# 7.3. Test Procedures

#### 7.3.1. Test Procedures for Radiated Spurious Emissions

- 1. The EUT is placed on a non-conductive table. For emission measurements at or below 1 GHz, the table height is 80 cm. For emission measurements above 1 GHz, the table height is 1.5 m. The table was rotated 360 degrees to determine the position of the highest radiation.
- 2. During performing radiated emission below 1 GHz, the EUT was set 3 meters away from the interference receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing radiated emission above 1 GHz, the EUT was set 1 or 3 meter away from the interference-receiving antenna.
- 3. For measurements above 1GHz absorbers are placed on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1 GHz, the absorbers are removed.
- 4. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- 5. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
- 6. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- 7. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Note: The radiated spurious emission was tested with below settings.

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.

2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection at frequency above 1GHz.

3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth

is [1/(minimum transmitter on time)] for Average detection (AV) at frequency above 1GHz.



# TDt&C

## 7.3.2. Test Procedures for Conducted Spurious Emissions

- 1. The transmitter output was connected to the spectrum analyzer.
- 2. The **reference level** of the fundamental frequency was measured with the spectrum analyzer using RBW = 100 kHz, VBW = 300 kHz.
- 3. The conducted spurious emission was tested each ranges were set as below.

#### Frequency range : 9 kHz ~ 30 MHz RBW = 100 kHz, VBW = 300 kHz, SWEEP TIME = AUTO, DETECTOR = PEAK, TRACE = MAX HOLD, SWEEP POINT : 40001

Frequency range : 30 MHz ~ 10 GHz, 10 GHz ~ 25 GHz RBW = 1 MHz, VBW = 3 MHz, SWEEP TIME = AUTO, DETECTOR = PEAK, TRACE = MAX HOLD, SWEEP POINT : 40001

#### LIMIT LINE = 20 dB below of the reference level of above measurement procedure Step 2. (RBW = 100 kHz, VBW = 300 kHz)

If the emission level with above setting was close to the limit (ie, less than 3 dB margin) then zoom scan is required using RBW = 100 kHz, VBW = 300 kHz, SPAN = 100 MHz and BINS = 2001 to get accurate emission level within 100 kHz BW.

Also the path loss for conducted measurement setup was used as described on the Appendix I of this test report.



## 7.4. Test Results

#### 7.4.1. Radiated Emissions

#### 9 kHz ~ 25 GHz Data (Modulation : GFSK)

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)
2388.99	V	Х	PK	45.38	1.70	N/A	N/A	47.08	74.00	26.92
2388.77	V	Х	AV	34.37	1.70	N/A	N/A	36.07	54.00	17.93
4803.83	Н	Х	PK	45.75	5.45	N/A	N/A	51.20	74.00	22.80
4803.93	Н	Х	AV	37.33	5.45	N/A	N/A	42.78	54.00	11.22

#### 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)
4881.76	Н	Х	PK	45.76	5.64	N/A	N/A	51.40	74.00	22.60
4881.89	Н	Х	AV	36.26	5.64	N/A	N/A	41.90	54.00	12.10

#### 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)
2493.10	V	Х	PK	45.09	1.86	N/A	N/A	46.95	74.00	27.05
2492.95	V	Х	AV	35.37	1.85	N/A	N/A	37.22	54.00	16.78
4960.24	Н	Х	PK	45.05	5.76	N/A	N/A	50.81	74.00	23.19
4960.02	Н	Х	AV	35.42	5.76	N/A	N/A	41.18	54.00	12.82

#### Note.

1. The radiated emissions were investigated 9 kHz 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. Sample Calculation.

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

 $\label{eq:Where, T.F = Total Factor, \quad AF = Antenna \ Factor, \quad CL = Cable \ Loss, \quad AG = Amplifier \ Gain.$ 



#### 9 kHz ~ 25 GHz Data (Modulation : $\pi$ /4DQPSK)

#### 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)
2389.01	V	Х	PK	45.21	1.70	N/A	N/A	46.91	74.00	27.09
2388.98	V	Х	AV	33.90	1.70	N/A	N/A	35.60	54.00	18.40
4803.69	Н	Х	PK	45.82	5.45	N/A	N/A	51.27	74.00	22.73
4803.84	Н	Х	AV	34.79	5.45	N/A	N/A	40.24	54.00	13.76

#### 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)
4881.65	Н	Х	PK	45.89	5.64	N/A	N/A	51.53	74.00	22.47
4881.84	Н	Х	AV	34.46	5.64	N/A	N/A	40.10	54.00	13.90

#### 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)
2484.05	V	Х	PK	46.90	1.80	N/A	N/A	48.70	74.00	25.30
2483.50	V	Х	AV	34.43	1.79	N/A	N/A	36.22	54.00	17.78
4959.61	Н	Х	PK	44.29	5.76	N/A	N/A	50.05	74.00	23.95
4959.91	Н	Х	AV	33.62	5.76	N/A	N/A	39.38	54.00	14.62

#### Note.

1. The radiated emissions were investigated 9 kHz 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. Sample Calculation.

