



TEST REPORT

Applicant: Shanghai Emcan Technology Co., Ltd Address: Building 5, No. 701 Taogan Road, Songjiang District, Shanghai, China FCC ID: 2BKRE-EM31P **Product Name: Harmonic Equatorial Mount** Standard(s): FCC Part 15B 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: 2403V49413E-00A

Date Of Issue: 2024/9/2

Reviewed By: Calvin Chen

Title: RF Engineer

Glim Chen Sun Zhong

Approved By: 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.

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 "▲". 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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This report may contain data that are not covered by the accreditation scope and shall be marked with an asterisk " \star ".

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	2403V49413E-00A	Original Report	2024/9/2

1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

EUT Name:	Harmonic Equatorial Mount
EUT Model:	EM31Pro
Highest Operation Frequency:	2480MHz
Rated Input Voltage:	DC 12V from adapter
Serial Number:	2PB2-1
EUT Received Date:	2024/8/2
EUT Received Status:	Good

Accessory Information:

Accessory Description	Manufacturer	Model	Parameters
USB Cable 1	/	/	0.5m USB2.0 Cable
USB Cable 2	/	/	2.0m USB2.0 Cable

1.2 Description of Test Configuration

1.2.1 EUT Operation Condition:

EUT Operation Mode:	The system was configured for testing in Typical Use Mode, which was provided by the manufacturer. The EUT have two power input port which cannot be connected simultaneously, two USB port which cannot be connected simultaneously and two hand controller port which cannot be connected simultaneously and two hand controller port which cannot be connected simultaneously. Test Mode: M1: Adapter Power supply (Powered by DEC Power Port) + DEC Hand Controller Port + DEC USB Port M2: Adapter Power supply (Powered by DEC Power Port) + Hand Controller Port + DEC USB Port M3: Adapter Power supply (Powered by DEC Power Port) + DEC Hand Controller Port + USB Port M4: Adapter Power supply (Powered by DEC Power Port) + DEC Hand Controller Port + USB Port M5: Adapter Power supply (Powered by DEC Power Port) + Hand Controller Port + USB Port M5: Adapter Power supply (Powered by DEC Power Port) + Hand Controller Port + USB Port M5: Adapter Power supply (Powered by DEC Power Port) + Hand Controller Port + USB Port M5: Adapter Power supply (Powered by Power Port) + Worst case from M1~M4 The Accessory of EUT have two USB Cable, Conducted Emissions Test only with 0.5m USB cable. Radiated Emissions Test for M1 with two USB cable and test with 0.5m USB cable was the worst, then other test mode test with 0.5m USB cable.
Equipment Modifications:	No
EUT Exercise Software:	Google Chrome

1.2.2 Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Lenovo	Laptop	T460S	60PDTEK7
Lenovo	Adapter2	A17-265N2A	00PC757
PHILIPS	Keyboard	SPT6234	K234210510746
PHILIPS	Mouse	SPT6234	C234210506222
SUZHOU ZWO	Adapter1	KPL-060F-VI	Unknown
Tenda	Wireless Router	RX12 Pro	ED331010215000033
SHI YINGYUAN	Adapter3	ICP30-120-2000	Unknown
Hand controller	Emcan	EM31 PRO	Unknown

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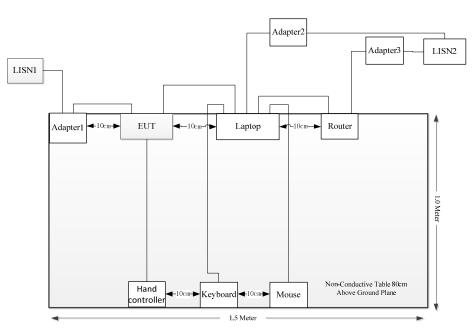
Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	То
Power Cable	No	No	1.2	Adapter2	LISN2
Power Cable	No	Yes	1.2	Adapter2	Laptop
Power Cable	No	No	1.2	Adapter1	LISN1
Power Cable	No	Yes	1.2	Adapter1	EUT
RJ45 Cable	No	No	1	Router	Laptop
Keyboard Cable	No	No	1.2	Keyboard	Laptop
Mouse Cable	No	No	1.2	Mouse	Laptop
Hand controller Cable	No	No	0.8	EUT	Hand controller
Power Cable	No	No	1.5	Router	Adapter 3
USB Cable 1	No	No	0.5	EUT	Laptop
USB Cable 2	No	No	2	EUT	Laptop

1.2.3 Support Cable List and Details

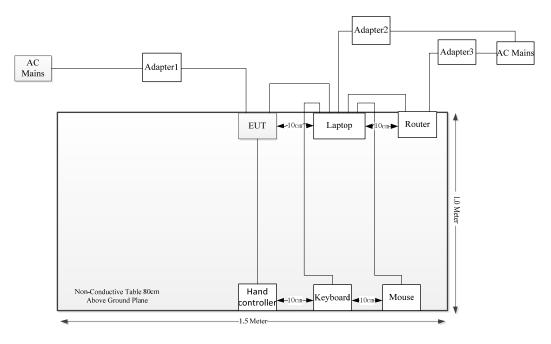
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1.2.4 Block Diagram of Test Setup

Conducted Emissions: M1-M5:



Radiated emissions: M1-M5:



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,		
Oliwanted Emissions, fadiated	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)		

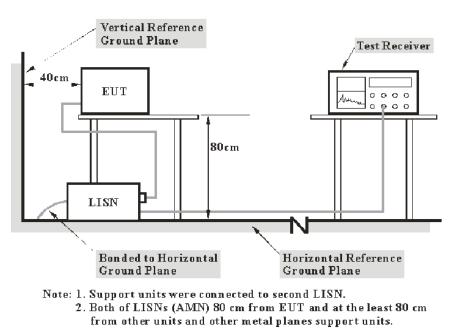
2. SUMMARY OF TEST RESULTS

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

3. REQUIREMENTS AND TEST PROCEDURES

3.1 Conducted Emissions

3.1.1 EUT Setup



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.

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

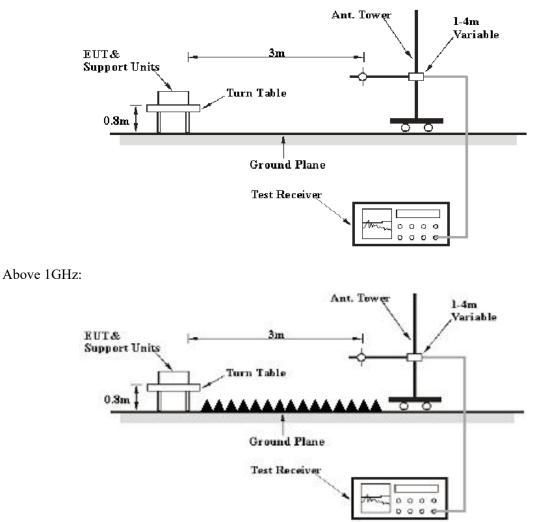
The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit – Result

3.2 Radiation Emissions

3.2.1 EUT Setup

Below 1GHz:



The radiated emission tests were performed in the 3 meters chamber, 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 Setup

The system was investigated from 30 MHz to 13 GHz.

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

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30 MHz – 1000 MHz	100 kHz	300 kHz	/	РК
30 MHZ – 1000 MHZ	/	/	120 kHz	QP
	1 MHz	3 MHz	/	Peak
Above 1 GHz	1 MHz	Reduced video bandwidth	/	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, peak and average detection mode above 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 Conducted Emissions

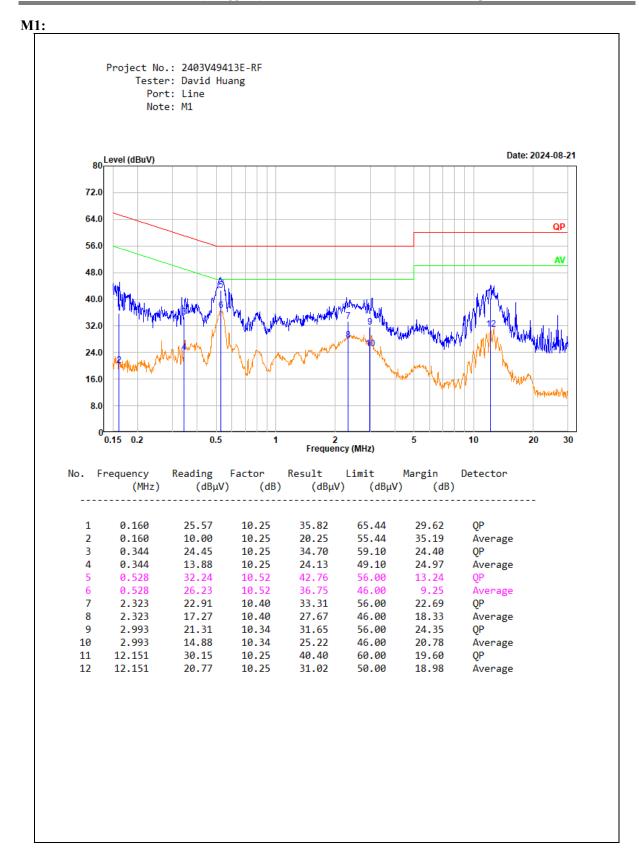
Serial Number:	2PB2-1	Test Date:	2024/8/21
Test Site:	CE	Test Mode:	M1, M2, M3, M4, M5
Tester:	David Huang	Test Result:	Pass

Environmental Conditions:

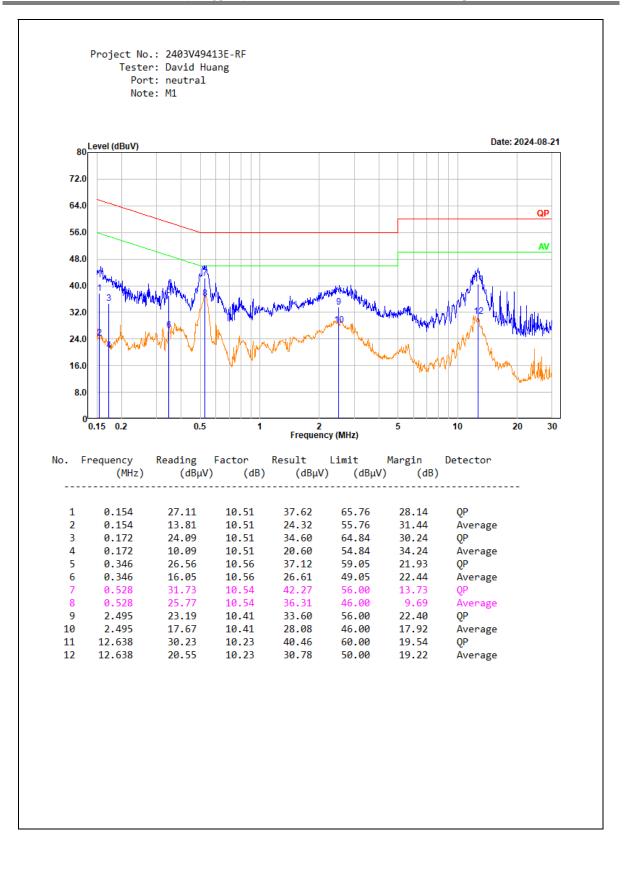
Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	LISN	ENV216	101132	2024/4/1	2025/3/31
R&S	LISN	ENV216	101134	2024/4/1	2025/3/31
R&S	EMI Test Receiver	ESR3	103104	2024/5/10	2025/5/9
MICRO-COAX	Coaxial Cable	UTIFLEX	C-0200-01	2024/1/15	2025/1/14
Audix	Test Software	E3	191218 (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).



