

Produkte Products

Prüfbericht - Nr.: Test Report No.:	14026300 001		Seite 1 von 16 Page 1 of 16
Auftraggeber: Client:	Peter Fish (HK) Ltd. Room 112A, 1/F., Tsim Sha Tsui 66 Mody Road Tsim Sha Tsui, Kowloon Hong Kong	Centre	
Gegenstand der Prüfung: Test Item:	Bluetooth Headset		
Bezeichnung: Identification:	The state of the s	erien-Nr.: erial No.:	Engineering sample
Wareneingangs-Nr.: Receipt No.:		ingangsdatum: ate of Receipt:	30.03.2011
Prüfort: Testing Location:	TÜV Rheinland Hong Kong Ltd. 8/F., Niche Centre, 14 Wang Tai Road, Kon Hong Kong Productivity Council HKPC Building, 78 Tat Chee Avenue, Kowl	9393862 01	ong Kong
Prüfgrundlage: Test Specification:	FCC Part 15 Subpart C ANSI C63.4-2003 CISPR 22:1997		7.0
Prüfergebnis: Test Results:	Das vorstehend beschriebene Gegenannter Prüfgrundlage. The above mentioned product was to		,
Prüflaboratorium: Testing Laboratory:	TÜV Rheinland Hong Kong Ltd. 9-10/F., Emperor International Square , 7 V	Vang Tai Road, Kowloo	n Bay, Kowloon, Hong Kong
geprüft/ tested by:	kontrolliert/ re	eviewed by:	
Mika Chan 27.05.2011 Project Enginee Datum Name/Stellung	Unterschrift Datum	Sharon Li Assistant Manager	Unterschrift
Sonstiges: FCC Other Aspects	Signature Date CID: ZLO-FISH20	Name/Position	Signature
Abkürzungen: P(ass) = entspi F(ail) = entspi N/A = nicht a	richt Prüfgrundlage Abbre richt nicht Prüfgrundlage anwendbar getestet	eviations: P(ass) = F(ail) = N/A = N/T =	passed failed not applicable not tested

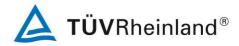
This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be



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Product information

Manufacturers declarations

	Transceiver
Operating frequency range	2402 - 2480 MHz
Type of modulation	FHSS modulation
Number of channels	79
Channel separation	1 MHz
Type of antenna	Integral
Antenna gain (dBi)	0
Power level	fix
Type of equipment	stand alone, plug-in radio device
Connection to public utility power line	No
Nominal voltage	V _{nor} : 3.7 V
Independent Operation Modes	Page scan
	Inquiry scan
	Connection state - ACL Link
	Connection state - SCO Link

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Product function and intended use

The test item is a Bluetooth Headset 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 1 MHz 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 625 μ s, 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 Ms/s.

BT Clip csr BC6130 supports the latest Bluetooth v2.1 + EDR specification, but the EDR functionality is disabled by manufacturer.

The USB interface id for charging only - no data exchange with a PC.

Submitted documents

Circuit Diagram Block Diagram Bill of material User manual

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.

Special accessories and auxiliary equipment

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List of Test and Measurement Instruments

Equipment used	Manufacturer	Model No.	S/N	Due Date
Semi-anechoic Chamber	Frankonia	Nil	Nil	25-May-12
Test Receiver	R&S	ESU26	100050	25-May-11
Bi-conical Antenna	R&S	HK116	100241	13-Apr-12
Log Periodic Antenna	R&S	HL223	841516/020	13-Apr-12
		RTK081-05S-	LA2-001-	
Coaxial cable 50ohm	Rosenberger	05S-10m	10M / 001	08-Dec-11
Microwave amplifer 0.5-				
26.5GHz, 25dB gain	HP	83017A	3950M00241	03-Oct-11
High Pass Filter (cutoff				
freq. =1000MHz)	Trilithic	23042	9829213	30-Oct-11
Horn Antenna	EMCO	3115	9002-3351	16-Apr-12
Active Loop Antenna	EMCO	6502	9107-2651	19-Apr-12
FSP 30 Spectrum Analyser	R&S	FSP 30	100007	16-Sep-12
LISN	R&S	ESH3-Z5	849876/026	21-Dec-11
Pulse Limiter	R&S	ESH3-Z2	Nil	04-Jun-11

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Results FCC Part 15 – Subpart C

Subclause 15.203 - Antenna Information

Pass

Requirement: No antenna other than that furnished by the responsible party shall be used with the

device

Results: Permanent attached antenna

Verdict: Pass

Subclause 15.204 - Antenna Information

Pass

Requirement: Provide information for every antenna proposed for the use with the EUT

Results: a) Antenna type: Integral

b) Manufacturer and model no: N.A.

c) Gain with reference to an isotropic radiator: 0 dBi

Verdict: Pass

Subclause 15.207 - Disturbance Voltage on AC Mains

N/A

The EUT could not be operated during battery charging.

