

9 kHz ~ 25 GHz Data (Modulation : <u>8DPSK</u>) _ Antenna 3

Lowest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	D.C.F (dB)	Distance Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2323.93	V	Z	PK	52.59	2.22	N/A	N/A	54.81	74.00	19.19
2323.93	V	Z	AV	52.59	2.22	-24.79	N/A	30.02	54.00	23.98
4803.92	Н	Y	PK	49.43	1.63	N/A	N/A	51.06	74.00	22.94
4803.92	Н	Y	AV	49.43	1.63	-24.79	N/A	26.27	54.00	27.73
9608.07	V	Х	PK	45.89	4.96	N/A	N/A	50.85	74.00	23.15
9608.07	V	Х	AV	45.89	4.96	-24.79	N/A	26.06	54.00	27.94
12010.01	Н	Y	PK	46.03	8.68	N/A	N/A	54.71	74.00	19.29
12010.01	Н	Y	AV	46.03	8.68	-24.79	N/A	29.92	54.00	24.08

Middle Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	D.C.F (dB)	Distance Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4881.81	Н	Y	PK	51.17	1.61	N/A	N/A	52.78	74.00	21.22
4881.81	Н	Y	AV	51.17	1.61	-24.79	N/A	27.99	54.00	26.01
9763.68	V	Х	PK	48.08	5.34	N/A	N/A	53.42	74.00	20.58
9763.68	V	Х	AV	48.08	5.34	-24.79	N/A	28.63	54.00	25.37
12204.71	Н	Y	PK	45.99	8.87	N/A	N/A	54.86	74.00	19.14
12204.71	Н	Y	AV	45.99	8.87	-24.79	N/A	30.07	54.00	23.93

Highest Channel

Frequency (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	D.C.F (dB)	Distance Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2483.60	V	Z	PK	52.18	3.26	N/A	N/A	55.44	74.00	18.56
2483.60	V	Z	AV	52.18	3.26	-24.79	N/A	30.65	54.00	23.35
4960.34	Н	Y	PK	50.72	1.75	N/A	N/A	52.47	74.00	21.53
4960.34	Н	Y	AV	50.72	1.75	-24.79	N/A	27.68	54.00	26.32
9920.27	V	Х	PK	48.71	5.72	N/A	N/A	54.43	74.00	19.57
9920.27	V	Х	AV	48.71	5.73	-24.79	N/A	29.65	54.00	24.35
12399.87	Н	Y	PK	45.52	9.07	N/A	N/A	54.59	74.00	19.41
12399.87	Н	Y	AV	45.52	9.07	-24.79	N/A	29.80	54.00	24.20

<u>Note.</u>

1. The radiated emissions were investigated up to 25 GHz. And no other spurious and harmonic emissions were found above listed frequencies.

2. Information of Distance Factor

For finding emissions, the test distance might be reduced from 3m to 1m. In this case, the distance factor(-9.54dB) is applied to the result.

- Calculation of distance factor = 20 log(applied distance / required distance) = 20 log(1 m / 3 m) = -9.54 dB

When distance factor is "N/A", the distance is 3 m and distance factor is not applied.

3. D.C.F Calculation. (D.C.F = Duty Cycle Correction Factor)

- Time to cycle through all channels = Δt = T [ms] X 20 minimum hopping channels , where T = pulse width = 2.88 ms

- 100 ms / Δt [ms] = H -> Round up to next highest integer, to account for worst case, H' = 100 / (2.88 X 20) = 1.74 = 2

- The Worst Case Dwell Time = T [ms] x H' = 2.88 ms X 2 = 5.76 ms

- D.C.F = 20 Log(The Worst Case Dwell Time / 100 ms) dB = 20 log(5.76 / 100) = -24.79 dB

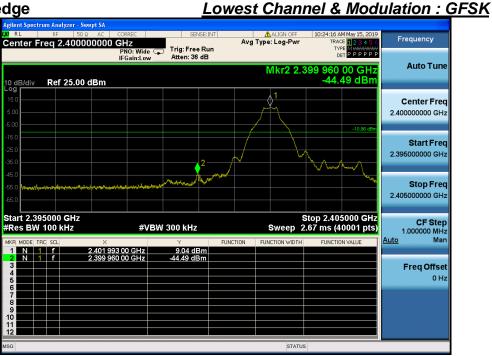
4. Sample Calculation.

Margin = Limit - Result / Result = Reading + T.F + D.C.F / T.F = AF + CL - AG

Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain.



Low Band-edge



Low Band-edge

Hopping mode & Modulation : GFSK





Lowest Channel & Modulation : GFSK

X RL		1 Ω <u>∧</u> DC CO 4500 MHz	RREC		BE:INT	Avg 1	ALIGN OFF	TRAC	M May 15, 2019 CE 1 2 3 4 5 6 PE M WWWWW	Frequency
10 dB/div	Ref 25.0	IF	Gain:Low	Atten: 36	dB			Mkr1 28	7.2 kHz 32 dBm	Auto Tune
Log 15.0 5.00										Center Freq 15.004500 MHz
-15.0									-10.96 dBm	Start Freq 9.000 kHz
-45.0 1	Wantiliteration	li,indrykeli,indraenieg	utveraleyee,attatele		an a	in finghetter og størage	ىرى ئىرىكە ئىرىكى ئى ئىرىكى ئىرىكى	allater a confirmera	gl/Herboursel	Stop Freq 30.000000 MHz
MKR MODE T	100 kHz	×		V 300 kHz Y	FUNC	TION	Sweep 5	Stop 3 5.33 ms (4 FUNCTIO		CF Step 2.999100 MH <u>Auto</u> Mar
1 N 1 2 3 4 5 6 7		287	7.2 kHz	-51.32 dB	m					Freq Offset 0 Hz
8 9 10 11 12										

	um Analyzer - Swe								
Center Fi	RF 50 Ω req 5.01500		REC	SENS		ALIGN OFF	TRAC	M May 15, 2019 E 1 2 3 4 5 6	Frequency
10 dB/div	Ref 25.00 c	IFO	NO: Fast 🕞 Gain:Low	Trig: Free F #Atten: 36 o		Mkr	DE 5 3.188	99 GHz 7 dBm	Auto Tune
Log 15.0 5.00		^1						-10.96 dBm	Center Freq 5.015000000 GHz
-15.0 -25.0 -35.0		¢ ²	5	n nigitata da parte parte parte		3	in detailed in any space of the second	and a second	Start Freq 30.000000 MHz
-45.0 -55.0 -65.0									Stop Freq 10.000000000 GHz
Start 30 N #Res BW	1.0 MHz	×		V 3.0 MHz Y	FUNCTIO	Sweep 1	Stop 10 8.7 ms (4 FUNCTIO		CF Step 997.000000 MHz <u>Auto</u> Man
1 N 1 2 N 1 3 N 1 4 N 1 5 N 1 6	f f f f	2.402 3 2.557 8 6.975 6 6.038 4 3.188 9	9 GHz 0 GHz 2 GHz	9.12 dBr -36.64 dBn -37.52 dBn -37.55 dBn -37.67 dBn	n n n				Freq Offset 0 Hz
7 8 9 10 11 12									
MSG						STATUS			



Lowest Channel & Modulation : GFSK

Agilent Spectr										
Center Fi		00000000			BEINT	Avg	ALIGN OFF	TRA	AM May 15, 2019 CE 1 2 3 4 5 6 PE M WAAWAAAA	Frequency
10 dB/div	Ref 25.0	IF	NO: Fast ⊂ Gain:Low	#Atten: 36			Mkr3	19.408 (000 GHz 50 dBm	Auto Tune
Log 15.0 5.00										Center Freq 17.500000000 GHz
-15.0 -25.0 -35.0	ي الله معرود الله الله والله الله والله الله والله الله	ngelut y dag part bei / hen fremene				→ ³			-10.96 dBm	Start Fred 10.000000000 GHz
-45.0 -55.0 -65.0										Stop Freq 25.000000000 GHz
Start 10.0 #Res BW			#VB	W 3.0 MHz			Sweep 4		5.000 GHz 10001 pts)	CF Step 1.500000000 GH;
MKR MODE TF 1 N 1 2 N 1 3 N 1 4 5	f f f	× 24.218 87 21.439 37 19.408 00	5 GHz	-24.71 dB -28.80 dB -31.50 dB	m m	NCTION	FUNCTION WIDTH	FUNCTI	DN VALUE	Auto Mar Freq Offset 0 Ha
5 6 7 8 9 10 11 12										
MSG							STATU	s		

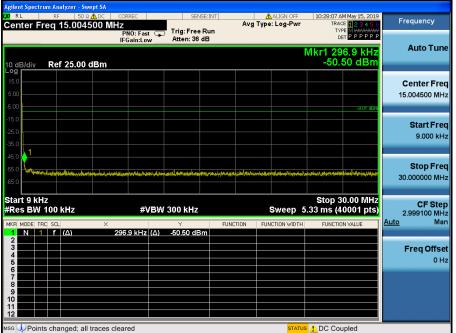


Reference for limit

Middle Channel & Modulation : GFSK



Conducted Spurious Emissions <u>Middle Channel & Modulation : GFSK</u>





Middle Channel & Modulation : GFSK

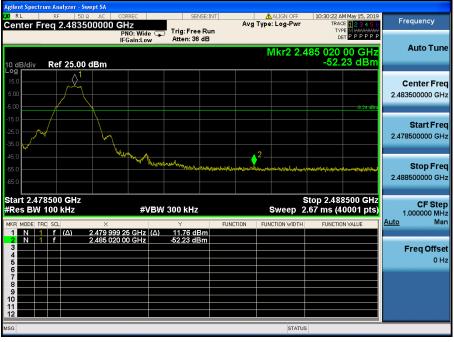
Agilent Spectr								
UMIRL Contor E		50 Q AC COR 5000000 GH	REC	SENSE:II		ALIGN OFF	10:28:31 AM May 15, 2019 TRACE 1 2 3 4 5 6	Frequency
Center F	req 5.01	PI	NO: Fast 😱 Gain:Low	Trig: Free Ru Atten: 36 dB			туре DET P P P P P P	Auto Tune
10 dB/div Log	Ref 25.	00 dBm					-38.22 dBm	
15.0								Center Freq
5.00								5.015000000 GHz
-5.00							-9.01 dBm	
-15.0								Start Freq
-35.0		2 ² 5			{4			30.000000 MHz
-45.0								
-55.0								Stop Freq
-65.0								10.000000000 GHz
Start 30 N #Res BW			#VBW	3.0 MHz		Sweep 1	Stop 10.000 GHz 8.7 ms (40001 pts)	CF Step 997.000000 MHz
MKR MODE TH		×	0 GHz (Δ)	ү 11.06 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man
2 N 1	f	2.519 2	6 GHz	-36.82 dBm				
3 N 1 4 N 1	f (∆) f	5.912 5	5 GHz (Δ) 5 GHz	-37.35 dBm -37.78 dBm				Freq Offset 0 Hz
5 N 1	f	2.777 4	8 GHz	-38.22 dBm				0 H2
8								
9								
11								
MSG						STATUS		

