

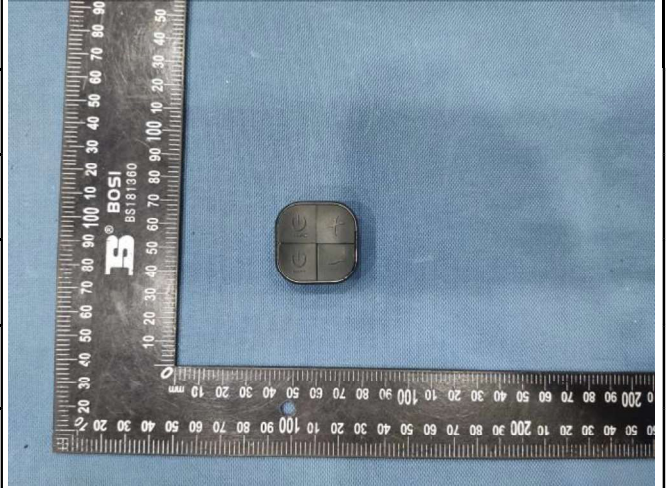
Prüfbericht-Nr.: <i>Test Report No.:</i>	CN21DZ92 001	Auftrags-Nr.: <i>Order No.:</i>	158229974	Seite 1 von 16 <i>Page 1 of 16</i>	
Kunden-Referenz-Nr.: <i>Client Reference No.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	15.04.2021		
Auftraggeber: <i>Client:</i>	JM Sunflower Limited 7th Floor, Goldsland Building, 22-26 Minden Avenue, Tsim Sha Tsui, Kowloon, Hong Kong				
Prüfgegenstand: <i>Test item:</i>	Short range device - PleX				
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	HO23				
Auftrags-Inhalt: <i>Order content:</i>	FCC Test				
Prüfgrundlage: <i>Test specification:</i>	FCC Part 15 Subpart C, ANSI C63.10-2013				
Wareneingangsdatum: <i>Date of receipt:</i>	13.04.2021				
Prüfmuster-Nr.: <i>Test sample No.:</i>	A003035678-007				
Prüfzeitraum: <i>Testing period:</i>	27.04.2021 - 20.05.2021				
Ort der Prüfung: <i>Place of testing:</i>	Shenzhen				
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland Hong Kong Ltd.				
Prüfergebnis*: <i>Test result*:</i>	Pass				
geprüft von / tested by:		kontrolliert von / reviewed by:			
 30.07.2021 Felicia Chan / Assistant Engineer		 30.07.2021 Sharon Li / Unit Senior Manager			
Datum <i>Date</i>	Name / Stellung <i>Name / Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>	Name / Stellung <i>Name / Position</i>	Unterschrift <i>Signature</i>
Sonstiges / Other: FCC ID: 2AILYC07-HO23					
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>			Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>		
* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor P(ass) = passed a.m test specification(s) F(ail) = failed a.m test specification(s) N/A = not applicable N/T = not tested					
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. <i>This test report only 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 test mark.</i>					

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Product information

Manufacturers declarations

	Transmitter
Operating frequency range	433.92MHz
Type of modulation	FSK
Number of channels	1
Type of antenna	Integral Antenna
Power level	fix
Connection to public utility power line	No
Nominal voltage	V _{nom} : 3.0 V

Product function and intended use

The equipment under test (EUT) is a 433MHz adult toy transmitter. It is powered by battery only.

FCC ID: 2AILYC07-HO23

Models	Product description
HO23	PleX

Submitted documents

Nil

Independent Operation Modes

The basic operation modes are:

- Transmitting mode.
- Normal operation 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.

- During test, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power was selected according to the instruction given by the manufacturer. The setting of the RF output power expected by the customer shall be fixed on the firmware of the final end product.

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.

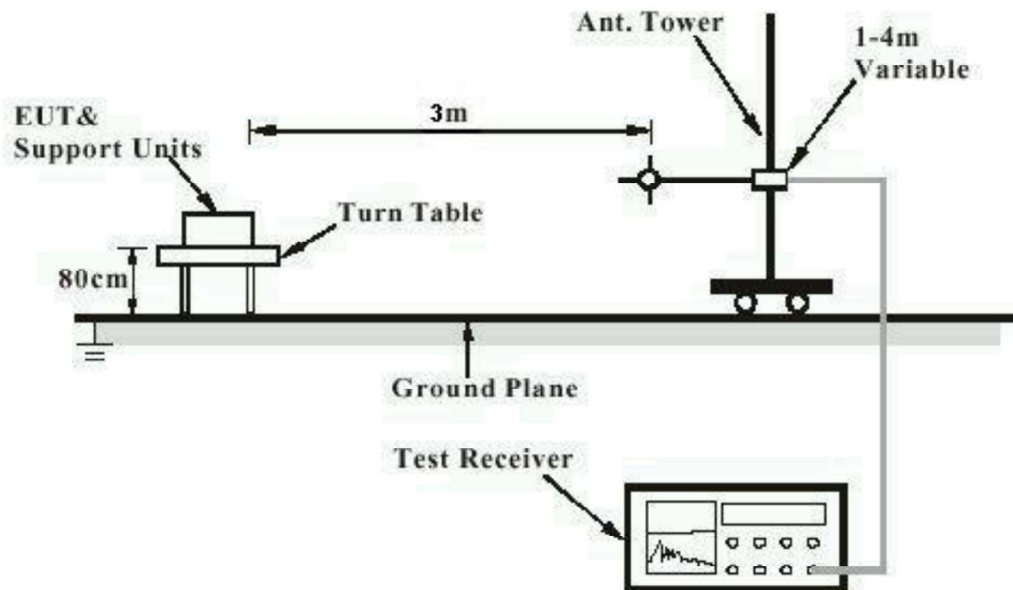
FA = Filter Attenuation Factor in dB.

