



TEST REPORT

Applicant: M5Stack Technology Co., Ltd

5F, Tangwei Stock Commercial Building Youli Road, Bao'an District, Address:

Shenzhen, Guangdong, China

FCC ID: 2AN3WM5COREMP135

Product Name: M5CoreMP135

Standard(s): 47 CFR Part 15 Subpart B

ANSI C63.4-2014

The above device has been tested and found compliant with the requirement of the relative standards by China Certification ICT Co., Ltd (Dongguan)

Report Number: CR231276278-00

Date Of Issue: 2024/3/7

Reviewed By: Calvin Chen

Title: RF Engineer

Approved By: Sun Zhong

Calvin Chen
Sun Zhong

Title: Manager

Test Laboratory: China Certification ICT Co., Ltd (Dongguan)

No. 113, Pingkang Road, Dalang Town, Dongguan,

Guangdong, China Tel: +86-769-82016888

Test Facility

The Test site used by China Certification ICT Co., Ltd (Dongguan) to collect test data is located on the No. 113, Pingkang Road, Dalang Town, Dongguan, Guangdong, China.

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The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 442868, the FCC Designation No. : CN1314.

Declarations

China Certification ICT Co., Ltd (Dongguan) is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with a triangle symbol "\(^{\text{a}}\)". Customer model name, addresses, names, trademarks etc. are not considered data.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	CR231276278-00	Original Report	2024/3/7

1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

EUT Name:	M5CoreMP135
EUT Model:	CoreMP135
Highest Operation Frequency:	1000 MHz
Rated Input Voltage:	DC 12V From Adapter
Serial Number:	2FEG-5
EUT Received Date:	2023/12/25
EUT Received Status:	Good

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Accessory Information:

Accessory Description	Manufacturer	Model
/	/	/

1.2 Description of Test Configuration

1.2.1 EUT Operation Condition:

1.2.1 EUT Operation Condition	ш•	
EUT Operation Mode:	The system was configured for testing in Typical Use Mode, which was provided by the manufacturer. Test Mode: M1: LCD Test M2: BUS Test M3: Device Test M4: Disk Test (mmc) M5: NET transmission M6: USB Data transmission M7: Type-C Data transmission	
Equipment Modifications:	S: No	
EUT Exercise Software:	No	

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1.2.2 Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Unknown	OTG Load	Unknown	Unknown
Kingston	USB Disk	DTI/2GB	CH 031308
SanDisk	TF Card	32 GB	521005904698
Unknown	I2C Load	Unknown	Unknown
Unknown	UART Load	Unknown	Unknown
AOC	Display	24M2	OHWL5YA000130 H7
Tenda	Router	RX12 Pro	ED331010215000033
Lenovo	Laptop	T460S	60PDTEK8
Lenovo	Laptop	T460S	60PDTEK7
PHILIPS	Keyboard	SPT6234	K234210510746
Unknown	Load	Unknown	Unknown
QingliuPower	Adapter	QL036-1203000U	2316

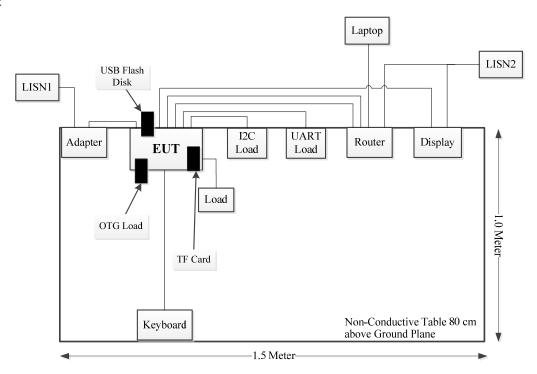
1.2.3 Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	То
Power Cable	No	No	1.2	Adapter	EUT
Keyboard Cable	No	No	1.2	EUT	Keyboard
RJ45 Cable	No	No	1	EUT	Router
RJ45 Cable	No	No	1.2	EUT	Router
RJ45 Cable	No	No	1	Router	Laptop
HDMI Cable	No	No	1.2	EUT	Display
Cable*2	No	No	0.2	EUT	i2C Load
Cable*2	No	No	0.2	EUT	UART Load
Cable	No	No	0.1	EUT	Load

1.2.4 Block Diagram of Test Setup

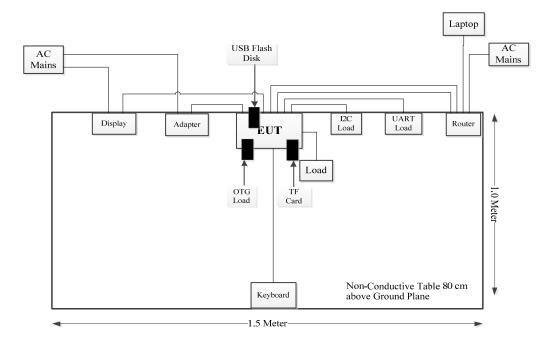
AC line conducted emissions:

M1-M7:



Radiated emissions:

M1-M7:



1.3 Measurement Uncertainty

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Parameter	Measurement Uncertainty	
Unwanted Emissions, radiated	30M~200MHz: 4.15 dB,200M~1GHz: 5.61 dB,1G~6GHz: 5.14 dB,	
Offwanted Effissions, radiated	6G~18GHz: 5.93 dB,18G~26.5G:5.47 dB,26.5G~40G:5.63 dB	
Temperature	±1 °C	
Humidity	±5%	
AC Power Lines Conducted Emission	2.8 dB (150 kHz to 30 MHz)	

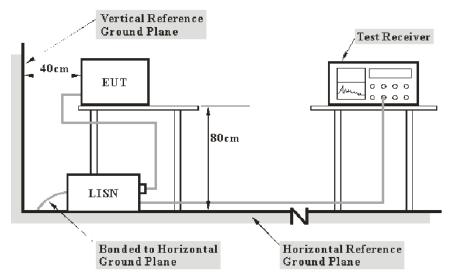
2. SUMMARY OF TEST RESULTS

Standard(s) Section	Description of Test	Result
§15.107	Conducted emissions	Compliant
§15.109	Radiated emissions	Compliant

3. REQUIREMENTS AND TEST PROCEDURES

3.1 AC Line Conducted Emissions

3.1.1 EUT Setup



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Note: 1. Support units were connected to second LISN.

2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 15 B Class B limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

3.1.2 EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

3.1.3 Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the first LISN and the other support equipments were connected to the outlet of the second LISN.

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Maximizing procedure was performed on the six (6) highest emissions of the EUT, the report shall list the six emissions with the smallest margin relative to the limit, unless the margin is greater than 20 dB.

All data was recorded in the Quasi-peak and average detection mode.

The report shall list the six emissions with the smallest margin relative to the limit, unless the margin is greater than 20 dB.

3.1.4 Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result = Reading + Factor

Factor = attenuation caused by cable loss + voltage division factor of AMN

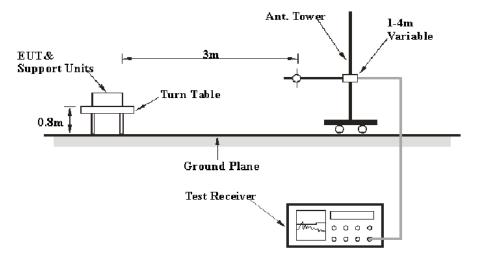
The "Margin" column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit - Result

3.2 Radiation Spurious Emissions

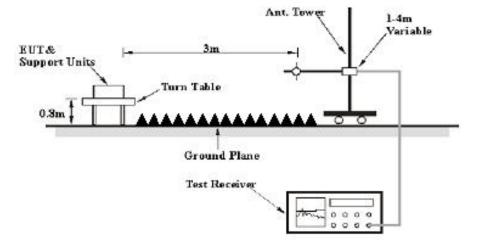
3.2.1 EUT Setup

Below 1GHz:



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Above 1GHz:



The radiated emission were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.4-2014. The specification used was with the FCC Part 15 B Class B limits.

3.2.2 EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 5 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer was set with the following configurations:

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Frequency Range	RBW	Video B/W	IF B/W	Measurement
30 MHz – 1000 MHz	100 kHz	300 kHz	/	Peak
30 MHZ – 1000 MHZ	/	/	120 kHz	QP
Above 1 CHz	1 MHz	3 MHz	/	Peak
Above 1 GHz	1 MHz	10 Hz	/	AVG

If the maximized peak measured value complies with under the limit more than 6dB, then it is unnecessary to perform an QP/Average measurement.

3.2.3 Test Procedure

During the radiated emissions, the adapter was connected to the first AC floor outlet and the other support equipments were connected to the second AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The data was recorded in the Quasi-peak detection mode for below 1 GHz.

All emissions under the average limit and under the noise floor have not recorded in the report.

