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TIMCO ENGINEERING, Inc.

An IIA Company

FCC Part 74H & ISED RSS-210

Test Report

APPLICANT	ZAXCOM, INC.
	230 WEST PARKWAY, UNIT 9 POMPTON PLAINS N.J. 07444 USA
FCC ID	PR6LA9
IC	12755A-LA9
MODEL NUMBER	TRXLA3.9
PRODUCT DESCRIPTION	WIRELESS MIC TRANSMITTER
DATE SAMPLE RECEIVED	CFR 47 Part 74 & IC RSS-210
DATE TESTED	12/4/2018
TESTED BY	Tim Royer
APPROVED BY	Franklin Rose
TEST RESULTS	☒ PASS ☐ FAIL

Report Number	Report Version	Description	Issue Date
2065UT18TestReport	Rev1	Initial Issue	12/04/2018
	Rev2	Added FCC 2.1033(c)(8)	06/29/2020

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

Tested by:

Name and Title	Tim Royer, Project Manager / EMC Testing Engineer
Date	12/05/2018

Reviewed and Approved by:

Name and Title	Franklin Rose, Project Manager / EMC Testing Technician
Date	01/09/2018

GENERAL INFORMATION

EUT Description	WIRELESS MIC TRANSMITTER
FCC ID	PR6LA9
IC	12755A-LA9
Model Number	TRXLA3.9
Operating Frequency	941.6 – 959.8 MHz
Test Frequencies	941.6, 950.4, 959.2
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	SMA
Test Conditions	The temperature was 26ºC 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 V03R01, KDB 206256 D01 v02, ANSI/TIA 603-D:2010, ANSI C63.4 2014**,** ETSI EN 300-422-1 V1.4.2
Test Facility	Timco Engineering Inc. at 849 NW State Road 45 Newberry, FL 32669 USA. Designation #: US1070

RESULTS SUMMARY

FCC Rule Part	Requirement	Result
PART 2.1046(a), 74.861(e) (1) (ii), (iii)	Conducted Power	**PASS**
2.1049(c), 74.861(d)(4)(i)	Operating Bandwidth	**PASS**
PART 74.861(e)(7), ETSI EN 300-422-1 s. 8.3.2	Unwanted Emissions	**PASS**
2.1051(a), 74.861(e)(6)(iii)	Unwanted Emissions	**PASS**
2.1053, 74.861(e)(6)(iii)	Unwanted Emissions	**PASS**
2.1053, 74.861(e) (4), RSS-210	Frequency Stability	**PASS**

RF POWER OUTPUT

Rule Part No.: 2.1046(a), 74.861(d) (1), RSS-210

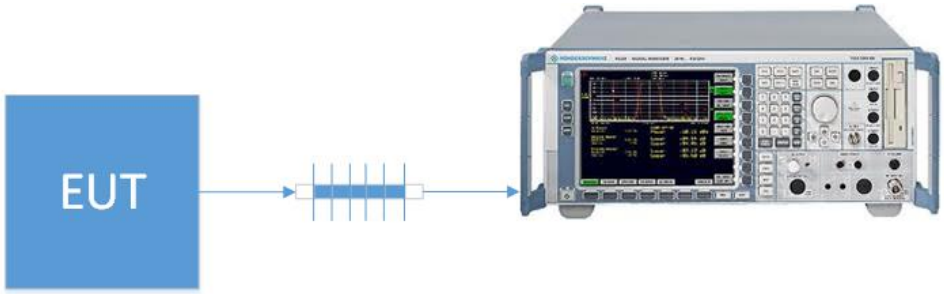
Requirement:

§74.861 Technical requirements.

(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

Setup Diagram:



Test Data: Mean Output Power Measurement Table

Tuned Freq. MHz	Power Output			
	Level (dBm)	Ant. Gain (dBi)	Level (mW)	Margin (mW)
941.60	20.10	0.0	102.3	9897.7
950.40	19.80	0.0	95.5	9904.5
959.20	20.09	0.0	102.1	9897.9

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.

Power In the Final Stage

Power at Final Stage: (3.3 VDC) (0.05 A) = **165 milliwatts**

OCCUPIED BANDWIDTH

Rule Part No.: 74.861(d) (4) (ii), RSS-210

Requirement: ETSI EN 300 422-1 Section 8.3.2

(ii) For the 653-657 MHz, 941.5-944 MHz, 944-952 MHz, 952.850-956.250 MHz, 956.45-959.85 MHz, and 1435-1525 MHz bands, digital emissions within the band from one megahertz below to one megahertz above the carrier frequency shall comply with the emission mask in section 8.3.2.2 (Figure 4) 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).

8.3.2.2 Limits

The transmitter output spectrum shall be within the mask defined in figure 4. This mask may also be used for analogue.

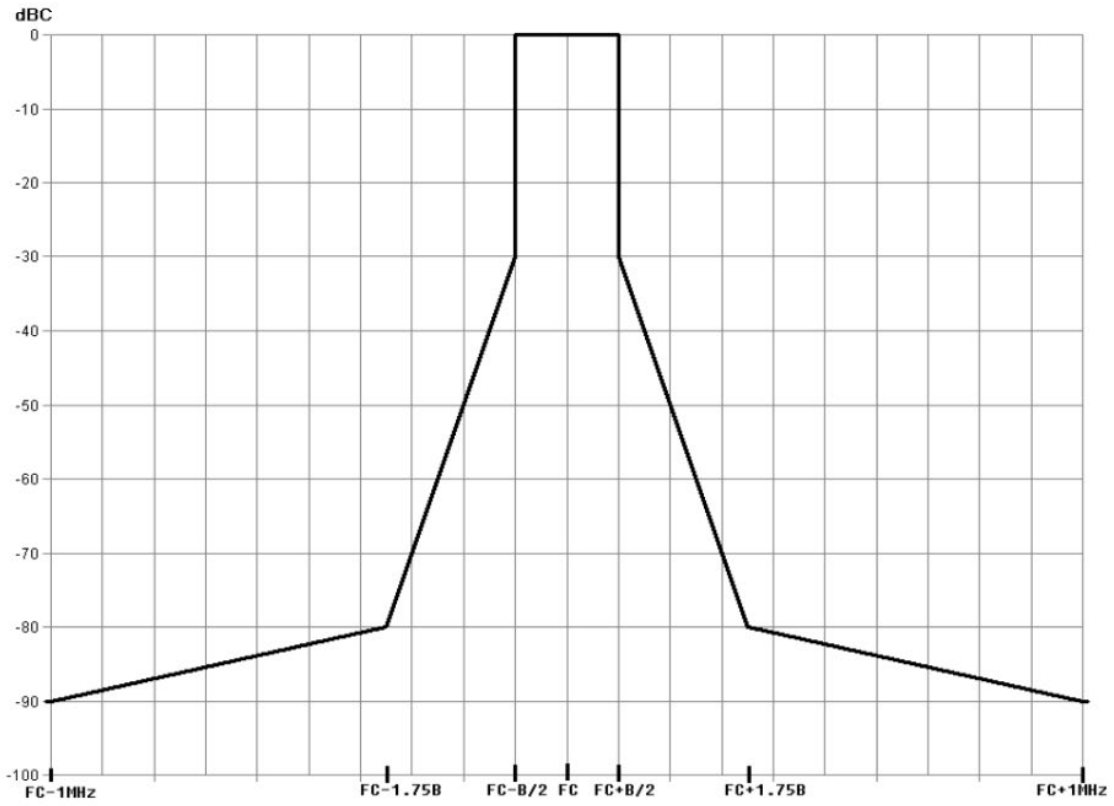
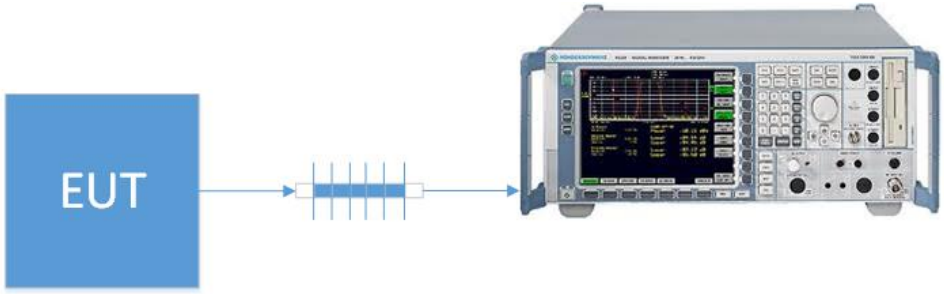


