

**Occupied Bandwidth Measurements
(FCC Rule 73.317)**

KLTH

Common Antenna and Combiner System

Sylvan Tower, Portland, Oregon

April 7, 2010

On April 7th, 2010, Boyd Broadcast Technical Services made measurements of KLTH (106.7 MHz), Lake Oswego, Oregon, to show compliance with FCC Rule 73.317. The measurements described here were made following the addition of KLTH to this combiner and master antenna. All stations at the site were operating with their authorized facilities at the time of the measurements. KLTH is one of four FM broadcast stations operating from a common antenna and combining system at the Sylvan tower facility in Portland, Oregon. The other stations are KINK (101.9 MHz), Portland, Oregon, KUFO (101.1 MHz), Portland, Oregon, and KXJM (107.5 MHz), Banks, Oregon.

Other stations operate from this same tower site. Three non-commercial FM stations are combined into a common antenna at a lower elevation on this same tower. They are KBVM (88.3 MHz), Portland, Oregon, KMHD (89.1 MHz), Gresham, Oregon, and KQAC (89.9 MHz), Portland, Oregon. The site also has a tower immediately adjacent (approximately 40 feet away) to the KLTH facility. There is one FM broadcast station operating from a common antenna on this adjacent tower. It is KUPL (98.7 MHz), Portland, Oregon. A low power FM translator is located at the site. It is K240CZ, (95.9 MHz) Tigard, Oregon.

Also co-located at the site, are five television stations. They are KRCW-LP, Channel 5, Portland, Oregon, KNMT, Channel 45, Portland, Oregon, KRCW-TV, Channel 33, Salem, Oregon, KOIN, Channel 40, Portland, Oregon, and KATU, Channel 43, Portland, Oregon.

In addition several other sites are near (within 5 km) the Sylvan site with other FM and TV broadcast transmitters.

All measurements were made at a forward port of a Dielectric directional coupler located in line following the multi-station combining system and prior to the facility's common antenna system. This directional coupler exhibits the usual 6 dB per octave rise in response.

Coaxial attenuators were inserted ahead of the Agilent E4402B spectrum analyzer (Serial Number MY44221068), which was used for the measurements. A total of 20 dB of external attenuation was used to make reference measurements of KLTH. The amplitude calibration of the instrument was electronically adjusted to account for this attenuation.

This attenuation was removed for all other measurements. This reduction in the amount of attenuation provides the necessary dynamic range for the spectrum analyzer to observe any spurious signals. Also double cavity notch filters, one for KLTH, one for KUFO, one for KXJM and one for KINK, were inserted in cascade following the attenuators and ahead of the spectrum analyzer to prevent signal overload and subsequent erroneous intermodulation products. The amplitude versus frequency response of these filters is shown on pages 3 and 4 of this report.

The filters, Model 6367-2, are manufactured by Microwave Filter Company, Inc. Attenuators are precision devices manufactured by Coaxial Dynamics. All cables are constructed of high quality, 100% shielded coaxial cable with premium connectors. Adapter connectors used are also premium quality. A block diagram of the measurement setup is shown on page 10 and a photograph of the test setup is shown on page 11.

Signals measured by the Agilent E4402B spectrum analyzer are digitized in the analyzer. Data was collected for a period of time using the instrument's peak-hold feature. The data for the reference plots was collected over an approximate 10 minute period. Other measurements were collected for several minutes each. This was done to observe possible short duration signals.

Data from these plots was saved in the analyzer's hard drive, then converted to .GIF files and downloaded into a computer for viewing and analysis (and to provide the plots shown in this report). The Agilent analyzer collected 401 data points over the instrument's selected frequency span for these measurements.

A reference plot for KLTH is shown on page 5. With notch filters for all four stations in line to the spectrum analyzer, the FM band and the spectrum from 30 MHz through 1100 MHz was examined. Data plots of the observed spectrum are shown on pages 5 through 9.

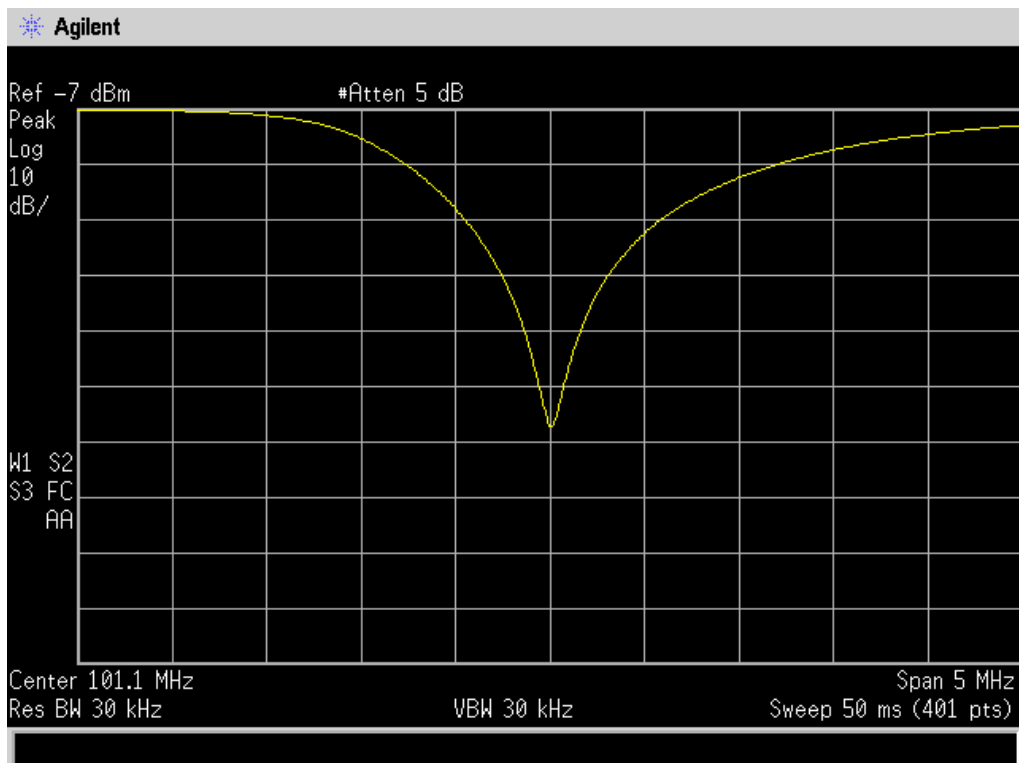
A number of signals were observed. All of these signals were identified. The signals observed were from other broadcast stations at this site and other nearby sites and are believed to be coming back down the transmission line from the common antenna. **No harmonic emissions or other spurious emissions from KLTH at levels less than 80 dB below the fundamental carrier frequency were observed.** It is believed that KLTH is in full compliance with section 73.317 of the commission's rules. A copy of the pertinent sections of this rule can be found on page 12.

