



TEST DATA

Test Data Number: 3159556MIN-001
Project Number: 3159556

Testing performed on the
WiMAX Gen 2

To
47 CFR, Part 27:2007

For
ADC Telecommunications Inc.

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

Test Authorized by:
ADC Telecommunications Inc.
5341 12th Avenue East
Shakopee, MN 55379

Prepared by: Uri Spector
Uri Spector

Date: August 15, 2008

Reviewed by: Simon Khazon
Simon Khazon

Date: August 15, 2008



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1.0 DESCRIPTION OF THE SAMPLE (EUT)

Model:	WiMAX Gen 2
Type of EUT:	Optical Repeater
Serial Number:	N/A
Company:	ADC Telecommunications Inc.
Customer:	Mr. Mark Miska
Address:	1187 Park Place Shakopee, MN 55379
Phone:	952-403-8340
Fax:	952-403-8858
Test Standards:	<input type="checkbox"/> EN 55022:2006, Class A <input type="checkbox"/> EN 55011:1998 + A1:1999 + A2:2002, Group <input type="checkbox"/> , Class <input type="checkbox"/> <input type="checkbox"/> 47 CFR, Part 15:2007, §15.107 and §15.109, Class A <input type="checkbox"/> 47 CFR, Part 22:2007 <input checked="" type="checkbox"/> 47 CFR, Part 27:2007 <input type="checkbox"/> 47 CFR, Part 90:2007 <input type="checkbox"/> EN 55014-1:2000 + A1:2001 + A2:2002 <input type="checkbox"/> EN 61326-1:2006 <input type="checkbox"/> Class <input type="checkbox"/> for Radiated and Conducted Emissions <input type="checkbox"/> EN 60601-1-2:2001 +A1:2006 <input type="checkbox"/> Class <input type="checkbox"/> Radiated and Conducted Emissions <input type="checkbox"/> EN 61000-6-3:2007 <input type="checkbox"/> EN 61000-6-4:2007 <input type="checkbox"/> EN 61000-3-2:2006 <input type="checkbox"/> EN 61000-3-3:1995 +A1:2001 +A2:2006 <input type="checkbox"/> Other <input type="checkbox"/>

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	Spurious Enclosure 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

General notes:

1. The EUT enclosure Radiated Emissions were tested with the transmitter tuned to low channel 2511 (2496MHz), middle channel 2593 (2593MHz), and upper channel 2675 (2690MHz) operating frequency. The remote laptop computer located outside of the test site was connected to the Ethernet Port of the transmitter via CAT5 cable.

Testing was performed in frequency range from 30MHz to 27GHz.

2. The Spurious Radiated Power limits of -13dBm was correlated with field strength reference level of 82.2dB μ V/m during field strength measurements at 3m measurement distance. Emissions at transmitters operating frequencies were removed from the Table.

3.0 TEST RESULTS

3.1 Spurious Radiated Emissions

Tables 1 to 6 show detected Radiated Emissions. Emissions. No emissions above the floor noise were detected in frequency range above 18GHz. See Graphs 19 to 42.

Graphs 1 to 42 show the EUT peak Radiated Emissions.

No emissions were chosen for substitution measurements as the maximum emission is more than 20dB below the reference limit.



Radiated Emissions from 30MHz to 1GHz

Date: 8/11/2008

Company: ADC Telecommunications
Model: WMAX Optical Repeater
Test Engineer: Uri Spector
Special Info: 2496MHz
Standard: FCC Part 27
Test Site: 3m Anechoic Chamber, 3m measurement distance
Note: The table shows the worst case radiated emissions
 Measurements were taken using a Peak detector

Table # 1

Frequency	Ant. Polarity	Peak Reading dBµV	Ant.Factor dB1/m	Total at 3m dBµV/m	QP Limit dBµV/m	Margin dB
Rx Mode						
36.141 MHz	V	22.09	17.28	39.37	82.2	-42.8
40.212 MHz	V	25.02	15.12	40.14	82.2	-42.1
58.726 MHz	V	21.62	8.07	29.69	82.2	-52.5
93.428 MHz	V	22.24	10.68	32.93	82.2	-49.3
111.59 MHz	V	19.81	13.26	33.06	82.2	-49.1
250.18 MHz	V	23.52	14.41	37.92	82.2	-44.3
600.06 MHz	V	20.22	21.68	41.9	82.2	-40.3
30.632 MHz	H	14.7	20.2	34.9	82.2	-47.3
91.047 MHz	H	25.3	10.3	35.5	82.2	-46.7
263.46 MHz	H	20.3	15.7	36.0	82.2	-46.2
300.0 MHz	H	21.0	15.6	36.6	82.2	-45.6
499.94 MHz	H	21.4	20.2	41.6	82.2	-40.6
619.52 MHz	H	19.4	21.8	41.2	82.2	-41.0
Tx Mode						
34.956 MHz	V	22.8	17.9	40.8	82.2	-41.5
37.177 MHz	V	22.0	16.7	38.8	82.2	-43.4
94.01 MHz	V	23.3	10.8	34.1	82.2	-48.1
143.37 MHz	V	19.5	13.0	32.5	82.2	-49.7
151.52 MHz	V	19.5	12.6	32.1	82.2	-50.1
249.9 MHz	V	20.4	14.4	34.8	82.2	-47.4
499.84 MHz	V	19.6	20.2	39.8	82.2	-42.4
250.39 MHz	H	33.1	14.4	47.5	82.2	-34.7
270.75 MHz	H	32.4	15.4	47.8	82.2	-34.4
308.86 MHz	H	32.7	15.8	48.5	82.2	-33.7
310.72 MHz	H	34.2	15.8	50.1	82.2	-32.2
499.84 MHz	H	22.2	20.2	42.4	82.2	-39.8
609.74 MHz	H	22.0	21.8	43.8	82.2	-38.5



Radiated Emissions from 30MHz to 1GHz

Date: 8/11/2008

Company: ADC Telecommunications
Model: WMAX Optical Repeater
Test Engineer: Uri Spector
Special Info: 2593MHz
Standard: FCC Part 27
Test Site: 3m Anechoic Chamber, 3m measurement distance
Note: The table shows the worst case radiated emissions
 Measurements were taken using a Peak detector

Table # 2

Frequency	Ant. Polarity	Peak Reading dBµV	Ant.Factor dB1/m	Total at 3m dBµV/m	QP Limit dBµV/m	Margin dB
Rx Mode						
36.193 MHz	V	20.45	17.25	37.7	82.2	-44.5
60.222 MHz	V	19.27	8	27.26	82.2	-54.9
92.769 MHz	V	22.12	10.57	32.69	82.2	-49.5
110.76 MHz	V	17.9	13.19	31.09	82.2	-51.1
250.05 MHz	V	21.35	14.39	35.74	82.2	-46.5
609.89 MHz	V	22.3	21.8	44.1	82.2	-38.1
700.13 MHz	V	19.5	22.5	42.0	82.2	-40.3
30.023 MHz	H	14.2	20.5	34.7	82.2	-47.5
93.396 MHz	H	27.7	10.7	38.4	82.2	-43.8
138.48 MHz	H	18.1	13.2	31.3	82.2	-50.9
250.05 MHz	H	27.1	14.4	41.5	82.2	-40.7
300.0 MHz	H	23.3	15.6	38.9	82.2	-43.3
500.3 MHz	H	22.5	20.2	42.7	82.2	-39.5
609.89 MHz	H	21.2	21.8	43.0	82.2	-39.2
619.37 MHz	H	19.6	21.8	41.4	82.2	-40.8
Tx Mode						
35.966 MHz	V	21.9	17.4	39.3	82.2	-42.9
58.726 MHz	V	21.8	8.1	29.9	82.2	-52.3
77.12 MHz	V	22.1	8.7	30.8	82.2	-51.5
90.959 MHz	V	21.7	10.3	32.0	82.2	-50.2
143.32 MHz	V	19.5	13.0	32.5	82.2	-49.7
151.57 MHz	V	21.1	12.6	33.6	82.2	-48.6
250.18 MHz	V	22.5	14.4	36.9	82.2	-45.3
499.94 MHz	V	20.0	20.2	40.2	82.2	-42.1
610.07 MHz	V	20.2	21.8	42.0	82.2	-40.2
93.339 MHz	H	28.5	10.7	39.2	82.2	-43.0
250.18 MHz	H	25.5	14.4	39.9	82.2	-42.3
272.99 MHz	H	24.4	15.3	39.7	82.2	-42.5
274.31 MHz	H	29.7	15.2	44.9	82.2	-37.3
315.44 MHz	H	25.4	16.0	41.3	82.2	-40.9
499.94 MHz	H	21.5	20.2	41.7	82.2	-40.5
610.07 MHz	H	22.1	21.8	43.9	82.2	-38.3
649.0 MHz	H	19.8	22.1	41.9	82.2	-40.3



Radiated Emissions from 30MHz to 1GHz

Date: 8/11/2008

Company: ADC Telecommunications
Model: WMAX Optical Repeater
Test Engineer: Uri Spector
Special Info: 2690MHz
Standard: FCC Part 27
Test Site: 3m Anechoic Chamber, 3m measurement distance
Note: The table shows the worst case radiated emissions
 Measurements were taken using a Peak detector

Table # 3

Frequency	Ant. Polarity	Peak Reading dBµV	Ant.Factor dB1/m	Total at 3m dBµV/m	QP Limit dBµV/m	Margin dB
Rx Mode						
36.944 MHz	V	20.84	16.85	37.69	82.2	-44.5
40.623 MHz	V	23.9	14.9	38.79	82.2	-43.4
94.01 MHz	V	22.4	10.78	33.19	82.2	-49.0
102.88 MHz	V	20.0	12.3	32.3	82.2	-49.9
151.52 MHz	V	19.7	12.6	32.3	82.2	-49.9
249.9 MHz	V	21.4	14.4	35.8	82.2	-46.4
648.79 MHz	V	19.7	22.1	41.8	82.2	-40.4
700.25 MHz	V	19.9	22.5	42.4	82.2	-39.9
Tx Mode						
30.264 MHz	H	15.0	20.4	35.4	82.2	-46.8
96.391 MHz	H	24.7	11.2	35.9	82.2	-46.3
249.9 MHz	H	28.3	14.4	42.7	82.2	-39.5
260.39 MHz	H	21.5	15.4	36.8	82.2	-45.4
300.0 MHz	H	26.0	15.6	41.5	82.2	-40.7
500.09 MHz	H	21.6	20.2	41.8	82.2	-40.4
609.74 MHz	H	21.2	21.8	42.9	82.2	-39.3
36.121 MHz	V	20.9	17.3	38.2	82.2	-44.0
43.792 MHz	V	23.0	13.2	36.2	82.2	-46.0
95.802 MHz	V	21.8	11.1	32.8	82.2	-49.4
98.406 MHz	V	20.7	11.5	32.2	82.2	-50.0
143.31 MHz	V	20.1	13.0	33.1	82.2	-49.1
145.28 MHz	V	18.8	12.9	31.7	82.2	-50.5
151.52 MHz	V	20.5	12.6	33.0	82.2	-49.2
249.9 MHz	V	21.3	14.4	35.7	82.2	-46.5
609.74 MHz	V	20.1	21.8	41.9	82.2	-40.3
90.42 MHz	H	25.6	10.2	35.8	82.2	-46.4
94.595 MHz	H	28.0	10.9	38.9	82.2	-43.3
249.9 MHz	H	24.5	14.4	38.9	82.2	-43.3
300.0 MHz	H	23.3	15.6	38.9	82.2	-43.3
305.59 MHz	H	22.0	15.7	37.7	82.2	-44.5
311.65 MHz	H	20.2	15.9	36.0	82.2	-46.2
500.09 MHz	h	21.9	20.2	42.1	82.2	-40.1
609.74 MHz	H	21.1	21.8	42.9	82.2	-39.3



Radiated Emissions from 1GHz to 27GHz

Date: 08-12-2008

Company: ADC Telecommunications
Model: WiMAX Optical Repeater
Test Engineer: Uri Spector
Special Info: 2496MHz
Standard: FCC Part 27
Test Site: 3m Anechoic Chamber, 3m measurement distance
Note: The table shows the worst case radiated emissions
 All measurements were taken using a Peak detector

Table # 4

Frequency MHz	Antenna Polarity	Reading dBµV	Total C.F. dB1/m	Pre-Amp. Gain (dB)	Total at 3m dBµV/m	QP Limit dBµV/m	Margin dB
			Rx Mode				
1.816 GHz	V	53.1	30.1	40.6	42.7	82.2	-39.5
2.309 GHz	V	49.6	32.1	39.9	41.8	82.2	-40.4
2.496 GHz	V	47.2	32.7	39.7	40.2	82.2	-42.0
6.049 GHz	V	45.7	41.3	40.0	47.0	82.2	-35.2
1.816 GHz	H	48.5	30.1	40.6	38.1	82.2	-44.1
2.309 GHz	H	54.0	32.1	39.9	46.2	82.2	-36.0
2.496 GHz	H	47.6	32.7	39.7	40.6	82.2	-41.6
3.0315 GHz	H	47.1	34.2	40.1	41.1	82.2	-41.1
			Tx Mode				
1.2295 GHz	V	52.5	27.4	41.2	38.7	82.2	-43.5
1.2975 GHz	V	49.6	27.7	41.2	36.1	82.2	-46.2
1.816 GHz	V	52.5	30.1	40.6	42.1	82.2	-40.1
2.309 GHz	V	49.7	32.1	39.9	41.9	82.2	-40.3
2.496 GHz	V	57.3	32.7	39.7	50.3	82.2	-31.9
3.0315 GHz	V	47.6	34.2	40.1	41.7	82.2	-40.5
6.049 GHz	V	46.6	41.3	40.0	47.9	82.2	-34.3
1.816 GHz	H	48.7	30.1	40.6	38.2	82.2	-44.0
2.309 GHz	H	54.2	32.1	39.9	46.4	82.2	-35.9
2.496 GHz	H	59.2	32.7	39.7	52.2	82.2	-30.0
9.2365 GHz	H	42.4	46.3	38.8	49.9	82.2	-32.3



Radiated Emissions from 1GHz to 27GHz

Date: 08-12-2008

Company: ADC Telecommunications
Model: WiMAX Optical Repeater
Test Engineer: Uri Spector
Special Info: 2593MHz
Standard: FCC Part 27
Test Site: 3m Anechoic Chamber, 3m measurement distance
Note: The table shows the worst case radiated emissions
 All measurements were taken using a Peak detector

Table # 5

Frequency MHz	Antenna Polarity	Reading dBμV	Total C.F. dB1/m	Pre-Amp. Gain (dB)	Total at 3m dBμV/m	QP Limit dBμV/m	Margin dB
Rx Mode							
1.816 GHz	V	53.1	30.1	40.6	42.7	82.2	-39.5
2.598 GHz	V	48.0	33.0	39.8	41.2	82.2	-41.0
3.193 GHz	V	49.0	34.7	40.2	43.6	82.2	-38.6
4.4935 GHz	V	48.1	38.7	39.9	46.8	82.2	-35.4
6.389 GHz	V	45.4	41.9	40.2	47.1	82.2	-35.1
Tx Mode							
1.2295 GHz	V	53.7	27.4	41.2	39.8	82.2	-42.4
1.816 GHz	V	53.7	30.1	40.6	43.2	82.2	-39.0
2.598 GHz	V	62.3	33.0	39.8	55.5	82.2	-26.7
3.193 GHz	V	49.6	34.7	40.2	44.2	82.2	-38.1
4.4935 GHz	V	45.9	38.7	39.9	44.6	82.2	-37.6
6.3805 GHz	V	46.9	41.9	40.2	48.5	82.2	-33.7
6.729 GHz	V	45.6	42.5	40.3	47.8	82.2	-34.4
1.816 GHz		48.5	30.1	40.6	38.1	82.2	-44.1
2.241 GHz		47.4	31.9	40.0	39.3	82.2	-42.9
2.394 GHz		46.8	32.4	39.8	39.4	82.2	-42.8
2.598 GHz		61.8	33.0	39.8	55.1	82.2	-27.2
3.193 GHz		50.8	34.7	40.2	45.4	82.2	-36.9
6.3805 GHz		45.8	41.9	40.2	47.4	82.2	-34.8
6.729 GHz		44.9	42.5	40.3	47.1	82.2	-35.1



