FCC PART 15C

TEST REPORT

For

Autel Intelligent Tech. Corp., Ltd.

6th - 10th Floor, Bldg. B1, Zhiyuan, Xueyuan Rd., Xili, Nanshan Shenzhen China

FCC ID: WQ8MAXISYSMS906TS

Report Type:	Product Type:
Original Report	MaxiSys MS906TS

Test Engineer:	David Lee
Report Number:	RSZ151116007-00C
Report Date:	2016-03-30
Reviewed By:	Candy Li RF Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Autel Intelligent Tech. Corp., Ltd.'s* product, model number: *MS906TS (FCC ID: WQ8MAXISYSMS906TS)* or the "EUT" in this report was a *MaxiSys MS906TS*, which was measured approximately: 270.8 cm (L) x176.0 cm (W) x36.0cm (H), rated with input voltage: DC 3.7 V Li-ion battery or DC 12V charging from adapter.

Adapter Information: Switching Power Adapter
Model: GFP361DA-1230-1
Input: AC 100-240V, 50/60 Hz, 1.2A
Output: DC 12V, 3A

**All measurement and test data in this report was gathered from production sample serial number: 1507110 (Assigned by Shenzhen BACL).The EUT supplied by the applicant was received on 2015-11-16.*

Objective

This report is prepared on behalf of *Autel Intelligent Tech. Corp., Ltd.* in accordance with Part 2-Subpart J, and Part 15-Subparts A, B and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, section 15.203, 15.205, 15.207 and 15.209 rules.

Related Submittal(s)/Grant(s)

FCC Part 15B JBP, and FCC Part 15.247 DTS submissions with FCC ID: WQ8MAXISYSMS906TS.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

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

Measurement uncertainty with radiated emission is 5.81 dB for 30MHz-1GHz.

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on 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 Laboratories 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 October 31, 2013. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.10-2013.

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

SYSTEM TEST CONFIGURATION

Justification

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

Note: EUT has one transmitting function at 125kHz.

EUT Exercise Software

Software: Ampak RFTestTool, VER: 5.3

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

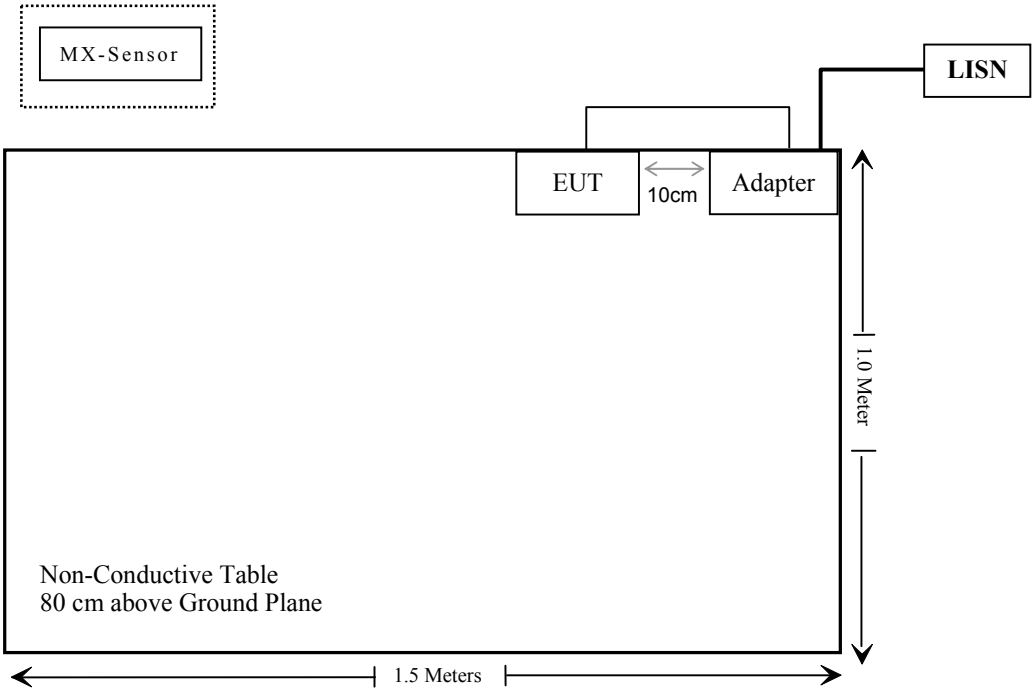
Manufacturer	Description	Model	Serial Number
Autel	MX-Sensor	8930C	/

