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FCC PART 15B

ANALOGUE SCANNING RECEIVER

TEST REPORT

Applicant	**YAESU MUSEN CO., LTD.**
Address	**TENNOZU PARKSIDE BUILDING 2-5-8 HIGASHI-SHINAGAWA, SHINAGAWA-KU, TOKYO 140-0002 JAPAN**
FCC ID:	**K6620523X51**
Model Number	**FTM-3100R**
Product Description	ANALOGUE SCANNING RECEIVER
Date Sample Received	2/11/2016
Final Test Date	3/01/2016
Tested By	Cory Leverett
Approved By	Tim Royer
Test Results	☒ PASS ☐ FAIL

Report Number	Version Number	Description	Issue Date
288AUT16TestReport	Rev1	Initial Issue	3/1/2016

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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
☐ 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: 2005 requirements.

I attest that the necessary measurements were made at:

Timco Engineering Inc.
849 NW State Road 45
Newberry, FL 32669

Authorized Signatory Name:

Cory Leverett
Project Manager

Date: 03/01/2016

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GENERAL INFORMATION

The test results relate only to the items tested.	
EUT Description	**ANALOGUE SCANNING RECEIVER**
FCC ID	**K6620523X51**
Model Number	**FTM-3100R**
Range	136 -174 MHz
Receiver Circuit Type	Double conversion superheterodyne
Lowest Internal Frequency	450 KHz IF signal
Antenna Connector	50 Ω VHF Female
EUT Power Source	☐ 110–120Vac/50– 60Hz
	☒ 12.6 VDC Nominal
	☐ Battery Operated Exclusively
Test Item	☐ Prototype
	☒ Pre-Production
	☐ Production
Modifications required for Testing	None

REPORT SUMMARY

Regulatory Standard	CFR Title 47 FCC Rule part 15B § 15.109, 15.111, & 15.121
Test Procedures	FCC Part 15.31, 15.33, 15.35 ANSI C63.4 – 2014
Operational Modes	Stopped at the Lowest, middle, and highest frequency of tuning range. In addition scanning all frequencies of tuning range
Test Frequencies	Low: 136.0 MHz
	Middle: 154.0 MHz
	High: 174.0 MHz
	Scan: 136.0 – 174.0 MHz
Setup	For radiated test the ant terminal was connected to 50Ω non radiating load through a 50 Ω coaxial cable
	For conducted test the ant terminal was connected to a EMI receiver through 50 Ω coaxial cable
Environmental Condition in the laboratory	Temperature: 24-26ºC Relative humidity: 50-65% Barometric Pressure:
Deviation from the standard/ procedure	No deviation

RESULTS SUMMARY

Requirement	Test Result	Limit	Pass/ Fail
15.109 Radiated Emissions	27.18 dBuV/m @ 147.41MHz	43.5 dBuV/m	Pass
15.111 Receiver Conducted Power	-72.29 dBm @ 843.99 MHz	-57 dBm	Pass
15.121 38 dB Rejection	NA(1)	38 dB	Pass

Notes:

1) Manufacturer provided attestation letter, no test required.

RADIATED SPURIOUS EMISSIONS

Rule Part No.: FCC Part 15 Subpart B

Requirements: FCC Part 15.109(a) Radiated Emission Limit

Class B Field Strength Limits @ 3 Meters	
Frequency (MHz)	**Level (dBuV/m)**
30 – 88	40.0
80 – 216	43.5
216 – 960	46.0
Above 960	54.0

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

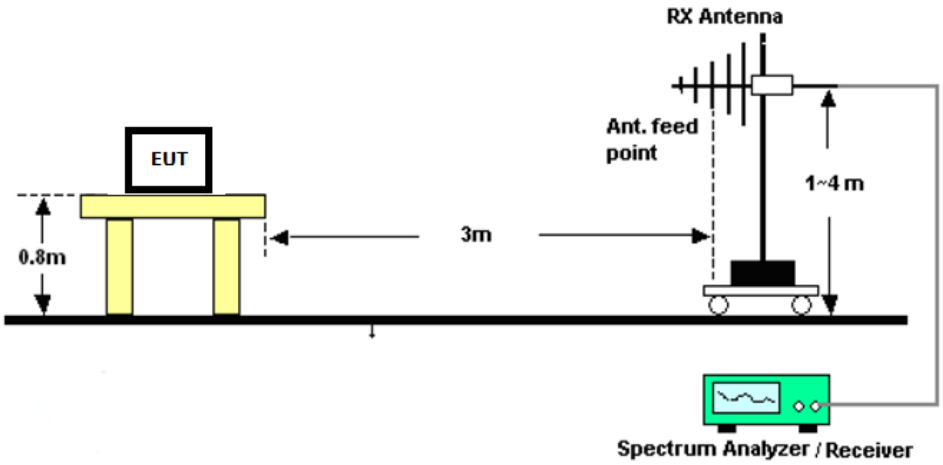
§ 6.2 Operating conditions
§ 6.3 Arrangement of EUT
§ 8.3.1 Exploratory radiated emissions measurements
§ 8.3.2 Final radiated emission measurements

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, all while the antenna terminals are terminated into a non-radiating 50 Ω load.

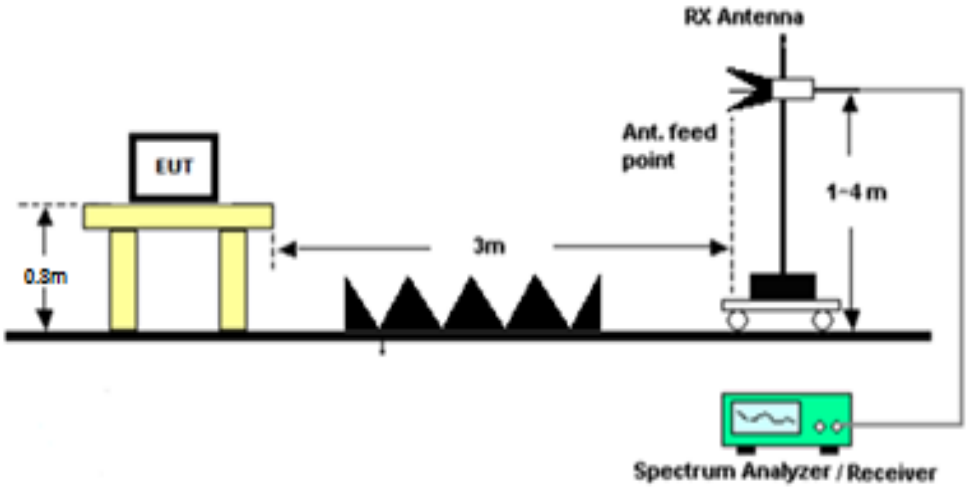
RADIATED SPURIOUS EMISSIONS

Setup:

