



MEASUREMENT REPORT

FCC ID : LZ6ALPHA6000
IC : 2838A-A6000
APPLICANT : FOMOTECH INTERNATIONAL CORP.

Application Type : Certification
Product : industrial remote control
Model No. : Alpha 6000
Brand Name : FOMOTECH
FCC Classification : FCC Part 15 Security/Remote Control Transmitter (DSC)
FCC Rule Part(s) : Part 15.231(b)
ISED Standard : RSS 210 Issue 10
Test Procedure(s) : ANSI C63.10-2013
Received Date : December 25, 2023
Test Date : January 04~19, 2024

Tested By : *Kaunaz Lee*
(Kaunaz Lee)

Reviewed By : *Paddy Chen*
(Paddy Chen)

Approved By : *Chenz Ker*
(Chenz Ker)



The test results only relate to the tested sample.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Taiwan) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
2312TWO601-U1	1.0	Original Report	2024-02-01	

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§2.1033 General Information

Applicant	FOMOTECH INTERNATIONAL CORP.
Applicant Address	2F-1, 286-3, HSIN-YA ROAD, CHIEN CHEN DISTRICT, KAOHSIUNG, TAIWAN
Manufacturer	FOMOTECH INTERNATIONAL CORP.
Manufacturer Address	2F-1, 286-3, HSIN-YA ROAD, CHIEN CHEN DISTRICT, KAOHSIUNG, TAIWAN
Test Site	MRT Technology (Taiwan) Co., Ltd
Test Site Address	No. 38, Fuxing Second Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C)
Test Device Serial No.	#1-1 ☐ Production ☒ Pre-Production ☐ Engineering

Test Facility / Accreditations

1. MRT facility is a FCC registered (Reg. No. 291082) test facility with the site description report on file and is designated by the FCC as an Accredited Test Firm.
2. MRT facility is an IC registered (MRT Reg. No. 21723) test laboratory with the site description on file at Industry Canada.
3. MRT Lab is accredited to ISO 17025 by the Taiwan Accreditation Foundation (TAF Cert. No. 3261) in EMC, Telecommunications and Radio testing for FCC (Designation Number: TW3261), Industry Canada, EU and TELEC Rules.

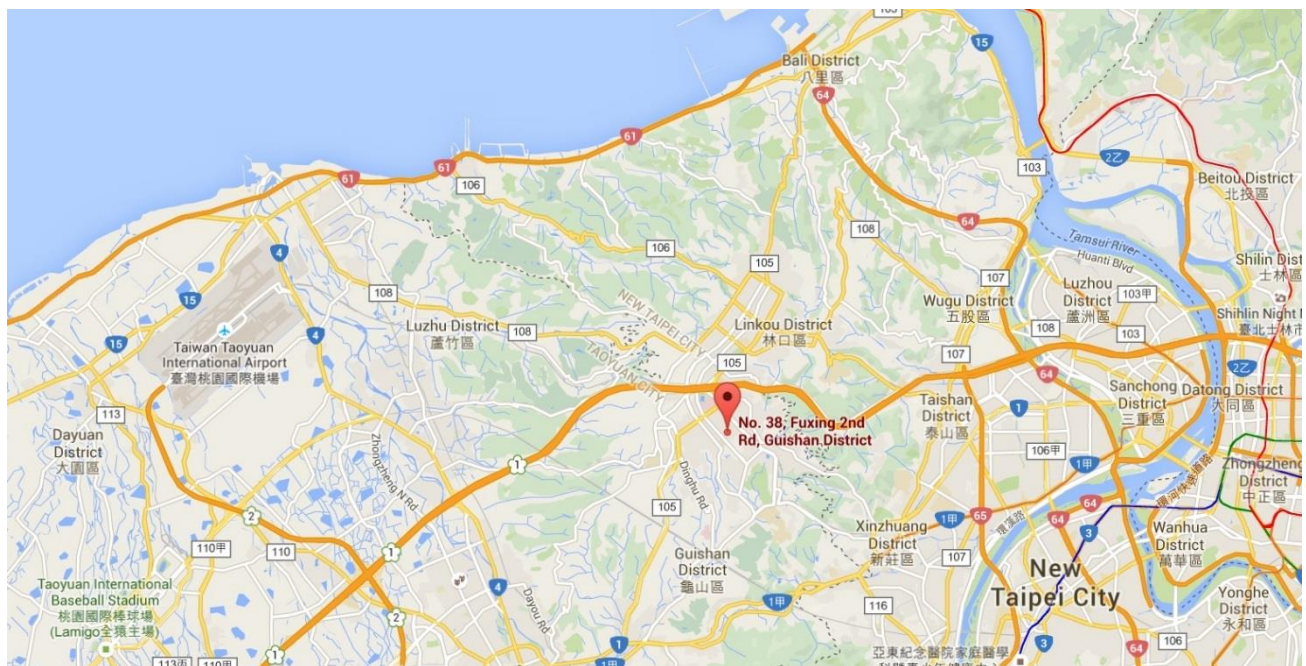
1. INTRODUCTION

1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taoyuan City. These measurement tests were conducted at the MRT Technology (Taiwan) Co., Ltd. Facility located at No.38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 33377, Taiwan (R.O.C).



2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name	industrial remote control
Model No.	Alpha 6000
Frequency Range	423.05 ~ 429.75MHz
Type of modulation	2FSK
Antenna Type	Monopole

2.2. Test Standards

The following report is prepared on behalf of the **FOMOTECH INTERNATIONAL CORP.** in accordance with FCC Part 15, Subpart C, and section 15.231, 15.203, 15.205 and 15.209 of the Federal Communication Commission rules/ IC RSS-Gen 8.8,8.9,8.10 and RSS-210 AnnexA

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which results in lowering the emission/immunity, should be checked to ensure compliance has been maintained.

2.3. Test Methodology

The measurement procedures described in the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2013).

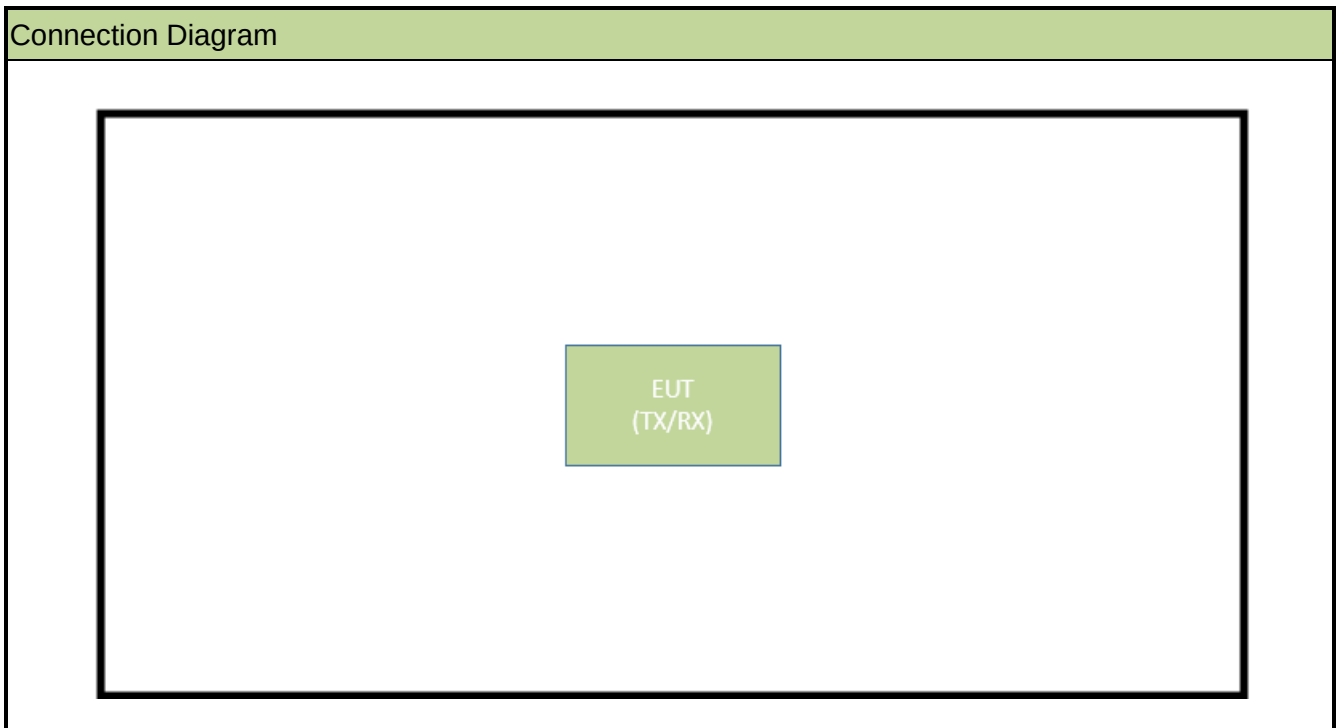
Deviation from measurement procedure.....None

2.4. EUT Setup and Test Mode

The EUT was operated at continuous transmitting mode that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode
Mode 1: Transmitting by 423.05MHz
Mode 2: Transmitting by 429.75MHz

2.5. Test Configuration



2.6. Test System Details

The types for all equipment, and descriptions of all cables used in the tested system (including inserted cards) are:

N/A

2.7. Operation Frequency / Channel List

Channel	Frequency	Channel	Frequency	Channel	Frequency
501	423.05	528	425.75	555	428.45
502	423.15	529	425.85	556	428.55
503	423.25	530	425.95	557	428.65
504	423.35	531	426.05	558	428.75
505	423.45	532	426.15	559	428.85
506	423.55	533	426.25	560	428.95
507	423.65	534	426.35	561	429.05
508	423.75	535	426.45	562	429.15
509	423.85	536	426.55	563	429.25
510	423.95	537	426.65	564	429.35
511	424.05	538	426.75	565	429.45
512	424.15	539	426.85	566	429.55
513	424.25	540	426.95	567	429.65
514	424.35	541	427.05	568	429.75
515	424.45	542	427.15	--	--
516	424.55	543	427.25	--	--
517	424.65	544	427.35	--	--
518	424.75	545	427.45	--	--
519	424.85	546	427.55	--	--
520	424.95	547	427.65	--	--
521	425.05	548	427.75	--	--
522	425.15	549	427.85	--	--
523	425.25	550	427.95	--	--
524	425.35	551	428.05	--	--
525	425.45	552	428.15	--	--
526	425.55	553	428.25	--	--
527	425.65	554	428.35	--	--

3. ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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 shall be considered sufficient to comply with the provisions of this section.”

- The antenna of the **Transmitter** is permanently attached.
- There are no provisions for connection to an external antenna.

Conclusion:

The Transmitter unit complies with the requirement of §15.203.

4. TEST EQUIPMENT CALIBRATION DATE

Radiated Emissions – AC1

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	MRTTWA00002	1 year	2024/5/22
Broadband TRILOG Antenna	SCHWARZBECK	VULB 9162	MRTTWA00001	1 year	2024/10/31
Broadband Hornantenna	SCHWARZBECK	BBHA 9120D	MRTTWA00003	1 year	2024/3/24
Broadband Preamplifier	SCHWARZBECK	BBV 9718	MRTTWA00005	1 year	2024/3/24
Breitband Hornantenna	SCHWARZBECK	BBHA 9170	MRTTWA00004	1 year	2024/3/20
Broadband Amplifier	SCHWARZBECK	BBV 9721	MRTTWA00006	1 year	2024/3/27
EMI Test Receiver	R&S	ESR3	MRTTWA00009	1 year	2024/3/8
Signal Analyzer	R&S	FSV40	MRTTWA00007	1 year	2024/3/14
Antenna Cable	HUBERSUHNER	SF106	MRTTWE00010	1 year	2024/6/13
Cable	Rosnol	K1K50-UP0264- K1K50-4M	MRTTWE00012	1 year	2024/6/18
Temperature/Humidity Meter	TFA	35.1078.10.IT	MRTTWA00032	1 year	2024/6/4

Test Software

Software	Version	Function
e3	9.160520a	EMI Test Software
EMI	V3	EMI Test Software

5. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.

AC Conducted Emission Measurement – SR2
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 150kHz~30MHz: $\pm 2.42\text{dB}$
Conducted Measurement– SR1
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): $\pm 1.3\text{dB}$
Radiated Emission Measurement – AC1
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): Horizontal: 9K~30MHz: $\pm 4.14\text{dB}$ 30MHz~1GHz: $\pm 4.22\text{dB}$ 1GHz~40GHz: $\pm 4.05\text{dB}$ Vertical: 9K~30MHz: $\pm 4.14\text{dB}$ 30MHz~1GHz: $\pm 3.37\text{dB}$ 1GHz~40GHz: $\pm 4.08\text{dB}$

6. TEST RESULT

6.1. Summary

Company Name: FOMOTECH INTERNATIONAL CORP.

