



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	RHDTX-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	☒ PASS ☐ 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.

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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	☒ 110–120Vac/50– 60Hz
	☐ DC Power
	☐ Battery Operated Exclusively
Test Item	☐ Prototype
	☒ Pre-Production
	☐ Production
Type of Equipment	☒ Fixed
	☐ Mobile
	☐ 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.

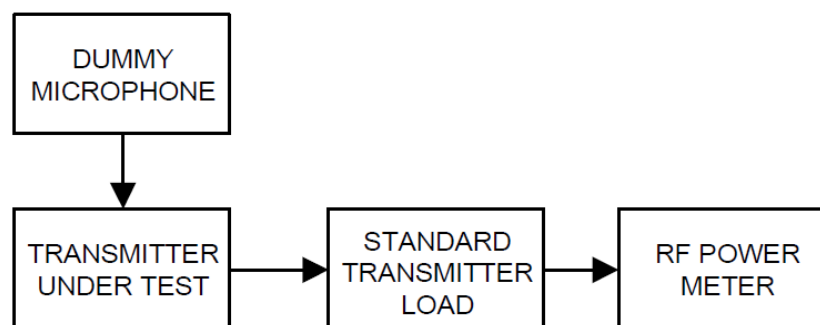
Test Requirements: BETS-6 6.1.3

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:

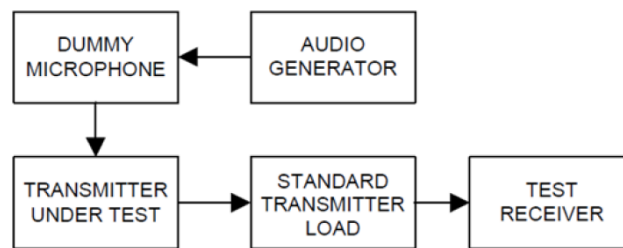
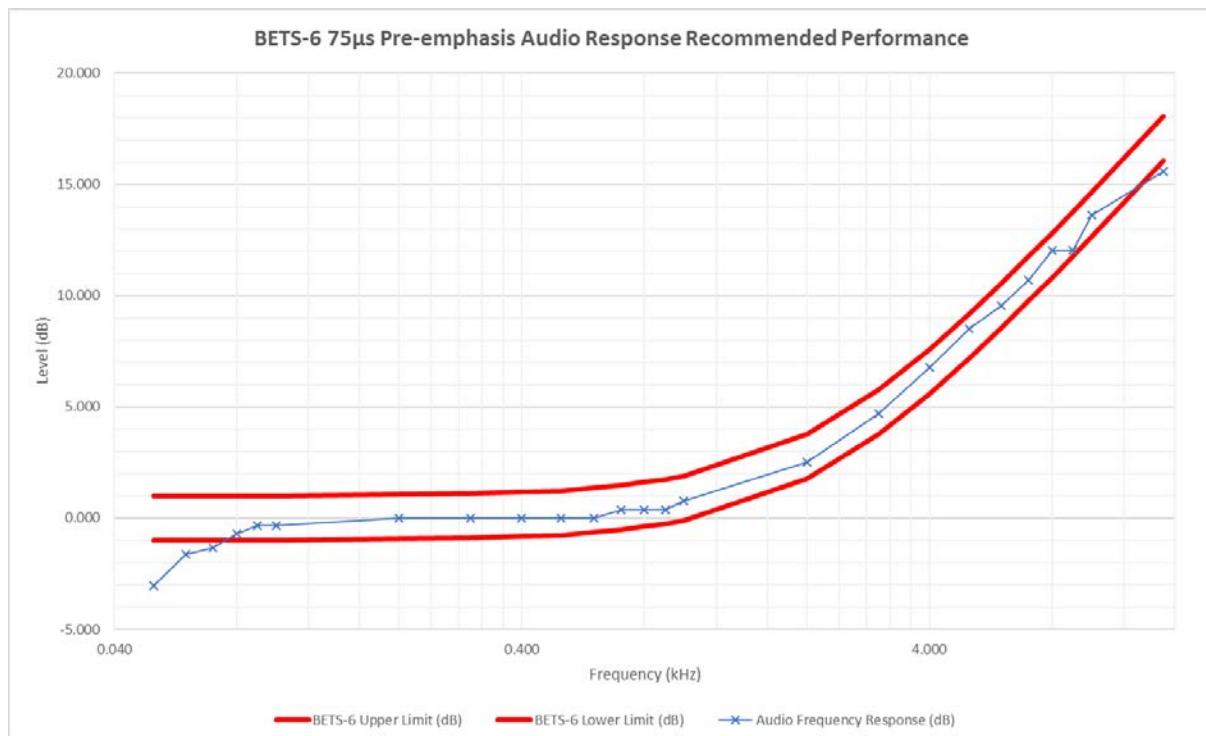


