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FCC PART 15B / RSS-215
ANALOGUE SCANNING RECEIVER
COMBO TEST REPORT

Applicant	YAESU MUSEN CO., LTD.
Address	TENNOZU PARKSIDE BUILDING 2-5-8 HIGASHI-SHINAGAWA, SHINAGAWA-KU, TOKYO JAPAN 140-0002
FCC ID:	K6620515X20
IC	511B-20515X20
Model Number	FT-70DR
Product Description	HH AMATEUR SCANNING RECEIVER
Date Sample Received	11/16/2016
Final Test Date	11/29/2016
Tested By	Tim Royer
Approved By	Cory Leverett
Test Results	☒ PASS ☐ FAIL

Report Number	Version Number	Description	Issue Date
2305AUT16TestReport	Rev1	Initial Issue	12/02/2016

**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: Tim Royer, Project Manager/Testing Engineer

Date: 11/29/2016



Reviewed and approved by:

Name and Title: Cory Leverett, Project Manager

Date: 12/02/2016

Applicant: YAESU MUSEN CO., LTD.
FCC ID: K6620515X20
IC: 511B-20515X20
Report: 2305AUT16TestReport_Rev1

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EUT SPECIFICATION

This test results relates only to the items tested.	
EUT DESCRIPTION	HH AMATEUR SCANNING RECEIVER
REQUIREMENTS	CFR 47 FCC Part 15B, RSS-215 Issue 2, RSS-Gen Issue 4
MODEL NUMBER	FT-70DR
TEST STANDARDS	ANSI C63.4 – 2014, FCC Part 15A, RSS-Gen Issue 4
TEST FREQUENCIES	136, 174 & 480 MHz
EUT POWER SOURCE	☐ 100–240Vac/50– 60Hz
	☐ DC Power
	☒ Battery Operated
TEST ITEM	☐ Prototype
	☐ Pre-Production
	☒ Production
TYPE OF EQUIPMENT	☐ Fixed
	☐ Mobile
	☒ Portable
MODIFICATIONS TO EUT:	☒ No ☐ Yes (explanation below)
TEST MODE DESCRIPTION	Receive only, Tuned to three places in band and scanning.
TEST FACILITIES	Timco Engineering Inc. located at 849 NW State Road 45 Newberry, FL 32669 USA.
LABORATORY TEST CONDITION	Temperature: 24-26°C Relative humidity: 50-65% Barometric Pressure:30.01"

PERIPHERALS USED FOR TESTING

Description	Model	Connector	Cable Type	Length
Power supply	MU12AR105100-A1	DC	2 Wire	1.5m

TEST RESULTS SUMMARY

Test Item	FCC Rule Part	RSS Specification	Result
Radiated Spurious Emissions	15.109	215 sec 5.1, GEN sec 7.1	Pass
Powerline Conducted Emissions	15.107	215, sec 5.1, GEN sec 8.8	Pass

RADIATED SPURIOUS EMISSIONS

Rule Part No.: FCC Part 15 Subpart B, RSS-215 sec 5.1

Requirements: FCC Part 15.109(a), RSS GEN 7.1.2 Radiated Emission Limit

Class B Field Strength Limits @ 3 Meters			
Frequency (MHz)	Quasi-peak (dBuV / m)	Average (dBuV / m)	Peak (dBuV / m)
30 – 88	40.0	-	-
80 – 216	43.5	-	-
216 – 960	46.0	-	-
960 - 1000	54.0	-	-
> 1000	54.0	54	74

FCC Part 15.109(f) Radiated Emission Limit

For a receiver which employs terminals for the connection of an external receiving antenna, the receiver shall be tested to demonstrate compliance with the provisions of this section with an antenna connected to the antenna terminals unless the antenna conducted power is measured as specified in §15.111(a).

Procedure: FCC Part 15.33(b)(3) Frequency range of radiated measurements

FCC Part 15.35(a) Measurement detector functions and bandwidths

ANSI C63.4 Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment 9 kHz to 40 GHz

§ 6.2 Operating conditions

§ 6.3 Arrangement of EUT

§ 8.3.1 Exploratory radiated emissions measurements

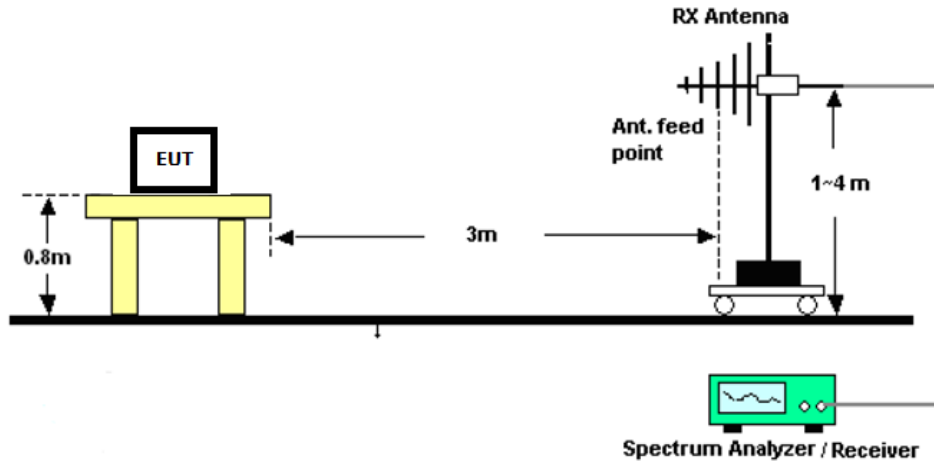
§ 8.3.2 Final radiated emission measurements

Configuration: The scanner receiver spurious emissions are to be measured when the receiver is in the scanning mode and repeated when the scanning is stopped.

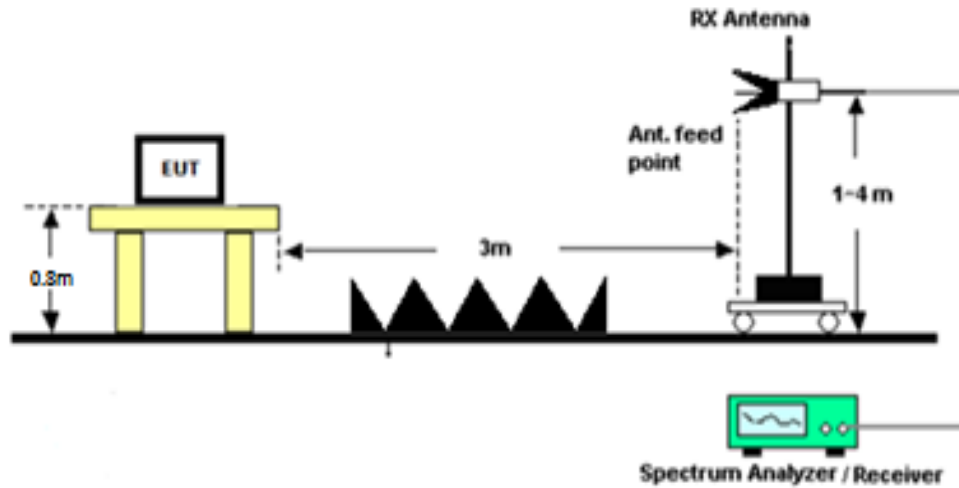
RADIATED SPURIOUS EMISSIONS

Setup:

Emissions 30 – 1000 MHz



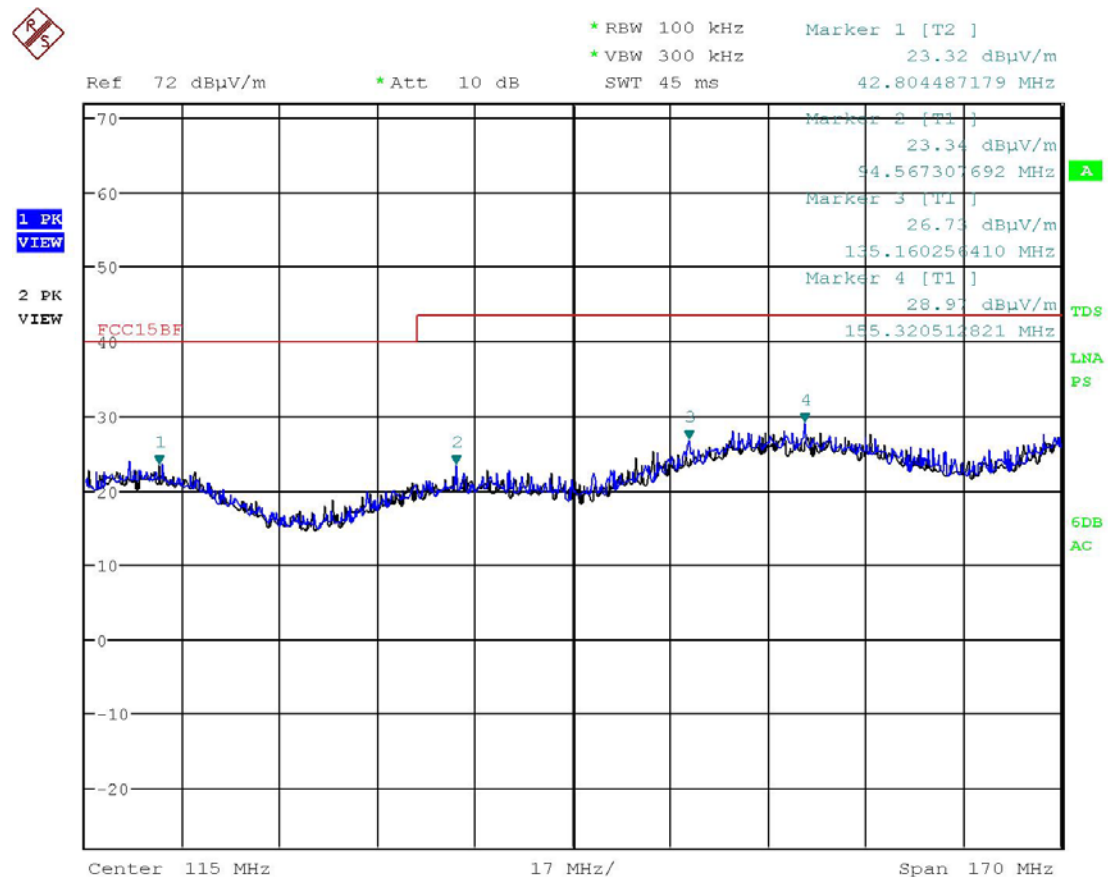
Emissions above 1 GHz



RADIATED SPURIOUS EMISSIONS

Test Data: Tuned to 136 MHz, 30 – 200 MHz Peak Plot

3 Meter Field Strength Plot



Date: 29.NOV.2016 17:39:09

Ant Polarity: T1 (Blue) = Vertical, T2 (Black) = Horizontal

Results Meets Requirements

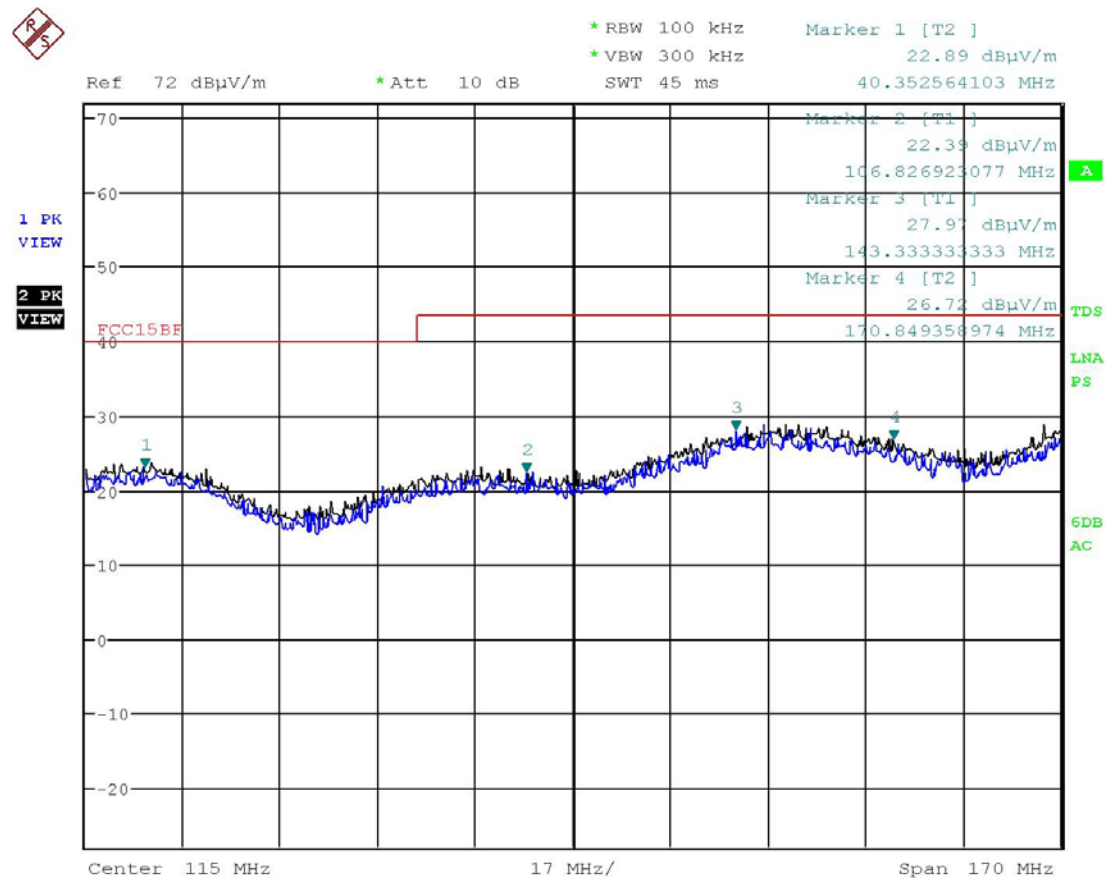
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RADIATED SPURIOUS EMISSIONS

Test Data: Tuned to 174 MHz, 30 – 200 MHz Peak Plot

3 Meter Field Strength Plot



Date: 29.NOV.2016 17:37:07

Ant Polarity: T1 (Blue) = Vertical, T2 (Black) = Horizontal

Results Meets Requirements

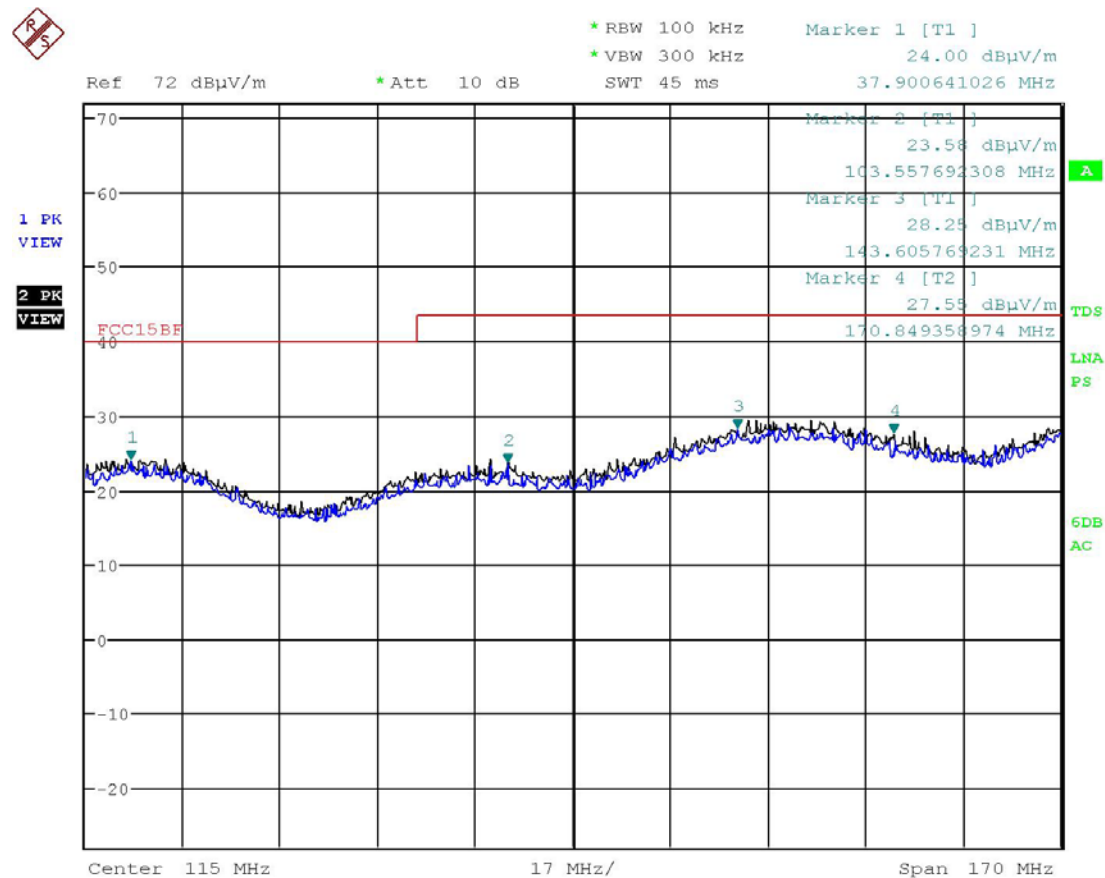
Applicant: YAESU MUSEN CO., LTD.
 FCC ID: K6620515X20
 IC: 511B-20515X20
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RADIATED SPURIOUS EMISSIONS

Test Data: Tuned to 480 MHz, 30 – 200 MHz Peak Plot

3 Meter Field Strength Plot



Date: 29.NOV.2016 17:34:00

Ant Polarity: T1 (Blue) = Vertical, T2 (Black) = Horizontal

Results Meets Requirements

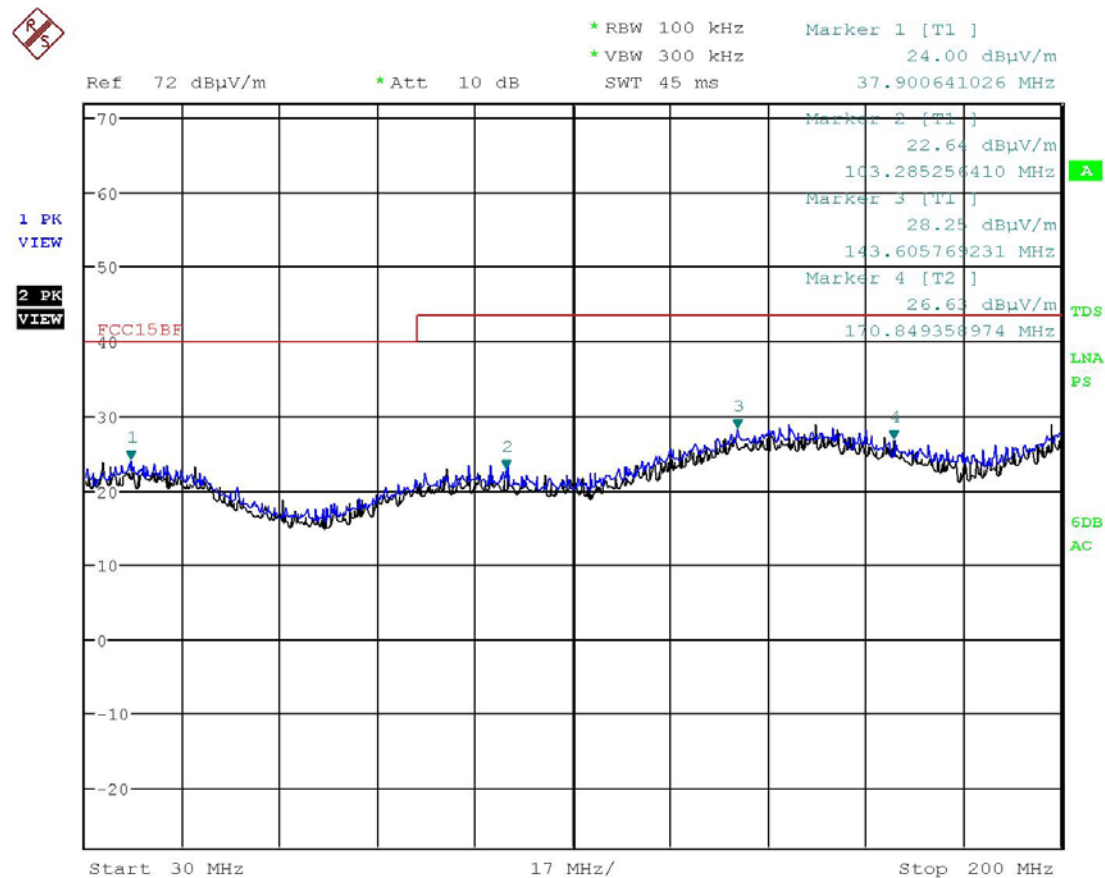
Applicant: YAESU MUSEN CO., LTD.
 FCC ID: K6620515X20
 IC: 511B-20515X20
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RADIATED SPURIOUS EMISSIONS

