



FCC PART 73G & BETS 6

LOW POWER FM BROADCAST STATIONS (LPFM) TEST REPORT

| | |
|-----------------------------|--|
| APPLICANT | R.V.R. USA |
| | 7782 NW 46 Street Miami FL 33166 USA |
| FCC ID | RHDTEX-30LCD |
| IC | 25290-TEX30LCD |
| MODEL NUMBER | TEX30LCD/S |
| PRODUCT DESCRIPTION | FM BROADCAST TRANSMITTER |
| DATE SAMPLE RECEIVED | 08/01/2019 |
| DATE TESTED | 08/12/2019 |
| TESTED BY | Tim Royer |
| APPROVED BY | Franklin Rose |
| TEST RESULTS | <input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL |

| Report Number | Report Version | Description | Issue Date |
|--------------------|----------------|--|------------|
| 1994UT19TestReport | Rev1 | Initial Issue | 09/03/2019 |
| | Rev2 | Updated Operating frequency Range & output power | 09/17/2019 |

THE ATTACHED REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN APPROVAL OF TIMCO ENGINEERING, INC.



TABLE OF CONTENTS

| | |
|--|-----------|
| GENERAL REMARKS | 1 |
| GENERAL INFORMATION | 2 |
| RESULTS SUMMARY | 3 |
| RF POWER OUTPUT | 4 |
| TEST DATA: RF OUTPUT POWER | 5 |
| FCC PART 2.1033(C)(8) | 5 |
| TEST DATA: POWER IN THE FINAL STAGE | 5 |
| MODULATION CHARACTERISTICS | 6 |
| AUDIO FREQUENCY RESPONSE | 7 |
| TEST DATA: AUDIO FREQUENCY RESPONSE PLOT | 7 |
| AUDIO INPUT VS MODULATION | 8 |
| TEST DATA: MODULATION LIMITING: N/A | 8 |
| OCCUPIED BANDWIDTH & EMISSION MASK | 9 |
| TEST DATA: OCCUPIED BANDWIDTH TABLE | 10 |
| 20dB OCCUPIED BANDWIDTH PLOT LOW END OF BAND | 10 |
| 20dB OCCUPIED BANDWIDTH PLOT MIDDLE OF BAND | 11 |
| 20dB OCCUPIED BANDWIDTH PLOT HIGH END OF BAND | 12 |
| EMISSION MASK PLOT LOW END OF BAND | 13 |
| EMISSION MASK PLOT MIDDLE OF BAND | 14 |
| EMISSION MASK PLOT HIGH END OF BAND | 15 |
| SPURIOUS EMISSIONS AT ANTENNA TERMINALS (CONDUCTED) | 16 |
| TEST DATA: LOW FREQUENCY | 17 |
| TEST DATA: MIDDLE FREQUENCY | 17 |
| TEST DATA: HIGH FREQUENCY | 17 |
| FIELD STRENGTH OF SPURIOUS EMISSIONS | 18 |
| TEST DATA: LOW FREQUENCY | 20 |
| TEST DATA: MIDDLE FREQUENCY | 20 |
| TEST DATA: HIGH FREQUENCY | 20 |
| FREQUENCY STABILITY | 21 |
| TEST DATA: FREQUENCY STABILITY TABLE | 22 |
| TEST DATA: FREQUENCY STABILITY PLOT | 23 |
| STATEMENT OF MEASUREMENT UNCERTAINTY | 24 |
| EQUIPMENT LIST | 25 |

GENERAL REMARKS

Summary

The device under test does:

- Fulfill the general approval requirements as identified in this test report and was selected by the customer.
- Not fulfill the general approval requirements as identified in this test report

Attestations

This equipment has been tested in accordance with the standards identified in this test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report.

All instrumentation and accessories used to test products for compliance to the indicated standards are calibrated regularly in accordance with ISO 17025 requirements.

I attest that the necessary measurements were made at:

Timco Engineering Inc.
849 NW State Road 45
Newberry, FL 32669
Designation #: US1070, IC: 2056-A

Tested by:



| | |
|-----------------------|---|
| Name and Title | Tim Royer, Project Manager / EMC Testing Engineer |
| Date | 08/12/2019 |

Reviewed and Approved by:



| | |
|-----------------------|---|
| Name and Title | Franklin Rose, Project Manager / EMC Testing Technician |
| Date | 09/03/2019 |

Applicant: R.V.R. USA
FCC ID: RHDTEX-30LCD
IC: 25290-TEX30LCD
Report: 1994UT19TestReport_Rev2

GENERAL INFORMATION

| | |
|--------------------------------|---|
| EUT Description | FM BROADCAST TRANSMITTER |
| FCC ID | RHDTEX-30LCD |
| IC | 25290-TEX30LCD |
| Model Number | TEX30LCD/S |
| Operating Frequency | 87.5 – 108 MHz |
| Test Frequencies | 88, 98, 108 MHz |
| EUT Power Source | <input checked="" type="checkbox"/> 110–120Vac/50– 60Hz |
| | <input type="checkbox"/> DC Power |
| | <input type="checkbox"/> Battery Operated Exclusively |
| Test Item | <input type="checkbox"/> Prototype |
| | <input checked="" type="checkbox"/> Pre-Production |
| | <input type="checkbox"/> Production |
| Type of Equipment | <input checked="" type="checkbox"/> Fixed |
| | <input type="checkbox"/> Mobile |
| | <input type="checkbox"/> Portable |
| Antenna Connector | DIN |
| Test Conditions | The temperature was 26°C Relative humidity of 50%. |
| Modification to the EUT | No Modification to EUT. |
| Test Exercise | The EUT was placed in continuous transmit and was operated in “Test Mode” for digital emissions tests. |
| Applicable Standards | ANSI C63.26-2015, FCC CFR 47 Part 73, BETS-6 Issue 2, Referencing ANSI/TIA 603-E:2015 |
| Test Facility | Timco Engineering Inc. at 849 NW State Road 45 Newberry, FL 32669 USA. Designation #: US1070, IC: 2056A |

RESULTS SUMMARY

| Test Description | FCC RULE PART NO. | RESULT |
|--|---|--------------------|
| RF Power Output | 2.1046(a), 73.267(b), 73.840, BETS-6 6.1.3 | PASS |
| Power Into the Amplifier | 2.1033(C)(8) | For Reporting Only |
| Modulation Characteristics | 2.202(g)(III)(3), BETS-6 4.2 | PASS |
| Audio Frequency Response | 2.1047(a) | PASS |
| Audio Input Vs. Modulation | 2.1047(b), BETS-6 4.2 | N/A |
| Occupied Bandwidth | 2.1049(e)(3) – (5), 73.317(b), (c), BETS-6 6.3.3 | PASS |
| Spurious Emissions at Antenna Terminal | Part 2.1051 & 73.317(d), BETS-6 6.3.3 | PASS |
| Field Strength of Spurious Radiation | Part 2.1053(a) & 73.317(d), BETS-6 6.3.3 | PASS |
| Frequency Stability | Part 2.1055(a)(3), Part 73.1545(b), BETS-6 6.2.2 | PASS |

RF POWER OUTPUT

Rule Part No.: Part 2.1046(a), Part 73.267(b), 73.840, BETS-6 6.1.3

Test Requirements: Part 73.267(b), 73.840

(b) Direct method. The direct method of power determination for an FM station uses the indications of a calibrated transmission line meter (responsive to relative voltage, current, or power) located at the RF output terminals of the transmitter. This meter must be calibrated whenever there is any indication that the calibration is inaccurate or whenever any component of the metering circuit is repaired or replaced. The calibration must cover, as a minimum, the range from 90% to 105% of authorized power. The meter calibration may be checked by measuring the power at the transmitter terminals while either:

§73.840 Operating power and mode tolerances.