 $\label{eq:margin} \begin{array}{ll} \mathsf{Margin} = \mathsf{Limit} - \mathsf{Result} & / & \mathsf{Result} = \mathsf{Reading} + \mathsf{T}.\mathsf{F} + \mathsf{D}.\mathsf{C}.\mathsf{F} & / & \mathsf{T}.\mathsf{F} = \mathsf{AF} + \mathsf{CL} - \mathsf{AG} \\ \\ \mathsf{Where, T}.\mathsf{F} = \mathsf{Total} \; \mathsf{Factor}, & \mathsf{AF} = \mathsf{Antenna} \; \mathsf{Factor}, & \mathsf{CL} = \mathsf{Cable} \; \mathsf{Loss}, & \mathsf{AG} = \mathsf{Amplifier} \; \mathsf{Gain}. \\ \end{array}$ 





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

#### 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)
2389.03	V	Х	PK	44.97	1.70	N/A	N/A	46.67	74.00	27.33
2389.03	V	Х	AV	34.07	1.70	N/A	N/A	35.77	54.00	18.23
4803.58	Н	Х	PK	45.17	5.45	N/A	N/A	50.62	74.00	23.38
4803.75	Н	Х	AV	34.56	5.45	N/A	N/A	40.01	54.00	13.99

#### 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)
4882.22	Н	Х	PK	46.29	5.64	N/A	N/A	51.93	74.00	22.07
4881.92	Н	Х	AV	35.25	5.64	N/A	N/A	40.89	54.00	13.11

#### 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)
2483.66	V	Х	PK	48.15	1.79	N/A	N/A	49.94	74.00	24.06
2483.65	V	Х	AV	34.47	1.79	N/A	N/A	36.26	54.00	17.74
4959.56	Н	Х	PK	44.53	5.76	N/A	N/A	50.29	74.00	23.71
4959.87	Н	Х	AV	33.60	5.76	N/A	N/A	39.36	54.00	14.64

#### Note.

1. The radiated emissions were investigated 9 kHz 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.

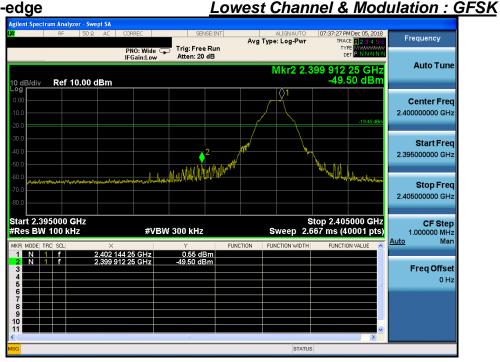
#### 3. Sample Calculation.