All information contained in this report was gathered by James E. Boyd, who has experience making these kinds of measurements and whose qualifications are a matter of record with the Federal Communications Commission.

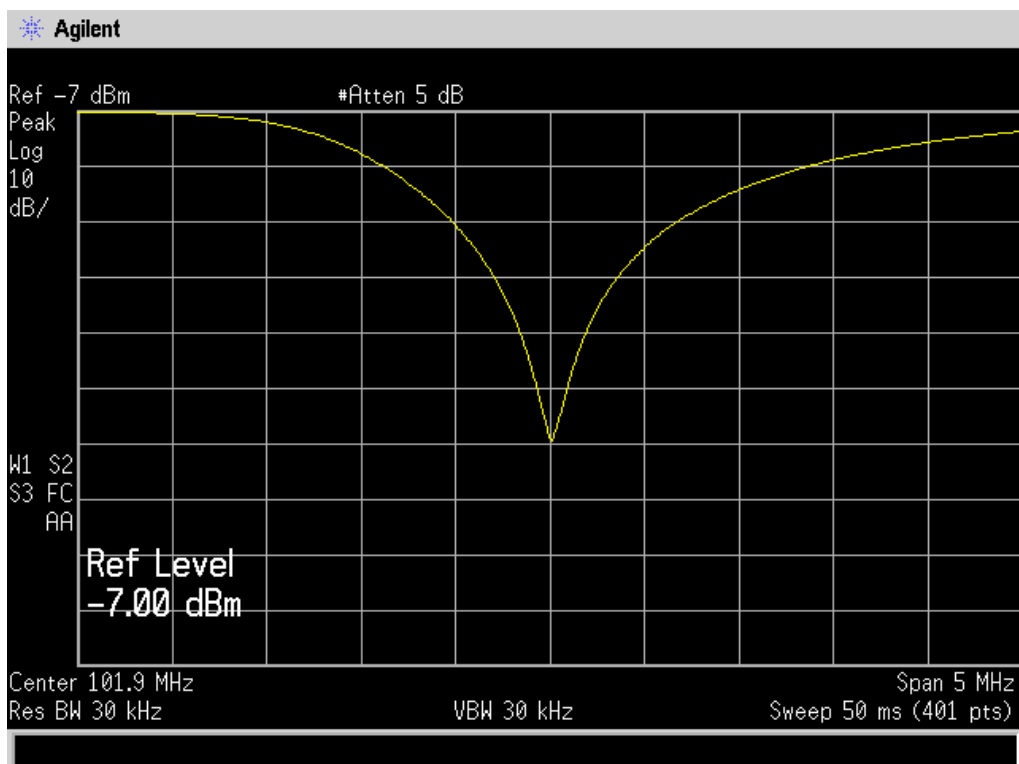
Respectfully Submitted,

A handwritten signature in black ink, appearing to read 'J.E. Boyd', with a long horizontal line extending to the right.

