TEST REPORT

Applicant:	Daimler(Hebei) Hoisting Machinery Manufacturing Co., Ltd
Address of Applicant:	Donglv Industrial Park,Qingyuan District,Baoding,Hebei,China
Manufacturer/Factory:	Daimler(Hebei) Hoisting Machinery Manufacturing Co., Ltd
Address of Manufacturer/Factory:	Donglv Industrial Park,Qingyuan District,Baoding,Hebei,China
Equipment Under Test (EUT)	
Product Name:	Wireless remote control
Model No.:	YT440-1, YX440-1, YX880-1, YX1320-1, YX1760-1, YX2200-1, WX440-1, WX880-1, WX1320-1, WX2200-1, YX550-2, YX1320-2, YX2200-2, WX550-2, WX880-2, WX1320-2, WX1760-2, WX2200-2, WX4400LBS-2, WX2200LBS-2, WX1100LBS-2, 330LBS, 1100LBS, 2200LBS, 2200LBS, 550LBS, 660LBS, 880LBS, 1320LBS, 1760LBS, 440LBS, PA200, PA250, PA300, PA400, PA500, PA600, PA800, PA900, PA1000, PA1200, 0.3T, 0.5T, 1T, 2T, 3T, 5T, 10T, 7.5T, 15T, 20T, 25T, 30T, 35T, 50T, 75T
FCC ID:	2BAAL-DML0312
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.231
Date of sample receipt:	February 20, 2023
Date of Test:	February 21, 2023-March 20, 2023
Date of report issued:	March 20, 2023
Test Result :	PASS *

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

Authorized Signature:

深圳市环球众一科技有限公司 Global United Technology Services Co., Ltd. 检验检测专用章 Inspection&Testing Services

Robinson Luo
Laboratory Manager

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

2 Version

Version No.	Date	Description
01	*March 20, 2023*	*Original*

Prepared By: ***Date:*** *March 20, 2023*

Project Engineer

Check By: ***Date:*** *March 20, 2023*

Reviewer

3 Contents

Page

1 COVER PAGE 1

2 VERSION 2

3 CONTENTS 3

4 TEST SUMMARY 4

4.1 MEASUREMENT UNCERTAINTY 4

5 GENERAL INFORMATION 5

5.1 GENERAL DESCRIPTION OF EUT 5
5.2 TEST MODE 6
5.3 DESCRIPTION OF SUPPORT UNITS 6
5.4 TEST FACILITY 6
5.5 TEST LOCATION 6
5.6 OTHER INFORMATION REQUESTED BY THE CUSTOMER 6
5.7 ADDITIONAL INSTRUCTIONS 6

6 TEST INSTRUMENTS LIST 7

7 TEST RESULTS AND MEASUREMENT DATA 9

7.1 ANTENNA REQUIREMENT 9
7.2 RADIATED EMISSION METHOD 10
7.2.1 Field Strength of The Fundamental Signal 12
7.2.2 Spurious Emissions 14
7.3 20DB OCCUPY BANDWIDTH 18
7.4 DEACTIVATION TESTING 19

8 TEST SETUP PHOTO 20

9 EUT CONSTRUCTIONAL DETAILS 20

4 Test Summary

Test Item	Section in CFR 47	Result
Antenna Requirement	15.203	Pass
Conduction Emission	15.207	N/A
Field strength of the Fundamental Signal	15.231 (b)	Pass
Spurious Emissions	15.231 (b)/15.209	Pass
20dB Bandwidth	15.231 (c)	Pass
Deactivation Testing	15.231 (a)(1)	Pass

Pass: The EUT complies with the essential requirements in the standard.

N/A: Not applicable.

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	30MHz-200MHz	3.8039dB	(1)
Radiated Emission	200MHz-1GHz	3.9679dB	(1)
Radiated Emission	1GHz-18GHz	4.29dB	(1)
Radiated Emission	18GHz-40GHz	3.30dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	3.44dB	(1)
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.			

