Report on the FCC and ISED Testing of the;

Entrust Datacard Corp.
13.56 MHz RFID Module, model 523442
FCC ID: GDI-523442001
IC: 889B-523442001

In accordance with:
FCC Part 15 Subpart C §15.225
ISED RSS-210 Issue 9, August 2016, Amendment November 2017

America

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Prepared for: Entrust Datacard Corp.
1187 Park Place
Shakopee, MN 55372 USA

COMMERCIAL-IN-CONFIDENCE

Document Number: NC72152791.1 | Issue: 1

SIGNATURE			
Joel T. Schneider			
NAME	**JOB TITLE**	**RESPONSIBLE FOR**	**ISSUE DATE**
Joel Schneider	Senior EMC Engineer	Authorized Signatory	26 September 2019

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD America, Inc. document control rules.

FCC Accreditation Designation Number US1148 New Brighton, MN Test Laboratory	Innovation, Science, and Economic Development Canada Accreditation Site Number 4512A New Brighton, MN Test Laboratory

EXECUTIVE SUMMARY

A sample of this product was tested and found to demonstrate compliance with FCC 47 CFR Part 15 Subpart C §15.225, ISED RSS-210 Issue 9 August 2016, Amendment November 2017

A2LA Cert. No. 2955.11

ACCREDITATION
Our A2LA Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our A2LA Accreditation.

TÜV SÜD America Inc
141 14th Street NW
New Brighton, MN 55112

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Signatures of the individuals responsible for testing the product

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 15 Subpart C and ISED RSS-210. The sample tested was found to comply with the requirements defined in the applied rules.

NAME	RESPONSIBLE FOR	SIGNATURE
Greg Jakubowski	EMC testing	

If this report is issued in support of the Supplier's Declaration of Conformity type of FCC authorization the following signature block need to be included for the responsible party to sign at a later date.

Signature of an official of the responsible party, as designated in § 2.909

SIGNATURE		
NAME	**COMPANY**	**DATE**

Contents

1 Report Summary

1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Table 1.1-1 Modification Record

Issue	Description of Change	Date of Issue
1	First Issue	26 September 2019

1.2 Introduction

Purpose	The purpose of this report is to demonstrate compliance with Part 15 Subpart C of the FCC's Code of Federal Regulations and ISED Canada's Radio Standard Specification RSS-210 Certification.
Applicant	Mark Forster
Manufacturer	Entrust Datacard Corp.
Applicant's Email Address	Mark.forster@entrustdatacard.com
Model Number(s)	523442
Serial Number(s)	n/a
Hardware Version(s)	n/a
Software Version(s)	n/a
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15 Subpart C / ISED RSS-210 / Issue 9 / August 2016, Amendment November 2017
Order Number	72152791
Date of Receipt of EUT	17 September 2019
Start of Test	17 September 2019
Finish of Test	18 September 2019
Related Document(s)	523442001_Test Plan-PIF Rev 16.docx

1.3 Summary of Results

The 13.56 MHz RFID module, model 523442, manufactured by Entrust Datacard Corp. meets the requirements of FCC Part 15 Subpart C and ISED Canada's Radio Standards Specification RSS-210 for the tests documented herein. A brief summary of the tests carried out in accordance with the specifications are shown below.

Table 1.3-1 – Summary of Results

Section	FCC § / ISED standard & clause	Test description	Result	Method
2.1	15.203 /	Antenna requirement	Pass	n/a
2.2	15.207 / RSS-Gen 7.2	AC power lines conducted emissions	Pass	ANSI C63.10-2013 6.2
2.3	15.225(a)(b)(c) / RSS-210 B.6(a)(b)(c)	Operation within the band 13.110-14.010 MHz	Pass	ANSI C63.10-2013 6.4
2.4	15.225(d) / RSS-210 B.6(d)	Out of band emissions below 30MHz	Pass	ANSI C63.10-2013 6.4
2.5	15.225(d) / RSS-210 B.6(d)	Out of band emissions 30 - 1000MHz	Pass	ANSI C63.10-2013 6.5
2.6	2.1049 / RSS-Gen 6.7	Occupied Bandwidth	Pass	ANSI C63.10-2013 6.9
2.7	15.225(e) / RSS-210 B.6	Frequency stability	Pass	ANSI C63.10-2013 6.8

Table 1.3-2 – Test Accreditation

Test Name	Name of Tester	Accreditation
AC power lines conducted emissions	Greg Jakubowski	A2LA
Operation within the band 13.110-14.010 MHz	Greg Jakubowski	A2LA
Out of band emissions below 30MHz	Greg Jakubowski	A2LA
Out of band emissions 30 - 1000MHz	Greg Jakubowski	A2LA
Occupied Bandwidth	Greg Jakubowski	A2LA
Frequency stability	Greg Jakubowski	A2LA

1.4 Product Information

1.4.1 Technical Description

The Equipment Under Test (EUT) was a PWA, RFID module.

Table 1.4.1-1 – Support Equipment Descriptions

Make/Model	Description
	Laptop computer with power supply
515058-xxx	Mainboard powered by Mega ATS072T-P240, 24 VDC, brick type power supply

1.4.2 Modes of Operation

The single channel device was operated in a continuous on mode at 13.56 MHz in either a CW or modulated state. For radiated emissions, the device was oriented in 3 orthogonal X, Y, and Z axes. The worst-case Y axis is reported in this document.

1.5 Deviations from the Standard

No deviations from the applicable test standard were made during testing.

1.6 EUT Modification Record

The table below details modifications made to the EUT during the test program. The modifications incorporated during each test are recorded on the appropriate test pages.

Table 1.6-1 – Modification Record

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date
None			

1.7 Test Location

TÜV SÜD conducted the following tests at our New Brighton, MN Test Laboratory.

Office address:
TÜV SÜD America
141 14th Street NW
New Brighton, MN 55112 USA

2 Test Details

2.1 Antenna requirement

2.1.1 Specification Reference

FCC 47 CFR Part 15 Subpart C, §15.203

2.1.2 Conclusion

The antenna is part of the printed circuit board which cannot be detached without damaging the device. Therefore, the antenna meets the requirements of §15.203.

2.2 AC power lines conducted emissions

2.2.1 Specification Reference

FCC 47 CFR Part 15 Subpart C, §15.207
ISED RSS-Gen clause 7.2

2.2.2 Equipment Under Test and Modification State

As shown in §1.2 with modifications if any as shown in §1.6.

2.2.3 Date of Test

18 September 2019

2.2.4 Test Method

The EUT is powered by its main control board which is powered by an AC to DC power supply (PS). The EUT, control board, and PS were placed on a non-conductive table 0.8 m above a reference ground plane and 0.4 m away from a vertical coupling plane. AC power was connected to the PS through an Artificial Mains Network (AMN). Conducted disturbance voltage measurements on mains lines were made at the output of the AMN. The AMN was placed 0.8 m from the boundary of the EUT and bonded to the reference ground plane. The system was assessed against the FCC §15.207 limits.

2.2.5 Environmental Conditions

The EUT was evaluated within the temperature and humidity range of the EUT as specified by the manufacturer. When the manufacturer does not specify climatic parameters for the EUT, all tests are performed within the ambient temperature range of 20°C to 40°C and humidity range of 30% to 80%.

2.2.6 Additional Observations

Measurements were performed using BAT-EMC v3.18 automated software. The reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only. See Section 2.2.7 for a sample computation.

2.2.7 Sample Computation (Mains Terminal Disturbance Voltage)

Measuring equipment raw measurement (dBµV) @ 150kHz			30.0
Correction Factor (dB)	TEMC00002 - LISN	0.03	10.53
	Cable 1	10.50	
Reported Quasi-peak Final Measurement (dBµV) @ 150kHz			40.53

2.2.8 Test Results

Results for Configuration and Mode: Transmit signal continuously on and modulated.

Performance assessment of the EUT made during this test: **Pass**
Detailed results are shown below.

