

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.

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



13.4 Test Result

Test Graphs Hopping No. NVNT 1-DH1 2441MHz RL ALIGN AUTO #Avg Type: RMS Avg|Hold:>100/100 10:24 Center Freq 2.441750000 GHz PNO: Fast Free Run IFGain:Low #Atten: 30 dB TYPE DET Mkr1 2.401 837 0 GH: -0.513 dBn Ref Offset 2.36 dB Ref 20.00 dBm 10 dB/div Stop 2.48350 GHz Sweep 8.000 ms (1001 pts) Start 2.40000 GHz #Res BW 100 kHz #VBW 300 kHz FUNCTION WIDTH UNCTION VALU -0.513 dBm -1.286 dBm 2.401 837 0 GHz 2.479 993 0 GHz N 1 f N 1 f **I**STATUS Hopping No. NVNT 2-DH1 2441MHz a RL SENSE:INT Center Freg 2.441750000 GHz #Avg Type: RMS Avg|Hold:>100/100 PNO: Fast Trig: Free Run IFGain:Low #Atten: 30 dB TYPE DET Mkr1 2.401 837 0 GHz -0.409 dBm Ref Offset 2.36 dB Ref 20.00 dBm Stop 2.48350 GHz Sweep 8.000 ms (1001 pts) Start 2.40000 GHz #Res BW 100 kHz #VBW 300 kHz 2.401 837 0 GHz 2.479 826 0 GHz -0.409 dBn -1.187 dBn N 1 f N 1 f **STATUS**

E

A



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).

3C

Edition: A.5



14.4 Test Result

DH5 Packet permit maximum 1600 / 79 / 6 hops per second in each channel (5 time slots RX, 1 time slot TX).

DH3 Packet permit maximum 1600 / 79 / 4 hops per second in each channel (3 time slots RX, 1 time slot TX).

DH1 Packet permit maximum 1600 / 79 /2 hops per second in each channel (1 time slot RX, 1 time slot TX). So, the Dwell Time can be calculated as follows:

DH5:1600/79/6*0.4*79*(MkrDelta)/1000 DH3:1600/79/4*0.4*79*(MkrDelta)/1000 DH1:1600/79/2*0.4*79*(MkrDelta)/1000 Remark: Mkr Delta is once pulse time.

Modulation	Channel Data	Packet	pulse time(ms)	Dwell Time(s)	Limits(s)
		DH1	0.384	0.123	0.4
GFSK	Middle	DH3	1.639	0.262	0.4
		DH5	2.888	0.308	0.4
		2DH1	0.391	0.125	0.4
π/4DQPSK	Middle	2DH3	1.644	0.263	0.4
		2DH5	2.892	0.308	0.4