FCC Part Section(s)	Test Description	Test Condition	Test Result
15.203	ANTENNA REQUIREMENTS	--	Pass
15.205,15.209,15.231(b)	Radiated Spurious Emissions	Radiated	Pass
15.231(c)	20dB Bandwidth / 99% Bandwidth		Pass
15.231(a)	Transmission Time		Pass
15.231(a)	Duty Cycle		Pass
15.207	AC Conducted Emissions 150kHz - 30MHz	Line Conducted	N/A

Notes:

- 1) Determining compliance is based on the test results met the regulation limits or requirements declared by clients, and the test results don't take into account the value of measurement uncertainty.
- 2) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 3) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
- 4) The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.
- 5) The EUT Power by Battery, so do not need to test Conducted Emissions.

6.2. Radiated Emissions

6.2.1. Standard Applicable

According to §15.231(b), the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
40.66-40.70	2,250	225
70-130	1,250	125
130-174	1,250 to 3,750	125 to 375
174-260	3,750	375
260-470	13,750 to 12,500	1375 to 1,250
Above 470	12,500	1,250

The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in §15.209, whichever limit permits a higher field strength.

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements start below or at the lowest crystal frequency.

Compliance with the provisions of §15.205 shall be demonstrated using the measurement instrumentation specified in that section.

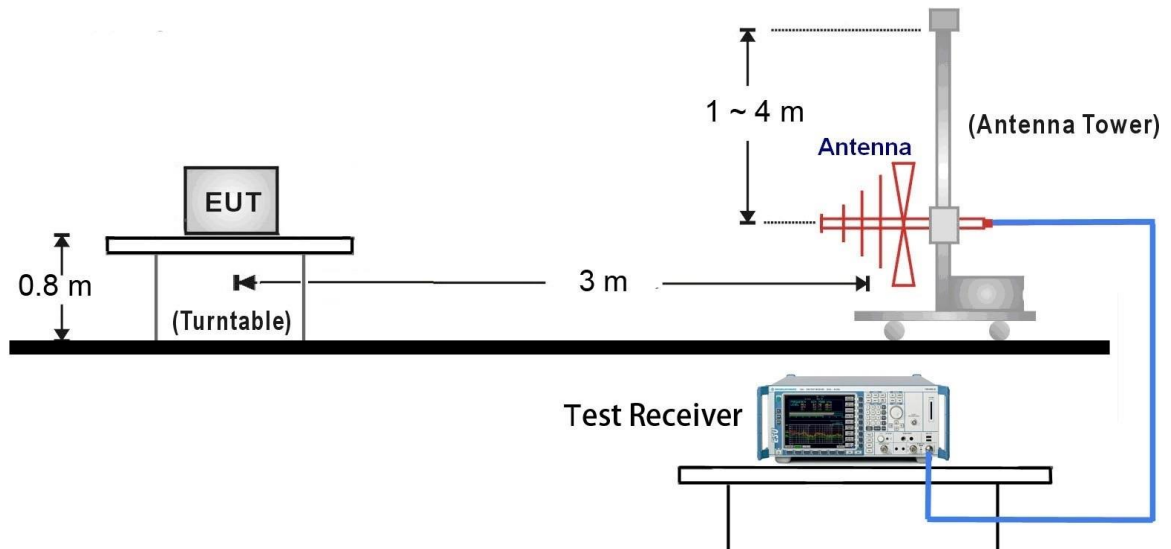
6.2.2. Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.231(b) and FCC Part 15.209 Limit / RSS-Gen 8.9 and RSS-210 Annex A.1.2.

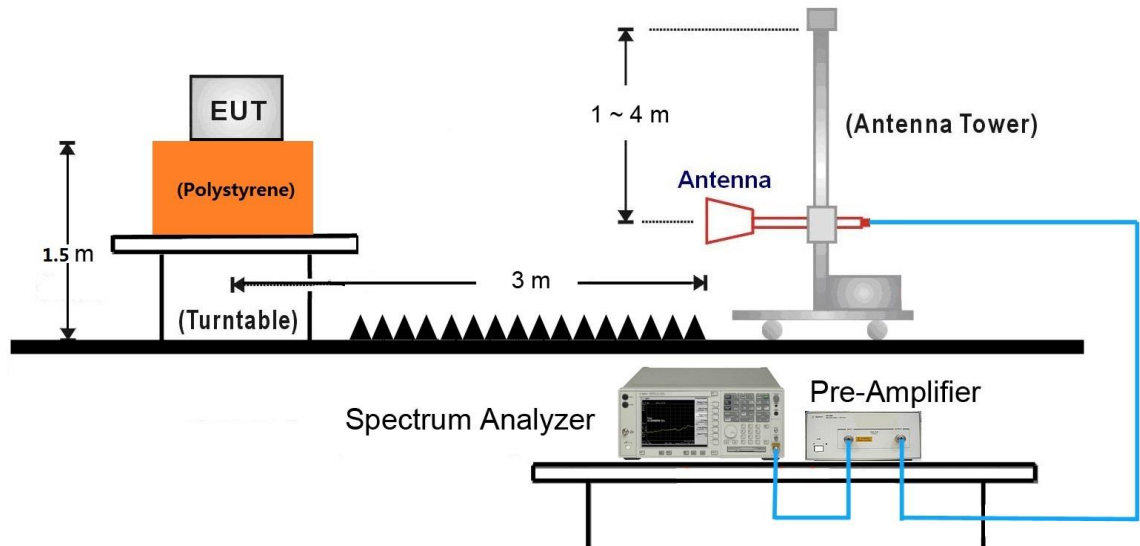
6.2.3. Test Setup

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.231(b) and FCC Part 15.209 Limit/ RSS-Gen 8.9 and RSS-210 Annex A.1.2.

30MHz ~ 1GHz Test Setup:

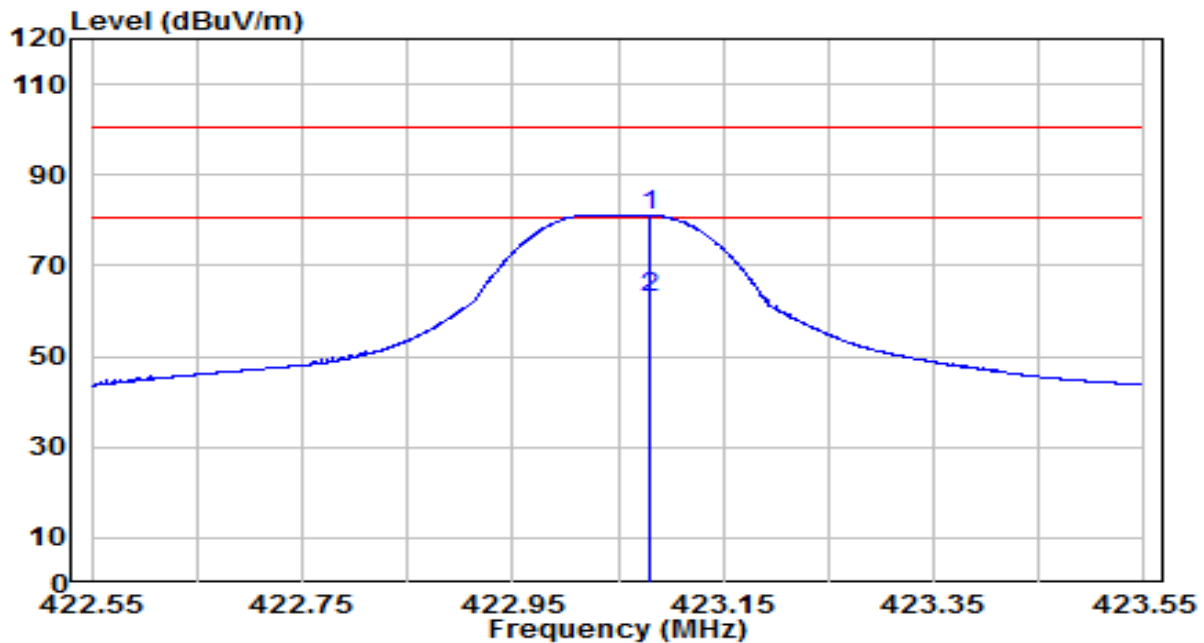


1GHz ~ 5GHz Test Setup:



6.2.4. Test Results

EUT	Transmitter	Date of Test	2024-01-23
Factor	VULB 9162	Temp. / Humidity	20°C /47%
Polarity	Horizontal	Site / Test Engineer	AC1 / Todd
Test Mode	TX-423.05MHz	Test Voltage	By Battery

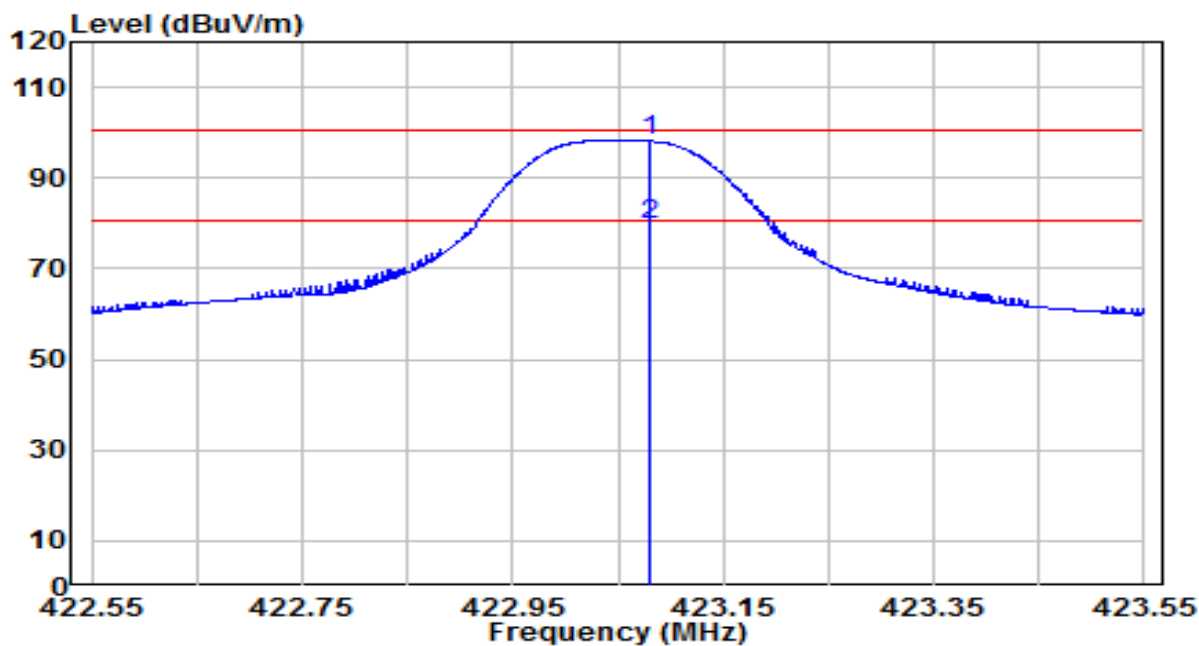


No		Frequency (MHz)	Reading (dBuV)	C.F (dB/m)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	423.080	57.22	23.84	81.06	-19.40	100.46	100	95	Peak
2	*	423.080	N/A	N/A	62.81	-17.65	80.46	100	95	Average

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB/m)+ Cable Loss (dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. Average factor ($20\log(1/\text{Duty Cycle})$) is 18.25dB.
6. Average Measurement = Peak Measurement - Average factor.

