



FCC Part 74H Test Report

APPLICANT	WISYCOM
	VIA SPIN, 156 ROMANO D'EZZELINO (VI) 36060 ITALY
FCC ID	POUMTH400US8
MODEL NUMBER	MTH400-US8
PRODUCT DESCRIPTION	HANDHELD WIRELESS MIC
STANDARD APPLIED	CFR 47 Part 74
DATE SAMPLE RECEIVED	4/23/2018
DATE TESTED	5/1/2018
TESTED BY	Tim Royer
APPROVED BY	Franklin Rose
TEST RESULTS	☒ PASS ☐ FAIL

Report Number	Report Version	Description	Issue Date
565AUT18TestReport	Rev1	Initial Issue	05/04/2018
	Rev2	Revised Report	06/13/2018

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

TABLE OF CONTENTS

GENERAL REMARKS	2
GENERAL INFORMATION	3
RESULTS SUMMARY	4
RF POWER OUTPUT	5
TEST DATA: MEAN OUTPUT POWER MEASUREMENT TABLE	5
OCCUPIED BANDWIDTH	6
TEST DATA: OPERATING BANDWIDTH MEASUREMENT TABLE.....	7
TEST DATA: 941.50 MHz 99% OBW PLOT.....	8
TEST DATA: 954.00 MHz 99% OBW PLOT.....	9
TEST DATA: 959.85 MHz 99% OBW PLOT.....	10
TEST DATA: 941.50 MHz EMISSION MASK PLOT.....	11
TEST DATA: 954.00 MHz EMISSION MASK PLOT	12
TEST DATA: 959.85 MHz EMISSION MASK PLOT	13
FIELD STRENGTH OF SPURIOUS EMISSIONS.....	14
TEST DATA: 941.5 MHz	16
TEST DATA: 954 MHz	17
TEST DATA: 959.85 MHz.....	18
FREQUENCY STABILITY.....	19
TEST DATA: MEASUREMENT TABLE	19
TEST DATA: MEASUREMENT GRAPH	20
STATEMENT OF MEASUREMENT UNCERTAINTY.....	21
EMC EQUIPMENT LIST	22

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

Tested by:



Name and Title	Tim Royer, Project Manager / EMC Testing Engineer
Date	05/04/2018

Reviewed and Approved by:



Name and Title	Franklin Rose, Project Manager / EMC Testing Technician
Date	05/04/2018

GENERAL INFORMATION

EUT Description	HANDHELD WIRELESS MIC
FCC ID	POUMTH400US8
Model Number	MTH400-US8
Operating Frequency	940 – 960 MHz
Test Frequencies	941.5, 954, 959.85
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	BNC
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	FCC CFR 47 Part 2, & 74 KDB 971168 D01 V02R02 ANSI/TIA 603-D:2010 ANSI C63.4 2014 ANSI C63.26 2015
Test Facility	Timco Engineering Inc. at 849 NW State Road 45 Newberry, FL 32669 USA. Designation #: US1070

RESULTS SUMMARY

FCC Rule Part	Requirement	Test Item	Result
2.1046(a), 74.861(d)(1)	Conducted Power	RF Power Output	PASS
2.1049(c), 74.861(d)(4)(i)	Operating Bandwidth	Occupied Bandwidth	PASS
2.1049(c), 74.861(d)(4)(i)	Unwanted Emissions	Emission Mask	PASS
2.1053, 74.861(d)(4)(i)	Unwanted Emissions	Field Strength of Spurious Emissions	PASS
2.1055, 74.861(e)(4)	Frequency Tolerance	Frequency Stability	PASS

RF POWER OUTPUT

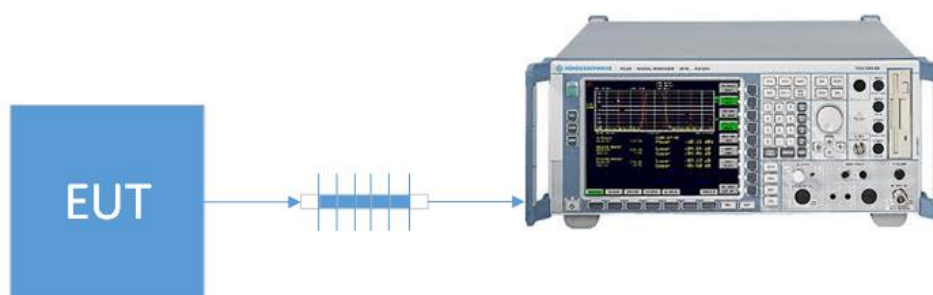
Rule Part No.: 2.1046(a), 74.861(d) (1)

Requirement:

(1) For all bands except the 1435-1525 MHz band, the maximum transmitter power which will be authorized is 1 watt. In the 1435-1525 MHz band, the maximum transmitter power which will be authorized is 250 milliwatts. Licensees may accept the manufacturer's power rating; however, it is the licensee's responsibility to observe specified power limits.

