



FCC EMI TEST REPORT

FCC ID : 2AZULRS8682
Equipment : 5G n48 RRU 4x4 5W/Ch Outdoor
Brand Name : LIONS
Model Name : RS8682
Applicant : LIONS Taiwan Technology Inc.
3F.-2, No. 120, Sec. 2, Gongdao 5th Rd., East
Dist., Hsinchu City 300031 , Taiwan (R.O.C.)
Manufacturer : LIONS Taiwan Technology Inc.
3F.-2, No. 120, Sec. 2, Gongdao 5th Rd., East
Dist., Hsinchu City 300031 , Taiwan (R.O.C.)
Standard : FCC 47 CFR FCC Part 15 Subpart B Class B

The product was received on Nov. 21, 2023 and testing was performed from Feb. 05, 2024 to Feb. 05, 2024. 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 C63.4a-2017 and has been in compliance with the applicable technical standards.

The test results in this variant 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
FC3N0925-03	01	Initial issue of report	Mar. 08, 2024
FC3N0925-03	02	Revise Appendix A. This report is an updated version, replacing the report issued on Mar. 08, 2024.	Mar. 14, 2024



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	2.59 dB under the limit at 126.39 MHz for Quasi-Peak

Note:

1. Not required means after assessing, test items are not necessary to carry out.
2. This is a variant report by changing built-in PSU. All the test cases were performed on original report which can be referred to Sporton Report Number FC3N0925. Based on the original report, only worst case was verified.

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.

Reviewed by: Keven Cheng**Report Producer: Mila Chen**



1. General Description

1.1. Product Feature of Equipment Under Test

Product Feature
General Specs 5G NR
Antenna Type WWAN: High Gain Antenna

Remark:

1. The EUT's information above is declared by manufacturer. Please refer to Disclaimer in report summary.
2. The maximum allowable antenna gain is determined by the manufacturer.

1.2. Modification of EUT

No modifications made to the EUT during the testing.

1.3. 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

1.4. 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 B
- ♦ ANSI C63.4a-2017

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

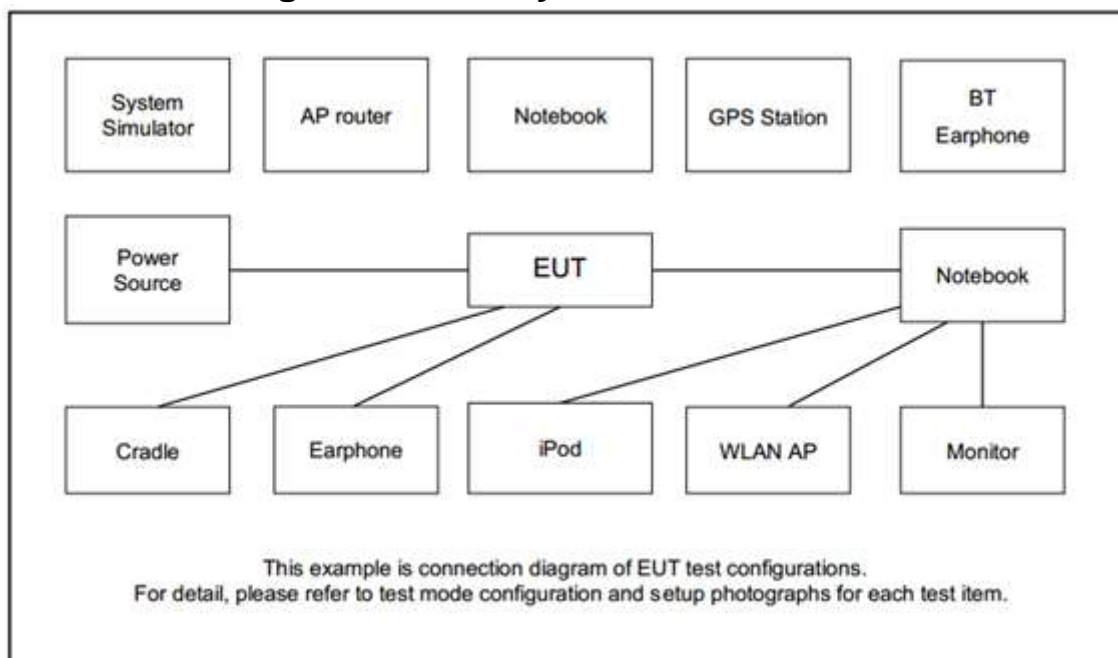
2. Test Configuration of Equipment Under Test