Agilent Spectr										
Center F		50 Ω AC CO	RREC		E:INT		ALIGN OFF	TRAC	1 May 15, 2019	Frequency
		Р	NO: Fast 🖵 Gain:Low	Trig: Free Atten: 36 d				TYP DE	PPPPP	
							Mkr3 2	21.472 7	50 GHz	Auto Tune
10 dB/div	Ref 25.	00 dBm							2 dBm	
Log 15.0										Center Freq
5.00										17.50000000 GHz
-5.00									-9.01 dBm	11.00000000000
-15.0									<u>~2</u> h	
-25.0							→ ³		<u> </u>	Start Freq 10.000000000 GHz
-35.0		a la constante destantino								10.00000000 GH2
-45.0										
-55.0										Stop Freq
-65.0										25.00000000 GHz
Start 10.0								Stop 25	000 GHz	
#Res BW			#VBW	/ 3.0 MHz		:	Sweep 4	0.0 ms (4)		CF Step 1.50000000 GHz
MKR MODE TH	RC SCL	×		Y	FUNCT	ION FUN	ICTION WIDTH	FUNCTION	I VALUE	Auto Man
1 N 1 2 N 1	f (Δ)	24.877 75 24.146 87	0 GHz (Δ)	-23.12 dBr -24.12 dBr						
3 N 1	f (Δ)	21.472 75	0 GHz (Δ)	-28.22 dBr	n					Freq Offset
4 5										0 Hz
6										
8										
10										
11 12										
MSG							STATUS	; ;		



High Band-edge

Highest Channel & Modulation : GFSK



High Band-edge <u>Hopping mode & Modulation : GFSK</u>

Center Freq 2.483500000 GHz PNO: Wide PRO: Wide PGain:Low Trig: Free Run Atten: 36 dB Frequency Avg Type: Log-Pwr RACE 123456 TYPE MULAUMAN DET PPPPP Auto Tune Mkr1 2.487 000 00 GHz -40.91 dBm Ref 25.00 dBm ldiv **Center Freq** 2.483500000 GHz Start Freq 2.478500000 GHz • Stop Freq 2.488500000 GHz Start 2.478500 GHz #Res BW 100 kHz Stop 2.488500 GHz 2.67 ms (40001 pts) CF Step 1.000000 MHz Man #VBW 300 kHz Sweep Auto 2.487 000 00 GHz (Δ) -40.91 dB Freq Offset 0 Hz STAT



Highest Channel & Modulation : GFSK

	um Analyzer - S										
LXI RL	RF 50 reg 15.004		RREC	SENS	E:INT		ALIGN OFF		May 15, 2019	Frequ	ency
Genter F	eq 15.004	F	PNO: Fast 🗔	Trig: Free Atten: 36 d				TYP	E MWWWWW T P P P P P P		
		IF	Gain:Low	Atten: 36 d	36					Au	to Tune
							I	Mkr1 28	1.9 KHZ 00 dBm		
10 dB/div Log	Ref 25.00	dBm						-50.0	JU UBIII		
15.0										Cen	ter Frea
5.00											500 MHz
-5.00									-8.24 dBm		
-15.0											
-25.0											art Freq
-35.0										Ś	0.000 kHz
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55.0										St	op Freq
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-03.0											
Start 9 kH									0.00 MHz		CF Step
#Res BW	100 kHz		#VBV	/ 300 kHz			Sweep 5	.33 ms (4	0001 pts)		100 MHz
MKR MODE TH		×		Y	FUNCTI	ON FUN	CTION WIDTH	FUNCTIO	N VALUE	<u>Auto</u>	Man
1 N 1 2	f (∆)	281	l.9 kHz (Δ)	-50.00 dBr	m						
3										Fre	q Offset
4											0 Hz
6											
8											
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Agilent Spectr X/ R L	um Analyzer - Sw RF 50 ຂ	rept SA AC COR	REC	SENS	E:INT		ALIGN OFF		M May 15, 2019	
Center Fr	req 5.01500	PN	Z IO: Fast ⊂⊾ ain:Low	Trig: Free Atten: 36 d		Avg Typ	e: Log-Pwr	TRAC TYP DB	E 1 2 3 4 5 6 E MWWWWW T P P P P P P	Frequency
10 dB/div	Ref 25.00		ain:Low	Atten: 30 G	10		Mkr	5 5.820		Auto Tune
Log 15.0 5.00		1 							-8.24 dBm	Center Freq 5.015000000 GHz
-15.0 -25.0 -35.0		2 ³				5 4		r landlinter, er en stirk	and a substance of the	Start Freq 30.000000 MHz
-45.0 -55.0 -65.0										Stop Fred 10.000000000 GHz
Start 30 M #Res BW MKR MODE TR	1.0 MHz	×	#VBW	Y 11.84 dB	FUNC		Sweep 1			CF Step 997.000000 MHz <u>Auto</u> Mar
1 N 1 2 N 1 3 N 1 4 N 1 5 N 1 6	f f (Δ) f	2.558 14	GHz GHz (Δ) GHz	-36.81 dB -37.19 dB -37.39 dB -37.46 dB	n n					Freq Offse 0 Hz
7 8 9 10 11 12										
ISG							STATUS	3		



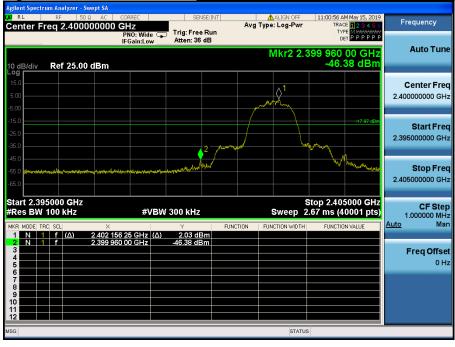
Conducted Spurious Emissions <u>Highest Channel & Modulation : GFSK</u>

Agilent Spectr <mark>XI</mark> RL Center Fi	RF	50 ឆ	AC C	DRREC GHz		ENSE:INT	Avg	ALIGN OFF	r TR	2 AM May 15, 2019 RACE 123456	Frequency
10 dB/div		25.00		PNO: Fast 0 FGain:Low	 Trig: Free Atten: 3 			Mkr3	19.441	750 GHz	Auto Tune
Log 15.0 5.00										-8.24 dBm	Center Fred 17.500000000 GH;
-15.0 -25.0 -35.0		ومتروب والمراجع	c.J. _{syn} ul Jirpiszi atominiegi				3		2		Start Fred 10.000000000 GH;
-45.0 -55.0 -65.0		1997 - 1997 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 -									Stop Fre 25.000000000 GH
Start 10.0 #Res BW				#VB	W 3.0 MH	z		Sweep	Stop 2 40.0 ms (25.000 GHz (40001 pts)	CF Ste 1.500000000 GH
MKR MODE TF 1 N 1 2 N 1 3 N 1 4 5		(Δ) (Δ)	21.551 8	25 GHz (A 75 GHz 50 GHz (A	-28.66 c	Bm Bm	FUNCTION	FUNCTION WID1	H FUNC	TION VALUE	Auto Ma Freq Offse 0 H
6 7 8 9 10 11											
12 								STA	rus		



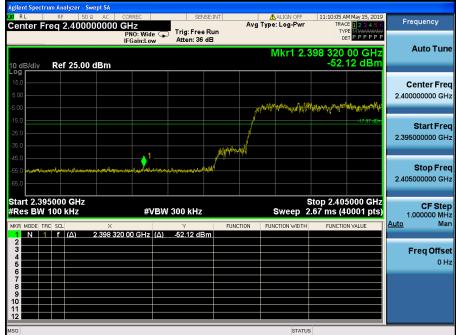
Low Band-edge

Lowest Channel & Modulation : π/4DQPSK



Low Band-edge

Hopping mode & Modulation : π/4DQPSK





Lowest Channel & Modulation : π/4DQPSK

Agilent Spectr	RF	50 Ω	▲DC COF	REC		SENSE:	INT				M May 15, 2019 E 1 2 3 4 5 6	Fre	quency
10 dB/div		25.00	PI IFC	NO: Fast Gain:Low		g: Free Ri en: 36 dE			<u> </u>	۳۲ Mkr1 28	1.9 kHz 56 dBm	,	Auto Tune
Log 15.0 5.00													e nter Freq 004500 MHz
-15.0 -25.0 -35.0											-17.97 dEm		Start Freq 9.000 kHz
-45.0 -55.0	triber of	later Asia interest	te disebut instance	(nigeline,1960)	hisered birth	idiyad kan	ortormont of the	Mari den filsken	ling og her de state for som som	general constructions of	lasten deste source		Stop Freq 000000 MHz
Start 9 kH #Res BW	100		×	#VI	BW 300	,	FUNC	TION FI	Sweep (i.33 ms (4	0.00 MHz 0001 pts)	2.9 <u>Auto</u>	CF Step 999100 MHz Man
1 N 1 2 3 4 5 6	f	(Δ)	281	.9 kHz (∆) -49	.56 dBm						F	r eq Offset 0 Hz
7 8 9 9 10 11 11 11 11 11 11 11 11 11 11 11 11													
12 MSG 🗘 File 4	scree	n77.png	> saved						STATU	s 🚹 DC Cou	upled		

Agilent Spectrum Analyzer - Swept					
RL RF 50 Ω Center Freq 5.015000	000 GHz	SENSE:INT	ALIGN OFF Avg Type: Log-Pwr	11:01:42 AM May 15, 2019 TRACE 1 2 3 4 5 6 TYPE MWWWWW	Frequency
	PNO: Fast 🖵 IFGain:Low) Trig: Free Run Atten: 36 dB	Mkr	5 8.226 59 GHz	Auto Tune
10 dB/div Ref 25.00 dE	3m			-38.78 dBm	
15.00 -5.00	1				Center Freq 5.015000000 GHz
-15.0			an a franciski som den sta alle som den stationer st		Start Freq 30.000000 MHz
-45.0			<u>na met dilatan yang kil</u> Balan yatan ya		Stop Freq 10.000000000 GHz
Start 30 MHz #Res BW 1.0 MHz		3.0 MHz		Stop 10.000 GHz 8.7 ms (40001 pts)	CF Step 997.000000 MHz Auto Man
MKR MODE TRC SCL 1 N 1 f (Δ) 2 N 1 f (Δ) 3 N 1 f (Δ) 4 N 1 f (Δ) 5 N 1 f (Δ)	× 2.402 36 GHz (Δ) 5.836 53 GHz 2.677 53 GHz (Δ) 3.387 40 GHz 8.226 59 GHz	Y FUNC 2.80 dBm -37.73 dBm -38.25 dBm -38.50 dBm -38.50 dBm	TION FUNCTION WIDTH	FUNCTION VALUE	Freq Offset 0 Hz
6 7 8 9 10 11 12					
MSG			STATUS		



