



FCC EMI TEST REPORT

FCC ID : LHJ-FE4NA0210
Equipment : FE4NA0110
Brand Name : Continental
Model Name : FE4NA0110
Applicant : Continental Automotive Technologies GmbH
Siemensstrasse 12, 93055 Regensburg, Germany
Manufacturer : Continental Automotive Technologies GmbH
Siemensstrasse 12, 93055 Regensburg, Germany
Standard : FCC 47 CFR FCC Part 15 Subpart B Class B

The product was received on Mar. 08, 2023 and testing was performed from Apr. 21, 2023 to Apr. 21, 2023. We, Sporton International Inc. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI C63.4-2014 and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval from Sporton International Inc. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

Sporton International Inc. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)



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History of this test report

Report No.	Version	Description	Issue Date
FC330812	01	Initial issue of report	Apr. 28, 2023



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
-	15.107	AC Conducted Emission	Not Required	-
3.1	15.109	Radiated Emission	Pass	6.96 dB under the limit at 990.200 MHz

Note: Not required means after assessing, test items are not necessary to carry out.

Conformity Assessment Condition:
1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the section "Measurement Uncertainty".
Disclaimer:
The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Yun Huang
Report Producer: Lea Yu



1. General Description

1.1. Product Feature of Equipment Under Test

Product Feature	
Equipment	FE4NA0110
Brand Name	Continental
Model Name	FE4NA0110
FCC ID	LHJ-FE4NA0210
Installed into the Host	Equipment name: G12U400G1 Brand name: Continental Model name: G12U400G1
EUT supports Radios application	GNSS
HW Version – NAD	P4
EUT Stage	Identical Prototype

Remark: The EUT's information above is declared by manufacturer.

1.2. Product Specification of Equipment Under Test

Product Specification is subject to this standard	
Rx Frequency	GNSS: 1559 ~ 1610 MHz (GPS / Glonass / BDS / Galileo / SBAS)
Antenna Type	GNSS: Fixed external antenna
Type of Modulation	GNSS: BPSK

Remark: The EUT's information above is declared by manufacturer. Please refer to Disclaimer in report summary.

1.3. Modification of EUT

No modifications made to the EUT during the testing.

1.4. Test Location

Test Site	Sporton International Inc. EMC & Wireless Communications Laboratory
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	Sporton Site No. 03CH06-HY

FCC designation No.: TW1093



1.5. Applicable Standards

According to the specifications declared by the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC 47 CFR FCC Part 15 Subpart B Class B
- ♦ ANSI C63.4-2014

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.

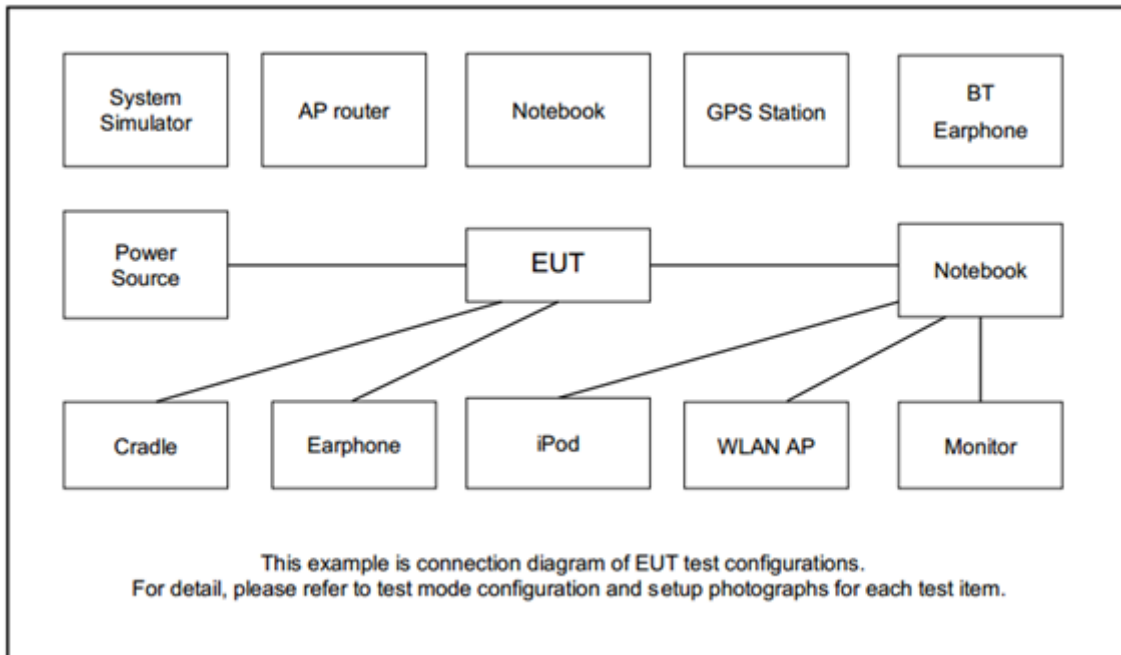
2. Test Configuration of Equipment Under Test

