



427 West 12800 South
 Draper, UT 84020

Test Report Certification

FCC ID	SWX-UECR
IC ID	6545A-UECR
Equipment Under Test	UACC-EVSP-Card Reader
Test Report Serial Number	TR8590_02
Date of Test(s)	October 6 - October 24, 2023
Report Issue Date	8 December 2023

Test Specification	Applicant
47 CFR FCC Part 15, Subpart C RSS-GEN Issue 5	Ubiquiti Inc. 685 Third Avenue New York, NY 10017 U.S.A.



NVLAP LAB CODE 600241-0

Certification of Engineering Report

This report has been prepared by Unified Compliance Laboratory (UCL) to document compliance of the device described below with the requirement of Federal Communication Commissions (FCC) Part 15, Subpart C. This report may be reproduced in full. Partial reproduction of this report may only be made with the written consent of the laboratory. The results in this report apply only to the sample tested.

Applicant	Ubiquiti Inc.
Manufacturer	Ubiquiti Inc.
Brand Name	UBIQUITI
Model Number	UACC-EVSP-Card Reader
FCC ID	SWX-UECR
IC ID	6545A-UECR

On this 15th day of November 2023, I individually and for Unified Compliance Laboratory certify that the statements made in this engineering report are true, complete, and correct to the best of my knowledge and are made in good faith.

Although NVLAP has accredited the Unified Compliance Laboratory testing facilities, this report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the U.S. federal government.

Unified Compliance Laboratory



Written By: Clay Allred



Reviewed By: Richard L. Winter

Revision History		
Revision	Description	Date
01	Original Report Release	October 24, 2023
02	Updated OBW Test Data	8 December 2023

Table of Contents

1	Client Information.....	5
1.1	Applicant.....	5
1.2	Manufacturer.....	5
2	Equipment Under Test (EUT).....	6
2.1	Identification of EUT	6
2.2	Description of EUT.....	6
2.3	EUT and Support Equipment.....	6
2.4	Interface Ports on EUT	6
2.5	Operating Environment.....	7
2.6	Operating Modes.....	7
2.7	EUT Exercise Software.....	7
2.8	Block Diagram of Test Configuration	7
2.9	Modification Incorporated/Special Accessories on EUT.....	7
2.10	Deviation, Opinions Additional Information or Interpretations from Test Standard.....	7
3	Test Specification, Method and Procedures.....	8
3.1	Test Specification.....	8
3.2	Methods & Procedures.....	8
3.3	FCC Part 15, Subpart C, RSS-210	8
3.4	Results.....	8
3.5	Test Location	9
4	Test Equipment	10
4.1	Radiated Emissions.....	10
4.2	Equipment Calibration	10
4.3	Measurement Uncertainty.....	11
5	Test Results.....	12
5.1	§15.225 Bandwidth Requirements.....	12
5.2	§15.225 Power Output Requirements	14
5.3	§15.225 Spurious Emissions Requirements.....	14
5.4	§15.225 Spurious Emissions.....	16
5.5	§15.225 Frequency Stability	19

1 Client Information

1.1 Applicant

Company	Ubiquiti Inc. 685 Third Avenue New York, NY 10017 U.S.A.
Contact Name	Alex Macon
Title	Compliance

1.2 Manufacturer

Company	Ubiquiti Inc. 685 Third Avenue New York, NY 10017 U.S.A.
Contact Name	Alex Macon
Title	Compliance

2 Equipment Under Test (EUT)

2.1 Identification of EUT

Brand Name	UBIQUITI
Model Number	UACC-EVSP-Card Reader
Serial Number	Test Sample 1
Dimensions (cm)	9 x 15 x 10

2.2 Description of EUT

The UACC-EVSP-Card Reader is an NFC device for utilizing NFC-A/B modes. It is intended for connection to a host device via the USB-C connector.

This report covers the circuitry of the device subject to FCC Part 15, Subpart C. The circuitry of the device subject to FCC Part 15 Subpart B was found to be compliant and is covered under a separate Unified Compliance Laboratory test report.

2.3 EUT and Support Equipment

The EUT and support equipment used during the test are listed below.

Brand Name Model Number Serial Number	Description	Name of Interface Ports / Interface Cables
BN: UBIQUITI MN: UACC-EVSP-Card Reader SN: Test Sample 1	NFC Card Reader	USB-C Cable
BN: DELL MN: XPS SN: N/A	Notebook PC	USB-C Port
BN: UBIQUITI MN: UA-Card SN: N/A	NFC Access Card	N/A

Notes: (1) EUT

(2) Interface port connected to EUT (See Section 2.4)

The support equipment listed above was not modified in order to achieve compliance with this standard.

