

Prüfbericht - Nr.: 14016428 001

Test Report No.

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Auftraggeber: Sure Win Technologies Ltd.
Client:
Flat C & A, 17/F.
International Industry Centre
2-8 Kwei Tei Street, Fotan, N.T.
Hong Kong

Gegenstand der Prüfung: Wireless Transmitter
Test item:

Bezeichnung: AM6003, AM6004
Identification:

Serien-Nr.:
Serial No.

Engineering sample

Wareneingangs-Nr.: 070705010
Receipt No.:

Eingangsdatum: 05.07.2007
Date of receipt:

Prüfort: TÜV Rheinland Hong Kong Ltd.
Testing location:
9th Floor, Oriental News Building, 7 Wang Tai Road, Kowloon Bay, Kowloon, Hong Kong
Hong Kong Productivity Council
HKPC Building, 78 Tat Chee Avenue, Kowloon, Hong Kong

Prüfgrundlage: FCC Part 15, Subpart C
Test specification:

Prüfergebnis: Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n).
Test Result:
The test item passed the test specification(s).

Prüflaboratorium: TÜV Rheinland Hong Kong Ltd.
Testing Laboratory:

geprüft / tested by: kontrolliert / reviewed by:

18.7.2007 Derek Leung
Project Manager



18.7.2007 Thomas Berns
Manager



Datum
Date

Name/Stellung
Name/Position

Unterschrift
Signature

Datum
Date

Name/Stellung
Name/Position

Unterschrift
Signature

Sonstiges /Other Aspects: FCC ID: S8AECACEFFB

Abkürzungen: P(pass) = entspricht Prüfgrundlage
F(fail) = entspricht nicht Prüfgrundlage
N/A = nicht anwendbar
N/T = nicht getestet

Abbreviations: P(pass) = passed
F(fail) = failed
N/A = not applicable
N/T = not tested

Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.

This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.

Test Summary

Periodic Operation Device

Result: Pass

Radiated Emission of Carrier Frequency

Result: Pass

Spurious Radiated Emissions

Result: Pass

Bandwidth Measurement

Result: Pass

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List of Test and Measurement Instruments

Instrument	Manufacturer	Type	S/N
Test Receiver	Rohde & Schwarz	ESVS30	842807/009
Biconical Antenna	Rohde & Schwarz	HK116	841489/015
Log-periodic Antenna	Rohde & Schwarz	HL223	841516/017
Double Ridge Horn Antenna	EMCO	3115	9002-3347
Spectrum Analyzer	Rohde & Schwarz	FSP30	1093.4495K30
Active Loop Antenna	EMCO	6502	9107-2651

General Product Information

Product Function and Intended Use

The equipment under test (EUT) is a transmitter of "wireless alarm system" operating at 315MHz with magnetic sensing function. The arrow symbol on enclosure of the magnet and the arrow symbol on the enclosure of the transmitter must be pointed to each other in parallel when mounting on the window frame, door or similar applications. When the distance between the magnet and the transmitter exceeded 1.25 inches, the transmitter will transmit a signal of 315MHz to the associated receiver, then the receiver sounds and alerts the user.

The EUT meets the requirement on periodic transmission as specified in Part 15.231 (a). For details, refer to Appendix 1.

Client declared AM6003 and AM6004 are identical on their circuitry, PCB layout and functions, and only different on the plastic housing.

AM6003 has been chosen as the representative model for the testing in this report.

EUT Details

FCCID	:	S8AECACEFFB
Operating Frequency	:	315MHz
Type of antenna	:	Antenna on PCB
Power supply	:	Battery operated :12.0V (alkaline type A23 battery x 1)
Port(s)	:	none

Independent Operation Mode

The basic operation mode:

- transmits signal to the associated receiver once triggered by the magnet.

For further information refer to User Manual.

Submitted Documents

The submitted documents are listed as follow:

- Circuit diagram
- Exploded diagram
- Block diagram
- User manual
- FCC ID label diagram

Related Submittal(s) Grants

This is a single application for certification of the transmitter.

Test Set-up and Operation Mode

Principle of Configuration Selection

Emission: The test mode was configured on the equipment under test (EUT) to obtain the continuous transmission mode

Test Operation and Test Software.

Test operation should refer to test methodology.

- There was no special software to exercise the device.

Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

- none

Countermeasures to achieve EMC Compliance

- none

Test Methodology

Radiated Emission

The radiated emission measurements were performed according to the procedures in ANSI C63.4-2003.

The equipment under test (EUT) was placed at the middle of the 80 cm height turntable, and the turntable is 3 meters far from the measuring antenna. During the testing, the EUT was operated standalone and arranged for maximum emissions. The EUT was tested in three orthogonal planes.

The measurement was performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained.

Field Strength Calculation

The field strength at 3 m was established by adding the meter reading of the spectrum analyzer to the factors associated with antenna factor, cable loss, preamplifiers gain and filter attenuation.

The equation is expressed as follow:

$$FS = R + AF + CF + FA - PA$$

$$\text{System Factor} = CF + FA - PA.$$

Where FS = Field Strength in dBuV/m at 3 meters.

