



REGULATORY COMPLIANCE TEST REPORT

FCC CFR 47 Part 15.225 & ISSED RSS-210

Report No.: NOVN17-U7 Rev A

Company: Novanta Inc.

Model Name: HS1RXS & HS1RX

REGULATORY COMPLIANCE TEST REPORT

Company Name: Novanta Inc.

Model Name: HS1RXS & HS1RX

To: FCC CFR 47 Part 15.225 & ISED RSS-210

Test Report Serial No.: NOVN17-U7 Rev A

This report supersedes: NONE

Applicant: Novanta Inc.
125 Middlesex Turnpike
Bedford, Massachusetts 01730
USA.

Issue Date: 12th June 2026

This Test Report is Issued Under the Authority of:

MiCOM Labs, Inc.
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MiCOM Labs is an ISO 17025 Accredited Testing Laboratory

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1. ACCREDITATION, LISTINGS & RECOGNITION

1.1. TESTING ACCREDITATION

MiCOM Labs, Inc. is an accredited Electrical testing laboratory per the international standard ISO/IEC 17025:2017. The company is accredited by the American Association for Laboratory Accreditation (A2LA) www.a2la.org test laboratory number 2381.01. MiCOM Labs test schedule is available at the following URL; <http://www.a2la.org/scopepdf/2381-01.pdf>



Accredited Laboratory

A2LA has accredited

MICOM LABS

Pleasanton, CA

for technical competence in the field of

Electrical Testing

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



Presented this 30th day of December 2025.



Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 2381.01
Valid to November 30, 2027

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

1.2. RECOGNITION

MiCOM Labs, Inc is widely recognized for its wireless testing and certification capabilities. In addition to being recognized for Testing and Certification under Phase 2 Mutual Recognition Agreements (MRA) with Canada, Europe, United Kingdom and Japan, our international recognition includes Conformity Assessment Body (CAB) designation status under agreements with Asia Pacific (APEC) MRA Phase 1 countries giving acceptance of MiCOM Labs test reports. MiCOM Labs test reports are accepted globally.

Country	Recognition Body	Status	MRA Phase	Identification No.
USA	Federal Communications Commission (FCC)	TCB	-	US0159 Test Firm Designation#: US1084
Canada	Industry Canada (ISED)	FCB	APEC MRA 2	US0159 ISED#: 4143A
Japan	MIC (Ministry of Internal Affairs and Communication)	CAB	Japan MRA 2	RCB 210
	Japan Approvals Institute for Telecommunication Equipment (JATE)			
	VCCI			
Europe	European Commission	NB	EU MRA 2	A-0012 NB 2280
United Kingdom	Department for Business, Energy & Industrial Strategy (BEIS)	AB	UK MRA 2	AB 2280
Indonesia	Minister of Communication and Digital Education Keputusan Menteri Komunikasi Dan Digital	Number 13 List of Overseas Test Labs	--	Lab n°50/2025 of Decree n°13
Mexico	Instituto Federal de Telecomunicaciones (IFT)	CAB	Mexico MRA 1	US0159
Australia	Australian Communications and Media Authority (ACMA)	CAB	APEC MRA 1	US0159
Hong Kong	Office of the Telecommunication Authority (OFTA)			
Korea	Ministry of Information and Communication Radio Research Laboratory (RRL)			
Singapore	Infocomm Development Authority (IDA)			
Taiwan	National Communications Commission (NCC) Bureau of Standards, Metrology and Inspection (BSMI)			
Vietnam	Ministry of Communication (MIC)			

TCB – Telecommunications Certification Bodies (TCB)

FCB – Foreign Certification Body

CAB – Conformity Assessment Body

NB – Notified Body

AB – Approved Body

MRA – Mutual Recognition Agreement

Phase I - recognition for product testing

Phase II – recognition for both product testing and certification

1.3. PRODUCT CERTIFICATION

MiCOM Labs, Inc. is an accredited Product Certification Body per the international standard ISO/IEC 17065:2012. The company is accredited by the American Association for Laboratory Accreditation (A2LA) www.a2la.org test laboratory number 2381.02. MiCOM Labs test schedule is available at the following URL; <http://www.a2la.org/scopepdf/2381-02.pdf>



Accredited Product Certification Body

A2LA has accredited

MICOM LABS

Pleasanton, CA

This product certification body is accredited in accordance with the recognized International Standard ISO/IEC 17065:2012 *Requirements for bodies certifying products, processes and services*. This product certification body also meets the A2LA R322 – *Specific Requirements – Notified Body Accreditation Requirements* and A2LA R308 - *Specific Requirements - ISO-IEC 17065 - Telecommunication Certification Body Accreditation Program*. This accreditation demonstrates technical competence for a defined scope and the operation of a management system.



Presented this 30th day of December 2025.



Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 2381.02
Valid to November 30, 2027

For the product certification schemes to which this accreditation applies, please refer to the organization's Product Certification Scope of Accreditation.

United States of America – Telecommunication Certification Body (TCB)
Industry Canada – Certification Body, CAB Identifier – US0159
Europe – Notified Body (NB), NB Identifier - 2280
UK – Approved Body (AB), AB Identifier - 2280
Japan – Recognized Certification Body (RCB), RCB Identifier - 210

2. DOCUMENT HISTORY

Document History		
Revision	Date	Comments
Draft	18 th April 2026	Draft report for client to review.
Rev A	12th June 2026	Initial Release

In the above table the latest report revision will replace all earlier versions.

3. TEST RESULT CERTIFICATE

Manufacturer: Novanta Inc.
125 Middlesex Turnpike
Bedford, Massachusetts 01730
USA.

Tested By: MiCOM Labs, Inc.
575 Boulder Court
Pleasanton California 94566
USA

Model: HS1RXS & HS1RX

Telephone: +1 925 462 0304

Equipment Type: Handheld HF/LF RFID & Barcode
Reader

Fax: +1 925 462 0306

S/N's: 260331-013, 2600331-017

Test Date(s): 7th & 9th April 2026

Website: www.micomlabs.com

STANDARD(S)

FCC CFR 47 Part 15.225 & ISED RSS-210

TEST RESULTS

EQUIPMENT COMPLIES

MiCOM Labs, Inc. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report.

Notes:

1. This document reports conditions under which testing was conducted and the results of testing performed.
2. Details of test methods used have been recorded and kept on file by the laboratory.
3. Test results apply only to the item(s) tested.

Approved & Released for MiCOM Labs, Inc. by:



Graeme Grieve
Quality Manager MiCOM Labs, Inc.

Gordon Hurst
President & CEO MiCOM Labs, Inc.

4. REFERENCES AND MEASUREMENT UNCERTAINTY

4.1. Normative References

REF.	PUBLICATION	YEAR	TITLE
I	KDB 662911 D01 & D02	Oct 31 2013	Guidance for measurement of output emission of devices that employ single transmitter with multiple outputs or systems with multiple transmitters operating simultaneously in the same frequency band
II	A2LA	24 th February 2025	R105 - Requirement's When Making Reference to A2LA Accreditation Status
III	ANSI C63.10	ANSI C63.10-2020+Amendment 1 C63.10a-2024 + Errata to C63.10a-2024	American National Standard for Testing Unlicensed Wireless Devices
IV	ANSI C63.4	2014 + C63.4a-2017 Amendment	American National Standards for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 KHz to 40 GHz
V	CISPR 32	2015 + Amd 1: 2019	Electromagnetic compatibility of multimedia equipment - Emission requirements
VI	ETSI TR 100 028	2001-12	Parts 1 and 2 Electromagnetic compatibility and Radio Spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics
VII	FCC 47 CFR Part 15.225	2022	Operation within the band 13.110-14.010MHz
VIII	ICES-003	Issue 7 October 15, 2020	Information Technology Equipment (Including Digital Apparatus) – Limits and methods of measurement.
IX	M 3003	Edition 6 March 2024	Expression of Uncertainty and Confidence in Measurements
X	RSS-210	Issue 11 June 25 2024	RSS-210 — Licence-Exempt Radio Apparatus: Category I Equipment
XI	RSS-Gen	Issue 5 April 2018 + Amendment 1 (March 2019) + Amendment 2 (February 2021)	General Requirements for Compliance of Radio Apparatus
XII	FCC 47 CFR Part 2.1033	2020	FCC requirements and rules regarding photographs and test setup diagrams.

4.2. Test and Uncertainty Procedure

Conducted and radiated emission measurements were conducted in accordance with American National Standards Institute ANSI C63.4, listed in the Normative References section of this report.

Measurement uncertainty figures are calculated in accordance with ETSI TR 100 028 Parts 1 and 2.

Measurement uncertainties stated are based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95 % in accordance with UKAS document M 3003 listed in the Normative References section of this report.

5. PRODUCT DETAILS AND TEST CONFIGURATIONS

5.1. Technical Details

Detail	Description
Purpose:	Test of the Novanta Inc. HS1RXS & HS1RX for compliance to FCC Part 15.225; Canada ISED RSS-210
Applicant:	Novanta Inc. 125 Middlesex Turnpike Bedford, Massachusetts 01730 USA
Manufacturer:	Novanta Inc.
Test Laboratory:	MiCOM Labs, Inc. 575 Boulder Court, Pleasanton, California 94566, USA
Test report reference number:	NOVN17-U4
Date EUT received:	7 th April 2026
Dates of test (from - to):	8 th April 2026
No of Units Tested:	Two
Type of Equipment:	Handheld HF/LF RFID & Barcode Reader
Product Name:	HS1RXS & HS1RX
Model No.:	HS1RXS & HS1RX
Installation type:	Portable < 20cm
Construction/Location for Use:	Indoors
Software/Firmware Release:	FW-HS1X-1-0-1
Hardware Release:	[Client information not provided]
Rated Input Voltage and Current:	5V _{DC} , 0.5A
Temperature:	0°C to +50°C
Equipment Dimensions:	W: 2.16" (54.864mm) x H: 1.3" (33.02mm) x D: 4.25" (107.95mm)
Weight:	<16 oz. (<1 lbs.)

5.2. Scope Of Test Program

Novanta Inc. HS1RXS & HS1RX

The scope of the test program was to test the Novanta Inc HS1RXS & HS1RX. HS1RXS has NFC operating in the frequency range 125 KHz by LF RFID Tag & 13.56 MHz by HF RFID Tag and HS1RX has NFC operating only in 13.56 MHz. As per client model HS1RX is only to verify the functionality of HS1RXS, Therefore the goal is to check model **HS1RXS** for compliance against the following specifications:

FCC CFR 47 Part 15.225

Radio Frequency Devices; Operating in the band 13.110 – 14.010 MHz

ISED RSS-210

License-Exempt Radio Apparatus

Section 7. Technical Specifications; B.6 Band 13.110-14.010 MHz

5.3. Equipment Details

The following is a description of equipment/supporting equipment used during the test program.

Type (EUT/Support)	Equipment Description (Including Brand Name)	Mfr.	Model No.	Serial No.
EUT	Handheld HF/LF RFID & Barcode Reader	Novanta Inc.	HS1RXS & HS1RX	260331-013, 260331-017
Support	Laptop	Dell	Latitude E7450	30782
Support	HF RFID Tag	Cardag	NTAG 203	--
Support	LF RFID Tag	HID PROXIMITY	--	--

5.4. Cabling and I/O Ports

The following is a description of the cable and input / output ports available on the EUT;

Port Type	Max Cable Length	# of Ports	Screened	Conn Type	Data Type	Environment
USB	--	1	No	USB-A	Digital	Indoors

5.5. Equipment Modifications

The following modifications were required to bring the equipment into compliance:

1. NONE

5.6. Deviations from the Test Standard

The following deviations from the test standard were required in order to complete the test program:

1. NONE

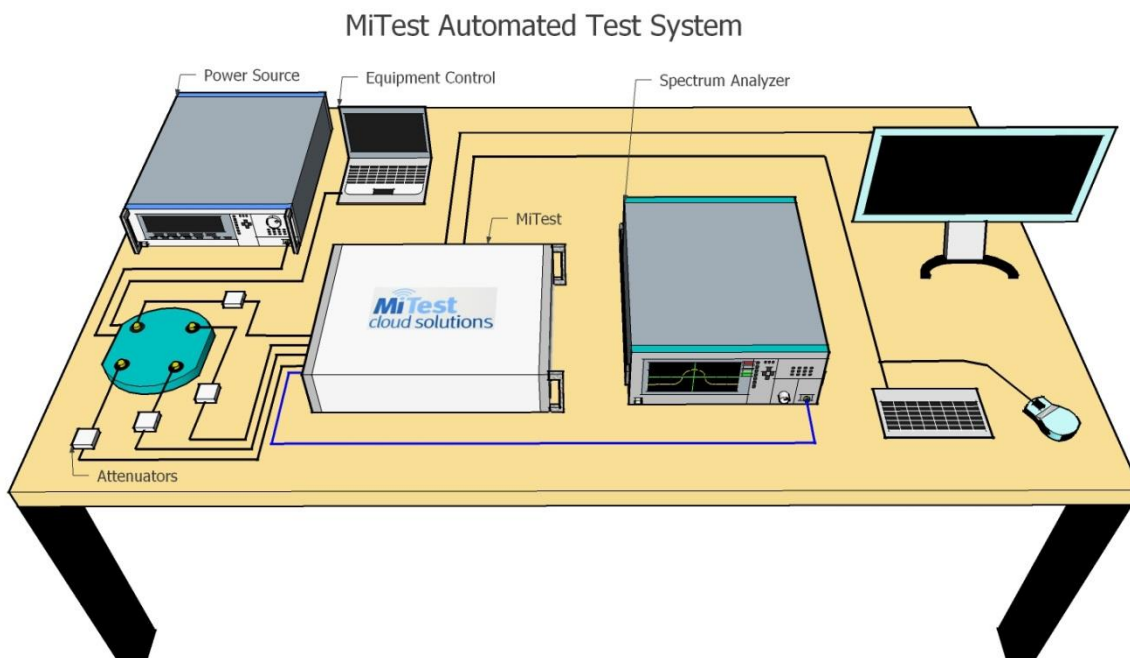
6. TEST SUMMARY

List of Measurements

Test Header	Result	Data Link
Frequency Tolerance	Complies	View Data
Emissions	Complies	-
Radiated Emissions	Complies	-
(i) TX Spurious & Restricted Band Emissions	Complies	View Data
(ii) Field Strength	Complies	View Data
(ii) Occupied Bandwidth	Complies	View Data

7. TEST EQUIPMENT CONFIGURATION(S)

7.1. Conducted Test Setup



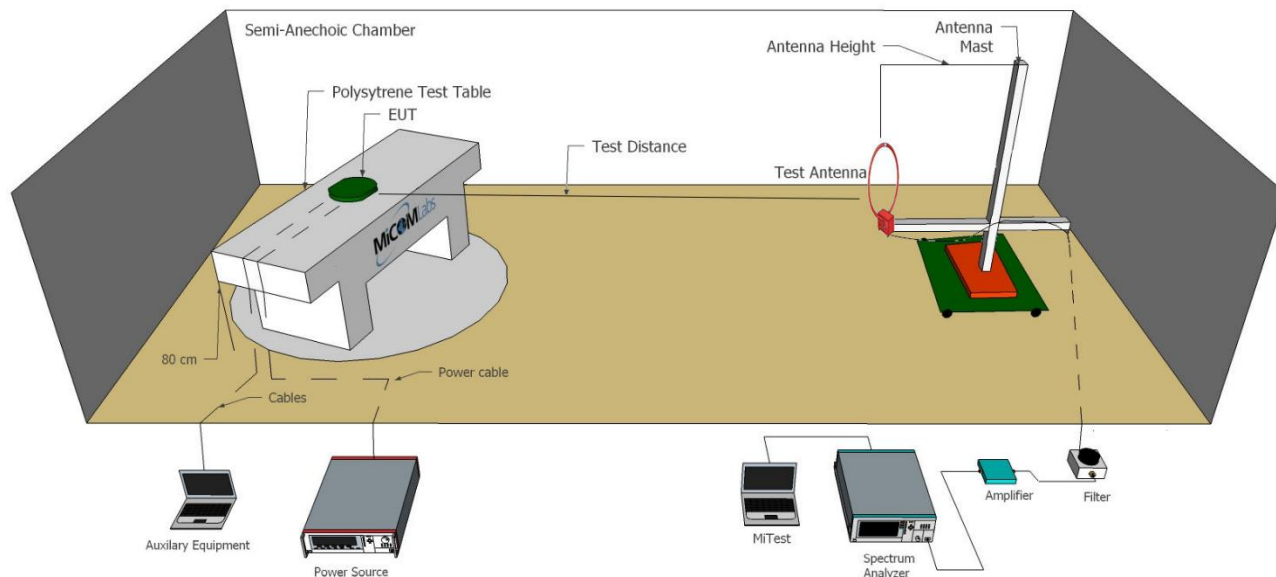
A full system calibration was performed on the test station and any resulting system losses (or gains) were taken into account in the production of all final measurement data.

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
#3 SA	MiTest Box to SA	Fairview Microwave	SCA1814-0101-72	#3 SA	8 Jul 2026
#3P1	EUT to MiTest box port 1	Fairview Microwave	SCA1814-0101-72	#3P1	8 Jul 2026
#3P2	EUT to MiTest box port 2	Fairview Microwave	SCA1814-0101-72	#3P2	8 Jul 2026
#3P3	EUT to MiTest box port 3	Fairview Microwave	SCA1814-0101-72	#3P3	8 Jul 2026
#3P4	EUT to MiTest box port 4	Fairview Microwave	SCA1812-0101-72	#3P4	8 Jul 2026
249	Thermocouple; Resistance Thermometer	Thermotronics	GR2105-02	9340 #2	22 Mar 2027
266	10 Hz to 50GHz MXA Signal Analyzer	Keysight	N9020B	MY60110791	25 Jul 2026
398	MiTest RF Conducted Test Software	MiCOM	MiTest ATS	Version 4.2.3.0	Not Required
405	DC Power Supply 0-60V	Agilent	6654A	MY4001826	Cal when used
408	USB to GPIB interface	National Instruments	GPIB-USB HS	14C0DE9	Not Required
441	USB Wideband Power Sensor	Boonton	55006	9179	4 Dec 2026
442	USB Wideband Power Sensor	Boonton	55006	9181	12 Dec 2026
445	PoE Injector	D-Link	DPE-101GL	QTAH1E2000625	Not Required
461	Spectrum Analyzer	Agilent	E4440A	MY46185537	21 Aug 2027
510	Barometer/Thermometer	Digi Sense	68000-49	170871375	4 Jan 2027
512	MiTest Cloud Solutions RF Test Box	MiCOM	2nd Gen	512	8 Jul 2026
516	USB Wideband Power Sensor	Boonton	RTP5006	10511	4 Dec 2026
596	DC Power Supply	Keysight	E36155A	MY63001023	17 Jan 2027
600	DC Power Supply 150V/10A, 1500W	Agilent	N5770A	US10M6490 J	Not Required
75	Environmental Chamber	Theratron	SE-300-2-2	27946	20 Jun 2027

7.2. Radiated Emissions - 3m Chamber

The following tests were performed using the radiated test set-up shown in the diagram below.
Radiated emissions Below 30 MHz, below 1GHz and above 1GHz.

Radiated Emissions Below 30MHz Test Setup



A full system calibration was performed on the test station and any resulting system losses (or gains) were considered in the production of all final measurement data.

Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
170	Video System Controller for Chamber	Panasonic	WV-CU101	04R08507	Not Required
298	3M Radiated Emissions Chamber Maintenance	MiCOM	3M Chamber	298	22 Aug 2026
336	Active loop Ant 10KHz to 30MHz	EMCO	EMCO 6502	00060498	7 Dec 2026
338	Sunol 30 to 3000 MHz Antenna	Sunol	JB3	A052907	5 Dec 2026
397	Amp 10 - 2500MHz	MiCOM Labs	Amp 10 - 2500 MHz	NA	18 Aug 2026
399	ETS 1-18 GHz Horn Antenna	ETS	3117	00154575	7 Dec 2026
406	Amplifier for Radiated Emissions	MiCOM Labs	40dB 1 to 18GHz Amp	0406	18 Aug 2026
410	Desktop Computer	Dell	Inspiron 620	WS38	Not Required
411	Mast/Turntable Controller	Sunol Sciences	SC98V	060199-1D	Not Required
412	USB to GPIB Interface	National Instruments	GPIB-USB HS	11B8DC2	Not Required
413	Mast Controller	Sunol Science	TWR95-4	030801-3	Not Required
415	Turntable Controller	Sunol Sciences	Turntable Controller	None	Not Required
416	Gigabit ethernet filter	ETS-Lingren	Gigafoil 260366	None	Not Required
447	MiTest Rad Emissions Test Software	MiCOM	Rad Emissions Test Software Version 1.0	447	Not Required
462	Schwarzbeck cable from Antenna to Amplifier.	Schwarzbeck	AK 9513	462	18 Aug 2026
463	Schwarzbeck cable from Amplifier to Bulkhead.	Schwarzbeck	AK 9513	463	18 Aug 2026
464	Schwarzbeck cable from Bulkhead to Receiver	Schwarzbeck	AK 9513	464	18 Aug 2026
465	Low Pass Filter DC-1000MHz	Mini-Circuits	NLP-1200+	VUU01901402	18 Aug 2026
480	Cable - Bulkhead to Amp	SRC Haverhill	157-3050360	480	18 Aug 2026
481	Cable - Bulkhead to Receiver	SRC Haverhill	151-3050787	481	18 Aug 2026
510	Barometer/Thermometer	Digi Sense	68000-49	170871375	4 Jan 2027
554	Precision SMA Cable	Fairview Microwave	SCE18060101-400CM	554	18 Aug 2026
555	Rhode & Schwarz Receiver (Firmware Version: 2.00 SP1)	Rhode & Schwarz	ESW 44	101893	14 Aug 2026
C05	Confidence Check	MiCOM	CC05	None	10 Aug 2026

8. MEASUREMENT AND PRESENTATION OF TEST DATA

The measurement and graphical data presented in this test report was generated automatically using state-of-the-art technology creating an easy to read report structure. Numerical measurement data is separated from supporting graphical data (plots) through hyperlinks. Numerical measurement data can be reviewed without scrolling through numerous graphical pages to arrive at the next data matrix.

Plots have been relegated into the Appendix 'Graphical Data'.

Test and report automation was performed by [MiTest](#). [MiTest](#) is an automated test system developed by MiCOM Labs. [MiTest](#) is the first cloud based modular test system enabling end-to-end automation of regulatory compliance testing for conducted RF testing.



The MiCOM Labs "[MiTest](#)" Automated Test System" (Patent Pending)

9. TEST RESULTS

9.1. Frequency Tolerance

Conducted Test Conditions for Frequency Stability			
Standard:	FCC CFR 47:15.225 ISED RSS-210/Gen	Ambient Temp. (°C):	24.0 - 27.5
Test Heading:	Frequency Stability	Rel. Humidity (%):	32 - 45
Standard Section(s):	15.225(e) RSS-Gen 6.11	Pressure (mBars):	999 - 1001
Reference Document(s):	See Normative References		
Test Procedure for Frequency Stability Measurement			
The Frequency Error was measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency.			
Testing was performed under ambient conditions at extreme voltages and over extreme temperatures at nominal voltages. Where the device operated with multiple antenna ports i.e. MIMO device, each port was measured and reported.			
Test configuration and setup used for the measurement was per the Conducted Test Set-up specified in this document.			
Limit: 100 ppm			

9.1.1. Results

Equipment Configuration for Nominal Centre frequencies

Antenna:	Integral	Variant:	HS1XRS
Antenna Gain (dBi):	Not Applicable	Modulation:	Not Applicable
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	Not Applicable
Channel Frequency (MHz):	125KHz & 13.56MHz	Data Rate:	Not Applicable
Power Setting:	Max	Tested By:	NN

Test Measurement Results

Test frequency	13.56 MHz	Measured Frequency	Frequency Error		Limit	Margin
Temperature	Voltage	Hz	KHz	ppm	ppm	ppm
0 °C	5.0 Vdc	13560205.21	0.205	15.12	±100	-84.88
10 °C	5.0 Vdc	13560345.39	0.345	25.442	±100	-74.55
20 °C	5.0 Vdc	13559072.95	-0.928	-68.44	±100	-31.56
20 °C	4.25 Vdc	13560090.00	0.09	6.64	±100	-93.36
20 °C	5.75 Vdc	13560170.00	0.17	12.54	±100	-87.46
30 °C	5.0 Vdc	13560195.19	0.195	14.38	±100	-85.62
40 °C	5.0 Vdc	13560235.27	0.235	17.33	±100	-82.67
50 °C	5.0 Vdc	13560155.11	0.155	11.431	±100	-88.57

Traceability to Industry Recognized Test Methodologies	
Work Instruction:	WI-02 MEASURING FREQUENCY
Measurement Uncertainty:	±0.86 ppm

9.2. Radiated Emissions

9.2.1. TX Spurious & Restricted Band Emissions

Radiated Test Conditions for Radiated Spurious and Band-Edge Emissions (Restricted Bands)			
Standard:	FCC CFR 47 Part 15.225 ISED RSS-210/GEN	Ambient Temp. (°C):	20.0 - 24.5
Test Heading:	Radiated Spurious and Band-Edge Emissions	Rel. Humidity (%):	32 - 45
Standard Section(s):	15.205, 15.209 RSS-GEN 6.13	Pressure (mBars):	999 - 1001
Reference Document(s):	See Normative References		

Test Procedure for Radiated Spurious and Band-Edge Emissions (Restricted Bands)

Radiated emissions for restricted bands above 1 GHz are measured in the anechoic chamber at a 3-meter distance on every azimuth in both horizontal and vertical polarities. The emissions are recorded and maximized as a function of azimuth by rotation through 360° with a spectrum analyzer in peak hold mode. Depending on the frequency band spanned a notch filter and waveguide filter was used to remove the fundamental frequency. The highest emissions relative to the limit are listed for each frequency spanned. Measurements on any restricted band frequency or frequencies above 1 GHz are based on the use of measurement instrumentation employing peak and average detectors. All measurements were performed using a resolution bandwidth of 1 MHz.