2.4 Interface Ports on EUT

Name of Ports	No. of Ports Fitted to EUT	Cable Description/Length
USB-C	1	30cm

2.5 Operating Environment

Power Supply	5V USB-C
AC Mains Frequency	d.c.
Temperature	22.3 – 24.5 °C
Humidity	25 - 29 %
Barometric Pressure	1010 mBar

2.6 Operating Modes

The UACC-EVSP-Card Reader was connected to a personal computer laptop and tested using test software in order to enable to constant transmission 100% duty cycle of the NFC transceiver.

2.7 EUT Exercise Software

EUT firmware version 1.0 was used to operate the transmitter using a constant transmit mode.

2.8 Block Diagram of Test Configuration

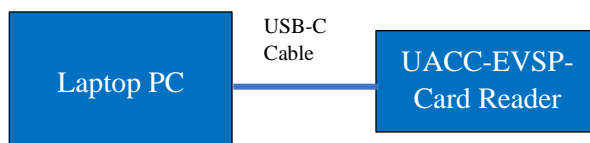


Diagram 1: Test Configuration Block Diagram

2.9 Modification Incorporated/Special Accessories on EUT

There were no modifications made to the EUT during testing to comply with the specification.

2.10 Deviation, Opinions Additional Information or Interpretations from Test Standard

Only temperature stability was performed as the device is powered via a USB-C plug with no means of varying the input voltage and maintain functionality.

3 Test Specification, Method and Procedures

3.1 Test Specification

Title	47 CFR FCC Part 15 – Radio Frequency Devices; Subpart C – Intentional Radiators; Sections: 15.203, 15.207, 15.215 and 15.225 Limits and methods of measurement of radio interference characteristics of radio frequency devices. RSS-GEN - General Requirements for Compliance of Radio Apparatus RSS-210 – License Exempt Radio Apparatus: Category I Equipment
Purpose of Test	The tests were performed to demonstrate initial compliance

3.2 Methods & Procedures

3.2.1 47 CFR FCC Part 15 Section 15.225

See test standard for details.

3.2.2 RSS-210 Issue 10

See test standard for details.

3.3 FCC Part 15, Subpart C, RSS-210

3.3.1 Summary of Tests

FCC Section	ISED Section	Environmental Phenomena	Frequency Range (MHZ)	Result
15.203	N/A	Antenna Requirement	-	Compliant
15.215 (c)	RSS-210 B.6	Bandwidth Requirement	FL \geq 13.110 FH \leq 13.567	Compliant
15.225 (a)-(b)	RSS-210 B.6	Peak Output Power	13.56	Compliant
15.225 (d)	RSS-210 B.6	Radiated Spurious Emissions	0.009 to 1000	Compliant
15.225	RSS-210 B.6	Frequency Stability	13.56	Compliant ¹

The testing was performed according to the procedures in ANSI C63.10-2013, KDB 558074 and 47 CFR Part 15.

¹: Only temperature stability was performed as the device is powered via a USB-C plug with no means of varying the input voltage and maintain functionality.

3.4 Results

In the configuration tested, the EUT complied with the requirements of the specification.

3.5 Test Location

Testing was performed at the Unified Compliance Laboratory located at 427 West 12800 South, Draper, UT 84020. Unified Compliance Laboratory is accredited by National Voluntary Laboratory Accreditation Program (NVLAP); NVLAP Code 600241-0 which is effective until 30 June 2024. This site has also been registered with Innovations, Science and Economic Development (ISED) department and was accepted under Appendix B, Phase 1 procedures of the APEC Tel MRA for Canadian recognition. ISED No.: 25346, effective until 30 June 2024.

Unified Compliance Laboratory has been assigned Designation Number US5037 by the FCC and Conformity Assessment Number US0223 by ISED.

4 Test Equipment

4.1 Radiated Emissions

Type of Equipment	Manufacturer	Model Number	Asset Number	Date of Last Calibration	Due Date of Calibration
EMI Receiver	Keysight	N9038A	UCL-2778	1/27/2023	1/27/2024
Pre-Amplifier 9 kHz – 1 GHz	Sonoma Instruments	310N	UCL-2889	11/7/2022	11/7/2024
Broadband Antenna	Scwarzbeck	VULB 9163	UCL-3062	2/22/2023	2/22/2025
Broadband Antenna	Scwarzbeck	VULB 9163	UCL-3071	1/11/2023	1/11/2025
Double Ridge Horn Antenna	Scwarzbeck	BBHA 9120D	UCL-3065	9/22/2022	9/22/2024
Log Periodic	Scwarzbeck	STLP 9129	UCL-3068	1/27/2023	1/27/2025
15 - 40 GHz Horn Antenna	Scwarzbeck	BBHA 9170	UCL-2487	6/09/2022	6/09/2024
1 – 18 GHz Amplifier	Com-Power	PAM 118A	UCL-3833	12/9/2022	12/9/2023
Test Software	UCL	Revision 1	UCL-3108	N/A	N/A

