



FCC EMI TEST REPORT

FCC ID : 2ABOF-G1BN6ASI002
Equipment : Base Node (BN)
Brand Name : TARANA
Model Name : G1BN6ASI002
Marketing Name : TARANA G1
Applicant : Tarana Wireless
590 Alder Drive, Milpitas, CA 95035
Manufacturer : Tarana Wireless
590 Alder Drive, Milpitas, CA 95035
Standard : FCC 47 CFR FCC Part 15 Subpart B Class A

The product was received on Jun. 27, 2023 and testing was performed from Jul. 06, 2023 to Jul. 06, 2023. We, Sporton International (USA) Inc., 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 (USA) Inc., the test report shall not be reproduced except in full.

Approved by: David Hung

Sporton International (USA) Inc.
1175 Montague Expressway, Milpitas, CA 95035



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History of this test report

Report No.	Version	Description	Issue Date
FC230625004	01	Initial issue of report	Jul. 14, 2023

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.107	AC Conducted Emission	Pass	24.95 dB under the limit at 0.16 MHz
3.2	15.109	Radiated Emission	Pass	8.35 dB under the limit at 40.67 MHz for Quasi-Peak

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/manufacture 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.

1. General Description

1.1. Product Feature of Equipment Under Test

Product Feature
General Specs 5 GHz Access Point
Antenna Type 5 GHz Access Point: Array Antenna

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

1.2. Modification of EUT

No modifications made to the EUT during the testing.

1.3. Test Location

Test Site	Sporton International (USA) Inc.
Test Site Location	1175 Montague Expressway, Milpitas, CA 95035 TEL : 408 9043300
Test Site No.	Sporton Site No. CO01-CA, 03CH01-CA

FCC Designation No.: US1250

1.4. 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 A
- ♦ ANSI C63.4-2014

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

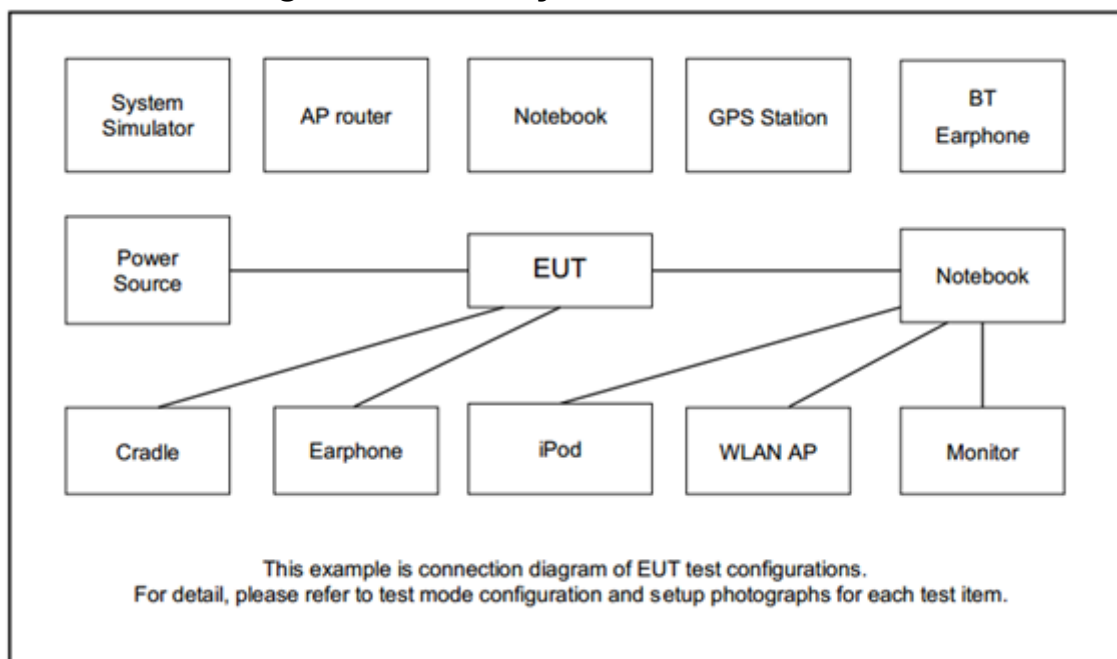
2. Test Configuration of Equipment Under Test

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: Conduction Emission (150 kHz to 30 MHz), Radiation Emission (30 MHz to the 5th harmonics of the highest fundamental frequency or to 40 GHz, whichever is lower).

Test Items	Functions Enabled
AC Conducted Emission	Mode 1: 5GHz TX + LAN Link (MGMT) + Optical fiber Load + USB Load + Adapter + LAN Load (Data 3) + GPS RX
Radiated Emissions	Mode 2: 5GHz TX + LAN Link (MGMT) + Optical fiber Load + USB Load + Adapter + LAN Load (Data 3) + GPS RX
Remark: 1. As requested by the manufacturer the entire testing was performed using shielded cables, the guidance to end users will be included in the user manual. 2. The test configurations and functions enabled are designated by the manufacturer.	

