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Test Report

FCC CFR 47 Subpart C Section 15.225

ISED RSS-Gen and RSS-210

13.56 MHz RFID / 125 kHz NFC

Applicant:
TriTeq Lock and Security LLC
701 Gullo Ave.
Elk Grove Village, IL 60007

Product:
Wireless Electronic Lock
Model:
MICROIQ

FCC ID:	2BDMF-MIQPROX
IC:	31637-MIQPROX
Test Report Number:	2406TTL_mqp_247le
Date Product Tested:	04/01/2024 – 05/31/2024
Date of Report:	06/03/2024

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Revision History

2406TTL_mqp_225RFID

Rev.	Change Description	Reason/Application	Date	Appvd.
Draft	Report for review	Applies to MICRO IQ	April 12, 2023	MEB
C1	Released report	Applies to MICRO IQ	April 12, 2023	MEB
C2	Date update	Update to Test equipment	May 1, 2023	MEB
C3	Update to Measurement Uncertainty	Added: The reported measurement uncertainty is for information only and is not considered for stating conformity to these requirements.	December 1, 2023	MEB

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Test Certificate

APPLICANT:	TriTeq Lock and Security LLC 701 Gullo Ave. Elk Grove Village, IL 60007
Trade Name:	TriTeq Lock and Security LLC
Model:	Micro IQ
FCC ID:	2BDMF-MIQPROX
IC:	31637-MIQPROX

I HEREBY CERTIFY THAT:

The measurements shown in this report were made in accordance with the procedures indicated and that the energy emitted by this equipment, as received, was found to be within the FCC CFR 47 Part 15 Rules and Regulations Subpart C requirements and Industry Canada RSS-247 and RSS-Gen requirements. Additionally, it should be noted that the results in this report apply only to the items tested, as identified herein.

I FURTHER CERTIFY THAT:

On the basis of the measurements taken at the test site, the equipment tested is capable of operation in compliance with the requirements set forth in FCC CFR 47 Part 15.207, 15.209 and 15.247 Rules and Regulations and Industry Canada RSS-247 and RSS-Gen requirements.

On this Date: April 12, 2023

Bruce Smith
Atlas Compliance & Engineering, Inc.

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Test Equipment

The following list contains the test equipment that was utilized in making the measurements in this report.

Description _ Model	Serial	Manufacturer	Calibration Due
BiLog Antenna with SA3NS-04 Attn CHL157.1 30-1000MHz _ 3143B	00217636	ETS Lindgren	5/20/26
Active Loop Antenna _ 6502	9108-2669	EMCO	5/22/26
Pre amp 9kHz-2GHz _ CPA9231A	3259	Schaffner	11/28/24
EMI Test Receiver 9 kHz - 2500 MHz _ ESPC	DE15934 845296/0024	Rohde & Schwarz	11/28/24
Pre amp 1Ghz-26.5GHz _ 8449B	3008A00910	HP	11/28/24
Signal Analyzer 10Hz - 40GHz option B4, B5, B24, B29, K54 Firmware 3.40 _ FSV40	101735	Rohde & Schwarz	11/28/24
LISN 10kHz – 100 MHz _ 3825/2	9007-1683	EMCO	5/22/25
Temperature and humidity probe _ RH-85	140020	Omega Engineering	12/4/25
RF Cable 45 ft. _ KPS-1571-5400-KPS	2040	IW Microwave	1/4/25
RF Cable 19m _ NPS-2801-1900M-NPS	1805	IW Microwave	1/4/25
Digital Voltmeter _ 179	15400440	Fluke	12/4/25
10dB attenuator	2		CBU
Thermal Chamber _ 107	0700496	Test Equity	CBU

CBU – characterized before use

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General Information

Applicant:	TriTeq Lock and Security LLC 701 Gullo Ave. Elk Grove Village, IL 60007
Contact Person:	Jacob Clites
Purpose of Test:	To demonstrate the compliance of the TriTeq Lock and Security LLC, MICRO IQ, with the requirements of FCC CFR 47 Part 15 Rules and Regulations to the limits of Subpart C 15.207, 15.209, 15.247 and Canada RSS-Gen, RSS-247 using the procedure stated in ANSI C63.10 and FCC KDB 558074 D01
Equipment Tested:	Wireless Electronic Lock
Trade Name:	TriTeq Lock and Security LLC
Model:	MICRO IQ
HVIN:	W, B, WL, BL, KnexIQ
FVN:	4.15
Power Supply Rating:	3.0Vdc VBAT [9 VDC for KNEX model only]
Transmitter Frequency:	13.56 MHz / 125 kHz
Modulation Type:	BPSK/ASK
Equipment Class:	DXX
Frequency Range Investigated:	9 KHz to 1 GHz
FCC ID:	2BDMF-MIQPROX
IC:	31637-MIQPROX
Test Site Locations:	ISED number 3655B Field Strength Measurement Facility: Atlas Compliance & Engineering, Inc. 726 Hidden Valley Road Royal Oaks, California 95076 ISED number 3655A Conducted Measurement Facility: Atlas Compliance & Engineering, Inc. 1792 Little Orchard Street San Jose, California 95125
Test Personnel:	Bob Cole EMC Engineer