Table 1: List of equipment used for Radiated Emissions

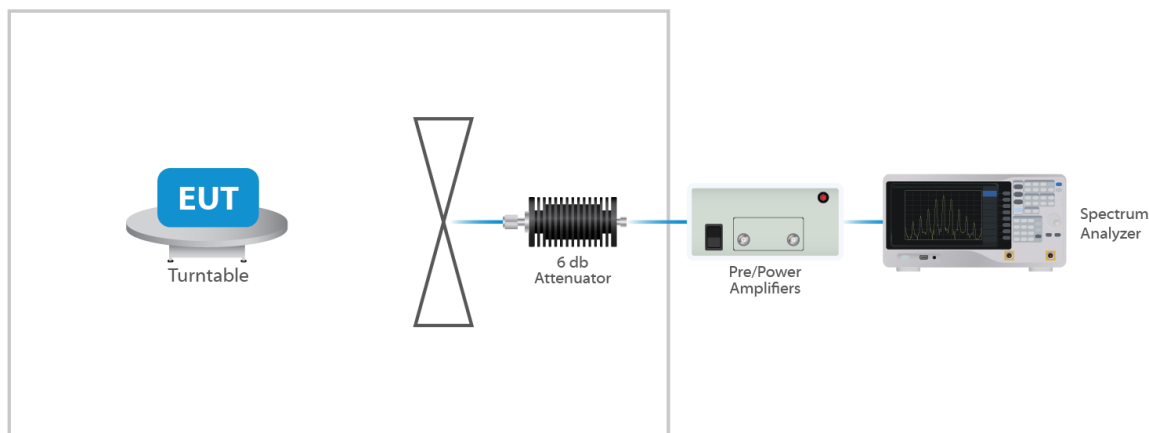


Figure 1: Radiated Emissions Test

4.2 Equipment Calibration

All applicable equipment is calibrated using either an independent calibration laboratory or Unified Compliance Laboratory personnel at intervals defined in ANSI C63.4:2014 following outlined calibration procedures. All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to traceability is on file and is available for examination upon request.

