

**Produkte**  
*Products*

<b>Prüfbericht - Nr.:</b> 14045467 001		<b>Seite 1 von 13</b>	
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<b>Auftraggeber:</b> <i>Client:</i>	Mindscope Products Inc. P.O. Box 9525, Glendale CA 91226 United States		
<b>Gegenstand der Prüfung:</b> <i>Test Item:</i>	Short Range Device - Radio Controlled Toy Transmitter (2.4GHz)		
<b>Bezeichnung:</b> <i>Identification:</i>	MSPSKYB(BLUE),MSPSKYC(ORANGER),MSPSKYD(GREEN)	<b>Serien-Nr.:</b> <i>Serial No.:</i>	Engineering sample
<b>Wareneingangs-Nr.:</b> <i>Receipt No.:</i>	A000407268-001	<b>Eingangsdatum:</b> <i>Date of Receipt:</i>	01.08.2016
<b>Zustand des Prüfgegenstandes bei Anlieferung:</b> <i>Condition of test item at delivery:</i>	Test sample is not damaged and suitable for testing.		
<b>Prüfört:</b> <i>Testing Location:</i>	Global United Technology Services Co., Ltd. 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, China		
<b>Prüfgrundlage:</b> <i>Test Specification:</i>	FCC Part 15 Subpart C ANSI C63.10-2013		
<b>Prüfergebnis:</b> <i>Test Results:</i>	Das vorstehend beschriebene Gerät wurde geprüft und entspricht oben genannter Prüfgrundlage. The above mentioned product was tested and <b>passed</b> .		
<b>Prüflaboratorium:</b> <i>Testing Laboratory:</i>	TÜV Rheinland Hong Kong Ltd. 8 - 10/F., Goldin Financial Global Square, 7 Wang Tai Road, Kowloon Bay, Kowloon, Hong Kong		
<b>geprüft/ tested by:</b>	<b>kontrolliert/ reviewed by:</b>		
11.08.2016	Benny Lau Senior Project Manager	11.08.2016	Sharon Li Department Manager
<i>Datum</i> <i>Date</i>	<i>Name/Stellung</i> <i>Name/Position</i>	<i>Unterschrift</i> <i>Signature</i>	<i>Unterschrift</i> <i>Signature</i>
<b>Sonstiges:</b> Other Aspects		FCC ID: YKGMSPSKY	
<b>Abkürzungen:</b>	P(ass) = entspricht Prüfgrundlage F(all) = entspricht nicht Prüfgrundlage N/A = nicht anwendbar N/T = nicht getestet	<b>Abbreviations:</b>	P(ass) = passed F(ail) = failed N/A = not applicable N/T = not tested
<b>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</b> <i>This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.</i>			

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## Product information

### Manufacturers declarations

	<b>Transmitter</b>
Operating frequency range	2453 - 2475 MHz
Type of modulation	GFSK
Number of channels	23
Type of antenna	Wire Antenna
Power level	fix
Connection to public utility power line	No
Nominal voltage	V <sub>nom</sub> : 3.0 V

### Product function and intended use

The equipment under test (EUT) is a remote controller of toy operating at 2.4GHz. It is powered by battery only. The manufacturer declares that the 3 models as listed below table are all identical in electrical, PCB layout and components used except the model number and packaging only.

FCC ID: YKGMSPSKY

<b>Models</b>	<b>Product description</b>
MSPSKYB(BLUE),MSPSKYC(ORANGER), MSPSKYD(GREEN)	Short Range Device - Radio Controlled Toy Transmitter (2.4GHz)

### Submitted documents

Circuit Diagram  
Block Diagram  
Bill of material  
User manual  
Rating Label

### Independent Operation Modes

The basic operation modes are:

- Transmitting mode.

For further information refer to User Manual

### Related Submittal(s) Grants

This is a single application for certification of the transmitter.

### Remark

The test results in this test report are only relevant to the tested sample and does not involve any assessment in the production.

## Test Set-up and Operation Mode

### Principle of Configuration Selection

**Emission:** The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

### Test Operation and Test Software

Test operation should refer to test methodology.

- A test mode sample which can transmit continuously in the lowest, middle and highest frequency channels at its maximum power was provided by the applicant.

### Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

- None

### Countermeasures to achieve EMC Compliance

- None

## Test Methodology

### Radiated Emission

The radiated emission measurements of the transmitter part were performed according to the procedures in ANSI C63.10-2013.

For measurement below 1GHz - the equipment under test (EUT) was placed at the middle of the 80 cm height turntable. For measurement above 1GHz - the EUT was placed at the middle of the 1.5 m height turntable and RF absorbing material was placed on ground plane between turntable and measuring antenna. During the testing, the EUT was operated standalone and arranged for maximum emissions. The EUT was tested in three orthogonal planes.

