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FCC PART 15.247 & IC RSS-247

2.4 GHz FHSS

TEST REPORT

Applicant	AUDIO-TECHNICA CORPORATION
Address	2-46-1 NISHI-NARUSE
	MACHIDA
	TOKYO 194-8666 JAPAN
FCC ID	JFZCKS990BT
IC #	1752B-CKS990BT
Model Number	ATH-CKS990BT
Product Description	BLUETOOTH WIRELESS STEREO HEADSET
Date Sample Received	7/15/2016
Final Test Date	8/1/2016
Tested By	Tim Royer
Approved By	Cory Leverett

Report Number	Version Number	Description	Issue Date
1375AUT16TestReport	Rev1	Initial Issue	8/8/2016

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

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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: Project Manager/Testing Engineer

Date: 8/1/2016



Reviewed and approved by: _____

Name and Title: Cory Leverett

Date: 8/8/2016

Applicant: AUDIO-TECHNICA CORPORATION
FCC ID: JFZCKS990BT
IC: 1752B-CKS990BT
Report: 1375AUT16TestReport_Rev1

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GENERAL INFORMATION

EUT Specification

Regulatory Standards	FCC Title 47 CFR Part 15.247 IC RSS-247 Issue 1 & RSS-GEN Issue 4		
FCC ID	JFZCKS990BT		
IC #	1752B-CKS990BT		
Model	ATH-CKS990BT		
EUT Description	BLUETOOTH WIRELESS STEREO HEADSET		
Number of Channels	79		
Modulation Types	Mode 1:BR DH5 Mode 2:EDR 2DH5 Mode 3:EDR 3DH5		
Operating Frequency	TX: 2400 – 2483.5 MHz	RX: 2400 – 2483.5 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	None (Temporary Connector Provided for Testing)		
Antenna	Integrated – Chip Antenna 0.0 dBi		
Test Facility	Timco Engineering Inc. located at 849 NW State Road 45 Newberry, FL 32669 USA.		
Test Conditions	Temperature: 24-26°C Relative humidity: 50-65%		
Measurement Standard	ANSI C63.10-2013 ANSI C63.4-2014 FCC DA 00-705		
Test Exercise	Engineering Software was used to enable the modes of operation, all modes of modulation were tested.		

Test Supporting Equipment

Device	Manufacturer	Model	S/N	Supplied By	Used For
Computer	HP	Compaq	1510P	Timco	Programming

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
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RESULTS SUMMARY

FCC Rule Part No.	IC Standard Ref.	Requirement	Test Item	Result
15.215 (c)	RSS-GEN 6.6	Occupied Bandwidth	99% Bandwidth	Pass
			20 dB Bandwidth	Pass
15.247(a,1)	RSS-247 § 5.1	FHSS Requirements	Channel Separation	Pass
			Number of Hopping Channels	Pass
			Hopping Channel Occupancy Time	Pass
15.247(b,1) & (b,4)	RSS-247 § 5.4.2	Peak Power Output	Peak Power Output (ERP)	Pass
			Antenna Gain (EIRP)	Pass
15.247(d)	RSS-247 § 5.5	Unwanted Emissions	Bandedge	Pass
			Radiated Spurious	Pass

Notes:

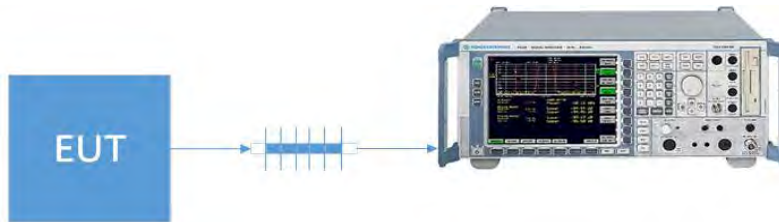
OCCUPIED BANDWIDTH

Rules Part No.: FCC 15.215(C), IC RSS 247 § 5.1.1

IC/ FCC Requirements: 20 dB emission bandwidth reporting only, measurement is also used to determine limits for other requirements of FHSS transmitters.

Test Method: ANSI C63.10 § 6.9.2 Occupied bandwidth-20dB Relative procedure

Setup:



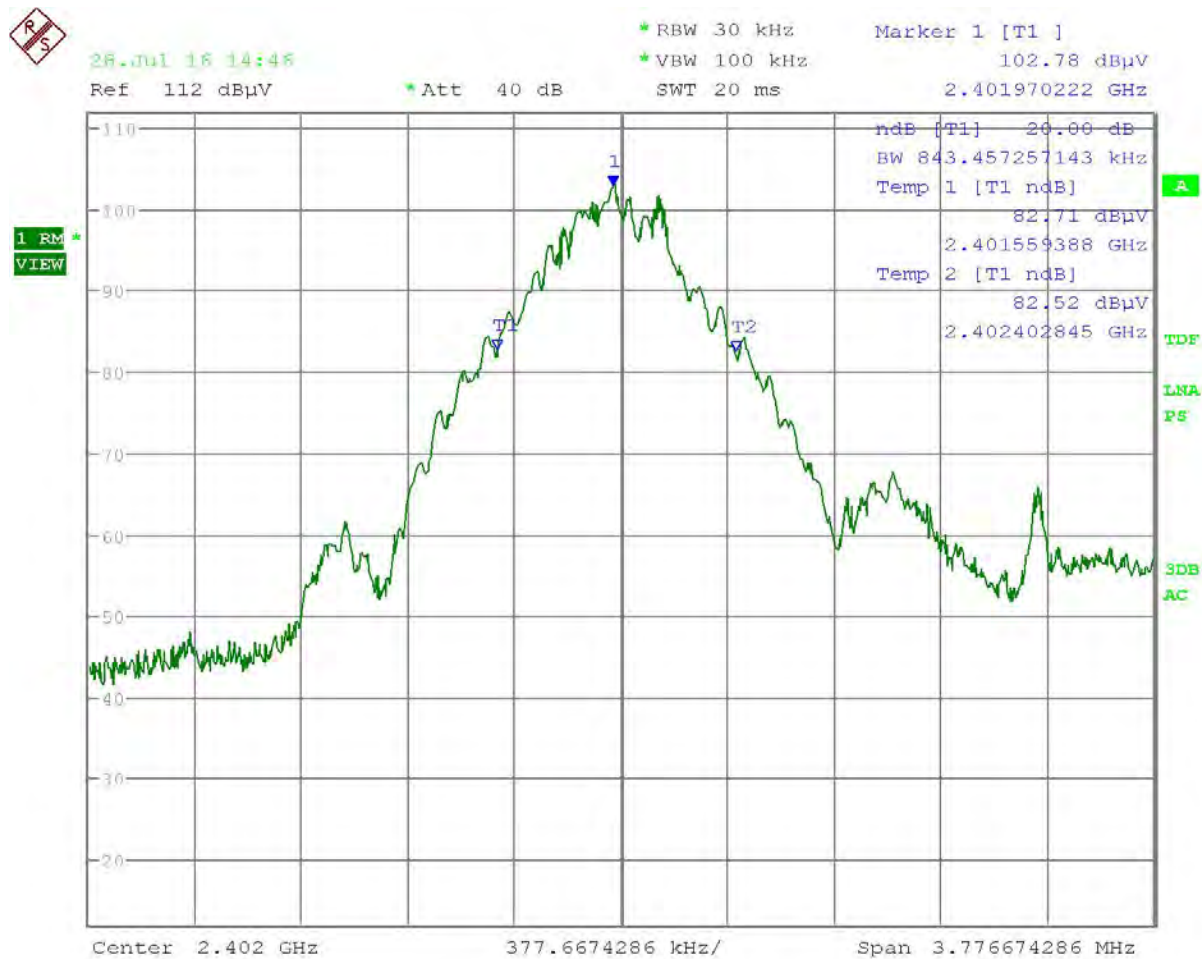
Test Data: 20 dB Occupied Bandwidth Measurement Table

Tuned Frequency (MHz)	Mode 1 20 dB BW (MHz)	Mode 2 20 dB BW (MHz)	Mode 3 20 dB BW (MHz)
2402	0.843	1.25	1.217
2440	0.909	1.24	1.27
2480	0.969	1.22	1.33

RESULTS: Meets Requirements

OCCUPIED BANDWIDTH

Test Data: 20 dB OBW Mode 1 Low End of Band Plot



Date: 28.JUL.2016 14:46:11

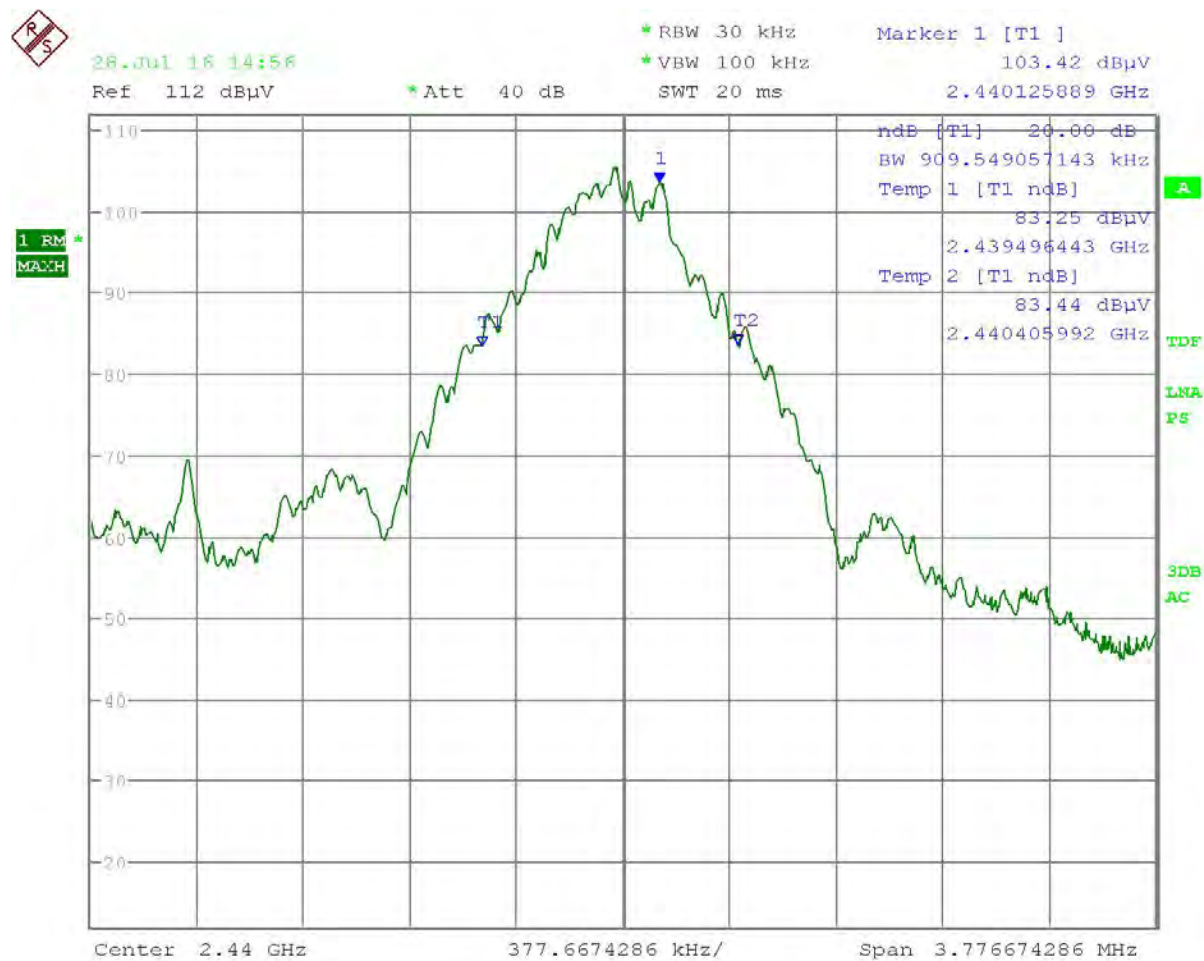
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
FCC ID: JFZCKS990BT
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OCCUPIED BANDWIDTH

Test Data: 20 dB OBW Mode 1 Middle of Band Plot



Date: 28.JUL.2016 14:56:18

RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
FCC ID: JFZCKS990BT
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Report: 1375AUT16TestReport_Rev1

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OCCUPIED BANDWIDTH

Test Data: 20 dB OBW Mode 1 High end of Band Plot



Date: 28.JUL.2016 14:40:19

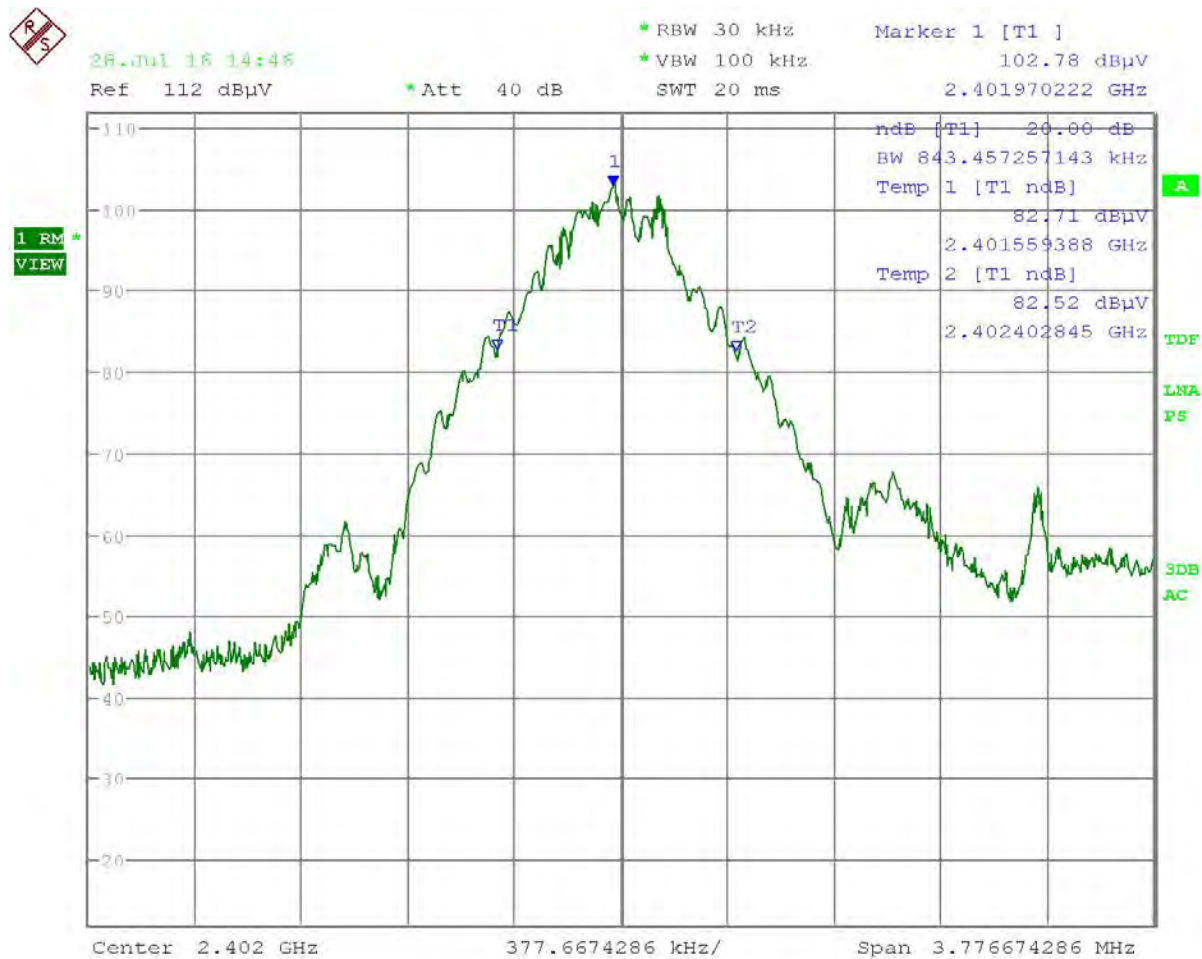
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
FCC ID: JFZCKS990BT
IC: 1752B-CKS990BT
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OCCUPIED BANDWIDTH

Test Data: 20 dB OBW Mode 2 Low End of Band Plot



Date: 28.JUL.2016 14:46:11

RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
FCC ID: JFZCKS990BT
IC: 1752B-CKS990BT
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OCCUPIED BANDWIDTH

Test Data: 20 dB OBW Mode 2 Middle of Band Plot



Date: 28.JUL.2016 14:57:38

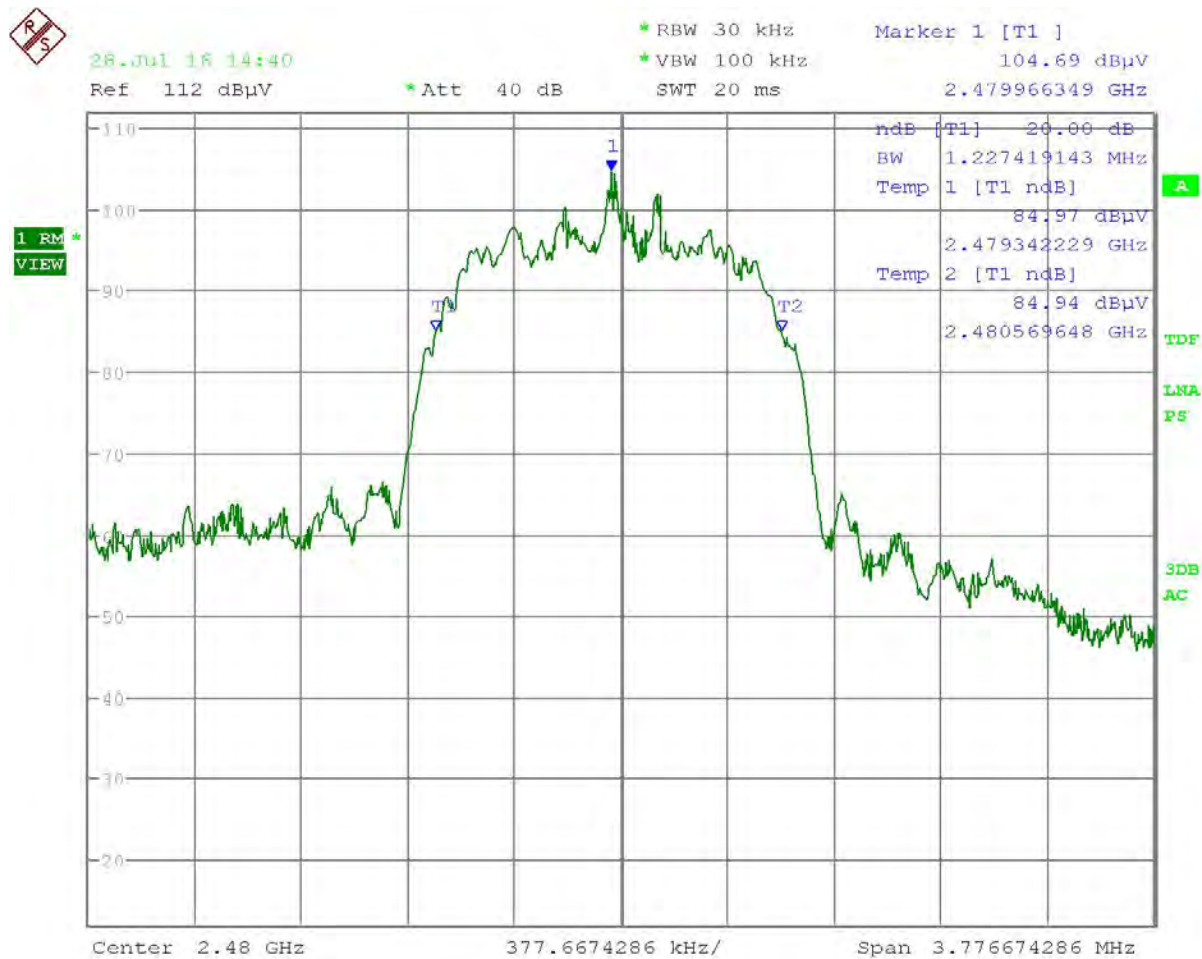
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
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OCCUPIED BANDWIDTH

Test Data: 20 dB OBW Mode 2 High end of Band Plot



Date: 28.JUL.2016 14:40:59

RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
FCC ID: JFZCKS990BT
IC: 1752B-CKS990BT
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OCCUPIED BANDWIDTH

Test Data: 20 dB OBW Mode 3 Low End of Band Plot



Date: 28.JUL.2016 14:49:05

RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
FCC ID: JFZCKS990BT
IC: 1752B-CKS990BT
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OCCUPIED BANDWIDTH

Test Data: 20 dB OBW Mode 3 Middle of Band Plot



Date: 28.JUL.2016 14:50:38

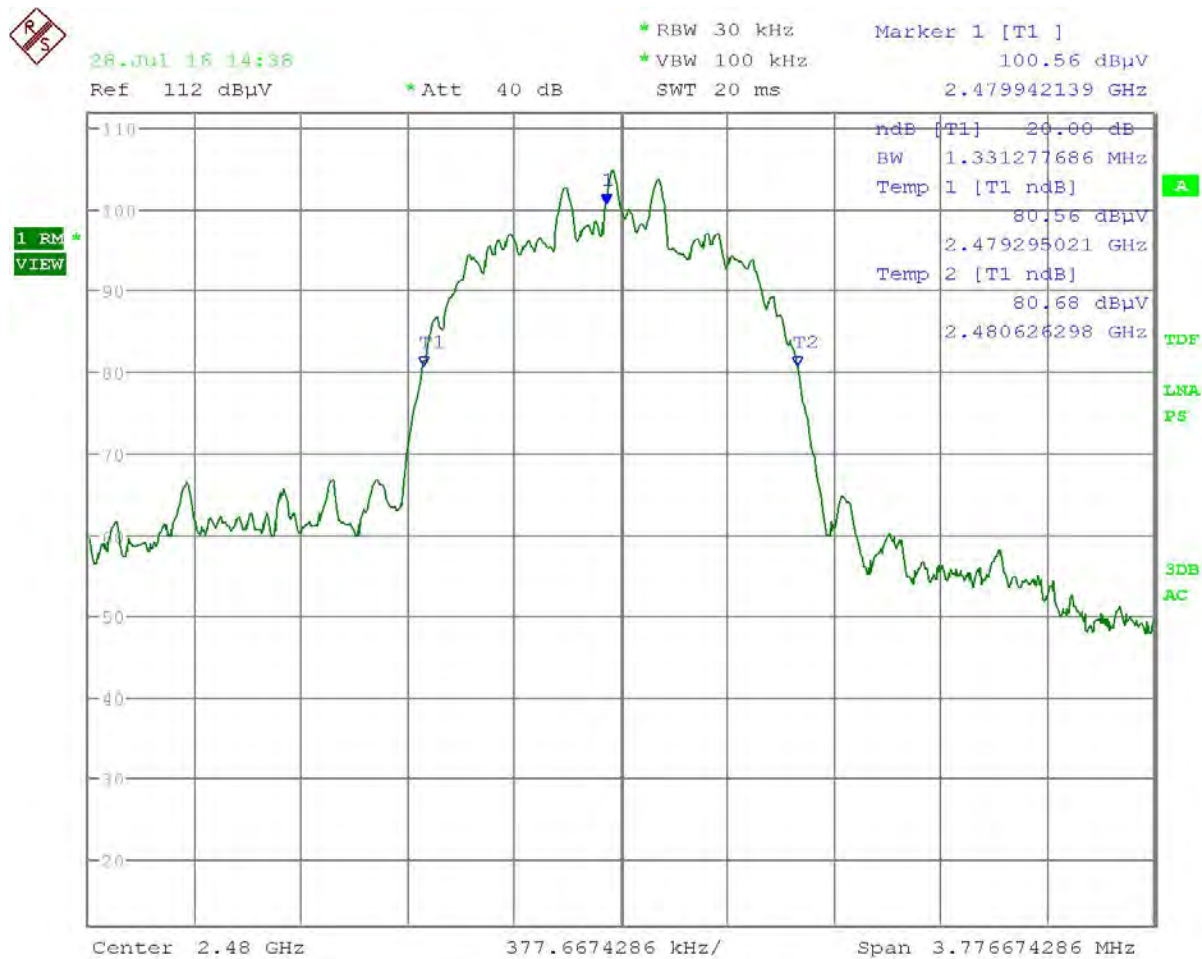
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
FCC ID: JFZCKS990BT
IC: 1752B-CKS990BT
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OCCUPIED BANDWIDTH

Test Data: 20 dB OBW Mode 3 High end of Band Plot



Date: 28.JUL.2016 14:38:44

RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
FCC ID: JFZCKS990BT
IC: 1752B-CKS990BT
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FHSS REQUIREMENTS

Rules Part No.: FCC 15.247(a)(1), IC RSS 247 § 5.1.1, 5.1.2, 5.1.4

Requirements: **Channel Separation**

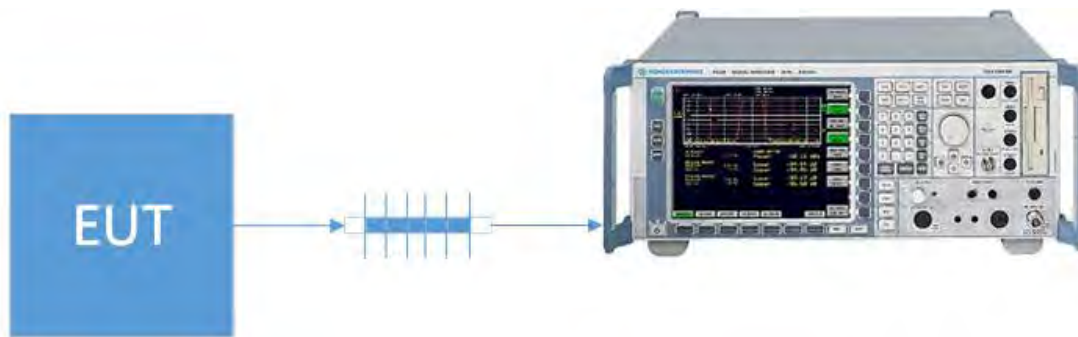
FHSS operating in the band 2400-2483.5 MHz may have hopping channel carrier frequencies that are separated by 25 kHz or two thirds of the -20 dB bandwidth of the hopping channel, whichever is greater, provided that the systems operate with an output power no greater than 0.125 W.

