TÜVRheinland®

Produkte
Products

Prüfbericht - Nr.: *Test Report No.:*	**14033931 001**	**Seite 1 von 19** *Page 1 of 19*
Auftraggeber: *Client:*	**Sunflex Europe GmbH** **Konrad-Zuse-Str. 13** **58239 Schwerte** **Germany**	
Gegenstand der Prüfung: *Test Item:*	**Bluetooth Game Controller**	
Bezeichnung: *Identification:*	**V907364, V01181**	**Serien-Nr.:** *Serial No.:* **Engineering sample**
Wareneingangs-Nr.: *Receipt No.:*	**A000038280-001**	**Eingangsdatum:** *Date of Receipt:* **19.02.2014**
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.** Address: 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China	
Zustand des Prüfgegenstandes bei Anlieferung: *Condition of test item at delivery:*	Test sample(s) is/are not damaged and suitable for testing.	
Prüfgrundlage: *Test Specification:*	**FCC Part 15 Subpart C** **RSS-210 Issue 8** **RSS-Gen Issue 3** **ANSI C63.4-2003** **CISPR 22:1997**	
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:*		
02.04.2014	Hugo Wan Senior Project Manager		02.04.2014	Sharon Li Section Manager	
Datum *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*	**Datum** *Date*	**Name/Stellung** *Name/Position*	**Unterschrift** *Signature*

Sonstiges: **FCC ID 2AA95-V907364**
IC: 11532A-V907364
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

	Transceiver
Operating frequency range	2402 - 2480 MHz
Type of modulation	GFSK; Pi/4 DQPSK; 8 DPSK
Number of channels	79
Channel separation	1 MHz
Type of antenna	PCB Antenna
Antenna gain (dBi)	0
Power level	fix
Type of equipment	stand alone radio device
Connection to public utility power line	No
Nominal voltage	V_{nor}: 4.2 VDC internal battery
Independent Operation Modes	Transmitting Receiving

Product function and intended use

The EUT is a Bluetooth game controller which can connect with Bluetooth enabled tablet to provide controlling function in wireless.

The controller has three different operating modes which can be activated via the switch at the back of the housing. The two main modes (analog and digital) only differ in how the trigger operates. The analog mode is used for games that require continuous trigger function, e.g. racing games. Most games are compatible with physical input devices which should work with digital triggers.

For details, please refer to the datasheet.

Submitted documents

Circuit Diagram
Block Diagram
Bill of material
User manual

Remark

Special accessories and auxiliary equipment

Nil

Independent Operation Modes

The basic operation modes are:

- Bluetooth 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.

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.

- There was no special software to exercise the device. The EUT was tested under test mode provided by client directly.

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 were performed according to the procedures in ANSI C63.4-2003.

The equipment under test (EUT) was placed at the middle of the 80 cm height turntable, and 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.

List of Test and Measurement Instruments

Global United Technology Services Co., Ltd.
(FCC Registration number: 600491, IC Registration number: 9079A-2)

Radiated Emission

Equipment	Manufacturer	Type	S/N	Cal. Date	Cal Due Date
3m Semi- Anechoic Chamber	ZhongYu Electron	9.0(L)*6.0(W)* 6.0(H)	--	06 Apr 2013	05 Apr 2015
Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	--	N/A	N/A
ESU EMI Test Receiver	R&S	ESU26	--	29 Jun 2013	28 Jun 2014
Loop Antenna	Zhinan	ZN30900A	--	29 Jun 2013	28 Jun 2014
Bi-log Hybrid Antenna	SCHWARZBECK	VULB9163	--	09 Mar 2014	08 Mar 2015
Double-ridged horn antenna	SCHWARZBECK	9120D	--	09 Mar 2014	08 Mar 2015
Horn Antenna	ETS-LINDGREN	3160-09	--	09 Mar 2014	08 Mar 2015
RF Amplifier	HP	8347A	--	29 Jun 2013	28 Jun 2014
RF Amplifier	HP	8349B	--	29 Jun 2013	28 Jun 2014
EMI Test Software	AUDIX	E3	--	N/A	N/A
Coaxial cable	GTS	N/A	--	29 Jun 2013	28 Jun 2014
Coaxial Cable	GTS	N/A	--	29 Jun 2013	28 Jun 2014
Thermo meter	N/A	N/A	--	1 Jul 2013	30 Jun 2014

