Amber Helm Development L.C.
92723 Michigan Hwy-152
Sister Lakes, Michigan 49047 USA
Tel: 888-847-8027

AWLTKEY-WR2431TXC
Issued: **December 20, 2024**

NFC Test Report

regarding

USA: CFR Title 47, Part 15.225 (Emissions)
Canada: RSS-210v11/GENv5 (Emissions)

for

47723029

Category: Reader Control Module

Judgments:
Complies with FCC Part 15.225, and ISED RSS-210v11
Testing Completed: October 24, 2024

TESTING
NVLAP LAB CODE 200129-0

Prepared for:

Allegion, PLC

11819 North Pennsylvania Street, Carmel Indiana 46032 USA
Phone: +1 (317) 810-3362, Fax: +1 (317) 810-3193
Contact: Frank Nardelli, Frank.Nardelli@allegion.com

Data Rec./Rev. by: John Nantz — John Nantz
Rpt. Auth. by: Dr. Joseph Brunett, EMC-002790-NE
Rpt. Prep./Rev. by: John Nantz — John Nantz
Date of Issue: December 20, 2024

Revision History

Rev. No.	Date	Details	Revised By
r0	December 20, 2024	Initial Release.	J. Nantz
r1	February 14, 2025	Minor corrections	J. Nantz
r2	March 24, 2025	Added temperature stability data.	J. Nantz

Contents

List of Tables

List of Figures

1 Test Report Scope and Limitations

1.1 Laboratory Authorization

Test Facility description and attenuation characteristics are on file with the FCC Laboratory, Columbia, Maryland (FCC Reg. No: US5348 and US5356) and with ISED Canada, Ottawa, ON (File Ref. No: 3161A and 24249). Amber Helm Development L.C. holds accreditation under NVLAP Lab Code 200129-0.

1.2 Report Retention

For equipment verified to comply with the regulations herein, the manufacturer is obliged to retain this report with the product records for the life of the product, and no less than ten years. A copy of this Report will remain on file with this laboratory until January 2035.

1.3 Subcontracted Testing

This report does not contain data produced under subcontract.

1.4 Test Data

This test report contains data included within the laboratory's scope of accreditation. Any data in this report that is not covered under the laboratory's scope is clearly identified.

1.5 Limitation of Results

The test results contained in this report relate only to the item(s) tested. Any electrical or mechanical modification made to the test item subsequent to the test date shall invalidate the data presented in this report. Any electrical or mechanical modification made to the test item subsequent to this test date shall require reevaluation.

1.6 Copyright

1.7 Endorsements

This report shall not be used to claim product endorsement by any accrediting, regulatory, or governmental agency.

1.8 Test Location

The EUT was fully tested by **Amber Helm Development L.C.**, headquartered at 92723 Michigan Hwy-152, Sister Lakes, Michigan 49047 USA. Table 1.8.0 lists all sites employed herein. Specific test sites utilized are also listed in the test results sections of this report where needed.

Table 1.8.0 Test Site List.

Description	Location	Quality Num.
OATS (3 meter)	3615 E Grand River Rd., Williamston, Michigan 48895	OATSC

1.9 Traceability and Equipment Used

Pertinent test equipment used for measurements at this facility is listed in Table 1.9.0 . The quality system employed at Amber Helm Development L.C. has been established to ensure all equipment has a clearly identifiable classification, calibration expiry date, and that all calibrations are traceable to the SI through NIST, other recognized national laboratories, accepted fundamental or natural physical constants, ratio type of calibration, or by comparison to consensus standards. All equipment is evaluated on a cycle no greater than 12 months following laboratory validation procedures and is calibrated following manufacturer recommended intervals.

Table 1.9.0 Equipment List.

Description	Manufacturer/Model	SN	Quality Num.	Cal/Ver By / Date Due
Spectrum Analyzer	R & S / FSV30	101660	RSFSV3001	RS / Apr-2025
Spectrum Analyzer	R & S / FPC1500	101692	RSFPC15001	RS / April-2026
BNC-BNC Coax	WRTL / RG58/U	001	CAB001-BLACK	AHD / Sept-2025
6dB Attenuator	Pasternack / PE7087-6	1	ATTEN01	AHD / On-Use
Shielded Loop Antenna	EMCO / 6502	9502-2926	EMCOLOOP1	Keysight / Jul-2026
Biconical	EMCO / 93110B	9802-3039	BICEMCO01	Keysight / Aug-2025
Log Periodic Antenna	EMCO / 3146	9305-3614	LOGEMCO01	Keysight / Aug-2025

2 Test Specifications and Procedures

2.1 Test Specification and General Procedures

The goal of Allegion, PLC is to demonstrate that the Equipment Under Test (EUT) complies with the Rules and/or Directives below. Detailed in this report are the results of testing the Allegion, PLC 47723029 for compliance to:

Country/Region/Manu.	**Rules or Directive**	**Referenced Section(s)**
United States	Code of Federal Regulations	CFR Title 47, Part 15.225
Canada	ISED Canada	RSS-210v11/GENv5

It has been determined that the equipment under test is subject to the rules and directives above at the date of this testing. In conjunction with these rules and directives, the following specifications and procedures are followed herein to demonstrate compliance (in whole or in part) with these regulations.

