Produkte
Products

Prüfbericht - Nr.: *Test Report No.:*	**14044690 001**	**Seite 1 von 11** *Page 1 of 11*

Auftraggeber: *Client:*	**Dickie Toys Hong Kong Ltd.** 19/F., Prudential Tower The Gateway, Harbour City 21 Canton Road, Tsimshatsui Kowloon, Hong Kong		
Gegenstand der Prüfung: *Test Item:*	**Short Range Device - Toy Audio Walkie Talkie (2.4GHz)**		
Bezeichnung: *Identification:*	**20 111 8185**	**Serien-Nr.:** *Serial No.:*	**Engineering sample**
Wareneingangs-Nr.: *Receipt No.:*	**A000360823-004**	**Eingangsdatum:** *Date of Receipt:*	**16.05.2016**
Zustand des Prüfgegenstandes bei Anlieferung: *Condition of test item at delivery:*	Test sample is not damaged and suitable for testing.		
Prüfort: *Testing Location:*	**TÜV Rheinland Hong Kong Ltd.** 8/F, First Group Centre, 14 Wang Tai Road, Kowloon Bay, Kowloon, Hong Kong **Global United Technology Services Co., Ltd.** 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, China		
Prüfgrundlage: *Test Specification:*	**FCC Part 15 Subpart C** **ANSI C63.10-2013**		
Prüfergebnis: *Test Results:*	**Das vorstehend beschriebene Gerät wurde geprüft und entspricht oben genannter Prüfgrundlage.** The above mentioned product was tested and **passed**.		
Prüflaboratorium: *Testing Laboratory:*	**TÜV Rheinland Hong Kong Ltd.** 8 - 10/F., Goldin Financial Global Square, 7 Wang Tai Road, Kowloon Bay, Kowloon, Hong Kong		

geprüft/ *tested by:* **kontrolliert/** *reviewed by:*

Datum / Date	Name/Stellung / Name/Position	Unterschrift / Signature	Datum / Date	Name/Stellung / Name/Position	Unterschrift / Signature
23.06.2016	Joey Leung Project Manager		23.06.2016	Sharon Li Department Manager	

Sonstiges: **FCC ID: NLB24016TX**
Other Aspects

Abkürzungen:				Abbreviations:			
	P(ass)	=	entspricht Prüfgrundlage		P(ass)	=	passed
	F(ail)	=	entspricht nicht Prüfgrundlage		F(ail)	=	failed
	N/A	=	nicht anwendbar		N/A	=	not applicable
	N/T	=	nicht getestet		N/T	=	not tested

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Product information

Manufacturers declarations

	Transmitter
Operating frequency range	2408 - 2474 MHz
Type of modulation	FSK
Number of channels	22
Type of antenna	Permanent attached antenna
Power level	fix
Connection to public utility power line	No
Nominal voltage	V_{nor}: 4.5 V

Product function and intended use

The equipment under test (EUT) is a toy audio walkie talkie operating at 2.4GHz. It is a half-duplex audio system and powered by battery only.

FCC ID: NLB24016TX

Models	Product description
20 111 8185	Toy audio walkie talkie

Submitted documents

Circuit Diagram
Block Diagram
Bill of material
User manual
Rating Label

Independent Operation Modes

The basic operation modes are transmitting and receiving audio from paired device.

For further information refer to User Manual

Related Submittal(s) Grants

This is a single application for certification of the transmitter.

Remarks

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

Test Methodology

Radiated Emission

The radiated emission measurements 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 the turntable is 3 meters far from the measuring antenna. In addition, 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:

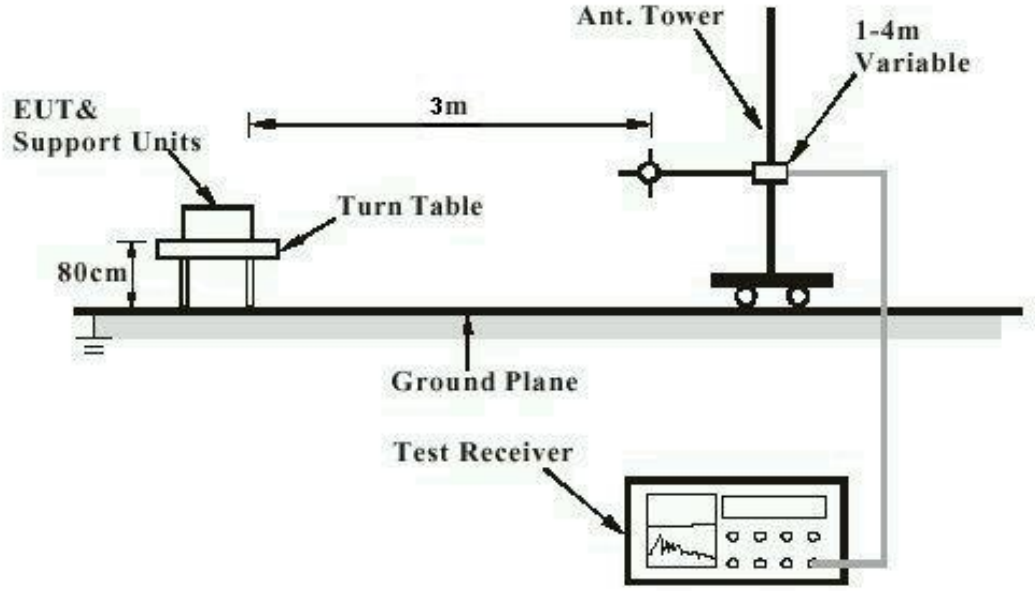
FS = R + AF + CF + FA – PA

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.

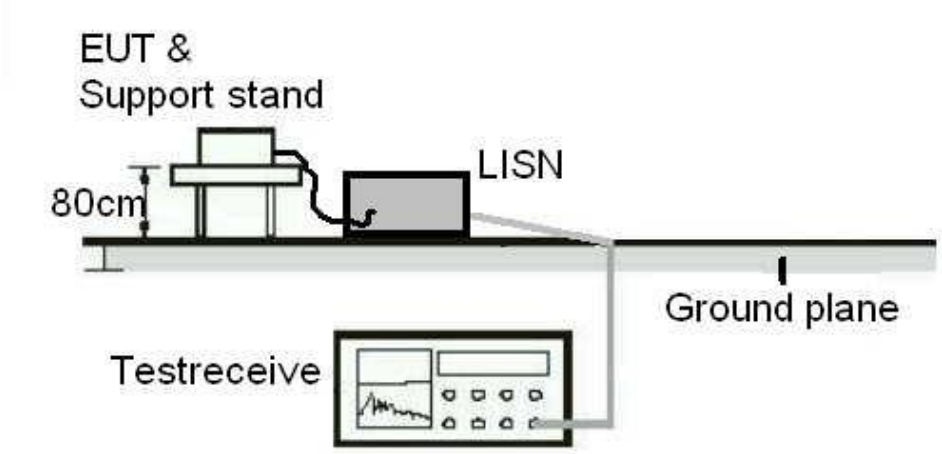
Test Setup Diagram

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	S/N	Last Cal. Date	Cal. Due Date
3m Semi- Anechoic Chamber	ZhongYu Electron	9.0(L)*6.0(W)* 6.0(H)	---	03 Jul 2015	02 Jul 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	---	03 Jul 2015	02 Jul 2016
Loop Antenna	Zhinan	ZN30900A	---	03 Jul 2015	05 Jul 2016
BiConiLog Antenna	SCHWARZBECK	VULB9163	---	03 Jul 2015	05 Jul 2016
Double-ridged horn antenna	SCHWARZBECK	9120D	---	06 Jul 2015	05 Jul 2016
Horn Antenna	ETS-LINDGREN	3160-09	---	06 Jul 2015	05 Jul 2016
RF Amplifier	HP	8347A	---	03 Jul 2015	02 Jul 2016
RF Amplifier	HP	8349B	---	03 Jul 2015	02 Jul 2016
Broadband Preamplifier	SCHWARZBECK	BBV9718		03 Jul 2015	02 Jul 2016
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	---	07 Jul 2015	06 Jul 2016

TÜV Rheinland Hong Kong Ltd

Radio Frequency Test

Equipment	Manufacturer	Type	S/N	Last Cal. Date	Cal. Due Date
Spectrum Analyzer	Rohde & Schwarz	FSP30	100610	20 Jan 2016	19 Jan 2017

Measurement Uncertainty

The estimated combined standard uncertainty for power-line conducted emissions measurements is ±3.43dB.

