

# FCC PART 15 SUBPART B

## MEASUREMENT AND TEST REPORT

For

**Gholamali Malekpour**

**Product description:** Remote Control for Window Blinds  
**Model No.:** DL-CS2017L,DL-CS2017A, DL-CS2017B  
**Supplementary Model:** DL-CS2017L,DL-CS2017A, DL-CS2017B  
**FCC ID:** RA7- DL-1251AR

**Prepared for:** **Gholamali Malekpour**

10531 4s Commons #166-411, San Diego, California 92127

**Prepared by:** **Bontek Compliance Laboratory Ltd**

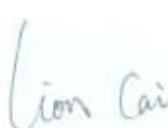
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**Report No.:** BCT12KR-2043E-1

**Issue Date:** November 28, 2012

**Test Date:** November 7~28, 2012

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Kevin Chi

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## **1 - GENERAL INFORMATION**

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### **1.1 Product Description for Equipment Under Test (EUT)**

#### Client Information

Applicant: **Gholamali Malekpour**  
Address of applicant: 10531 4s Commons #166-411, San Diego, California 92127  
Manufacturer: **Gholamali Malekpour**  
Address of manufacturer: 10531 4s Commons #166-411, San Diego, California 92127

#### General Description of E.U.T

EUT Description: Remote Control for Window Blinds  
Model No.: DL-CS2017L,DL-CS2017A, DL-CS2017B  
Supplementary Model: DL-CS2017L,DL-CS2017A, DL-CS2017B  
Trade Mark: N/A  
Rated Voltage: DC 6V from

### **1.2 Test Standards**

The following Declaration of Conformity report of EUT is prepared in accordance with  
FCC Rules and Regulations Part 15 Subpart B 2006

The objective of the manufacturer is to demonstrate compliance with the described above standards.

### 1.3 Test Summary

For the EUT described above. The standards used were FCC Part 15 Subpart B for Emissions

Table 1 : Tests Carried Out Under FCC Part 15 Subpart B

Standard	Test Items	Status
FCC Part 15 Subpart B	Conduction Emission, 0.15MHz to 30MHz	✓
FCC Part 15 Subpart B	Radiation Emission, 30MHz to 1000MHz	✓

✓ Indicates that the test is applicable  
✗ Indicates that the test is not applicable

### 1.4 Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

The maximum emission levels emanating from the device are compared to the FCC Part 15 Subpart B limits for radiation emissions and the measurement results contained in this test report show that EUT is to be technically compliant with FCC requirements.

All measurement required was performed at Shenzhen Bontek Compliance Testing Laboratory Co., Ltd at 1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China

## **1.5 Test Facility**

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

### **FCC – Registration No.: 338263**

Shenzhen Bontek Compliance Testing Laboratory Co., Ltd , 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 our files. Registration 338263, March 03, 2011.

### **IC Registration No.: 7631A**

The 3m alternate test site of Shenzhen Bontek Compliance Testing Laboratory Co., Ltd EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 7631A on January 25,2011.

### **CNAS - Registration No.: L3923**

Shenzhen Bontek Compliance Testing Laboratory Co., Ltd to ISO/IEC 17025:25 General Requirements for the Competence of Testing and Calibration Laboratories(CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

The acceptance letter from the CNAS is maintained in our files: Registration:L3923, March 22, 2012.

### **TUV - Registration No.: UA 50203122-0001**

Shenzhen Bontek Compliance Testing Laboratory Co., Ltd. An assessment of the laboratory was conducted according to the"Procedures and Conditions for EMC Test Laboratories"with reference to EN ISO/IEC 17025 by a TUV Rheinland auditor. Audit Report NO. 17010783-002.

## 1.6 Test Equipment List and Details

Test equipments list of Shenzhen Bontek Compliance Testing Laboratory Co., Ltd .

