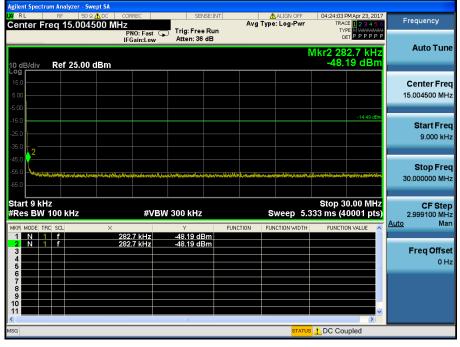
Highest Channel & Modulation : π/4DQPSK





Highest Channel & Modulation : π/4DQPSK





Low Band-edge

Lowest Channel & Modulation : 8DPSK



Low Band-edge

Hopping mode & Modulation : 8DPSK





Lowest Channel & Modulation : 8DPSK

Agilent																			
LXI RL		RF		50 Q 🦺		CORREC		SE	NSE:INT			🛕 ALIG				or 23, 2017		Frequency	
Cent	ter Fi	req	15.0	0450	00 MI			Talas			Avg T	ype: Log	J-Pwr		TRACE	23456 WWWWWW		requeries	
						PNO: Fa	st 🖵	Trig: Fre Atten: 3							DET	PPPPP			
_	_					IFGain:L	ow	Actent of	540									Auto Tur	-
														Mkr2	281.	9 kHz		Auto Tui	IE
10 dE	Idio	Do	f 25	00 di	Rm									-4	7.73	dBm			
Log	ana	Ke	1 20.	00 01	- 110														
15.0																		Center Fre	
																			- 1
5.00																		15.004500 MH	Ηz
-5.00																			
45.0	1															-14.73 dBm			
-15.0																		Start Fre	ea
-25.0																		9.000 kł	· · ·
-35.0																		5.000 KI	12
	2																		
-45.0	<u></u>																		
-55.0	L																	Stop Fre	eq
	11111	****	iquei hitai	المطبقة واللو	And in the second	And Balance Stades	a filles and a second	antistanta da sub	el-manin	Apple de la constant	iter de la Maria de la Mari	al state and the	, etterarie	a participation	-	upolitate terrete		30.000000 MH	Hz
-65.0																			
	t 9 kH															0 MHz		CF Ste	2p
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	10DE TF		1		×		1			FUNC	TION	FUNCTION	MINTH		NCTION V	ALLIE 🔼	Au	to Ma	an
	N 1	_	-			281.9 kH		-47.73 d	D m	FUNC	TION	FUNCTION	WIDTH	FUI	NUTION V.	ALUE -			
	N 1	f				281.9 kH	-	-47.73 d	Bm										
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gilent Spectrun <mark>V</mark> RL	n Analyzer - Swe RF 50 Ω	AC CORREC	SENSE:	NT	🔥 ALIGN OF	F 04:47:35	5 PM Apr 23, 2017	-
Center Fre	q 5.01500	0000 GHz PNO: Fast	Trig: Free Ru	A\ In	g Type: Log-Pv	VI TR. T	ACE 123456 YPE MINIMUM DET PPPPP	Frequency
		IFGain:Low	Atten: 36 dB				DETPPPPP	Auto Tomo
					M	kr5 8.155		Auto Tune
I0 dB/div _og	Ref 25.00 c	lBm				-39	.79 dBm	
15.0		1						Center Fred
5.00		Y						5.015000000 GHz
5.00								
15.0							-14.73 dBm	
25.0								Start Freq
35.0				∆ ³		▲5		30.000000 MHz
	المعادية والمراجع	Marine Providence		A started and	Subarantin Magazard Sta		الم الم العالي و حدار بالعمارين	
45.0								Stop Fred
55.0								10.00000000 GHz
65.0								
start 30 MH	lz					Stop 1	0.000 GHz	CF Step
Res BW 1	.0 MHz	#VB	W 3.0 MHz		Sweep	18.67 ms (40001 pts)	997.000000 MHz
MKR MODE TRC	SCL	×	Y	FUNCTION	FUNCTION WIE	TH FUNCI	TION VALUE	<u>Auto</u> Man
1 N 1 2 N 1	f	2.402 11 GHz 2.558 39 GHz	6.95 dBm -37.09 dBm					
3 N 1	f	5.478 85 GHz	-38.51 dBm					Freq Offset
4 N 1 5 N 1	f	2.506 05 GHz 8.155 30 GHz	-38.73 dBm -39.79 dBm				=	0 Hz
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Lowest Channel & Modulation : 8DPSK



