FCC TEST REPORT

for

47 CFR, Part 15, Subpart C

Equipment	:	RF REMOTE CONTROL
Model No.	:	TA3312-1
FCC ID	:	IXVTA3312-1
Filing Type	:	Certification
Applicant	:	**AutoMicro TECHNOLOGY INC.** No. 6, Alley 8, Lane 214, Pao-Ping Road, Young-Ho City, Taipei Hsien, Taiwan, R.O.C.

SPORTON International Inc.

6F, No.106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

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History of this test report

Original Report Issue Date: Jun. 4, 2002

■ No additional attachment.

□ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

Certificate No. : F252403

CERTIFICATE OF COMPLIANCE

for

47 CFR, Part 15, Subpart C

Equipment	:	RF REMOTE CONTROL
Model No.	:	TA3312-1
FCC ID	:	IXVTA3312-1
Applicant	:	**AutoMicro TECHNOLOGY INC.** No. 6, Alley 8, Lane 214, Pao-Ping Road, Young-Ho City, Taipei Hsien, Taiwan, R.O.C.

I **HEREBY** CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4 - 1992** and the energy emitted by this equipment was ***passed*** both radiated and conducted emission limits. Testing was carried out on May 30, 2002 at **SPORTON International Inc.** LAB.

K. J. Lin
Manager

SPORTON International Inc.

6F, No.106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

1. General Description of Equipment under Test

1.1. Applicant

AutoMicro TECHNOLOGY INC.
No. 6, Alley 8, Lane 214, Pao-Ping Road, Young-Ho City, Taipei Hsien, Taiwan, R.O.C.

1.2. Manufacturer

Same as 1.1.

1.3. Basic Description of Equipment under Test

Equipment	: RF REMOTE CONTROL
Model No.	: TA3312-1
FCC ID	: IXVTA3312-1
Trade Name	: AutoMicro Technology Inc.
Power Supply Type	: From Battery (3V)
Power Cord	: N/A

1.4. Feature of Equipment under Test

- V_{DD}=3V
- F_O=433.92MHz
- P_O=maximum output
- Typical values at T_A=25℃ unless otherwise specified

2. Test Configuration of Equipment under Test

2.1. Test Manner

a. The EUT has been associated with peripherals pursuant to ANSI C63.4-1992 and configuration operated in a manner which tended to maximize its emission characteristics in a typical application.
b. Frequency range investigated: conduction 150 KHz to 30 MHz, radiation 30 MHz to 4339.2MHz.
c. The radiated emissions testing was made by rotating three orthogonal axes.
d. Pursuant to 15.231(c) of Part 15. Subpart C, the bandwidth of the emission at the 20dB point shall be no wider than 0.25% of the center frequency for EUT.
The carrier frequency of EUT is 433.8974MHz
433.8974MHz * 0.25% = 1084.74KHz.

The test result is 290KHz (as shown in section 2.4 of this test report), which is less than 1084.74KHz.
The EUT meet the 20dB point bandwidth requirement.

