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FCC PART 80
TEST REPORT

APPLICANT	TAIT LIMITED
	535 Wairakei Road P.O. Box 1645 Christchurch, 8140 New Zealand
FCC ID	CASTMBC0A
MODEL NUMBER	TMBC0A
PRODUCT DESCRIPTION	25W MOBILE TRANSCEIVER
DATE SAMPLE RECEIVED	11/15/2017
FINAL TEST DATE	01/02/2018
TESTED BY	Franklin Rose
APPROVED BY	Tim Royer
TEST RESULTS	☒ PASS ☐ FAIL

Report Number	Version Number	Description	Issue Date
1976UT17TestReport_Rev	Rev1	Initial Issue	01/03/2018
1976UT17TestReport_Rev	Rev2	Clerical Updates	01/17/2018
1976UT17TestReport_Rev	Rev3	Clerical Corrections	02/19/2018

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GENERAL REMARKS

The attached report shall not be reproduced except in full without the written permission of Timco Engineering Inc.

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

Tested by:
Name and Title: Franklin Rose, Project Manager/Testing Technician

Date: 01/02/2018

Reviewed and approved by:
Name and Title: Tim Royer, Engineer

Date: 01/09/2018

GENERAL INFORMATION

EUT Specification

EUT Description	25W MOBILE TRANSCEIVER
FCC ID	CASTMBC0A
Model Number	TMBC0A
Operating Frequency	217 – 220 MHz
Maritime Device Type	AMTS band Private Mobile Radio Service Device (per FCC CFR 47 Part 80.475(c)(d))
Test Frequencies	217.5, 219.5 MHz
Type of Emission	11K0F3E, 7K60F2D, 7K60FXD, 7K60FXW
Modulation	FM
EUT Power Source	☐ 110–120Vac/50– 60Hz
	☒ DC Power (13.8 V)
	☐ Battery Operated Exclusively
Test Item	☐ Prototype
	☐ Pre-Production
	☒ Production
Type of Equipment	☐ Fixed
	☒ Mobile
	☐ Portable
Antenna Connector	BNC
Test Conditions	The temperature was 26ºC Relative humidity of 50%.
Modification to the EUT	None
Test Exercise	The EUT was placed in continuous transmit mode. The EUT was operated in “Test Mode” for digital emissions tests.
Applicable Standards	ANSI/TIA 603-E:2016, FCC CFR 47 Part 2, Part 80
Test Facility	**Timco Engineering Inc. at 849 NW State Road 45 Newberry, FL 32669 USA.**

EUT Specification, Con't.

Equip. Type	Type Code	FCC ID	Product code	Serial Number
Mobile	TMBC0A	CASTMBC0A	T02-00012-CBAA	20466893

Type	Code and Version	Target Hardware
Hardware ID	TMBC12-0100_0007	Head
Boot Code	QCB1B_S00_3.01.03.0001	Head
Radio Application	QCB1F_S00_1.01.08.1023	Head
FPGA Image	QCB1G_S01_1.07.01.0001	Head
Hardware ID	TMBB12-C000_0008	Torso
Boot Code	QMB1B_S00_3.01.03.0001	Torso
DSP	QMB1A_E00_2.15.01.0060	Torso
Radio Application	QMB1F_E00_2.15.01.0060	Torso
Firmware Package	QI93M_E00_2.15.01.0060	Torso
FPGA Image	QMB1G_S01_1.11.00.0001	Torso

RESULTS SUMMARY

Rule Part No.	Test Item	Results
80.203(c)	< 5 min. Tx maximum	PASS
2.1046(a), 80.215(e)(2)	RF Power Output < 25 W	PASS
2.1033(c)(4), 80.205(b), 80.213(a), 80.207	Modulation Characteristics	PASS
2.1047(a)(b)	Audio Frequency Response and Low Filter	PASS
2.1047(b), 80.213 (a)(2) & (b)	Audio Input Vs Modulation	PASS
2.1049(c), 80.211 (f)(1)(2)	Occupied Bandwidth	PASS
2.1051(a), 80.211(f)(3)	Spurious Emissions at Antenna Terminals	PASS
2.1053(a), 80.211(f)(3)	Field Strength of Spurious Emissions	PASS
2.1055(a)(2), 80.209(a)	Frequency Stability < 5 ppm	PASS

TECHNICAL DATA

80.203 (c) Five minutes continuous transmission test. The antenna was connected to a dummy load and the radio was locked in a transmit PTT mode. An external timer digital clock was used to observe the duration of the Un-modulated transmission. The transmitter turned off and the radio went to receive mode at **5 minutes, 0 seconds** as displayed by the external digital clock.

RF POWER OUTPUT

FCC Rule Parts: FCC Part 2.1046(a), 80.215(e)(2)

Test Requirements: The maximum power must not exceed the values listed below.

> (e) *Ship stations frequencies above 27500 kHz.* The maximum power must not exceed the values listed below.
>
> (2) Ship stations 216-220 MHz—25W[7]
>
> [7][Reserved]

Method of Measurement: ANSI/TIA-603-E

Test Data: **Power Measurement Table**

Peak Output Power				
Tuned Freq. MHz	**dBm**		**Watts**	
	High	**Low**	**High**	**Low**
217.5000	43.40	29.63	21.88	0.92
219.5000	43.40	29.65	21.88	0.92

80.211(f)(3) – 250% of the Authorized Bandwidth may not exceed 43+10 log(Mean Power in Watts). The Mean Power Output has been measured below:

Mean Output Power				
Tuned Freq. MHz	**dBm**		**Watts**	
	High	**Low**	**High**	**Low**
217.5000	43.39	29.62	21.83	0.92
219.5000	43.39	29.64	21.83	0.92

Part 2.1033 (c)(8) DC Input into Final Amplifier

FOR LOW POWER SETTING INPUT POWER: (13.8V) (1.13 A) = **15.6 Watts**

FOR HIGH POWER SETTING INPUT POWER: (13.8V) (4.6 A) = **63.5 Watts**

Result: **Meets Requirements**

MODULATION CHARACTERISTICS (11K0F3E & 7K60F2D)

FCC Rule Parts: Part 2.1033(c)(4), 80.205(a), 80.207, 80.213(b)

Test Data: **11K0F3E Bandwidth Calculation**

Bn = 2M + 2DK
Bn = 2(3.0 kHz) +2(2.5 kHz)(1) = **11.0 kHz**

Where:
M = 3.0 (Highest Modulation Frequency, kHz)
D = 2.5 kHz (Peak Deviation, kHz)
K = 1 (FM Constant)

Test Data: **7K60F2D Bandwidth Calculation**

Bn = 2M + 2DK
Bn = 2(1.8 kHz) +2(2.0 kHz)(1) = **7.6 kHz**

Where:
M = 1.8 (Highest Modulation Frequency, kHz)
D = 2.0 kHz (Peak Deviation, kHz)
K = 1 (FM Constant)

Class of emission	Emission designator	Authorized bandwidth (kHz)
F2D[12]	16K0F2D	20.0
F3E[8]	16KOF3E	20.0

Note 12 – Not applicable to this band.
Note 8 – Not applicable to deviations below 5 kHz.

