



849 NW STATE ROAD 45
NEWBERRY, FL 32669 USA
PH: 888.472.2424 OR
352.472.5500
FAX: 352.472.2030
EMAIL: INFO@TIMCOENGR.COM
[HTTP://WWW.TIMCOENGR.COM](http://WWW.TIMCOENGR.COM)

FCC PART 95 SUBPART D & IC RSS-236 TEST REPORT FOR CB TRANSCEIVERS

APPLICANT	COBRA ELECTRONICS CORPORATION
	6500 WEST CORTLAND STREET CHICAGO, IL 60707 USA
FCC ID	BBOHH50WXST
IC	906A-HH50WXST
MODEL NUMBER	HH 50 WX ST
PRODUCT DESCRIPTION	HANDHELD CB TRANSCEIVER
DATE SAMPLE RECEIVED	12/20/2017
FINAL TEST DATE	12/26/2017
TESTED BY	Franklin Rose
APPROVED BY	Sid Sanders
TEST RESULTS	☒ PASS ☐ FAIL

Report Number	Version Number	Description	Issue Date
1844BUT17TestReport	Rev1	Initial Issue	12/26/2017
1844BUT17TestReport	Rev2	Power Output updated. Measurement Uncertainty added.	12/27/2017

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



TABLE OF CONTENTS

GENERAL REMARKS	3
GENERAL INFORMATION	4
TEST REPORT SUMMARY	5
RF POWER OUTPUT	6
Test Data: High Power Output Measurement Table	6
Test Data: Low Power Output Measurement Table	6
Test Data: DC Power Input Measurement Table	6
AUDIO FREQUENCY RESPONSE	7
Test Data: Audio Response Plot	7
AUDIO INPUT VS MODULATION	8
Test data: Modulation Limiting Plot	8
OCCUPIED BANDWIDTH	9
Test Data: CH 1 High Power - FCC Part 95D Emission Mask and 99% OBW	10
Test Data: CH 1 Low Power - FCC Part 95D Emission Mask and 99% OBW	11
Test Data: CH 19 High Power - FCC Part 95D Emission Mask and 99% OBW	12
Test Data: CH 19 Low Power - FCC Part 95D Emission Mask and 99% OBW	13
Test Data: CH 40 High Power - FCC Part 95D Emission Mask and 99% OBW	14
Test Data: CH 40 Low Power - FCC Part 95D Emission Mask and 99% OBW	15
SPURIOUS EMISSIONS AT ANTENNA TERMINALS (CONDUCTED)	16
Test Data: CH 1 High Power - Spurious Emission Measurement Table	16
Test Data: CH 1 Low Power - Spurious Emission Measurement Table	17
Test Data: CH 19 High Power - Spurious Emission Measurement Table	18
Test Data: CH 19 Low Power - Spurious Emission Measurement Table	19
Test Data: CH 40 High Power - Spurious Emission Measurement Table	20
Test Data: CH 40 Low Power - Spurious Emission Measurement Table	21
FIELD STRENGTH OF SPURIOUS EMISSIONS	22
Test Data: Spurious Emission Measurement Table	22
FREQUENCY STABILITY	23
Test Data: Frequency Error Measurement Plot	23
Test Data: Frequency Error Measurement Table	24
Statement of Measurement Uncertainty	25
EQUIPMENT LIST	26

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 Engineer

Date: 12/26/2017

Reviewed and approved by:



Name and Title: Sid Sanders , Engineering Manager

Date: 12/26/2017

APPLICANT: COBRA ELECTRONICS CORPORATION
FCC ID: BBOHH50WXST
IC: 906A-HH50WXST
REPORT #: 1844BUT17TestReport_Rev2

[Table of Contents](#)

GENERAL INFORMATION

EUT Specification

EUT Description	HH50WXST
FCC ID	BBOHH50WXST
IC	906A-HH50WXST
Model Number	HH 50 WX ST
Serial Number	N/A
Operating Frequency	26.965-27.405 MHz – 40 Channel
No. of Channels	40
Type of Emission	6K00A3E Bn = 2M M = 3000 Bn = 6000
Modulation	A3E/ J3E
EUT Power Source	☐ 110–120Vac/50– 60Hz
	☐ DC Power
	☒ Battery Operated Exclusively
Test Item	☐ Prototype
	☐ Pre-Production
	☒ Production
Type of Equipment	☐ Fixed
	☐ Mobile
	☒ Portable
Applicable Standards	FCC CFR 47 Part 2, FCC CFR 47 Part 95 D, RSS-Gen Issue 4, RSS-236 Issue 5, EIA/TIA-382-A, ANSI C63.10, NOTICE 2012-DRS0126

TEST REPORT SUMMARY

FCC/ IC Rule Part	Scope of Work	Requirement	Status Pass / Fail / NA
2.1046(a), 95.967, RSS-236 5.2	RF Power Output	< 4 W	Pass
2.1047(a)(b), 95.975, RSS-236 5.3.2	Modulation Characteristics	85% < dev < 100%	Pass
2.1049(c)(1), 95.973, 95.979(1)(3), RSS-236 5.4.2, 5.4.4	Occupied Bandwidth	Comply with Mask	Pass
2.1051, 95.979(5)(6), RSS-236 5.4.2, 5.4.4	Antenna Conducted Emissions	Comply with Mask	Pass
2.1053, 95.979(5)(6), RSS-236 5.4.2, 5.4.4	Field Strength Spurious Emissions	Comply with Mask	Pass
2.1055(a)(b)(d), 95.965, RSS-236 5.3.2	Frequency Stability	< 50 ppm	Pass

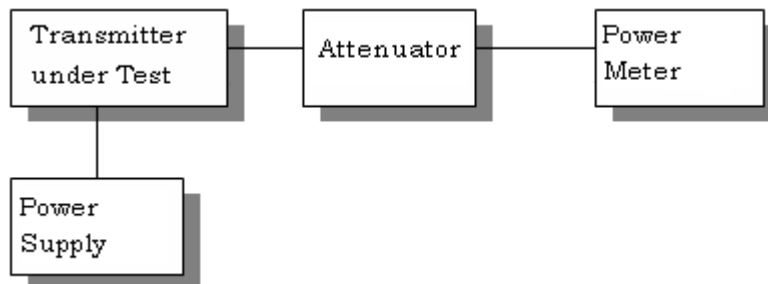
RF POWER OUTPUT

Rule Part No.: FCC Pt. 2.1046(a), 95.967; RSS-236 5.2

Test Requirements: 4 W Mean Carrier power when transmitting emission type A1D or A3E

Method of Measurement: RF power is measured by connecting a 50-ohm, resistive wattmeter to the RF output connector. With a nominal battery voltage and the transmitter properly adjusted the RF output measures:

Test Setup Diagram:



Test Data: High Power Output Measurement Table

High Power Mode (4W)

