

Spurious Emissions Measurements

Radio Training Network, Inc.

W231AO and W271CF Shared Antenna

W231AO is being combined into the existing antenna system that has been used for W271CF since September, 2015. A Shively Labs model 2930 3-pole two station combiner was installed between the 2 transmitters and the antenna feed line input. The TPO for each transmitter was calculated and each transmitter was operated at normal power and modulation.

A Narda 2030A Directional coupler, SN58836, was used to sample the combined RF output of the combiner. An Agilent EAS-A Series E4411B, SN MY41440495 RF Spectrum analyzer was used to measure a 40 MHz span around the 2 translator frequencies. Markers were placed on the 94.1 MHz carrier and the 102.1 MHz carrier. Markers were also set to the most likely intermodulation frequencies of 86.1 MHz (2A-B) and 110.1 MHz (2B-A).

The measured level of 94.1 MHz was -8.17 dBm for 99 watts ERP. The spurious emission attenuation of $43+10*\text{Log}99$ equals -63.0 dB, which would be -71.2 dBm. The measured level of 102.1 MHz was -4.42 dBm for 210 watts ERP. The spurious emission attenuation of $43+10*\text{Log}210$ equals -66.2 dB, which would be -70.6 dBm. The measured level at 86.1 MHz was -79.2 dBm and at 110.1 MHz was -79.5 dBm, well below the requirement of -71.2 dBm.

No signals were seen that exceeded the -71.2 dBm limit. The spectrum was also observed with both transmitters turned off and all the signals seen above -71.2 dBm were associated with other stations operating on this tower site or from nearby sites.

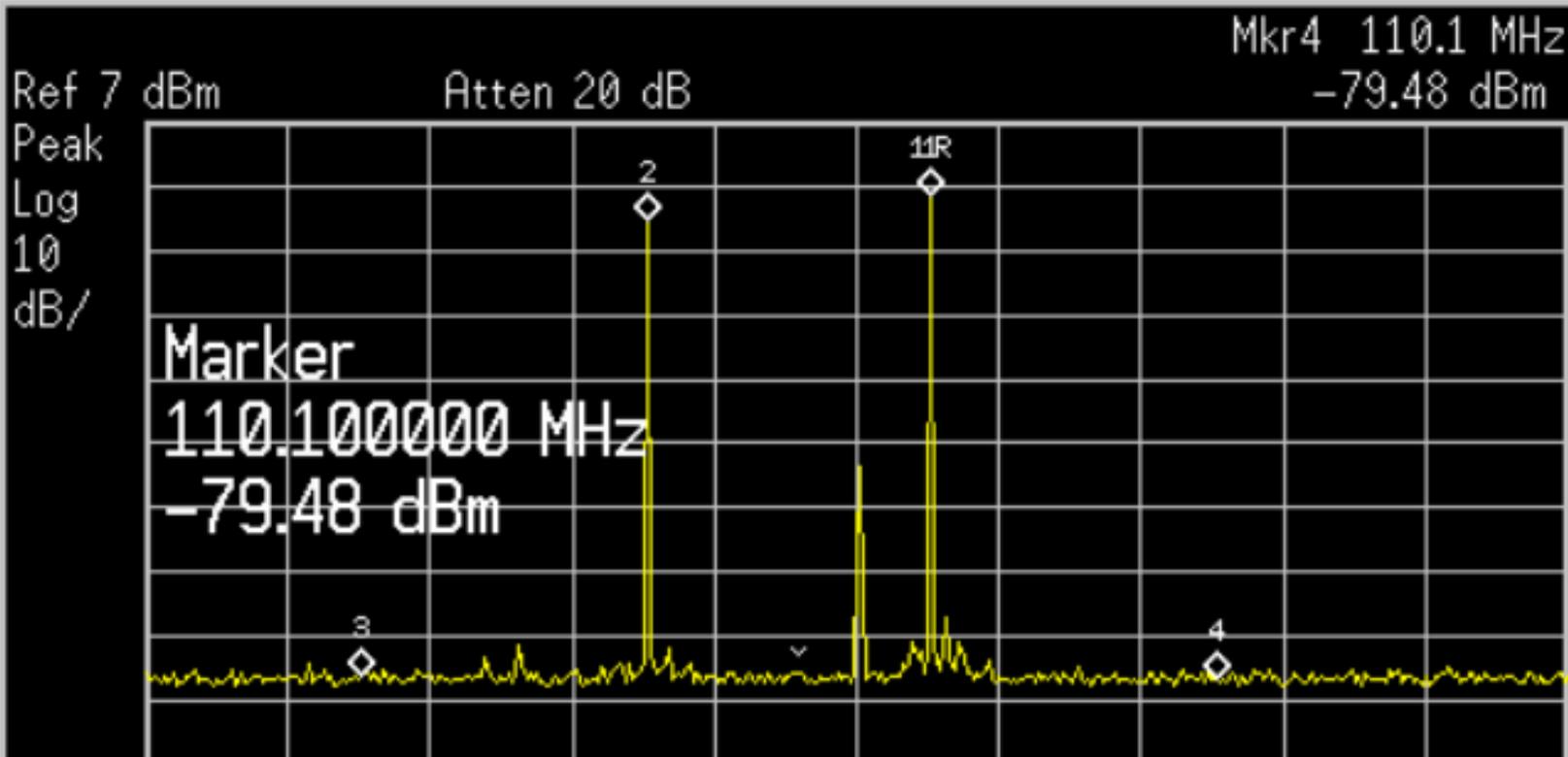
Attached are screen shots of the measurements.