Test configuration and setup for Radiated Spurious and Band-Edge Measurement were per the Radiated Test Set-up specified in this document.

Limits for Restricted Bands

Peak emission: 74 dBuV/m

Average emission: 54 dBuV/m

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. All factors are included in the reported data.

$$FS = R + AF + CORR - FO$$

where:

FS = Field Strength

R = Measured Spectrum analyzer Input Amplitude

AF = Antenna Factor

CORR = Correction Factor = CL – AG + NFL

CL = Cable Loss

AG = Amplifier Gain

FO = Distance Falloff Factor

NFL = Notch Filter Loss or Waveguide Loss

Example:

Given receiver input reading of 51.5 dBmV; Antenna Factor of 8.5 dB; Cable Loss of 1.3 dB; Falloff Factor of 0 dB, an Amplifier Gain of 26 dB and Notch Filter Loss of 1 dB. The Field Strength (FS) of the measured emission is:

$$FS = 51.5 + 8.5 + 1.3 - 26.0 + 1 = 36.3 \text{ dBmV/m}$$

Conversion between dBmV/m (or dBmV) and mV/m (or mV) are as follows:

$$\text{Level (dBmV/m)} = 20 * \text{Log (level (mV/m))}$$

$$40 \text{ dBmV/m} = 100 \text{ mV/m}$$

$$48 \text{ dBmV/m} = 250 \text{ mV/m}$$

Restricted Bands of Operation (15.205)

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

Frequency Band			
MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41			

(b) Except as provided in paragraphs (d) and (e) of this section, the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

(c) Except as provided in paragraphs (d) and (e) of this section, regardless of the field strength limits specified elsewhere in this subpart, the provisions of this section apply to emissions from any intentional radiator.

(d) The following devices are exempt from the requirements of this section:

- (1) Swept frequency field disturbance sensors operating between 1.705 and 37 MHz provided their emissions only sweep through the bands listed in paragraph (a) of this section, the sweep is never stopped with the fundamental emission within the bands listed in paragraph (a) of this section, and the fundamental emission is outside of the bands listed in paragraph (a) of this section more than 99% of the time the device is actively transmitting, without compensation for duty cycle.
- (2) Transmitters used to detect buried electronic markers at 101.4 KHz which are employed by telephone companies.
- (3) Cable locating equipment operated pursuant to §15.213.
- (4) Any equipment operated under the provisions of §15.253, 15.225, and 15.256 in the frequency band 75-85 GHz, or §15.257 of this part.
- (5) Biomedical telemetry devices operating under the provisions of §15.242 of this part are not subject to the restricted band 608-614 MHz but are subject to compliance within the other restricted bands.
- (6) Transmitters operating under the provisions of subparts D or F of this part.

(7) Devices operated pursuant to §15.225 are exempt from complying with this section for the 13.36-13.41 MHz band only.

(8) Devices operated in the 24.075-24.175 GHz band under §15.245 are exempt from complying with the requirements of this section for the 48.15-48.35 GHz and 72.225-72.525 GHz bands only, and shall not exceed the limits specified in §15.245(b).

(9) Devices operated in the 24.0-24.25 GHz band under §15.249 are exempt from complying with the requirements of this section for the 48.0-48.5 GHz and 72.0-72.75 GHz bands only, and shall not exceed the limits specified in §15.249(a).

(e) Harmonic emissions appearing in the restricted bands above 17.7 GHz from field disturbance sensors operating under the provisions of §15.245 shall not exceed the limits specified in §15.245(b).

9.2.1.1. 9 KHz – 150 KHz

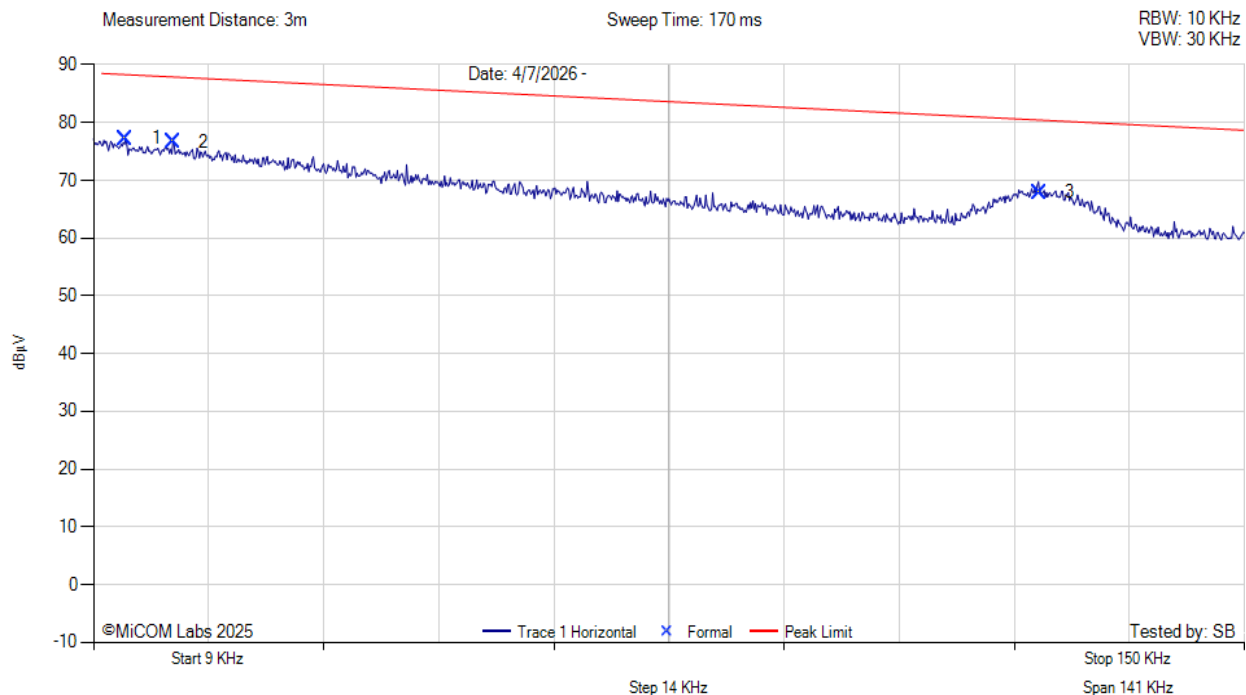
Equipment Configuration for Below 30MHz Emissions (9KHz - 150KHz)

Antenna:	Integral	Variant:	HS1RXS
Antenna Gain (dBi):	Not Applicable	Modulation:	Not Applicable
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	Not Applicable
Channel Frequency (MHz):	125KHz & 13.56MHz	Data Rate:	Not Applicable
Power Setting:	Max	Tested By:	SB

Test Measurement Results



9 KHz to 150 KHz



0.009.00 - 0.15.00 MHz

Num	Frequency MHz	Raw dBμV	Cable Loss dB	AF dB/m	Level dBμV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBμV/m	Margin dB	Pass /Fail
1	0.01	63.33	0.10	19.79	77.22	MaxP	Horizontal	101	60	88.2	-11.0	Pass
2	0.02	62.79	0.10	19.76	76.64	MaxP	Horizontal	101	30	87.8	-11.2	Pass
3	0.12	54.64	0.10	19.17	67.91	MaxP	Horizontal	101	180	80.4	-12.5	Pass

Test Notes: The EUT was set to scan barcode and HF RFID continuously, Laptop was running on battery and lid was closed.

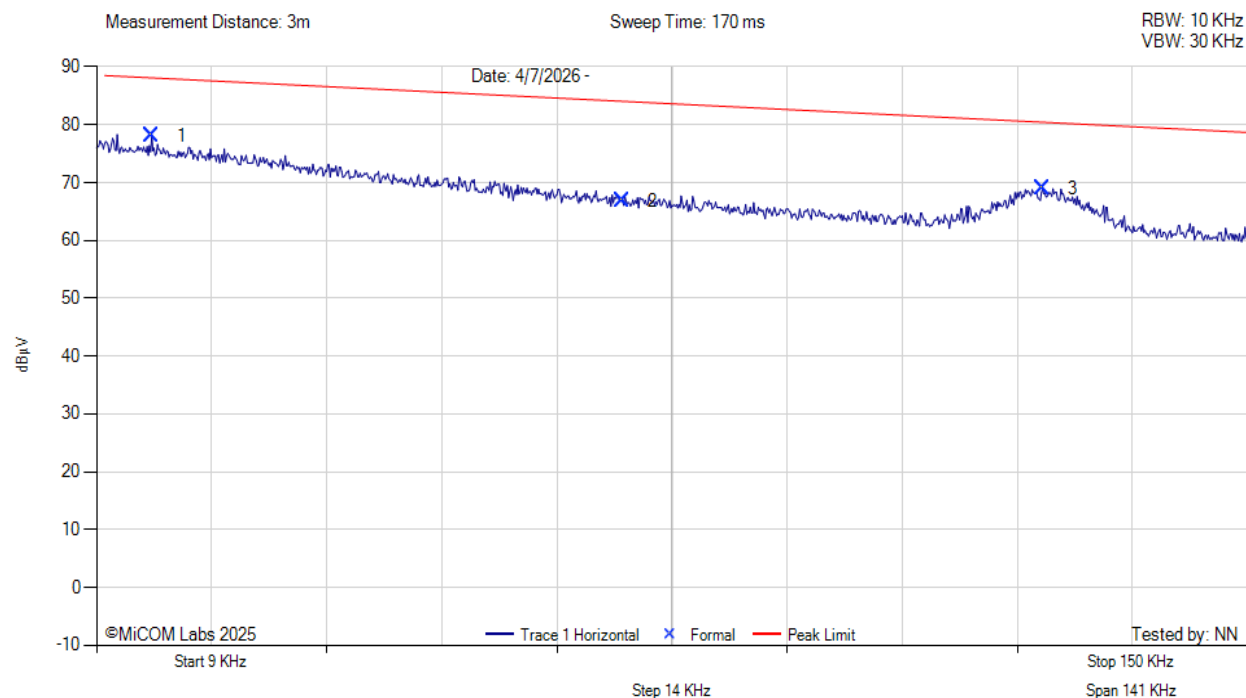
Although both the polarities were investigated, only the worst-case polarity is reported.

Equipment Configuration for Below 30MHz Emissions 9 - 150KHz

Antenna:	Integral	Variant:	HS1RXS
Antenna Gain (dBi):	Not Applicable	Modulation:	Not Applicable
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	Not Applicable
Channel Frequency (MHz):	125KHz & 13.56MHz	Data Rate:	Not Applicable
Power Setting:	Max	Tested By:	NN

Test Measurement Results

9 KHz to 150 KHz



0.009.00 – 0.15.00 MHz

Num	Frequency MHz	Raw dBμV	Cable Loss dB	AF dB/m	Level dBμV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBμV/m	Margin dB	Pass /Fail
1	0.02	64.26	0.10	19.77	78.14	MaxP	Horizontal	101	30	88.0	-9.9	Pass
2	0.07	53.32	0.10	19.46	66.87	MaxP	Horizontal	199	330	84.0	-17.1	Pass
3	0.12	55.62	0.10	19.17	68.90	MaxP	Horizontal	199	179	80.4	-11.5	Pass

Test Notes: The EUT was set to scan barcode and LF RFID continuously, Laptop was running on battery and lid was closed.

Although both the polarities were investigated, only the worst-case polarity is reported.

