

FCC - TEST REPORT

Report Number	64.790.18.00378.01	Date of Issue:	January 24, 2018
Model	: HTR-B1623-B		
Product Type	: Shoe Beatz		
Applicant	: Terry Electronics Technolo	ogy Company Lim	ited
Manufacturer	: Terry Electronics Technolo	ogy Company Lim	ited
Address	: 2/F, Building D, Dingfeng Shuitian Community, Shiy		
Test Result	■ Positive □ Negat	ive	

Total pages including Appendices

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2 Details about the Test Laboratory

Details about the Test Laboratory

Test Site 1

Company name:	TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District, Shenzhen City, 518052, P. R. China
FCC Registration Number:	502708
IC Registration Number:	10320A-1
Telephone: Fax:	86 755 8828 6998 86 755 828 5299



3 Description of the Equipment Under Test

- Product: Shoe Beatz
- Model no.: HTR-B1623-B
- FCC ID: 2AOPFTERRY201802
- Rating: DC 3.7V
- RF Transmission Frequency: 2402MHz to 2480MHz
- Modulation: GFSK, $\pi/4$ -DQPSK
- Antenna Type: PIFA
- Antenna Gain: 3.3dBi

Description of the EUT: The EUT is a Shoe which can play music by connecting Bluetooth



4 Summary of Test Standards

Test Standards		
FCC Part 15 Subpart C	PART 15 - RADIO FREQUENCY DEVICES	
10-1-2016 Edition	Subpart C - Intentional Radiators	

All the test methods were according to Public Notice DA 00-705 -Frequency Hopper Spread Spectrum Test Procedure released by FCC on March 30, 2000 and C63.10 (2013).

5 Summary of Test Results

Technical Requirements					
FCC Part 15 Subpart C					
Test Condition		Pages	Test Site	Test Result	
§15.207	Conducted emission AC power port		Site 1	Pass	
§15.247(b)(1)	Conducted peak output power		Site 1	Pass	
§15.247(a)(2)	6dB bandwidth			N/A	
§15.247(a)(1)	20dB bandwidth and 99% Occupied Bandwidth		Site 1	Pass	
§15.247(a)(1)	Carrier frequency separation		Site 1	Pass	
§15.247(a)(1)(iii)	Number of hopping frequencies		Site 1	Pass	
§15.247(a)(1)(iii)	Dwell Time		Site 1	Pass	
§15.247(e)	Power spectral density*			N/A	
§15.247(d)	Spurious RF conducted emissions		Site 1	Pass	
§15.247(d)	Band edge		Site 1	Pass	
§15.247(d) & §15.209 &	Spurious radiated emissions for transmitter and receiver		Site 1	Pass	
§15.203	Antenna requirement	See	e note 2	Pass	

Note 1: N/A=Not Applicable.

Note 2: The EUT uses a PIFA antenna, which gain is 3.3dBi. In accordance to §15.203, It is considered sufficiently to comply with the provisions of this section.



6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: 2AOPFTERRY201802, complies with Section 15.207, 15.209, 15.247 of the FCC Part 15, Subpart C Rules.

SUMMARY:

All tests according to the regulations cited on page 5 were

Performed

- Not Performed

The Equipment Under Test

Fulfills the general approval requirements.

□ - **Does not** fulfill the general approval requirements.

Sample Received Date:

January 16, 2018

Testing Start Date: November 17, 2014

Testing End Date:

December 23, 2014

- TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch -

Reviewed by:

Prepared by:

Peter Jia

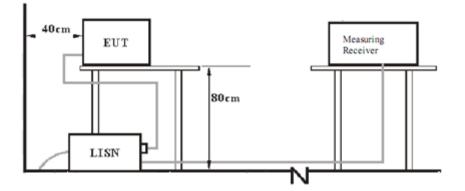


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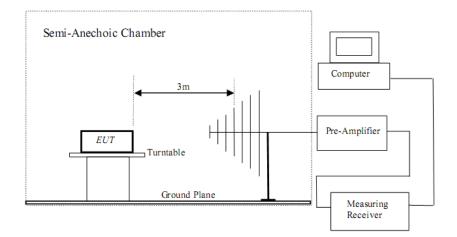


7 Test Setups

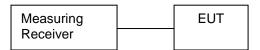
7.1 AC Power Line Conducted Emission test setups



7.2 Radiated test setups



7.3 Conducted RF test setups





8 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.(SHIELD)	S/N(LENGTH)
Adaptor	Apple	A1357	

Test software: FCCAssist_1.5.exe, which used to control the EUT in continues transmitting mode

The system was configured to hopping mode and non-hopping mode.

