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CERTIFICATION TEST REPORT

Manufacturer: Regula Baltija
97 A.Pumpura Street
Daugavpils, LV-5404
LATVIA

Applicant: Same as Above

Product Name: Document Reader Regula 70X4M.XXX-5A

Product Description: Optical Imaging Reader

Operating Voltage/Frequency: 120V/60 Hz (AC Adapter)
Cincon Model TRE25050-A

Model: 7024M.111-5A*
**Denotes actual model tested as representative of 70X4M.xxx-5A product family.*

FCC ID: 2AOFE-7024M5A

Testing Commenced: Oct. 25, 2019

Testing Ended: Oct. 28, 2019

Summary of Test Results: In Compliance

Standards:

- FCC Part 15 Subpart C, Section 15.209
- FCC15.207 - Conducted Limits



Order Number: F2P22001

Client: Regula Baltija

Model: 7024M.111-5A

Evaluation Conducted by:

Julius Chiller, EMC/Wireless Engineer

Report Reviewed by:

Ken Littell, Director of EMC & Wireless Operations

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1 ADMINISTRATIVE INFORMATION

1.1 Measurement Location:

F2 Labs in Middlefield, Ohio. Site description and attenuation data are on file with the FCC's Sampling and Measurement Branch at the FCC Laboratory in Columbia, MD.

1.2 Measurement Procedure:

All measurements were performed according to the 2013 version of ANSI C63.10 and recommended FCC procedure of measurement of equipment operating under Section 15.209. A list of the measurement equipment can be found in Section 6.

1.3 Uncertainty Budget:

The uncertainty in EMC measurements arises from several factors which affect the results, some associated with environmental conditions in the measurement room, the test equipment being used, and the measurement techniques adopted.

The measurement uncertainty budgets detailed below are calculated from the test and calibration data and are expressed with a 95% confidence factor. Note: Only measurements listed below which relate to tests included in this Test Report are applicable to it.

Measurement Range	Expanded Uncertainty	Combined Uncertainty
Radiated Emissions <1 GHz @ 3m	$\pm 5.07\text{dB}$	± 2.54
Radiated Emissions <1 GHz @ 10m	$\pm 5.09\text{dB}$	± 2.55
Radiated Emissions 1 GHz to 2.7 GHz	$\pm 3.62\text{dB}$	± 1.81
Radiated Emissions 2.7 GHz to 18 GHz	$\pm 3.10\text{dB}$	± 1.55
AC Power Line Conducted Emissions, 150kHz to 30 MHz	$\pm 2.76\text{dB}$	± 1.38

This Uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

1.4 Document History

Document Number	Description	Issue Date	Approved By
F2P22001-01E	First Issue	Nov. 7, 2019	K. Littell



2 SUMMARY OF TEST RESULTS

Test Name	Standard(s)	Results
Radiated Emissions	FCC Part 15 Subpart C 15.209	Complies
Occupied Bandwidth	ANSI C63.10 Sec. 6.9	Complies
Conducted Emissions	FCC Part Subpart C 15.207	Complies

Modifications Made to the Equipment
No modifications were made to the EUT.



3 **ENGINEERING STATEMENT**

This report has been prepared on behalf of Regular Baltija to provide documentation for the testing described herein. This equipment has been tested and found to comply with Part 15.209 of the FCC Rules using ANSI C63.10 2013 and Part 15 standards. The test results found in this test report relate only to the items tested.



4 EUT INFORMATION AND DATA

4.1 Equipment Under Test:

Product: Document Reader

Model: 7024M.111-5A*

**Denotes actual model tested as representative of 70X4M.xxx-5A product family.*

Serial Number: 7E3316A13593

FCC ID: **2AOFE-7024M5A**

4.2 Trade Name:

Regula Baltija

4.3 Power Supply:

AC Adapter: Circon Model TRE25050A

4.4 Applicable Rules:

CFR 47, Part 15.209, subpart C

4.5 Equipment Category:

RFID

4.6 Antenna:

Internal

4.7 Accessories:

Laptop: Dell Model P15S, s/n 3RPSWP1

4.8 Test Item Condition:

The equipment to be tested was received in good condition.

4.9 Testing Algorithm:

EUT was set to continuously scan a sample passport. The highest emissions were recorded in the data tables.