Figure 4: Spectrum mask for digital systems below 1 GHz

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:



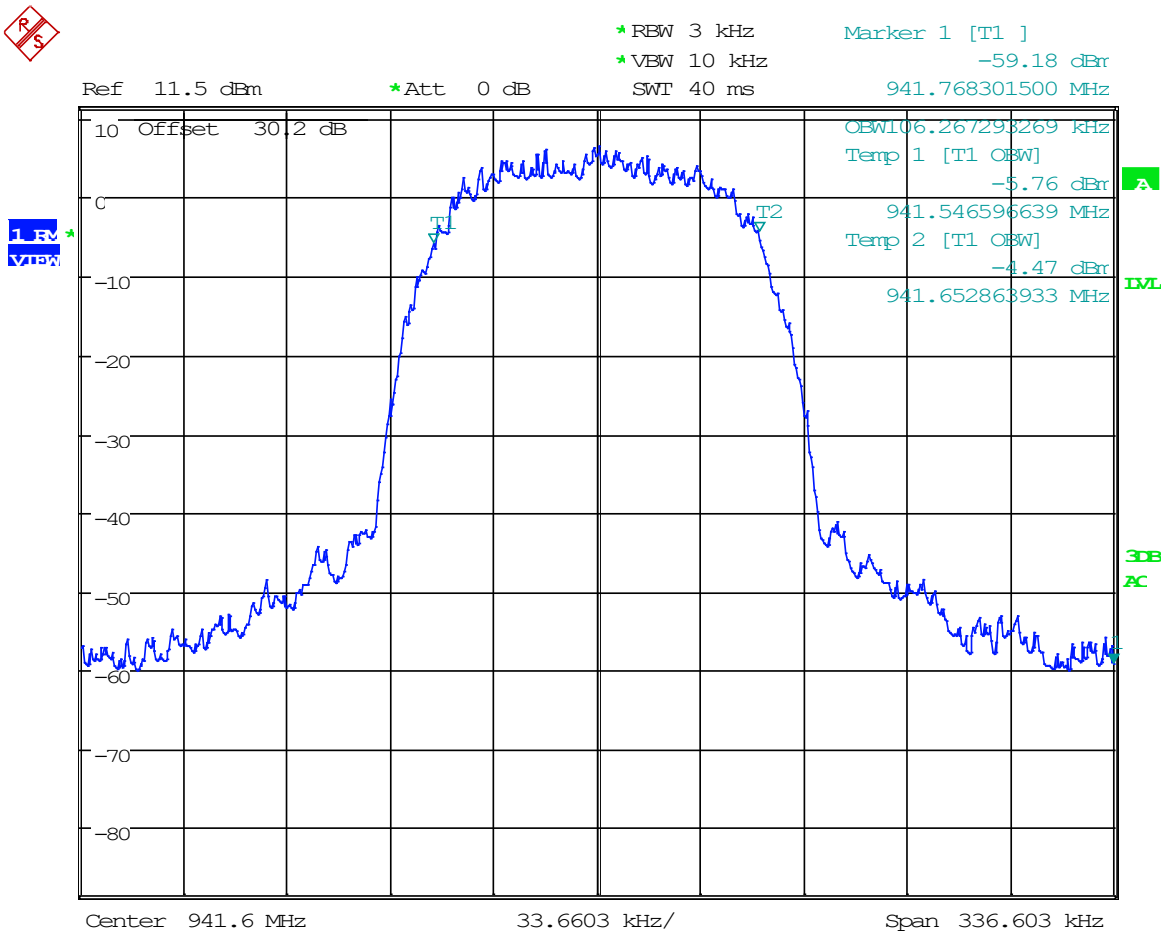
Test Data: **Operating Bandwidth Measurement Table**

Tuned Freq (MHz)	Measured 99% BW (KHz)	Margin (KHz)
941.6	106.26	93.74
950.4	105.7	94.3
959.2	107.3	92.7