RESULT: 80.205(a) AUTHORIZED BANDWIDTH = 20.00 kHz

AUDIO FREQUENCY RESPONSE & LOW PASS FILTER RESPONSE

FCC Rule Parts: FCC Part 2.1047(a) (b)

Test Requirements: A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 – 5000Hz shall be submitted.

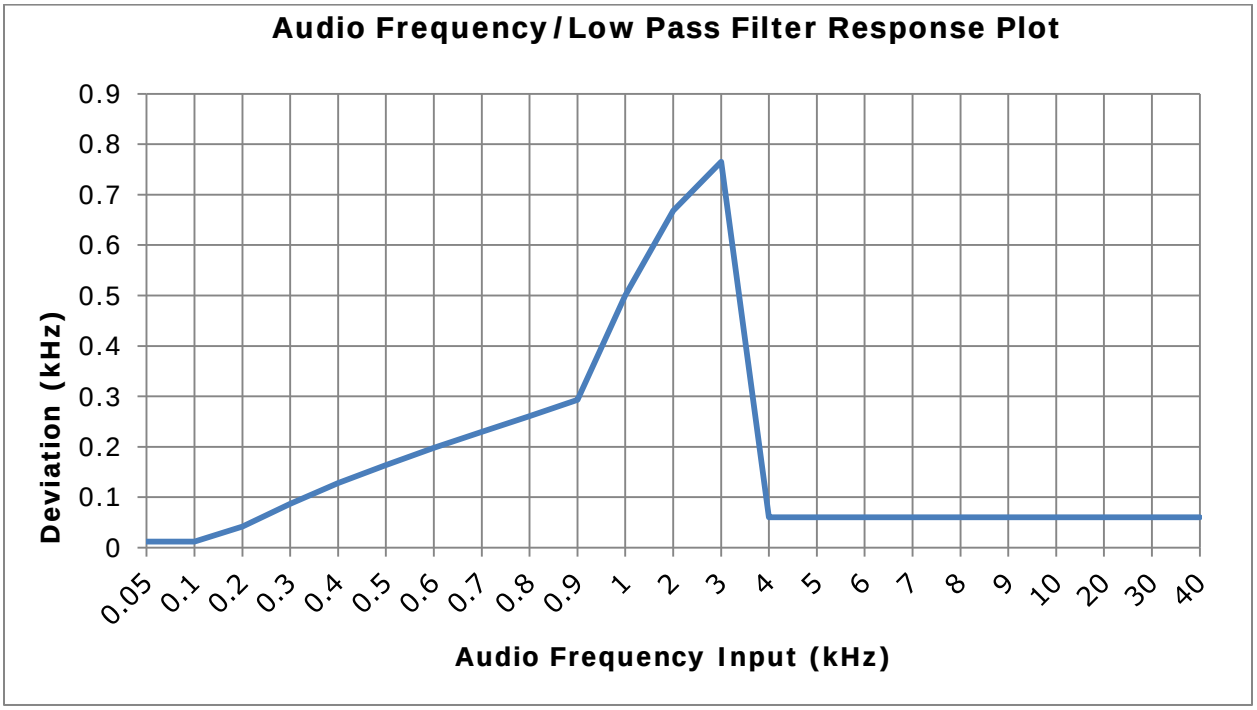
Method of Measurement: ANSI/TIA-603-E

FCC Rule Parts: 2.1047(a)

Test Requirements: For equipment required to have an audio low-pass filter, a curve showing the frequency response of the filter or of all the circuitry installed between the modulation limiter and the modulated stage shall be submitted.