**5 LIST OF MEASUREMENT INSTRUMENTATION**

Equipment Type	Asset Number	Manufacturer	Model	Serial Number	Calibration Due Date
Shielded Chamber	CL166-E	AlbatrossProjects	B83117-DF435-T261	US140023	Oct. 31, 2019
Antenna, Bilog	CL211	Sunol Sciences, Inc.	JB1	A02-1017	Oct. 3, 2021
Receiver	CL151	Rohde & Schwarz	ESU40	100319	Oct. 25, 2019
Pre-amplifier	CL153	Agilent	83006-69007	MY39500791	Aug. 5, 2020
Amplifier w/Monopole & 18" Loop	CL163-Loop	A.H. Systems, Inc.	EHA-52B	100	July 24, 2020
Software:	Tile Version 3.4.B.3. Software Verified: Oct. 25, 2019				
Software:	EMC 32, Version 8.53.0 Software Verified: Oct. 25, 2019				
Temp/Hum. Recorder	CL261	Extech	445814	04	Mar. 6, 2020
Temp/Hum. Recorder	CL263	Extech	445814	06	Mar. 6, 2020
Transient Limiter	CL102	Hewlett Packard	11947A	3107A03325	Feb. 7, 2020
Transient Limiter	0202	Hewlett Packard	11947A	3107A00729	July 29, 2020
Spectrum Analyzer	CL147	Agilent	E7402A	MY45101241	Jan. 25, 2020
LISN	CL181	Com-Power	LI-125A	191226	Sept. 6, 2020
LISN	CL182	Com-Power	LI-125A	191225	Sept. 6, 2020

6 RADIATED EMISSIONS

6.1 Requirements

Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100**	3
88-216	150**	3
216-960	200**	3
Above 960	500	3

6.2 Test Procedure

The EUT was tested at a distance of 3 meters. The limits shown are extrapolated from the above table. The emissions were maximized by rotating the table and raising/lowering the antenna mounted on a 4-meter mast. Cable and peripheral positions were also varied to produce maximum emissions. Both horizontal and vertical polarities were measured for frequencies above 30MHz, and all three orientations of the loop antenna were scanned to determine worst case emission. The output of the antenna was connected to the input of the receiver and emissions were measured in the range 9 kHz to 1 GHz.

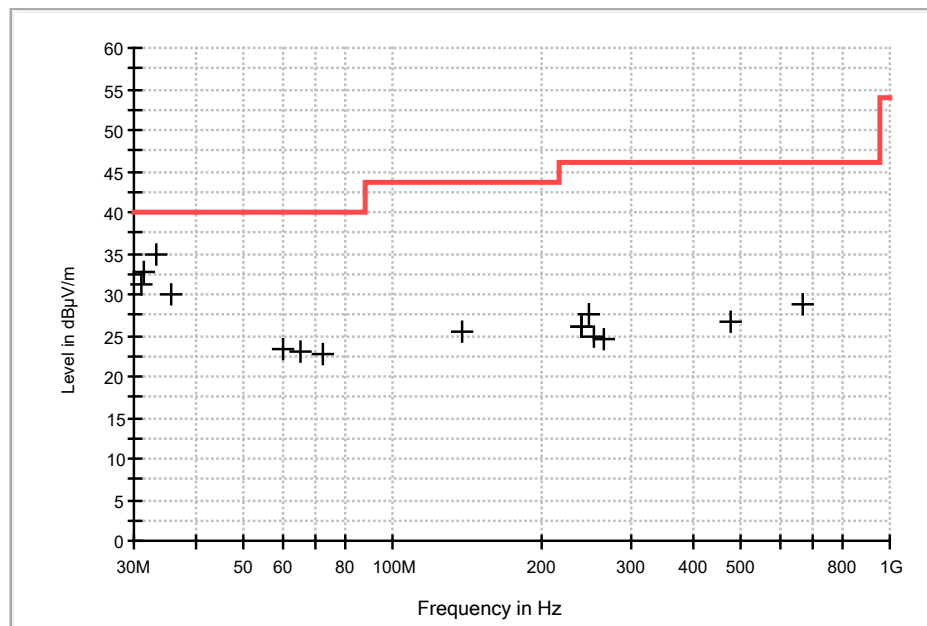
The limit at 13.56 MHz is 30 μ V/m at 30 meters, which equals 29.54 dB μ V/m. 40dB per decade was added for the shortened test distance of 3 meters.



6.3 Test Data

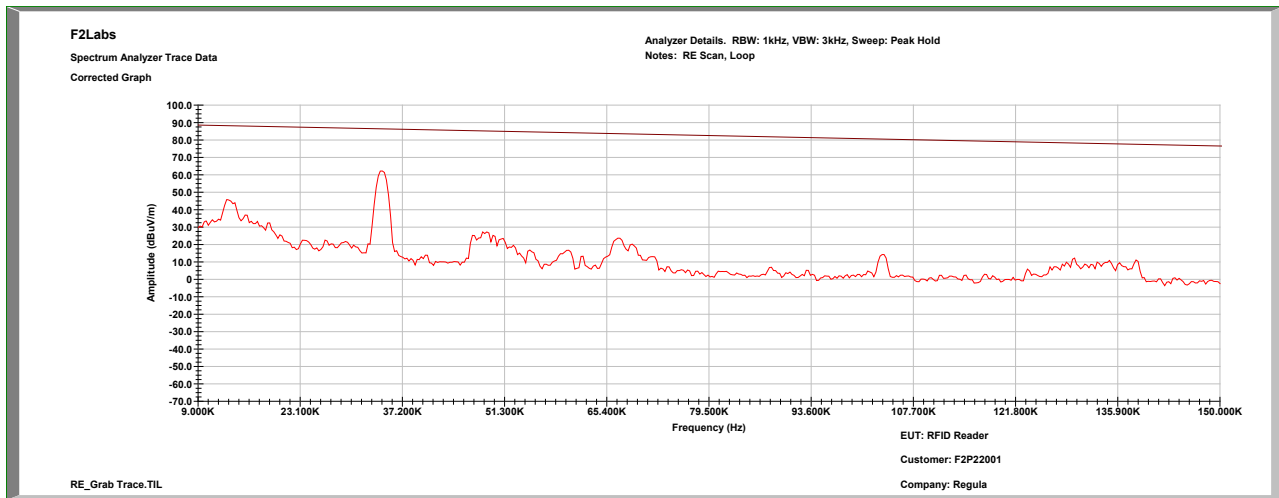
Test Date(s):	Oct. 25, 2019	Test Engineer:	J. Chiller
Standards:	FCC CFR 47 15.209	Air Temperature:	22.7°C
		Relative Humidity:	35%

