



*From the desk of Lonnie England C.E.*

Director Of Engineering  
Saddlerock Professional Services  
981 Crawford Ave  
Wenatchee, WA 98801  
Office: 509-888-5072  
Mobile: 509-860-5485  
E-Mail: saddlerockpro@gmail.com

May 30, 2018

RE: K243CD FAC:155536 FILE: BNPFT-20150521ABN (Brewster, WA) 96.5FM

On Monday May 14, 2018 I, Lonnie England CPBE, went to Billy Goat Mtn, Okanogan County, Washington to satisfy the THREE special conditions on FCC Construction Permit BNPFT-20150521ABN Fac ID 155536, for FM translator station K243CD INPUT: KDMB CH:204 88.7 Moses Lake, Washington by request of John Habberman of Divine Mercy Boascasting. Unfortunately the site/road was not passable, so we re-scheduled and made the trip to the site Tuesday May 29, 2018. I met John Saddleman from the Okanogan TV District there who followed thru reducing the TV dist transmitter levels while we installed equipment and performed the required tests.

FCC Type Accepted Broadcast Equipment per CFR 47 Parts 73.1660 and 74.1250

Transmitter= BW Broadcast TX-50 V2 FCC ID: TUO TX25-50

Antenna Specified in CP= Shively Labs 6812B with heater/de-icing, mounted on EAST face of TRI-Mast self-supporting tower FCC ID: 121465 System GAIN/LOSS= -3.39dB

Extra Protective Equipment installed per NCW Communications Engineering Group for use of this communications facility to prevent any possible interference to existing VHF-HI Televisions Services:

EMR-FM4350/L 96.5 Mhz (.15dB insertion Loss)

Telewave T-1030 Ferrite Isolator 96.5 Mhz (-.65dB insertion Loss)

Transmission line is 100' of Andrew LDF-4-50A 1/2" Heliax (-.653dB insertion Loss)

Transmission Line Connectors: 2-Commscope L4TNM-PSA (-.10dB insertion Loss)

TOTAL System Gain/Loss = LOSS= -4.943dB

TPO Setting = 31Watts (10watts ERP) + 4.943dB = 31.21045 watts TPO

TPO setting is at 31Watts which equals 9.93258 watts ERP per polarity= 99.3258% power is within the FCC rules of 90% to 110% ERP operating requirements.

Transmitter settings: 75uS pre-emphasis, DEV Limiter=72kHz,  
Transmitter RF Mute on silence = ON Transmitter=MONO (NO PILOT's)

Broadcast antenna is NOT shared with any other transmitter.

Test Equipment used:

Tektronics 492 Spectrum Analyzer (calibrated 2/16/2018)

Inovonics Digital FM Modulation Analyzer 531 (calibrated 2/05/2018)

CMC 440015 Directional Coupler -30dB last verified (2/16/2018)

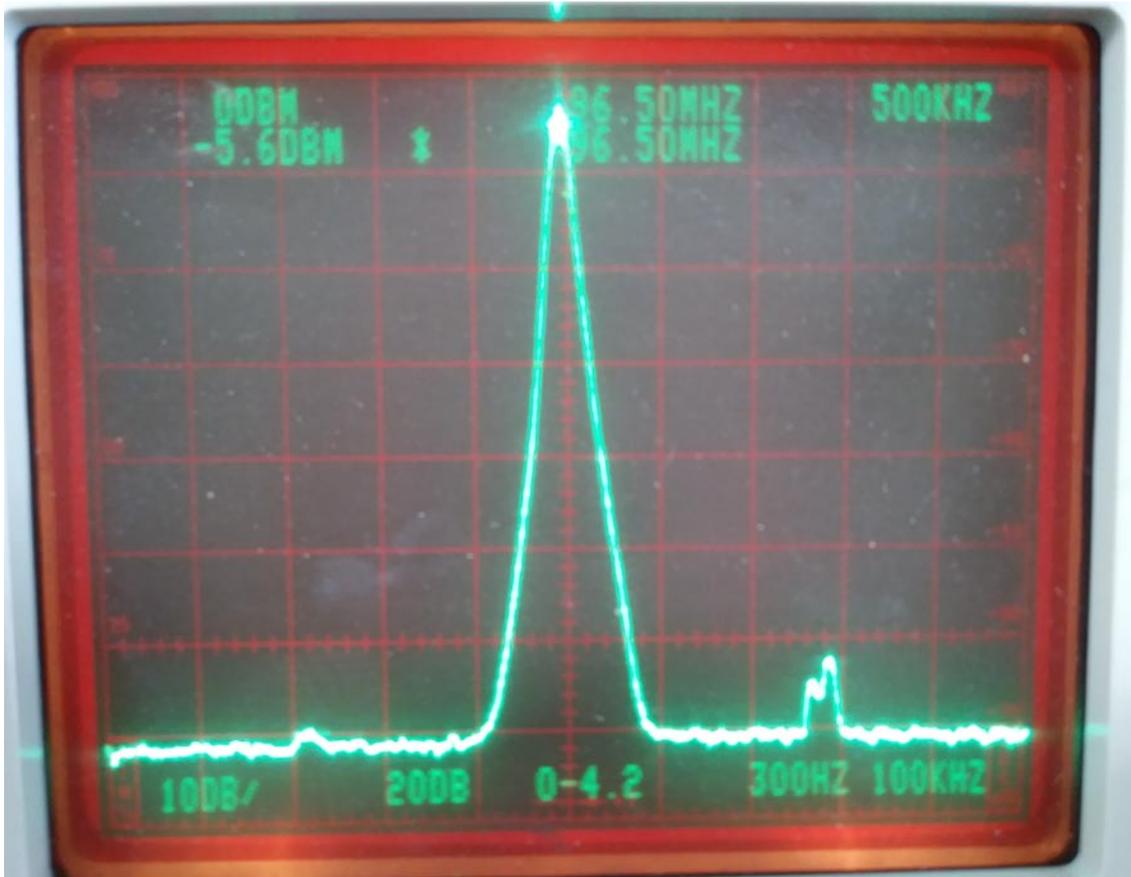
Bird 43 Watt Meter w/ 50watt slug (to verify TPO at transmitter output and TX PWR meter)