5 General Information

5.1 General Description of EUT

Product Name:	Wireless remote control
Model No.:	YT440-1, YX440-1, YX880-1, YX1320-1, YX1760-1, YX2200-1, WX440-1, WX880-1, WX1320-1, WX2200-1, YX550-2, YX1320-2, YX2200-2, WX550-2, WX880-2, WX1320-2, WX1760-2, WX2200-2, WX4400LBS-2, WX2200LBS-2, WX1100LBS-2, 330LBS, 1100LBS, 2200LBS, 2200LBS, 550LBS, 660LBS, 880LBS, 1320LBS, 1760LBS, 440LBS, PA200, PA250, PA300, PA400, PA500, PA600, PA800, PA900, PA1000, PA1200, 0.3T, 0.5T, 1T, 2T, 3T, 5T, 10T, 7.5T, 15T, 20T, 25T, 30T, 35T, 50T, 75T
Test Model No:	YT440-1
Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The differences are appearance color and model name for commercial purpose.	
S/N:	YT440-1
Test sample(s) ID:	GTS2023020245-1
Sample(s) Status:	Engineer sample
Operation Frequency:	868.3MHz
Modulation technology:	FSK
Antenna Type:	Copper Spring Antenna
Antenna gain:	2.5dBi(declare by applicant)
Power supply:	DC 3V(2*1.5V Size“AAA” Battery)

5.2 Test mode

Transmitting mode	Keep the EUT in transmitting mode. The new battery used

Per-test mode.

We have verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which only the worst case was shown in this test report and defined as follows:

868.3MHz	Axis	X	Y	Z
	Field Strength(dBuV/m)	87.23	87.58	86.85

5.3 Description of Support Units

None.

5.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC —Registration No.: 381383**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 381383.

- **IC —Registration No.: 9079A**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A.

- **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

5.5 Test Location

All tests were performed at:

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

5.6 Other Information Requested by the Customer

None.

5.7 Additional Instructions

EUT Software Settings:

Mode	Continuously transmitter by manufacturer, power set default

6 Test Instruments list

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)*6.4(H)	GTS250	July 02, 2020	July 01, 2025
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)*2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	April 22, 2022	April 21, 2023
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9168	GTS640	March 21, 2022	March 20, 2023
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June 12, 2022	June 11, 2023
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June 23, 2022	June 22, 2023
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	April 22, 2022	April 21, 2023
9	Coaxial Cable	GTS	N/A	GTS211	April 22, 2022	April 21, 2023
10	Coaxial cable	GTS	N/A	GTS210	April 22, 2022	April 21, 2023
11	Coaxial Cable	GTS	N/A	GTS212	April 22, 2022	April 21, 2023
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	April 22, 2022	April 21, 2023
13	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 23, 2022	June 22, 2023
14	Band filter	Amindeon	82346	GTS219	June 23, 2022	June 22, 2023
15	Power Meter	Anritsu	ML2495A	GTS540	June 23, 2022	June 22, 2023
16	Power Sensor	Anritsu	MA2411B	GTS541	June 23, 2022	June 22, 2023
17	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	April 22, 2022	April 21, 2023
18	Splitter	Agilent	11636B	GTS237	June 23, 2022	June 22, 2023
19	Loop Antenna	ZHINAN	ZN30900A	GTS534	Nov. 29, 2022	Nov. 28, 2023
20	Broadband Preamplifier	SCHWARZBECK	BBV9718	GTS535	April 22, 2022	April 21, 2023
21	Breitband hornantenna	SCHWARZBECK	BBHA 9170	GTS579	Oct. 16, 2022	Oct. 15, 2023
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 16, 2022	Oct. 15, 2023
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 16, 2022	Oct. 15, 2023
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June 23, 2022	June 22, 2023
25	Amplifier(1GHz-26.5GHz)	HP	8449B	GTS601	April 22, 2022	April 21, 2023

RF Conducted Test:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	April 22, 2022	April 21, 2023
2	EMI Test Receiver	R&S	ESCI 7	GTS552	April 22, 2022	April 21, 2023
3	Spectrum Analyzer	Agilent	E4440A	GTS536	April 22, 2022	April 21, 2023
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	April 22, 2022	April 21, 2023
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	April 22, 2022	April 21, 2023
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	April 22, 2022	April 21, 2023
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	April 22, 2022	April 21, 2023
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	April 22, 2022	April 21, 2023

General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	April 25, 2022	April 24, 2023
2	Barometer	KUMAO	SF132	GTS647	July 26, 2022	July 25, 2023

7 Test results and Measurement Data

7.1 Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.	
EUT Antenna:	
The antenna is copper spring antenna, reference to the appendix II for details.	