Frequency (MHz)	Antenna Polarization	Antenna Height (cm)	Azimuth (deg)	Reading (dB μ V)	Corection Factors (dB)	Emission (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
13.560000	N/A	100.00	78.00	-24.8	5.4	-19.40	29.5	-48.9
31.160000	H	100.00	342.00	25.3	5.8	31.10	40.0	-8.9
31.360000	V	100.00	225.00	27.1	5.6	32.70	40.0	-7.3
33.280000	V	100.00	316.00	30.8	4.2	35.00	40.0	-5.0
35.840000	V	100.00	350.00	27.7	2.4	30.10	40.0	-9.9
60.280000	V	100.00	37.00	30.8	-7.5	23.30	40.0	-16.7
65.320000	V	100.00	349.00	30.2	-7.2	23.00	40.0	-17.0
72.080000	V	100.00	68.00	29.9	-7.2	22.70	40.0	-17.3
137.680000	V	100.00	195.00	27.6	-2.0	25.60	43.5	-17.9
239.920000	V	100.00	158.00	29.8	-3.6	26.20	46.0	-19.8
240.120000	H	100.00	74.00	29.6	-3.6	26.00	46.0	-20.0
246.520000	H	100.00	285.00	31.1	-3.6	27.50	46.0	-18.5
253.280000	H	100.00	15.00	28.2	-3.5	24.70	46.0	-21.3
265.120000	H	100.00	137.00	27.0	-2.4	24.60	46.0	-21.4
480.080000	H	100.00	295.00	24.2	2.5	26.70	46.0	-19.3