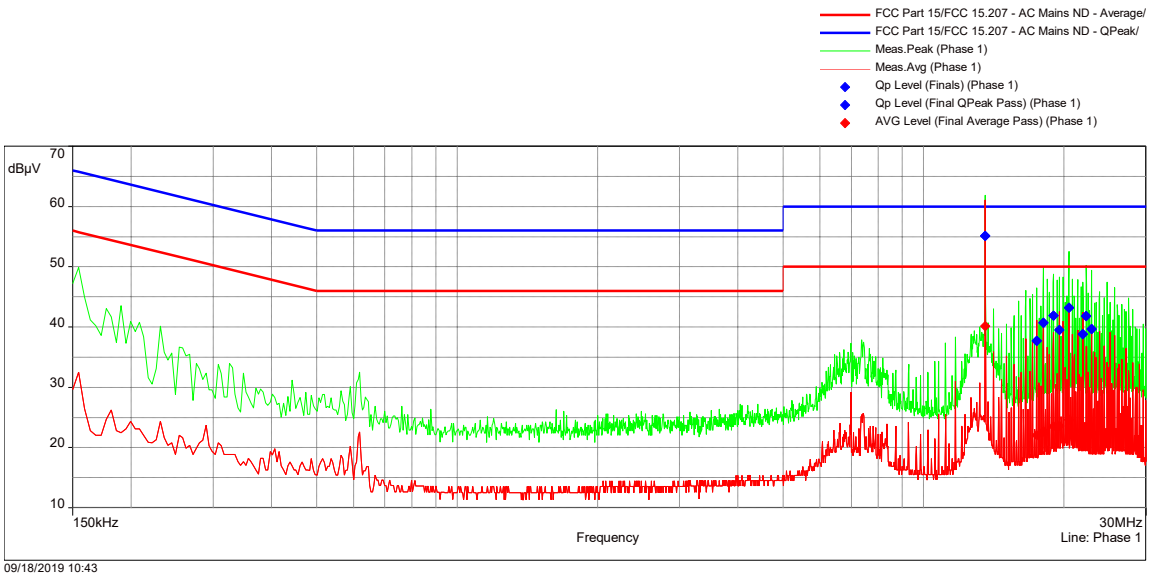

Figure 2.2.8-1 - Graphical Results - AC Mains L1 Plot

Table 2.2.8-1 – Results on the AC Power Port L1

Frequency	Average (dBuV)	Average Limit (dBuV)	Average Margin (dB)	QPeak (dBuV)	QPeak Limit (dBuV)	QPeak Margin (dB)	Result
13.56MHz	40.14	50.00	-9.86	55.13	60.00	-4.87	Pass
17.493MHz	22.05	50.00	-27.95	37.74	60.00	-22.26	Pass
18.0555MHz	22.65	50.00	-27.35	40.69	60.00	-19.31	Pass
18.9825MHz	23.53	50.00	-26.47	41.91	60.00	-18.09	Pass
19.545MHz	23.61	50.00	-26.39	39.51	60.00	-20.49	Pass
20.481MHz	24.61	50.00	-25.39	43.18	60.00	-16.82	Pass
21.9705MHz	22.76	50.00	-27.24	38.83	60.00	-21.17	Pass
22.326MHz	23.41	50.00	-26.59	41.82	60.00	-18.18	Pass
22.9065MHz	22.36	50.00	-27.64	39.66	60.00	-20.34	Pass

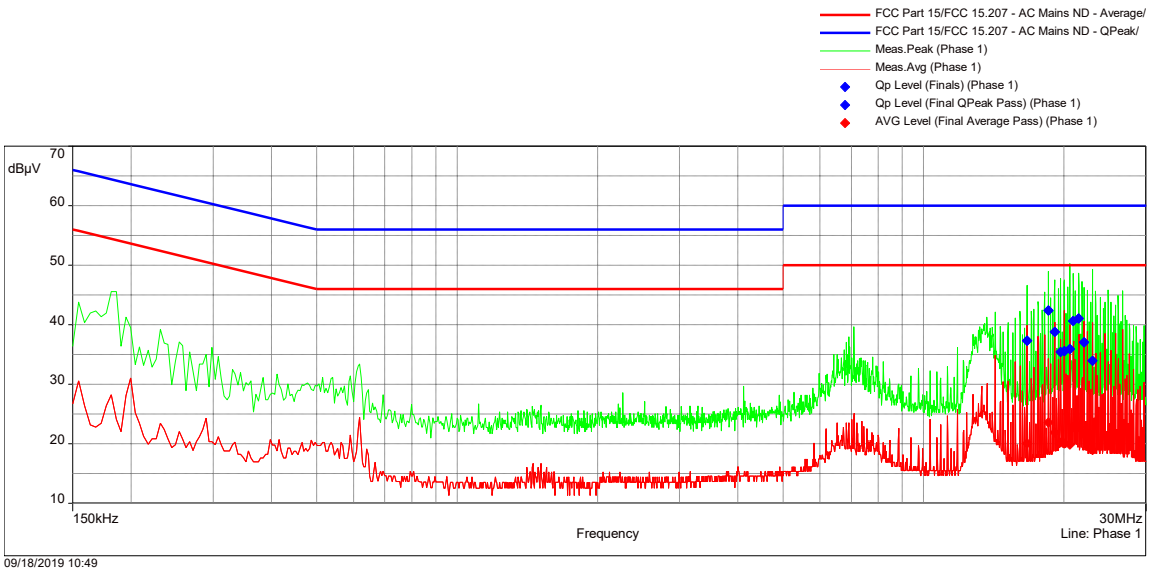

Figure 2.2.8-2 - Graphical Results - AC Mains L2 Plot

Table 2.2.8-2 – Results on the AC Power Port L2

Frequency	Average (dBuV)	Average Limit (dBuV)	Average Margin (dB)	QPeak (dBuV)	QPeak Limit (dBuV)	QPeak Margin (dB)	Result
16.674MHz	20.08	50.00	-29.92	37.36	60.00	-22.64	Pass
18.519MHz	23.62	50.00	-26.38	42.39	60.00	-17.61	Pass
19.0995MHz	21.88	50.00	-28.12	38.78	60.00	-21.22	Pass
19.662MHz	20.19	50.00	-29.81	35.42	60.00	-24.58	Pass
20.031MHz	20.06	50.00	-29.94	35.58	60.00	-24.42	Pass
20.5935MHz	19.89	50.00	-30.11	35.92	60.00	-24.08	Pass
20.9445MHz	22.85	50.00	-27.15	40.66	60.00	-19.34	Pass
21.5205MHz	22.80	50.00	-27.20	41.04	60.00	-18.96	Pass
22.083MHz	21.60	50.00	-28.40	37.07	60.00	-22.93	Pass
23.019MHz	18.92	50.00	-31.08	33.94	60.00	-26.06	Pass

2.2.9 Test Location and Test Equipment Used

The tests were carried out in New Brighton, MN using equipment listed below in Table 2.2.10-1.
Test Area: GRP2

Table 2.2.10-1 Conducted emissions. Test equipment list

Device #	Manufacturer	Description	Model	Serial #	Cal Code	Cal Date	Cal Due
NBLE02991	Inmet	Attenuator, 20dB	18N10W-20dB	2	B	10/29/2018	10/29/2019
NBLE11430	Rohde & Schwarz	Receiver, 20 Hz-40 GHz	ESI40	835193/007	G	04/30/2019	04/30/2020
WRLE10945	Fischer Custom Comm.	LISN	FCC-LISN-50-25-2-10	120309	G	08/08/2019	08/08/2020

Cal Code G = Calibration performed by an accredited outside source.
Cal Code B = Calibration verification performed internally.
Cal Code Y = Passive Device, or Calibration not required when used with other calibrated equipment.

2.3 Operation within the band 13.110-14.010 MHz

2.3.1 Specification Reference

FCC 47 CFR Part 15 Subpart C, §15.225(a)(b)(c)
ISED RSS-210 B.6(a)(b)(c)

2.3.2 Equipment Under Test and Modification State

As shown in §1.2 with modifications if any as shown in §1.6.

2.3.3 Date of Test

17 September 2019

2.3.4 Test Method

ANSI C63.10: 2013. Section 6.4. Measurements were performed in a semi anechoic chamber. The fundamental emission was measured at 3m & 10m to determine roll off over distance and calculate the extrapolated levels at 30m. The EUT was oriented in 3 orthogonal X, Y, and Z axes. The worst-case Y axis being reported and shown in the test pictures. The final fundamental level and in band emissions were measured at 10m and extrapolated to 30m. The EUT was rotated 360° and the magnetic loop antenna rotated about the vertical axis to maximize emissions. The spectrum analyzer's RBW = 9kHz, detector = CISPR quasi-peak, reference level offset = the antenna correction factor + the distance roll off so that the Y scale = the extrapolated level in dBuV/m at 30m.

2.3.5 Environmental Conditions

The EUT was evaluated within the temperature and humidity range of the EUT as specified by the manufacturer. When the manufacturer does not specify climatic parameters for the EUT, all tests are performed within the ambient temperature range of 20°C to 40°C and humidity range of 30% to 80%.

2.3.6 Test Results

Performance assessment of the EUT made during this test: **Pass.**
Detailed results are shown below.