Figure 3—Equipment set-up audio frequency response (constant input)

Test Data: Audio Frequency Response Plot



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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

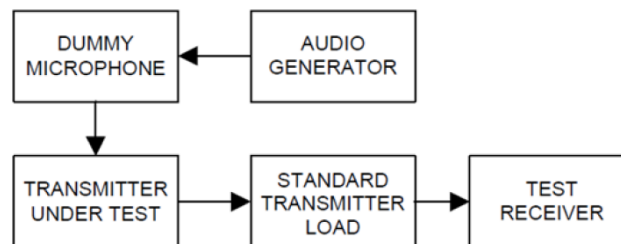


Figure 3—Equipment set-up audio frequency response (constant input)

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.

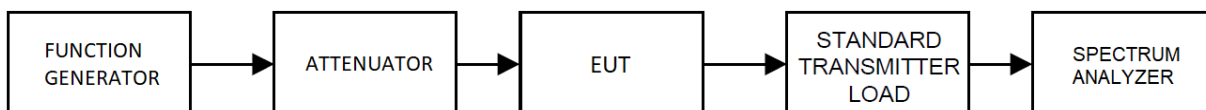
Requirement: BETS-6 6.3.3

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

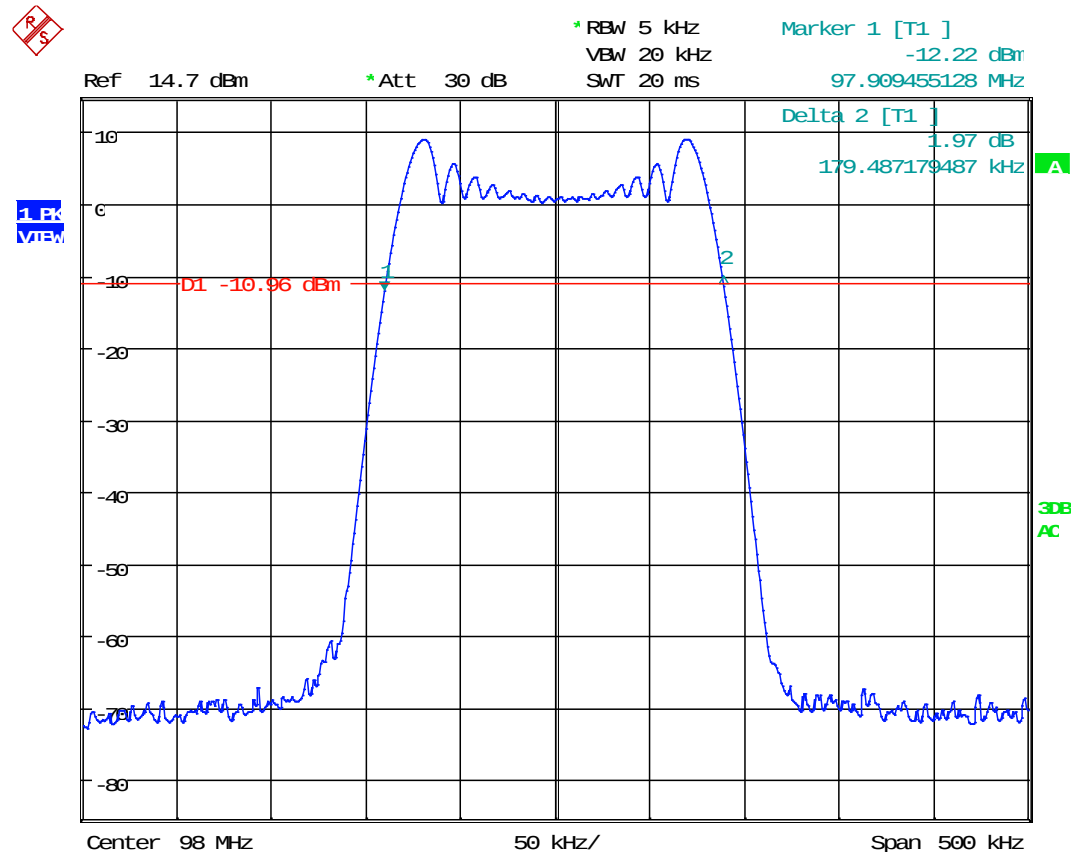
Test Setup Diagram:



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OCCUPIED BANDWIDTH & EMISSION MASK

20dB OCCUPIED BANDWIDTH PLOT Middle of band

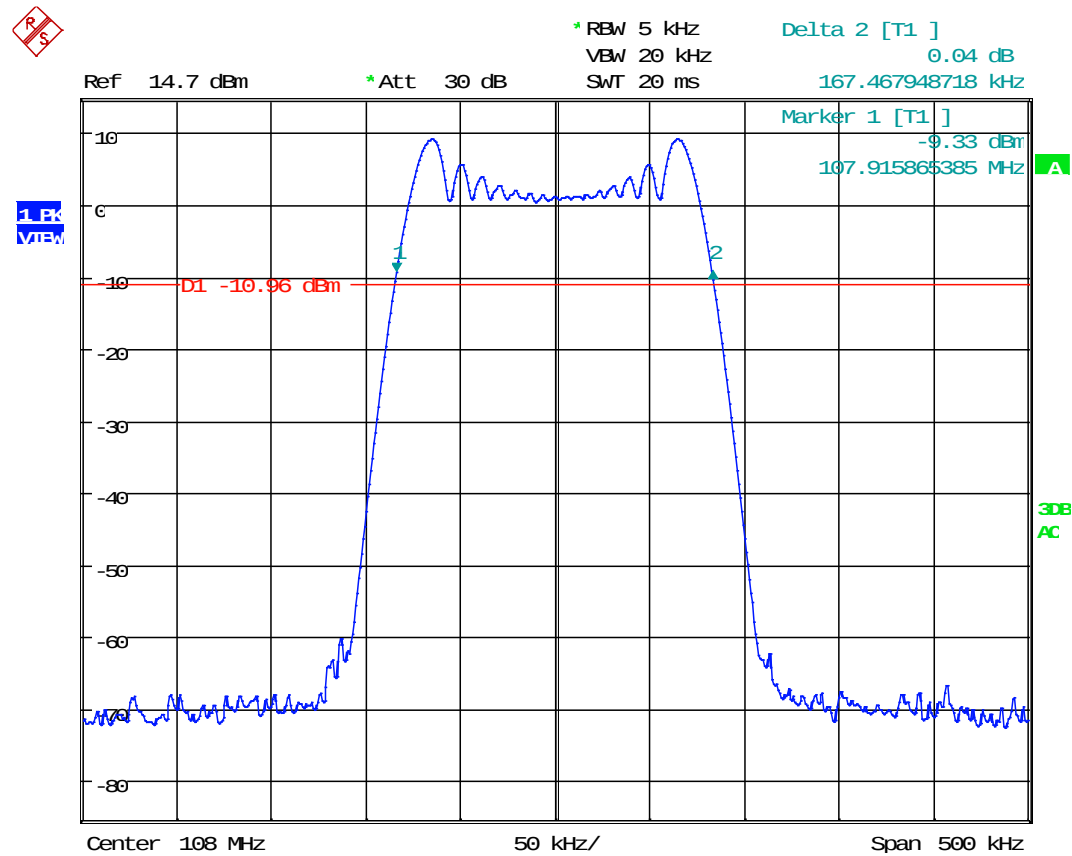


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OCCUPIED BANDWIDTH & EMISSION MASK