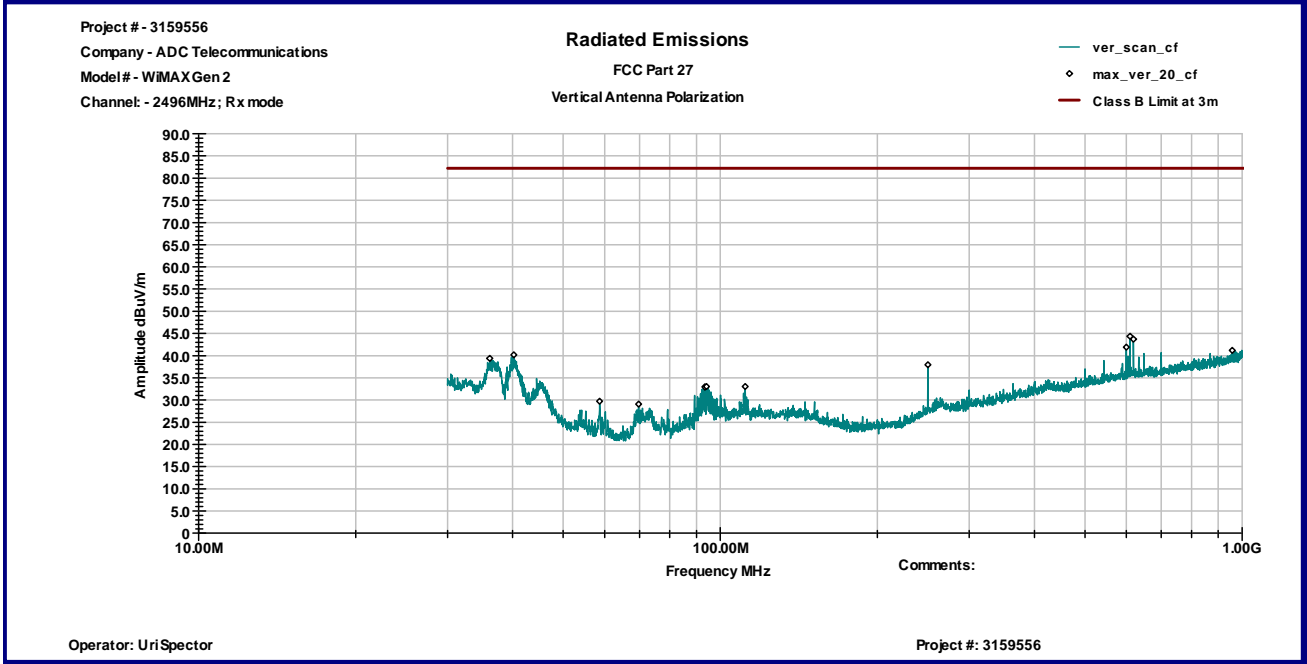
Radiated Emissions from 1GHz to 27GHz

Date: 08-12-2008

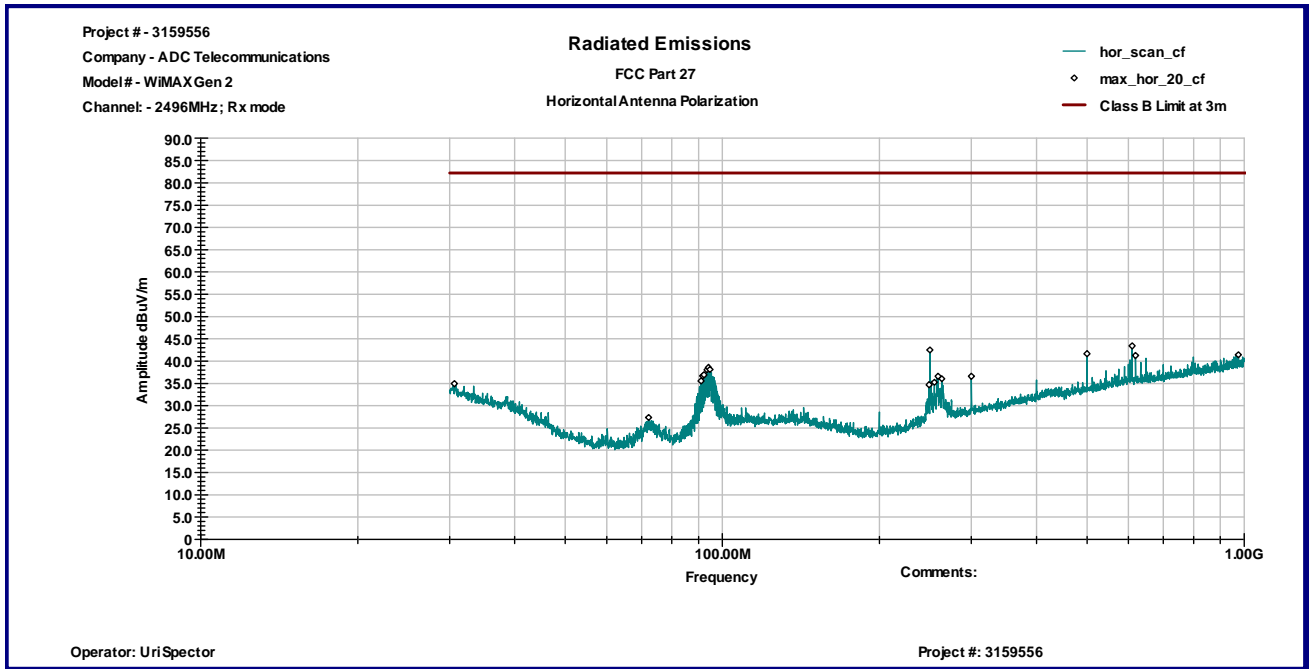
Company: ADC Telecommunications
Model: WiMAX Optical Repeater
Test Engineer: Uri Spector
Special Info: 2690MHz
Standard: FCC Part 27
Test Site: 3m Anechoic Chamber, 3m measurement distance
Note: The table shows the worst case radiated emissions
 All measurements were taken using a Peak detector

Table # 6

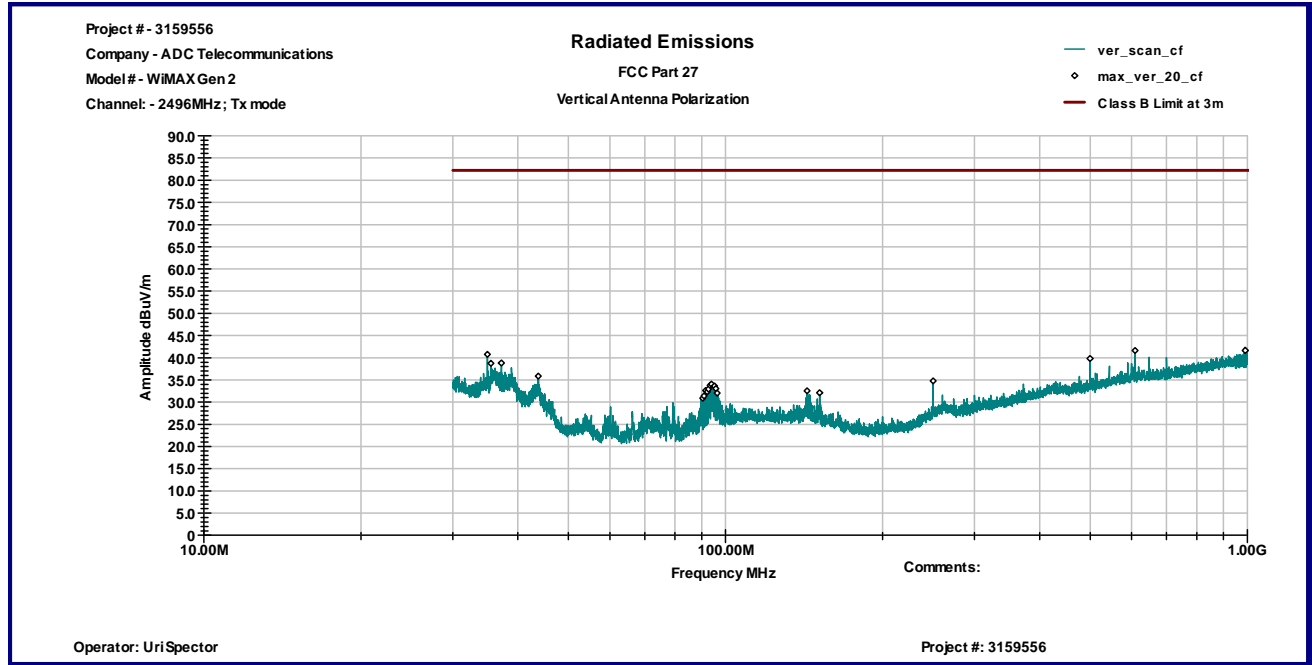
Frequency MHz	Antenna Polarity	Reading dBμV	Total C.F. dB1/m	Pre-Amp. Gain (dB)	Total at 3m dBμV/m	QP Limit dBμV/m	Margin dB
			Rx Mode				
1.68 GHz	V	53.7	29.5	40.8	42.4	82.2	-39.8
1.816 GHz	V	52.4	30.1	40.6	42.0	82.2	-40.2
2.4705 GHz	V	47.5	32.7	39.7	40.4	82.2	-41.8
3.3545 GHz	V	49.3	35.3	40.2	44.4	82.2	-37.8
6.9755 GHz	V	46.7	42.9	40.2	49.3	82.2	-32.9
7.4175 GHz	V	46.3	44.0	39.9	50.5	82.2	-31.7
1.68 GHz	H	58.4	29.5	40.8	47.1	82.2	-35.1
1.8245 GHz	H	48.3	30.2	40.5	37.9	82.2	-44.3
2.326 GHz	H	46.9	32.2	39.9	39.2	82.2	-43.0
2.4705 GHz	H	51.1	32.7	39.7	44.0	82.2	-38.2
3.3545 GHz	H	49.2	35.3	40.2	44.3	82.2	-37.9
6.9755 GHz	H	45.0	42.9	40.2	47.7	82.2	-34.6
			Tx Mode				
1.1615 GHz	V	50.8	27.1	41.3	36.6	82.2	-45.6
1.2295 GHz	V	52.5	27.4	41.2	38.7	82.2	-43.5
1.2975 GHz	V	52.5	27.7	41.2	39.0	82.2	-43.2
1.68 GHz	V	54.6	29.5	40.8	43.3	82.2	-38.9
1.816 GHz	V	54.3	30.1	40.6	43.8	82.2	-38.4
2.4705 GHz	V	48.8	32.7	39.7	41.7	82.2	-40.5
2.6915 GHz	V	51.9	33.3	39.9	45.3	82.2	-36.9
3.3545 GHz	V	50.2	35.3	40.2	45.3	82.2	-36.9
5.0375 GHz	V	46.2	39.9	39.7	46.3	82.2	-35.9
6.9755 GHz	V	46.8	42.9	40.2	49.5	82.2	-32.7
7.409 GHz	V	47.2	44.0	39.9	51.4	82.2	-30.8
1.68 GHz	H	59.7	29.5	40.8	48.4	82.2	-33.8
1.816 GHz	H	48.9	30.1	40.6	38.5	82.2	-43.7
2.1815 GHz	H	47.6	31.7	40.1	39.2	82.2	-43.0
2.4705 GHz	H	52.4	32.7	39.7	45.3	82.2	-36.9
2.6915 GHz	H	54.7	33.3	39.9	48.1	82.2	-34.1
3.3545 GHz	H	49.7	35.3	40.2	44.8	82.2	-37.4
6.9755 GHz	H	47.0	42.9	40.2	49.6	82.2	-32.6