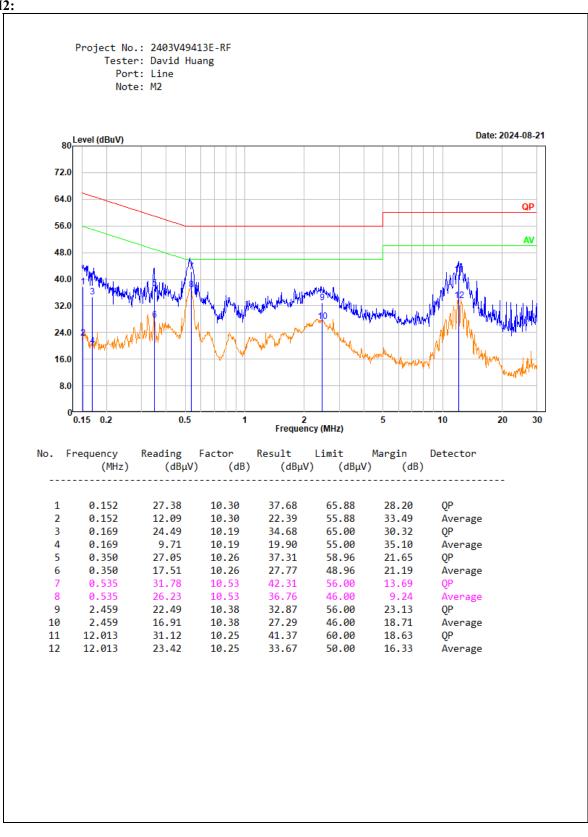
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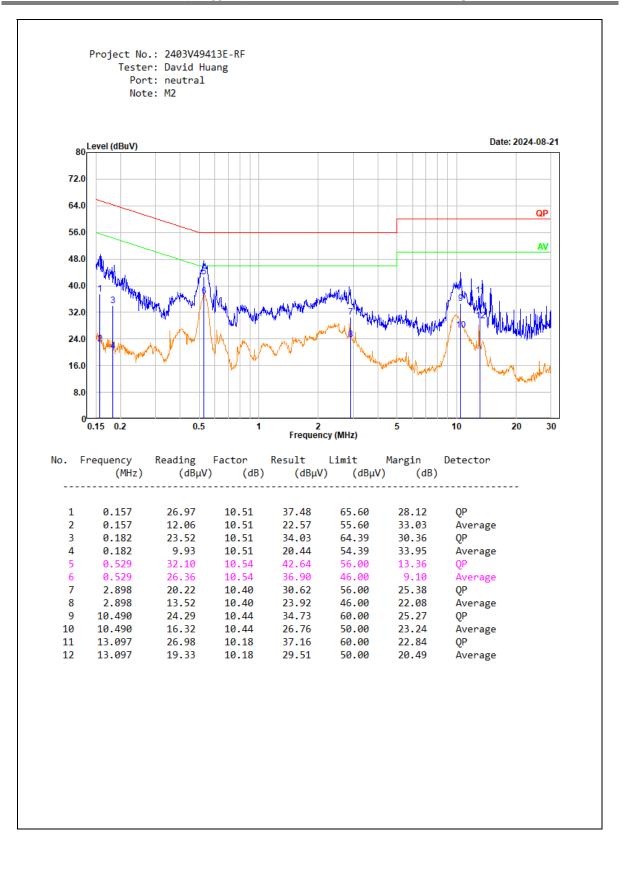
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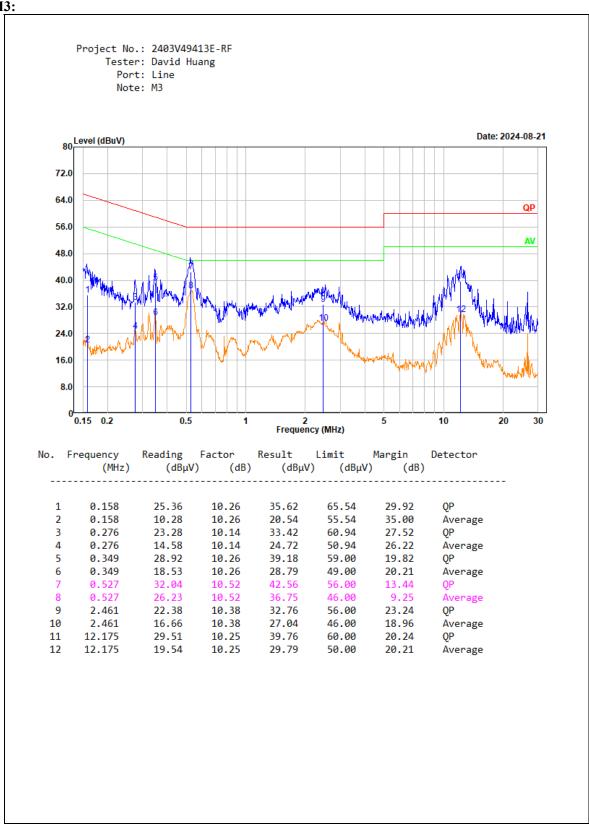
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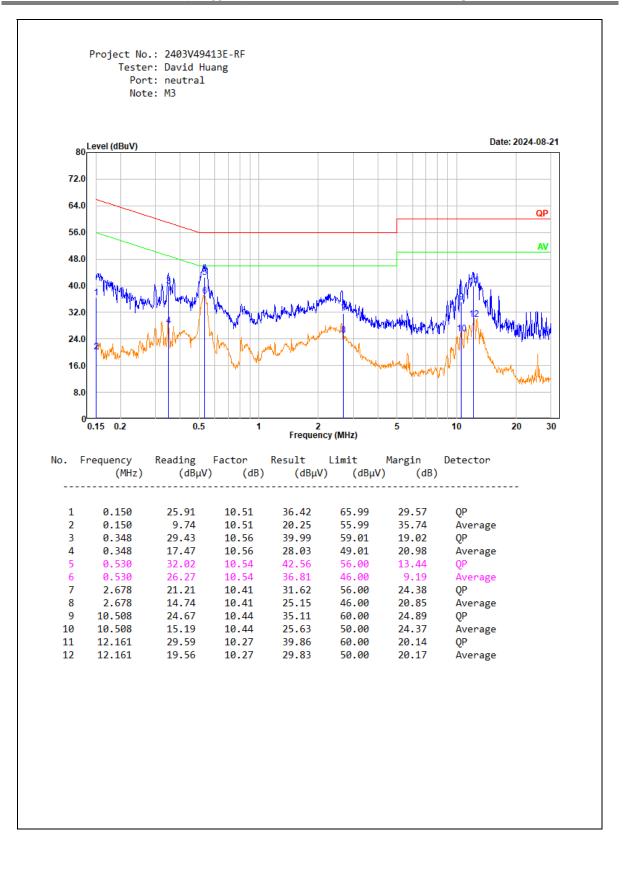
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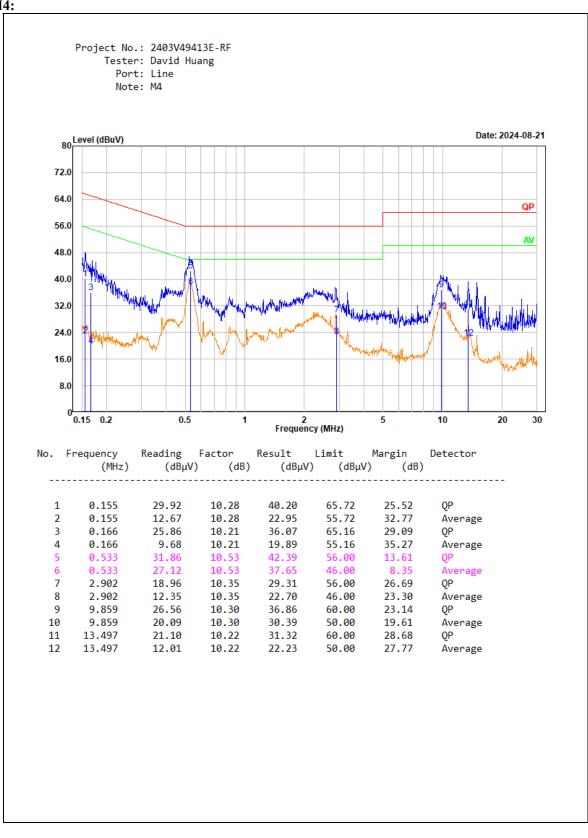
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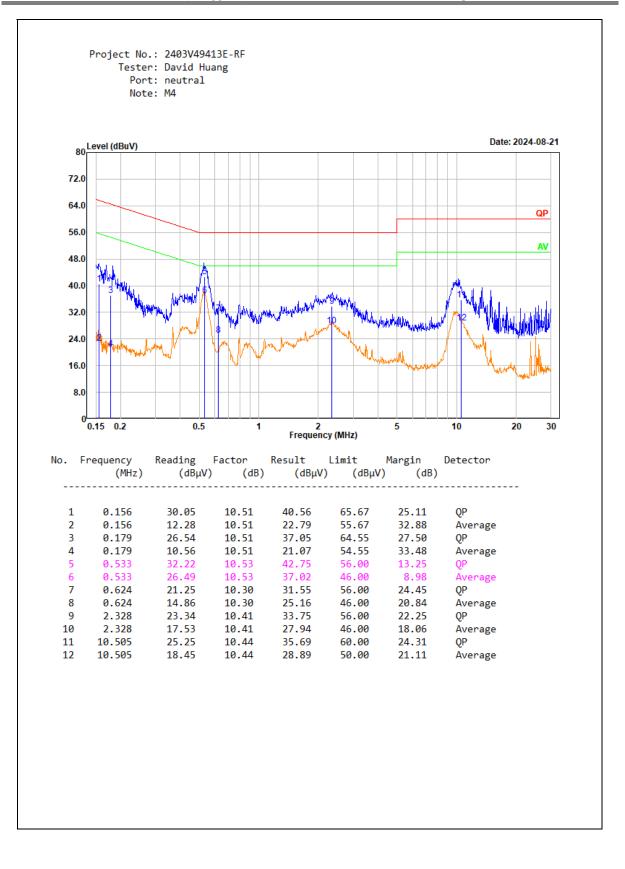
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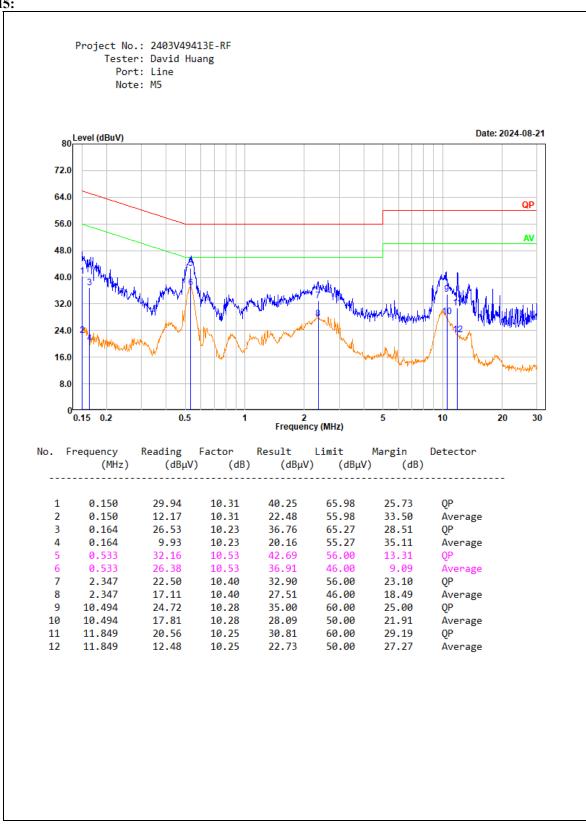
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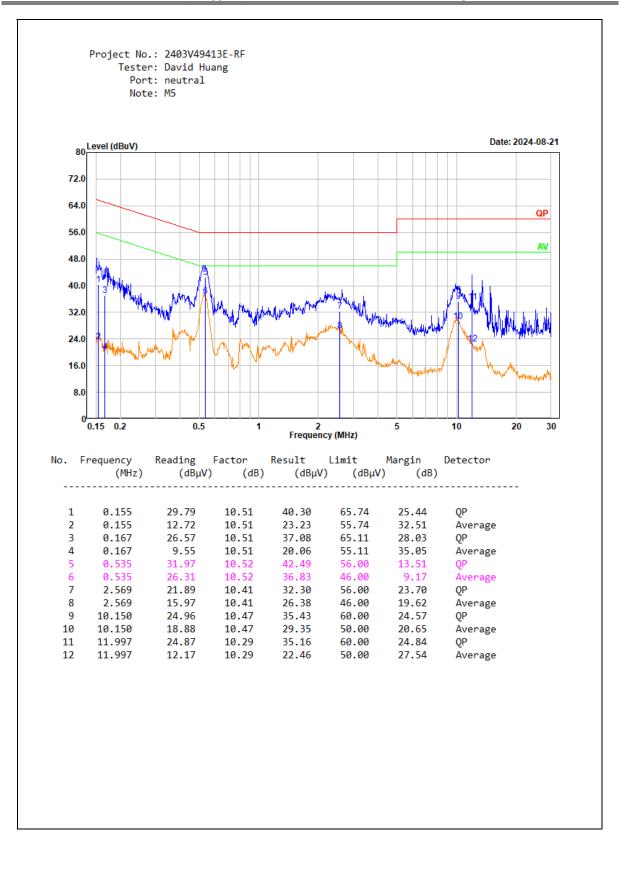