OV



dB m	n:Low #Atter	n:30 dB				RACE 12345 TYPE WWWWWWW DET PNNNN
						384.0 μs 1.73 dB
						TRIG LVL
Harbert Herelford and Marine	dino duta a pilata unita utila	aterita dalah janas		^{all} theolog ^a ll the tool	landa tala tala tala.	ergel Halled Hander
an the first state of the first		<mark>wilitiga pinala</mark> ndari	ana <mark>la disentena la</mark>	n liter of the property of the		all all all and all free
Z	#VBW 3.0 N	ЛНz		Sweep	10.00 ms	Span 0 Hz (10001 pts
× 384.0 μs (Δ)	۲ 1.73 dB	FUNCTION FU	NCTION WIDTH			^
466.0 µs	-15.80 dBm					
			I o STATUS			<u> </u>
	VNT 1-DH3	3 2441MF	lz One B	urst		
000 GHz)elay-500.0 μs	ALIGNAUTO #Avg Type:	RMS	10:31:00 TI	0 AM Dec 05, 2022 RACE 1 2 3 4 5 TYPE WWWWWW DET P N N N N
IFGai	Tast F					1.639 ms
m						1.74 dE
162						TRIG LVL
ala da setta setta setta da s Setta da setta da set	<mark>, nijalite da para banda sebelari</mark> na. Kajalite da para banda sebelari	adinaka matan Malikan <mark>auton Uungka pal</mark> apasin	and different beit wei weiten, alterie die ge	alitetidessi persedation I <mark>l piliperpinent kining</mark>	an ai di kanaha mula Munjaha atau tina	and produced and and function of the set
7.	#VBW 3.0 N					Span 0 Hz (10001 pts
× 1.639 ms (Δ) 429.0 μs	Y 1.74 dB -17.03 dBm	FUNCTION FU	ICTION WIDTH	F	JNCTION VALUE	
	3941 4 4 4 4 4 4 2 3924.0 µs (A) 3924.0 µs (A) 466.0 µs 4 000 GHz PNO: 102 1 102 1 102 1 102 1 103 1 104 1 104 1 105 1 <td>2 2 2 2 2 2 2 2 2 2 2 394.0 µs 466.0 µs -15.80 dBm -15.80 dBm</td> <td>2 #VBW 3.0 MHz X Y S84.0 µs 1.73 dB 466.0 µs -15.80 dBm 466.0 µs -15.80 dBm 9 1.00 dB 1000 GHz PN0: Fast PN0: Fast Trig: Video IFGain: Low Trig: Video 102 102 102 102 102 104 102 104 102 104 102 104 102 104 104 104</td> <td>Image: set of the set of</td> <td>Automatical interviewer Automatical interviewer Automatical interviewer Automatical interviewer Z #VEW 3.0 MHz Sweep X Y FUNCTION FUNCTION WIDTH FUNCTION WIDTH X Y FUNCTION FUNCTION WIDTH FUNCTION X Y FUNCTION FUNCTION FUNCTION</td> <td>Image: series of the series</td>	2 2 2 2 2 2 2 2 2 2 2 394.0 µs 466.0 µs -15.80 dBm -15.80 dBm	2 #VBW 3.0 MHz X Y S84.0 µs 1.73 dB 466.0 µs -15.80 dBm 466.0 µs -15.80 dBm 9 1.00 dB 1000 GHz PN0: Fast PN0: Fast Trig: Video IFGain: Low Trig: Video 102 102 102 102 102 104 102 104 102 104 102 104 102 104 104 104	Image: set of the set of	Automatical interviewer Automatical interviewer Automatical interviewer Automatical interviewer Z #VEW 3.0 MHz Sweep X Y FUNCTION FUNCTION WIDTH FUNCTION WIDTH X Y FUNCTION FUNCTION WIDTH FUNCTION X Y FUNCTION FUNCTION FUNCTION	Image: series of the series