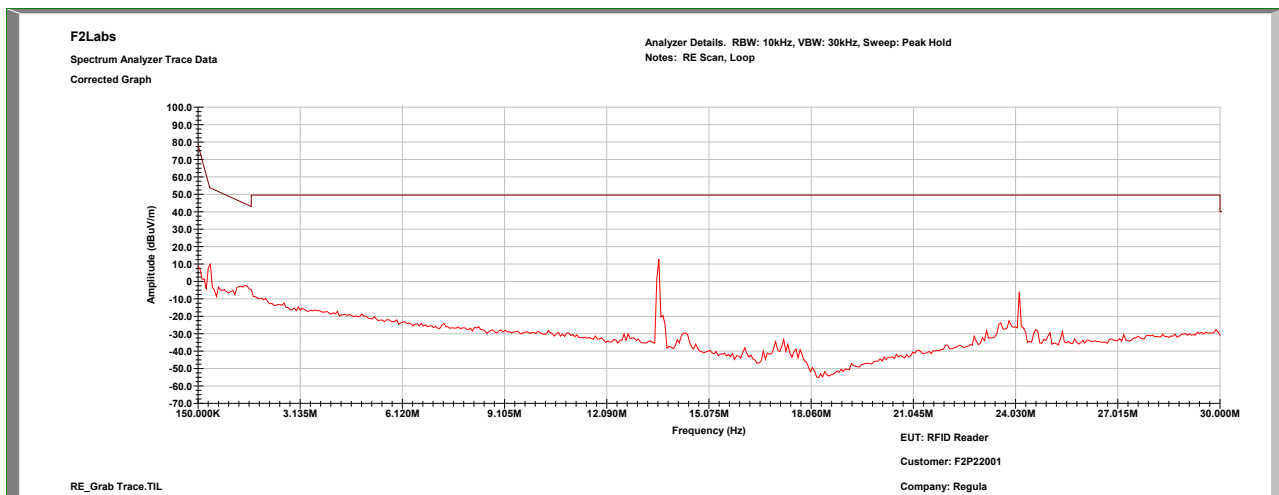




Characterization Scan, 9kHz to 150 kHz

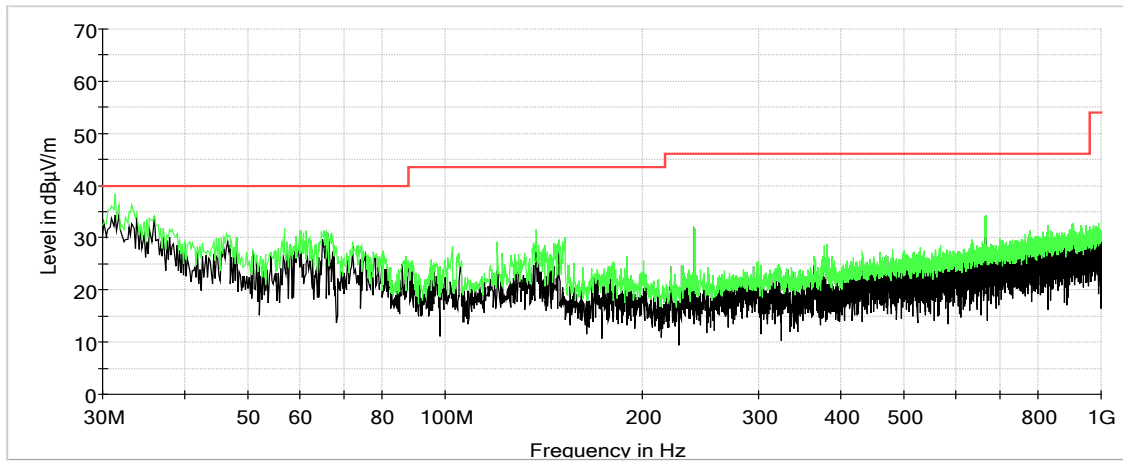


Characterization Scan, 0.15 MHz to 30 MHz

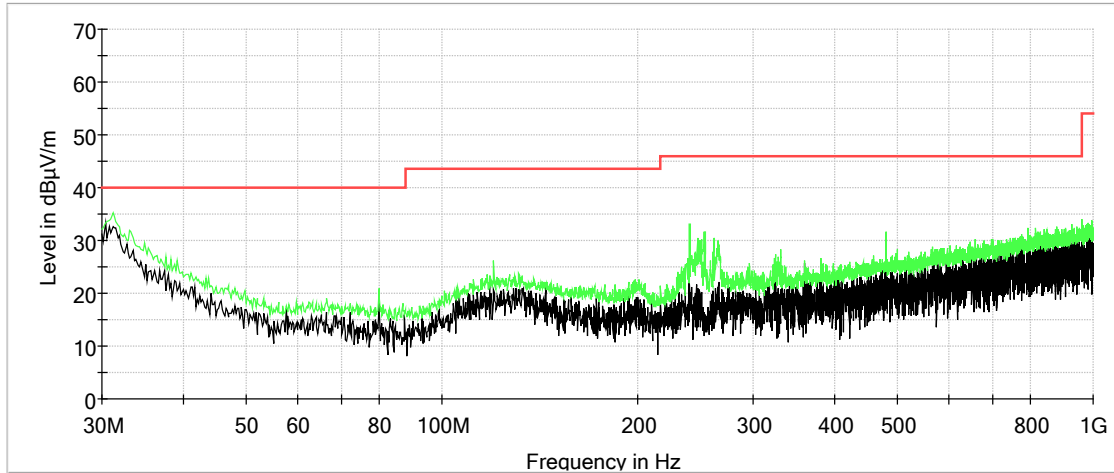




Characterization Scan, 30 MHz to 1000 MHz - Vertical



Characterization Scan, 30 MHz to 1000 MHz - Horizontal





7 OCCUPIED BANDWIDTH

7.1 Requirements:

The 20dB bandwidth was measured using the marker-delta method according to ANSI C63.10 Sec. 6.9

Bandwidth measurements were made at the 13.56 frequency with the resolution Bandwidth set at 30 Hz (video bandwidth set at 100 Hz) while the span was set at 1 kHz.