Test Data: Scanning all bands, 30 – 200 MHz Peak Plot

3 Meter Field Strength Plot



Date: 29.NOV.2016 17:29:09

Ant Polarity: T1 (Blue) = Vertical, T2 (Black) = Horizontal

Results Meets Requirements

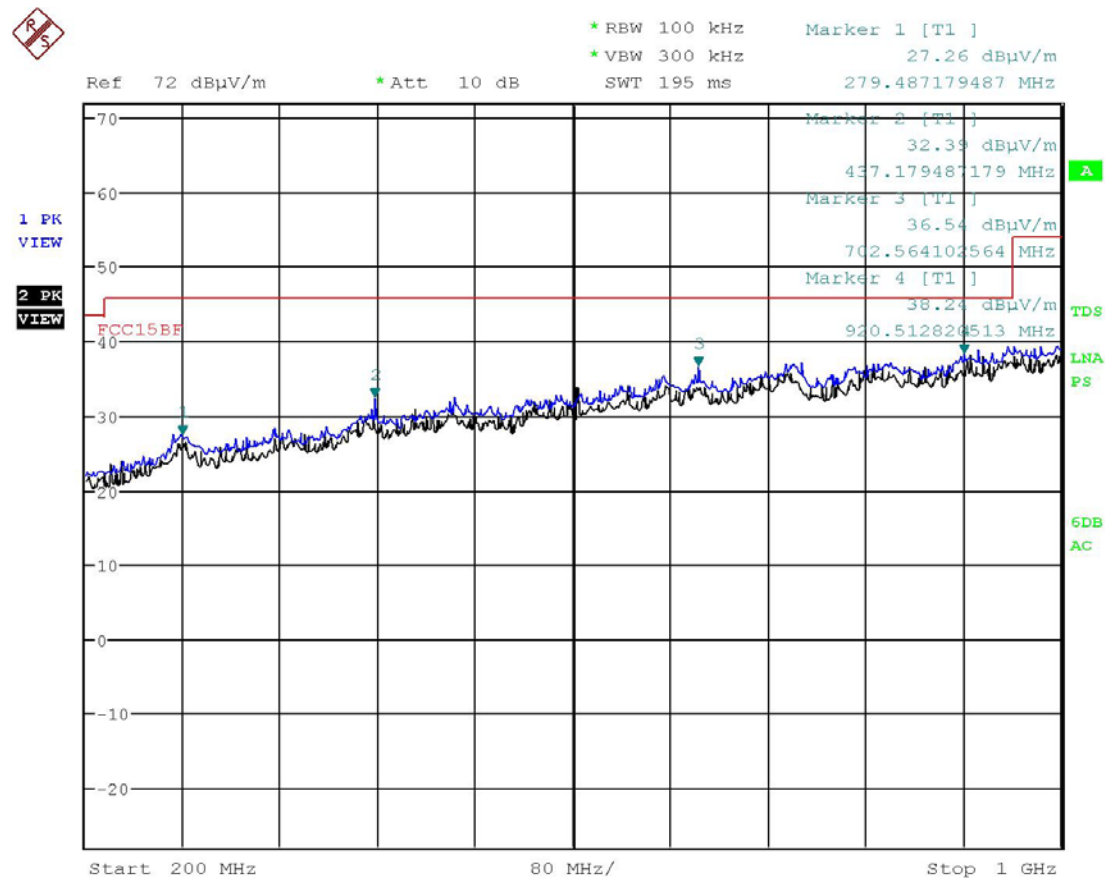
Applicant: YAESU MUSEN CO., LTD.
 FCC ID: K6620515X20
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RADIATED SPURIOUS EMISSIONS

Test Data: Tuned to 136 MHz, 200 - 1000 MHz Peak Plot

3 Meter Field Strength Plot



Date: 29.NOV.2016 16:59:14

Ant Polarity: T1 (Blue) = Vertical, T2 (Black) = Horizontal

Results Meets Requirements

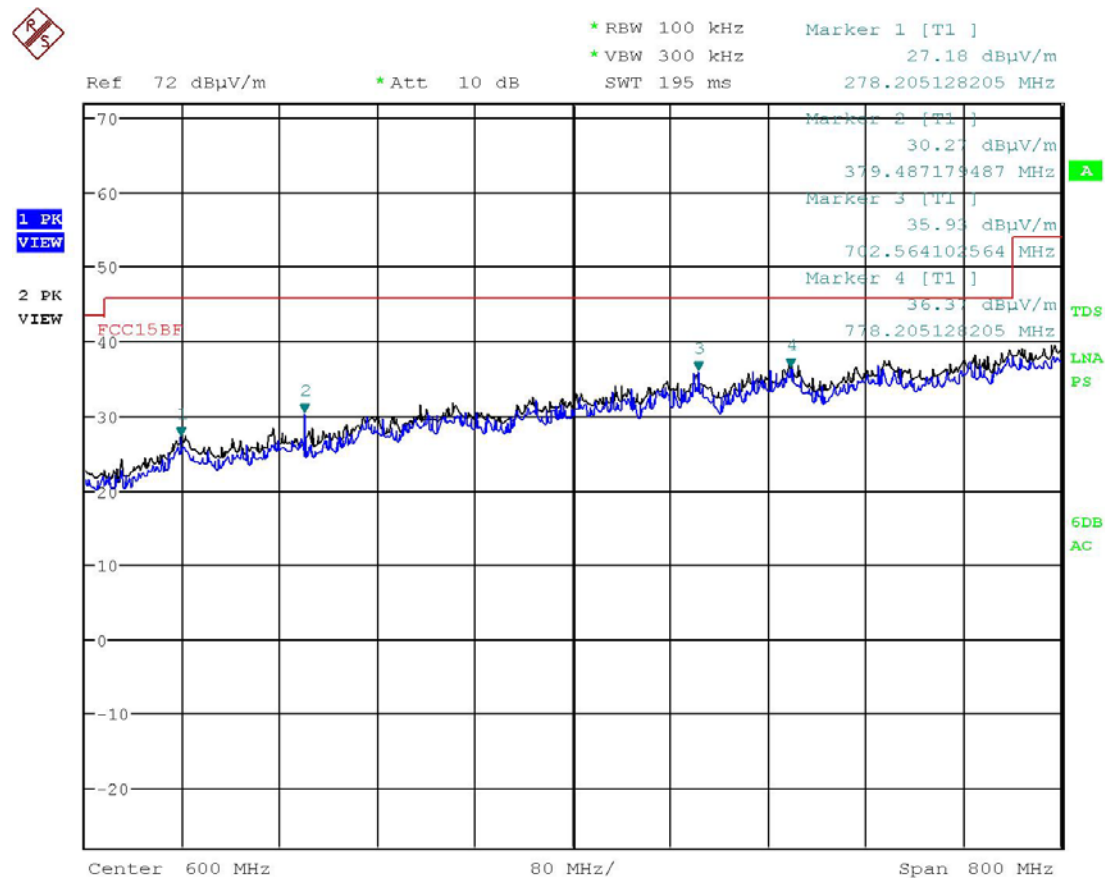
Applicant: YAESU MUSEN CO., LTD.
 FCC ID: K6620515X20
 IC: 511B-20515X20
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RADIATED SPURIOUS EMISSIONS

Test Data: Tuned to 174 MHz, 200 - 1000 MHz Peak Plot

3 Meter Field Strength Plot



Date: 29.NOV.2016 17:05:32

Ant Polarity: T1 (Blue) = Vertical, T2 (Black) = Horizontal

Results Meets Requirements

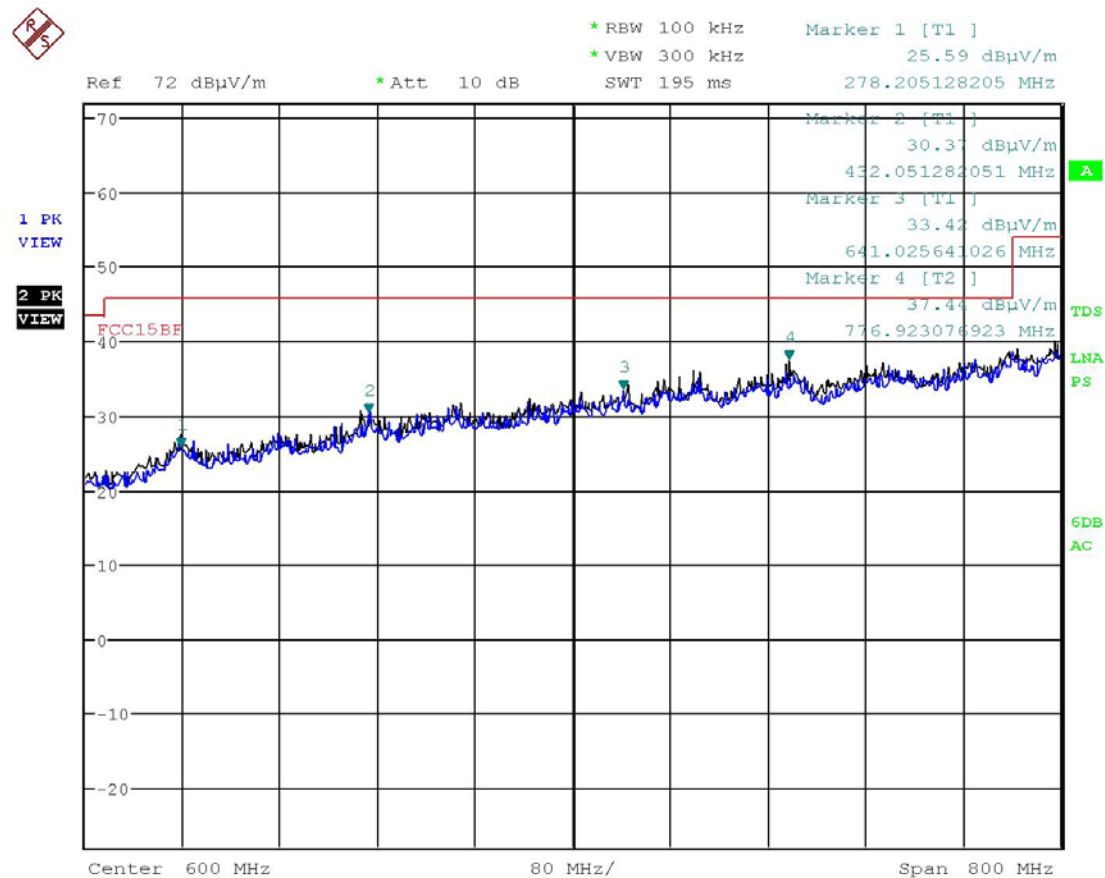
Applicant: YAESU MUSEN CO., LTD.
 FCC ID: K6620515X20
 IC: 511B-20515X20
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RADIATED SPURIOUS EMISSIONS

