REGULATORY COMPLIANCE TEST REPORT

FCC CFR 47 Part 15.225 & ISED RSS-210

Report No.: LYFT14-U4 Rev A

Company: Lyft, Inc

Model Name: BIT-01-2

REGULATORY COMPLIANCE TEST REPORT

Company Name: Lyft, Inc

Model Name: BIT-01-2

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

Test Report Serial No.: LYFT14-U4 Rev A

This report supersedes: NONE

Applicant: Lyft, Inc
185 Berry St #5000
San Francisco,
California 94107
USA

Issue Date: 16th July 2022

This Test Report is Issued Under the Authority of:

MiCOM Labs, Inc.
575 Boulder Court
Pleasanton California 94566
USA
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www.micomlabs.com

A2LA ACCREDITED
TESTING CERT #2381.01

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

ilac-MRA A2LA

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 14th day of January 2022.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 2381.01
Valid to November 30, 2023

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	--	--	A-0012
Europe	European Commission	NB	EU MRA 2	NB 2280
United Kingdom	Department for Business, Energy & Industrial Strategy (BEIS)	AB	UK MRA 2	AB 2280
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
MRA Phase I - recognition for product testing
MRA 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 14th day of January 2022

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 2381.02
Valid to November 30, 2023

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	5th July 2022	Draft report for client for review.
Rev A	16th July 2022	Initial release.
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In the above table the latest report revision will replace all earlier versions.

MiCOM Labs, 575 Boulder Court, Pleasanton, California 94566 USA, Phone: +1 (925) 462 0304, Fax: +1 (925) 462 0306, www.micomlabs.com

3. TEST RESULT CERTIFICATE

Manufacturer:	Lyft, Inc 185 Berry St #5000 San Francisco California 94107 USA	**Tested By:**	MiCOM Labs, Inc. 575 Boulder Court Pleasanton California 94566 USA
Model:	BIT-01-2	**Telephone:**	+1 925 462 0304
Type Of Equipment:	Bicycle Interface Module	**Fax:**	+1 925 462 0306
S/N's:	FK1924WSAM5010913		
Test Date(s):	17th – 20th June 2021	**Website:**	www.micomlabs.com

STANDARD(S)	TEST RESULTS
FCC CFR 47 Part 15.225 & ISED RSS-210	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.

A2LA ACCREDITED TESTING CERT #2381.01

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	5th October 2020	R105 - Requirement's When Making Reference to A2LA Accreditation Status
III	ANSI C63.10	2013	American National Standard for Testing Unlicensed Wireless Devices
IV	ANSI C63.4	2014	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	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	2020	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 3 Nov.2012	Expression of Uncertainty and Confidence in Measurements
X	RSS-210	Issue 10 December 2019	RSS-210 — Licence-Exempt Radio Apparatus: Category I Equipment
XI	RSS-Gen Issue 5	March 2019 Amendment 1 February 2021 Amendment 2	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

Details	Description
Purpose:	Test of the Lyft, Inc BIT-01-2 to FCC CFR 47 Part 15.225 & ISED RSS-210
Applicant:	Lyft, Inc 185 Berry St #5000 San Francisco California 94107 USA
Manufacturer:	Lyft, Inc
Laboratory performing the tests:	MiCOM Labs, Inc. 575 Boulder Court Pleasanton California 94566 USA
Test report reference number:	LYFT14-U4 Rev A
Date EUT received:	14th June 2022
Standard(s) applied:	FCC CFR 47 Part 15.225 & ISED RSS-210
Dates of test (from - to):	17th – 20th June 2021
No of Units Tested:	1
Type Of Equipment:	Bicycle Interface Module
Model(s):	BIT-01-2
Location for use:	Indoor / Outdoor
Declared Frequency Range(s):	13.56 MHz;
Type of Modulation:	ASK
EUT Modes of Operation:	NFC
Transmit/Receive Operation:	Transceiver
Rated Input Voltage and Current:	36VDC / 1A Battery
Operating Temperature Range:	-20ºC to +50ºC
ITU Emission Designator:	14K0K1D
Equipment Dimensions:	270 x 70 x 40mm
Weight:	400grams
Hardware Rev:	Rev 1
Software Rev:	2022.23.100