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	Spectracom	GSG-5	NA	NA	N/A
2.	Laptop	Lenovo	20FN002VUS	N/A	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	USB Flash drive	SanDisk	N/A	N/A	N/A	N/A
4.	Adapter	MEAN WELL	HEP-480-54A	NA	NA	AC I/P : Unshielded, 1.8 m
5.	Shielding Cable	NA	NA	NA	NA	AC I/P: Shielded, 3.0 m

2.4. EUT Operation Test Setup

GPS

1. The EUT links with supported units.
2. Enter EUT command line, through Putty. Using “cgps” monitor GPS.
3. The GNSS receiver performance is kept monitoring.

LAN

1. EUT is connected with notebook or PC via RJ-45 cable.
2. For testing, execute “Ping IP” function under the “cmd” of Window system to transfer packet bi-directionally between the EUT and supported units and monitor the packet loss.

Fiber Load

The EUT connected with fiber cables as a load.

LAN Load

The EUT connected with RJ45 cables as a load.

3. Test Result

3.1. Test of AC Conducted Emission Measurement

3.1.1. Limits of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

<Class A>

Frequency of emission (MHz)	Conducted limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	79	66
0.5-30	73	60

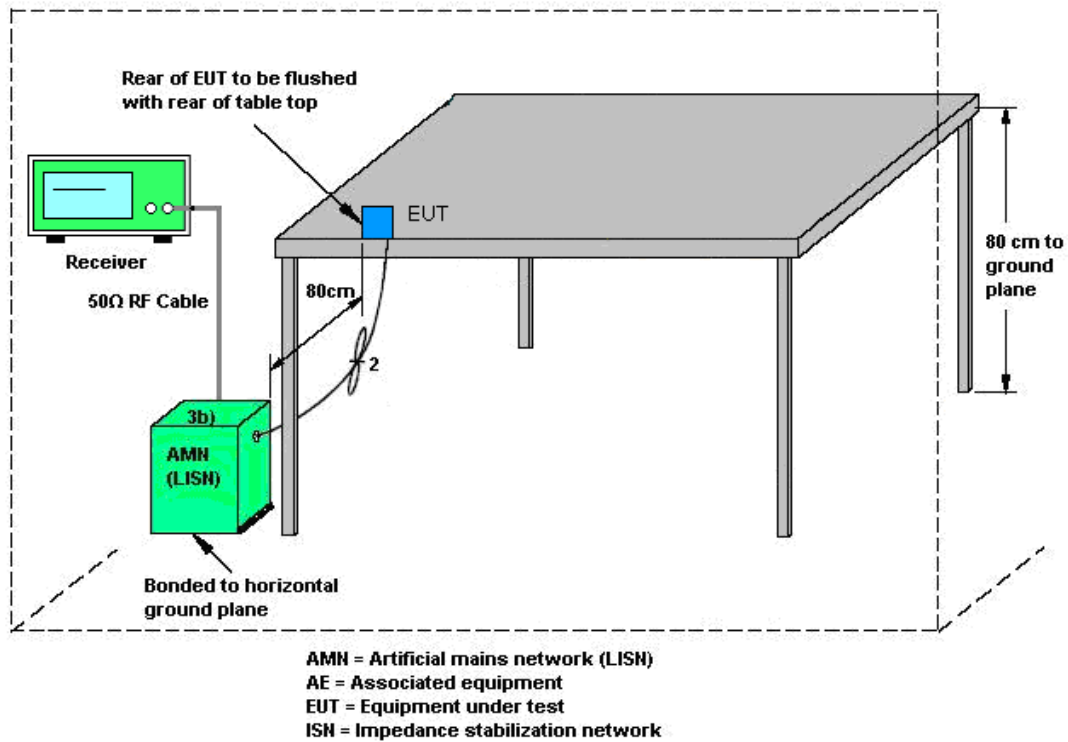
3.1.2. Measuring Instruments

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

3.1.3. Test Procedure

1. The EUT is placed 0.4 meter away from the conducting wall of the shielding room, and is kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN shall be used.
6. Both Line and Neutral shall be tested in order to find out the maximum conducted emission.
7. The frequency range from 150 kHz to 30 MHz is scanned.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (If Bandwidth = 9 kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

3.1.4. Test Setup



3.1.5. Test Result of AC Conducted Emission

Please refer to Appendix A.

3.2. Test of Radiated Emission Measurement

3.2.1. Limit of Radiated Emission

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

<Class A>

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 – 88	90	10
88 – 216	150	10
216 - 960	210	10
Above 960	300	10

Note:

1. A disclaimer from test lab., based on the FCC Part 15.31(f)(1) standard applicability, the results which are consents by manufacturer, are extrapolated to the specified 10m distance using an extrapolation factor of 20 dB/decade, an Aux factor corrected for the test result tested at 3m distance, and which are declared by manufacturer, are not impacted by near field effect due to the characteristic of EUT, when measurement between frequency 30MHz to 1GHz.
2. The RSE test results above 18GHz are measured at a test distance of 1m. According to the test rules, the distance extrapolation factor should be used and the test results of 3m should be reported in this report.
3. Distance extrapolation factor = $20 \log (\text{specific distance} / \text{test distance})$ (dB)