Hopping mode: typical working mode (normal hopping status)

Non-hopping mode: The system was configured to operate at a signal channel transmitting. The test software allows the configuration and operation at the worst-case duty and the highest transmit power

9 Technical Requirement

9.1 Conducted Emission

Test Method

- 1. The EUT was placed on a table, which is 0.8m above ground plane
- 2. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.).
- 3. Maximum procedure was performed to ensure EUT compliance
- 4. A EMI test receiver is used to test the emissions from both sides of AC line

Limit

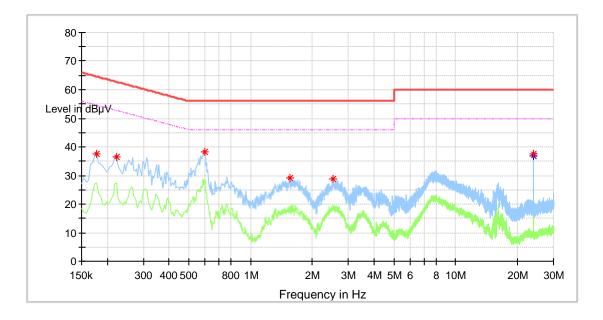
	Frequency	QP Limit	AV Limit
	MHz	dBµV	dBµV
	0.150-0.500	66-56*	56-46*
	0.500-5	56	46
	5-30	60	50
D	ecreasing linearly with	logarithm of the freq	uency





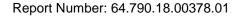
Conducted Emission

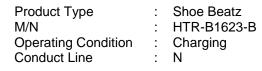
:	Shoe Beatz
:	HTR-B1623-B
:	Charging
:	L
	:

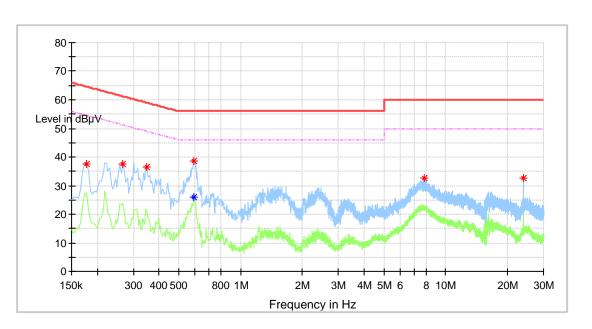


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line
0.178000	37.41		64.58	27.17	L1
0.222000	36.50		62.74	26.25	L1
0.598000	38.34		56.00	17.66	L1
1.558000	29.01		56.00	26.99	L1
2.514000	28.64		56.00	27.36	L1
23.998000	37.57		60.00	22.43	L1
23.998000		36.74	50.00	13.26	L1







Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line
0.178000	37.64		64.58	26.94	Ν
0.266000	37.68		61.24	23.56	Ν
0.350000	36.34		58.96	22.62	Ν
0.590000		25.85	46.00	20.15	Ν
0.594000	38.48		56.00	17.52	Ν
7.834000	32.78		60.00	27.22	Ν
23.998000	32.66		60.00	27.34	Ν



9.2 Conducted peak output power

Test Method

- Use the following spectrum analyzer settings: Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel RBW > the 20 dB bandwidth of the emission being measured, VBW≥RBW, Sweep = auto, Detector function = peak, Trace = max hold
- 2. Add a correction factor to the display.
- 3. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power

Limits

Frequency Range	Limit	Limit
MHz	W	dBm
2400-2483.5	≤1	≤30



Conducted peak output power

Bluetooth Mode GFSK modulation Test Result					
	Conducted Peak				
Frequency	Output Power	Result			
MHz	dBm				
Low channel 2402MHz	-4.50	Pass			
Middle channel 2441MHz	-4.41	Pass			
High channel 2480MHz	-5.74	Pass			



2402MHz

Date: 19.JAN.2018 15:20:40



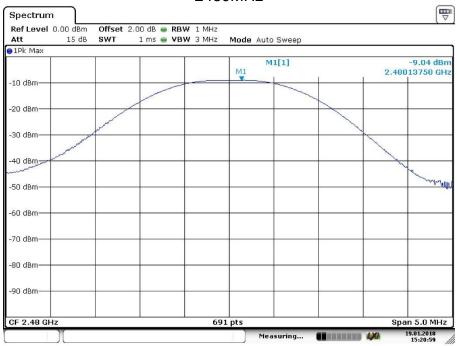


2441MHz



Date: 19.JAN.2018 15:19:48

2480MHz



Date: 19.JAN.2018 15:20:59

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Bluetooth Mode π/4-DQPSK modulation Test Result Conducted Peak

Frequency	Output Power	Result
MHz	dBm	
Low channel 2402MHz	-3.50	Pass
Middle channel 2441MHz	-3.62	Pass
High channel 2480MHz	-4.79	Pass

			2404				
Spectrum							₩
Ref Level 0.	00 dBm	Offset	2.00 dB 🝙 RBW 1 MHz				1
Att	15 dB	SWT	1 ms 👄 VBW 3 MHz	Mode Auto Swe	ер		
●1Pk Max							
				M1 M1[1]		-6 2.40210	.80 dBm 850 GHz
-10 dBm					~		
-20 dBm		_					
-20 ubiii	1 and 1 and 1				1	1 and a second	
-30 dBm	per la						
-40 dBm							and a
-50 dBm		-					alment a
-60 dBm							
-70 dBm		-					
-80 dBm							
-90 dBm							
CF 2.402 GH:	z		69	1 pts		Span 5	.0 MHz
				Measurin	ıg III III III		.2018 32:27 //

2402MHz

Date: 19.JAN.2018 15:32:27



2441MHz





Date: 19.JAN.2018 15:31:29

Note: Test result=Power spectrum + antenna gain, Antenna gain=3.3dBi



9.3 20 dB bandwidth and 99% Occupied Bandwidth

Test Method

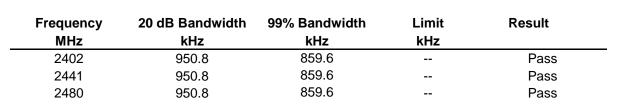
- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- 3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
- 4. Repeat above procedures until all frequencies measured were complete.