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 C63.4a-2017. 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	Mode 1 : 5G NR n48 TX + LAN 1 Link with Notebook + Fiber connect to Switch + DC Adapter

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.	Notebook	DELL	Latitude 3400	FCC DoC	N/A	AC I/P : Unshielded, 1.2m DC O/P : Shielded, 1.8m
2.	DC Power Supply	GW Instek	GEU810960	FCC DoC	N/A	N/A

2.4. EUT Operation Test Setup

The EUT is in 5G NR n48 idle mode during the test. The EUT is synchronized with the BCCH, and has been continuous receiving mode by setting paging reorganization of the system simulator.



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

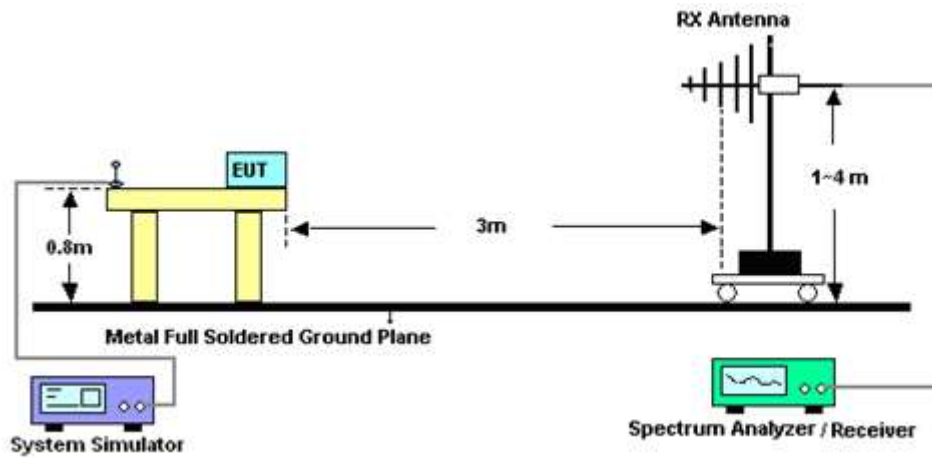
Please refer to the measuring equipment list in this test report.

3.1.3. Test Procedures

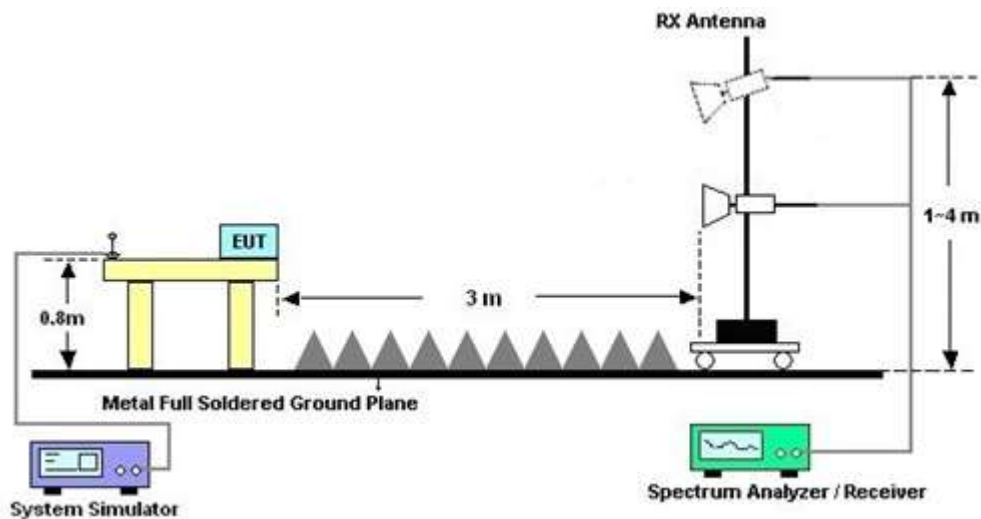
1. The EUT is placed on a turntable with 0.8 meter above ground.
2. The EUT is set 3 meters (30 M~18 G) and 1 meters (18 G~ 40 G) from the interference receiving antenna, which is mounted on the top of a variable height antenna tower.
3. The table is rotated 360 degrees to determine the position of the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