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)

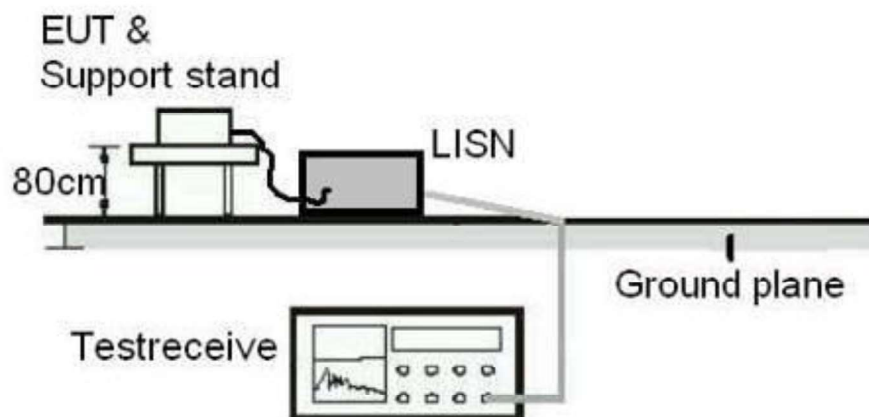
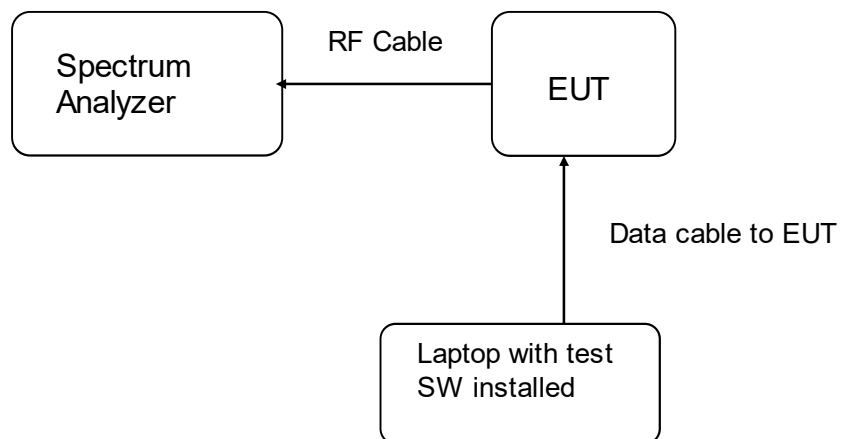


Diagram of Equipment Configuration for Antenna-port Conducted Measurement (if applicable)

Test Facility

Test Laboratory Information

TÜV Rheinland Hong Kong Ltd.

Address: 3-4/F, Fou Wah Industrial Building, 10-16 Pun Shan Street, Tsuen Wan, N.T., Hong Kong

Tel.: +852 2192 1000

Fax: +852 2192 1001

Email service-gc@tuv.com

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

FCC

Test Firm Registration Number : 371735

List of Test and Measurement Instruments

Radiated Emission

Equipment	Manufacturer	Type	Cal. Date	Due Date
Semi-anechoic Chamber	Frankonia	Nil	5-Mar-21	5-Mar-22
Multi-functional Anechoic Chamber	Albatross	Nil	4-Jan-21	4-Jan-22
Test Receiver	R & S	ESU40	7-Oct-20	7-Oct-21
Active Loop Antenna	EMCO	6502	3-Nov-20	3-Nov-22
Bi-conical Antenna	R & S	HK116	15-Sep-20	15-Sep-22
Log Periodic Antenna	R & S	HL223	15-Sep-20	15-Sep-22
Standard Gain Horn	ETS-Lindgren	3160-07	24-Nov-20	24-Nov-22
Standard Gain Horn	ETS-Lindgren	3160-08	24-Nov-20	24-Nov-22
Standard Gain Horn	ETS-Lindgren	3160-10	30-Oct-20	30-Oct-22
Double-Ridged Waveguide Horn	EMCO	3116	30-Oct-20	30-Oct-22
Double-Ridged Waveguide Horn	EMCO	3117	11-Nov-20	11-Nov-22
Coaxial cable	Harbour	SF118/11n/11n/12000.0	3-Aug-20	3-Aug-22
High Frequency Cable	Pasternack	PE3VNA4001-3M	29-Jan-21	29-Jan-23
Microwave amplifier 0.5-26.5GHz, 25dB gain	COM-POWER Corporation	PAM-118A	5-Mar-21	5-Mar-22
Preamplifier 18GHz to 40GHz with cable (EMC656)	A.H. Systems, Inc.	PAM-1840VH	29-Jan-21	29-Jan-22
High Pass Filter (cutoff freq. = 1000MHz)	Trilithic	23042	30-Oct-19	30-Oct-21
Bore-Sight Antenna Mast	Maturo	BAM 4.0-P-10kg	N.A.	N.A.