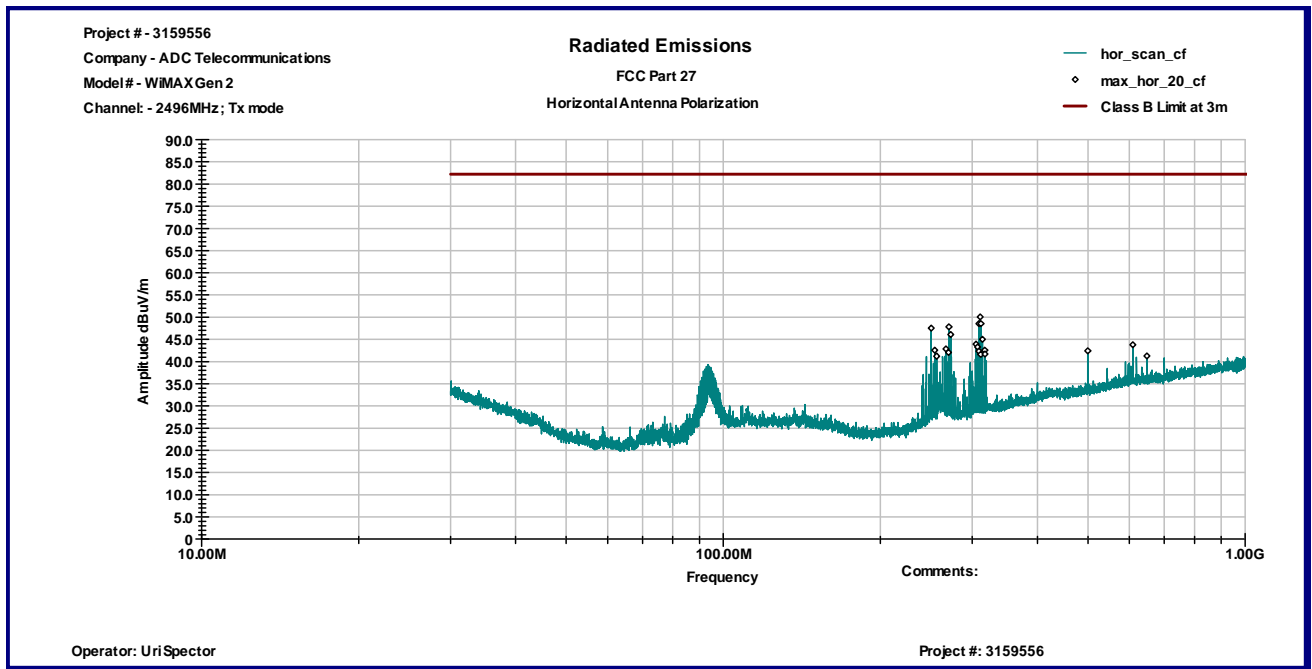
Graph 1



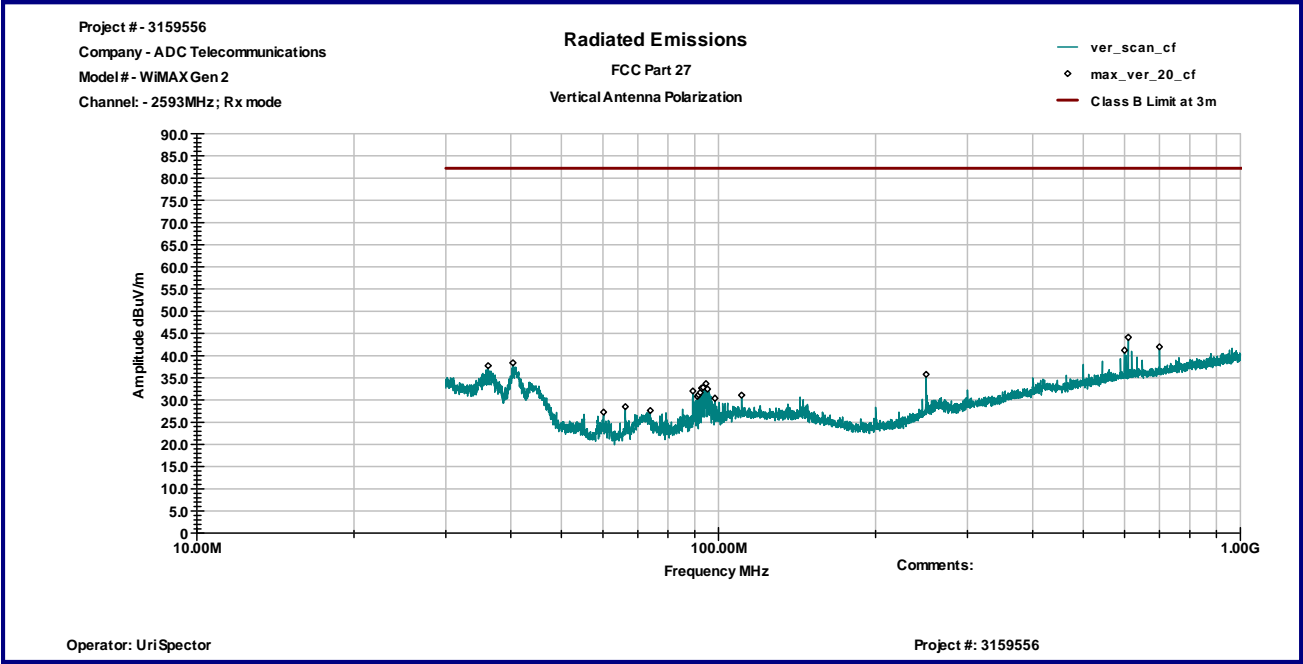
Graph 2



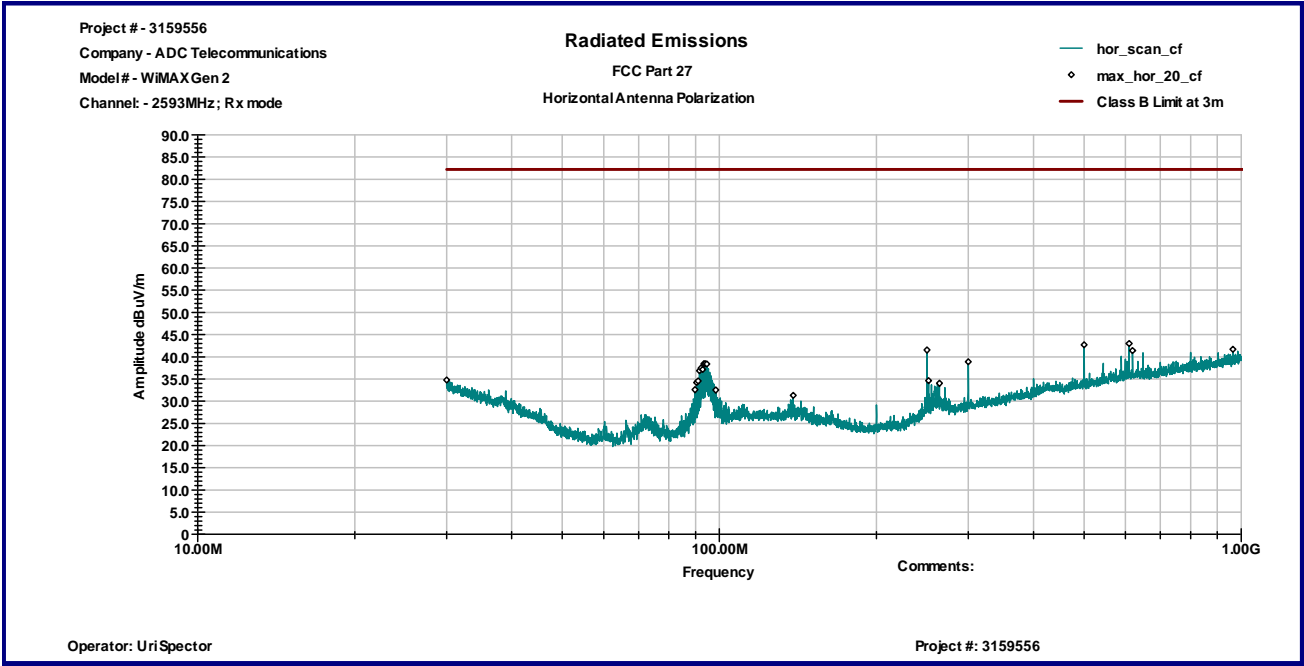
Graph 3



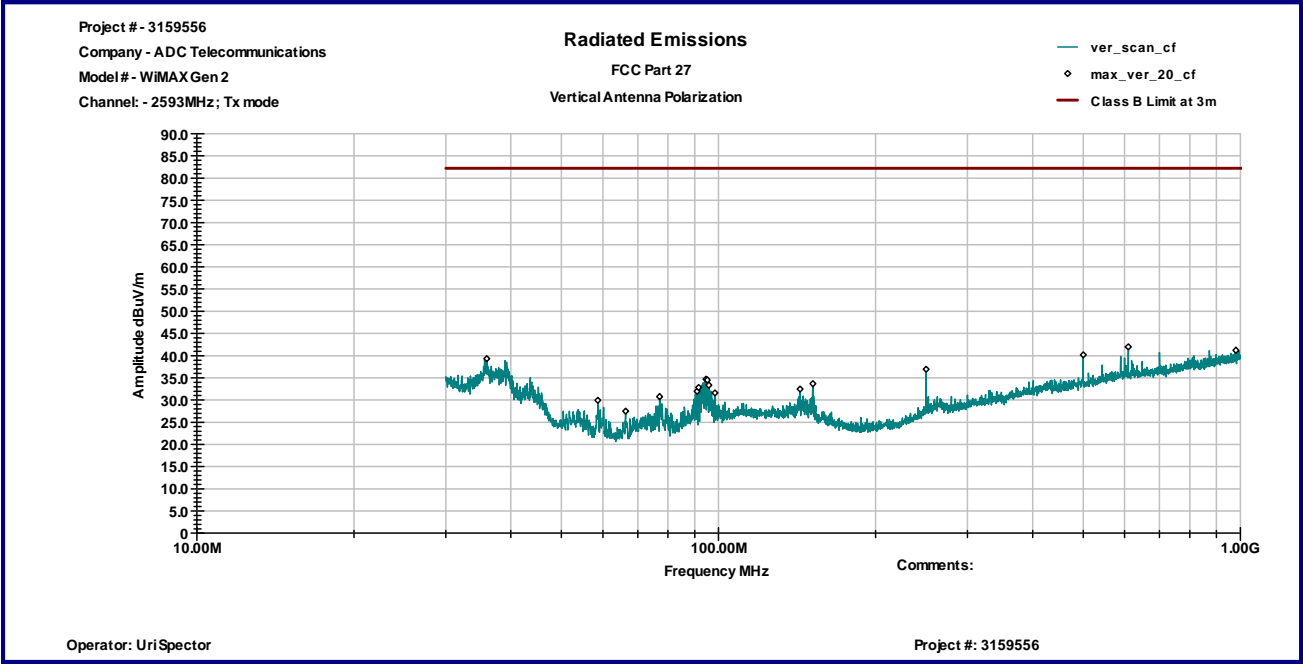
Graph 4



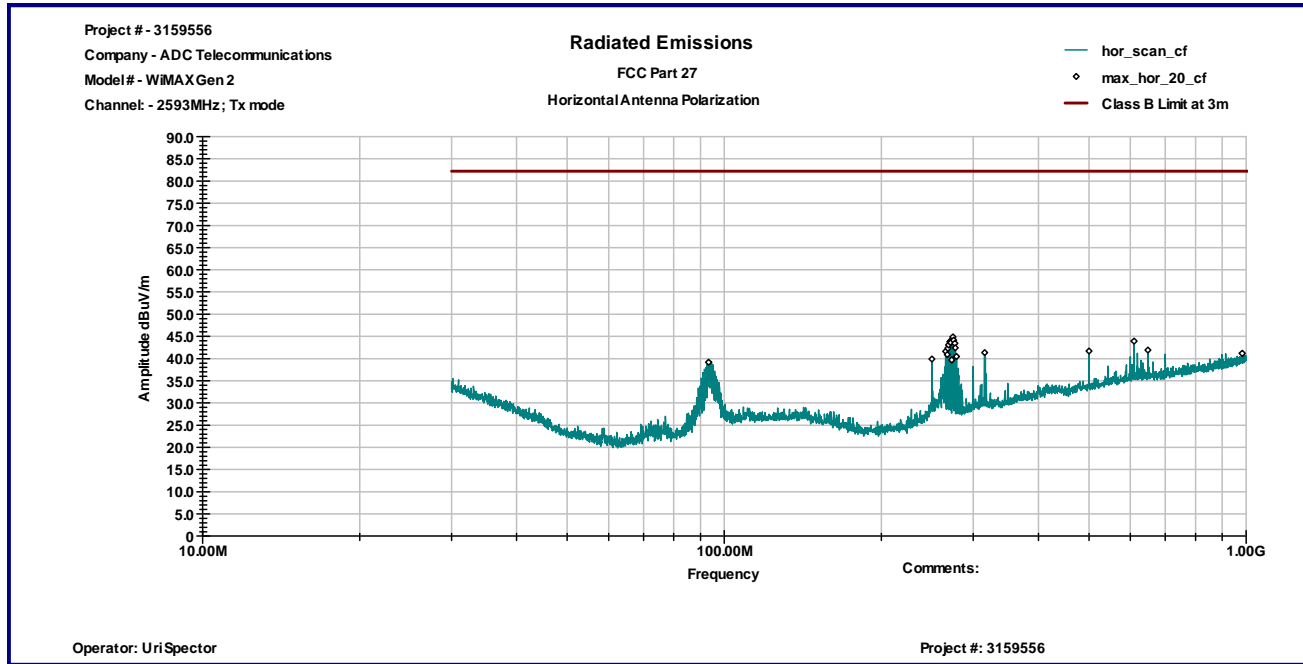
Graph 5



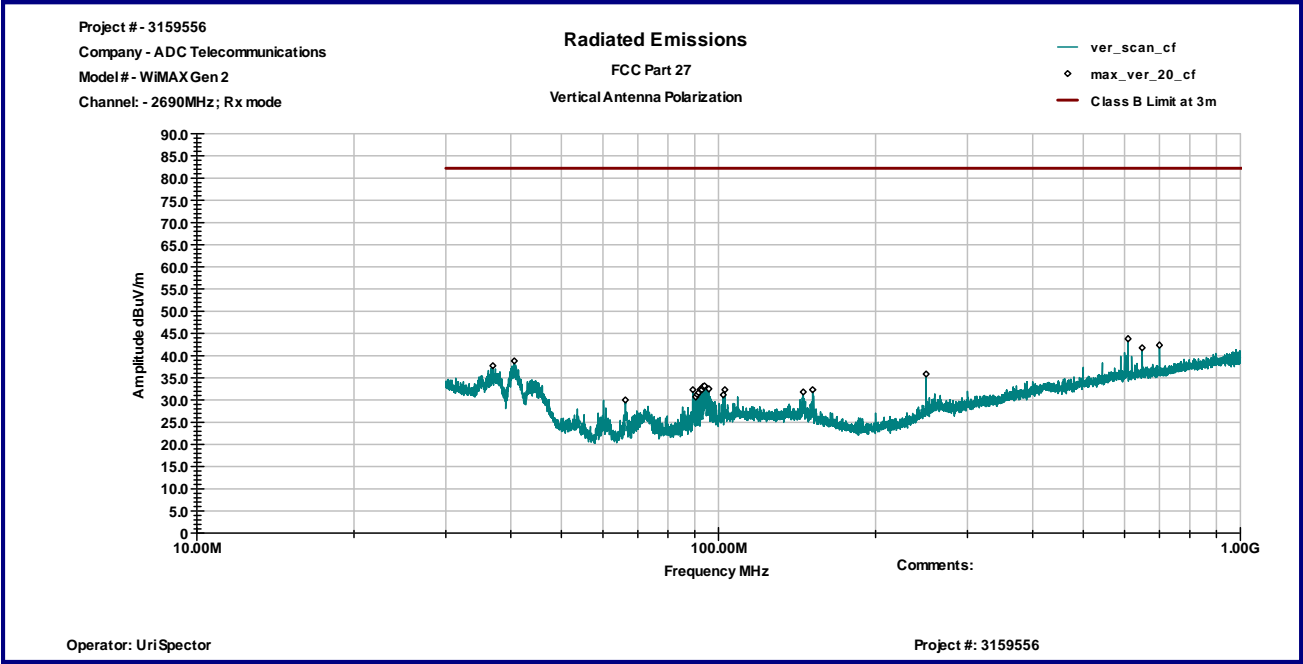
Graph 6



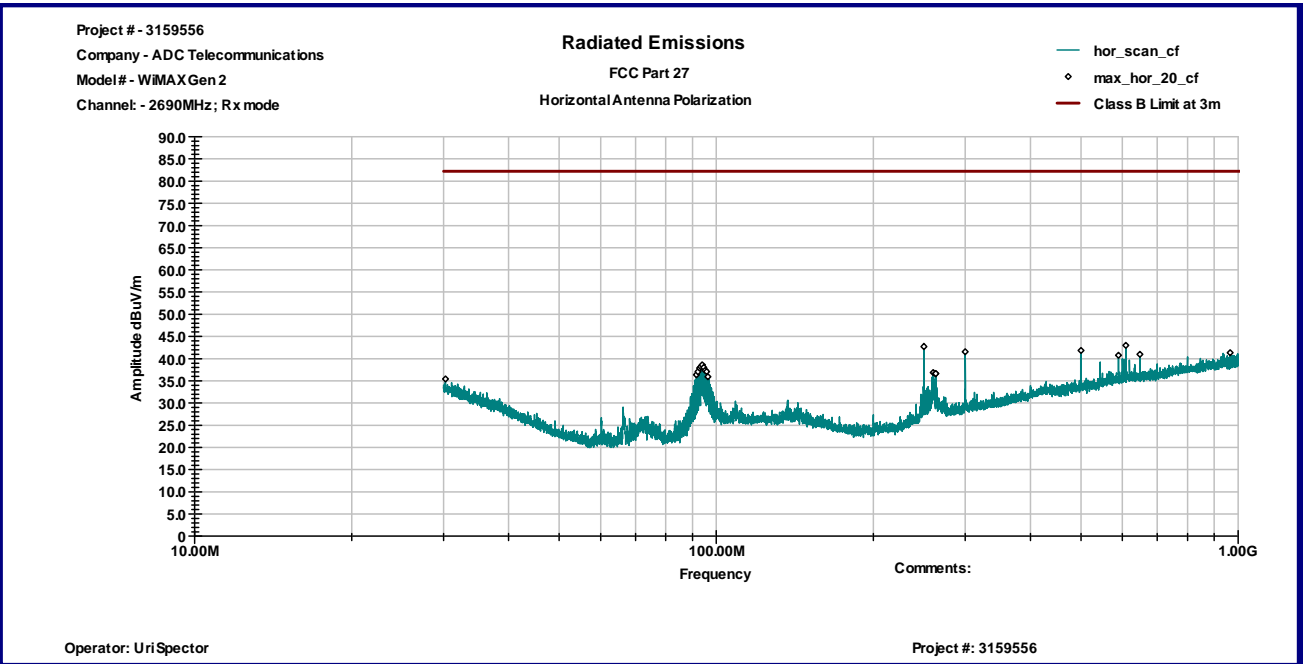
Graph 7



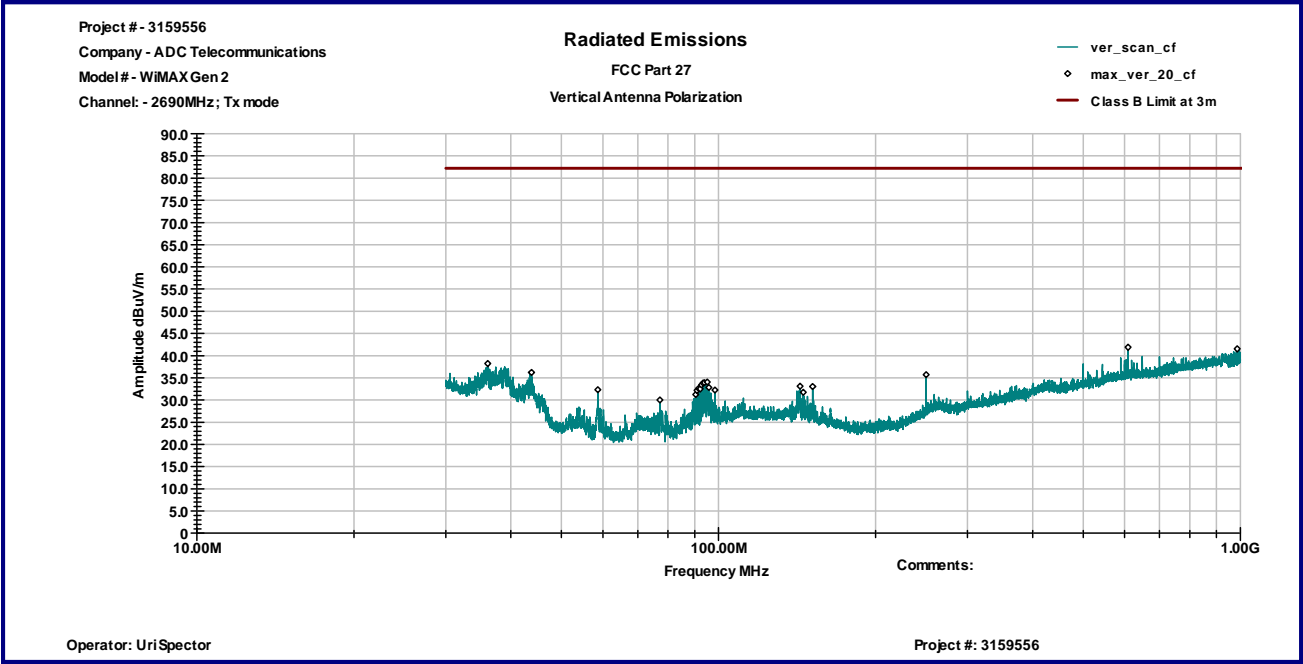
Graph 8



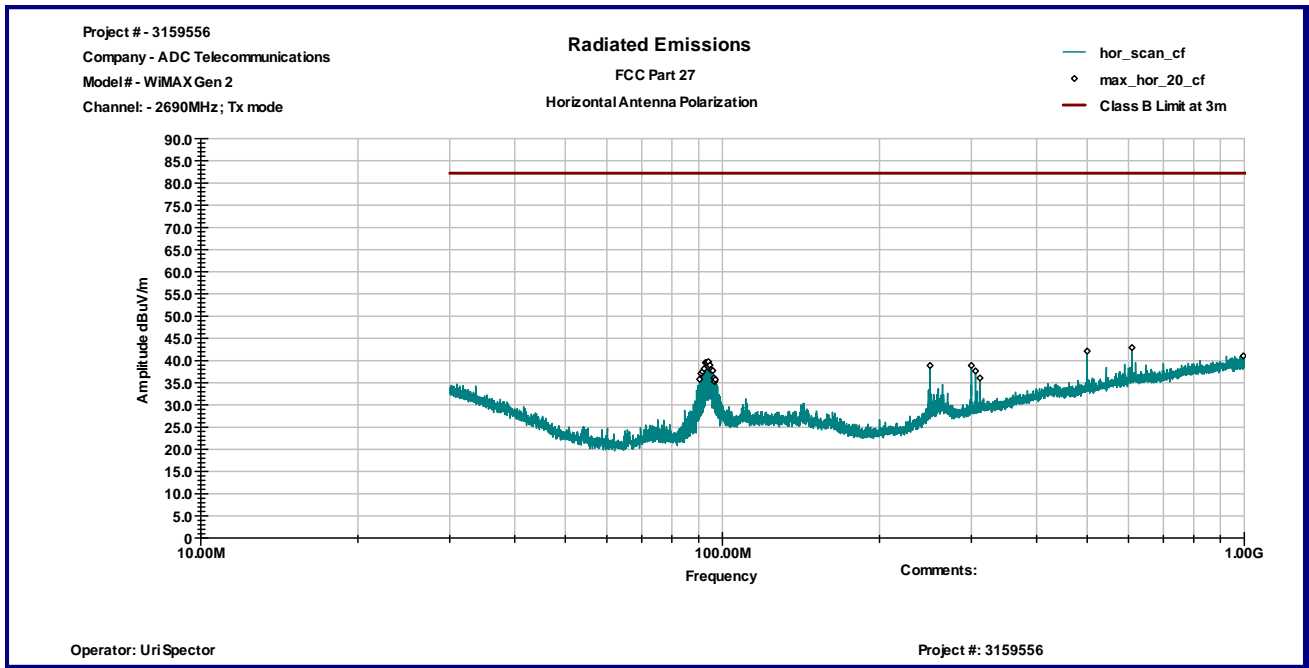
Graph 9



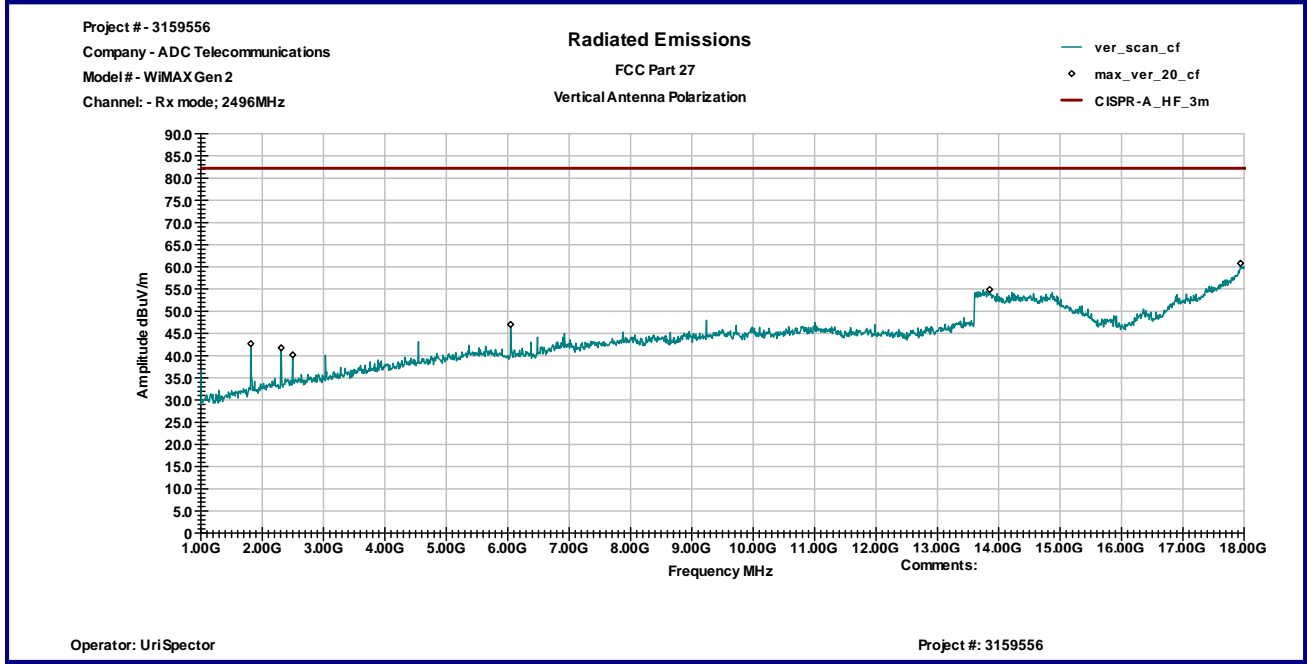
Graph 10