Method of Measurement: ANSI/TIA-603-E

Test Data: **Audio Frequency & Low Pass Filter Response**



Frequency of Maximum Response: 3 kHz

RESULT: **Meets Requirements**

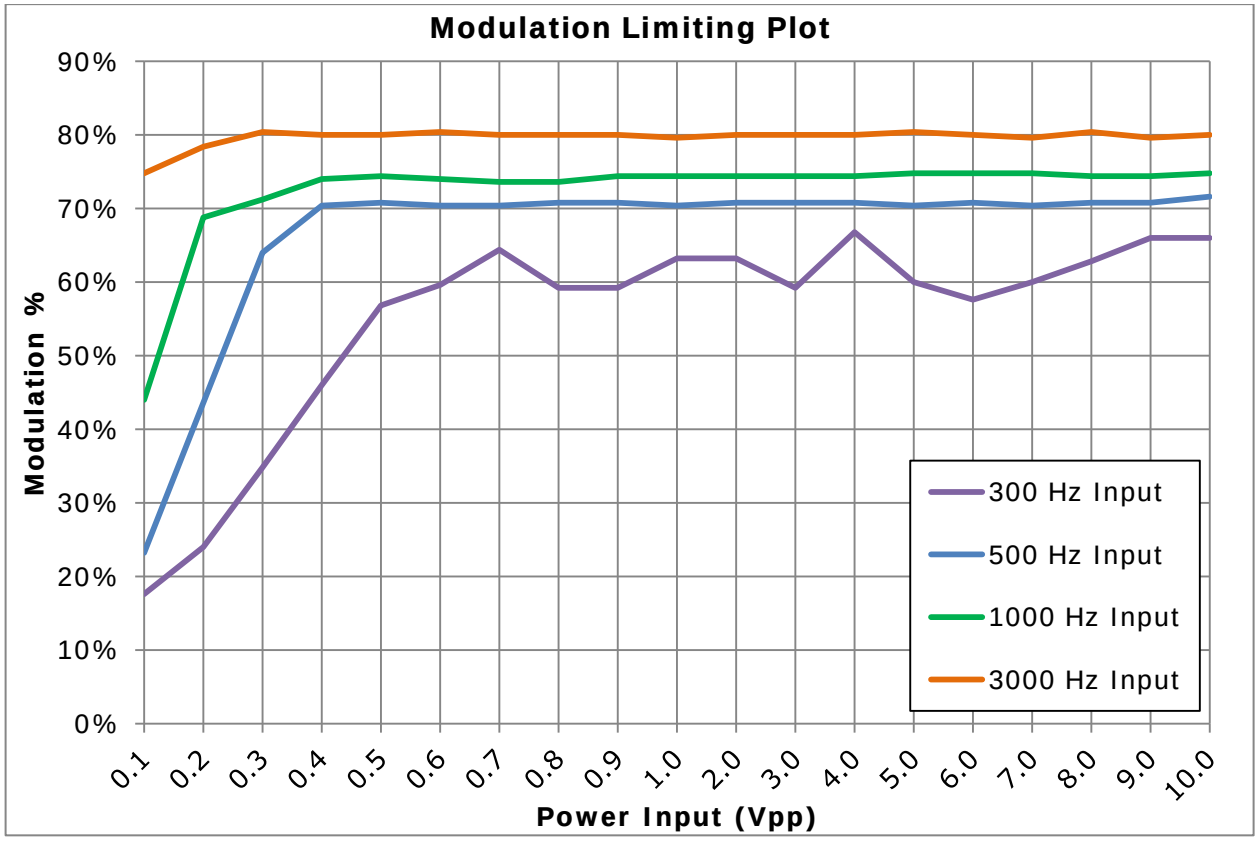
AUDIO INPUT VERSUS MODULATION

FCC Rule Parts: FCC Part 2.1047(b) & 80.213 (b)

Test Requirements: Radiotelephone transmitters using A3E, F3E and G3E emission must have a modulation limiter to prevent any modulation over 100 percent.

Method of Measurement: ANSI/TIA-603-E

Test data: **Modulation Limiting Plot**



Frequency of Maximum Response: 3 kHz

RESULT: **Meets Requirements**

MODULATION CHARACTERISTICS (7K60FXD/FXW)

FCC Rule Parts: Part 2.1033(c)(4), 80.481, 80.211(f)(1)(2)(3)

Test Data: **7K60FXD/FXW Bandwidth Calculation**

80.481

In lieu of the technical parameters set forth in this part, AMTS transmitters may utilize any modulation or channelization scheme so long as emissions are attenuated in accordance with §80.211 at the band edges of each station's assigned channel group or groups.

[65 FR 77827, Dec. 13, 2000]

80.211

(f) The mean power when using emissions other than those in paragraphs (a), (b), (c) and (d) of this section:

(1) On any frequency removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: At least 25 dB;

(2) On any frequency removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: At least 35 dB; and

(3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43 plus $10\log_{10}$ (mean power in watts) dB.

Note: Please refer to Occupied Bandwidth for data showing compliance with 80.211(f)(1) & (2), and Spurious Emissions at Antenna Terminals & Field Strength of Spurious Emissions for compliance with 80.211(f)(3).

RESULT: FXD/FXW - 99% Occupied Bandwidth = 8.41 kHz

OCCUPIED BANDWIDTH

FCC Rule Parts: 2.1049 (c), 80.211(f)(1)(2)

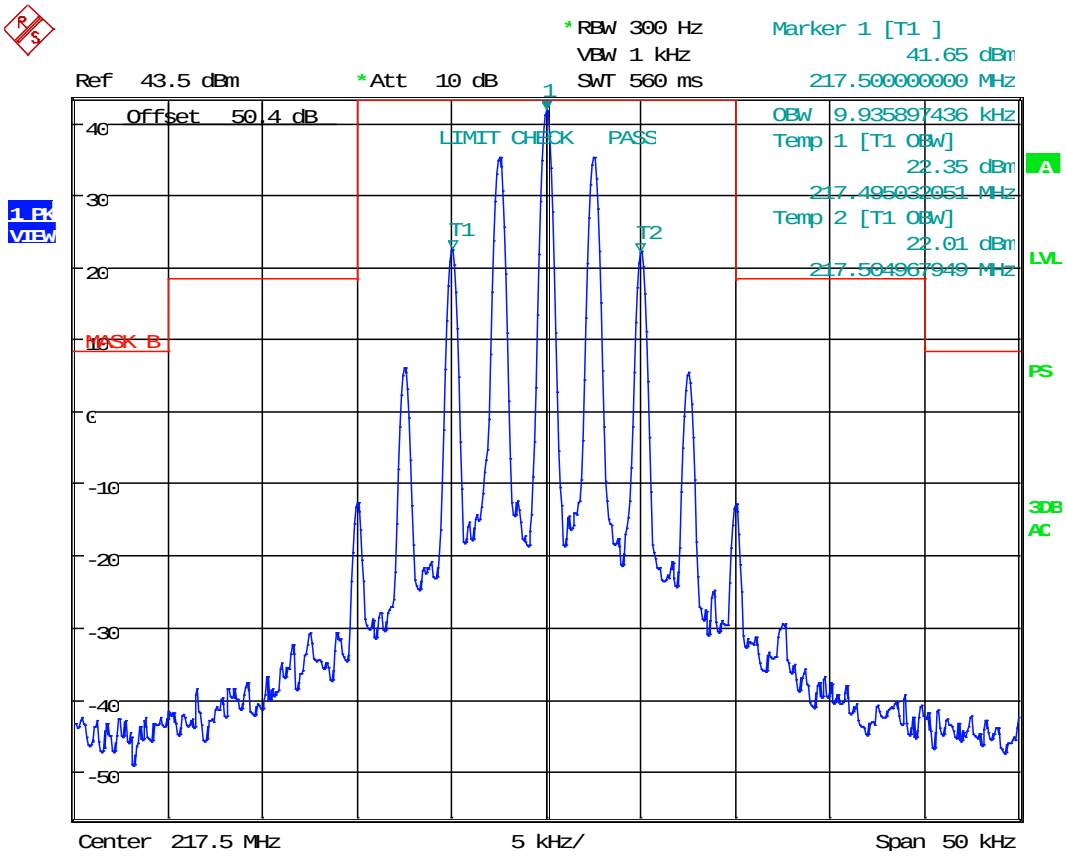
Requirements: (1) On any frequency removed from the assigned frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: At least 25 dB;

(2) On any frequency removed from the assigned frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: At least 35 Db

Note: The emission mask specified is identical to FCC Pt. 90.210(b)