External I/O Cable

Cable Description	Length (m)	From Port	To
Un-shielding Detachable AC Power Cable	1.3	EUT	Adapter
Un-shielding Un-detachable DC Power Cable	1.4	LISN	Adapter

Block Diagram of Test Setup

For conducted emission:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.207(a)	AC Line Conducted Emission	Compliance
15.205, §15.209	Field Strength And Radiated Emissions	Compliance

FCC§15.203 - ANTENNA REQUIREMENT

Applicable Standard

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used.

Antenna Connector Construction

The EUT has one internal LC oscillation antenna arrangement, which was permanently attached; fulfill the requirement of this section. Please refer to EUT photos.

Result: Compliant

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207

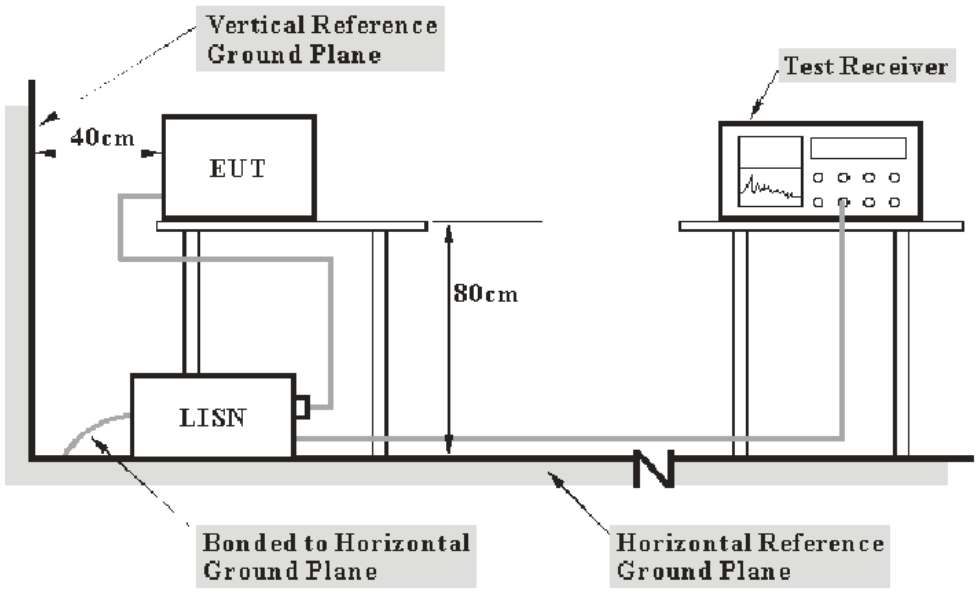
Measurement Uncertainty

Input quantities to be considered for conducted disturbance measurements maybe receiver reading, attenuation of the connection between AMN/ISN and receiver, AMN/ISN voltage division factor, AMN/ISN VDF frequency interpolation and receiver related input quantities, etc.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of conducted disturbance test at Bay Area Compliance Laboratories Corp. (Shenzhen) is shown as below. And the uncertainty will not be taken into consideration for the test data recorded in the report

Port	Measurement uncertainty
AC Mains	3.34 dB (k=2, 95% level of confidence)
CAT 3	3.72 dB (k=2, 95% level of confidence)
CAT 5	3.74 dB (k=2, 95% level of confidence)
CAT 6	4.54 dB (k=2, 95% level of confidence)

