

## Chip BT8916A:















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#### 11. Maximum Peak Output Power

#### 11.1 Block Diagram Of Test Setup



#### 11.2 Limit

FCC Part15 (15.247) , Subpart C							
Section	Test Item	Limit	Frequency Range (MHz)	Result			
15.247(b)(1)	Peak Output Power	0.125 watt or 21dBm	2400-2483.5	PASS			

### 11.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

- 2. Set the spectrum analyzer: RBW = 2MHz. VBW = 6MHz. Sweep = auto; Detector Function = Peak.
- 3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

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## 11.4 Test Result

# Chip AB5303B:

Condition	Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	1-DH1	2402	-1.97	21	Pass
NVNT	1-DH1	2441	-2.75	21	Pass
NVNT	1-DH1	2480	-4.17	21	Pass
NVNT	2-DH1	2402	0.22	21	Pass
NVNT	2-DH1	2441	-0.57	21	Pass
NVNT	2-DH1	2480	-1.98	21	Pass
NVNT	3-DH1	2402	0.86	21	Pass
NVNT	3-DH1	2441	-0.05	21	Pass
NVNT	3-DH1	2480	-1.42	21	Pass

# Chip BT8916A:

Condition	Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	1-DH1	2402	-1.39	21	Pass
NVNT	1-DH1	2441	-2.02	21	Pass
NVNT	1-DH1	2480	-3.4	21	Pass
NVNT	2-DH1	2402	0.69	21	Pass
NVNT	2-DH1	2441	0.08	21	Pass
NVNT	2-DH1	2480	-1.21	21	Pass

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## Chip AB5303B:



















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## Chip BT8916A:









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### 12. Hopping Channel Separation

### 12.1 Block Diagram Of Test Setup



#### 12.2 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. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 0.125W.

#### 12.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set the spectrum analyzer: RBW = 30kHz. VBW = 100kHz , Span = 2.0MHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.

3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.

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## 12.4 Test Result

# Chip AB5303B:

Modulation	Test Channel	Separation (MHz)	Limit(MHz)	Result
GFSK	Low	1.000	0.568	PASS
GFSK	Middle	1.000	0.587	PASS
GFSK	High	0.998	0.592	PASS
π/4 DQPSK	Low	1.000	0.841	PASS
π/4 DQPSK	Middle	1.000	0.835	PASS
π/4 DQPSK	High	1.002	0.851	PASS
8DPSK	Low	0.998	0.834	PASS
8DPSK	Middle	1.000	0.835	PASS
8DPSK	High	1.000	0.825	PASS

# Chip BT8916A:

Modulation	Test Channel	Separation (MHz)	Limit(MHz)	Result
GFSK	Low	1.000	0.616	PASS
GFSK	Middle	1.000	0.576	PASS
GFSK	High	1.000	0.585	PASS
π/4 DQPSK	Low	1.004	0.859	PASS
π/4 DQPSK	Middle	0.998	0.824	PASS
π/4 DQPSK	High	1.004	0.845	PASS

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### Chip AB5303B:







Agilent Spectrum Analyzer - Swe	(	CFS NVNT	1-DH1	2480MHz		
RL RF 50 S	2 AC	SENSE:II	T	ALIGN AUTO	DMS	08:33:39 PM Nov 10, 20
enter Freq 2.4795	UUUUU GHZ PN IFC	IO: Wide 🖵 Trig Gain:Low #At	j: Free Run ten: 30 dB	Avg Hold:>1	00/100	
Ref Offset 2	4 dB dBm				Mkr1 2	.478 830 GH -6.166 dBr
	<u>1</u>			<mark>^2</mark>		
.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~				
.0 0						
.0						
.0						
.0						
onter 2 479500 GHz						Snan 2 000 MH
es BW 30 kHz		#VBW 10	0 kHz		Sweep 2.1	33 ms (1001 pt
N 1 f	× 2.478 830 GHz	۲ -6.166 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION	VALUE
<u>N 1 f</u>	2.479 828 GHz	-6.209 dBm				
			III	STATUS		•
			2 0 1 1	2402MH-		
Agilent Spectrum Analyzer - Swe	ept SA			2402101112		
RL RF 50 S	2 AC	SENSE:II	T	ALIGN AUTO #Avg Type:	RMS	08:36:22 PM Nov 10, 20 TRACE 1 2 3 4
	PN IFC	IO: Wide 😱 Trig Gain:Low #At	j: Free Run ten: 30 dB	Avg Hold:>1	00/100	DET PNNN
Ref Offset 2 dB/div Ref 20.00	.34 dB dBm				Mkr1 2	.401 830 GH -4.019 dBi
a 🗌 🗌						
	<b>♦</b> <sup>1</sup>			\ <b>2</b>		
	$\sim$	$\sim$	~~~~			~~~~
.0						
.0						
.0						
.0						
enter 2 402500 CHz						Snan 2.000 MI
les BW 30 kHz		#VBW 10	0 kHz		Sweep 2.1	33 ms (1001 pt
R MODE TRC SCL	× 2.401 830 GHz	۲ -4.019 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION	VALUE
<u>N 1 f</u>	2.402 830 GHz	-4.086 dBm				