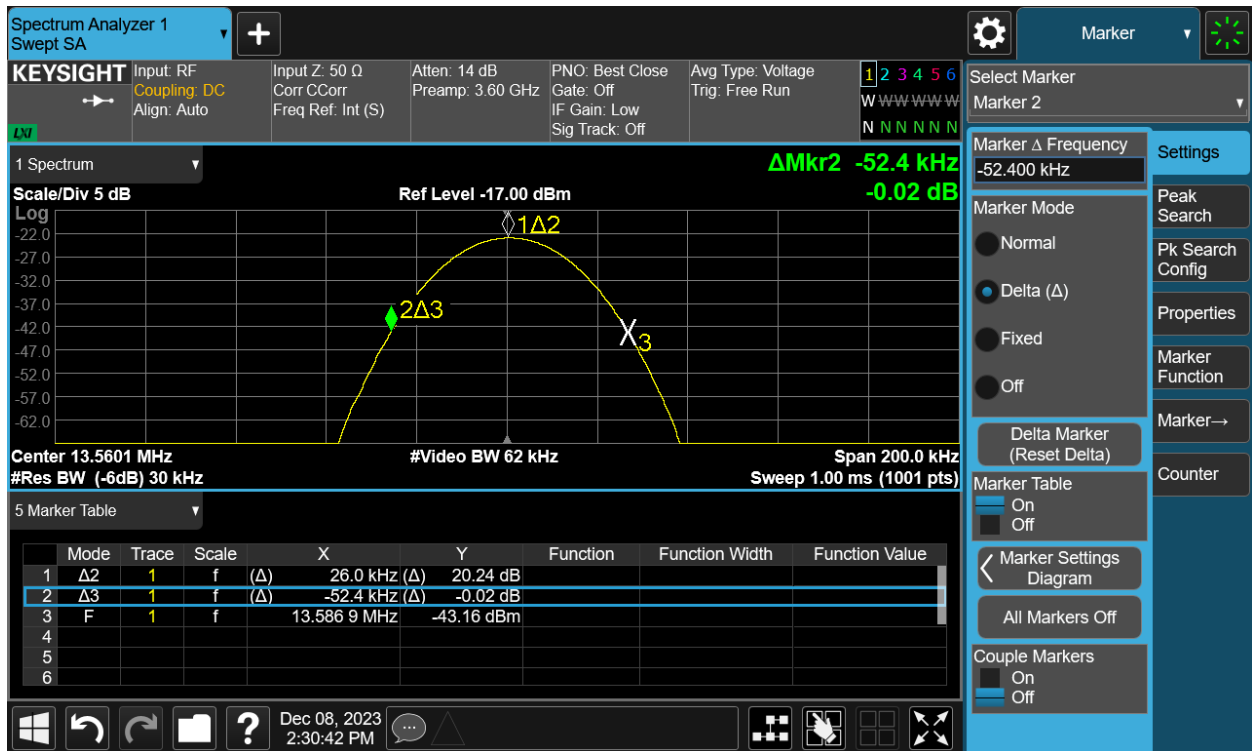
4.3 Measurement Uncertainty

Test	Uncertainty (\pm dB)	Confidence (%)
Conducted Emissions	1.44	95
Radiated Emissions (9 kHz to 30 MHz)	2.50	95
Radiated Emissions (30 MHz to 1 GHz)	4.38	95
Radiated Emissions (1 GHz to 18 GHz)	4.37	95
Radiated Emissions (18 GHz to 40 GHz)	3.93	95
Direct Connect Tests	K Factor	Value
Emissions Bandwidth	2	2.0%
Output Power	2	1.0 dB
Peak Power Spectral Density	2	1.3 dB
Band Edge	2	0.8 dB
Transmitter Spurious Emissions	2	1.8 dB

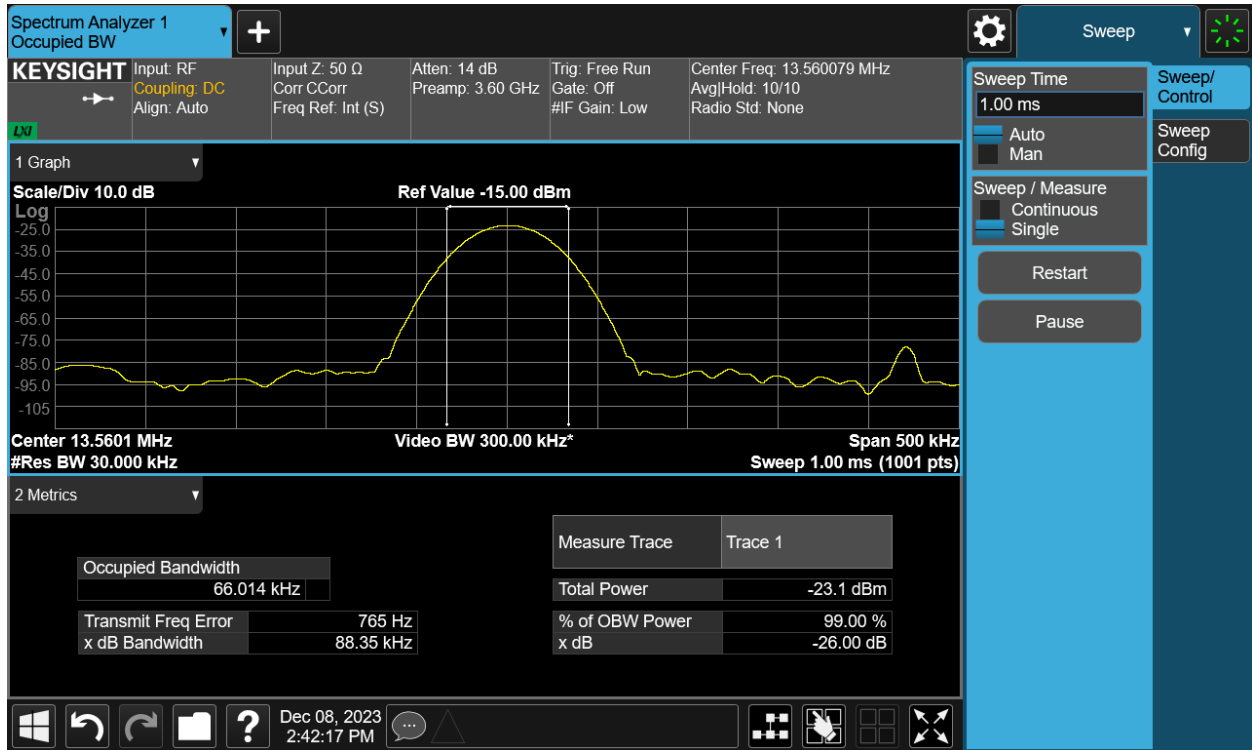
5 Test Results

5.1 §15.225 Bandwidth Requirements

Modulation	Frequency (MHz)	20 dB BW (kHz)	99% BW (kHz)	FL at 20dB (MHz)	FH at 20 dB (MHz)	Result
NFC	13.56	52.4	66.01	13.534	13.586	Pass



20 dB Emission Bandwidth Plot



99% Emission Bandwidth Plot

Results

The EUT complied with the specification

5.2 §15.225 Power Output Requirements

Polarity	Frequency (MHz)	Level @3m ¹ (dBuV/m)	Limit @ 3m ¹ (dBuV/m)	Delta (dB)	TT Azimuth	Detector	Result
Vertical	13.56	74.40	124.0	-49.6	-50°	QP	Pass
Horizontal	13.56	74.72	124.0	-49.28	-55°	QP	Pass

- Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)T
- The other emission levels were very low against the limit.
- Delta value = Emission level – Limit value.