20dB OCCUPIED BANDWIDTH PLOT High End of band

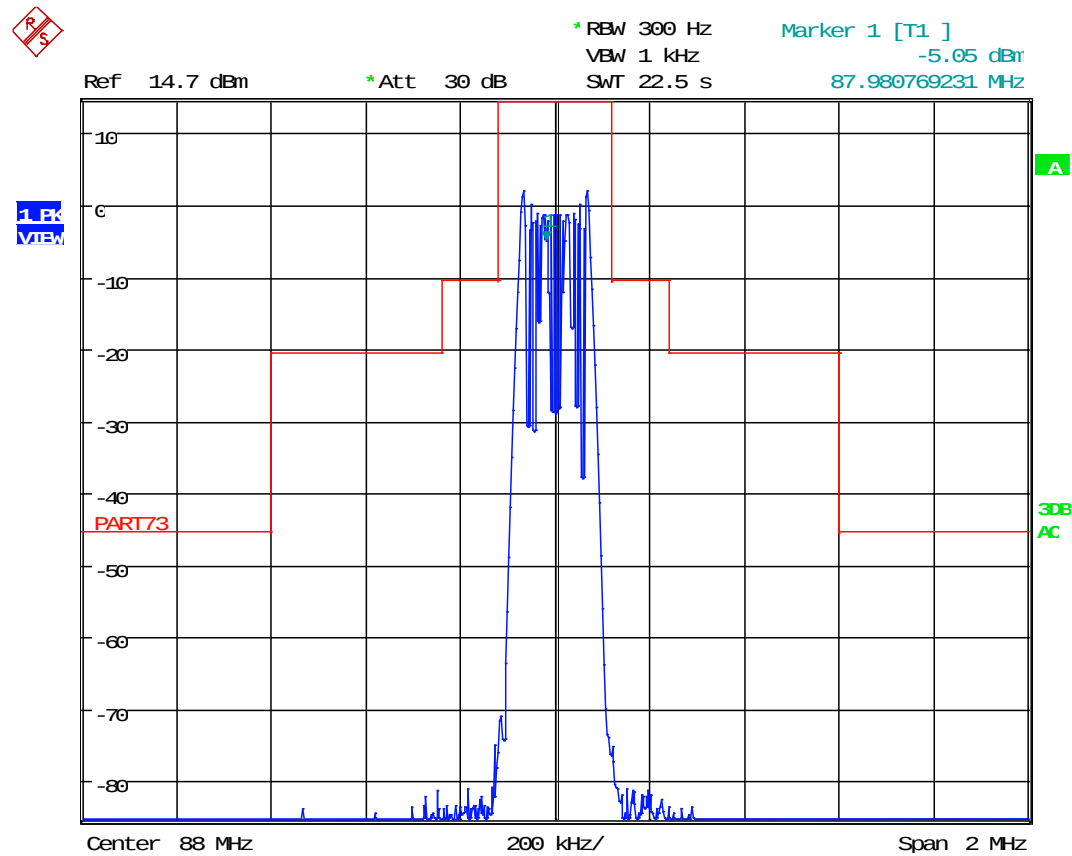


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Applicant: R.V.R. USA
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OCCUPIED BANDWIDTH & EMISSION MASK

