





TEST REPORT

EUT Description Notebook

Brand Name HP

Model Name HSN-I38C

FCC/IC ID FCC ID: B94HNI38PDHP2, IC ID: 21374-L850GL

Date of Test Start/End 2020-02-21 / 2020-03-03

Features WWAN (LTE, UMTS), WLAN, BT

(see section 5)

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FCC CFR Title 47 Part 2, 22, 24, 27, 90

Reference Standards RSS-Gen issue 5-A1, RSS 130 issue 2, RSS 132 issue 3, RSS 133 issue 6,

RSS 139 issue 3, RSS-195 issue 2, RSS 199 issue 3

(see section 1)

Test Report identification 200120-08.TR12

Rev. 00

Revision Control

This test report revision replaces any previous test report revision

(see section 8)

The test results relate only to the samples tested.

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Reference to accreditation shall be used only by full reproduction of test report.

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1. Standards, reference documents and applicable test methods

- 1. FCC 47 CFR part 2 Subpart J Equipment Authorization Procedures.
- 2. FCC 47 CFR part 22 Subpart H Cellular Radiotelephone Service.
- 3. FCC 47 CFR part 24 Subpart E Broadband PCS.
- 4. FCC 47 CFR part 27 Subpart C Technical Standards.
- 5. FCC 47 CFR part 27 Subpart L 1695-1710, 1710-1755 MHz, 1755-1780 MHz, 2110-2155 MHz, 2155-2180 MHz, 2180-2200 MHz Bands.
- 6. FCC 47 CFR part 90 Subpart S 806-824, 851-869, 896-901, and 935-940 MHz Bands.
- 7. FCC OET KDB 971168 D01 v03r01 Measurement guidance for certification of licensed digital transmitters.
- 8. RSS-Gen issue 5 Amendment 1 General Requirements for Compliance of Radio Apparatus.
- 9. RSS 130 issue 2 Equipment Operating in the Frequency Bands 617 652 MHz, 663 698 MHz, 698-756 MHz and 777-787 MHz.
- 10. RSS 132 issue 3 Cellular Telephone Systems Operating in the Bands 824-849 MHz and 869-894 MHz.
- 11. RSS 133 issue 6 2 GHz Personal Communications Services.
- 12. RSS 139 issue 3 Advanced Wireless Services Equipment Operating in the Bands 1710–1755 MHz and 2110–2155 MHz.
- 13. RSS-195 issue 2 Wireless Communication Service (WCS) Equipment Operating in the Bands 2305-2320 MHz and 2345-2360 MHz.
- 14. RSS-199 issue 3 Broadband Radio Services (BRS) Equipment Operating in the Bands 2500-2690 MHz
- 15. C63.26-2015 IEEE/ANSI Standard for Compliance Testing of Transmitters Used in Licensed Radio Services.

2. General conditions, competences and guarantees

- ✓ Tests performed under FCC standards identified on section 1 are covered by A2LA accreditation.
- ✓ Tests performed under ISED standards identified on section 1 are covered by Cofrac accreditation.
- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is an ISO/IEC 17025:2017 laboratory accredited by the American Association for Laboratory Accreditation (A2LA) with the certificate number 3478.01.
- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is an Accredited Test Firm recognized by the FCC, with Designation Number FR0011.
- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is an ISO/IEC 17025:2017 testing laboratory accredited by the French Committee for Accreditation (Cofrac) with the certificate number 1-6736.
- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is a Registered Test Site listed by ISED, with ISED #1000Y.
- ✓ Intel WRF Lab declines any responsibility with respect to the identified information provided by the customer and that may affect the validity of results.
- ✓ Intel WRF Lab only provides testing services and is committed to providing reliable, unbiased test results and interpretations.
- ✓ Intel WRF Lab is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.
- ✓ Intel WRF Lab has developed calibration and proficiency programs for its measurement equipment to ensure correlated and reliable results to its customers.
- ✓ This report is only referred to the item that has undergone the test.
- ✓ This report does not imply an approval of the product by the Certification Bodies or competent Authorities.
- ✓ Complete or partial reproduction of the report cannot be made without written permission of Intel WRF Lab.