3.2.2. Measuring Instruments

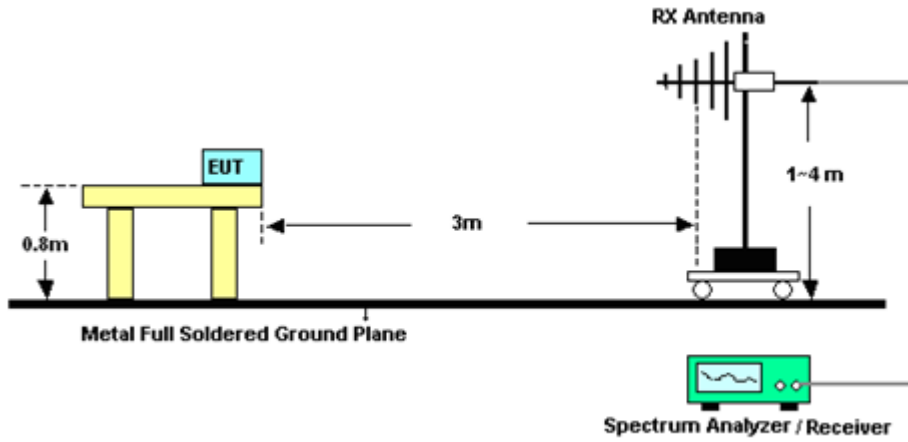
Please refer to the measuring equipment list in this test report.

3.2.3. Test Procedures

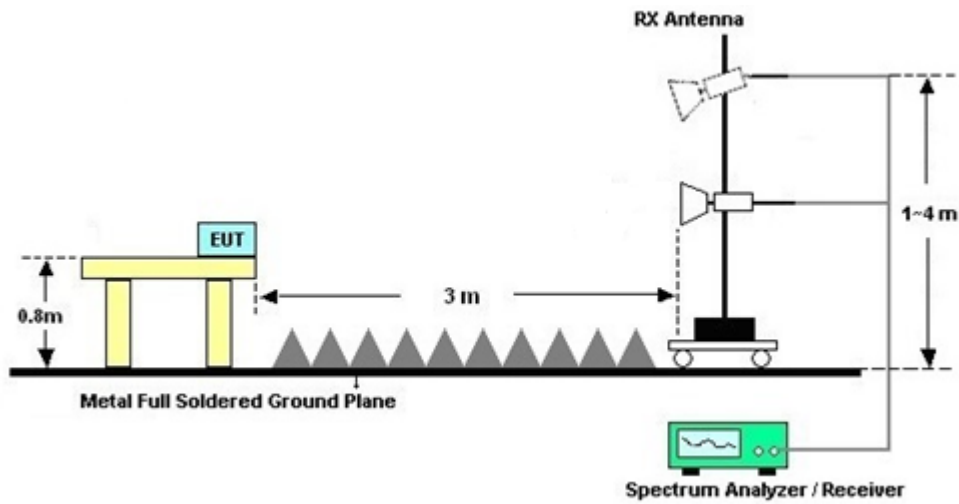
1. The EUT is placed on a turntable with 0.8 meter above ground.
2. The EUT is set 3 meters (30MHz~18GHz) and 1 meters (18GHz~40GHz) from the interference receiving antenna, which is mounted on the top of a variable height antenna tower.
3. The table is rotated 360 degrees to determine the position of 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.

3.2.4. Test Setup of Radiated Emission

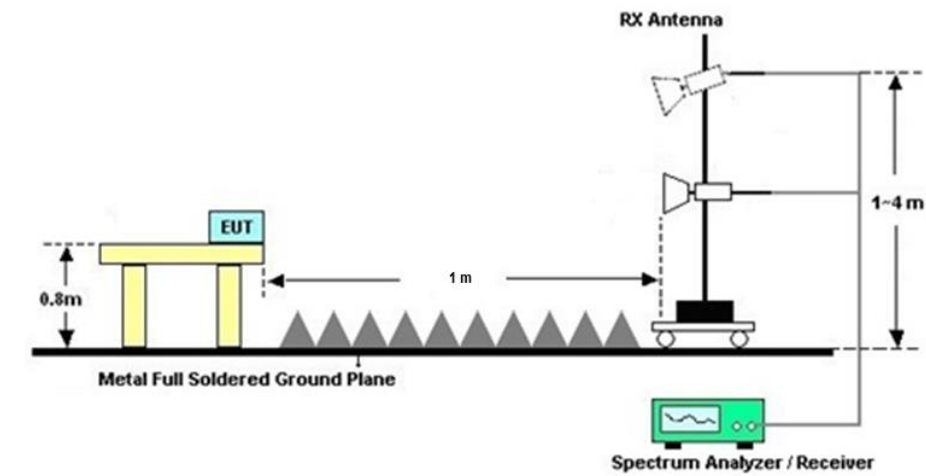
For Radiated Emissions from 30 MHz to 1 GHz



For Radiated Emissions from 1GHz to 18GHz



For Radiated Emissions above 18GHz



3.2.5. Test Result of Radiated Emission

Please refer to Appendix B.



