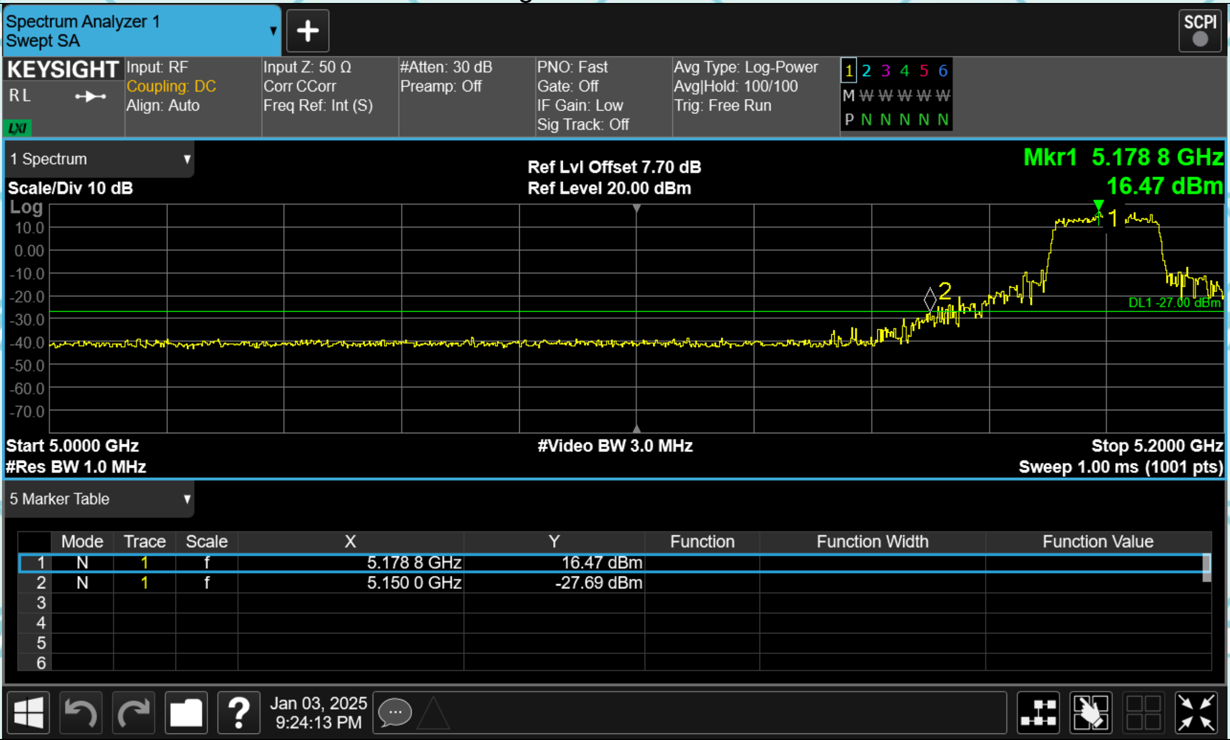
Band Edge n20 5180MHz Low



Spectrum Analyzer 1
Swept SA
SCPI
KEYSIGHT
RL
LXI
1 2 3 4 5 6
M W W W W W
P N N N N N
1 Spectrum
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1
2
DL1 -27.00 dBm
5 Marker Table

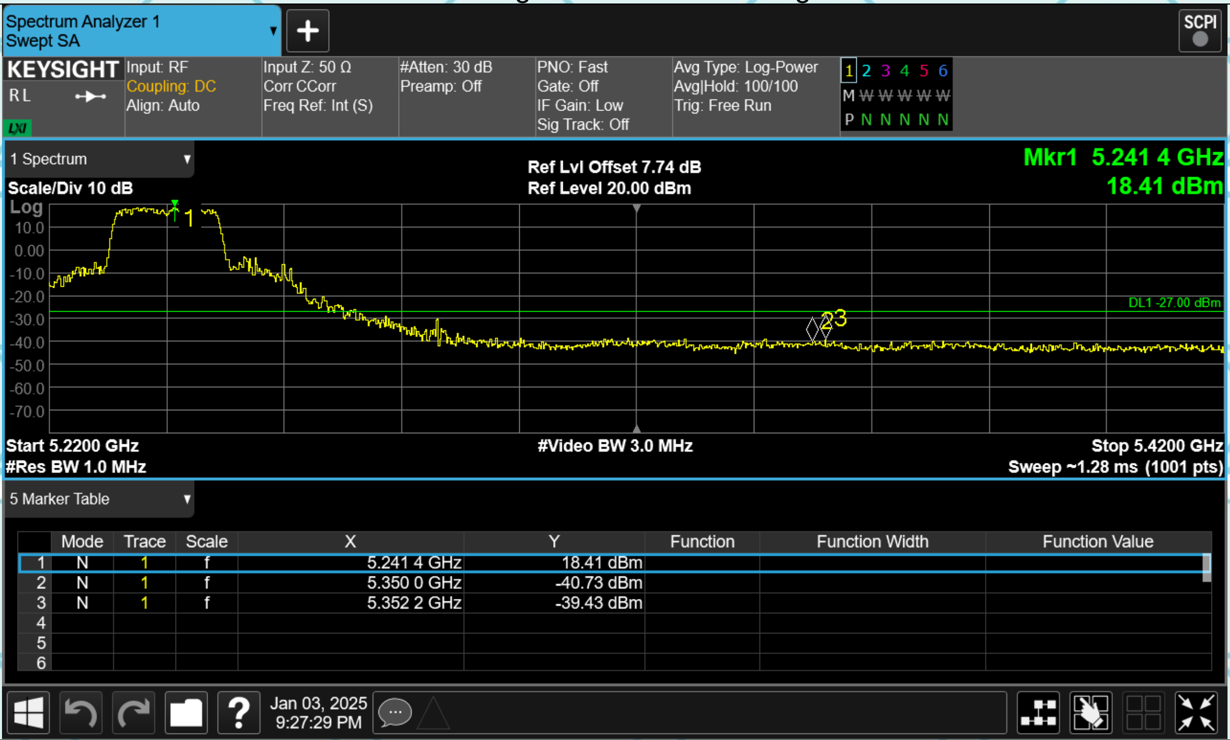
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

Ref Lvl Offset 7.70 dB
Ref Level 20.00 dBm
Scale/Div 10 dB
Mkr1 5.178 8 GHz
16.47 dBm
Start 5.0000 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.2000 GHz
Sweep 1.00 ms (1001 pts)

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.178 8 GHz	16.47 dBm			
2	N	1	f	5.150 0 GHz	-27.69 dBm			
3								
4								
5								
6								

Jan 03, 2025
9:24:13 PM

Band Edge n20 5240MHz High



Spectrum Analyzer 1
Swept SA
SCPI
KEYSIGHT
RL
LXI
1 2 3 4 5 6
M W W W W W
P N N N N N
1 Spectrum
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1
23
DL1 -27.00 dBm
5 Marker Table

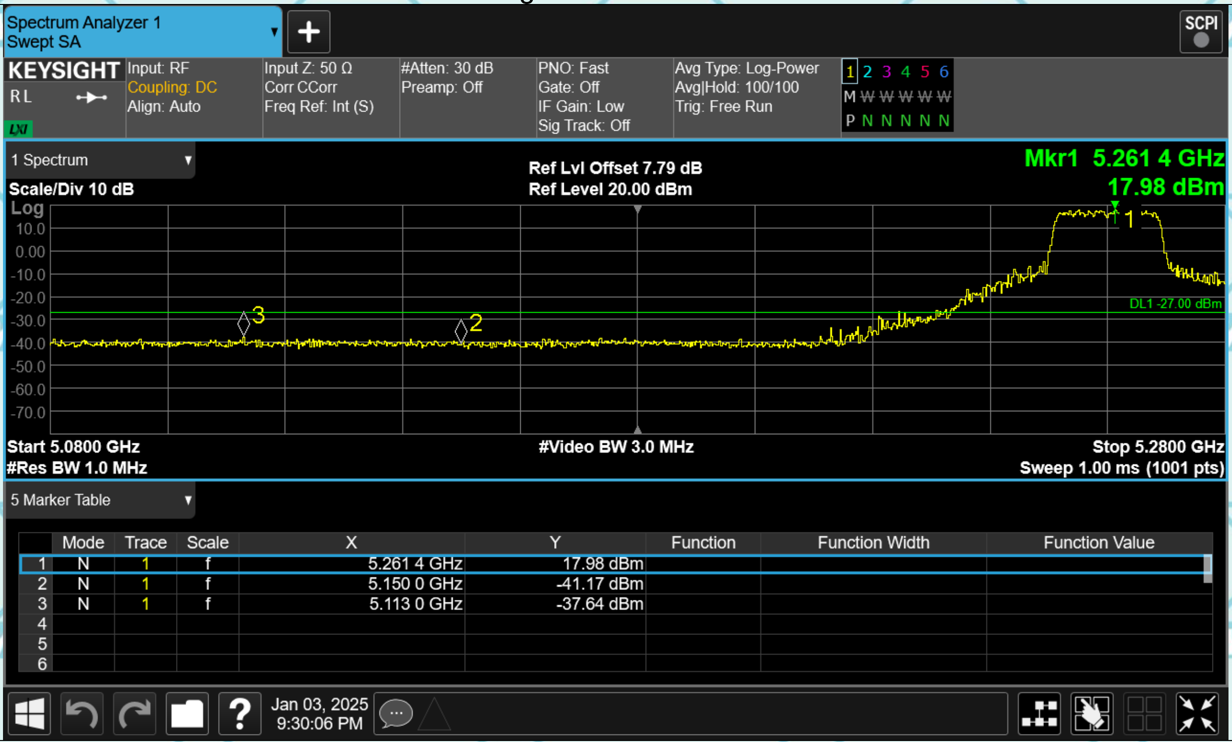
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

Ref Lvl Offset 7.74 dB
Ref Level 20.00 dBm
Scale/Div 10 dB
Mkr1 5.241 4 GHz
18.41 dBm
Start 5.2200 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.4200 GHz
Sweep ~1.28 ms (1001 pts)

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.241 4 GHz	18.41 dBm			
2	N	1	f	5.350 0 GHz	-40.73 dBm			
3	N	1	f	5.352 2 GHz	-39.43 dBm			
4								
5								
6								

Jan 03, 2025
9:27:29 PM

Band Edge n20 5260MHz Low


Spectrum Analyzer 1
Swept SA
SCPI
KEYSIGHT
RL
LXI
1 Spectrum
1 2 3 4 5 6
M W W W W W
P N N N N N
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
DL1 -27.00 dBm
1
2
3
5 Marker Table

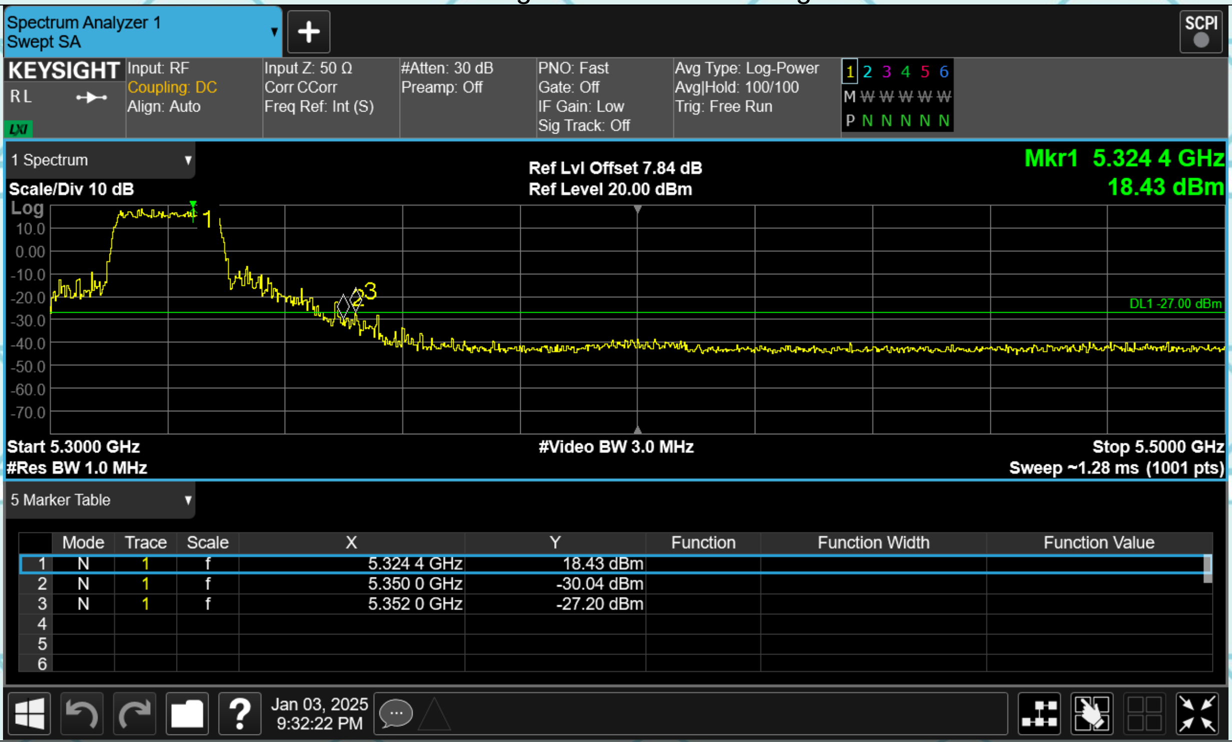
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

Ref Lvl Offset 7.79 dB
Ref Level 20.00 dBm
Scale/Div 10 dB
Mkr1 5.261 4 GHz
17.98 dBm
Start 5.0800 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.2800 GHz
Sweep 1.00 ms (1001 pts)

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.261 4 GHz	17.98 dBm			
2	N	1	f	5.150 0 GHz	-41.17 dBm			
3	N	1	f	5.113 0 GHz	-37.64 dBm			
4								
5								
6								

Jan 03, 2025
9:30:06 PM

Band Edge n20 5320MHz High


Spectrum Analyzer 1
Swept SA
SCPI
KEYSIGHT
RL
LXI
1 Spectrum
1 2 3 4 5 6
M W W W W W
P N N N N N
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
DL1 -27.00 dBm
1
2
3
5 Marker Table

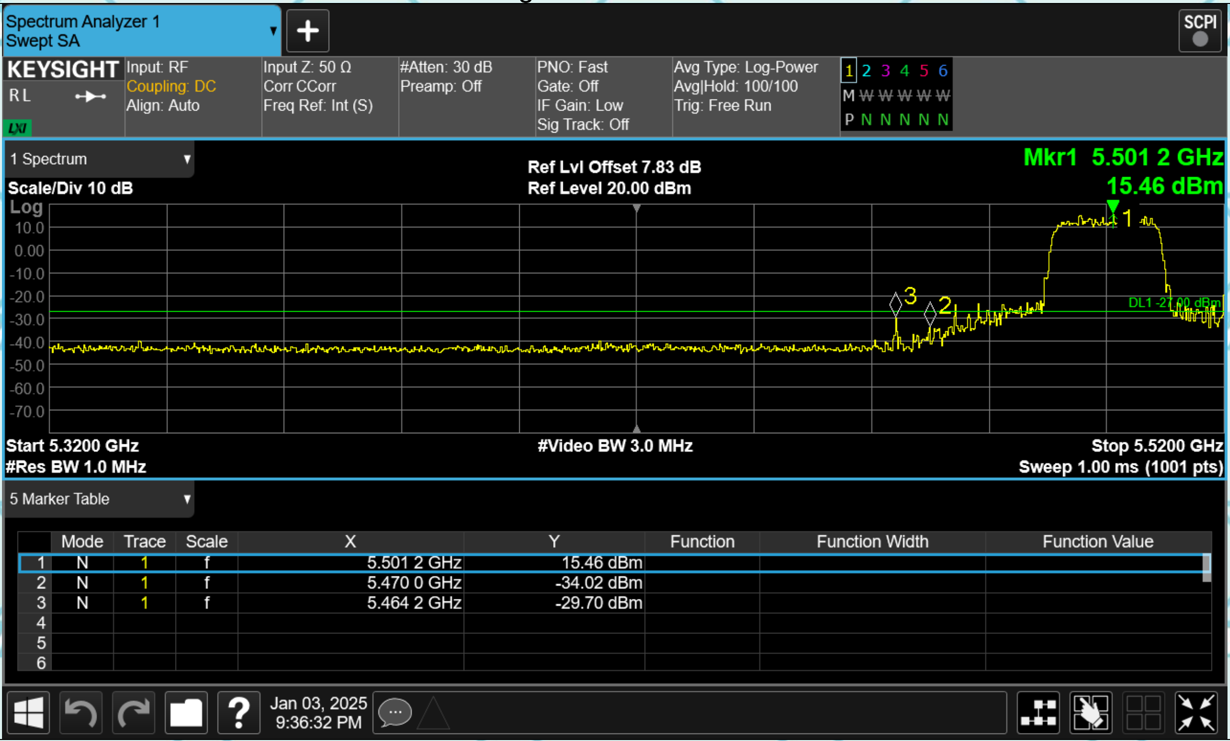
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

Ref Lvl Offset 7.84 dB
Ref Level 20.00 dBm
Scale/Div 10 dB
Mkr1 5.324 4 GHz
18.43 dBm
Start 5.3000 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.5000 GHz
Sweep ~1.28 ms (1001 pts)

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.324 4 GHz	18.43 dBm			
2	N	1	f	5.350 0 GHz	-30.04 dBm			
3	N	1	f	5.352 0 GHz	-27.20 dBm			
4								
5								
6								

Jan 03, 2025
9:32:22 PM

Band Edge n20 5500MHz Low



Spectrum Analyzer 1
Swept SA

KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

1 Spectrum
Ref Lvl Offset 7.83 dB
Ref Level 20.00 dBm
Scale/Div 10 dB
Mkr1 5.501 2 GHz
15.46 dBm

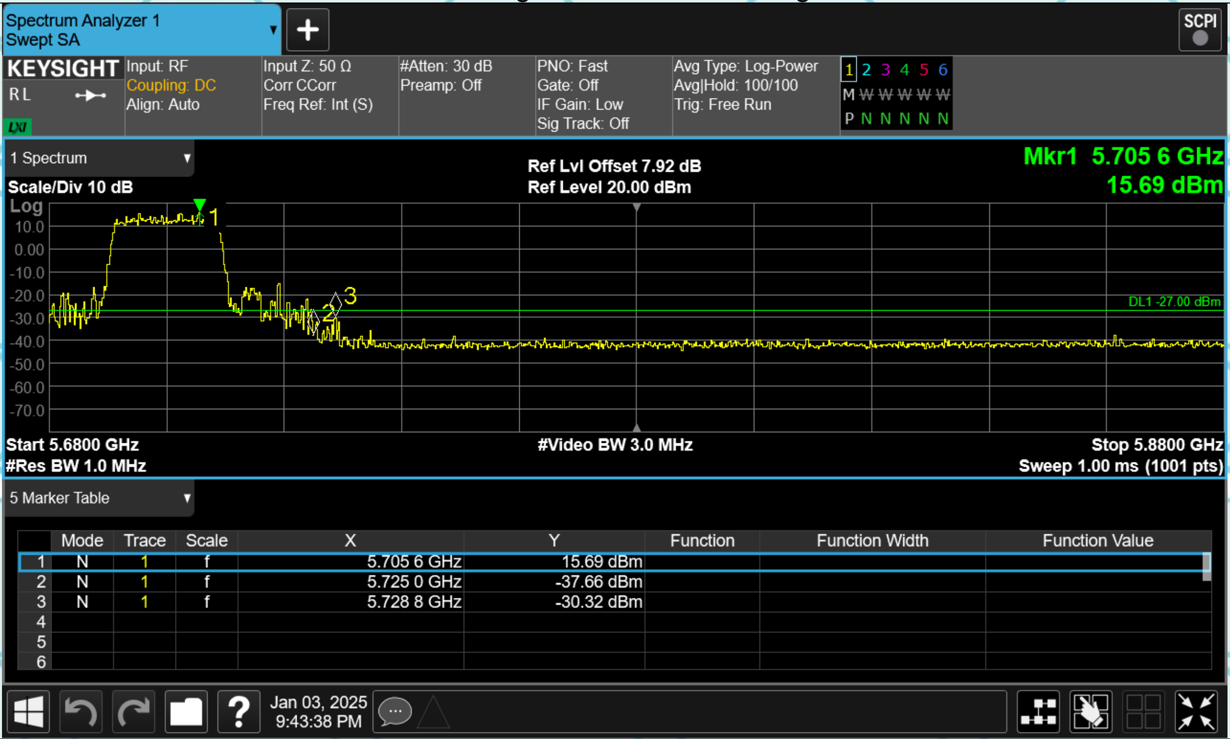
Start 5.3200 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.5200 GHz
Sweep 1.00 ms (1001 pts)

5 Marker Table

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.501 2 GHz	15.46 dBm			
2	N	1	f	5.470 0 GHz	-34.02 dBm			
3	N	1	f	5.464 2 GHz	-29.70 dBm			
4								
5								
6								

Jan 03, 2025
9:36:32 PM

Band Edge n20 5700MHz High



Spectrum Analyzer 1
Swept SA

KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

1 Spectrum
Ref Lvl Offset 7.92 dB
Ref Level 20.00 dBm
Scale/Div 10 dB
Mkr1 5.705 6 GHz
15.69 dBm

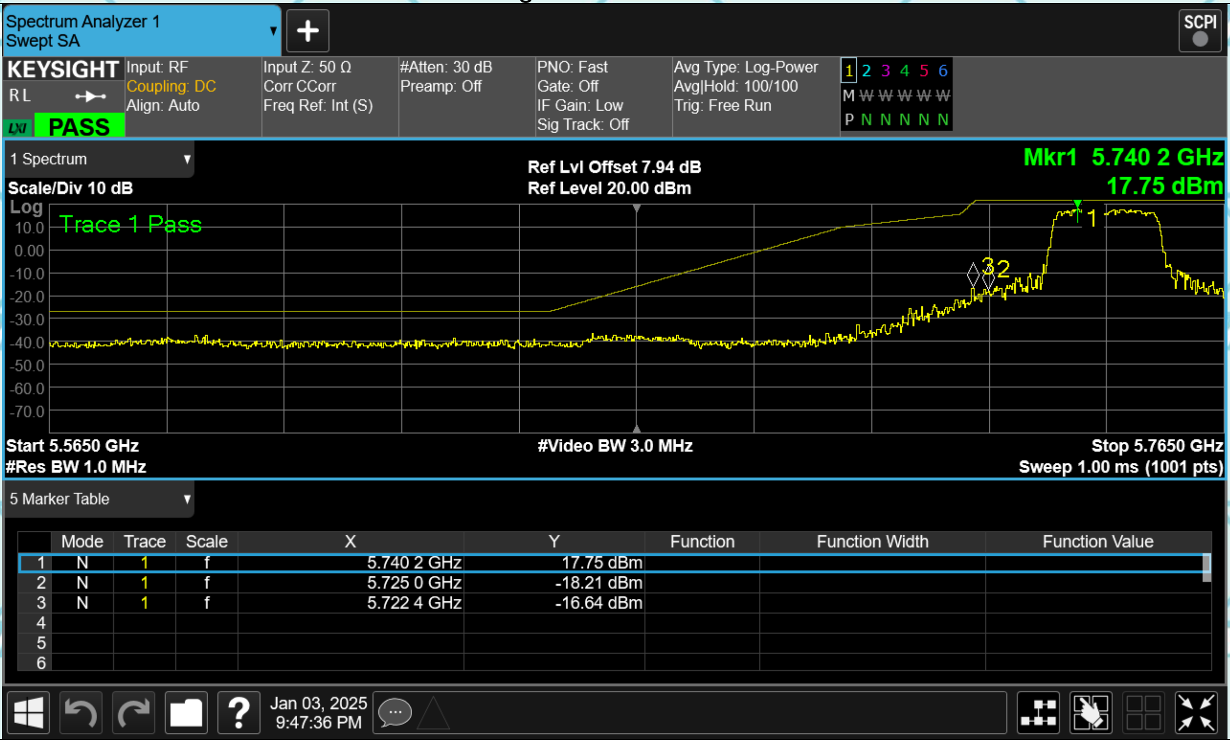
Start 5.6800 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.8800 GHz
Sweep 1.00 ms (1001 pts)