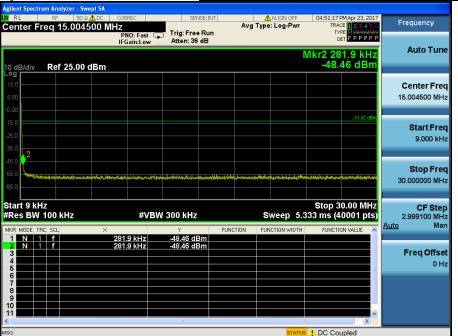


Reference for limit

Middle Channel & Modulation : 8DPSK



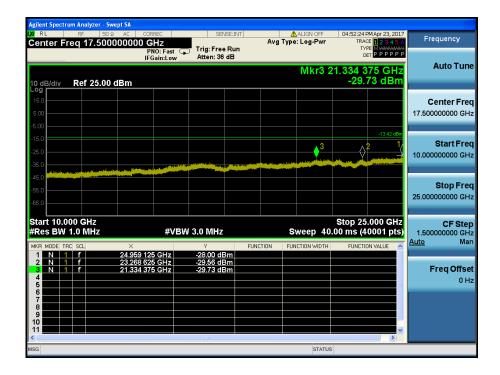
Conducted Spurious Emissions <u>Middle Channel & Modulation : 8DPSK</u>





Middle Channel & Modulation : 8DPSK







High Band-edge

Highest Channel & Modulation : 8DPSK



High Band-edge

Hopping mode & Modulation : 8DPSK





Highest Channel & Modulation : 8DPSK

Agilent Spe													
LXI RL	RF		Ω 🛕 DC 📗	CORREC		SENSE:	INT		ALIGN OFF		PM Apr 23, 2017	Frequency	
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				PNO: Fast IFGain:Low		en: 36 dE				C	ETPPPPP		
				II GUIILEUN								Auto Tur	ne
											31.9 kHz		
10 dB/div	v Re	f 25.00) dBm							-47.	09 dBm		
Log													
15.0												Center Fre	PS
5.00												15.004500 MH	Ηz
-5.00													
											-14.29 dBm		
-15.0												Start Fre	ea
-25.0												9.000 kH	I
-35.0												5.000 Kr	12
<u> </u> <u> </u> 2													
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MKR MODE		-	×		Y			CTION F	JNCTION WIDTH	FUNCTI	ON VALUE	Auto	211
1 N	1 f			281.9 kHz	-47	09 dBm							
2 N 3				281.9 kHz	-47	<u>09 aBm</u>						Freq Offs	et
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RL			50Ω AC	CORREC		SENS	E:INT		ALIGN OFF		MApr 23, 2017	Frequency
Center	Fre	q 5.01	500000		ast 🖵	Trig: Free		Avg Ty	pe:Log-Pwr	TRAI TY	^{2E} <mark>1 2 3 4 5 6</mark> РЕ М ИМИИИ ЕТ Р Р Р Р Р Р	requercy
				IFGain:	low	Atten: 36 d	B					Auto Tune
0 dB/di	v	Ref 25.	00 dBm						Mkr		53 GHz 07 dBm	
-og 15.0				1								Center Fred
5.00				/								5.015000000 GH
5.00												0.010000000000
15.0											-14.29 dBm	
25.0												Start Fred
35.0				2			_5					30.000000 MHz
		. A . Area much state	Y	and the second	New Yorks	and a strength of the local distances			and a state of the state of the	- Transmission	and the second	
45.0									dial data			Stop Fred
55.0 65.0												10.00000000 GH:
65.U												
Start 30										Stop 10	.000 GHz	CF Step
fRes B	W 1	.0 MHz			#VBW	3.0 MHz			Sweep 18	.67 ms (4	0001 pts)	997.000000 MHz
MKR MODE	TRC	SCL	×			Y		CTION F	UNCTION WIDTH	FUNCTIO	ON VALUE	<u>Auto</u> Man
1 N 2 N	1	f	2.	480 13 GH 324 10 GH	1 <u>z</u>	7.93 dB -38.14 dB						
3 N	1	f	5.	753 53 GH	z	-39.07 dBi	m					Freq Offse
4 N 5 N	1	f		753 53 GH 753 53 GH		-39.07 dBi -39.07 dBi						0 Hz
6			5.	755 55 GF	12	-59.07 uBi	"					
7 8												
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10											~	
()	-				_	Ш					>	

