

7. Transmitter Radiated Spurious Emissions and Conducted Spurious Emission

7.1 Test Setup

Refer to the APPENDIX I.

7.2 Limit

According to §15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval , as permitted under paragraph(b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in section §15.209(a) is not required. In addition, radiated emission which in the restricted band, as define in section §15.205(a), must also comply the radiated emission limits specified in section §15.205(c))

According to § 15.209(a), except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table

Frequency (MHz)	Limit (uV/m)	Measurement Distance (meter)
0.009 ~ 0.490	2400/F (kHz)	300
0.490 ~ 1705	24000/F (kHz)	30
1705 ~ 30.0	30	30
30 ~ 88	100 **	3
88 ~ 216	150 **	3
216 ~ 960	200 **	3
Above 960	500	3

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54 - 72 MHz, 76 - 88 MHz, 174 - 216 MHz or 470 - 806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

According to § 15.205(a) and (b), only spurious emissions are permitted in any of the frequency bands listed below :

MHz	MHz	MHz	MHz	GHz	GHz
0.009 ~ 0.110	8.41425 ~ 8.41475	108 ~ 121.94	1300 ~ 1427	4.5 ~ 5.15	14.47 ~ 14.5
0.495 ~ 0.505	12.29 ~ 12.293	123 ~ 138	1435 ~ 1626.5	5.35 ~ 5.46	15.35 ~ 16.2
2.1735 ~ 2.1905	12.51975 ~ 12.52025	149.9 ~ 150.05	1645.5 ~ 1646.5	7.25 ~ 7.75	17.7 ~ 21.4
4.125 ~ 4.128	12.57675 ~ 12.57725	156.52475 ~ 156.52525	1660 ~ 1710	8.025 ~ 8.5	22.01 ~ 23.12
4.17725 ~ 4.17775	13.36 ~ 13.41	156.7 ~ 156.9	1718.8 ~ 1722.2	9.0 ~ 9.2	23.6 ~ 24.0
4.20725 ~ 4.20775	16.42 ~ 16.423	162.0125 ~ 167.17	2200 ~ 2300	9.3 ~ 9.5	31.2 ~ 31.8
6.215 ~ 6.218	16.69475 ~ 16.69525	167.72 ~ 173.2	2310 ~ 2390	10.6 ~ 12.7	36.43 ~ 36.5
6.26775 ~ 6.26825	16.80425 ~ 16.80475	240 ~ 285	2483.5 ~ 2500	13.25 ~ 13.4	Above 38.6
6.31175 ~ 6.31225	25.5 ~ 25.67	322 ~ 335.4	2655 ~ 2900		
8.291 ~ 8.294	37.5 ~ 38.25	399.90 ~ 410	3260 ~ 3267		
8.362 ~ 8.366	73 ~ 74.6	608 ~ 614	3332 ~ 3339		
8.37625 ~ 8.38675	74.8 ~ 75.2	960 ~ 1240	3345.8 ~ 3358		
			3600 ~ 4400		

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.



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 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.
- NOTE 2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1 GHz.
- NOTE 3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 1 kHz for Average detection (AV) at frequency above 1 GHz.



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	The worst case 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)
2375.90	Н	Х	PK	51.08	0.78	N/A	N/A	51.86	74.00	22.14
2376.02	Н	Х	AV	40.78	0.78	-24.79	N/A	16.77	54.00	37.23
4803.87	Н	Х	PK	53.99	7.63	N/A	N/A	61.62	74.00	12.38
4804.00	Н	Х	AV	49.94	7.63	-24.79	N/A	32.78	54.00	21.22

Middle Channel

Frequency (MHz)	ANT Pol	The worst case 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)
4882.01	Н	Х	PK	56.36	7.30	N/A	N/A	63.66	74.00	10.34
4881.99	Н	Х	AV	51.81	7.30	-24.79	N/A	34.32	54.00	19.68

Highest Channel

Frequency (MHz)	ANT Pol	The worst case 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)
2484.03	Н	Х	PK	57.56	1.16	N/A	N/A	58.72	74.00	15.28
2483.97	Н	Х	AV	50.93	1.16	-24.79	N/A	27.30	54.00	26.70
4959.61	Н	Х	PK	52.22	7.48	N/A	N/A	59.70	74.00	14.30
4959.96	Н	Х	AV	47.35	7.48	-24.79	N/A	30.04	54.00	23.96

<u>Note.</u>

1. No other spurious and harmonic emissions were found greater than listed emissions on above table.

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) = 1.736 = 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



9 kHz ~ 25 GHz Data (Modulation : π /4DQPSK)

Lowest Channel

Frequency (MHz)	ANT Pol	The worst case 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)
2385.02	Н	Х	PK	51.65	0.78	N/A	N/A	52.43	74.00	21.57
2386.00	Н	Х	AV	41.52	0.78	-24.79	N/A	17.51	54.00	36.49
4803.98	Н	Х	PK	51.15	7.63	N/A	N/A	58.78	74.00	15.22
4803.81	Н	Х	AV	36.81	7.63	-24.79	N/A	19.65	54.00	34.35

Middle Channel

Frequency (MHz)	ANT Pol	The worst case 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)
4881.87	Н	Х	PK	52.23	7.30	N/A	N/A	59.53	74.00	14.47
4881.94	Н	Х	AV	36.06	7.30	-24.79	N/A	18.57	54.00	35.43

Highest Channel

Frequency (MHz)	ANT Pol	The worst case 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)
2483.75	Н	Х	PK	61.09	1.16	N/A	N/A	62.25	74.00	11.75
2483.51	Н	Х	AV	52.64	1.16	-24.79	N/A	29.01	54.00	24.99
4959.94	Н	Х	PK	48.87	7.48	N/A	N/A	56.35	74.00	17.65
4959.90	Н	Х	AV	35.12	7.48	-24.79	N/A	17.81	54.00	36.19

Note.

1. No other spurious and harmonic emissions were found greater than listed emissions on above table.

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) = 1.736 \approx 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



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

Lowest Channel

Frequency (MHz)	ANT Pol	The worst case 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)
2386.54	Н	Х	PK	51.12	0.78	N/A	N/A	51.90	74.00	22.10
2385.84	Н	Х	AV	41.75	0.78	-24.79	N/A	17.74	54.00	36.26
4803.94	Н	Х	PK	49.96	7.63	N/A	N/A	57.59	74.00	16.41
4803.98	Н	Х	AV	36.74	7.63	-24.79	N/A	19.58	54.00	34.42

Middle Channel

Frequency (MHz)	ANT Pol	The worst case 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)
4882.11	Н	Х	PK	51.73	7.30	N/A	N/A	59.03	74.00	14.97
4881.88	Н	Х	AV	36.10	7.30	-24.79	N/A	18.61	54.00	35.39

Highest Channel

Frequency (MHz)	ANT Pol	The worst case 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)
2483.58	Н	Х	PK	60.32	1.16	N/A	N/A	61.48	74.00	12.52
2483.51	Н	Х	AV	52.03	1.16	-24.79	N/A	28.40	54.00	25.60
4959.78	Н	Х	PK	49.34	7.48	N/A	N/A	56.82	74.00	17.18
4959.76	Н	Х	AV	35.29	7.48	-24.79	N/A	17.98	54.00	36.02

Note.