EUT	Transmitter	Date of Test	2024-01-23
Factor	VULB 9162	Temp. / Humidity	20°C /47%
Polarity	Vertical	Site / Test Engineer	AC1 / Todd
Test Mode	TX-423.05MHz	Test Voltage	By Battery

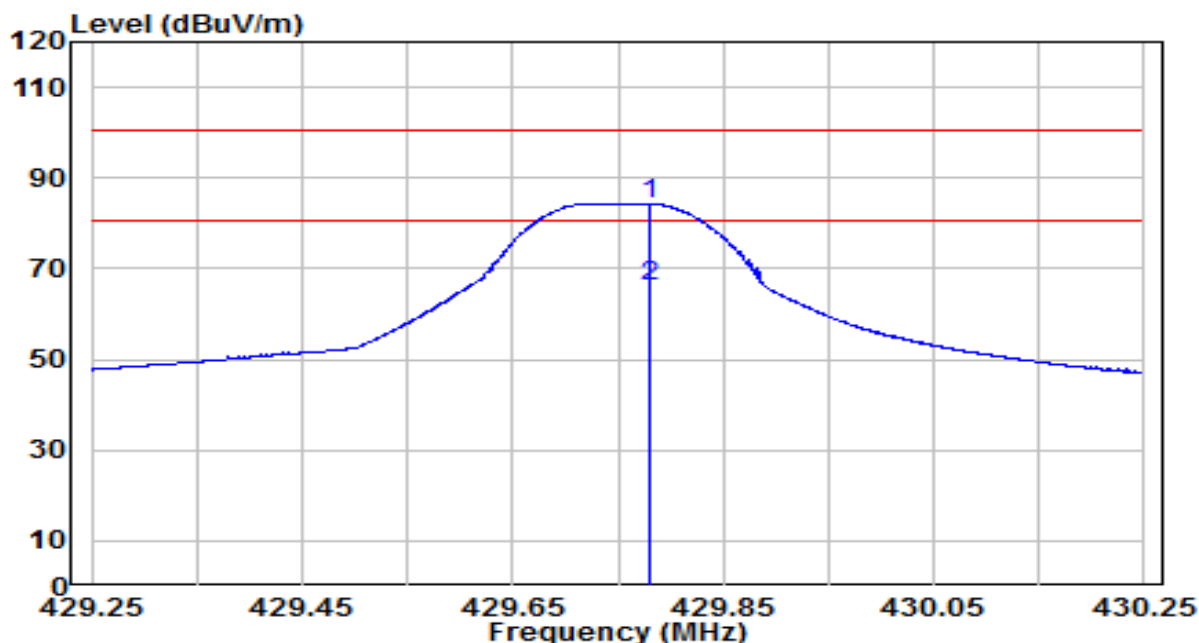


No		Frequency (MHz)	Reading (dBuV)	C.F (dB/m)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	423.080	74.24	23.84	98.07	-2.39	100.46	100	68	Peak
2	*	423.080	N/A	N/A	79.82	-0.64	80.46	100	68	Average

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB/m)+ Cable Loss (dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. Average factor ($20\log(1/\text{Duty Cycle})$) is 18.25dB.
6. Average Measurement = Peak Measurement - Average factor.

EUT	Transmitter	Date of Test	2024-01-23
Factor	VULB 9162	Temp. / Humidity	20°C /47%
Polarity	Horizontal	Site / Test Engineer	AC1 / Todd
Test Mode	TX-429.75MHz	Test Voltage	By Battery

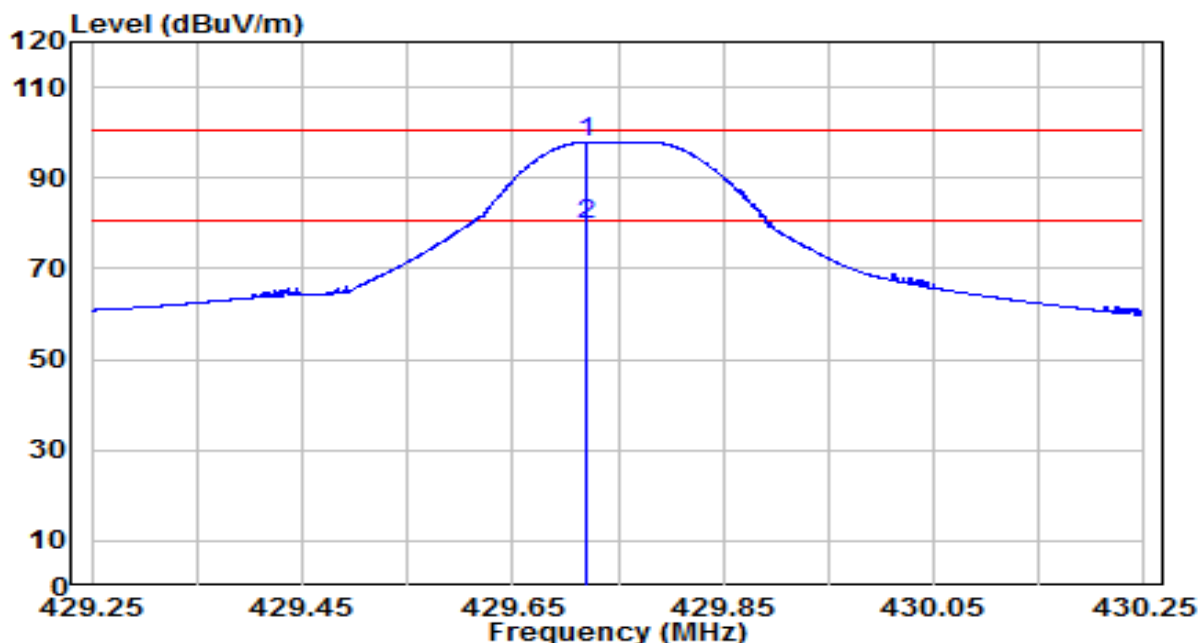


No		Frequency (MHz)	Reading (dBuV)	C.F (dB/m)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	429.780	60.34	23.90	84.24	-16.22	100.46	100	49	Peak
2	*	429.780	N/A	N/A	65.99	-14.47	80.46	100	49	Average

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB/m)+ Cable Loss (dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. Average factor (20Log(1/Duty Cycle)) is 18.25dB.
6. Average Measurement = Peak Measurement - Average factor.

EUT	Transmitter	Date of Test	2024-01-23
Factor	VULB 9162	Temp. / Humidity	20°C /47%
Polarity	Vertical	Site / Test Engineer	AC1 / Todd
Test Mode	TX-429.75MHz	Test Voltage	By Battery

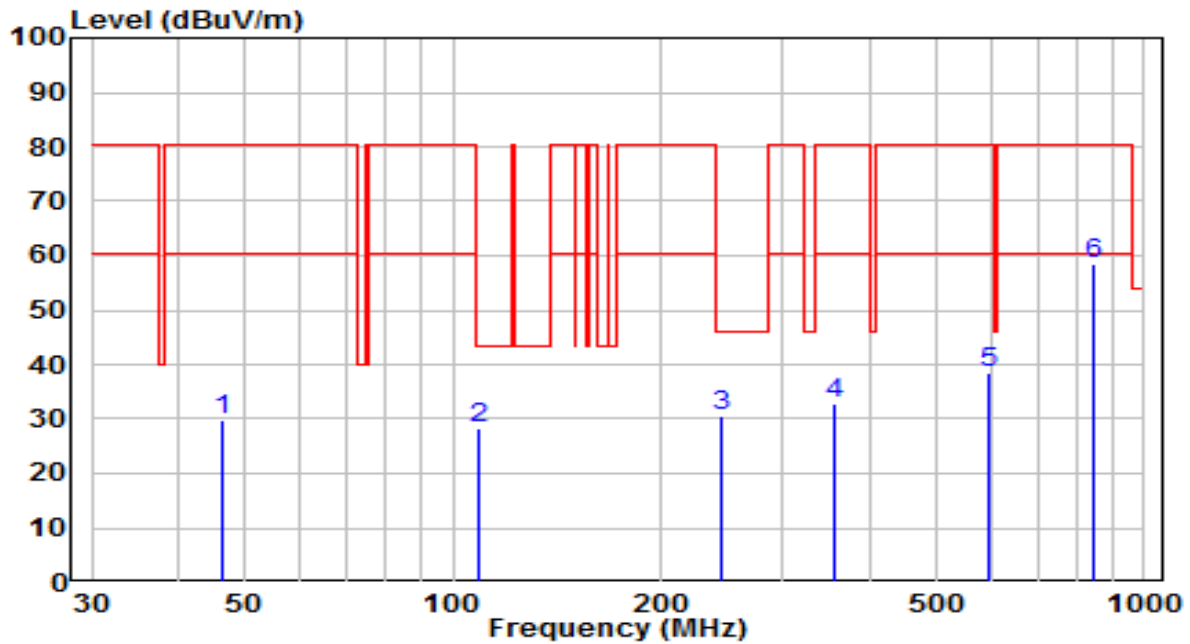


No		Frequency (MHz)	Reading (dBuV)	C.F (dB/m)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	429.720	73.94	23.90	97.84	-2.62	100.46	100	31	Peak
2	*	429.720	N/A	N/A	79.59	-0.87	80.46	100	31	Average

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB/m)+ Cable Loss (dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. Average factor (20Log(1/Duty Cycle)) is 18.25dB.
6. Average Measurement = Peak Measurement - Average factor.

EUT	industrial remote control	Date of Test	2024-01-18
Factor	VULB 9162	Temp. / Humidity	24°C /50%
Polarity	Horizontal	Site / Test Engineer	AC1 / Todd
Test Mode	TX-423.05MHz	Test Voltage	By Battery

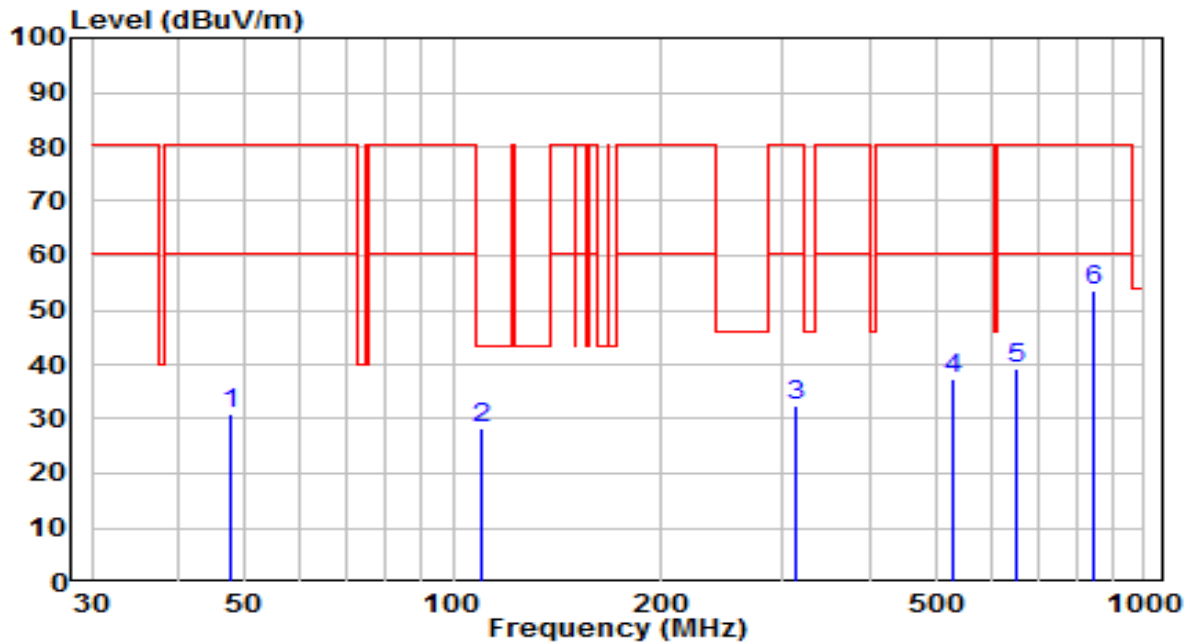


No	Frequency (MHz)	Reading (dBuV)	C.F (dB/m)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	46.490	9.34	20.59	29.94	-50.52	80.46	100	315	QP
2	* 108.570	9.66	18.53	28.19	-15.31	43.50	100	65	QP
3	244.370	10.76	19.83	30.59	-15.41	46.00	100	115	QP
4	355.920	10.20	22.79	32.99	-47.47	80.46	100	225	QP
5	596.480	11.19	27.31	38.50	-41.96	80.46	100	110	QP
6	846.740	27.47	30.99	58.46	-22.00	80.46	100	255	QP

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB/m)+ Cable Loss (dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	industrial remote control	Date of Test	2024-01-18
Factor	VULB 9162	Temp. / Humidity	24°C /50%
Polarity	Vertical	Site / Test Engineer	AC1 / Todd
Test Mode	TX-423.05MHz	Test Voltage	By Battery