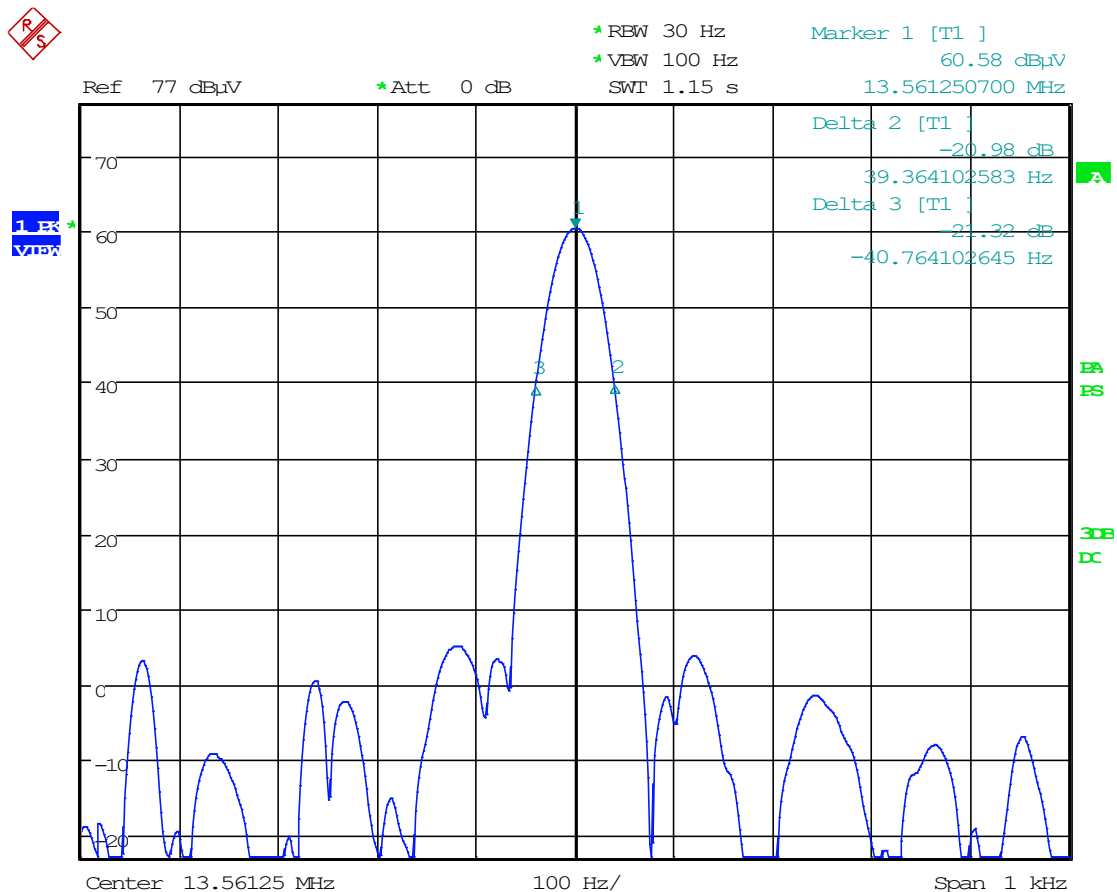


7.2 Occupied Bandwidth Test Data

Test Date:	Oct. 28, 2019	Test Engineer:	J. Chiller
Standards:	C63.10 Sec.6.9.2	Air Temperature:	22.5°C
		Relative Humidity:	36%

Test	13.56 MHz
-20dB Occupied Bandwidth	80.2 Hz

OBW



Date: 28.OCT.2019 11:03:27

8 CONDUCTED EMISSIONS

8.1 Requirements

In accordance with FCC CFR 47 Part 15.207(a), "Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

8.2 Procedure

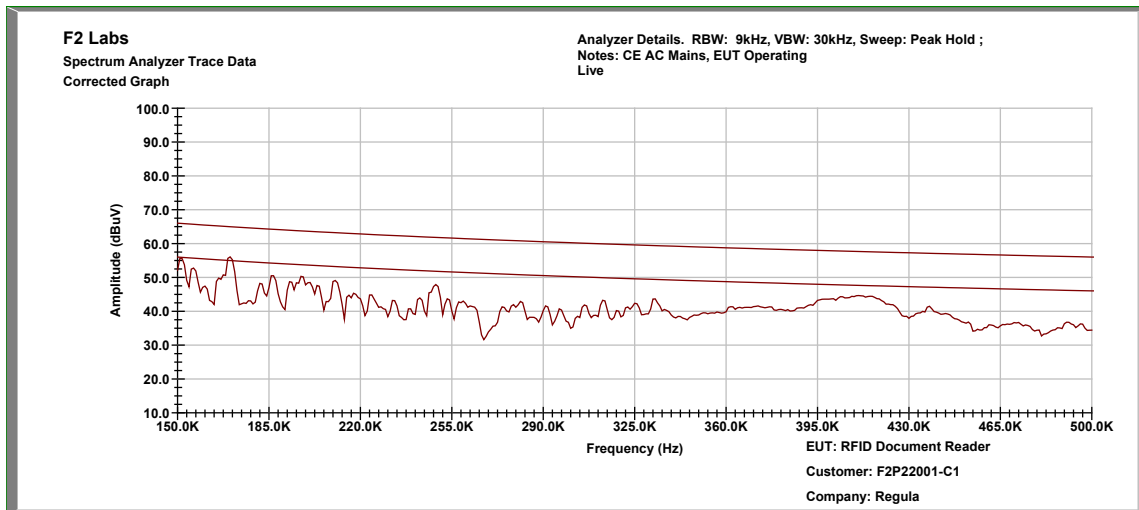
The EUT was placed on a 1.0 x 1.5 meter non-conductive table, 0.8 meter above a horizontal ground plane and 0.4 meter from a vertical ground plane. Power was provided to the EUT through a LISN bonded to a 3 x 2 meter ground plane. The LISN and peripherals were supplied power through a filtered AC power source. The output of the LISN was connected to the input of the receiver via a transient limiter, and emissions in the range 150 kHz to 30 MHz were measured. The measurements were recorded using the quasi-peak and average detectors as directed by the standard, and the resolution bandwidth during testing was 9 kHz. The raw measurements were corrected to allow for attenuation from the LISN, transient limiter and cables.