Equipment Configuration for 9 - 150 KHz HORIZONTAL

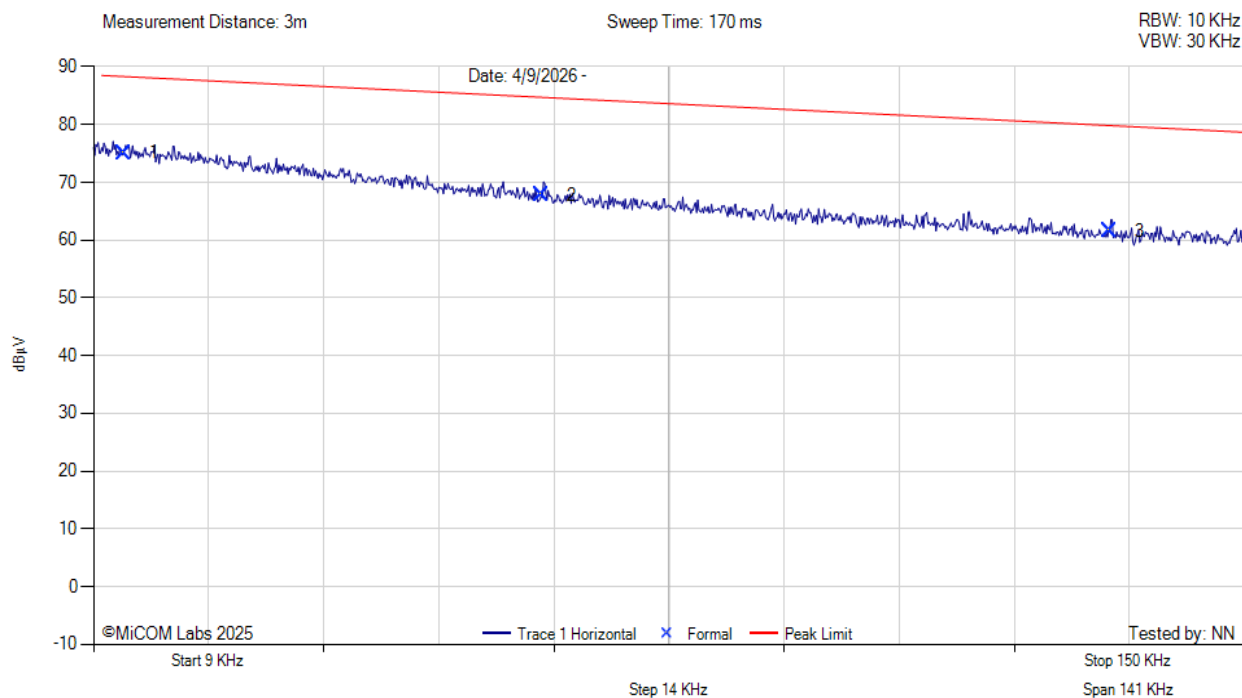
Antenna:	Integral	Variant:	HS1RX
Antenna Gain (dBi):	Not Applicable	Modulation:	Not Applicable
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	Not Applicable
Channel Frequency (MHz):	125KHz & 13.56MHz	Data Rate:	Not Applicable
Power Setting:	Max	Tested By:	NN

Test Measurement Results

9 KHz to 150 KHz



Variant: , Test Freq: 0.00 MHz, Antenna: Integral



0.009.00 - 0.15.00 MHz

Num	Frequency MHz	Raw dBμV	Cable Loss dB	AF dB/m	Level dBμV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBμV/m	Margin dB	Pass /Fail
1	0.01	61.23	0.10	19.79	75.12	MaxP	Horizontal	100	330	88.3	-13.1	Pass
2	0.06	54.09	0.10	19.51	67.70	MaxP	Horizontal	100	90	84.7	-17.0	Pass
3	0.13	48.25	0.10	19.13	61.47	MaxP	Horizontal	100	30	79.8	-18.3	Pass

Test Notes: The EUT was set to scan barcode and HF RFID continuously, Laptop was running on battery and lid was closed.

Although both the polarities were investigated, only the worst-case polarity is reported.

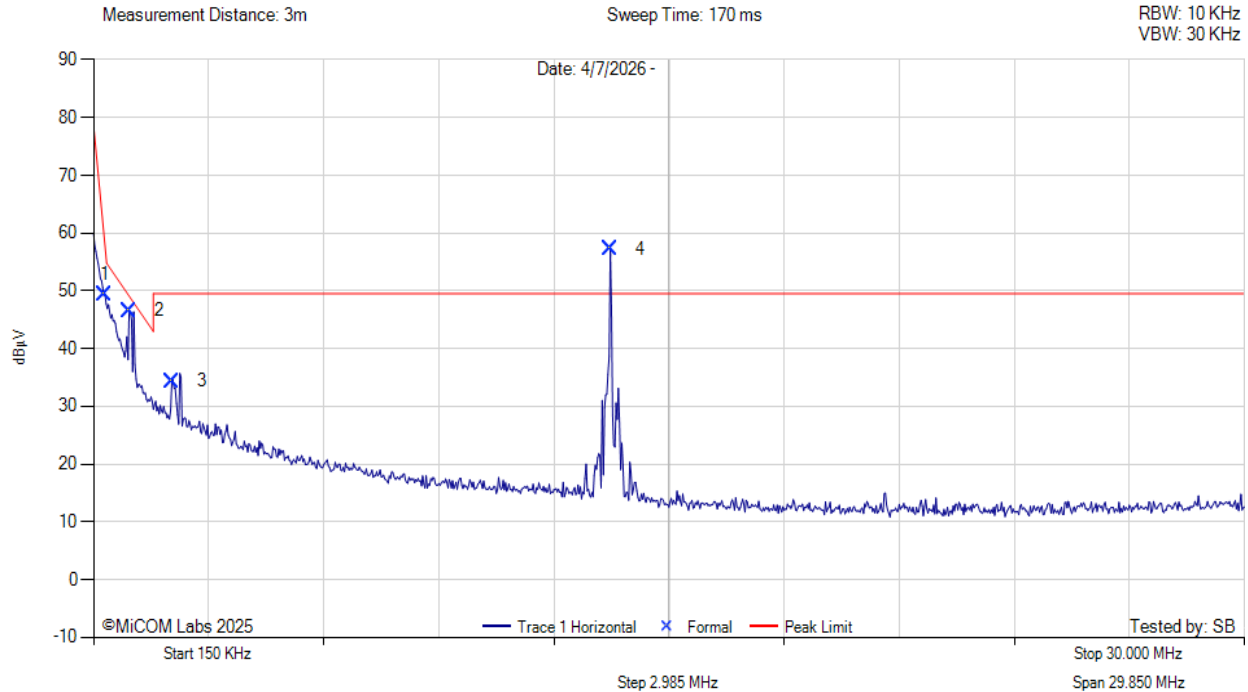
9.2.1.2. 150 KHz – 30 MHz

Equipment Configuration for 150KHz TO 30MHz

Antenna:	Integral	Variant:	HS1RXS
Antenna Gain (dBi):	Not Applicable	Modulation:	Not Applicable
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	Not Applicable
Channel Frequency (MHz):	125KHz & 13.56MHz	Data Rate:	Not Applicable
Power Setting:	Max	Tested By:	NN

Test Measurement Results

150 KHz to 30MHz



0.15.00 - 30.00 MHz

Num	Frequency MHz	Raw dBμV	Cable Loss dB	AF dB/m	Level dBμV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBμV/m	Margin dB	Pass /Fail
1	0.45	37.90	0.10	17.40	49.40	MaxP	Horizontal	199	269	57.7	-8.3	Pass
2	1.08	38.46	0.11	13.96	46.53	MaxP	Horizontal	199	179	49.1	-2.5	Pass
3	2.18	28.78	0.12	11.48	34.38	MaxP	Horizontal	199	179	49.5	-15.2	Pass
4	13.55	52.42	0.49	10.36	57.26	MaxP	Horizontal	100	180	--	--	Fundamental

Test Notes: The EUT was set to scan barcode and HF RFID continuously, Laptop was running on battery and lid was closed.

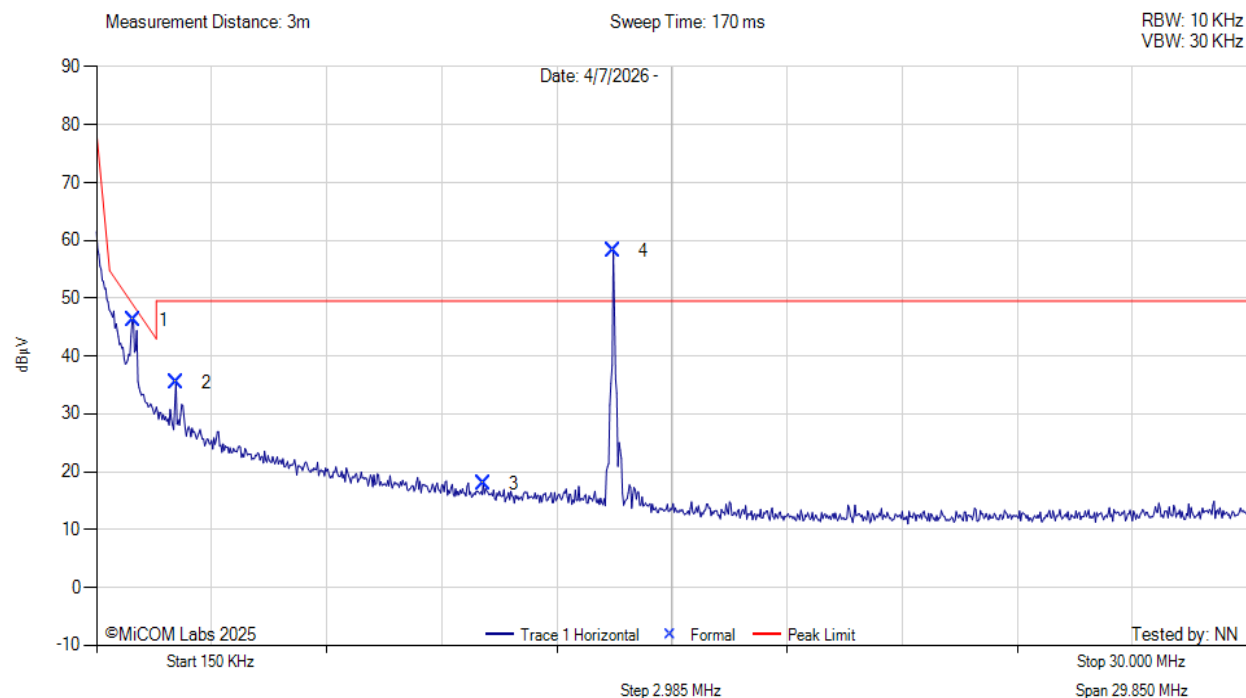
Although both the polarities were investigated, only the worst-case polarity is reported.

Equipment Configuration for 150 KHz TO 30MHz

Antenna:	Integral	Variant:	HS1RXS
Antenna Gain (dBi):	Not Applicable	Modulation:	Not Applicable
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	Not Applicable
Channel Frequency (MHz):	125KHz & 13.56MHz	Data Rate:	Not Applicable
Power Setting:	Max	Tested By:	NN

Test Measurement Results

150 KHz to 30MHz



0.15.00 - 30.00 MHz

Num	Frequency MHz	Raw dBμV	Cable Loss dB	AF dB/m	Level dBμV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBμV/m	Margin dB	Pass /Fail
1	1.11	38.35	0.11	13.79	46.26	MaxP	Horizontal	199	179	48.8	-2.5	Pass
2	2.21	29.86	0.12	11.48	35.46	MaxP	Horizontal	199	179	49.5	-14.1	Pass
3	10.18	13.07	0.32	10.55	17.94	MaxP	Horizontal	101	30	49.5	-31.6	Pass
4	13.55	53.28	0.49	10.36	58.12	MaxP	Horizontal	101	180	--	--	Fundamental

Test Notes: The EUT was set to scan barcode and HF RFID continuously, Laptop was running on battery and lid was closed.

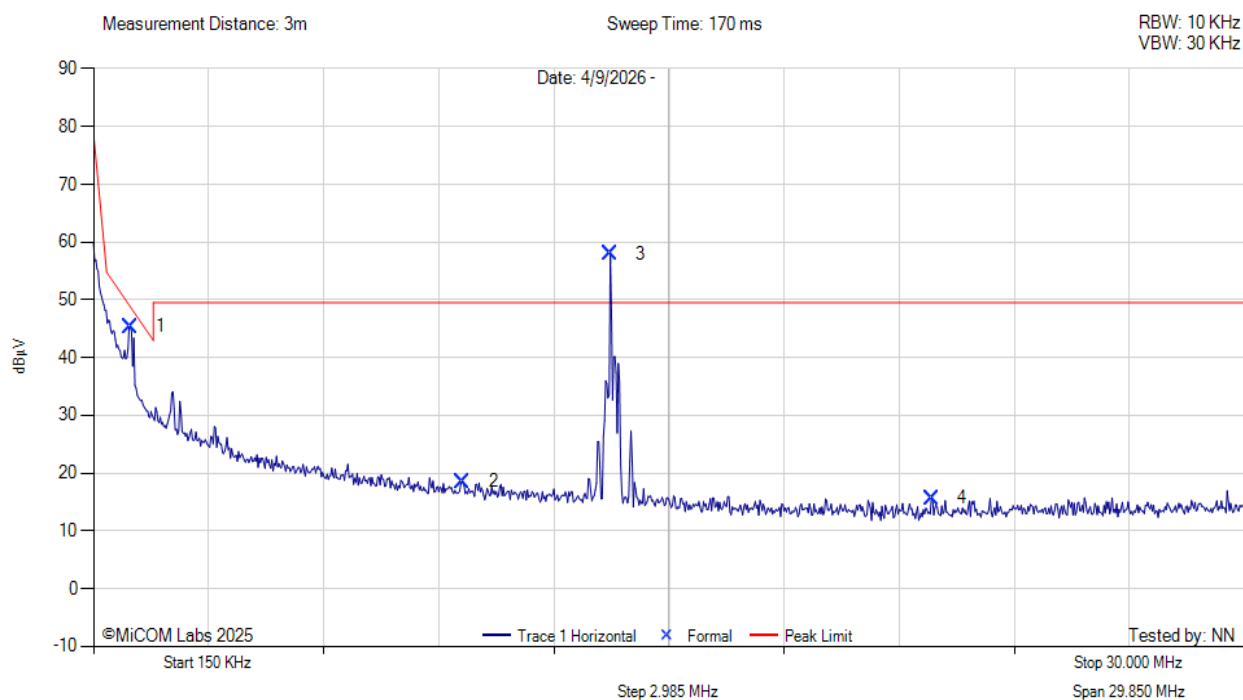
Although both the polarities were investigated, only the worst-case polarity is reported.