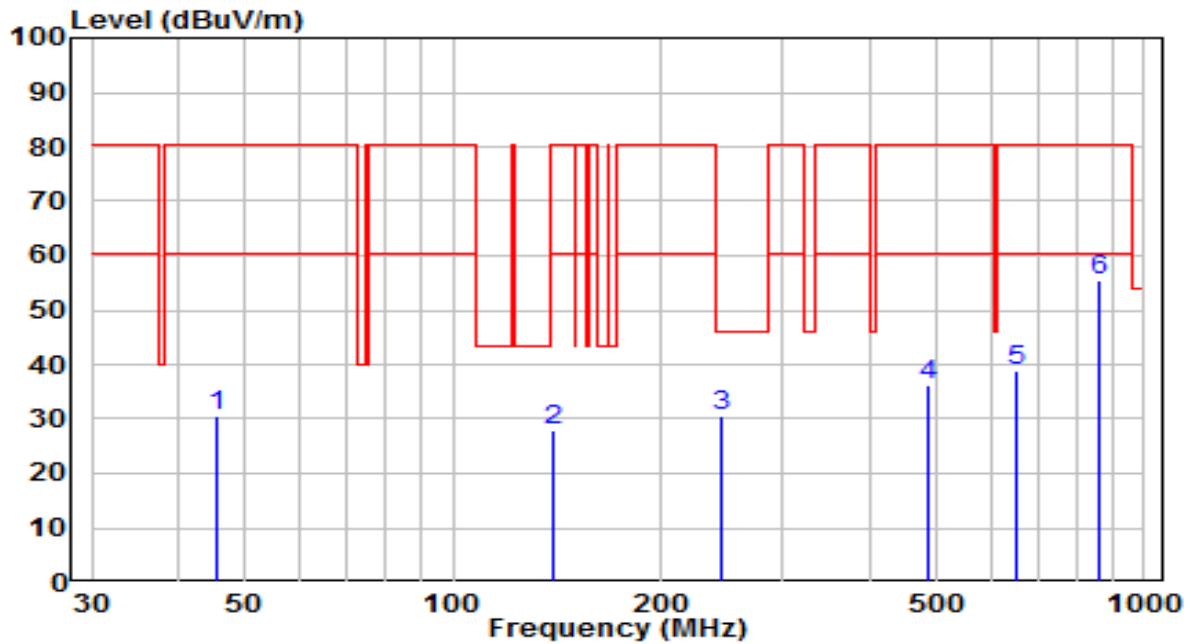


No	Frequency (MHz)	Reading (dBuV)	C.F (dB/m)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	47.460	10.18	20.58	30.76	-49.70	80.46	100	295	QP
2	* 109.540	9.87	18.53	28.41	-15.09	43.50	100	70	QP
3	313.240	11.17	21.26	32.43	-48.03	80.46	150	45	QP
4	528.580	11.56	25.75	37.31	-43.15	80.46	100	195	QP
5	655.650	11.54	27.69	39.23	-41.23	80.46	150	125	QP
6	846.740	22.65	30.99	53.64	-26.82	80.46	100	35	QP

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB/m)+ Cable Loss (dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	industrial remote control	Date of Test	2024-01-18
Factor	VULB 9162	Temp. / Humidity	24°C /50%
Polarity	Horizontal	Site / Test Engineer	AC1 / Todd
Test Mode	TX-429.75MHz	Test Voltage	By Battery

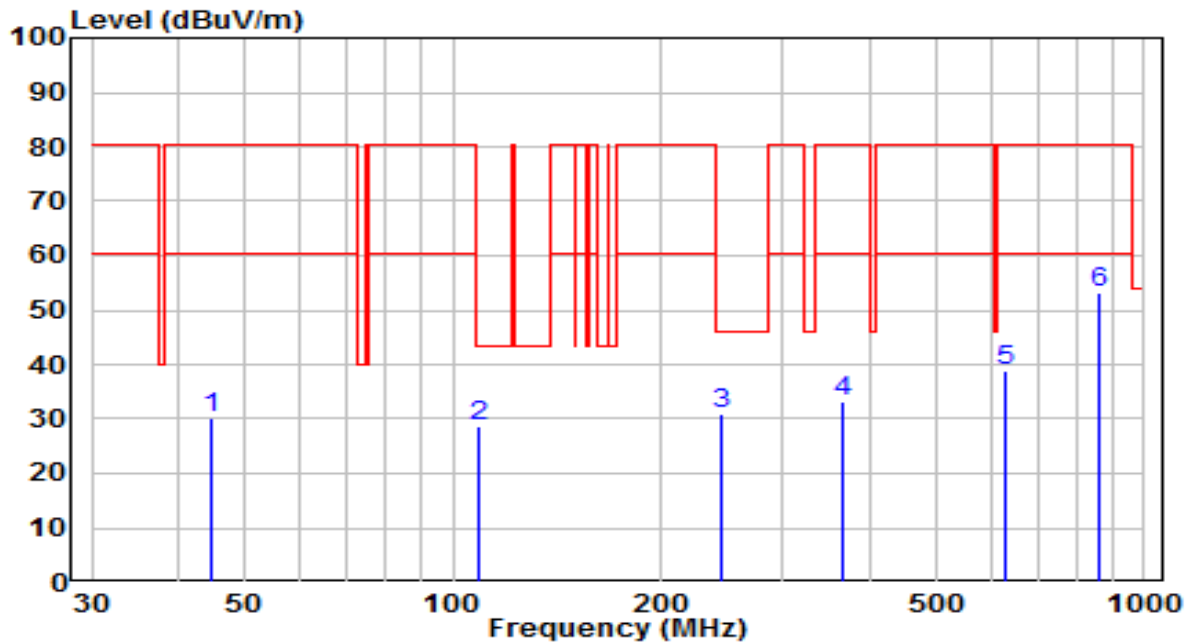


No	Frequency (MHz)	Reading (dBuV)	C.F (dB/m)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	45.520	9.84	20.61	30.44	-50.02	80.46	150	75	QP
2	139.610	12.93	14.87	27.80	-52.66	80.46	150	105	QP
3	* 244.370	10.89	19.83	30.72	-15.28	46.00	150	225	QP
4	484.930	11.32	24.93	36.25	-44.21	80.46	150	45	QP
5	650.800	11.10	27.61	38.71	-41.75	80.46	150	270	QP
6	860.320	24.27	31.13	55.40	-25.06	80.46	100	200	QP

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB/m)+ Cable Loss (dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	industrial remote control	Date of Test	2024-01-18
Factor	VULB 9162	Temp. / Humidity	24°C /50%
Polarity	Vertical	Site / Test Engineer	AC1 / Todd
Test Mode	TX-429.75MHz	Test Voltage	By Battery

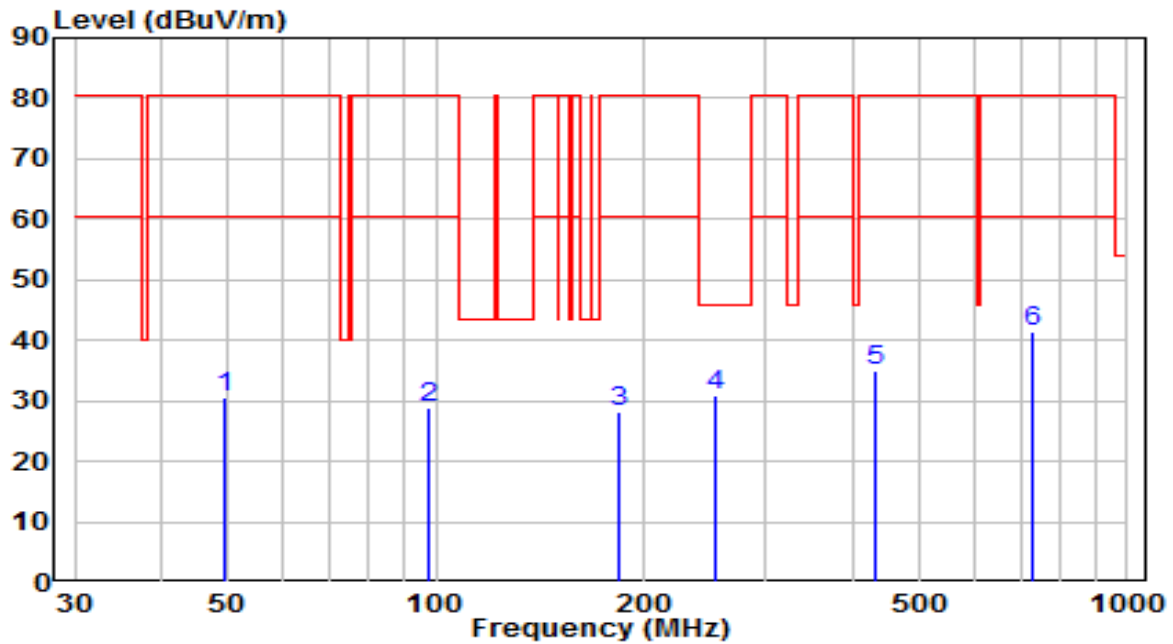


No		Frequency (MHz)	Reading (dBuV)	C.F (dB/m)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		44.550	9.50	20.54	30.04	-50.42	80.46	150	30	QP
2	*	108.570	10.06	18.53	28.59	-14.91	43.50	150	320	QP
3		245.340	10.99	19.88	30.87	-15.13	46.00	100	305	QP
4		364.650	10.37	22.95	33.32	-47.14	80.46	100	310	QP
5		627.520	11.39	27.51	38.90	-41.56	80.46	150	265	QP
6		860.320	22.02	31.13	53.15	-27.31	80.46	100	345	QP

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB/m)+ Cable Loss (dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	industrial remote control	Date of Test	2024-01-18
Factor	VULB 9162	Temp. / Humidity	24°C /50%
Polarity	Horizontal	Site / Test Engineer	AC1 / Todd
Test Mode	RX-423.05MHz	Test Voltage	AC 120V/60Hz

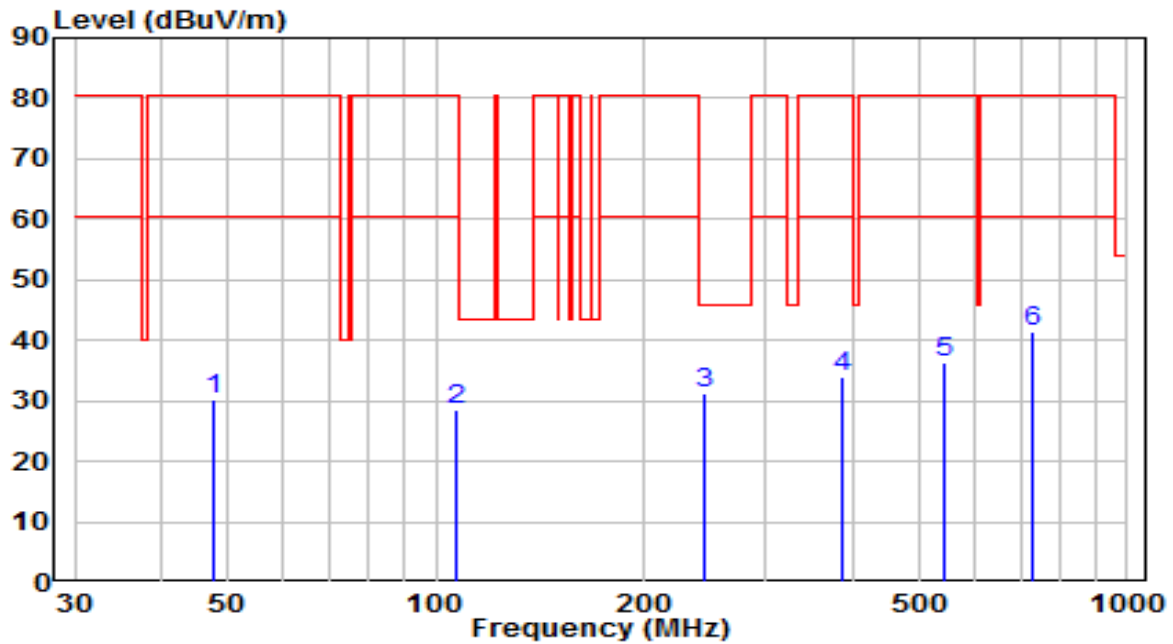


No	Frequency (MHz)	Reading (dBuV)	C.F (dB/m)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	49.400	9.92	20.55	30.47	-49.99	80.46	100	195	QP
2	97.900	10.59	18.17	28.76	-51.70	80.46	100	295	QP
3	184.230	11.17	16.97	28.14	-52.32	80.46	100	255	QP
4	* 253.100	10.73	20.17	30.89	-15.11	46.00	150	320	QP
5	430.610	11.16	23.91	35.07	-45.39	80.46	100	275	QP
6	730.340	12.41	29.00	41.42	-39.04	80.46	150	350	QP

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB/m)+ Cable Loss (dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	industrial remote control	Date of Test	2024-01-18
Factor	VULB 9162	Temp. / Humidity	24°C /50%
Polarity	Vertical	Site / Test Engineer	AC1 / Todd
Test Mode	RX-423.05MHz	Test Voltage	AC 120V/60Hz

