

Prüfbericht - Nr.: 14033267 002
Test Report No.:
Seite 1 von 8
Page 1 of 8
Auftraggeber:
Client:
DEPO Manufacturing Corp., Ltd.
1206, Block A, Electronic Science & Technology Building
2070 Shennan Zhonglu
Shenzhen, China
Gegenstand der Prüfung: **Bluetooth Speaker**
Test Item:
Bezeichnung:
Identification:
EBS6001
Serien-Nr.:
Serial No.:
Engineering sample
Wareneingangs-Nr.:
Receipt No.:
00131129218-001
Eingangsdatum: **29.11.2013**
Date of Receipt:
Zustand des Prüfgegenstandes bei Anlieferung:
Condition of test item at delivery:
Test sample(s) is/are not damaged and
suitable for testing.
Prüfort:
Testing Location:
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 C63.4-2003
CISPR 22:2003
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:
24.01.2014 **Hugo Wan**
Date *Name/Position*
Datum
Date
Name/Stellung
Name/Position
Unterschrift
Signature

24.01.2014
Mika Chan
Project Manager
Datum
Date
Name/Stellung
Name/Position
Unterschrift
Signature

Sonstiges: FCCID: SLA-EBS5001
Other Aspects
Permissive class II change
Abkürzungen: **P(ass) = entspricht Prüfgrundlage**
F(ail) = entspricht nicht Prüfgrundlage
N/A = nicht anwendbar
N/T = nicht getestet
Abbreviations: **P(ass) = passed**
F(ail) = failed
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.
This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be
uplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.

Table of Content

	Page
Cover Page	1
Table of Content	2
Product information.....	3
Manufacturers declarations.....	3
Product function and intended use	4
Submitted documents	4
Remark.....	4
Special accessories and auxiliary equipment	4
List of Test and Measurement Instruments	5
Results FCC Part 15 – Subpart C.....	6
Subclause 15.247 (b)(1) – Peak Output Power.....	Pass6
Subclause 15.247 (d) – Spurious Radiated Emissions	Pass7
Appendix 1 – Test results	3 pages
Appendix 2 – Test setup photos.....	2 pages
Appendix 3 – Photo documentation	8 pages
Appendix 4 – Product documentation	8 pages

Product information

Manufacturers declarations

	Transceiver
Operating frequency range	2402 - 2480 MHz
Type of modulation	GFSK; Pi/4 DPSK; 8 DPSK
Number of channels	79
Channel separation	1 MHz
Type of antenna	Integral antenna
Antenna gain (dBi)	0
Power level	fix
Type of equipment	stand alone radio device
Connection to public utility power line	Yes
Nominal voltage	Internal battery V_{nor} : 3.7V DC Charging: 5.0V DC
Independent Operation Modes	Page scan Inquiry scan Connection state - ACL Link Connection state - SCO Link

Product function and intended use

The test item is a Bluetooth Speaker based on the Bluetooth technology.

Bluetooth is a short-range radio link intended to be a cable replacement between portable and/or fixed electronic devices.

Bluetooth operates in the unlicensed ISM Band at 2.4 GHz. In the US a band of 83.5 MHz width is available. In this band, 79 RF channels spaced 1MHz apart are defined.

The channel is represented by a pseudo-random hopping sequence through the 79 channels. The channel is divided into time slots, with a nominal slot length of 625µs, where each slot corresponds to different RF hop frequencies. The nominal hop rate is 1600 hops/s. The symbol rate on the channel is 1 -3Mbps. The device supports basic rate (BR) and enhanced data rate (EDR).

The USB connector is for charging only, no data exchange supported.

Submitted documents

Circuit Diagram
Block Diagram
Bill of material
User Manual
Label Artwork

Remark

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases.

The On/Off switch was modified using touch panel method. Hence the test for Part 15.247(b)(1) Peak Output Power and Part 15.247(d) Spurious Radiated Emission were re-evaluated in this test report.

Due to the spurious radiated emission result was worse than the previous, permissive class II change report is submitted to TCB.

Special accessories and auxiliary equipment

Additional accessory used for testing

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

- 1) USB Cable, 1 meter (provided by client)

List of Test and Measurement Instruments

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

Radiated Emission

Equipment	Manufacturer	Type	S/N	Cal Due Date
3m Semi- Anechoic Chamber	ZhongYu Electron	9.0(L)*6.0(W)* 6.0(H)	--	05 Apr 2015
Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	--	N/A
ESU EMI Test Receiver	R&S	ESU26	--	28 Jun 2014
Loop Antenna	Zhinan	ZN30900A	--	28 Jun 2014
Bi-log Hybrid Antenna	SCHWARZBECK	VULB9163	--	17 Mar 2014
Double-ridged horn antenna	SCHWARZBECK	9120D	--	17 Mar 2014
Horn Antenna	ETS-LINDGREN	3160-09	--	17 Mar 2014
RF Amplifier	HP	8347A	--	28 Jun 2014
RF Amplifier	HP	8349B	--	28 Jun 2014
EMI Test Software	AUDIX	E3	--	N/A
Coaxial cable	GTS	N/A	--	28 Jun 2014
Coaxial Cable	GTS	N/A	--	28 Jun 2014
Thermo meter	N/A	N/A	--	30 Jun 2014

TÜV Rheinland Hong Kong Ltd.

