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)
2378.31	V	X	PK	48.90	0.70	N/A	N/A	49.60	74.00	24.40
2378.31	V	X	AV	48.90	0.70	-24.79	N/A	24.81	54.00	29.19
4803.14	H	Z	PK	45.15	4.77	N/A	N/A	49.92	74.00	24.08
4803.14	H	Z	AV	45.15	4.77	-24.79	N/A	25.13	54.00	28.87

▪ 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)
4882.45	H	Z	PK	45.99	5.11	N/A	N/A	51.10	74.00	22.90
4882.45	H	Z	AV	45.99	5.11	-24.79	N/A	26.31	54.00	27.69

▪ 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)
2486.72	V	X	PK	49.68	1.07	N/A	N/A	50.75	74.00	23.25
2486.72	V	X	AV	49.68	1.07	-24.79	N/A	25.96	54.00	28.04
4960.25	H	Z	PK	45.11	5.34	N/A	N/A	50.45	74.00	23.55
4960.25	H	Z	AV	45.11	5.34	-24.79	N/A	25.66	54.00	28.34

▪ **Note.**

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

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

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

   When distance factor is “N/A”, the distance is 3 m and distance factor is not applied.
3. D.C.F Calculation. (D.C.F = Duty Cycle Correction Factor)
   - Time to cycle through all channels = Δt = T [ms] X 20 minimum hopping channels , where T = pulse width = **2.88 ms**
   - 100 ms / Δt [ms] = H -> Round up to next highest integer, to account for worst case, H' = **100 / (2.88 X 20)** = **1.74 ≒ 2**
   - The Worst Case Dwell Time = T [ms] x H' = **2.88 ms X 2** = **5.76 ms**
   - D.C.F = 20 Log(The Worst Case Dwell Time / 100 ms) dB = **20 log(5.76 / 100)** = **-24.79 dB**
4. Sample Calculation.

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

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

.

9 kHz ~ 25 GHz Data (Modulation : *__8DPSK__*)

▪ 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)
2387.43	V	X	PK	50.05	0.70	N/A	N/A	50.75	74.00	23.25
2387.43	V	X	AV	50.05	0.70	-24.79	N/A	25.96	54.00	28.04
4803.80	H	Z	PK	44.85	4.77	N/A	N/A	49.62	74.00	24.38
4803.80	H	Z	AV	44.85	4.77	-24.79	N/A	24.83	54.00	29.17

▪ 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)
4881.89	H	Z	PK	45.33	5.11	N/A	N/A	50.44	74.00	23.56
4881.89	H	Z	AV	45.33	5.11	-24.79	N/A	25.65	54.00	28.35

▪ Highest Channel

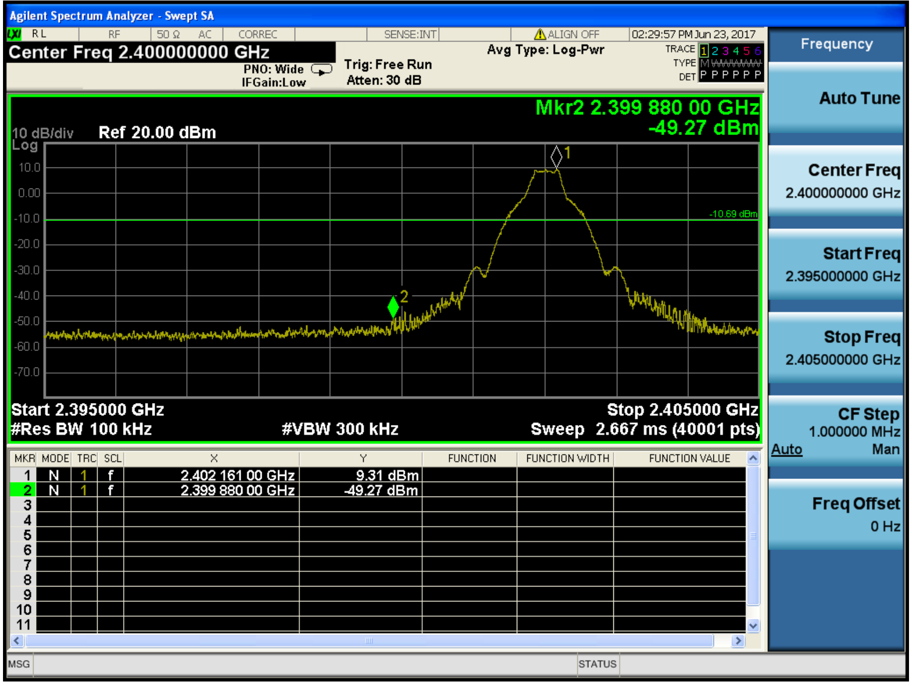
Frequency (MHz)	ANT Pol	The worst case EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	D.C.F (dB)	Distance Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
2492.22	V	X	PK	49.88	1.07	N/A	N/A	50.95	74.00	23.05
2492.22	V	X	AV	49.88	1.07	-24.79	N/A	26.16	54.00	27.84
4960.43	H	Z	PK	44.78	5.34	N/A	N/A	50.12	74.00	23.88
4960.43	H	Z	AV	44.78	5.34	-24.79	N/A	25.33	54.00	28.67

▪ **__Note.__**

1. The radiated emissions were investigated up to 25GHz. And no other spurious and harmonic emissions were found above listed frequencies.
2. Information of Distance Factor
   For finding emissions, the test distance might be reduced from 3m to 1m. In this case, the distance factor(-9.54dB) is applied to the result.
   - Calculation of distance factor = 20 log(applied distance / required distance) = **20 log(1 m / 3 m)** = **__-9.54 dB__**
   When distance factor is "N/A", the distance is 3 m and distance factor is not applied.
3. D.C.F Calculation. (D.C.F = Duty Cycle Correction Factor)
   - Time to cycle through all channels = Δt = T [ms] X 20 minimum hopping channels , where T = pulse width = **2.88 ms**
   - 100 ms / Δt [ms] = H -> Round up to next highest integer, to account for worst case, H' = **100 / (2.88 X 20)** = **1.74 ≒ 2**
   - The Worst Case Dwell Time = T [ms] x H' = **2.88 ms X 2** = **5.76 ms**
   - D.C.F = 20 Log(The Worst Case Dwell Time / 100 ms) dB = **20 log(5.76 / 100)** = **__-24.79 dB__**
4. Sample Calculation.
   Margin = Limit – Result / Result = Reading + T.F + D.C.F / T.F = AF + CL – AG
   Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain.

7.4.3. Conducted Spurious Emissions

Low Band-edge *__Lowest Channel & Modulation : GFSK__*



Agilent Spectrum Analyzer - Swept SA

02:29:57 PM Jun 23, 2017

Center Freq 2.400000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr

Mkr2 2.399 880 00 GHz
-49.27 dBm

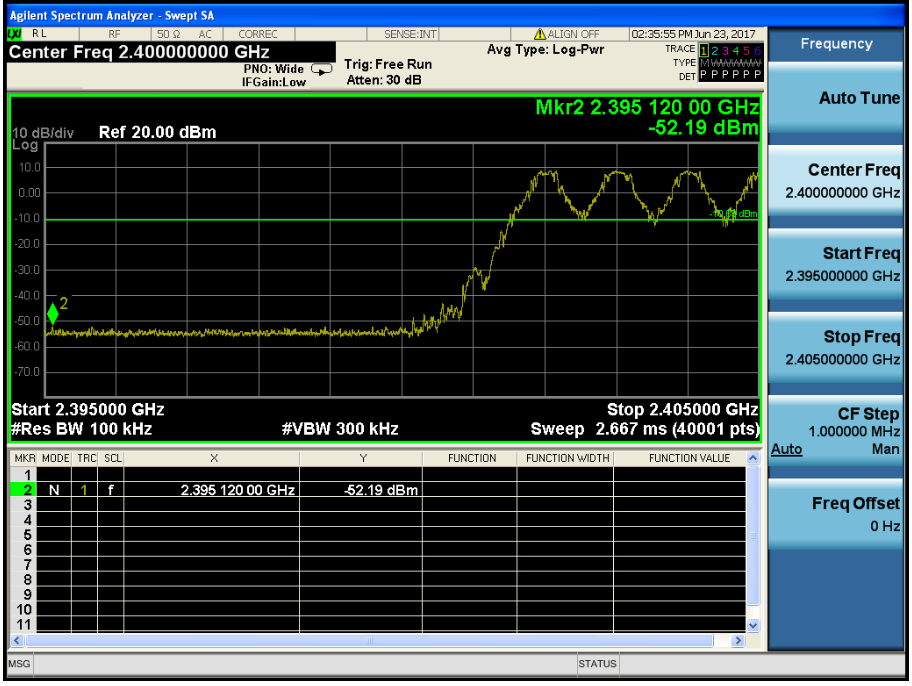
10 dB/div Ref 20.00 dBm

Start 2.395000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.405000 GHz
Sweep 2.667 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.402 161 00 GHz	9.31 dBm			
2	N	1	f	2.399 880 00 GHz	-49.27 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

RL
RF
50 Ω
AC
CORREC
SENSE:INT
ALIGN OFF
TRACE 1 2 3 4 5 6
TYPE
DET P P P P P P
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-10.69 dBm
1
2
Frequency
Auto Tune
Center Freq 2.400000000 GHz
Start Freq 2.395000000 GHz
Stop Freq 2.405000000 GHz
CF Step 1.000000 MHz
Auto
Man
Freq Offset 0 Hz
MSG
STATUS

Low Band-edge *__Hopping mode & Modulation : GFSK__*



Agilent Spectrum Analyzer - Swept SA

02:35:55 PM Jun 23, 2017

Center Freq 2.400000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr

Mkr2 2.395 120 00 GHz
-52.19 dBm

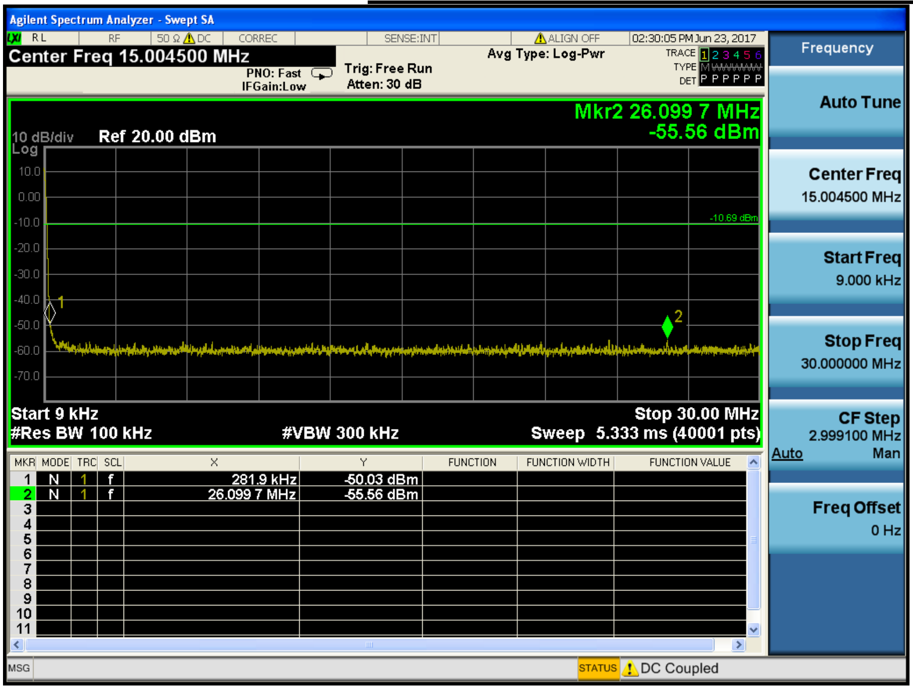
10 dB/div Ref 20.00 dBm

Start 2.395000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.405000 GHz
Sweep 2.667 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1								
2	N	1	f	2.395 120 00 GHz	-52.19 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

RL
RF
50 Ω
AC
CORREC
SENSE:INT
ALIGN OFF
TRACE 1 2 3 4 5 6
TYPE
DET P P P P P P
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
2
Frequency
Auto Tune
Center Freq 2.400000000 GHz
Start Freq 2.395000000 GHz
Stop Freq 2.405000000 GHz
CF Step 1.000000 MHz
Auto
Man
Freq Offset 0 Hz
MSG
STATUS

Conducted Spurious Emissions *Lowest Channel & Modulation : GFSK*



Agilent Spectrum Analyzer - Swept SA

Center Freq 15.004500 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
02:30:05 PM Jun 23, 2017

Mkr2 26.099 7 MHz
-55.56 dBm

10 dB/div Ref 20.00 dBm

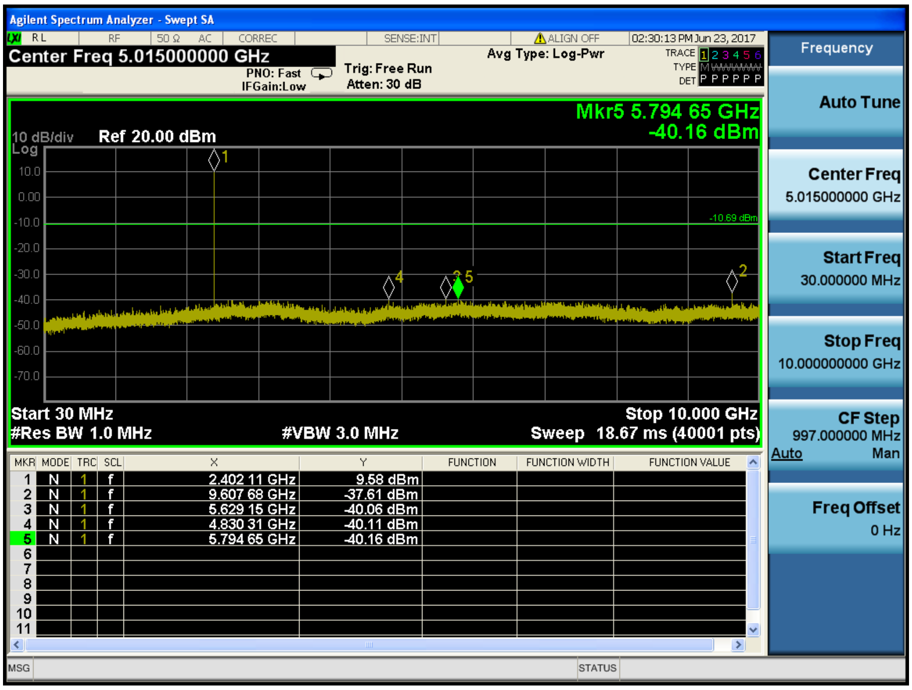
Start 9 kHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 30.00 MHz
Sweep 5.333 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	281.9 kHz	-50.03 dBm			
2	N	1	f	26.099 7 MHz	-55.56 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

Frequency
Auto Tune
Center Freq 15.004500 MHz
Start Freq 9.000 kHz
Stop Freq 30.000000 MHz
CF Step 2.999100 MHz Auto Man
Freq Offset 0 Hz

STATUS DC Coupled

RL
RF
50 Ω DC
CORREC
SENSE:INT
ALIGN OFF
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-10.69 dBm
1
2
MSG



Agilent Spectrum Analyzer - Swept SA

Center Freq 5.015000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
02:30:13 PM Jun 23, 2017

Mkr5 5.794 65 GHz
-40.16 dBm

10 dB/div Ref 20.00 dBm

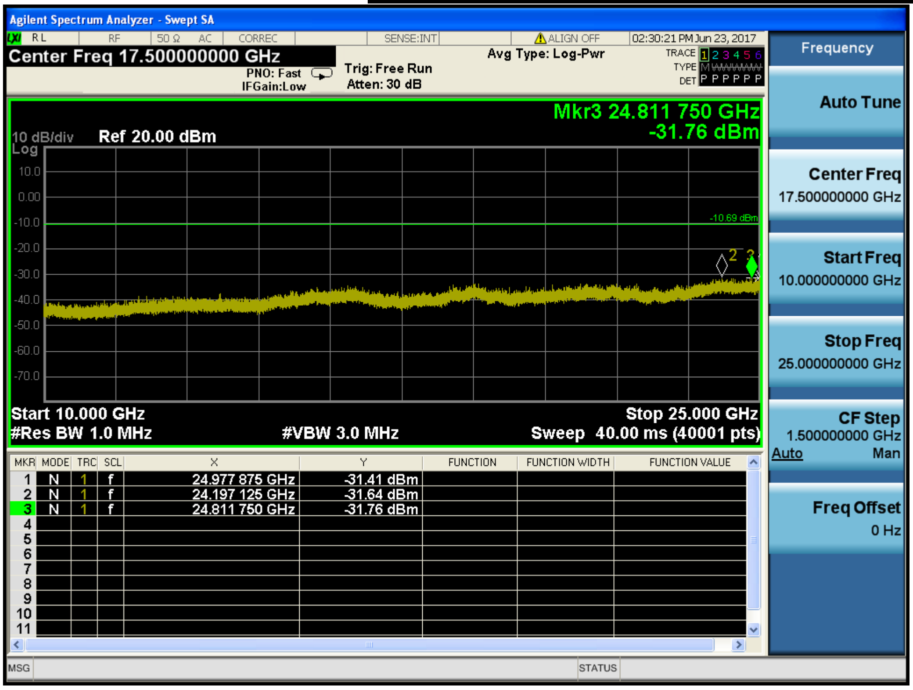
Start 30 MHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 10.000 GHz
Sweep 18.67 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.402 11 GHz	9.58 dBm			
2	N	1	f	9.607 68 GHz	-37.61 dBm			
3	N	1	f	5.629 15 GHz	-40.06 dBm			
4	N	1	f	4.830 31 GHz	-40.11 dBm			
5	N	1	f	5.794 65 GHz	-40.16 dBm			
6								
7								
8								
9								
10								
11								

Frequency
Auto Tune
Center Freq 5.015000000 GHz
Start Freq 30.000000 MHz
Stop Freq 10.000000000 GHz
CF Step 997.000000 MHz Auto Man
Freq Offset 0 Hz

RL
RF
50 Ω AC
CORREC
SENSE:INT
ALIGN OFF
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-10.69 dBm
1
4
3 5
2
MSG
STATUS

Conducted Spurious Emissions *Lowest Channel & Modulation : GFSK*


Agilent Spectrum Analyzer - Swept SA
LXI
R L
RF
50 Ω
AC
CORREC
SENSE:INT
ALIGN OFF
TRACE 1 2 3 4 5 6
TYPE M W W W W W
DET P P P P P P
10 dB/div
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-10.69 dBm
2
3
1
Frequency
Auto Tune
Center Freq
17.500000000 GHz
Start Freq
10.000000000 GHz
Stop Freq
25.000000000 GHz
CF Step
1.500000000 GHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

02:30:21 PM Jun 23, 2017

Center Freq 17.500000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr

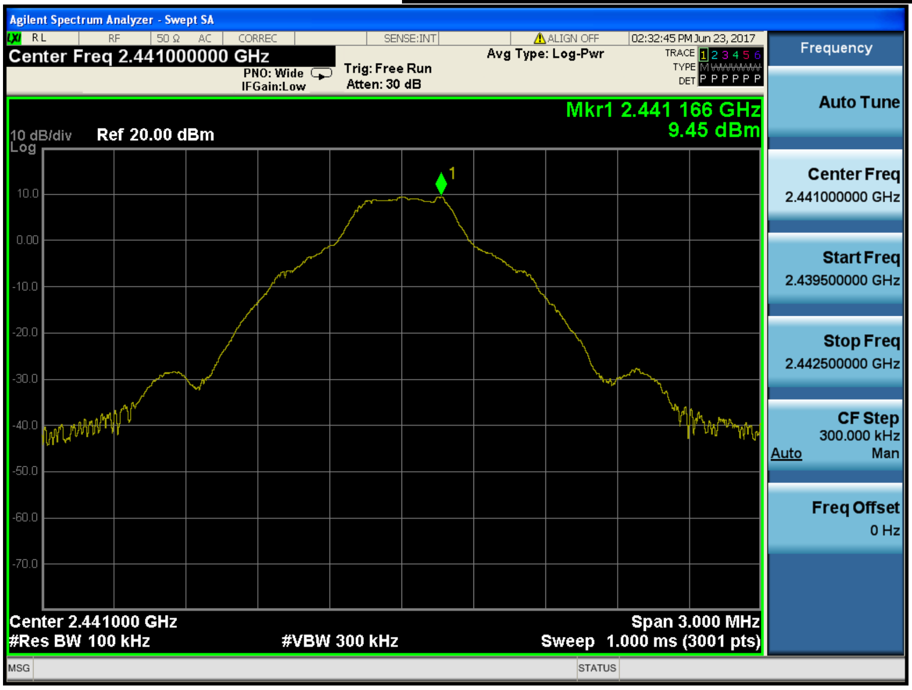
Mkr3 24.811 750 GHz
-31.76 dBm

Ref 20.00 dBm

Start 10.000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 25.000 GHz
Sweep 40.00 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	24.977 875 GHz	-31.41 dBm			
2	N	1	f	24.197 125 GHz	-31.64 dBm			
3	N	1	f	24.811 750 GHz	-31.76 dBm			
4								
5								
6								
7								
8								
9								
10								
11								

Reference for limit *Middle Channel & Modulation : GFSK*



Agilent Spectrum Analyzer - Swept SA

Center Freq 2.441000000 GHz

PNO: Wide IFGain:Low

Trig: Free Run

Atten: 30 dB

Avg Type: Log-Pwr

02:32:45 PM Jun 23, 2017

Mkr1 2.441 166 GHz 9.45 dBm

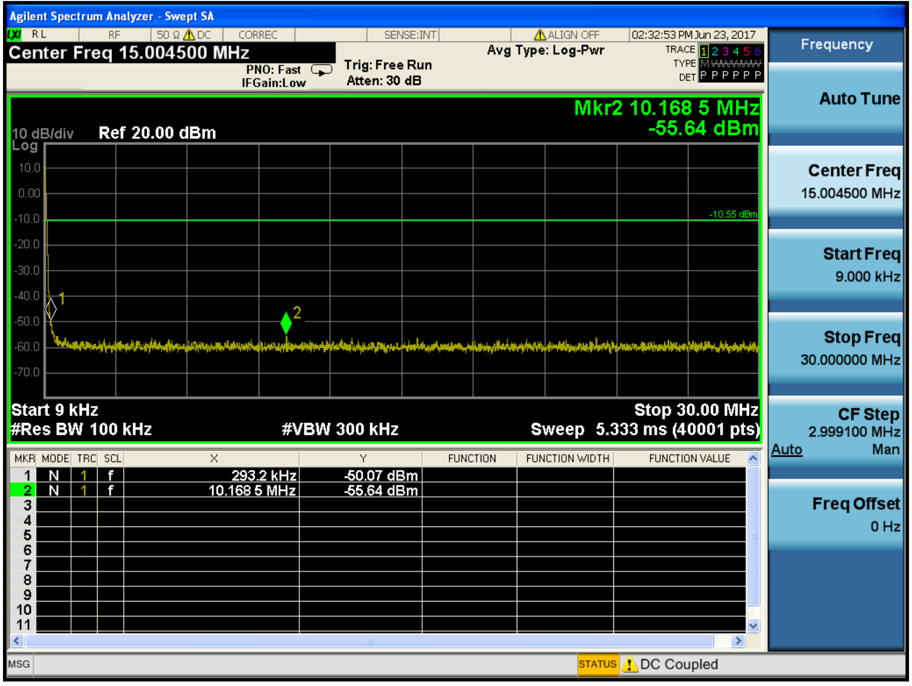
10 dB/div Ref 20.00 dBm

Center 2.441000 GHz Span 3.000 MHz

#Res BW 100 kHz #VBW 300 kHz Sweep 1.000 ms (3001 pts)

R L
RF
50 Ω
AC
CORREC
SENSE:INT
ALIGN OFF
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1
MSG
STATUS
Frequency
Auto Tune
Center Freq
2.441000000 GHz
Start Freq
2.439500000 GHz
Stop Freq
2.442500000 GHz
CF Step
300.000 kHz
Auto
Man
Freq Offset
0 Hz