Channel	Output Freq (MHz)	Mean Power (dBm)	Mean Power (W)	Limit (W)	Margin (W)
1	26.965	35.94	3.93	4.00	0.07
19	27.185	35.96	3.94	4.00	0.06
40	27.405	36.02	4.00	4.00	0.00

Test Data: Low Power Output Measurement Table

Low Power Mode (1W)

Channel	Output Freq (MHz)	Mean Power (dBm)	Mean Power (W)	Limit (W)	Margin (W)
1	26.965	29.58	0.91	4.00	3.09
19	27.185	29.67	0.93	4.00	3.07
40	27.405	29.76	0.95	4.00	3.05

FCC Part 2.1033(C)(8) DC Input into the final amplifier

Test Data: DC Power Input Measurement Table

INPUT POWER: (13.2 VDC) (1.1 A) = **14.52 Watts**

Result: Meets Requirements

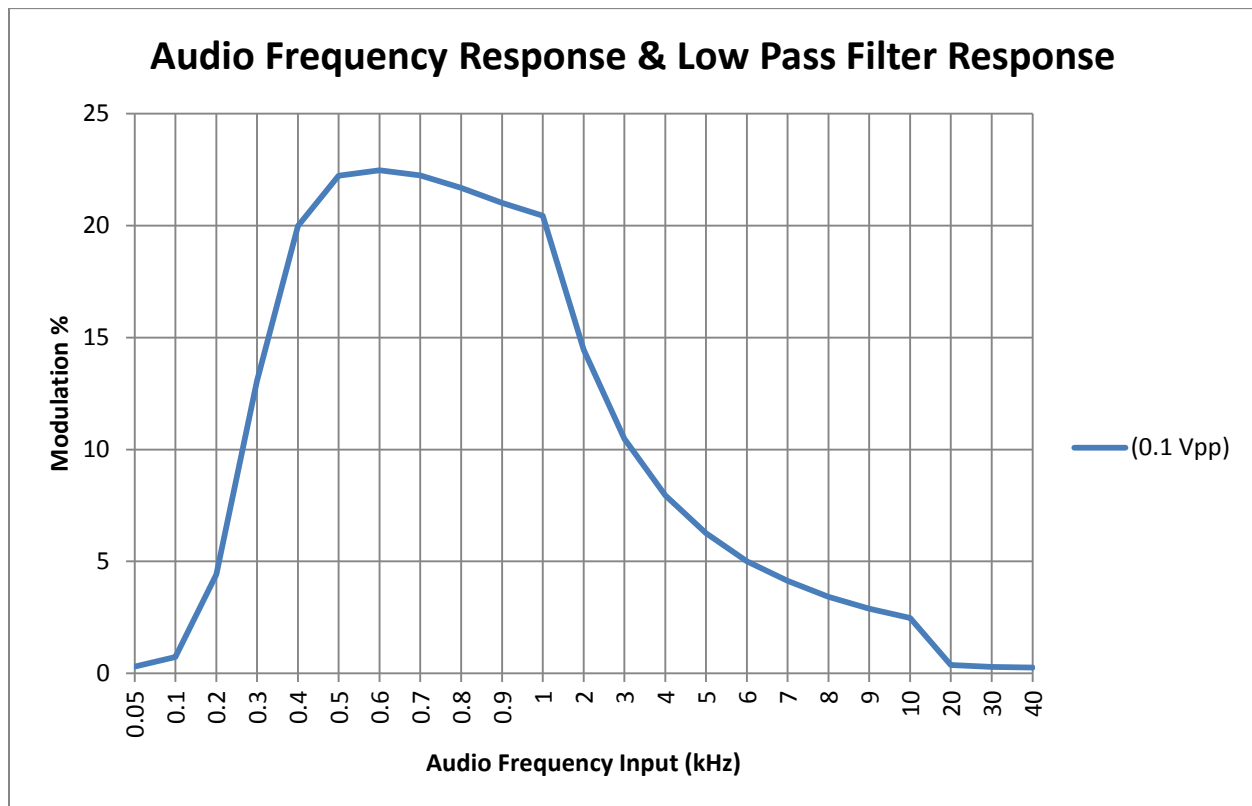
AUDIO FREQUENCY RESPONSE

Rule Part No.: FCC Pt. 2.1047(a), 95.975; RSS-236 5.3.2

Method of Measurement:

The audio frequency response was measured in accordance with TIA-603 D with no exception. A curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 – 5000 Hz shall be submitted. The audio frequency response curve is shown below.