Dwell Time and Number of Hopping Channels

FHSS operating in the band 2400-2483.5 MHz shall use at least 15 hopping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds, multiplied by the number of hopping channels employed. Transmissions on particular hopping frequencies may be avoided or suppressed provided that at least 15 hopping channels are used.

Test Method: ANSI C63.10 § 7.8.2 Carrier frequency separation
ANSI C63.10 § 7.8.3 Number of hopping frequencies
ANSI C63.10 § 7.8.3 Time of Occupancy

Setup:



FHSS REQUIREMENTS

Test Data: FHSS Channel Separation Measurement Table

Mode	Separation (KHz)	(2/3 of 20 dBBW) Limit (KHz)	Pass / Fail
1	1009.6	562	Pass
2	1016.3	813	Pass
3	1008.4	811	Pass

Test Data: Number of Hopping Channels Measurement Table

Mode	Number of channels	Limit	Pass / Fail
1,2,3	79	≥ 75	Pass

Test Data: Hopping Channel Occupancy Time Measurement Table

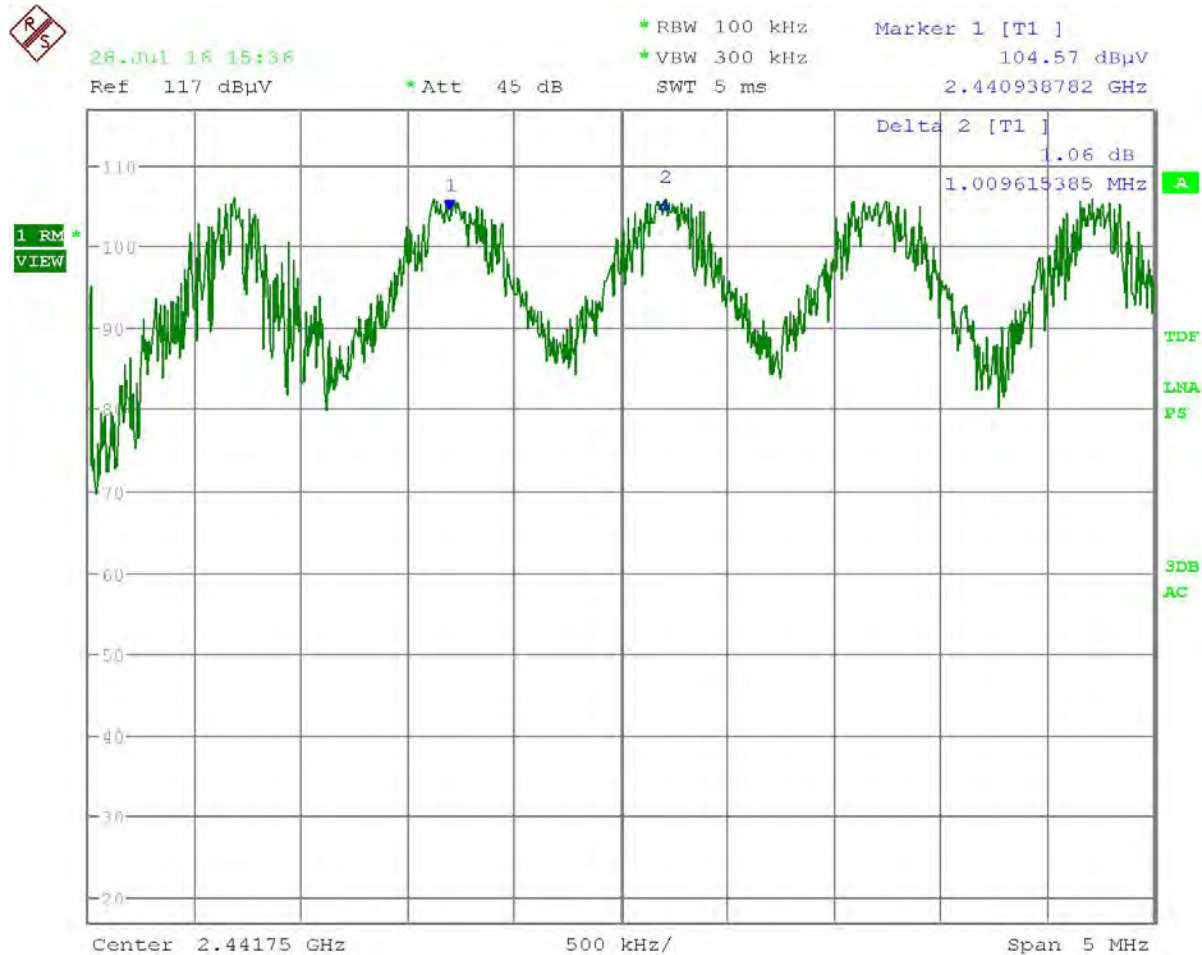
Mode	Dwell Time (ms)	Limit (sec)	Pass / Fail
1	2.9	≤ 0.4	Pass
2	2.9	≤ 0.4	Pass
3	2.9	≤ 0.4	Pass

RESULTS: Meets Requirements

FHSS REQUIREMENTS

Test Data:

Mode 1 Channel Separation Plot



Date: 28.JUL.2016 15:36:58

RESULTS: Meets Requirements

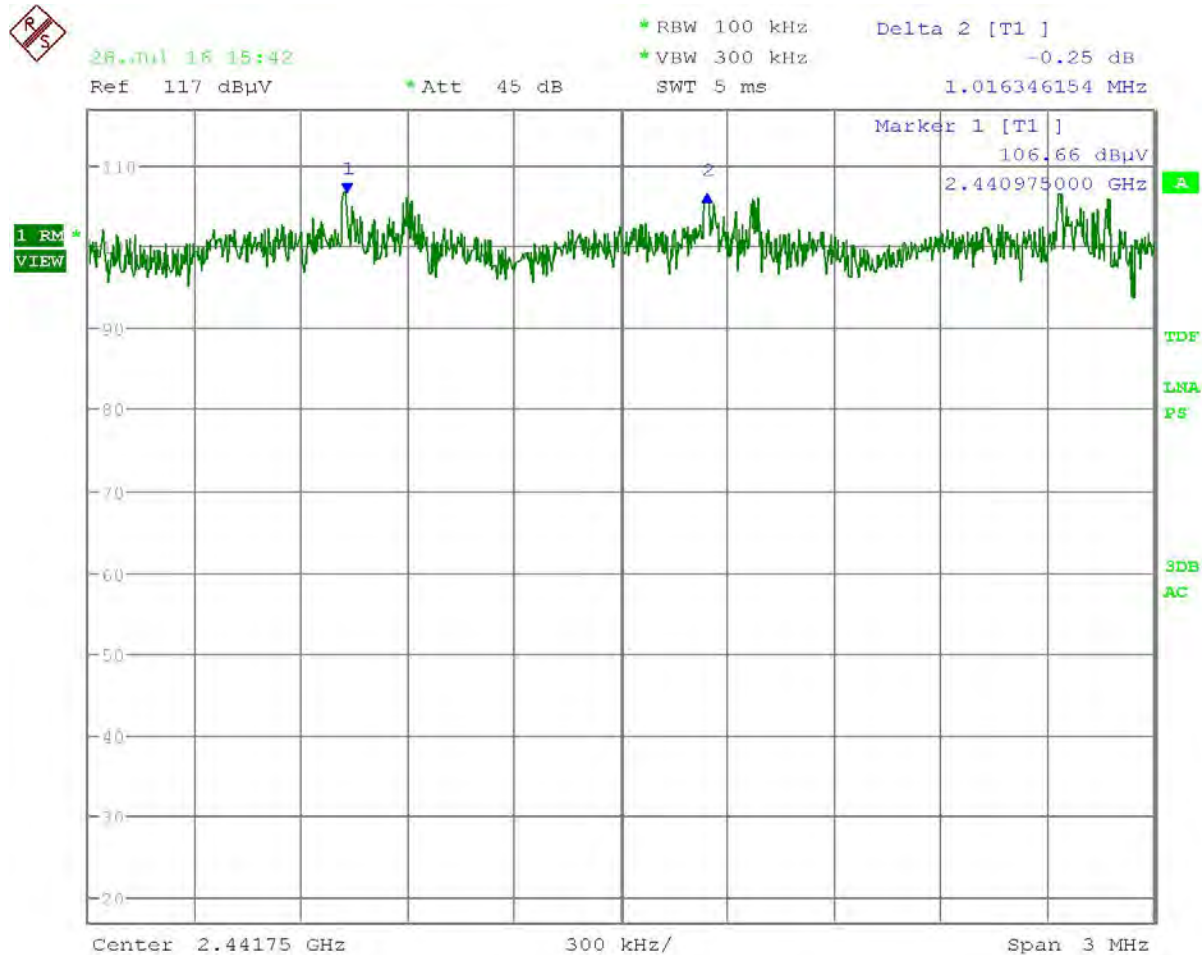
Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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FHSS REQUIREMENTS

Test Data:

Mode 2 Channel Separation Plot



Date: 28.JUL.2016 15:42:04

RESULTS: Meets Requirements

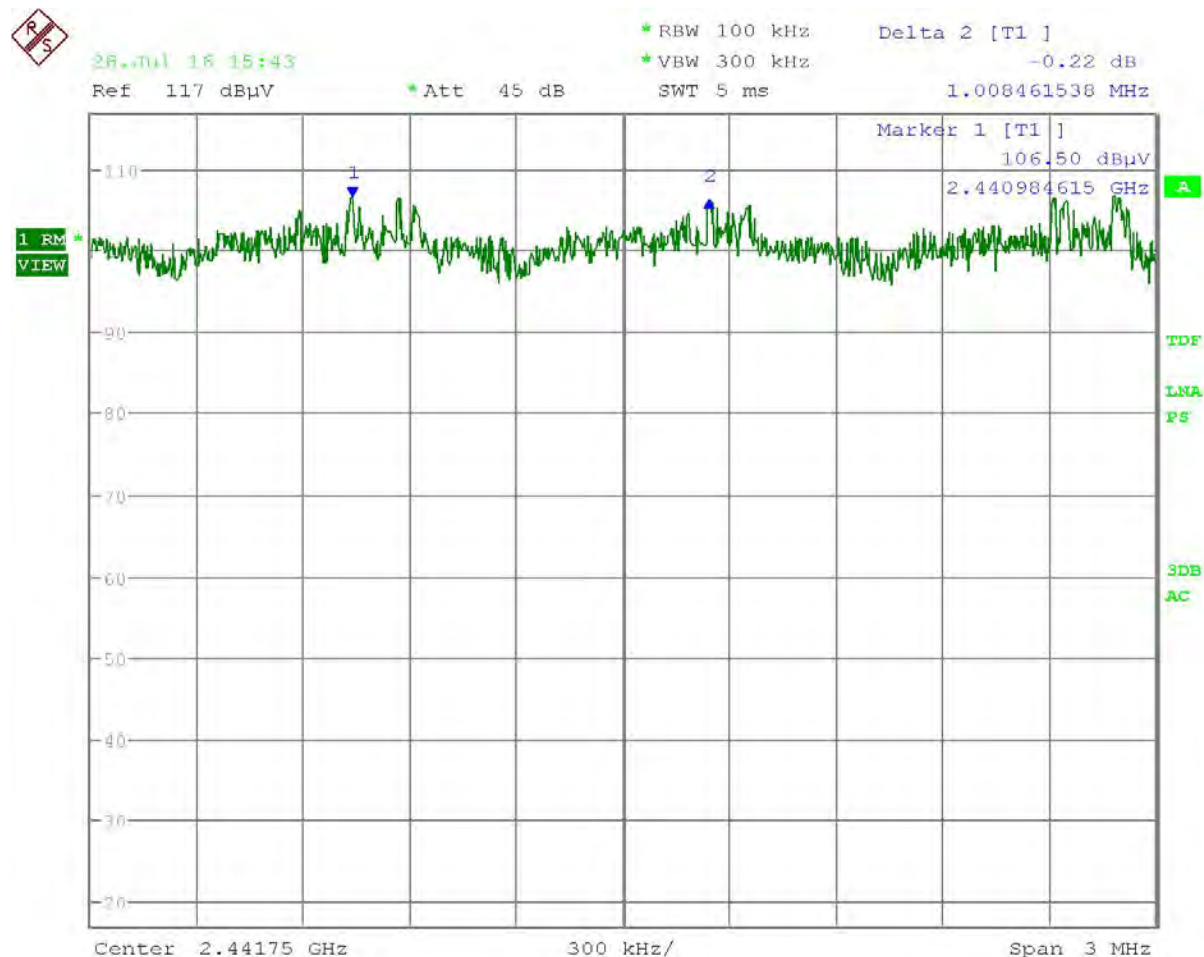
Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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FHSS REQUIREMENTS

Test Data:

Mode 3 Channel Separation Plot



Date: 28.JUL.2016 15:43:47

RESULTS: Meets Requirements

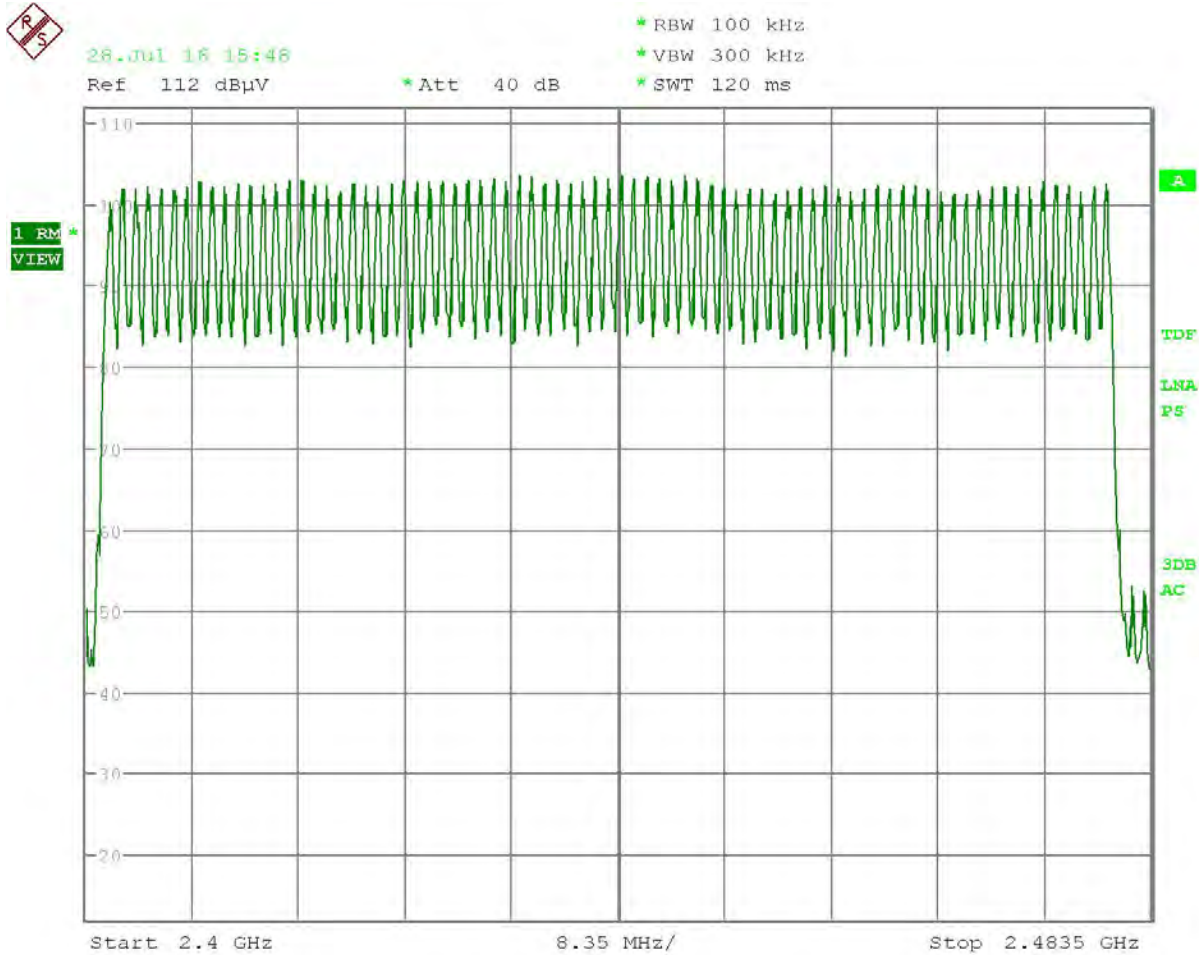
Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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FHSS REQUIREMENTS

Test Data:

Number of Hopping Channels Plot



Date: 28.JUL.2016 15:48:29

RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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FHSS REQUIREMENTS

Test Data:

Mode 1 Channel Occupancy Time Plot



Date: 28.JUL.2016 15:49:49

RESULTS: Meets Requirements

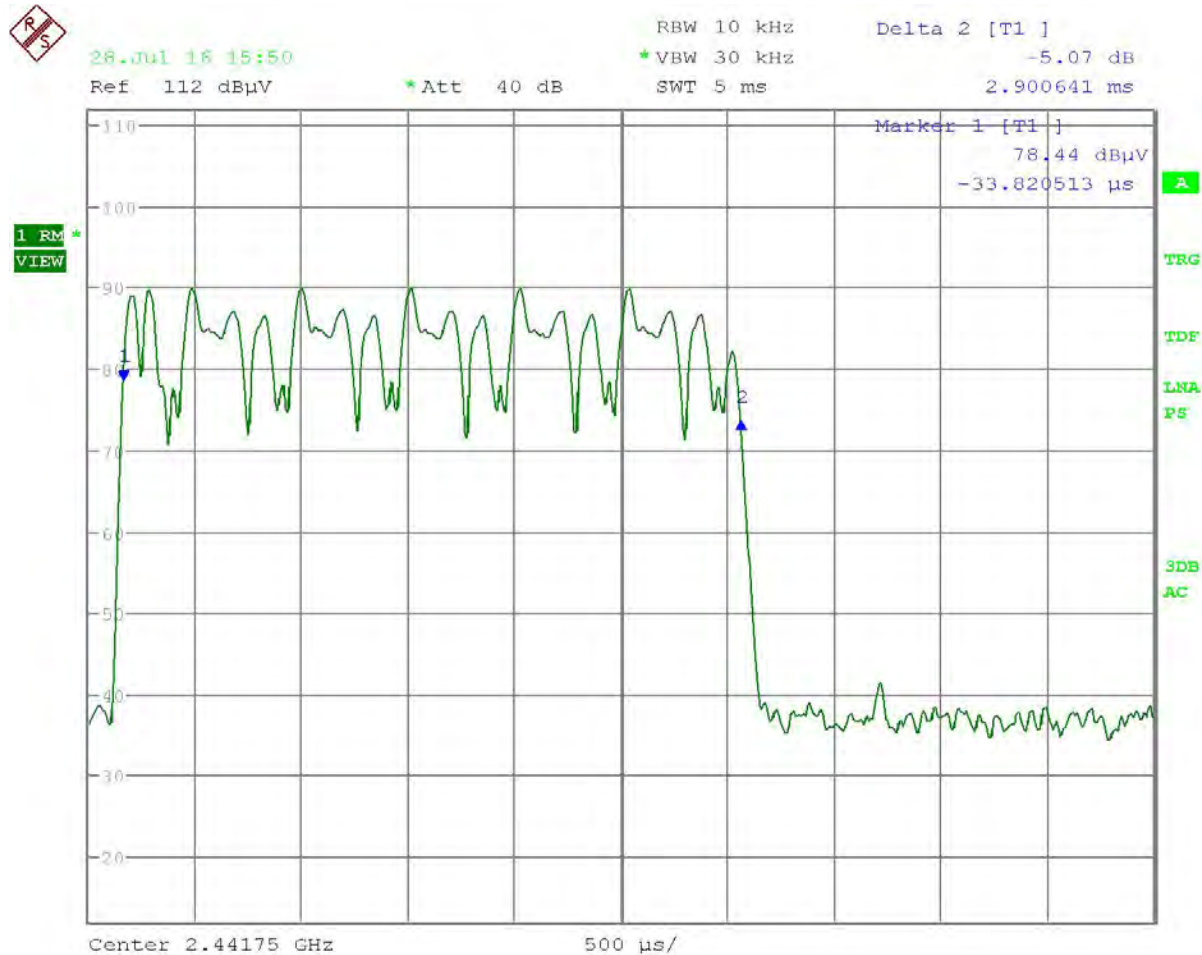
Applicant: AUDIO-TECHNICA CORPORATION
FCC ID: JFZCKS990BT
IC: 1752B-CKS990BT
Report: 1375AUT16TestReport_Rev1

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FHSS REQUIREMENTS

Test Data:

Mode 2 Channel Occupancy Time Plot



Date: 28.JUL.2016 15:50:38

RESULTS: Meets Requirements

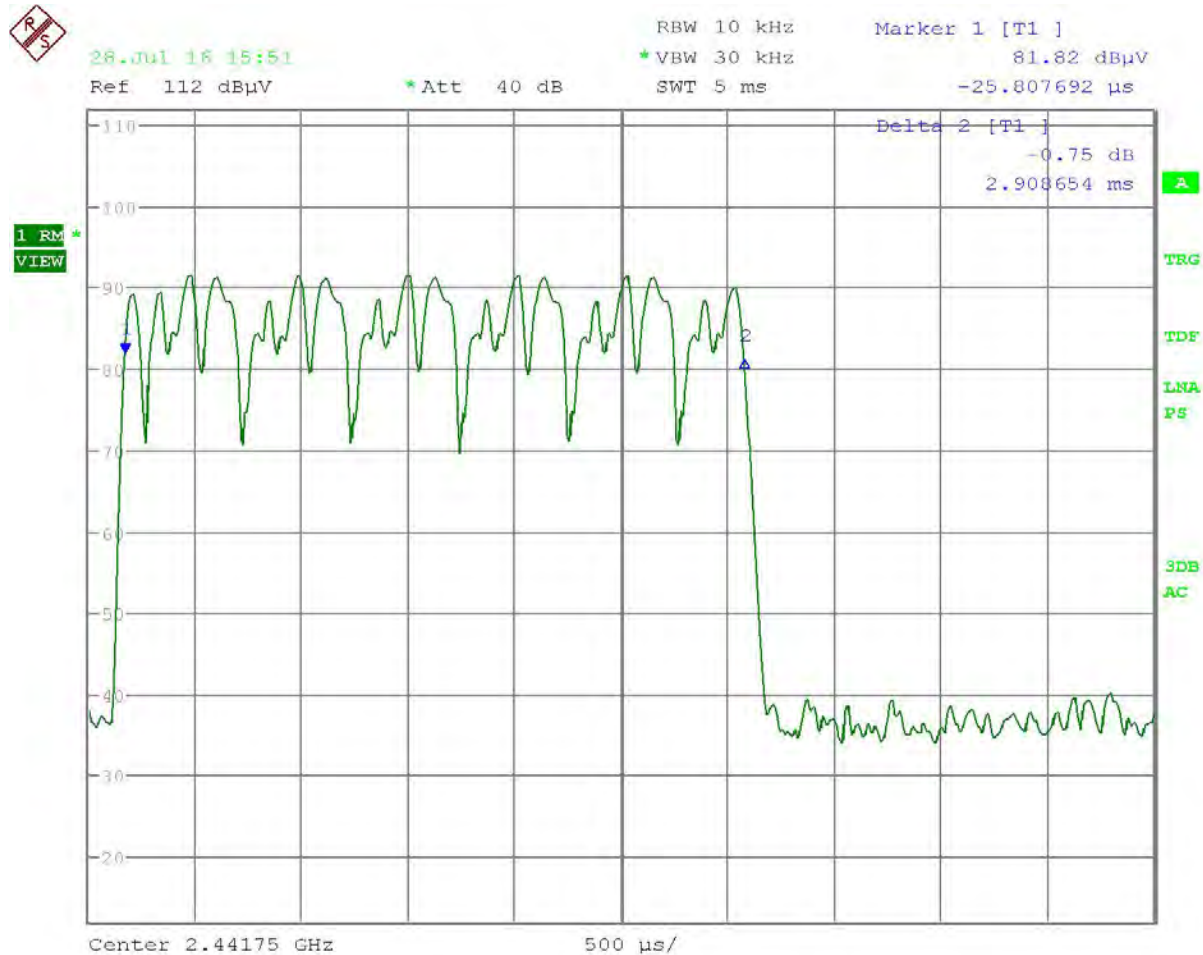
Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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FHSS REQUIREMENTS

Test Data:

Mode 3 Channel Occupancy Time Plot



Date: 28.JUL.2016 15:51:29

RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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PEAK POWER OUTPUT

Rules Part No.: FCC 15.247(b) (1) (4), IC RSS 247 § 5.4.2

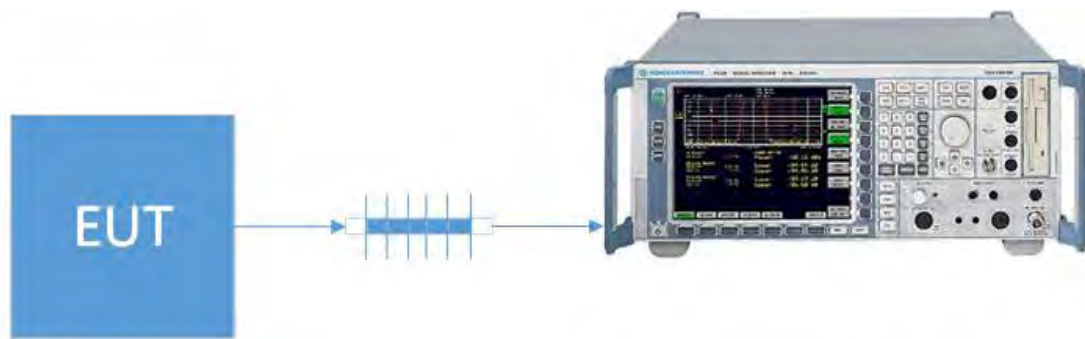
Requirements:

FHSS Using Hopset ≥ 75 Channels

For FHSs operating in the band 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1.0 W and the e.i.r.p. shall not exceed 4 W if the hopset uses 75 or more hopping channels.

Test Method: ANSI C63.10 § 7.8.5 Output Power test procedure for FHSS

Setup:



PEAK POWER OUTPUT

Test Data: Mode 1 Peak Power Output Measurement Table

Peak Conducted Power Output Measurement				
Tuned Frequency (MHz)	P _{Cond} (dBm)	P _{Conducted} (W)	Limit (W)	Margin (W)
2402	1.33	0.00136	1.00	0.99864
2440	-0.03	0.00099	1.00	0.99901
2480	-0.58	0.00087	1.00	0.99913
Peak EIRP Power Output Calculation				
Tuned Frequency (MHz)	P _T (dBm)	EIRP (W)	Limit (W)	Margin (W)
2402	1.33	0.00223	4.00	3.99777
2440	-0.03	0.00163	4.00	3.99837
2480	-0.58	0.00144	4.00	3.99856

Test Data: Mode 2 Peak Power Output Measurement Table

Peak Conducted Power Output Measurement				
Tuned Frequency (MHz)	P _{Cond} (dBm)	P _{Cond} (W)	Limit (W)	Margin (W)
2402	-2.2	0.00060	1.00	0.99940
2440	-1.59	0.00069	1.00	0.99931
2480	-0.62	0.00087	1.00	0.99913
Peak EIRP Power Output Calculation				
Tuned Frequency (MHz)	P _T (dBm)	EIRP (W)	Limit (W)	Margin (W)
2402	-2.2	0.00099	4.00	3.99901
2440	-1.59	0.00114	4.00	3.99886
2480	-0.62	0.00142	4.00	3.99858

RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
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PEAK POWER OUTPUT

Test Data: Mode 3 Peak Power Output Measurement Table

Peak Conducted Power Output Measurement				
Tuned Frequency (MHz)	P _{Cond} (dBm)	P _{Cond} (W)	Limit (W)	Margin (W)
2402	-2.19	0.00060	1.00	0.99940
2440	-1.31	0.00074	1.00	0.99926
2480	-0.61	0.00087	1.00	0.99913

Peak EIRP Power Output Calculation				
Tuned Frequency (MHz)	P _T (dBm)	EIRP (W)	Limit (W)	Margin (W)
2402	-2.19	0.00099	4.00	3.99901
2440	-1.31	0.00121	4.00	3.99879
2480	-0.61	0.00143	4.00	3.99857

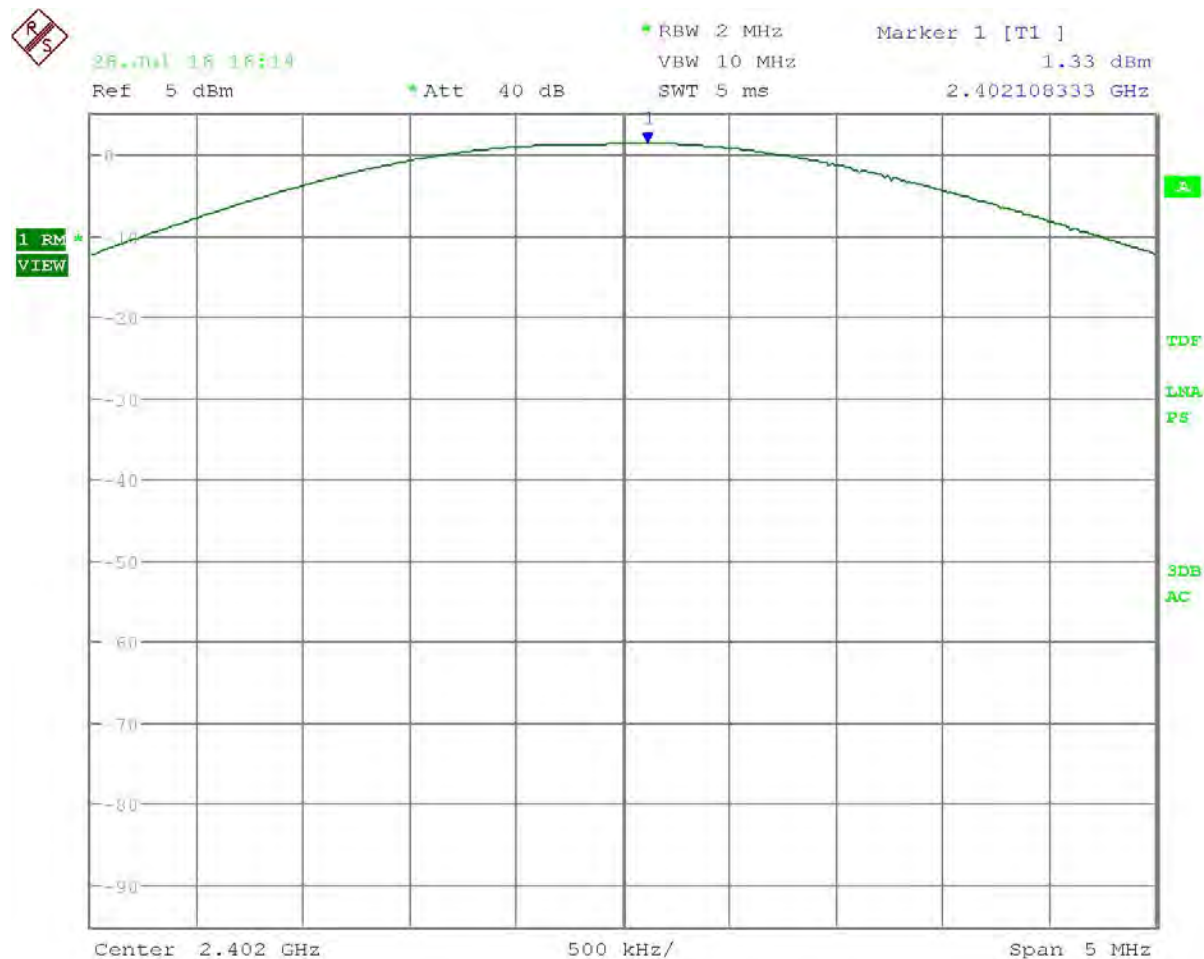
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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PEAK POWER OUTPUT

Test Data: Mode 1 Low End of Band Peak Conducted Power Plot



Date: 28.JUL.2016 16:14:42

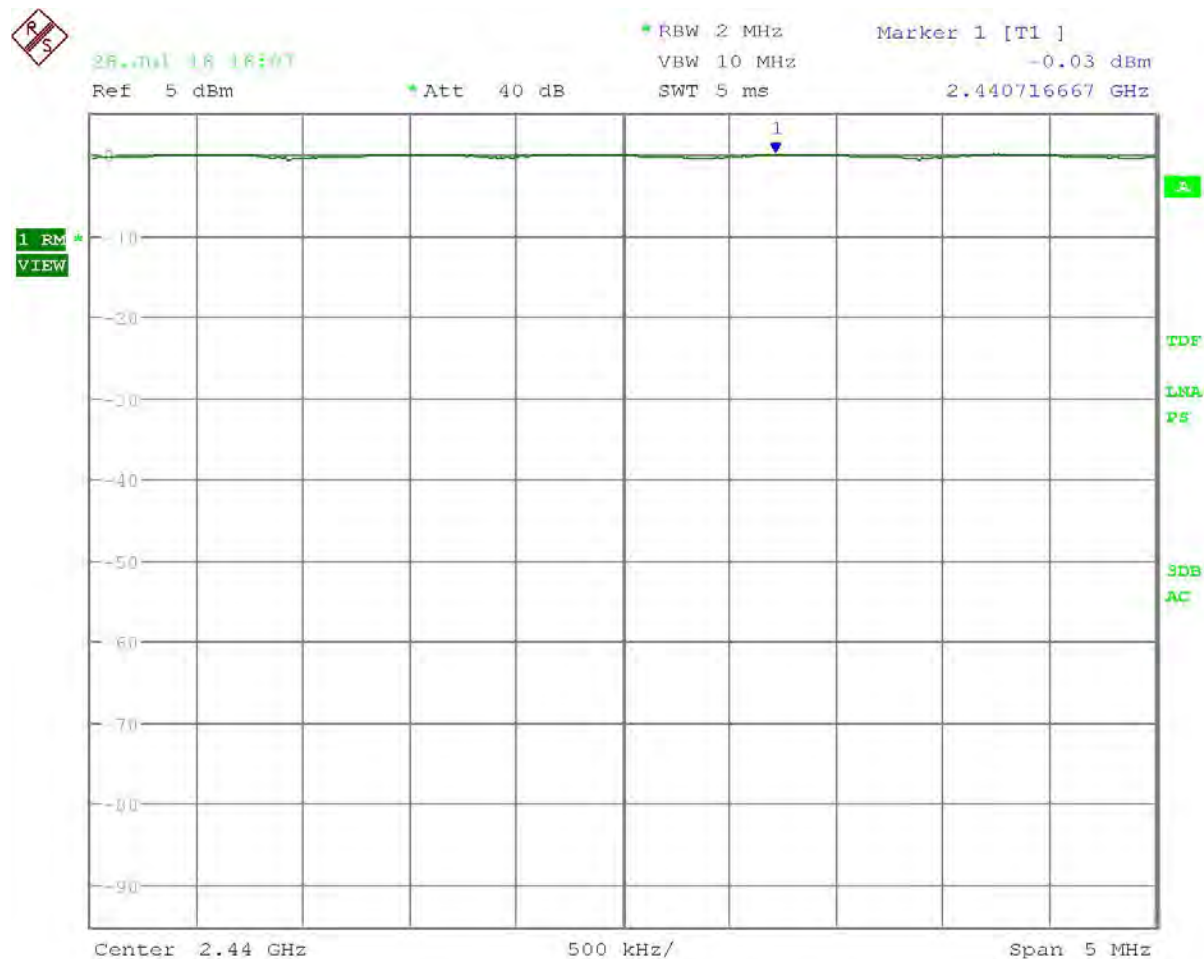
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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PEAK POWER OUTPUT

Test Data: Mode 1 Middle of Band Peak Conducted Power Plot



Date: 28.JUL.2016 16:07:08

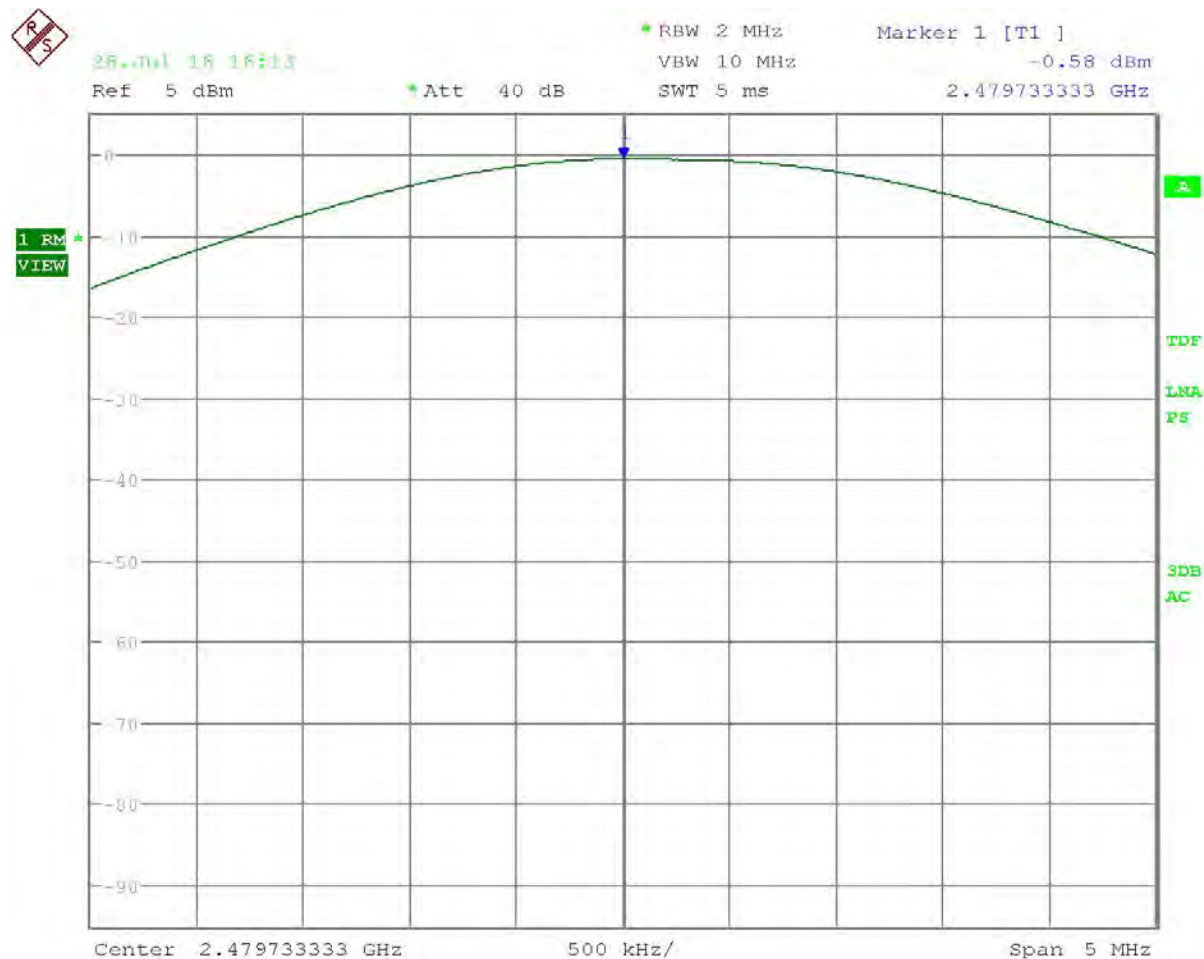
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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PEAK POWER OUTPUT

Test Data: Mode 1 High End of Band Peak Conducted Power Plot



Date: 28.JUL.2016 16:13:36

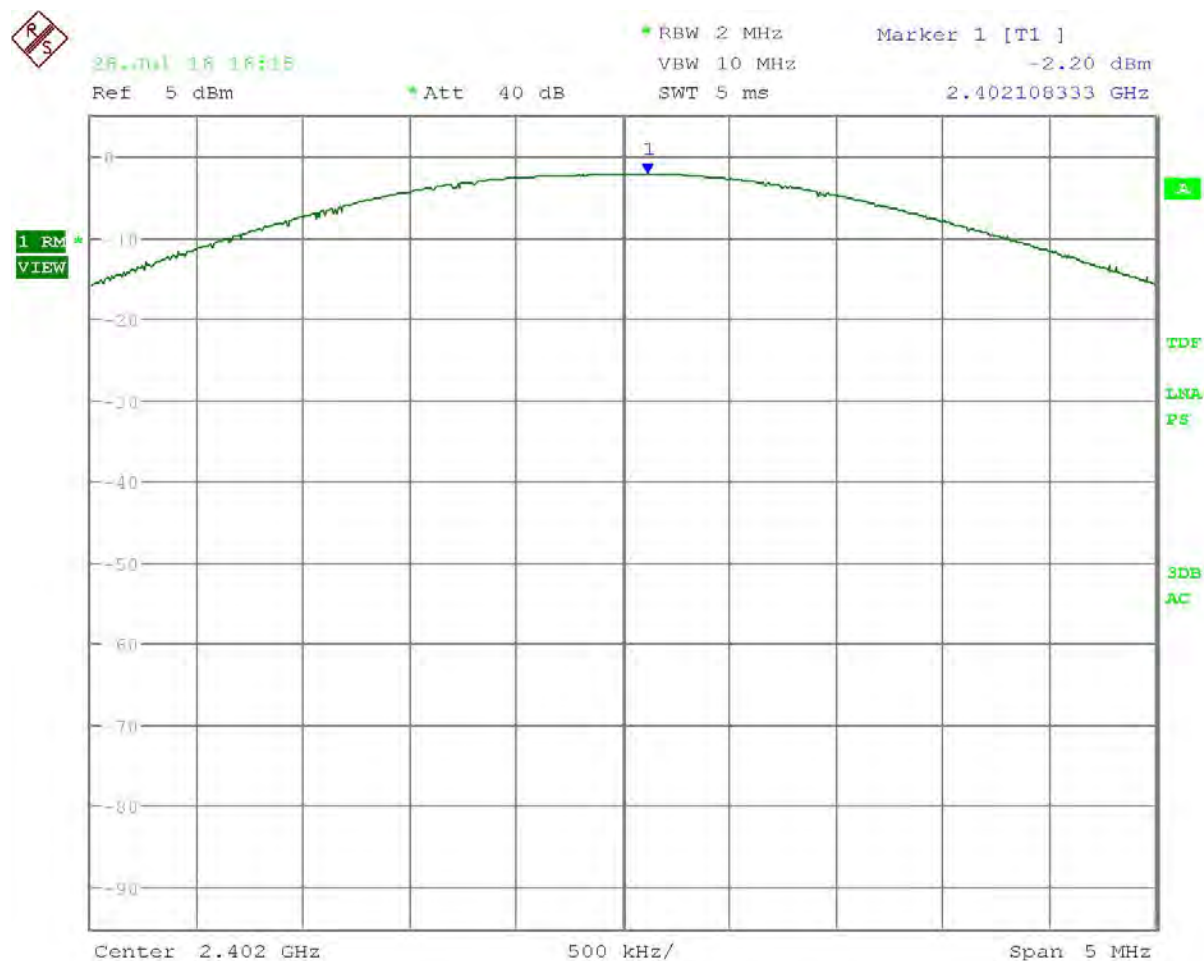
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
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PEAK POWER OUTPUT

Test Data: Mode 2 Low End of Band Peak Conducted Power Plot



Date: 28.JUL.2016 16:15:27

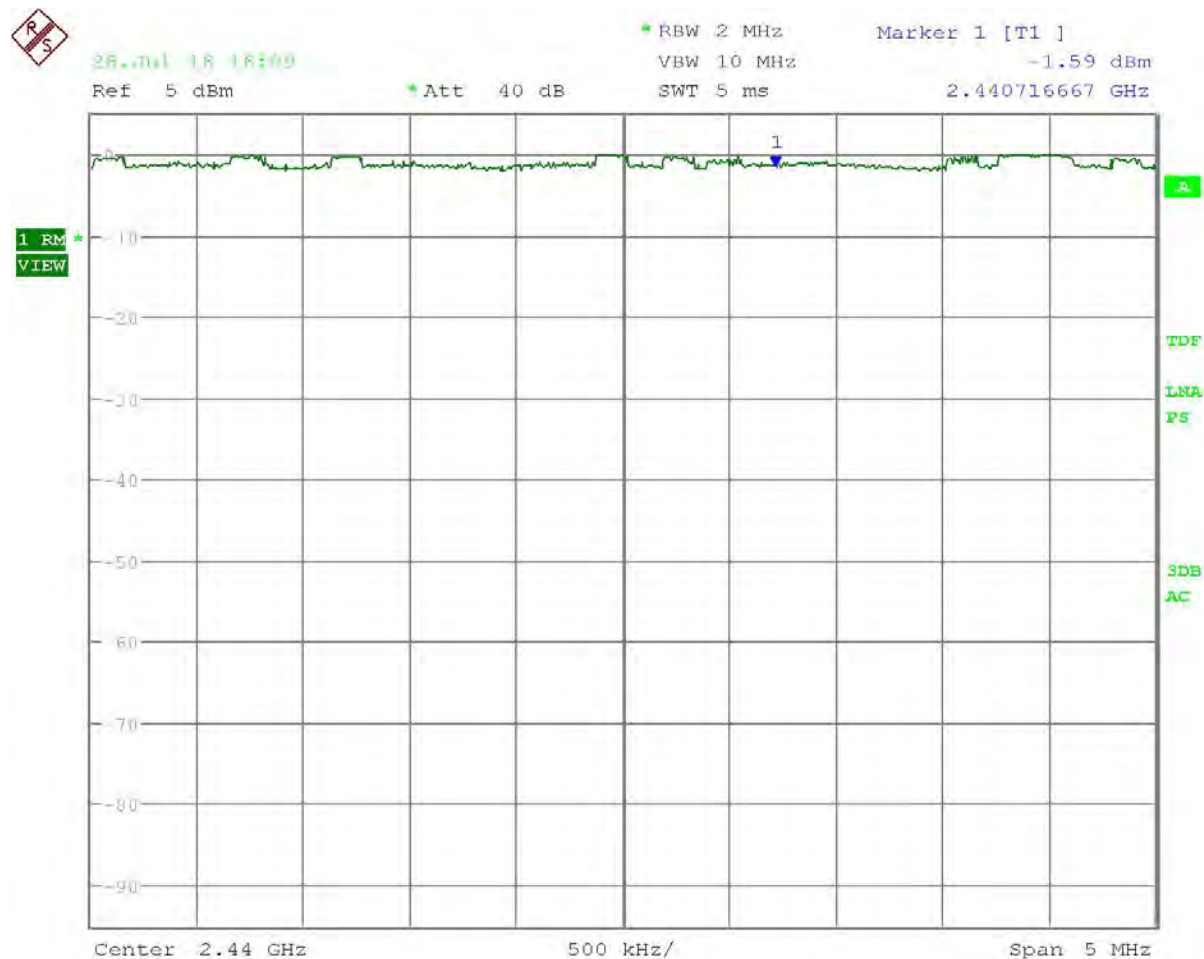
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
FCC ID: JFZCKS990BT
IC: 1752B-CKS990BT
Report: 1375AUT16TestReport_Rev1

