

FCC CERTIFICATION
On Behalf of
Shenzhen Yifang Digital Technologies Co., Ltd.

Back Up Camera
Model No.: VR300W

FCC ID: S7JVR300W

Prepared for : Shenzhen Yifang Digital Technologies Co.,Ltd.
Address : 5/F.,Bldg.H-3, Huaqiaocheng East Industrial Park, No.1
Xiangshan East Rd., Nanshan District, Shenzhen City,
Guangdong, P.R.China
Prepared by : ACCURATE TECHNOLOGY CO. LTD
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Report Number : ATE20060325
Date of Test : March 10, 2006
Date of Report : March 15, 2005

TABLE OF CONTENTS

Description	Page
Test Report Certification	
1. GENERAL INFORMATION	4
1.1. Description of Device (EUT).....	4
1.2. Description of Test Facility	4
1.3. Measurement Uncertainty.....	4
2. MEASURING DEVICE AND TEST EQUIPMENT	5
3. FUNDAMENTAL AND HARMONICS RADIATED EMISSION MEASUREMENT	6
3.1. Block Diagram of Test Setup.....	6
3.2. The Emission Limit	6
3.3. Configuration of EUT on Measurement	7
3.4. Operating Condition of EUT	7
3.5. Test Procedure	7
3.6. The Field Strength of Radiation Emission Measurement Results	8
4. RADIATED EMISSION FOR FCC PART 15 SECTION 15.249(D).....	10
4.1. Block Diagram of Test Setup.....	10
4.2. The Emission Limit For Section 15.249(d)	10
4.3. EUT Configuration on Measurement	12
4.4. Operating Condition of EUT	12
4.5. Test Procedure	12
4.6. The Emission Measurement Result	13
5. BAND EDGES FOR FCC PART 15 SECTION 15.249(D).....	14
5.1. The Requirement For Section 15.249(d)	14
5.2. EUT Configuration on Measurement	14
5.3. Operating Condition of EUT	14
5.4. Test Procedure	14
5.5. The Measurement Result	15
6. ANTENNA REQUIREMENT.....	16
6.1. The Requirement	16
6.2. Antenna Construction	16
APPENDIX I (TEST CURVES) (3pages)	

Test Report Certification

Applicant : Shenzhen Yifang Digital Technologies Co.,Ltd.
 Manufacturer : Shenzhen Yifang Digital Technologies Co.,Ltd.
 EUT Description : Back Up Camera
 (A) MODEL NO.: VR300W
 (B) SERIAL NO.: N/A
 (C) POWER SUPPLY: 12Vd.c.

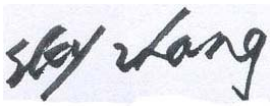
Measurement Procedure Used:

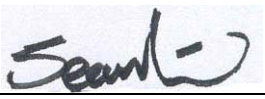
FCC Rules and Regulations Part 15 Subpart C Section 15.249:2004 & ANSI C63.4: 2003

The device described above is tested by ACCURATE TECHNOLOGY CO. LTD to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C Section 15.249 limits. The measurement results are contained in this test report and ACCURATE TECHNOLOGY CO. LTD is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of ACCURATE TECHNOLOGY CO. LTD.

Date of Test : March 10, 2006

Prepared by : 
 (Engineer)

Reviewer : 
 (Quality Manager)

Approved & Authorized Signer : 
 (Manager)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT : Back Up Camera

Model Number : VR300W

Power Supply : 12Vd.c.

Applicant : Shenzhen Yifang Digital Technologies Co.,Ltd.

Address : 5/F.,Bldg.H-3, Huaqiaocheng East Industrial Park, No.1
Xiangshan East Rd., Nanshan District, Shenzhen City,
Guangdong, P.R.China

Manufacturer : Shenzhen Yifang Digital Technologies Co.,Ltd.