ANSI C63.4:2014	"Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz"
ANSI C63.10:2020	"American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices"
WR-ITP0102RA	"AHD Internal Document - Radiated Emissions Test Method"
WR-ITP0101LC	"AHD Internal Document - Conducted Emissions Test Method"

3 Configuration and Identification of the Equipment Under Test

3.1 Description and Declarations

The EUT is a access card reader module. The EUT is approximately 10 x 7 x 2 cm max. in dimension, and is depicted in Figure 3.1.0 . It is powered by 3.3 Vdc external battery power. This product is used as an access reader to enable key free door access. Table 3.1.0 outlines provider declared EUT specifications.

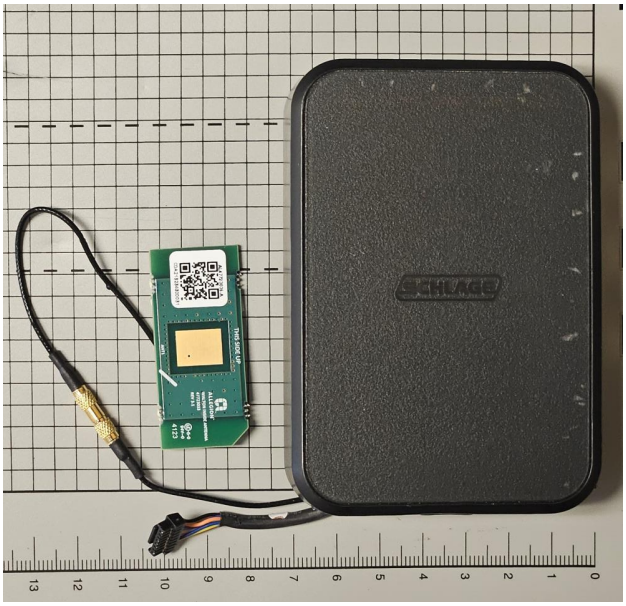


Figure 3.1.0 Photos of EUT.

Table 3.1.0 EUT Declarations.

General Declarations	
Equipment Type:	Reader Control Module
Country of Origin:	USA
Nominal Supply:	3.3 Vdc
Oper. Temp Range:	Not Declared
Frequency Range:	13.56 MHz
Antenna Dimension:	Integral
Antenna Type:	Integral PCB Trace
Antenna Gain:	Integral
Number of Channels:	1
Channel Spacing:	None
Alignment Range:	Not Declared
Type of Modulation:	ASK

United States	
FCC ID Number:	XPB-SENSEPRO1
Classification:	DXX

Canada	
IC Number:	8053B-SENSEPRO1
Classification:	Other

3.1.1 EUT Configuration

The EUT is configured for testing as depicted in Figure 3.1.1 .

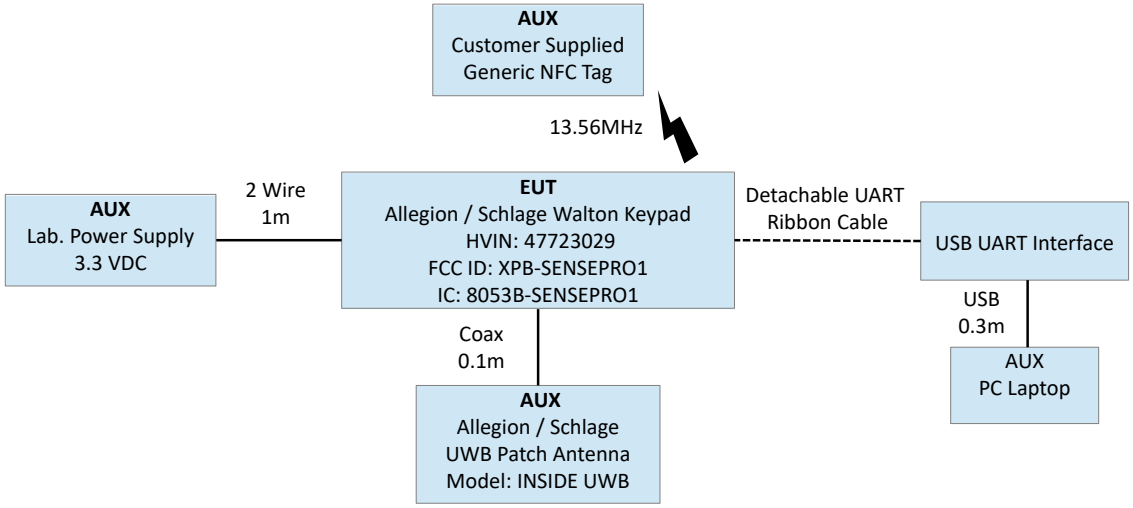


Figure 3.1.1 EUT Test Configuration Diagram.