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Radio Test

Equipment	Manufacturer	Type	S/N	Cal. Date	Cal Due Date
Spectrum Analyzer	Rohde & Schwarz	FSP30	100007	03 Dec 2013	03 Dec 2014

Results FCC Part 15 – Subpart C / RSS-Gen, RSS-210

FCC 15.203 / RSS-Gen 7.1.2 – Antenna Requirement 1	**Pass**
FCC Requirement:	No antenna other than that furnished by the responsible party shall be used with the device
IC Requirement:	A transmitter can only be sold or operated with antennas with which it was approved. Any antenna of the same type having equal or lesser gain as an antenna that had been successfully tested with the transmitter, will also be considered approved with the transmitter, and may be used and marketed with the transmitter.
Results:	Permanent attached antenna
Verdict:	Pass

FCC 15.204 / RSS-Gen 7.1.2 – Antenna Requirement 2	**Pass**
FCC Requirement:	Provide information for every antenna proposed for the use with the EUT
IC Requirement:	When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer.
Results:	a) Antenna type: PCB Antenna b) Manufacturer and model no: N.A. c) Gain with reference to an isotropic radiator: 0 dBi
Verdict:	Pass

RSS-Gen 5.4 – Transmitter External Control	**Pass**
IC Requirement:	The device shall not have any external controls accessible to the user that enable it to be adjusted, selected or programmed to operate in violation of the limits prescribed in the applicable RSS.
Results:	The device does not have any transmitter external controls accessible to the user that can be adjusted and operated in violation of the limits of this standard.
Verdict:	Pass

FCC 15.207 / RSS-Gen 7.2.4 – Disturbance Voltage on AC Mains	**N/A**
The EUT does not have AC mains power input power, hence this test is not applicable.	

FCC 15.247 (a)(1) / RSS-210 A8.1(b) – Carrier Frequency Separation	Pass
FCC 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.
IC Requirement:	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the -20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the band 2400-2483.5 MHz may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the -20 dB bandwidth of the hopping channel, whichever is greater, provided that the systems operate with an output power no greater than 0.125 W.
Test Specification : FCC Part 15 Subpart A – Subclause 15.31 / RSS-Gen Mode of operation : Tx mode (hopping on), 8DPSK Port of testing : Temporary antenna port Detector : Peak RBW/VBW : 100 kHz / 300 kHz Supply voltage : 4.2VDC Temperature : 23ºC Humidity : 50%	
Results:	Pre-scan has been conducted 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

FCC 15.247 (a)(1)(iii) / RSS-210 A8.1(d) – Number of hopping channels	Pass
FCC Requirement:	Frequency hopping systems operating in the 2400MHz-2483.5MHz bands shall use at least 15 hopping frequencies.
IC Requirement:	Frequency hopping systems operating in the band 2400-2483.5 MHz shall use at least 15 hopping channels.
Test Specification : FCC Part 15 Subpart A – Subclause 15.31 / RSS-Gen Mode of operation : Tx mode (hopping on), GFSK Port of testing : Temporary antenna port Detector : Peak RBW/VBW : 1 MHz / 3 MHz Supply voltage : 4.2 VDC Temperature : 23ºC 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

FCC 15.247 (a)(1)(iii) / RSS-210 A8.1(d) – Time of Occupancy (Dwell Time) **Pass**

FCC 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.