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General Description of EUT

EUT	Wireless Electronic Lock
MODEL NO.	MicroProx-6, MicroProx-12, KNEX
POWER SUPPLY	3.0Vdc (Coin Battery)
	9.0Vdc Adapter (KNEX Model only)
MODULATION TYPE	ASK
OPERATING FREQUENCY	13.56MHz
ANTENNA TYPE	loop antenna
DATA CABLE	NONE
I/O PORTS	NONE
ACCESSORY DEVICES	Refer to Note

Item	Product	Brand	Model	HVIN	Description
1	Wireless Electronic Lock	TriTeq	KNEXIQ	KnexIQ	6 button lock with Bluetooth 2.0 / 13.56 MHz / 125 kHz RFID, +12Vdc AC Adapter / +9V DC Battery capable
2	Wireless Electronic Lock	TriTeq	MicroIQ Prox-12	WL	12 button lock with Bluetooth 2.0 / 13.56 MHz / 125 kHz RFID, +3.0Vdc Battery
3	Wireless Electronic Lock	TriTeq	MicroIQ Prox-12	BL	12 button lock with Bluetooth 2.0, +3.0Vdc Battery
4	Wireless Electronic Lock	TriTeq	MicroIQ Prox-6	W	6 button lock with Bluetooth 2.0 / 13.56 MHz / 125 kHz RFID, 3Vdc Battery
4	Wireless Electronic Lock	TriTeq	MicroIQ Prox-6	B	6 button lock with Bluetooth 2.0, 3Vdc Battery

NOTE:
These products have identical radio circuitry for 125kHz and 13.56 MHz RFID, and 2.4 GHz BLE transmission. The differences in the products are explained below.

- MicrolQ Prox 6-button: uses a CR2032 coin cell battery and has a 5-digit keypad (1-5) plus a program button. It is designed to enter sleep mode and turn off radios when not in use. The device controls a knob manually-actuated latch mechanism.

- Micro IQ 12-button: uses a CR2450 coin cell'battery, and a 10-digit keypad (0-9) plus a program button and clear button. It is designed to enter sleep mode and turn off radios when not in use. The device controls a knob manually-actuated latch mechanism.

- Knex: uses an FCC-certified AC-DC power supply, and a keypad with 5 digits (1-5) plus a program button. This product has optional sleep mode. The device controls a non manually-actuated latch mechanism.

Test Results

Test Results 47 CFR Part 15, Subpart C (Section 15.225), ISED RSS-Gen, RSS-210			
Clause	Test Parameter	Result	Remarks
15.225 a, b, c RSS 210 B6 a	Emissions Mask	Pass	Meets the Requirement
15.225 d	Spurious Emissions	Pass	Meets the requirement
15.225 d RSS 210 b	Frequency Stability	Pass	Meets the requirement
15.215, RSS-Gen 6.11 8.11	Transmitter frequency Stability	Pass	Meets the requirement

Temperature and Humidity

The ambient temperature of the actual EUT was within the range of 10° to 40° C (50° to 104° F) unless the particular equipment requirements specify testing over a different temperature range. The humidity levels were within the range of 10% to 90% relative humidity unless the EUT operating requirements call for a different level.

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Test Configuration

Customer:	TriTeq Lock and Security LLC
Test Date:	April 11 – June 30, 2024
Specification:	FCC CRF 47 Part 15.247 Limits, ANSI C63.10 Methods

Operational Description:

The MicroIQ is a Electronic Wireless Lock

EUT Description / Note:

The EUT, MICRO IQ, a Electronic Wireless Lock, was powered up and the 13.56 MHz RFID or 125 kHz NFC transmitters were operating continuously

EUT Support Program

The EUT was tested sequentially at 13.56 MHz (RFID) and 125 kHz (NFC). The EUT was then operated to find worst case levels of unwanted emissions. Preliminary radiated tests were performed to identify which operating mode produced the worst case (maximum) transmit level.

EUT Modifications for Compliance

There were no modifications performed on the EUT. The test results state the emission levels of the EUT in the condition as it was received.

Measurement Uncertainty

Measurement uncertainty is caused by random effects and imperfect correction of systematic effects. The reported measurement uncertainty is for information only and is not considered for stating conformity to these requirements. The measurement uncertainties stated were calculated with a confidence level of approximately 95%, using a coverage factor of k = 2.