The transmitter power output (TPO) of an LPFM station must be determined by the procedures set forth in §73.267 of this part. The operating TPO of an LPFM station with an authorized TPO of more than ten watts must be maintained as near as practicable to its authorized TPO and may not be less than 90% of the minimum TPO nor greater than 105% of the maximum authorized TPO. An LPFM station with an authorized TPO of ten watts or less may operate with less than the authorized power, but not more than 105% of the authorized power.

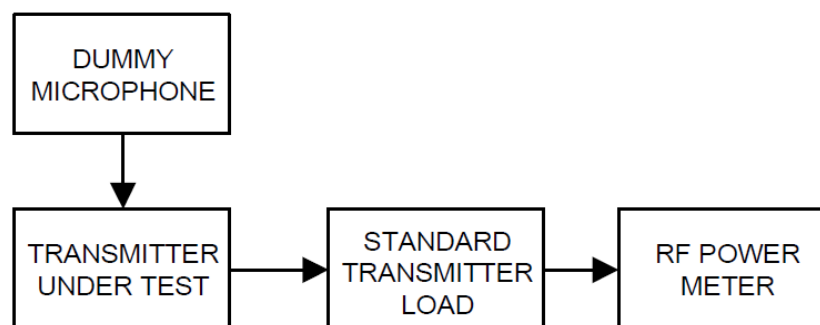
Test Requirements: BETS-6 6.1.3

6.1.3 Standard

The standard rating of power output for the transmitting equipment shall be as specified by the individual manufacturer. The transmitting equipment shall be capable of being adjusted to deliver the rated power output when the AC input voltage varies by 5% from the rated value.

Method of Measurement: ANSI C63.26

Test Setup Diagram:



RF POWER OUTPUT

Test Data: RF Output Power

| Frequency (MHz) | Output Power (dBm) | Rated Output Power (W) |
|-----------------|--------------------|------------------------|
| 88.0 | 44.7 | 30 |
| 98.0 | 44.7 | 30 |
| 108.0 | 44.7 | 30 |

FCC Part 2.1033(C)(8)

(8) The dc voltages applied to and dc currents into the several elements of the final radio frequency amplifying device for normal operation over the power range.

Test Data: Power In the Final Stage

Power at Final Stage: (110 VAC) (1.57 A) = **70 Watts**

MODULATION CHARACTERISTICS

Rule Part No.: Part 2.202(g)(III)(3) "Sound Broadcasting", BETS-6 4.2

Test Requirements: Part 2.202(g)(III)(3)

| Description of emission | Necessary bandwidth | | Designation of emission |
|------------------------------------|--------------------------------------|---|-------------------------|
| | Formula | Sample calculation | |
| III-A. FREQUENCY MODULATION | | | |
| 3. Sound Broadcasting | | | |
| Sound broadcasting | $B_n = 2M + 2DK$, K = 1 (typically) | Monaural, D = 75,000 Hz, M = 15,000, Bandwidth: 18,000 Hz = 180 kHz | 180KF3E |

Test Requirements: BETS-6 4.2

4.2 Type of Emission

The designation of modulation and emission refers to the manner in which the carrier is modulated and transmitted. The transmitting equipment shall produce F3EGN emission for monophonic operation and F8EHF emission for stereophonic operation. The transmitting equipment shall be capable of operating with a frequency deviation of ± 75 kHz, which is equivalent to 100% modulation.

Type of Emission: **180KF3E**

$$B_n = 2M + 2DK$$

$$B_n = 2(15K) + 2(75K)(1) = 180K$$

Where:

M = 15 (Modulation Frequency, kHz)

D = 75 (Peak Deviation, kHz)

K = 1 (constant value)

AUDIO FREQUENCY RESPONSE

Rule Part No.: FCC Part 2.1047(a), (b)

Test Requirements: FCC Part 2.1047(a)

§2.1047 Measurements required: Modulation characteristics.

(a) *Voice modulated communication equipment.* A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be submitted. For equipment required to have an audio low-pass filter, a curve showing the frequency response of the filter, or of all circuitry installed between the modulation limiter and the modulated stage shall be submitted.

Method of Measurement: ANSI C63.26 s. 5.3.3, per BETS-6

Test Setup Diagram:

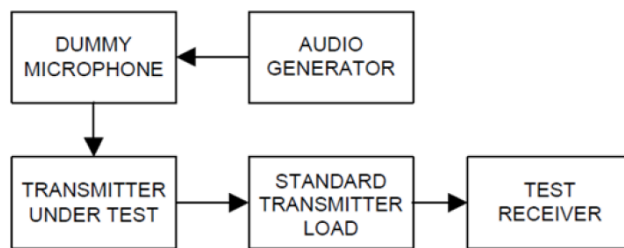
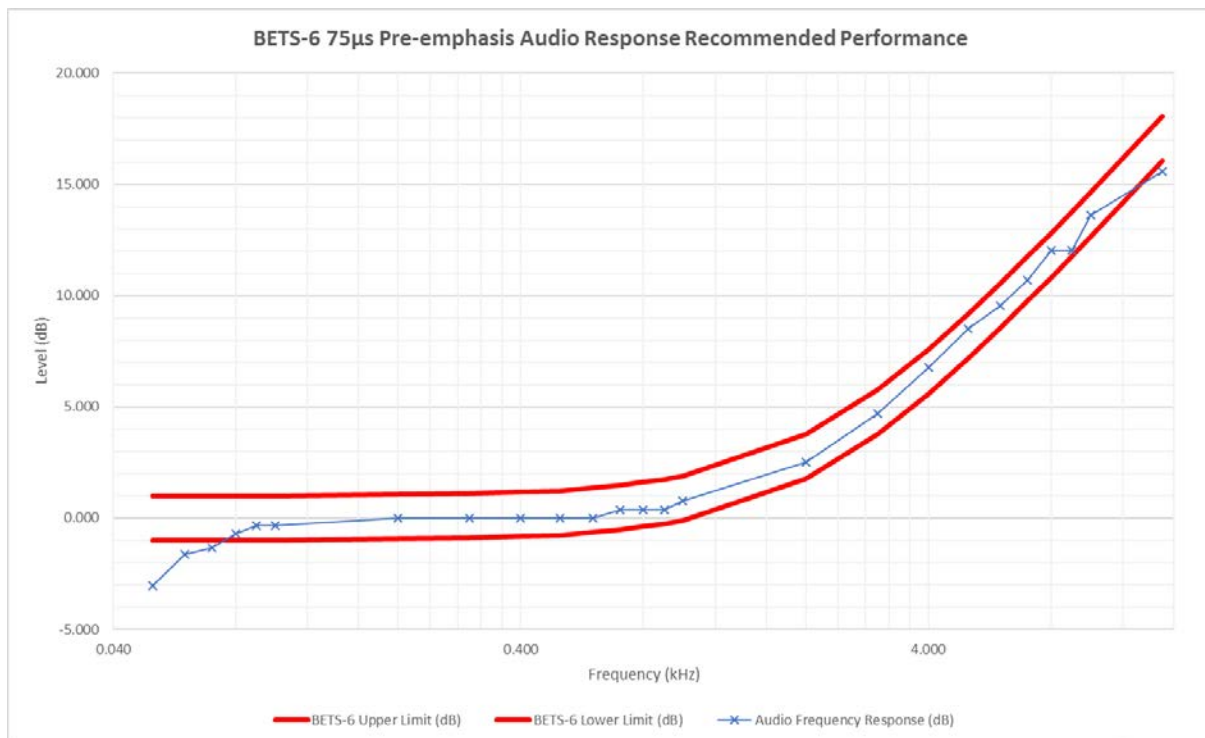


Figure 3—Equipment set-up audio frequency response (constant input)

Test Data: Audio Frequency Response Plot



Applicant: R.V.R. USA
 FCC ID: RHDTEX-30LCD
 IC: 25290-TEX30LCD
 Report: 1994UT19TestReport_Rev2

AUDIO INPUT VS MODULATION

Rule Part No.: FCC Part 2.1047(b), BETS-6 4.2

Test Requirements: FCC Part 2.1047(b)

(b) Equipment which employs modulation limiting. A curve or family of curves showing the percentage of modulation versus the modulation input voltage shall be supplied. The information submitted shall be sufficient to show modulation limiting capability throughout the range of modulating frequencies and input modulating signal levels employed.

