SGS-CSTC Standards Technical Services Ltd.

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FEDERAL COMMUNICATIONS COMMISSION
Registration number: 556682

FCC TEST REPORT

Application No. :	SZEMO060400704RF
Applicant:	SHENZHEN AEE TECHNOLOGY CO., LTD
FCC ID:	TW4AT102
Fundamental Carrier	**Frequency** :2.414GHz and 2.468GHz
Equipment Under Test (EUT):	
Name:	2.4G Wireless Camera
Model:	AT102(Trade mark: AEE), ZT-735(Trade mark: AEE), R35(Trade mark: SWANN)
Standards:	FCC PART 15: 2006
	Please refer to section 2 for further details.
Date of Receipt:	24 April 2006
Date of Test:	27 April to 24 May 2006
Date of Issue:	26 May 2006
Test Result :	**PASS ***

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Robinson Lo
Laboratory Manager

2 Test Summary

Test	Test Requirement	Stanadard Paragraph	Result
Flied Strength of Fundamental	FCC PART 15 :2006	Section 15.249 (a)	PASS
Flied Strength of Harmornics or other Frequency	FCC PART 15 :2006	Section 15.249 (a) Section 15.209	PASS
Occupied Bandwidth	FCC PART 15 :2006	Section 15.249	PASS
Band Edges Measurement	FCC PART 15 :2006	Section 15.249 (d)	PASS

3 Contents

4 General Information

4.1 Client Information

Applicant Name:	SHENZHEN AEE TECHNOLOGY CO., LTD
Applicant Address:	1st Floor B building Shenzhen Tsinghua Hi-Tech Park Nanshan Hi-Tech Park North Shenzhen P.R.C

4.2 General Description of E.U.T.

Product Name:	2.4G Wireless Camera
Model:	AT102(Trade mark: AEE), ZT-735(Trade mark: AEE), R35(Trade mark: SWANN)
Power Supply:	Transmitter Part : 7.5V DC
	Receiver Part: 8.0V DC
Power Cord:	N/A-

4.3 Description of Support Units

The EUT was tested as an independent unit.

The transmitter have 4 frequencies in the 2.4GHz and 2.4835GHz can in exchange for choice.

4.4 Standards Applicable for Testing

The customer requested FCC tests for a 2.4G Wireless Camera.

The standard used was FCC PART 15, SUBPART C (2006) section 15.249.

4.5 Test Location

All tests were performed at:-

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory, No.198 Kezhu Road, Science Town Economic& Technology Development District Guangzhou, China 510663

Tel: +86 20 8215 5555 Fax: +86 20 8207 5059

4.6 Other Information Requested by the Customer

None.

4.7 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **NVLAP – Lab Code: 200611-0**
  SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is recognized under the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0. Effective through December 31, 2004.
- **ACA**
  SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our NVLAP accreditation.
- **VCCI**
  The 3m Semi-anechoic chamber and Shielded Room (7.5m x 4.0m x 3.0m) of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2197 and C-2383 respectively.
  Date of Registration: September 29, 2005. Valid until September 28, 2008
- **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**
  Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.
- **CNAL – LAB Code: L0141**
  SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAL/AC01: 2002 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:1999 General Requirements) for the Competence of Testing Laboratories.
- **FCC – Registration No.: 556682**
  SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 556682, Aug. 04, 2005.
- **Industry Canada (IC)**
  The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 6002.

5 Test Results

5.1 Test Instruments

Item	Test Equipment	Manufacturer	Serial No.	Cal.Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	SEL0017	28-04-2005	27-04-2007
2	EMI Test Receiver	Rohde & Schwarz	100249	22-09-2005	21-09-2006
3	EMI Test software	AUDIX	E3	N/A	N/A
4	Coaxial cable	SGS	SEL0028	20-05-2006	19-05-2007
5	BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	00042673	03-03-2006	02-03-2007
6	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	2944A10861	26-08-2005	25-08-2006
7	Double-ridged horn (1-18GHz)	ETS-LINDGREN	00035926	30-12-2004	29-12-2006
8	Pre-amplifier (1-18GHz)	Rohde & Schwarz	1091457	29-07-2005	28-07-2007
9	Cable (0-18GHz)	MCE Mobile Communications	249439	20-05-2006	19-05-2007
9	Shielding Room	ZhongYu Electron	SEL0042	N/A	N/A
10	LISN	ETS-LINDGREN	00033512	19-09-2005	18-09-2006
11	EMI Test Receiver	Rohde & Schwarz	100119	03-03-2006	02-03-2007
12	Coaxial Cable	SGS	SEL0024	20-05-2006	19-05-2007

5.2 E.U.T. Operation

Input voltage: 7.5V DC
Operating Environment:
Temperature: 24.0 °C
Humidity: 52 % RH
Atmospheric Pressure: 1012 mbar
EUT Operation: Test in transmitting mode:

1. For channel 1: 2.414GHz.
2. For channel 2: 2.4319GHz.
3. For channel 3: 2.450GHz.
4. For channel 4: 2.468GHz.

5.3 Test Procedure & Measurement Data

5.3.1 Radiated Emissions

5.3.1.1 Test in transmitting mode

Test Requirement:	FCC Part15 C
Test Method:	Based on FCC Part15 C Section 15.249
Test Date:	27 April 2006(Initial Test)
	18 May 2006(Retest)
Measurement Distance:	3m (Semi-Anechoic Chamber)
Frequency range	30 MHz – 10GHz for transmitting mode.
	Test instrumentation resolution bandwidth 120 kHz (30 MHz - 1000 MHz), 1 MHz (1000 M – 25GHz)
Operation:	Receive antenna scan height 1 - 4 m, polarization Vertical/ Horizontal

Requirements:

Fundamental Frequency (MHz)	Field Strength of Fundamental (dBuV/m @ 3m)	Field Strength of Harmonics and Spurious Emissions (dBuV/m @ 3m)
902 to 928	94.0	54.0
2400 to 2483.5	94.0	54.0
5725 to 5875	94.0	54.0
24000 to 24250	108.0	68.0

The fundamental frequency of the EUT is 2414, 2431.9 2450 and 2468MHz

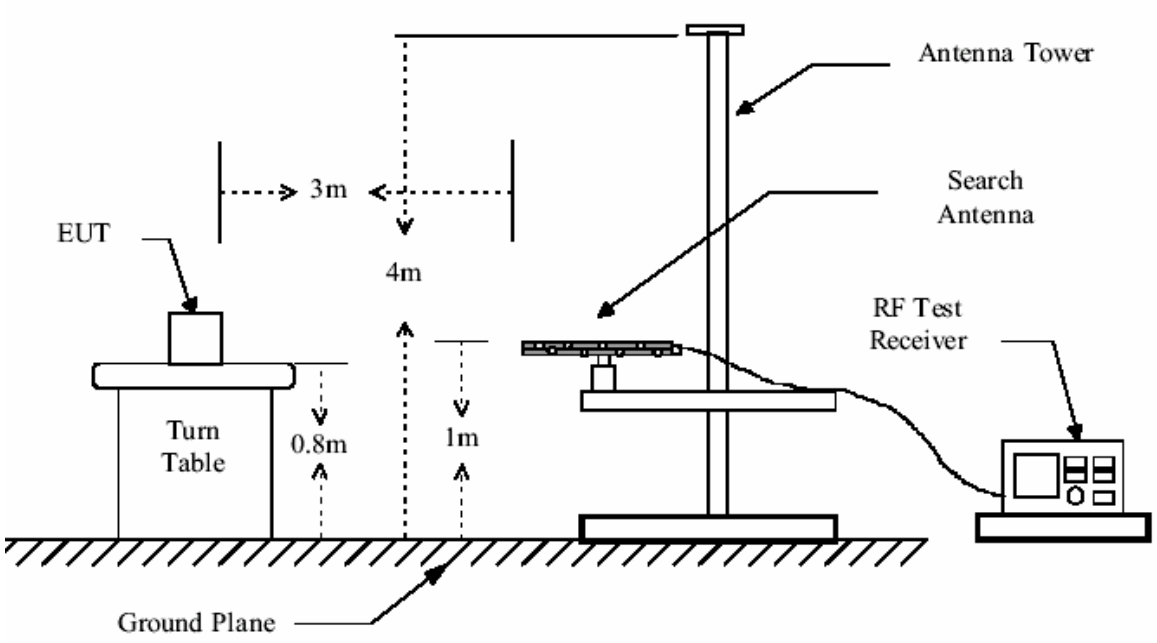
The limit for average field strength dBuv/m for the fundamental frequency = 94.0 dBμV/m.

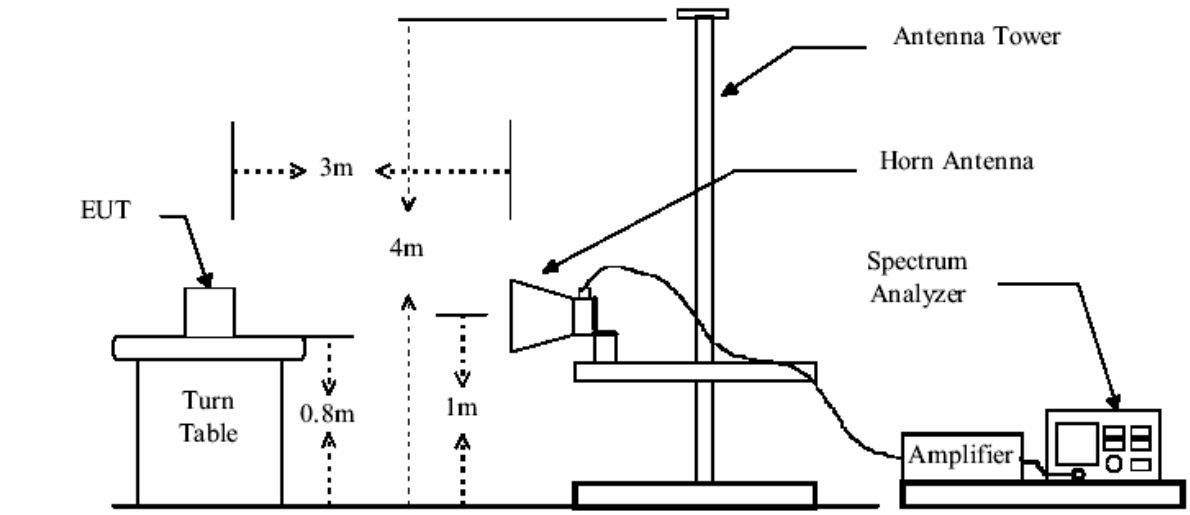
No fundamental is allowed in the restricted bands.