No.	Instrument no.	Equipment	Manufacturer	Model No.	S/N	Last Calculator	Due Calculator
1	BCT-EMC001	EMI Test Receiver	R&S	ESCI	100687	2012-4-17	2013-4-16
2	BCT-EMC002	EMI Test Receiver	R&S	ESPI	100097	2012-11-1	2013-10-31
3	BCT-EMC003	Amplifier	HP	8447D	1937A02492	2012-4-20	2013-4-19
4	BCT-EMC004	Single Power Conductor Module	R&S	NNBM 8124	242	2012-4-20	2013-4-19
5	BCT-EMC005	Single Power Conductor Module	R&S	NNBM 8124	243	2012-4-20	2013-4-19
6	BCT-EMC006	Power Clamp	SCHWARZBECK	MDS-21	3812	2012-11-5	2013-11-4
7	BCT-EMC007	Positioning Controller	C&C	CC-C-1F	MF7802113	N/A	N/A
8	BCT-EMC008	Electrostatic Discharge Simulator	TESEQ	NSG437	125	2012-11-2	2013-11-1
9	BCT-EMC009	Fast Transient Burst Generator	SCHAFFNER	MODULA6150	34572	2012-4-17	2013-4-16
10	BCT-EMC010	Fast Transient Noise Simulator	Noiseken	FNS-105AX	10501	2012-6-26	2013-6-25
11	BCT-EMC011	Color TV Pattern Generator	PHILIPS	PM5418	TM209947	N/A	N/A
12	BCT-EMC012	Power Frequency Magnetic Field Generator	EVERFINE	EMS61000-8K	608002	2012-4-17	2013-4-16
14	BCT-EMC014	Capacitive Coupling Clamp	TESEQ	CDN8014	25096	2012-4-17	2013-4-16
15	BCT-EMC015	High Field Biconical Antenna	ELECTRO-METRICS	EM-6913	166	2011-11-28	2013-11-27
16	BCT-EMC016	Log Periodic Antenna	ELECTRO-METRICS	EM-6950	811	2011-11-28	2013-11-27
17	BCT-EMC017	Remote Active Vertical Antenna	ELECTRO-METRICS	EM-6892	304	2011-11-28	2013-11-27
18	BCT-EMC018	TRILOG Broadband Test-Antenna	SCHWARZBECK	VULB9163	9163-324	2012-5-19	2014-5-18
19	BCT-EMC019	Horn Antenna	SCHWARZBECK	BBHA9120A	0499	2011-11-28	2013-11-27
20	BCT-EMC020	Teo Line Single Phase Module	SCHWARZBECK	NSLK8128	8128247	2012-11-1	2013-10-31
21	BCT-EMC021	Triple-Loop Antenna	EVERFINE	LLA-2	711002	2012-11-15	2013-11-14
22	BCT-EMC022	Electric bridge	Jhai	JK2812C	803024	N/A	N/A
23	BCT-EMC026	RF POWER AMPLIFIER	FRANKONIA	FLL-75	1020A1109	2012-4-17	2013-4-16
24	BCT-EMC027	CDN	FRANKONIA	CDN M2+M3	A3027019	2012-4-17	2013-4-16
25	BCT-EMC029	6DB Attenuator	FRANKONIA	N/A	1001698	2012-4-17	2013-4-16

26	BCT-EMC030	EM Injection clamp	FCC	F-203I-23mm	091536	2012-4-17	2013-4-16
27	BCT-EMC031	9kHz-2.4GHz signal generator 2024	MARCONI	10S/6625-99-457-8730	112260/042	2012-4-17	2013-4-16
28	BCT-EMC032	10dB attenuator	ELECTRO-METRICS	EM-7600	836	2012-4-17	2013-4-16
29	BCT-EMC033	ISN	TESEQ	ISN-T800	30301	2012-11-15	2013-11-14
30	BCT-EMC034	10KV surge generator	SANKI	SKS-0510M	048110003E 321	2012-11-01	2013-10-31
31	BCT-EMC035	HRMONICS&FLICK RE ANALYSER	VOLTECH	PM6000	200006700433	2012-11-20	2013-11-19
32	BCT-EMC036	Spectrum Analyzer	R&S	FSP	100397	2012-11-1	2013-10-31
33	BCT-EMC037	Broadband preamplifier	SCH WARZBECK	BBV9718	9718-182	2012-4-20	2013-4-19

## **2 - SYSTEM TEST CONFIGURATION**

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### **2.1 Justification**

The system was configured for testing in a typical fashion (as only used by a typical user).

### **2.2 EUT Exercise Software**

The EUT exercising program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The software offered by manufacture, can let the EUT being ON operation.

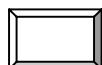
### **2.3 Special Accessories**

As shown in section 2.5, interface cable used for compliance testing is shielded as normally supplied by **Shenzhen YIDONG Technology Co., Ltd** and its respective support equipment manufacturers.

