

Test Report

Prepared for: Icom Incorporated

Model: ID-52A

Description: VHF/UHF Digital transceiver

Serial Number: 00000505

FCC ID: AFJ386700
IC: 202D-386700

To

FCC Part 15.121

And

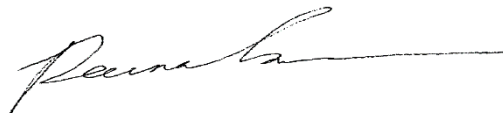
IC RSS-215 Issue 2 (June 2009)

Date of Issue: November 18, 2020

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Poona Saber
Project Test Engineer

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All results contained herein relate only to the sample tested.

Test Report Revision History

Revision	Date	Revised By	Reason for Revision
1.0	November 18,2020	Poona Saber	Original Document

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The applicant has been cautioned as to the following

FCC

15.21 – Information to user

The user's manual or instruction manual for an intentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

15.27(a) – Special Accessories

Equipment marketed to a consumer must be capable of complying with the necessary regulations in the configuration in which the equipment is marketed. Where special accessories such as shielded cables and/or special connectors are required to enable an unintentional or intentional radiator to comply with the emission limits in the part, the equipment must be marketed with, i.e. shipped and sold with, those special accessories. However, in lieu of shipping or packaging the special accessories with the unintentional or intentional radiator, the responsible party may employ other methods of ensuring that the special accessories are provided to the consumer without an additional charge.

Information detailing any alternative method used to supply the special accessories for a grant of equipment authorization or retained in the verification records, as appropriate. The party responsible for the equipment, as detailed in §2.909 of this chapter, shall ensure that these special accessories are provided with the equipment. The instruction manual for such devices shall include appropriate instructions on the first page of text concerned with the installation of the device that these special accessories must be used with the device. It is the responsibility of the user to use the needed special accessories supplied with the equipment.

ANAB

Compliance Testing, LLC, has been accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to the joint ISO-ILAC-IAF Communiqué dated January 2009).

The tests results contained within this test report all fall within our scope of accreditation, unless noted below.

Please refer to <http://www.compliancetesting.com/labscope.html> for current scope of accreditation.



FCC Site Reg. #349717

IC Site Reg. #2044A-2

Non-accredited tests contained in this report:

N/A

Standard Test Conditions Engineering Practices

Except as noted herein, the following conditions and procedures were observed during the testing: FCC Part 15.121.

In accordance with ANSI C63.10-2014 and unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10° to 40°C (50° to 104°F), unless the particular equipment requirements specified testing over a different temperature range. Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

Measurement results, unless otherwise noted, are worst-case measurements.

Environmental Conditions		
Temperature (°C)	Humidity (%)	Pressure (mbar)
24.3	30.2	973.4

EUT Description

Model: ID-52

Description: VHF/UHF Digital transceiver

Serial Number: 0000505

Additional Information:

Device under test is a VHF/UHF digital transceiver with the scanning receiver that works in the following range:
88-108 MHz, FM mode.
108-174 MHz Am and FM mode.
225-479 MHz, FM mode.

Device works Both with a Li-ion battery that comes with a rapid charger and AC/DC power adapter. It has an external BNC antenna connector with a 50 Ohms impedance.

The transmitter is used for amateur radio service per Part 97 and is exempt from FCC certification. As stated at one of the FCC Wireless Telecommunications Bureau (WTB) websites for Part 97, the FCC (OET) equipment authorization program does not generally apply to amateur radio service station transmitters.

The scanning receiver was tested to comply with part 47 CFR 15.109, 15.111, and 15.121.

This scanning receiver upper operating range is up to 479 MHz and is not capable of scanning in the Part 22 Cellular Radiotelephone Service band per 15.121(a)(1). Therefore this scanning receiver meets the requirements of section 15.121 (b) by design since it cannot receive any signals above 479 MHz.

Unit contains a pre certified Bluetooth (FCC ID: VIYHRM1016, IC: 7305A-HRM1016) and GPS radios. Bluetooth radio is put on off mode and GPS position Fix is on manual.

EUT Operation during Tests

Unit is powered with 7.4V Li-ion battery and an AC/DC power adapter. It is tested with both power Li-ion battery on rapid charger and with AC adapter.
The external antenna is connected for radiated measurement and terminated to spectrum analyzer for conducted measurements.

Accessories:

Qty	Description	Manufacturer	Model	S/N
1	AC Charger	ICOM	BC-167SA	N/A
1	AC battery charger	ICOM	BC-123SA	N/A
1	DC Li-ion rapid charger	ICOM	BC-202	N/A
1	Rechargeable Li-ion Battery	ICOM	BP-307	N/A

Cables:

Qty	Description	Length (M)	Shielding Y/N	Shielded Hood Y/N	Termination
	None				

Modifications: None

Test Results Summary

FCC Specification	ISED Specification	Test Name	Pass, Fail, N/A	Comments
15.109(f), 15.111(a)	RSS 215 5.1 RSS Gen 7.4	Conducted Spurious Emissions	Pass	
15.109	RSS 215 5.1 RSS Gen 7.3	Radiated Spurious Emissions	Pass	
15.107	RSS Gen 7.2	AC Powerline Conducted Emissions	Pass	
15.121(b)	NA	Rejection	N/A	EUT is not capable of operating in the Part 22 Cellular Radiotelephone band

Conducted Spurious Emissions

Engineer: Poona Saber

Test Date: 11/18/2020

Test Procedure

Per FCC section 15.109(f), 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).

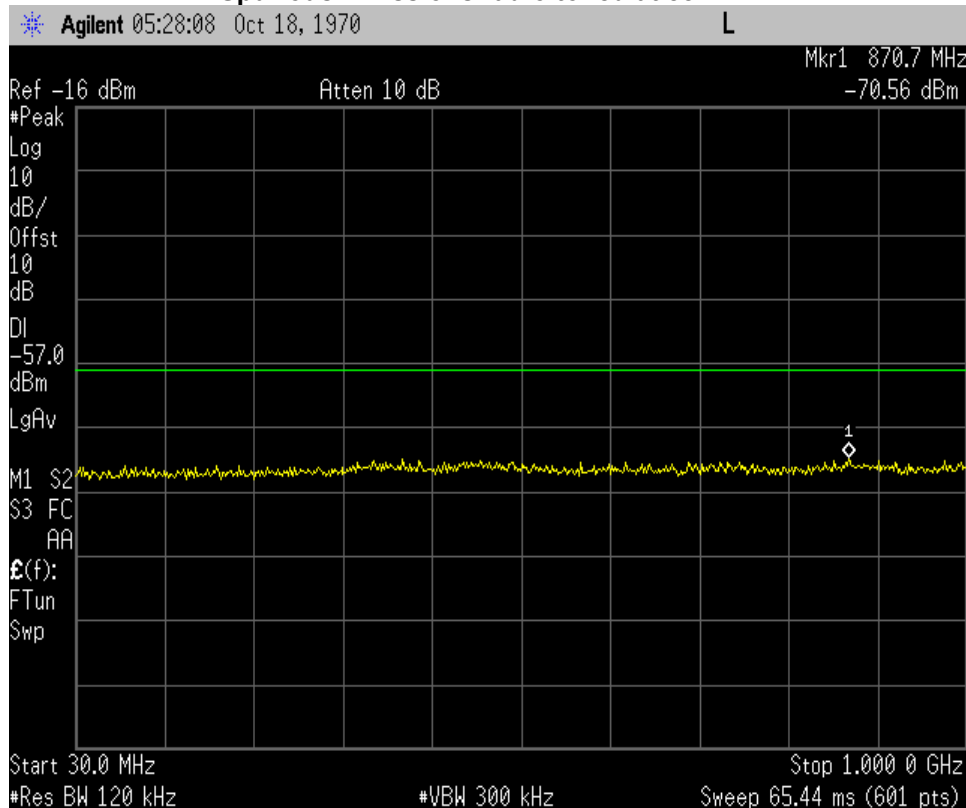
FCC section 15.111(a) states: In addition to the radiated emission limits, receivers that operate (tune) in the frequency range 30 to 960 MHz and CB receivers that provide terminals for the connection of an external receiving antenna may be tested to demonstrate compliance with the provisions of §15.109 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.