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All final data was recorded in the Quasi-peak and average detection mode.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2015-06-03	2016-06-03
Rohde & Schwarz	L.I.S.N.	ENV216	3560.6650.12-101613-Yb	2015-12-15	2016-12-14
Rohde & Schwarz	Transient Limitor	ESH3Z2	DE25985	2015-05-14	2016-05-14
Rohde & Schwarz	CE Test software	EMC 32	V8.53	NCR	NCR
Ducommun technologies	Conducted Emission Cable	RG-214	CB031	2015-06-15	2016-06-15

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Results Summary

According to the recorded data in following table, the worst margin as below:

8.2 dB at **0.189500 MHz** in the **Line** conducted mode

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m + U_{(Lm)} \leq L_{lim} + U_{cispr}$$

In BACL, $U_{(Lm)}$ is less than U_{cispr}, if L_m is less than L_{lim}, it implies that the EUT complies with the limit.

Test Data

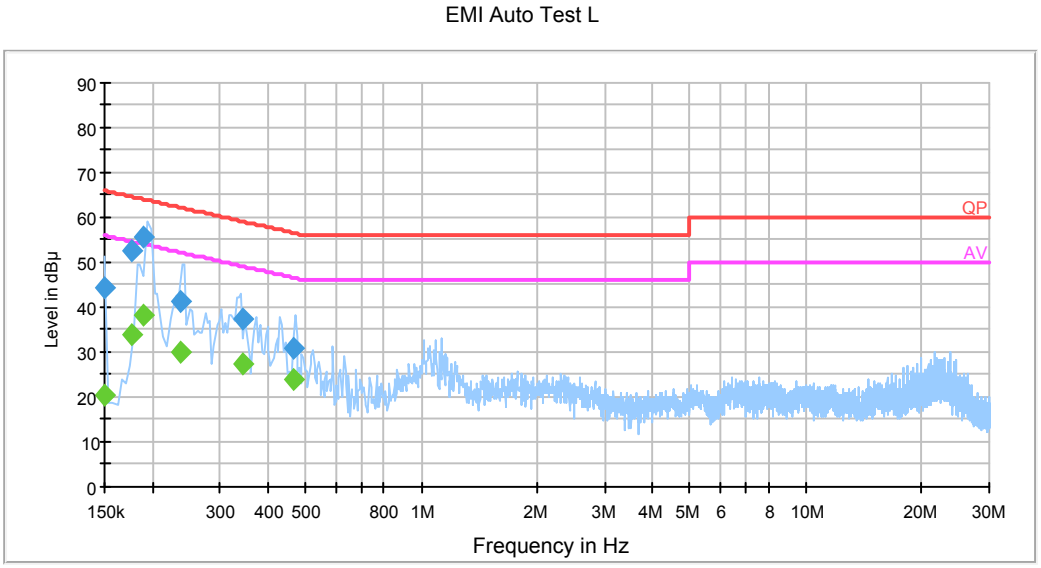
Environmental Conditions

Temperature:	24 ℃
Relative Humidity:	49 %
ATM Pressure:	101.0 kPa

The testing was performed by David Lee on 2016-03-25.