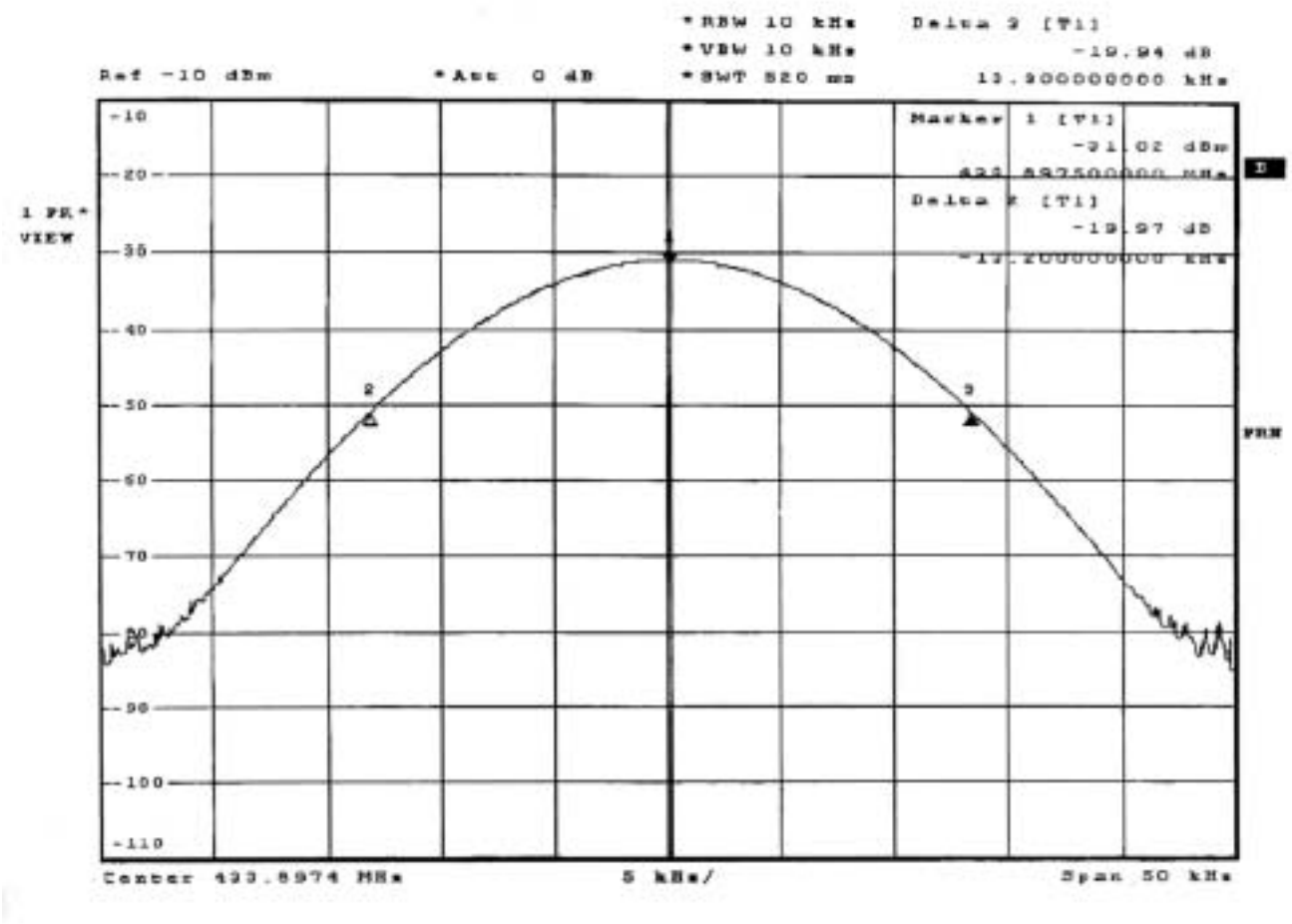
2.2. Description of Test System

The EUT was tested alone. No support devices is needed for testing.

2.3. Connection Diagram of Test System

EUT

2.4. A plot shows the EUT meet the requirement of 15.231(c)



3. Test Software

No test software was used during testing.

4. General Information of Test

4.1. Test Facility

Test Site Location	:	No. 52, Hwa Ya 1St Road, Hwa Ya Technology Park, Kwei-Shan Hsiang, TaoYuan Hsien, Taiwan, R.O.C. TEL : 886-3-3273456 FAX : 886-3-3180055
Test Site No.	:	SH03

4.2. Standard for Methods of Measurement

ANSI C63.4-1992

4.3. Test in Compliance with

FCC Part 15, Subpart C

4.4. Frequency Range Investigated

a. Conduction: from 450 kHz to 30 MHz
b. Radiation: from 30 MHz to 4,339 MHz

4.5. Test Distance

The test distance of radiated emission from antenna to EUT is 3 M.

5. Test of Conducted Powerline

The power supply of the EUT is from battery.

So Conducted Powerline test is not applicable to this equipment.

6. Test of Radiated Emission

Radiated emissions from 30 MHz to 4,339 MHz were measured with a bandwidth of 120 kHz according to the methods defines in ANSI C63.4-1992. The EUT was placed on a nonmetallic stand in the open-field site, 0.8 meter above the ground plane, as shown in section 6.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

6.1. Major Measuring Instruments

6.1.1. from 30MHz to 1GHz

- Amplifier (ADVANTEST BB525C)

Attenuation	10 dB
RF Gain	30 dB
Signal Input	100 KHz to 1.3 GHz

- Spectrum Analyzer (RAHDE&SCHEARZ & FSP7)

Attenuation	10 dB
Start Frequency	30 MHz
Stop Frequency	1000 MHz
Resolution Bandwidth	1 MHz
Video Bandwidth	1 MHz
Signal Input	9 KHz to 7 GHz