Expanded Measurement Uncertainty at 95% confidence probability;
Radiated emissions = ±3.92dB
Conducted emissions = ±1.16dB

EUT Support Devices

Table 1 – Support Equipment Used For Test

Model:	Description:	S/N	FCC ID#

I/O Ports and Cables

Table 2 – EUT Port Terminations

KNEX Modle Only

I/O Port	Cable Type	Length	Connector	Termination
Power	Unshielded	1 M	Custom	AC Adapter (9 VDC)

Table 3 – Host Port Termination's

I/O Port	Cable Type	Length	Connector	Termination

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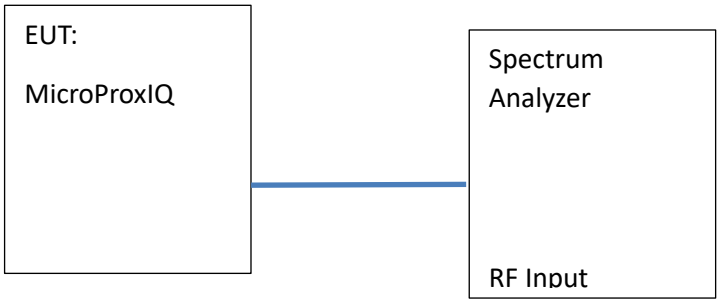
Test Setup Diagram

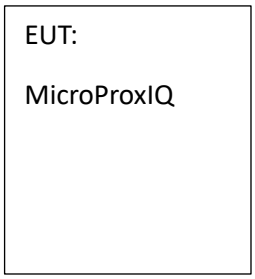
Following is the block diagram of the test setup.

Figure 1 – Test Setup Diagram

Conducted antenna port measurements



Radiated emissions measurements



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General Description of Applied Standards

The EUT is a RFID / NFC Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C (15.225)

FCC Part 15, Subpart C (15.209)

ANSI C63.10-2009

All test items have been performed and recorded as per the above standards.

Test Types and Test Data

AC Power Line Conducted Emissions

§15.207 Conducted limits.

(c) Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provisions for, the use of battery chargers which permit operating while charging, AC adapters or battery eliminators or that connect to the AC power lines indirectly, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

RSS-Gen 8.8 AC power-line conducted emissions limits

Unless stated otherwise in the applicable RSS, for radio apparatus that are designed to be connected to the public utility AC power network, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the range 150 kHz to 30 MHz shall not exceed the limits in table 4, as measured using a 50 µH / 50 Ω line impedance stabilization network. This requirement applies for the radio frequency voltage measured between each power line and the ground terminal of each AC power-line mains cable of the EUT.

For an EUT that connects to the AC power lines indirectly, through another device, the requirement for compliance with the limits in table 4 shall apply at the terminals of the AC power-line mains cable of a representative support device, while it provides power to the EUT. The lower limit applies at the boundary between the frequency ranges. The device used to power the EUT shall be representative of typical applications.

AC Power Line Conducted Emissions Limits

	Conducted limit (dBµV)	
Frequency of emission (MHz)	**Quasi-peak**	**Average**
0.15 – 0.5	66 to 56*	56 to 46*
0.5 - 5	56	46
5 - 30	60	50

* The level decreases linearly with the logarithm of the frequency.

ANSI 63.10

6.2 Standard test method fo r ac power-line conducted emissions from unlicensed wireless devices

6.2.1 General considerations

AC power-line conducted emission measurements shall be made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz, to determine the line-to-ground radio-noise voltage

that is conducted from all of the EUT current-carrying power input terminals that are directly (or indirectly via separate transformers or power supplies) connected to a public power network. These measurements may also be required between 9 kHz and 150 kHz.

If the EUT normally receives power from another device that in turn connects to the public utility ac power lines, measurements shall be made on that device with the EUT in operation to demonstrate that the device continues to comply with the appropriate limits while providing the EUT with power. If the EUT is operated only from internal or dedicated batteries, with no provisions for connection to the public utility ac power lines (600 VAC or less) to operate the EUT (such as an adapter), then ac power-line conducted measurements are not required.

For direct current (dc) powered devices where the ac power adapter is not supplied with the device, an "off-the-shelf" unmodified ac power adapter shall be used. If the device is supposed to be installed in a host (e.g., the device is a module or PC card), then it is tested in a typical compliant host (see also 5.10.3).