Results Meet Requirements

OCCUPIED BANDWIDTH

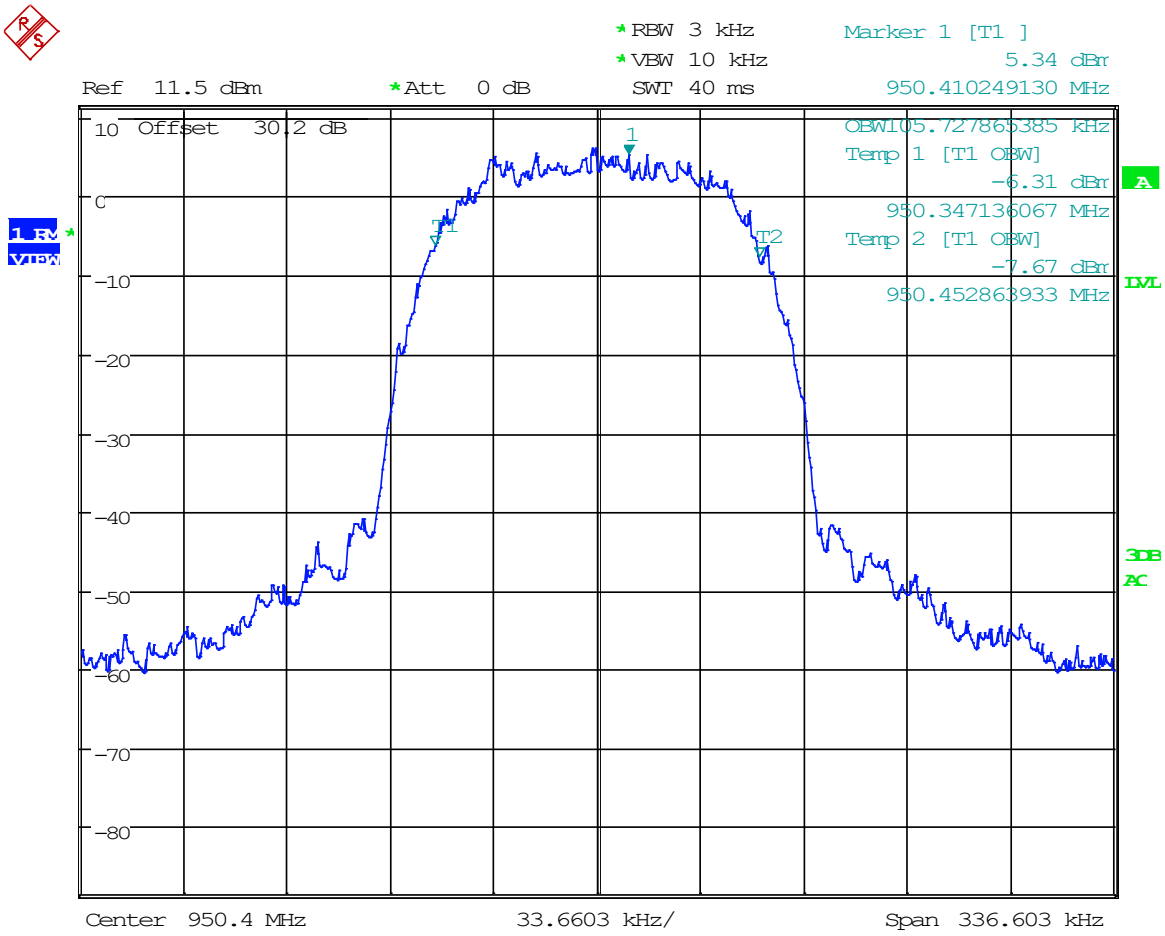
Test Data: 941.6 MHz 99% OBW Plot



Date: 11.DEC.2018 11:12:07

OCCUPIED BANDWIDTH

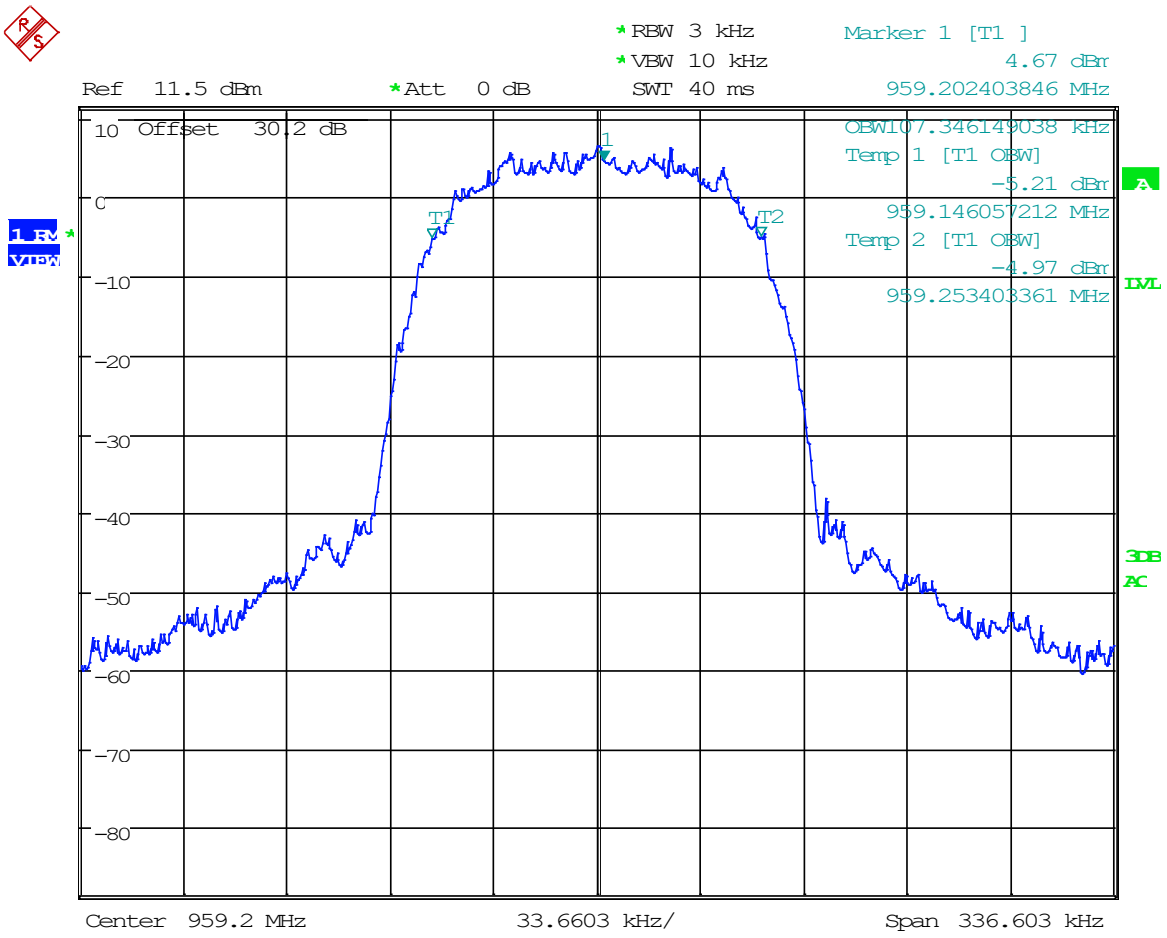
Test Data: 950.4 MHz 99% OBW Plot



Date: 11.DEC.2018 11:11:09

OCCUPIED BANDWIDTH

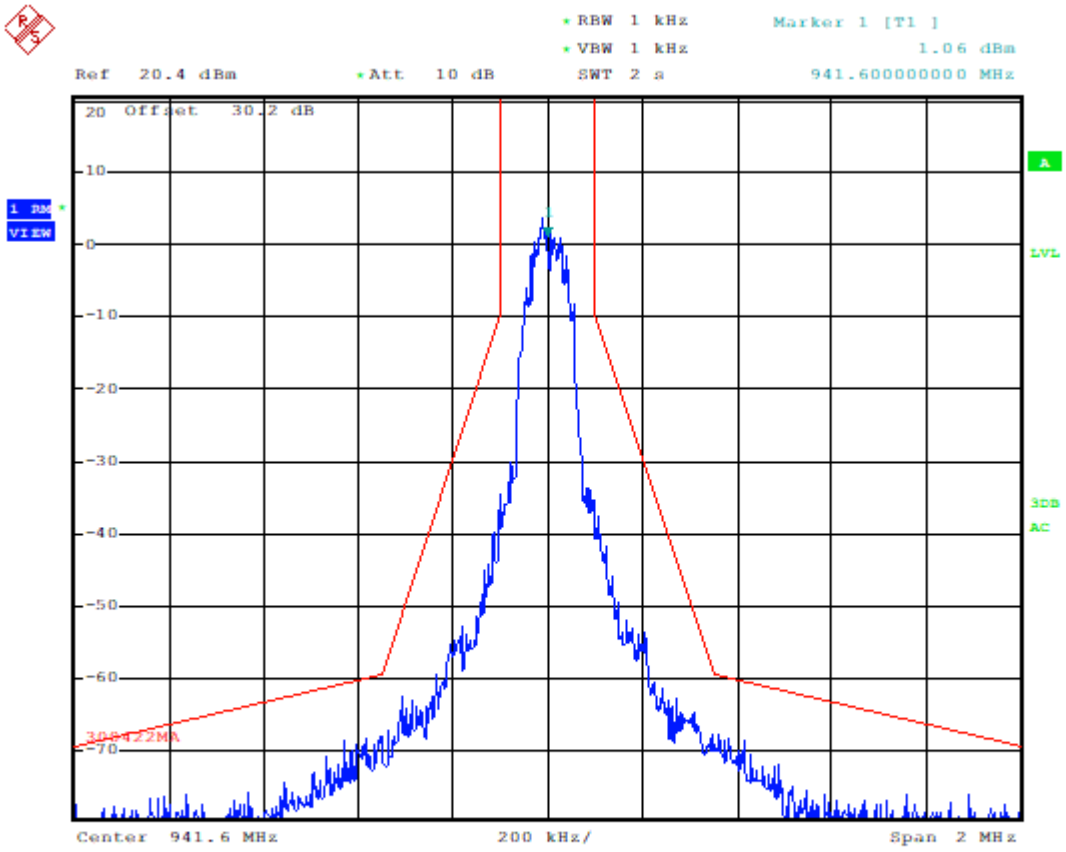
Test Data: 959.2 MHz 99% OBW Plot



Date: 11.DEC.2018 11:10:08

EMISSION MASK

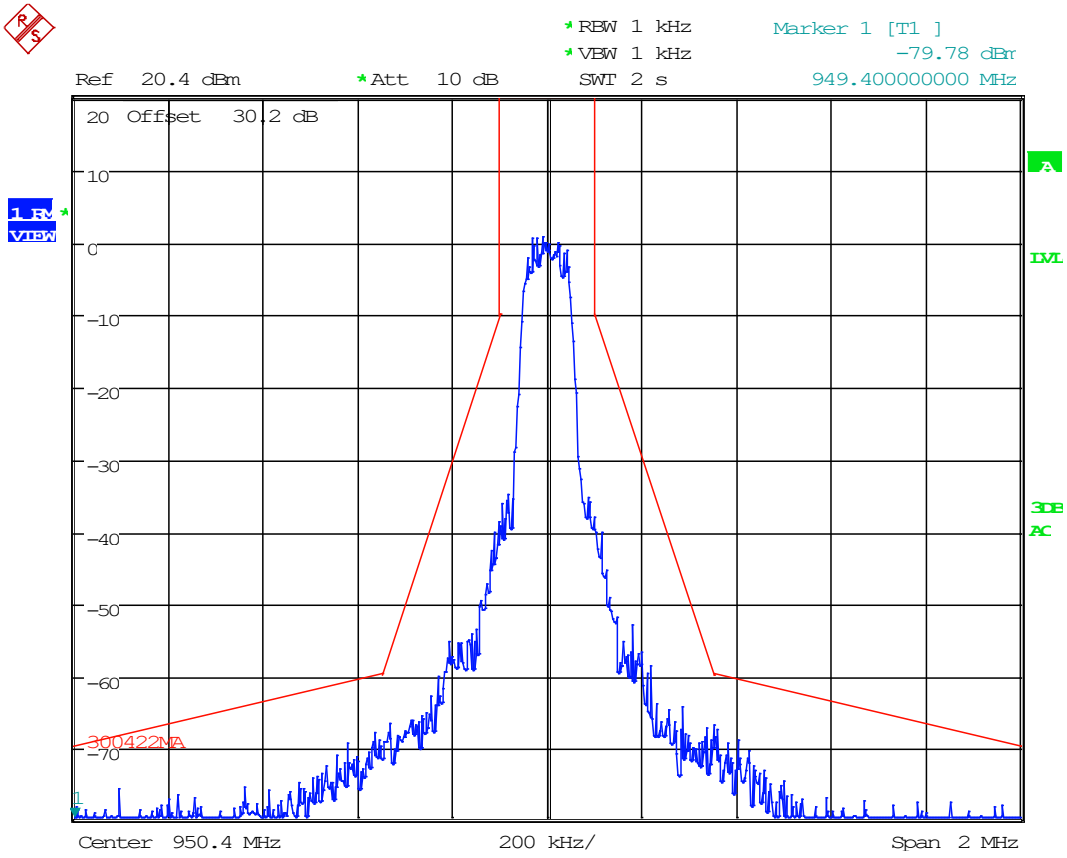
Test Data: 941.6 MHz Emission Mask Plot



Date: 17.DEC.2018 09:03:24

EMISSION MASK

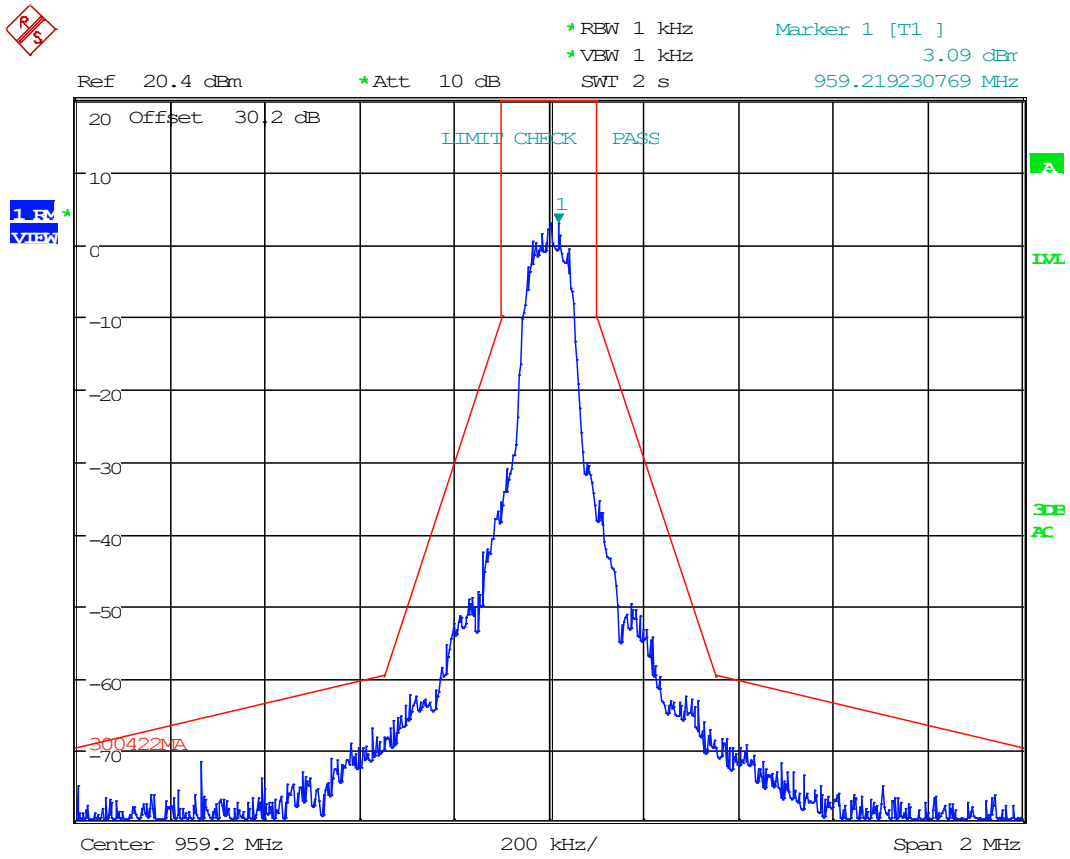
Test Data: 950.4 MHz Emission Mask Plot



Date: 17.DEC.2018 09:04:45