¹: The measured field strength was extrapolated from a distance of 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)

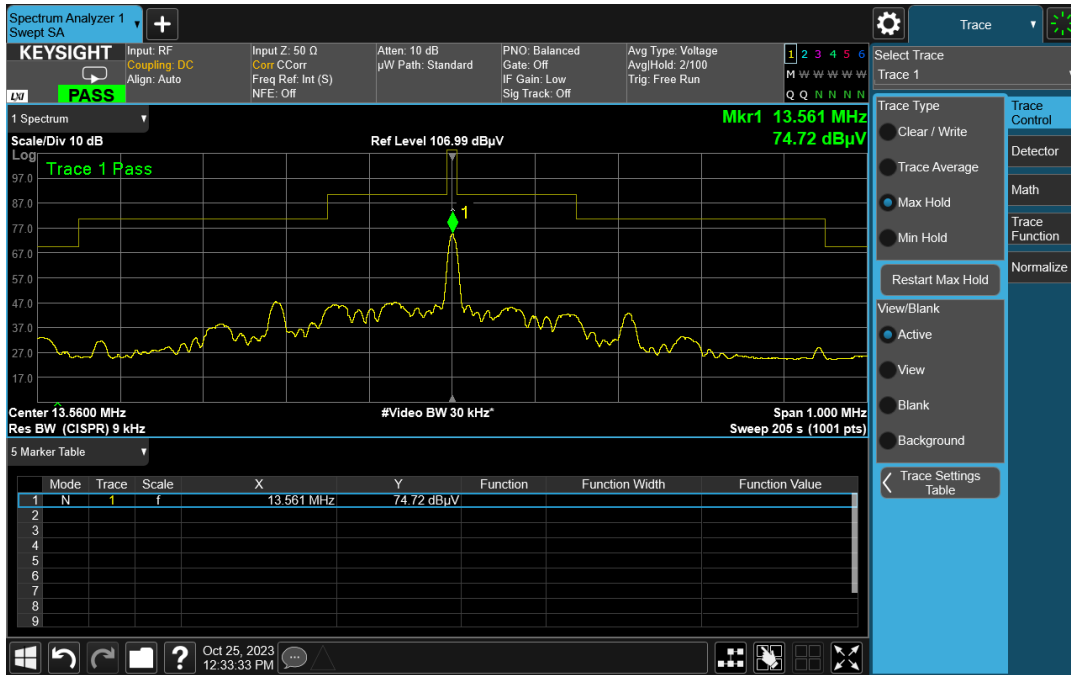
Example:
 13.56MHz = 15848uV/m 30m
 = 84dBuV/m 30m
 = 84+20log(30/3)2 3m
 = 124dBuV/m

Fundamental Results

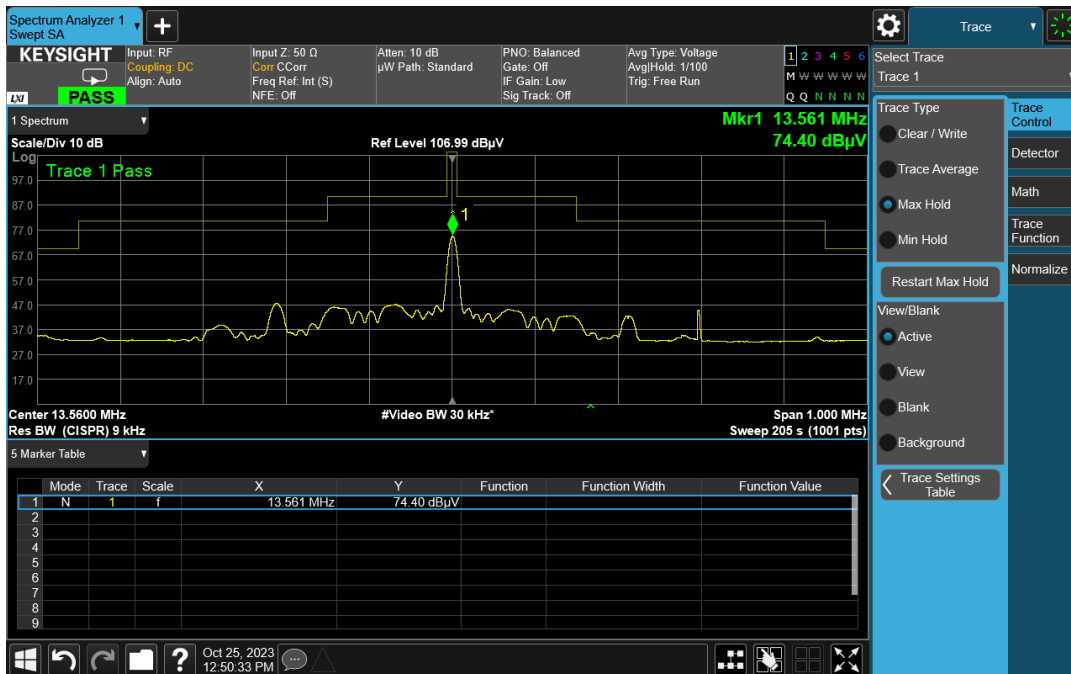
5.3 §15.225 Spurious Emissions Requirements