The EUT was connected as shown in the test set-up and tested at both scanning and non-scanning modes. All signals measured at the receiver antenna port were below 2 nanowatts (-57 dBm) for upto 1 GHz and 5 nanowatts (-54 dBm) for above 1 GHz.

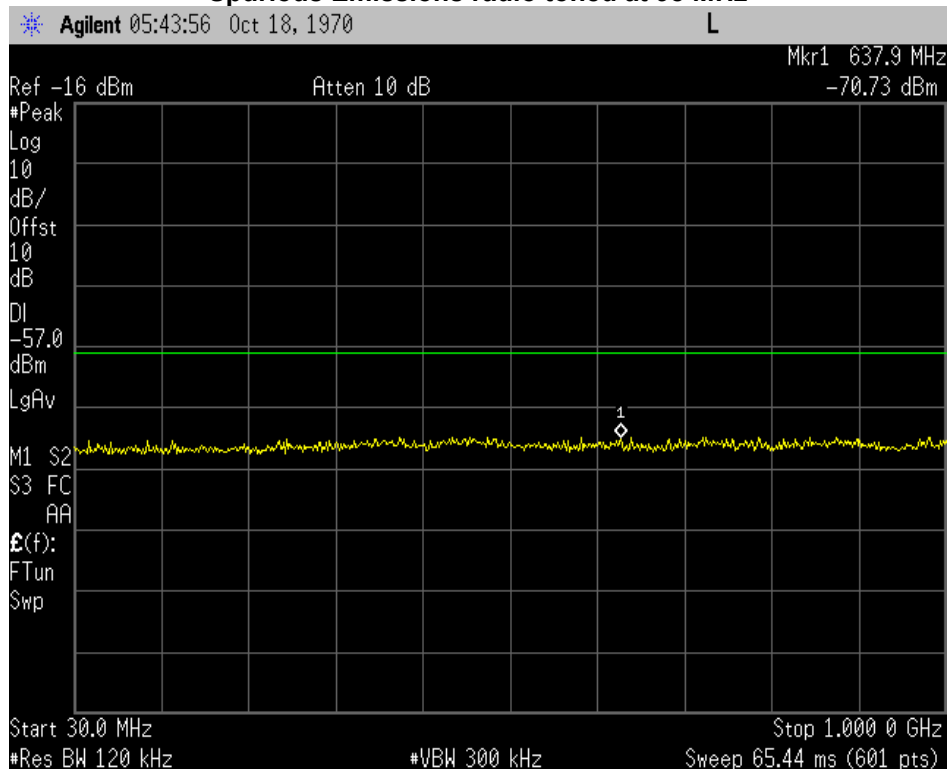
Test Results

30 MHz-1GHz non-scanning

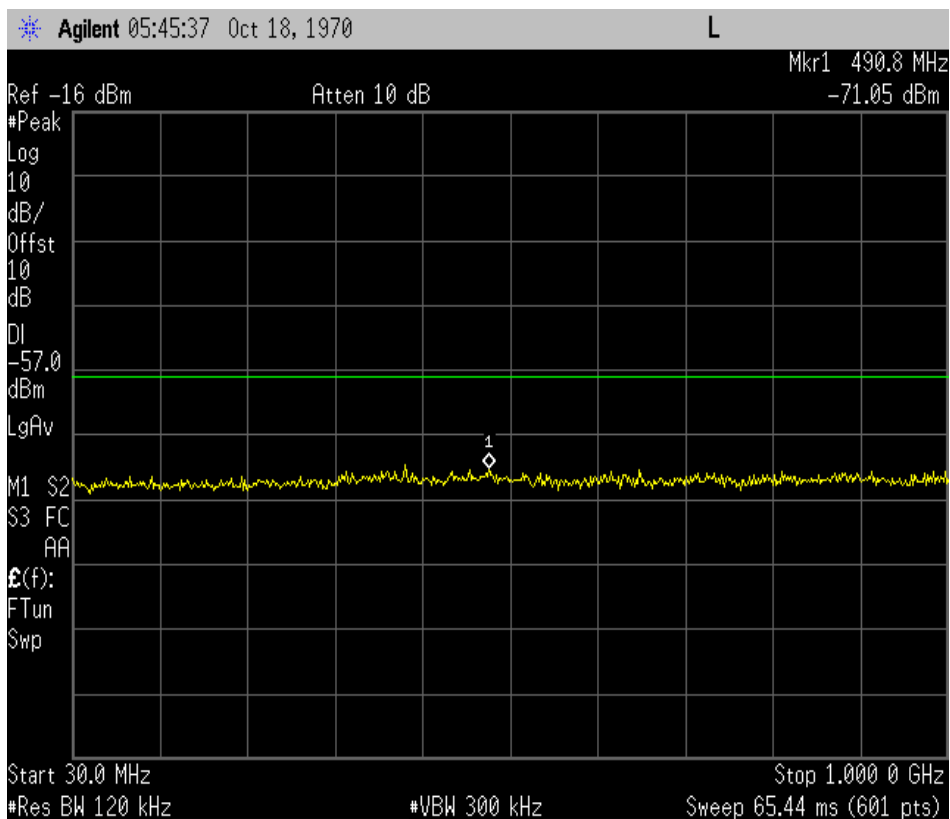
Spurious Emissions radio toned at 88 MHz



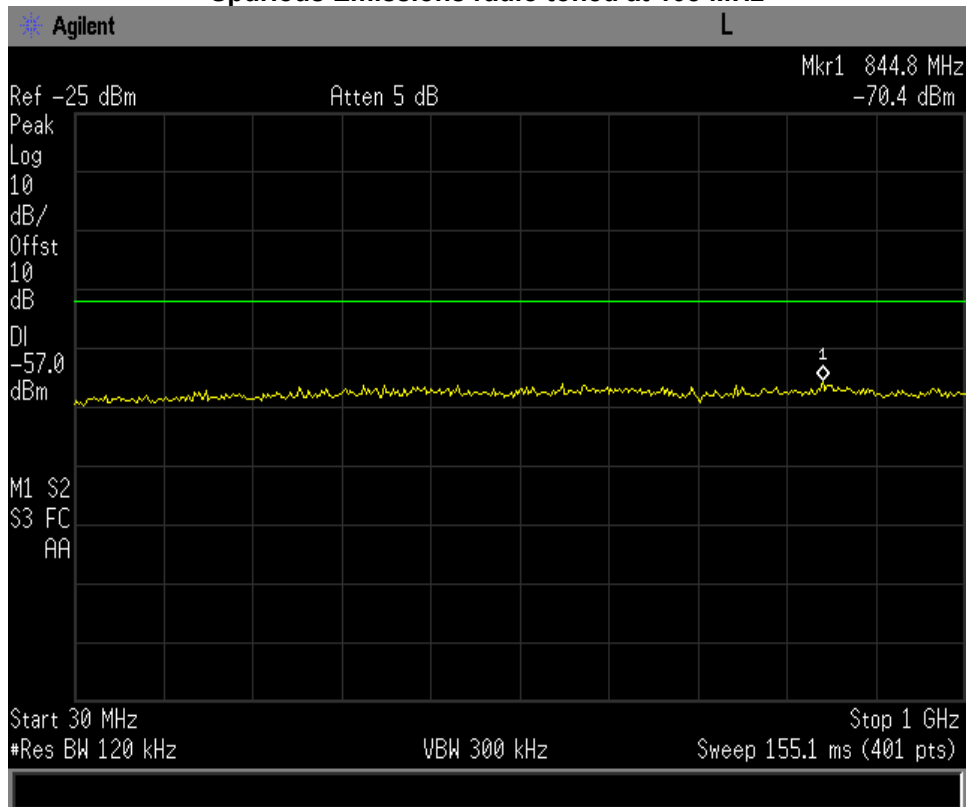
Spurious Emissions radio toned at 98 MHz