Lowest Channel & Modulation : π/4DQPSK

Agilent Spectru L <mark>XI</mark> RL	RF	50 Ω	AC COF			SEN	SE:INT			ALIGN OFF		AM May 15, 2019	Freq	Jency
Center Fr	req 1	7.500	P	HZ NO: Fast Gain:Low		Trig: Free Atten: 36		Av	з Туре	: Log-Pwr	T	CE 123456 (PE M M A A A A A A A A A A A A A A A A A		
10 dB/div Log	Ref	25.00	dBm							Mkr3 :		375 GHz 29 dBm	A	uto Tune
15.0 5.00 -5.00														nter Freq 10000 GHz
-15.0 -25.0 -35.0 -45.0										3		72 %		tart Freq 10000 GHz
-55.0														top Fred 10000 GH2
Start 10.0 #Res BW				#V	BW	3.0 MHz				Sweep 4	Stop 2: 0.0 ms (4	5.000 GHz 10001 pts)		CF Step
MKR MODE TR 1 N 1 2 N 1 3 N 1 4 - - 5 - -	f f	(Δ) (Δ)	× 24.809 879 24.150 250 20.819 879) GHz		Y -24.57 d⊟ -25.07 d⊟ -28.29 d⊟	m	FUNCTION	FUN	ICTION WIDTH	FUNCTI	ON VALUE	Auto Fre	Mar e q Offse 0 H:
6 7 8 9 10 11 12														
MSG										STATUS	6			

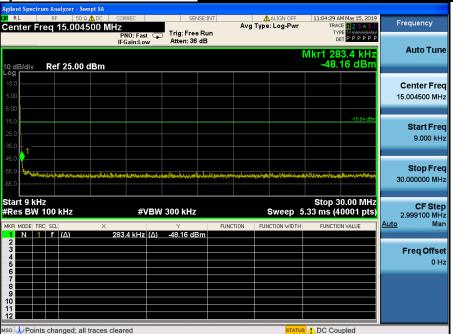


Reference for limit

Middle Channel & Modulation : π/4DQPSK



Conducted Spurious Emissions <u>Middle Channel & Modulation : π/4DQPSK</u>





<u>Middle Channel & Modulation : π/4DQPSK</u>

RL RF 503 Center Freq 5.0150			Avg T In	ALIGN OFF	TYPE	lay 15, 2019 2 3 4 5 6 4 9 P P P P P	Frequency
10 dB/div Ref 25.00				Mkr	5 8.248 5: -38.89		Auto Tune
5.00							Center Fred 5.015000000 GH
-15.0 -25.0 					5	15,84 dBm	Start Free 30.000000 MH
-45.0							Stop Fre 10.000000000 GH
Start 30 MHz #Res BW 1.0 MHz	#\	'BW 3.0 MHz		Sweep 1	Stop 10.0 8.7 ms (400		CF Ste 997.000000 MH
MKR MODE TRC SCL 1 N 1 f (Δ) 2 N 1 f 3 N 1 f 4 N 1 f 5 N 1 f <	× 2.441 00 GHz 5.520 98 GHz 3.417 31 GHz 2.519 26 GHz 8.248 52 GHz	-38.06 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION V	ALUE	A <u>uto</u> Ma FreqOffse 0 H
6 7 8 9 10 11 12							
SG				STATUS	3		

RL		wept SA Ω AC CC	ORREC	SENS	E:INT	ALIGN OFF	11:05:16 AM May 15, 2019	
enter F	req 17.500	000000			A [.] Run	vg Type: Log-Pwr	TRACE 123456 TYPE MWWWW DET PPPPP	Frequency
0 dB/div	Ref 25.00	dBm				Mkr3 :	21.403 375 GHz -28.26 dBm	Auto Tune
.og 15.0 5.00								Center Fre 17.500000000 GH
15.0 25.0 35.0	and the fill of the second					3		Start Fre 10.000000000 GH
45.0 55.0 65.0								Stop Fre 25.000000000 GH
	1.0 MHz		#VBV	V 3.0 MHz			Stop 25.000 GHz I0.0 ms (40001 pts)	1.500000000 GH
	f (Δ)		50 GHz (Δ)	-24.23 dBr		FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Ma
2 N 1 3 N 1 4 5	f f (∆)	24.235 75 21.403 37	50 GHz 75 GHz (Δ)	-25.68 dBr -28.26 dBr	n			Freq Offso 0 H
6 7 8 9								
10 11 12								
SG						STATU	S	



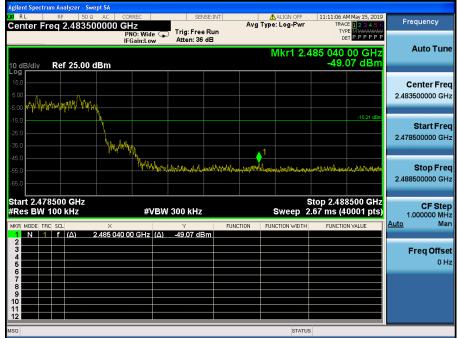
High Band-edge

Highest Channel & Modulation : π/4DQPSK



High Band-edge

Hopping mode & Modulation : π/4DQPSK





<u>Highest Channel & Modulation : π/4DQPSK</u>

IXI RL	um Analyzer - Sw RF 50 G Teq 15.004	2 🚹 DC 🕴 CORF	EC		E:INT		ALIGN OFF	TRAC	M May 15, 2019 E 123456	Frequency	,
10 dB/div	Ref 25.00	IFG	0: Fast ⊂ ain:Low	Atten: 36 o				DE Mkr1 28	3.4 kHz 30 dBm	Auto Ti	une
Log 15.0 5.00										Center F 15.004500 I	
-15.0 -25.0 -35.0									-15.21 dBm	Start F 9.000	
-45.0 -55.0 -65.0	hanna barlaran an	بالما معروف المراجع ويواد المراجع المر المراجع المراجع	يەلەرمىلىد ارار لەر	Hedforder Vojtsmark b	whenderstation	the printile Archel	g yan bahan yan dagara s	deriolithe officies	Naturi somo Nytherator	Stop F 30.000000 I	
Start 9 kH #Res BW	100 kHz		#VBV	V 300 kHz				.33 ms (4		CF S 2.999100 I Auto	
2 3 4 5	C SCL f (△)	× 283.4	l kHz (Δ)	⊻ -48.30 dBr	FUNCT	ION FUN	ICTION WIDTH	FUNCTIO	N VALUE	Freq Off	
6 7 8 9 10 11											
12 File <	screen77.png	> saved					STATUS	DC Cou	pled		

Agilent Spectrum Analyzer - Swep		SENSE:INT	ALIGN OFF	11:07:35 AM May 15, 2019	
Center Freq 5.015000			Avg Type: Log-Pwr	TRACE 123456 TYPE MWARMAN	Frequency
	IFGain:Low	Atten: 36 dB		DETPPPPP	Auto Tune
10 dB/div Ref 25.00 d	Bm		Mkr	5 8.288 65 GHz -38.82 dBm	Auto Tune
Log 15.0	1				Center Freq
5.00					5.015000000 GHz
-5.00				-15.21 dBm	
-25.0					Start Freq
-35.0		3		∮ 5	30.000000 MHz
-45.0			ni a bilanda ka ka shi ili bila pisasa ki ka ka sa s		Stop Freq
-65.0					10.000000000 GHz
Start 30 MHz				Otors 10 000 Otto	
#Res BW 1.0 MHz	#VBN	3.0 MHz	Sweep 1	Stop 10.000 GHz 8.7 ms (40001 pts)	CF Step 997.000000 MHz
MKR MODE TRC SCL	× 2.480 13 GHz (Δ)	Y FUNC 5.84 dBm	TION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	2.480 13 GH2 (Δ) 7.084 52 GHz 5.687 98 GHz (Δ)	-37.12 dBm -37.75 dBm			Ener Offert
4 N 1 f 5 N 1 f	7.449 42 GHz 8.288 65 GHz	-37.97 dBm -38.82 dBm			Freq Offset 0 Hz
6	0.200 00 0112	00.02 ubm			
8					
10					
12			0.000		
MSG			STATUS	5	



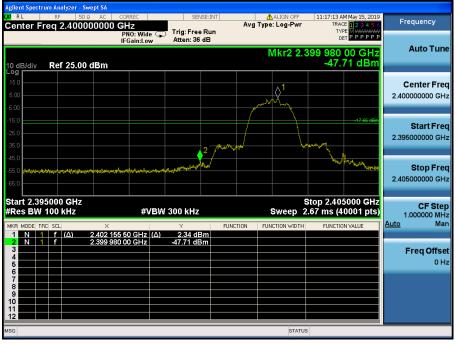
<u>Highest Channel & Modulation : π/4DQPSK</u>

XI RL		οΩ AC CC 00000000	PNO: Fast	Trig: Fr		Avg	ALIGN OFF Type: Log-Pwr	TRAC	M May 15, 2019 E 123456 E M WWWWWW	Frequency
10 dB/div	Ref 25.0		-Gain:Low	Atten: 3	6 ab		Mkr3	20.902 0		Auto Tune
Log 15.0 5.00										Center Free 17.500000000 GH:
-15.0 -25.0 -35.0	- Look at the second	ويعدي ويورد ويحدونه ويوال المحدود							-15.21 dBm	Start Free 10.000000000 GH
-45.0 -55.0 -65.0										Stop Fre 25.000000000 GH
Start 10.0 #Res BW			#VE	3W 3.0 MH	z		Sweep	Stop 25 40.0 ms (4	.000 GHz 0001 pts)	CF Ste 1.500000000 GH
MKR MODE TH 1 N 1 2 N 1 3 N 1 4		21.424 7	75 GHz (<i>i</i> 50 GHz 00 GHz (<i>i</i>	-28.43 (Bm	FUNCTION	FUNCTION WIDTH	H FUNCTIO	N VALUE	Auto Ma Freq Offse 0 H
7 8 9 10 11										
ISG							STAT	US		



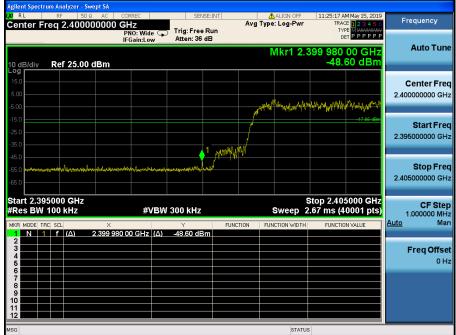
Low Band-edge

Lowest Channel & Modulation : 8DPSK



Low Band-edge

Hopping mode & Modulation : 8DPSK





Lowest Channel & Modulation : 8DPSK

^a RL	req 15.004				ALIGN OFF	11:17:35 AM May 15, 2019 TRACE 1 2 3 4 5 6 TYPE MUMUMUM	Frequency
10 dB/div	Ref 25.00	IFGair				0et P P P P P Vikr1 304.4 kHz -50.30 dBm	Auto Tune
- og 15.00 -5.00							Center Free 15.004500 MH
-15.0						-17.86 dBn	Start Free 9.000 kH
45.0 + -55.0 + -65.0		haddy the state of	an anipi an a dagini king saya anin a anipi	nin sehelen unser Minister Al	anatrabiji dogi ngangti Abbya nigatinga	a tenanomina keteridari randra talar na adalar	Stop Fre 30.000000 M⊦
Start 9 kH Res BW			#VBW 300 kHz		Sweep 5	Stop 30.00 MHz .33 ms (40001 pts)	2.999100 MF
MKR MODE TR 1 N 1 2 3 4 5	ic scl f (∆)	× 304.4 k	(Hz (Δ) -50.30 dB	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	Auto Ma Freq Offse 0 H
6 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2							
11 12	screen77.png	1> saved			STATUS	DC Coupled	