Freq. of Emissions (MHz)	uv/m @ 30m	dBuv/m @ 30m	dBuv/m @ 10m	dBuv/m @ 3m	dBuv/m @ 1m
1.705-13.110	30	29.5	48.6	69.5	88.6
13.110 – 13.410	106	40.5	59.6	80.5	99.6
13.410 – 13.553	334	50.5	69.6	90.5	109.6
13.553 – 13.567	15848	84.0	103.1	124.0	143.1
13.567 – 13.710	334	50.5	48.6	69.5	88.6
13.710 – 14.010	106	40.5	59.6	80.5	99.6
14.010 – 30.000	30	29.5	69.6	69.5	109.6

Spectrum Mask Limits



MASK / PWR Horizontal Plot



MASK / PWR Vertical Plot

Result

The EUT complied with the specification limit.

5.4 §15.225 Spurious Emissions

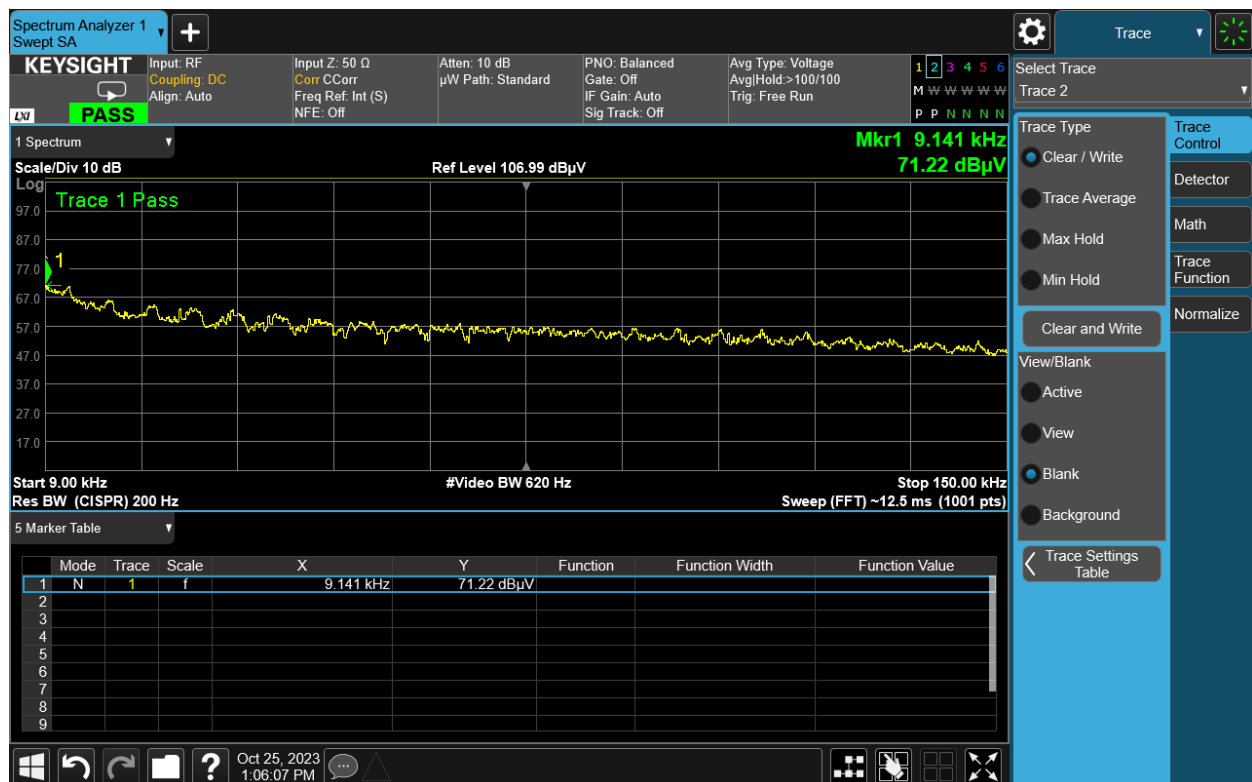
5.4.1 Radiated Spurious Emissions in the Restricted Bands of §15.205

The frequency range from the lowest frequency generated or used in the device to the tenth harmonic of the highest fundamental emissions was investigated to measure any radiated emissions in the restricted bands. The following tables show measurements of any emissions that fell into the restricted bands of §15.205. The tables show the worst-case emissions measured from the EUT. For frequencies above 18.0 GHz, a measurement distance of 1 meter was used. The noise floor was a minimum of 6 dB below the limits. The emissions in the restricted bands must meet the limits specified in §15.209. Tabular data for each of the spurious emissions is shown below for each of the units. Plots of the band edges are also shown.