1. No other spurious and harmonic emissions were found greater than listed emissions on above table.

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) = 1.736 \approx 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

9 kHz ~ 25 GHz Data (Hopping mode)

Modulation : GFSK

Frequency (MHz)	ANT Pol	The worst case 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)
2384.45	Н	Х	PK	51.10	0.78	N/A	N/A	51.88	74.00	22.12
2384.10	Н	Х	AV	40.99	0.78	-24.79	N/A	16.98	54.00	37.02
2483.63	Н	Х	PK	57.00	1.16	N/A	N/A	58.16	74.00	15.84
2483.94	Н	Х	AV	50.89	1.16	-24.79	N/A	27.26	54.00	26.74

Modulation : π/4DQPSK

Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	D.C.F (dB)	Distance Factor(d B)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2386.51	Н	Х	PK	51.34	0.78	N/A	N/A	52.12	74.00	21.88
2386.06	Н	Х	AV	41.34	0.78	-24.79	N/A	17.33	54.00	36.67
2483.54	Н	Х	PK	59.89	1.16	N/A	N/A	61.05	74.00	12.95
2483.56	Н	Х	AV	52.51	1.16	-24.79	N/A	28.88	54.00	25.12

Modulation : 8DPSK

Frequency (MHz)	ANT Pol	The worst case 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)
2385.53	Н	Х	PK	51.68	0.78	N/A	N/A	52.46	74.00	21.54
2386.16	Н	Х	AV	41.30	0.78	-24.79	N/A	17.29	54.00	36.71
2483.52	Н	Х	PK	59.27	1.16	N/A	N/A	60.43	74.00	13.57
2483.52	Н	Х	AV	51.81	1.16	-24.79	N/A	28.18	54.00	25.82

Note.

1. No other spurious and harmonic emissions were found greater than listed emissions on above table.

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) = 1.736 = 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

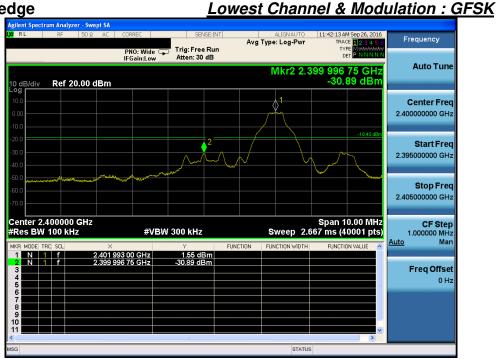
4. Sample Calculation.

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



Low Band-edge

Dt&C



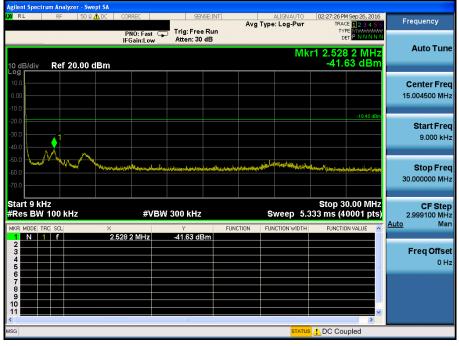
Low Band-edge

Hopping mode & Modulation : GFSK





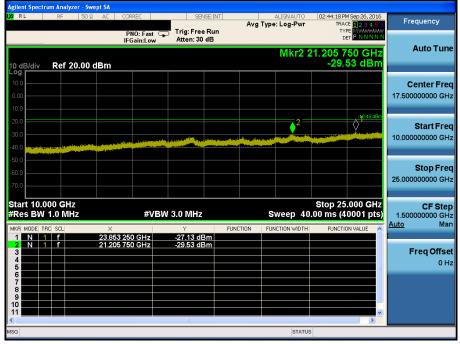
Lowest Channel & Modulation : GFSK



Agilent Spectrum Analyzer - Swept SA									
LXURL RF 50Ω AC	CORREC	SENSE:INT	ALIGNAUTO Avg Type: Log-Pwr	02:35:13 PM Sep 26, 2016 TRACE 1 2 3 4 5 6	Frequency				
	PNO: Fast 🖵 IFGain:Low	Trig: Free Run Atten: 30 dB	• •	TYPE MWWWWWWW DET P N N N N N					
	IFGain:Low	Atten: 50 dB	Mice	2 2.690 25 GHz	Auto Tune				
10 dB/div Ref 20.00 dBm	dB/div Ref 20.00 dBm -37.80 dBm								
10.0	1				Center Freq				
0.00					5.015000000 GHz				
-10.0									
-20.0				-18.45 dBm	01				
-30.0	2				Start Freq 30.000000 MHz				
-40.0		A DESCRIPTION OF TAXABLE PARTY OF TAXABLE PARTY.	and the second	- Andrea a litter and a filler and a state of the state o	30.000000 WH2				
-50.0									
-60.0					Stop Freq				
-70.0					10.00000000 GHz				
Start 30 MHz #Res BW 1.0 MHz	#VBW	3.0 MHz	Sweep 18	Stop 10.000 GHz .67 ms (40001 pts)	CF Step 997.000000 MHz				
MKR MODE TRC SCL X			UNCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man				
1 N 1 f 2.	402 11 GHz 690 25 GHz	1.70 dBm -37.80 dBm							
3					Freq Offset				
5				=	0 Hz				
6 7									
8									
10									
<				>					
MSG			STATUS	3					