Method of Measurement: ANSI/TIA-603-E

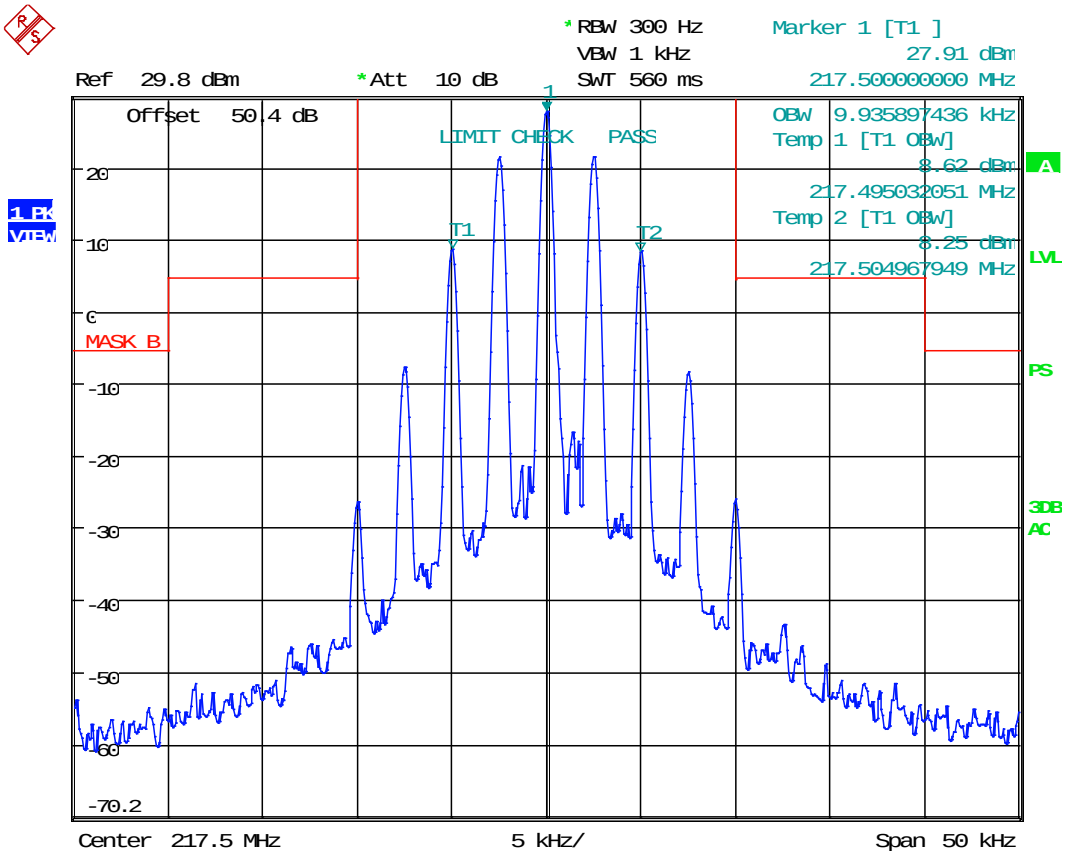
Test Data: 11K0F3E (FM Voice) – 217.5 MHz High Power