3. Environmental Conditions

✓ At the site where the measurements were performed the following limits were not exceeded during the tests:

Temperature	22°C ± 3°C
Humidity	43% ± 5%



4. Test samples

Sample	Control #	Description	Model	Serial #	Date of receipt	Note
#01	200120-08.S07	Convertible _ WNC _AX201NGW + L850- GL	HP Oleander	00095100PC	27/01/2020	N/A

5. EUT Features

HSN-I38C Production								
The Cibese								
The Fibocom M2 L850 GL module supports only UMTS and LTE, without carrier aggregation. The applicable frequency bands and operating modes are identified in the following table, where North America bands are shown in bold. WWAN:								
Mode	В	ands			Suppo	orted Tx N	lode	
			WCDMA	HSD	PA	HSUPA	١	DC-HSDPA
	FDD II (1850.	.0 – 1910.0 MHz)	✓	✓		✓		✓
WCDMA /	FDD IV (1710	0.0 – 1755.0 MHz)	✓	✓		✓		✓
HSPA+	FDD V (824	.0 – 849.0 MHz)	✓	✓		✓		✓
	FDD VIII (880	0.0 – 915.0 MHz)	✓	✓		✓		✓
Mode	В	ands	\$	Support	ed Cha	annel Ban	dwidth	(MHz)
			1.4	3	5	10	15	20
	Band 2 (1850	0.0 – 1910.0 MHz)	✓	✓	✓	✓	✓	✓
LTE FDD	Band 4 (1710).0 – 1755.0 MHz)	✓	✓	✓	✓	✓	✓
	Band 5 (824.0 – 849.0 MHz)		✓	✓	✓	✓		
	Band 7 (2500.0 – 2570.0 MHz)				✓	✓	✓	✓
	Band 12 (699	9.0 – 716.0 MHz)	✓	✓	✓	✓		
	Band 13 (777.0 – 787.0 MHz)				✓	✓		
	Band 17 (704.0 – 716.0 MHz)				✓	✓		
	Band 18 (815.0 – 830.0 MHz)				✓	✓	✓	
	Band 19 (830.0 – 845.0 MHz)				✓	✓	✓	
	Band 26 (814.0 – 849.0 MHz)		✓	✓	✓	✓	✓	
	Band 28 (703.0 – 748.0 MHz)			✓			✓	✓
	Band 30 (2305.0 – 2315.0 MHz)				✓	✓		
	Band 66 (1710.0 – 1780.0 MHz)		✓	✓	✓	✓	✓	✓
	Band 38 (2570.0 – 2620.0 MHz)				✓	✓	✓	✓
LTE TDD	Band 40 (2300.0 – 2400.0 MHz)				✓	✓	✓	✓
	Band 41 (249	6.0 – 2690.0 MHz)			✓	✓	✓	✓
WI AN/DT								
	nde	·	LII	Frea R	ange	(MHz)		
000.44								
802.118	ı/n/ac/ax			5475	5-5725	5		
				5725	5-5850)		
BDR/EI	DR v5.0			2400-	-2483.	.5		
Bluetootl	h LE v5.0			2400-	-2483.	.5		
	WCDMA / HSPA+ Mode LTE FDD LTE TDD WLAN/BT Mc 802.11a BDR/Ei Bluetooti Wistron New	## FDD II (1850 FDD IV (1710 FDD V (824 FDD V (824 FDD V (888) Mode	## FDD II (1850.0 – 1910.0 MHz) FDD IV (1710.0 – 1755.0 MHz) FDD V (824.0 – 849.0 MHz) FDD V (III (880.0 – 915.0 MHz) FDD VIII (880.0 – 915.0 MHz) Band 2 (1850.0 – 1910.0 MHz) Band 4 (1710.0 – 1755.0 MHz) Band 5 (824.0 – 849.0 MHz) Band 7 (2500.0 – 2570.0 MHz) Band 12 (699.0 – 716.0 MHz) Band 13 (777.0 – 787.0 MHz) Band 18 (815.0 – 830.0 MHz) Band 19 (830.0 – 845.0 MHz) Band 26 (814.0 – 849.0 MHz) Band 30 (2305.0 – 2315.0 MHz) Band 30 (2305.0 – 2315.0 MHz) Band 66 (1710.0 – 1780.0 MHz) Band 30 (2300.0 – 2400.0 MHz) Band 40 (2300.0 – 2400.0 MHz) Band 41 (2496.0 – 2690.0 MHz) WLAN/BT Mode	WCDMA / HSPA+ FDD II (1850.0 - 1910.0 MHz)	NCDMA	WCDMA	FDD II (1850.0 - 1910.0 MHz)	FDD II (1850.0 - 1910.0 MHz)

6. Remarks and comments

The tested configurations were selected based on the worst-case spurious emissions per frequency band from modular type approval report.