Test Data: Tuned to 480 MHz, 200 - 1000 MHz Peak Plot

3 Meter Field Strength Plot



Date: 29.NOV.2016 17:12:04

Ant Polarity: T1 (Blue) = Vertical, T2 (Black) = Horizontal

Results Meets Requirements

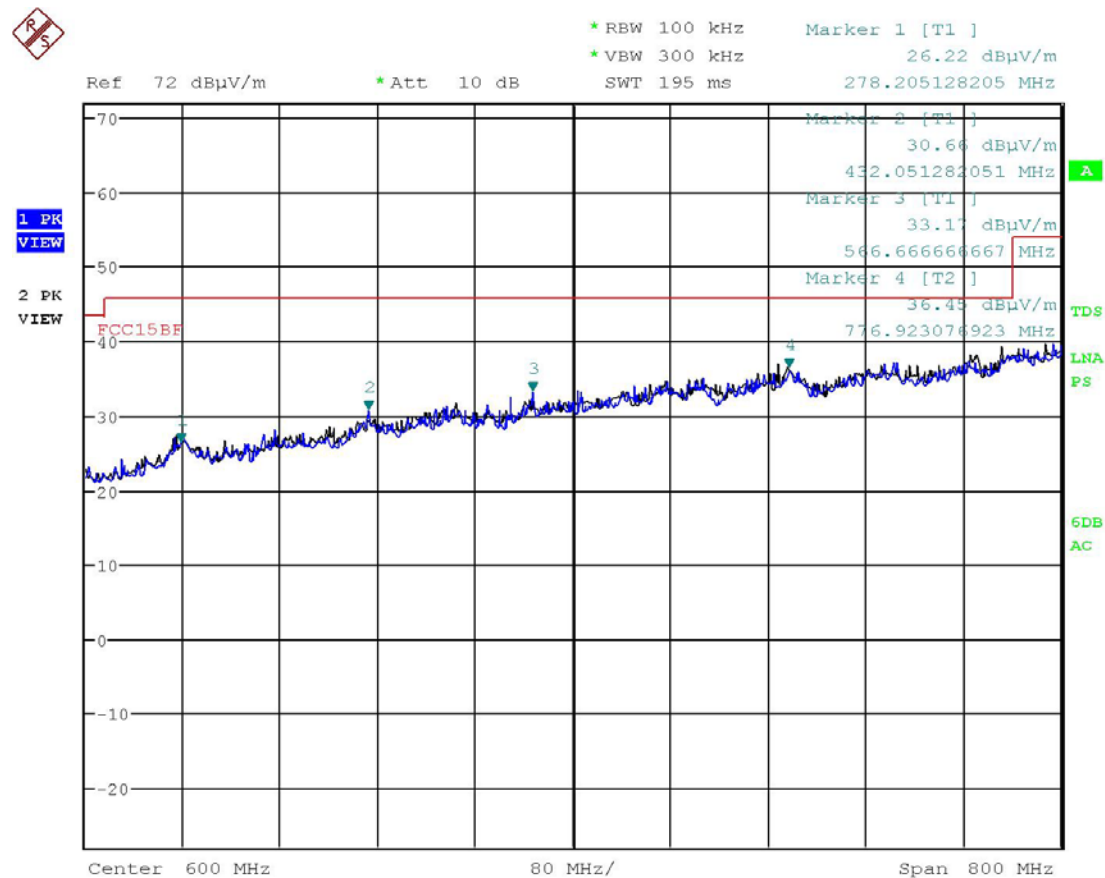
Applicant: YAESU MUSEN CO., LTD.
 FCC ID: K6620515X20
 IC: 511B-20515X20
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RADIATED SPURIOUS EMISSIONS

Test Data: Scanning all bands, 200 - 1000 MHz Peak Plot

3 Meter Field Strength Plot



Date: 29.NOV.2016 17:25:25

Ant Polarity: T1 (Blue) = Vertical, T2 (Black) = Horizontal

Results Meets Requirements

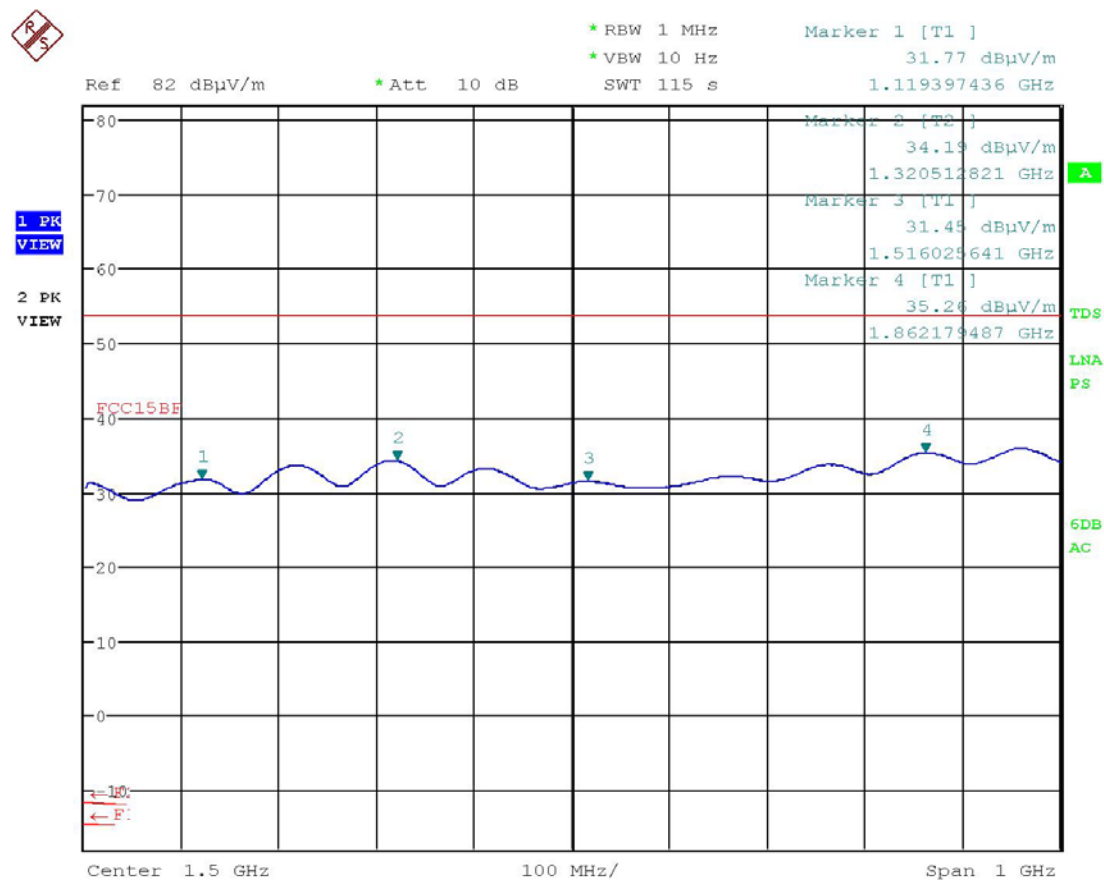
Applicant: YAESU MUSEN CO., LTD.
 FCC ID: K6620515X20
 IC: 511B-20515X20
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RADIATED SPURIOUS EMISSIONS

Test Data: Tuned to 136 MHz, 1000 - 2000 MHz Average Plot

3 Meter Field Strength Plot



Ant Polarity: T1 (Blue) = Vertical, T2 (Black) = Horizontal

Results Meets Requirements

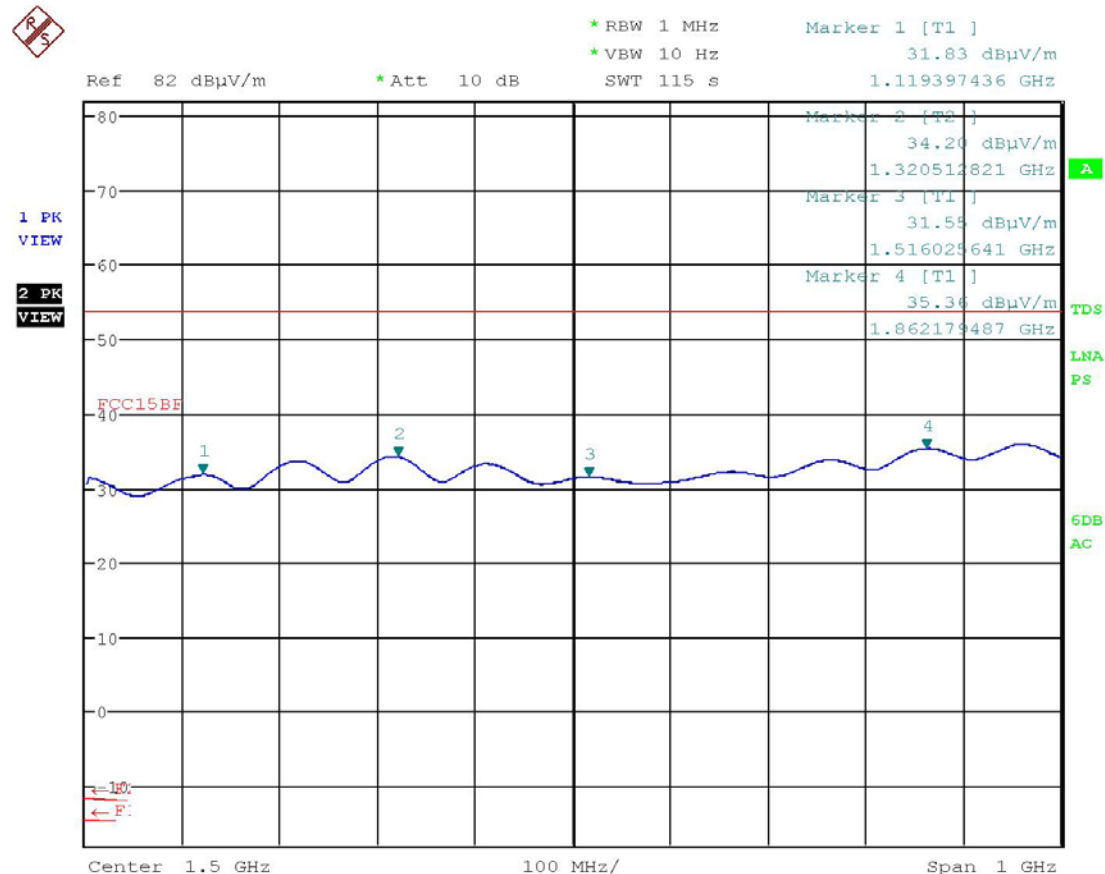
Applicant: YAESU MUSEN CO., LTD.
 FCC ID: K6620515X20
 IC: 511B-20515X20
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RADIATED SPURIOUS EMISSIONS