Test Requirements: BETS-6 4.2

4.2 Type of Emission

The designation of modulation and emission refers to the manner in which the carrier is modulated and transmitted. The transmitting equipment shall produce F3EGN emission for monophonic operation and F8EHF emission for stereophonic operation. The transmitting equipment shall be capable of operating with a frequency deviation of ± 75 kHz, which is equivalent to 100% modulation.

Method of Measurement: ANSI C63.26 s. 5.3.2

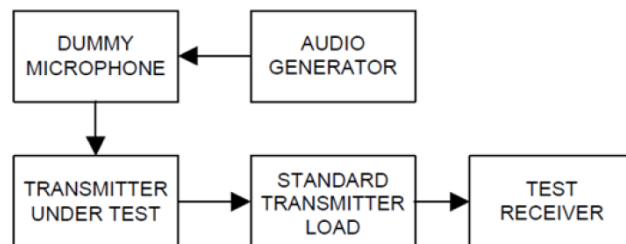


Figure 3—Equipment set-up audio frequency response (constant input)

Test data: Modulation Limiting: n/a

This equipment is not equipped with a modulation limiting circuit. The device performs to BETS-6 standards and produces 75 kHz of deviation.

OCCUPIED BANDWIDTH & EMISSION MASK

Rule Part No.: FCC Part 2.1049(e)(3) – (5), Part 73.317(b), (c), BETS-6 6.3.3

Requirement: FCC 2.1049(e)(3)-(5)

§2.1049 Measurements required: Occupied bandwidth.

(e) Transmitters for use in the Radio Broadcast Services:

(3) FM broadcast transmitter not used for multiplex operation—when modulated 85 percent by a 15 kHz input signal.

(4) FM broadcast transmitters for multiplex operation under Subsidiary Communication Authorization (SCA)—when carrier is modulated 70 percent by a 15 kHz main channel input signal, and modulated an additional 15 percent simultaneously by a 67 kHz subcarrier (unmodulated).

(5) FM broadcast transmitter for stereophonic operation—when modulated by a 15 kHz input signal to the main channel, a 15 kHz input signal to the stereophonic subchannel, and the pilot subcarrier simultaneously. The input signals to the main channel and stereophonic subchannel each shall produce 38 percent modulation of the carrier. The pilot subcarrier should produce 9 percent modulation of the carrier.

Requirement: FCC 73.317(b), (c)

(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.

(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.

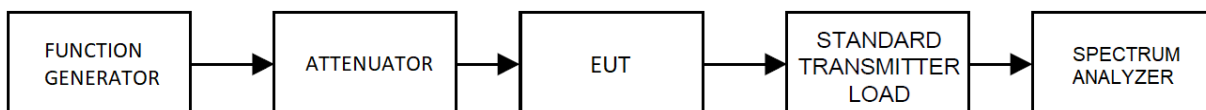
Requirement: BETS-6 6.3.3

6.3.3 Standard

Spurious emissions of the transmitting equipment shall not exceed the values given below:

| Spurious Emission | Maximum Value |
|--|---|
| Between 120 kHz and 240 kHz from the carrier frequency | -25 dB |
| More than 240 kHz and up to and including 600 kHz from the carrier frequency | -35 dB* |
| More than 600 kHz from the carrier frequency, whichever is the stronger | $-(43 + 10 \log P)$ or -80 dB* P = power in watts |

Test Setup Diagram:



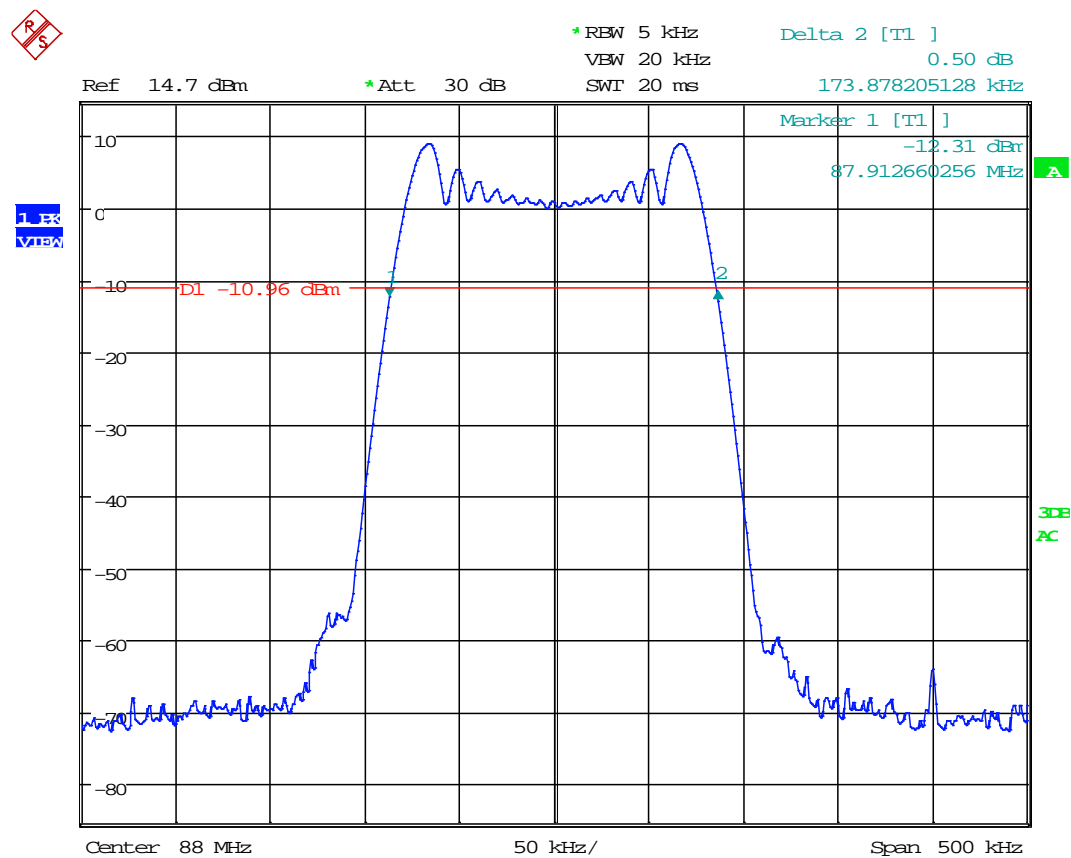
Applicant: R.V.R. USA
 FCC ID: RHDTEX-30LCD
 IC: 25290-TEX30LCD
 Report: 1994UT19TestReport_Rev2

OCCUPIED BANDWIDTH & EMISSION MASK

Test Data: Occupied Bandwidth Table

| Frequency (MHz) | 20dB OBW (kHz) |
|-----------------|----------------|
| 88 | 173.88 |
| 98 | 179.49 |
| 108 | 167.47 |