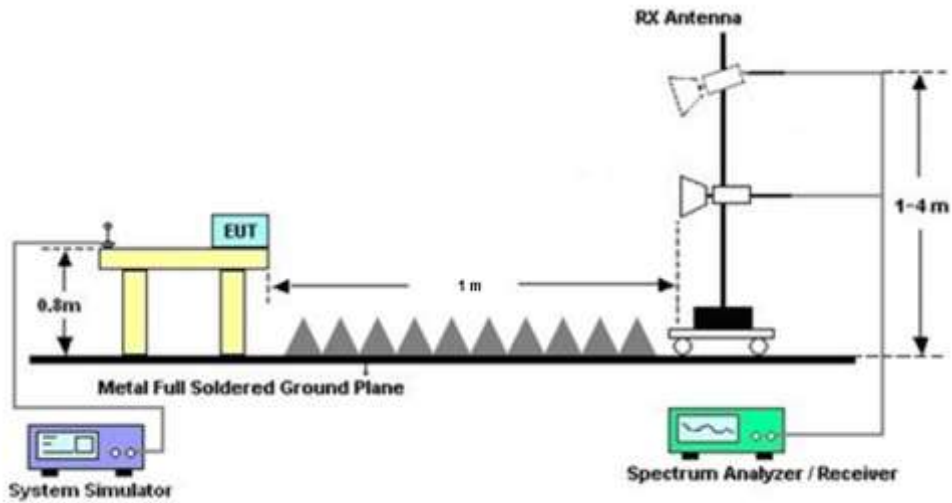
For Radiated Emissions from 30 MHz to 1 GHz



For Radiated Emissions from 1GHz to 18GHz



For Radiated Emissions above 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. 17, 2023	Feb. 05, 2024	Apr. 16, 2024	Radiation (03CH06-HY)
Bilog Antenna	Schaffner	CBL 6111C & N-6-06	2725 & AT-N0601	30MHz~1GHz	Nov. 03, 2023	Feb. 05, 2024	Nov. 02, 2024	Radiation (03CH06-HY)
EMI Test Receiver	Rohde & Schwarz	ESU26	100472	20Hz~26.5GHz	Feb. 13, 2023	Feb. 05, 2024	Feb. 12, 2024	Radiation (03CH06-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1212	1GHz~18GHz	Mar. 23, 2023	Feb. 05, 2024	Mar. 22, 2024	Radiation (03CH06-HY)
Preamplifier	Jet-Power	JPA00101800-3 0-10P	1601180001	1GHz~18GHz	Jul. 16, 2023	Feb. 05, 2024	Jul. 15, 2024	Radiation (03CH06-HY)
RF Cable	HUBER + SUHNER	104 SF102_2000mm SF102_3000mm SF102_7000mm	802433/4 532421/2 532422/2 532299/2	30Mhz to 18Ghz	Jul. 03, 2023	Feb. 05, 2024	Jul. 02, 2024	Radiation (03CH06-HY)
Hygrometer	TECPEL	DTM-303B	TP210018	N/A	Oct. 24, 2023	Feb. 05, 2024	Oct. 23, 2024	Radiation (03CH06-HY)
Controller	INN-CO	EM1000	060782	Control Turn table & Ant Mast	N/A	Feb. 05, 2024	N/A	Radiation (03CH06-HY)
Antenna Mast	MF	MF-7802	MF780208212	1m~4m	N/A	Feb. 05, 2024	N/A	Radiation (03CH06-HY)
Turn Table	INN-CO	DS2000	420/650/00	0-360 degree	N/A	Feb. 05, 2024	N/A	Radiation (03CH06-HY)
Software	Audix	E3 6.2009-8-24(k5)	N/A	N/A	N/A	Feb. 05, 2024	N/A	Radiation (03CH06-HY)
Signal Analyzer	R&S	FSV3044	101104	10Hz~44GHz	Feb. 21, 2023	Feb. 05, 2024	Feb. 20, 2024	Radiation (03CH06-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	18~40GHz	Nov. 24, 2023	Feb. 05, 2024	Nov. 23, 2024	Radiation (03CH06-HY)
Preamplifier	EMEC	EM18G40G	0600789	18~40GHz	Jul. 25, 2023	Feb. 05, 2024	Jul. 24, 2024	Radiation (03CH06-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	801606/2	9KHz ~ 40GHz	Apr. 20, 2023	Feb. 05, 2024	Apr. 19, 2024	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% ($U = 2Uc(y)$)	4.7 dB
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Uncertainty of Radiated Emission Measurement (6000 MHz ~ 18000 MHz)