2.1. Test Mode

The EUT is tested along with the peripherals, operating under possible configurations in compliant with normal operation. The maximum emissions can be identified by a pre-scan carried out in different orientations of placement pursuant to ANSI C63.4-2014. Frequency range covered: Radiation Emission (30 MHz to the 5th harmonics of the highest fundamental frequency or to 40 GHz, whichever is lower).

Test Items	Functions Enabled
Radiated Emissions	GPS Rx + TC + DC 12V
Remark: TC stands for test configuration, and consists of EUT, "Teddy Jr Load Box (X1 + X2), External Antenna with metal plate (X3), Ethernet connector cable (X7), Bias Tee*2 and Battery".	

2.2. Connection Diagram of Test System





2.3. Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	GPS Station	Pendulum	GSG-54	N/A	N/A	Unshielded, 1.8 m
2.	Antenna	Molex	85597238	N/A	N/A	N/A
3.	Teddy Jr Load Box	Continental	N/A	N/A	N/A	N/A
4.	Adapter	TePoo	PT-WC-03	N/A	N/A	N/A
5.	Metal Plate	N/A	N/A	N/A	N/A	N/A
6.	DC Power Supply	GW Instek	GEU810960	FCC DoC	N/A	N/A

2.4. EUT Operation Test Setup

Execute "lte_x24_hwtool_0.6.24.exe" to make the EUT receive continuous signals from GPS station.



3. Test Result

3.1. Test of Radiated Emission Measurement

3.1.1. Limit of Radiated Emission

The emissions from an unintentional radiator shall not exceed the field strength levels specified in the following table:

<Class B>

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.1.2. Measuring Instruments

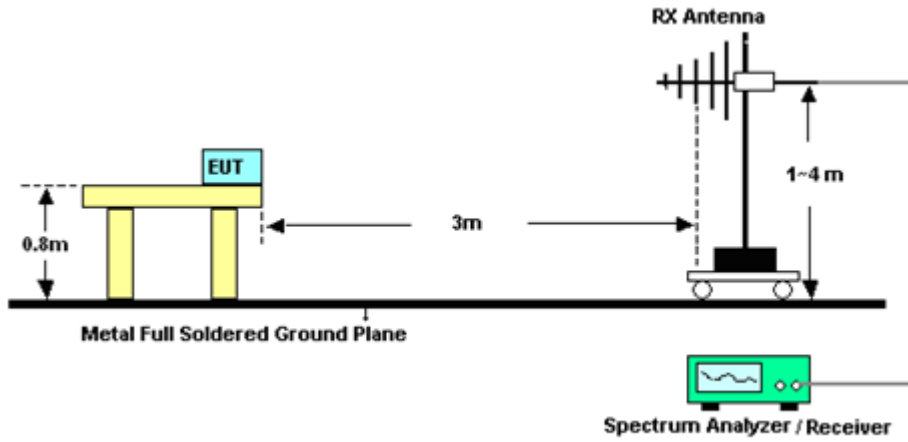
Please refer to the measuring equipment list in this test report.