6.1.2. from 1GHz to 4.33GHz

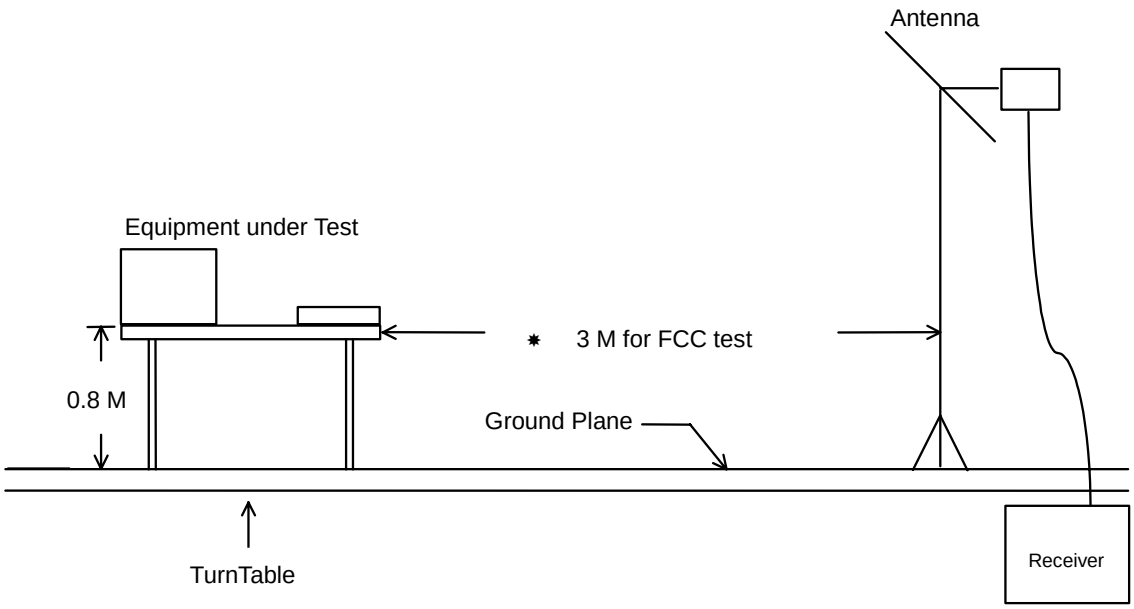
- Horn Antenna (COM-POWER AH-118)

Attenuation	10 dB
Start Frequency	1000 MHz
Stop Frequency	4339 MHz
Resolution Bandwidth	1 MHz
Video Bandwidth	1 MHz
Signal Input	1GHz to 18GHz

6.2. Test Procedures

a. The EUT was placed on a rotatable table top 0.8 meter above ground.
b. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
c. The table was rotated 360 degrees to determine the position of the highest radiation.
d. The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
f. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
g. If the emission level of the EUT in peak mode was 6 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 6 dB margin will be repeated one by one using the quasi-peak method and reported.
h. For testing above 1GHz, the emission level of the EUT in peak mode was more than 20dB lower (that means the emission level in peak mode also pass the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

6.3. Typical Test Setup Layout of Radiated Emission



6.4. Test Result of Radiated Emission

- Frequency range: 30 ~ 1000MHz
- Test Distance : 3 M
- Temperature : 27.3°C
- Relative Humidity : 74 %
- Test Date : May 30, 2002
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading : Antenna Factor + Cable Loss + Reading = Emission

- **Spurious Emission**

The Radiated Emission test was passed at minimum margin

288.930 MHz / 20.70 dBuV (HORIZONTAL) Antenna Height 1.1 Meter, Turntable Degree 360 °.

Frequency	Polarity	Antenna Factor	Cable Loss	Reading	Limits		Emission	Level	Margin
(MHz)		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)
288.930	H	12.59	3.06	5.05	46.00	199.53	20.70	10.84	-25.30

Remark: Frequency from 30MHz to 1000MHz, the emission emitted by the EUT is too low to be measured

- Field strength of fundamental and harmonics

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	Limits (uV/m)	Emission Level (dBuV/m)	Emission Level (uV/m)	Margin (dB)	Detect Mode
433.8974	H	16.31	3.70	52.86	80.83	11002.72	72.87	4400.48	-7.96	Q.P.
867.700	H	20.24	5.22	17.35	60.83	1100.27	42.81	138.20	-18.02	Q.P.
1316.000	H	26.56	3.63	18.97	74.00	5011.87	49.16	287.08	-24.84	Peak
1734.000	H	26.91	4.07	12.43	74.00	5011.87	43.41	148.08	-30.59	Peak
433.8974	V	16.31	3.70	38.56	80.83	11002.72	58.57	848.20	-22.26	Q.P.
867.700	V	20.24	5.22	24.12	60.83	1100.27	49.58	301.30	-11.25	Q.P.
1324.000	V	26.59	3.64	10.83	74.00	5011.87	41.06	112.98	-32.94	Peak
1734.000	V	26.91	4.07	9.19	74.00	5011.87	40.17	101.98	-33.83	Peak
2169.487	H/V						-			Peak, A.V.
2603.3844	H/V						-			Peak, A.V.
3037.2818	H/V						-			Peak, A.V.
3471.1792	H/V						-			Peak, A.V.
3905.077	H/V						-			Peak, A.V.
4338.974	H/V						-			Peak, A.V.