The TEK 492 Spectrum Analyzer was connected to the RF sample of the transmitter BEFORE EMR-FM4350/L and Telewave T-1030 Ferrite Isolator and antenna. The communications site has several TV transmitters. By connecting the analyzer this way it verifies that NONE of the other licensees RF is getting into this transmitter to mix and thus NO RF intermodulation is present >100dB isolation. It also provides a RAW RF signal from the transmitter to see if the transmitter harmonics are meeting specifications.

After I recorded/documentated the required exhibits, I inserted a CMC 440015 s/n C424 -30dB directional coupler between isolator and antenna transmission line to verify if any harmonics from transmitter were getting OUT and feeding the antenna to verify that the EMR-FM4350/L and Telewave T-1030 Ferrite Isolator are doing there job. Each recorded harmonic EXHIBIT contained in this report was UN-READABLE thus beyond the 90-120dB resolution of the analyzer. There are NO harmonics or out of band RF reaching the broadcast antenna. There are NO IN-BAND harmonics from this transmitter.

K243CD and K250BL are the FIRST FM translators installed and co-located with Methow Valley Communications District TV operations at Billy Goat Mtn, K08AP-D, K10AP-D and K12AV-D. Second harmonics from either FM translator MUST meet and exceed FCC requirements due to interference that could be caused DIRECTLY to the Television Translators sharing the same site. Second harmonics fall right in the SAME frequencies of the primary signals of the TV Translators.

Exhibit #:	Description:	Level:	Result:
Exhibit-01	Primary Signal 96.5FM ref level:	-5.6dBm	REF@ 0dBm scale



97.9 showing above (-67dBm)  
60dB+ isolation inline filters working.

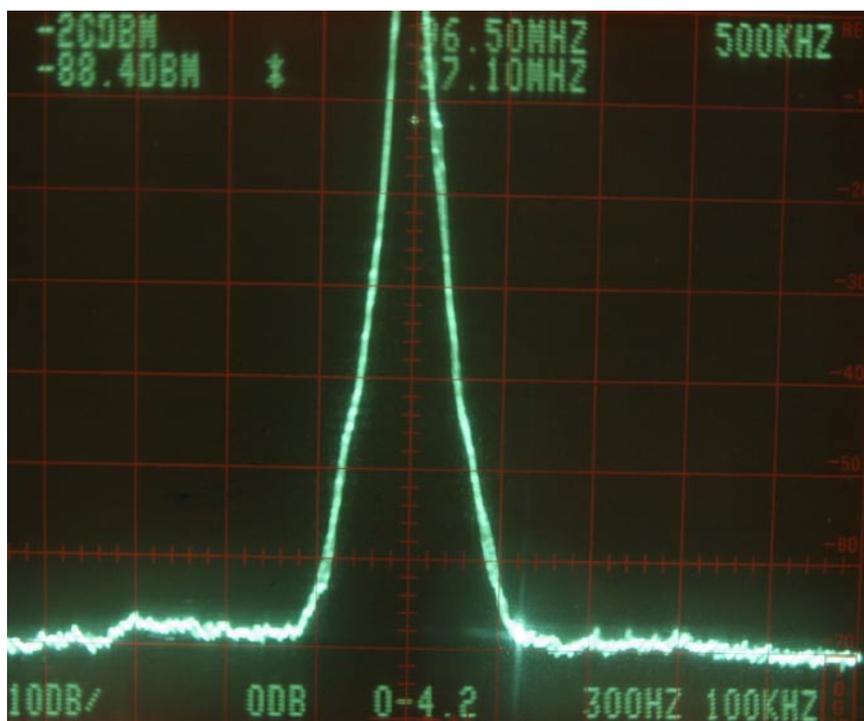
10 watts ERP

$43+10\log(10)= 53\text{dB}$  (maximum emission must be less than -13dBm)

**47CFR 73.317**

(d) Any emission appearing on a frequency removed from the carrier by more than 600 kHz must be attenuated at least  $43 + 10 \log_{10}(\text{Power, in watts})$  dB below the level of the unmodulated carrier, or 80 dB, whichever is the lesser attenuation.