Test Data: Audio Response Plot



Result: Meets Requirements

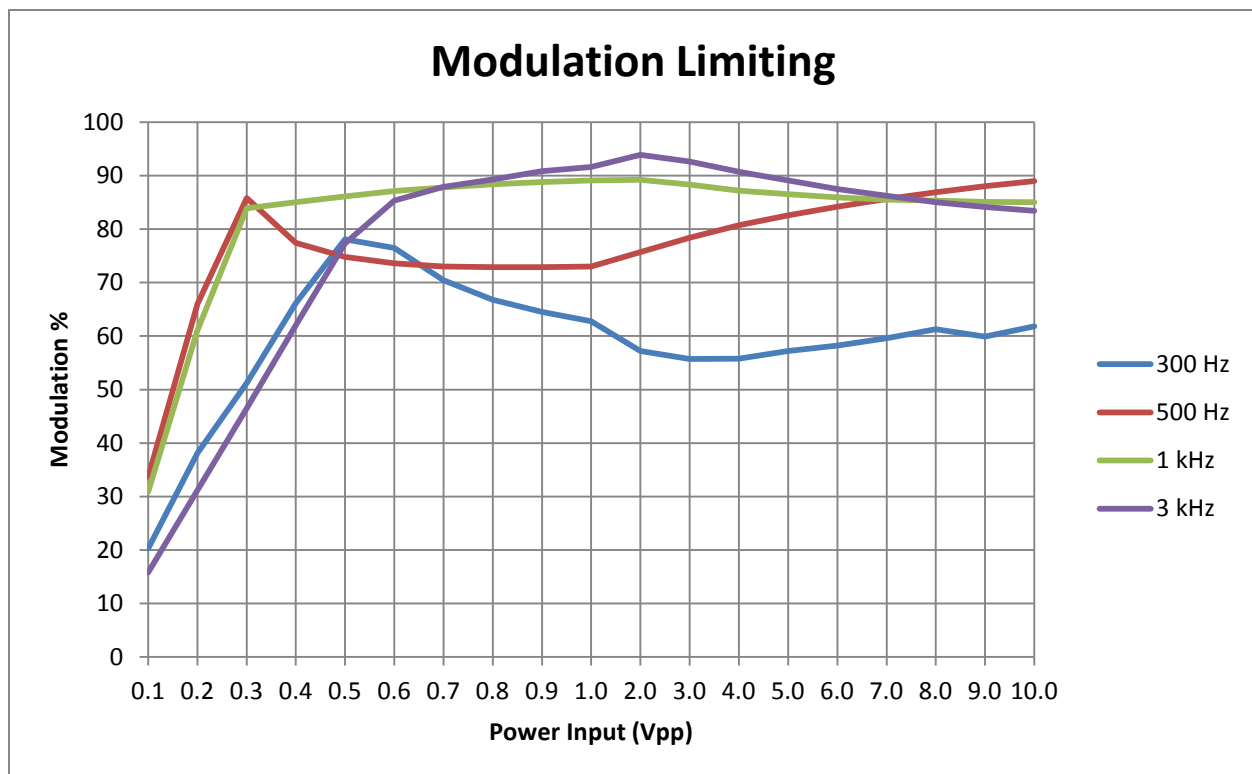
AUDIO INPUT VS MODULATION

Rule Part No.: FCC Pt. 2.1047(b), 95.975; RSS-236 5.3.2

Test Requirements: Modulation must be greater than 85% and cannot exceed 100%

Method of Measurement: The audio input level needed for a particular percentage of modulation was measured in accordance with TIA-603 D. The audio input curves versus modulation are shown below. Curves are provided for audio input frequencies of 300, 1000, and 3000 Hz.

Test data: Modulation Limiting Plot



Frequency of Max Response: 3 kHz

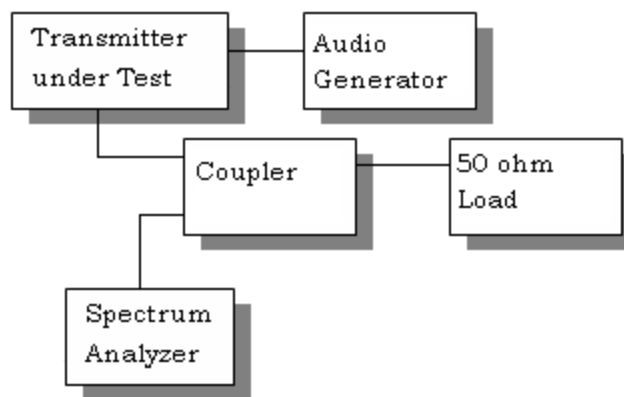
Result: Meets Requirements

OCCUPIED BANDWIDTH

Rule Part No.: 2.1049(c)(1), 95.973, 95.979(1)(3), RSS-236 5.4.2, 5.4.4

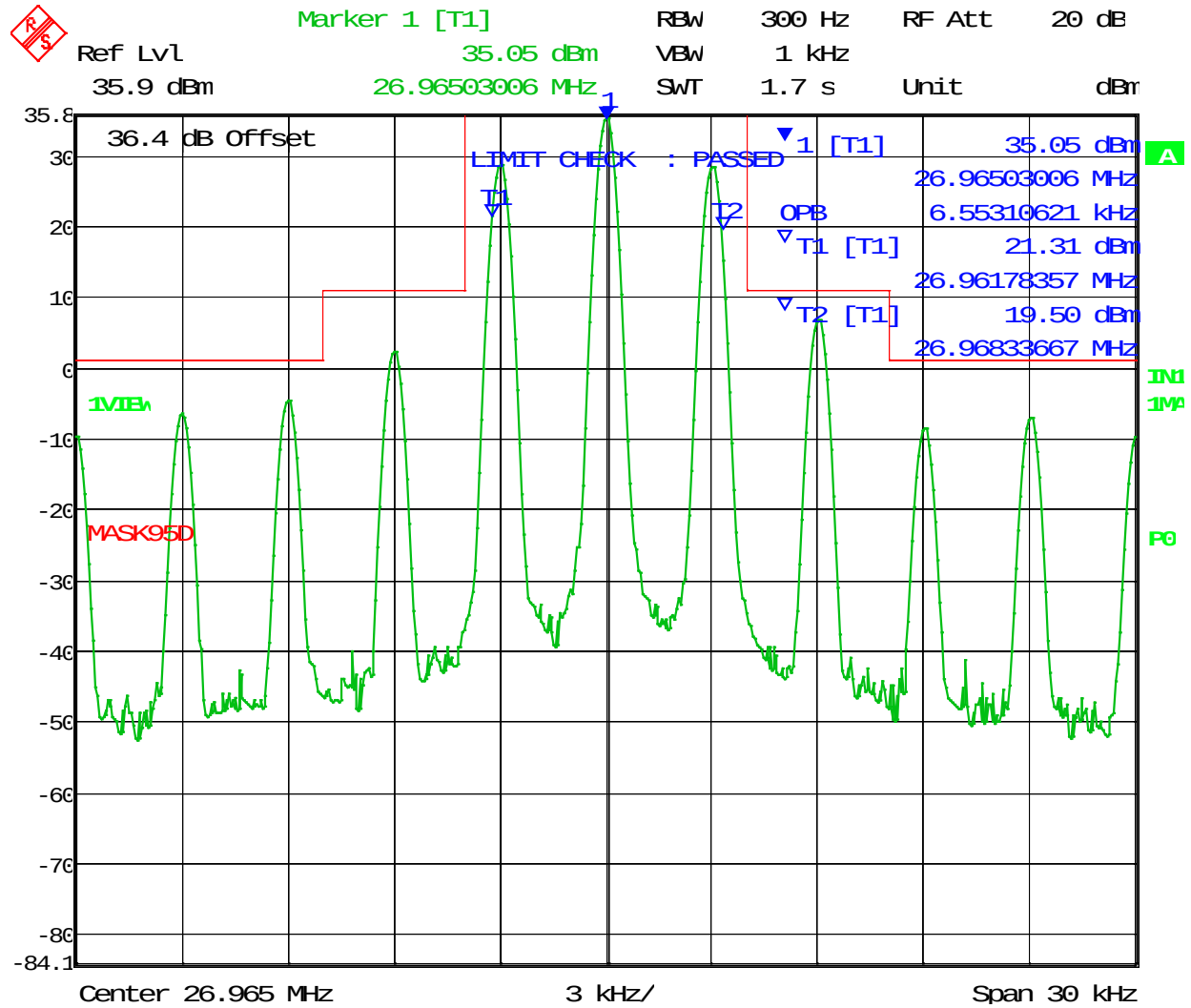
Data in the plots shows that the sidebands from greater than 50% to 100% of the authorized bandwidth must be attenuated by at least 25 dB and from 100 to 250% the sidebands must be attenuated by at least 35 dB. Beyond 250% the sidebands must be attenuated by at least $53 + 10\log (TP)$. The transmitter was modulated with 2500 Hz, adjusted for 50% modulation plus 16 dB. The spectrum analyzer was set with the unmodulated carrier at the top of the screen. The test procedure diagram and occupied bandwidth photographs follow.