EMISSION MASK

Test Data: 959.2 MHz Emission Mask Plot



Date: 31.DEC.2018 10:14:10

EMISSION MASK

SPURIOUS EMISSIONS AT ANTENNA TERMINALS (CONDUCTED)

Rule Part No.: 2.1051(a), 74.861(d)(4)(ii), RSS-210

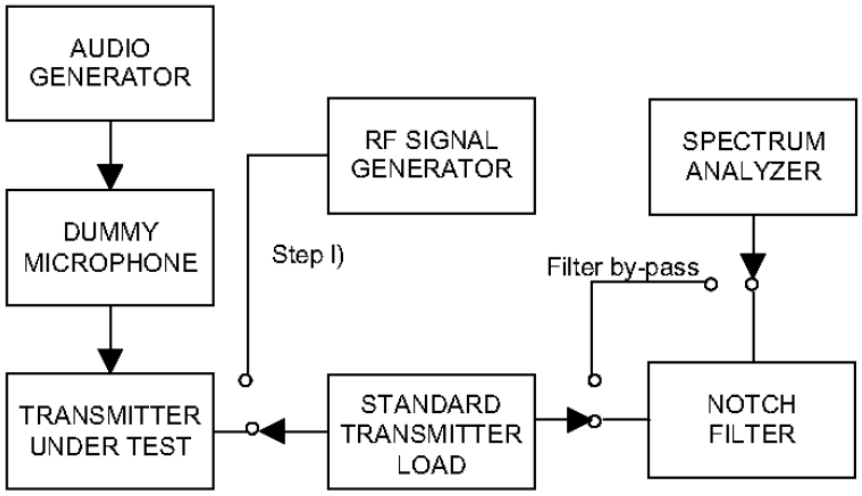
Requirement: ETSI EN 300 422-1 v1.4.2 Section 8.4

(ii) For the 653-657 MHz, 941.5-944 MHz, 944-952 MHz, 952.850-956.250 MHz, 956.45-959.85 MHz, and 1435-1525 MHz bands, digital emissions within the band from one megahertz below to one megahertz above the carrier frequency shall comply with the emission mask in section 8.3.2.2 (Figure 4) 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).