Limit

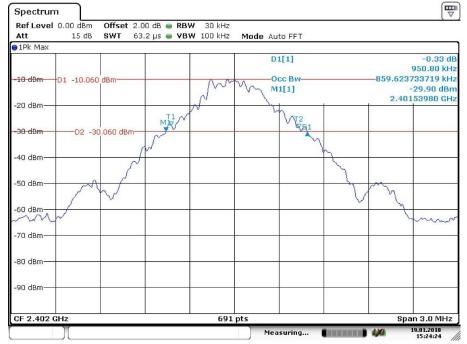
Limit [kHz]

N/A

20 dB bandwidth and 99% Occupied Bandwidth



Bluetooth Mode GFSK Modulation test result

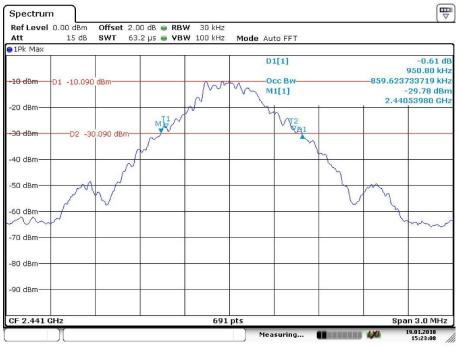


2402MHz

Date: 19.JAN.2018 15:24:25

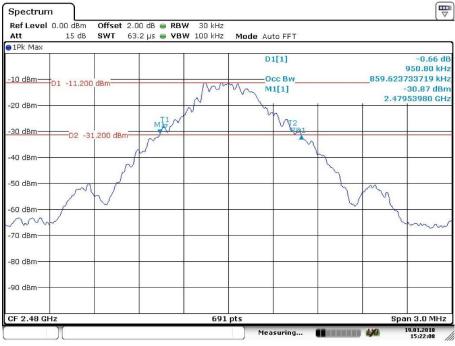


2441MHz



Date: 19.JAN.2018 15:23:08

2480MHz



Date: 19.JAN.2018 15:22:09

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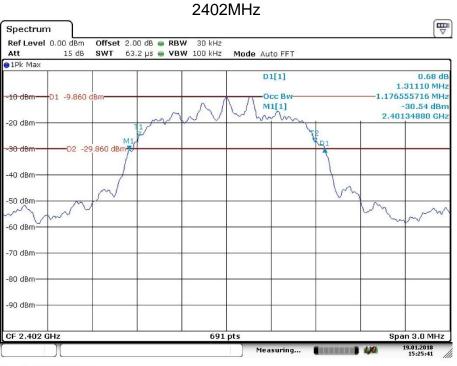




20 dB bandwidth and 99% Occupied Bandwidth

Bluetooth Mode $\pi/4$ -DQPSK Modulation test result

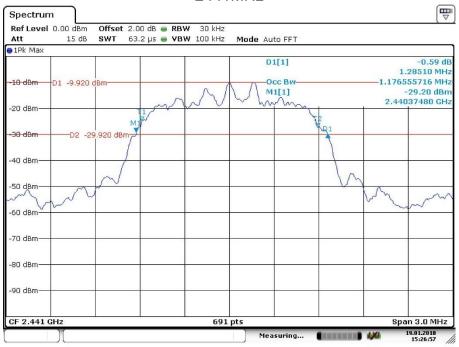
Frequency	20 dB Bandwidth	99% Bandwidth	Limit	Result
 MHz	kHz	kHz	kHz	
 2402	1311.1	1176.6		Pass
2441	1285.1	1176.6		Pass
2480	1285.1	1172.2		Pass



Date: 19.JAN.2018 15:25:41

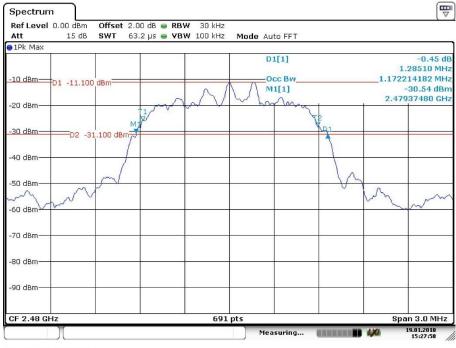
TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch 5F, Communication Building,163 Pingyun Rd, Huangpu Ave. West Guangzhou, P.R.China TEL: +86 20 3832 0668 FAX: +86 20 3832 0478

2441MHz



Date: 19.JAN.2018 15:26:58

2480MHz



Date: 19.JAN.2018 15:27:58



9.4 Carrier Frequency Separation

Test Method

- Use the following spectrum analyzer settings: Span = wide enough to capture the peaks of two adjacent channels, RBW ≥ 1% of the span, VBW) ≥RBW, Sweep = auto, Detector function = peak
- 2. By using the Max-Hold function record the separation of two adjacent channels.
- 3. Measure the frequency difference of these two adjacent channels by spectrum analyzer marker function.
- 4. Repeat above procedures until all frequencies measured were complete.