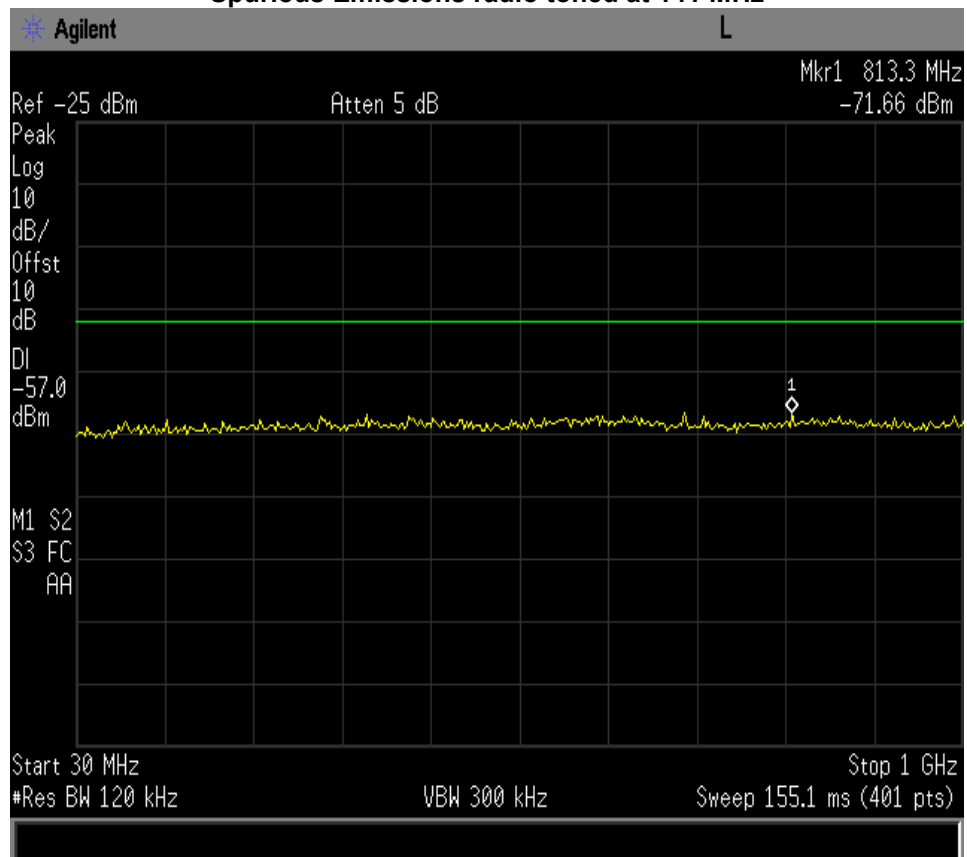
Spurious Emissions radio toned at 107 MHz



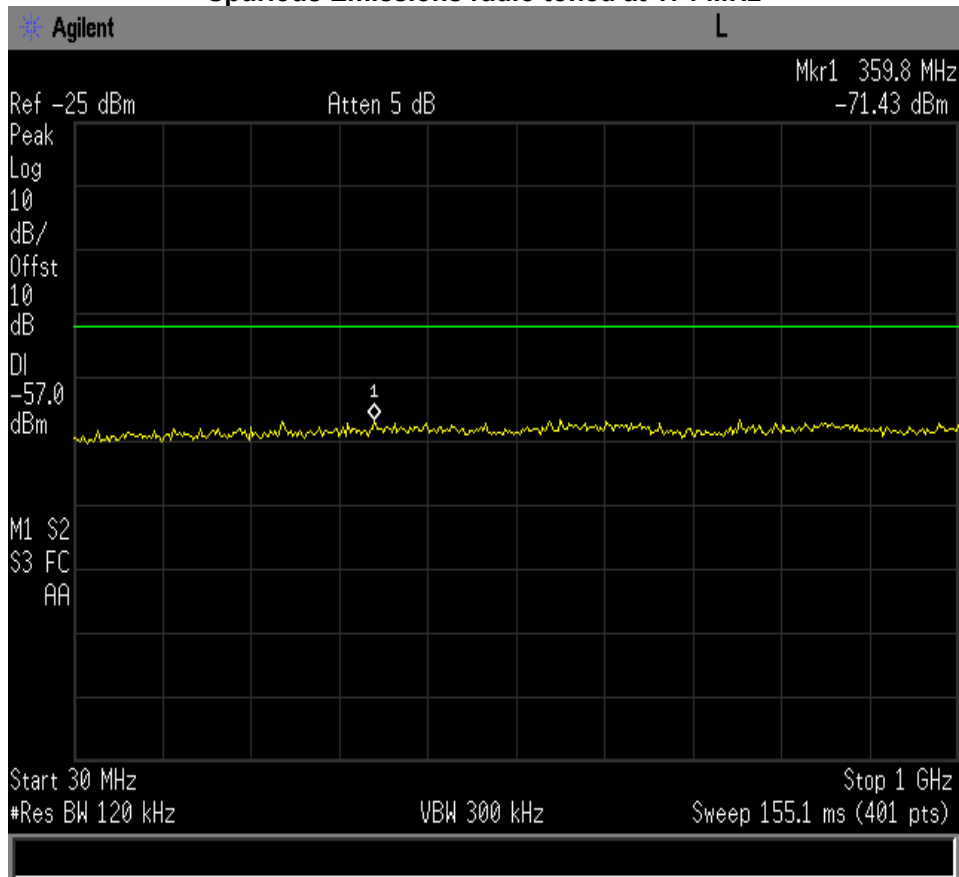
Spurious Emissions radio toned at 108 MHz



