

APPLICATION CERTIFICATION FCC Part 15.249 & RSS-210
On Behalf of
Shanghai Chuangdou Technology Co., Ltd.

Motor actuator
Model No.: Z1801

FCC ID: 2ATKRZ1801
IC: 25132-Z1801

Prepared for : Shanghai Chuangdou Technology Co., Ltd.
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Report Number : ATE20191161
Date of Test : April 16-April 26, 2019
Date of Report : July 30, 2019

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Test Report Certification

Applicant : Shanghai Chuangdou Technology Co., Ltd.
Address : 2 Floor, No.46 Guokang Road, Yangpu District, Shanghai, 200092, China
Product : Motor actuator
Model No. : Z1801

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.249

ANSI C63.10: 2013

RSS-210 Issue 9 August 2016

RSS-Gen Issue 5 April 2018

The EUT was tested according to FCC 47CFR 15.249 for compliance to FCC 47CFR 15.249 requirements

The device described above is tested by Shenzhen Accurate Technology Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C Section 15.249 and RSS-210 limits. The measurement results are contained in this test report and Shenzhen Accurate Technology Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Shenzhen Accurate Technology Co., Ltd.

Date of Test : April 16-April 26, 2019
Date of Report : July 30, 2019

Prepared by : (Star Yang, Engineer)

Approved & Authorized Signer : (Sean Liu, Manager)



1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT	:	Motor actuator
Model No.	:	Z1801
HVIN	:	Z1801
Operate Frequency	:	2402-2480MHz
Number of channel	:	40
Channel spacing	:	2MHz
Modulation mode	:	GFSK
Antenna Gain	:	0.5dBi
Antenna type	:	Integral Antenna
Power Supply	:	DC 3.7V

1.2. Special Accessory and Auxiliary Equipment

N/A

1.3. Description of Test Facility

EMC Lab	: Recognition of accreditation by Federal Communications Commission (FCC) The Designation Number is CN1189 The Registration Number is 708358 Listed by Innovation, Science and Economic Development Canada (ISED) The Registration Number is 5077A-2 Accredited by China National Accreditation Service for Conformity Assessment (CNAS) The Registration Number is CNAS L3193 Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 4297.01
Name of Firm	: Shenzhen Accurate Technology Co., Ltd.
Site Location	: 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China

1.4. Measurement Uncertainty

Radiated Emission Expanded Uncertainty (9kHz-30MHz)	: U=2.66dB, k=2
Radiated Emission Expanded Uncertainty (30MHz-1000MHz)	: U=4.28dB, k=2
Radiated Emission Expanded Uncertainty (1G-18GHz)	: U=4.98dB, k=2
Radiated Emission Expanded Uncertainty (18G-26.5GHz)	: U=5.06dB, k=2
Conduction Emission Expanded Uncertainty (Mains ports, 9kHz-30MHz)	: U=2.72dB, k=2

2. MEASURING DEVICE AND TEST EQUIPMENT

Table 1: List of Test and Measurement Equipment

Kind of equipment	Manufacturer	Type	S/N	Calibrated dates	Cal. Interval
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 05, 2019	One Year
EMI Test Receiver	Rohde&Schwarz	ESR	101817	Jan. 05, 2019	One Year
Spectrum Analyzer	Rohde&Schwarz	FSV-40	101495	Jan. 05, 2019	One Year
Pre-Amplifier (Radiated Emission)	Compliance Direction	RSU-M2	38322	Jan. 05, 2019	One Year
Pre-Amplifier (Radiated Emission)	Agilent	8447D	294A 10619	Jan. 05, 2019	One Year
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 05, 2019	One Year
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 05, 2019	One Year
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 05, 2019	One Year
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 05, 2019	One Year
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 05, 2019	One Year
Highpass Filter	Wainwright Instruments	WHKX3.6/18G-10SS	N/A	Jan. 05, 2019	One Year
Band Reject Filter	Wainwright Instruments	WRCG2400/2485-2375/2 510-60/11SS	N/A	Jan. 05, 2019	One Year
RF Coaxial Cable (Conducted Emission)	SUHNER	N-2m	No.2	Jan. 05, 2019	One Year
RF Coaxial Cable (Radiated Emission)	RESENBERGER	N-12m	No.11	Jan. 05, 2019	One Year
RF Coaxial Cable (Radiated Emission)	RESENBERGER	N-0.5m	No.12	Jan. 05, 2019	One Year
RF Coaxial Cable (Radiated Emission)	SUHNER	N-2m	No.13	Jan. 05, 2019	One Year
RF Coaxial Cable (Radiated Emission)	SUHNER	N-0.5m	No.15	Jan. 05, 2019	One Year
RF Coaxial Cable (Radiated Emission)	SUHNER	N-2m	No.16	Jan. 05, 2019	One Year
RF Coaxial Cable (Radiated Emission)	RESENBERGER	N-6m	No.17	Jan. 05, 2019	One Year
Conducted Emission Measurement Software: ES-K1 V1.71					
Radiated Emission Measurement Software: EZ EMC V1.1.4.2					

3. OPERATION OF EUT DURING TESTING

3.1. Operating Mode

The mode is used: **Transmitting mode**

Low Channel: 2402MHz

Middle Channel: 2440MHz

High Channel: 2480MHz

3.2. Configuration and peripherals

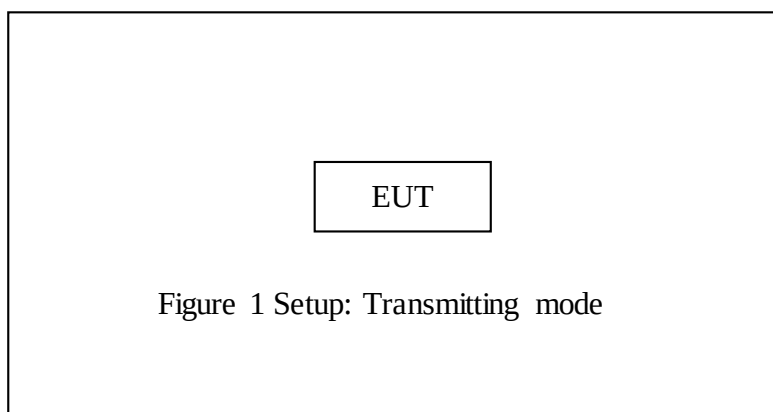


Figure 1 Setup: Transmitting mode

4. TEST PROCEDURES AND RESULTS

FCC&IC Rules	Description of Test	Result
Section 15.249(a) RSS-210 Annex B B.10	E.I.R.P Test	Compliant
Section 15.215(c)	20dB Bandwidth Test	Compliant
RSS-Gen Section 6.7	99% Bandwidth Test	Compliant
Section 15.249(d) RSS-210 Annex B B.10 RSS-Gen 8.9 RSS-Gen 8.10	Band Edge Compliance Test	Compliant
Section 15.205(a), Section 15.209(a), Section 15.249(a), Section 15.35 RSS-210 Annex B B.10 RSS-Gen 6.13 RSS-Gen 8.9	Radiated Spurious Emission Test	Compliant
Section 15.207 RSS-Gen Section 8.8	AC Power Line Conducted Emission Test	Compliant
Section 15.203 RSS-Gen 6.8	Antenna Requirement	Compliant

5. E.I.R.P TEST

5.1. The Requirement For Section 15.249(a) and RSS-210 Annex B B.10

(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

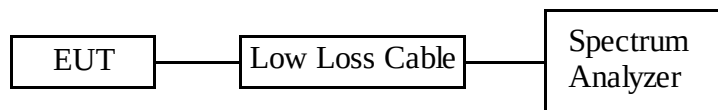
Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902–928 MHz	50	500
2400–2483.5 MHz	50	500
5725–5875 MHz	50	500
24.0–24.25 GHz	250	2500

5.2. Test Result

Frequency (MHz)	PEAK E.I.R.P (dBuV/m)	AVG E.I.R.P (dBuV/m)	PEAK Limits (dBuV/m)	AVG Limits (dBuV/m)	Result
2402	87.03	85.83	114	94	Pass
2440	87.38	86.18	114	94	Pass
2480	87.33	86.23	114	94	Pass

6. 20DB BANDWIDTH TEST

6.1. Block Diagram of Test Setup



6.2. The Requirement For Section 15.215(c)

Must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

6.3. Operating Condition of EUT

6.3.1. Setup the EUT and simulator as shown as Section 6.1.

6.3.2. Turn on the power of all equipment.

6.3.3. Let the EUT work in TX modes measure it. The transmit frequency are 2402, 2440, 2480MHz.

6.4. Test Procedure

6.4.1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

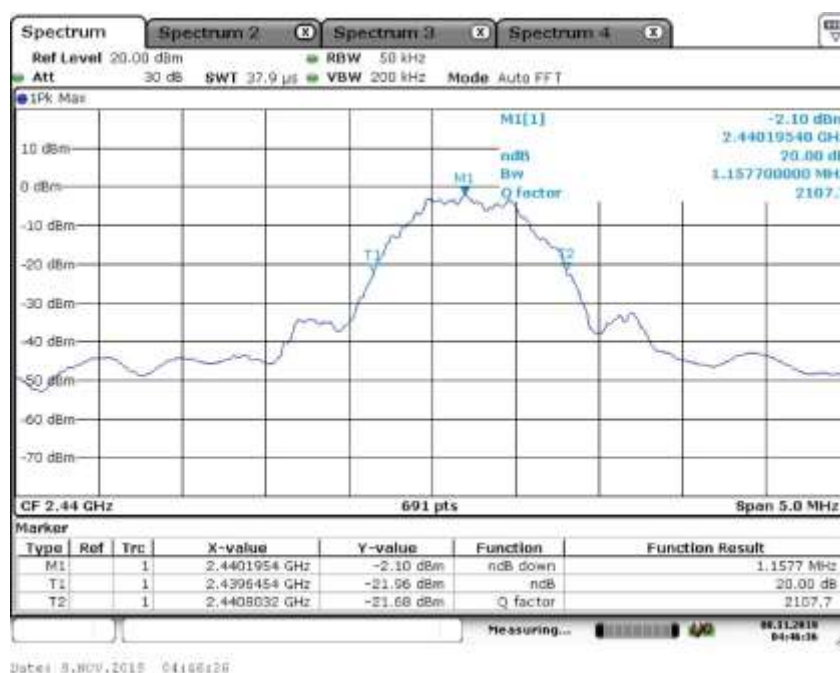
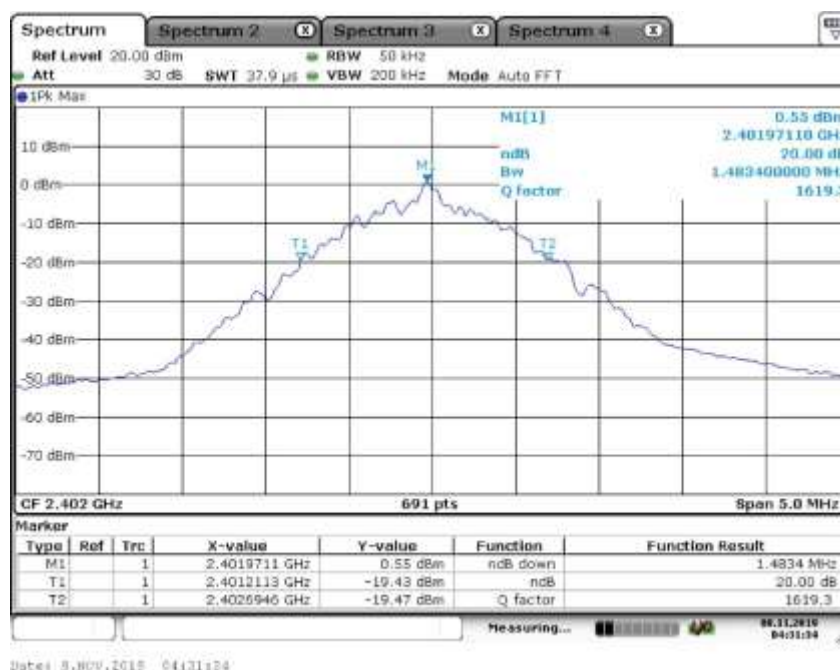
6.4.2. The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the EMI receiver or spectrum analyzer shall be between two times and five times the OBW.

6.4.3. RBW shall be in the range of 1% to 5% of the OBW and VBW shall be approximately three times RBW.

6.4.4. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

6.5. Test Result

Channel	Frequency (MHz)	20 dB Bandwidth(MHz)
Low	2402	1.483
Middle	2440	1.158
High	2480	1.158





7. 99% OCCUPIED BANDWIDTH TEST

7.1. Block Diagram of Test Setup



7.2. The Requirement For RSS- Gen Clause 6.7

The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

In some cases, the “x dB bandwidth” is required, which is defined as the frequency range between two points, one at the lowest frequency below and one at the highest frequency above the carrier frequency, at which the maximum power level of the transmitted emission is attenuated x dB below the maximum in-band power level of the modulated signal, where the two points are on the outskirts of the in-band emission.

7.3. Operating Condition of EUT

7.3.1. Setup the EUT and simulator as shown as Section 7.1.

7.3.2. Turn on the power of all equipment.

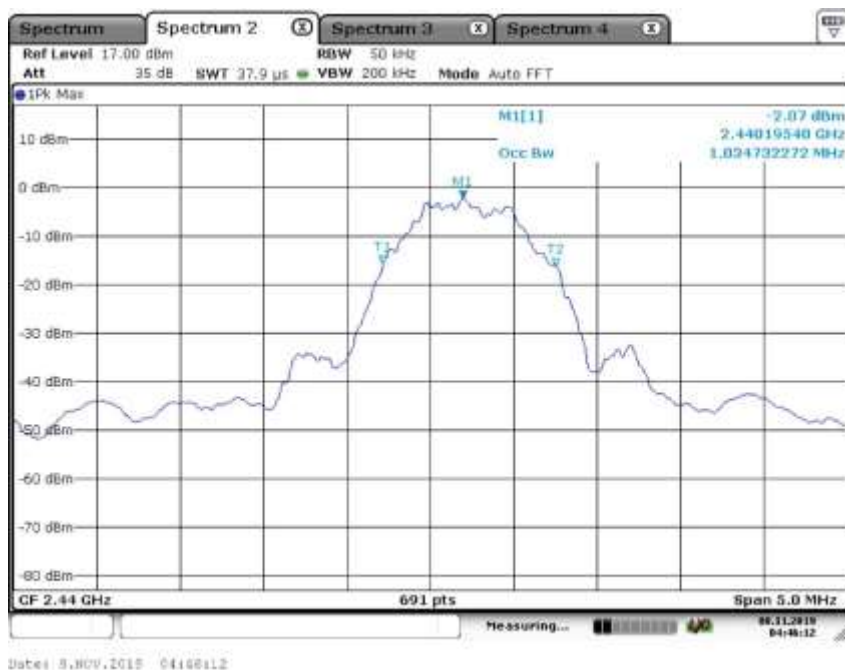
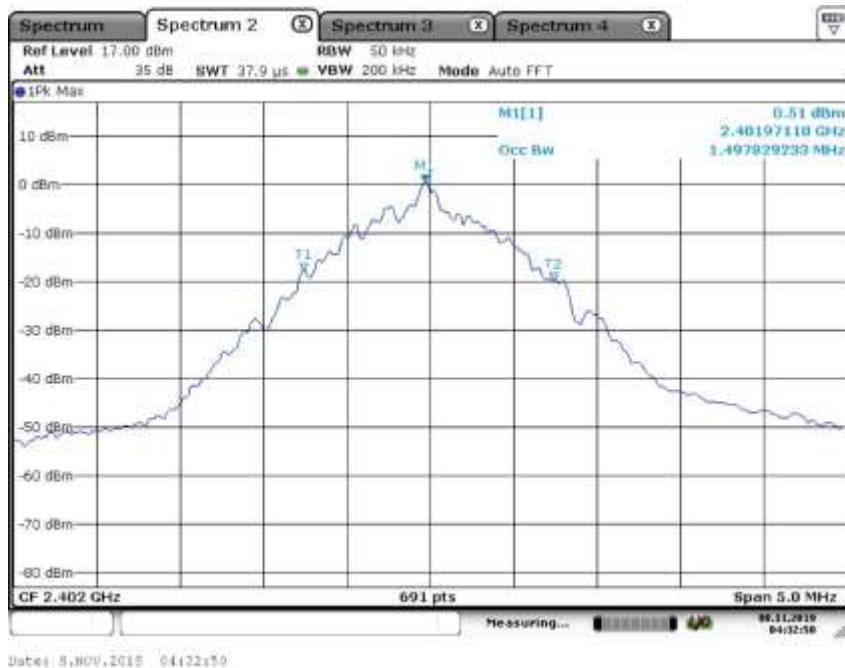
7.3.3. Let the EUT work in TX modes measure it. The transmit frequency is 2402, 2440, 2480MHz.