Limit

Limit
kHz
\geq 25KHz or 2/3 of the 20 dB bandwidth which is greater

GFSK Modulation Limit

Frequency	2/3 of 20 dB Bandwidth
MHz	kHz
2402	633.87
2441	633.87
2480	633.87





Carrier Frequency Separation

Test result: The measurement was performed with the typical configuration (normal hopping status), here GFSK modulation mode was used to show compliance.

GFSK Modulation test result

F	requency	Carrier F	requency	Separation		Result	
	MHz		kHz				
	2402		1000			Pass	
	2441		1000			Pass	
	2480		1000			Pass	
			2402M	IHz			
Spect	rum						
	vel 0.00 dBm	Offset 2.00 dB 🖷 F	BW 100 kHz				(*)
Att	15 dB	SWT 19 µs 🖷 V	/BW 300 kHz M	lode Auto FFT			
⊜1Pk Ma			1 1	D1[1]			-0.30 dB
10 10	M1		D1		~		0000 MHz
-10 dBm				[M1[1]			8.46 dBm 0000 GHz
-20 dBfr	ĩ					2.4020	DUUU GHZ
				\sim	1		~
-30 dBm							
-40 dBm	ı—						
-50 dBm	ı						
-60 dBm	ı						
-70 dBm							
-70 UBII							
-80 dBm	ı <u></u> -						
-90 dBm	n				_		
05.0.4			601 sta				2.0 MU-
CF 2.40 Marker	U3 GHZ		691 pts			span	3.0 MHz
Туре		X-value	Y-value	Function	Func	tion Result	
M1 D1	1 M1 1	2.402 GHz 1.0 MHz	-8.46 dBm -0.30 dB				
			0.00 UB	Measuring			.01.2018
						0	9:56:06

Date: 21.JAN.2018 09:56:06

Report Number: 64.790.18.00378.01

2441MHz

Spectrum	ר								E T
Ref Level 0.00	dBm	Offset 2.0	0 dB 🥃 RB	W 100 kHz					```
Att 1	.5 dB	SWT 1	9 µs 👄 VB	W 300 kHz	Mode	Auto FFT			
1Pk Max									
	M1					D1[1]			-0.01 d
~	X.	-		D	1	100 million 100	_	_ 1.	00000 MH
-10 dBm		1			1	M1[1]	/~		7.94 dBr
		7				7	. 1	2.440	00000 GH
-20_d8m						-	1		
-			~			~			
-30 dBm									
-40 dBm	-						-		
-50 dBm						-	-		
-60 dBm								-	
-70 dBm									
-80 dBm									
-90 dBm							-		
CF 2.441 GHz				691	nts			Sna	n 3.0 MHz
Marker				0,71	P(3			opu	
Type Ref Tr	e l	X-value	· 1	Y-value	E.	nction	Func	tion Result	
M1	1		; 44 GHz	-7.94 dB				cion Result	
D1 M1	1		.0 MHz	-0.01 d					
					N	easuring		110 2	1.01.2018
						easuring		ayur -	09:57:51

Date: 21.JAN.2018 09:57:50

2480MHz

Spectr	um									₽
Ref Lev	el O.	00 dBm	Offset 2	00 dB 🥃 F	BW 100 kHz					
Att		15 dB	SWT	19 µs 👄 🕻	/BW 300 kHz	Mo	de Auto FFT			
●1Pk Ma	x									
-10 dBm-	-	···~-	~		M	1	D1[1]	~	D1 1.00000	60 dB 0 MHz 0 dBm
	\bigwedge						1	/	2.4790800	
-20 dBm-				5	-					>
-30 dBm-										
-40 dBm-										
-50 dBm-				-						
-60 dBm-				_				-		
-70 dBm-	_									
-80 dBm-	_				_					
-90 dBm-	_									
CF 2.47	9 GH	z			691	pts			Span 3.0	MHz
Marker										
Type	Ref	Trc	X-valı		Y-value	1	Function	Fun	ction Result	
M1 D1	M1	1		479 GHz 1.0 MHz	-9.70 dB 0.60 c					
DI	INI I	1		1.0 MH2	0.00 0			6	21.01.20	18
							Measuring		09:58:	

Date: 21.JAN.2018 09:58:32



9.5 Number of hopping frequencies

Test Method

- Use the following spectrum analyzer settings: Span = wide enough to capture the peaks of two adjacent channels, RBW ≥ 1% of the span, VBW) ≥RBW, Sweep = auto, Detector function = peak
- 2. Set the spectrum analyzer on Max-Hold Mode, and then keep the EUT in hopping mode.
- 3. Record all the signals from each channel until each one has been recorded.
- 4. Repeat above procedures until all frequencies measured were complete.

Limit

Limit number ≥ 15





Number of hopping frequencies

Test result: The measurement was performed with the typical configuration (normal hopping status), and the total hopping channels is constant for the all modulation mode according with the Bluetooth Core Specification. Here GFSK modulation mode was used to show compliance.