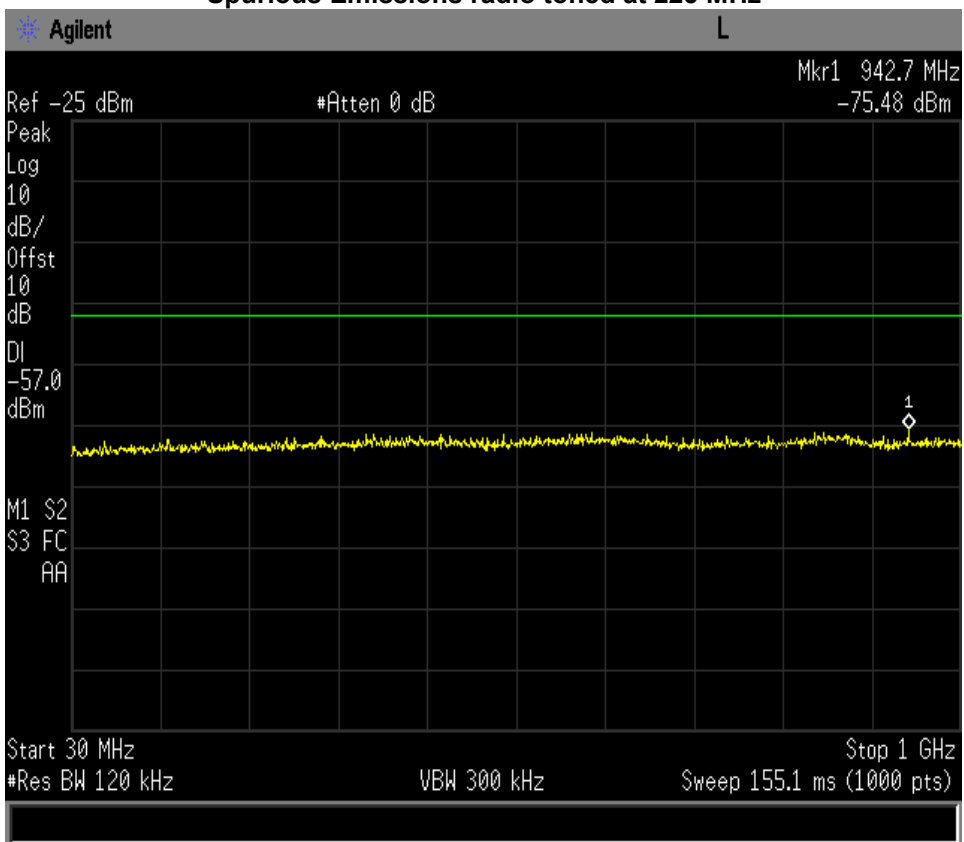
Spurious Emissions radio toned at 141 MHz



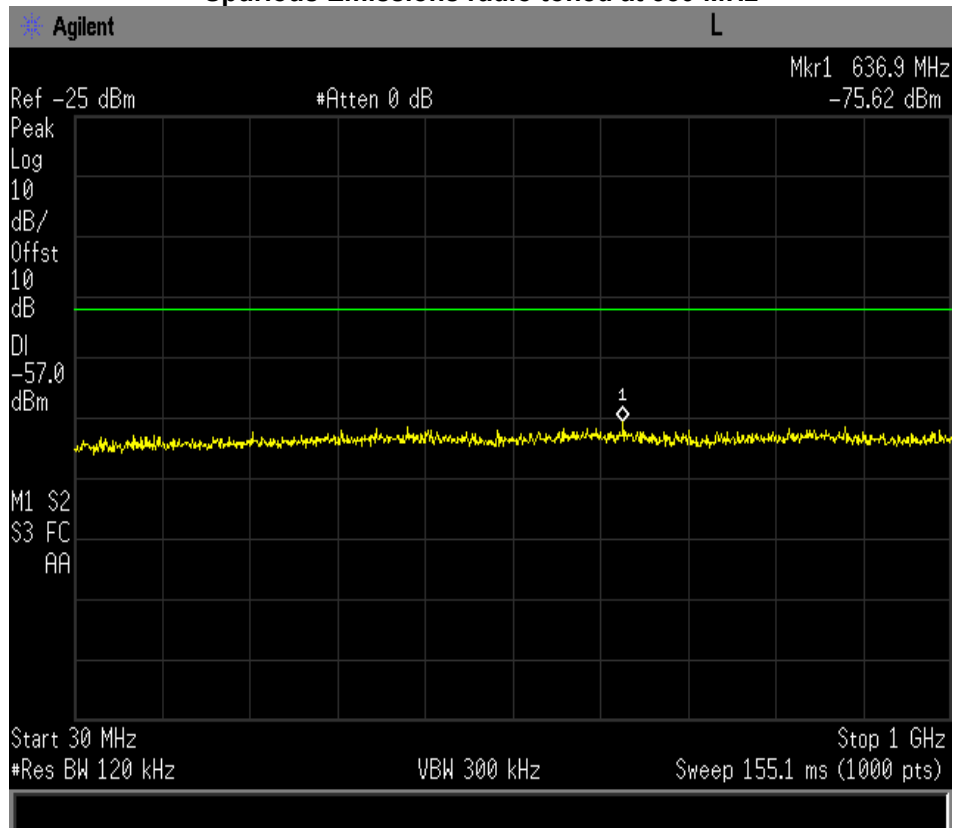
Spurious Emissions radio toned at 174 MHz



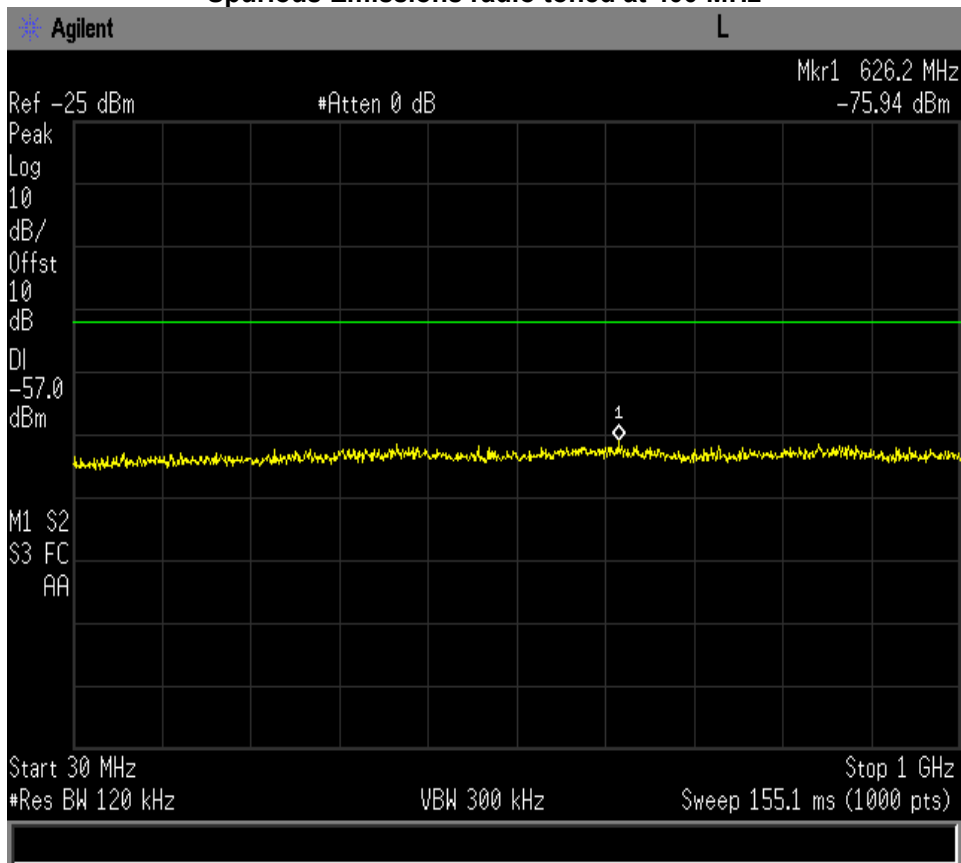
Spurious Emissions radio toned at 225 MHz