	AC 0000 GHz PNC IFGa): Fast 🔸 in:Low	SENSE:INT Trig Dela Trig: Vide #Atten: 30	y-500.0 µs o	LIGNAUTO #Avg Type:	RMS	т	5 AM Dec 05, 202 RACE 1 2 3 4 5 TYPE WAAAAAA DET P N N N N	56 WV N N
Ref Offset 2.36 dB/div Ref 20.00 d	⁸ dB Bm						ΔMkr1	2.888 m 2.25 dl	s B
		▲1∆2							
□ <mark>X</mark> 2								TRIG LV	VL
0 0 <mark>mirtp.q</mark>			ha han lan tita sa ha		An tabl ^a yn the H <mark>alpanad</mark>	n <mark>i data ang salang kapitaki pa</mark>	tan kana kana kana kana kana kana kana k	And the principal of the	l.v
					المارية (1991) (1994) (1994) (1994) (1994) (1994) (1994) (1994) (1994) (1994) (1994) (1994) (1994) (1994) (1994)	and the second	and the provided of the provid	<mark>la, priza ang dising</mark> Manggan ang dising	N.
nter 2.441000000 G s BW 1.0 MHz	Hz	#\/B	W 3.0 MH;	,		Sween	10.00 ms	Span 0 H (10001 pts	
MODE TRC SCL	× 2.888 ms (∆	Y			CTION WIDTH		JNCTION VALUE	τουστρι	<u>~</u>
$\begin{array}{c c} F \\ F \\ \hline \end{array} \\ \hline \\ \\ \hline \end{array} \\ \hline \end{array} \\ \hline \\ \\ $ \\ \hline \\ \\ \hline \end{array} \\ \\ \hline \end{array} \\ \\ \\ \\ \\ \end{array} \\ \hline \\ \\ \\ \end{array} \\ \\ \\ \\	498.0 µs	-7.45	dBm						
									Ξ
								>	>
					STATUS				
	Dweii in					urot			
	ot SA				z One B	urst			
RL RF 50Ω	pt SA AC 0000 GHz PNC): Fast 🔸	SENSE:INT Trig Dela , Trig: Vide	д у-500.0 µs ∞	Z One B		Т	DAM Dec 05, 202 RACE 12 3 4 5 TYPE WWWWW	5 6 WAH
RL RF 50 Ω nter Freq 2.441000 	ot SA AC DOOOD GHZ PNC IFGa 6 dB		SENSE:INT	д у-500.0 µs ∞	LIGNAUTO		Π	TYPE P NNNN	5 6 \$ 2 8
RL RF 50 Ω nter Freq 2.441000 Ref Offset 2.36 dB/div Ref 20.00 d	ot SA AC DOOOD GHZ PNC IFGa 6 dB): Fast 🔸	SENSE:INT Trig Dela , Trig: Vide	д у-500.0 µs ∞	LIGNAUTO		Π	RACE 12345 TYPE WWWWWW DET PNNNN	5 6 \$ 2 8
RL RF 50 Ω nter Freq 2.44100(Ref Offset 2.36 dB/div Ref 20.00 d	ot SA AC DOOOD GHZ PNC IFGa 6 dB): Fast 🔸	SENSE:INT Trig Dela , Trig: Vide	д у-500.0 µs ∞	LIGNAUTO		Π	RACE 12345 TYPE WANNAM DET P N N N N 391.0 μ 1.16 dl	s S B B
RL RF 50 Ω nter Freq 2.44100(Ref Offset 2.34 dB/div Ref 20.00 d	ot SA AC DOOOD GHZ PNC IFGa 6 dB): Fast 🔸	SENSE:INT Trig Dela , Trig: Vide	д у-500.0 µs ∞	LIGNAUTO		Π	TYPE P NNNN	s S B B
Ref Offset 2.36 B/div Ref 2.00 d	ot SA AC DOOOD GHZ PNC IFGa 6 dB): Fast 🔸	SENSE:INT Trig Dela , Trig: Vide	д у-500.0 µs ∞	LIGNAUTO		Π	RACE 12345 TYPE WANNAM DET P N N N N 391.0 μ 1.16 dl	s S B B
Ref Offset 2.36 Ref Offset 2.36 αB/div Ref 20.00 dl α 1Δ2 α α α α α α α α α α α α α	ac PNC ac PNC PNC IFGa 6 dB Bm 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1): Fast ← → In:Low	SENSE:INT Trig Dela Trig: Vide #Atten: 30	у-500.0 µs о dB	LIGNAUTO #Avg Type:	RMS	T AMkr1	асе і 23 4 5 уче у мило ост ² N N N N 1.16 dl тво си	SB SB