Mat Offset 2.00 dB RBW 100 kHz Att 15 dB SWT 1 ms VBW 300 kHz Mode Auto Sweep Image: SWT 1 ms VBW 300 kHz Mode Auto Sweep Image: SWT 1 ms VBW 300 kHz Mode Auto Sweep Image: SWT 1 ms VBW 300 kHz Mode Auto Sweep Image: SWT 1 ms VBW 300 kHz Mode Auto Sweep Image: SWT 1 ms VBW 300 kHz Mode Auto Sweep Image: SWT 1 ms VBW M2[1] 2.48 -30 dBm -	
Att 15 dB SWT 1 ms VBW 300 kHz Mode Auto Sweep IPk Max M1 M2[1] 2.48 -10 dBm	
IPk Max M2[1] 2.48 -10 dBm -20 dBm -40 dBm -80 dBm -50 dBm -40 dBm -70 dBm -70 dBm -70 dBm -80 dBm -70 dBm -70 dBm	(.
M1 -20 H2M1H7 #1444444444444444444444444444444444444	
10 2.46 -10 10 -20	
- 10 dem	-9.40 dBm
-20 0Bm	BOOOD GHZ
-70 dBm 	B)EE dBm ISCOO GHz
-30 dBm -40 dBm -50 dBm -60 dBm -70 dBm -80 dBm -80 dBm	INNN I
40 dBm	000.4
-50 dBm	
-50 dBm	
-60 dBm	
-60 dBm	
-70 dBm	6.
-80 dBm	m
-80 dBm	
-90 dBm	
Start 2.4 GHz 691 pts Stop 2.4 Marker	1835 GHz
Marker Type Ref Trc X-value Y-value Function Function Result	
M1 1 2.402 GHz -8.86 dBm Function Funciting Function Funct	
M2 1 2.48 GHz -9.40 dBm	
	.01.2018 09:55:01

Date: 21.JAN.2018 09:55:01

9.6 Dwell Time

Test Method

- 1. Connect EUT antenna terminal to the spectrum analyzer with a low loss cable. Equipment mode: Spectrum analyzer
- 2. RBW: 1MHz; VBW: 1MHz; SPAN: Zero Span
- 3. Adjust the center frequency of spectrum analyzer on any frequency be measured.
- 4. Measure the Dwell Time by spectrum analyzer Marker function.
- 5. Repeat above procedures until all frequencies measured were complete.

Limit

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



Dwell Time

Dwell time

The maximum dwell time shall be 0,4 s.

According to the Bluetooth Core Specification, the worse result (DH5 mode) was reported to show compliance.

The Dwell Time = Burst Width * Total Hops. The detailed calculations are showed as follows: The duration for dwell time calculation: 0.4 [s] * hopping number = 0.4 [s] * 79 [ch] = 31.6 [s*ch];

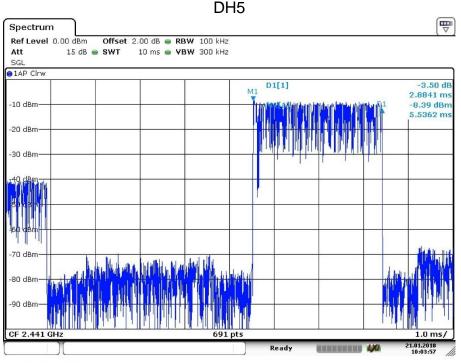
The burst width, which is directly measured, refers to the duration on one channel hop.

The maximum number of hopping channels in 31.6s for DH5=1600 / 6 / 79 *31.6=106.67

Test Result

Modulation	Mode	Reading (µs)	Total Hops	Test Result (ms)	Limit (ms)	Result
GFSK	DH5	2884.1	106.7	307.7	< 400	Pass
π/4-DQPSK	2DH5	2898.6	106.7	309.3	< 400	Pass

GFSK Modulation



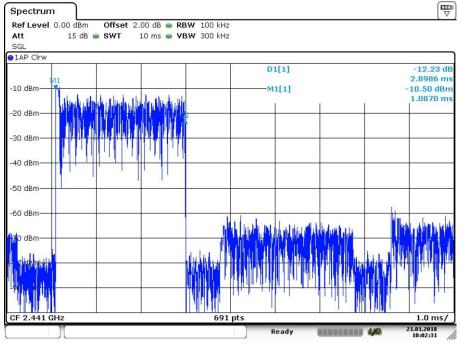
Date: 21.JAN.2018 10:03:57



SUD

$\pi/4$ -DQPSK Modulation





Date: 21.JAN.2018 10:02:31

9.7 Spurious RF conducted emissions

Test Method

- 1. Use the following spectrum analyzer settings:
- Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span. RBW = 100 kHz, VBW≥RBW, Sweep = auto, Detector function = peak, Trace = max hold
- 2. Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded.
- 3. The level displayed must comply with the limit specified in this Section. Submit these plots.
- 4. Repeat above procedures until all frequencies measured were complete.

Limit

Frequency Range MHz	Limit (dBc)
30-25000	-20

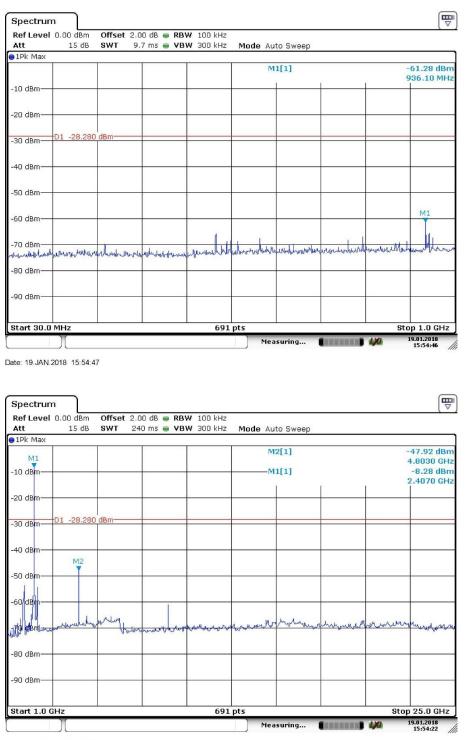


Spurious RF conducted emissions



Only the worse case (which is subject to the maximum EIRP, GFSK mode) test result is listed in the report.

