



7. Test of Conducted Spurious Emission

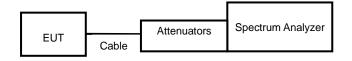
7.1 Test Limit

Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

7.2 Test Procedure

- a. The transmitter output was connected to the spectrum analyzer via a low loss cable.
- b. Set RBW of spectrum analyzer to 100 KHz and VBW of spectrum analyzer to 300 KHz with convenient frequency span including 100 KHz bandwidth from band edge.
- c. The band edges was measured and recorded.

7.3 Test Setup Layout



7.4 Test Result and Data

Note: Test plots refer to the following pages.



Single test

Modulation Standard: GFSK (1Mbps) Channel: 00

Keysight Spectrum Analyzer - Swe RL RF 50 Q	pt SA	SENSE:INT		ALIGN AUTO		03:39:23 PM May 30, 202
enter Freq 2.40000	0000 GHz	Trig:	Free Run n: 20 dB	Avg Type: Avg Hold:	Log-Pwr 1/1	TRACE 1 2 3 4 5 TYPE MWWWW DET P N N N N
Ref Offset 10 dB/div Ref 20.00 c	5 dB IBm				M	r3 2.399 00 GHz -42.054 dBm
1.0			- <u></u> <u> </u>			
			$- \wedge$			-26.20 dB
1.0			♦ ³			
1.0			Å#	MA		
1.0 268448879899498-462-462-462		herritere en estad (filo, and	~ ~~	- Suman and		*****
enter 2.40000 GHz						Span 50.00 MH
es BW 100 kHz	×	#VBW 300	KHZ FUNCTION FUN	CTION MOTH		4.800 ms (1001 pts
2 N 1 f 2 N 1 f 3 N 1 f	2.401 85 GHz 2.400 00 GHz 2.399 00 GHz	-6.195 dBm -53.360 dBm -42.054 dBm	FORCHON		PON	
5						
3						
0						

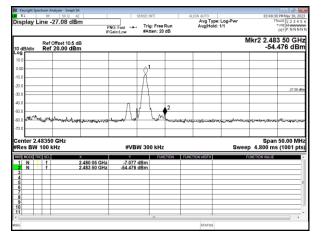
		inalyzer - Swept SA								
Marker 1	RF 24.7	50 Q AC			Trig: Free	Bun	ALIGN AUTO Avg Ty Avg[Hol	pe: Log-Pwr	т	8 PM May 30, 202 RACE 1 2 3 4 5 TYPE MWWWW
			P	Gain:Low	#Atten: 20		Augino	u. 1/1		DET P NNNN
10 dB/div		Offset 10.5 dE 20.00 dBm								.775 GHz .951 dBm
10.0										
0.00										
10.0								_		
20.0										-26.20 dt
30.0	_					-	-		-	-20.20 08
40.0								-	-	-
50.0		ا يميا		الم والمعر والم			an to have the	a sussian	a south and a second	-
60.0 	المتاريقية	and a state of the		Charleson and the set	ala a la caracteria de la			-		
Start 30 #Res BW		kHz		#VBW	/ 300 kHz			Sw	Stop eep 2.386	o 25.00 GH s (1001 pt
KR MODE T	RC SCL		24.775 GHz	-46,951 d		CTION	FUNCTION WIDTH		FUNCTION VALUE	_
2 3										
4					_					
6					_					
8	-									
10										
-										-
iG							STATUS			

Modulation Standard: GFSK (1Mbps) Channel: 39

Keysight S	Spectrum A	nalyzer - Swept SA 50 Q AC		SENS	own		LIGN AUTO		03:47:	👝 🛛 📾 📕
		1000000	00 GHz		rig: Free Ru Atten: 20 dB	n		: Log-Pwr 1/1		TYPE NNNN
) dB/div		Offset 10.5 di 20.00 dBn							Mkr1 2.44 -7	1 00 GH .206 dBn
0.0										
					1					
1.0					Å			-	-	-
					///					-27.21 dB
1.0					111					
1.0					n v l	-				
1.0	and and	-	monterent	marcumber		hyphalus		a construction	www.amer.apublid	and a contracted
0.0										
	2.4410 N 100			#VBW 3	00 kHz			Swe	Spar ep 4.800 m	n 50.00 MH s (1001 pts
1 N	TRC SCU		2.441 00 GHz	-7.206 dBn		N FUN	TION WIDTH		FUNCTION VALUE	
2										
4 5 6										
9 7 8	-					_				
9	-									
1										_

L	m Analyzer - Swept RF 50 Ω	AC	S	INSE:INT				03:48:	08 PM May 30, 2 TRACE 1 2 3 4
ker 1 24	.05114000	00000 GHz	PNO: Fast +++	Trig: Free #Atten: 20	Run dB	Avg Hold:	1/1		TYPE MWWW DET P NNN
	ef Offset 10.5 ef 20.00 de							Mkr1 24 -47	.051 GI .371 dB
	1					-	-	-	-
	+								-27.21
	1								•
	alery.		manda	and a strength	mound	a mana	1 magazart	and the states of the states o	- Samerarda
- Broken				wanted and a second					
1 30 MH: sBW 10			#VBV	/ 300 kHz			Sw	eep 2.386	o 25.00 G s (1001 p
NODE TRC S	CL f	× 24.051 GHz	-47.371 d		CTION FUN	TION WIDTH		FUNCTION VALUE	
				_					
				_					
	_			_					
					_				
	-		-		-				
						STATUS			

Modulation Standard: GFSK (1Mbps) Channel: 78



		lyzer - Swept SA									
RL arker 1	₽F	50 Q AC			SENSE:INT		ALI	Avg Typ	e: Log-Pwr	(03:50:27 PM May 30, 2 TRACE 1 2 3 4
			I	NO: Fast	Trig: I #Atter	Free Run n: 20 dB		Avg Hold	: 1/1		DET P NN
dBidiy		ffset 10.5 di 20.00 dBn									1 24.825 G -47.434 dE
g	Kei /	20.00 UDI									
0.0											
	-								_		
0											
						_				_	-27.08
-											
.0									-	_	
.0						-		Aur	marine	a mar	and the second
10	م در مدید ا	and the second second	unadam.r.	استعيبه است	م در دریان	and and the second	a lorg		Carden		-
.0											
art 30 I tes BW	MHZ 100 ki	Hz		#VB	W 300 I	kHz			s	weep 2.	Stop 25.00 G 386 s (1001 p
	100 000		x	Y		FUNCTION	FUNCT	KON WIDTH		FUNCTION	VALUE
N	1 f		24.825 GHz	-47.434	dBm		-	-			
N			24.825 GHz	-47.434	dBm						
N			24.825 GHz	-47.434	dBm						
			24.825 GHz	-47.434	dBm						
N 2 3 4 5 5 7			24.825 GHz	-47.434	dBm						
N 2 3 4 5 5 7 8			24.825 GHz	-47.434	dBm						
			24.825 GHz	-47.434	dBm						
			24.825 GHz	-47.434	dBm	1					



Modulation Standard: π /4 DQPSK (2Mbps) Channel: 00

E Keysight Sp R L	ectrum A	nalyzer - Swept SA 50 Q Al									
		50 Ω A	n	NO: Fast	SENSE:INT Trig: Free #Atten: 20		A	IGN AUTO Avg Ty Avg Ho	pe: Log-Pwr ld: 1/1		1 2 3 4 5 1 TRACE 1 2 3 4 5 1 TYPE NNNN1 DET PNNNN1
0 dB/div		Offset 10.5 d 20.00 dBr			_			_		Mkr3	2.398 85 GHz -43.891 dBm
10.0											
0.0						Â	1				
0.0						HA					-27.06 dDm
1.0					♦ ³						
0.0						ģ¶ _	<u>\</u> .			-	
0.0 0.0	(herself)	ancher and		*****	للاسلاميوس ش		<u>`</u>	a la anno anno anno anno anno anno anno	there are a fighter	deberre seder	wood from the second
enter 2. Res BW				#VB	W 300 kHz	:			Sw		Span 50.00 MHz)0 ms (1001 pts
GR MODE T			x	Y		ICTION	FUNC	TION WOTH		FUNCTION	WALUE
1 N 2 N 3 N 4	1		2.402 15 GHz 2.400 00 GHz 2.398 85 GHz	-7.057 -55.007 -43.891	dBm						
5 6 7 8											
9 0 1											
a								STATUS			,