Address : 5/F.,Bldg.H-3, Huaqiaocheng East Industrial Park, No.1
Xiangshan East Rd., Nanshan District, Shenzhen City,
Guangdong, P.R.China

Date of sample received : March 08, 2006

Date of Test : March 10, 2006

1.2. Description of Test Facility

EMC Lab : Accredited by TUV Rheinland Shenzhen, May 10, 2004

Accredited by FCC, May 10, 2004
The Certificate Registration Number is 253065

Accredited by Industry Canada, May 18, 2004
The Certificate Registration Number is IC 5077

Name of Firm : ACCURATE TECHNOLOGY CO. LTD

Site Location : F1, Bldg. A, Changyuan New Material Port, Keyuan Rd.
Science & Industry Park, Nanshan, Shenzhen, Guangdong
P.R. China

1.3. Measurement Uncertainty

Conducted Emission Uncertainty = $\pm 2.66\text{dB}$

Radiated Emission Uncertainty = $\pm 4.26\text{dB}$

2. MEASURING DEVICE AND TEST EQUIPMENT

Table 1: List of Test and Measurement Equipment

Kind of equipment	Manufacturer	Type	S/N	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	12.16.2006
EMI Test Receiver	Rohde&Schwarz	ESI26	838786/013	12.16.2006
Bilog Antenna	Schwarzbeck	VULB9163	9163-194	12.16.2006
Bilog Antenna	Chase	CBL6112B	2591	12.16.2006
Horn Antenna	Rohde&Schwarz	HF906	100013	12.16.2006
Spectrum Analyzer	Anritsu	MS2651B	6200238856	12.16.2006
Pre-Amplifier	Agilent	8447D	2944A10619	12.16.2006
Signal Generator	GW	GAG-810	0913317	12.16.2006

3. FUNDAMENTAL AND HARMONICS RADIATED EMISSION MEASUREMENT

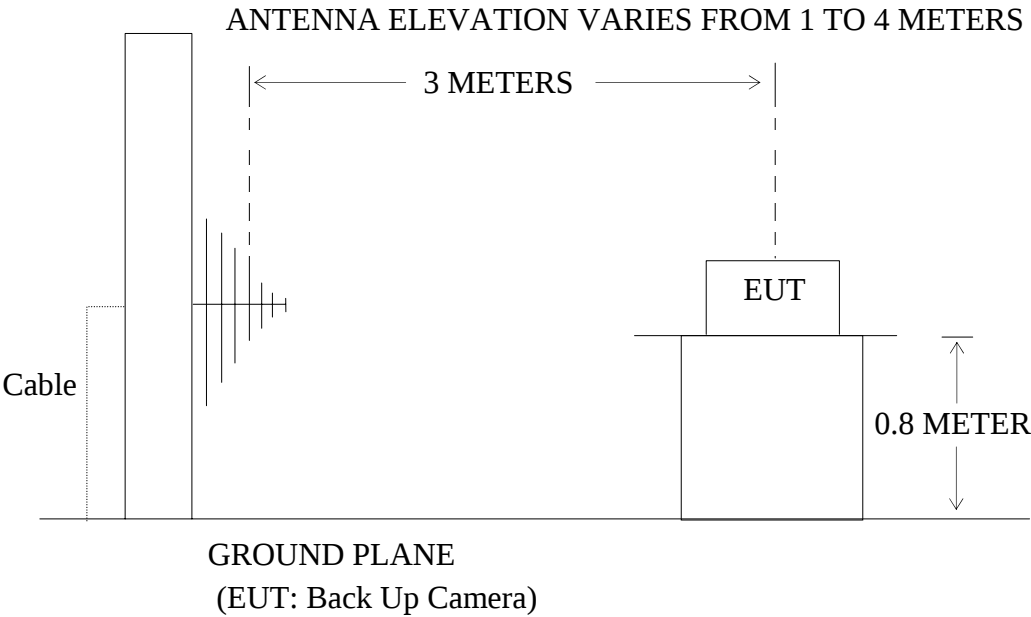
3.1. Block Diagram of Test Setup

3.1.1. Block diagram of connection between the EUT and simulators



(EUT: Back Up Camera)

3.1.2. Anechoic Chamber Test Setup Diagram



3.2. The Emission Limit

3.2.1 For intentional radiators, According to section 15.249(a), Operation within the frequency band of 2.4 to 2.4835GHz, The fundamental field strength shall not exceed 94 dBμV/m and the harmonics shall not exceed 54 dBμV/m.