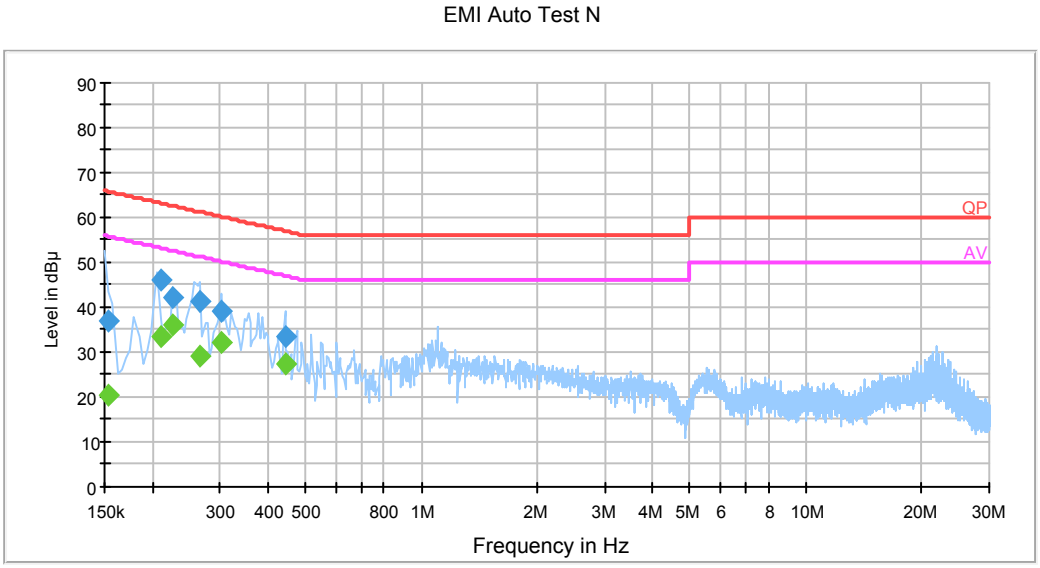
Test Mode: Transmitting

AC 120 V, 60 Hz, Line:



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/QP/Ave.)
0.150000	44.2	20.0	66.0	21.8	QP
0.150000	20.3	20.0	56.0	35.7	Ave.
0.177500	52.5	20.0	64.6	12.1	QP
0.177500	34.0	20.0	54.6	20.6	Ave.
0.189500	55.9	20.0	64.1	**8.2**	QP
0.189500	38.1	20.0	54.1	16.0	Ave.
0.237500	41.4	20.0	62.2	20.8	QP
0.237500	29.9	20.0	52.2	22.3	Ave.
0.343070	37.4	19.9	59.1	21.7	QP
0.343070	27.5	19.9	49.1	21.6	Ave.
0.466950	30.7	19.9	56.6	25.9	QP
0.466950	24.0	19.9	46.6	22.6	Ave.

AC 120V, 60 Hz, Neutral:



Frequency (MHz)	Corrected Amplitude (dBµV)	Correction Factor (dB)	Limit (dBµV)	Margin (dB)	Detector (PK/QP/Ave.)
0.154000	36.9	20.0	65.8	28.9	QP
0.154000	20.5	20.0	55.8	35.3	Ave.
0.209500	46.0	20.0	63.2	17.2	QP
0.209500	33.4	20.0	53.2	19.8	Ave.
0.225500	42.0	20.0	62.6	20.6	QP
0.225500	36.1	20.0	52.6	16.5	Ave.
0.265500	41.3	19.9	61.3	20.0	QP
0.265500	29.1	19.9	51.3	22.2	Ave.
0.301470	39.0	19.9	60.2	21.2	QP
0.301470	32.4	19.9	50.2	17.8	Ave.
0.443370	33.5	19.9	57.0	23.5	QP
0.443370	27.4	19.9	47.0	19.6	Ave.

Note:
1) Corrected Amplitude = Reading + Correction Factor
2) Correction Factor =LISN/ISN VDF (Voltage Division Factor) + Cable Loss + Pulse Limiter Attenuation
The corrected factor has been input into the transducer of the test software.
3) Margin = Limit – Corrected Amplitude

FCC§15.205 & §15.209 - FIELD STRENGTH AND RADIATED EMISSIONS

Applicable Standard

FCC§15.205, §15.209

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on CISPR 16-4-2:2011, the expended combined standard uncertainty of radiation emissions at Bay Area Compliance Laboratories Corp. (Shenzhen) will not be taken into consideration for the test data recorded in the report