5.2. Scope Of Test Program

Lyft, Inc BIT-01-2

The scope of the test program was to test the Lyft, Inc BIT-01-2 NFC operating in the frequency range 13.110 – 14.010 MHz; 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 Model(s) and Serial Number(s)

Type (EUT/ Support)	Equipment Description (Including Brand Name)	Mfr.	Model No.	Serial No.
EUT	Bicycle Interface Module	Lyft Inc	BIT-01-2	FK1924WSAM5010913
Support	Laptop	Lenovo	N/A	N/A

5.4. Antenna Details

Type	Manufacturer	Model	Gain (dBi)	Frequency Band (MHz)
Integral	Lyft	PCB Loop Antenna	0.0	13.110-14.010

5.5. Cabling and I/O Ports

Port Type	Max Cable Length	Conn Type	Environment
Power + Digital I/O	<3m	Higo MiniB 6 Female	End-User
External Vehicle Lock	<3m	Higo MiniB 4 Male	End-User
External Headlight	<3m	Higo MiniB 2 Pin Female	End-User

5.6. Test Configurations

Results for the following configurations are provided in this report:

Operational Mode	Data Rate with Highest Power MBit/s	Channel Frequency (MHz)		
		Low	Mid	High
13.110 – 14.010 MHz				
NFC	-	--	13.56	--

5.7. Equipment Modifications

The following modifications were required to bring the equipment into compliance:
1. NONE

5.8. Deviations from the Test Standard

The following deviations from the test standard were required in order to complete the test program:
1. NONE