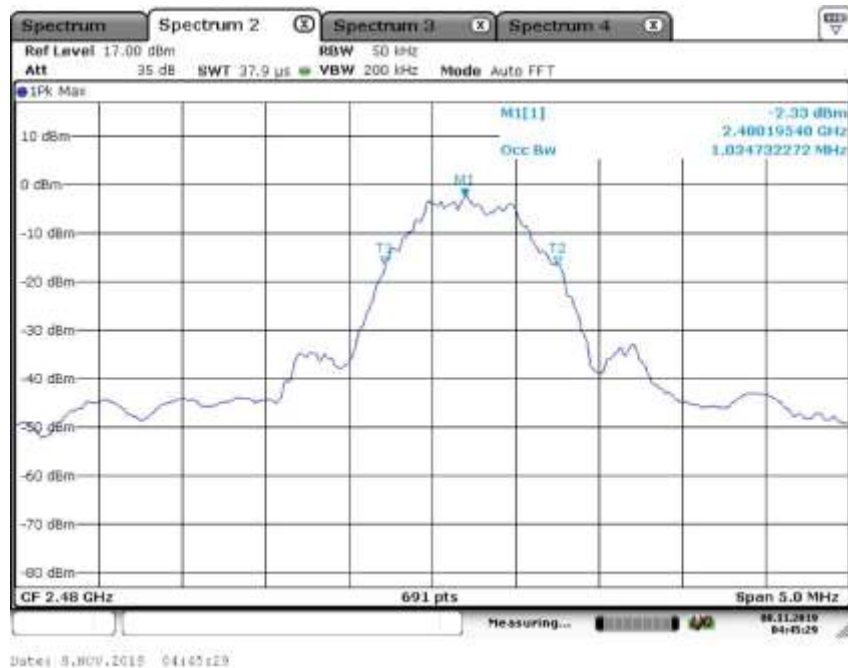
7.4. Test Procedure

- 7.4.1. The transmitter shall be operated at its maximum carrier power measured under normal test conditions. The transmitter output was connected to the spectrum analyzer through a low loss cable.
- 7.4.2. The span of the spectrum analyzer shall be set large enough to capture all products of the modulation process, including the emission skirts, around the carrier frequency, but small enough to avoid having other emissions (e.g. on adjacent channels) within the span.
- 7.4.3. The detector of the spectrum analyzer shall be set to “Sample”. However, a peak, or peak hold, may be used in place of the sampling detector since this usually produces a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold (or “Max Hold”) may be necessary to determine the occupied / x dB bandwidth if the device is not transmitting continuously.
- 7.4.4. The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the actual occupied / x dB bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value. Video averaging is not permitted.

7.5. Test Result

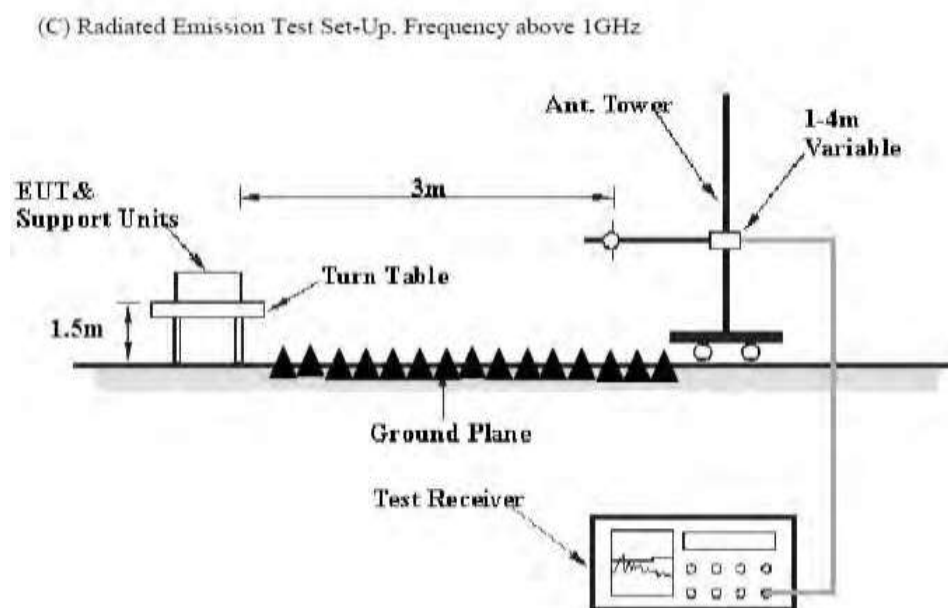
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.498
Middle	2440	1.035
High	2480	1.035





8. BAND EDGE COMPLIANCE TEST

8.1. Block Diagram of Test Setup



8.2. The Requirement For Section 15.249(d)

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.

8.3. The Requirement For RSS-210 Annex B B.10

Emissions radiated outside of the specified frequency bands, except for harmonic emissions, shall be attenuated by at least 50 dB below the level of the fundamental emissions or to the general field strength limits listed in RSS-Gen, whichever is less stringent.

8.4. Restricted bands of operation

8.4.1. FCC Part 15.205 Restricted bands of operation

- (a) Except as shown in paragraph (d) of this section, Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(²)
13.36-13.41			

¹Until February 1, 1999, this restricted band shall be 0.490-0.510

²Above 38.6

- (b) Except as provided in paragraphs (d) and (e), the field strength of emission appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000MHz, Compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

8.4.2. RSS-Gen 8.10 Restricted bands of operation

Restricted frequency bands, identified in table 7, are designated primarily for safety-of-life services (distress calling and certain aeronautical activities), certain satellite downlinks, radio astronomy and some government uses. Except where otherwise indicated, the following conditions related to the restricted frequency bands apply:

- (a) The transmit frequency, including fundamental components of modulation, of licence-exempt radio apparatus shall not fall within the restricted frequency bands listed in table 7 except for apparatus compliant with RSS-287, *Emergency Position Indicating Radio Beacons (EPIRB)*, *Emergency Locator Transmitters (ELT)*, *Personal Locator Beacons (PLB)*, and *Maritime Survivor Locator Devices (MSLD)*.
- (b) Unwanted emissions that fall into restricted frequency bands listed in table 7 shall comply with the limits specified in table 5 and table 6.
- (c) Unwanted emissions that fall into restricted frequency bands listed in table 7 shall comply with the limits specified in table 5 and table 6.

Table 7 – Restricted frequency bands*

MHz	MHz	GHz
0.090 - 0.110	149.9 - 150.05	9.0 - 9.2
0.495 - 0.505	156.52475 - 156.52525	9.3 - 9.5
2.1735 - 2.1905	156.7 - 156.9	10.6 - 12.7
3.020 - 3.026	162.0125 - 167.17	13.25 - 13.4
4.125 - 4.128	167.72 - 173.2	14.47 - 14.5
4.17725 - 4.17775	240 - 285	15.35 - 16.2
4.20725 - 4.20775	322 - 335.4	17.7 - 21.4
5.677 - 5.683	399.9 - 410	22.01 - 23.12
6.215 - 6.218	608 - 614	23.6 - 24.0
6.26775 - 6.26825	960 - 1427	31.2 - 31.8
6.31175 - 6.31225	1435 - 1626.5	36.43 - 36.5
8.291 - 8.294	1645.5 - 1646.5	Above 38.6
8.362 - 8.366	1660 - 1710	
8.37625 - 8.38675	1718.8 - 1722.2	
8.41425 - 8.41475	2200 - 2300	
12.29 - 12.293	2310 - 2390	
12.51975 - 12.52025	2483.5 - 2500	
12.57675 - 12.57725	2655 - 2900	
13.36 - 13.41	3260 - 3267	
16.42 - 16.423	3332 - 3339	
16.69475 - 16.69525	3345.8 - 3358	
16.80425 - 16.80475	3500 - 4400	
25.5 - 25.67	4500 - 5150	
37.5 - 38.25	5350 - 5460	
73 - 74.6	7250 - 7750	
74.8 - 75.2	8025 - 8500	
108 - 138	--	

* Certain frequency bands listed in table 7 and in bands above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.

8.5. EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

8.6. Operating Condition of EUT

8.6.1. Setup the EUT and simulator as shown as Section 8.1.

8.6.2. Turn on the power of all equipment.

8.6.3. Let the EUT work in TX modes measure it. The transmit frequency are 2402, 2480MHz.

8.7. Test Procedure

Radiate Band Edge:

8.7.1. The EUT is placed on a turntable, which is 1.5m above the ground plane and worked at highest radiated power.

8.7.2. The turntable was rotated for 360 degrees to determine the position of maximum emission level.

8.7.3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.

8.7.4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:

RBW=1MHz, VBW=1MHz

8.7.5. The band edges was measured and recorded.

8.8. Test Result

Note: 1. Emissions attenuated more than 20 dB below the permissible value are not reported.

2. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any) from the measured reading. The basic equation calculation is as follows: Result = Reading + Corrected Factor

3. Display the measurement of peak values.

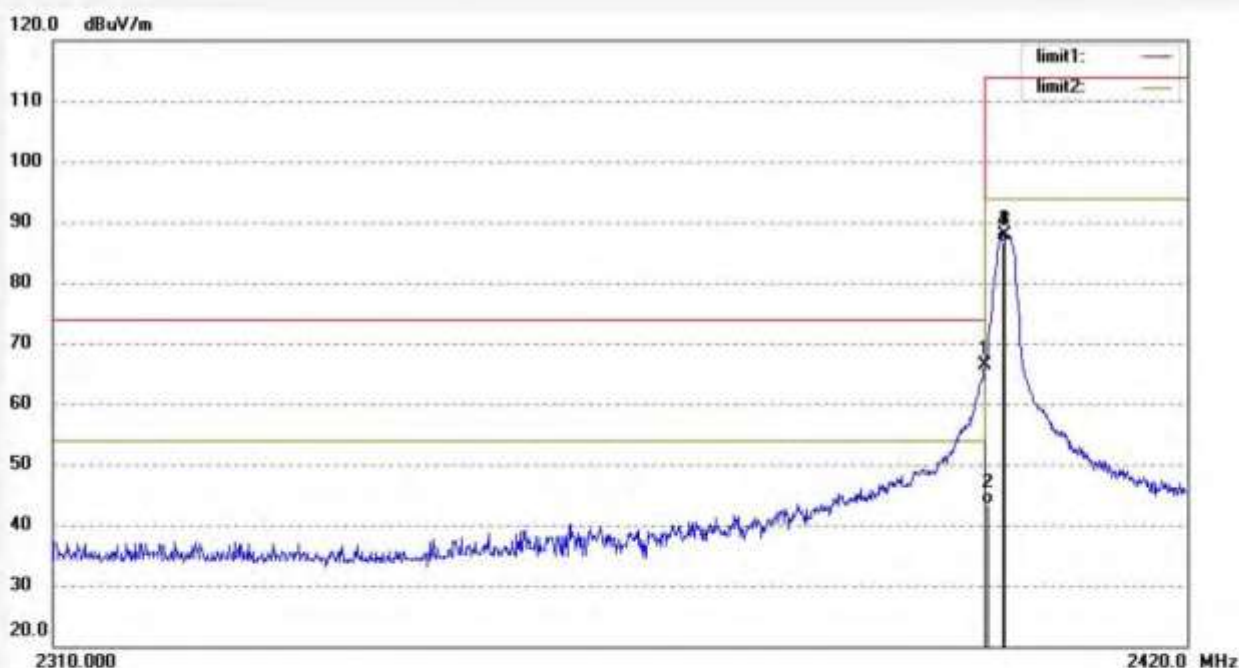
4. The average measurement was not performed when peak measured data under the limit of average detection.

The spectrum analyzer plots are attached as below.

Job No.: LGW2019 #1088
Standard: FCC (Band Edge)
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Motor actuator
Mode: TX 2402MHz
Model: Z1801
Manufacturer: Shanghai Chuangdou Technology Co., Ltd.

Polarization: Horizontal
Power Source: DC 3.7V
Date: 19/04/17/
Time:
Engineer Signature: WADE
Distance: 3m

Note:

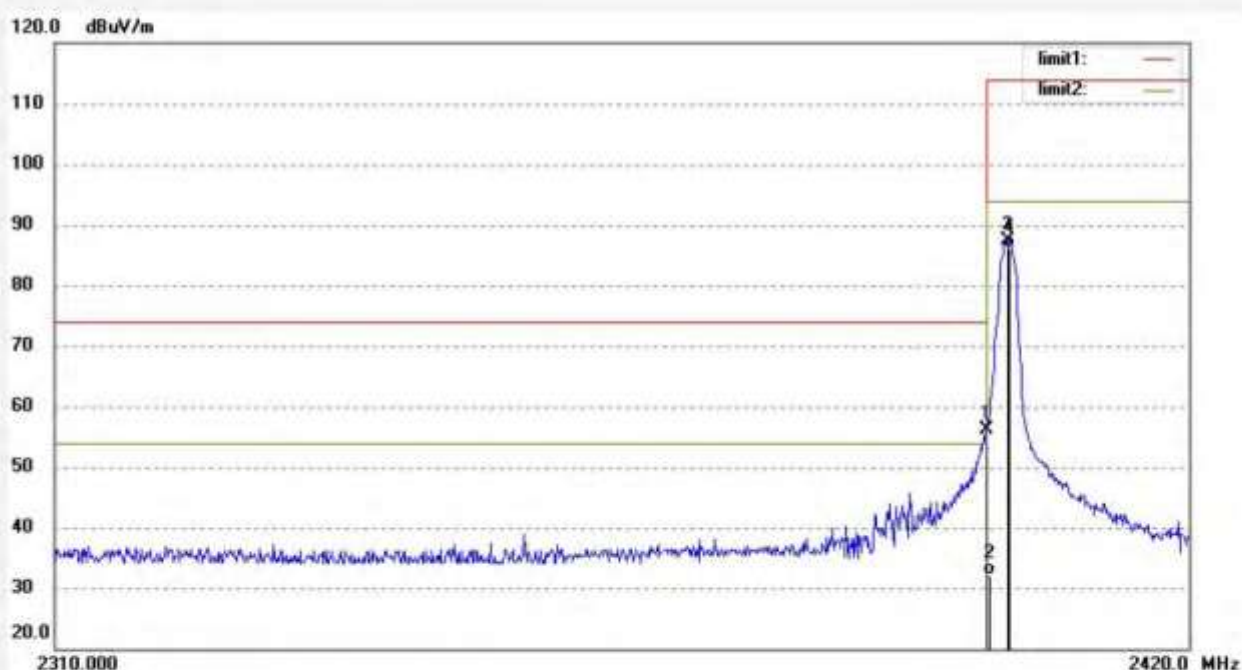


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2400.000	65.49	0.88	66.37	74.00	-7.63	peak			
2	2400.000	42.47	0.88	43.35	54.00	-10.65	AVG			
3	2402.000	86.99	0.89	87.88	114.00	-26.12	peak			
4	2402.000	85.79	0.89	86.68	94.00	-7.32	AVG			

Job No.: LGW2019 #1087
Standard: FCC (Band Edge)
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Motor actuator
Mode: TX 2402MHz
Model: Z1801
Manufacturer: Shanghai Chuangdou Technology Co., Ltd.

Polarization: Vertical
Power Source: DC 3.7V
Date: 19/04/17/
Time:
Engineer Signature: WADE
Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2400.000	55.22	0.88	56.10	74.00	-17.90	peak			
2	2400.000	31.34	0.88	32.22	54.00	-21.78	AVG			
3	2402.000	86.43	0.89	87.32	114.00	-26.68	peak			
4	2402.000	85.23	0.89	86.12	94.00	-7.88	AVG			

Job No.: LGW2019 #1093

Standard: FCC (Band Edge)

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Motor actuator

Mode: TX 2480MHz

Model: Z1801

Manufacturer: Shanghai Chuangdou Technology Co., Ltd.

Polarization: Horizontal

Power Source: DC 3.7V

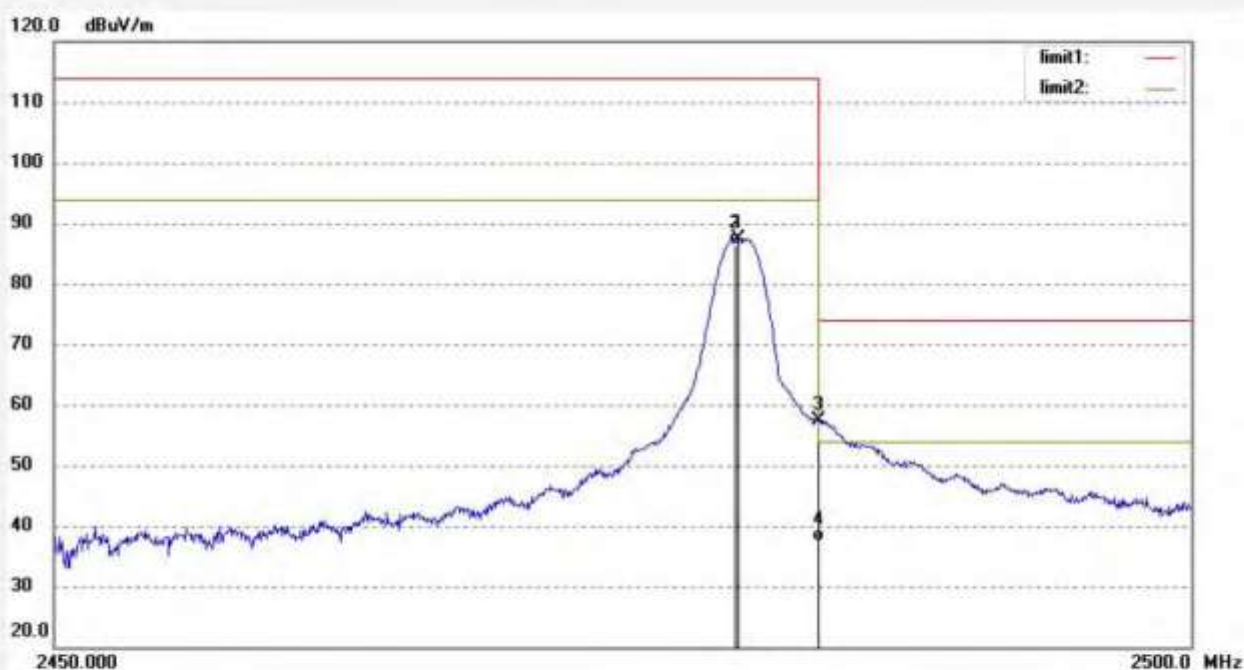
Date: 19/04/17/

Time:

Engineer Signature: WADE

Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.000	86.28	1.10	87.38	114.00	-26.62	peak			
2	2480.000	85.18	1.10	86.28	94.00	-7.72	AVG			
3	2483.500	56.26	1.10	57.36	74.00	-16.64	peak			
4	2483.500	36.25	1.10	37.35	54.00	-16.65	AVG			

Job No.: LGW2019 #1094

Standard: FCC (Band Edge)

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Motor actuator

Mode: TX 2480MHz

Model: Z1801

Manufacturer: Shanghai Chuangdou Technology Co., Ltd.

