# FCC CERTIFICATION
On Behalf of
Guangzhou Panyu Shiji Jincheng Electronic Factory

Back-Up Camera
Model No.: DY-W-M

FCC ID: T7NDYWM24

| | | |
|---|---|---|
| Prepared for | : | Guangzhou Panyu Shiji Jincheng Electronic Factory |
| Address | : | 4/F.,2 Anding Street, Zhushan Industrial Area, Shiji, Panyu District, Guangzhou City, Guangdong Province, China |
| Prepared by | : | ACCURATE TECHNOLOGY CO. LTD |
| Address | : | F1, Bldg. A, Changyuan New Material Port, Keyuan Rd. Science & Industry Park, Nanshan, Shenzhen, Guangdong P.R. China<br>Tel: (0755) 26503290<br>Fax: (0755) 26503396 |

| | | |
|---|---|---|
| Report Number | : | ATE20060739 |
| Date of Test | : | May 06, 2006 |
| Date of Report | : | May 12, 2006 |

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Description Page

# Test Report Certification

| | | |
|---|---|---|
| Applicant | : | Guangzhou Panyu Shiji Jincheng Electronic Factory |
| Manufacturer | : | Guangzhou Panyu Shiji Jincheng Electronic Factory |
| EUT Description | : | Back-Up Camera |
| | | (A) MODEL NO.: DY-W-M |
| | | (B) SERIAL NO.: N/A |
| | | (C) POWER SUPPLY: 12Vd.c. |

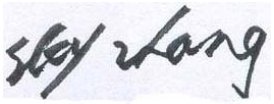
Measurement Procedure Used:

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

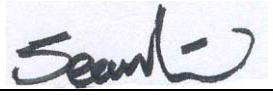
The device described above is tested by ACCURATE TECHNOLOGY CO. LTD to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C Section15.249 limits. The measurement results are contained in this test report and ACCURATE TECHNOLOGY 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.

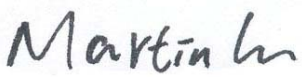
Date of Test : May 06, 2006

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 | : | DY-W-M |
| Power Supply | : | 12Vd.c. |
| Applicant | : | Guangzhou Panyu Shiji Jincheng Electronic Factory |
| Address | : | 4/F.,2 Anding Street, Zhushan Industrial Area, Shiji, Panyu District, Guangzhou City, Guangdong Province, China |
| Manufacturer | : | Guangzhou Panyu Shiji Jincheng Electronic Factory |
| Address | : | 4/F.,2 Anding Street, Zhushan Industrial Area, Shiji, Panyu District, Guangzhou City, Guangdong Province, China |
| Date of sample received | : | April 26, 2006 |
| Date of Test | : | May 06, 2006 |

## 1.2.Description of Test Facility

| | | |
|---|---|---|
| EMC Lab | : | Accredited by TUV Rheinland Shenzhen, May 10, 2004<br><br>Accredited by FCC, May 10, 2004<br>The Certificate Registration Number is 253065<br><br>Accredited by Industry Canada, May 18, 2004<br>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 = ±2.66dB

Radiated Emission Uncertainty = ±4.26dB

# 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 | 04.01.2007 |
| EMI Test Receiver | Rohde&Schwarz | ESI26 | 838786/013 | 04.01.2007 |
| Bilog Antenna | Schwarzbeck | VULB9163 | 9163-194 | 04.01.2007 |
| Bilog Antenna | Chase | CBL6112B | 2591 | 04.01.2007 |
| Horn Antenna | Rohde&Schwarz | HF906 | 100013 | 04.01.2007 |
| Spectrum Analyzer | Anritsu | MS2651B | 6200238856 | 04.01.2007 |
| Pre-Amplifier | Agilent | 8447D | 2944A10619 | 04.01.2007 |
| Signal Generator | GW | GAG-810 | 0913317 | 01.02.2007 |