### **2.4 Equipment Modifications**

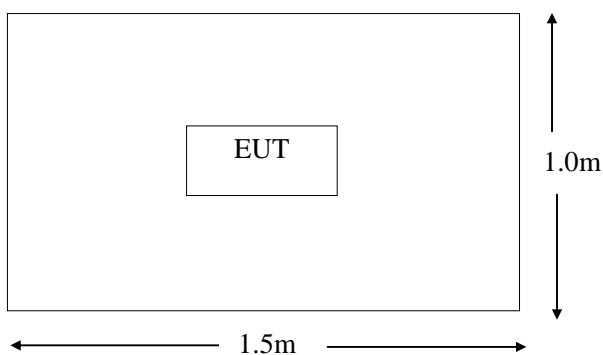
The EUT tested was not modified by BCT.

### **2.5 Configuration of Test System**



EUT

### **2.6 Test Setup Diagram**



## **3 - DISTURBANCE VOLTAGE AT THE MAINS TERMINALS**

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### **3.1 Measurement Uncertainty**

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is 3.4 dB.

### **3.2 Limit of Disturbance Voltage at The Mains Terminals**

<b>Frequency Range (MHz)</b>	<b>Limits ( dBuV)</b>	
	<b>Quasi-Peak</b>	<b>Average</b>
0.150~0.500	66~56	56~46
0.500~5.000	56	46
5.000~30.00	60	50

Note: (1)The tighter limit shall apply at the edge between two frequency bands.

### **3.3 Test Description**

The EUT is excused from investigation of Disturbance Voltage at The Mains Terminals, for it is powered by a DC 3V battery. According to the Section FCC Part 15 Subpart B, measurement to demonstrate compliance with the limits of Disturbance Voltage at The Mains Terminals are not required to the devices which only employed battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.

## 4 - RADIATED DISTURBANCES

### 4.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is 4.0 dB.

### 4.2 Limit of Radiated Disturbances

Frequency (MHz)	Distance (Meters)	Field Strengths Limits (dB $\mu$ V/m)
30 ~ 88	3	40
88~216	3	43.5
216 ~ 960	3	46
960 ~ 1000	3	54

Note: (1) The tighter limit shall apply at the edge between two frequency bands.  
(2) Distance refers to the distance in meters between the test instrument antenna and the closest point of any part of the E.U.T.

### 4.3 EUT Setup

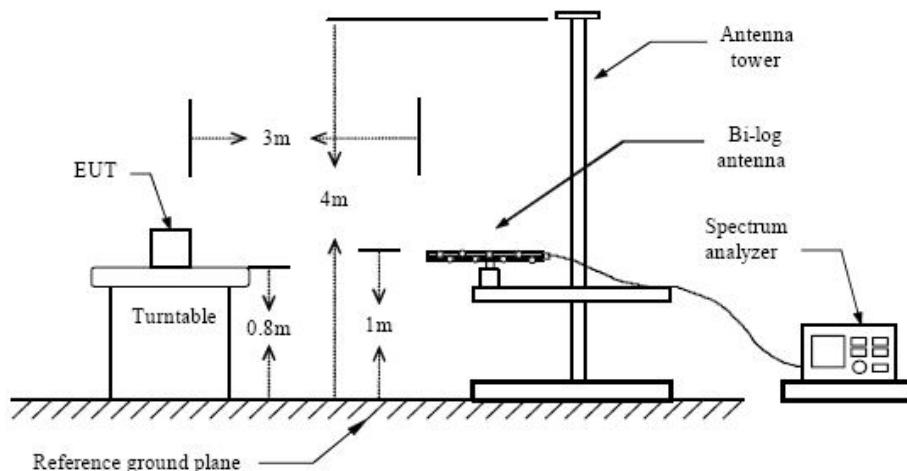
The radiated emission tests were performed in the in the 3-meter anechoic chamber, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC Part 15 Subpart B limits.

The EUT was placed on the center of the test table.

Maximum emission emitted from EUT was determined by manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation and the levels in the final result of the test were recorded with the EUT running in the operating mode that maximum emission was emitted.

Block diagram of test setup (In chamber)

Below 1 GHz



#### 4.4 Test Receiver Setup

According to FCC Part 15 rule, the frequency was investigated from 30 to 1000 MHz. During the radiated emission test, the test receiver was set with the following configurations:

Test Receiver Setting:

Detector.....Peak & Quasi-Peak  
IF Band Width.....120KHz  
Frequency Range.....30MHz to 1000MHz  
Turntable Rotated.....0 to 360 degrees

Antenna Position:

Height.....1m to 4m  
Polarity.....Horizontal and Vertical

#### 4.5 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the peak detection mode. Quasi-peak readings performed only when an emission was found to be marginal (within  $-10 \text{ dB}\mu\text{V}$  of specification limits), and are distinguished with a "QP" in the data table.