Test procedure diagram



OCCUPIED BANDWIDTH

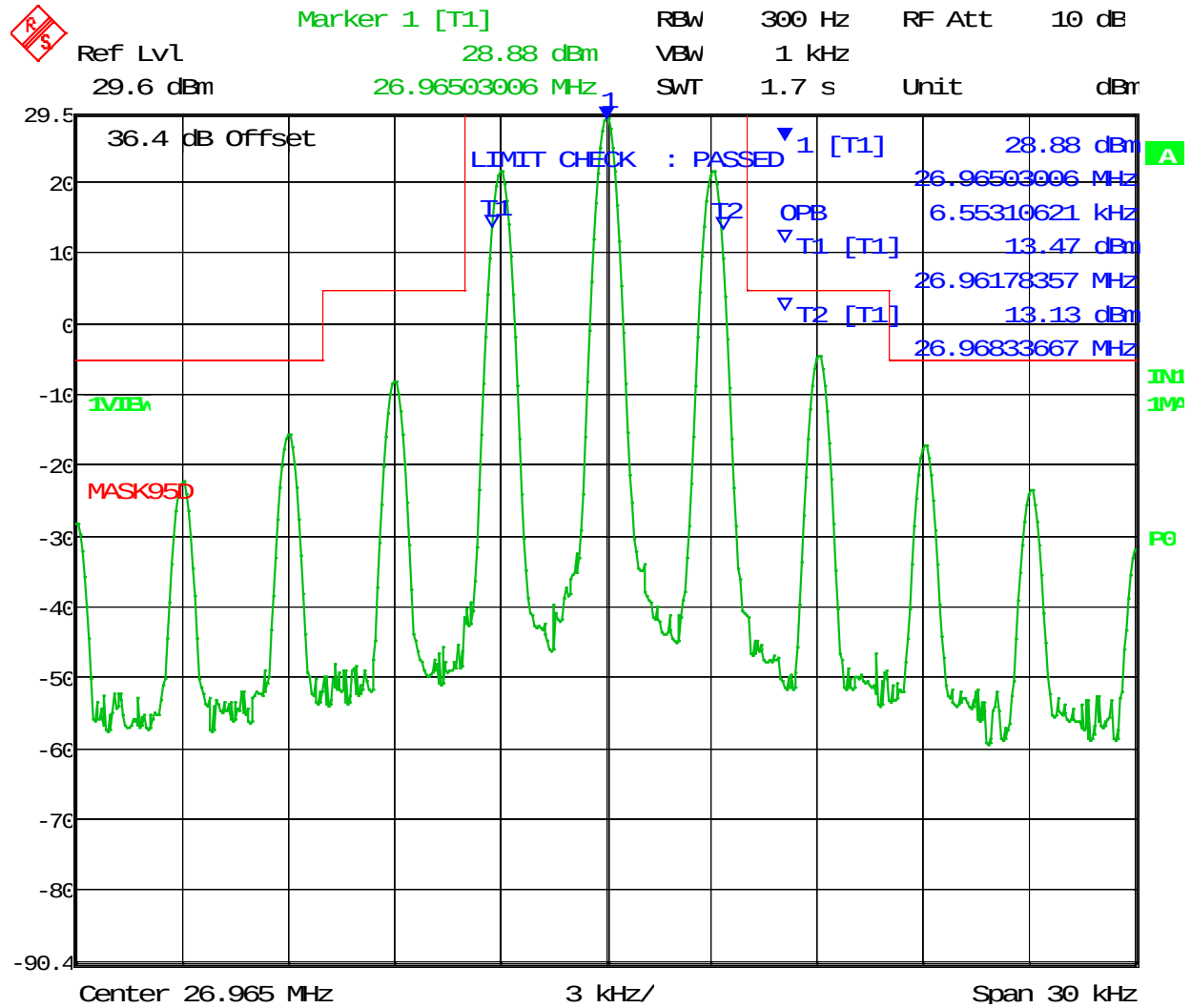
Test Data: CH 1 High Power - FCC Part 95D Emission Mask and 99 % OBW



Date: 21.DEC.2017 14:32:53

OCCUPIED BANDWIDTH

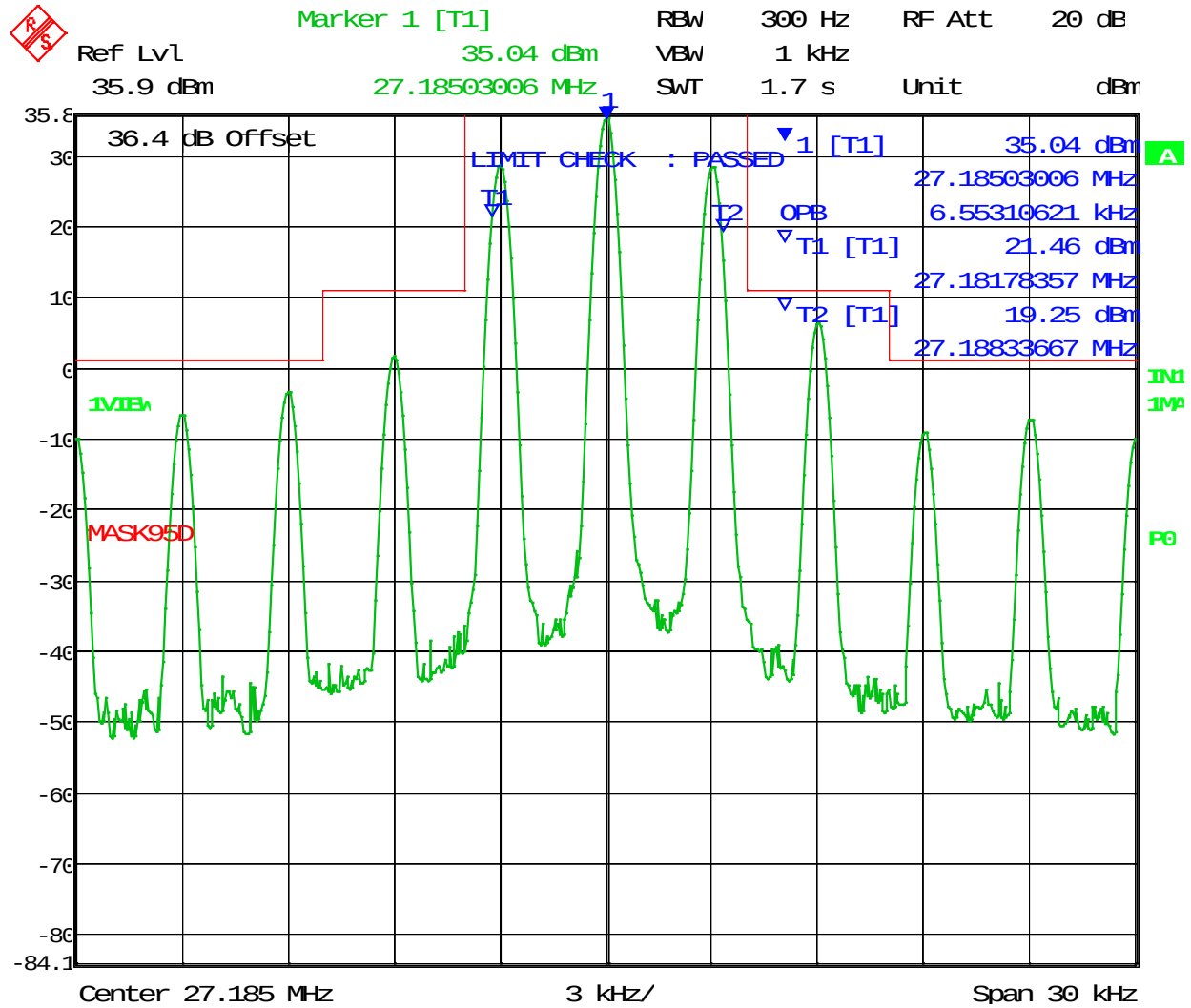
Test Data: CH 1 Low Power - FCC Part 95D Emission Mask and 99% OBW