3.1.3. Test Procedures

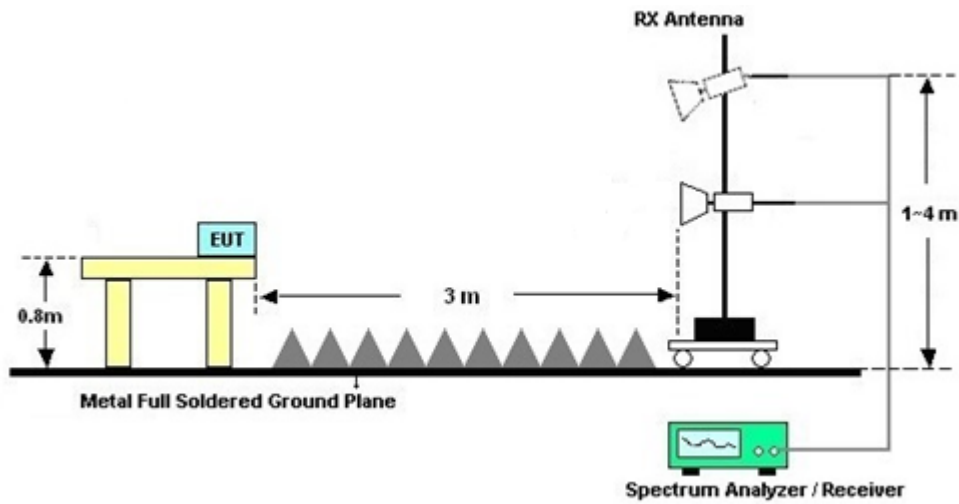
1. The EUT is placed on a turntable with 0.8 meter above ground.
2. The EUT is set 3 meters from the interference receiving antenna, which is mounted on the top of a variable height antenna tower.
3. The table is rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a Bi-Log antenna and its height is adjusted between one to four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT is arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode (RBW=120 kHz/VBW=300 kHz for frequency below 1 GHz; RBW=1 MHz VBW=3 MHz (Peak), RBW=1 MHz/VBW=10 Hz (Average) for frequency above 1 GHz).
7. If the emission level of the EUT in peak mode is 3 dB lower than the limit specified, peak values of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.

3.1.4. Test Setup of Radiated Emission

For Radiated Emissions from 30 MHz to 1 GHz



For Radiated Emissions from 1GHz to 18GHz



3.1.5. Test Result of Radiated Emission

Please refer to Appendix A.



4. List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Amplifier	SONOMA	310N	186713	9kHz~1GHz	Apr. 28, 2022	Apr. 21, 2023	Apr. 27, 2023	Radiation (03CH06-HY)
Bilog Antenna	Schaffner	CBL 6111C & N-6-06	2725 & AT-N0601	30MHz~1GHz	Nov. 06, 2022	Apr. 21, 2023	Nov. 05, 2023	Radiation (03CH06-HY)
EMI Test Receiver	Rohde & Schwarz	ESU26	100472	20Hz~26.5GHz	Feb. 13, 2023	Apr. 21, 2023	Feb. 12, 2024	Radiation (03CH06-HY)
Horn Antenna	SCHWARZB ECK	BBHA 9120 D	9120D-02037	1GHz~18GHz	Dec. 30, 2022	Apr. 21, 2023	Dec. 29, 2023	Radiation (03CH06-HY)
Preamplifier	Jet-Power	JPA00101800- 30-10P	1601180001	1GHz~18GHz	Jul. 18, 2022	Apr. 21, 2023	Jul. 17, 2023	Radiation (03CH06-HY)
RF Cable	HUBER + SUHNER	SF102_7000m m	532299/2	30MHz to 40GHz	Jul. 04, 2022	Apr. 21, 2023	Jul. 03, 2023	Radiation (03CH06-HY)
RF Cable	HUBER + SUHNER	SF102_3000m m	532422/2	30MHz to 40GHz	Jul. 04, 2022	Apr. 21, 2023	Jul. 03, 2023	Radiation (03CH06-HY)
RF Cable	HUBER + SUHNER	SF102_2000m m	532421/2	30MHz to 40GHz	Jul. 04, 2022	Apr. 21, 2023	Jul. 03, 2023	Radiation (03CH06-HY)
RF Cable	HUBER + SUHNER	SF104	802433/4	30Mhz to 18Ghz	Aug. 18, 2022	Apr. 21, 2023	Aug. 17, 2023	Radiation (03CH06-HY)
Hygrometer	TECPEL	DTM-303B	TP210018	N/A	Oct. 27, 2022	Apr. 21, 2023	Oct. 26, 2023	Radiation (03CH06-HY)
Controller	INN-CO	EM1000	060782	Control Turn table & Ant Mast	N/A	Apr. 21, 2023	N/A	Radiation (03CH06-HY)
Antenna Mast	MF	MF-7802	MF780208212	1m~4m	N/A	Apr. 21, 2023	N/A	Radiation (03CH06-HY)
Turn Table	INN-CO	DS2000	420/650/00	0-360 degree	N/A	Apr. 21, 2023	N/A	Radiation (03CH06-HY)
Software	Audix	E3 6.2009-8-24(k 5)	N/A	N/A	N/A	Apr. 21, 2023	N/A	Radiation (03CH06-HY)