3.1.2 Modes of Operation

The EUT is capable of two modes of operation, POLLING to detect a 13.56 MHz tag and TAG READ interrogation if detected. Both modes are tested herein. In addition to its NFC radio functionality, the EUT is also co-located with an onboard BLE radio (addressed in AHD Report No. AWLTKEY-WR2431TXB) and an onboard UWB radio (addressed in AHD Report No. AWLTKEY-WR2431TXA). The integral BLE + UWB + NFC radios are all capable of simultaneous transmission, and intermodulation products are examined in AHD Report No. AWLTKEY-WR2431TXB.

3.1.3 Variants

There is only a single version of the EUT.

3.1.4 Test Samples

Two samples of the EUT were provided for testing (SN: KEY1, DV3), both capable of CW and modulated transmission of the NFC radio via a PC serial UART interface that could be attached and then detached from the EUT during testing.

3.1.5 Functional Exerciser

Normal functionality was confirmed by measurement of transmitted signals.

3.1.6 Modifications Made

There were no modifications made to the EUT by this laboratory.

3.1.7 Production Intent

The EUT appears to be a production ready sample.

3.1.8 Declared Exemptions and Additional Product Notes

In addition to its NFC radio functionality, the EUT is also co-located with an onboard BLE radio (addressed in AHD Report No. AWLTKEY-WR2431TXB) and an onboard UWB radio (addressed in AHD Report No. AWLTKEY-WR2431TXA). The integral BLE + UWB + NFC radios are all capable of simultaneous transmission. Furthermore, the EUT may be co-located with the manufacturer's radio device placed on the interior side of the door (FCC ID: XPB-SENSEPRO2, IC: 8053B-SENSEPRO2), and is evaluated for multi-transmitter co-location with Spurious digital emissions in AHD Report No. AWLTKEY-WR2431TXD.

4 Emissions

4.1 General Test Procedures

4.1.1 Radiated Test Setup and Procedures

Radiated electromagnetic emissions from the EUT are first pre-scanned in our screen room. Spectrum and modulation characteristics of all emissions are recorded. Instrumentation, including spectrum analyzers and other test equipment as detailed in Section 1.8 are employed. After pre-scan, emission measurements are made on the test site of record. If the EUT connects to auxiliary equipment and is table or floor standing, the configurations prescribed in relevant test standards are followed. Alternatively, a layout closest to normal use (as declared by the provider) is employed if the resulting emissions appear to be worst-case in such a configuration. See Figure 4.1.1 . All intentionally radiating elements that are not fixed-mounted in use are placed on the test table lying flat, on their side, and on their end (3-axes) and the resulting worst case emissions are recorded. If the EUT is fixed-mounted in use, measurements are made with the device oriented in the manner consistent with installation and then emissions are recorded. If the EUT exhibits spurious emissions due to internal receiver circuitry, such emissions are measured with an appropriate carrier signal applied.

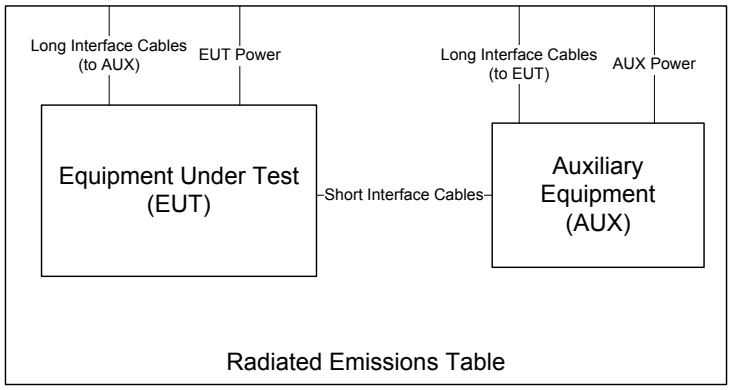


Figure 4.1.1 Radiated Emissions Diagram of the EUT.

For devices with intentional emissions below 30 MHz, a shielded loop antenna and/or E-field and H-Field broadband probes are used depending on the regulation. Shielded loops are placed at a 1 meter receive height at the desired measurement distance. For exposure in this band, 10cm diameter single-axis broadband probes meeting the requirements of ISED RSS-102.NS.MEAS are employed. Measurements are repeated and summed over three axes, and the entire frequency range is measured with and without the EUT transmitting.

