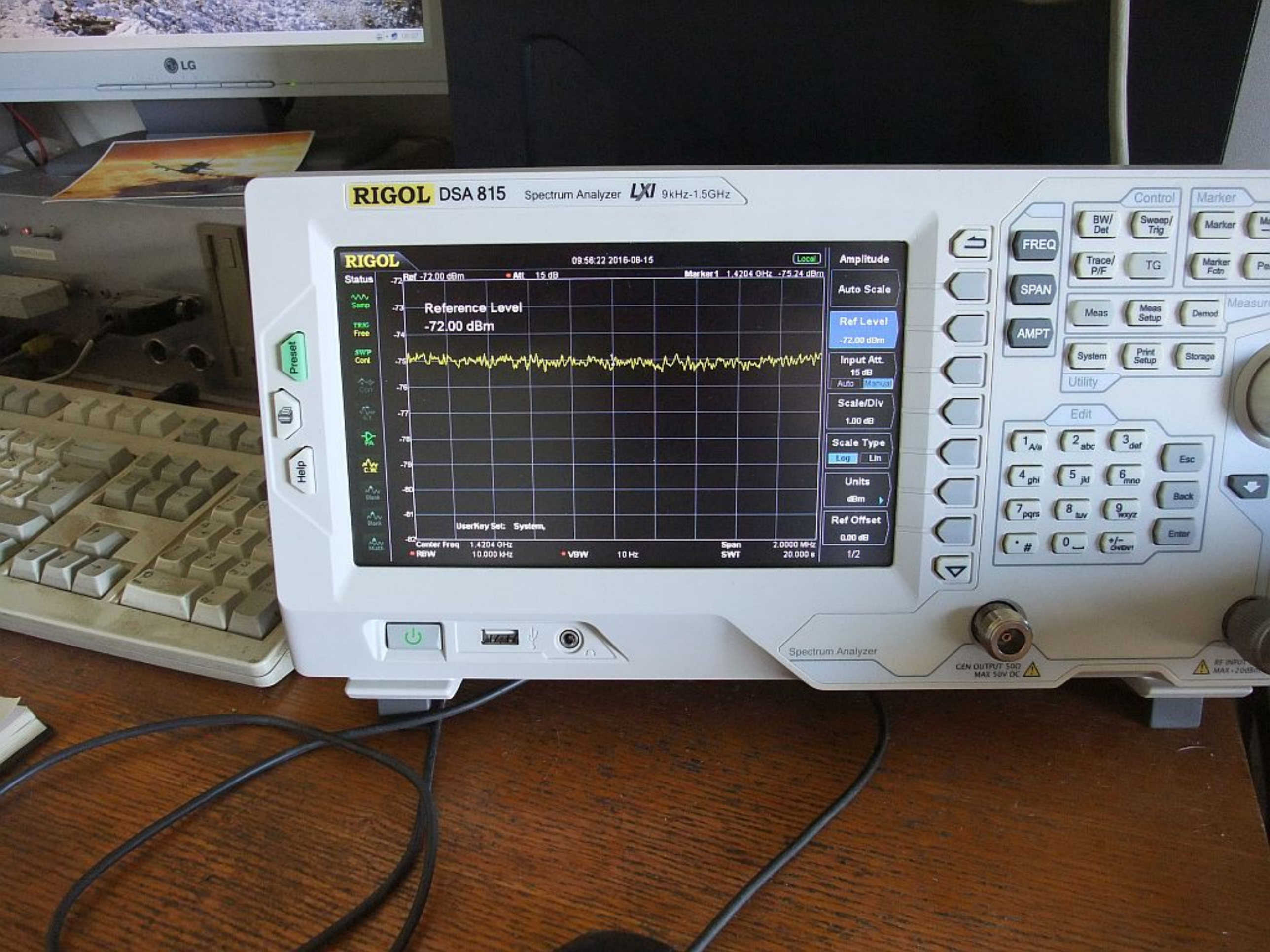
Amaterska radioastronomija

8 – Spektralni analizator

Laboratorij za sevanje in optiko

Tadeja Saje, S56ZSA
&
Matjaž Vidmar, S53MV

MREŽA
PRIKAZOVALNIK
LCD 128×64
40dB
80dB
10dB-5dB/div
MIN MAX
2ms/div
VPIS
POMNILNIK
BREZ
RAZLIKA
VHOD
1...26GHz
IZHOD
0...136Hz
LO
4 x −10dB
fvco1
fvco2
B
10K 20K 50K 150K 700K HF
VB
20K
500K
Y-NF
izhod
5M 10M 20M 50M
Δf/div
100M
200M
2M
1M
50K
Δf=0
STAB
VCO#1
#2 500K 2
−10dBm
4 x −10dB


RIGOL DSA 815 Spectrum Analyzer LXI 9kHz-1.5GHz
RIGOL
09:58:22 2016-08-15
Local
Status
Ref -72.00 dBm
Att 15 dB
Marker1 1.4204 GHz -75.24 dBm
Reference Level
-72.00 dBm
UserKey Set: System,
Center Freq 1.4204 GHz
RBW 10.000 kHz
VBW 10 Hz
Span 2.0000 MHz
SWT 20.000 s
Amplitude
Auto Scale
Ref Level
-72.00 dBm
Input Att.
15 dB
Auto Manual
Scale/Div
1.00 dB
Scale Type
Log Lin
Units
dBm
Ref Offset
0.00 dB
1/2
Preset
Help
FREQ
SPAN
AMPT
Control
BW/ Det
Sweep/ Trig
Trace/ P/F
TG
Marker
Marker Fctn
Meas
Meas Setup
Demod
System
Print Setup
Storage
Utility
Edit
Esc
Back
Enter
Spectrum Analyzer
CEN OUTPUT 50Ω MAX 50V DC

Grande desert
STANLEY

MREŽA
PRIKAZOVALNIK
LCD 128×64
40dB
30dB
MIN MAX
10dB-5dB/div
2ms/div
VPIS
POMNILNIK
BREZ
RAZLIKA
fLO
VHOD
1...26GHz
0...1.7GHz
HARMONSKI KONVERTER
fVCO1
fVCO2
4 × −10dB
5M 10M 20M 50M
Δf/div
2M
1M
100M
200M
#2 500
100K 50K
Δf=0
STAB
VCO#1
B
10K 20K 50K 150K 700K 4M
VB
20K
500K
1K
Y-NF
izhod
SLEDILNI
IZVOR
0...1750MHz
−10dBm
4 × −10dB

R3GOL
Double cluster (NGC 884)

RIGOL

09:21:24 2016-08-15

Local

Status

Samp

TRIG Free

SWP Cont

Corr

S.T.

PA

C.W.

Blank

Blank

Math

Ref -72.00 dBm

Att 15 dB

Marker1 1.4204 GHz -74.74 dBm

-72

-73

-74

-75

-76

-77

-78

-79

-80

-81

-82

Reference Level

-72.00 dBm

1

Sonce

UserKey Set: System,

Center Freq 1.4204 GHz

Span 2.0000 MHz

RBW 10.000 kHz

VBW 10 Hz

SWT 20.000 s

Amplitude

Auto Scale

Ref Level

-72.00 dBm

Input Att.

15 dB

Auto Manual

Scale/Div

1.00 dB

Scale Type

Log Lin

Units

dBm

Ref Offset

0.00 dB

1/2

RIGOL

23:44:23 2016-08-14

Local

Status

Samp

TRIG Free

SWP Cont

Corr

S.T.

PA

C.W.

Blank

Blank

Math

Ref -79.00 dBm

Att 15 dB

Marker1 1.4204 GHz -80.93 dBm

-79

-80

-81

-82

-83

-84

-85

-86

-87

-88

-89

Center Frequency

1.420405000 GHz

Zemlja (gozd)