	C	FS NVNT	2-DH1	2441MHz		
Agilent Spectrum Analyzer - Swept           R L         RF         50 Ω	AC AC	SENSE:I	NT	ALIGN AUTO		08:38:33 PM Nov 10, 202
enter Freq 2.44150	DOOO GHz PNO: IFGai	Wide 🖵 Tris n:Low #At	g: Free Run tten: 30 dB	#Avg Type Avg Hold:>	RMS 100/100	TRACE 12345 TYPE MWWW DET PNNNN
Ref Offset 2.3 dB/div Ref 20.00 d	5 dB Bm				Mkr1 2	.440 830 GHz -4.857 dBm
og 10.0						
0.00	1					
20.0			~~~~			
80.0						
10.0						
50.0						
0.0						
enter 2 111500 GHz						Spap 2 000 MH
Res BW 30 kHz		#VBW 10	0 kHz		Sweep 2.1	33 ms (1001 pts
KR MODE TRC SCL	× 2.440 830 GHz	۲ -4.857 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION	VALUE
2 N 1 T	2.441 830 GHz	-4.919 dBm				
5						=============
7						
9						
1						,
G				STATUS		
	C	FS NVNT	2-DH1	2480MHz		
Agilent Spectrum Analyzer - Swept	SA	SENSE	NT			08:40:52 PM Nov 10, 202
enter Freq 2.47950	DOOO GHZ PNO: IFGai	Wide — Tri n:Low #At	g: Free Run tten: 30 dB	#Avg Type Avg Hold:>	RMS 100/100	TRACE 1 2 3 4 5 TYPE MWWWW DET PNNNN
Ref Offset 2.4 dB/div <b>Ref 20.00 d</b>	dB Bm				Mkr1 2	.478 828 GHz -6.286 dBm
og 10.0						
0.00	1					
0.0		$\sim$	~~~~			
			<u> </u>			
50.0						
60.0						
70.0						
enter 2.479500 GHz		#V/B\A( 10	0 kHz		Sween 21	Span 2.000 MH
IKR MODE TRC SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION	VALUE
1 N 1 f 2 N 1 f	2.478 828 GHz 2.479 830 GHz	-6.286 dBm -6.287 dBm				
3 4						
5 6						
7 8						
9						
						P.







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	(	CFS NVNT	3-DH1 2	2480MHz			
Agilent Spectrum Analyzer -	Swept SA	CENCE.	ACT.			00:47:17.0	- 6
Center Freq 2.479	9500000 GHz PM IFC	NO: Wide Tri Gain:Low #At	g: Free Run Itten: 30 dB	#Avg Typ Avg Hold	e: RMS :>100/100	08:47:17 F TRAC TY D	DE 1 2 3 4 9 PE MWWW ET P NNN
Ref Offse dB/div Ref 20.0	t 2.4 dB 10 dBm				Mł	(r1 2.478 9 -6.5	92 GH 96 dBi
og 10.0							
).00	1				<b>2</b>		
0.0	~~~~~	$\sim$	~~~~	$\sim$		$\sim$	~~~~
0.0							
0.0							
0.0							
0.0							
0.0							
enter 2.479500 G Res BW 30 kHz	Hz	#VBW 10	0 kHz	ľ	Sweep	Span 2 2.133 ms (	.000 Mi 1001 pt
KR MODE TRC SCL	X	Y	FUNCTION	FUNCTION WIDTH	FU	JNCTION VALUE	
1 N 1 f 2 N 1 f	2.478 992 GHz 2.479 992 GHz	-6.596 dBm -6.625 dBm					
4							
6							
8							
0							
			III				•
G				STATUS			





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## Chip BT8916A:



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Agilent Spectrum Analyzer - Swe	pt SA			
RL RF 50 Ω	AC	SENSE:INT	ALIGN AUTO	10:42:48 AM Jan 02, 202
inter Freq 2.47950	JUUUU GHZ PNO:	Wide Trig: Free Ru	n Avg Hold:>100/10	0 TYPE MWWWW DET P NNNN
	IFGai	n:Low #Atten: 30 dB	)	Mkr1 2 478 988 GH
Ref Offset 2. dB/div Ref 20.00	4 dB dBm			-5.095 dBn
	1			2
.0				
.0				
0				
.0				
onter 2 479500 GHz				Span 2 000 MH
es BW 30 kHz		#VBW 100 kHz		Sweep 2.133 ms (1001 pts
R MODE TRC SCL	X	Y FUNCTIO	DN FUNCTION WIDTH	FUNCTION VALUE
N 1 F N 1 F	2.478 988 GHZ 2.479 988 GHZ	-5.202 dBm		
				Þ
			STATUS	
	0			
	C	FS NVNT 2-DH1 2	402MHz Ant1	
Agilent Spectrum Analyzer - Swe	pt SA	FS NVNT 2-DH1 2	402MHz Ant1	
Agilent Spectrum Analyzer - Swe RL RF 50 Ω Inter Freq 2.40250	pt SA AC D00000 GHz	FS NVNT 2-DH1 2	402MHz Ant1	10:45:22 AM Jan 02, 202 TRACE 2 34 6 TRACE 2 34 6
Agilent Spectrum Analyzer - Swe RL RF 50 Ω Inter Freq 2.40250	pt SA AC D00000 GHz IFGai	FS NVNT 2-DH1 2 SENSE:INT Wide miLow #Atten: 30 dB	402MHz Ant1 #Aug Type: RMS n Avg Hold:>100/10	10:45:22 AM Jan 02, 202 TRACE 12 3 4 5 0 TYPE MWWW DET PNNNN
Agilent Spectrum Analyzer - Swe RL RF 50 Ω inter Freq 2.4025( Ref Offset 2:	pt SA AC D00000 GHz IFGai 34 dB	FS NVNT 2-DH1 2 SENSE:INT Wide Trig: Free Ru #Atten: 30 dB	402MHz Ant1 #Avg Type: RMS n Avg Hold:>100/10	10:45:22 AH) an 02, 202 TRACE 12 23 4 5 0 TYPE WWWW DET PNNNN Mkr1 2.401 986 GH:
Agilent Spectrum Analyzer - Swe RL RF 50 Ω nter Freq 2.40250 Ref Offset 2: dB/div Ref 20.000	pt SA AC D00000 GHZ IFGai 34 dB dBm	FS NVNT 2-DH1 2 SENSE:INT Wide Trig: Free Ru #Atten: 30 dB	402MHz Ant1 #Avg Type: RMS n Avg Hold:>100/10	10:45:22 AMJan 02, 202 TRACE 2 2 3 4 3 TYPE MUMUU DET P.NNNN Mkr1 2.401 986 GH: -3.298 dBn
Agilent Spectrum Analyzer - Swe RL RF 50 Ω Inter Freq 2.40250 Ref Offset 2: dB/div Ref 20.00 0	Pt SA AC D00000 GHZ PNO: IFGai 34 dB dBm	FS NVNT 2-DH1 2 SENSE:INT Wide Trig: Free Ru #Atten: 30 dB	402MHz Ant1 ALIGN AUTO #Avg Type: RMS Avg Hold:>100/10	10:45:22 AN Jan 02, 202 TRACE 12 3 4 5 TYPE M DET P.N.N.N Mkr1 2.401 986 GH; -3.298 dBn
Agilent Spectrum Analyzer - Swe RL RF 50 Ω Inter Freq 2.40250 Ref Offset 2: dB/div Ref 20.00 0 0 0	AC DO000 GHz AC PNO: IFGai	FS NVNT 2-DH1 2	402MHz Ant1	10:45:22 AM Jan 02, 202 TRACE 12 3 4 5 0 TYPE MWWW DET PNNNN Mkr1 2.401 986 GH: -3.298 dBn
Agilent Spectrum Analyzer - Swe RL RF 50 Ω Inter Freq 2.40250 Ref Offset 2: dB/div Ref 20.00 o	PNO: AC PNO: IFGai 34 dB dBm	FS NVNT 2-DH1 2	402MHz Ant1	10:45:22 AM Jan 02, 202 TRACE 12 34 5 0 Tree 12 34
Agilent Spectrum Analyzer - Swe RL RF 50 Ω Inter Freq 2.40250 Ref Offset 2: dB/div Ref 20.00 0	pt SA AC D00000 GHz PNO: IFGai 34 dB dBm	FS NVNT 2-DH1 2	402MHz Ant1	10:45:22 AM Jan 02, 202 ТКАСЕ 12 3 4 5 0 ТГАСЕ 12 3 4 5 ОТТРЕСТИТИТИТИТИТИТИТИТИТИТИТИТИТИТИТИТИТИТИ
Agilent Spectrum Analyzer - Swe RL RF 50 Ω Inter Freq 2.40250 Ref Offset 2: dB/div Ref 20.00 0	pt SA AC D00000 GHZ PNO: IFGai 34 dB dBm	FS NVNT 2-DH1 2	402MHz Ant1	10:45:22 AH Jan 02, 202 TRACE 12 3 4 5 0 TYPE NNNN Mkr1 2.401 986 GH: -3.298 dBn
Agilent Spectrum Analyzer - Swe RL RF 50 Ω Inter Freq 2.40250 Ref Offset 2: dB/div Ref 20.00 0 0 0 0 0 0 0 0 0 0 0 0 0 0	PtSA AC D00000 GHZ PNO: IFGai 34 dB dBm	FS NVNT 2-DH1 2	402MHz Ant1	10:45:22 AM Jan 02, 202 TRACE 2 2 3 4 5 0 TYPE MUMUM DET MNNNN Mkr1 2.401 986 GH: -3.298 dBn
Agilent Spectrum Analyzer - Swe RL RF 50 Ω Inter Freq 2.40250 Ref Offset 2: dB/div Ref 20.00 d 0 0 0 0 0 0 0 0 0 0 0 0 0	AC DO000 GHz AC PNO: IFGai	FS NVNT 2-DH1 2	402MHz Ant1	10:45:22 AM Jan 02, 202 TRACE 12 3 4 5 0 TYPE WINNER Mkr1 2.401 986 GH: -3.298 dBn
Agilent Spectrum Analyzer - Swe RL RF 50 Ω Inter Freq 2.40250 Ref Offset 2: dB/div Ref 20.00 0 0 0 0 0 0 0 0 0 0 0 0 0 0	AC DO000 GHz AC DO000 GHz IFGai	FS NVNT 2-DH1 2	402MHz Ant1	10:45:22 AM Jan 02, 202 TRACE 12 34 5 0 Tree 12 34
Agilent Spectrum Analyzer - Swe RL RF 50 Ω Inter Freq 2.40250 Ref Offset 2: dB/div Ref 20.00 0 0 0 0 0 0 0 0 0 0 0 0 0 0	AC PNO: AC PNO: IFGai 34 dB dBm	FS NVNT 2-DH1 2	402MHz Ant1	10:45:22 AM Jan 02, 202 TRACE 12:34 5 0 Tree DI 2:34 5 DET PNNNN Mkr1 2:401 986 GH: -3.298 dBn
Agilent Spectrum Analyzer - Swe RL RF 50 Ω enter Freq 2.40250 B B C C C C C C C C C C C C C	pt SA AC PNO: IFGai 34 dB dBm 1 1 1 1 1 1 1 1 1 1 1 1 1	FS NVNT 2-DH1 2 SENSE:INT Wide Trig: Free Ru #Atten: 30 dB #VBW 100 kHz	402MHz Ant1	Contracting the second
Agilent Spectrum Analyzer - Swe RL RF 50 Ω Inter Freq 2.40250 Ref Offset 2: dB/div Ref 20.00 0 a a c c c c c c c c c c c c c	2 401 986 GHz	FS NVNT 2-DH1 2 SENSE:INT Wide Trig: Free Ru #Atten: 30 dB #VBW 100 kHz Y FUNCTIO 3 298 dBm	402MHz Ant1	Contraction value
Agilent Spectrum Analyzer - Swe RL RF 50 Ω Inter Freq 2.40250 Ref Offset 2. dB/div Ref 20.00 0 0 0 0 0 0 0 0 0 0 0 0 0 0	2.401 986 GHz 2.402 990 GHz	FS NVNT 2-DH1 2 SENSE:INT Wide Trig: Free Ru #Atten: 30 dB #VBW 100 KHz Y FUNCTIC -3.298 dBm -3.271 dBm	402MHz Ant1	Contraction value
Agilent Spectrum Analyzer - Swe RL RF 50 Ω Inter Freq 2.40250 Benter Freq 2.400 of Ref Offset 2: Comparison of the second	AC PINO: AC PINO: IFGai 34 dB dBm 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	FS NVNT 2-DH1 2 SENSE:INT Wide Trig: Free Ru #Atten: 30 dB #VBW 100 kHz Y FUNCTIC -3.298 dBm -3.271 dBm	402MHz Ant1	Contraction value
Agilent Spectrum Analyzer - Swe RL RF 50 Ω Inter Freq 2.40250 Billion Ref 20.00 1 Ref 0ffset 2: dB/div Ref 20.00 1 Comparison of the second se	X AC PNO:	FS NVNT 2-DH1 2 SENSE:INT Wide Trig: Free Ru #Atten: 30 dB #VBW 100 kHz Y FUNCTIC -3.298 dBm -3.271 dBm	402MHz Ant1	Contract of the second
Agilent Spectrum Analyzer - Swe RL RF 50 Ω Inter Freq 2.40250 Ref Offset 2: dB/div Ref 20.00 0 0 0 0 0 0 0 0 0 0 0 0 0 0	AC PNO: AC PNO: IFGai 34 dB dBm 1 1 2.401 986 GHz 2.401 986 GHz 2.402 990 GHz	FS NVNT 2-DH1 2 Vide Trig: Free Ru Atten: 30 dB VBW 100 kHz VBW 100 kHz V FUNCTIC 3.298 dBm -3.271 dBm	402MHz Ant1	Contract of the second
Agilent Spectrum Analyzer - Swe RL RF 50 Ω Inter Freq 2.40250 Ref Offset 2: dB/div Ref 20.00 0 0 0 0 0 0 0 0 0 0 0 0 0 0	AC PNO: AC PNO: IFGai 34 dB dBm 1 1 2.401 986 GHz 2.401 986 GHz 2.402 990 GHz	FS NVNT 2-DH1 2 Wide Trig: Free Ru #Atten: 30 dB #VBW 100 kHz Y FUNCTIC -3.298 dBm -3.271 dBm	402MHz Ant1	Contract of the second