5. Measurement Uncertainty

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	6.3 dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 6000 MHz)

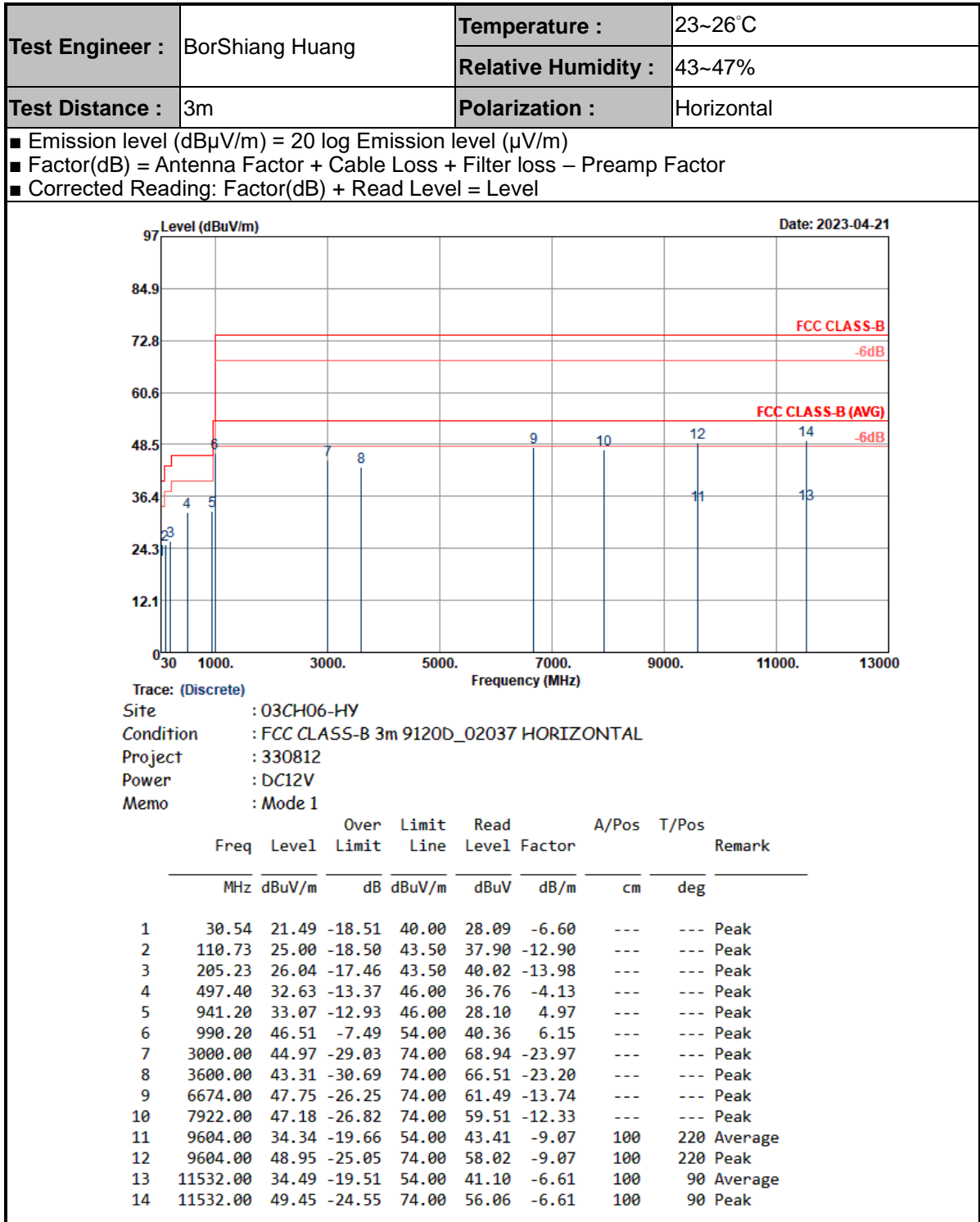
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.6 dB
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Uncertainty of Radiated Emission Measurement (6000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.5 dB
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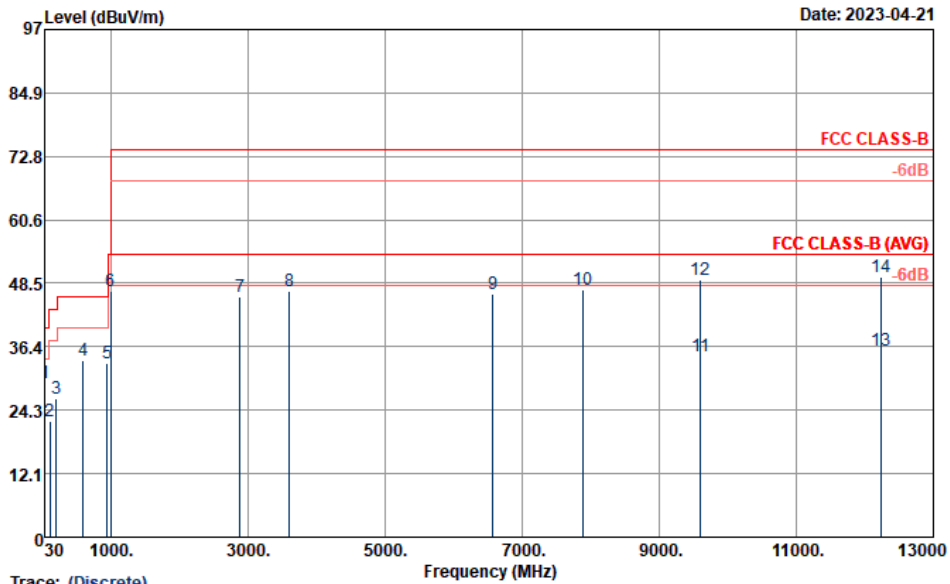
Appendix A. Radiated Emission Test Result