UserKey Set: System,

Center Freq 1.4204 GHz

Span 2.0000 MHz

RBW 10.000 kHz

VBW 10 Hz

SWT 20.000 s

Frequency

Center Freq

1.4204050 GHz

Start Freq

1.4194050 GHz

Stop Freq

1.4214050 GHz

Freq Offset

0 Hz

CF Step

200.000 kHz

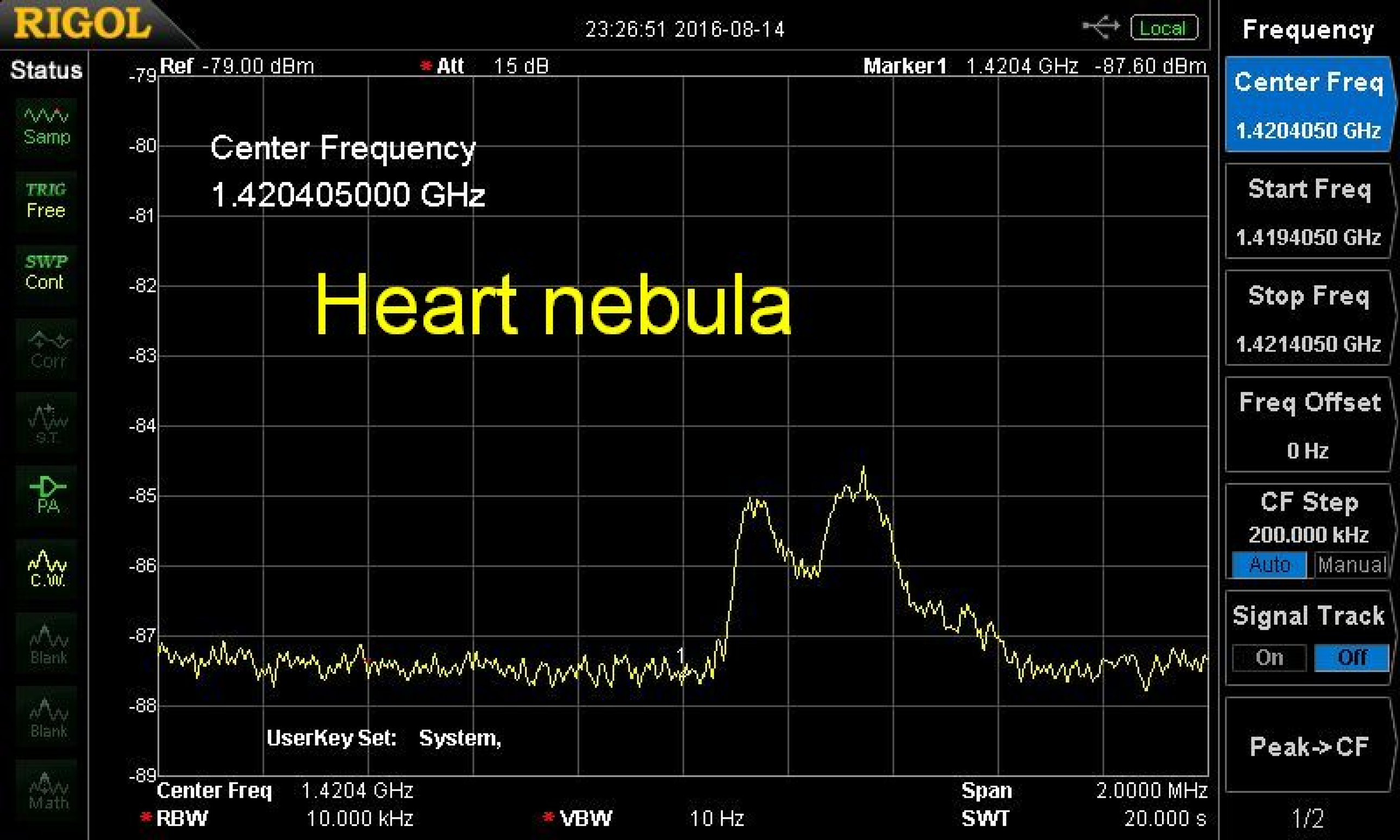
Auto Manual

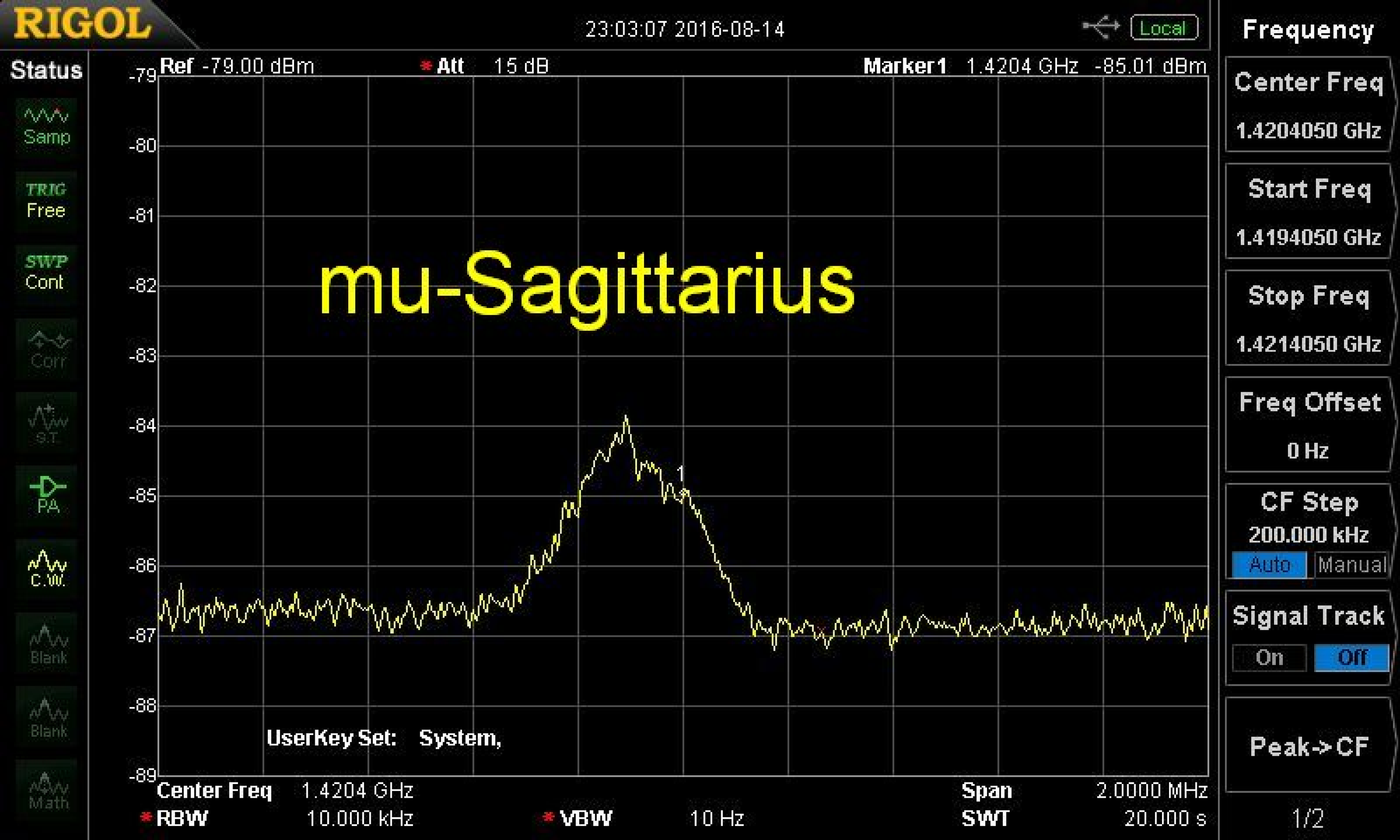
Signal Track

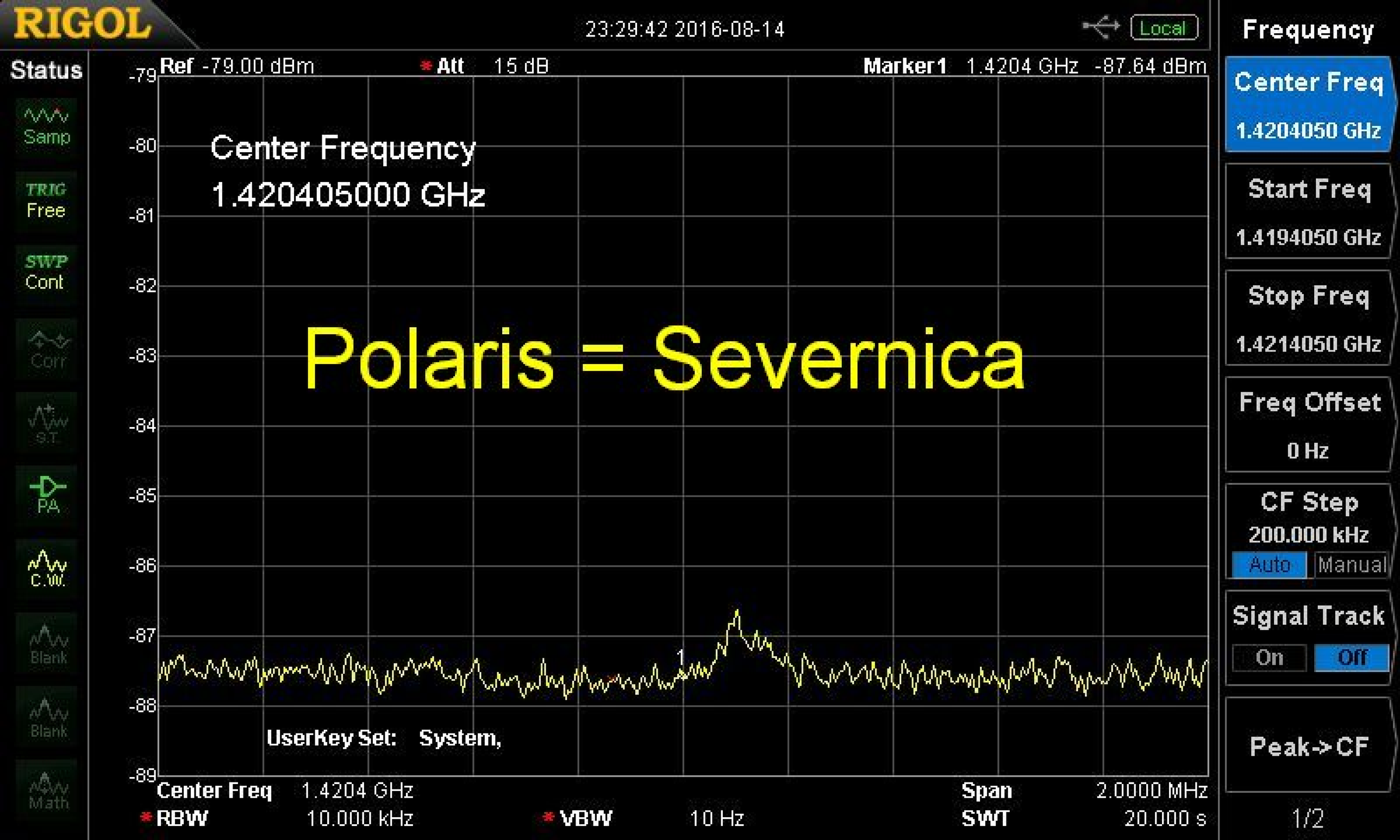
On Off

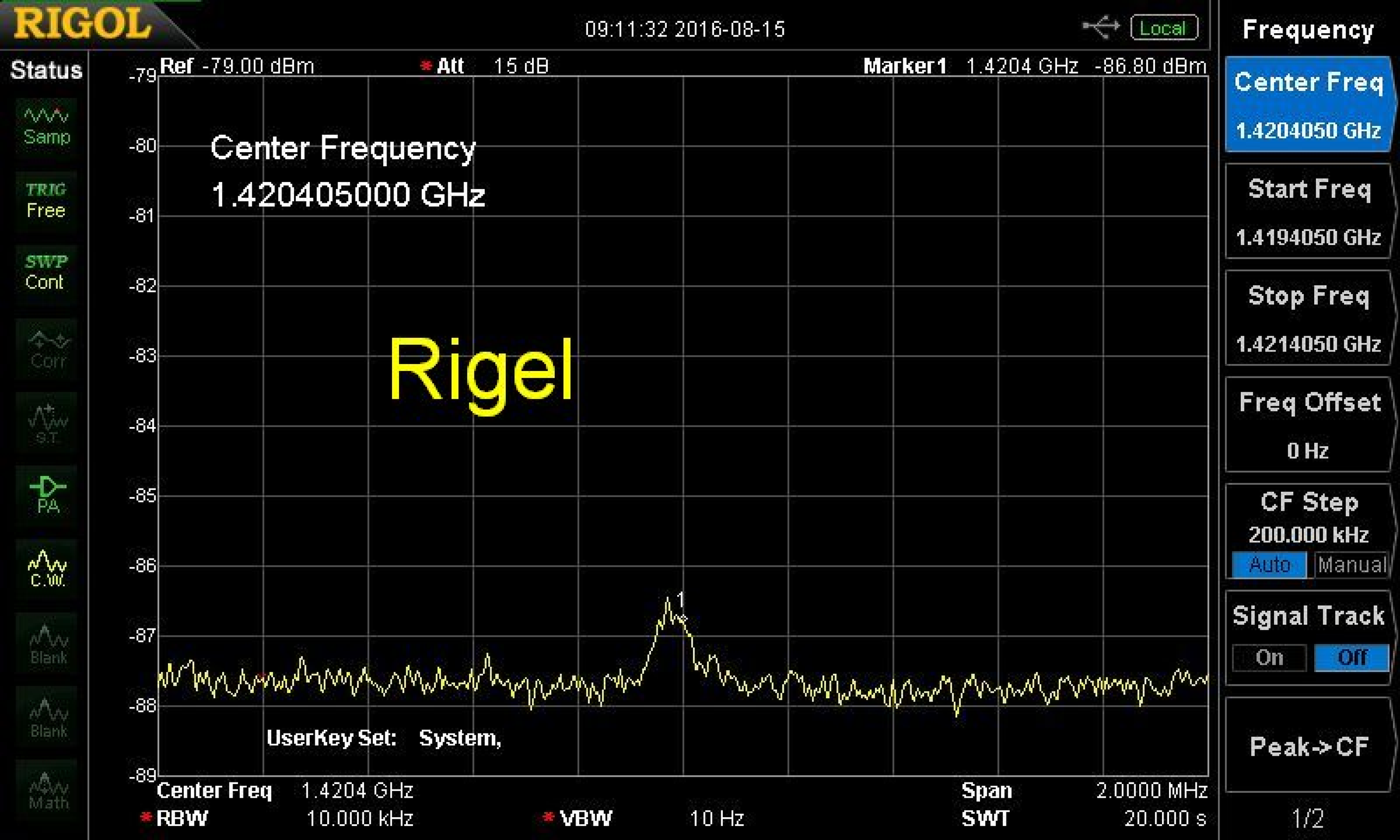
Peak->CF

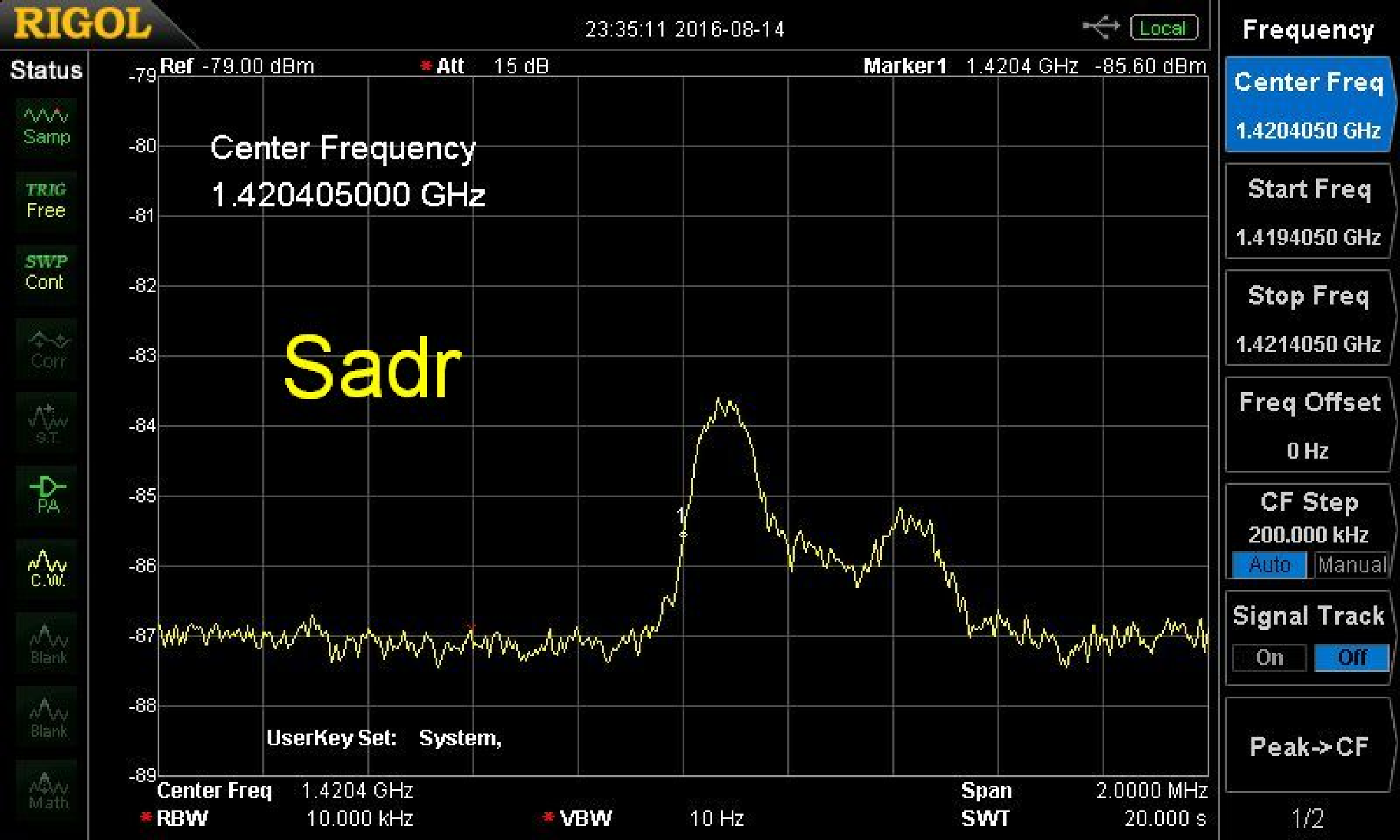
1/2


RIGOL
23:26:51 2016-08-14
Local
Status
Samp
TRIG
Free
SWP
Cont
Corr
S.T.
PA
C.W.
Blank
Blank
Math
Ref -79.00 dBm
Att 15 dB
Marker1 1.4204 GHz -87.60 dBm
-79
-80
-81
-82
-83
-84
-85
-86
-87
-88
-89
Center Frequency
1.420405000 GHz
Heart nebula
UserKey Set: System,
Center Freq 1.4204 GHz
Span 2.0000 MHz
RBW 10.000 kHz
VBW 10 Hz
SWT 20.000 s
Frequency
Center Freq
1.4204050 GHz
Start Freq
1.4194050 GHz
Stop Freq
1.4214050 GHz
Freq Offset
0 Hz
CF Step
200.000 kHz
Auto
Manual
Signal Track
On
Off
Peak->CF
1/2