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
902-928MHz	50	500
2400-2483.5MHz	50	500
5725-5875MHz	50	500
24.0-24.25GHz	250	2500

- 3.2.2 According to section 15.249(e), as shown in section 15.35(b), The peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

3.3.Configuration of EUT on Measurement

The following equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

3.3.1. Back Up Camera (EUT)

Model Number : VR300W
Serial Number : N/A
Manufacturer : Shenzhen Yifang Digital Technologies Co., Ltd.

3.4.Operating Condition of EUT

3.4.1.Setup the EUT and simulator as shown as Section 3.1.

3.4.2.Turn on the power of all equipment.

3.4.3. Let the EUT work in TX modes measure it.

3.5.Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4: 2003 on radiated emission measurement.

The bandwidth of test receiver (R&S ESI26) is set at 1MHz.

3.6. The Field Strength of Radiation Emission Measurement Results PASS.

Date of Test:	March 10, 2006	Temperature:	21°C
EUT:	Back Up Camera	Humidity:	53%
Model No.:	VR300W	Power Supply:	12V d.c.
Test Mode:	TX	Test Engineer:	Andy

Fundamental and Harmonics Radiated Emissions

Frequency (MHz)	Reading(dBμV/m)		Factor(dB) Corr.	Result(dBμV/m)		Limit(dBμV/m)		Margin(dBμV/m)		Polarization
	AV	PEAK		AV	PEAK	AV	PEAK	AV	PEAK	
2468.643	82.5	87.1	-3.4	79.1	83.7	94	114	14.9	30.3	Vertical
2468.643	83.9	88.5	-3.4	80.5	85.1	94	114	13.5	28.9	Horizontal
4937.286	46.1	50.7	2.2	48.3	52.9	54	74	5.7	21.1	Vertical
4937.286	46.9	51.5	2.2	49.1	53.7	54	74	4.9	20.3	Horizontal
7405.929	38.5	43.1	7.4	45.9	50.5	54	74	8.1	23.5	Vertical
7405.929	39.3	43.9	7.4	46.7	51.3	54	74	7.3	22.7	Horizontal
9874.572	33.0	37.6	9.3	42.3	46.9	54	74	11.7	27.1	Vertical
9874.572	33.9	38.5	9.3	43.2	47.8	54	74	10.8	26.2	Horizontal
12343.215	28.1	32.7	10.5	38.6	43.2	54	74	15.4	30.8	Vertical
12343.215	29.7	34.4	10.5	40.2	44.9	54	74	13.8	29.1	Horizontal
14811.858	21.8	26.5	13.8	35.6	40.3	54	74	18.4	33.7	Vertical
14811.858	22.8	27.4	13.8	36.6	41.2	54	74	17.4	32.8	Horizontal
17280.501	15.3	19.8	15.2	30.5	35.0	54	74	23.5	39.0	Vertical
17280.501	17.3	21.9	15.2	32.5	37.1	54	74	21.5	36.9	Horizontal
19749.144	-	-	-	-	-	54	74	-	-	Vertical
19749.144	-	-	-	-	-	54	74	-	-	Horizontal
22217.787	-	-	-	-	-	54	74	-	-	Vertical
22217.787	-	-	-	-	-	54	74	-	-	Horizontal
24686.433	-	-	-	-	-	54	74	-	-	Vertical
24686.433	-	-	-	-	-	54	74	-	-	Horizontal

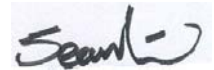
Note:

1. Remark “- “ means that the emission level is too low to be measured.
2. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

Where Corrected Factor = Antenna Factor + Cable Loss + High Pass Filter Loss – Amplifier Gain

Reviewer :



