



NVLAP LAB CODE 200707-0



FCC PART 95
MEASUREMENT AND TEST REPORT
 For
Aztech Systems Ltd

31 Ubi Road 1, Aztech Building, Singapore 408694

FCC ID: I38-COPTERS001

This Report Concerns: <input checked="" type="checkbox"/> Original Report	Equipment Type: Helex, R/C Controller
Test Engineer:	Cinderallar Chen <i>Cinderallar Chen</i>
Report No.:	RSZ07062609
Test Date:	2007-08-01 to 2007-08-17
Report Date:	2007-08-17
Reviewed By:	EMC Manager: Boni Baniqued <i>Boni Baniqued</i>
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Note: This test report is for the customer shown above and their specific product only. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratory Corp. (Shenzhen). This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Aztech Systems Ltd*'s product, model number: *HELEX* or the "EUT" as referred to in this report is a *Helex*. The EUT is measured approximately 17.5 cm L x 17.6 cmW x 9.5 cmH, rated input voltage: DC 12 V Battery, with permanent Antenna 0.967 cm.

** The test data gathered are from production sample, serial number: 0706052, provided by the manufacturer, we received the EUT on 2007-06-26.*

Objective

This Type approval report is prepared on behalf of *Aztech Systems Ltd* in accordance with Part 2, Subpart J, and Part 95 of the Federal Communication Commissions rules.

Related Submittal(s)/Grant(s)

No related submittal(s).

Test Methodology

All tests and measurements indicated in this document were performed in accordance with Part 95 Subpart B and Subpart E of the Federal Communication Commissions rules.

All emissions measurement was performed and Bay Area Compliance Laboratory Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Laboratory Corp. (Shenzhen) to collect radiated and conducted emission measurement data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratory Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 04, 2004. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179 and Industrial Canada registration test site No.: 5500A. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratory Corp. (Shenzhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0). The current scope of accreditations can be found at <http://ts.nist.gov/ts/htdocs/210/214/scopes/2007070.htm>

SYSTEM TEST CONFIGURATION

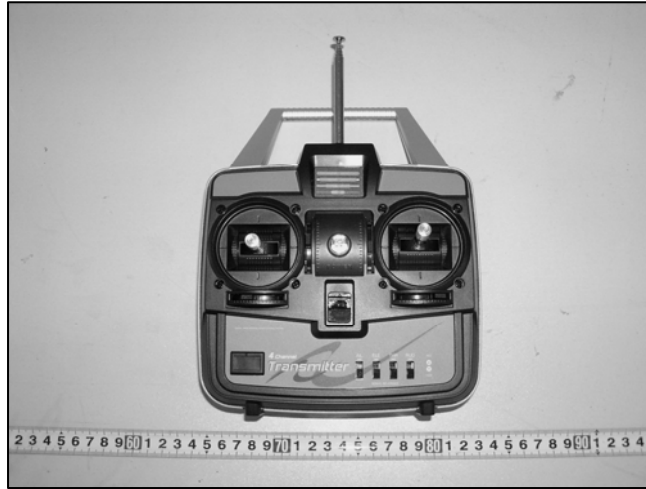
Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user).