6.2.2 Measurement requirements

Measured levels of ac power-line conducted emission shall be the emission voltages from the voltage probe, where permitted, or across the 50 Ω LISN port (to which the EUT is connected), where permitted, terminated into a 50 Ω measuring instrument. All emission voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord by the use of mating plugs and receptacles on the LISN, if used. Equipment shall be tested with power cords that are normally supplied or recommended by the manufacturer and that have electrical and shielding characteristics that are the same as those cords normally supplied or recommended by the manufacturer. For those measurements using a LISN, the 50 Ω measuring port is terminated by a measuring instrument having 50 Ω input impedance. All other ports are terminated in 50 Ω loads. Figure 4 shows typical test setups of radiated measurements. Note the optional LISN in this figure. Figure 5 and Figure 6 show typical test setups for ac power-line conducted emissions testing (see 6.12). For information about the use of an RF-shielded (screened) room, vertical conducting plane, and voltage probe, see ANSI C63.4.

Tabletop devices shall be placed on a platform of nominal size 1 m by 1.5 m, raised 80 cm above the reference ground plane. The vertical conducting plane or wall of an RF-shielded (screened) room shall be located 40 cm to the rear of the EUT. Floor-standing devices shall be placed either directly on the reference ground-plane or on insulating material as described in ANSI C63.4. All other surfaces of tabletop or floor-standing EUTs shall be at least 80 cm from any other grounded conducting surface, including the case or cases of one or more LISNs.

Each current-carrying conductor of the EUT power cord(s), except the ground (safety) conductor(s), shall be connected individually through a LISN to the input power mains. All 50 Ω ports of the LISN shall be resistively terminated in 50 Ω loads when not connected to the measuring instrument. When the test configuration comprises multiple units that have their own power cords, ac power-line conducted emissions measurements shall be performed with the ac power-line cord of the particular unit under test connected to one LISN that is connected to the measuring instrument. Power cords not connected to the EUT shall be connected to separate LISN(s). This connection may be made using a multiple-receptacle device.

Emissions from each current-carrying conductor of the EUT shall be measured individually. Where multiple portions of the EUT receive ac power from a common power strip, which is furnished by the manufacturer as part of the EUT, measurements need only be made on the current-carrying conductors of the common power strip. Adapters or extension cords connected between the EUT power cord plug and the LISN power receptacle shall be included in the LISN setup such that the calibration of the combined adapter or extension cord with an adapter and the LISN meets the requirements of 4.2.

If the EUT is composed of several devices that have their own separate ac power connections (e.g., a floor-standing frame with independent power cords for each shelf), which can connect directly to

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the ac power network, then each current-carrying conductor of one device is measured while the other devices are connected to a second (or more) LISN(s). All devices shall be measured separately.

If the EUT is normally operated with a ground (safety) connection, then the EUT shall be connected to the ground at the LISN through a conductor provided in the lead from the ac power to the LISN.

The excess length of the power cord between the EUT and the LISN receptacle (or ac power receptacle where a LISN cannot be used), or an adapter or extension cord connected to and measured with the LISN, shall be folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length; see Figure 4. If the EUT does not have a flexible power lead, then the EUT shall be placed at a distance of 80 cm from the LISN (or power receptacle where a LISN cannot be used) and connected thereto by a power lead or appropriate connection no more than 1 m long. The measurement shall be made at the LISN end of this power lead or connection.

The LISN housing, measuring instrument case, and reference ground plane or vertical conducting plane, if used, shall be bonded together (see ANSI C63.4).

AC Power Line Conducted Data for Line

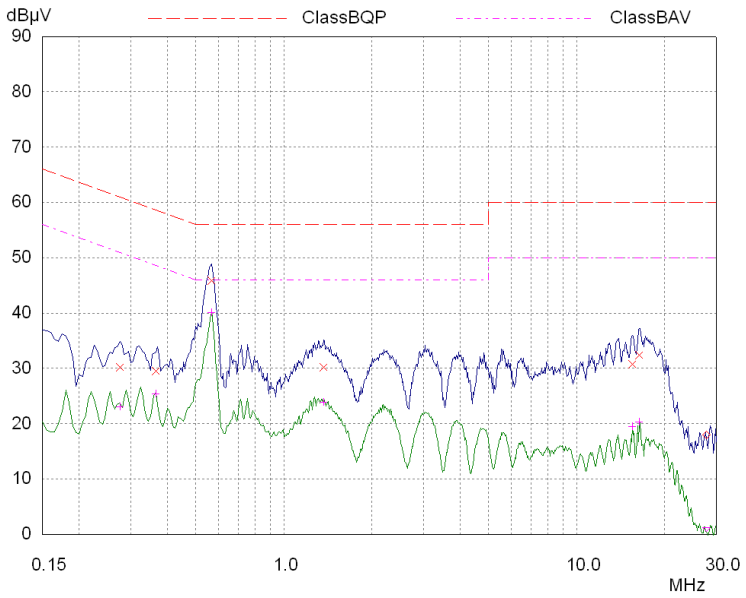

Figure 2 – Line Scan

Blue Trace: Peak Measurement Green Trace: Average Measurement
Final Measurement: x = QP / + = AV at 2 second measurement time.

