# **Dt&C**

#### Conducted Spurious Emissions

#### Lowest Channel & Modulation : π/4DQPSK





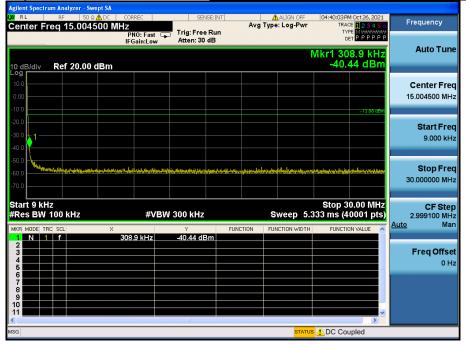
#### **Reference for limit**

#### Middle Channel & Modulation : π/4DQPSK



#### **Conducted Spurious Emissions**

## Middle Channel & Modulation : π/4DQPSK



# **Dt&C**

#### Conducted Spurious Emissions

#### Middle Channel & Modulation : π/4DQPSK



Agilent Spectrum Anal	50 Ω AC CORREC	SENSE:INT		ALIGN OFF	04:40:52 PM Oct 26, 2021 TRACE 1 2 3 4 5 6	Frequency
Center Freq 1	7.500000000 GHz PNO: Fast IFGain:Low	Trig: Free Run Atten: 30 dB	Avgi	ype: Log-Pwr	TYPE MWWWWWW DET PPPPP	
10 dB/div Ref	20.00 dBm			Mkr3 1	9.320 250 GHz -36.96 dBm	Auto Tune
Log 10.0 0.00 -10.0					-13.88 dBm	Center Freq 17.50000000 GHz
-20.0 -30.0 -40.0			→ <sup>3</sup> -			<b>Start Freq</b> 10.000000000 GHz
-50.0 -60.0 -70.0						<b>Stop Freq</b> 25.000000000 GHz
Start 10.000 GH #Res BW 1.0 M		W 3.0 MHz		Sweep 40	Stop 25.000 GHz .00 ms (40001 pts)	1.500000000 GHz
MKR MODE TRC SCL	×	Y 24.70 dDm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	Auto Man
1 N 1 f 2 N 1 f 3 N 1 f 4 5	24.388 750 GHz 16.774 375 GHz 19.320 250 GHz	-31.78 dBm -36.37 dBm -36.96 dBm				Freq Offset 0 Hz
6 7 8 9						
10					~	
MSG				STATUS		



#### High Band-edge

#### Highest Channel & Modulation : π/4DQPSK



#### **High Band-edge**

#### Hopping mode & Modulation : π/4DQPSK





# Conducted Spurious Emissions

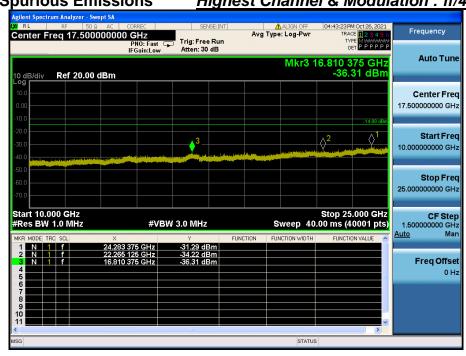
### Highest Channel & Modulation : π/4DQPSK

Agilent Spectrum Analyzer - Swept X/ RL RF 50 ହ 🛕	DC CORREC	SENSE: INT		ALIGN OFF	04:42:34 PM Oct 26,	
Center Freq 15.00450	OMHz PNO: Fast IEGain:Low	Trig: Free Run Atten: 30 dB	Avg	Type: Log-Pwr	TRACE 123 TYPE MAAA DET P P P	HAAAAAA
10 dB/div Ref 20.00 dE					Mkr1 281.9 k -41.42 dl	
0.00						Center F 15.004500
-10.0 -20.0 -30.0 +1					-14.8	9.000
-50.0	wordtstaffatiesmigeterfeansfrankf	adga ana bilan sisair tan bahan sinai sinai si	<u>teri tikiran</u> (estainet	Ageneithein glanna bhail guilleal ag an b	ang Tilo (i Si alba da ang Alba (	Stop F 30.000000
Start 9 kHz #Res BW 100 kHz	#VB\	N 300 kHz		Sweep 5.3	Stop 30.00 M 333 ms (40001	pts) 2.999100
MKR MODE TRC SCL	× 281.9 kHz	۲ -41.42 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	Auto
2 3 4 5						Freq Of
6 7 8 9 10						
ISG				STATUS	L DC Coupled	