Conducted Spurious Emissions *Middle Channel & Modulation : GFSK*



Agilent Spectrum Analyzer - Swept SA

Center Freq 15.004500 MHz

PNO: Fast IFGain:Low

Trig: Free Run

Atten: 30 dB

Avg Type: Log-Pwr

02:32:53 PM Jun 23, 2017

Mkr2 10.168 5 MHz -55.64 dBm

10 dB/div Ref 20.00 dBm

-10.55 dBm

Start 9 kHz Stop 30.00 MHz

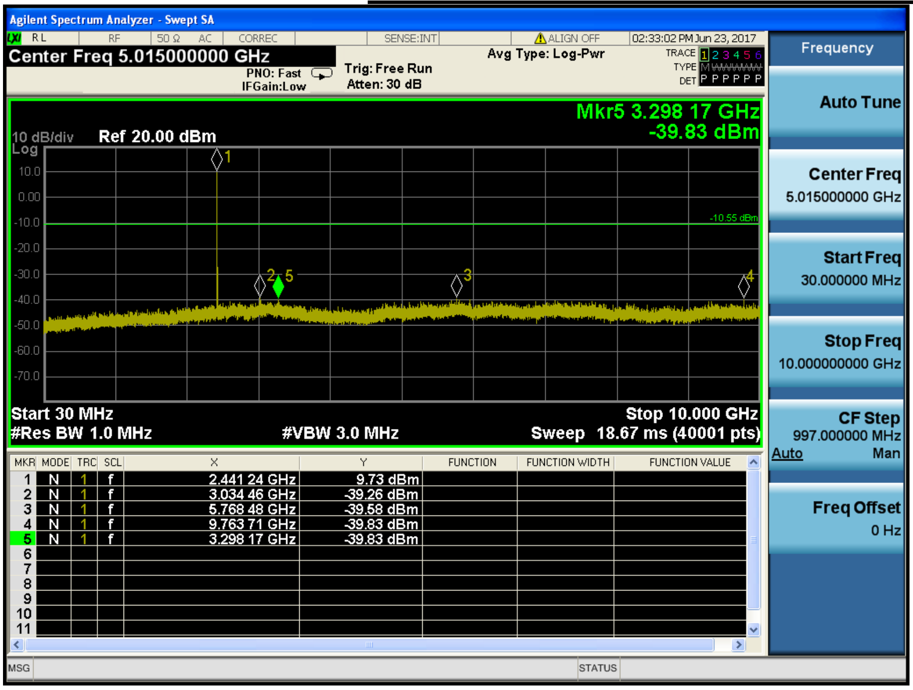
#Res BW 100 kHz #VBW 300 kHz Sweep 5.333 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	293.2 kHz	-50.07 dBm			
2	N	1	f	10.168 5 MHz	-55.64 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

STATUS DC Coupled

R L
RF
50 Ω
DC
CORREC
SENSE:INT
ALIGN OFF
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1
2
MSG
Frequency
Auto Tune
Center Freq
15.004500 MHz
Start Freq
9.000 kHz
Stop Freq
30.000000 MHz
CF Step
2.999100 MHz
Auto
Man
Freq Offset
0 Hz

Conducted Spurious Emissions ***Middle Channel & Modulation : GFSK***



Agilent Spectrum Analyzer - Swept SA

Center Freq 5.015000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
02:33:02 PM Jun 23, 2017

Mkr5 3.298 17 GHz
-39.83 dBm

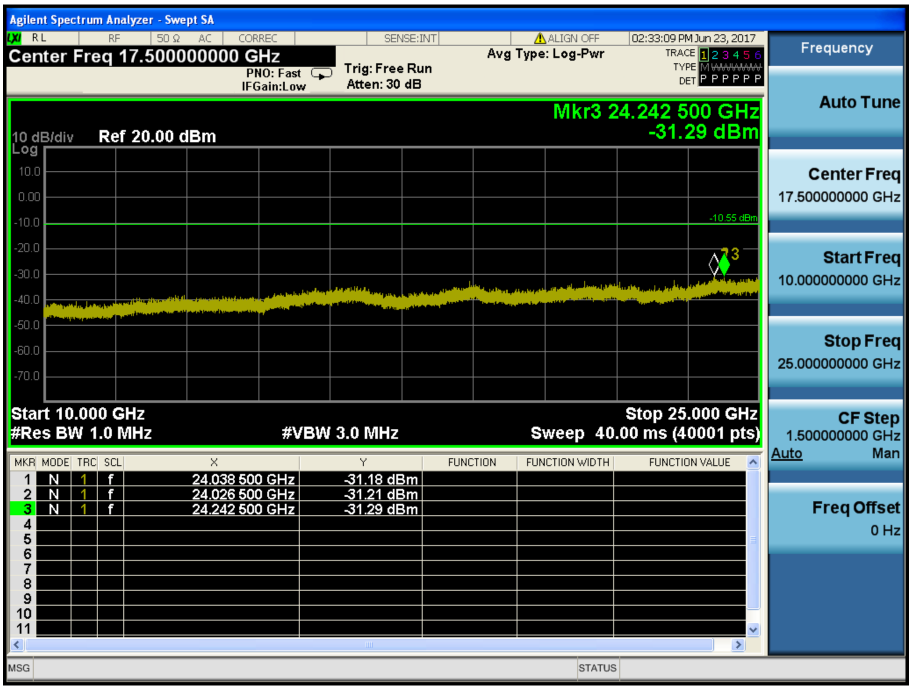
10 dB/div Ref 20.00 dBm

Start 30 MHz
Stop 10.000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Sweep 18.67 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.441 24 GHz	9.73 dBm			
2	N	1	f	3.034 46 GHz	-39.26 dBm			
3	N	1	f	5.768 48 GHz	-39.58 dBm			
4	N	1	f	9.763 71 GHz	-39.83 dBm			
5	N	1	f	3.298 17 GHz	-39.83 dBm			
6								
7								
8								
9								
10								
11								

Center Freq 5.015000000 GHz
Start Freq 30.000000 MHz
Stop Freq 10.000000000 GHz
CF Step 997.000000 MHz
Freq Offset 0 Hz

R L
RF
50 Ω
AC
CORREC
SENSE:INT
ALIGN OFF
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-10.55 dBm
1
2
5
3
4
Frequency
Auto Tune
Auto
Man
MSG
STATUS



Agilent Spectrum Analyzer - Swept SA

Center Freq 17.500000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
02:33:09 PM Jun 23, 2017

Mkr3 24.242 500 GHz
-31.29 dBm

10 dB/div Ref 20.00 dBm

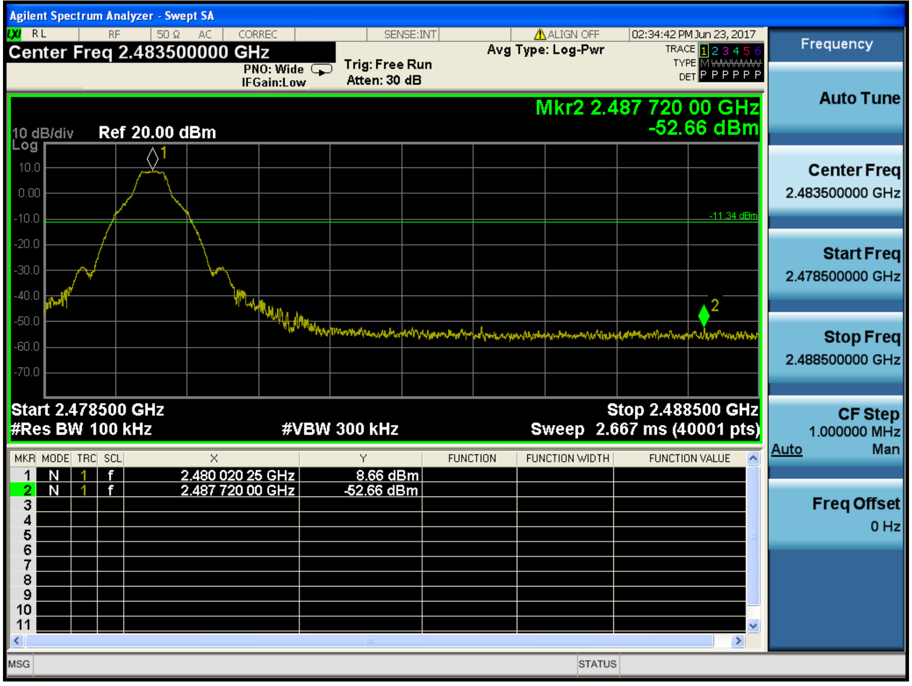
Start 10.000 GHz
Stop 25.000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Sweep 40.00 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	24.038 500 GHz	-31.18 dBm			
2	N	1	f	24.026 500 GHz	-31.21 dBm			
3	N	1	f	24.242 500 GHz	-31.29 dBm			
4								
5								
6								
7								
8								
9								
10								
11								

Center Freq 17.500000000 GHz
Start Freq 10.000000000 GHz
Stop Freq 25.000000000 GHz
CF Step 1.500000000 GHz
Freq Offset 0 Hz

R L
RF
50 Ω
AC
CORREC
SENSE:INT
ALIGN OFF
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-10.55 dBm
3
Frequency
Auto Tune
Auto
Man
MSG
STATUS

High Band-edge ***Highest Channel & Modulation : GFSK***


Agilent Spectrum Analyzer - Swept SA
RL RF 50 Ω AC CORREC SENSE:INT ALIGN OFF
02:34:42 PM Jun 23, 2017
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
10 dB/div Ref 20.00 dBm
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-11.34 dBm
1
2
Frequency
Auto Tune
Center Freq 2.483500000 GHz
Start Freq 2.478500000 GHz
Stop Freq 2.488500000 GHz
CF Step 1.000000 MHz
Auto Man
Freq Offset 0 Hz
MSG
STATUS

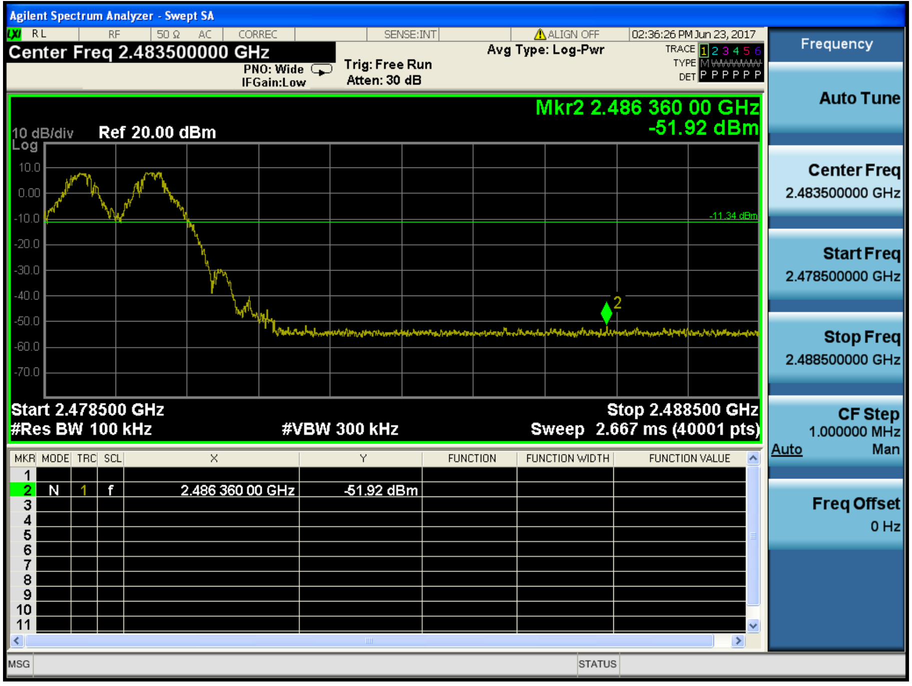
Center Freq 2.483500000 GHz
PNO: Wide IFGain:Low
Trig: Free Run Atten: 30 dB
Avg Type: Log-Pwr

Mkr2 2.487 720 00 GHz -52.66 dBm

Start 2.478500 GHz #Res BW 100 kHz #VBW 300 kHz Stop 2.488500 GHz Sweep 2.667 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.480 020 25 GHz	8.66 dBm			
2	N	1	f	2.487 720 00 GHz	-52.66 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

High Band-edge ***Hopping mode & Modulation : GFSK***


Agilent Spectrum Analyzer - Swept SA
RL RF 50 Ω AC CORREC SENSE:INT ALIGN OFF
02:36:26 PM Jun 23, 2017
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
10 dB/div Ref 20.00 dBm
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-11.34 dBm
2
Frequency
Auto Tune
Center Freq 2.483500000 GHz
Start Freq 2.478500000 GHz
Stop Freq 2.488500000 GHz
CF Step 1.000000 MHz
Auto Man
Freq Offset 0 Hz
MSG
STATUS

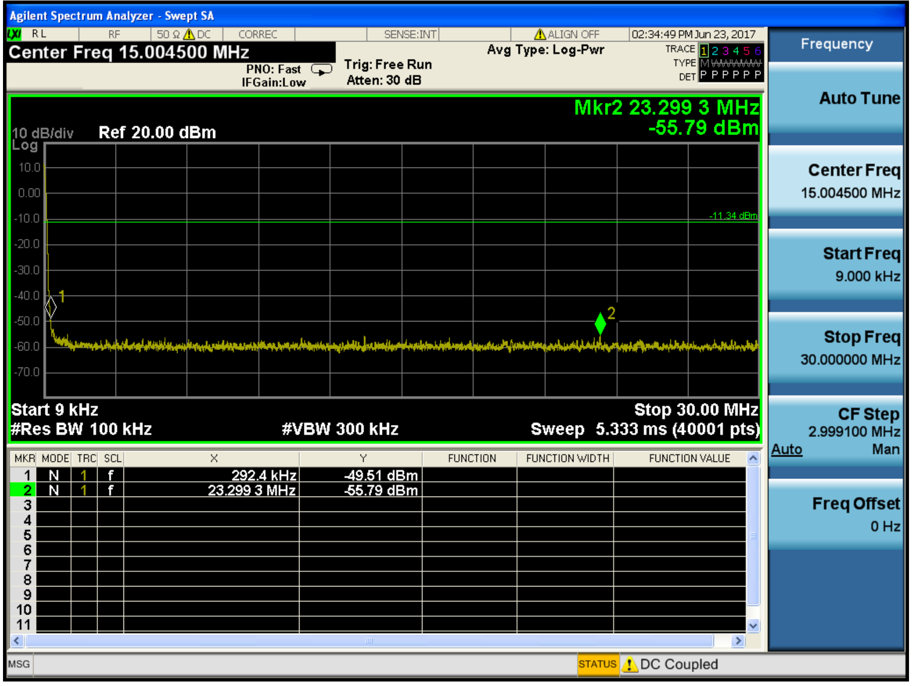
Center Freq 2.483500000 GHz
PNO: Wide IFGain:Low
Trig: Free Run Atten: 30 dB
Avg Type: Log-Pwr

Mkr2 2.486 360 00 GHz -51.92 dBm

Start 2.478500 GHz #Res BW 100 kHz #VBW 300 kHz Stop 2.488500 GHz Sweep 2.667 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1								
2	N	1	f	2.486 360 00 GHz	-51.92 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

Conducted Spurious Emissions *Highest Channel & Modulation : GFSK*



Agilent Spectrum Analyzer - Swept SA

Center Freq 15.004500 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
02:34:49 PM Jun 23, 2017

Mkr2 23.299 3 MHz
-55.79 dBm

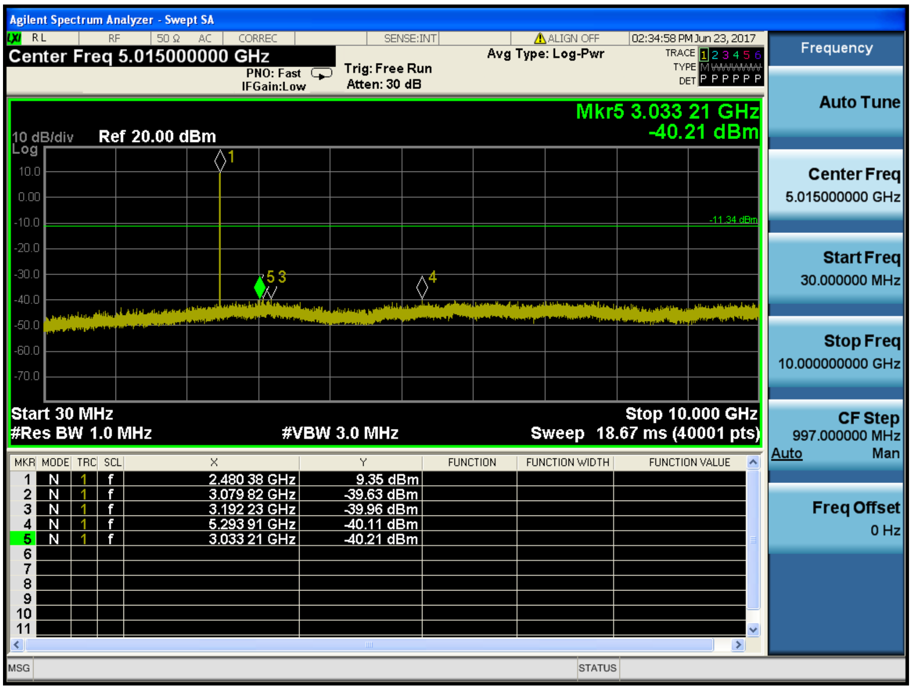
10 dB/div Ref 20.00 dBm

Start 9 kHz
Stop 30.00 MHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 5.333 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	292.4 kHz	-49.51 dBm			
2	N	1	f	23.299 3 MHz	-55.79 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

STATUS DC Coupled

RL
RF
50 Ω DC
CORREC
SENSE:INT
ALIGN OFF
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-11.34 dBm
1
2
MSG
Frequency
Auto Tune
Center Freq
15.004500 MHz
Start Freq
9.000 kHz
Stop Freq
30.000000 MHz
CF Step
2.999100 MHz
Auto
Man
Freq Offset
0 Hz



Agilent Spectrum Analyzer - Swept SA

Center Freq 5.015000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
02:34:58 PM Jun 23, 2017

Mkr5 3.033 21 GHz
-40.21 dBm

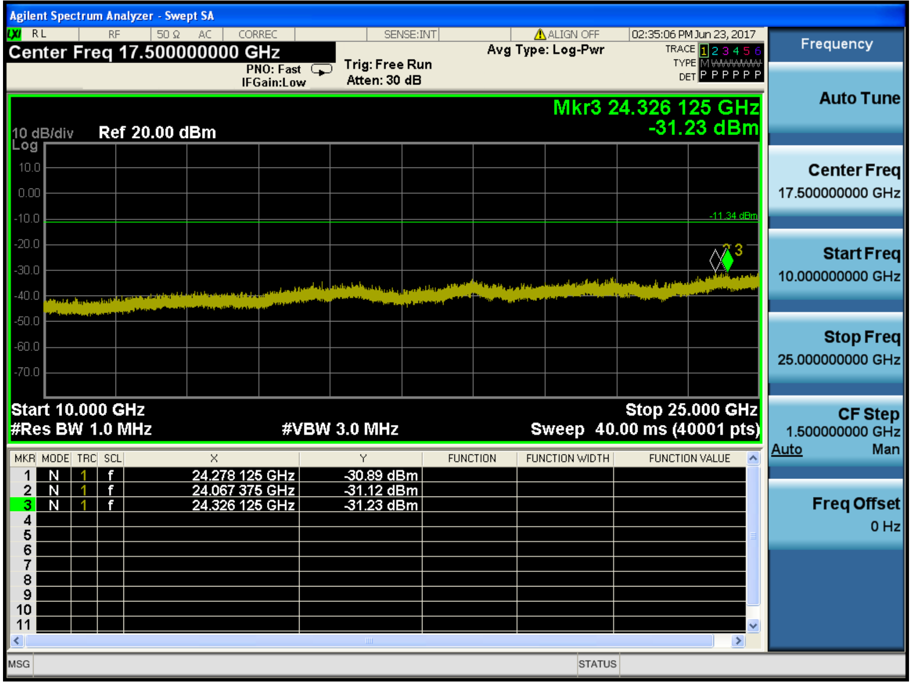
10 dB/div Ref 20.00 dBm

Start 30 MHz
Stop 10.000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Sweep 18.67 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.480 38 GHz	9.35 dBm			
2	N	1	f	3.079 82 GHz	-39.63 dBm			
3	N	1	f	3.192 23 GHz	-39.96 dBm			
4	N	1	f	5.293 91 GHz	-40.11 dBm			
5	N	1	f	3.033 21 GHz	-40.21 dBm			
6								
7								
8								
9								
10								
11								

RL
RF
50 Ω AC
CORREC
SENSE:INT
ALIGN OFF
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-11.34 dBm
1
5 3
4
MSG
STATUS
Frequency
Auto Tune
Center Freq
5.015000000 GHz
Start Freq
30.000000 MHz
Stop Freq
10.000000000 GHz
CF Step
997.000000 MHz
Auto
Man
Freq Offset
0 Hz

Conducted Spurious Emissions *Highest Channel & Modulation : GFSK*



Agilent Spectrum Analyzer - Swept SA

RL RF 50 Ω AC CORREC SENSE:INT ALIGN OFF 02:35:06 PM Jun 23, 2017

Center Freq 17.500000000 GHz

PNO: Fast IFGain:Low

Trig: Free Run
Atten: 30 dB

Avg Type: Log-Pwr

TRACE 1 2 3 4 5 6
TYPE M W W W W W
DET P P P P P P

Mkr3 24.326 125 GHz
-31.23 dBm

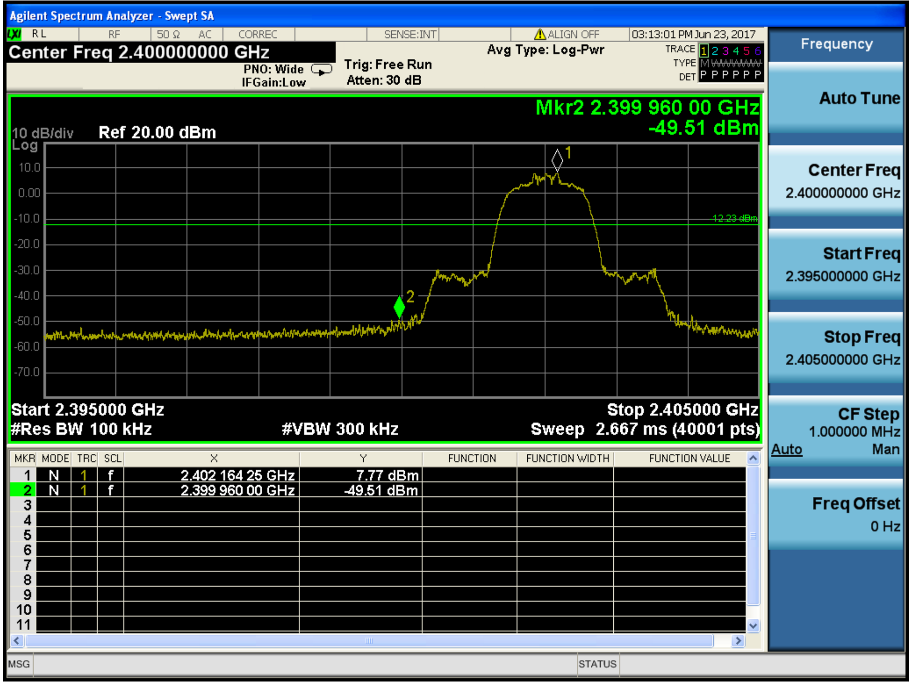
10 dB/div Ref 20.00 dBm

Start 10.000 GHz
Stop 25.000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Sweep 40.00 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	24.278 125 GHz	-30.89 dBm			
2	N	1	f	24.067 375 GHz	-31.12 dBm			
3	N	1	f	24.326 125 GHz	-31.23 dBm			
4								
5								
6								
7								
8								
9								
10								
11								

Frequency
Auto Tune
Center Freq 17.500000000 GHz
Start Freq 10.000000000 GHz
Stop Freq 25.000000000 GHz
CF Step 1.500000000 GHz Auto Man
Freq Offset 0 Hz

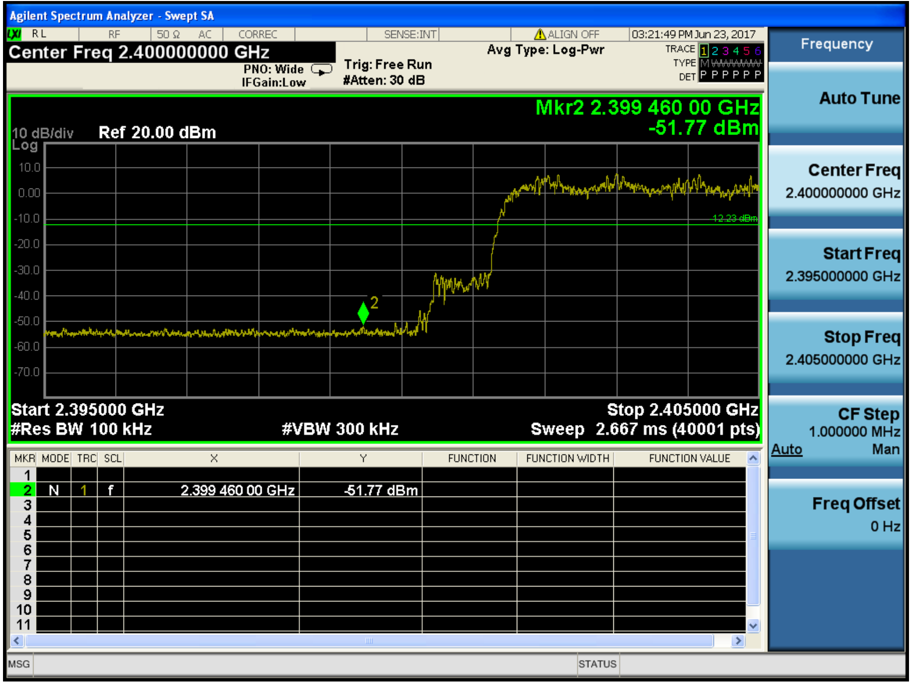
Low Band-edge ***Lowest Channel & Modulation : π/4DQPSK***