Emissions between 30 MHz and 1 GHz are measured using calibrated broadband antennas. For both horizontal and vertical polarizations, the test antenna is raised and lowered from 1 to 4 m in height until a maximum emission level is detected. The EUT is then rotated through 360^o in azimuth until the highest emission is detected. The test antenna is then raised and lowered one last time from 1 to 4 m and the worst case value is recorded. Emissions above 1 GHz are characterized using standard gain or broadband ridge-horn antennas on our OATS with a 4×5 m rectangle of ECCOSORB absorber covering the OATS ground screen and a 1.5m table height. Care is taken to ensure that test receiver resolution and video bandwidths meet the regulatory requirements, and that the emission bandwidth of the EUT is not reduced. Photographs of the test setup employed are depicted in Figure 4.1.1 .

Where regulations allow for direct measurement of field strength, power values (dBm) measured on the test receiver / analyzer are converted to dBμV/m at the regulatory distance, using

$$E_{dist} = 107 + P_R + K_A - K_G + K_E - C_F$$

where P_R is the power recorded on spectrum analyzer, in dBm, K_A is the test antenna factor in dB/m, K_G is the combined pre-amplifier gain and cable loss in dB, K_E is duty correction factor (when applicable) in dB, and C_F is a distance conversion (employed only if limits are specified at alternate distance) in dB. This field strength value is then compared with the regulatory limit. If effective isotropic radiated power (EIRP) is computed, it is computed as

$$EIRP(dBm) = E_{3m}(dB\mu V/m) - 95.2.$$

When presenting data at each frequency, the highest measured emission under all possible EUT orientations (3-axes) is reported.

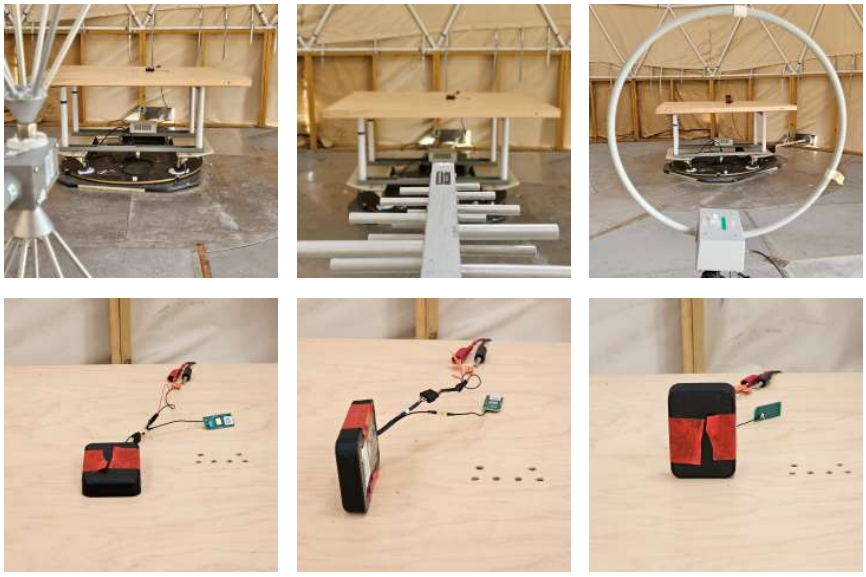


Figure 4.1.1 Radiated Emissions Test Setup Photograph(s).

4.1.2 Power Supply Variation

Tests at extreme supply voltages are made if required by the procedures specified in the test standard, and results of this testing are detailed in this report.

In the case the EUT is designed for operation from a battery power source, the extreme test voltages are evaluated over the range specified in the test standard; no less than ±10% of the nominal battery voltage declared by the manufacturer. For all battery operated equipment, worst case intentional and spurious emissions are re-checked employing a new (fully charged) battery.

4.2 Intentional Emissions

4.2.1 Fundamental Emission Pulsed Operation

The details and results of testing the EUT for pulsed operation are summarized in Table 4.2.1 .

Table 4.2.1 Pulsed Emission Characteristics (Duty Cycle).