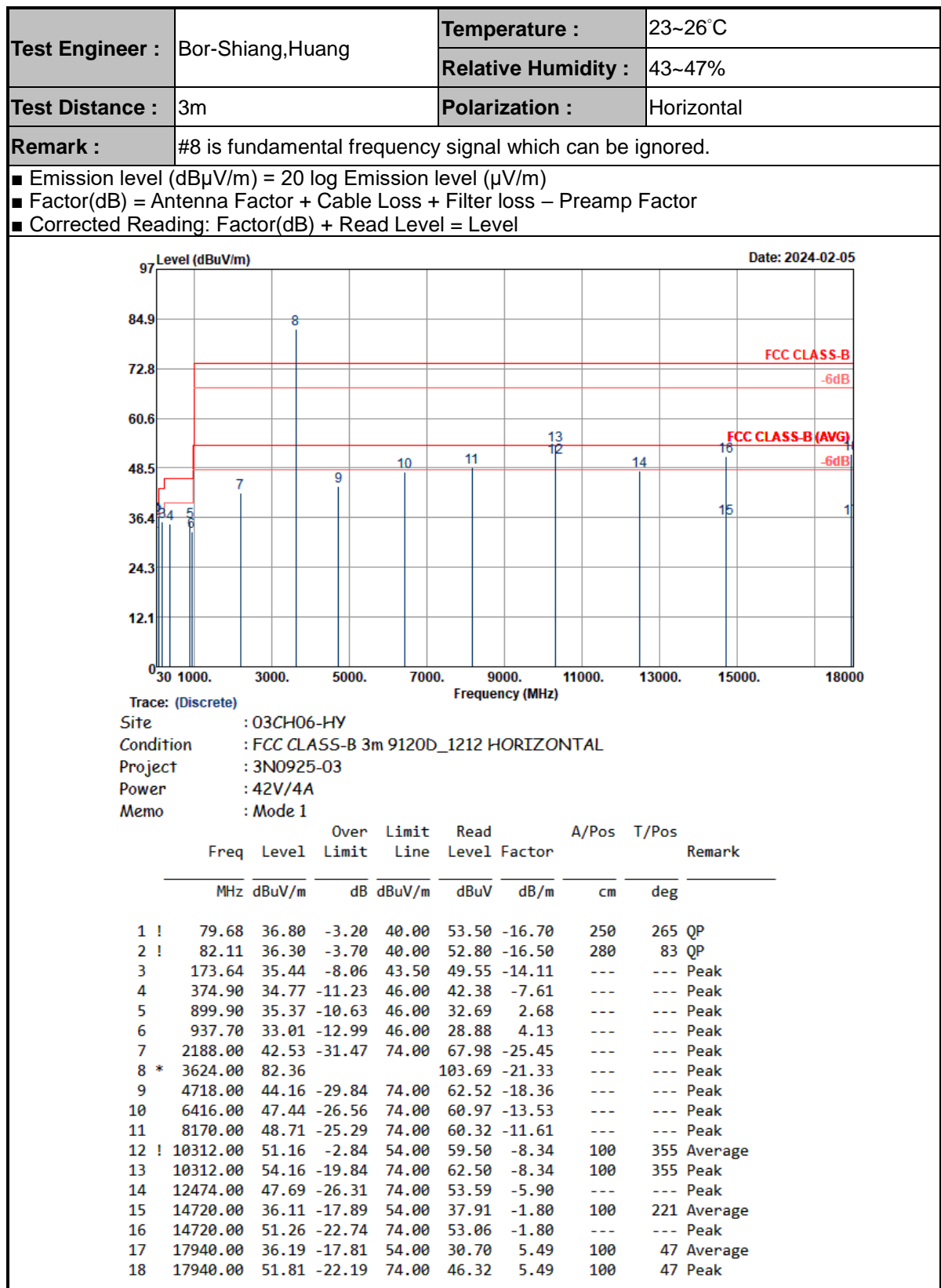
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.6 dB
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.2 dB