IC Requirement: 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 / RSS-Gen
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 : 4.2 VDC
Temperature : 23ºC
Humidity : 50%

Results: Time period calculation = 0.4 x 79 = 31.6s
Dwell time = 107 x 2.904 x 10^{-3} = 310.728 x 10^{-3} s
<= 400 x 10^{-3} s

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

Verdict: Pass

FCC 15.247 (a) / RSS-210 A8.1(a) – 20 dB Bandwidth **Pass**

FCC 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.

IC Requirement: The bandwidth of a frequency hopping channel is the -20 dB emission bandwidth, measured with the hopping stopped.

Test Specification : FCC Part 15 Subpart A – Subclause 15.31 / RSS-Gen
Mode of operation : Tx mode (2402MHz, 2441MHz, 2480MHz)
Port of testing : Temporary antenna port
Detector : Peak
RBW/VBW : 30 kHz / 100 kHz
Supply voltage : 4.2 VDC
Temperature : 23ºC
Humidity : 50%

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, page 5-8.

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	0.474	0.930

2480	0.468	0.474	0.942
8DPSK Modulation			
Frequency (MHz)	**20 dB left (MHz)**	**20 dB right (MHz)**	**20dB bandwidth (MHz)**
2402	0.660	0.660	1.320
2441	0.660	0.654	1.314
2480	0.654	0.648	1.302

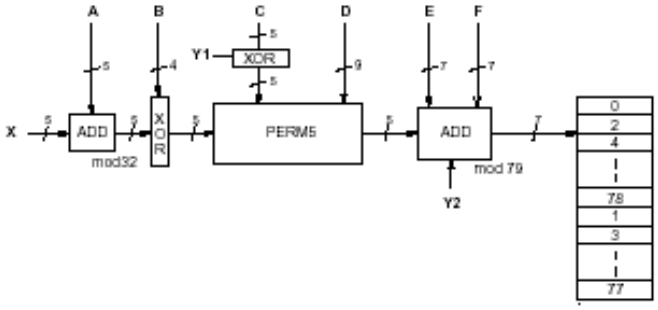
FCC 15.247 (a) / RSS-210 A8.1(a) – Hopping Sequence **Pass**

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

IC Requirement: The system radio frequency (RF) bandwidth is equal to the channel bandwidth multiplied by the number of channels in the hopset. The hopset shall be such that the near-term distribution of frequencies appears random, with sequential hops randomly distributed in both direction and magnitude of change in the hopset, while the long-term distribution appears evenly distributed.

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.



Example data:

Hop sequence {k} for CONNECTION STATE:
CLK start: 0x0000010
ULAP: 0x00000000

#ticks:	00 02	04 06	08 0a	0c 0e	10 12	14 16	18 1a	1c 1e
0x0000010:	08 66	10 70	12 19	14 23	16 01	18 05	20 33	22 37
0x0000030:	24 03	26 07	28 35	30 39	32 72	34 76	36 25	38 29
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
0x00000d0:	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:	01 51	03 55	05 04	07 08	72 57	74 61	76 10	78 14
0x0000130:	09 59	11 63	13 12	15 16	17 65	19 69	21 18	23 22
0x0000150:	33 67	35 71	37 20	39 24	25 73	27 77	29 26	31 30
0x0000170:	41 75	43 00	45 28	47 32	17 02	21 04	19 34	23 36
0x0000190:	33 06	37 08	35 38	39 40	25 10	29 12	27 42	31 44
0x00001b0:	41 14	45 16	43 46	47 48	49 18	53 20	51 50	55 52
0x00001d0:	65 22	69 24	67 54	71 56	57 26	61 28	59 58	63 60
0x00001f0:	73 30	77 32	75 62	00 64	49 34	51 42	57 66	59 74
0x0000210:	53 36	55 44	61 68	63 76	65 50	67 58	73 03	75 11
0x0000230:	69 52	71 60	77 05	00 13	02 38	04 46	10 70	12 78
0x0000250:	06 40	08 48	14 72	16 01	18 54	20 62	26 07	28 15
0x0000270:	22 56	24 64	30 09	32 17	02 66	06 74	10 19	14 27
0x0000290:	04 70	08 78	12 23	16 31	18 03	22 11	26 35	30 43
0x00002b0:	20 07	24 15	28 39	32 47	34 68	38 76	42 21	46 29
0x00002d0:	36 72	40 01	44 25	48 33	50 05	54 13	58 37	62 45
0x00002f0:	52 09	56 17	60 41	64 49	34 19	36 35	50 51	52 67
0x0000310:	38 21	40 37	54 53	56 69	42 27	44 43	58 59	60 75
0x0000330:	46 29	48 45	62 61	64 77	66 23	68 39	03 55	05 71
0x0000350:	70 25	72 41	07 57	09 73	74 31	76 47	11 63	13 00
0x0000370:	78 33	01 49	15 65	17 02	66 51	70 67	03 04	07 20
0x0000390:	68 55	72 71	05 08	09 24	74 59	78 75	11 12	15 28
0x00003b0:	76 63	01 00	13 16	17 32	19 53	23 69	35 06	39 22
0x00003d0:	21 57	25 73	37 10	41 26	27 61	31 77	43 14	47 30
0x00003f0:	29 65	33 02	45 18	49 34	19 04	21 08	23 20	25 24