20dB OCCUPIED BANDWIDTH PLOT Low End of band

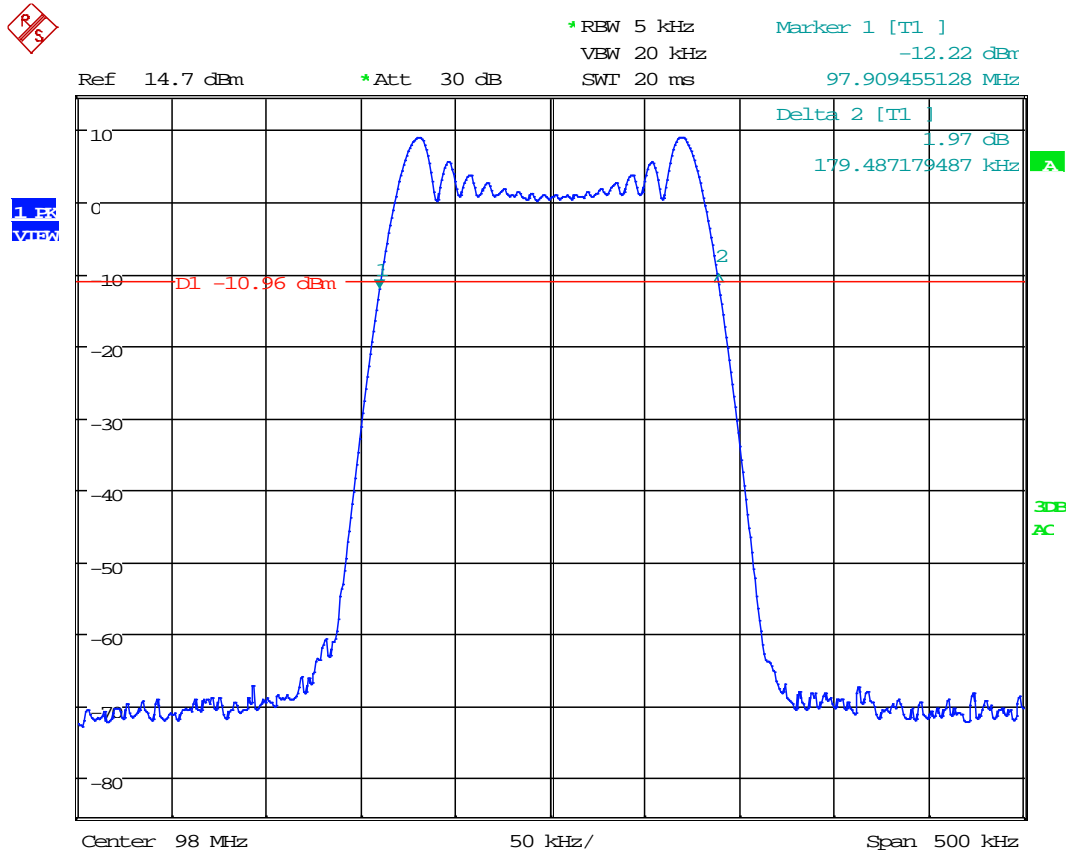


Date: 16.AUG.2019 17:53:32

Applicant: R.V.R. USA
 FCC ID: RHDTEX-30LCD
 IC: 25290-TEX30LCD
 Report: 1994UT19TestReport_Rev2

OCCUPIED BANDWIDTH & EMISSION MASK

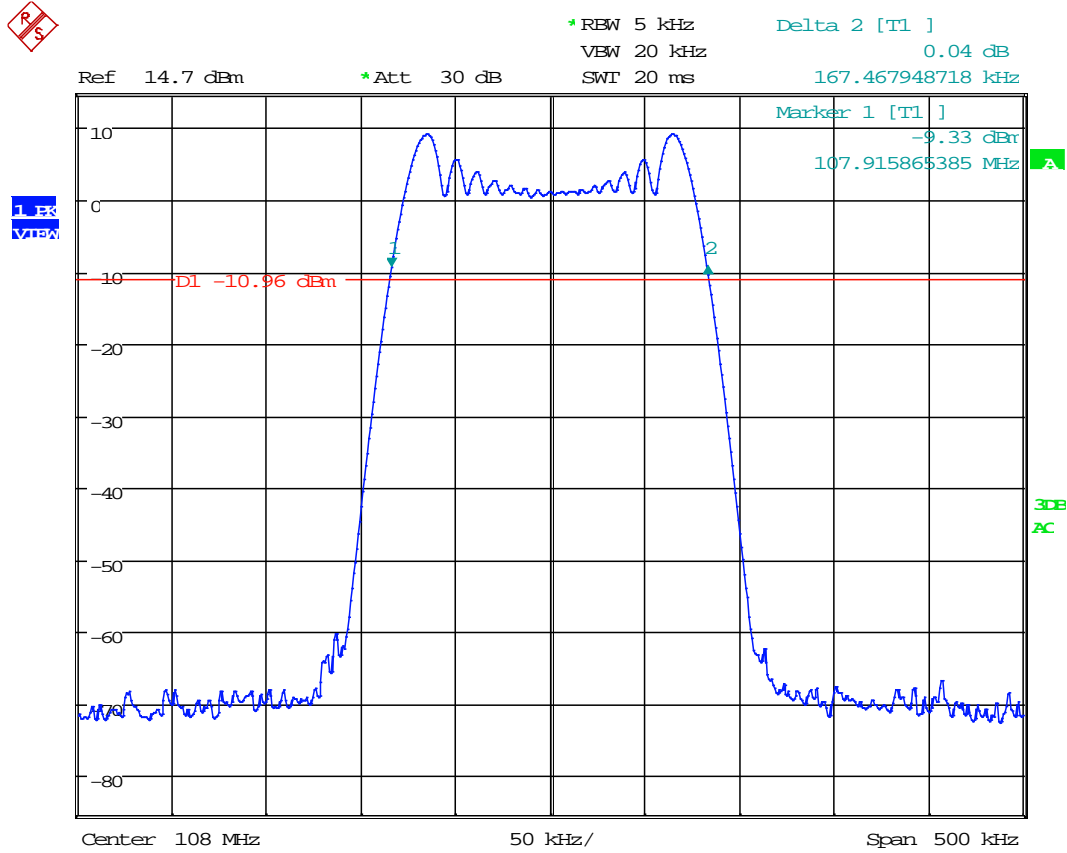
20dB OCCUPIED BANDWIDTH PLOT Middle of band



Date: 16.AUG.2019 17:52:36

OCCUPIED BANDWIDTH & EMISSION MASK

20dB OCCUPIED BANDWIDTH PLOT High End of band



Date: 16.AUG.2019 17:51:27

SPURIOUS EMISSIONS AT ANTENNA TERMINALS (CONDUCTED)

Rule Part No.: Part 2.1051 & 73.317(d), BETS-6 6.3.3

Test Requirements: 73.317 (d)

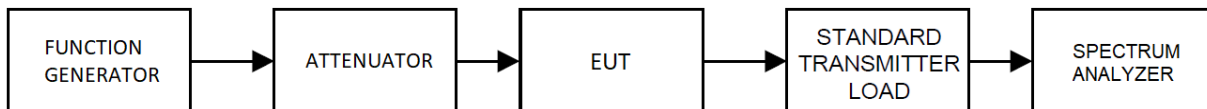
(d) Any emission appearing on a frequency removed from the carrier by more than 600 kHz must be attenuated at least $43 + 10 \log_{10}(\text{Power, in watts})$ dB below the level of the unmodulated carrier, or 80 dB, whichever is the lesser attenuation.

Test Requirements: BETS-6 6.3.3

| | |
|---|--|
| More than 600 kHz from the carrier frequency, whichever is the stronger | $-(43 + 10 \log P)$ <input type="text"/> or -80 dB* P = power in watts |
|---|--|

Antenna Conducted Emissions: The RBW = 100 kHz, VBW = 300 kHz and the span set to 10.0 MHz and the spectrum was scanned from 30 MHz to the 10th harmonic of the fundamental. Above 1 GHz the resolution bandwidth was 1 MHz and the VBW = 3 MHz and the span to 50 MHz.