4. List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Bilog Antenna	TESEQ	6111D	54683	30MHz~1GHz	Nov. 01, 2022	Jul. 06, 2023	Oct. 31, 2023	Radiation (03CH01-CA)
Horn Antenna	SCHWARZBECK	BBHA 9120D	02115	1GHz~18GHz	Aug. 16, 2022	Jul. 06, 2023	Aug. 15, 2023	Radiation (03CH01-CA)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA9170	00841	18GHz~40GHz	Sep. 12, 2022	Jul. 06, 2023	Sep. 11, 2023	Radiation (03CH01-CA)
Preamplifier	EMEC	00675	EMC18G40G	060725	May 04, 2023	Jul. 06, 2023	May 03, 2024	Radiation (03CH01-CA)
Preamplifier	SONOMA	310N	372241	9kHz~1GHz	May 03, 2023	Jul. 06, 2023	May 02, 2024	Radiation (03CH01-CA)
Preamplifier	Jet-Power	JPA0118-55-303	1710001800055004	1GHz~18GHz	May 04, 2023	Jul. 06, 2023	May 03, 2024	Radiation (03CH01-CA)
Spectrum Analyzer	Keysight	N9010B	MY63440343	10Hz~44GHz	Jan. 15, 2023	Jul. 06, 2023	Jan. 14, 2024	Radiation (03CH01-CA)
EMI Test Receiver	R&S	ESU26	100049	20Hz~26.5GHz	May 02, 2023	Jul. 06, 2023	May 01, 2024	Radiation (03CH01-CA)
RF Cable	HUBER+SUHNER	SUCOFLEX 102	8015932/2,8015762/2,804938/2	NA	Mar. 06, 2023	Jul. 06, 2023	Mar. 05, 2024	Radiation (03CH01-CA)
Hygrometer	TESTO	608-H1	45141354	NA	Jul. 27, 2022	Jul. 06, 2023	Jul. 26, 2023	Radiation (03CH01-CA)
Notch Filter	Wainwright	WRCJV12-5695-5725-5850-5880-40SS	SN18	NA	Jul. 05, 2023	Jul. 06, 2023	Jul. 04, 2024	Radiation (03CH01-CA)
Filter	Filter	WHKX8-5872.5-6750-18000-40ST	SN8	6.75GHz High Pass Filter	Jun. 05, 2023	Jul. 06, 2023	Jun. 04, 2024	Radiation (03CH01-CA)
Controller	Chaintek	EM-1000	060881	Control Turn Table & Antenna Mast	N/A	Jul. 06, 2023	N/A	Radiation (03CH01-CA)
Antenna Mast	ChainTek	MBS-520-1	N/A	1m~4m	N/A	Jul. 06, 2023	N/A	Radiation (03CH01-CA)
Test Software	Audix E3	E6.2009-8-24d	PK-002093	N/A	N/A	Jul. 06, 2023	N/A	Radiation (03CH01-CA)
LISN	TESEQ	NNB51	47407	N/A	May 16, 2023	Jul. 06, 2023	May 15, 2024	Conduction (CO01-CA)
EMI Test Receiver	R&S	ESR7	102177	9kHz~7GHz	May 23, 2023	Jul. 06, 2023	May 22, 2024	Conduction (CO01-CA)
Pulse limiter with 10dB attenuation	R&S	VTSD 9561-F N	9561-F-N00412	N/A	Jun. 05, 2023	Jul. 06, 2023	Jun. 04, 2024	Conduction (CO01-CA)
Test Software	R&S	EMC32 V10.30.0	N/A	N/A	N/A	Jul. 06, 2023	N/A	Conduction (CO01-CA)

5. Measurement Uncertainty

Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.7 dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 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 (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.2 dB
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.1 dB
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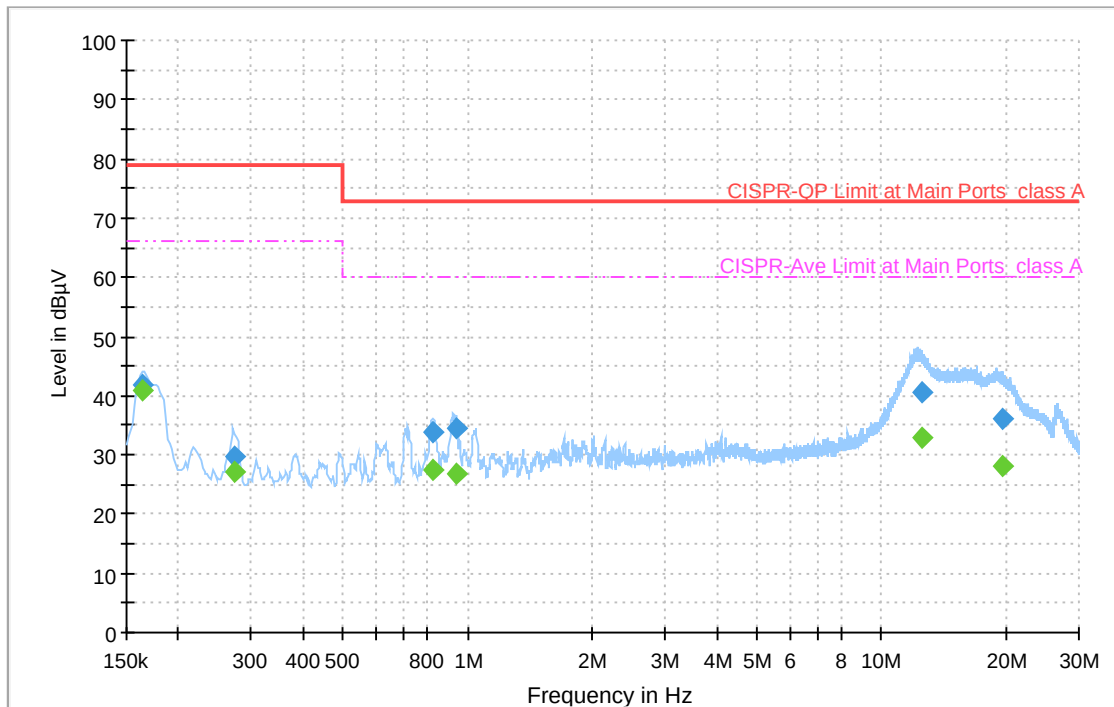
Appendix A. AC Conducted Emission Test Results