Table 4 – Line Scan Data

Frequency MHz	Level dBµV	Detector	Limit dBµV	Margin dB	Phase	PE
0.275	30.14	QP	60.97	30.83	L1	fl
0.365	29.56	QP	58.61	29.05	L1	fl
0.565	45.89	QP	56.00	10.11	L1	fl
1.37	30.16	QP	56.00	25.84	L1	fl
15.565	30.79	QP	60.00	29.21	L1	fl
16.41	32.42	QP	60.00	27.58	L1	fl
0.275	23.08	AV	50.97	27.89	L1	fl
0.365	25.36	AV	48.61	23.25	L1	fl
0.565	40.08	AV	46.00	5.92	L1	fl

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1.37	23.90	AV	46.00	22.10	L1	fl
15.565	19.42	AV	50.00	30.58	L1	fl
16.41	20.26	AV	50.00	29.74	L1	fl

AC Power Line Conducted Data for Neutral

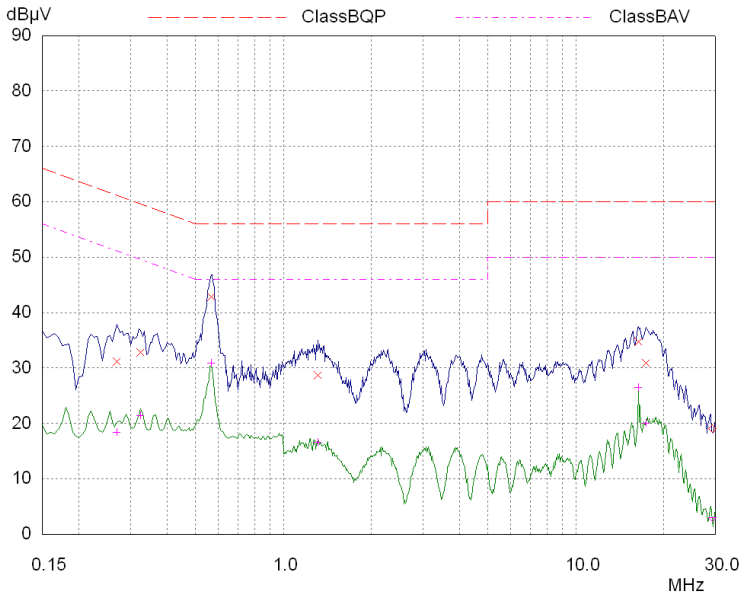

Figure 3 – Neutral Scan

Blue Trace: Peak Measurement Green Trace: Average Measurement
Final Measurement: x = QP / + = AV at 2 second measurement time.

Neutral Scan Data

Frequency MHz	Level dBµV	Detector	Limit dBµV	Margin dB	Phase	PE
0.27	31.13	QP	61.12	29.99	N	fl
0.325	32.76	QP	59.58	26.82	N	fl
0.565	42.89	QP	56.00	13.11	N	fl
1.31	28.61	QP	56.00	27.39	N	fl
16.455	34.74	QP	60.00	25.26	N	fl
17.385	30.83	QP	60.00	29.17	N	fl
0.27	18.31	AV	51.12	32.81	N	fl
0.325	21.40	AV	49.58	28.18	N	fl
0.565	30.82	AV	46.00	15.18	N	fl
1.31	16.52	AV	46.00	29.48	N	fl
16.455	26.50	AV	50.00	23.50	N	fl
17.385	20.00	AV	50.00	30.00	N	fl

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§ 15.225 Operation within the band 13.110-14.010 MHz.

(a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

(b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

(d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

(e) 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. For battery operated equipment, the equipment tests shall be performed using a new battery.

(f) In the case of radio frequency powered tags designed to operate with a device authorized under this section, the tag may be approved with the device or be considered as a separate device subject to its own authorization. Powered tags approved with a device under a single application shall be labeled with the same identification number as the device.

RSS 210 B6 Band 13.110-14.010 MHz

Devices shall comply with the following requirements:

(a)the field strength of any emission shall not exceed the following limits:

(i) 15.848 mV/m (84 dBµV/m) at 30 m, within the band 13.553-13.567 MHz

(ii) 334 µV/m (50.5 dBµV/m) at 30 m, within the bands 13.410-13.553 MHz and 7-13.710 MHz

(iii) 106 µV/m (40.5 dBµV/m) at 30 m, within the bands 13.110-13.410 MHz and 13.710-14.010 MHz

(iv) RSS-Gen general field strength limits for frequencies outside the band 13.110-14.010 MHz

(b) the carrier frequency stability shall not exceed ±100 ppm

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ANSI 63.10 Requirements:

6.2.3.1 General requirements

The emission tests shall be performed with the EUT and accessories arranged and configured in a manner that tends to produce maximum emissions within the range of variations that can be expected under normal operating conditions. Equipment that typically operates within a system made up of multiple interconnected units shall be tested as part of such a typical operational system. The guidance and consideration in 5.10 shall also be applied in the setup and operating requirements of the unlicensed wireless device.