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

**Dt&C** 



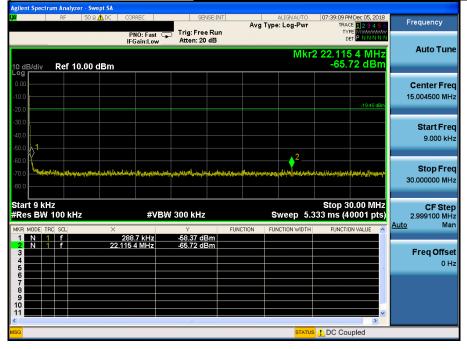
#### Low Band-edge

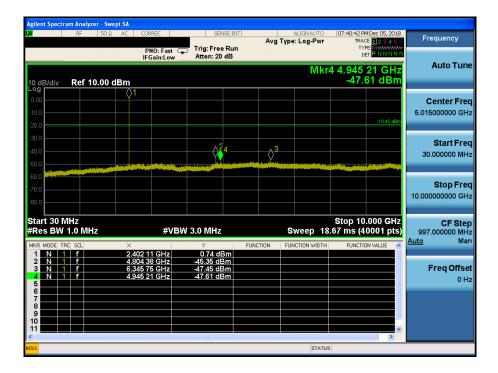
# Hopping mode & Modulation : GFSK





# Lowest Channel & Modulation : GFSK







## Lowest Channel & Modulation : GFSK





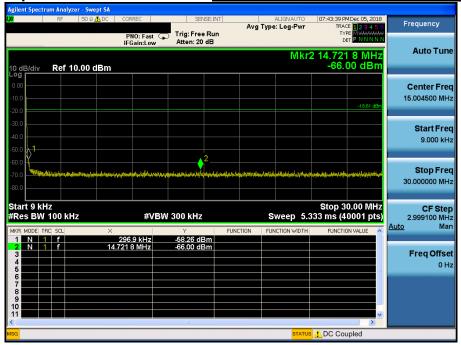
**Reference for limit** 



## Middle Channel & Modulation : GFSK

# Conducted Spurious Emissions <u>Middle</u>







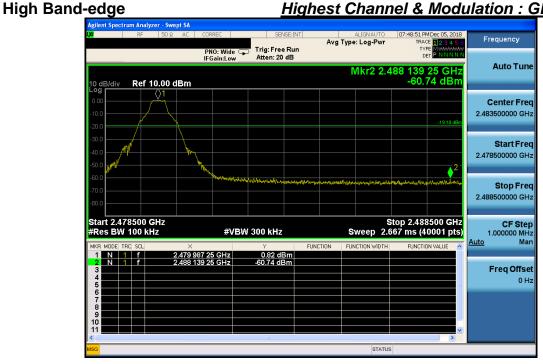






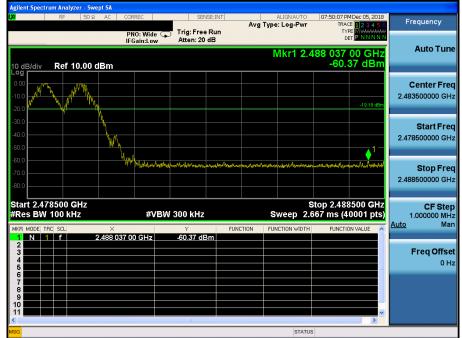


## Highest Channel & Modulation : GFSK



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

## Hopping mode & Modulation : GFSK

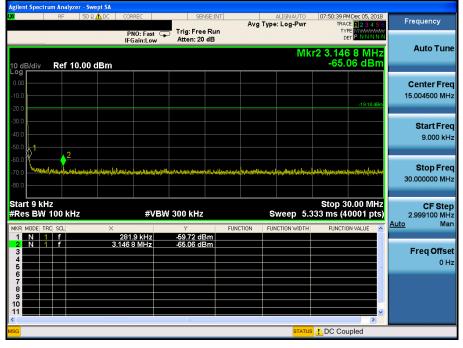


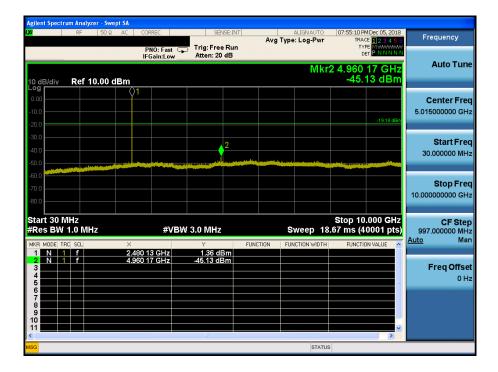




#### Conducted Spurious Emissions <u>h</u>

## Highest Channel & Modulation : GFSK







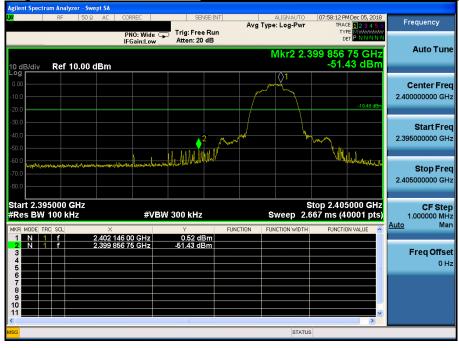
# Highest Channel & Modulation : GFSK





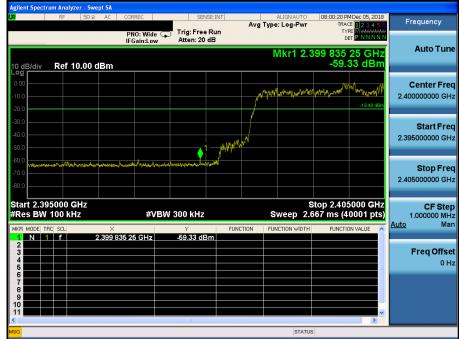
## Low Band-edge

# Lowest Channel & Modulation : π/4DQPSK



## Low Band-edge

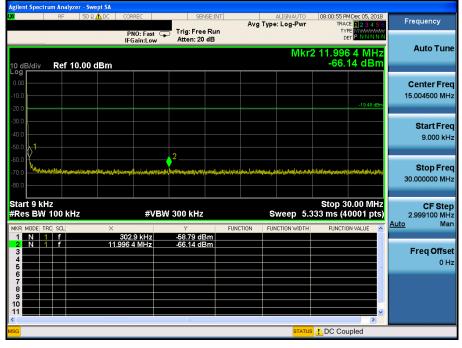
## Hopping mode & Modulation : π/4DQPSK





#### Conducted Spurious Emissions <u>Lowest</u>

## Lowest Channel & Modulation : π/4DQPSK



Agilent Spectrum Analyzer					