The estimated combined standard uncertainty for radiated emissions measurements is ±4.68dB (30MHz to 200MHz) and ±5.73dB (200MHz to 1000MHz) and ±5.57dB (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

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:	Antenna type:	Fixed Integral wire antenna
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:	N/A

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

FCC 15.215(c) – 20 dB Bandwidth	**Pass**
Test Specification : ANSI C63.10 – 2013 Mode of operation : Tx mode Port of testing : Enclosure RBW/VBW : 100 kHz / 300 kHz Supply voltage : 4.5VDC, 3 x 1.5V AAA size new battery Temperature : 23ºC Humidity : 50%	
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.
Results:	For test protocols refer to Appendix 1, page 2-3.

Frequency (MHz)	**20 dB left (MHz)**	**Limit (MHz)**	**20 dB right (MHz)**	**Limit (MHz)**
2408	2406.680	> 2400	2409.000	< 2483.5
2441	2439.680	> 2400	2441.980	< 2483.5
2474	2472.680	> 2400	2474.960	< 2483.5

FCC 15.249(a) – Field Strength of Fundamental and Harmonics **Pass**

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 : 4.5VDC, 3 x 1.5V AAA size new battery
Temperature : 23ºC
Humidity : 50%

Requirement: The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following limit.

Results: PASS.

Fundamental Frequency 2408MHz Vertical Polarization

Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
2407.900	106.27	114.0 / PK
2407.900	86.46	94.0 / AV

Fundamental Frequency 2408MHz Horizontal Polarization

Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
2407.900	101.18	114.0 / PK
2407.900	81.96	94.0 / AV

Harmonics 2408MHz Vertical Polarization

Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
4816.150	56.73	74.0 / PK
4816.150	42.04	54.0 / AV
7224.000	54.79	74.0 / PK
7224.000	39.66	54.0 / AV

Harmonics 2408MHz Horizontal Polarization

Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
4816.150	61.79	74.0 / PK
4816.150	44.10	54.0 / AV

Fundamental Frequency 2441MHz Vertical Polarization

Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
2440.950	107.25	114.0 / PK
2440.950	87.47	94.0 / AV

Fundamental Frequency 2441MHz Horizontal Polarization

Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
2440.950	100.69	114.0 / PK
2440.950	80.67	94.0 / AV

Harmonics 2441MHz	Vertical Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
4882.500	58.88	74.0 / PK
4882.500	41.16	54.0 / AV
7323.000	55.55	74.0 / PK
7323.000	42.76	54.0 / AV
Harmonics 2441MHz	Horizontal Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
4882.500	61.10	74.0 / PK
4882.500	41.50	54.0 / AV
7323.000	52.53	74.0 / PK
7323.000	40.73	54.0 / AV
Fundamental Frequency 2474MHz	Vertical Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
2474.450	106.95	114.0 / PK
2474.450	87.06	94.0 / AV
Fundamental Frequency 2474MHz	Horizontal Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
2474.390	101.28	114.0 / PK
2474.390	82.06	94.0 / AV
Harmonics 2474MHz	Vertical Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
4948.075	56.73	74.0 / PK
4948.075	40.20	54.0 / AV
7422.000	55.85	74.0 / PK
7422.000	41.38	54.0 / AV
Harmonics 2474MHz	Horizontal Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
4948.050	61.79	74.0 / PK
4948.050	42.27	54.0 / AV
7422.000	51.89	74.0 / PK
7422.000	42.43	54.0 / AV

FCC 15.249 (d), 15.205 – Out Of Band Radiated Emission **Pass**

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 : 4.5VDC, 3 x 1.5V AAA size new battery
Temperature : 23ºC
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 2408MHz — Vertical Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2400.000	56.96	74.0 / PK
2400.000	37.15	54.0 / AV

Tx frequency 2408MHz — Horizontal Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2400.000	51.87	74.0 / PK
2400.000	32.65	54.0 / AV

Tx frequency 2441MHz — Vertical Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
No peak found	---	74.0 / PK
No peak found	---	54.0 / AV

Tx frequency 2441MHz — Horizontal Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
No peak found	---	74.0 / PK
No peak found	---	54.0 / AV

Tx frequency 2474MHz — Vertical Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2483.500	59.31	74.0 / PK
2483.500	39.42	54.0 / AV

Tx frequency 2474MHz — Horizontal Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
2483.500	53.64	74.0 / PK
2483.500	34.42	54.0 / AV