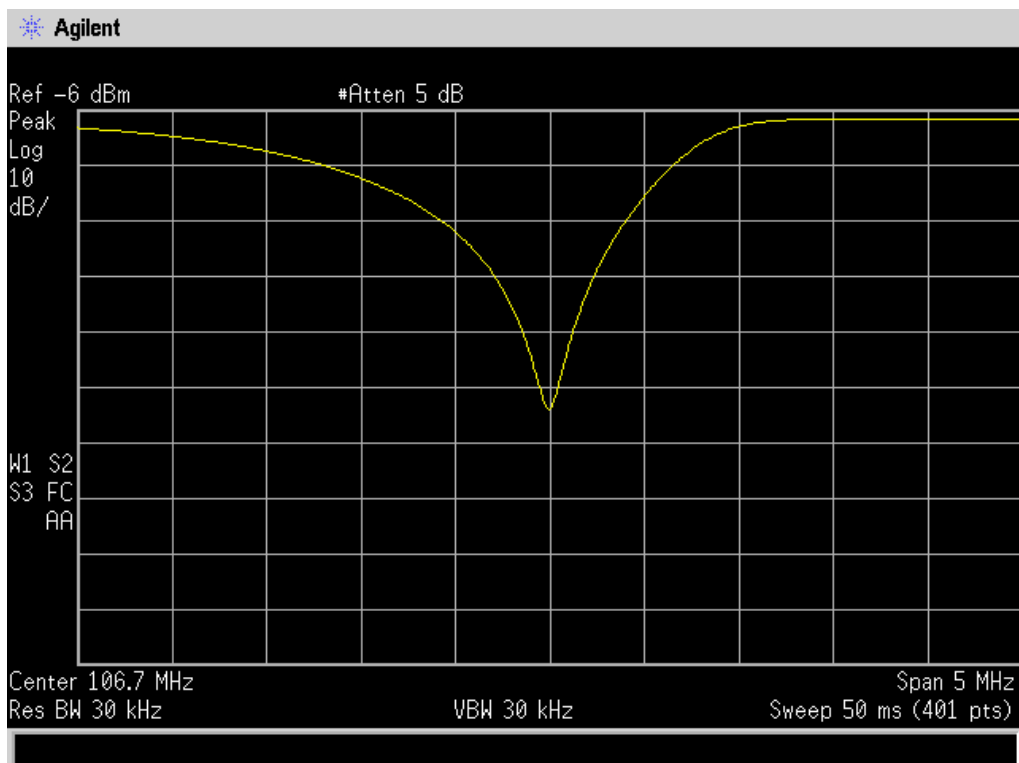
James E. Boyd
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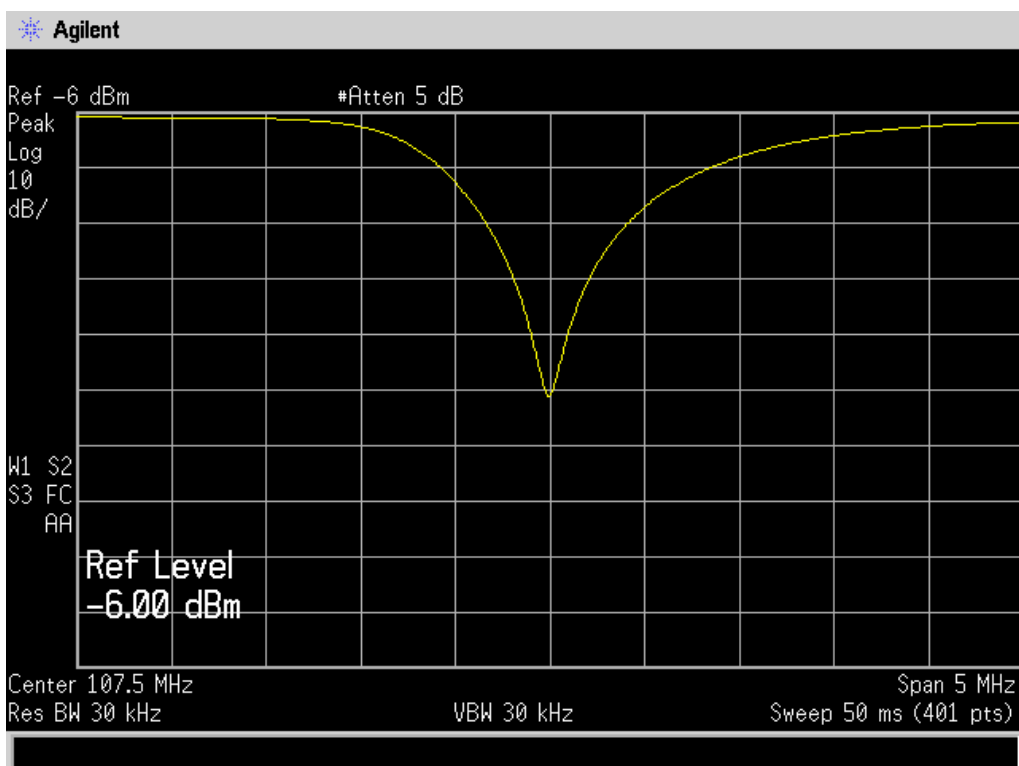
101.1 MHz Notch Filter