Test Data: Tuned to 174 MHz, 1000 - 2000 MHz Average Plot

3 Meter Field Strength Plot



Date: 29.NOV.2016 15:50:37

Ant Polarity: T1 (Blue) = Vertical, T2 (Black) = Horizontal

Results Meets Requirements

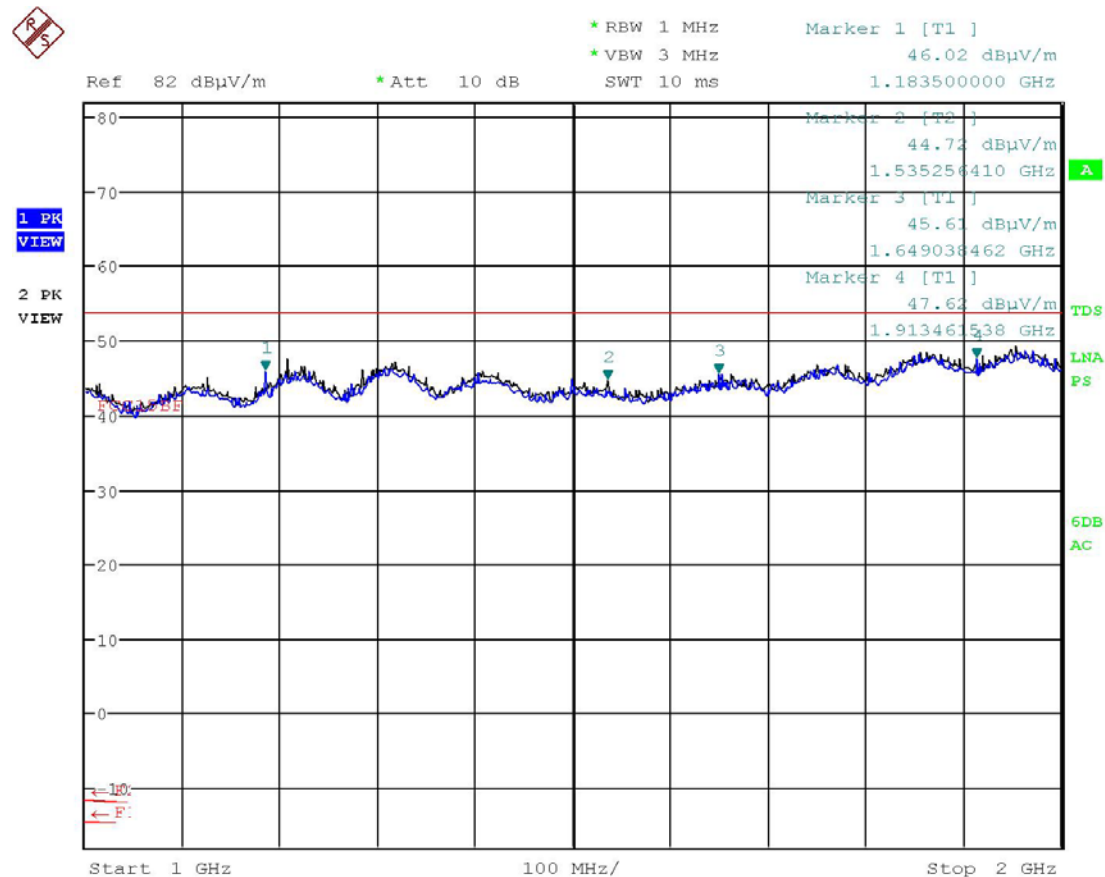
Applicant: YAESU MUSEN CO., LTD.
 FCC ID: K6620515X20
 IC: 511B-20515X20
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RADIATED SPURIOUS EMISSIONS

Test Data: Tuned to 480 MHz, 1000 - 2000 MHz Average Plot

3 Meter Field Strength Plot



Date: 29.NOV.2016 15:34:24

Ant Polarity: T1 (Blue) = Vertical, T2 (Black) = Horizontal

Results Meets Requirements

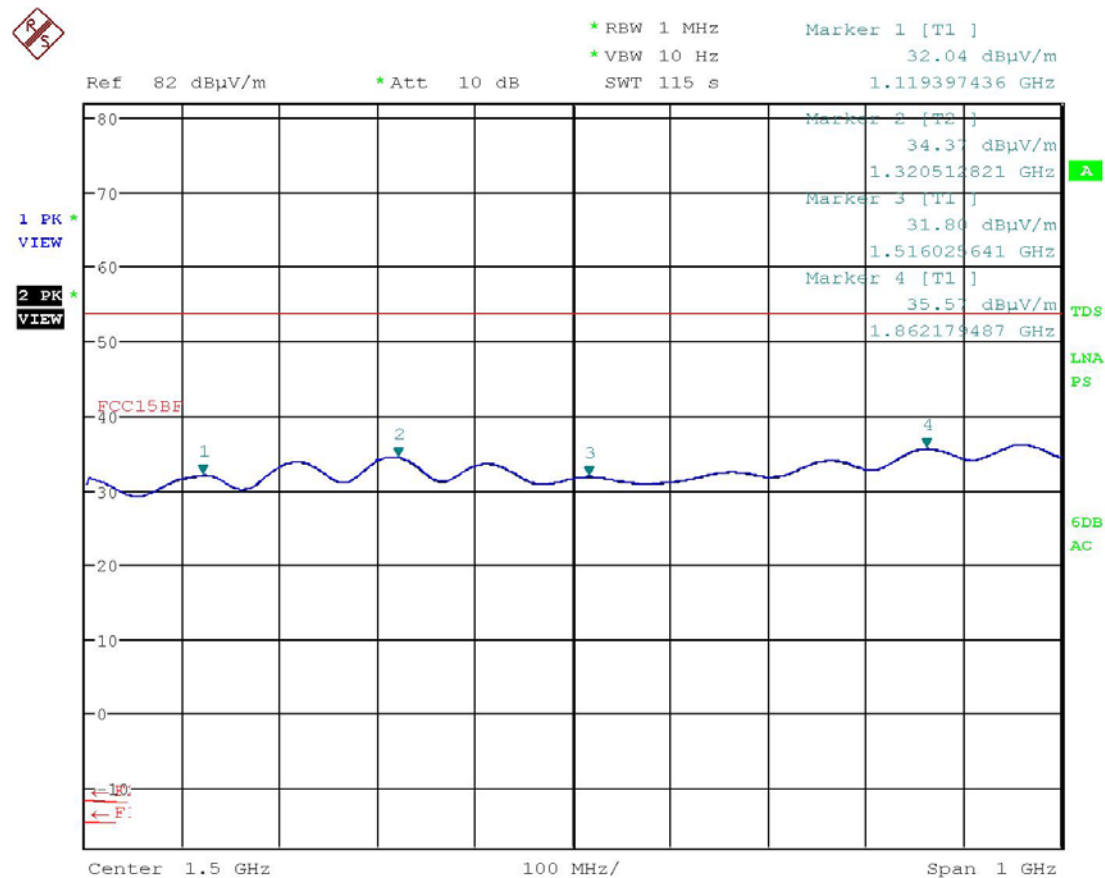
Applicant: YAESU MUSEN CO., LTD.
 FCC ID: K6620515X20
 IC: 511B-20515X20
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RADIATED SPURIOUS EMISSIONS

Test Data: Scanning all bands, 1000 - 2000 MHz Average Plot

3 Meter Field Strength Plot



Date: 29.NOV.2016 15:38:59

Ant Polarity: T1 (Blue) = Vertical, T2 (Black) = Horizontal

Results Meets Requirements

Applicant: YAESU MUSEN CO., LTD.
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POWER LINE CONDUCTED INTERFERENCE