Lowest Channel & Modulation : GFSK



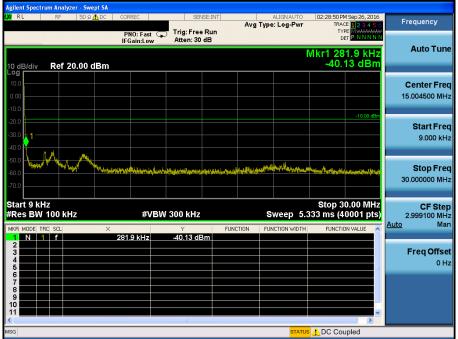


Reference for limit

Middle Channel & Modulation : GFSK



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





Middle Channel & Modulation : GFSK

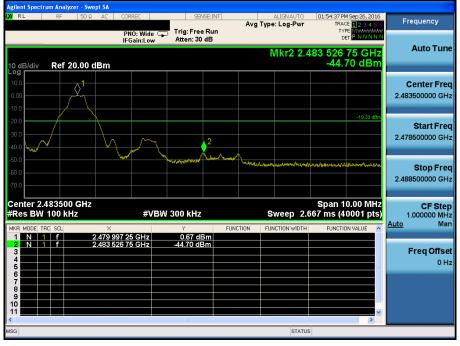


Agilent Spectrum Analyzer - S						
LXI RL RF 50	Ω AC CORREC	SENSE:INT		ALIGNAUTO e: Log-Pwr	02:45:21 PM Sep 26, 2016 TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast	Trig: Free Run			TYPE MWWWWWW	
	IFGain:Low	Atten: 30 dB				Auto Tune
				Mkr2 2	3.887 750 GHz -27.83 dBm	riaco rano
10 dB/div Ref 20.00) dBm				-27.65 UBIII	
10.0						Center Freq
0.00						17.50000000 GHz
-10.0						
-20.0					2 00 dBm	
-30.0						Start Freq
-40.0	A REAL PROPERTY OF THE REAL PR		and the second			10.00000000 GHz
-50.0						
-60.0						Stop Freq
-70.0						25.00000000 GHz
-70.0						
Start 10.000 GHz					Stop 25.000 GHz	CF Step
#Res BW 1.0 MHz	#VE	3W 3.0 MHz	s	weep 40	.00 ms (40001 pts)	1.500000000 GHz
MKR MODE TRC SCL	×	Y	FUNCTION FUI	NCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man
1 N 1 f	24.923 875 GHz 23.887 750 GHz	-27.76 dBm -27.83 dBm				
3						Freq Offset
4 5 1 1 1 1						0 Hz
6						
8						
9						
11					~	
MSG				STATUS		
mod				STATUS		



High Band-edge

Highest Channel & Modulation : GFSK



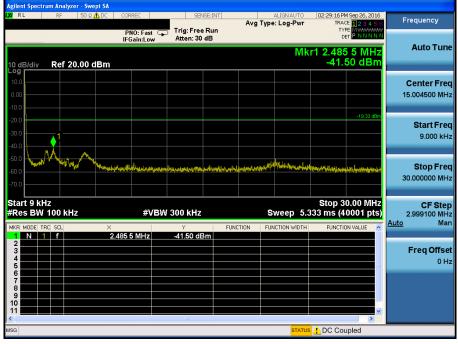
High Band-edge

Hopping mode & Modulation : GFSK





Highest Channel & Modulation : GFSK



Agilent Spectrum Analyzer - Sv					
LXI RL RF 50 9	Ω AC CORREC	SENSE:INT	ALIGNAUTO Avg Type: Log-Pwr	02:37:37 PM Sep 26, 2016 TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast	Trig: Free Run Atten: 30 dB		TYPE MWWWWWWW DET P. N.N.N.N.N.	
	IFGain:Low	Atten: 30 dB			Auto Tune
			MKr	2 3.306 39 GHz -37.72 dBm	
10 dB/div Ref 20.00	dBm			-37.72 UBII	
10.0					Center Freq
0.00	<u> </u>				5.015000000 GHz
-10.0					
-20.0				-19.33 dBm	Otherst Energy
-30.0	2				Start Freq 30.000000 MHz
-40.0		an mar fille and a state of the	And the state of the		30.000000 MHz
-50.0					
-60.0					Stop Freq
-70.0					10.00000000 GHz
-70.0					
Start 30 MHz				Stop 10.000 GHz	CF Step
#Res BW 1.0 MHz	#VBV	V 3.0 MHz	Sweep 18	.67 ms (40001 pts)	997.000000 MHz
MKR MODE TRC SCL	×		INCTION FUNCTION WIDTH	FUNCTION VALUE	<u>Auto</u> Man
1 N 1 f 2 N 1 f	2.480 13 GHz 3.306 39 GHz	0.85 dBm -37.72 dBm			
3					Freq Offset
5					0 Hz
6					
8					
10					
				~	
MSG			STATUS	,	











Low Band-edge

Lowest Channel & Modulation : π/4DQPSK



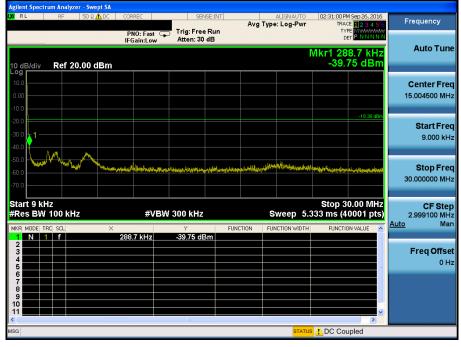
Low Band-edge

Hopping mode & Modulation : π/4DQPSK





Lowest Channel & Modulation : π/4DQPSK



lgilent Spectrum Analyzer - Sw					
X/RL RF 50Ω	PNO: Fast	SENSE:INT	ALIGNAUTO Avg Type: Log-Pwr	02:38:50 PM Sep 26, 2016 TRACE 2 3 4 5 6 TYPE MAAAAAAA DET P N N N N N	Frequency
10 dB/div Ref 20.00	IFGain:Low	Atten: 30 dB	Mkr	2 3.358 98 GHz -37.43 dBm	Auto Tune
10.0 0.00	1				Center Free 5.015000000 GH
-20.0	2-			-18.36 dBm	Start Free 30.000000 MH
-50.0 -60.0 -70.0					Stop Fre 10.000000000 GH
Start 30 MHz #Res BW 1.0 MHz	X		Sweep 18	Stop 10.000 GHz .67 ms (40001 pts) FUNCTION VALUE	CF Ste 997.000000 MH <u>Auto</u> Ma
1 N 1 F 2 N 1 F 3 4 5 5 6 7 7	2.402 11 GHz 3.358 98 GHz	2.03 dBm -37.43 dBm			Freq Offse 0 H
9 10 11				 	