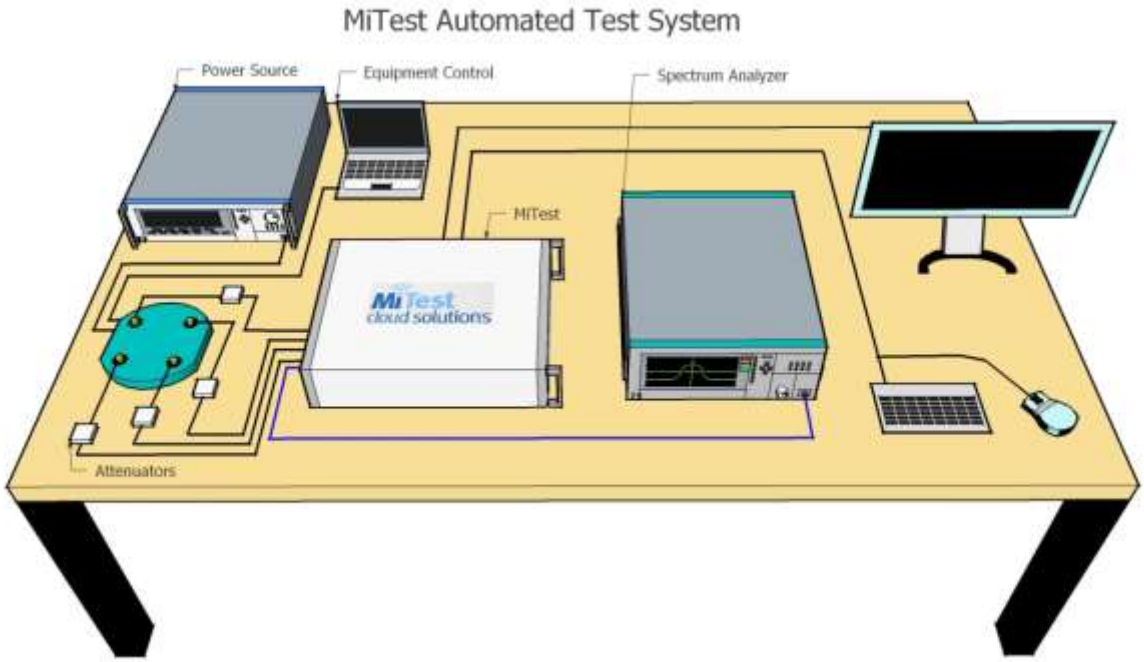
6. TEST SUMMARY

List of Measurements

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

7. TEST EQUIPMENT CONFIGURATION(S)

7.1. Conducted Test Setup

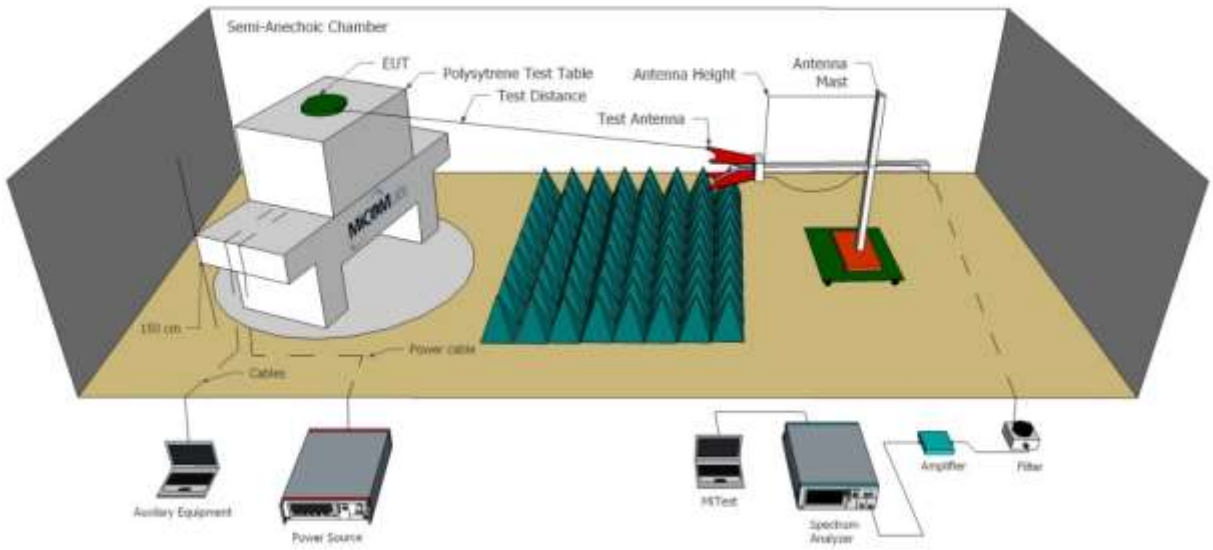


Asset#	Description	Manufacturer	Model#	Serial#	Calibration Due Date
127	Power Supply	HP	6674A	US36370530	Cal when used
248	Resistance Thermometer	Thermotronics	GR2105-02	9340 #1	30 Oct 2022
287	Rohde & Schwarz 40 GHz Receiver	Rhode & Schwarz	ESIB40	100201	8 Oct 2022
398	MiTest RF Conducted Test Software	MiCOM	MiTest ATS	Version 4.2.3.0	Not Required
419	Laptop with Labview Software	Lenova	W520	TS02	Not Required
420	USB to GPIB Interface	National Instruments	GPIB-USB HS	1346738	Not Required
440	USB Wideband Power Sensor	Boonton	55006	9178	8 Oct 2022
445	PoE Injector	D-Link	DPE-101GL	QTAH1E2000625	Not Required
461	Spectrum Analyzer	Agilent	E4440A	MY46185537	27 Sep 2023
510	Barometer/Thermometer	Digi Sense	68000-49	170871375	4 Jan 2023
515	MiTest Cloud Solutions RF Test Box	MiCOM	2nd Gen with DFS	515	7 Oct 2022
516	USB Wideband Power Sensor	Boonton	RTP5006	10511	12 Oct 2022
517	USB Wideband Power Sensor	Boonton	RTP5006	10510	8 Oct 2022
555	Rhode & Schwarz Receiver (Firmware Version : 2.00 SP1)	Rhode & Schwarz	ESW 44	101893	28 Jun 2023
74	Environmental Chamber Chamber 3	Tenney	TTC	12808-1	Not Required
RF#2 GPIB#1	GPIB cable to Power Supply	HP	GPIB	None	Not Required
RF#2 SMA#1	EUT to Mitest box port 1	Flexco	SMA Cable port1	None	7 Oct 2022
RF#2 SMA#2	EUT to Mitest box port 2	Flexco	SMA Cable port2	None	7 Oct 2022
RF#2 SMA#3	EUT to Mitest box port 3	Flexco	SMA Cable port3	None	7 Oct 2022
RF#2 SMA#4	EUT to Mitest box port 4	Flexco	SMA Cable port4	None	7 Oct 2022
RF#2 SMA#SA	Mitest box to SA	Flexco	SMA Cable SA	None	7 Oct 2022
RF#2 USB#1	USB Cable to Mitest Box	Dynex	USB Cable	None	Not Required

