

Produkte Products

Prüfbericht - Nr.:

14039738 001

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Test Report No.:

Auftraggeber:

Sensibo LTD.

Client:

3 Ahuzat Bait 6514302

Tel Aviv Israel

Gegenstand der Prüfung:

Test Item:

Bluetooth Low Energy and ZigBee Device

Bezeichnung:

Identification:

Sensibo Pod

Serien-Nr.: Serial No.:

Engineering sample

Wareneingangs-Nr.:

Receipt No.:

A000299390 (003-004)

Eingangsdatum: Date of Receipt:

23.12.2015

Zustand des Prüfgegenstandes bei Anlieferung:

Condition of test item at delivery:

Test samples are not damaged and suitable

for testing.

Prüfort:

Hong Kong Productivity Council

Testing Location:

HKPC Building, 78 Tat Chee Avenue, Kowloon, Hong Kong

TÜV Rheinland Hong Kong Ltd.

8/F., First Group Center, 14 Wang Tai Road, Kowloon Bay, Kowloon, Hong

Kong

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:

TÜV Rheinland Hong Kong Ltd.

Testing Laboratory:

8 - 10/F., Goldin Financial Global Square, 7 Wang Tai Road, Kowloon Bay,

Kowloon, Hong Kong

geprüft/ tested by:

kontrolliert/ reviewed by:

23.02.2016

Joey Leung

Project Manager

23.02.2016

Benny Lau Senior Project Manager

Datum Date

Name/Stellung Name/Position

Unterschrift Signature

Datum Date

Name/Stellung Name/Position

Unterschrift

Signature

Sonstiges / Other Aspects:

FCCID: 2AHCD-POD-V01

Abkürzungen:

P(ass)

entspricht Prüfgrundlage

Abbreviations:

P(ass)

F(ail) N/A

entspricht nicht Prüfgrundlage nicht anwendbar

F(ail) N/A

passed failed

N/T

nicht getestet

N/T

not applicable 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.



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Date: 23.02.2016



Product information

Manufacturers declarations

	Transceiver		
Operating frequency range	Bluetooth Low Energy (BLE) - 2402 - 2480 MHz		
Operating frequency range	ZigBee - 2405 - 2480MHz		
Type of modulation	BLE - GFSK / FHSS		
Type of modulation	ZigBee - OQPSK / DSSS		
Number of channels	BLE - 40 Channels		
Number of charmers	ZigBee - 16 Channels		
Channel concretion	BLE - 2 MHz		
Channel separation	ZigBee - 5 MHz		
Type of antenna	PCB antenna		
Antonno goin (dDi)	BLE - 0 dBi		
Antenna gain (dBi)	ZigBee - 0 dBi		
Power level	fix		
Type of equipment	stand alone radio device		
Connection to public utility power line	No		
Nominal voltage	V _{nor} : 6.0 VDC		
Independent Operation Medea	Transmitting		
Independent Operation Modes	Receiving		

Product function and intended use

The Equipment Under Test (EUT) is a device implemented Bluetooth Low Energy and ZigBee technology and is powered by battery. It can be connected to Bluetooth enabled smart phone for the control of home device.

Bluetooth Low Energy and ZigBee will not operate at the same time.

For details, please refer to the user manual.

Submitted documents

Circuit Diagram Block Diagram Bill of material User Manual Label Artwork

Remark

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Independent Operation Modes

The basic operation mode is radio communication link maintained with data transfer.

For further information refer to User Manual

Related Submittal(s) Grants

This is a single application for certification of the transmitter.

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Test Set-up and Operation Mode

Principle of Configuration Selection

Emission: The 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.

1) The EUT was powered by 2 x CR123A batteries.

2) Two test mode samples were provided by client for performing radiated and conducted test by pressing a button on EUT to change transmission frequencies at highest RF output power and longest burst time.

Special Accessories and Auxiliary Equipment

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

nil

Countermeasures to achieve EMC Compliance

nil

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Test Methodology

Radiated Emission

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

For emission measurement at or below 1GHz, the equipment under test (EUT) was placed at the middle of the 80 cm height turntable. For emission testing above 1GHz, the EUT was placed at the middle of 1.5m height turntable. In above two measurement, the turntable is 3 meters far from the 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.