<b>LXI</b> RF	50 Ω AC CORREC	SENSE:INT	ALIGNAUTO Avg Type: Log-Pwr	08:01:59 PM Dec 05, 2018 TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast ( IFGain:Low _	Trig: Free Run Atten: 20 dB	Mkr		Auto Tune
10 dB/div Ref 10.	00 dBm			-48.65 dBm	
0.00	1				Center Freq 5.015000000 GHz
-20.0				-19.48 dBm	
-30.0 -40.0 -50.0	4	<u>2</u>	3	Carried And the second s	Start Freq 30.000000 MHz
-60.0 -70.0 -80.0					Stop Freq 10.000000000 GHz
Start 30 MHz #Res BW 1.0 MHz		W 3.0 MHz		Stop 10.000 GHz .67 ms (40001 pts)	CF Step 997.000000 MHz Auto Mar
MKR MODE TRC SCL	× 2.402 11 GHz	∀ 0.92 dBm	FUNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Haro</u> mai
2 N 1 f 3 N 1 f 4 N 1 f 5	4.804 13 GHz 6.384 38 GHz 2.653 85 GHz	-45.90 dBm -47.88 dBm -48.65 dBm			Freq Offset 0 Hz
6					
9 10 11 <				×	
MSG			STATUS		



#### Conducted Spurious Emissions <u>Le</u>

## Lowest Channel & Modulation : π/4DQPSK



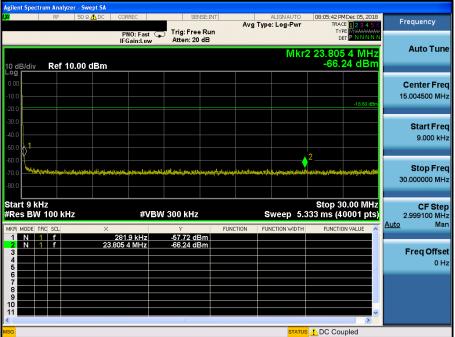


#### Reference for limit

Middle Channel & Modulation : π/4DQPSK



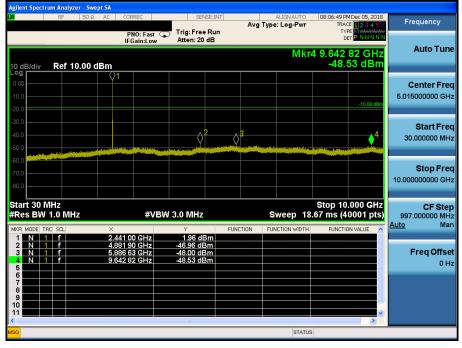
## Conducted Spurious Emissions <u>Middle Channel & Modulation : π/4DQPSK</u>







