DEKRA Testing and Certification, S.A.U.
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C.I.F. A29 507 456

Test report No:
79390REM.007

Test report

FCC Rules and Regulations CFR 47, Part 15, Subpart B (10-1-23 Edition) & ICES-003 Issue 7 (October 2020)

(*) Identification of item tested	Telematic Control Unit, used in automotive industry
(*) Trademark	VOLVO
(*) Model and /or type reference	TCAM3
Other identification of the product	Version: ROW FCC ID: T8GTCAM3 Contains FCC ID: YZP-GN3000 IC: 6434A-TCAM3 Contains IC: 7414C-GN3000
(*) Features	Features: GSM, UMTS, LTE, 5G, BLE, GNSS, TPMS HW version: C3 SW version: 2024-10-25-master-TCAM3-E
Manufacturer	HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH BECKER-GOERING-STR. 16 76307, KARLSBAD, GERMANY
Test method requested, standard	FCC Rules and Regulations CFR 47, Part 15, Subpart B (10-1-23 Edition) & ICES-003 Issue 7 (October 2020)
Summary	IN COMPLIANCE
Approved by (name / position & signature)	José Manuel Gómez EMC Consumer & RF Lab. Manager Firmado digitalmente por 53680346W JOSE MANUEL GOMEZ (C:A29507456)
Date of issue	2025-04-22
Report template No	FDT08_25 (*) "Data provided by the client"

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Acronyms

Acronym ID	Acronym Description
Code	EMC Test Code
Freq Rng	Frequency Range
MP	Measurement Point
OM	Operation Mode
S/	Sample
V	Verdict

Competences and guarantees

DEKRA Testing and Certification S.A.U. is a testing laboratory accredited by the National Accreditation Body (ENAC -Entidad Nacional de Acreditación), to perform the tests indicated in the Certificate No. 51/LE 147.

In order to assure the traceability to other national and international laboratories, DEKRA Testing and Certification S.A.U. has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification S.A.U. guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Testing and Certification S.A.U. at the time of performance of the test.

DEKRA Testing and Certification S.A.U. 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.

The results presented in this Test Report apply only to the particular item under test established in this document.

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General conditions

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA Testing and Certification S.A.U.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Testing and Certification S.A.U. and the Accreditation Bodies.

Uncertainty

Uncertainty (factor k=2) was calculated according to the DEKRA Testing and Certification S.A.U. internal document PODT000.

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 30 MHz to 1000 MHz is I = ± 4,9 dB for quasi-peak measurements, I = ± 4,6 dB for peak measurements (k= 2).

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 1000 MHz to 12.75 GHz is I = ± 2,6 dB for peak and average measurements (k = 2).

Data provided by the client

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested").

2. The sample consists of a Telematics Control Unit with eCall technologies, used in automotive, equipped with eCall modem. The project name TCAM3 has the meaning “Telematic Connectivity Antenna Module” and thus describes the key features of this device as Communication and Data Interface. This unit was designed for automotive usage and contains the following features: GSM/UMTS/LTE/5G, BTLE, TPMS receiver, SDARS and GNSS.

DEKRA Testing and Certification S.A.U. declines any responsibility with respect to the information provided by the client and that may affect the validity of results. The laboratory is not responsible for such information and it is not covered by accreditation.

Usage of samples

Samples undergoing test have been selected by: The client.