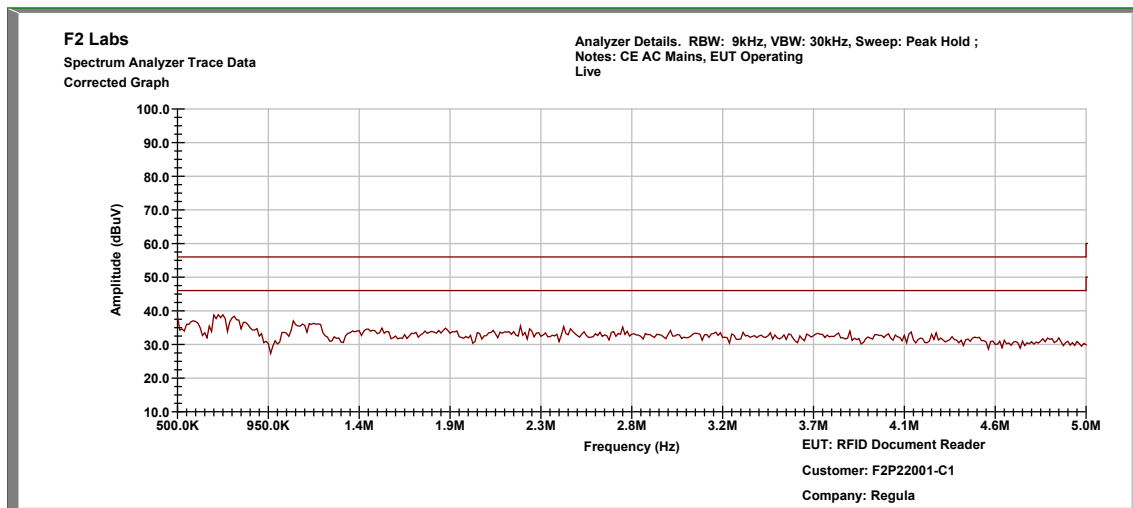
8.3 Conducted Emissions Test Data

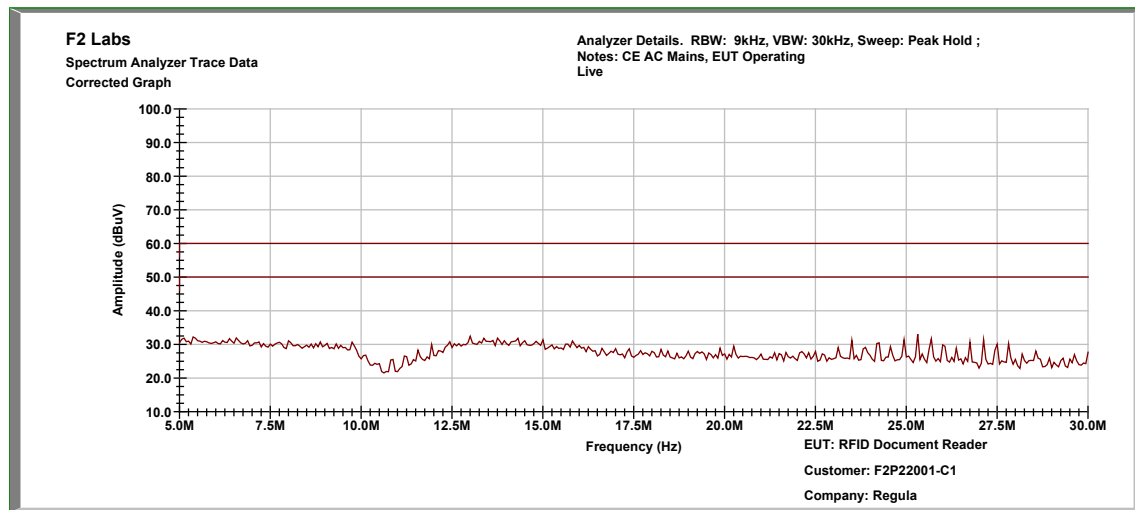
Test Date(s):	Oct. 28, 2019	Test Engineer:	J. Chiller
Rule:	15.207	Air Temperature:	23.4° C
Test Results:	Complies	Relative Humidity:	38%