Method of Measuring Conducted Spurious Emissions



SPURIOUS EMISSIONS AT ANTENNA TERMINALS (CONDUCTED)

Test Data: Low Frequency

| Harmonic | Harmonic (MHz) | Loss at Harmonic (dB) | Analyzer offset (dB) | Measured Level (dBm) | Correction (dB) | Level (dBm) | Limit (dBc) | Limit (dBm) | Margin (dB) |
|----------|----------------|-----------------------|----------------------|----------------------|-----------------|-------------|-------------|-------------|-------------|
| 2 | 176.00 | -30.87 | 0.00 | -65.70 | -30.87 | -34.83 | 57.77 | -13.00 | 21.83 |
| 3 | 264.00 | -30.95 | 0.00 | -73.04 | -30.95 | -42.09 | 57.77 | -13.00 | 29.09 |
| 4 | 352.00 | -31.19 | 0.00 | -80.42 | -31.19 | -49.23 | 57.77 | -13.00 | 36.23 |
| 5 | 440.00 | -31.42 | 0.00 | -81.00 | -31.42 | -49.58 | 57.77 | -13.00 | 36.58 |
| 6 | 528.00 | -31.55 | 0.00 | -79.44 | -31.55 | -47.89 | 57.77 | -13.00 | 34.89 |
| 7 | 616.00 | -31.75 | 0.00 | -72.63 | -31.75 | -40.88 | 57.77 | -13.00 | 27.88 |
| 8 | 704.00 | -31.92 | 0.00 | -74.68 | -31.92 | -42.76 | 57.77 | -13.00 | 29.76 |
| 9 | 792.00 | -31.96 | 0.00 | -81.40 | -31.96 | -49.44 | 57.77 | -13.00 | 36.44 |
| 10 | 880.00 | -32.11 | 0.00 | -81.53 | -32.11 | -49.42 | 57.77 | -13.00 | 36.42 |

Test Data: Middle Frequency

| Harmonic | Harmonic (MHz) | Loss at Harmonic (dB) | Analyzer offset (dB) | Measured Level (dBm) | Correction (dB) | Level (dBm) | Limit (dBc) | Limit (dBm) | Margin (dB) |
|----------|----------------|-----------------------|----------------------|----------------------|-----------------|-------------|-------------|-------------|-------------|
| 2 | 196.00 | -30.81 | 0.00 | -71.72 | -30.81 | -40.91 | 57.77 | -13.00 | 27.91 |
| 3 | 294.00 | -31.08 | 0.00 | -71.52 | -31.08 | -40.44 | 57.77 | -13.00 | 27.44 |
| 4 | 392.00 | -31.29 | 0.00 | -75.42 | -31.29 | -44.13 | 57.77 | -13.00 | 31.13 |
| 5 | 490.00 | -31.48 | 0.00 | -77.73 | -31.48 | -46.25 | 57.77 | -13.00 | 33.25 |
| 6 | 588.00 | -31.71 | 0.00 | -70.95 | -31.71 | -39.24 | 57.77 | -13.00 | 26.24 |
| 7 | 686.00 | -31.88 | 0.00 | -70.46 | -31.88 | -38.58 | 57.77 | -13.00 | 25.58 |
| 8 | 784.00 | -31.91 | 0.00 | -77.53 | -31.91 | -45.62 | 57.77 | -13.00 | 32.62 |
| 9 | 882.00 | -32.17 | 0.00 | -80.70 | -32.17 | -48.53 | 57.77 | -13.00 | 35.53 |
| 10 | 980.00 | -32.19 | 0.00 | -77.97 | -32.19 | -45.78 | 57.77 | -13.00 | 32.78 |

Test Data: High Frequency

| Harmonic | Harmonic (MHz) | Loss at Harmonic (dB) | Analyzer offset (dB) | Measured Level (dBm) | Correction (dB) | Level (dBm) | Limit (dBc) | Limit (dBm) | Margin (dB) |
|----------|----------------|-----------------------|----------------------|----------------------|-----------------|-------------|-------------|-------------|-------------|
| 2 | 216.00 | -30.98 | 0.00 | -66.66 | -30.98 | -35.68 | 57.77 | -13.00 | 22.68 |
| 3 | 324.00 | -31.11 | 0.00 | -70.70 | -31.11 | -39.59 | 57.77 | -13.00 | 26.59 |
| 4 | 432.00 | -31.43 | 0.00 | -73.63 | -31.43 | -42.20 | 57.77 | -13.00 | 29.20 |
| 5 | 540.00 | -31.63 | 0.00 | -71.39 | -31.63 | -39.76 | 57.77 | -13.00 | 26.76 |
| 6 | 648.00 | -31.68 | 0.00 | -66.72 | -31.68 | -35.04 | 57.77 | -13.00 | 22.04 |
| 7 | 756.00 | -31.93 | 0.00 | -69.51 | -31.93 | -37.58 | 57.77 | -13.00 | 24.58 |
| 8 | 864.00 | -32.04 | 0.00 | -74.44 | -32.04 | -42.40 | 57.77 | -13.00 | 29.40 |
| 9 | 972.00 | -32.19 | 0.00 | -74.39 | -32.19 | -42.20 | 57.77 | -13.00 | 29.20 |
| 10 | 1080.00 | -32.19 | 0.00 | -75.56 | -32.19 | -43.37 | 57.77 | -13.00 | 30.37 |

FIELD STRENGTH OF SPURIOUS EMISSIONS

Rule Parts. No.: Part 2.1053(a) & 73.317 (d), BETS-6 6.3.3

Test Requirements: 73.317 (d)

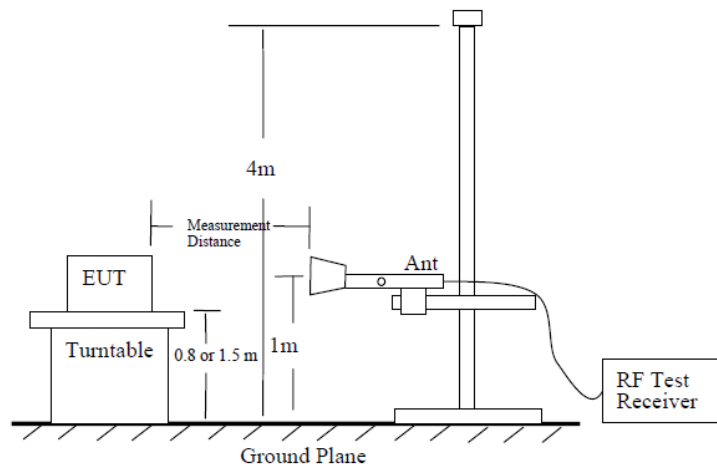
(d) Any emission appearing on a frequency removed from the carrier by more than 600 kHz must be attenuated at least $43 + 10 \text{Log}_{10}$ (Power, in watts) dB below the level of the unmodulated carrier, or 80 dB, whichever is the lesser attenuation.