Date: 28.DEC.2017 13:09:46

OCCUPIED BANDWIDTH

Test Data: 11K0F3E (FM Voice) – 217.5 MHz Low Power



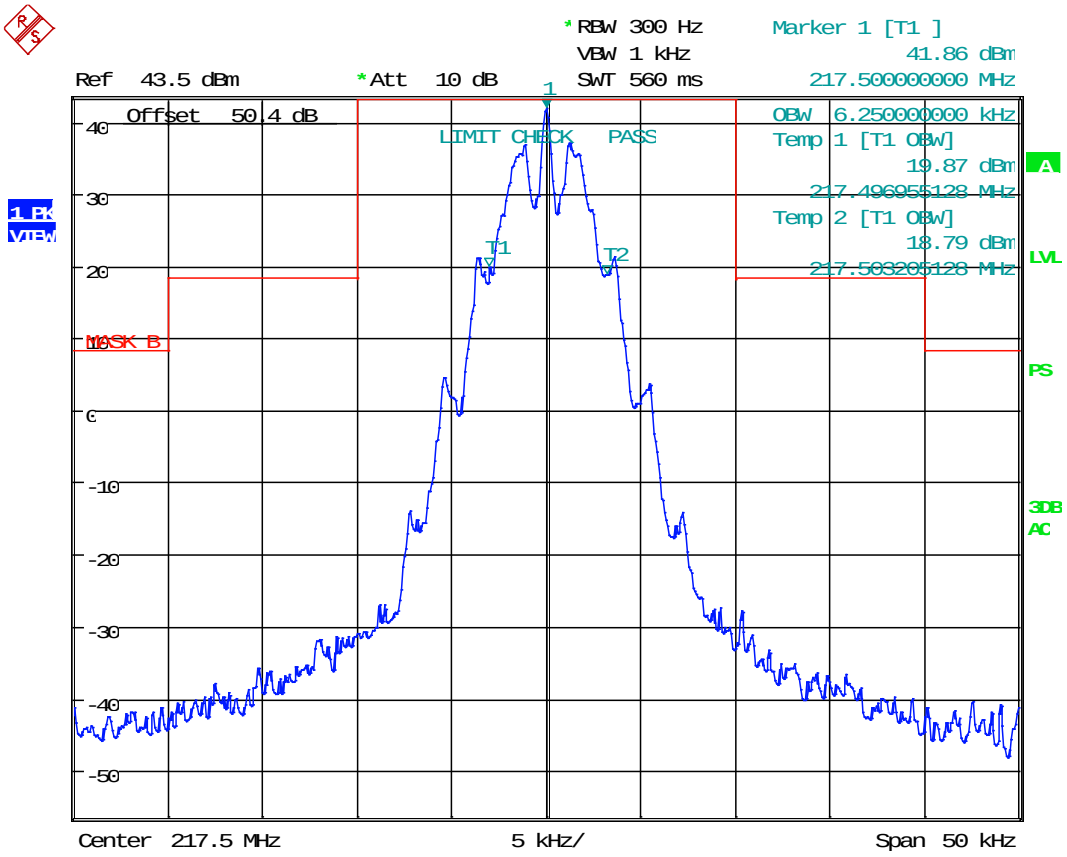
Date: 28.DEC.2017 13:07:35

11K0F3E 99% OBW: 9.94 kHz

Result: Meets Requirements

OCCUPIED BANDWIDTH

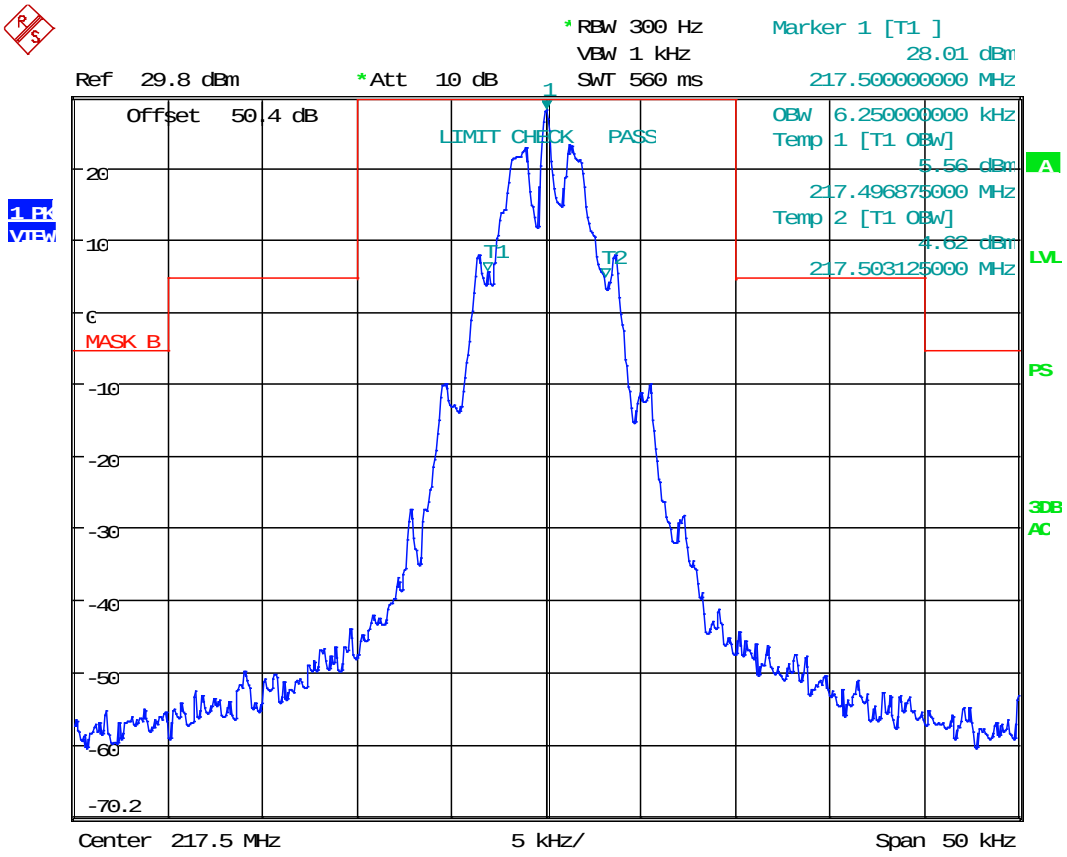
Test Data: 7K60F2D (FM Data) – 217.5 MHz High Power