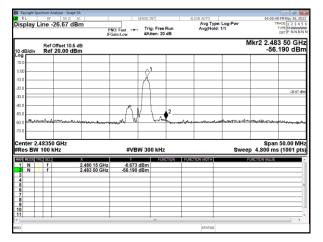
Keysight Sp R L	ectrum A	nalyzer - Swept SA		5	ENSE: INT		ALIGN AUTO			03:52:59 PM May 30, 20
larker 1	24.9	00120000	P	NO: Fast +++	Trig: Fre #Atten: 2		Avg Avg	Type: Log-P fold: 1/1		TRACE 1 2 3 4 5 TYPE MWWW DET P NNN
0 dB/div		Offset 10.5 d 20.00 dBn							Mkr	1 24.900 GH -47.812 dBr
0.0						-		_		
0.0										
0.0										-27.06 d
0.0										
0.0						-	معيد مدر	***	بعهيم مراعوس	and the state of t
0.0 Garry 0.0		and-there are	y.wytanery	man an a	م	- and the second	~~~~			
tart 30 I Res BW		kHz		#VB	N 300 KH	z			Sweep 2.	Stop 25.00 GH 386 s (1001 pt
33 MODE 1 1 N 2	RC SCL		× 24.900 GHz	-47.812		NCTION	FUNCTION WIDT	н	FUNCTION	VALUE
3 4 5					_			-		
6					_					
8					_					
1					1			-		

Modulation Standard: π /4 DQPSK (2Mbps) Channel: 39

Keysight RL	Spectrum A	Inalyzer - Swept SA			SENSE:INT	A	LIGN AUTO		03:58:5	2 PM May 30, 202
larker	1 2.44	08500000	P	NO: Fast Gain:Low	Trig: Free #Atten: 20	Run dB	Avg Type Avg Hold:	Log-Pwr 1/1	Т	TYPE NNNN
0 dB/div	Ref v Ref	Offset 10.5 d 20.00 dBn	B n			_			0 Wkr1 2.44 -5.	0 85 GHz 947 dBm
10.0										
0.00						<u> </u>				
10.0					(1				
0.0						1				-25.95 dB
0.0					AU					
50.0 30.0 Ave		- And and the	a warman	h	J.V.	Inne.		n-Int Address	www.ww	an sand
70.0							for an and a second			
	2.4410 W 100			#VB	W 300 kHz			Swee	Span p 4.800 ms	50.00 MH 6 (1001 pts
08 MODE 1 N 2	TRC SCL		x 2.440 85 GHz	-5.947		CTION FUNC	TION WIDTH		FUNCTION VALUE	
3										
5 6										
7 8 9										
9 0 1					_	_				
-					-					
3							STATUS			

eysight Spectrum Analyzer - Swept SA L RF 50 Ω AC	SENSE	INT	ALIGN AUTO		03:50:4	1 PM May 30, 2
ker 1 24.875150000000 GHz	PNO: East	ig: Free Run tten: 20 dB		e: Log-Pwr i: 1/1	03.397 T	TYPE NWW DET P N N N
Ref Offset 10.5 dB B/div Ref 20.00 dBm					Mkr1 24 -47	.875 GI 906 dB
		_				-25.95
and the second	ang tang ang sa	and the second second	Service of Carlon		y yan kana kana ka	and an and a second
t 30 MHz s BW 100 kHz	#VBW 30	00 kHz		Sw	Stop eep 2.386	25.00 G s (1001 p
NODE TRC SCL X N 1 1 24.875 G	Hz -47.906 dBm		FUNCTION WIDTH		FUNCTION VALUE	

Modulation Standard: π /4 DQPSK (2Mbps) Channel: 78



Keys	ight Spe	ctrum A	nalyzer - Swept SA			SENSE:1	wrl			IGN AUTO			04	:01:47 PM Ma] 🖗 💽
lark	er 1	24.6	50 Q AC 254500000		PNO: Fast	Tri	g: Free tten: 20				pe: Log-F Id: 1/1	wr		TRACE 1	2 3 4 5 6 NNNN
10 dB	/div		Offset 10.5 dB 20.00 dBm											24.628 46.904	
.og 10.0															
0.00											_				
10.0									_		-		-	-	
20.0															-26.67 dBm
30.0 40.0															4
4U.U 50.0															- dela
0.0	and the second	لمعمد	hours	and an an are	maria	in.m.	وموري ارسو	an m	برر میں	and a start and	No. and	راقيوندرو	~~~	Ynogodio	~
70.0											_				
	30 N BW	1Hz 100 I	kHz		#VB	W 30	0 kHz					Swe	Sep 2.3	top 25.0 86 s (10	00 GHz 01 pts)
1	N 1	C SCL	· · · · · · · · · · · · · · · · · · ·	24.625 GHz	-46.904	dBm	FUN	CTION	FUNC	TION WIDTH	_	ſ	UNCTION VA	LUE	-
2	+					_									
4 5						_				_					_
5 6 7	+					_									
8	+					_									
0															
50	-	-				-		-	-	STATUS					



Modulation Standard: 8DPSK (3Mbps) Channel: 00

arker 3	^{RF} 3 2.39	50 Q AC	00 GHz	PNO: Fast	SENSE:1	rri Free F ten: 20 d	un IB	AL	IGN AUTO Avg Ty Avg[Ho	rpe: Log- ld: 1/1	Pwr	04:02	49 PM May 30, 202 TRACE 1 2 3 4 5 TYPE MWWW DET P N N N N
dB/div		Offset 10.5 di 20.00 dBn			_						N		98 85 GH: 3.042 dBn
					-	_		1		-			
.0							Å						
													-26.22 dB
					+	▲3				-			
							b/						
		and some of	membra	-		1	7	Jul	d.	m	- Uharran	mana	
					-					_			
enter 2 tes BW				#V	BW 30	0 kHz					Swee		n 50.00 MH ns (1001 pts
E MODE N	TRC SCL		2.402 15 GHz	Y 6.2	0 dBm	FUNC	TION	FUNC	TION WOTH		ſ	UNCTION VALUE	
N	1 1		2.400 00 GHz 2.398 85 GHz	-56.8	8 dBm 2 dBm								

Modulation Standard: 8DPSK (3Mbps) Channel: 39

Keysight Spectrum Analyzer - Swept SA			
Center Freq 2.441000000 GHz	PNO: Fast Trig: Free Run IFGain:Low #Atten: 20 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 1/1	04:05:00 PM May 30, 202: TRACE 1 2 3 4 5 TYPE M WWWWW DET P N N N N
Ref Offset 10.5 dB 0 dB/div Ref 20.00 dBm			Mkr1 2.440 85 GHz -6.403 dBm
10.0			
100			
0.0			-26.40 dB
0.0			
0.0		and the second second	
0.0 2000 000000000000000000000000000000	North March 198	and the second	water and the second and the second and the second s
enter 2.44100 GHz Res BW 100 kHz	#VBW 300 kHz	Swe	Span 50.00 MH ep 4.800 ms (1001 pts
DE MODE TRE SEL X 1 N 1 f 2.440 85 0		FUNCTION WIDTH	FUNCTION VALUE
3 4 5			
4 5 6 7			
3 4 5 6			8

Char			ndard	: 80	PS	K (3	Mbps)	0 2 2
enter Fre		500000 GHz	NO: Fast	Tria: Free	Run	ALIGN AUTO Avg T Avg H	ype: Log-Pwr		13 PM May 30, 2023 TRACE 1 2 3 4 5 TYPE MWWWW
			Gain:Low	#Atten: 2	0 dB				DET PNNNN
) dB/div	Ref Offset Ref 20.0	10.5 dB							33 50 GHz 191 dBm
	Rei 20.0	o ubili							
0.0						-		-	
.00				0 I		-		-	
1.0				A	-	-		-	-
1.0				[]					-26.61 dBr
1.0	_				-				
1.0			A.W						
	tore and	matter and the same of a strange	www.w	Jarl	£	n dan ba damilar	- Anna	maran	
10		an and a second strengt strengt	4-9 P						
enter 2.4 Res BW 1	8350 GH2 00 kH2	z	#VBW	/ 300 kH	,		Swe	Spa ep 4.800 m	n 50.00 MHz s (1001 pts)
R MODE TRO		x	Y			UNCTION WIDTH		FUNCTION VALUE	
1 N 1 2 N 1	1	2.479 85 GHz 2.483 50 GHz	-6.608 d -58.191 d						
3	-	2.433 00 GHZ	-00.1910		_				
5									
6									
8									
0									
1				-					