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List of Test and Measurement Instruments

Hong Kong Productivity Council (FCC Registration number: 90656)

Radiated Emission

Equipment	Manufacturer	Туре	S/N	Cal. Date	Cal. Due Date
Semi-anechoic Chamber	Frankonia	Nil	Nil	14 Apr 2015	14 Apr 2016
Cable	Hubersuhner	SUCOFLEX 104	72799 /6	31 Mar 2014	31 Mar 2016
Test Receiver	R&S	ESU26	100050	12 Feb 2015	07 Dec 2016
Bi-conical Antenna	R&S	HK116	100241	01 Sep 2015	01 Sep 2017
Log Periodic Antenna	R&S	HL223	841516/017	01 Sep 2015	01 Sep 2017
Coaxial cable	Harbour	LL335	N/A	10 Jun 2014	10 Jun 2016
Microwave amplifer 0.5- 26.5GHz, 25dB gain	HP	83017A	3950M00241	17 Jul 2014	17 Jul 2016
High Pass Filter (cutoff freq. =1000MHz)	Trilithic	23042	9829213	28 Oct 2015	28 Oct 2017
Horn Antenna	EMCO	3115	9002-3347	26 Aug 2015	26 Aug 2017
Active Loop Antenna	EMCO	6502	9107-2651	15 Aug 2015	15 Aug 2016

TÜV Rheinland Hong Kong Ltd.

Radio Test

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

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Results FCC Part 15 - Subpart C

Subclause 15.203 – Antenna Information

Pass

FCC 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

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

Results:

a) Antenna type: PCB Antenna

b) Manufacturer N/A
c) Model no: N/A
d) Gain with reference to an isotropic radiator: 0 dBi

Verdict: Pass

Subclause 15.207 - Disturbance Voltage on AC Mains

N/A

There is no AC mains power port on EUT. Hence this test is not applicable.

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FCC 15.247 (a)(2) - 6dB Bandwidth Measurement

Pass

FCC Requirement: Systems using digital modulation techniques may operate in the 902 – 928 MHz, 2400 –

2483.5 MHz, and 5725 – 5850 MHz bands. The minimum 6dB bandwidth shall be at

least 500kHz.

Test Specification: KDB 558074 D01 DTS Meas Guidance v03r04 Mode of operation: BLE Tx mode (2402MHz, 2440MHz, 2480MHz)

Port of testing : Temporary antenna port

Detector : Peak

RBW/VBW : 100KHz / 300KHz

Supply voltage : 6.0 VDC from DC power supply

Temperature : 23°C Humidity : 50%

Results: For test protocols please refer to Appendix 1, page 2-3.

Channel frequency (MHz)	6 dB left (MHz)	6 dB right (MHz)	6dB bandwidth (MHz)
2402	2401.646	2402.342	0.696
2440	2439.640	2440.342	0.702
2480	2479.622	2480.342	0.720

Test Specification: KDB 558074 D01 DTS Meas Guidance v03r04 Mode of operation: ZigBee Tx mode (2405MHz, 2440MHz, 2480MHz)

Port of testing : Temporary antenna port

Detector : Peak

RBW/VBW : 100KHz / 300KHz

Supply voltage : 6.0 VDC from DC power supply

Temperature : 23°C Humidity : 50%

Results: For test protocols please refer to Appendix 1, page 3-4.

Channel frequency (MHz)	6 dB left (MHz)	6 dB right (MHz)	6dB bandwidth (MHz)
2405	2404.180	2405.790	1.610
2440	2439.180	2440.790	1.610
2480	2479.180	2480.790	1.610

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FCC 15.247 (b) (1), (3) – Maximum Peak Output Power

Pass

FCC Requirement: For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-

5850MHz bands: 1 Watt (30dBm)

Test Specification: KDB 558074 D01 DTS Meas Guidance v03r04 Mode of operation: BLE Tx mode (2402MHz, 2440MHz, 2480MHz)

Port of testing : Temporary antenna port

Detector : Peak

RBW/VBW : ≥ DTS BW / ≥ 3xRBW

Span : $\geq 3 \times RBW$

Supply voltage : 6.0 VDC from DC power supply

Temperature : 23°C Humidity : 50%

Results: For test protocols please refer to Appendix 1, page 5-6.