Agilent Spectrum Analyzer - Sw	rept SA				
LX/RL RF 50Ω		SENSE:INT	ALIGN OFF	04:43:00 PM Oct 26, 2021 TRACE 1 2 3 4 5 6	Frequency
Center Freq 5.0150	PNO: Fast G IFGain:Low	Trig: Free Run Atten: 30 dB	Avg Type. Log-Fwi	TYPE MWWWWW DET PPPPP	
10 dB/div Ref 20.00	dBm		Mkr	5 6.996 04 GHz -40.75 dBm	Auto Tune
10.0 0.00 -10.0	1 			-14.89 dBm	Center Freq 5.015000000 GHz
-20.0 -30.0 -40.0	$2^2 0^4$			n nod alekt	Start Freq 30.000000 MHz
-60.0 -60.0 -70.0					Stop Freq 10.000000000 GHz
Start 30 MHz #Res BW 1.0 MHz	#VB\	V 3.0 MHz	Sweep 18	Stop 10.000 GHz .67 ms (40001 pts)	CF Step 997.000000 MHz
MKR MODE TRC SCL	× 2.480 38 GHz	6.47 dBm	FUNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man
2 N 1 f 3 N 1 f 4 N 1 f 5 N 1 f	2.702 21 GHz 6.021 72 GHz 3.122 69 GHz 6.996 04 GHz	-39.88 dBm -40.09 dBm -40.28 dBm -40.75 dBm			<b>Freq Offset</b> 0 Hz
7 8 9 10					
11		III		>	
MSG			STATUS		

#### Conducted Spurious Emissions

#### Highest Channel & Modulation : π/4DQPSK





#### Low Band-edge

#### Lowest Channel & Modulation : 8DPSK



#### Low Band-edge

#### Hopping mode & Modulation : 8DPSK



# 🛈 Dt&C

# Conducted Spurious Emissions Lowest Channel & Modulation : 8DPSK

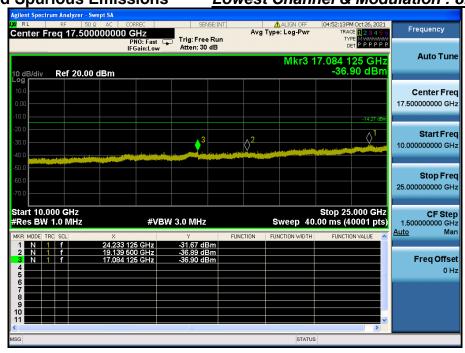
XIRL	RF 50 Ω 🚹		SENSE:1	NT	ALIGN OFF	04:51:25 PM Oct 26, 2021	-
Center Fre	q 15.00450	O MHz PNO: Fast	Trig: Free Ru		g Type: Log-Pwr	TRACE 123456 TYPE MWWWWW DET PPPPP	Frequency
10 dB/div	Ref 20.00 dE	IFGain:Low	Atten: 30 dB			Mkr1 281.9 kHz -42.06 dBm	Auto Tun
Log 10.0 0.00						-14.27 dBm	Center Free 15.004500 MH
-20.0 -30.0 -40.0						-14.27 0071	Start Free 9.000 kH
-50.0 -60.0 -70.0	,#}d======,=,==,==,==,==,==,==,==,==,==,==,	ىرىمىيەتەنبەر بىلىزىلار بىرىكە بىلەر بەر بەر بەر بەر بەر بەر بەر بەر بەر ب	halistina yananina aku yanana	hanaantikisterastijatei	<u>ۇ مەر يارىدار مېرىيا بولغان بالغان يارىمۇر.</u>	มูลรัฐปังหลุง <sub>เ</sub> ประชาติเหลง <sub>เ</sub> ประชาติเป็นประเทศ	<b>Stop Fre</b> 30.000000 MH
Start 9 kHz #Res BW 1		#VI	3W 300 kHz		Sweep 5.	Stop 30.00 MHz 333 ms (40001 pts)	2.999100 MH
MKR MODE TRC	SCL f	× 281.9 kHz	⊻ -42.06 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	Auto Ma
2 3 4 5							Freq Offse 0 H
6 7 8 9 10							
11			Ш			~	
MSG					STATUS	DC Coupled	