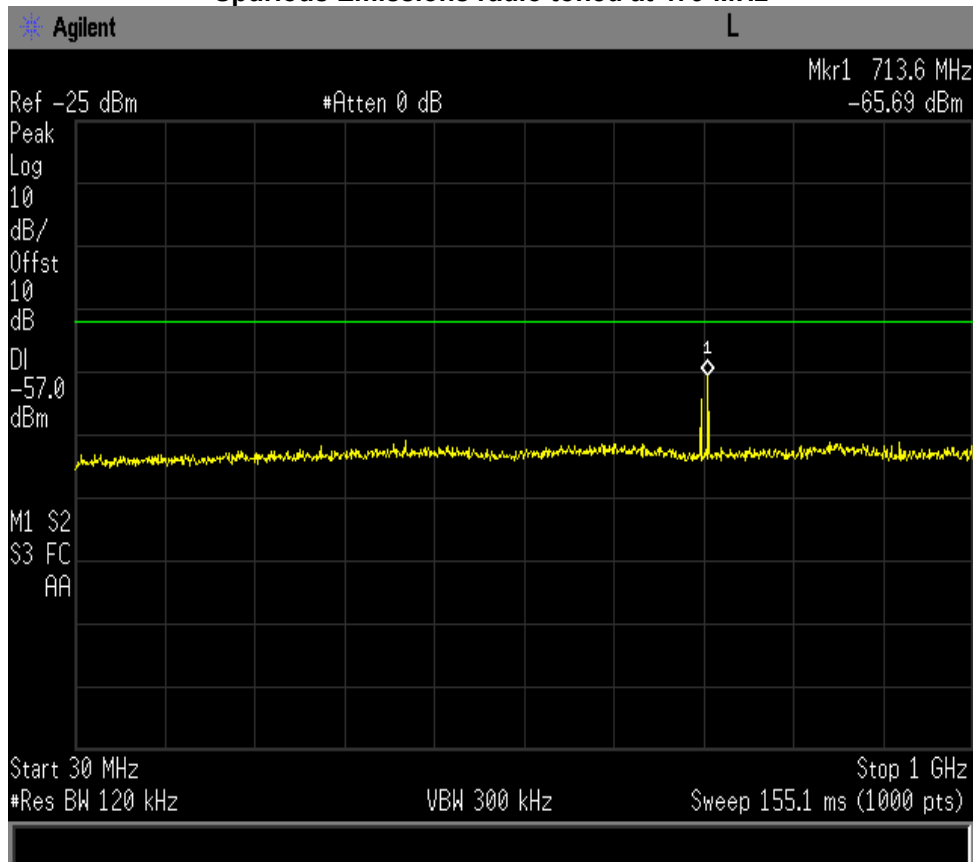
Spurious Emissions radio toned at 350 MHz



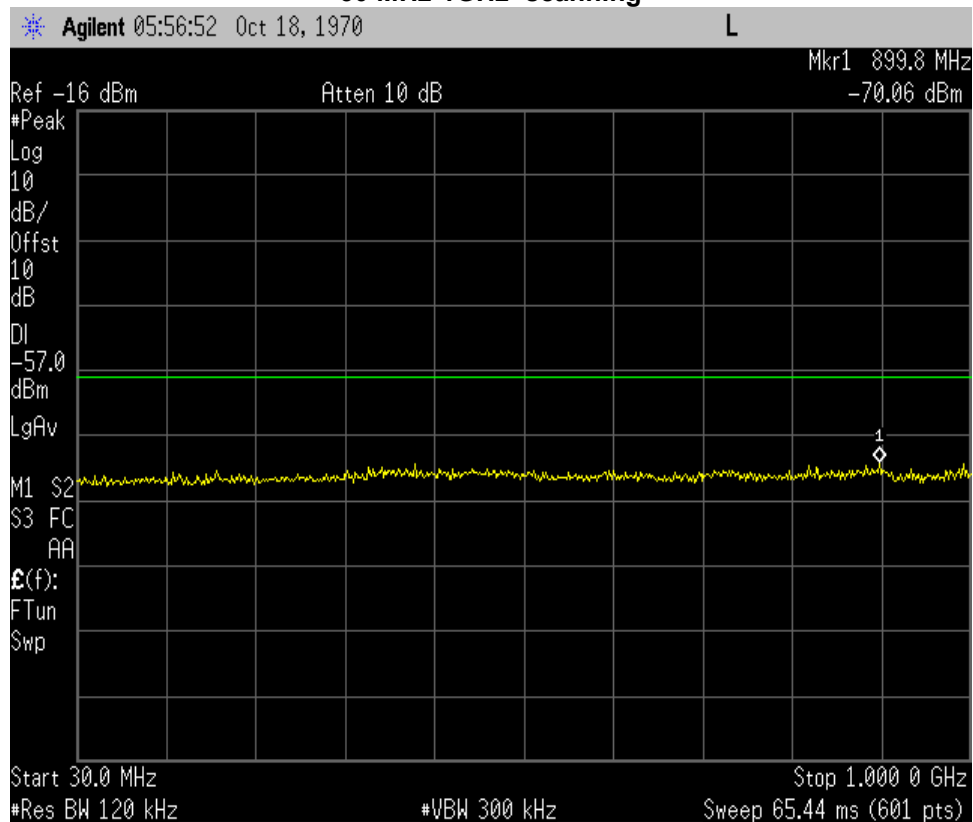
Spurious Emissions radio toned at 400 MHz



Spurious Emissions radio toned at 479 MHz



30 MHz-1GHz -scanning



15.107 A/C Powerline Conducted Emissions

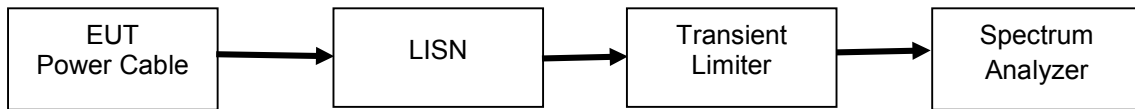
Engineer: Poona Saber

Test Date: 11/17/2020

Test Procedure

The EUT power cable was connected to a LISN and the monitored output of the LISN was connected to a transient limiter, which then connected directly to a spectrum analyzer. The conducted emissions from 150 kHz to 30 MHz were measured and compared to the specification limits.