	Frequency (MHz)	Maximum peak output power (dBm)	Cable attenuation (dB)	Output power (dBm)	Limit (W/dBm)	Verdict
	2402	-4.11	1.00	-3.11	1 / 30.0	Pass
	2440	-5.66	1.00	-4.66	1 / 30.0	Pass
ſ	2480	-6.92	1.00	-5.92	1 / 30.0	Pass

Test Specification: KDB 558074 D01 DTS Meas Guidance v03r04 Mode of operation: ZigBee Tx mode (2405MHz, 2440MHz, 2480MHz)

Port of testing : Temporary antenna port

Detector : Peak

RBW/VBW : ≥ DTS BW / ≥ 3xRBW

Span : $\geq 3 \times RBW$

Supply voltage : 6.0 VDC from DC power supply

Temperature : 23°C Humidity : 50%

Results: For test protocols please refer to Appendix 1, page 6-7.

Frequency (MHz)	Maximum peak output power (dBm)	Cable attenuation (dB)	Output power (dBm)	Limit (W/dBm)	Verdict
2405	-8.80	1.00	-7.80	1 / 30.0	Pass
2440	-9.35	1.00	-8.35	1 / 30.0	Pass
2480	-10.48	1.00	-9.48	1 / 30.0	Pass

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FCC 15.247 (d) - Spurious Conducted Emissions

Pass

FCC 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.

Test Specification: KDB 558074 D01 DTS Meas Guidance v03r04 Mode of operation: BLE Tx mode (2402MHz, 2440MHz, 2480MHz)

Port of testing : Temporary antenna port

Detector : Peak

RBW/VBW : 100 kHz / 300 kHz

Supply voltage : 6.0 VDC from DC power supply

Temperature : 23 °C Humidity : 50 %

Results: All three transmit frequency modes comply with the limit stated in subclause 15.247(d).

For test protocols refer to Appendix 1, page 8-13.

Operating frequency (MHz)	Spurious frequency (MHz)	Spurious Level (dBm)	Reference value (dBm)	Delta (dB)	Verdict
2402	9260.000	-42.37	-4.16	-38.21	Pass
2440	7440.000	-41.51	-5.67	-35.84	Pass
2480	8440.000	-42.08	-6.97	-35.11	Pass

Test Specification: KDB 558074 D01 DTS Meas Guidance v03r04 Mode of operation: ZigBee Tx mode (2405MHz, 2440MHz, 2480MHz)

Port of testing : Temporary antenna port

Detector : Peak

RBW/VBW : 100 kHz / 300 kHz

Supply voltage : 6.0 VDC from DC power supply

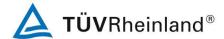
Temperature : 23 °C Humidity : 50 %

Results: All three transmit frequency modes comply with the limit stated in subclause 15.247(d).

For test protocols refer to Appendix 1, page 14-19.

Operating frequency (MHz)	Spurious frequency (MHz)	Spurious Level (dBm)	Reference value (dBm)	Delta (dB)	Verdict
2405	9280.000	-42.27	-12.85	-29.42	Pass
2440	9240.000	-41.48	-13.07	-28.41	Pass
2480	9260.000	-42.77	-14.73	-28.04	Pass

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FCC 15.247 (d) - Radiated Spurious Emissions

Pass

FCC 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 section15.205(a), must also comply with the radiated emission

limits specified in section 15.209(a).

Test Specification : ANSI C63.10 - 2013

Mode of operation : BLE Tx mode (2402MHz, 2440MHz, 2480MHz), hopping off

Port of testing : Enclosure Detector : Peak

RBW/VBW : 100 kHz / 300 kHz for f < 1 GHz

1 MHz / 3 MHz for f > 1 GHz

Measurement range : 9kHz to 25GHz Supply voltage : 6.0 VDC from battery

Temperature : 23°C Humidity : 50%

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

combinations in available packet length.