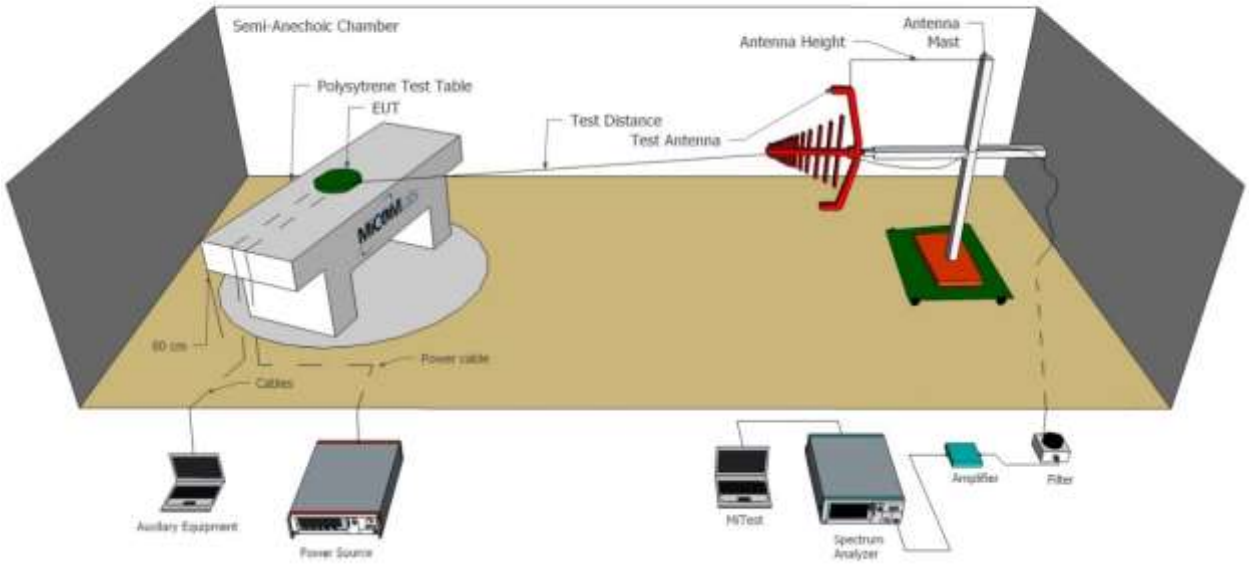
7.2. Radiated Emissions - 3m Chamber

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

Radiated Emissions Above 1GHz Test Setup



Radiated Emissions Below 1GHz 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 Semi Anechoic Chamber	Panasonic	WV-CU101	04R08507	Not Required
287	Rohde & Schwarz 40 GHz Receiver	Rhode & Schwarz	ESIB40	100201	8 Oct 2022
298	3M Radiated Emissions Chamber Maintenance Check	MiCOM	3M Chamber	298	24 Jul 2022
336	Active loop Ant 10kHz to 30 MHz	EMCO	EMCO 6502	00060498	29 Nov 2022
338	Sunol 30 to 3000 MHz Antenna	Sunol	JB3	A052907	29 Sep 2023
397	Amp 10 - 2500MHz	MiCOM Labs	Amp 10 - 2500 MHz	NA	27 Oct 2022
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
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	27 Oct 2022
463	Schwarzbeck cable from Amplifier to Bulkhead.	Schwarzbeck	AK 9513	463	27 Oct 2022
464	Schwarzbeck cable from Bulkhead to Receiver	Schwarzbeck	AK 9513	464	27 Oct 2022
466	Low Pass Filter DC-1500 MHz	Mini-Circuits	NLP-1750+	VUU10401438	6 Oct 2022
480	Cable - Bulkhead to Amp	SRC Haverhill	157-3050360	480	6 Oct 2022
481	Cable - Bulkhead to Receiver	SRC Haverhill	151-3050787	481	6 Oct 2022
510	Barometer/Thermometer	Digi Sense	68000-49	170871375	4 Jan 2023
554	Precision SMA Cable	Fairview Microwave	SCE18060101-400CM	554	6 Oct 2022