## Middle Channel & Modulation : π/4DQPSK

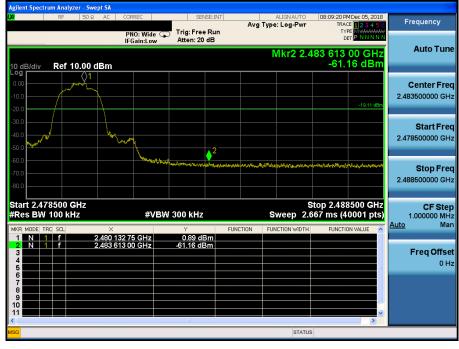






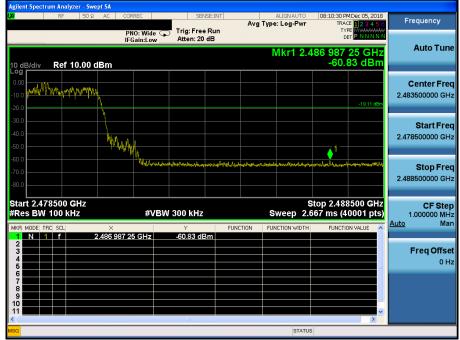
## **High Band-edge**

# Highest Channel & Modulation : π/4DQPSK



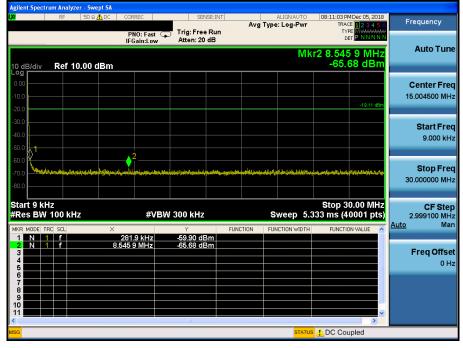
# High Band-edge

# Hopping mode & Modulation : π/4DQPSK





## Highest Channel & Modulation : π/4DQPSK



Agilent Spect														
L <b>XI</b>	RF	50 Ω	AC	CORREC		SENSE: IM	VT.	Ava		IGNAUTO		M Dec 05, 201 CE <mark>1 2 3 4 5</mark>		Frequency
				PNO: Fas	at 🖵 Trig: Fi		n		.,,,		T		444 N	
	_			IFGain:Lo	w Atten:	20 dB								Auto Tune
10 dB/div	Re	f 10.00 d								MKR	4 3.164 -48.	82 GH 54 dBn		
			Ŷ1											Center Freq
-10.0														5.015000000 GHz
-20.0												-19.11 dB	In	0.01000000000112
-30.0														
-40.0				. 1		. 3	<u>,</u>	2						Start Freq
-40.0						9	$\langle \rangle$							30.000000 MHz
-50.0			annan ar				and the second							
-80.0														Stop Freq
														10.00000000 GHz
-80.0														
Start 30											Stop 10	.000 GH	z	CF Step
#Res BW	1.0	MHz		#	VBW 3.0 MH	z			Sw	eep 18	.67 ms (4	0001 pts		997.000000 MHz
MKR MODE		-	×		Y		FUNC	TION	FUNCT	ION WIDTH	FUNCTI	ON VALUE	~	<u>Auto</u> Man
1 N 2 N	<u>1 f</u> 1 f			7 <u>9 88 GHz</u> 53 95 GHz		dBm dBm								
3 N	1 f 1 f		4.95	59 42 GHz 54 82 GHz	-47.80	dBm								Freq Offset
5			5.10	34 82 GHZ	-40.04	автт							=	0 Hz
6 7														
8														
10														
11												>	~	
MSG	_		_			_	_	_		STATUS				
	_		_			-	_	_	_		-		_	