Equipment Modifications

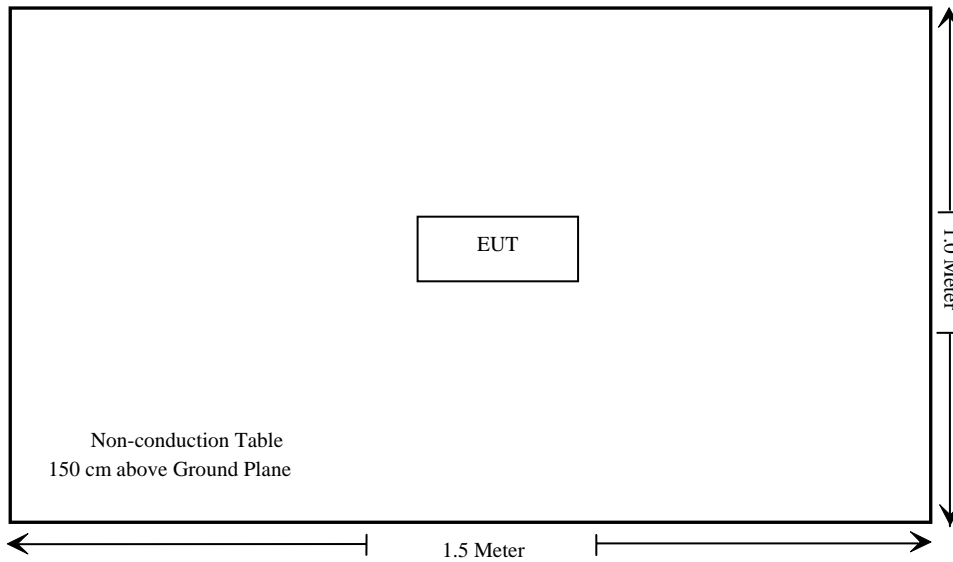
Bay Area Compliance Laboratory Corp. (Shenzhen) has not done any modification on the EUT.

Configuration of Test Setup



EUT

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§95.639(b)(3)	Maximum Transmitter Power	Compliant
§95.633(b), §95.635(b)	Emission Bandwidth and Emission Mask	Compliant
§95.635	Unwanted Radiation	Compliant
§95.623(c)	Frequency Tolerance	Compliant
§95.651	Crystal Control	Compliant
§95.647	Transmitter Antenna	Compliant

§95.639(b) (3) – MAXIMUM TRANSMITTER POWER

Applicable Standard

No R/C transmitter, under any condition of modulation, shall exceed a carrier power or peak envelope TP (single-sideband only) of: 0.75W in the 72.76 MHz frequency band.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Signal Generator	HP8657A	2849U00982	2006-09-29	2007-09-29
Rohde&Schwarz	EMI Test Receiver	ESCI	100035	2006-09-29	2007-09-29
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2006-08-14	2007-08-14
COM POWER	Dipole Antenna	AD-100	041000	2006-09-25	2007-09-25

* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

The transmitter was placed on a wooden turntable and it was transmitting .The antenna of the transmitter was extended to its maximum length

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT .The test was performed by placing the EUT on 3-orthogonal axis.

The fundamental emission was maximized and the field strength were recorded.

The EUT was removed and replaced with a substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the fundamental emissions were measured by the substitution.

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	100.5kPa

The testing was performed by Cinderallar Chen on 2007-08-09.

Test Mode: Transmitting

Indicated		Table Angle Degree	Test Antenna		Substituted			Antenna Gain (dB)	Cable Loss (dB)	Absolute Level		FCC Part 95 Limit (mW)
Frequency (MHz)	Reading (dBuV)		Height (m)	Polar H/V	Frequency (MHz)	Level (dBm)	Polar H/V			(dBm)	(mW)	
72.87	90.07	35	1.0	V	72.87	+5	V	0	1.55	3.45	2.21	750
72.87	77.58	35	1.5	H	72.87	-8	H	0	1.55	-9.55	0.11	750

Test Result: Pass

§ 95.633(b) and § 95.635(b) – EMISSION BANDWIDTH AND EMISSION MASK

Applicable Standard

Per FCC §95.633 (b), the authorized bandwidth for any emission type by an R/C. Transmitter is 8 kHz. The power of each unwanted emission shall be less than the transmitter power(TP) by :

- (1) At least 25dB on any frequency removed from the center of the authorized bandwidth by more than 50% up to and including, 100% of the authorized bandwidth.
- (2) At least 45dB on any frequency removed from the center of the authorized bandwidth by more than 100% up to and including 125% of the authorized bandwidth.
- (3) At least 55dB on any frequency removed from the center of the authorized bandwidth by more than 125% up to and including 250% of the authorized bandwidth.
- (4) At least $56+10 \log(TP)$ dB on any frequency removed from the center of the authorized bandwidth by more than 250%.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
NANYAN	Audio Generator	NY2201	019829	2006-12-23	2007-12-23
Rohde&Schwarz	EMI Test Receiver	ESCI	100035	2006-09-29	2007-09-29

* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

- 1) The EUT was placed on a wooden turntable, which is 0.8m above ground plane.
- 2) Set the EUT in normal operation.
- 3) Set the EMI test receiver center frequency = fundamental frequency, RBW, VBW=1 kHz, span= 50 kHz.
- 4) Set EMI test receiver to MAX hold. Mark the peak and the required 26 dB bandwidth.

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	100.5kPa

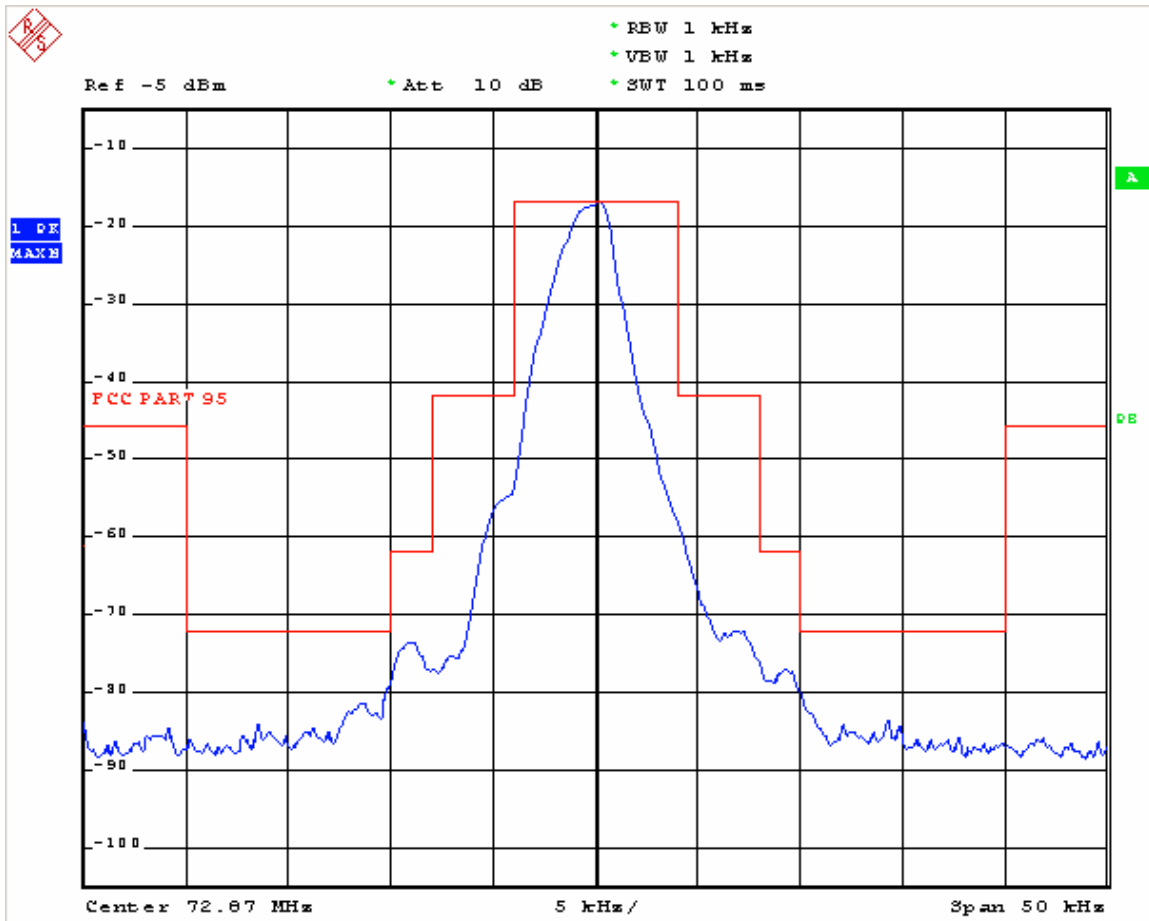
The testing was performed by Cinderallar Chen on 2007-08-09.