Conducted Test – Live: 0.15 MHz to 0.5 MHz



Conducted Test – Live: 0.5 MHz to 5.0 MHz

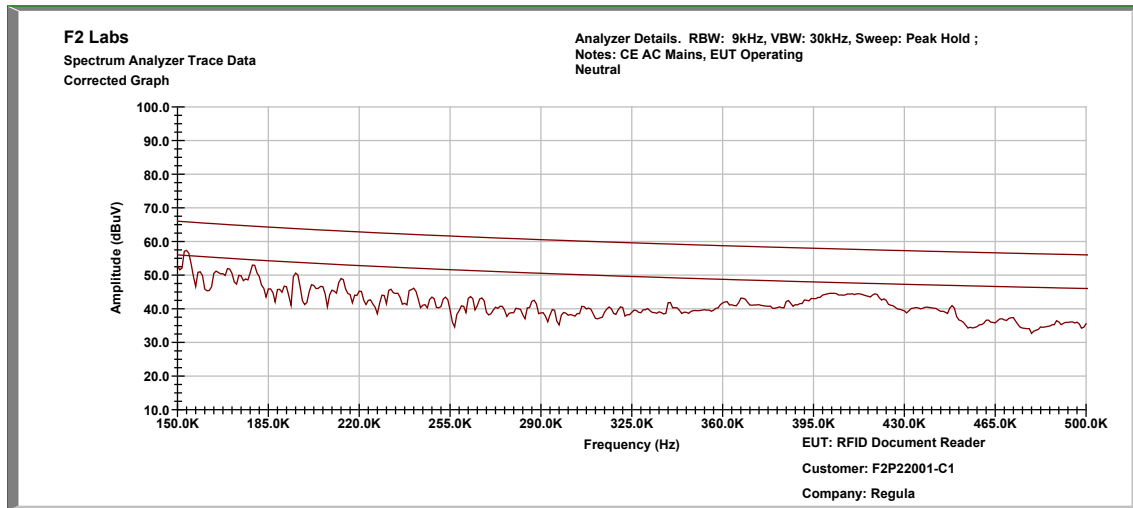


**Conducted Test – Live: 5.0 MHz to 30.0 MHz**

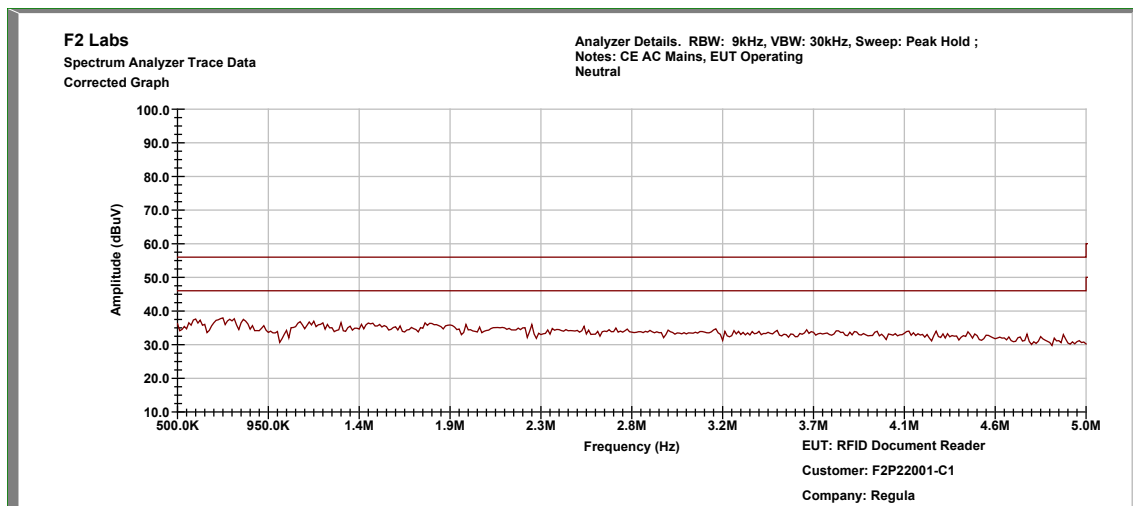
Top Discrete Measurements								
No.	Conductor	Frequency (MHz)	Detector	Level (dBμV)	Adjustment (dB)	Results (dBμV)	Limit (dBμV)	Margin (dB)
1	Live	0.152	Quasi-Peak	35.99	11.544	47.53	65.857	-18.3
			Average	19.78	11.544	31.32	55.857	-24.5
2	Live	0.17	Quasi-Peak	33.35	11.373	44.72	64.955	-20.2
			Average	16.03	11.373	27.40	54.955	-27.6
3	Live	0.186	Quasi-Peak	31.81	11.21	43.02	64.181	-21.2
			Average	15.4	11.21	26.61	54.181	-27.6
4	Live	0.411	Quasi-Peak	31.97	10.568	42.54	57.615	-15.1
			Average	25.2	10.568	35.77	47.615	-11.8