The results of any such discussion and decision process shall be reported in the test report. A photograph or detailed drawing shall be used to document the equipment arrangement and shall be part of the test report.

6.4.3 Measuring antenna selection, location, and test distance

Radiated emission tests shall be performed in the frequency range of 9 kHz to 30 MHz, using a calibrated loop antenna as specified in 4.3.2, at a suitable site and measurement distance as specified in 5.3. This method is applicable for measuring radiated RF emissions from all units, cables, power cords, and interconnect cabling or wiring of the EUT, by applying the guidance provided in 5.10 along with guidance provided subsequently.

At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the requirements. When performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by using one of the methods described in 6.4.4 or 6.4.5, unless otherwise accepted by a regulatory authority. See Table 5 showing the relationship between frequency and wavelength.[47] For all measurements or calculations of extrapolation, if extrapolation is determined at a particular frequency, then the resultant extrapolation value may be presumed to apply to other frequencies
within one octave of the frequency that was used for the measurement or calculation of extrapolation.

—Relationship of frequency and wavelength (informative)

Frequency (MHz)	l (m)	0.625l (m)	l/21r
0.009	33333.3	20833.3	5305.2
0.1	3000.0	1875.0	477.5
0.3	1000.0	625.0	159.2
1	300.0	187.5	47.7
4.76	63.0	39.4	10.0
16	18.8	11.7	3.0
30	10.0	6.3	1.6

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE	25deg. C, 65%RH	3.0 Vdc	Bob Cole
FS	24deg. C, 62%RH	3.0 Vdc	Bob Cole
BW	25deg. C, 65%RH	3.0 Vdc	Bob Cole

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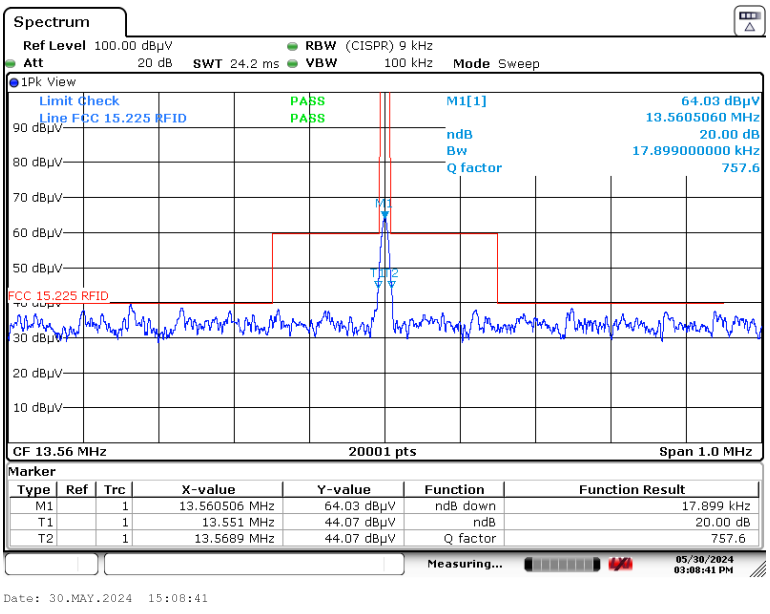
Radiated Emissions Measurements

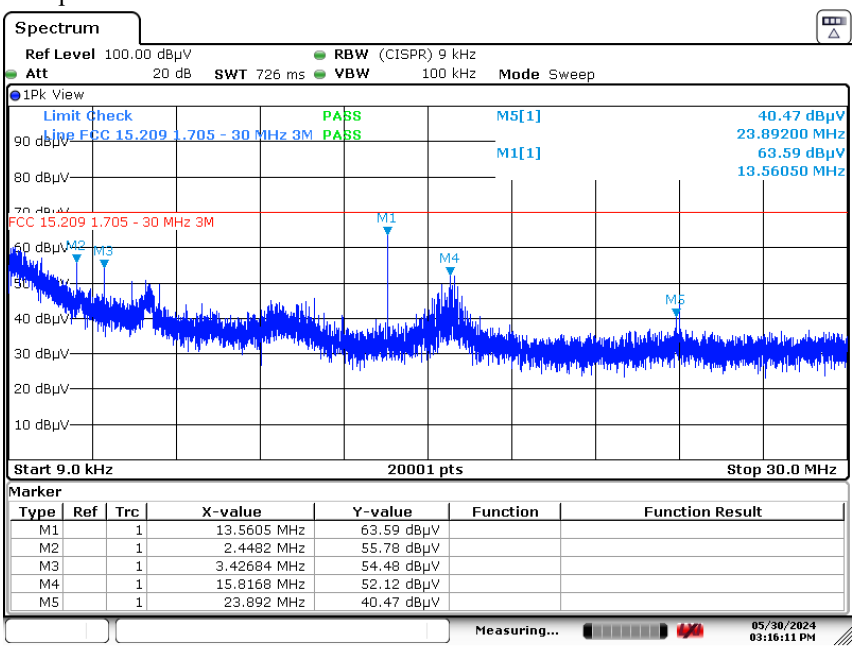
Antenna, Azimuth, Antenna Ht (M)	Polarization, H or V	Emission Frequency	Measured Level	Site CF	Corrected Level	Limit	Level vs Limit
BiLog, 270, 0	H PK	13.56	63.04	-15.04	48.00	104.00	-56.00

