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TEST REPORT

For GNSS

Report No. ..... :	**CHTEW22090085**	Report verification:
Project No.....:	**SHT2103098305EW**	
Applicant ..... :	**HARDWARIO a.s.**	
Address.....:	U Jezu 525/4, 460 01 Liberec, CZECHIA	
Product Name ..... :	**CHESTER**	
Trade Mark .....:	-	
Model No. .....:	CHESTER	
Listed Model(s) .....:	-	
Standard ..... :	**ETSI EN 303 413 V1.1.1: 2017-06**	
Date of receipt of test sample.....:	Jun. 29, 2022	
Date of testing.....:	Jun. 30, 2022- Sep. 20, 2022	
Date of issue.....:	Sep. 21, 2022	
Result.....:	**PASS**	

Compiled by (Position - Printed name - Signature):	File administrators	Silvia Li
Supervised by (Position - Printed name - Signature):	Project Engineer	David Chen
Approved by (Position - Printed name - Signature):	RF Manager: Hans Hu	Hans Hu

Testing Laboratory Name ..... :	**Shenzhen Huatongwei International Inspection Co., Ltd.**
Address.....:	1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

Contents

1. TEST STANDARDS AND REPORT VERSION

1.1. Test standards

The tests were performed according to following standards:

ETSI EN 303 413 V1.1.1 (2017-06)–Satellite Earth Stations and Systems (SES);Global Navigation Satellite System (GNSS) receivers; Radio equipment operating in the 1164 MHz to 1300 MHz and 1559 MHz to 1610 MHz frequency bands; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU.

1.2. Report version information

Revision No.	Date of issue	Description
N/A	2022-09-21	Original

2. TEST DESCRIPTION

Section	Test item	Standards requirement	Result #1	Test Engineer
	Adjacent signal selectivity	Sub-clause 4.2.1	Pass*	N/A
5.1	Spurious emissions	Sub-clause 4.2.2	Pass	Pan Xie

Note:

#1: The test result does not include measurement uncertainty value

* Refer to module report which is issued by Verkotan lab on June 19, 2017.

3. SUMMARY

3.1. Client information

Applicant:	HARDWARIO a.s.
Address:	U Jezu 525/4, 460 01 Liberec, CZECHIA
Manufacturer:	HARDWARIO a.s.
Address:	U Jezu 525/4, 460 01 Liberec, CZECHIA

3.2. Product description

Product Name:	CHESTER
Trade Mark:	-
Model No.:	CHESTER
Listed Model(s):	-
Power supply:	DC 3.6V
Hardware version:	R3.2
Software version:	v1.0.0

3.3. Radio specification description

GNSS type:	☒ GPS	☒ GLONASS	☒GALILEO	☒ BDS
Operation frequency:	☒ GPS	1575.42MHz		
	☒ GLONASS	1602.5625MHz		
	☒ GALILEO	1575.42MHz		
	☒ BDS	1561.098MHz		
Modulation type:	☒ GPS	C/A Code		
	☒ GLONASS	BPSK		
	☒ GALILEO	BPSK		
	☒ BDS	BPSK / QPSK		
Antenna type	Module integrated patch antenna			

Note:
☒: means that this feature is supported; ☐: means that this feature is not supported

3.4. Testing laboratory information

Laboratory Name	Shenzhen Huatongwei International Inspection Co., Ltd.
Laboratory Location	1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China
Connect information:	Tel: 86-755-26715499 E-mail: cs@szhtw.com.cn http://www.szhtw.com.cn

4. TEST CONFIGURATION

4.1. Test mode

The EUT has been tested under GNSS receive mode.

4.2. Support unit used in test configuration and system

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

The following peripheral devices and interface cables were connected during the measurement:

Whether support unit is used?				
✓ No				
Item	Equipment	Trade Name	Model No.	Other
1				
2				

4.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	25°C
Relative Humidity	55 %
Air Pressure	989hPa

4.4. Statement of the measurement uncertainty

Test Items	Measurement Uncertainty
Adjacent signal selectivity	1.21 dB
Radiated spurious emissions	2.85dB for <1GHz 3.66dB for >1GHz