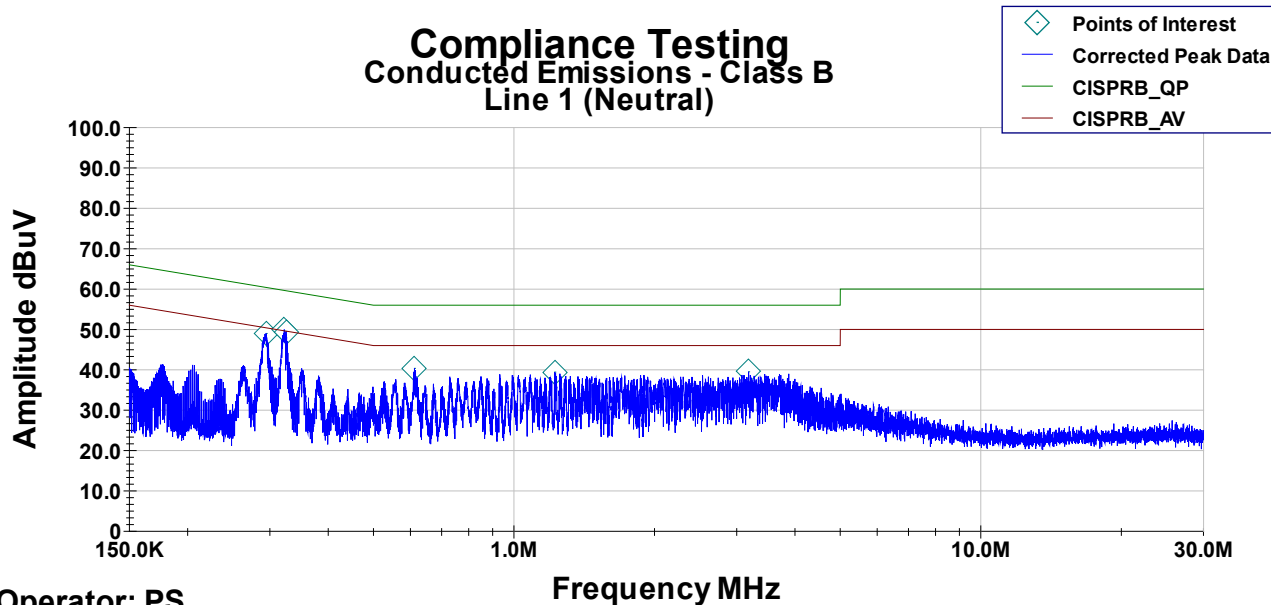
Test Setup



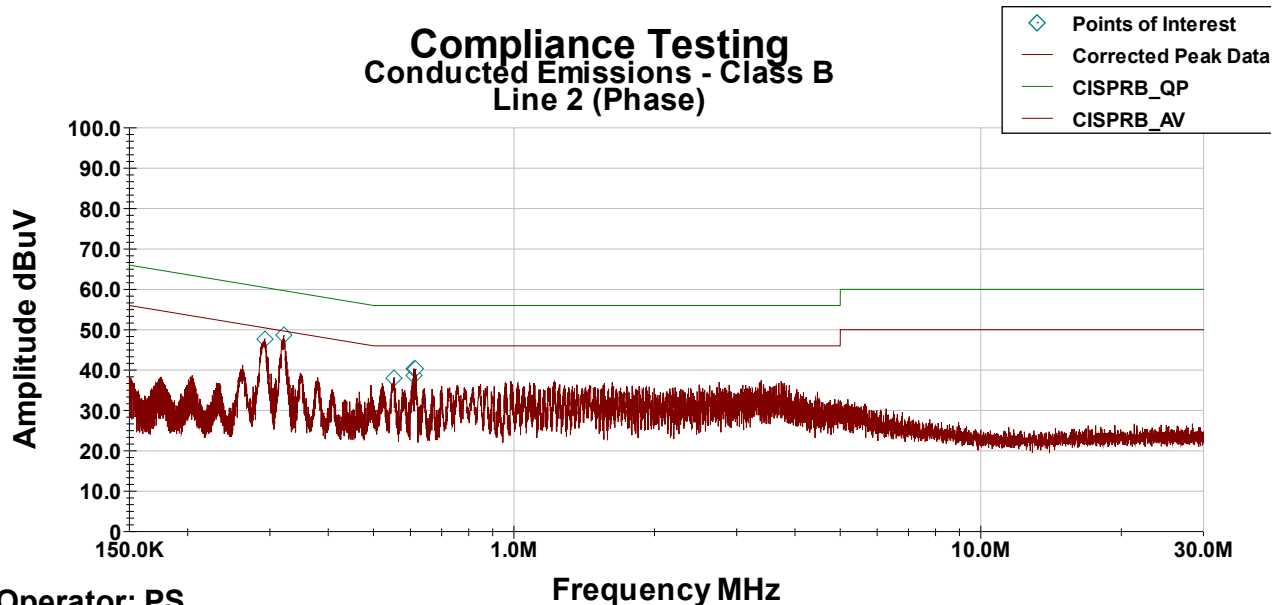
Conducted Emissions Test Results

Tested with Power Supply

Line 1 Peak Plot



Line 2 Peak Plot



All peak readings are below the quasi peak and average limits; therefore, no tabular data was recorded.

Line 1 Neutral Avg Detector

Frequency	Measured Value (dBuV)	LISN Correction Factor (dB)	Cable Loss (dB)	Transient Limiter (dB)	Final Data (dBuV)	Limit (dBuV)	Avg Margin (dB)
296.38 KHz	23.47	0.17	0.025	10.100	33.768	51.818	-18.050
321.72 KHz	28.40	0.16	0.026	10.100	38.691	51.094	-12.403
325.01 KHz	25.14	0.16	0.026	10.100	35.430	51.000	-15.570
613.15 KHz	13.71	0.10	0.031	10.100	23.941	46.000	-22.059
1.2219 MHz	13.00	0.08	0.041	10.100	23.224	46.000	-22.776
3.1719 MHz	8.58	0.08	0.080	10.114	18.857	46.000	-27.143

Line 2 Phase Avg Detector

Frequency	Measured Value (dBuV)	LISN Correction Factor (dB)	Cable Loss (dB)	Transient Limiter (dB)	Final Data (dBuV)	Limit (dBuV)	Avg Margin (dB)
289.96 KHz	29.63	0.17	0.024	10.100	39.926	52.001	-12.075
321.68 KHz	29.68	0.15	0.026	10.100	39.950	51.095	-11.145
551.92 KHz	17.72	0.09	0.030	10.100	27.936	46.000	-18.064
606.33 KHz	12.25	0.08	0.030	10.100	22.464	46.000	-23.536
609.1 KHz	15.06	0.08	0.030	10.100	25.267	46.000	-20.733
611.45 KHz	15.34	0.08	0.031	10.100	25.551	46.000	-20.449

Line 1 Neutral QP Detector

Frequency	Measured Value (dBuV)	LISN Correction Factor (dB)	Cable Loss (dB)	Transient Limiter (dB)	Final Data (dBuV)	Limit (dBuV)	QP Margin (dB)
296.38 KHz	34.130	0.173	0.025	10.100	44.428	61.818	-17.390
321.72 KHz	37.630	0.161	0.026	10.100	47.917	61.094	-13.176
325.01 KHz	35.430	0.160	0.026	10.100	45.716	61.000	-15.283
613.15 KHz	25.920	0.100	0.031	10.100	36.151	56.000	-19.849
1.2219 MHz	26.560	0.080	0.041	10.100	36.781	56.000	-19.219
3.1719 MHz	24.430	0.080	0.080	10.114	34.704	56.000	-21.296

Line 2 Phase QP Detector

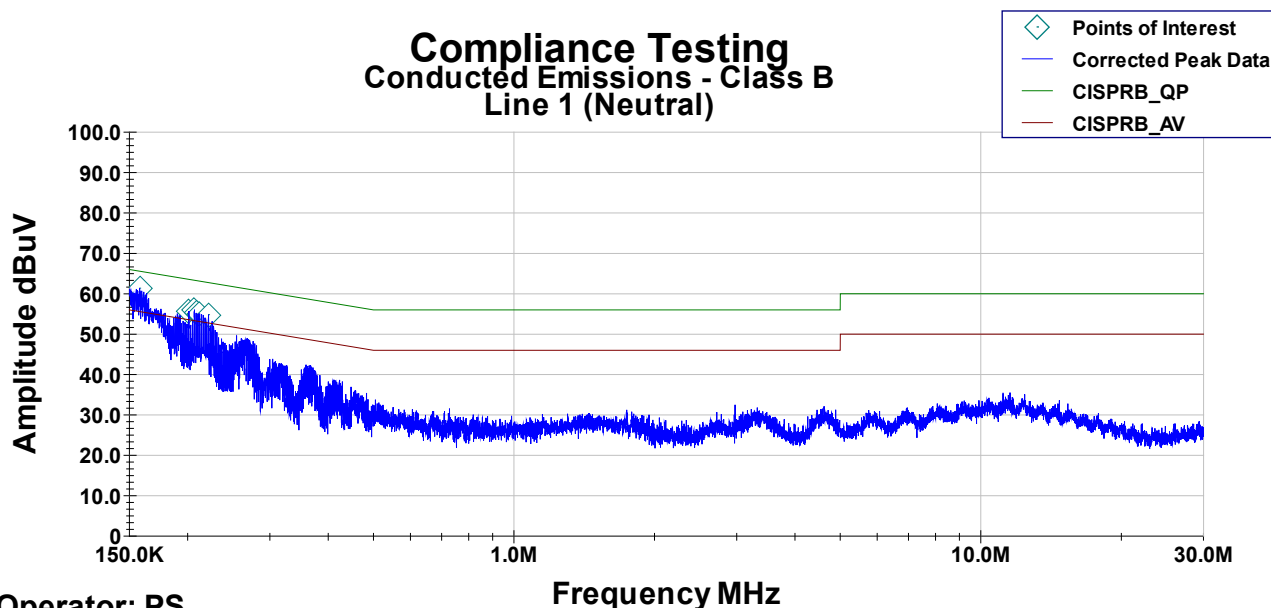
Frequency	Measured Value (dBuV)	LISN Correction Factor (dB)	Cable Loss (dB)	Transient Limiter (dB)	Final Data (dBuV)	Limit (dBuV)	QP Margin (dB)
289.96 KHz	35.34	0.17	0.024	10.100	45.633	62.001	-16.369
321.68 KHz	35.66	0.15	0.026	10.100	45.933	61.095	-15.162
551.92 KHz	24.54	0.09	0.030	10.100	34.760	56.000	-21.240
606.33 KHz	22.86	0.08	0.030	10.100	33.070	56.000	-22.930
609.1 KHz	24.33	0.08	0.030	10.100	34.540	56.000	-21.460
611.45 KHz	24.13	0.08	0.031	10.100	34.341	56.000	-21.659