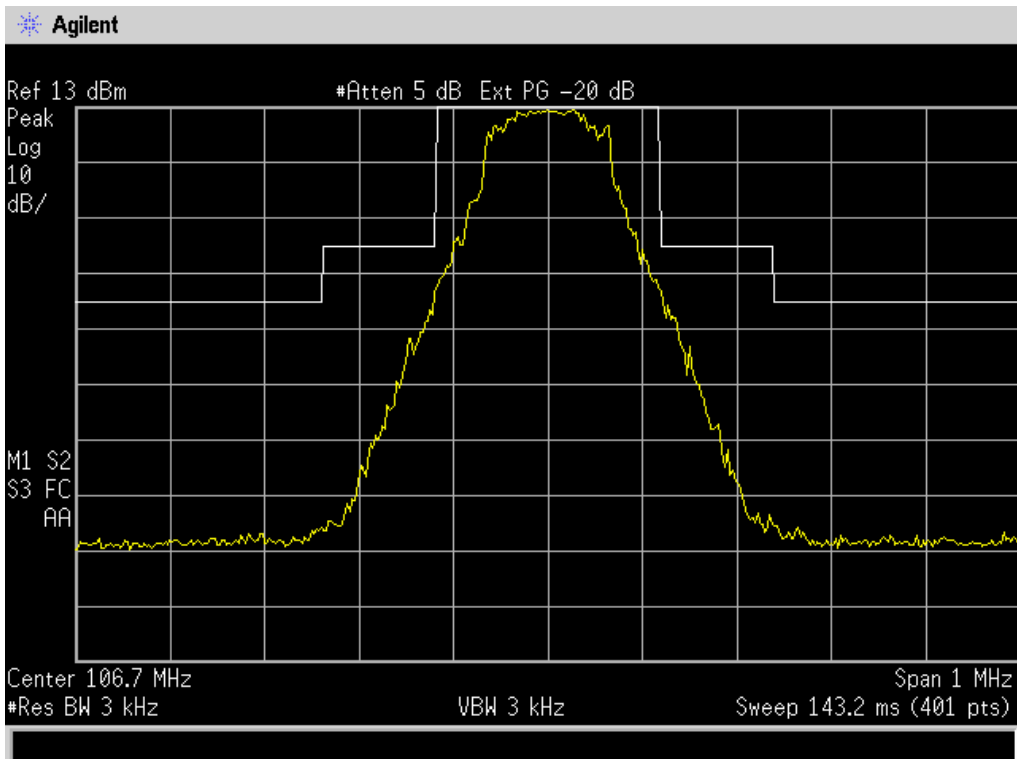
101.9 MHz Notch Filter



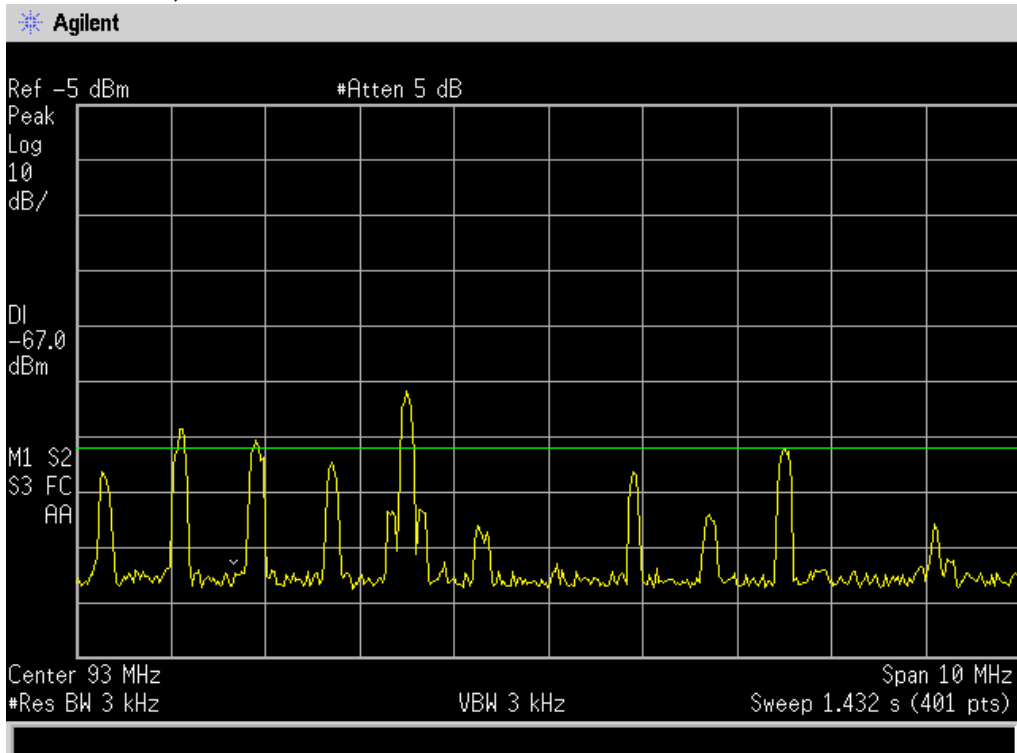
106.7 MHz Notch Filter



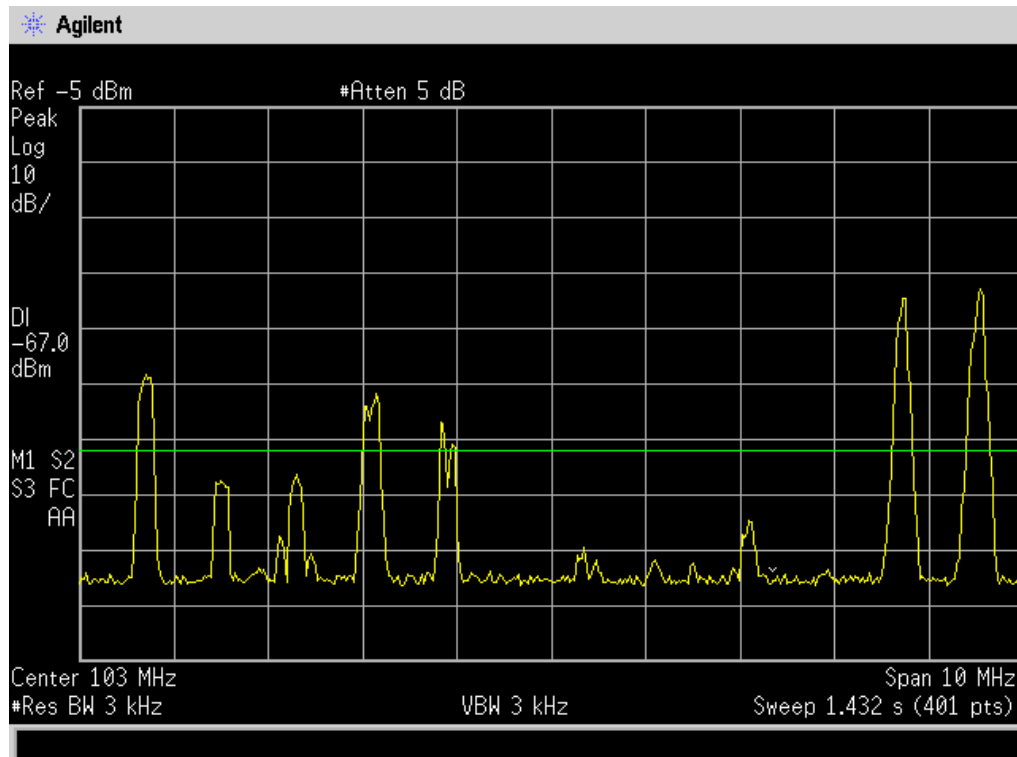
107.5 MHz Notch Filter



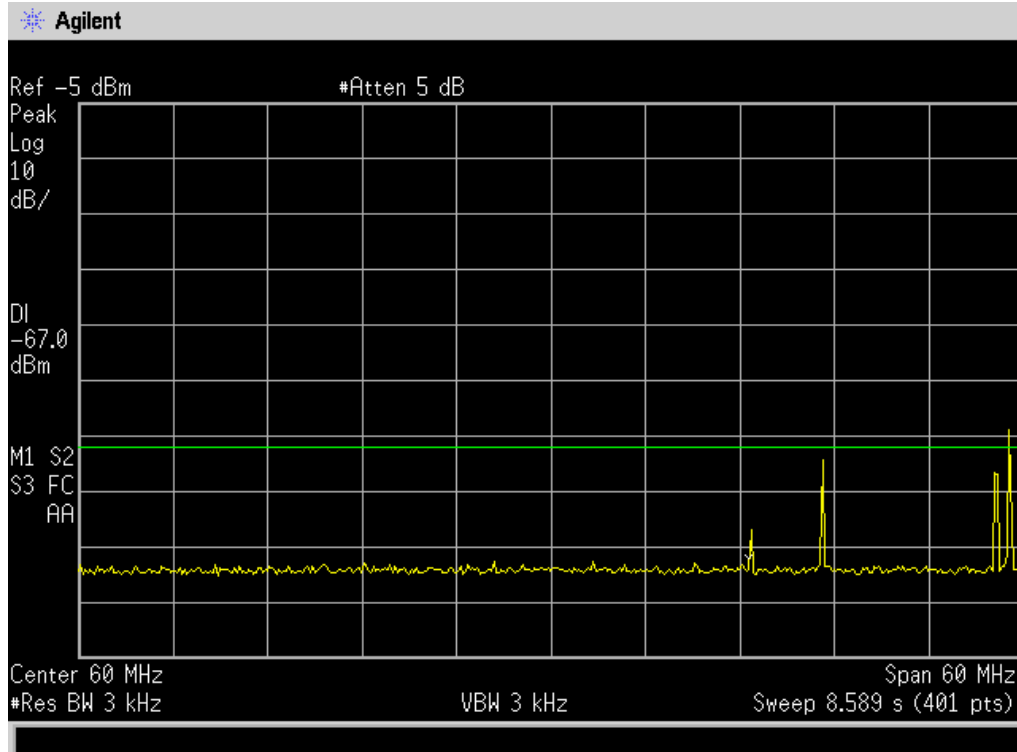
106.7 MHz, KLTH Reference Plot -- Reference carrier level +13 dBm