Date: 28.DEC.2017 13:38:48

OCCUPIED BANDWIDTH

Test Data: 7K60F2D (FM Data) – 217.5 MHz Low Power



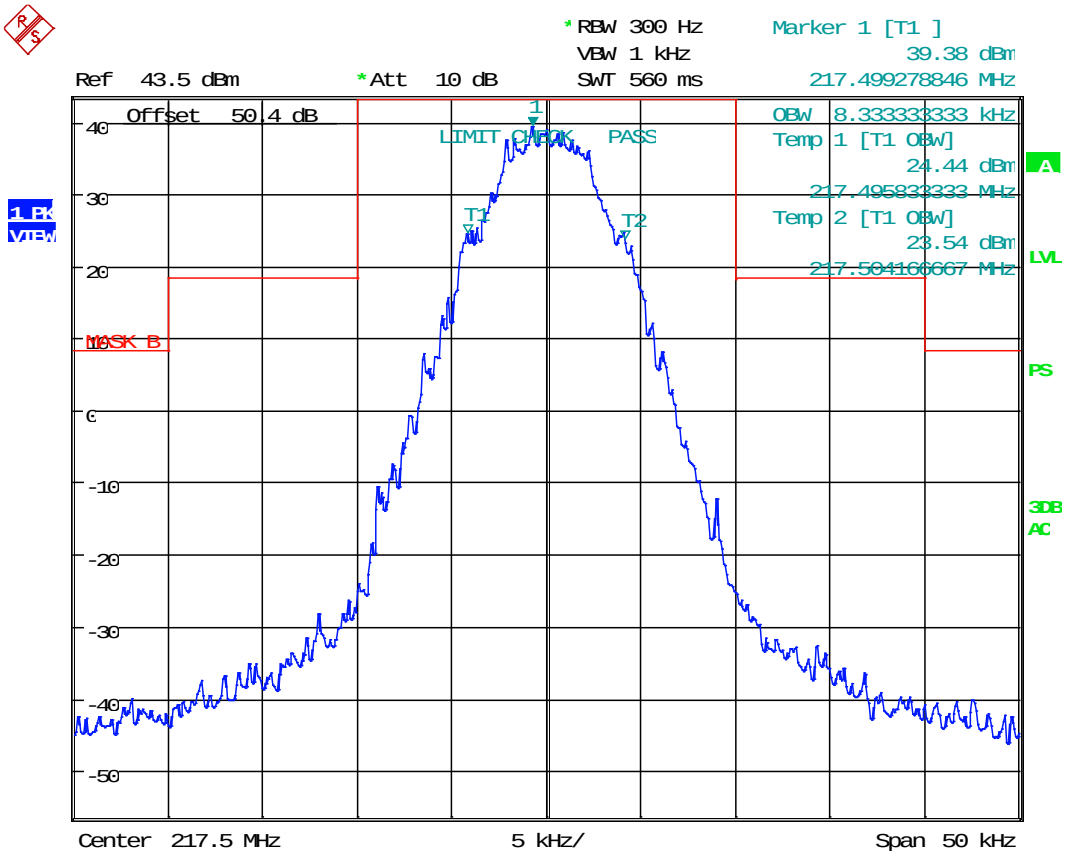
Date: 28.DEC.2017 13:41:13

7K60F2D 99% OBW: 6.25 kHz

Result: Meets Requirements

OCCUPIED BANDWIDTH

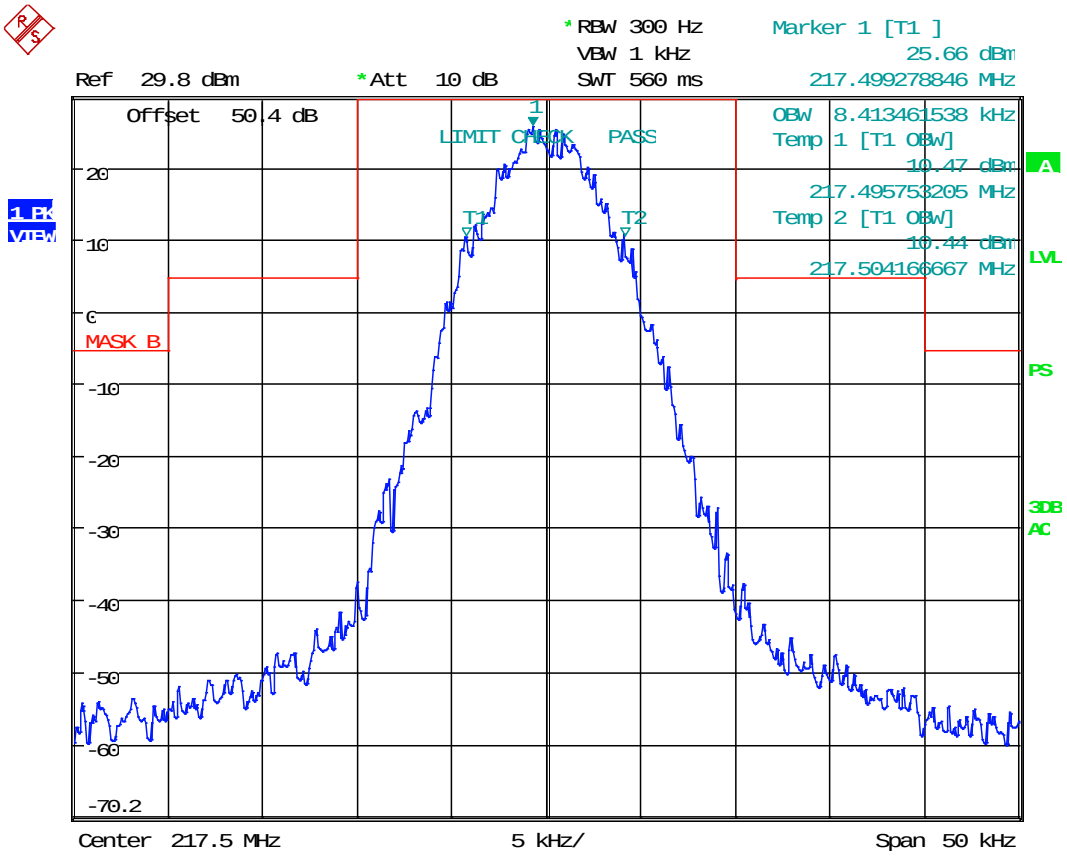
Test Data: 7K60FXD/FXW (FM Data/Telephony) – 217.5 MHz High Power



Date: 28.DEC.2017 13:50:25

OCCUPIED BANDWIDTH

Test Data: 7K60FXD/FXW (FM Data/Telephony) – 217.5 MHz Low Power



Date: 28.DEC.2017 13:49:16

7K60FXD/FXW 99% OBW: 8.41 kHz

Result: Meets Requirements

SPURIOUS EMISSIONS AT ANTENNA TERMINALS (CONDUCTED)

FCC Rule Parts: FCC Part 2.1051(a), 80.211(f)(3)

Requirements: (3) On any frequency removed from the assigned frequency by more than 250% of the authorized bandwidth: At least 43 +10 log (Mean Power in Watts) dB

Method of Measurement: ANSI/TIA-603-E

Test Data: **11K0F3E (FM Voice) – 217.5 MHz**

	(dBm)	(Watts)	Limit (dBc)
Mean High Power (dBm)	43.39	21.83	56.39
Mean Low Power (dBm)	29.62	0.92	42.62

			High Power		Low Power	
		Frequency	Peak (dBm)	Margin	Peak (dBm)	Margin
(fundamental)		217.500	0.00	0.00	13.77	0.00
2nd Harmonic		435.000	-47.27	34.27	-54.19	41.19
3rd Harmonic		652.500	-64.12	51.12	-76.85	63.85
4th Harmonic		870.000	-72.93	59.93	-76.76	63.76
5th Harmonic		1087.500	-59.14	46.14	-76.25	63.25
6th Harmonic		1305.000	-73.14	60.14	-77.23	64.23
7th Harmonic		1522.500	-61.02	48.02	-74.66	61.66
8th Harmonic	*	1740.000	-74.25	61.25	-74.39	61.39
9th Harmonic	*	1957.500	-74.81	61.81	-74.06	61.06
10th Harmonic	*	2175.000	-66.97	53.97	-67.83	54.83

* Indicates Noise Floor of Measurement

SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Test Data: 7K60F2D (FM Data) – 217.5 MHz

	(dBm)	(Watts)	Limit (dBc)
Mean High Power (dBm)	43.39	21.83	56.39
Mean Low Power (dBm)	29.62	0.92	42.62

			High Power		Low Power	
		Frequency	Peak (dBm)	Margin	Peak (dBm)	Margin
(fundamental)		217.500	0.00	0.00	13.77	0.00
2nd Harmonic		435.000	-47.82	34.82	-57.78	44.78
3rd Harmonic		652.500	-60.41	47.41	-67.46	54.46
4th Harmonic		870.000	-65.39	52.39	-67.26	54.26
5th Harmonic	*	1087.500	-68.08	55.08	-67.15	54.15
6th Harmonic	*	1305.000	-68.30	55.30	-67.37	54.37
7th Harmonic	*	1522.500	-67.05	54.05	-66.12	53.12
8th Harmonic	*	1740.000	-65.52	52.52	-64.59	51.59
9th Harmonic	*	1957.500	-65.84	52.84	-64.91	51.91
10th Harmonic	*	2175.000	-59.04	46.04	-58.11	45.11

* Indicates Noise Floor of Measurement

Test Data: 7K60FXD/FXW (FM Data/Telephony) – 217.5 MHz

	(dBm)	(Watts)	Limit (dBc)
Mean High Power (dBm)	43.39	21.83	56.39
Mean Low Power (dBm)	29.62	0.92	42.62

			High Power		Low Power	
		Frequency	Peak (dBm)	Margin	Peak (dBm)	Margin
(fundamental)		217.500	0.00	0.00	13.77	0.00
2nd Harmonic		435.000	-47.57	34.57	-57.94	44.94
3rd Harmonic		652.500	-61.20	48.20	-66.93	53.93
4th Harmonic		870.000	-64.79	51.79	-66.73	53.73
5th Harmonic		1087.500	-58.56	45.56	-66.62	53.62
6th Harmonic	*	1305.000	-67.56	54.56	-66.84	53.84
7th Harmonic	*	1522.500	-66.31	53.31	-65.59	52.59
8th Harmonic	*	1740.000	-64.78	51.78	-64.06	51.06
9th Harmonic	*	1957.500	-65.10	52.10	-64.38	51.38
10th Harmonic	*	2175.000	-58.30	45.30	-57.58	44.58

* Indicates Noise Floor of Measurement

SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Test Data: 11K0F3E (FM Voice) – 219.5 MHz

	(dBm)	(Watts)	Limit (dBc)
Mean High Power (dBm)	43.39	21.83	56.39
Mean Low Power (dBm)	29.64	0.92	42.64

			High Power		Low Power	
		Frequency	Peak (dBm)	Margin	Peak (dBm)	Margin
(fundamental)		219.500	0.00	0.00	13.75	0.00
2nd Harmonic		439.000	-49.59	36.59	-57.52	44.52
3rd Harmonic		658.500	-50.08	37.08	-67.05	54.05
4th Harmonic	*	878.000	-66.17	53.17	-66.85	53.85
5th Harmonic	*	1097.500	-66.74	53.74	-66.74	53.74
6th Harmonic	*	1317.000	-66.96	53.96	-66.96	53.96
7th Harmonic	*	1536.500	-65.71	52.71	-65.71	52.71
8th Harmonic	*	1756.000	-64.18	51.18	-64.18	51.18
9th Harmonic	*	1975.500	-64.50	51.50	-64.50	51.50
10th Harmonic	*	2195.000	-57.70	44.70	-57.70	44.70