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4.2 Radiation Spurious Emissions

Serial Number:	2PB2-1	Test Date:	2024/8/15~2024/8/20
Test Site:	966-1, 966-2	Test Mode:	M1, M2, M3, M4, M5
Tester:	Roinin Fu, Mack Huang	Test Result:	Pass

Environmental Conditions:						
Temp	erature: (°C)	25.3~26.1	Relative Humidity: (%)	54~63	ATM Pressure: (kPa)	100.1~100.4

Test Equipment List and Details:

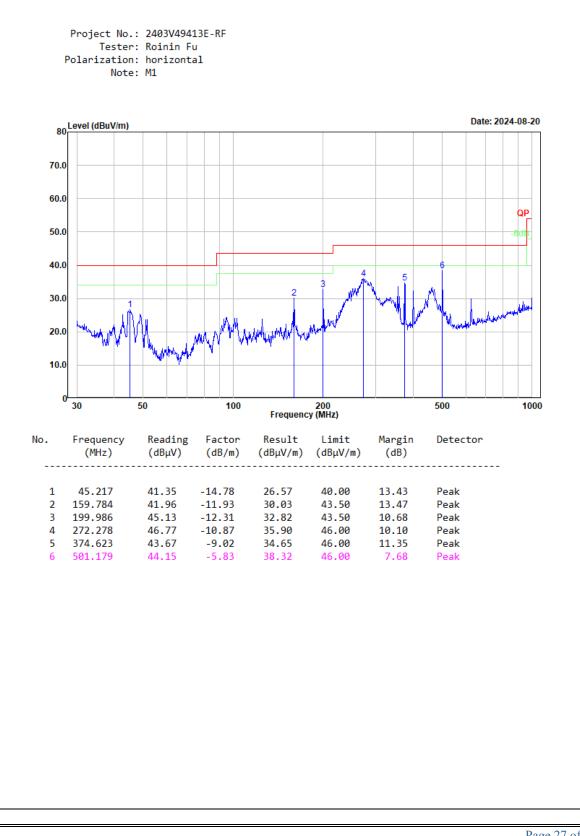
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Antenna	JB6	A082520-5	2023/12/1	2026/11/30
R&S	EMI Test Receiver	ESR3	102724	2024/2/29	2025/2/28
TIMES MICROWAVE	Coaxial Cable	LMR-600- UltraFlex	C-0100-03	2023/12/4	2024/12/3
TIMES MICROWAVE	Coaxial Cable	LMR-600- UltraFlex	C-0370-01	2023/12/4	2024/12/3
XQY	Coaxial Cable	XQY- CMR400UF-NJ- NJ-7M	24056379	2024/6/11	2025/6/10
Sonoma	Amplifier	310N	186165	2023/12/4	2024/12/3
Audix	Test Software	E3	191218 (V9)	N/A	N/A
ETS-Lindgren	Horn Antenna	3115	9912-5985	2023/12/6	2026/12/5
R&S	Spectrum Analyzer	FSV40	101591	2024/4/1	2025/3/31
MICRO-COAX	Coaxial Cable	UFA210A-1- 1200-70U300	217423-008	2024/1/15	2025/1/14
MICRO-COAX	Coaxial Cable	UFA210A-1- 2362-300300	235780-001	2024/1/15	2025/1/14
BACL	Preamplifier	1313-A20M18G	4032311	2024/4/1	2025/3/31

* 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).

Test Data:

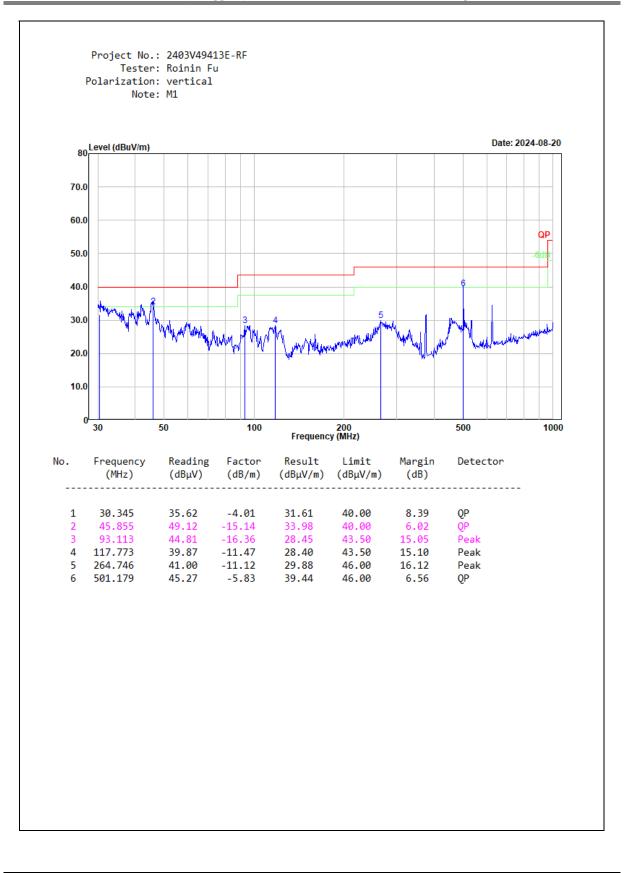
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1) 30MHz-1GHz M1 (0.5m Cable):



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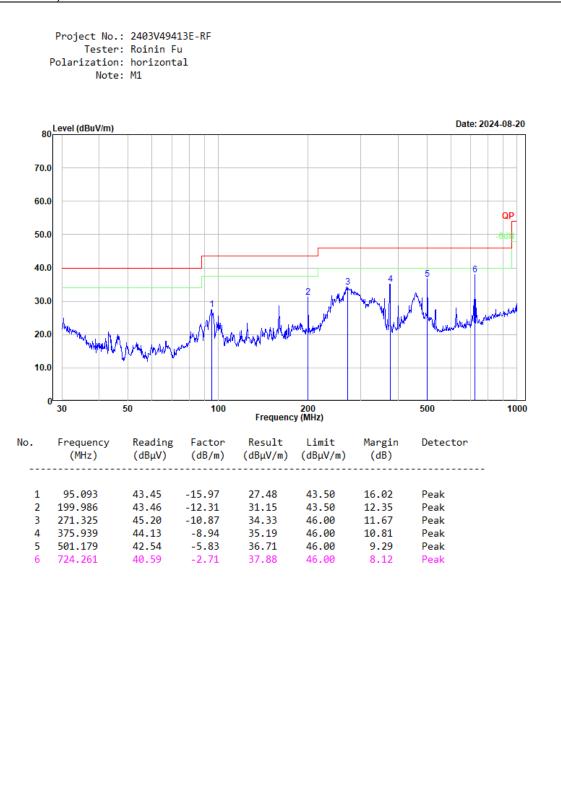
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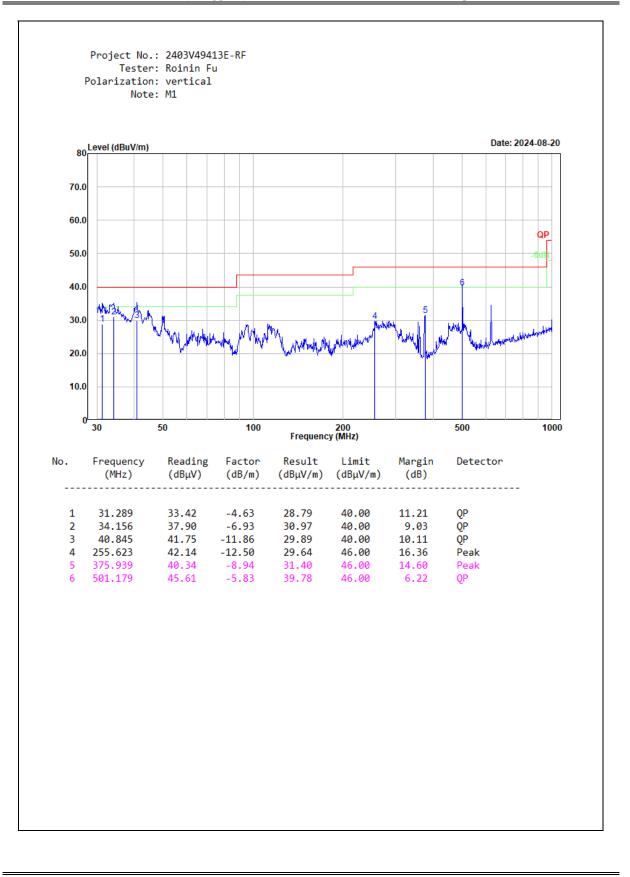
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M1 (2m Cable):