The limit for average field strength dBμV/m for the harmonics and spurious frequencies = 54.0 dBμV/m. Spurious in the restricted bands must be less than 54.0 dBuv/m or 15.209.

Test Procedure: The procedure uesd was ANSI Standard C63.4-2003. The receive was scanned from 30MHz to 25GHz.When an emission was found,the table was roated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. The worst case emissions were reported.

Test Configuration:





The field strength is calculated by adding the Antenna Factor, Cable Factor & Peramplifier . The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Peramlifer Factor

The following test results were performed on the EUT:

For Radiated Emission(30M—1GHz)

Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
47.289	0.75	8.78	28.11	55.40	36.82	40.00	-3.18
59.100	0.80	7.27	28.06	41.64	21.65	40.00	-18.35
70.740	0.82	6.97	28.00	40.29	20.08	40.00	-19.92
105.660	1.22	8.81	27.82	41.61	23.82	43.50	-19.68
128.940	1.27	7.72	27.61	34.31	15.69	43.50	-27.81
235.640	1.60	11.84	26.97	29.71	16.18	46.00	-29.82

Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
47.460	0.75	9.27	28.11	41.32	23.23	40.00	-16.77
70.740	0.82	6.97	28.00	34.40	14.19	40.00	-25.81
105.660	1.22	8.81	27.82	39.72	21.93	43.50	-21.57
176.470	1.36	9.77	27.28	39.77	23.62	43.50	-19.88
235.640	1.60	11.84	26.97	27.95	14.42	46.00	-31.58
489.780	2.56	17.80	27.68	27.95	20.63	46.00	-25.37

Above 1GHz
For **Channel 1**: (1). Fundamental emission

Peak Measurement

Test Frequency (GHz)	Measuring Level (dBuV/m)		Limits (dBuV/m)	Margin (dB)	
	Vertical	Horizontal		Vertical	Horizontal
2.4414	86.36	93.8	114.0	27.64	20.20
Average Measurement					
2.4414	63.95	75.85	94.0	30.05	18.15

(2). Harmonics & Spurious Emissions

Peak Measurement

Test Frequency (GHz)	Measuring Level (dBuV/m)		Limits (dBuV/m)	Over Limit (dB)	
	Vertical	Horizontal		Vertical	Horizontal
2) 4828.75	64.94	54.74	74.0	9.06	19.26
3) 7243.12	40.50	39.85	74.0	33.50	34.15
4) 9657.50	39.60	39.61	74.0	34.40	34.39
5) 12071.88	N/A	N/A	74.0	N/A	N/A
6) 14486.25	N/A	N/A	74.0	N/A	N/A
7) 16900.63	N/A	N/A	74.0	N/A	N/A
8) 19315.00	N/A	N/A	74.0	N/A	N/A
9) 21729.38	N/A	N/A	74.0	N/A	N/A
10) 24143.75	N/A	N/A	74.0	N/A	N/A
Average Measurement					
2) 4828.75	38.84	39.85	54.0	15.16	14.15
3) 7243.12	32.20	32.60	54.0	21.80	21.40
4) 9657.50	36.00	32.90	54.0	18.00	21.10
5) 12071.88	N/A	N/A	54.0	N/A	N/A
6) 14486.25	N/A	N/A	54.0	N/A	N/A
7) 16900.63	N/A	N/A	54.0	N/A	N/A
8) 19315.00	N/A	N/A	54.0	N/A	N/A
9) 21729.38	N/A	N/A	54.0	N/A	N/A
10) 24143.75	N/A	N/A	54.0	N/A	N/A

The following test results were performed on the EUT:

For **Channel** 2: (1). Fundamental emission

Peak Measurement

Test Frequency (GHz)	Measuring Level (dBuV/m)		Limits (dBuV/m)	Margin (dB)	
	Vertical	Horizontal		Vertical	Horizontal
2.432	82.28	89.28	114.0	31.72	24.72
Average Measurement					
2.432	61.58	65.98	94.0	32.42	28.02