These measurements were made under my direct supervision on July 2, 2018.

Ted McCall



Engineering Director, Radio Training Network, Inc.



Start 80 MHz Stop 120 MHz
 #Res BW 3 kHz VBW 3 kHz Sweep 5.726 s (401 pts)

Marker	Trace	Type	X Axis	Amplitude
1R	(1)	Freq	102.1 MHz	-4.416 dBm
1Δ	(1)	Freq	0 Hz	0.018 dB
2	(1)	Freq	94.1 MHz	-8.169 dBm
3	(1)	Freq	86.1 MHz	-79.19 dBm
4	(1)	Freq	110.1 MHz	-79.48 dBm

Marker

Select Marker

1 2 3 4

Marker Trace

Auto 1 2 3

Readout
 Frequency

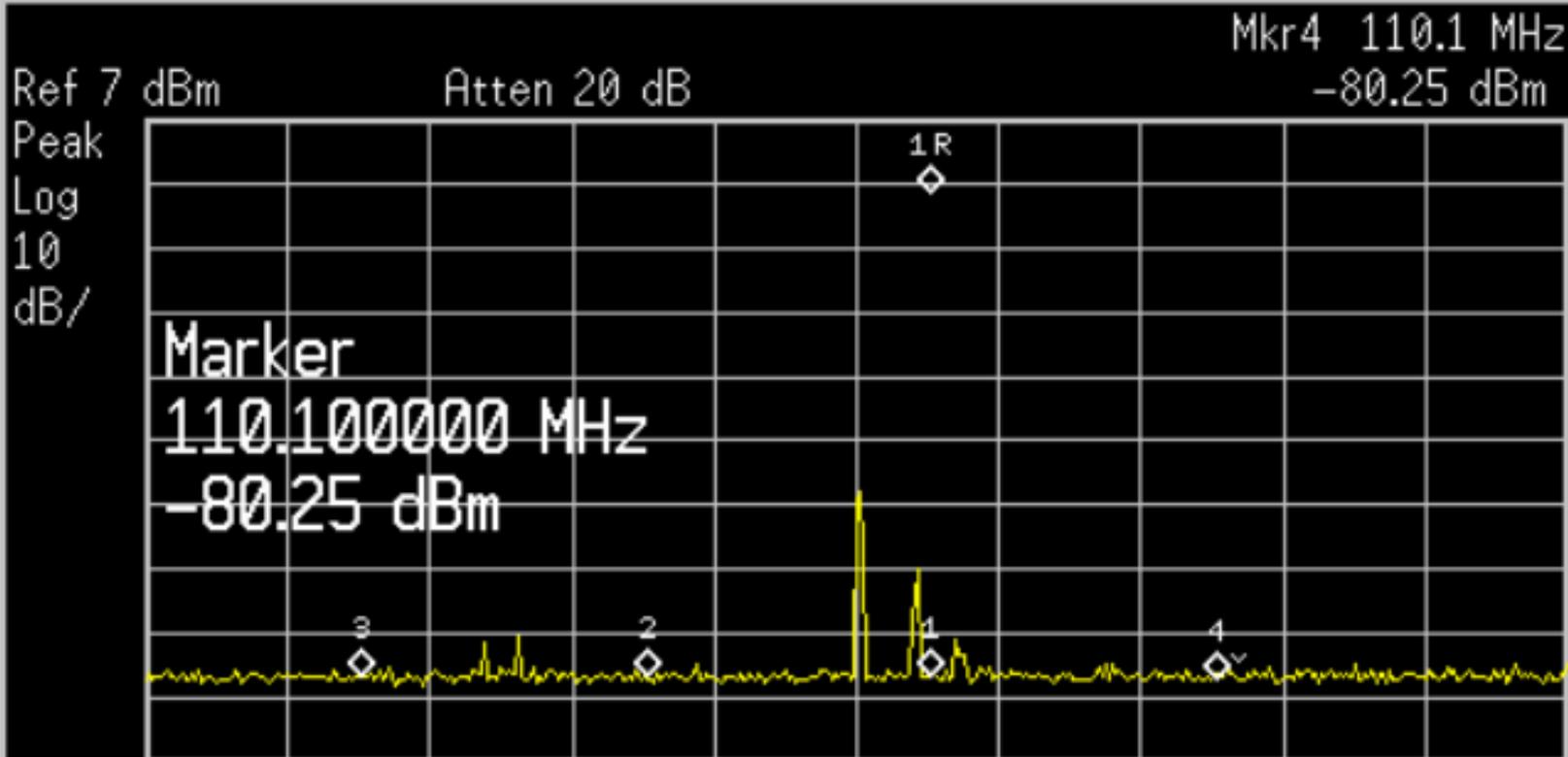
Function
 Off

Marker Table

On Off

Marker All Off

More
 2 of 2



Start 80 MHz Stop 120 MHz
 #Res BW 3 kHz VBW 3 kHz Sweep 5.726 s (401 pts)

Marker	Trace	Type	X Axis	Amplitude
1R	(1)	Freq	102.1 MHz	-4.416 dBm
1Δ	(1)	Freq	0 Hz	-75.12 dB
2	(1)	Freq	94.1 MHz	-79.69 dBm
3	(1)	Freq	86.1 MHz	-79.85 dBm
4	(1)	Freq	110.1 MHz	-80.25 dBm

Marker

Select Marker
 1 2 3 4

Marker Trace
 Auto 1 2 3

Readout
 Frequency

Function
 Off

Marker Table
 On Off

Marker All Off

More
 2 of 2

**Exhibit 12
Form 350**

**Radio Training Network Inc
BPFT-20180117AAN
Fac ID 149991**

**W231AO
Columbus, GA**

Calculation Of Transmitter Output Power

System ERP 0.099 Kwatts

Antenna Make	Scala
Antenna Model	TWO CL-FM Slant
No of Bays	1
Antenna Power Gain	1.41 1.5 db
Antenna Input Power	0.070 Kwatts

Main Feed Line Type	RSF 7/8
Line Length (Ft)	362
Line loss per 100 ft (DB)	0.388
Line loss (DB)	1.405

Inside Jumper	RFS 1/2
Line Type	RFS 1/2
Line Length (Ft)	9
Line loss per 100 ft (DB)	0.665
Line loss (DB)	0.060

Other System Losses

Polyphaser (db)	0.1
Combiner Loss	1.04

Total System Losses (db)	2.604
Feed System Effy	0.549

Transmitter Power Output 0.128 Kwatts