* Indicates Noise Floor of Measurement

Test Data: 7K60F2D (FM Data) – 219.5 MHz

	(dBm)	(Watts)	Limit (dBc)
Mean High Power (dBm)	43.39	21.83	56.39
Mean Low Power (dBm)	29.64	0.92	42.64

			High Power		Low Power	
		Frequency	Peak (dBm)	Margin	Peak (dBm)	Margin
(fundamental)		219.500	0.00	0.00	13.75	0.00
2nd Harmonic		439.000	-49.28	36.28	-56.96	43.96
3rd Harmonic		658.500	-52.11	39.11	-67.70	54.70
4th Harmonic	*	878.000	-67.49	54.49	-67.50	54.50
5th Harmonic	*	1097.500	-67.38	54.38	-67.39	54.39
6th Harmonic	*	1317.000	-67.60	54.60	-67.61	54.61
7th Harmonic	*	1536.500	-66.35	53.35	-66.36	53.36
8th Harmonic	*	1756.000	-64.82	51.82	-64.83	51.83
9th Harmonic	*	1975.500	-65.14	52.14	-65.15	52.15
10th Harmonic	*	2195.000	-58.34	45.34	-58.35	45.35

* Indicates Noise Floor of Measurement

SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Test Data: 7K60FXD/FXW (FM Data/Telephony) – 219.5 MHz

	(dBm)	(Watts)	Limit (dBc)
Mean High Power (dBm)	43.39	21.83	56.39
Mean Low Power (dBm)	29.64	0.92	42.64

			High Power		Low Power	
		Frequency	Peak (dBm)	Margin	Peak (dBm)	Margin
(fundamental)		219.500	0.00	0.00	13.75	0.00
2nd Harmonic		439.000	-49.12	36.12	-57.72	44.72
3rd Harmonic		658.500	-58.73	45.73	-67.26	54.26
4th Harmonic	*	878.000	-67.03	54.03	-67.06	54.06
5th Harmonic	*	1097.500	-66.92	53.92	-66.95	53.95
6th Harmonic	*	1317.000	-67.14	54.14	-67.17	54.17
7th Harmonic	*	1536.500	-65.89	52.89	-65.92	52.92
8th Harmonic	*	1756.000	-64.36	51.36	-64.39	51.39
9th Harmonic	*	1975.500	-64.68	51.68	-64.71	51.71
10th Harmonic	*	2195.000	-57.88	44.88	-57.91	44.91

* Indicates Noise Floor of Measurement

Worst-Case Emission Settings

Analog: 11K0F3E (FM Voice) – 217.5 MHz, High Power
Digital: 7K60FXD/FXW (FM Data/Telephony) – 217.5 MHz, High Power

Result: Meets Requirements

FIELD STRENGTH OF SPURIOUS EMISSIONS

FCC Rule Parts: FCC Part 2.1053(a), 80.211(f)(3)

Requirements: (3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43 + 10log(mean power in watts) dB.

Method of Measurement: ANSI/TIA-603-E

Note: The tabulated data shows the results of the radiated field strength emissions test. The spectrum was scanned from 9 KHz 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 freqencies tested.

Note: The six (6) highest emissions of each worst-case settings of both Analog (11K0F3E) and Digital (7K60FXD/FXW) are represented below. Emissions below 20 dB below the limit are not required to be reported.

Test Data: 11K0F3E (FM Voice) – 217.5 MHz

217.50 MHz, 11K0F3E High Power				
Emission Frequency (MHz)	Antenna Polarity	ERP (dBm)	Limit (dBm)	Margin (dBm)
870.00	H	-41.39	-13.00	28.39
870.00	V	-42.58	-13.00	29.58
2175.00	H	-44.57	-13.00	31.57
1305.00	H	-45.15	-13.00	32.15
2175.00	V	-46.42	-13.00	33.42
1957.50	H	-46.97	-13.00	33.97

Test Data: 7K60FXD/FXW (FM Data/Telephony) – 217.5 MHz

217.50 MHz, 7K60FXD/FXW High Power				
Emission Frequency (MHz)	Antenna Polarity	ERP (dBm)	Limit (dBm)	Margin (dBm)
1957.50	H	-47.27	-13.00	34.27
2175.00	H	-47.42	-13.00	34.42
2175.00	V	-48.27	-13.00	35.27
1957.50	V	-48.87	-13.00	35.87
1740.00	H	-49.00	-13.00	36.00
870.00	V	-49.65	-13.00	36.65

Test Data: 11K0F3E (FM Voice) – 219.5 MHz

219.50 MHz, 11K0F3E High Power				
Emission Frequency (MHz)	Antenna Polarity	ERP (dBm)	Limit (dBm)	Margin (dBm)
878.00	H	-41.06	-13.00	28.06
878.00	V	-42.68	-13.00	29.68
1317.00	H	-43.51	-13.00	30.51
1317.00	V	-45.19	-13.00	32.19
2195.00	H	-45.82	-13.00	32.82
1975.50	H	-46.39	-13.00	33.39

Test Data: 7K60FXD/FXW (FM Data/Telephony) – 219.5 MHz

219.50 MHz, 7K60FXD/FXW High Power				
Emission Frequency (MHz)	Antenna Polarity	ERP (dBm)	Limit (dBm)	Margin (dBm)
878.00	V	-43.83	-13.00	30.83
878.00	H	-44.22	-13.00	31.22
2195.00	H	-46.65	-13.00	33.65
1975.50	H	-47.39	-13.00	34.39
1317.00	H	-48.05	-13.00	35.05
2195.00	V	-48.56	-13.00	35.56

RESULT: Meets Requirements

FREQUENCY STABILITY

FCC Rule Parts: FCC Part 2.1055(a)(2), Part 80.209(a)

Requirements: The frequency stability must remain within 5 ppm from -20 C to +50 C.

§80.209 Transmitter frequency tolerances.

