FCC Test Report

Product Name	Klipsch Heritage Wireless TableTop Bluetooth Small
Model No.	the One II
FCC ID.	2AJAATHEONEII

Applicant	Dongguan Meiloon Acoustic Equipments Co., Ltd.	
Address	77, Yuanlin Road, Feng Huang Gang Ind Estate, Tangxia Town,	
	523727 Dongguan City, Guangdong Province, China	

Date of Receipt	Mar. 28, 2019
Issued Date	Apr. 22, 2019
Report No.	1930453R-RFUSP01V00
Report Version	V1.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.

This report must not be used to claim product endorsement by TAF or any agency of the government.

The test report shall not be reproduced without the written approval of DEKRA Testing and Certification Co., Ltd.



Test Report

Issued Date: Apr. 22, 2019 Report No.: 1930453R-RFUSP01V00

DEKRA

Product Name	Klipsch Heritage Wireless TableTop Bluetooth Small		
Applicant	Dongguan Meiloon Acoustic Equipments Co., Ltd.		
Address	77, Yuanlin Road, Feng Huang Gang Ind Estate, Tangxia Town, 523727		
	Dongguan City, Guangdong Province, China		
Manufacturer	Klipsch Group, Inc .		
Model No.	the One II		
FCC ID.	2AJAATHEONEII		
EUT Rated Voltage	AC 100-240V, 50/60Hz		
EUT Test Voltage	AC 120V/ 60Hz		
Trade Name	Klipsch		
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2017		
ANSI C63.4: 2014, ANSI C63.10: 2013			
	KDB 558074 D01 15.247 Meas Guidance v05		
Test Result	Complied		

Documented By :

Jessie Ciou

(Adm. Assistant / Jessie Ciou)

Tested By

:

Sam Hsu

(Engineer / Sam Hsu)

Approved By :

nn

(Director / Vincent Lin)



TABLE OF CONTENTS

SC	cription	Page
	GENERAL INFORMATION	5
	EUT Description	5
	Tested System Details	7
	Configuration of Tested System	7
	EUT Exercise Software	7
	Test Facility	
	List of Test Equipment	9
	CONDUCTED EMISSION	
	Test Setup	10
	Limits	11
	Test Procedure	11
	Uncertainty	
	Test Result of Conducted Emission	12
	PEAK POWER OUTPUT	
	Test Setup	
	Limit	
	Test Procedure	
	Uncertainty	
	Test Result of Peak Power Output	
	RADIATED EMISSION	
	Test Setup	
	Limits	
	Test Procedure	
	Uncertainty	
	Test Result of Radiated Emission	
	RFANTENNA CONDUCTED TEST	
	Test Setup	
	Limits	
	Test Procedure	
	Uncertainty	
	Test Result of RF Antenna Conducted Test	39
	BAND EDGE	41
	Test Setup	
	Limit	
	Test Procedure	
	Uncertainty	
	Test Result of Band Edge	43
	CHANNEL NUMBER	63
	Test Setup	63
	Limit	63
	Test Procedure	63
	Uncertainty	63
	Test Result of Channel Number	64
	CHANNEL SEPARATION	66
	Test Setup	66
	Limit	66
	Test Procedure	66
	Uncertainty	66
	Test Result of Channel Separation	67
	DWELL TIME	71
	Test Setup	71
	Limit	71
	Test Procedure	71
	Uncertainty	71
	Test Result of Dwell Time	72
	OCCUPIED BANDWIDTH	
	Test Setup	76
	Limits	76

DEKRA

10.3.	Test H	Procedure	76
10.4.	Uncer	rtainty	76
10.5.	Test F	Result of Occupied Bandwidth	77
11.	EMI	REDUCTION METHOD DURING COMPLIANCE TESTING	81
Attachme	ent 1:	EUT Test Photographs	

Attachment 2: EUT Detailed Photographs



1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Klipsch Heritage Wireless TableTop Bluetooth Small		
Trade Name	Klipsch		
Model No.	the One II		
FCC ID.	2AJAATHEONEII		
Frequency Range	2402-2480MHz		
Channel Number	79		
Type of Modulation	FHSS: GFSK(1Mbps) / π /4DQPSK(2Mbps) / 8DPSK(3Mbps)		
Antenna Type	IFA Antenna		
Channel Control	Auto		
Antenna Gain	Refer to the table "Antenna List"		
Power Adapter	MFR: DYS, M/N: DYS650-200250W-K		
	Input: AC 100-240V, 50/60Hz, 1.3A		
	Output: DC 20V 2.5A		
	Cable Out: Non-Shielded, 1.5m		

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	Meiloon	N/A	IFA Antenna	0.5 dBi for 2.4 GHz

Note:

1. The antenna of EUT conforms to FCC 15.203.



Center Frequency of Each Channel:

-	-						
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 00:	2402 MHz	Channel 20:	2422 MHz	Channel 40:	2442 MHz	Channel 60:	2462 MHz
Channel 01:	2403 MHz	Channel 21:	2423 MHz	Channel 41:	2443 MHz	Channel 61:	2463 MHz
Channel 02:	2404 MHz	Channel 22:	2424 MHz	Channel 42:	2444 MHz	Channel 62:	2464 MHz
Channel 03:	2405 MHz	Channel 23:	2425 MHz	Channel 43:	2445 MHz	Channel 63:	2465 MHz
Channel 04:	2406 MHz	Channel 24:	2426 MHz	Channel 44:	2446 MHz	Channel 64:	2466 MHz
Channel 05:	2407 MHz	Channel 25:	2427 MHz	Channel 45:	2447 MHz	Channel 65:	2467 MHz
Channel 06:	2408 MHz	Channel 26:	2428 MHz	Channel 46:	2448 MHz	Channel 66:	2468 MHz
Channel 07:	2409 MHz	Channel 27:	2429 MHz	Channel 47:	2449 MHz	Channel 67:	2469 MHz
Channel 08:	2410 MHz	Channel 28:	2430 MHz	Channel 48:	2450 MHz	Channel 68:	2470 MHz
Channel 09:	2411 MHz	Channel 29:	2431 MHz	Channel 49:	2451 MHz	Channel 69:	2471 MHz
Channel 10:	2412 MHz	Channel 30:	2432 MHz	Channel 50:	2452 MHz	Channel 70:	2472 MHz
Channel 11:	2413 MHz	Channel 31:	2433 MHz	Channel 51:	2453 MHz	Channel 71:	2473 MHz
Channel 12:	2414 MHz	Channel 32:	2434 MHz	Channel 52:	2454 MHz	Channel 72:	2474 MHz
Channel 13:	2415 MHz	Channel 33:	2435 MHz	Channel 53:	2455 MHz	Channel 73:	2475 MHz
Channel 14:	2416 MHz	Channel 34:	2436 MHz	Channel 54:	2456 MHz	Channel 74:	2476 MHz
Channel 15:	2417 MHz	Channel 35:	2437 MHz	Channel 55:	2457 MHz	Channel 75:	2477 MHz
Channel 16:	2418 MHz	Channel 36:	2438 MHz	Channel 56:	2458 MHz	Channel 76:	2478 MHz
Channel 17:	2419 MHz	Channel 37:	2439 MHz	Channel 57:	2459 MHz	Channel 77:	2479 MHz
Channel 18:	2420 MHz	Channel 38:	2440 MHz	Channel 58:	2460 MHz	Channel 78:	2480 MHz
Channel 19:	2421 MHz	Channel 39:	2441 MHz	Channel 59:	2461 MHz		

- 1. The EUT is a Klipsch Heritage Wireless TableTop Bluetooth Small with a built-in Bluetooth V3.0, V2.1+EDR transceiver.
- 2. These tests were conducted on a sample for the purpose of demonstrating compliance of Bluetooth transmitter with Part 15 Subpart C Paragraph 15.247 for spread spectrum devices.
- 3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test
- 4. Bluetooth operation was evaluated at both 1Mb/s and 3Mb/s data rates. 2Mb/s data rate was found, through pre-testing, to produce emissions similar to those for 3Mb/s.

Test Mode	Mode 1: Transmit - 1Mbps (GFSK)	
	Mode 2: Transmit - 3Mbps (8DPSK)	

1.2. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Pro	oduct	Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook PC	DELL	Latitude 5580	2HRD7H2	Non-Shielded, 0.8m
2	Fixture	N/A	N/A	N/A	N/A

Sig	gnal Cable Type	Signal cable Description
А	USB Cable	Shielded, 2.0m
В	LAN Cable	Non-shielded, 1.2m
С	Audio Cable	Non-shielded, 1.5m

1.3. Configuration of Tested System



1.4. EUT Exercise Software

- 1. Setup the EUT as shown in Section 1.4.
- 2. Execute software "Blue Test3 2.6.2.632" on the Notebook PC.
- 3. Configure the test mode, the test channel, and the data rate.
- 4. Press "OK" to start the continuous Transmit.
- 5. Verify that the EUT works properly.

1.5. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	30-65
Barometric pressure (mbar)	860-1060	950-1000

The related certificate for our laboratories about the test site and management system can be downloaded from DEKRA Testing and Certification Co., Ltd. Web Site:

http://www.dekra.com.tw/english/about/certificates.aspx?bval=5

The address and introduction of DEKRA Testing and Certification Co., Ltd. laboratories can be founded in our Web site: <u>http://www.dekra.com.tw/index_en.aspx</u>

Site Description:	Accredited by TAF Accredited Number: 3023
Site Name:	DEKRA Testing and Certification Co., Ltd
Site Address:	No.5-22, Ruishukeng, Linkou Dist., New Taipei City 24451, Taiwan, R.O.C.
	TEL: 886-2-8601-3788 / FAX: 886-2-8601-3789
	E-Mail : info.tw@dekra.com

FCC Accreditation Number: TW3023



1.6. List of Test Equipment

For Conducted measurements /CB3/SR8

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
	Temperature Chamber	WIT GROUP	TH-1S-B	EQ-201-00146	2019/2/26	2020/2/25
Х	Spectrum Analyzer	Agilent	N9010A	MY53470892	2018/09/27	2019/09/26
X	Peak Power Analyzer	Keysight	8990B	MY51000410	2018/08/01	2019/07/31
Х	Wideband Power Sensor	Keysight	N1923A	MY56080003	2018/07/25	2019/07/24
Х	Wideband Power Sensor	Keysight	N1923A	MY56080004	2018/07/25	2019/07/24
Х	EMI Test Receiver	R&S	ESCS 30	100369	2018/11/19	2019/11/18
Х	LISN	R&S	ENV216	101105	2018/03/30	2019/03/29
X	LISN	R&S	ESH3-Z5	836679/014	2018/04/02	2019/04/01
X	Coaxial Cable	DEKRA	RG 400	LC018-RG	2018/06/21	2019/06/20

For Radiated measurements /Site3/CB8

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
X	Spectrum Analyzer	R&S	FSP40	100170	2019/3/11	2020/3/10
X	Loop Antenna	Teseq	HLA6121	37133	2017/10/13	2019/10/12
X	Bilog Antenna	Schaffner Chase	CBL6112B	2707	2018/06/24	2019/06/23
Х	Coaxial Cable	DEKRA	RG 214	LC003-RG	2018/06/14	2019/06/13
X	Pre-Amplifier	Jet-Power	JPA-10M1G33	170101000330010	2018/06/14	2019/06/13
X	Horn Antenna	ETS-Lindgren	3117	00135205	2018/05/03	2019/05/02
Х	Horn Antenna	SCHWARZBECK	9120D	576	2018/12/18	2019/12/17
х	Pre-Amplifier	EMCI	EMC012630SE	980210	2018/04/10	2019/04/09
Х	Horn Antenna	Com-Power	AH-840	101043	2019/01/19	2020/01/18
X	Amplifier + Cable	EMCI	EMC184045SE	980370	2018/3/21	2019/3/20
X	Filter	MICRO-TRONICS	BRM50702	G270	2018/08/06	2019/08/05
X	Filter	MICRO-TRONICS	BRM50716	G196	2018/08/06	2019/08/05

Note:

1. All equipments are calibrated every one year.

2. The test instruments marked with "X" are used to measure the final test results.

3. Test Software version :QuieTek EMI 2.0 V2.1.113.



2. Conducted Emission

2.1. Test Setup



2.2. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBµV) Limit						
Frequency	Lin	nits				
MHz	QP	AV				
0.15 - 0.50	66-56	56-46				
0.50-5.0	56	46				
5.0 - 30	60	50				

Remarks: In the above table, the tighter limit applies at the band edges.

2.3. Test Procedure

The EUT and Peripherals are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

2.4. Uncertainty

± 2.26 dB



2.5. Test Result of Conducted Emission

Product	:	Klipsch Heritage Wireless TableTop Bluetooth Small
Test Item	:	Conducted Emission Test
Test date	:	2019/04/09
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK) (2441MHz)



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV)	(dB)	(dBuV)	
1	*	0.173	9.657	30.580	40.237	-25.106	65.343	QUASIPEAK
2		0.205	9.658	24.620	34.278	-30.151	64.429	QUASIPEAK
3		0.224	9.659	23.540	33.199	-30.687	63.886	QUASIPEAK
4		0.236	9.659	21.280	30.939	-32.604	63.543	QUASIPEAK
5		0.353	9.664	13.380	23.044	-37.156	60.200	QUASIPEAK
6		13.697	10.049	14.220	24.269	-35.731	60.000	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak and average value.

2. " * ", means this data is the worst emission level.