Key Con Ri		Spectr	um A RF	nalyzer - Swept SA			SENSE:1	url.			IGN AUTO			
		12		00960000	000 GHz	NO: Fast	. Trig	g: Free ten: 20		AL	Avg Typ Avg Hold	e: Log-Pwr : 1/1		TYPE NNNNN DET PNNNNN
10 di	B/div			Offset 10.5 d 20.00 dBn									Mkr1 24 -46	.201 GHz .856 dBm
Log 10.0														
0.00														
-10.0							<u> </u>							
-20.0														-26.22 dBm
-30.0	_													
-40.0														<u> </u>
-50.0 -60.0				and the second	anner	بالمر بالمر			weer solar	ميوم يود	at an all the an	and a second	a marker	and the second
-70.0	ي المراجع (شيد اورد	_											
	L													
Star #Re:				KHZ		#VB	W 30	0 kHz				Sw	stoj eep 2.386/	o 25.00 GHz s (1001 pts)
MKR 1	MODE N	TRC 1	SCL 1		× 24.201 GHz	-46,856	dBm	FUN	CTION	FUNCT	ION WIDTH		EUNCTION VALUE	^
2 3 4			_											_
4			_											E
6 7	_		-											
8	_		-				_							_
10 11	_		_											
•								ш		•				- F
MSG											STATUS			

rysight Spe	ctrum Ar	nalyzer - Swept SA			cruce and			CH 11 (70)			
ker 1	24.7	50 Q AC	000 GHz		SENSE:INT		ALI	IGN AUTO Avg Type	: Log-Pwr	04:00	TRACE 1 2 3 4
Kei I	24.11	00300000		PNO: Fast	Trig: F #Atten	ree Run 20 dB		Avg Hold:	1/1		DET P NNN
	Ref	Offset 10.5 dB									4.700 GH
B/div	Ref	20.00 dBm								-4	8.573 dB
										_	
	_									_	-26.40
	1										
			and and a start and a start a st	• I		ر. معروم ما ال	A	يم يعاد و م	manner	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Jacob and Notice and
ALCONO.	أمميتهم	and a second	and so the state of the state	Marria Marrie	ath.you_water	-	- ngar -		-		-
	_								-	-	-
t 30 N	1Hz								-	Sto	p 25.00 G
s BW	100 k	Hz		#VB	W 300 k	Hz			Sv	veep 2.386	s (1001 p
NODE TR	C SCL)	24,700 GHz	Y		FUNCTION	FUNCT	ION WIDTH		FUNCTION VALU	8
N	1		24.700 GHz	-48.573	dBm						
-											
-	+ +						-				
	+ +										
-							-				

		Analyzer - Swept S/								
RL	RF	50 Q A			SENSE:INT		ALIGN AUTO	vpe: Log-Pwr		2 PM May 30, 20 RACE 1 2 3 4 1
arker	1 24.0	50420000	P	NO: Fast +++	Trig: Free #Atten: 20	Run dB	Avg H	old: 1/1		DET P NNNI
0 dB/di		Offset 10.5 d								.650 GH
0.0	<u>i ne</u>	20.00 001								
00										
٥Ľ		1								
Ĩ										-26.61
								_		
		hanny	Lauran	مسيرمعه	andan and a star	m	and a second	and the second second	- Another	st aver a
0										
	0 MHz W 100	kHz		#VB	W 300 kHz			Sw	Stop eep 2.386	o 25.00 G s (1001 p
8 MODE N	TRC SCI		24.650 GHz	-47.236		CTION	EUNCTION WIDTH		FUNCTION VALUE	
N			24.000 GHZ	-47.230	ubm					
			_		т		STATU	-		
							SIATU	5		

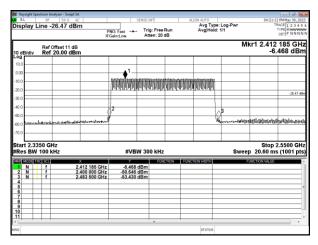


Hopping test

Modulation Standard: GFSK (1Mbps)

arker 1 96.3	60000000	MHz	NO: Fast ++ Gain:Low	ENSE:INT Trig: Free F Atten: 20 d	Run	IGN AUTO Avg Type Avg[Hold	: Log-Pwr : 1/1		03 PM May 30, 202 TRACE 1 2 3 4 5 TYPE MWWW DET P N N N N
	Offset 11 dB 20.00 dBm								96.36 MH 8.262 dBr
0.0									
00									
.0									-26.47 dB
0									-20141 02
u ⊢_ 1									
	an and a start	an a	and the state of the second	an a	مانولورور میرور میرور میرور میرور می	h-trag-densely			ور المحمد الم وسطوال
. withdramation	errysectoredgestergent	17.1 _{7.17} .17.17.17.17.17.17	netratukkenas	kapan per pen der	new server of the	k-tour-ana-h	anter a constante da serie da		ليرد مريسة مريسة مرار
art 30 MHz		มักมี _{ก็สั} ญญัติสารุไปชีญกัง		казантасын V 300 kHz	ามใจ4 ₂ 201-225(be ¹ able)	betrage strand of		Sto	p 2.400 GH
art 30 MHz es BW 100 I				V 300 kHz	neter second function		Swee	Sto	p 2.400 GH
art 30 MHz es BW 100 I	ĸHz	<	#VBV	V 300 kHz			Swee	Sto p 226.5 n	p 2.400 GH
art 30 MHz tes BW 100 I	ĸHz	<	#VBV	V 300 kHz			Swee	Sto p 226.5 n	p 2.400 GH
0 art 30 MHz tes BW 100 I	ĸHz	<	#VBV	V 300 kHz			Swee	Sto p 226.5 n	p 2.400 GH s (1001 pts
art 30 MHz tes BW 100 I	ĸHz	<	#VBV	V 300 kHz			Swee	Sto p 226.5 n	p 2.400 GH

Modulation Standard: GFSK (1Mbps)



Modulation Standard: GFSK (1Mbps)

		nalyzer - Swept Si								
RL	RF	50 Q A			SENSE:INT		ALIGN AUTO	ype: Log-Pwr	04:2	2:52 PM May 30, 20 TRACE 1 2 3 4
arker	1 24.9	77500000		NO: Fast	. Trig: Free	Run	AvgiH	old: 1/1		TYPE NWWW
			IF	Gain:Low	Atten: 20	dB				DET P NNNI
		Offset 11 dB							Mkr1 24	.977 5 GH
dBidiv		20.00 dBr								6.308 dBr
	1101	Loice an								
0.0								_		
00							_			
10										
1.0										
							_			-26.47 d
1.0							-			
3.0								_		
1.0		1					- man		www.www.	North States Marie
1.0	-	Langer and the states	anno an	when a strate manual	مدارتكميو وماريون مع	and the second second	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			1.
10										
	50 GHz								St	op 25.00 GH
Res BV	V 100 I			#VB	W 300 KH	z		S	weep 2.15	0 S (1001 Pt
R MODE		kHz	x	#VB		Z NCTION FU	NCTION WIDTH		weep 2.15	
R MODE	V 100 H	kHz	x 24.977 5 GHz		FU	-	NCTION WIDTH			
N N	V 100 I	kHz		Y	FU	-	NCTION WIDTH			
10 MODE N 2 3	V 100 I	kHz		Y	FU	-	NOTION WIDTH			
N N 2 3 4 5	V 100 I	kHz		Y	FU	-	NCTION WIDTH			
R MODE N 2 3 4 5 5 7	V 100 I	kHz		Y	FU	-	NCTION WIDTH			
R MODE N 2 3 4 5 5	V 100 I	kHz		Y	FU	-	NCTION WIDTH			
E MORE N 2 3 4 5 5 7 3 8 9 0	V 100 I	kHz		Y	FU	-	NCTION WIDTH			
R MODE N 2 3 4 5 5 5 7 8 9	V 100 I	kHz		Y	dBm	-	NCTION WIDTH			
	V 100 I	kHz		Y	FU	-	NOTION MIDTH			

Modulation Standard: π /4 DQPSK (2Mbps)

	rum Analyzer - Swej								
RL arker 3 2	RF 50 Ω 2.48350000	0000 GHz		SENSE:INT		IGN AUTO Avg Type	: Log-Pwr	04:17:4 T	7 PM May 30, 202 RACE 1 2 3 4 5
		i Ii	NO: Fast Gain:Low	Trig: Free Atten: 20		Avg Hold:	1/1		DET P N N N N
	Ref Offset 11 Ref 20.00 d						M	kr3 2.483 -57	500 GH
.00			1						
1.0	_		, un de la companya	i niji hetiji ny hipitaji	N _e ritayati entit	AND AWARNER			
.0									-26.47 d£
1.0									
		(2				•3		
	ana marine	and mound	°			U U	Goon and a second	and the second	warund
1.0									
art 2.335	0 GHz							Stop	2.5500 GH
Res BW 1	00 kHz		#VB	N 300 kHz			Swee	20.60 m	s (1001 pt
R MODE TRO	SCL 1	x 2.410 895 GHz	-6,465		CTION FUNC	TION WOTH	F	UNCTION VALUE	_
2 N 1	1	2.400 000 GHz 2.483 500 GHz	-50.060	dBm					
5									
6									
7									
7 B 9									
7 B									

Modulation Standard: π /4 DQPSK (2Mbps)