Limits: ETSI EN 300 422-1 v1.4.2 Section 8.4.3, Table 3

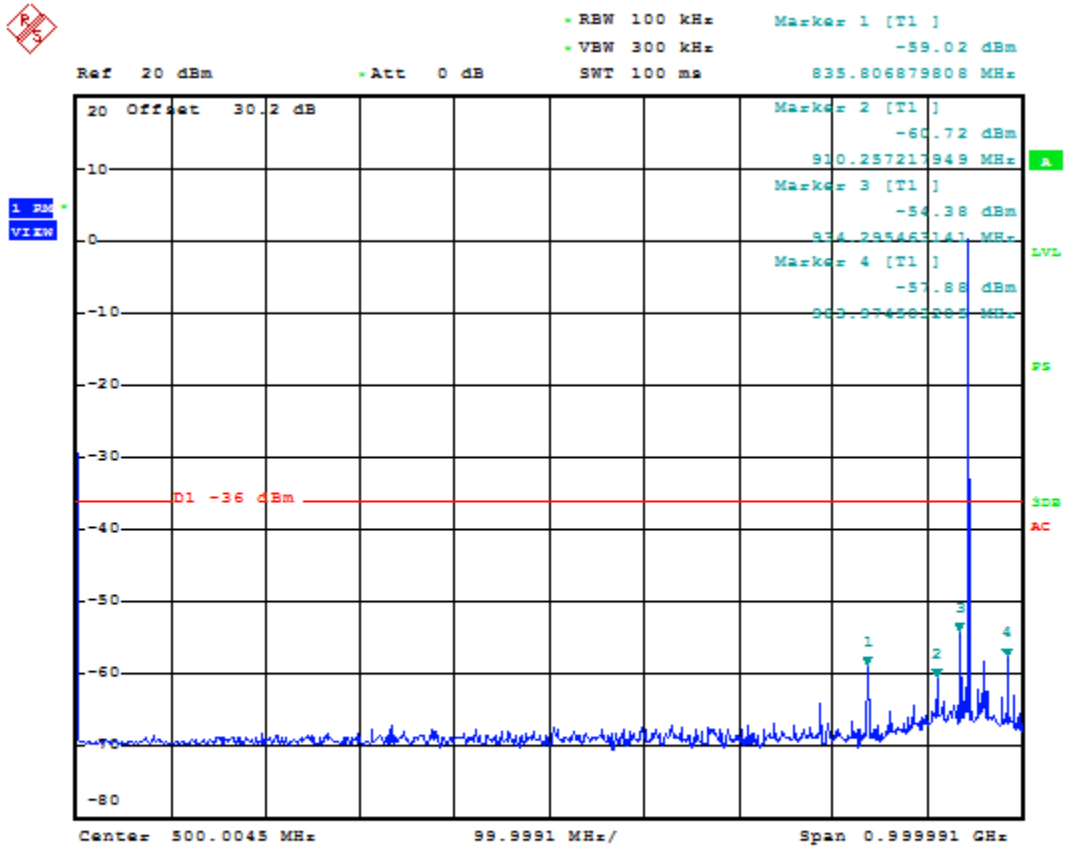
State	Frequency		
	47 MHz to 74 MHz 87,5 MHz to 137 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz	Other Frequencies below 1 000 MHz	Frequencies above 1 000 MHz
Operation	4 nW	250 nW	1 µW
Standby	2 nW	2 nW	20 nW

Setup Diagram:



SPURIOUS EMISSIONS AT ANTENNA TERMINALS (CONDUCTED)

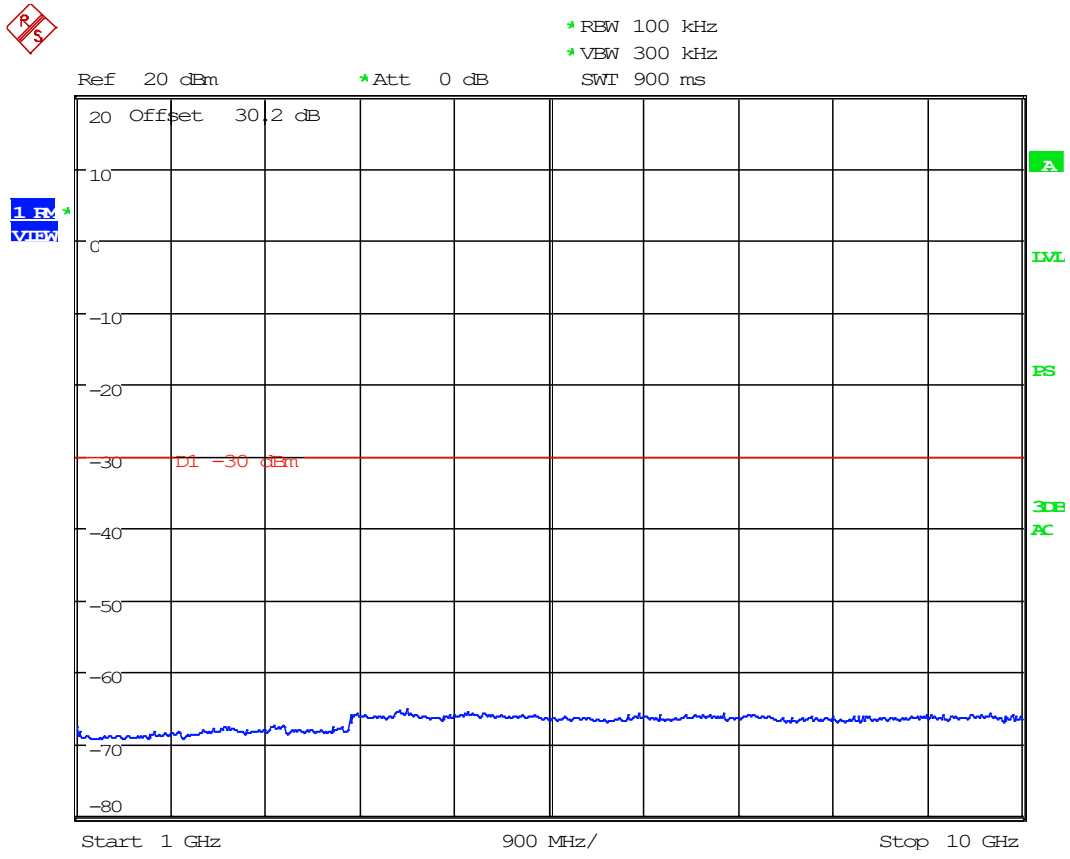
Test Data: 941.6 MHz Spurious Conducted Emissions f<1GHz



Result: Meets Requirements

SPURIOUS EMISSIONS AT ANTENNA TERMINALS (CONDUCTED)