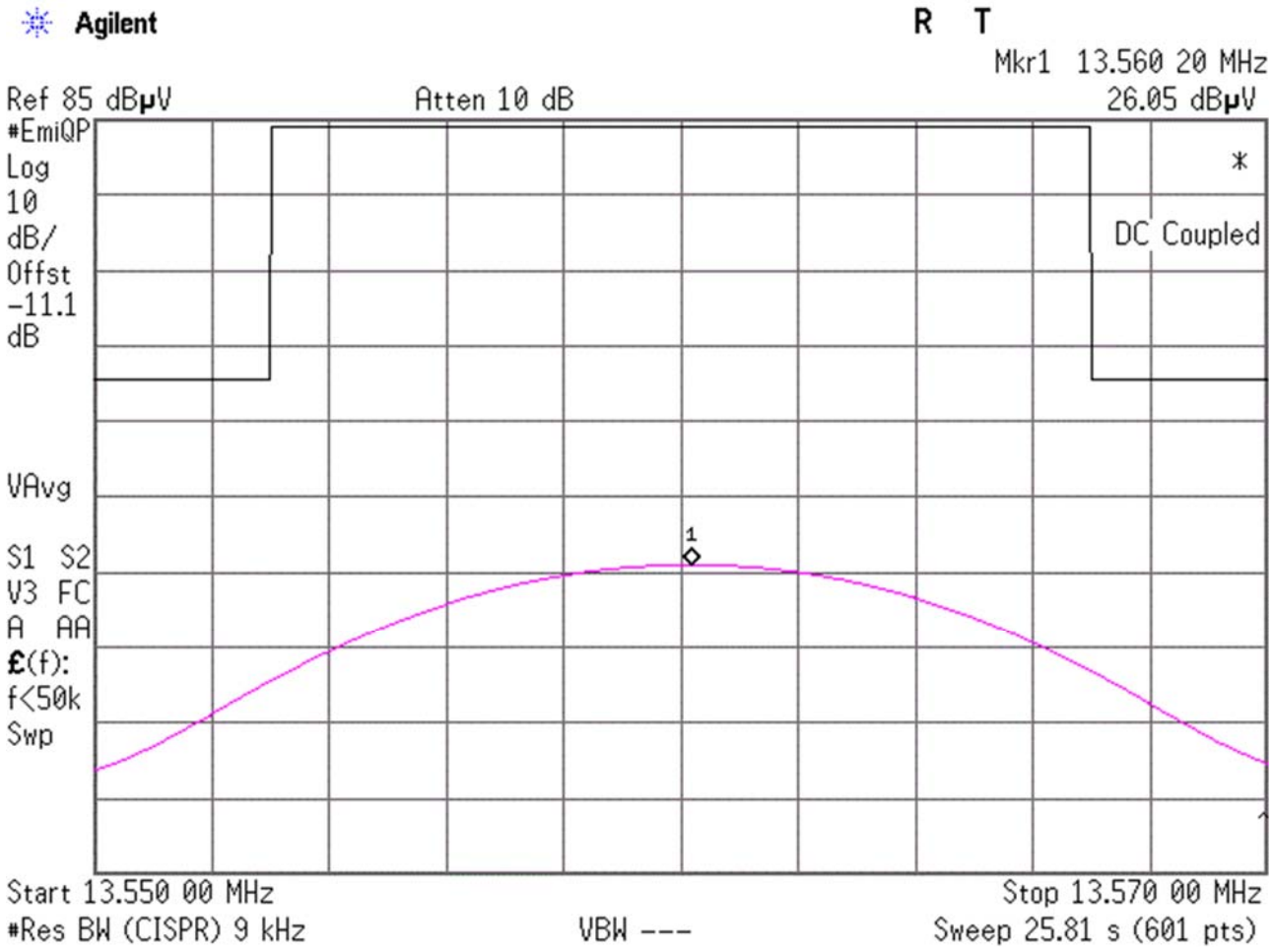

Figure 2.3.6-1 Fundamental field strength. Corrected Y scale = dBuV/m at 30 meters

Ref level offset = 11.1 antenna correction factor + negligible cable loss – 22.2 dB 10m/30m extrapolation

Table 2.3.6-1 Fundamental field strength

Frequency (MHz)	30 m extrapolated Corrected Level (dBuV/m)	30m Limit (dBuV/m)	Margin (dB)
13.56	26.05	84	57.95

Maximum level at 3 meters = 71.15 dBµV/m

Maximum level at 10 meters = 48.6 dBµV/m

This indicates an extrapolation falloff of 45 dB/decade, or 40 dB/decade as allowed by rules, to be appropriate.

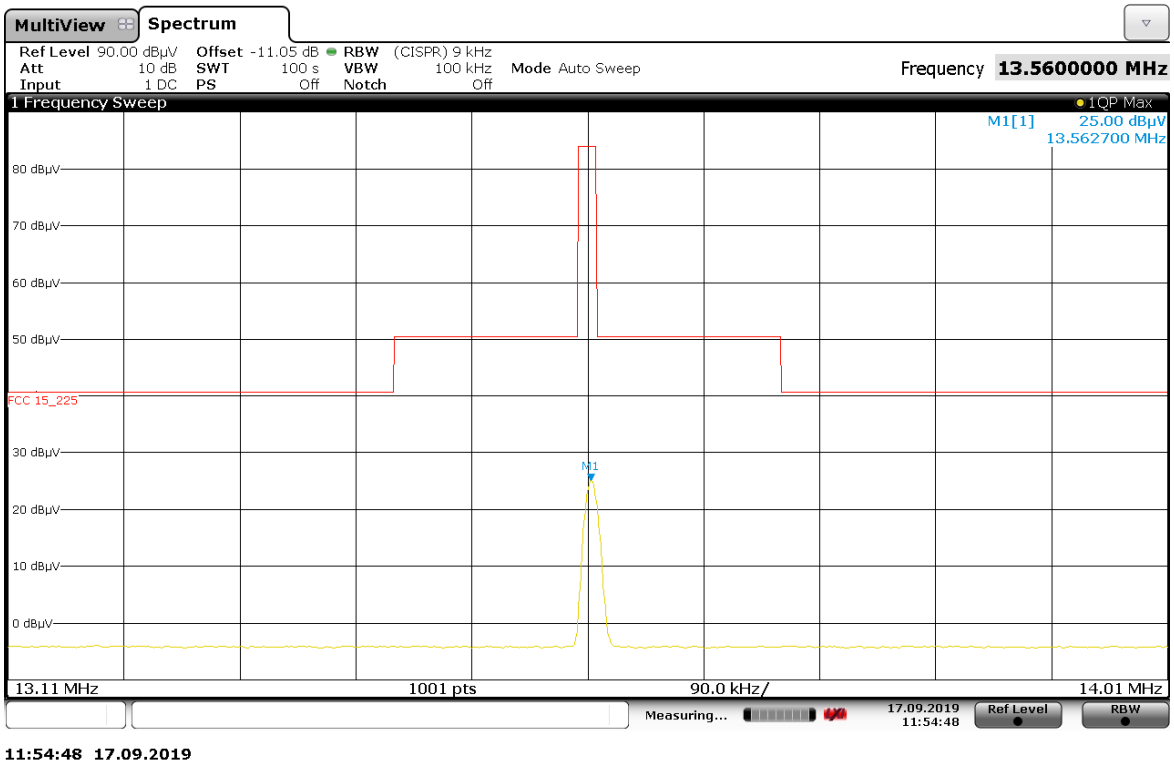

Figure 2.3.6-2 In band emissions 13.11 – 14.01MHz

2.3.7 Test Location and Test Equipment Used

The tests were carried out in New Brighton, MN using equipment listed below in Table 2.3.8-1.
Test Area: LTS

Table 2.3.8-1 Operation within the band. Test equipment list

Device #	Manufacturer	Description	Model	Serial #	Cal Code	Cal Date	Cal Due
NBLE03366	Agilent Technologies	Spectrum Analyzer	E4440A	MY42510427	G	10/23/2018	10/23/2019
WRLE02418	EMCO/EMC Test	Antenna, Loop	6502	2215	G	09/25/2018	09/25/2020
NBLE11555	Rohde & Schwarz	Receiver, 2 Hz-44 GHz	ESW44	101537	G	04/26/2019	04/26/2020

Cal Code G = Calibration performed by an accredited outside source.
Cal Code B = Calibration verification performed internally.
Cal Code Y = Passive Device, or Calibration not required when used with other calibrated equipment.

2.4 Out of band emissions below 30MHz

2.4.1 Specification Reference

FCC 47 CFR Part 15 Subpart C, §15.225(d)
ISED RSS-210 B.6(d)

2.4.2 Equipment Under Test and Modification State

As shown in §1.2 with modifications if any as shown in §1.6.

2.4.3 Date of Test

17 September 2019

2.4.4 Test Method

ANSI C63.10: 2013. Section 6.4. Measurements were performed in a semi anechoic chamber. The emissions were measured at 3m. The spectrum analyzer results were offset corrected so that the Y scale is in dBuV/m at the limit distance. 300m limit 9kHz – 490kHz, 30m limit 490kHz – 30MHz. The offset, within a given frequency range, was determined by summing the worst-case antenna correction factor with a 40dB/decade distance extrapolation. The spectrum analyzer's settings were RBW 9kHz, Detector peak, Trace Max hold. The EUT was rotated 360°. A worst case 9kHz RBW instead of 200Hz was used from 9kHz to 150kHz and peak detector instead of quasi-peak or average.

2.4.5 Environmental Conditions

The EUT was evaluated within the temperature and humidity range of the EUT as specified by the manufacturer. When the manufacturer does not specify climatic parameters for the EUT, all tests are performed within the ambient temperature range of 20°C to 40°C and humidity range of 30% to 80%.

2.4.6 Test Results

Performance assessment of the EUT made during this test: **Pass**
Detailed results are shown below.