# 3. FUNDAMENTAL AND HARMONICS RADIATED EMISSION MEASURMENT

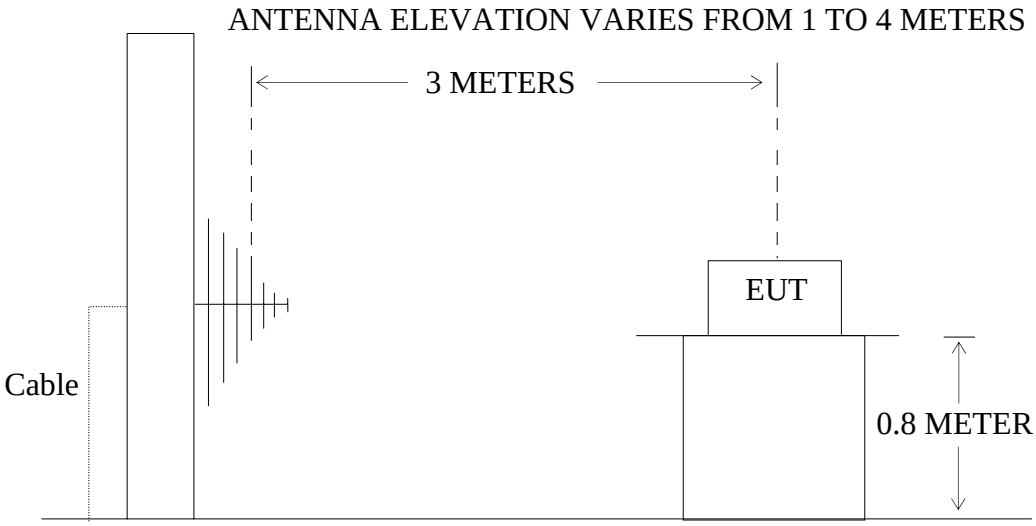
## 3.1.Block Diagram of Test Setup

### 3.1.1.Block diagram of connection between the EUT and simulators

EUT

(EUT: Back-Up Camera)

### 3.1.2.Anechoic Chamber Test Setup Diagram




(EUT: Back-Up Camera)

## 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 | : | DY-W-M |
| Serial Number | : | N/A |
| Manufacturer | : | Guangzhou Panyu Shiji Jincheng Electronic Factory |

## 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: | May 06, 2006 | Temperature: | 23°C |
| EUT: | Back-Up Camera | Humidity: | 53% |
| Model No.: | DY-W-M | Power Supply: | 12V d.c. |
| Test Mode: | TX | Test Engineer: | Andy |