Procedure: KDB 971168 D01 Average Power Measurements section 5.2.1
TIA-603-E, 2.2.1

Setup Diagram:



Test Data: Mean Output Power Measurement Table

Tuned Freq. MHz	Power Output		
	Level (dBm)	Level (mW)	Margin (mW)
941.5000	16.84	48.3	201.7
954.0000	16.53	45.0	205.0
959.8500	16.91	49.1	200.9

Results Meet Requirements

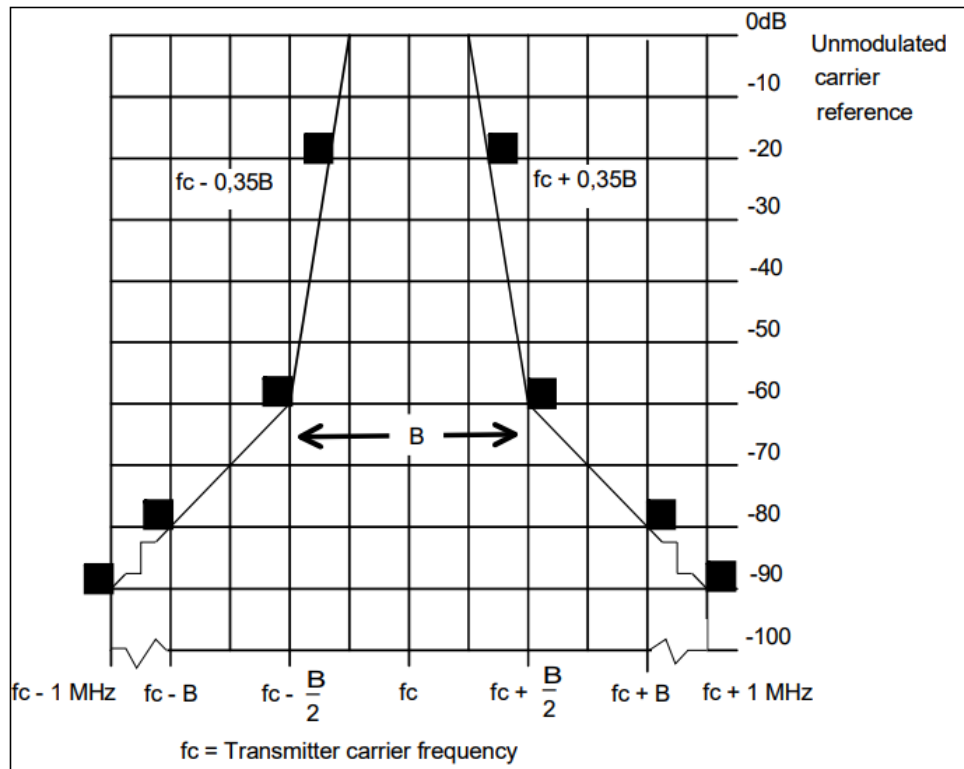
OCCUPIED BANDWIDTH

Rule Part No.: 2.1049(c), 74.802(c)(2), 74.861(d)(4)(i)

Requirement:

(2) One or more adjacent 25 kHz segments within the assignable frequencies may be combined to form a channel whose maximum bandwidth shall not exceed 200 kHz.

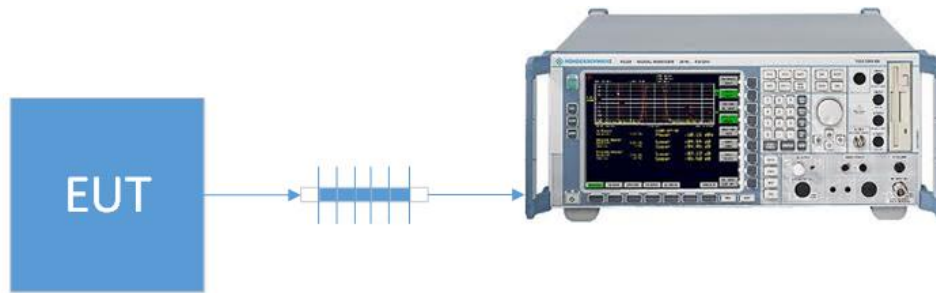
(4)(i) For the 653-657 MHz, 941.5-944 MHz, 944-952 MHz, 952.850-956.250 MHz, 956.45-959.85 MHz, 1435-1525 MHz, 6875-6900 MHz and 7100-7125 MHz bands, analog emissions within the band from one megahertz below to one megahertz above the carrier frequency shall comply with the emission mask in section 8.3.1.2 of the European Telecommunications Institute Standard ETSI EN 300 422-1 v1.4.2 (2011-08), Electromagnetic compatibility and Radio spectrum Matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range; Part 1: Technical characteristics and methods of measurement. Beyond one megahertz below and above the carrier frequency, emissions shall comply with the limits specified in section 8.4 of ETSI EN 300 422-1 v1.4.2 (2011-08).



Procedure: KDB 971168 D01 Power Bandwidth 99% section 4.2
 KDB 971168 D01 Spurious Emissions at antenna term section 6
 ANSI C63.26, 5.4.4 (using Test Setup from TIA 603-E 2.2.11, below)

OCCUPIED BANDWIDTH

Setup Diagram:



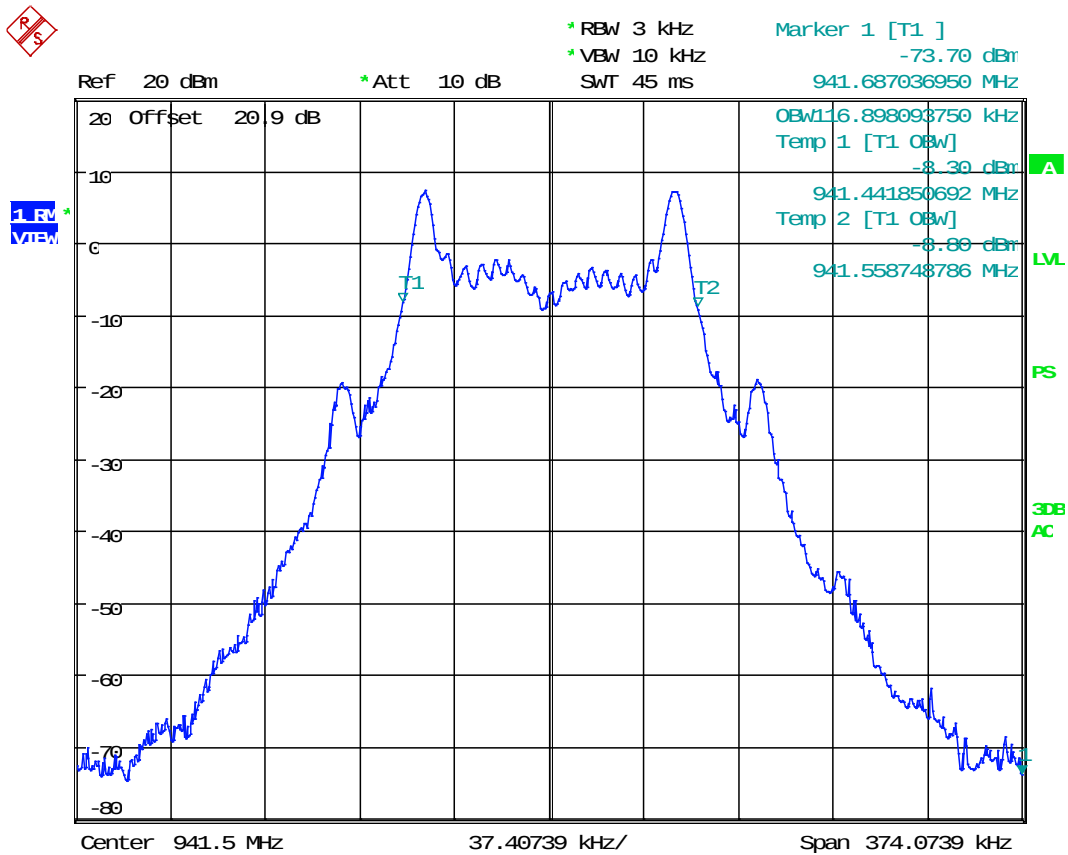
Test Data: Operating Bandwidth Measurement Table

Tuned Freq (MHz)	Measured 99% BW (KHz)	Margin (KHz)
941.5	116.89	83.11
954	121.69	78.31
959.85	116.89	83.11