$96.5 + .600 = 97.1$  is  $-88.4\text{dBm}$  REF =  $-5.6\text{dBm}$  =  $-82.8\text{dBm}$  down at 600kHz



10 watts ERP (+10dBW), MINUS  $-82.8\text{dBm}$  =  $-72.8\text{ dBW}$  =  $-42.8\text{dBm}$

$43 + 10 \log_{10}(10) =$   $53\text{dB}$  (maximum emission must be less than  $-13\text{dBm}$ )

Does K243CD @+600kHz (97.1FM) PASS 47CFR 73.317(d)

YES by 29.8dB

Exhibit #:	Description:	Level:	Result: (REF-Harmonic)
Exhibit-02	2 <sup>nd</sup> Harmonic at 193Mhz	-92.0dBm	-86.4 dBm down (-30dBm scale)

10 watts ERP = (+10dBW), MINUS -86.4dBm = -76.4 dBW = -46.4.0dBm

43+10log(10)= 53dB (maximum emission must be less than -13dBm)

**47CFR 73.317**

(d) Any emission appearing on a frequency removed from the carrier by more than 600 kHz must be attenuated at least 43 10 Log<sub>10</sub>(Power, in watts) dB below the level of the unmodulated carrier, or 80 dB, whichever is the lesser attenuation.

Does K243CD second harmonic pass 47CFR 73.317(d) YES by 33.4dB

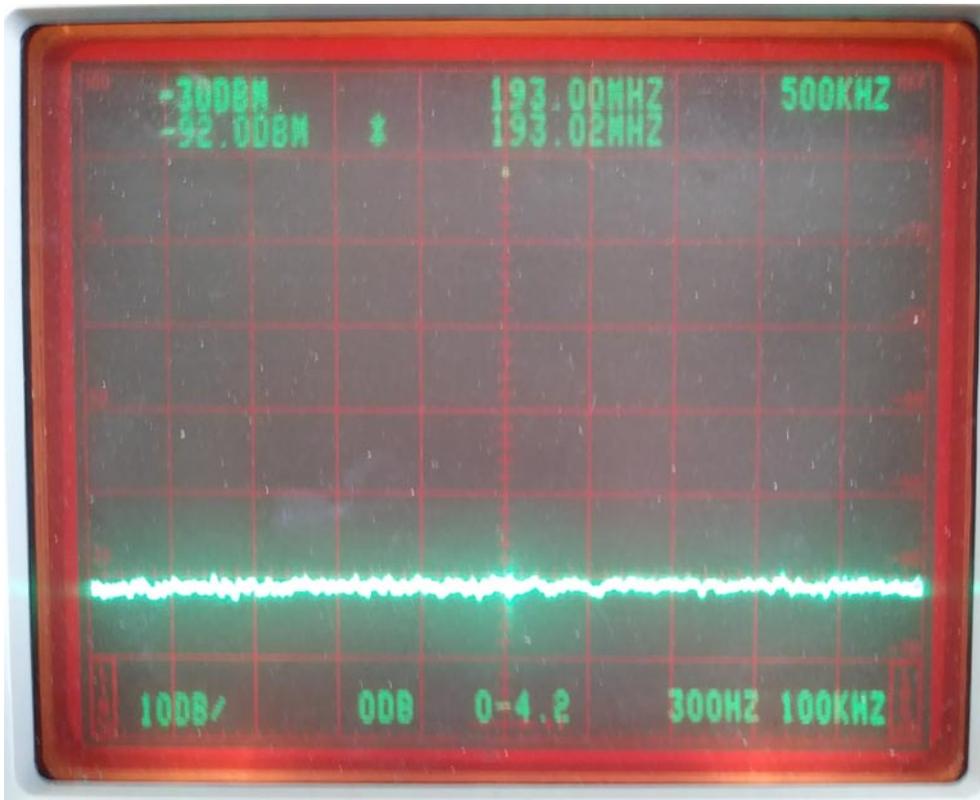


Exhibit #:	Description:	Level:	Result: (REF-Harmonic)
Exhibit-03	3rd Harmonic at 289.5Mhz	-91.6dBm	-86 dB down(-30dBm scale)