3.2.4 Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result = Reading + Factor Factor = Antenna Factor + Cable Loss- Amplifier Gain

The "Margin" column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit - Result

4. TEST DATA AND RESULTS

4.1 AC Line Conducted Emissions

Serial Number:	2FEG-5	Test Date:	2024/3/5
Test Site:	CE	Test Mode:	M1,M2,M3,M4,M5,M6,M7
Tester:	David Huang	Test Result:	Pass

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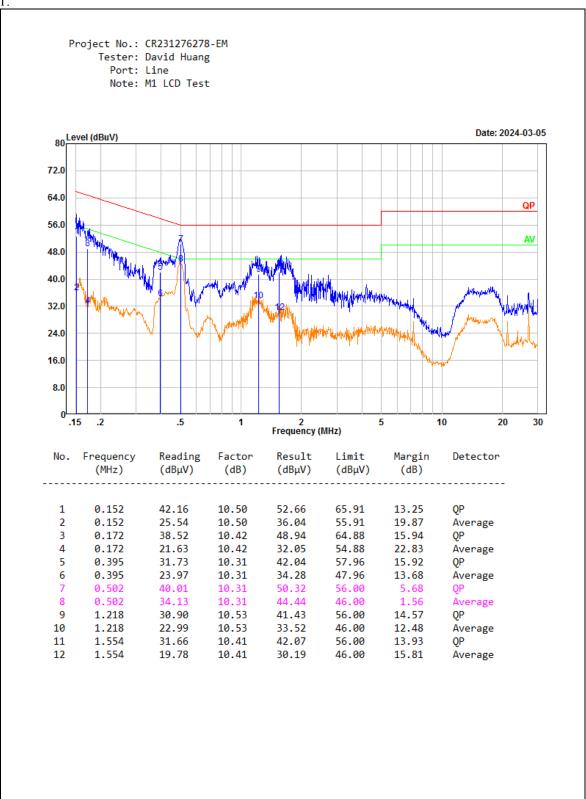
Environmental Conditions:						
Temperature: (°C)	24.4	Relative Humidity: (%)	60	ATM Pressure: (kPa)	100.3	

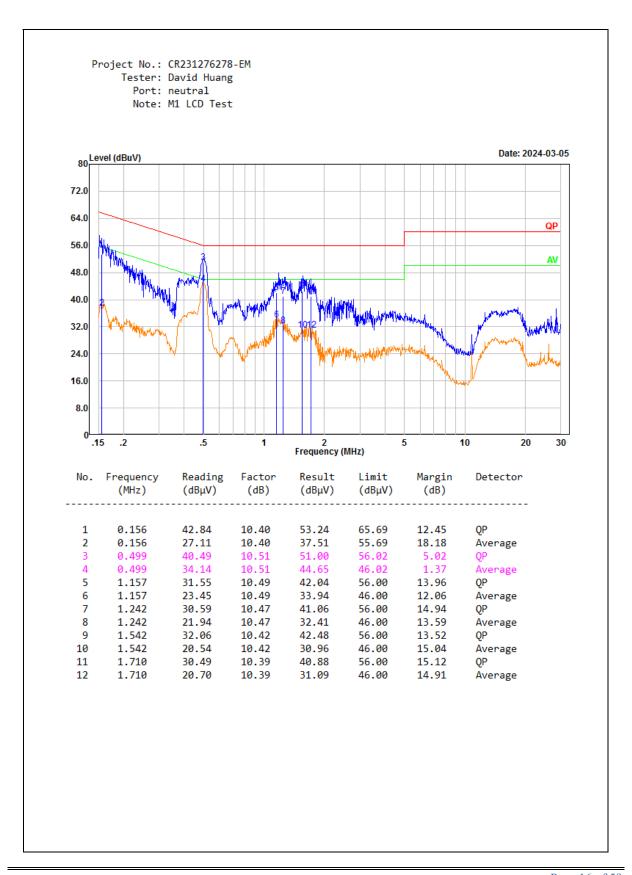
Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	LISN	ENV216	101134	2023/3/31	2024/3/30
R&S	EMI Test Receiver	ESR3	102726	2023/3/31	2024/3/30
MICRO-COAX	Coaxial Cable	UTIFLEX	C-0200-01	2024/1/15	2025/1/14
Audix	Test Software	E3	190306 (V9)	N/A	N/A

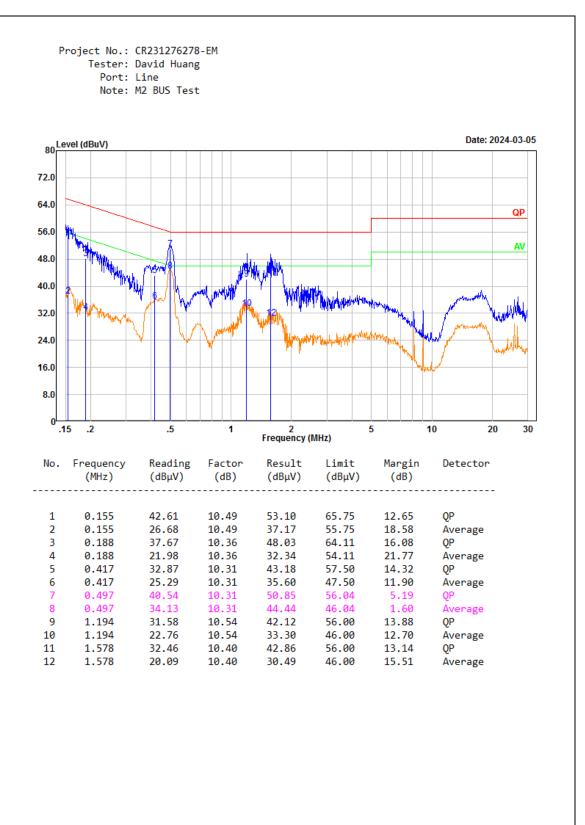
^{*} Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

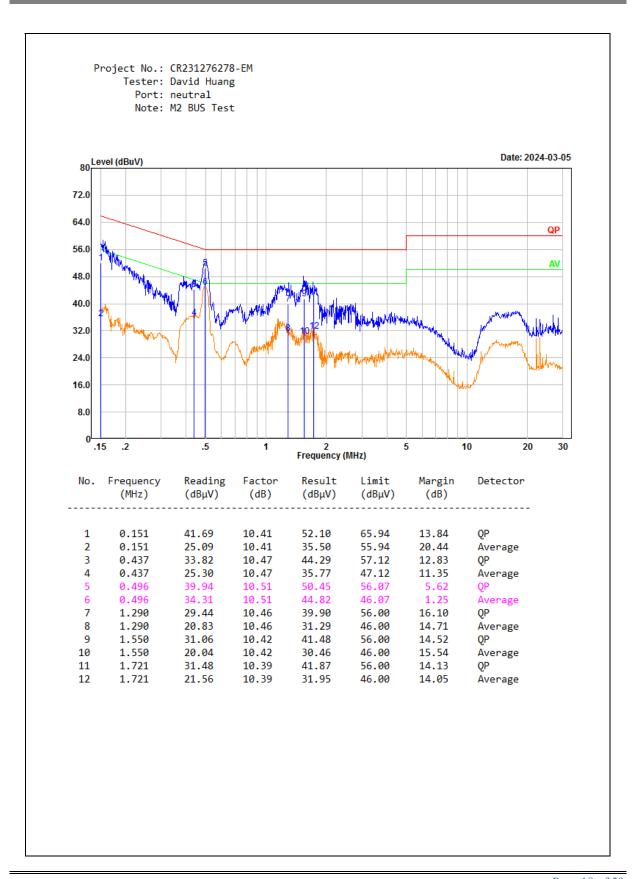
M1:



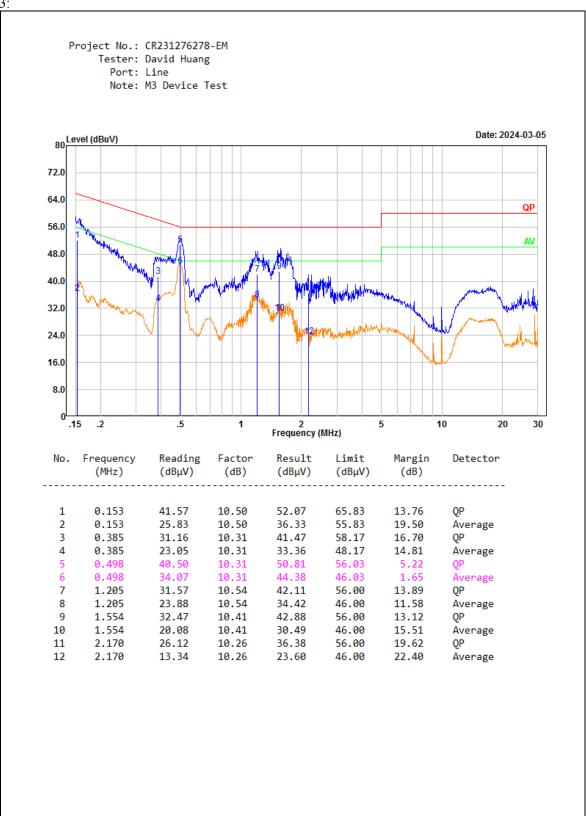


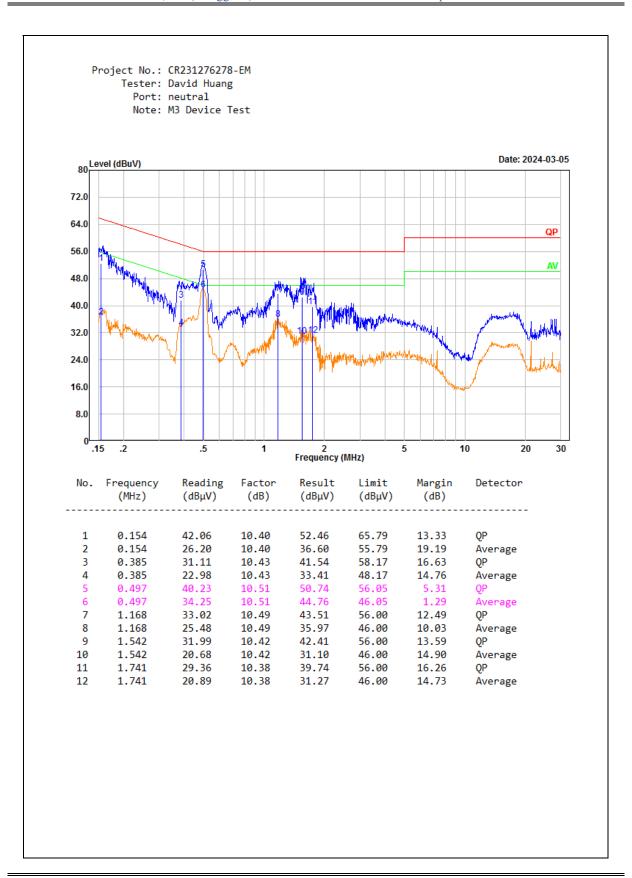
M2:



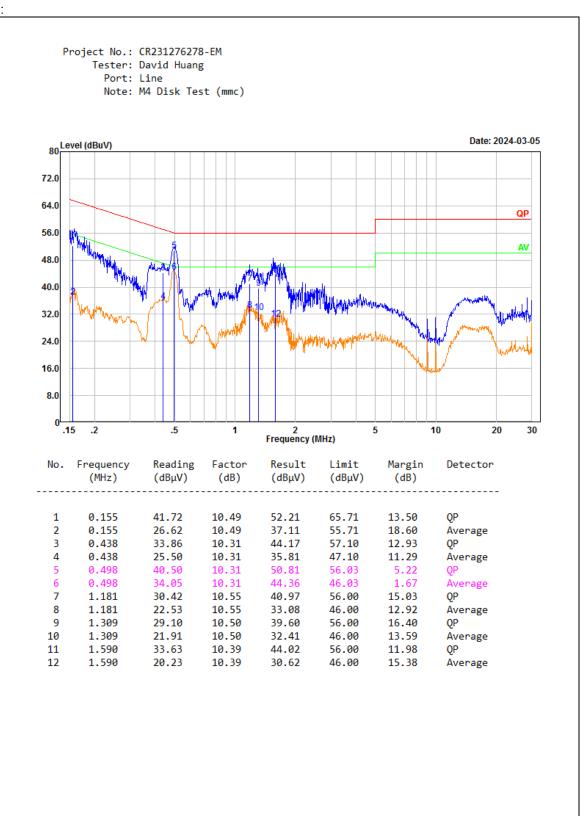


M3:

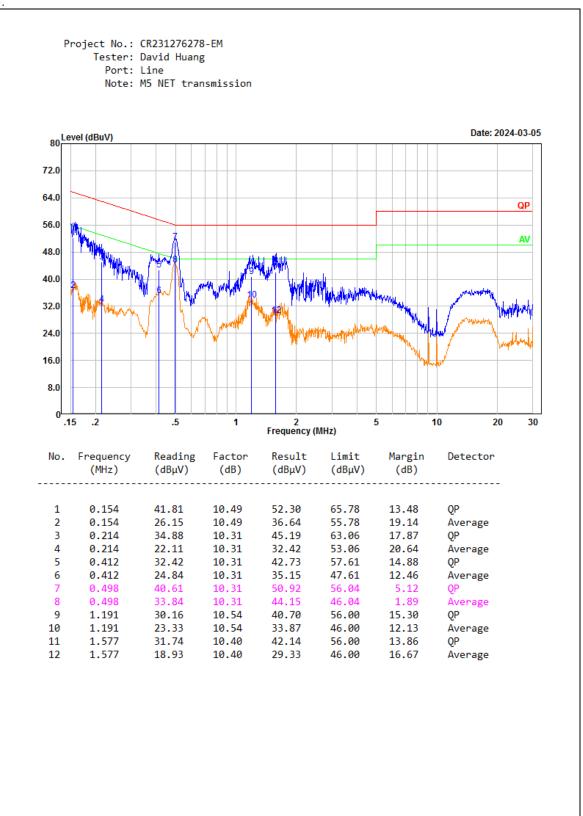


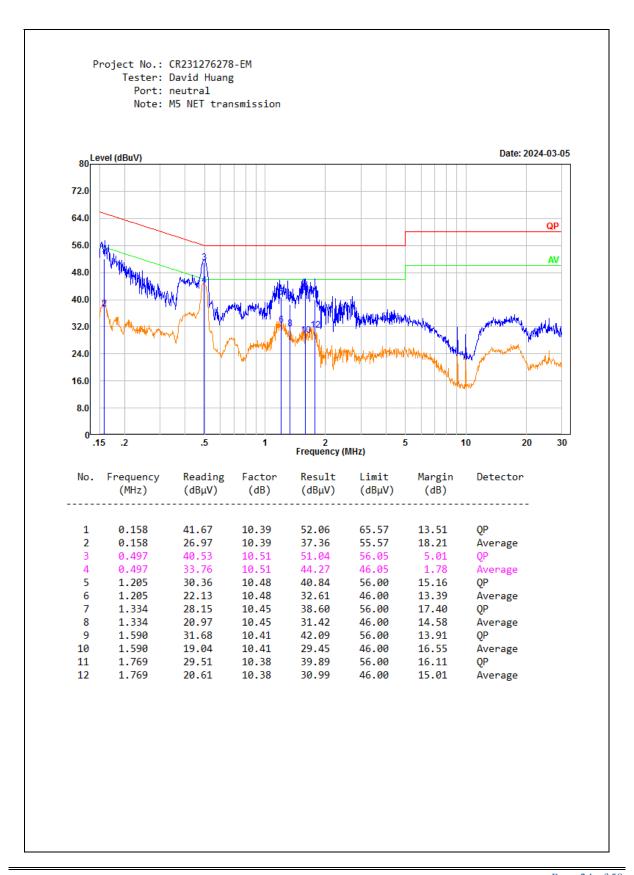


M4:

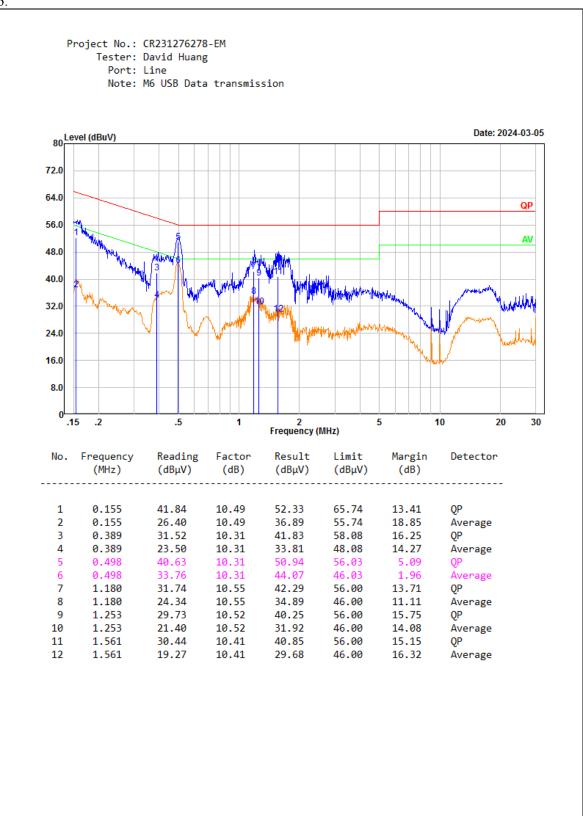


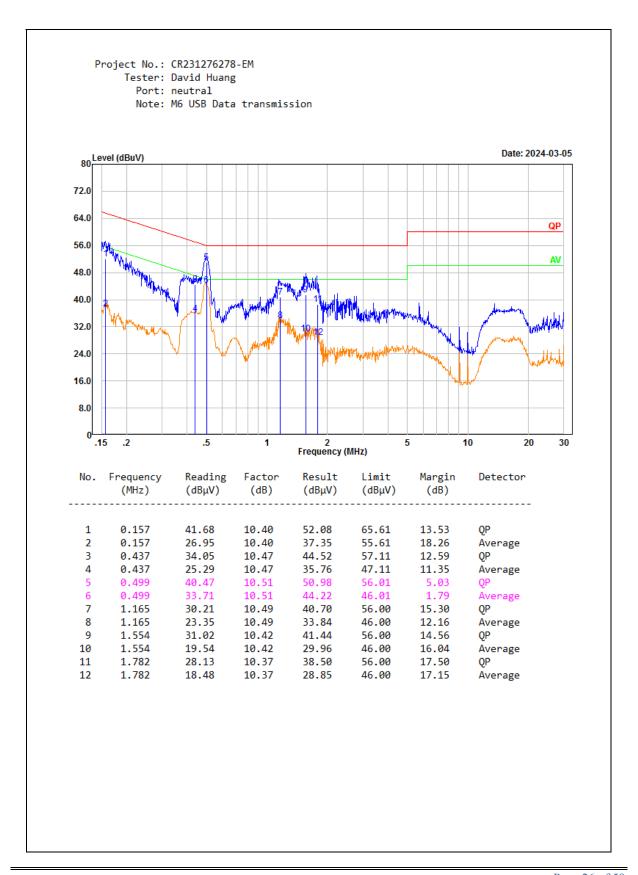
M5:



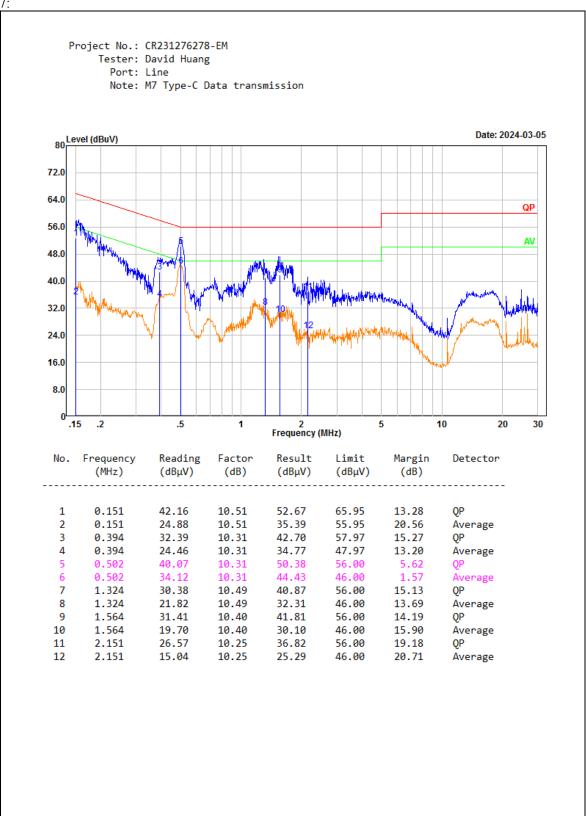


M6:





M7:



4.2 Radiation Spurious Emissions

Serial Number:	2FEG-5	Test Date:	2024/2/4~2024/3/7
Test Site:	966-2,966-1	Test Mode:	M1,M2,M3,M4,M5,M6, M7
Tester:	Jeff Luo,Mack Huang	Test Result:	Pass

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Environmental Conditions:						
	Temperature: $(^{\circ}\mathbb{C})$	24.3~24.4	Relative Humidity: (%)	56~60	ATM Pressure: (kPa)	100.9~101

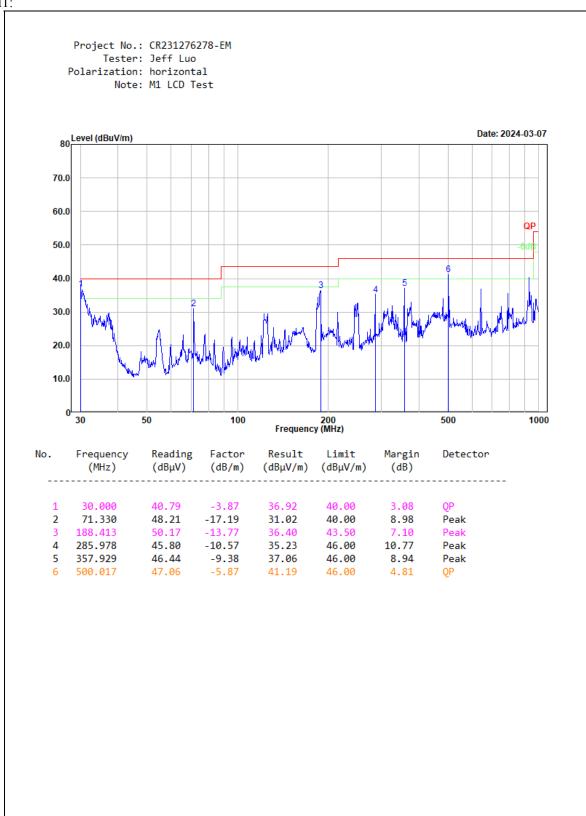
Test Equipment List and Details:

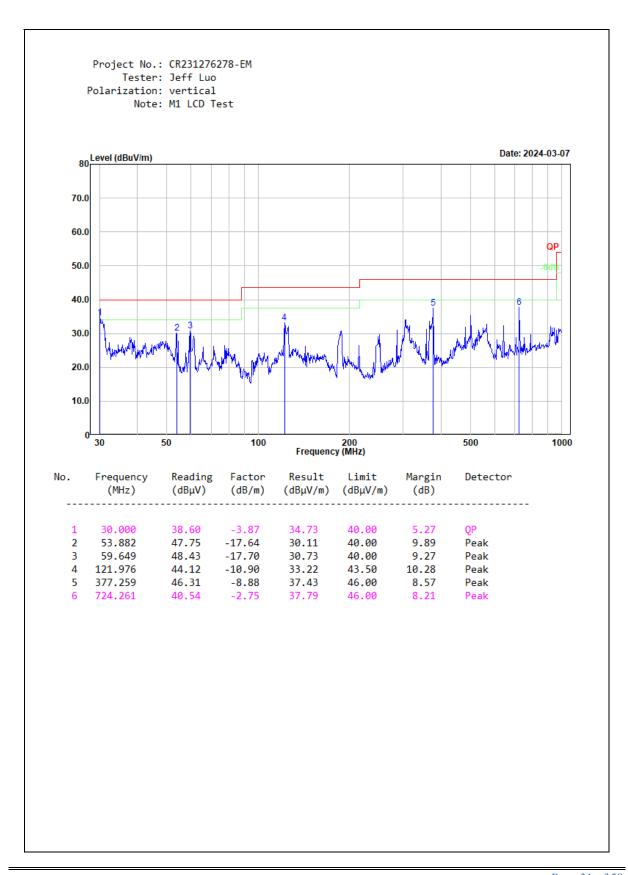
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Antenna	JB6	A082520-5	2023/12/1	2026/11/30
R&S	EMI Test Receiver	ESR3	102724	2023/3/31	2024/3/30
TIMES MICROWAVE	Coaxial Cable	LMR-600- UltraFlex	C-0470-02	2023/7/16	2024/7/15
TIMES MICROWAVE	Coaxial Cable	LMR-600- UltraFlex	C-0780-01	2023/7/16	2024/7/15
Sonoma	Amplifier	310N	186165	2023/7/16	2024/7/15
АН	Double Ridge Guide Horn Antenna	SAS-571	1394	2023/2/22	2026/2/21
R&S	Spectrum Analyzer	FSV40	101591	2023/3/31	2024/3/30
MICRO-COAX	Coaxial Cable	UFA210A-1- 1200-70U300	217423-008	2023/8/6	2024/8/5
MICRO-COAX	Coaxial Cable	UFA210A-1- 2362-300300	235780-001	2023/8/6	2024/8/5
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2023/11/8	2024/11/7
Audix	Test Software	E3	201021 (V9)	N/A	N/A

^{*} Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

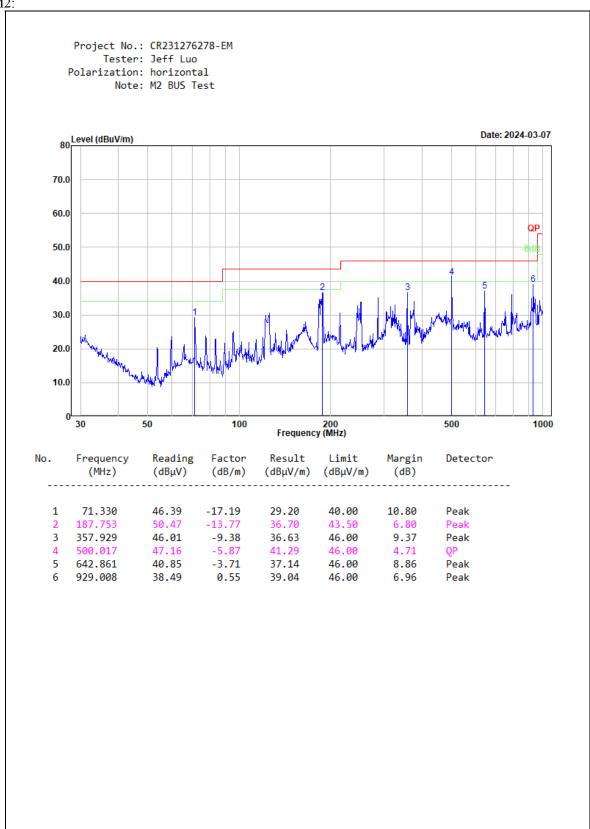
1) 30MHz-1GHz:

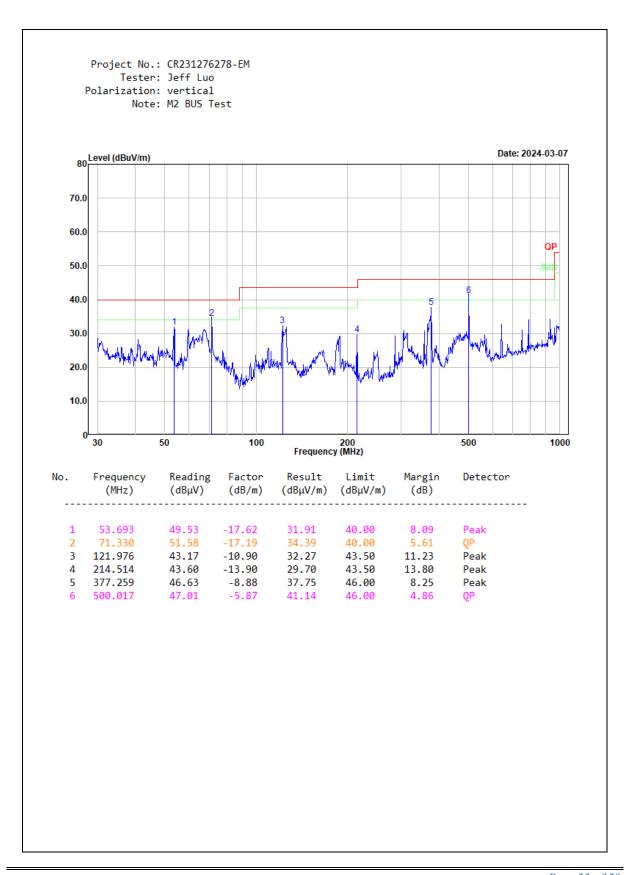
M1:



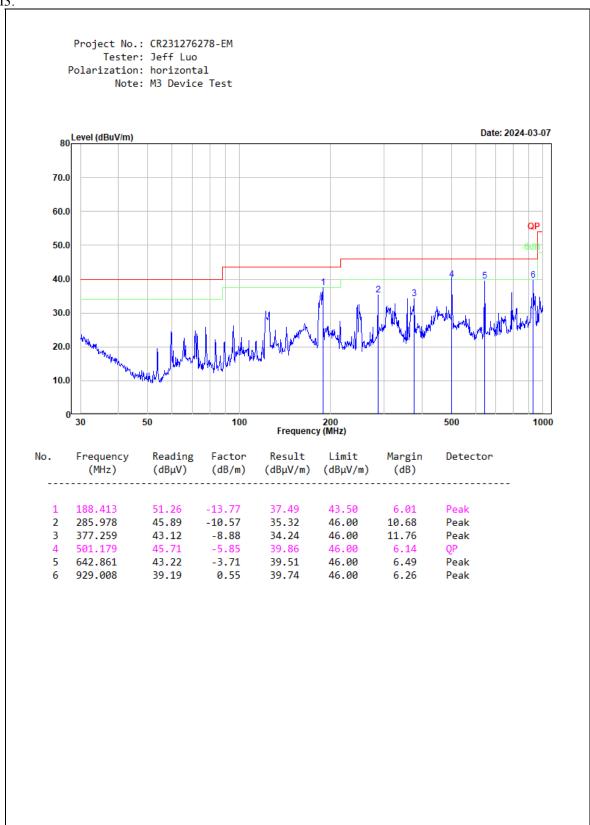


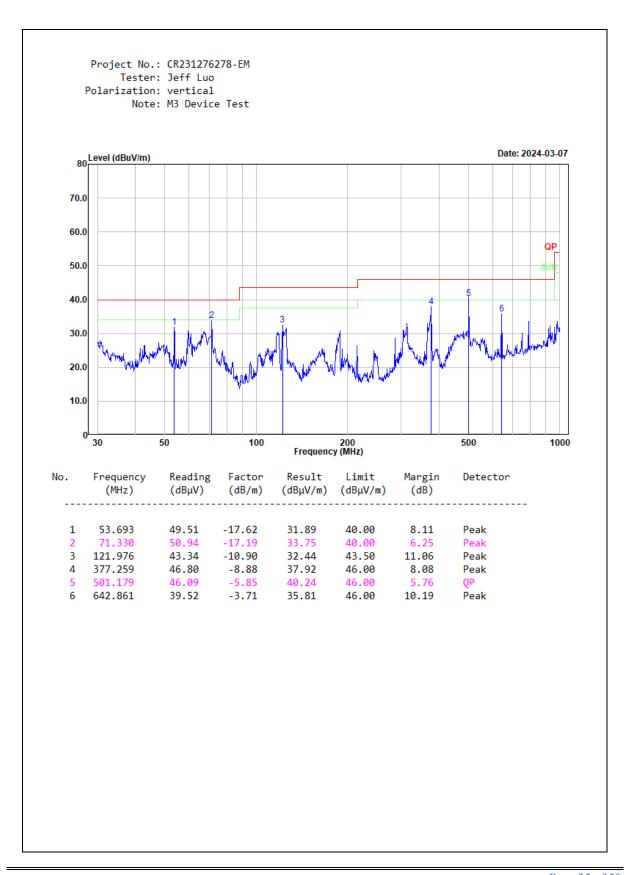
M2:



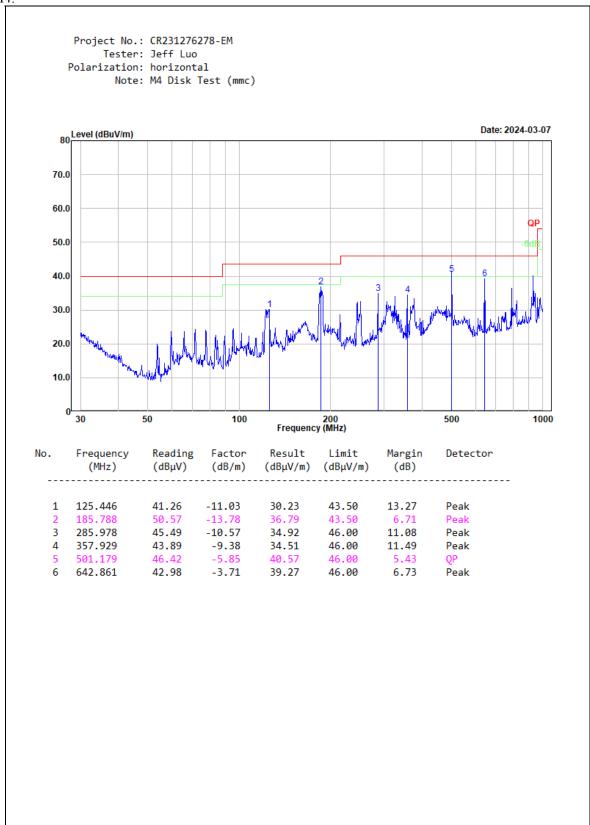


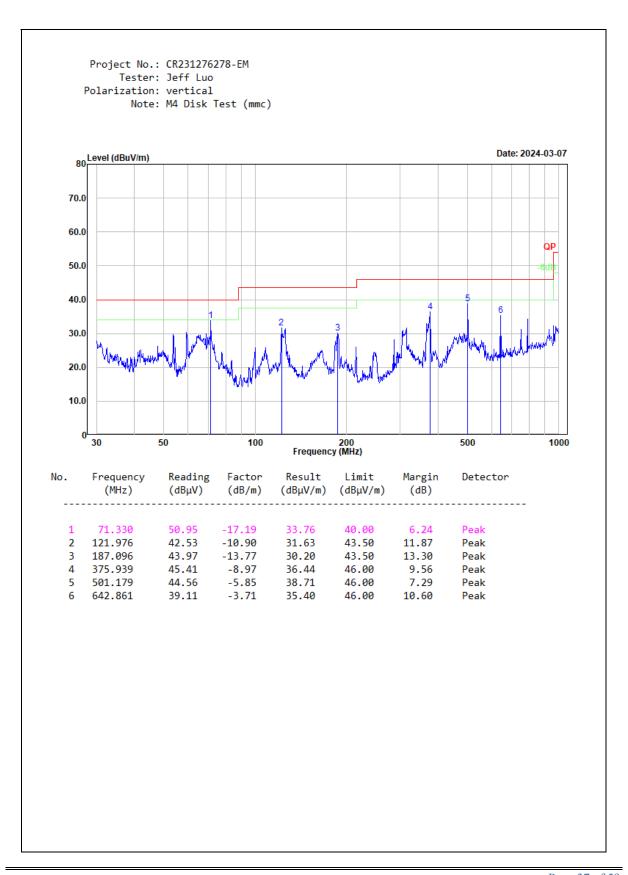




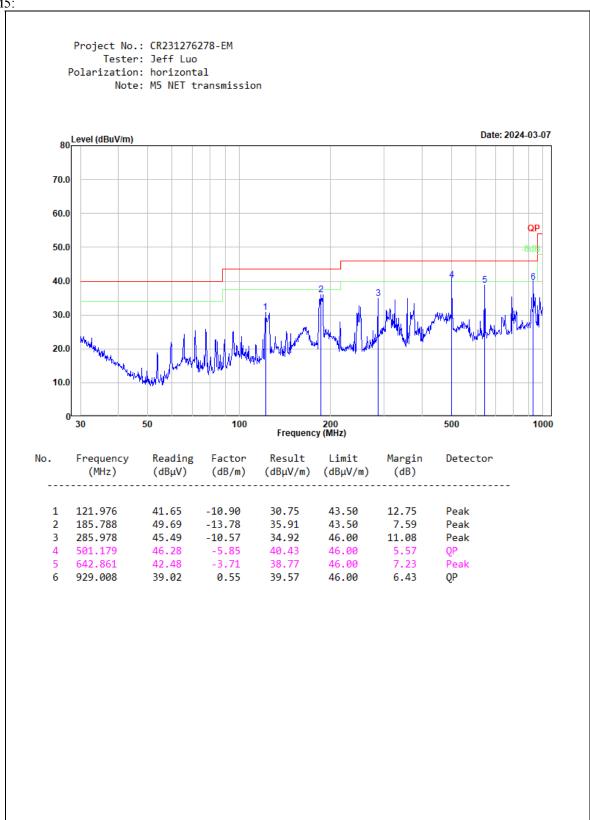


M4:

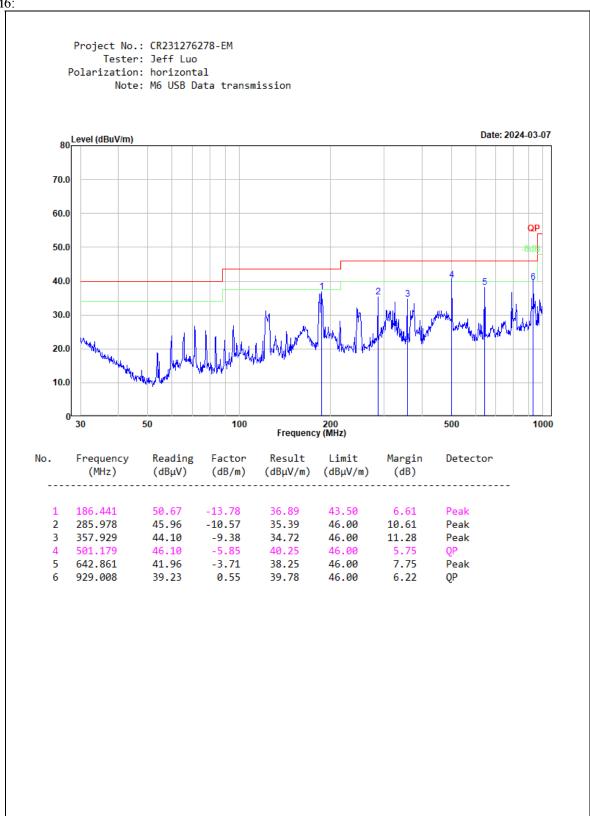




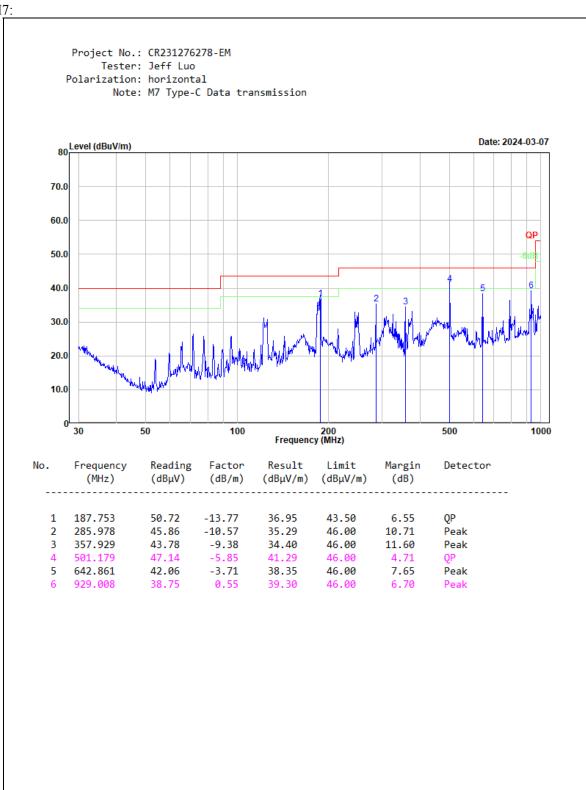
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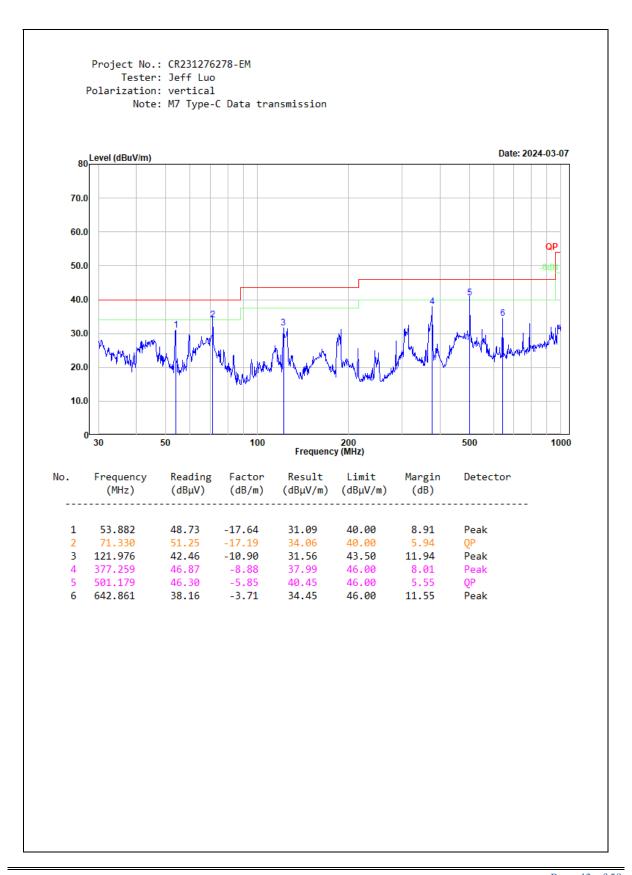


M6:



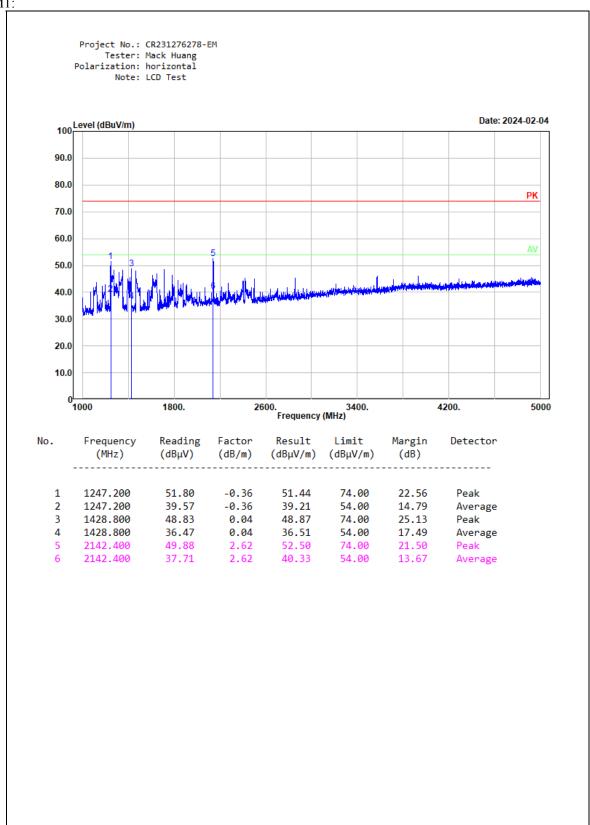
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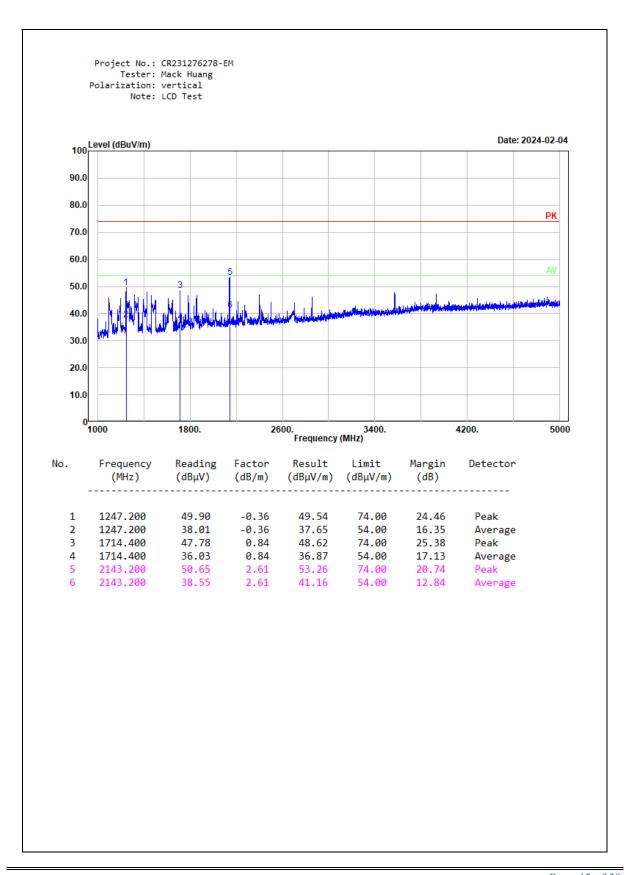




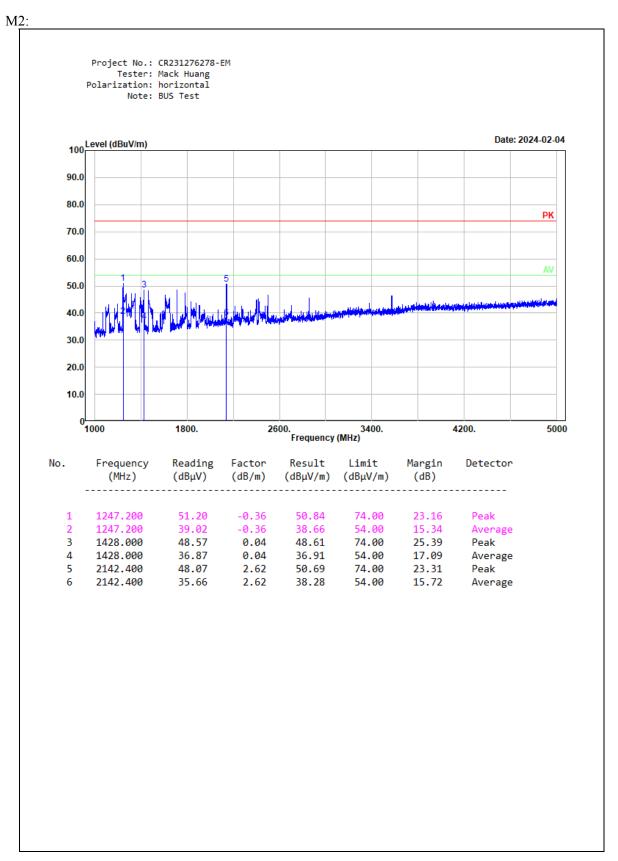
2) Above 1GHz:

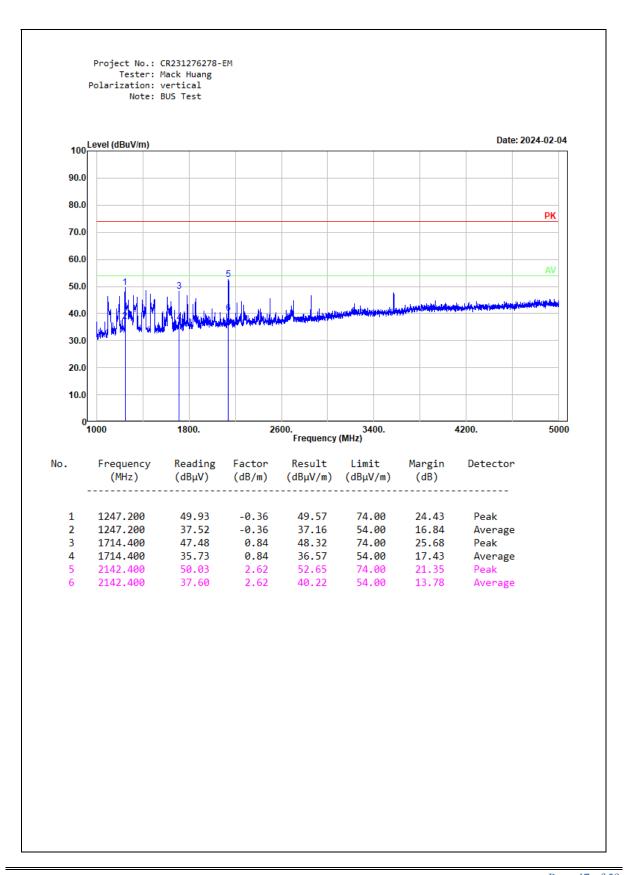
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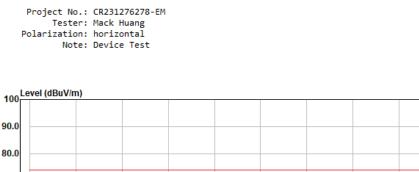


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M<u>3</u>:

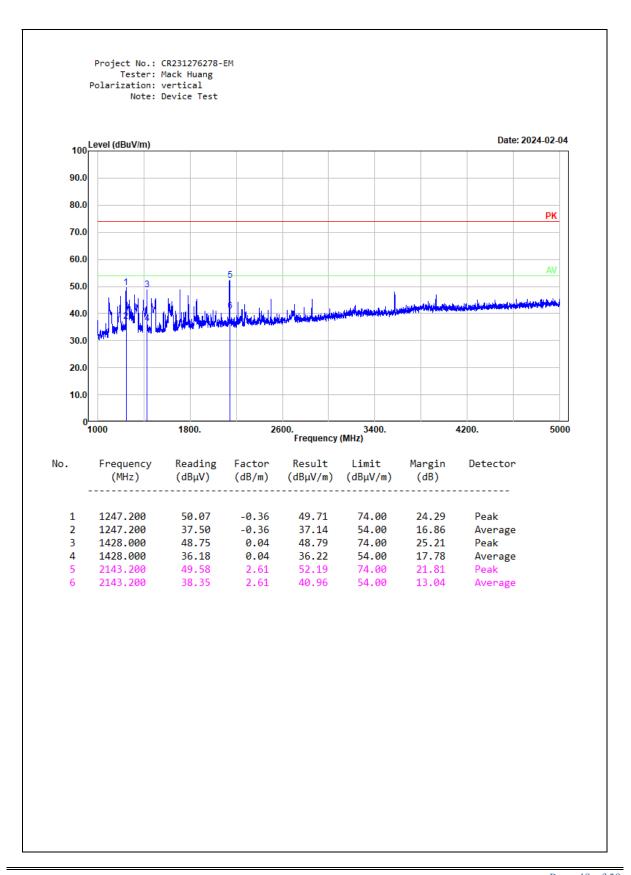


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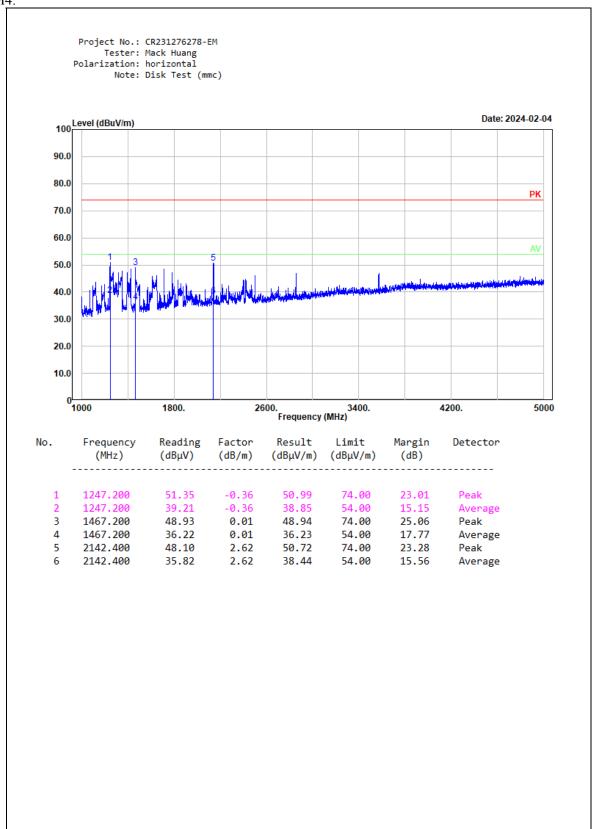
Date: 2024-02-04

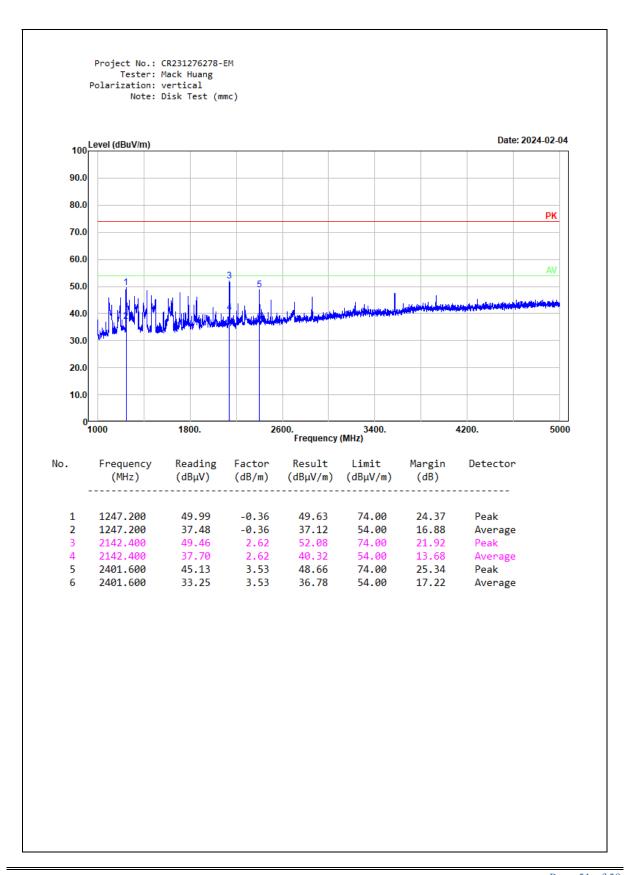
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No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	1247.200	51.11	-0.36	50.75	74.00	23.25	Peak
2	1247.200	38.64	-0.36	38.28	54.00	15.72	Average
3	1714.400	47.05	0.84	47.89	74.00	26.11	Peak
4	1714.400	34.82	0.84	35.66	54.00	18.34	Average
5	2142.400	49.49	2.62	52.11	74.00	21.89	Peak
6	2142.400	37.81	2.62	40.43	54.00	13.57	Average