5 Marker Table

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.705 6 GHz	15.69 dBm			
2	N	1	f	5.725 0 GHz	-37.66 dBm			
3	N	1	f	5.728 8 GHz	-30.32 dBm			
4								
5								
6								

Jan 03, 2025
9:43:38 PM

Band Edge n20 5745MHz Low



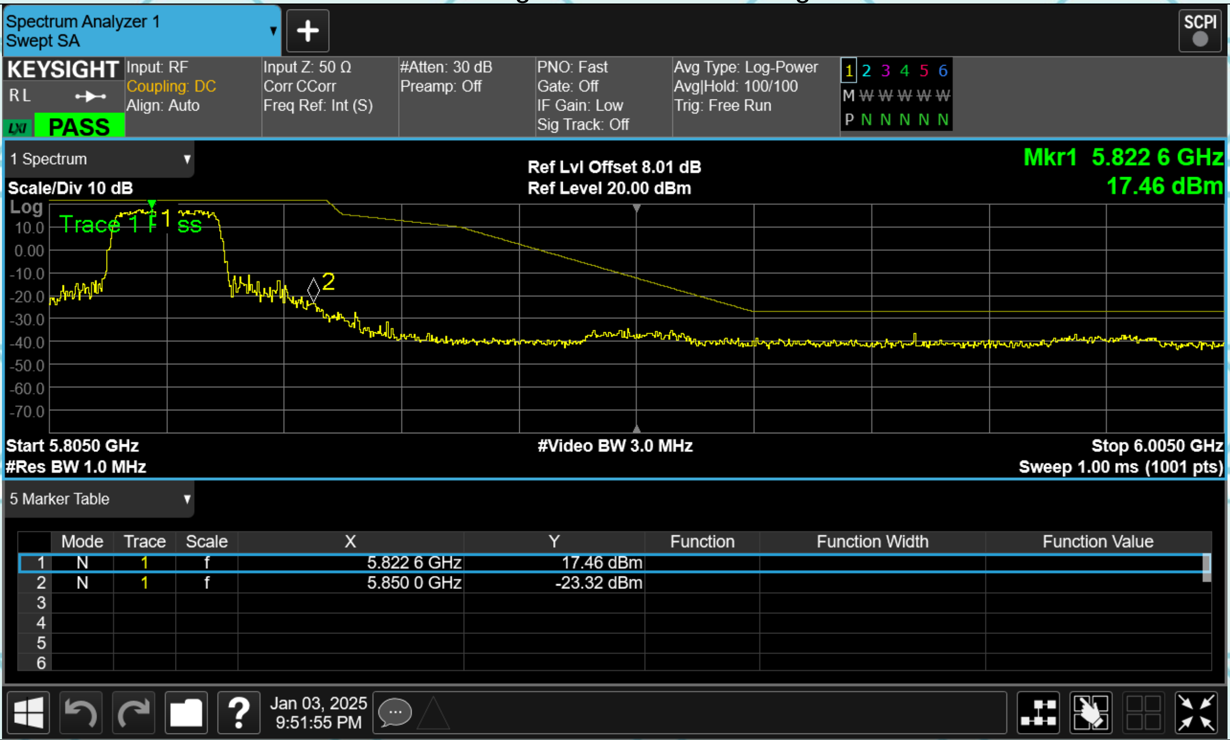
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

Ref Lvl Offset 7.94 dB
Ref Level 20.00 dBm
Scale/Div 10 dB
Mkr1 5.740 2 GHz
17.75 dBm
Start 5.5650 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.7650 GHz
Sweep 1.00 ms (1001 pts)

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.740 2 GHz	17.75 dBm			
2	N	1	f	5.725 0 GHz	-18.21 dBm			
3	N	1	f	5.722 4 GHz	-16.64 dBm			
4								
5								
6								

Jan 03, 2025
9:47:36 PM

Band Edge n20 5825MHz High



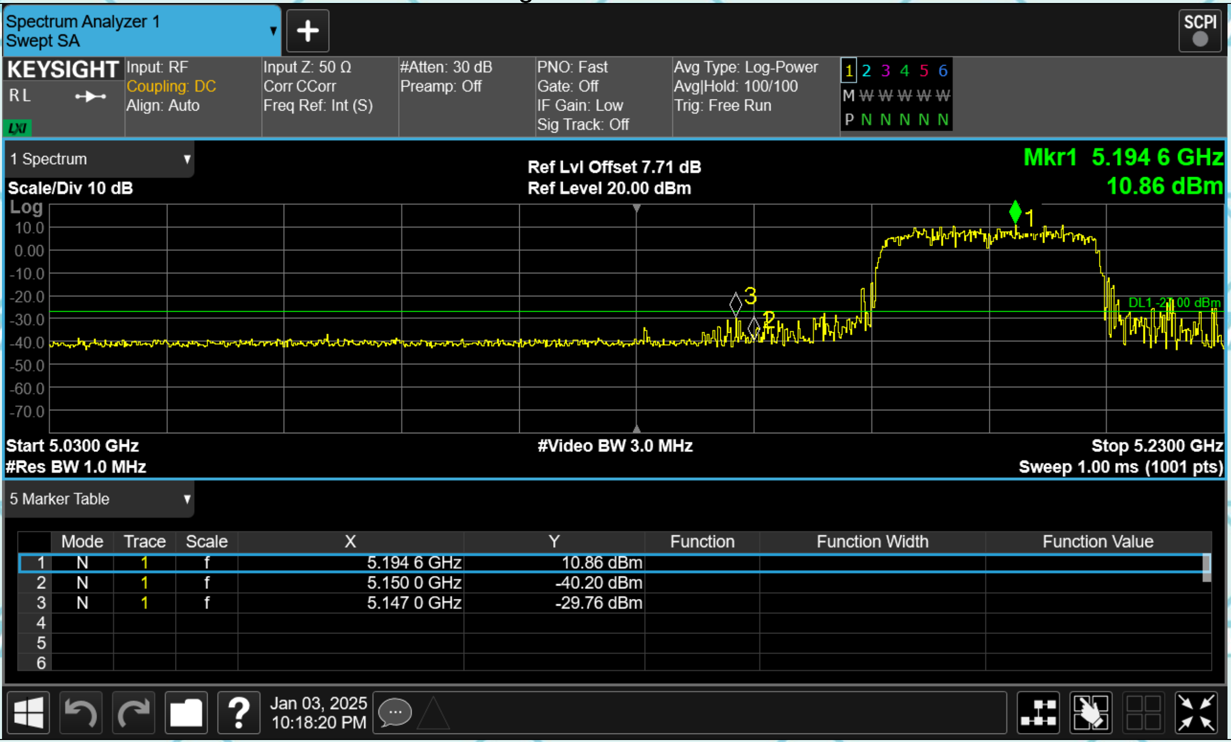
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

Ref Lvl Offset 8.01 dB
Ref Level 20.00 dBm
Scale/Div 10 dB
Mkr1 5.822 6 GHz
17.46 dBm
Start 5.8050 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 6.0050 GHz
Sweep 1.00 ms (1001 pts)

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.822 6 GHz	17.46 dBm			
2	N	1	f	5.850 0 GHz	-23.32 dBm			
3								
4								
5								
6								

Jan 03, 2025
9:51:55 PM

Band Edge n40 5190MHz Low



Spectrum Analyzer 1
Swept SA

KEYSIGHT Input: RF Coupling: DC Align: Auto
Input Z: 50 Ω Corr CCorr Freq Ref: Int (S)
#Atten: 30 dB Preamp: Off
PNO: Fast Gate: Off IF Gain: Low Sig Track: Off
Avg Type: Log-Power Avg|Hold: 100/100 Trig: Free Run

1 Spectrum
Scale/Div 10 dB
Ref Lvl Offset 7.71 dB
Ref Level 20.00 dBm
Mkr1 5.194 6 GHz 10.86 dBm

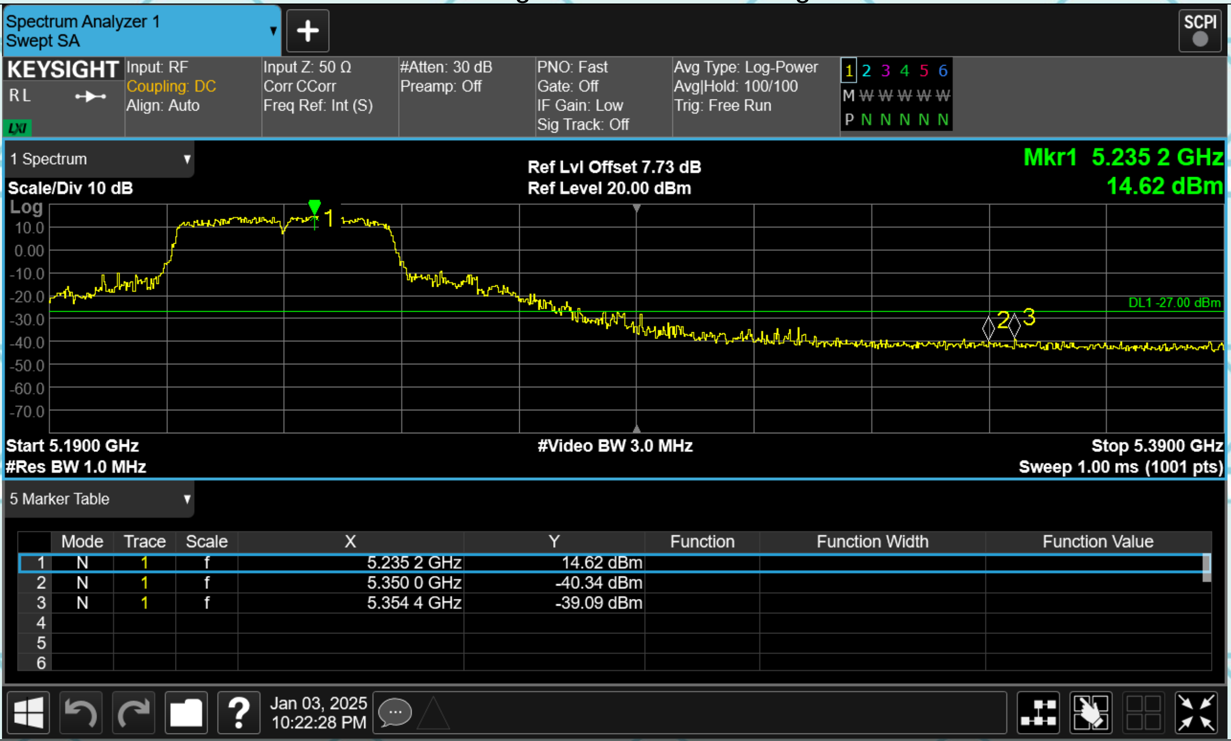
Start 5.0300 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.2300 GHz
Sweep 1.00 ms (1001 pts)

5 Marker Table

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.194 6 GHz	10.86 dBm			
2	N	1	f	5.150 0 GHz	-40.20 dBm			
3	N	1	f	5.147 0 GHz	-29.76 dBm			
4								
5								
6								

Jan 03, 2025
10:18:20 PM

Band Edge n40 5230MHz High



Spectrum Analyzer 1
Swept SA

KEYSIGHT Input: RF Coupling: DC Align: Auto
Input Z: 50 Ω Corr CCorr Freq Ref: Int (S)
#Atten: 30 dB Preamp: Off
PNO: Fast Gate: Off IF Gain: Low Sig Track: Off
Avg Type: Log-Power Avg|Hold: 100/100 Trig: Free Run

1 Spectrum
Scale/Div 10 dB
Ref Lvl Offset 7.73 dB
Ref Level 20.00 dBm
Mkr1 5.235 2 GHz 14.62 dBm

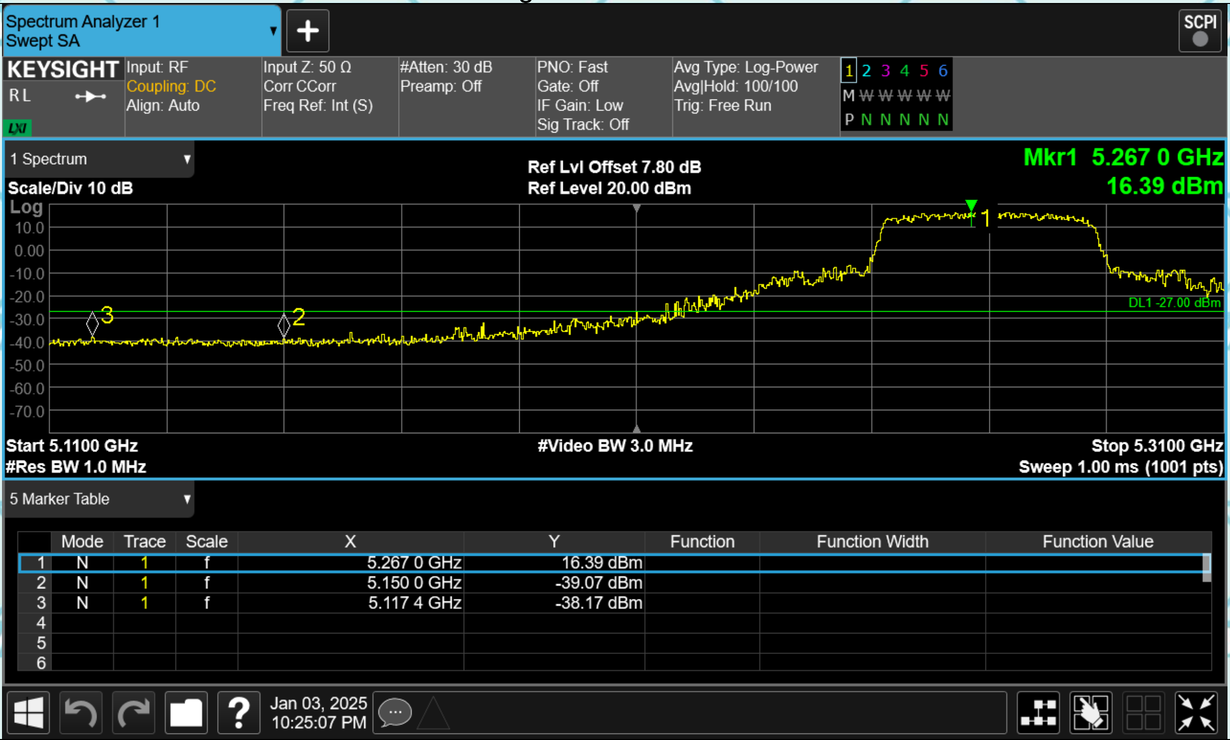
Start 5.1900 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.3900 GHz
Sweep 1.00 ms (1001 pts)

5 Marker Table

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.235 2 GHz	14.62 dBm			
2	N	1	f	5.350 0 GHz	-40.34 dBm			
3	N	1	f	5.354 4 GHz	-39.09 dBm			
4								
5								
6								

Jan 03, 2025
10:22:28 PM

Band Edge n40 5270MHz Low


Spectrum Analyzer 1
Swept SA
SCPI
KEYSIGHT
RL
LXI
1 2 3 4 5 6
M W W W W W
P N N N N N
1 Spectrum
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1
2
3
DL1 -27.00 dBm
5 Marker Table
Jan 03, 2025
10:25:07 PM

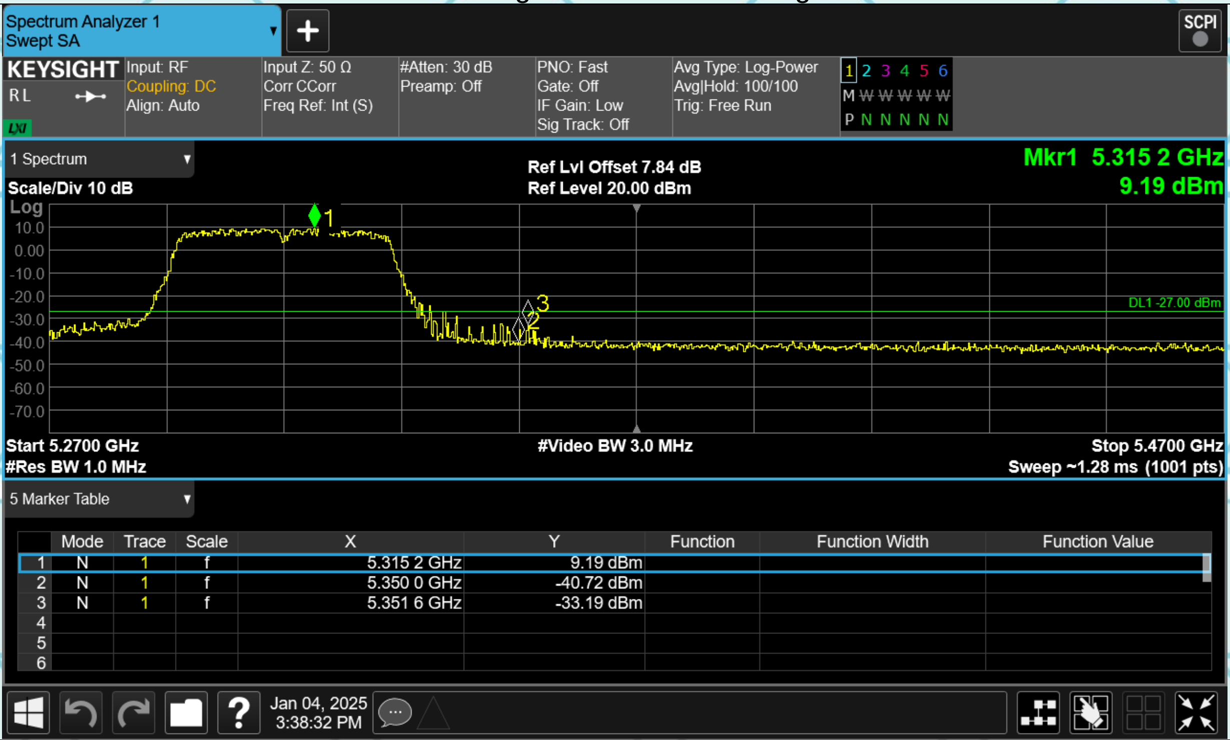
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

Ref Lvl Offset 7.80 dB
Ref Level 20.00 dBm
Scale/Div 10 dB
Mkr1 5.267 0 GHz
16.39 dBm

Start 5.1100 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.3100 GHz
Sweep 1.00 ms (1001 pts)

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.267 0 GHz	16.39 dBm			
2	N	1	f	5.150 0 GHz	-39.07 dBm			
3	N	1	f	5.117 4 GHz	-38.17 dBm			
4								
5								
6								

Band Edge n40 5310MHz High


Spectrum Analyzer 1
Swept SA
SCPI
KEYSIGHT
RL
LXI
1 2 3 4 5 6
M W W W W W
P N N N N N
1 Spectrum
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1
2
3
DL1 -27.00 dBm
5 Marker Table
Jan 04, 2025
3:38:32 PM

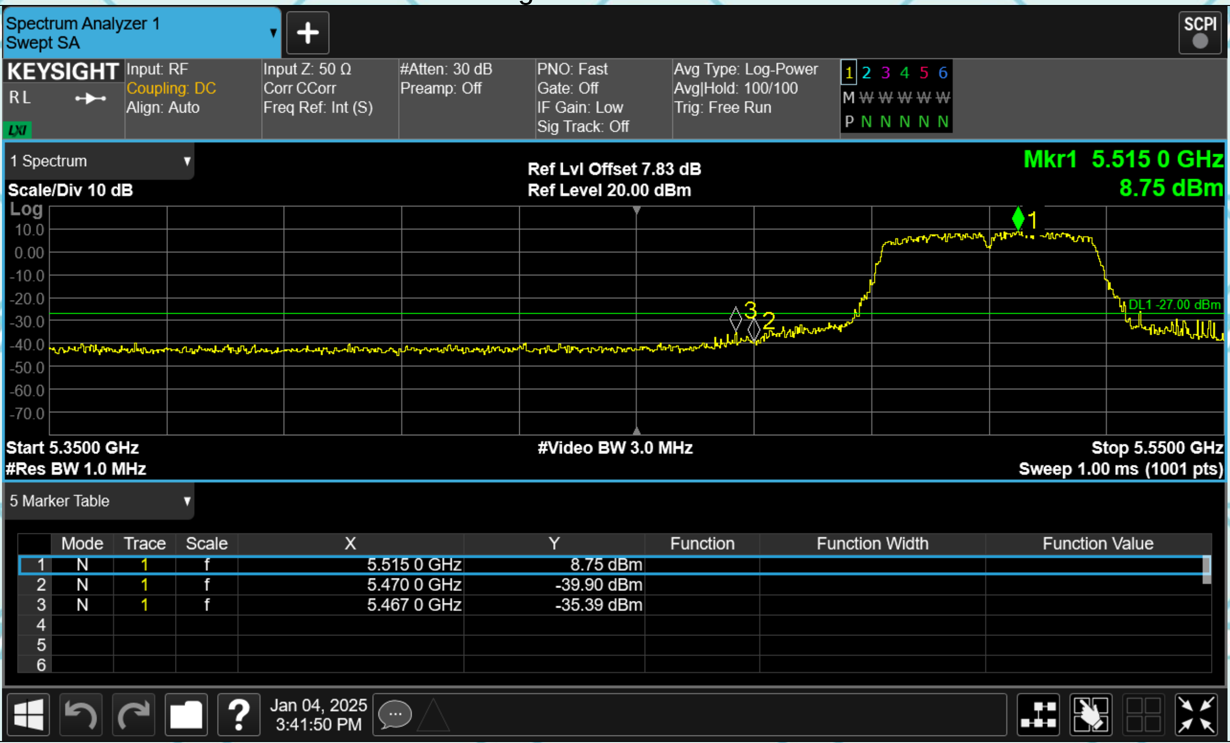
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