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	CFS NVNT 2-DH1 244	1MHz Ant1	
Agilent Spectrum Analyzer - Swept SA R L RF 50 Ω AC	SENSE:INT	ALIGN AUTO	10:47:17 AM Jan 02, 2024
enter Freq 2.441500000 GHz	PNO: Wide Trig: Free Run IFGain:Low #Atten: 30 dB	#Avg Type: RMS Avg Hold:>100/100	TRACE 1 2 3 4 5 TYPE MWWWW DET P NNNN
Ref Offset 2.36 dB dB/div Ref 20.00 dBm		Mkı	1 2.440 990 GHz -3.863 dBm
29 0.0 ▲1		^2	
			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
0.0			
0.0			
0.0			
			Snop 2 000 MHz
Res BW 30 kHz	#VBW 100 kHz	Sweep	2.133 ms (1001 pts)
R         MODE         TRC         SCL         X           1         N         1         f         2.440         990         GI           2         N         1         f         2.441         988         GI	Y         FUNCTION           Hz         -3.863 dBm           Hz         -3.921 dBm	FUNCTION WIDTH FUN	CTION VALUE
3 4 5			=
6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7			
9			
a	m	STATUS	Þ
	CFS NVNT 2-DH1 248	0MHz Ant1	
Agilent Spectrum Analyzer - Swept SA RL RF 50 Ω AC	SENSE:INT	ALIGN AUTO	10:49:14 AM Jan 02, 2024
enter Freq 2.479500000 GH2	PNO: Wide IFGain:Low Trig: Free Run #Atten: 30 dB	Avg Hold:>100/100	
Ref Offset 2.4 dB dB/div Ref 20.00 dBm		Mkı	1 2.478 986 GHz -5.092 dBm
		^2	
enter 2.479500 GHz Res BW 30 kHz	#VBW 100 kHz	Sweep	Span 2.000 MHz 2.133 ms (1001 pts)
0.0	#VBW 100 kHz +VBW 100 kHz 		Span 2.000 MHz 2.133 ms (1001 pts) CTION VALUE
00	#VBW 100 kHz           Y         FUNCTION           12         -5.202 dBm           12         -5.202 dBm	FUNCTION WIDTH FUN	Span 2.000 MHz 2.133 ms (1001 pts) CTION VALUE
0.0	#VBW 100 kHz #VBW 100 kHz Hz -5.992 dBm Hz -5.202 dBm	FUNCTION WIDTH FUN	Span 2.000 MHz 2.133 ms (1001 pts) CTION VALUE
00	#VBW 100 kHz #VBW 100 kHz Hz -5.092 dBm Hz -5.202 dBm		Span 2.000 MHz 2.133 ms (1001 pts) CTION VALUE