#### 4.6 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of  $-7 \text{ dB}\mu\text{V}$  means the emission is  $7 \text{ dB}\mu\text{V}$  below the maximum limit for Subpart B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corr. Ampl.}$$

#### 4.7 Radiated Emissions Test Result

Temperature ( °C )	22~25
Humidity ( %RH )	50~54
Barometric Pressure ( mbar )	950~1000
EUT	Remote Control for Window Blinds
M/N	DL-CS2017L,DL-CS2017A, DL-CS2017B
Operating Mode	Normal Operation/MP3 Playing

Test data see following pages

**Remark:** (1) When PK reading is less than relevant limit 20dB, the QP reading and AV reading will not be recorded.

(2) Where QP reading is less than relevant AV limit, the AV reading will not be measured

#### 4.8 Test Result

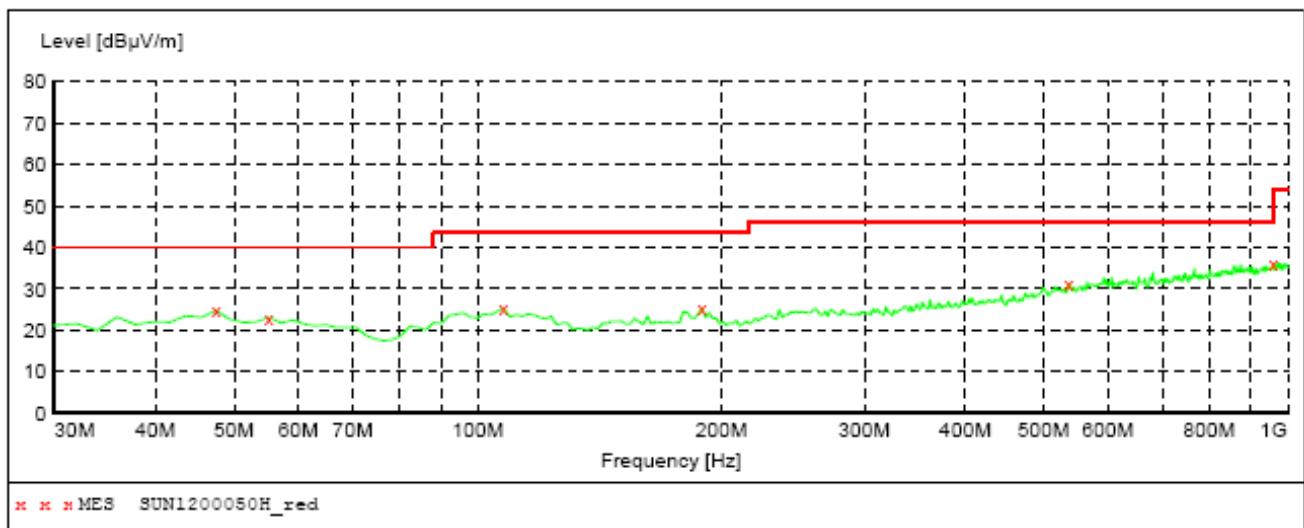
**PASS**

**Radiated Emission Test Data:**

EUT: Remote Control for Window Blinds  
M/N: DL-CS2017L  
Operating Condition: Normal Operation  
Test Site: 3m CHAMBER  
Operator: Chen  
Test Specification: DC 6V  
Comment: Polarization: Horizontal  
Start of Test: 11/27/12/07:20 Tem:25°C Hum:50%

***SWEEP TABLE: "test (30M-1G)"***

Short Description:		Field Strength		
Start Frequency	Stop Frequency	Detector	Meas.	IF
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz
				Transducer
				VULB9163 NEW