Rules Part No.: Part 15.107, RSS-GEN sec 8.8

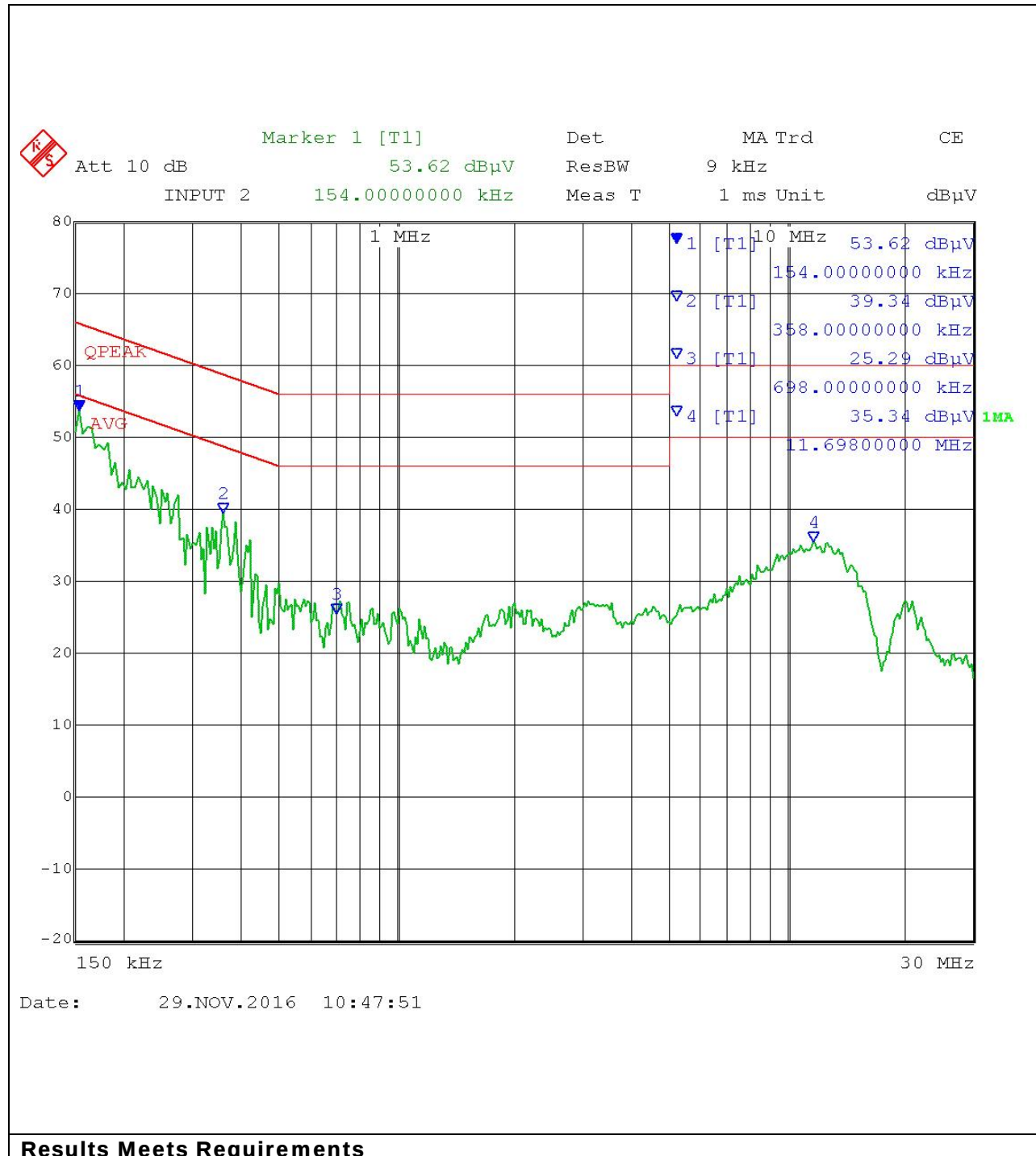
Requirements:

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 Data: The following plots represent the emissions for power line conducted. Both lines were observed. 120 Volts AC 60 Hz supply voltage was used for all tests

POWER LINE CONDUCTED INTERFERENCE

Test Data: Tuned to 136 MHz, Line 1 Peak Plot

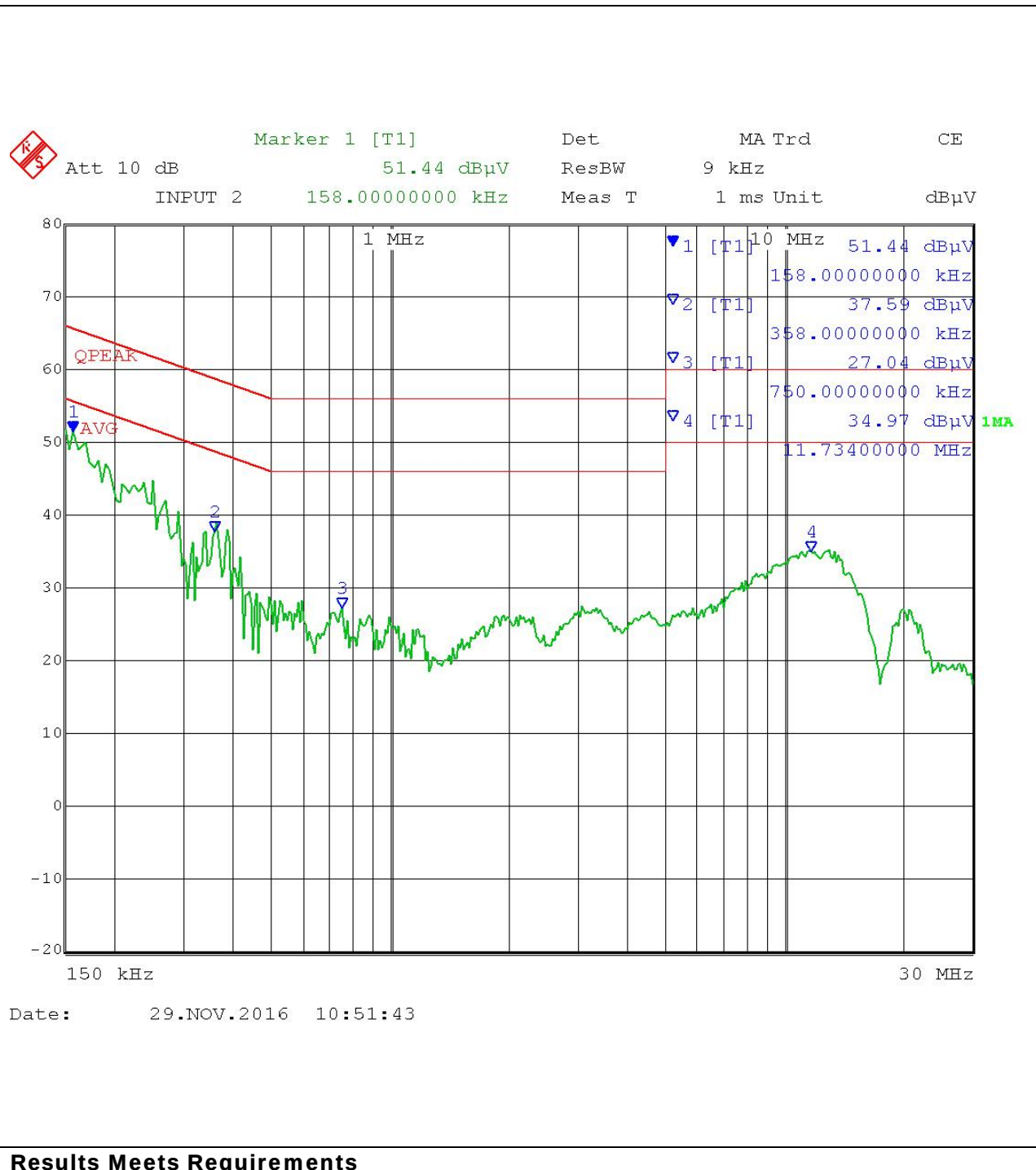


Applicant: YAESU MUSEN CO., LTD.
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POWER LINE CONDUCTED INTERFERENCE

Test Data: Tuned to 174 MHz, Line 1 Peak Plot

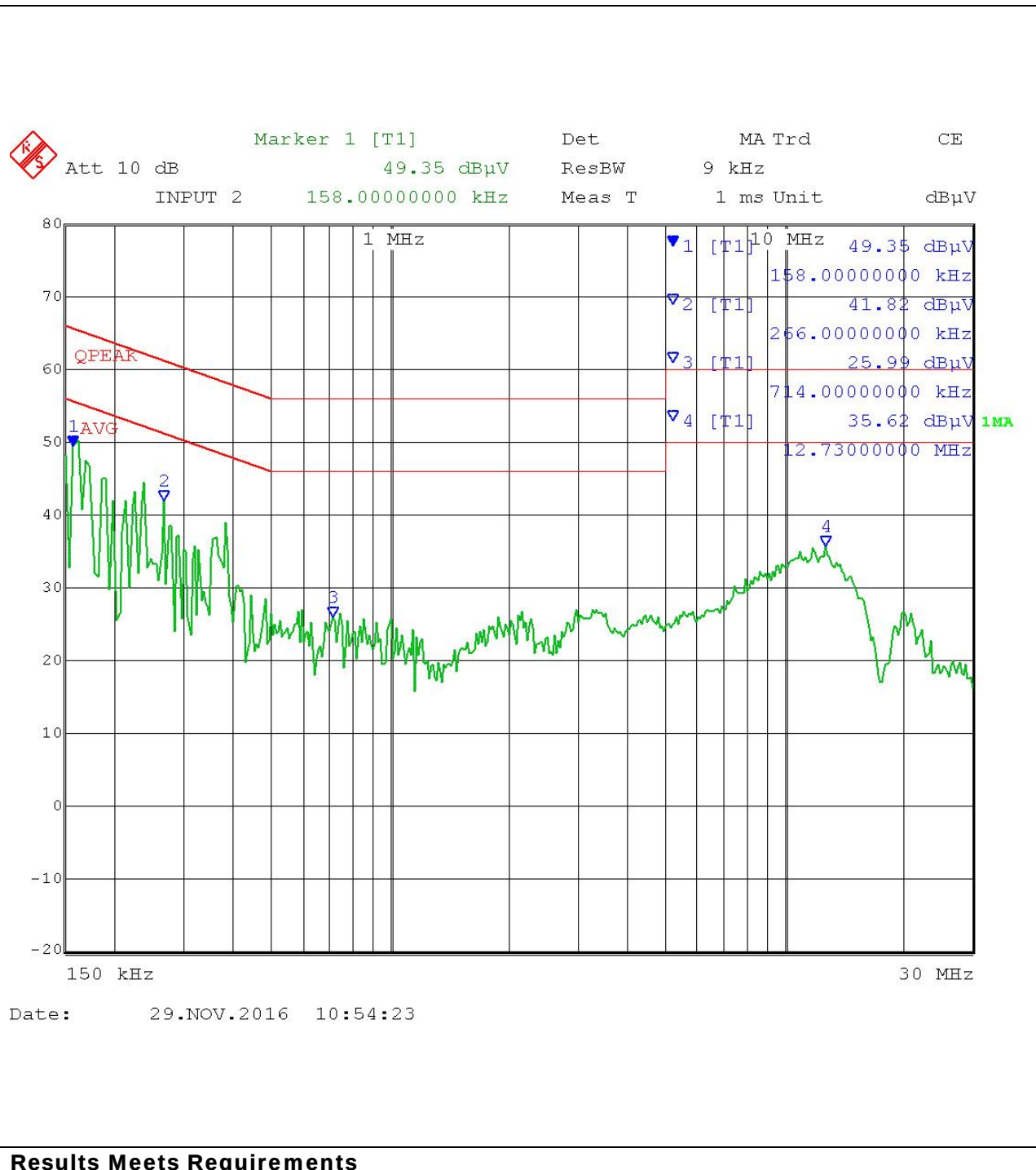


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POWER LINE CONDUCTED INTERFERENCE