Results Meet Requirements

OCCUPIED BANDWIDTH

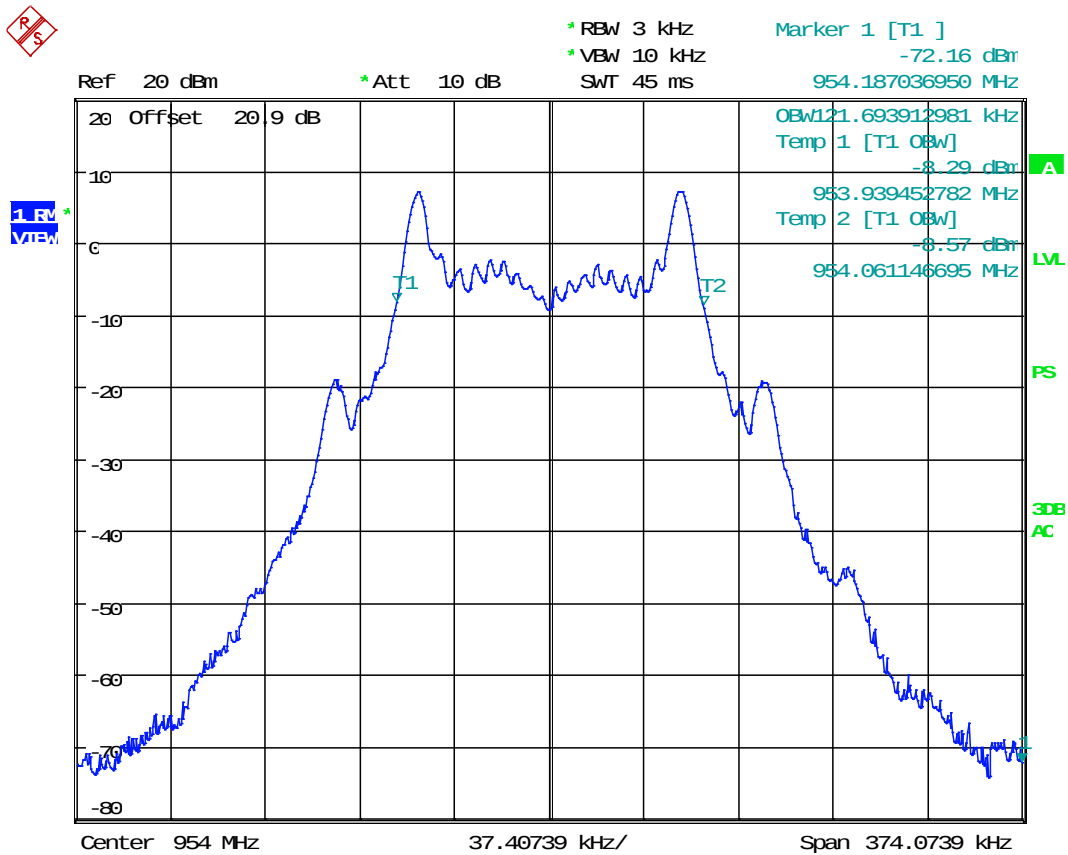
Test Data: 941.50 MHz 99 % OBW Plot



Date: 2.MAY.2018 15:43:24

OCCUPIED BANDWIDTH

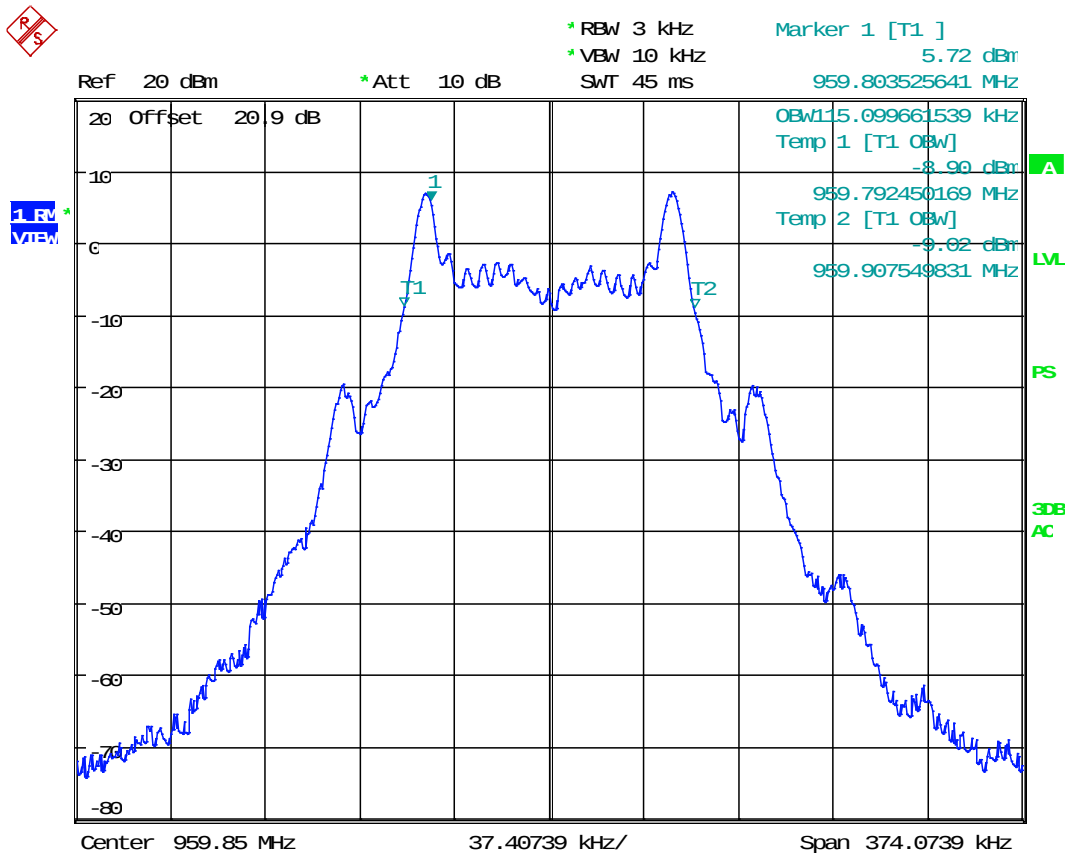
Test Data: 954.00 MHz 99 % OBW Plot