Agilent Spectrum Analyzer - Sw					
₩ RL RF 50 Ω Center Freq 5.01500		SENSE:INT	ALIGN OFF Avg Type: Log-Pwr	11:17:59 AM May 15, 2019 TRACE 2 3 4 5 6	Frequency
	PNO: Fast 🖵 IFGain:Low	Trig: Free Run Atten: 36 dB		TYPE WWWWWW DET PPPPP	Auto Tune
10 dB/div Ref 25.00	dBm		Mkr	5 8.230 08 GHz -39.20 dBm	Auto Tun
15.0 5.00	1				Center Free 5.015000000 GH:
-15.0	<u>↓</u> 4 <u>↓</u> 2 <u>↓</u> 3	معلمه المراجع والمعاري والمعاري والمعاري والمعاري والمعاري والمعاري والمعاري والمعاري والمعار والمعار		-17.66 dBm	Start Free 30.000000 MH
-45.0 -65.0					Stop Free 10.000000000 GH
Start 30 MHz #Res BW 1.0 MHz	#VBW	3.0 MHz	Sweep 1	Stop 10.000 GHz 8.7 ms (40001 pts)	CF Step 997.000000 MH Auto Mai
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	2.402 36 GHz (Δ) 3.054 40 GHz 3.302 65 GHz (Δ) 2.669 56 GHz 8.230 08 GHz	2.72 dBm -38.61 dBm -38.74 dBm -39.13 dBm -39.20 dBm			Freq Offse 0 Hi
7 8 9 10 11					
MSG			STATUS	()	



Lowest Channel & Modulation : 8DPSK

Agilent Spectrum Analyzer - Sv	Vept SA	SENSE:INT	ALIGN OFF	11:18:22 AM May 15, 2019	
Center Freq 17.500			Avg Type: Log-Pwr	TRACE 1 2 3 4 5 6 TYPE	Frequency
10 dB/div Ref 25.00	IFGain:Low	Atten: 36 dB	Mkr3 2	^{рет} РРРРРР 21.540 625 GHz -27.87 dBm	Auto Tune
Log 15.0 5.00					Center Freq 17.500000000 GHz
-15.0 -25.0 -35.0				-17.69 dB	Start Fred 10.000000000 GHz
-45.0 -55.0 -65.0					Stop Fred 25.000000000 GHz
Start 10.000 GHz #Res BW 1.0 MHz	#VE	3W 3.0 MHz	Sweep 4	Stop 25.000 GHz 0.0 ms (40001 pts)	CF Step 1.50000000 GH:
MKR MODE TRC SCL	× 24.889 750 GHz(∆) -25.02 dBm	UNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Mar
2 N 1 f 3 N 1 f (Δ) 4 5	24.187 000 GHz 21.540 625 GHz (/	-25.56 dBm Δ) -27.87 dBm			Freq Offset 0 Hz
6 7 8 9 10					
12 MSG			STATUS	5	

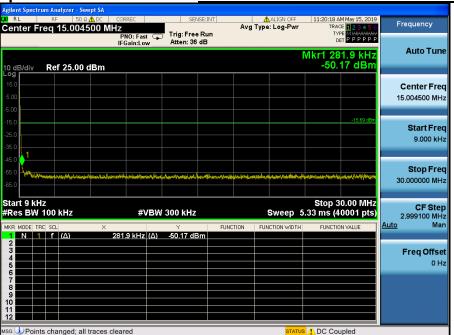


Reference for limit

Middle Channel & Modulation : 8DPSK



Conducted Spurious Emissions <u>Middle Channel & Modulation : 8DPSK</u>





Middle Channel & Modulation : 8DPSK

RL RF S Center Freq 5.015	0 Ω AC CORREC 0000000 GHz PNO: Fast	SENSE:IN	Avg Type	ALIGN OFF : Log-Pwr	11:20:41 AM May 15, 201 TRACE 1 2 3 4 5 TYPE MWWWWW DET P P P P P	Frequency
0 dB/div Ref 25.0	IFGain:Low 0 dBm	Atten: 36 dB		Mkr	5 9.414 01 GHz -39.50 dBm	Auto Tune
5.00	1 					Center Fre 5.015000000 GH
5.0				2	-15.69 dBn	Start Fre 30.000000 MH
15.0 55.0						Stop Fre 10.000000000 GH
tart 30 MHz Res BW 1.0 MHz	#VI	3W 3.0 MHz		Sweep 1	Stop 10.000 GHz 8.7 ms (40001 pts	997.000000 MH
IN 1 F (Δ) 1 N 1 f (Δ) 2 N 1 f (Δ) 3 N 1 f (Δ) 4 N 1 f 5 N 1 f 1 f	× 2.441 00 GHz(6.955 66 GHz(3.282 46 GHz(2.666 07 GHz 9.414 01 GHz	-37.67 dBm	FUNCTION FUN	ICTION WIDTH	FUNCTION VALUE	Auto Ma FreqOffse 0⊦
6 7 8 9 0 1						
2 2				STATUS		

KIRL	rum Analyzer - S RF 50		RREC	SENS	EINT	ALIGN OFF	11:21:05 AM	May 15, 2019	
Center F	req 17.50	0000000			A [.] Run	vg Type: Log-Pwr	TRACE	123456 MWWWWW PPPPPP	Frequency
10 dB/div	Ref 25.00		Guill.Low		_	Mkr3	21.421 37 -28.5	75 GHz 2 dBm	Auto Tune
- og 15.00 5.00									Center Fred 17.500000000 GH;
-15.0 -25.0 -35.0	ور ورو المراجع الم							-15.69 dBn	Start Free 10.000000000 GH
-45.0 -55.0 -65.0									Stop Fre 25.000000000 GH
Start 10.0 #Res BW	1.0 MHz	X	#VBV	/ 3.0 MHz	FUNCTION	Sweep	Stop 25. 40.0 ms (40	001 pts)	CF Stej 1.500000000 GH Auto Ma
1 N 1 2 N 1 3 N 1 4 5		24.889 37 24.226 75	/5 GHz (Δ) 50 GHz /5 GHz (Δ)	-24.49 dBr -25.38 dBr -28.52 dBr	n n	PONCTION WIDT	n ronction	VALUE	Freq Offse
6 7 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9									
11 12						STAT			



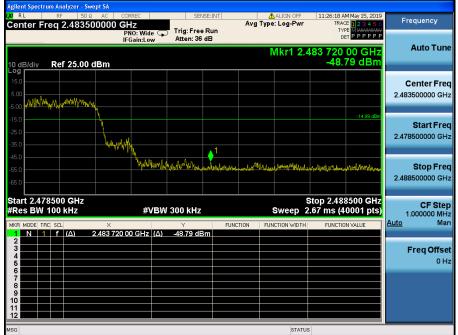
High Band-edge

Highest Channel & Modulation : 8DPSK



High Band-edge

Hopping mode & Modulation : 8DPSK





Highest Channel & Modulation : 8DPSK

LXI RL	um Analyzer - Sv RF 50 1 reg 15.004	2 \Lambda DC 🕴 CORF	EC	SENS	E:INT		ALIGN OFF		M May 15, 2019 E 1 2 3 4 5 6	Frequency
10 dB/div	Ref 25.00	PN IFG:	0: Fast ⊊ ain:Low	Trig: Free Atten: 36 o				Mkr1 28	E MWWWWW T P P P P P P	Auto Tun
Log 15.0 5.00										Center Fre 15.004500 MH
-15.0 -25.0 -35.0									-14.99 dBm	Start Fre 9.000 kH
-45.0 -55.0 -65.0	unitered densignation of	higenessisterstation	ارور والماري (مريان	بىدىنەيلەردەر يەرىكەر كەرىكەر	ing the second states of the	ndmaddliddayntferio		let. Mediterst. Me	wykiene Autorali	Stop Free 30.000000 MH
Start 9 kH #Res BW	100 kHz	X	#VBV	V 300 kHz	FUNC		Sweep 5	Stop 3 .33 ms (4		CF Stej 2.999100 MH <u>Auto</u> Ma
1 N 1 2 3 4 5	f (Δ)	281.9	kHz (Δ)	-49.83 dBr	n					Freq Offse 0 H
6 7 8 9 10 11										
MSG 🗘 File •	<screen77.png< td=""><td>]> saved</td><td></td><td></td><td></td><td></td><td>STATUS</td><td>DC Cou</td><td>pled</td><td></td></screen77.png<>]> saved					STATUS	DC Cou	pled	

RL	um Analyzer - S RF 50	Ω AC CO	RREC	SENS	EINT		LIGN OFF		M May 15, 2019	Frequency
Center Fi	req 5.015(IZ NO: Fast ⊂	Trig: Free F	Run	Avg Type:	Log-Pwr	TRAC TYP	E 123456 E M WAWAAA	Frequency
		IF:	Gain:Low	Atten: 36 d				DE	PPPPP	Auto Tun
							Mkr	5 2.704	20 GHz	Auto Tun
0 dB/div	Ref 25.00	dBm						-37.5	91 dBm	
15.0		<u></u> 1								Center Fre
5.00		\ \ \								5.015000000 GH
5.00										
15.0									-14.99 dBm	
25.0					~)			Start Fre 30.000000 MH
35.0		∮ ⁵				$ \downarrow^2$		♦ ⁴		30.000000 MH
45.0	terror or testingent		and the second distance		Contract of the second se				(propartition) pro-	
55.0										Stop Fre
65.0										10.00000000 GH
								8 4 40		
itart 30 N Res BW			#\/B\A	/ 3.0 MHz		s	ween 1		.000 GHz 0001 pts)	CF Ste
IKRI MODE TR		×		Y	FUNCT		TION WIDTH	FUNCTIO		997.000000 MH Auto Ma
1 N 1	f (Δ)	2.479 8	8 GHz (Δ)	5.69 dBr	n			Tonicho	TALOC	
2 N 1 3 N 1	f f (Δ)	6.936 9 5 665 0	7 GHz 4 GHz (Δ)	-37.27 dBr -37.73 dBr	n					Freq Offse
4 N 1 5 N 1	f	8.164 7 2.704 2	7 GHz	-37.82 dBr -37.91 dBr	n					0 H
6		2.704 2	UGHZ	-37.91 dBr	1					
7 8										
9										
11										
12						ļ				
G							STATUS			



Highest Channel & Modulation : 8DPSK

Agilent Spectrum Analyzer - S X/ RL RF 50	wept SA Ω AC CORREC	SENSE:INT	ALIGN OFF	11:23:41 AM May 15, 2019	
Center Freq 17.50		Trig: Free Run	Avg Type: Log-Pwr	TRACE 123456	Frequency
10 dB/div Ref 25.00	IFGain:Low	Atten: 36 dB	Mkr3 :	_{Det} РРРРРР 21.482 875 GHz -28.13 dBm	Auto Tune
15.0 5.00 -5.00					Center Freq 17.500000000 GHz
-15.0 -25.0 -35.0			3	-14.99 dBm	Start Freq 10.000000000 GHz
-45.0 -55.0 -65.0					Stop Freq 25.000000000 GHz
Start 10.000 GHz #Res BW 1.0 MHz	#VB\	N 3.0 MHz	Sweep 4	Stop 25.000 GHz 0.0 ms (40001 pts)	CF Step 1.50000000 GHz
MKR MODE TRC SCL 1 N 1 f (Δ) 2 N 1 f	× 24.804 250 GHz (Δ) 24.165 250 GHz		INCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Mar
3 N 1 f (Δ) 4 5 6	21.482 875 GHz (Δ)	-28.13 dBm			Freq Offset 0 Hz
7 8 9 10					
11 12 MSG			STATUS		
			314100		



8. Transmitter AC Power Line Conducted Emission

8.1 Test Setup

See test photographs for the actual connections between EUT and support equipment.

