

TEST REPORT

Applicant: Radiolink Electronic Limited

Address of Applicant: 3/F,BLD2,FuGuo industrial park,KaiFeng North Road, MeiLin, Shenzhen, China

Manufacturer/Factory: Radiolink Electronic Limited

Address of Manufacturer/Factory: 3/F,BLD2,FuGuo industrial park,KaiFeng North Road, MeiLin, Shenzhen, China

Equipment Under Test (EUT)

Product Name: Radio Control

Model No.: AT9, AT9S, AT9S Pro

Trade Mark: Radiolink

FCC ID: U2BRL039AT9S

Applicable standards: FCC CFR Title 47 Part 15 Subpart C Section 15.247

Date of sample receipt: September 16, 2021

Date of Test: September 16-23, 2021

Date of report issued: September 23, 2021

Test Result : PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Robinson Luo

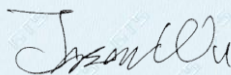
Laboratory Manager

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2 Version

Version No.	Date	Description
00	September 23, 2021	Original

Prepared By:

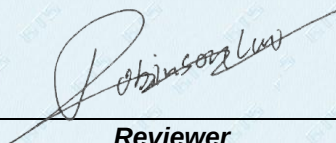


Date:

September 23, 2021

Project Engineer

Check By:



Date:

September 23, 2021

Reviewer

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna Requirement	15.203/15.247 (c)	N/A
AC Power Line Conducted Emission	15.207	N/A
Conducted Peak Output Power	15.247 (b)(1)	N/A
20dB Occupied Bandwidth	15.247 (a)(1)	N/A
Carrier Frequencies Separation	15.247 (a)(1)	N/A
Hopping Channel Number	15.247 (a)(1)(iii)	N/A
Dwell Time	15.247 (a)(1)(iii)	N/A
Radiated Emission	15.205/15.209	Pass
Band Edge	15.247(d)	N/A

Remarks:

1. Pass: The EUT complies with the essential requirements in the standard.
2. Test according to ANSI C63.10:2013

Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	30MHz-200MHz	3.8039dB	(1)
Radiated Emission	200MHz-1GHz	3.9679dB	(1)
Radiated Emission	1GHz-18GHz	4.29dB	(1)
Radiated Emission	18GHz-40GHz	3.30dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	3.44dB	(1)

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

5 General Information

5.1 General Description of EUT

Product Name:	Radio Control
Model No.:	AT9, AT9S, AT9S Pro
Test sample(s) ID:	GTSL202109000148-1
Sample(s) Status:	Engineer sample
Serial No.:	N/A
Hardware version:	REV:3.0
Software version:	V2.1.0
Operation Frequency:	2409MHz ~2474MHz
Channel numbers:	32
Channel separation:	2MHz
Modulation technology:	GFSK
Antenna Type:	Integral Antenna
Antenna gain:	2.00dBi (declare by Applicant)
Power supply:	DC 12V (8*1.5V Size "AA" Battery)

Operation Frequency each of channel					
Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2409.0MHz	12	2431.0MHz	23	2456.0MHz
2	2411.0MHz	13	2433.0MHz	24	2458.0MHz
3	2413.0MHz	14	2435.0MHz	25	2460.0MHz
4	2415.0MHz	15	2437.0MHz	26	2462.0MHz
5	2417.0MHz	16	2439.0MHz	27	2464.0MHz
6	2419.0MHz	17	2444.0MHz	28	2466.0MHz
7	2421.0MHz	18	2446.0MHz	29	2468.0MHz
8	2423.0MHz	19	2448.0MHz	30	2470.0MHz
9	2425.0MHz	20	2450.0MHz	31	2472.0MHz
10	2427.0MHz	21	2452.0MHz	32	2474.0MHz
11	2429.0MHz	22	2454.0MHz		

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	2409MHz
The middle channel	2444MHz
The Highest channel	2474MHz

5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode.
Remark: New battery is used during all test.	

5.3 Description of Support Units

None.

5.4 Deviation from Standards

None.

5.5 Abnormalities from Standard Conditions

None.