Agilent Spectrum Al M RL R Center Freq	F 50 Q AC COP 5.015000000 GH	REC	SENSE:IN	Avg	ALIGN OFF	04:51:50 PM Oct 2 TRACE 1 2 TYPE MW DET P P	3456	Frequency
10 dB/div Re	IF1 ef 20.00 dBm	Gain:Low	Atten: 30 dB		Mkr	5 7.635 86 ( -40.48 c	GHz	Auto Tune
Log 10.0 0.00	\_1						4.27 dBm	Center Freq 5.015000000 GHz
-20.0 -30.0 -40.0			م رساز محمد و رو الرو الرو الرو الرو الرو الرو الرو		5-	eleptier (Iterature and entre friender griper	ti ana sa ta ta	Start Freq 30.000000 MHz
-50.0 -60.0 -70.0								<b>Stop Freq</b> 10.00000000 GHz
Start 30 MHz #Res BW 1.0		#VBW	/ 3.0 MHz			Stop 10.000 .67 ms (40001	l pts)	CF Step 997.000000 MHz Auto Man
MKR   MODE   TRC   SC     1   N   1   f     2   N   1   f     3   N   1   f     4   N   1   f     5   N   1   f     6   7   7   7		2 GHz 2 GHz 0 GHz	7.64 dBm .39.65 dBm .39.78 dBm .39.98 dBm .40.48 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VAL		Freq Offset 0 Hz
8 9 10 11 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1			Ш		STATUS		~	