2402MHz



Date: 19.JAN.2018 15:54:23

2441MHz

Ref Level Att	0.00 dBm 15 dB	Offset SWT	2.00 dB 👄 RE 9.7 ms 👄 VE		Mode Au	to Sweep			
∋1Pk Max									
					м	1[1]			-54.55 dBm 404.10 MH;
-10 dBm			_	+					
-20 dBm—									
-30 dBm	D1 -28.040	dBm					-		
-40 dBm—									
-50 dBm			M	1			7		
-60 dBm									
-70 dBm-	hours	ulun	Merdenhourdel	-	ulmuntrul	Maturarila	manaham	muumotud	montherer
-80 dBm									
-90 dBm—				<u>.</u>					
Start 30.0	MHz			691	pts			Sto	pp 1.0 GHz

Date: 19.JAN.2018 15:51:32

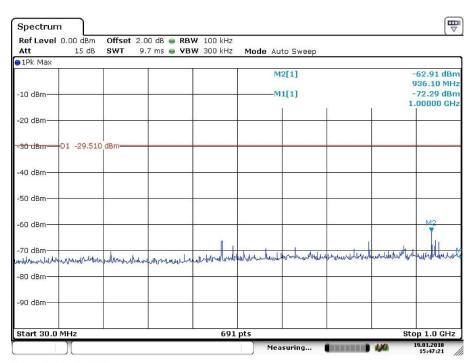
Spectrum	n								
Ref Level			2.00 dB 🖷 RB						
Att 1Pk Max	15 dB	SWT	240 ms 🥌 ۷ B	W 300 kHz	Mode Au	ito Sweep			
-10 dBm						1[1] 2[1]			-8.04 dBn 2.4410 GH -49.86 dBn 4.8730 GH
-20 dBm							<u> </u>		
-30 dBm	D1 -28.040	dBm							
-40 dBm									
-50 dBm	M2			5 (S)			,		
	and the second states	www.j	to the second second	, and the second states	turner Marker	unun	umpanter	lungshortunteral	Mar and a construction of the construction of
-80 dBm									1
90 dBm									
Start 1.0 G	Hz			691	pts			Sto	0 25.0 GHz
)(suring		4,40	19.01.2018 15:51:04

Date: 19.JAN.2018 15:51:05



Report Number: 64.790.18.00378.01

2480MHz



Date: 19.JAN.2018 15:47:22

Spectrum									
Ref Level			00 dB 🥃 RB1						
Att	15 dB	SWT 2	40 ms 🥃 VBN	N 300 kHz	Mode Au	ito Sweep			
∋1Pk Max									
					M	2[1]			-51.52 dBr 4.9770 GH
-10 dBm					M	1[1]			-9.51 dBi
-10 UBIII						1[1]			2.4760 GH
						Ĩ	Ĩ.		1
-20 dBm									
		l							
-30 dBm[01 -29.510	dBm							
-40 dBm			-					1	1
	M2								
-50 dBm	Y			2			1		-
-60 dBm			I						
1.1.		الايس					- b.		
- no other man	, utraditional market	www.	Hurmarket w	and the second second	have madelial	Marraus	monauli	moundance	malinda
mb oo									36
-80 dBm									
-90 dBm		-							
					later - rear				
Start 1.0 GI	HZ			691	pts			Sto	p 25.0 GHz
	Л				Mea	suring		1,10	19.01.2018 15:46:58

Date: 19.JAN.2018 15:46:58





9.8 Band edge testing

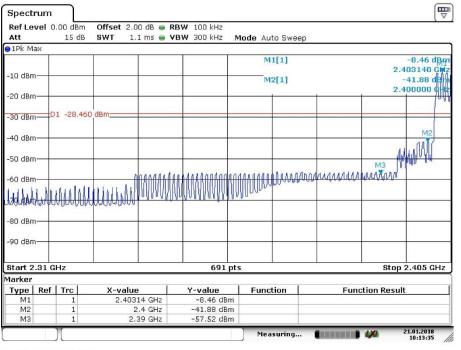
Test Method

- Use the following spectrum analyzer settings: Span = wide enough to capture the peak level of the in-band emission and all spurious RBW = 100 kHz, VBW ≥ RBW, Sweep = auto, Detector function = peak, Trace = max hold
- 2 Allow the trace to stabilize, use the peak and delta measurement to record the result.
- 3 The level displayed must comply with the limit specified in this Section. .
- 4 Repeat the test at the hopping off and hopping on mode, submit all the plots.