Test Data: Tuned to 480 MHz, Line 1 Peak Plot

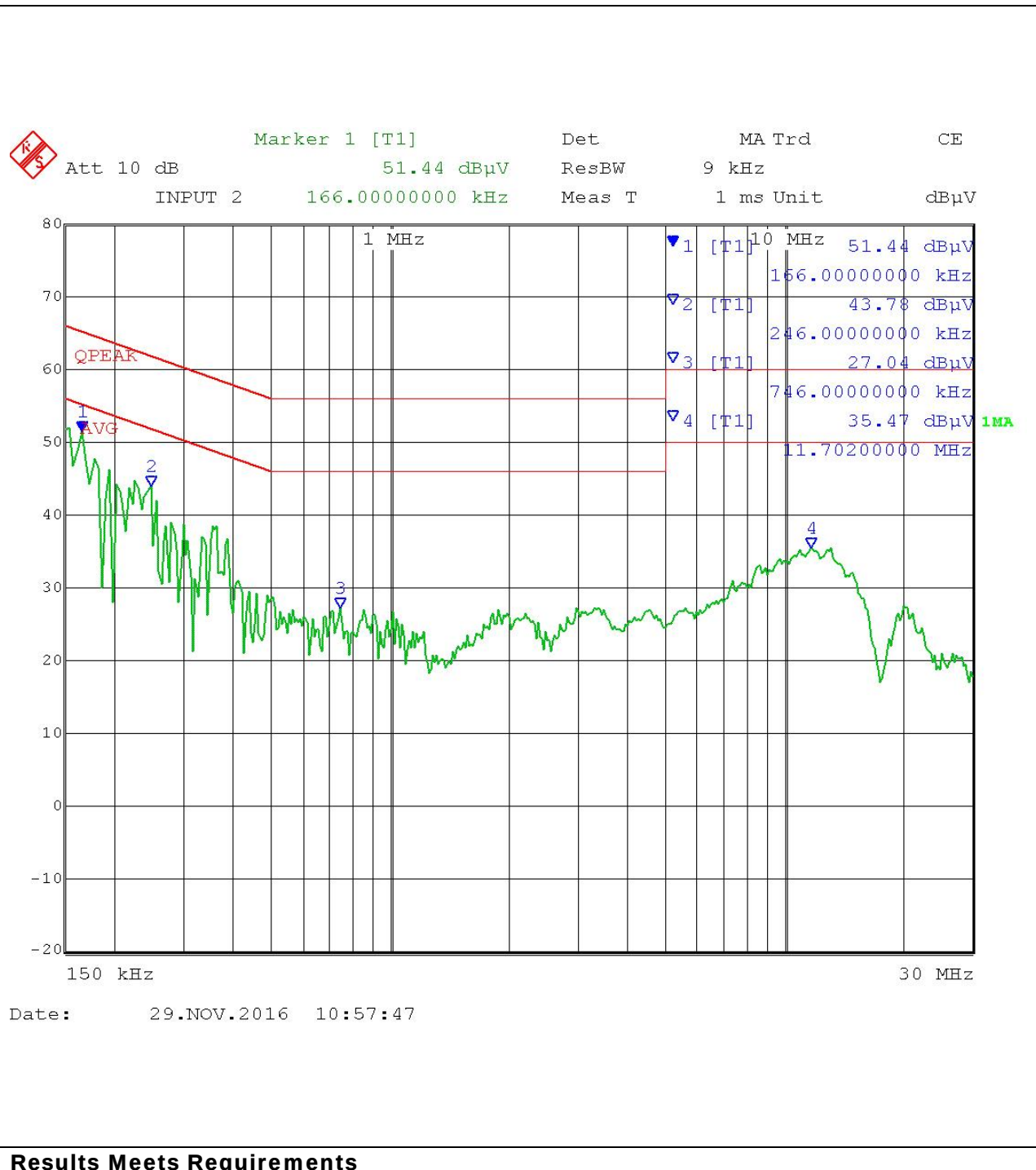


Applicant: YAESU MUSEN CO., LTD.
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POWER LINE CONDUCTED INTERFERENCE

Test Data: Scanning all bands, Line 1 Peak Plot

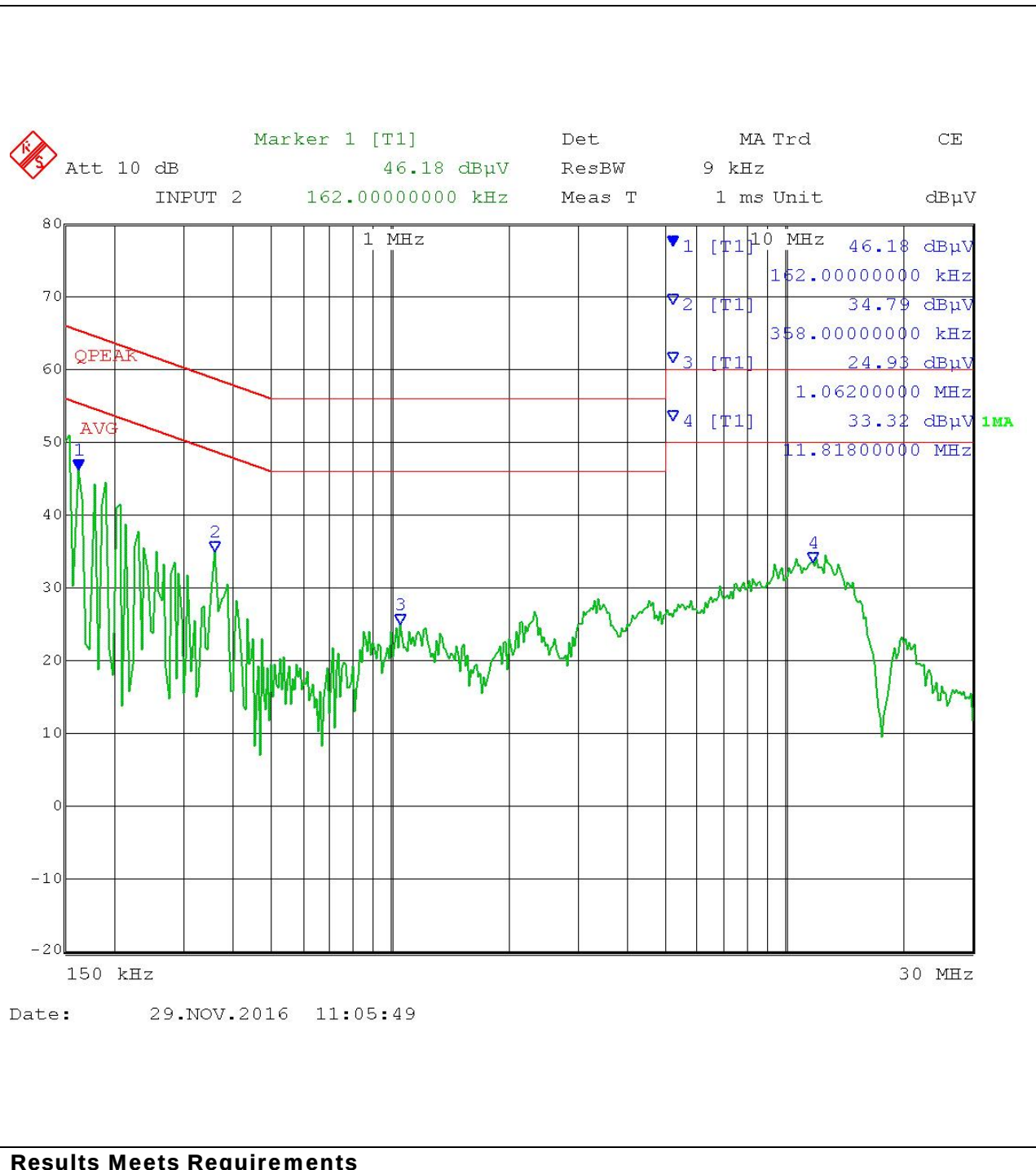


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POWER LINE CONDUCTED INTERFERENCE

Test Data: Tuned to 136 MHz, Line 2 Peak Plot

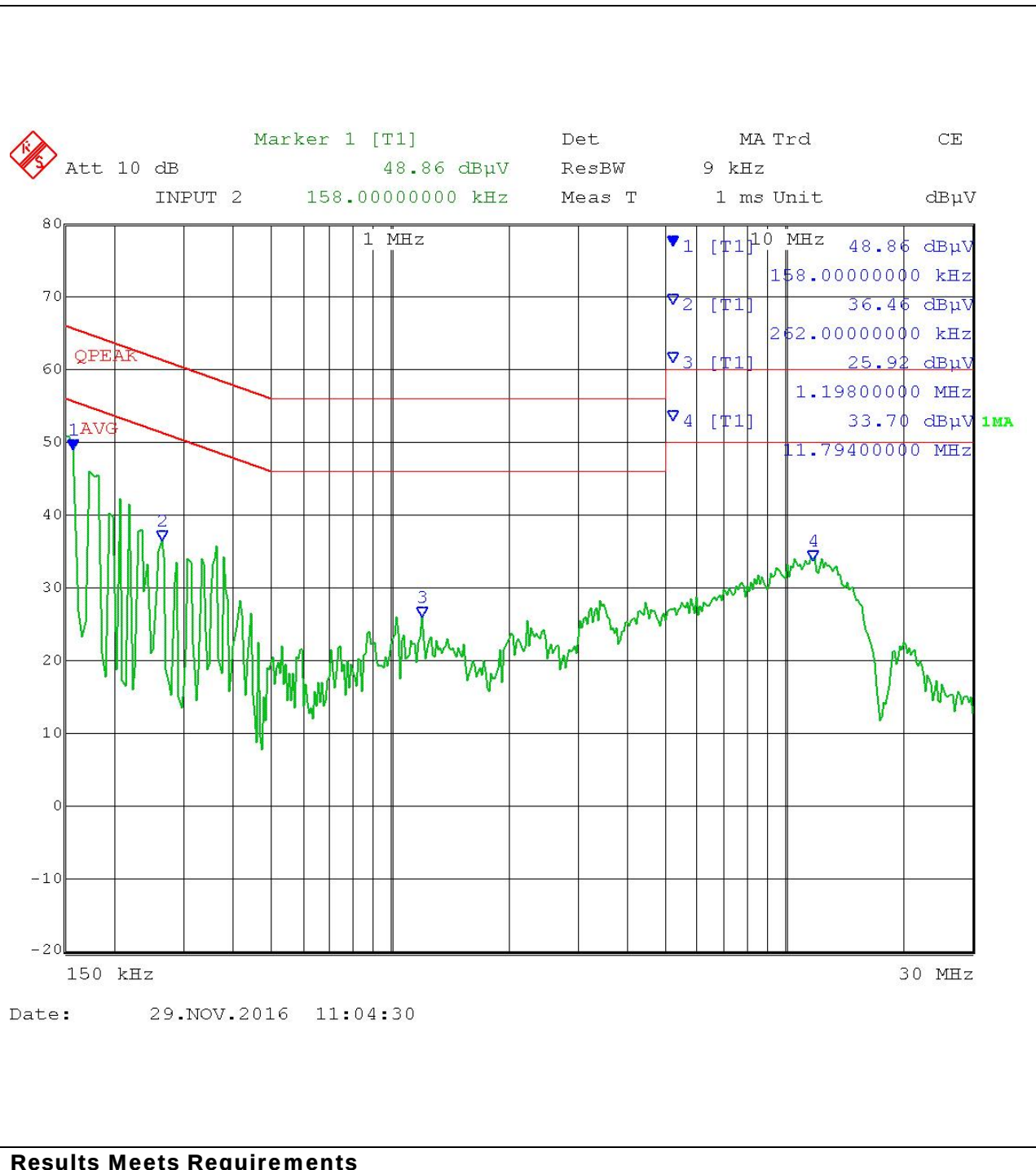


Applicant: YAESU MUSEN CO., LTD.
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POWER LINE CONDUCTED INTERFERENCE