# **Dt&C**

#### **Conducted Spurious Emissions**

### Lowest Channel & Modulation : 8DPSK





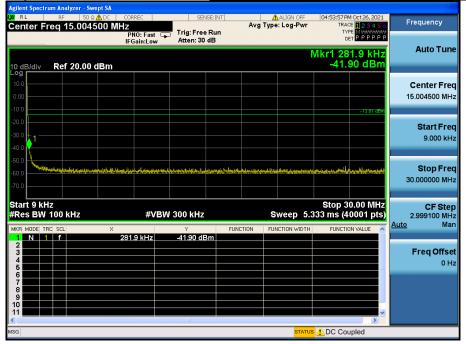
#### **Reference for limit**

#### Middle Channel & Modulation : 8DPSK



#### **Conducted Spurious Emissions**

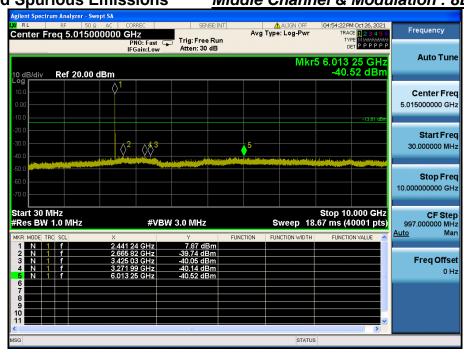
## Middle Channel & Modulation : 8DPSK

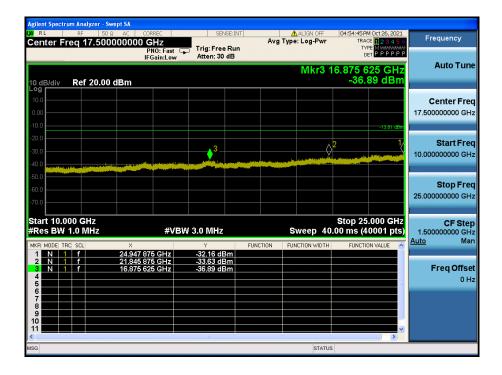


# **Dt&C**

#### **Conducted Spurious Emissions**

#### Middle Channel & Modulation : 8DPSK







#### High Band-edge

#### Highest Channel & Modulation : 8DPSK



#### **High Band-edge**

#### Hopping mode & Modulation : 8DPSK





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

RL RL	RF 50		RREC	SENS	E:INT	4	ALIGN OFF	04:57:22.0	M Oct 26, 2021	
		4500 MHz					: Log-Pwr	TRA	CE 123456	
10 dB/div	Ref 20.0	IF	NO: Fast 🎧 Gain:Low	Trig: Free I #Atten: 30				□ Mkr1 28	1.9 kHz 77 dBm	Auto Tune
10.0									-14.69 dBm	Center Free 15.004500 MH:
-20.0 -30.0 -40.0									-14.69 dbm	Start Free 9.000 kH:
-50.0 •60.0	*****	ndereensoliensetaanseeligtei	nuuntalan munahi	entretter anderer	na a state i de la dige de la	وأبية اليادار وعرجوا	numiero sudut	yoursolynstorphi	intelaisteltingentei	Stop Free 30.000000 MH:
Start 9 kH #Res BW	100 kHz	×	#VBW	300 kHz Y	FUNCT		weep 5.3	333 ms (4	0.00 MHz 0001 pts)	
1 N 1 2 3 4 4 5 1	f	281	.9 kHz	-41.77 dBr	n					Freq Offse 0 H
6 7 8 9 10 11										
<				Ш					>	
MSG							STATUS	🛚 🚹 DC Co	upled	

LXI RL	im Analyzer - Swi RF 50 ຊ Teq 5.01500	AC   COR 00000 GH	REC	SENS			ALIGN OFF	TRAC	Oct 26, 2021 E <b>1 2 3 4 5</b> 6	Frequency
10 dB/div	Ref 20.00 (	IFC	NO:Fast ⊂ Gain:Low	Trig: Free F #Atten: 30	iB		Mkr	DE 5 6.347	24 GHz 64 dBm	Auto Tune
10.0 0.00		^1 							-14.69 dBm	Center Freq 5.015000000 GHz
-20.0 -30.0 -40.0			<b>⊘</b> <sup>3</sup>		dia and an and distanting the	5,4	a i pila la posta consta tala yan	U postation places of better	-14.03 dom	Start Freq 30.000000 MHz
-50.0						Marth (1994) Inc. I. do notes				<b>Stop Freq</b> 10.000000000 GHz
Start 30 N #Res BW	1.0 MHz	X		W 3.0 MHz Y	FUNC		weep 18	Stop 10. .67 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 f	2.480 3 2.678 7 3.209 1 6.637 8 6.347 2	8 GHz 8 GHz 7 GHz	6.88 dBr -40.02 dBr -40.28 dBr -40.58 dBr -40.64 dBr	n n n				=	Freq Offset 0 Hz
7 8 9 10 11 <				III					×	
MSG							STATUS	3		



#### **Conducted Spurious Emissions**

#### Highest Channel & Modulation : 8DPSK



## **10. AC Power-Line Conducted Emissions**

#### 10.1. Test Setup

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

#### 10.2. 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.

Frequency Range (MHz)	Conducted Limit (dBuV)					
	Quasi-Peak	Average				
0.15 ~ 0.50	66 to 56 *	56 to 46 *				
0.5 ~ 5.0	56	46				
5 ~ 30	60	50				

\* Decreases with the logarithm of the frequency

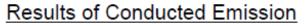
#### 10.3. Test Procedure

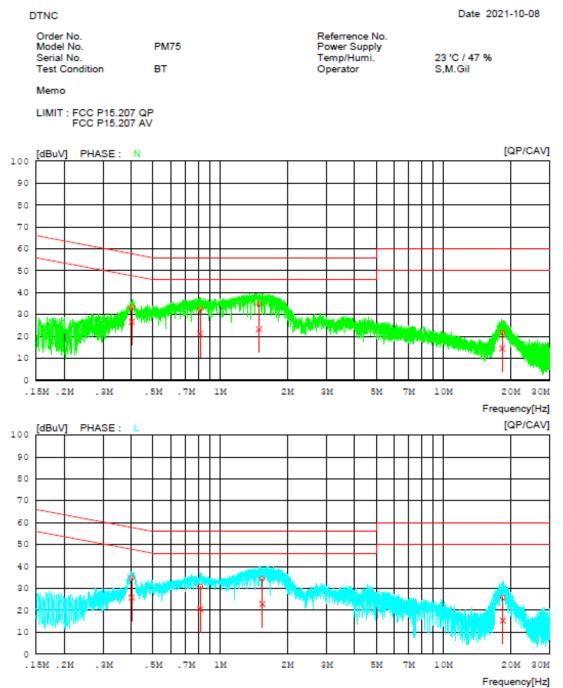
Conducted emissions from the EUT were measured according to the ANSI C63.10.

- 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.