5.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations: • FCC—Registration No.: 381383 Designation Number: CN5029 Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. • IC —Registration No.: 9079A CAB identifier: CN0091 The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing • NVLAP (LAB CODE:600179-0) Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).
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5.7 Test Location

All tests were performed at:
Global United Technology Services Co., Ltd. Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102 Tel: 0755-27798480 Fax: 0755-27798960

5.8 Additional Instructions

Test Software	Special test command provided by manufacturer
Power level setup	Default

6 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 02 2020	July. 01 2025
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 24 2021	June. 23 2022
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 24 2021	June. 23 2022
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 24 2021	June. 23 2022
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 24 2021	June. 23 2022
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 24 2021	June. 23 2022
9	Coaxial Cable	GTS	N/A	GTS211	June. 24 2021	June. 23 2022
10	Coaxial cable	GTS	N/A	GTS210	June. 24 2021	June. 23 2022
11	Coaxial Cable	GTS	N/A	GTS212	June. 24 2021	June. 23 2022
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 24 2021	June. 23 2022
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 24 2021	June. 23 2022
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 24 2021	June. 23 2022
15	Band filter	Amindeon	82346	GTS219	June. 24 2021	June. 23 2022
16	Power Meter	Anritsu	ML2495A	GTS540	June. 24 2021	June. 23 2022
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 24 2021	June. 23 2022
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 24 2021	June. 23 2022
19	Splitter	Agilent	11636B	GTS237	June. 24 2021	June. 23 2022
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 24 2021	June. 23 2022
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 18 2020	Oct. 17 2021
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 18 2020	Oct. 17 2021
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 18 2020	Oct. 17 2021
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 24 2021	June. 23 2022

General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 24 2021	June. 23 2022
2	Barometer	ChangChun	DYM3	GTS255	June. 24 2021	June. 23 2022

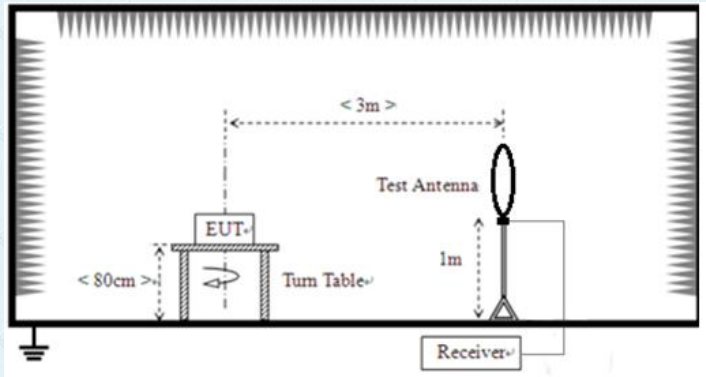
7 Test results and Measurement Data

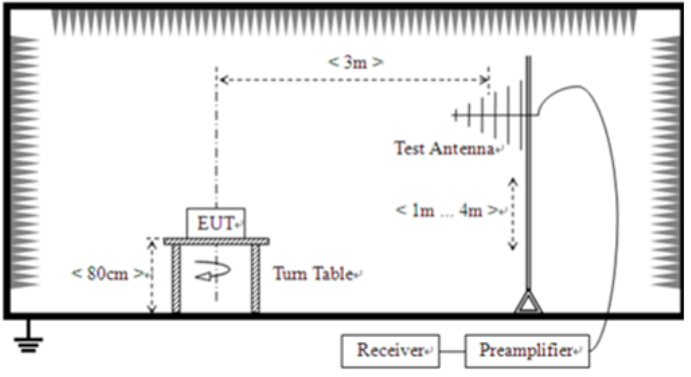
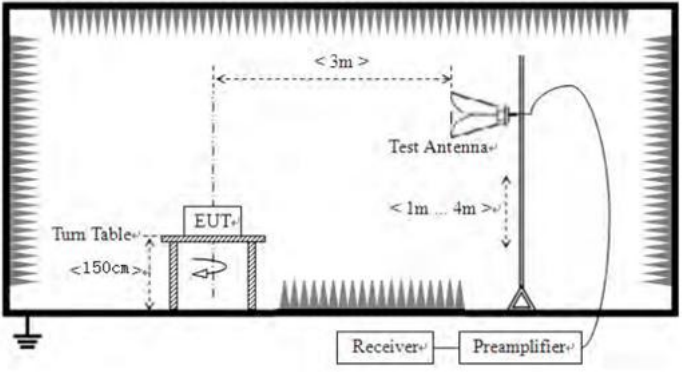
7.1 Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203 /247(c)
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 15.247(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.	
E.U.T Antenna:	
<i>The antenna is integral antenna, the best case gain of the is 2dBi, reference to the appendix II for details</i>	