4. RADIATED EMISSION FOR FCC PART 15 SECTION 15.249(D)

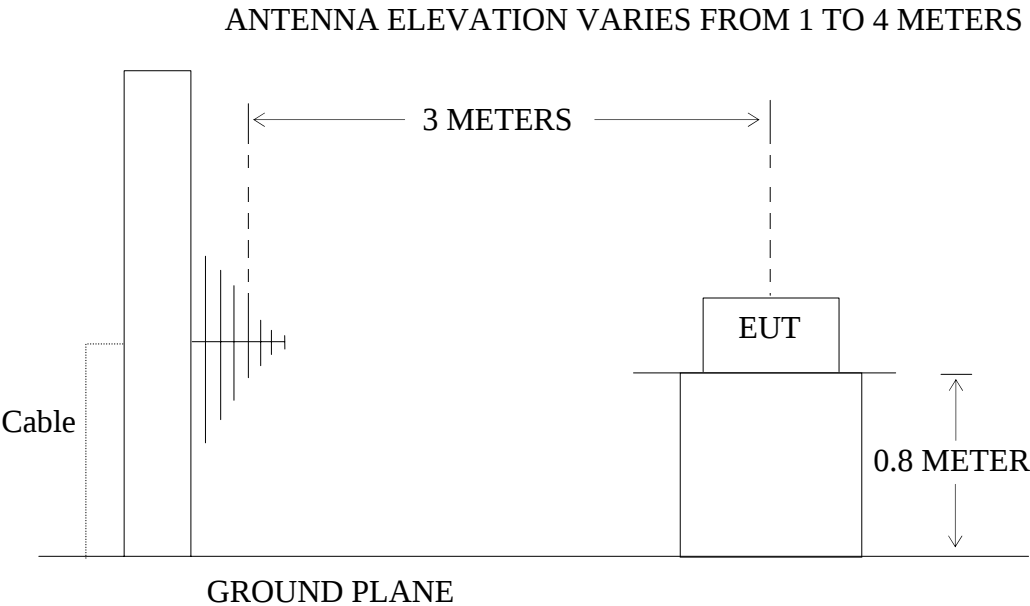
4.1. Block Diagram of Test Setup

4.1.1. Block diagram of connection between the EUT and simulators



(EUT: Back Up Camera)

4.1.2. Anechoic Chamber Test Setup Diagram



(EUT: Back Up Camera)

4.2. The Emission Limit For Section 15.249(d)

4.2.1 Emission radiated outside of the specified frequency bands, except for harmonics, shall be comply with the general radiated emission limits in Section 15.209.

Radiation Emission Measurement Limits According to Section 15.209

Frequency (MHz)	Limit,		The final measurement in band 9-90kHz, 110-490kHz and above 1000MHz is performed with Average detector.
	Field Strength of Quasi-peak Value (microvolts/m)	Field Strength of Quasi-peak Value (dBμV/m)	
30 - 88	100	40	

88 - 216	150	43.5	Except those frequency bands mention above, the final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.
216 - 960	200	46	
Above 960	500	54	

4.3.EUT Configuration on Measurement

The following equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

4.3.1. Back Up Camera (EUT)

Model Number : VR300W
Serial Number : N/A
Manufacturer : Shenzhen Yifang Digital Technologies Co., Ltd.

4.4.Operating Condition of EUT

4.4.1. Setup the EUT and simulator as shown as Section 4.1.

4.4.2. Turn on the power of all equipment.

4.4.3. Let the EUT work in TX modes measure it.

4.5.Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4: 2003 on radiated emission measurement.

The bandwidth of test receiver (R&S ESI26) is set at 120KHz in 30-1000MHz. and set at 1MHz in above 1000MHz.

The frequency range from 30MHz to 1000MHz is checked.

The final measurement in band 9-90kHz, 110-490kHz and above 1000MHz is performed with Average detector. Except those frequency bands mention above, the final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.

4.6. The Emission Measurement Result

PASS.