**MEASUREMENT RESULT:**

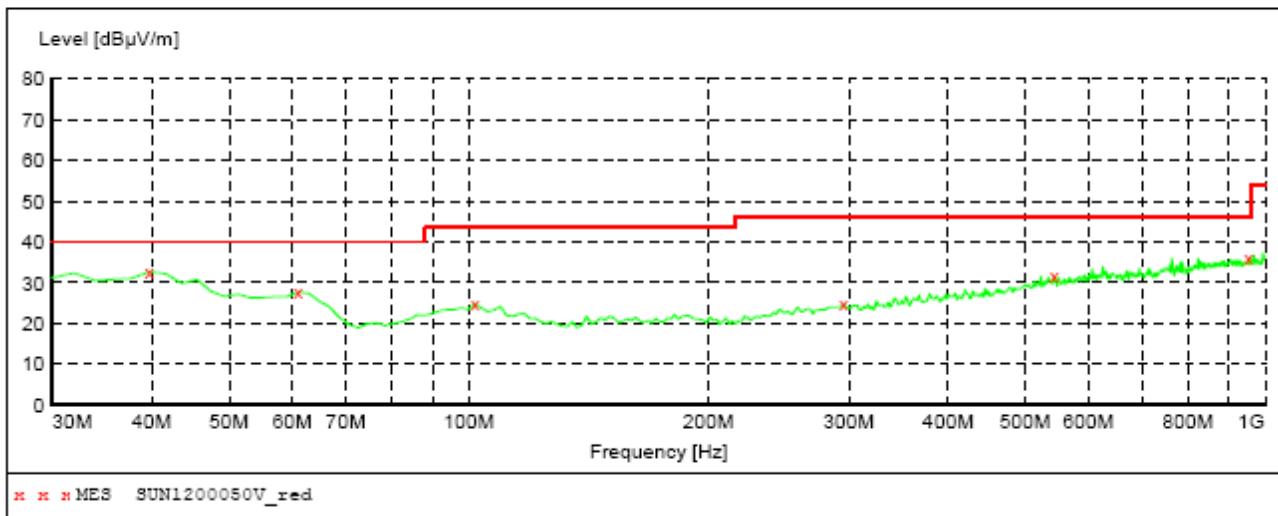
Frequency MHz	Level dB $\mu$ V/m	Transd dB	Limit dB $\mu$ V/m	Margin dB	Det. QP	Height cm	Azimuth deg	Polarization
47.460000	24.80	15.8	40.0	15.2	QP	100.0	0.00	HORIZONTAL
55.220000	23.10	15.6	40.0	16.9	QP	100.0	0.00	HORIZONTAL
107.600000	25.40	16.8	43.5	18.1	QP	100.0	0.00	HORIZONTAL
189.080000	25.40	14.7	43.5	18.1	QP	100.0	0.00	HORIZONTAL
536.340000	31.30	24.7	46.0	14.7	QP	100.0	0.00	HORIZONTAL
959.260000	36.00	29.6	46.0	10.0	QP	100.0	0.00	HORIZONTAL

## Radiated Emission Test Data:

EUT: Remote Control for Window Blinds  
 M/N: DL-CS2017L,  
 Operating Condition: Normal Operation  
 Test Site: 3m CHAMBER  
 Operator: Chen  
 Test Specification: DC 6V  
 Comment: Polarization: Vertical  
 Start of Test: 11/27/12/23:46 Tem:25°C Hum:50%

### ***SWEET TABLE: "test (30M-1G)"***

Short Description: Field Strength					
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	VULB9163 NEW



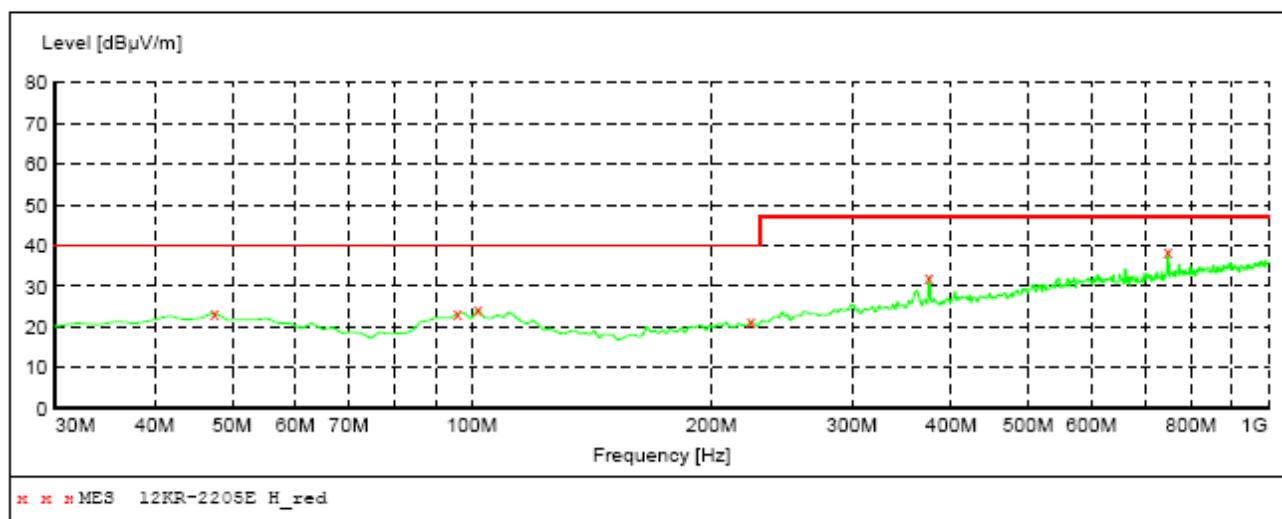
## MEASUREMENT RESULT:

Frequency MHz	Level dB $\mu$ V/m	Transd dB	Limit dB $\mu$ V/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
39.700000	32.70	15.8	40.0	7.3	QP	100.0	0.00	VERTICAL
61.040000	27.70	14.2	40.0	12.3	QP	100.0	0.00	VERTICAL
101.780000	24.90	17.3	43.5	18.6	QP	100.0	0.00	VERTICAL
295.780000	24.80	18.6	46.0	21.2	QP	100.0	0.00	VERTICAL
544.100000	31.60	24.9	46.0	14.4	QP	100.0	0.00	VERTICAL
953.440000	36.00	29.6	46.0	10.0	QP	100.0	0.00	VERTICAL

EUT: Remote Control for Window Blinds  
 M/N: DL-CS2017A  
 Operating Condition: Normal Operation  
 Test Site: 3m CHAMBER  
 Operator: Chen  
 Test Specification: DC 6V  
 Comment: Polarization: Horizontal  
 Start of Test: 11/27/12/07:20 Tem:25°C Hum:50%

***SWEEP TABLE: "test (30M-1G)"***

Short Description:		Field Strength			
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
Frequency	Frequency		Time	Bandw.	
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	VULB9163 NEW



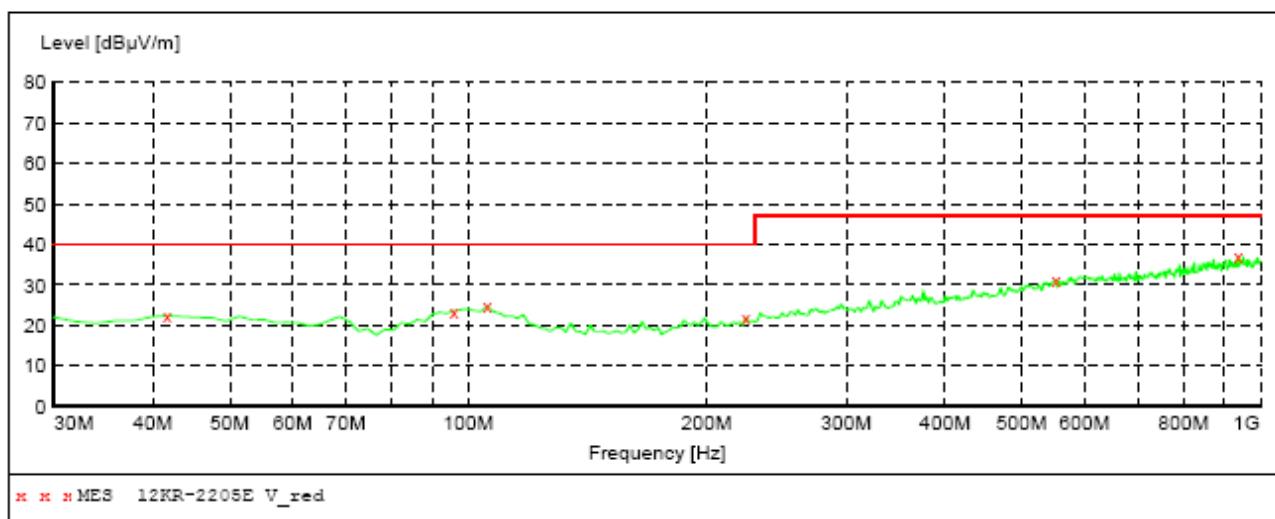
***MEASUREMENT RESULT:***

Frequency MHz	Level dB $\mu$ V/m	Transd dB	Limit dB $\mu$ V/m	Margin dB	Det. QP	Height cm	Azimuth deg	Polarization
47.460000	23.60	15.8	40.0	16.4	QP	100.0	0.00	HORIZONTAL
95.960000	23.30	17.2	40.0	16.7	QP	100.0	0.00	HORIZONTAL
101.780000	24.30	17.3	40.0	15.7	QP	100.0	0.00	HORIZONTAL
224.000000	21.40	15.6	40.0	18.6	QP	100.0	0.00	HORIZONTAL
375.320000	32.40	20.8	47.0	14.6	QP	100.0	0.00	HORIZONTAL
747.800000	38.50	27.2	47.0	8.5	QP	100.0	0.00	HORIZONTAL