Test Data: 941.6 MHz Spurious Conducted Emissions f>1GHz

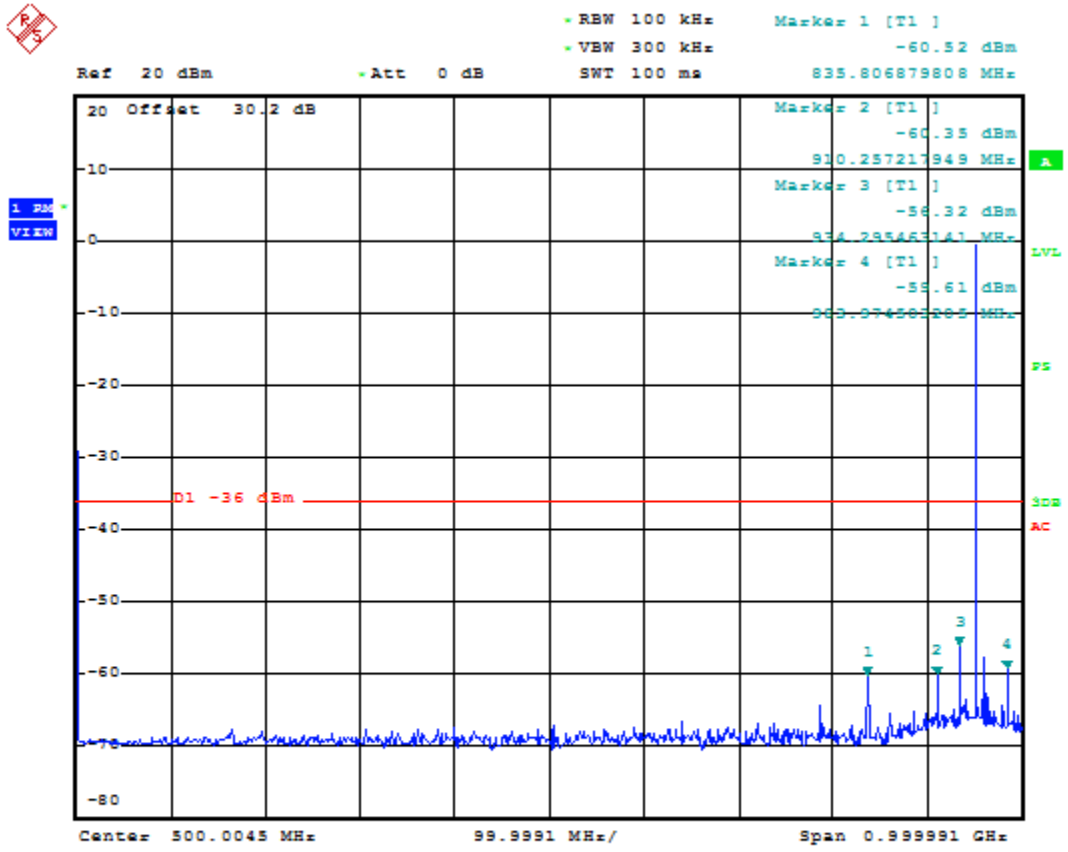


Date: 11.DEC.2018 12:41:03

Result: Meets Requirements

SPURIOUS EMISSIONS AT ANTENNA TERMINALS (CONDUCTED)

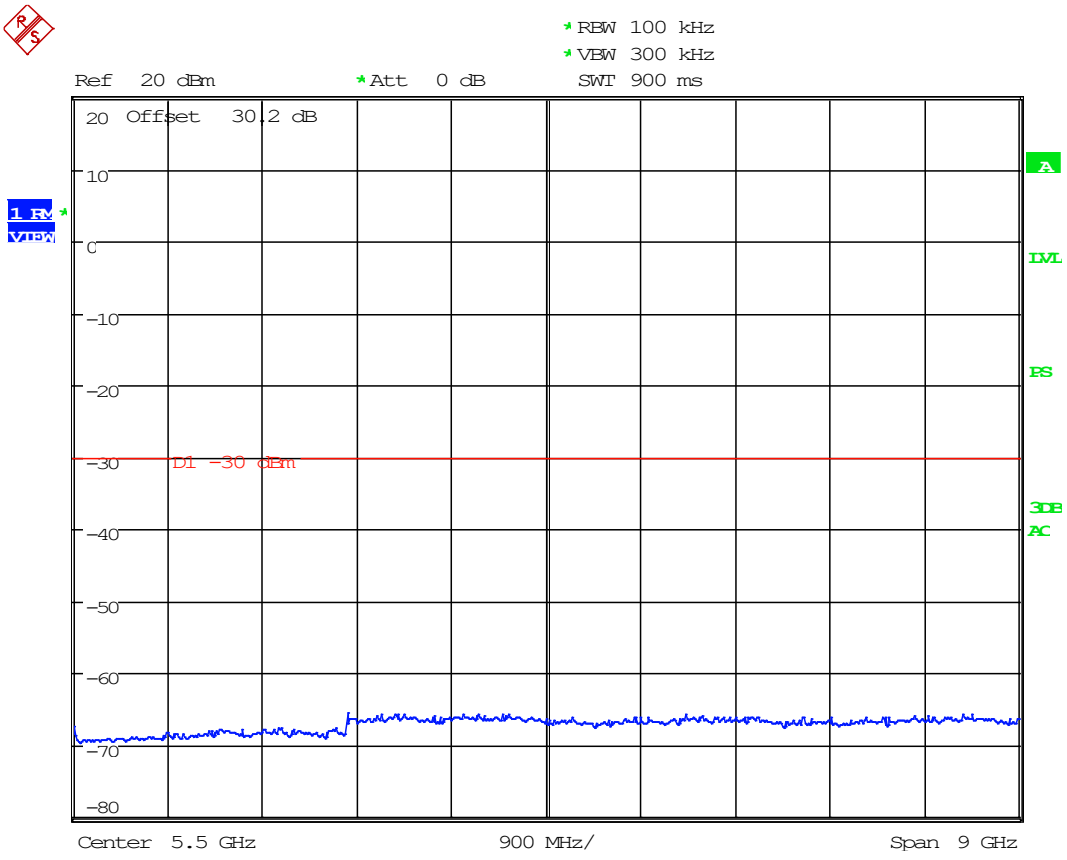
Test Data: 950.4 MHz Spurious Conducted Emissions f<1GHz



Result: Meets Requirements

SPURIOUS EMISSIONS AT ANTENNA TERMINALS (CONDUCTED)

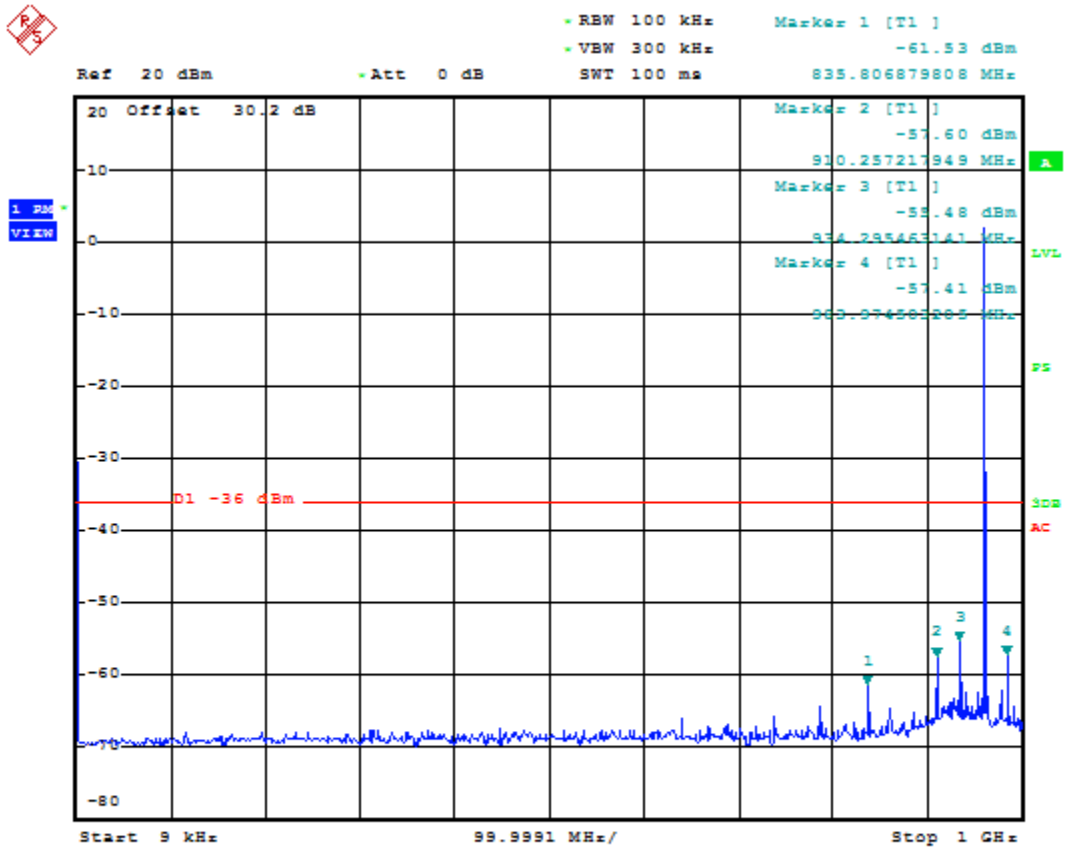
Test Data: 950.4 MHz Spurious Conducted Emissions f>1GHz