# Highest Channel & Modulation : π/4DQPSK

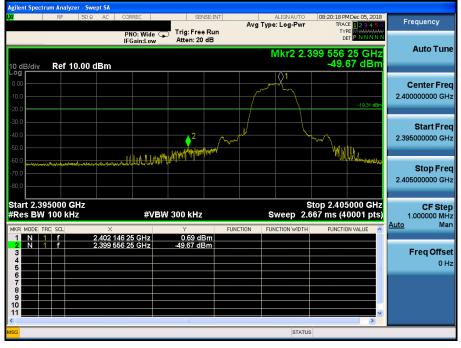




#### Low Band-edge

Low Band-edge

# Lowest Channel & Modulation : 8DPSK

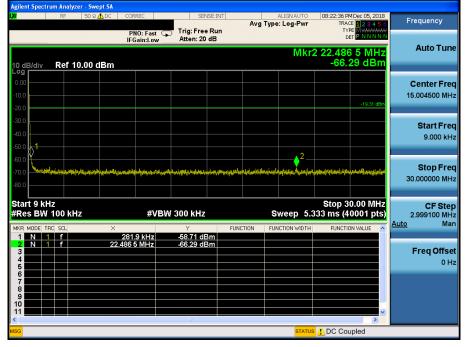


# Hopping mode & Modulation : 8DPSK



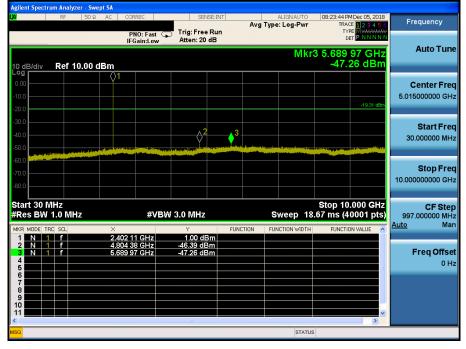


# Lowest Channel & Modulation : 8DPSK





## Lowest Channel & Modulation : 8DPSK





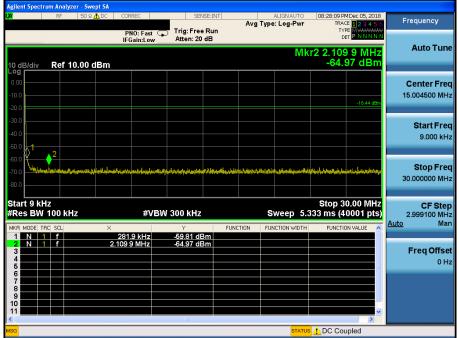


#### Reference for limit

Middle Channel & Modulation : 8DPSK



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







#### Middle Channel & Modulation : 8DPSK



Agilent Spectrum Analyzer - Swe							
<b>LXI</b> RF 50 Ω	AC CORREC	SENSE:I		ALIGNAUTO	08:30:51 PM Dec 05 TRACE 123	456	Frequency
	PNO: Fast IFGain:Lov	Trig: Free Ru Atten: 20 dB	in U,		DET P N N	NNN	
10 dB/div Ref 10.00 d	Bm			Mkr3 1	6.999 000 G -42.83 d	iHz Bm	Auto Tune
-10.0 -20.0					-18.4	I4 dBm	Center Freq 17.50000000 GHz
-30.0 -40.0 -50.0 cm of pole - the first the date		3				•••*	Start Freq 10.000000000 GHz
-60.0 -70.0 -80.0							<b>Stop Freq</b> 25.00000000 GHz
Start 10.000 GHz #Res BW 1.0 MHz	#V	BW 3.0 MHz		Sweep 40	Stop 25.000 .00 ms (40001	GHz pts)	CF Step 1.50000000 GHz Auto Man
MKR MODE TRC SCL	× 23.296 375 GHz	-34.73 dBm	FUNCTION F	UNCTION WIDTH	FUNCTION VALUE	^	Auto Man
2 N 1 f 3 N 1 f 4 5	21.411 625 GHz 16.999 000 GHz	-38.00 dBm -42.83 dBm					<b>Freq Offset</b> 0 Hz
6 7 8 9 9							
11						>	
MSG				STATUS			



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

## Highest Channel & Modulation : 8DPSK



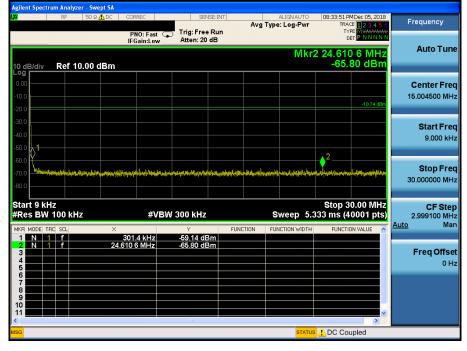
# High Band-edge

## Hopping mode & Modulation : 8DPSK





## Highest Channel & Modulation : 8DPSK







# Highest Channel & Modulation : 8DPSK





# 8. Transmitter AC Power Line Conducted Emission

## 8.1 Test Setup

NA

## 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.

Frequency Range (MHz)	Conducted Limit (dBuV)					
	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 permanently attached. (Refer to Internal Photo file.) Therefore this EUT complies with the requirement of §15.203.

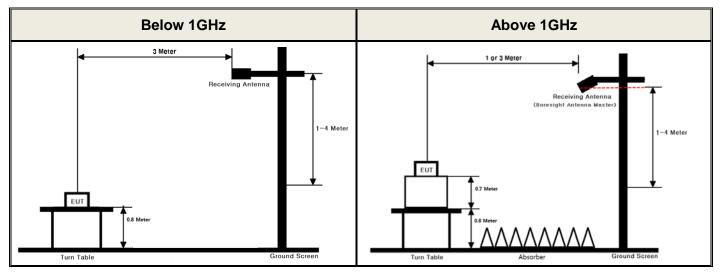
#### - Minimum Standard :

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.