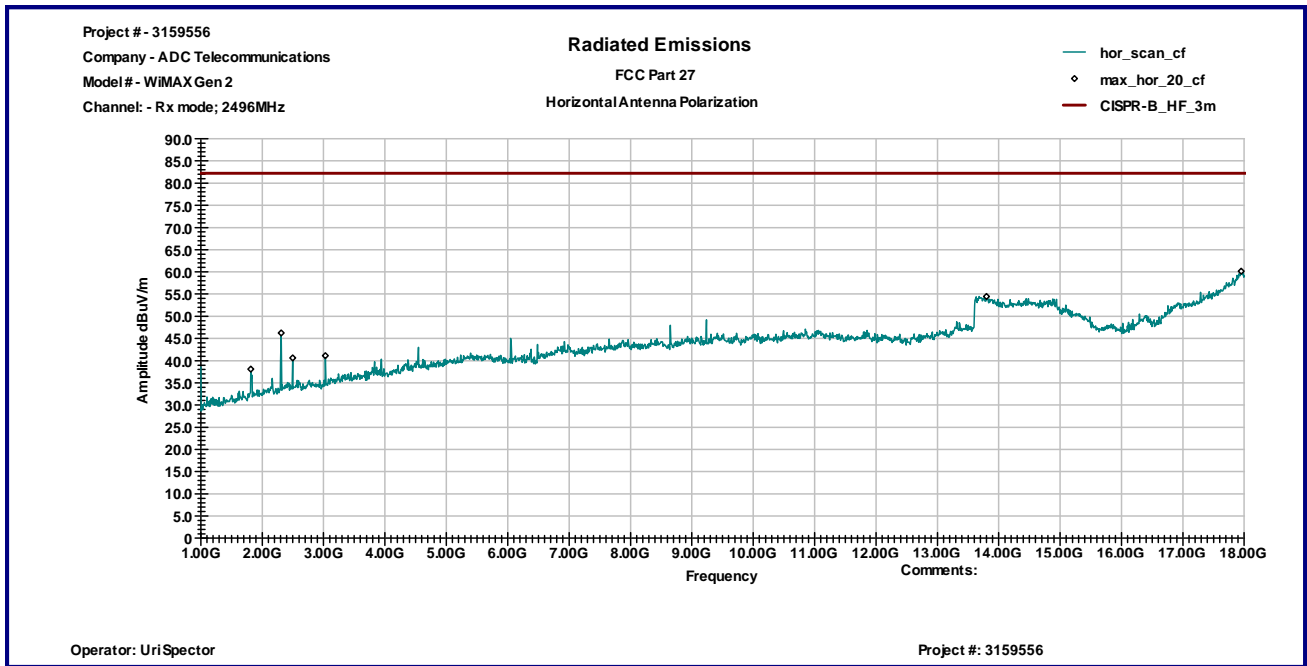
Graph 11



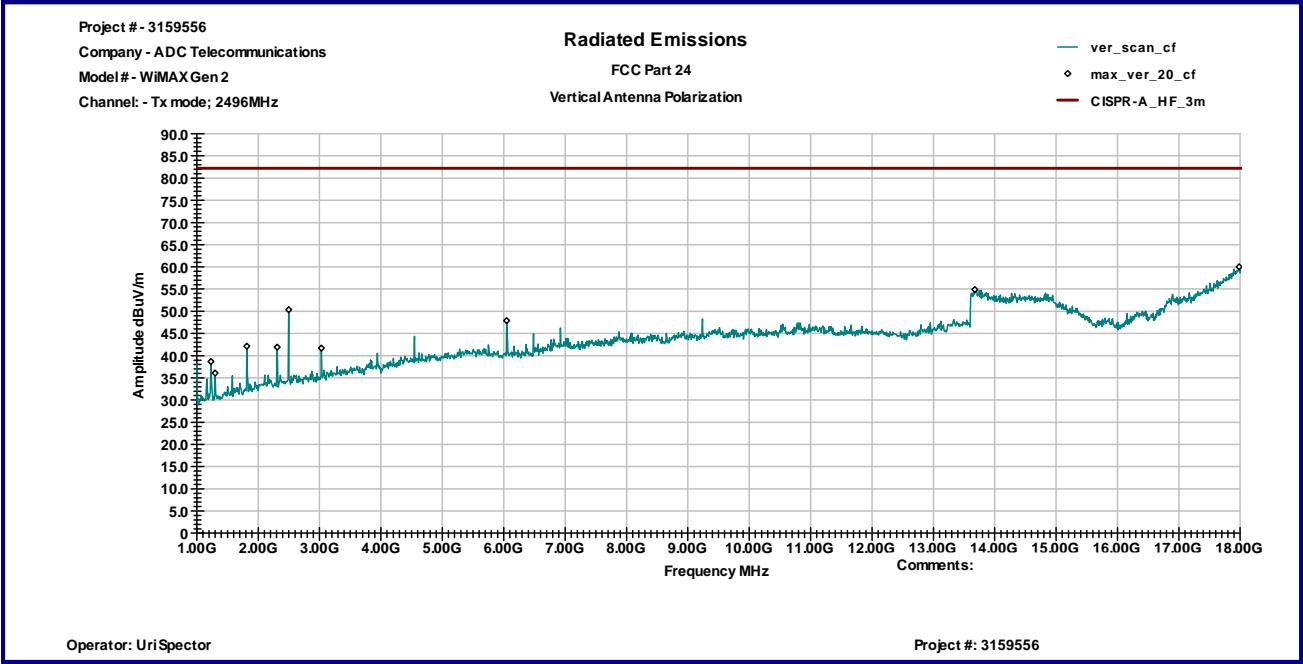
Graph 12



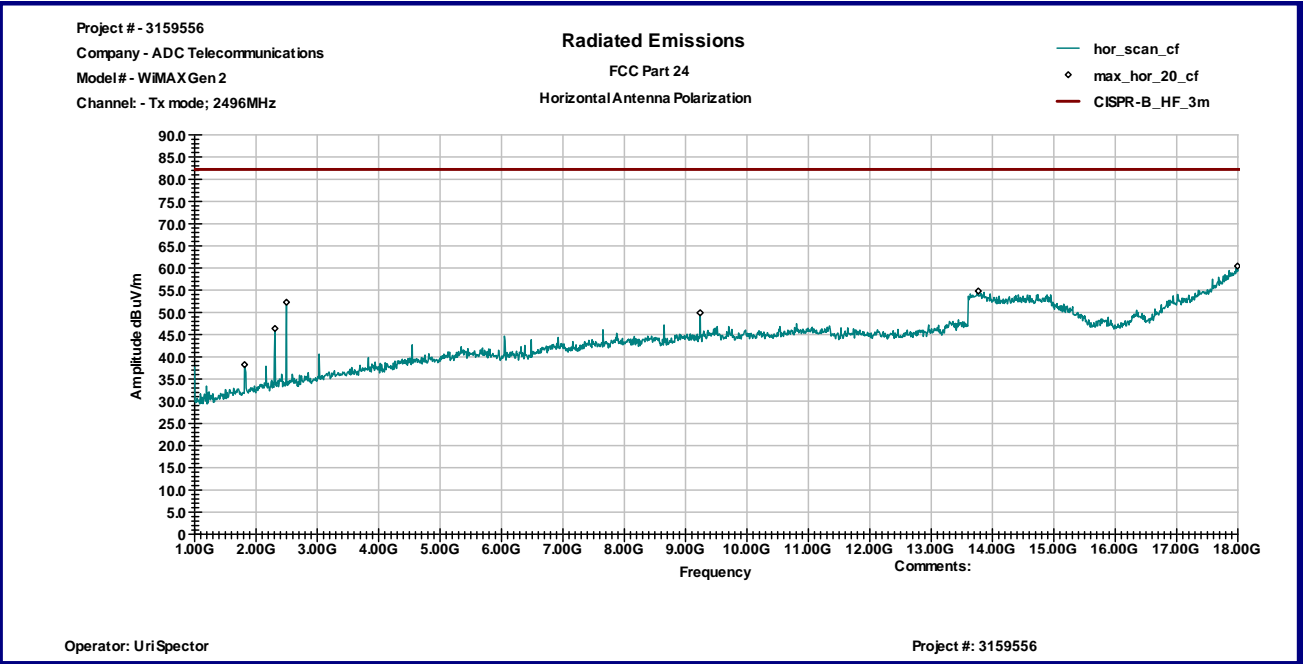
Graph 13



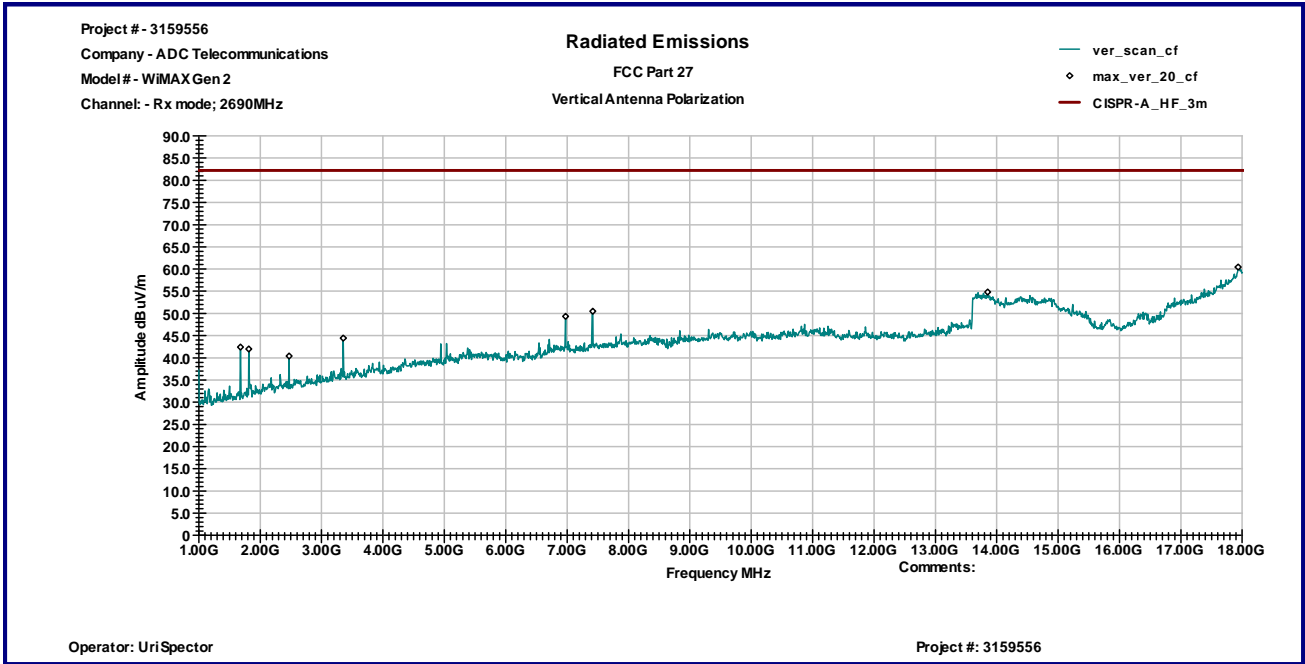
Graph 14



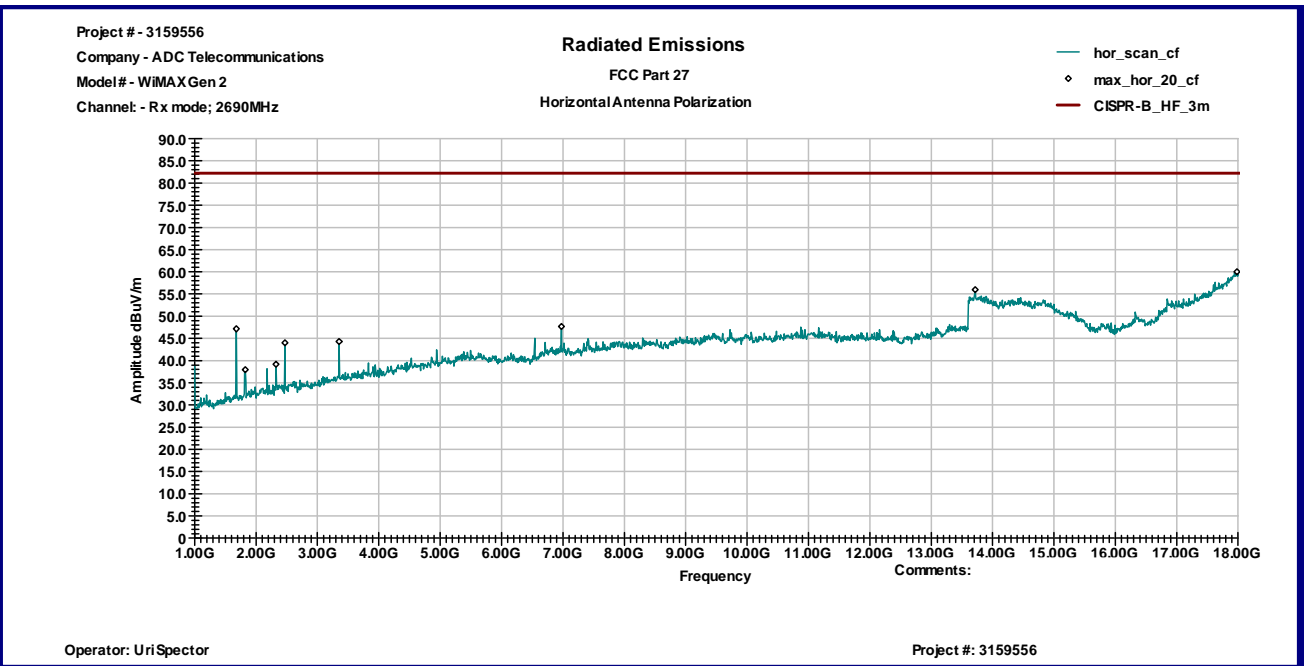
Graph 15



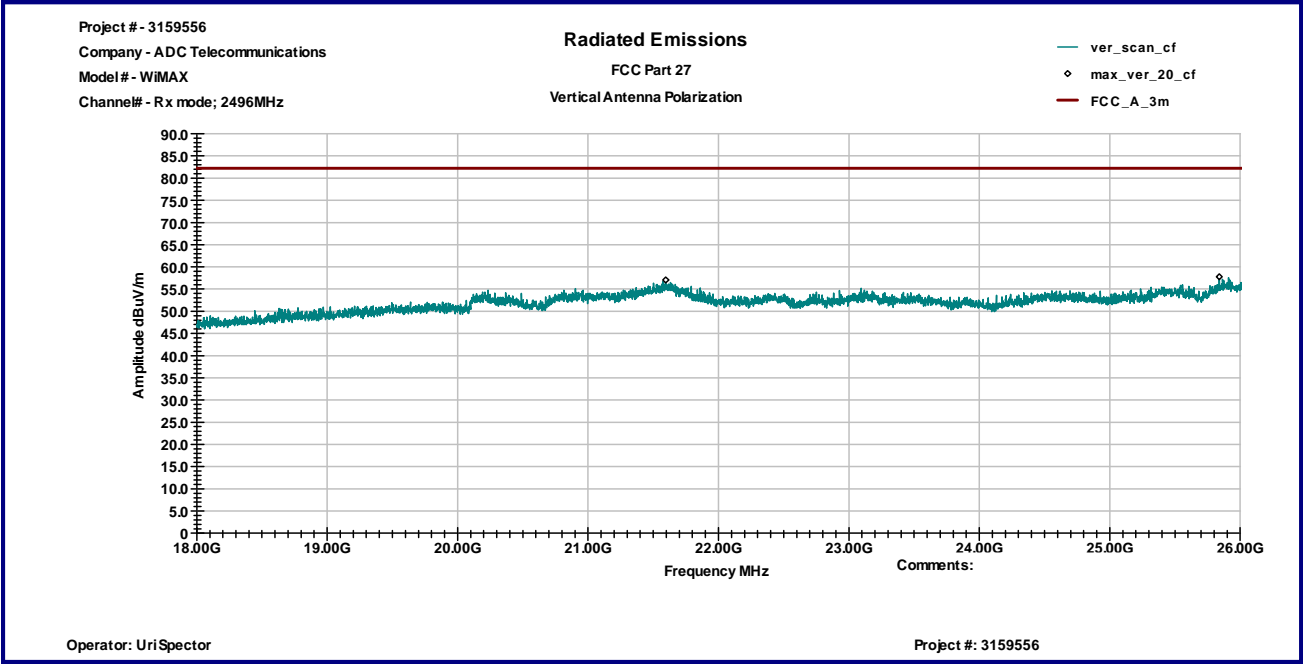
Graph 16



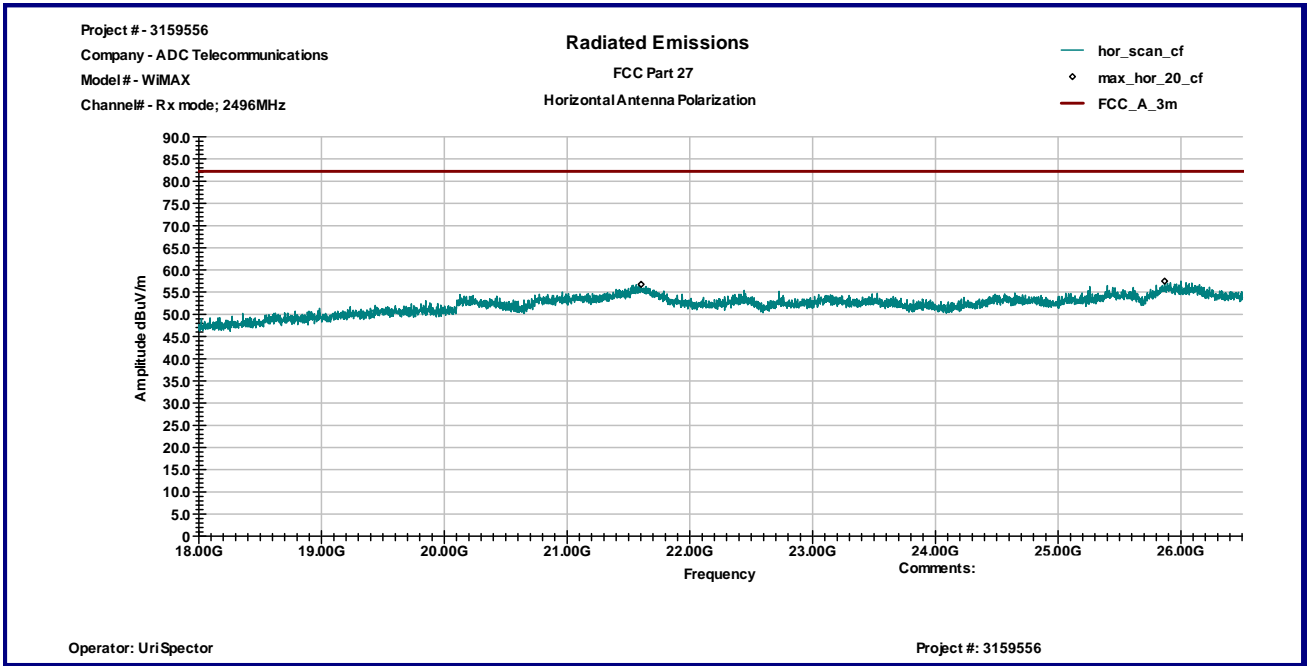
Graph 17



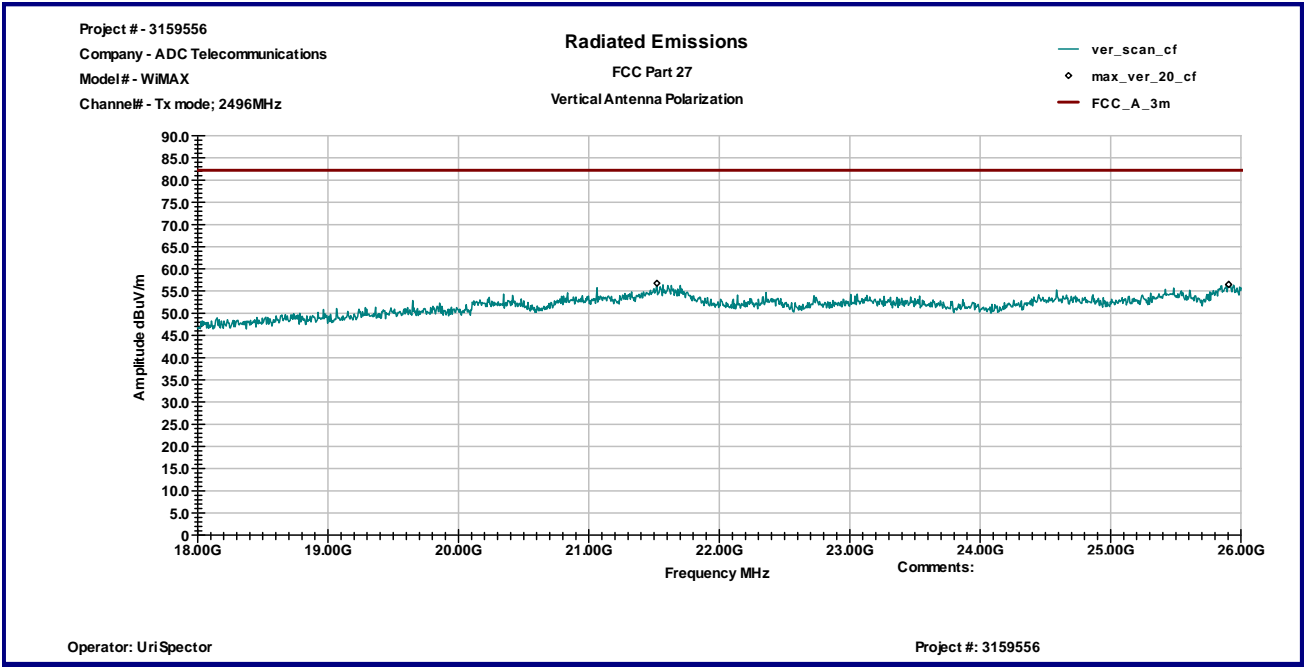
Graph 18



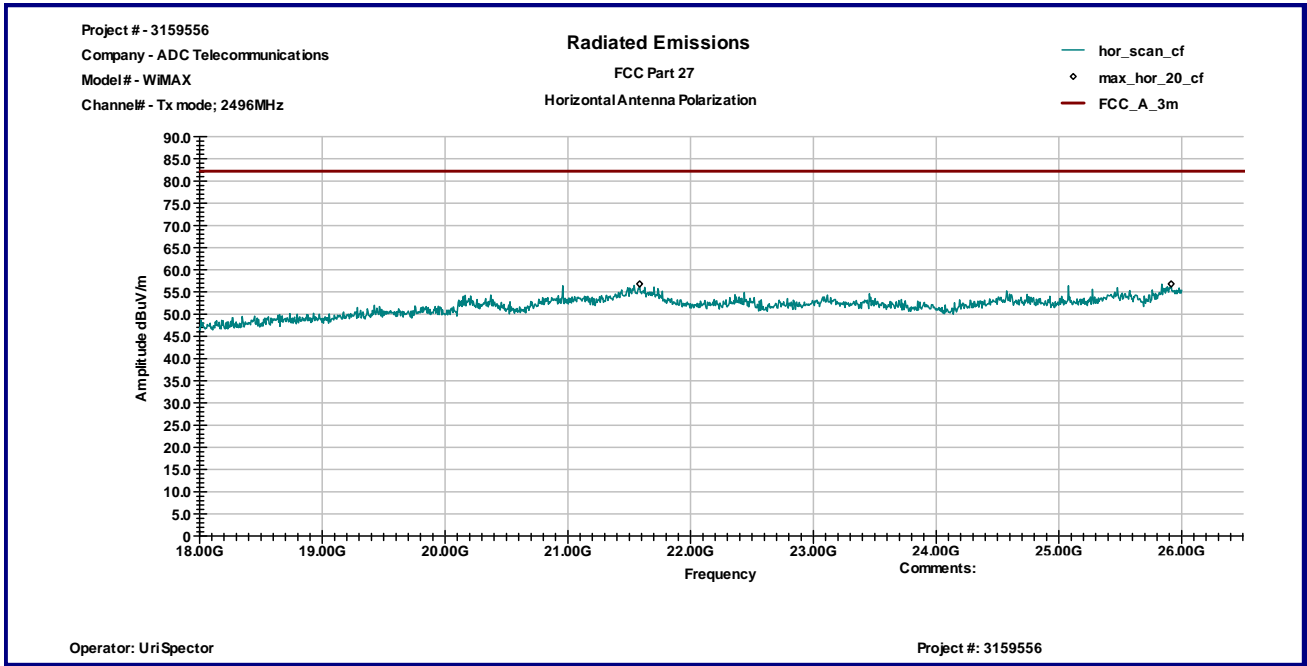
Graph 19



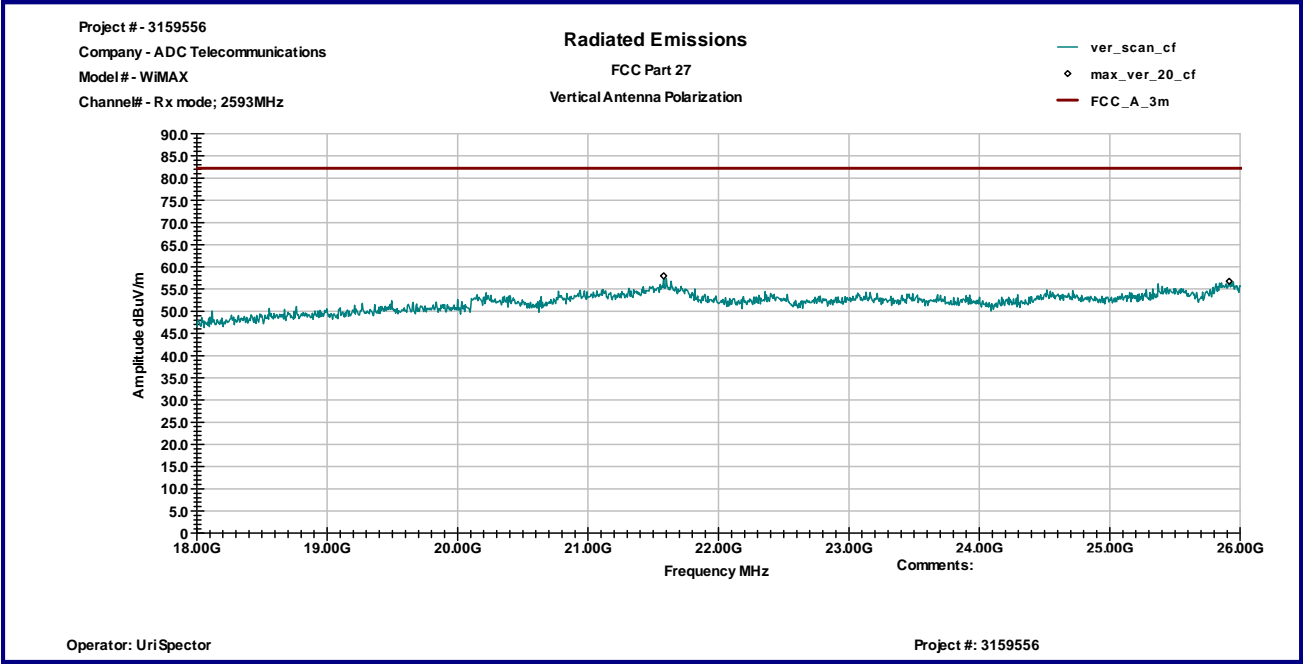
Graph 20