**Fundamental and Harmonics Radiated Emissions**

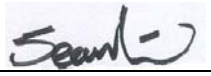
| Frequency (MHz) | Reading(dBμV/m) | | Factor(dB) Corr. | Result(dBμV/m) | | Limit(dBμV/m) | | Margin(dBμV/m) | | Polarization |
|---|---|---|---|---|---|---|---|---|---|---|
| | AV | PEAK | | AV | PEAK | AV | PEAK | AV | PEAK | |
| 2414.909 | 88.4 | 97.0 | -3.6 | 84.8 | 93.4 | 94 | 114 | 9.2 | 20.6 | Vertical |
| 2414.909 | 84.8 | 93.4 | -3.6 | 81.2 | 89.8 | 94 | 114 | 12.8 | 24.2 | Horizontal |
| 4829.818 | 45.7 | 53.5 | 2.1 | 47.8 | 55.6 | 54 | 74 | 6.2 | 18.4 | Vertical |
| 4829.818 | 44.5 | 52.4 | 2.1 | 46.6 | 54.5 | 54 | 74 | 7.4 | 19.5 | Horizontal |
| 7244.727 | 33.5 | 41.3 | 7.1 | 40.6 | 48.4 | 54 | 74 | 13.4 | 25.6 | Vertical |
| 7244.727 | 31.5 | 39.3 | 7.1 | 38.6 | 46.4 | 54 | 74 | 15.4 | 27.6 | Horizontal |
| 9659.636 | 42.0 | 49.8 | 9.3 | 39.3 | 47.1 | 54 | 74 | 14.7 | 26.9 | Vertical |
| 9659.636 | 40.2 | 48.0 | 9.3 | 37.5 | 45.3 | 54 | 74 | 16.5 | 28.7 | Horizontal |
| 12074.545 | - | - | - | - | - | 54 | 74 | - | - | Vertical |
| 12074.545 | - | - | - | - | - | 54 | 74 | - | - | Horizontal |
| 14489.454 | - | - | - | - | - | 54 | 74 | - | - | Vertical |
| 14489.454 | - | - | - | - | - | 54 | 74 | - | - | Horizontal |
| 16904.363 | - | - | - | - | - | 54 | 74 | - | - | Vertical |
| 16904.363 | - | - | - | - | - | 54 | 74 | - | - | Horizontal |
| 19319.272 | - | - | - | - | - | 54 | 74 | - | - | Vertical |
| 19319.272 | - | - | - | - | - | 54 | 74 | - | - | Horizontal |
| 21734.181 | - | - | - | - | - | 54 | 74 | - | - | Vertical |
| 21734.181 | - | - | - | - | - | 54 | 74 | - | - | Horizontal |
| 24149.090 | - | - | - | - | - | 54 | 74 | - | - | Vertical |
| 24149.090 | - | - | - | - | - | 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)

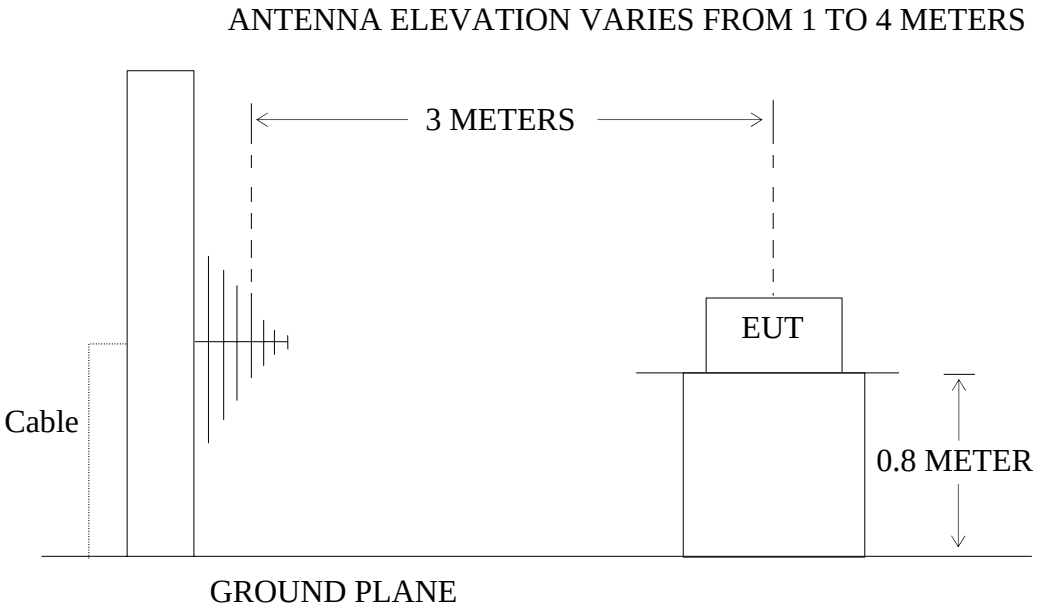
## 4.1.Block Diagram of Test Setup

### 4.1.1.Block diagram of connection between the EUT and simulators

EUT

(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, | | |
|---|---|---|---|
| | Field Strength of Quasi-peak Value (microvolts/m) | Field Strength of Quasi-peak Value (dBμV/m) | The final measurement in band 9-90kHz, 110-490kHz and above 1000MHz is performed with Average detector. |
| 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 | : | DY-W-M |
| Serial Number | : | N/A |
| Manufacturer | : | Guangzhou Panyu Shiji Jincheng Electronic Factory |