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### 13. Number Of Hopping Frequency

### 13.1 Block Diagram Of Test Setup



### 13.2 Limit

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

### 13.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set the spectrum analyzer: RBW = 100kHz. VBW = 300kHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.

3. Allow the trace to stabilize. It may prove necessary to break the span up to sections. in order to clearly show all of the hopping frequencies. The limit is specified in one of the subparagraphs of this Section.

4. Set the spectrum analyzer: Start Frequency = 2.4GHz, Stop Frequency = 2.4835GHz. Sweep=auto;

#### 13.4 Test Result

Chip AB5303B:

Condition	Mode	Hopping Number	Verdict
NVNT	1-DH1	79	Pass
NVNT	2-DH1	79	Pass
NVNT	3-DH1	79 15	Pass

#### Chip BT8916A:

Condition	Mode	Hopping Number	Limit	Verdict
NVNT	1-DH1	79	15	Pass
NVNT	2-DH1	79	15	Pass



## Chip AB5303B:

Test Graphs Hopping No. NVNT 1-DH1 2441MHz -#Avg Type: RMS Avg|Hold:>100/100 Center Freq 2.441750000 GHz PNO: Fast IFGain:Low Trig: Free Run #Atten: 30 dB DET P Mkr1 2.401 920 5 GHz -2.692 dBm Ref Offset 2.36 dB Ref 20.00 dBm 10 dB/div AAAAAA Stop 2.48350 GHz Sweep 8.000 ms (1001 pts) Start 2.40000 GHz #Res BW 100 kHz #VBW 300 kHz 2.401 920 5 GHz 2.479 909 5 GHz -2.692 dBr -5.129 dBr N 1 f Hopping No. NVNT 2-DH1 2441MHz K RI 08:57:17 PM Nov 10, 2023 RACE 1 2 3 4 5 TYPE MWWWW DET P NNNN #Avg Type: RMS Avg|Hold:>100/100 Center Freg 2.441750000 GHz PNO: Fast Trig: Free Run IFGain:Low #Atten: 30 dB Mkr1 2.401 837 0 GHz -2.389 dBm Ref Offset 2.36 dB Ref 20.00 dBm ቢ ስ ሰ / ነ ለስለለለለለ Start 2.40000 GHz #Res BW 100 kHz Stop 2.48350 GHz Sweep 8.000 ms (1001 pts) #VBW 300 kHz 2.401 837 0 GHz 2.480 160 0 GHz -2.389 dBn -4.693 dBn N





	Но	pping No. N	VNT 3-DI	H1 2441M	Hz	
Agilent Spectrum An	alyzer - Swept SA	SENSE	INT	ALIGN AUTO		09:03:50 PM Nov 10, 20
enter Freq 2	2.441750000 GHz	PNO: Fast Tri IFGain:Low #A	ig: Free Run itten: 30 dB	#Avg Typ Avg Hold:	e: RMS :>100/100	TRACE 1 2 3 4 5 TYPE MWWW DET P N N N
Ref dB/div Ref	Offset 2.36 dB <sup>7</sup> 20.00 dBm				Mkr1	2.401 837 0 GH -3.051 dBr
0.0						
						^ <b>2</b>
0.0 JWYYWY	AMAMMAAAAAAAA	<u>AAAAAAAAAAA</u>	www.www.ww	<u>www.www.</u>	ኯኯኯኯኯኯ	MMMMMMMM
0.0						
0.0						
0.0						
0.0						
0.0						V
0.0						
tart 2.40000 ( Res BW 100	GHz kHz	#VBW 30	00 kHz		Sweep	Stop 2.48350 GF 8.000 ms (1001 pt
KR MODE TRC SCL	Х	Y	FUNCTION	FUNCTION WIDTH	FU	NCTION VALUE
2 N 1 f	2.401 837 0 GH 2.480 410 5 GH	z -3.051 dBm z -7.853 dBm				
3						
5						
7						
9						
1						
						•
3				STATUS		