Test Requirements: BETS-6 6.3.3

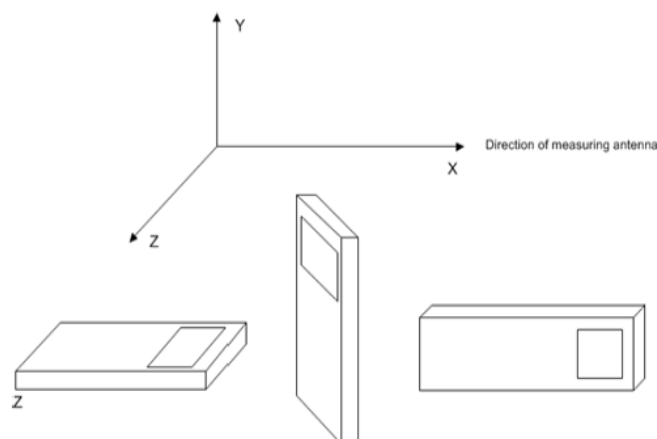
More than 600 kHz from the carrier frequency, whichever is the stronger

$-(43 + 10 \log P)$
 or -80 dB^*
 P = power in watts

Test Site Setup:



EUT Orientation(s):



Applicant: R.V.R. USA
 FCC ID: RHDTEX-30LCD
 IC: 25290-TEX30LCD
 Report: 1994UT19TestReport_Rev2

FIELD STRENGTH OF SPURIOUS EMISSIONS

Note: The tabulated data shows the results of the radiated field strength emissions test. The spectrum was scanned from the lowest frequency generated internally to at least the tenth harmonic of the fundamental. This test was conducted in accordance with the standard listed above using the substitution method. Measurements were made at the test site of TIMCO ENGINEERING, INC. located at 849 NW State Road 45, Newberry, FL 32669. The measurements below represent the worst case of all the frequencies tested.

Note: Six (6) or more of the highest emissions of each worst-case operational mode of the EUT are represented below. Emissions 20 dB below the limit were not required to be reported.

FIELD STRENGTH OF SPURIOUS EMISSIONS

Test Data: Low Frequency

| Tuned Frequency (MHz) | Emission Frequency (MHz) | Detector | Meter Reading (dBµV) | Antenna Polarity | Coax Loss (dB) | Correction Factor (dB/m) | Distance (m) | Field Strength (dBµV/m) | ERP (dBm) | Limit (dBm) | Margin (dBm) |
|-----------------------|--------------------------|----------|----------------------|------------------|----------------|--------------------------|--------------|-------------------------|-----------|-------------|--------------|
| 88.00 | 176.00 | PK | 24.84 | H | 1.54 | 14.70 | 3.00 | 41.08 | -56.29 | -13.00 | 43.29 |
| 88.00 | 176.00 | PK | 20.86 | V | 1.54 | 14.70 | 3.00 | 37.10 | -60.27 | -13.00 | 47.27 |
| 88.00 | 264.00 | PK | 10.29 | V | 2.03 | 11.88 | 3.00 | 24.20 | -73.17 | -13.00 | 60.17 |
| 88.00 | 264.00 | PK | 8.34 | H | 2.03 | 11.88 | 3.00 | 22.25 | -75.12 | -13.00 | 62.12 |
| 88.00 | 352.00 | PK | 12.95 | H | 2.12 | 14.16 | 3.00 | 29.23 | -68.15 | -13.00 | 55.15 |
| 88.00 | 352.00 | PK | 21.93 | V | 2.12 | 14.16 | 3.00 | 38.21 | -59.17 | -13.00 | 46.17 |
| 88.00 | 440.00 | PK | 13.41 | V | 2.40 | 15.70 | 3.00 | 31.51 | -65.87 | -13.00 | 52.87 |
| 88.00 | 440.00 | PK | 11.42 | H | 2.40 | 15.70 | 3.00 | 29.52 | -67.86 | -13.00 | 54.86 |
| 88.00 | 528.00 | PK | 10.24 | V | 2.76 | 16.94 | 3.00 | 29.94 | -67.44 | -13.00 | 54.44 |
| 88.00 | 528.00 | PK | 8.32 | H | 2.76 | 16.94 | 3.00 | 28.02 | -69.36 | -13.00 | 56.36 |
| 88.00 | 616.00 | PK | 9.48 | H | 2.90 | 18.72 | 3.00 | 31.10 | -66.28 | -13.00 | 53.28 |
| 88.00 | 616.00 | PK | 11.58 | V | 2.90 | 18.72 | 3.00 | 33.20 | -64.18 | -13.00 | 51.18 |
| 88.00 | 704.00 | PK | 7.74 | V | 3.11 | 20.60 | 3.00 | 31.45 | -65.93 | -13.00 | 52.93 |
| 88.00 | 704.00 | PK | 11.39 | H | 3.11 | 20.60 | 3.00 | 35.10 | -62.28 | -13.00 | 49.28 |
| 88.00 | 792.00 | PK | 10.98 | H | 3.32 | 20.68 | 3.00 | 34.98 | -62.40 | -13.00 | 49.40 |
| 88.00 | 880.00 | PK | 10.96 | H | 3.54 | 22.60 | 3.00 | 37.10 | -60.28 | -13.00 | 47.28 |
| 88.00 | 880.00 | PK | 10.82 | V | 3.54 | 22.60 | 3.00 | 36.96 | -60.42 | -13.00 | 47.42 |

Test Data: Middle Frequency

| Tuned Frequency (MHz) | Emission Frequency (MHz) | Detector | Meter Reading (dBµV) | Antenna Polarity | Coax Loss (dB) | Correction Factor (dB/m) | Distance (m) | Field Strength (dBµV/m) | ERP (dBm) | Limit (dBm) | Margin (dBm) |
|-----------------------|--------------------------|----------|----------------------|------------------|----------------|--------------------------|--------------|-------------------------|-----------|-------------|--------------|
| 98.00 | 196.00 | PK | 33.97 | V | 1.61 | 15.90 | 3.00 | 51.48 | -45.90 | -13.00 | 32.90 |
| 98.00 | 196.00 | PK | 32.21 | H | 1.61 | 15.90 | 3.00 | 49.72 | -47.66 | -13.00 | 34.66 |
| 98.00 | 294.00 | PK | 13.40 | H | 2.08 | 13.12 | 3.00 | 28.60 | -68.78 | -13.00 | 55.78 |
| 98.00 | 294.00 | PK | 19.31 | H | 2.08 | 13.12 | 3.00 | 34.51 | -62.87 | -13.00 | 49.87 |
| 98.00 | 392.00 | PK | 22.98 | H | 2.27 | 14.60 | 3.00 | 39.85 | -57.53 | -13.00 | 44.53 |
| 98.00 | 392.00 | PK | 20.16 | V | 2.27 | 14.60 | 3.00 | 37.03 | -60.35 | -13.00 | 47.35 |
| 98.00 | 490.00 | PK | 15.08 | V | 2.62 | 16.80 | 3.00 | 34.50 | -62.88 | -13.00 | 49.88 |
| 98.00 | 490.00 | PK | 9.64 | H | 2.62 | 16.80 | 3.00 | 29.06 | -68.32 | -13.00 | 55.32 |
| 98.00 | 588.00 | PK | 9.76 | H | 2.87 | 18.48 | 3.00 | 31.11 | -66.27 | -13.00 | 53.27 |
| 98.00 | 588.00 | PK | 10.17 | V | 2.87 | 18.48 | 3.00 | 31.52 | -65.86 | -13.00 | 52.86 |
| 98.00 | 686.00 | PK | 9.45 | V | 3.06 | 20.64 | 3.00 | 33.15 | -64.23 | -13.00 | 51.23 |