Polarization: Vertical

Power Source: DC 3.7V

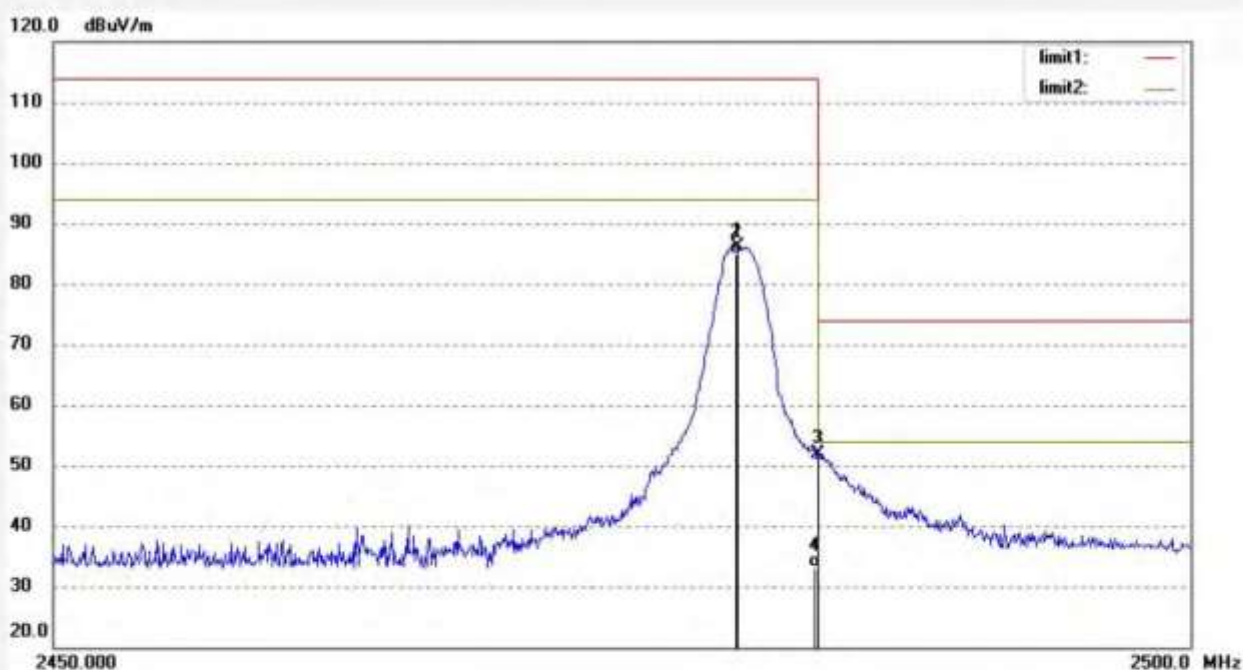
Date: 19/04/17/

Time:

Engineer Signature: WADE

Distance: 3m

Note:

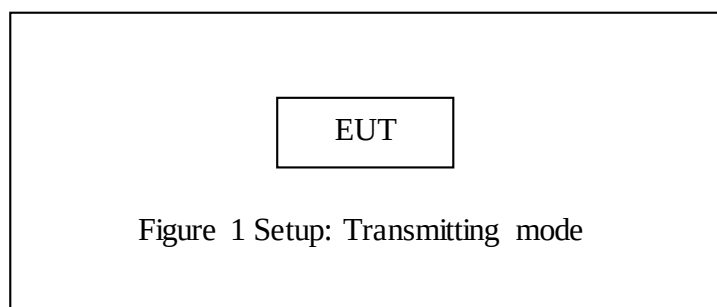


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.000	84.95	1.10	86.05	114.00	-27.95	peak			
2	2480.000	83.85	1.10	84.95	94.00	-9.05	AVG			
3	2483.500	50.67	1.10	51.77	74.00	-22.23	peak			
4	2483.500	32.14	1.10	33.24	54.00	-20.76	AVG			

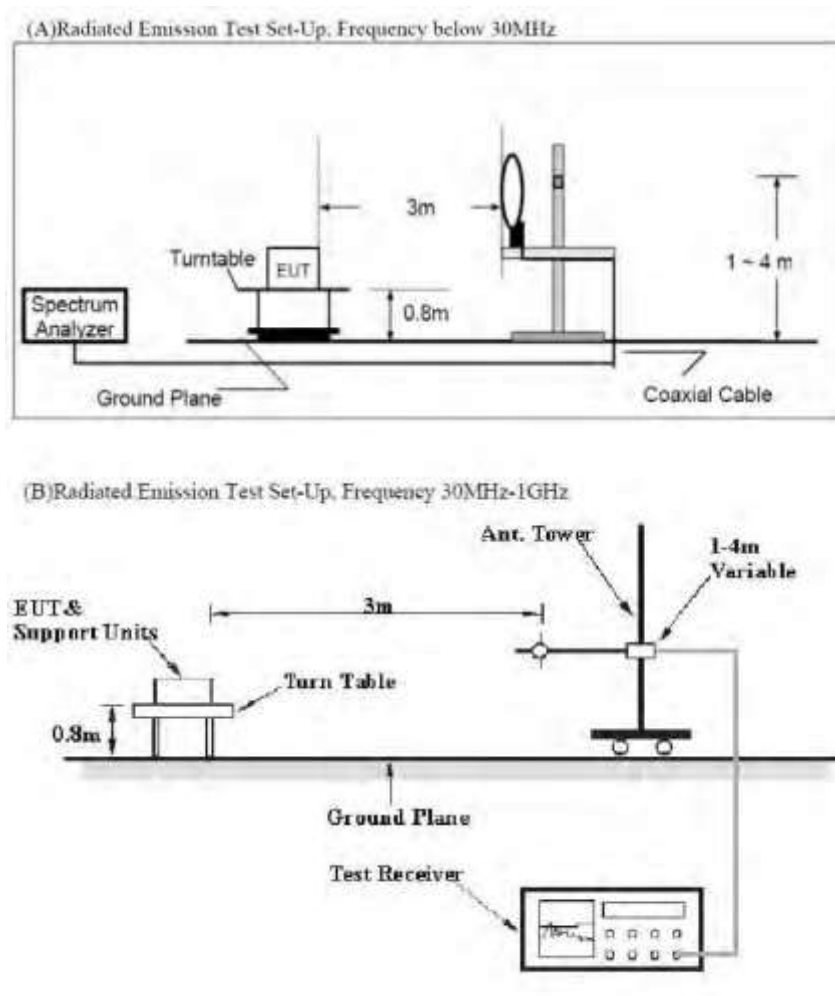
9. RADIATED SPURIOUS EMISSION TEST

9.1. Block Diagram of Test Setup

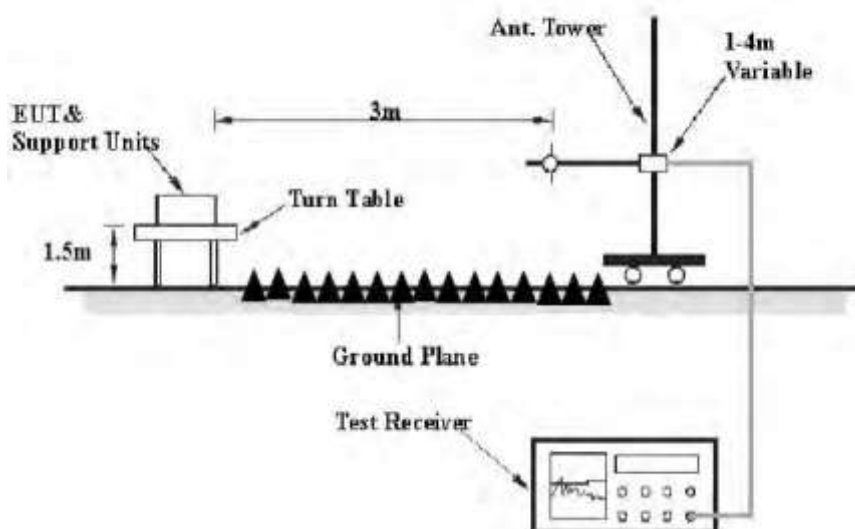
9.1.1. Block diagram of connection between the EUT and peripherals



9.1.2. Semi-Anechoic Chamber Test Setup Diagram



(C) Radiated Emission Test Set-Up, Frequency above 1GHz



9.2. The Requirement For Section 15.249(d)

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.

9.3. The Requirement For RSS-210 Annex B B.10

Emissions radiated outside of the specified frequency bands, except for harmonic emissions, shall be attenuated by at least 50 dB below the level of the fundamental emissions or to the general field strength limits listed in RSS-Gen, whichever is less stringent.

9.4. The Limit For Section 15.249(a) and RSS-210 Annex B B.10(a)

The field strength of fundamental and harmonic emissions, measured at 3 m, shall not exceed 50 mV/m and 0.5 mV/m respectively

9.5. Configuration of EUT on Measurement

The equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

9.6. Operating Condition of EUT

9.6.1. Setup the EUT and simulator as shown as Section 9.1.

9.6.2. Turn on the power of all equipment.

9.6.3. Let the EUT work in TX modes and measure it. The transmit frequency are 2402, 2440, 2480MHz.

9.7. Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter (Below 1GHz) and 1.5m (above 1GHz) high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated emission measurement. This EUT was tested in 3 orthogonal positions and the worst case position data was reported.

The bandwidth of test receiver is set at 9 kHz in below 30MHz. and set at 120 kHz in 30-1000MHz, and 1MHz in above 1000MHz.

The frequency range from 9 kHz to 26.5GHz is checked.

The final measurement in band 9-90 kHz, 110-490 kHz and above 1000MHz is performed with Average detector. Except those frequency bands mention above, the final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.

RBW (120 kHz), VBW (300 kHz) for QP detector below 1GHz
Peak detector above 1GHz

RBW (1 MHz), VBW (3MHz) for Peak measurement

RBW (1 MHz), VBW (10Hz) for AV measurement

9.8. Data Sample

Frequency (MHz)	Reading (dB μ v)	Factor (dB/m)	Result (dB μ v/m)	Limit (dB μ v/m)	Margin (dB)	Remark
X.XX	48.69	-13.35	35.34	46	-7	QP

Frequency(MHz) = Emission frequency in MHz

Reading(dB μ v) = Uncorrected Analyzer/Receiver reading

Factor (dB/m) = Antenna factor + Cable Loss – Amplifier gain

Result(dB μ v/m) = Reading(dB μ v) + Factor(dB/m)

Limit (dB μ v/m) = Limit stated in standard

Margin (dB) = Result(dB μ v/m) - Limit (dB μ v/m)

QP = Quasi-peak Reading

Calculation Formula:

Margin(dB) = Result (dB μ V/m)–Limit(dB μ V/m)

Result(dB μ V/m)= Reading(dB μ V)+ Factor(dB/m)

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the limit.

9.9. Test Results

PASS.

Note: Emissions attenuated more than 20 dB below the permissible value are not reported.

The frequency range from 9 kHz to 26.5GHz is checked.

The spectrum analyzer plots are attached as below.

9kHz-30MHz test data

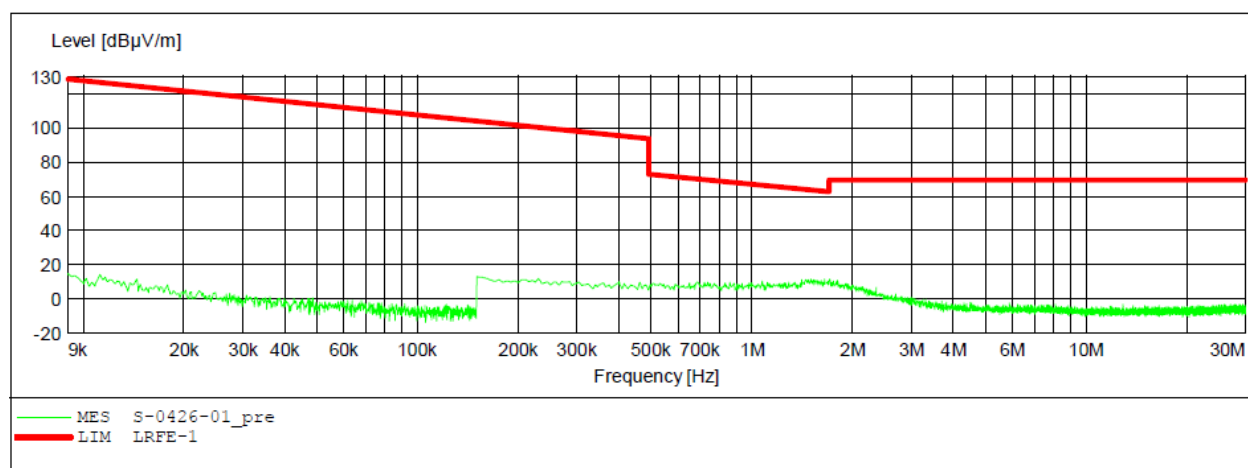
ACCURATE TECHNOLOGY CO., LTD

FCC Class B 3M Radiated

EUT: Motor actuator M/N:Z1801
 Manufacturer: Shanghai Chuangdou Technology Co., Ltd.
 Operating Condition: TX 2402MHz
 Test Site: 2# Chamber
 Operator: WADE
 Test Specification: DC 3.7V
 Comment: X
 Start of Test: 2019-4-26 /

SCAN TABLE: "LFRE Fin"

Short Description:			_SUB_STD_VTERM2 1.70			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M



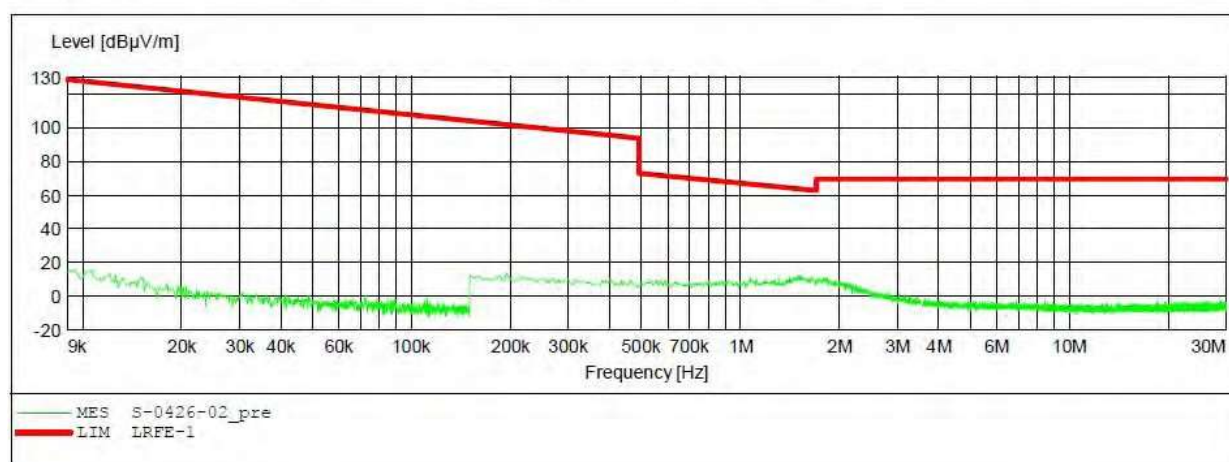
ACCURATE TECHNOLOGY CO., LTD

FCC Class B 3M Radiated

EUT: Motor actuator M/N:Z1801
 Manufacturer: Shanghai Chuangdou Technology Co., Ltd.
 Operating Condition: TX 2402MHz
 Test Site: 2# Chamber
 Operator: WADE
 Test Specification: DC 3.7V
 Comment: Y
 Start of Test: 2019-4-26 /

SCAN TABLE: "LFRE Fin"

Short Description:			_SUB STD VTERM2 1.70				
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer	
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M	
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M	