Emissions 30 – 1000 MHz



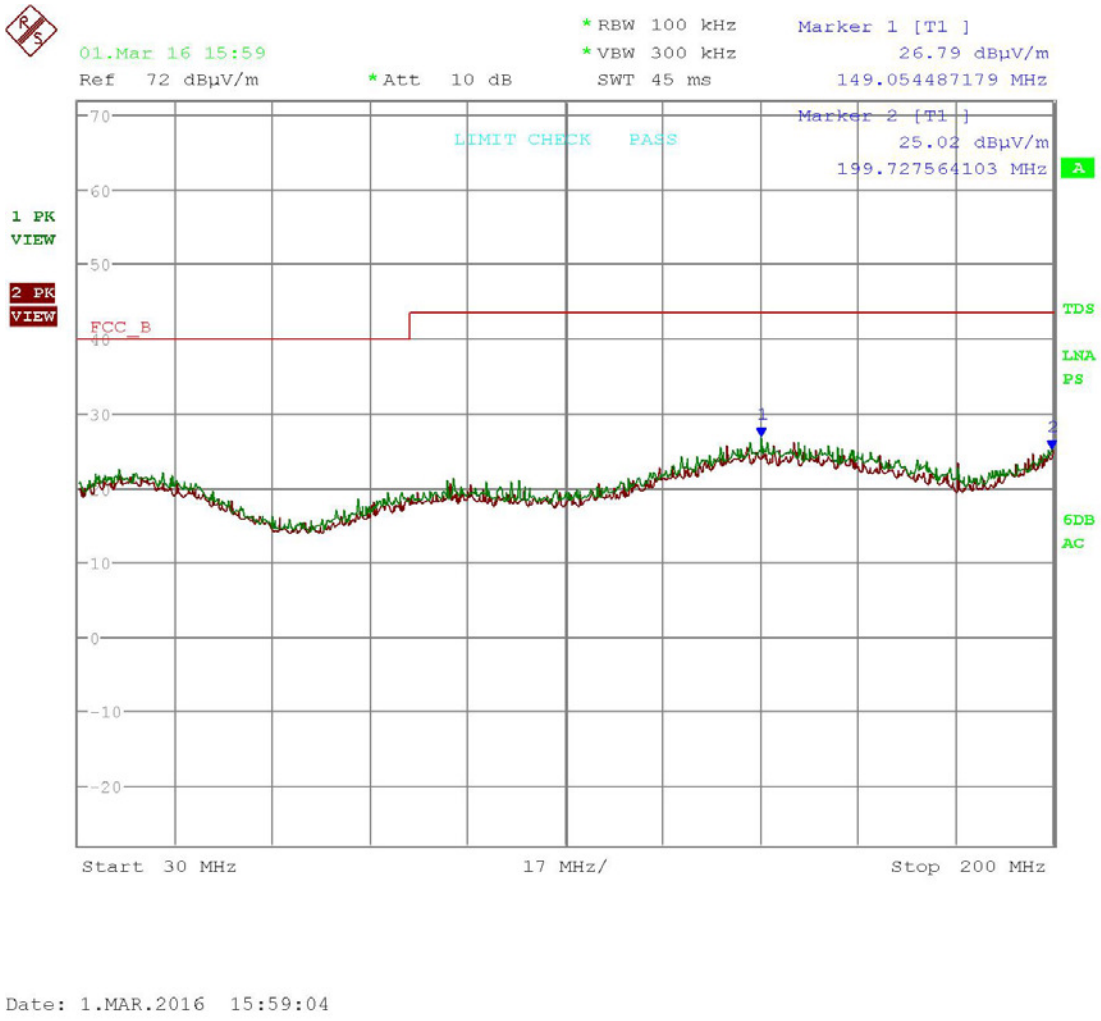
Emissions above 1 GHz



RADIATED SPURIOUS EMISSIONS

Test Data: Low End of Band 30 – 200 MHz Peak Field Strength Plot

3 Meter Field Strength Plot



Date: 1.MAR.2016 15:59:04

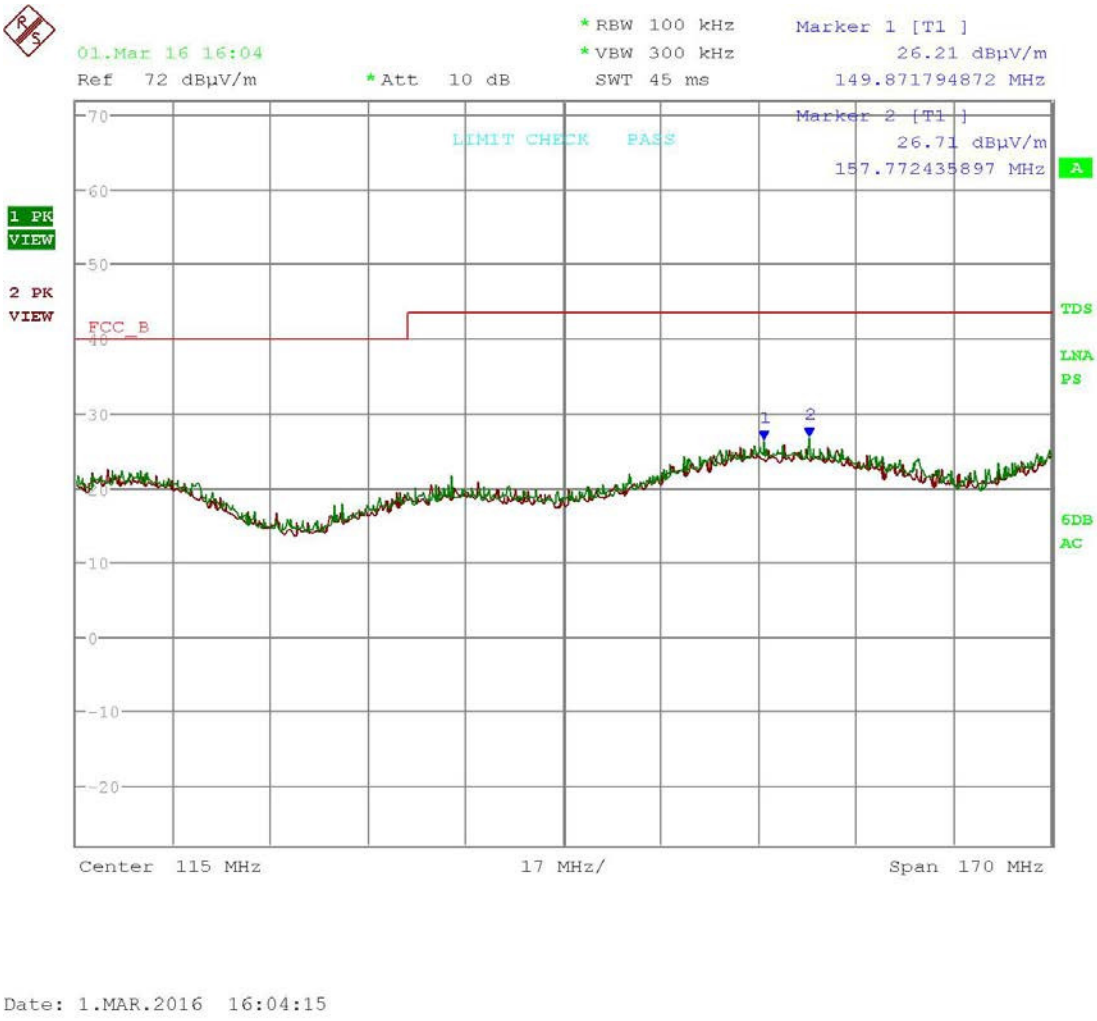
Ant Polarity: T1 (Green) = Vertical, T2 (Red) = Horizontal