10 watts ERP (+10dBW), MINUS -86dBm = -76 dBW = -46dBm

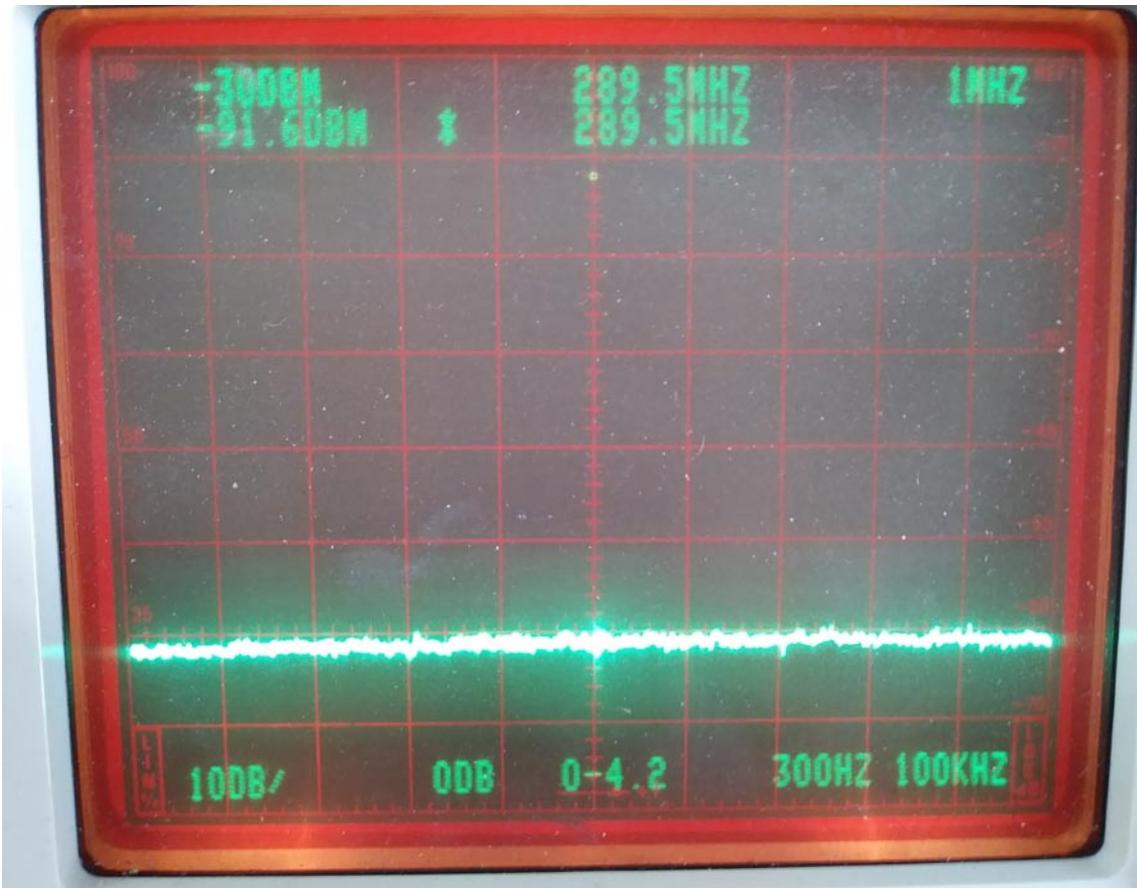
$43+10\log(10)= 53\text{dB}$  (maximum emission must be less than -13dBm)

**47CFR 73.317**

(d) Any emission appearing on a frequency removed from the carrier by more than 600 kHz must be attenuated at least  $43 + 10 \log_{10}(\text{Power, in watts})$  dB below the level of the unmodulated carrier, or 80 dB, whichever is the lesser attenuation.

Does K243CD third harmonic pass 47CFR 73.317(d) YES by 33dB

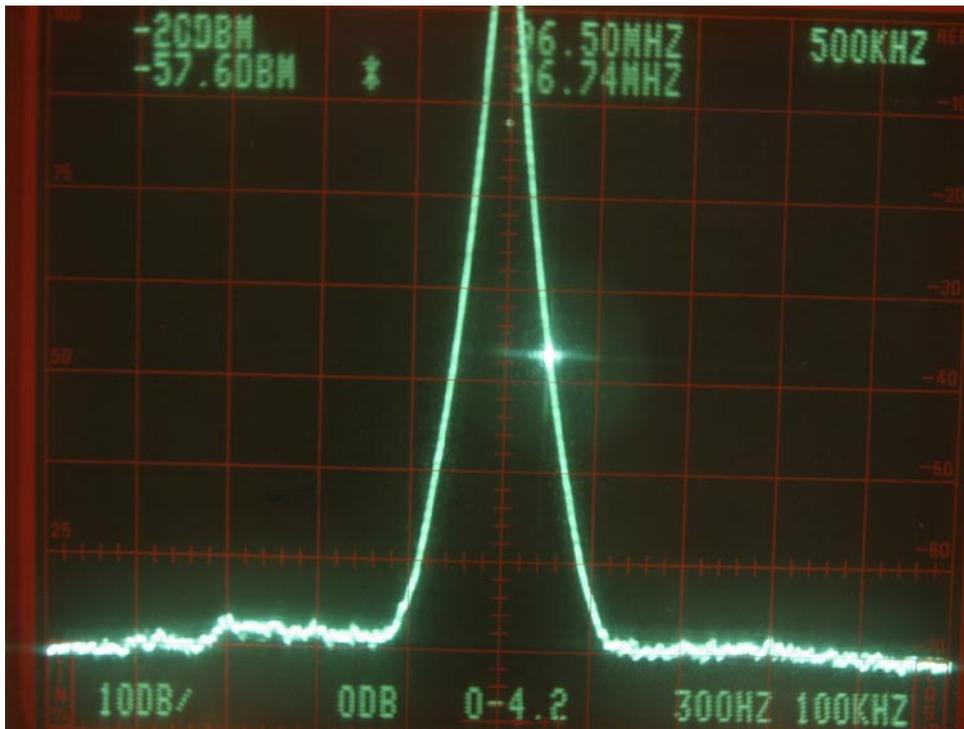
Harmonics at the 4<sup>th</sup> and greater were unreadable thru 1000Mhz.