7.2 Spurious Emission

7.2.1 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	9kHz to 25GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
	150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10Hz	Average
Limit:	Frequency	Limit (uV/m)		Value	Measurement Distance
	0.009MHz-0.490MHz	2400/F(KHz)		QP	300m
	0.490MHz-1.705MHz	24000/F(KHz)		QP	30m
	1.705MHz-30MHz	30		QP	30m
	30MHz-88MHz	100		QP	3m
	88MHz-216MHz	150		QP	
	216MHz-960MHz	200		QP	
	960MHz-1GHz	500		QP	
	Above 1GHz	500		Average	
		5000		Peak	
Test setup:	For radiated emissions from 9kHz to 30MHz				
					

	For radiated emissions from 30MHz to 1GHz  For radiated emissions above 1GHz 
Test Procedure:	1. The EUT was placed on the top of a rotating table (0.8m for below 1G and 1.5m for above 1G) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details

Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Test results:	Pass					

Measurement data:

Remark:

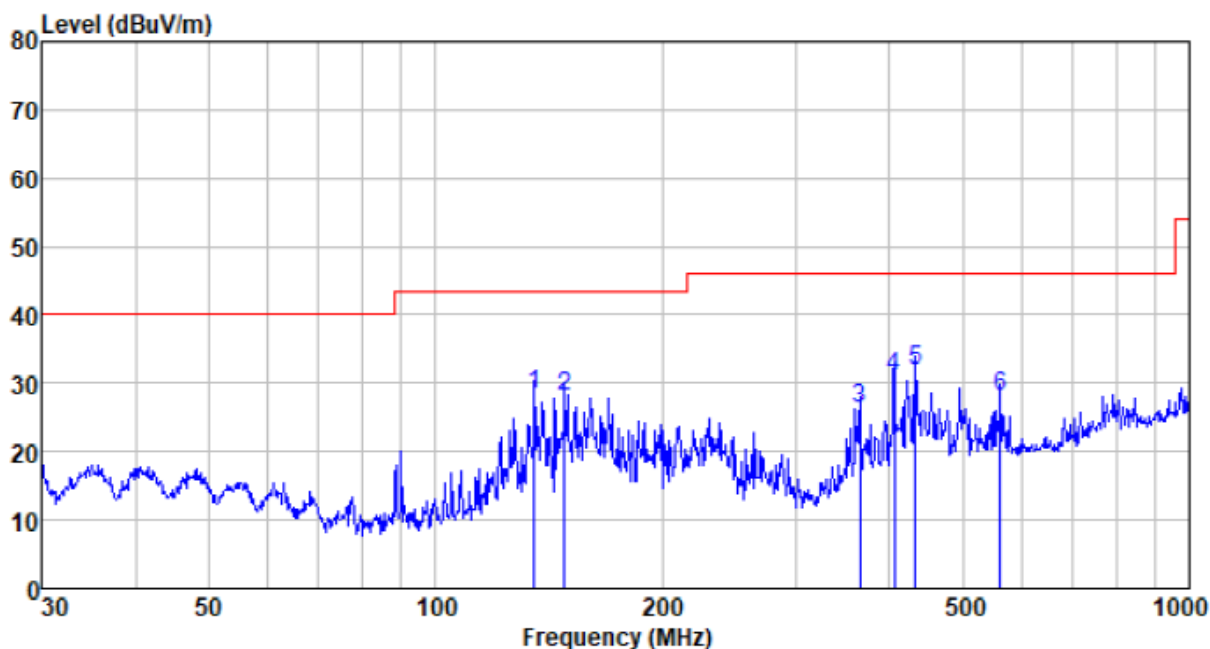
1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.
2. The measured filed strength at frequencies below 30MHz are lower than the limit over 30dB. So the data isn't reported.