Limit:

Band edge testing

GFSK Modulation Test Result: Hopping on mode:



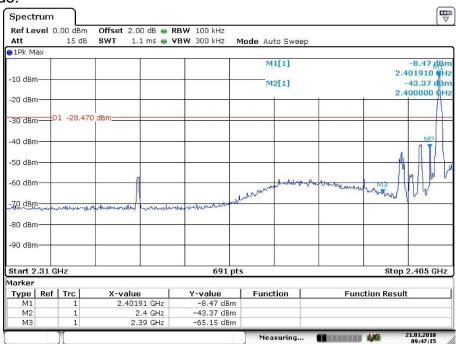
Date: 21.JAN.2018 10:13:35

Spectrum						("
Ref Level 0	1.00 dBm	Offset 2.00 dB 🥃 I	RBW 100 kHz			
Att	15 dB	SWT 75.9 μs 🖷 '	VBW 300 kHz M	ode Auto FFT		
1Pk Max						
M1				M1[1]		-8.95 dBr
-10 dBm						2.4788390 GH
				M2[1]		-58.23 dBr
120 dBm						2.4835000 GH
A.A.A.						
3U dBm-D	1 -28.95	0 dBm				
-40 dBm						
50 dBm	N					
	Les A	12		_	MB	
-60 dBm	wyo	from martinety	armorational ru	M. Mortin	norther Ann	mound
		4	Ψ.	Contraction of the second	~~~~	a and no rea the Art A
-70 dBm						
-80 dBm						
-90 dBm					2	
Start 2.477	GHz	31	691 pts			Stop 2.51 GHz
1arker						
Type Ref		X-value	Y-value	Function	Func	tion Result
M1	1	2.478839 GHz	-8.95 dBm			
M2 M3	1	2.4835 GHz	-58.23 dBm			
DVL5	1	2.5 GHz	-61.00 dBm			

Date: 21.JAN.2018 10:16:45



Hopping off mode:



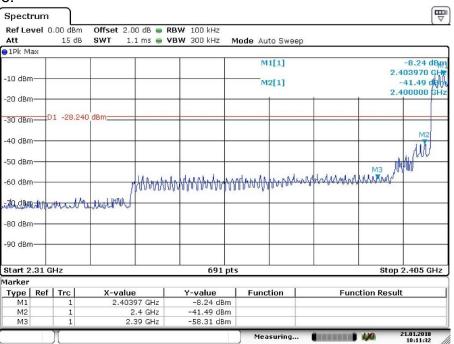
Date: 21.JAN.2018 09:47:15

Spectrum						
Ref Level	0.00 dBm	Offset 2.00 dB 🖷 R	BW 100 kHz			,
Att	15 dB	SWT 75.9 µs 👄 V	'BW 300 kHz 🛛 M	Mode Auto FFT		
●1Pk Max						
-10 dBm				M1[1]		-8.91 dBr 2.4798420 GH -57.00 dBr
-20 dBm						2.4835000 GH
	D1 -28.91	0_dBm=				
-40 dBm						
-50 dBm-	4	M2				
pp dem-	Luy.	All monthing	1 mm	mon	MB	aman have been
-70 dBm		Anna .				
-80 dBm						
-90 dBm						
Start 2.477	GHz		691 pt	s		Stop 2.51 GHz
/larker						
Type Ref		X-value	Y-value	Function	Fun	ction Result
M1	1	2.479842 GHz	-8.91 dBm			
M2 M3	1	2.4835 GHz 2.5 GHz	-57.00 dBm -62.10 dBm			
	Y			Measuring.		21.01.2018

Date: 21.JAN.2018 09:49:40



π /4-DQPSK Modulation Test Result: Hopping on mode:



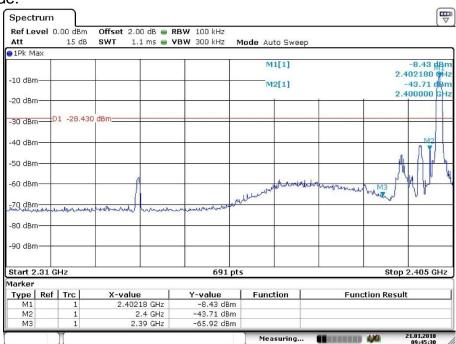
Date: 21.JAN.2018 10:11:32

Spectrur	m					E
Ref Level	0.00 dBm	Offset 2.00 dB 🥃 R	BW 100 kHz			· · · · · · · · · · · · · · · · · · ·
Att	15 dB	SWT 75.9 µs 👄 V	'BW 300 kHz M	lode Auto FFT		
∋1Pk Max						
	1			M1[1]		-8.92 dBr 2.4781700 GH -59.03 dBr
-20 dBm-	1			1		2.4835000 GH
20 0011						
-30 dBm	D1 -28.92	0 dBm				
-40 dBm—						
-50 dBm—						
-60 dBm		Mp	manerature	motor manon	MB Marine Mas	Annahar Ander
70 dBm—					V	
80 dBm-						
oo abiii						
-90 dBm						
Start 2.47	77 GHz		691 pts			Stop 2.51 GHz
1arker						
Type Re		X-value	Y-value	Function	Fun	ction Result
M1 M2	1	2.47817 GHz 2.4835 GHz	-8.92 dBm -59.03 dBm			
M3	1	2.4835 GHz	-62.15 dBm			
				Measuring	CONTRACTOR .	21.01.2018 10:18:50