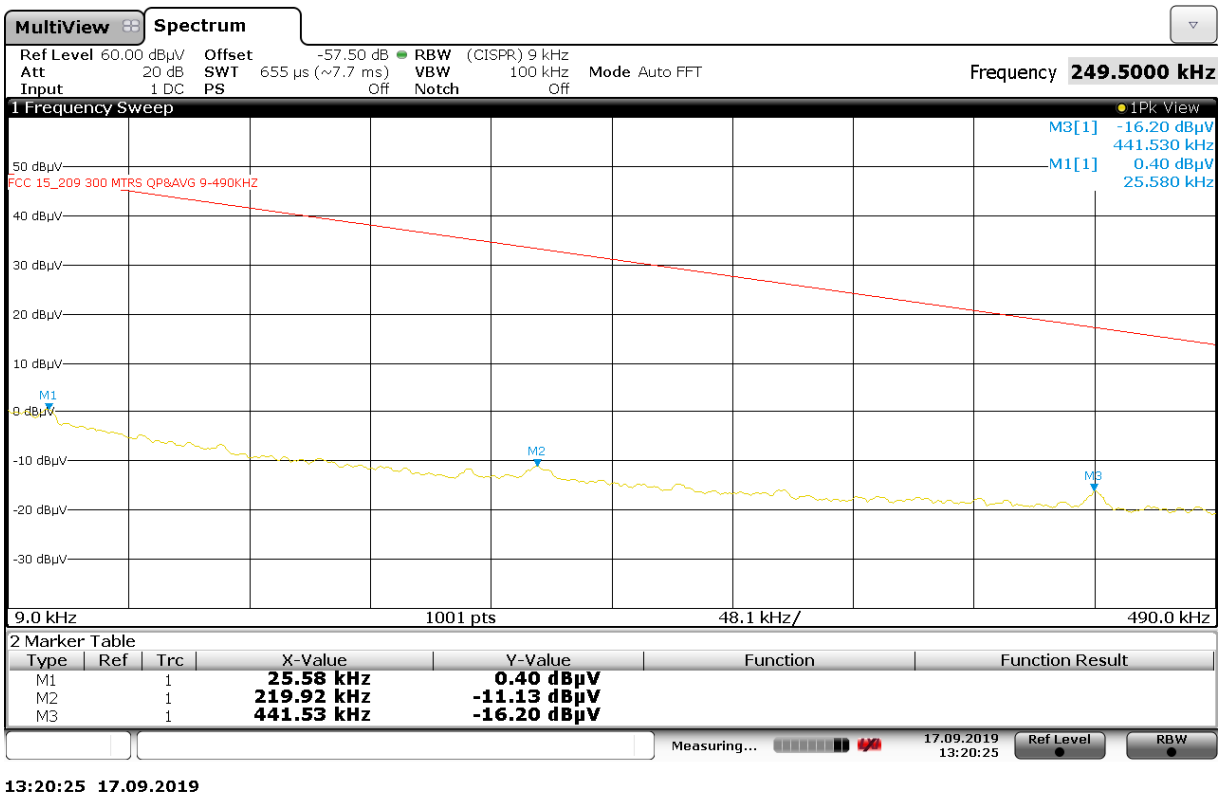

Figure 2.4.6-1 Out of band emissions 9kHz–490kHz. Corrected Y scale = dBuV/m at 300 meters

Table 2.4.6-1 Field strength levels at 300m. 9kHz–490kHz

Frequency (kHz)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
25.58	0.4	39.45	39.05
219.92	-11.13	20.76	31.89
441.53	-16.2	14.71	30.91

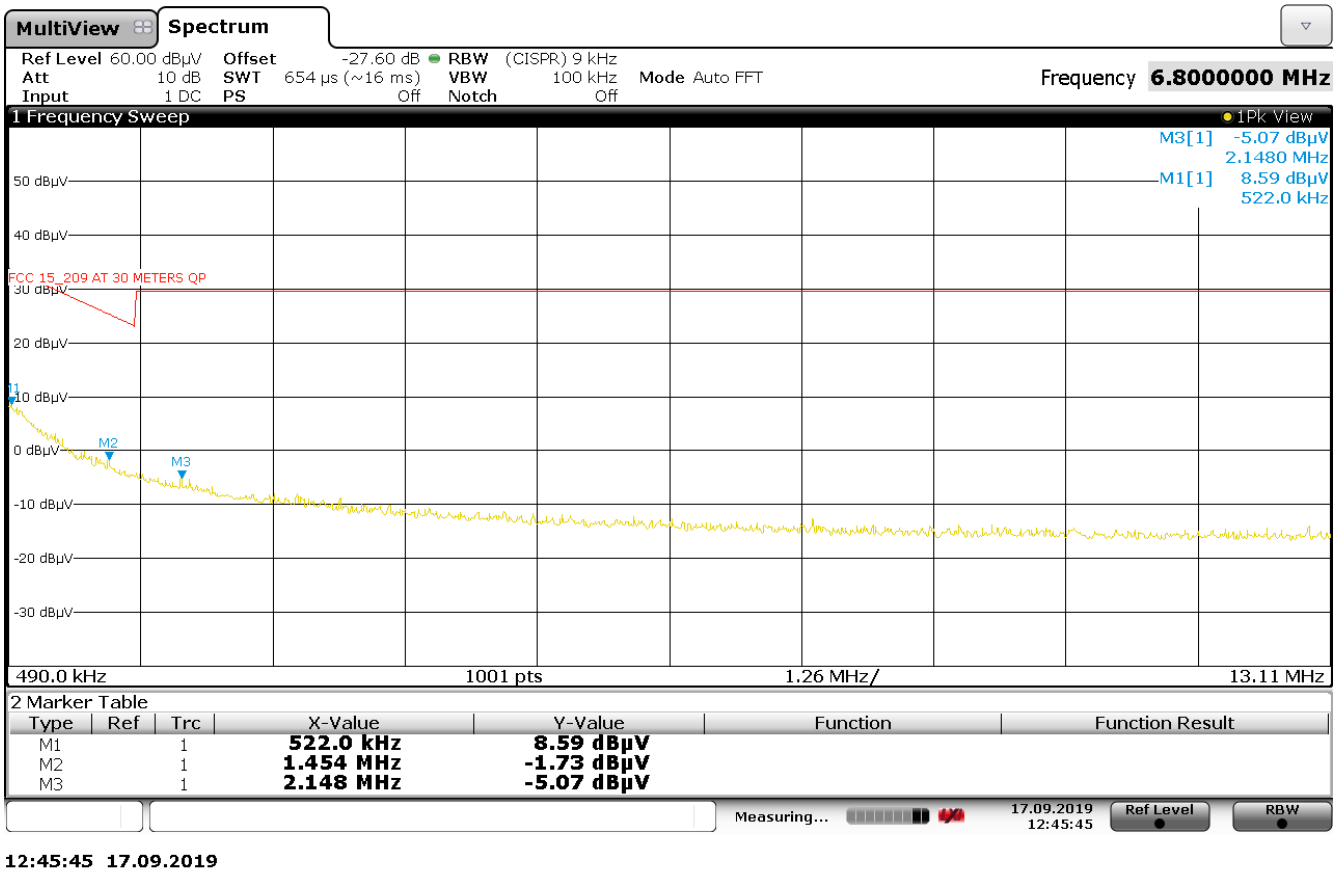

Figure 2.4.6-2 Out of band/lower band edge emissions 490kHz–13.11MHz. Corrected Y scale = dBuV/m at 30 meters

Table 2.4.6-2 Field strength levels at 30m. 490kHz–13.11MHz

Frequency (kHz)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
522.0	8.59	33.25	24.66
1454	-1.73	24.35	26.08
2148	-5.07	29.54	34.61