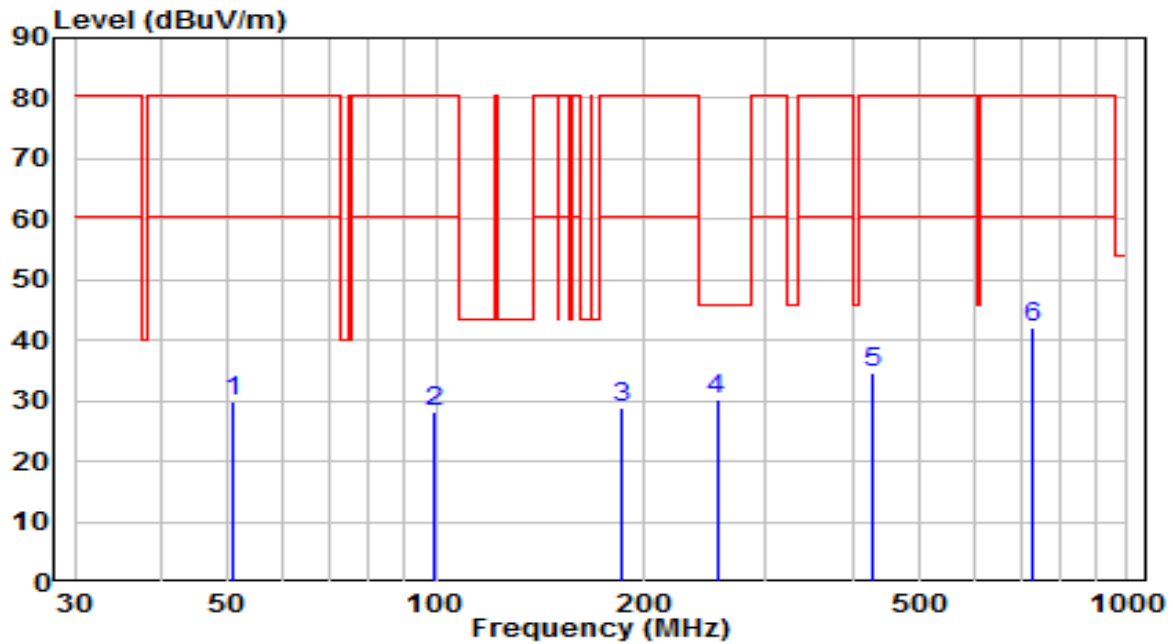


No	Frequency (MHz)	Reading (dBUV)	C.F (dB/m)	Measurement (dBUV/m)	Margin (dB)	Limit (dBUV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	47.460	9.66	20.58	30.24	-50.22	80.46	100	295	QP
2	106.630	10.16	18.52	28.68	-51.78	80.46	150	80	QP
3	* 244.370	11.27	19.83	31.10	-14.90	46.00	100	175	QP
4	385.990	10.74	23.35	34.09	-46.37	80.46	150	280	QP
5	542.160	10.45	25.97	36.42	-44.04	80.46	100	15	QP
6	728.400	12.48	28.97	41.45	-39.01	80.46	150	265	QP

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB/m)+ Cable Loss (dB).
3. Measurement (dBUV/m) = Reading(dBUV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	industrial remote control	Date of Test	2024-01-18
Factor	VULB 9162	Temp. / Humidity	24°C /50%
Polarity	Horizontal	Site / Test Engineer	AC1 / Todd
Test Mode	RX-429.75MHz	Test Voltage	AC 120V/60Hz

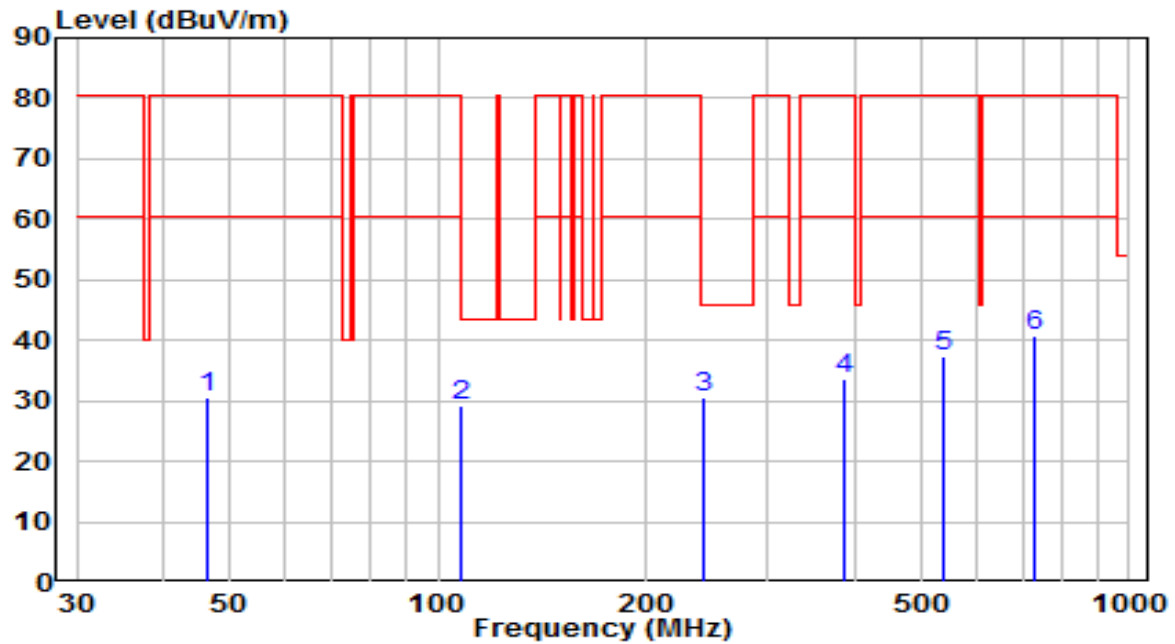


No	Frequency (MHz)	Reading (dBuV)	C.F (dB/m)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	50.795	9.47	20.45	29.92	-50.54	80.46	100	195	QP
2	99.477	9.92	18.41	28.32	-52.14	80.46	100	295	QP
3	185.692	11.63	17.14	28.77	-51.69	80.46	100	255	QP
4	* 254.769	9.96	20.19	30.15	-15.85	46.00	150	320	QP
5	429.226	10.83	23.90	34.73	-45.73	80.46	100	275	QP
6	731.959	12.94	29.04	41.97	-38.49	80.46	150	350	QP

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB/m)+ Cable Loss (dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	industrial remote control	Date of Test	2024-01-18
Factor	VULB 9162	Temp. / Humidity	24°C /50%
Polarity	Vertical	Site / Test Engineer	AC1 / Todd
Test Mode	RX-429.75MHz	Test Voltage	AC 120V/60Hz

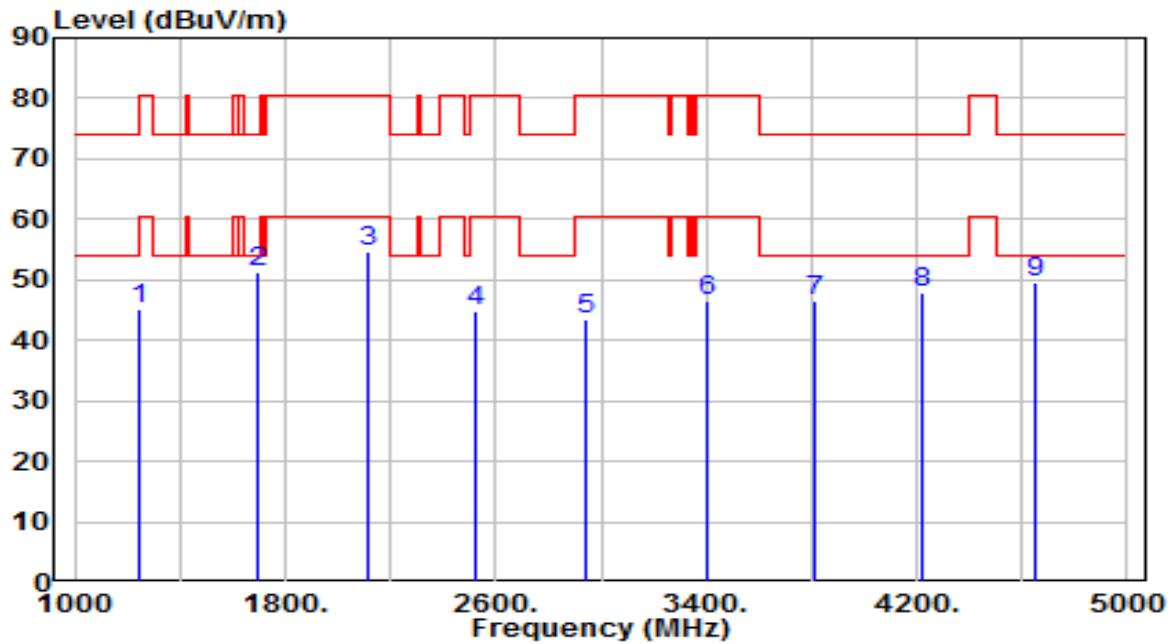


No	Frequency (MHz)	Reading (dBuV)	C.F (dB/m)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	46.183	10.06	20.60	30.65	-49.81	80.46	100	295	QP
2	* 108.379	10.79	18.53	29.32	-14.18	43.50	150	80	QP
3	242.695	10.66	19.74	30.40	-15.60	46.00	100	175	QP
4	387.731	10.29	23.38	33.67	-46.79	80.46	150	280	QP
5	540.528	11.32	25.94	37.26	-43.20	80.46	100	15	QP
6	726.982	11.68	28.94	40.62	-39.84	80.46	150	265	QP

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB/m)+ Cable Loss (dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	industrial remote control	Date of Test	2024-01-19
Factor	BBHA 9120D	Temp. / Humidity	24°C /50%
Polarity	Horizontal	Site / Test Engineer	AC1 / Todd
Test Mode	TX-423.05MHz	Test Voltage	By Battery

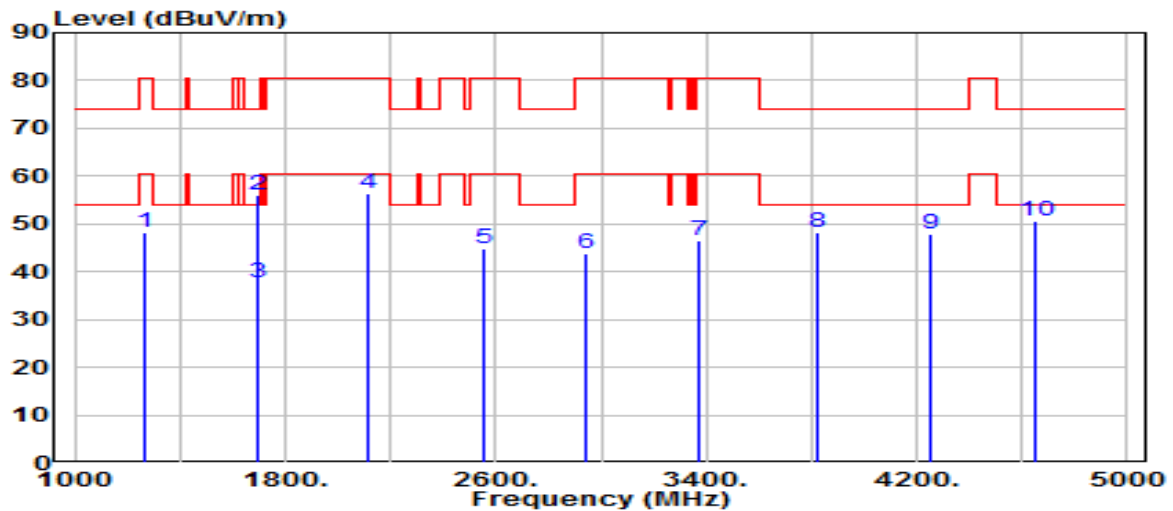


No	Frequency (MHz)	Reading (dBuV)	C.F (dB/m)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	1247.500	50.34	-5.04	45.30	-35.16	80.46	100	135	Peak
2	* 1692.500	55.09	-3.87	51.22	-22.78	74.00	100	70	Peak
3	2115.375	57.51	-2.93	54.57	-25.89	80.46	100	115	Peak
4	2527.250	46.48	-1.77	44.72	-35.74	80.46	100	10	Peak
5	2944.750	45.61	-2.02	43.60	-36.86	80.46	100	105	Peak
6	3402.375	47.38	-0.84	46.53	-33.93	80.46	100	10	Peak
7	3815.000	46.02	0.38	46.40	-27.60	74.00	100	315	Peak
8	4225.375	45.93	1.84	47.77	-26.23	74.00	100	340	Peak
9	4648.375	46.22	3.28	49.49	-24.51	74.00	100	115	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB/m)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	industrial remote control	Date of Test	2024-01-19
Factor	BBHA 9120D	Temp. / Humidity	24°C /50%
Polarity	Vertical	Site / Test Engineer	AC1 / Todd
Test Mode	TX-423.05MHz	Test Voltage	By Battery