Highest Channel & Modulation : 8DPSK



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

NA

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 antenna is printed to the External PCB (Refer to Internal Photo file.)

Therefore this E.U.T Complies with the requirement of §15.203.

- 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.

10.1 Test Setup

Refer to the APPENDIX I.

10.2 Limit

Limit : Not Applicable

10.3 Test Procedure

The 99 % power bandwidth was measured with a calibrated spectrum analyzer.

The resolution bandwidth (RBW) shall be in the range of 1 % to 5 % of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately $3 \times RBW$.

Spectrum analyzer plots are included on the following pages.

10.4 Test Results

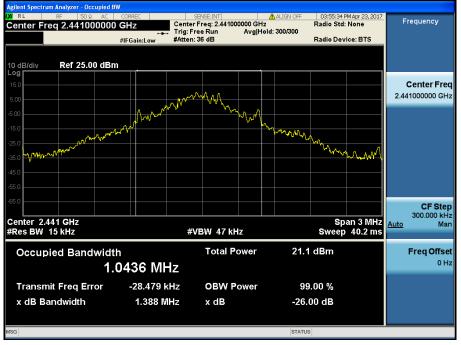
Modulation	Tested Channel	Test Results (MHz)
	Lowest	1.039
<u>GFSK</u>	Middle	1.044
	Highest	1.046
	Lowest	1.316
<u>π/4DQPSK</u>	Middle	1.319
	Highest	1.318
	Lowest	1.282
<u>8DPSK</u>	Middle	1.285
	Highest	1.288



Occupied Bandwidth (99 %)

Middle Channel & GFSK

Lowest Channel & GFSK



Highest Channel & GFSK

Occupied Bandwidth (99 %)





Occupied Bandwidth (99 %)

Middle Channel & π/4 DQPSK

STATUS

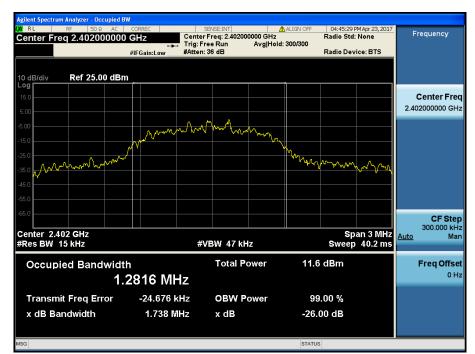


Highest Channel & π/4 DQPSK



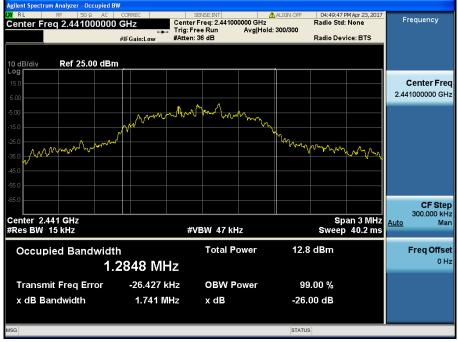


Lowest Channel & 8DPSK



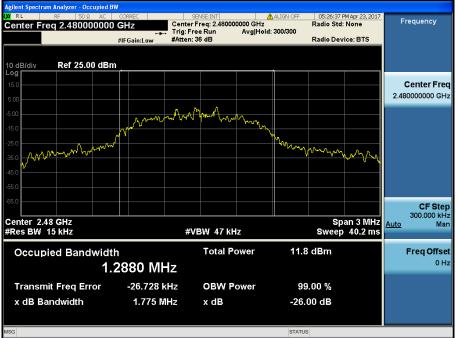
Occupied Bandwidth (99 %)

Middle Channel & 8DPSK



Highest Channel & 8DPSK

Occupied Bandwidth (99 %)