Results Meets Requirements

RADIATED SPURIOUS EMISSIONS

Test Data: Middle of Band 30 – 200 MHz Peak Field Strength Plot

3 Meter Field Strength Plot

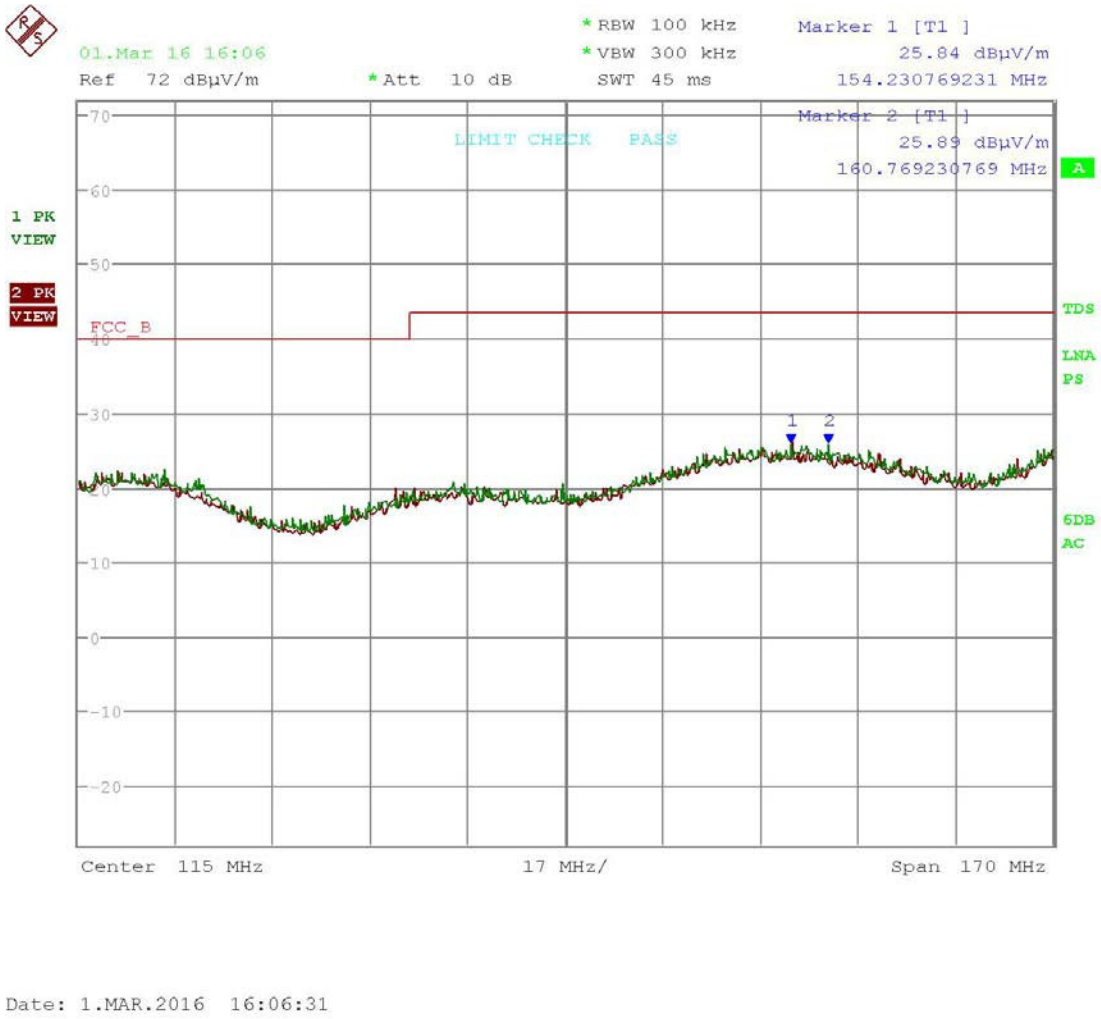


Ant Polarity: T1 (Green) = Vertical, T2 (Red) = Horizontal

Results Meets Requirements

RADIATED SPURIOUS EMISSIONS

Test Data: High End of Band 30 – 200 MHz Peak Field Strength Plot

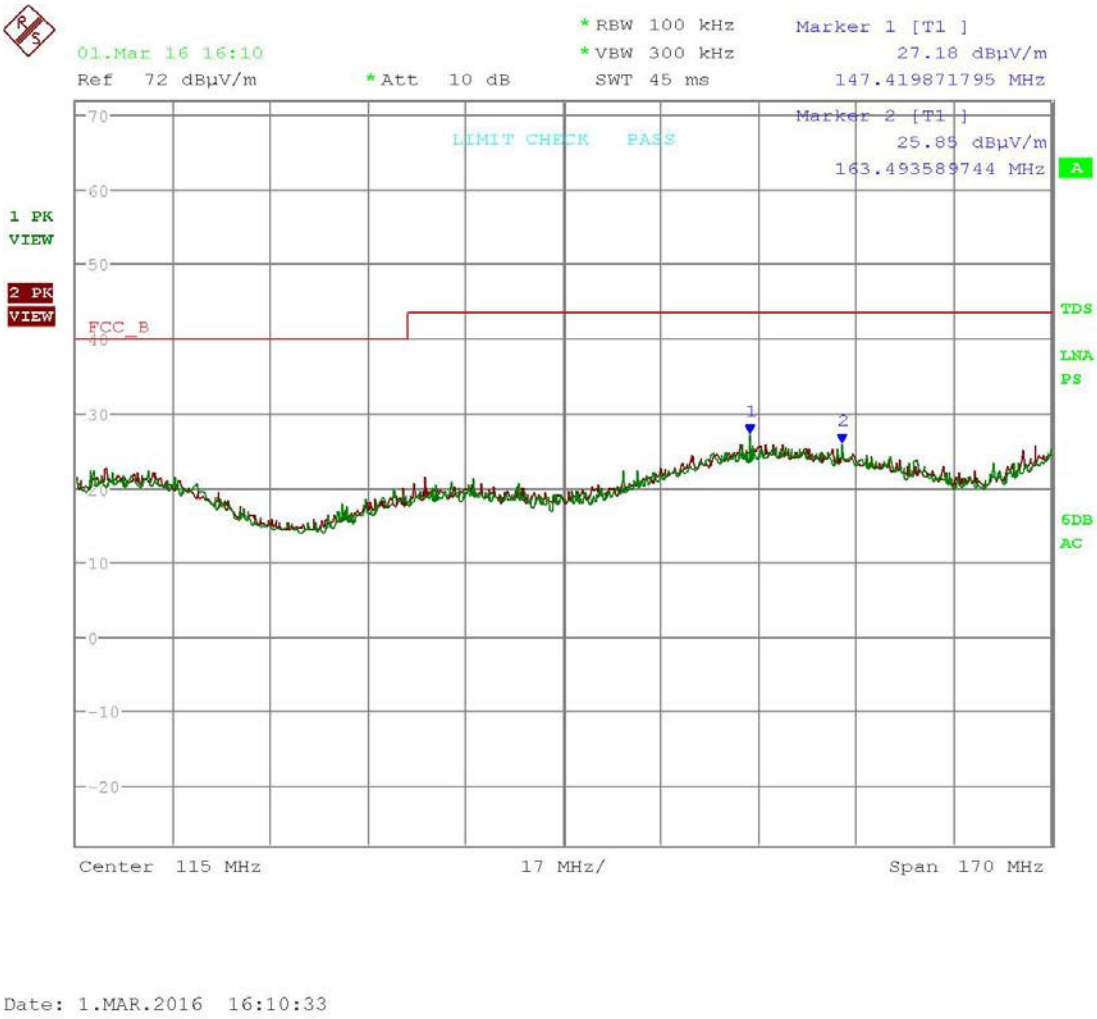
3 Meter Field Strength Plot


Ant Polarity: T1 (Green) = Vertical, T2 (Red) = Horizontal