FCC 15.247 (a) / RSS-210 A8.1(a) – Equal Hopping Frequency Use	**Pass**
FCC Requirement:	Each of the transmitter's hopping channels is used equally on average.
IC Requirement:	The system radio frequency (RF) bandwidth is equal to the channel bandwidth multiplied by the number of channels in the hopset. The hopset shall be such that the near-term distribution of frequencies appears random, with sequential hops randomly distributed in both direction and magnitude of change in the hopset, while the long-term distribution appears evenly distributed.

Equal hopping frequency use

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

FCC 15.247 (a) / RSS-210 A8.1(b) – Receiver Input Bandwidth	Pass
FCC Requirement:	The associated receiver(s) complies with the requirement that its input bandwidth matches the bandwidth of the transmitted signal.
IC Requirement:	The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.
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.	

FCC 15.247 (a) – Receiver Hopping Capability	Pass
FCC 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.	

FCC 15.247 (b)(1) / RSS-210 A8.4(2) – Peak Output Power **Pass**

Test Specification : FCC Part 15 Subpart A – Subclause 15.31 / RSS-Gen
Mode of operation : Tx mode (2402MHz, 2441MHz, 2480MHz), GFSP, π/4-DPSK and 8DPSK
Port of testing : Temporary antenna port
Detector : Peak
RBW/VBW : 3 MHz / 10 MHz
Supply voltage : 4.2 VDC
Temperature : 23ºC
Humidity : 50%

FCC 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.

IC Requirement: For frequency hopping systems operating in the band 2400-2483.5 MHz and employing at least 75 hopping channels, the maximum peak conducted output power shall not exceed 1 W; for all other frequency hopping systems in the band, the maximum peak conducted output power shall not exceed 0.125 W.

Results: For test protocols please refer to Appendix 1, page 9-14.

GFSK Modulation

Frequency (MHz)	Maximum peak output power (dBm)	Cable attenuation (dB)	Output power (dBm)	Limit (W/dBm)	Verdict
2402	-2.67	0.00	-2.67	1 / 30.0	Pass
2441	-1.54	0.00	-1.54	1 / 30.0	Pass
2480	-1.14	0.00	-1.14	1 / 30.0	Pass

π/4-DPSK Modulation

Frequency (MHz)	Maximum peak output power (dBm)	Cable attenuation (dB)	Output power (dBm)	Limit (W/dBm)	Verdict
2402	-1.96	0.00	-1.96	0.125 / 21.0	Pass
2441	-0.74	0.00	-0.74	0.125 / 21.0	Pass
2480	-0.90	0.00	-0.90	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	-2.09	0.00	-2.09	0.125 / 21.0	Pass
2441	-0.68	0.00	-0.68	0.125 / 21.0	Pass
2480	-0.74	0.00	-0.74	0.125 / 21.0	Pass

FCC 15.247 (d) / RSS-210 A8.5 – Band edge compliance of conducted emissions	**Pass**

Test Specification : FCC Part 15 Subpart A – Subclause 15.31 / RSS-Gen
Mode of operation : Tx mode (2402MHz, 2480MHz), 8DPSK
Port of testing : Temporary antenna port
Detector : Peak
RBW/VBW : 100 kHz / 300 kHz
Supply voltage : 4.2 VDC
Temperature : 23ºC
Humidity : 50%

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.