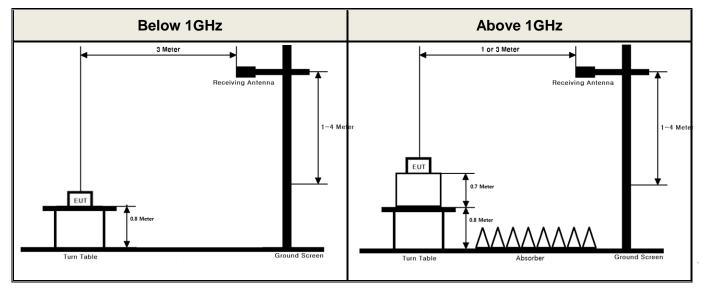


TRF-RF-237(04)170516

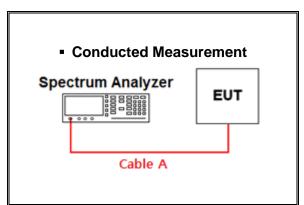
APPENDIX I

Test set up diagrams

Radiated Measurement



Note : The test of this model was used with a bore-sight antenna mast has been used for the measurement above 1GHz



Path loss information

Frequency (GHz)	Path Loss (dB)	Frequency (GHz)	Path Loss (dB)	
0.03	0.18	15	3.50	
1	0.80	20	4.86	
2.402 & 2.441 & 2.480	1.30	25	5.35	
5	1.82	-	-	
10	2.70	-	-	

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

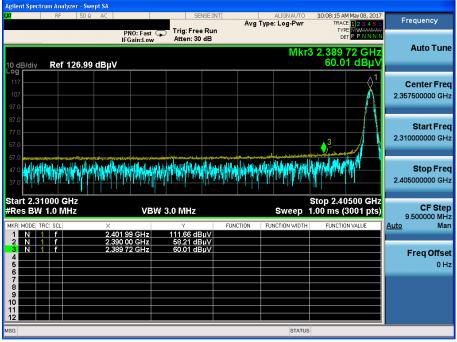
TRF-RF-237(04)170516



APPENDIX II

Unwanted Emissions (Radiated) Test Plot

GFSK & Lowest & X & Hor



Detector Mode : PK

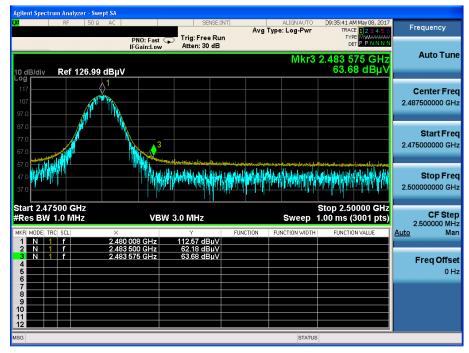
Detector Mode : AV

GFSK & Lowest & X & Hor

Agilent Spectrum Analyzer - Swept SA				
ιχι rf 50.Ω AC		E:INT ALIGN Avg Type: Log- Run Avg Hold: 200/20	Pwr TRACE 123456	Frequency
10 dB/div Ref 126.99 dBµV	PN0: Fast ↔ Trig: Free F IFGain:Low Atten: 30 d	в	Mkr3 2.389 72 GHz 47.842 dBµV	Auto Tune
Log 117 117				Center Freq 2.357500000 GHz
87.0 77.0 67.0 57.0				Start Freq 2.310000000 GHz
37.0				Stop Freq 2.405000000 GHz
Start 2.31000 GHz #Res BW 1.0 MHz MKR MODE TRC SCL X	#VBW 1.0 kHz	Swe		CF Step 9.500000 MHz <u>Auto</u> Man
2 N 1 f 2.39	109 968 ави 90 00 GHz 47.904 dBµ 89 72 GHz 47.842 dBµ	V		Freq Offset 0 Hz
7 8 9 10 11 12				
MSG		1	STATUS	