Result: Meets Requirements

SPURIOUS EMISSIONS AT ANTENNA TERMINALS (CONDUCTED)

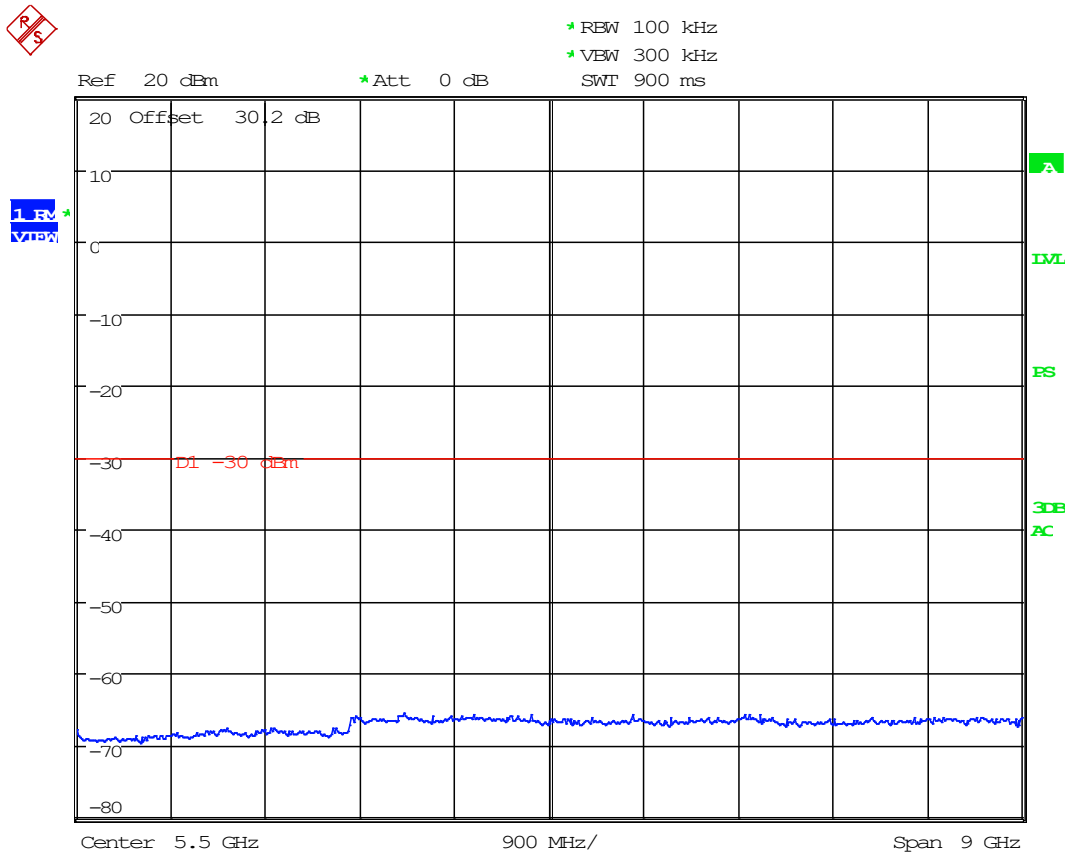
Test Data: 959.2 MHz Spurious Conducted Emissions f<1GHz



Result: Meets Requirements

SPURIOUS EMISSIONS AT ANTENNA TERMINALS (CONDUCTED)

Test Data: 959.2 MHz Spurious Conducted Emissions f>1GHz



Result: Meets Requirements

FIELD STRENGTH OF SPURIOUS EMISSIONS

Rule Part No.: 2.1051(a), 74.861(d)(4)(ii), RSS-210

Requirement: ETSI EN 300 422-1 v1.4.2 Section 8.4

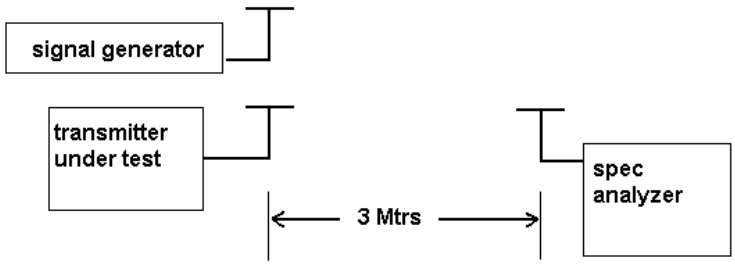
(ii) For the 653-657 MHz, 941.5-944 MHz, 944-952 MHz, 952.850-956.250 MHz, 956.45-959.85 MHz, and 1435-1525 MHz bands, digital emissions within the band from one megahertz below to one megahertz above the carrier frequency shall comply with the emission mask in section 8.3.2.2 (Figure 4) of the European 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: ETSI EN 300 422-1 v1.4.2 Section 8.3

Limits: ETSI EN 300 422-1 v1.4.2 Section 8.4.3, Table 3

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 µW
Standby	2 nW	2 nW	20 nW

Test Setup Diagram:



FIELD STRENGTH OF SPURIOUS EMISSIONS

Test Data: 941.6 MHz Measurement Table

Tuned Freq MHz	Emission Frequency MHz	Antenna Polarity	ERP (dBm)	Margin (dB)
941.60	1883.20	V	-53.31	23.31
941.60	1883.20	V	-56.19	26.19
941.60	2824.80	V	-57.98	27.98
941.60	2824.80	H	-57.98	27.98
941.60	3766.40	H	-55.66	25.66
941.60	3766.40	V	-55.66	25.66
941.60	4708.00	V	-54.31	24.31
941.60	4708.00	H	-54.31	24.31
941.60	5649.60	H	-52.82	22.82
941.60	5649.60	V	-52.82	22.82
941.60	6591.20	V	-51.01	21.01
941.60	6591.20	H	-51.01	21.01
941.60	7532.80	H	-50.43	20.43
941.60	7532.80	V	-50.43	20.43
941.60	8474.40	V	-49.76	19.76
941.60	8474.40	H	-49.76	19.76
941.60	9416.00	H	-48.50	18.50
941.60	9416.00	V	-48.50	18.50