8.2 Limit

According to §15.207(a) for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 uH/50 ohm line impedance stabilization network (LISN).

Compliance with the provision of this paragraph shall on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower applies at the boundary between the frequency ranges.

	Conducted Limit (dBuV)					
Frequency Range (MHz)	Quasi-Peak	Average				
0.15 ~ 0.5	66 to 56 *	56 to 46 *				
0.5 ~ 5	56	46				
5 ~ 30	60	50				

* Decreases with the logarithm of the frequency

8.3 Test Procedures

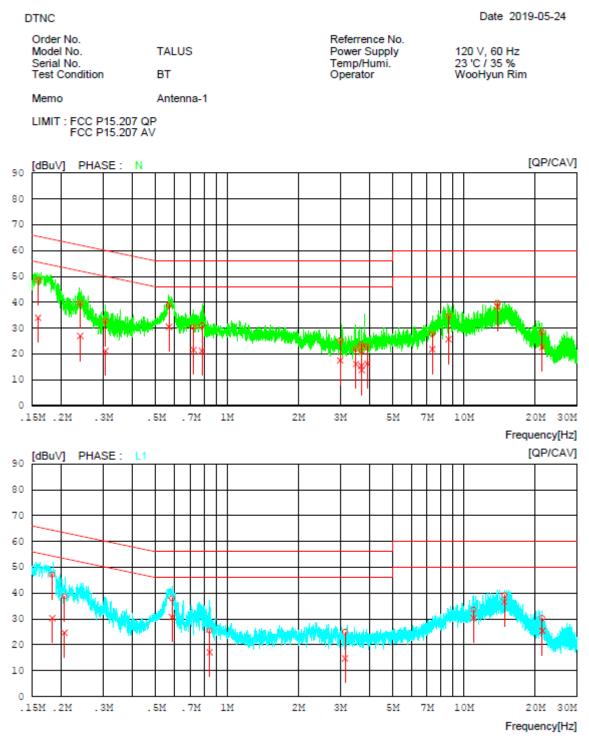
Conducted emissions from the EUT were measured according to the ANSI C63.10.

- The test procedure is performed in a 6.5 m × 3.5 m × 3.5 m (L × W × H) shielded room. The EUT along with its peripherals were placed on a 1.0 m (W) × 1.5 m (L) and 0.8 m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.
- 2. The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room.
- 3. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.
- 4. The excess power cable between the EUT and the LISN was bundled. The power cables of peripherals were unbundled. All connecting cables of EUT and peripherals were moved to find the maximum emission.

8.4 Test Results

AC Line Conducted Emissions (Graph) = Modulation : <u>GFSK</u> Antenna 1

Results of Conducted Emission



DTNC

AC Line Conducted Emissions (List) = Modulation : <u>GFSK</u> Antenna 1

Results of Conducted Emission

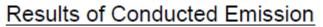
Date 2019-05-24

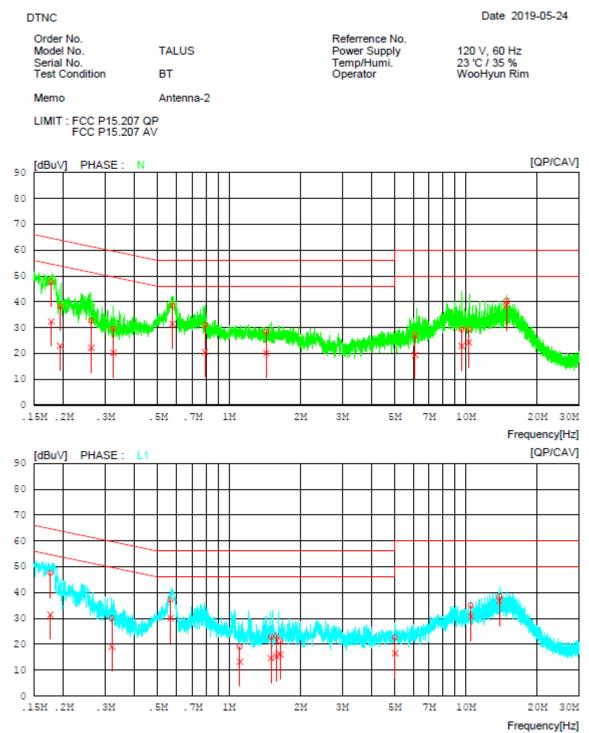
Order No. Model No. Serial No. Test Condition	TALUS BT	Referrence No. Power Supply Temp/Humi. Operator	120 V, 60 Hz 23 'C / 35 % WooHyun Rim
Memo	Antenna-1		

LIMIT : FCC P15.207 QP FCC P15.207 AV

NC	FREQ	READING QP CAV [dBuV] [dBuV		RESULT QP CAV [dBuV] [dBuV	QP	MIT CAV][dBuV	MARGIN QP CAV] [dBuV][dBuV]	phase
1	0.15928	38.6524.11	9.94	48.5934.05	65.50	55.50	16.9121.45	N
2	0.24009	29.7617.07	9.94	39.7027.01	62.09	52.09	22.3925.08	N
3	0.30658	22.7311.20	9.94	32.67 21.14	60.06	50.06	27.3928.92	N
4	0.56815	28.97 20.57	9.95	38.92 30.52	56.00	46.00	17.0815.48	N
5	0.72231	20.5111.63	9.97	30.4821.60	56.00	46.00	25.5224.40	N
6	0.78325	21.0211.26	9.97	30.9921.23	56.00	46.00	25.0124.77	N
7	3.00560	15.16 7.42	10.07	25.2317.49	56.00	46.00	30.7728.51	N
8	3.50160	12.00 6.04	10.10	22.10 16.14	56.00	46.00	33.90 29.86	N
9	3.68880	13.71 5.30	10.10	23.8115.40	56.00	46.00	32.19 30.60	N
10	3.70440	11.01 3.66	10.10	21.1113.76	56.00	46.00	34.8932.24	N
11	3.90720	12.81 6.14	10.12	22.9316.26	56.00	46.00	33.07 29.74	N
12	7.35560	17.4711.61	10.24	27.7121.85	60.00	50.00	32.2928.15	N
13	8.63040	24.3415.43	10.29	34.6325.72	60.00	50.00	25.37 24.28	N
14	13.85400	29.3327.80	10.46	39.7938.26	60.00	50.00	20.2111.74	N
15	21.42040	17.80 12.17	10.58	28.38 22.75	60.00	50.00	31.62 27.25	N
16	0.18284	37.22 20.25	9.94	47.1630.19	64.36	54.36	17.20 24.17	L1
17	0.20585	28.7414.68	9.94	38.6824.62	63.37	53.37	24.6928.75	L1
18	0.58543	27.9720.71	9.95	37.92 30.66	56.00	46.00	18.0815.34	L1
19	0.84418	15.58 7.14	9.96	25.5417.10	56.00	46.00	30.4628.90	L1
20	3.15040	14.85 4.65	10.06	24.9114.71	56.00	46.00	31.0931.29	L1
21		23.17 20.01	10.36	33.53 30.37	60.00	50.00	26.4719.63	L1
22	14.83520	28.77 26.13	10.46	39.2336.59	60.00	50.00	20.7713.41	L1
23	21.41560	19.7714.83	10.56	30.3325.39	60.00	50.00	29.6724.61	L1

AC Line Conducted Emissions (Graph) = Modulation : <u>GFSK</u> Antenna 2





DTNC

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AC Line Conducted Emissions (List) = Modulation : <u>GFSK</u> Antenna 2

Results of Conducted Emission

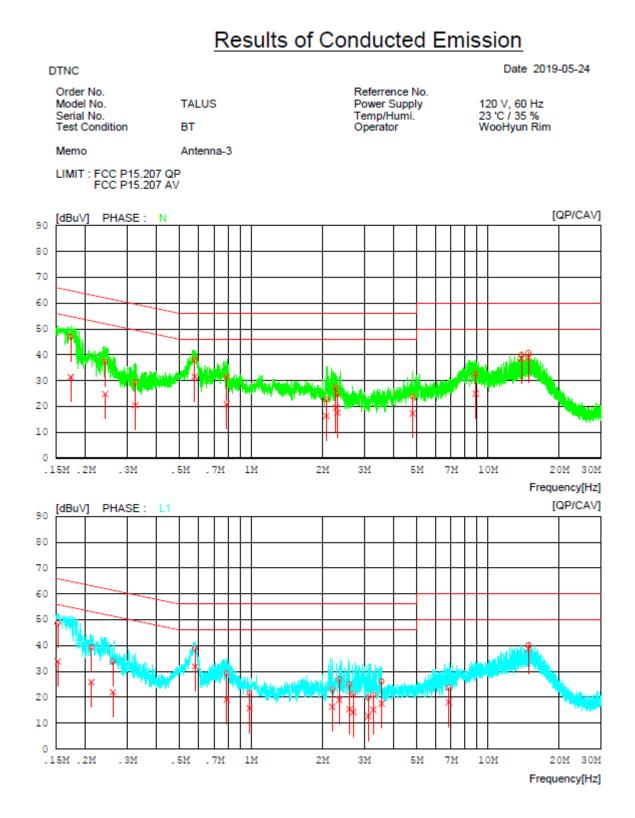
Date 2019-05-24

Order No. Model No. Serial No. Test Condition	TALUS BT	Referrence No. Power Supply Temp/Humi. Operator	120 V, 60 Hz 23 'C / 35 % WooHyun Rim	
Memo	Antenna-2			