Test Engineer :	Leo Liu	Temperature :	20~23℃
		Relative Humidity :	38~42%

EUT Information

Test Site Location : CO01-CA
Project 230625004
Power: 120Vac/60Hz
Mode 1
Line

Full Spectrum



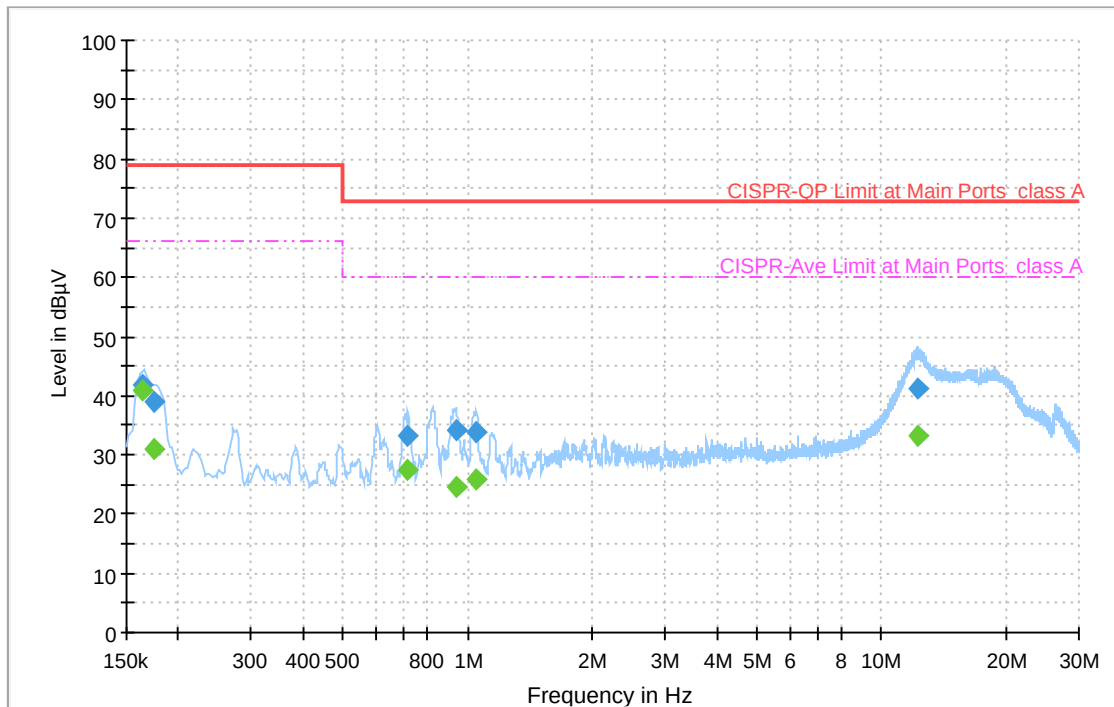
Final Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.163509	---	41.05	66.00	24.95	L1	OFF	20.3
0.163509	41.92	---	79.00	37.08	L1	OFF	20.3
0.272310	---	27.03	66.00	38.97	L1	OFF	20.3
0.272310	29.60	---	79.00	49.40	L1	OFF	20.3
0.827304	---	27.57	60.00	32.43	L1	OFF	20.3
0.827304	33.76	---	73.00	39.24	L1	OFF	20.3
0.939534	---	26.77	60.00	33.23	L1	OFF	20.3
0.939534	34.41	---	73.00	38.59	L1	OFF	20.3
12.517053	---	32.91	60.00	27.09	L1	OFF	20.5
12.517053	40.67	---	73.00	32.33	L1	OFF	20.5
19.685292	---	28.27	60.00	31.73	L1	OFF	20.7
19.685292	36.25	---	73.00	36.75	L1	OFF	20.7