The smallest bandwidth and RB were selected in order to guarantee the worst case in terms of power density.

7. Test Verdicts summary

The statement of conformity to applicable standards in the table below are based on the measured values, without taking into account the measurement uncertainties.

Band	FCC part	RSS part	Test name	Verdict
WCDMA II	24.238, 2.1053	133-ch 6.5.1	Radiated spurious emission	Р
WCDMA IV	27.53 (h), 2.1053	139-ch.6.5	Radiated spurious emission	Р
WCDMA V	22.917, 2.1053	132-ch.5.5	Radiated spurious emission	Р
LTE 2	24.238, 2.1053	133-ch 6.5.1	Radiated spurious emission	Р
LTE 5	22.917, 2.1053	132-ch.5.5	Radiated spurious emission	Р
LTE 13	27.53 (g)(f), 2.1053	130-ch.4.7	Radiated spurious emission	Р
LTE 26	90.691, 22.917, 2.1053	132-ch.5.5	Radiated spurious emission	Р
LTE 30	27.53 (a)(4), 2.1053	195- ch.5.6.2	Radiated spurious emission	Р
LTE 41	27.53 (m), 2.1053	199-ch.4.5	Radiated spurious emission	Р

P: Pass F: Fail

NM: Not Measured NA: Not Applicable

8. Document Revision History

F	Revision #	Date	Modified by	Revision Details
	Rev. 00	2020-03-03	A.LOUNES	First Issue

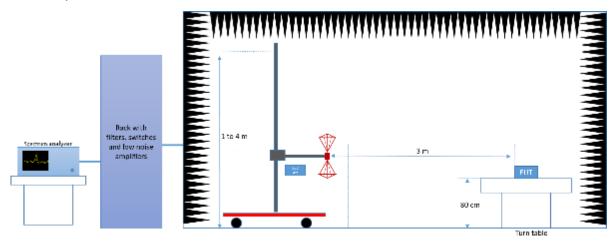


Annex A. Test & System Description

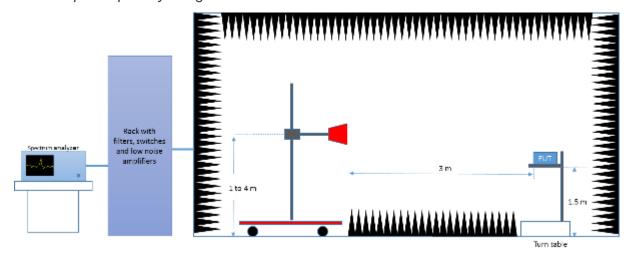
A.1 Measurement System

Measurements were performed using the following setups. A communication tester was used to establish a communication link with the EUT, and the communication tester parameters were set to get the maximum output power from the EUT.

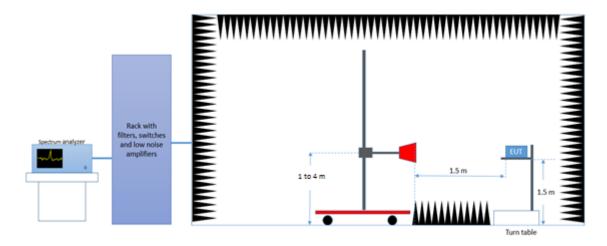
Radiated Setup 30MHz- 1GHz



Radiated Setup Frequency range 1 GHz to 18 GHz



Radiated Setup Frequency range 18 GHz to 40 GHz



Sample Calculation

The spurious received power P at the spectrum Analyzer is converted to EIRP the equivalent isotropically radiated power, in dBm using the transducer factor F corresponding to the Rx path Loss:

 $F (dB) = Free \ Space \ Attenuation \ (dB) + Cable \ losses \ (dB) - Amplifiers \ Gain \ (dB) - Rx \ Antenna \ Gain \ (dBi) \\ EIRP \ (dBm) = P(dBm) + F \ (dB)$