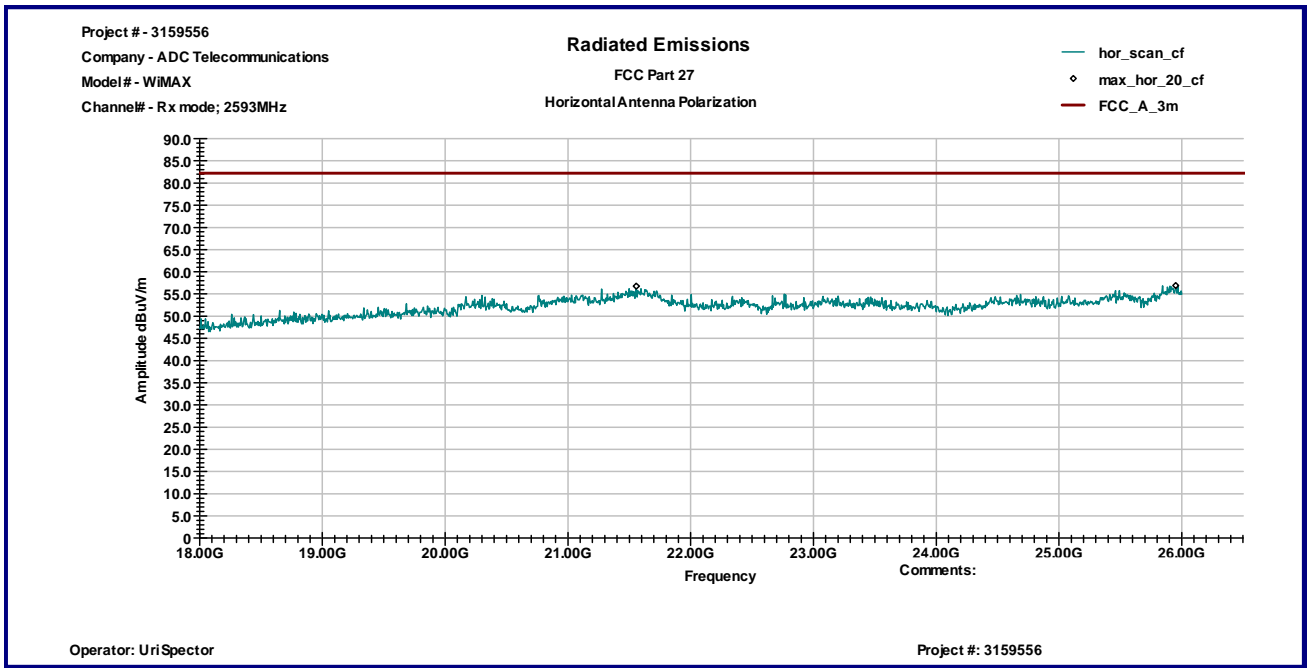
Graph 21



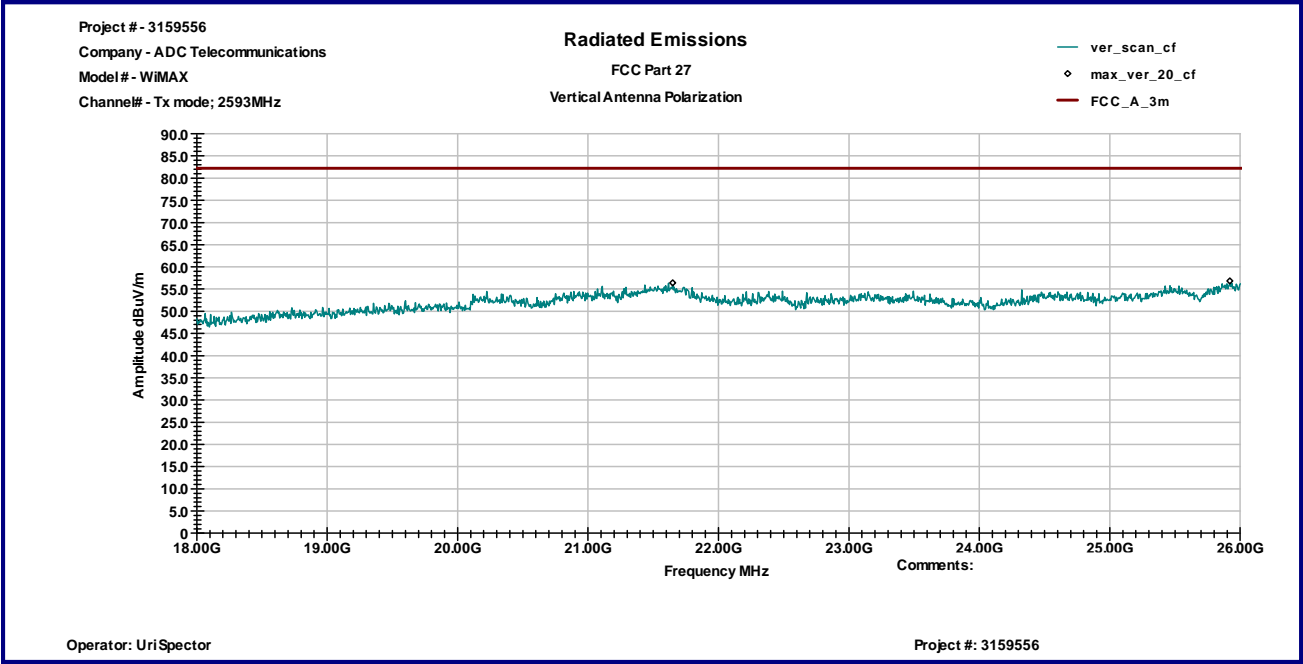
Graph 22



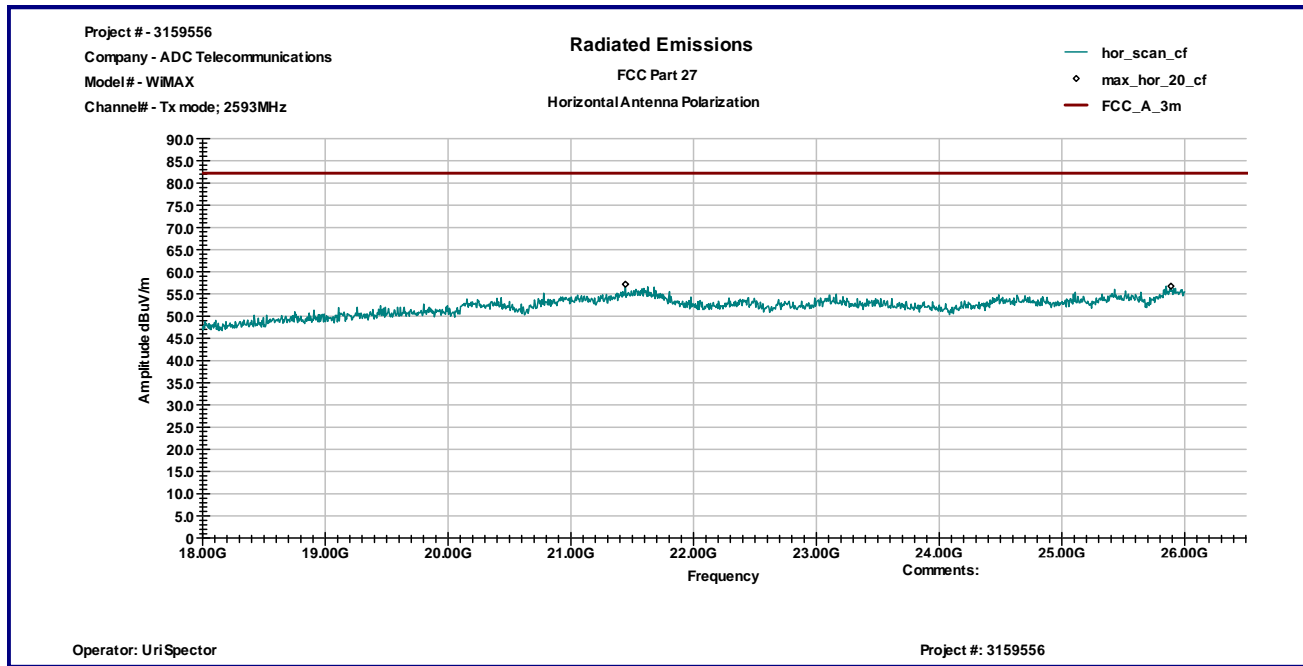
Graph 23



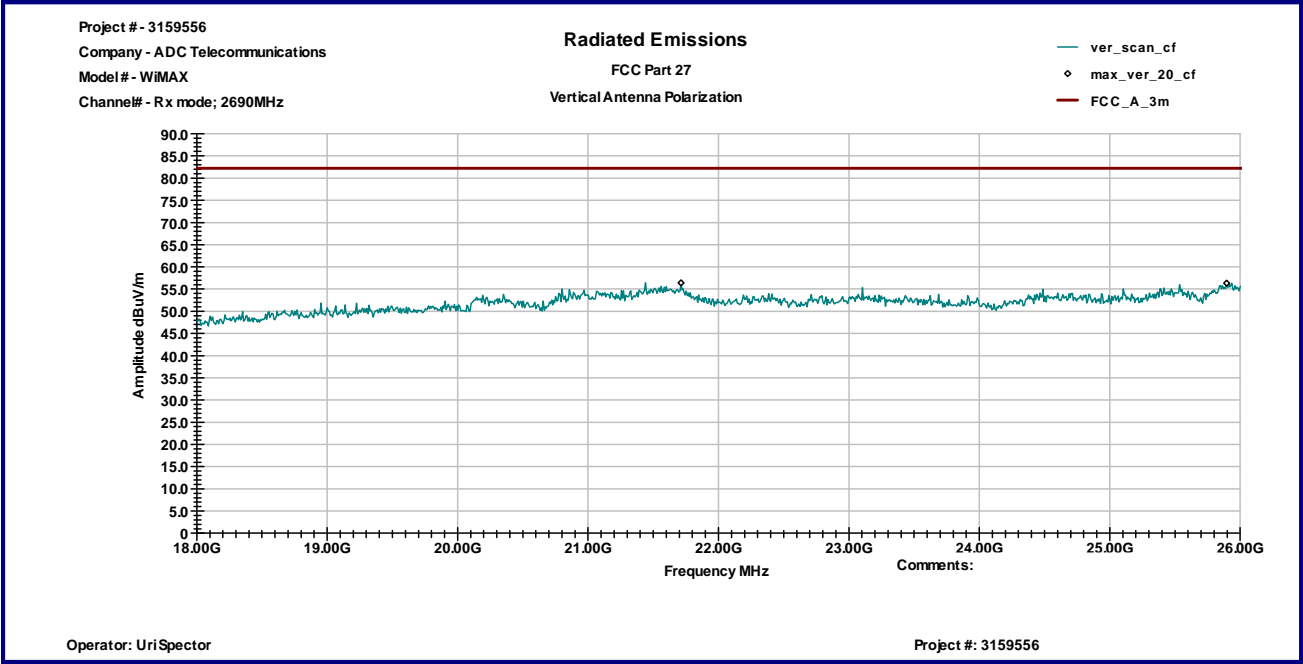
Graph 24



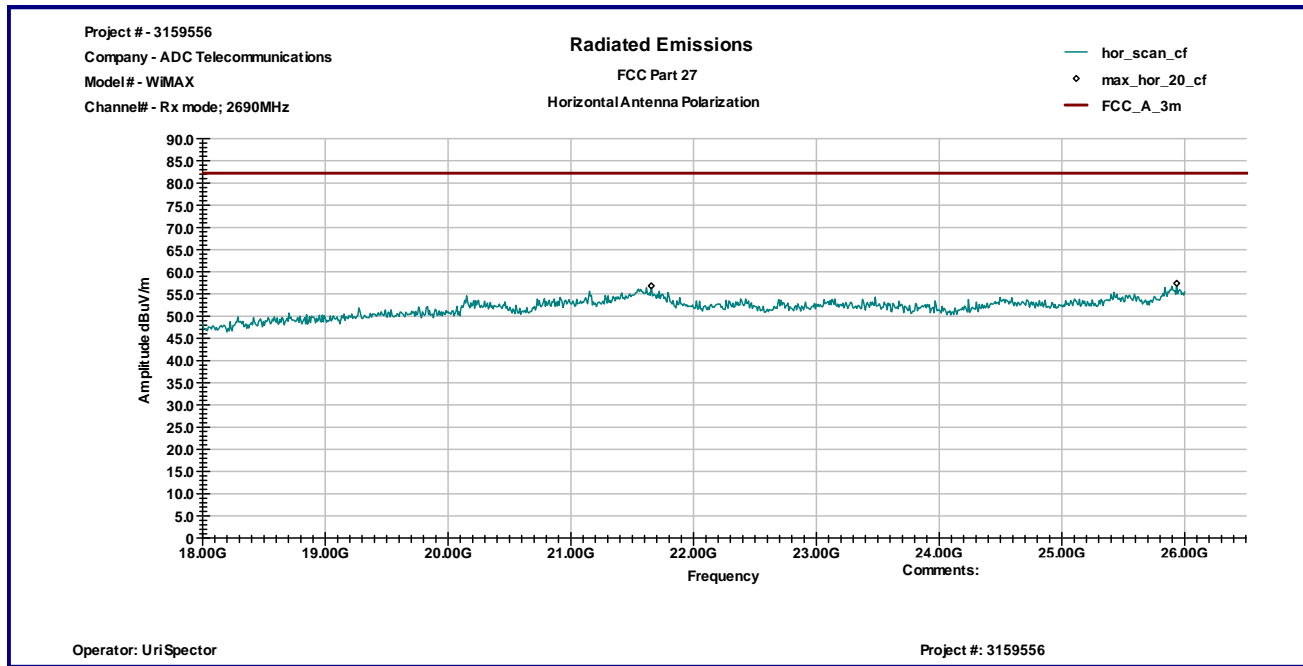
Graph 25



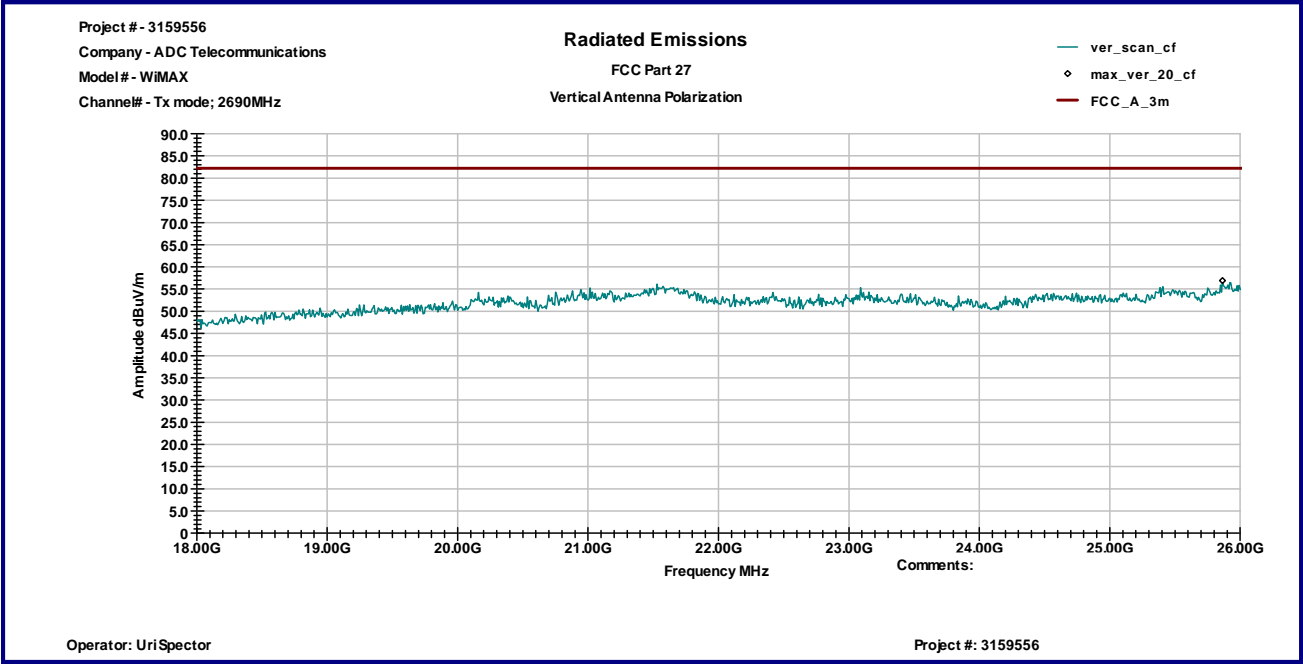
Graph 26



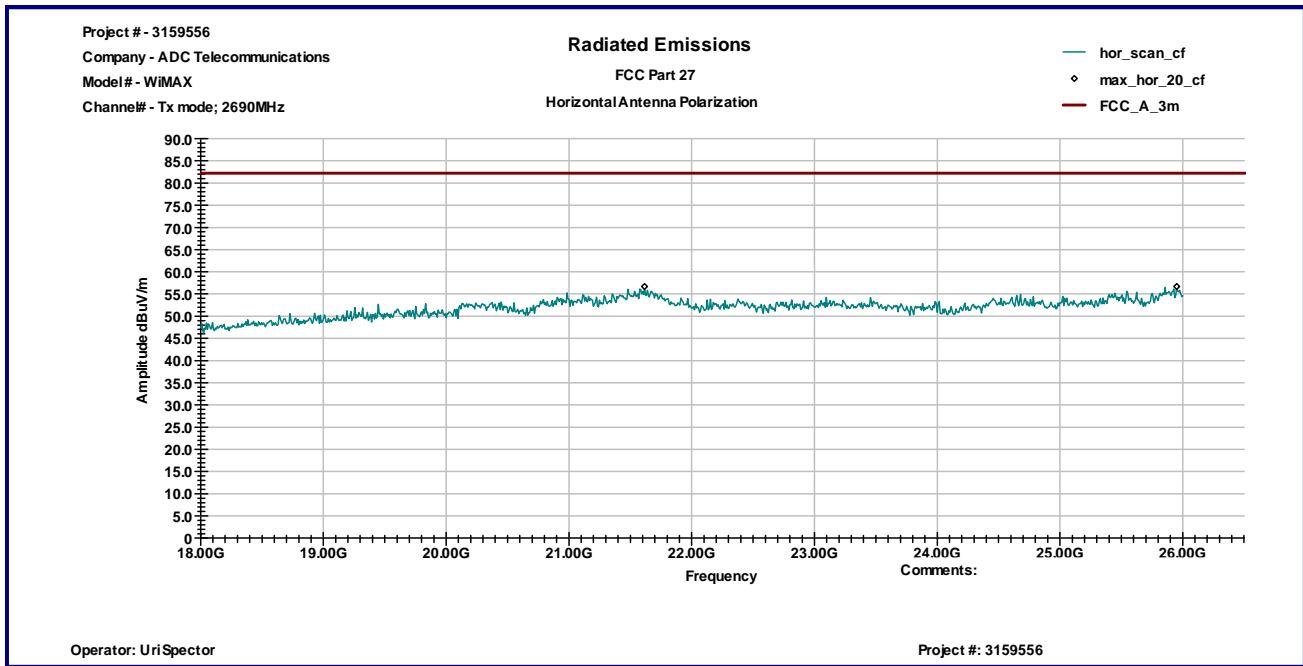
Graph 27



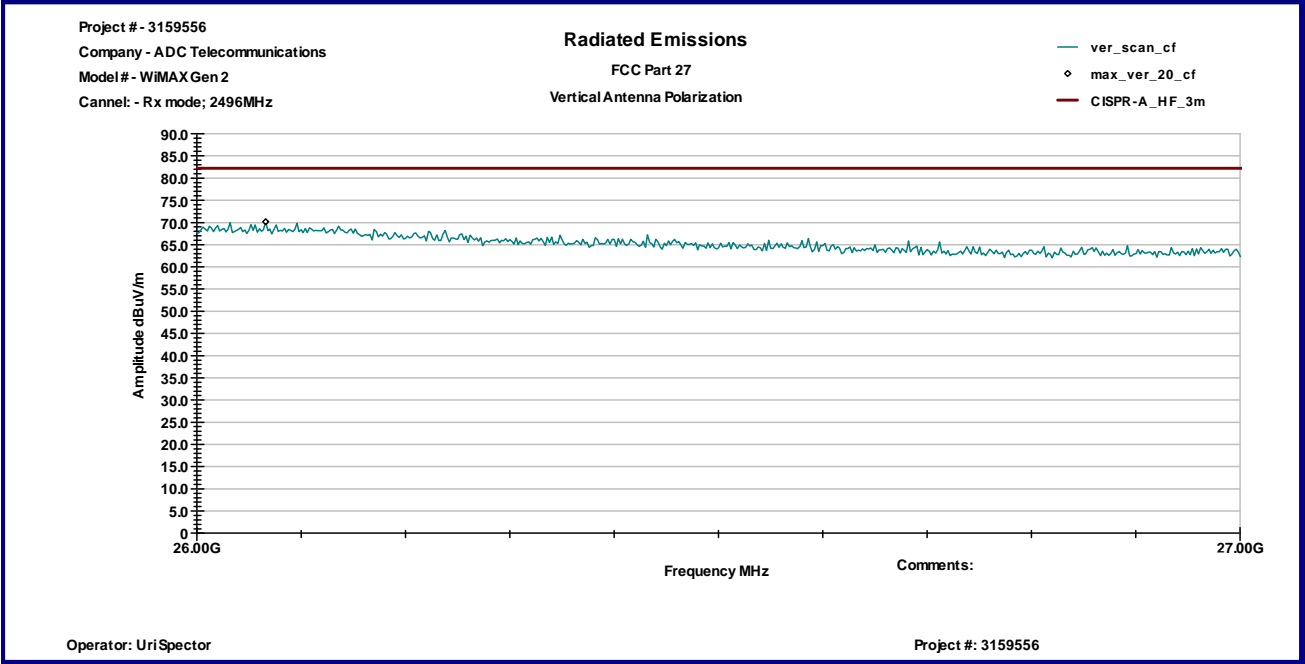
Graph 28



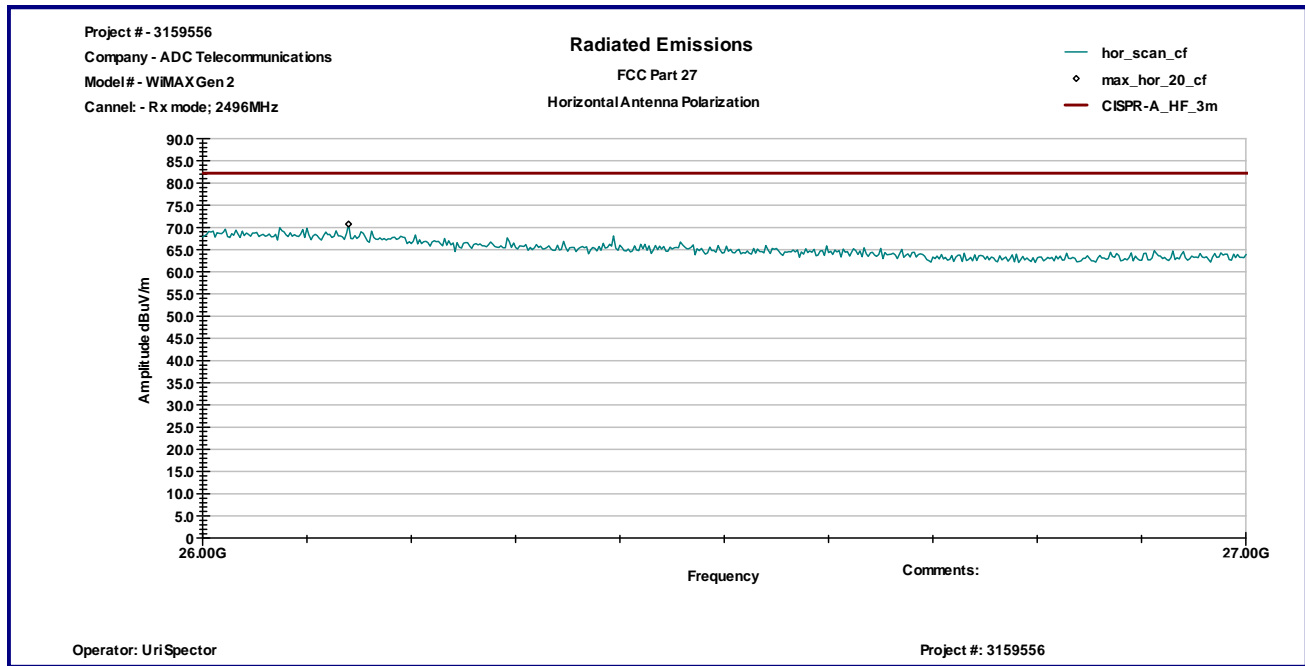
Graph 29



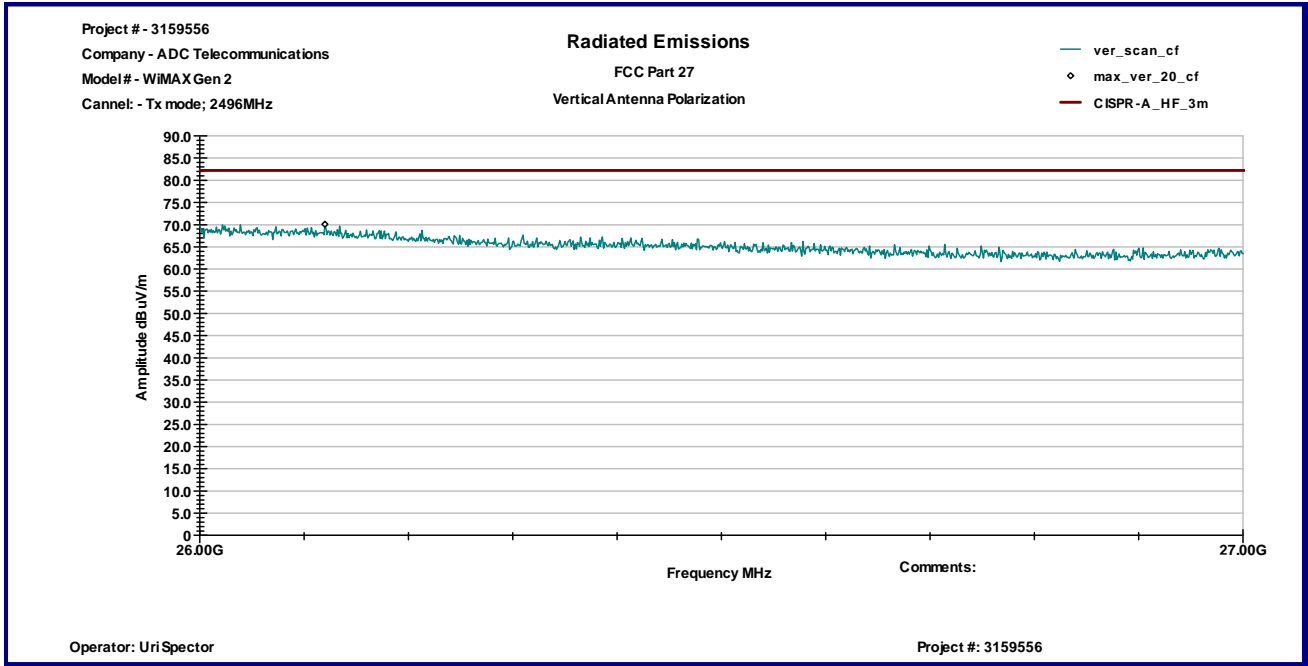