EUT Information

Test Site Location : CO01-CA
Project 230625004
Power: 120Vac/60Hz
Mode 1
Neutral

Full Spectrum

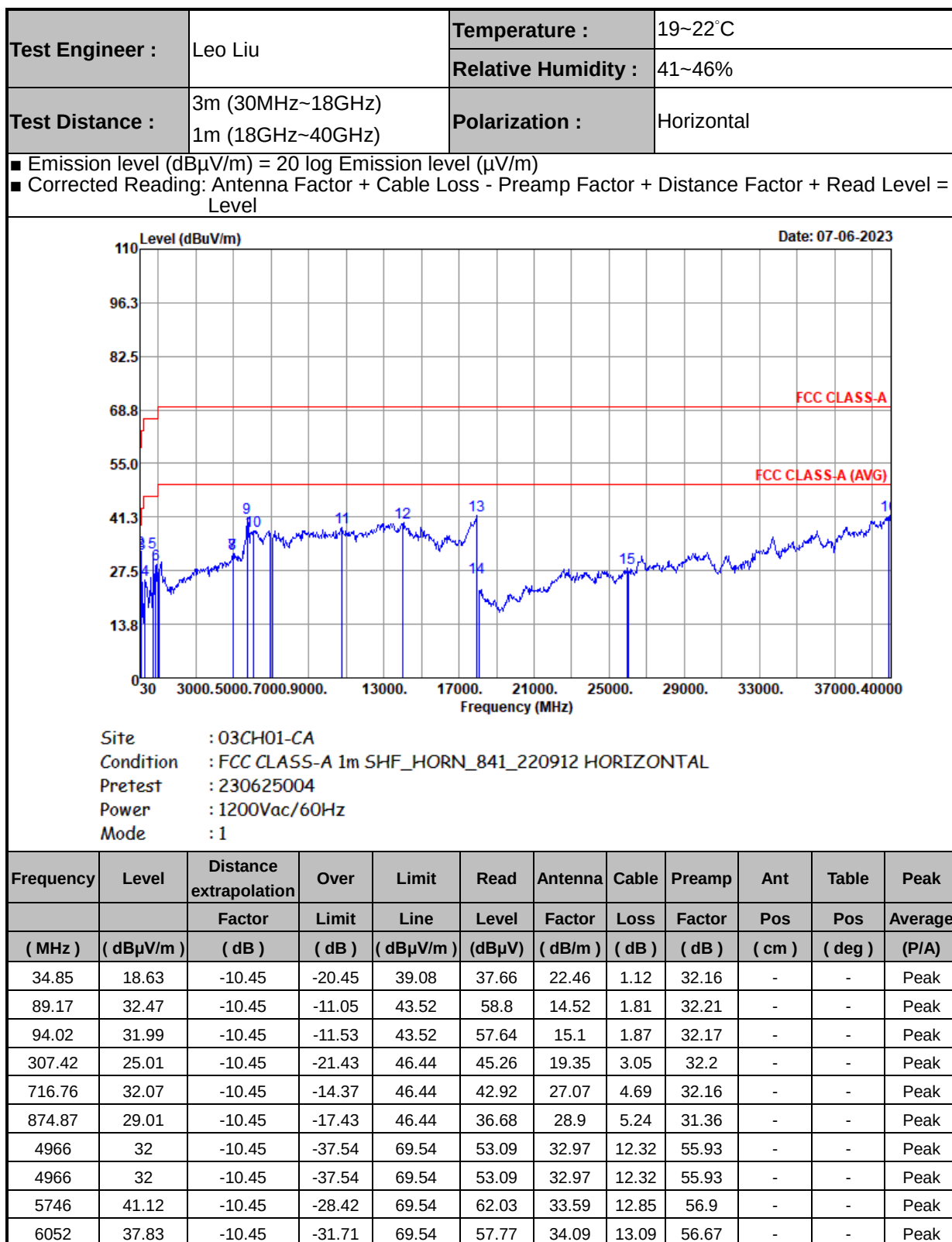


Final Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.163239	---	40.97	66.00	25.03	N	OFF	20.3
0.163239	41.95	---	79.00	37.05	N	OFF	20.3
0.174660	---	31.11	66.00	34.89	N	OFF	20.3
0.174660	39.13	---	79.00	39.87	N	OFF	20.3
0.717684	---	27.35	60.00	32.65	N	OFF	20.3
0.717684	33.31	---	73.00	39.69	N	OFF	20.3
0.941784	---	24.75	60.00	35.25	N	OFF	20.3
0.941784	34.05	---	73.00	38.95	N	OFF	20.3
1.050153	---	25.80	60.00	34.20	N	OFF	20.3
1.050153	33.89	---	73.00	39.11	N	OFF	20.3
12.243975	---	33.38	60.00	26.62	N	OFF	20.5
12.243975	41.22	---	73.00	31.78	N	OFF	20.5