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PEAK POWER OUTPUT

Test Data: Mode 2 Middle of Band Peak Conducted Power Plot



Date: 28.JUL.2016 16:09:21

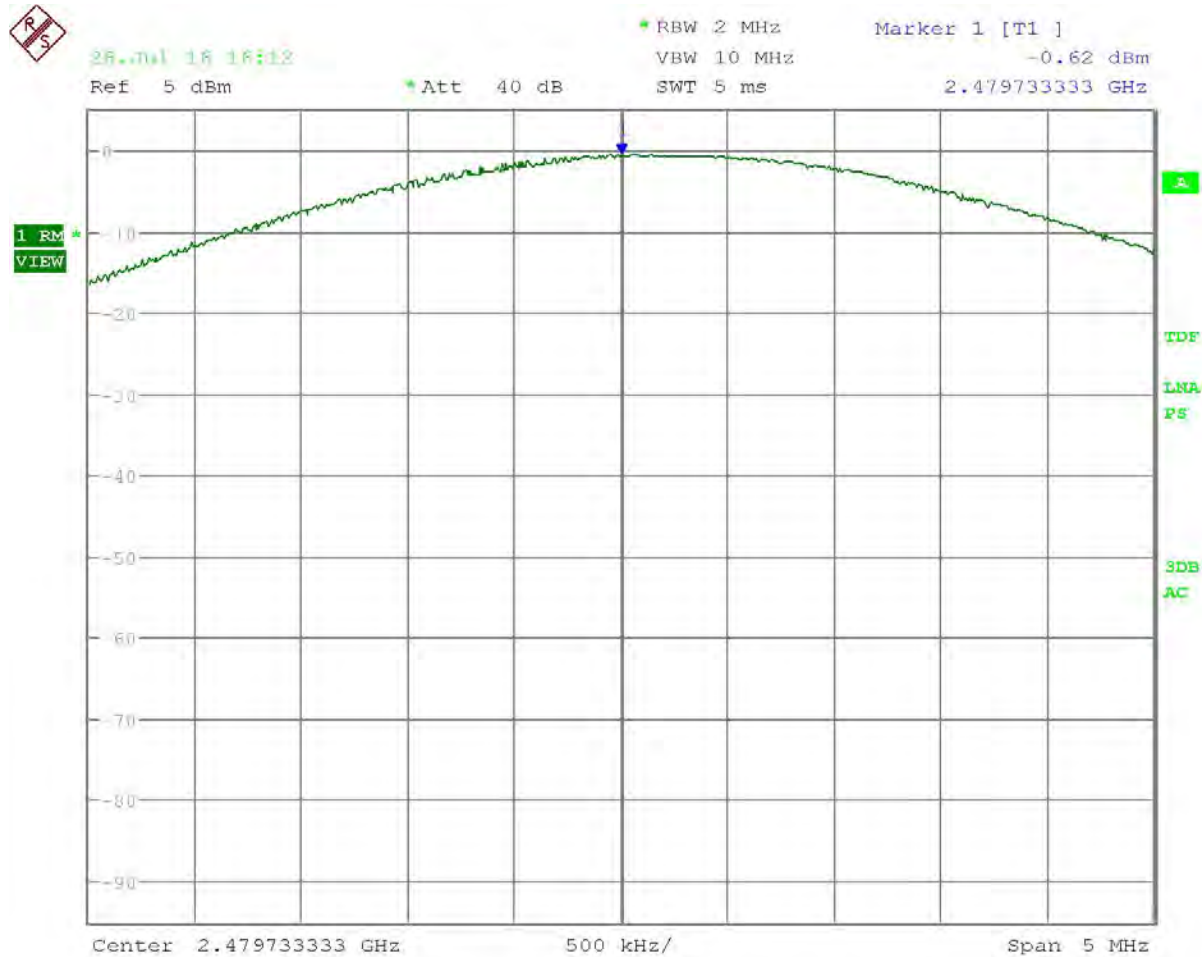
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
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 Report: 1375AUT16TestReport_Rev1

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PEAK POWER OUTPUT

Test Data: Mode 2 High End of Band Peak Conducted Power Plot



Date: 28.JUL.2016 16:12:27

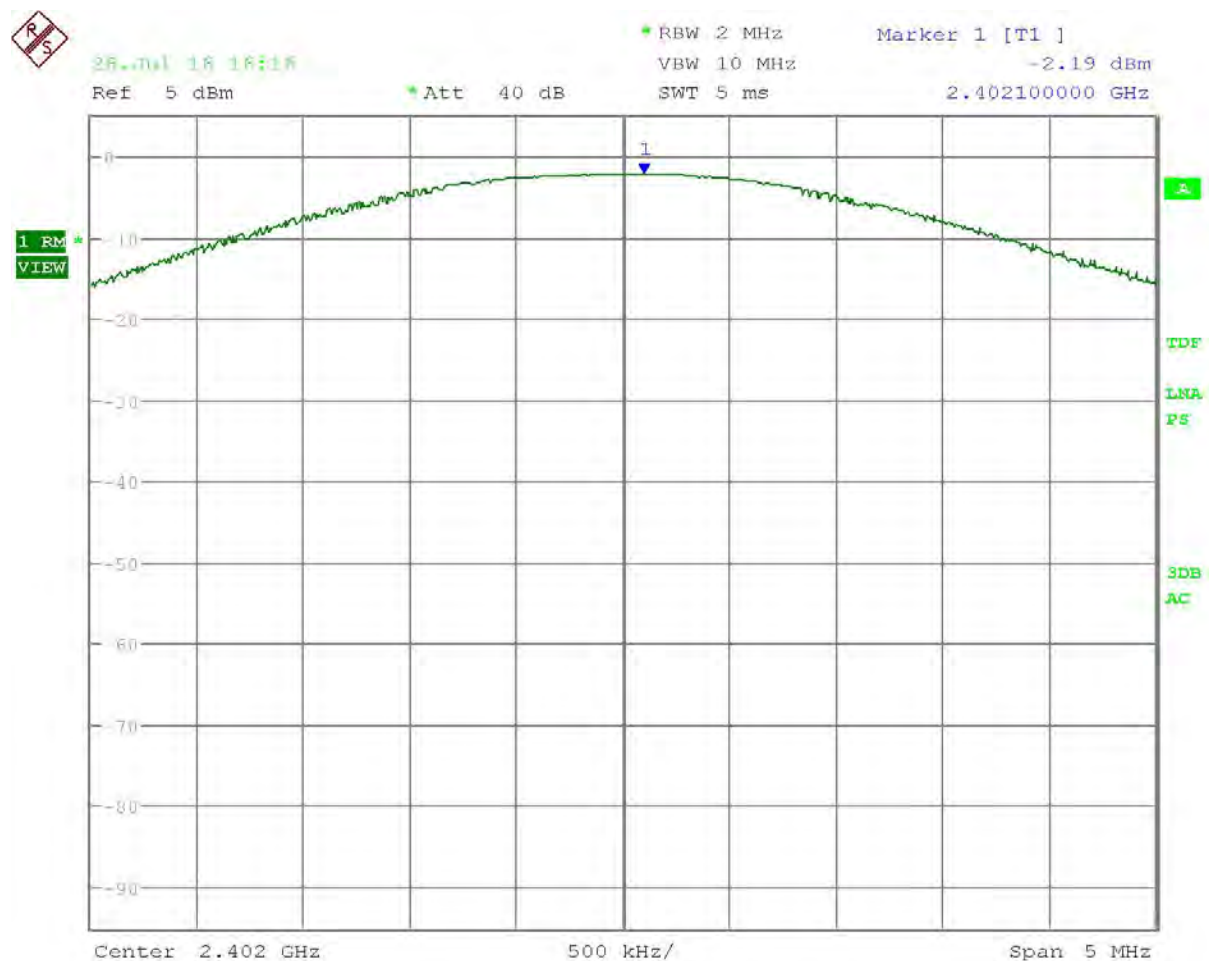
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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PEAK POWER OUTPUT

Test Data: Mode 3 Low End of Band Peak Conducted Power Plot



Date: 28.JUL.2016 16:16:36

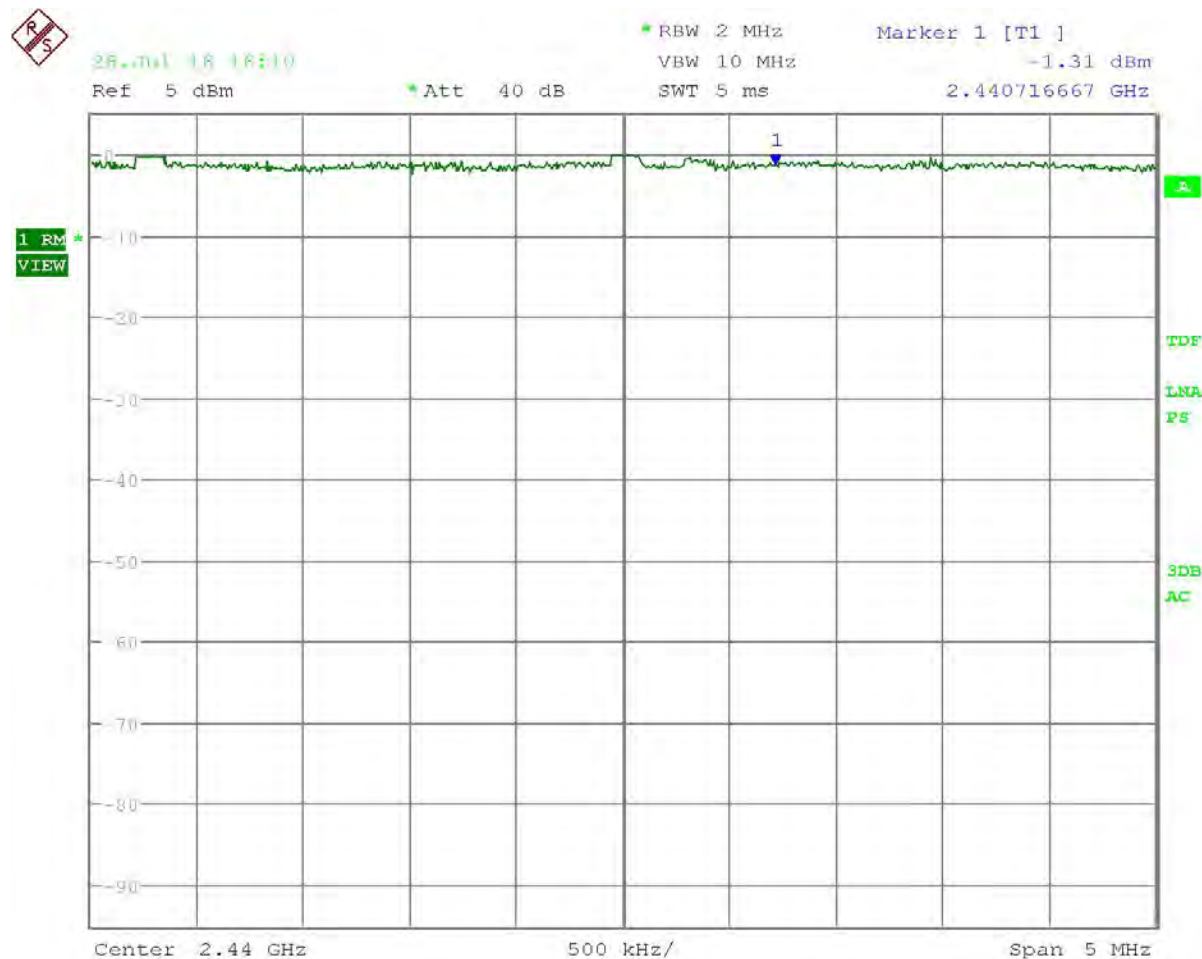
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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PEAK POWER OUTPUT

Test Data: Mode 3 Middle of Band Peak Conducted Power Plot



Date: 28.JUL.2016 16:10:33

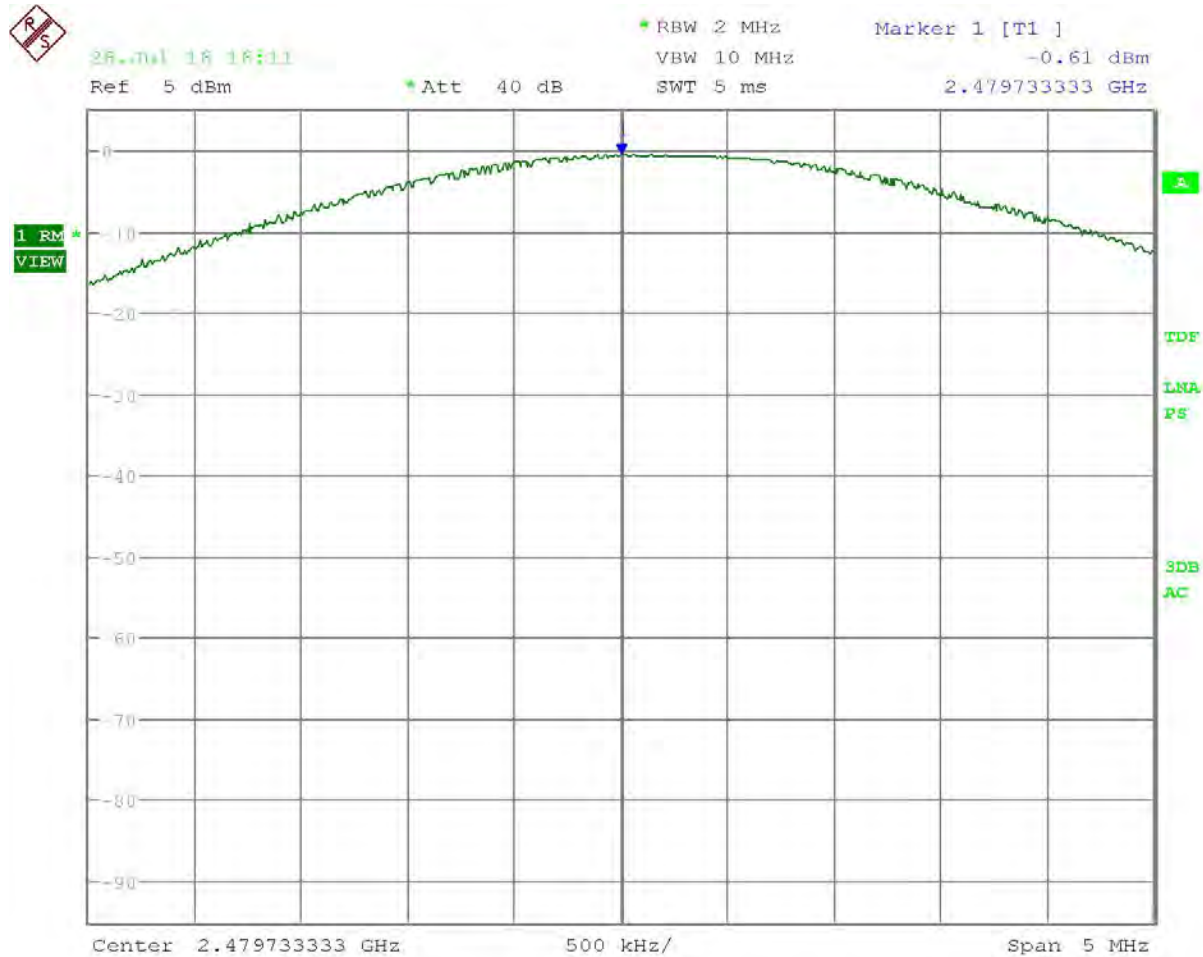
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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PEAK POWER OUTPUT

Test Data: Mode 3 High End of Band Peak Conducted Power Plot



Date: 28.JUL.2016 16:11:33

RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
FCC ID: JFZCKS990BT
IC: 1752B-CKS990BT
Report: 1375AUT16TestReport_Rev1

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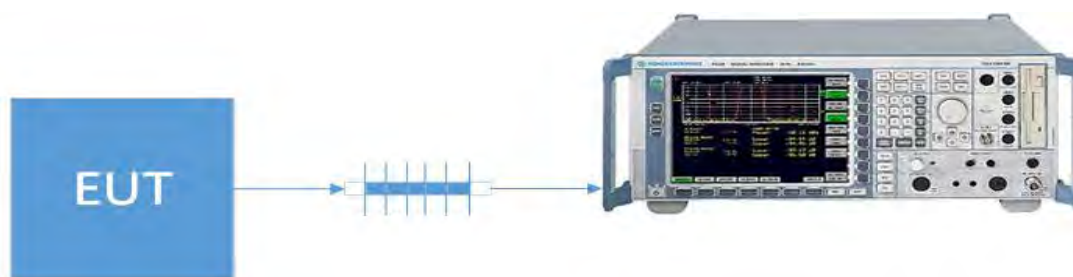
BANDEDGE

Rule Part No.: FCC 15.247(d), IC RSS 247 § 5.5

Requirements: Emissions must be at least 20dB down from the highest emission level Within the authorized band as measured with a 100 kHz RBW.

Test Method: ANSI C63.10 § 6.10.4 Authorized band-edge relative method (lower bandedge)
ANSI C63.10 § 6.10.6 Marker Delta Method (upper restricted bandedge)

Setup:



Test Data: Mode 1 Lower Bandedge Measurement Table

Bandedge	Tuned Frequency (MHz)	Measured Level (dBc)	Limit (dBc)	Margin (dB)
Lower	2402	50.09	20	30.09
	Hopping	48.78	20	28.78

Test Data: Mode 2 Lower Bandedge Measurement Table

Bandedge	Tuned Frequency (MHz)	Measured Level (dBc)	Limit (dBc)	Margin (dB)
Lower	2402	50.52	20	30.52
	Hopping	47.44	20	27.44

Test Data: Mode 3 Lower Bandedge Measurement Table

Bandedge	Tuned Frequency (MHz)	Measured Level (dBc)	Limit (dBc)	Margin (dB)
Lower	2402	49.69	20	29.69
	Hopping	46.7	20	26.7

Results Meet Requirements

Applicant: AUDIO-TECHNICA CORPORATION
FCC ID: JFZCKS990BT
IC: 1752B-CKS990BT
Report: 1375AUT16TestReport_Rev1

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BANDEDGE

Test Data: Mode 1 Upper Bandedge Measurement Table

Tuned Frequency	Detector	Field Strength of Carrier (dBuV/m)	Emission Level Below Carrier (dBc)	Field Strength of Emission (dBuV/m)	Emission Limit (dBuV/m)	Margin (dB)
2480	Peak	97.36	53.47	43.89	54	10.11
Hopping	Peak	97.36	49.76	47.6	54	16.4

Test Data: Mode 2 Upper Bandedge Measurement Table

Tuned Frequency	Detector	Field Strength of Carrier (dBuV/m)	Emission Level Below Carrier (dBc)	Field Strength of Emission (dBuV/m)	Emission Limit (dBuV/m)	Margin (dB)
2480	Peak	93.14	52.27	40.87	54	13.13
Hopping	Peak	93.14	50.59	42.55	54	11.45

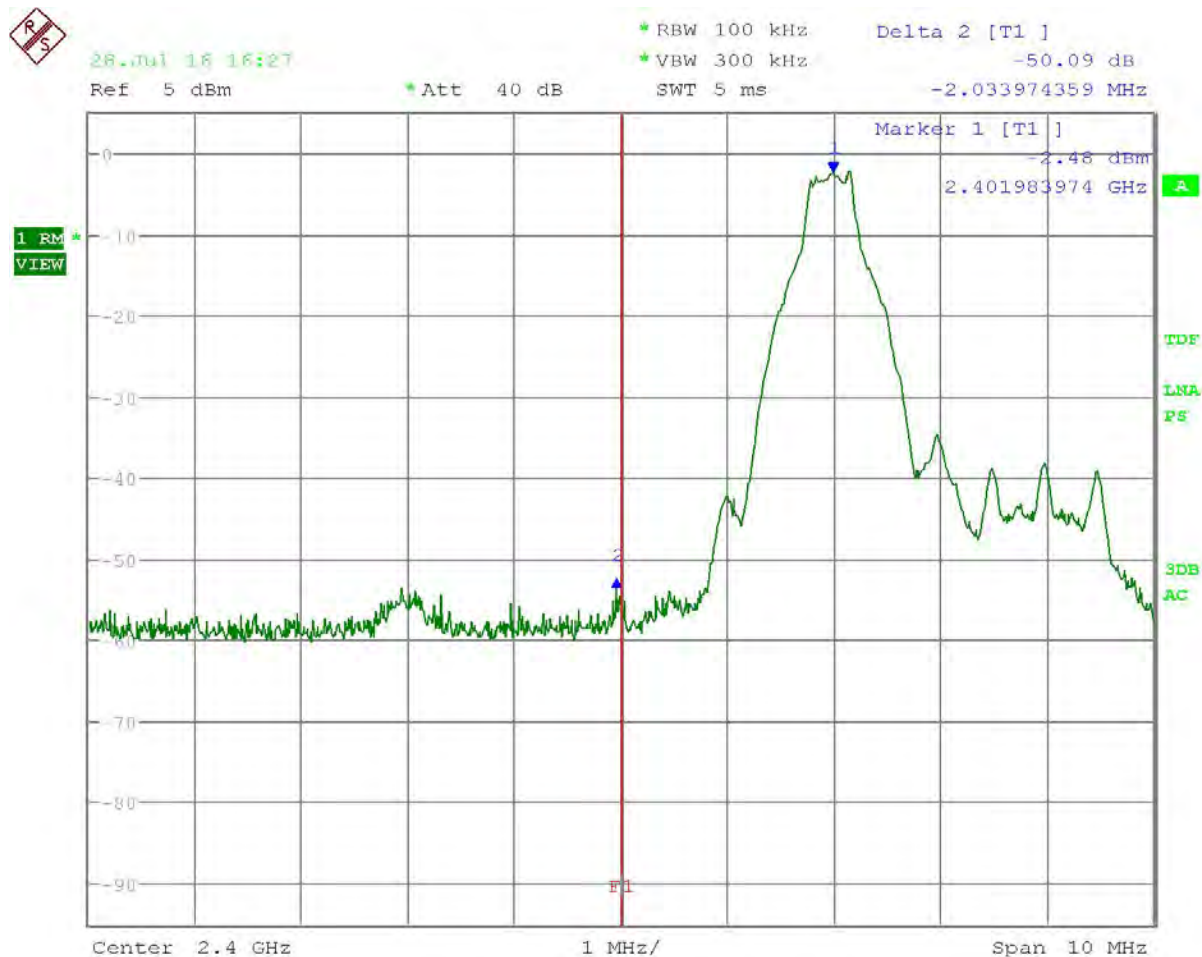
Test Data: Mode 3 Upper Bandedge Measurement Table

Tuned Frequency	Detector	Field Strength of Carrier (dBuV/m)	Emission Level Below Carrier (dBc)	Field Strength of Emission (dBuV/m)	Emission Limit (dBuV/m)	Margin (dB)
2480	Peak	89.3	52.37	36.93	54	17.07
Hopping	Peak	89.3	47.05	42.25	54	11.75