	RF	50 9 4	AC	5	ENSE:INT	A	LIGN AUTO		04:18:3	IS PM May 30, 20
arker	1 96.3	36000000	P	NO: Fast	Trig: Free I Atten: 20 d		Avg Type Avg Hold:	: Log-Pwr 1/1	,	TYPE NNN
dB/div		Offset 11 dE f 20.00 dB								6.36 MH .742 dB
.0										
00										
1.0										
										-26.47 d
.0										
	1									-
10 - 9			-					-		
	ر مردنوزاری مرا	and the second	ەەرىلىرا ھۆرپ يەل ئال	charaterarana a	e-a-daystat		alan arang ang ang ang ang ang ang ang ang ang	444 m-deckel-s-dy-wep-yda	ลาราศษณะเป็นสา	and services
10 	مرداری ا	la rain ny salahan	للار العروب على العالي العالي (1996) . 	chanallemannanca.y	eusautoreixe		elester (versignes	Viet yn dechlandy wyt ynto	ennebenanene	dankaranan dan dan dan dan dan dan dan dan dan
art 30			ىلىرىلىرىغۇرىيىرىغارىي		v 300 kHz	waandi dhawa	alaun viyatalakaa			2.400 GH
art 30	MHz	kHz	ىر يەر يەر يەر يەر يەر يەر يەر يەر يەر يە		V 300 kHz	en Anges Malhonne Stion Euno		Swee	Stop	2.400 GH
1.0 alt.a 1.0 art 30 tes BV	MHz N/100	kHz	×	#VBW	V 300 kHz			Swee	Stop p 226.5 m	2.400 GH
art 30 tes Bl	MHz N/100	kHz	×	#VBW	V 300 kHz			Swee	Stop p 226.5 m	2.400 GH
art 30 tes Bl N 2 3 4 5 5 5 5 7	MHz N/100	kHz	×	#VBW	V 300 kHz			Swee	Stop p 226.5 m	2.400 GH
art 30 tes Bl	MHz N/100	kHz	×	#VBW	V 300 kHz			Swee	Stop p 226.5 m	2.400 GH
art 30 tes BV	MHz N/100	kHz	×	#VBW	V 300 kHz			Swee	Stop p 226.5 m	2.400 GH

Modulation Standard: π /4 DQPSK (2Mbps)

Keysight Sp R L	RF	nalyzer - Swept SA					AI	IGN AUTO				
		62500000	000 GHz	NO: Fast		ree Run 20 dB		Avg Type Avg Hold:	Log-Pwr 1/1		TRACE 1 2 3 TYPE MWW DET P N N	3 4
dB/div		Offset 11 dB 20.00 dBn	ņ								24.662 5 0 -46.531 d	
						_				_		
												_
.0												_
0 -						-			-	-	-26.	47.6
0			-									
.0		Jastine Appendices	al oll	-		and and	ليعاميوهم	and a second	فواصوره المجمط وال	-	Warris Printer and	www.
0	مايوريونية ما ^{ير}	A STREET AND A STREET		and the classes of	Chine and the							_
art 2.5	0 GHz										Stop 25.00	GI
es BW		Hz		#VB	W 300 k	Hz			S		150 s (1001	
N MODE	RC SCL		x 24.662 5 GHz	-46,531		FUNCTION	FUNC	TION WIDTH		FUNCTION	VALUE	-
							-					_
												_
							-					_
					-		-					_
					- L.							



Modulation Standard: 8DPSK (3Mbps)

Modulation Standard: 8DPSK (3Mbps)

Keysight Spe R L		Aver - Swept SA				1				
	2.483	50 Ω AC	P	NO: Fast +	Trig: Free Atten: 20	Run	Avg Type: Avg Hold:	Log-Pwr 1/1	TR	6 PM May 30, 202 RACE 1 2 3 4 5 TYPE MWWW DET P N N N N
10 dB/div		ffset 11 dB 20.00 dBm						М	kr3 2.483 -57.	500 GH: 346 dBn
10.0										
0.00				1						
10.0					الإباليط بالمتعاقبية	hellow from fit is	And Malan			
20.0				-						-26.46 dt
30.0										
40.0	-			2				3		
0.0		والمعو والمان ومان والمان	manne	-					والدارية الجارية المحامية	ALAMANON
70.0										
tart 2.33										2.5500 GH
Res BW				#VB	W 300 kHz			Swee	20.60 ms	2.5500 GF 6 (1001 pt
1 N 1	RC SCL		406 810 GHz	-6.476		CTION FUNC	TION WIDTH	ł	UNCTION VALUE	
1 N 2 N 3 N	1	2.4	400 000 GHz	-52.397	dBm		_			
4	-	20	183 500 GHz	-57.346	dBm					
6										
7 8 9							_			
10							_			
11							-			-
sg							STATUS			

Modulation Standard: 8DPSK (3Mbps)

RL												
	1 24 P	50 Q AC			SENSE:INT		ALIGN AU		Log-Pwr	04	15:57 PM May 3 TRACE 1 2	
arker	1 24.0	07500000	P	NO: Fast 🔸	Trig: Free		Av	Hold: 1	/1		DET P N	inin
			IF	Gain:Low	Atten: 20	0 dB						
		Offset 11 dB									4.887 5 0	
dB/div	Ref	20.00 dBm	<u>ا</u>								47.604 d	в
0.0												
00												
1.0												
1.0												
						-					-26	48 dE
												_
1.0		I and sure	M. Marine and			ب ا عدر بدار	June Morten	maria		6 Prover 198	marian	-
بمعيدا (1	الوروسيهجاروز	Real Property	a state of the second	- All and a second second	and the state of t		_				_	
										1		
1.0						-						
	0 GHz											_
art 2.5	0 GHz V 100 I				W 300 KH					s	top 25.00 50 s (1001	GH
art 2.5 Res BV	V 100 I	kHz	×		W 300 KH	z	FUNCTION W		Sw	s	itop 25.00 50 s (1001	GH
art 2.5 Res BV	V 100 I	kHz			W 300 kH:	z			Sw	S eep 2.1	itop 25.00 50 s (1001	GH
art 2.5 Res BV	V 100 H	kHz	×	#VB	W 300 kH:	z			Sw	S eep 2.1	itop 25.00 50 s (1001	GH
art 2.5 Res BV	V 100 H	kHz	×	#VB	W 300 kH:	z			Sw	S eep 2.1	itop 25.00 50 s (1001	GH
art 2.5 Res BV	V 100 H	kHz	×	#VB	W 300 kH:	z			Sw	S eep 2.1	itop 25.00 50 s (1001	GH
Cart 2.5 Res BV MODE N 2 3 4 5 5 5 5 8	V 100 H	kHz	×	#VB	W 300 kH:	z			Sw	S eep 2.1	itop 25.00 50 s (1001	GH
art 2.5 Res BW MDDE 1 N 2 3 4 5 5 7 7 8 9	V 100 H	kHz	×	#VB	W 300 kH:	z			Sw	S eep 2.1	itop 25.00 50 s (1001	GH
a.o tart 2.5 Res BV B B B B C C C C C C C C C C C C C C C	V 100 H	kHz	×	#VB	W 300 kH:	z			Sw	S eep 2.1	itop 25.00 50 s (1001	GH
tart 2.5 Res BV NODE 1 N 2 3 4 4 5 6 6 7 8 9 9 0	V 100 H	kHz	×	#VB	W 300 kH:	z	FUNCTION W		Sw	S eep 2.1	itop 25.00 50 s (1001	GH

8. 20dB Bandwidth Measurement Data

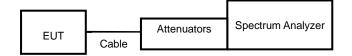
8.1 Test Limit

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 than125 mW.

8.2 Test Procedures

- a. The transmitter output was connected to the spectrum analyzer.
- b. Set RBW of spectrum analyzer to 30 KHz and VBW to 100 KHz.
- c. The 20 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20 dB.

8.3 Test Setup Layout



Modulation Type	Channel	Frequency (MHz)	20dB Bandwidth (MHz)	2/3 20dB Bandwidth(MHz)
0501	00	2402	0.953	0.635
GFSK (1Mbps)	39	2441	0.952	0.635
(Timps)	78	2480	0.954	0.636
	00	2402	1.283	0.855
π /4-DQPSK (2Mbps)	39	2441	1.285	0.857
(Zivibps)	78	2480	1.285	0.857
	00	2402	1.297	0.865
8DPSK (3Mbps)	39	2441	1.297	0.865
	78	2480	1.297	0.865
Note	2/3*20dB Ba	ndwidth=20dB	Bandwidth x 2/3	

8.4 Test Result and Data



Modulation Type: GFSK (1Mbps) Channel: 00

Keysight Spectrum Analyzer - Occupied BW RL RF 50 Ω AC Center Freq 2.402000000	CHa	SENSE:INT Center Freq: 2.402000	ALIGN AUTO	03:36:53 PM May 30, 202: Radio Std: None
enter Freq 2.40200000	#FGain:Low		Avg Hold: 10/10	Radio Device: BTS
0 dB/div Ref 20.00 dBm				
.og 10.0				
0.00				
10.0		mon		
20.0				
40.0			~	
50.0				m
60.0 marine to	,			~ man
70.0				
Center 2.402 GHz #Res BW 30 kHz		#VBW 100 k	Hz	Span 3 MHz Sweep 3.2 ms
Occupied Bandwidth	1	Total Power	1.26 dBm	
	52.54 kHz			
Transmit Freq Error	-4.545 kHz	OBW Power	99.00 %	
x dB Bandwidth	952.6 kHz	x dB	-20.00 dB	
ISG			STATUS	