Test Data: High Frequency

| Tuned Frequency (MHz) | Emission Frequency (MHz) | Detector | Meter Reading (dBµV) | Antenna Polarity | Coax Loss (dB) | Correction Factor (dB/m) | Distance (m) | Field Strength (dBµV/m) | ERP (dBm) | Limit (dBm) | Margin (dBm) |
|-----------------------|--------------------------|----------|----------------------|------------------|----------------|--------------------------|--------------|-------------------------|-----------|-------------|--------------|
| 108.00 | 216.00 | PK | 18.91 | V | 1.67 | 10.38 | 3.00 | 30.96 | -66.42 | -13.00 | 53.42 |
| 108.00 | 216.00 | PK | 24.20 | H | 1.67 | 10.38 | 3.00 | 36.25 | -61.13 | -13.00 | 48.13 |
| 108.00 | 324.00 | PK | 10.36 | H | 2.09 | 13.74 | 3.00 | 26.19 | -71.19 | -13.00 | 58.19 |
| 108.00 | 324.00 | PK | 9.73 | V | 2.09 | 13.74 | 3.00 | 25.56 | -71.82 | -13.00 | 58.82 |
| 108.00 | 432.00 | PK | 14.16 | V | 2.38 | 15.88 | 3.00 | 32.42 | -64.95 | -13.00 | 51.95 |
| 108.00 | 432.00 | PK | 14.05 | H | 2.38 | 15.88 | 3.00 | 32.31 | -65.06 | -13.00 | 52.06 |
| 108.00 | 540.00 | PK | 10.98 | H | 2.78 | 17.40 | 3.00 | 31.16 | -66.22 | -13.00 | 53.22 |
| 108.00 | 540.00 | PK | 12.98 | V | 2.78 | 17.40 | 3.00 | 33.16 | -64.22 | -13.00 | 51.22 |
| 108.00 | 648.00 | PK | 14.01 | V | 2.96 | 19.72 | 3.00 | 36.69 | -60.69 | -13.00 | 47.69 |
| 108.00 | 648.00 | PK | 7.92 | H | 2.96 | 19.72 | 3.00 | 30.60 | -66.78 | -13.00 | 53.78 |
| 108.00 | 756.00 | PK | 8.91 | H | 3.23 | 20.98 | 3.00 | 33.12 | -64.26 | -13.00 | 51.26 |
| 108.00 | 756.00 | PK | 11.23 | V | 3.23 | 20.98 | 3.00 | 35.44 | -61.94 | -13.00 | 48.94 |
| 108.00 | 864.00 | PK | 12.93 | V | 3.50 | 22.36 | 3.00 | 38.79 | -58.59 | -13.00 | 45.59 |
| 108.00 | 864.00 | PK | 10.10 | H | 3.50 | 22.36 | 3.00 | 35.96 | -61.42 | -13.00 | 48.42 |
| 108.00 | 972.00 | PK | 11.12 | H | 3.66 | 22.72 | 3.00 | 37.50 | -59.88 | -13.00 | 46.88 |
| 108.00 | 972.00 | PK | 11.23 | V | 3.66 | 22.72 | 3.00 | 37.61 | -59.77 | -13.00 | 46.77 |
| 108.00 | 1080.00 | PK | 11.37 | V | 3.81 | 27.00 | 3.00 | 42.18 | -55.20 | -13.00 | 42.20 |
| 108.00 | 1080.00 | PK | 11.58 | H | 3.81 | 27.00 | 3.00 | 42.39 | -54.99 | -13.00 | 41.99 |

FREQUENCY STABILITY

Rule Parts. No.: Part 2.1055(a)(3), Part 73.1545(b), BETS-6 6.2.2

Test Requirements: Part 2.1055(A) (3)

§2.1055 Measurements required: Frequency stability.

(a) The frequency stability shall be measured with variation of ambient temperature as follows:

(1) From -30° to $+50^{\circ}$ centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.

(3) From 0° to $+50^{\circ}$ centigrade for equipment to be licensed for use in the Radio Broadcast Services under part 73 of this chapter.

Test Requirements: Part 73.1545(b)

§73.1545 Carrier frequency departure tolerances.

(b) *FM stations.* (1) The departure of the carrier or center frequency of an FM station with an authorized transmitter output power more than 10 watts may not exceed ± 2000 Hz from the assigned frequency.

Test Requirements: BETS-6 6.2.2

6.2 Carrier Frequency Stability

6.2.1 Definition

The carrier frequency stability is the ability of the transmitting equipment to maintain a mean test frequency.

6.2.2 Method of Measurement

After a warm-up period of one hour at rated AC input voltage, measure the frequency of the carrier at one minute intervals during a period of fifteen minutes. From these measurements, determine a mean test frequency. Then, measure and record the operating frequency at a temperature of 5°C at 85, 100 and 115% of the rated AC supply voltage. Repeat for a temperature of 45°C .

Where it is not practical to subject the complete transmitting equipment to the specified test conditions, it is permissible to isolate and separately measure the stability of the frequency-determining elements of the transmitting equipment under the specified conditions.

6.2.3 Standard

The frequency of the carrier shall remain within ± 1 kHz of the mean test frequency.