The investigation is performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained.

All radiated tests were performed at an antenna to EUT with 3 meters distance, unless stated otherwise in particular parts of this test report.

### Field Strength Calculation

The field strength at 3 m was established by adding the meter reading of the spectrum analyzer to the factors associated with antenna correction factor, cable loss, preamplifiers and filter attenuation.

The equation is expressed as follow:

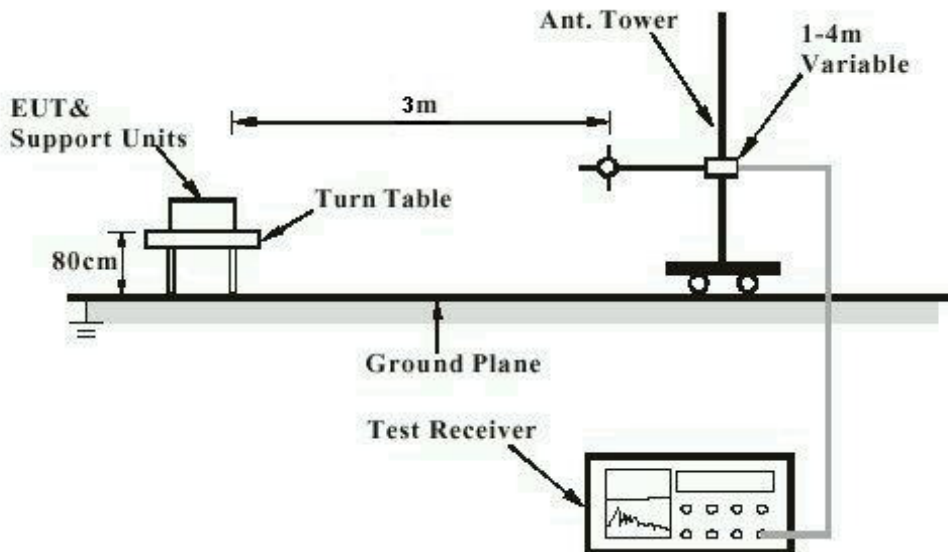
$$FS = R + AF + CF + FA - PA$$

Where FS = Field Strength in dBuV/m at 3 meters.  
R = Reading of Spectrum Analyzer in dBuV.  
AF = Antenna Factor in dB.  
CF = Cable Attenuation Factor in dB.  
FA = Filter Attenuation Factor in dB.  
PA = Preamplifier Factor in dB.

FA and PA are only be used for the measuring frequency above 1 GHz.

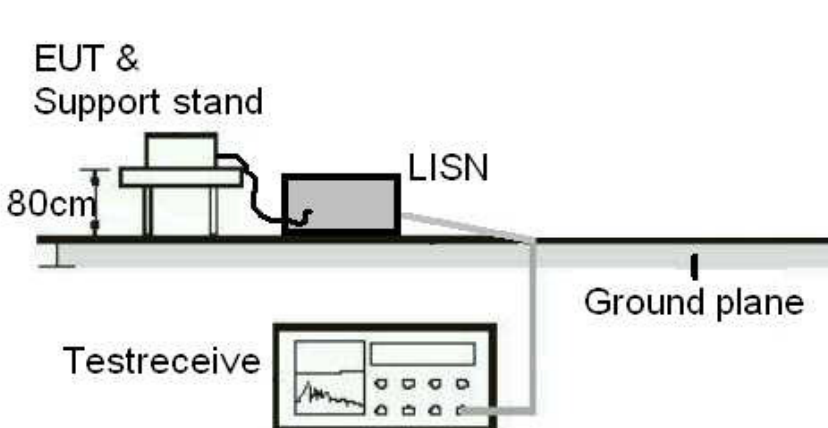
## Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test



Note: Measurements above 1 GHz are done with a table height of 1.5m. In addition, there is RF absorbing material on the floor of the test site for above 1GHz measurement.