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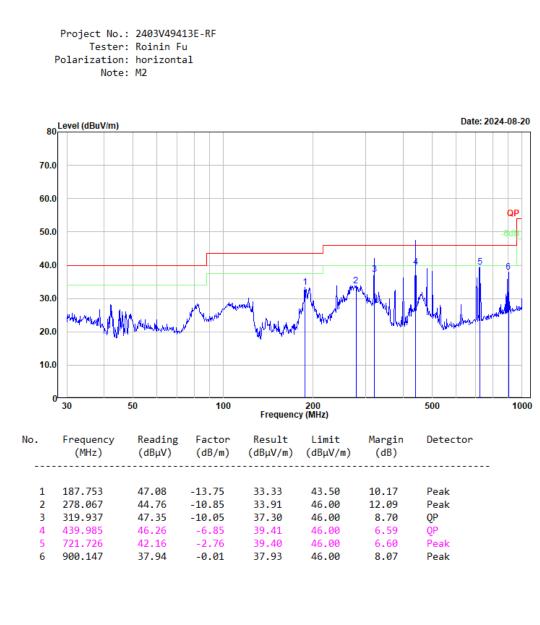
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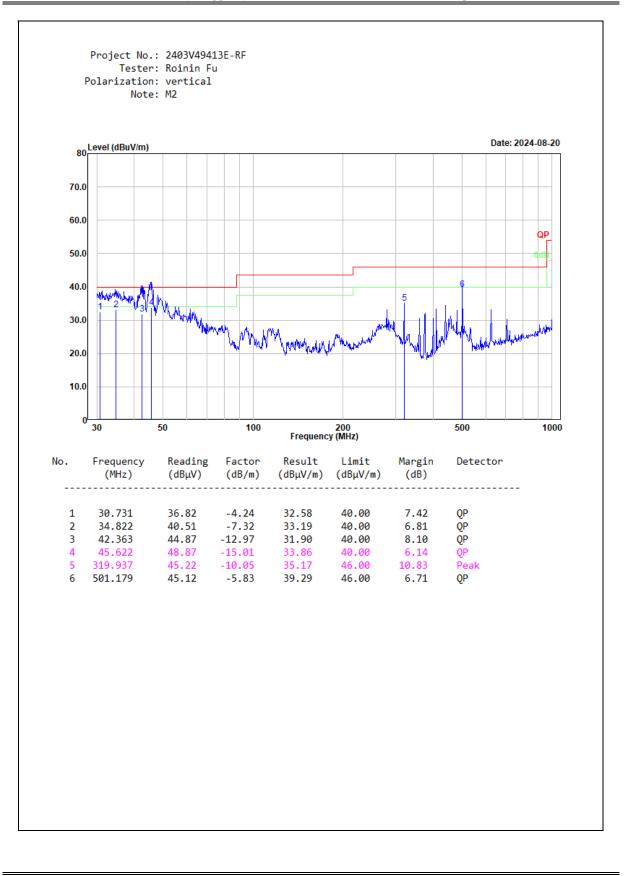
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M2 (0.5m Cable):



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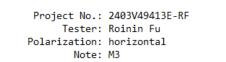
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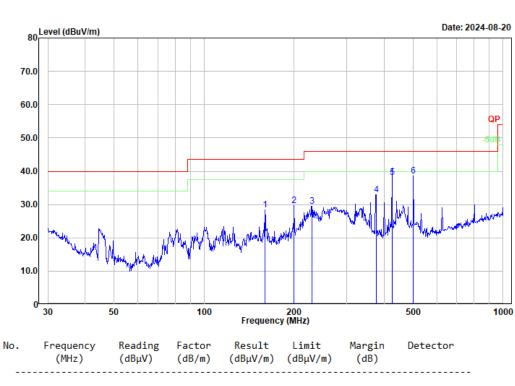


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M3 (0.5m Cable):

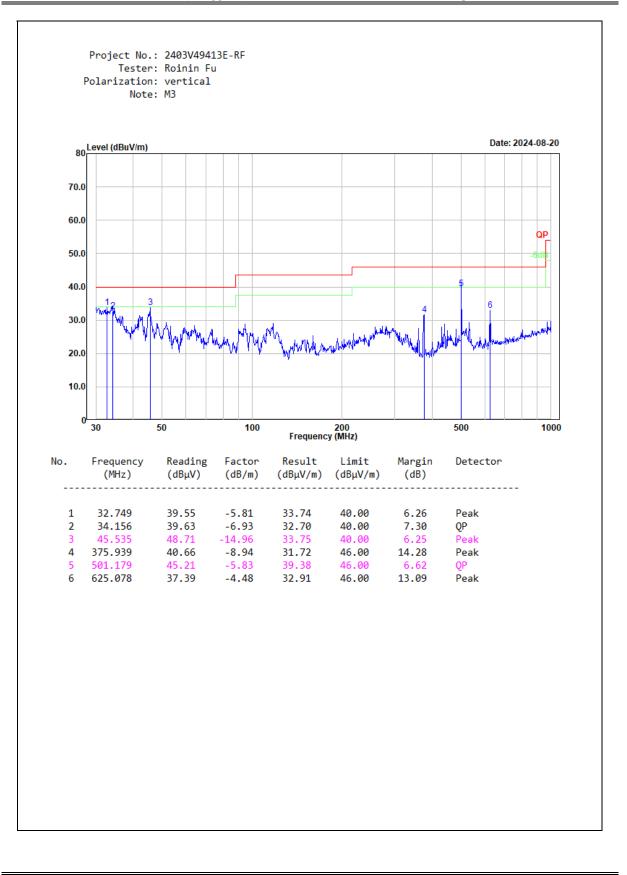




1	159.784	40.26	-11.93	28.33	43.50	15.17	Peak	
2	199.986	41.92	-12.31	29.61	43.50	13.89	Peak	
3	229.293	42.67	-13.25	29.42	46.00	16.58	Peak	
4	375.939	41.95	-8.94	33.01	46.00	12.99	Peak	
5	425.028	45.61	-7.49	38.12	46.00	7.88	QP	
6	501.179	44.43	-5.83	38.60	46.00	7.40	Peak	

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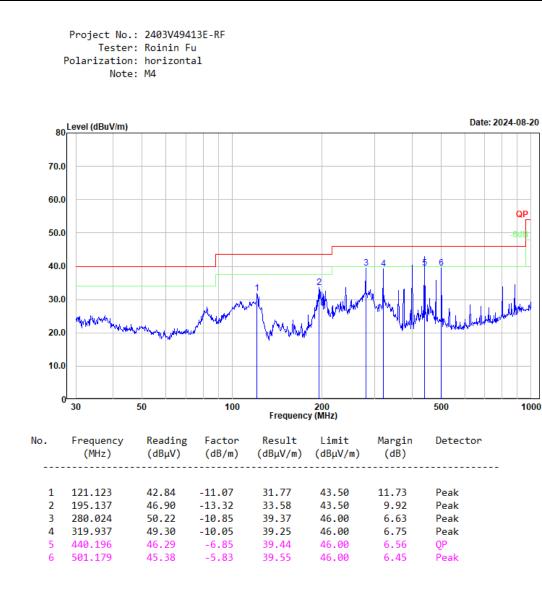
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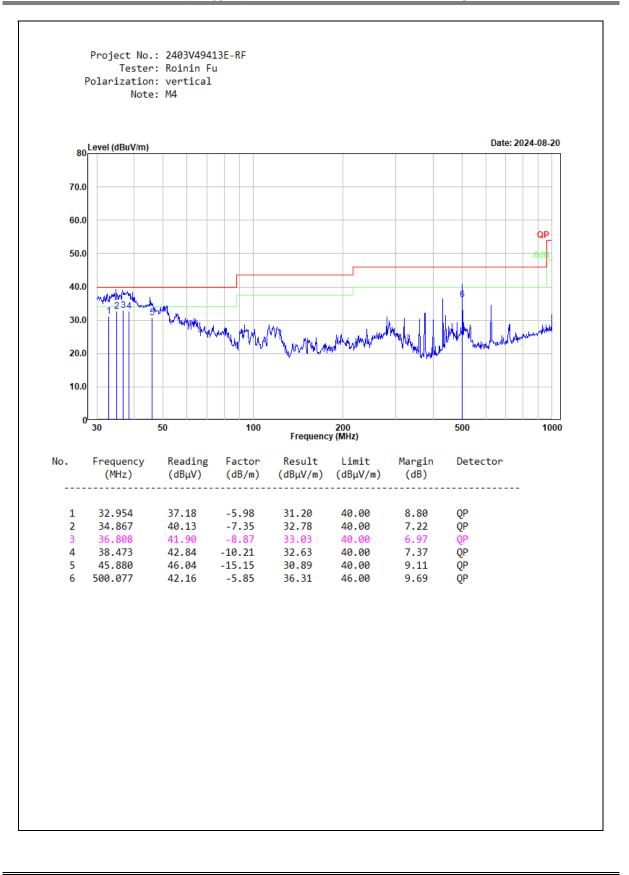
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M4 (0.5m Cable):