RIGOL
23:03:07 2016-08-14
Local
Status
Samp
TRIG
Free
SWP
Cont
Corr
S.T.
PA
C.W.
Blank
Blank
Math
Ref -79.00 dBm
Att 15 dB
Marker1 1.4204 GHz -85.01 dBm
-79
-80
-81
-82
-83
-84
-85
-86
-87
-88
-89
mu-Sagittarius
1
UserKey Set: System,
Center Freq 1.4204 GHz
Span 2.0000 MHz
RBW 10.000 kHz
VBW 10 Hz
SWT 20.000 s
Frequency
Center Freq
1.4204050 GHz
Start Freq
1.4194050 GHz
Stop Freq
1.4214050 GHz
Freq Offset
0 Hz
CF Step
200.000 kHz
Auto
Manual
Signal Track
On
Off
Peak->CF
1/2


RIGOL
23:29:42 2016-08-14
Local
Status
Samp
TRIG
Free
SWP
Cont
Corr
S.T.
PA
C.W.
Blank
Blank
Math
Ref -79.00 dBm
Att 15 dB
Marker1 1.4204 GHz -87.64 dBm
-79
-80
-81
-82
-83
-84
-85
-86
-87
-88
-89
Center Frequency
1.420405000 GHz
Polaris = Severnica
UserKey Set: System,
Center Freq 1.4204 GHz
Span 2.0000 MHz
RBW 10.000 kHz
VBW 10 Hz
SWT 20.000 s
Frequency
Center Freq
1.4204050 GHz
Start Freq
1.4194050 GHz
Stop Freq
1.4214050 GHz
Freq Offset
0 Hz
CF Step
200.000 kHz
Auto
Manual
Signal Track
On
Off
Peak->CF
1/2


RIGOL
09:11:32 2016-08-15
Local
Status
Samp
TRIG
Free
SWP
Cont
Corr
S.T.
PA
C.W.
Blank
Blank
Math
Ref -79.00 dBm
Att 15 dB
Marker1 1.4204 GHz -86.80 dBm
-79
-80
-81
-82
-83
-84
-85
-86
-87
-88
-89
Center Frequency
1.420405000 GHz
Rigel
1
UserKey Set: System,
Center Freq 1.4204 GHz
Span 2.0000 MHz
RBW 10.000 kHz
VBW 10 Hz
SWT 20.000 s
Frequency
Center Freq
1.4204050 GHz
Start Freq
1.4194050 GHz
Stop Freq
1.4214050 GHz
Freq Offset
0 Hz
CF Step
200.000 kHz
Auto
Manual
Signal Track
On
Off
Peak->CF
1/2


RIGOL
23:35:11 2016-08-14
Local
Status
Samp
TRIG
Free
SWP
Cont
Corr
S.T.
PA
C.W.
Blank
Blank
Math
Ref -79.00 dBm
Att 15 dB
Marker1 1.4204 GHz -85.60 dBm
-79
-80
-81
-82
-83
-84
-85
-86
-87
-88
-89
Center Frequency
1.420405000 GHz
Sadr
UserKey Set: System,
Center Freq 1.4204 GHz
RBW 10.000 kHz
VBW 10 Hz
Span 2.0000 MHz
SWT 20.000 s
Frequency
Center Freq
1.4204050 GHz
Start Freq
1.4194050 GHz
Stop Freq
1.4214050 GHz
Freq Offset
0 Hz
CF Step
200.000 kHz
Auto
Manual
Signal Track
On
Off
Peak->CF
1/2

RIGOL

22:47:44 2016-08-14

Local

Status

Samp

TRIG Free

SWP Cont

Corr

S.T.

PA

C.W.