## 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: | May 06, 2006 | Temperature: | 23°C |
| EUT: | Back-Up Camera | Humidity: | 53% |
| Model No.: | DY-W-M | Power Supply: | 12V d.c. |
| Test Mode: | TX | Test Engineer: | Andy |

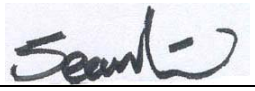
| Frequency (MHz) | Reading(dBμV/m) QP | Factor(dB) Corr. | Result(dBμV/m) QP | Limit(dBμV/m) QP | Margin(dBμV/m) QP | Polarization |
|---|---|---|---|---|---|---|
| 47.495 | 53.4 | -24.1 | 29.3 | 40.0 | 10.7 | Vertical |
| 66.934 | 59.7 | -27.0 | 32.7 | 40.0 | 7.3 | Vertical |
| 70.822 | 53.1 | -26.3 | 26.8 | 40.0 | 13.2 | Vertical |
| 158.296 | 48.0 | -22.4 | 25.6 | 43.5 | 17.9 | Vertical |
| 66.934 | 60.8 | -27.0 | 33.8 | 40.0 | 6.2 | Horizontal |
| 70.821 | 54.0 | -26.3 | 27.7 | 40.0 | 12.3 | Horizontal |
| 99.980 | 50.3 | -21.6 | 28.7 | 43.5 | 14.8 | 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 | : | DY-W-M |
| Serial Number | : | N/A |
| Manufacturer | : | Guangzhou Panyu Shiji Jincheng Electronic Factory |

## 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.

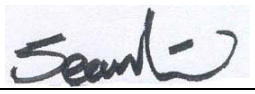
## 5.4.Test Procedure

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 51.2 dB below the level of the fundamental.
5.5.2 Upper band edge: Emission radiated outside of the upper band edge are 57.9 dB below the level of the fundamental.
5.5.3 All the spectral waveforms are attached in Appendix I.