Equipment Configuration for 150 KHz TO 30MHz

Antenna:	Integral	Variant:	HS1RX
Antenna Gain (dBi):	Not Applicable	Modulation:	Not Applicable
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	Not Applicable
Channel Frequency (MHz):	125KHz & 13.56MHz	Data Rate:	Not Applicable
Power Setting:	Max	Tested By:	NN

Test Measurement Results

150 KHz to 30MHz



0.15.00 - 30.00 MHz

Num	Frequency MHz	Raw dBμV	Cable Loss dB	AF dB/m	Level dBμV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBμV/m	Margin dB	Pass /Fail
1	1.11	37.46	0.11	13.79	45.37	MaxP	Horizontal	98	240	48.8	-3.4	Pass
2	9.73	13.73	0.29	10.56	18.58	MaxP	Horizontal	199	179	49.5	-31.0	Pass
3	13.55	53.06	0.49	10.36	57.90	MaxP	Horizontal	199	179	--	--	Fundamental
4	21.88	12.62	0.62	8.39	15.64	MaxP	Horizontal	199	59	49.5	-33.9	Pass

Test Notes: The EUT was set to scan barcode and LF RFID continuously, Laptop was running on battery and lid was closed.

Although both the polarities were investigated, only the worst-case polarity is reported.

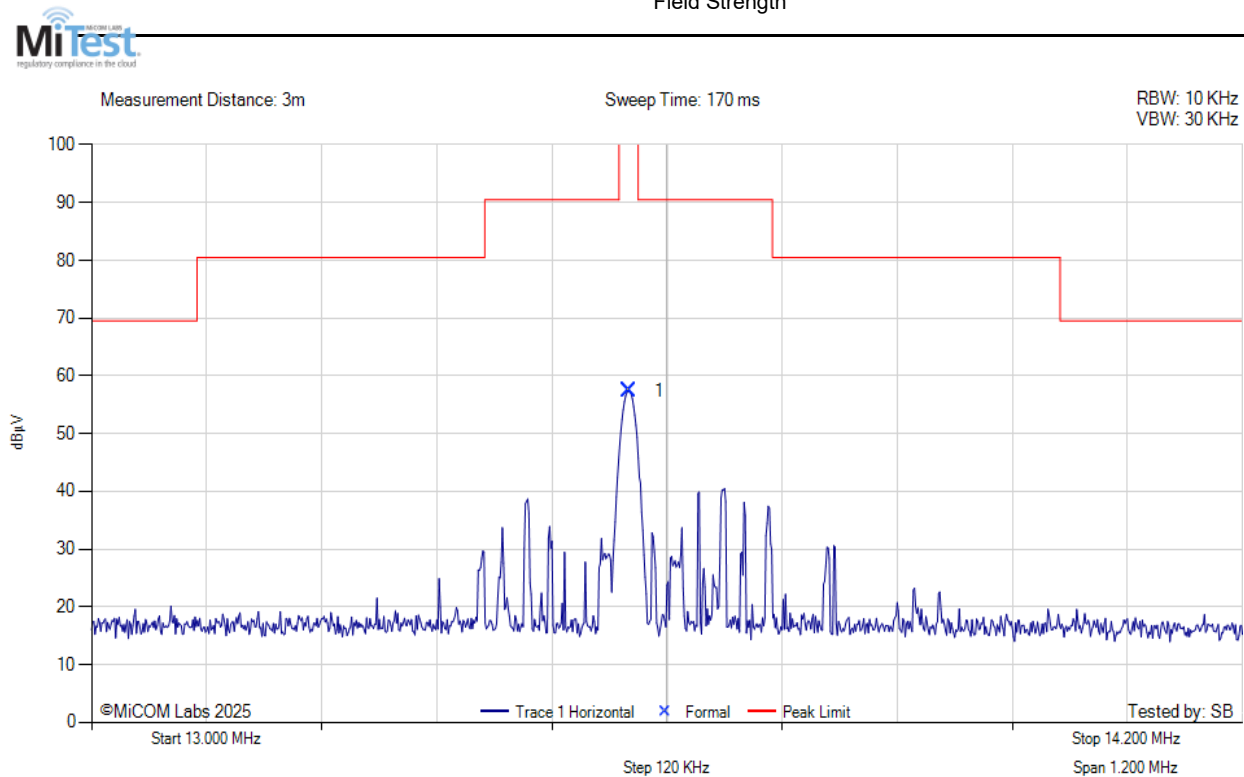
9.2.2. Field Strength

Equipment Configuration for 13.56 MHz Field Strength

Antenna:	Integral	Variant:	HS1RXS
Antenna Gain (dBi):	Not Applicable	Modulation:	Not Applicable
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	Not Applicable
Channel Frequency (MHz):	125KHz & 13.56MHz	Data Rate:	Not Applicable
Power Setting:	Max	Tested By:	SB

Test Measurement Results

Field Strength



13.00 - 14.200 MHz

Num	Frequency MHz	Raw dBμV	Cable Loss dB	AF dB/m	Level dBμV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBμV/m	Margin dB	Pass /Fail
1	13.56	52.50	0.49	10.35	57.34	MaxP	Horizontal	101	180	124.0	-66.7	Pass

Test Notes: The EUT was set to scan barcode and HF RFID continuously, Laptop was running on battery and lid was closed.

Although both the polarities were investigated, only the worst-case polarity is reported.

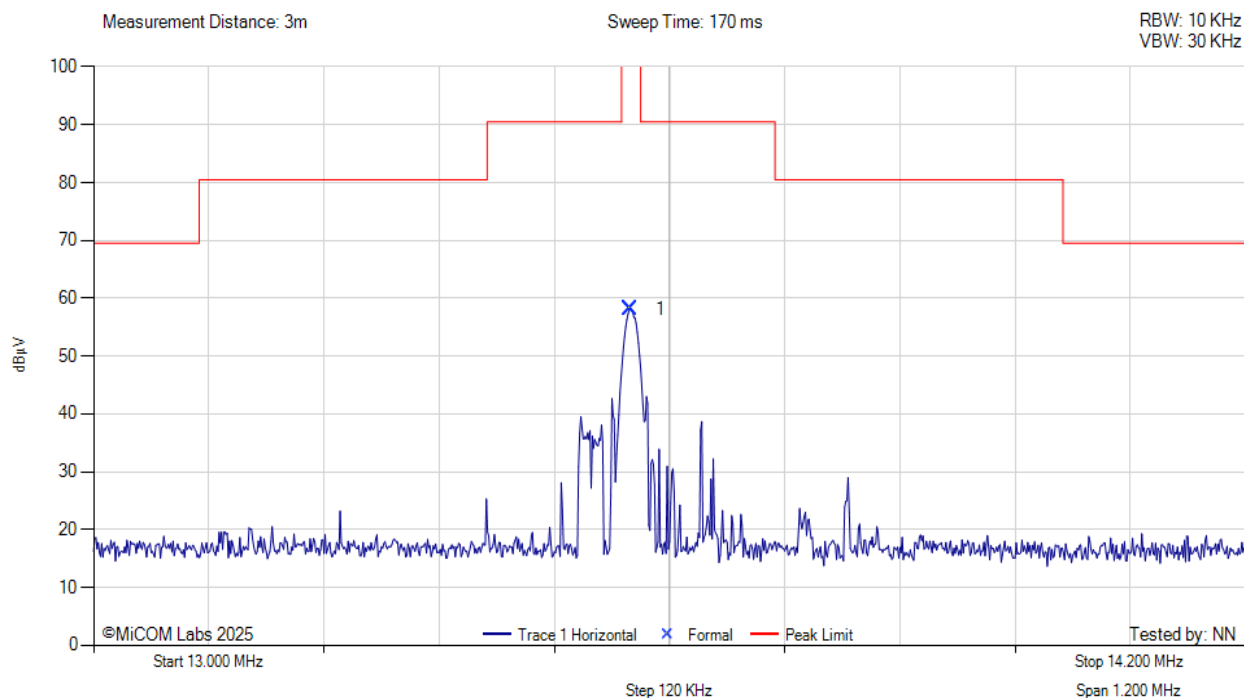
Equipment Configuration for 13.56 MHz Field Strength

Antenna:	Integral	Variant:	HS1RXS
Antenna Gain (dBi):	Not Applicable	Modulation:	Not Applicable
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	Not Applicable
Channel Frequency (MHz):	125KHz & 13.56MHz	Data Rate:	Not Applicable
Power Setting:	Max	Tested By:	NN

Test Measurement Results



Field Strength



13.00 - 14.200 MHz

Num	Frequency MHz	Raw dBμV	Cable Loss dB	AF dB/m	Level dBμV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBμV/m	Margin dB	Pass /Fail
1	13.56	53.30	0.49	10.35	58.14	MaxP	Horizontal	101	180	124.0	-65.9	Pass

Test Notes: The EUT was set to scan barcode and LF RFID continuously, Laptop was running on battery and lid was closed.

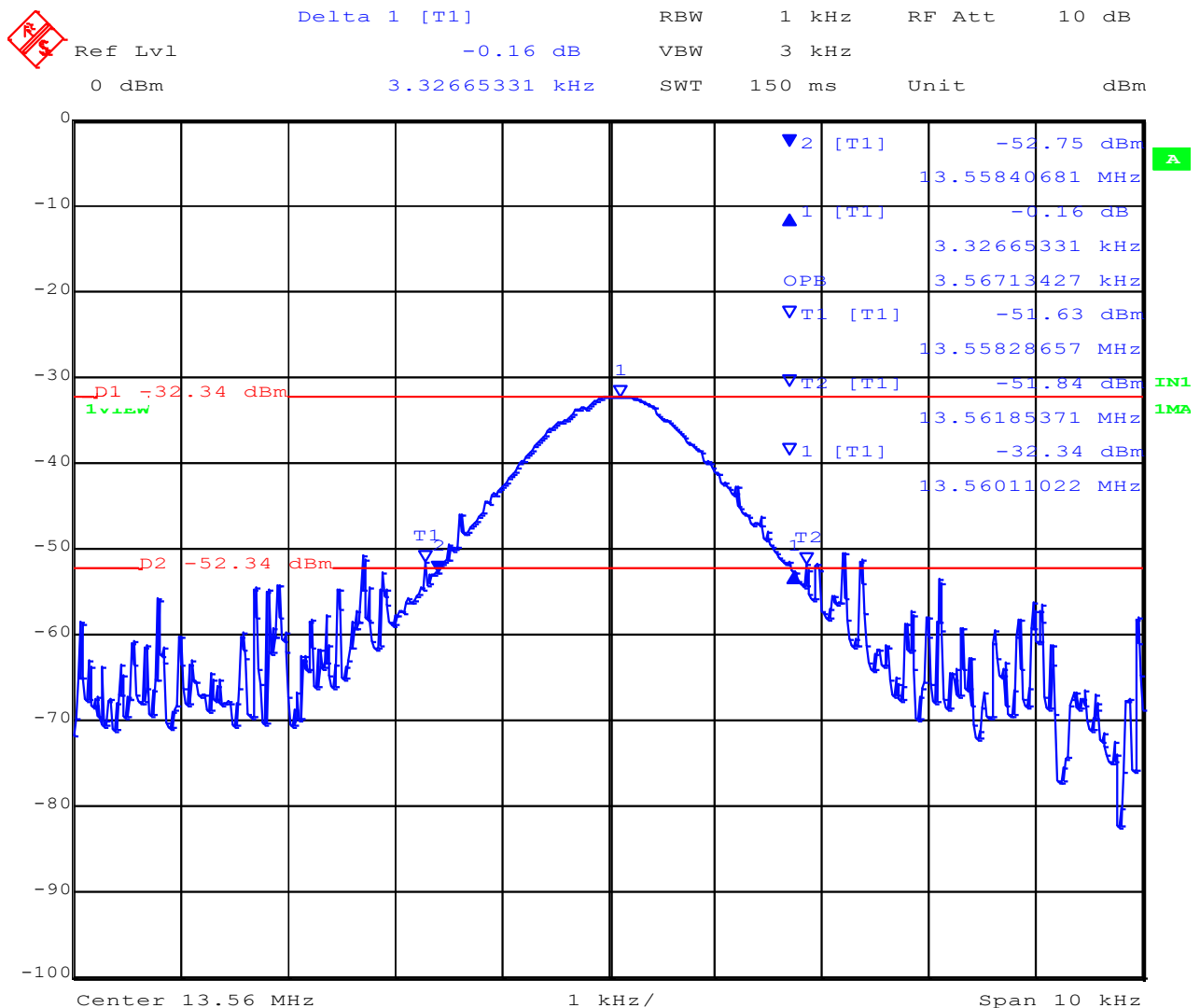
Although both the polarities were investigated, only the worst-case polarity is reported.