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. (ºC):**	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

Equipment Configuration for Nominal Centre frequencies			
Variant:	NFC	**Duty Cycle (%):**	Not Applicable
Data Rate:	Not Applicable	**Antenna Gain (dBi):**	Not Applicable
Modulation:	Not Applicable	**Beam Forming Gain (Y)(dB):**	Not Applicable
TPC:	Not Applicable	**Tested By:**	SB
Engineering Test Notes:			

Test Measurement Results

Test frequency	13.56 MHz	Measured Frequency	Frequency Error		Limit	Margin
Temperature	Voltage	Hz	kHz	ppm	ppm	ppm
25 °C	36.0 Vdc	13560133.00	0.133	9.80826	±100	-90.1917
25 °C	42.0 Vdc	13560133.00	0.133	9.80826	±100	-90.1917
25 °C	30.0 Vdc	13560133.00	0.133	9.80826	±100	-90.1917
50 °C	36.0 Vdc	13560050.00	0.050	3.687316	±100	-96.3127
40 °C	36.0 Vdc	13560067.00	0.067	4.941003	±100	-95.0590
30 °C	36.0 Vdc	13560100.00	0.100	7.374631	±100	-92.6254
20 °C	36.0 Vdc	13560150.00	0.150	11.06195	±100	-88.9381
10 °C	36.0 Vdc	13560150.00	0.150	11.06195	±100	-88.9381
0 °C	36.0 Vdc	13560233.00	0.233	17.18289	±100	-82.8171
-10 °C	36.0 Vdc	13560267.00	0.267	19.69027	±100	-80.3097
-20 °C	36.0 Vdc	13560283.00	0.283	20.87021	±100	-79.1298

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

9.2. Radiated Emissions

9.2.1.1. TX Spurious, Restricted Band Emissions & Field Strength

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. (ºC):**	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 dBmV/m

Conversion between dBmV/m (or dBmV) and mV/m (or mV) are as follows:
Level (dBmV/m) = 20 * Log (level (mV/m))

40 dBmV/m = 100 mV/m
48 dBmV/m = 250 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, 15.255, 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).

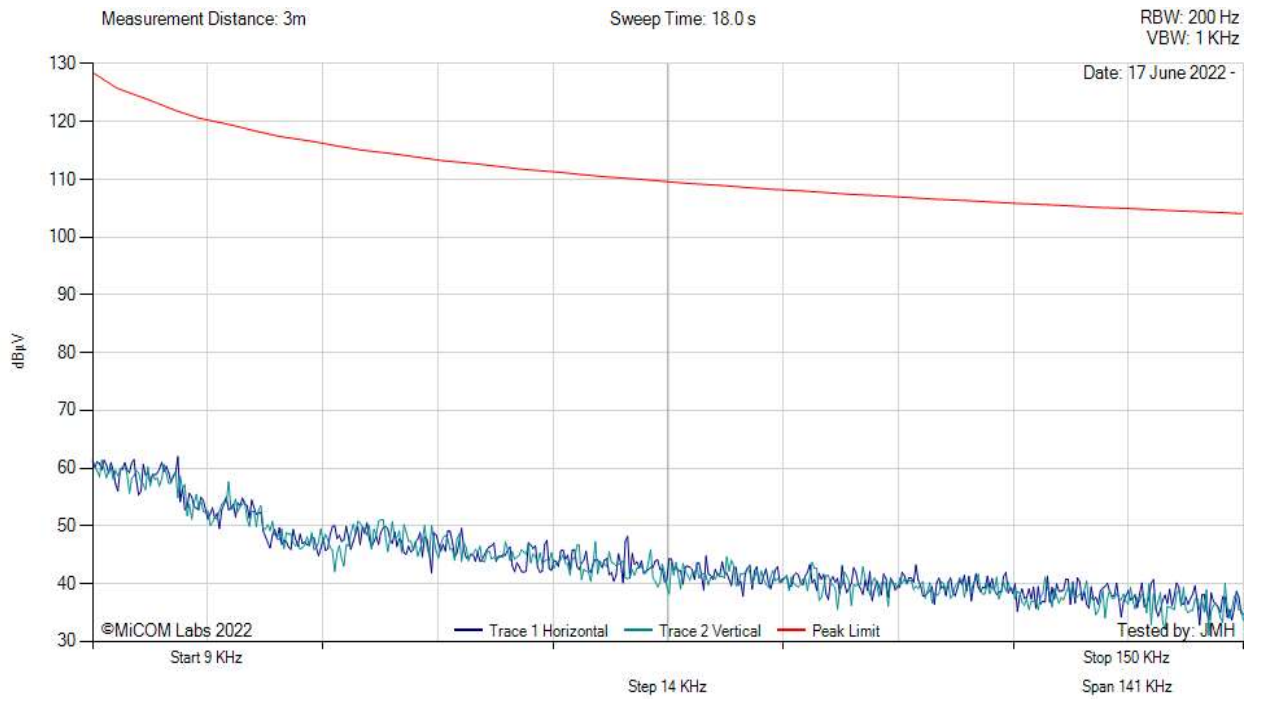
(9) Devices operated in the 24.0-24.25 GHz band under §15.249 are exempt from complying with the requirements of this section for the 48.0-48.5 GHz and 72.0-72.75 GHz bands only, and shall not exceed the limits specified in §15.249(a).

