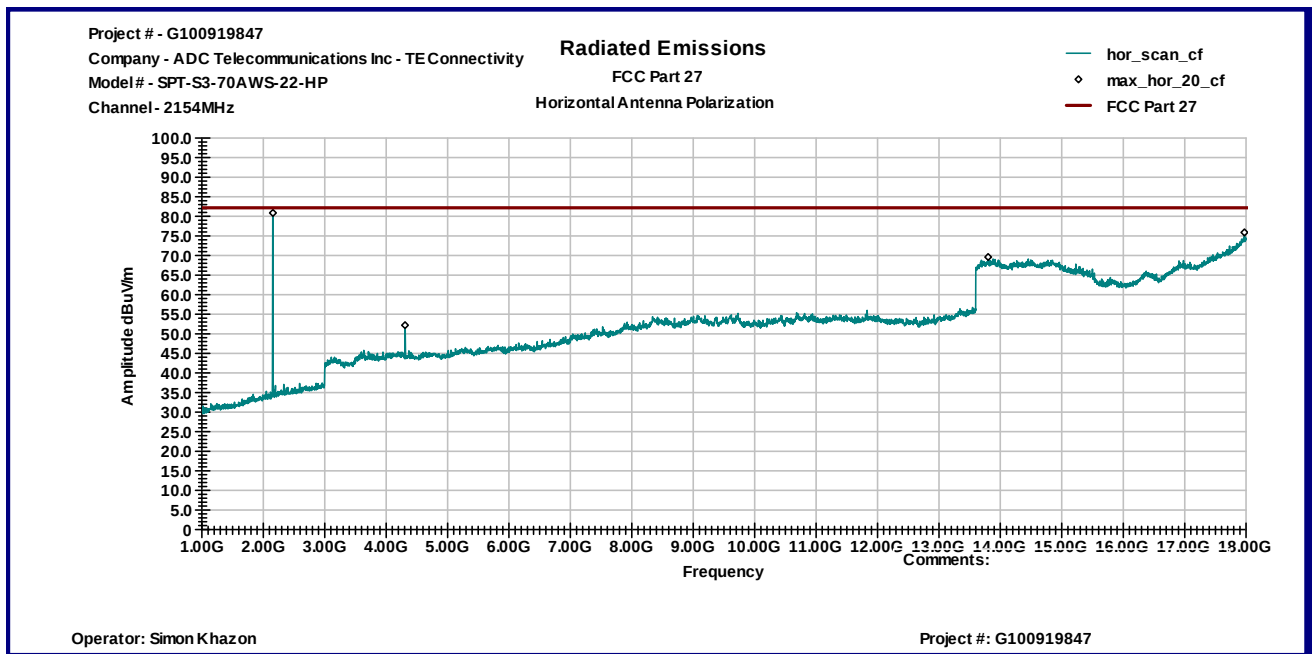
Graph 21



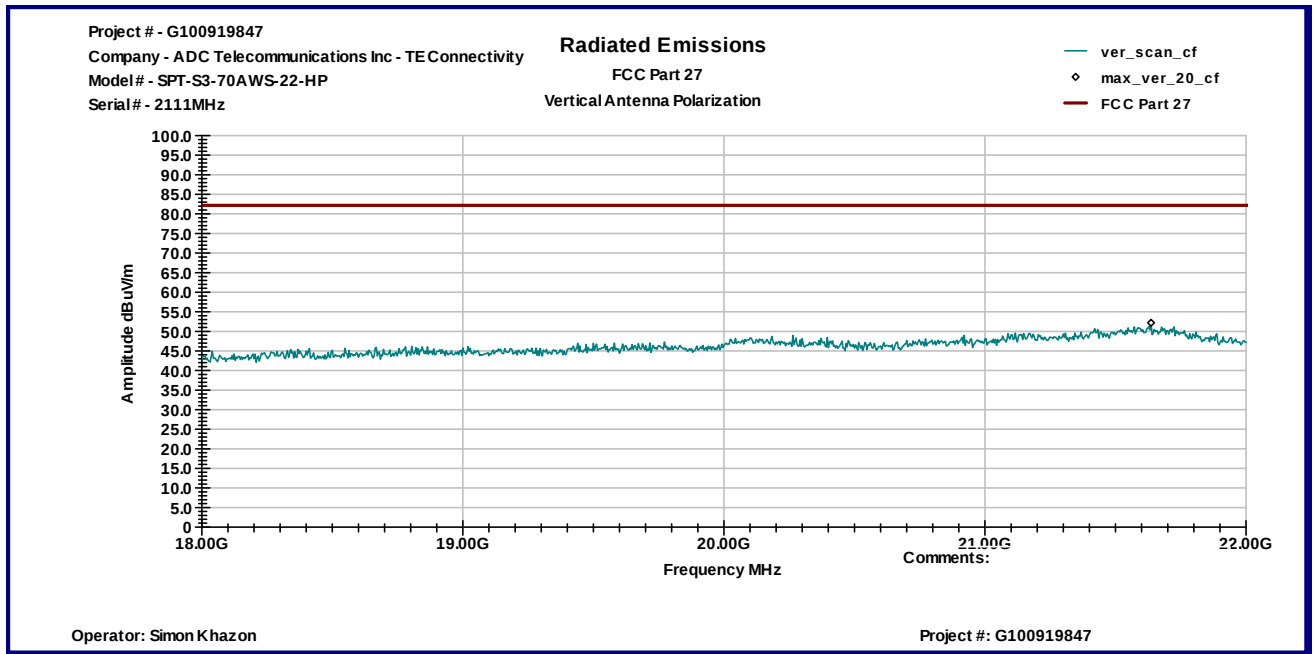
Graph 22



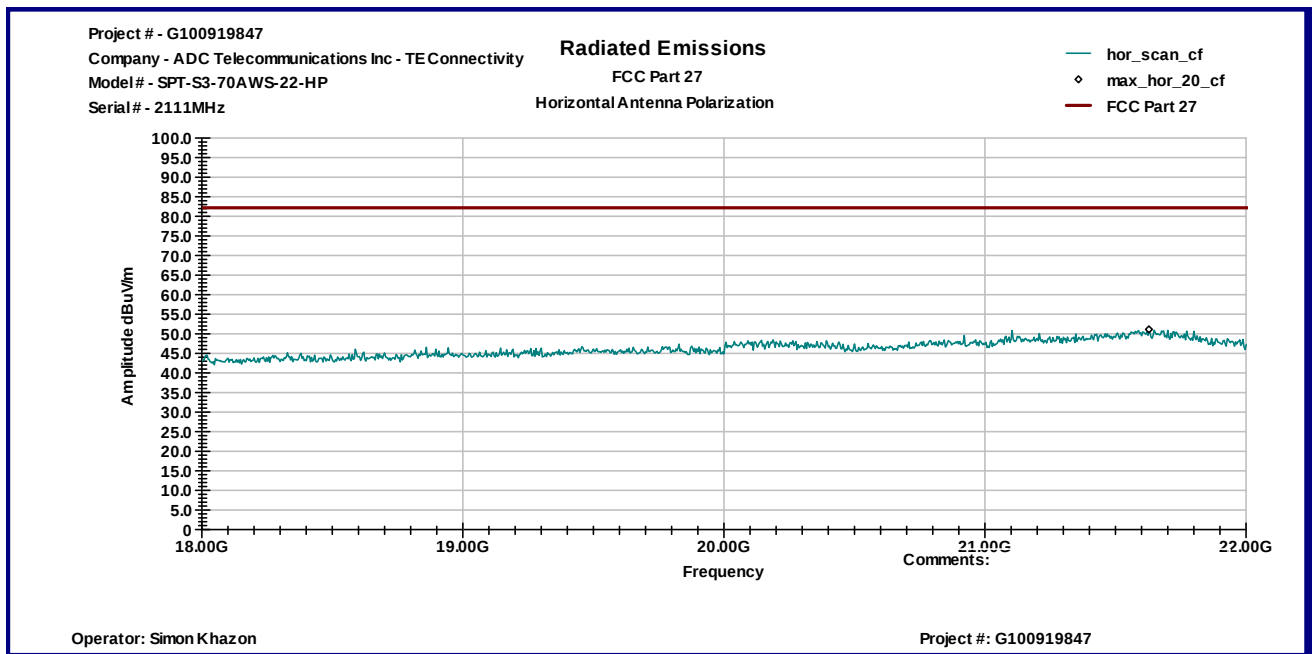
Graph 23



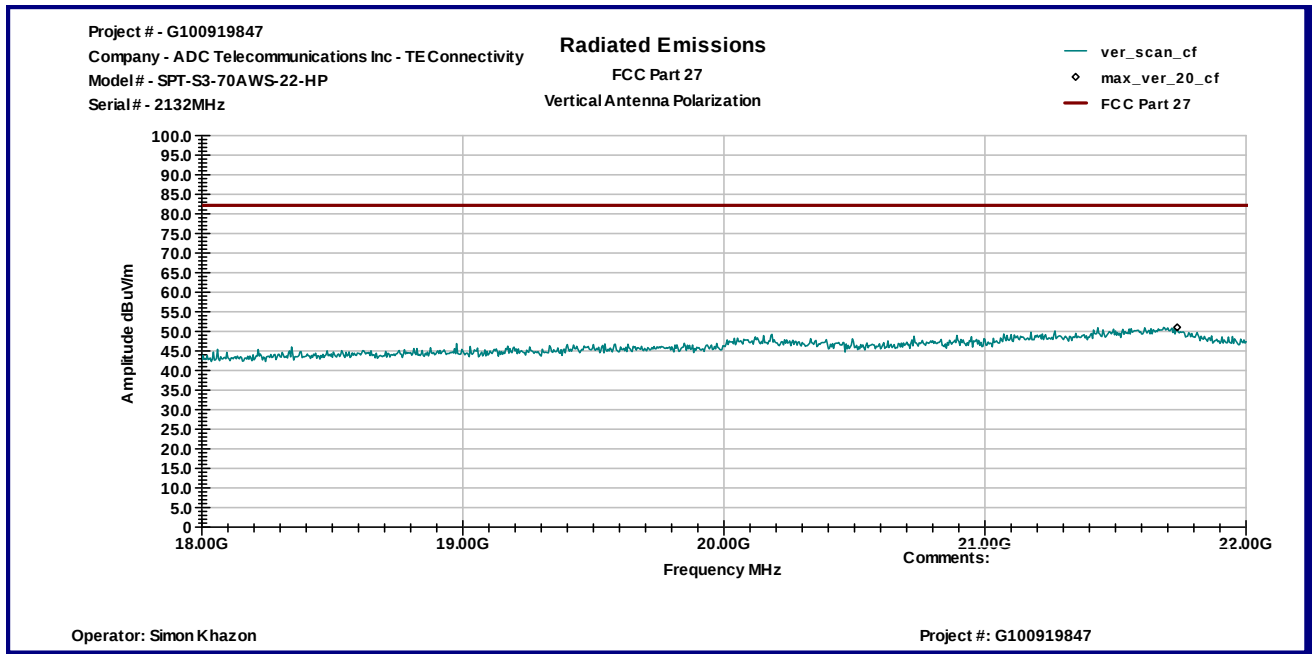