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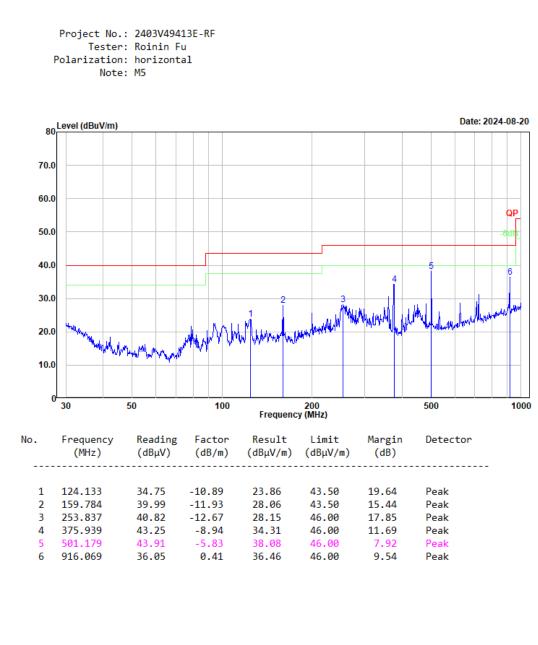
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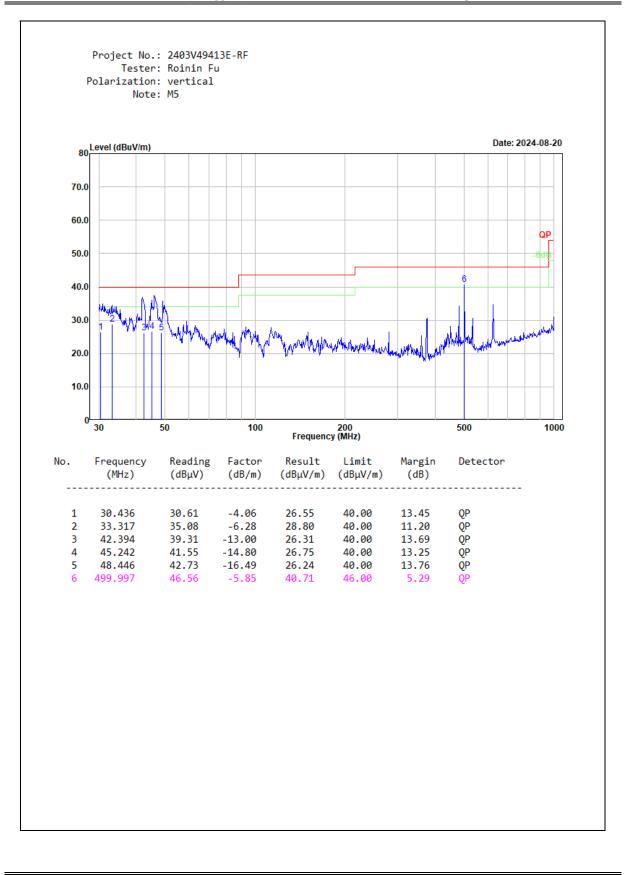
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M5 (0.5m Cable):



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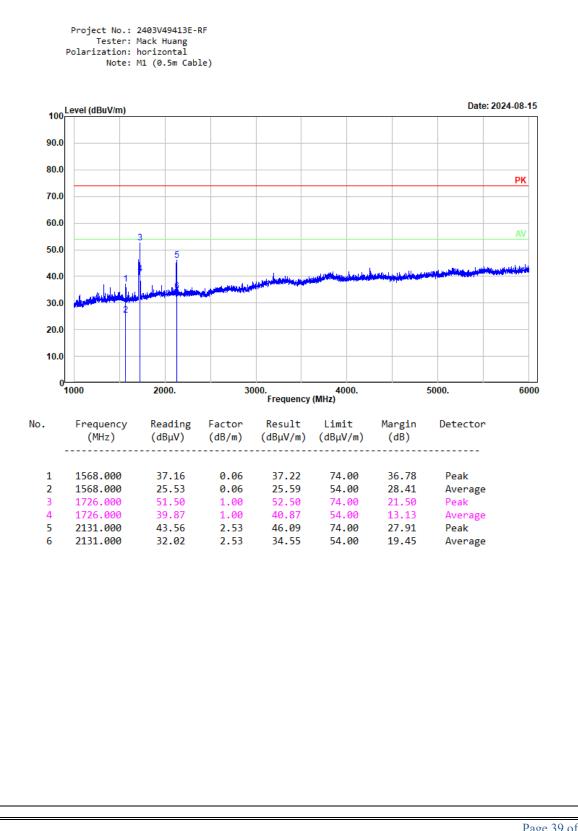
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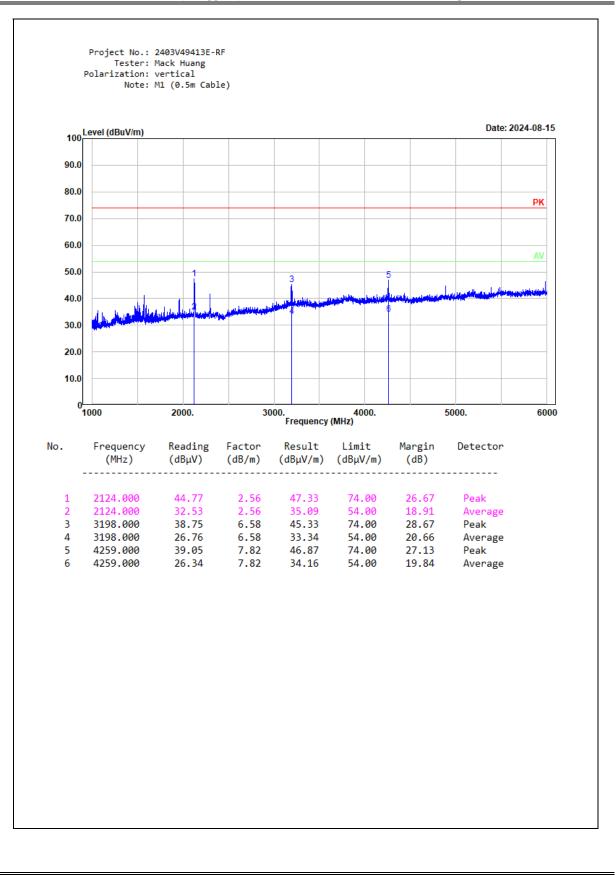
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2)Above 1GHz: M1 (0.5m Cable):



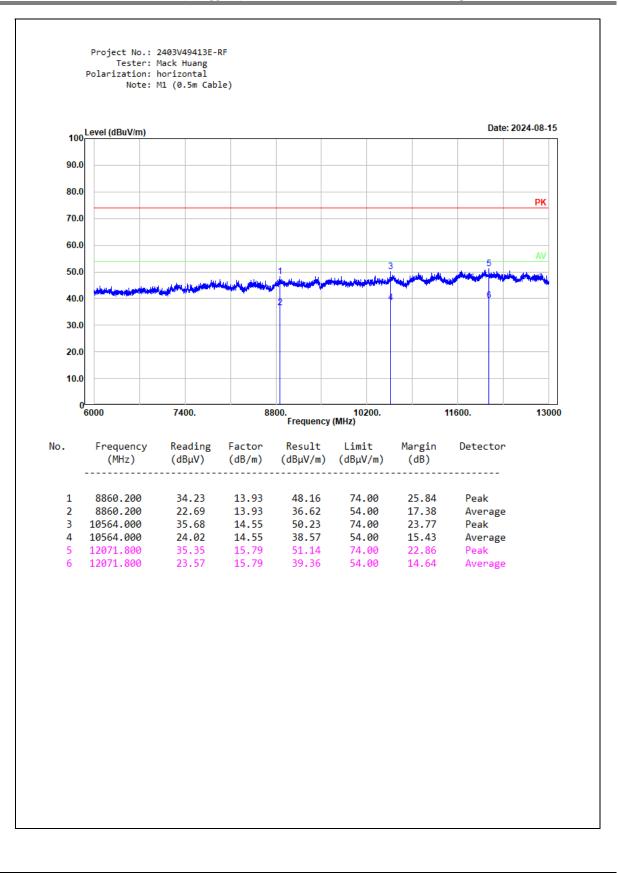
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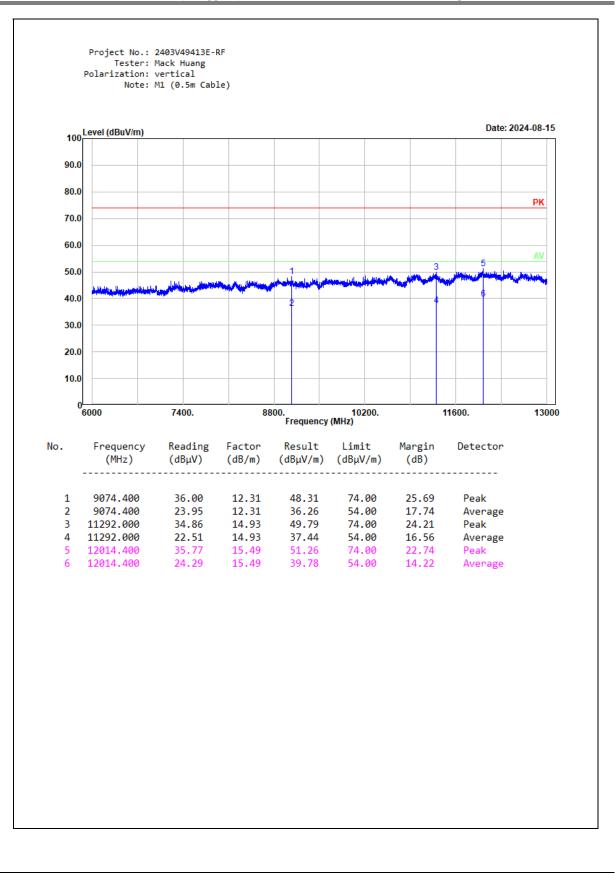
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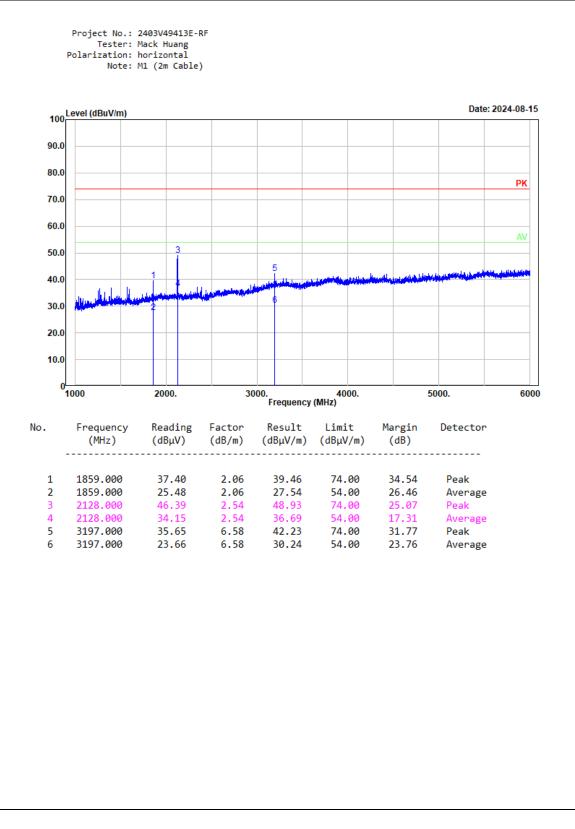
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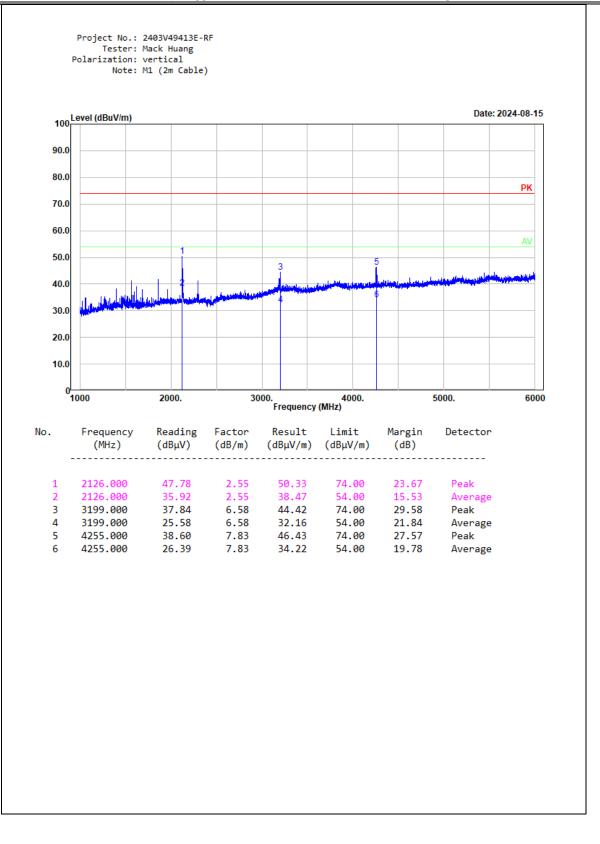
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M1 (2m Cable):