7.2 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.231 (b)& Section 15.209
Test Method:	ANSI C63.10:2013
Test Frequency Range:	9kHz to 6000MHz
Test site:	Measurement Distance: 3m

Receiver setup:

Frequency	Detector	RBW	VBW	Value
9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

Limit:
(Field strength of the fundamental signal)

Frequency	Limit (dBuV/m @3m)	Remark
868.3MHz	101.94	Peak Value
	81.94	Average Value

Limit:
(Spurious Emissions)

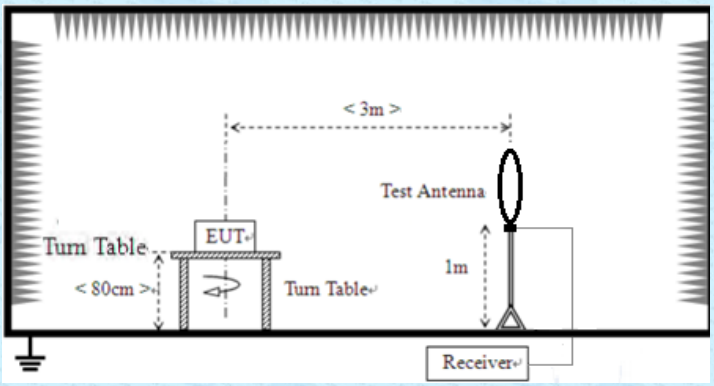
Fundamental Frequency (MHz)	Field Strength of fundamental (microvolts/meter)	Field Strength of Unwanted Emissions (microvolts/meter)
40.66-40.70	2250	225
70-130	1250	125
130-174	1250 to 3750**	125 to 735
174-260	3750	375
260-470	3750 to12500	375 to 1250
Above 470	12500	1250

Frequency (MHz)	Class B(dBuV/m @3m)	
	Peak	Average
Above 1000	74	54

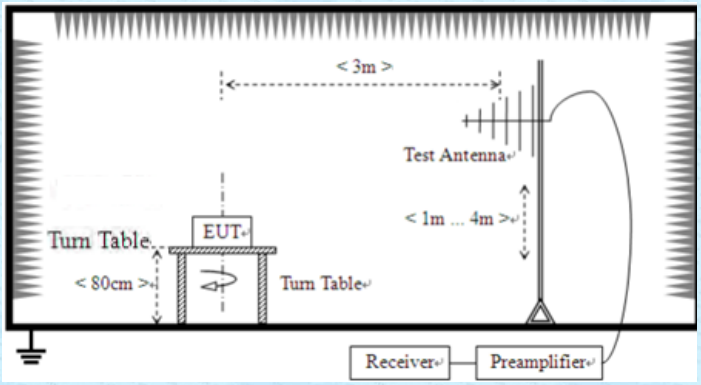
Or The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level whichever limit permits higher field strength.

Test setup:

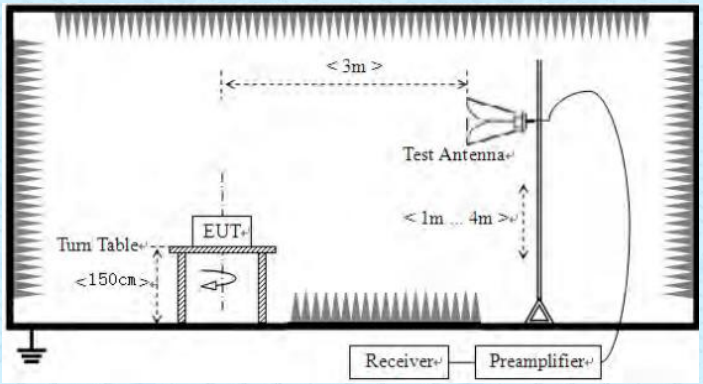
Below 30MHz



Below 1GHz



Above 1GHz



Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test environment:	Temp.:	25 °C	Humid.:	50%	Press.:	1 010mbar
Test voltage:	DC 3V					
Test results:	Pass					

Measurement data:

7.2.1 Field Strength of The Fundamental Signal

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
868.3	89.32	23.53	4.73	30	87.58	101.94	-14.36	Horizontal
868.3	87.64	23.53	4.73	30	85.90	101.94	-16.04	Vertical

Average value:

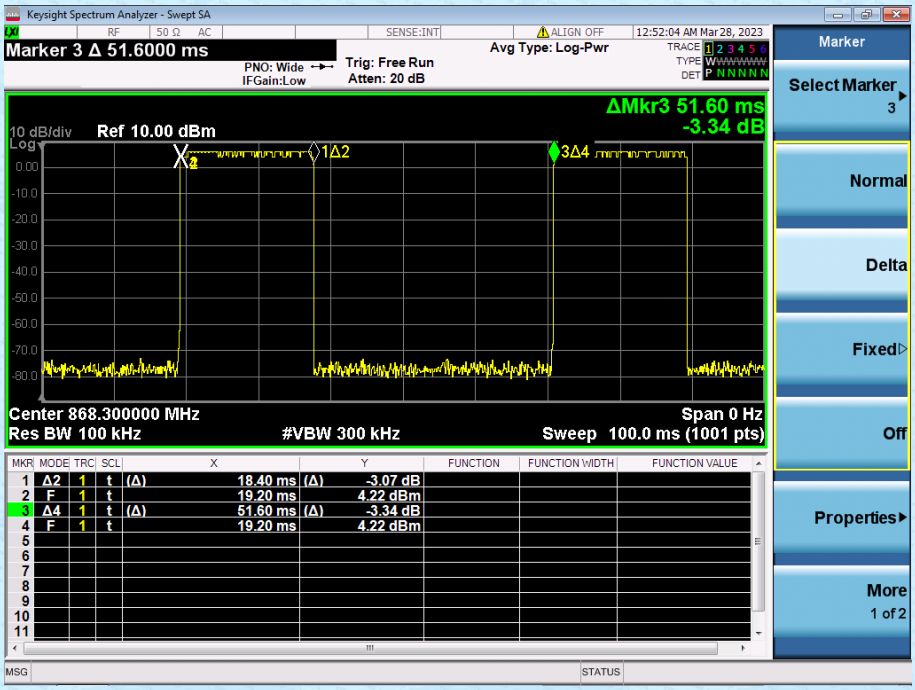
Frequency (MHz)	Peak Value (dBuV/m)	Duty cycle factor	Average value (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
868.3	87.58	-8.96	78.62	81.94	-3.32	Horizontal
868.3	85.90	-8.96	76.94	81.94	-5.00	Vertical

Remarks:

1. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

Average value:	
Calculate Formula:	Average value=Peak value + Duty Cycle Factor
	Duty cycle factor=20 log(Duty cycle)
	Duty cycle=on time/100 milliseconds or period, whichever is less
Test data:	T on time =18.4(ms)
	T period =51.6(ms)
	Duty cycle=0.357
	duty cycle factor=-8.96

Test plot as follows:



7.2.2 Spurious Emissions

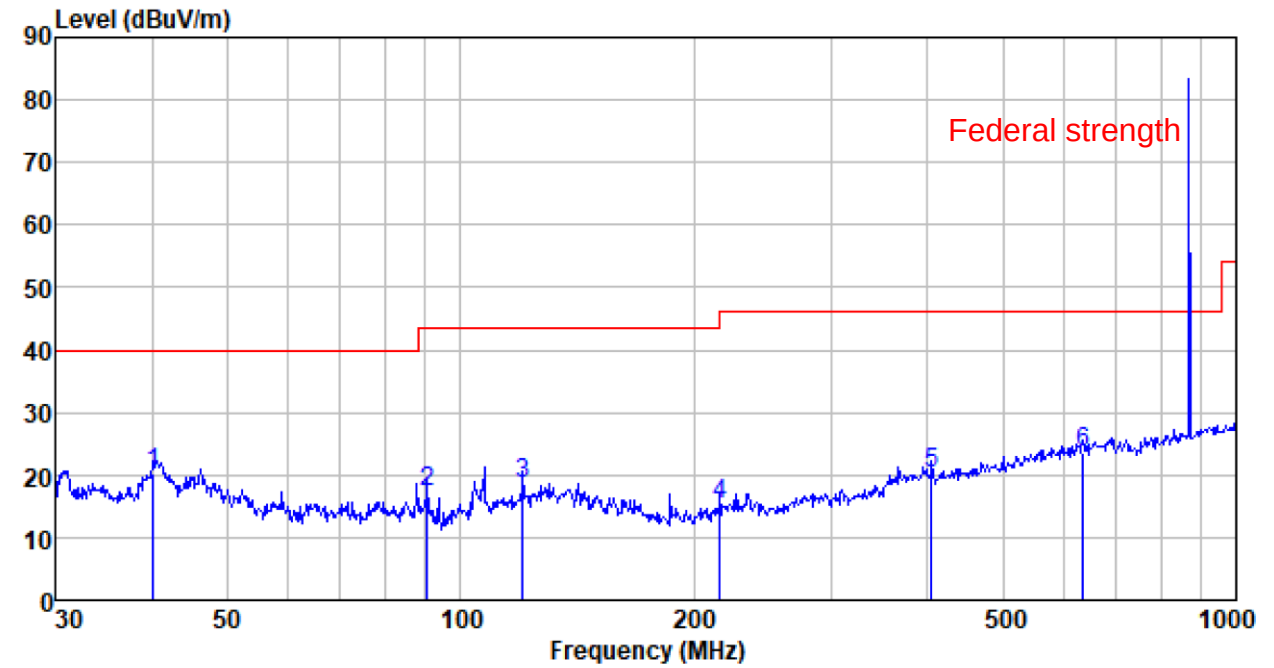
Measurement data:

9 kHz ~ 30 MHz

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

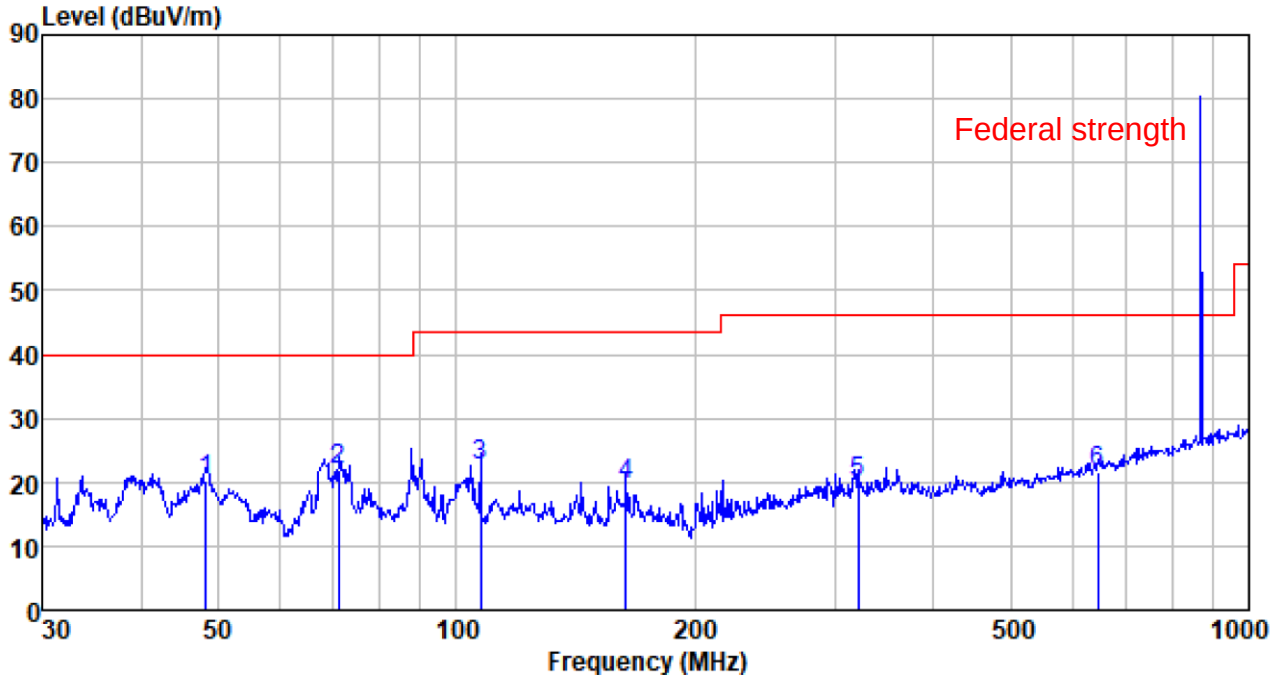
Below 1GHz:

Mode:	**Transmitting mode**	**Polarization:**	**Horizontal**



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
40.135	36.20	13.50	0.66	30.00	20.36	40.00	-19.64	QP
90.537	37.46	8.66	1.11	30.00	17.23	43.50	-26.27	QP
120.277	35.96	11.22	1.36	30.00	18.54	43.50	-24.96	QP
216.024	33.11	10.09	1.93	30.00	15.13	46.00	-30.87	QP
404.667	31.63	15.80	2.88	30.00	20.31	46.00	-25.69	QP
633.907	29.80	19.83	3.85	30.00	23.48	46.00	-22.52	QP