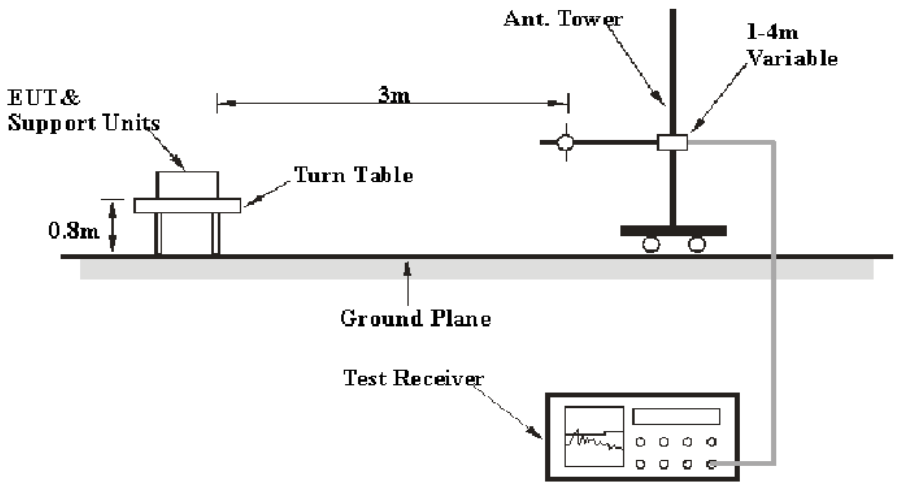
Test Equipment Setup

The spectrum analyzer or receiver is set as:

Frequency Range	RBW	Video B/W	IF B/W	Detector
9 kHz – 30 MHz	10 kHz	30 kHz	9 kHz	QP
30 MHz – 1000 MHz	100 kHz	300 kHz	120kHz	QP

Note: The frequency bands 9-90 kHz and 110-490 kHz, the testing are use an average detector.

EUT Setup



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209 and 15.205 limits.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 mete, and the EUT is placed on a turntable, which is 0.8 meter above ground plane, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin = Limit – Corrected Amplitude

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	HP8447E	1937A01046	2015-05-06	2016-05-06
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2015-12-15	2016-12-14
Sunol Sciences	Bi-log Antenna	JB1	A040904-2	2014-12-07	2017-12-06
ETS	Passive Loop Antenna	6512	00029604	2014-12-24	2017-12-23
R&S	Auto test Software	EMC32	V9.10	NCR	NCR
Ducommun technologies	RF Cable	UFA210A-1-4724-30050U	MFR64369 223410-001	2015-06-15	2016-06-15
Ducommun technologies	RF Cable	104PEA	218124002	2015-06-15	2016-06-15

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205 and 15.209, the worst margin reading as below:

12.01 dB at **2.48 MHz** for transmitting mode

Refer to CISPR16-4-2:2011 and CISPR 16-4-1:2009, the measured level is in compliance with the limit if

$$L_m + + U_{(Lm)} \leq L_{lim} + + U_{cispr}$$

In BACL., $U_{(Lm)}$ is less than + U_{cispr}, if L_m is less than L_{lim}, it implies that the EUT complies with the limit.

Test Data

Environmental Conditions

Temperature:	24 ℃
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by David Lee on 2016-03-24.

EUT operation mode: Transmitting

1) Field Strength of Radiated Emissions, 9 kHz to 30 MHz:

Indicated		Table Angle Degree	Antenna Height (m)	Detector PK/QP/Ave.	Correction Factor		Corrected Amplitude (dBµV/m) @3m	FCC Part 15C	
Frequency (MHz)	Maximum Reading (dBµV) @3m				Antenna Factor (dB/m)	Cable Loss (dB)		Limit (dBµV/m) @3m	Margin (dB)
0.05	2.51	226	1.5	Ave.	73.1	0.2	75.81	113.62	37.81
0.125	17.87	130	1.5	Ave.	64.6	0.2	82.67	105.67	23.00
2.48	17.53	279	1.5	QP	39.8	0.2	57.53	69.54	12.01
27.37	6.66	265	1.5	QP	31.1	0.2	37.96	69.54	31.58

2) Spurious Emission, up to 1000 MHz:

Frequency (MHz)	Corrected Amplitude (dBµV/m)	Turntable position (Degree)	Antenna height (m)	Detector PK/QP/Ave.	Polarity	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
30.53	25.18	237	1.5	QP	V	-0.5	40	14.82
41.18	23.15	167	1.3	QP	V	-8.2	40	16.85
43.36	25.30	198	1.1	QP	V	-9.9	40	14.70
277.42	27.85	253	1.4	QP	H	-6.8	46	18.15

Test result: Pass.

******* END OF REPORT *******