**47CFR 73.317**

(b) Any emission appearing on a frequency removed from the carrier by between 120 kHz and 240 kHz inclusive must be attenuated at least 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.

96.500 + .240 = 96.74    level at 96.74 = -57.6dBm    REF level = -5.6dBm    **diff = 52dB**

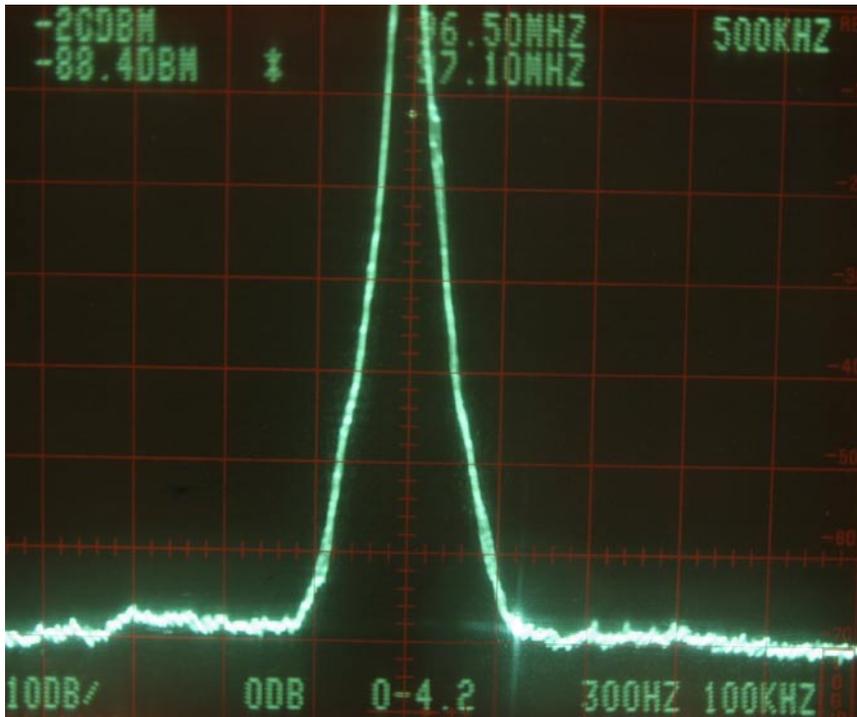


Does K243CD translator PASS 47CFR 73.317(b)

**YES by 27dB**

(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.

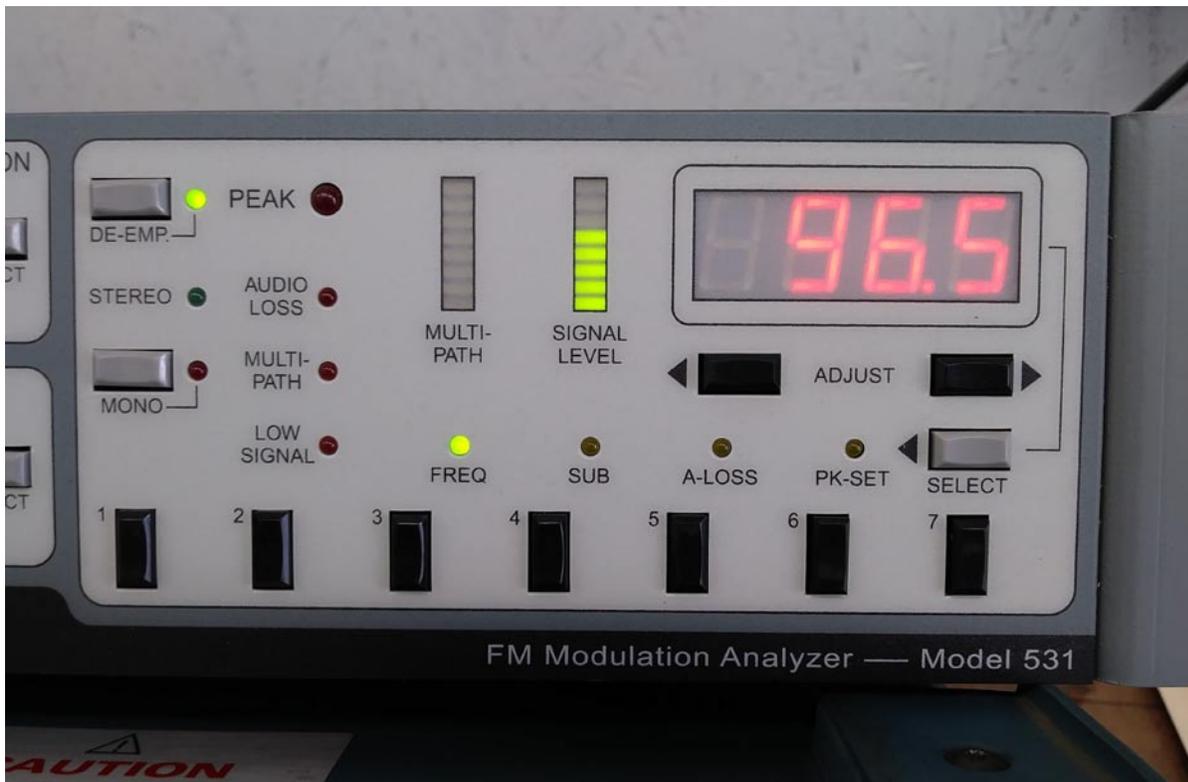
$96.5 + .600 = 97.1$  is  $-88.4\text{dBm}$  REF =  $-5.6\text{dBm}$  =  $-82.8\text{dBm}$  down at 600kHz