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 Polarizatio
----------------------	----------------------

Freq MHz	Level dBμV/m	Limit/ Detector dBµV/m
2390.000	50.48	74.0 / P
2390.000	38.86	54.0 / A
4803.940	53.99	74.0 / P
4804.048	41.82	54.0 / A

Tx frequency 2402MHz Horizontal Polarization

Level dΒμV/m	Limit/ Detector dBµV/m
53.79	74.0 / P
44.42	54.0 / A
53.30	74.0 / P
41.22	54.0 / A
	53.79 44.42 53.30

Tx frequency 2440MHz Vertical Polarization

Freq MHz	Level dBμV/m	Limit/ Detector dBµV/m
4879.584	54.12	74.0 / P
4879.968	43.81	54.0 / A

Tx frequency 2440MHz Horizontal Polarization

Freq	Level	Limit/ Detector
MHz	dBμV/m	dBμV/m
4880.536	54.80	74.0 / P
4879.912	45.58	54.0 / A

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Tx frequency 2480MHz	Vertical Polarization	
Freq	Level	Limit/ Detector
MHz	dBμV/m	dBμV/m
2483.500	54.65	74.0 / P
2483.500	43.97	54.0 / A
4960.024	54.18	74.0 / P
4959.904	44.29	54.0 / A
Tx frequency 2480MHz	Horizontal Polarization	
Freq	Level	Limit/ Detector
MHz	dBμV/m	dBμV/m
2483.500	59.62	74.0 / P
2483.500	52.27	54.0 / A
4960.240	52.82	74.0 / P
4959.808	39.37	54.0 / A
1 MH Measurement range : 9kHz	kHz / 300 kHz for f < 1 GHz z / 3 MHz for f > 1 GHz	
Humidity: 50% Results: Pre-scar combina All three bands. T	h has been conducted to determine the wortions in available packet length. transmit frequency modes comply with the here is no spurious found below 30MHz.	
Humidity : 50% Results: Pre-scar combina All three bands. T Tx frequency 2405MHz	tions in available packet length. transmit frequency modes comply with the here is no spurious found below 30MHz. Vertical Polarization	field strength within the restricted
Humidity: 50% Results: Pre-scar combina All three bands. To the frequency 2405MHz Freq	tions in available packet length. transmit frequency modes comply with the here is no spurious found below 30MHz. Vertical Polarization Level	field strength within the restricted Limit/ Detector
Humidity: 50% Results: Pre-scar combina All three bands. To the frequency 2405MHz Freq MHz	tions in available packet length. transmit frequency modes comply with the here is no spurious found below 30MHz. Vertical Polarization Level dBµV/m	field strength within the restricted Limit/ Detector dBμV/m
Humidity: 50% Results: Pre-scar combina All three bands. To the frequency 2405MHz Freq MHz 2390.000	tions in available packet length. transmit frequency modes comply with the here is no spurious found below 30MHz. Vertical Polarization Level dBµV/m 45.26	Limit/ Detector dBµV/m 74.0 / P
Humidity: 50% Results: Pre-scar combina All three bands. To the frequency 2405MHz Freq MHz 2390.000 2390.000	tions in available packet length. transmit frequency modes comply with the here is no spurious found below 30MHz. Vertical Polarization Level dBµV/m 45.26 32.95	field strength within the restricted Limit/ Detector dBμV/m
Humidity: 50% Results: Pre-scar combina All three bands. T Tx frequency 2405MHz Freq MHz 2390.000 2390.000 Tx frequency 2405MHz	tions in available packet length. transmit frequency modes comply with the here is no spurious found below 30MHz. Vertical Polarization Level dBµV/m 45.26 32.95 Horizontal Polarization	Limit/ Detector dBµV/m 74.0 / P 54.0 / A
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Humidity: 50% Results: Pre-scar combina All three bands. T Tx frequency 2405MHz Freq MHz 2390.000 2390.000 Tx frequency 2405MHz Freq MHz Freq MHz	transmit frequency modes comply with the here is no spurious found below 30MHz. Vertical Polarization Level dBµV/m 45.26 32.95 Horizontal Polarization Level dBµV/m	Limit/ Detector dBµV/m 74.0 / P 54.0 / A Limit/ Detector dBµV/m
Humidity: 50% Results: Pre-scar combina All three bands. T Tx frequency 2405MHz Freq MHz 2390.000 Tx frequency 2405MHz Freq MHz 2390.000	transmit frequency modes comply with the here is no spurious found below 30MHz. Vertical Polarization Level dBµV/m 45.26 32.95 Horizontal Polarization Level dBµV/m 46.06	Limit/ Detector dBµV/m 74.0 / P 54.0 / A Limit/ Detector dBµV/m 74.0 / P