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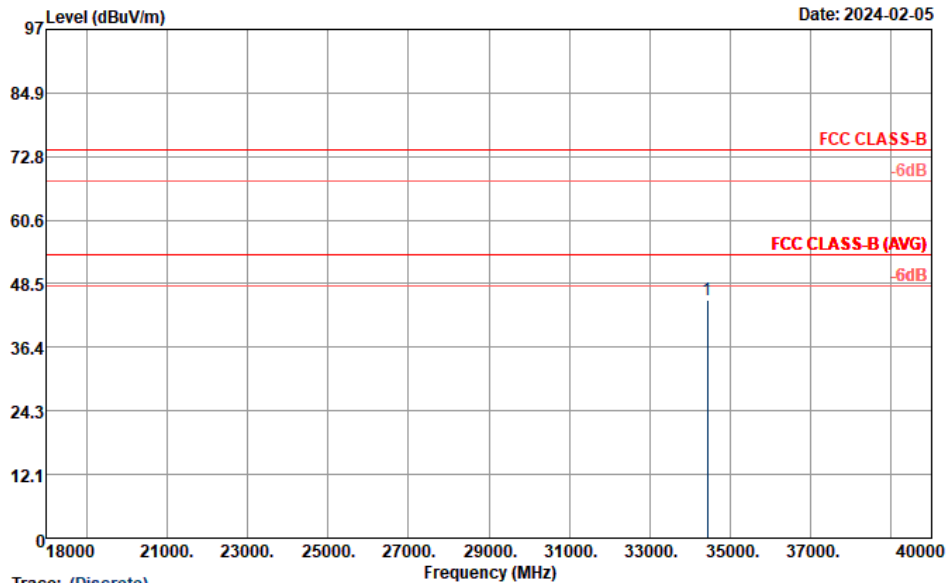
Appendix A. Radiated Emission Test Result