Id	Control Number	Description	Model	Serial Nº	Date of Reception	Application
S/01	79390_19.1	Telematic Control Unit	TCAM3 (Version: ROW)	ID = 11.112	2024-12-11	Element Under Test
S/01	79390_23.1	EMC Harness			2024-12-11	Auxiliary Element
S/01	79390_27.1	Ethernet Cable			2024-12-11	Auxiliary Element
S/01	79390_31.1	OABR Power Cable			2024-12-11	Auxiliary Element
S/01	79390_35.1	Yellow Box			2024-12-11	Auxiliary Element
S/01	79390_39.1	USB Cable			2024-12-11	Auxiliary Element
S/01	79390_48.1	Module Circuit Board			2024-12-11	Auxiliary Element

Test sample description

Ports……. :	Port name and description	Cable			
		Specified max length [m]	Attached during test	Shielded	Coupled to patient(3)
	.....	.....	[ ]	[ ]	[ ]
	.....	.....	[ ]	[ ]	[ ]
	.....	.....	[ ]	[ ]	[ ]
	.....	.....	[ ]	[ ]	[ ]
	.....	.....	[ ]	[ ]	[ ]
	.....	.....	[ ]	[ ]	[ ]
Supplementary information to the ports……. :	.....				

Rated power supply .....:	Voltage and Frequency		Reference poles			
			L1	L2	L3	N	PE
	[ ]	AC:	[ ]	[ ]	[ ]	[ ]	[ ]
	[ ]	AC:	[ ]	[ ]	[ ]	[ ]	[ ]
	[ ]	DC:					
	[X]	DC: 12V car battery / alternator (4,5 V ≤ UB ≤ 18 V; UB typical: 12V)					

Rated Power .....:	
Clock frequencies.....:	See technical description
Other parameters .....:	See Technical description
Software version .....:	2024-10-25-master-TCAM3-E
Hardware version .....:	C3
Dimensions in cm (W x H x D) ....:	162 mm(W) X 31 mm(H) X 251 mm(L)

Mounting position .....:	[ ]	Table top equipment
	[x]	Wall/Ceiling mounted equipment
	[ ]	Floor standing equipment
	[ ]	Hand-held equipment

	[ ]	Other: automotive telematics control unit	
Modules/parts.....:	Module/parts of test item	Type	Manufacturer
	.....	.....	.....
	.....	.....	.....
	.....	.....	.....
	.....	.....	.....
Accessories (not part of the test item) .....:	Description	Type	Manufacturer
	Cable Harness	.....	.....
	.....	.....	.....
	.....	.....	.....
	.....	.....	.....
	.....	.....	.....
	.....	.....	.....
Documents as provided by the applicant.....:	Description	File name	Issue date
	Technical description manual	.....	.....
	.....	.....	.....
	.....	.....	.....
	.....	.....	.....

(3) Only for Medical Equipment

Identification of the client

HARMAN BECKER AUTOMOTIVE SYSTEMS GMBH
BECKER-GOERING-STR. 16
76307, KARLSBAD, GERMANY

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2025-01-06
Date (finish)	2025-01-07

Document history

Report number	Date	Description
79390REM.007	2025-04-22	First release

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860mbar Max. = 1060mbar

In the semianechoic chamber, the following limits were not exceeded during the test.

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860mbar Max. = 1060mbar

In the chamber for conducted measurements, the following limits were not exceeded during the test:

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 30 % Max. = 60 %
Air pressure	Min. = 860mbar Max. = 1060mbar

Remarks and comments

The tests have been performed by the technical personnel: Iván Guerrero González.

Testing verdicts

Fail	F
Inconclusive	I
Not applicable	N/A
Not measured	N/M
Pass	P
Partial Passed	P*

List of equipment used during the test

Control No.	Equipment	Model	Manufacturer	Next Calibration
08866	EMI TEST RECEIVER 2Hz-44GHz	ESW44	ROHDE AND SCHWARZ	2026-06-12
06132	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2025-04-09
06126	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2025-04-04
04612	HORN ANTENNA 1-18GHz	BBHA 9120 D	SCHWARZBECK MESS-ELEKTRONIK	2027-10-15
05641	HYBRID BILOG ANTENNA 30MHz-6GHz	3142E	ETS LINDGREN	2027-10-23
09360	PRE-AMPLIFIER G>40dB 1-18 GHz	BLMA 0118-1M	BONN ELEKTRONIK	2025-08-05
06064	SEMIANECHOIC ABSORBER LINED CHAMBER	SAC-3	Frankonia	--
06329	SHIELDED ROOM	--	FRANKONIA	--
04848	SOFTWARE FOR EMC/RF TESTING	EMC32	ROHDE AND SCHWARZ	--