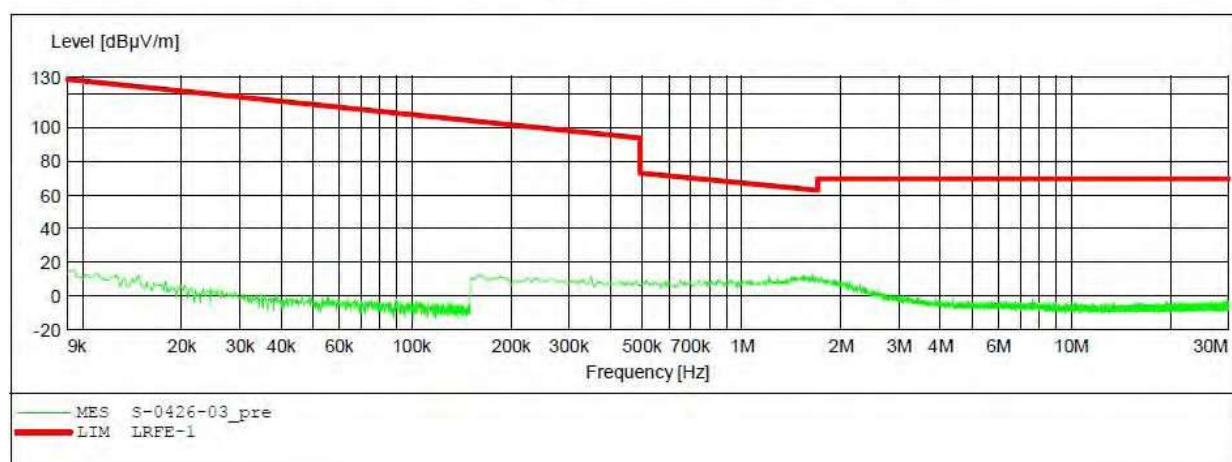
ACCURATE TECHNOLOGY CO., LTD

FCC Class B 3M Radiated

EUT: Motor actuator M/N:Z1801
 Manufacturer: Shanghai Chuangdou Technology Co., Ltd.
 Operating Condition: TX 2402MHz
 Test Site: 2# Chamber
 Operator: WADE
 Test Specification: DC 3.7V
 Comment: Z
 Start of Test: 2019-4-26 /

SCAN TABLE: "LFRE Fin"

Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M



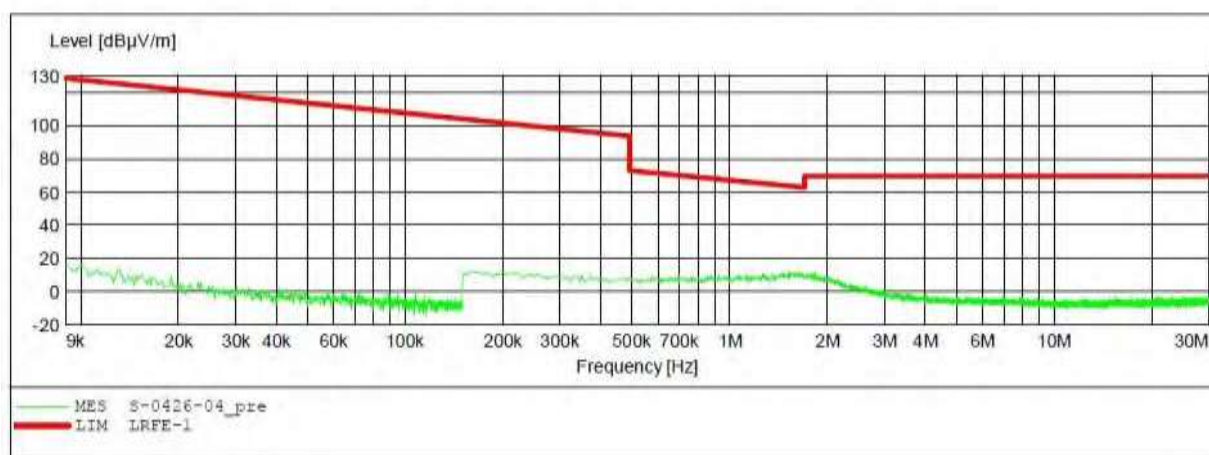
ACCURATE TECHNOLOGY CO., LTD

FCC Class B 3M Radiated

EUT: Motor actuator M/N:Z1801
 Manufacturer: Shanghai Chuangdou Technology Co., Ltd.
 Operating Condition: TX 2440MHz
 Test Site: 2# Chamber
 Operator: WADE
 Test Specification: DC 3.7V
 Comment: X
 Start of Test: 2019-4-26 /

SCAN TABLE: "LFRE Fin"

Short Description:			_SUB_STD VTERM2 1.70				
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer	
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M	
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M	



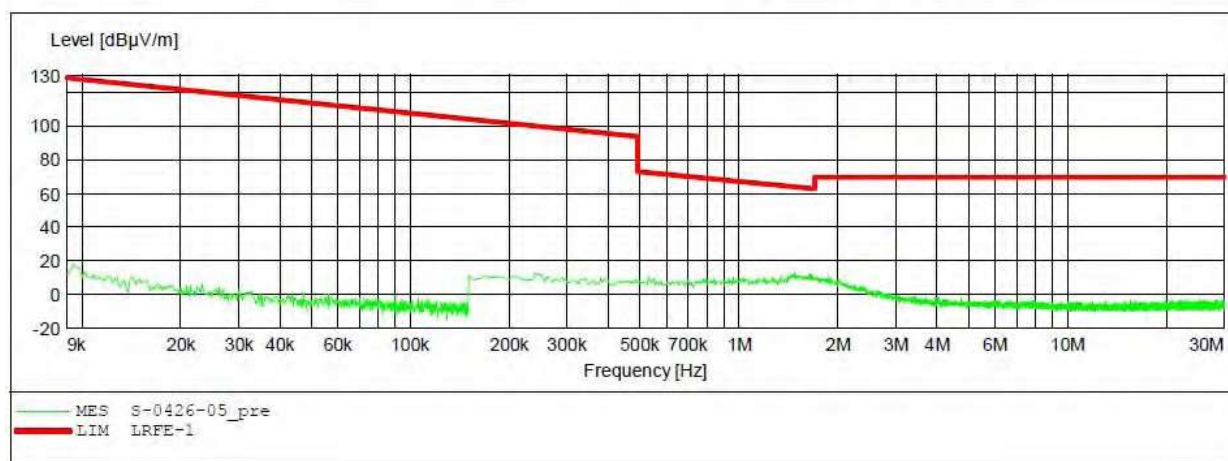
ACCURATE TECHNOLOGY CO., LTD

FCC Class B 3M Radiated

EUT: Motor actuator M/N:Z1801
 Manufacturer: Shanghai Chuangdou Technology Co., Ltd.
 Operating Condition: TX 2440MHz
 Test Site: 2# Chamber
 Operator: WADE
 Test Specification: DC 3.7V
 Comment: Y
 Start of Test: 2019-4-26 /

SCAN TABLE: "LFRE Fin"

Short Description:			_SUB_STD VTERM2 1.70				
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer	
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M	
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M	



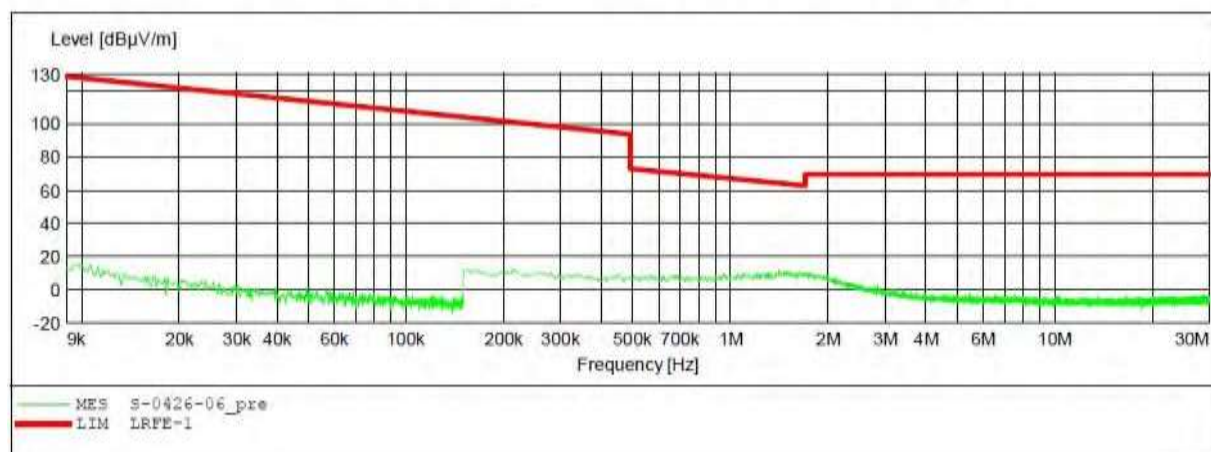
ACCURATE TECHNOLOGY CO., LTD

FCC Class B 3M Radiated

EUT: Motor actuator M/N:Z1801
 Manufacturer: Shanghai Chuangdou Technology Co., Ltd.
 Operating Condition: TX 2440MHz
 Test Site: 2# Chamber
 Operator: WADE
 Test Specification: DC 3.7V
 Comment: Z
 Start of Test: 2019-4-26 /

SCAN TABLE: "LFRE Fin"

Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M



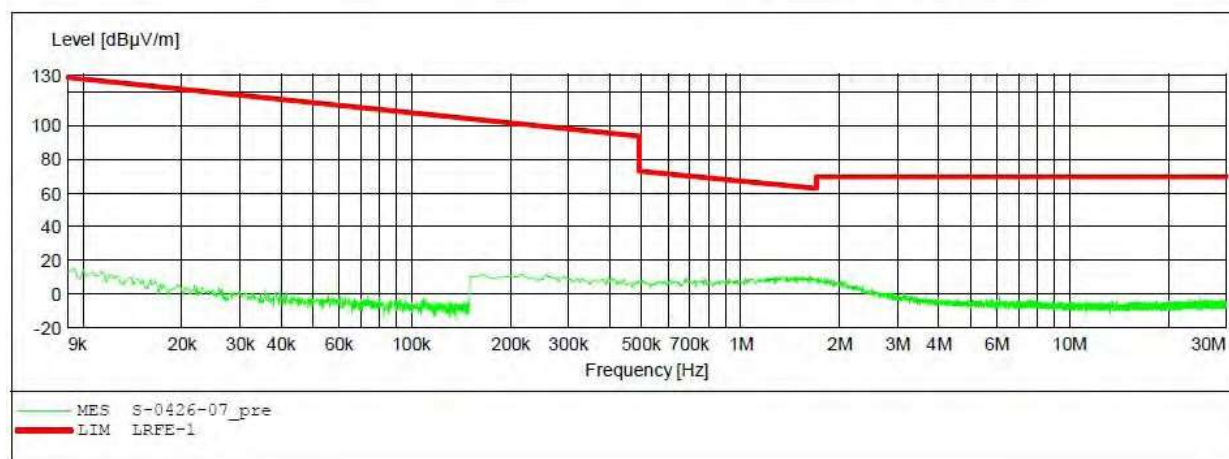
ACCURATE TECHNOLOGY CO., LTD

FCC Class B 3M Radiated

EUT: Motor actuator M/N:Z1801
 Manufacturer: Shanghai Chuangdou Technology Co., Ltd.
 Operating Condition: TX 2480MHz
 Test Site: 2# Chamber
 Operator: WADE
 Test Specification: DC 3.7V
 Comment: X
 Start of Test: 2019-4-26 /

SCAN TABLE: "LFRE Fin"

Short Description:			_SUB_STD VTERM2 1.70				
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer	
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M	
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M	



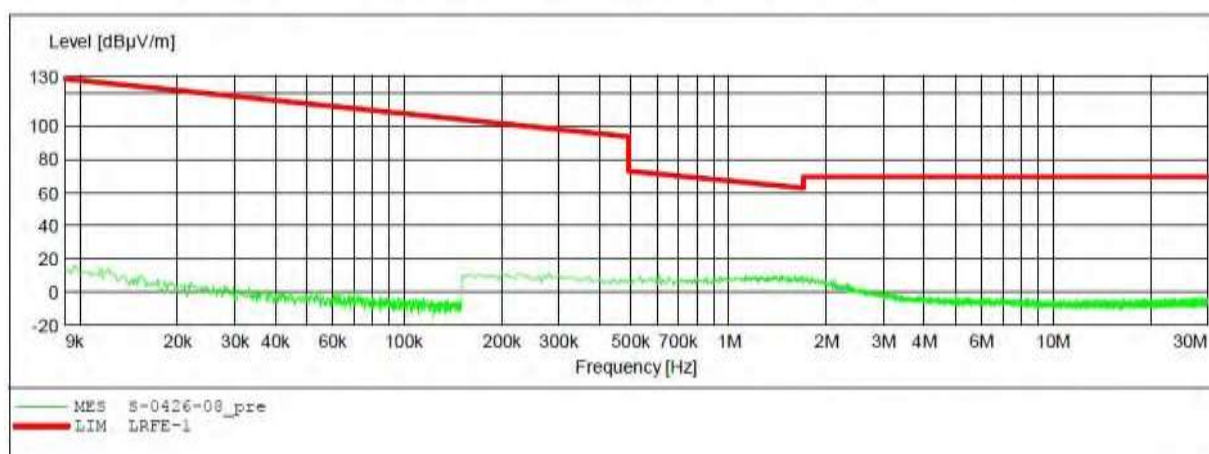
ACCURATE TECHNOLOGY CO.,LTD

FCC Class B 3M Radiated

EUT: Motor actuator M/N:Z1801
 Manufacturer: Shanghai Chuangdou Technology Co., Ltd.
 Operating Condition: TX 2480MHz
 Test Site: 2# Chamber
 Operator: WADE
 Test Specification: DC 3.7V
 Comment: Y
 Start of Test: 2019-4-26 /

SCAN TABLE: "LFRE Fin"

Short Description:			_SUB_STD_VTERM2 1.70			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M



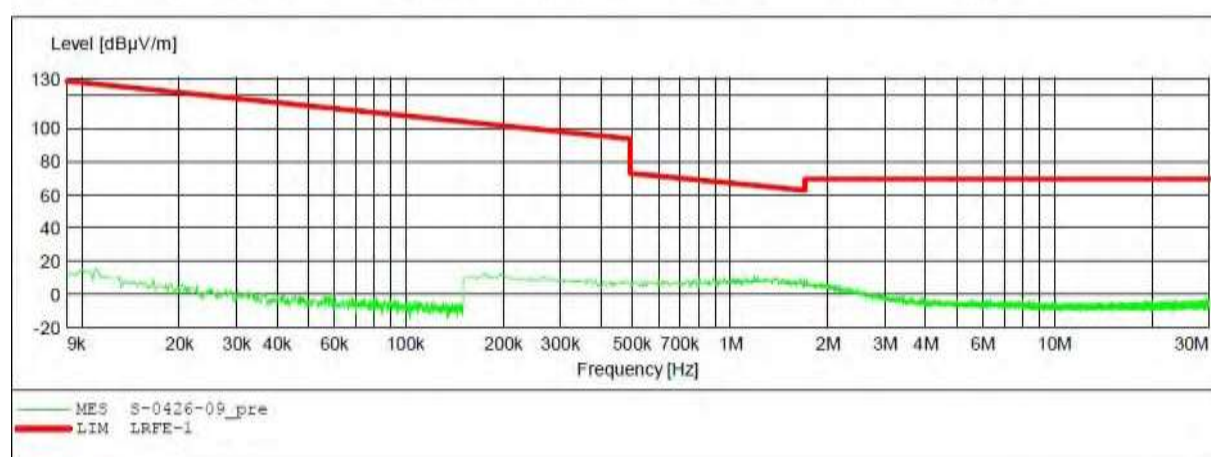
ACCURATE TECHNOLOGY CO., LTD

FCC Class B 3M Radiated

EUT: Motor actuator M/N:Z1801
 Manufacturer: Shanghai Chuangdou Technology Co., Ltd.
 Operating Condition: TX 2480MHz
 Test Site: 2# Chamber
 Operator: WADE
 Test Specification: DC 3.7V
 Comment: Z
 Start of Test: 2019-4-26 /

SCAN TABLE: "LFRE Fin"

Short Description:			_SUB_STD VTERM2 1.70			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
9.0 kHz	150.0 kHz	100.0 Hz	QuasiPeak	1.0 s	200 Hz	1516M
150.0 kHz	30.0 MHz	5.0 kHz	QuasiPeak	1.0 s	9 kHz	1516M



30MHz-1GHz test data



ACCURATE TECHNOLOGY CO., LTD.

F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 2# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: LGW2019 #1101

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Motor actuator

Mode: TX 2402MHz

Model: Z1801

Manufacturer: Shanghai Chuangdou Technology Co., Ltd.