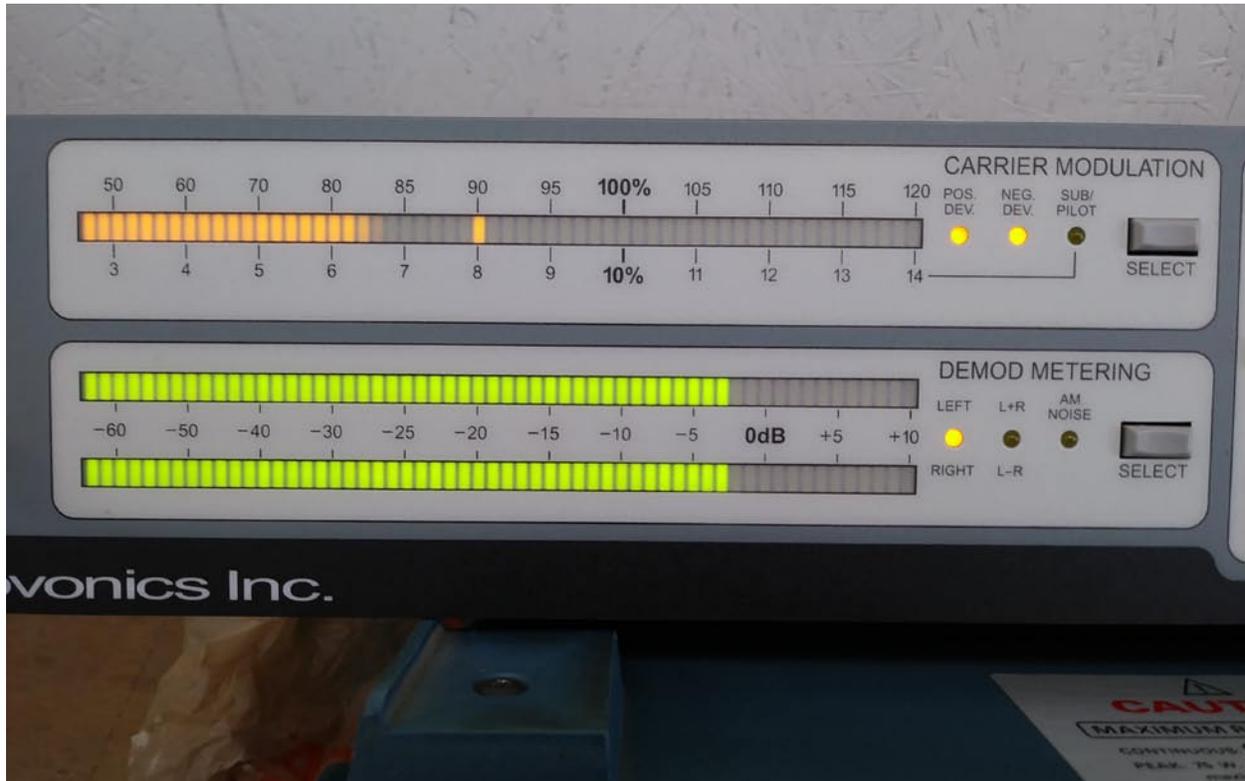
Does K243CD translator PASS 47CFR 73.317(c)

YES by 47.8dB

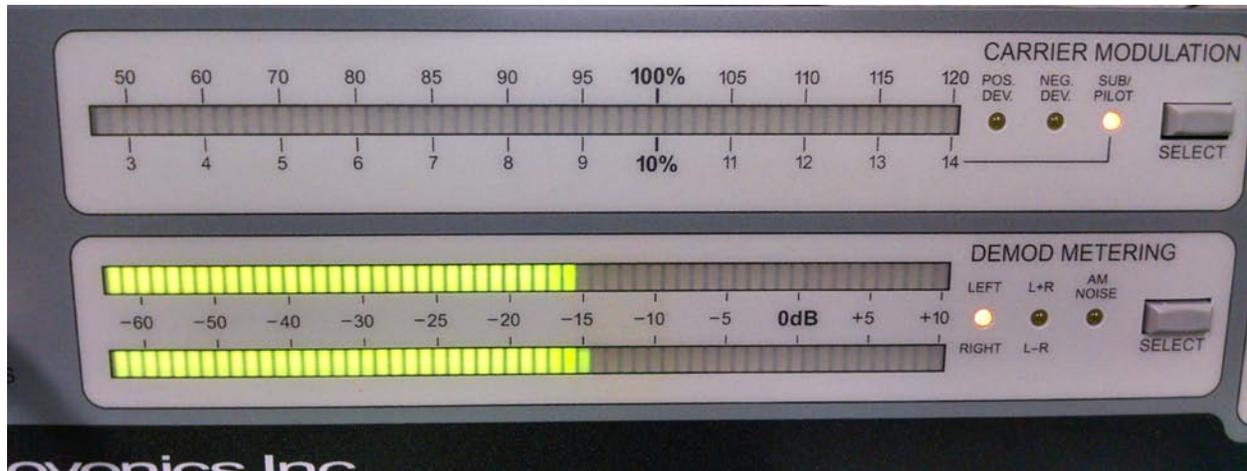
This picture shows I have proper signal level, right frequency and NO multipath for tests.