LIMIT : FCC P15.207 QP FCC P15.207 AV

NC	FREQ [MHz]	READING QP CAV [dBuV][dBuV		QP CAV	QP	CAV	MARGIN QP CAV [dBuV][dBuV	
1	0.17772	37.64 22.45	9.94	47.58 32.39	64.59	54.59	17.0122.20	Ν
2	0.19378	28.3913.03	9.94	38.3322.97	63.87	53.87	25.54 30.90	N
3	0.26192	22.7112.24	9.94	32.65 22.18	61.37	51.37	28.7229.19	N
4	0.32533	19.6410.36	9.94	29.58 20.30	59.57	49.57	29.9929.27	N
5	0.57726	28.5521.44	9.95	38.50 31.39	56.00	46.00	17.5014.61	N
6	0.79222	21.0210.60	9.97	30.9920.57	56.00	46.00	25.01 25.43	N
7	1.43620	18.4010.13	9.99	28.3920.12	56.00	46.00	27.61 25.88	N
8	6.09760	16.87 9.24	10.20	27.0719.44	60.00	50.00	32.93 30.56	N
9	9.61220	18.90 12.57	10.32	29.22 22.89	60.00	50.00	30.7827.11	N
10	10.29440	19.0213.92	10.35	29.37 24.27	60.00	50.00	30.6325.73	N
11	14.83720	29.9328.09	10.49	40.4238.58	60.00	50.00	19.5811.42	N
12	0.17604	37.6521.41	9.94	47.5931.35	64.67	54.67	17.0823.32	L1
13	0.31986	20.06 9.02	9.94	30.0018.96	59.71	49.71	29.71 30.75	L1
14	0.56650	27.2220.14	9.95	37.17 30.09	56.00	46.00	18.8315.91	L1
15	1.11220	9.11 3.20	9.97	19.0813.17	56.00	46.00	36.9232.83	L1
16	1.50340	12.81 4.60	10.01	22.8214.61	56.00	46.00	33.18 31.39	L1
17	1.58640	13.12 5.38	10.01	23.1315.39	56.00	46.00	32.87 30.61	L1
18	1.64400	11.18 6.03	10.01	21.1916.04	56.00	46.00	34.8129.96	L1
19	5.02020	12.42 6.27	10.16	22.5816.43	60.00	50.00	37.42 33.57	L1
20	10.48640	24.6220.45	10.35	34.97 30.80	60.00	50.00	25.0319.20	L1
21	13.85760	28.0426.34	10.43	38.47 36.77	60.00	50.00	21.5313.23	L1

AC Line Conducted Emissions (Graph) = Modulation : <u>GFSK</u> Antenna 3



AC Line Conducted Emissions (List) = Modulation : <u>GFSK</u> Antenna 3

Results of Conducted Emission

DTNC

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Order No. Model No. TAI Serial No. Test Condition BT

TALUS BT Referrence No. Power Supply Temp/Humi. Operator

120 V, 60 Hz 23 'C / 35 % WooHyun Rim

Date 2019-05-24

Memo Antenna-3 LIMIT : FCC P15.207 QP FCC P15.207 AV

NC	FREQ	READING QP CAV [dBuV] [dBuV		QP CAV	-		v
1	0.17323	36.9921.52	9.94	46.9331.46	64.80 54.	80 17.87 23.34	N
2	0.24174	27.50 14.87	9.94	37.4424.81	62.04 52.	04 24.60 27.23	8 N
3	0.32470	19.54 10.62	9.94	29.48 20.56	59.59 49.	59 30.11 29.03	8 N
4	0.57795	28.14 21.63	9.95	38.0931.58	56.00 46.	00 17.9114.42	N
5	0.78862	21.6310.90	9.97	31.60 20.87	56.00 46.	00 24.40 25.13	8 N
6	2.07720	12.67 6.32	10.03	22.7016.35	56.00 46.	00 33.30 29.65	o N
7	2.28360	17.36 9.61	10.05	27.4119.66	56.00 46.	00 28.5926.34	N
8	2.31600	14.68 7.50	10.05	24.7317.55	56.00 46.	00 31.27 28.45) N
9	4.81660	13.74 7.14	10.16	23.9017.30	56.00 46.	00 32.10 28.70) N
10	8.89020	22.2914.66	10.30	32.5924.96	60.00 50.	00 27.41 25.04	N
11	13.85500	29.47 28.08	10.46	39.9338.54	60.00 50.	00 20.0711.46	N
12		30.2128.40		40.70 38.89	60.00 50.	00 19.3011.11	. N
13	0.15261	38.7223.78	9.94	48.6633.72	65.86 55.	86 17.20 22.14	L1
14		29.37 15.88		39.3125.82		13 23.8227.31	
15		23.8311.93				40 27.63 29.53	
16		28.8321.84		38.78 31.79			
17		19.14 9.17				00 26.90 26.87	
18		11.67 5.69	9.97			00 34.3630.34	
19	2.20240		10.03	22.9516.24		00 33.0529.76	
20	2.36160		10.04	26.9218.96		00 29.08 27.04	
21	2.60440		10.04			00 30.98 30.63	
22	2.70160		10.04	21.34 14.19			
23						00 36.1933.34	
24			10.08			00 35.18 30.91	
25	3.56240		10.09	26.0617.53			
26		13.47 7.82	10.22	23.6918.04		00 36.3131.96	
27	14.83800	29.7328.19	10.46	40.1938.65	60.00 50.	00 19.8111.35	5 L1

TRF-RF-237(05)180118



9. Antenna Requirement

Describe how the EUT complies with the requirement that either its antenna is permanently attached, or that it employs a unique antenna connector, for every antenna proposed for use with the EUT.

Conclusion: Comply

The external antenna empplys a unique antenna connector.

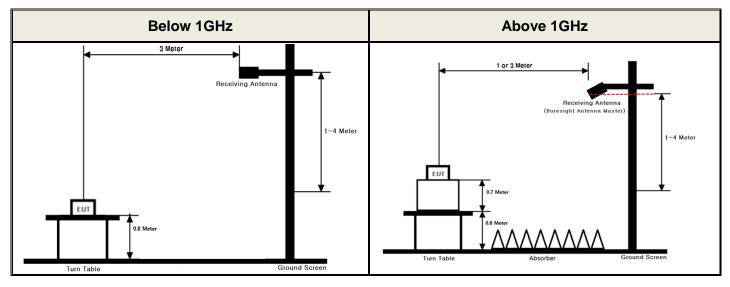
- Minimum Standard :

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions.

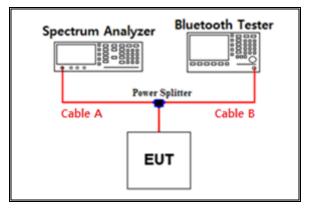
APPENDIX I

Test set up diagrams

Radiated Measurement



Conducted Measurement



Path loss information

Frequency (GHz)	Path Loss (dB)	Frequency (GHz)	Path Loss (dB)
0.03	6.63	15	10.84
1	6.89	20	11.81
2.402 & 2.441 & 2.480	7.65	25	12.10
5	8.18	-	-
10	9.14	-	-

Note 1 : The path loss from EUT to Spectrum analyzer were measured and used for test. Path loss (S/A's Correction factor) = Cable A + Power splitter



Detector Mode : PK

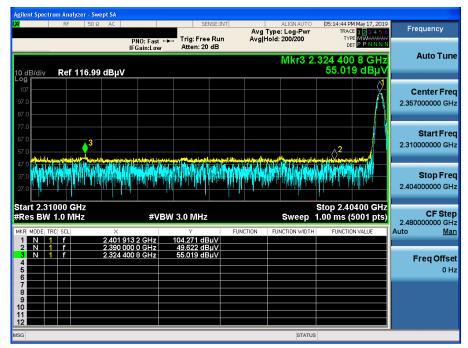
Detector Mode : PK

APPENDIX II

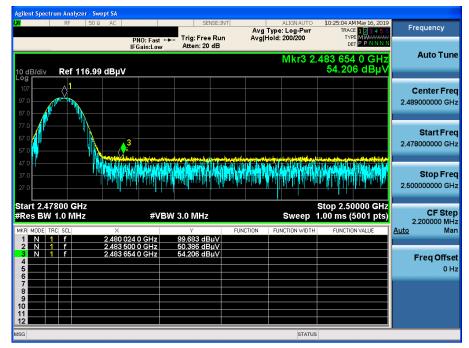
Unwanted Emissions (Radiated) Test Plot

Antenna 1

GFSK & Lowest & Z & Ver



GFSK & Highest & Z & Ver





Detector Mode : PK

$\pi/4DQPSK$ & Lowest & Z & Ver

Agilent Spectrum Analyzer - Swept SA				
LXI RF 50 Ω AC	SENSE	EINT ALIGN Avg Type: Log	IAUTO 05:16:30 PM May 17, -Pwr TRACE 123	456 Frequency
	PNO: Fast +++ Trig: Free R IFGain:Low Atten: 20 df			ALALAL
10 dB/div Ref 116.99 dBµV		Mk	r3 2.324 288 0 G 53.511 dB	
107 97.0 67.0				Center Freq 2.357000000 GHz
77.0 67.0 57.0 57.0	k dina yang santikatik bilatingkain sasar di	eta star la constante de la cons	2 2	Start Freq 2.310000000 GHz
47.0 37.0 27.0				Stop Freq 2.404000000 GHz
Start 2.31000 GHz #Res BW 1.0 MHz	#VBW 3.0 MHz		Stop 2.40400 C eep 1.00 ms (5001 p	ots) CF Step 2.480000000 GHz
MKR MODE TRC SCL X	913 2 GHz 98.000 dBu	FUNCTION FUNCTION	WIDTH FUNCTION VALUE	Auto <u>Man</u>
2 N 1 f 2.390 0	000 0 GHz 48.854 dBµ\ 288 0 GHz 53.511 dBµ\	/		Freq Offset
6 7 8 9 10				
MSG			STATUS	

Detector Mode : PK

$\pi/4DQPSK$ & Highest & Z & Ver

Agilent Spectrum Analyzer - Swept SA							
LX/ RF 50 Ω AC		SENSE:INT	Avg Type	ALIGNAUTO E: Log-Pwr		May 16, 2019	Frequency
	PNO: Fast +++ IFGain:Low	Trig: Free Run Atten: 14 dB	Avg Hold		TYPE	MWWWWWW PPNNNN	
	IFGalli.Low	TRACENCE IN ALL		Mkr3 2.	483 544	0 GHz	Auto Tune
10 dB/div Ref 110.00 dBµV						dBµV	
Log 1							Center Freq
90.0							2.489000000 GHz
80.0							
70.0							Start Freq
60.0							2.478000000 GHz
50.0	and the second	an aisin an an air differan Is Is an air dir an air differan	al ability all in the	a built stids a the	a har the state of the	al Ni val 1 kud	
40.0							Stop Freq
20.0	be der breville i	un di adad	Lee with the				2.500000000 GHz
Start 2.47800 GHz #Res BW 1.0 MHz	#VBW 3	MH7		Sweep 1	Stop 2.50 I.00 ms (5	000 GHz	CF Step
MKR MODE TRC SCL X	*** * **	Y	FUNCTION FU	NCTION WIDTH	FUNCTION		2.480000000 GHz Auto Man
1 N 1 f 2.480 0		01.010 dBµV			, one not	- THEOR	
3 N 1 f 2.483 5		52.954 dBµV					Freq Offset
5							0 Hz
6 7							
8							
10							
12							
MSG				STATUS			