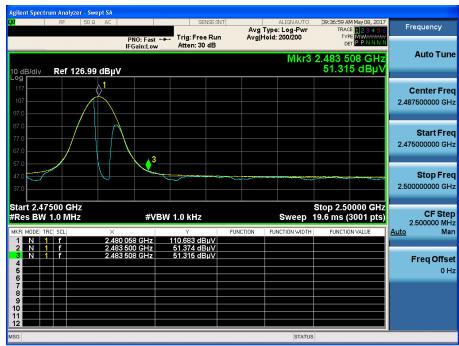


GFSK & Highest & X & Hor



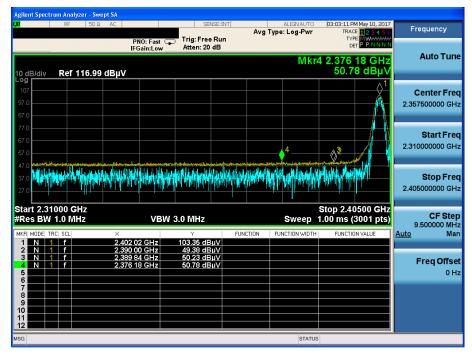
Detector Mode : AV

GFSK & Highest & X & Hor





$\pi/4DQPSK$ & Lowest & X & Hor



Detector Mode : AV

$\pi/4DQPSK$ & Lowest & X & Hor

RF	50 Ω AC	PNO: Fast 🔸	SENSE:INT	Avg	ALIGN AUTO Type: Log-Pwr Hold: 200/200	03:01:18 PM May 10, 201 TRACE 1 2 3 4 5 TYPE MWWWW DET P P N N N	Frequency
0 dB/div Ref	116.99 dBµV	IFGain:Low	Atten: 20 dB		Mkr4	2.376 09 GHz 38.668 dBµ\	Auto Tun
107 97.0 87.0							Center Fre 2.357500000 GH
77.0 67.0 57.0							Start Fre 2.310000000 G⊢
47.0 37.0 27.0				eren ornoren dabat-	4		Stop Fre 2.405000000 G⊢
tart 2.31000 (Res BW 1.0 N		#VBW	1.0 kHz		Sweep 7	Stop 2.40500 GH: '4.2 ms (3001 pts	CF Ste
IKR MODE TRC SCL		2 06 GHz	γ 99.233 dBμV	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	Auto Ma
2 N 1 f 3 N 1 f 4 N 1 f 5 6	2.3	00 00 GHz 09 37 GHz 76 09 GHz	38.141 dBµV 38.229 dBµV 38.668 dBµV				FreqOffs 0 ⊦
7 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9							
12					STATUS		