Method of Measurements: ANSI C63.26 5.6

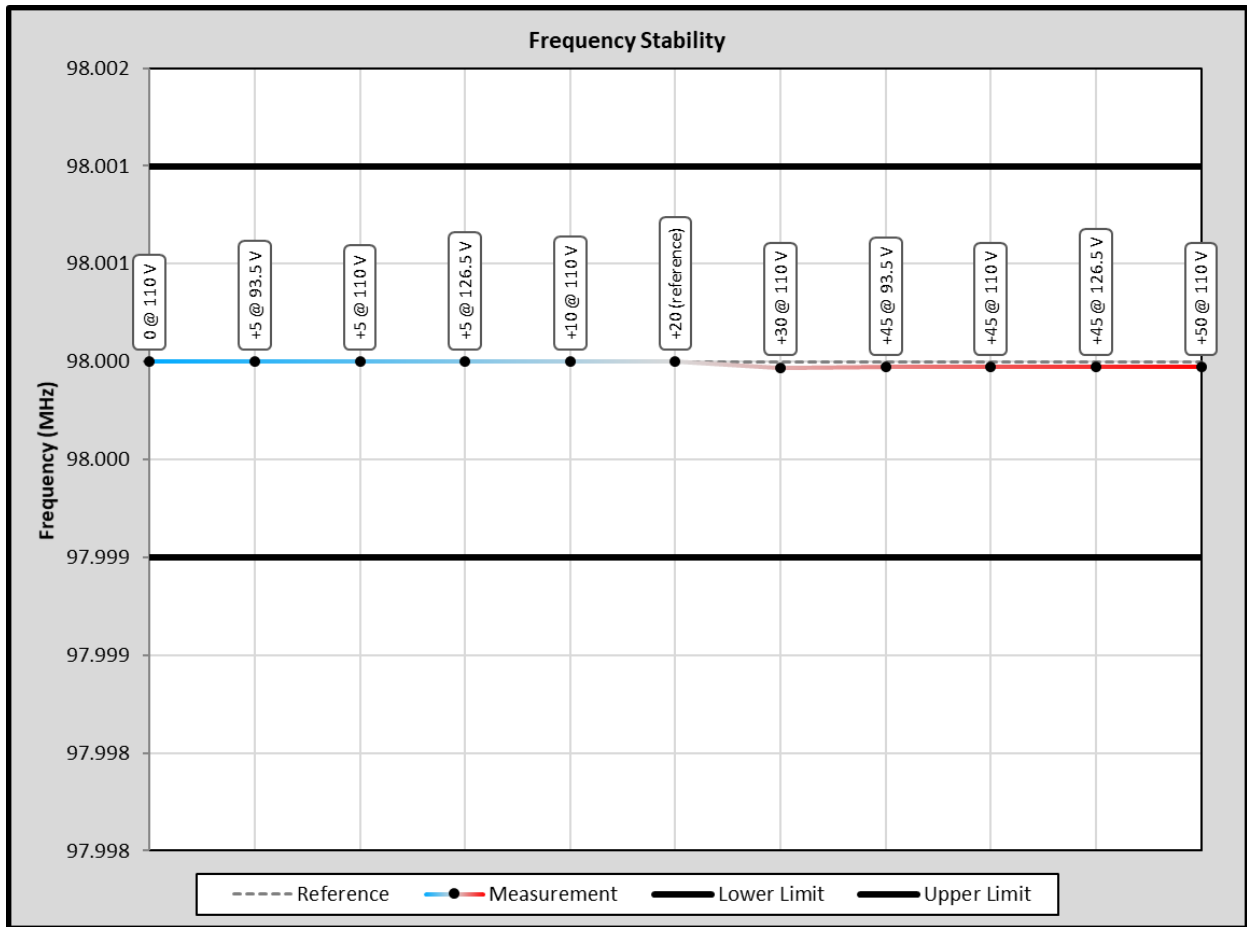
FREQUENCY STABILITY

Test Data: Frequency Stability Table

| Minimum of FCC PT 74 & BETS-6 Limit | 1 | +/- kHz | |
|-------------------------------------|----------------------|--|-----------------|
| Lower Limit | 97.998999 | MHz | |
| Upper Limit | 98.000999 | MHz | |
| Rated Supply Voltage | 110.0 | <input checked="" type="radio"/> AC <input type="radio"/> DC | |
| Temperature / Voltage Variation | | | |
| Temperature (°C) | Supplied Voltage (V) | Frequency (MHz) | Deviation (kHz) |
| 0 | 110.0 | 97.999999 | 0.002 |
| +5 | 93.5 | 98.000001 | -0.002 |
| +5 | 110.0 | 98.000001 | -0.002 |
| +5 | 126.5 | 98.000001 | -0.002 |
| +10 | 110.0 | 98.000001 | 0.000 |
| +20 (reference) | 110 | 97.999999 | 0.000 |
| +30 | 110.0 | 97.999969 | 0.032 |
| +45 | 93.5 | 97.999972 | 0.027 |
| +45 | 110.0 | 97.999972 | 0.027 |
| +45 | 126.5 | 97.999972 | 0.027 |
| +50 | 110.0 | 97.999972 | 0.029 |

FREQUENCY STABILITY

Test Data: Frequency Stability Plot



STATEMENT OF MEASUREMENT UNCERTAINTY

The data and results referenced in this document are true and accurate. The measurement uncertainty was calculated for all measurements listed in this test report according To CISPR 16-4 or ENTR 100-028 Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: “Uncertainty in EMC Measurements” and is documented in the Timco Engineering, Inc. quality system according to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Timco Engineering, Inc. is reported:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=1.96$.

| Test Items | Measurement Uncertainty | Notes |
|--|------------------------------|-------|
| RF Frequency Accuracy | ± 49.5 Hz | (1) |
| RF Conducted Power | ± 0.93 dB | (1) |
| Conducted spurious emission of transmitter valid up to 40GHz | ± 1.86 dB | |
| Occupied Bandwidth | ± 2.65 % | |
| Audio Frequency Response | ± 1.86 dB | |
| Modulation limiting | ± 1.88 % | |
| Radiated RF Power | ± 1.4 dB | |
| Maximum frequency deviation: Within 300 Hz and 6 kHz of audio freq. Within 6 kHz and 25 kHz of audio freq. | ± 1.88 % ± 2.04 % | |
| Rad Emissions Sub Meth up to 26.5GHz | ± 2.14 dB | |
| Rad Emissions Sub Meth up to 18-40 GHz | ± 2.04 % | |
| Adjacent channel power | ± 1.47 dB | (1) |
| Intermodulation - Tx | ± 2.07 dB | |
| Noise Figure | ± 1.00 dB | |
| Transient Frequency Response | ± 1.88 % | |
| Temperature | ± 1.0 °C | (1) |
| Humidity | ± 5.0 % | |
| Radiated Emissions to 6.0GHz | ± 4.4 dB | |
| Power line conducted emissions | ± 3.9 dB | |

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=1.96$.

EQUIPMENT LIST

| Device | Manufacturer | Model | Serial Number | Cal/Char Date | Due Date |
|--|--------------------|------------------------------|--|---------------|------------|
| CHAMBER | Panashield | 3M | N/A | 03/12/19 | 03/12/21 |
| Antenna: Active Loop | ETS-Lindgren | 6502 | 00062529 | 12/11/17 | 12/11/19 |
| Antenna: Biconical 1057 | Eaton | 94455-1 | 1057 | 12/13/17 | 12/13/19 |
| Antenna: Log-Periodic 1243 | Eaton | 96005 | 1243 | 04/20/18 | 04/20/21 |
| Antenna: Double-Ridged Horn/ETS Horn 1 | ETS-Lindgren | 3117 | 00035923 | 01/30/17 | 01/30/20 |
| Coaxial Cable - Chamber 3 cable set (backup) | Micro-Coax | Chamber 3 cable set (backup) | KMKM-0244-02 KMKM-0670-01 KFKF-0197-00 | 02/27/19 | 02/27/21 |
| Software: Field Strength Program | Timco | N/A | Version 4.10.7.0 | N/A | N/A |
| EMI Test Receiver R & S ESU 40 | Rohde & Schwarz | ESU 40 | 100320 | 08/28/18 | 08/28/20 |
| Comb Generator | Com-Power Corp | CGO-515 | 291728 | NA | NA |
| Function Generator | Standford | DS340 | 25200 | 02/21/18 | 02/21/20 |
| Modulation Analyzer | HP | 8901A | 3050A05856 | 04/13/17 | 04/13/20 |
| Audio Analyzer | HP | 8903B | 3011A13084 | 02/20/18 | 02/20/20 |
| Audio Load | Heathkit | ID-5252 | 00714 | NA | NA |
| Temperature Chamber LARGE | Tenney Engineering | TTRC | 11717-7 | NA | NA |
| Type K J Thermometer | Martel | 303 | 080504494 | 11/06/17 | 11/06/19 |
| Frequency Counter Small Chamber | HP | 5385A | 3242A07460 | 08/22/17 | 08/22/19 |
| High Power Attenuator NFNF 30dB 2000W DC-1G | Bird | 8329-300 | 4980 | 08/01/2019 | 08/01/2021 |
| Attenuator N 30dB 500W DC-2.5G | Bird | 8325 | 1761 | 08/01/2019 | 08/01/2021 |
| Attenuator N 30dB 100W DC-6G | Pasternack | PE7214-30 | #110 | 08/01/2019 | 08/01/2021 |
| Attenuator N 20dB 20W DC-4G | Narda | 766-20 | 0605 | 08/01/2019 | 08/01/2021 |
| Attenuator N 10dB 20W DC-4G | Narda | 766-10 | 0010 | 08/01/2019 | 08/01/2021 |
| Tunable Notch Filter 54-210 MHz | Eagle | 210BFBF | 54-210 MHz (#42) | 08/01/2019 | 08/01/2021 |
| Coaxial Cable - BMBM-0061-01 RG400 | Pasternack | PE3582LF-24 | BMBM-0061-01 | 08/01/2019 | 08/01/2021 |
| Coaxial Cable - BMBM-0184-01 Silver | TEK | | BMBM-0184-01 | 08/01/2019 | 08/01/2021 |
| Coaxial Cable - BMBM-0183-01 RG400 | Pasternack | PE3582LF-72 | BMBM-0183-01 | 08/01/2019 | 08/01/2021 |
| XLR Breakout Cable (input) | Timco | n/a | n/a | n/a | n/a |

*EMI RECEIVER SOFTWARE VERSION

The receiver firmware used was version 4.43 Service Pack 3

END OF REPORT

Applicant: R.V.R. USA
 FCC ID: RHDTEX-30LCD
 IC: 25290-TEX30LCD
 Report: 1994UT19TestReport_Rev2