Agilent Spectrum Analyzer - Swept SA
03:13:01 PM Jun 23, 2017
Center Freq 2.400000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Mkr2 2.399 960 00 GHz
-49.51 dBm
10 dB/div Ref 20.00 dBm
Start 2.395000 GHz
Stop 2.405000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 2.667 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.402 164 25 GHz	7.77 dBm			
2	N	1	f	2.399 960 00 GHz	-49.51 dBm			

Frequency
Auto Tune
Center Freq 2.400000000 GHz
Start Freq 2.395000000 GHz
Stop Freq 2.405000000 GHz
CF Step 1.000000 MHz Auto Man
Freq Offset 0 Hz
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-12.23 dBm
1
2
MSG
STATUS

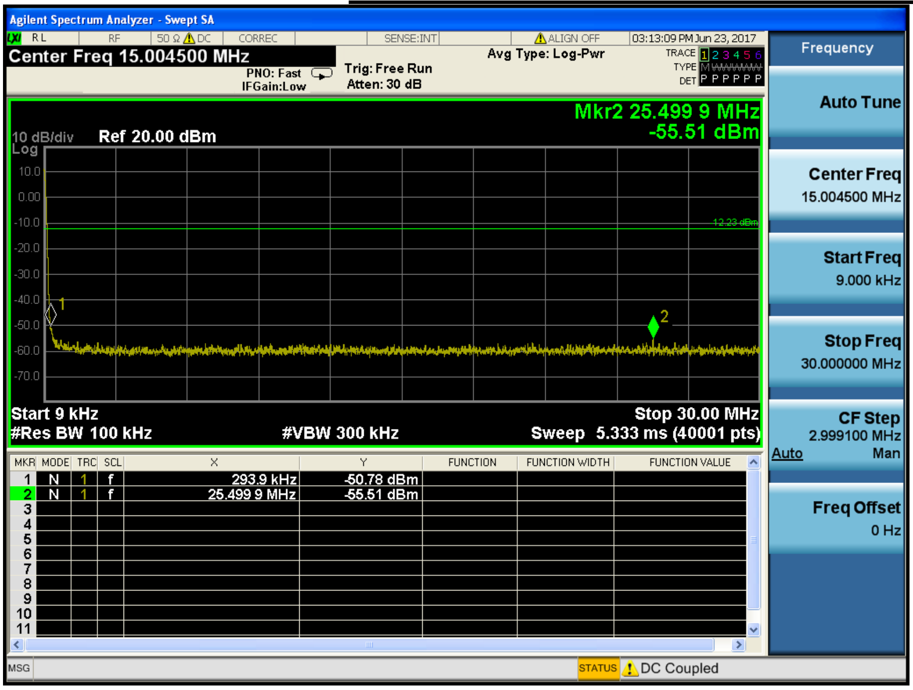
Low Band-edge ***Hopping mode & Modulation : π/4DQPSK***


Agilent Spectrum Analyzer - Swept SA
03:21:49 PM Jun 23, 2017
Center Freq 2.400000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
Mkr2 2.399 460 00 GHz
-51.77 dBm
10 dB/div Ref 20.00 dBm
Start 2.395000 GHz
Stop 2.405000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 2.667 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
2	N	1	f	2.399 460 00 GHz	-51.77 dBm			

Frequency
Auto Tune
Center Freq 2.400000000 GHz
Start Freq 2.395000000 GHz
Stop Freq 2.405000000 GHz
CF Step 1.000000 MHz Auto Man
Freq Offset 0 Hz
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-12.23 dBm
2
MSG
STATUS

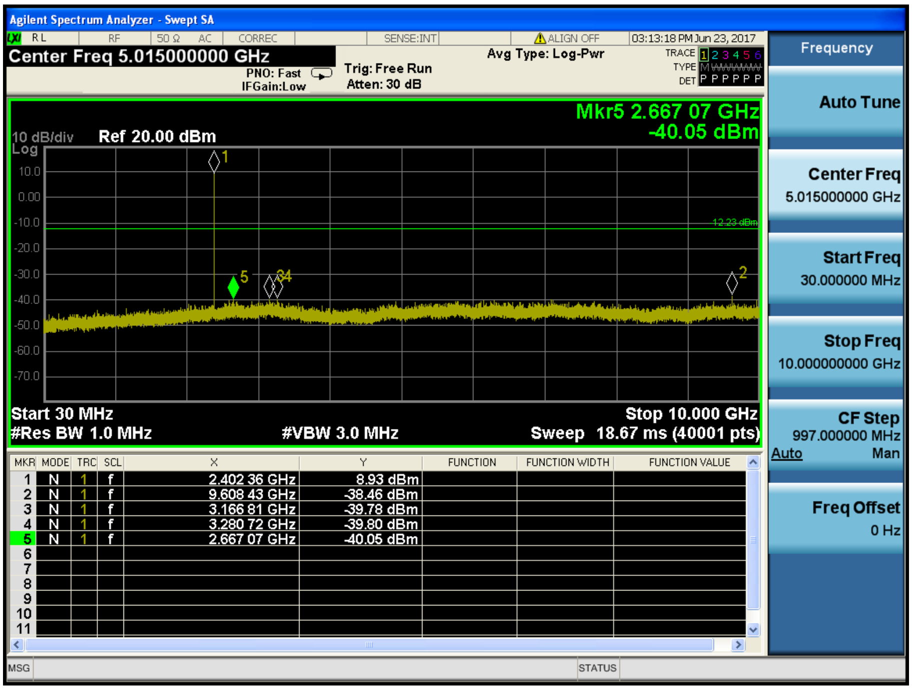
Conducted Spurious Emissions *Lowest Channel & Modulation : π/4DQPSK*


Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω DC
CORREC
SENSE:INT
ALIGN OFF
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-12.23 dBm
1
2
Frequency
Auto Tune
Center Freq
15.004500 MHz
Start Freq
9.000 kHz
Stop Freq
30.000000 MHz
CF Step
2.999100 MHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

03:13:09 PM Jun 23, 2017
Center Freq 15.004500 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Mkr2 25.499 9 MHz
-55.51 dBm
10 dB/div Ref 20.00 dBm
Start 9 kHz
Stop 30.00 MHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 5.333 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	293.9 kHz	-50.78 dBm			
2	N	1	f	25.499 9 MHz	-55.51 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

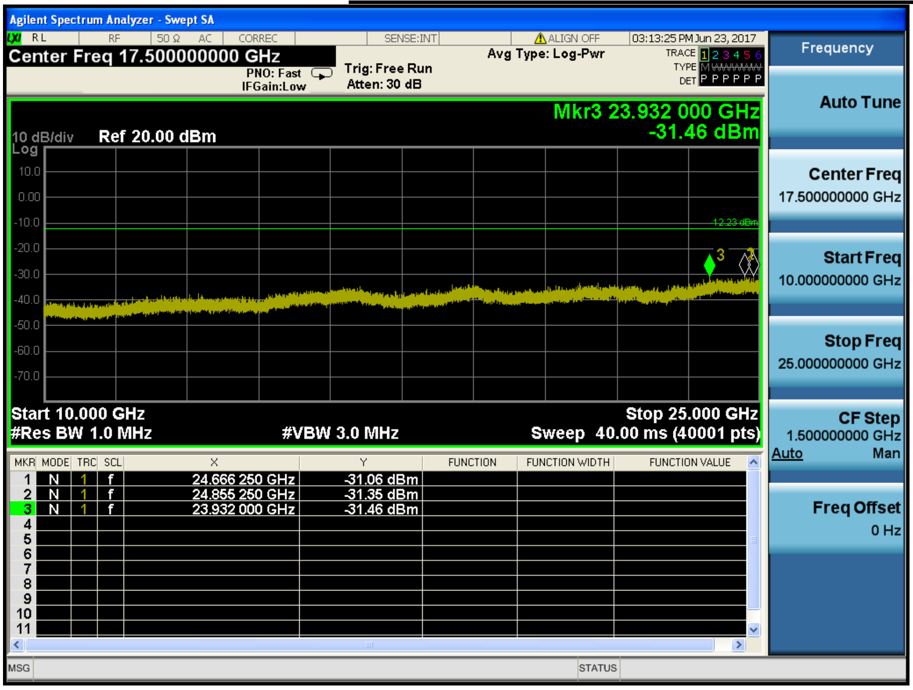
DC Coupled


Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
CORREC
SENSE:INT
ALIGN OFF
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-12.23 dBm
1
5
34
2
Frequency
Auto Tune
Center Freq
5.015000000 GHz
Start Freq
30.000000 MHz
Stop Freq
10.000000000 GHz
CF Step
997.000000 MHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

03:13:18 PM Jun 23, 2017
Center Freq 5.015000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Mkr5 2.667 07 GHz
-40.05 dBm
10 dB/div Ref 20.00 dBm
Start 30 MHz
Stop 10.000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Sweep 18.67 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.402 36 GHz	8.93 dBm			
2	N	1	f	9.608 43 GHz	-38.46 dBm			
3	N	1	f	3.166 81 GHz	-39.78 dBm			
4	N	1	f	3.280 72 GHz	-39.80 dBm			
5	N	1	f	2.667 07 GHz	-40.05 dBm			
6								
7								
8								
9								
10								
11								

Conducted Spurious Emissions ***Lowest Channel & Modulation : π/4DQPSK***


Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω
AC
CORREC
SENSE:INT
ALIGN OFF
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
10 dB/div
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-12.23 dBm
3
MSG
STATUS
Frequency
Auto Tune
Center Freq
Start Freq
Stop Freq
CF Step
Auto
Man
Freq Offset

03:13:25 PM Jun 23, 2017

Center Freq 17.500000000 GHz

PNO: Fast
IFGain:Low

Trig: Free Run
Atten: 30 dB

Avg Type: Log-Pwr

Mkr3 23.932 000 GHz
-31.46 dBm

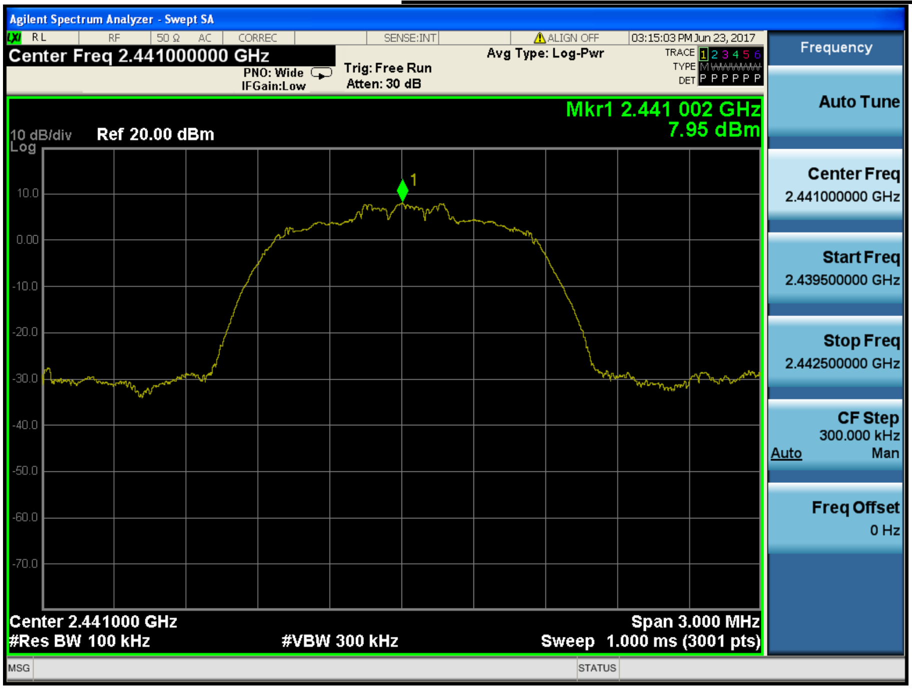
Ref 20.00 dBm

Start 10.000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 25.000 GHz
Sweep 40.00 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	24.666 250 GHz	-31.06 dBm			
2	N	1	f	24.855 250 GHz	-31.35 dBm			
3	N	1	f	23.932 000 GHz	-31.46 dBm			
4								
5								
6								
7								
8								
9								
10								
11								

Center Freq 17.500000000 GHz
Start Freq 10.000000000 GHz
Stop Freq 25.000000000 GHz
CF Step 1.500000000 GHz
Freq Offset 0 Hz

Reference for limit ***Middle Channel & Modulation : π/4DQPSK***


Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω
AC
CORREC
SENSE:INT
ALIGN OFF
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
10 dB/div
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1
Frequency
Auto Tune
Center Freq
Start Freq
Stop Freq
CF Step
Auto
Man
Freq Offset
MSG
STATUS

03:15:03 PM Jun 23, 2017

Center Freq 2.441000000 GHz

PNO: Wide

IFGain:Low

Trig: Free Run

Atten: 30 dB

Avg Type: Log-Pwr

Mkr1 2.441 002 GHz
7.95 dBm

Ref 20.00 dBm

Center 2.441000 GHz

#Res BW 100 kHz

#VBW 300 kHz

Span 3.000 MHz

Sweep 1.000 ms (3001 pts)

Center Freq 2.441000000 GHz

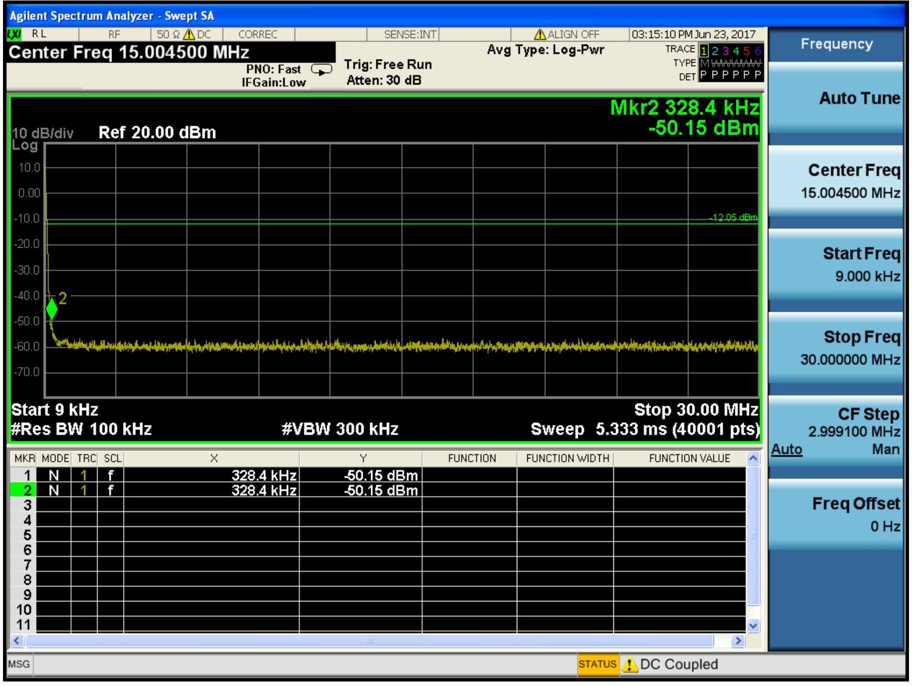
Start Freq 2.439500000 GHz

Stop Freq 2.442500000 GHz

CF Step 300.000 kHz

Freq Offset 0 Hz

Conducted Spurious Emissions ***Middle Channel & Modulation : π/4DQPSK***


Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω
DC
CORREC
SENSE:INT
ALIGN OFF
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
10 dB/div
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-12.05 dBm
2
Frequency
Auto Tune
Center Freq
Start Freq
Stop Freq
CF Step
Auto
Man
Freq Offset
MSG
STATUS

03:15:10 PM Jun 23, 2017

Center Freq 15.004500 MHz

PNO: Fast

IFGain:Low

Trig: Free Run

Atten: 30 dB

Avg Type: Log-Pwr

Mkr2 328.4 kHz
-50.15 dBm

Ref 20.00 dBm

Start 9 kHz

#Res BW 100 kHz

#VBW 300 kHz

Stop 30.00 MHz

Sweep 5.333 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	328.4 kHz	-50.15 dBm			
2	N	1	f	328.4 kHz	-50.15 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

Center Freq 15.004500 MHz

Start Freq 9.000 kHz

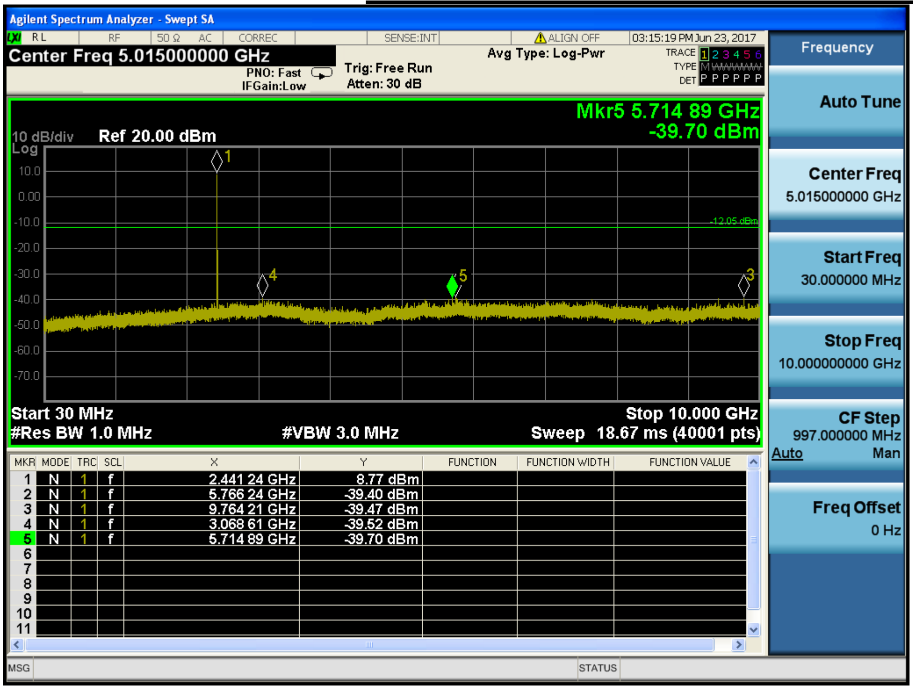
Stop Freq 30.000000 MHz

CF Step 2.999100 MHz

Freq Offset 0 Hz

DC Coupled

Conducted Spurious Emissions *Middle Channel & Modulation : π/4DQPSK*


Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω
AC
CORREC
SENSE:INT
ALIGN OFF
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
10 dB/div
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-12.05 dBm
1
4
5
3
Frequency
Auto Tune
Center Freq
Start Freq
Stop Freq
CF Step
Auto
Man
Freq Offset
MSG
STATUS

03:15:19 PM Jun 23, 2017

Center Freq 5.015000000 GHz

PNO: Fast
IFGain:Low

Trig: Free Run
Atten: 30 dB

Avg Type: Log-Pwr

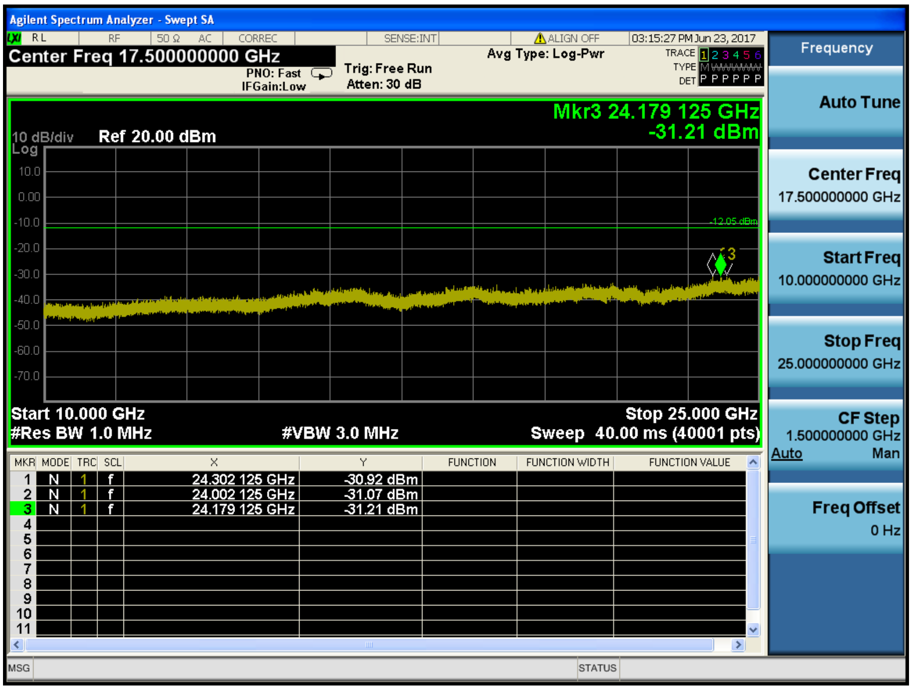
Mkr5 5.714 89 GHz
-39.70 dBm

Ref 20.00 dBm

Start 30 MHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 10.000 GHz
Sweep 18.67 ms (40001 pts)

Center Freq 5.015000000 GHz
Start Freq 30.000000 MHz
Stop Freq 10.000000000 GHz
CF Step 997.000000 MHz
Freq Offset 0 Hz

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.441 24 GHz	8.77 dBm			
2	N	1	f	5.766 24 GHz	-39.40 dBm			
3	N	1	f	9.764 21 GHz	-39.47 dBm			
4	N	1	f	3.068 61 GHz	-39.52 dBm			
5	N	1	f	5.714 89 GHz	-39.70 dBm			
6								
7								
8								
9								
10								
11								


Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω
AC
CORREC
SENSE:INT
ALIGN OFF
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
10 dB/div
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-12.05 dBm
3
Frequency
Auto Tune
Center Freq
Start Freq
Stop Freq
CF Step
Auto
Man
Freq Offset
MSG
STATUS

03:15:27 PM Jun 23, 2017

Center Freq 17.500000000 GHz

PNO: Fast
IFGain:Low

Trig: Free Run
Atten: 30 dB

Avg Type: Log-Pwr

Mkr3 24.179 125 GHz
-31.21 dBm

Ref 20.00 dBm

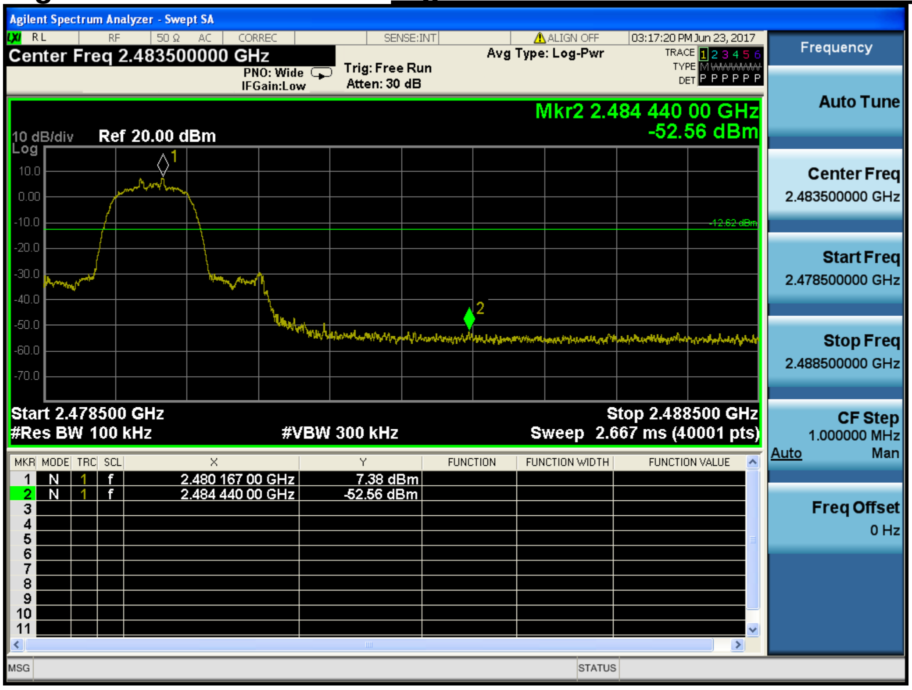
Start 10.000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 25.000 GHz
Sweep 40.00 ms (40001 pts)