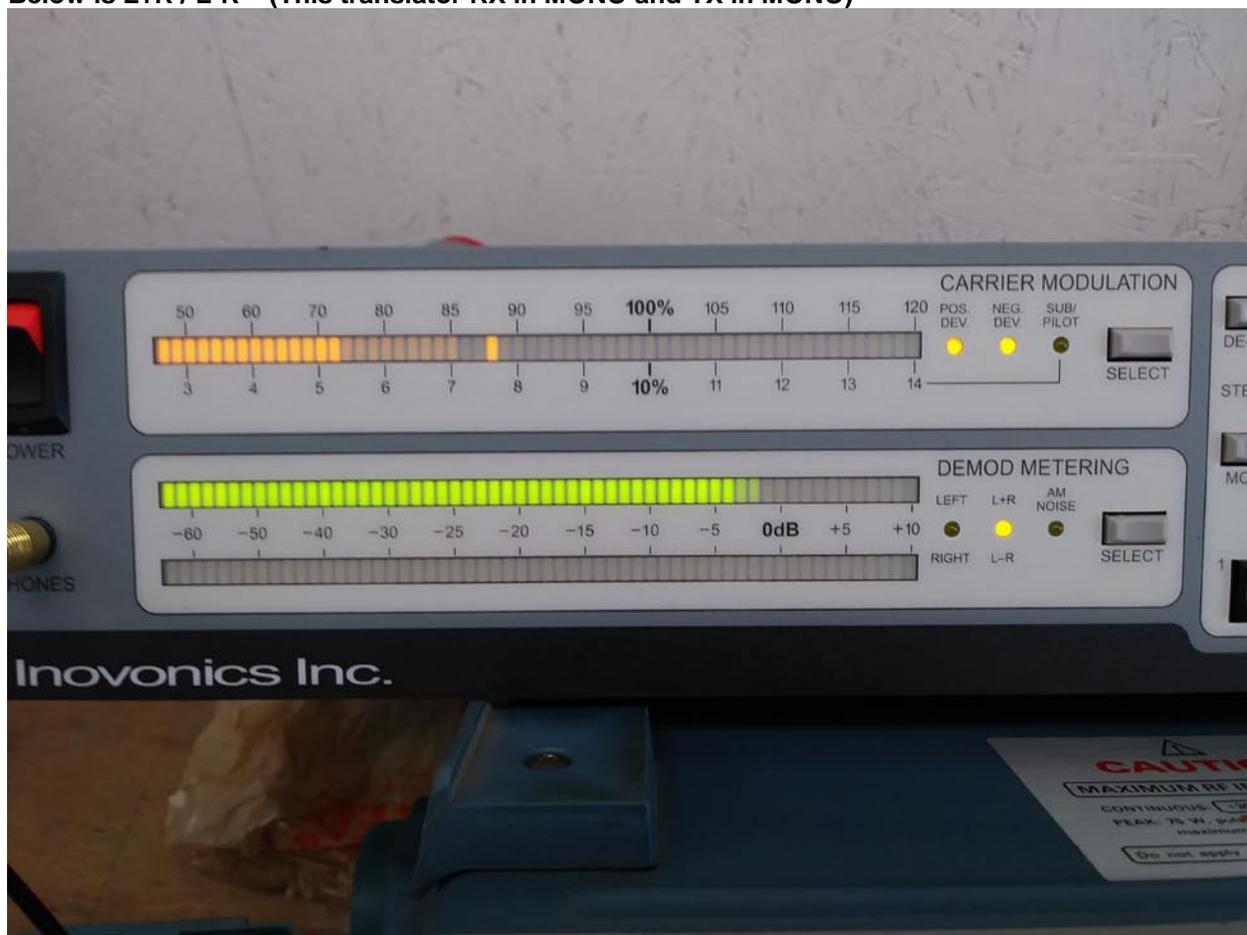
This picture shows DEV/Modulation is peaking at 90% which is the same as the primary station being received at the time of reading.



This picture shows there are NO pilot or sub-channels being broadcast by translator.