(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).

Equipment Configuration for Below 30MHz Emissions (9kHz - 150kHz)			
Antenna:	Integral	**Variant:**	NFC
Antenna Gain (dBi):	Not Applicable	**Modulation:**	Not Applicable
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	13.56	**Data Rate:**	Not Applicable
Power Setting:	Max	**Tested By:**	JMH

Test Measurement Results

Variant: , Test Freq: 13.56 MHz, Power Setting: Max



There are no emissions found within 6dB of the limit line.

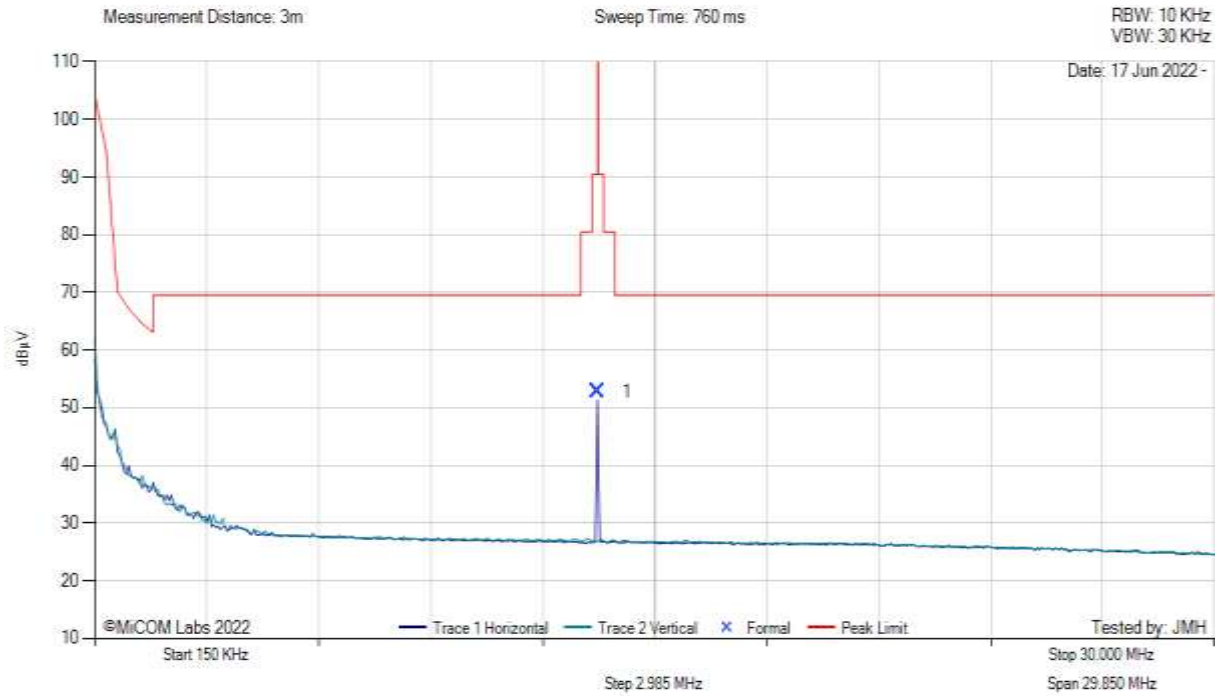
Test Notes: BIT-01-2 powered by 36V AC/DC PS. NFC Active.