Subclause 15.247 (a)(1) - Carrier Frequency Separation

Pass

Requirement: Frequency hopping systems shall have hopping channel carrier frequencies separated

by a minimum of 25kHz or the 2/3*20dB bandwidth of the hopping channel, whichever is

greater.

Test Specification: FCC Part 15 Subpart A - Subclause 15.31

Mode of operation: Tx mode (hopping on), GFSK Port of testing: Temporary antenna port

Detector : Peak

RBW/VBW : 100 kHz / 300 kHz

Supply voltage : 3.7VDC from DC power supply

Temperature : 23°C Humidity : 50%

Results: Pre-scan has been conduced to determine the worst-case mode from all possible

combinations between available modulations and packet types.

The centre frequencies of the hopping channels are separated by more than the

2/3*20dB bandwidth. For test Results plots refer to Appendix 1, page 2.

Verdict: Pass

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Subclause 15.247 (a)(1)(iii) – Number of hopping channels

Pass

Requirement: Frequency hopping systems operating in the 2400MHz-2483.5MHz bands shall use at

least 15 hopping frequencies.

Test Specification: FCC Part 15 Subpart A - Subclause 15.31

Mode of operation: Tx mode (hopping on), GFSK Port of testing: Temporary antenna port

Detector : Peak

RBW/VBW : 1 MHz / 3 MHz

Supply voltage : 3.7VDC from DC power supply

Temperature : 23°C Humidity : 50%

Results: The total number of hopping frequencies is more than 15. For test Results plots refer to

Appendix 1, page 3.

Verdict: Pass

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Subclause 15.247 (a)(1)(iii) – Time of Occupancy (Dwell Time)

Pass

Requirement: Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15

channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels

employed.

Test Specification: FCC Part 15 Subpart A - Subclause 15.31

Mode of operation: Tx mode (hopping on), DH5 packet

Port of testing : Temporary antenna port

Detector : Peak

RBW/VBW : 1 MHz / 3 MHz

Supply voltage : 3.7VDC from DC power supply

Temperature : 23°C Humidity : 50%

Results: Time period calculation = $0.4 \times 79 = 31.6s$

Dwell time = $64 \times 2.912 \times 10^{-3} = 186.368 \times 10^{-3}$

 $<= 400 \times 10^{-3} \text{ s}$

For test protocols please refer to Appendix 1, page 4.

Verdict: Pass

Subclause 15.247 (a) - 20 dB Bandwidth

Pass

Requirement: Frequency hopping systems shall have hopping channel carrier frequencies separated

by a minimum of 25kHz or the 2/3*20dB bandwidth of the hopping channel, whichever is

greater.

Test Specification: FCC Part 15 Subpart A - Subclause 15.31

Mode of operation: Tx mode (2402MHz, 2441MHz, 2480MHz), (GFSK)

Port of testing : Temporary antenna port

Detector : Peak

RBW/VBW : 30 kHz / 100 kHz

Supply voltage : 3.7VDC from DC power supply

Temperature : 23°C Humidity : 50%

Results: Pre-scan has been conduced to determine the worst-case mode from all possible

combinations between available modulations and packet types.

For test protocols refer to Appendix 1, page 5-7.

GFSK Modulation

Frequency (MHz)	20 dB left (MHz)	20 dB right (MHz)	20dB bandwidth (MHz)
2402	0.462	0.480	0.942
2441	0.456	0.486	0.942
2480	0.456	0.480	0.936

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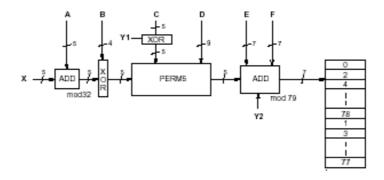
Subclause 15.247 (a) - Hopping Sequence

Pass

Requirement: The hopping sequence is generated and provided with an example.