Diagram of Measurement Equipment Configuration for Mains Conduction Measurement (if applicable)



## List of Test and Measurement Instruments

Global United Technology Services Co., Ltd. (Registration number: 600491)

### Radiated Emission

Equipment	Manufacturer	Type	Cal. Date	Due Date
3m Semi- Anechoic Chamber	ZhongYu Electron	9.0(L)*6.0(W)* 6.0(H)	July. 03 2015	July. 02 2020
Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	N/A	N/A
ESU EMI Test Receiver	R&S	ESU26	June. 29 2016	June. 28 2017
Loop Antenna	Zhinan	ZN30900A	June. 29 2016	June. 28 2017
BiConiLog Antenna	SCHWARZBECK	VULB9163	June. 29 2016	June. 28 2017
Double-ridged horn antenna	SCHWARZBECK	9120D	June. 29 2016	June. 28 2017
Horn Antenna	ETS-LINDGREN	3160-09	June. 29 2016	June. 28 2017
RF Amplifier	HP	8347A	June. 29 2016	June. 28 2017
RF Amplifier	HP	8349B	June. 29 2016	June. 28 2017
Broadband Preamplifier	SCHWARZBECK	BBV9718	June. 29 2016	June. 28 2017
EMI Test Software	AUDIX	E3	N/A	N/A
Coaxial cable	GTS	N/A	N/A	N/A
Coaxial Cable	GTS	N/A	N/A	N/A
Thermo meter	N/A	N/A	June. 29 2016	June. 28 2017



## Measurement Uncertainty

The estimated combined standard uncertainty for power-line conducted emissions measurements is  $\pm 3.43\text{dB}$ .

The estimated combined standard uncertainty for radiated emissions measurements is  $\pm 5.10\text{dB}$  (30MHz to 200MHz) and  $\pm 5.08\text{dB}$  (200MHz to 1000MHz) and is  $\pm 5.10\text{dB}$  (30MHz to 200MHz) and  $\pm 5.08\text{dB}$  (above 1GHz).

The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of  $k=2$ , which for the level of confidence is approximately 95%.

## Results FCC Part 15 – Subpart C / RSS-210 Issue 8

<b>FCC 15.203 – Antenna Requirement 1</b>		<b>Pass</b>
<b>FCC Requirement:</b> No antenna other than that furnished by the responsible party shall be used with the device		
<b>Results:</b>	Antenna type:	Fixed Integral wire antenna
<b>Verdict:</b>	Pass	

<b>FCC 15.204 – Antenna Requirement 2</b>		<b>Pass</b>
<b>FCC Requirement:</b> An intentional radiator may be operated only with the antenna with which it is authorized. If an antenna is marketed with the intentional radiator, it shall be of a type which is authorized with the intentional radiator.		
<b>Results:</b>	Only one integral antenna can be used.	
<b>Verdict:</b>	N/A	

<b>FCC 15.207 – Conducted Emission on AC Mains</b>		<b>N/A</b>
There is no AC power input or output ports on the EUT.		

<b>Subclause 15.215 (c) – 20 dB Bandwidth</b>		<b>Pass</b>		
Test Specification : ANSI C63.10 – 2013 Mode of operation : Tx mode Port of testing : Enclosure RBW/VBW : 100 kHz / 300 kHz Supply voltage : 3VDC Temperature : 23°C Humidity : 50%				
<b>Requirement:</b>	The intentional radiators must be designed to ensure that the 20dB bandwidth of the emission, is contained within the frequency band designated in the rule section under which the equipment is operated.			
<b>Results:</b>	For test protocols refer to Appendix 1.			
<b>Frequency (MHz)</b>	<b>20 dB left (MHz)</b>	<b>Limit (MHz)</b>	<b>20 dB right (MHz)</b>	<b>Limit (MHz)</b>
2453	2452.370	> 2400	2453.710	< 2483.5
2465	2464.360	> 2400	2465.700	< 2483.5
2475	2474.350	> 2400	2475.700	< 2483.5

<b>Subclause 15.249 (a) – Field Strength of Fundamental and Harmonics</b>		<b>Pass</b>
Test Specification : ANSI C63.10 – 2013 Mode of operation : Tx mode Port of testing : Enclosure Frequency range : 9kHz – 25GHz RBW/VBW : 100 kHz / 300 kHz for f < 1 GHz 1 MHz / 3 MHz for f > 1 GHz Supply voltage : 3VDC Temperature : 23°C Humidity : 50%		
Requirement: The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following limit.		
<b>Results:</b> PASS.		
Fundamental Frequency 2453MHz		Vertical Polarization
<b>Freq MHz</b>	<b>Level dBuV/m</b>	<b>Limit/ Detector dBuV/m</b>
2453.000	75.68	114.0 / PK
2453.000	66.24	94.0 / AV
Fundamental Frequency 2405MHz		Horizontal Polarization
<b>Freq MHz</b>	<b>Level dBuV/m</b>	<b>Limit/ Detector dBuV/m</b>
2453.000	76.17	114.0 / PK
2453.000	67.13	94.0 / AV
Harmonics 2453MHz		Vertical Polarization
<b>Freq MHz</b>	<b>Level dBuV/m</b>	<b>Limit/ Detector dBuV/m</b>
4906.054	48.77	74.0 / PK
4906.054	38.19	54.0 / AV
Harmonics 2453MHz		Horizontal Polarization
<b>Freq MHz</b>	<b>Level dBuV/m</b>	<b>Limit/ Detector dBuV/m</b>
4906.054	46.81	74.0 / PK
4906.054	37.23	54.0 / AV
Fundamental Frequency 2465MHz		Vertical Polarization
<b>Freq MHz</b>	<b>Level dBuV/m</b>	<b>Limit/ Detector dBuV/m</b>
2465.000	76.01	114.0 / PK
2465.000	66.69	94.0 / AV
Fundamental Frequency 2465MHz		Horizontal Polarization
<b>Freq MHz</b>	<b>Level dBuV/m</b>	<b>Limit/ Detector dBuV/m</b>
2465.000	77.01	114.0 / PK