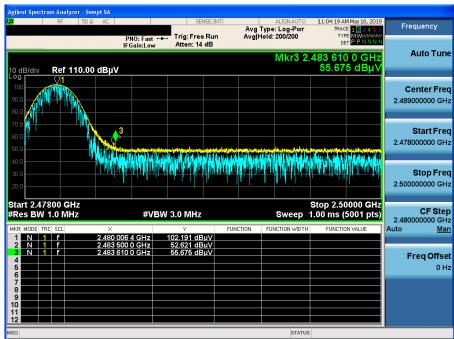


8DPSK & Lowest & Z & Ver

Agilent Spectrum Analyzer - Swept SA	
UX RF 50 Ω AC SENSE:INT ALIGN AUTO 05:18:53 PM May 17, 2019 Avg Type: Log-Pwr TRACE	Frequency
PN0: Fast Trig: Free Run Avg Hold: 200/200 TVPE	
IFGain:Low Atten. 20 db	Auto Tune
Мkr3 2.324 551 2 GHz 10 dB/div Ref 116.99 dBuV 53.271 dBµV	
10 dB/div Ref 116.99 dBµV 53.2/1 dBµV	
107	Center Freq
97.0	357000000 GHz
87.0	
	Stort From
	Start Freq 31000000 GHz
	510000000 GH2
	Stop Freq
27.0	404000000 GHz
Start 2.31000 GHz Stop 2.40400 GHz	
#Res BW 1.0 MHz #VBW 3.0 MHz Sween 1.00 ms (5001 nts)	CF Step
2,4 MKR MODE TRC SCL X Y FUNCTION VIDTH FUNCTION VALUE Auto	480000000 GHz Man
1 N 1 f 2.401 913 2 GHz 98.286 dBµV	<u>Iviari</u>
2 N 1 f 2.390 000 0 GHz 49.708 dBμV 49.708 dBμV -3 N 1 f 2.324 551 2 GHz 53.271 dBμV 53.271 dBμV <td>-</td>	-
	Freq Offset
	0 Hz
MSG STATUS	

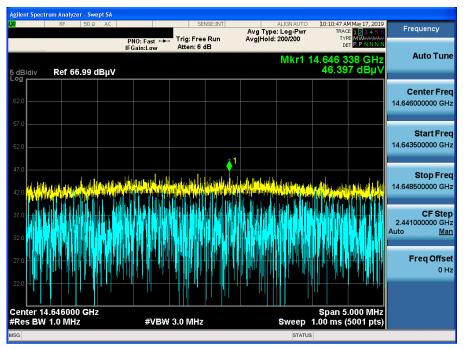
Detector Mode : PK

8DPSK & Highest & Z & Ver

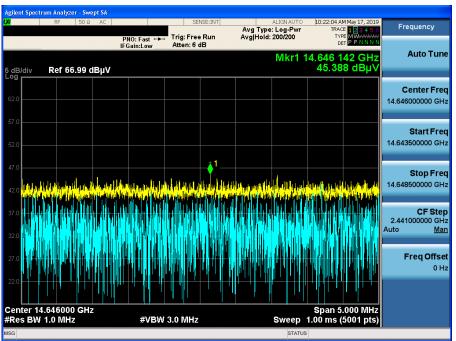




GFSK & Middle & X & Hor

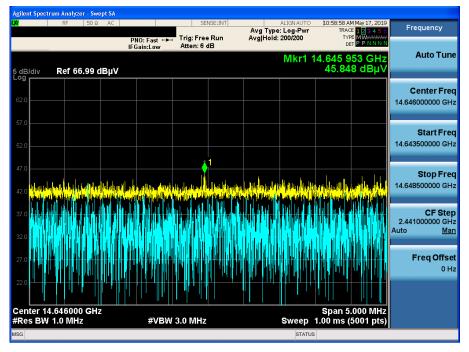


π /4DQPSK & Middle & X & Hor





8DPSK & Middle & X & Hor





GFSK & Lowest & Z & Ver

Detector Mode : PK

Antenna 2

gilent Spectrum Analyzer - Swept SA Frequency Avg Type: Log-Pwr Avg|Hold: 200/200 Trig: Free Run Atten: 20 dB PNO: Fast ← IFGain:Low DE Auto Tune Mkr3 2.323 761 6 GH 54.284 dBµ Ref 116.99 dBµV 0 dB/div **Center Freq** 2.357000000 GHz Start Freq 2.31000000 GHz ∂² Stop Freq . N. 2.404000000 GHz Stop 2.40400 GHz 1.00 ms (5001 pts) CF Step 2.48000000 GHz Auto Start 2.31000 GHz #Res BW 1.0 MHz #VBW 3.0 MHz Sweep Freq Offset 0 Hz STATUS

Detector Mode : PK

GFSK & Highest & Z & Ver





$\pi/4DQPSK$ & Lowest & Z & Ver

Agilent Spectrum Analyzer - Swept SA						
LXI RF 50 Ω AC		SENSE:INT Ava T	ALIGNAUTO vpe: Log-Pwr	04:59:58 PM TRACE	May 17, 2019	Frequency
	PNO: Fast +++ Trig: Fr IFGain:Low Atten: :	eeRun AvgH	old: 200/200	TYPE	PPNNN	
	IFGail.20W Fictoria		Mkr3 2	324 758	0 GHz	Auto Tune
10 dB/div Ref 116.99 dBµV	,			53.060		
Log 107						Center Freq
97.0					<u>X</u> _	2.357000000 GHz
87.0					<u></u>	
77.0						Start Freq
67.0				. 2		2.310000000 GHz
57.0	and water to be such that we are a second		والمام ومراجع المراجع والم		and the	
47.0 37.0			n Miltin I			Stop Freq
27.0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		in teallable a settion a	and a state of the	TROMUT		2.404000000 GHz
					·	
Start 2.31000 GHz #Res BW 1.0 MHz	#VBW 3.0 MH	7	Sweep '	Stop 2.404 1.00 ms (5	100 GHz	CF Step
MKR MODE TRC SCL X	#VDW 3.0 WIT	FUNCTION	FUNCTION WIDTH	FUNCTION		2.480000000 GHz Auto Man
1 N 1 f 2.402 1	157 6 GHz 96.569 d	dBμV	PONCTION WIDTH	FONCTION	VALUE	Auto <u>Mari</u>
	000 0 GHz 50.650 0 758 0 GHz 53.060 0					Freq Offset
4 5						0 Hz
6						
8						
10						
12						
MSG			STATUS			

Detector Mode : PK

$\pi/4DQPSK$ & Highest & Z & Ver

Agilent Spectrum Analyzer - Swept SA					
LXI RF 50 Ω AC			ALIGNAUTO	05:03:07 PM May 17, 2019 TRACE 123456	Frequency
	PNO: Fast +++ Trig: Fi IFGain:Low Atten:		g Hold: 200/200	DET P P N N N N	
			Mkr3 2.	483 610 0 GHz	Auto Tune
10 dB/div Ref 116.99 dBµV	1			54.446 dBµV	
107					Center Freq
97.0					2.489000000 GHz
87.0					
77.0					Start Freq
67.0 67.0	3				2.478000000 GHz
47.0	and a single state of the last last		den stille af source of its to juste affaire a fille a dat its britter		
37.0				n a de _{de} nte a la deser	Stop Freq
27.0		<u>, i thu kit</u>	<u>, l'enne a la la la</u>	<u>l la clibu i c c u dell</u>	2.50000000 GHz
Start 2.47800 GHz				Stop 2.50000 GHz	
#Res BW 1.0 MHz	#VBW 3.0 MH	z	Sweep 1	1.00 ms (5001 pts)	CF Step 2.48000000 GHz
MKR MODE TRC SCL X	812 8 GHz 98.873	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	Auto <u>Man</u>
2 N 1 f 2.483	500 0 GHz 50.791 610 0 GHz 54.446	dBµV			
4	6100 GHZ 54.446	αDμν			Freq Offset 0 Hz
6					0 Hz
7 8					
9 10 10					
11 12					
MSG			STATUS		

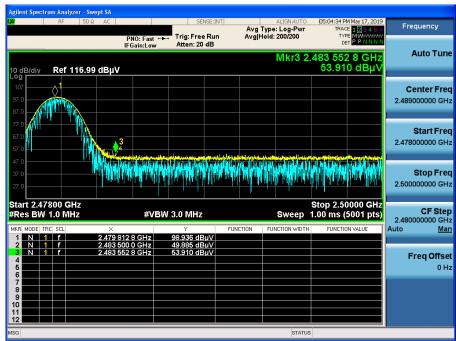


8DPSK & Lowest & Z & Ver

	um Analyzer - S									
L <u>XI</u>	RF 50	ΩAC		SET	JSE:INT	Avg Typ	ALIGN AUTO e: Log-Pwr		M May 17, 2019	Frequency
			PNO: Fast ← IFGain:Low	Trig: Free Atten: 20			1: 200/200	TY	PE MWAAAAAAA ET P P N N N N	
			IFGain:Low	Atten: 20	45		Mkr3.2	324 53	2 4 GHz	Auto Tune
10 dB/div	Ref 116.9	9 dBµV					WIKIO 2		6 dBµV	
107										Center Freq
97.0									-	2.357000000 GHz
87.0									<u> </u>	
77.0										Start Freq
67.0	3							<u>م2</u>		2.310000000 GHz
57.0	tata balaning milanon	1. Anno 1000	ور والدر و المار الم المار الم	he plantas firinda di	a sugar a sugar da sugar da	وفجوا وترجا والإنتاج	wayladwara	an and the states	the state of the	
37.0	h Nin Min	Man	n a hear	Her Hand Hand	hhan	H Minth	1 8 4th/A			Stop Freq
27.0	utan Tirkta dala	ti biztet.	and the day is	Muundela U	h L de da	<u>מויזיי איז איז</u>	l na de la compañía d	wir. Lifth		2.404000000 GHz
Start 2.31					<u> </u>			Stop 2 4	0400 GHz	
#Res BW			#VB	W 3.0 MHz			Sweep		5001 pts)	CF Step 2.48000000 GHz
MKR MODE TR	C SCL	Х		Y		CTION FL	JNCTION WIDTH	FUNCTI	ON VALUE	Auto <u>Man</u>
1 N 1 2 N 1	f		13 2 GHz 00 0 GHz	97.089 dB 51.518 dB						
3 N 1 4	f	2.324 5	32 4 GHz	52.746 dB	μV					Freq Offset
5										0 Hz
7										
9										
11										
12							STATUS			
							STATUS	,		