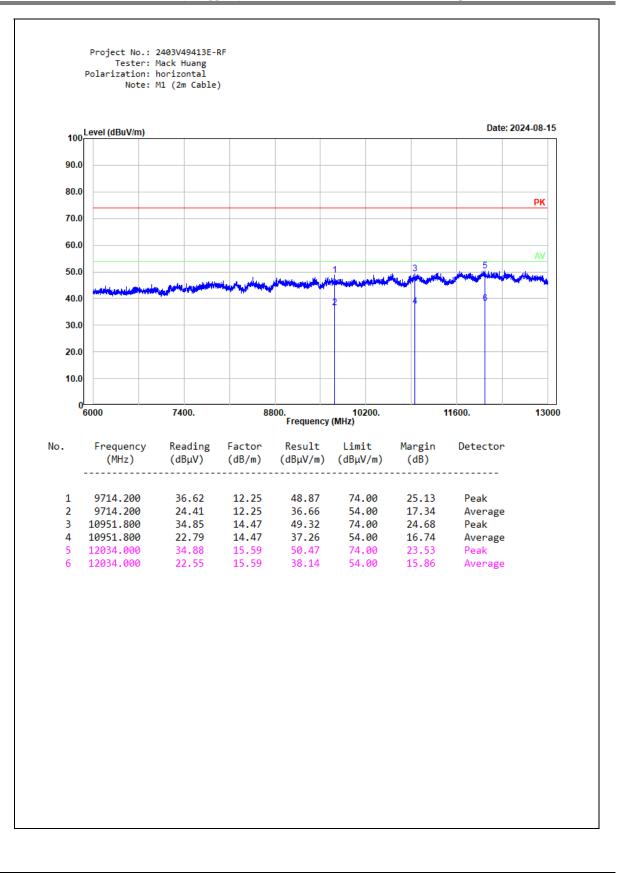
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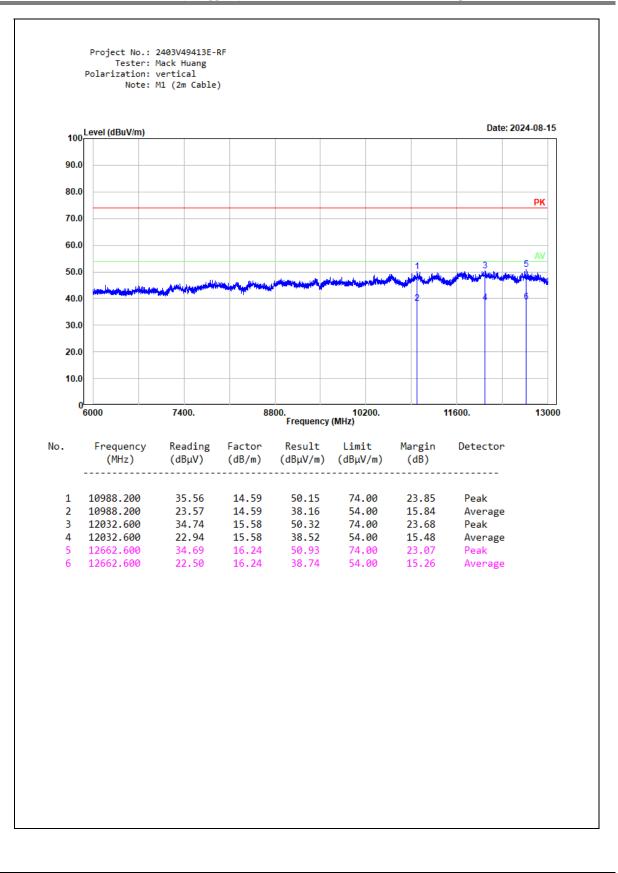
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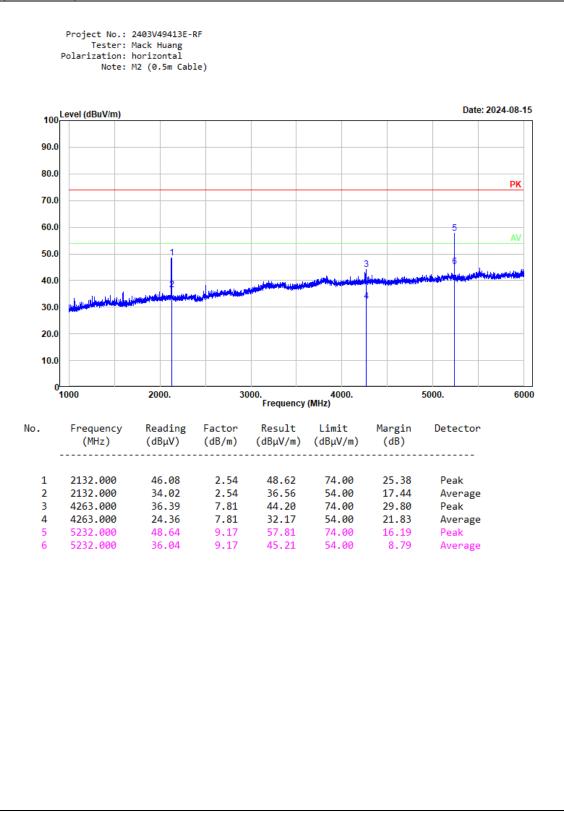
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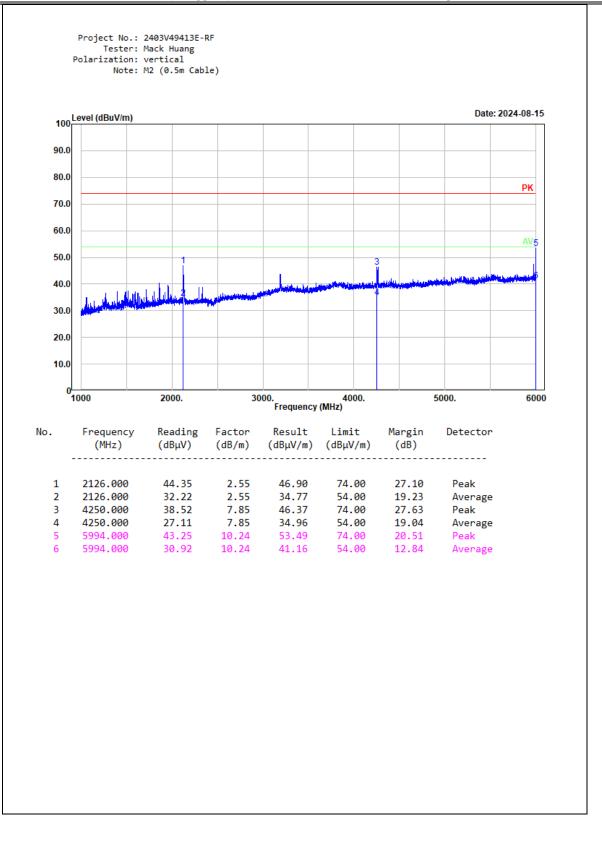
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M2 (0.5m Cable):

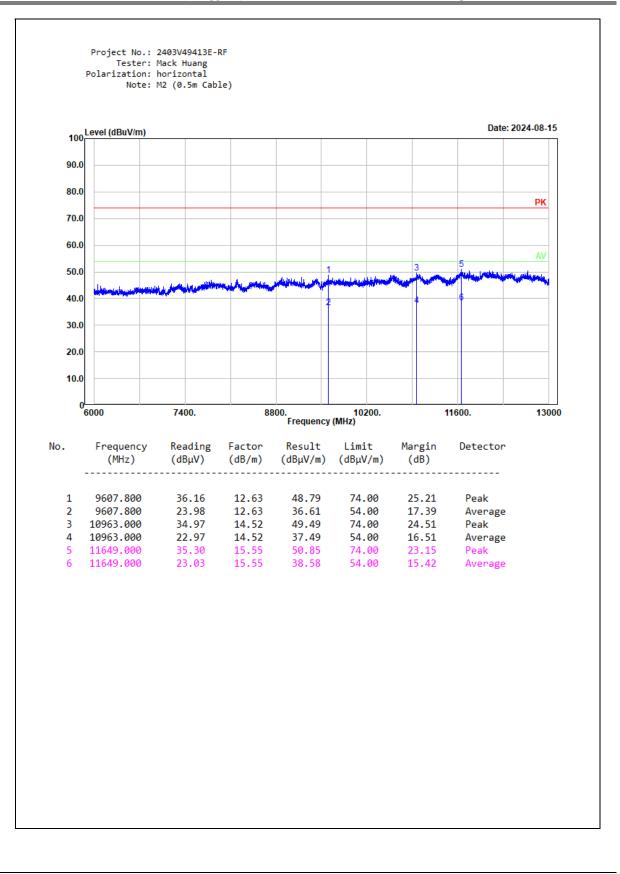


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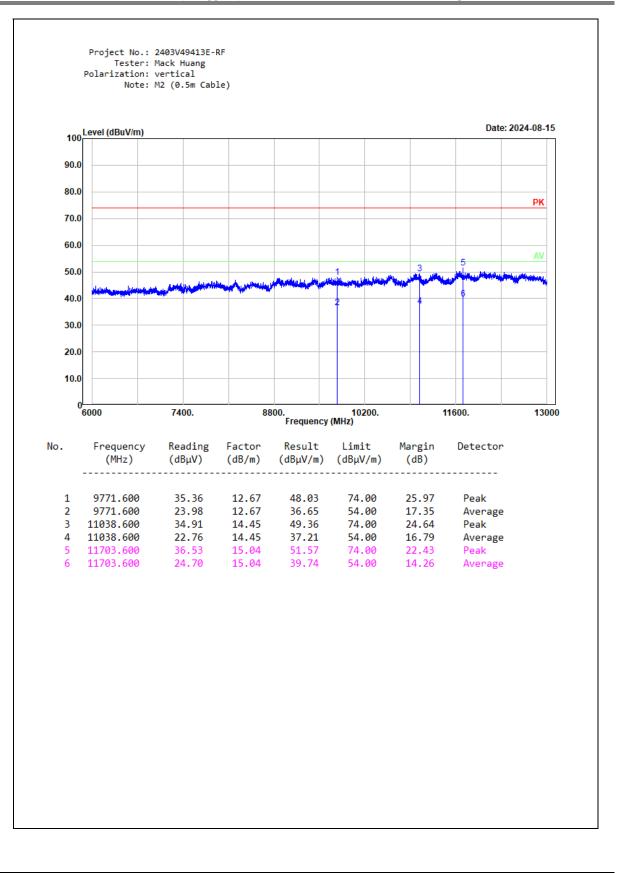