Appendix B. Radiated Emission Test Result

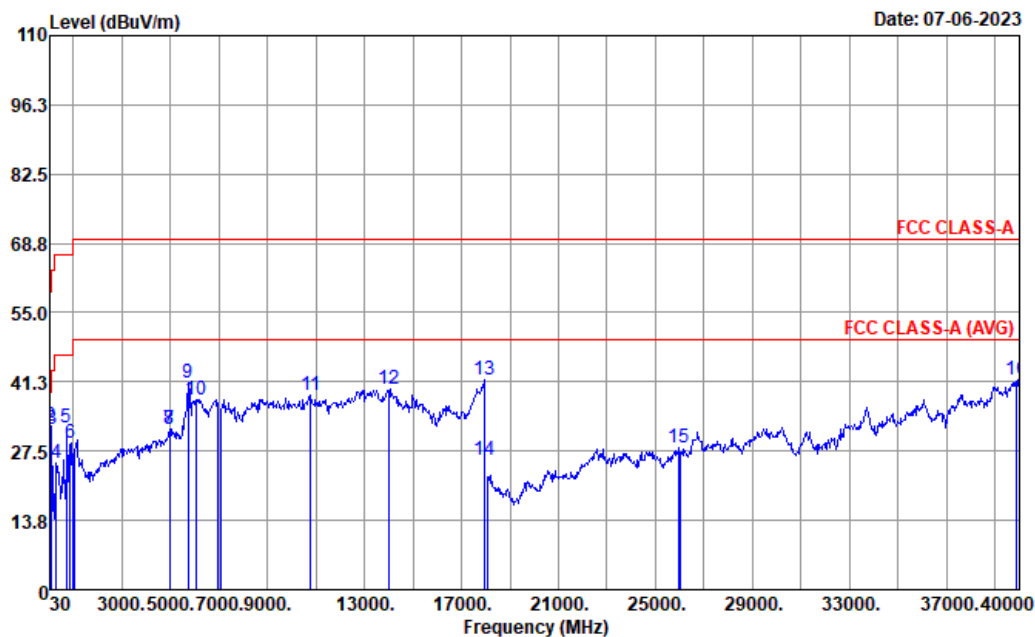




Test Engineer :	Leo Liu	Temperature :	19~22°C
		Relative Humidity :	41~46%
Test Distance :	3m (30MHz~18GHz)	Polarization :	Horizontal
	1m (18GHz~40GHz)		

■ Emission level (dBμV/m) = 20 log Emission level (μV/m)

■ Corrected Reading: Antenna Factor + Cable Loss - Preamp Factor + Distance Factor + Read Level = Level



Site : 03CH01-CA
Condition : FCC CLASS-A 1m SHF_HORN_841_220912 HORIZONTAL
Pretest : 230625004
Power : 1200Vac/60Hz
Mode : 1

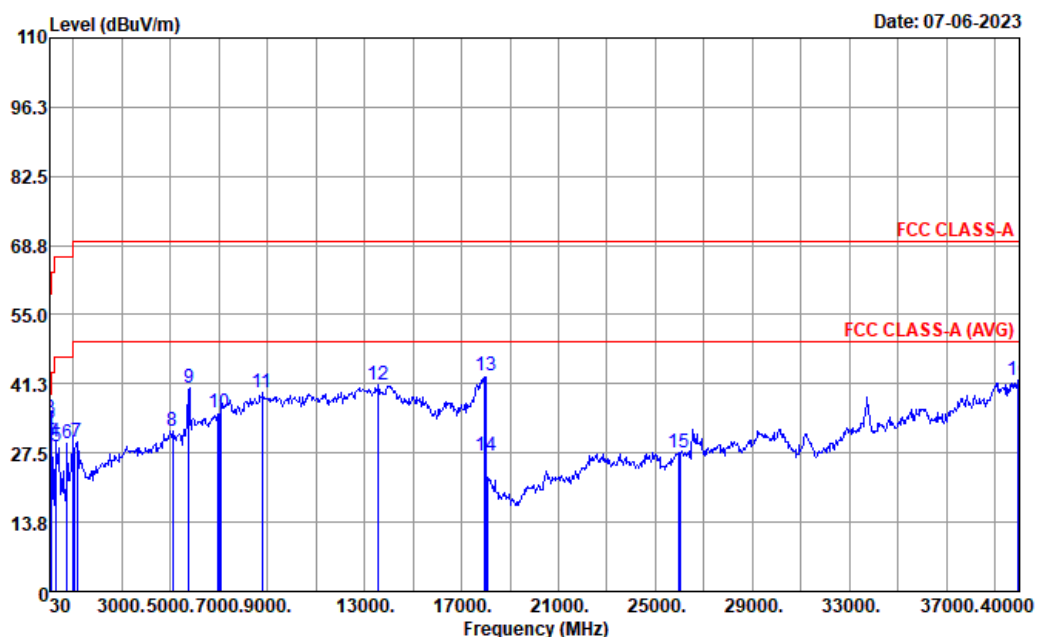
Frequency	Level	Distance extrapolation	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak
(MHz)	(dBμV/m)	Factor (dB)	Limit (dB)	Line (dBμV/m)	Level (dBμV)	Factor (dB/m)	Loss (dB)	Factor (dB)	Pos (cm)	Pos (deg)	Average (P/A)
10773	38.56	-10.45	-30.98	69.54	52.36	39.45	16.04	58.84	-	-	Peak
14040	39.68	-10.45	-29.86	69.54	51	40.77	18.28	59.92	-	-	Peak
17923	41.57	-10.45	-27.97	69.54	44.45	42.32	21.09	55.84	-	-	Peak
17923	25.7	-10.45	-23.84	49.54	28.58	42.32	21.09	55.84	-	-	Average
25968	28.21	-20.00	-41.33	69.54	33.99	38.88	26.38	51.04	-	-	Peak
39888	41.62	-20.00	-27.92	69.54	36.61	43.67	33.28	51.94	-	-	Peak



Test Engineer :	Leo Liu	Temperature :	19~22°C
		Relative Humidity :	41~46%
Test Distance :	3m (30MHz~18GHz)	Polarization :	Vertical
	1m (18GHz~40GHz)		

■ Emission level (dBμV/m) = 20 log Emission level (μV/m)

■ Corrected Reading: Antenna Factor + Cable Loss - Preamp Factor + Distance Factor + Read Level = Level