Polarization: Horizontal

Power Source: DC 3.7V

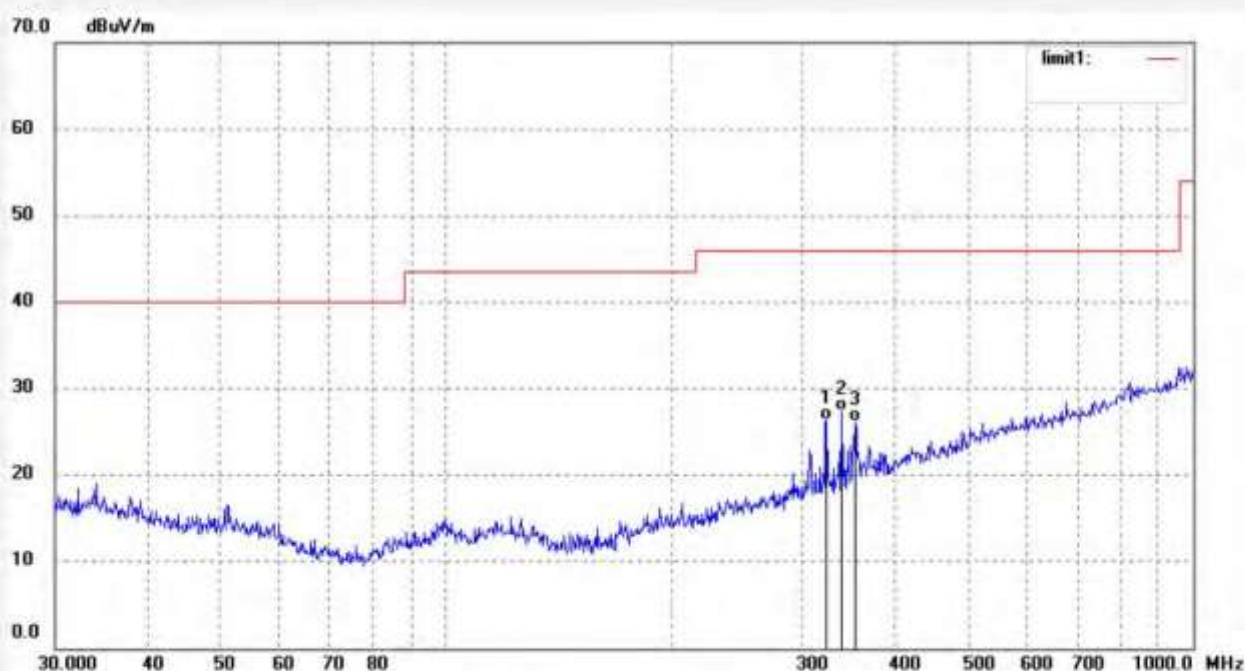
Date: 19/04/17/

Time:

Engineer Signature: WADE

Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	323.3204	34.65	-8.31	26.34	46.00	-19.66	QP			
2	338.4001	35.24	-7.81	27.43	46.00	-18.57	QP			
3	352.9433	33.59	-7.40	26.19	46.00	-19.81	QP			

Shenzhen Accurate Technology Co., Ltd.

Address: 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China

Tel: +86-755-26503290

Fax: +86-755-26503396

E-mail: webmaster@atc-lab.com

Http://www.atc-lab.com

Job No.: LGW2019 #1102

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Motor actuator

Mode: TX 2402MHz

Model: Z1801

Manufacturer: Shanghai Chuangdou Technology Co., Ltd.

Polarization: Vertical

Power Source: DC 3.7V

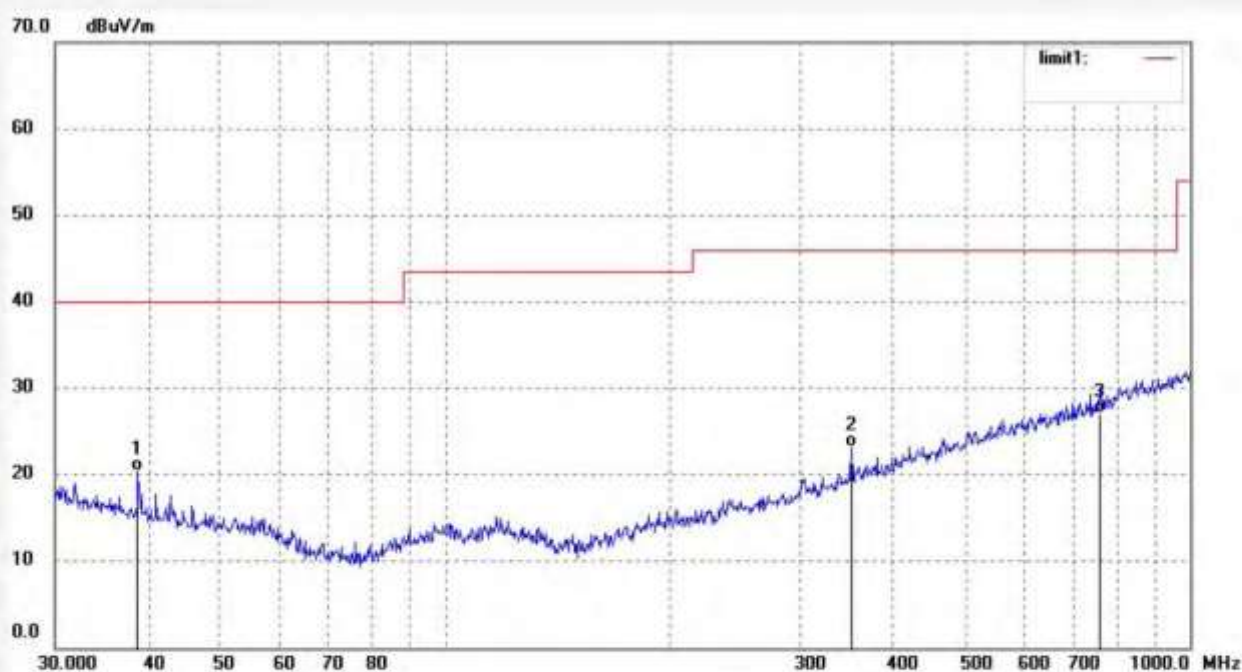
Date: 19/04/17/

Time:

Engineer Signature: WADE

Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	38.7518	31.64	-11.25	20.39	40.00	-19.61	QP			
2	351.7078	30.51	-7.40	23.11	46.00	-22.89	QP			
3	755.3872	27.26	-0.21	27.05	46.00	-18.95	QP			

Job No.: LGW2019 #1104

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Motor actuator

Mode: TX 2440MHz

Model: Z1801

Manufacturer: Shanghai Chuangdou Technology Co., Ltd.

Polarization: Horizontal

Power Source: DC 3.7V

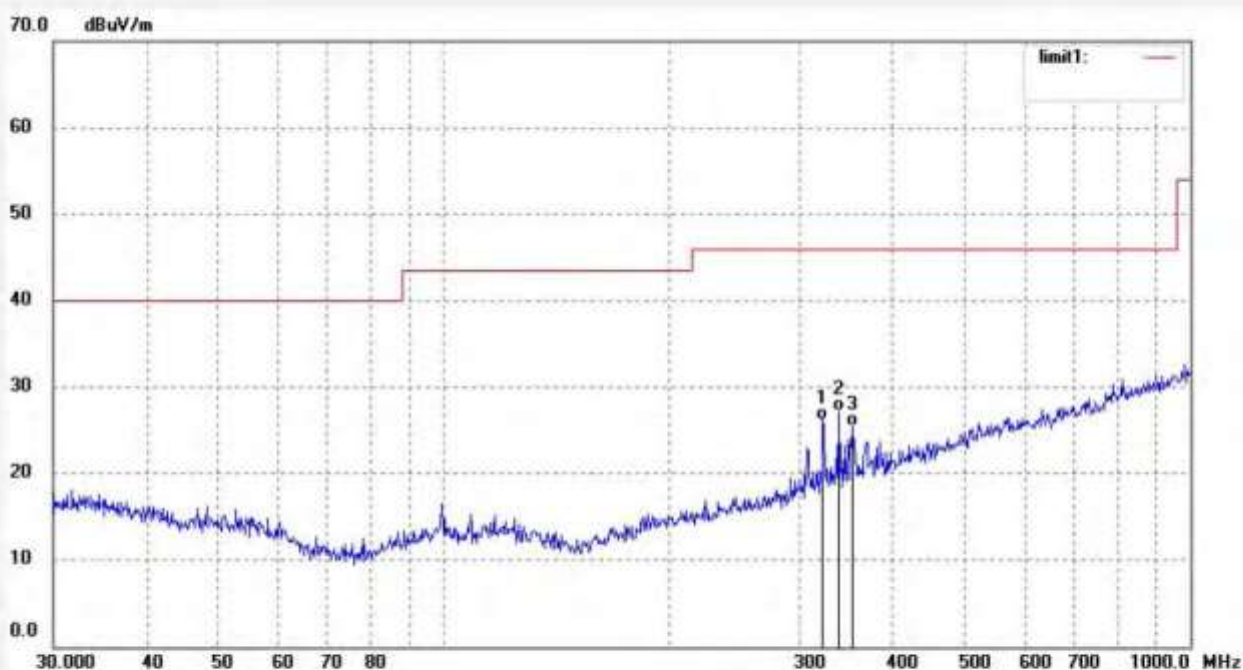
Date: 19/04/17/

Time:

Engineer Signature: WADE

Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	322.1886	34.61	-8.36	26.25	46.00	-19.75	QP			
2	338.4001	35.04	-7.81	27.23	46.00	-18.77	QP			
3	352.9433	32.83	-7.40	25.43	46.00	-20.57	QP			

Job No.: LGW2019 #1103

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Motor actuator

Mode: TX 2440MHz

Model: Z1801

Manufacturer: Shanghai Chuangdou Technology Co., Ltd.

Polarization: Vertical

Power Source: DC 3.7V

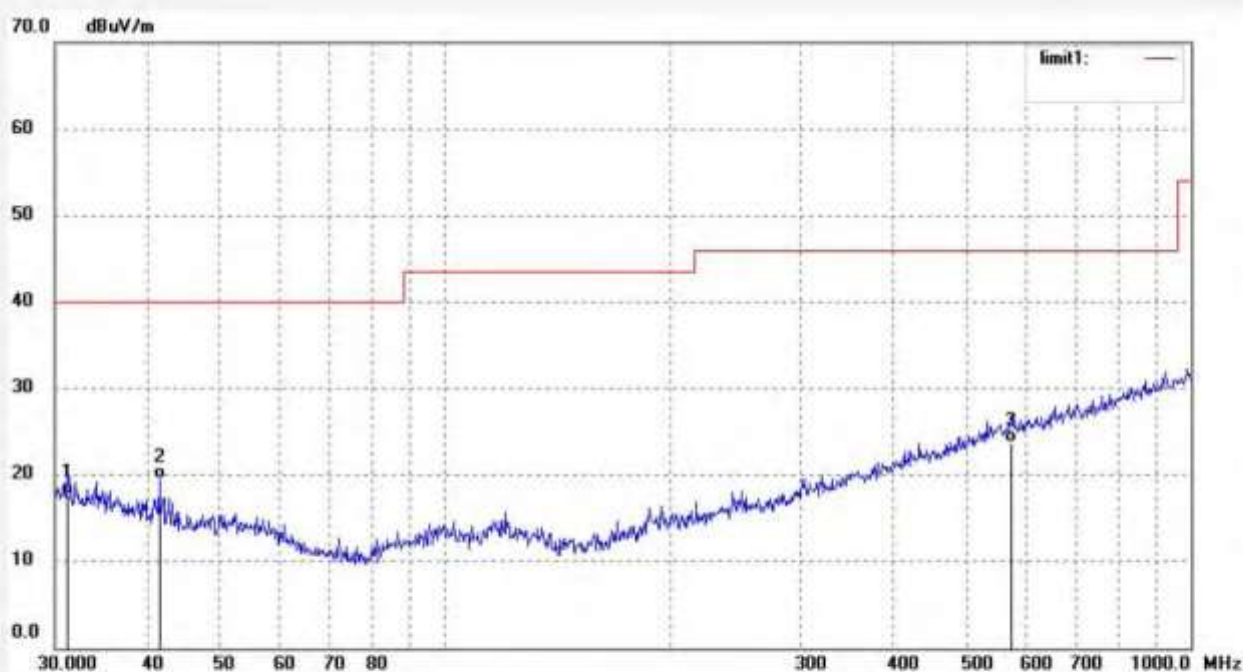
Date: 19/04/17/

Time:

Engineer Signature: WADE

Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	31.1798	27.06	-9.27	17.79	40.00	-22.21	QP			
2	41.4215	31.35	-11.85	19.50	40.00	-20.50	QP			
3	574.6258	26.41	-2.63	23.78	46.00	-22.22	QP			

Job No.: LGW2019 #1105

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Motor actuator

Mode: TX 2480MHz

Model: Z1801

Manufacturer: Shanghai Chuangdou Technology Co., Ltd.

Polarization: Horizontal

Power Source: DC 3.7V

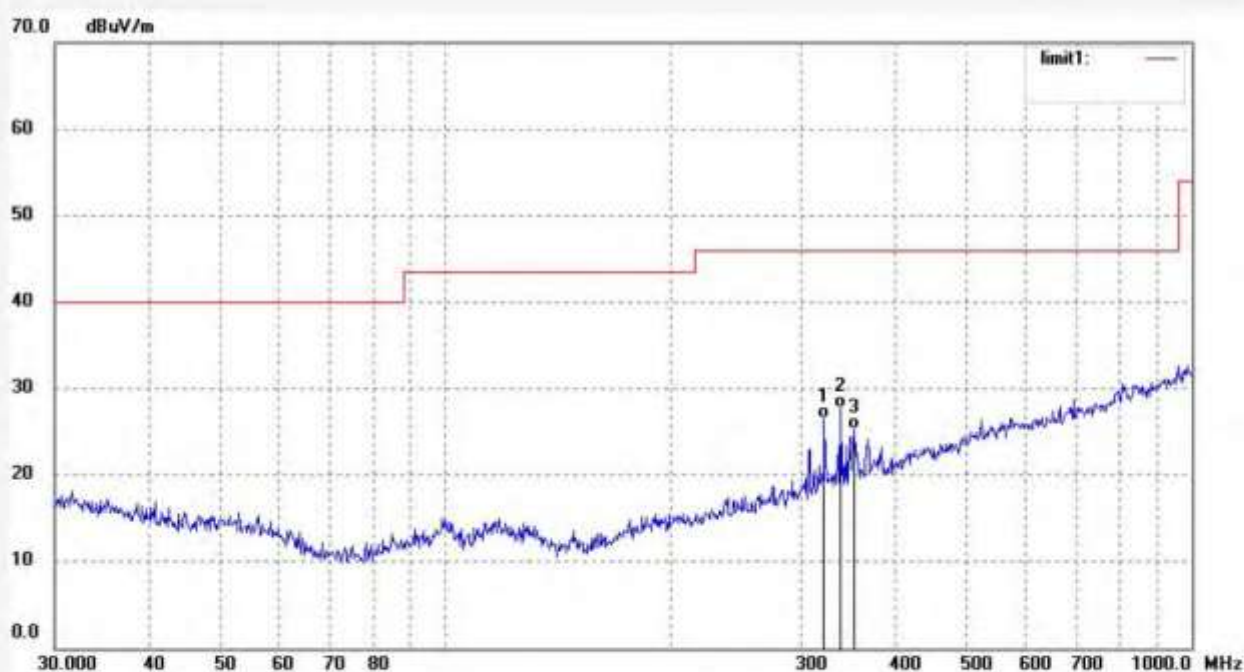
Date: 19/04/17/

Time:

Engineer Signature: WADE

Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	322.1886	34.89	-8.36	26.53	46.00	-19.47	QP			
2	338.4001	35.54	-7.81	27.73	46.00	-18.27	QP			
3	352.9433	32.72	-7.40	25.32	46.00	-20.68	QP			

Job No.: LGW2019 #1106

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Motor actuator

Mode: TX 2480MHz

Model: Z1801

Manufacturer: Shanghai Chuangdou Technology Co., Ltd.

Polarization: Vertical

Power Source: DC 3.7V

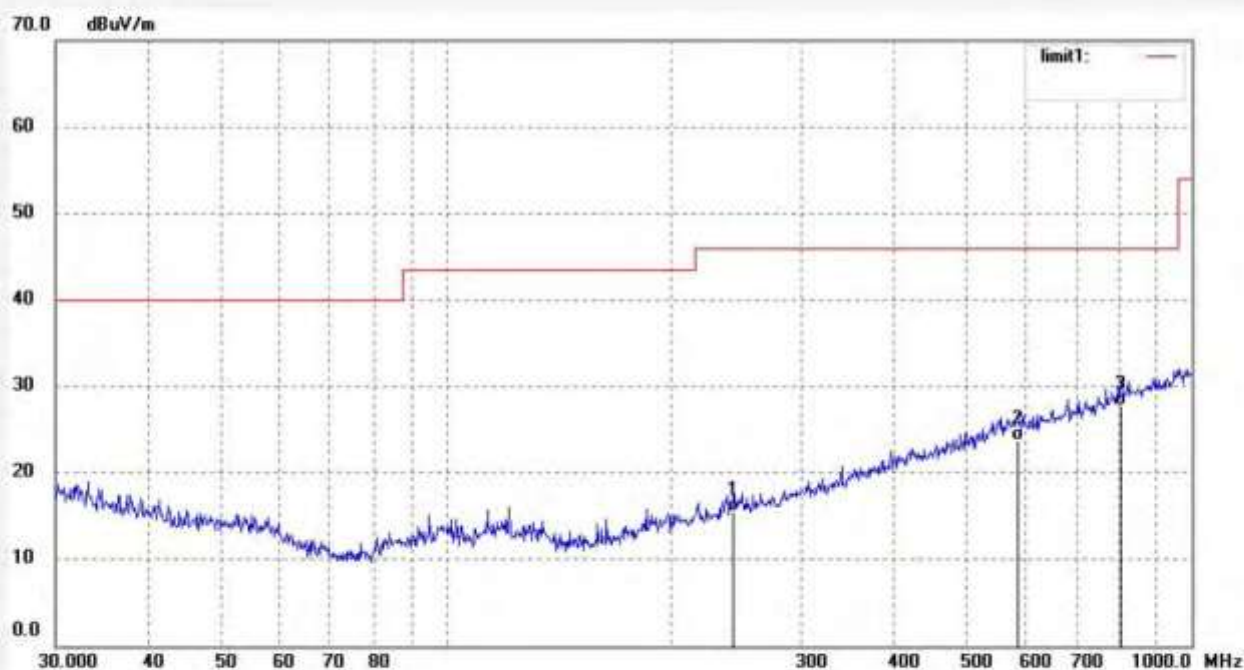
Date: 19/04/17/

Time:

Engineer Signature: WADE

Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	243.3771	26.06	-10.60	15.46	46.00	-30.54	QP			
2	584.7894	26.32	-2.52	23.80	46.00	-22.20	QP			
3	804.6028	26.76	0.91	27.67	46.00	-18.33	QP			



1GHz-18GHz test data

ACCURATE TECHNOLOGY CO., LTD.