Test Result: Pass.

Test Mode: Transmitting

Please refer to the hereinafter plots.

Emission Mask



Aztech emission mask

20 dB Bandwidth

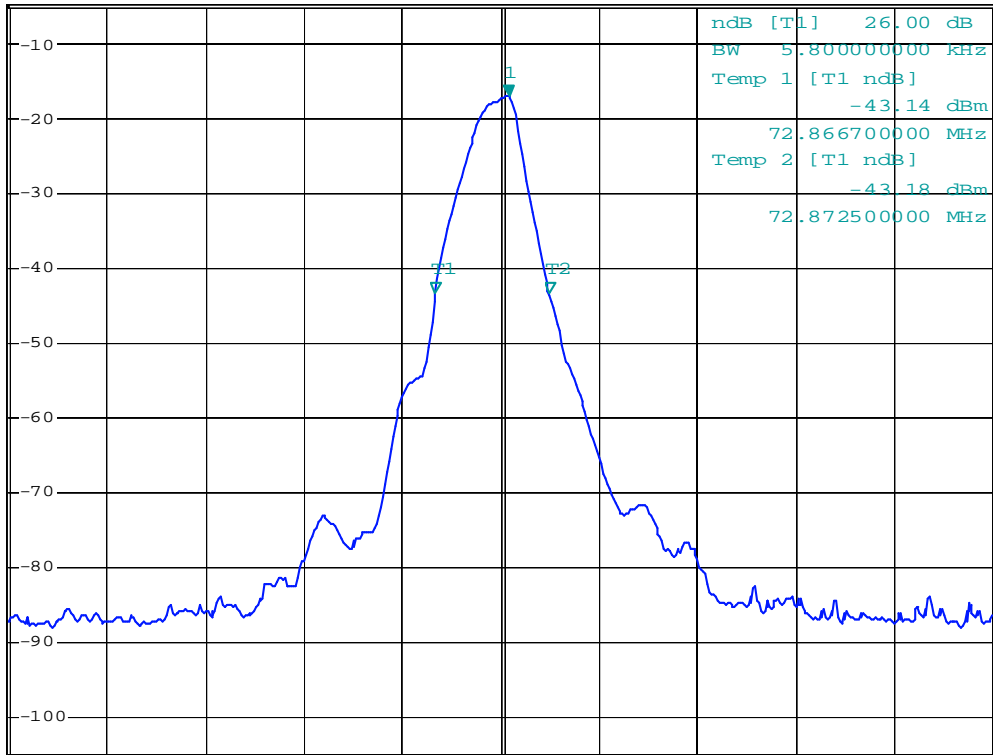


1. PK
MAXH

* RBW 1 kHz Marker 1 [T1]
* VBW 1 kHz -16.93 dBm
* SWT 100 ms 72.870400000 MHz

Ref -5 dBm

* Att 10 dB



Center 72.87 MHz

5 kHz/

Span 50 kHz

Aztech occupied bandwidth

Date: 9.AUG.2007 20:40:38

§95.635 - UNWANTED RADIATION

Applicable Standard

§95.635(b)

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Signal Generator	HP8657A	2849U00982	2006-09-29	2007-09-29
Agilent	Spectrum Analyzer	8564E	3943A01781	2006-11-22	2007-11-22
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2006-08-14	2007-08-14
COM POWER	Dipole Antenna	AD-100	041000	2006-09-25	2007-09-25
SUNOL SCIENCES	Horn Antenna	DRH-118	A052604	2006-09-25	2007-09-25

* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load, which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Test Results Summary

4.55 dB at 291.036 MHz in the Vertical polarization.

Test Data**Environmental Conditions**

Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	100.5kPa

The testing was performed by Cinderallar Chen on 2007-08-17.