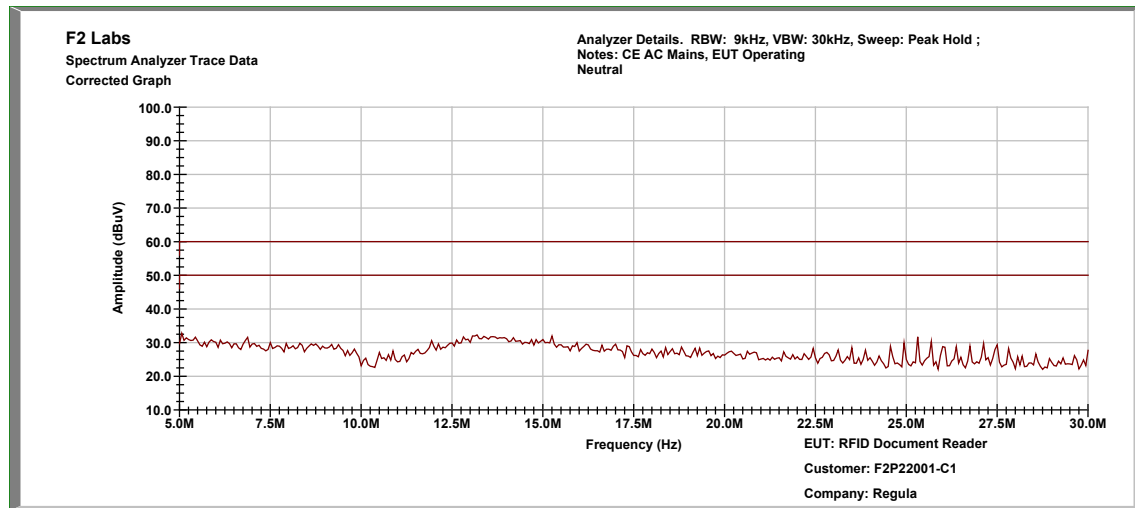


Conducted Test – Neutral: 0.15 MHz to 0.5 MHz



Conducted Test – Neutral: 0.5 MHz to 5.0 MHz

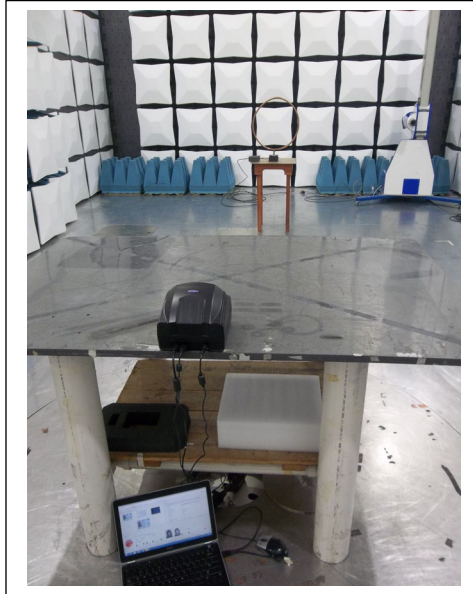


**Conducted Test – Neutral: 5.0 MHz to 30.0 MHz**

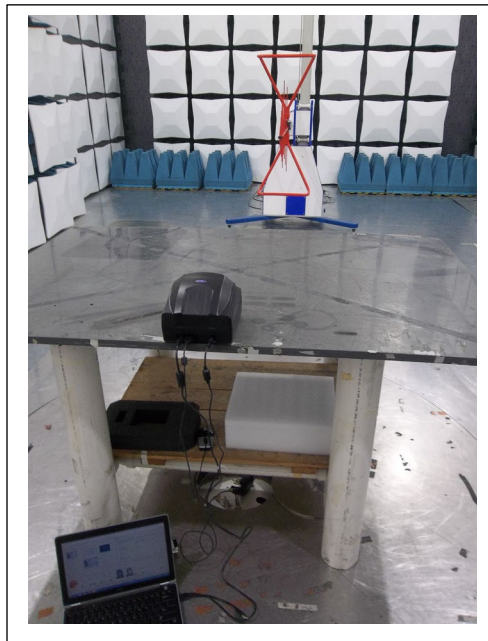
Top Discrete Measurements								
No.	Conductor	Frequency (MHz)	Detector	Level (dBμV)	Adjustment (dB)	Results (dBμV)	Limit (dBμV)	Margin (dB)
1	Neutral	0.154	Quasi-Peak	34.47	11.594	46.06	65.762	-19.7
			Average	19.09	11.594	30.68	55.762	-25.1
2	Neutral	0.178	Quasi-Peak	32.38	11.343	43.72	64.58	-20.9
			Average	16.0	11.343	27.34	54.58	-27.2
3	Neutral	0.196	Quasi-Peak	29.32	11.148	40.47	63.763	-23.3
			Average	14.52	11.148	25.67	53.763	-28.1
4	Neutral	0.4195	Quasi-Peak	32.05	10.568	42.62	57.458	-14.8
			Average	25.72	10.568	36.29	47.458	-11.2

9 PHOTOGRAPHS

Radiated Emissions, Below 30 MHz; Occupied Bandwidth



Radiated Emissions: 30 MHz to 1000 MHz





Conducted Emissions