Hopping sequence

The channel is represented by a pseudo-random hopping sequence hopping through the 79 RF channels. The hopping sequence is unique for the piconet and is determined by the Bluetooth device address of the master. The X input determines the phase in the 32-hop segment, whereas Y1 and Y2 selects between master-to-slave and slave-to-master transmission. The inputs A to D determine the ordering within the segment, the inputs E and F determine the mapping onto the hop frequencies.



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Example d	lata:							
	Hop sequence {k} for CONNECTION STATE:							
CLK start: 0:								
ULAP: 0x000 #ticks:			10000	00.00	110 10	11116	11010	1c 1e
#IICKS.		04 06	00 0a 	10006	10 12 	14 16 	10 1a 	10 1e
0x0000010:	08 66	10 70	12 19	14 23	16 01	18 05	20 33	22 37
0x0000030:								
0x0000050:	40 74	42 78	44 27	46 31	48 09	50 13	52 41	54 45
0x0000070:	56 11	58 15	60 43	62 47	32 17	36 19	34 49	38 51
0x0000090:	40 21	44 23	42 53	46 55	48 33	52 35	50 65	54 67
0x00000b0:	56 37	60 39	58 69	62 71	64 25	68 27	66 57	70 59
0x0000d0:	72 29	76 31	74 61	78 63	01 41	05 43	03 73	07 75
0x00000f0:	09 45	13 47	11 77	15 00	64 49	66 53	68 02	70 06
0x0000110:								
0x0000130:								
0x0000150:								
0x0000170:								
0x0000190:								
0x00001b0:			•	•	•			
0x00001d0:								
0x00001f0:								
0x0000210:								
0x0000230:								
0x0000250:								
0x0000270:								
0x0000290:								
0x00002b0:			•	•	•			
0x00002d0:								
0x00002f0:								
0x0000310: 0x0000330:								
0x0000330.								
0x0000330.								
0x0000370.								
0x0000350:								
0x00003d0:								
								25 24

Subclause 15.247 (a) - Equal Hopping Frequency Use

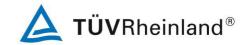
Pass

Requirement: Each of the transmitter's hopping channels is used equally on average.

Equal hopping frequency use

The EUT complies with the Bluetooth RF specifications. For details refer to the Bluetooth standard.

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Subclause 15.247 (a) – Receiver Input Bandwidth

Pass

Requirement:

The associated receiver(s) complies with the requirement that its input bandwidth matches the bandwidth of the transmitted signal.

Receiver input bandwidth

The receiver bandwidth is equal to the receiver bandwidth in the 79 hopping channel mode, which is 1 MHz. The receiver bandwidth was verified during Bluetooth RF conformance testing.

Subclause 15.247 (a) – Receiver Hopping Capability

Pass

Requirement:

The associated receiver has the ability to shift frequencies in synchronisation with the

transmitted signals.

Receiver hopping Capability

The EUT complies with the Bluetooth RF specifications. For details refer to the Bluetooth standard.

Subclause 15.247 (b)(1) – Peak Output Power

Pass

Test Specification: FCC Part 15 Subpart A – Subclause 15.31 Mode of operation: Tx mode (2402MHz, 2441MHz, 2480MHz)

Port of testing : Temporary antenna port

Detector : Peak

: 3 MHz / 10 MHz RBW/VBW

: 3.7VDC from DC power supply Supply voltage

Temperature : 23ºC Humidity : 50%

Requirement:

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 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 protocols please refer to Appendix 1, page 8-12.

GFSK Modulation

Frequency (MHz)	Maximum peak output power (dBm)	Cable attenuation (dB)	Output power (dBm)	Limit (W/dBm)	Verdict
2402	0.74	3.52	4.260	1 / 30.0	Pass
2441	-0.08	3.65	3.570	1 / 30.0	Pass
2480	0.50	3.60	4.100	1 / 30.0	Pass

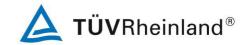
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Subclause 15.247	' (d) – Band edge compliance of conducted emissions	Pass
	: FCC Part 15 Subpart A – Subclause 15.31 : Tx mode (2402MHz, 2480MHz), GFSK : Temporary antenna port : Peak : 100 kHz / 300 kHz : 3.7VDC from DC power supply : 23°C : 50%	
Requirement:	In any 100 kHz bandwidth outside the frequency band in which the digitally modulated intentional radiator is operating, the radio frequency by the intentional radiator shall be at least 20 dB below bandwidth within the band that contains the highest level of the defither an RF conducted or a radiated measurement.	uency power that is that in the 100 kHz
Results:	Pre-scan has been conduced to determine the worst-case mode combinations between available modulations and packet types.	from all possible
	There is no peak found outside any 100 kHz bandwidth of the ope For test protocols refer to Appendix 1, page 13-14.	erating frequency band