EMISSION MASK PLOT Low End of band

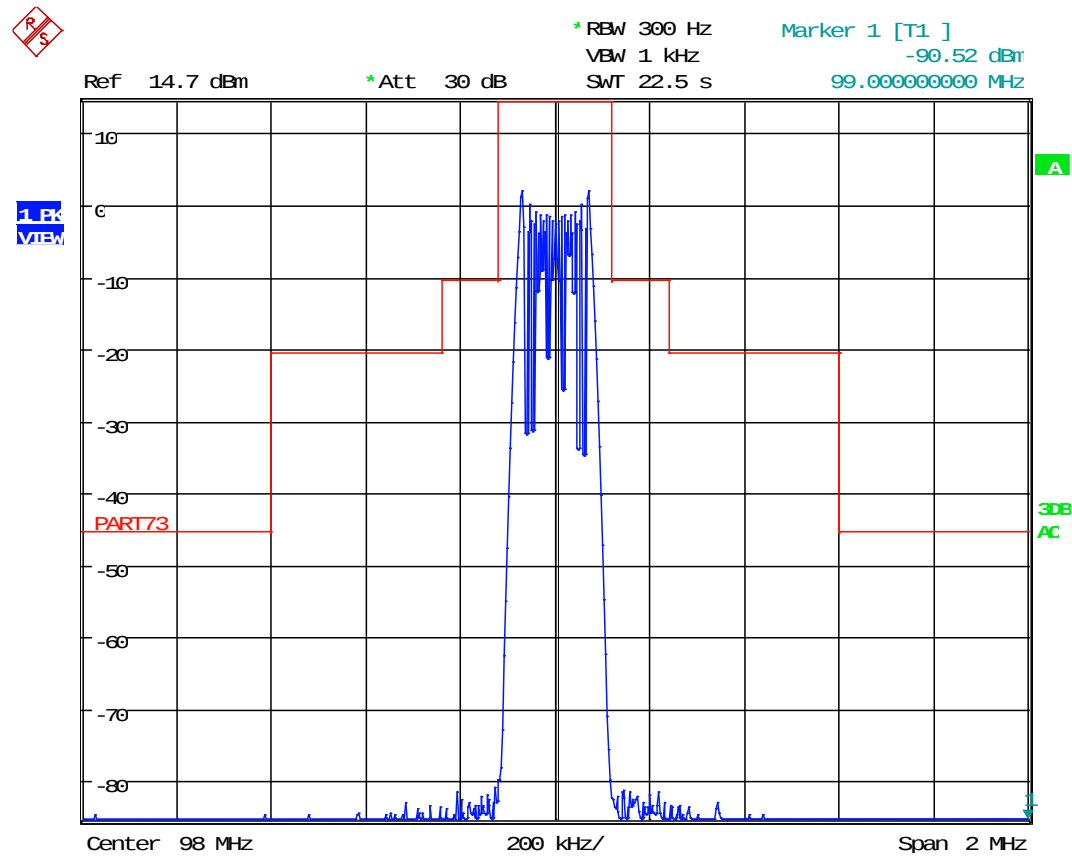


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Applicant: R.V.R. USA
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OCCUPIED BANDWIDTH & EMISSION MASK