Blank

Blank

Math

Ref -79.00 dBm

Att 15 dB

Marker1 1.4204 GHz -85.59 dBm

-79

-80

-81

-82

-83

-84

-85

-86

-87

-88

-89

Center Frequency

1.420405000 GHz

Sadr

1

UserKey Set: System,

Center Freq 1.4204 GHz

Span 2.0000 MHz

RBW 10.000 kHz

VBW 10 Hz

SWT 20.000 s

Frequency

Center Freq

1.4204050 GHz

Start Freq

1.4194050 GHz

Stop Freq

1.4214050 GHz

Freq Offset

0 Hz

CF Step

200.000 kHz

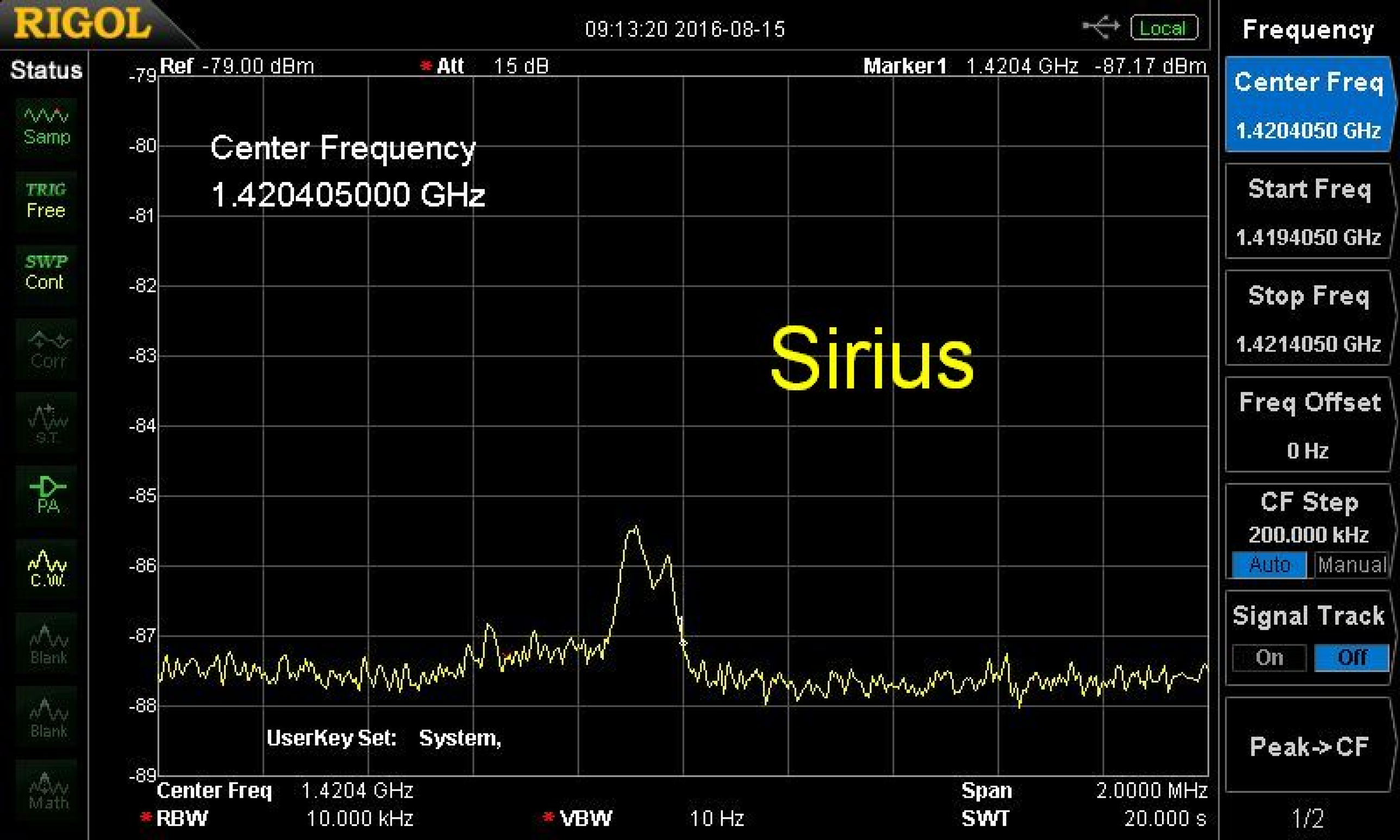
Auto Manual

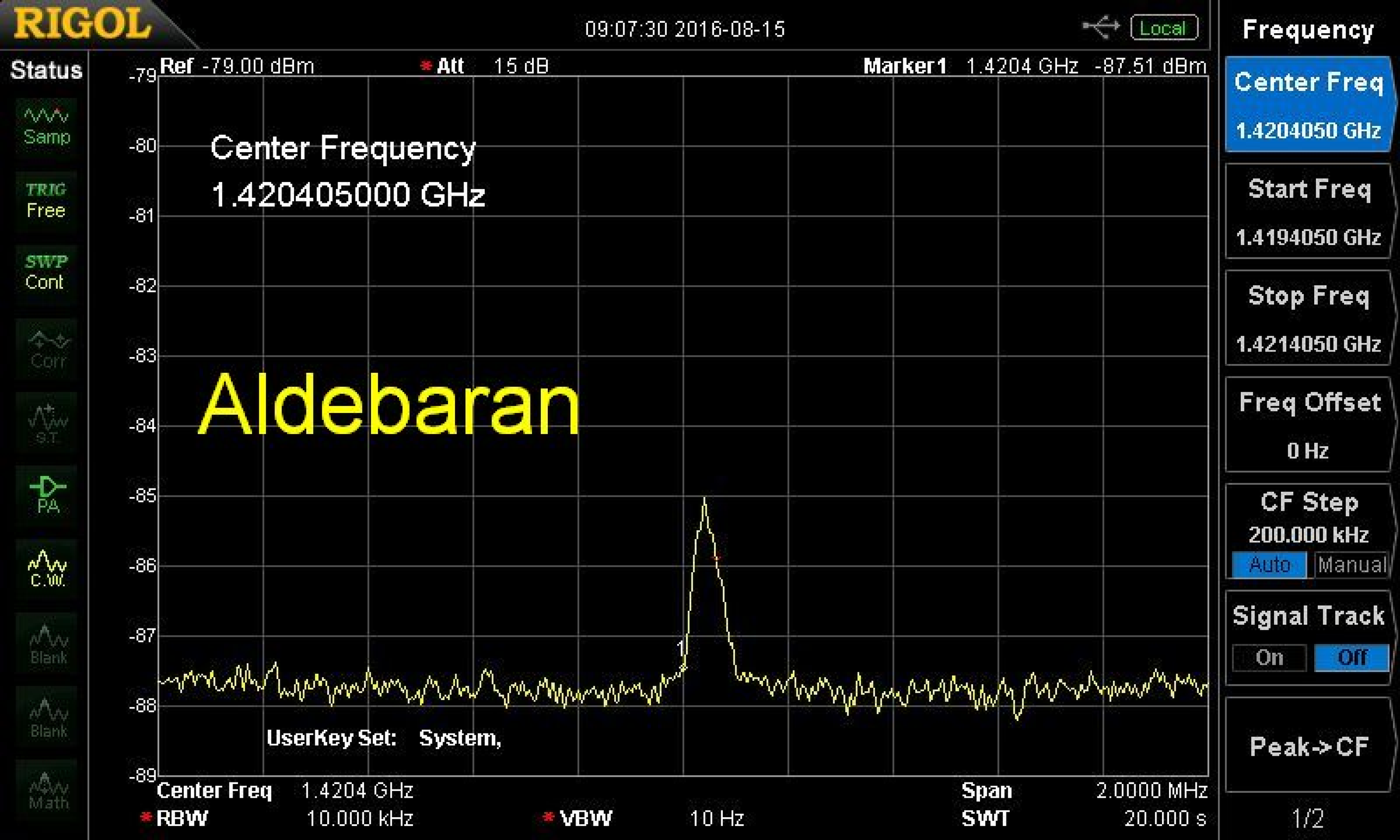
Signal Track

On Off

Peak->CF

1/2


RIGOL
09:13:20 2016-08-15
Local
Status
Samp
TRIG
Free
SWP
Cont
Corr
S.T.
PA
C.W.
Blank
Blank
Math
Ref -79.00 dBm
Att 15 dB
Marker1 1.4204 GHz -87.17 dBm
-79
-80
-81
-82
-83
-84
-85
-86
-87
-88
-89
Center Frequency
1.420405000 GHz
Sirius
UserKey Set: System,
Center Freq 1.4204 GHz
Span 2.0000 MHz
RBW 10.000 kHz
VBW 10 Hz
SWT 20.000 s
Frequency
Center Freq
1.4204050 GHz
Start Freq
1.4194050 GHz
Stop Freq
1.4214050 GHz
Freq Offset
0 Hz
CF Step
200.000 kHz
Auto
Manual
Signal Track
On
Off
Peak->CF
1/2


RIGOL
09:07:30 2016-08-15
Local
Status
Samp
TRIG
Free
SWP
Cont
Corr
S.T.
PA
C.W.
Blank
Blank
Math
Ref -79.00 dBm
Att 15 dB
Marker1 1.4204 GHz -87.51 dBm
-79
-80
-81
-82
-83
-84
-85
-86
-87
-88
-89
Center Frequency
1.420405000 GHz
Aldebaran
1
UserKey Set: System,
Center Freq 1.4204 GHz
Span 2.0000 MHz
RBW 10.000 kHz
VBW 10 Hz
SWT 20.000 s
Frequency
Center Freq
1.4204050 GHz
Start Freq
1.4194050 GHz
Stop Freq
1.4214050 GHz
Freq Offset
0 Hz
CF Step
200.000 kHz
Auto
Manual
Signal Track
On
Off
Peak->CF
1/2

RIGOL

22:57:55 2016-08-14

Local

Status

Samp

TRIG Free

SWP Cont

Corr

S.T.

PA

C.W.