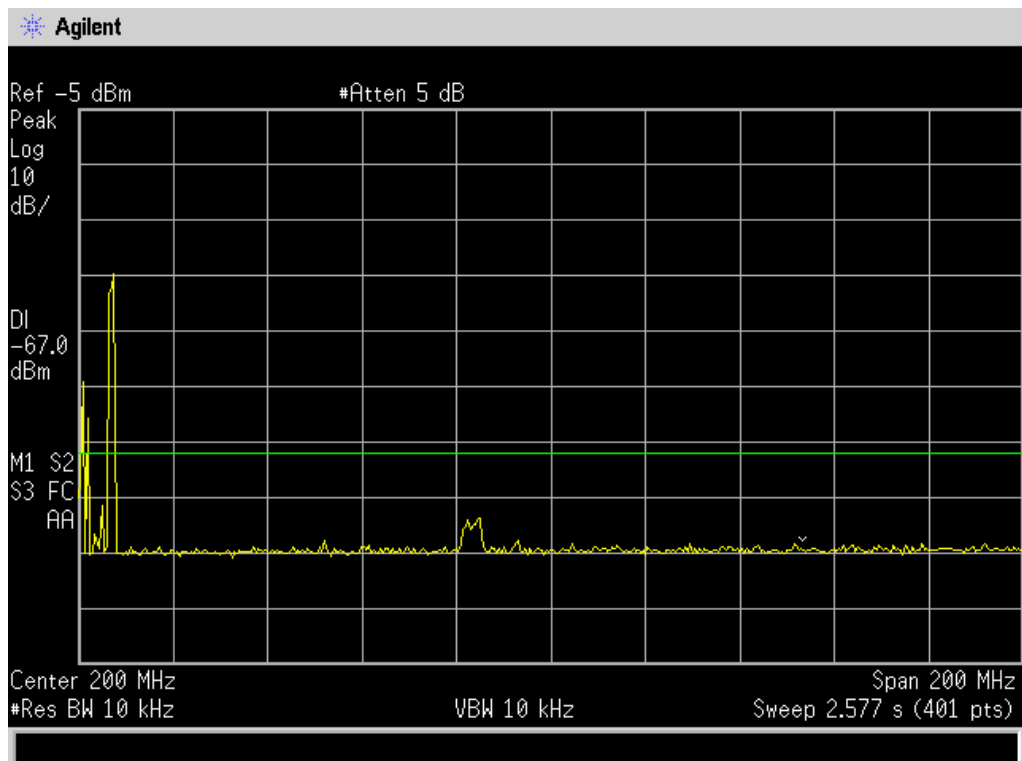
FM Broadcast Band from 88 to 98 MHz -- The signals from left to right are 88.3 MHz KBVM, 89.1 MHz KMHD and 89.9 MHz KQAC, all on site and on this tower, 90.7 MHz KBOO, 91.5 MHz KOPB, 92.3 MHz KGON, 93.9 MHz KPDQ, 94.7 MHz KNRK, 95.5 MHz KXTG and 97.1 MHz KYCH, all at nearby sites.