Site : 03CH01-CA

Condition : FCC CLASS-A 1m SHF_HORN_841_220912 VERTICAL

Pretest : 230625004

Power : 1200Vac/60Hz

Mode : 1

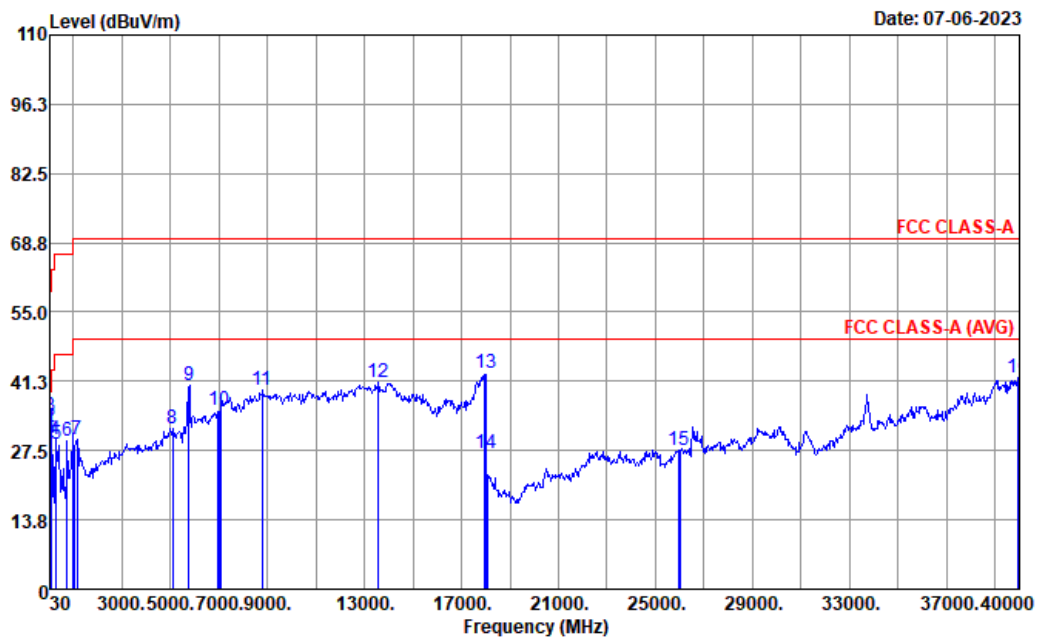
Frequency	Level	Distance extrapolation	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak
(MHz)	(dBμV/m)	Factor (dB)	Limit (dB)	Line (dBμV/m)	Level (dBμV)	Factor (dB/m)	Loss (dB)	Factor (dB)	Pos (cm)	Pos (deg)	Average (P/A)
40.67	30.73	-10.45	-8.35	39.08	53	19.17	1.17	32.16	101	3	QP
86.26	32.05	-10.45	-7.03	39.08	58.74	14.23	1.75	32.22	-	-	Peak
93.05	34.36	-10.45	-9.16	43.52	60.12	15.01	1.86	32.18	-	-	Peak
268.62	29.69	-10.45	-16.75	46.44	50.21	19.28	2.82	32.17	-	-	Peak
299.66	28.77	-10.45	-17.67	46.44	49.21	19.2	3.03	32.22	-	-	Peak
740.04	29.44	-10.45	-17	46.44	39.27	28	4.74	32.12	-	-	Peak
1144	29.74	-10.45	-39.8	69.54	70.42	25.48	5.64	61.35	-	-	Peak
5086	31.89	-10.45	-37.65	69.54	52.97	33.21	12.31	56.15	-	-	Peak
5758	40.57	-10.45	-28.97	69.54	61.24	33.81	12.87	56.9	-	-	Peak
6994	35.59	-10.45	-33.95	69.54	52.04	36.03	14.08	56.11	-	-	Peak



Test Engineer :	Leo Liu	Temperature :	19~22°C
		Relative Humidity :	41~46%
Test Distance :	3m (30MHz~18GHz)	Polarization :	Vertical
	1m (18GHz~40GHz)		

■ Emission level (dBμV/m) = 20 log Emission level (μV/m)

■ Corrected Reading: Antenna Factor + Cable Loss - Preamp Factor + Distance Factor + Read Level = Level



Site : 03CH01-CA
 Condition : FCC CLASS-A 1m SHF_HORN_841_220912 VERTICAL
 Pretest : 230625004
 Power : 1200Vac/60Hz
 Mode : 1

Frequency	Level	Distance extrapolation	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak
(MHz)	(dBμV/m)	Factor (dB)	Limit (dB)	Line (dBμV/m)	Level (dBμV)	Factor (dB/m)	Loss (dB)	Factor (dB)	Pos (cm)	Pos (deg)	Average (P/A)
8793	39.46	-10.45	-30.08	69.54	52.08	37.98	14.69	54.84	-	-	Peak
13556	41.02	-10.45	-28.52	69.54	53.14	40.53	18.04	60.24	-	-	Peak
18000	42.83	-10.45	-26.71	69.54	44.68	43.21	21.14	55.75	-	-	Peak
18000	26.92	-10.45	-22.62	49.54	28.77	43.21	21.14	55.75	-	-	Average
25944	27.63	-20.00	-41.91	69.54	33.53	38.79	26.36	51.05	-	-	Peak
39916	42.08	-20.00	-27.46	69.54	36.87	43.91	33.3	52	-	-	Peak