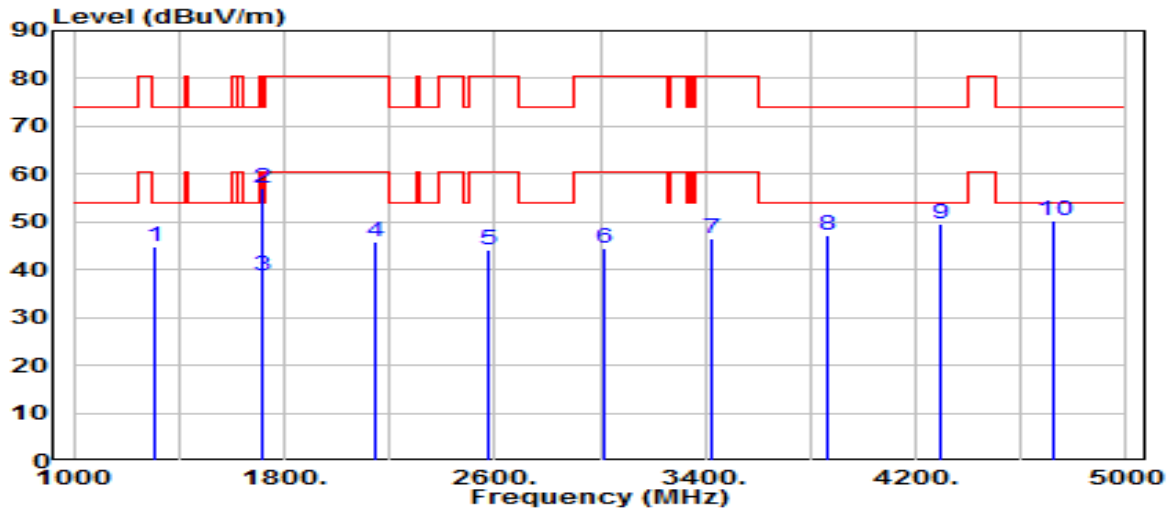


No		Frequency (MHz)	Reading (dBuV)	C.F (dB/m)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1269.125	53.25	-4.97	48.28	-32.18	80.46	100	45	Peak
2	*	1692.000	59.79	-3.87	55.93	-18.07	74.00	100	355	Peak
3	*	1692.000	N/A	N/A	37.67	-16.33	54.00	100	355	Average
4		2115.250	59.37	-2.94	56.43	-24.03	80.46	100	190	Peak
5		2554.750	46.59	-1.78	44.80	-35.66	80.46	100	220	Peak
6		2945.625	45.95	-2.02	43.93	-36.53	80.46	100	110	Peak
7		3374.125	47.33	-0.93	46.40	-34.06	80.46	100	320	Peak
8		3823.500	47.78	0.40	48.18	-25.82	74.00	100	235	Peak
9		4250.250	45.93	1.94	47.87	-26.13	74.00	100	115	Peak
10		4653.500	47.30	3.29	50.58	-23.42	74.00	100	325	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB/m)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. Average factor ($20\log(1/\text{Duty Cycle})$) is 18.25dB.
6. Average Measurement = Peak Measurement - Average factor.

EUT	industrial remote control	Date of Test	2024-01-19
Factor	BBHA 9120D	Temp. / Humidity	24°C /50%
Polarity	Horizontal	Site / Test Engineer	AC1 / Todd
Test Mode	TX-429.75MHz	Test Voltage	By Battery

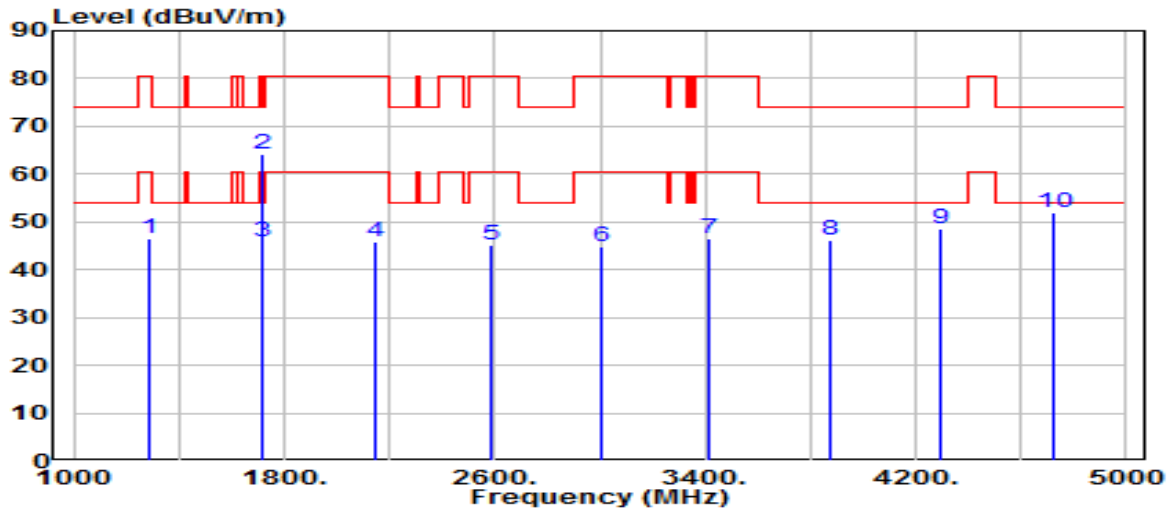


No	Frequency (MHz)	Reading (dBUV)	C.F (dB/m)	Measurement (dBUV/m)	Margin (dB)	Limit (dBUV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	1310.250	49.57	-4.84	44.73	-29.27	74.00	100	225	Peak
2	* 1719.125	60.89	-3.82	57.08	-16.92	74.00	100	130	Peak
3	* 1719.125	N/A	N/A	38.82	-15.18	54.00	100	130	Average
4	2149.000	48.71	-2.83	45.88	-34.58	80.46	100	315	Peak
5	2577.000	46.08	-1.80	44.29	-36.17	80.46	100	175	Peak
6	3016.375	46.41	-2.00	44.41	-36.05	80.46	100	180	Peak
7	3423.000	47.32	-0.78	46.54	-33.92	80.46	100	355	Peak
8	3866.875	46.62	0.53	47.15	-26.85	74.00	100	210	Peak
9	4297.875	47.36	2.13	49.49	-24.51	74.00	100	350	Peak
10	4727.625	46.74	3.45	50.20	-23.80	74.00	100	320	Peak

Note:

- "*", means this data is the worst emission level.
- C.F (Correction Factor) = Antenna Factor (dB/m)+ Cable Loss (dB) – Preamplifier(dB).
- Measurement (dBUV/m) = Reading(dBUV) + C.F (Correction Factor).
- The emission levels of other frequencies are very lower than the limit and not show in test report.
- Average factor ($20\log(1/\text{Duty Cycle})$) is 18.25dB.
- Average Measurement = Peak Measurement - Average factor.

EUT	industrial remote control	Date of Test	2024-01-19
Factor	BBHA 9120D	Temp. / Humidity	24°C /50%
Polarity	Vertical	Site / Test Engineer	AC1 / Todd
Test Mode	TX-429.75MHz	Test Voltage	By Battery

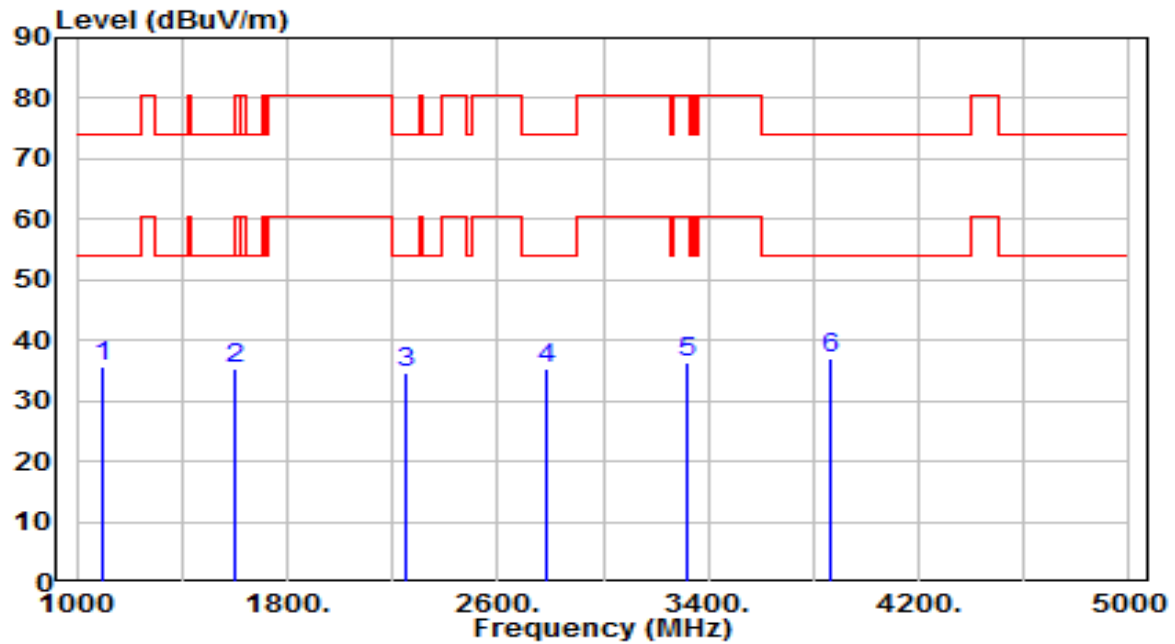


No		Frequency (MHz)	Reading (dBUV)	C.F (dB/m)	Measurement (dBUV/m)	Margin (dB)	Limit (dBUV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1		1289.250	51.56	-4.91	46.65	-33.81	80.46	100	35	Peak
2	*	1718.875	68.06	-3.82	64.24	-9.76	74.00	100	340	Peak
3	*	1718.875	N/A	N/A	45.98	-8.02	54.00	100	340	Average
4		2149.500	48.62	-2.83	45.79	-34.67	80.46	100	320	Peak
5		2590.625	46.85	-1.80	45.05	-35.41	80.46	100	105	Peak
6		3004.750	47.02	-2.04	44.98	-35.48	80.46	100	75	Peak
7		3418.875	47.43	-0.79	46.63	-33.83	80.46	100	145	Peak
8		3880.125	45.78	0.57	46.35	-27.65	74.00	100	160	Peak
9		4296.375	46.42	2.12	48.54	-25.46	74.00	100	155	Peak
10		4727.500	48.41	3.45	51.86	-22.14	74.00	100	335	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB/m)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBUV/m) = Reading(dBUV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. Average factor (20Log(1/Duty Cycle)) is 18.25dB.
6. Average Measurement = Peak Measurement - Average factor.

EUT	industrial remote control	Date of Test	2024-01-19
Factor	BBHA 9120D	Temp. / Humidity	24°C /50%
Polarity	Horizontal	Site / Test Engineer	AC1 / Todd
Test Mode	RX-423.05MHz	Test Voltage	AC 120V/60Hz

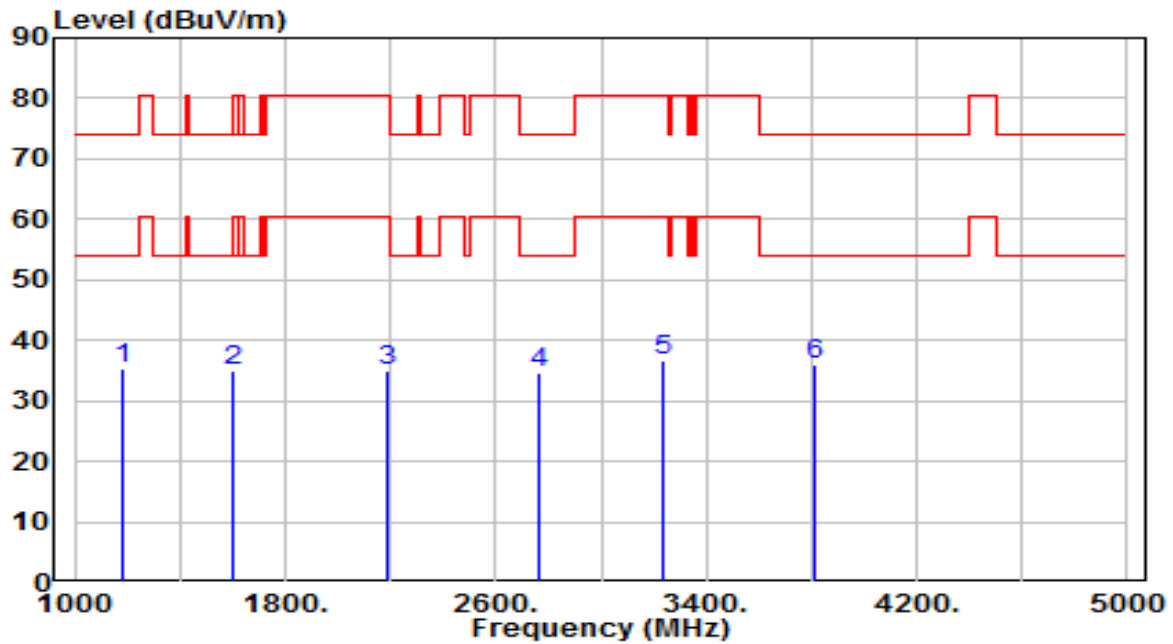


No	Frequency (MHz)	Reading (dBuV)	C.F (dB/m)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	1098.625	41.02	-5.52	35.50	-38.50	74.00	100	260	Peak
2	1602.250	39.43	-4.04	35.39	-38.61	74.00	100	115	Peak
3	2253.625	37.25	-2.51	34.74	-39.26	74.00	100	190	Peak
4	2780.500	37.25	-1.92	35.33	-38.67	74.00	100	125	Peak
5	3321.250	37.54	-1.09	36.46	-44.00	80.46	100	65	Peak
6	* 3859.875	36.67	0.51	37.18	-36.82	74.00	100	320	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB/m)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	industrial remote control	Date of Test	2024-01-19
Factor	BBHA 9120D	Temp. / Humidity	24°C /50%
Polarity	Vertical	Site / Test Engineer	AC1 / Todd
Test Mode	RX-423.05MHz	Test Voltage	AC 120V/60Hz