CH39

20.00 dBm	#IFGain	:Low	#Atten: 20		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				
					~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				
	~~~				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		~~~~		
~~~~~			~~~~		~~~~		~~~		
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~	_~~			``````````````````````````````````````		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
~~~~~	~~~				~~~		~~~~	<u></u>	
~~~~					~~~		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~	
~~~~							~~~~	~	
~~~~~							~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	2	
~~~~~							w	n.	
							~	5	
		_						- marine	n
					-			_	
z			-					Span	3 MH
			#VE	BW 100 k	Hz			Sweep 3	
andwidth			Total F	ower	0.9	1 dBm			
85	4.86 kl	Ηz							
Error	-3.633	kHz	OBW P	ower	99	9.00 %			
lth	952.11	kHz	x dB		-20	00 dB			
					20.				
		g Error -3.633	854.86 kHz Error -3.633 kHz	854.86 kHz a Error -3.633 kHz OBW F	854.86 kHz Firror -3.633 kHz OBW Power	854.86 kHz 1 Error -3.633 kHz OBW Power 9	854.86 kHz I Error -3.633 kHz OBW Power 99.00 %	854.86 kHz I Error -3.633 kHz OBW Power 99.00 %	854.86 kHz 1 Error3.633 kHz OBW Power 99.00 %

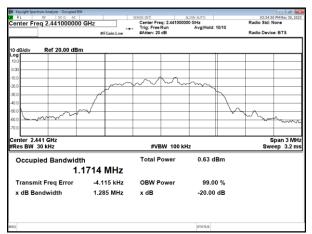
#### CH78

	000.0 KHZ		2000 08	
Transmit Freq Error x dB Bandwidth	-3.303 kHz 953.9 kHz	OBW Power x dB	99.00 % -20.00 dB	
_	54.85 kHz	0.014	00 00 V	
Occupied Bandwidt		Total Power	0.72 dBm	
enter 2.48 GHz Res BW 30 kHz		#VBW 100 k	Hz	Span 3 MHz Sweep 3.2 ms
1.0				
10 monton	r			
1.0			- The	-
1.0				
1.0		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
00				
0.0				
dB/div Ref 20.00 dBm				
	#FGain:Low	#Atten: 20 dB	Avg Hold: 10/10	Radio Device: BTS
enter Freq 2.48000000	GHz	Center Freq: 2.4800000	00 GHz	Radio Std: None

#### Modulation Type: $\pi$ /4-DQPSK (2Mbps) Channel: 00



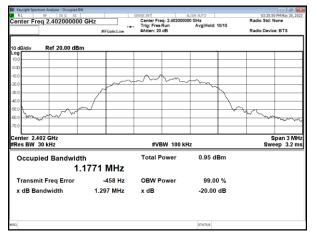
#### CH39



Keysight Spectrum Analyzer - Occupied BW           RL         RF         50 Q         AC           Center Freq 2.480000000	GHz	Center Freq: 2.480000	ALIGN AUTO 000 GHz Avg Hold: 10/10	03:32:29 PM May 30, 20 Radio Std: None
	#IFGain:Low	#Atten: 20 dB	AvgiHold: 10/10	Radio Device: BTS
0 dB/div Ref 20.00 dBm				
.og 10.0				
.00				
0.0				
0.0			mm -	
0.0	1			
0.0	~			
10 mm mm				
0.0				
enter 2.48 GHz Res BW 30 kHz		#VBW 100 k		Span 3 M
Kes BW 30 KHZ		#VBW 100 K		Sweep 3.2 r
Occupied Bandwidth	ı	Total Power	0.58 dBm	
1.1	704 MHz			
Transmit Freq Error	-3.678 kHz	OBW Power	99.00 %	
x dB Bandwidth	1.285 MHz	x dB	-20.00 dB	
a			STATUS	



# Modulation Type: 8DPSK (3Mbps) Channel: 00



#### CH39

Keysight Spectrum Analyzer - Occupied BW R L RF 50 Q AC		SENSE:INT	ALIGN AUTO	03:35:25 PM May 30, 202
enter Freq 2.441000000	GHz	Center Freq: 2.4410000	00 GHz	Radio Std: None
	#IFGain:Low	#Atten: 20 dB	Avg Hold: 10/10	Radio Device: BTS
0 dB/div Ref 20.00 dBm				
10.0				
0.00				
10.0				
20.0	~~~	~~~~~	m	
30.0			- ~	
0.0	_/			
8.0	~			~ ~ ~
0.0 man 100				ma manana
70.0				
Center 2.441 GHz				
Res BW 30 kHz		#VBW 100 k	Hz	Span 3 MH Sweep 3.2 m
Occupied Bandwidt	1	Total Power	0.63 dBm	
	799 MHz			
Transmit Freq Error	-663 Hz	OBW Power	99.00 %	
x dB Bandwidth	1.297 MHz	x dB	-20.00 dB	

Keysight Spectrum Analyzer - Occupied BW           R L         RF         50 Q         AC			ALIGN AUTO	03:33:11 PM May 30, 202
enter Freq 2.480000000	GHz	Center Freq: 2.4800000	000 GHz	Radio Std: None
	#IFGain:Low	#Atten: 20 dB	Avg Hold: 10/10	Radio Device: BTS
dB/div Ref 20.00 dBm				
00				
1.0				
0	~~~~	$\sim \sim $	m	
0			<u> </u>	
.0	_/			
1.0	~		- V	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
				the particular
0.0	_			
enter 2.48 GHz Res BW 30 kHz		#VBW 100 k	Hz	Span 3 MH Sweep 3.2 m
Occupied Bandwidth		Total Power	0.43 dBm	
	795 MHz	roturr onor		
Transmit Freq Error	-1.234 kHz	OBW Power	99.00 %	
x dB Bandwidth	1.297 MHz	x dB	-20.00 dB	



# 9. Frequencies Separation

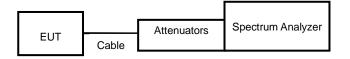
#### 9.1 Test Limit

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.

#### 9.2 Test Procedures

- a. The transmitter output was connected to the spectrum analyzer.
- b. Set RBW of spectrum analyzer to 30 KHz and VBW to 100 KHz.
- c. By using the MaxHold function record the separation of two adjacent channels.
- d. Measure the frequency difference of these two adjacent channels.

#### 9.3 Test Setup Layout



# 9.4 Test Result and Data

Modulation Type	Channel	Channel Separation (MHz)	Limit (MHz)
	00	1.000	0.635
GFSK	39	1.000	0.635
	78	1.000	0.636
	00	1.000	0.855
π/4-DQPSK	39	1.000	0.857
	78	1.000	0.857
	00	1.000	0.865
8DPSK	39	1.000	0.865
	78	1.000	0.865



## Modulation Type: GFSK (1Mbps) Channel: 00

		nalyzer - Swept SA									- 0
arker 1	.®F 1.00	50 Ω AC 00000000 M	MHz P	NO: Wide +	SENSE:INT Trig: Fr #Atten:	ee Run 20 dB		g Type: Log-  Hold: 1/1	Pwr	TR	A PM May 30, 2023 RACE 1 2 3 4 5 TYPE MWWWW DET P N N N N
0 dB/div		Offset 10.5 dE 20.00 dBm								ΔMkr1 1	.000 MHz 0.999 dE
0.0						_				▲1∆2	
0.0					m	~X2m	m		~~~~	- Ann	m.
0.0				www			~~~	2mm	mi		www
1.0			www.			_					
1.0	M					_					
1.0											
enter 2. Res BW				#VB	W 300 ki	Hz			Sweep	Span 0 1.000 ms	3.000 MH (1001 pts
	RC SCL		1.000 MHz	Y AN	9 dB	UNCTION	FUNCTION WI	отн	FL	UNCTION VALUE	
2 F	1		402 033 GHz	-6.702	dBm						
3								-			
5											
7											
9	+				_			-			
0								_			
								-			
3							ST	ATUS			

#### CH39

	ectrum Analyzer -									
arker 1		0 Q AC 0000 MHz	_	SENSE:1	: Free Run	ALI	Avg Type: Avg Hold:	Log-Pwr	04:25:1	5 PM May 30, 202 RACE 1 2 3 4 5 TYPE MWWW
			PNO: Wide IFGain:Lov		ten: 20 dB		Avg Hold:	1/1		DET P N N N N
dB/div	Ref Offset Ref 20.0								∆Mkr1 -1	.000 MH -0.029 dl
9	1101 2010									
00		▲1∆2								
1.0		mm	_		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	wi -			hann	
0 - 000	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		when a	~~~~~		wh	Vm a	www.	· · · ·	man
0			m				V V ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			
.0										
.0						-				
.0										
	441000 GH 100 kHz	łz		#VBW 30	0 kHz			Swee	Spar p 1.000 m	n 3.000 MH s (1001 pt
NODE T		x		Y		FUNCT	ON WIDTH		UNCTION VALUE	• (1001 pr
Δ2 1	1 (Δ)	-1.000 M	MHz (Δ)	-0.029 dB						
F		2.441.000	2012 -	0.005 UDIII			_			
$\vdash$										
							_			
					m					
							STATUS			

# Modulation Type: $\pi/4$ -DQPSK (2Mbps) Channel: 00

Keysight S R L	pectrum A	nalyzer - Swept SA			SENSE:INT		IGN AUTO		81-20-2	
		0000000	MHz	NO: Wide 🔸		Run	Avg Type: Avg Hold:	Log-Pwr 1/1	TR	TYPE NNNN DET PNNNN
0 dB/div		Offset 10.5 d 20.00 dBn							ΔMkr1 1	.000 MH 4.458 dl
10.0										
10.00					0.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			•	1Δ2
0.0				Summer .	www.www.		work		an way	m
0.0			~							
		mm	and the							
0.0	-1-9-4-J	1	°							
0.0										
enter 2 Res BV				#VB	W 300 kHz			Swee	Span p 1.000 ms	3.000 MH s (1001 pt
E MODE	TRC SCL		× 1.000 MHz	(A) <u>A</u> A	FUN	CTION FUNC	TION WIDTH	1	FUNCTION VALUE	
2 F 3	ii	2	.402 177 GHz	-6.557						
5										
6										
8 9										
1					-					
a							STATUS			

#### CH39

	ectrum Analyzer - S						
RL	RF 50		SENSE	INT	ALIGN AUTO		04:27:50 PM May 30, 20
arker 1	-1.000000	P	NO: Wide Tr Gain:Low #	ig: Free Run itten: 20 dB	Avg Type Avg Hold	: Log-Pwr : 1/1	TYPE MWWW DET P NNNI
0 dB/div	Ref Offset 1 Ref 20.00					L	Mkr1 -1.000 MH -3.858 d
0.0							
00				1Δ2			
1.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	man	martin	www.co.	mm	2	man and the second
1.0					A ter A termina		
1.0							
1.0							
.0							
1.0							
1.0							
	441000 GH 100 kHz	z	#VBW 3	00 kHz		Sweep	Span 3.000 Mi 1.000 ms (1001 pt
NODE T		×	Y		FUNCTION WIDTH	FL	NCTION VALUE
Δ2 2 F	1 (Δ) 1	-1.000 MHz 2.441 813 GHz	(Δ) -3.858 dB -7.403 dBm				
4							
5							
7 B							
9							
9							

# CH78

Keysight S R L		Analyzer - S				1								00
	⊮ 1 -1.0	000000			PNO: Wi	de 🛶	Trig: Fi #Atten:	ee Run 20 dB	AL	Avg Ty Avg Ho	pe: Log- ld: 1/1	Pwr	04:20	TRACE 1 2 3 4 5 TYPE MWWW DET P N N N N
dB/div		f Offset 1 f 20.00											ΔMkr1 -	1.000 MHz -0.719 dE
		-			-			_			-			
.0		~~~		۵2 ۱۹۹۰					n _n					
°~~		-	-	لمريد	hun	~~~~		_		and and a second	20			
.0											M	<u>~</u>		
.0		-			-	-		-			+	-	- when the second	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
.0														
nter 2 es BV		000 GH kHz	z			#VBW	300 k	Hz				Swee	Spa p 1.000 r	n 3.000 MH ns (1001 pts
Δ2 F		( <u>(</u> )	X	-1.000 MH	: ( <u>(</u> )	¥ -0.719	dB	UNCTION	FUNC	TION WIDTH	_		FUNCTION VALU	
F	1		2.4	80 057 GHz	-	-7.087 dE	\$m							
							-							
							1			_				
										STATUS				

		alyzer - Swept SA								
RL	RF	50 Q AC			SENSE:INT		ALIGN AUTO	: Log-Pwr	04:27:10	5 PM May 30, 202 RACE 1 2 3 4 5
Aarker 1	1 -1.00	0000000		NO: Wide	Trig: Free	Run	Avg Type AvgiHold			TYPE NWWW DET P NNNN
				Gain:Low	#Atten: 2	dB				DET P N N N N
									ΔMkr1 -1.	000 MH
0 dB/div		offset 10.5 de 20.00 dBm								1.848 dl
og 🗌										
10.0						-				
.00		<b></b> 1∆	2							
0.0	ma		Amar			2				
1.0			0. V. 00.00 V	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Winner	wV.	mm			
1.0								~		
								N.		
1.0								, 'W		
1.0								- ~	home .	
1.0									Mr. March	m
1.0										
enter 2										3.000 MH
Res BW	/ 100 k	Hz		#VB	W 300 kH	!		Swee	p 1.000 ms	s (1001 pt
R MODE T			X	Y		ICTION	FUNCTION WIDTH	1	UNCTION VALUE	
Δ2 2 F			-1.000 MHz 480 000 GHz	(Δ) -1.8- -7.265	48 dB					
		4	480 000 GHZ	-7.200	dBm					
5					_					
7										
9										
0										
1										
							an an an			
•							STATUS			



# Modulation Type: 8DPSK (3Mbps) Channel: 00

RL	trum Analyzer - 5			SENSE:INT		ALIGN AUTO		04:20	23 PM May 30, 20
	1.000000		PNO: Wide	Trig: Free #Atten: 20		Avg Type: Avg Hold:	Log-Pwr 1/1		TRACE 1 2 3 4 TYPE NWWW DET P NNN
dB/div	Ref Offset 1 Ref 20.00		IPGain:Low		40			ΔMkr1	1.000 MH -5.033 d
	Rei 20.00	чып							0.000 u
.0									
0				X			•	1Δ2	
0			hann	-hard	ww	man	p-yp*	and and	hand
0			N						
0		0							
	~~~~	www							
ů –									
	02000 GH 100 kHz	z	#V	/BW 300 kHz			Swee	Spa 20 1.000 n	n 3.000 Mi is (1001 pt
MODE TR		x	Y		CTION FL	UNCTION WIDTH		FUNCTION VALUE	
Δ2 1 F 1	1 (A)	1.000 M 2.401 841 G	Hz (Δ) -5	.033 dB 16 dBm					
		2.401.041.0							