Center Freq 17.500000000 GHz
Start Freq 10.000000000 GHz
Stop Freq 25.000000000 GHz
CF Step 1.500000000 GHz
Freq Offset 0 Hz

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	24.302 125 GHz	-30.92 dBm			
2	N	1	f	24.002 125 GHz	-31.07 dBm			
3	N	1	f	24.179 125 GHz	-31.21 dBm			
4								
5								
6								
7								
8								
9								
10								
11								

High Band-edge

Highest Channel & Modulation : π/4DQPSK



Agilent Spectrum Analyzer - Swept SA

Center Freq 2.483500000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
03:17:20 PM Jun 23, 2017

Mkr2 2.484 440 00 GHz
-52.56 dBm

10 dB/div Ref 20.00 dBm

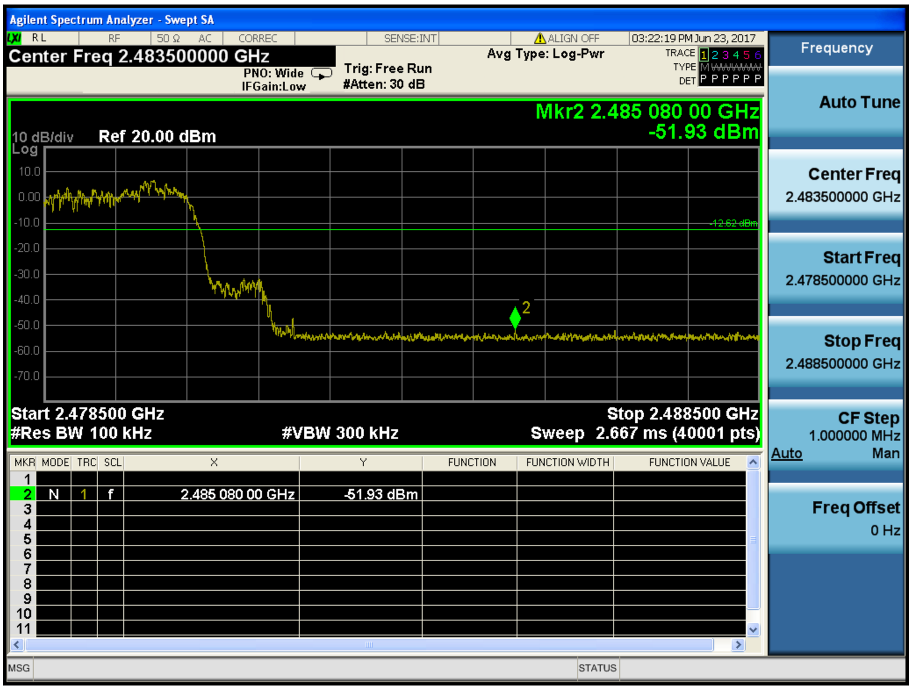
Start 2.478500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.488500 GHz
Sweep 2.667 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.480 167 00 GHz	7.38 dBm			
2	N	1	f	2.484 440 00 GHz	-52.56 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

R L
RF
50 Ω
AC
CORREC
SENSE:INT
ALIGN OFF
TRACE 1 2 3 4 5 6
TYPE M W W W W W
DET P P P P P P
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-12.62 dBm
1
2
MSG
STATUS
Frequency
Auto Tune
Center Freq
2.483500000 GHz
Start Freq
2.478500000 GHz
Stop Freq
2.488500000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz

High Band-edge

Hopping mode & Modulation : π/4DQPSK



Agilent Spectrum Analyzer - Swept SA

Center Freq 2.483500000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
03:22:19 PM Jun 23, 2017

Mkr2 2.485 080 00 GHz
-51.93 dBm

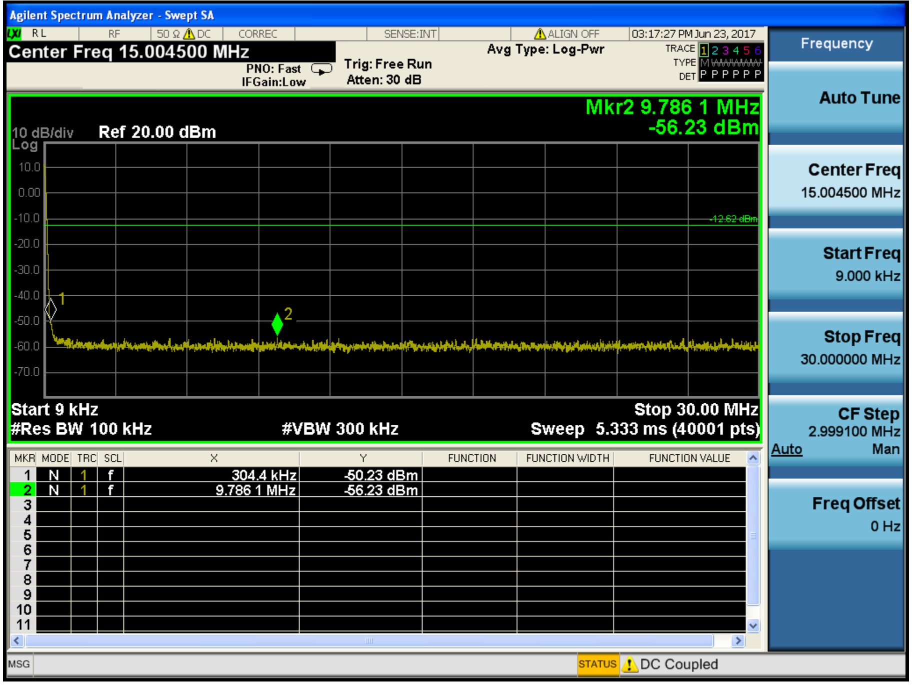
10 dB/div Ref 20.00 dBm

Start 2.478500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.488500 GHz
Sweep 2.667 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1								
2	N	1	f	2.485 080 00 GHz	-51.93 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

R L
RF
50 Ω
AC
CORREC
SENSE:INT
ALIGN OFF
TRACE 1 2 3 4 5 6
TYPE M W W W W W
DET P P P P P P
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-12.62 dBm
2
MSG
STATUS
Frequency
Auto Tune
Center Freq
2.483500000 GHz
Start Freq
2.478500000 GHz
Stop Freq
2.488500000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz

Conducted Spurious Emissions *Highest Channel & Modulation : π/4DQPSK*


Agilent Spectrum Analyzer - Swept SA

Center Freq 15.004500 MHz
PNO: Fast IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
03:17:27 PM Jun 23, 2017

Mkr2 9.786 1 MHz
-56.23 dBm

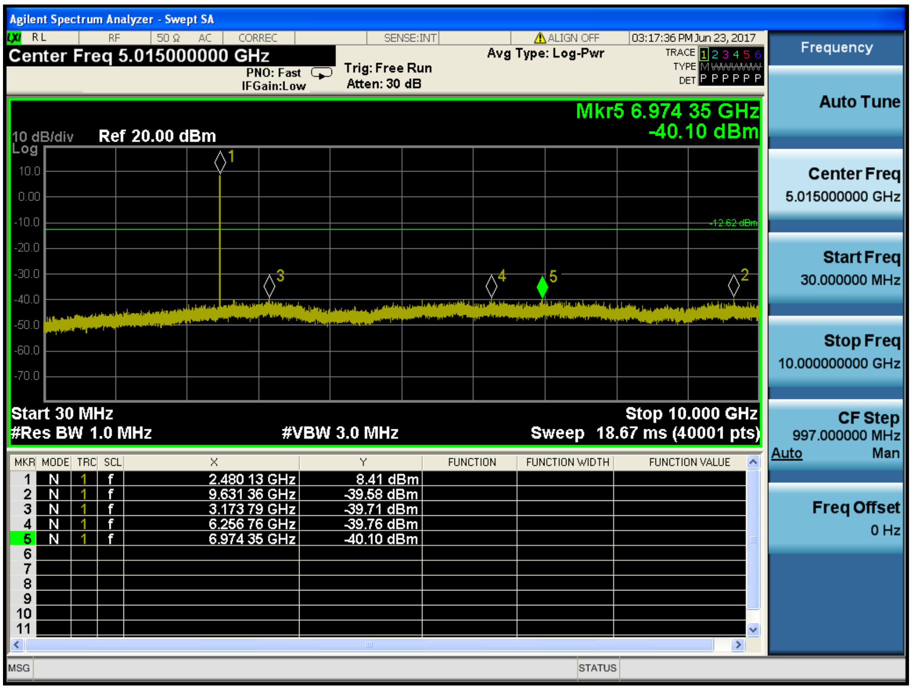
10 dB/div Ref 20.00 dBm

Start 9 kHz Stop 30.00 MHz
#Res BW 100 kHz #VBW 300 kHz Sweep 5.333 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	304.4 kHz	-50.23 dBm			
2	N	1	f	9.786 1 MHz	-56.23 dBm			

Center Freq 15.004500 MHz
Start Freq 9.000 kHz
Stop Freq 30.000000 MHz
CF Step 2.999100 MHz Auto Man
Freq Offset 0 Hz

STATUS DC Coupled


Agilent Spectrum Analyzer - Swept SA

Center Freq 5.015000000 GHz
PNO: Fast IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
03:17:36 PM Jun 23, 2017

Mkr5 6.974 35 GHz
-40.10 dBm

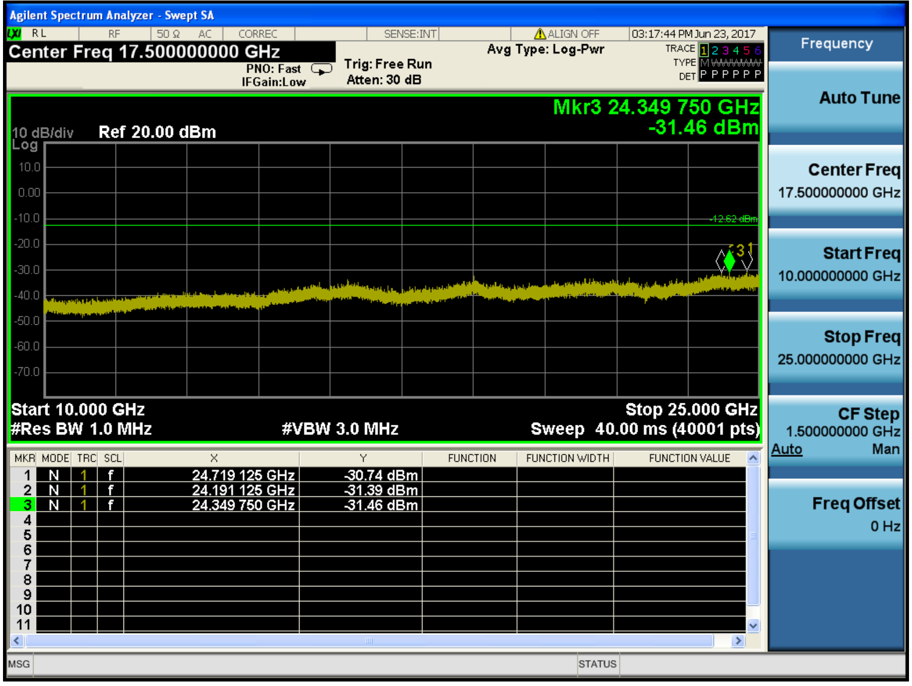
10 dB/div Ref 20.00 dBm

Start 30 MHz Stop 10.000 GHz
#Res BW 1.0 MHz #VBW 3.0 MHz Sweep 18.67 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.480 13 GHz	8.41 dBm			
2	N	1	f	9.631 36 GHz	-39.58 dBm			
3	N	1	f	3.173 79 GHz	-39.71 dBm			
4	N	1	f	6.256 76 GHz	-39.76 dBm			
5	N	1	f	6.974 35 GHz	-40.10 dBm			

Center Freq 5.015000000 GHz
Start Freq 30.000000 MHz
Stop Freq 10.000000000 GHz
CF Step 997.000000 MHz Auto Man
Freq Offset 0 Hz

Conducted Spurious Emissions *__Highest Channel & Modulation : π/4DQPSK__*


Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω
AC
CORREC
SENSE:INT
ALIGN OFF
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
10 dB/div
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-12.62 dBm
3
1
Frequency
Auto Tune
MSG
STATUS

03:17:44 PM Jun 23, 2017

Center Freq 17.500000000 GHz

PNO: Fast
IFGain:Low

Trig: Free Run
Atten: 30 dB

Avg Type: Log-Pwr

Mkr3 24.349 750 GHz
-31.46 dBm

Ref 20.00 dBm

Start 10.000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 25.000 GHz
Sweep 40.00 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	24.719 125 GHz	-30.74 dBm			
2	N	1	f	24.191 125 GHz	-31.39 dBm			
3	N	1	f	24.349 750 GHz	-31.46 dBm			
4								
5								
6								
7								
8								
9								
10								
11								

Center Freq
17.500000000 GHz

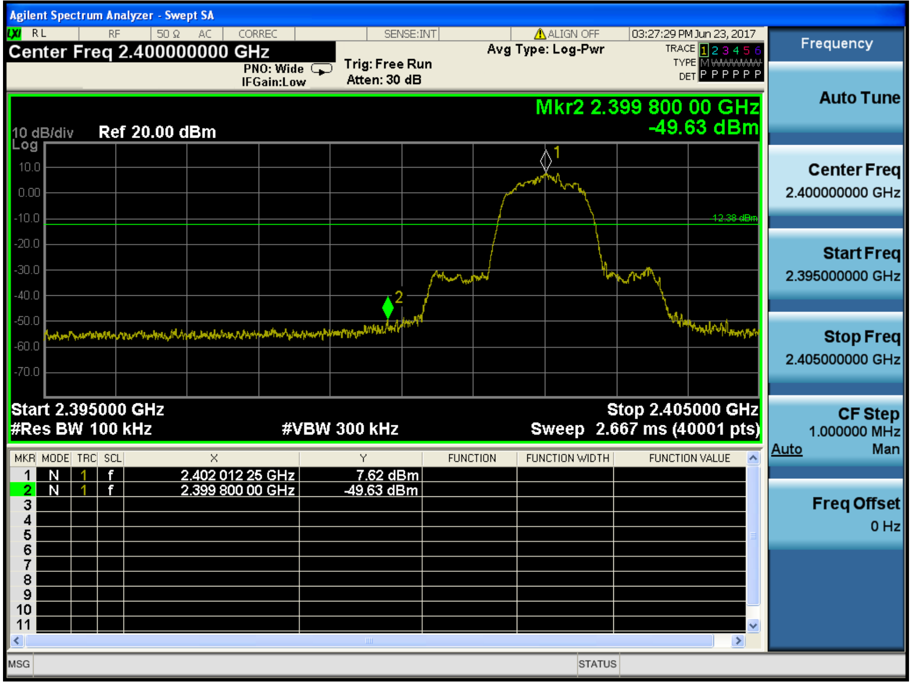
Start Freq
10.000000000 GHz

Stop Freq
25.000000000 GHz

CF Step
1.500000000 GHz
Auto Man

Freq Offset
0 Hz

Low Band-edge ***Lowest Channel & Modulation : 8DPSK***


Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω
AC
CORREC
SENSE:INT
ALIGN OFF
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
10 dB/div
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-12.38 dBm
1
2
MSG
STATUS
Frequency
Auto Tune
Center Freq
2.400000000 GHz
Start Freq
2.395000000 GHz
Stop Freq
2.405000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz

03:27:29 PM Jun 23, 2017

Center Freq 2.400000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr

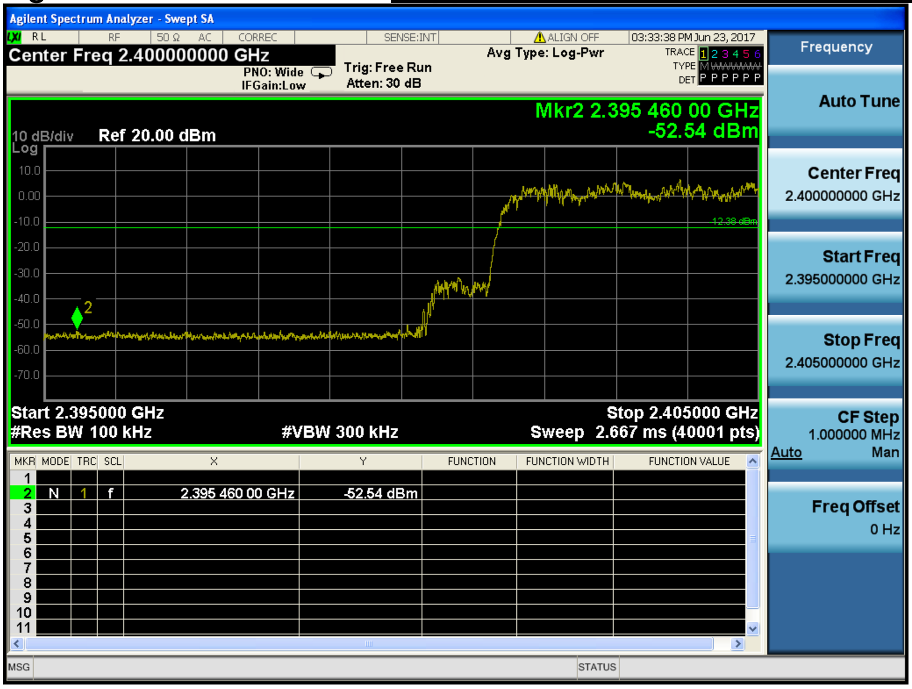
Mkr2 2.399 800 00 GHz
-49.63 dBm

Ref 20.00 dBm

Start 2.395000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.405000 GHz
Sweep 2.667 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.402 012 25 GHz	7.62 dBm			
2	N	1	f	2.399 800 00 GHz	-49.63 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

Low Band-edge ***Hopping mode & Modulation : 8DPSK***


Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω
AC
CORREC
SENSE:INT
ALIGN OFF
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
10 dB/div
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-12.38 dBm
2
MSG
STATUS
Frequency
Auto Tune
Center Freq
2.400000000 GHz
Start Freq
2.395000000 GHz
Stop Freq
2.405000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz

03:33:38 PM Jun 23, 2017

Center Freq 2.400000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr

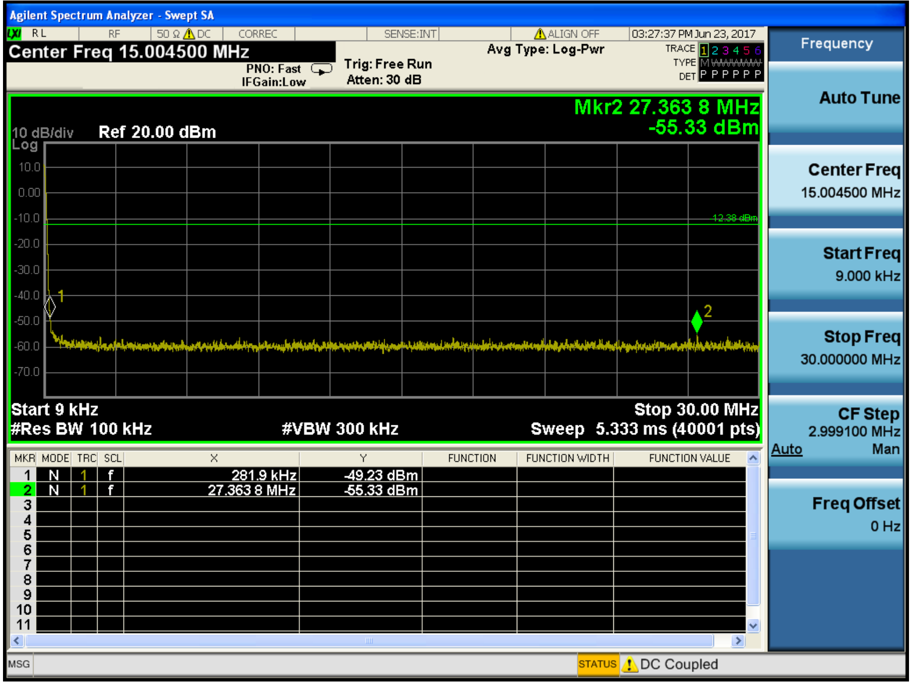
Mkr2 2.395 460 00 GHz
-52.54 dBm

Ref 20.00 dBm

Start 2.395000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.405000 GHz
Sweep 2.667 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1								
2	N	1	f	2.395 460 00 GHz	-52.54 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

Conducted Spurious Emissions ***Lowest Channel & Modulation : 8DPSK***


Agilent Spectrum Analyzer - Swept SA
RL RF 50 Ω DC CORREC SENSE:INT ALIGN OFF
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
10 dB/div
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-12.38 dBm
1
2
Frequency
Auto Tune
Auto
Man
MSG
STATUS

03:27:37 PM Jun 23, 2017

Center Freq 15.004500 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr

Ref 20.00 dBm

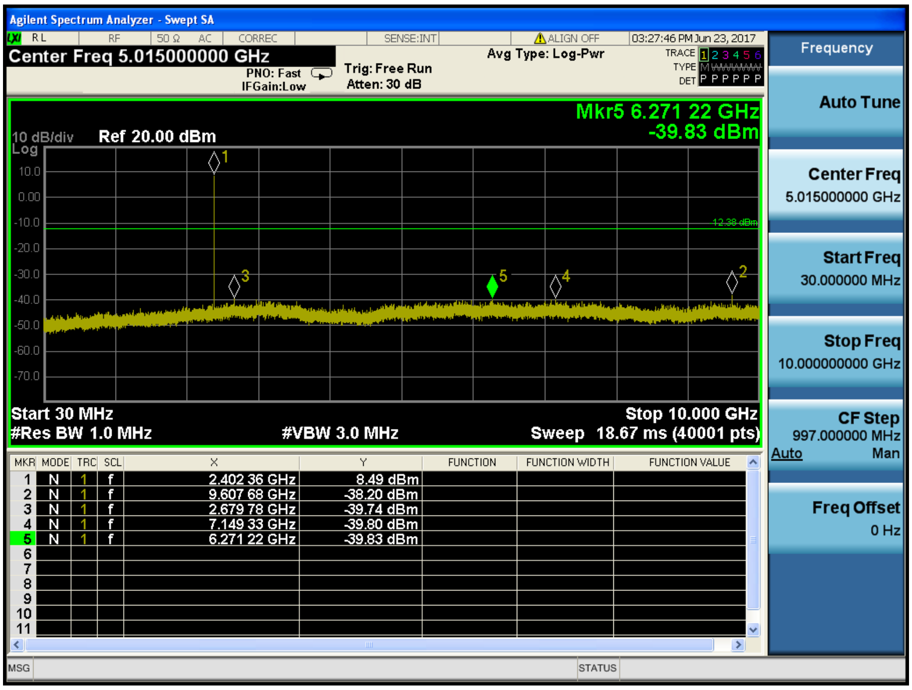
Mkr2 27.363 8 MHz
-55.33 dBm

Start 9 kHz
Stop 30.00 MHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 5.333 ms (40001 pts)

Center Freq 15.004500 MHz
Start Freq 9.000 kHz
Stop Freq 30.000000 MHz
CF Step 2.999100 MHz
Freq Offset 0 Hz

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	281.9 kHz	-49.23 dBm			
2	N	1	f	27.363 8 MHz	-55.33 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

DC Coupled


Agilent Spectrum Analyzer - Swept SA
RL RF 50 Ω AC CORREC SENSE:INT ALIGN OFF
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
10 dB/div
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-12.38 dBm
1
3
5
4
2
Frequency
Auto Tune
Auto
Man
MSG
STATUS