$\pi/4DQPSK$ & Highest & X & Hor



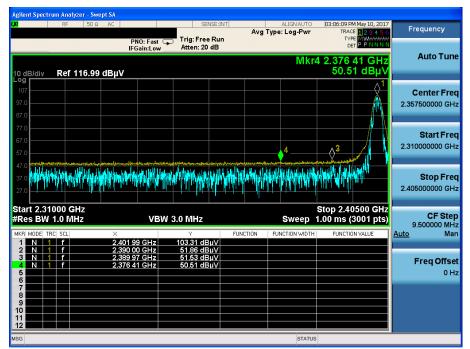
Detector Mode : AV

$\pi/4DQPSK$ & Highest & X & Hor



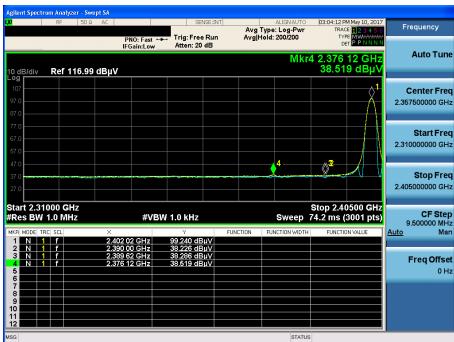


8DPSK & Lowest & X & Hor



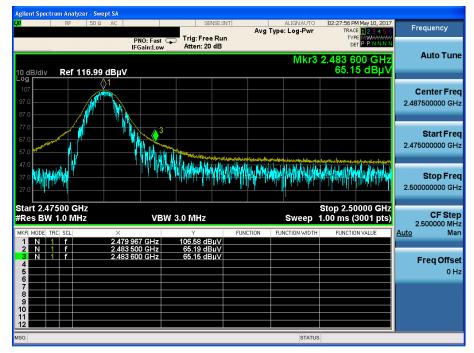
Detector Mode : AV

8DPSK & Lowest & X & Hor





8DPSK & Highest & X & Hor



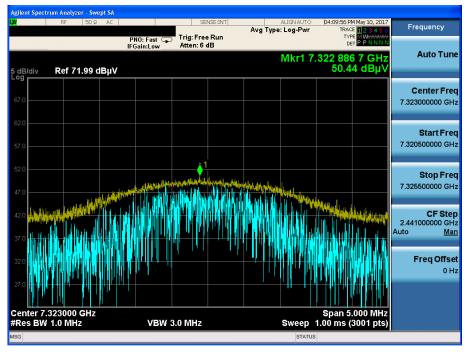
Detector Mode : AV

8DPSK & Highest & X & Hor

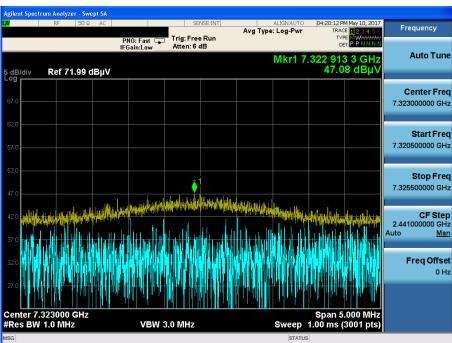




GFSK & Middle & X & Ver



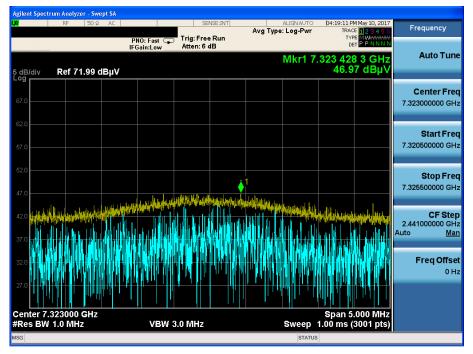
π /4DQPSK & Middle & X & Ver



Detector Mode : PK

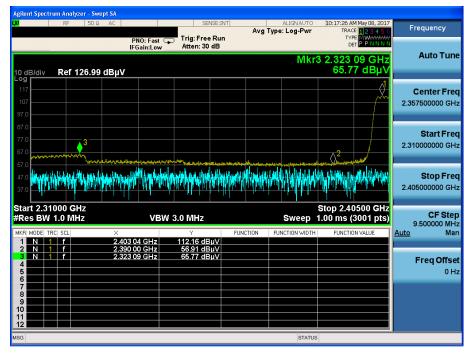


8DPSK & Middle & X & Ver

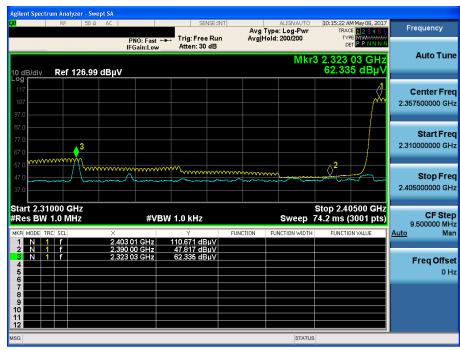




GFSK & Hopping mode & X & Hor

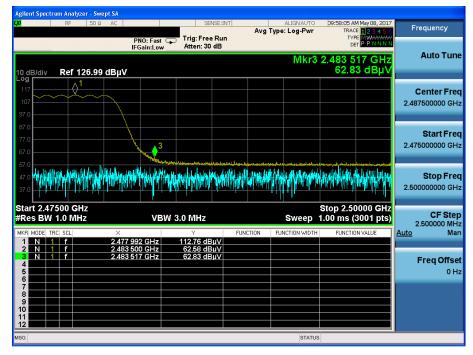


GFSK & Hopping mode & X & Hor





GFSK & Hopping mode & X & Hor



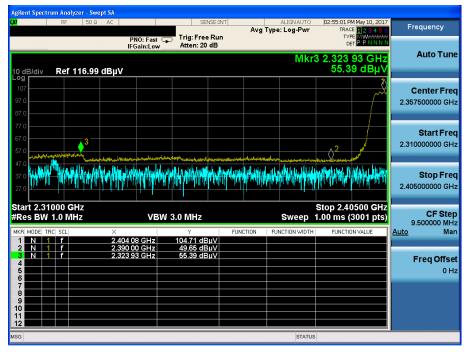
Detector Mode : AV

GFSK & Hopping mode & X & Hor

Agilent Spectrum Analyzer - Swept SA				
ΙΧΙ RF 50 Ω AC	PNO: Fast +++ Trig: Free Ru	Avg Type: Log-Pwr	09:55:03 AM May 08, 2017 TRACE 1 2 3 4 5 6 TYPE MWWWWW	Frequency