(2). Harmonics & Spurious Emissions

Peak Measurement

Test Frequency (GHz)	Measuring Level (dBuV/m)		Limits (dBuV/m)	Margin (dB)	
	Vertical	Horizontal		Vertical	Horizontal
2) 4861.17	61.52	55.21	74.0	12.84	18.79
3) 7291.46	41.50	43.60	74.0	32.50	30.40
4) 9721.76	40.20	42.50	74.0	33.80	31.50
5) 12152.05	N/A	N/A	74.0	N/A	N/A
6) 14582.35	N/A	N/A	74.0	N/A	N/A
7) 17012.64	N/A	N/A	74.0	N/A	N/A
8) 19442.93	N/A	N/A	74.0	N/A	N/A
9) 21873.22	N/A	N/A	74.0	N/A	N/A
10) 24303.51	N/A	N/A	74.0	N/A	N/A
Average Measurement					
2) 4861.17	44.92	31.41	54.0	9.08	22.59
3) 7291.46	32.20	32.80	54.0	21.80	21.20
4) 9721.76	36.50	33.80	54.0	17.50	20.20
5) 12152.05	N/A	N/A	54.0	N/A	N/A
6) 14582.35	N/A	N/A	54.0	N/A	N/A
7) 17012.64	N/A	N/A	54.0	N/A	N/A
8) 19442.93	N/A	N/A	54.0	N/A	N/A
9) 21873.22	N/A	N/A	54.0	N/A	N/A
10) 24303.51	N/A	N/A	54.0	N/A	N/A

The following test results were performed on the EUT:

For **Channel** 3: (1). Fundamental emission

Peak Measurement

Test Frequency (GHz)	Measuring Level (dBuV/m)		Limits (dBuV/m)	Margin (dB)	
	Vertical	Horizontal		Vertical	Horizontal
2.450	87.06	92.43	114.0	26.94	21.57
Average Measurement					
2.450	63.96	71.96	94.0	30.04	22.04

(2). Harmonics & Spurious Emissions

Peak Measurement

Test Frequency (GHz)	Measuring Level (dBuV/m)		Limits (dBuV/m)	Margin (dB)	
	Vertical	Horizontal		Vertical	Horizontal
2) 4900.35	58.13	44.83	74.0	15.87	29.17
3) 7350.53	41.50	43.60	74.0	32.50	30.40
4) 9800.70	40.20	42.50	74.0	33.80	31.50
5) 12250.89	N/A	N/A	74.0	N/A	N/A
6) 14701.06	N/A	N/A	74.0	N/A	N/A
7) 17151.24	N/A	N/A	74.0	N/A	N/A
8) 19601.42	N/A	N/A	74.0	N/A	N/A
9) 22051.59	N/A	N/A	74.0	N/A	N/A
10) 24501.77	N/A	N/A	74.0	N/A	N/A
Average Measurement					
2) 4900.35	40.23	26.53	54.0	13.77	27.47
3) 7350.53	32.20	32.80	54.0	21.80	21.20
4) 9800.70	36.50	33.80	54.0	17.50	20.20
5) 12250.89	N/A	N/A	54.0	N/A	N/A
6) 14701.06	N/A	N/A	54.0	N/A	N/A
7) 17151.24	N/A	N/A	54.0	N/A	N/A
8) 19601.42	N/A	N/A	54.0	N/A	N/A
9) 22051.59	N/A	N/A	54.0	N/A	N/A
10) 24501.77	N/A	N/A	54.0	N/A	N/A

The following test results were performed on the EUT:

For **Channel** 4: (1). Fundamental emission

Peak Measurement

Test Frequency (GHz)	Measuring Level (dBuV/m)		Limits (dBuV/m)	Margin (dB)	
	Vertical	Horizontal		Vertical	Horizontal
2.468	86.71	90.14	114.0	27.29	23.86
Average Measurement					
2.468	63.79	69.01	94.0	30.21	24.99

(2). Harmonics & Spurious Emissions

Peak Measurement

Test Frequency (GHz)		Measuring Level (dBuV/m)		Limits (dBuV/m)	Margin (dB)	
		Vertical	Horizontal		Vertical	Horizontal
2)	4936.97	60.82	56.24	74.0	13.18	17.76
3)	7405.45	41.50	43.60	74.0	32.50	30.40
4)	9873.94	40.20	42.50	74.0	33.80	31.50
5)	12342.43	N/A	N/A	74.0	N/A	N/A
6)	14810.91	N/A	N/A	74.0	N/A	N/A
7)	17279.40	N/A	N/A	74.0	N/A	N/A
8)	19747.88	N/A	N/A	74.0	N/A	N/A
9)	22216.37	N/A	N/A	74.0	N/A	N/A
10)	24684.85	N/A	N/A	74.0	N/A	N/A
Average Measurement						
2)	4936.97	38.96	39.29	54.0	15.04	14.71
3)	7405.45	32.20	32.80	54.0	21.80	21.20
4)	9873.94	36.50	33.80	54.0	17.50	20.20
5)	12342.43	N/A	N/A	54.0	N/A	N/A
6)	14810.91	N/A	N/A	54.0	N/A	N/A
7)	17279.4	N/A	N/A	54.0	N/A	N/A
8)	19747.88	N/A	N/A	54.0	N/A	N/A
9)	22216.37	N/A	N/A	54.0	N/A	N/A
10)	24684.85	N/A	N/A	54.0	N/A	N/A

N/A: refer to remark 1).