Reviewer **:** 

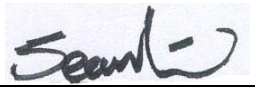
# 6. ANTENNA REQUIREMENT

## 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.

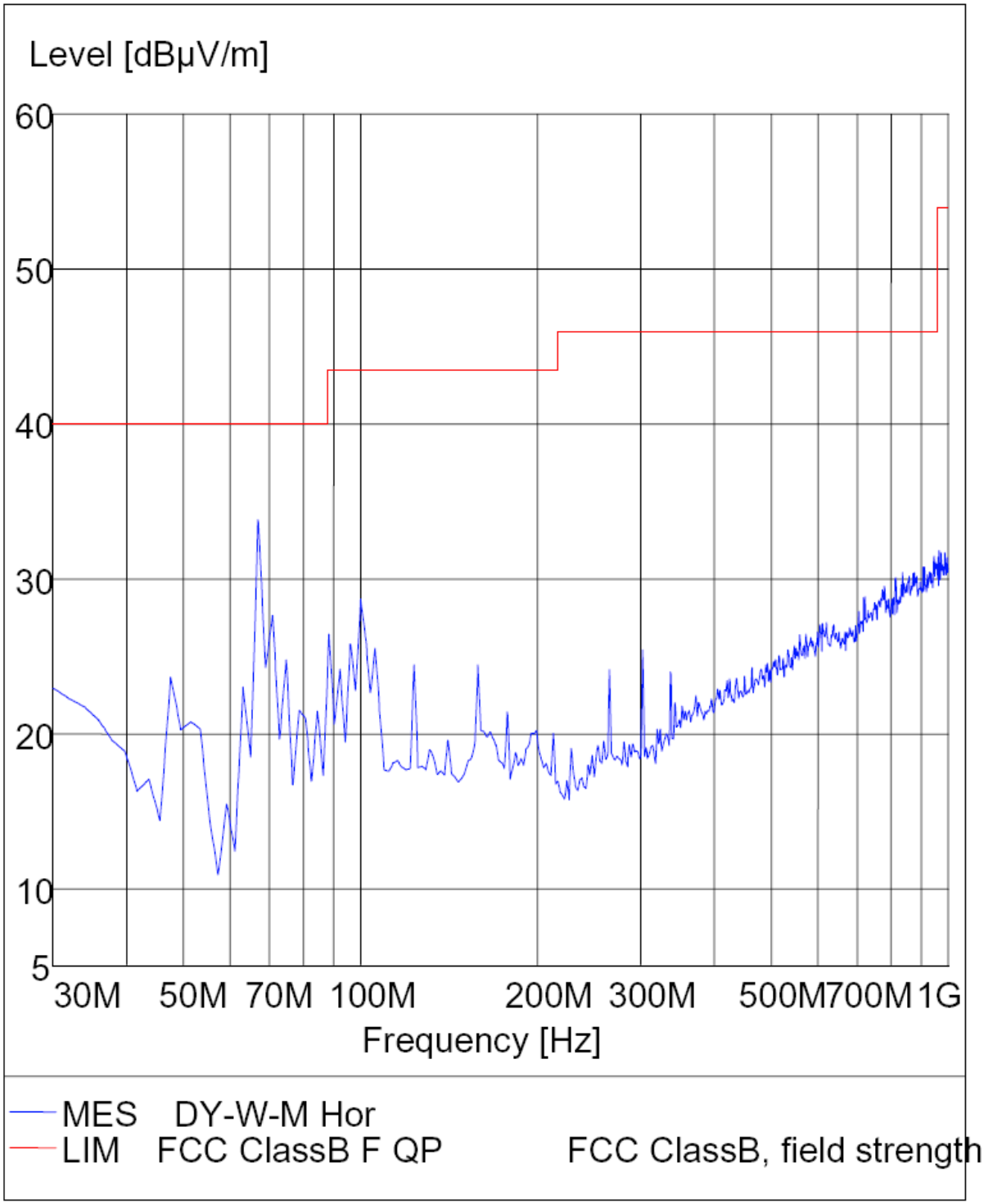
Reviewer **:** 

# APPENDIX I
# (Test Curves)

*Radiated Disturbance*