Date of Test:	<u>March 10, 2006</u>	Temperature:	<u>21°C</u>
EUT:	<u>Back Up Camera</u>	Humidity:	<u>53%</u>
Model No.:	<u>VR300W</u>	Power Supply:	<u>12V d.c.</u>
Test Mode:	<u>TX</u>	Test Engineer:	<u>Andy</u>

Frequency (MHz)	Reading(dBμV/m)	Factor(dB) Corr.	Result(dBμV/m)	Limit(dBμV/m)	Margin(dBμV/m)	Polarization
	QP		QP	QP	QP	
33.948	45.7	-16.7	29.0	40.0	11.0	Vertical
89.218	54.7	-23.1	31.6	43.5	11.9	Vertical
101.062	54.3	-21.5	32.8	43.5	10.7	Vertical
106.281	52.4	-21.2	31.2	43.5	12.3	Vertical
337.936	53.1	-18.1	35.0	46.0	11.0	Vertical
101.062	52.8	-21.5	31.3	43.5	12.2	Horizontal
310.301	54.7	-19.0	35.7	46.0	10.3	Horizontal
337.936	53.1	-18.1	35.0	46.0	11.0	Horizontal

Note:

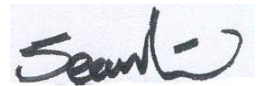
1. Remark “- “ means that the emission level is too low to be measured.
2. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:

Result = Reading + Corrected Factor

Where Corrected Factor = Antenna Factor + Cable Loss + High Pass Filter Loss – Amplifier Gain

3. All the scanning waveforms are attached in Appendix I.

Reviewer :



5. BAND EDGES FOR FCC PART 15 SECTION 15.249(D)

5.1. The Requirement For Section 15.249(d)

5.1.1. According to Section 15.249(d), out band emission except for harmonics shall be at least attenuated by 50 dB below the level of the fundamental.

5.2. EUT Configuration on Measurement

The following equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

5.2.1. Back Up Camera (EUT)

Model Number : VR300W
Serial Number : N/A
Manufacturer : Shenzhen Yifang Digital Technologies Co., Ltd.

5.3. Operating Condition of EUT

5.3.1. Setup the EUT and simulator as shown as Section 4.1.

5.3.2. Turn on the power of all equipment.

5.3.3. Let the EUT work in TX modes measure it.

5.4. Test Procedure

5.4.1. Measure the fundamental amplitude appearing on spectral display and set it as a reference level. measure the lower band edge amplitude. Get the delta amplitude and edge frequency.

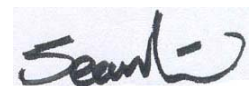
5.4.2. Repeat above procedures , Measure the fundamental amplitude appearing on spectral display and set it as a reference level. measure the upper band edge amplitude. Get the delta amplitude and edge frequency.

5.5. The Measurement Result

Pass

- 5.5.1 Lower band edge: Emission radiated outside of the lower band edge are 52.99 dB below the level of the fundamental.
- 5.5.2 Upper band edge: Emission radiated outside of the upper band edge are 52.13 dB below the level of the fundamental.
- 5.5.3 All the spectral waveforms are attached in Appendix I.

Reviewer :

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6. ANTENNA REQUIREMENT

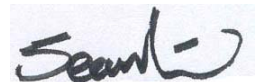
6.1. The Requirement

- 7.1.1. According to Section 15.203, An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

6.2. Antenna Construction

The antenna is mount on PCB , no consideration of replacement.

Reviewer :