F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 2# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: LGW2019 #1085

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Motor actuator

Mode: TX 2402MHz

Model: Z1801

Manufacturer: Shanghai Chuangdou Technology Co., Ltd.

Polarization: Horizontal

Power Source: DC 3.7V

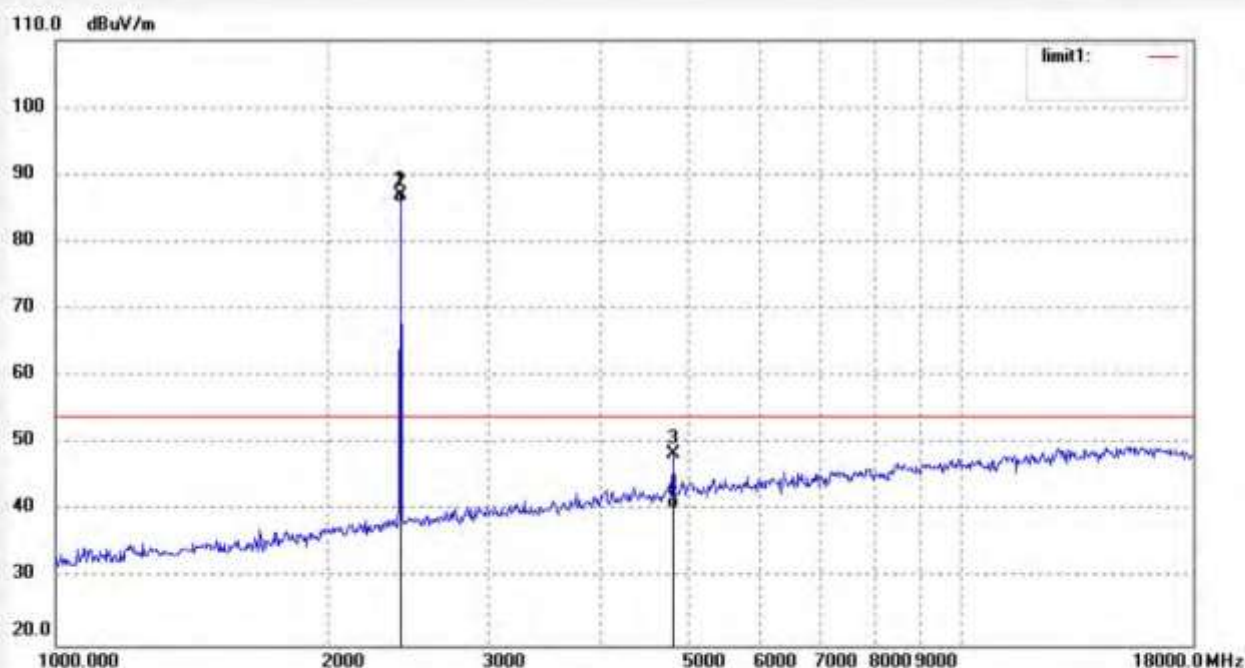
Date: 19/04/17/

Time:

Engineer Signature: WADE

Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2402.000	86.14	0.89	87.03	114.00	-26.97	peak			
2	2402.000	84.94	0.89	85.83	94.00	-8.17	AVG			
3	4804.026	40.96	7.40	48.36	74.00	-25.64	peak			
4	4804.026	32.95	7.40	40.35	54.00	-13.65	AVG			

Job No.: LGW2019 #1086

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Motor actuator

Mode: TX 2402MHz

Model: Z1801

Manufacturer: Shanghai Chuangdou Technology Co., Ltd.

Polarization: Vertical

Power Source: DC 3.7V

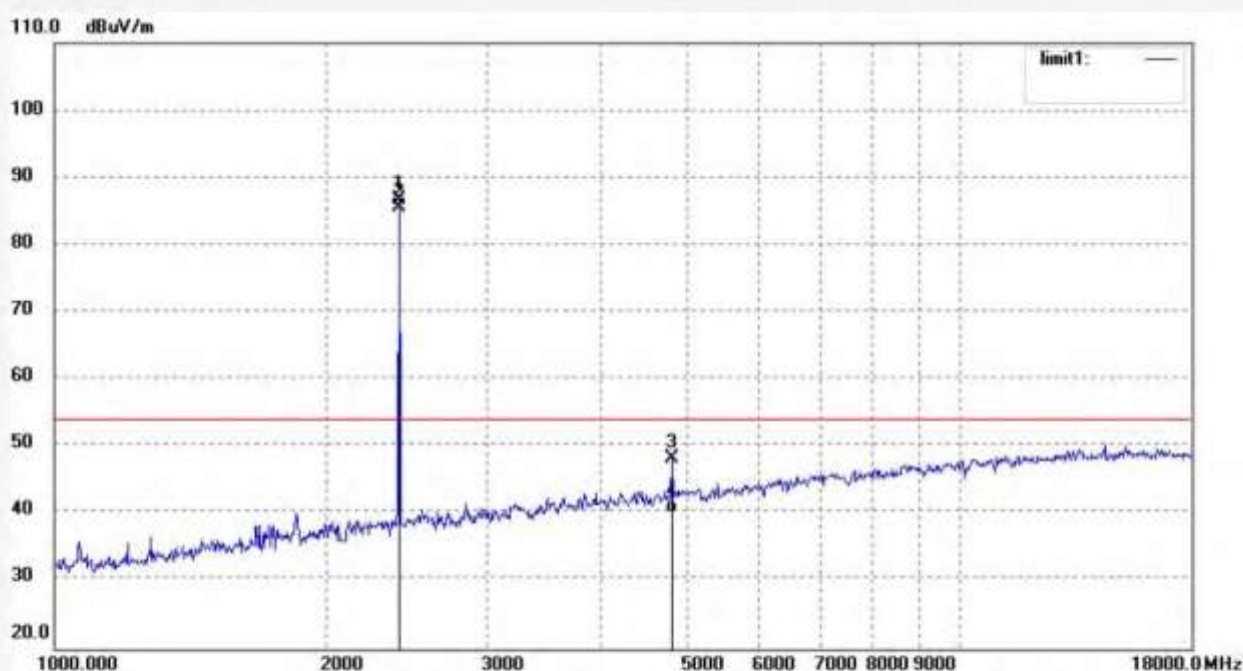
Date: 19/04/17/

Time:

Engineer Signature: WADE

Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2402.000	85.80	0.89	86.69	114.00	-27.31	peak			
2	2402.000	84.60	0.89	85.49	94.00	-8.51	peak			
3	4804.027	40.83	7.40	48.23	74.00	-25.77	peak			
4	4804.027	32.81	7.40	40.21	54.00	-13.79	AVG			

Job No.: LGW2019 #1089

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Motor actuator

Mode: TX 2440MHz

Model: Z1801

Manufacturer: Shanghai Chuangdou Technology Co., Ltd.

Polarization: Horizontal

Power Source: DC 3.7V

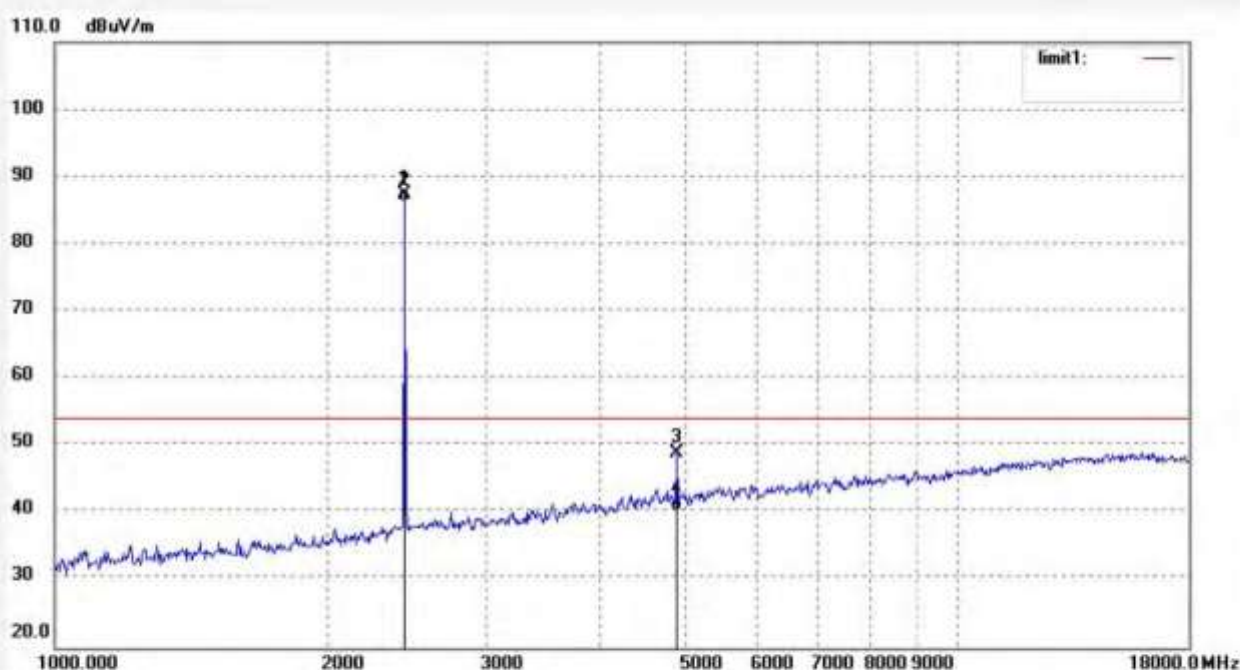
Date: 19/04/17/

Time:

Engineer Signature: WADE

Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2440.000	86.34	1.04	87.38	114.00	-26.62	peak			
2	2440.000	85.14	1.04	86.18	94.00	-7.82	AVG			
3	4880.028	40.74	8.10	48.84	74.00	-25.16	peak			
4	4880.028	32.25	8.10	40.35	54.00	-13.65	AVG			

Job No.: LGW2019 #1090

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Motor actuator

Mode: TX 2440MHz

Model: Z1801

Manufacturer: Shanghai Chuangdou Technology Co., Ltd.

Polarization: Vertical

Power Source: DC 3.7V

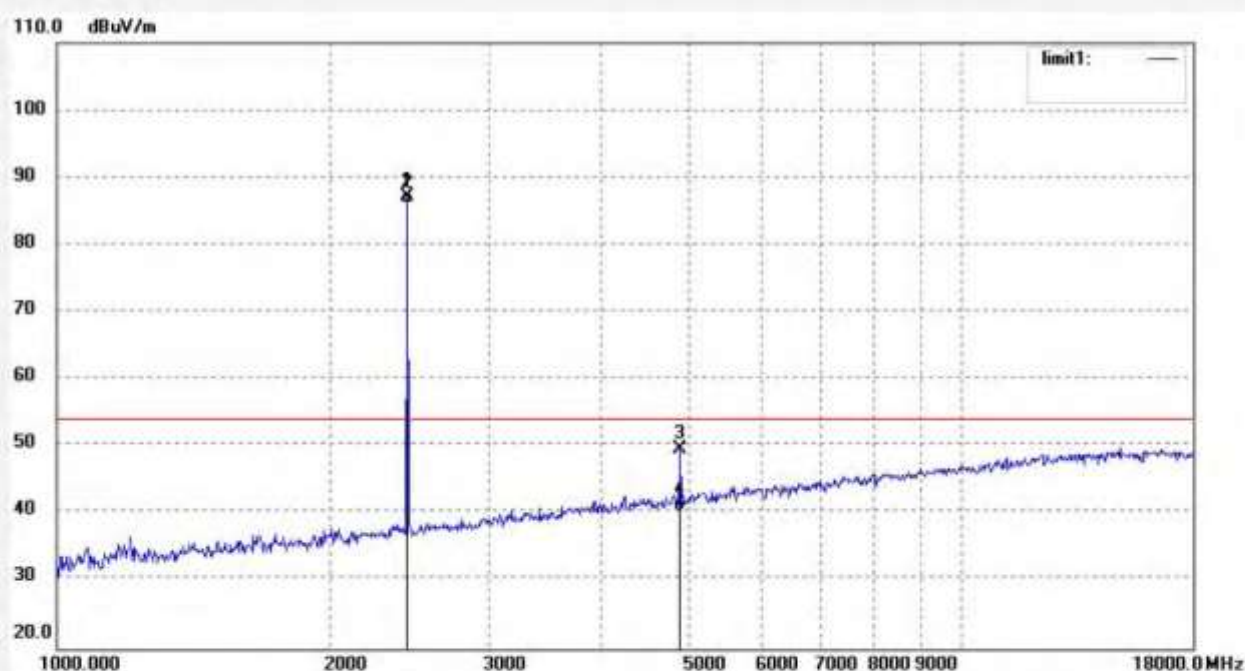
Date: 19/04/17/

Time:

Engineer Signature: WADE

Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2440.000	86.13	1.04	87.17	114.00	-26.83	peak			
2	2440.000	84.93	1.04	85.97	94.00	-8.03	AVG			
3	4880.028	41.45	8.10	49.55	74.00	-24.45	peak			
4	4880.028	32.25	8.10	40.35	54.00	-13.65	AVG			

Job No.: LGW2019 #1092

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Motor actuator

Mode: TX 2480MHz

Model: Z1801

Manufacturer: Shanghai Chuangdou Technology Co., Ltd.

Polarization: Horizontal

Power Source: DC 3.7V

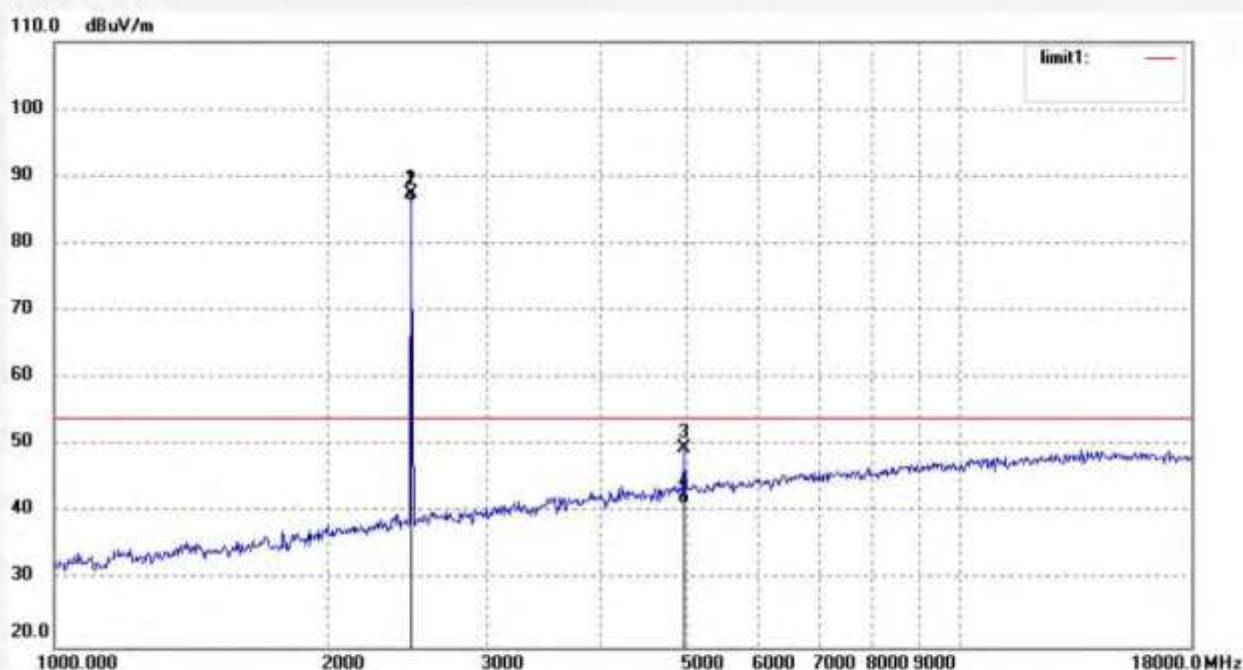
Date: 19/04/17/

Time:

Engineer Signature: WADE

Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.000	86.23	1.10	87.33	114.00	-26.67	peak			
2	2480.000	85.13	1.10	86.23	94.00	-7.77	AVG			
3	4960.026	40.97	8.60	49.57	74.00	-24.43	peak			
4	4960.026	32.75	8.60	41.35	54.00	-12.65	AVG			



ACCURATE TECHNOLOGY CO., LTD.

F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 2# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: LGW2019 #1091

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Motor actuator

Mode: TX 2480MHz

Model: Z1801

Manufacturer: Shanghai Chuangdou Technology Co., Ltd.