Frequency Range	Det	IF Bandwidth	Video Bandwidth
9 kHz ≤ f ≤ 150 kHz	Pk/QPk	200 Hz	300 Hz
150 kHz ≤ f ≤ 30 MHz	Pk/QPk	9 kHz/10 kHz	30 kHz
25 MHz ≤ f ≤ 1 000 MHz	Pk/QPk	120 kHz	300 kHz
f > 1 000 MHz	Pk	3 MHz	3MHz
f > 1 000 MHz	Avg	3 MHz	10kHz

Test Date:	23-Oct-24
Test Engineer:	J. Nantz
EUT Mode:	Normal Operating
Meas. Distance:	0.1m
EUT Tested:	Allegion 47723029

R0		Overall Transmission			Internal Frame Characteristics			Computed Duty Cycle	
	EUT Mode	Min. Repetition Rate (sec)	Max. No. of Frames	Total Transmission Length (sec)	Max. Frame Length (ms)	Min. Frame Period (ms)	Frame Encoding	(%)	Duty (dB)
R1	13.56 MHz Polling	0.098	1	-	0.044	98.011	In normal operation the EUT NFC device transmits 1 short pulse at 13.56 MHz every 98 ms looking for a tag (coil loading change).	N/A	N/A
R2	13.56 MHz Tag Read	Single	2	-	528.7	1795	When a tag is detected the EUT NFC device will transmit two longer (528.7 ms) frames to read the tag. This frame occurs on every tag read.	N/A	N/A
#	C1	C2	C3	C4	C5	C6	C7	C8	C9

(ROW) (COLUMN) NOTE:
R0 C8/C9 No Duty Cycle is employed when demonstrating compliance.

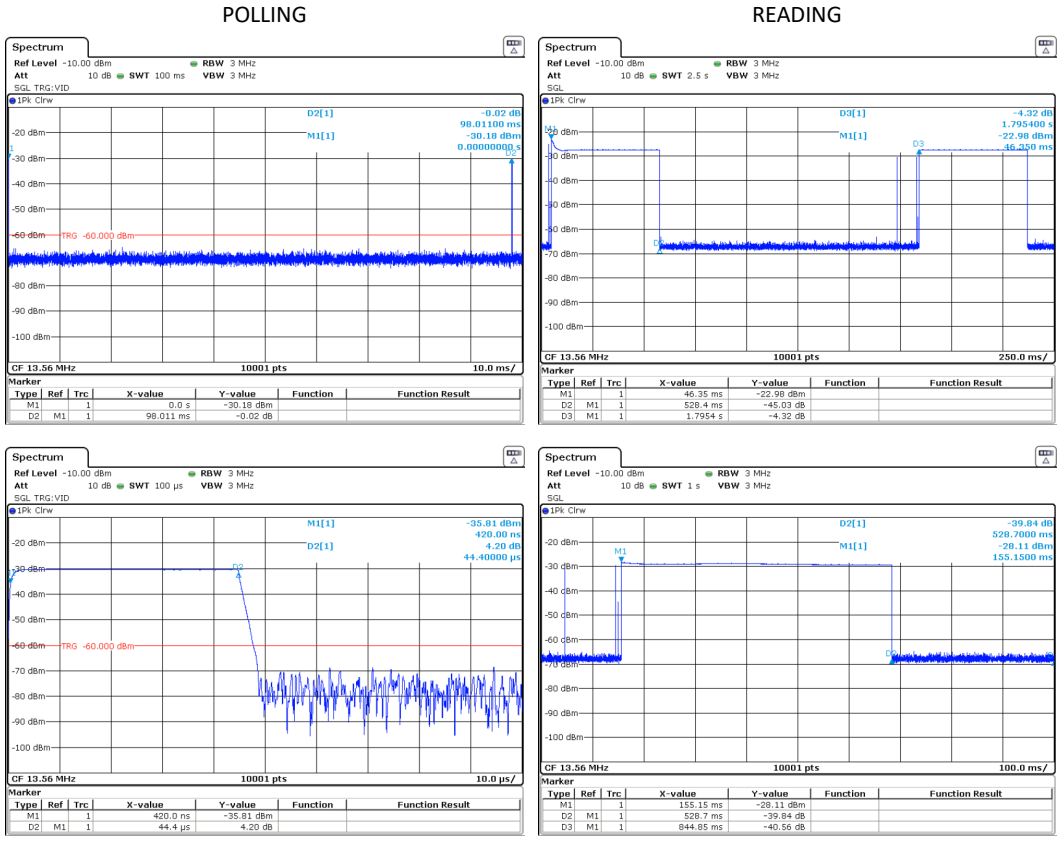


Figure 4.2.1 Example Pulsed Emission Characteristics (Duty Cycle).

4.2.2 Fundamental Emission Bandwidth

Emission bandwidth (EBW) of the EUT is measured with the device placed in the test mode(s) with the shortest available frame length and minimum frame spacing. Radiated emissions are recorded following the test procedures listed in Section 2.1. The 20 dB EBW is measured as the max-held peak-detected signal when the IF bandwidth is greater than or equal to 1% of the receiver span. For complex modulations other than ASK and FSK, the 99% emission bandwidth per IC test procedures has a different result, and is also separately reported.The results of EBW testing are summarized in Table 4.2.2 . Plots showing measurements employed to obtain the emission bandwidth reported are provided in Figure 4.2.2 .