Blank

Blank

Math

Ref -79.00 dBm

Att 15 dB

Marker1 1.4204 GHz -86.58 dBm

-79

-80

-81

-82

-83

-84

-85

-86

-87

-88

-89

Altair

1

UserKey Set: System,

Center Freq 1.4204 GHz

Span 2.0000 MHz

RBW 10.000 kHz

VBW 10 Hz

SWT 20.000 s

Frequency

Center Freq

1.4204050 GHz

Start Freq

1.4194050 GHz

Stop Freq

1.4214050 GHz

Freq Offset

0 Hz

CF Step

200.000 kHz

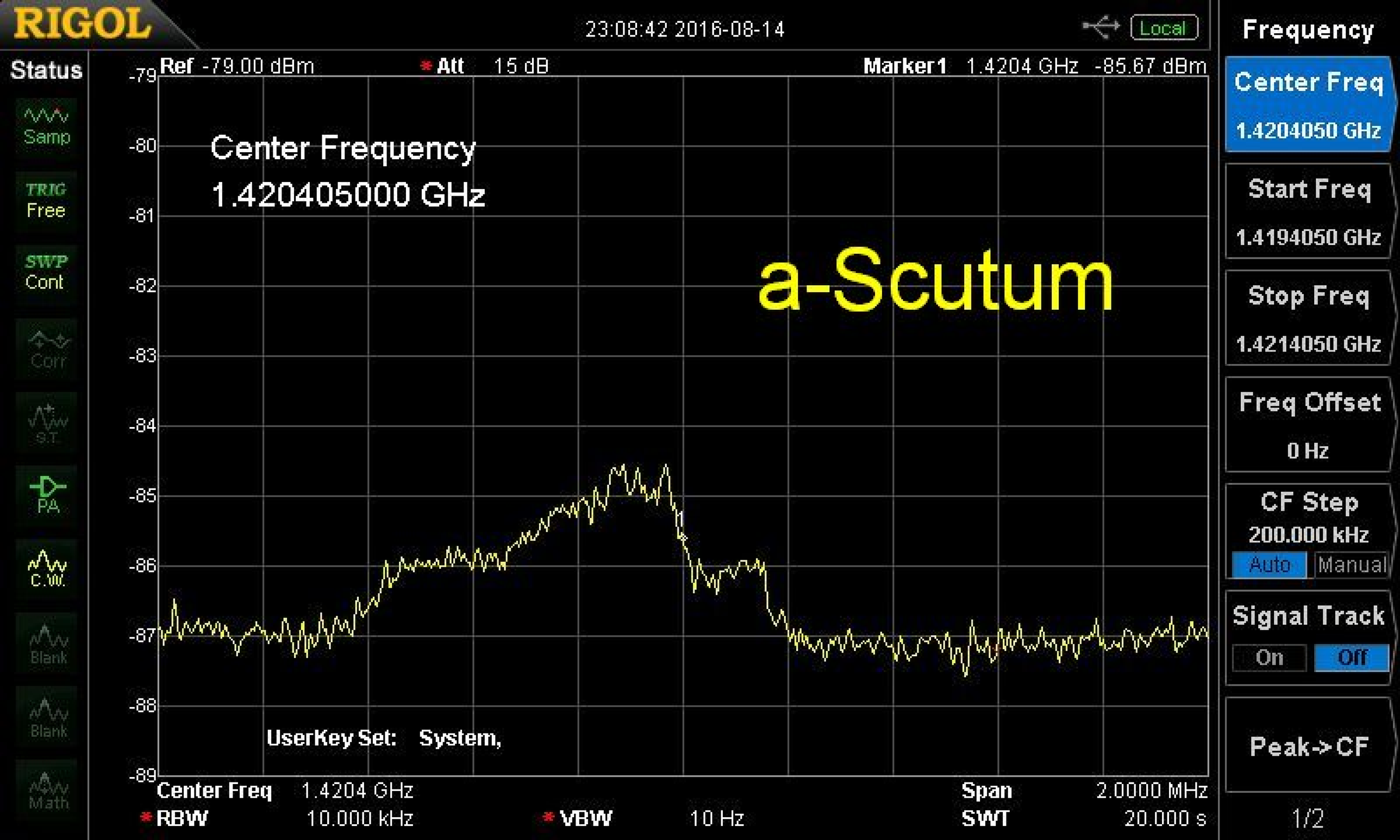
Auto Manual

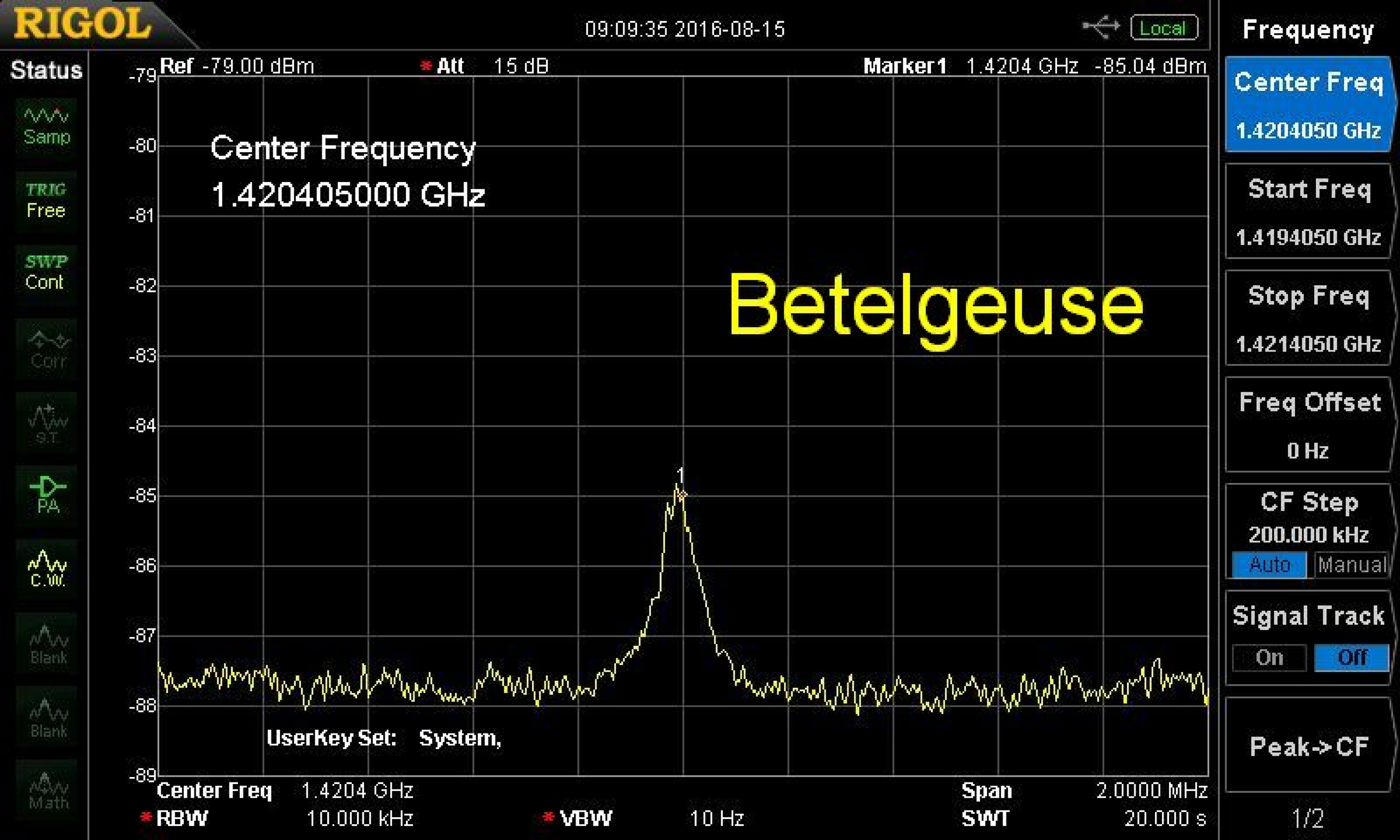
Signal Track

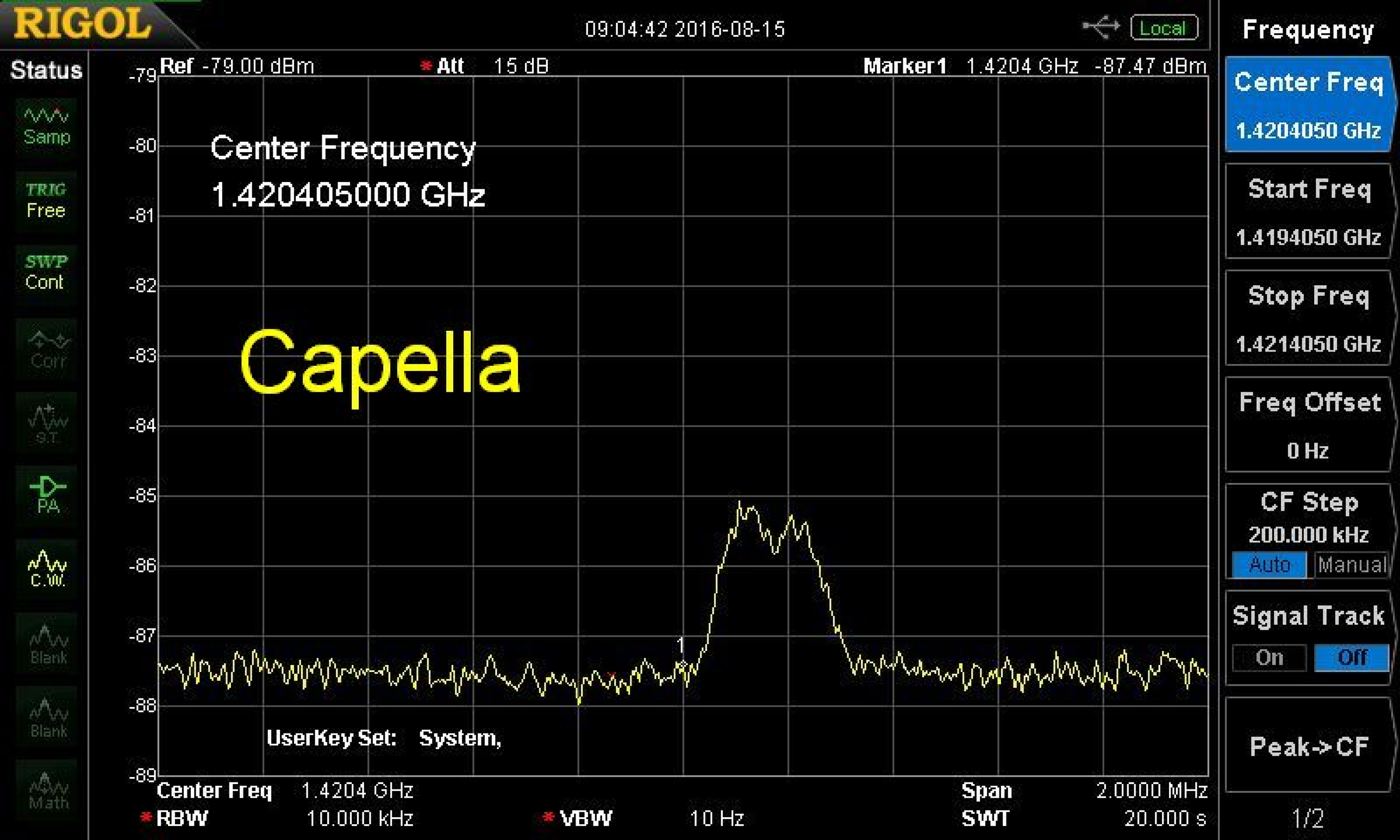
On Off

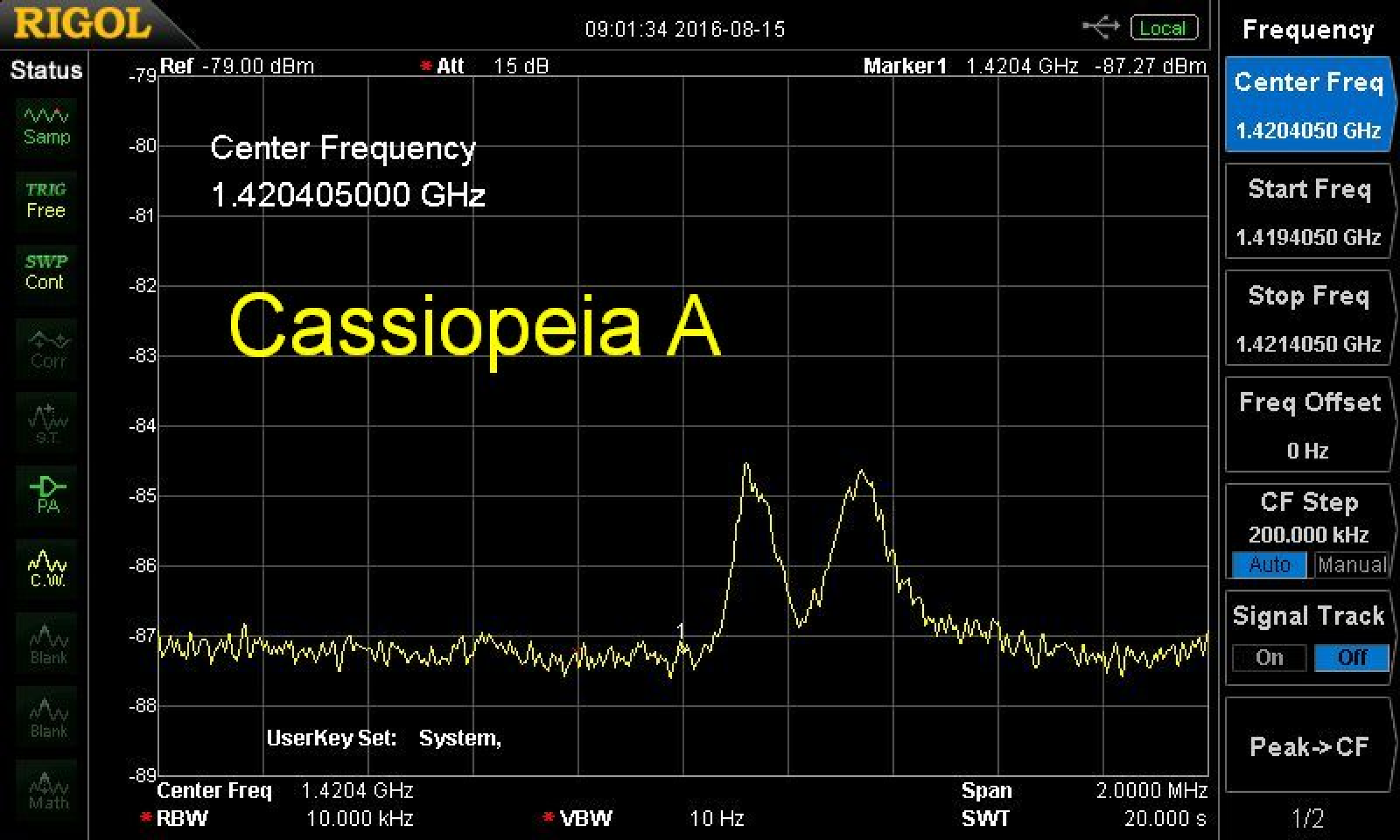
Peak->CF