Polarization: Vertical

Power Source: DC 3.7V

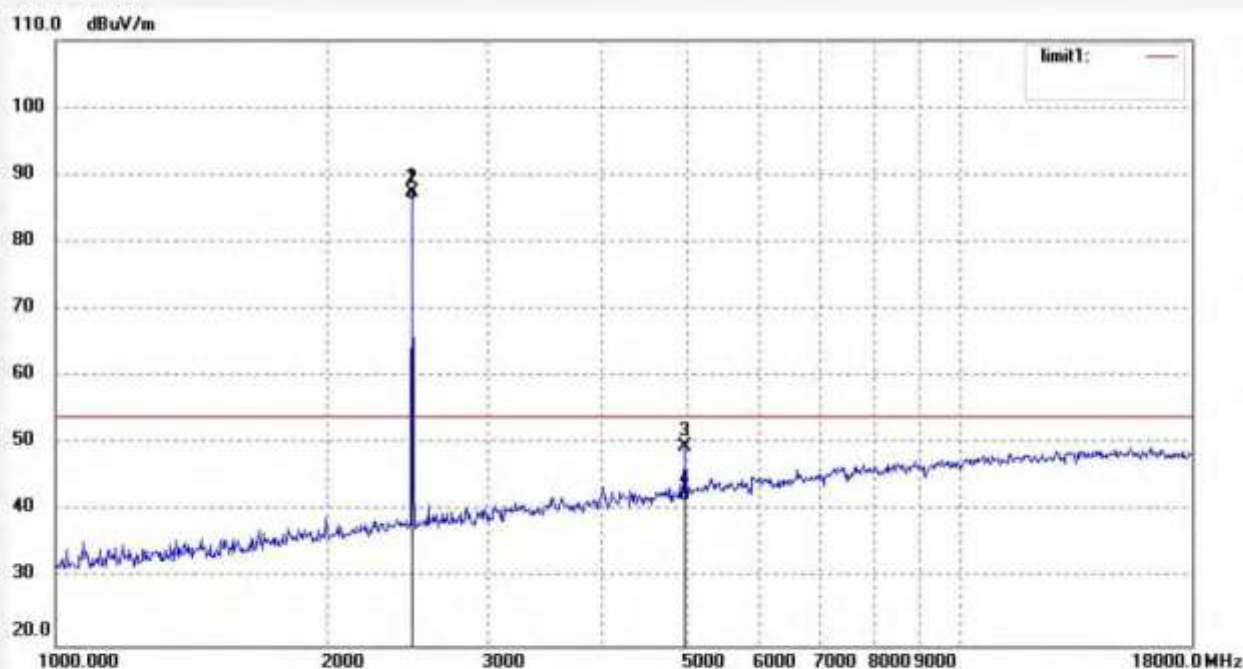
Date: 19/04/17/

Time:

Engineer Signature: WADE

Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.000	86.18	1.10	87.28	114.00	-26.72	peak			
2	2480.000	85.08	1.10	86.18	94.00	-7.82	AVG			
3	4960.027	41.01	8.60	49.61	74.00	-24.39	peak			
4	4960.027	32.78	8.60	41.38	54.00	-12.62	AVG			

Shenzhen Accurate Technology Co., Ltd.

Address: 1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China

Tel: +86-755-26503290

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E-mail: webmaster@atc-lab.com

Http://www.atc-lab.com



18GHz-26.5GHz test data
ACCURATE TECHNOLOGY CO., LTD.
 F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
 Science & Industry Park,Nanshan Shenzhen,P.R.China

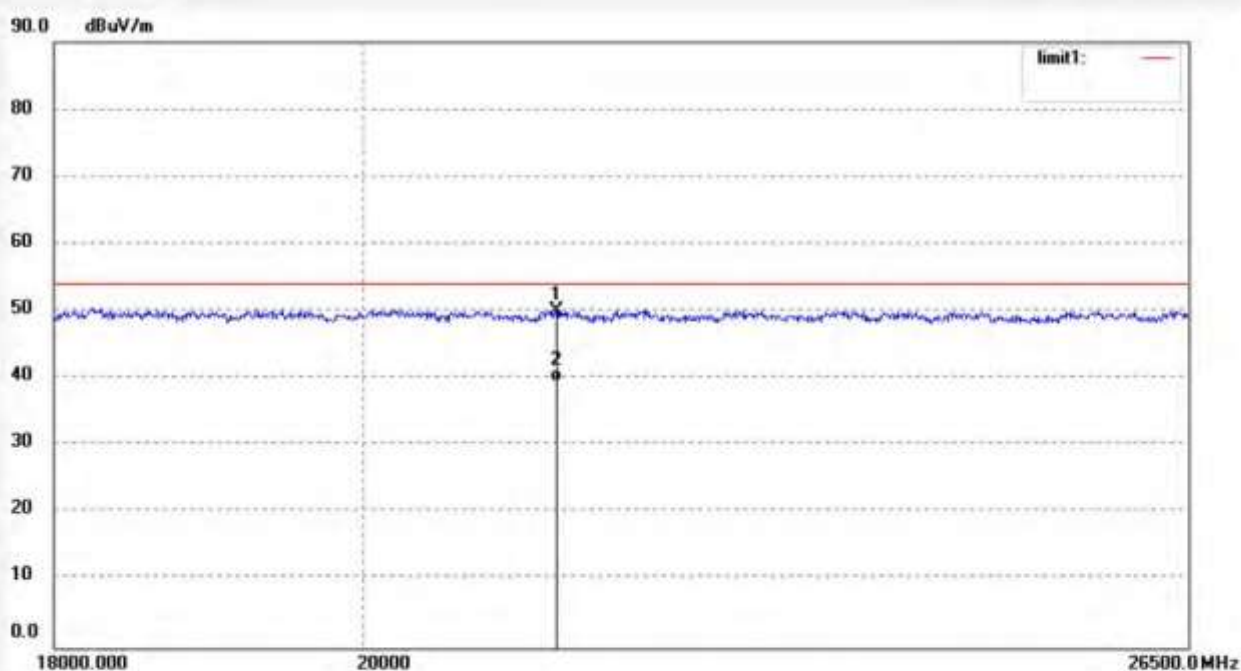
Site: 2# Chamber
 Tel:+86-0755-26503290
 Fax:+86-0755-26503396

Job No.: LGW2019 #1096
 Standard: FCC Class B 3M Radiated
 Test item: Radiation Test
 Temp.(C)/Hum.(%) 23 C / 48 %
 EUT: Motor actuator
 Mode: TX 2402MHz
 Model: Z1801

Polarization: Horizontal
 Power Source: DC 3.7V
 Date: 19/04/17/
 Time:
 Engineer Signature: WADE
 Distance: 3m

Manufacturer: Shanghai Chuangdou Technology Co., Ltd.

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	21364.105	18.59	31.38	49.97	74.00	-24.03	peak			
2	21364.105	8.16	31.38	39.54	54.00	-14.46	AVG			

Job No.: LGW2019 #1095

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Motor actuator

Mode: TX 2402MHz

Model: Z1801

Manufacturer: Shanghai Chuangdou Technology Co., Ltd.

Polarization: Vertical

Power Source: DC 3.7V

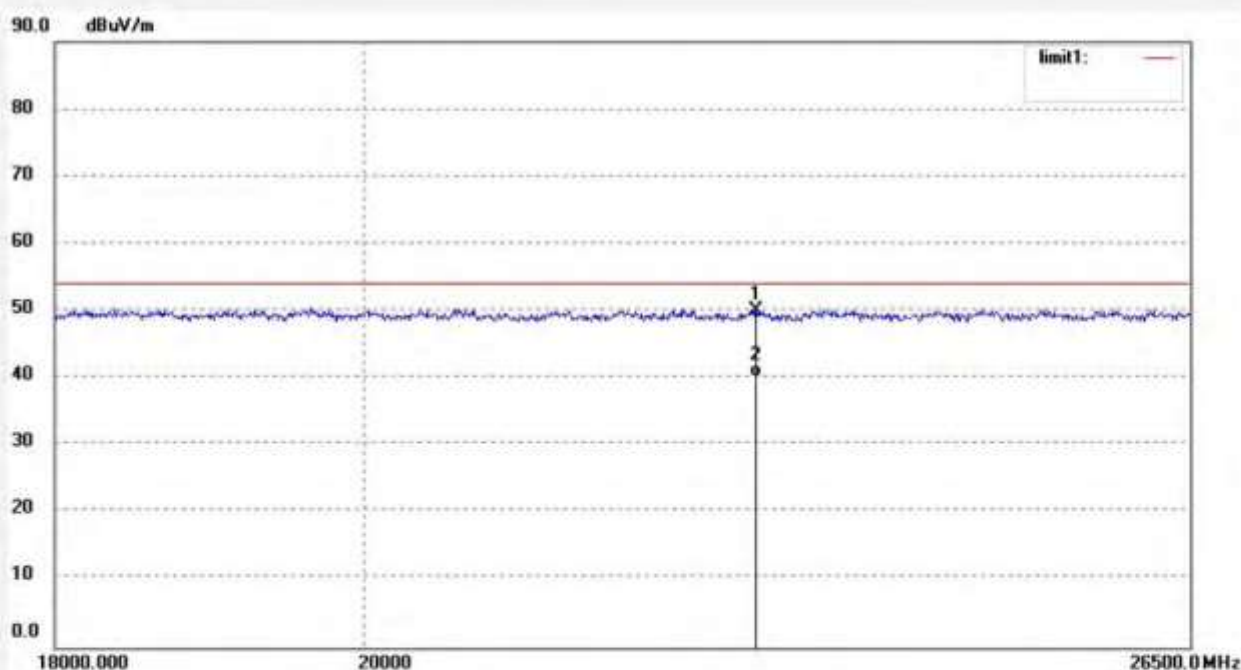
Date: 19/04/17/

Time:

Engineer Signature: WADE

Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	22860.201	17.71	32.33	50.04	74.00	-23.96	peak			
2	22860.201	7.91	32.33	40.24	54.00	-13.76	AVG			

Job No.: LGW2019 #1097

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Motor actuator

Mode: TX 2440MHz

Model: Z1801

Manufacturer: Shanghai Chuangdou Technology Co., Ltd.

Polarization: Horizontal

Power Source: DC 3.7V

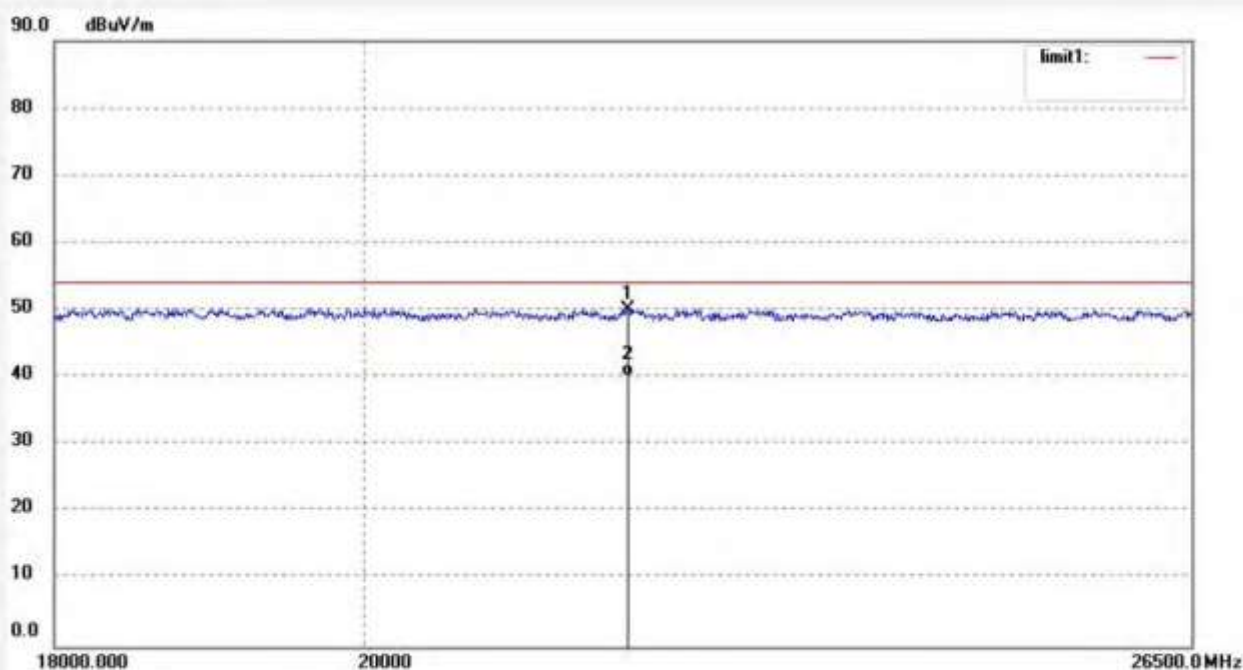
Date: 19/04/17/

Time:

Engineer Signature: WADE

Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	21874.145	18.03	31.98	50.01	74.00	-23.99	peak			
2	21874.145	8.26	31.98	40.24	54.00	-13.76	AVG			

Job No.: LGW2019 #1098

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Motor actuator

Mode: TX 2440MHz

Model: Z1801

Manufacturer: Shanghai Chuangdou Technology Co., Ltd.

Polarization: Vertical

Power Source: DC 3.7V

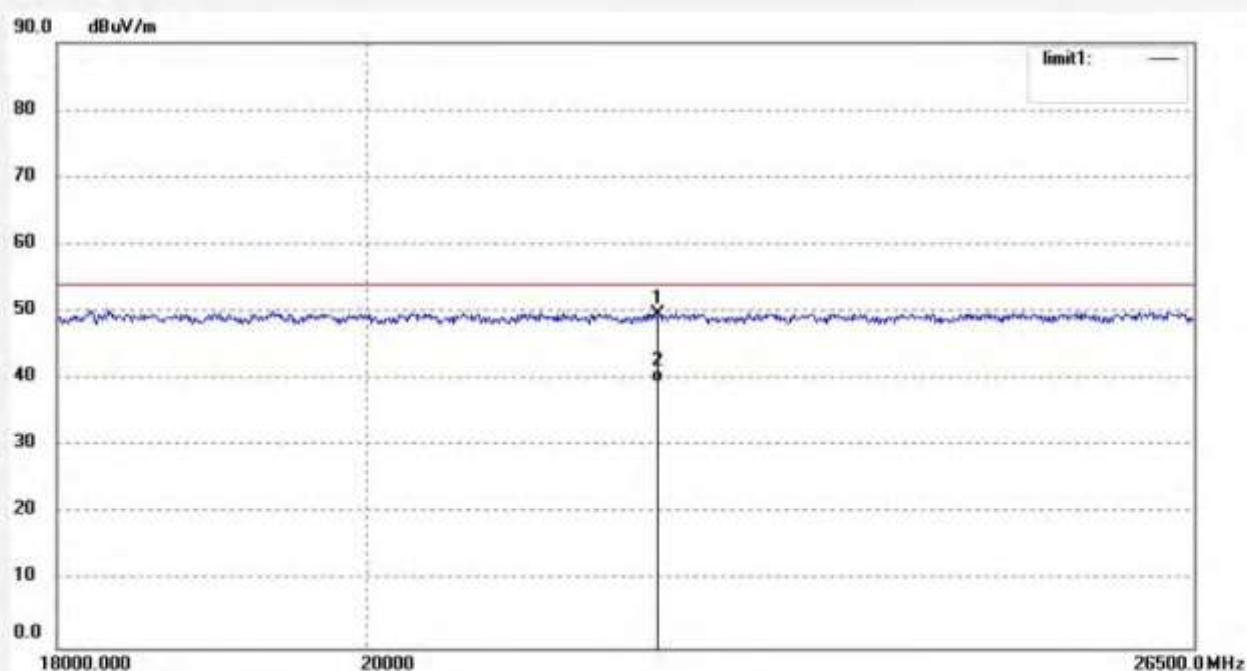
Date: 19/04/17/

Time:

Engineer Signature: WADE

Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	22078.138	17.71	32.01	49.72	74.00	-24.28	peak			
2	22078.138	7.40	32.01	39.41	54.00	-14.59	AVG			

Job No.: LGW2019 #1100

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Motor actuator

Mode: TX 2480MHz

Model: Z1801

Manufacturer: Shanghai Chuangdou Technology Co., Ltd.