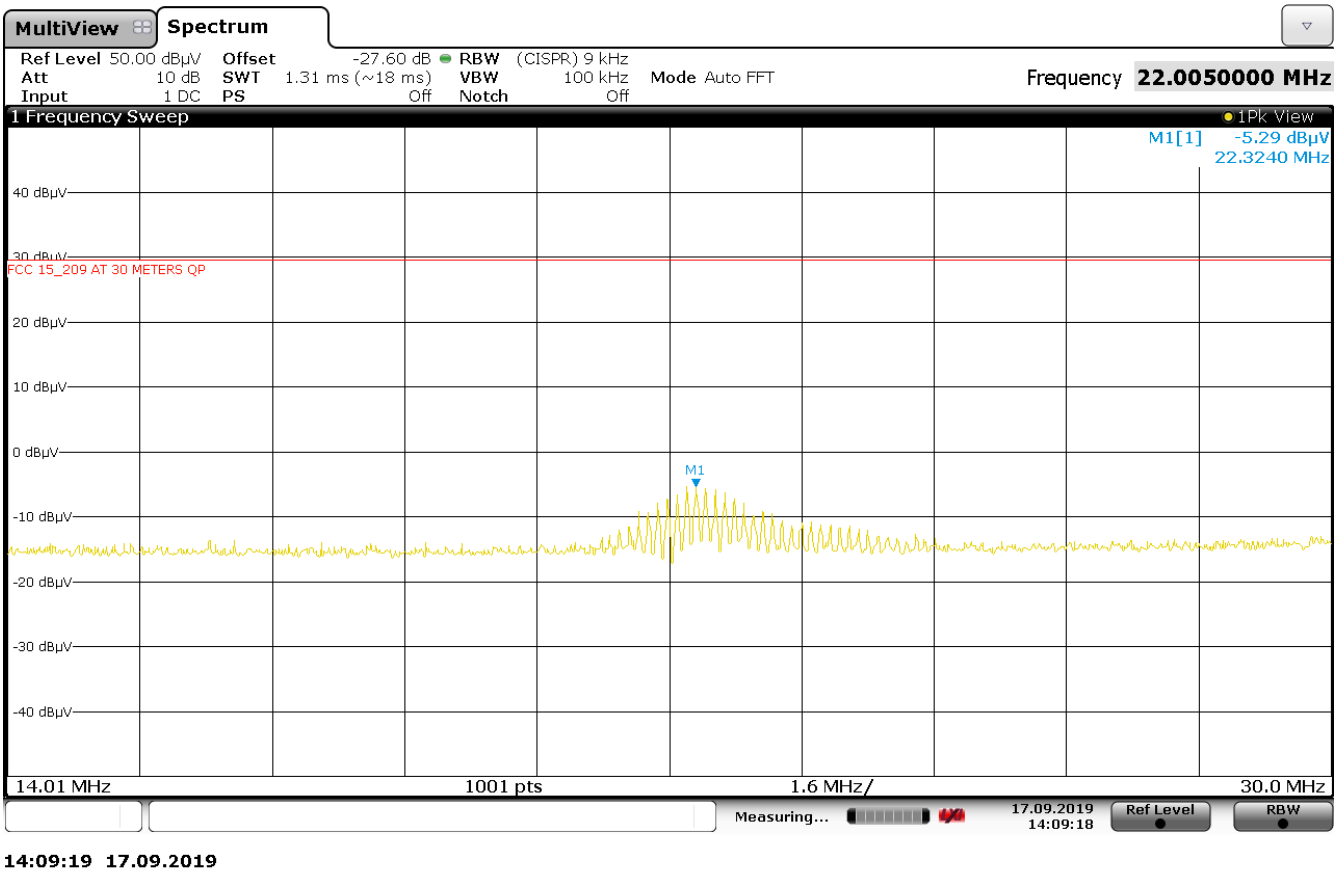

Figure 2.4.6-3 Out of band/upper band edge emissions 14.01MHz–30MHz. Corrected Y scale = dBuV/m at 30 meters

Table 2.4.6-3 Field strength levels at 30m. 14.01MHz–30MHz

Frequency (MHz)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
22.324	-5.29	29.54	34.83

2.4.7 Test Location and Test Equipment Used

The tests were carried out in New Brighton, MN using equipment listed below in Table 2.4.8-1.
Test Area: LTS

Table 2.4.8-1 Out of band emissions below 30MHz. Test equipment list

Device #	Manufacturer	Description	Model	Serial #	Cal Code	Cal Date	Cal Due
NBLE03366	Agilent Technologies	Spectrum Analyzer	E4440A	MY42510427	G	10/23/2018	10/23/2019
WRLE02418	EMCO/EMC Test	Antenna, Loop	6502	2215	G	09/25/2018	09/25/2020
NBLE11555	Rohde & Schwarz	Receiver, 2 Hz-44 GHz	ESW44	101537	G	04/26/2019	04/26/2020

Cal Code G = Calibration performed by an accredited outside source.
Cal Code B = Calibration verification performed internally.
Cal Code Y = Passive Device, or Calibration not required when used with other calibrated equipment.

2.5 Out of band emissions 30 - 1000MHz

2.5.1 Specification Reference

FCC 47 CFR Part 15 Subpart C, §15.225(d)
ISED RSS-210 B.6(d)

2.5.2 Equipment Under Test and Modification State

As shown in §1.2 with modifications if any as shown in §1.6.

2.5.3 Date of Test

18 September 2019

2.5.4 Test Method

The EUT was set up in a semi-anechoic chamber on a remotely controlled turntable and placed on a non-conductive support 0.8 m above a reference ground plane using a measurement distance of 3m. A pre-scan of the EUT emissions profile was made while varying the antennae-to-EUT azimuth and antennae-to-EUT polarization using a peak detector; measurements were taken at a 3m distance. Using the pre-scan list of the highest emissions detected, their bearing and associated antenna polarization, the EUT was then formally measured using Quasi-Peak detector. The readings were maximized by adjusting the antenna height, polarization and turntable azimuth, in accordance with the specification. The frequency range investigated was 30 MHz to 1 GHz. The highest frequency required to be measured was up to 10 times the fundamental or 135.6 MHz. Measurements were done using BAT-EMC v3.18 automated software. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only. See Section 2.5.6 for sample computation.

2.5.5 Environmental Conditions

The EUT was evaluated within the climatic range of the EUT as specified by the manufacturer. When the manufacturer does not specify climatic parameters for the EUT, all tests are performed within the ambient climatic conditions of the laboratory.

2.5.6 Sample Computation (Radiated Emissions)

Measuring equipment raw measurement (dBµV) @ 30 MHz			20.0
Correction Factor (dB)	Cable 2	0.24	18.94
	TEMC00011 (antenna)	18.70	
Reported Quasi-peak Final Measurement (dBµV/m) @ 30MHz			38.94

2.5.7 Test Results

Performance assessment of the EUT made during this test: **Pass**
Detailed results are shown below.

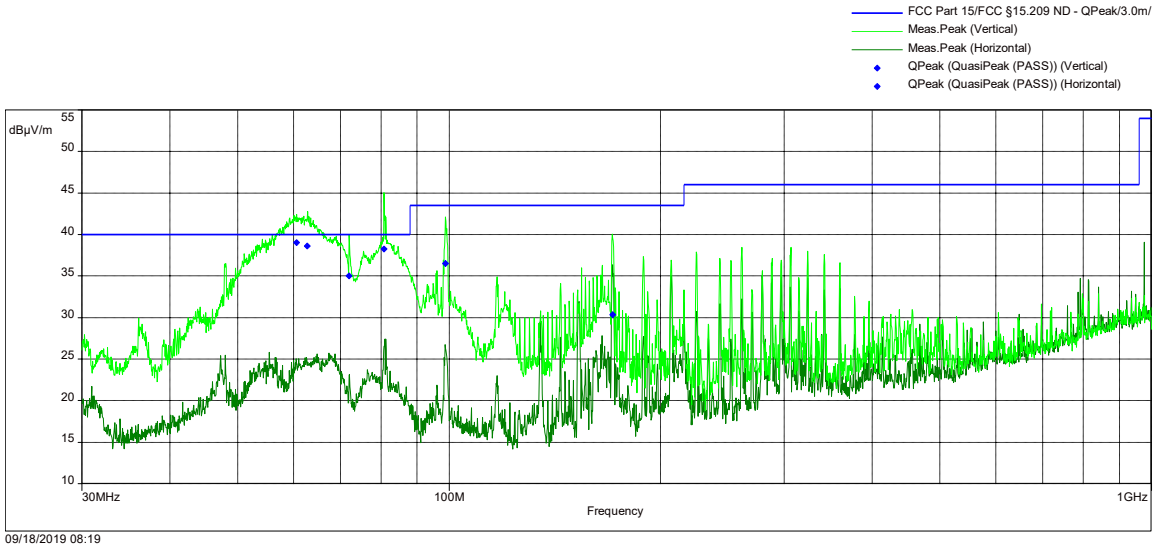

Figure 2.5.7-1 Graphical Results 30MHz - 1GHz. Horizontal and Vertical Polarization

Table 2.5.7-1 Radiated Emissions Data: 30MHz - 1 GHz

Frequency	QP Level (dBuV)	QP Limit (dBuV)	Margin (dB)	Azimuth (º)	Height (m)	Polarization	Result
60.635492MHz	39.02	40.00	-0.98	330.00	1.09	Vertical	Pass
62.827831MHz	38.61	40.00	-1.39	313.00	1.87	Vertical	Pass
72.001121MHz	35.04	40.00	-4.96	320.00	1.75	Vertical	Pass
80.718782MHz	38.23	40.00	-1.77	175.00	1.01	Vertical	Pass
98.749882MHz	36.50	43.50	-7.00	253.00	1.02	Vertical	Pass
170.98796MHz	30.37	43.50	-13.13	231.00	1.44	Horizontal	Pass

2.5.8 Test Location and Test Equipment Used

The tests were carried out in New Brighton, MN using equipment listed below in Table 2.5.9-1.
Test Area: 3mSAC

Table 2.5.9-1 Out of band Emissions 30 - 1000MHz. Test equipment list

Equipment Description	Equipment Manufacturer	Equipment Model #	Equipment SN#	Asset #	Frequency Range	Calibrated On	Calibration Due	Calibration Required (Y or N)
Antenna - Trilog	Schwarzbeck	VULB 9162	0254	NBLE11645	30 MHz - 8 GHz	3/19/2019	3/19/2021	Yes
Preamplifier - 8447D	Hewlett-Packard	8447D	2944A08773	NBLE11141	100 kHz - 1.3 GHz	1/4/2019	1/4/2020	Yes
Receiver - R&S ESU	Rohde & Schwarz	ESU 26	100379	WRLE10998	20 Hz - 26.5 GHz	12/13/2018	12/13/2019	Yes

Cal Code G = Calibration performed by an accredited outside source.
Cal Code B = Calibration verification performed internally.
Cal Code Y = Passive Device, or Calibration not required when used with other calibrated equipment.