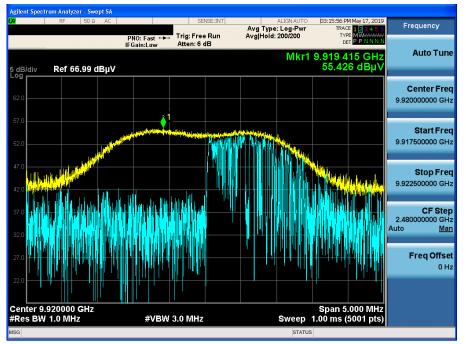
Detector Mode : PK

8DPSK & Highest & Z & Ver

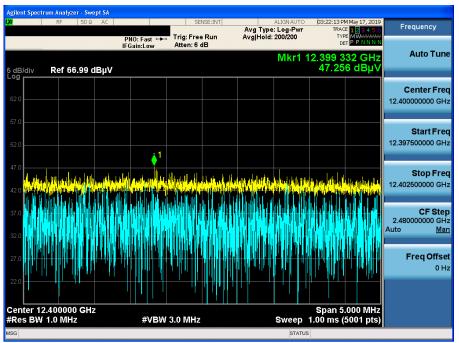




GFSK & Highest & Y & Hor

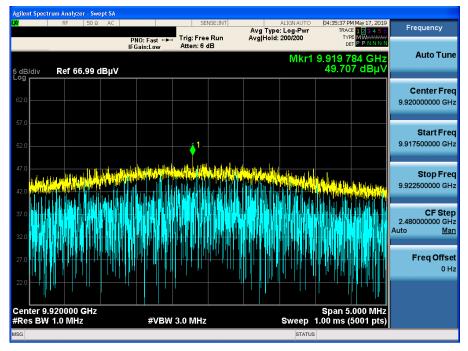


π /4DQPSK & Highest & Y & Hor





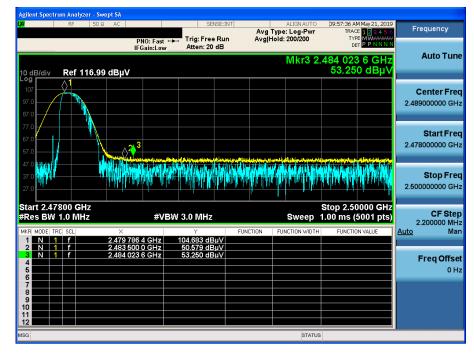
8DPSK & Highest & X & Ver



Antenna 3

GFSK & Lowest	& Z & V								Detec
Agneri ÇXI	RF	50Ω AC	IO: Fast ↔ iain:Low	SENSE: Trig: Free Ru Atten: 20 dB	Avg	ALIGN AUTO g Type: Log-Pwr Hold: 200/200		M May 17, 2019 26 1 2 3 4 5 6 PE MW MMMM ET P P N N N N	Frequency
10 dt	B/div Ref 1	16.99 dBµV				Mkr3 2		5 2 GHz 6 dBµV	Auto Tune
Log 107 97.0 87.0								Å	Center Freq 2.357000000 GHz
77.0 67.0 57.0		3 	and descriptions		n almiddiau (n airrig		2 		Start Freq 2.310000000 GHz
37.0 27.0						Marina		MM.	Stop Freq 2.404000000 GHz
#Re:	t 2.31000 GH s BW 1.0 MH	z	#VBW	3.0 MHz		Sweep	1.00 ms (0400 GHz 5001 pts)	CF Step 2.48000000 GHz
	MODE TRC SCL N 1 f N 1 f N 1 f N 1 f	× 2.401 913 2 2.390 000 0 2.324 175 2) GHz	Υ 101.950 dBμV 51.224 dBμV 54.346 dBμV	FUNCTION	FUNCTION WIDTH	FUNCTIO	ON VALUE	Auto <u>Man</u> Freq Offset 0 Hz
8 9 10 11 12 MSG						STATUS			

GFSK & Highest & Z & Ver





$\pi/4DQPSK$ & Lowest & Z & Ver

Agilent Spectrum											
L)(I	RF 50 Ω	AC AC		SEI	NSE:INT	Avg Type	ALIGNAUTO e: Log-Pwr		M May 17, 2019	Frequ	lency
			PNO: Fast 🔸	Trig: Free Atten: 20		AvgHold	: 200/200	TYI			
			IFGain:Low	Atten. 20	40		Mike2 O	204 60	6 4 GHz	Au	ito Tune
10 dB/div	Ref 116.99	dBuV					WIKIS Z		2 dBµV		
Log		Jabhr									
107									6		nter Freq
97.0									Å	2.35700	0000 GHz
87.0											
67.0										S	tart Freq
57.0	▲3							2		2.31000	0000 GHz
47.0	and stand in the sure	auto anna ann	an in the side of	ويدعنه والمبعلي	induction allowed	anger en deide	وينقوه والعودورا	and the second			
37.0			NAMA	n an Arian a		NAME A	机树桃	a da ana ana ana ana ana ana ana ana ana		S	top Freq
27.0	la na a la la	a dia na	Addan wede e	d ta dh'hadhai	a da la	al bull h	a kanan sa di	and a define			0000 GHz
				[] [· · ·					
Start 2.3100 #Res BW 1.			#\/R\A	/ 3.0 MHz			Sweep		0400 GHz 5001 pts)		CF Step
MKRI MODEL TRCI			<i></i>						IN VALUE		0000 GHz
1 N 1	f		3 2 GHz	ү 95.871 dB	μV	CTION FU	INCTION WIDTH	FUNCTI	JN VALUE	Auto	<u>Man</u>
2 N 1 3 N 1	f	2.390 00	00GHz	51.403 dB	μV uV					_	
4				00.0-12 uE						Fre	e q Offset 0 Hz
6											UHZ
8	_										
9											
11											
MSG							STATUS	,			
mag							STATUS				

Detector Mode : PK

$\pi/4DQPSK$ & Highest & Z & Ver

Agilent Spectrum Analyzer - Swept SA									
KM RF 50Ω AC	SENSE:IN	Avg Type: Log-Pwr	10:07:16 AM May 21, 2019 TRACE 123456 TYPE MWARMAN	Frequency					
IFGain:	PNO: Fast Free Street 10 dB Det PRINNII IFGain:Low Atten: 10 dB Mkr3 2.483 922 4 GHz								
10 αB/div Ref 106.99 dBμV			52.186 dBµ∨	Center Freq 2.489000000 GHz					
67.0 3 57.0 4 47.0 4 	ALAMA ANA TANA INA MANA	Mana ing katalahatan di katalahatan di katalahatan di katalahatan di katalahatan di katalahatan di katalahatan	ka Manul ah ku	Start Freq 2.478000000 GHz					
37.0 74.0 M M M M M M M M M M M M M M M M M M M			N dinter a significant	Stop Freq 2.500000000 GHz					
	¢VBW 3.0 MHz		Stop 2.50000 GHz 1.00 ms (5001 pts)	CF Step 2.200000 MHz					
MKR MODE TRC SCL X 1 N 1 f 2.479 786 4 GH 2 N 1 f 2.483 500 0 GH		FUNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man					
3 N 1 f 2.483 922 4 G 4 5 6				Freq Offset 0 Hz					
7 8 9 10 11 12									
ISG STATUS									

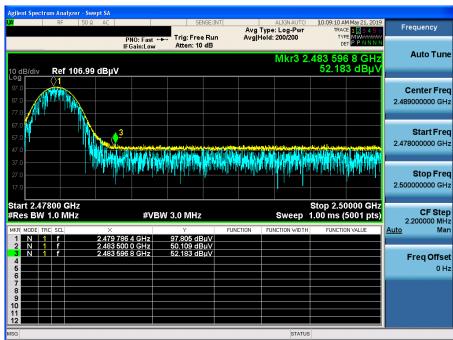


8DPSK & Lowest & Z & Ver

Agilent Spectrum Analyzer - Swept SA							
LXI RF 50Ω AC		SENSE:IN		ALIGNAUTO	TRAC	May 17, 2019	Frequency
	PNO: Fast ↔ IFGain:Low	Trig: Free Run Atten: 20 dB	Avg Hold	d: 200/200	TYF	E MWANANAN T P P N N N N	
	IFGain:Low	Atten: 20 db		Mkr3 2.	303 030		Auto Tune
10 dB/div Ref 116.99 dBµ	v			WIKIU 2.		7 dBµV	
Log	<u> </u>						
97.0						0	Center Freq
87.0						<u> </u>	2.357000000 GHz
77.0							
67.0							Start Freq
57.0					2		2.310000000 GHz
47.0	1.1	والالاستين وتداول إمارتها والإستان والمسترك			k ine sele fan hann	addes of	
37.0	ann an Anna an Anna	(Windowski)		UNION MAR	NKINR		Stop Freq
27.0	har and the line	i contrat de la conce	utale a bhar tabh.	Jellin I. I. H	hat di	utio T	2.404000000 GHz
Start 2.31000 GHz #Res BW 1.0 MHz	#\/B\M	3.0 MHz)400 GHz 5001 pts)	CF Step
MKRI MODEI TRCI SCLI X		Y	FUNCTION	UNCTION WIDTH		N VALUE	2.48000000 GHz Auto <u>Man</u>
1 N 1 f 2.401	913 2 GHz	95.995 dBµV	PONCTION	ONCTION WIDTH	PONCTIC	N VALUE	
	000 0 GHz 930 8 GHz	50.121 dBµV 52.587 dBµV					
4 5							Freq Offset 0 Hz
6							0 H2
8							
9							
11							
12 MSG				STATUS			
mag				STATUS			

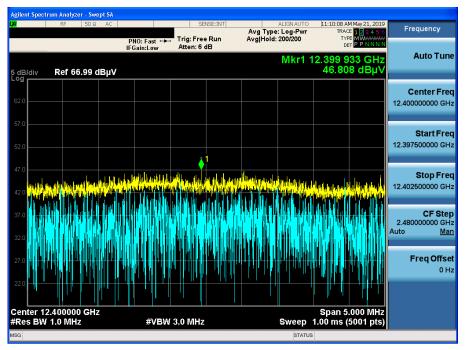
Detector Mode : PK

8DPSK & Highest & Z & Ver

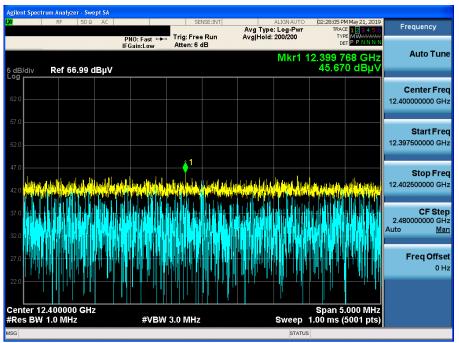




GFSK & Highest & Y & Hor



π /4DQPSK & Highest & Y & Hor





8DPSK & Middle & Y & Hor