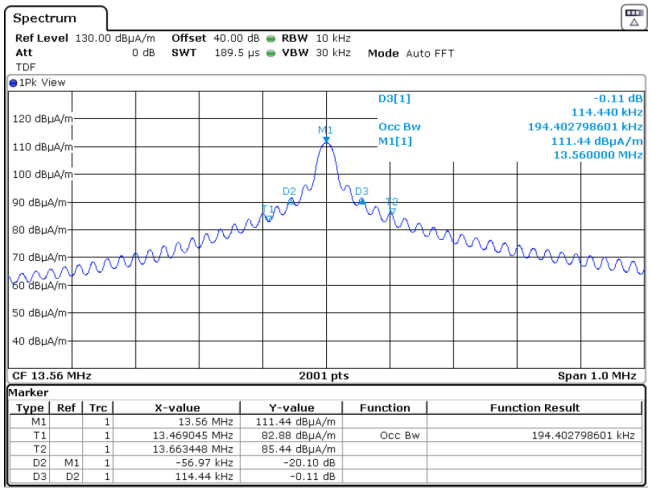
Table 4.2.2 Intentional Emission Bandwidth.

Frequency Range	**Det**	**IF Bandwidth**	**Video Bandwidth**	**Test Date:**	23-Oct-24
9 kHz ≤ f ≤ 150 kHz	Pk	> 1% Span	>= 3 * IFBW	**Test Engineer:**	J. Nantz
150 kHz ≤ f ≤ 30 MHz	Pk	> 1% Span	>= 3 * IFBW	**EUT Mode:**	See Below
				Meas. Distance:	0.1 meters
				EUT Tested:	Allegion 47723029

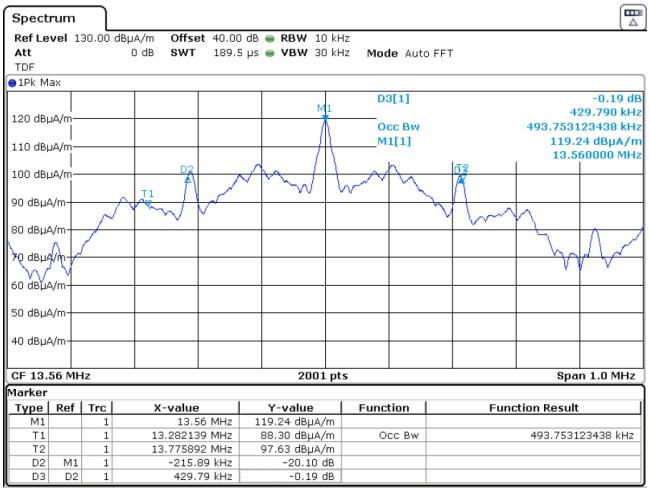
R0	Mode	Frequency Range (MHz)	Temp (C)	Supply (V)	99% PWR BW (kHz)	20 dB EBW (kHz)	fL (20 dBc) (MHz)	fH (20 dBc) (MHz)
R1	13.56 MHz Polling	13.56	20	3.3	194.40	114.44	13.503	13.617
R2	13.56 MHz Tag Read	13.56	20	3.3	493.75	429.79	13.344	13.772
#	C1	C2	C3	C4	C5	C6	C7	C9

(ROW) (COLUMN) NOTE:

POLLING



READING



MASK

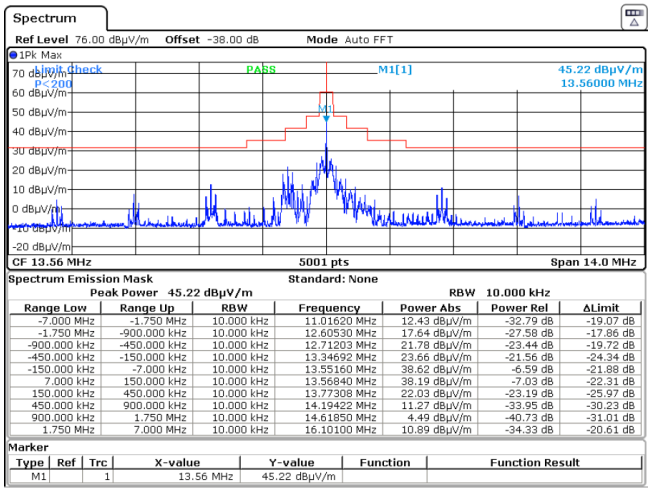


Figure 4.2.2 Example Intentional Emission Bandwidth.

4.2.3 Fundamental Emission

Following the test procedures listed in Section 2.1, field emissions measurements are made on the EUT for both Horizontal and Vertically polarized coupling fields. The EUT's loop antenna(s) are measured along all three axes, including when the EUT loop axes are aligned in the same axis as the test loop and aligned coplanar (in the same plane) with the test loop antenna. Table 4.2.3 details the results of these measurements.