Test Mode: Transmitting

Indicated Reading		Table Angle (Degree)	Test Antenna		ERP (Substitution Method) (dBm)	Transmission Power (dBm)	Attenuation (dBc)	Limit (dBc)	Margin (dB)
Frequency (MHz)	Level (dBuV)		Height (m)	Polarity (H/V)					
291.036	39.19	180	1.2	V	-30.55	3.45	34.00	29.44	4.56
145.350	35.37	201	1.1	V	-31.71	3.45	35.16	29.44	5.72
218.308	31.19	217	3.7	V	-48.09	3.45	51.54	29.44	22.10
364.259	30.31	9.0	1.0	V	-50.89	3.45	54.34	29.44	24.90
875.246	29.28	75	1.2	V	-54.75	3.45	58.20	29.44	28.76
804.602	29.04	194	2.5	V	-55.52	3.45	58.97	29.44	29.53
582.742	32.22	49	1.2	H	-39.63	3.45	43.08	29.44	13.64
364.259	30.05	105	1.5	H	-43.89	3.45	47.34	29.44	17.90
952.093	29.13	220	3.0	H	-48.12	3.45	51.57	29.44	22.13
291.036	28.05	230	1.0	H	-48.55	3.45	52.00	29.44	22.56
656.529	27.60	58	3.9	H	-53.06	3.45	56.51	29.44	27.07
437.119	26.91	105	1.2	H	-54.24	3.45	57.69	29.44	28.25

NOTES: Limit (dBc) = 56 + 10 log (T) dB = 56 + 10 log (0.00221) = 29.44 dBc

Attenuation (dBc) = Transmission Power - ERP

Margin (dB) = Attenuation - Limit

§95.623(c) - FREQUENCY TOLERANCE

Applicable Standard

According to FCC §95.623(c), the frequency tolerance must be maintained within 0.002%.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde&Schwarz	EMI Test Receiver	ESCI	100035	2006-09-29	2007-09-29
WUHUAN	Temperature & Humidity Chamber	HTP205	20021115	2006-12-28	2007-12-28

* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to a Spectrum Analyzer via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the Spectrum Analyzer.

Frequency Stability vs. Voltage: An external variable DC power supply Source. The voltage was set to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the end point. The output frequency was recorded for each voltage.

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	100.2 kPa

The testing was performed by Cinderallar Chen on 2007-08-01.

Test Result: Pass

Test Mode: Transmitting

Reference Frequency: 72. 87 MHz, Limit: 0.002%			
Environment Temperature (°C)	Power Supply (Vdc)	Frequency Measure with Time Elapsed	
		Mesured Frequency (MHz)	Frequency error (%)
50	12	72.87072	0.000988
40	12	72. 87074	0.001015
30	12	72. 87075	0.001029
20	12	72. 87076	0.001043
10	12	72. 87087	0.001194
0	12	72. 87096	0.001317
-10	12	72. 87121	0.001660
-20	12	72. 87126	0.001729
-30	12	72. 87128	0.001756

Frequency Stability Versus Input Voltage

Reference Frequency: 72. 87 MHz, Limit: 0.002%		
Power Supply (Vdc)	Frequency Measure with Time Elapsed	
	Mesured Frequency (MHz)	Frequency error (%)
10.2	72. 87116	0.001592

§95.651- CRYSTAL CONTROL

Applicable Standard

According to FCC §95.651, all transmitters used in personal radio services must be crystal controlled, except an R/C station that transmits in the 26-27 MHz frequency band.

Result:

Compliance, the crystal is soldered on the mainboard and not accessible to the user.

§95.647- TRANSMITTER ANTENNA

Applicable Standard

According to FCC §95.647, the antenna of each FRS unit, and the antenna of each R/C station transmitting in the 72–76 MHz band, must be an integral part of the transmitter. The antenna must have no gain (as compared to a half-wave dipole) and must be vertically polarized.

Result:

Compliance, the antenna used is the integral with vertical polarized and without gain.