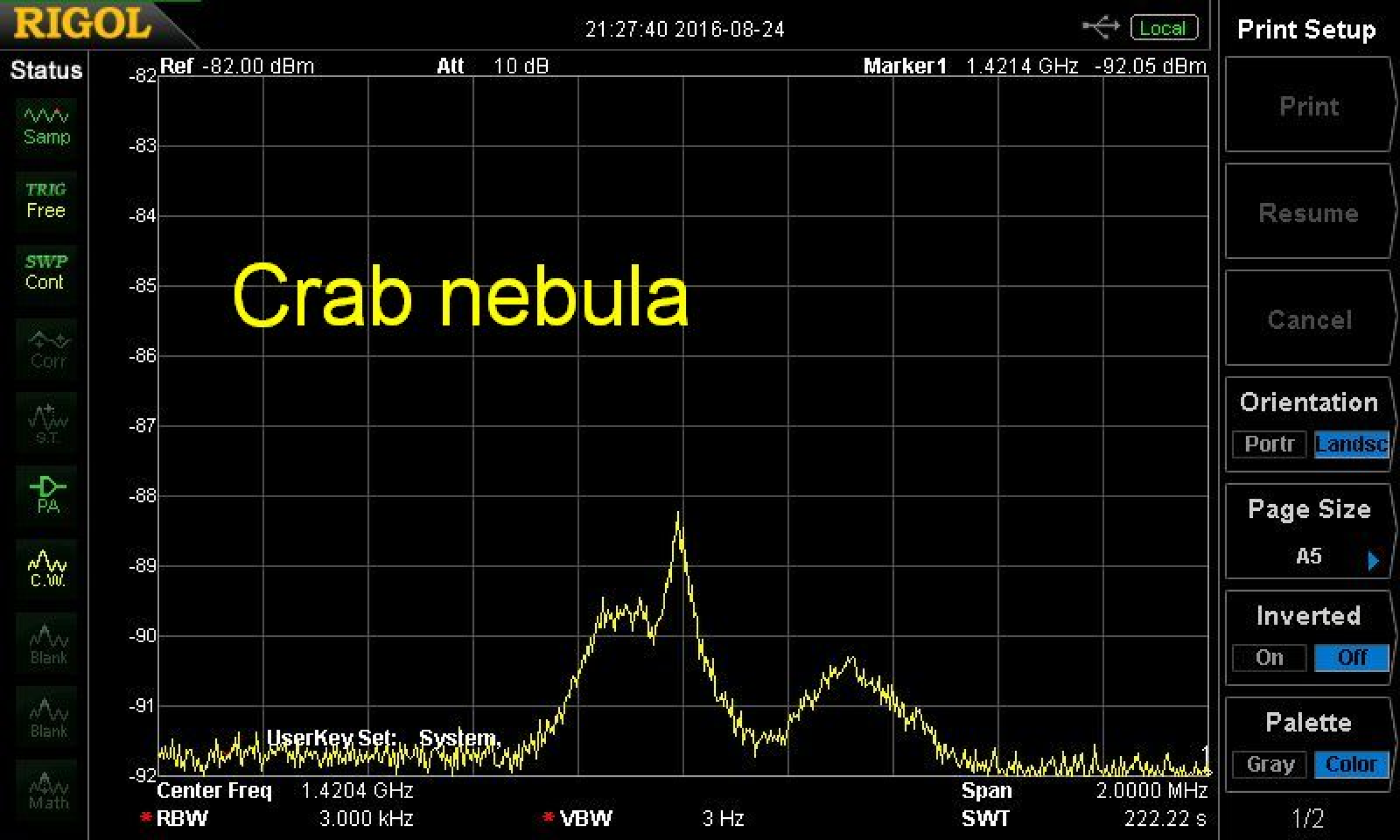
1/2

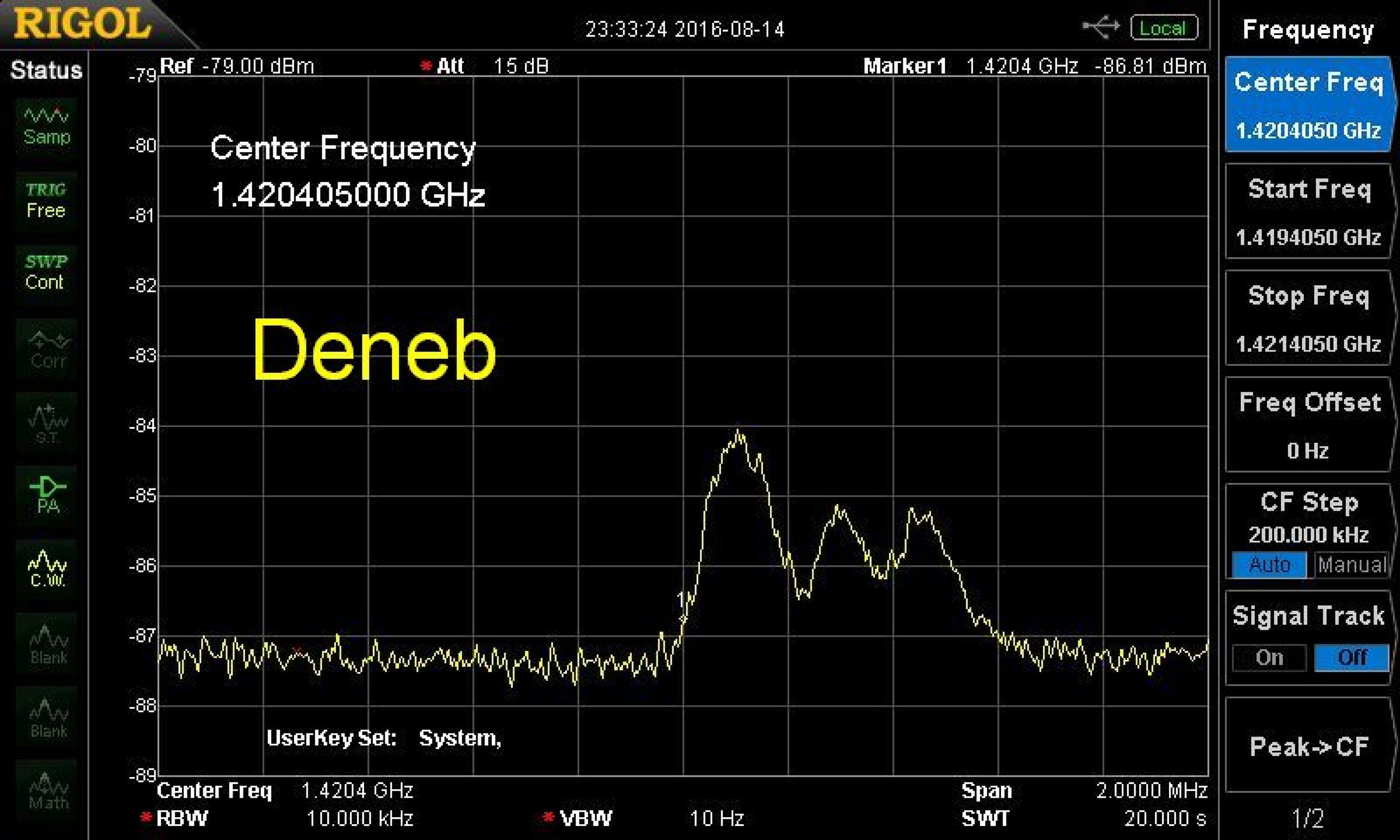

RIGOL
23:08:42 2016-08-14
Local
Status
Samp
TRIG
Free
SWP
Cont
Corr
S.T.
PA
C.W.
Blank
Blank
Math
Ref -79.00 dBm
Att 15 dB
Marker1 1.4204 GHz -85.67 dBm
-79
-80
-81
-82
-83
-84
-85
-86
-87
-88
-89
Center Frequency
1.420405000 GHz
a-Scutum
UserKey Set: System,
Center Freq 1.4204 GHz
Span 2.0000 MHz
RBW 10.000 kHz
VBW 10 Hz
SWT 20.000 s
Frequency
Center Freq
1.4204050 GHz
Start Freq
1.4194050 GHz
Stop Freq
1.4214050 GHz
Freq Offset
0 Hz
CF Step
200.000 kHz
Auto
Manual
Signal Track
On
Off
Peak->CF
1/2