Test Data: Tuned to 174 MHz, Line 2 Peak Plot

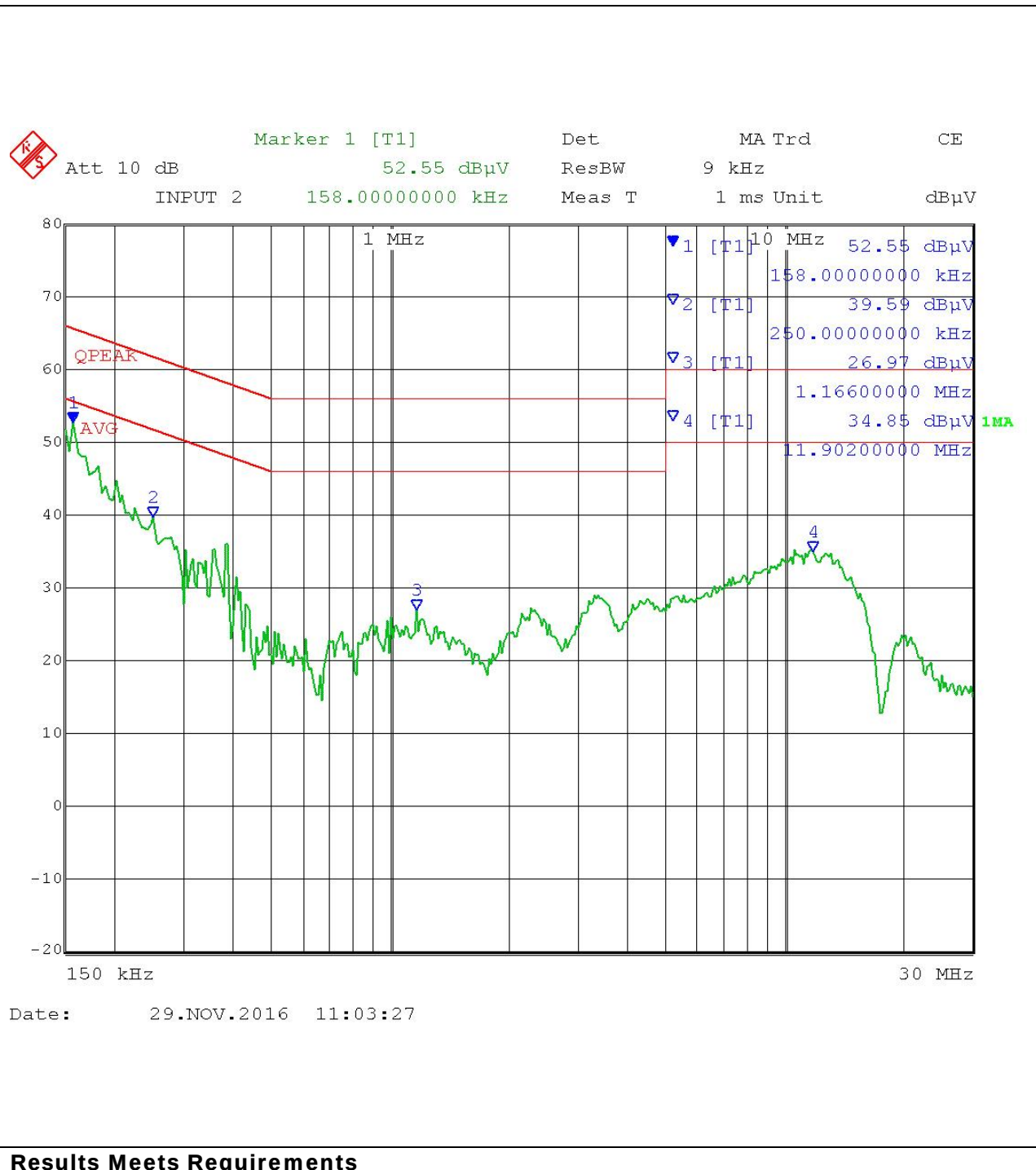


Applicant: YAESU MUSEN CO., LTD.
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POWER LINE CONDUCTED INTERFERENCE

Test Data: Tuned to 480 MHz, Line 2 Peak Plot

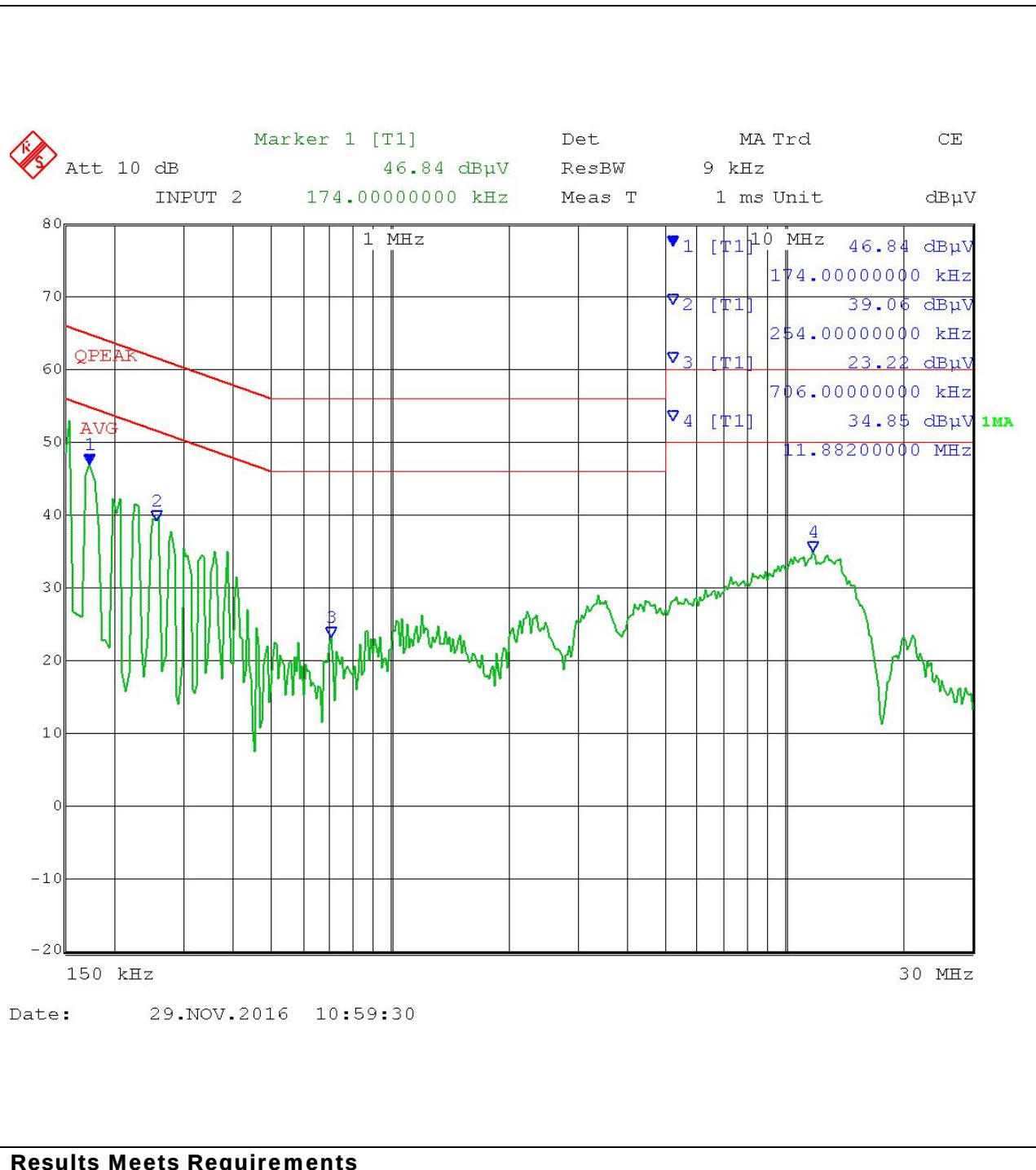


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POWER LINE CONDUCTED INTERFERENCE

Test Data: Scanning all bands, Line 2 Peak Plot



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TEST EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
Antenna: Biconical 1096 Chamber	Eaton	94455-1	1096	07/14/15	07/14/17
Antenna: Log- Periodic 1122	Electro-Metrics	LPA-25	1122	07/14/15	07/14/17
LISN (Primary) CHAMBER	Electro-Metrics Panashield	ANS-25/2 3M	2604 N/A	07/13/15 04/25/16	07/13/17 12/31/17
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	08/16/16	08/16/18
Software: Field Strength Program	Timco	N/A	Version 4.0	N/A	N/A
EMI Test Receiver R & S ESU 40 Chamber	Rohde & Schwarz	ESU 40	100320	04/01/16	04/01/18
Coaxial Cable - BMBM-1000-00 Silver	Semflex	LISN Cable	BMBM-1000-00	01/05/16	01/04/17
Coaxial Cable - Chamber 3 cable set (Primary)	Micro-Coax	Chamber 3 cable set (Primary)	KMKM-0244-01; KMKM-0670-00; KFKF-0198-01	08/08/16	08/08/18
Bore-sight Antenna Positioning Tower	Sunol Sciences	TLT2	N/A	N/A	N/A
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

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