9.2.3. Occupied Bandwidth

Equipment Configuration for 13.56 MHz Occupied Bandwidth

Antenna:	Integral	Variant:	HS1RXS
Antenna Gain (dBi):	Not Applicable	Modulation:	Not Applicable
Beam Forming Gain (Y):	Not Applicable	Duty Cycle (%):	Not Applicable
Channel Frequency (MHz):	13.56MHz	Data Rate:	Not Applicable
Power Setting:	Max	Tested By:	NN

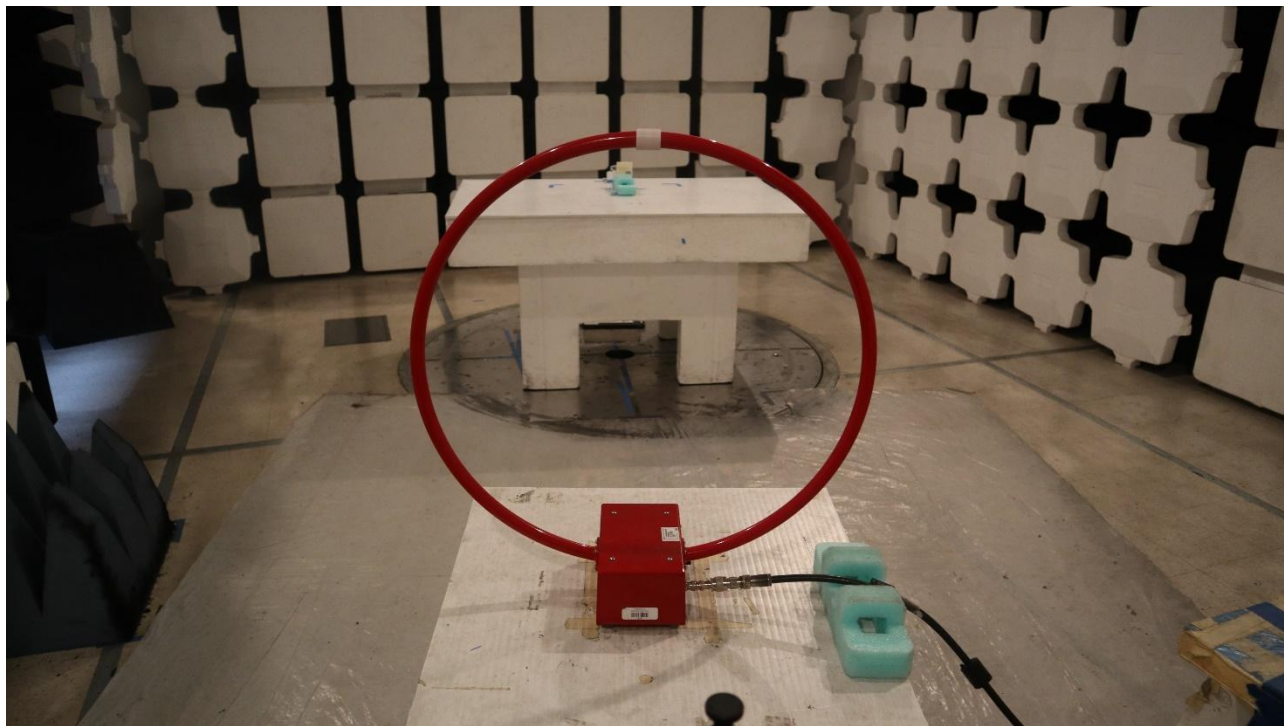
Test Measurement Results



Date: 10.APR.2026 12:03:04

10. PHOTOGRAPHS

10.1 Radiated Emissions 9 KHz - 30 MHz



Appendix A – Graphical Images

A.1. Frequency Stability

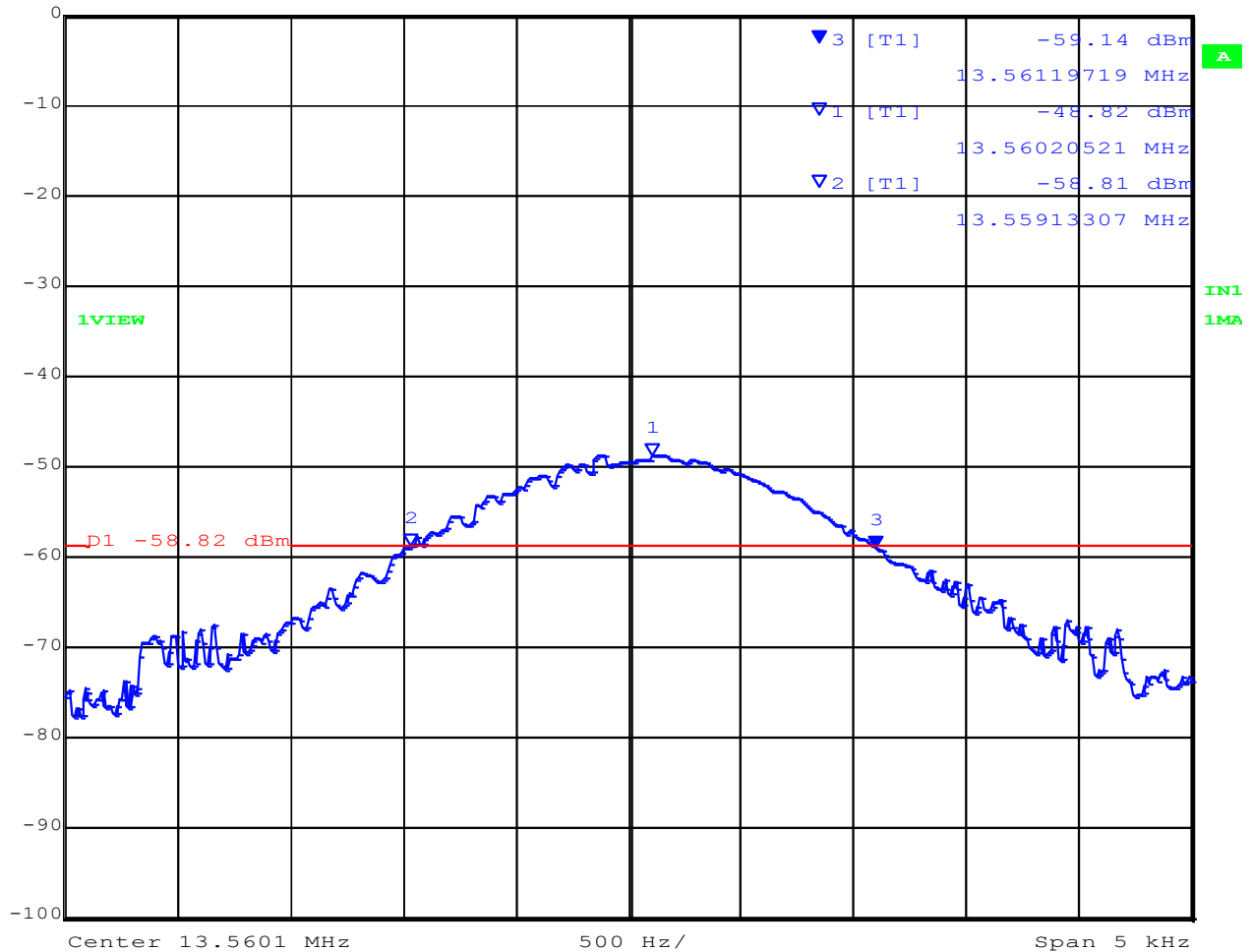
Frequency Stability



Variant: HS1RXS, Channel: 13.56 MHz, Chain a, Temp: 0, Voltage: 5 Vdc



Marker 3 [T1] RBW 1 kHz RF Att 20 dB
 Ref Lvl -59.14 dBm VBW 1 kHz
 0 dBm 13.56119719 MHz SWT 76 ms Unit dBm



Date: 10.APR.2026 09:11:29

[back to matrix](#)

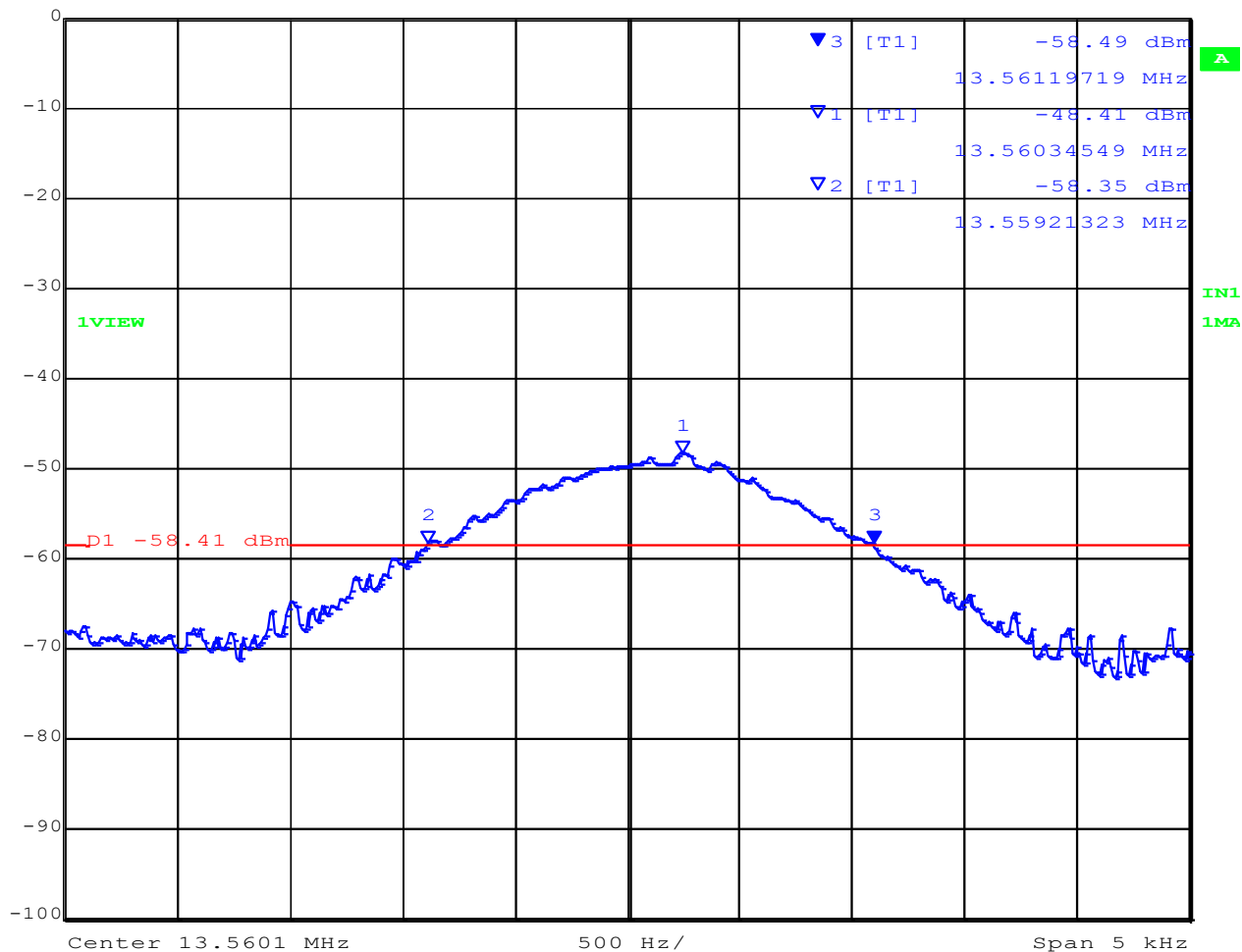
Frequency Stability



Variant: HS1RXS, Channel: 13.56 MHz, Chain a, Temp: 10, Voltage: 5 Vdc



Ref Lvl 0 dBm
 Marker 3 [T1] 13.56119719 MHz
 RBW 1 kHz
 VBW 1 kHz
 SWT 76 ms
 RF Att 20 dB
 Unit dBm



Date: 10.APR.2026 09:24:28

[back to matrix](#)