Results Meets Requirements

RADIATED SPURIOUS EMISSIONS

Test Data: Scanning 30 – 200 MHz Peak Field Strength Plot

3 Meter Field Strength Plot


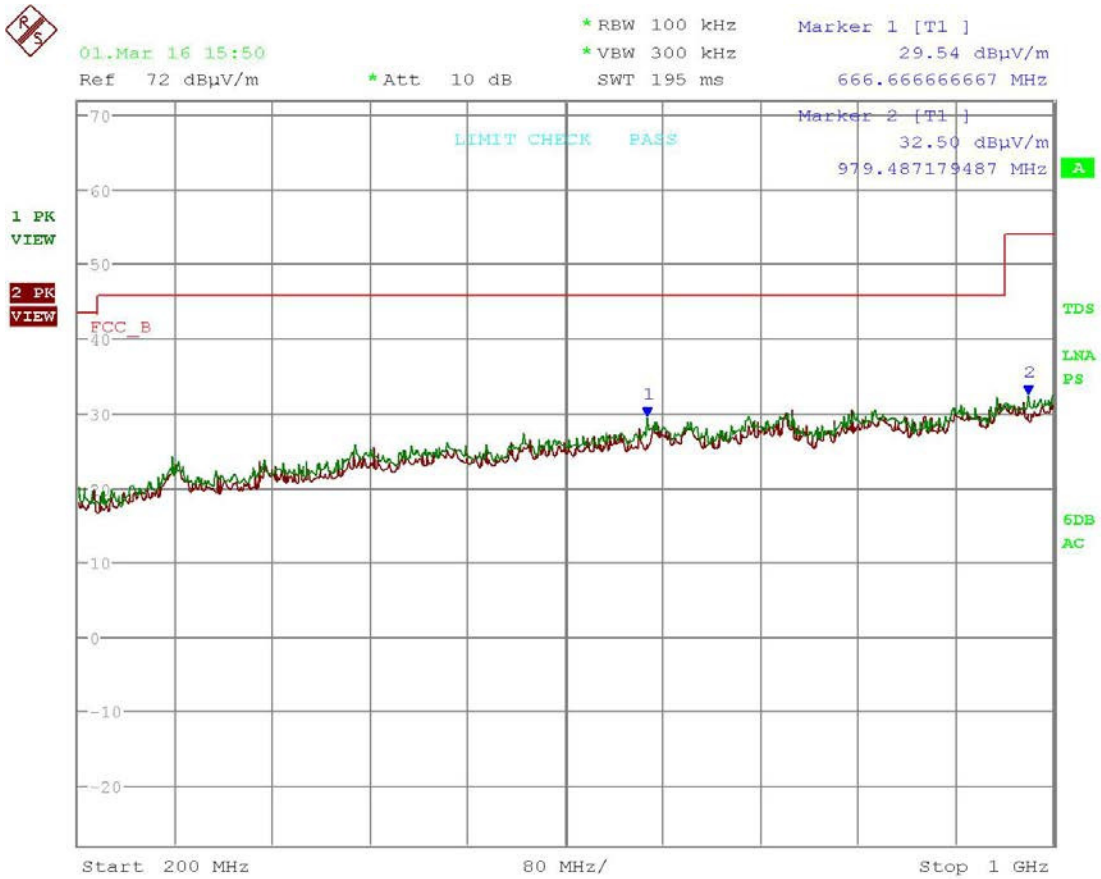
Ant Polarity: T1 (Green) = Vertical, T2 (Red) = Horizontal

Results Meets Requirements

RADIATED SPURIOUS EMISSIONS

Test Data: Low End of Band 200 - 1000 MHz Peak Field Strength Plot

3 Meter Field Strength Plot



Date: 1.MAR.2016 15:50:11

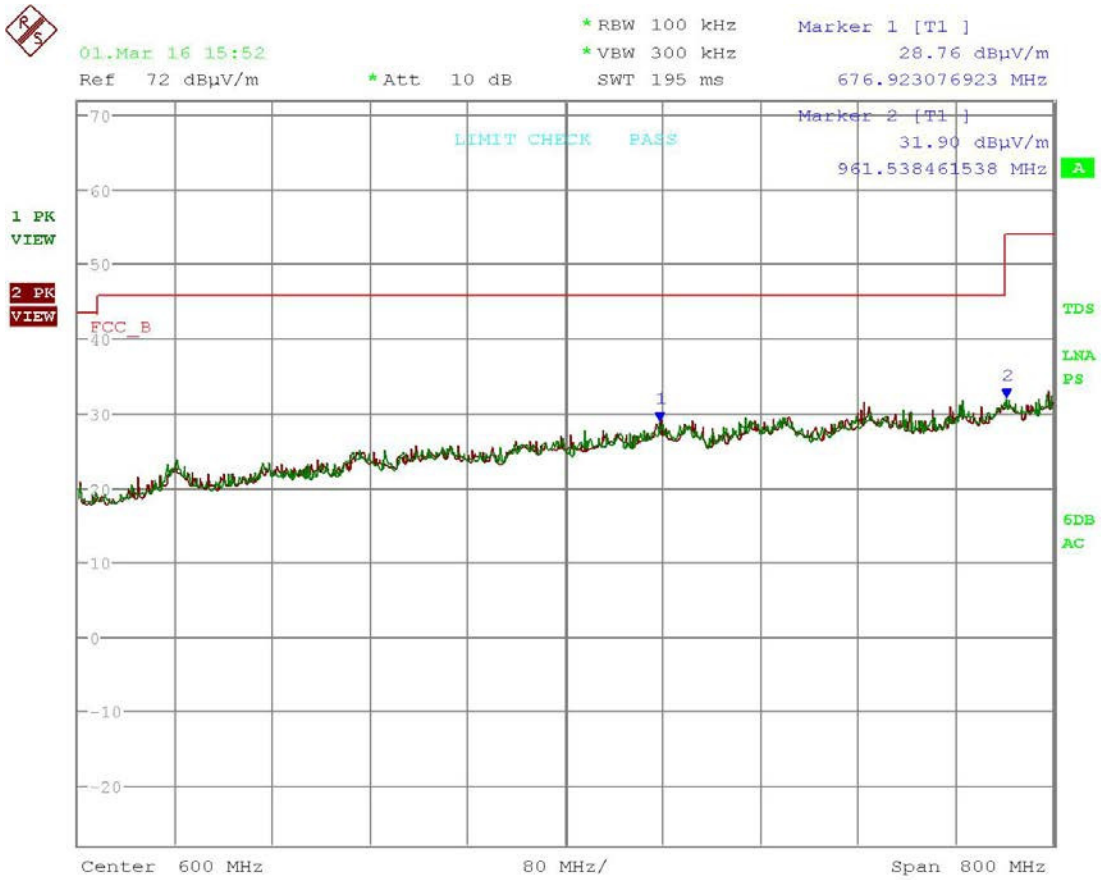
Ant Polarity: T1 (Green) = Vertical, T2 (Red) = Horizontal