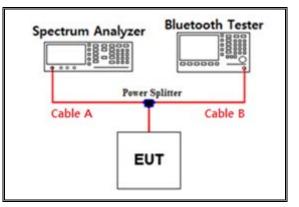
# **APPENDIX I**

#### Test set up diagrams

#### Radiated Measurement



#### Conducted Measurement



#### Path loss information

Frequency (GHz)	Path Loss (dB)	Frequency (GHz)	Path Loss (dB)	
0.03	6.32	15	10.07	
1	6.92	20	10.26	
2.402 & 2.441 & 2.480	7.47	25	11.46	
5	8.11	-	-	
10	9.73	-	-	

Note 1 : The path loss from EUT to Spectrum analyzer were measured and used for test.

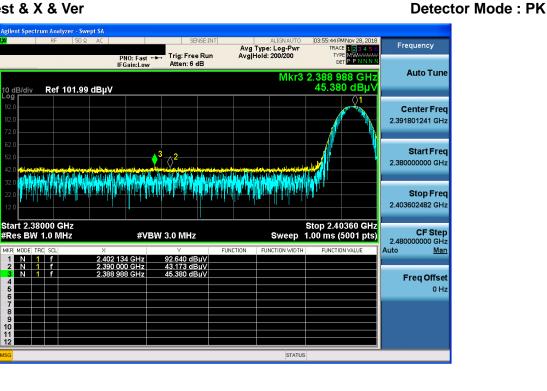
Path loss (S/A's Correction factor) = Cable A+ Power splitter



# **APPENDIX II**

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

#### GFSK & Lowest & X & Ver



#### GFSK & Lowest & X & Ver



#### **Detector Mode : AV**



#### GFSK & Highest & X & Ver



## GFSK & Highest & X & Ver

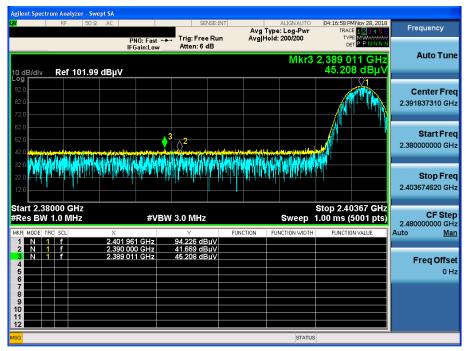
#### gilent Spectrum Analyzer - Swept SA Frequency #Avg Type: Voltage Avg|Hold: 200/200 CA TYF DET Trig: Free Run Atten: 6 dB PNO: Fast +++ IFGain:Low Auto Tune Mkr3 2.492 947 GH: 35.370 dBµ\ Ref 101.99 dBµV i0 dB/div .og **Center Freq** 2.489169558 GHz Start Freq **⊘**2 2.478339116 GHz **♦**<sup>3</sup> Stop Freq 2.50000000 GHz Stop 2.50000 GHz 39.3 ms (5001 pts) Start 2.47834 GHz #Res BW 1.0 MHz CF Step 2.480000000 GHz uto <u>Man</u> #VBW 430 Hz Sweep uto 2.480 2.483 2.492 Freq Offset 0 Hz STATUS

#### **Detector Mode : AV**

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



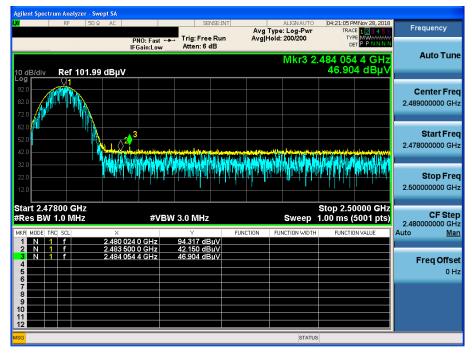
#### π/4DQPSK & Lowest & X & Hor

#### gilent Spectrum Analyzer - Swept SA Frequency #Avg Type: Voltage Avg|Hold: 200/200 A TYF DE Trig: Free Run Atten: 6 dB PNO: Fast ← IFGain:Low Auto Tune Mkr3 2.388 977 GH: 33.901 dBµ\ Ref 101.99 dBµV 10 c Log $\Delta 1$ **Center Freq** 2.391837310 GHz Start Freq 2.38000000 GHz 3 0<sup>2</sup> Stop Freq 2.403674620 GHz Start 2.38000 GHz #Res BW 1.0 MHz Stop 2.40367 GHz 43.0 ms (5001 pts) **CF Step** 2.480000000 GHz uto <u>Man</u> #VBW 430 Hz Sweep FUNCTION Auto 2.401 91.375 33.470 33.901 dBµ\v Freq Offset 0 Hz STATUS