Remark " - ": The emission emitted by the EUT is too low to be measured except the emission listed above,

Test Engineer : Wayne

Wayue Hsu

7. Antenna Factor & Cable Loss

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
30	18.10	0.99
35	16.00	1.07
40	13.29	1.13
45	10.75	1.20
50	8.10	1.26
55	6.40	1.32
60	5.36	1.40
65	4.94	1.41
70	5.19	1.51
75	6.05	1.57
80	6.96	1.60
85	8.04	1.70
90	8.76	1.70
95	9.70	1.75
100	10.30	1.79
110	11.17	1.93
120	11.60	1.95
130	11.23	2.01
140	10.61	2.12
150	10.10	2.20
160	9.20	2.26
170	9.01	2.33
180	8.71	2.40
190	8.80	2.52
200	8.24	2.55
220	8.80	2.64
240	10.72	2.78
260	13.20	2.89
280	12.50	2.98
300	12.96	3.11
320	13.50	3.20
340	13.93	3.25
360	14.39	3.44
380	14.70	3.63
400	15.76	3.50
450	16.35	3.82
500	17.29	4.01
550	18.50	4.16
600	18.43	4.39
650	18.85	4.72
700	18.93	4.71
750	19.75	4.83
800	19.92	5.27
850	20.24	5.22
900	20.30	5.22
950	20.46	5.54
1000	20.80	5.81
1000	25.10	3.06
2000	31.00	4.53
3000	30.30	5.19
4000	31.40	7.11
5000	34.10	7.62

8. EMI Suppression Component List

No EMI suppression components.

9. List of Measuring Equipments Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	RAHDE & SCHEARZ	FSP	838858/039	9KHz – 7GHz	Jan. 7, 2002	Radiation (SH03)
Amplifier	ADVANTEST	BB525C	CH300001	9KHz – 3GHz	Nov. 15, 2001	Radiation (SH03)
Bilog Antenna	SCHAFFNER	CBL61128	2681	30MHz –2GHz	Dec. 23, 2001	Radiation (SH03)
Turn Table	HD	DS 420	420/649/00	0 ~ 360 degree	N/A	Radiation (SH03)
Antenna Mast	HD	MA 240	240/559/00	1 m - 4 m	N/A	Radiation (SH03)
Half-wave dipole antenna	Schwarzbeck	UHAP VHAP	995+99 1024+1024	30MHz - 1GHz	Sep. 27, 2001	Radiation (SH03)
Horn Antenna	COM-POWER	AH-118	10094	1GHz – 18GHz	Apr. 09, 2002	Radiation (SH03)

Calibration Interval of instruments listed above is one year.

10. Uncertainty of Test Site

Uncertainty of Radiated Emission Measurement

Contribution	Probability Distribution	3m
Antenna factor calibration	normal(k=2)	±1
cable loss calibration	normal(k=2)	±0.3
RCV/SPA specification	rectangular	±2
Antenna Directivity	rectangular	±3
Antenna Factor V.S. Height	rectangular	±2
Antenna Factor Interpolation for Frequency	rectangular	±0.25
site imperfection	rectangular	±2
Mismatch Receiver VSWR Γ1=0.09 Antenna VSWR Γ2=0.67 Uncertainty=20log(1-Γ1*Γ2)	U-shaped	±0.54
combined standard uncertainty Ue(y)	normal	±2.7
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	normal (k=2)	±5.4

$U=\sqrt{\{(1/2)^2+(0.3/2)^2+(2^2+0.5^2+2^2+0.25^2+2^2)/3+(0.54)^2/2\}}=2.2$ for 10m test distance

$U=\sqrt{\{(1/2)^2+(0.3/2)^2+(2^2+3^2+2^2+0.25^2+2^2)/3+(0.54)^2/2\}}=2.7$ for 3m test distance

Uncertainty of Conducted Emission Measurement

Contribution	Probability Distribution	150KHz – 30MHz
Cable and I/P attenuator calibration	normal(k=2)	±0.3
RCV/SPA specification	rectangular	±2
LISN coupling specification	rectangular	±1.5
Transducer factor frequency interpolation	rectangular	±0.2
Mismatch Receiver VSWR Γ1=0.09 LISN VSWR Γ2=0.33 Uncertainty=20log(1-Γ1*Γ2)	U-shaped	0.2
combined standard uncertainty Ue(y)	normal	±1.66
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	normal (k=2)	±3.32

$U=\sqrt{\{(0.3/2)^2+(2^2+1.5^2+0.2^2)/3+(0.2)^2/2\}}=1.66$