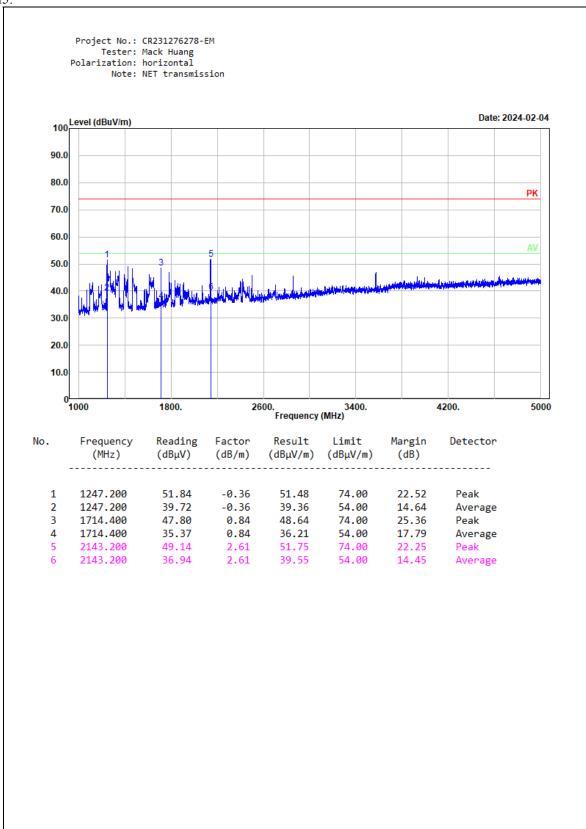


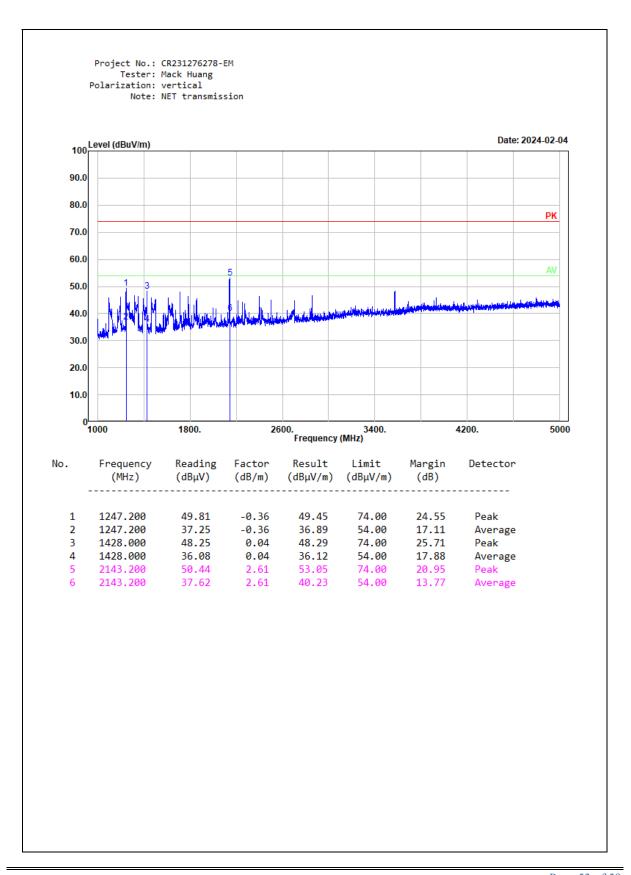






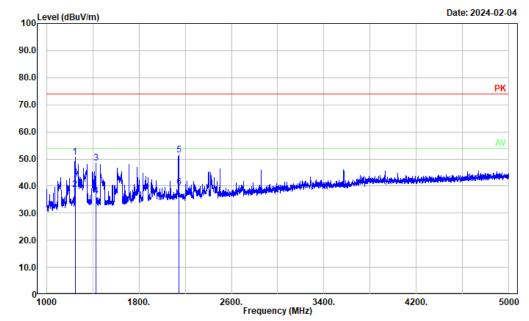
M5:



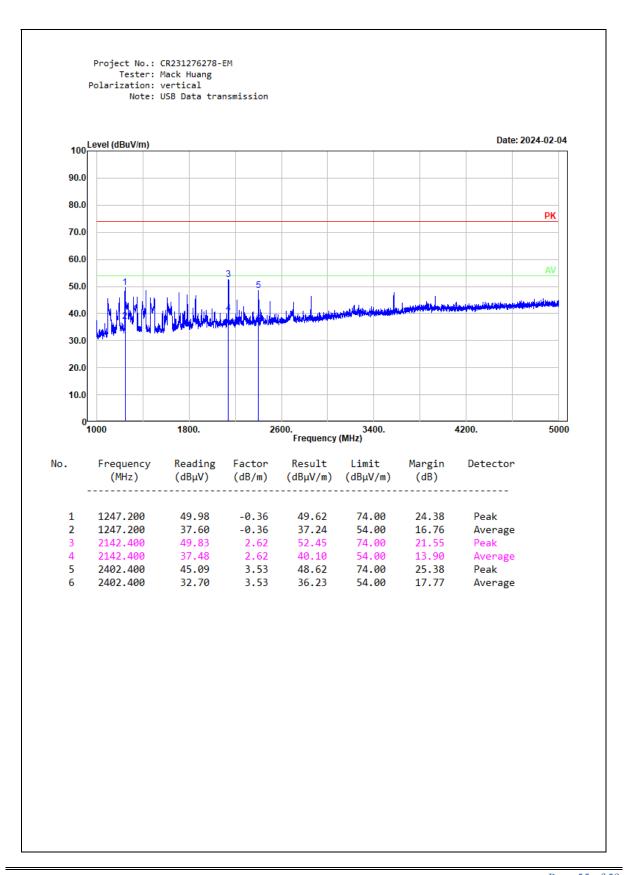




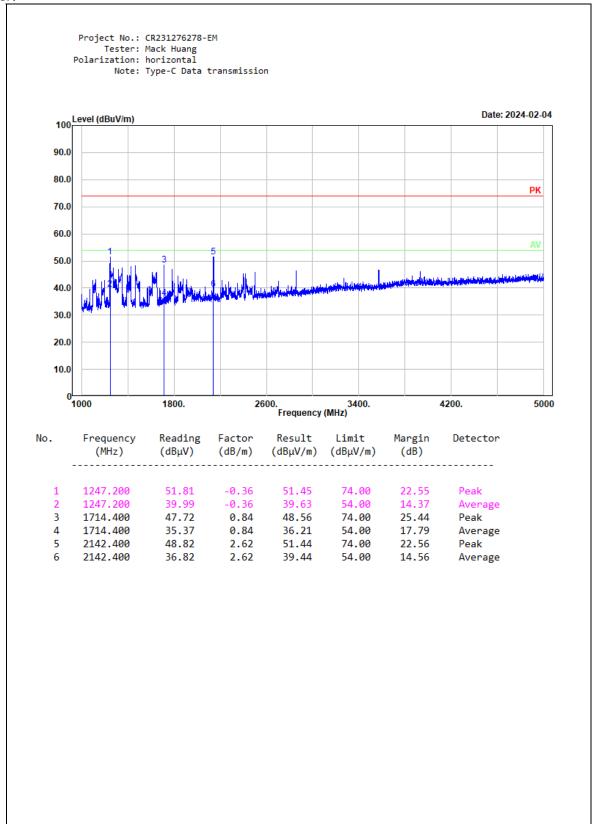


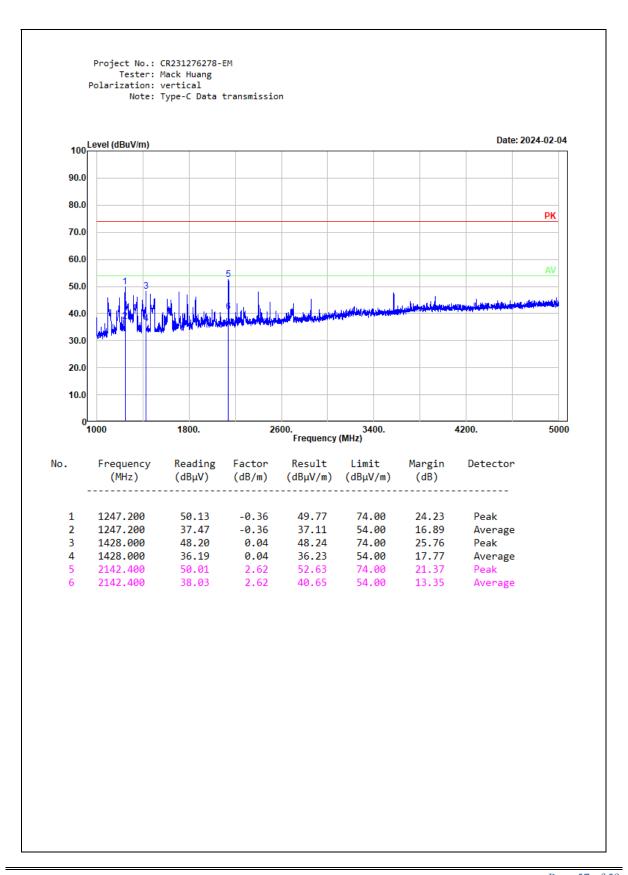


No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
1	1247.200	51.00	-0.36	50.64	74.00	23.36	Peak
2	1247.200	39.14	-0.36	38.78	54.00	15.22	Average
3	1428.000	48.54	0.04	48.58	74.00	25.42	Peak
4	1428.000	36.29	0.04	36.33	54.00	17.67	Average
5	2143.200	48.96	2.61	51.57	74.00	22.43	Peak
6	2143.200	37.04	2.61	39.65	54.00	14.35	Average









China Certification ICT Co., Ltd (Dongguan)	Report No.: CR231276278-00
5. EUT PHOTOGRAPHS	
Please refer to the attachment CR231276278-EXP EUT E	XTERNAL PHOTOGRAPHS and
CR231276278-INP EUT INTERNAL PHOTOGRAPHS	

6. TEST SETUP PHOTOGRAPHS

Please refer to the attachment CR231276278-00-TSP TEST SETUP PHOTOGRAPHS.

==== END OF REPORT ====

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