3. Measurement Level = Reading Level + Correct Factor



- Product : Klipsch Heritage Wireless TableTop Bluetooth Small
- Test Item : Conducted Emission Test
- Test date : 2019/04/09
- Test Mode : Mode 2: Transmit 3Mbps (8DPSK) (2441MHz)



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV)	(dB)	(dBuV)	
1		0.173	9.657	11.890	21.547	-33.796	55.343	AVERAGE
2		0.205	9.658	7.950	17.608	-36.821	54.429	AVERAGE
3		0.224	9.659	6.390	16.049	-37.837	53.886	AVERAGE
4		0.236	9.659	4.760	14.419	-39.124	53.543	AVERAGE
5	*	0.353	9.664	7.130	16.794	-33.406	50.200	AVERAGE
6		13.697	10.049	6.090	16.139	-33.861	50.000	AVERAGE

- 1. All Reading Levels are Quasi-Peak and average value.
- 2. " * ", means this data is the worst emission level.
- 3. Measurement Level = Reading Level + Correct Factor



- Product : Klipsch Heritage Wireless TableTop Bluetooth Small
- Test Item : Conducted Emission Test
- Test date : 2019/04/09
- Test Mode : Mode 2: Transmit 3Mbps (8DPSK) (2441MHz)



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV)	(dB)	(dBuV)	
1		0.158	9.696	30.960	40.656	-25.115	65.771	QUASIPEAK
2		0.173	9.692	30.960	40.652	-24.691	65.343	QUASIPEAK
3		0.185	9.688	28.880	38.568	-26.432	65.000	QUASIPEAK
4	*	0.400	9.696	26.280	35.976	-22.881	58.857	QUASIPEAK
5		0.423	9.697	23.460	33.157	-25.043	58.200	QUASIPEAK
6		13.521	10.156	13.000	23.156	-36.844	60.000	QUASIPEAK

- 1. All Reading Levels are Quasi-Peak and average value.
- 2. " * ", means this data is the worst emission level.
- 3. Measurement Level = Reading Level + Correct Factor



- Product : Klipsch Heritage Wireless TableTop Bluetooth Small
- Test Item : Conducted Emission Test
- Test date : 2019/04/09
- Test Mode : Mode 2: Transmit 3Mbps (8DPSK) (2441MHz)



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV)	(dB)	(dBuV)	
1		0.158	9.696	14.590	24.286	-31.485	55.771	AVERAGE
2		0.173	9.692	14.380	24.072	-31.271	55.343	AVERAGE
3		0.185	9.688	12.990	22.678	-32.322	55.000	AVERAGE
4	*	0.400	9.696	16.100	25.796	-23.061	48.857	AVERAGE
5		0.423	9.697	14.250	23.947	-24.253	48.200	AVERAGE
6		13.521	10.156	5.260	15.416	-34.584	50.000	AVERAGE

- 1. All Reading Levels are Quasi-Peak and average value.
- 2. " * ", means this data is the worst emission level.
- 3. Measurement Level = Reading Level + Correct Factor

3. Peak Power Output

3.1. Test Setup



3.2. Limit

The maximum peak power shall be less 1Watt.

3.3. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

3.4. Uncertainty

± 1.19 dB



3.5. Test Result of Peak Power Output

Product	:	Klipsch Heritage Wireless TableTop Bluetooth Small
Test Item	:	Peak Power Output
Test Site	:	No.3 OATS
Test date	:	2019/04/12
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK)

Channel No.	Frequency	Peak Measurement	Required Limit	Result
(MHz)		(dBm)		
Channel 00	2402.00	5.50	1 Watt= 30 dBm	Pass
Channel 39	2441.00	5.90	1 Watt= 30 dBm	Pass
Channel 78	2480.00	5.91	1 Watt= 30 dBm	Pass



Product	:	Klipsch Heritage Wireless TableTop Bluetooth Small
Test Item	:	Peak Power Output
Test Site	:	No.3 OATS
Test date	:	2019/04/12
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK)

Channel No.	Frequency	Peak Measurement	Required Limit	Result
	(MHz)	(dBm)		
Channel 00	2402.00	3.69	1 Watt= 30 dBm	Pass
Channel 39	2441.00	4.24	1 Watt= 30 dBm	Pass
Channel 78	2480.00	5.05	1 Watt= 30 dBm	Pass



To Controller

To Receiver

4. Radiated Emission

4.1. Test Setup

Under 30MHz

Test

Receiver



Fully soldered Metal Ground

Above 1GHz



4.2. Limits

➤ General Radiated Emission Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209 Limits									
Frequency MHz	Field strength	Measurement distance							
	(microvolts/meter)	(meter)							
0.009-0.490	2400/F(kHz)	300							
0.490-1.705	24000/F(kHz)	30							
1.705-30	30	30							
30-88	100	3							
88-216	150	3							
216-960	200	3							
Above 960	500	3							

Remarks: 1. RF Voltage $(dB\mu V) = 20 \log RF$ Voltage (uV)

- 2. In the Above Table, the tighter limit applies at the band edges.
- 3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

4.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested compliance to FCC 47CFR 15.247 requirements.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground, when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.

The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna. The worst radiated emission is measured in the Open Area Test Site on the Final Measurement.

The measurement frequency range form 9kHz - 10th Harmonic of fundamental was investigated.

4.4. Uncertainty

 \pm 4.08 dB above 1GHz

± 4.22 dB below 1GHz



4.5. Test Result of Radiated Emission

Product	:	Klipsch Heritage Wireless TableTop Bluetooth Small
Test Item	:	Harmonic Radiated Emission
Test Site	:	No.3 OATS
Test date	:	2019/04/11
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK)(2402MHz)

Horizontal



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		4804.000	5.787	36.194	41.981	-32.019	74.000	PEAK
2	*	7206.000	10.333	37.497	47.830	-26.170	74.000	PEAK
3		9608.000	13.713	33.051	46.764	-27.236	74.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.



- Product Klipsch Heritage Wireless TableTop Bluetooth Small
- Test Item Harmonic Radiated Emission : No.3 OATS
- Test Site
- : Test date 2019/04/11 :

Test Mode Mode 1: Transmit - 1Mbps (GFSK)(2402MHz) :

Vertical



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		4804.000	5.787	38.845	44.632	-29.368	74.000	PEAK
2	*	7206.000	10.333	37.981	48.314	-25.686	74.000	PEAK
3		9608.000	13.713	32.909	46.622	-27.378	74.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average 6. detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product	•	Klipsch Heritage	Wireless TableTor	Bluetooth Small
ITOuuci	•	1 mpson monugo	merebb rubicrop	Diactootii Dinaii

- Test Item Harmonic Radiated Emission : No.3 OATS
- Test Site
- : Test date 2019/04/11 :

Test Mode :

Mode 1: Transmit - 1Mbps (GFSK)(2441MHz)

Horizontal



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		4882.000	5.904	35.508	41.412	-32.588	74.000	PEAK
2	*	7323.000	10.380	38.040	48.420	-25.580	74.000	PEAK
3		9764.000	14.054	32.268	46.321	-27.679	74.000	PEAK

- All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average 1. measurements as necessary.
- Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto. 2.
- Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. 3.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average 6. detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product	•	Klipsch Heritage	Wireless TableTor	Bluetooth Small
ITOuuci	•	1 mpson monuge	Therebs rublerop	Diactootii Dinan

- Test Item Harmonic Radiated Emission : No.3 OATS
- Test Site
- : 2019/04/11 Test date :

Test Mode Mode 1: Transmit - 1Mbps (GFSK)(2441MHz) :



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		4882.000	5.904	37.504	43.408	-30.592	74.000	PEAK
2	*	7323.000	10.380	37.567	47.947	-26.053	74.000	PEAK
3		9764.000	14.054	33.429	47.482	-26.518	74.000	PEAK

- All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average 1. measurements as necessary.
- Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto. 2.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average 6. detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product	•	Klipsch Heritage	Wireless TableTor	Bluetooth Small
TTouuci	•	impsen nemage	whereas rablerop	Diuctootii Sillali

- Harmonic Radiated Emission Test Item :
- Test Site
 - No.3 OATS : 2019/04/11
- Test date :

Test Mode Mode 1: Transmit - 1Mbps (GFSK)(2480MHz) :

Horizontal



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		4960.000	6.008	36.762	42.770	-31.230	74.000	PEAK
2	*	7440.000	10.485	38.193	48.678	-25.322	74.000	PEAK
3		9920.000	14.146	32.907	47.053	-26.947	74.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average 6. detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product	:	Klipsch Heritage Wireless TableTop Bluetooth Small
Test Item	:	Harmonic Radiated Emission
Test Site	:	No.3 OATS
Test date	:	2019/04/11
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK)(2480MHz)



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		4960.000	6.008	38.069	44.077	-29.923	74.000	PEAK
2		7440.000	10.485	36.983	47.468	-26.532	74.000	PEAK
3	*	9920.000	14.146	33.777	47.923	-26.077	74.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product	•	Klinsch Heritage	Wireless	TableTon	Bluetooth Small
TTOuuci	•	Kilpsen Heinage	vv ii cicss	radiciop	Diuctootii Sinan

- Harmonic Radiated Emission Test Item :
- Test Site :
- No.3 OATS Test date 2019/04/11 :

Test Mode

Mode 2: Transmit - 3Mbps (8DPSK)(2402MHz) :

Horizontal



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		4804.000	5.787	36.154	41.941	-32.059	74.000	PEAK
2	*	7206.000	10.333	36.438	46.771	-27.229	74.000	PEAK
3		9608.000	13.713	32.534	46.247	-27.753	74.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average 6. detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product		Klipsch Heritage	Wireless	TableTon	Rluetooth Small
TTOULLET	•	Kilpsen Heinage	wiiciess	radiciop	Diuctootti Sinan

- Harmonic Radiated Emission Test Item :
- Test Site
- No.3 OATS : Test date 2019/04/11 :

Test Mode

Mode 2: Transmit - 3Mbps (8DPSK)(2402MHz) :

Vertical



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		4804.000	5.787	35.778	41.565	-32.435	74.000	PEAK
2	*	7206.000	10.333	37.116	47.449	-26.551	74.000	PEAK
3		9608.000	13.713	33.520	47.233	-26.767	74.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average 6. detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product	:	Klipsch Heritage Wireless TableTop Bluetooth Small
Test Item	:	Harmonic Radiated Emission
Test Site	:	No.3 OATS
Test date	:	2019/04/11
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK) (2441MHz)

Horizontal



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		4882.000	5.904	35.086	40.990	-33.010	74.000	PEAK
2	*	7323.000	10.380	36.604	46.984	-27.016	74.000	PEAK
3		9764.000	14.054	31.479	45.532	-28.468	74.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product	:	Klipsch Heritage Wireless TableTop Bluetooth Small
Test Item	:	Harmonic Radiated Emission
Test Site	:	No.3 OATS
Test date	:	2019/04/11
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK) (2441MHz)



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		4882.000	5.904	35.048	40.952	-33.048	74.000	PEAK
2	*	7323.000	10.380	37.093	47.473	-26.527	74.000	PEAK
3		9764.000	14.054	32.592	46.645	-27.355	74.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product	•	Klipsch Heritage	Wireless TableTor	Bluetooth Small
ITOuuci	•	1 mpson monugo	merebb rubicrop	Diactootii Dinaii

- Test Item Harmonic Radiated Emission : No.3 OATS
- Test Site
- : Test date 2019/04/11 :

Test Mode Mode 2: Transmit - 3Mbps (8DPSK) (2480MHz) :

Horizontal



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		4960.000	6.008	35.249	41.257	-32.743	74.000	PEAK
2		7440.000	10.485	36.010	46.495	-27.505	74.000	PEAK
3	*	9920.000	14.146	32.434	46.580	-27.420	74.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average 6. detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product	•	Klipsch Heritage	Wireless TableTor	Bluetooth Small
ITOuuci	•	1 mpbon Hornuge	Therebs rublerop	Diactootii Dinan

Test Item Harmonic Radiated Emission : No.3 OATS

- Test Site
- : Test date 2019/04/11 :

Test Mode Mode 2: Transmit - 3Mbps (8DPSK) (2480MHz) :



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		4960.000	6.008	36.413	42.421	-31.579	74.000	PEAK
2		7440.000	10.485	36.526	47.011	-26.989	74.000	PEAK
3	*	9920.000	14.146	33.949	48.095	-25.905	74.000	PEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average 6. detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product	•	Klipsch Heritage	e Wireless	TableTop	Bluetooth Small
ITOdduct	•	ranpoon morning,		ruorerop	Diactootii Dillali

- Test Item General Radiated Emission : No.3 OATS
- Test Site
- : Test date : 2019/04/10
- Test Mode Mode 1: Transmit - 1Mbps (GFSK) (2441MHz) :

Horizontal



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		171.620	17.445	18.764	36.209	-7.291	43.500	QUASIPEAK
2	*	196.840	17.617	18.646	36.263	-7.237	43.500	QUASIPEAK
3		379.200	24.153	11.246	35.399	-10.601	46.000	QUASIPEAK
4		480.080	25.952	6.441	32.393	-13.607	46.000	QUASIPEAK
5		792.420	29.583	3.265	32.848	-13.152	46.000	QUASIPEAK
6		918.520	31.093	3.355	34.448	-11.552	46.000	QUASIPEAK

- All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average 1. measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.



Droduct		Klingah Upritaga	Wireless TableTer	Divotooth Small
FIOUUCI	•	Kilpsch neihage	whereas rablero	J Diueloolii Sillali

- General Radiated Emission Test Item :
- Test Site :
- No.3 OATS Test date 2019/04/10 :

Test Mode : Mode 1: Transmit - 1Mbps (GFSK) (2441MHz)



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	107.600	19.035	13.198	32.233	-11.267	43.500	QUASIPEAK
2		270.560	21.147	9.147	30.294	-15.706	46.000	QUASIPEAK
3		503.360	26.347	4.821	31.168	-14.832	46.000	QUASIPEAK
4		629.460	28.190	3.450	31.640	-14.360	46.000	QUASIPEAK
5		736.160	29.062	3.179	32.241	-13.759	46.000	QUASIPEAK
6		943.740	31.485	3.155	34.640	-11.360	46.000	QUASIPEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average 6. detection.
- The emission levels of other frequencies are very lower than the limit and not show in test report. 7.