Ref Offset 2.34 Ref Offset 2.34 Ref Offset 2.34 Ref 20.00 dl	ot SA AC DO000 GHZ PRO IFGa 6 dB Bm): Fast ← → In:Low	SENSE:INT Trig Dela Trig: Vide #Atten: 30	у-500.0 µs о dB	LIGNAUTO #Avg Type:	RMS	T AMkr1	асе і 23 4 5 уче у мило ост ² N N N N 1.16 dl тво си	SB SB
Ref 50 Ω nter Freq 2.441000 dB/div Ref Offset 2.341000 dB/div Ref 20.00 df 10.2 0 10.2 10.2 10.2 0 10.2 10.2 10.2 0 10.2 10.2 10.2 0 10.2 10.2 10.2 0 10.2 10.2 10.2 0 10.2 10.2 10.2 0 10.2 10.2 10.2 0 10.2 10.2 10.2 0 10.2 10.2 10.2 0 10.2 10.2 10.2 0 10.2 10.2 10.2 0 10.2 10.2 10.2 0 10.2 10.2 10.2 0 10.2 10.2 10.2 0 10.2 10.2 10.2 0 10.2 10.2 10.2	et SA AC DOUOD GH2 PNC IFGa S dB Bm Ho (c) foot state of state a state of state of state of state of state a state of state of state of state of state of state a state of st	D: Fast in:Low Post (pr™)sprag	SENSE:INT Trig Dela Trig: Vide #Atten: 30	р 	LIGNAUTO #Avg Type:			асе 2 3 4 5 Уче (2 3 4 5 Уче (2 3 4 5 Останование) 391.0 µ 1.16 dl тво (2 Останование) Станование С С С С С С С С С С С С С С С С С С С	
Ref 50 Ω nter Freq 2.441000 Ref Offset 2.33 GB/div Ref 20.00 dl Image: State of the state of th	AC DOUDO GHZ PNC FGa 6 dB 8 m 10 dq dougg direction of the 10 dq dougg direction of the 10 dq dougg direction of the 10 dq dougg direction of the 11 dq doug direction of the 11 dq doug direction of the 11 dq dougg direction of the 11 dq doug direction of the 11 d): Fast in:Low the trend the state the trend the state the trend the state the trend the state the trend the state #VB	SENSE:INT Trig Dela Trig: Vide #Atten: 30	у-500.0 µs o I dB	LIGNAUTO #Avg Type:	RMS	T AMkr1	асе 2 3 4 5 Уче мара 12 3 4 5 Останования 391.0 µ 1.16 dl тво Lv	
Ref S0 Ω nter Freq 2.441000 Ref Offset 2.36 Ref Offset 2.36 Ref Offset 2.36 Image: State of the state of t	pt SA AC DOUOD GHZ PNC IFGa S dB Bm HI of the state of the state of the state of the state of the state of the state of the state of the state of the state of th): Fast in:Low the trend the state the trend the state the trend the state the trend the state the trend the state #VB	SENSE:INT Trig Dela Trig: Vide #Atten: 30	у-500.0 µs o I dB	LIGNAUTO #Avg Type: Duty-out-off file Duty-out-off file al data and an an anti-base	RMS	T AMkr1 ماریکا دوران ایلون مورا مورا ایلون مورا ایلون مورا مورا ایلون مورا مورا مورا مورا مورا مورا مورا مورا	асе 2 3 4 5 Уче мара 12 3 4 5 Останования 391.0 µ 1.16 dl тво Lv	
Ref Offset 2.3% BJ/div Ref Offset 2.3% Ref Offset 2.3% Ref BJ/div Ref 20.00 dl Image: State of the state of	AC DOUD GH2 PNC IFGa 6 dB Bm 4 d option (1) d and a state 1 d option (1) d a stat	D: Fast in:Low #United #United #VB	SENSE:INT Trig Dela Trig: Vide #Atten: 30	у-500.0 µs o I dB	LIGNAUTO #Avg Type: Duty-out-off file Duty-out-off file al data and an an anti-base	RMS	T AMkr1 ماریکا دوران ایلون مورا مورا ایلون مورا ایلون مورا مورا ایلون مورا مورا مورا مورا مورا مورا مورا مورا	асе 2 3 4 5 Уче мара 12 3 4 5 Останования 391.0 µ 1.16 dl тво Lv	