Humidity: 50% Results: Pre-scar combina All three bands. T Tx frequency 2405MHz Freq MHz 2390.000 2390.000 Tx frequency 2405MHz Freq MHz 2390.000 2390.000 2390.000	transmit frequency modes comply with the here is no spurious found below 30MHz. Vertical Polarization Level dBµV/m 45.26 32.95 Horizontal Polarization Level dBµV/m	Limit/ Detector dBµV/m 74.0 / P 54.0 / A Limit/ Detector dBµV/m
Humidity: 50% Results: Pre-scar combina All three bands. T Tx frequency 2405MHz Freq MHz 2390.000 2390.000 Tx frequency 2405MHz Freq MHz 2390.000 2390.000 Tx frequency 2440MHz Freq Freq Freq Freq Freq Freq Freq Freq MHz Freq Freq MHz Freq Freq	transmit frequency modes comply with the here is no spurious found below 30MHz. Vertical Polarization Level dBµV/m 45.26 32.95 Horizontal Polarization Level dBµV/m 46.06 32.97	Limit/ Detector dBµV/m 74.0 / P 54.0 / A Limit/ Detector dBµV/m 74.0 / P
Humidity: 50% Results: Pre-scar combina All three bands. T Tx frequency 2405MHz Freq MHz 2390.000 2390.000 Tx frequency 2405MHz Freq MHz 2390.000 2390.000 2390.000 Tx frequency 2440MHz	tions in available packet length. transmit frequency modes comply with the here is no spurious found below 30MHz. Vertical Polarization Level dBµV/m 45.26 32.95 Horizontal Polarization Level dBµV/m 46.06 32.97 Vertical Polarization	Limit/ Detector dBµV/m 74.0 / P 54.0 / A Limit/ Detector dBµV/m 74.0 / A
Humidity: 50% Results: Pre-scar combina All three bands. T Tx frequency 2405MHz Freq MHz 2390.000 2390.000 Tx frequency 2405MHz Freq MHz 2390.000 2390.000 Tx frequency 2440MHz Freq Freq Freq Freq Freq Freq MHz 2390.000 2390.000 Tx frequency 2440MHz Freq	tions in available packet length. transmit frequency modes comply with the here is no spurious found below 30MHz. Vertical Polarization Level dBµV/m 45.26 32.95 Horizontal Polarization Level dBµV/m 46.06 32.97 Vertical Polarization Level	Limit/ Detector dBµV/m 74.0 / P 54.0 / A Limit/ Detector dBµV/m 74.0 / A Limit/ Detector dBµV/m 74.0 / P 54.0 / A
Results: Pre-scar combina All three bands. T Fix frequency 2405MHz Freq MHz 2390.000 2390.000 Fix frequency 2405MHz Freq MHz 2390.000 2390.000 Fix frequency 2440MHz Freq MHz Freq MHz 1390.000 15x frequency 2440MHz Freq MHz Freq MHz	transmit frequency modes comply with the here is no spurious found below 30MHz. Vertical Polarization Level dBµV/m 45.26 32.95 Horizontal Polarization Level dBµV/m 46.06 32.97 Vertical Polarization Level dBµV/m 46.06 46.06 40	Limit/ Detector dBµV/m 74.0 / P 54.0 / A Limit/ Detector dBµV/m 74.0 / P 54.0 / A Limit/ Detector dBµV/m 74.0 / P 54.0 / A
Humidity: 50% Results: Pre-scar combina All three bands. T Tx frequency 2405MHz Freq MHz 2390.000 2390.000 Tx frequency 2405MHz Freq MHz 2390.000 Tx frequency 2405MHz Freq MHz No peak found No peak found	tions in available packet length. transmit frequency modes comply with the here is no spurious found below 30MHz. Vertical Polarization Level dBµV/m 45.26 32.95 Horizontal Polarization Level dBµV/m 46.06 32.97 Vertical Polarization Level dBµV/m 46.06 32.97 Vertical Polarization Level dBµV/m	Limit/ Detector dBµV/m 74.0 / P 54.0 / A Limit/ Detector dBµV/m 74.0 / P 54.0 / A Limit/ Detector dBµV/m 74.0 / P 54.0 / A
Humidity : 50% Results: Pre-scar combina All three bands. T Tx frequency 2405MHz Freq MHz 2390.000 2390.000 Tx frequency 2405MHz Freq MHz 2390.000 2390.000 Tx frequency 2440MHz Freq MHz No peak found	tions in available packet length. transmit frequency modes comply with the here is no spurious found below 30MHz. Vertical Polarization Level dBµV/m 45.26 32.95 Horizontal Polarization Level dBµV/m 46.06 32.97 Vertical Polarization Level dBµV/m	Limit/ Detector dBµV/m 74.0 / P 54.0 / A Limit/ Detector dBµV/m 74.0 / P 54.0 / A Limit/ Detector dBµV/m 74.0 / P 54.0 / A