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## Chip BT8916A:

Test Graphs Hopping No. NVNT 1-DH1 2441MHz Ant1 📕 Agilent Spectrum Analyzer - Swept SA KI RI 1:01:00 AM Jan 02 #Avg Type: RMS Avg|Hold:>100/100 Center Freq 2.441750000 GHz PNO: Fast Frig: Free Run IFGain:Low #Atten: 30 dB Mkr1 2.401 837 0 GHz -1.636 dBm Ref Offset 2.36 dB Ref 20.00 dBm 10 dB/div  $\triangle^2$ VVVVV Start 2.40000 GHz #Res BW 100 kHz Stop 2.48350 GHz Sweep 8.000 ms (1001 pts) #VBW 300 kHz FUNCTION FUNCTION WIDTH FUNCTION VALU 2.401 837 0 GHz 2.479 993 0 GHz -1.636 dBr -3.660 dBr Hopping No. NVNT 2-DH1 2441MHz Ant1 ectrum Analyzer - Swept S 📜 Agil 🖬 RL 11:07:07 AM Jan 02, 20 TRACE 1 2 3 4 TYPE MWWW ALIGN AUTO #Avg Type: RMS Avg|Hold:>100/100 Center Freq 2.441750000 GHz PNO: Fast Free Run IFGain:Low #Atten: 30 dB Mkr1 2.401 503 0 GHz -6.542 dBm Ref Offset 2.36 dB Ref 20.00 dBm 10 dB/div Log **r** an a second se Stop 2.48350 GHz Sweep 8.000 ms (1001 pts) Start 2.40000 GHz #Res BW 100 kHz #VBW 300 kHz 2.401 503 0 GHz 2.479 993 0 GHz -6.542 dBn -3.575 dBn N 1 f

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### 14. Dwell Time

### 14.1 Block Diagram Of Test Setup



14.2 Limit

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

### 14.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set spectrum analyzer span = 0. Centred on a hopping channel;

3. Set RBW = 1MHz and VBW = 3MHz.Sweep = as necessary to capture the entire dwell time per hopping channel. Set the EUT for DH5, DH3 and DH1 packet transmitting.

4. Use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).

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### 14.4 Test Result

## Chip AB5303B:

Mode	Frequency (MHz)	Pulse Time (ms)	Total Dwell Time (ms)	Burst Count	Period Time (ms)	Limit (ms)	Verdict
1-DH1	2441	0.389	122.924	316	31600	400	Pass
1-DH3	2441	1.643	269.452	164	31600	400	Pass
1-DH5	2441	2.892	292.092	101	31600	400	Pass
2-DH1	2441	0.394	125.686	319	31600	400	Pass
2-DH3	2441	1.646	253.484	154	31600	400	Pass
2-DH5	2441	2.897	283.906	98	31600	400	Pass
3-DH1	2441	0.395	125.61	318	31600	400	Pass
3-DH3	2441	1.649	278.681	169	31600	400	Pass
3-DH5	2441	2.896	350.416	121	31600	400	Pass

Note: Total Dwell Time (ms) = Pulse Time (ms)\*Burst Count

### Chip BT8916A:

Mode	Frequency (MHz)	Pulse Time (ms)	Total Dwell Time (ms)	Burst Count	Period Time (ms)	Limit (ms)	Verdict
1-DH1	2441	0.401	127.117	317	31600	400	Pass
1-DH3	2441	1.655	264.8	160	31600	400	Pass
1-DH5	2441	2.905	310.835	107	31600	400	Pass
2-DH1	2441	0.411	131.52	320	31600	400	Pass
2-DH3	2441	1.662	275.892	166	31600	400	Pass
2-DH5	2441	2.910	311.37	107	31600	400	Pass

Note: Total Dwell Time (ms) = Pulse Time (ms)\*Burst Count

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### Chip AB5303B:

Test Graphs Dwell NVNT 1-DH1 2441MHz One Burst R #Avg Type: RMS NSE:INT Trig Delay-500.0 μs Trig: Video #Atten: 30 dB Center Freq 2.441000000 GHz PNO: Fast ↔ IFGain:Low DET ΔMkr1 389.0 μs 4.17 dB Ref Offset 2.36 dB Ref 20.00 dBm 10 dB/div Δ2 X<sub>2</sub> ni aastaada yaala hadiga inayaa shaharaya dha galada yaa ahadiga yahada ahayaa h an an Shinkarda a tara an Anna an Center 2.441000000 GHz Res BW 1.0 MHz Span 0 Hz Sweep 10.00 ms (10001 pts) #VBW 3.0 MHz 389.0 μs (Δ) 497.0 μs <u>1 t</u> 1 t 4.17 dE -12.35 dBm STATUS Dwell NVNT 1-DH1 2441MHz Accumulated 08:51:18 PM Nov 10, 2023 TRACE 1 2 3 4 5 6 TYPE WWWWWW DET P N N N N K RI #Avg Type: RMS Center Freq 2.441000000 GHz Trig: Free Run #Atten: 30 dB PNO: Fast ++++ IFGain:Low Ref Offset 2.36 dB Ref 20.00 dBm 10 dB/div Loa Center 2.441000000 GHz Res BW 1.0 MHz Span 0 Hz Sweep 31.60 s (10001 pts) #VBW 3.0 MHz