Product	:	Klipsch Heritage Wireless TableTop Bluetooth Small
Test Item	:	General Radiated Emission
Test Site	:	No.3 OATS
Test date	:	2019/04/10
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK) (2441MHz)

Horizontal



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	171.620	17.445	19.644	37.089	-6.411	43.500	QUASIPEAK
2		270.560	21.147	12.810	33.957	-12.043	46.000	QUASIPEAK
3		480.080	25.952	6.162	32.114	-13.886	46.000	QUASIPEAK
4		621.700	28.096	3.471	31.567	-14.433	46.000	QUASIPEAK
5		788.540	29.556	3.473	33.029	-12.971	46.000	QUASIPEAK
6		947.620	31.553	3.577	35.130	-10.870	46.000	QUASIPEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.
- 8. No emission found between lowest internal used/generated frequency to 30MHz.


Product	:	Klipsch Heritage Wireless TableTop Bluetooth Small
Test Item	:	General Radiated Emission
Test Site	:	No.3 OATS
Test date	:	2019/04/10
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK) (2441MHz)



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	107.600	19.035	13.993	33.028	-10.472	43.500	QUASIPEAK
2		270.560	21.147	10.018	31.165	-14.835	46.000	QUASIPEAK
3		528.580	26.832	3.188	30.020	-15.980	46.000	QUASIPEAK
4		676.020	28.518	3.418	31.936	-14.064	46.000	QUASIPEAK
5		807.940	29.789	2.984	32.773	-13.227	46.000	QUASIPEAK
6		937.920	31.396	2.959	34.355	-11.645	46.000	QUASIPEAK

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. Measurement Level = Reading Level + Correct Factor.
- 5. Correct Factor = Antenna factor + Cable loss Amplifier gain.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.
- 8. No emission found between lowest internal used/generated frequency to 30MHz.

5. **RF** Antenna Conducted Test

5.1. Test Setup



5.2. Limits

According to FCC Section 15.247(d). 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 measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

5.3. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

5.4. Uncertainty

± 1.20dB



5.5. Test Result of RF Antenna Conducted Test

Product	:	Klipsch Heritage Wireless TableTop Bluetooth Small
Test Item	:	RF Antenna Conducted Test
Test Site	:	No.3 OATS
Test date	:	2019/04/12
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK)







Note: The above test pattern is synthesized by multiple of the frequency range.



- Product Klipsch Heritage Wireless TableTop Bluetooth Small :
- Test Item **RF** Antenna Conducted Test :
- Test Site
- No.3 OATS : Test date 2019/04/12 :
- Test Mode Mode 2: Transmit - 3Mbps (8DPSK) :







Note: The above test pattern is synthesized by multiple of the frequency range.



6. Band Edge

6.1. Test Setup

RF Radiated Measurement:

Above 1GHz



RF Conducted Measurement



6.2. Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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. Attenuation below the general limits specified in Section 15.209(a) is not required. 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) (see Section 15.205(c)).

6.3. Test Procedure

The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.

The bandwidth setting below 1GHz and above 1GHz on the field strength meter is 120 kHz and 1MHz, respectively.

6.4. Uncertainty

- \pm 4.08 dB above 1GHz
- ± 4.22 dB below 1GHz



6.5. **Test Result of Band Edge**

Product	:	Klipsch Heritage Wireless TableTop Bluetooth Small
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test date	:	2019/04/10
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK) (2402MHz)

Horizontal



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		2390.000	-2.687	45.686	42.999	-31.001	74.000	PEAK
2		2400.000	-2.660	65.847	63.187	-10.813	74.000	PEAK
3	*	2402.174	-2.657	100.394	97.737			PEAK

- All readings above 1GHz are performed with peak and/or average measurements as necessary. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. "*", means this data is the worst emission level. Measurement Level = Reading Level + Correction Factor. The average measurement was not performed when the peak measured data is used on the limit of

- 1. 2. 3. 4. 5.
- The average measurement was not performed when the peak measured data is under the limit of 6. average detection.



Product	:	Klipsch Heritage Wireless TableTop Bluetooth Small

- Test Item Band Edge :
- Test Site No.3 OATS :
- Test date 2019/04/10 :

Horizontal



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		2376.232	-2.748	33.687	30.939	-23.061	54.000	AVERAGE
2		2390.000	-2.687	32.284	29.597	-24.403	54.000	AVERAGE
3		2400.000	-2.660	50.838	48.178	-5.822	54.000	AVERAGE
4	*	2402.029	-2.657	85.996	83.339			AVERAGE

- All readings above 1GHz are performed with peak and/or average measurements as necessary. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. "*", means this data is the worst emission level. 1.
- 1. 2. 3. 4.

- 5. Measurement Level = Reading Level + Correction Factor.
- The average measurement was not performed when the peak measured data is under the limit of 6. average detection.



Product	•	Klipsch Heritage Wireless TableTop Bluetooth Smal	1
Trouuct	•	Ripsen Hendige Wheless Table top Didetooth Shah	.1

- Test Item Band Edge :
- Test Site No.3 OATS :
- Test date 2019/04/10 :

Vertical



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		2375.942	-4.111	50.053	45.941	-28.059	74.000	PEAK
2		2390.000	-4.159	48.346	44.187	-29.813	74.000	PEAK
3		2400.000	-4.171	73.982	69.811	-4.189	74.000	PEAK
4	*	2402.174	-4.171	108.554	104.383			PEAK

- All readings above 1GHz are performed with peak and/or average measurements as necessary. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. "*", means this data is the worst emission level.
- 1. 2. 3. 4.

- 5. Measurement Level = Reading Level + Correction Factor.
- The average measurement was not performed when the peak measured data is under the limit of 6. average detection.



- Product Klipsch Heritage Wireless TableTop Bluetooth Small •
- Test Item Band Edge •
- Test Site No.3 OATS •
- Test date 2019/04/10 :

Vertical



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		2375.942	-4.111	39.150	35.038	-18.962	54.000	AVERAGE
2		2390.000	-4.159	33.307	29.148	-24.852	54.000	AVERAGE
3		2400.000	-4.171	57.437	53.266	-0.734	54.000	AVERAGE
4	*	2402.029	-4.171	92.491	88.320			AVERAGE

- All readings above 1GHz are performed with peak and/or average measurements as necessary. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. "*", means this data is the worst emission level
- 1. 2. 3.
- 4. 5. , means this data is the worst emission level.
- Measurement Level = Reading Level + Correction Factor.
- 6. The average measurement was not performed when the peak measured data is under the limit of average detection.



- Product Klipsch Heritage Wireless TableTop Bluetooth Small :
- Test Item Band Edge :
- No.3 OATS Test Site :
- Test date 2019/04/10 :

Horizontal



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	2479.732	-2.605	98.349	95.744			PEAK
2		2483.500	-2.601	46.190	43.588	-30.412	74.000	PEAK

Note:

All readings above 1GHz are performed with peak and/or average measurements as necessary. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. "*", means this data is the worst emission level. Measurement Level = Reading Level + Correction Factor. 1.

2. 3. 4. 5.

- The average measurement was not performed when the peak measured data is under the limit of 6. average detection.



Product	:	Klipsch Heritage Wireless TableTop Bluetooth Sma	all
1104400	•	impsen menuge whereas rubierop Braccoom bin	~

- Test Item Band Edge :
- Test Site No.3 OATS :
- Test date 2019/04/10 •

Horizontal



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	2480.022	-2.605	84.383	81.778			AVERAGE
2		2483.500	-2.601	33.274	30.672	-23.328	54.000	AVERAGE
3		2505.964	-2.642	33.822	31.180	-22.820	54.000	AVERAGE

- All readings above 1GHz are performed with peak and/or average measurements as necessary. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. "*", means this data is the worst emission level.
- 1. 2. 3.
- 4.
- 5. 6. Measurement Level = Reading Level + Correction Factor. The average measurement was not performed when the peak measured data is under the limit of average detection.



Product	·	Klipsch Heritage	Wireless TableTo	p Bluetooth Small
TTouuci	•	impoon nontage	Whereas fuorero	p Diactooth Shan

- Test Item Band Edge :
- Test Site No.3 OATS :
- Test date 2019/04/10 •

Test Mode

Mode 1: Transmit - 1Mbps (GFSK) (2480MHz) :

Vertical



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	2479.877	-3.978	107.214	103.236			PEAK
2		2483.500	-3.966	50.200	46.233	-27.767	74.000	PEAK

Note:

All readings above 1GHz are performed with peak and/or average measurements as necessary. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. "*", means this data is the worst emission level. Measurement Level = Reading Level + Correction Factor. 1.

1. 2. 3. 4.

5.

6. The average measurement was not performed when the peak measured data is under the limit of average detection.



- Product Klipsch Heritage Wireless TableTop Bluetooth Small •
- Test Item Band Edge •
- Test Site No.3 OATS •
- Test date 2019/04/10 :

Vertical



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	2480.022	-3.978	91.480	87.502			AVERAGE
2		2483.500	-3.966	37.103	33.136	-20.864	54.000	AVERAGE
3		2506.109	-3.880	38.868	34.987	-19.013	54.000	AVERAGE

- All readings above 1GHz are performed with peak and/or average measurements as necessary. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. "*", means this data is the worst emission level. 1. 2. 3.

- 4.
- 5. Measurement Level = Reading Level + Correction Factor.
- The average measurement was not performed when the peak measured data is under the limit of 6. average detection.



Product	•	Klipsch Heritage	Wireless TableTo	Bluetooth Small
Trouuct	•	Kiipsen Heinage	Whereas rablero	J Diuctootii Sinan

- Test Item Band Edge :
- Test Site No.3 OATS :
- Test date 2019/04/10 •

Horizontal



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		2390.000	-2.687	45.691	43.004	-30.996	74.000	PEAK
2		2400.000	-2.660	72.058	69.398	-4.602	74.000	PEAK
3	*	2402.029	-2.657	98.360	95.703			PEAK

- All readings above 1GHz are performed with peak and/or average measurements as necessary. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. "*", means this data is the worst emission level. 1.
- 2. 3.
- 4.
- 5.
- Measurement Level = Reading Level + Correction Factor. The average measurement was not performed when the peak measured data is under the limit of 6. average detection.



Draduat		Klingah Haritaga Winalaga TahlaT	on Divoto oth Small
FIOUUCI	•	Kilpsch neihage wheless fablef	op Diuetooth Shiah

- Test Item Band Edge :
- Test Site No.3 OATS :
- Test date 2019/04/10 :



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		2349.855	-2.828	32.729	29.900	-24.100	54.000	AVERAGE
2		2390.000	-2.687	32.441	29.754	-24.246	54.000	AVERAGE
3		2400.000	-2.660	55.960	53.300	-0.700	54.000	AVERAGE
4	*	2401.884	-2.658	81.988	79.330			AVERAGE

- All readings above 1GHz are performed with peak and/or average measurements as necessary. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. "*", means this data is the worst emission level.
- 1. 2. 3. 4.

- 5. Measurement Level = Reading Level + Correction Factor.
- The average measurement was not performed when the peak measured data is under the limit of 6. average detection.



Product	·	Klipsch Heritage	Wireless TableTo	p Bluetooth Small
TTouuci	•	impoon nontage	Whereas fuorero	p Diactooth Shan

- Test Item Band Edge :
- Test Site No.3 OATS :
- Test date 2019/04/10 :

Vertical



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		2390.000	-4.159	50.469	46.310	-27.690	74.000	PEAK
2		2400.000	-4.171	80.820	76.649	2.649	74.000	PEAK
3	*	2402.029	-4.171	107.194	103.023			PEAK

- All readings above 1GHz are performed with peak and/or average measurements as necessary. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. "*", means this data is the worst emission level.
- 1. 2. 3.
- 4.
- 5. 6. Measurement Level = Reading Level + Correction Factor. The average measurement was not performed when the peak measured data is under the limit of average detection.



- Product Klipsch Heritage Wireless TableTop Bluetooth Small •
- Test Item Band Edge •
- Test Site No.3 OATS •
- Test date 2019/04/10 :

Vertical



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1		2376.087	-4.112	35.863	31.751	-22.249	54.000	AVERAGE
2		2390.000	-4.159	33.378	29.219	-24.781	54.000	AVERAGE
3		2400.000	-4.171	62.718	58.547	4.547	54.000	AVERAGE
4	*	2401.884	-4.171	89.100	84.929			AVERAGE

- All readings above 1GHz are performed with peak and/or average measurements as necessary. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. "*", means this data is the worst emission level
- 1. 2. 3.
- , means this data is the worst emission level.
- 4. 5. Measurement Level = Reading Level + Correction Factor.
- 6. The average measurement was not performed when the peak measured data is under the limit of average detection.



Product		Klinsch Heritage	Wireless TableTo	Bluetooth Small
TTOuuci	•	Kilpsen Heinage	whereas radiero) Diuctootti Siliali

- Test Item Band Edge :
- Test Site No.3 OATS :
- Test date 2019/04/10 •

Horizontal



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	2480.022	-2.605	96.234	93.629			PEAK
2		2483.500	-2.601	45.483	42.881	-31.119	74.000	PEAK

Note:

All readings above 1GHz are performed with peak and/or average measurements as necessary. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. "*", means this data is the worst emission level. Measurement Level = Reading Level + Correction Factor. 1.

1. 2. 3. 4.

5.

The average measurement was not performed when the peak measured data is under the limit of 6. average detection.