Test Engineer :	BorShiang Huang	Temperature :	23~26°C
		Relative Humidity :	43~47%
Test Distance :	3m	Polarization :	Vertical

- Emission level (dBμV/m) = 20 log Emission level (μV/m)
- Factor(dB) = Antenna Factor + Cable Loss + Filter loss – Preamp Factor
- Corrected Reading: Factor(dB) + Read Level = Level



Trace: (Discrete)

Site : 03CH06-HY
 Condition : FCC CLASS-B 3m 9120D_02037 VERTICAL
 Project : 330812
 Power : DC12V
 Memo : Mode 1

	Freq	Level	Over	Limit	Read	Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	cm	deg	
1	30.27	29.55	-10.45	40.00	35.99	-6.44	---	---	Peak
2	110.19	22.07	-21.43	43.50	35.02	-12.95	---	---	Peak
3	201.45	26.35	-17.15	43.50	40.46	-14.11	---	---	Peak
4	594.00	33.67	-12.33	46.00	35.85	-2.18	---	---	Peak
5	939.80	33.17	-12.83	46.00	28.22	4.95	---	---	Peak
6	990.20	47.04	-6.96	54.00	40.89	6.15	---	---	Peak
7	2880.00	46.04	-27.96	74.00	71.21	-25.17	---	---	Peak
8	3600.00	46.96	-27.04	74.00	70.16	-23.20	---	---	Peak
9	6574.00	46.47	-27.53	74.00	60.62	-14.15	---	---	Peak
10	7896.00	47.36	-26.64	74.00	59.71	-12.35	---	---	Peak
11	9600.00	34.57	-19.43	54.00	43.60	-9.03	100	185	Average
12	9600.00	49.17	-24.83	74.00	58.20	-9.03	100	185	Peak
13	12244.00	35.70	-18.30	54.00	41.60	-5.90	100	60	Average
14	12244.00	49.68	-24.32	74.00	55.58	-5.90	100	60	Peak