	IFGain:Low Atten: 30 dB		DET PPNNN	Auto Tune
10 dB/div Ref 126.99 dBµV		Mkr3	2.483 508 GHz 50.927 dBµV	
Log 117 107 97.0				Center Freq 2.487500000 GHz
87.0	43			Start Freq 2.475000000 GHz
57.0 47.0 37.0				Stop Freq 2.50000000 GHz
Start 2.47500 GHz #Res BW 1.0 MHz	#VBW 1.0 kHz	Sweep	Stop 2.50000 GHz 19.6 ms (3001 pts)	CF Step 2.500000 MHz
MKR MODE TRC SCL X 1 N 1 f 2.478	9 008 GHz 110.903 dBμV	FUNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Mar
2 N 1 f 2.483 3 N 1 f 2.483 4 5 6 6	500 GHz 50.969 dBμV 508 GHz 50.927 dBμV			Freq Offset 0 Hz
7 8 9 10 11				
MSG		STATU:	3	



$\pi/4DQPSK$ & Hopping mode & X & Hor

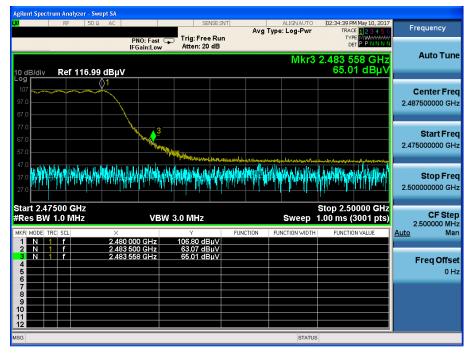


π /4DQPSK & Hopping mode & X & Hor





$\pi/4DQPSK$ & Hopping mode & X & Hor

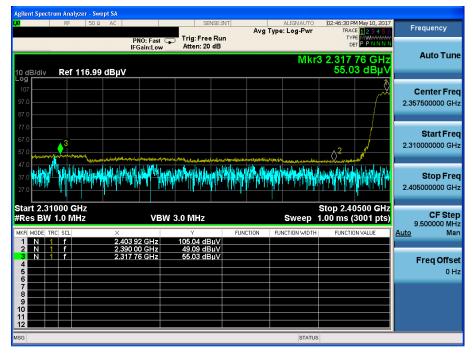


π /4DQPSK & Hopping mode & X & Hor

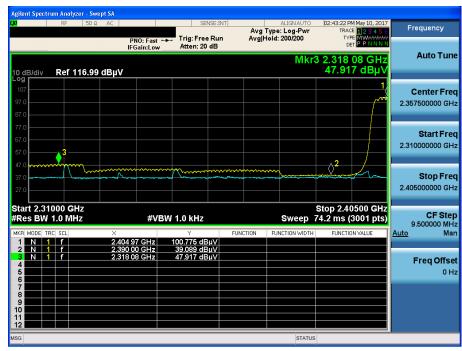




8DPSK & Hopping mode & X & Hor

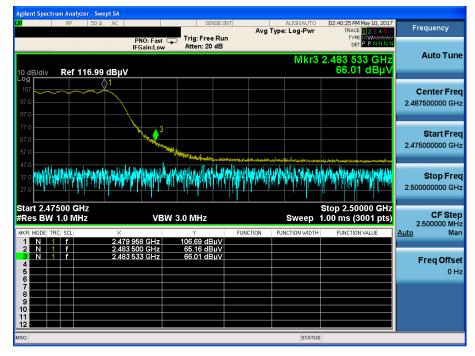


8DPSK & Hopping mode & X & Hor





8DPSK & Hopping mode & X & Hor



8DPSK & Hopping mode & X & Hor