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Magilent Spectrum Analyzer - Swept RL RF 50 Ω Center Freq 2.44100	AC 0000 GHz	SENSE:INT Trig Dela Trig: Vide	ΔL	IGN AUTO #Avg Type:	RMS	09:07:2	8 PM Nov 10, 2023 ACE 1 2 3 4 5 6 TYPE WWWWWW
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## Chip BT8916A:

Test Graphs Dwell NVNT 1-DH1 2441MHz Ant1 One Burst 📕 Agilent Spectrum Analyzer - Swept SA 🕷 RL RF 50 Ω A 11:01:06 AM Jan 02 PNO: Fast +++ Trig: Video IFGain:Low #Atten: 30 dB Center Freq 2.441000000 GHz #Avg Type: RMS ΔMkr1 401.0 μs 1.96 dB Ref Offset 2.36 dB Ref 20.00 dBm I0 dB/div 1Δ2 X<sub>2</sub> al provide no barre a grand and a particular and the state of the Center 2.441000000 GHz Res BW 1.0 MHz Span 0 Hz Sweep 10.00 ms (10001 pts) #VBW 3.0 MHz FUNCTION FUNCTION WIDTH FUNCTION VALUE 401.0 μs (Δ) 497.0 μs 1.96 dB -10.64 dBm 10 Dwell NVNT 1-DH1 2441MHz Ant1 Accumulated 11:01:40 AM Jan 02, 20 TRACE 1 2 3 4 TYPE WWWW P N N N 📕 Agi 🖬 RL ALIGN AUTO #Avg Type: RMS SENSE:INT Center Freq 2.441000000 GHz PNO: Fast +++ Trig: Free Run IFGain:Low #Atten: 30 dB DET Ref Offset 2.36 dB Ref 20.00 dBm 10 dB/div Log Center 2.441000000 GHz Res BW 1.0 MHz Span 0 Hz Sweep 31.60 s (10001 pts) #VBW 3.0 MHz STATUS



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![](_page_39_Figure_3.jpeg)

![](_page_40_Picture_0.jpeg)

la place status lange: lange 1 Center Freq 2.441000000 GHz Ref 00fset 238 dB Ref 2.000 dBm Ref 2.000 dBm R	Dw	ell NVNT 1-DH5 2441MHz	Ant1 One Burst	
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Ref Offset 2.36 dB         100       100         100       100         100       100         100       100         100       100         100       100         100       100         100       100         100       100         100       100         100       100         100       100         100       100         100       100         100       100         100       100         100       100         100       100         100       100         100       100         100       100         100       100         100       100         100       100         100       100         100       100         100       100         100       100         100       100         100       100         100       100         100       100         100       100         100       100         100       100 </th <th>Agilent Spectrum Analyzer - Swept SA Agilent Spectrum Analyzer - Swept SA AC Center Freq 2.4410000000 GHz</th> <th>PNO: Fast Trig: Free Run IFGain:Low #Atten: 30 dB</th> <th>ALIGN AUTO #Avg Type: RMS</th> <th>11:15:55 AM Jan 02, 2024 TRACE 1 2 3 4 5 6 TYPE WWWWWW DET P N N N N N</th>	Agilent Spectrum Analyzer - Swept SA Agilent Spectrum Analyzer - Swept SA AC Center Freq 2.4410000000 GHz	PNO: Fast Trig: Free Run IFGain:Low #Atten: 30 dB	ALIGN AUTO #Avg Type: RMS	11:15:55 AM Jan 02, 2024 TRACE 1 2 3 4 5 6 TYPE WWWWWW DET P N N N N N
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Center 2.44100000 GHz         Span 0 Hz           Res BW 1.0 MHz         #VBW 3.0 MHz         Sweep 31.60 s (10001 pts)           Msg         status	-60.0			
Iotatuoi	Center 2.441000000 GHz Res BW 1.0 MHz	#VBW 3.0 MHz	SWEE	Span 0 Hz p 31.60 s (10001 pts)

![](_page_41_Picture_0.jpeg)

![](_page_41_Picture_1.jpeg)