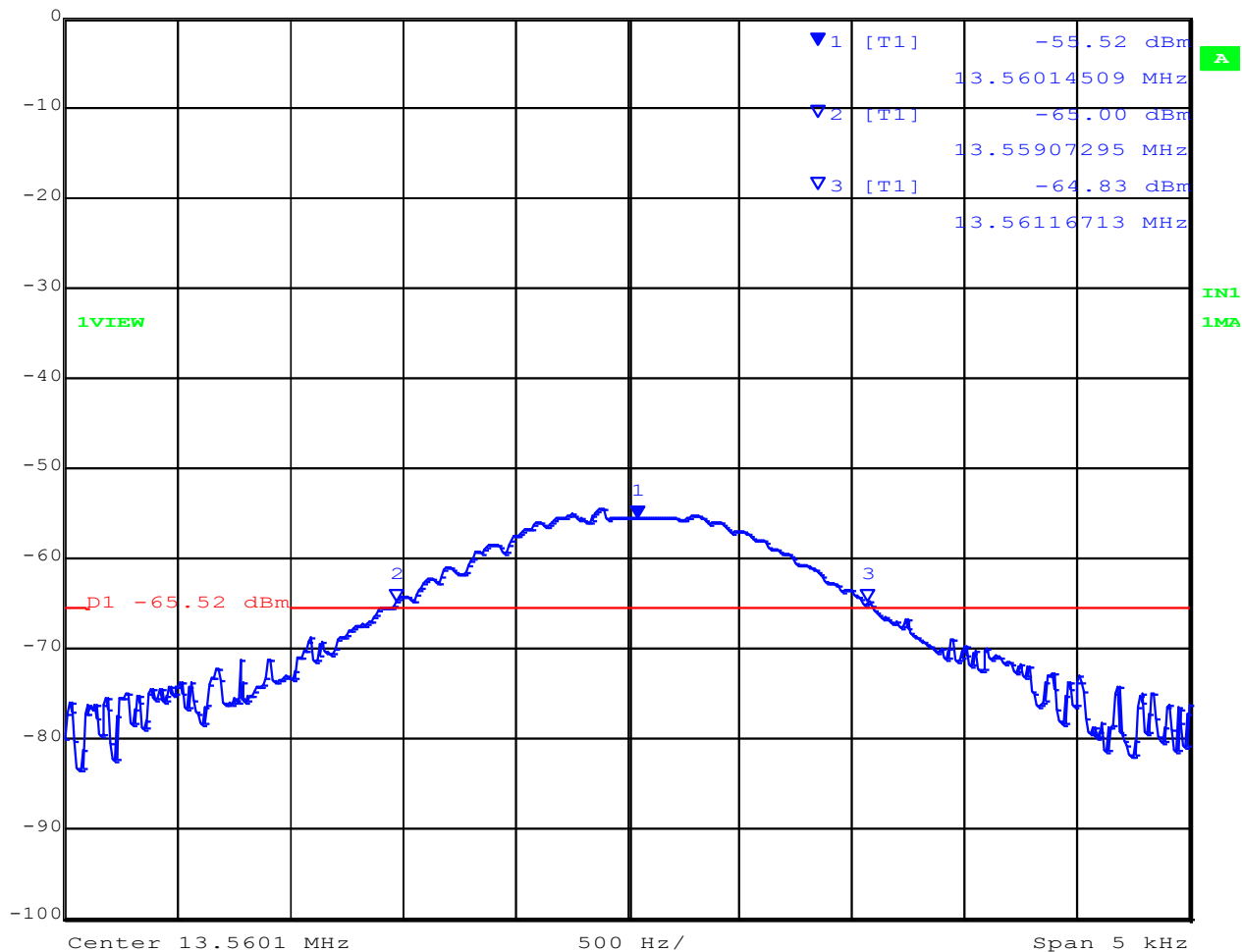
Frequency Stability



Variant: HS1RXS, Channel: 13.56 MHz, Chain a, Temp: 20, Voltage: 5 Vdc



Marker 1 [T1] RBW 1 kHz RF Att 20 dB
 Ref Lvl -55.52 dBm VBW 1 kHz
 0 dBm 13.56014509 MHz SWT 76 ms Unit dBm



Date: 10.APR.2026 08:37:27

[back to matrix](#)

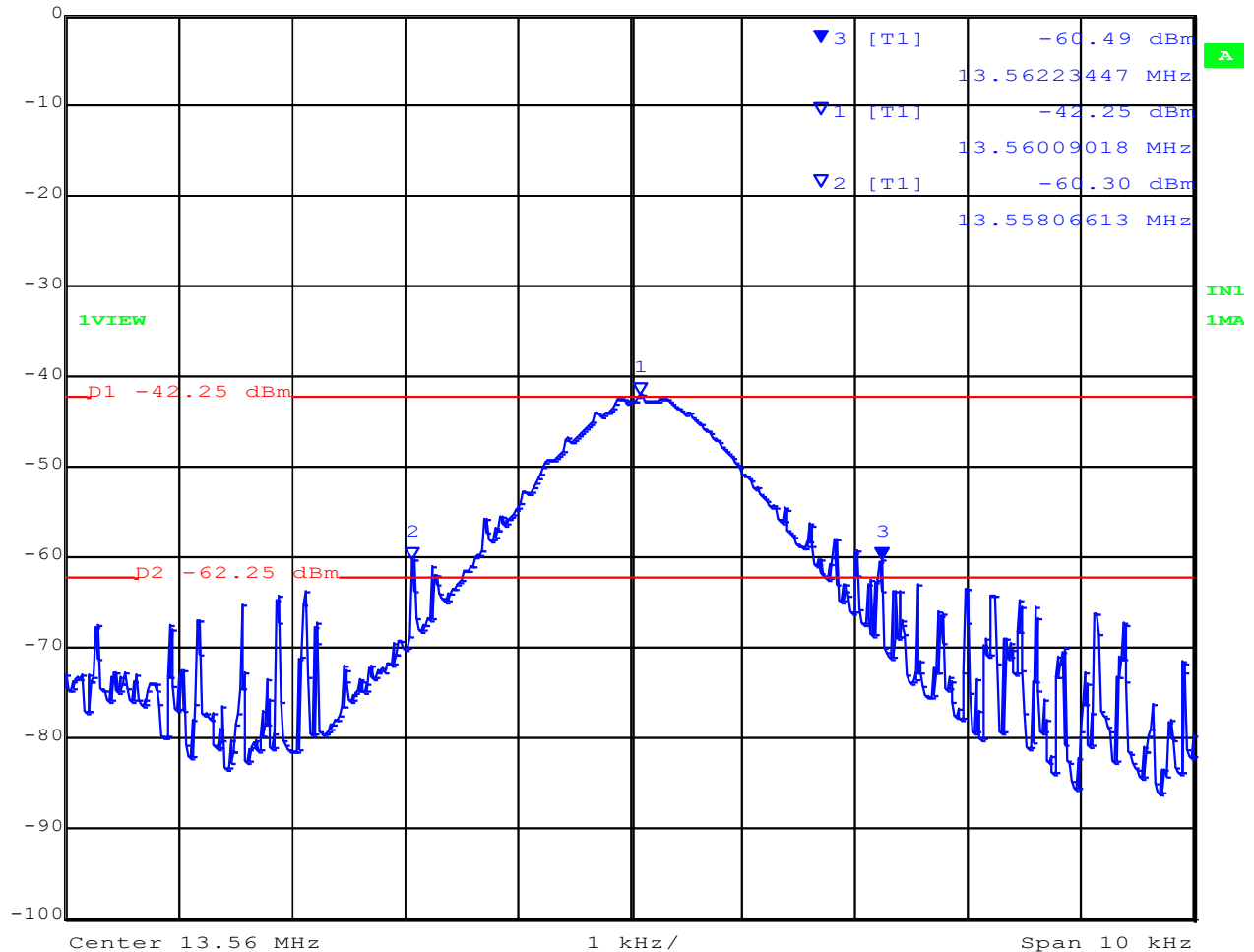
Frequency Stability



Variant: HS1RXS, Channel: 13.56 MHz, Chain a, Temp: 20, Voltage: 4.25 Vdc



Marker 3 [T1] RBW 1 kHz RF Att 20 dB
 Ref Lvl -60.49 dBm VBW 3 kHz
 0 dBm 13.56223447 MHz SWT 150 ms Unit dBm



Date: 10.APR.2026 13:14:12

[back to matrix](#)

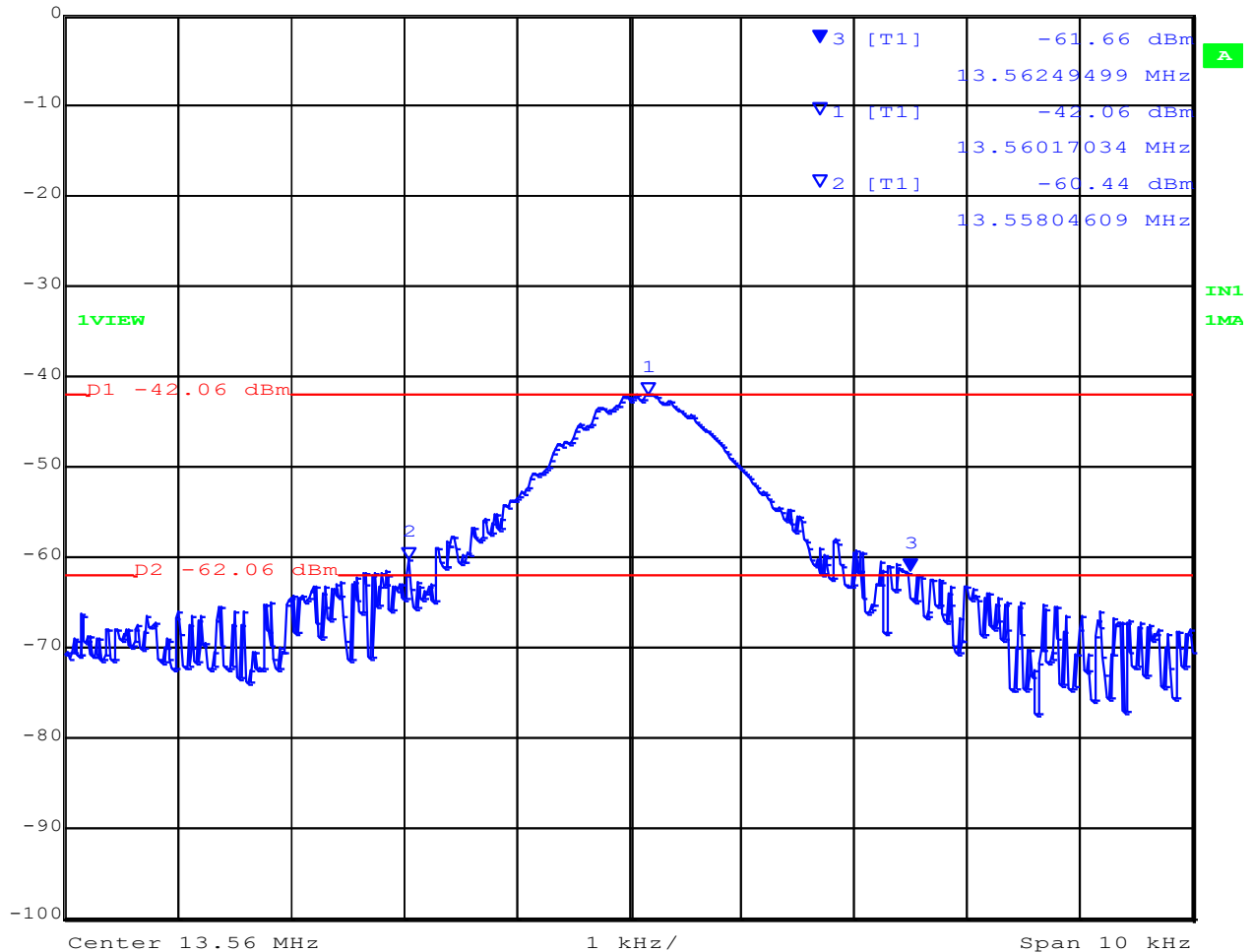
Frequency Stability



Variant: HS1RXS, Channel: 13.56 MHz, Chain a, Temp: 20, Voltage: 5.75 Vdc



Marker 3 [T1] RBW 1 kHz RF Att 20 dB
 Ref Lvl -61.66 dBm VBW 3 kHz
 0 dBm 13.56249499 MHz SWT 150 ms Unit dBm



Date: 10.APR.2026 13:10:20

[back to matrix](#)