EUT: Remote Control for Window Blinds  
 M/N: DL-CS2017A  
 Operating Condition: Normal Operation  
 Test Site: 3m CHAMBER  
 Operator: Chen  
 Test Specification: DC 6V  
 Comment: Polarization: Vertical  
 Start of Test: 11/27/13/23:46 Tem:25°C Hum:50%

***SWEET TABLE: "test (30M-1G)"***

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Start Frequency	Stop Frequency	Detector	Meas.	IF
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz
Transducer VULB9163 NEW				



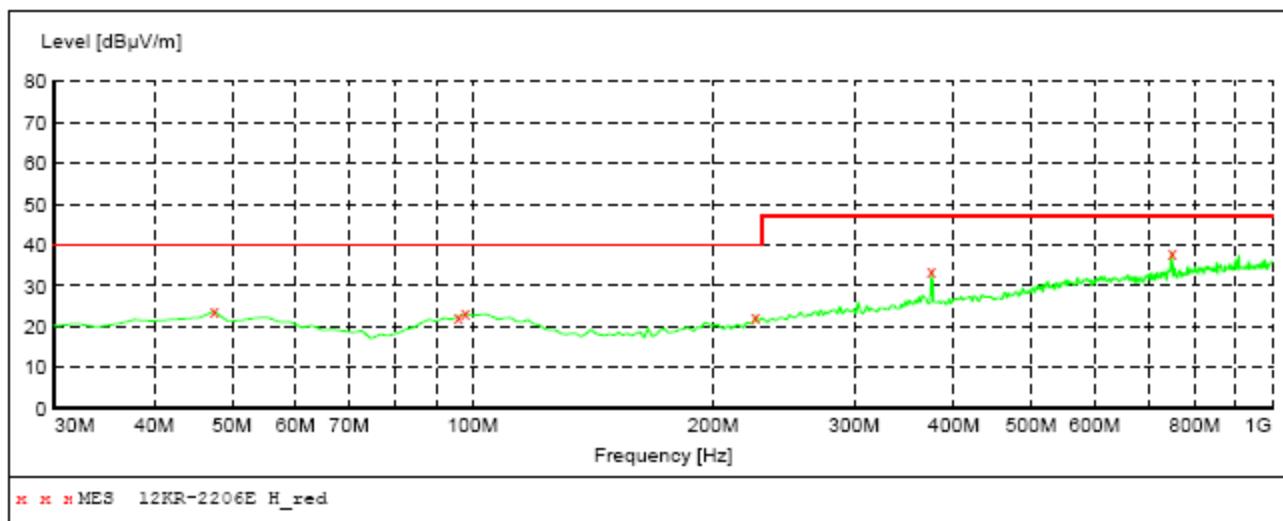
***MEASUREMENT RESULT:***

Frequency MHz	Level dB $\mu$ V/m	Transd dB	Limit dB $\mu$ V/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
41.640000	22.50	15.9	40.0	17.5	QP	100.0	0.00	VERTICAL
95.960000	23.60	17.2	40.0	16.4	QP	100.0	0.00	VERTICAL
105.660000	24.70	16.9	40.0	15.3	QP	100.0	0.00	VERTICAL
224.000000	22.00	15.6	40.0	18.0	QP	100.0	0.00	VERTICAL
551.860000	31.30	25.0	47.0	15.7	QP	100.0	0.00	VERTICAL
937.920000	37.10	29.5	47.0	9.9	QP	100.0	0.00	VERTICAL

EUT: Remote Control for Window Blinds  
 M/N: DL-CS2017B  
 Operating Condition: Normal Operation  
 Test Site: 3m CHAMBER  
 Operator: Chen  
 Test Specification: DC 6V  
 Comment: Polarization: Horizontal  
 Start of Test: 11/27/12/07:20 Tem:25°C Hum:50%

***SWEET TABLE: "test (30M-1G)"***

Short Description: Field Strength					
Start Frequency	Stop Frequency	Detector	Meas.	IF Time	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	VULB9163 NEW