CH39

	ectrum Analy	zer - Swept SA								
RL	RF	50 Q AC			SENSE:1	NT	ALIGN AUTO			52 PM May 30, 202
arker 1	1.0000	00000 MH	PN	O:Wide ↔ iain:Low	Trij #At	g: Free Run ten: 20 dB	Avg	Type: Log-Pwr Iold: 1/1		TYPE NNNN DET PNNNN
dB/div		set 10.5 dB).00 dBm							∆Mkr1	1.000 MH -1.859 di
9										
00					<u> </u>			_	142	
0 000	nm	m	mm	www	-m	Kan m	mm	Lanno	howard	mm
U			_		-					
•					-				-	
0										
0										
0										
	.441000 100 kH			#VI	3W 30	0 kHz		Swe		n 3.000 MH 1s (1001 pt
NODE T		х		Y		FUNCTION	FUNCTION WIDT	н	FUNCTION VALUE	
Δ2 F	1 (Δ		1.000 MHz (59 dB 8 dBm					
		6.00	00000112	-0.04						
							-			
								-		
+ +					-	m	1	+		

RL	RF	Analyzer - Swept SA 50 Ω AC			SENSE:1	NT		ALI	GN AUTO		0	🖙 4:30:46 PM May 30, 20
arker 1	1.00	0000000 1	P	NO: Wide ++ Gain:Low	Trij #At	g: Free F ten: 20	Run dB		Avg Typ Avg Hold	e: Log-Pwr :>1/1		TYPE MWWW DET P NNN
dB/div		Offset 10.5 di 20.00 dBn									ΔMkr	1 1.000 MH 0.692 d
					-							
0		Berry				142						
0	~~/~*	\$1.400 (C	mm	m	<u>m</u> w	Vvw	vγ	~~~	\sim	m		
0					+					1	+	
.0										1	mm.	
					-					-	V	man
enter 2 tes BW		00 GHz kHz		#VE	3W 30	0 kHz				Sw		ipan 3.000 MH 0 ms (1001 pt
		(Δ)	* 1.000 MHz	Y A	92 dB	FUNC	TION	FUNCT	ION WIDTH		FUNCTION V	ALUE
F	1		478 845 GHz		6 dBm							
	-											
	+											
1	1											,
									STATUS			



10. Dwell Time on each channel

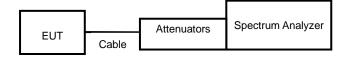
10.1 Test Limit

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.

10.2 Test Procedures

- 1. The transmitter output was connected to the spectrum analyzer.
- 2. Adjust the center frequency to measure frequency, then set zero span mode.
- 2. Set RBW of spectrum analyzer to 1 MHz and VBW to 1 MHz.
- 4. Measure the time duration of one transmission on the measured frequency.