Results Meets Requirements

RADIATED SPURIOUS EMISSIONS

Test Data: Middle of Band 200 - 1000 MHz Peak Field Strength Plot

3 Meter Field Strength Plot



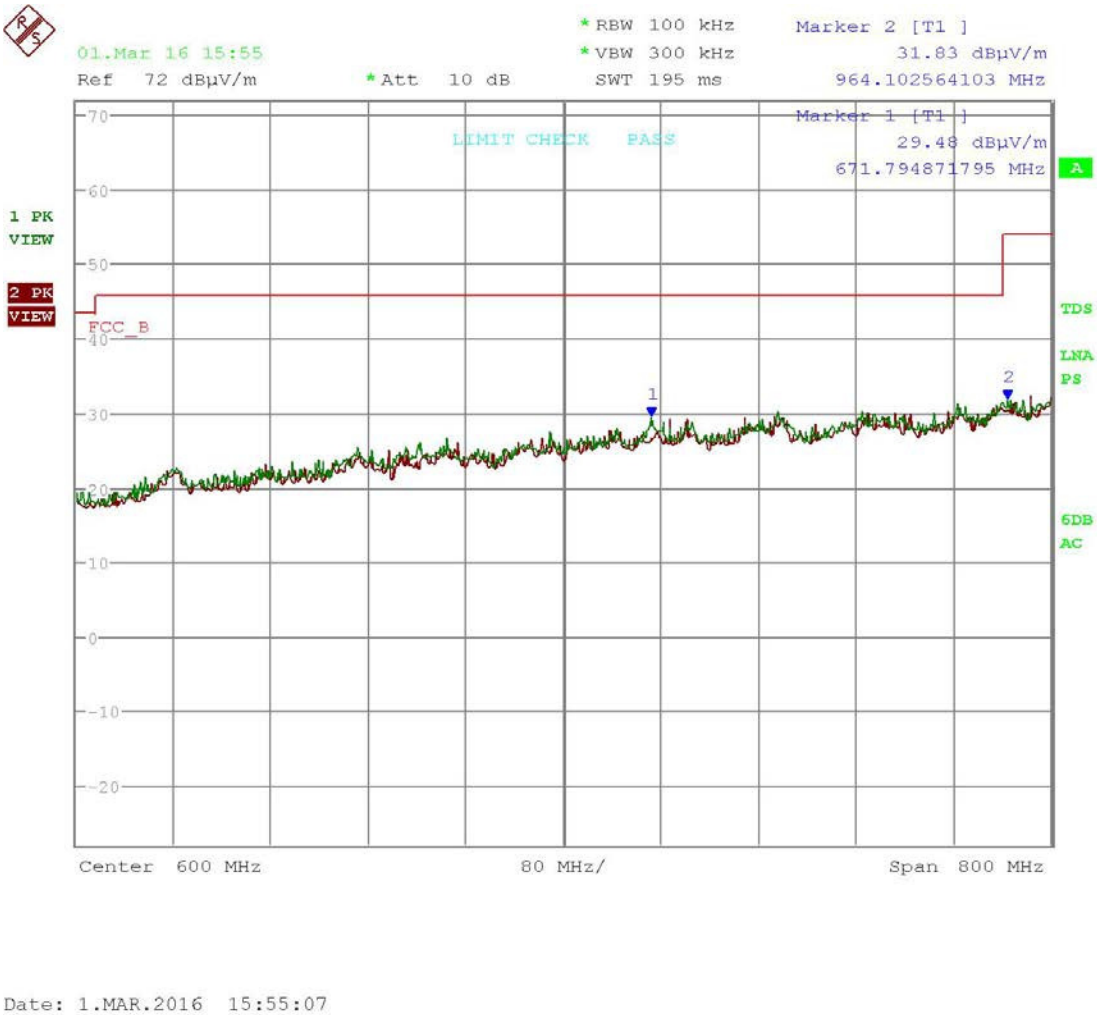
Date: 1.MAR.2016 15:52:02

Ant Polarity: T1 (Green) = Vertical, T2 (Red) = Horizontal

Results Meets Requirements

RADIATED SPURIOUS EMISSIONS

Test Data: High End of Band 200 - 1000 MHz Peak Field Strength Plot

3 Meter Field Strength Plot


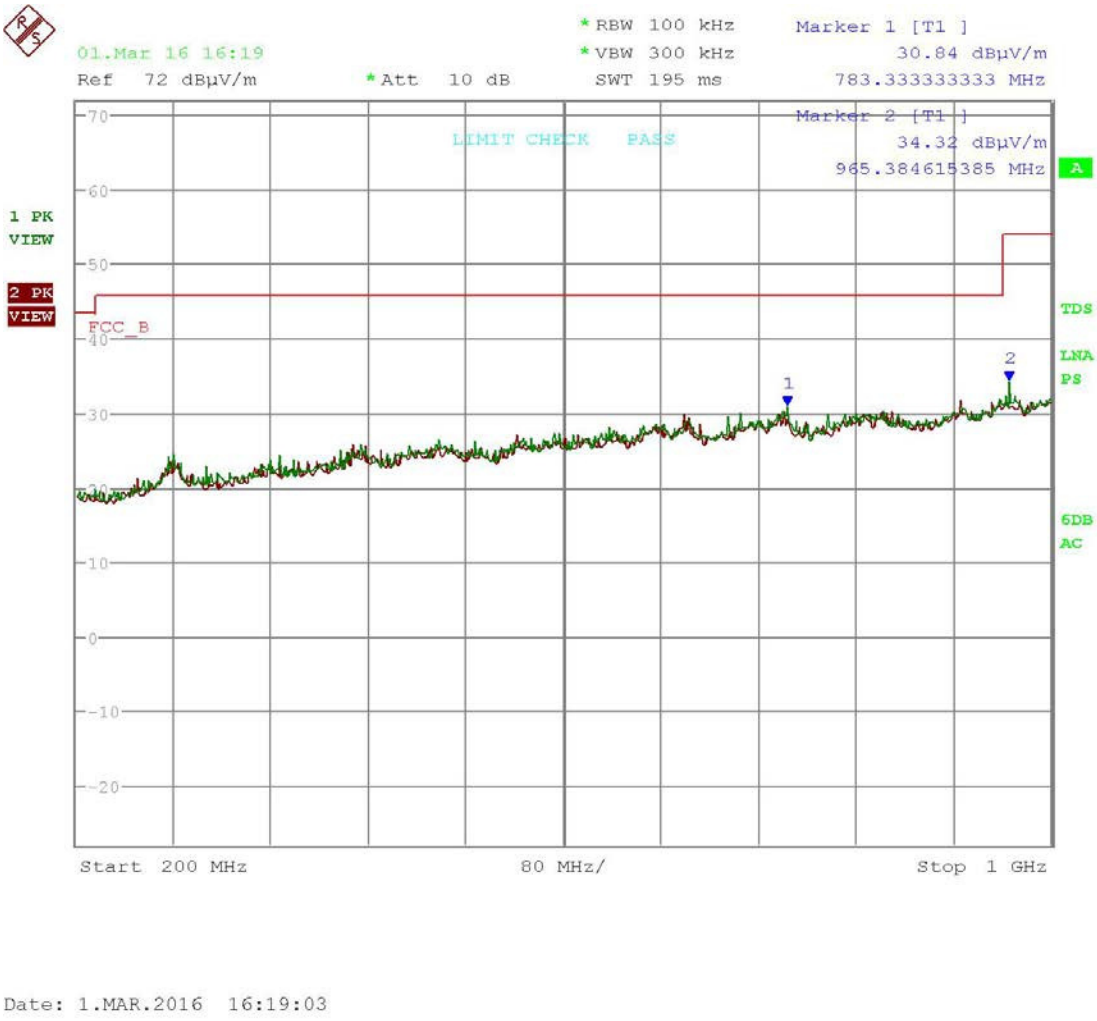
Ant Polarity: T1 (Green) = Vertical, T2 (Red) = Horizontal

Results Meets Requirements

RADIATED SPURIOUS EMISSIONS

Test Data: Scanning 200 - 1000 MHz Peak Field Strength Plot

3 Meter Field Strength Plot



Ant Polarity: T1 (Green) = Vertical, T2 (Red) = Horizontal

Results Meets Requirements

ANTENNA CONDUCTED POWER

Rule Part No.: FCC Part 15 Subpart B

Requirements: FCC Part 15.111(a) Antenna power conduction limits for receivers
In addition to the radiated emission limits. Receivers that operate (tune) in the frequency range 30 to 960 MHz and CB receivers that provide terminals for the connection of an external receiving antenna may be tested to demonstrate compliance with the provisions of §15.109 with the antenna terminals shielded and terminated with a resistive termination equal to the impedance specified for the antenna. Provided these receivers also comply with the following: With the receiver antenna terminal connected to a resistive termination equal to the impedance specified or employed for the antenna, the power at the antenna terminal at any frequency within the range of measurements specified in §15.33 shall not exceed 2.0 nanowatts.