*FCC PART 15*

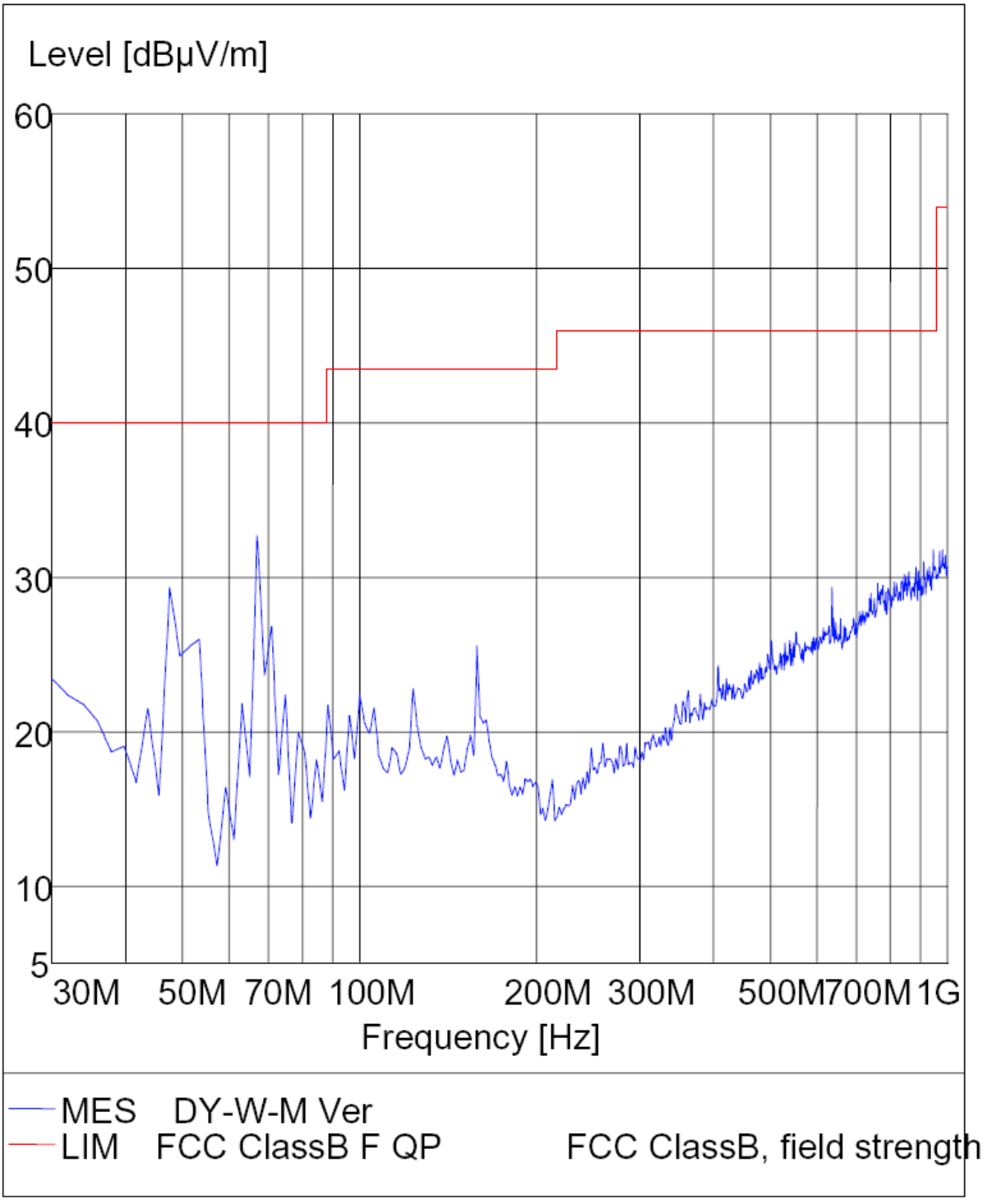
EUT: Back-Up Camera M/N:DY-W-M
Manufacturer: Guangzhou Panyu Shiji Jincheng Electronic Factory
Operating Condition: TX
Test Site: ATC EMC Lab.SAC
Operator: Andy
Test Specification: Horizontal
Comment: DC 12V