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No peak found		74.0 / P
No peak found		54.0 / A
Tx frequency 2480MHz	Vertical Polarization	
Freq	Level	Limit/ Detector
MHz	dBμV/m	dBμV/m
2483.500	52.71	74.0 / P
2483.500	39.25	54.0 / A
Tx frequency 2480MHz	Horizontal Polarization	
Freq	Level	Limit/ Detector
MHz	dBμV/m	dBμV/m
2483.500	59.08	74.0 / P
2483.500	43.80	54.0 / A

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FCC 15.247 (d) – Band Edge Emissions (Conducted)

Pass

FCC 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.

Test Specification: KDB 558074 D01 DTS Meas Guidance v03r04

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

Port of testing : Temporary antenna port

Detector : Peak

RBW/VBW : 100 kHz / 300 kHz

Supply voltage : 6.0 VDC from DC power supply

Temperature : 23°C Humidity : 50%

Results: The peak found outside any 100 kHz bandwidth of the operating frequency band comply

with the requirement. For test protocols refer to Appendix 1, page 20.

Operating frequency (MHz)	Spurious frequency (MHz)	Spurious Level (dBm)	Reference value (dBm)	Delta (dB)	Verdict
2402	2399.280	-35.92	-4.72	-31.20	Pass
2480	2485.760	-50.82	-6.88	-43.94	Pass

Test Specification: KDB 558074 D01 DTS Meas Guidance v03r04

Mode of operation: ZigBee Tx mode (2405MHz, 2480MHz)

Port of testing : Temporary antenna port

Detector : Peak

RBW/VBW : 100 kHz / 300 kHz

Supply voltage : 6.0 VDC from DC power supply

Temperature : 23°C Humidity : 50%

Results: The peak found outside any 100 kHz bandwidth of the operating frequency band comply

with the requirement. For test protocols refer to Appendix 1, page 21.

Operating frequency (MHz)	Spurious frequency (MHz)	Spurious Level (dBm)	Reference value (dBm)	Delta (dB)	Verdict
2405	2386.260	-51.43	-12.44	-38.99	Pass
2480	2483.640	-51.05	-14.56	-36.49	Pass

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FCC 15.247 (e) - Power Spectral Density

Pass

FCC Requirement: For digitally modulated systems, the power spectral density conducted from the

intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band

during any time interval of continuous transmission.

Test Specification: KDB 558074 D01 DTS Meas Guidance v03r04 Mode of operation: BLE Tx mode (2402MHz, 2440MHz, 2480MHz)

Port of testing : Temporary antenna port

Detector : Peak

RBW/VBW : $\geq 100 \text{ kHz} / \geq 3x \text{RBW}$ span : $\geq 1.5 \text{ x DTS BW}$

Supply voltage : 6.0 VDC from DC power supply

Temperature : 23°C Humidity : 50%

Results: For test protocols please refer to Appendix 1, page 22-23.

Operating frequency (MHz)	Power density (dBm)	Limit (dBm)	Verdict
2402	-4.16	8.0	Pass
2440	-5.67	8.0	Pass
2480	-6.97	8.0	Pass

Test Specification: KDB 558074 D01 DTS Meas Guidance v03r04 Mode of operation: ZigBee Tx mode (2405MHz, 2440MHz, 2480MHz)

Port of testing : Temporary antenna port

Detector : Peak

RBW/VBW : \geq 100 kHz / \geq 3xRBW span : \geq 1.5 x DTS BW

Supply voltage : 6.0 VDC from DC power supply

Temperature : 23°C Humidity : 50%

Results: For test protocols please refer to Appendix 1, page 23-24.

Operating frequency (MHz)	Power density (dBm)	Limit (dBm)	Verdict
2405	-12.85	8.0	Pass
2440	-13.07	8.0	Pass
2480	-14.73	8.0	Pass

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