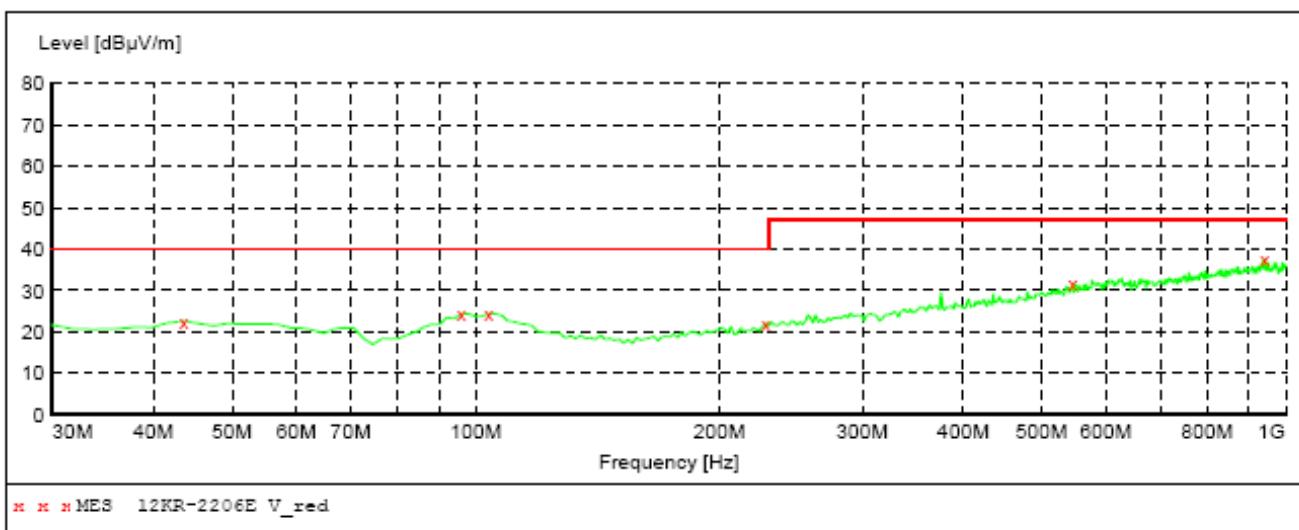
***MEASUREMENT RESULT:***

Frequency MHz	Level dB $\mu$ V/m	Transd dB	Limit dB $\mu$ V/m	Margin dB	Det. QP	Height cm	Azimuth deg	Polarization
47.460000	23.80	15.8	40.0	16.2	QP	100.0	0.00	HORIZONTAL
95.960000	22.50	17.2	40.0	17.5	QP	100.0	0.00	HORIZONTAL
97.900000	23.20	17.4	40.0	16.8	QP	100.0	0.00	HORIZONTAL
225.940000	22.60	15.8	40.0	17.4	QP	100.0	0.00	HORIZONTAL
375.320000	33.80	20.8	47.0	13.2	QP	100.0	0.00	HORIZONTAL
749.740000	38.20	27.3	47.0	8.8	QP	100.0	0.00	HORIZONTAL

EUT: Remote Control for Window Blinds  
 M/N: DL-CS2017B  
 Operating Condition: Normal Operation  
 Test Site: 3m CHAMBER  
 Operator: Chen  
 Test Specification: DC 6V  
 Comment: Polarization: Vertical  
 Start of Test: 11/27/13/23:46 Tem:25°C Hum:50%

***SWEET TABLE: "test (30M-1G)"***

Short Description: Field Strength				
Start Frequency	Stop Frequency	Detector	Meas.	IF Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz VULB9163 NEW



***MEASUREMENT RESULT:***

Frequency MHz	Level dB $\mu$ V/m	Transd dB	Limit dB $\mu$ V/m	Margin dB	Det. QP	Height cm	Azimuth deg	Polarization
43.580000	22.60	15.9	40.0	17.4	QP	100.0	0.00	VERTICAL
95.960000	24.40	17.2	40.0	15.6	QP	100.0	0.00	VERTICAL
103.720000	24.50	17.1	40.0	15.5	QP	100.0	0.00	VERTICAL
227.880000	22.20	16.0	40.0	17.8	QP	100.0	0.00	VERTICAL
546.040000	31.80	24.9	47.0	15.2	QP	100.0	0.00	VERTICAL
941.800000	37.70	29.5	47.0	9.3	QP	100.0	0.00	VERTICAL