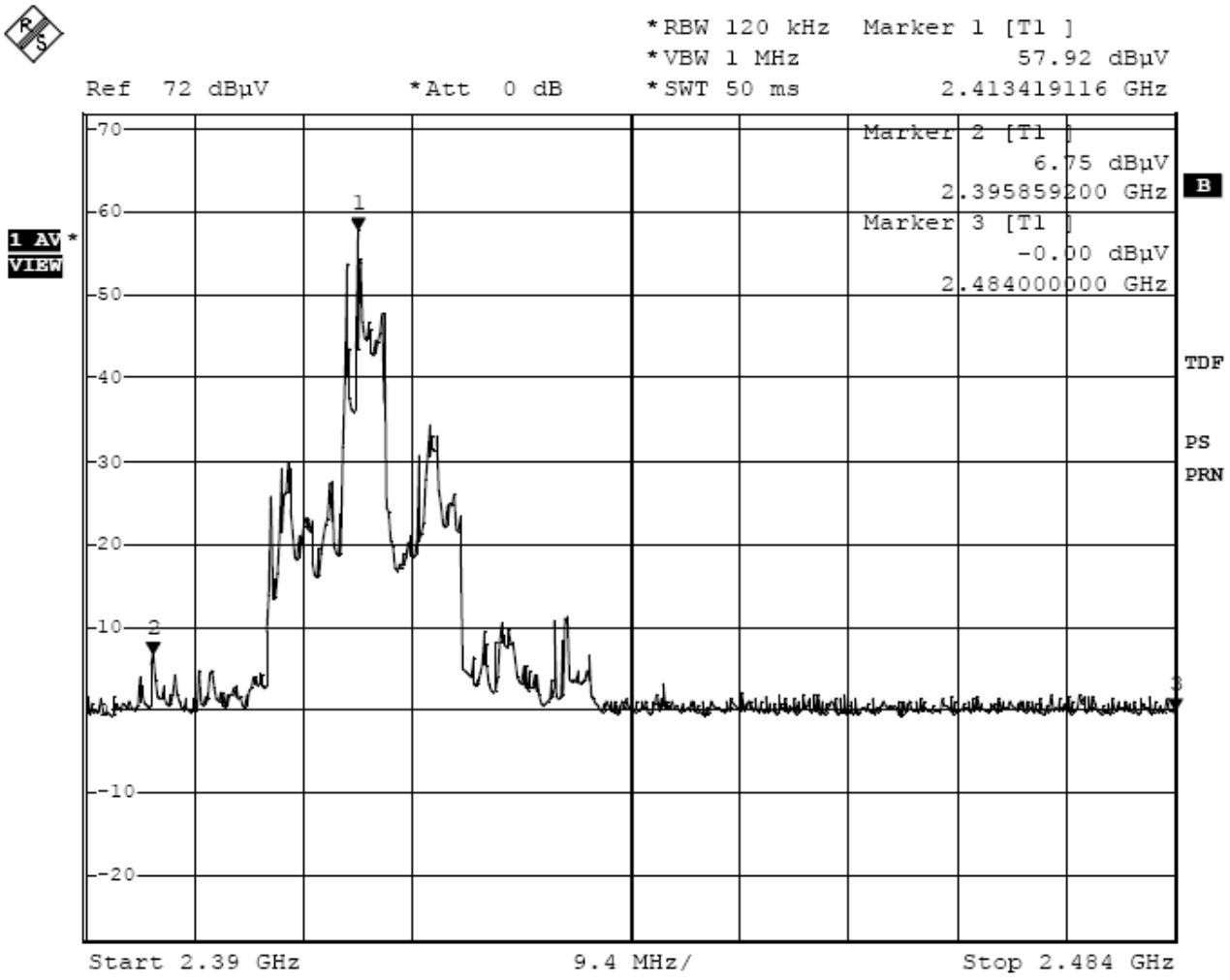


*Radiated Disturbance*

*FCC PART 15*

EUT: Back-Up Camera M/N:DY-W-M
Manufacturer: Guangzhou Panyu Shiji Jincheng Electronic Factory
Operating Condition: TX
Test Site: ATC EMC Lab.SAC
Operator: Andy
Test Specification: Vertical
Comment: DC 12V




*RBW 120 kHz
*VBW 1 MHz
*SWT 50 ms
Marker 1 [T1 ]
57.92 dBµV
2.413419116 GHz
Ref 72 dBµV
*Att 0 dB
Marker 2 [T1 ]
6.75 dBµV
2.395859200 GHz
Marker 3 [T1 ]
-0.00 dBµV
2.484000000 GHz
1 AV
VIEW
B
TDF
PS
PRN
70
60
50
40
30
20
10
-10
-20
Start 2.39 GHz
9.4 MHz/
Stop 2.484 GHz