2465.000	67.56	94.0 / AV
Harmonics 2465MHz Vertical Polarization		
<b>Freq MHz</b>	<b>Level dBuV/m</b>	<b>Limit/ Detector dBuV/m</b>
4929.050	48.94	74.0 / PK
4929.050	38.40	54.0 / AV
Harmonics 2465MHz Horizontal Polarization		
<b>Freq MHz</b>	<b>Level dBuV/m</b>	<b>Limit/ Detector dBuV/m</b>
4927.000	46.21	74.0 / PK
4927.000	37.66	54.0 / AV
Fundamental Frequency 2475MHz Vertical Polarization		
<b>Freq MHz</b>	<b>Level dBuV/m</b>	<b>Limit/ Detector dBuV/m</b>
2475.000	75.39	114.0 / PK
2475.000	67.54	94.0 / AV
Fundamental Frequency 2481MHz Horizontal Polarization		
<b>Freq MHz</b>	<b>Level dBuV/m</b>	<b>Limit/ Detector dBuV/m</b>
2475.000	76.57	114.0 / PK
2475.000	66.12	94.0 / AV
Harmonics 2475MHz Vertical Polarization		
<b>Freq MHz</b>	<b>Level dBuV/m</b>	<b>Limit/ Detector dBuV/m</b>
4950.045	46.44	74.0 / PK
4950.045	38.61	54.0 / AV
Harmonics 2475MHz Horizontal Polarization		
<b>Freq MHz</b>	<b>Level dBuV/m</b>	<b>Limit/ Detector dBuV/m</b>
4950.047	46.74	74.0 / PK
4950.047	37.22	54.0 / AV

<b>Subclause 15.249 (d), 15.205 – Out Of Band Radiated Emission</b>		<b>Pass</b>
Test Specification : ANSI C63.10 – 2013 Mode of operation : Tx mode Port of testing : Enclosure Detector : Peak Frequency range : 9kHz – 25GHz RBW/VBW : 1 MHz / 3 MHz for f > 1 GHz Supply voltage : 3VDC Temperature : 23°C Humidity : 50%		
Requirement: Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.		
Results: All three transmit frequency modes comply with the field strength limit of section 15.209. There is no spurious found below 30MHz.		
Tx frequency 2465MHz Vertical Polarization		
<b>Freq MHz</b>	<b>Level dBuV/m</b>	<b>Limit/ Detector dBuV/m</b>
2400.000	32.85	74.0 / PK
2400.000	23.73	54.0 / AV
Tx frequency 2465MHz Horizontal Polarization		
<b>Freq MHz</b>	<b>Level dBuV/m</b>	<b>Limit/ Detector dBuV/m</b>
2400.000	31.96	74.0 / PK
2400.000	23.86	54.0 / AV
Tx frequency 2465MHz Vertical Polarization		
<b>Freq MHz</b>	<b>Level dBuV/m</b>	<b>Limit/ Detector dBuV/m</b>
No peak found	---	74.0 / PK
No peak found	---	54.0 / AV
Tx frequency 2465MHz Horizontal Polarization		
<b>Freq MHz</b>	<b>Level dBuV/m</b>	<b>Limit/ Detector dBuV/m</b>
No peak found	---	74.0 / PK
No peak found	---	54.0 / AV
Tx frequency 2475MHz Vertical Polarization		
<b>Freq MHz</b>	<b>Level dBuV/m</b>	<b>Limit/ Detector dBuV/m</b>
2483.500	42.06	74.0 / PK
2483.500	24.15	54.0 / AV
Tx frequency 2475MHz Horizontal Polarization		
<b>Freq MHz</b>	<b>Level dBuV/m</b>	<b>Limit/ Detector dBuV/m</b>
2483.500	41.23	74.0 / PK
2483.500	24.32	54.0 / AV