Ref Lvl Offset 7.84 dB
Ref Level 20.00 dBm
Scale/Div 10 dB
Mkr1 5.315 2 GHz
9.19 dBm

Start 5.2700 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.4700 GHz
Sweep ~1.28 ms (1001 pts)

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.315 2 GHz	9.19 dBm			
2	N	1	f	5.350 0 GHz	-40.72 dBm			
3	N	1	f	5.351 6 GHz	-33.19 dBm			
4								
5								
6								

Band Edge n40 5510MHz Low



Spectrum Analyzer 1
Swept SA

KEYSIGHT Input: RF
Coupling: DC
Align: Auto

Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)

#Atten: 30 dB
Preamp: Off

PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off

Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

Ref Lvl Offset 7.83 dB
Ref Level 20.00 dBm

Scale/Div 10 dB

Mkr1 5.515 0 GHz
8.75 dBm

Start 5.3500 GHz
#Res BW 1.0 MHz

#Video BW 3.0 MHz

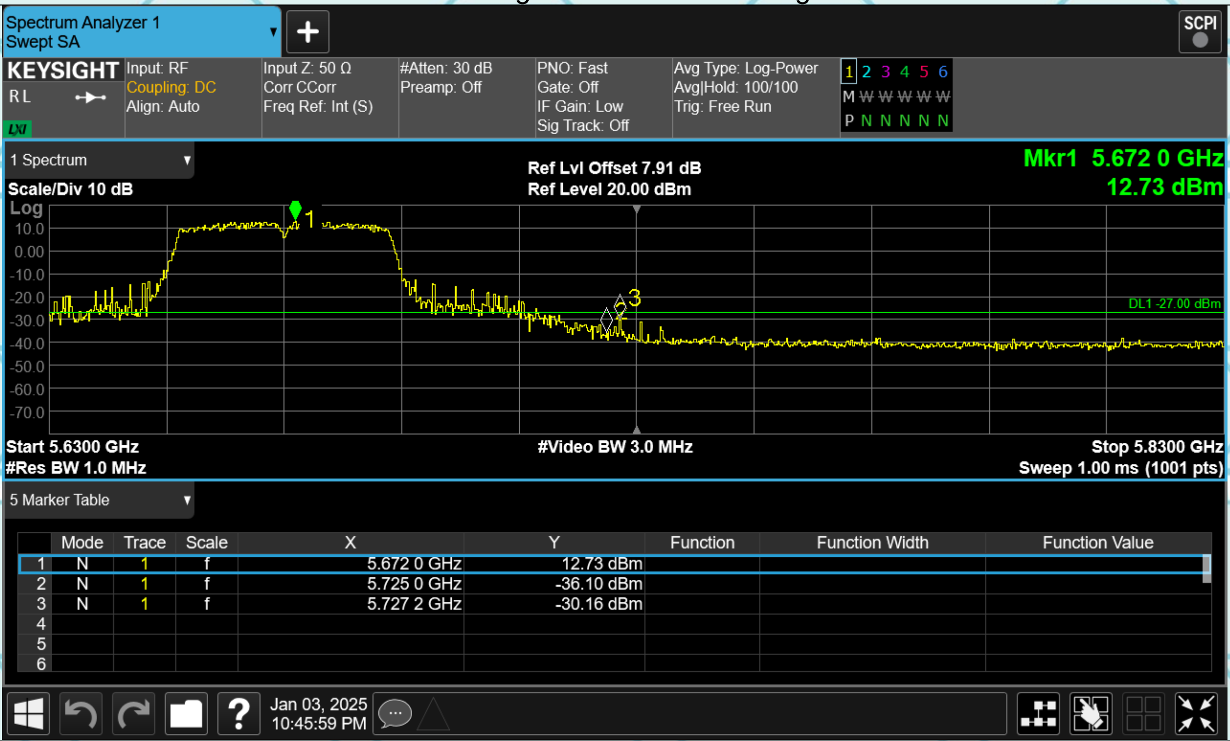
Stop 5.5500 GHz
Sweep 1.00 ms (1001 pts)

5 Marker Table

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.515 0 GHz	8.75 dBm			
2	N	1	f	5.470 0 GHz	-39.90 dBm			
3	N	1	f	5.467 0 GHz	-35.39 dBm			
4								
5								
6								

Jan 04, 2025
3:41:50 PM

Band Edge n40 5670MHz High



Spectrum Analyzer 1
Swept SA

KEYSIGHT Input: RF
Coupling: DC
Align: Auto

Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)

#Atten: 30 dB
Preamp: Off

PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off

Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

Ref Lvl Offset 7.91 dB
Ref Level 20.00 dBm

Scale/Div 10 dB

Mkr1 5.672 0 GHz
12.73 dBm

Start 5.6300 GHz
#Res BW 1.0 MHz

#Video BW 3.0 MHz

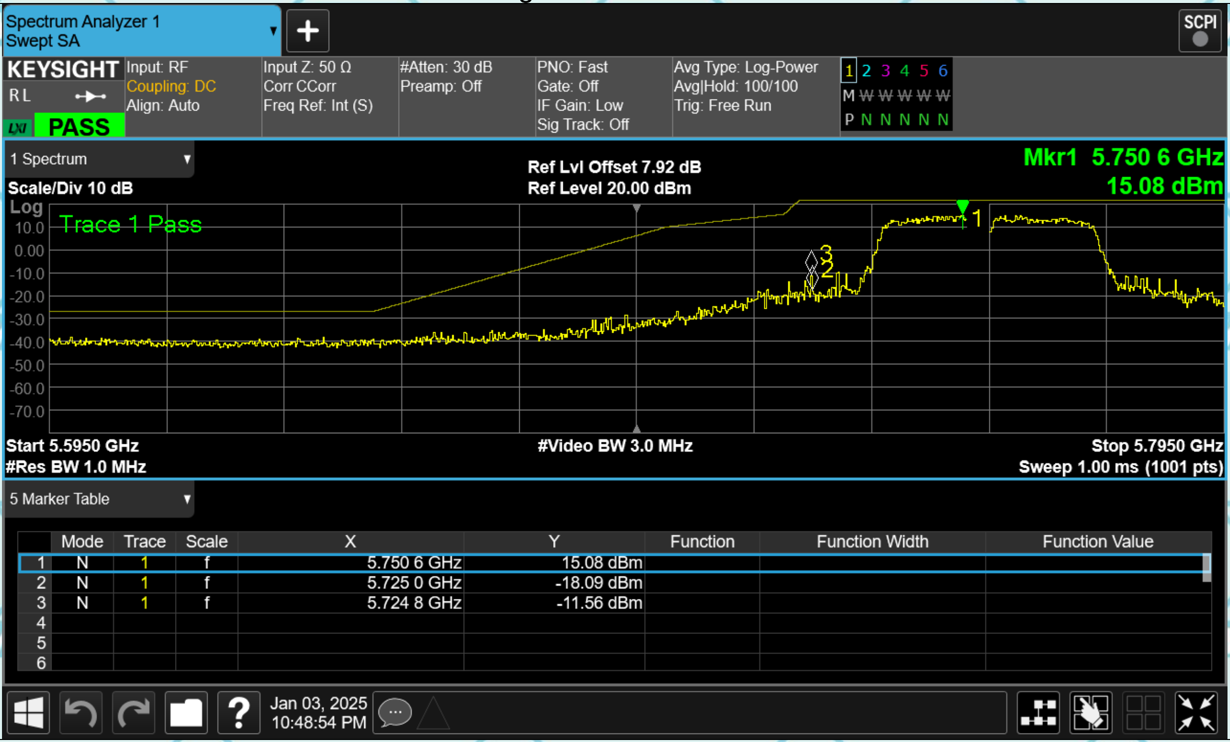
Stop 5.8300 GHz
Sweep 1.00 ms (1001 pts)

5 Marker Table

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.672 0 GHz	12.73 dBm			
2	N	1	f	5.725 0 GHz	-36.10 dBm			
3	N	1	f	5.727 2 GHz	-30.16 dBm			
4								
5								
6								

Jan 03, 2025
10:45:59 PM

Band Edge n40 5755MHz Low


Spectrum Analyzer 1
Swept SA
SCPI
KEYSIGHT
RL
PASS
1 Spectrum
Log
Trace 1 Pass
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1
2
3
5 Marker Table

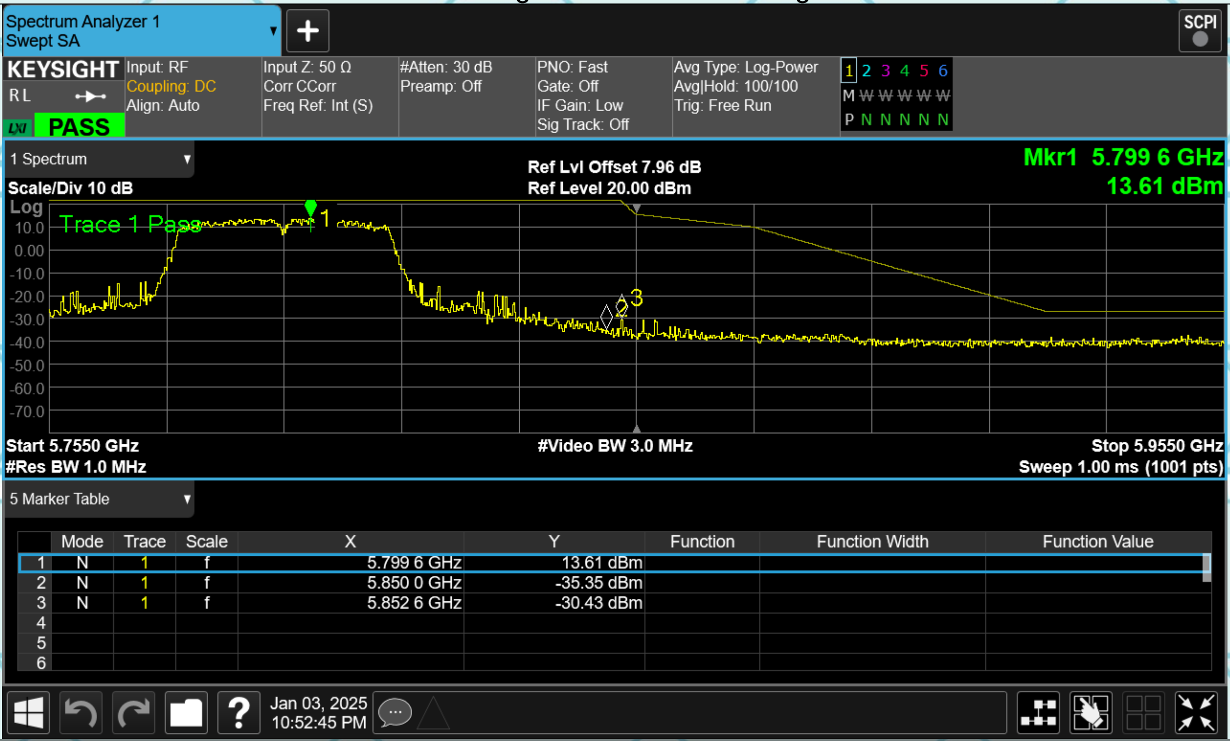
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

Ref Lvl Offset 7.92 dB
Ref Level 20.00 dBm
Scale/Div 10 dB
Mkr1 5.750 6 GHz
15.08 dBm
Start 5.5950 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.7950 GHz
Sweep 1.00 ms (1001 pts)

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.750 6 GHz	15.08 dBm			
2	N	1	f	5.725 0 GHz	-18.09 dBm			
3	N	1	f	5.724 8 GHz	-11.56 dBm			
4								
5								
6								

Jan 03, 2025
10:48:54 PM

Band Edge n40 5795MHz High


Spectrum Analyzer 1
Swept SA
SCPI
KEYSIGHT
RL
PASS
1 Spectrum
Log
Trace 1 Pass
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1
2
3
5 Marker Table

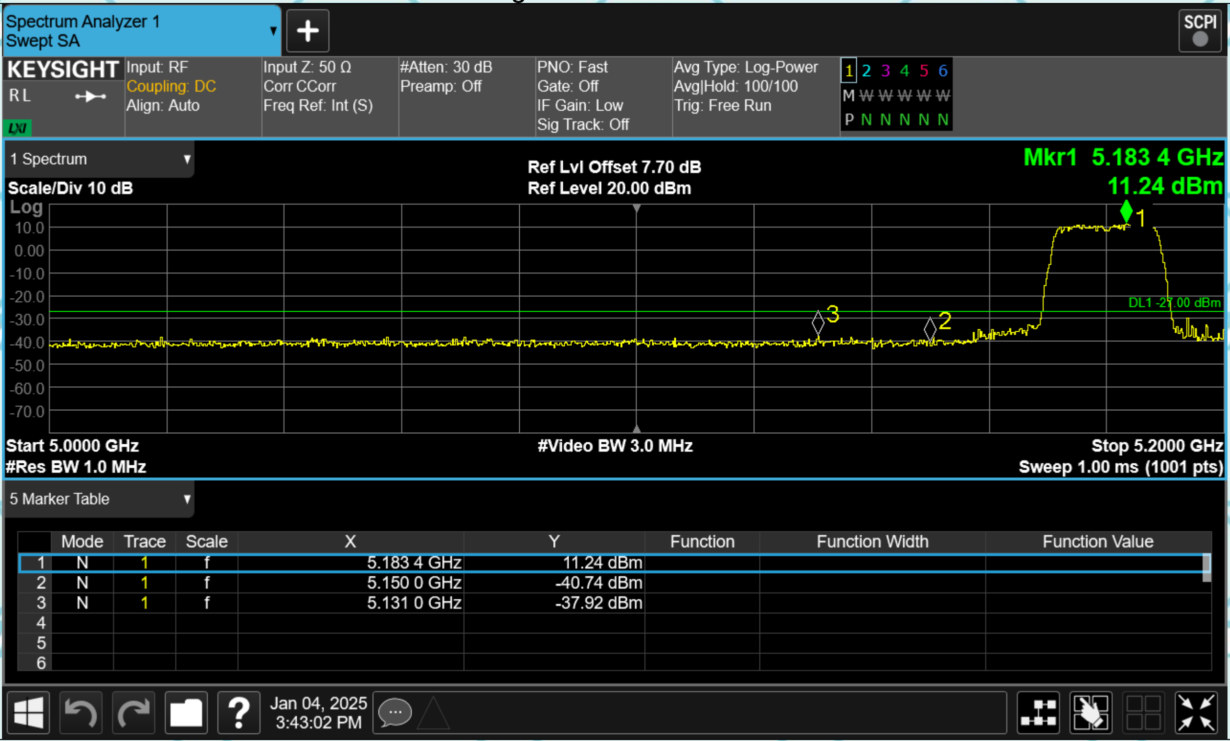
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

Ref Lvl Offset 7.96 dB
Ref Level 20.00 dBm
Scale/Div 10 dB
Mkr1 5.799 6 GHz
13.61 dBm
Start 5.7550 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.9550 GHz
Sweep 1.00 ms (1001 pts)

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.799 6 GHz	13.61 dBm			
2	N	1	f	5.850 0 GHz	-35.35 dBm			
3	N	1	f	5.852 6 GHz	-30.43 dBm			
4								
5								
6								

Jan 03, 2025
10:52:45 PM

Band Edge ac20 5180MHz Low


Spectrum Analyzer 1
Swept SA
SCPI
KEYSIGHT
RL
LXI
1 Spectrum
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
DL1 -27.00 dBm
1
2
3
5 Marker Table

Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run
1 2 3 4 5 6
M W W W W W
P N N N N N

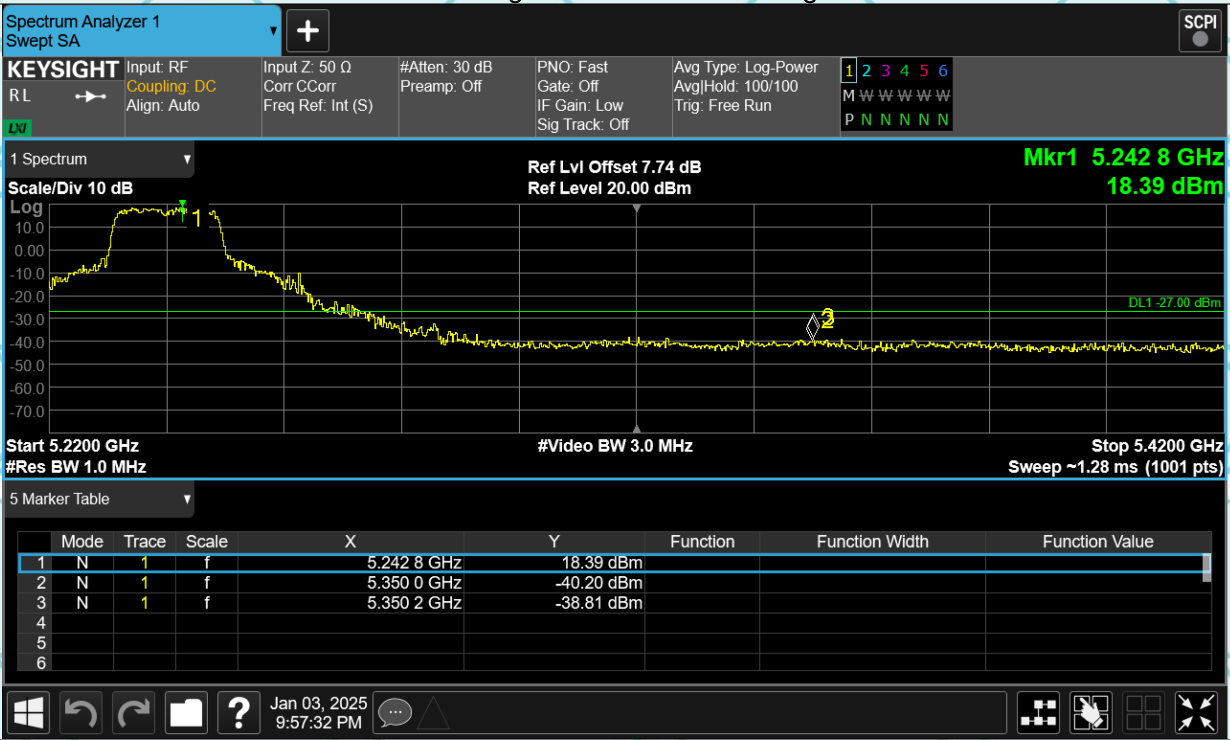
Ref Lvl Offset 7.70 dB
Ref Level 20.00 dBm
Scale/Div 10 dB
Mkr1 5.183 4 GHz
11.24 dBm

Start 5.0000 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.2000 GHz
Sweep 1.00 ms (1001 pts)

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.183 4 GHz	11.24 dBm			
2	N	1	f	5.150 0 GHz	-40.74 dBm			
3	N	1	f	5.131 0 GHz	-37.92 dBm			
4								
5								
6								

Jan 04, 2025
3:43:02 PM

Band Edge ac20 5240MHz High


Spectrum Analyzer 1
Swept SA
SCPI
KEYSIGHT
RL
LXI
1 Spectrum
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
DL1 -27.00 dBm
1
2
3
5 Marker Table

Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run
1 2 3 4 5 6
M W W W W W
P N N N N N

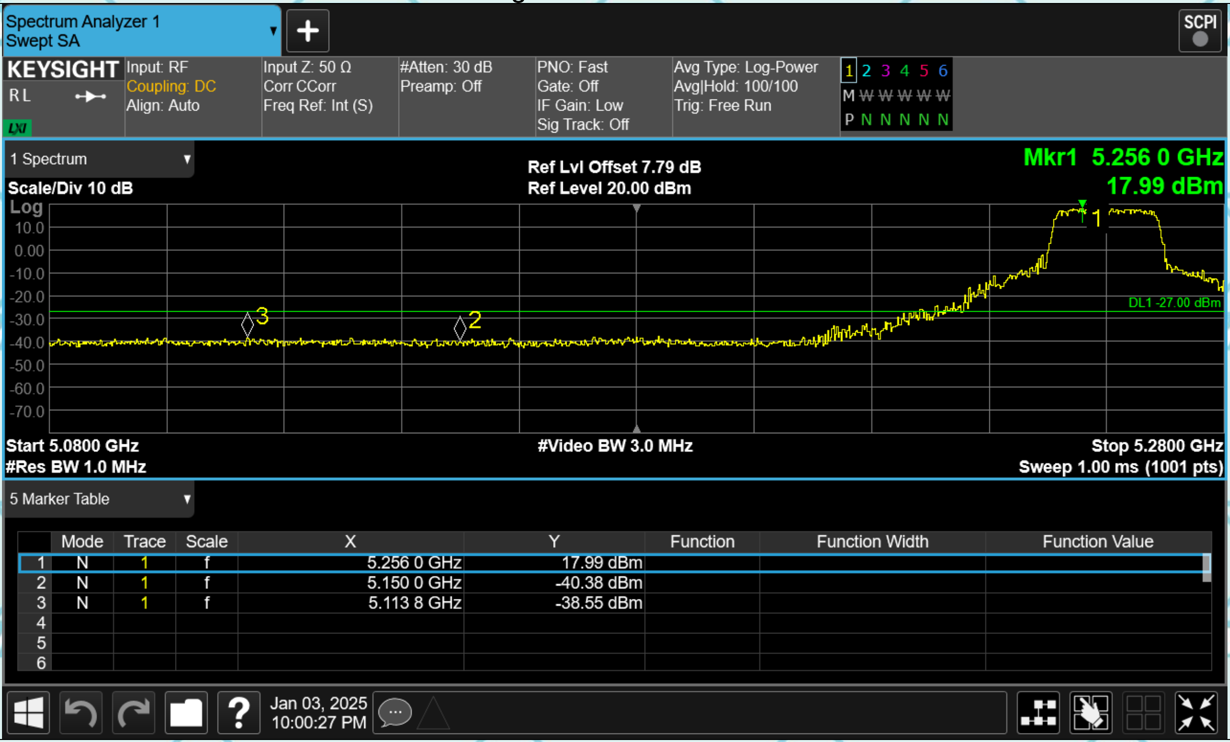
Ref Lvl Offset 7.74 dB
Ref Level 20.00 dBm
Scale/Div 10 dB
Mkr1 5.242 8 GHz
18.39 dBm

Start 5.2200 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.4200 GHz
Sweep ~1.28 ms (1001 pts)

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.242 8 GHz	18.39 dBm			
2	N	1	f	5.350 0 GHz	-40.20 dBm			
3	N	1	f	5.350 2 GHz	-38.81 dBm			
4								
5								
6								

Jan 03, 2025
9:57:32 PM

Band Edge ac20 5260MHz Low



Spectrum Analyzer 1
Swept SA

KEYSIGHT Input: RF Coupling: DC Align: Auto
Input Z: 50 Ω Corr CCorr Freq Ref: Int (S)
#Atten: 30 dB Preamp: Off
PNO: Fast Gate: Off IF Gain: Low Sig Track: Off
Avg Type: Log-Power Avg|Hold: 100/100 Trig: Free Run