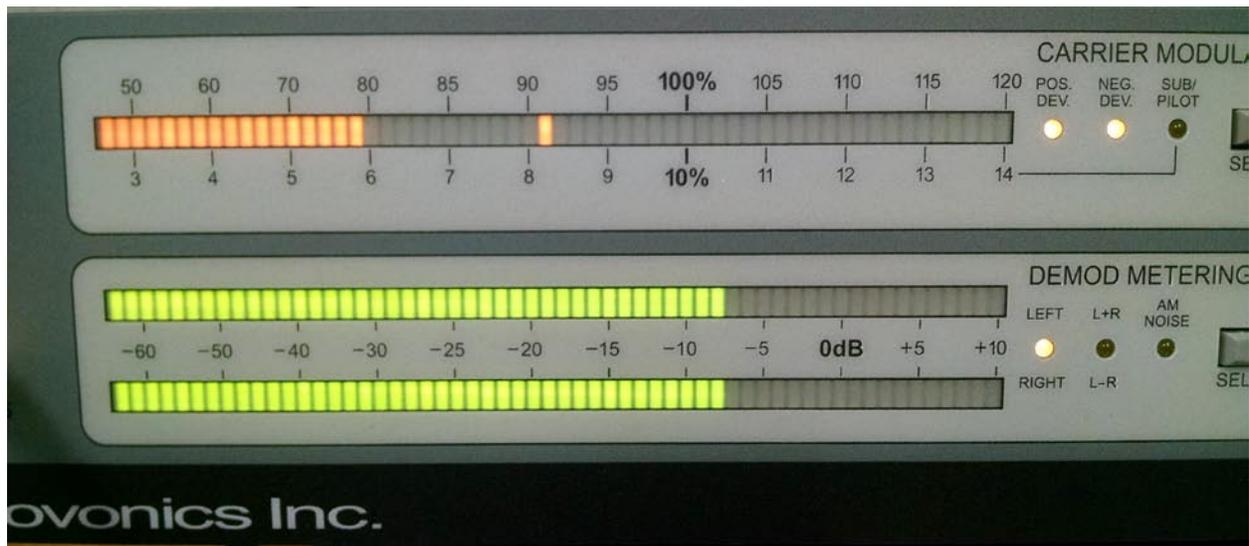


Below is L+R / L-R (This translator RX in MONO and TX in MONO)



Please note that the BW Broadcast TX-50 V2 transmitter has a builtin setable limiter feature. It is currently set to a MAXIMUM of 72kHz. I tested this by adjusting the gain of the audio level on back of transmitter to EXCEED incoming level to see if this feature worked, it did and held at 72Khz DEV. I turned OFF the limiter and DEV exceeded 120% for less than 10 seconds for the test. I than turned limiter back on recalibrated the audio levels.

This picture is when the limit of 72Khz DEV was reached and limited with a high audio level. Content was just voice and peaked at 92% modulation thus limiter with 120% modulation into transmitter limited to a maximum of 92% modulation.



Does K243CD DEV/Modulation pass 47CFR 73.317(b)(c) with modulation?

YES by 8db as shown above with modulation and by EXHIBIT-01 without modulation

100% on carrier modulation on Inovonics = 75Khz DEV

Receiver and transmitter audio levels are EXACTLY calibrated with each other so if primary station EXCEEDS 75Khz modulation for what ever reason, this translator will NOT exceed 72Khz DEV.

**The above exhibits satisfies special conditions #3 of the construction permit.**

**This report is to satisfy special conditions #2 of the construction permit as an attachment to FCC FORM-350.**

**We have authorization from the site owner to turn down RF levels at the site to a safe RF level to prevent RF exposure and adhere to RF Exposure limits, thus satisfies special conditions #1 of the constructions permit. We also require a MINIMUM of TWO persons at the site at any given time and for any reason of the visit. Personal RF exposure metering devices are also required due to the new installation of 11ghz microwave equipment on same tower.**

This party to the application is in compliance with Section 5301 of the *Anti-Drug Abuse Act of 1988*, 21 U.S.C. Section 862, the federal law which provides federal and state court judges the discretion to deny federal benefits to individuals convicted of offenses consisting of the distribution of controlled substances. For a definition of "party" for these purposes, see [47 C.F.R. Section 1.2002\(b\)](#). See also *Amendment of Part 1 of the Commission's Rules to Implement Section 5301 of the Anti-Drug Abuse Act of 1988*, 6 FCC Rcd 7551, 57 Fed. Reg. 00186 (1991).

I, Lonnie England, certify that, I am not subject to a denial of federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 862, or, in the case of a non-individual applicant (e.g., corporation, partnership or other unincorporated association), no party to the application is subject to a denial of federal benefits that includes FCC benefits pursuant to that section. For the definition of a party for these purposes, see [47 C.F.R. Section 1.2002\(b\)](#).

I certify that the statements made in this report / proof of performance are true, complete, and correct to the best of my knowledge and belief, and are made in good faith.

**Respectfully  
Lonnie England-CPBE-16041  
Radio & Television  
Director of Engineering  
Saddlerock Professional Services  
WA#604174733  
CW#170349**

**K243CD / 155536 Report / Proof of Performance completed May 31, 2018**