Conducted Emissions Test Results

Tested with Battery

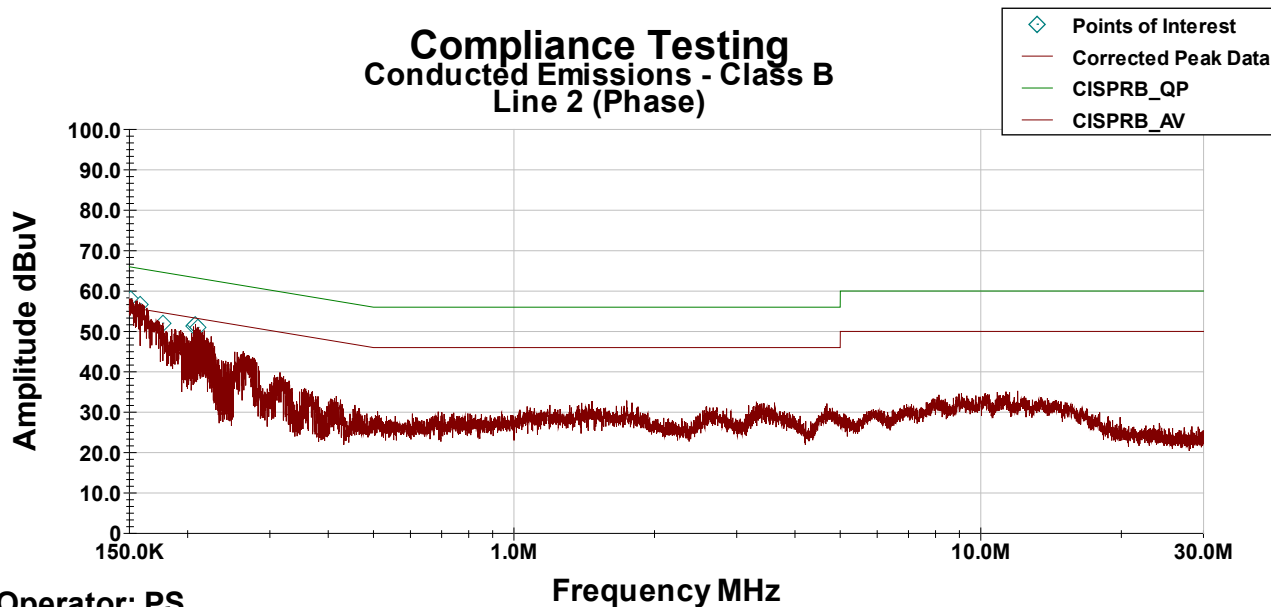
Line 1 Peak Plot

Compliance Testing Conducted Emissions - Class B Line 1 (Neutral)



Line 2 Peak Plot

Compliance Testing Conducted Emissions - Class B Line 2 (Phase)



All peak readings are below the quasi peak and average limits; therefore, no tabular data was recorded.

Line 1 Neutral Avg Detector

Frequency	Measured Value (dBuV)	LISN Correction Factor (dB)	Cable Loss (dB)	Transient Limiter (dB)	Final Data (dBuV)	Limit (dBuV)	Avg Margin (dB)
156.13 KHz	28.62	0.40	0.020	10.200	39.232	55.825	-16.593
204.56 KHz	23.99	0.27	0.020	10.100	34.384	54.441	-20.057
207.39 KHz	25.03	0.27	0.020	10.100	35.417	54.360	-18.944
209.17 KHz	26.66	0.27	0.020	10.100	37.048	54.309	-17.262
210.71 KHz	27.37	0.27	0.021	10.100	37.759	54.265	-16.507
214.19 KHz	28.88	0.26	0.021	10.100	39.258	54.166	-14.908

Line 2 Phase Avg Detector

Frequency	Measured Value (dBuV)	LISN Correction Factor (dB)	Cable Loss (dB)	Transient Limiter (dB)	Final Data (dBuV)	Limit (dBuV)	Avg Margin (dB)
150.78 KHz	26.97	0.44	0.020	10.200	37.624	55.978	-18.354
151.68 KHz	26.77	0.43	0.020	10.200	37.423	55.952	-18.529
164.55 KHz	24.32	0.38	0.020	10.155	34.873	55.584	-20.711
205.29 KHz	20.57	0.27	0.020	10.100	30.962	54.420	-23.458
208.5 KHz	22.20	0.27	0.020	10.100	32.590	54.329	-21.738
208.78 KHz	22.28	0.27	0.020	10.100	32.666	54.321	-21.654

Line 1 Neutral QP Detector

Frequency	Measured Value (dBuV)	LISN Correction Factor (dB)	Cable Loss (dB)	Transient Limiter (dB)	Final Data (dBuV)	Limit (dBuV)	QP Margin (dB)
156.13 KHz	45.370	0.395	0.020	10.200	55.985	65.825	-9.839
204.56 KHz	36.840	0.274	0.020	10.100	47.234	64.441	-17.207
207.39 KHz	38.300	0.270	0.020	10.100	48.690	64.360	-15.670
209.17 KHz	39.900	0.267	0.020	10.100	50.288	64.309	-14.022
210.71 KHz	39.920	0.265	0.021	10.100	50.306	64.265	-13.960
214.19 KHz	39.180	0.260	0.021	10.100	49.561	64.166	-14.605

Line 2 Phase QP Detector

Frequency	Measured Value (dBuV)	LISN Correction Factor (dB)	Cable Loss (dB)	Transient Limiter (dB)	Final Data (dBuV)	Limit (dBuV)	QP Margin (dB)
150.78 KHz	43.06	0.44	0.020	10.200	53.717	65.978	-12.261
151.68 KHz	42.88	0.43	0.020	10.200	53.533	65.952	-12.419
164.55 KHz	39.52	0.38	0.020	10.155	50.076	65.584	-15.508
205.29 KHz	33.42	0.27	0.020	10.100	43.812	64.420	-20.608
208.5 KHz	35.35	0.27	0.020	10.100	45.737	64.329	-18.592
208.78 KHz	35.64	0.27	0.020	10.100	46.026	64.321	-18.294

15.109 Radiated Emissions

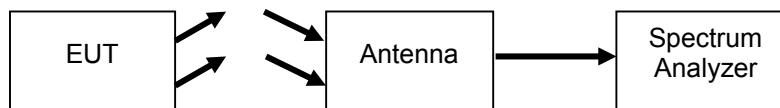
Engineer: Poona Saber

Test Date: 11/17/19

Test Procedure

The EUT was tested in a semi-anechoic chamber with the turntable set 3m from the receiving antenna. A spectrum analyzer was used to verify that the EUT met the requirements for Radiated Emissions. The EUT was tested by rotating it 360 degrees with the antennas in both the vertical and horizontal orientation while raised from 1 to 4 meters to ensure the signal levels were maximized. All emissions from 30 MHz to 1 GHz were examined.