Correction Factor = Antenna Factor + Cable Loss - Pre-Amplifier Gain and is added to the Receiver reading.

Result

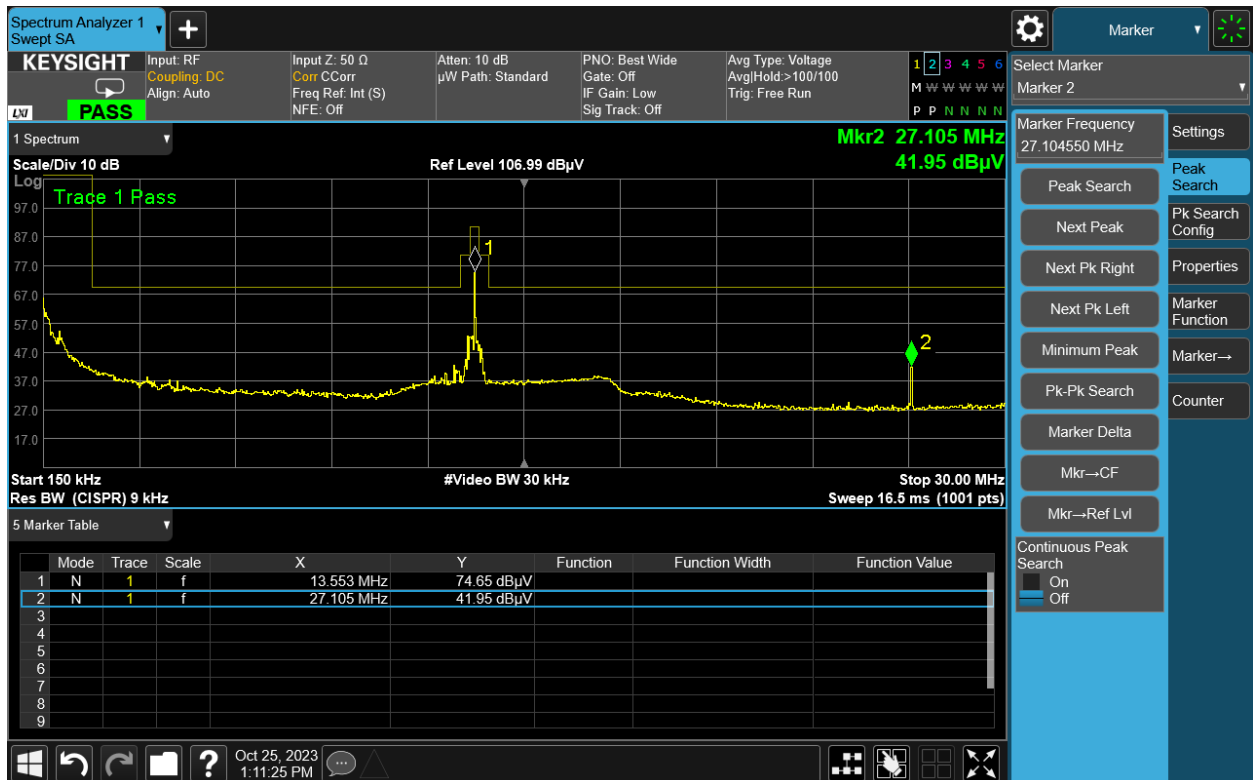
All emissions in the restricted bands of §15.205 met the limits specified in §15.209; therefore, the EUT complies with the specification.



9kHz – 150kHz Plot (Horizontal – Worst Case)

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin	Azimuth (°)	Height (m)	Pol.	Det.	RBW (Hz)	Correct (dB)
27.124	41.27	69.5	-28.23	295	1	Horizontal	QP	9kHz	12.4
27.121	39.52	69.5	-29.98	102	1	Horizontal	QP	9kHz	12.4