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

4.5. Equipment used during the test

● Radiated Spurious Emission							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Semi-Anechoic Chamber	Albatross projects	HTWE0122	SAC-3m-01	C11121	2018/09/27	2023/09/26
●	Spectrum Analyzer	R&S	HTWE0098	FSP40	100597	2022/08/25	2023/08/24
●	Loop Antenna	R&S	HTWE0170	HFH2-Z2	100020	2021/04/06	2024/04/05
●	Broadband Horn Antenna	SCHWARZBECK	HTWE0103	BBHA9170	BBHA9170472	2020/04/27	2023/04/26
●	Ultra-Broadband Antenna	SCHWARZBECK	HTWE0123	VULB9163	538	2021/04/06	2024/04/05
●	Horn Antenna	SCHWARZBECK	HTWE0126	9120D	1011	2020/04/01	2023/03/31
●	Pre-amplifier	CD	HTWE0071	PAP-0102	12004	2021/11/05	2022/11/04
●	Broadband Preamplifier	SCHWARZBECK	HTWE0201	BBV 9718	9718-248	2022/02/28	2023/02/27
●	RF Connection Cable	HUBER+SUHNER	HTWE0120-01	6m 18GHz S Serisa	N/A	2022/02/25	2023/02/24
●	RF Connection Cable	HUBER+SUHNER	HTWE0120-02	6m 3GHz RG Serisa	N/A	2022/02/25	2023/02/24
●	RF Connection Cable	HUBER+SUHNER	HTWE0119-05	6m 3GHz RG Serisa	N/A	2022/02/25	2023/02/24
●	RF Connection Cable	HUBER+SUHNER	HTWE0120-04	6m 3GHz RG Serisa	N/A	2022/02/25	2023/02/24
●	EMI Test Software	Audix	N/A	E3	N/A	N/A	N/A

5. TEST CONDITIONS AND RESULTS

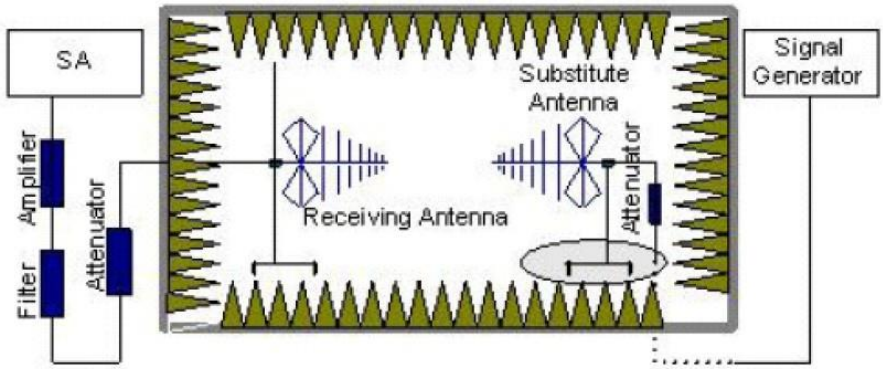
5.1. Spurious emissions

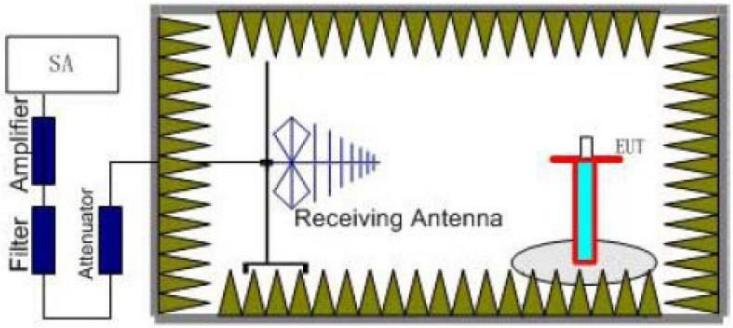
LIMIT

ETSI EN 303 413Sub-clause 4.2.2.2

Frequency range	Maximum power	Bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 8,3 GHz	-47 dBm	1 MHz