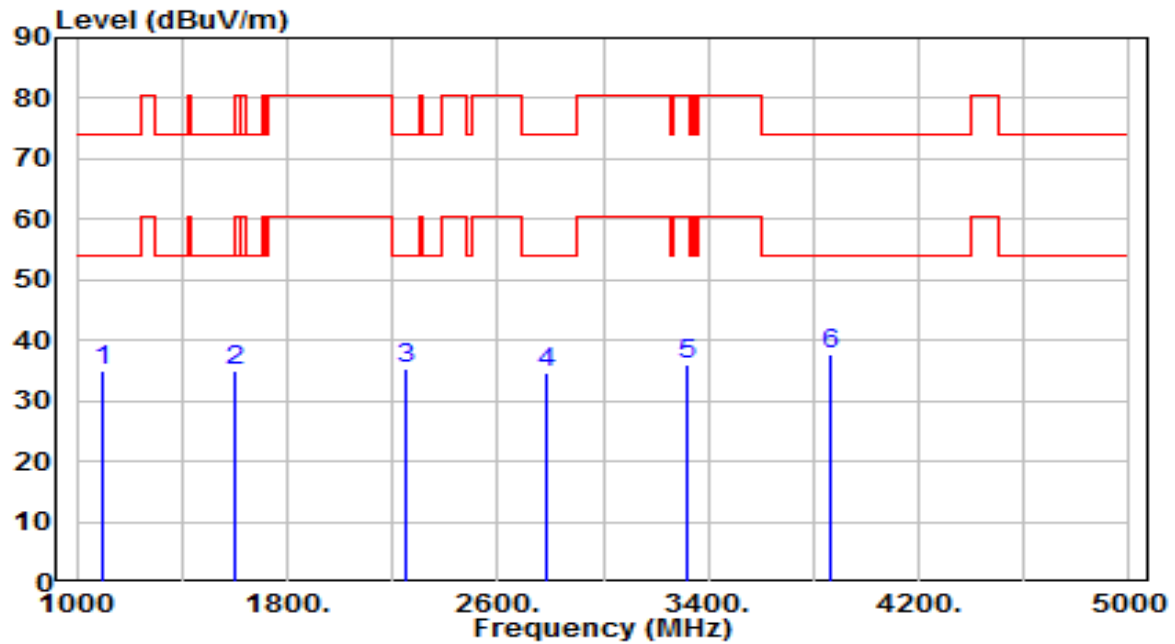


No	Frequency (MHz)	Reading (dBuV)	C.F (dB/m)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	1181.500	40.63	-5.26	35.38	-38.62	74.00	100	155	Peak
2	1603.750	39.11	-4.03	35.07	-38.93	74.00	100	290	Peak
3	2192.375	37.68	-2.70	34.98	-45.48	80.46	100	155	Peak
4	2759.625	36.62	-1.91	34.72	-39.28	74.00	100	10	Peak
5	3236.250	38.02	-1.34	36.68	-43.78	80.46	100	330	Peak
6	* 3813.875	35.61	0.37	35.98	-38.02	74.00	100	360	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB/m)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	industrial remote control	Date of Test	2024-01-19
Factor	BBHA 9120D	Temp. / Humidity	24°C /50%
Polarity	Horizontal	Site / Test Engineer	AC1 / Todd
Test Mode	RX-429.75MHz	Test Voltage	AC 120V/60Hz

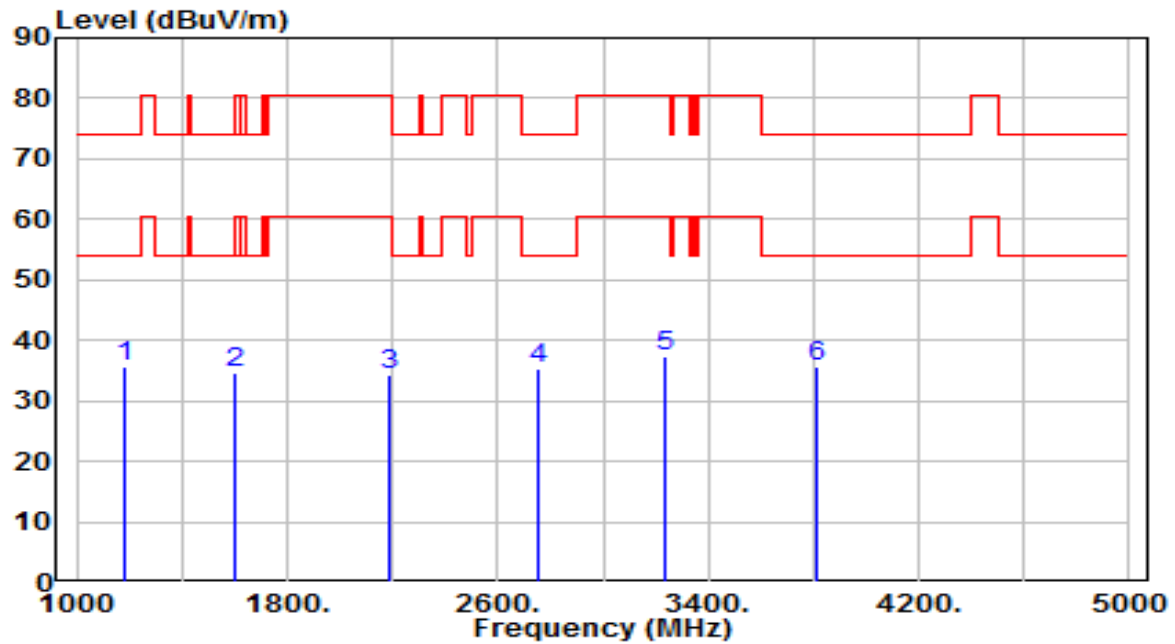


No	Frequency (MHz)	Reading (dBUV)	C.F (dB/m)	Measurement (dBUV/m)	Margin (dB)	Limit (dBUV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	1100.020	40.46	-5.52	34.94	-39.06	74.00	100	260	Peak
2	1603.827	39.00	-4.03	34.96	-39.04	74.00	100	115	Peak
3	2255.087	37.87	-2.50	35.36	-38.64	74.00	100	190	Peak
4	2782.169	36.51	-1.92	34.59	-39.41	74.00	100	125	Peak
5	3319.866	37.21	-1.09	36.11	-44.35	80.46	100	65	Peak
6	* 3861.494	37.22	0.51	37.74	-36.26	74.00	100	320	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB/m)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBUV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

EUT	industrial remote control	Date of Test	2024-01-19
Factor	BBHA 9120D	Temp. / Humidity	24°C /50%
Polarity	Vertical	Site / Test Engineer	AC1 / Todd
Test Mode	RX-429.75MHz	Test Voltage	AC 120V/60Hz



No		Frequency (MHz)	Reading (dBuV)	C.F (dB/m)	Measurement (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Height (cm)	Angle (deg)	Remark (QP/PK/AV)
1	*	1182.944	41.05	-5.25	35.80	-38.20	74.00	100	155	Peak
2		1604.996	38.56	-4.03	34.53	-39.47	74.00	100	290	Peak
3		2191.118	37.02	-2.70	34.32	-46.14	80.46	100	155	Peak
4		2758.130	37.36	-1.90	35.46	-38.54	74.00	100	10	Peak
5		3237.593	38.56	-1.34	37.22	-43.24	80.46	100	330	Peak
6		3815.449	35.13	0.38	35.50	-38.50	74.00	100	360	Peak

Note:

1. " *", means this data is the worst emission level.
2. C.F (Correction Factor) = Antenna Factor (dB/m)+ Cable Loss (dB) – Preamplifier(dB).
3. Measurement (dBuV/m) = Reading(dBuV) + C.F (Correction Factor).
4. The emission levels of other frequencies are very lower than the limit and not show in test report.

6.3. 20dB Bandwidth / 99% Bandwidth

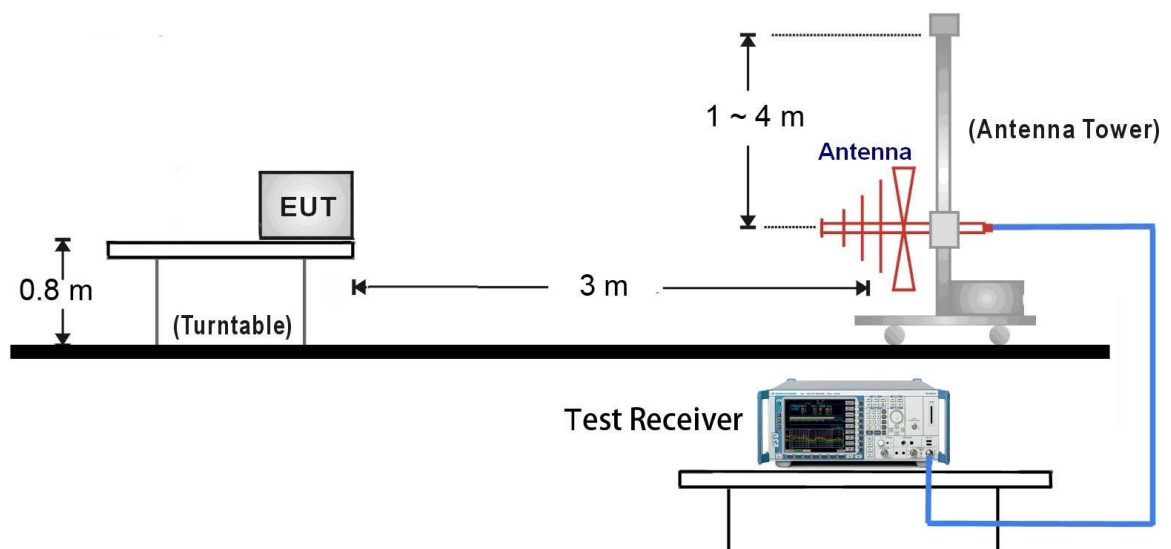
6.3.1. Standard Applicable

According to FCC Part 15.231(c), the bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz. Bandwidth is determined at the points 20 dB down from the modulated carrier.

6.3.2. Test Procedure

With the EUT's antenna attached, the EUT's 20dB Bandwidth power was received by the test antenna, which was connected to the spectrum analyzer with the START, and STOP frequencies set to the EUT's operation band.

6.3.3. Test Setup



6.3.4. Test Result

Test Frequency (MHz)	20dB Bandwidth (kHz)	99% Bandwidth (kHz)	Limit (kHz)	Result
423.05	73.130	73.126	≤ 1058	Pass
429.75	74.130	73.326	≤ 1058	Pass

Note:

Limit = Fundamental Frequency * 0.25%, 423.05 MHz * 0.25% = 1.058MHz;

1.058MHz * 1000= 1058kHz.