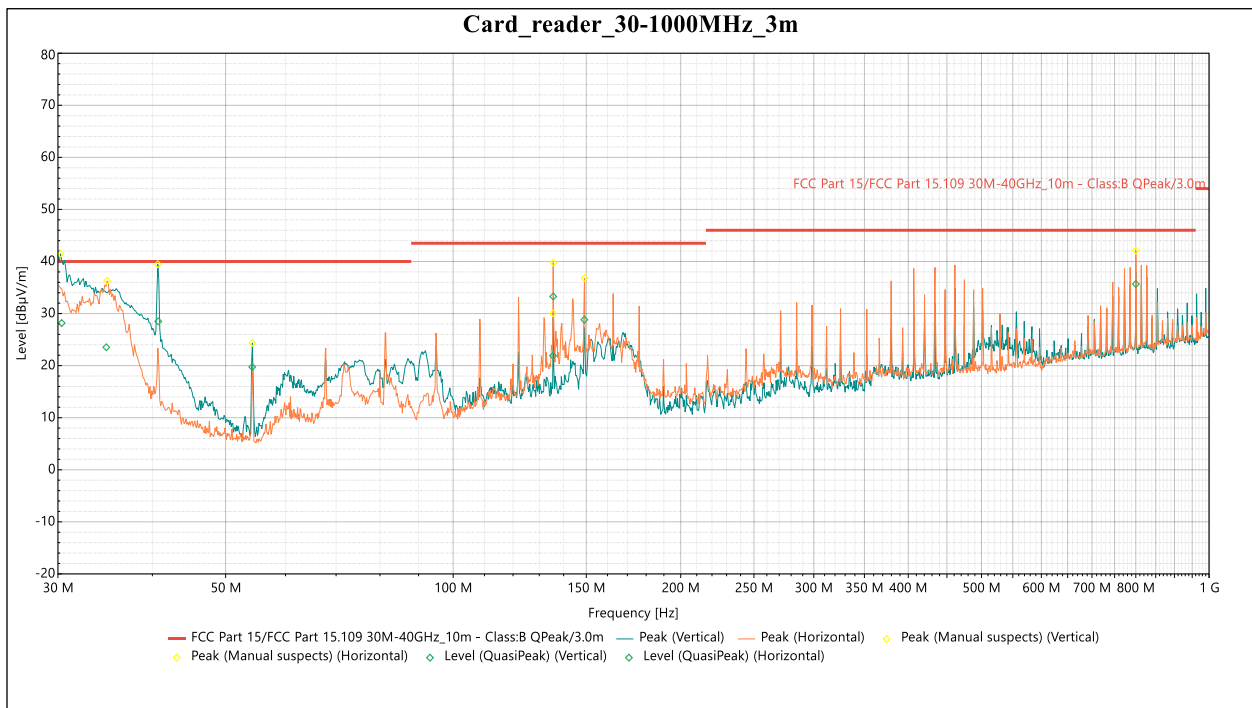
Table 2: Radiated Emissions 150kHz – 30MHz



150kHz – 30M Hz Plot (Horizontal – Worst Case)

Frequency	Level (dB μ V/m)	Limit (dB μ V/m)	Margin	Azimuth (°)	Height (m)	Pol.	Det.	RBW (Hz)	Correct (dB)
30.343 MHz	28.169	40	-11.831	246	1.849	Vertical	QP	120 k	-7.924
40.725 MHz	28.499	40	-11.501	120	1.13	Vertical	QP	120 k	-14.95
54.221 MHz	19.739	40	-20.261	81	1.13	Vertical	QP	120 k	-21.313
135.58 MHz	21.901	43.5	-21.599	349	1.848	Vertical	QP	120 k	-14.367
34.764 MHz	23.535	40	-16.465	151	3.287	Horizontal	QP	120 k	-10.425
135.62 MHz	33.287	43.5	-10.213	31	1.53	Horizontal	QP	120 k	-14.37
149.11 MHz	28.821	43.5	-14.679	25	2.567	Horizontal	QP	120 k	-15.357
800.1 MHz	35.668	46	-10.332	52	1	Horizontal	QP	120 k	-4.942

Table 3: Radiated Emissions 30 MHz – 1 GHz



Radiated Emissions 30 MHz – 1 GHz Plot

Result

The EUT complied with the specification limit.

5.5 §15.225 Frequency Stability

5.5.1 Limits of Frequency Stability Measurements

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

Temp °C	CH Frequency (MHz)	Measured Frequency (MHz)				Frequency Stability (PPM)				Limit (PPM)	Result
		0 min	2 min	5 min	10 min	0 min	2 min	5 min	10 min		
20	13.56	13.56065	13.56065	13.56070	13.56070	47.9	47.9	51.6	51.6	100	Pass
30	13.56	13.56065	13.56070	13.56070	13.56070	47.9	51.6	51.6	51.6	100	Pass
40	13.56	13.56070	13.56070	13.56070	13.56070	51.6	51.6	51.6	51.6	100	Pass
50	13.56	13.56070	13.56070	13.56075	13.56075	51.6	51.6	55.3	55.3	100	Pass
10	13.56	13.56075	13.56070	13.56070	13.56070	55.3	51.6	51.6	51.6	100	Pass
0	13.56	13.56075	13.56070	13.56070	13.56070	55.3	51.6	51.6	51.6	100	Pass
-10	13.56	13.56075	13.56070	13.56075	13.56075	55.3	51.6	55.3	55.3	100	Pass
-20	13.56	13.56075	13.56075	13.56075	13.56075	55.3	55.3	55.3	55.3	100	Pass

Table 4: Frequency Stability Results

Result

The EUT complied with the specification limit.

-- End of Test Report --