Product		Klinsch Heritage	Wireless TableTo	Bluetooth Small
TTOuuci	•	Kilpsen Heinage	whereas radiero) Diuctootti Siliali

- Test Item Band Edge :
- Test Site No.3 OATS :
- Test date 2019/04/10 •

Horizontal



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	2480.022	-2.605	80.194	77.589			AVERAGE
2		2483.500	-2.601	32.864	30.262	-23.738	54.000	AVERAGE

Note:

All readings above 1GHz are performed with peak and/or average measurements as necessary. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. "*", means this data is the worst emission level. Measurement Level = Reading Level + Correction Factor. 1.

1. 2. 3. 4.

5.

The average measurement was not performed when the peak measured data is under the limit of 6. average detection.



Product	•	Klinsch Heritage	Wireless	TableTop	Bluetooth Small
Trouuci	•	impoon nonage	1101035	radicióp	Diactooth Shian

- Test Item Band Edge :
- Test Site No.3 OATS :
- Test date 2019/04/10 •

Vertical



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	2479.877	-3.978	105.003	101.025			PEAK
2		2483.500	-3.966	49.136	45.169	-28.831	74.000	PEAK

Note:

All readings above 1GHz are performed with peak and/or average measurements as necessary. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. "*", means this data is the worst emission level. Measurement Level = Reading Level + Correction Factor. 1.

1. 2. 3. 4.

5.

6. The average measurement was not performed when the peak measured data is under the limit of average detection.



- Product Klipsch Heritage Wireless TableTop Bluetooth Small •
- Test Item Band Edge •
- Test Site No.3 OATS •
- Test date 2019/04/10 •

Vertical



		Frequency	Correct Factor	Reading Level	Measure Level	Margin	Limit	Detector Type
		(MHz)	(dB)	(dBuV)	(dBuV/m)	(dB)	(dBuV/m)	
1	*	2480.022	-3.978	87.300	83.322			AVERAGE
2		2483.500	-3.966	35.995	32.028	-21.972	54.000	AVERAGE

- All readings above 1GHz are performed with peak and/or average measurements as necessary. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. "*", means this data is the worst emission level.
- 1. 2. 3. 4.

- 5. Measurement Level = Reading Level + Correction Factor.
- The average measurement was not performed when the peak measured data is under the limit of 6. average detection.



:	Klipsch Heritage Wireless TableTop Bluetooth Small
:	Band Edge
:	No.3 OATS
:	Mode 1: Transmit - 1Mbps (GFSK)(Hopping off)
	: : :

Measurement Level	Result
Δ (dB)	
> 20	PASS

Figure Channel 00:

Rt RF S0 Q AC SENSE:INT ALIGN AUTO 04-56-34 PM avrop, 2019 Frequency Center Freq 2.397000000 GHz Trig: Free Run Avg Type: Log-Pwr Trid: Tree Run Trid: Free Run Trid: Tree Run Auto Tunk 0 dB/div Ref Offset 0.5 dB Mkr3 2.399 976 75 GHz Auto Tunk 0 dB/div Ref 20.50 dBm -46.27 dBm -46.27 dBm 0 dB/div Ref 20.50 dBm -46.27 dBm -46.27 dBm 0 dB/div Ref 32.390 0000 GHz -46.27 dBm -46.27 dBm 0 dB/div Ref 32.300 0000 GHz -46.27 dBm -46.27 dBm 0 dB/div Ref 32.300 0000 GHz -46.27 dBm -46.27 dBm 0 dB/div Ref 32.300 0000 GHz -46.27 dBm -23.3000000 GHz 0 dB/div Ref 32.300 0000 GHz -46.27 dBm -23.3000000 GHz 1 A 1 f 2.3900000 GHz -46.27 dBm -46.27 dBm 1 A 1 f 2.40400000 GHz -46.27 dBm -46.27 dBm 2 N 1 f 2.40400000 GHz -46.27 dBm -23.3000000 GHz 2.404000000 GHz -4	🎉 Keysight Sp	oectrum Analyzer - Sv	wept SA								
PNO: hast Ing. result Der P NNNN Ref Offset 0.5 dB Mkr3 2.399 976 75 GHz Auto Turu 10 dB/div Ref 20.50 dBm -46.27 dBm Center Free 10 dB/div Ref 20.50 dBm -46.27 dBm Center Free 10 dB/div Ref 20.50 dBm -46.27 dBm Center Free 10 dB/div Ref 20.50 dBm -46.27 dBm Center Free 10 dB/div Ref 20.50 dBm -46.27 dBm Center Free 20 dB/div -46.27 dBm -46.27 dBm Start Free 23 d0/div -46.27 dBm -46.27 dBm Start Free 23 d0/div -47.27 dBm -46.27 dBm -46.27 dBm 24 d0/div -47.28 dBm -47.28 dBm -47.28	X RL Center F	RF 50 Ω Freq 2.3970	R AC 00000 GHz	z	SENS	Bun	Avg Typ	ALIGN AUTO e: Log-Pwr	04:56:34 PI TRAC	E 1 2 3 4 5 6	Frequency
Og Image: Construction of the sector of the se	10 dB/div	Ref Offset 0 Ref 20.50	IFGa 15 dB dBm	D: Fast 🕞	#Atten: 30	dB	I	Mkr3 2.3	399 976 -46.2	75 GHz 27 dBm	Auto Tune
Start Free Start Free 395 3 3900000 GHz 3 4000000 GHZ<	Log 10.5 0.500										Center Freq 2.397000000 GHz
Start 2.390000 GHz #Res BW 100 kHz #VBW 300 kHz Stop 2.4040000 GHz Sweep (#Swp) 2.667 ms (40001 pts) 1 1 1 1 2.402 158 65 GHz 3.66 dBm FUNCTION WIDTH	-19.5 -29.5 -39.5							▲ <u>3</u>		-16.34 dBm	Start Fred 2.390000000 GHz
Start 2.390000 GHz #Res BW 100 kHz #VBW 300 kHz Stop 2.404000 GHz Sweep (#Swp) 2.667 ms (40001 pts) CF Step 1.40000 MHz Image: Index Find Seal X Function Function Function Function Auto Mar Image: Index Find Seal X Function Function Function Function Function Function Function Mar Image: Index Find Seal X Function Function Function Function Function Mar	-49.5 -59.5 -69.5	unanan menunanakan k		attribute a la terrese		andere affer alle					Stop Fred 2.404000000 GH
MKR MODE TRC [SCL] X Y FUNCTION FUNCTION MIDTH FUNCTION VALUE A 1 N 1 f 2.402 158 65 GHz 3.66 dBm 2 N 1 f 2.400 000 00 GHz 447.82 dBm Error Office	Start 2.3 #Res BW	90000 GHz / 100 kHz		#VBW	1 300 kHz		Sweep (#	Swp) 2.6	5top 2.404 567 ms (4	000 GHz 0001 pts)	CF Step 1.400000 MH Auto Mar
3 N 1 f 2.399.976.75 GHz -46.27 dBm Freq Unse OH 5 - - - - - 0 H 6 - - - - - 0 H	MKR MODE 1 N 2 N 3 N 4 5 6	fcc scl 1 f 1 f 1 f	× 2.402 158 65 2.400 000 00 2.399 976 75	GHz GHz GHz	3.66 dBi -47.82 dBi -46.27 dBi	m m m		NCTION WIDTH	FUNCTIO		Freq Offse
3 -	7 8 9 10 11										
	. ₹				m			074-7-1-		•	

Figure Channel 78:

📕 Keysight Spectrum Analyzer - Swept SA				
X RL RF 50 Ω AC Center Freg 2.489000000	GHz SENSE:I	ALIGN AUTO Avg Type: Log-Pwr	05:09:58 PM Apr 09, 2019 TRACE 1 2 3 4 5 6	Frequency
Ref Offset 0.5 dB	PNO: Fast Trig: Free Ru IFGain:Low #Atten: 30 dE	ⁿ Mkr3 2.4	198 496 30 GHz -54.72 dBm	Auto Tune
Log 1 10.5 1 0.500				Center Freq 2.489000000 GHz
-19.5			-14.56 dBm	Start Freq 2.478000000 GHz
-49.5 -59.5 -69.5	2	ant the second and the second and the second	ane/www.europerations	Stop Freq 2.50000000 GHz
Start 2.47800 GHz #Res BW 100 kHz	#VBW 300 kHz	Sweep (#Swp) 2.6	Stop 2.50000 GHz 667 ms (40001 pts)	CF Step 2.200000 MHz <u>Auto</u> Man
N 1 F 2.480 15 1 F 2.480 15 1 F 2.480 15 1 1 2.480 15 1 1 2.480 15 1 1 2.480 15 1 1 1 2.480 15 1 1 1 1 1 1 1 1 1 1 1 2.480 15 1 1 1 1 2.480 15 1 </th <td>57 65 GHz 5.44 dBm 10 00 GHz -56.42 dBm 16 30 GHz -54.72 dBm</td> <td>FUNCTION FUNCTION WIDTH</td> <td></td> <td>Freq Offset 0 Hz</td>	57 65 GHz 5.44 dBm 10 00 GHz -56.42 dBm 16 30 GHz -54.72 dBm	FUNCTION FUNCTION WIDTH		Freq Offset 0 Hz
MSG	III	STATUS	, ,	



Product	:	Klipsch Heritage Wireless TableTop Bluetooth Small
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK) (Hopping off)

Measurement Level	Result
Δ (dB)	
> 20	PASS

Figure Channel 00:

🊺 Ke	ysight	t Spect	trum	Analyzer	- Swep	ot SA														
Cen	L nter	Fre	RF ⊇q	2.397	Ω 2000	AC	GH	z	_	SE	NSE:IN	T	Avg	Туре	LIGN AUTO	05:24:01 TR	PM Apr 09, 2 ACE 1 2 3 4	019	F	requency
10 d	B/di	v	Ref Re	Offse f 20.5	t 0.5	dB Bm	IFG	iO: Fas Sain:Lo	t (w	#Atten: 3	0 dB			N	/lkr3 2.3	399 990 -45	0 05 G	Hz		Auto Tune
Log 10.5 0.500 -9.50																	2		2.39	Center Freq 97000000 GHz
-19.5 -29.5 -39.5															3/~^^		-19.26	dBm	2.39	Start Freq
-49.5 -59.5 -69.5	an a	/gJinay	č-mb	wheeler Sal		hadrage-sate/di	****	-	townshi	weither with the	a a de la caracteria de la	no ne presidente de la	*****	****	<u></u>			\	2.40	Stop Freq 04000000 GHz
Stai #Re	rt 2. s B	.390 W 1	000	0 GHz kHz	:			#\	/BW	300 kHz	:		Swee	р (#	9 Swp) 2.0	Stop 2.4 667 ms (04000 G 40001 p	Hz ts)	Auto	CF Step 1.400000 MHz Man
MKR 1 2 3 4 5 6 7 8 9 10 11 4	MOD: N N	1 1 1	f f f		222	X .401 8 .400 0 .399 9	<u>35 25</u> 00 00 90 05	5 GHz) GHz 5 GHz		₩ 0.74 d -45.30 d -45.01 d	Bm Bm Bm	FUNC	TION	FUN	CTION WIDTH	FUNC	TION VALUE			Freq Offsel
MSG															STATU	5				

Figure Channel 78:

鱦 Key	/sight Sp	pectrun	n Analyzer - S	wept SA								- ē 🔀
Cent	ter F	req	50 2.4890	Ω AC	z	SE	NSE:INT	Avg T	ALIGN AUTO ype: Log-Pwr	05:36:15 TRA	CE 1 2 3 4 5 6	Frequency
10 dE	3/div	R	ef Offset 0 ef 20.50	PI IF(0.5 dB 0 dBm	NO: Fast (Gain:Low	➡ Trig: Fre #Atten: 3	eRun 0dB		Mkr3 2.	492 482 -54	05 GHz	Auto Tune
Log 10.5 0.500 -9.50			1									Center Freq 2.489000000 GHz
-19.5 -29.5 -39.5	M		Ly.								-17.34 dBm	Start Freq 2.478000000 GHz
-49.5 -59.5 -69.5				un mun harmer			n.44m//4.44		3 Millionarfythmosairte	Manggar Malana ana da ka		Stop Freq 2.50000000 GHz
Star #Res	t 2.4 s BW	7800 / 100) GHz) kHz		#VB	W 300 kHz		Sweep	(#Swp) 2.	Stop 2.5 667 ms (4	0000 GHz 10001 pts)	CF Step 2.200000 MHz Auto Man
MKR 1 2 3 4 5 6 7 8 9 10 11 <				x 2.480 000 33 2.483 500 0 2.492 482 0	5 GHz 0 GHz 5 GHz	¥ 2.66 dl -57.50 dl -54.31 dl	3m 3m 3m					Freq Offset 0 Hz
MSG									STATU	IS		



Product	:	Klipsch Heritage Wireless TableTop Bluetooth Small
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK)(Hopping on)

Measurement Level	Result
Δ (dB)	
> 20	PASS

Figure Channel 00 Hopping:

🃁 Keysigh	nt Spectrui	m Analyze	er - Swept S	A											- ē 🗙
Cente	r Frec	RF 2.39	50 Ω A	∞ 000 GH	z		SENSE	INT	Avg T	ALIGN A ype: Log-	NUTO Pwr	04:59:02 P	M Apr 09, 20	19 5 6	Frequency
10 dB/d	R Iv R	ef Offs	et 0.5 di 50 dB	PN IFG B m	NO: Fast Sain:Low	#Att	: Free R en: 30 d	un B		Mkr3	3 2.3	99 189 -48.	95 GH 56 dBi	iz m	Auto Tune
Log 10.5 0.500 -9.50													$\overline{\mathcal{A}}$	7	Center Freq 2.397000000 GHz
-19.5 -29.5 -39.5										3	N		-16.4070		Start Freq 2.390000000 GHz
-49.5 -59.5 -69.5	internet and		hand a start of the	antical	******	lon internet	www.	and any second	warment A	w port	¥				Stop Freq 2.404000000 GHz
Start 2 #Res E	2.3900 3W 10	00 GH 0 kHz	z		#VI	3W 300	kHz	EUN	Sweep	(#Swp)	S) 2.6	top 2.40 67 ms (4	4000 GH 0001 pt	lz :s)	CF Step 1.400000 MHz <u>Auto</u> Man
1 N 2 N 3 N 4 5 6 7 8 9			2.40 2.40 2.39	22 154 45 00 000 00 99 189 95	5 GHz) GHz 5 GHz	3. -52. -48.	30 dBm 71 dBm 56 dBm			FUNCTION		FUNCTI	UN VALUE	m	Freq Offset 0 Hz
11 1 MSG		_				ľ	1			5	STATUS		•	Ŧ	

Figure Channel 78 Hopping:

🇾 Ke	ysight S	Spectri	um A	nalyzer - Swe	ept SA											- ē 🔀
Cen	L Iter	Fre	RF q 2	50 Ω .48900	AC	lz	s	ENSE:IN	Т	Avg T	ALIGN /	AUTO -Pwr	05:13:20 PI TRAC	M Apr 09, 2019 E 1 2 3 4 5	6	Frequency
10 d	B/div	. F	Ref Ref	Offset 0.5 20.50 c	Pi IFi dB JBm	NO: Fast Gain:Low	Trig: Fr #Atten:	ee Run 30 dB			Mkr	3 2.49	95 981 -50.9	15 GHz 96 dBm		Auto Tune
Log 10.5 0.500 -9.50	V	$\overline{\mathbf{v}}$														Center Freq 2.489000000 GHz
-19.5 -29.5 -39.5	<u>ү</u>			h									A 3	-14.88 dBm		Start Freq 2.478000000 GHz
-49.5 -59.5 -69.5				h	n Que	الهمدارية المحتهم	han Marana	al hayand	-	egeneral de	al New angel of m	م مرود ل ^{را} لیس	Anna Marris	Mary Maryan		Stop Freq 2.50000000 GHz
Star #Re	rt 2.4 s BV	1780 N 10	00 0 00 1	GHz KHz	1	#VI	300 kH	z		Sweep) (#Swp	S) 2.66	itop 2.50 67 ms (4	0000 GHz		CF Step 2.200000 MHz Auto Man
1 2 3 4 5 6 7 8 9 10 11	N N N	1 1 1	f f		× 2.483 500 0 2.495 981 1	5 GHz 0 GHz 5 GHz	5.12 (-57.71 (-50.96 (IBm IBm IBm	FUNC		FUNCTION		FUNCTION			Freq Offset 0 Hz
MSG												STATUS				



Product	:	Klipsch Heritage Wireless TableTop Bluetooth Small
Test Item	:	Band Edge
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK) (Hopping on)

Measurement Level	Result
Δ (dB)	
> 20	PASS

Figure Channel 00 Hopping:

📜 Keysight Spectrum Analyzer - Swept SA				
	GHz	ALIGN AUTO 05:26:17 PM Apr 09, 2019 Avg Type: Log-Pwr TRACE 1 2 3 4 5 6	Frequency	
Ref Offset 0.5 dB	PNO: Fast Firing: Free Run IFGain:Low #Atten: 30 dB	Mkr3 2.399 978 85 GHz -46.63 dBm	Auto Tune	
10.5 0.500		1 mm May my hyper	Center Freq 2.397000000 GHz	
-19.5			Start Freq 2.390000000 GHz	
-49.5 -59.5 -69.5	andri blasne menistrat taleption di estas sente fastas estas di estas di estas di estas di estas di estas di estas		Stop Freq 2.404000000 GHz	
Start 2.390000 GHz #Res BW 100 kHz	#VBW 300 kHz	Stop 2.404000 GHz Sweep (#Swp) 2.667 ms (40001 pts)	CF Step 1.400000 MHz <u>Auto</u> Man	
1 N 1 f 2.403.9 2 2 N 1 f 2.403.9 2 2 N 1 f 2.403.9 2 3 N 1 f 2.400.0 3 3 N 1 f 2.399.9 4 4 5 5 5 5 5 5 5 5 5 5 5 5 6 6 7 7 7 7 7 7 <th7< th=""> 7 <th7< th=""> 7 <th7< th=""> <th7< th=""> 7 <th 7<<="" th=""><td>98 25 GHz 0.76 dBm 00 00 GHz -47.22 dBm 78 85 GHz -46.63 dBm</td><td></td><td>Freq Offset 0 Hz</td></th></th7<></th7<></th7<></th7<>	<td>98 25 GHz 0.76 dBm 00 00 GHz -47.22 dBm 78 85 GHz -46.63 dBm</td> <td></td> <td>Freq Offset 0 Hz</td>	98 25 GHz 0.76 dBm 00 00 GHz -47.22 dBm 78 85 GHz -46.63 dBm		Freq Offset 0 Hz
7 8 9 10 11		*		
MSG	m	STATUS		

Figure Channel 78 Hopping:

Bit No. Bit No. Start Start Auge Auron Auge Auron Start Start Frequence Center Freq 2.489000000 GHz (FGainLow) Trig: Free Run (FGainLow) Trig: Free Run (FGainLow) Auge Type: Log-Pwr (FActionLog) Trig: Free Run (FGainLow) Auge Type: Log-Pwr (FActionLog) Trig: Free Run (FGainLow) Auge Type: Log-Pwr (FGainLow) Auge Composition Type: Log	Keysight Spectrum Analyzer - Swept SA				
Ref Offset 0.5 dB Mkr3 2.492 166 35 GHz 10 dB/div Ref Offset 0.5 dB Center 0 dB/div Ref 0.5 dB -53.19 dBm 0 dB/div Ref 0.5 dB -53.19 dBm 10 dB/div Ref 0.5 dB -54.00 dB 2 M 1 f 2.4780000 dHz 2 N 1 f 2.478 026 95 GHz -56.02 dBm 2 N 1 f 2.480 165 36 GHz -56.02	RL RF 50 Ω AC	SENSE:INT	ALIGN AUTO	05:38:34 PM Apr 09, 2019 TRACE 1 2 3 4 5 6	Frequency
10 dB/div Ref 20.50 dBm -53.19 dBm 10 dB/div Ref 20.50 dBm -53.19 dBm 10 dB/div Ref 20.50 dBm Center 10 dB/div 10 dB/div 10 dB/div 10 dB/div 2 33 dB/div 10 dB/div 2 33 dB/div 10 dB/div 2 33 dB/div 10 dB/div 10 dB/div 10 dB/div	Ref Offset 0.5 dB	PNO: Fast Trig: Free Run IFGain:Low #Atten: 30 dB	Mkr3 2.49	TYPE MWWWW DET NNNNN 2 166 35 GHz	Auto Tune
9.60	dB/div Ref 20.50 dBm			-53.19 dBm	Center Fre 2.489000000 GH
33 3 49.5 3 69.5 1 58.6 1 58.6 1 58.6 1 58.6 1 58.6 1 58.6 1 58.6 1 58.7 1.47800 GHz 58.7 1.47800 GHz 58.7 1.48 026 95 GHz 1 1 1 1 1 1 1 1 2 1.46 dBm 2 1.42 026 95 GHz 3 1.46 dBm 1 1 1 1 1 1 2 1.46 dBm 1 1	5			-18.54 dBm	Start Fre 2.478000000 GH
Start 2.47800 GHz #Res BW 100 kHz Stop 2.50000 GHz WSW 300 kHz Stop 2.50000 GHz Sweep (#Swp) 2.667 ms (40001 pts) Sweep (#Swp) 2.667 ms (40001 pts) 1 N 1 f 2.20000 Auto 1 N 1 f 2.478 026 95 GHz 1.46 dBm Function Function Multiple Auto 1 N 1 f 2.478 026 95 GHz 1.46 dBm Function Function Multiple Auto 2 N 1 f 2.483 500 00 GHz -58 02 dBm Function Functi	.5 .5 .5		3 mag_n/kul/www.en./hat/www.en/wt/c/u/	mendenshikabeteren ine	Stop Fre 2.50000000 G⊦
XEP MODE TRC SQL X FUNCTION FUNCTION MIDTH FUNCTION VALUE And Comparison 1 N 1 f 2.478 026 95 GHz 1.46 dBm FUNCTION FUNCTION MIDTH FUNCTION VALUE And Comparison FUNCTION VALUE And Comparison </td <td>art 2.47800 GHz tes BW 100 kHz</td> <td>#VBW 300 kHz</td> <td>St Sweep (#Swp) 2.667</td> <td>op 2.50000 GHz 7 ms (40001 pts)</td> <td>CF Ste 2.200000 MH Auto Ma</td>	art 2.47800 GHz tes BW 100 kHz	#VBW 300 kHz	St Sweep (#Swp) 2.667	op 2.50000 GHz 7 ms (40001 pts)	CF Ste 2.200000 MH Auto Ma
	N 1 f 2.478 0 N 1 f 2.483 5 N 1 f 2.492 1 I 1 f 2.492 1	Y FU 3 95 GHz 1.46 dBm 0 00 GHz -58.02 dBm 5 36 GHz -53.19 dBm	NCTION FUNCTION WIDTH		Freq Offs
Y					
	1			•	



7. Channel Number

7.1. Test Setup



7.2. Limit

Frequency hopping systems operating in the 2400-2483.5 MHz bands shall use at least 75 hopping frequencies.

7.3. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

7.4. Uncertainty

N/A

7.5. Test Result of Channel Number

Product	:	Klipsch Heritage Wireless TableTop Bluetooth Small
Test Item	:	Channel Number
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK)

Frequency Range	Measurement	Required Limit	Result
(MHz)	(Hopping Channel)	(Hopping Channel)	Kesun
2402 ~ 2480	79	>75	Pass

2402-2421MHz

2422-2441MHz

🊺 Ke	eysight Spectrum Analyzer - Swept SA											👝 🔊 🚘 🌉 Keysight Spectrum Analyzer - Swept SA							- 2 -						
Cen	ter F	req 2	50 s 2.4110	AC	Hz	Tria: F	SENSE:INT	Avg	g Type: Log-Pwr	05:15:45 TRA	PM Apr 09, 2019 ICE 1 2 3 4 5 6	Frequency	Cer	nter F	RF req 2	50 Ω 2.43150	AC 0000 GH	łz	SEI	Run	Avg Typ	ALIGN AUTO	05:16:50 PI TRAC	4 Apr 09, 2019 E 1 2 3 4 5 6	Frequency
10 d	IFGainLow #Atten: 30 dB Cert P NA Ref Offset 0.5 dB Mkr2 2.421 000 G dB/div Ref 20.50 dBm 3.89 df									000 GHz	Auto Tune	10 d	B/div	Ref Ref	Offset 0.5	dB JBm	NO:Fast 🕞 Gain:Low	#Atten: 3	0 dB		Mkr	2 2.441 3.0	00 GHz	Auto Tune	
Log 10.5 0.500 -9.50		Å	χ	ΛΛ	ЛЛ	ЛЛ	$\overline{\mathcal{N}}$	vv	vvv	w		Center Freq 2.411000000 GHz	Log 10.6 0.500 -9.50	Å	n	ΛΛ	лл	лл	лл	ЛЛ	πn	лл	ЛЛ	ΛÂ	Center Freq 2.431500000 GHz
-19.5 -29.5 -39.5		-	0		· ·	v v						Start Freq 2.400500000 GHz	-19.5 -29.5 -39.5												Start Freq 2.421500000 GHz
-49.5 -59.5 -69.5												Stop Freq 2.421500000 GHz	-49.5 -59.5 -69.5												Stop Freq 2.441500000 GHz
Sta #Re	t 2.40 s BW	0050 100	GHz kHz		#VE	3W 100 KI	łz	Swe	eep (#Swp)	Stop 2.4 2.533 ms	2150 GHz (1001 pts)	CF Step 2.100000 MHz Auto Man	Sta #Re	rt 2.42 s BW	150 100	GHz kHz		#VBV	/ 100 kHz		Sweep	(#Swp) 2	Stop 2.44 .467 ms (150 GHz 1001 pts)	CF Step 2.000000 MHz Auto Man
1 2 3 4 5	N			2.402 0 2.421 0	00 GHz 00 GHz	2.87 3.89	dBm dBm	FUNCTION	FUNCTION WIDT	FUNC	E	Freq Offset 0 Hz	1 2 3 4 5	N 1 N 1			× 2.422 0 2.441 0	0 GHz 0 GHz	4.41 dl 3.68 dl	3m 3m	TION	NCTION WIDTH	FUNCTR	E	Freq Offset 0 Hz
6 7 8 9 10 11													6 7 8 9 10 11											≣.	
I ≺ MSG	STATUS												KSG						m			STATUS	5	- ·	