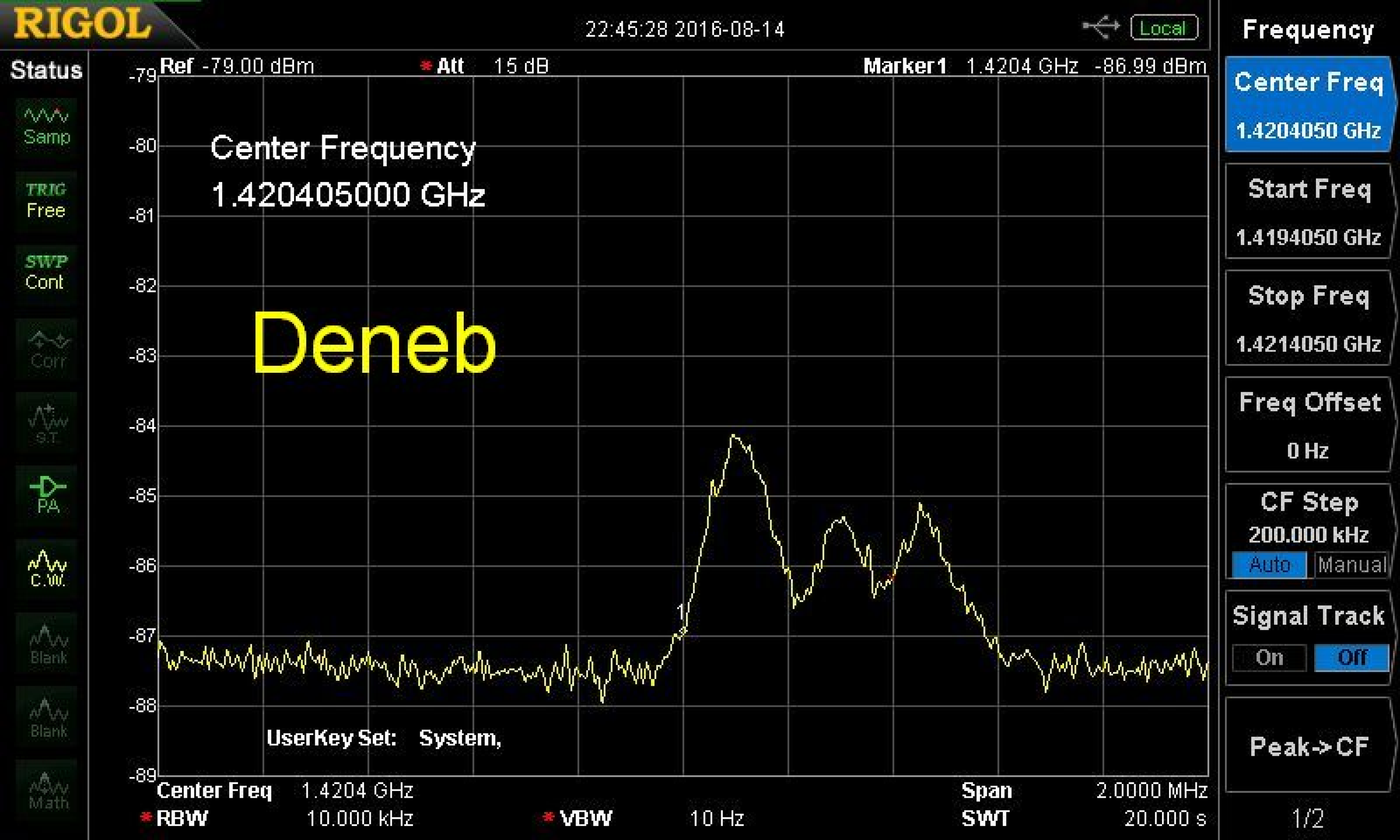

RIGOL
09:09:35 2016-08-15
Local
Status
Samp
TRIG
Free
SWP
Cont
Corr
S.T.
PA
C.W.
Blank
Blank
Math
Ref -79.00 dBm
Att 15 dB
Marker1 1.4204 GHz -85.04 dBm
-79
-80
-81
-82
-83
-84
-85
-86
-87
-88
-89
Center Frequency
1.420405000 GHz
Betelgeuse
1
UserKey Set: System,
Center Freq 1.4204 GHz
Span 2.0000 MHz
RBW 10.000 kHz
VBW 10 Hz
SWT 20.000 s
Frequency
Center Freq
1.4204050 GHz
Start Freq
1.4194050 GHz
Stop Freq
1.4214050 GHz
Freq Offset
0 Hz
CF Step
200.000 kHz
Auto
Manual
Signal Track
On
Off
Peak->CF
1/2


RIGOL
09:04:42 2016-08-15
Local
Status
Samp
TRIG
Free
SWP
Cont
Corr
S.T.
PA
C.W.
Blank
Blank
Math
Ref -79.00 dBm
Att 15 dB
Marker1 1.4204 GHz -87.47 dBm
-79
-80
-81
-82
-83
-84
-85
-86
-87
-88
-89
Center Frequency
1.420405000 GHz
Capella
UserKey Set: System,
Center Freq 1.4204 GHz
Span 2.0000 MHz
RBW 10.000 kHz
VBW 10 Hz
SWT 20.000 s
Frequency
Center Freq
1.4204050 GHz
Start Freq
1.4194050 GHz
Stop Freq
1.4214050 GHz
Freq Offset
0 Hz
CF Step
200.000 kHz
Auto
Manual
Signal Track
On
Off
Peak->CF
1/2


RIGOL
09:01:34 2016-08-15
Local
Status
Samp
TRIG
Free
SWP
Cont
Corr
S.T.
PA
C.W.
Blank
Blank
Math
Ref -79.00 dBm
Att 15 dB
Marker1 1.4204 GHz -87.27 dBm
-79
-80
-81
-82
-83
-84
-85
-86
-87
-88
-89
Center Frequency
1.420405000 GHz
Cassiopeia A
UserKey Set: System,
Center Freq 1.4204 GHz
RBW 10.000 kHz
VBW 10 Hz
Span 2.0000 MHz
SWT 20.000 s
Frequency
Center Freq
1.4204050 GHz
Start Freq
1.4194050 GHz
Stop Freq
1.4214050 GHz
Freq Offset
0 Hz
CF Step
200.000 kHz
Auto
Manual
Signal Track
On
Off
Peak->CF
1/2


RIGOL
21:27:40 2016-08-24
Local
Print Setup
Status
Samp
TRIG
Free
SWP
Cont
Corr
S.T.
PA
C.W.
Blank
Blank
Math
Ref -82.00 dBm
Att 10 dB
Marker1 1.4214 GHz -92.05 dBm
-82
-83
-84
-85
-86
-87
-88
-89
-90
-91
-92
Crab nebula
UserKey Set: System
Center Freq 1.4204 GHz
Span 2.0000 MHz
RBW 3.000 kHz
VBW 3 Hz
SWT 222.22 s
Print
Resume
Cancel
Orientation
Portr
Landsc
Page Size
A5
Inverted
On
Off
Palette
Gray
Color
1/2


RIGOL
23:33:24 2016-08-14
Local
Status
Samp
TRIG
Free
SWP
Cont
Corr
S.T.
PA
C.W.
Blank
Blank
Math
Ref -79.00 dBm
Att 15 dB
Marker1 1.4204 GHz -86.81 dBm
-79
-80
-81
-82
-83
-84
-85
-86
-87
-88
-89
Center Frequency
1.420405000 GHz
Deneb
1
UserKey Set: System,
Center Freq 1.4204 GHz
Span 2.0000 MHz
RBW 10.000 kHz
VBW 10 Hz
SWT 20.000 s
Frequency
Center Freq
1.4204050 GHz
Start Freq
1.4194050 GHz
Stop Freq
1.4214050 GHz
Freq Offset
0 Hz
CF Step
200.000 kHz
Auto
Manual
Signal Track
On
Off
Peak->CF
1/2


RIGOL
22:45:28 2016-08-14
Local
Status
Samp
TRIG
Free
SWP
Cont
Corr
S.T.
PA
C.W.
Blank
Blank
Math
Ref -79.00 dBm
Att 15 dB
Marker1 1.4204 GHz -86.99 dBm
-79
-80
-81
-82
-83
-84
-85
-86
-87
-88
-89
Center Frequency
1.420405000 GHz
Deneb
1
UserKey Set: System,
Center Freq 1.4204 GHz
Span 2.0000 MHz
RBW 10.000 kHz
VBW 10 Hz
SWT 20.000 s
Frequency
Center Freq
1.4204050 GHz
Start Freq
1.4194050 GHz
Stop Freq
1.4214050 GHz
Freq Offset
0 Hz
CF Step
200.000 kHz
Auto
Manual
Signal Track
On
Off
Peak->CF
1/2