Radio Test

Equipment	Manufacturer	Type	Cal. Date	Due Date
EXA Spectrum Analyzer	KEYSIGHT	N9010A	10-Nov-20	09-Nov-21
Spectrum Analyzer	R & S	FSV40-N	18-Jun-20	17-Jun-21
USB Wideband Power Sensor	KEYSIGHT	U2021XA	10-Nov-20	09-Nov-21

Measurement Uncertainty

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

No.	Item	Measurement Uncertainty
1	Radiated emission 9 kHz - 30 MHz	± 4.7 dB
2	Radiated emission 30MHz-1GHz	± 4.6 dB
3	Radiated emission 1GHz-18GHz	± 4.4 dB
4	Bandwidth	± 1.8 %

Results FCC Part 15 – Subpart C

FCC 15.203 – Antenna Requirement 1		Pass
FCC Requirement: No antenna other than that furnished by the responsible party shall be used with the device		
Results:		
a) Antenna type:	Integral Antenna	
b) Manufacturer and model no:	N/A	
c) Peak Gain:	0dBi	
Verdict:	Pass	

FCC 15.204 – Antenna Requirement 2		Pass
FCC Requirement: 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.		
Results:		
Only one integral antenna can be used.		
Verdict:	Pass	

Subclause 15.215 (c) & 15.231 (c) – 20 dB Bandwidth		Pass
Test Specification : ANSI C63.10 – 2013 Test date : 15.05.2021 Mode of operation : Tx mode Port of testing : Temporary antenna port Supply voltage : 3.0VDC Temperature : 24.6°C Humidity : 50.0%		
Requirement: 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. The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. 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.		
Results: Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types. For test protocols refer to Appendix 1.		
Frequency (MHz)	20 dB Bandwidth (Hz)	Limit (MHz)
433.92	810.50	1.0848

Subclause 15.231 (b) – Field Strength of Fundamental and Harmonics		Pass
Test Specification : ANSI C63.10 – 2013 Test date : 10.05.2021 to 10.05.2021 Mode of operation : Tx mode Port of testing : Enclosure Frequency range : 9kHz – 5GHz Supply voltage : 3.0VDC Temperature : 24.6°C Humidity : 52.0%		
Requirement: The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following limit.		
Results: PASS.		
Fundamental Frequency 433.92MHz Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
433.933	53.70	80.82 / QP
433.933	46.50	60.82 / AV
Fundamental Frequency 433.92MHz Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
433.933	37.80	80.82 / QP
433.933	30.90	60.82 / AV
Harmonics 433.92MHz Vertical Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
867.854	41.20	60.82 / QP
Harmonics 433.92MHz Horizontal Polarization		
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
867.854	38.90	60.82 / QP

Subclause 15.231 (b), 15.205, 15.209 – Field strength of spurious emissions			Pass
Test Specification : ANSI C63.10 – 2013 Test date : 10.05.2021 to 10.05.2021 Mode of operation : Tx mode Port of testing : Enclosure Frequency range : 9kHz – 5GHz Supply voltage : 3.0VDC Temperature : 24.6°C Humidity : 52.0%			
Requirement: In addition to the provisions of §15.205, the field strength of emissions from intentional radiators shall not exceed the limits in Section 15.231(b).			
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 433.92MHz		Vertical Polarization	
Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m	
3037.530	52.20	74.0 / PK	
3037.530	41.70	54.0 / AV	
3471.550	51.50	74.0 / PK	
3471.550	40.40	54.0 / AV	
3905.490	47.00	74.0 / PK	
3905.490	35.50	54.0 / AV	
Tx frequency 433.92Hz		Horizontal Polarization	
Freq MHz	Level dBµV/m	Limit/ Detector dBµV/m	
1301.790	34.00	74.0 / PK	
1301.790	23.00	54.0 / AV	

Subclause 15.231 (a) – Deactivation of the Transmission		Pass
Test Specification : ANSI C63.10 – 2013 Test date : 15.05.2021 Mode of operation : Tx mode Port of testing : Temporary antenna port Supply voltage : 3.0VDC Temperature : 24.6°C Humidity : 50.0%		
Requirement:	A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.	
Results:	Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types. For test protocols refer to Appendix 1.	