2442-2461MHz

2462-2480MHz

Keys	ght Spectrum	Analyzer - Sw	ept SA									Key	ysight Spei	trum A	nalyzer - Swe	pt SA								
Cent	er Freq	50 Ω 2.45150	AC	Hz	SE	NSE:INT	Avg Type	ALIGN AUTO : Log-Pwr	05:17:43 PI	M Apr 09, 2019 E 1 2 3 4 5 6	Frequency	Cen	ter Fr	®F eq 2	<u>50 ຊ</u> 2.47150	AC 0000 GH	z	SE	NSE:INT	Avg Typ	ALIGN AUTO e: Log-Pwr	05:18:24 PM TRACE	Apr 09, 2019	Frequency
_			F	PNO:Fast G FGain:Low	#Atten: 3	0 dB		Mkr	2 2 461		Auto Tune					P	NO:Fast G Gain:Low	#Atten: 3	0 dB		Mkr	0 0 0 0 0 0		Auto Tune
10 dB	Re div R €	f Offset 0. f 20.50	5 dB dBm					WIND	2 2.401	77 dBm		10 di	B/div	Ref Ref	Offset 0.5 20.50 c	dB IBm					WIKI	5.3	1 dBm	
10.5 0.500		ΛЛ	лл	m	M	лЛ	лл	лл	ΛЛ	Ń	Center Freq 2.451500000 GHz	10.5 0.500	Å	2	$\gamma \gamma$	ЛЛ	Λh	лл	n	лл	M	M	★ ²	Center Freq 2.471500000 GHz
-19.5		V	• •				•		r v ·		Start Freq 2.441500000 GHz	-19.5 -29.5 -39.5					· ·		y u				- h	Start Freq 2.461500000 GHz
-49.5 -59.5 -69.5											Stop Freq 2.461500000 GHz	-49.5 -59.5 -69.5												Stop Freq 2.481500000 GHz
Start #Res	2.44150 BW 100	GHz kHz	×	#VBV	V 100 kHz	ET INV	Sweep	#Swp) 2	Stop 2.40 .467 ms (5150 GHz 1001 pts)	CF Step 2.000000 MHz Auto Man	Star #Re	t 2.46 s BW	150 (100	GHz kHz		#VB\	V 100 kHz	5.0	Sweep	(#Swp) 2	Stop 2.481 .467 ms (1	150 GHz 001 pts)	CF Step 2.000000 MHz Auto Man
1 2 3 4 5			2.442 (00 GHz 00 GHz	3.92 d 3.77 d	Bm Bm			FUNCTION		Freq Offset 0 Hz	1 2 3 4 5	N 1 N 1	1		2.462 0 2.480 0	0 GHz 0 GHz	3.87 di 5.31 di	Bm Bm					Freq Offset 0 Hz
6 7 8 9 10												6 7 8 9 10												
11 <								STATUS		- • *		11 <	-					ш			STATU	5	- • *	



Product	:	Klipsch Heritage Wireless TableTop Bluetooth Small
Test Item	:	Channel Number
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmit - 3Mbps (8DPSK)

Frequency Range	Measurement	Required Limit	Pogult		
(MHz)	(Hopping Channel)	(Hopping Channel)	Kesun		
2402 ~ 2480	79	>75	Pass		

2402-2421MHz

2422-2441MHz

🗱 Keysight Spectrum Analyzer - Swept SA			🔤 🐹 Keysight Spectrum Analyzer - Swept SA 👘	
Image: RL RF 50 Ω AC SENSE:INT ALIGN Center Freq 2.411000000 GHz Avg Type: Log Avg Type: Log Avg Type: Log Avg Type: Log	N AUTO 05:40:05 PM Apr 09, 2019 g-Pwr TRACE 1 2 3 4 5 6	Frequency	Mg RL RF 50 Ω AC SENSE:INT ALIGN AUTO 05:40:55 PM Apr09, 2019 Center Freq 2.431500000 GHz Avg Type: Log-Pwr TRACE [1 2 3 4 5 6 Freque	ency
PNC: Fast Ting: Free Run IFGainLow #Atten: 30 dB	Mkr2 2.421 000 GHz 0.82 dBm	Auto Tune	Ine Ref Offset 0.5 dBm Presk dan Serie Presk d	to Tune
	m, mut marke	Center Freq 2.411000000 GHz		ter Freq
-19.5 		Start Freq 2.400500000 GHz	195 Sta 225 242100 395 9	art Freq 2000 GHz
-49.5		Stop Freq 2.421500000 GHz	eq 40.5 Stc Stc 60.5	op Freq X000 GHz
Start 2.40050 GHz #Res BW 100 kHz #VBW 100 kHz Sweep (#Sv Tras Monet Fred Sci 2010 X Starting Sci 2010 KHz Starting Sci 2010 KHz	Stop 2.42150 GHz wp) 2.533 ms (1001 pts)	CF Step 2.100000 MHz <u>Auto</u> Man	ep Start 2.42150 GHz Stop 2.44150 GHz 2.000 H+z #Res BW 100 kHz #VBW 100 kHz Sweep (#Swp) 2.457 ms (100 1 pt 2.400 kHz 2.000 Auto	CF Step 2000 MHz Man
1 N 1 f 2.402.000 GHz 0.51 dBm 2 N 1 f 2.402.000 GHz 0.51 dBm 3	E	Freq Offset 0 Hz	1 N I	q Offset 0 Hz
6 -			6 - - 7 - - - 8 - - - 9 - - - 10 - - -	
MSG	STATUS		If a status	

2442-2461MHz

2462-2480MHz

🇱 Keysight Spectrum Analyzer - Swept SA			💓 Keysight Spi	ctrum Analyzer - Sv	wept SA					
RL RF 50 Ω AC SENSE:INT ALIGN AUTO Start Freq 2.441500000 GHz Avg Type: Log-Pwr Avg Type: Log-Pwr	05:41:49 PM Apr 09, 2019 TRACE 1 2 3 4 5 6	Trace/Detector	Center F	RF 50 S	2 AC 00000 GHz	SENSE:1	Avg Type	ALIGN AUTO	05:42:47 PM Apr 09, 2019 TRACE 1 2 3 4 5 6	Frequency
PNO: Fast Ing: Free Run IFGain:Low #Atten: 30 dB Mkr2	2.461 00 GHz	Select Trace			PNO: Fast (IFGain:Low	#Atten: 30 dE	n 3	Mkr2	2.480 00 GHz	Auto Tune
10 dB/div Ref 20.50 dBm	-5.39 dBm		10 dB/div	Ref 20.50	dBm				-0.78 dBm	
105 1 per antigen and antigen antigen antigen antigen and antigen anti	My My mark	Clear Write	10.5 0.500	Mur martin	hornowan	howard	work or work	man	marthy 2	Center Freq 2.471500000 GHz
-195		Trace Average	-19.5 -29.5 -39.5							Start Freq 2.461500000 GHz
495		Max Hold	-49.5 -69.5							Stop Freq 2.481500000 GHz
Start 2.44150 GHz Sweep (#Swp) 2.44150 GHz Sweep (#Swp) 2.44150 GHz Start 2.44150 GHz Sweep (#Swp) 2.44150 GHz Sweep (#Swep) 2.44150 GHz Sweep (#Swep) 2.44150 GHz Sweep (#Swp) 2.44150 GHZ Swep (#Swp) 2.44150 GHZ Sweep (#Swp) 2.441500 GHZ Swep (#S	Stop 2.46150 GHz 467 ms (1001 pts)	Min Hold	Start 2.46 #Res BW	150 GHz 100 kHz	#VB	W 100 kHz	Sweep	St (#Swp) 2.40	top 2.48150 GHz 67 ms (1001 pts)	CF Step 2.000000 MHz Auto Man
Construction X X X Z <thz< th=""> Z <thz< th=""> Z <thz< th=""> Z <thz< th=""> <thz< <="" td=""><td></td><td>View Blank View</td><td>1 N 1 2 N 1 3 4 5</td><td></td><td>2.462 00 GHz 2.480 00 GHz</td><td>1.34 dBm -0.78 dBm</td><td>FUNCTION FU</td><td></td><td>FUNCTION VALUE</td><td>Freq Offset 0 Hz</td></thz<></thz<></thz<></thz<></thz<>		View Blank View	1 N 1 2 N 1 3 4 5		2.462 00 GHz 2.480 00 GHz	1.34 dBm -0.78 dBm	FUNCTION FU		FUNCTION VALUE	Freq Offset 0 Hz
71		More 1 of 3	7 8 9 10 11			18				
MSG STATUS			MSG					STATUS		

8. Channel Separation

8.1. Test Setup



8.2. Limit

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.

8.3. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

8.4. Uncertainty

± 283Hz

8.5. Test Result of Channel Separation

Product	:	Klipsch Heritage Wireless TableTop Bluetooth Small
Test Item	:	Channel Separation
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK)

	Fraguanay	Measurement	Limit	Limit of (2/3)*20dB	
Channel No.	(MH ₇)	Level	(kHz)	Bandwidth (kHz)	Result
	(IVIIIZ)	(kHz)	(KIIZ)	Daliuwiulii (KHZ)	
00	2402	1000	>25 kHz	636.0	Pass
39	2441	1000	>25 kHz	634.0	Pass
78	2480	1000	>25 kHz	632.0	Pass

NOTE: The 20dB Bandwidth is refer to section 10.

🊺 Ke	eysigh	t Spec	trum /	Analyzer - Sw	ept SA								
<mark>α α</mark> Cer	L nter	Fre	RF eq 2	50 Ω 2.40200	AC 00000 GH	łz	SE	NSE:INT	Avg Typ	ALIGN AUTO e: Log-Pwr	04:55:41 P	M Apr 09, 2019	Frequency
10 d	B/di	v	Ref Ref	Offset 0.6	Pi IFi 5 dB 3 Bm	NO: Wide (Gain:Low	#Atten: 3	0 dB		Mkr	2 2.403 3.	00 GHz 59 dBm	Auto Tune
Log 10.6 0.500								1	2				Center Freq 2.402000000 GHz
-19.5 -29.5 -39.5								~					Start Freq 2.397000000 GHz
-49.5 -59.5 -69.5		n	-	and a start of the								hummun	Stop Freq 2.407000000 GHz
Cer #Re	nter es B MOD	2.4 W 1	020	00 GHz kHz	×	#VB	W 100 kHz	FUN	#	Sweep 5	Span 1 00.0 ms (0.00 MHz 1001 pts)	CF Step 1.000000 MHz <u>Auto</u> Man
1 2 3 4 5 6 7 8	N	1	f		2.402 0 2.403 0	0 GHz 0 GHz	3.56 d 3.59 d	Bm Bm				E	Freq Offset 0 Hz
9 10 11 <										STATUS	3		

Channel 00 (2402MHz)

🊺 Keys	ight S	Spectr	rum A	Analyzer - Swe	ept SA											
Cent	er	Fre	RF q 2	50 Ω 2.44100	AC 0000 GH	lz		SEI	NSE:INT	Av	у Туре	ALIGN AUTO	05:03:52 P TRAC	M Apr 09, 20 CE 1 2 3 4 1 PE M WWW	19 5 6	Frequency
10 dB	/div		Ref Ref	Offset 0.5 f 20.50 c	dB iBm	NO: Wide Gain:Low	ļ	#Atten: 3	0 dB			Mkr	۵ 2 2.442 4.	00 GH 26 dBi	iz m	Auto Tune
10.5 - 0.500 - -9.50 -									1	2					_	Center Freq 2.441000000 GHz
-19.5 - -29.5 - -39.5 -						~~	<u>م</u> ر	~								Start Freq 2.436000000 GHz
-49.5 -59.5 -69.5 -	(***)ke)	in the second	~~~	New York and the second of	hand and							- way	have a second the	mannen		Stop Freq 2.446000000 GHz
Cent #Res	er 2 BV	2.44 V 1	10 00	00 GHz kHz		#V	BW ·	100 kHz		TUNCTION	#	Sweep 5	Span 1 00.0 ms (0.00 MH 1001 pt	lz s)	CF Step 1.000000 MHz <u>Auto</u> Man
1 2 3 4 5 6 6 7 8 9 10 11			f		x 2.441 0 2.442 0	0 GHz 0 GHz		4.20 df 4.26 df	3m 3m 	UNCTION			FUNCTI	ON VALUE		Freq Offset 0 Hz
MSG												STATUS				

Channel 39 (2441MHz)

Channel 78 (2480MHz)





Product :	Klipsch Heritage	Wireless TableTop	Bluetooth Small
-----------	------------------	-------------------	-----------------

- Test Item : Channel Separation
- Test Site : No.3 OATS
- Test Mode : Mode 2: Transmit 3Mbps (8DPSK)

	Frequency	Measurement	Limit	Limit of (2/3)*20dB	
Channel No.	(MHz)	Level	(kHz)	Bandwidth (kHz)	Result
	(IVIIIZ)	(kHz)	(KIIZ)	Danuwidtii (KHZ)	
00	2402	1000	>25 kHz	844.0	Pass
39	2441	1000	>25 kHz	844.0	Pass
78	2480	1000	>25 kHz	846.0	Pass

NOTE: The 20dB Bandwidth is refer to section 10.

🊺 Ke	ysight	Spect	rum A	Analyzer - Swe	ept SA									
<mark>ω</mark> κ Cen	L Iter	Fre	RF eq 2	50 Ω 2.40200	AC 0000 GH	Ηz	SE	NSE:INT	Avg T	AL ype:	LIGN AUTO Log-Pwr	05:23:04 P	M Apr 09, 2019 E 1 2 3 4 5 6	Frequency
10 d	B/div	,	Ref Ref	Offset 0.5	P IF dB 1Bm	NO: Wide C Gain:Low	#Atten: 3	odB			Mkr	2 2.403 0.	00 GHz 71 dBm	Auto Tun
10.5 0.500 -9.50							- mile	1 	2-					Center Fre 2.402000000 GH
-19.5 -29.5 -39.5						~	~			L.	~			Start Fre 2.397000000 GH
-49.5 -59.5 -69.5	در اید ا	iya sekisik		ألفيت إلى مالي مقادر	And all and a street of							Vergleingenne	N. 30. VAL. 10. WINKING.	Stop Free 2.407000000 GH
Cen #Re	iter s Bi	2.40 W 1	020 00	00 GHz kHz		#VB	W 100 kHz			#S ¹	weep 5	Span 1 00.0 ms (0.00 MHz 1001 pts)	CF Stej 1.000000 MH <u>Auto</u> Ma
MKR 1 2 3 4 5 6 7 8 9 10 11 <	N				x 2.402 0 2.403 0	0 GHz 0 GHz	v 0.69 d 0.71 d					FUNCTION		Freq Offse 0 H
MSG											STATUS			IL.