Lowest Channel & Modulation : π/4DQPSK



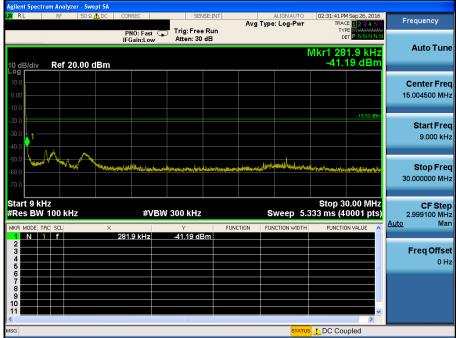


Reference for limit

Middle Channel & Modulation : π/4DQPSK



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





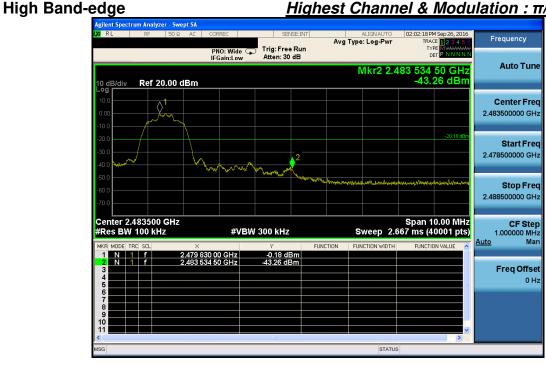
Middle Channel & Modulation : π/4DQPSK







Highest Channel & Modulation : π/4DQPSK



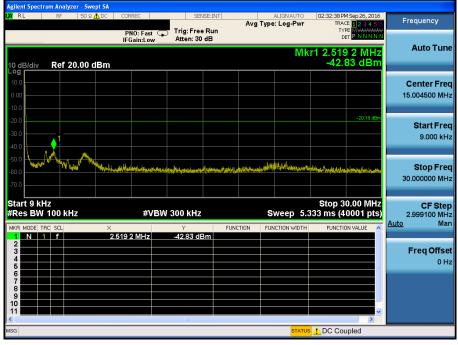
High Band-edge

Hopping mode & Modulation : π/4DQPSK





Highest Channel & Modulation : π/4DQPSK



Agilent Spectrum Analyzer - Sw	ept SA				
LXI R L RF 50 Ω	AC CORREC	SENSE:INT	ALIGNAUTO	r TRACE 123456	Frequency
	IFGain:Low	Atten: 30 dB	Mł	DET PINNNNN (r2 3.200 96 GHz	Auto Tune
10 dB/div Ref 20.00	dBm			-38.13 dBm	
10.0 0.00					Center Freq 5.015000000 GHz
-20.0	2			-20.18 dBm	Start Freq 30.000000 MHz
-50.0 -60.0 -70.0					Stop Freq 10.000000000 GHz
Start 30 MHz #Res BW 1.0 MHz	#VE	3.0 MHz	Sweep 1	Stop 10.000 GHz 8.67 ms (40001 pts)	CF Step 997.000000 MHz Auto Man
MKR MODE TRC SCL	× 2.480 13 GHz	⊻ 0.08 dBm	FUNCTION FUNCTION WIDT	H FUNCTION VALUE	<u>Auto</u> Man
2 N 1 f 3 4 5	3.200 96 GHz	-38.13 dBm			Freq Offset 0 Hz
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11				▼	
MSG			STAT		



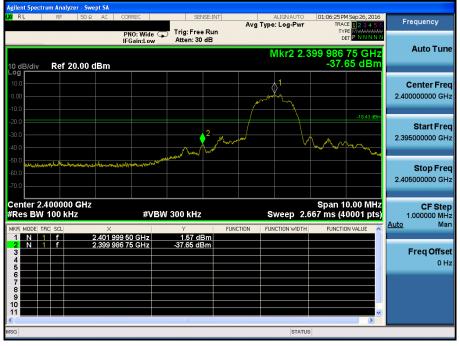
Highest Channel & Modulation : π/4DQPSK





Low Band-edge

Lowest Channel & Modulation : 8DPSK



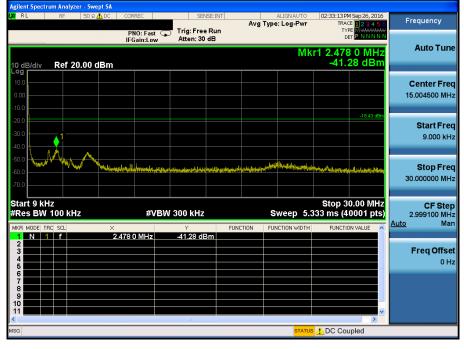
Low Band-edge

Hopping mode & Modulation : 8DPSK





Lowest Channel & Modulation : 8DPSK



RL RF	50 Ω AC CORREC	SENSE:IN	т	ALIGN AUTO	02:41:16 PM Sep 26, 2016	
	PNO: Fast	Trig: Free Rur	Avg Typ	e: Log-Pwr	TRACE 12345 TYPE MWWWWW DET P N N N N	Frequency
	IFGain:Lov	Atten: 30 dB		Mkr	2 9.480 56 GHz	Auto Tup
dB/div Ref 20.	00 dBm				-37.29 dBm	
29 0.0						Center Fre
.00						5.015000000 GH
0.0					-18.43 dBr	
0.0					2_	Start Fre
0.0	State of the local division of the local div	The state of the s	New Constantion (primited in the particular	و همه الدليان و و يو و هم .	Lipsequention spectrum its investigation of the lange pro-	30.000000 MH
0.0						Oton Fra
0.0						Stop Fre 10.000000000 GH
0.0						
tart 30 MHz Res BW 1.0 MHz	#\	/BW 3.0 MHz		ween 19	Stop 10.000 GHz .67 ms (40001 pts	CF Ste 997.000000 MH
KR MODE TRC SCL	×	Y Y		INCTION WIDTH	FUNCTION VALUE	Auto Ma
1 N 1 f 2 N 1 f	2.402 11 GHz 9.480 56 GHz	1.81 dBm -37.29 dBm				
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Lowest Channel & Modulation : 8DPSK