10.3 Test Setup Layout



10.4 Test Result and Data

Test Period = 0.4 (second/ channel) x 79 Channel = 31.6 sec

Modulation Type	Frequency (MHz)	Length of transmission time (ms)	Number of transmission in a 31.6 (79 Hopping*0.4)	Dwell Time (ms)	Limit (ms)
GFSK (DH1)	2402	0.382	320.00	122.24	400
GFSK (DH3)	2402	1.644	160.00	263.04	400
GFSK (DH5)	2402	2.895	106.67	308.80	400
π/4-DQPSK (DH1)	2402	0.393	320.00	125.76	400
π/4-DQPSK (DH3)	2402	1.656	160.00	264.96	400
π/4-DQPSK (DH5)	2402	2.905	106.67	309.87	400
8DPSK (DH1)	2402	0.393	320.00	125.76	400
8DPSK (DH3)	2402	1.650	160.00	264.00	400
8DPSK (DH5)	2402	2.910	106.67	310.40	400



Modulation Type: GFSK (1Mbps) DH1

RL	RF	Nyzer - Swept SA 50 Q AC				ENSE:IN	т		ALI	IGN AUTO			04:38:0	🕞 🖓 📕
arker 1	382.0	00 µs	P	NO: Fat Gain:Lo	st 🔸	Trig #Att	Free R en: 20 d	un IB		Avg Ty	/pe: Lo	ig-Pwr	т	RACE 1 2 3 4 5 TYPE WWWWW DET P NNNN
0 dB/div		ffset 10.5 di 20.00 dBm											ΔMkr1	382.0 µs 5.81 dE
0.0											_			
00												_		
1.0														
1.0														
											-			
0	ansil u	ia sia del autor	that the stars	et aver			-				+	1 <u>Δ</u> 2 -	ad model of	an esta a d
1.0 41111 1.0	γ· ιωμ	ndl at the se	ALA AN		×2								eter app	HE HE HE WAS
		0000 GHz												
enter 2.4 es BW 1					#VB\	N 1.0	MHz					Swee	p 1.000 m	Span 0 H: s (1001 pts
	t (A)	X 382.0 µs	(A)	Y 5.8	1 dB	FUNC	NON	FUNCT	ION WIDTH		f	UNCTION VALUE	
2 F 1	t		357.0 µs		-64.34	dBm								
5								_						
6						_								
9						-								
0								_						
a										STATUS	5			

DH3

Keysight Spe R L	ectrum Analy RF	zer - Swept SA 50 Q AC			SENSE:INT		ALIGN AU	10		44.03	10 PM May 30, 2023
Marker 1				NO: Fast		Run		g Type: L	og-Pwr	04:37	TRACE 1 2 3 4 5 1 TYPE WWWWW
10 dB/div		set 10.5 dB 0.00 dBm	1	Gain:Low	and en. 2	7 U B				∆Mkr1	1.644 ms -0.51 dB
og	Ref 2	J.UU aBM									-0.01 00
10.0											
10.00							-			-	
0.0											
0.0											
0.0						_					
0.0		م باب م	1							142	10
0.0	ng ang ang ang ang ang ang ang ang ang a	manhalysi	Pril 2							the difference	nger Venning
0.0											
enter 2. es BW 1		000 GHz		#VB	W 1.0 MH:	z			Swe	ep 3.000 m	Span 0 H s (1001 pts
1 Δ2	t (∆)	1.644 ms	γ (Δ) -0.5	51 dB	ICTION	FUNCTION W	DTH		FUNCTION VALUE	
2 F 1	t		756.0 µs	-56.25	dBm						
5											
7											
4 5 7 8 9					_						
0								_			
3							ST	ATUS			

Modulation Type: π /4-DQPSK (2Mbps) DH1

💓 Keysight Sp 💭 R.L	rectrum A RF	nalyzer - Swept SA 50 Ω AC			SENSE:INT		AL.	IGN AUTO			H:38:52 PM May 30, 2023
Marker 1	393.	.000 µs		NO: Fast ++ Gain:Low	. Trig: F #Atten	ree Run : 20 dB		Avg Typ	e: Log-Pwr		TYPE DET P NNNNN
10 dB/div		Offset 10.5 dE 20.00 dBm								ΔN	lkr1 393.0 μs -1.88 dB
10.0											
0.00					The level is	m 1.~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	when	where were			
-10.0					f						
-30.0						_					
-40.0			1								
-60.0 4 447	ykyesi	and Alther his	dyne, i her	2					1 <u>62</u>	entral destruction	KAN ATHADAY
-70.0			1.1.			-				1 10	
Center 2. Res BW		00000 GHz Hz		#VE	W 1.0 M	IHz			Sv	veep 1.00	Span 0 Hz 10 ms (1001 pts)
		(Δ)	393.0 µs	Y	88 dB	FUNCTION	FUNC	TON WIDTH		FUNCTION	VALUE
2 F	t		289.0 µs	-59.21	dBm						
4 5											
6 7 8 9 10	+										
10											
MSG								STATUS			

DH3

		zer - Swept SA											
RL arker 1	1.656	50 Q AC			1	ENSE:1/			AL	IGN AUTO Avg Ty	pe: Log-Pwr		05 PM May 30, 21 TRACE 1 2 3 4
				PNO: F FGain:I	ast 🔸	Trig #At	Free ten: 20	Run dB					DET P N N N
		set 10.5 dB										ΔMkr1	1.656 m 2.57 d
odB/div	Ref 2	0.00 dBm											2.57 u
0.0				-							_		
00				-									
.0					~~~~~~		**	******				1	
0				-									
.0													
0												1Δ2	
0 1/11/4/1	er navela	er 11 4.49.10	partition									"HULLAND	喇叭小小
			<i>n</i> 0 <u>z</u>										1.
		000 GHz											Span 0 H
s BW 1	1.0 MHz				#VB\	V 1.0	MHz					p 3.000 m	is (1001 pi
	RC SCL	X	1.656 ms	(4)	Y	7 dB	FUN	TION	FUNC	TION WIDTH		FUNCTION VALUE	
F	t		747.0 µs	(<u></u>)	-67.71	dBm							
				-		-	_						
5													
				-									
				1									

DH5

RL	RF 50 Q A	A C		SENSE:1		ALIGN ALITO			53 PM May 30, 20
	2.89500 ms		PNO: Fast	Trig	: Free Run		Type: Log-Pwr	04:32:	TRACE 1 2 3 4 5
			IFGain:Low	#At	ten: 20 dB				DET P NNNN
dB/div	Ref Offset 10.5 d Ref 20.00 dBr							ΔMkr1	2.895 m -0.52 d
.0									
				_					
0							_	<u>h</u>	
				_					
				_					
				_					
0	and a set of	Mar	-					1Δ2	allowing
	all where the second	2						A.11. all	eren All Add
nter 2.	402000000 GHz								Span 0 H
s BW 1	1.0 MHz		\$	¥VBW 1.0	MHz		Swe	ep 5.000 m	is (1001 pt
MODE TR		х		Y	FUNCTION	FUNCTION WID	н	FUNCTION VALUE	
Δ2 F	t (Δ)	2.895 m 1.210 m	s (Δ) s -5	-0.52 dB 6.38 dBm					
F 1									
			-						

DH5

	ctrum Analyzer - Swept SA								
arker 1	2.90500 ms	P	NO: Fast	SE:INT Trig: Free R #Atten: 20 d		ALIGN AUTO Avg Typ	e: Log-Pwr	TR	PM May 30, 20 RACE 1 2 3 4 5 TYPE WWWW DET P N N N
0 dB/div	Ref Offset 10.5 di Ref 20.00 dBn							ΔMkr1	2.905 m 0.78 d
0.0									
10	n		,		p	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		h	
1.0									
1.0									
1.0	And the property of the second	ahlly 2						1Δ2 (14)/#-hn-th	halanaah
1.0		- // 1/2						- H - H	
enter 2.4 es BW 1	402000000 GHz .0 MHz		#VBW	1.0 MHz			Swee	p 5.000 ms	Span 0 s (1001 p
	C SCL t (Δ)	x 2.905 ms	(Δ) 0.78	dB	FION F	UNCTION WIDTH	F	UNCTION VALUE	
2 F 1	t	1.165 ms	-55.24 dE	Im					
5									
7 8 9				_					
0									
a				m		STATUS			



Modulation Type: 8DPSK (3Mbps)