Table 4.2.3 Fundamental Radiated Emissions.

Frequency Range	Det	IF Bandwidth	Video Bandwidth
9 kHz ≤ f ≤ 150 kHz	Pk/QPk	200 Hz	300 Hz
150 kHz ≤ f ≤ 30 MHz	Pk/QPk	9 kHz	30 kHz
30 MHz ≤ f ≤ 1 000 MHz	Pk/QPk	120 kHz	300 kHz

Test Date:	23-Oct-24
Test Engineer:	J. Nantz
Meas. Distance:	3 meters
EUT Tested:	Allegion 47723029
EUT Mode:	CM

Fundamental Emissions Measurements

R0	Mode / Antenna	Test Antenna Polarization	Freq. MHz	Ant. Used	Ant Ht.	Table Angle	Meas. Dist. m	Pr dBm	Ka dB/m	Kg dB	NF/FF boundary m	Cf 3 m / 30 m dB	E3m (Pk) Pk dBuV/m	E30m Pk	E30m QPk/Avg dBuV/m	E30m Limit	H30m Pk	H30m QPk/Avg dBuA/m	H30m Limit	Pass By
R1	CM	Coaxial	13.56	EMCOLOOP1	1.0	90.0	3.0		16.9	0.8	3.5	20.0	64.5	44.5		84.0	-7.0			39.5
R2		Coplanar – Horz	13.56	EMCOLOOP1	1.0	90.0	3.0		16.9	0.8	3.5	20.0	63.6	43.6		84.0	-7.9			40.4
R3		Coplanar – Vert	13.56	EMCOLOOP1	1.0	90.0	3.0		16.9	0.8	3.5	20.0	65.3	45.3		84.0	-6.2			38.7

Frequency Stability over Temperature/Voltage

R4	Mode	Temp (°C)	Freq. (MHz)	Voltage (VDC)	Freq. Variation (+/- ppm)	Freq. Variation Limit (+/- ppm)	Pass
R5	CM	55	13.560031	3.3	16	100	TRUE
R6	CM	45	13.559970	3.3	12	100	TRUE
R7	CM	35	13.559912	3.3	7	100	TRUE
R8	CM	25	13.559856	3.3	3	100	TRUE
R9	CM	20	13.559821	3.6	1	100	TRUE
R10	CM	20	13.559812	3.3	BASELINE		
R11	CM	20	13.559799	3.0	-1	100	TRUE
R12	CM	20		2.0	off	100	
R13	CM	10	13.559802	3.3	-1	100	TRUE
R14	CM	0	13.559789	3.3	-2	100	TRUE
R15	CM	-10	13.559767	3.3	-3	100	TRUE
R16	CM	-20	13.559741	3.3	-5	100	TRUE

#	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20

(ROW)	(COLUMN)	NOTE:
R0	C1	EUT was tested in CM mode. No averaging applied, Peak data reported to demonstrate compliance.
R0	C11	NF/FF Boundary at lambda/2pi distance for small radiator.
R0	C12	40 dB/dec near field conversion factor, 20 dB/dec far-field conversion factors are permitted. 20dB is chosen to show compliance under worst case conversion.
R0	C13	When E-field is reported directly from Spectrum Analyzer, Antenna Factors and Cable losses are included directly in SA settings.
R0	C17	H-field is computed by subtracting dBΩ in freespace from E-Field measurements = 20*log(120π) = 51.5dB

4.3 Unintentional Emissions

4.3.1 Transmit Chain Spurious Emissions

The results for the measurement of transmit chain spurious emissions at the nominal voltage and temperature are provided in Table 4.3.1 . Following the test procedures listed in Section 2.1, field emissions measurements are made on the EUT for both Horizontal and Vertically polarized coupling fields. The EUT's loop antenna(s) are measured when the EUT loop axes placed in all three axes, including when they are aligned along the same axis as the test loop antenna and are aligned coplanar with the test loop antenna. For all arrangements, test loop is rotated for maximum field. The results for the measurement of transmit chain spurious emissions at the nominal voltage and temperature are provided in Table 4.3.1 . Measurements are performed to 10 times the highest fundamental operating frequency.

Table 4.3.1 Transmit Chain Spurious Emissions.