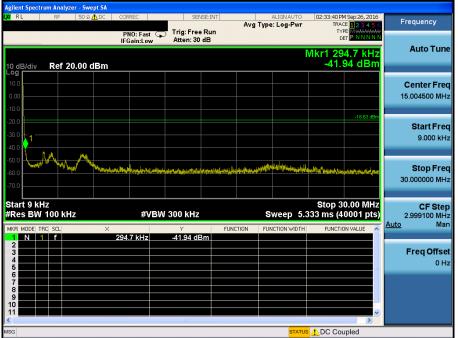


Reference for limit





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





Middle Channel & Modulation : 8DPSK



Avg Type: Log-Pwr Trace Prequency PHO: Fast Trig: Free Run Atten: 30 dB Mkr2 23.828 125 GHz -27.30 dBm Auto Tune 0 dB/div Ref 20.00 dBm -27.30 dBm Center Free 17.500000000 GHz Center Free 10.00000000 GHz 000 000 000 000 000 000 000 000 000 000 000 000 000 000 000 000 000 0000	Agilent Spectr											
Internation Attent 30 dB Def NNNNN Mkr2 23.828 125 GHz -27.30 dBm -27.30 dBm Center Free 17.50000000 GHz 000	X/RL	RF	50Ω AC	CORREC				Avg Type		TRAG	E 123456	Frequency
MIRT 2 23.828 120 GHZ Center Freq 27.30 dBm -27.30 dBm 000 -27.30 dBm 11.00000000 GHZ -27.30 dBm 12.00000000 GHZ -27.30 dBm 13.00000000 GHZ -27.30 dBm 14.1 1 15.00000000 GHZ -27.30 dBm 14.1 1 15.2 -27.30 dBm 16.2 -27.30 dBm 17.5 -27.30 dBm 17.5 -27.30 dBm 17.5 -27.30 dBm				PNO: Fas IFGain:Lo			in			TY D	ET P N N N N N	
Gg Gg <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>Mkr2 2</td><td></td><td></td><td>Auto Tune</td></td<>									Mkr2 2			Auto Tune
100 Center Freq 17.50000000 GHz 200 22 2 4 10.0000000 GHz 300 200 300 1 300 1 300 1 300 1 300 1 300 1 300 1 300 1 300 1	10 dB/div Log	Ref 20.	00 dBm							-27.3	30 dBm	
1000 1	10.0											Center Free
200 2 3 3 4 5 4 5 5 5 5 6 6 7 8 9	0.00											17.50000000 GH
000 0000 000	-10.0										- 63 dBm	
0 0	-20.0											Start Free
0000 00000 00000 00000 00000 00000 00000 00000 00000 000000 000000 000000 000000 000000 000000 000000 000000 000000 000000 000000 000000 0000000 000000 000000 0000000 0000000 0000000<	-30.0		المعرب المتعاد	A STREET OF STREET	Sector Conservation	and the second second		-				10.00000000 GHz
000 Image: Stop Free 25,0000000 GHz 1	frank a setting of											
25.00000000 GH ttart 10.000 GHz Res BW 1.0 MHz #VBW 3.0 MHz Sweep 40.00 ms (40001 pts) 1 N 1 f 24.456 250 GHz -26.66 dBm 2 N 1 f 23.828 125 GHz -27.30 dBm Function Function violtit Function violtit Function violtit Function violtit Function violtit Freq Offsee 3 -	-60.0											Stop Free
Res BW 1.0 MHz #VBW 3.0 MHz Sweep 40.00 ms (40001 pts) 1.50000000 GHz NR NODE TC X Y FUNCTION FUNCTION VALUE Auto Mart 1 N 1 f 24.456 250 GHz -26.66 dBm FUNCTION FUNCTION VALUE Function Value Freq Offset 3 4 -	-70.0											25.00000000 GH;
Res BW 1.0 MHz #VBW 3.0 MHz Sweep 40.00 ms (40001 pts) 1.50000000 GHz NR NODE TC X Y FUNCTION FUNCTION VALUE Auto Mart 1 N 1 f 24.456 250 GHz -26.66 dBm FUNCTION FUNCTION VALUE Function Value Freq Offset 3 4 -										0 4	000 011-	
MRR MODE TRC: State Y FUNCTION FUNCTION VIDIT FUNCTION VALUE 1 N 1 f 24.455.250 GHz -26.66 dBm Final State Final State				#`	VBW 3.0	MHz		s	weep 40	500 25 00 ms (4.	.000 GHZ 0001 pts)	
2 N 1 f 23.828 125 GHz -27.30 dBm 3 4 4 4 4 6 6 6 6 6 6 6 6 6 6 6 6 6 7 8 6 7 7	MKR MODE TR						FUNC	TION FUI	NCTION WIDTH	FUNCTIO	IN VALUE	<u>Auto</u> Mar
			24.4 23.8	56 250 GHz 28 125 GHz	-26	6.66 dBm 7.30 dBm						
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	11										~	
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High Band-edge

Highest Channel & Modulation : 8DPSK



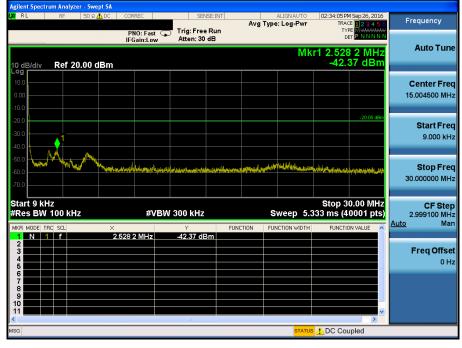
High Band-edge

Hopping mode & Modulation : 8DPSK





Highest Channel & Modulation : 8DPSK



RL RF	50Ω AC C	ORREC	SENSE:INT		ALIGNAUTO	02:43:00 PM Sep 26,	2016	-
		PNO: Fast	Trig: Free Run	Avg T	ype: Log-Pwr	TRACE 123 TYPE MWW	WWWW	Frequency
	1	FGain:Low	Atten: 30 dB			DET PNN		Auto Tune
					Mkr	2 3.178 53 G -37.71 dl		Auto Tune
odB/div Ref	20.00 dBm					-37.7 T UI		
0.0								Center Free
.00								5.015000000 GH
0.0								
0.0						-20.0	5 dBm	Start Fre
0.0		<u>2</u>						30.000000 MH
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0.0								Stop Fre
0.0								10.00000000 GH
						0 4		
tart 30 MHz Res BW 1.0 N	Hz	#VB\	N 3.0 MHz		Sweep 18	Stop 10.000 C 67 ms (40001	sHZ pts)	CF Stej 997.000000 MH
KR MODE TRC SCL	×		Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	~	<u>Auto</u> Ma
1 N 1 f 2 N 1 f	2.480	13 GHz 53 GHz	0.27 dBm -37.71 dBm					
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9								
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Highest Channel & Modulation : 8DPSK



8. Transmitter AC Power Line Conducted Emission

8.1 Test Setup

Not Applicable

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)					
Frequency hange (Minz)	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

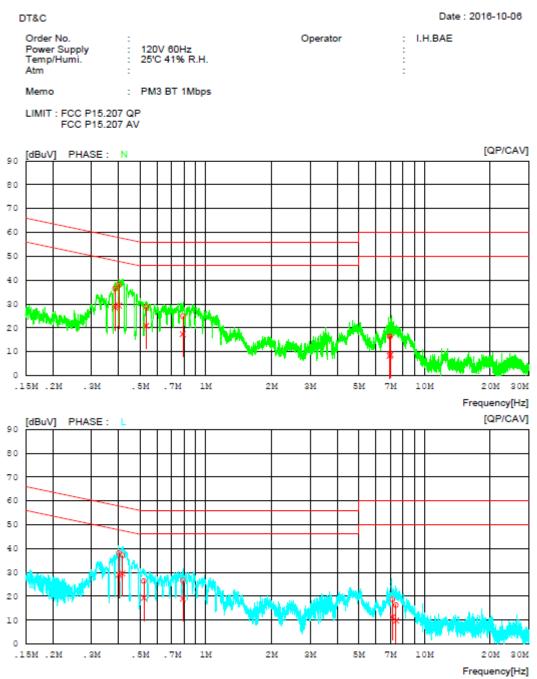
Conducted emissions from the EUT were measured according to the ANSI C63.10.