RL RF 50.0	AC	SENSE:INT	AI	IGN AUTO		11:07:	4 AM Jan 02, 202
enter Freq 2.44100	00000 GHz PNC IFGa	Trig Del D: Fast ↔ Trig: Vic ain:Low #Atten:	ay-500.0 µs ieo 30 dB	#Avg Type: R	MS	TI	ACE 12345 TYPE WWWWW DET PNNNN
Ref Offset 2.	86 dB					ΔMkr1	411.0 µs
							TRIG LVL
30.0							
so.o <mark>dan kanan dara sedaraharan baran baran Baran baran bara</mark>	ing and the process in a property of the The process of the second s	an a	a Marchen (proposition) A Marchen (proposition)			kili teredi tepatra da. Igti pitiki patra s	i en la marter legitari supe Rich i di d
				dean		dia nel t	., i, ii,
enter 2.441000000 C es BW 1.0 MHz	Hz	#VBW 3.0 MH	z		Sweep	10.00 ms	Span 0 Hz (10001 pts
KR MODE TRC SCL	Х	Y F	UNCTION FUNCT	ION WIDTH	Fl	JNCTION VALUE	4
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	411.0 µs (/ 497.0 µs	) -6.46 dB -3.84 dBm					
4							
6 7							
9							
G				STATUS			
	Dwell N	VNT 2-DH1 244	1MHz Ant1	Accumulate	ed		
Agilent Spectrum Analyzer - Swe RL RF 50 Ω	AC	SENSE:INT	AL	IGN AUTO		11:07:4	- 🗗 🗾
enter Freq 2.44100	10000 GHz PNO IFGa	):Fast ↔ Trig:Fre ain:Low #Atten:	e Run 30 dB	#Avg Type: R	MS	T	TYPE WWWWWW DET P NNNN
Ref Offset 2.3 dB/div Ref 20.00 (	6 dB 1Bm						
0.0							
0.00							
enter 2.441000000 G							Span 0 Hz

C 00.,LTA

![](_page_42_Picture_0.jpeg)

![](_page_42_Picture_1.jpeg)

![](_page_42_Figure_2.jpeg)

![](_page_42_Picture_3.jpeg)

![](_page_43_Picture_0.jpeg)

Dwe	II NVNT 2-DH5 2441MHz Ant1	One Burst
Agilent Spectrum Analyzer - Swept SA  Carter Freq 2.441000000 GHz	SENSE:INT ALIGN Trig Delay-500.0 µs PNO: Fast →→ Trig: Video FGain:Low #Atten: 30 dB	AUTO 11:17:09 AM Jan 02, 2024 #Avg Type: RMS TRACE 12:3 4 5 0 TYPE UNIT TRACE 12:3 4 5 0 TYPE UNIT TRACE 10:5 4 5 0 TYPE UNIT TRACE 10:5 4 5 0 TYPE UNIT TRACE 10:5 4 5 0
Ref Offset 2.36 dB 10 dB/div Ref 20.00 dBm		ΔMkr1 2.910 ms -2.53 dB
	1Δ2	
-20.0		
-30.0		ing the provide state of the p
-60.0 million	e bill i provinski bill and i provinski bill and a bill and bi	
Center 2.441000000 GHz Res BW 1.0 MHz	#VBW 3.0 MHz	Span 0 Hz Sweep 10.00 ms (10001 pts)
MKR         MODE         TRC         SCL         X           1         Δ2         1         t         (Δ)         2.910 ms           2         F         1         t         497.0 μs	Y FUNCTION FUNCTION s (Δ) -2.53 dB s -4.19 dBm	N WIDTH FUNCTION VALUE
4 5 6 7		E
8 9 10 11		
MSG	m	STATUS
Dwell	NVNT 2-DH5 2441MHz Ant1 A	ccumulated
07 RL   RF   50 Ω AC   Center Freq 2.441000000 GHz	SENSE:INT ALIGN PNO: Fast ↔ Trig: Free Run IFGain:Low #Atten: 30 dB	11:17:43 AM Jan 02, 2024 #Avg Type: RMS TRACE 11:23 45 6 TYPE WWWWW DET PNNNNN
Ref Offset 2.36 dB 10 dB/div Ref 20.00 dBm		
10.0		
-10.0		
-30.0		
-40.0		
-70.0		
Center 2.441000000 GHz		Span 0 Hz

![](_page_43_Picture_3.jpeg)

![](_page_44_Picture_0.jpeg)

### 15. Antenna Requirement

#### 15.1 Limit

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

#### 15.2 Test Result

The EUT antenna is PCB antenna, fulfill the requirement of this section.

![](_page_44_Figure_7.jpeg)

No.: BCTC/RF-EMC-005

![](_page_45_Picture_0.jpeg)

### 16. EUT Photographs

**EUT** Photo

![](_page_45_Picture_4.jpeg)

![](_page_45_Picture_5.jpeg)

NOTE: Appendix-Photographs Of EUT Constructional Details

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RC

ort

![](_page_46_Picture_0.jpeg)

# 17. EUT Test Setup Photographs

Conducted emissions

![](_page_46_Picture_4.jpeg)

![](_page_46_Picture_5.jpeg)

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![](_page_47_Picture_0.jpeg)

**Radiated Measurement Photos** 

![](_page_47_Figure_3.jpeg)

![](_page_47_Picture_4.jpeg)

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![](_page_48_Picture_0.jpeg)

## STATEMENT

- 1. The equipment lists are traceable to the national reference standards.
- 2. The test report can not be partially copied unless prior written approval is issued from our lab.
- 3. The test report is invalid without the "special seal for inspection and testing".
- 4. The test report is invalid without the signature of the approver.
- 5. The test process and test result is only related to the Unit Under Test.

6. Sample information is provided by the client and the laboratory is not responsible for its authenticity.

7. The quality system of our laboratory is in accordance with ISO/IEC17025.

8. If there is any objection to this test report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

Address:

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\*\*\*\*\* END \*\*\*\*\*

2 CO.,L72

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