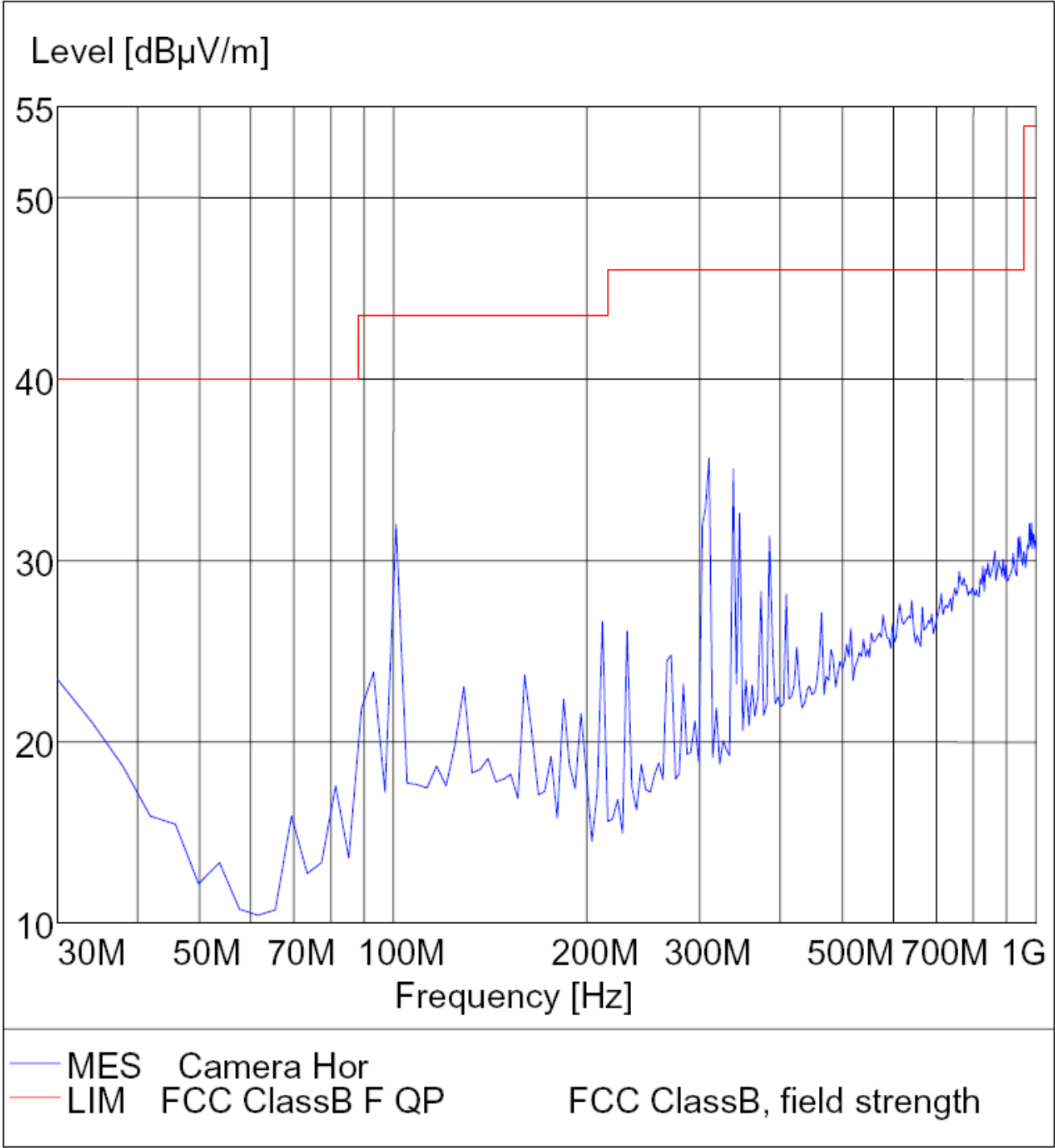
A handwritten signature in black ink, appearing to read "Sean", is written over a light blue rectangular background. The signature is stylized with a large 'S' and a trailing flourish.

APPENDIX I (Test Curves)

Radiated Disturbance

FCC Part15B

EUT: Back Up Camera M/N: VR300W
Manufacturer: Shenzhen Yifang Digital Technology Co., Ltd.
Operating Condition: TX
Test Site: ATC EMC Lab.SAC
Operator: Andy
Test Specification: Horizontal
Comment: DC 12V



Radiated Disturbance

FCC Part15B

EUT: Back Up Camera M/N: VR300W
Manufacturer: Shenzhen Yifang Digital Technology Co., Ltd.
Operating Condition: TX
Test Site: ATC EMC Lab.SAC
Operator: Andy
Test Specification: Vertical
Comment : DC 12V