- 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>

Results of Conducted Emission



DT&C

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

Results of Conducted Emission

Date : 2016-10-06	

Order No. Power Supply Temp/Humi. Atm			120V 60Hz 25'C 41% R.H.		Operator		: I.H.BAE	
Memo		:	PM3 BT	1Mbps				
LIMIT : FCC P15.207 QP FCC P15.207 AV								
NO	FREQ	REA QP	DING CAV	C.FACTOR	RESULT QP CAV	LIMIT QP CAV	MARGIN QP CAV	PHASE
	[MHz]	[dBuV][dBuV] [dB]	[dBuV][dBuV] [dBuV][dBu	V] [dBuV][dBuV	7]
1	0.38466	35.60	27.66	0.92	36.52 28.58	58.18 48.18	21.6619.60	N
2	0.40115	37.36	28.55	0.87	38.2329.42	57.83 47.83	19.6018.41	N
3	0.53416	28.06	20.22	0.65	28.7120.87	56.00 46.00	27.2925.13	N
4	0.78580	24.39	16.92	0.47	24.8617.39	56.00 46.00	31.1428.61	N
5	6.93063	16.01	7.86	0.36	16.37 8.22	60.00 50.00	43.6341.78	N
6	6.99961	16.12	8.43	0.36	16.48 8.79	60.00 50.00	43.5241.21	N
7	0.40050	37.17	28.10	0.90	38.0729.00	57.84 47.84	19.77 18.84	L
8	0.41550	36.19	28.73	0.87	37.0629.60	57.54 47.54	20.4817.94	L
9	0.52150	25.58	18.62	0.69	26.27 19.31	56.00 46.00	29.7326.69	L
10	0.78622	26.09	18.44	0.50	26.5918.94	56.00 46.00	29.4127.06	L
11	7.14857	18.16	10.86	0.40	18.5611.26	60.00 50.00	41.4438.74	L
12	7.43422	15.83	9.34	0.40	16.23 9.74	60.00 50.00	43.77 40.26	L



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 internal antenna was permanently printed on the main PCB. (Refer to Internal Photo file.)

- 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. Occupied Bandwidth (99 %)

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.

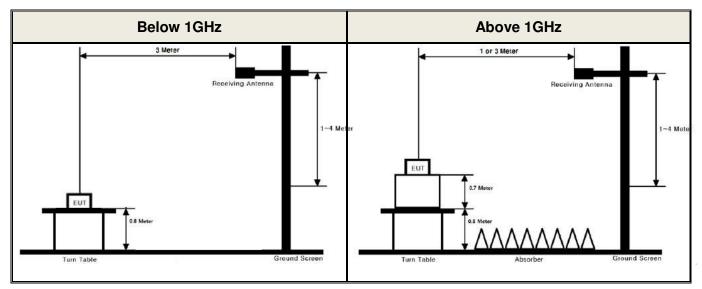
10.4 Test Results

Not Applicable

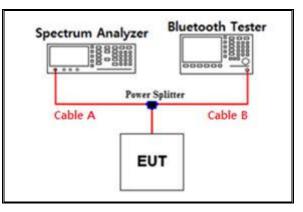
APPENDIX I

Test set up diagrams

Radiated Measurement



Conducted Measurement



Path loss information

Frequency (GHz)	Path Loss (dB)	Frequency (GHz)	Path Loss (dB)
0.03	6.21	15	11.14
1	7.29	20	11.79
2402 & 2440 & 2480	8.27	25	13.06
5	9.54	-	-
10	9.63	-	-

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

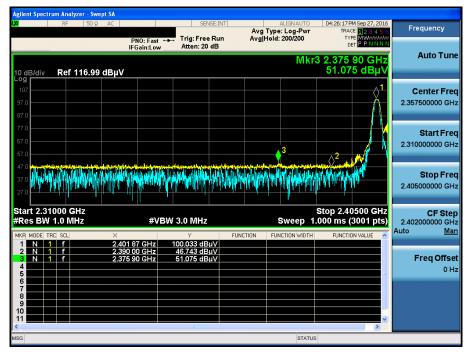
Path loss (S/A's Correction factor) = Cable A + Power splitter



APPENDIX II

Unwanted Emissions (Radiated) Test Plot

GFSK & Lowest & X & Hor



GFSK & Lowest & X & Hor





GFSK & Highest & X & Hor



Detector Mode : AV

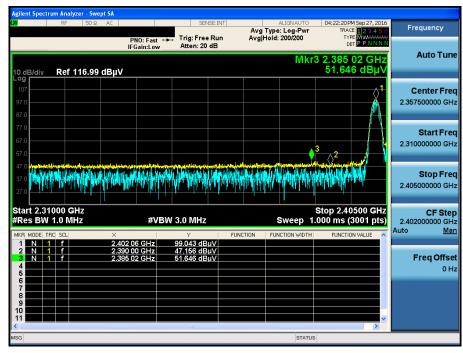
GFSK & Highest & X & Hor





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

Detector Mode : PK



Detector Mode : AV

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

	RF	50 Ω	AC			SENSE:			ALIGN AUTO		PM Sep 27, 2016	Frequency
				PNO: Fast IFGain:Low		g:FreeRu en:20 dB	ın		/pe: Voltage ld: 200/200	Th	CE 123456 (PE MWWWWWWW DET P P N N N N	Frequency
) dB/div	Ref 1	16.99 (Mkı	3 2.386 41.51	00 GHz I9 dBµV	Auto Tu
0 g 107 17.0												Center Fi 2.357500000 0
7.0 7.0 7.0										3,2		Start Fi 2.310000000 G
7.0 7.0 7.0											~/	Stop Fi 2.405000000 G
tart 2.31 Res BW				#VI	3W 1.0	kHz			Sweep 7		0500 GHz (3001 pts)	CF S1 2.402000000 G Auto M
KR MODE T			× 2.402	06 GHz	06.1	34 dBuV	FUNCTI	ION F	UNCTION WIDTH	FUNCTI	ON VALUE	Auto <u>n</u>
2 N 4 3 N 4 5	f		2.390	00 GHz 00 GHz	39.6	32 dBμV 32 dBμV 19 dBμV						Freq Off 0
6 7 8 9 0												
1											~	



π /4DQPSK & Highest & X & Hor

Detector Mode : PK



π/4DQPSK & Highest & X & Hor





8DPSK & Lowest & X & Hor

Frequency Avg Type: Log-Pwr Avg|Hold: 200/200 PNO: Fast ↔ Trig: Free Run IFGain:Low Atten: 20 dB Auto Tune Mkr3 2.386 54 GH2 51.121 dBµ\ Ref 116.99 dBµV B/div Center Freq 2.357500000 GHz Start Freq 2.310000000 GHz n a sense and a sense of the sense Stop Freq 2.405000000 GHz Stop 2.40500 GHz 1.000 ms (3001 pts) Start 2.31000 GHz #Res BW 1.0 MHz CF Step 2.40200000 GHz uuto <u>Man</u> #VBW 3.0 MHz Sweep Auto 99.229 dBµ\ 47.764 dBµ\ 51.121 dBµ\ Freq Offset 0 Hz STATUS