Graph 30



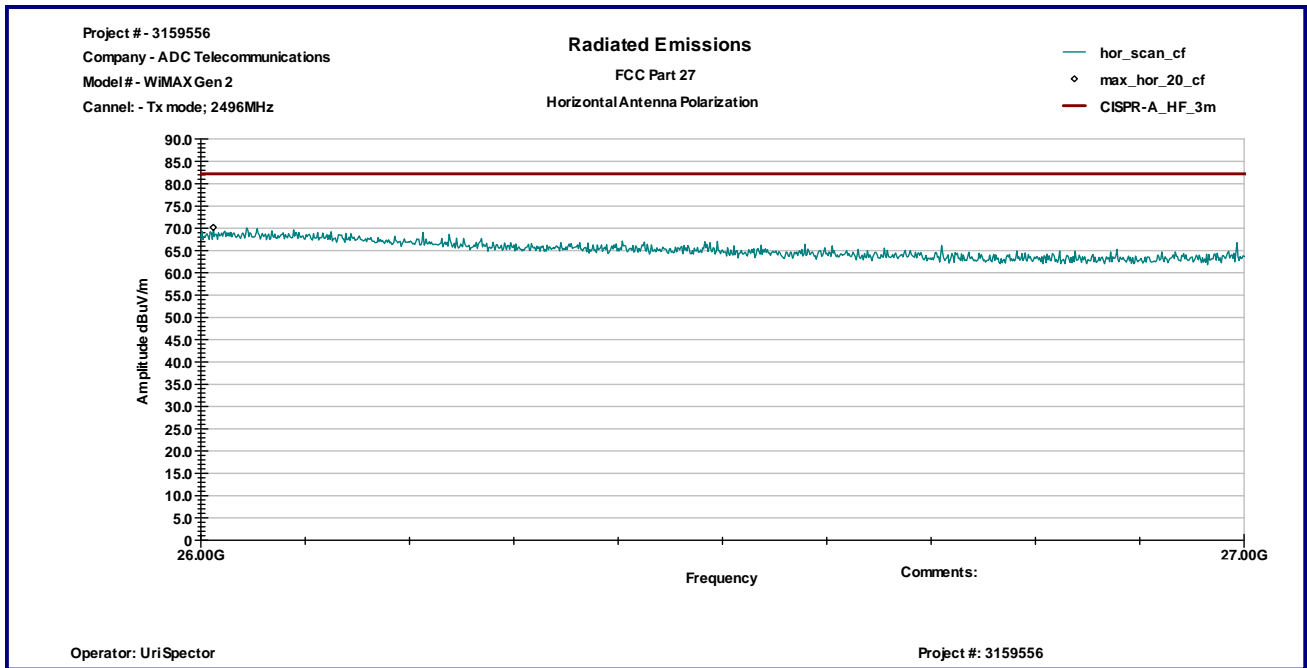
Graph 31



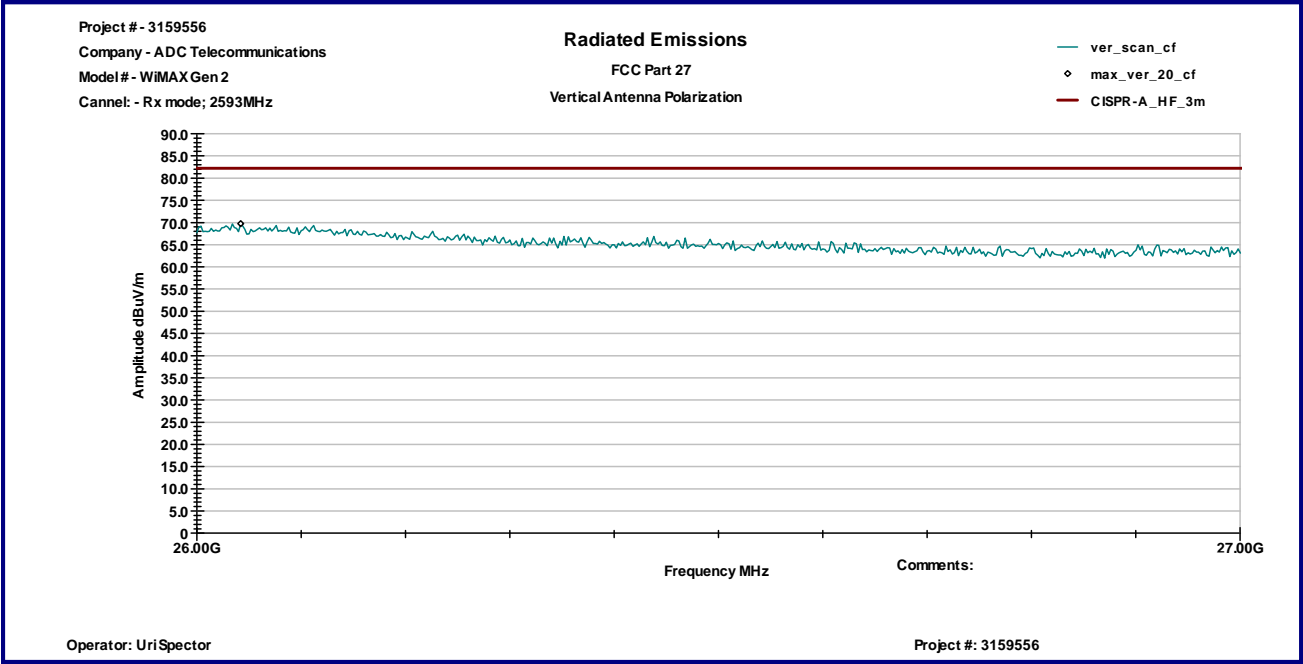
Graph 32



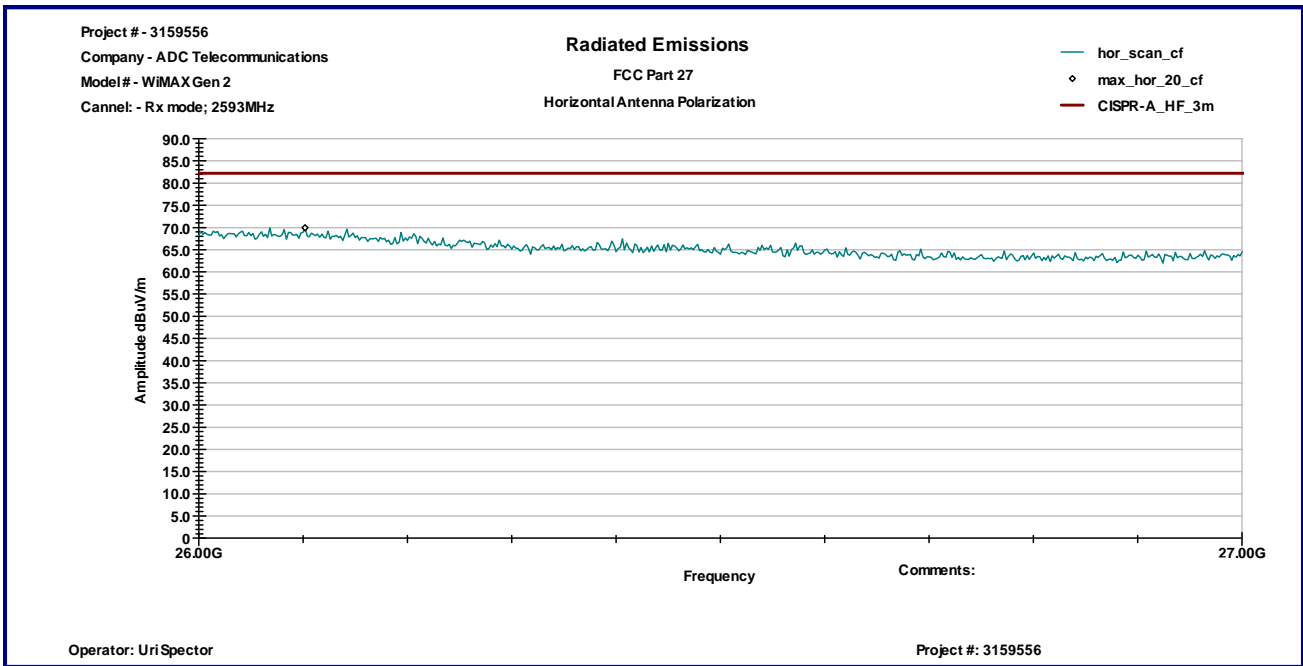
Graph 33



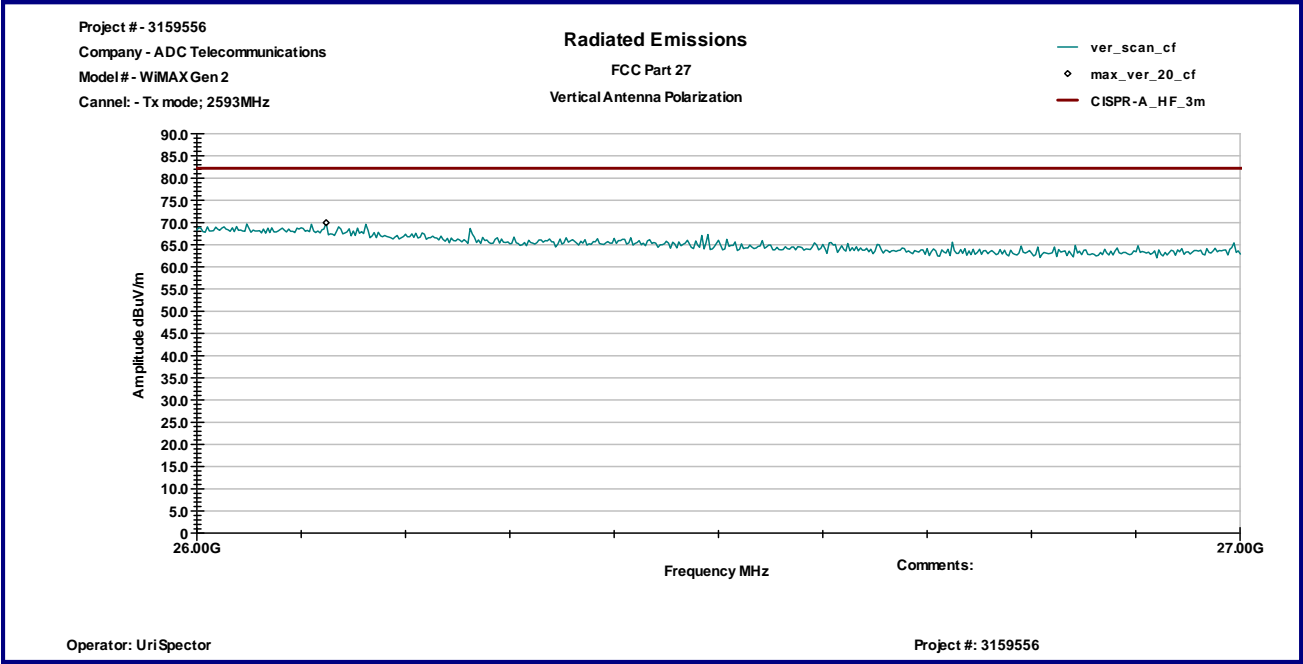
Graph 34



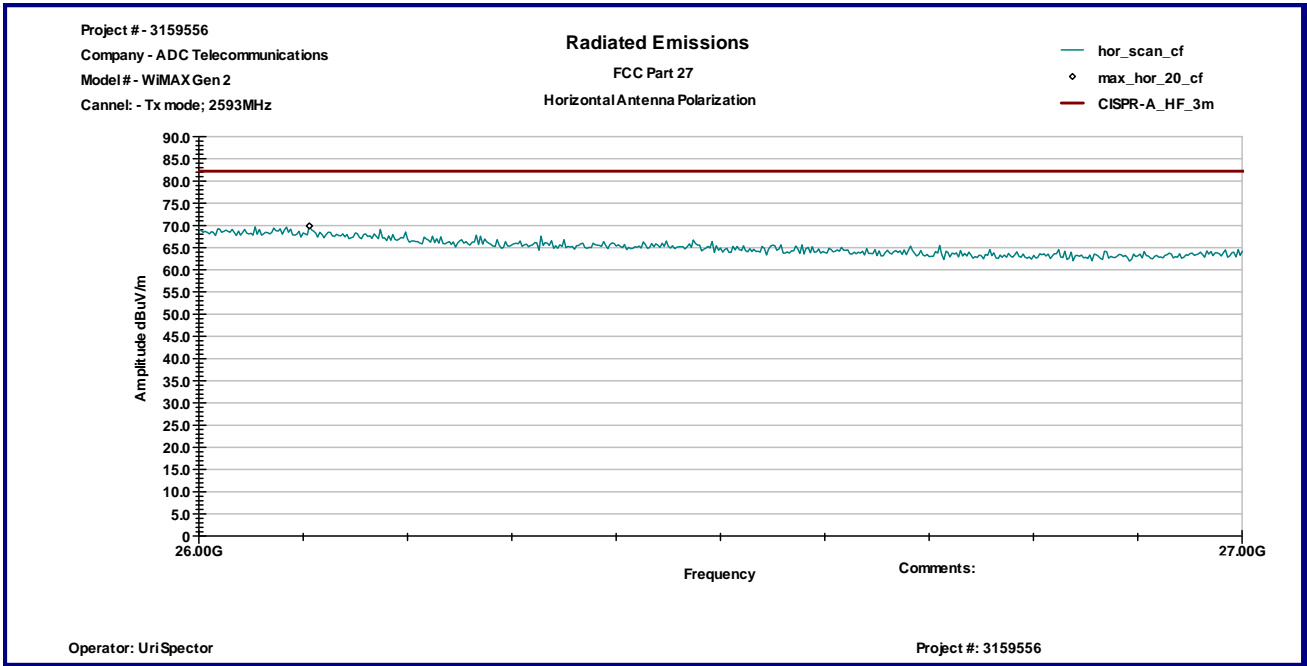
Graph 35



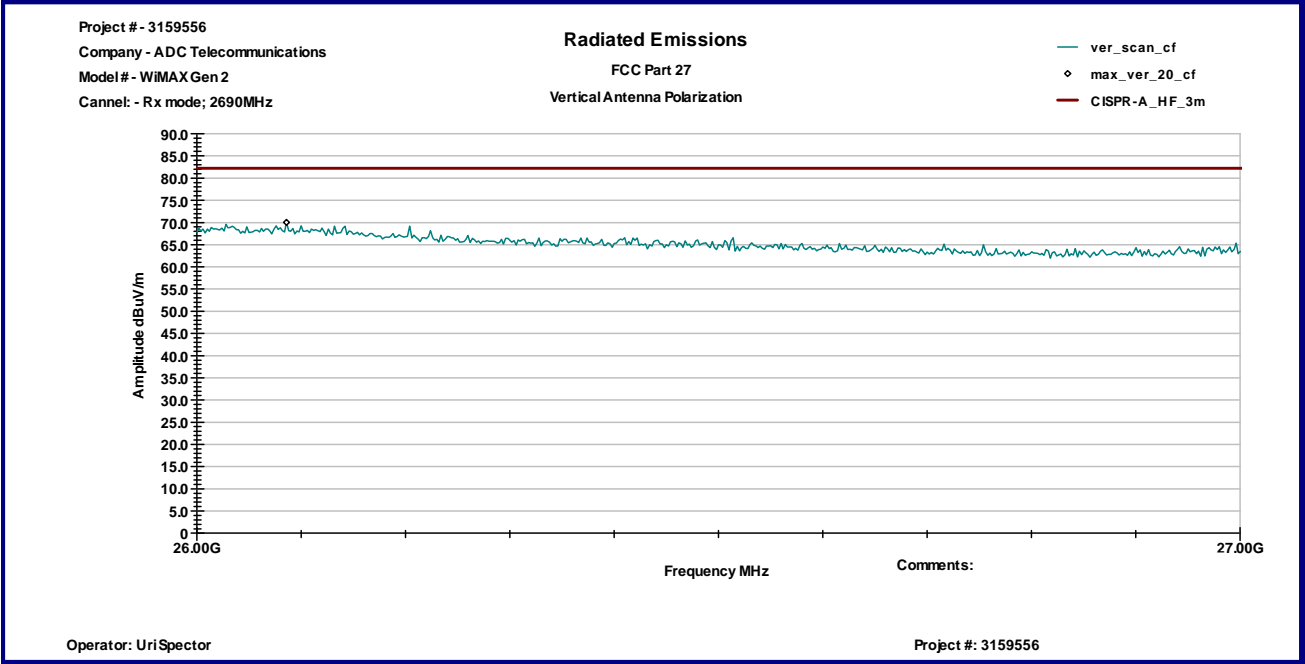
Graph 36



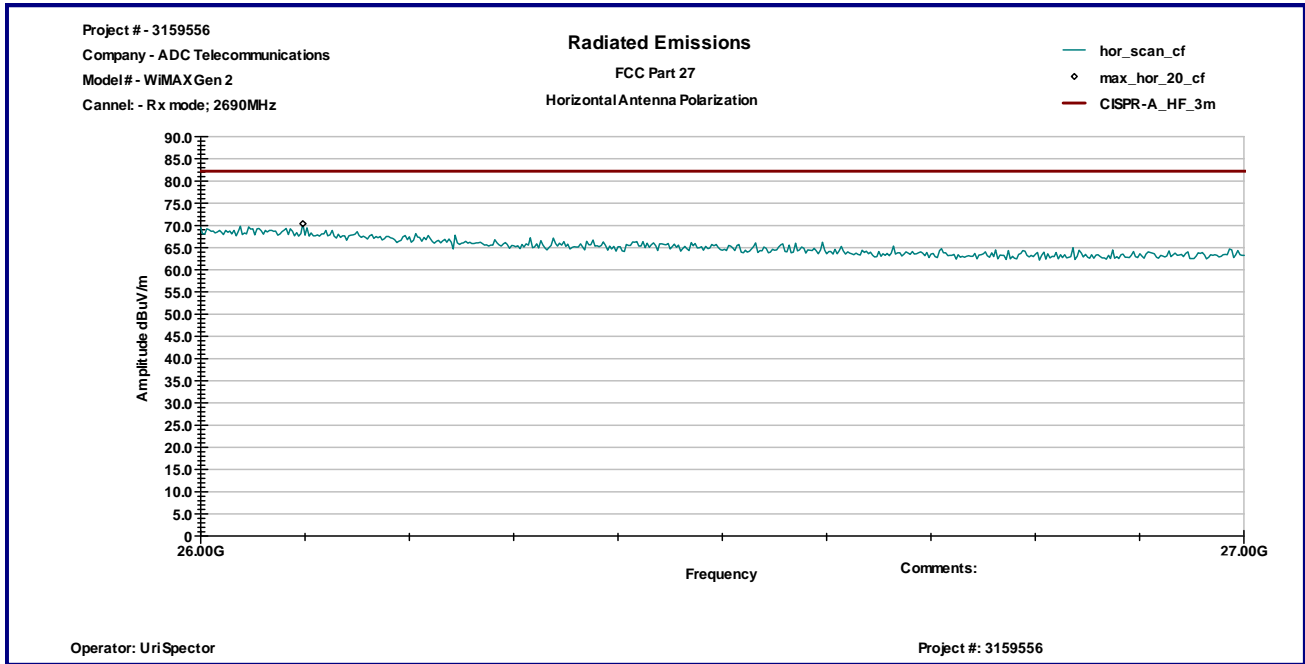
Graph 37



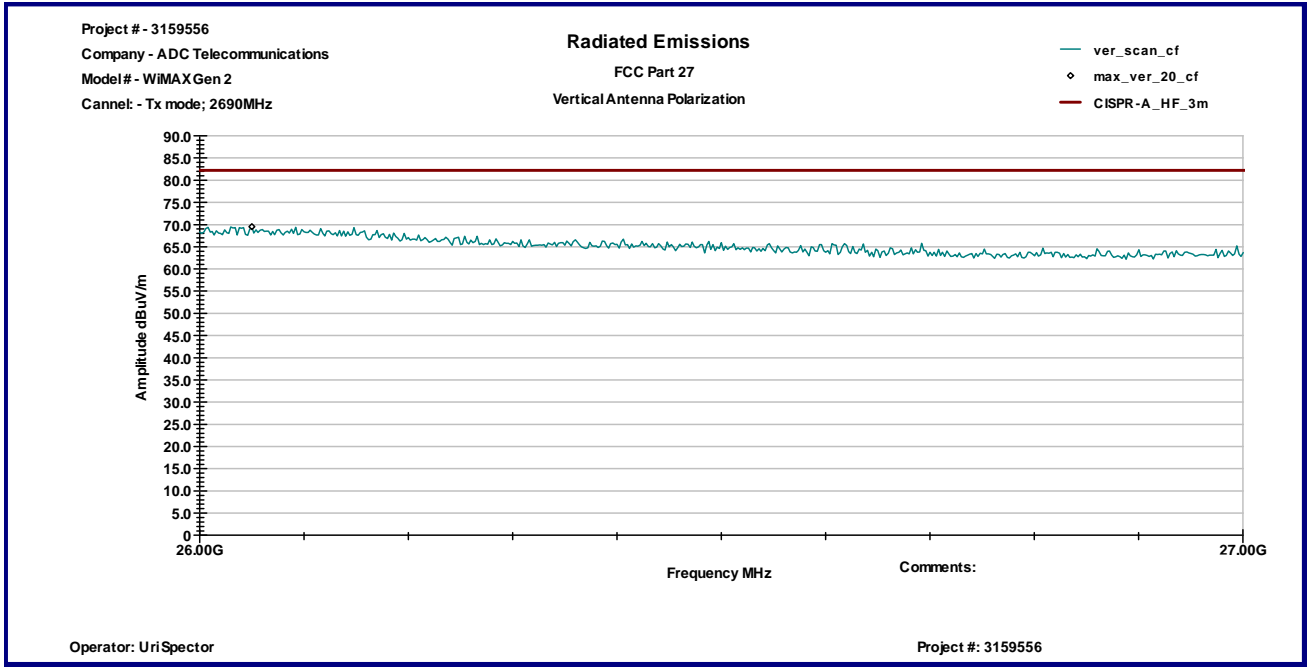
Graph 38



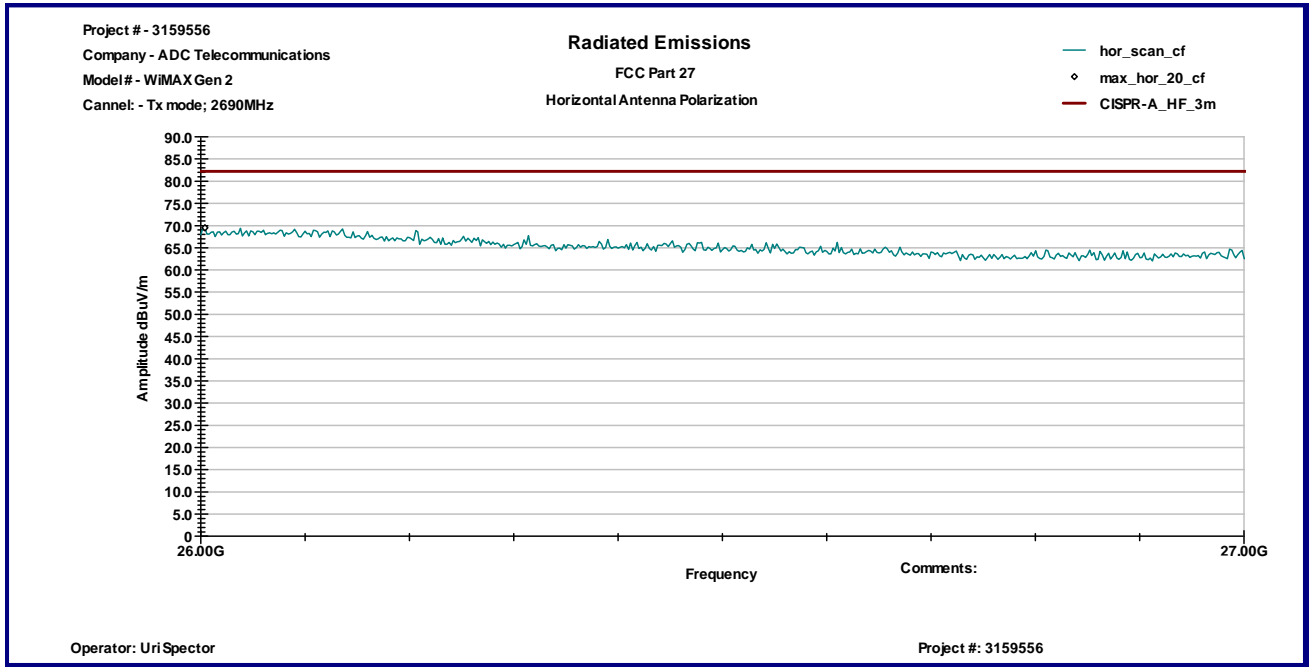
Graph 39



Graph 40



Graph 41



Graph 42