1 Spectrum
Scale/Div 10 dB
Ref Lvl Offset 7.79 dB
Ref Level 20.00 dBm
Mkr1 5.256 0 GHz
17.99 dBm

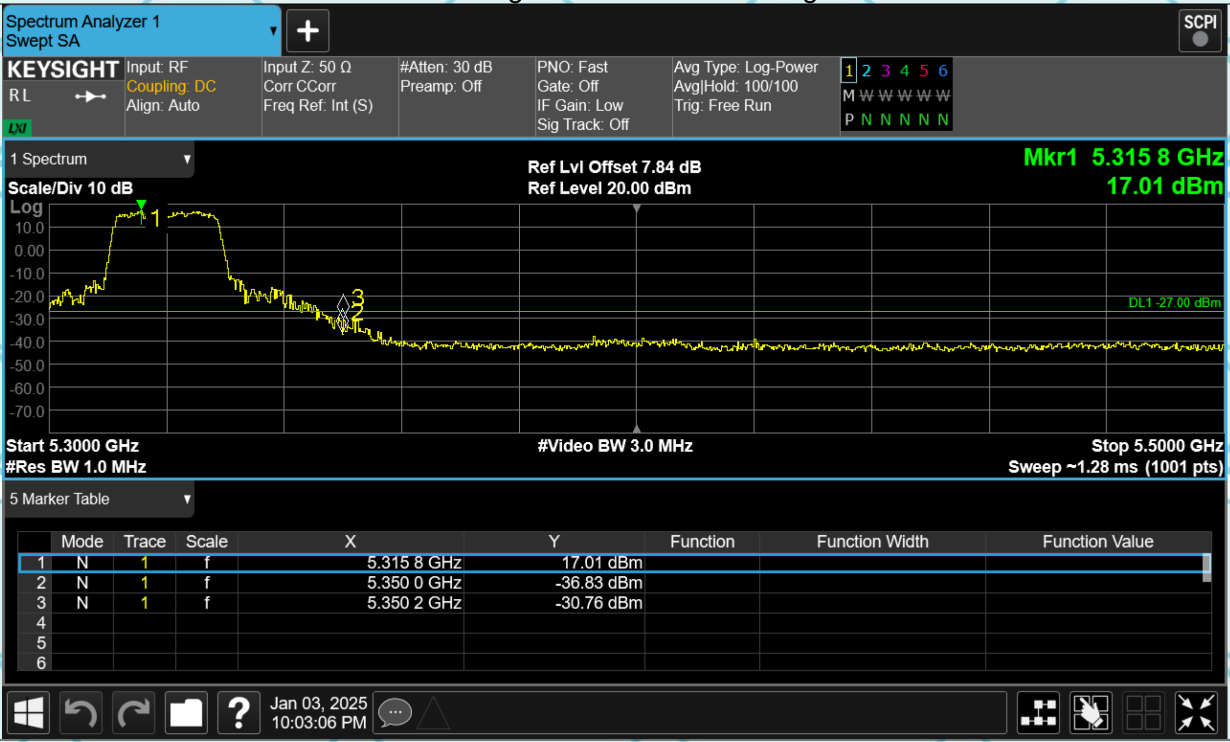
Start 5.0800 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.2800 GHz
Sweep 1.00 ms (1001 pts)

5 Marker Table

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.256 0 GHz	17.99 dBm			
2	N	1	f	5.150 0 GHz	-40.38 dBm			
3	N	1	f	5.113 8 GHz	-38.55 dBm			
4								
5								
6								

Jan 03, 2025
10:00:27 PM

Band Edge ac20 5320MHz High



Spectrum Analyzer 1
Swept SA

KEYSIGHT Input: RF Coupling: DC Align: Auto
Input Z: 50 Ω Corr CCorr Freq Ref: Int (S)
#Atten: 30 dB Preamp: Off
PNO: Fast Gate: Off IF Gain: Low Sig Track: Off
Avg Type: Log-Power Avg|Hold: 100/100 Trig: Free Run

1 Spectrum
Scale/Div 10 dB
Ref Lvl Offset 7.84 dB
Ref Level 20.00 dBm
Mkr1 5.315 8 GHz
17.01 dBm

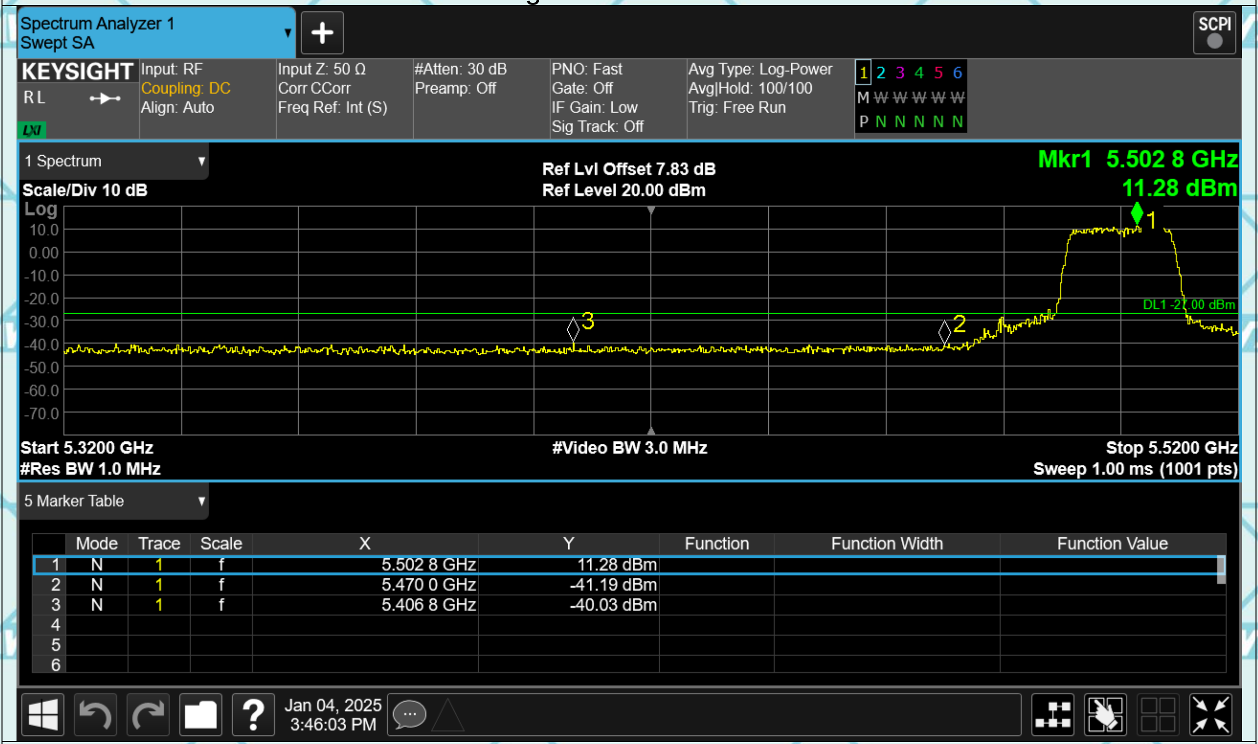
Start 5.3000 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.5000 GHz
Sweep ~1.28 ms (1001 pts)

5 Marker Table

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.315 8 GHz	17.01 dBm			
2	N	1	f	5.350 0 GHz	-36.83 dBm			
3	N	1	f	5.350 2 GHz	-30.76 dBm			
4								
5								
6								

Jan 03, 2025
10:03:06 PM

Band Edge ac20 5500MHz Low


Spectrum Analyzer 1
Swept SA
SCPI
KEYSIGHT
RL
LXI
1 2 3 4 5 6
M W W W W W
P N N N N N
1 Spectrum
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1
2
3
DL1 -27.00 dBm
5 Marker Table

Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

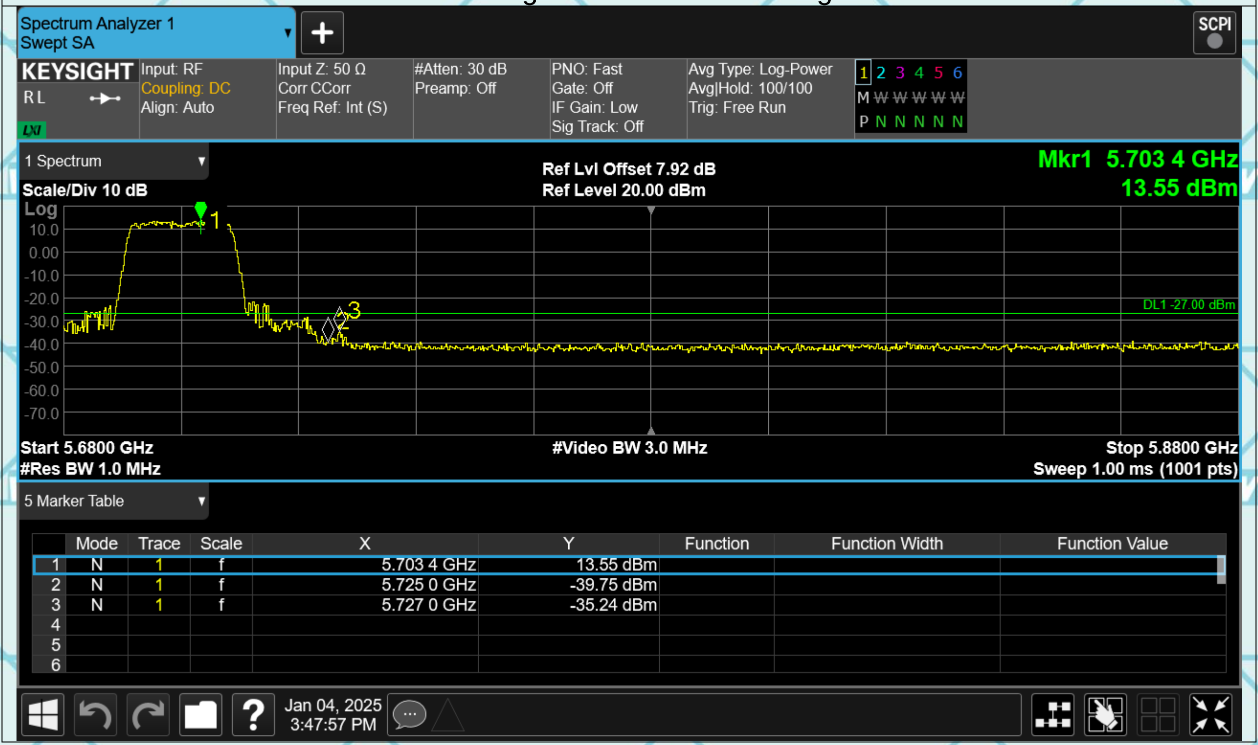
Ref Lvl Offset 7.83 dB
Ref Level 20.00 dBm
Scale/Div 10 dB
Mkr1 5.502 8 GHz
11.28 dBm

Start 5.3200 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.5200 GHz
Sweep 1.00 ms (1001 pts)

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.502 8 GHz	11.28 dBm			
2	N	1	f	5.470 0 GHz	-41.19 dBm			
3	N	1	f	5.406 8 GHz	-40.03 dBm			
4								
5								
6								

Jan 04, 2025
3:46:03 PM

Band Edge ac20 5700MHz High


Spectrum Analyzer 1
Swept SA
SCPI
KEYSIGHT
RL
LXI
1 2 3 4 5 6
M W W W W W
P N N N N N
1 Spectrum
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1
2
3
DL1 -27.00 dBm
5 Marker Table

Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

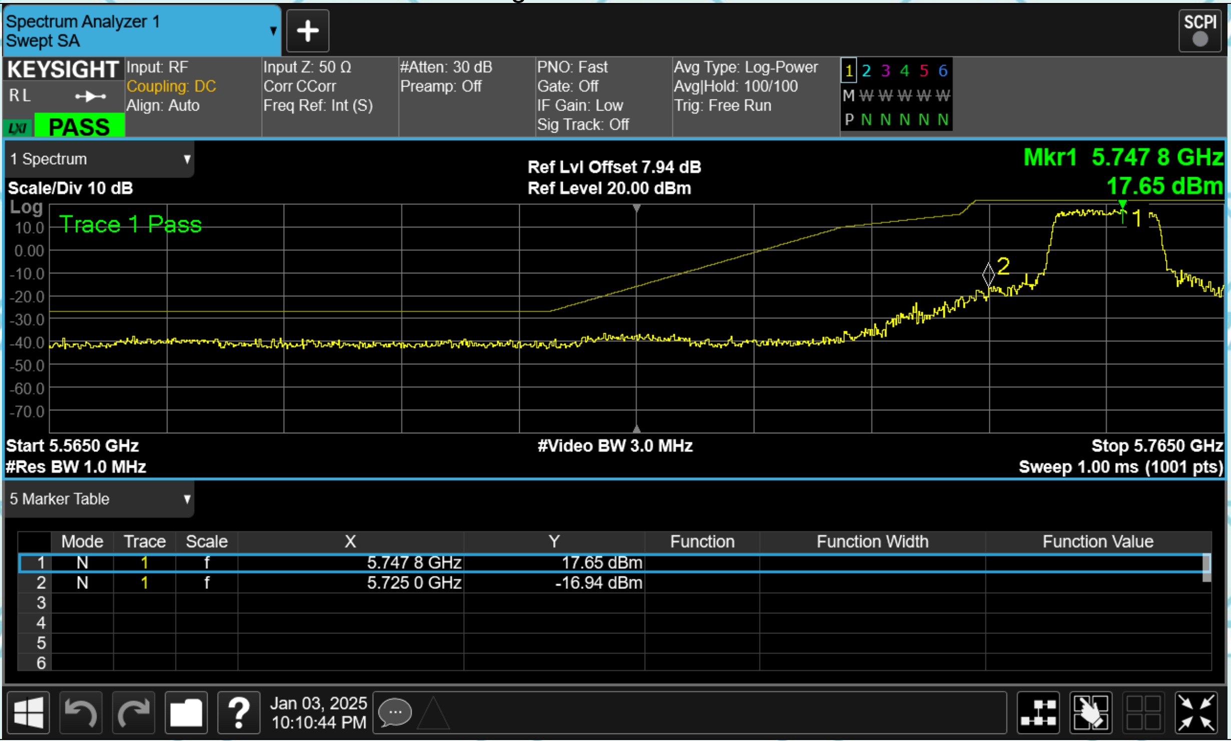
Ref Lvl Offset 7.92 dB
Ref Level 20.00 dBm
Scale/Div 10 dB
Mkr1 5.703 4 GHz
13.55 dBm

Start 5.6800 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.8800 GHz
Sweep 1.00 ms (1001 pts)

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.703 4 GHz	13.55 dBm			
2	N	1	f	5.725 0 GHz	-39.75 dBm			
3	N	1	f	5.727 0 GHz	-35.24 dBm			
4								
5								
6								

Jan 04, 2025
3:47:57 PM

Band Edge ac20 5745MHz Low


Spectrum Analyzer 1
Swept SA
KEYSIGHT
RL
PASS
SCPI
1 2 3 4 5 6
M W W W W W
P N N N N N
1 Spectrum
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1
2
5 Marker Table

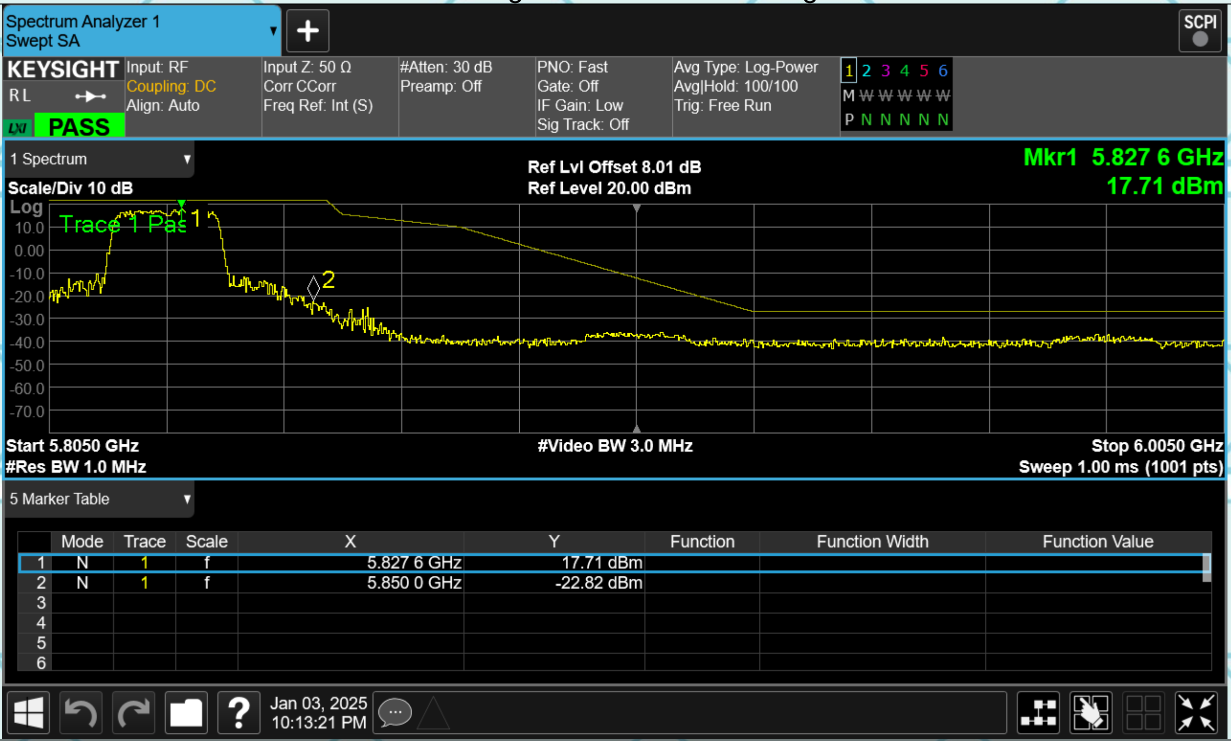
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

Ref Lvl Offset 7.94 dB
Ref Level 20.00 dBm
Scale/Div 10 dB
Mkr1 5.747 8 GHz
17.65 dBm
Trace 1 Pass
Start 5.5650 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.7650 GHz
Sweep 1.00 ms (1001 pts)

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.747 8 GHz	17.65 dBm			
2	N	1	f	5.725 0 GHz	-16.94 dBm			
3								
4								
5								
6								

Jan 03, 2025
10:10:44 PM

Band Edge ac20 5825MHz High


Spectrum Analyzer 1
Swept SA
KEYSIGHT
RL
PASS
SCPI
1 2 3 4 5 6
M W W W W W
P N N N N N
1 Spectrum
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1
2
5 Marker Table

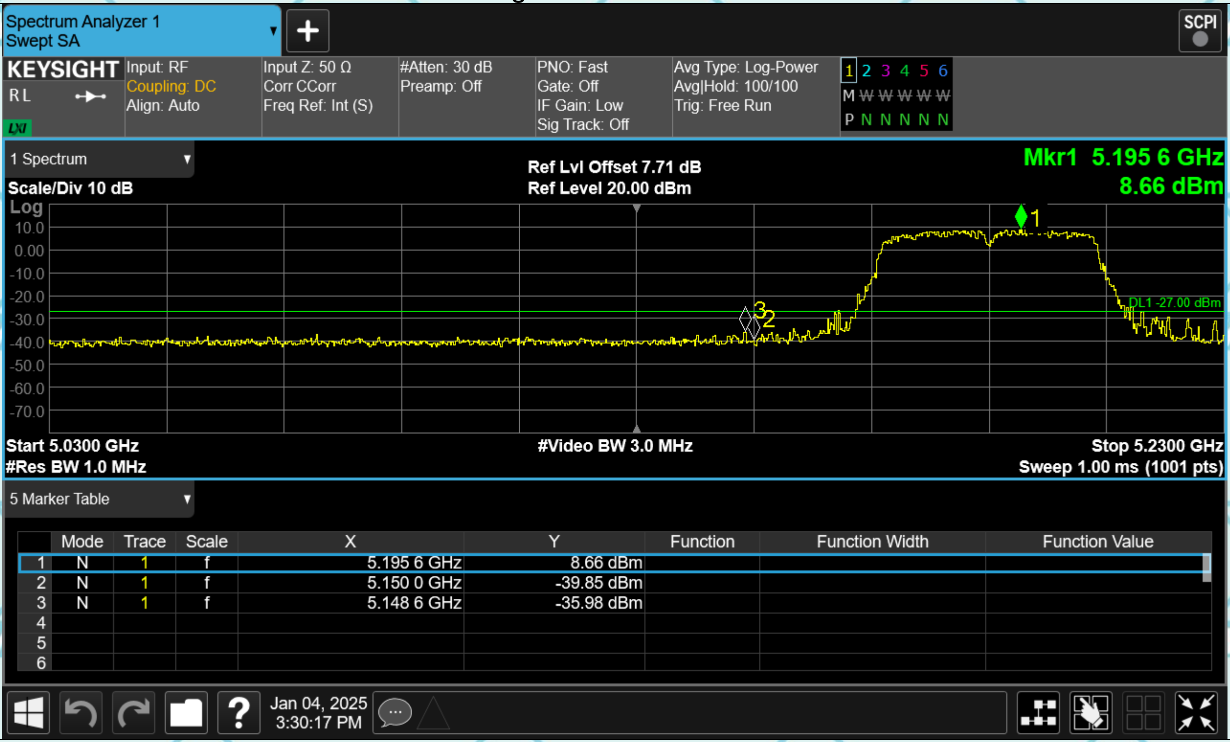
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

Ref Lvl Offset 8.01 dB
Ref Level 20.00 dBm
Scale/Div 10 dB
Mkr1 5.827 6 GHz
17.71 dBm
Trace 1 Pass
Start 5.8050 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 6.0050 GHz
Sweep 1.00 ms (1001 pts)

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.827 6 GHz	17.71 dBm			
2	N	1	f	5.850 0 GHz	-22.82 dBm			
3								
4								
5								
6								

Jan 03, 2025
10:13:21 PM

Band Edge ac40 5190MHz Low


Spectrum Analyzer 1
Swept SA
SCPI
KEYSIGHT
RL
LXI
1 2 3 4 5 6
M W W W W W
P N N N N N
1 Spectrum
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1
3
2
DL1 -27.00 dBm
5 Marker Table

Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

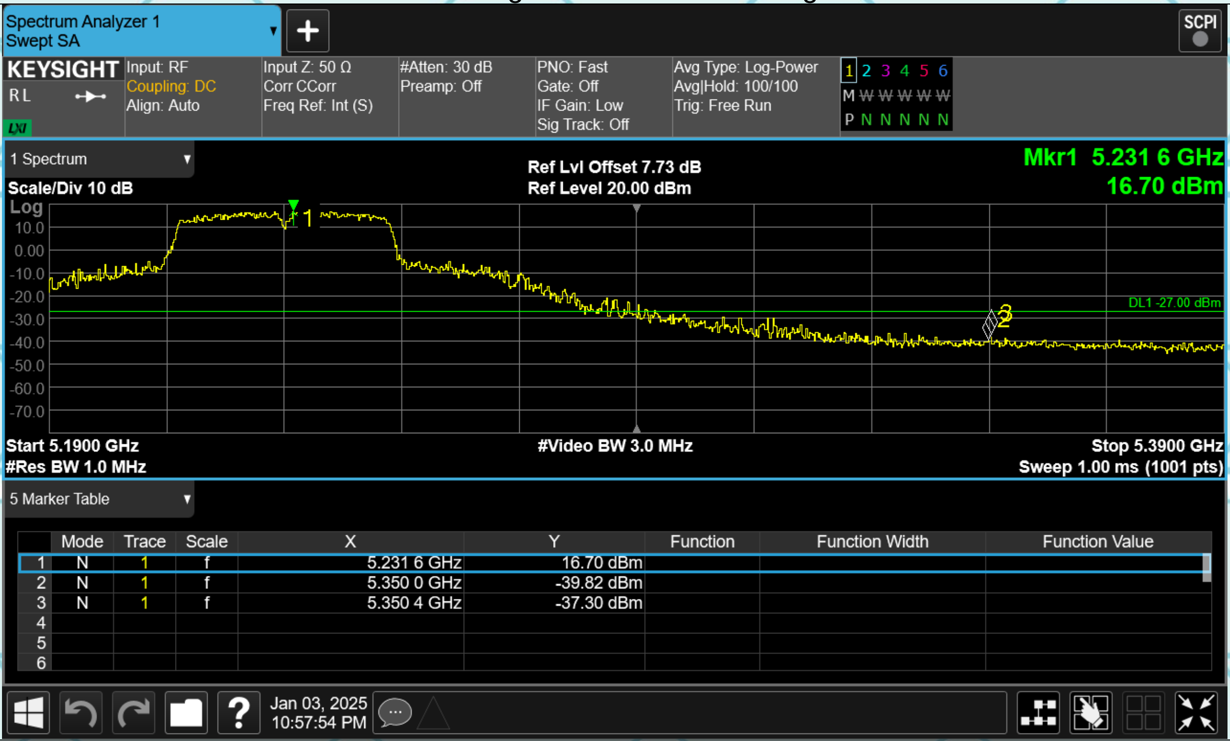
Ref Lvl Offset 7.71 dB
Ref Level 20.00 dBm
Scale/Div 10 dB
Mkr1 5.195 6 GHz
8.66 dBm

Start 5.0300 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.2300 GHz
Sweep 1.00 ms (1001 pts)

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.195 6 GHz	8.66 dBm			
2	N	1	f	5.150 0 GHz	-39.85 dBm			
3	N	1	f	5.148 6 GHz	-35.98 dBm			
4								
5								
6								

Jan 04, 2025
3:30:17 PM

Band Edge ac40 5230MHz High


Spectrum Analyzer 1
Swept SA
SCPI
KEYSIGHT
RL
LXI
1 2 3 4 5 6
M W W W W W
P N N N N N
1 Spectrum
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1
3
2
DL1 -27.00 dBm
5 Marker Table

Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

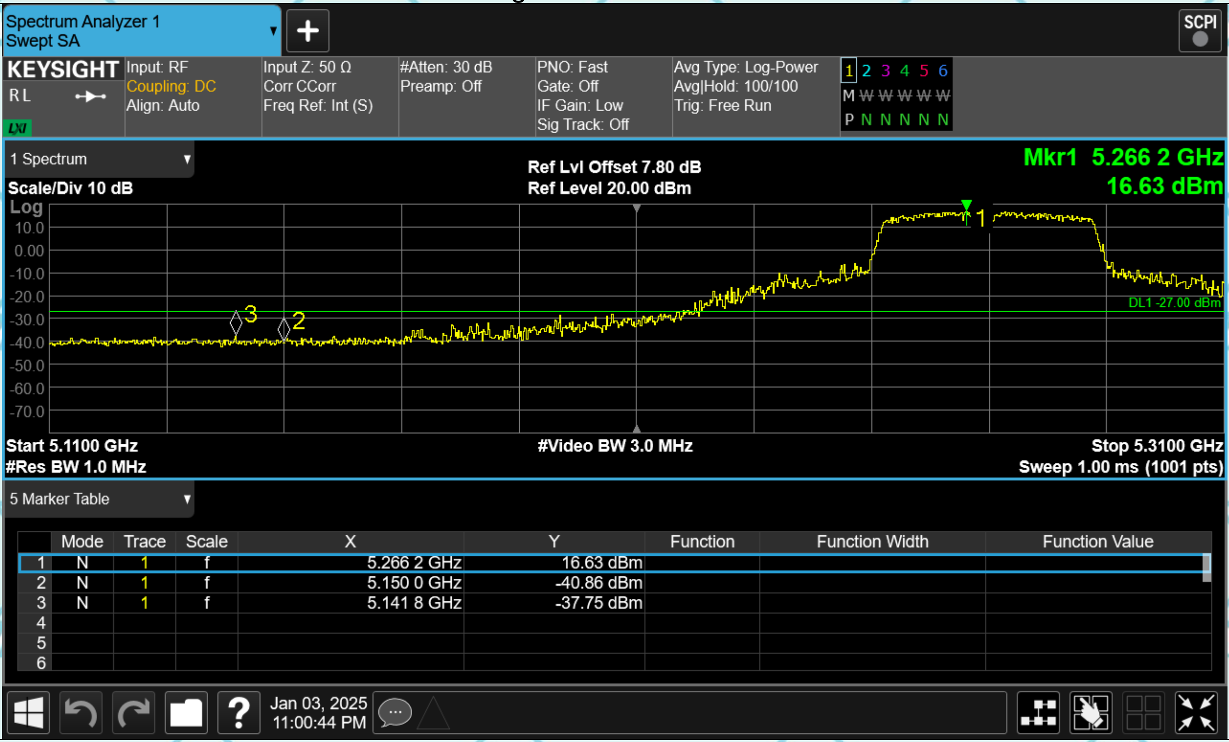
Ref Lvl Offset 7.73 dB
Ref Level 20.00 dBm
Scale/Div 10 dB
Mkr1 5.231 6 GHz
16.70 dBm

Start 5.1900 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.3900 GHz
Sweep 1.00 ms (1001 pts)

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.231 6 GHz	16.70 dBm			
2	N	1	f	5.350 0 GHz	-39.82 dBm			
3	N	1	f	5.350 4 GHz	-37.30 dBm			
4								
5								
6								

Jan 03, 2025
10:57:54 PM

Band Edge ac40 5270MHz Low


Spectrum Analyzer 1
Swept SA
SCPI
KEYSIGHT
RL
LXI
1 2 3 4 5 6
M W W W W W
P N N N N N
1 Spectrum
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1
2
3
DL1 -27.00 dBm
5 Marker Table
Jan 03, 2025
11:00:44 PM

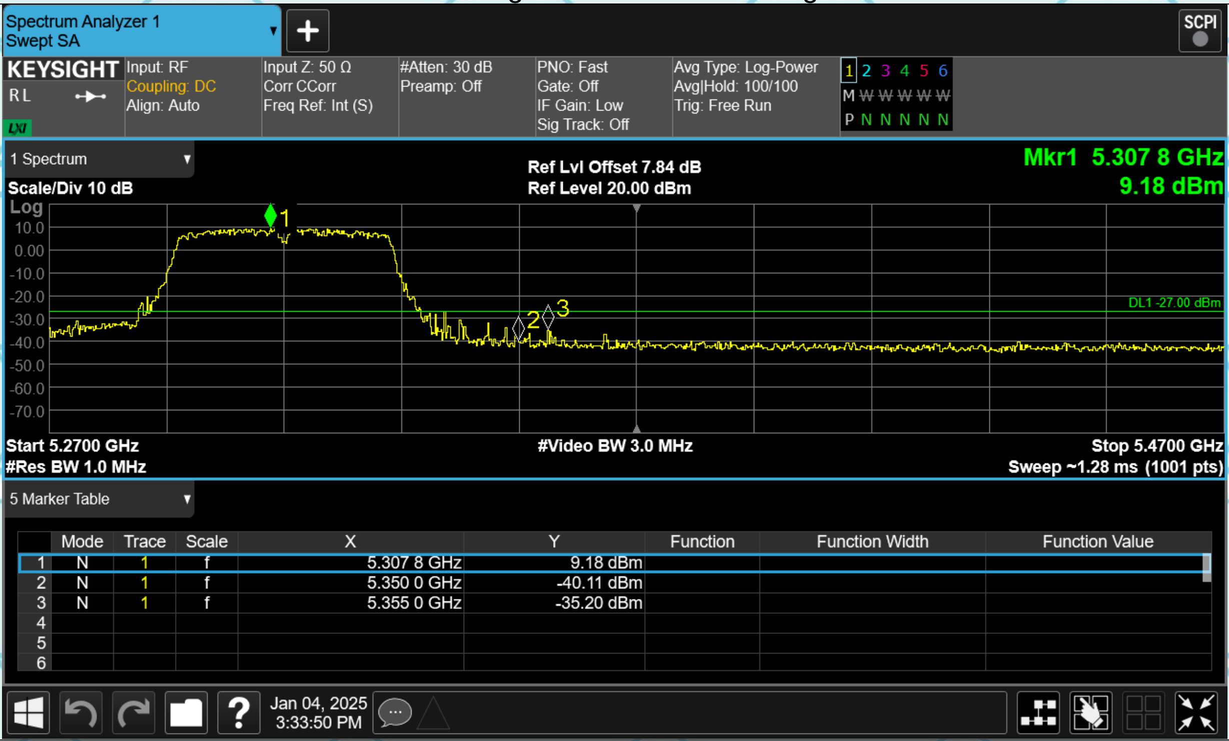
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

Scale/Div 10 dB
Ref Lvl Offset 7.80 dB
Ref Level 20.00 dBm
Mkr1 5.266 2 GHz
16.63 dBm

Start 5.1100 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.3100 GHz
Sweep 1.00 ms (1001 pts)

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.266 2 GHz	16.63 dBm			
2	N	1	f	5.150 0 GHz	-40.86 dBm			
3	N	1	f	5.141 8 GHz	-37.75 dBm			
4								
5								
6								

Band Edge ac40 5310MHz High


Spectrum Analyzer 1
Swept SA
SCPI
KEYSIGHT
RL
LXI
1 2 3 4 5 6
M W W W W W
P N N N N N
1 Spectrum
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1
2
3
DL1 -27.00 dBm
5 Marker Table
Jan 04, 2025
3:33:50 PM

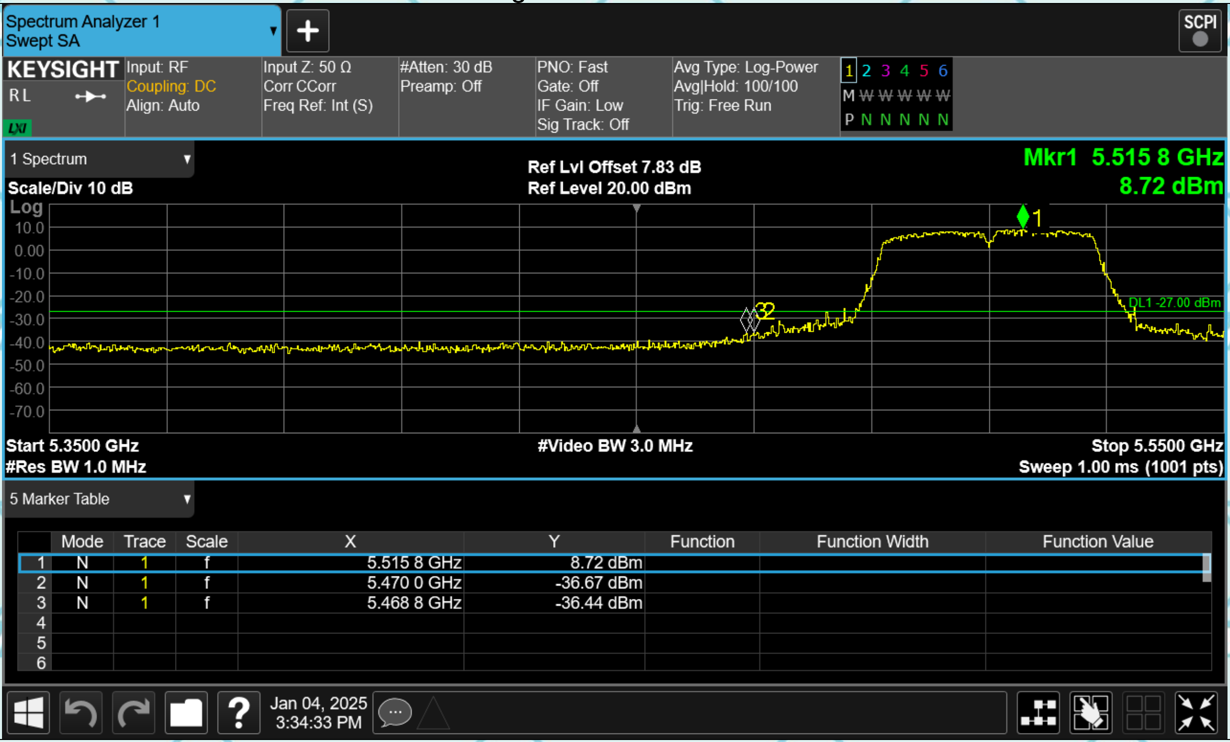
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

Scale/Div 10 dB
Ref Lvl Offset 7.84 dB
Ref Level 20.00 dBm
Mkr1 5.307 8 GHz
9.18 dBm

Start 5.2700 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.4700 GHz
Sweep ~1.28 ms (1001 pts)

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.307 8 GHz	9.18 dBm			
2	N	1	f	5.350 0 GHz	-40.11 dBm			
3	N	1	f	5.355 0 GHz	-35.20 dBm			
4								
5								
6								

Band Edge ac40 5510MHz Low


Spectrum Analyzer 1
Swept SA
SCPI
KEYSIGHT
RL
LXI
1 2 3 4 5 6
M W W W W W
P N N N N N
1 Spectrum
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1
3 2
DL1 -27.00 dBm
5 Marker Table
Jan 04, 2025
3:34:33 PM

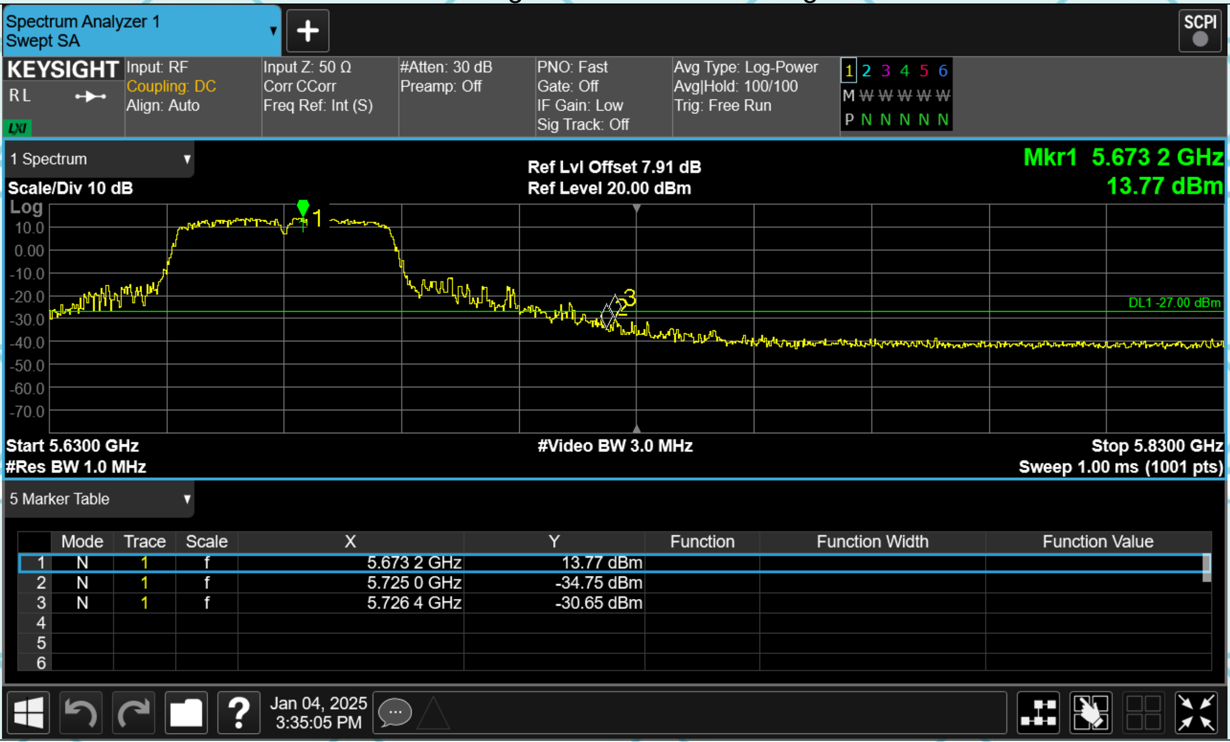
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

Ref Lvl Offset 7.83 dB
Ref Level 20.00 dBm
Scale/Div 10 dB
Mkr1 5.515 8 GHz
8.72 dBm

Start 5.3500 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.5500 GHz
Sweep 1.00 ms (1001 pts)

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.515 8 GHz	8.72 dBm			
2	N	1	f	5.470 0 GHz	-36.67 dBm			
3	N	1	f	5.468 8 GHz	-36.44 dBm			
4								
5								
6								

Band Edge ac40 5670MHz High


Spectrum Analyzer 1
Swept SA
SCPI
KEYSIGHT
RL
LXI
1 2 3 4 5 6
M W W W W W
P N N N N N
1 Spectrum
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1
2 3
DL1 -27.00 dBm
5 Marker Table
Jan 04, 2025
3:35:05 PM

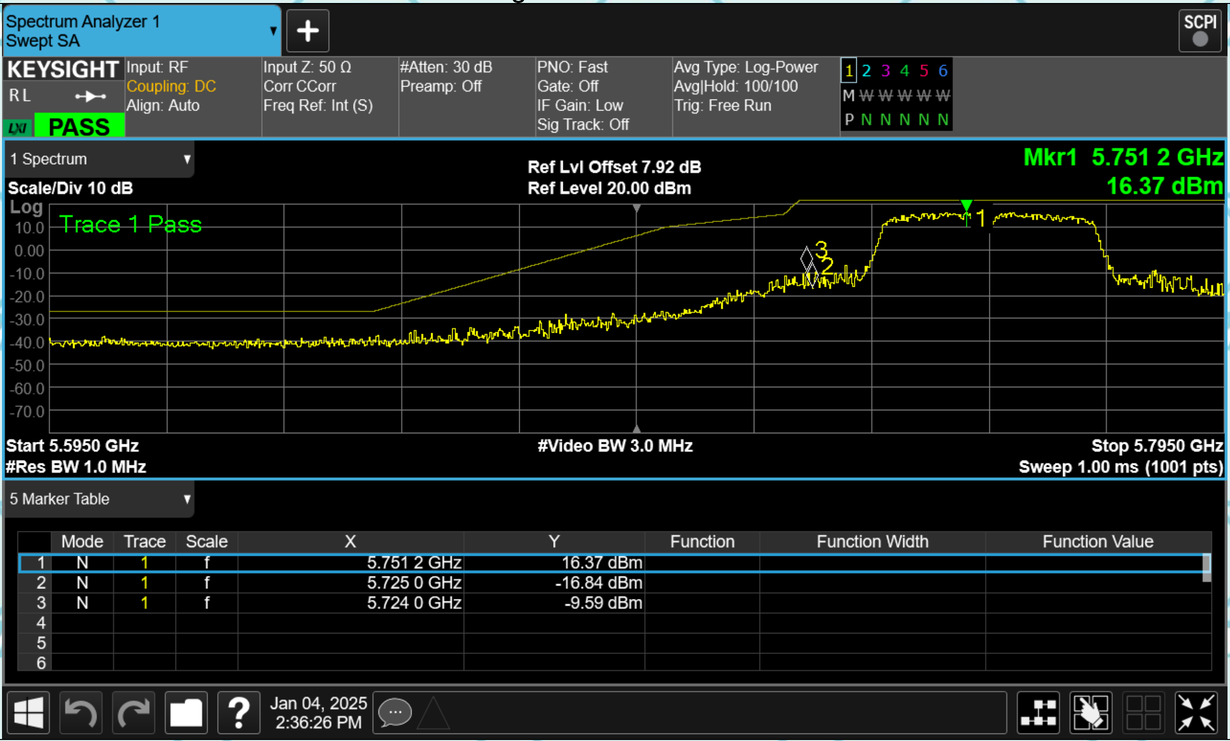
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

Ref Lvl Offset 7.91 dB
Ref Level 20.00 dBm
Scale/Div 10 dB
Mkr1 5.673 2 GHz
13.77 dBm

Start 5.6300 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.8300 GHz
Sweep 1.00 ms (1001 pts)

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.673 2 GHz	13.77 dBm			
2	N	1	f	5.725 0 GHz	-34.75 dBm			
3	N	1	f	5.726 4 GHz	-30.65 dBm			
4								
5								
6								

Band Edge ac40 5755MHz Low



Spectrum Analyzer 1
Swept SA
SCPI
KEYSIGHT
RL
PASS
1 Spectrum
Trace 1 Pass
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1
2
3
5 Marker Table
Jan 04, 2025
2:36:26 PM

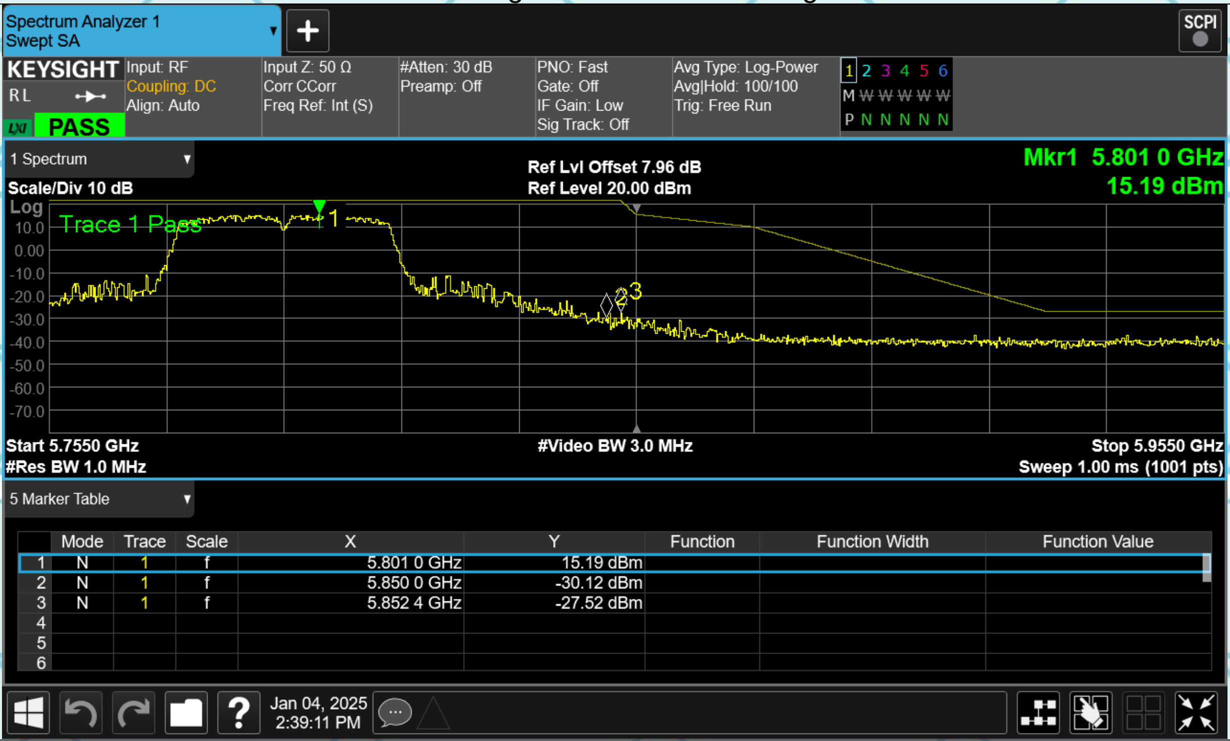
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