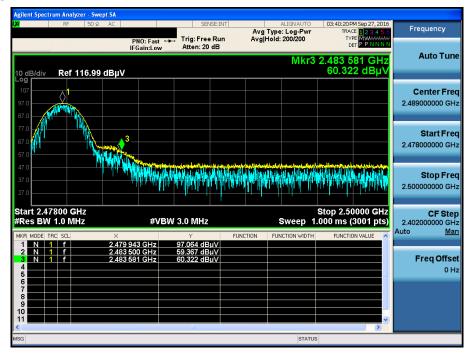
Detector Mode : AV

8DPSK & Lowest & X & Hor

	RF 5		'NO: Fast ↔ Gain:Low	Trig: Free Ru Atten: 20 dB	#Avg	ALIGNAUTO g Type: Voltage Hold: 200/200	TRACE	Sep 27, 2016 1 2 3 4 5 6 MWWWWWW P P N N N N	Frequency
dB/div	Ref 116.	99 dBµV	Gam.cow	TREET. LO UD		Mkr	3 2.385 8 41.748		Auto Tu
29 107 7.0 7.0								^1 	Center Fr 2.357500000 G
7.0 7.0 7.0									Start Fr 2.310000000 G
7.0 7.0 7.0					Aurori, mart, martan		³ 2		Stop Fr 2.405000000 G
art 2.310 Res BW	1.0 MHz	×	#VB\	V 1.0 kHz	FUNCTION	Sweep 7	Stop 2.403 4.20 ms (3	001 pts)	CF St 2.402000000 G Auto <u>N</u>
1 N 1 2 N 1 3 N 1 4 5	f f f	2.401 9	9 GHz 0 GHz 4 GHz	96.166 dBµV 39.581 dBµV 41.748 dBµV					Freq Off 0
6 7 8 9									



8DPSK & Highest & X & Hor



Detector Mode : AV

8DPSK & Highest & X & Hor





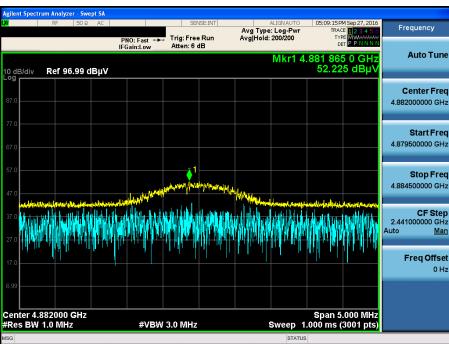
GFSK & Middle & X & Hor

Detector Mode : PK



π/4DQPSK & Middle & X & Hor

Detector Mode : PK





8DPSK & Middle & X & Hor





GFSK & Hopping mode & X & Hor

Detector Mode : PK

Agilent Spectrum Analyzer - Swept SA						
LXI RF 50 Ω AC		SENSE:I	Avg T	ALIGNAUTO	04:30:20 PM Sep 27, 201 TRACE 2 3 4 5 TYPE MWWWWW	Frequency
10 dB/div Ref 116.99 dBµ	PNO: Fast ↔ IFGain:Low	Trig: Free Ru Atten: 20 dB	in Avg H	old: 300/300 Mkr	3 2.384 45 GHz 51.100 dBµ\	Auto Tune
107 97.0 87.0					<u> </u>	Center Fred 2.357500000 GH;
77.0				(3	Start Fred 2.310000000 GH
47.0 37.0 27.0	nt de la construction de la construcción de la construcción de la construcción de la construcción de la constru La construcción de la construcción d	n tel ar praise	alanyiy a layin y	ad the state of th	Wetter	Stop Fred 2.405000000 GH:
Start 2.31000 GHz #Res BW 1.0 MHz		/ 3.0 MHz	FUNCTION		Stop 2.40500 GH2 .000 ms (3001 pts FUNCTION VALUE	2.402000000 GH:
2 N 1 f 2	401 87 GHz 390 00 GHz 384 45 GHz	99.989 dBµV 46.389 dBµV 51.100 dBµV				Freq Offse 0 H:
7 8 9 9 9 10 10 10 10 10 10 10 10 10 10 10 10 10						
K MSG		illi.		STATUS		
Mog				STATUS		

GFSK & Hopping mode & X & Hor

	RF	50Ω AC			E:INT		ALIGNAUTO pe: Voltage	TRA	PM Sep 27, 2016 CE 1 2 3 4 5 6	Frequ	ency
			PNO: Fast IFGain:Low	 Trig: Free F Atten: 20 d 		Avg Hole	d: 300/300	T) [PE MWAAAAAA DET P P N N N N		
0 dB/div	Ref 116	.99 dBµV					Mkr		10 GHz 37 dBµV	Au	ito Tun
og 107 97.0										Cen 2.357500	ter Fre 0000 GH
77.0 57.0 57.0										St 2.31000	art Fre
47.0 37.0 27.0							³	2		St 2.405000	op Fre 0000 GH
tart 2.310 Res BW 1	.0 MHz		#VB	W 1.0 kHz			Sweep 7	4.20 ms		2.402000 Auto	CF Ste 0000 G⊦ Ma
KR MODE TRO	f f	2.390	99 GHz 00 GHz	γ 99.900 dBµ 39.815 dBµ	V	TION FL	JNCTION WIDTH	FUNCTI	ON VALUE	_	
3 N 1 4 5	f	2.384	10 GHz	40.987 dBµ	V				=	Fre	q Offse 0 H
6 6 7 8											
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6				ш			STATUS				



GFSK & Hopping mode & X & Hor

Detector Mode : PK

Agilent Spectrum Analyzer - Swept SA			
	ALIGNAUTO Avg Type: Log-Pwr e Run Avg Hold: 1000/1000	03:59:39 PM Sep 27, 2016 TRACE 1 2 3 4 5 6 TYPE MWWWWW	Frequency
Atten: 2) dB	2.483 632 GHz 57.002 dBµV	Auto Tune
107 107 197.0 87.0			Center Fred 2.489000000 GH;
77.0 67.0 57.0			Start Fred 2.478000000 GH:
	alation in all the light of the international states		Stop Fred 2.500000000 GH2
Start 2.47800 GHz #Res BW 1.0 MHz #VBW 3.0 MHz MKR MODEL TRC SCL X Y	Sweep 1	Stop 2.50000 GHz .000 ms (3001 pts) FUNCTION VALUE	CF Step 2.402000000 GH Auto <u>Mar</u>
1 N 1 f 2.480 134 GHz 98.081 d 2 N 1 f 2.483 600 GHz 56.391 d 3 N 1 f 2.483 632 GHz 57.002 d 4 -	βμV		Freq Offse 0 Ha
8 9 10			
MSG	STATUS	>	