EMISSION MASK PLOT Middle of band

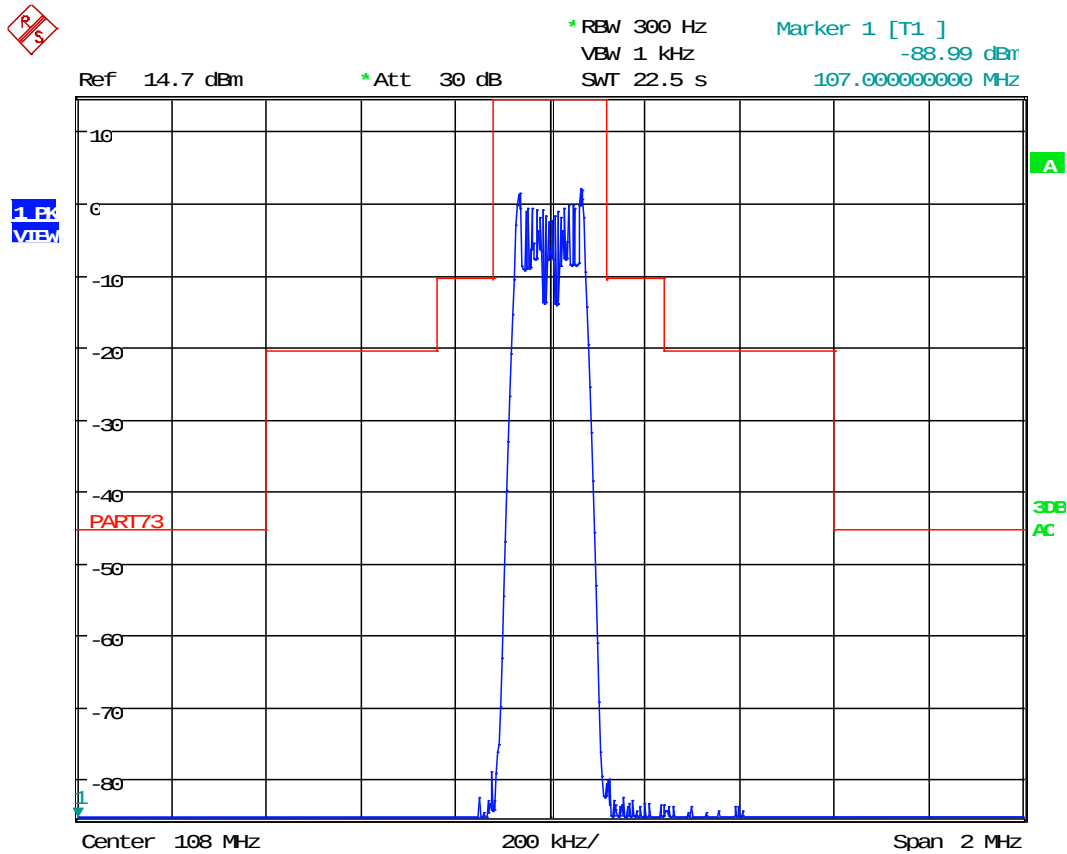


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Applicant: R.V.R. USA
FCC ID: RHDTEX-30LCD
IC: 25290-TEX30LCD
Report: 1994UT19TestReport_Rev2

OCCUPIED BANDWIDTH & EMISSION MASK

EMISSION MASK PLOT High End of band



Date: 16.AUG.2019 17:49:20

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

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.

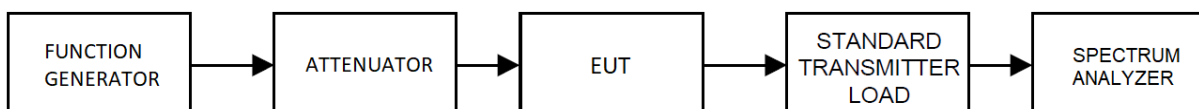
Test Requirements: BETS-6 6.3.3

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

$-(43 + 10 \log P)$ dB
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)

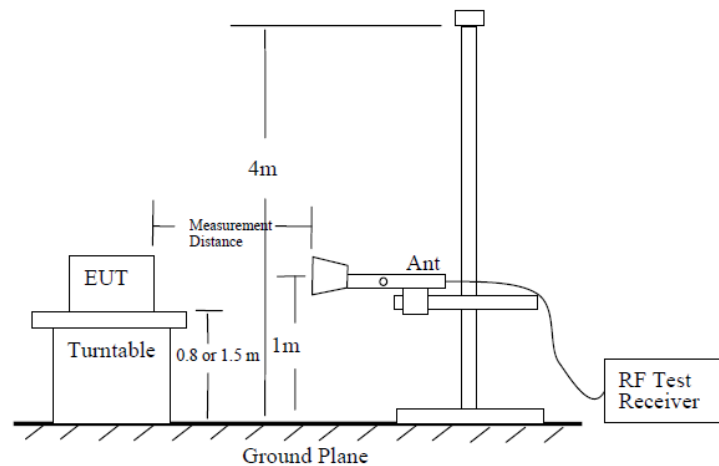
(d) Any emission appearing on a frequency removed from the carrier by more than 600 kHz must be attenuated at least $43 + 10 \log_{10}(\text{Power, in watts})$ dB below the level of the unmodulated carrier, or 80 dB, whichever is the lesser attenuation.

Test Requirements: BETS-6 6.3.3

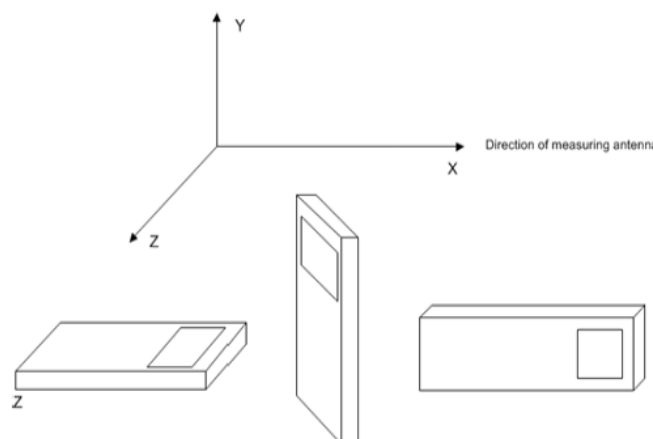
More than 600 kHz from the carrier frequency, whichever is the stronger