Summary

Test Specification	Requirement – Test case	Verdict	Remark
FCC CFR 47, Part 15, Subpart B (10-1-23 Edition) & ICES-003 Issue 7 (October 2020)	RE Radiated emission. Electromagnetic field measure	P	(1)
	CE Continuous conducted emission	N/A	(2)

Supplementary information and remarks:

(1) Test required only to the 5th harmonics of the maximum internal work frequency in the EUT.
(2) Not applicable according to standard. The equipment is powered in DC.

Appendix A: Test results

Appendix A content

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Description of the operation modes

The operation modes described in this paragraph constitute a functionality of the sample under test for itself.

The operation modes used by the samples to which the present report refers, are shown in the following table:

Id	Description
OM/01	EUT ON. Cellular searching network. Bluetooth without communication established. GNSS module waiting for a valid position signal. Power supply: 12 Vdc.

Test standards version applied

The product standards and test standards applied for each test cases are shown in the following table:

Product Test Standard	Test standard	Requirement – Test case
FCC CFR 47, Part 15, Subpart B (10-1-23 Edition) & ICES-003 Issue 7 (October 2020)	ANSI C63.4 (2014)	RE Radiated emission.
	ANSI C63.4 (2014)	CE Continuous conducted emission

Test Cases Details

FCC 47 CFR Part 15B

RE Radiated emission. Electromagnetic field measure

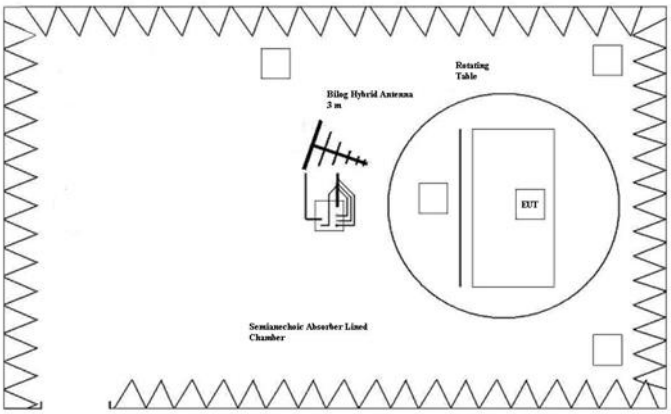
Limits of interference Class B

The applied limit for radiated emissions, 3 m distance, according to the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (10-1-21 Edition), Secs. 15.109 & ICES-003 Issue 7 (October 2020)

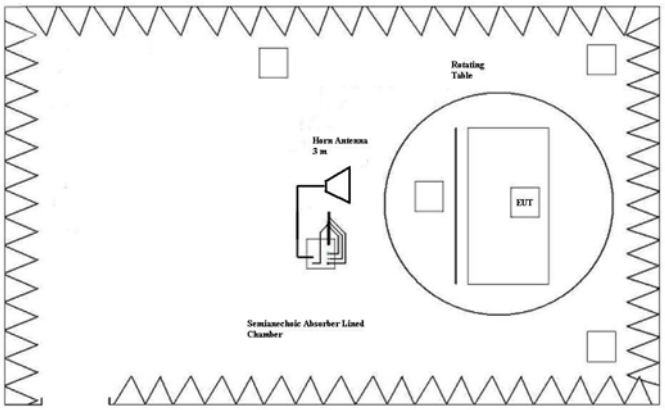
Frequency range (MHz)	FCC Part 15B		ICES-003 Issue 7		FCC Part 15B & ICES-003 Issue 7	
	QP Limit for 3 m		QP Limit for 3 m		PK Limit for 3 m	AVG Limit for 3 m
	(µV/m)	(dBµV/m)	(µV/m)	(dBµV/m)	(dBµV/m)	(dBµV/m)
30 to 88	100	40	100	40	---	---
88 to 216	150	43.5	150	43.5	---	---
216 to 230	200	46	200	46	---	---
230 to 960	200	46	224	47		
960 to 1000	500	54	500	54	---	---
Above 1000	---	---	---	---	74	54

Limits according to FCC Part 15B, are equal or more stringent than those of ICES-003 Issue 7.