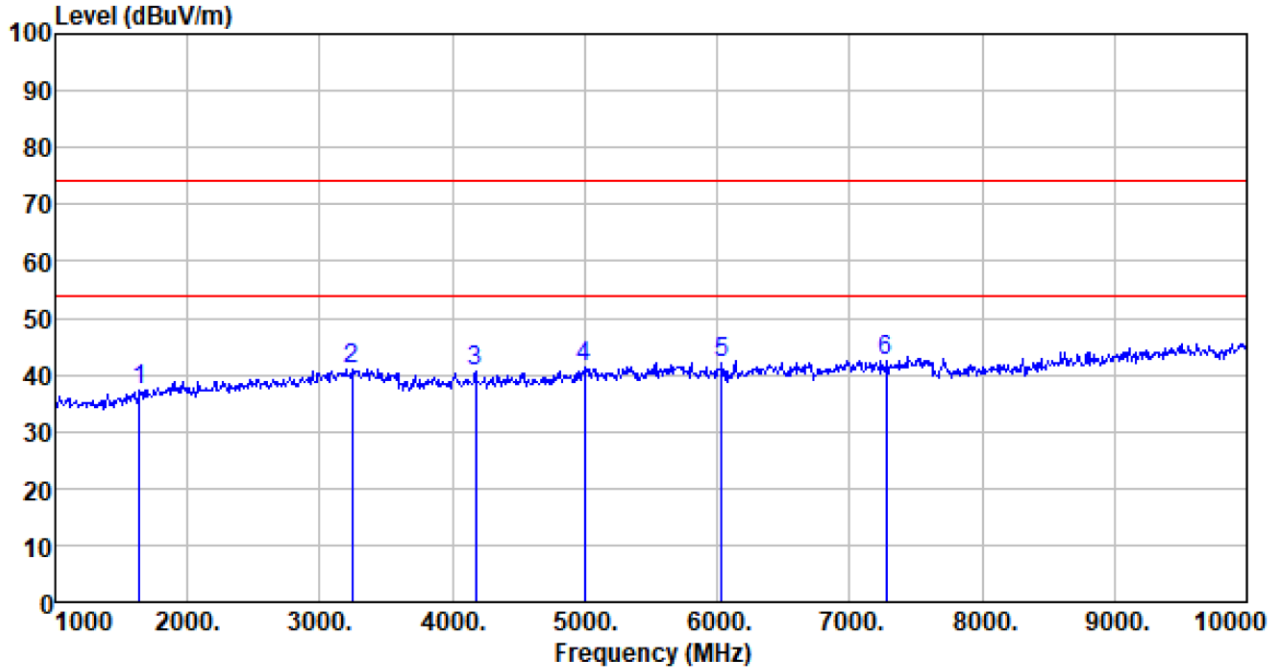
Mode:	Transmitting mode	Polarization:	Vertical



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
48.332	36.20	13.25	0.75	30.00	20.20	40.00	-19.80	QP
71.080	40.76	10.32	0.95	30.00	22.03	40.00	-17.97	QP
107.134	40.90	10.27	1.25	30.00	22.42	43.50	-21.08	QP
163.755	35.76	12.15	1.65	30.00	19.56	43.50	-23.94	QP
321.061	34.38	13.18	2.47	30.00	20.03	46.00	-25.97	QP
645.120	27.79	20.01	3.89	30.00	21.69	46.00	-24.31	QP