Subclause 15.205	5 – Band edge compliance of radiated emissions Pass	
	: FCC Part 15 Subpart A – Subclause 15.31 : Tx mode (2402MHz, 2480MHz), GFSK : Temporary antenna port : Peak : 1 MHz / 3 MHz : 3.7VDC from DC power supply : 23°C : 50%	
Requirement:	Radiated emissions which fall in the restricted bans, as defined in 15.205 (a), must also comply with the radiated emission limits specified in 15.209(a).)
Results:	There is no peak found in the restricted bands. For test protocols refer to Appendix 1, page 15-18.	

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Subclause 15.247 (d) - Spurious Conducted Emissions

Pass

Test Specification: FCC Part 15 Subpart A - Subclause 15.31

Mode of operation: Tx mode (2402MHz, 2441MHz, 2480MHz), GFSK

Port of testing : Temporary antenna port

Detector : Peak

RBW/VBW : 100 kHz / 300 kHz

Supply voltage : 3.7VDC from DC power supply

Temperature : 23 °C Humidity : 50 %

Requirement: In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or

digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on

either an RF conducted or a radiated measurement.

Results: Pre-scan has been conduced to determine the worst-case mode from all possible

combinations between available modulations and packet types.

There is no peak found outside any 100kHz bandwidth of the operating frequency band in the three transmit frequency. All three transmit frequency modes comply with the limit stated in subclause 15.247(d). For test protocols refer to Appendix 1, page 19-20.

Operating frequency (MHz)	Spurious frequency (MHz)	Spurious Level (dBm)	Reference value (dBm)	Delta (dB)	Verdict
2402	4800.00	-43.24	1.58	-44.82	Pass
2441	4850.00	-40.80	1.16	-41.96	Pass
2480	4950.00	-40.15	0.54	-40.69	Pass

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Subclause 15.247	' (c) – Spurious I	Radiated Emissions	Pass
Port of testing Detector	: Tx mode (2402 : Enclosure : Peak	MHz, 2441MHz, 2480MHz), GFSK	
RBW/VBW	1 MHz / 3 MHz		
Supply voltage Temperature	: internal batterie : 23ºC	s has been activated	
Humidity	: 50%		
Requirement:	level of the desibands, as defin	pandwidth outside the frequency ban ired power. In addition, radiated emis ed in section15.205(a), must also co in section 15.205(c).	ssions which fall in the restricted
Results:	combinations b	een conduced to determine the wors etween available modulations and pa	acket types.
		it frequency modes comply with the no spurious found below 30MHz.	field strength within the restricted
Tx frequency 2402	PMHz	Vertical Polarization	
Fre MH	Z	Level dBuV/m	Limit/ Detector dBuV/m
4804.		54.02	74.0 / P
4803. Tx frequency 2402		37.35 Horizontal Polarization	54.0 / A
Fre		Level	Limit/ Detector
МН		dBuV/m	dBuV/m
4803.	622	52.52	74.0 / P
4803.	942	36.60	54.0 / A
Tx frequency 2441	MHz	Vertical Polarization	
Fre		Level	Limit/ Detector
MH		dBuV/m	dBuV/m
1626. 1626.		41.11	74.0 / P
1626. 4881.		35.96 53.82	54.0 / A 74.0 / P
4881.		37.37	54.0 / A
Tx frequency 2441		Horizontal Polarization	01.0771
Freq		Freq Level MHz dBuV/m	
4882.		51.48	dBuV/m 74.0 / P
4882.		36.30	54.0 / A
Tx frequency 2480		Vertical Polarization	
	Freq Level		Limit/ Detector
MH 1654		dBuV/m	dBuV/m
1654.	บบฮ	40.85	74.0 / P

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1653.979	34.43	54.0 / A
4959.984	57.85	74.0 / P
4959.952	37.18	54.0 / A
Tx frequency 2480MHz	Horizontal Polarization	
Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4960.029	53.81	74.0 / P

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