2.6 Occupied Bandwidth

2.6.1 Specification Reference

FCC 47 CFR Part 2 §2.1049
ISED RSS-Gen 6.7

2.6.2 Equipment Under Test and Modification State

As shown in §1.2 with modifications if any as shown in §1.6.

2.6.3 Date of Test

17 September 2019

2.6.4 Test Method

The spectrum analyzer span was set to capture all products of the modulation process. The RBW was set to 1-5% of the estimated bandwidth. The trace was set to max hold with the peak detector. The measurement function of the analyzer was utilized to determine the 99% bandwidth.

2.6.5 Environmental Conditions

The EUT was evaluated within the climatic range of the EUT as specified by the manufacturer. When the manufacturer does not specify climatic parameters for the EUT, all tests are performed within the ambient climatic conditions of the laboratory.

2.6.6 Test Results

Performance assessment of the EUT made during this test: **Pass**
Detailed results are shown below.

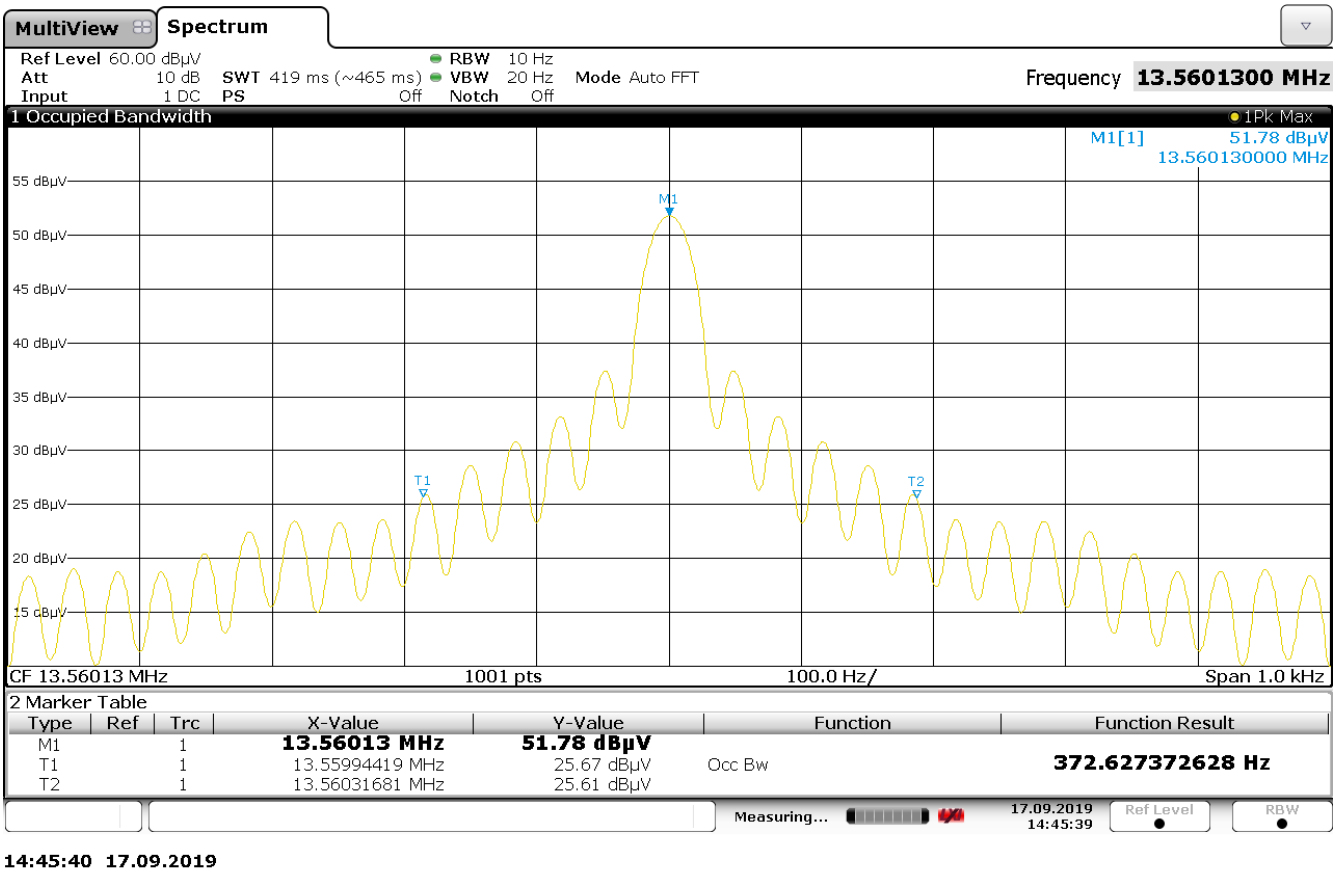

Figure 2.6.6-1 99% bandwidth

2.6.7 Test Location and Test Equipment Used

The tests were carried out in New Brighton, MN using equipment listed below in Table 2.6.8-1.
Test Area: LTS

Table 2.6.8-1 Occupied bandwidth. Test equipment list

Device #	Manufacturer	Description	Model	Serial #	Cal Code	Cal Date	Cal Due
NBLE03366	Agilent Technologies	Spectrum Analyzer	E4440A	MY42510427	G	10/23/2018	10/23/2019
WRLE02418	EMCO/EMC Test	Antenna, Loop	6502	2215	G	09/25/2018	09/25/2020
NBLE11555	Rohde & Schwarz	Receiver, 2 Hz-44 GHz	ESW44	101537	G	04/26/2019	04/26/2020

Cal Code G = Calibration performed by an accredited outside source.
Cal Code B = Calibration verification performed internally.
Cal Code Y = Passive Device, or Calibration not required when used with other calibrated equipment.

2.7 Frequency stability

2.7.1 Specification Reference

FCC 47 CFR Part 15 Subpart C, §15.225(e)
ISED RSS-210 B.6

2.7.2 Equipment Under Test and Modification State

As shown in §1.2 with modifications if any as shown in §1.6.

2.7.3 Date of Test

18 September 2019

2.7.4 Test Method

ANSI C63.10-2013 6.8.

2.7.5 Environmental Conditions

The EUT was evaluated within the climatic range of the EUT as specified by the manufacturer. When the manufacturer does not specify climatic parameters for the EUT, all tests are performed within the ambient climatic conditions of the laboratory.

2.7.6 Test Results

Performance assessment of the EUT made during this test: **Pass**
Detailed results are shown below. ±0.01% requirement = ±100 ppm.

Table 2.7.6-1 Frequency stability

Temp (°C)	Time* (Minutes)	Freq (MHz)	Tolerance (PPM)	Voltage (%)	Voltage (VDC)
20.000	0.000	13.5601288	9.50	85	20.4
	2.000	13.5601294	9.54	85	20.4
	5.000	13.5601292	9.53	85	20.4
	10.000	13.5601282	9.45	85	20.4
20.000	0.000	13.5601298	9.57	115	27.6
	2.000	13.5601304	9.62	115	27.6
	5.000	13.5601304	9.62	115	27.6
	10.000	13.5601304	9.62	115	27.6
50.000	0.000	13.56010512	7.75	100	24
	2.000	13.56010463	7.72	100	24
	5.000	13.56010223	7.54	100	24
	10.000	13.56010063	7.42	100	24
40.000	0.000	13.56010792	7.96	100	24
	2.000	13.56010832	7.99	100	24
	5.000	13.56010832	7.99	100	24
	10.000	13.56010832	7.99	100	24
30.000	0.000	13.5601251	9.23	100	24
	2.000	13.5601253	9.24	100	24
	5.000	13.56012491	9.21	100	24
	10.000	13.56012481	9.20	100	24
20.000	0.000	13.56014319	10.56	100	24
	2.000	13.56014329	10.57	100	24
	5.000	13.56014329	10.57	100	24
	10.000	13.56014279	10.53	100	24
10.000	0.000	13.56015388	11.35	100	24
	2.000	13.56015388	11.35	100	24
	5.000	13.56015398	11.36	100	24
	10.000	13.56015368	11.33	100	24
0.000	0.000	13.56014978	11.05	100	24
	2.000	13.56014988	11.05	100	24
	5.000	13.56014978	11.05	100	24
	10.000	13.56014988	11.05	100	24
-10.000	0.000	13.56012411	9.15	100	24
	2.000	13.5601262	9.31	100	24
	5.000	13.5601258	9.28	100	24
	10.000	13.5601256	9.26	100	24
-20.000	0.000	13.56007084	5.22	100	24
	2.000	13.56007384	5.45	100	24
	5.000	13.56007443	5.49	100	24
	10.000	13.56007423	5.47	100	24