#### **Detector Mode : AV**



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



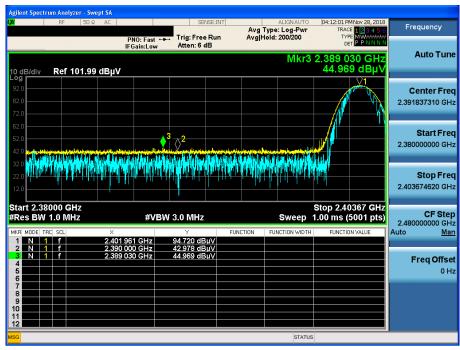
#### $\pi$ /4DQPSK & Highest & X & Ver

#### gilent Spectrum Analyzer - Swept SA Frequency #Avg Type: Voltage Avg|Hold: 200/200 Trig: Free Run Atten: 6 dB PNO: Fast ← IFGain:Low Auto Tune Mkr3 2.484 067 6 GH: 34.193 dBµ\ Ref 101.99 dBµV **Center Freq** 2.489000000 GHz Start Freq 2.478000000 GHz Stop Freq 2.50000000 GHz Start 2.47800 GHz #Res BW 1.0 MHz Stop 2.50000 GHz 40.0 ms (5001 pts) **CF Step** 2.480000000 GHz uto <u>Man</u> #VBW 430 Hz Sweep FUNCTION Auto 91.422 dBµV 34.433 dBµV 34.193 dBµV 2.480 024 0 GHz 2.483 500 0 GHz 2.484 067 6 GHz Freq Offset 0 Hz STATUS

#### **Detector Mode : AV**



#### 8DPSK & Lowest & X & Ver



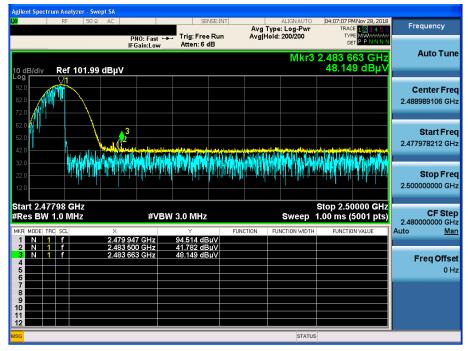
#### **Detector Mode : AV**

#### 8DPSK & Lowest & X & Ver





## 8DPSK & Highest & X & Ver



#### **Detector Mode : AV**

#### 8DPSK & Highest & X & Ver



**Detector Mode : AV** 



#### GFSK & Lowest & X & Hor



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

#### gilent Spectrum Analyzer - Swept SA Frequency #Avg Type: Voltage Avg|Hold: 200/200 TYPE MWWWWW DET P P N N N PNO: Fast ++++ IFGain:High #Atten: 0 dB Auto Tune Mkr1 4.803 837 GHz 34.789 dBµ\ Ref 61.99 dBµV 5 dB/div **Center Freq** 4.804000000 GHz Start Freq 4.801500000 GHz Stop Freq 4.806500000 GHz ô CF Step 2.402000000 GHz uto <u>Man</u> Auto Freq Offset 0 Hz Span 5.000 MHz Sweep 9.33 ms (5001 pts) Center 4.804000 GHz #Res BW 1.0 MHz #VBW 430 Hz

#### **Detector Mode : AV**



#### **Detector Mode : AV**

### 8DPSK & Middle & X & Hor

	RF	50 Ω	AC		SI	ENSE:INT		ALIGN AUTO	04:48:57 PM Nov 2		
				PNO: Fast IFGain:High	+ Trig: Fre #Atten: 0		#Avg Typ Avg Hold	e: Voltage : 200/200	TRACE 1 2 TYPE MW DET P P	3456 NNNN	Frequency
dB/div	Ref 6	1.99 d	ΒμV					Mkr1	4.881 919 35.254 d	GHz BµV	Auto Tun
7.0											Center Fre 4.882000000 GH
17.0											<b>Start Fr</b> 4.879500000 Gi
12.0						1					<b>Stop Fr</b> 4.884500000 G
12.0										A	<b>CF Ste</b> 2.441000000 GI tuto <u>M</u> i
12.0											Freq Offs 0 I
enter 4.									Span 5.000	MHz	
Res BW	T.U IVIH	Z		#VE	3W 430 Hz			Sweep s	9.33 ms (500 <sup>,</sup>	r pis)	