■ 9kHz~30MHz

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

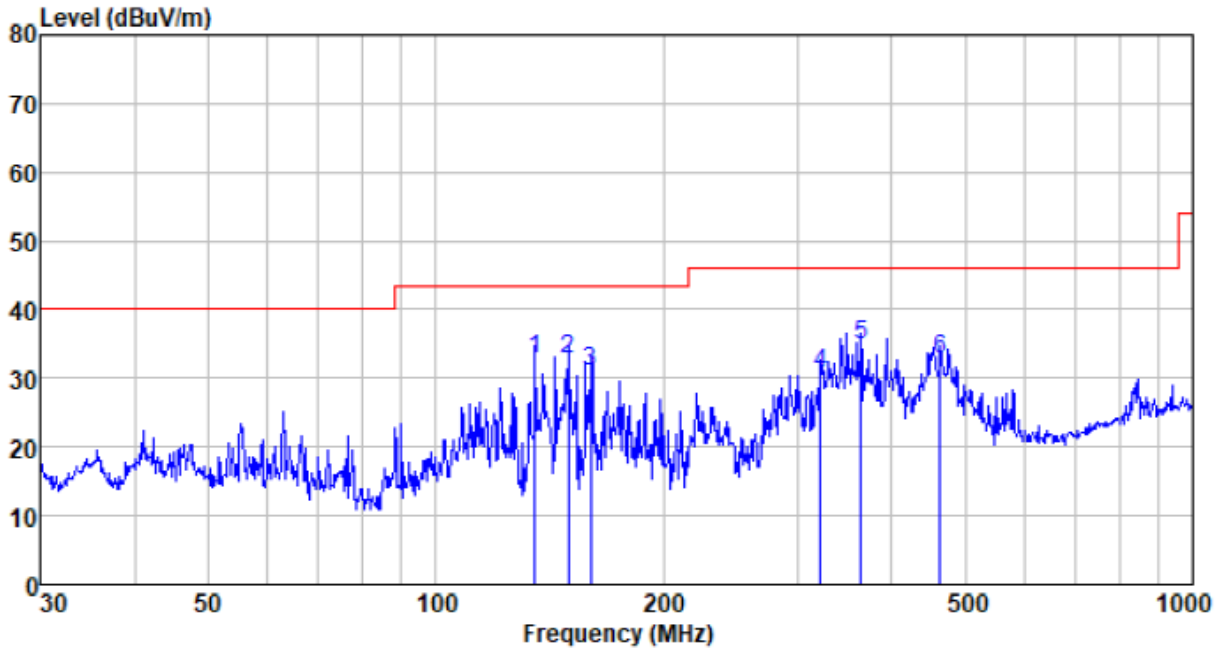
■ Below 1GHz

Test channel:	Lowest	Polarization:	Horizontal
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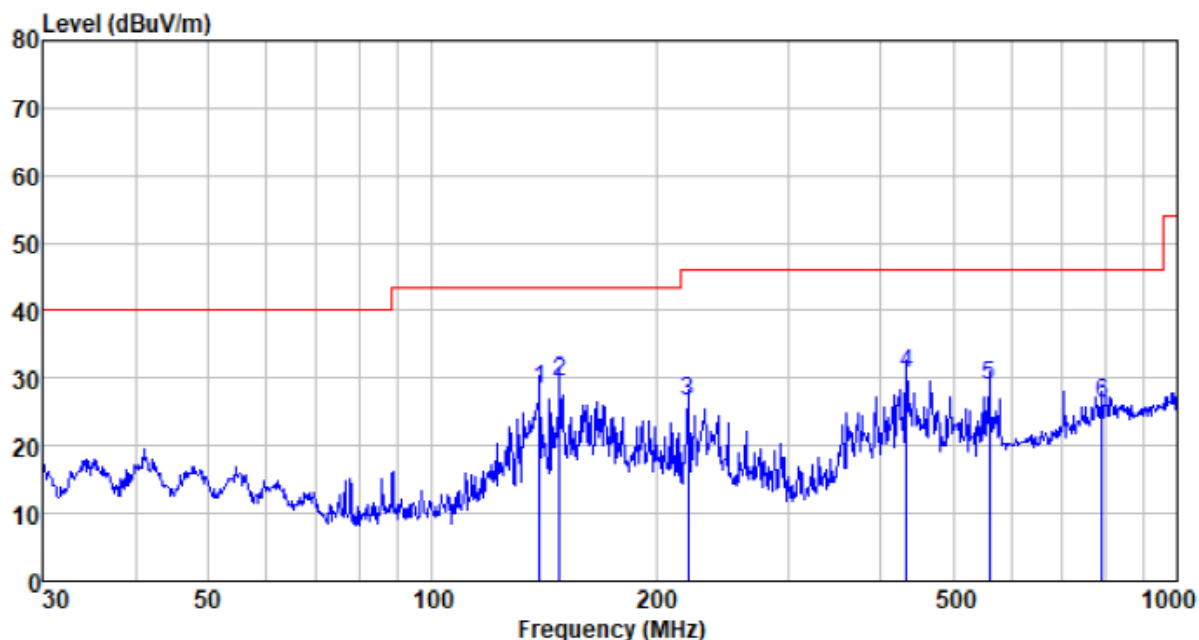
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
135.032	52.16	11.82	1.47	36.98	28.47	43.50	-15.03	QP
148.441	51.00	12.69	1.56	37.07	28.18	43.50	-15.32	QP
365.539	46.98	13.95	2.69	37.49	26.13	46.00	-19.87	QP
406.088	50.77	14.86	2.88	37.52	30.99	46.00	-15.01	QP
432.546	50.99	15.54	3.01	37.52	32.02	46.00	-13.98	QP