Polarization: Horizontal

Power Source: DC 3.7V

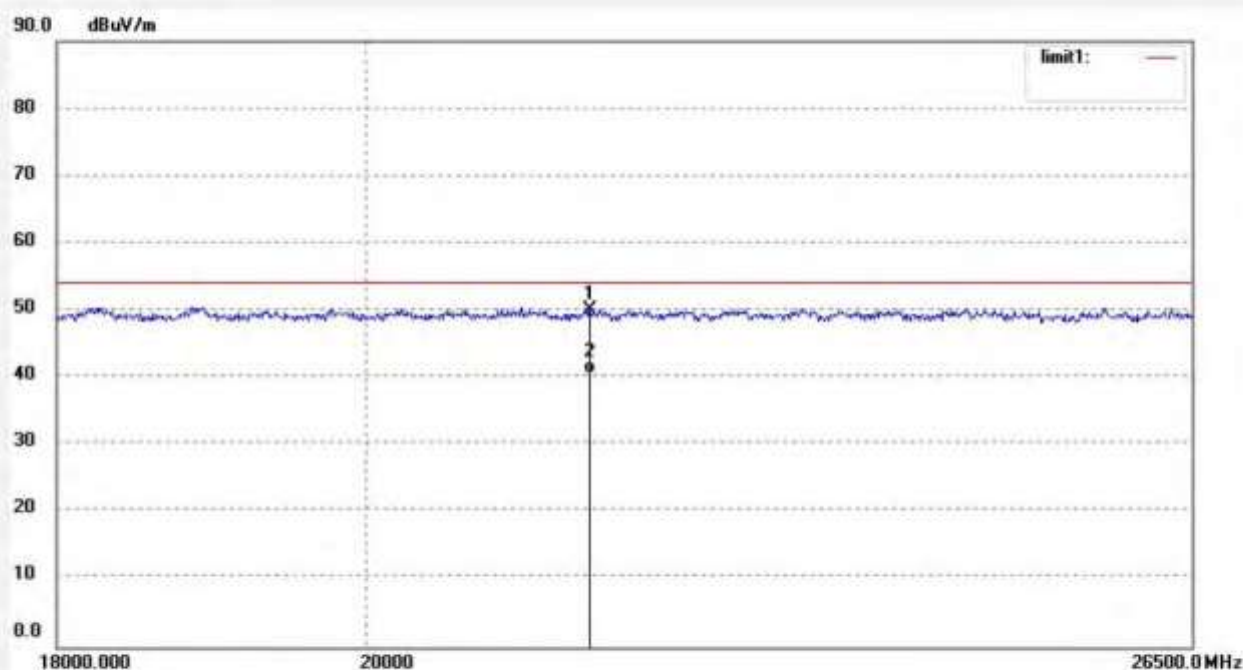
Date: 19/04/17/

Time:

Engineer Signature: WADE

Distance: 3m

Note:



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	21588.377	18.50	31.52	50.02	74.00	-23.98	peak			
2	21588.377	9.07	31.52	40.59	54.00	-13.41	AVG			

Job No.: LGW2019 #1099

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 23 C / 48 %

EUT: Motor actuator

Mode: TX 2480MHz

Model: Z1801

Manufacturer: Shanghai Chuangdou Technology Co., Ltd.

Polarization: Vertical

Power Source: DC 3.7V

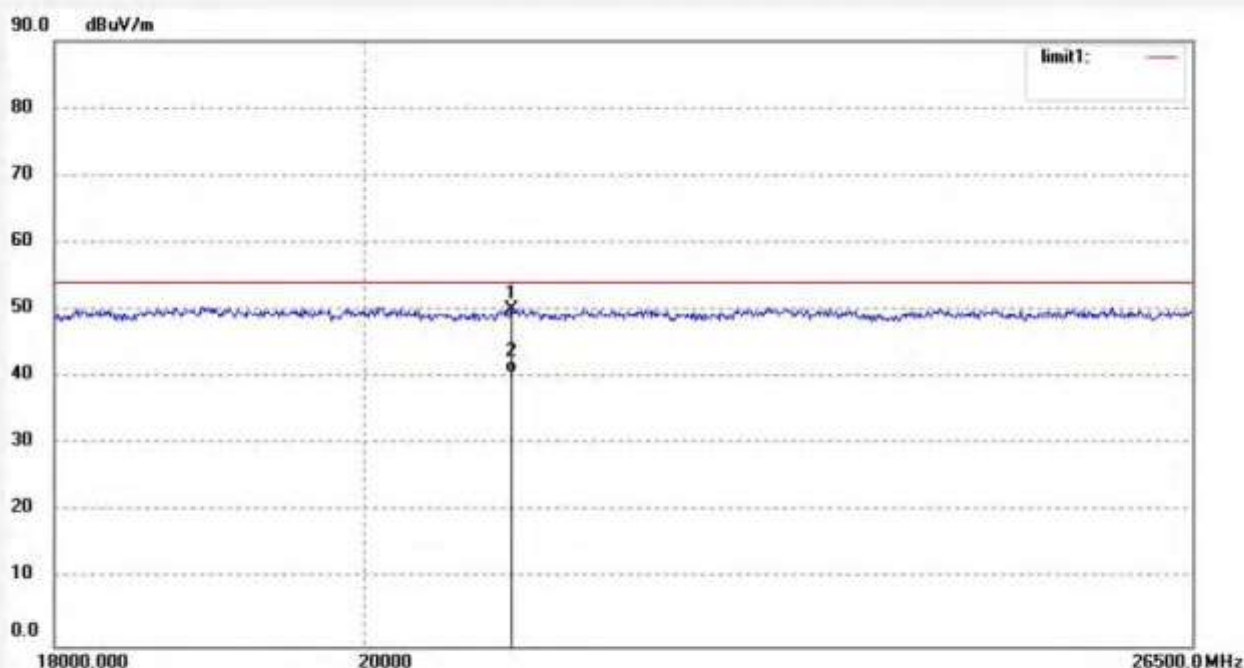
Date: 19/04/17/

Time:

Engineer Signature: WADE

Distance: 3m

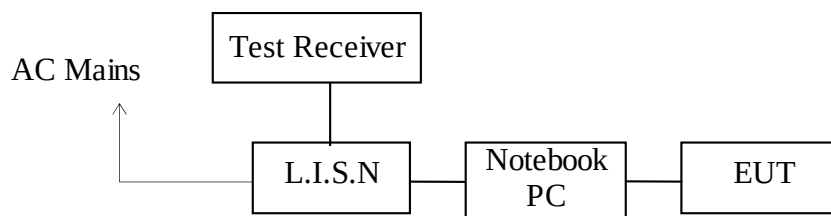
Note:



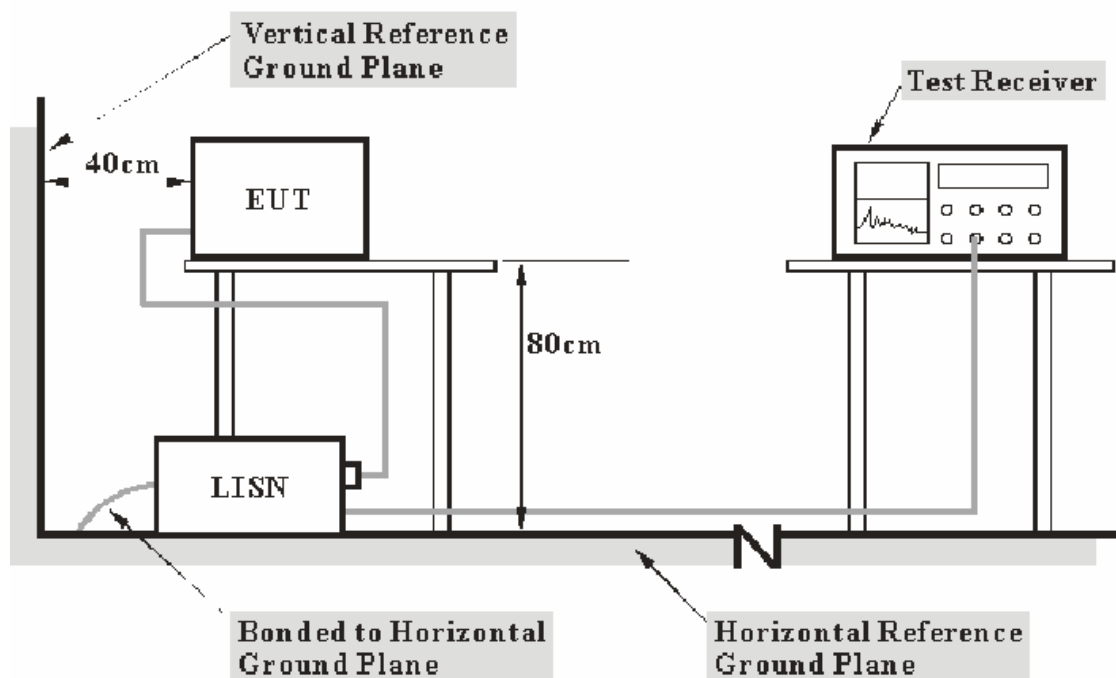
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	21027.992	17.65	32.36	50.01	74.00	-23.99	peak			
2	21027.992	8.15	32.36	40.51	54.00	-13.49	AVG			

10.AC POWER LINE CONDUCTED EMISSION TEST

10.1. Block Diagram of Test Setup



10.2. Test System Setup



- 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.

10.3. The Limits for FCC Section 15.207 & RSS-Gen Section 8.8

Frequency (MHz)	Limit dB(μ V)	
	Quasi-peak Level	Average Level
0.15 - 0.50	66.0 – 56.0 *	56.0 – 46.0 *
0.50 - 5.00	56.0	46.0
5.00 - 30.00	60.0	50.0
NOTE1: The lower limit shall apply at the transition frequencies.		
NOTE2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.		

10.4. Configuration of EUT on Measurement

The equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner, which tends to maximize its emission characteristics in a normal application.

10.5. Operating Condition of EUT

10.5.1. Setup the EUT and simulator as shown as Section 10.1.

10.5.2. Turn on the power of all equipment.

10.5.3. Let the EUT work in test mode and measure it.

10.6. Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.4: 2014 on Conducted Emission Measurement.

The bandwidth of test receiver (R & S ESCS30) is set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

10.7. Data Sample

Frequency (MHz)	Transducer value (dB)	QuasiPeak Level (dBμV)	Average Level (dBμV)	QuasiPeak Limit (dBμV)	Average Limit (dBμV)	QuasiPeak Margin (dB)	Average Margin (dB)	Remark (Pass/Fail)
X.XX	10.5	51.1	34.2	56.0	46.0	4.9	11.8	Pass

Frequency(MHz) = Emission frequency in MHz

Transducer value(dB) = Insertion loss of LISN + Cable Loss

Level(dBμV) = Quasi-peak Reading/Average Reading + Transducer value

Limit (dBμV) = Limit stated in standard

Margin = Limit (dBμV) - Level (dBμV)

Calculation Formula:

Margin = Limit (dBμV) - Level (dBμV)

10.8. Test Results

PASS.

The frequency range from 150kHz to 30MHz is checked.

Emissions attenuated more than 20 dB below the permissible value are not reported.

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

The spectral diagrams are attached as below.

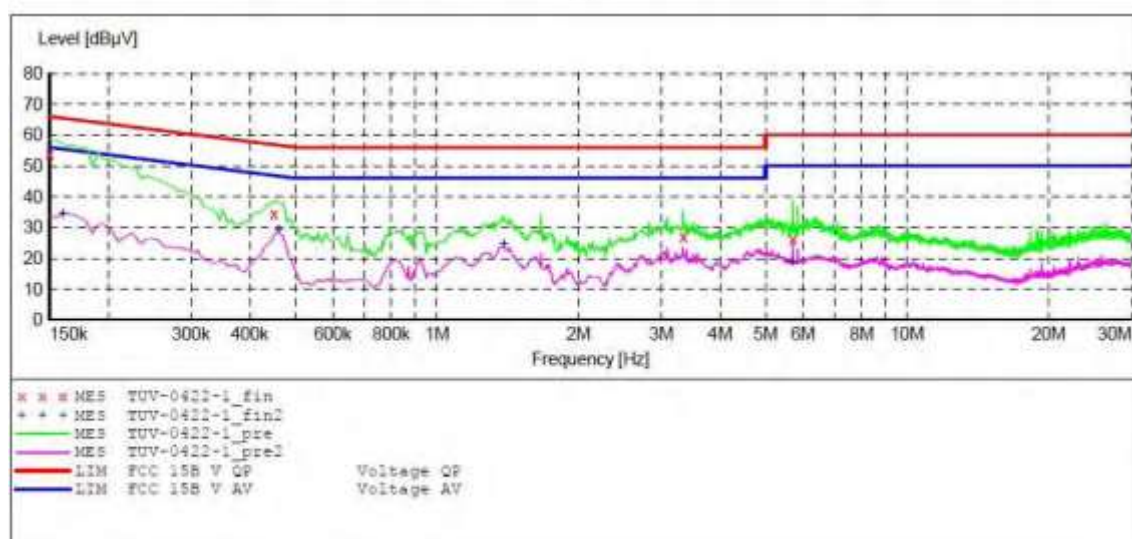
ACCURATE TECHNOLOGY CO., LTD

CONDUCTED EMISSION STANDARD FCC PART 15 C

EUT: Motor actuator M/N:Z1801
 Manufacturer: Shanghai Chuangdou Technology Co., Ltd.
 Operating Condition: Wireless communication
 Test Site: 1#Shielding Room
 Operator: WADE
 Test Specification: L 120V/60Hz
 Comment:
 Start of Test: 4/22/2019 /

SCAN TABLE: "V 9K-30MHz fin"

Short Description: _SUB_STD_VTERM2 1.70
 Start Stop Step Detector Meas. IF Transducer
 Frequency Frequency Width Time Bandw.
 9.0 kHz 150.0 kHz 100.0 Hz QuasiPeak 1.0 s 200 Hz NSLK8126 2008
 Average
 150.0 kHz 30.0 MHz 5.0 kHz QuasiPeak 1.0 s 9 kHz NSLK8126 2008
 Average



MEASUREMENT RESULT: "TUV-0422-1_fin"

4/22/2019

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.150000	54.00	10.5	66	12.0	QP	L1	GND
0.450000	34.40	10.7	57	22.5	QP	L1	GND
3.340000	26.80	11.1	56	29.2	QP	L1	GND
5.710000	26.20	11.2	60	33.8	QP	L1	GND

MEASUREMENT RESULT: "TUV-0422-1_fin2"

4/22/2019

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.160000	34.20	10.5	56	21.3	AV	L1	GND
0.460000	29.50	10.7	47	17.2	AV	L1	GND
1.385000	24.70	10.9	46	21.3	AV	L1	GND
5.710000	18.80	11.2	50	31.2	AV	L1	GND

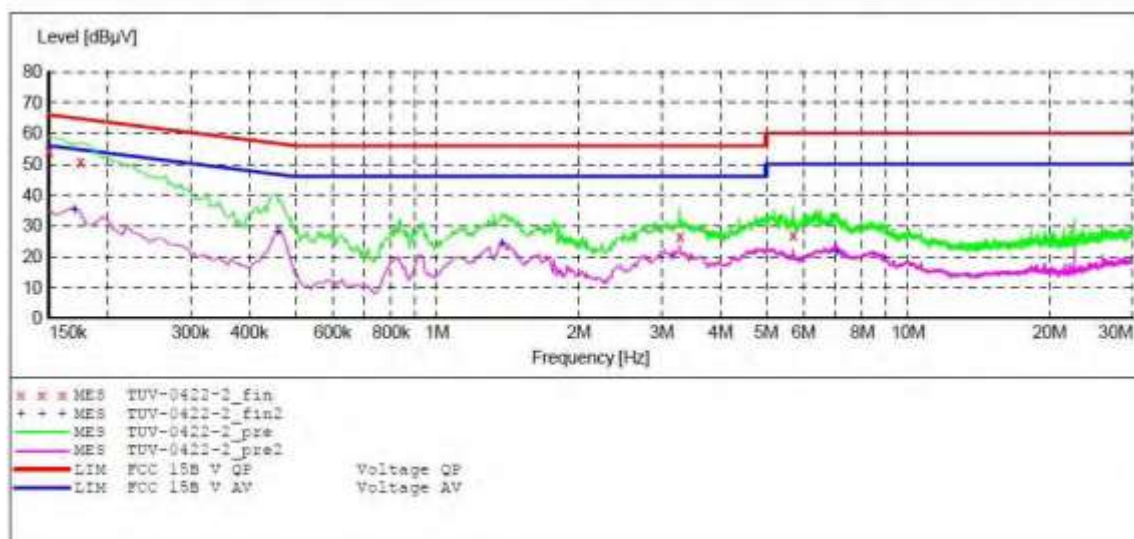
ACCURATE TECHNOLOGY CO., LTD

CONDUCTED EMISSION STANDARD FCC PART 15 C

EUT: Motor actuator M/N:Z1801
 Manufacturer: Shanghai Chuangdou Technology Co., Ltd.
 Operating Condition: Wireless communication
 Test Site: 1#Shielding Room
 Operator: WADE
 Test Specification: N 120V/60Hz
 Comment: Mains port
 Start of Test: 4/22/2019 /

SCAN TABLE: "V 9K-30MHz fin"

Short Description: _SUB_STD_VTERM2 1.70
 Start Stop Step Detector Meas. IF Transducer
 Frequency Frequency Width Time Bandw.
 9.0 kHz 150.0 kHz 100.0 Hz QuasiPeak 1.0 s 200 Hz NSLK8126 2008
 Average
 150.0 kHz 30.0 MHz 5.0 kHz QuasiPeak 1.0 s 9 kHz NSLK8126 2008
 Average



MEASUREMENT RESULT: "TUV-0422-2_fin"

4/22/2019

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.150000	54.20	10.5	66	11.8	QP	N	GND
0.175000	50.70	10.5	65	14.0	QP	N	GND
3.280000	26.60	11.1	56	29.4	QP	N	GND
5.700000	27.10	11.2	60	32.9	QP	N	GND

MEASUREMENT RESULT: "TUV-0422-2_fin2"

4/22/2019

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.170000	35.20	10.5	55	19.8	AV	N	GND
0.460000	28.00	10.7	47	18.7	AV	N	GND
1.375000	24.30	10.9	46	21.7	AV	N	GND
7.050000	21.60	11.2	50	28.4	AV	N	GND

11.ANTENNA REQUIREMENT

11.1. The Requirement

According to Section 15.203 and RSS GEN 6.8, 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.

11.2. Antenna Construction

Device is equipped with permanent attached antenna, which isn't displaced by other antenna. The Antenna gain of EUT is 0.5dBi. Therefore, the equipment complies with the antenna requirement of Section 15.203 and RSS GEN 6.8

******* End of Test Report *******