20dB:



99%:



6.4. Transmission Time

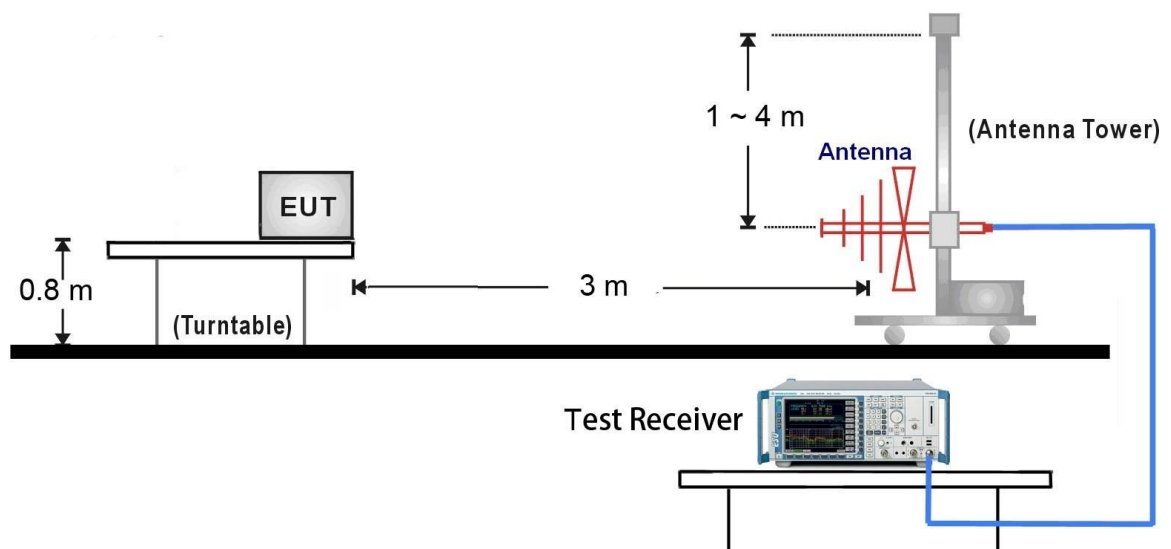
6.4.1. Standard Applicable

According to FCC 15.231(a)(1), A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

6.4.2. Test Procedure

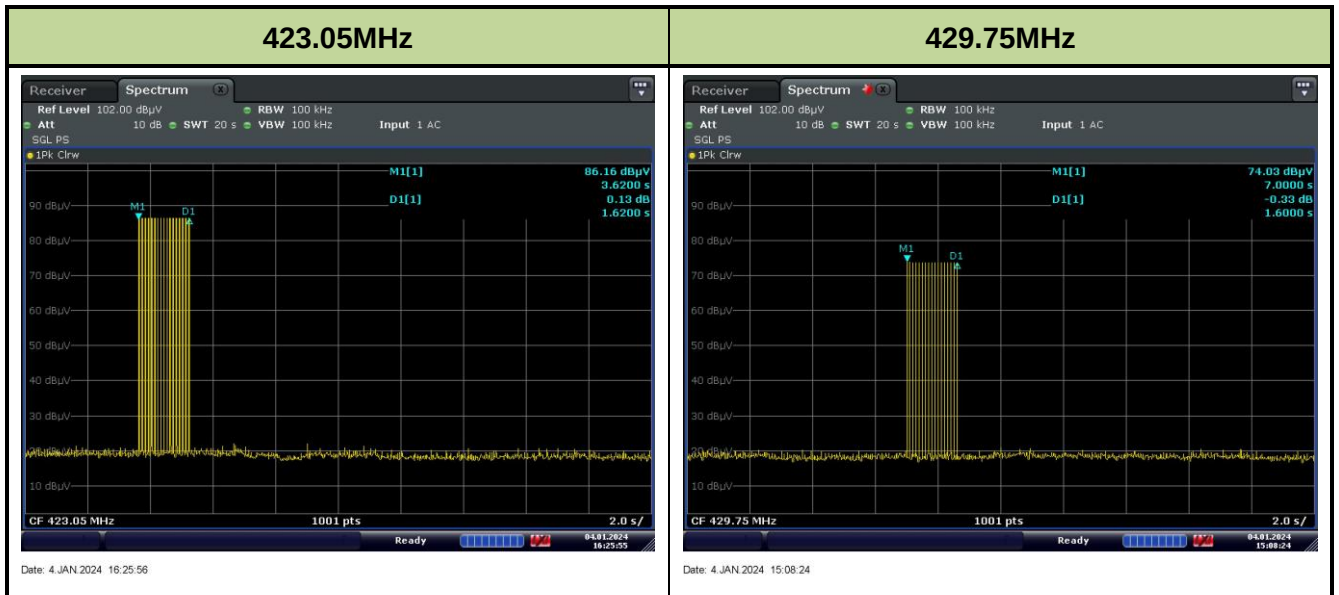
With the EUT's antenna attached, the EUT's output signal was received by the test antenna, which was connected to the spectrum analyzer. Set the center frequency to 434MHz, then set the spectrum analyzer to Zero Span for the release time reading. During the testing, the switch was released then the EUT automatically deactivated.

6.4.3. Test Setup



6.4.4. Test Result

Test Item	Frequency (MHz)	Measurement (s)	Limit (s)	Result
Transmission Time (T_{on})	423.05	1.62	< 5	Pass
	429.75	1.6	< 5	Pass



6.5. Duty Cycle

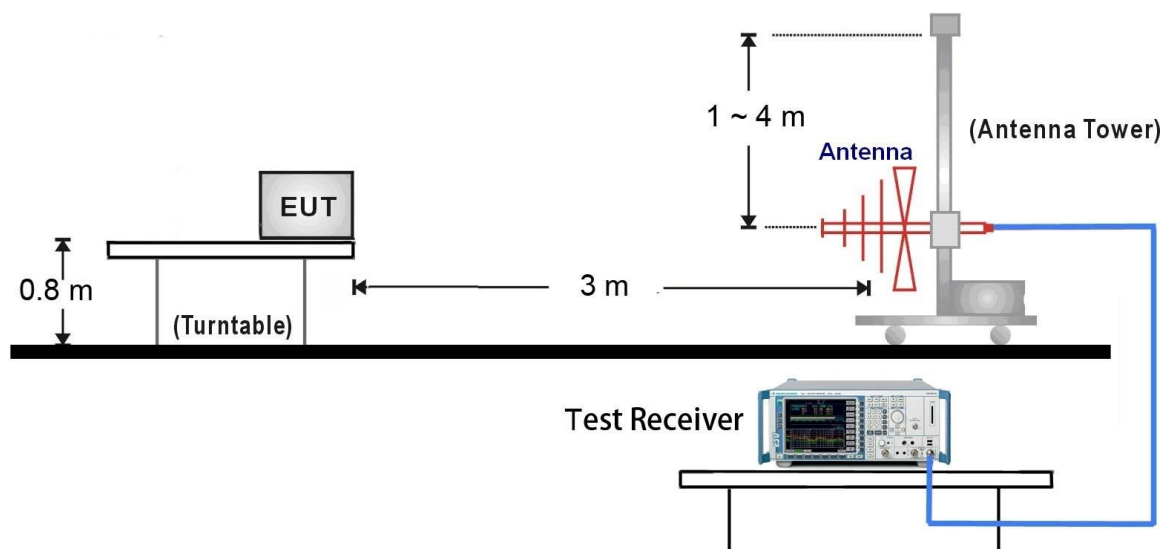
6.5.1. Standard Applicable

According to FCC Part 15.231(b) and 15.35(c), for pulse operation transmitter, the averaging pulsed emissions are calculated by peak value of measured emission plus duty cycle factor.

6.5.2. Test Procedure

With the EUT's antenna attached, the EUT's output signal was received by the test antenna, which was connected to the spectrum analyzer. Set the center frequency to 434MHz, then set the spectrum analyzer to Zero Span for the release time reading. During the testing, the switch was released then the EUT automatically deactivated.

6.5.3. Test Setup



6.5.4. Test Result

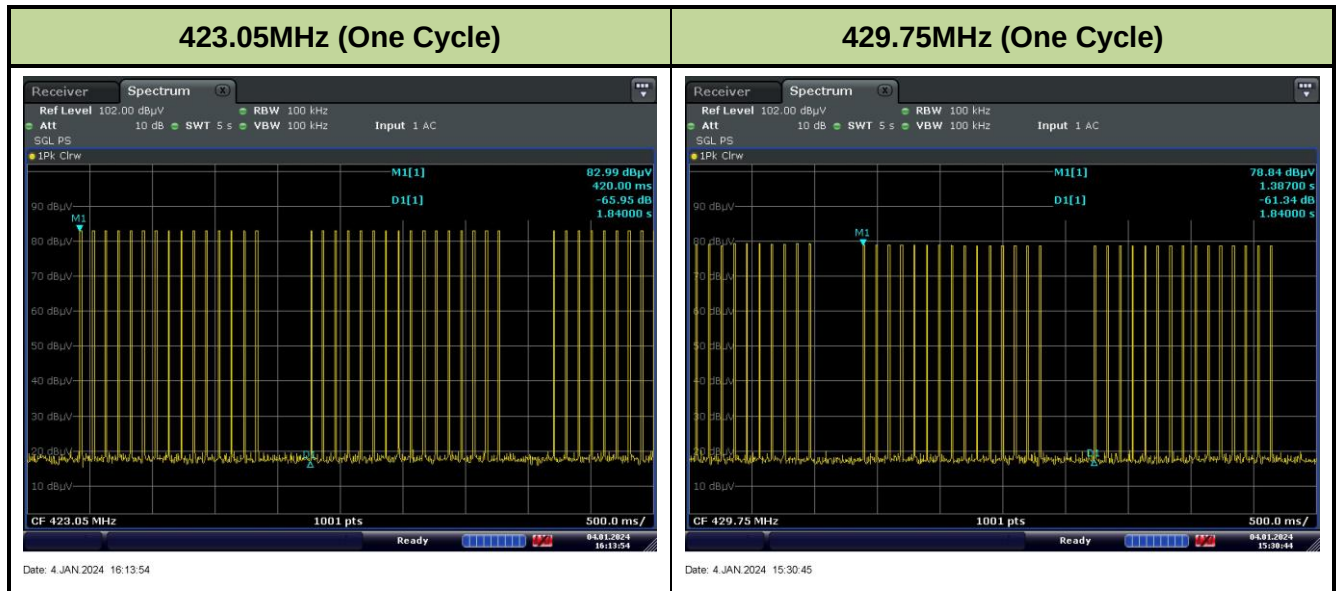
Frequency (MHz)	Total Time (T _{on}) (ms)	The duration of one cycle (ms)	Duty Cycle (ms)	Average Factor (dB)
423.05	225.00	1840.00	0.12	18.25
429.75	225.00	1840.00	0.12	18.25

Note 1: Duty Cycle = Total Time (T_{on}) / (T_{on} + T_{off}).

423.05MHz: 15000us*15 =225000us, 225000us / 1000 = 225ms.

429.75MHz: 15000us*15 =225000us, 225000us / 1000 = 225ms.

Note 2: Average Factor = 20*Log*(1/Duty Cycle).





6.6. AC Conducted Emissions Measurement

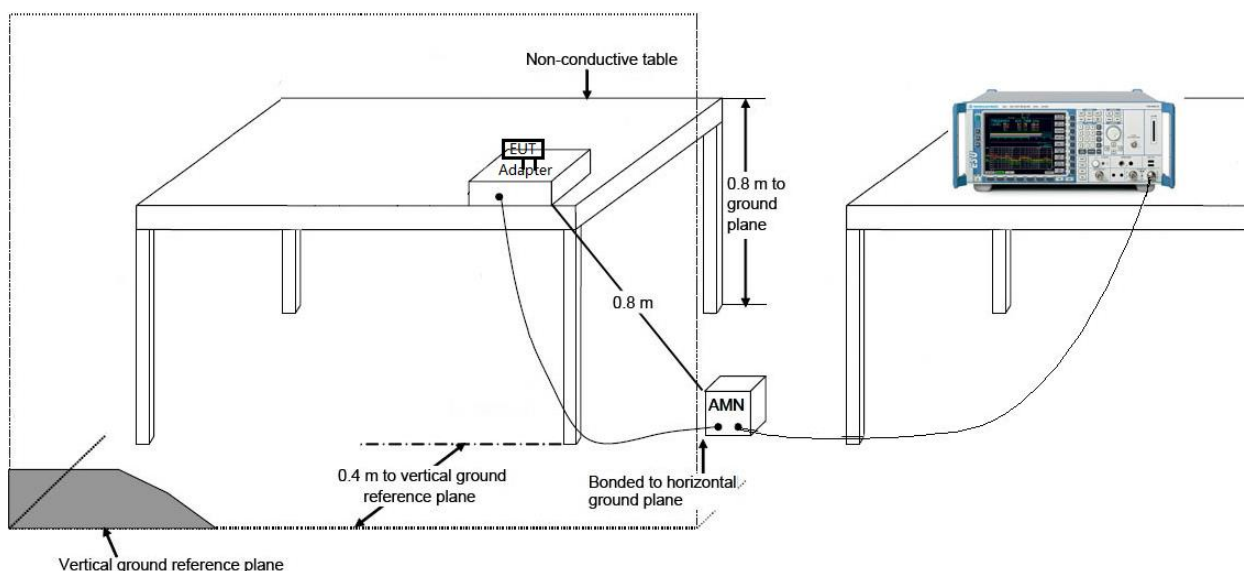
6.6.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.207 / RSS-Gen Limits		
Frequency (MHz)	QP (dB μ V)	Average (dB μ V)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

6.6.2. Test Setup



6.6.3. Test Result

Note: The EUT Power by Battery, so do not need to test Conducted Emissions.

7. CONCLUSION

The data collected relate only the item(s) tested and show that the **industrial remote control** is in compliance with FCC Rules/ IC RSS 210 Annex A1.1.

Appendix A : Test Photograph

Refer to “2312TWO601-UT” file.

Appendix B : External Photograph

Refer to “2312TWO601-UE” file.

Appendix C : Internal Photograph

Refer to “2312TWO601-UI” file.

————— The End —————