IC Requirement: In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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, provided that the transmitter demonstrates compliance with the peak conducted power limits.

Results: Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types.

There is no peak found outside any 100 kHz bandwidth of the operating frequency band. For test protocols refer to Appendix 1, page 15-16.

FCC 15.205 (a) – Restricted Bands next to Band-edge	**Pass**

Test Specification : FCC Part 15 Subpart A – Subclause 15.31
Mode of operation : Tx mode (2402MHz, 2480MHz), GFSK
Port of testing : Enclosure
Detector : a) Peak, b) Average
RBW/VBW : a) 1 MHz / 3 MHz (Peak), b) 1MHz / 10Hz (Average)
Supply voltage : 4.2 VDC
Temperature : 23ºC
Humidity : 50%

FCC 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: Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and packet types.

There is no peak found in the restricted bands. For test protocols refer to Appendix 1, page 17-20.

FCC 15.247 (d) / RSS-210 A8.5 – Spurious Conducted Emissions **Pass**

Test Specification : FCC Part 15 Subpart A – Subclause 15.31 / RSS-Gen
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 : 4.2 VDC
Temperature : 23 ºC
Humidity : 50 %

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.

IC Requirement: In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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, provided that the transmitter demonstrates compliance with the peak conducted power limits.

Results: Pre-scan has been conducted 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 21-22.

Operating frequency (MHz)	Spurious frequency (MHz)	Spurious Level (dBm)	Reference value (dBm)	Delta (dB)	Verdict
2402	4800	-48.82	-4.42	-44.40	Pass
2441	4850	-47.63	-5.21	-42.42	Pass
2480	4950	-54.27	-4.18	-50.09	Pass

FCC 15.247 (c) / RSS-Gen 7.2.5 – Spurious Radiated Emissions **Pass**

Test Specification : ANSI C63.4 – 2003
Mode of operation : Tx mode (2402MHz, 2441MHz, 2480MHz), GFSK
Port of testing : Enclosure
Detector : Peak
RBW/VBW : 100 kHz / 300 kHz for f < 1 GHz
1 MHz / 3 MHz for f > 1 GHz
Supply voltage : 4.2 VDC
Temperature : 23ºC
Humidity : 50%

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 15.205(c).

IC Requirement: Spurious emissions from licence-exempt transmitters shall comply with the field strength limits shown in table 5. Additionally, the level of any transmitter spurious emission shall not exceed the level of the transmitter's fundamental emission.

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

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4808.000	58.2	74.0 / PK
4808.000	48.1	54.0 / AV

Tx frequency 2402MHz Horizontal Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4808.000	61.2	74.0 / PK
4808.000	49.8	54.0 / AV

Tx frequency 2441MHz Vertical Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4876.000	56.1	74.0 / PK
4876.000	45.8	54.0 / AV

Tx frequency 2441MHz Horizontal Polarization

Freq MHz	Level dBuV/m	Limit/ Detector dBuV/m
4876.000	60.9	74.0 / PK
4876.000	49.8	54.0 / AV

Tx frequency 2480MHz	Vertical Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
4961.000	57.5	74.0 / PK
4961.000	46.0	54.0 / AV
Tx frequency 2480MHz	Horizontal Polarization	
Freq MHz	**Level dBuV/m**	**Limit/ Detector dBuV/m**
4961.000	60.1	74.0 / PK
4961.000	48.5	54.0 / AV