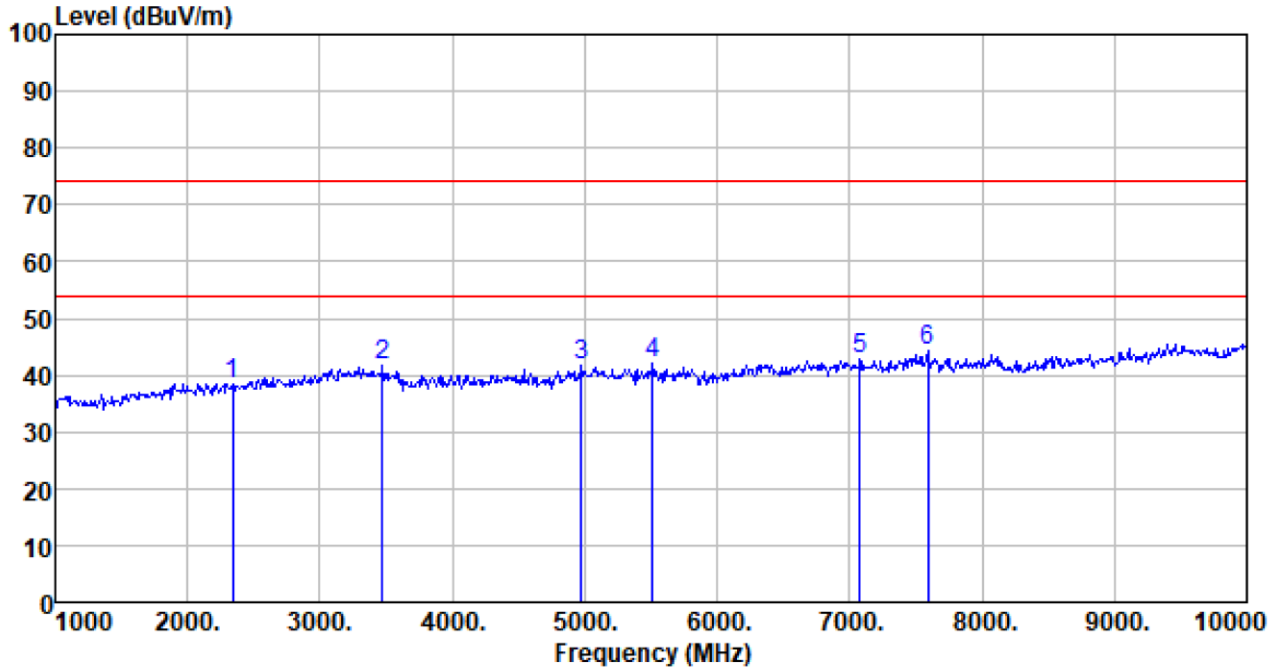
Above 1G:

Mode:	**Transmitting mode**	**Polarization:**	**Horizontal**



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
1639.000	48.30	25.32	2.37	38.69	37.30	74.00	-36.70	Peak
3241.000	47.29	28.60	3.62	38.55	40.96	74.00	-33.04	Peak
4177.000	45.28	29.62	4.00	38.24	40.66	74.00	-33.34	Peak
4996.000	43.14	31.59	4.83	38.40	41.16	74.00	-32.84	Peak
6031.000	42.57	32.61	5.62	38.71	42.09	74.00	-31.91	Peak
7273.000	38.91	36.05	6.57	38.98	42.55	74.00	-31.45	Peak

Mode:	Transmitting mode	Polarization:	Vertical

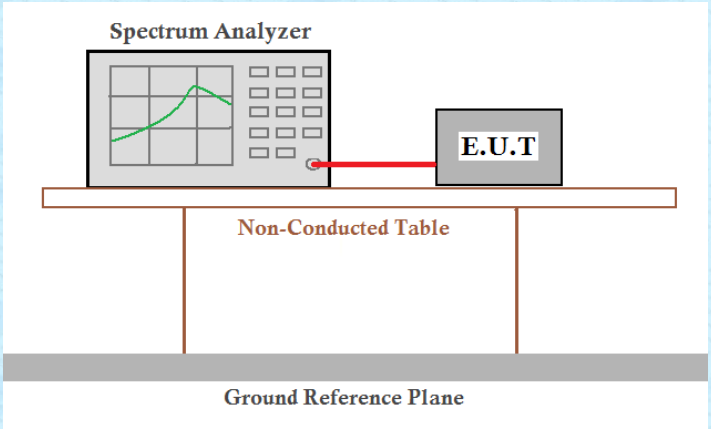


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2341.000	47.01	27.21	2.85	38.54	38.53	74.00	-35.47	Peak
3475.000	47.97	28.60	3.72	38.51	41.78	74.00	-32.22	Peak
4978.000	43.85	31.54	4.81	38.40	41.80	74.00	-32.20	Peak
5509.000	43.08	32.30	5.23	38.60	42.01	74.00	-31.99	Peak
7075.000	39.63	35.65	6.32	38.92	42.68	74.00	-31.32	Peak
7588.000	39.99	36.43	6.81	39.08	44.15	74.00	-29.85	Peak

Remarks:

2. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

7.3 20dB Occupy Bandwidth

Test Requirement:	FCC Part15 C Section 15.231 (c)
Test Method:	ANSI C63.10:2013
Limit:	The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