Date: 21.DEC.2017 15:51:32

OCCUPIED BANDWIDTH

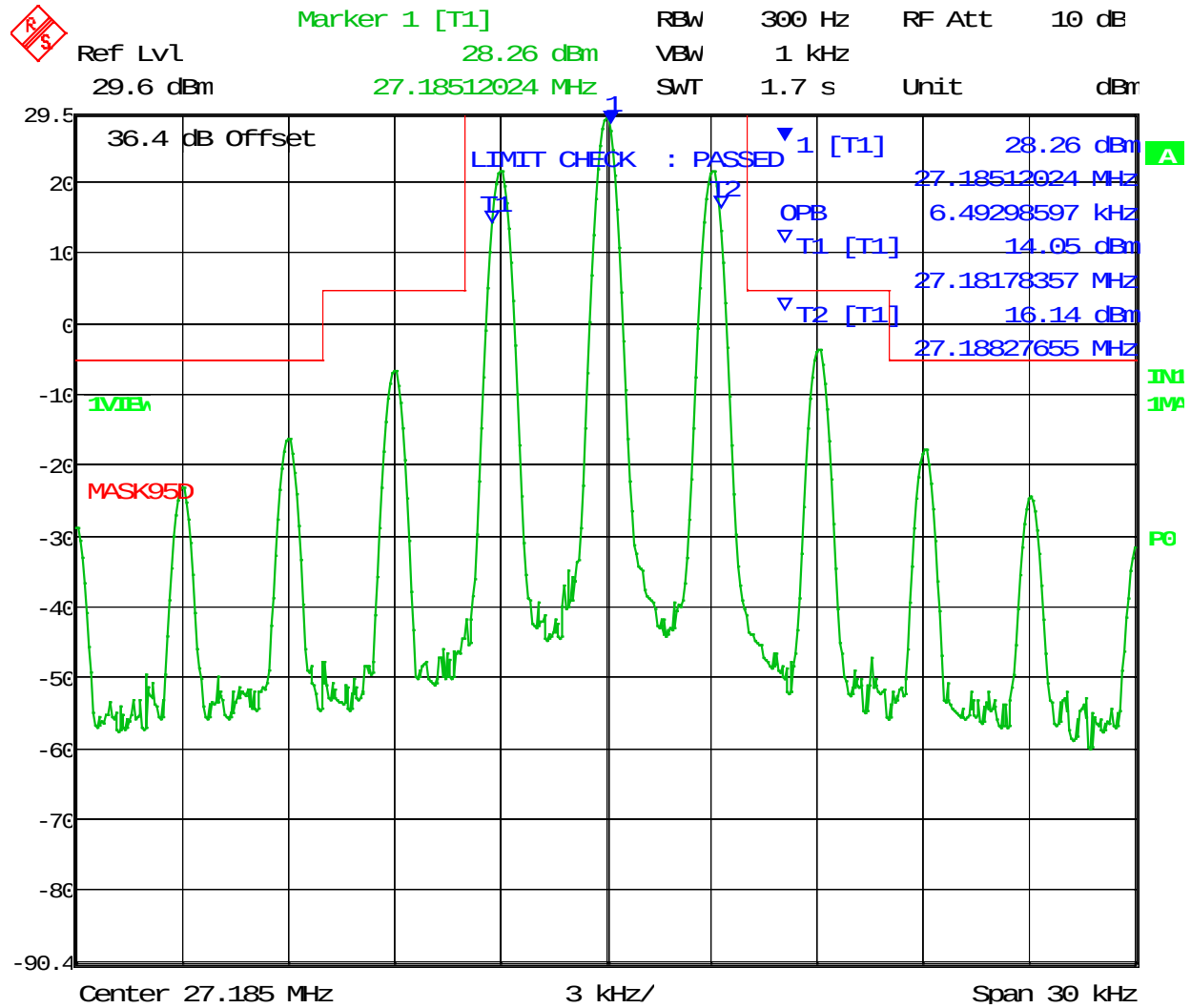
Test Data: CH 19 High Power - FCC Part 95D Emission Mask and 99 % OBW