Ref Lvl Offset 7.92 dB
Ref Level 20.00 dBm
Scale/Div 10 dB
Mkr1 5.751 2 GHz
16.37 dBm

Start 5.5950 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.7950 GHz
Sweep 1.00 ms (1001 pts)

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.751 2 GHz	16.37 dBm			
2	N	1	f	5.725 0 GHz	-16.84 dBm			
3	N	1	f	5.724 0 GHz	-9.59 dBm			
4								
5								
6								

Band Edge ac40 5795MHz High



Spectrum Analyzer 1
Swept SA
SCPI
KEYSIGHT
RL
PASS
1 Spectrum
Trace 1 Pass
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
1
2
3
5 Marker Table
Jan 04, 2025
2:39:11 PM

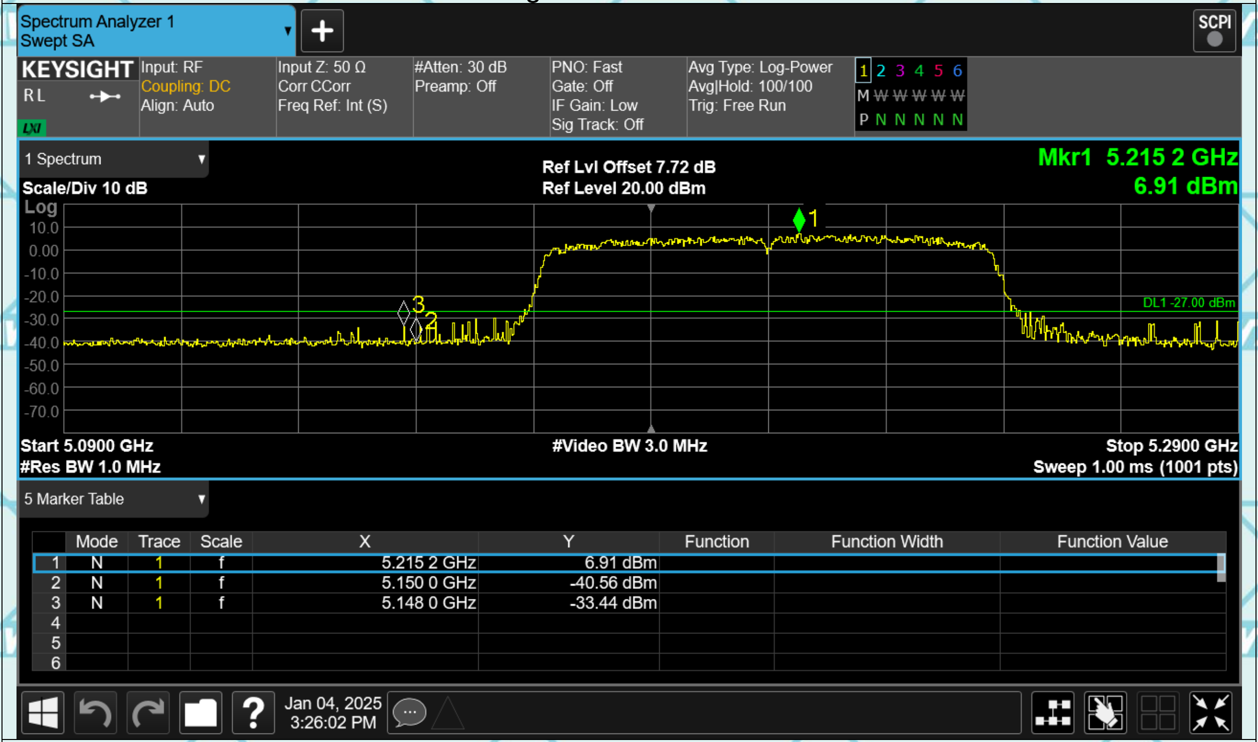
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

Ref Lvl Offset 7.96 dB
Ref Level 20.00 dBm
Scale/Div 10 dB
Mkr1 5.801 0 GHz
15.19 dBm

Start 5.7550 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.9550 GHz
Sweep 1.00 ms (1001 pts)

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.801 0 GHz	15.19 dBm			
2	N	1	f	5.850 0 GHz	-30.12 dBm			
3	N	1	f	5.852 4 GHz	-27.52 dBm			
4								
5								
6								

Band Edge ac80 5210MHz Low


Spectrum Analyzer 1
Swept SA
KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

1 Spectrum
Ref Lvl Offset 7.72 dB
Ref Level 20.00 dBm
Scale/Div 10 dB
Mkr1 5.215 2 GHz
6.91 dBm
DL1 -27.00 dBm
Start 5.0900 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.2900 GHz
Sweep 1.00 ms (1001 pts)

5 Marker Table

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.215 2 GHz	6.91 dBm			
2	N	1	f	5.150 0 GHz	-40.56 dBm			
3	N	1	f	5.148 0 GHz	-33.44 dBm			
4								
5								
6								

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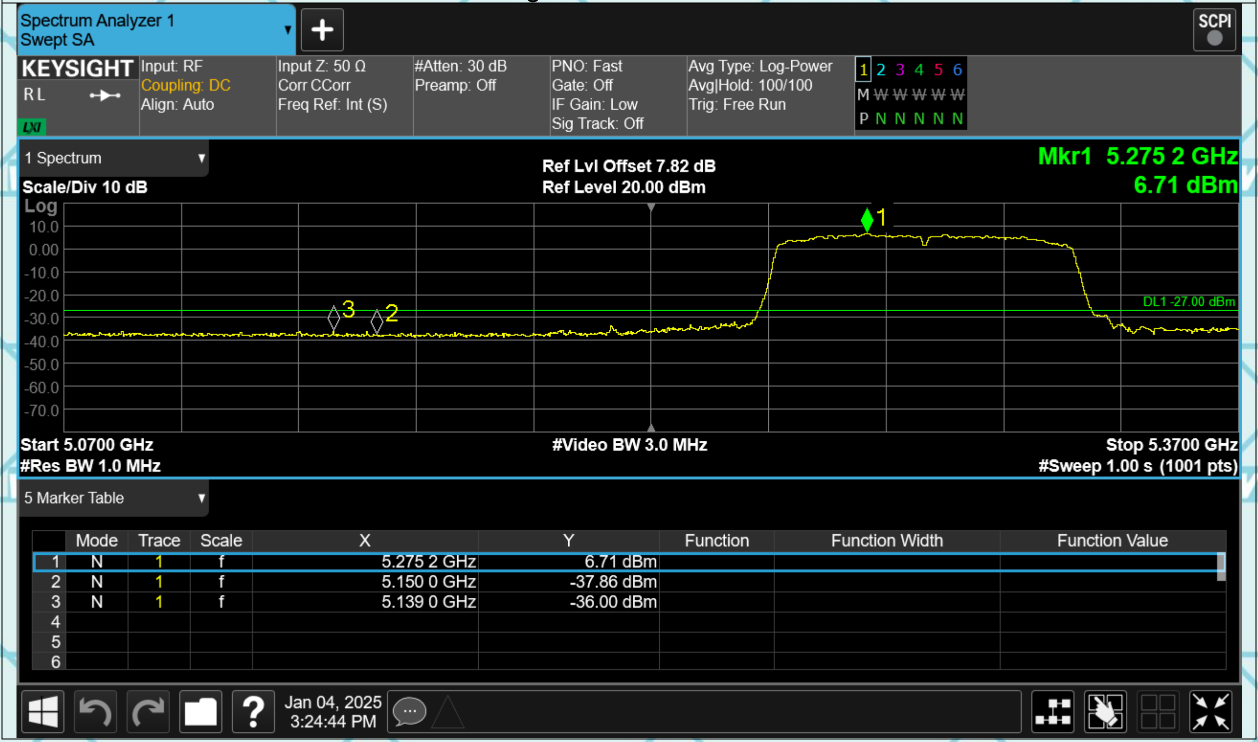
Band Edge ac80 5290MHz Low


Spectrum Analyzer 1
Swept SA
KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

1 Spectrum
Ref Lvl Offset 7.82 dB
Ref Level 20.00 dBm
Scale/Div 10 dB
Mkr1 5.275 2 GHz
6.71 dBm
DL1 -27.00 dBm
Start 5.0700 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.3700 GHz
#Sweep 1.00 s (1001 pts)

5 Marker Table

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.275 2 GHz	6.71 dBm			
2	N	1	f	5.150 0 GHz	-37.86 dBm			
3	N	1	f	5.139 0 GHz	-36.00 dBm			
4								
5								
6								

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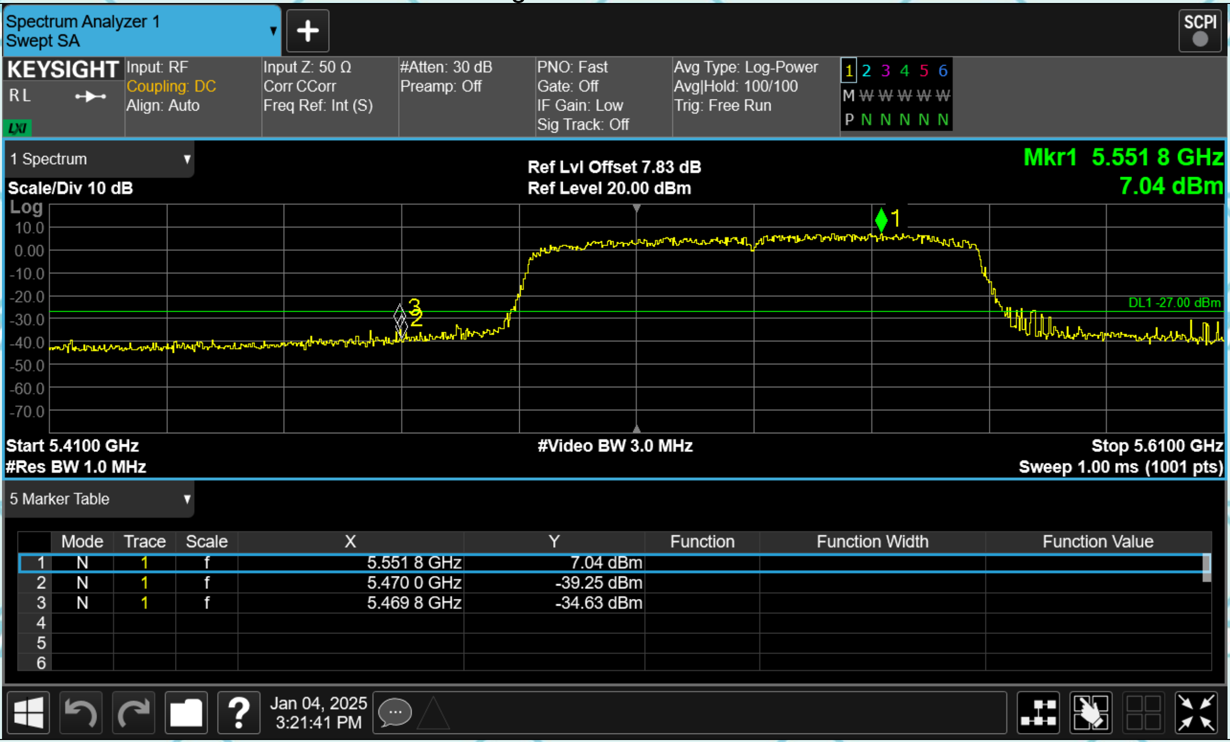
Band Edge ac80 5530MHz Low


Spectrum Analyzer 1
Swept SA
KEYSIGHT
RL
LXI
SCPI
1 2 3 4 5 6
M W W W W W
P N N N N N
1 Spectrum
5 Marker Table
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
DL1 -27.00 dBm
1
2
3
Jan 04, 2025
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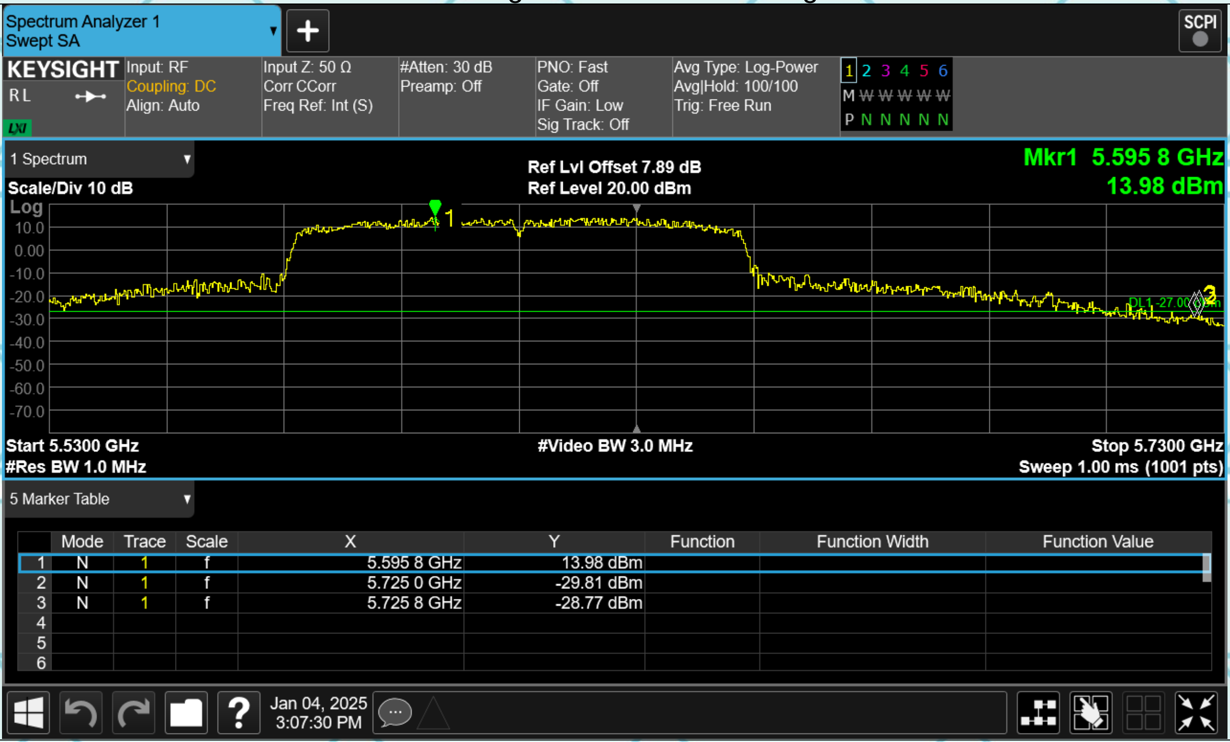
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

Ref Lvl Offset 7.83 dB
Ref Level 20.00 dBm
Scale/Div 10 dB
Mkr1 5.551 8 GHz
7.04 dBm
Start 5.4100 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.6100 GHz
Sweep 1.00 ms (1001 pts)

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.551 8 GHz	7.04 dBm			
2	N	1	f	5.470 0 GHz	-39.25 dBm			
3	N	1	f	5.469 8 GHz	-34.63 dBm			
4								
5								
6								

Band Edge ac80 5610MHz High


Spectrum Analyzer 1
Swept SA
KEYSIGHT
RL
LXI
SCPI
1 2 3 4 5 6
M W W W W W
P N N N N N
1 Spectrum
5 Marker Table
Log
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
DL1 -27.00 dBm
1
2
Jan 04, 2025
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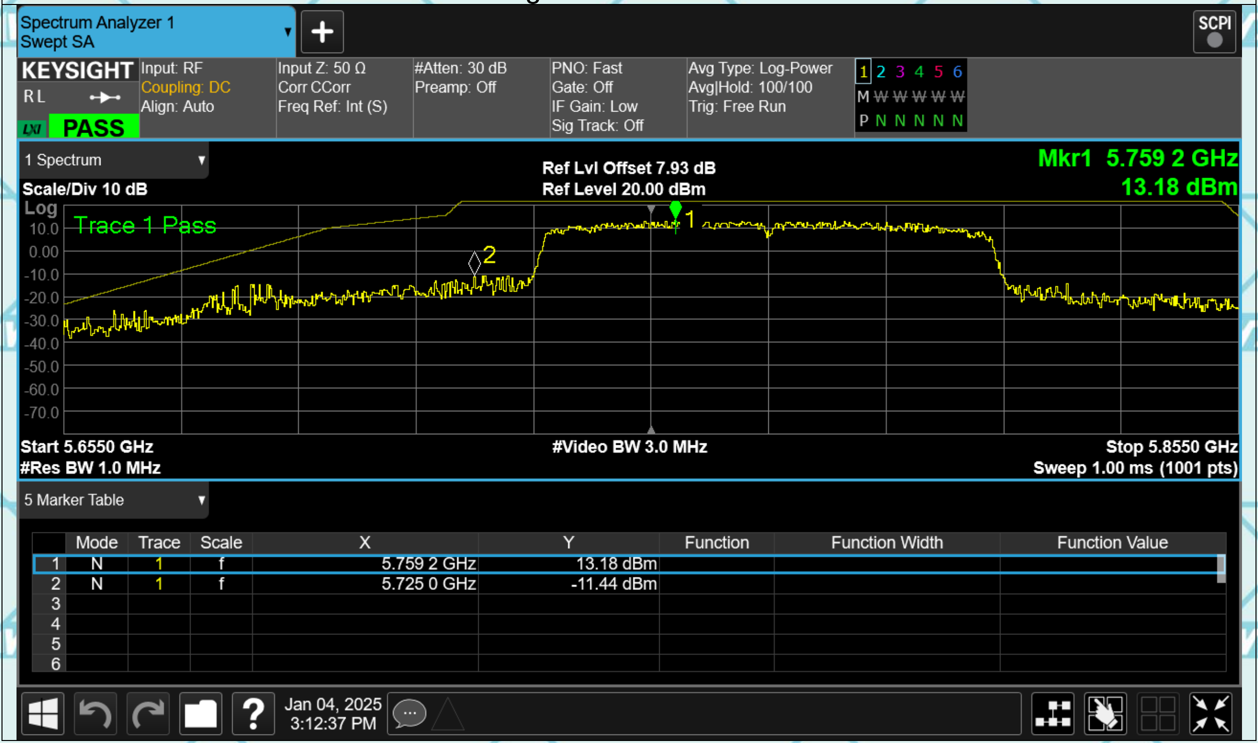
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
Preamp: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

Ref Lvl Offset 7.89 dB
Ref Level 20.00 dBm
Scale/Div 10 dB
Mkr1 5.595 8 GHz
13.98 dBm
Start 5.5300 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz
Stop 5.7300 GHz
Sweep 1.00 ms (1001 pts)

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.595 8 GHz	13.98 dBm			
2	N	1	f	5.725 0 GHz	-29.81 dBm			
3	N	1	f	5.725 8 GHz	-28.77 dBm			
4								
5								
6								

Band Edge ac80 5775MHz Low



Spectrum Analyzer 1
Swept SA

KEYSIGHT
RL
PASS

Input: RF
Coupling: DC
Align: Auto

Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)

#Atten: 30 dB
Preamp: Off

PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off

Avg Type: Log-Power
Avg|Hold: 100/100
Trig: Free Run

1 2 3 4 5 6
M W W W W W
P N N N N N

1 Spectrum

Scale/Div 10 dB
Log

Ref Lvl Offset 7.93 dB
Ref Level 20.00 dBm

Mkr1 5.759 2 GHz
13.18 dBm

Start 5.6550 GHz
#Res BW 1.0 MHz

#Video BW 3.0 MHz

Stop 5.8550 GHz
Sweep 1.00 ms (1001 pts)

5 Marker Table

	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.759 2 GHz	13.18 dBm			
2	N	1	f	5.725 0 GHz	-11.44 dBm			
3								
4								
5								
6								

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7.10 DYNAMIC FREQUENCY SELECTION (DFS)

7.10.1 DFS OVERVIEW

A U-NII network will employ a DFS function to detect signals from radar systems and to avoid co-channel operation with these systems. This applies to the 5250-5350 MHz and/or 5470-5725 MHz bands.

Within the context of the operation of the DFS function, a U-NII device will operate in either *Master Mode* or *Client Mode*. U-NII devices operating in *Client Mode* can only operate in a network controlled by a U-NII device operating in *Master Mode*.