560.693	43.71	18.22	3.56	37.53	27.96	46.00	-18.04	QP

Test channel:	Lowest	Polarization:	Vertical
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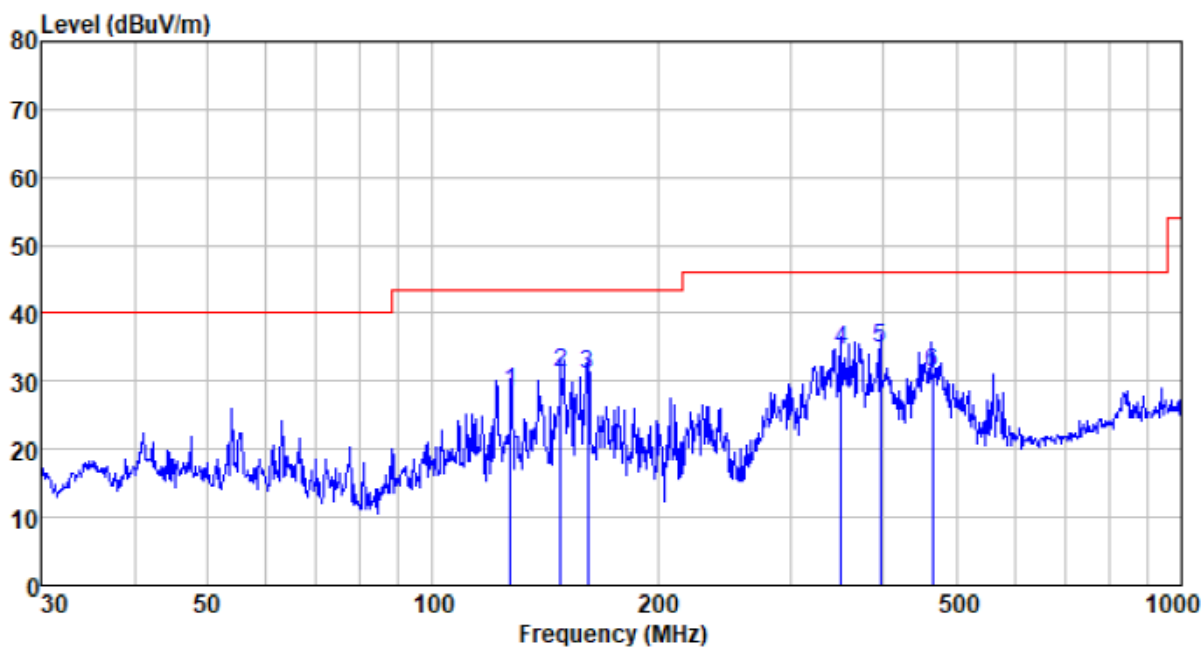
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
135.032	56.52	11.82	1.47	36.98	32.83	43.50	-10.67	QP
149.486	55.57	12.77	1.56	37.07	32.83	43.50	-10.67	QP
160.346	53.68	12.75	1.63	37.14	30.92	43.50	-12.58	QP
322.189	52.61	13.03	2.48	37.44	30.68	46.00	-15.32	QP
364.260	55.58	13.92	2.69	37.49	34.70	46.00	-11.30	QP
463.970	50.90	16.18	3.15	37.51	32.72	46.00	-13.28	QP