Date: 21.DEC.2017 14:34:14

OCCUPIED BANDWIDTH

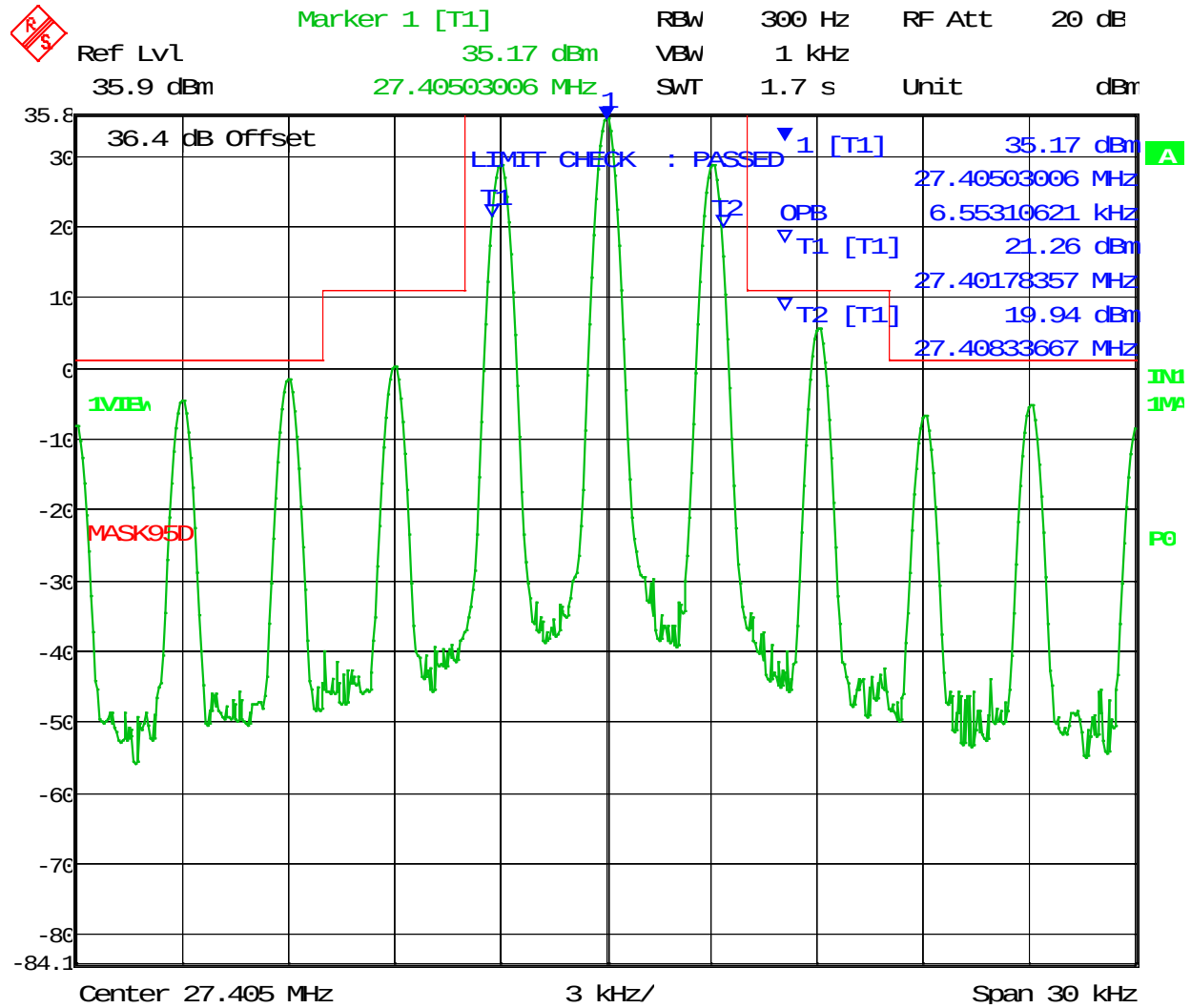
Test Data: CH 19 Low Power - FCC Part 95D Emission Mask and 99 % OBW



Date: 21.DEC.2017 15:07:30

OCCUPIED BANDWIDTH

Test Data: CH 40 High Power - FCC Part 95D Emission Mask and 99 % OBW



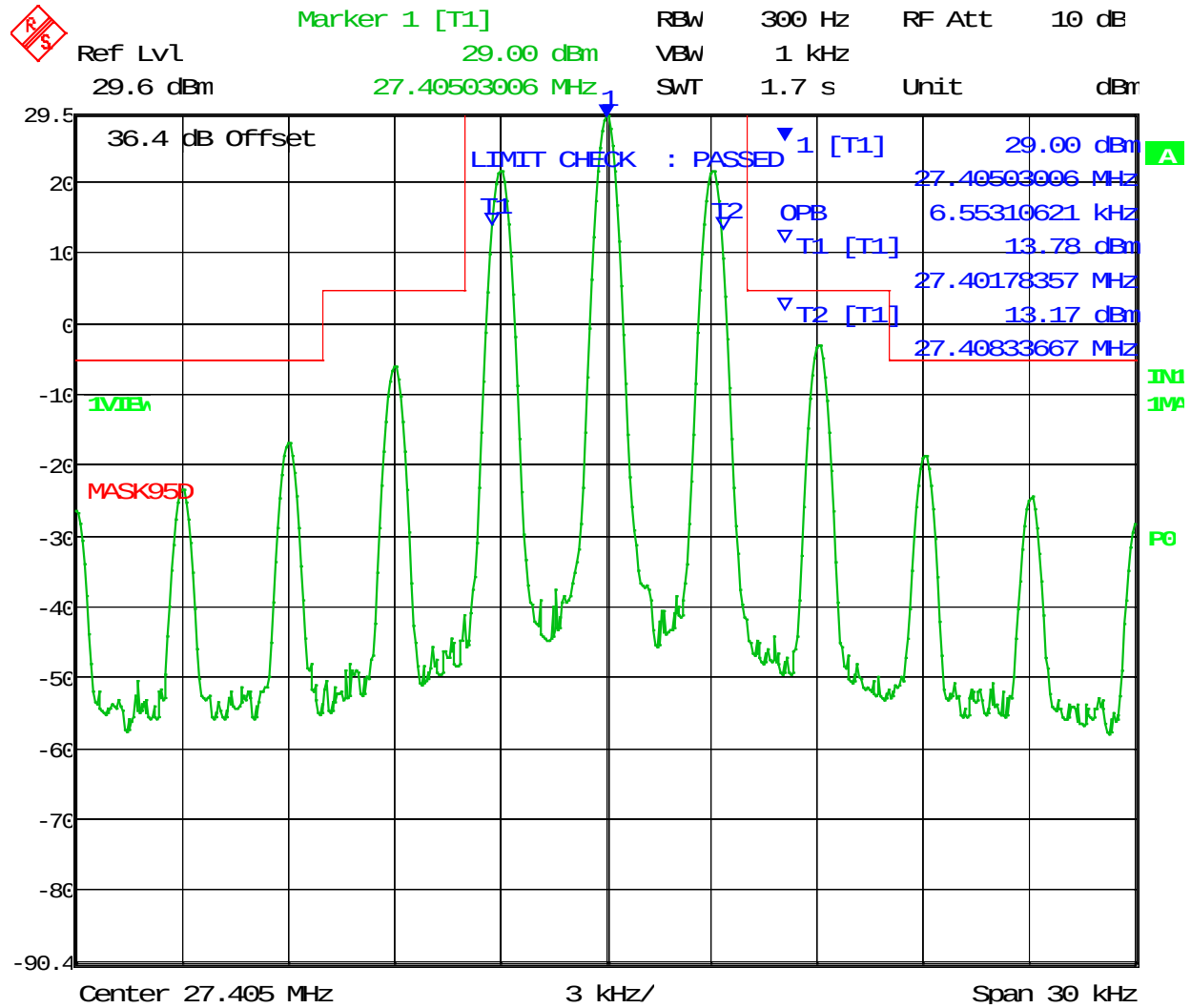
Date: 21.DEC.2017 14:31:15

APPLICANT: COBRA ELECTRONICS CORPORATION
 FCC ID: BBOHH50WXST
 IC: 906A-HH50WXST
 REPORT #: 1844BUT17TestReport_Rev2

[Table of Contents](#)

OCCUPIED BANDWIDTH

Test Data: CH 40 Low Power - FCC Part 95D Emission Mask and 99 % OBW



Date: 21.DEC.2017 15:52:48

99 % OBW for 6K00A3E Signal: 6.55 kHz

Result: Meets Requirements

SPURIOUS EMISSIONS AT ANTENNA TERMINALS (CONDUCTED)

Rule Part No.: Part 2.1051(a), 95.979(5)(6), RSS-236 5.4.4

Requirements: $53 + 10\log(P)$ dBc. Any harmonic emissions must be > 60 dBc.