2.7.7 Test Location and Test Equipment Used

The tests were carried out in New Brighton, MN using equipment listed below in Table 2.7.8-1.
Test Area: LTS

Table 2.7.8-1 Frequency stability. Test equipment list

Device #	Manufacturer	Description	Model	Serial #	Cal Code	Cal Date	Cal Due
NBLE11105	Sorensen	Power Supply, DC 33V-33A	XHR33-33-MGA	1215A01757	Y	N/A	N/A
NBLE11375	Fluke	Digital Multimeter	115	32530450WS	G	05/21/2019	05/21/2020
NBLE11522	ESPEC	Environmental Chamber	SU-241 (TUV)	92010168	G	05/21/2019	05/21/2020
NBLE11555	Rohde & Schwarz	Receiver, 2 Hz-44 GHz	ESW44	101537	G	04/26/2019	04/26/2020

Cal Code G = Calibration performed by an accredited outside source.
Cal Code Y = Passive Device, or Calibration not required when used with other calibrated equipment.

3 Measurement Uncertainty

The test system for radiated emissions is defined as the antenna, the pre-amplifier, the spectrum analyzer and the coaxial cable. This test system for 30 MHz – 1000 MHz has a measurement uncertainty of ±5.88 dB and above 1 GHz a measurement uncertainty of ±4.47 dB. The measurement uncertainty values for radiated emissions meet the requirements as expressed in CISPR 16-4-2. The equipment comprising the test systems is calibrated on an annual basis.

4 Diagram of Test Set-ups

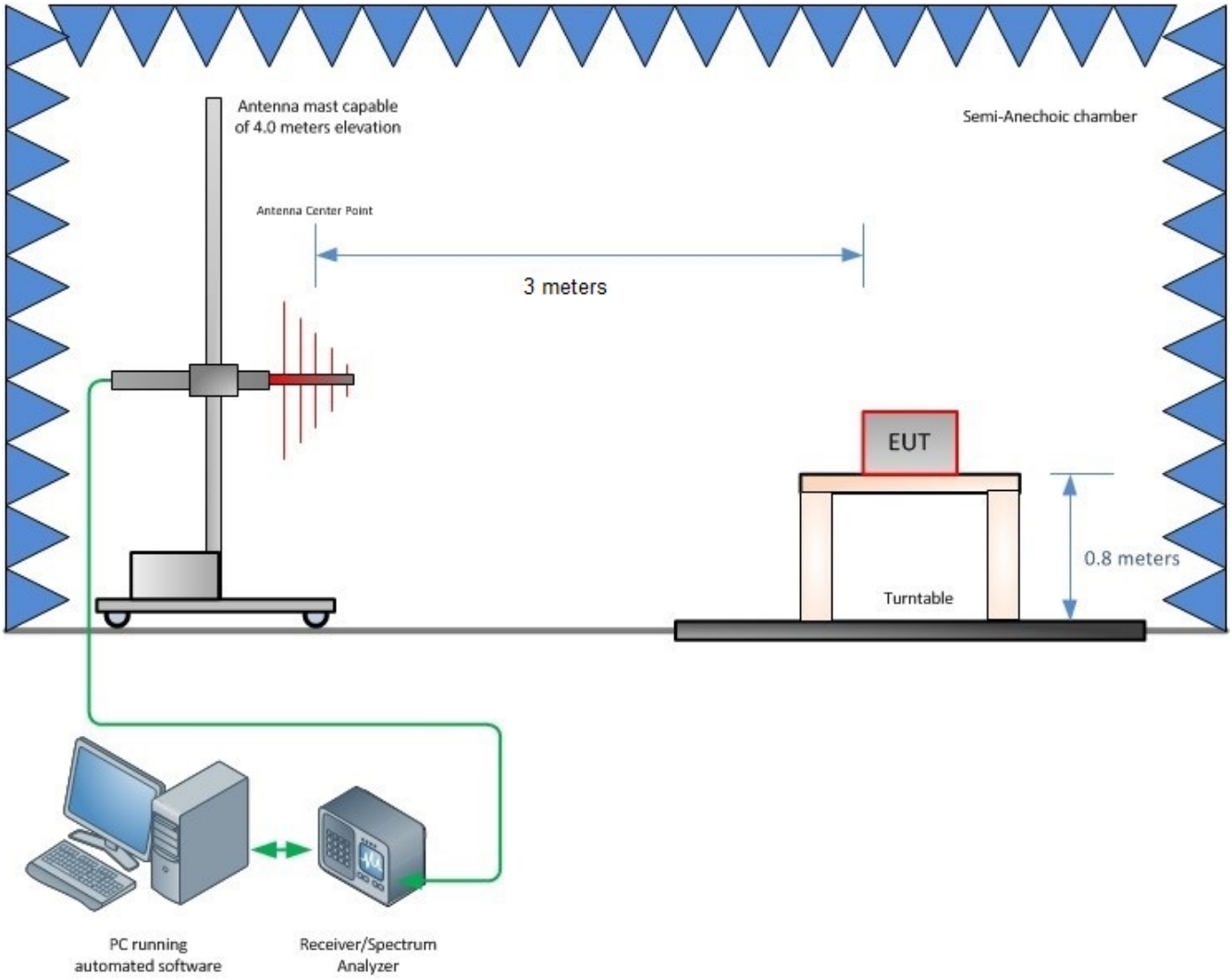

Figure 4-1 Radiated Emissions Test Setup 30 – 1000 MHz

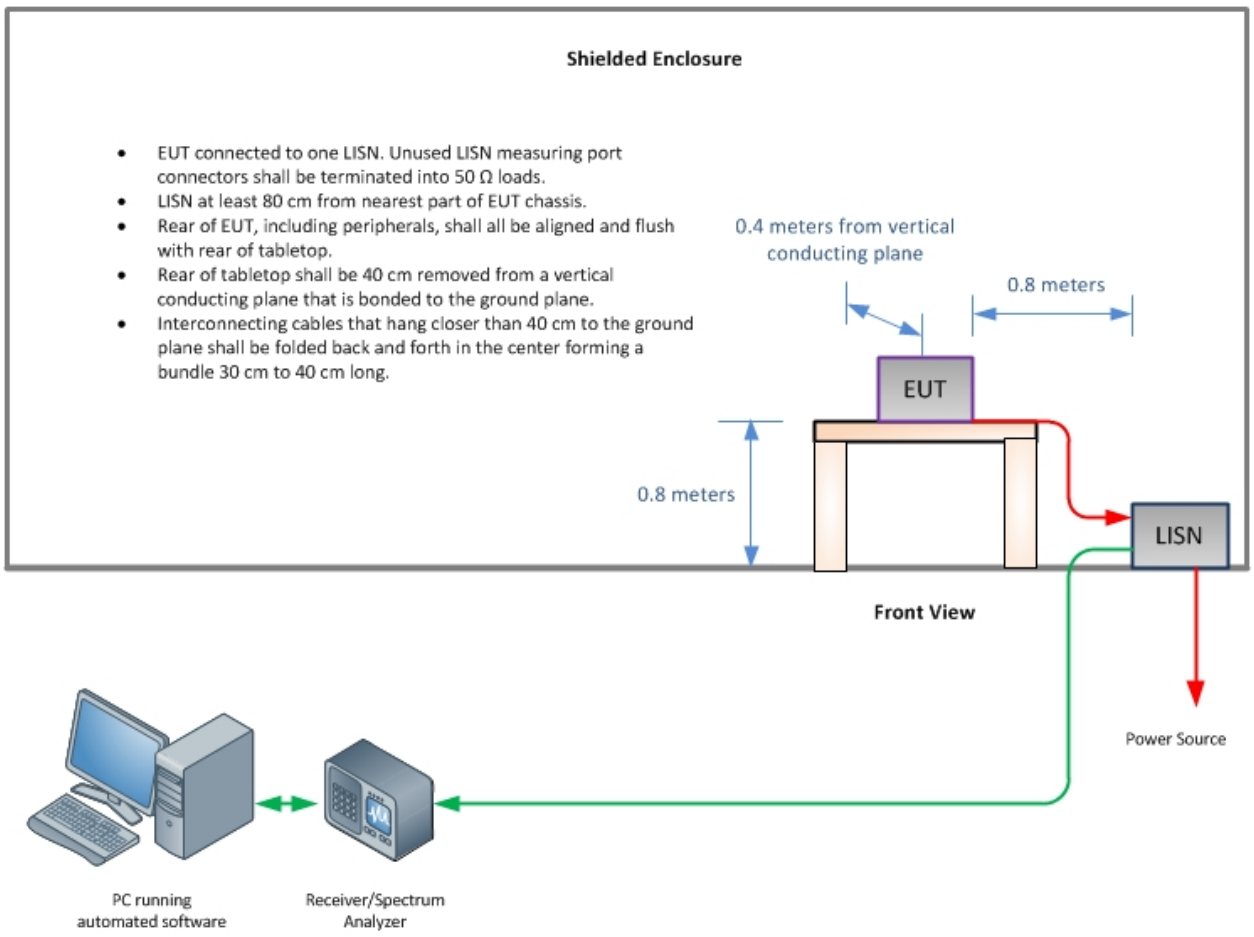

Figure 4-2 AC Line Conducted Emissions Test Setup

5 Accreditation, Disclaimers and Copyright

TÜV SÜD America Inc.'s reports apply only to the specific sample tested under stated test conditions. It is the manufacturer's responsibility to assure the continued compliance of production units of this model. TÜV SÜD America Inc. shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD America Inc.'s issued reports.