Test channel:	Middle	Polarization:	Horizontal
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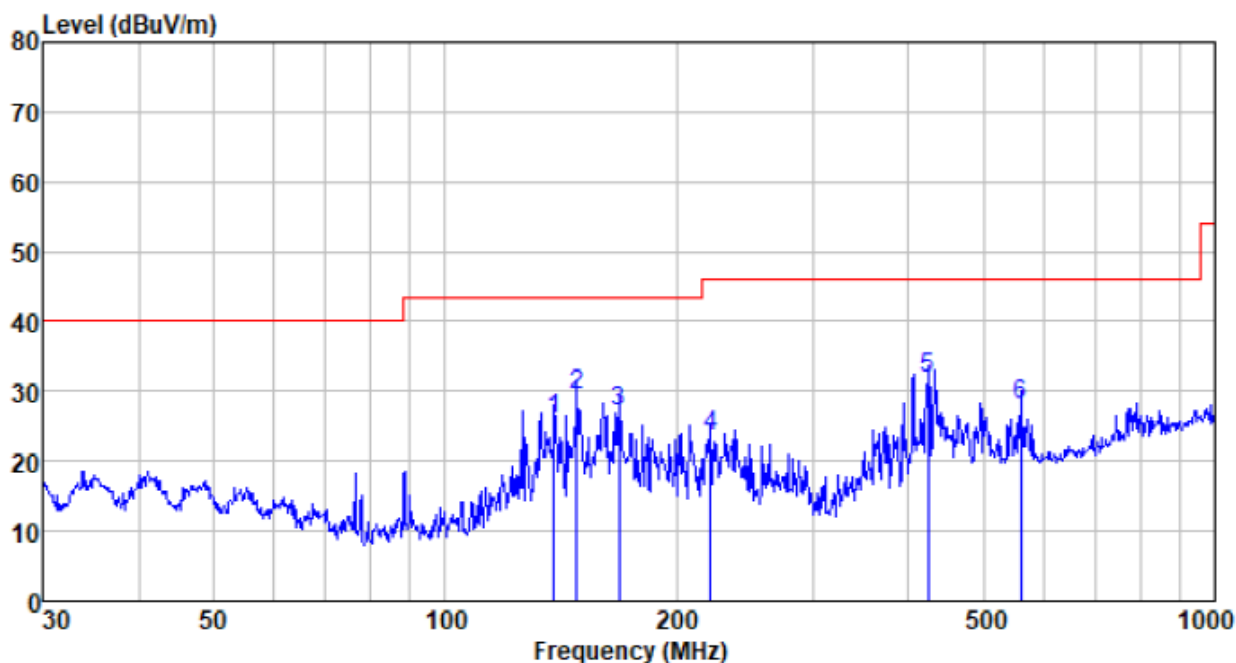
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
139.361	51.98	11.99	1.50	37.01	28.46	43.50	-15.04	QP
148.441	52.44	12.69	1.56	37.07	29.62	43.50	-13.88	QP
220.617	52.82	9.05	1.96	37.35	26.48	46.00	-19.52	QP
432.546	49.67	15.54	3.01	37.52	30.70	46.00	-15.30	QP
558.730	44.84	18.16	3.56	37.53	29.03	46.00	-16.97	QP
793.396	37.20	22.15	4.43	37.62	26.16	46.00	-19.84	QP