Tables 1 and 2 shown below summarize the information contained in sections 5.1.1 and 5.1.2

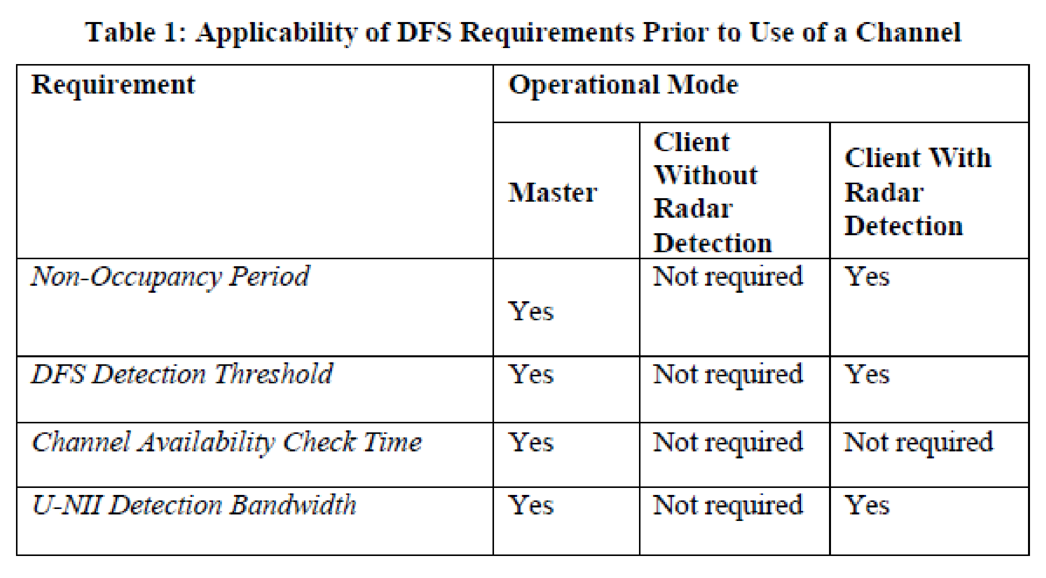


Table 1: Applicability of DFS Requirements Prior to Use of a Channel

Requirement	Operational Mode		
	Master	Client Without Radar Detection	Client With Radar Detection
Non-Occupancy Period	Yes	Not required	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	Yes	Not required	Not required
U-NII Detection Bandwidth	Yes	Not required	Yes

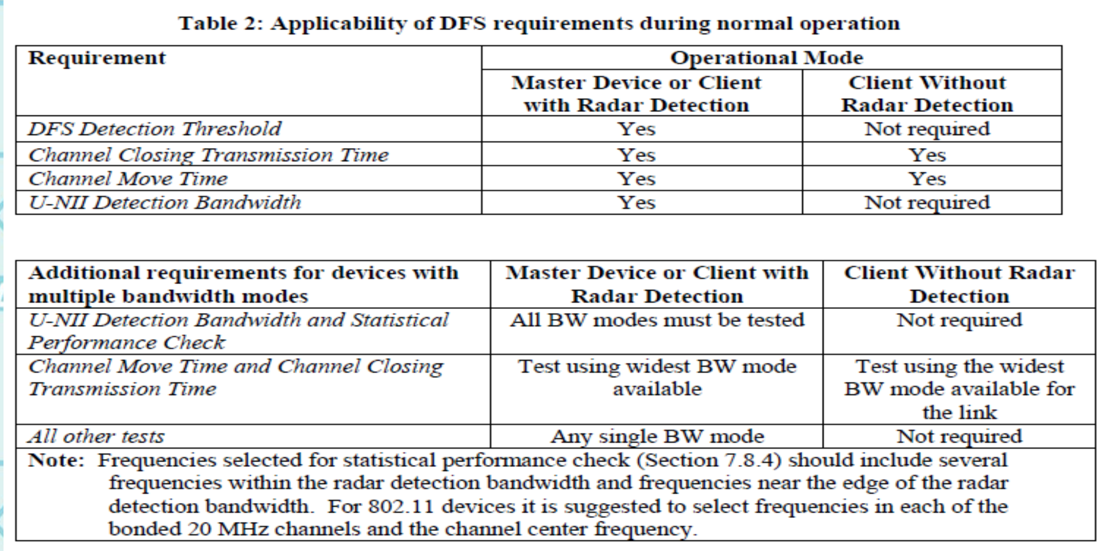


Table 2: Applicability of DFS requirements during normal operation

Requirement	Operational Mode	
	Master Device or Client with Radar Detection	Client Without Radar Detection
DFS Detection Threshold	Yes	Not required
Channel Closing Transmission Time	Yes	Yes
Channel Move Time	Yes	Yes
U-NII Detection Bandwidth	Yes	Not required

Additional requirements for devices with multiple bandwidth modes	Master Device or Client with Radar Detection	Client Without Radar Detection
U-NII Detection Bandwidth and Statistical Performance Check	All BW modes must be tested	Not required
Channel Move Time and Channel Closing Transmission Time	Test using widest BW mode available	Test using the widest BW mode available for the link
All other tests	Any single BW mode	Not required

Note: Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in each of the bonded 20 MHz channels and the channel center frequency.

The operational behavior and individual DFS requirements that are associated with these modes are as follows:

DFS Detection Thresholds

Table 3 below provides the *DFS Detection Thresholds* for *Master Devices* as well as *Client Devices* incorporating *In-Service Monitoring*.

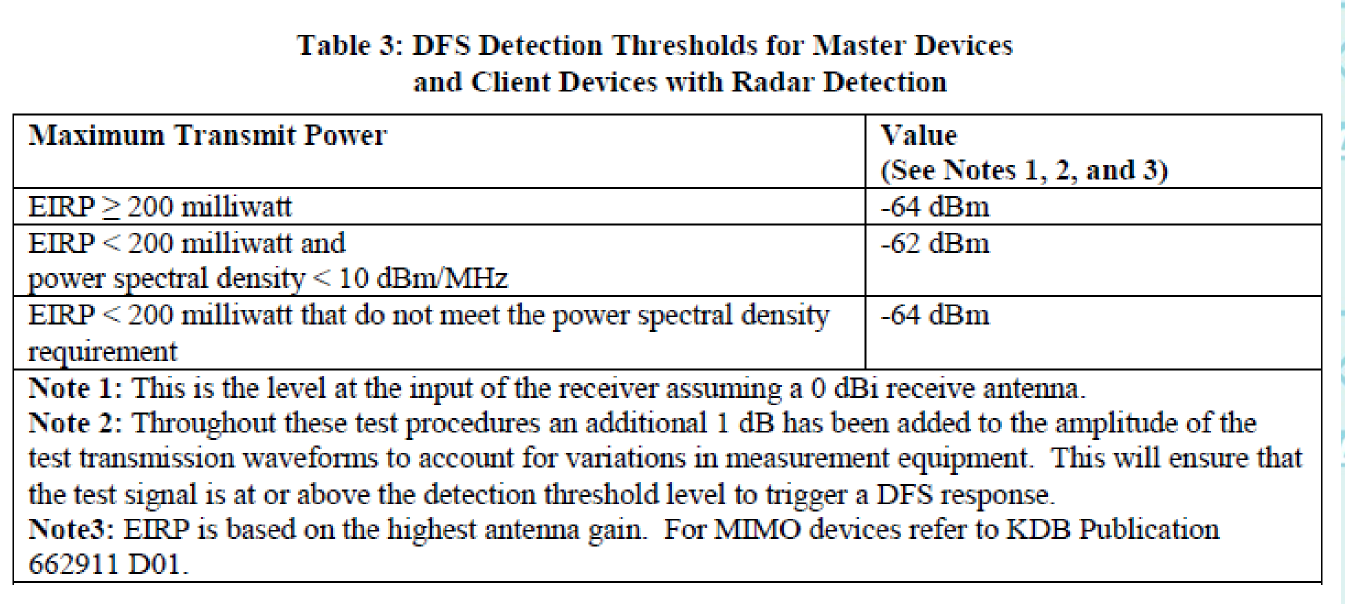


Table 3: DFS Detection Thresholds for Master Devices and Client Devices with Radar Detection

Maximum Transmit Power	**Value** **(See Notes 1, 2, and 3)**
EIRP ≥ 200 milliwatt	-64 dBm
EIRP < 200 milliwatt and power spectral density < 10 dBm/MHz	-62 dBm
EIRP < 200 milliwatt that do not meet the power spectral density requirement	-64 dBm

Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna.
Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.
Note3: EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.

Response Requirements

Table 4 provides the response requirements for *Master* and *Client Devices* incorporating DFS.

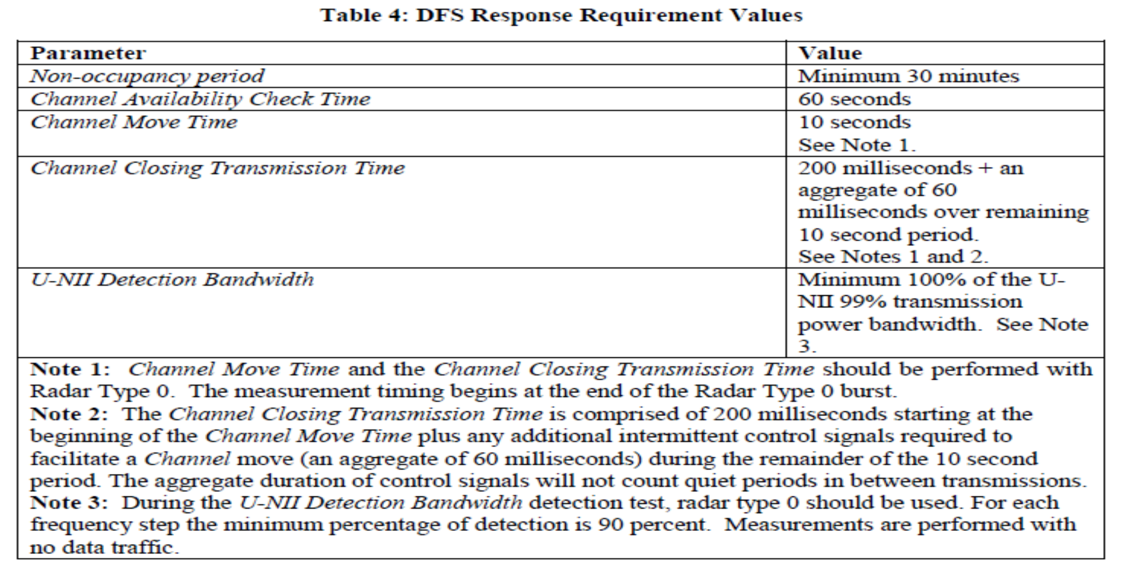


Table 4: DFS Response Requirement Values

Parameter	**Value**
Non-occupancy period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds See Note 1.
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.
U-NII Detection Bandwidth	Minimum 100% of the U-NII 99% transmission power bandwidth. See Note 3.

Note 1: *Channel Move Time* and the *Channel Closing Transmission Time* should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.
Note 2: The *Channel Closing Transmission Time* is comprised of 200 milliseconds starting at the beginning of the *Channel Move Time* plus any additional intermittent control signals required to facilitate a *Channel* move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.
Note 3: During the *U-NII Detection Bandwidth* detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

RADAR TEST WAVEFORMS

This section provides the parameters for required test waveforms, minimum percentage of successful detections, and the minimum number of trials that must be used for determining DFS conformance. Step intervals of 0.1 microsecond for Pulse Width, 1 microsecond for PRI, 1 MHz for chirp width and 1 for the number of pulses will be utilized for the random determination of specific test waveforms.

Short Pulse Radar Test Waveforms

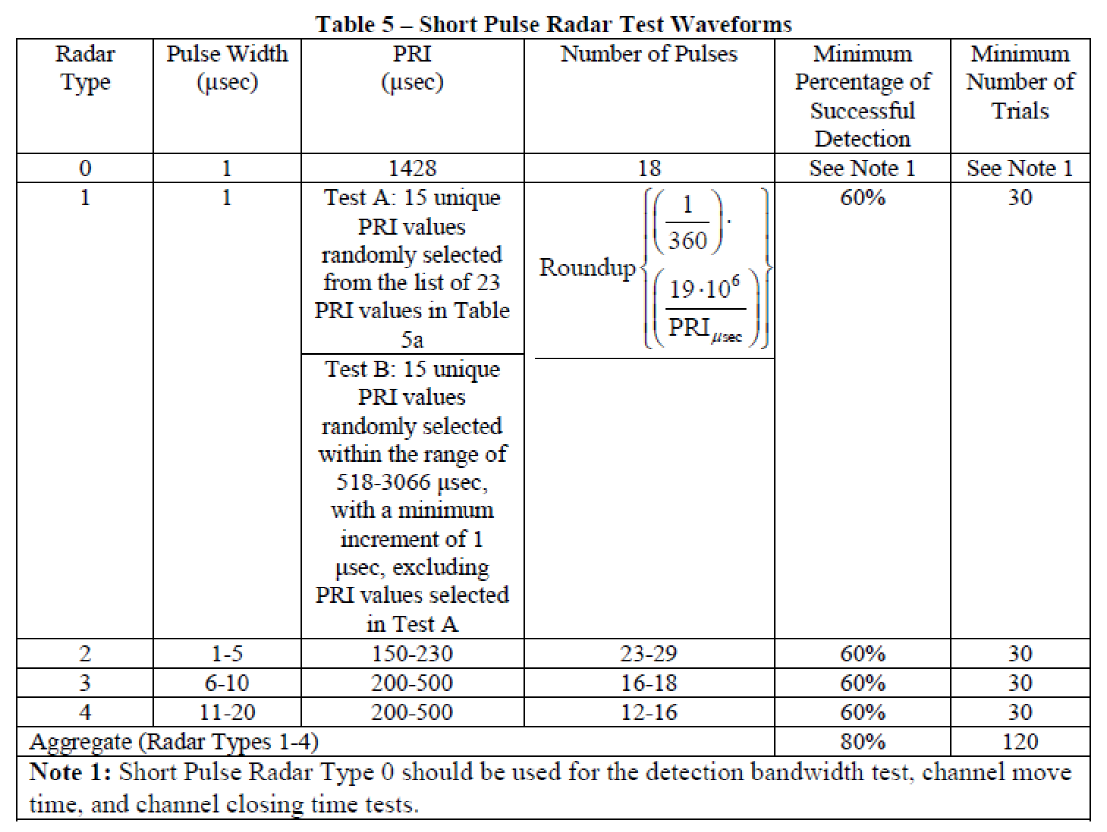


Table 5 – Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (µsec)	PRI (µsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Number of Trials
0	1	1428	18	See Note 1	See Note 1
1	1	Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a	$\text{Roundup}\left\{\left(\frac{1}{360}\right)\cdot\left(\frac{19\cdot10^{6}}{\text{PRI}_{\mu sec}}\right)\right\}$	60%	30
		Test B: 15 unique PRI values randomly selected within the range of 518-3066 µsec, with a minimum increment of 1 µsec, excluding PRI values selected in Test A			
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120
Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.					

A minimum of 30 unique waveforms are required for each of the Short Pulse Radar Types 2 through 4. If more than 30 waveforms are used for Short Pulse Radar Types 2 through 4, then each additional waveform must also be unique and not repeated from the previous waveforms. If more than 30 waveforms are used for Short Pulse Radar Type 1, then each additional waveform is generated with Test B and must also be unique and not repeated from the previous waveforms in Tests A or B.

For example if in Short Pulse Radar Type 1 Test B a PRI of 3066 µsec is selected, the number of pulses would be

Roundup $\left\{\left(\frac{1}{360}\right)\cdot\left(\frac{19\cdot10^{6}}{3066}\right)\right\}$ = Round up {17.2} = 18.

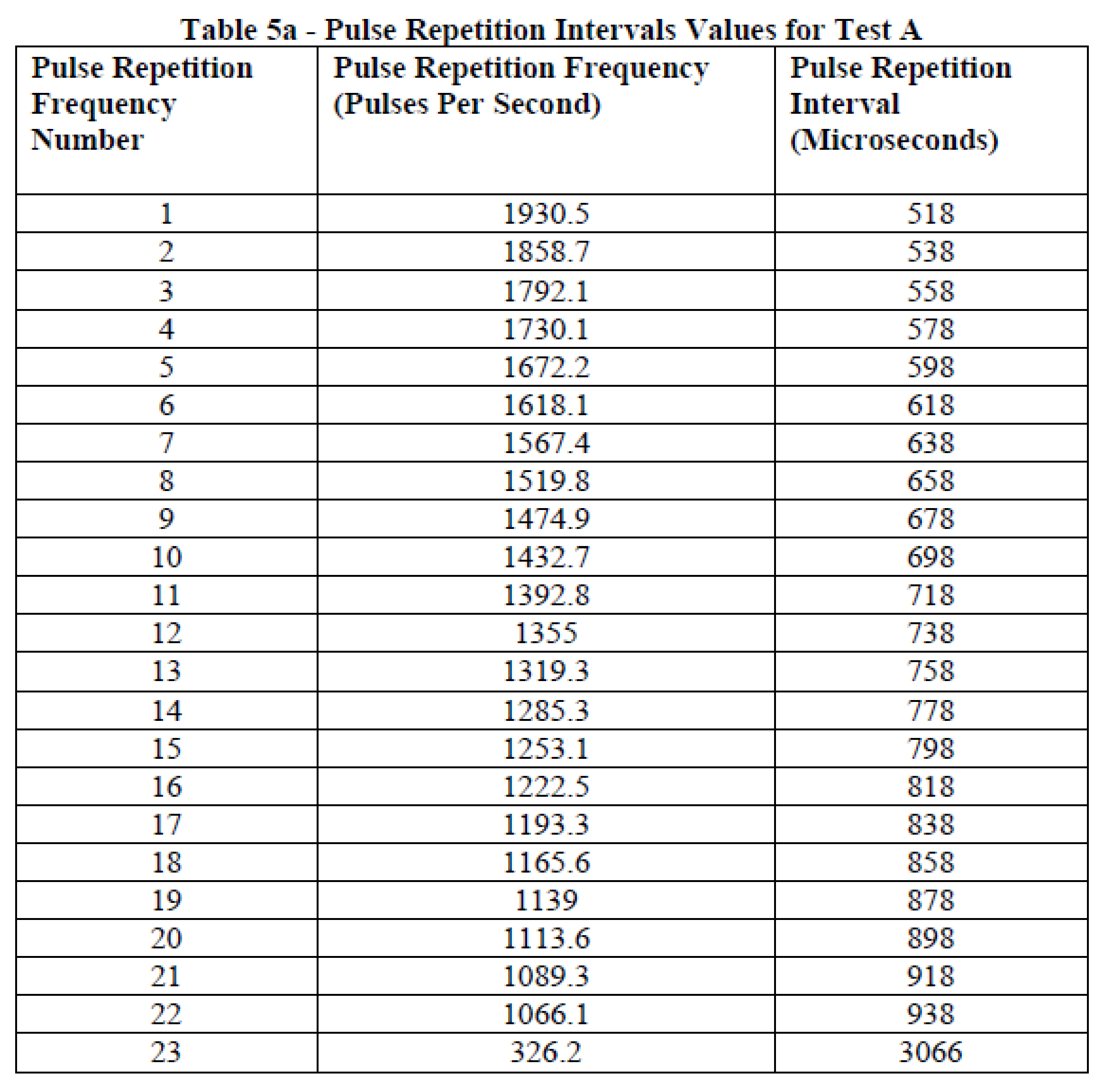
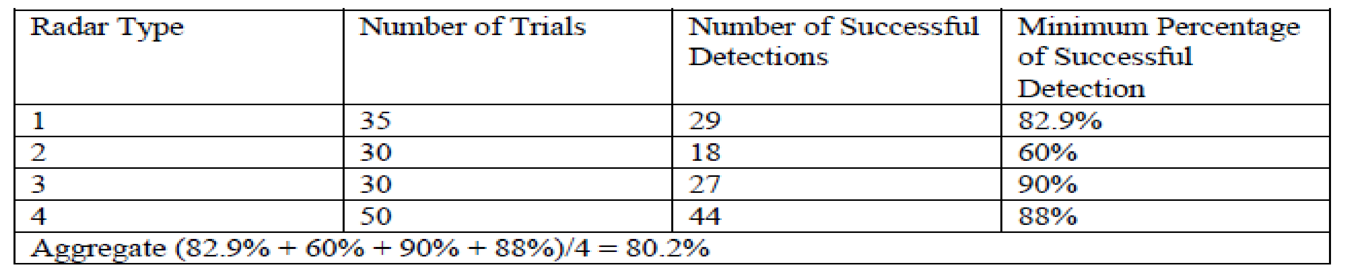


Table 5a - Pulse Repetition Intervals Values for Test A

Pulse Repetition Frequency Number	Pulse Repetition Frequency (Pulses Per Second)	Pulse Repetition Interval (Microseconds)
1	1930.5	518
2	1858.7	538
3	1792.1	558
4	1730.1	578
5	1672.2	598
6	1618.1	618
7	1567.4	638
8	1519.8	658
9	1474.9	678
10	1432.7	698
11	1392.8	718
12	1355	738
13	1319.3	758
14	1285.3	778
15	1253.1	798
16	1222.5	818
17	1193.3	838
18	1165.6	858
19	1139	878
20	1113.6	898
21	1089.3	918
22	1066.1	938
23	326.2	3066

The aggregate is the average of the percentage of successful detections of Short Pulse Radar Types 1-4. For example, the following table indicates how to compute the aggregate of percentage of successful detections.



Radar Type	Number of Trials	Number of Successful Detections	Minimum Percentage of Successful Detection
1	35	29	82.9%
2	30	18	60%
3	30	27	90%
4	50	44	88%
Aggregate (82.9% + 60% + 90% + 88%)/4 = 80.2%			

Long Pulse Radar Test Waveform

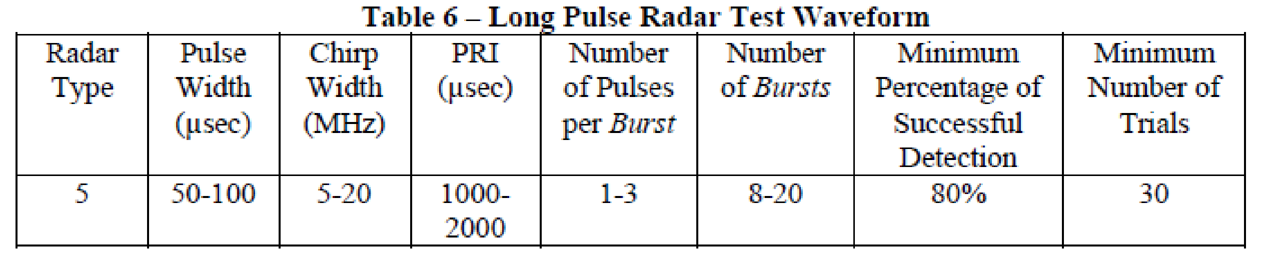


Table 6 – Long Pulse Radar Test Waveform

Radar Type	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Number of Pulses per *Burst*	Number of *Bursts*	Minimum Percentage of Successful Detection	Minimum Number of Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

The parameters for this waveform are randomly chosen. Thirty unique waveforms are required for the Long Pulse Radar Type waveforms. If more than 30 waveforms are used for the Long Pulse Radar Type waveforms, then each additional waveform must also be unique and not repeated from the previous waveforms.

Each waveform is defined as follows:

1) The transmission period for the Long Pulse Radar test signal is 12 seconds.

2) There are a total of 8 to 20 *Bursts* in the 12 second period, with the number of *Bursts* being randomly chosen. This number is *Burst Count*.

3) Each *Burst* consists of 1 to 3 pulses, with the number of pulses being randomly chosen. Each *Burst* within the 12 second sequence may have a different number of pulses.

4) The pulse width is between 50 and 100 microseconds, with the pulse width being randomly chosen. Each pulse within a *Burst* will have the same pulse width. Pulses in different *Bursts* may have different pulse widths.

5) Each pulse has a linear frequency modulated chirp between 5 and 20 MHz, with the chirp width being randomly chosen. Each pulse within a *transmission period* will have the same chirp width. The chirp is centered on the pulse. For example, with a radar frequency of 5300 MHz and a 20 MHz chirped signal, the chirp starts at 5290 MHz and ends at 5310 MHz.

6) If more than one pulse is present in a *Burst*, the time between the pulses will be between 1000 and 2000 microseconds, with the time being randomly chosen. If three pulses are present in a *Burst*, the random time interval between the first and second pulses is chosen independently of the random time interval between the second and third pulses.

7) The 12 second transmission period is divided into even intervals. The number of intervals is equal to *Burst Count*. Each interval is of length (12,000,000 / *Burst Count*) microseconds. Each interval contains one *Burst*. The start time for the *Burst*, relative to the beginning of the interval, is between 1 and [(12,000,000 / *Burst Count*) – (Total *Burst* Length) + (One Random PRI Interval)] microseconds, with the start time being randomly chosen. The step interval for the start time is 1 microsecond. The start time for each *Burst* is chosen randomly.