R = Reading of Spectrum Analyzer in dBuV.

AF = Antenna Factor in dB.

CF = Cable Loss in dB.

FA = Filter Attenuation Factor in dB.

PA = Preamplifier Gain in dB.

FA and PA are only be used for the measuring frequency above 1 GHz.

Average value of FS(dB) = FS (dB) – Duty cycle averaging factor (dB).

Duty Cycle Averaging Factor (dB) = $20 \log [\text{duty cycle}]$.

Test Results

Periodic Operation Device

Section 15.231(a)

RESULT:**Pass**

The EUT will be activated for transmission after triggered by the magnet and automatically cease transmission at 0.816 seconds after activation. (Refer to appendix 1, page 2)

Radiated Emission of Carrier Frequency
Section 15.231(b)
RESULT:
Pass

Test Specification : FCC Part 15 Section 15.231(b1-b2)
 Test Method : ANSI C63.4-2003
 Measurement Location : Semi Anechoic Chamber
 Measurement BW : 120 kHz
 Supply Voltage : DC 12.0V

Polarization: Vertical

Detector	Frequency (MHz)	Measured Field Strength at 3m (dB μ V/m)	Duty Cycle Averaging Factor (dB)	Field Strength at 3m (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
Peak	315.3745	63.3	-	63.3	75.64	-12.34
Average	315.3745	63.3	-12.53	50.77	55.54	-4.77

Detector	Frequency (MHz)	Measured Field Strength at 3m (dB μ V/m)	Duty Cycle Averaging Factor (dB)	Field Strength at 3m (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
Peak	315.3745	58.8	-	58.8	75.64	-16.84
Average	315.3745	58.8	-12.53	46.27	55.54	-9.27

Polarization: Horizontal

Remark: The calculation of average factor is shown in appendix 1 page 3-5.

Section 15.231(b)
Limit

Frequency within the band (MHz)	Peak Emission		Average Emission	
	(microvolt/meter)	dB μ V/m	(microvolt/meter)	dB μ V/m
315.3745	6057.3	75.64	605.7	55.64

According to section 15.35(b), when average radiated emission measurements are specified, including emission measurement below 1000MHz, there also is limit on the radio frequency emissions, as measured using instrumentation with a peak detector, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated.

Spurious Radiated Emissions
Section 15.231(b)
RESULT:
Pass

Test Specification	:	FCC Part 15 Section 15.231(b1- b3)
Test Method	:	ANSI C63.4-2003
Measurement Location	:	Semi Anechoic Chamber
Detector Function	:	<1000MHz:QP, >1000MHz:Peak
Measurement BW	:	120 kHz for frequency range of 30Mz-1GHz, 1MHz for frequency > 1GHz.
Supply Voltage	:	DC 12.0V
Measuring Frequency Range	:	9kHz-4000MHz (10 th harmonic of the fundamental frequency)

Frequency (MHz)	Antenna Polarization	Field Strength at 3m (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
630.765	Vertical	51.8	55.64	-3.8
946.15	Vertical	50.0	55.64	-5.6
1576.94	Vertical	36.6	55.64	-19.0
630.7652	Horizontal	36.4	55.64	-19.2
946.1487	Horizontal	41.5	55.64	-14.1

There is no spurious emission was found between the lowest oscillating frequency within the EUT (29.5kHz) and 30 MHz.

Section 15.231(b)
Limit

Frequency (MHz)	Measurement distance (meters)	Field strength of fundamental signal (μ V/m)	Field strength of fundamental signal (dB μ V/m)	Spurious Emission (dB μ V/m)
315.3745	3	6057.28	$20 \log(6057.28) =$ 75.64	75.64 -20 = 55.64

Section 15.209

Radiated emissions, which fall in the restricted bands, as defined in Section 15.205(a), was also comply with the radiated emission limits specified in Section 15.209.

Limit for Radiated Emission under Section 15.209:

Frequency (MHz)	Field strength (μ V/m)	Field strength (dB μ V/m)	Measurement distance (meters)
30-88	100	$20 \log(100) = 40.00$	3
88-216	150	$20 \log(150) = 43.52$	3
216-960	200	$20 \log(200) = 46.02$	3
Above 960	500	$20 \log(500) = 53.98$	3

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector and above 1000 MHz are based on the measurements employing an average detector.

Bandwidth Measurement

Section 15.231(c)

RESULT:

Pass

Test Specification : FCC Part 15 section 15.231(c)
Detector Function : Peak
Supply Voltage : DC 12.0V

Centre Frequency (MHz)	20dB Bandwidth (kHz)	FCC Limits* (kHz)
315.3745	784	788.436

$$\begin{aligned} * \quad \text{FCC Limit of 20dB bandwidth measurement} &= (0.25\%)(\text{Center Frequency}) \\ &= (0.25\%)(315.3745 \times 10^6) \\ &= 788.436 \text{kHz} \end{aligned}$$

For test results refer to Appendix 1, page 1.

Limit

Section 15.231(c)

The bandwidth of the emission shall be no wider than 0.25% if the center frequency for devices operating above 70MHz and below 900MHz.