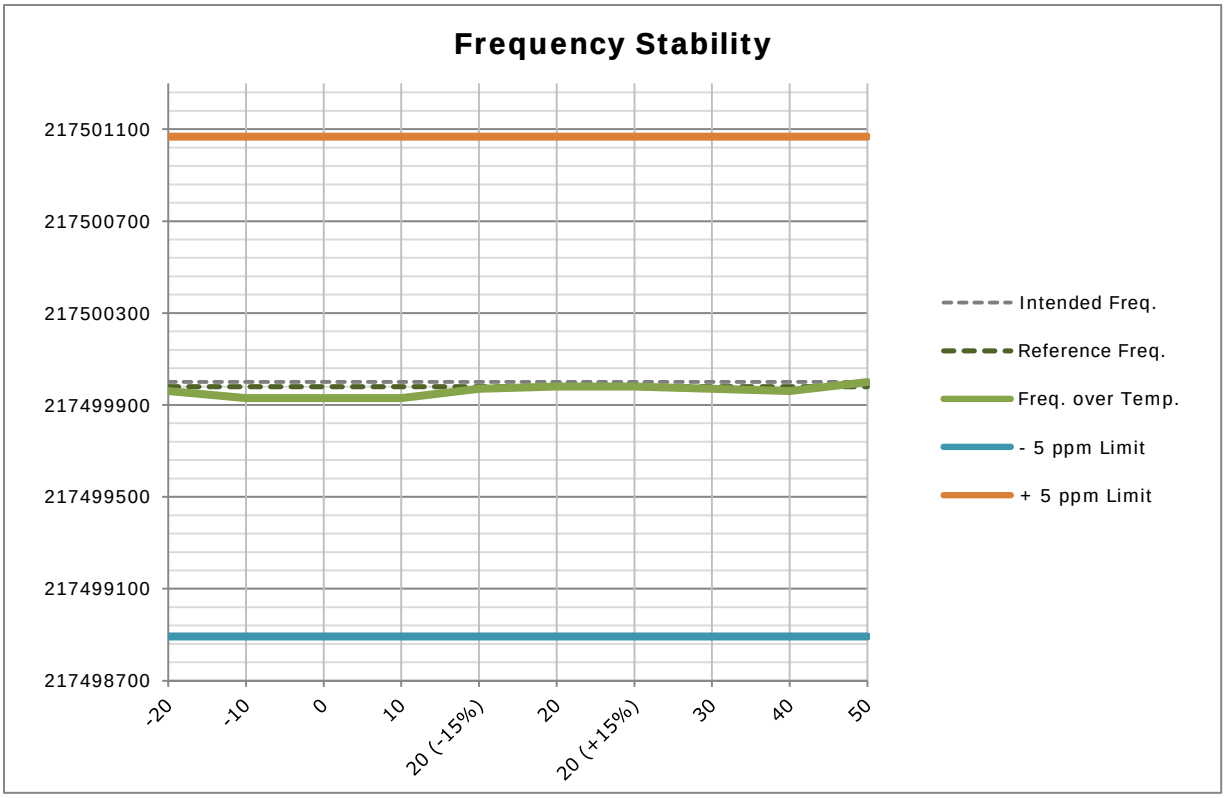
(a) The frequency tolerance requirements applicable to transmitters in the maritime services are shown in the following table. Tolerances are given as parts in 10^6 unless shown in Hz.

Frequency bands and categories of stations	Tolerances[1]
(6) Band 216-220 MHz:	
(i) Coast stations:	
For all emissions	5.
(ii) Ship stations:	
For all emissions	5.

[1]Transmitters authorized prior to January 2, 1990, with frequency tolerances equal to or better than those required after this date will continue to be authorized in the maritime services provided they retain approval and comply with the applicable standards in this part.

Method of Measurements: ANSI/TIA 603-E

Test Data: Frequency Error Measurement Plot



FREQUENCY STABILITY

Test Data: Frequency Error Measurement Table

217.500 MHz High Power (Worst-case Settings)				
		Limit:	5	ppm
Temperature (°C)	**Supplied Voltage (VDC)**	**Intended Frequency (Hz)**	**Measured Reference Frequency (Hz)**	**Deviation (Hz)**
20°C (reference)	13.8	217500000	217499980	20

@ 20°C (reference)				
Supplied Voltage (%)	**Supplied Voltage (VDC)**	**Frequency (Hz)**	**Deviation (Hz)**	**PPM**
-15%	11.73	217499970	10	0.046
15%	15.87	217499980	0	0.000

Temperature (°C)	**Supplied Voltage (VDC)**	**Frequency (Hz)**	**Deviation (Hz)**	**PPM**
50	13.8	217500000	-20	-0.092
40	13.8	217499960	20	0.092
30	13.8	217499970	10	0.046
20	13.8	217499980	0	0.000
10	13.8	217499930	50	0.230
0	13.8	217499930	50	0.230
-10	13.8	217499930	50	0.230
-20	13.8	217499960	20	0.092

RESULT: Meets Requirements

Statement of Measurement Uncertainty – TEI Tab Lic Devices Uc 170428

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:

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

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

EMC EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
Coaxial Cable - BMBM-0065-01 Black DC-2G	Belden		BMBM-0065-01	07/18/16	07/18/18
Antenna: Biconical 1096	Eaton	94455-1	1096	08/01/17	08/01/19
Antenna: Log-Periodic 1122	Electro-Metrics	LPA-25	1122	07/26/17	07/26/19
Temperature Chamber LARGE	Tenney Engineering	TTRC	11717-7	09/01/16	09/01/18
Frequency Counter Small Chamber	HP	5385A	3242A07460	08/22/17	08/22/19
Coaxial Cable - Chamber 3 cable set (backup)	Micro-Coax	Chamber 3 cable set (backup)	KMKM-0244-02 ; KMKM-0670-01; KFKF-0197-00	N/A	N/A
CHAMBER	Panashield	3M	N/A	04/25/16	1/31/18
Rohde & Schwarz Signal Generator SMU200A	Rohde & Schwarz	SMU200A	103195	03/07/16	03/07/18
Antenna: Double-Ridged Horn/ETS Horn 2	ETS-Lindgren	3117	00041534	03/01/17	03/01/19
Software: Field Strength Program	Timco	N/A	Version 4.10.7.0	N/A	N/A
Antenna: Passive Loop	EMCO	6512	9706-1211	07/26/17	07/26/19
Type K J Thermometer	Martel	303	080504494	11/02/17	11/02/19
EMI Test Receiver R & S ESU 40 Chamber	Rohde & Schwarz	ESU 40	100320	04/01/16	04/01/18
Attenuator N 30dB 100W DC-6G	Pasternack	PE7214-30	#109	05/24/17	05/24/19
Attenuator BNC 10dB DC-2G	MiniCircuits	HAT-10+	#54	07/14/17	07/14/19
Bore-sight Antenna Positioning Tower	Sunol Sciences	TLT2	N/A	N/A	N/A
Tuneable Notch Filter 15-30 MHz	Eagle	TNF-200	15-30 MHz	11/19/17	11/19/19

***EMI RECEIVER SOFTWARE VERSION**

The receiver firmware used was version 4.43 Service Pack 3

END OF TEST REPORT