FIELD STRENGTH OF SPURIOUS EMISSIONS

Test Data: 950.4 MHz Measurement Table

Tuned Freq MHz	Emission Frequency MHz	Antenna Polarity	ERP (dBm)	Margin (dB)
950.40	1900.80	H	-53.98	23.98
950.40	1900.80	V	-58.74	28.74
950.40	2851.20	V	-57.72	27.72
950.40	2851.20	H	-57.72	27.72
950.40	3801.60	H	-55.49	25.49
950.40	3801.60	V	-55.49	25.49
950.40	4752.00	V	-54.03	24.03
950.40	4752.00	H	-54.03	24.03
950.40	5702.40	H	-52.48	22.48
950.40	5702.40	V	-52.48	22.48
950.40	6652.80	V	-50.72	20.72
950.40	6652.80	H	-50.72	20.72
950.40	7603.20	H	-50.09	20.09
950.40	7603.20	V	-50.09	20.09
950.40	8553.60	V	-49.47	19.47
950.40	8553.60	H	-49.47	19.47
950.40	9504.00	H	-47.99	17.99
950.40	9504.00	V	-47.99	17.99

FIELD STRENGTH OF SPURIOUS EMISSIONS

Test Data: 959.2 MHz Measurement Table

Tuned Freq MHz	Emission Frequency MHz	Antenna Polarity	ERP (dBm)	Margin (dB)
959.20	1918.40	V	-57.64	27.64
959.20	1918.40	H	-55.58	25.58
959.20	2877.60	V	-58.10	28.10
959.20	2877.60	H	-56.67	26.67
959.20	3836.80	H	-55.52	25.52
959.20	3836.80	V	-54.69	24.69
959.20	5755.20	V	-51.78	21.78
959.20	5755.20	H	-51.78	21.78
959.20	6714.40	H	-50.04	20.04
959.20	6714.40	V	-50.04	20.04
959.20	7673.60	V	-49.36	19.36
959.20	7673.60	H	-49.36	19.36
959.20	8632.80	H	-48.78	18.78
959.20	8632.80	V	-48.78	18.78
959.20	9592.00	V	-47.11	17.11
959.20	9592.00	H	-47.11	17.11

FREQUENCY STABILITY

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

Requirement:

(4) 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

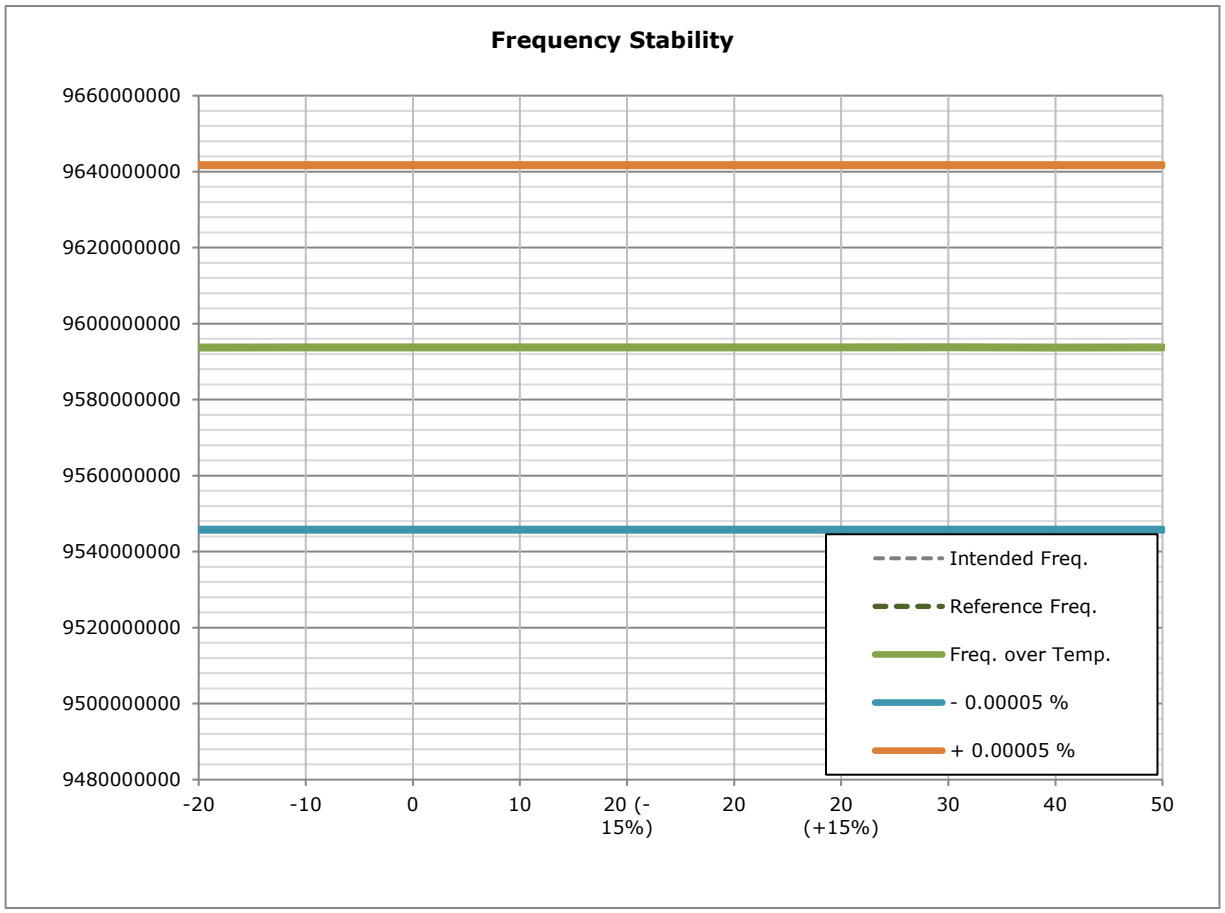
Test Data: Measurement Table

959.2 MHz High Power (Worst-case Settings)				
		Limit:	0.005%	
Temperature (°C)	**Supplied Voltage (VDC)**	**Intended Frequency (Hz)**	**Measured Reference Frequency (Hz)**	**Deviation (Hz)**
20°C (reference)	3	9594000000	9593742281	257719

@ 20°C (reference)				
Supplied Voltage (%)	**Supplied Voltage (VDC)**	**Frequency (Hz)**	**Deviation (Hz)**	**PPM**
-15%	2.55	9593743271	-990	-0.103
15%	3.45	9593732281	10000	1.042

Temperature (°C)	**Supplied Voltage (VDC)**	**Frequency (Hz)**	**Deviation (Hz)**	**PPM**
50	3	9593760525	-18244.00000	-1.902
40	3	9593710514	31767.00000	3.311
30	3	9593783498	41217.00000	-4.296
20	3	9593742281	0.00000	0.000
10	3	9593718801	23480.00000	2.447
0	3	9593762931	20650.00000	-2.152
-10	3	9593716492	25789.00000	2.688
-20	3	9593710506	31775.00000	3.312

Test Data: Measurement 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:

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%	

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
Sweep/Signal Generator	Anritsu	68369B	985112	11/08/17	11/08/19
EMI Test Receiver R & S ESIB 40 Screen Room	Rohde & Schwarz	ESIB 40	100274	08/16/16	08/16/19
Tunable Notch Filter 250-850 MHz	Eagle	TNF-200	250-850 MHz (#19)	01/19/17	11/19/19
Antenna: Biconical 1096 Chamber	Eaton	94455-1	1096	08/01/2017	08/01/2019
Antenna: Log-Periodic 1122	Electro-Metrics	LPA-25	1122	07/26/17	07/26/19
CHAMBER	Panashield	3M	N/A	12/31/17	12/31/19
Antenna: Double-Ridged Horn/ETS Horn 2	ETS-Lindgren Chamber	3117	00041534	01/30/17	01/30/19
Software: Field Strength Program	Timco	N/A	Version 4.0	NA	NA
Bore-sight Antenna Positioning Tower	Sunol Sciences	TLT2	N/A	NA	NA

***EMI RECEIVER SOFTWARE VERSION**

The receiver firmware used was version 4.43 Service Pack 3

END OF TEST REPORT