Date: 2.MAY.2018 15:42:48

OCCUPIED BANDWIDTH

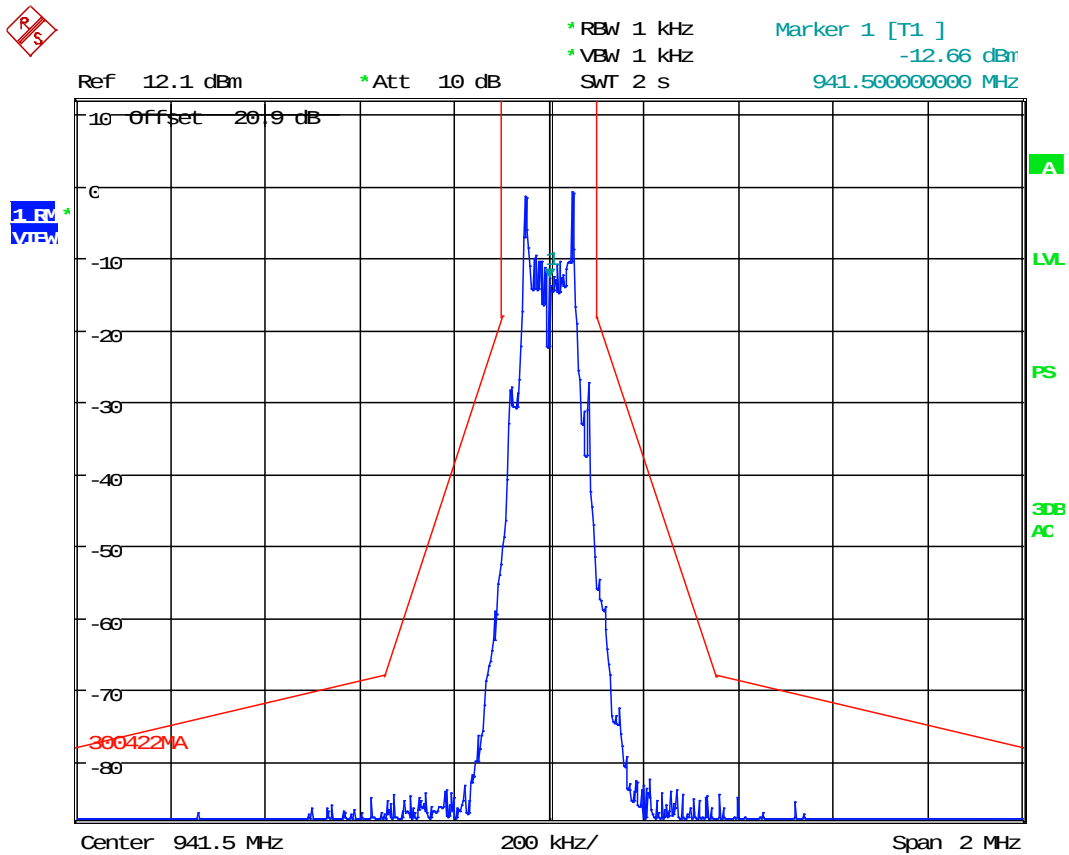
Test Data: 959.85 MHz 99 % OBW Plot



Date: 2.MAY.2018 15:41:59

OCCUPIED BANDWIDTH

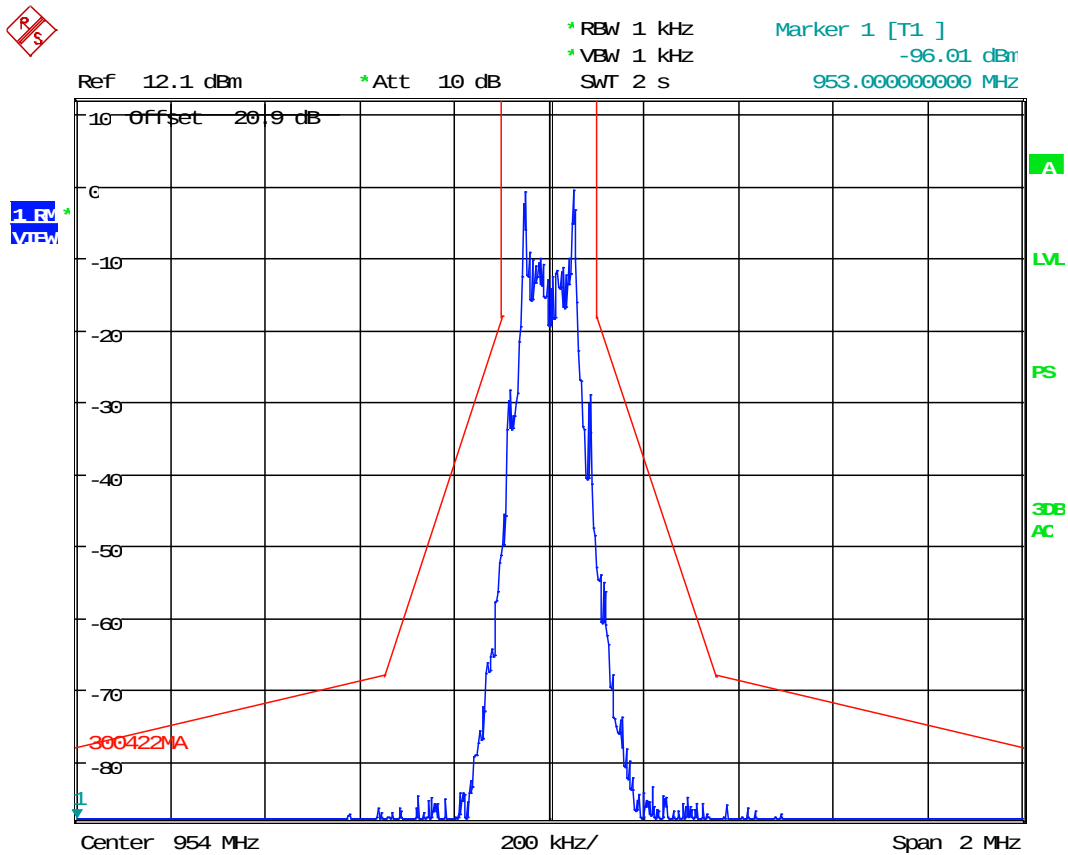
Test Data: 941.50 MHz Emission Mask Plot