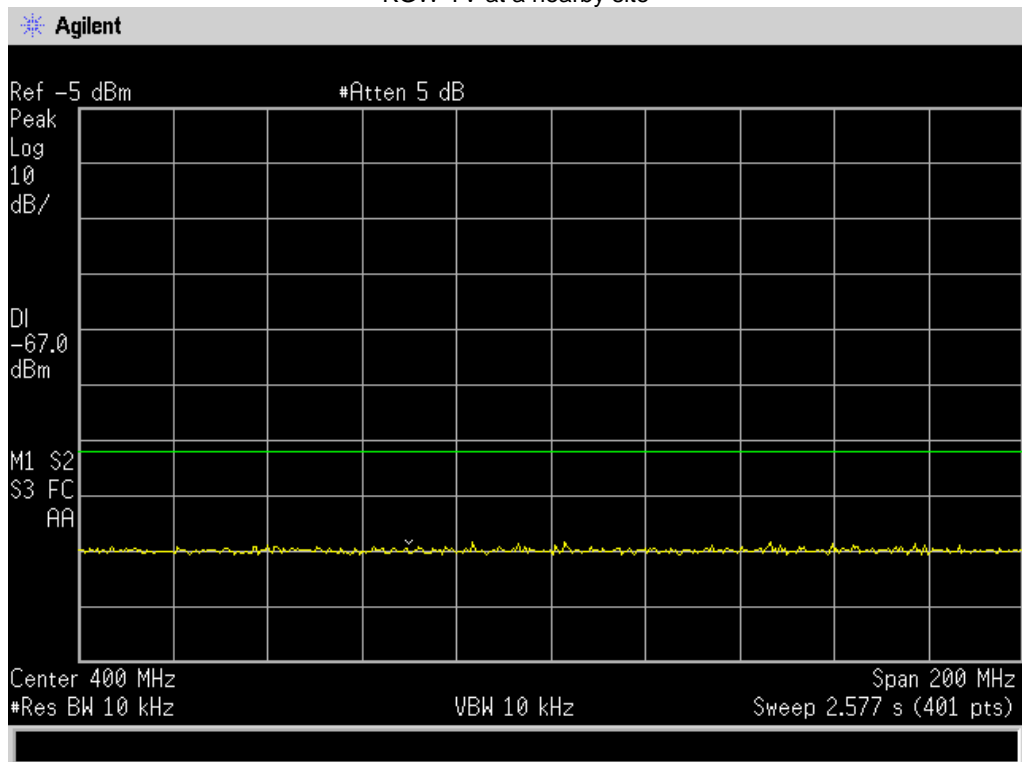
FM Broadcast Band from 98 to 108 MHz -- From left to right the signals identified are 98.7 MHz KUPL, on site at an adjacent tower, 99.5 MHz KWJJ at a nearby site, 100.3 MHz KKRZ, at a nearby site, 101.1 MHz KUFO and 101.9 MHz KINK, both into this same combiner and antenna, 103.3 MHz KKCW, 104.1 MHz KFIS, K283BL 104.5 MHz (a translator), 105.1 MHz KRSK, and 105.9 MHz KFBW, all at nearby sites, 106.7 MHz KLTH, the station being studied in this report and 107.5 MHz KXJM, both into this same combiner and antenna.



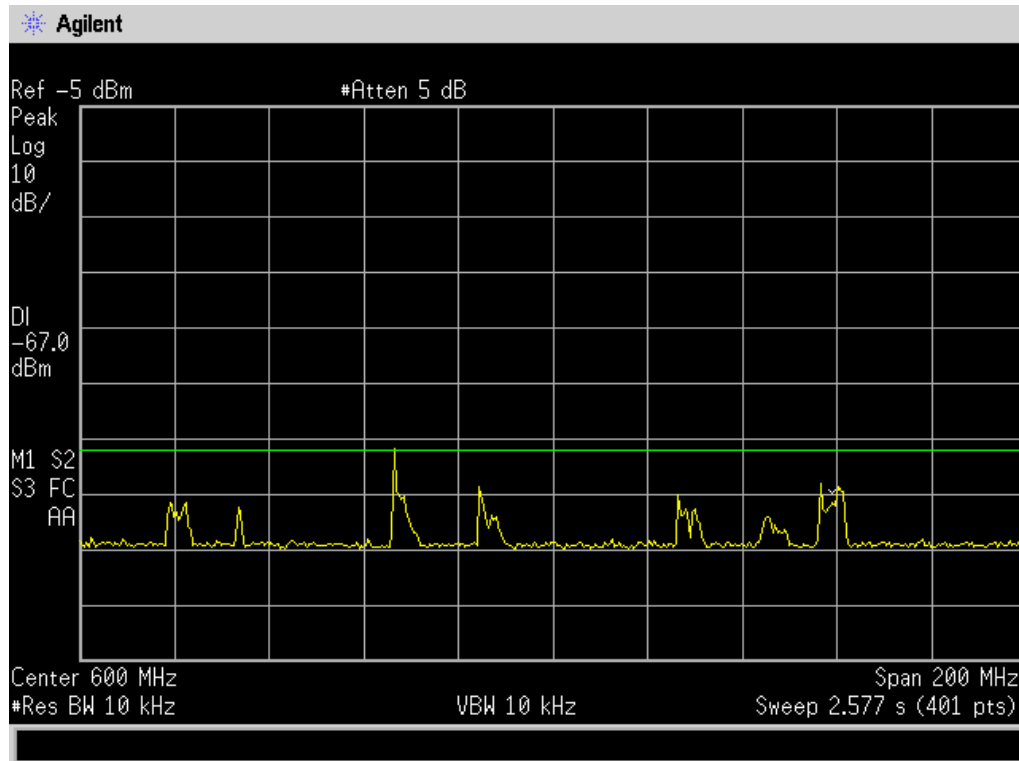
The signals at approximately 66 MHz and 76 MHz are KPXG-TV Ch. 4, at a nearby site, and KRCW-LP Ch. 5, on this tower, and the signals near 90 MHz are signals previously identified at the bottom edge of the FM Broadcast Band.