Channel 00 (2402MHz)

🊺 Keysigl	ht Spect	rum A	nalyzer - Swe	ot SA										
Cente	r Fre	RF q2	50 Ω 2.44100	AC 0000 GH	z	SEN:	SE:INT	Avg Typ	ALIGN AUTO e: Log-Pwr	05:30:26 P TRAC	M Apr 09, 2019	Frequency		
10 dB/d	liv	Ref Ref	Offset 0.5 20.50 d	dB Bm	NO: Wide ∟ Gain:Low	#Atten: 30	dB		Mkr	ت 2 2.442 1.	00 GHz 46 dBm	Auto Tune		
10.5							1 Jugart	2				Center Freq 2.441000000 GHz		
-19.5 -29.5 -39.5					~							Start Freq 2.436000000 GHz		
-49.5 -59.5 🌥 -69.5 —	helayaatoor	stram	می می اولیا رسی می اوانی می اولیا رسی	www.					- Mari	Mundue Lusteree	`}e!==%e!#e.e%e	Stop Freq 2.446000000 GHz		
Center #Res I	Center 2.441000 GHz Span 10.00 MHz Span 10.00 MHz #Res BW 100 kHz #Sweep 500.0 ms (1001 pts)													
MR MOI 1 N 2 N 3 4 5 6 7 8 9 10				x 2.441 0 2.442 0	0 GHz 0 GHz	Y <u>1.39 dB</u> 1.46 dB	m m			FUNCTI		Freq Offset 0 Hz		
11 MSG						III			STATUS	3	•			

Channel 39 (2441MHz)

Channel 78 (2480MHz)

🊺 Ke	ysight	Spect	rum A	Analyzer - Swe	ept SA										
Kø R Cen	L Iter	Fre	RF q 2	50 Ω 2.48000	AC	łz	Tri	SENSE	:INT	Avg T	AL ype: l	IGN AUTO Log-Pwr	05:35:42 P TRA	M Apr 09, 2019 CE 1 2 3 4 5 6	Frequency
10 d	B/div	,	Ref Ref	Offset 0.5 7 20.50 c	odB JBm	NO: Wide Gain:Low	, #A1	tten: 30 d	B			Mkr	1 2.479 2.	00 GHz 53 dBm	Auto Tur
Log 10.5 0.500 -9.50							1_ 	2 	hay						Center Fre 2.480000000 GH
-19.5 -29.5 -39.5					~~~					L-					Start Fre 2.475000000 GF
-49.5 -59.5 -69.5	creeyo	-14415-4	~~	weekhaward							~~	۵ ۵ م رومی م		alter and the gradest	Stop Fre 2.485000000 GF
Cen #Re	enter 2.480000 GHz Span 10.00 MHz Res BW 100 kHz #VBW 100 kHz #Sweep 500.0 ms (1001 pts)													CF Ste 1.000000 MH Auto Ma	
MKR 1 2 3 4 5 6 7 8 9 10 11 <	N		f f		X 2.479 0 2.480 0	0 GHz 0 GHz	2222	2.53 dBm 2.58 dBm			FUNCT			ON VALUE	Freq Offs 0 F
MSG												STATUS	3		

9. Dwell Time

9.1. Test Setup



9.2. Limit

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.

9.3. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

9.4. Uncertainty

 \pm 25msec



9.5. Test Result of Dwell Time

Product	:	Klipsch Heritage Wireless TableTop Bluetooth Small
Test Item	:	Dwell Time
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmit - 1Mbps (GFSK) (Channel 00,39,78 –DH5)

Frequency (MHz)	Time slot length (ms)	Hopping of Number	Sweep time (ms)	Dwell Time (ms)	Limit (ms)	Result
2402	2.887	106	31600	306.022	400	Pass
2441	2.887	106	31600	306.022	400	Pass
2480	2.887	108	31600	311.796	400	Pass

Dwell time = Time slot length*Hopping of number

Sweep time= 79 CHannel * 0.4

CH 00 Time Interval between hops

TRACE 1 2 3 4 5 6 TYPE DET P NNNNN SENSE:INT Trig Delay-1.000 ms Trig: Video 23 PM Apr 09, 2019 TRACE 1 2 3 4 5 TYPE WWWWW DET P N N N N RL RF 50 Ω AC I enter Freq 2.402000000 GHz PNO: Fast PNO: Fast PNO: Fast ALIGN AUTO Avg Type: Log-Pwr Frequency Aug Type: Log-Pw Frequency Auto Tur Auto Tu ΔMkr2 2.887 ms 0.05 dB Ref Offset 0.5 dB Ref 20.50 dBm Ref Offset 0.5 dB Ref 20.50 dBm **≜**2∆1 \wedge^1 Center Fre 402000000 GH Center Fre 2 Start Fre 2.402000000 GH Start Fre 2.402000000 GH antoniana Stop Fre 2.402000000 GH (water water being the Stop Fre 2000000 GH 2.40 CF Step 1.000000 MH: Mar CF Step 100.000 kH er 2.402000000 SW 1.0 MHz Span 0 Hz Sweep 7.533 ms (1001 pts VBW 1.0 MHz 984.7 μs 2.887 ms (Δ) 3.58 dBm 0.05 dB N 1 t Δ1 1 t (Δ) Freq Offse 0 H Freq Offse Span 0 Hz Sweep 31.60 s (1001 pts) enter 2.4020000 es BW 100 kHz #VBW 300 kHz

CH39 Time Interval between hops

CH 39Transmission Time

CH 00 Transmission Time

🊺 Ke	Keysight Spectrum Analyzer - Swept SA 💦 🖉												🕅 Keysight Spectrum Analyzer - Swept SA												
Cer	L nter	Freq	F 50 Ω 2.44100	AC	Ηz	SE	NSE:INT	Avg Type	LIGN AUTO	06:26:07 I	M Apr 09, 21	019	Frequency	Cen	ter Fred	RF 50	Ω AC	z	Trig Delay	-1.000 ms	Avg Type	ALIGN AUTO	06:12:05 PM	Apr09, 2019	Frequency
PNO: Wide +++ Ing: Free Run The Wwwww IFGain:Low Atten: 30 dB DET P NNNN									NN N	Auto Tune	PNO: Fast Fig: Video IFGain:Low Atten: 30 dB DET P NNNN								PNNNNN	Auto Tupe					
10 d	Ref Offset 0.5 dB 10 dB/div Ref 20.50 dBm												10 d	B/div R	ef Offset (ef 20.50	0.5 dB) dBm						Mkr1 9 3.4	84.7 µs I1 dBm		
LUg												٦	Center Freq	10.5		 •1−			-	201					Center Freq
10.5													2.441000000 GHz	0.500 -9.50		I.	-							TRIG LVL	2.441000000 GHz
0.500												III	Start Freq	-19.6		+									Start Freq
-9.50													2.441000000 GHz	-29.5											2.441000000 GHz
-19.5					+								Stop Freq	-49.5	Martha Joseph	they.				ythereways	porth magely with	anytation pa	015071744-1966	and from the type	Stop Freq
-29.5	Ļ	III.		ĻĻĻĻ								ш	2.441000000 GHz	-69.5			_								2.441000000 GHz
-39.5													CF Step	Cen	L	000000	GHz						S	oan 0 Hz	CF Step
													Auto Man	Res	MODE TRO S	CU	×	VBW	1.0 IVIHZ	EUN	TION FUI	sweep 7	.533 ms (1 Functio		Auto Man
-43.5	J.				بالموسوبين فالبادي			u y y y y h l l a	an a				Freg Offset	1	Ν 1 Δ1 1	t t (Δ)	98 2.8	4.7 μs 87 ms (Δ)	3.41 dB 0.90 d	m B					Freg Offset
-59.5											-		0 Hz	4		-								=	0 Hz
-69.5	_											-		6 7 8		+		-		-	_			_	
Cen	ter	2.441	00000 0	Hz							Span 0	Hz		9 10										_	
Res	BW	100	KHz		#VBV	V 300 kHz			Sweep	31.60 s	(1001 p	ots)		11		-			-	-				· ·	
MSG									STATUS	5				MSG								STATUS	5		


CH 78 Time Interval between hops

CH 78 Transmission Time

Keysight Spectrum Analyzer - Swept SA		🖬 🚺 Keysight Spectrum Analyzer - Swept SA 👘 🔂 👘
Image: RL RF S0 Ω AC SENSE:INT ALIGN AUTO 06:27:0 Center Freq 2.480000000 GHz Tele Face Face Avg Type: Log-Pwr T	07 PM Apr09, 2019 TR4CE 1 2 3 4 5 6 Frequency	MR RF 50 Ω AC SENSE:INT ALIGN AUTO 06:12:55 PM Apr:09, 2019 Frequency Center Freq 2.480000000 GHz Trip Delay-1.000 ms Avg Type: Log-Pwr TRACE 12.2.4.5 6 Frequency
PNO:Wide →→ Ing: Free Kun IFGain:Low Atten: 30 dB Ref Offset 0.5 dB	Auto Tun	e Ref Offset 0.5 dB Auto Tune
10 dB/div Ref 20.50 dBm		10 dB/div Ref 20.50 dBm -0.04 dB
10.5	2.480000000 GH	Log 1 2∆1 Center Freq 2.48000000 GH2 z a.0 2.48000000 GH2
	Start Free 2.480000000 GH	195
-95	Stop Free 2.480000000 GH	495 μγκαλατική ματογραφική του το
-395	CF Step 100.000 kH Auto Mar	Center 2.480000000 GHz Span 0 Hz CF Step 1.000000 MHz Res BW 1.0 MHz VBW 1.0 MHz Sweep 7.533 ms (1001 pts) 1.000000 MHz Auto Man X Store (Mark 1004 MHz) Store (Mark 1004 MHz) Auto
-815 	Freq Offse	1 N 1 1 994.7 μs 5.52 dBm 1 2 Δ.1 1 (Δ) 2.887.ms (Δ) -0.04 dB Freq Offset 3 Δ.1 1 (Δ) 2.887.ms (Δ) -0.04 dB -0.12 4 3 1 1 (Δ) -0.04 dB -0.12 -0.12 5 6 - <th< td=""></th<>
49.5		
Center 2.480000000 GHz Res BW 100 kHz #VBW 300 kHz Sweep 31.60	Span 0 Hz s (1001 pts)	
MSG STATUS	<u>, , , , , , , , , , , , , , , , , , , </u>	MSG STATUS

Note:

The dwell times of the packet type of DH1, DH3, and DH5 are tested. Only the worst case is shown on the report.



Droduct	•	Klinsch Heritage	Wireless Table	on Bluetooth Small
TTouuct	•	Kiipsen Heinage	whereas rables	op Diactooth Shah

Test Item : Dwell Time

Test Site : No.3 OATS

Test Mode :

Mode 2: Transmit - 3Mbps (8DPSK) (Channel 00,39,78 –DH5)

Frequency (MHz)	Time slot length (ms)	Hopping of Number	Sweep time (ms)	Dwell Time (ms)	Limit (ms)	Result
2402	2.902	106	31600	307.612	400	Pass
2441	2.902	105	31600	304.710	400	Pass
2480	2.902	106	31600	307.612	400	Pass

Dwell time = Time slot length*Hopping of number

Sweep time= 79 CHannel * 0.4

CH 00 Time Interval between hops

CH 00 Transmission Time

M Ke	ysight Spectru	m Analyzer - Sw	ept SA								_		Ke Ke	rysight Spectri	Im Analyzer - :	Swept SA								
Cen	ter Fred	RF 50 Ω 2.40200	AC 0000 GH	lz	SE	NSE:INT	Avg Type	ALIGN AUTO	06:29:59 TRA	CE 1 2 3 4	19 5 6	Frequency	Cer	nter Fre	q 2.4020	Ω AC	GHz	Trig Dela	y-1.000 ms	Avg Typ	e: Log-Pwr	06:16:04 P	M Apr 09, 2019	Frequency
			P	NO:Wide ↔ Gain:Low	Atten: 3	0 dB			Ì	PNNN	NN	Auto Tune	_				PNO: Fast IFGain:Low	Atten: 30	dB			D		Auto Tune
10 di	R B/div R	ef Offset 0.6 ef 20.50 (idB 118m										10 d	B/div I	Ref Offset Ref 20.50	0.5 dB) dBm					Δ	-	0.72 dB	
LOG											T	Center Freq	10.5	;	1				<u>_</u> 2∆1 —					Center Freq
10.5											╢	2.402000000 GHz	0.500		¥		*****						TRIO LVL	2.402000000 GHz
0.500				huuuu						huuu	mF	Start Fred	-19.5											Start Fred
-9.50											4	2.402000000 GHz	-29.5		+[-									2.402000000 GHz
-19.5											ШF		-39.5	of the last	lations				voutate	atmathacu		artua daha		
												Stop Freq 2.402000000 GHz	-59.5		100-1				* 8 10 m	()	out the .		la avai ala	Stop Freq 2.402000000 GHz
-29.5											TI-		-69.5											
-39.5											H.	CF Step 100.000 kHz	Cer Res	nter 2.40 BW 1.0	2000000 MHz	GHz	VBW	1.0 MHz			Sweep 7	S 533 ms (span 0 Hz 1001 pts)	CF Step 1.000000 MHz
-49.5											H,	Auto Man	MKR 1	NODE TRC	SCL	×	984.7 us	Y 0.75 df	FUN Bm	CTION FU	NCTION WIDTH	FUNCTI	ON VALUE	<u>Auto</u> Man
-69.5		H		HUHUUU	WWWWW			lahian di ku	ierleiser liefe	han the states of the states o	Jul,	Freq Offset	2	Δ1 1	t (Δ)		2.902 ms (Δ)	-0.72	dB					Freq Offset
												0 Hz	4 5 6		-				-				=E	0 Hz
-69.5													7		_									
Cen	ter 2.402	000000 G	Hz	1		1				Span 0 H	Ηz		9 10 11		_				-				<u> </u>	
Res	BW 100	kHz		#VBV	V 300 kHz			Sweep	31.60 s	(1001 pi	ts)		•										-	
MSG STATUS MSG STATUS																								