Graph 24



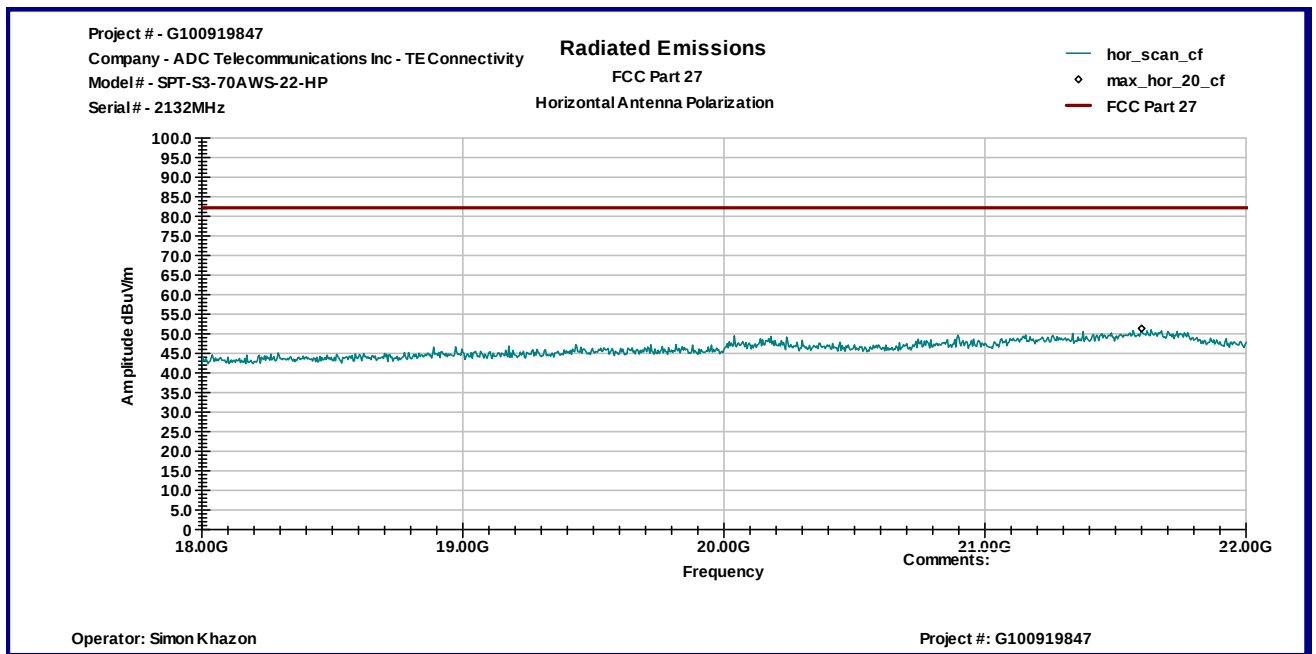
Graph 25



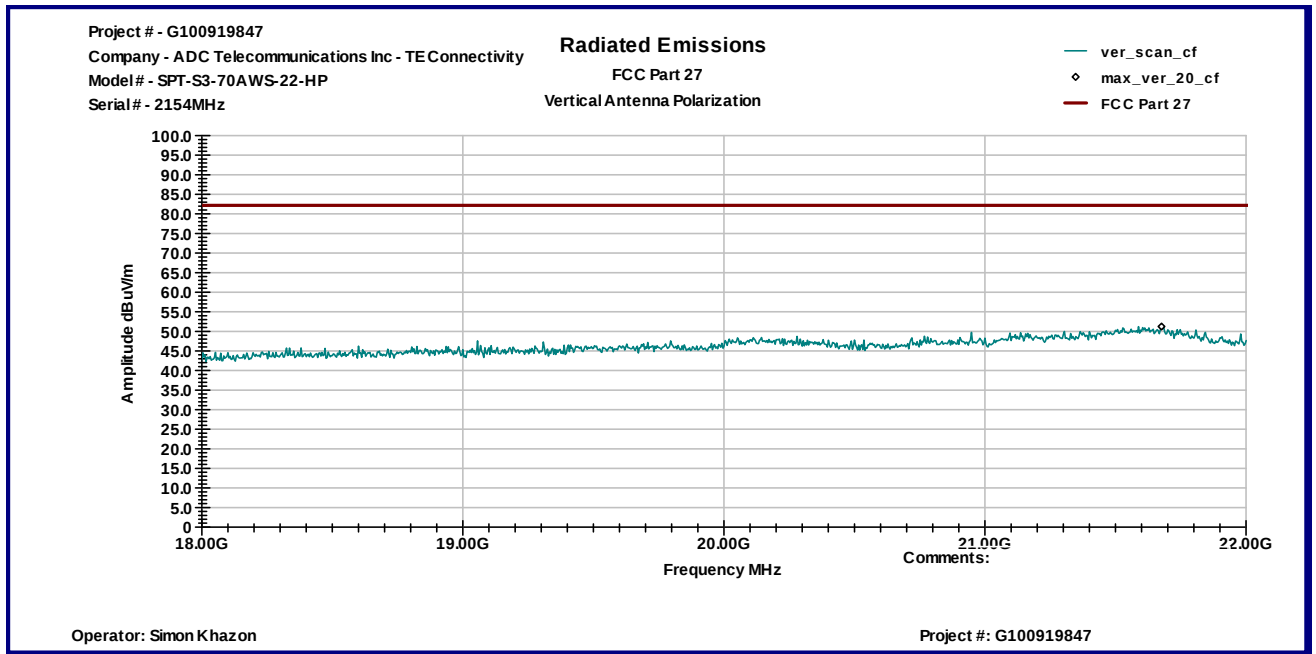
Graph 26



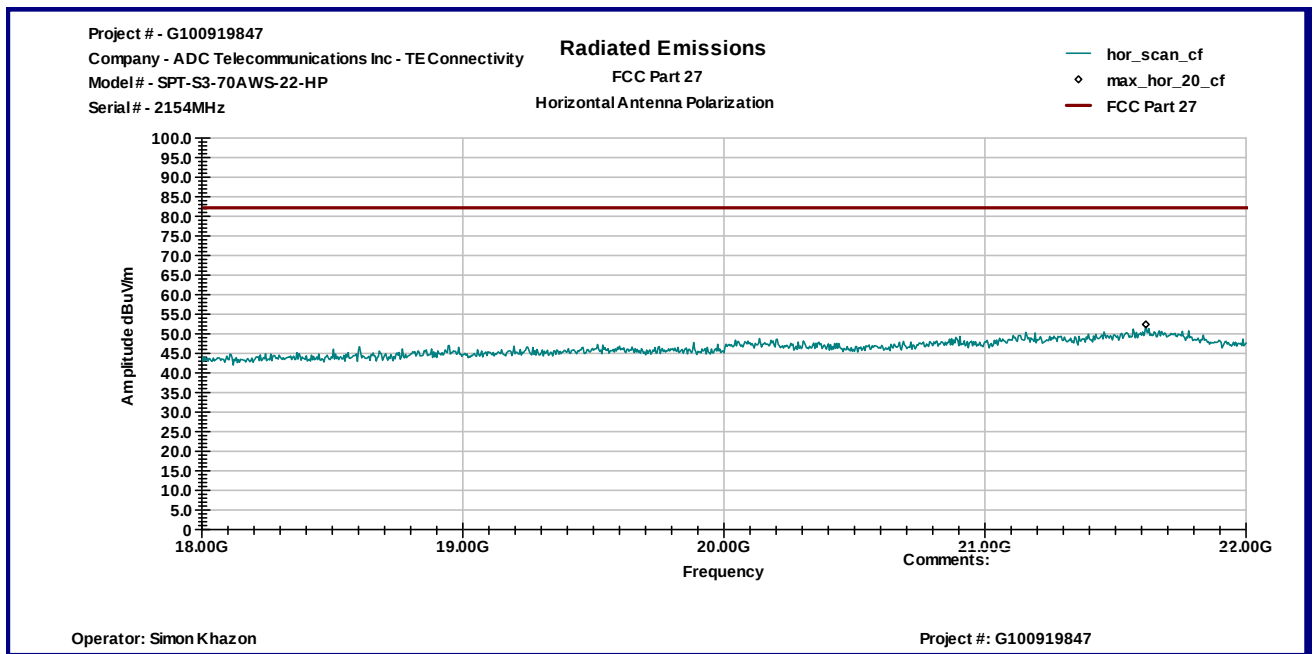
Graph 27



Graph 28



Graph 29



Graph 30

5.0 TEST EQUIPMENT

DESCRIPTION	MANUFACTURER	MODEL	SERIAL NO.	INTERTEK ID	CAL DUE	USED
Spectrum Analyzer	R & S	FSP 40	100024	12559	11/17/2012	☒
Spectrum Analyzer	R & S	ESU	100398	25283	12/09/2012	☒
Bicono-Log Antenna	Schaffner-Chase	CBL6112D	32859	25289	08/09/2013	☒
Horn Antenna	EMCO	3115	9507-4513	9936	05/16/2013	☒
Waveguide Horn Antenna	EMCO	3116	9904-2423	9705	10/31/2012	☒
Pre-Amplifier	MITEQ	AMF-5D-00501800-28-13P	1402232	172081	10/31/2012	☒
System	Quantum Change	TILE! Instrument Control	Ver. 3.4.K.29	15259	VBU	☒
Signal Generator	R & S	SMR20	101469	25233	10/23/2012	☒
Horn Antenna	EMCO	3115	6579	15580	07/19/2013	☒