RESULTS: Meets Requirements

BANDEDGE

Test Data: Mode 1 Low End of Band Lower Band Edge Plot



Date: 28.JUL.2016 16:27:14

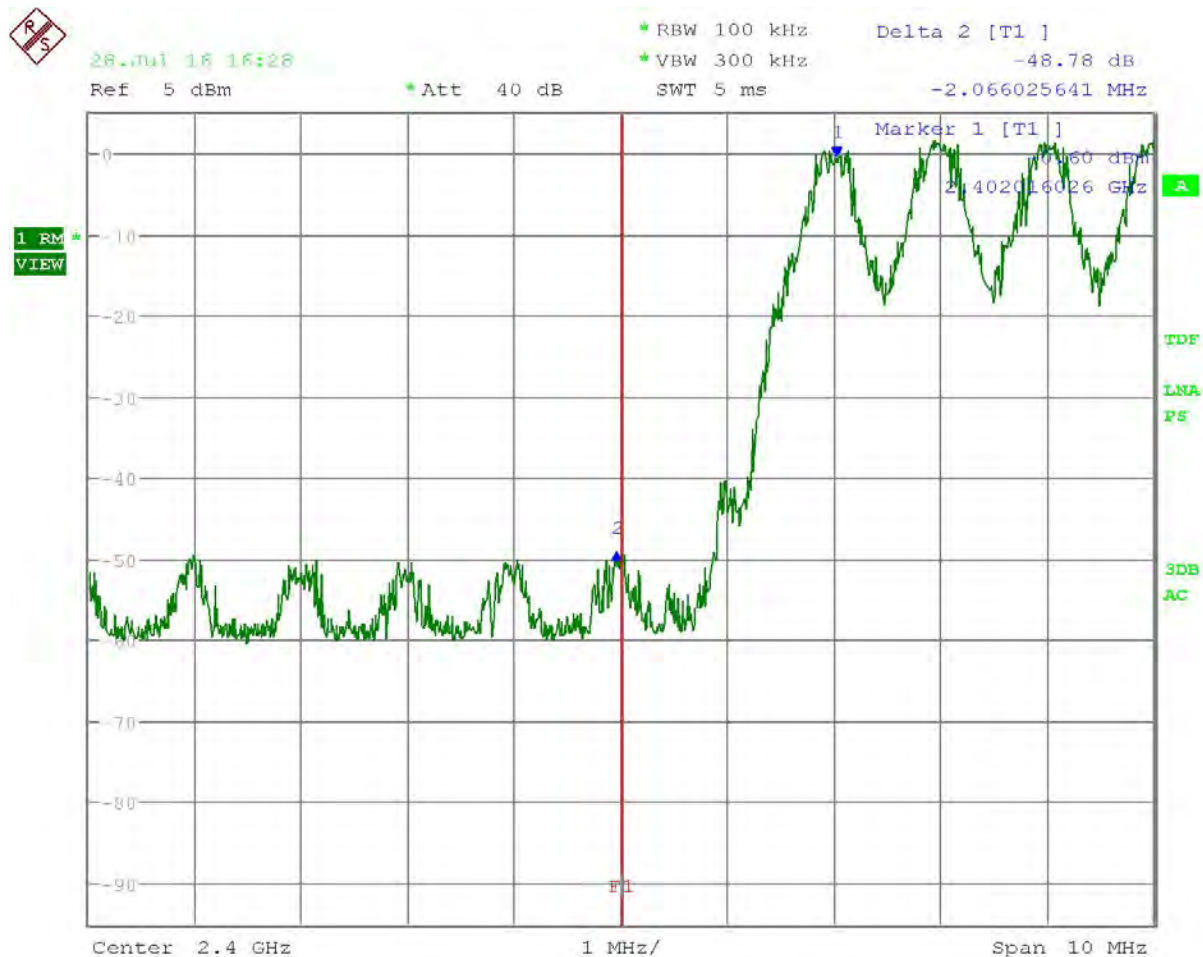
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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BANDEDGE

Test Data: Mode 1 Hopping Lower Band Edge Plot



Date: 28.JUL.2016 16:28:07

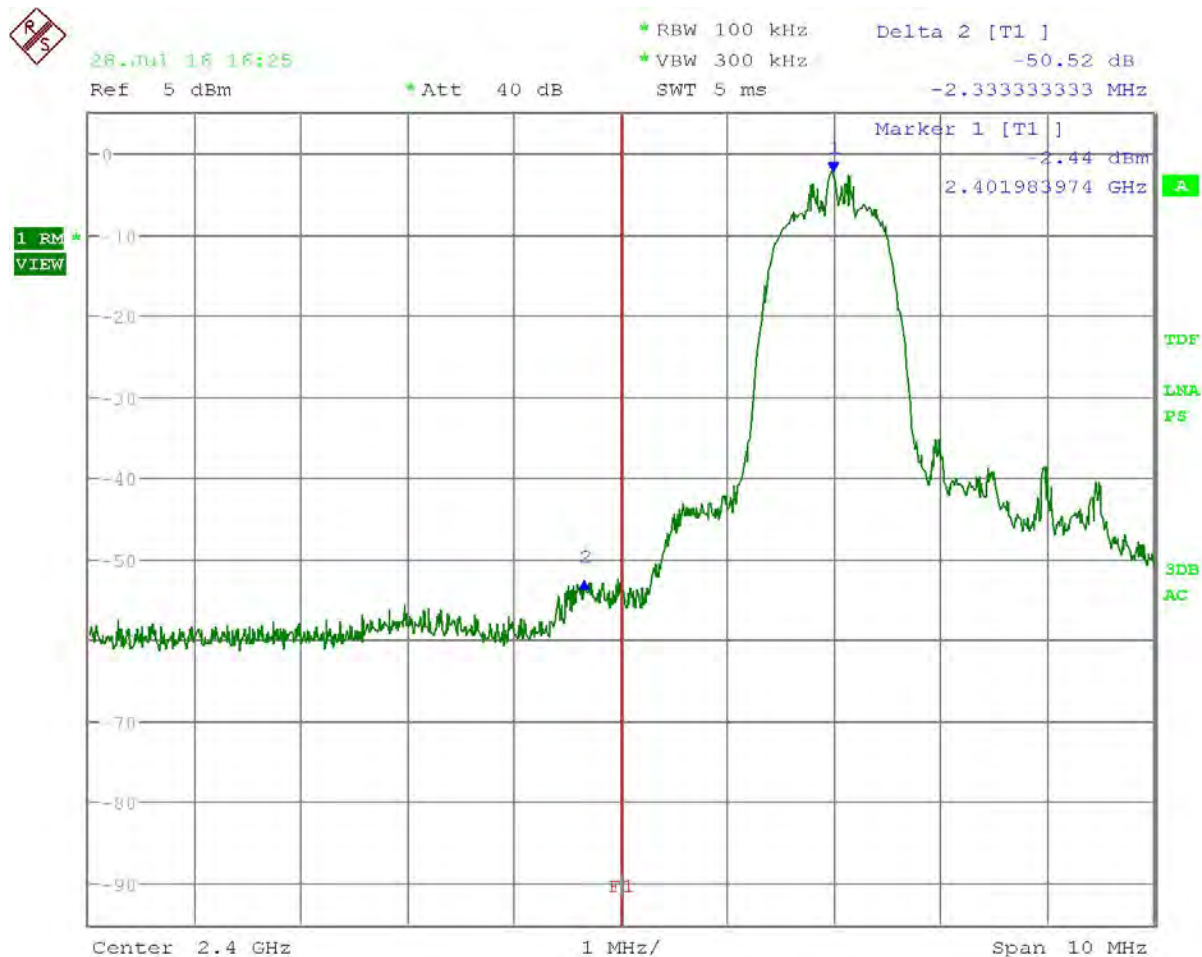
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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BANDEDGE

Test Data: Mode 2 Low End of Band Lower Band Edge Plot



Date: 28.JUL.2016 16:25:55

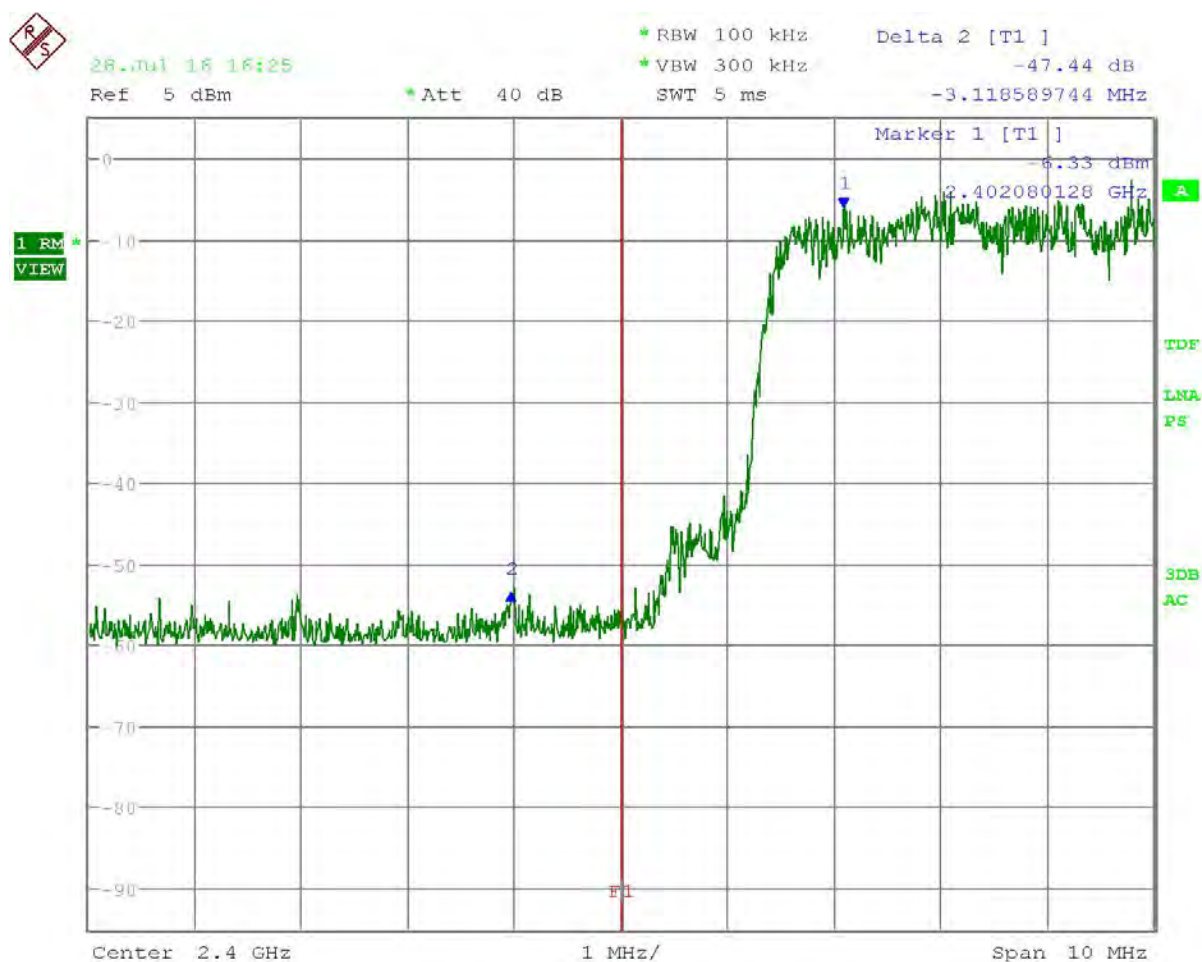
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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BANDEDGE

Test Data: Mode 2 Hopping Lower Band Edge Plot



Date: 28.JUL.2016 16:25:02

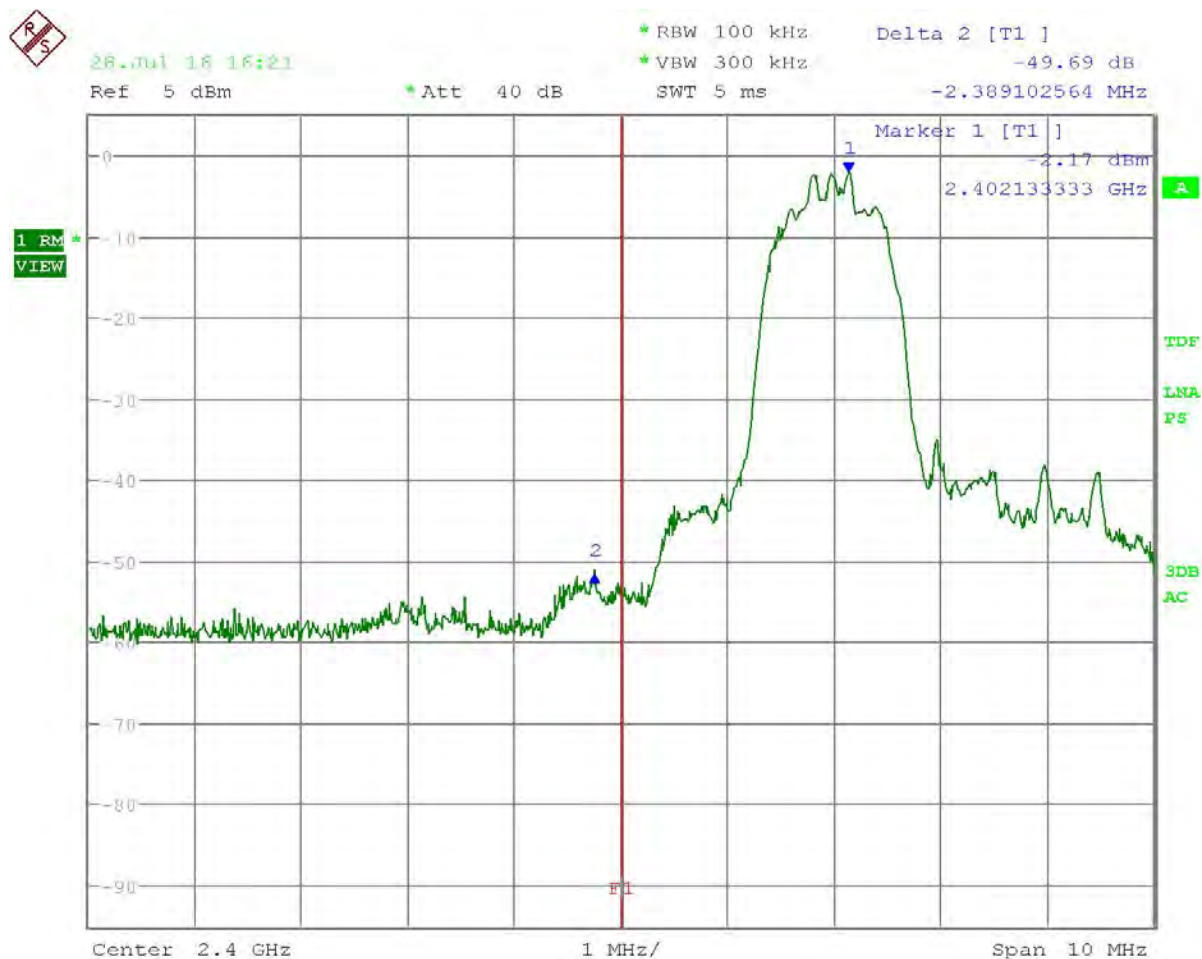
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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BANDEDGE

Test Data: Mode 3 Low End of Band Lower Band Edge Plot



Date: 28.JUL.2016 16:21:31

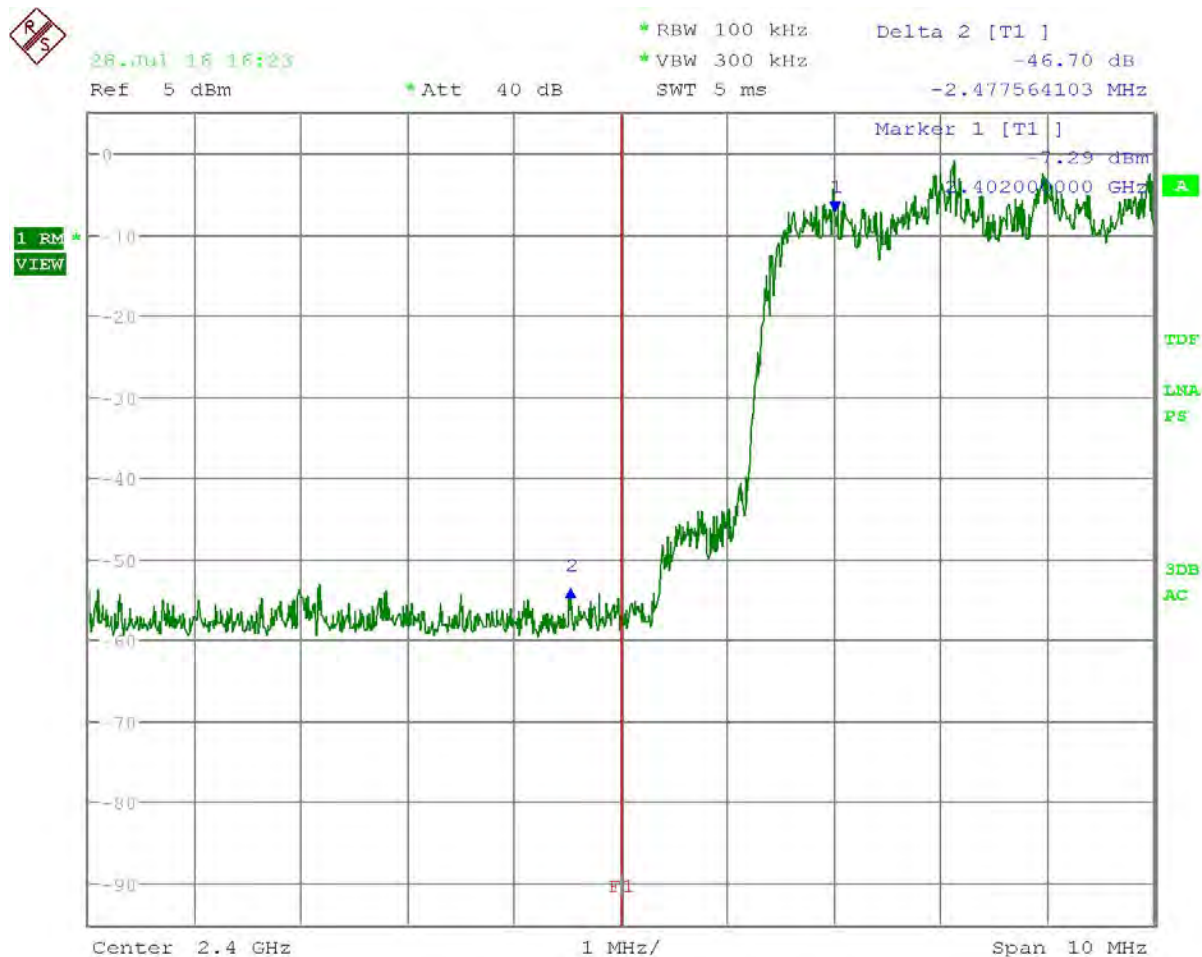
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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BANDEDGE

Test Data: Mode 3 Hopping Lower Band Edge Plot



Date: 28.JUL.2016 16:23:12

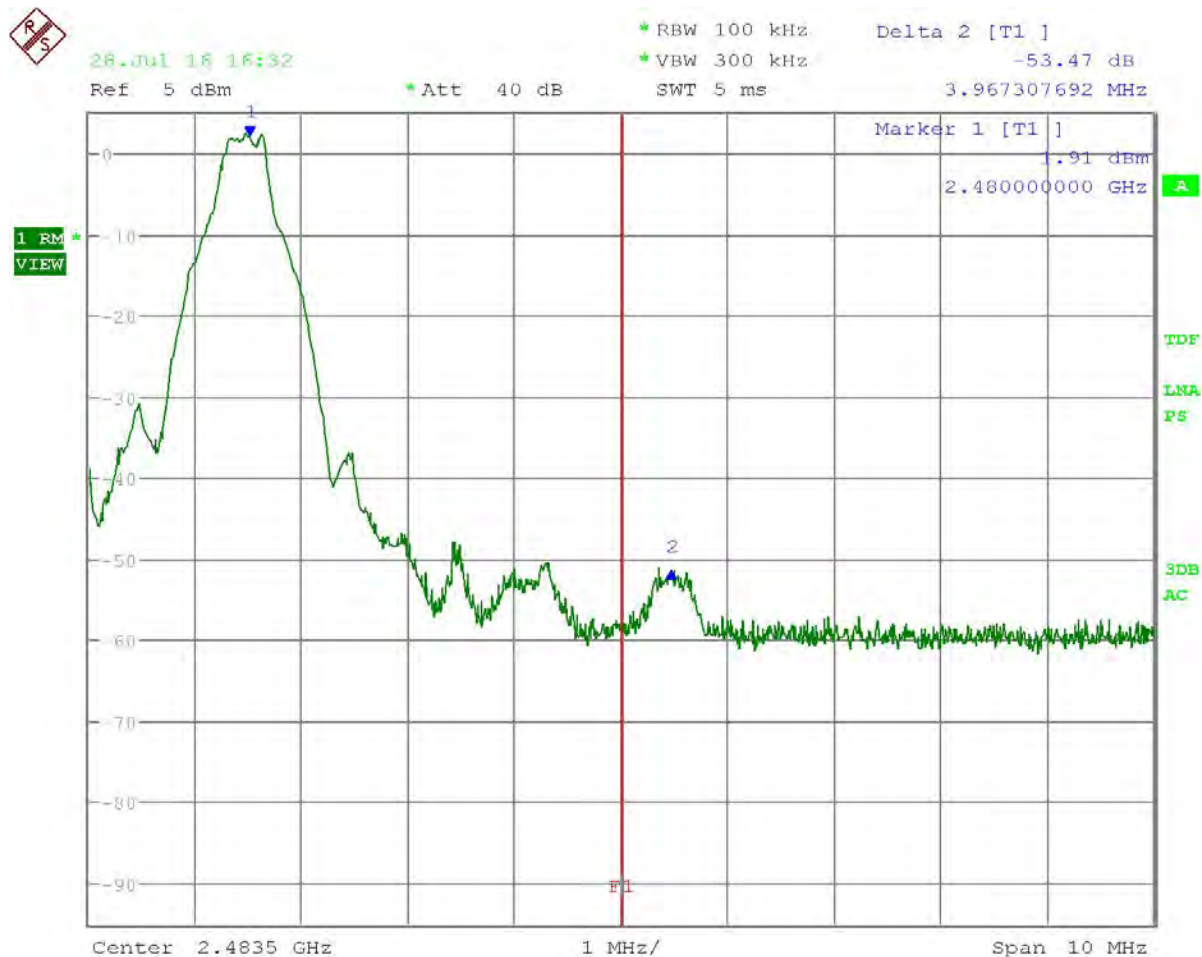
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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BANDEDGE

Test Data: Mode 1 High End of Band Upper Band Edge Plot



Date: 28.JUL.2016 16:32:06

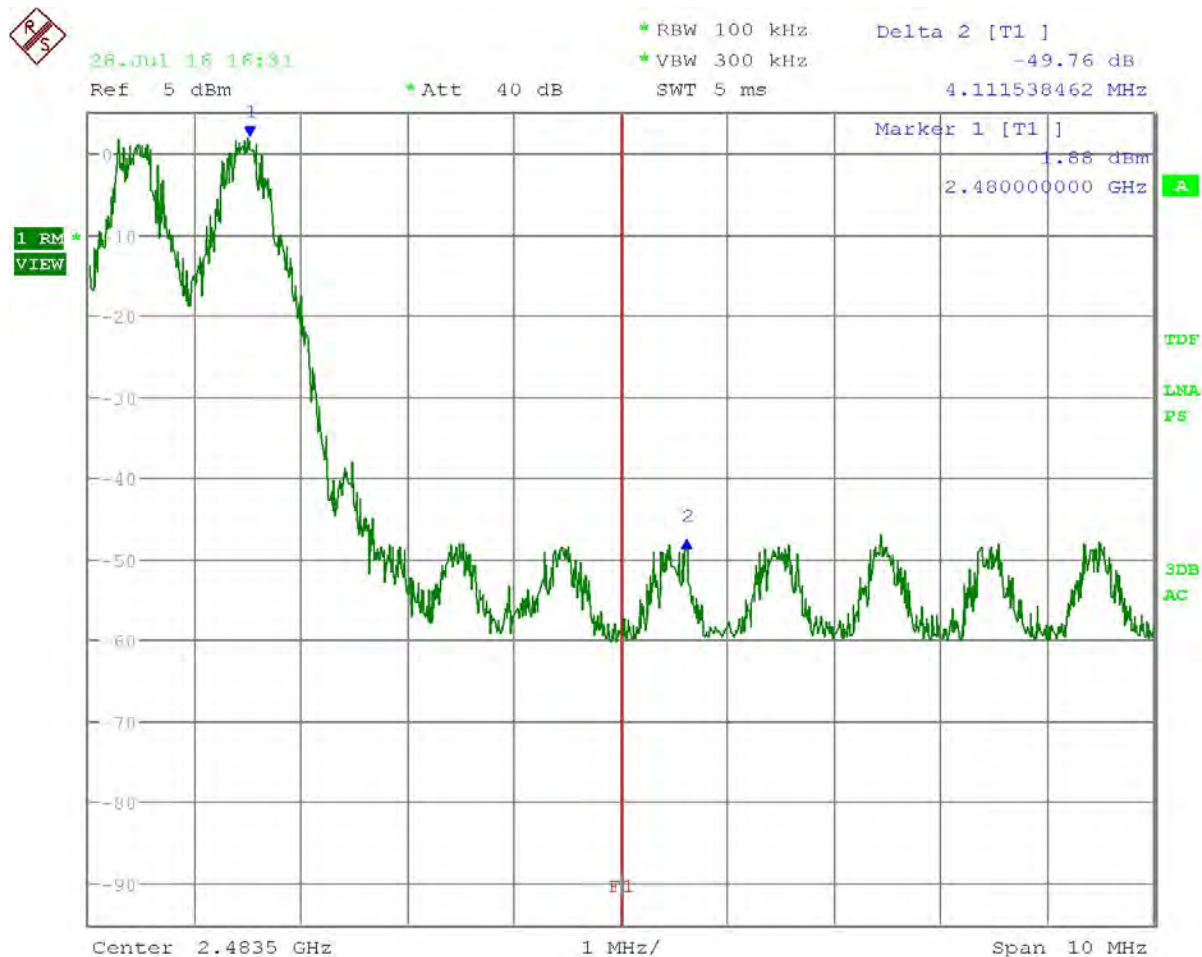
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
FCC ID: JFZCKS990BT
IC: 1752B-CKS990BT
Report: 1375AUT16TestReport_Rev1