A.2 Test Equipment List

A.2.1 Radiated Setup #1

ID#	Device	Type/Model	Serial #	Manufacturer	Cal. Date	Cal. Due Date
0420	Spectrum analyzer	FSV40	101556	Rohde & Schwarz	2018-05-17	2020-05-17
0993	BiConical antenna 30 MHz – 1 GHz	UBAA9115+BBVU9135+ DGA9552N	0286+CH 9044	Schwarzbeck	2019-11-22	2021-11-21
0141	Double Ridged Horn Antenna 1 GHz – 18 GHz	3117	00157736	ETS Lindgren	2018-05-11	2020-05-11
0325	Double Ridged Horn Antenna 1 GHz – 18 GHz	3117	00157734	ETS Lindgren	2019-08-12	2021-08-12
0139	Horn Antenna 3116+ Amplifier 18GHz – 26.5GHz	3116	00167100	ETS Lindgren	2018-04-06	2020-04-06
0135	Semi Anechoic chamber	FACT 3	5720	ETS Lindgren	2018-04-18	2020-04-18
0329	Measurement Software	EMC32 V10.40.10	100401	Rohde & Schwarz	N/A	N/A
0622	Communication tester	CMW500	163186	Rohde & Schwarz	2019-05-02	2020-05-02
0210	Communication tester	CMW500	147712	Rohde & Schwarz	N/A	N/A
0996	Communication tester	CMW500	163104	Rohde & Schwarz	N/A	N/A
0797	Temperature & Humidity logger	RA12E-TH1-RAS	RA12-D0EB1A	AVTECH	2019-04-07	2021-04-07

N/A: Not applicable

A.2.2 Radiated Setup #2

ID#	Device	Type/Model	Serial #	Manufacturer	Cal. Date	Cal. Due Date
0419	Spectrum analyzer	FSW67	103266	Rohde & Schwarz	2019-02-04	2021-02-04
0334	Horn Antenna 3116C+ Amplifier 18GHz – 40GHz	3116C-PA	00169308bis + 00196308	ETS Lindgren	2019-07-24	2021-07-24
0337	Full Anechoic chamber	RFD-FA-100	5996	ETS Lindgren	2019-09-09	2021-09-09
0128	Measurement Software	EMC32 10.50.10	1520.9791.00 (100931)	Rohde & Schwarz	N/A	N/A
0996	Communication tester	CMW500	163104	Rohde & Schwarz	N/A	N/A
0581	Temperature & Humidity logger	RA12E-TH1-RAS	RA12-B89BE3	AVTECH	2020-01-23	2022-01-23

N/A: Not applicable

A.3 Measurement Uncertainty Evaluation

The system uncertainty evaluation is shown in the below table:

Measurement type	Uncertainty [±dB]
Radiated test < 1GHz	± 2.95
Radiated test 1GHz – 26.5 GHz	± 5.02



Annex B. Test Results

B.1 Radiated spurious emission

B.1.1 Standard references

Band	FCC part	RSS Part	FCC Limit	IC Limit
WCDMA II LTE 2	24.238 2.1053	133-ch 6.5.1	The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB	(ii) After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1 MHz is required.
WCDMA IV	27.53 (h) 2.1053	139- ch.6.5	The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB	(ii) After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB.
WCDMA V LTE 5 LTE 26	22.917 2.1053 90.691	132- ch.5.5	The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB	(ii) After the first 1.0 MHz immediately outside and adjacent to each of the sub-bands, the power of emissions in any 100 kHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10 p (watts). If the measurement is performed using 1% of the occupied bandwidth, power integration over 100 kHz is required.
LTE 13	27.53 (g)(f) 2.1053	130- ch.4.7	The power of any emission outside a licensee's frequency block shall be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth.	The power of any emission outside a licensee's frequency block shall be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. In addition, equipment operating in the frequency bands 746-756 MHz and 777-787 MHz shall also comply with the following restrictions: a) The power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dBW), by at least: (i) 76 + 10 log10 p (watts), dB, for base and fixed equipment, and (ii) 65 + 10 log10 p (watts), dB, for mobile and portable equipment. b) The e.i.r.p. in the band 1559-1610 MHz shall not exceed -70 dBW/MHz for wideband signal and -80 dBW for discrete emission with bandwidth less than 700 Hz.