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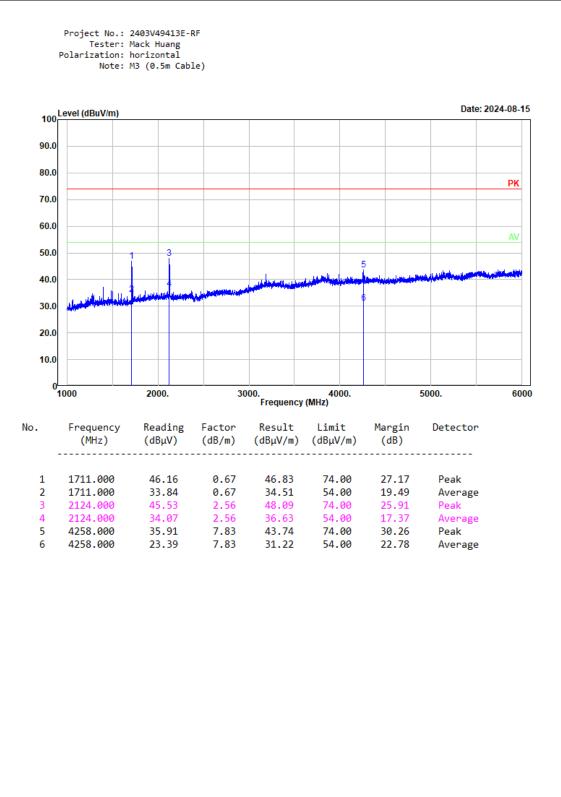
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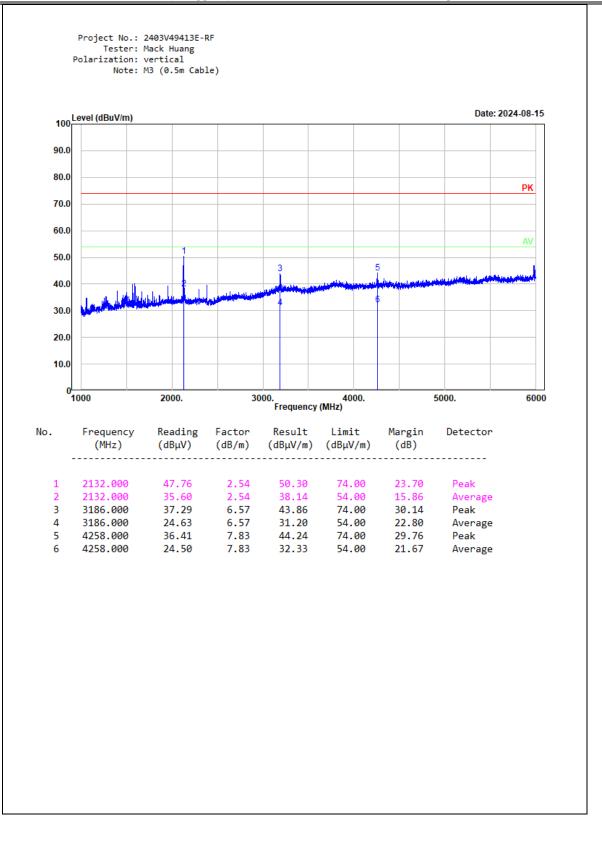
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M3 (0.5m Cable):



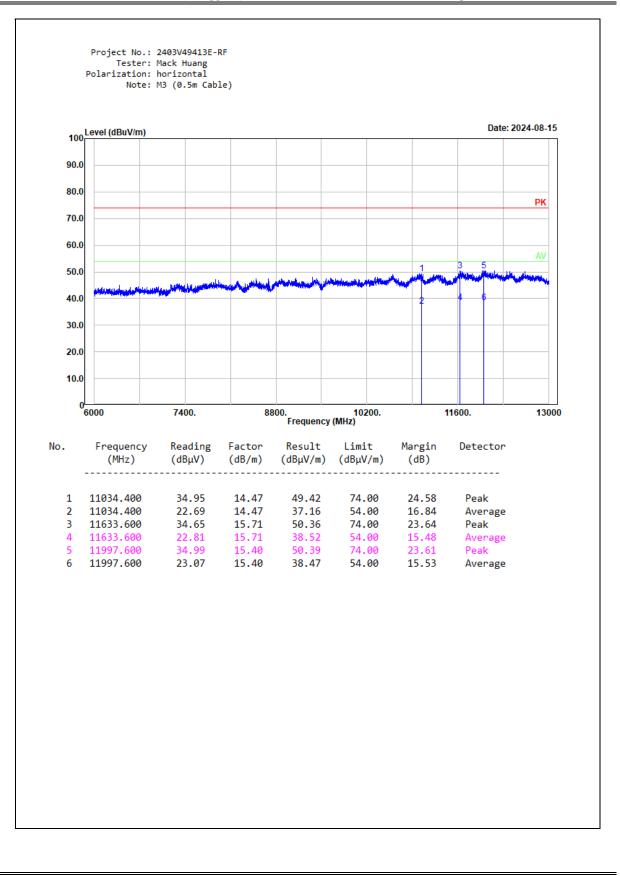
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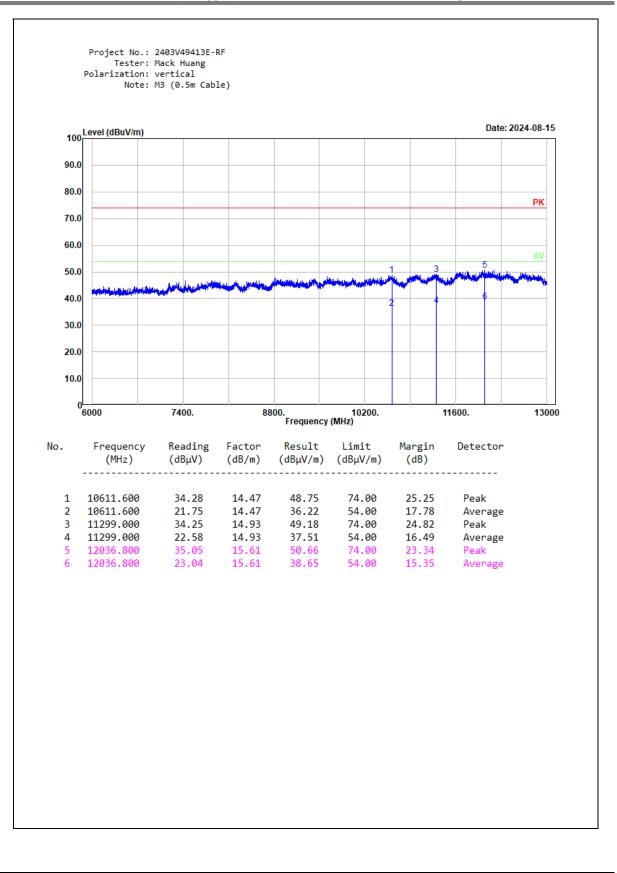
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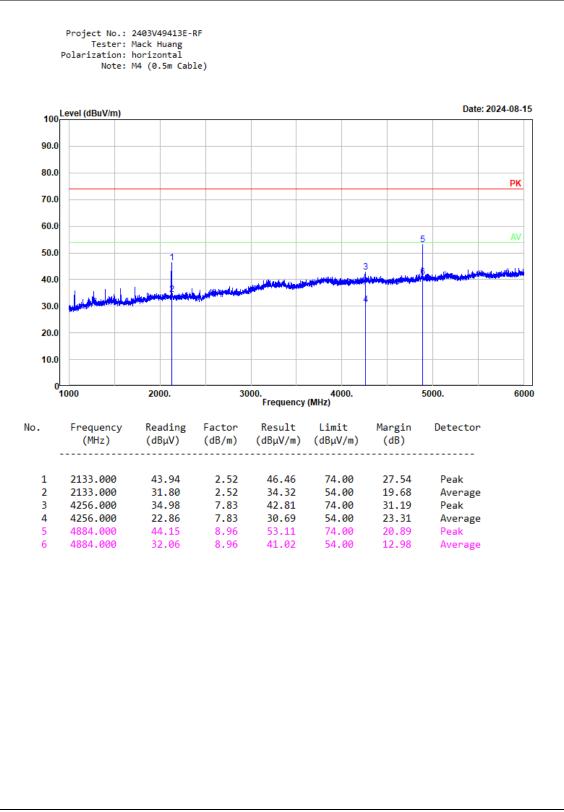
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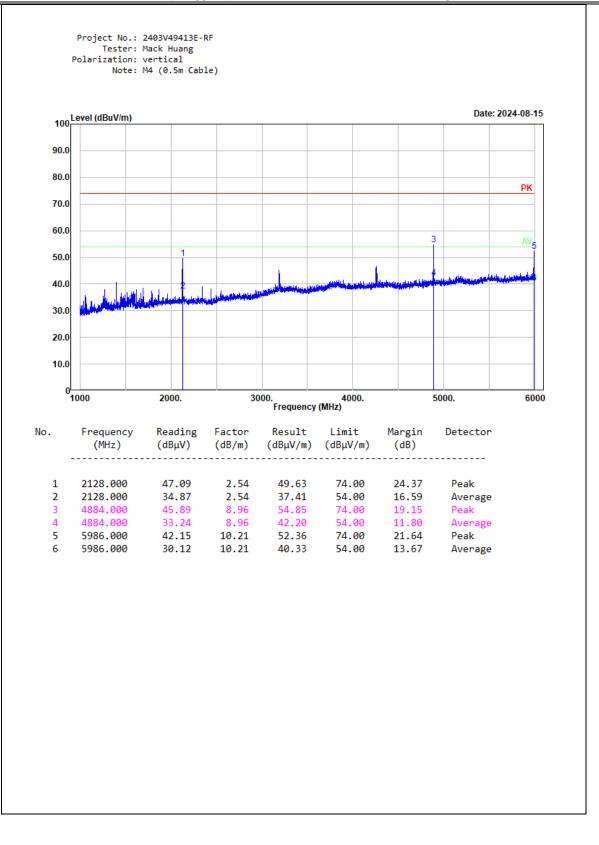
Report No.: 2403V49413E-00A