03:27:46 PM Jun 23, 2017

Center Freq 5.015000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr

Ref 20.00 dBm

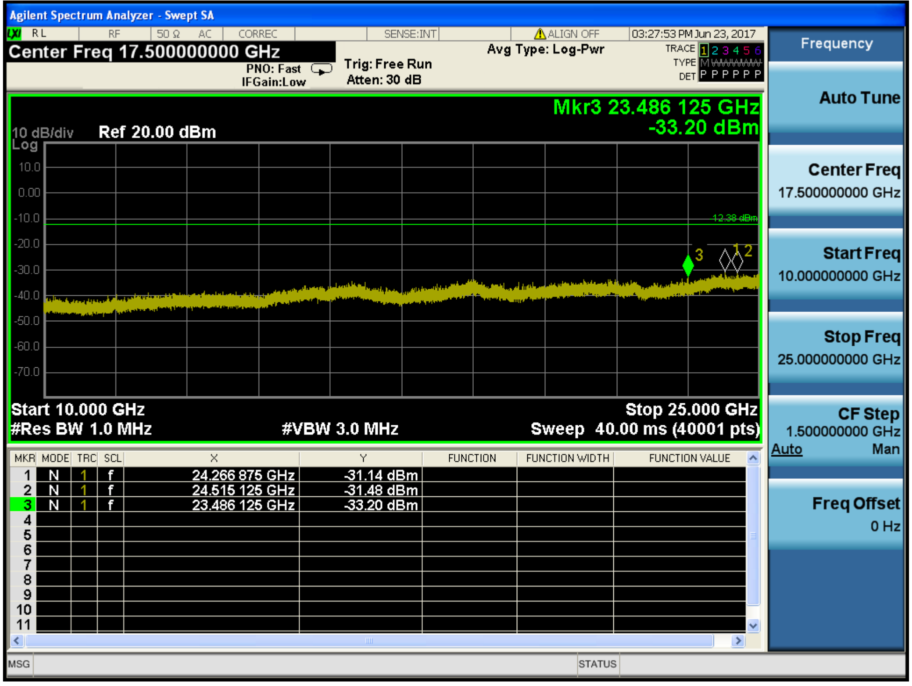
Mkr5 6.271 22 GHz
-39.83 dBm

Start 30 MHz
Stop 10.000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Sweep 18.67 ms (40001 pts)

Center Freq 5.015000000 GHz
Start Freq 30.000000 MHz
Stop Freq 10.000000000 GHz
CF Step 997.000000 MHz
Freq Offset 0 Hz

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.402 36 GHz	8.49 dBm			
2	N	1	f	9.607 68 GHz	-38.20 dBm			
3	N	1	f	2.679 78 GHz	-39.74 dBm			
4	N	1	f	7.149 33 GHz	-39.80 dBm			
5	N	1	f	6.271 22 GHz	-39.83 dBm			
6								
7								
8								
9								
10								
11								

Conducted Spurious Emissions *Lowest Channel & Modulation : 8DPSK*



Agilent Spectrum Analyzer - Swept SA

Center Freq 17.500000000 GHz

PNO: Fast IFGain:Low Trig: Free Run Atten: 30 dB

Avg Type: Log-Pwr

03:27:53 PM Jun 23, 2017

Mkr3 23.486 125 GHz -33.20 dBm

10 dB/div Ref 20.00 dBm

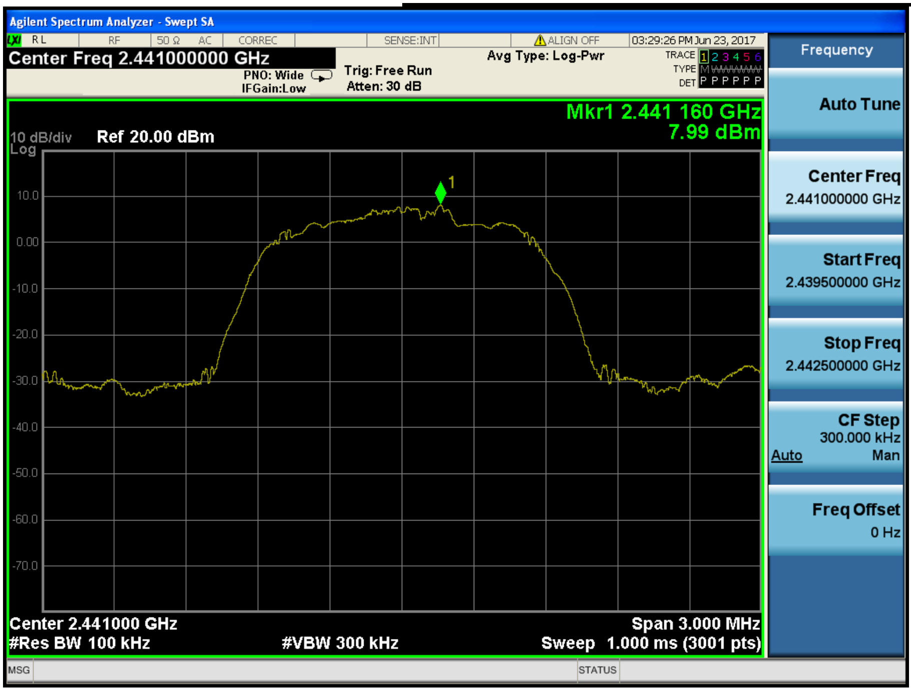
Start 10.000 GHz Stop 25.000 GHz

#Res BW 1.0 MHz #VBW 3.0 MHz Sweep 40.00 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	24.266 875 GHz	-31.14 dBm			
2	N	1	f	24.515 125 GHz	-31.48 dBm			
3	N	1	f	23.486 125 GHz	-33.20 dBm			
4								
5								
6								
7								
8								
9								
10								
11								

RL
RF
50 Ω
AC
CORREC
SENSE:INT
ALIGN OFF
TRACE 1 2 3 4 5 6
TYPE
DET P P P P P P
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-12.38 dBm
3
1 2
Frequency
Auto Tune
Center Freq
17.500000000 GHz
Start Freq
10.000000000 GHz
Stop Freq
25.000000000 GHz
CF Step
1.500000000 GHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

Reference for limit ***Middle Channel & Modulation : 8DPSK***



Agilent Spectrum Analyzer - Swept SA

R L | RF | 50 Ω AC | CORREC | SENSE:INT | ALIGN OFF | 03:29:26 PM Jun 23, 2017

Center Freq 2.441000000 GHz

PNO: Wide IFGain:Low

Trig: Free Run Atten: 30 dB

Avg Type: Log-Pwr

TRACE 1 2 3 4 5 6 TYPE M WWWWW DET P P P P P P

Mkr1 2.441 160 GHz 7.99 dBm

10 dB/div Ref 20.00 dBm

Center 2.441000 GHz Span 3.000 MHz

#Res BW 100 kHz #VBW 300 kHz Sweep 1.000 ms (3001 pts)

Center Freq 2.441000000 GHz

Start Freq 2.439500000 GHz

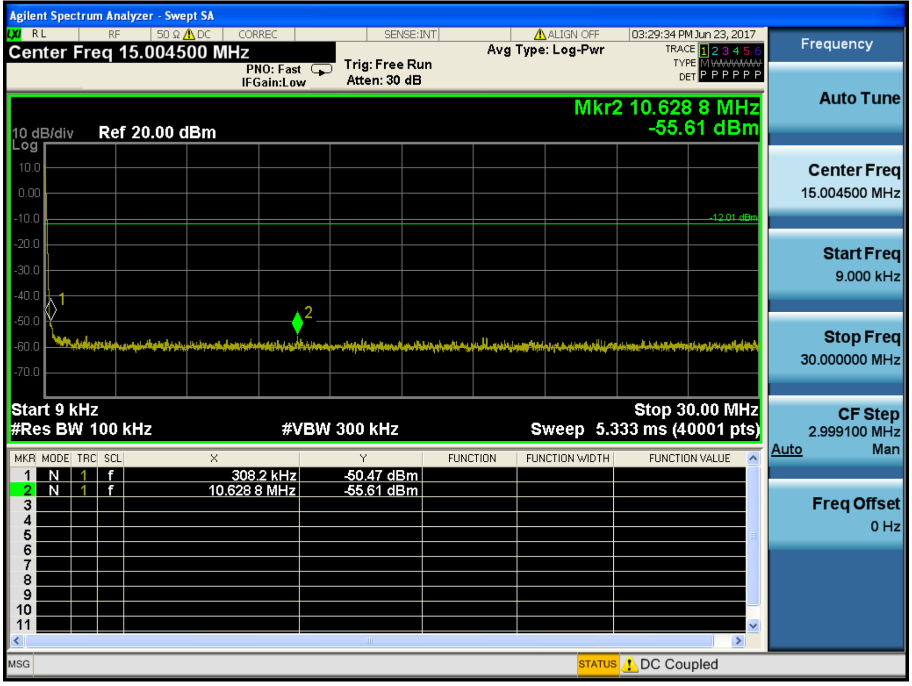
Stop Freq 2.442500000 GHz

CF Step 300.000 kHz

Freq Offset 0 Hz

Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1
Frequency
Auto Tune
Auto
Man
MSG
STATUS

Conducted Spurious Emissions ***Middle Channel & Modulation : 8DPSK***



Agilent Spectrum Analyzer - Swept SA

R L | RF | 50 Ω DC | CORREC | SENSE:INT | ALIGN OFF | 03:29:34 PM Jun 23, 2017

Center Freq 15.004500 MHz

PNO: Fast IFGain:Low

Trig: Free Run Atten: 30 dB

Avg Type: Log-Pwr

TRACE 1 2 3 4 5 6 TYPE M WWWWW DET P P P P P P

Mkr2 10.628 8 MHz -55.61 dBm

10 dB/div Ref 20.00 dBm

Start 9 kHz Stop 30.00 MHz

#Res BW 100 kHz #VBW 300 kHz Sweep 5.333 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	308.2 kHz	-50.47 dBm			
2	N	1	f	10.628 8 MHz	-55.61 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

Center Freq 15.004500 MHz

Start Freq 9.000 kHz

Stop Freq 30.000000 MHz

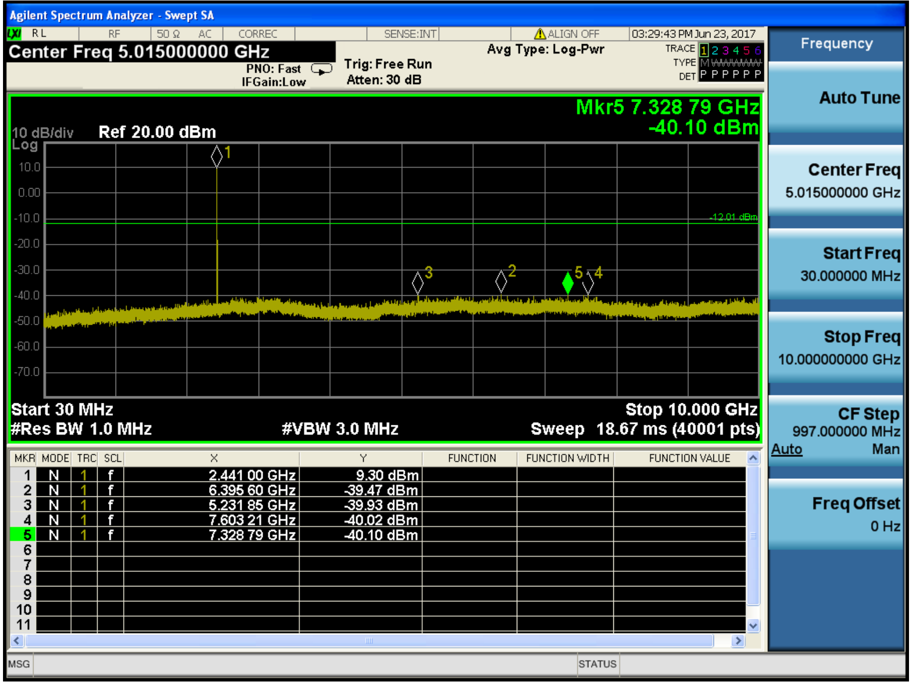
CF Step 2.999100 MHz

Freq Offset 0 Hz

DC Coupled

Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-12.01 dBm
1
2
Frequency
Auto Tune
Auto
Man
MSG
STATUS

Conducted Spurious Emissions *Middle Channel & Modulation : 8DPSK*


Agilent Spectrum Analyzer - Swept SA
RL RF 50 Ω AC CORREC SENSE:INT ALIGN OFF
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
10 dB/div Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-12.01 dBm
1
2
3
4
5
Frequency
Auto Tune
Center Freq
5.015000000 GHz
Start Freq
30.000000 MHz
Stop Freq
10.000000000 GHz
CF Step
997.000000 MHz
Auto Man
Freq Offset
0 Hz
MSG STATUS

03:29:43 PM Jun 23, 2017

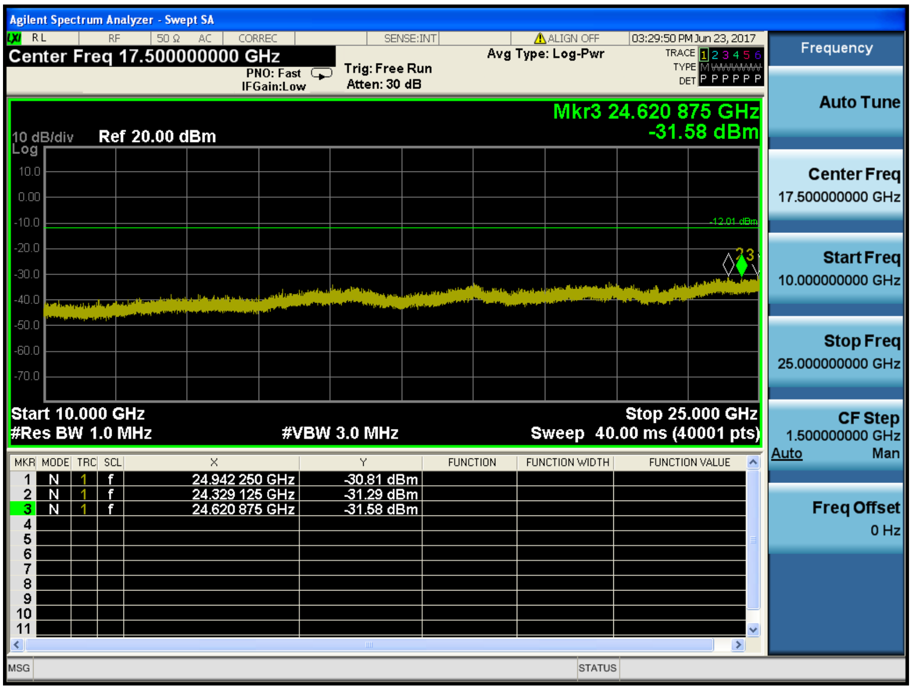
Center Freq 5.015000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr

Mkr5 7.328 79 GHz
-40.10 dBm

Ref 20.00 dBm

Start 30 MHz Stop 10.000 GHz
#Res BW 1.0 MHz #VBW 3.0 MHz Sweep 18.67 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.441 00 GHz	9.30 dBm			
2	N	1	f	6.395 60 GHz	-39.47 dBm			
3	N	1	f	5.231 85 GHz	-39.93 dBm			
4	N	1	f	7.603 21 GHz	-40.02 dBm			
5	N	1	f	7.328 79 GHz	-40.10 dBm			
6								
7								
8								
9								
10								
11								


Agilent Spectrum Analyzer - Swept SA
RL RF 50 Ω AC CORREC SENSE:INT ALIGN OFF
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
10 dB/div Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-12.01 dBm
2 3
1
Frequency
Auto Tune
Center Freq
17.500000000 GHz
Start Freq
10.000000000 GHz
Stop Freq
25.000000000 GHz
CF Step
1.500000000 GHz
Auto Man
Freq Offset
0 Hz
MSG STATUS

03:29:50 PM Jun 23, 2017

Center Freq 17.500000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr

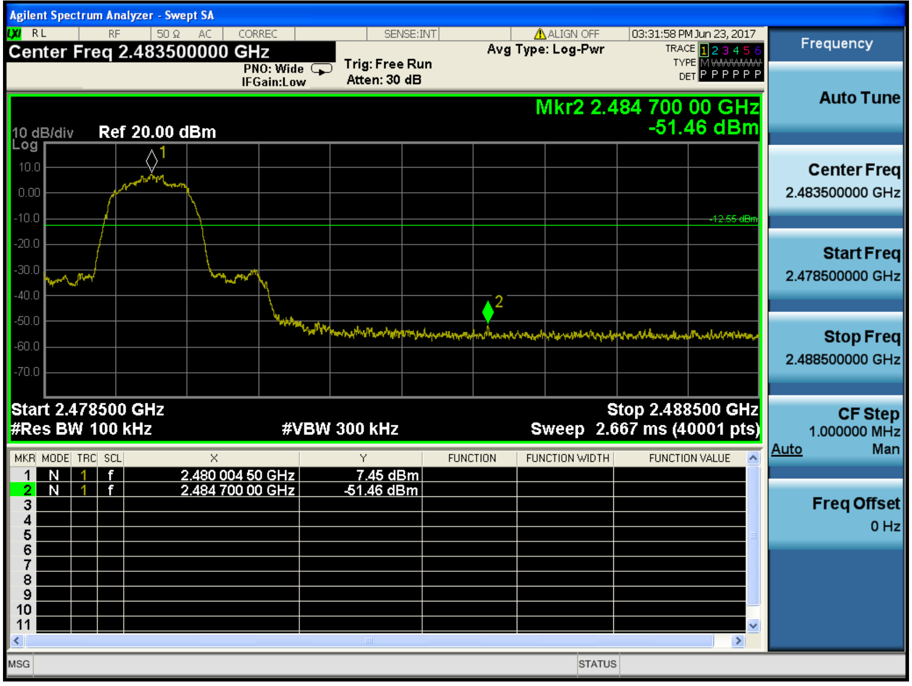
Mkr3 24.620 875 GHz
-31.58 dBm

Ref 20.00 dBm

Start 10.000 GHz Stop 25.000 GHz
#Res BW 1.0 MHz #VBW 3.0 MHz Sweep 40.00 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	24.942 250 GHz	-30.81 dBm			
2	N	1	f	24.329 125 GHz	-31.29 dBm			
3	N	1	f	24.620 875 GHz	-31.58 dBm			
4								
5								
6								
7								
8								
9								
10								
11								

High Band-edge ***Highest Channel & Modulation : 8DPSK***



Agilent Spectrum Analyzer - Swept SA

RL RF 50 Ω AC CORREC SENSE:INT ALIGN OFF 03:31:58 PM Jun 23, 2017

Center Freq 2.483500000 GHz
PNO: Wide IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr

Mkr2 2.484 700 00 GHz
-51.46 dBm

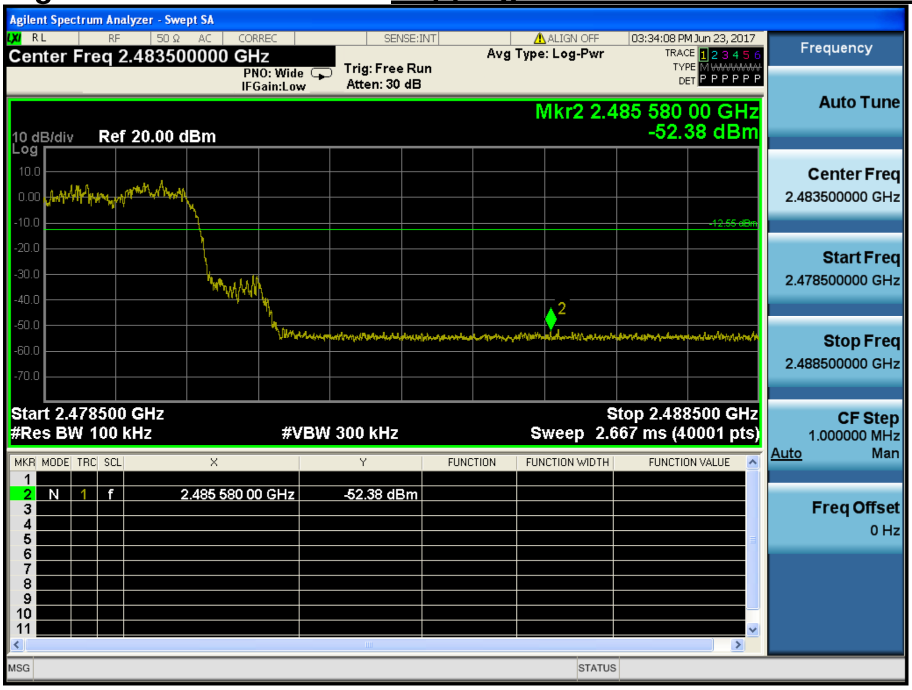
10 dB/div Ref 20.00 dBm

Start 2.478500 GHz
#Res BW 100 kHz #VBW 300 kHz
Stop 2.488500 GHz
Sweep 2.667 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.480 004 50 GHz	7.45 dBm			
2	N	1	f	2.484 700 00 GHz	-51.46 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-12.55 dBm
1
2
Frequency
Auto Tune
Center Freq 2.483500000 GHz
Start Freq 2.478500000 GHz
Stop Freq 2.488500000 GHz
CF Step 1.000000 MHz
Auto Man
Freq Offset 0 Hz
MSG
STATUS

High Band-edge ***Hopping mode & Modulation : 8DPSK***



Agilent Spectrum Analyzer - Swept SA

RL RF 50 Ω AC CORREC SENSE:INT ALIGN OFF 03:34:08 PM Jun 23, 2017

Center Freq 2.483500000 GHz
PNO: Wide IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr

Mkr2 2.485 580 00 GHz
-52.38 dBm

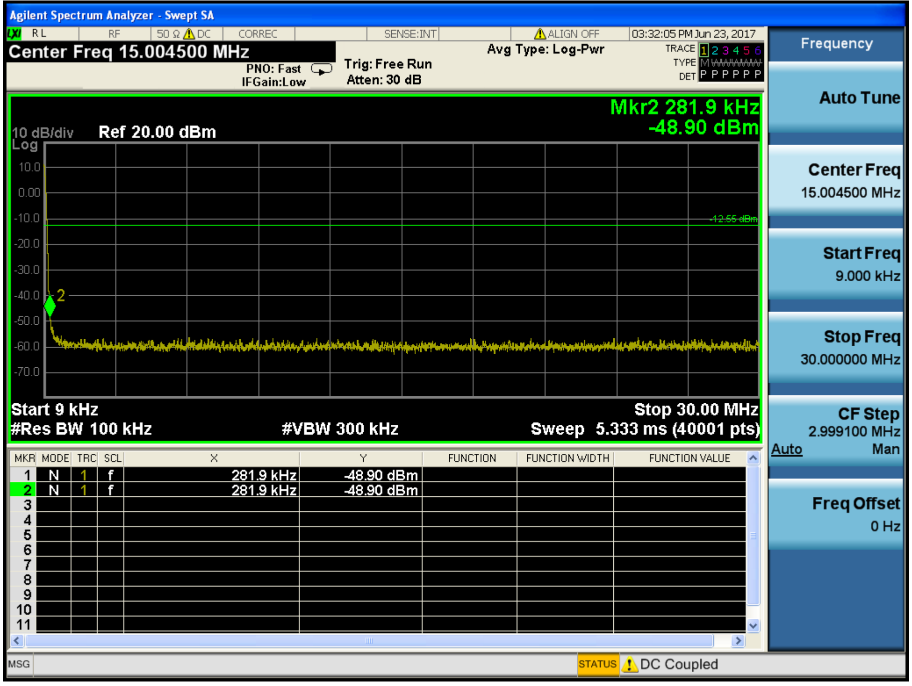
10 dB/div Ref 20.00 dBm

Start 2.478500 GHz
#Res BW 100 kHz #VBW 300 kHz
Stop 2.488500 GHz
Sweep 2.667 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1								
2	N	1	f	2.485 580 00 GHz	-52.38 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-12.55 dBm
2
Frequency
Auto Tune
Center Freq 2.483500000 GHz
Start Freq 2.478500000 GHz
Stop Freq 2.488500000 GHz
CF Step 1.000000 MHz
Auto Man
Freq Offset 0 Hz
MSG
STATUS

Conducted Spurious Emissions ***Highest Channel & Modulation : 8DPSK***


Agilent Spectrum Analyzer - Swept SA
RL RF 50 Ω DC CORREC SENSE:INT ALIGN OFF
03:32:05 PM Jun 23, 2017
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
10 dB/div Ref 20.00 dBm
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-12.55 dBm
2
Frequency
Auto Tune
Auto
Man
MSG
STATUS

Center Freq 15.004500 MHz
PNO: Fast IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr

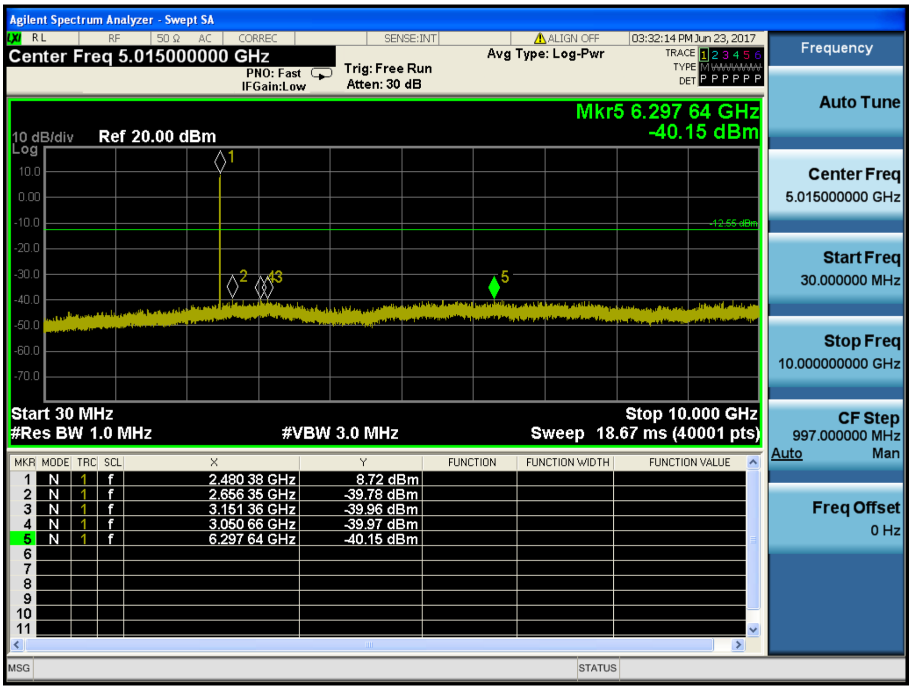
Mkr2 281.9 kHz
-48.90 dBm

Start 9 kHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 30.00 MHz
Sweep 5.333 ms (40001 pts)

Center Freq 15.004500 MHz
Start Freq 9.000 kHz
Stop Freq 30.000000 MHz
CF Step 2.999100 MHz
Freq Offset 0 Hz

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	281.9 kHz	-48.90 dBm			
2	N	1	f	281.9 kHz	-48.90 dBm			
3								
4								
5								
6								
7								
8								
9								
10								
11								

DC Coupled


Agilent Spectrum Analyzer - Swept SA
RL RF 50 Ω AC CORREC SENSE:INT ALIGN OFF
03:32:14 PM Jun 23, 2017
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
10 dB/div Ref 20.00 dBm
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-12.55 dBm
1
2
43
5
Frequency
Auto Tune
Auto
Man
MSG
STATUS

Center Freq 5.015000000 GHz
PNO: Fast IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr

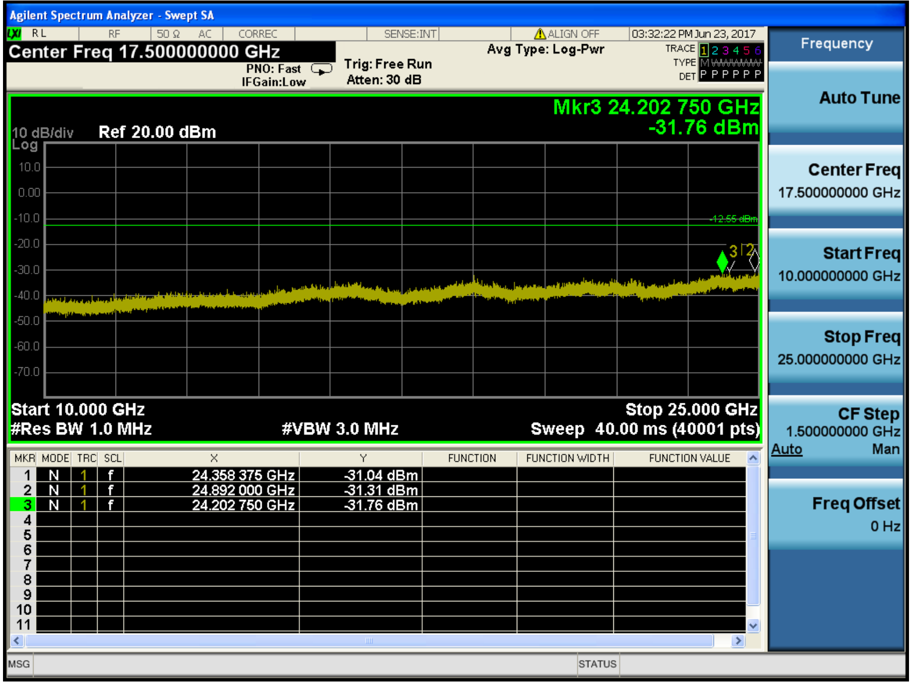
Mkr5 6.297 64 GHz
-40.15 dBm

Start 30 MHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 10.000 GHz
Sweep 18.67 ms (40001 pts)

Center Freq 5.015000000 GHz
Start Freq 30.000000 MHz
Stop Freq 10.000000000 GHz
CF Step 997.000000 MHz
Freq Offset 0 Hz

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.480 38 GHz	8.72 dBm			
2	N	1	f	2.656 35 GHz	-39.78 dBm			
3	N	1	f	3.151 36 GHz	-39.96 dBm			
4	N	1	f	3.050 66 GHz	-39.97 dBm			
5	N	1	f	6.297 64 GHz	-40.15 dBm			
6								
7								
8								
9								
10								
11								

Conducted Spurious Emissions *__Highest Channel & Modulation : 8DPSK__*



Agilent Spectrum Analyzer - Swept SA

R L | RF | 50 Ω AC | CORREC | SENSE:INT | ALIGN OFF | 03:32:22 PM Jun 23, 2017

Center Freq 17.500000000 GHz

PNO: Fast IFGain:Low

Trig: Free Run
Atten: 30 dB

Avg Type: Log-Pwr

TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P

Mkr3 24.202 750 GHz
-31.76 dBm

10 dB/div Log Ref 20.00 dBm

Start 10.000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Stop 25.000 GHz
Sweep 40.00 ms (40001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	24.358 375 GHz	-31.04 dBm			
2	N	1	f	24.892 000 GHz	-31.31 dBm			
3	N	1	f	24.202 750 GHz	-31.76 dBm			
4								
5								
6								
7								
8								
9								
10								
11								

MSG STATUS

10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-12.55 dBm
3
1
2
Frequency
Auto Tune
Center Freq
17.500000000 GHz
Start Freq
10.000000000 GHz
Stop Freq
25.000000000 GHz
CF Step
1.500000000 GHz
Auto
Man
Freq Offset
0 Hz

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.

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.

1. 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 : ***8DPSK***

Results of Conducted Emission

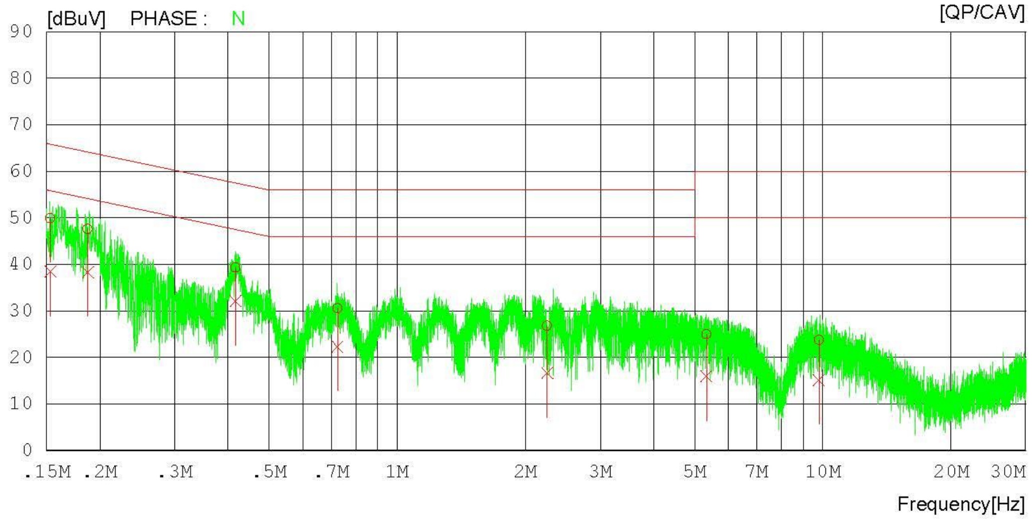
DT&C

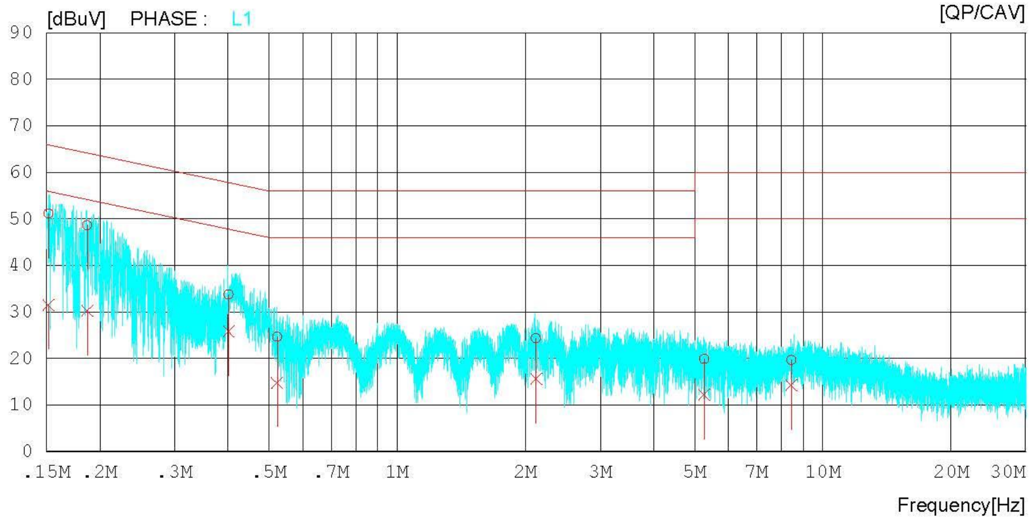
Date 2017-06-23

Model	PM70	Temp/Humi.	23 'C 48 %
Function	Bluetooth	Power Supply	AC 120 V 60 Hz
Mode	1Mbps_Hopping_0	Operator	J.W.KIM
Test condition			

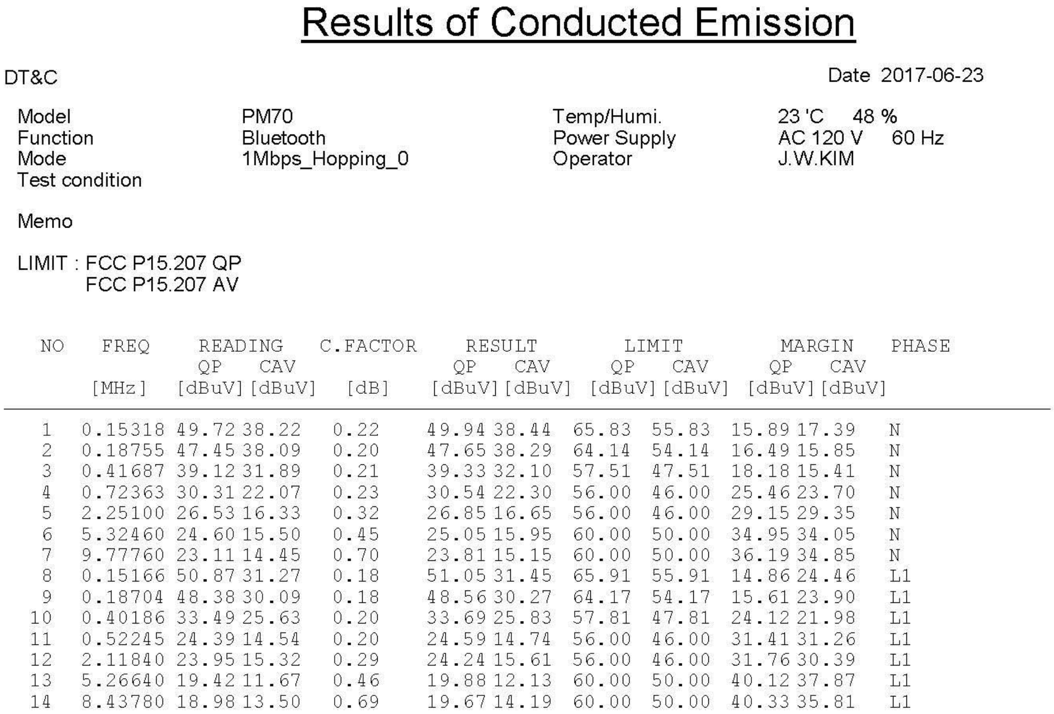
Memo

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





AC Line Conducted Emissions (List) = Modulation : *8DPSK*



Results of Conducted Emission

DT&C Date 2017-06-23

Model	PM70	Temp/Humi.	23 'C 48 %
Function	Bluetooth	Power Supply	AC 120 V 60 Hz
Mode	1Mbps_Hopping_0	Operator	J.W.KIM
Test condition			

Memo

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

NO	FREQ	READING		C.FACTOR	RESULT		LIMIT		MARGIN		PHASE
		QP	CAV		QP	CAV	QP	CAV	QP	CAV	
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	
1	0.15318	49.72	38.22	0.22	49.94	38.44	65.83	55.83	15.89	17.39	N
2	0.18755	47.45	38.09	0.20	47.65	38.29	64.14	54.14	16.49	15.85	N
3	0.41687	39.12	31.89	0.21	39.33	32.10	57.51	47.51	18.18	15.41	N
4	0.72363	30.31	22.07	0.23	30.54	22.30	56.00	46.00	25.46	23.70	N
5	2.25100	26.53	16.33	0.32	26.85	16.65	56.00	46.00	29.15	29.35	N
6	5.32460	24.60	15.50	0.45	25.05	15.95	60.00	50.00	34.95	34.05	N
7	9.77760	23.11	14.45	0.70	23.81	15.15	60.00	50.00	36.19	34.85	N
8	0.15166	50.87	31.27	0.18	51.05	31.45	65.91	55.91	14.86	24.46	L1
9	0.18704	48.38	30.09	0.18	48.56	30.27	64.17	54.17	15.61	23.90	L1
10	0.40186	33.49	25.63	0.20	33.69	25.83	57.81	47.81	24.12	21.98	L1
11	0.52245	24.39	14.54	0.20	24.59	14.74	56.00	46.00	31.41	31.26	L1
12	2.11840	23.95	15.32	0.29	24.24	15.61	56.00	46.00	31.76	30.39	L1
13	5.26640	19.42	11.67	0.46	19.88	12.13	60.00	50.00	40.12	37.87	L1
14	8.43780	18.98	13.50	0.69	19.67	14.19	60.00	50.00	40.33	35.81	L1

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 is attached on the main PCB using the special spring tension. (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.

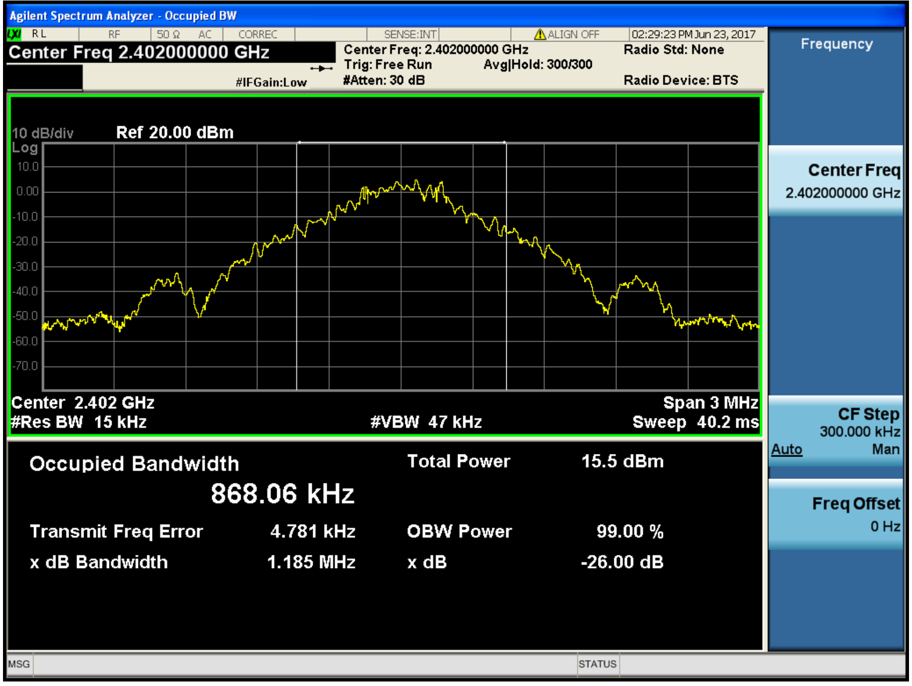
The resolution bandwidth (RBW) shall be in the range of 1 % to 5 % of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3 × RBW.

Spectrum analyzer plots are included on the following pages.

10.4 Test Results

Modulation	Tested Channel	Test Results (MHz)
GFSK	**Lowest**	0.868
	Middle	0.880
	Highest	**0.883**
π/4DQPSK	**Lowest**	1.173
	Middle	**1.180**
	Highest	1.177
8DPSK	**Lowest**	1.182
	Middle	**1.183**
	Highest	1.178

Occupied Bandwidth (99 %) ***Lowest Channel & GFSK***


Agilent Spectrum Analyzer - Occupied BW

Center Freq 2.402000000 GHz

Center Freq: 2.402000000 GHz
Trig: Free Run
Avg|Hold: 300/300
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
02:29:23 PM Jun 23, 2017

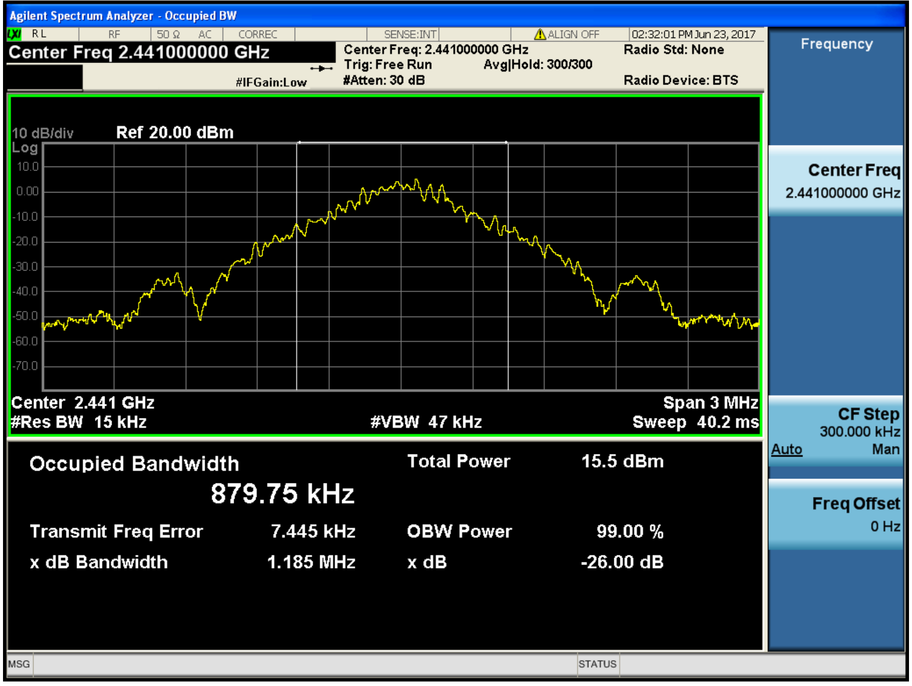
10 dB/div Ref 20.00 dBm

Center 2.402 GHz
#Res BW 15 kHz
#VBW 47 kHz
Span 3 MHz
Sweep 40.2 ms

Occupied Bandwidth 868.06 kHz
Total Power 15.5 dBm
Transmit Freq Error 4.781 kHz
OBW Power 99.00 %
x dB Bandwidth 1.185 MHz
x dB -26.00 dB

RL
RF
50 Ω
AC
CORREC
SENSE:INT
ALIGN OFF
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Frequency
Center Freq
2.402000000 GHz
CF Step
300.000 kHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

Occupied Bandwidth (99 %) ***Middle Channel & GFSK***


Agilent Spectrum Analyzer - Occupied BW

Center Freq 2.441000000 GHz

Center Freq: 2.441000000 GHz
Trig: Free Run
Avg|Hold: 300/300
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
02:32:01 PM Jun 23, 2017

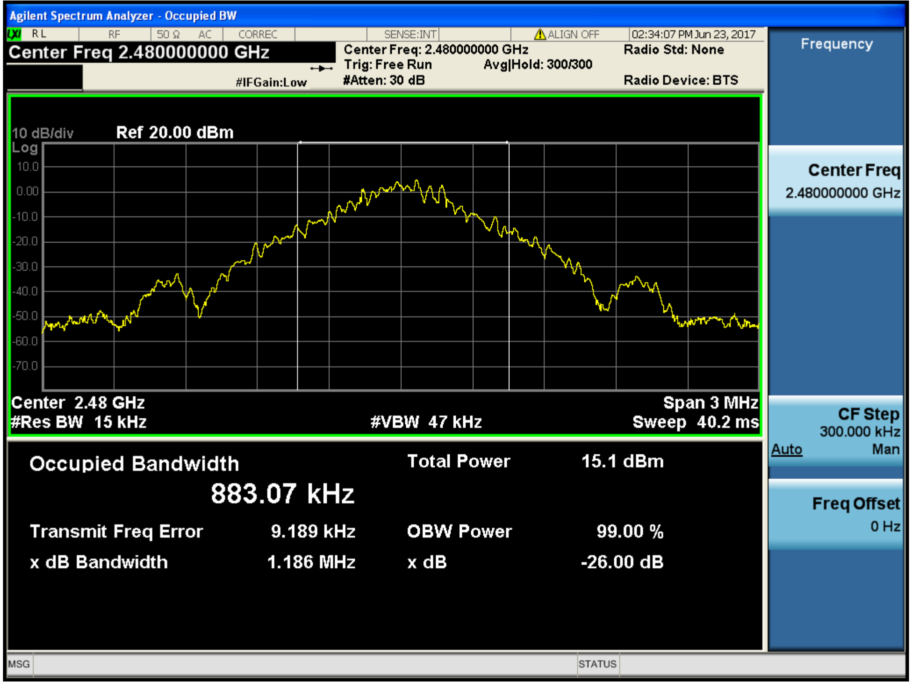
10 dB/div Ref 20.00 dBm

Center 2.441 GHz
#Res BW 15 kHz
#VBW 47 kHz
Span 3 MHz
Sweep 40.2 ms

Occupied Bandwidth 879.75 kHz
Total Power 15.5 dBm
Transmit Freq Error 7.445 kHz
OBW Power 99.00 %
x dB Bandwidth 1.185 MHz
x dB -26.00 dB

RL
RF
50 Ω
AC
CORREC
SENSE:INT
ALIGN OFF
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Frequency
Center Freq
2.441000000 GHz
CF Step
300.000 kHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

Occupied Bandwidth (99 %) *Highest Channel & GFSK*



Agilent Spectrum Analyzer - Occupied BW

Center Freq 2.480000000 GHz

Center Freq: 2.480000000 GHz
Trig: Free Run
#Atten: 30 dB
Avg|Hold: 300/300
Radio Std: None
Radio Device: BTS
#IFGain:Low
02:34:07 PM Jun 23, 2017

Ref 20.00 dBm

Center 2.48 GHz
#Res BW 15 kHz
#VBW 47 kHz
Span 3 MHz
Sweep 40.2 ms

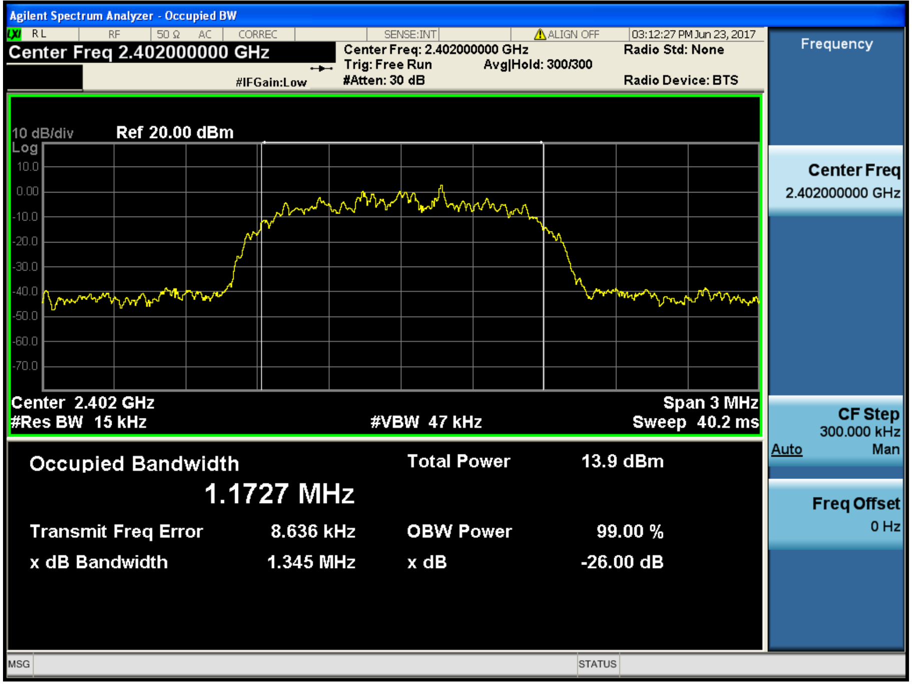
Occupied Bandwidth
883.07 kHz

Total Power 15.1 dBm

Transmit Freq Error 9.189 kHz
x dB Bandwidth 1.186 MHz
OBW Power 99.00 %
x dB -26.00 dB