Fundamental Frequency (13.56 MHz)
20 dB Bandwidth = 17.9 kHz



Date: 30.MAY.2024 15:08:41

9 kHz – 30 MHz Spurious Emissions



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30 MHz – 1 GHz Spurious Emissions

Antenna, Azimuth	Polarization, H or V	Emission Frequency	Measured Level	Site CF	Corrected Level	Correlated Level	Limit	Level vs Limit
BiLog, 270, 1.5	H PK	43.7	55.89	-25.99	29.90	29.90	40.00	10.10
BiLog, 270, 1.5	H PK	142.4	50.4	-25.43	24.97	24.97	40.00	15.03
BiLog, 270, 1.5	H PK	738.7	46.6	-14.27	32.33	32.33	40.00	7.67
BiLog, 270, 1.5	H PK	54.11	50.92	-30.17	20.75	20.75	40.00	19.25
BiLog, 270, 1.5	V PK	909.45	43.7	-12.91	30.79	30.79	40.00	9.21
BiLog, 270, 1.5	V PK	57.34	44.6	-30.70	13.90	13.90	40.00	26.10
BiLog, 270, 1.5	V PK	70.37	42.9	-30.62	12.28	12.28	40.00	27.72
BiLog, 270, 1.5	V PK	54.43	39.2	-30.24	8.96	8.96	40.00	31.04

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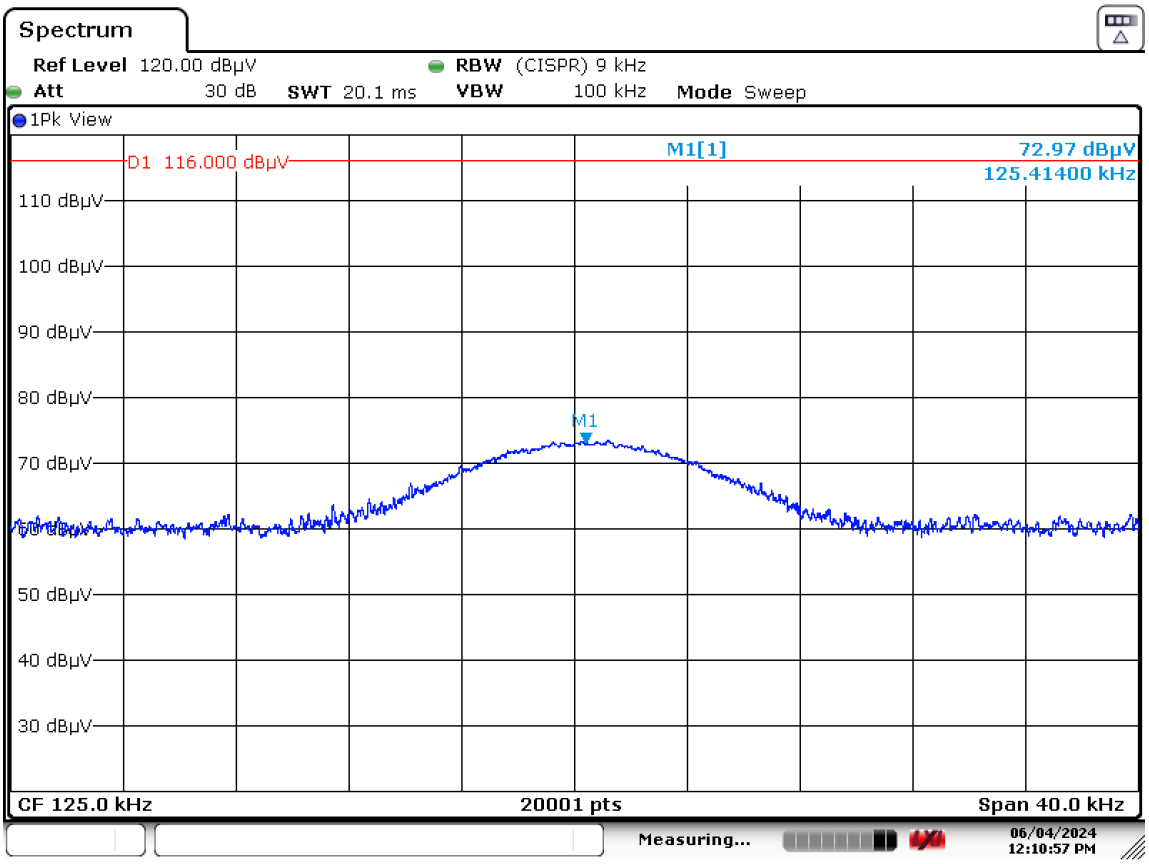
125 kHz Xmit Frequency