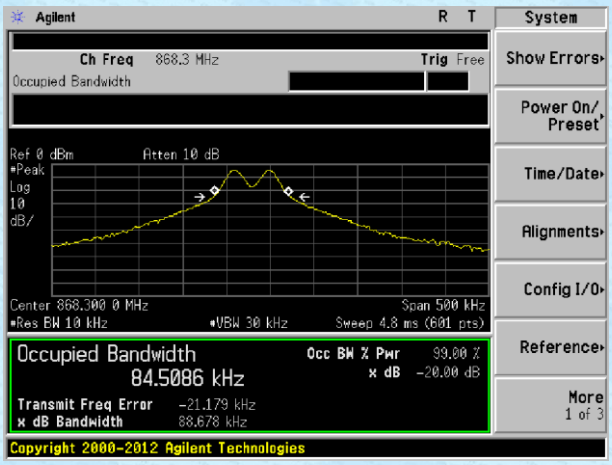
Measurement Data

Test Frequency (MHz)	20dB bandwidth (kHz)	Limit (MHz)	Result
868.3	88.678	2.1708	Pass

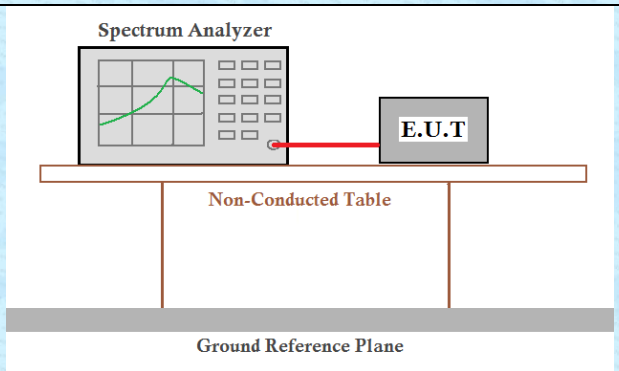
Note: Limit= Fundamental frequency×0.25%

868.3×0.25%=2.1708MHz

Test plot as follows:



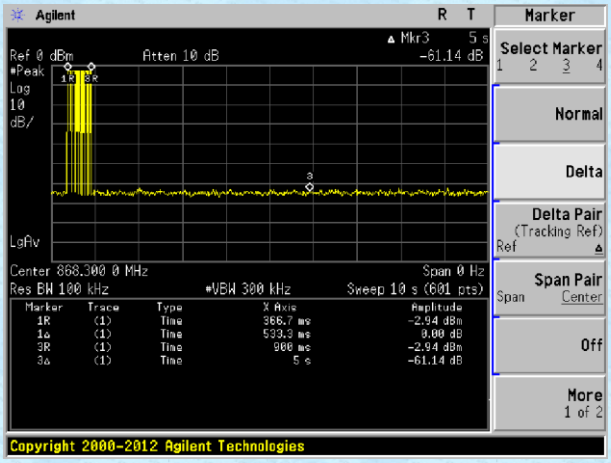
7.4 Deactivation Testing

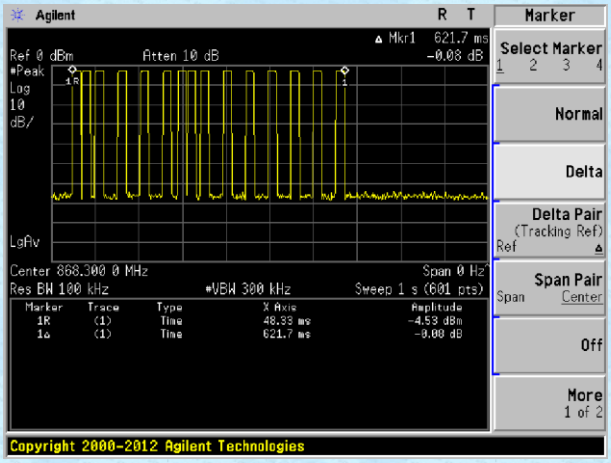
Test Requirement:	FCC Part15 C Section 15.231 (a)(1)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=1MHz, VBW=1MHz, span=0Hz, detector: Peak
Limit:	Not more than 5 seconds
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement data:

Frequency (MHz)	Duration of each TX (ms)	Limit (second)	Result
868.3	621.7	<5.0	Pass

Test plot as follows:





8 Test Setup Photo

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

9 EUT Constructional Details

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

------ End ------