LXI
R L
RF
50 Ω
AC
CORREC
SENSE:INT
ALIGN OFF
10 dB/div
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Frequency
Center Freq
2.480000000 GHz
CF Step
300.000 kHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

Occupied Bandwidth (99 %) *Lowest Channel & π/4 DQPSK*



Agilent Spectrum Analyzer - Occupied BW

RL | RF | 50 Ω | AC | CORREC | SENSE:INT | ALIGN OFF | 03:12:27 PM Jun 23, 2017

Center Freq 2.402000000 GHz

Center Freq: 2.402000000 GHz
Trig: Free Run Avg|Hold: 300/300
#IFGain:Low #Atten: 30 dB
Radio Std: None
Radio Device: BTS

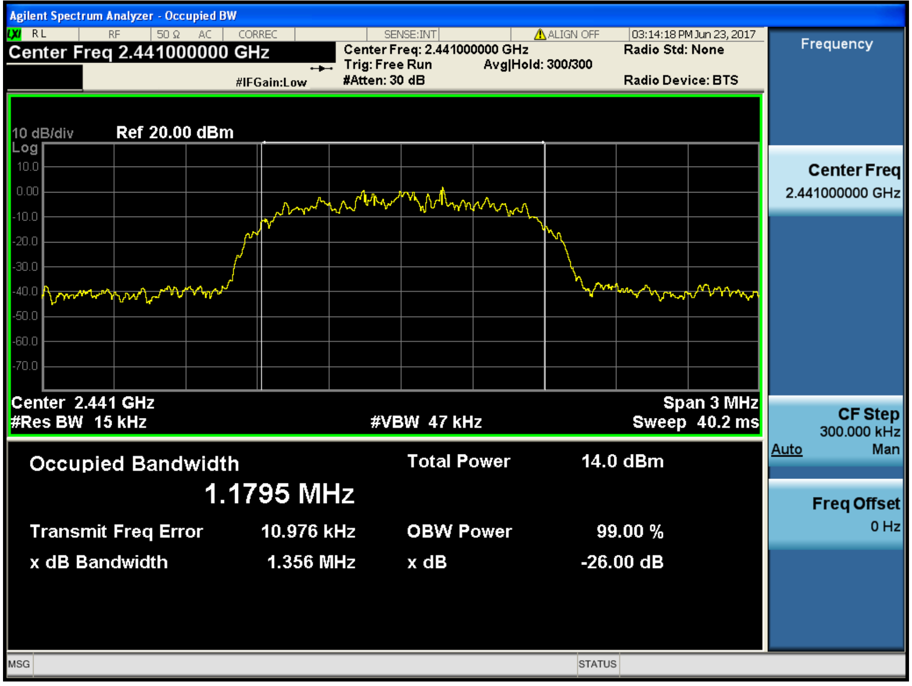
10 dB/div Ref 20.00 dBm

Center 2.402 GHz Span 3 MHz
#Res BW 15 kHz #VBW 47 kHz Sweep 40.2 ms

Occupied Bandwidth		Total Power	13.9 dBm
1.1727 MHz			
Transmit Freq Error	8.636 kHz	OBW Power	99.00 %
x dB Bandwidth	1.345 MHz	x dB	-26.00 dB

Frequency
Center Freq 2.402000000 GHz
CF Step 300.000 kHz Auto Man
Freq Offset 0 Hz

Occupied Bandwidth (99 %) *Middle Channel & π/4 DQPSK*



Agilent Spectrum Analyzer - Occupied BW

RL | RF | 50 Ω | AC | CORREC | SENSE:INT | ALIGN OFF | 03:14:18 PM Jun 23, 2017

Center Freq 2.441000000 GHz

Center Freq: 2.441000000 GHz
Trig: Free Run Avg|Hold: 300/300
#IFGain:Low #Atten: 30 dB
Radio Std: None
Radio Device: BTS

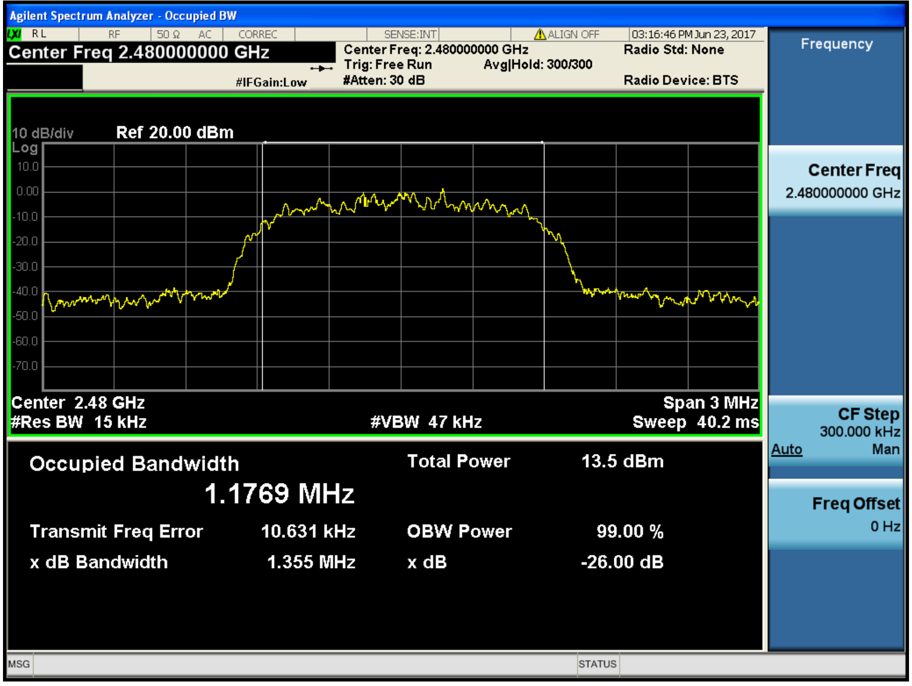
10 dB/div Ref 20.00 dBm

Center 2.441 GHz Span 3 MHz
#Res BW 15 kHz #VBW 47 kHz Sweep 40.2 ms

Occupied Bandwidth		Total Power	14.0 dBm
1.1795 MHz			
Transmit Freq Error	10.976 kHz	OBW Power	99.00 %
x dB Bandwidth	1.356 MHz	x dB	-26.00 dB

Frequency
Center Freq 2.441000000 GHz
CF Step 300.000 kHz Auto Man
Freq Offset 0 Hz

Occupied Bandwidth (99 %) ***Highest Channel & π/4 DQPSK***


Agilent Spectrum Analyzer - Occupied BW
RL
RF
50 Ω
AC
CORREC
SENSE:INT
ALIGN OFF
10 dB/div
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Frequency
Center Freq
2.480000000 GHz
CF Step
300.000 kHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

03:16:46 PM Jun 23, 2017

Center Freq 2.480000000 GHz

#IFGain:Low

Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold: 300/300
#Atten: 30 dB
Radio Std: None
Radio Device: BTS

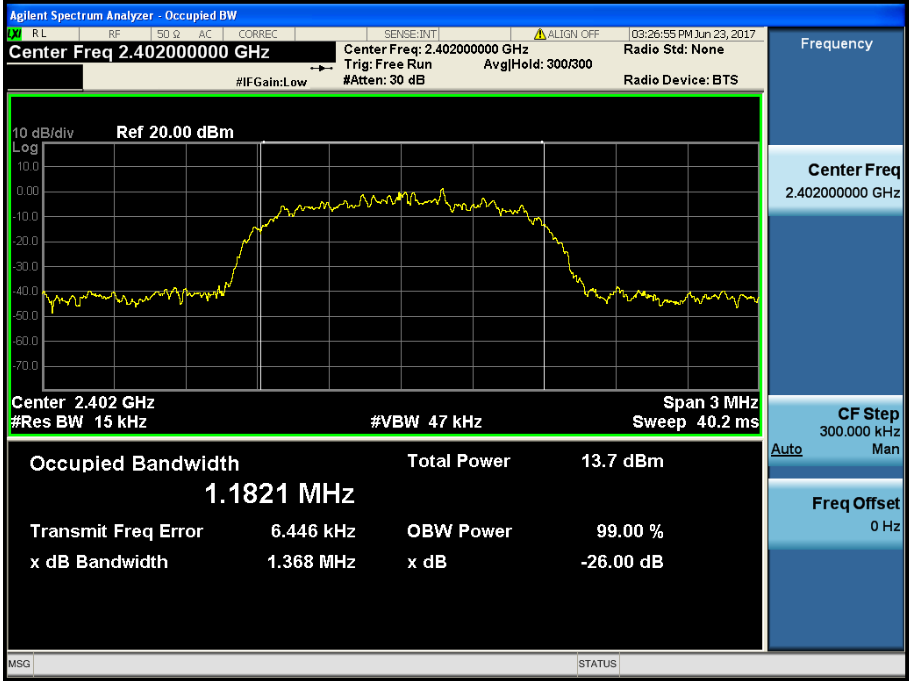
Ref 20.00 dBm

Center 2.48 GHz
#Res BW 15 kHz
#VBW 47 kHz
Span 3 MHz
Sweep 40.2 ms

Occupied Bandwidth
1.1769 MHz

Total Power 13.5 dBm
Transmit Freq Error 10.631 kHz
OBW Power 99.00 %
x dB Bandwidth 1.355 MHz
x dB -26.00 dB

Occupied Bandwidth (99 %) ***Lowest Channel & 8DPSK***


Agilent Spectrum Analyzer - Occupied BW

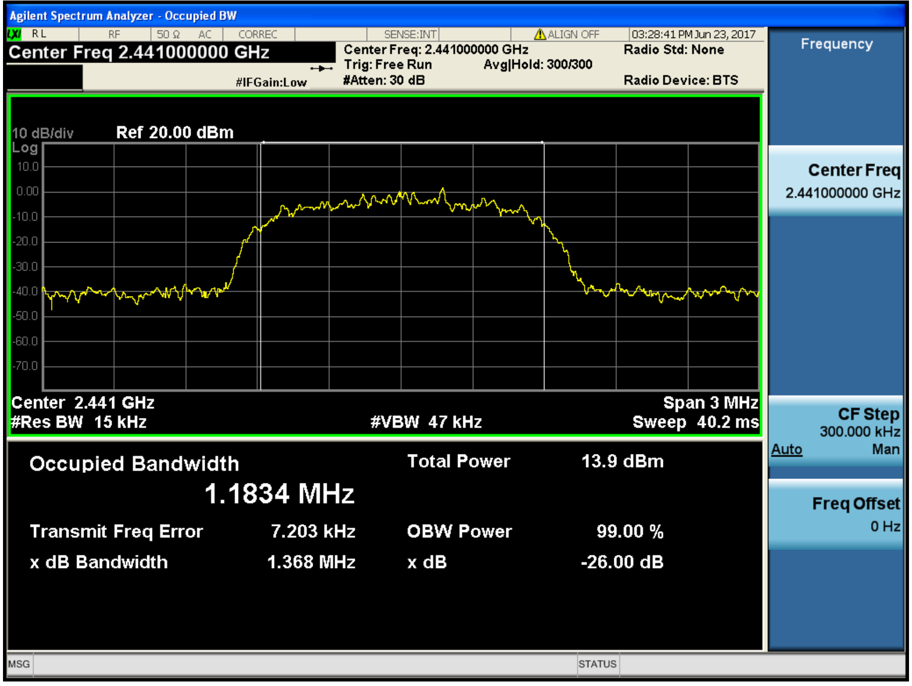
Center Freq 2.402000000 GHz
Center Freq: 2.402000000 GHz
Trig: Free Run
Avg|Hold: 300/300
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
03:26:55 PM Jun 23, 2017

Center 2.402 GHz
#Res BW 15 kHz
#VBW 47 kHz
Span 3 MHz
Sweep 40.2 ms

Occupied Bandwidth
1.1821 MHz
Total Power 13.7 dBm
Transmit Freq Error 6.446 kHz
OBW Power 99.00 %
x dB Bandwidth 1.368 MHz
x dB -26.00 dB

Center Freq 2.402000000 GHz
CF Step 300.000 kHz Auto Man
Freq Offset 0 Hz
R L
RF
50 Ω
AC
CORREC
SENSE:INT
ALIGN OFF
10 dB/div
Log
Ref 20.00 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Frequency
MSG
STATUS

Occupied Bandwidth (99 %) ***Middle Channel & 8DPSK***


Agilent Spectrum Analyzer - Occupied BW

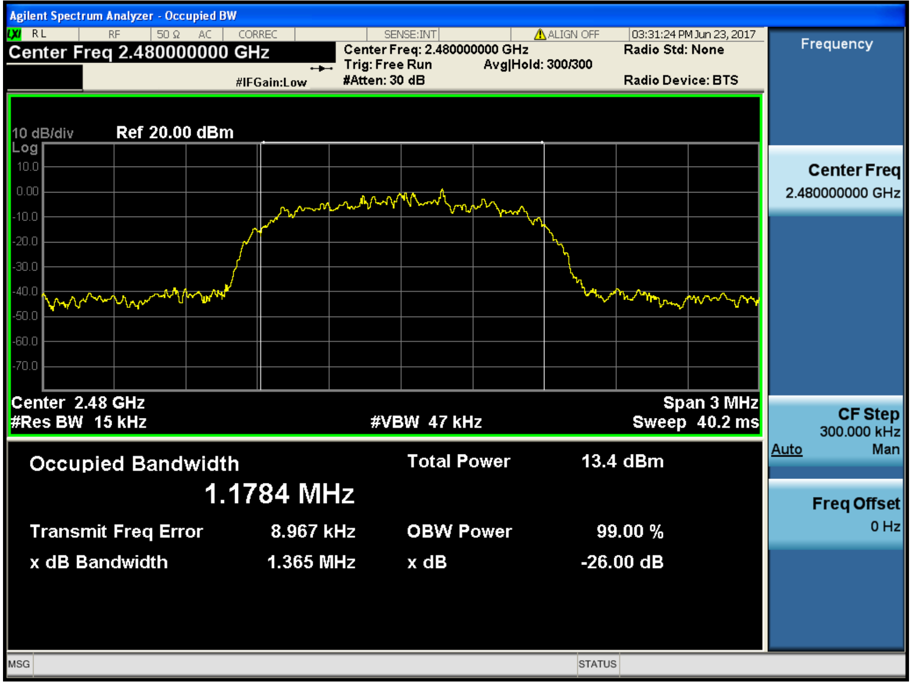
Center Freq 2.441000000 GHz
Center Freq: 2.441000000 GHz
Trig: Free Run
Avg|Hold: 300/300
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
03:28:41 PM Jun 23, 2017

Center 2.441 GHz
#Res BW 15 kHz
#VBW 47 kHz
Span 3 MHz
Sweep 40.2 ms

Occupied Bandwidth
1.1834 MHz
Total Power 13.9 dBm
Transmit Freq Error 7.203 kHz
OBW Power 99.00 %
x dB Bandwidth 1.368 MHz
x dB -26.00 dB

Center Freq 2.441000000 GHz
CF Step 300.000 kHz Auto Man
Freq Offset 0 Hz
R L
RF
50 Ω
AC
CORREC
SENSE:INT
ALIGN OFF
10 dB/div
Log
Ref 20.00 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Frequency
MSG
STATUS

Occupied Bandwidth (99 %) ***Highest Channel & 8DPSK***



Agilent Spectrum Analyzer - Occupied BW

Center Freq 2.480000000 GHz

Center Freq: 2.480000000 GHz
Trig: Free Run
Avg|Hold: 300/300
#IFGain:Low
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
03:31:24 PM Jun 23, 2017

10 dB/div Ref 20.00 dBm

Center 2.48 GHz
#Res BW 15 kHz
#VBW 47 kHz
Span 3 MHz
Sweep 40.2 ms

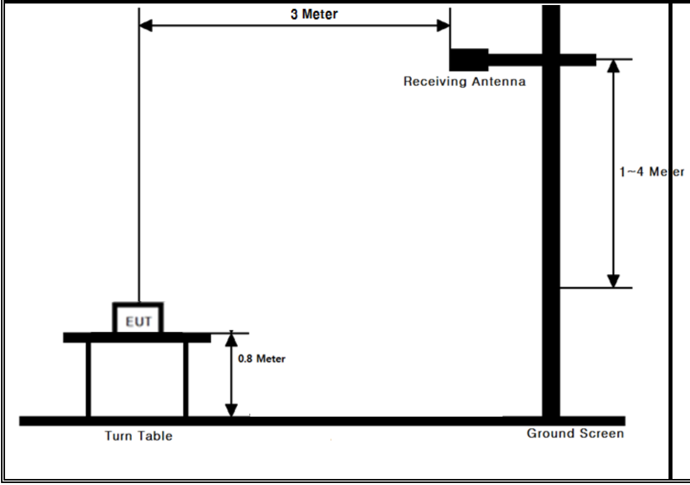
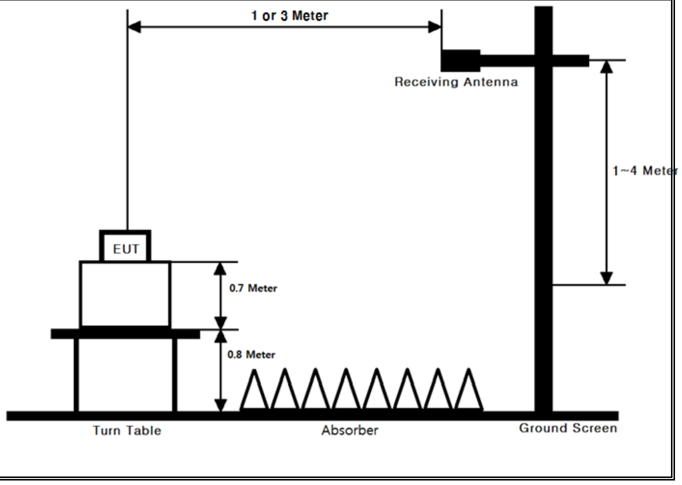
Occupied Bandwidth		Total Power	13.4 dBm
	1.1784 MHz		
Transmit Freq Error	8.967 kHz	OBW Power	99.00 %
x dB Bandwidth	1.365 MHz	x dB	-26.00 dB

RL
RF
50 Ω
AC
CORREC
SENSE:INT
ALIGN OFF
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Frequency
Center Freq
2.480000000 GHz
CF Step
300.000 kHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

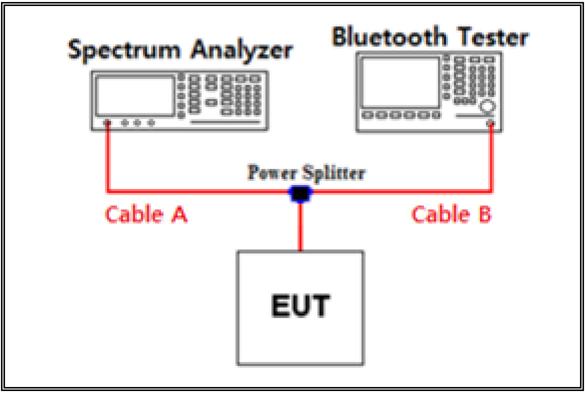
APPENDIX I

Test set up diagrams

- **Radiated Measurement**

Below 1GHz	Above 1GHz
 3 Meter Receiving Antenna 1~4 Meter EUT 0.8 Meter Turn Table Ground Screen	 1 or 3 Meter Receiving Antenna 1~4 Meter EUT 0.7 Meter 0.8 Meter Turn Table Absorber Ground Screen

- **Conducted Measurement**


Spectrum Analyzer
Bluetooth Tester
Power Splitter
Cable A
Cable B
EUT

Path loss information

Frequency (GHz)	Path Loss (dB)	Frequency (GHz)	Path Loss (dB)
0.03	6.69	15	10.40
1	6.97	20	11.17
2.402 & 2.440 & 2.480	7.60	25	13.39
5	8.33	-	-
10	9.49	-	-

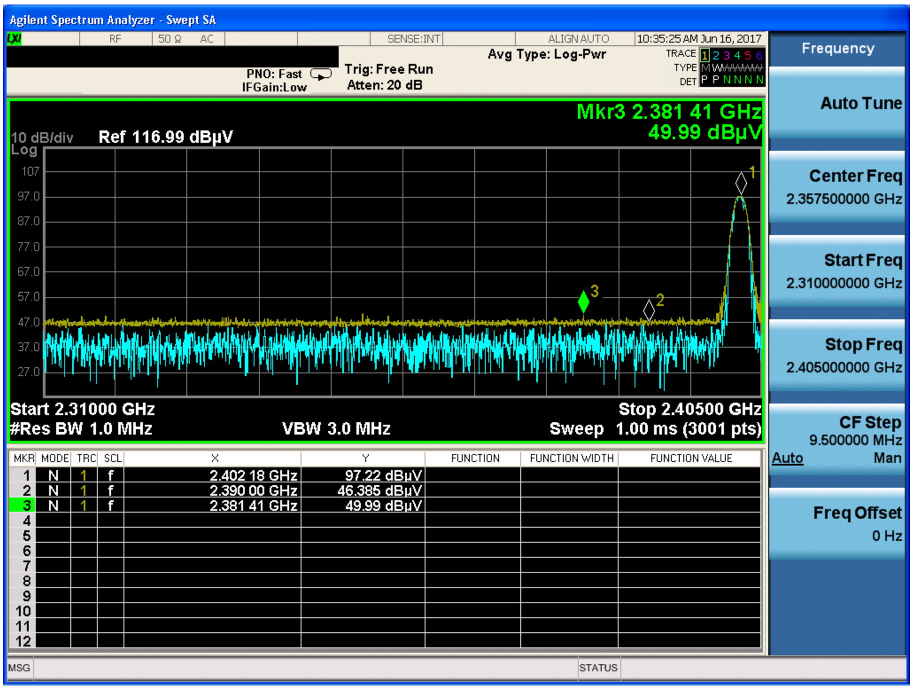
Note 1 : The path loss from EUT to Spectrum analyzer were measured and used for test.