DH1

		nalyzer - Swept SA								
Marker	⊮ 1 393.	50 Ω AC 000 µs	P	NO: Fast	Trig: Free #Atten: 20	Run	ALIGN AUTO Avg Ty	pe: Log-Pwr	TR	PM May 30, 2023 RACE 1 2 3 4 5 6 TYPE WWWWWW DET P N N N N
10 dB/div		Offset 10.5 dB 20.00 dBm							∆Mkr1	393.0 µs -0.86 dB
10.0										
-10.0			ſ		panton	i-mirana	440/#T~~~			
-20.0										
-40.0										
-50.0 -60.0	(AAM)	eulos produce	hanna i				-	1 <u>4</u> 2 Mill / 1 / 1 / 1	espiletorily. Here	algebler of the lit
-70.0			11.					· 11 ·		P 1
Center 2 Res BW		00000 GHz Hz		#VB	W 1.0 MHz			Swe	ep 1.000 ms	Span 0 Hz (1001 pts)
MKE MODE 1 Δ2 2 F	TRC SCU		393.0 µs 281.0 µs	(Δ) -0.8 -59.86	6 dB	CTION FUN	CTION WIDTH		FUNCTION VALUE	^
3 4 5			LUIIU IU							
6										
8 9 10 11										_
<										
MSG							STATUS			

DH3

Keysight Spectrum Analyzer - Swept SA					
Marker 1 1.65000 ms	PNO: Fast ++ Tri FGain:Low #A	g: Free Run tten: 20 dB	ALIGN AUTO Avg Type: Lo		29 PM May 30, 2023 TRACE 1 2 3 4 5 6 TYPE WWWWWW DET P N N N N N
Ref Offset 10.5 dB 10 dB/div Ref 20.00 dBm				ΔMkr1	1.650 ms 0.50 dB
10.0			_		
-10.0	~~	~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
-20.0					
-30.0					
-50.0 -50.0 MINTY-#************************************				1Δ2	
-60.0 WWWY-**********************************				אמציוריריאייאראר	alar Malaka
Center 2.402000000 GHz					Span 0 Hz
Res BW 1.0 MHz	#VBW 1.0	0 MHz		Sweep 3.000 m	
Δ2 1 t (Δ) 1.650 ms 2 F 1 t 702.0 μs	(Δ) 0.50 dB -57.69 dBm	FUNCTION FU	NCTION WIDTH	FUNCTION VALUE	
3 4 5					
5 6 7					
8 9 10					
11					
MSG			STATUS		

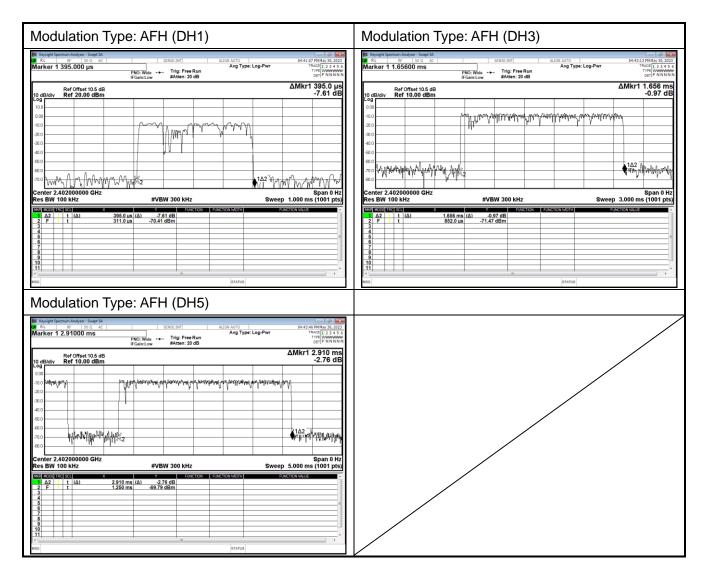
DH5

RL	RF	alyzer - Swept SA 50 Q AC			SENSE		_	AL 1	IGN ALITO		64-24	
		000 ms		_	JENDE.	141		14.1	Avg Type	Log-Pwr	01.51	TRACE 1 2 3 4 5
	2.910	00 115		PNO: Fas	r i Tr	ig: Free	Run					TYPE WWWW
				FGain:Lo	w #A	tten: 20	dB					DET P N N N
			_								ΔMkr1	1 2.910 m
dB/div		offset 10.5 de 20.00 dBm										0.35 d
9	Rei	20.00 0.01		_								
0				-								
• • • • • •	1		prost				111.40	-			1	
0	1										-	_
•				-				-				+ +
0											1A2	
• —	HUNK	(MAN/WAN/WAY)	all and a second								Wayproduty.	Margar W.A. Wagara
			2002								11.	
•												
		0000 GHz										Span 0 H
s BW	1.0 MH	z			#VBW 1.	0 MHz				Swee	p 5.000 n	ns (1001 pt
MODE T			X		Y		CTION	FUNCT	ION WIDTH	í	UNCTION VALUE	
Δ2	1 t (Δ)	2.910 ms	: (Δ)	0.35 dB							
F	1 t		1.110 ms		-56.97 dBm	<u> </u>						
	++			-								
				-				_				
+ +	++					<u> </u>						
F				-								
				1								



Modulation Type	Frequency (MHz)	Length of transmission time (ms)	Number of transmission in a 8 (20 Hopping*0.4)	Dwell Time (ms)	Limit (ms)
AFH (DH1)	2402-2421	0.395	160	63.20	400
AFH (DH3)	2402-2421	1.656	80	132.48	400
AFH (DH5)	2402-2421	2.910	53.33	155.19	400

Test Period = 0.4 (second/ channel) x 20 Channel = 8 sec





11. Number of Hopping Channels

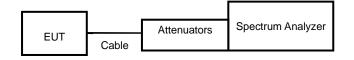
11.1 Test Limit

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

11.2 Test Procedures

- a. The transmitter output was connected to the spectrum analyzer.
- b. Set RBW of spectrum analyzer to 300 KHz and VBW to 300 KHz.
- c. Set the MaxHold function, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been record.

11.3 Test Setup Layout



11.4 Test Result and Data

Modulation Type	Number of hopping channels
GFSK	79
π/4-DQPSK	79
8DPSK	79



Modulation Standard: GFSK (1Mbps)

Keysight Sper	ctrum Analyzer - Swept SA RF 50 Q Al		SENSE:INT	AL	IGN AUTO		04:45:21	PM May 30, 20
Start Fred	2.40000000	PNO: Fast	Trig: Free #Atten: 20		Avg Type: Avg Hold: 1	Log-Pwr /1	1	ACE 1 2 3 4 5 TYPE MWWW DET P NNNI
0 dB/div	Ref Offset 10.5 d Ref 20.00 dBn							
10.0								
1.00								
10.0			<u> </u>	mm		<u></u>	MANANA	
20.0								
0.0								
50.0								
50.0								Ŷ
70.0								
tart 2.400 Res BW 3		#VB	W 300 kHz			Sweep	Stop 2. 0 1.133 ms	48350 GH (1001 pt
a					STATUS			

Modulation Standard: π/4-DQPSK (2Mbps)

art Fr	eq 2.4	00000000	6	NO: Fast	. Trig: Free #Atten: 20	Run dB	Avg Type: Avg Hold: 1	.og-Pwr /1	TR	ACE 1 2 3 4
dB/div	Ref (Ref	Offset 10.5 dE 20.00 dBm	3							
0										
0										
o pr	ww	MMM	www	www.	www	wwww	www.ww	www.	www.www	www
+										
-										
-										- (
-										
-										
	0000 C			**	W 300 kHz				Stop 2.	48350 GI

Modulation Standard: 8DPSK (3Mbps)

art Fre	RF 50 Ω eq 2.40000000	0 GHz	PNO: Fast	Trig: Free #Atten: 20	Run	IGN AUTO Avg Type: I Avg Hold: 1	.og-Pwr /1	TRA	PM May 30, 2 ACE 1 2 3 4 YPE M WWW DET P N N N
dB/div	Ref Offset 10.5 Ref 20.00 dB	iB	IFGain:Low	#Atten: 20	ab				
• •									
N.	www.w	mmm	กงางงางงา	mmm	www	www.www	งากจากก	งงากกะกก	กกกก
ļ[
-									
									1
-									
	0000 GHz 300 kHz		#VB	W 300 kHz			Sween	Stop 2.4	8350 GI



12. Maximum Peak Output Power

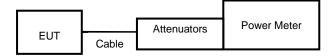
12.1 Test Limit

The Maximum Peak Output Power Measurement is 21dBm.

12.2 Test Procedures

The antenna port(RF output)of the EUT was connected to the input(RF input)of a power meter. Power was read directly from the meter and cable loss connection was added to the reading to obtain power at the EUT antenna terminal. The EUT Output Power was set to maximum to produce the worse case test result.

12.3 Test Setup Layout



12.4 Test Result and Data

Modulation Type	Channel	Frequency (MHz)	Peak Power Output (dBm)	Peak Power Output (mW)
0501/	00	2402	-6.092	0.246
GFSK (1Mbps)	39	2441	-6.350	0.232
(TWDPS)	78	2480	-6.631	0.217
	00	2402	-5.127	0.307
π /4-DQPSK (2Mbps)	39	2441	-5.462	0.284
(2101005)	78	2480	-5.594	0.276
00001/	00	2402	-4.910	0.323
8DPSK (3Mbps)	39	2441	-5.044	0.313
(510053)	78	2480	-5.356	0.291

----- End of the report -----