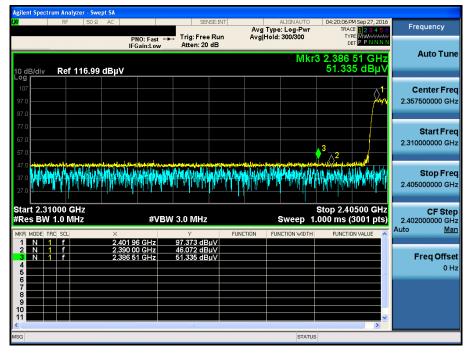
GFSK & Hopping mode & X & Hor

)Ω AC	SENSE		ALIGNAUTO	04:01:16 PM Sep 27,		Frequency
	PNO: Fa IFGain:L	ast ↔→ Trig: Free F .ow Atten: 20 d	Run Avgļī	Type: Voltage Hold: 1000/1000	TRACE 123 TYPE MWW DET P P N	HARABAR	
dB/div Ref 116.	99 dBµV			Mkr3	2.483 940 G 50.887 dB	Hz uV	Auto Tune
Pg 107 7.0							Center Free 2.489000000 GH
7.0	3						Start Free 2.478000000 GH
7.0							Stop Fre 2.500000000 GH
tart 2.47800 GHz Res BW 1.0 MHz		≇VBW 1.0 kHz		Sweep 1	Stop 2.50000 (7.20 ms (3001	pts)	CF Ste 2.402000000 GH Auto Ma
	×	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE		
KR MODE TRC SCL 1 N 1 f 2 N 1 f 3 N 1 f 4 5	2.480 024 GH 2.483 500 GH 2.483 940 GH	z 50.405 dBµ\	V				Freq Offse 0 H
1 N 1 F 2 N 1 F 3 N 1 F 4	2.480 024 GH 2.483 500 GH	z 50.405 dBµ\	V				



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

Detector Mode : PK



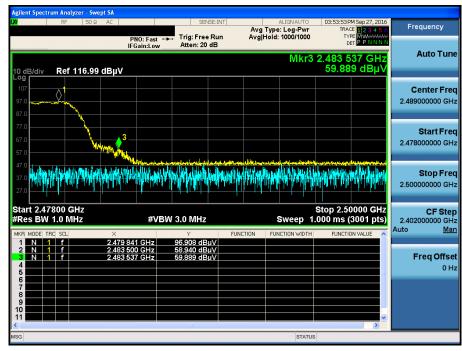
$\pi/4DQPSK$ & Hopping mode & X & Hor

RF	50 Ω AC		SENSE:IN		ALIGNAUTO		M Sep 27, 2016	Frequency
		PNO: Fast ← IFGain:Low	Trig: Free Run Atten: 20 dB		g Type: Voltage Hold: 300/300	TY	23456 92 MWWWWWW 27 P P N N N N	
dB/div Ref	116.99 dBµV				Mkı	3 2.386 41.34	06 GHz 2 dBµV	Auto Tu
99 07 7.0 7.0							^1	Center Fr 2.357500000 G
7.0								Start F 2.310000000 (
7.0				1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -		• ³		Stop F 2.405000000
art 2.31000 G Res BW 1.0 M		#VBI	N 1.0 kHz		Sweep 7	Stop 2.40 4.20 ms (0500 GHz 3001 pts)	CF S 2.402000000 (Auto
Image: R MODE TRC SCL 1 N 1 f 2 N 1 f 3 N 1 f	2.39	1 96 GHz 0 00 GHz 6 06 GHz	Υ 96.167 dBμV 40.459 dBμV 41.342 dBμV	FUNCTION	FUNCTION WIDTH	FUNCTI	ON VALUE	Freq Off
								ſ



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

Detector Mode : PK



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





8DPSK & Hopping mode & X & Hor

Detector Mode : PK

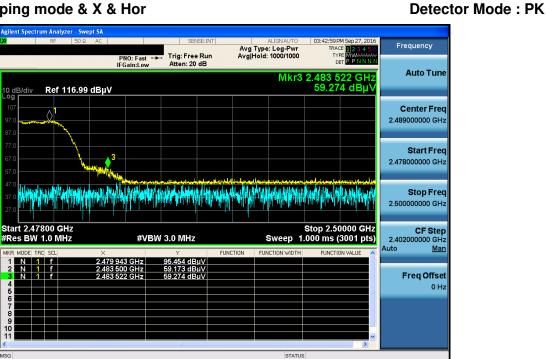
Agilent Spec												
LXI	RF	50 Ω	AC	PNO: Fast		Run		ALIGNAUTO ype: Log-Pwr old: 300/300	TRA T)	PM Sep 27, 2016 CE 1 2 3 4 5 ((PE MW	Frequenc	У
10 dB/div	Ref	f 116.99	dBµV	IFGain:Low	Atten: 20				3 2.385	53 GHz 6 dBμV	Auto	Гun
Log 107 97.0 87.0										A lange	Center 2.357500000	
77.0 67.0 57.0								(³ 2		Start 2.310000000	
47.0 37.0 27.0	h/19#	r halfeninger	halwi he		her mentander	WANNA A	*/ */*/*/*/	honori linin	I rmplin	M	Stop 2.405000000	
Start 2.3 #Res BV	i 1.0 I	VIHz	×	#VE	3W 3.0 MHz	510	CTION	Sweep 1	.000 ms	0500 GHz (3001 pts)	2.402000000 Auto	
1 N	1 f		2.40	1 96 GHz 0 00 GHz	98.917 dB 47.889 dB	μV		FUNCTION WIDTH	FUNCT			
4 5	1 f		2.39	5 53 GHz	51.676 dB	μV μV				_	Freq O	offse 0 H
6 7 8												
9 10 11										~	J A	
<								Ú	-1	>		
MSG								STATU	5			

8DPSK & Hopping mode & X & Hor

	RF	50 Ω A		ast 🔸	Trig: Free			ALI Type: \ Hold: 30		TRA T)	PM Sep 27, 20 ACE 1234 (PE MWANAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	56 AAAA	Frequency
) dB/div	Ref 11	l6.99 dE	IFGain:	Low	Atten: 20	dB			Mkr	3 2.386			Auto Tur
9 g 107 17.0												1	Center Fr 2.357500000 G
7.0 7.0 7.0													Start Fr 2.310000000 G
7.0 7.0 7.0					1					³ 2			Stop Fr 2.405000000 G
tart 2.310 Res BW 7	I.O MH	z	×		i 1.0 kHz Y		INCTION			Stop 2.4 4.20 ms FUNCT		s)	CF St 2.402000000 G Auto <u>N</u>
1 N 1 2 N 1 3 N 1 4 5 6	f f		2.401 99 GI 2.390 00 GI 2.386 16 GI	-Iz	96.157 dBi 40.376 dBi 41.304 dBi	uV							Freq Offs 0
7 8 9 0 1												~	
											>		



8DPSK & Hopping mode & X & Hor



8DPSK & Hopping mode & X & Hor