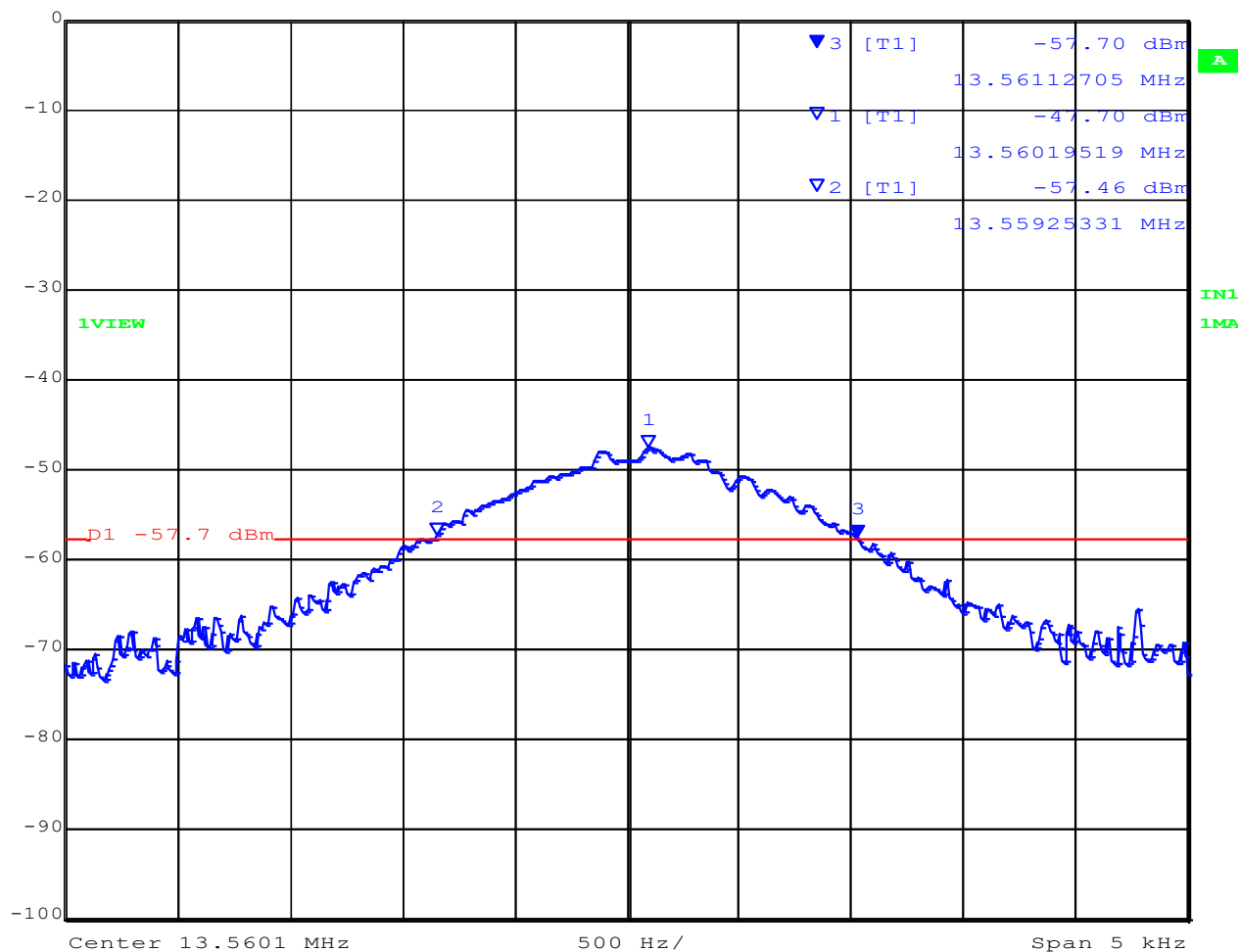
Frequency Stability



Variant: HS1RXS, Channel: 13.56 MHz, Chain a, Temp: 30, Voltage: 5 Vdc



Ref Lvl 0 dBm
 Marker 3 [T1] 13.56112705 MHz
 RBW 1 kHz
 VBW 1 kHz
 SWT 76 ms
 RF Att 20 dB
 Unit dBm



Date: 10.APR.2026 09:38:46

[back to matrix](#)

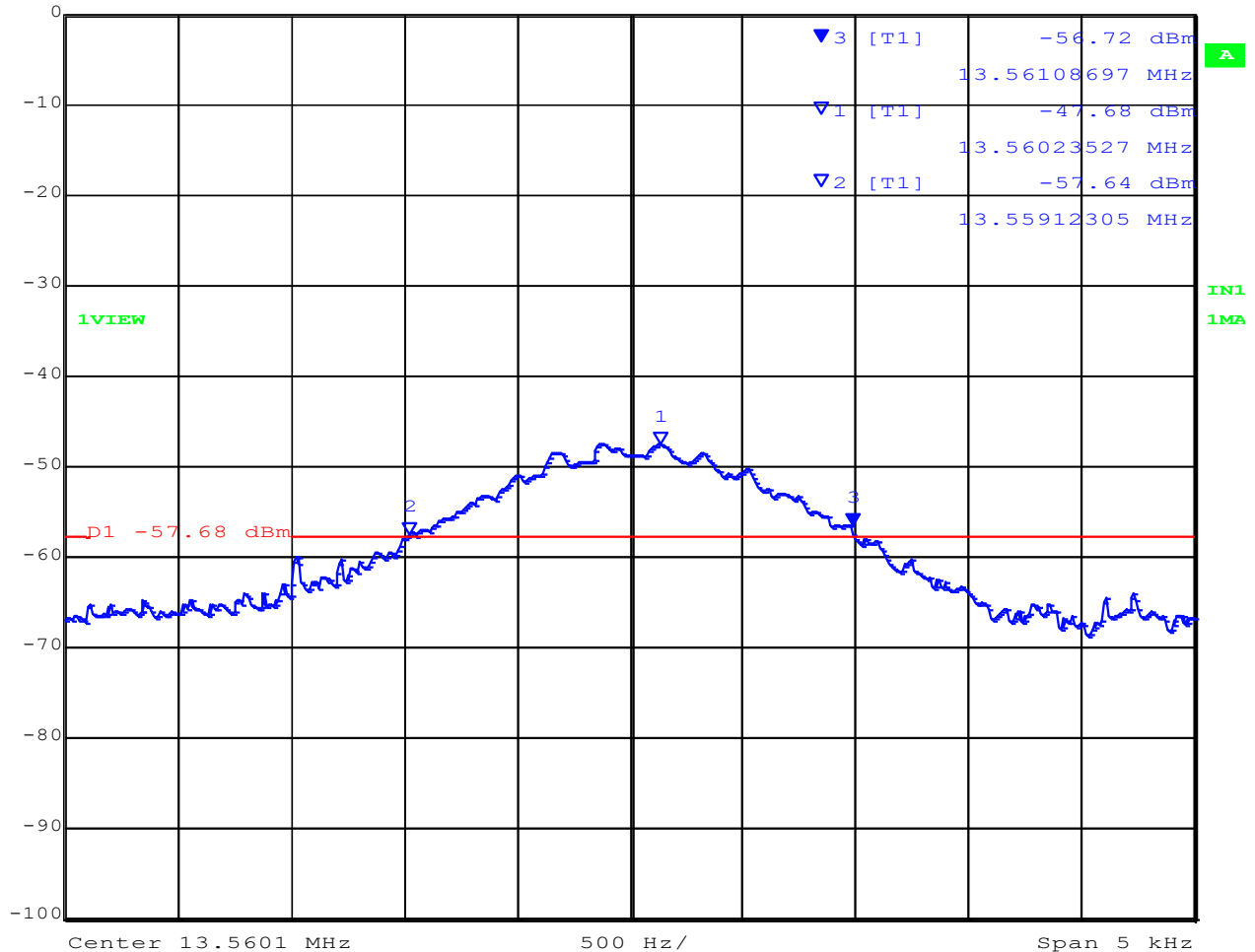
Frequency Stability



Variant: HS1RXS, Channel: 13.56 MHz, Chain a, Temp: 40, Voltage: 5 Vdc



Ref Lvl 0 dBm
 Marker 3 [T1] -56.72 dBm
 RBW 1 kHz
 VBW 1 kHz
 RF Att 20 dB
 13.56108697 MHz
 SWT 76 ms
 Unit dBm



Date: 10.APR.2026 09:48:17

[back to matrix](#)

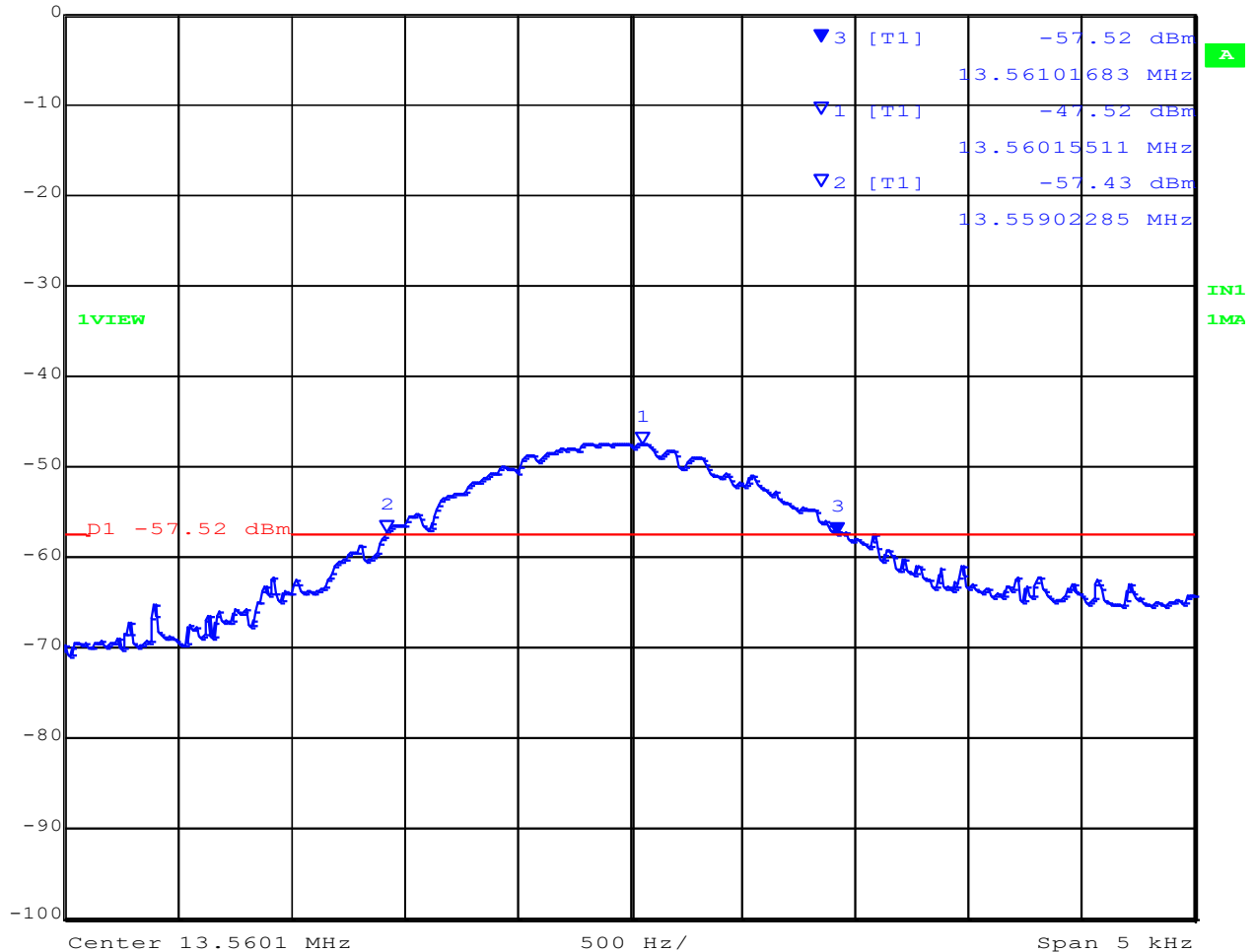
Frequency Stability



Variant: HS1RXS, Channel: 13.56 MHz, Chain a, Temp: 50, Voltage: 5 Vdc



Ref Lvl 0 dBm
 Marker 3 [T1] 13.56101683 MHz
 RBW 1 kHz
 VBW 1 kHz
 SWT 76 ms
 RF Att 20 dB
 Unit dBm



Date: 10.APR.2026 09:59:00

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APPENDIX B – DECLARATION OF SIMILARITY



April 30, 2026

Novanta Handheld Barcode / RFID Scanners HS1RX and HS1RXS

The purpose of this letter is to illustrate the differences between Novanta Scanner Models HS1RX and HS1RXS.

Novanta certifies that the scanner models are electrically equivalent in PCB & RF design, with the differences in the products being:

HS1RXS – Includes digital module required to read specialized encrypted tags used for building access and system login applications.

HS1RX – Digital module to read specialized tags is not populated. PCB design, RF, and antenna design is equivalent to HS1RXS.

Sincerely,

A handwritten signature in black ink, appearing to read "Charles Barber".

Charles Barber

Director of R&D and Applications Engineering
Novanta



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