Date: 2.MAY.2018 15:46:12

OCCUPIED BANDWIDTH

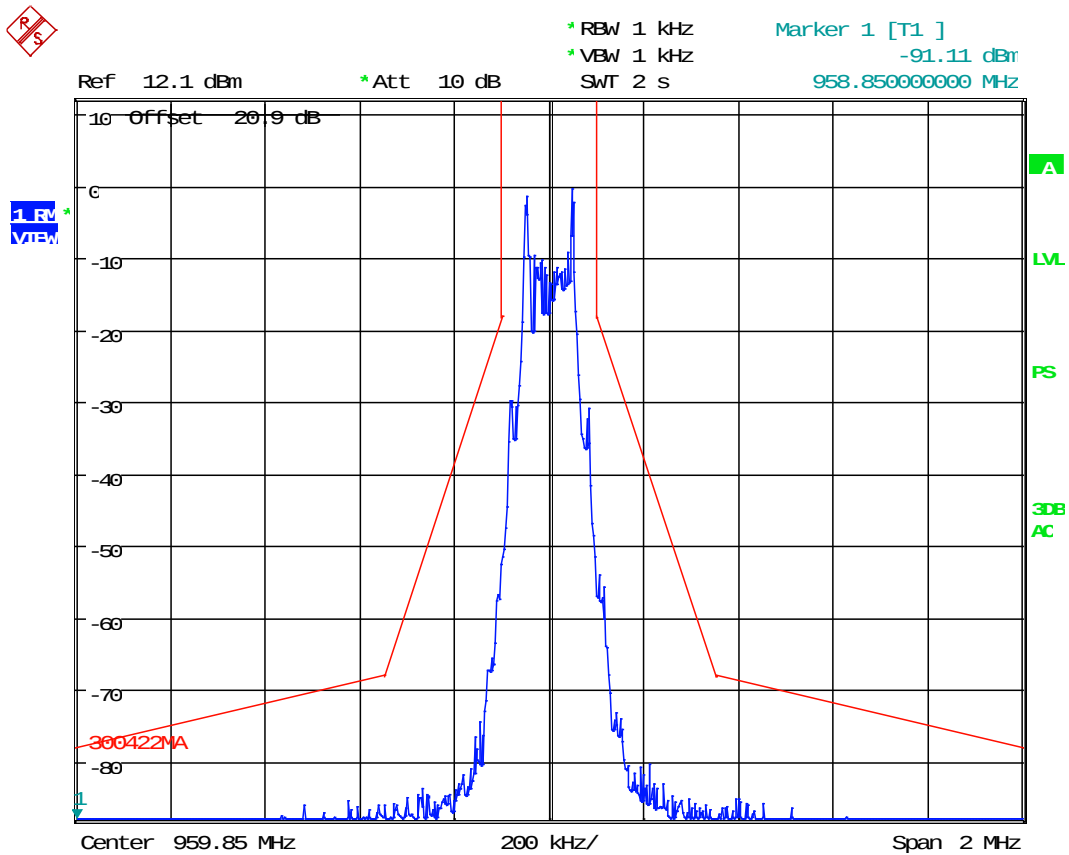
Test Data: 954.00 MHz Emission Mask Plot



Date: 2.MAY.2018 15:46:44

OCCUPIED BANDWIDTH

Test Data: 959.85 MHz Emission Mask Plot



Date: 2.MAY.2018 15:47:15

FIELD STRENGTH OF SPURIOUS EMISSIONS

Rule Part No.: 2.1053, 74.861(d)(4)(i), EN 300-422 v1.4.1 sec 8.4.3

Requirement:

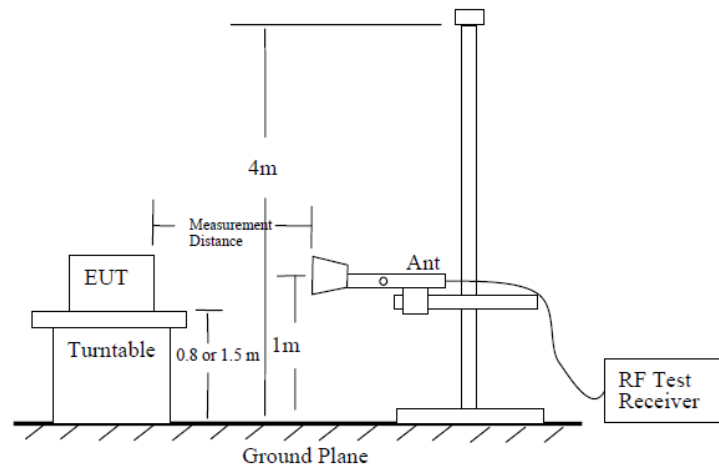
(4)(i) For the 653-657 MHz, 941.5-944 MHz, 944-952 MHz, 952.850-956.250 MHz, 956.45-959.85 MHz, 1435-1525 MHz, 6875-6900 MHz and 7100-7125 MHz bands, analog emissions within the band from one megahertz below to one megahertz above the carrier frequency shall comply with the emission mask in section 8.3.1.2 of the European Telecommunications Institute Standard ETSI EN 300 422-1 v1.4.2 (2011-08), Electromagnetic compatibility and Radio spectrum Matters (ERM); Wireless microphones in the 25 MHz to 3 GHz frequency range; Part 1: Technical characteristics and methods of measurement. Beyond one megahertz below and above the carrier frequency, emissions shall comply with the limits specified in section 8.4 of ETSI EN 300 422-1 v1.4.2 (2011-08).

Table 3: Limits for spurious emissions

State	Frequency		
	47 MHz to 74 MHz 87,5 MHz to 137 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz	Other Frequencies below 1 000 MHz	Frequencies above 1 000 MHz
Operation	4 nW	250 nW	1 μ W
Standby	2 nW	2 nW	20 nW

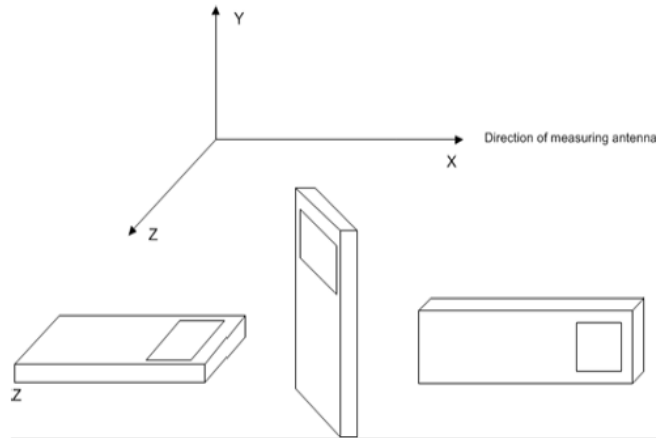
Procedure: KDB 971168 D01 Spurious Emissions at antenna term section 7
ANSI C63.26, 5.5.4
ANSI C63.4 General Radiated Testing and Site Validation