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BANDEDGE

Test Data: **Mode 1 Hopping Upper Band Edge Plot**



Date: 28.JUL.2016 16:31:05

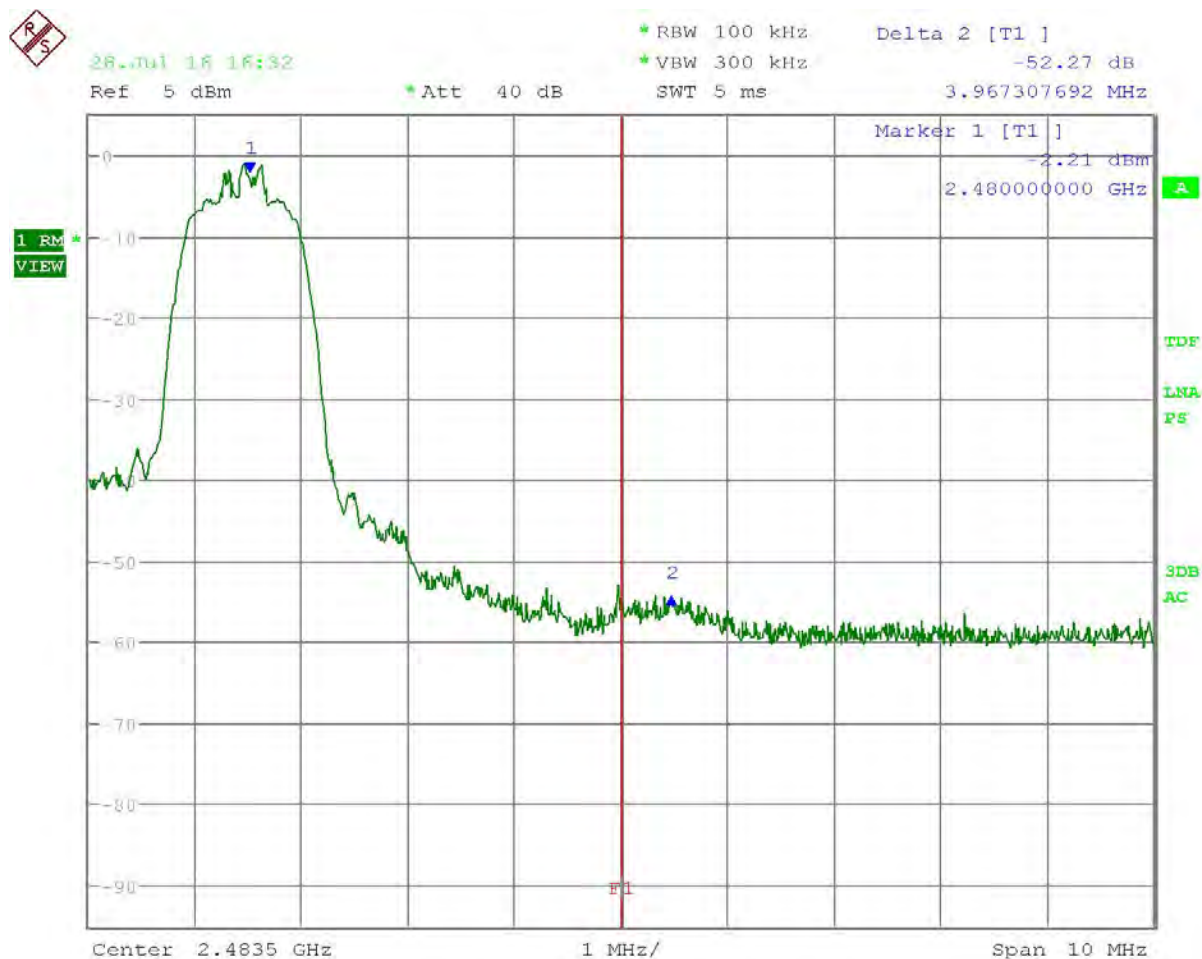
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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BANDEDGE

Test Data: **Mode 2 High End of Band Upper Band Edge Plot**



Date: 28.JUL.2016 16:32:53

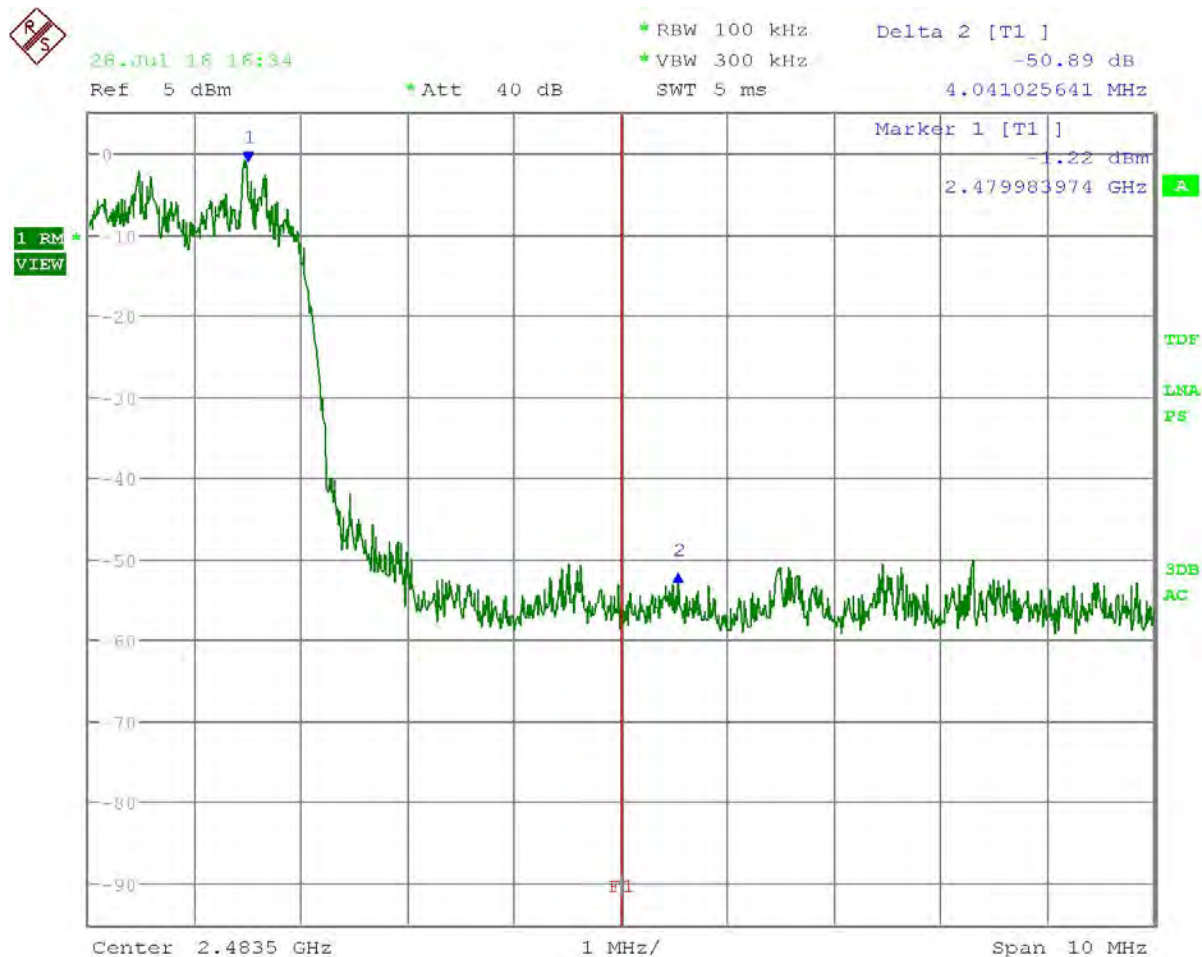
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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BANDEDGE

Test Data: Mode 2 Hopping Upper Band Edge Plot



Date: 28.JUL.2016 16:34:17

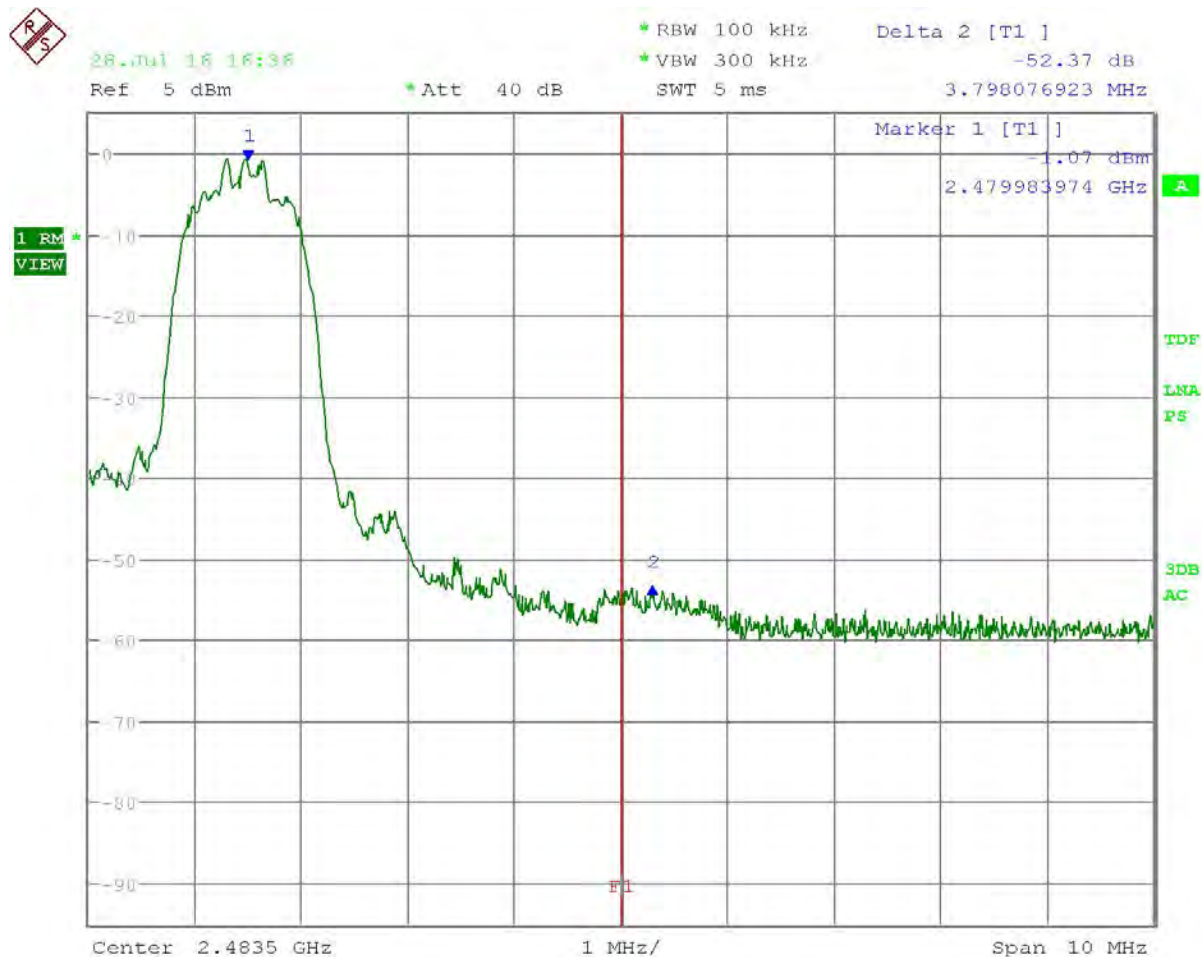
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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BANDEDGE

Test Data: **Mode 3 High End of Band Upper Band Edge Plot**



Date: 28.JUL.2016 16:36:44

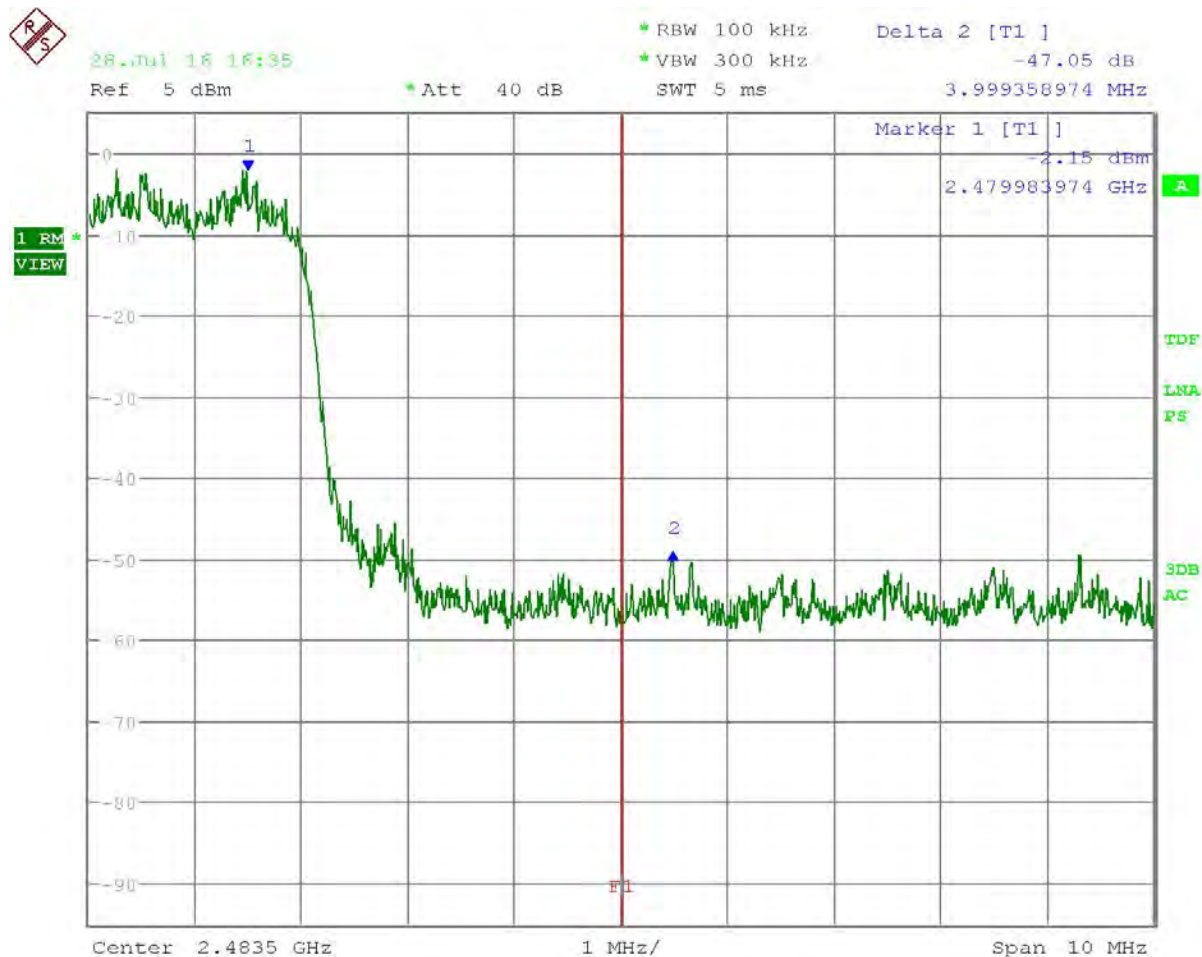
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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BANDEDGE

Test Data: Mode 3 Hopping Upper Band Edge Plot



Date: 28.JUL.2016 16:35:41

RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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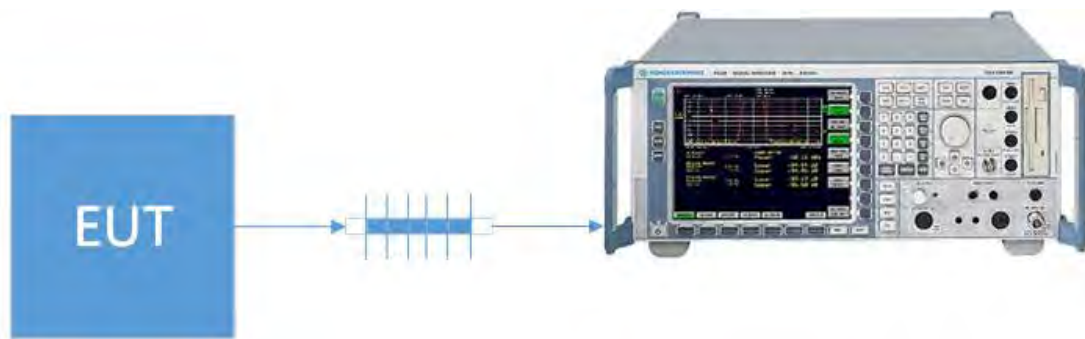
ANTENNA CONDUCTED SPURIOUS EMISSIONS

Rules Part No.: FCC part 15.247 (d) & 15.209, IC RSS 247 § 5.5 & RSS GEN § 8.9

Requirements: In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below

Test Method: ANSI C63.10 § 6.7 Antennaport Conducted Emission Measurements
ANSI C63.10 § 7.8.8 Conducted Spurious Emissions Test Methodology

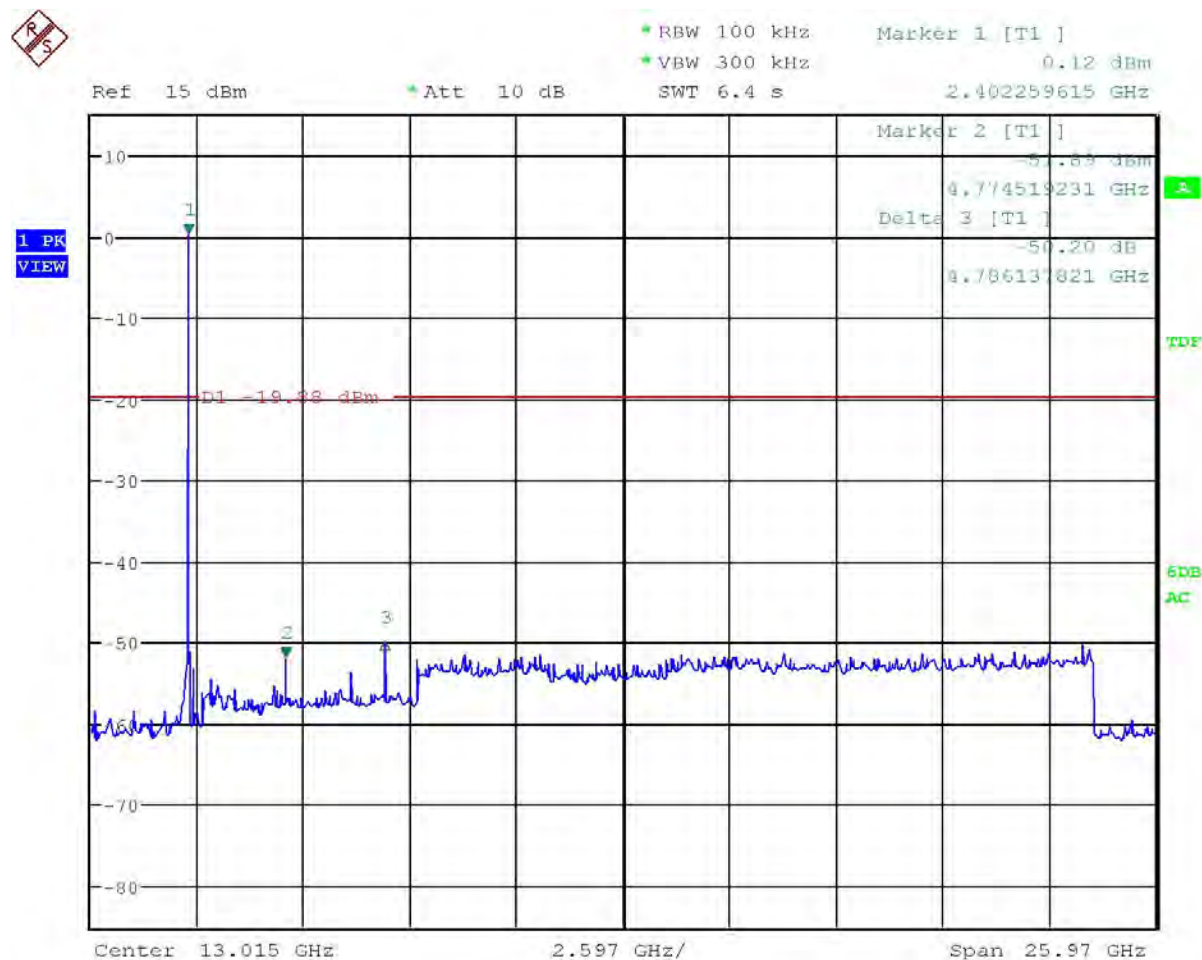
Setup:



ANTENNA CONDUCTED SPURIOUS EMISSIONS

ANTENNA CONDUCTED SPURIOUS EMISSIONS

Test Data: Mode 1 Low End of Band 30 MHz – 26 GHz Plot



Date: 1.AUG.2016 16:34:05

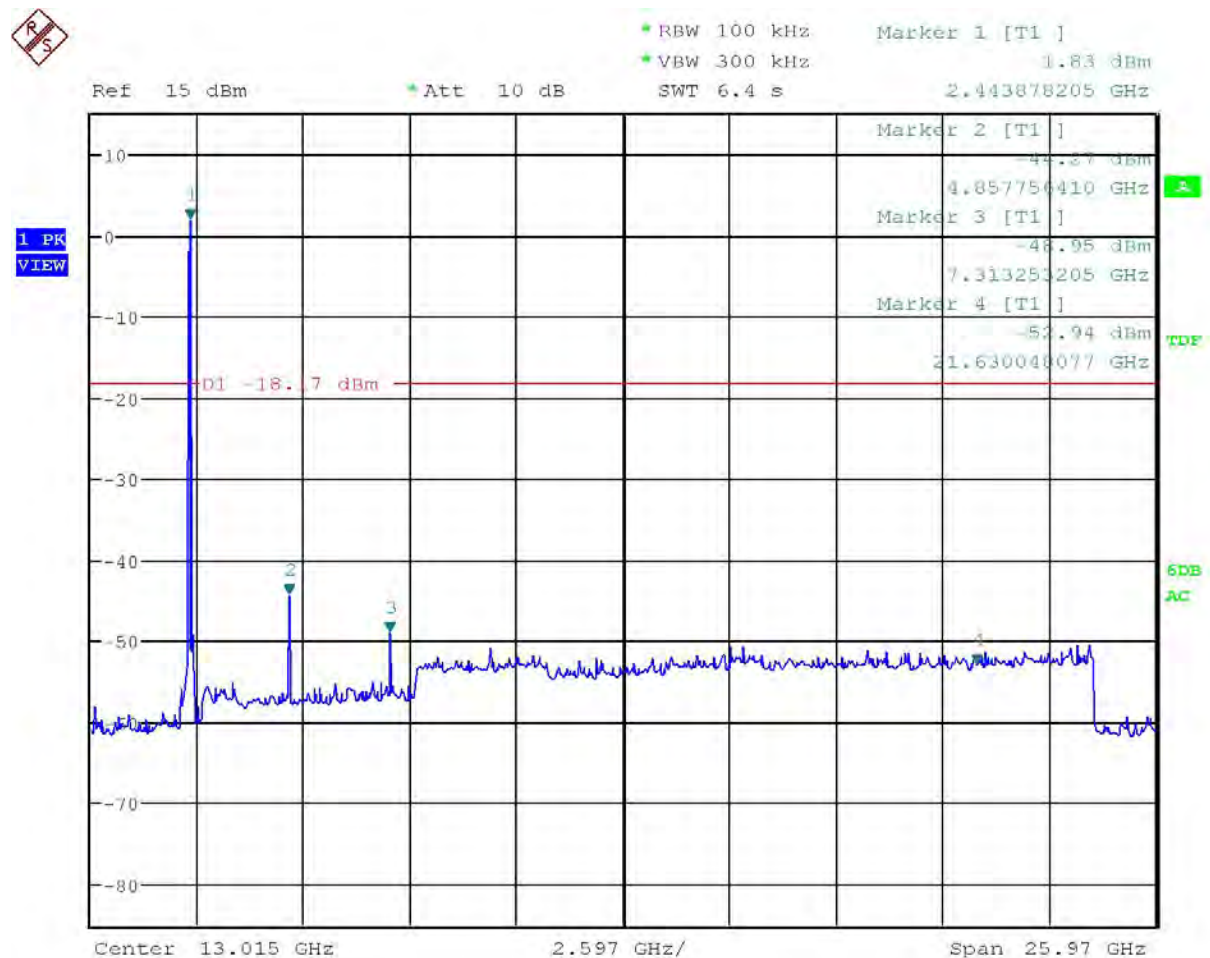
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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ANTENNA CONDUCTED SPURIOUS EMISSIONS

Test Data: Mode 1 Middle of Band 30 MHz – 26 GHz Plot



Date: 1.AUG.2016 16:32:47

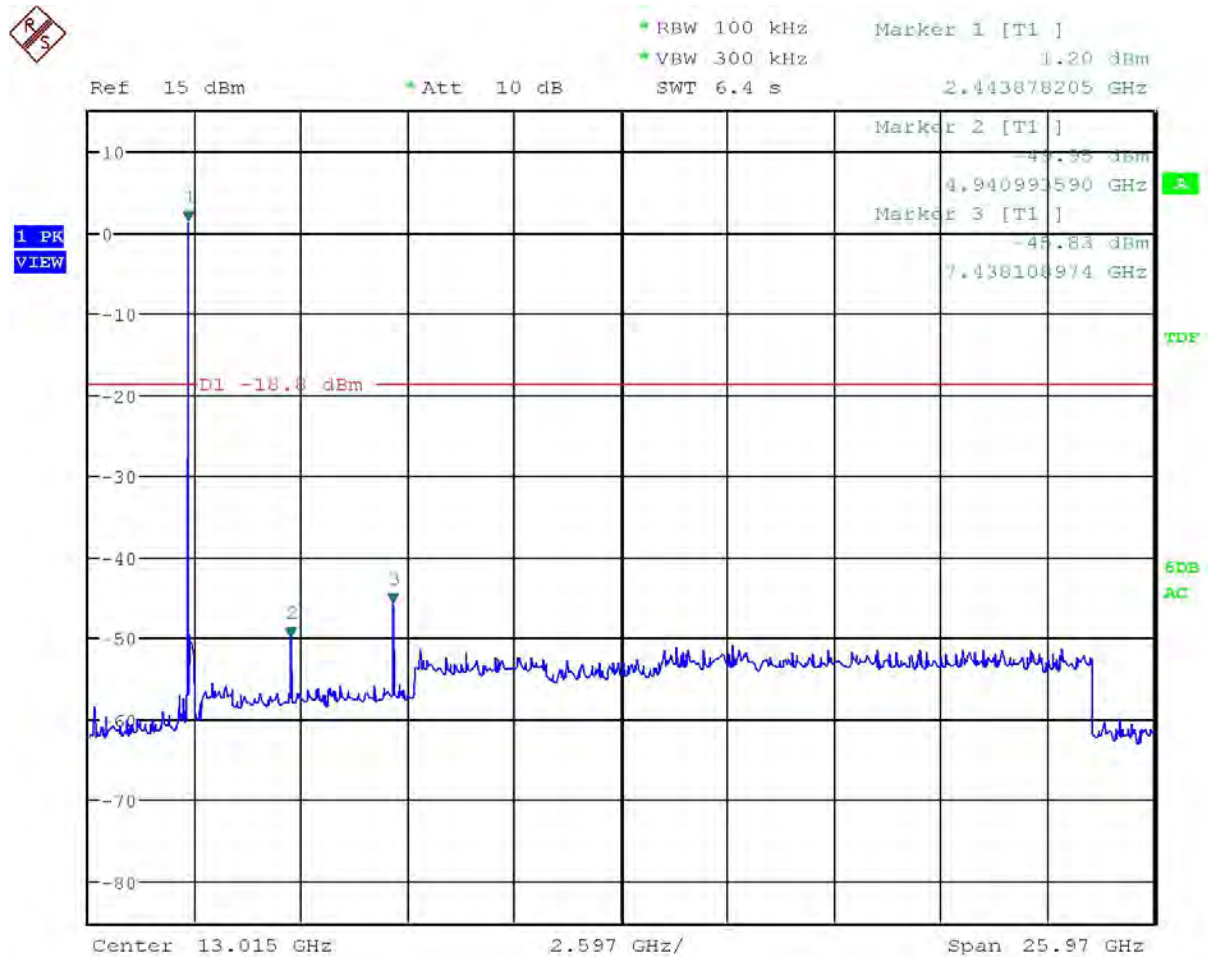
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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ANTENNA CONDUCTED SPURIOUS EMISSIONS

Test Data: Mode 1 High End of Band 30 MHz – 26 GHz Plot



Date: 1.AUG.2016 16:36:02

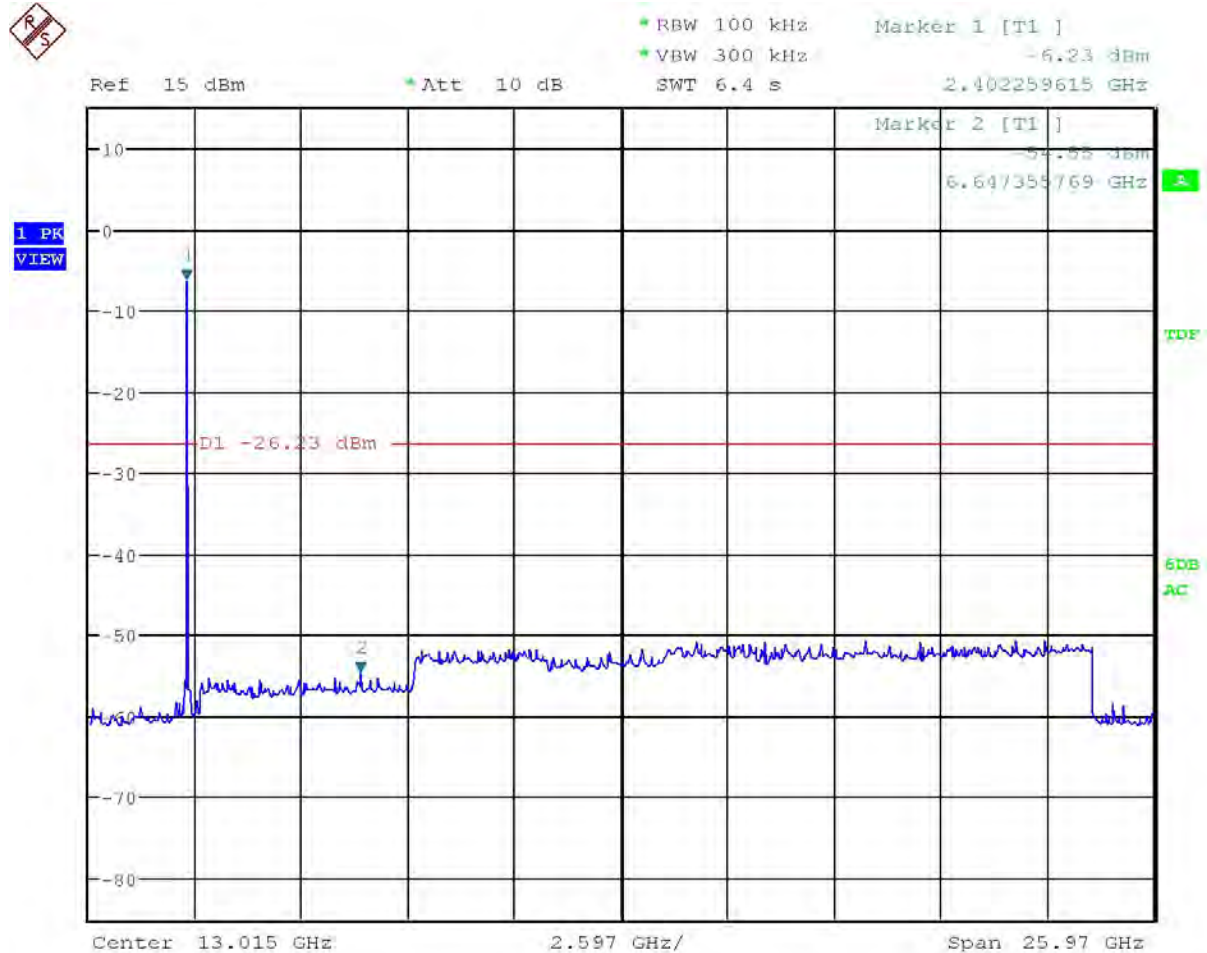
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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ANTENNA CONDUCTED SPURIOUS EMISSIONS

Test Data: Mode 2 Low of Band 30 MHz – 26 GHz Plot



Date: 1.AUG.2016 16:39:44

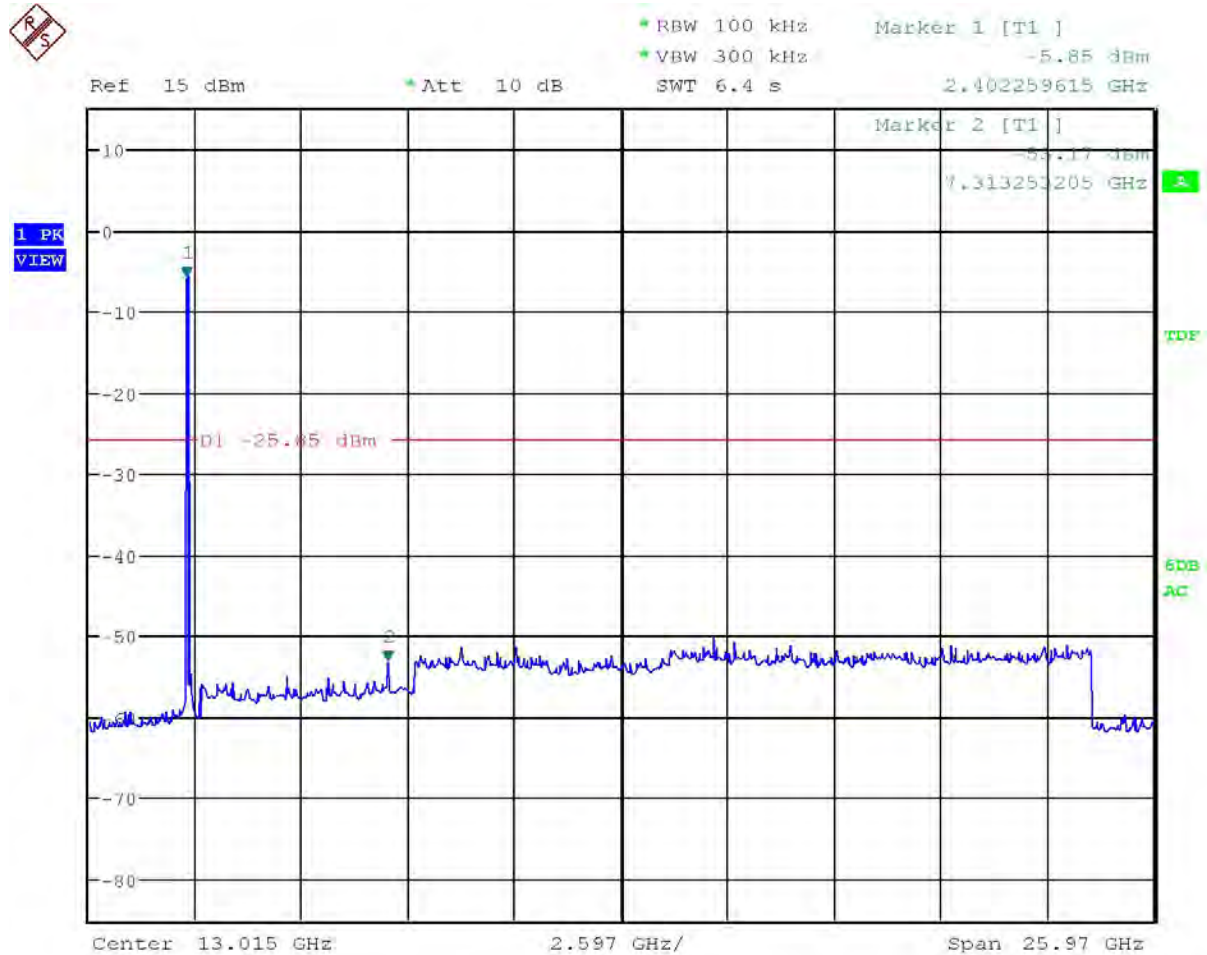
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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ANTENNA CONDUCTED SPURIOUS EMISSIONS

Test Data: Mode 2 Middle of Band 30 MHz – 26 GHz Plot



Date: 1.AUG.2016 16:37:59

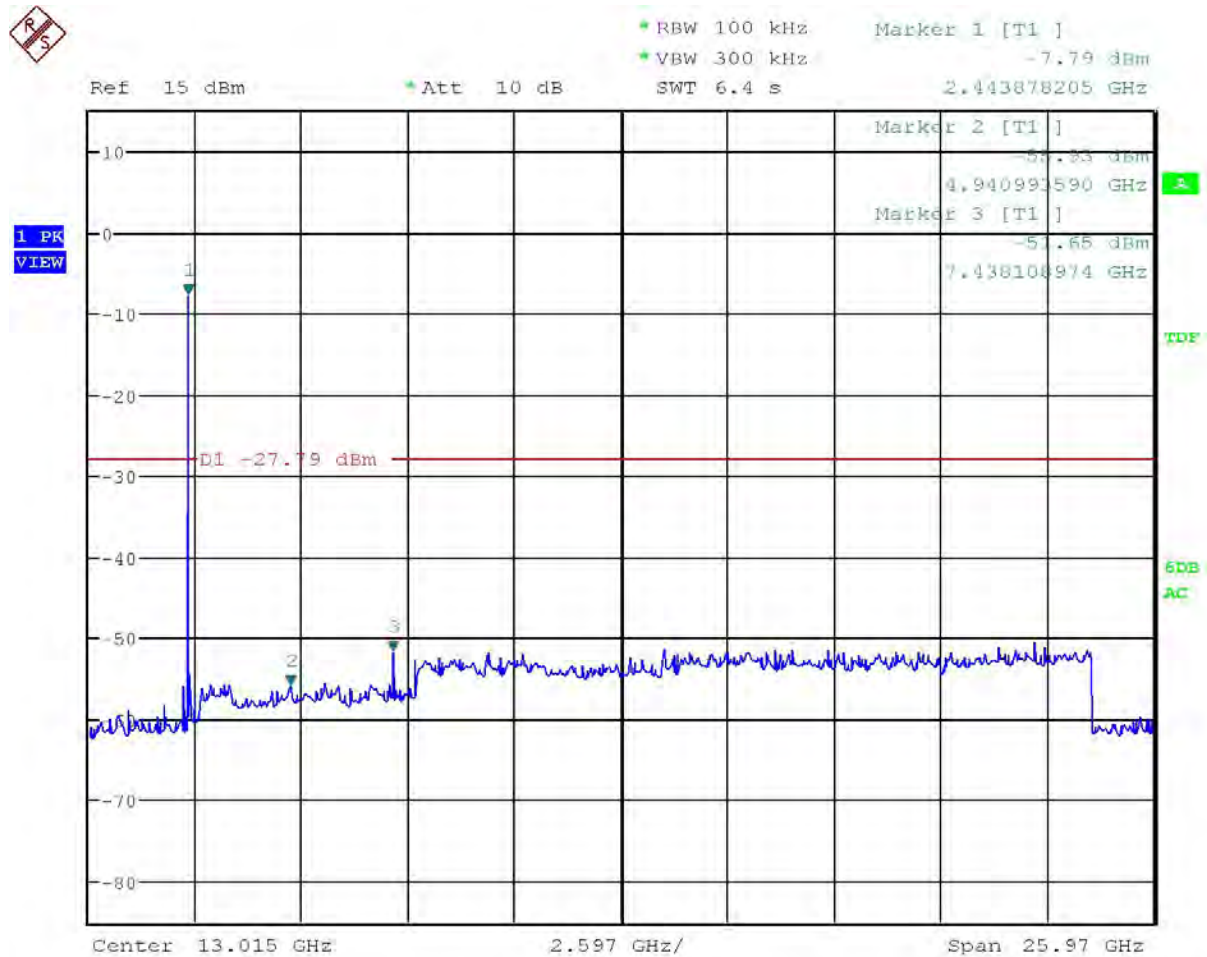
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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ANTENNA CONDUCTED SPURIOUS EMISSIONS

Test Data: Mode 2 High End of Band 30 MHz – 26 GHz Plot



Date: 1.AUG.2016 16:37:01

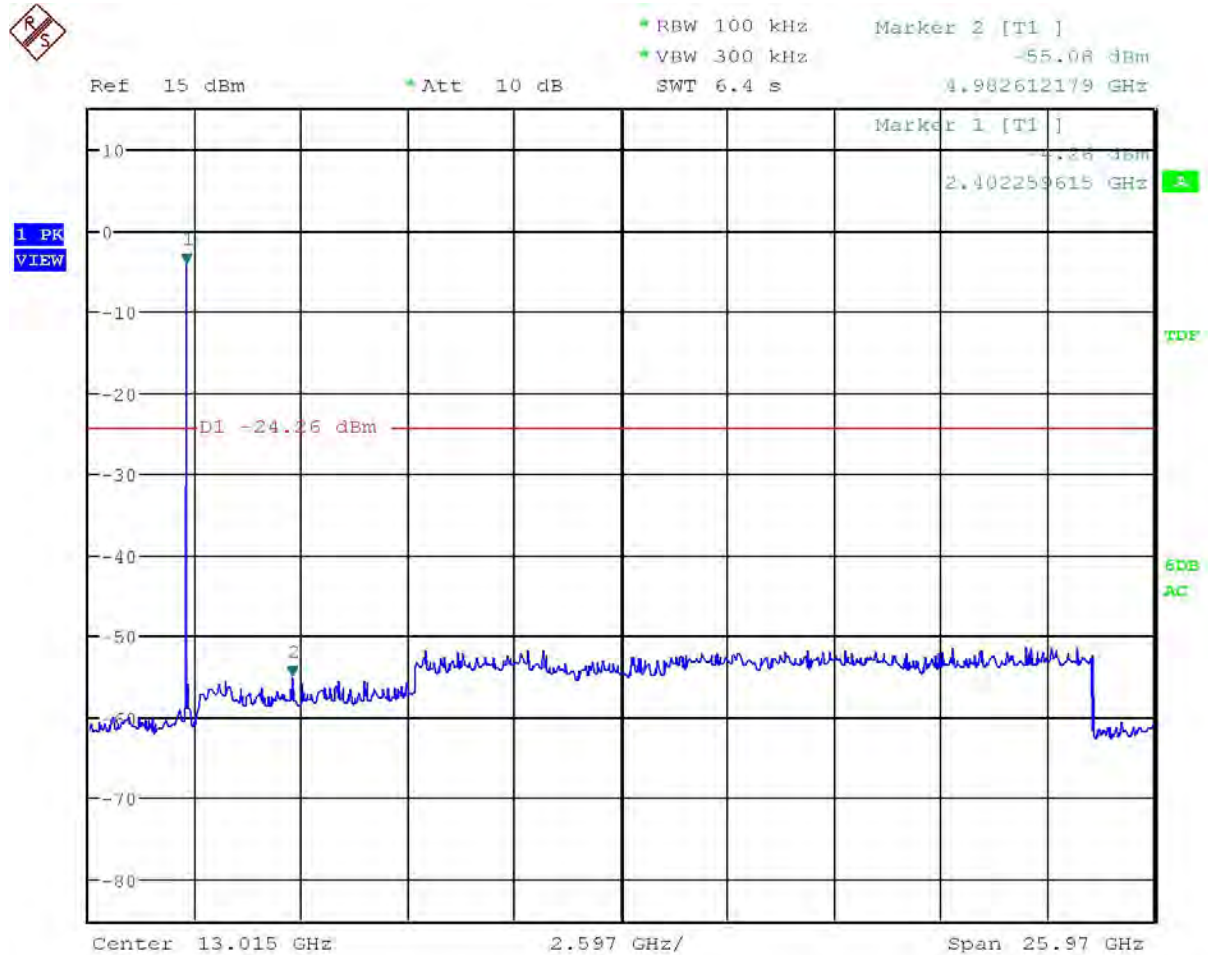
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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ANTENNA CONDUCTED SPURIOUS EMISSIONS

Test Data: Mode 3 Low of Band 30 MHz – 26 GHz Plot



Date: 1.AUG.2016 16:41:03

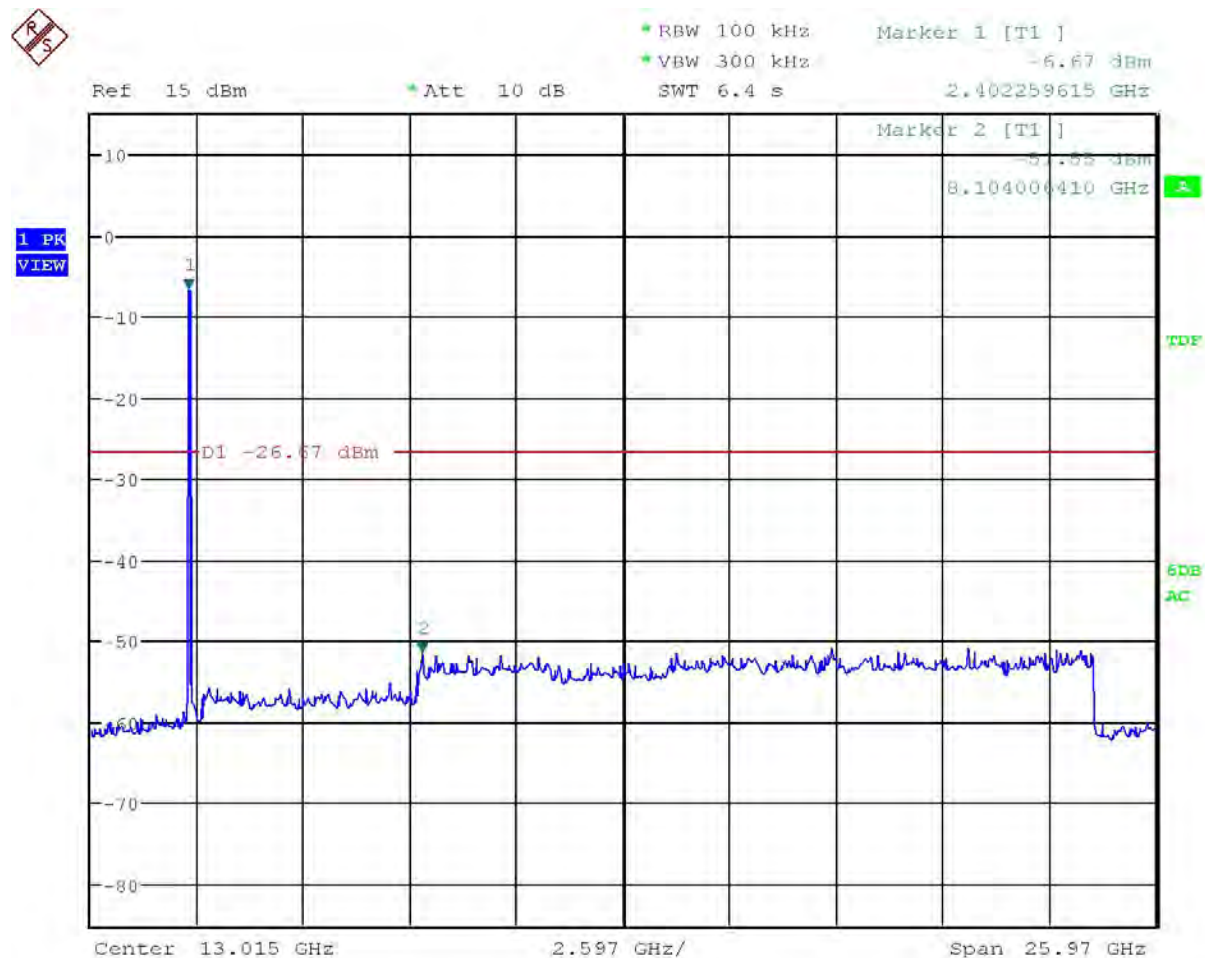
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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ANTENNA CONDUCTED SPURIOUS EMISSIONS