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6 Manufacturer's Test Plan

Form

EMC Test Plan and Product Information Form

PLEASE COMPLETE THIS DOCUMENT IN FULL, ENTERING N/A IF THE FIELD IS NOT APPLICABLE. IF TESTING RESULTS IN MODIFICATIONS TO THE EQUIPMENT, PLEASE SUBMIT A REVISED VERSION OF THIS DOCUMENT INDICATING THOSE MODIFICATIONS. ***NOTE: This information will be input into your test report as shown below.***				
Company:	Entrust Datacard Corp			
Address: *(incl City, State, ZIP)*	1187 Park Place Shakopee, MN 55372			
Contact:	Mark Forster	Position:		
Phone - Office:	952-221-6264	Cell:		
E-mail Address:	Mark.forster@entrustdatacard.com	Form completion date:		

General Equipment Description -- ***NOTE: This info will be input into your test report as shown below.***			
EUT Description	PWA, RFID module		
EUT Name	RFID Module		
Model No.:	523442	Serial No.:	n/a
Product Options:	n/a		
Configurations to be tested:	n/a		

Equipment Modification ***(If applicable, indicate modifications since EUT was last tested. If modifications are made during this testing, submit revised version of this document after testing is complete.)***	
Modifications since last test:	n/a
Modifications made during test:	n/a

EUT Specifications and Requirements

Length: 3' Width: 1.5" Height: 0.25" Weight: 2oz

Power Requirements

Regulations require testing to be performed at typical power ratings in the countries of intended use. (i.e., European power is typically 230 VAC 50 Hz or 400 VAC 50 Hz, single and three phase, respectively)

Voltage: 100-230 VAC (If battery powered, make sure battery life is sufficient to complete testing.)

# of Phases: 1

Current (Amps/phase(max)): _____ Current (Amps/phase(nominal)): _____

Other Power to the module is 5V DC

Oscillator Frequencies (Please list any and all internally generated frequencies of the Product - clocks, CPUs, etc. ***The highest frequency will determine the upper frequency range to be tested.***)

Frequency (kHz, MHz, GHz)	***Description of Use***
Y1 Oscillator 27.12M	PWA oscillator

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Form

EMC Test Plan and Product Information Form

Typical Installation and/or Operating Environment (ie. Hospital, Small Business, Industrial/Factory, etc.)
Office environment, RFID PWA module is installed inside a Entrust Datacard desktop card printer during normal operation

Test Objective(s):
Please indicate (x) the tests to be performed, entering the applicable standard(s) where noted.

___	EMC Directive	Std(s):
___	RED Directive	Std(s):
___	Medical Device Directive	Std(s):
___	Vehicle	Std(s):
___	Ag Directive	Std(s):

Countries Needed ***(common standards shown below - "x" those applicable)*:**

_x_	FCC (USA):	Class	_x_ A (Industrial)	___ B (Residential)	
___	VCCI (Japan):	Class	___ A (Industrial)	___ B (Residential)	
___	BSMI (Taiwan):	Class	___ A (Industrial)	___ B (Residential)	(Separate Report required)
_x_	Canada:	Class	_x_ A (Industrial)	___ B (Residential)	
___	Australia	Class	___ A (Industrial)	___ B (Residential)	
___	Korea:	Std(s):			
___	Other:	Std(s):			

Other Special Requirements (i.e. Water access, compressed air, etc)

Emissions Testing Operating Modes.
Describe what the product is doing during testing. Describe how the product will be exercised during emissions testing and what software is running, if any. If testing multiple operating modes, please describe each one. If testing only one operating mode out of several, please describe why it is considered the worst-case. In addition to operating modes, all ports must be populated to achieve the worst case condition.

Operating Mode 1.	Software will allow continuous reading of an RFID tag
Operating Mode 2.	

Immunity Testing Operating Modes.
If different than operating mode during emissions testing, describe what the product is doing during test. Describe how the product will be exercised during immunity testing and what software is running, if any. If testing multiple operating modes, please describe each one. If testing only one operating mode out of several, please describe why it is considered the worst-case. In addition to operating modes, all ports must be populated to achieve the worst case condition.

Cycle Time of Product:	n/a
Operating Mode 1.	n/a
Operating Mode 2.	n/a

Form

EMC Test Plan and Product Information Form

Immunity Testing Performance Criteria and Pass/Fail Criteria.
For immunity testing, it is very important that performance criteria be defined. Please describe what parameters can be monitored, as well as their tolerances, to ensure that the product is operating properly during the immunity testing. Explain what the test operator should monitor during the testing to determine if the product is operating within specified parameters.

n/a

EUT Interface Ports and Cables
In order to verify all configurations in the report properly, it is generally necessary to populate all ports on the equipment under test. If any ports are to remain unpopulated, the justification for leaving them unpopulated should be noted. (e.g., "diagnostic use only"). Please note that any unpopulated port will be documented in the report, which may exclude it from the scope of compliance as detailed in that report. Please provide as many cables as possible for testing adding rows as needed. ***The cable length should represent the maximum length of cable that you specify that can be attached to the product in your instruction manual. TUV SUD AMERICA requires a minimum of 15 feet that will connect to any support equipment that you do not want included in the test field.***

Type	*Length tested (in meters)*	*Qty*	*Shielding*		
			Yes	*No*	*Type*
***EXAMPLE**: Ethernet*	*6*	*2*		*X*	
RFID cable, Datacard #525065-001	7inch	1		x	

Equipment Under Test (EUT) System Components
List and describe all major components which are part of the EUT. For FCC & Taiwan testing a minimum configuration is required.

Description	*Model #*	*Serial #*	*FCC ID #*
U3- Near Field Comm frontend	NXP CLRC66301HN1	n/a	n/a
U2- 3.3V regulator	TI LP2985-33DBV	n/a	n/a
U4- 5V regulator	TI REG102NA-A	n/a	n/a

Customer Supplied Support Equipment
List and describe all support equipment which is not part of the EUT but that you are providing to exercise and monitor your product. Support equipment is defined as only needed for testing and is not part of the final product to be delivered to the customer (i.e. peripherals, simulators, etc). This information is required for FCC & Taiwan testing.

Mainboard 515058-xxx powered by Mega ATS072T-P240, 24 VDC, brick type power supply
Laptop computer with power supply

Critical EMI Components (Capacitors, ferrites, etc.)

Description	*Manufacturer*	*Part # or Value*	*Qty*	*Component # / Location*

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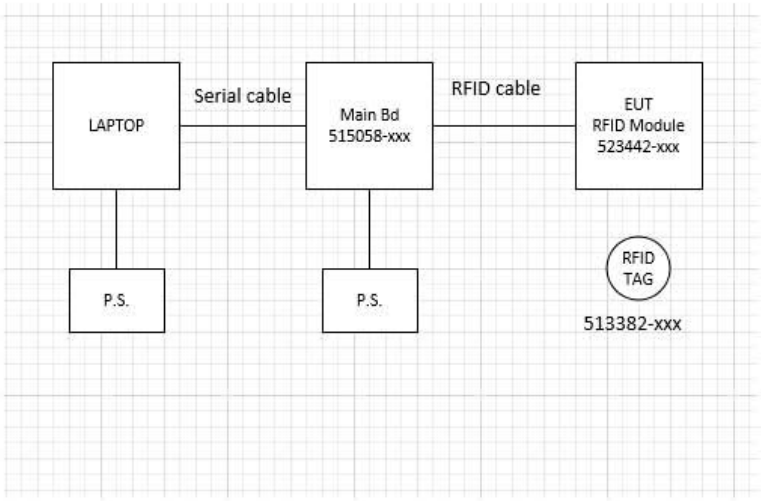
Form

EMC Test Plan and Product Information Form

EMC Critical Detail Describe other EMC Design details used to reduce high frequency noise.

System Configuration Block Diagram Provide a line drawing identifying the EUT, simulators, support equipment, I/O cables, power cables, and any other pertinent components to be used during testing. Use a dashed line to separate the equipment in the testing field versus equipment outside testing field.



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