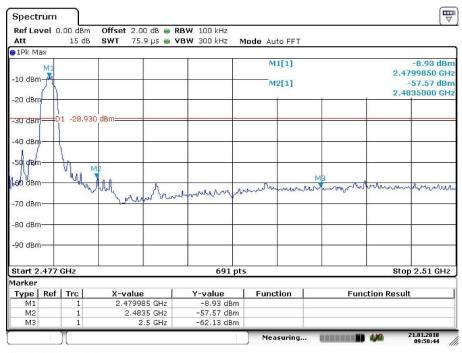
Date: 21.JAN.2018 10:18:50



Hopping off mode:



Date: 21.JAN.2018 09:45:30



Date: 21.JAN.2018 09:50:44





9.9 Spurious radiated emissions for transmitter and receiver

Test Method

- 1. The EUT is placed on a turntable, which is 0.8m above ground plane.
- 2. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
- Use the following spectrum analyzer settings: Span = wide enough to fully capture the emission being measured, RBW = 1 MHz for f ≥ 1GHz, 100 kHz for f < 1 GHz, VBW ≥ RBW, Sweep = auto, Detector function = peak, Trace = max hold
- 4. Follow the guidelines in ANSI C63.4-2014 with respect to maximizing the emission by rotating the EUT, adjusting the measurement antenna height and polarization, etc. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, submit this data. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- 5. Set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the duty cycle per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from 20log(duty cycle/100 ms), in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

Limit

The radio emission outside the operating frequency band 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. Radiated emissions which fall in the restricted bands, as defined in section15.205, must comply with the radiated emission limits specified in section 15.209.

Frequency MHz	Field Strength uV/m	Field Strength dBµV/m	Detector
30-88	100	40	QP
88-216	150	43.5	QP
216-960	200	46	QP
960-1000	500	54	QP
Above 1000	500	54	AV
Above 1000	5000	74	PK



Spurious radiated emissions for transmitter and receiver

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

The only worse case (which is subject to the maximum EIRP, GFSK mode) test result is listed in the report.

Transmitting spurious emission test result as below:

Bluetooth Mode GFSK Modulation 2402MHz Test Result

Frequency	Emission Level	Polarization	Limit	Detector	Margin	Result
MHz	dBuV/m		dBµV/m		dBuV/m	
767.97	43.68	Н	46.00	PK	2.32	Pass
4800.00	45.25	V	74.00	PK	28.75	Pass

Bluetooth Mode GFSK Modulation 2441MHz Test Result

Frequency	Emission Level	Polarization	Limit	Detector	Margin	Result
MHz	dBuV/m		dBµV/m		dBuV/m	
4877.81	48.65	Н	74.00	PK	25.35	Pass
4877.81	45.14	V	74.00	PK	28.86	Pass

Bluetooth Mode GFSK Modulation 2480MHz Test Result

Frequency	Emission Level	Polarization	Limit	Detector	Margin	Result
MHz	dBuV/m		dBµV/m		dBuV/m	
4955.65	45.79	Н	74.00	PK	28.21	Pass
4955.62	44.48	V	74.00	PK	29.52	Pass

Remark:

- (1) AV Emission Level= PK Emission Level+20log(dutycycle)
- (2) Data of measurement within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20db below the permissible limits or the field strength is too small to be measured.
- (3) "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.

10 Te

Test	Test Equipment List								
		List of Test	Instruments						
	DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE				
	EMI Test Receiver	Rohde & Schwarz	ESR 3	101782	2018-7-14				
	LISN	Rohde & Schwarz	ENV4200	100249	2018-7-17				
	LISN	Rohde & Schwarz	ENV216	100326	2018-7-14				
	ISN	Rohde & Schwarz	ENY81	100177	2018-7-14				
CE	ISN	Rohde & Schwarz	ENY81- CAT6	101664	2018-7-14				
	High Voltage Proble	Rohde & Schwarz	TK9420(VT9 420)	9420-58	2018-7-14				
	RF Current probe	Rohde & Schwarz	EZ-17	100816	2018-7-14				
С	Signal Generator	Rohde & Schwarz	SMB100A	108272	2018-7-7				
÷	Signal Analyzer	Rohde & Schwarz	FSV40	101030	2018-7-7				
	Vector Signal Generator	Rohde & Schwarz	SMU 200A	105324	2018-7-7				
	RF Switch Module	Rohde & Schwarz	OSP120/OS P-B157	101226/10085 1	2018-7-7				
	EMI Test Receiver	Rohde & Schwarz	ESR 26	101269	2018-7-14				
	Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	707	2018-7-14				
RE	Horn Antenna	Rohde & Schwarz	HF907	102294	2018-7-14				
	Pre-amplifier	Rohde & Schwarz	SCU 18	102230	2018-7-14				
	3m Semi-anechoic chamber	TDK	9X6X6		2019-5-29				

C - Conducted RF tests

- Conducted peak output power •
- 6dB bandwidth •
- 20dB bandwidth and 99% Occupied Bandwidth •
- Carrier frequency separation •
- Number of hopping frequencies •
- **Dwell Time** •
- Power spectral density* •
- Spurious RF conducted emissions •
- Band edge



11 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

System Measurement Uncertainty						
Test Items Extended Uncertainty						
Uncertainty for Radiated Emission in 3m chamber 30MHz-1000MHz	Horizontal: 4.83dB; Vertical: 4.91dB;					
Uncertainty for Radiated Emission in 3m chamber 1000MHz- 25000MHz	Horizontal: 4.89dB; Vertical: 4.88dB;					
Uncertainty for Conducted Emission 9kHz-150KHz	3.88dB					