A representative example of a Long Pulse Radar Type waveform:

1) The total test waveform length is 12 seconds.

2) Eight (8) *Bursts* are randomly generated for the *Burst Count*.

3) *Burst* 1 has 2 randomly generated pulses.

4) The pulse width (for both pulses) is randomly selected to be 75 microseconds.

5) The PRI is randomly selected to be at 1213 microseconds.

6) *Bursts* 2 through 8 are generated using steps 3 – 5.

7) Each *Burst* is contained in even intervals of 1,500,000 microseconds. The starting location for Pulse 1, *Burst* 1 is randomly generated (1 to 1,500,000 minus the total *Burst* 1 length + 1 random PRI interval) at the 325,001 microsecond step. *Bursts* 2 through 8 randomly fall in successive 1,500,000 microsecond intervals (i.e. *Burst* 2 falls in the 1,500,001 – 3,000,000 microsecond range).

Figure 1 provides a graphical representation of the Long Pulse Radar Test Waveform.

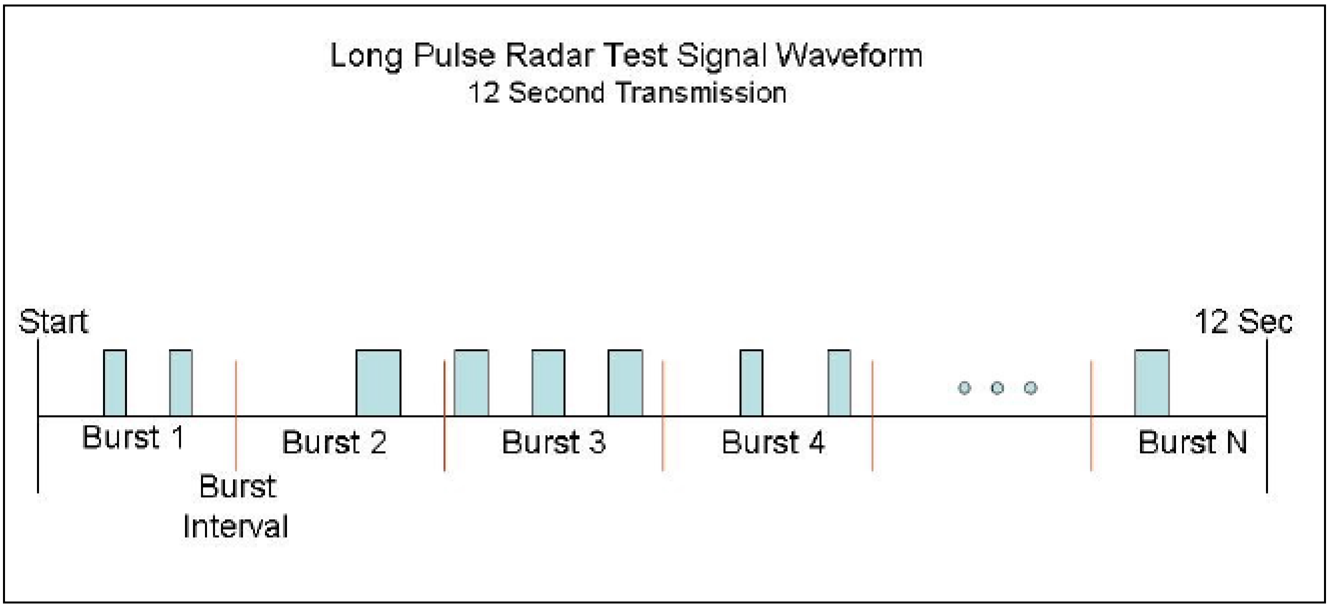


Figure 1: Graphical Representation of a Long Pulse Radar Type Waveform

Frequency Hopping Radar Test Waveform

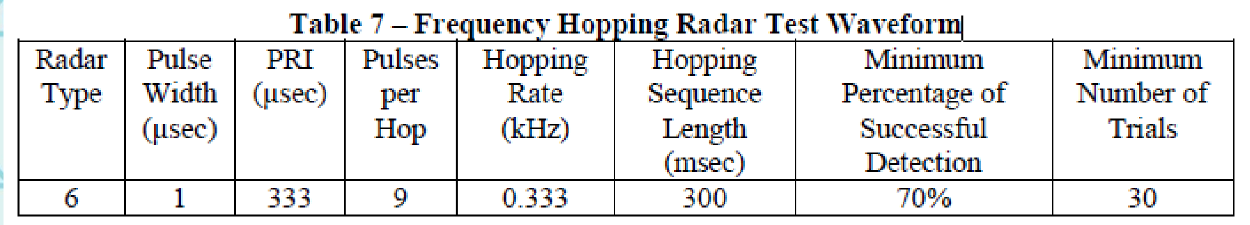


Table 7 – Frequency Hopping Radar Test Waveform

Radar Type	Pulse Width (μsec)	PRI (μsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Minimum Percentage of Successful Detection	Minimum Number of Trials
6	1	333	9	0.333	300	70%	30

For the Frequency Hopping Radar Type, the same *Burst* parameters are used for each waveform. The hopping sequence is different for each waveform and a 100-length segment is selected from the hopping sequence defined by the following algorithm: [4]

The first frequency in a hopping sequence is selected randomly from the group of 475 integer frequencies from 5250 – 5724 MHz. Next, the frequency that was just chosen is removed from the group and a frequency is randomly selected from the remaining 474 frequencies in the group. This process continues until all 475 frequencies are chosen for the set. For selection of a random frequency, the frequencies remaining within the group are always treated as equally likely.

7.10.2 TEST PROCEDURE

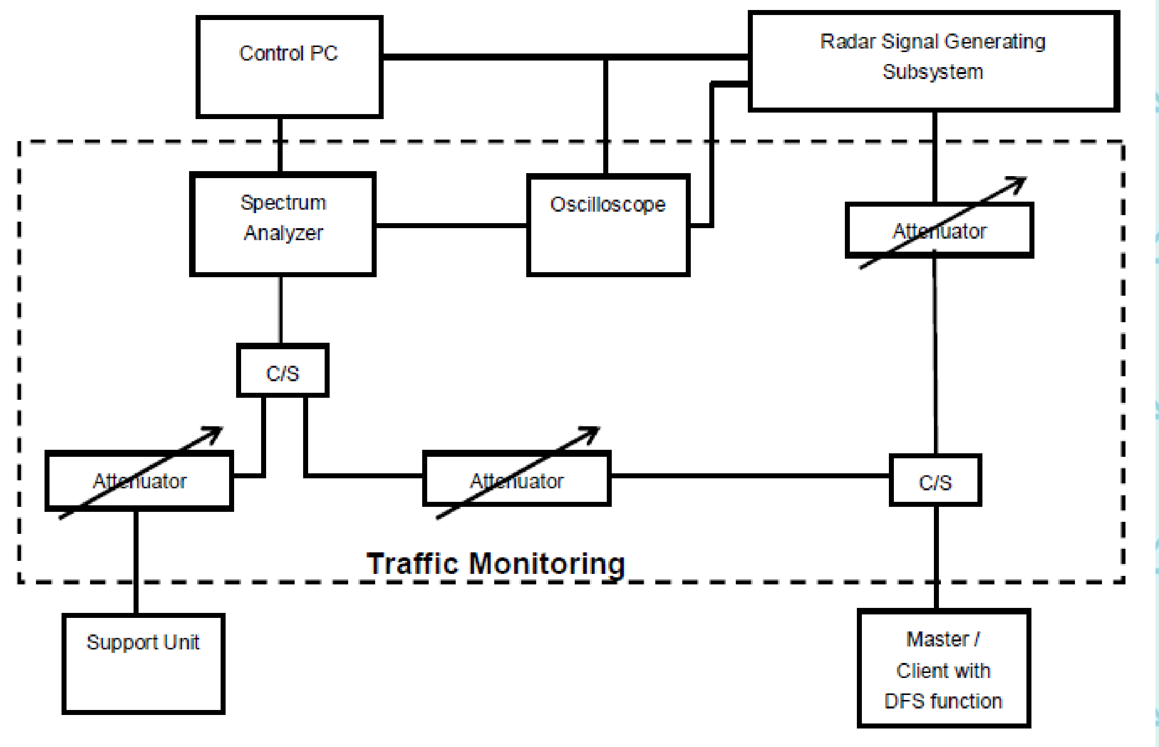
DFS MEASUREMENT SYSTEM

A complete DFS Measurement System consists of two subsystems:

(1) The Radar Signal Generating Subsystem and

(2) The Traffic Monitoring Subsystem.

The control PC is necessary for generating the Radar waveforms in Table 10, 11 and 12. The traffic monitoring subsystem is specified to the type of unit under test (UUT).


Control PC
Radar Signal Generating Subsystem
Spectrum Analyzer
Oscilloscope
Attenuator
C/S
Attenuator
Attenuator
C/S
Traffic Monitoring
Support Unit
Master / Client with DFS function

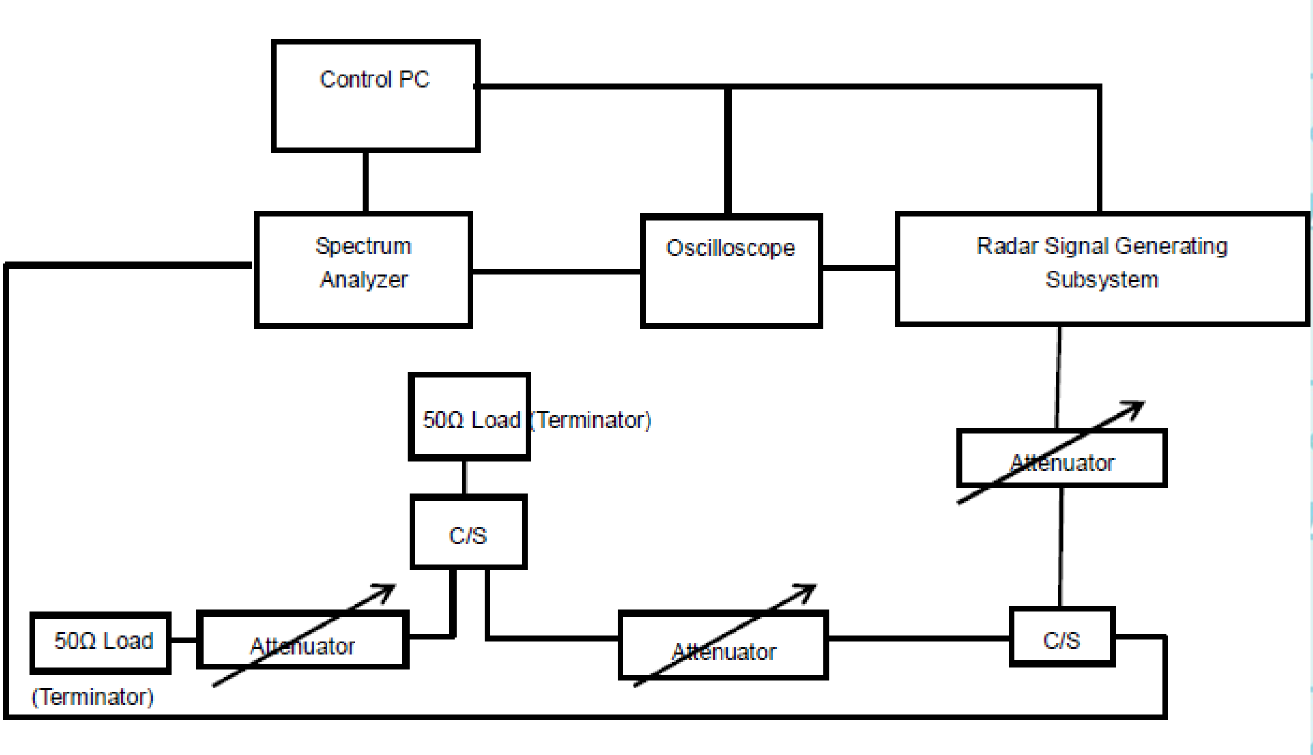
The test transmission will always be from the Master Device to the Client Device. While the Client device is set up to associate with the Master device and play the MPEG file (6 y Magic Hours) from Master device, the designated MPEG test file and instructions are located at: http://ntiacsd.ntia.doc.gov/dfs/.

CALIBRATION OF DFS DETECTION THRESHOLD LEVEL

The measured channel is 5260MHz. The radar signal was the same as transmitted channels, and injected into the antenna port of Client Device with Radar Detection, measured the channel closing transmission time and channel move time.

SLAVE WITHOUT RADAR DETECTION MODE

The antenna gain is -4dBi and required detection threshold is -65dBm (= -62 +1 - 4)dBm. The calibrated conducted detection threshold level is set to -65dBm.


Control PC
Spectrum Analyzer
Oscilloscope
Radar Signal Generating Subsystem
50Ω Load (Terminator)
Attenuator
C/S
50Ω Load
(Terminator)
Attenuator
Attenuator
C/S

DEVIATION FROM TEST STANDARD

No deviation.

7.10.3 TEST RESULT

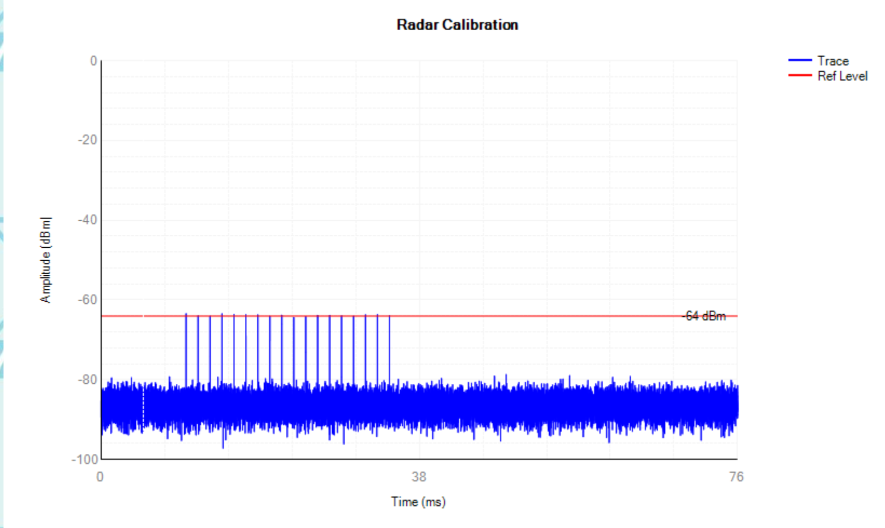
Test Items	Remark	Result
Channel Closing Transmission Time	Applicable	PASS
Channel Move Time	Applicable	PASS

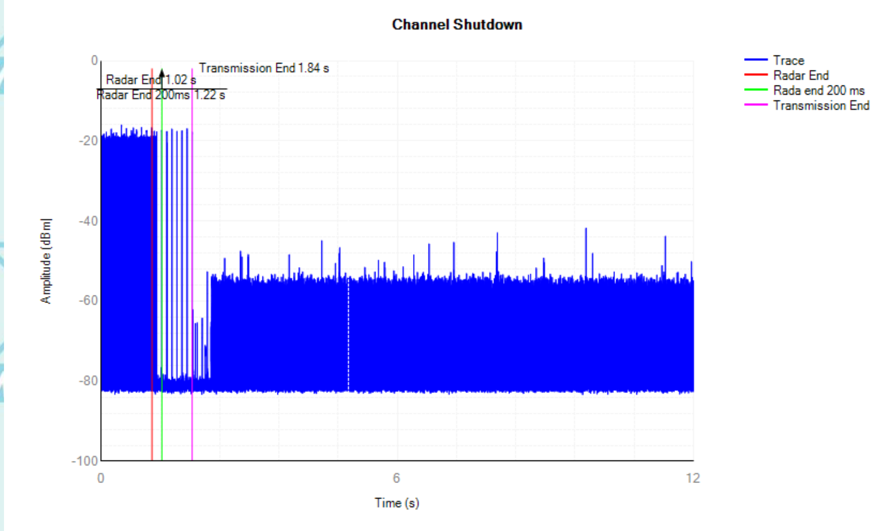
Note: This phone can only be used as a slave without radar detection function, and no signal was recovered in 30 minutes for Non-Occupancy period.

Measurement Record (the wost case)

Measurement data below:

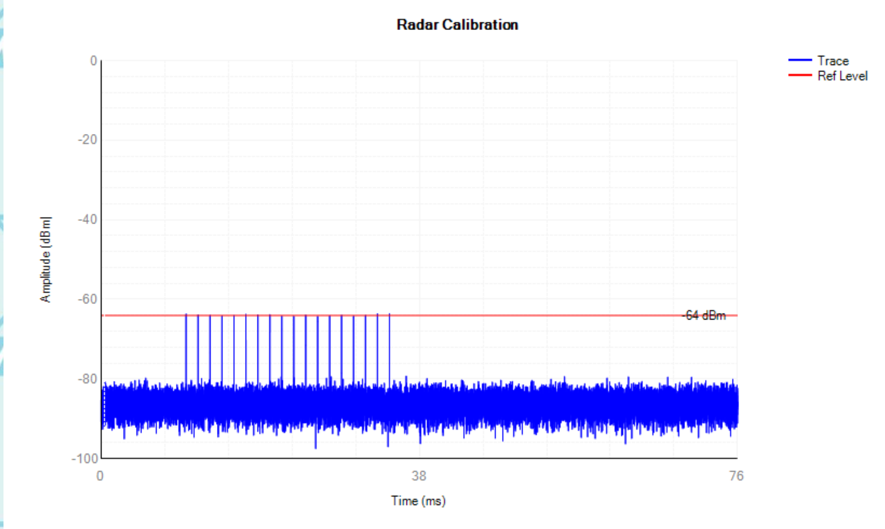
5290MHz			
Test Items	**Value（s）**	**Limit（s）**	**Test Result**
Channel Closing Transmission Time	0.0196	0.26	Pass
Channel Move Time	0.8137	10	Pass

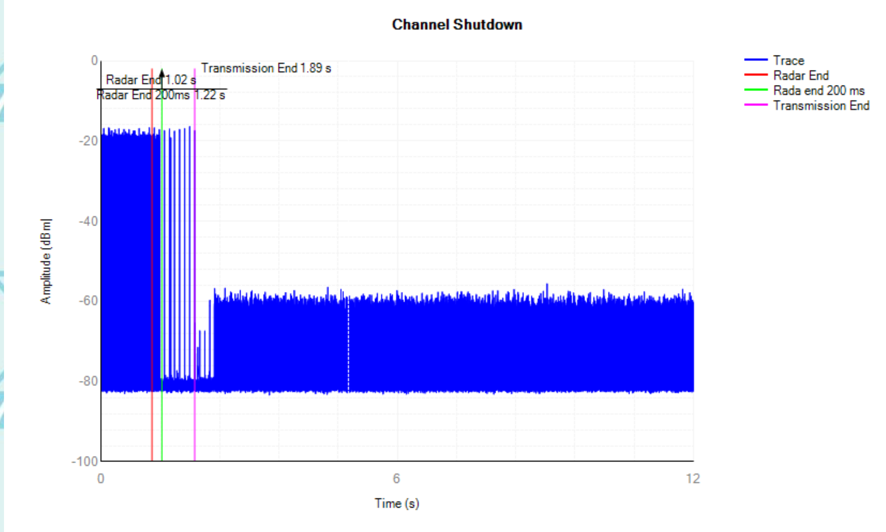




Measurement data below:

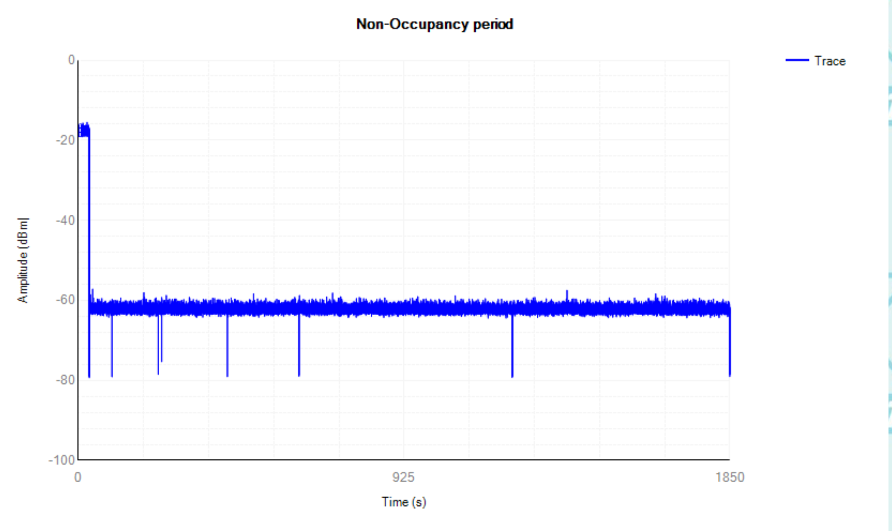
5530MHz			
Test Items	**Value（s）**	**Limit（s）**	**Test Result**
Channel Closing Transmission Time	0.0248	0.26	Pass
Channel Move Time	0.8665	10	Pass



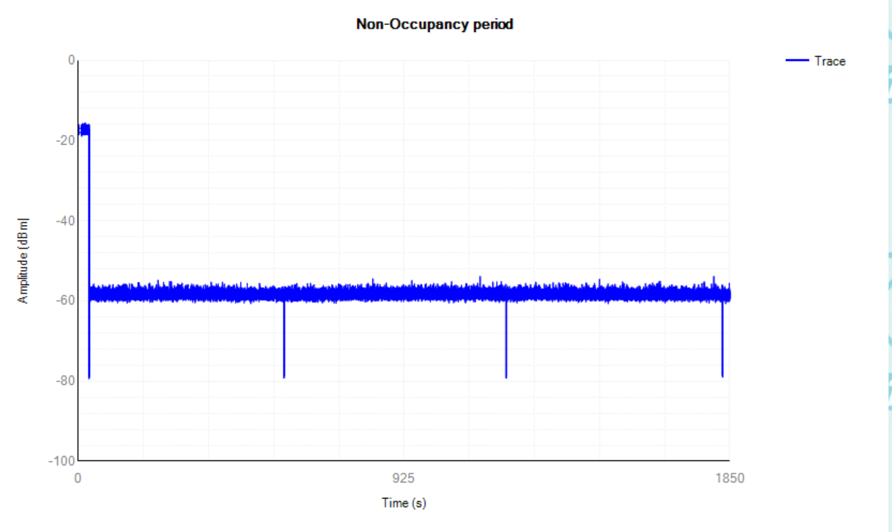


Non-Occupancy perod:

Frequency (MHz)	Result	Verdict
5290	See test Graph	Pass



Frequency (MHz)	Result	Verdict
5530	See test Graph	Pass



8 Test Setup Photographs

Please refer to Annex "Set Up Photos-15E" for test setup photos

*******END OF REPORT*******