c 00.,LTA



	AC DOOO GHz PNO: IFGain	Fast 🛶 Trig: \	elay-500.0 µs	ALIGN AUTO #Avg Type	RMS	Т	BAM Dec 05, 2022 RACE 1 2 3 4 5 6 TYPE WWWWWWW DET P N N N N N
Ref Offset 2.36 dB/div Ref 20.00 d						ΔMkr1	1.644 ms 3.53 dB
	1Δ2						TRIG LVL
	h, ith						
0 <mark>×t¹m</mark>		- ang thang a start of the star	a loo manadila harat	ter talaptica in statistica i	ter de la de la popula	han an the state of the	hanna hairin an
o <mark>pudp</mark>	terrations. In Los John a spiele, mithered	n h <mark>at hada an an an hain an hana</mark>		<mark>alarite al di Perluja</mark>	<mark>any salahan padalangka</mark> n	<mark>dagan bisabili kad</mark>	
nter 2.441000000 G	Hz						Span 0 Hz
s BW 1.0 MHz	116	#VBW 3.0 N					(10001 pts)
MODE TRC SCL Δ2 1 t (Δ) F 1 t	× 1.644 ms (Δ) 352.0 μs	Y 3.53 dB	FUNCTION FU	NCTION WIDTH	FI	UNCTION VALUE	
	352.0 µs	-14.66 dBm					
							======
							~
				STATUS			
		/NT 2-DH5	5 2441M⊦	lz One B	urst		
ent Spectrum Analyzer - Swep RL RF 50 Ω nter Freg 2.441000	AC		elay-500.0 µs	ALIGNAUTO #Avg Type	RMS	10:33:2 T	7 AM Dec 05, 2022
		Fast 🛶 Trig: \					
Ref Offset 2.36 B/div Ref 20.00 d	5 dB					∆Mkr1	2.892 ms -2.69 dB
dB/div Ref 20.00 d	БШ						
× ₂		1∆2					
							TRIG LVL
0							
0 data da		ana, maint da facalista a m	en danistei verstaatiest	و الحالية المحالية ا	والرومانية التروينية والمانية	المراجع والمحادث	
			and a start of the s	<mark>u, ni gi, a sig</mark> i a shi sa	<mark>hanna an a</mark>	<mark>, hidy waa ahay shi a</mark> h	ling of the substitution of
	HZ	#VBW 3.0 N	ЛНz		Sweep	10.00 ms	Span 0 Hz (10001 pts)
					FI	UNCTION VALUE	<u>^</u>
nter 2.441000000 Gl s BW 1.0 MHz	× 2.892 ms (Δ)	⊻ -2.69 dB	FUNCTION FU	ICTION WIDTH			
nter 2.441000000 Gl s BW 1.0 MHz	× 2.892 ms (Δ) 498.0 μs	Y -2.69 dB -1.34 dBm	FUNCTION FU	NCTION WIDTH			
D		-2.69 dB	FUNCTION FU	NCTION WIDTH			



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 Internal antenna, fulfill the requirement of this section.

A Edition: A 5



16. EUT Photographs

EUT Photo 1



EUT Photo 2



No.: BCTC/RF-EMC-005

,TC 3C

》测

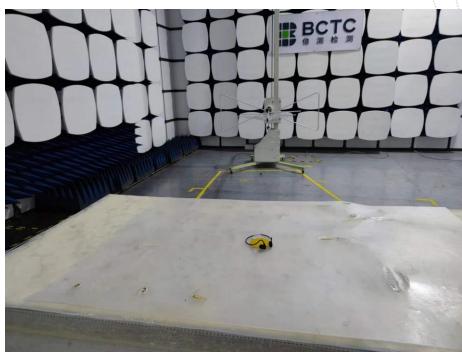


17. EUT Test Setup Photographs

Conducted Emissions Photo



Radiated Measurement Photos



检





No.: BCTC/RF-EMC-005

Page 66 of 67

Edition: A 5

=D



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 test report without CMA mark is only used for scientific research, teaching, enterprise product development and internal quality control purposes.

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

9. 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:

1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China

TEL: 400-788-9558

P.C.: 518103

FAX: 0755-33229357

Website: http://www.chnbctc.com

E-Mail: bctc@bctc-lab.com.cn

******** END *******

No.: BCTC/RF-EMC-005

Page 67 of 67