TEST CONFIGURATION





TEST PROCEDURE

1. The test conditions.

☒Normal condition ☐Extreme conditions

2. Please refer to ETSI EN 303 413 Sub-clause5.5.2.2 for the measurement method.

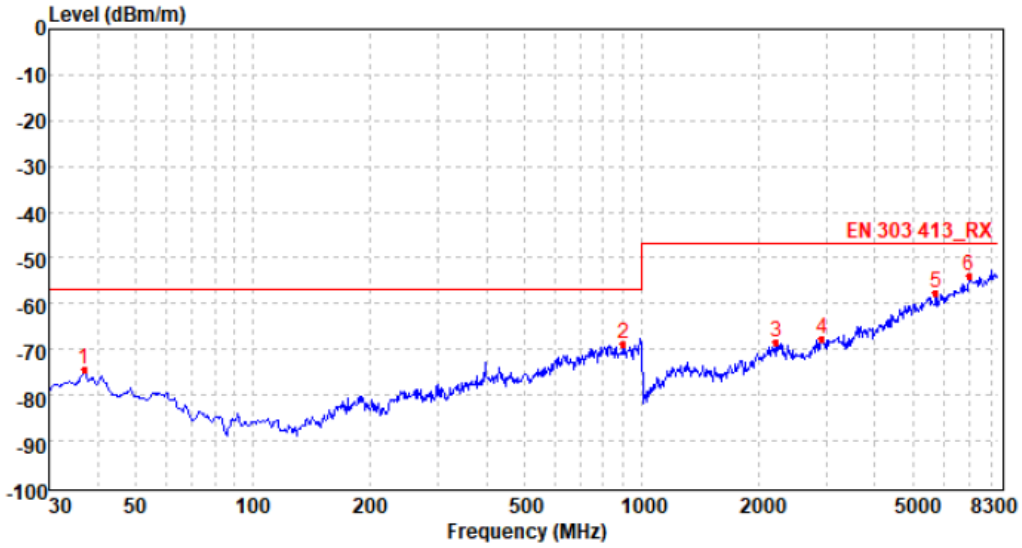
TEST MODE:

Please refer to section 4.1

TEST RESULTS

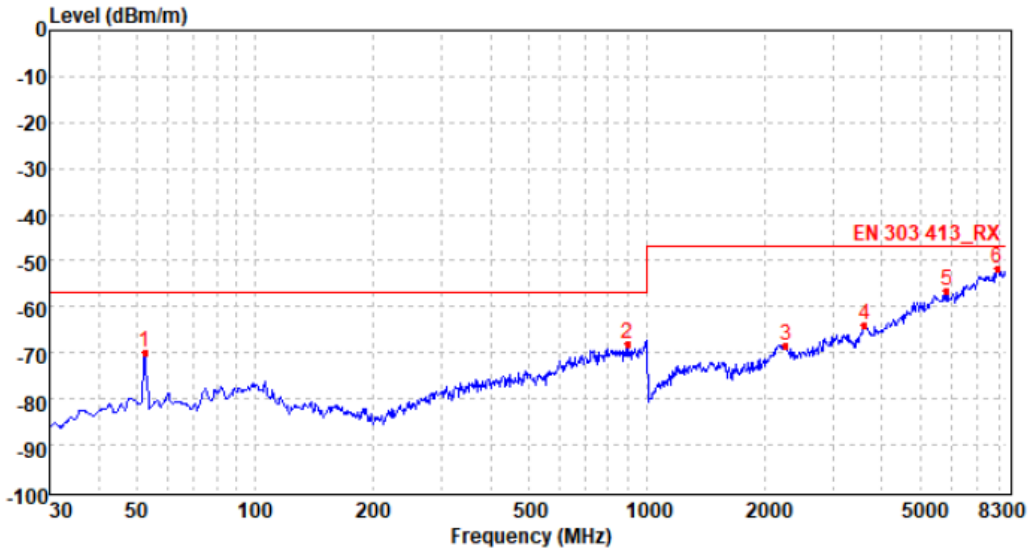
☒ **Passed** ☐ **Not Applicable**

Polarity:	*Horizontal*



Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	36.92	-77.71	27.32	6.89	30.87	-74.37	-57.00	-17.37	Peak
2	902.51	-79.08	29.49	10.87	29.95	-68.67	-57.00	-11.67	Peak
3	2230.13	-77.08	40.79	5.34	37.47	-68.42	-47.00	-21.42	Peak
4	2917.79	-77.23	40.92	6.14	37.37	-67.54	-47.00	-20.54	Peak
5	5731.12	-77.61	43.90	9.56	33.39	-57.54	-47.00	-10.54	Peak
6	6992.51	-78.14	47.62	10.11	33.44	-53.85	-47.00	-6.85	Peak

Polarity:	Vertical



Mark	Frequency MHz	Reading dBm	Antenna dB	Cable dB	Preamp dB	Level dBm	Limit dBm	Over limit	Remark
1	52.47	-68.38	22.52	7.07	31.04	-69.83	-57.00	-12.83	Peak
2	896.18	-79.01	29.95	10.85	29.98	-68.19	-57.00	-11.19	Peak
3	2277.83	-77.02	40.77	5.39	37.40	-68.26	-47.00	-21.26	Peak
4	3605.47	-76.57	42.60	6.92	37.01	-64.06	-47.00	-17.06	Peak
5	5853.70	-77.07	44.30	9.59	33.38	-56.56	-47.00	-9.56	Peak
6	7872.29	-77.72	48.21	10.77	33.06	-51.80	-47.00	-4.80	Peak

6. TEST SETUP PHOTOS OF THE EUT

7. EXTERNAL AND INTERNAL PHOTOS OF THE EUT

Refer to the test report No.: CHTEW22090081

-------End of the report------