Test Engineer :	Bor-Shiang,Huang	Temperature :	23~26°C
		Relative Humidity :	43~47%
Test Distance :	1m	Polarization :	Horizontal

- Emission level (dBμV/m) = 20 log Emission level (μV/m)
- Distance extrapolation factor (for above 18GHz) = 20 log (test distance / specific distance) (dB)
- EX.: Distance extrapolation factor = 20 log (1/3) = -9.54 (dB)
- Factor(dB) = Antenna Factor + Cable Loss + Filter loss – Preamp Factor + Distance extrapolation factor
- Level = Read Level + Factor(dB)



Trace: (Discrete)

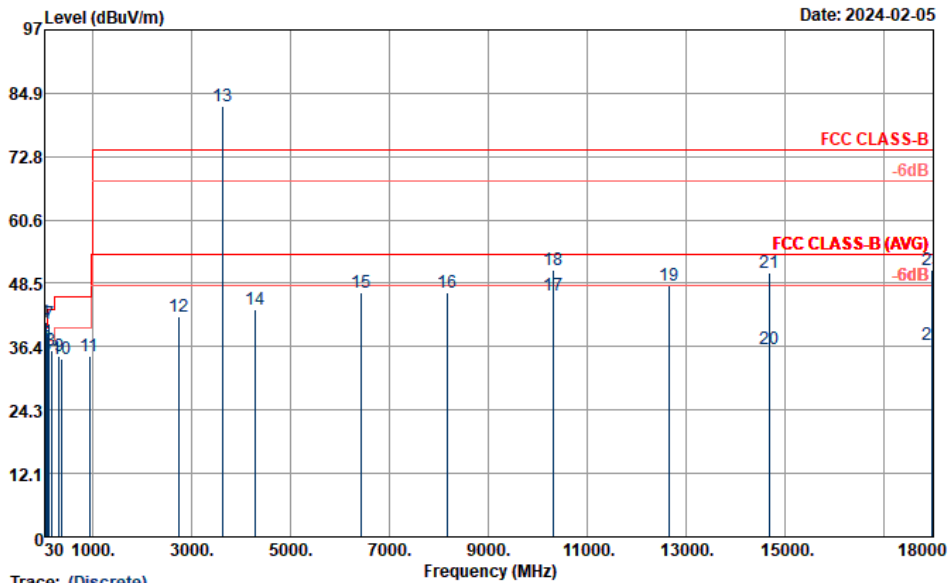
Site : 03CH06-HY
Condition : FCC CLASS-B 3m BBHA_9170251 HORIZONTAL
Project : 3N0925-03
Power : 42V/4A
Memo : Mode 1

	Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	cm	deg	
1	34434.00	45.34	-28.66	74.00	41.71	3.63	---	---	Peak



Test Engineer :	Bor-Shiang,Huang	Temperature :	23~26°C
		Relative Humidity :	43~47%
Test Distance :	3m	Polarization :	Vertical
Remark :	#13 is fundamental frequency signal which can be ignored.		

- 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



Site : 03CH06-HY
Condition : FCC CLASS-B 3m 9120D_1212 VERTICAL
Project : 3N0925-03
Power : 42V/4A
Memo : Mode 1

	Freq	Level	Over	Limit	Read		A/Pos	T/Pos	Remark
	MHz	dBuV/m	Limit	Line	Level	Factor			
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	cm	deg	
1	35.13	32.92	-7.08	40.00	41.90	-8.98	100	96	QP
2	39.18	32.31	-7.69	40.00	43.30	-10.99	100	182	QP
3 !	43.50	35.83	-4.17	40.00	48.81	-12.98	100	185	QP
4 *	47.55	40.98	0.98	40.00	55.99	-15.01	100	155	Peak
5 !	79.14	34.71	-5.29	40.00	51.49	-16.78	100	0	QP
6 !	82.38	36.96	-3.04	40.00	53.40	-16.44	100	28	QP
7 !	126.39	40.91	-2.59	43.50	53.00	-12.09	100	355	QP
8	161.22	35.72	-7.78	43.50	48.99	-13.27	100	360	QP
9	329.40	34.71	-11.29	46.00	43.71	-9.00	---	---	Peak
10	374.90	33.99	-12.01	46.00	41.60	-7.61	---	---	Peak
11	937.70	34.69	-11.31	46.00	30.56	4.13	---	---	Peak
12	2740.00	42.19	-31.81	74.00	65.08	-22.89	---	---	Peak
13 *	3624.00	82.40			103.73	-21.33	---	---	Peak
14	4290.00	43.48	-30.52	74.00	62.73	-19.25	---	---	Peak
15	6434.00	46.81	-27.19	74.00	60.39	-13.58	---	---	Peak
16	8160.00	46.65	-27.35	74.00	58.30	-11.65	---	---	Peak
17	10312.00	46.16	-7.84	54.00	54.50	-8.34	100	320	Average
18	10312.00	51.16	-22.84	74.00	59.50	-8.34	100	320	Peak
19	12666.00	48.14	-25.86	74.00	53.58	-5.44	---	---	Peak
20	14685.00	36.06	-17.94	54.00	37.80	-1.74	100	71	Average
21	14685.00	50.51	-23.49	74.00	52.25	-1.74	100	71	Peak