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

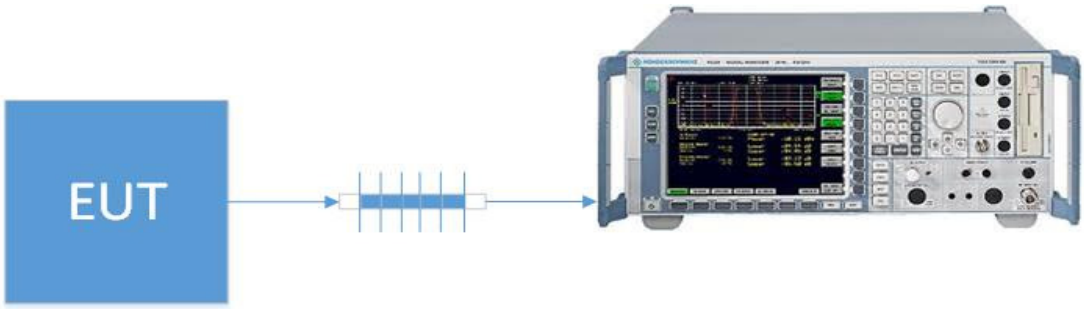
FCC Part 15.35(a) Measurement detector functions and bandwidths

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

§ 12.2.2 Operating conditions
§ 12.2.6 Antenna-conducted power measurements

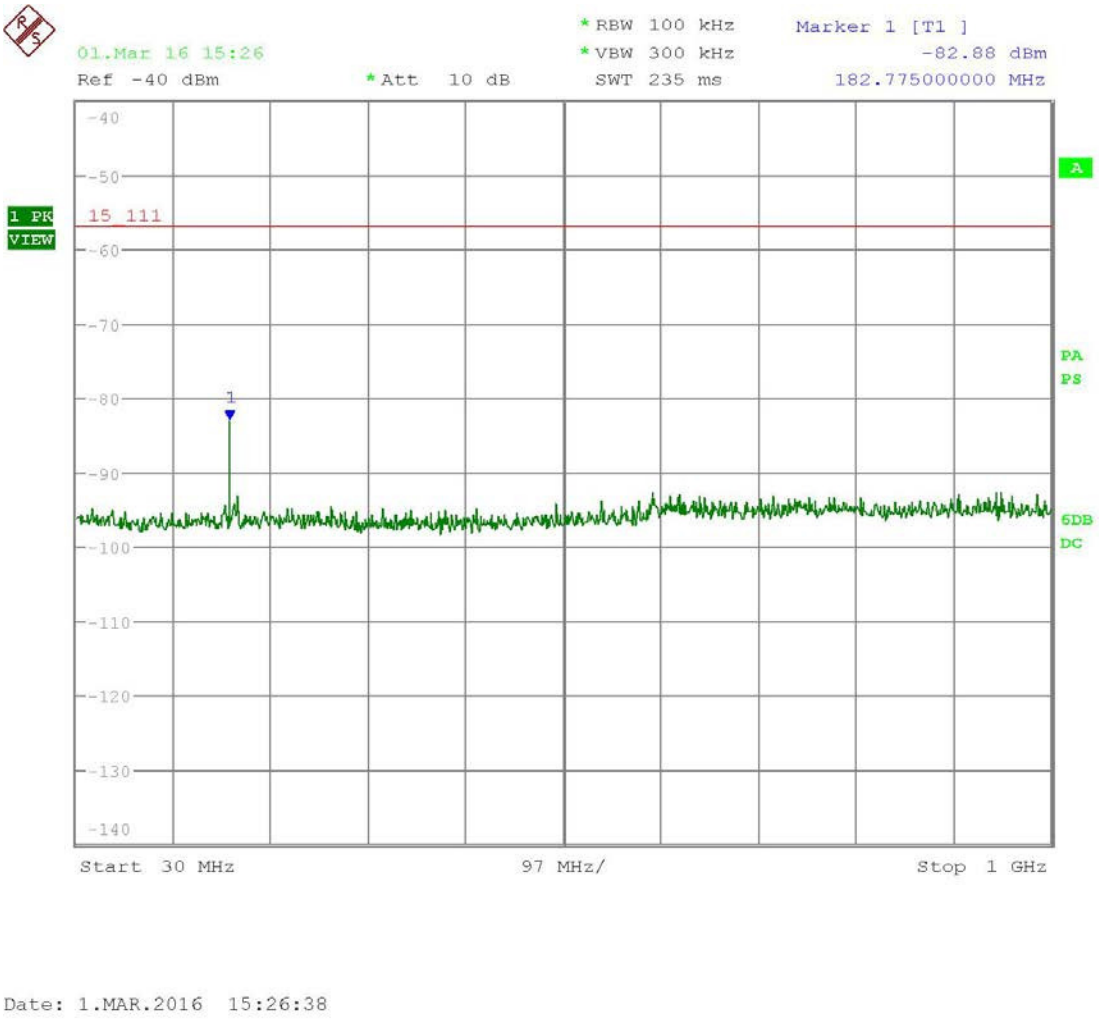
Configuration: The scanner receiver spurious emissions are to be measured when the receiver is in the scanning mode and repeated when the scanning is stopped, all while the antenna terminals are connected to a EMI receiver through a 50 Ω coaxial cable.

Setup:



ANTENNA CONDUCTED POWER

Test Data: Low End of Band 30 - 1000 MHz conducted Plot

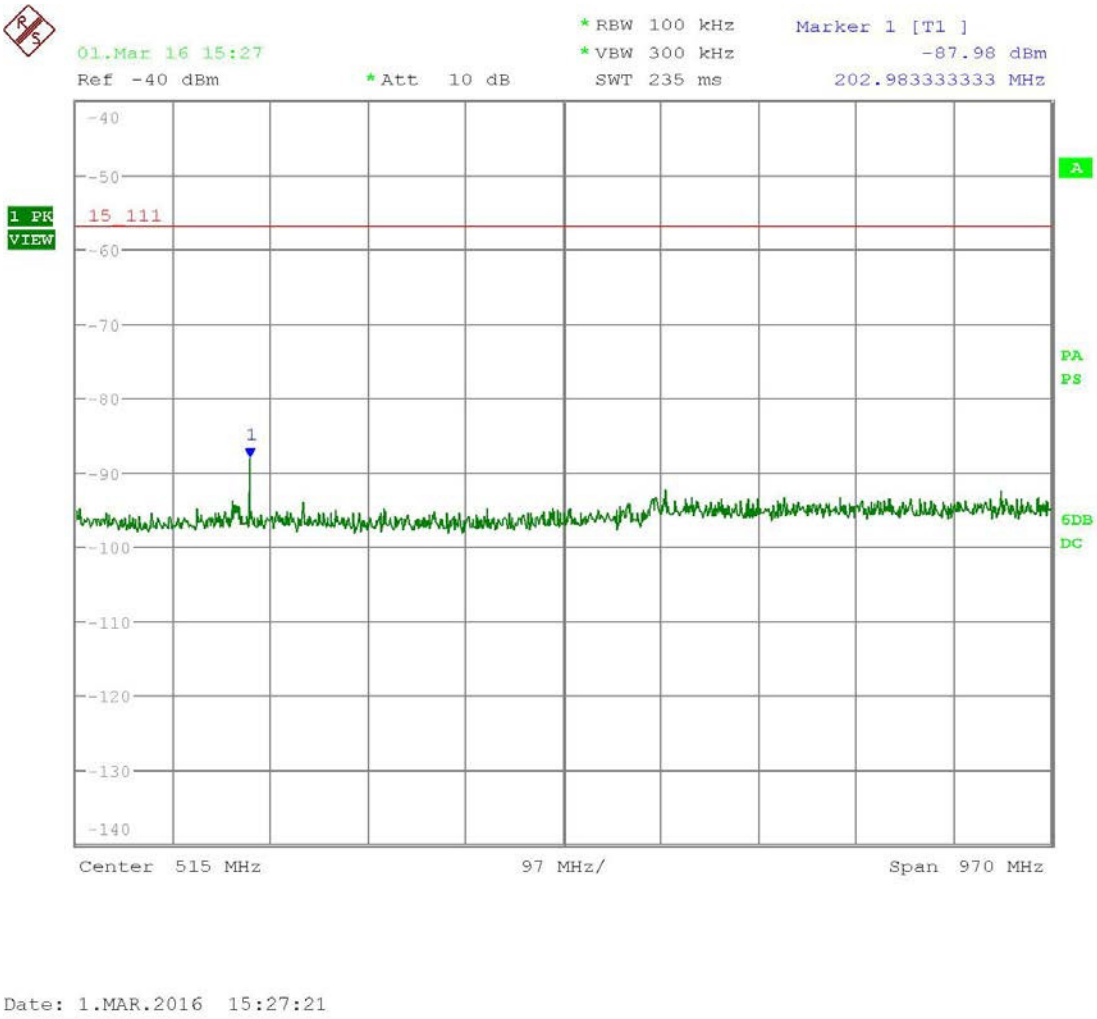
Ant conducted plot


Ant Polarity: T1 (Green) = Vertical, T2 (Red) = Horizontal

Results Meets Requirements

ANTENNA CONDUCTED POWER

Test Data: Middle of Band 30 - 1000 MHz conducted Plot

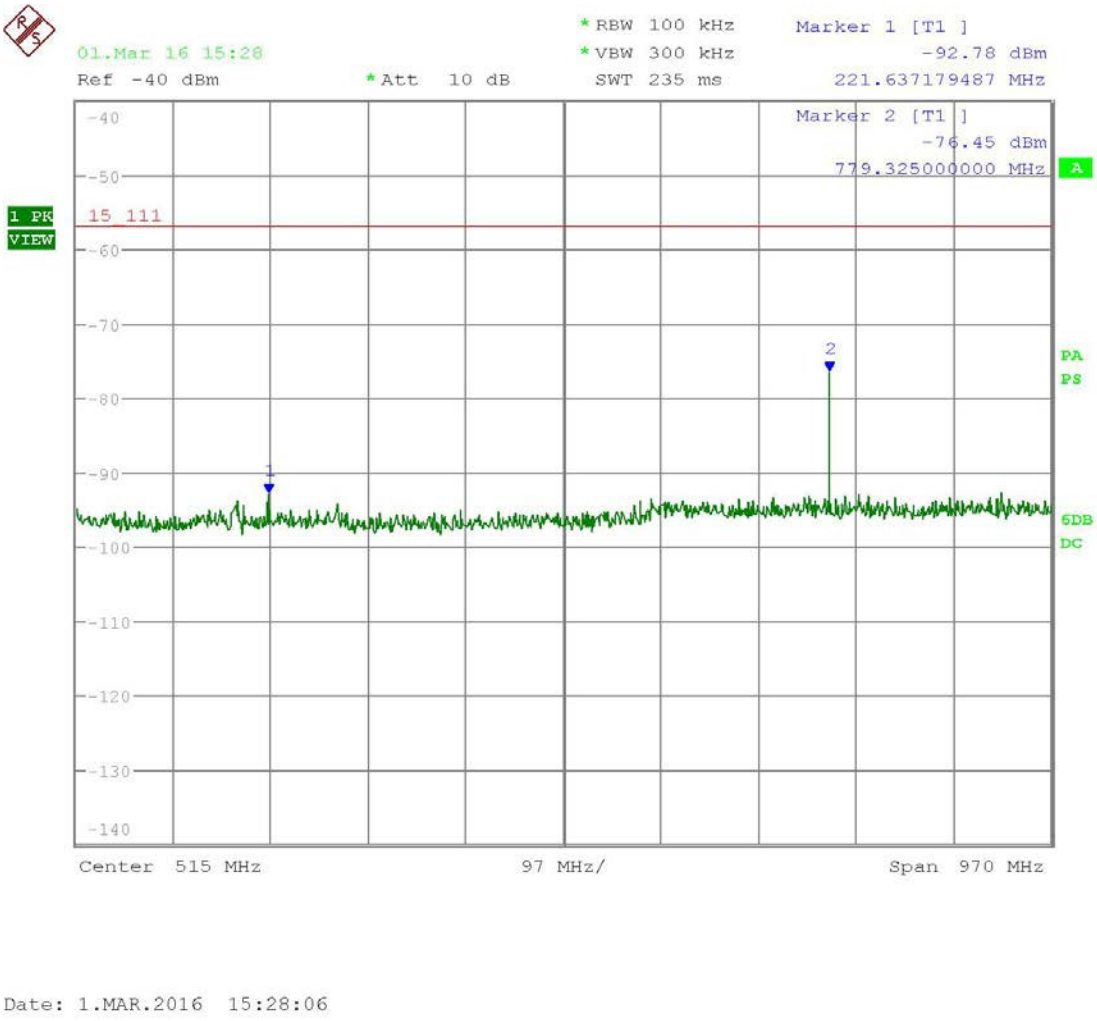
Ant conducted plot


Ant Polarity: T1 (Green) = Vertical, T2 (Red) = Horizontal

Results Meets Requirements

ANTENNA CONDUCTED POWER

Test Data: High End of Band 30 - 1000 MHz conducted Plot

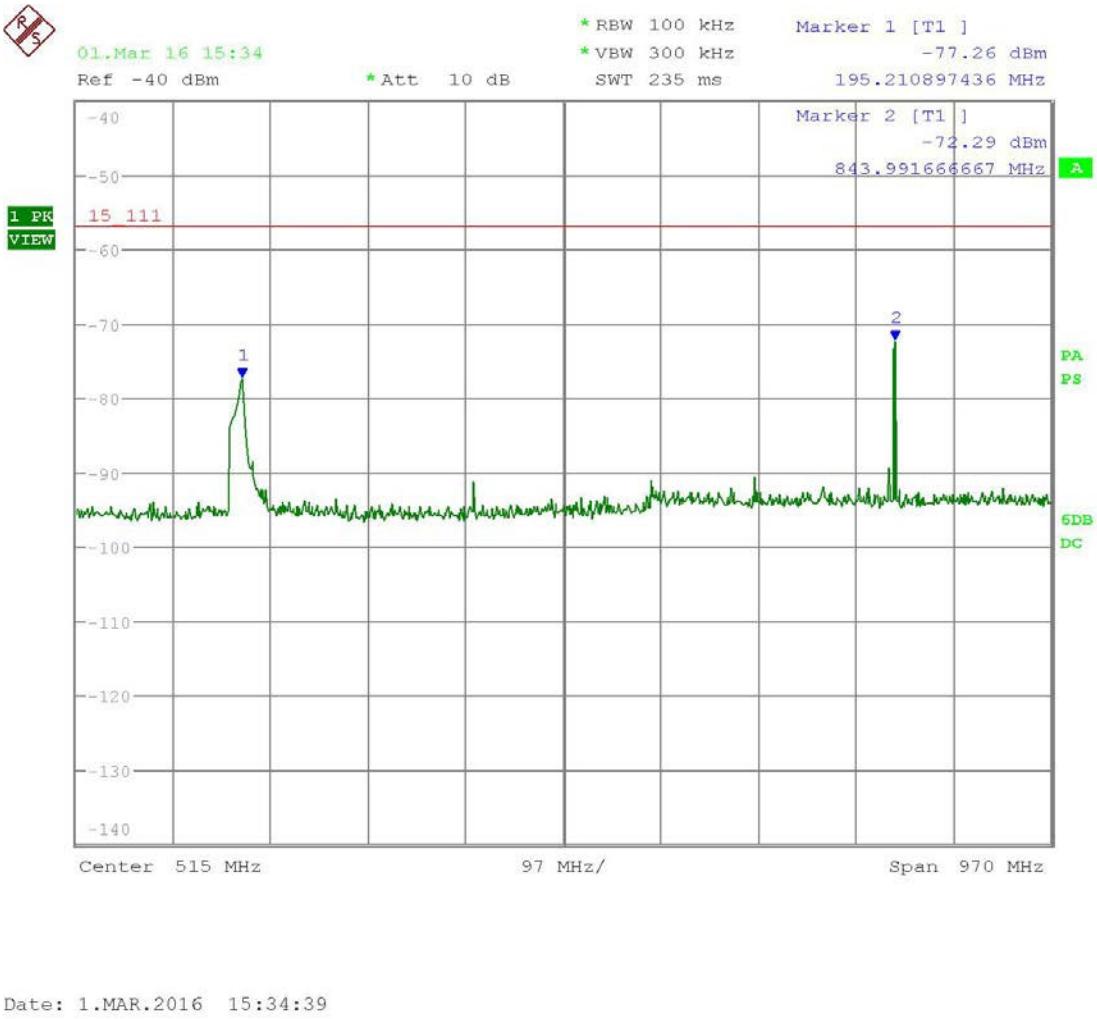
Ant conducted plot


Ant Polarity: T1 (Green) = Vertical, T2 (Red) = Horizontal

Results Meets Requirements

ANTENNA CONDUCTED POWER

Test Data: Scanning 30 - 1000 MHz conducted Plot

Ant conducted plot


Ant Polarity: T1 (Green) = Vertical, T2 (Red) = Horizontal

Results Meets Requirements

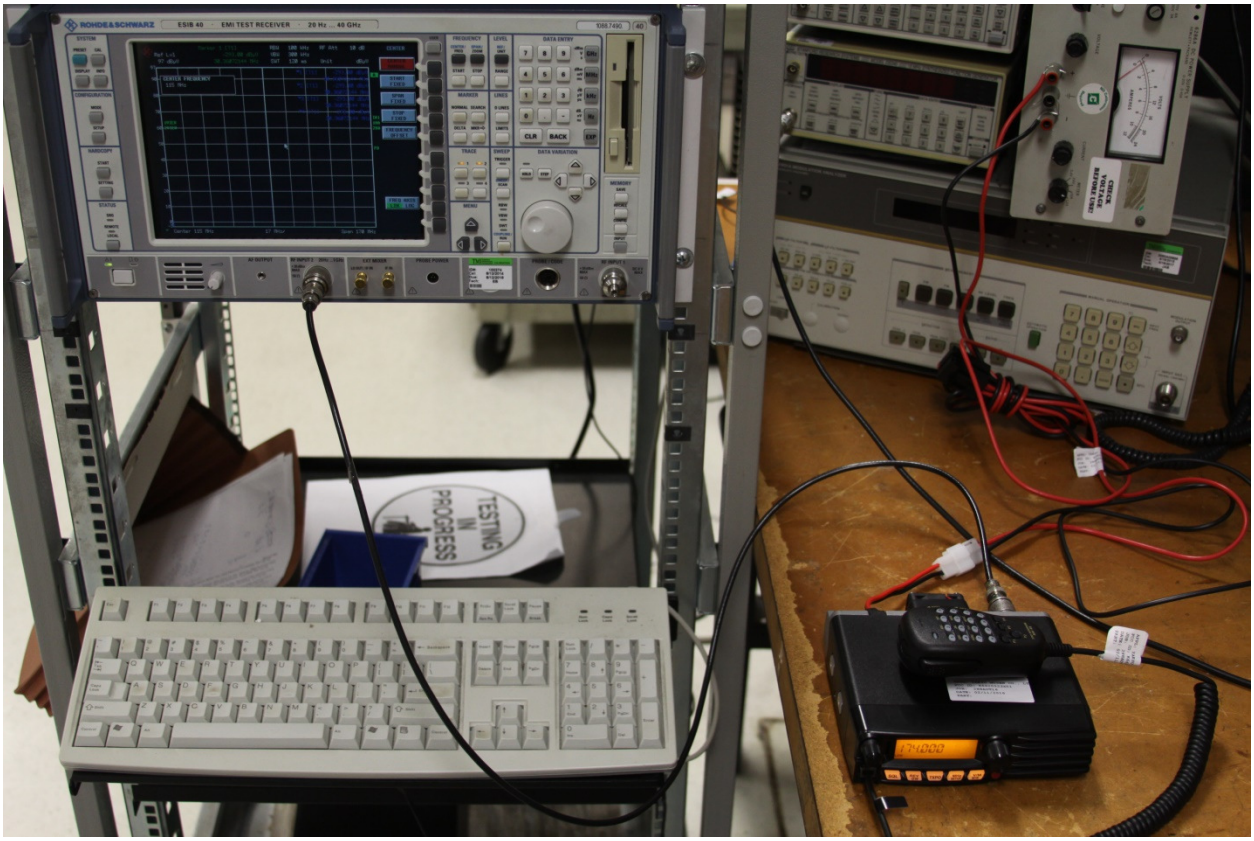