Radio Frequency Test

Equipment	Manufacturer	Type	S/N	Cal Due Date
Spectrum Analyzer	Rohde & Schwarz	FSP30	100007	03 Dec 2014

Results FCC Part 15 – Subpart C

Subclause 15.247 (b)(1) – Peak Output Power					Pass
Test Specification : FCC Part 15 Subpart A – Subclause 15.31 Mode of operation : Tx mode (hopping off) at GFSK, Pi/4 DQPSK, 8 DPSK Port of testing : Temporary antenna port Detector : Peak RBW/VBW : 3 MHz / 10 MHz Supply voltage : 3.7 VDC Temperature : 23°C Humidity : 50%					
Requirement: For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 Watt. For all other frequency hopping systems in the 2400 – 2483.5 MHz band: 0.125 Watts.					
Results: For test result plots, please refer to Appendix 1, page 2-7.					
GFSK Modulation					
Frequency (MHz)	Maximum peak output power (dBm)	Cable attenuation (dB)	Output power (dBm)	Limit (W/dBm)	Verdict
2402	-2.42	0.00	-2.42	1 / 30.0	Pass
2441	-2.02	0.00	-2.02	1 / 30.0	Pass
2480	-1.54	0.00	-1.54	1 / 30.0	Pass
$\pi/4$-DPSK Modulation					
Frequency (MHz)	Maximum peak output power (dBm)	Cable attenuation (dB)	Output power (dBm)	Limit (W/dBm)	Verdict
2402	-4.34	0.00	-4.34	0.125 / 21.0	Pass
2441	-3.86	0.00	-3.86	0.125 / 21.0	Pass
2480	-3.31	0.00	-3.31	0.125 / 21.0	Pass
8DPSK Modulation					
Frequency (MHz)	Maximum peak output power (dBm)	Cable attenuation (dB)	Output power (dBm)	Limit (W/dBm)	Verdict
2402	-4.01	0.00	-4.01	0.125 / 21.0	Pass
2441	-3.55	0.00	-3.55	0.125 / 21.0	Pass
2480	-2.97	0.00	-2.97	0.125 / 21.0	Pass

Subclause 15.247 (d) – Spurious Radiated Emissions		Pass
Test Specification : ANSI C63.4 – 2003 Mode of operation : Tx mode (hopping off) at GFSK Port of testing : Enclosure Detector : a) Quasi-peak for $f \leq 1$ GHz, b) Peak for $f > 1$ GHz RBW/VBW : a) 100 kHz / 300 kHz for $f \leq 1$ GHz, b) 1 MHz / 3 MHz for $f > 1$ GHz Supply voltage : 3.7 VDC Temperature : 23°C Humidity : 50%		
Requirement: In any 100kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in section 15.205(a), must also comply with the radiated emission limits specified in section 15.209(a).		
Results: Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types. All three transmit frequency modes comply with the field strength within the restricted bands. There is no spurious found below 30MHz.		
Tx frequency 2402MHz Vertical Polarization		
Frequency (MHz)	Level (dBµV/m)	Limit/ Detector (dBµV/m)
294.114	30.0	46.0 / QK
345.595	34.2	46.0 / QK
357.929	37.3	46.0 / QK
362.985	36.8	46.0 / QK
4804.000	39.2	74.0 / PK
4804.000	26.7	54.0 / AV
Tx frequency 2402MHz Horizontal Polarization		
Frequency (MHz)	Level (dBµV/m)	Limit/ Detector (dBµV/m)
290.017	29.7	46.0 / QK
4804.000	40.2	74.0 / PK
4804.000	27.2	54.0 / AV
Tx frequency 2441MHz Vertical Polarization		
Frequency (MHz)	Level (dBµV/m)	Limit/ Detector (dBµV/m)
47.736	36.5	40.0 / QK
50.464	34.5	40.0 / QK
447.996	31.7	46.0 / QK
463.995	30.3	46.0 / QK
4881.737	54.2	74.0 / PK
4881.946	45.8	54.0 / AV

Tx frequency 2441MHz			Horizontal Polarization		
Frequency (MHz)	Level (dBµV/m)	Limit/ Detector (dBµV/m)	Frequency (MHz)	Level (dBµV/m)	Limit/ Detector (dBµV/m)
398.145	41.4	46.0 / QK	398.120	42.8	46.0 / QK
409.851	39.8	46.0 / QK	4959.279	47.9	74.0 / PK
4881.987	49.0	74.0 / PK	4959.872	36.0	54.0 / AV
4881.907	40.0	54.0 / AV			
Tx frequency 2480MHz			Vertical Polarization		
Frequency (MHz)	Level (dBµV/m)	Limit/ Detector (dBµV/m)	Frequency (MHz)	Level (dBµV/m)	Limit/ Detector (dBµV/m)
47.742	35.5	40.0 / QK			
50.471	34.5	40.0 / QK			
447.996	31.5	46.0 / QK			
398.396	30.1	46.0 / QK			
4959.503	54.6	74.0 / PK			
4959.936	46.5	54.0 / AV			
Tx frequency 2480MHz			Horizontal Polarization		
Frequency (MHz)	Level (dBµV/m)	Limit/ Detector (dBµV/m)	Frequency (MHz)	Level (dBµV/m)	Limit/ Detector (dBµV/m)
398.120	42.8	46.0 / QK			
4959.279	47.9	74.0 / PK			
4959.872	36.0	54.0 / AV			