Antenna, Azimuth, Antenna Ht (M)	Polarization, H or V	Emission Frequency	Measured Level	Site CF	Corrected Level	Limit	Level vs Limit
BiLog, 270, 0	H PK	0.125	72.04	-17.74	54.30	116.00	-61.70



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Frequency Stability Limits

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.

Frequency Stability Test Procedure

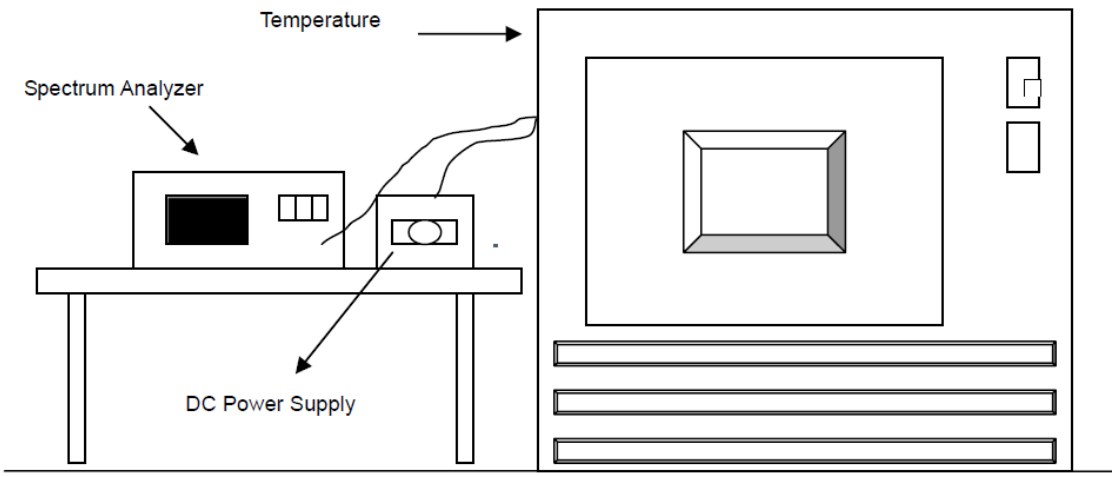
The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.

1. Turn the EUT on and couple its output to a spectrum analyzer.
2. Turn the EUT off and set the chamber to the highest temperature specified.
3. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
4. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
5. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

Deviation from Test Standard

No deviation.

Test Setup



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Frequency Stability Test Results

*EUT Tested with fresh battery

FREQUENCY STABILITY VERSUS TEMP.

	POWER SUPPLY (Vdc)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift	Measured Frequency	Frequency Drift
		(MHz)	%	(MHz)	%	(MHz)	%	(MHz)	%
50	3.0	13.560009	0.00007	13.559992	-0.00006	13.559986	-0.00010	13.56	0.00000
40	3.0	13.559976	-0.00018	13.559998	-0.00001	13.559994	-0.00004	13.559981	-0.00014
30	3.0	13.560026	0.00019	13.560015	0.00011	13.560027	0.00020	13.560027	0.00020
20	3.0	13.559933	-0.00049	13.559943	-0.00042	13.559943	-0.00042	13.55995	-0.00037
10	3.0	13.559977	-0.00017	13.559973	-0.00020	13.559977	-0.00017	13.55997	-0.00022
0	3.0	13.559993	-0.00005	13.559978	-0.00016	13.559992	-0.00006	13.559977	-0.00017
-10	3.0	13.560033	0.00024	13.560058	0.00043	13.560035	0.00026	13.560048	0.00035
-20	3.0	13.559941	-0.00044	13.559935	-0.00048	13.559953	-0.00035	13.55994	-0.00044

Information on Testing Laboratories

We, Atlas Compliance and Engineering, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety Compliance Engineeirng. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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