Method of Measurement: The carrier was modulated with a 2500 Hz tone at a level 16 dB above the level to produce 50% modulation at frequency of highest response. The spectrum was scanned from 9 KHz to at least the 10th harmonic of the fundamental. The measurements were made in accordance with standard TIA-603 D.

Test Data: CH 1 High Power - Spurious Emission Measurement Table

Power Output	dBm	Watts	Limit (dBc)
	35.94	3.93	60

Frequency	Peak (dBm)	Margin
(fundamental) 26.965	0.00	0.00
53.930	-34.69	10.63
80.895	-40.98	16.92
107.860	-48.28	24.22
134.825	-55.84	31.78
161.790	-57.57	33.51
188.755	-59.96	35.90
215.720	-61.88	37.82
242.685	-61.87	37.81
269.650	-62.94	38.88

* Indicates Noise Floor

Result: Meets Requirements

CONDUCTED SPURIOUS EMISSIONS

Test Data: CH 1 Low Power - Spurious Emission Measurement Table

Power Output	dBm	Watts	Limit (dBc)
	29.58	0.91	60

Frequency	Peak (dBm)	Margin
(fundamental) 26.965	0.00	0.00
53.930	-41.46	11.04
80.895	-56.31	25.89
107.860	-63.27	32.85
134.825	-72.11	41.69
* 161.790	-72.31	41.89
* 188.755	-73.81	43.39
* 215.720	-73.50	43.08
* 242.685	-73.49	43.07
* 269.650	-73.33	42.91

* Indicates Noise Floor

Result: Meets Requirements

CONDUCTED SPURIOUS EMISSIONS

Test Data: CH 19 High Power - Spurious Emission Measurement Table

Power Output	dBm	Watts	Limit (dBc)
	35.96	3.94	60

Frequency	Peak (dBm)	Margin
(fundamental) 27.185	0.00	0.00
54.370	-34.22	10.18
81.555	-38.61	14.57
108.740	-43.73	19.69
135.925	-57.70	33.66
163.110	-59.63	35.59
190.295	-62.27	38.23
217.480	-62.94	38.90
244.665	-62.93	38.89
271.850	-64.32	40.28

* Indicates Noise Floor

Result: Meets Requirements

CONDUCTED SPURIOUS EMISSIONS

Test Data: CH 19 Low Power - Spurious Emission Measurement Table

Power Output	dBm	Watts	Limit (dBc)
	29.67	0.93	60

Frequency	Peak (dBm)	Margin
(fundamental) 27.185	0.00	0.00
54.370	-40.61	10.28
81.555	-56.44	26.11
108.740	-63.95	33.62
* 135.925	-72.43	42.10
* 163.110	-72.31	41.98
* 190.295	-73.55	43.22
* 217.480	-73.53	43.20
* 244.665	-73.52	43.19
* 271.850	-73.35	43.02

* Indicates Noise Floor

Result: Meets Requirements

CONDUCTED SPURIOUS EMISSIONS

Test Data: CH 40 High Power - Spurious Emission Measurement Table

Power Output	dBm	Watts	Limit (dBc)
	36.02	4.00	60

Frequency	Peak (dBm)	Margin
(fundamental) 27.405	0.00	0.00
54.810	-33.64	9.66
82.215	-43.47	19.49
109.620	-51.54	27.56
137.025	-61.25	37.27
164.430	-63.19	39.21
191.835	-64.74	40.76
219.240	-67.09	43.11
246.645	-67.08	43.10
274.050	-68.31	44.33

* Indicates Noise Floor

Result: Meets Requirements

CONDUCTED SPURIOUS EMISSIONS

Test Data: CH 40 Low Power - Spurious Emission Measurement Table

Power Output	dBm	Watts	Limit (dBc)
	29.67	0.93	60

Frequency	Peak (dBm)	Margin
(fundamental) 27.405	0.00	0.00
54.810	-40.90	10.57
82.215	-54.89	24.56
109.620	-64.63	34.30
137.025	-72.49	42.16
* 164.430	-72.39	42.06
* 191.835	-73.74	43.41
* 219.240	-73.72	43.39
* 246.645	-73.71	43.38
* 274.050	-73.54	43.21

* Indicates Noise Floor

WORST CASE SETTING: CH 40 HIGH POWER

Result: Meets Requirements

FIELD STRENGTH OF SPURIOUS EMISSIONS

Rule Parts. No.: Part 2.1053, 95.979(5)(6), RSS-236 5.4.4

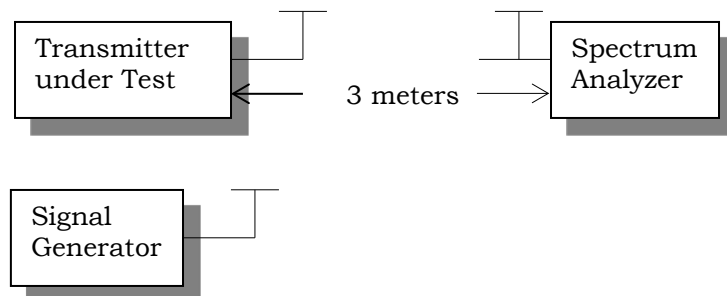
Requirements: Emissions must be attenuated by at least the following below the output of the transmitter.

At least $53 + 10 \log(P)$ dBc on any frequency removed from the center of the authorized bandwidth by more than 250%. At least 60dB on any harmonic frequency.

METHOD OF MEASUREMENT

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 per TIA-603 E using the substitution method.

Test Setup Diagram:



Test Data: Spurious Emission Measurement Table

Tuned Frequency (MHz)						
27.405 MHz (Worst-Case Settings)						
36.30 dBm Max Power Output						
Emission Frequency (MHz)	Antenna Polarity	Field Strength (dBUV/m)	ERP (dBm)	Power Output (dBc)	Limit (dBc)	Margin (dBc)
383.670	H	57.84	-39.54	75.84	60.00	15.84
465.885	V	54.10	-43.28	79.58	60.00	19.58
54.810	V	53.30	-44.07	80.37	60.00	20.37
109.620	V	50.85	-46.53	82.83	60.00	22.83
191.835	H	50.35	-47.03	83.33	60.00	23.33
246.645	H	49.71	-47.66	83.96	60.00	23.96

Note: The highest 6 emissions are shown above. Emissions > 20 dB under the limit are not required to be reported.