Setup for measurements



Setup for measurements < 1GHz.



Setup for measurements > 1GHz.

Results

S/	OM	Code	Freq Rng (MHz)	V
01	OM/01	RE0101LR	[30, 1000]	P
01	OM/01	RE0101HR1	[1000, 17000]	P
01	OM/01	RE0101HR2	[17000, 26000]	P

Verdict

Pass

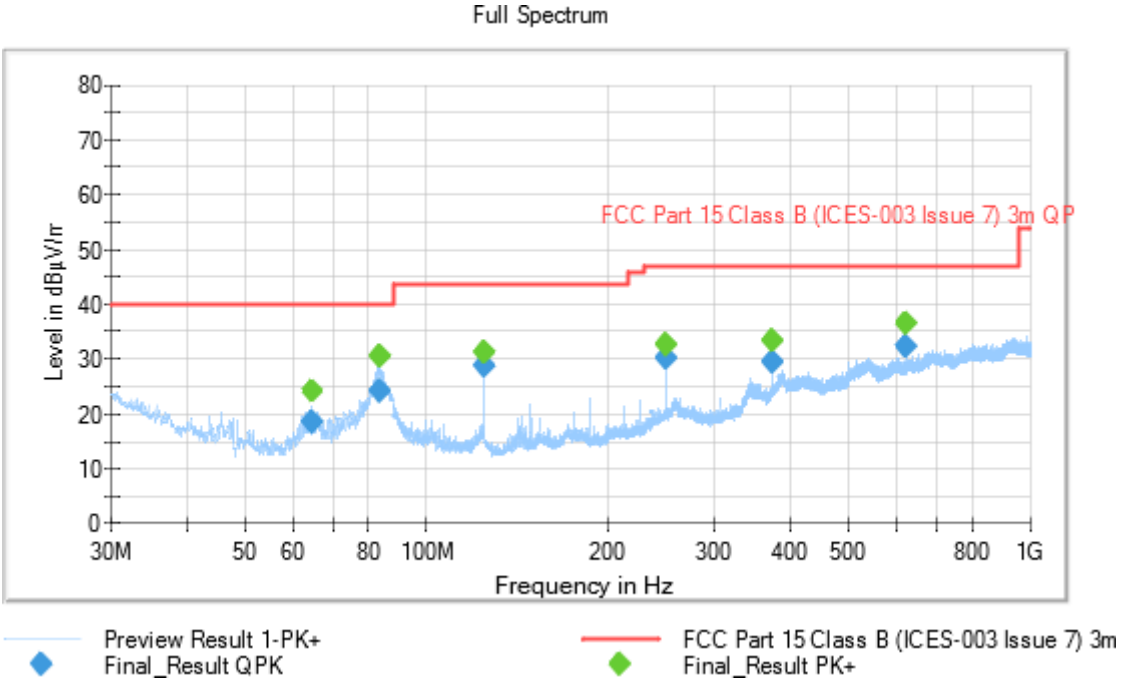
Attachments

EMC Test Code = RE0101LR Frequency Range MHz = [30, 1000]

Sample ID: S/01

Operation Mode: OM/01

Images:



Tables:

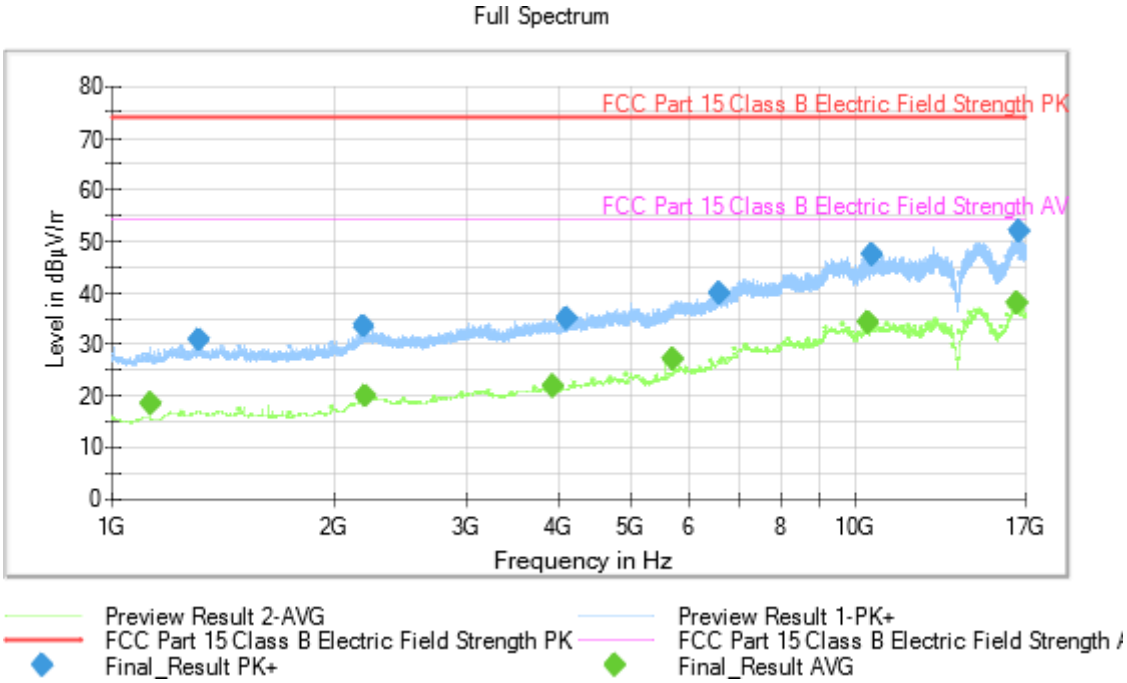
Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
64.765000	18.49	---	40.00	21.51	142.0	V	-14.0
64.765000	---	24.06	---	---	142.0	V	-14.0
83.829000	---	30.29	---	---	128.0	V	6.0
83.829000	24.14	---	40.00	15.86	128.0	V	6.0
125.015000	---	31.28	---	---	100.0	V	-180.0
125.015000	28.70	---	43.52	14.82	100.0	V	-180.0
250.014000	30.06	---	47.00	16.94	115.0	V	168.0
250.014000	---	32.63	---	---	115.0	V	168.0
374.991000	---	33.30	---	---	136.0	V	168.0
374.991000	29.26	---	47.00	17.74	136.0	V	168.0
625.010000	---	36.40	---	---	118.0	H	-148.0
625.010000	32.37	---	47.00	14.63	118.0	H	-148.0

EMC Test Code = RE0101HR1 Frequency Range MHz = [1000, 17000]

Sample ID: S/01

Operation Mode: OM/01

Images:



Tables:

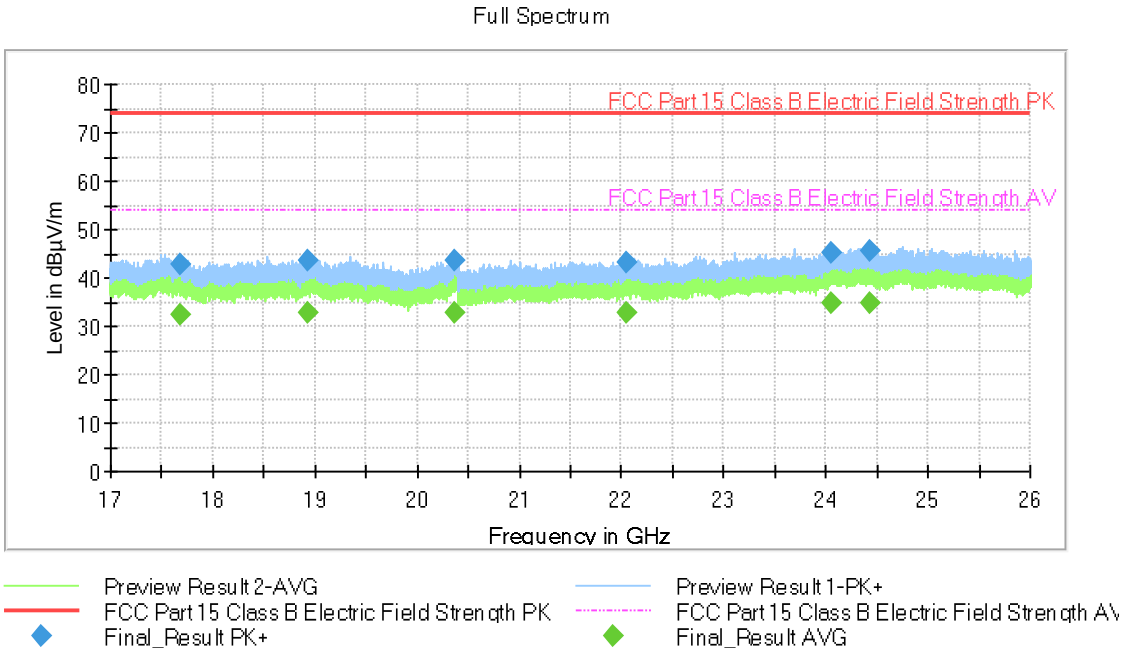
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
1125.000000	---	18.54	53.97	35.43	80.0	H	0.0
1309.000000	30.63	---	73.97	43.34	80.0	H	0.0
2184.000000	33.30	---	73.97	40.67	80.0	V	0.0
2199.000000	---	19.75	53.97	34.22	80.0	V	0.0
3924.500000	---	21.85	53.97	32.12	80.0	V	0.0
4089.750000	35.00	---	73.97	38.97	80.0	H	0.0
5687.500000	---	27.09	53.97	26.88	80.0	V	0.0
6601.000000	39.77	---	73.97	34.20	80.0	V	0.0
10457.750000	---	34.10	53.97	19.87	80.0	V	0.0
10559.750000	47.45	---	73.97	26.52	80.0	H	0.0
16646.500000	---	37.78	53.97	16.19	80.0	H	0.0
16671.000000	51.66	---	73.97	22.31	80.0	V	0.0

EMC Test Code = RE0101HR2 Frequency Range MHz = [17000, 26000]

Sample ID: S/01

Operation Mode: OM/01

Images:



Tables:

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
17679.781250	42.89	---	73.97	31.08	100.0	H	-105.0
17679.781250	---	32.58	53.97	21.39	100.0	H	-105.0
18920.375000	43.51	---	73.97	30.46	100.0	H	-111.0
18920.375000	---	32.73	53.97	21.24	100.0	H	-111.0
20365.156250	43.53	---	73.97	30.44	100.0	V	99.0
20365.156250	---	32.99	53.97	20.98	100.0	V	99.0
22051.250000	---	32.79	53.97	21.18	100.0	V	-79.0
22051.250000	43.01	---	73.97	30.96	100.0	V	-79.0
24056.281250	---	34.78	53.97	19.19	100.0	V	126.0
24056.281250	45.31	---	73.97	28.66	100.0	V	126.0
24426.687500	45.63	---	73.97	28.34	100.0	H	-80.0
24426.687500	---	34.83	53.97	19.14	100.0	H	-80.0