Remark:

1). For this intentional radiator operates below 10 GHz, the spectrum shall be investigated to the tenth harmonic of the highest fundamental frequency. And above the fifth harmonic of this intentional radiator, the disturbance is very low. So the test result only displays to 4^{th} harmonic.

2). According to 15.249 (e) As shown in Section 15.35(b), for frequencies above 1000 MHz, the above field strength limits are based on average limits. However, 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.

TEST RESULTS: The unit does meet the FCC requirements.

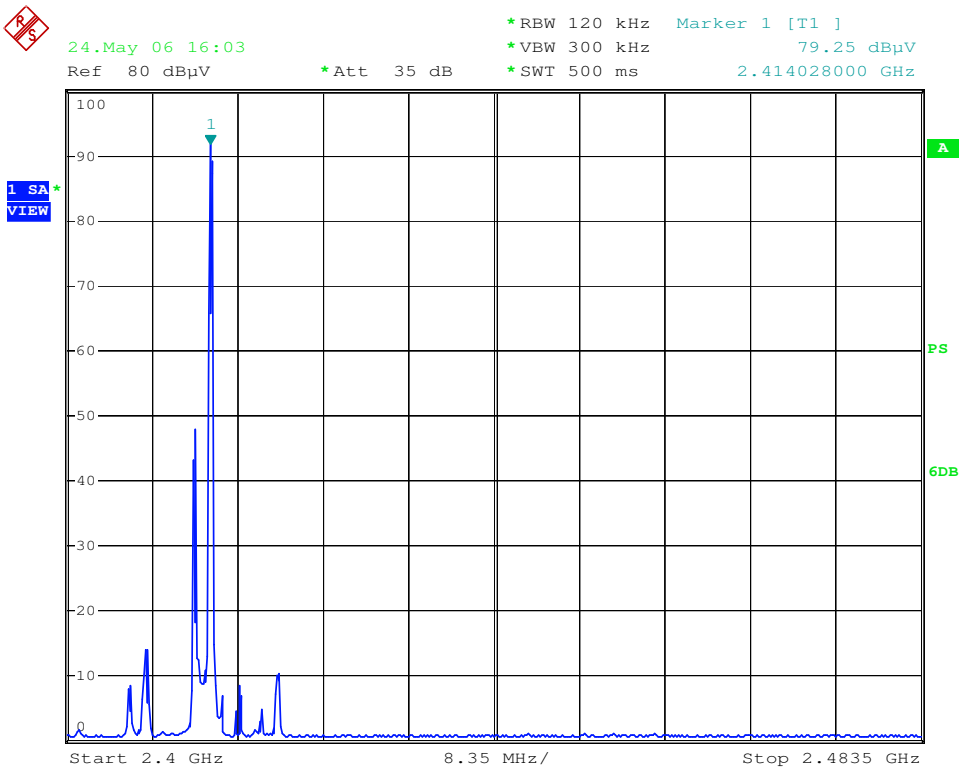
5.3.2 Occupied Bandwidth & Band Edge

Test Requirement:	FCC Part 15 C
Test Method:	Based on FCC Part15 C Section 15.249:
	Operation within the band 2.4000 – 2.4835GHz
Test Date:	27 April 2006(Initial Test)
	24 May 2006(Retest)
Requirements:	15.249 (d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.
Method of measurement:	A small sample of the transmitter output was fed into the Spectrum Analyzer and the attached plot was taken. The vertical is set to 10dB per division. The horizontal scale is set to 100KHz per division.

(1). For Channel 1:

(1). For Channel 1:

The occupied bandwidth and band edge as below:



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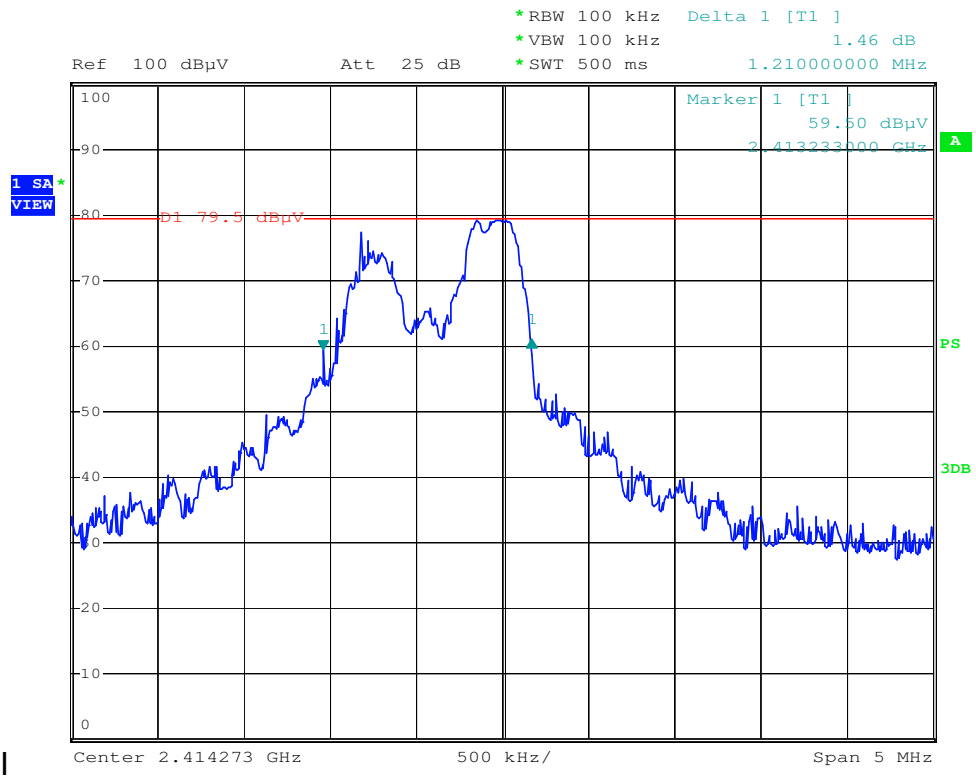
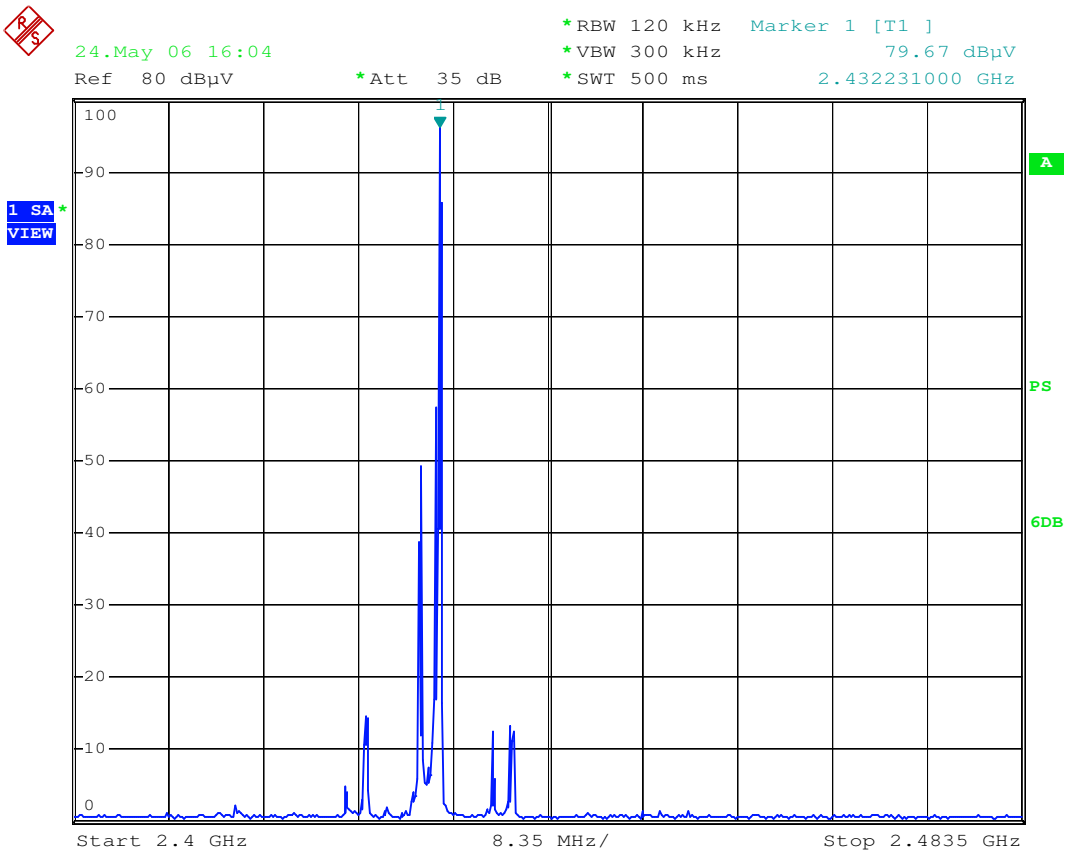


2. For Channel 2:

(1).The occupied bandwidth and band edge as below:

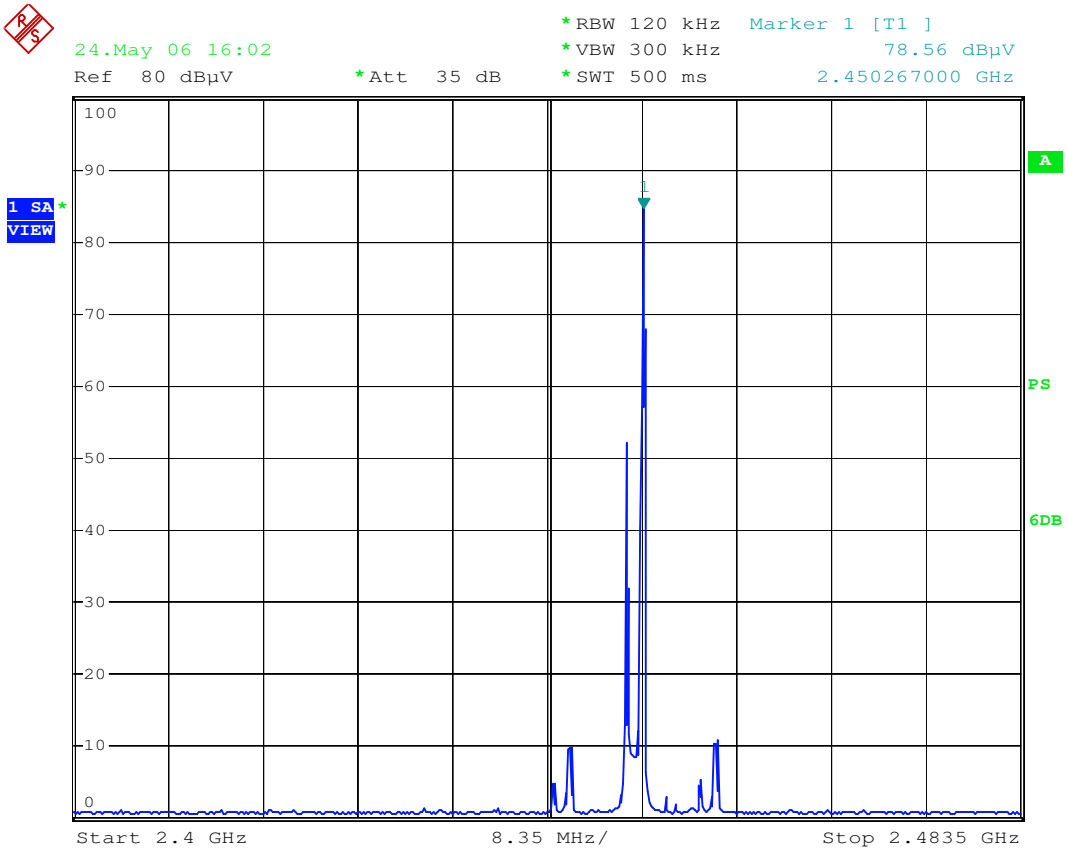


Date: 24.MAY.2006 16:04:39

Date: 16.JUN.2006 11:43:20

3. For Channel 3:

(1).The occupied bandwidth and edge as below:

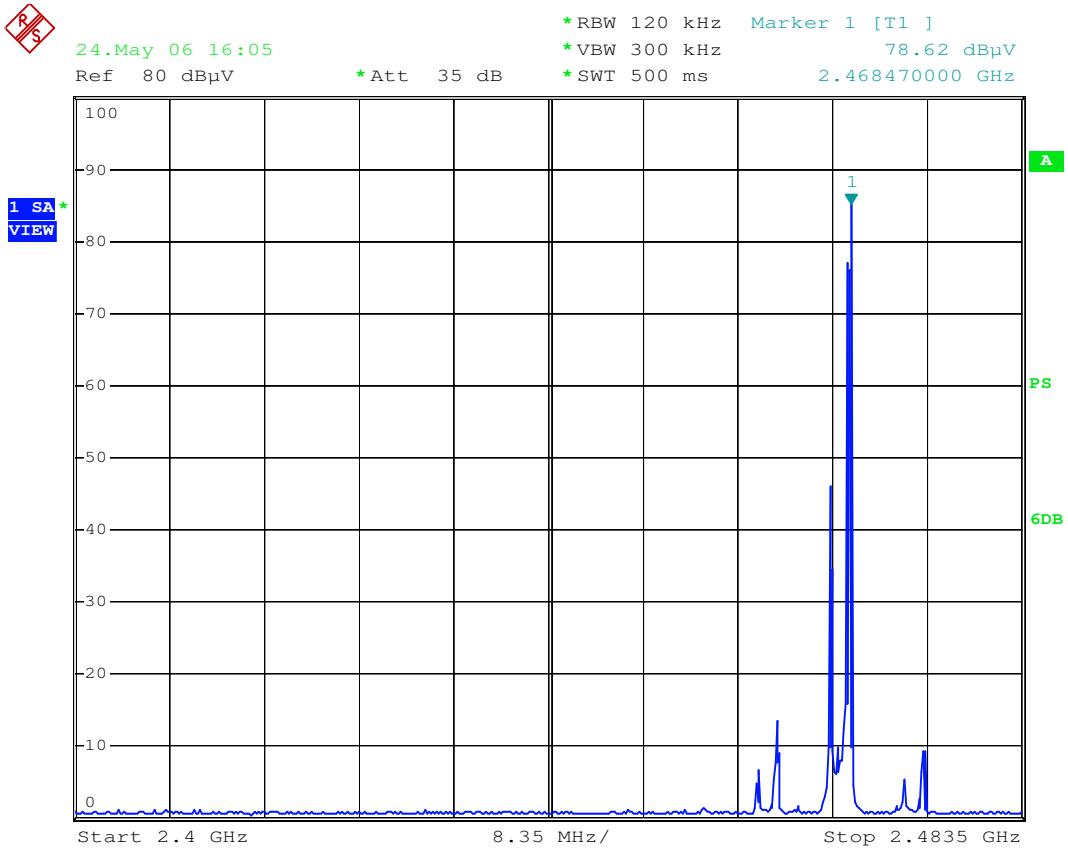


Date: 24.MAY.2006 16:02:15

Date: 16.JUN.2006 11:53:47

4. For Channel 4:

(1).The occupied bandwidth and edge as below:



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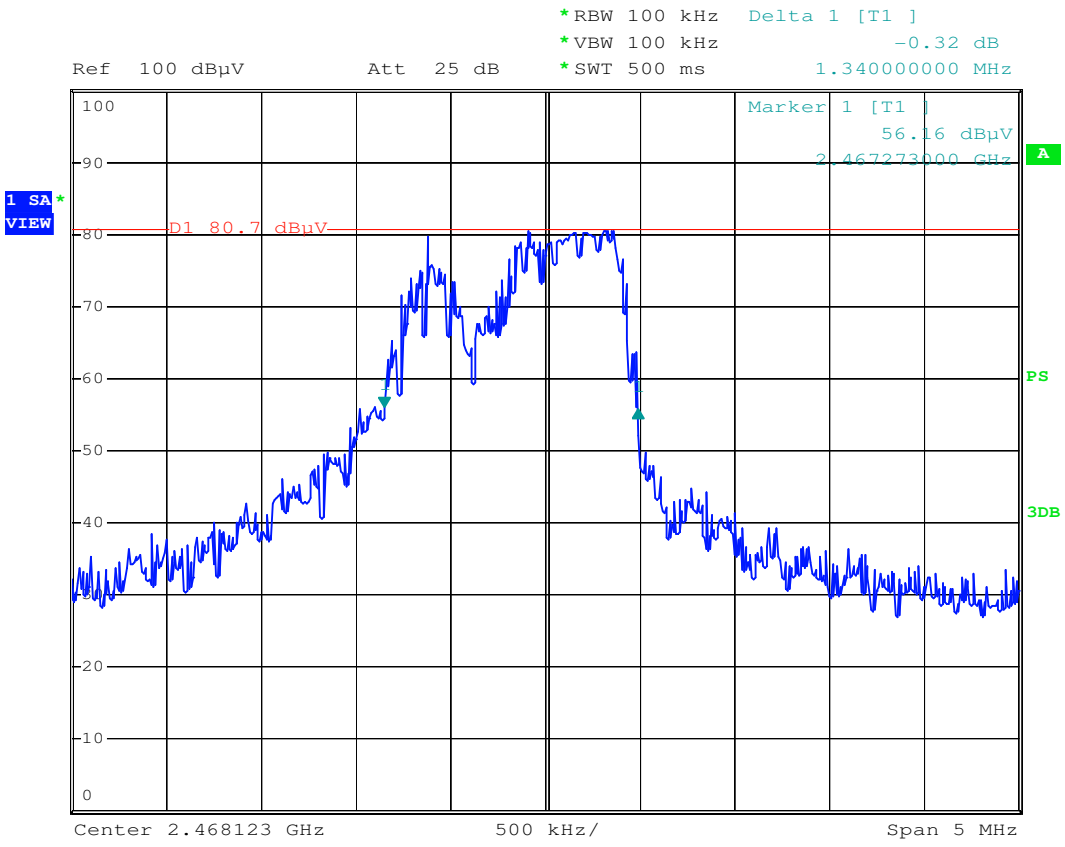

Date: 16.JUN.2006 11:56:26

The test result for the Emissions radiated outside of the specified frequency bands , please refer the section 5.3.1 of thisreport.

The worst case is 43.8dBuV/m at frequency 4.96440GHz, it's below the limits in Section 15.209.

For the field strength of Lower Edges:2.4000GHz is 23.6dBuV/m.

For the field strength of Upper Edges:2.4835GHz is 29.7dBuV/m.

The results: The unit does meet the FCC requirements.