Result: Meets Requirements

APPLICANT: COBRA ELECTRONICS CORPORATION
 FCC ID: BBOHH50WXST
 IC: 906A-HH50WXST
 REPORT #: 1844BUT17TestReport_Rev2

[Table of Contents](#)

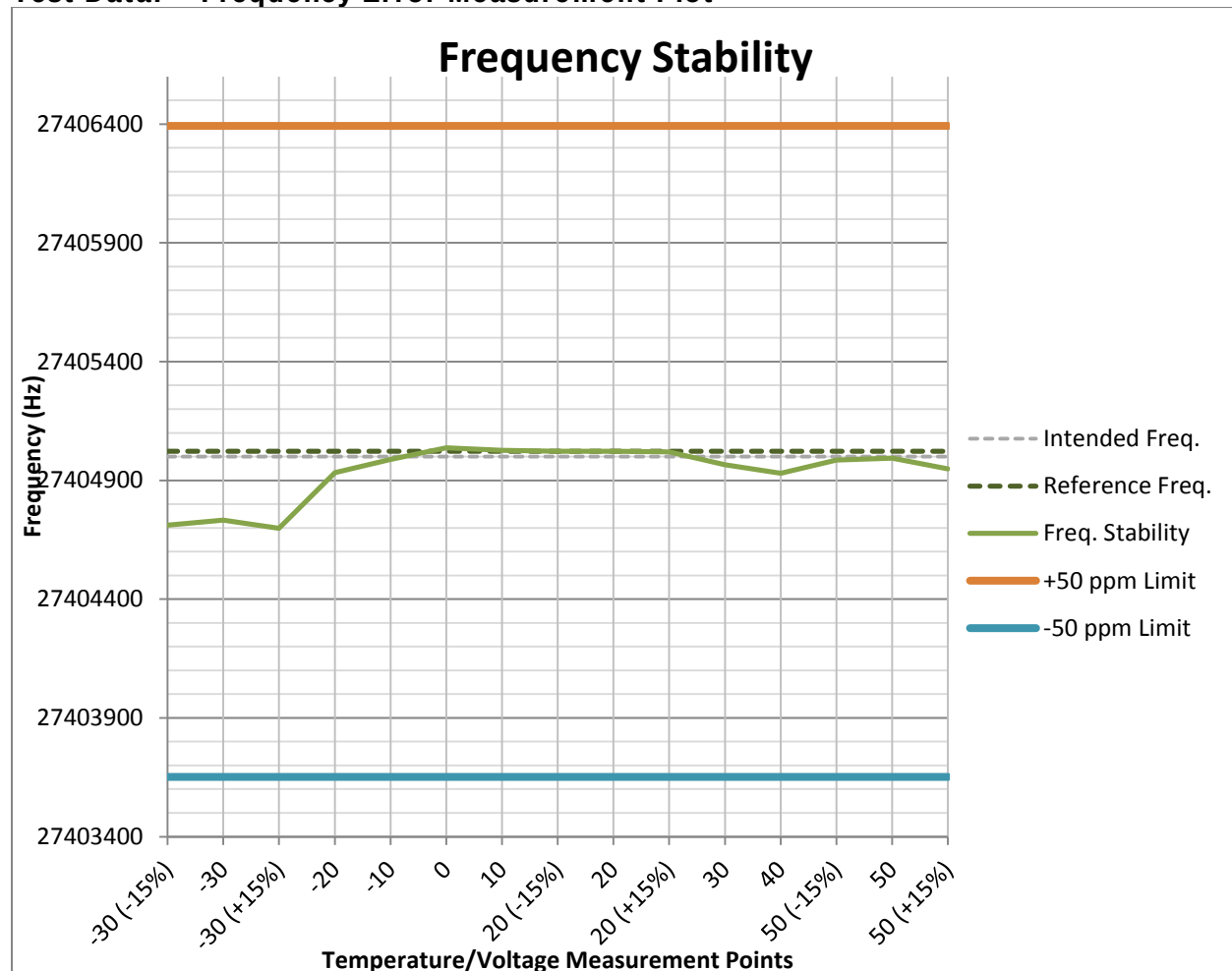
FREQUENCY STABILITY

Rule Parts. No.: 2.1055(a) (b) (d), Part 95.965, RSS-236 5.3.2

Requirements: Maintain a frequency tolerance of less than 50 ppm

Temperature and voltage tests were performed to verify that the frequency remains within the 50 ppm specification limit. The test was conducted as follows: The transmitter was placed in the temperature chamber at 25 °C and allowed to stabilize for one hour. The transmitter was keyed ON for one minute during which four frequency readings were recorded at 15-second intervals. The worst case number was taken for temperature plotting. The assigned channel frequency was considered to be the reference frequency. The temperature was then reduced to -30 °C after which the transmitter was again allowed to stabilize for one hour. The transmitter was keyed ON for one minute, and again frequency readings were noted at 15-second intervals. The worst case number was recorded for temperature plotting. This procedure was repeated in 10 degree increments up to + 50 °C.

Test Data: Frequency Error Measurement Plot



FREQUENCY STABILITY

Test Data: Frequency Error Measurement Table

Frequency Stability				
27.405 High Power (Worst-case Settings)				
Temperature (°C)	Supplied Voltage (VDC)	Intended Frequency (Hz)	Measured Reference Frequency (Hz)	Deviation (Hz)
20°C (reference)	13.8	27405000	27405022	22
@ 20°C (reference)				
Supplied Voltage (%)	Supplied Voltage (VDC)	Frequency (Hz)	Deviation (Hz)	PPM
-15%	11.73	27405022	0	0.000
15%	15.87	27405020	2	0.073
Temperature (°C)	Supplied Voltage (VDC)	Frequency (Hz)	Deviation (Hz)	PPM
50	13.8	27404993	29	1.058
40	13.8	27404930	92	3.357
30	13.8	27404966	56	2.043
20	13.8	27405022	0	0.000
10	13.8	27405027	-5	-0.182
0	13.8	27405037	-15	-0.547
-10	13.8	27404988	34	1.241
-20	13.8	27404933	89	3.248
-30	13.8	27404733	289	10.546
@ -30°C				
Supplied Voltage (%)	Supplied Voltage (VDC)	Frequency (Hz)	Deviation (Hz)	PPM
-15%	11.73	27404711	311	11.348
15%	15.87	27404698	324	11.823
@ 50°C				
Supplied Voltage (%)	Supplied Voltage (VDC)	Frequency (Hz)	Deviation (Hz)	PPM
-15%	11.73	27404986	36	1.314
15%	15.87	27404948	74	2.700

Result: Meets Requirements

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:

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 6kHz of audio freq.	± 1.88 %	
Within 6kHz and 25kHz of audio Freq.	± 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	

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
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	12/31/17
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 REPORT

APPLICANT: COBRA ELECTRONICS CORPORATION
 FCC ID: BBOHH50WXST
 IC: 906A-HH50WXST
 REPORT #: 1844BUT17TestReport_Rev2

[Table of Contents](#)