Test Data: Mode 3 Middle of Band 30 MHz – 26 GHz Plot



Date: 1.AUG.2016 16:41:57

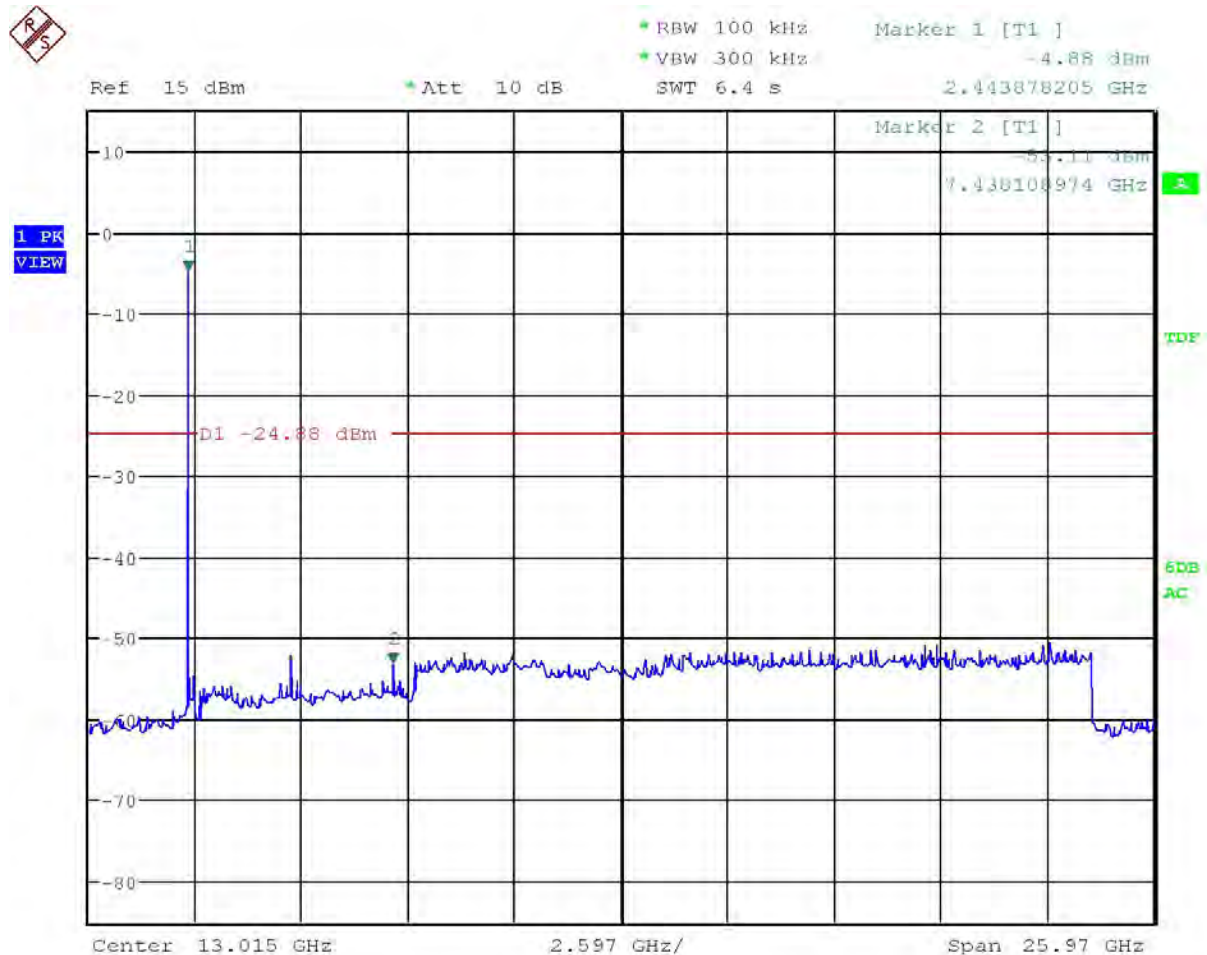
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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ANTENNA CONDUCTED SPURIOUS EMISSIONS

Test Data: Mode 3 High End of Band 30 MHz – 26 GHz Plot



Date: 1.AUG.2016 16:42:51

RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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RADIATED SPURIOUS EMISSIONS

Rules Part No.: FCC part 15.247 (d) & 15.209, IC RSS 247 § 5.5 & RSS GEN § 8.9

Requirements: Emissions found in restricted bands the levels must comply with the general limits found in FCC part 15.209

Frequency	Limits
FCC Part 15.209, IC RSS-GEN 8.9	
9 to 490 kHz	2400/F (kHz) μ V/m @ 300 meters
490 to 1705 kHz	24000/F (kHz) μ V/m @ 30 meters
1705 kHz to 30 MHz	29.54 dB μ V/m @ 30 meters
30 – 88	40.0 dB μ V/m @ 3 meters
80 – 216	43.5 dB μ V/m @ 3 meters
216 – 960	46.0 dB μ V/m @ 3 meters
Above 960	54.0 dB μ V/m @ 3 meters

Test Method: ANSI C63.4 § Annex D Validation of radiated emissions standard test sites
 ANSI C63.10 § 6.3 Common requirements radiated emissions
 ANSI C63.10 § 6.4 Emissions below 30 MHz
 ANSI C63.10 § 6.5 Emissions between 30 & 1000 MHz
 ANSI C63.10 § 6.6 Emissions above 1 GHz

Field Strength Calculation:

The field strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dB μ V) to the antenna correction factor supplied by the antenna manufacturer plus the coax loss. The antenna correction factors are stated in terms of dB. The gain of the preselector was accounted for in the spectrum analyzer meter reading.

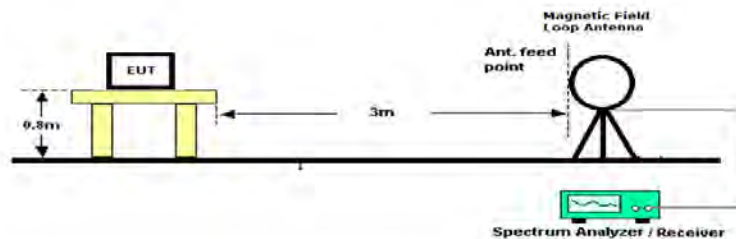
Example:

Freq (MHz)	Meter Reading	+ ACF	+ CL = FS
33	20 dB μ V	+ 10.36 dB	+ 0.5 = 30.86 dB μ V/m @ 3m

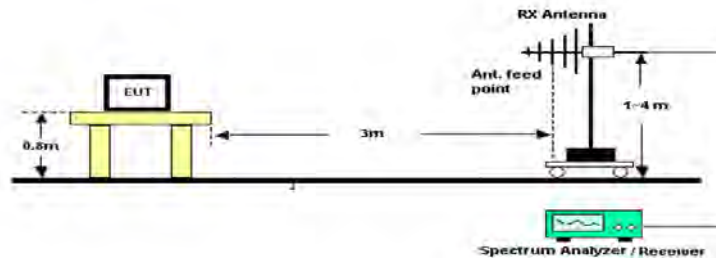
RADIATED SPURIOUS EMISSIONS

Setup:

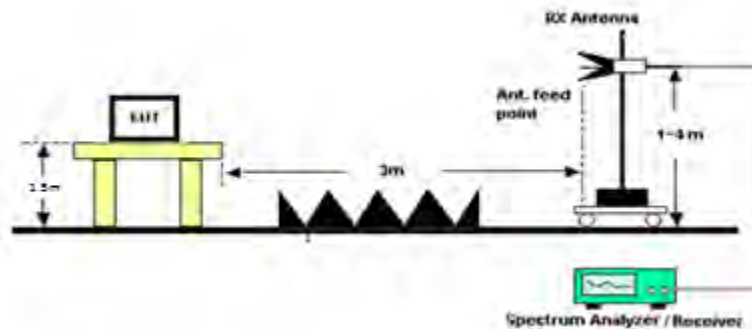
Emissions below 30 MHz



Emissions 30 – 1000 MHz



Emissions above 1 GHz



Notes:

The EUT was checked in three orthogonal planes as required, a setup photo is provided to show the orientation of the worst case position.

Only the worst case data rate and Output Power which produced emissions within 20dB of the limit are reported.

The spectrum was measured from 9 KHz to 25 GHz

RADIATED SPURIOUS EMISSIONS

Test Data: Mode 1 Low End of Band Meters Measurement Table

Tuned Freq MHz	Emission Frequency MHz	Detector	Meter Reading dBu V	Antenna Polarity	Coax Loss Db	Correction Factor dB/M	Field Strength dBu V/M	Margin
2402	4804.00	PK	7.95	V	8.07	34.00	50.02	3.98
2402	12010.00	PK	4.24	H	13.05	39.30	56.59	17.41
2402	12010.00	AV	-10.23	H	13.05	39.30	42.12	11.88

Test Data: Mode 1 Middle of Band Measurement Table

Tuned Freq MHz	Emission Frequency MHz	Detector	Meter Reading dBu V	Antenna Polarity	Coax Loss Db	Correction Factor dB/M	Field Strength dBu V/M	Margin
2440	4880.00	PK	10.32	V	8.13	33.92	52.37	21.63
2440	4880.00	AV	-1.49	V	8.13	33.92	40.56	13.44
2440	7320.00	PK	13.00	H	10.00	35.60	58.60	15.40
2440	7320.00	AV	3.78	H	10.00	35.60	49.38	4.62
2440	12200.00	PK	3.03	H	13.14	39.30	55.47	18.53
2440	12200.00	AV	-9.89	H	13.14	39.30	42.55	11.45

Test Data: Mode 1 High End of Band Measurement Table

Tuned Freq MHz	Emission Frequency MHz	Detector	Meter Reading dBu V	Antenna Polarity	Coax Loss Db	Correction Factor dB/M	Field Strength dBu V/M	Margin
2480	4960.00	PK	9.42	V	8.20	33.96	51.58	22.42
2480	4960.00	AV	0.83	V	8.20	33.96	42.99	11.01
2480	7440.00	PK	17.96	H	10.08	35.60	63.64	10.36
2480	7440.00	AV	7.28	H	10.08	35.60	52.96	1.04
2480	12400.00	PK	2.46	H	13.24	39.20	54.90	19.10
2480	12400.00	AV	-10.06	H	13.24	39.20	42.38	11.62

Test Data: Mode 1 Hopping Measurement Table

	Emission Frequency MHz	Detector	Meter Reading dBu V	Antenna Polarity	Coax Loss Db	Correction Factor dB/M	Field Strength dBu V/M	Margin
Hopping	109.03	PK	13.16	H	1.21	10.30	24.67	18.83
Hopping	177.17	PK	16.37	V	1.51	14.47	32.35	11.15
Hopping	400.40	PK	13.41	V	2.28	15.39	31.08	14.92
Hopping	652.10	PK	15.16	H	2.95	19.43	37.54	8.46
Hopping	868.50	PK	15.15	V	3.38	22.25	40.78	5.22

Results Meet Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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AC POWER LINE CONDUCTED EMISSIONS

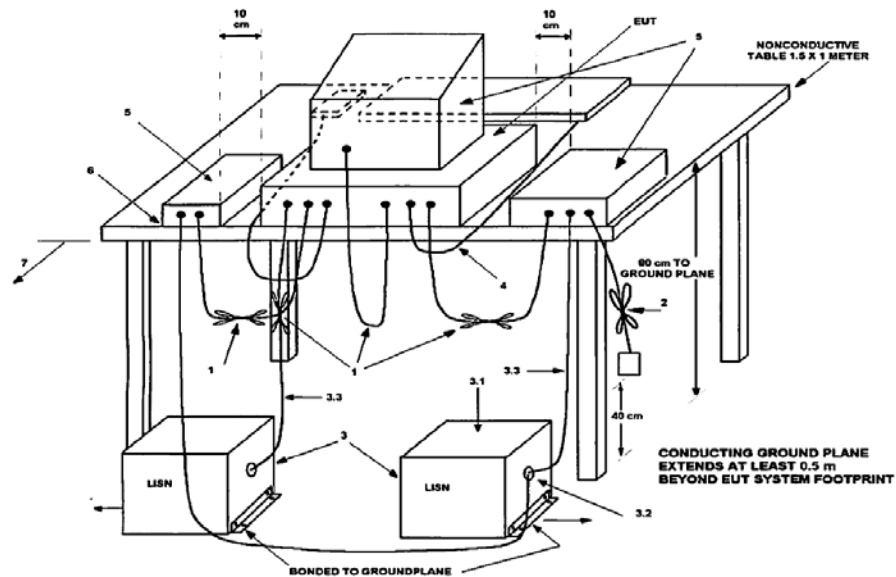
Rules Part No.: FCC 15.207(a)

Requirements:

Frequency (MHz)	Quasi Peak Limits (dB μ V)	Average Limits (dB μ V)
0.15 – 0.5	66 – 56 *	56 – 46 *
0.5 – 5.0	56	46
5.0 – 30	60	50
* Decrease with logarithm of frequency		

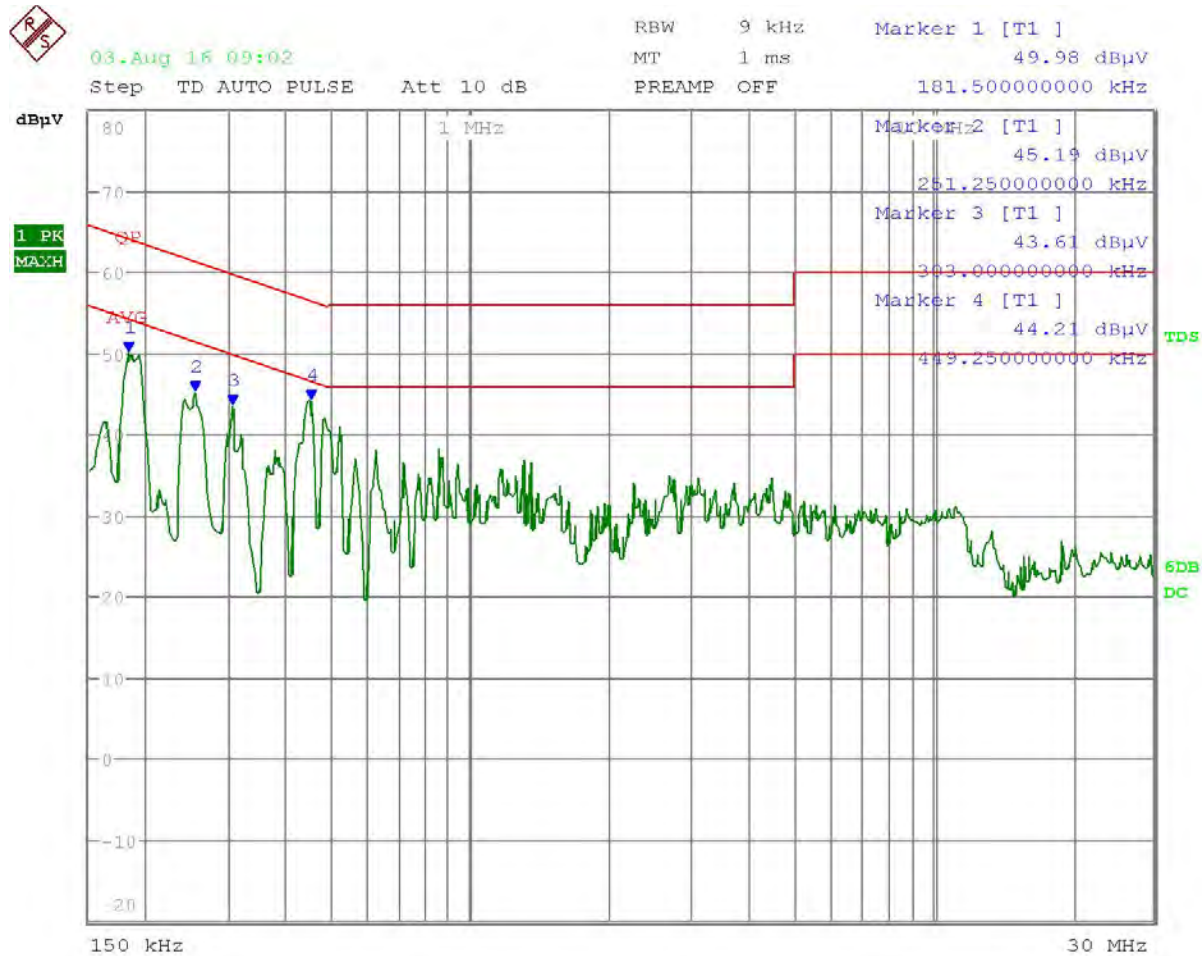
Test Method: ANSI C63.10 § 6.2 Test Method for AC power-line conducted emissions

Setup:



AC POWER LINE CONDUCTED EMISSIONS

Test Data: The following plots represent the emissions read for power line Conducted. Both lines were observed.



Date: 3.AUG.2016 09:02:51

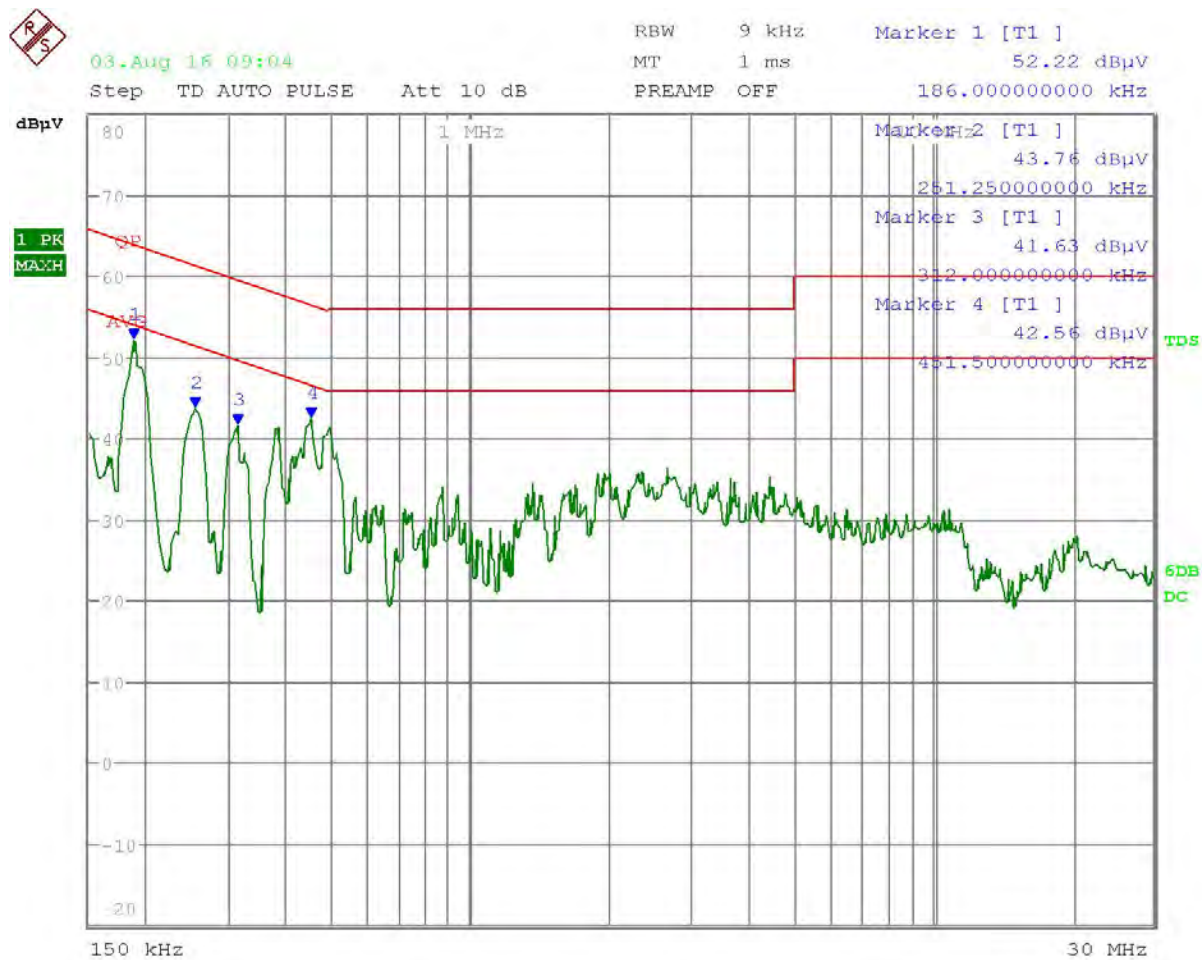
RESULTS: Meets Requirements

Applicant: AUDIO-TECHNICA CORPORATION
 FCC ID: JFZCKS990BT
 IC: 1752B-CKS990BT
 Report: 1375AUT16TestReport_Rev1

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POWER LINE CONDUCTED INTERFERENCE

Test Data:



Date: 3.AUG.2016 09:04:40

RESULTS: Meets Requirements

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EMC EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
Antenna: Biconical 1057	Eaton	94455-1	1057	11/18/15	11/18/17
Antenna: Log-Periodic 1122	Electro-Metrics	LPA-25	1122	07/14/15	07/14/17
3M Chamber	Panashield	NA	NA	04/25/2016	12/31/2017
LISN (Primary)	Electro-Metrics	ANS-25/2	2604	07/13/15	07/13/17
Antenna: Double-Ridged Horn/ETS Horn 2	ETS-Lindgren Chamber	3117	00041534	02/25/15	02/25/17
EMI Test Receiver R & S ESIB 40 Screen Room	Rohde & Schwarz	ESIB 40	100274	08/12/14	08/12/16
Software: Field Strength Program	Timco	N/A	Version 4.0	N/A	N/A
Antenna: Active Loop	ETS-Lindgren	6502	00062529	11/18/15	11/18/17
Attenuator #26 - K 6dB 2W DC-40G	Narda	4768-6	1044-2 (#26)	06/25/15	06/25/17
Coaxial Cable #103 - KMKM-0180-01 Aqua	Micro-Coax	UFB142A-0-0720-200200	225363-002 (#103)	08/05/15	08/05/17
EMI Test Receiver R & S ESU 40 Chamber	Rohde & Schwarz	ESU 40	100320	04/01/16	04/01/18
Coaxial Cable - Chamber 3 cable set (Primary)	Micro-Coax	Chamber 3 cable set (Primary)	KMKM-0244-00; KMKM-0670-00; KFKF-0198-00	12/05/15	12/05/17
Band Reject Filter 2.4GHz	Micro-Tronics	BRM50702-02	G042	04/28/16	04/28/18
Pre-amp	RF-LAMBDA	RLNA00M45GA	NA	01/04/16	01/04/18

*EMI RECEIVER SOFTWARE VERSION

The receiver firmware used was version 4.43 Service Pack 3

END OF TEST REPORT