100 to 300 MHz -- Signals at far left are 106.7 MHz and 107.5 MHz. The signal at approximately 180 MHz is KGW-TV at a nearby site

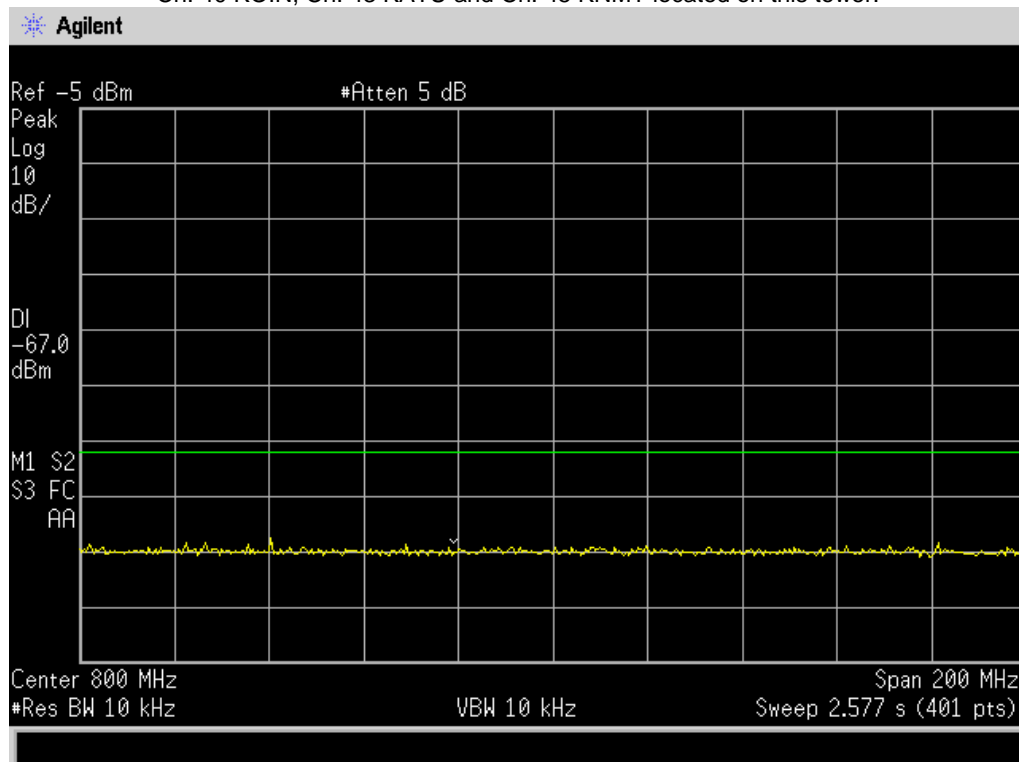


300 to 500 MHz

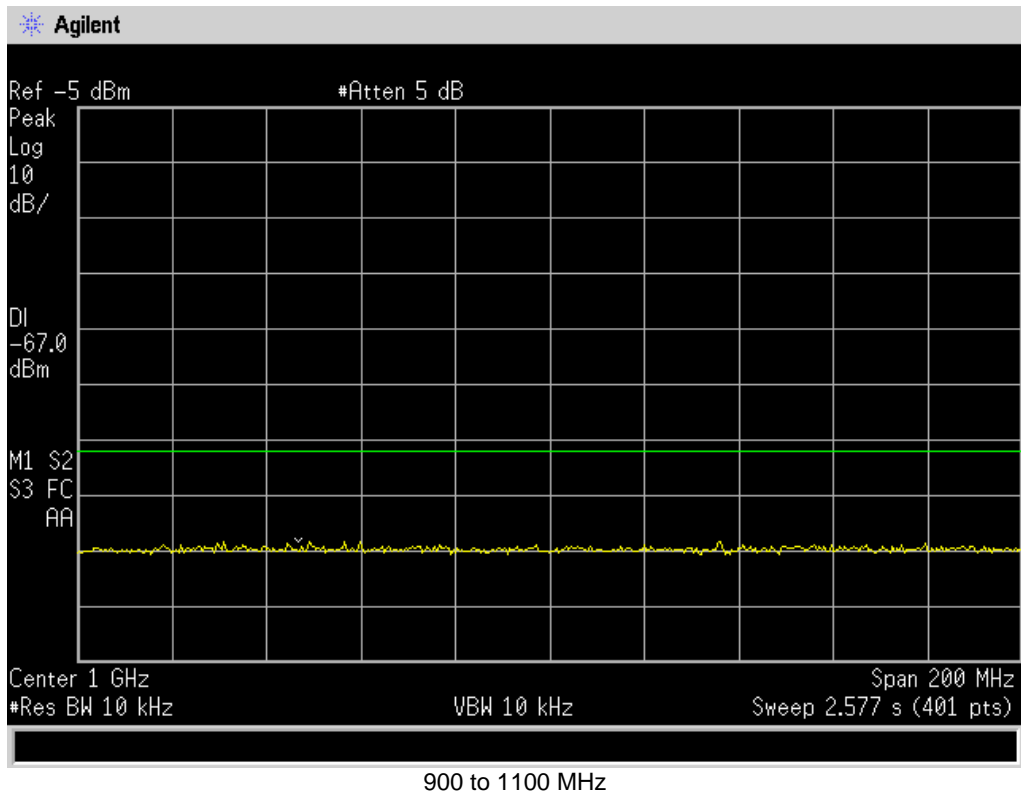


500 to 700 MHz

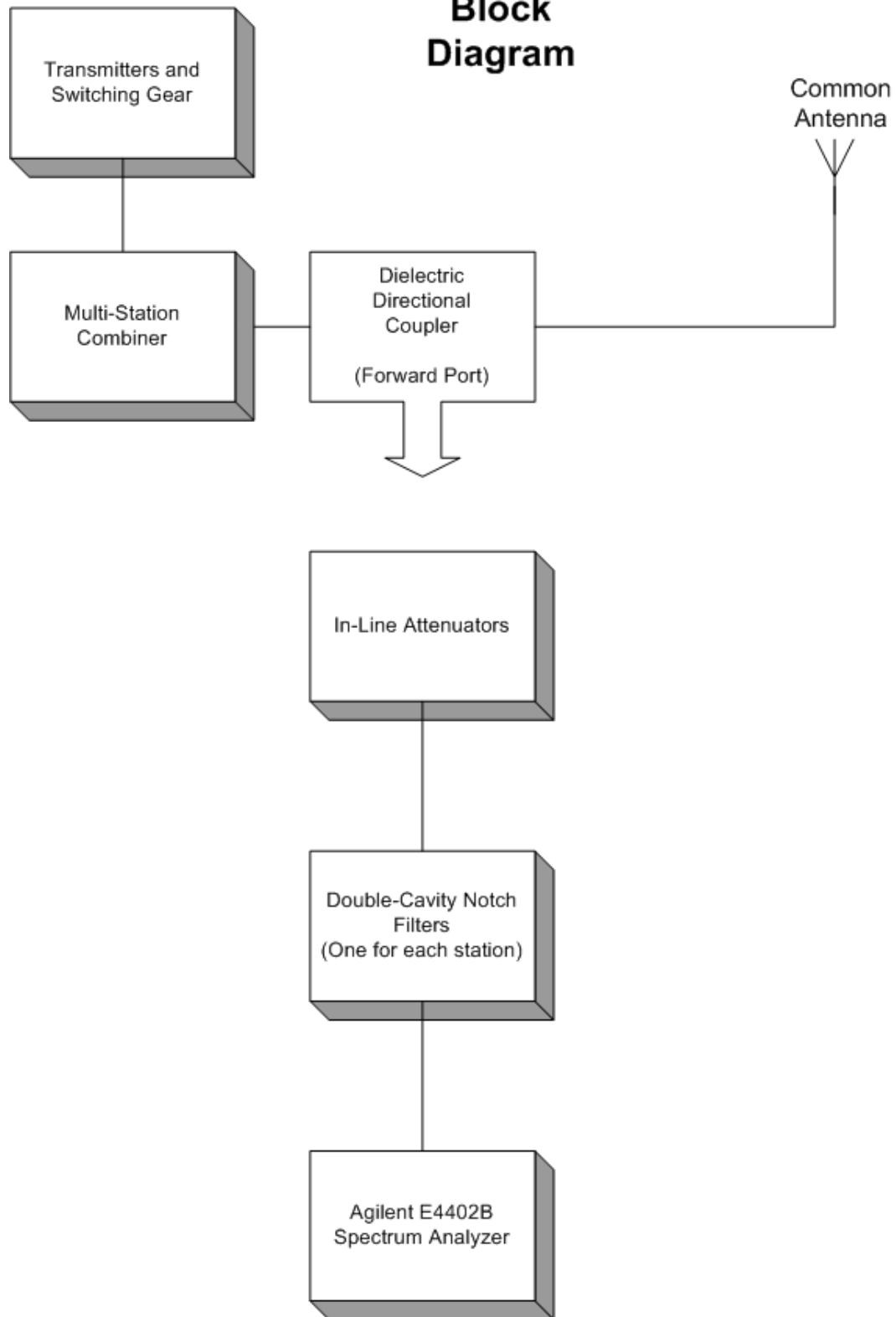
The signals from left to right are Ch. 22 KPXG, Ch. 24 KKEI-CA, Ch 30 KPDX, at sites nearby, Ch. 33 KRCW, Ch. 40 KOIN, Ch. 43 KATU and Ch. 45 KNMT located on this tower.



700 to 900 MHz



Equipment Block Diagram





Test Setup

73.317 FM TRANSMISSION SYSTEM REQUIREMENTS

- (a) FM broadcast stations employing transmitters authorized after January 1, 1960, must maintain the bandwidth occupied by their emissions in accordance with the specification detailed below. FM broadcast stations employing transmitters installed or type accepted before January 1, 1960, must achieve the highest degree of compliance with these specifications practicable with their existing equipment. In either case, should harmful interference to other authorized stations occur, the licensee shall correct the problem promptly or cease operation.
- (b) Any emission appearing on a frequency removed from the carrier by between 120 kHz and 240 kHz inclusive must be attenuated 25 dB below the level of the unmodulated carrier. Compliance with this requirement will be deemed to show the occupied bandwidth to be 240 kHz or less.
- (c) Any emission appearing on a frequency removed from the carrier by more than 240 kHz and up to and including 600 kHz must be attenuated at least 35 dB below the level of the unmodulated carrier.
- (d) Any emission appearing on a frequency removed the carrier by more than 600 kHz must be attenuated at $43 + 10\log(\text{Power in watts})$ dB below the level of the unmodulated carrier, or 80 dB, whichever is the lesser attenuation.