CH39 Time Interval between hops

CH 39Transmission Time

🕼 Keysight Spectrum Analyzer - Swept SA 💿 🖉 📶 Keysight Spectrum Analyzer - Swept SA													×																																																					
Cer	RL nte	er I	Fre	RF q 2	2.4	41	οΩ 000	AC)0 (GH	z			Tri	ia: F	SEI	RSE:	NT]			Avg	ту	AL pe: I		AUT -Pw	o vr	0	6:30	51 P TRAC		2 3	, 201	9		Frequency	/	Ce	RL ent	tei	r Fr	eq	₹F 2.	441	50 Ω 100	AC	00	GH	z			Trig	SEN Delay Vide	ISE:INT y-1.00	0 ms	Av	у Тур	ALIGN e: Lo	n AUTO g-Pwr	0	16:16:48 TRJ T	PM ACE 1	pr09, 20 1 2 3 4	319 5 6		Frequency	у
		_		Ref	Off	set	0.5	dB		IFG	ain:L	ow .	-	At	tten	: 30) dB		_	_	_	_	_	_	_	_	_		D	ET	N	NN	IN I		Auto T	une					R	of O	ffce	+ 0 f	5 dB		IFC	NO: Fi Gain:L	Low	•	Atte	n: 30	dB				_		ΔΜ	kr2 2	DET F	02 n	ns		Auto T	Tune
10 d Log	iB/c	vit	İ	Ref	20	0.5	0 dl	Bm	1	_			_				_			_			_				_			_						=	10 Lo	dE g	B/d	liv	R	ef 2	20.5	50 0	dBm	'n	_			_					-		—		—		-0.	77 d	IB			_
10.6	5			+						_			_							Ļ			+			_								1	Center F 2.441000000	^r req GHz	10 0.50	0.5 00	F			<	2 1	ten w		e const	~*100					-		1-			+		+		+	TRIO I		2.	Center .441000000	Freq GHz
0.500	, 11		1111	ı		111				111	1111	1111			111			111	111				ı	111				111	1111				t		Start	rea	-9.8 -19	.50 9.5	F																				T	_	Ŧ				Start	Fred
-9.60	-			╢		╢									╢				╢			_											+	:	2.441000000	GHz	-29 -39	9.5 9.5	F								_			+							-		+		+			2.	.441000000	GHz
-19.6	5			╢		₩									╢				╢		-	-	╢			-		╢					H		Stop F	req	-49 -59	9.5 9.5	ut,	40%	n atv	٩ħ										_	eŋ	N PVI	44×19	gtery	ymy	n the second	¢n. N	u de la construcción de la constru La construcción de la construcción d	dered	ut anti-a	p.co		Stop I	Freq
-29.6	5			╫	╫	₩				$\ $					╢				╢			Π	╢					╢					ł	2	2.441000000	GHz	-69	9.5																									-	2.	.441000000	GHz
-39.6	5	ľ			╢	H			H			╢		ł				╢	Í		ť	T	╢				$\ $			ľ	ľ		ł	A.,	CF S 100.000	kHz Man	Ce Re	ent es	ter B\	r 2.4 W 1	141 .0 M	00 MH	000 z	00 0	Hz			,	VBV	V 1.	.0 M	Hz					Swe	eep 7	7.53	13 ms	Spa (10	an 0 i 101 pi	Hz ts)	Auto	CF \$ 1.000000	MHz
-49.5	5																																ł					99 B 1 2	<u>Ν00</u> Ν Δ1		C SC t		Δ)			X	98 2.9	4.7 L 02 m	JS 1S (A	7)	Y 1.4 -(17 dE	3m dB	FUN	CTION	FU	NCTIO	IN WIDTH		FUNCT	ION	VALUE				
-59.6	5			-		***		440						-			F						1		***					1		p.o.	-		Frequi	0 Hz	4	3 4 5	_														+				_		=		_		-		Frequ	0 Hz
-69.5	5			+									+				-			+			+			_				+								6 7 8	_	+		+							+				+			-	_		ŧ	_	_					
Cer	nte s B	r2 w	2.44	10 1 ki	000 Hz	000	G	Hz			#	VB	w	30(n ki	H7				1				Sv	100	'n	31	60	5	Spa (10	an (0 H	iz s)				10	0		ł	t	+	_	_	_	_	_	_	1	_		_	+	_		+	_		E	=	=					
MSG	86 87475 816 87475																																																																	



CH 78 Time Interval between hops

CH 78 Transmission Time

🕼 Keysight Spectrum Analyzer - Swept SA												
RL RF 50 Ω AC SENSE:INT ALIGN AUTO 06:31:58 PM Apr09, 200 Center Freq 2.480000000 GHz Avg Type: Log-Pwr TRACE 1/2 3.41 TRACE 1/2 3.41	9 Frequency	RL RF S0 Ω AC SENSE:INT ALIGN AUTO 06:17:33 PM Apr 09, 2019 Free Center Freq 2.480000000 GHz Trip Delay-1.000 ms Avg Type: Log-Pwr TRACE[1:2:3:45 G Free	quency									
PHC: Wide → 10g. Free Run opple: Free Run opple: Free Run Ref Offset 0.5 dB 10 dB/div Ref 20,50 dBm	Auto Tune	PRC Fast C Ing. was a certPinnen PRC fast C Ing. was a certPinnen Ref Offset 0.5 dB ΔMkr2 2.902 ms A Do dB/dw Ref 20.50 dB ΔM	Auto Tune									
	Center Freq 2.480000000 GHz		enter Freq									
9 50	Start Freq 2.480000000 GHz	195 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Start Freq 000000 GHz									
-195	Stop Freq 2.48000000 GHz	435	Stop Freq 000000 GHz									
-995	CF Step 100.000 kHz Auto Man	Center 2.480000000 GHz Span 0 Hz Res BW 1.0 MHz VBW 1.0 MHz Sweep 7.533 ms (1001 pts) 1.0 1.0 1.0 Image: the sector of the	CF Step 000000 MHz Man									
	Freq Offset 0 Hz	I Λ Λ Λ Λ	req Offset _{0 Hz}									
2010 Center 2.480000000 GHz Span 0 H Res RW 100 kHz Sweep 31 6 B < (1001 pt	IZ S)	7										
	-1	MSG STATUS										

Note:

The dwell times of the packet type of DH1, DH3, and DH5 are tested. Only the worst case is shown on the report.



10. Occupied Bandwidth

10.1. Test Setup



10.2. Limits

N/A

10.3. Test Procedure

The EUT was setup to ANSI C63.4, 2014; tested to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

10.4. Uncertainty

± 283Hz



10.5. Test Result of Occupied Bandwidth

CableTop Bluetooth Small
(GFSK)
(

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	954		NA
39	2441	951		NA
78	2480	948		NA

Keysight Spectrum Analyzer - Swept SA													
Cen	L Iter	Fre	RF q2	50 Ω .40200	AC	łz	SE Trig: Erg	NSE:INT	Avg Type	ALIGN AUTO E: Log-Pwr	05:00:29 P	M Apr 09, 2019	Frequency
10 d	B/div	 F	Ref	Offset 0.5	P IF 5 dB 1Bm	NO:Wide ⊂ Gain:Low	#Atten: 3	30 dB		Mkr2	2.401 5 -17.	32 GHz 76 dBm	Auto Tune
Log 10.5 0.500						.2	~~~~						Center Freq 2.402000000 GHz
-19.5 -29.5 -39.5					~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	-17.52 dBm	Start Freq 2.400500000 GHz
-49.5 -59.5 -69.5	~~~ 	<u></u>											Stop Freq 2.403500000 GHz
Cen #Re	ter 2 s BV	2.40 N 31	200) kl)0 GHz Hz	X	#VB	W 100 kHz	FUN	Sweep ((#Swp) 3	Span 3 200 ms (.000 MHz 1001 pts) DN VALUE	CF Step 300.000 kHz <u>Auto</u> Man
1 2 3 4 5 6	N N N	1 1 1	f f		2.402 00 2.401 53 2.402 48	0 GHz 2 GHz 6 GHz	2.48 d -17.76 d -17.83 d	Bm Bm Bm				=	Freq Offset 0 Hz
7 8 9 10 11 <							III						
MSG										STATUS			<u>. </u>

Figure Channel 00:



🔟 Keysight Spectrum Ana	lvzer - Swept SA				
LXI RL RF	50 Ω AC	SENSE:INT	ALIGN AUTO	05:06:49 PM Apr 09, 2019	
Center Freq 2.4	141000000 GHz		Avg Type: Log-Pwr	TRACE 1 2 3 4 5 6	Frequency
	PNO: Wide 🖵 IFGain:Low	Trig: Free Run #Atten: 30 dB		DET P NNNN	
Ref Of 10 dB/div Ref 2	fset 0.5 dB 2 0.50 dBm		Mkr2	2.440 529 GHz -17.02 dBm	Auto Tune
10.5 0.500	2		~3		Center Freq 2.441000000 GHz
10.5				-16.93 dBm	
-19.5			~		Start Freq
-29.5					2.439500000 GHz
-39.5				and the second	
-49.5			\sim		
50.5				mon	Stop Freq
-59.5					2.442500000 GHz
-69.5					
Center 2.441000 #Res BW 30 kHz	IGHZ Z #VBW	/ 100 kHz	Sweep (#Swp) 3	Span 3.000 MHz 200 ms (1001 pts).	CF Step 300.000 kHz
MKR MODE TRC SCL	X	Y FU	NCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man
1 N 1 f	2.440 994 GHz	3.07 dBm			
2 N 1 f	2.440 529 GHz	-17.02 dBm			Fred Offset
4 I	2.441 480 GHZ	-17.29 0011			0 4
5				E	0 H2
6					
8					
9					
10					
MSG			STATUS		l
				1	

Figure Channel 39:

Figure Channel 78:





Droduct		Klingah Haritaga Wiralaga TahlaTan Pluataath Small
FIOUUCI	•	Kilpsch Heltage wheless TableTop Bluetooth Shah

- Test Item : Occupied Bandwidth Data
- Test Site : No.3 OATS
- Test Mode : Mode 2: Transmit 3Mbps (8DPSK) (2402MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
00	2402	1266		NA
39	2441	1266		NA
78	2480	1269		NA

Figure Channel 00:

🊺 Key	/sight !	Spect	rum A	nalyzer - Swe	ept SA											
Cen	ter	Fre	RF q 2	50 Ω 2.40200	AC	Hz		SENS	SE:INT	Avg	AL Type: I	IGN AUTO Log-Pwr	05:27:43 F	CE 1 2 3 4 5	9 6	Frequency
10 dE	PN0: Wide IFGain:Low Ing: rree Run #Atten: 30 dB Ing: rree Run DEF Ing: rree Run DEF Ing: rree Run D										ž z	Auto Tune				
Log 10.5 0.500 -9.50						2	~~~	\sim	1			?				Center Freq 2.402000000 GHz
-19.5 -29.5 -39.5		~												-19.85 dB	m 	Start Freq 2.400500000 GHz
-49.5 -59.5 -69.5																Stop Freq 2.403500000 GHz
Cen #Re:	Center 2.402000 GHz Span 3.000 MHz #Res BW 30 kHz #VBW 100 kHz Sweep (#Swp) 3.200 ms (1001 pts)										CF Step 300.000 kHz Auto Man					
MRR 1 2 3 4 5 6 7 8 9 10 11	N N N	1 1 1	f f f		x 2.401 99 2.401 34 2.402 61	97 GHz 46 GHz 12 GHz	(-20 -19	Y .15 dB .30 dB .87 dB					FUNCT			Freq Offset 0 Hz
MSG												STATU	5			

🎉 Keysight Sp	ectrum Analyzer - Sw	rept SA					
Center F	RF 50 Ω Freq 2.44100	AC 00000 GHz	SENSE:INT	ALIG Avg Type: Lo	N AUTO 05:32:54 P g-Pwr TRAC TY	M Apr 09, 2019 CE 1 2 3 4 5 6 PE M WWWWW	Frequency
10 dB/div	Ref Offset 0. Ref 20.50	FRO: Wide IFGain:Low 5 dB dBm		۵ .Mkr2 2.440 3 .19	Auto Tune		
10.5 0.500			1	L			Center Freq 2.441000000 GHz
-19.5 -29.5 -39.5						-19.11 dBm	Start Freq 2.439500000 GHz
-49.5 -59.5 -69.5							Stop Freq 2.442500000 GHz
Center 2. #Res BW	441000 GHz 30 kHz	#VI	3W 100 kHz	Sweep (#S)	∫ Span 3 wp) 3.200 ms (0.000 MHz (1001 pts)	CF Step 300.000 kHz <u>Auto</u> Man
1 N 2 N 3 N 4 5 6 7 8 9	HC Sol 1 f 1 f 1 f	2.440 994 GHz 2.440 346 GHz 2.441 612 GHz	0.89 dBm -19.32 dBm -19.21 dBm			E	Freq Offset 0 Hz
9 10 11 •					STATUS	•	

Figure Channel 39:

Figure Channel 78:





11. EMI Reduction Method During Compliance Testing

No modification was made during testing.