Test Site Setup:



FIELD STRENGTH OF SPURIOUS EMISSIONS

EUT Orientation(s):



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

FIELD STRENGTH OF SPURIOUS EMISSIONS

Test Data: 941.5 MHz

Tuned Freq (MHz)	Emission Frequency (MHz)	Antenna Polarity	ERP (dBm)	Margin (dB)
941.50	1883.00	V	-49.287	13.27
941.50	1883.00	H	-46.207	10.19
941.50	2824.50	H	-56.800	20.78
941.50	2824.50	V	-56.800	20.78
941.50	3766.00	V	-54.478	18.46
941.50	3766.00	H	-54.478	18.46
941.50	4707.50	H	-53.132	17.11
941.50	4707.50	V	-53.132	17.11
941.50	6590.50	H	-49.826	13.81
941.50	6590.50	V	-49.826	13.81
941.50	7532.00	V	-49.251	13.23
941.50	7532.00	H	-49.251	13.23
941.50	5649.00	H	-49.257	13.24
941.50	5649.00	V	-49.777	13.76
941.50	8473.50	V	-48.585	12.57
941.50	8473.50	H	-48.585	12.57
941.50	9415.00	H	-47.331	11.31
941.50	9415.00	V	-47.331	11.31

FIELD STRENGTH OF SPURIOUS EMISSIONS

Test Data: 954 MHz

Tuned Freq (MHz)	Emission Frequency (MHz)	Antenna Polarity	ERP (dBm)	Margin (dB)
954.00	1908.00	H	-46.914	10.89
954.00	1908.00	V	-50.484	14.46
954.00	2862.00	V	-56.679	20.66
954.00	2862.00	H	-56.679	20.66
954.00	3816.00	H	-54.525	18.50
954.00	3816.00	V	-54.525	18.50
954.00	4770.00	V	-53.068	17.05
954.00	4770.00	H	-53.068	17.05
954.00	5724.00	H	-51.556	15.54
954.00	5724.00	V	-51.556	15.54
954.00	6678.00	V	-49.790	13.77
954.00	6678.00	H	-49.790	13.77
954.00	7632.00	H	-49.172	13.15
954.00	7632.00	V	-49.172	13.15
954.00	8586.00	V	-48.613	12.59
954.00	8586.00	H	-48.613	12.59
954.00	9540.00	H	-46.991	10.97
954.00	9540.00	V	-46.991	10.97

FIELD STRENGTH OF SPURIOUS EMISSIONS

Test Data: 959.85 MHz

Tuned Freq (MHz)	Emission Frequency (MHz)	Antenna Polarity	ERP (dBm)	Margin (dB)
959.85	1919.70	V	-42.220	6.20
959.85	1919.70	H	-43.500	7.48
959.85	2879.55	H	-45.140	9.12
959.85	2879.55	V	-49.960	13.94
959.85	3839.40	V	-54.442	18.42
959.85	3839.40	H	-54.442	18.42
959.85	4799.25	H	-52.998	16.98
959.85	4799.25	V	-52.998	16.98
959.85	5759.10	V	-51.534	15.51
959.85	5759.10	H	-51.534	15.51
959.85	6718.95	H	-49.794	13.77
959.85	6718.95	V	-49.794	13.77
959.85	6718.95	V	-49.794	13.77
959.85	6718.95	H	-49.794	13.77
959.85	8638.65	H	-48.525	12.50
959.85	8638.65	V	-48.525	12.50
959.85	9598.50	V	-46.847	10.83
959.85	9598.50	H	-46.847	10.83

FREQUENCY STABILITY

Rule Part No.: 2.1053, 74.861(e) (4), RSS-210

Requirement: The frequency tolerance of the transmitter shall be 0.005 percent.

Procedure: KDB 971168 D01 Spurious Emissions at antenna term section 9
TIA 603-D Carrier Frequency Stability 2.2.2

Test Data: Measurement Table

959.85 MHz High Power				
Limit:		5	ppm	
Temperature (°C)	Supplied Voltage (VDC)	Intended Frequency (Hz)	Measured Reference Frequency (Hz)	Deviation (Hz)
20°C (reference)	3	959850000	959850100	-100