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

Test Site Setup:



EUT Orientation(s):



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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

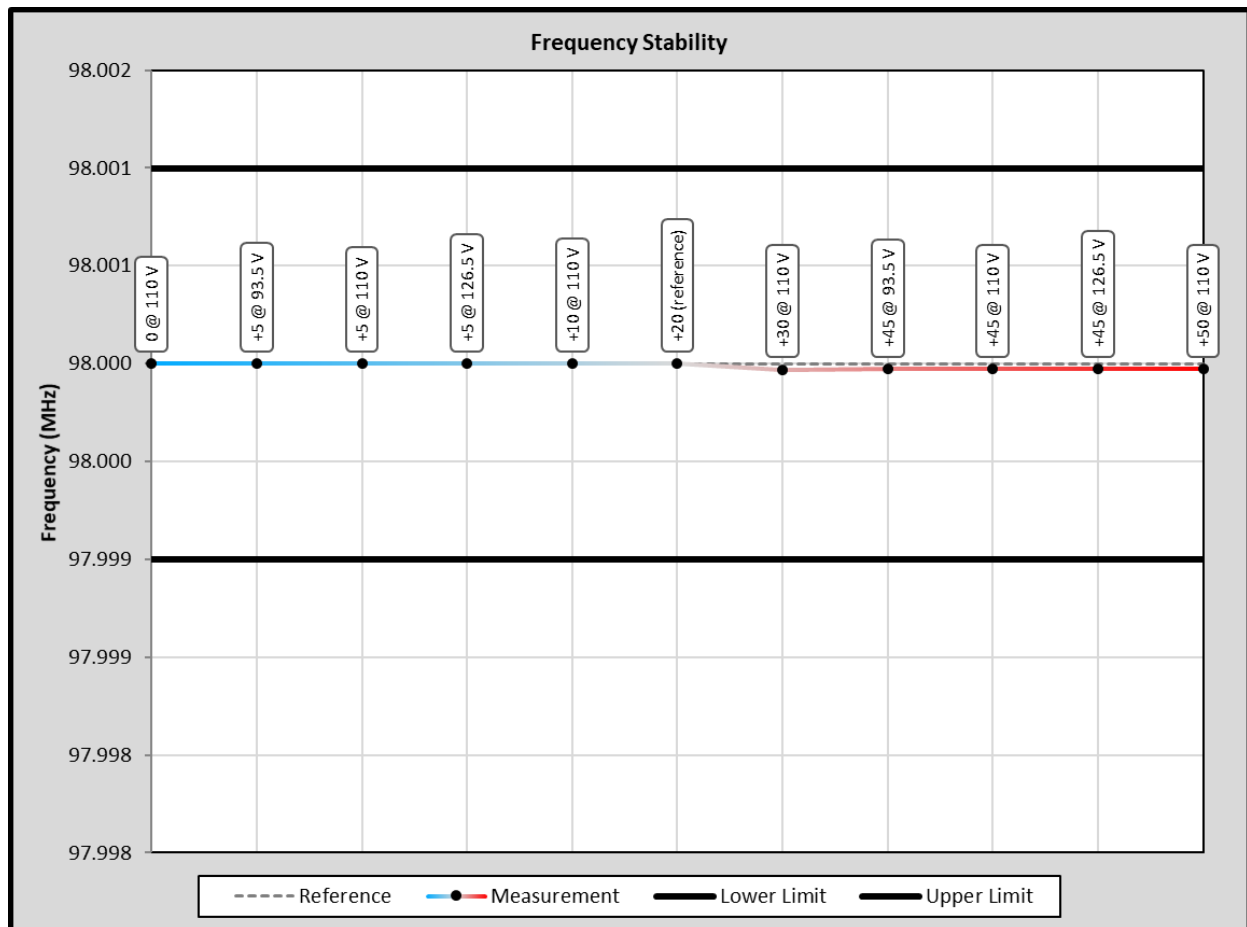
FREQUENCY STABILITY

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	☒ AC ☐ 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	$\pm 1.0^{\circ}$ 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