#### 10.4. Test Results

#### AC Power-Line Conducted Emissions (Graph) = Modulation : <u>8DPSK</u>





#### AC Power-Line Conducted Emissions (List) = Modulation : <u>8DPSK</u>

# Results of Conducted Emission

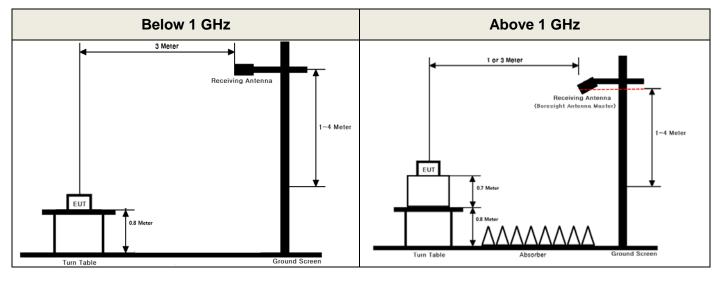
DTNC			Date 2021-10-08
Order No. Model No. Serial No. Test Condition	PM75 BT	Referrence No. Power Supply Temp/Humi. Operator	23 'C / 47 % S,M.Gil
Memo			
LIMIT : FCC P15 FCC P15			
NO FREQ	READING C.FACTOR QP CAV [dBuV][dBuV] [dB]	QP CAV QP CAV	MARGIN PHASE QP CAV ] [dBuV][dBuV]
2 0.81348 3 1.49109 4 18.38414 5 0.40129 6 0.81646 7 1.54417	23.3016.83 9.91 22.6911.35 9.92 24.8013.27 10.05 11.264.18 10.43 24.9315.88 9.91 20.9710.57 9.92 24.3512.77 10.06 15.404.88 10.44	33.2126.74 57.81 47.81   32.6121.27 56.00 46.00   34.8523.32 56.00 46.00   21.6914.61 60.00 50.00   34.8425.79 57.83 47.83   30.8920.49 56.00 46.00   34.4122.83 56.00 46.00   34.4122.83 56.00 46.00	24.6021.07 N 23.3924.73 N 21.1522.68 N 38.3135.39 N 22.9922.04 L 25.1125.51 L 21.5923.17 L 34.1634.68 L



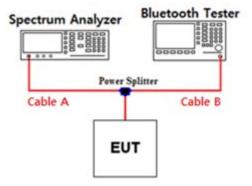
### **APPENDIX I**

#### Test set up diagrams

#### Radiated Measurement



#### Conducted Measurement



#### Path loss information

Frequency (GHz)	Path Loss (dB)	Frequency (GHz)	Path Loss (dB)
0.03	6.61	15	6.92
1	6.67	20	7.10
2.402 & 2.441 & 2.480	6.71	25	7.58
5	6.69	-	-
10	6.91	-	-

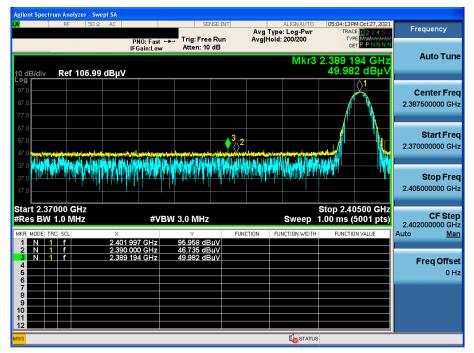
Note 1: The path loss from EUT to Spectrum analyzer was measured and used for test. Path loss (S/A's correction factor) = Cable A + Power Splitter



## **APPENDIX II**

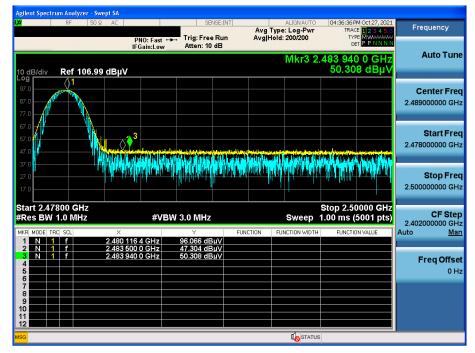
#### **Unwanted Emissions (Radiated) Test Plot**