TEST EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/ Char Date	Due Date
Terminator N 20W DC-18G	Narda	8205	14	NA	NA
Coaxial Cable #65	General cable co.	E9917 RG233/U	65	6/26/15	6/26/17
Antenna: Biconnical Chamber	Eaton Chamber	94455-1	1057	11/18/15	11/18/17
Antenna: Log-Periodic Chamber	Electro-Metrics	LPA-25	1122	07/14/15	07/14/17
3-Meter Semi-Anechoic Chamber	Panashield	N/A	N/A	01/05/16	03/01/16
Antenna: Double-Ridged Horn/ ETS Horn 2	ETS-Lindgren	3117	00041534	02/25/15	02/25/17
EMI Test Receiver R & S ESIB 40	Rohde & Schwarz	ESIB 40	100274	08/12/14	08/12/16
Software: Field Strength Program	Timco	N/A	Version 4.0	NA	NA
EMI Test Receiver R & S ESU 40	Rohde & Schwarz	ESU 40	100320	03/11/14	03/11/16

*** EMI RECEIVER SOFTWARE VERSION**
The receiver firmware used was version 4.43 Service Pack 3

APPLICANT: YAESU MUSEN CO., LTD.
FCC ID: K6620523X51

TEST SET UP PHOTOS

Antenna conducted power


Radiated Setup

Radiated final setup