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

APPENDIX II

Unwanted Emissions (Radiated) Test Plot

GFSK & Lowest & X & Ver Detector Mode : PK



Agilent Spectrum Analyzer - Swept SA

RF 50 Ω AC SENSE:INT ALIGN AUTO 10:35:25 AM Jun 16, 2017

PNO: Fast IFGain:Low Trig: Free Run Atten: 20 dB Avg Type: Log-Pwr

TRACE 1 2 3 4 5 6 TYPE M W W W W W DET P P N N N N

Mkr3 2.381 41 GHz
49.99 dBµV

10 dB/div Ref 116.99 dBµV

Start 2.31000 GHz Stop 2.40500 GHz
#Res BW 1.0 MHz VBW 3.0 MHz Sweep 1.00 ms (3001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.402 18 GHz	97.22 dBµV			
2	N	1	f	2.390 00 GHz	46.385 dBµV			
3	N	1	f	2.381 41 GHz	49.99 dBµV			
4								
5								
6								
7								
8								
9								
10								
11								
12								

Frequency

Auto Tune

Center Freq 2.357500000 GHz

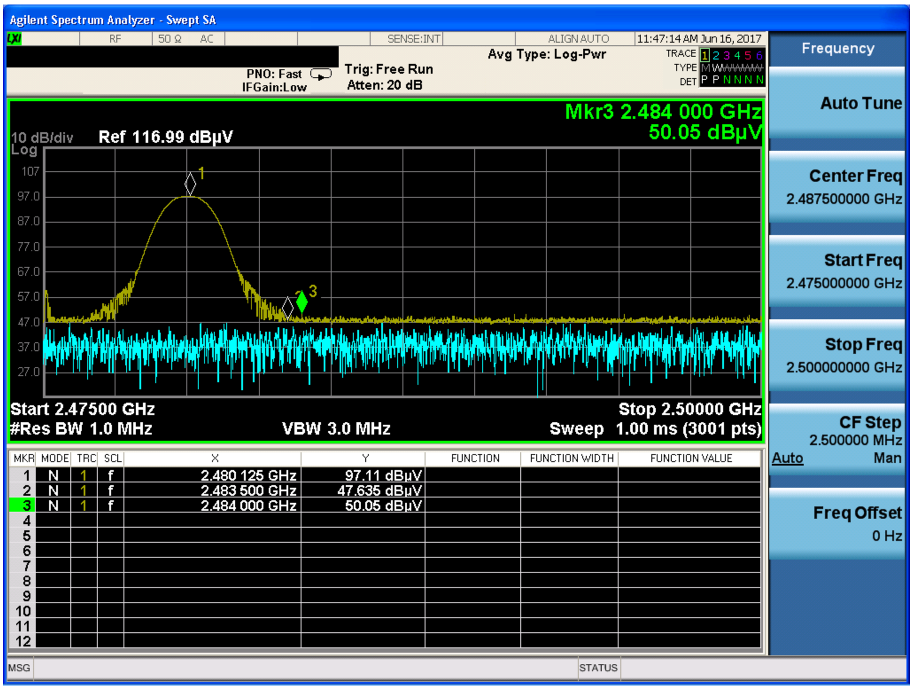
Start Freq 2.310000000 GHz

Stop Freq 2.405000000 GHz

CF Step 9.500000 MHz Auto Man

Freq Offset 0 Hz

GFSK & Highest & X & Ver Detector Mode : PK



Agilent Spectrum Analyzer - Swept SA

RF 50 Ω AC SENSE:INT ALIGN AUTO 11:47:14 AM Jun 16, 2017

PNO: Fast IFGain:Low Trig: Free Run Atten: 20 dB Avg Type: Log-Pwr

TRACE 1 2 3 4 5 6 TYPE M W W W W W DET P P N N N N

Mkr3 2.484 000 GHz
50.05 dBµV

10 dB/div Ref 116.99 dBµV

Start 2.47500 GHz Stop 2.50000 GHz
#Res BW 1.0 MHz VBW 3.0 MHz Sweep 1.00 ms (3001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.480 125 GHz	97.11 dBµV			
2	N	1	f	2.483 500 GHz	47.635 dBµV			
3	N	1	f	2.484 000 GHz	50.05 dBµV			
4								
5								
6								
7								
8								
9								
10								
11								
12								

Frequency

Auto Tune

Center Freq 2.487500000 GHz

Start Freq 2.475000000 GHz

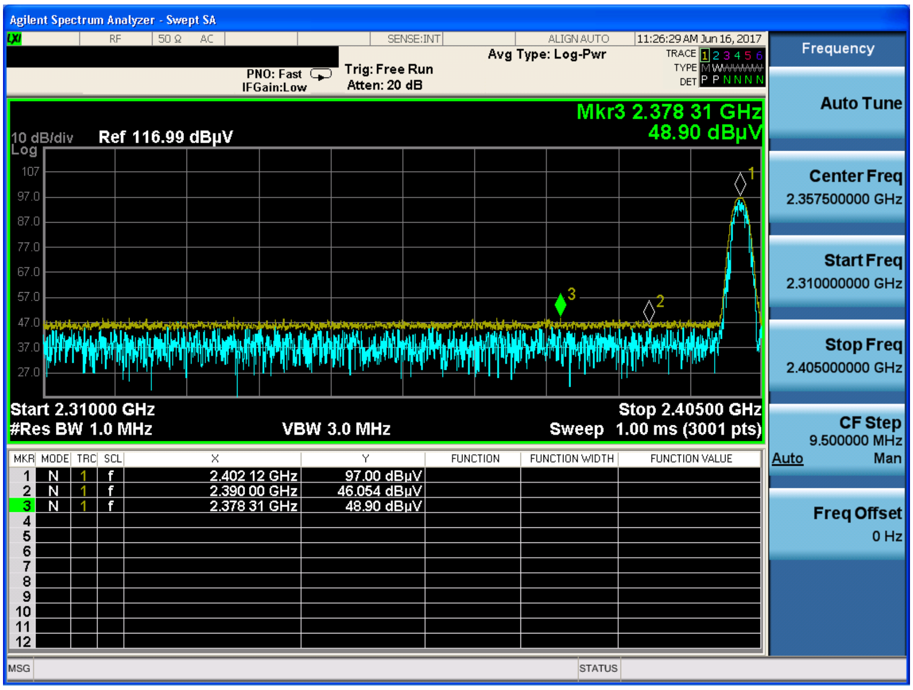
Stop Freq 2.500000000 GHz

CF Step 2.500000 MHz Auto Man

Freq Offset 0 Hz

π/4DQPSK & Lowest & X & Ver

Detector Mode : PK



Agilent Spectrum Analyzer - Swept SA

RF | 50 Ω | AC | SENSE:INT | ALIGN AUTO | 11:26:29 AM Jun 16, 2017

PNO: Fast Trig: Free Run Avg Type: Log-Pwr
IFGain:Low Atten: 20 dB

TRACE 1 2 3 4 5 6
TYPE M W W W W W
DET P P N N N N

Mkr3 2.378 31 GHz
48.90 dBμV

10 dB/div Ref 116.99 dBμV

Start 2.31000 GHz Stop 2.40500 GHz
#Res BW 1.0 MHz VBW 3.0 MHz Sweep 1.00 ms (3001 pts)

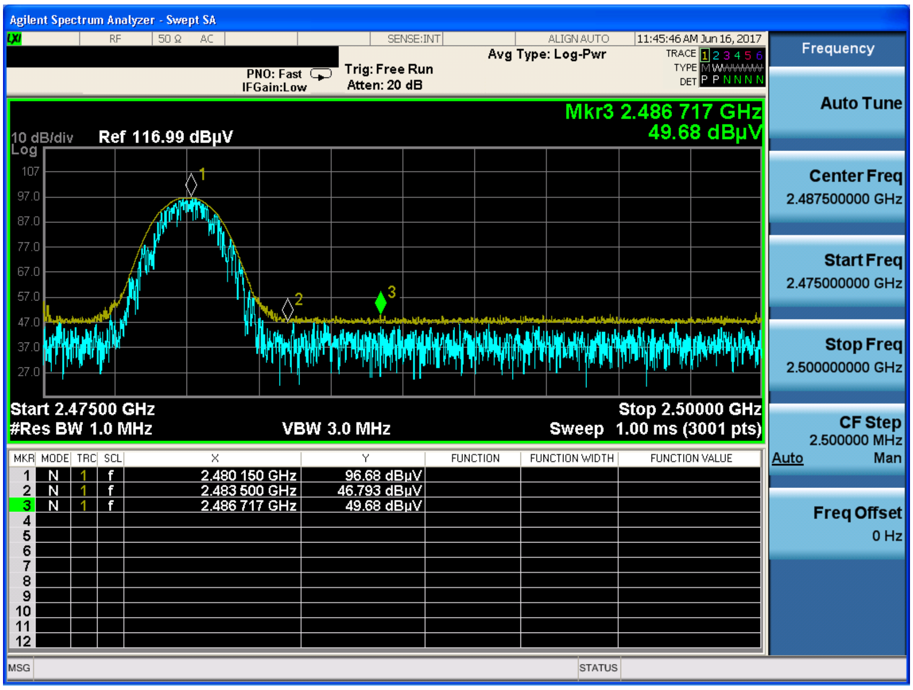
MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.402 12 GHz	97.00 dBμV			
2	N	1	f	2.390 00 GHz	46.054 dBμV			
3	N	1	f	2.378 31 GHz	48.90 dBμV			
4								
5								
6								
7								
8								
9								
10								
11								
12								

Center Freq 2.357500000 GHz
Start Freq 2.310000000 GHz
Stop Freq 2.405000000 GHz
CF Step 9.500000 MHz
Freq Offset 0 Hz

Log
107
97.0
87.0
77.0
67.0
57.0
47.0
37.0
27.0
1
2
3
Frequency
Auto Tune
Auto
Man
MSG
STATUS

π/4DQPSK & Highest & X & Ver

Detector Mode : PK



Agilent Spectrum Analyzer - Swept SA

RF | 50 Ω | AC | SENSE:INT | ALIGN AUTO | 11:45:46 AM Jun 16, 2017

PNO: Fast Trig: Free Run Avg Type: Log-Pwr
IFGain:Low Atten: 20 dB

TRACE 1 2 3 4 5 6
TYPE M W W W W W
DET P P N N N N

Mkr3 2.486 717 GHz
49.68 dBμV

10 dB/div Ref 116.99 dBμV

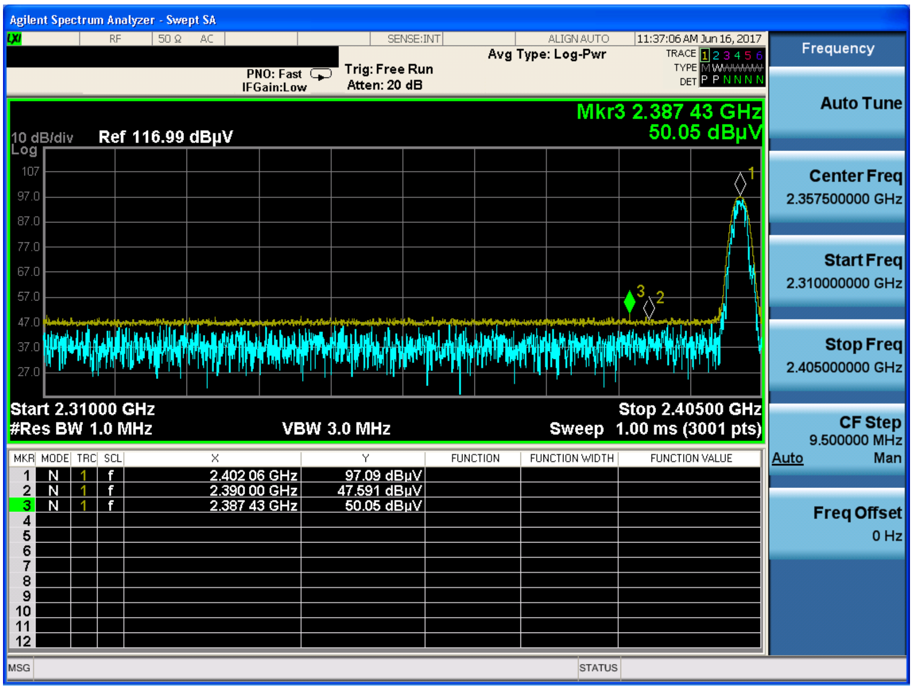
Start 2.47500 GHz Stop 2.50000 GHz
#Res BW 1.0 MHz VBW 3.0 MHz Sweep 1.00 ms (3001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.480 150 GHz	96.68 dBμV			
2	N	1	f	2.483 500 GHz	46.793 dBμV			
3	N	1	f	2.486 717 GHz	49.68 dBμV			
4								
5								
6								
7								
8								
9								
10								
11								
12								

Center Freq 2.487500000 GHz
Start Freq 2.475000000 GHz
Stop Freq 2.500000000 GHz
CF Step 2.500000 MHz
Freq Offset 0 Hz

Log
107
97.0
87.0
77.0
67.0
57.0
47.0
37.0
27.0
1
2
3
Frequency
Auto Tune
Auto
Man
MSG
STATUS

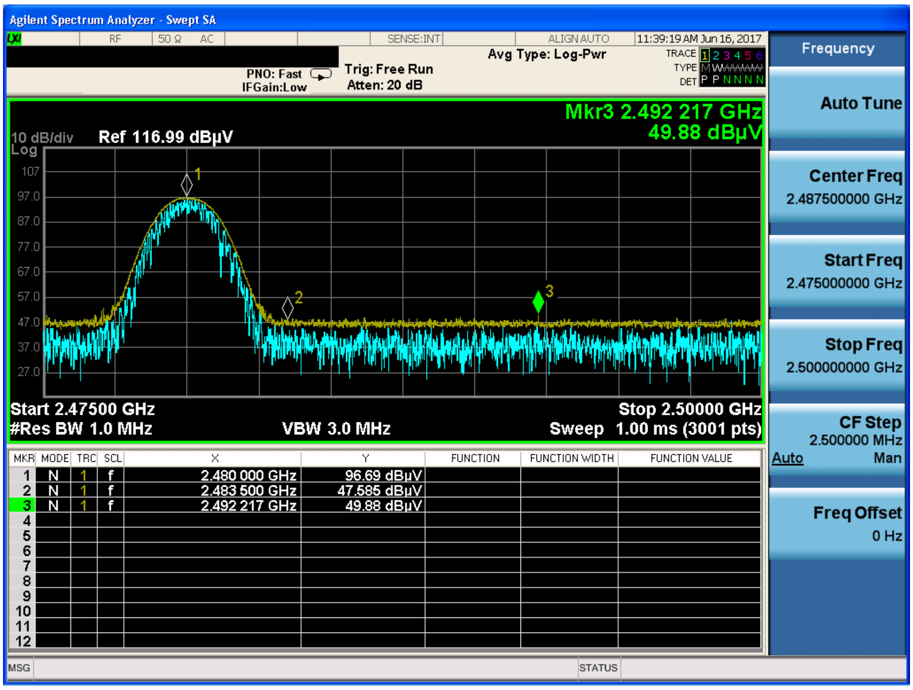
8DPSK & Lowest & X & Ver   Detector Mode : PK


Agilent Spectrum Analyzer - Swept SA
RF
50 Ω
AC
SENSE:INT
ALIGN AUTO
TRACE 1 2 3 4 5 6
TYPE M W W W W W
DET P P N N N N
Log
107
97.0
87.0
77.0
67.0
57.0
47.0
37.0
27.0
1
2
3
Frequency
Auto Tune
Center Freq
Start Freq
Stop Freq
CF Step
Auto
Man
Freq Offset
MSG
STATUS

11:37:06 AM Jun 16, 2017
Avg Type: Log-Pwr
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Mkr3 2.387 43 GHz
50.05 dBμV
10 dB/div Ref 116.99 dBμV
Start 2.31000 GHz
#Res BW 1.0 MHz
VBW 3.0 MHz
Stop 2.40500 GHz
Sweep 1.00 ms (3001 pts)
Center Freq 2.357500000 GHz
Start Freq 2.310000000 GHz
Stop Freq 2.405000000 GHz
CF Step 9.500000 MHz
Freq Offset 0 Hz

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.402 06 GHz	97.09 dBμV			
2	N	1	f	2.390 00 GHz	47.591 dBμV			
3	N	1	f	2.387 43 GHz	50.05 dBμV			
4								
5								
6								
7								
8								
9								
10								
11								
12								

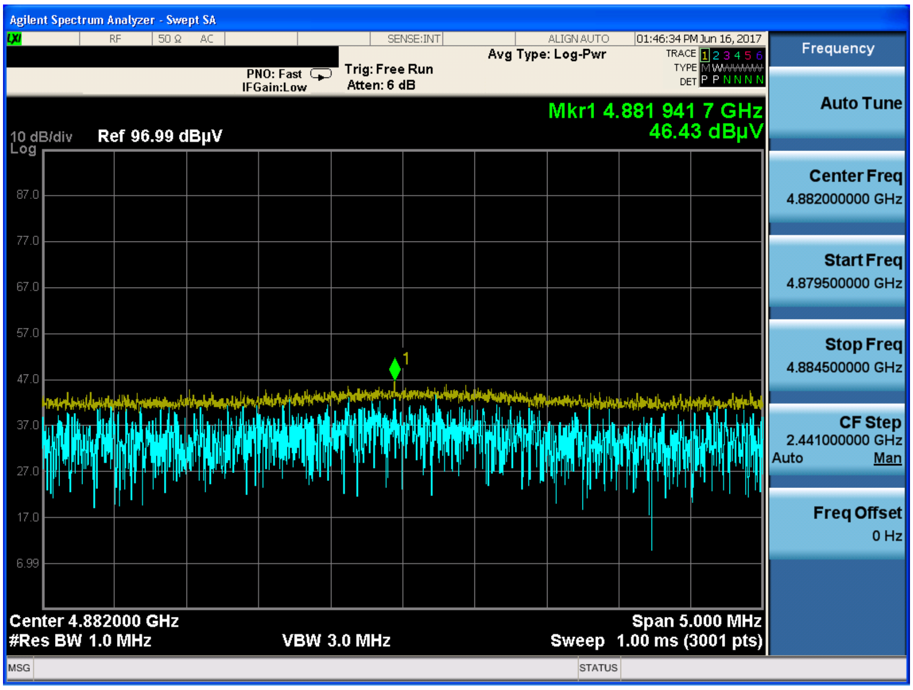
8DPSK & Highest & X & Ver   Detector Mode : PK


Agilent Spectrum Analyzer - Swept SA
RF
50 Ω
AC
SENSE:INT
ALIGN AUTO
TRACE 1 2 3 4 5 6
TYPE M W W W W W
DET P P N N N N
Log
107
97.0
87.0
77.0
67.0
57.0
47.0
37.0
27.0
1
2
3
Frequency
Auto Tune
Center Freq
Start Freq
Stop Freq
CF Step
Auto
Man
Freq Offset
MSG
STATUS

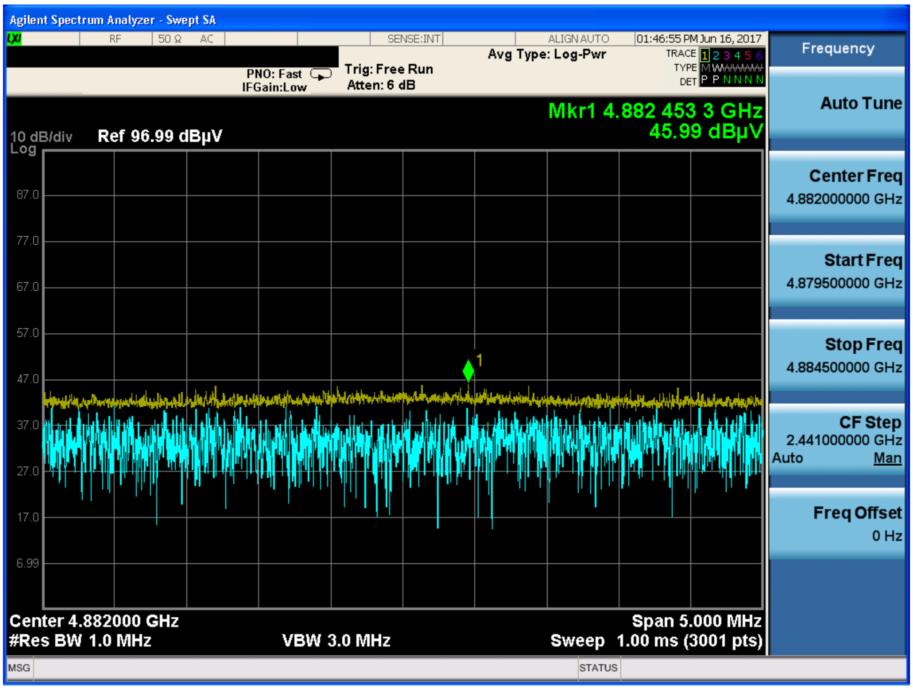
11:39:19 AM Jun 16, 2017
Avg Type: Log-Pwr
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 20 dB
Mkr3 2.492 217 GHz
49.88 dBμV
10 dB/div Ref 116.99 dBμV
Start 2.47500 GHz
#Res BW 1.0 MHz
VBW 3.0 MHz
Stop 2.50000 GHz
Sweep 1.00 ms (3001 pts)
Center Freq 2.487500000 GHz
Start Freq 2.475000000 GHz
Stop Freq 2.500000000 GHz
CF Step 2.500000 MHz
Freq Offset 0 Hz

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.480 000 GHz	96.69 dBμV			
2	N	1	f	2.483 500 GHz	47.585 dBμV			
3	N	1	f	2.492 217 GHz	49.88 dBμV			
4								
5								
6								
7								
8								
9								
10								
11								
12								

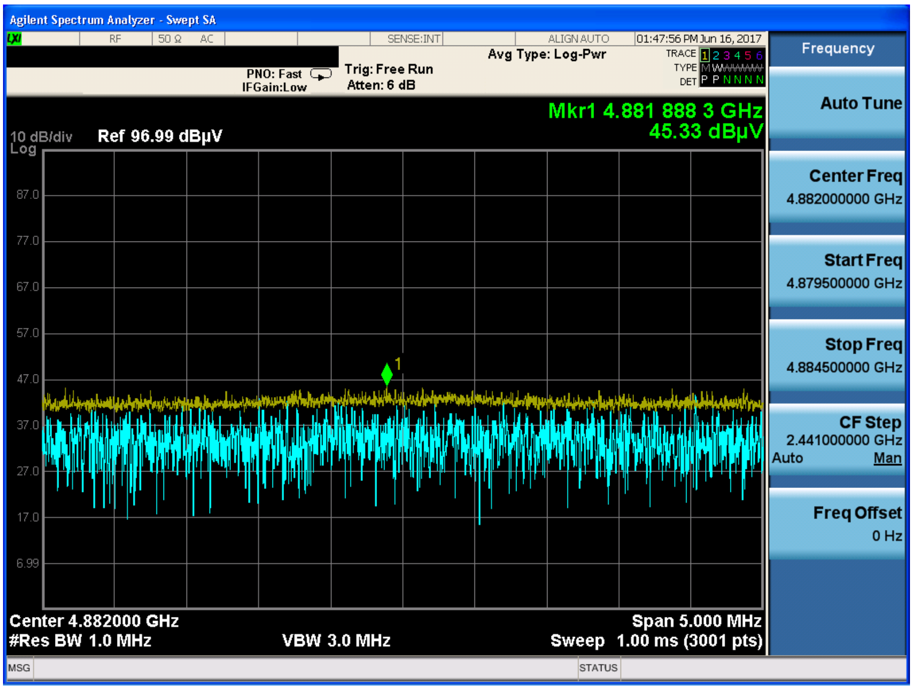
GFSK & Middle & Z & Hor **Detector Mode : PK**


Agilent Spectrum Analyzer - Swept SA
RF 50 Ω AC SENSE:INT ALIGN AUTO 01:46:34 PM Jun 16, 2017
PNO: Fast IFGain:Low
Trig: Free Run
Atten: 6 dB
Avg Type: Log-Pwr
TRACE 1 2 3 4 5 6
TYPE M W W W W W
DET P P N N N N
Mkr1 4.881 941 7 GHz
46.43 dBµV
10 dB/div Log Ref 96.99 dBµV
Center 4.882000 GHz
#Res BW 1.0 MHz
VBW 3.0 MHz
Span 5.000 MHz
Sweep 1.00 ms (3001 pts)
Center Freq 4.882000000 GHz
Start Freq 4.879500000 GHz
Stop Freq 4.884500000 GHz
CF Step 2.441000000 GHz Auto Man
Freq Offset 0 Hz
Frequency
Auto Tune
87.0
77.0
67.0
57.0
47.0
37.0
27.0
17.0
6.99
1
MSG
STATUS

π/4DQPSK & Middle & Z & Hor **Detector Mode : PK**


Agilent Spectrum Analyzer - Swept SA
RF 50 Ω AC SENSE:INT ALIGN AUTO 01:46:55 PM Jun 16, 2017
PNO: Fast IFGain:Low
Trig: Free Run
Atten: 6 dB
Avg Type: Log-Pwr
TRACE 1 2 3 4 5 6
TYPE M W W W W W
DET P P N N N N
Mkr1 4.882 453 3 GHz
45.99 dBµV
10 dB/div Log Ref 96.99 dBµV
Center 4.882000 GHz
#Res BW 1.0 MHz
VBW 3.0 MHz
Span 5.000 MHz
Sweep 1.00 ms (3001 pts)
Center Freq 4.882000000 GHz
Start Freq 4.879500000 GHz
Stop Freq 4.884500000 GHz
CF Step 2.441000000 GHz Auto Man
Freq Offset 0 Hz
Frequency
Auto Tune
87.0
77.0
67.0
57.0
47.0
37.0
27.0
17.0
6.99
1
MSG
STATUS

8DPSK & Middle & Z & Hor **Detector Mode : PK**


Agilent Spectrum Analyzer - Swept SA
RF 50 Ω AC SENSE:INT ALIGN AUTO 01:47:56 PM Jun 16, 2017
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 6 dB
Avg Type: Log-Pwr
Mkr1 4.881 888 3 GHz
45.33 dBμV
10 dB/div Ref 96.99 dBμV
Center 4.882000 GHz
#Res BW 1.0 MHz
VBW 3.0 MHz
Span 5.000 MHz
Sweep 1.00 ms (3001 pts)
Frequency
Auto Tune
Center Freq 4.882000000 GHz
Start Freq 4.879500000 GHz
Stop Freq 4.884500000 GHz
CF Step 2.441000000 GHz
Auto Man
Freq Offset 0 Hz
TRACE 1 2 3 4 5 6
TYPE M W W W W W
DET P P N N N N
Log
87.0
77.0
67.0
57.0
47.0
37.0
27.0
17.0
6.99
1
MSG
STATUS