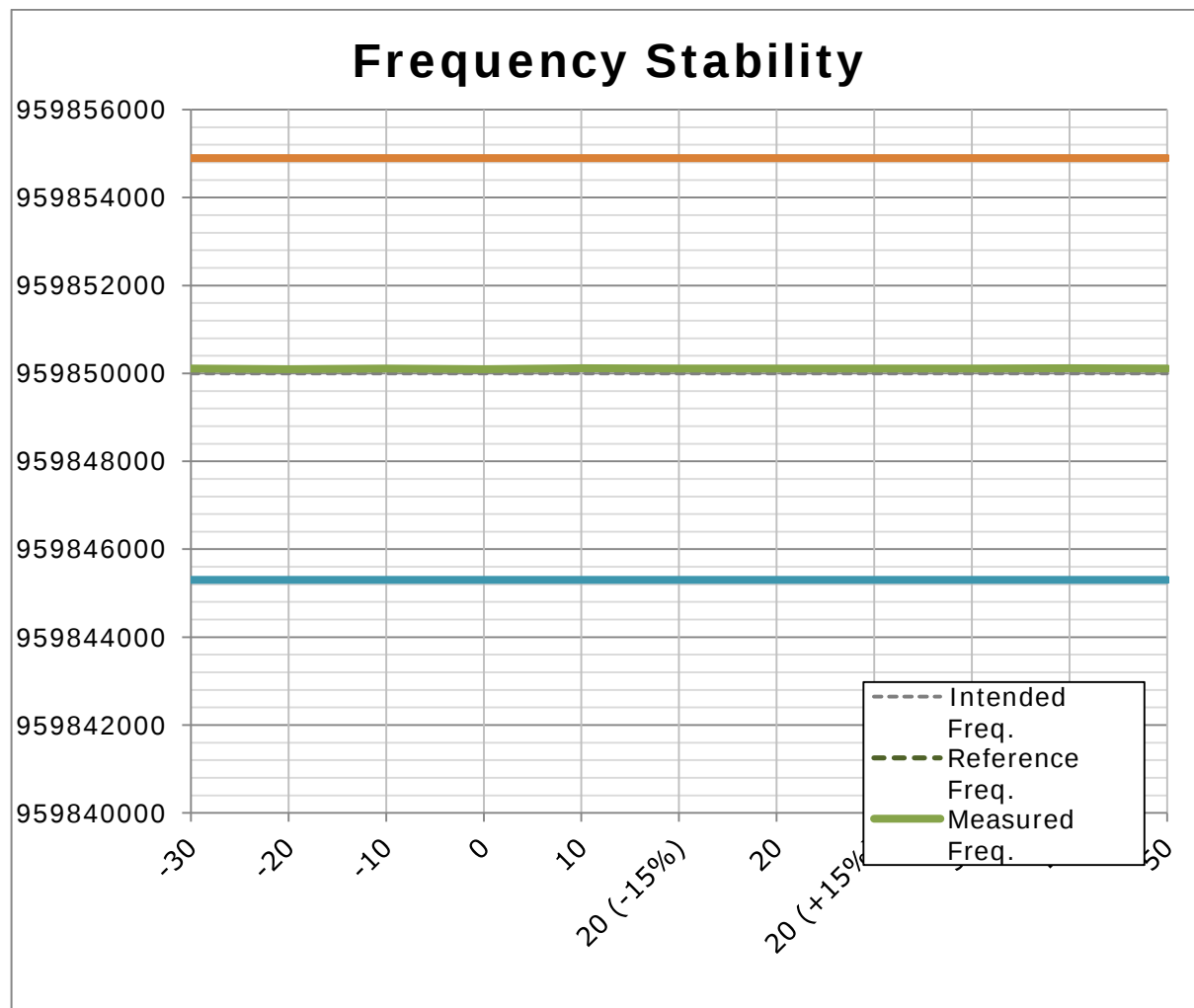
@ 20°C (reference)				
Supplied Voltage (%)	Supplied Voltage (VDC)	Frequency (Hz)	Deviation (Hz)	PPM
-15%	2.55	959850110	-10	-0.010
15%	3.45	959850110	-10	-0.010

Temperature (°C)	Supplied Voltage (VDC)	Frequency (Hz)	Deviation (Hz)	PPM
50	3	959850110	-10.00000	-0.010
40	3	959850120	-20.00000	-0.021
30	3	959850110	10.00000	-0.010
20	3	959850110	10.00000	-0.010
10	3	959850120	20.00000	-0.021
0	3	959850100	0.00000	0.000
-10	3	959850110	10.00000	-0.010
-20	3	959850100	0.00000	0.000
-30	3	959850110	10.00000	-0.010

Results Meet Requirements

FREQUENCY STABILITY

Test Data: Measurement Graph



Results Meet 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	
Adjacent channel power	± 1.47 dB	(1)
Transient Frequency Response	± 1.88 %	
Temperature	± 1.0 °C	(1)
Humidity	± 5.0 %	

Notes: (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
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	5/31/18
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
EMI Test Receiver R & S ESIB 40	Rohde & Schwarz	ESIB 40	100274	08/18/16	08/18/18
EMI Test Receiver R & S ESU 40	Rohde & Schwarz	ESU 40	100320	04/01/16	04/01/19
Attenuator N 20dB 20W DC-12G	Narda	768-20-SP	155	07/10/17	07/10/19
Attenuator N 20dB 20W DC-12G	Narda	768-20-SP	344	07/10/17	07/10/19
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
Terminator N 20W DC-18G	Narda	8205	#14	04/06/17	04/06/19
Attenuator BNC 6dB 50Ohm DC-2G	Mini-Circuits	HAT-6+	#53	07/14/17	07/14/19
Terminator N 20W DC-18G	Narda	8205	#14	04/06/17	04/06/19
Temperature Chamber LARGE	Tenney Engineering	TTRC	11717-7	09/01/16	09/01/18
Type K J Thermometer	Martel	303	080504494	11/02/17	11/02/19

*EMI RECEIVER SOFTWARE VERSION

The receiver firmware used was version 4.43 Service Pack 3

END OF TEST REPORT