M4 (0.5m Cable):



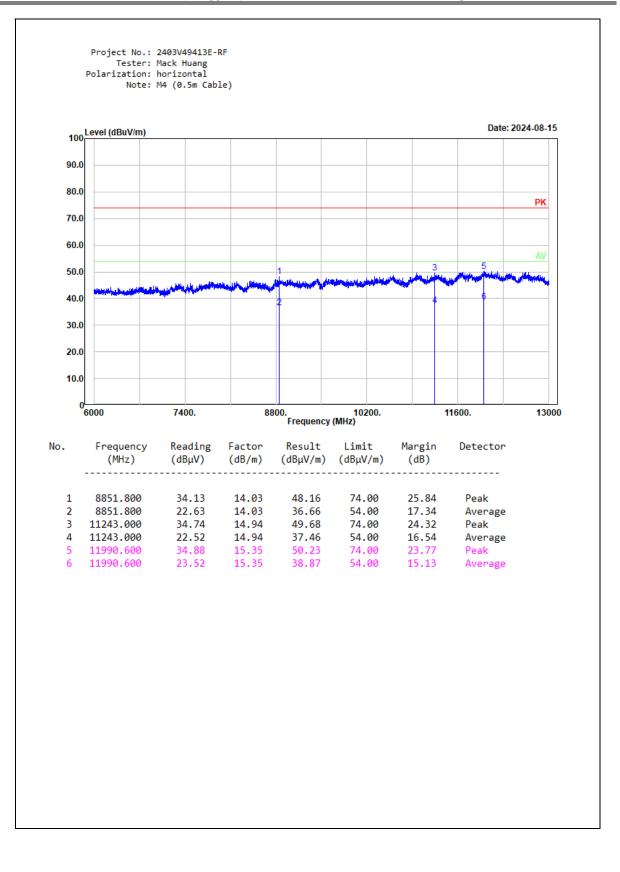
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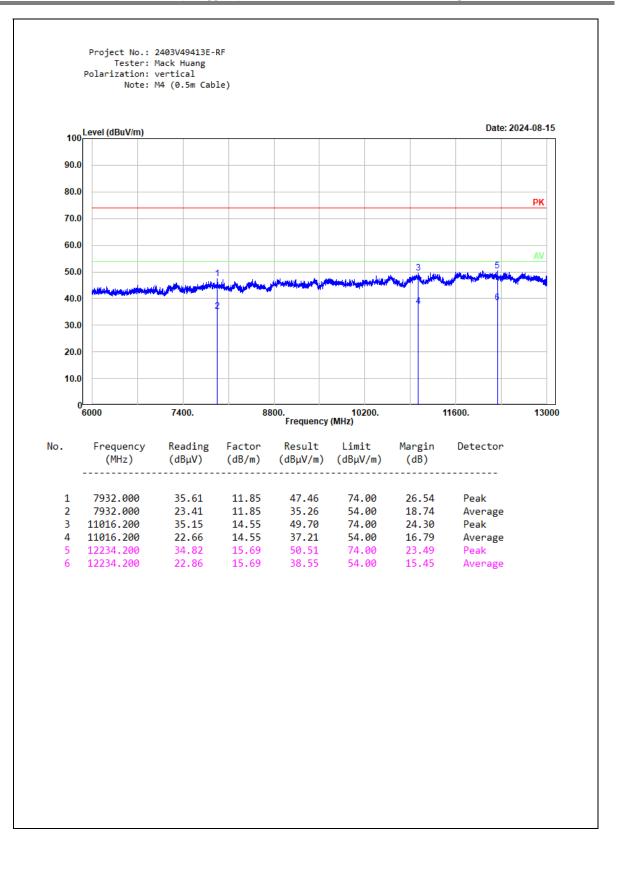
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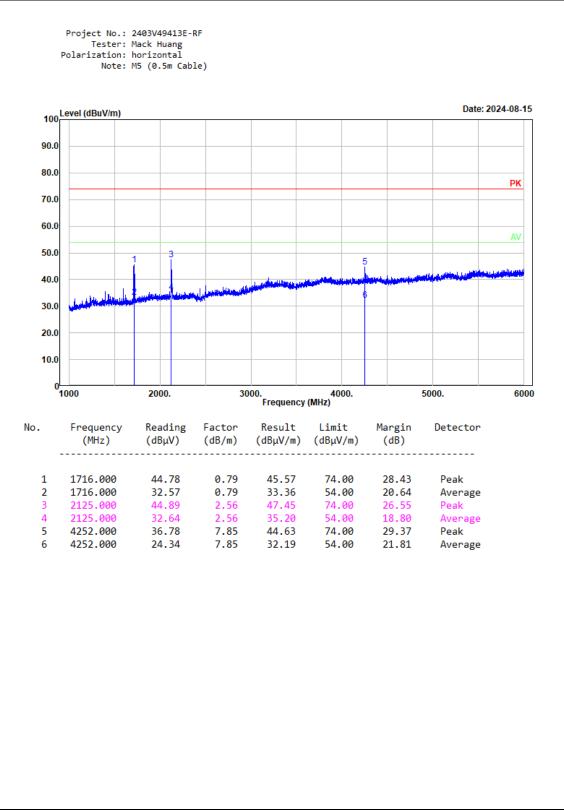
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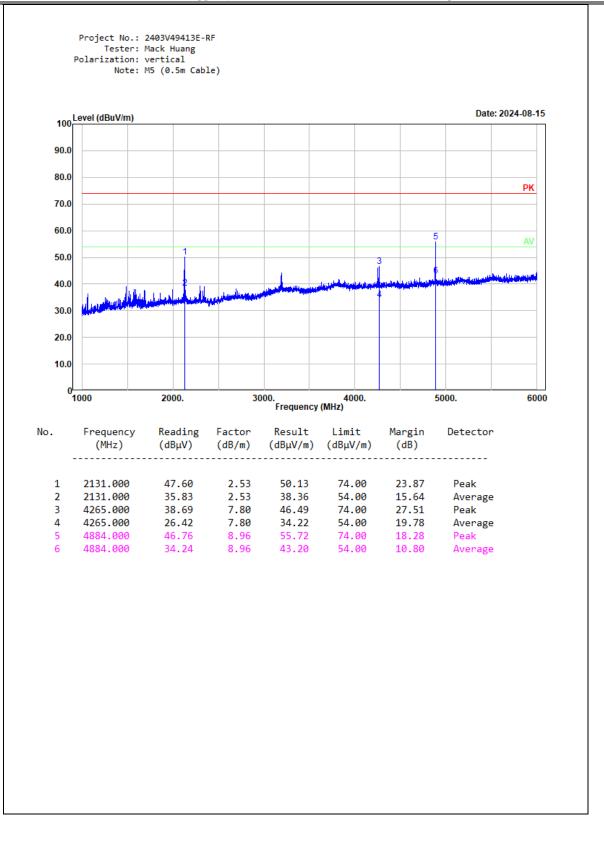
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M5 (0.5m Cable):



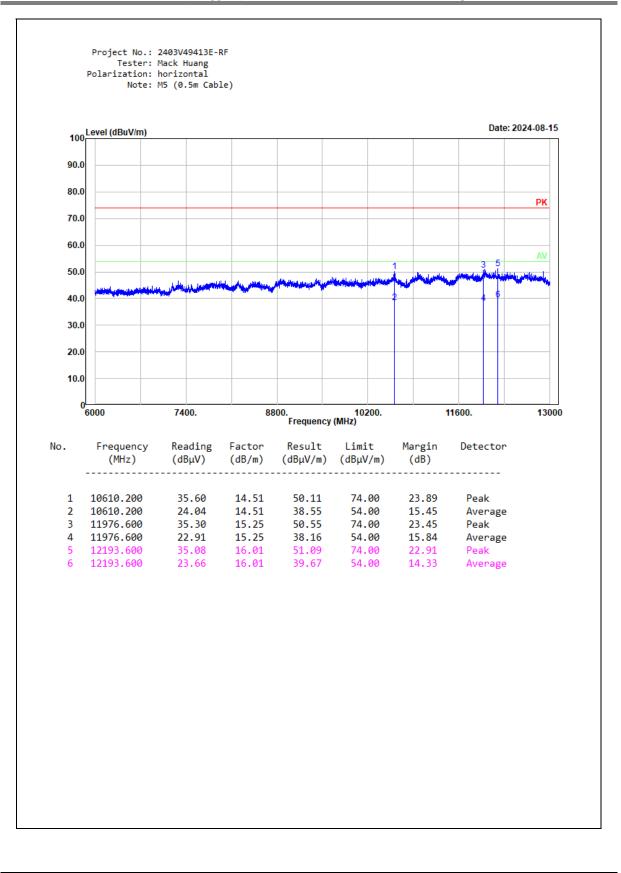
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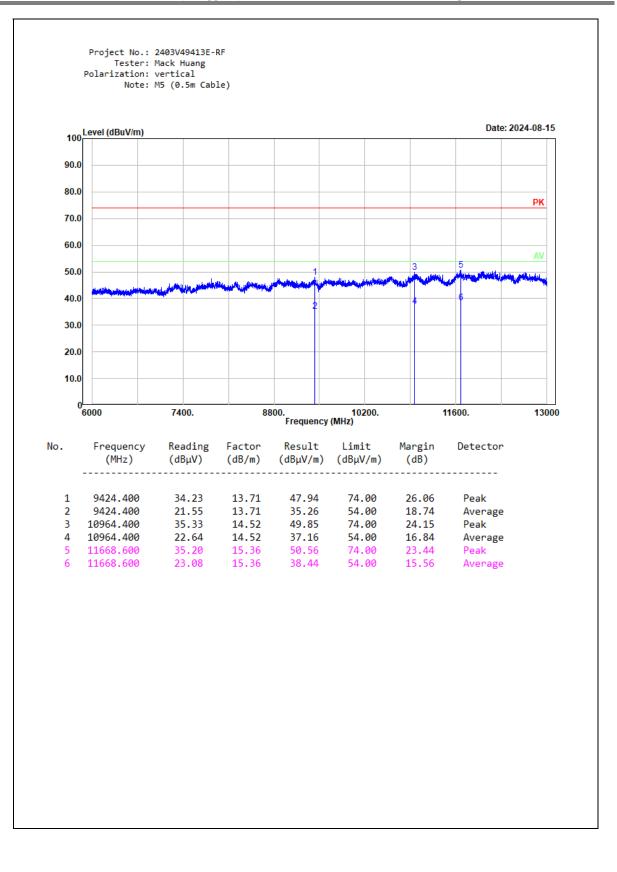
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5. EUT PHOTOGRAPHS

Please refer to the attachment 2403V49413E-EXP EUT EXTERNAL PHOTOGRAPHS and 2403V49413E-INP EUT INTERNAL PHOTOGRAPHS.

6. TEST SETUP PHOTOGRAPHS

Please refer to the attachment 2403V49413E-00A-TSP TEST SETUP PHOTOGRAPHS.

====END OF REPORT=====

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