Test Setup



Settings below 1 GHz

RBW = 120 KHz

VBW = 300 KHz

Detector – Quasi Peak

Settings above 1 GHz

RBW = 1 MHz

VBW = 3 MHz

Detector – Peak

Sample Calculations

Corrected Value = Measured Value + Correction factor

Correction factor = ACF + Cable loss

Radiated Emissions

30 MHz-1GHz

Emission Frequency (MHz)	Measured Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Antenna Polarity (V/H)	Turntable Position (deg)	Detector (QP,PK,Avg)
30.00	29.661	40.000	-10.339	325.000	V	259.000	PK
32.96	30.212	40.000	-9.788	400.000	H	252.000	PK
882.28	27.227	46.000	-18.773	395.000	H	282.000	PK
908.93	26.615	46.000	-19.385	325.000	H	259.000	PK
922.19	27.480	46.000	-18.520	395.000	H	344.000	PK
930.13	28.359	46.000	-17.641	325.000	H	359.000	PK
940.19	28.385	46.000	-17.615	395.000	H	282.000	PK



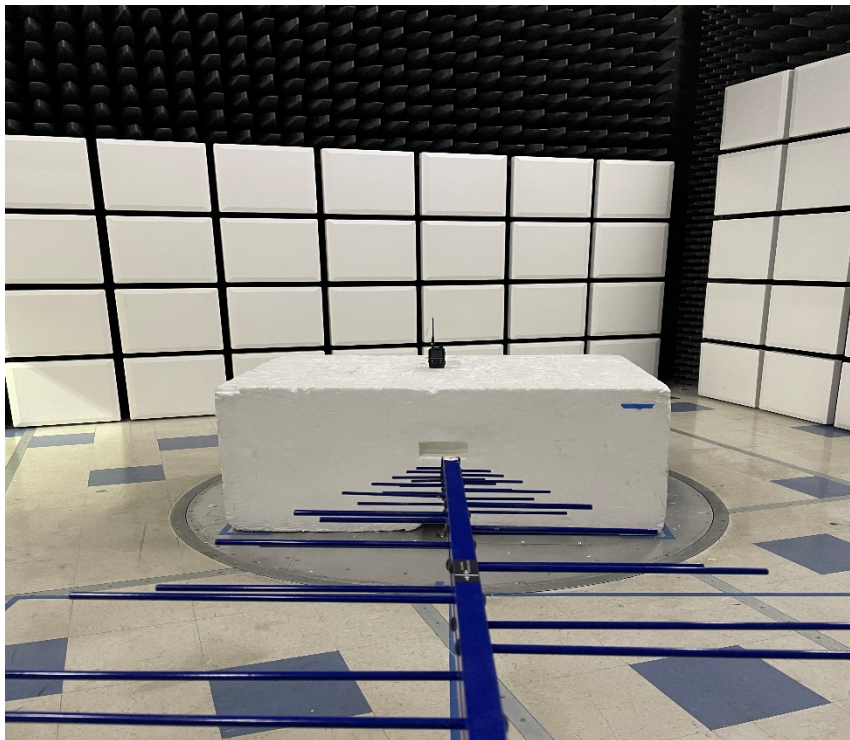
Test Equipment Utilized

Description	Manufacturer	Model #	CT Asset #	Last Cal Date	Cal Due Date
EMI Receiver	HP	8546A	i00033	5/18/20	5/18/21
Transient Limiter	Com-Power	LIT-153	i00123	Verified on: 11/17/2020	
Humidity / Temp Meter	Newport	IBTHX-W-5	i00282	8/28/2020	8/28/2021
Bi-Log antenna	Chase	CBL6111C	i00267	8/28/2020	8/28/2022
AC Power Source	Behlman	BL 6000	i00362	Verified on: 11/17/2020	
EMI Analyzer	Agilent	E7405A	i00379	1/21/20	1/21/21
ESA Spectrum Analyzer	Agilent	E4407B	i00331	12/18/19	12/18/2020
3 Meter Semi-Anechoic Chamber	Panashield	3 Meter Semi-Anechoic Chamber	i00428	7/17/2020	7/17/2023
LISN	COM-Power	LI-125A	i00446	4/28/20	4/28/22
LISN	COM-Power	LI-125A	i00448	4/28/20	4/28/22

In addition to the above listed equipment standard RF connectors and cables were utilized in the testing of the described equipment. Prior to testing these components were tested to verify proper operation.

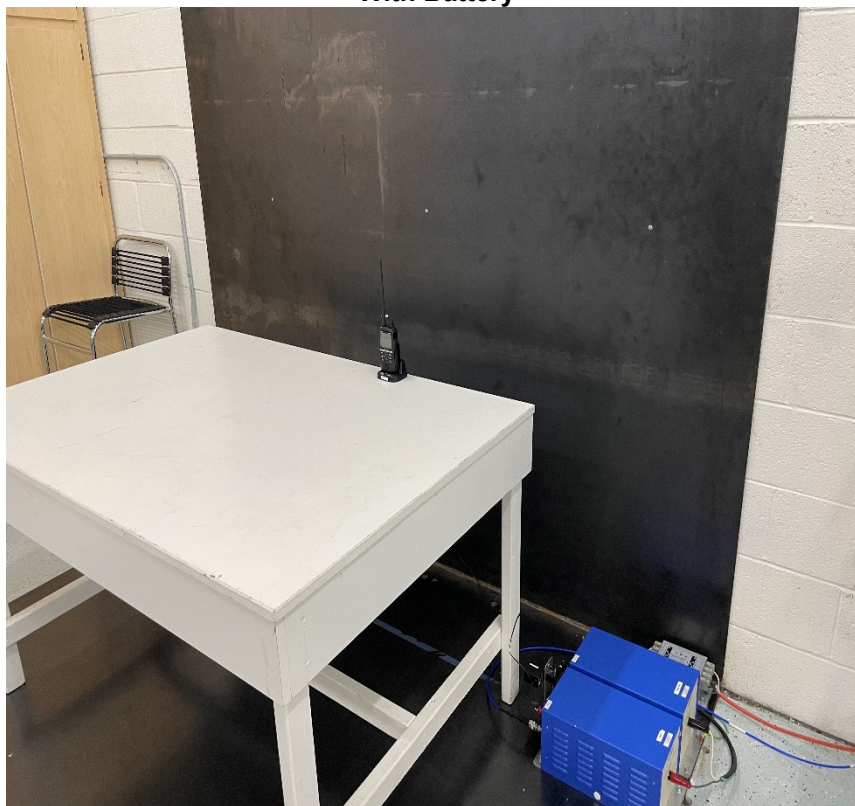
END OF TEST REPORT

Radiated Emissions Test Setup Photos



A/C Conducted Emissions Test Setup Photos

With Battery



With Power Supply



With Power Supply Side