Test channel:	Middle	Polarization:	Vertical
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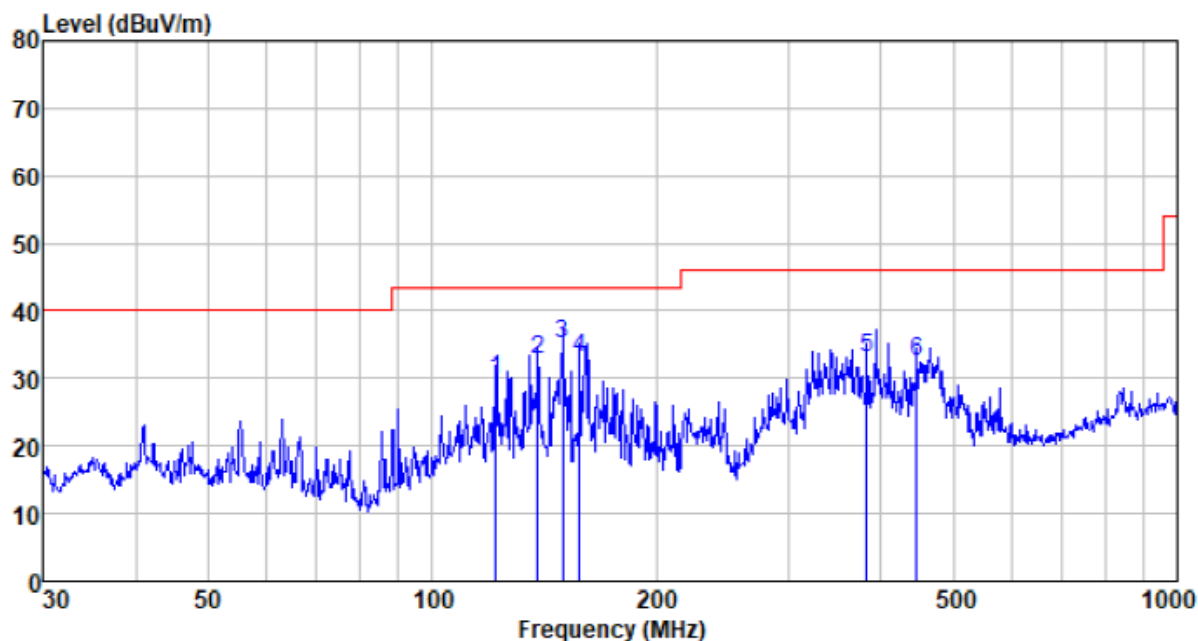
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
127.218	52.47	11.45	1.41	36.93	28.40	43.50	-15.10	QP
148.441	54.23	12.69	1.56	37.07	31.41	43.50	-12.09	QP
160.909	53.76	12.73	1.63	37.14	30.98	43.50	-12.52	QP
351.708	55.93	13.59	2.63	37.48	34.67	46.00	-11.33	QP
396.242	54.97	14.62	2.83	37.52	34.90	46.00	-11.10	QP
465.599	49.51	16.20	3.16	37.51	31.36	46.00	-14.64	QP

Test channel:	Highest	Polarization:	Horizontal
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Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
138.387	49.51	11.95	1.50	37.01	25.95	43.50	-17.55	QP
148.441	52.48	12.69	1.56	37.07	29.66	43.50	-13.84	QP
168.414	50.29	12.50	1.68	37.18	27.29	43.50	-16.21	QP
221.392	49.79	9.08	1.97	37.35	23.49	46.00	-22.51	QP
423.540	51.00	15.30	2.96	37.52	31.74	46.00	-14.26	QP
558.730	43.95	18.16	3.56	37.53	28.14	46.00	-17.86	QP

Test channel:	Highest	Polarization:	Vertical
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Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
121.549	54.37	11.09	1.37	36.89	29.94	43.50	-13.56	QP
138.387	56.18	11.95	1.50	37.01	32.62	43.50	-10.88	QP
149.486	57.97	12.77	1.56	37.07	35.23	43.50	-8.27	QP
157.559	55.81	12.77	1.62	37.12	33.08	43.50	-10.42	QP
382.588	53.45	14.34	2.77	37.50	33.06	46.00	-12.94	QP
446.414	51.12	15.91	3.07	37.52	32.58	46.00	-13.42	QP

8 Test Setup Photo

Reference to the **appendix I** for details.

9 EUT Construnctional Details

Reference to the **appendix II** for details.

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