#### GFSK & Lowest & Z & Ver



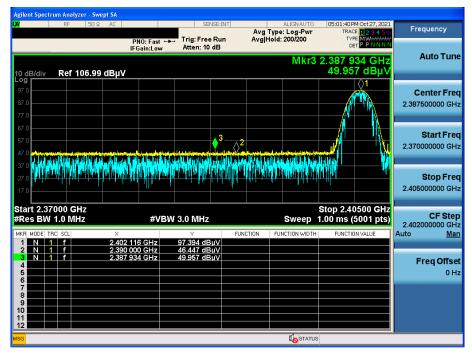
#### Detector Mode : PK

#### GFSK & Highest & Z & Ver



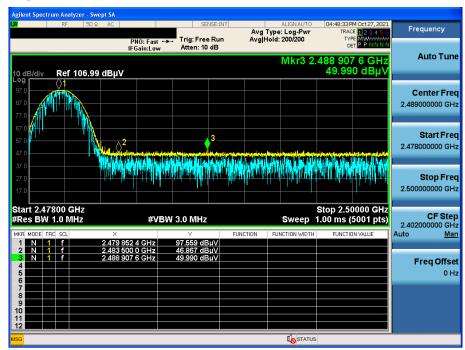


#### $\pi/4DQPSK$ & Lowest & Z & Ver



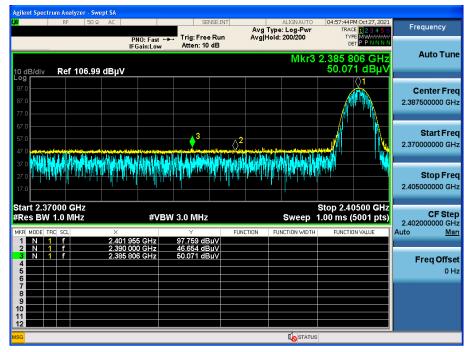
#### **Detector Mode : PK**

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



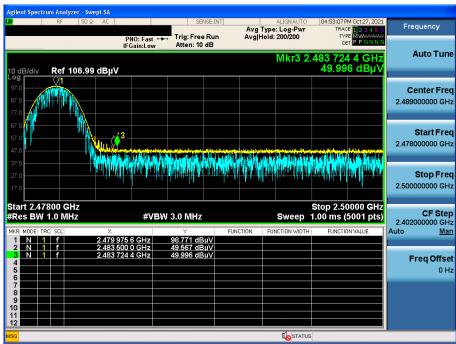


#### 8DPSK & Lowest & Z & Ver



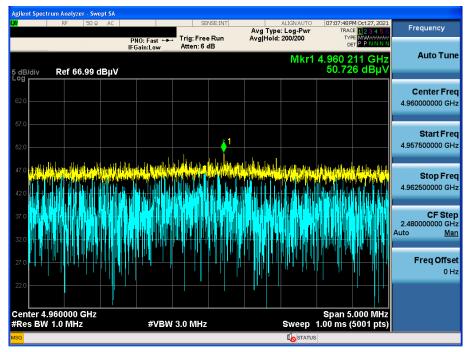
#### **Detector Mode : PK**

#### 8DPSK & Highest & Z & Ver



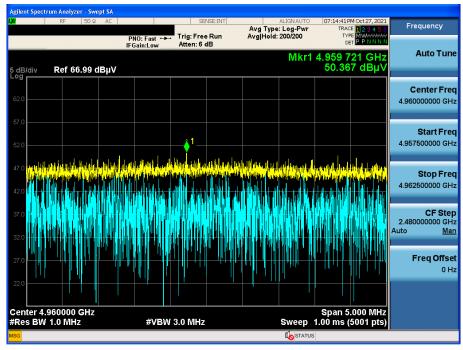


#### GFSK & Highest & Z & Hor



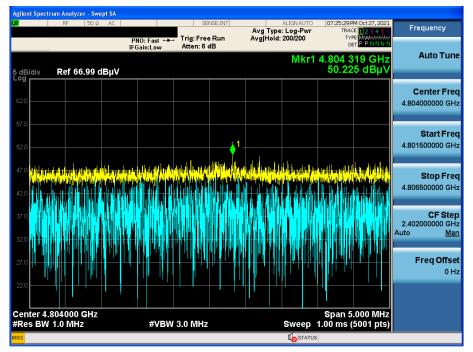
#### $\pi$ /4DQPSK & Highest & Z & Hor

#### **Detector Mode : PK**





#### 8DPSK & Lowest & Z & Hor



### Detector Mode : PK