Band	FCC part	RSS Part	FCC Limit	IC Limit
LTE 30	27.53 (a)(4), 2.1053	195- ch.5.6.2	By a factor of not less than: 43 + 10 log (P) dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, not less than 55 + 10 log (P) dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345 MHz, not less than 61 + 10 log (P) dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2324 and 2328 MHz and on all frequencies between 2327 and 2341 MHz, and not less than 67 + 10 log (P) dB on all frequencies between 2328 and 2337 MHz; (ii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2300 and 2305 MHz, 55 + 10 log (P) dB on all frequencies between 2296 and 2300 MHz, 61 + 10 log (P) dB on all frequencies between 2298 and 2292 MHz, and 70 + 10 log (P) dB below 2288 MHz; (iii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2365 MHz, and not less than 70 + 10 log (P) dB above 2365 MHz.	Frequency (MHz) Attenuation (dB) <2200
LTE 41	27.53 (m), 2.1053	199-ch.4.5	For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz.	for mobile subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power, P (dBW), by at least: (i) 40 + 10 log10 p from the channel edges to 5 MHz away (ii) 43 + 10 log10 p between 5 MHz and X MHz from the channel edges, and (iii) 55 + 10 log10 p at X MHz and beyond from the channel edges In addition, the attenuation shall not be less than 43 + 10 log10 p on all frequencies between 2490.5 MHz and 2496 MHz, and 55 + 10 log10 p at or below 2490.5 MHz.

B.1.2 **Test procedure**

The setup described in Test & System Description was used to measure the radiated spurious emissions. The test was done following the FCC OET KDB 971168 D01 v03r01.

Depending of the frequency range and bands being tested, different antennas and filters were used.

The final measurement is done by varying the antenna height from 1 to 4 meters, the EUT azimuth over 360° and for both Vertical and Horizontal polarizations.

B.1.3 Test Results

WCDMA 2

30 MHz to 26.5 GHz - Radiated Spurious WCDMA 2- QPSK - Low channel – 1850 MHz BW 5 MHz

Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
217.0	-71.4	-13.0	58.4
2967.0	-48.8	-13.0	35.8
17692.1	-39.1	-13.0	26.1
22591.5	-57.4	-13.0	44.4

WCDMA 4

30 MHz to 18GHz - Radiated Spurious WCDMA 4- QPSK - Mid channel - 1732.5 MHz BW 5 MHz

Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
217.0	-70.7	-13.0	57.7
2988.0	-48.8	-13.0	35.8
17692.6	-39.2	-13.0	26.2

WCDMA 5

30 MHz to 18 GHz - Radiated Spurious WCDMA 5- QPSK - Mid channel – 836.5 MHz BW 5 MHz

Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
991.3	-36.0	-13.0	23.0
2506.4	-46.1	-13.0	33.1



LTE 2

30MHz to 26.5GHz - Radiated Spurious LTE 2- QPSK - High channel - 1910 MHz BW 1.4 MHz- RB 1

Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
216.9	-72.1	-13.0	59.1
5216.0	-37.1	-13.0	24.1
7635.4	-45.6	-13.0	32.6
17695.4	-37.8	-13.0	24.8
19059.5	-60.6	-13.0	47.6

LTE 13

30MHz to 18GHz - Radiated Spurious LTE 13 - QPSK - Mid channel - 782 MHz BW 5 MHz- RB 1

Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
976.9	-36.2	-13.0	23.2
1559.1	-60.3	-40.0	20.3
2339.2	-38.7	-13.0	25.7

LTE 26

30MHz to 18GHz - Radiated Spurious LTE 26 - QPSK - Mid channel - 831.5 MHz BW 1.4 MHz- RB 1

Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
983.3	-35.7	-13.0	22.7
1662.1	-59.3	-13.0	46.3
2492.7	-35.6	-13.0	22.6



LTE 30

30MHz to 26.5GHz - Radiated Spurious LTE 30 - QPSK - Mid channel - 2310 MHz BW 5 MHz- RB 1

Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
217.0	-71.3	-40.0	31.3
4615.3	-45.9	-40.0	5.9
6923.2	-48.2	-40.0	8.2
16347.8	-56.6	-40.0	16.6
19360.5	-60.6	-40.0	20.6

LTE 41

30MHz to 26.5GHz – Radiated Spurious LTE 41 – QPSK – High channel 2690 BW 5 MHz– RB 1

Frequency	RMS	Limit	Margin
MHz	dBm	dBm	dB
217.0	-75.6	-25.0	50.6
5370.5	-50.4	-25.0	25.4
8055.5	-43.7	-25.0	18.7
17486.0	-55.7	-25.0	30.7
26839.5	-56.6	-25.0	31.6