Frequency Range	Det	IF Bandwidth	Video Bandwidth		
9 kHz ≤ f ≤ 150 kHz	Pk/QPk	200 Hz	300 Hz	**Test Date:**	23-Oct-24
150 kHz ≤ f ≤ 30 MHz	Pk/QPk	9 kHz	30 kHz	**Test Engineer:**	J. Nantz
25 MHz ≤ f ≤ 1 000 MHz	Pk/QPk	120 kHz	300 kHz	**Meas. Distance:**	3 meters
				EUT Tested:	Allegion 47723029

Transmit Chain Spurious Emissions

#	Mode / Antenna	Test Antenna Polarization	Freq. Start MHz	Freq. Stop MHz	Ant. Used	Ant Ht. m	Table Angle deg	Meas. Dist. m	Ka dB/m	Kg dB	NF/FF boundary m	Cf (3 to 30m) dB	E3m (Pk) Pk dBuV/m	E-field (Pk) dBuV/m	E-field (Qpk/Avg) dBuV/m	E-field Limit (30m / 3m) dBuV/m	H-field (Pk) dBuA/m	H-field (Qpk/Avg) dBuA/m	ISED H-field Limit (30m / 3m) dBuA/m	Pass By	Comments
R1	CM	Coplaner-Horizontal	27.1	27.1	EMCOLOOP1	1.0	90.0	3.0	8.7	1.0	1.8	20.0	14.7	-5.3		49.5	-56.8		-21.9	34.9	Max
R2		H/V (worst case)	40.7	40.7	BICEMCO01	1.0	max all	3.0	11.5	-.4		.0	31.9	31.9		40.0				8.1	background
R3		H/V (worst case)	54.2	54.2	BICEMCO01	1.0	max all	3.0	10.1	-.4		.0	33.5	33.5		40.0				**6.5**	background
R4		H/V (worst case)	67.8	67.8	BICEMCO01	1.0	max all	3.0	9.7	-.4		.0	32.1	32.1		40.0				7.9	background
R5		H/V (worst case)	81.4	81.4	BICEMCO01	1.0	max all	3.0	9.5	-.5		.0	32.6	32.6		40.0				7.4	background
R6		H/V (worst case)	94.9	94.9	BICEMCO01	1.0	max all	3.0	9.7	-.5		.0	36.9	36.9		43.5				6.6	background
R7		H/V (worst case)	108.5	108.5	BICEMCO01	1.0	max all	3.0	10.6	-.6		.0	36.1	36.1		43.5				7.4	background
R8		H/V (worst case)	122.0	122.0	BICEMCO01	1.0	max all	3.0	11.7	-.6		.0	35.8	35.8		43.5				7.7	background
R9		H/V (worst case)	135.6	135.6	BICEMCO01	1.0	max all	3.0	12.3	-.6		.0	31.2	31.2		43.5				12.3	background
#	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20	C21

(ROW)	(COLUMN)	NOTE:
R0	C1	EUT was tested in CM (Continously Modulating) mode. No averaging applied, Peak data reported to demonstrate compliance.
R0	C11	NF/FF Boundary at lambda/2pi distance for small radiator.
R1	C12	40 dB/dec near field conversion factor, 20 dB/dec far-field conversion factors are permitted. 20dB is chosen to show compliance under worst case conversion.
R0	C13	When E-field is reported directly from Spectrum Analyzer, Antenna Factors and Cable losses are included directly in SA settings.
R0	C17	H-field is computed by subtracting dBΩ in freespace from E-Field measurements = 20*log(120π) = 51.5dB
R0	C21	Data reported is the maximum of all antennas, coupling/polarizations and background noise.

5 Measurement Uncertainty and Accreditation Documents

The maximum values of measurement uncertainty for the laboratory test equipment and facilities associated with each test are given in the table below. This uncertainty is computed for a 95.45% confidence level based on a coverage factor of $k = 2$.

Table 5.0.0 Measurement Uncertainty.

Measured Parameter	Measurement Uncertainty†
Radio Frequency	$\pm(f_{Mkr}/10^7 + RBW/10 + (SPN/(PTS-1))/2 + 1\,\text{Hz})$
Conducted Emm. Amplitude	$\pm 1.9\,\text{dB}$
Radiated Emm. Amplitude ($f < 30\,\text{MHz}$)	$\pm 3.1\,\text{dB}$
Radiated Emm. Amplitude ($30 - 200\,\text{MHz}$)	$\pm 4.0\,\text{dB}$
Radiated Emm. Amplitude ($200 - 1000\,\text{MHz}$)	$\pm 5.2\,\text{dB}$
Radiated Emm. Amplitude ($f > 1000\,\text{MHz}$)	$\pm 3.7\,\text{dB}$

†Ref: CISPR 16-4-2:2011+A1:2014


United States Department of Commerce
National Institute of Standards and Technology

NVLAP® ilac-MRA

Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 200129-0

AHD (Amber Helm Development, L.C.)
Sister Lakes, MI

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

Electromagnetic Compatibility & Telecommunications

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique on ISO/IEC 17025).

2024-06-13 through 2025-06-30
Effective Dates

For the National Voluntary Laboratory Accreditation Program

Figure 5.0.0 Accreditation Documents