3.2 Environmental conditions

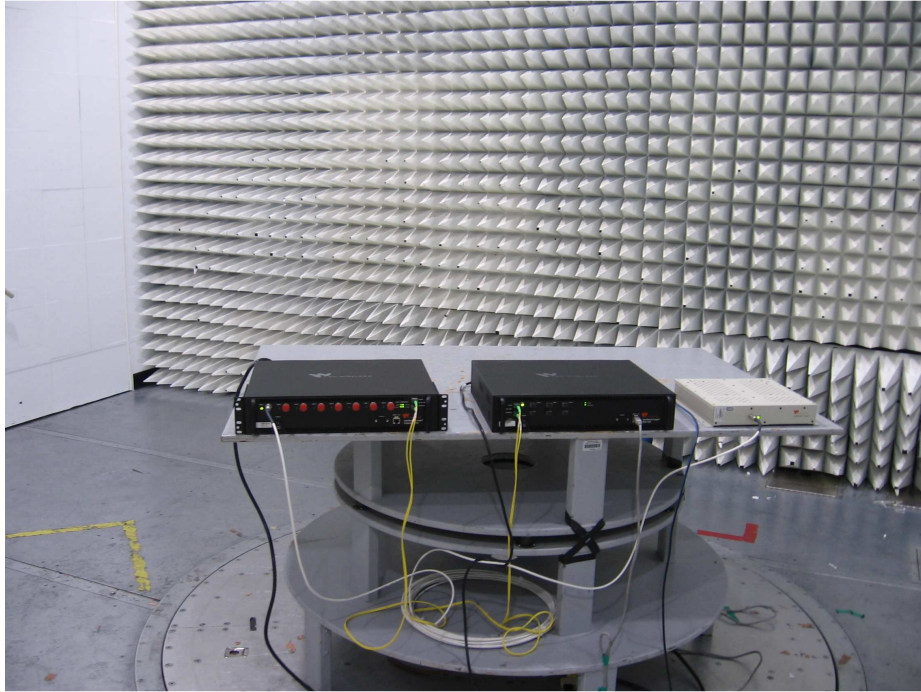
During the measurement the environmental conditions were within the listed ranges:

Temperature: 15-35 °C

Humidity: 30-60 %

Atmospheric pressure: 86-106 kPa

4.0 PHOTOS





5.0 TEST EQUIPMENT

DESCRIPTION	MANUFACTURER	MODEL	SERIAL NO.	CAL DUE	USED
Spectrum Analyzer	R & S	FSP 40	100024	08/23/2008	<input checked="" type="checkbox"/>
Spectrum Analyzer	R & S	ESCI	100358	05/07/2009	<input checked="" type="checkbox"/>
Bicono-Log Antenna	Schaffner-Chase	CBL 6112 B	2630	09/07/2008	<input checked="" type="checkbox"/>
Horn Antenna	EMCO	3115	9507-4513	02/13/2009	<input checked="" type="checkbox"/>
Waveguide Horn Antenna	EMCO	3116	9904-2423	07/20/2009	<input checked="" type="checkbox"/>
Pre-Amplifier	MITEQ	AMF-5D-00501800-28-13P	1122951	04/28/2009	<input checked="" type="checkbox"/>
Pre-Amplifier	MITEQ	AMF-6F-16002600-25-10P	1222383	01/17/2009	<input checked="" type="checkbox"/>
System	TILE! Instrument Control		Ver. 3.4.K.29	VBV	<input checked="" type="checkbox"/>