Equipment Configuration for Below 30MHz Emissions (150kHz - 30Mhz)

Antenna:	Integral	**Variant:**	NFC
Antenna Gain (dBi):	Not Applicable	**Modulation:**	ASK
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	13.56	**Data Rate:**	Not Applicable
Power Setting:	Max	**Tested By:**	JMH

Test Measurement Results

Variant: NFC, Test Freq: 13.56 MHz, Power Setting: Max



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	13.56	42.40	0.44	9.96	52.80	Fundamental	--	0	0	124.0	-71.2	Pass

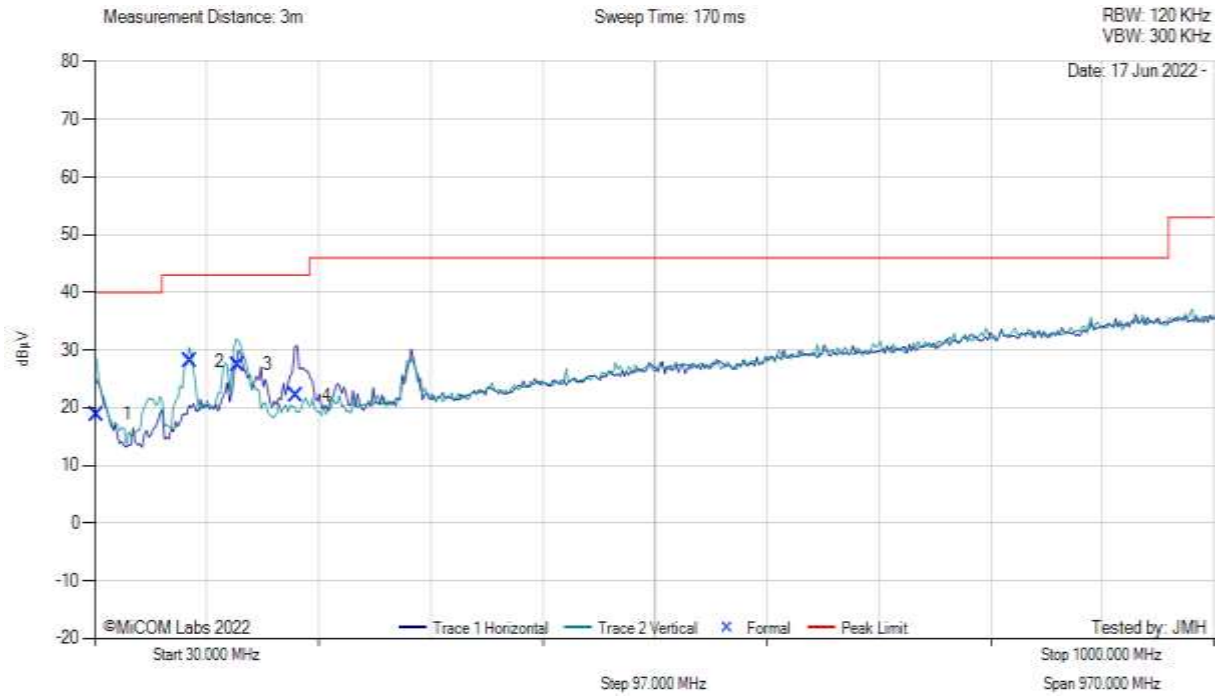
Test Notes: BIT-01-2 powered by 36V AC/DC PS. NFC active

Equipment Configuration for Radiated Digital Emissions (Class B)

Antenna:	Integral	**Variant:**	NFC
Antenna Gain (dBi):	Not Applicable	**Modulation:**	ASK
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	13.56	**Data Rate:**	Not Applicable
Power Setting:	Max	**Tested By:**	JMH

Test Measurement Results

Variant: NFC, Test Freq: 13.56 MHz, Power Setting: Max

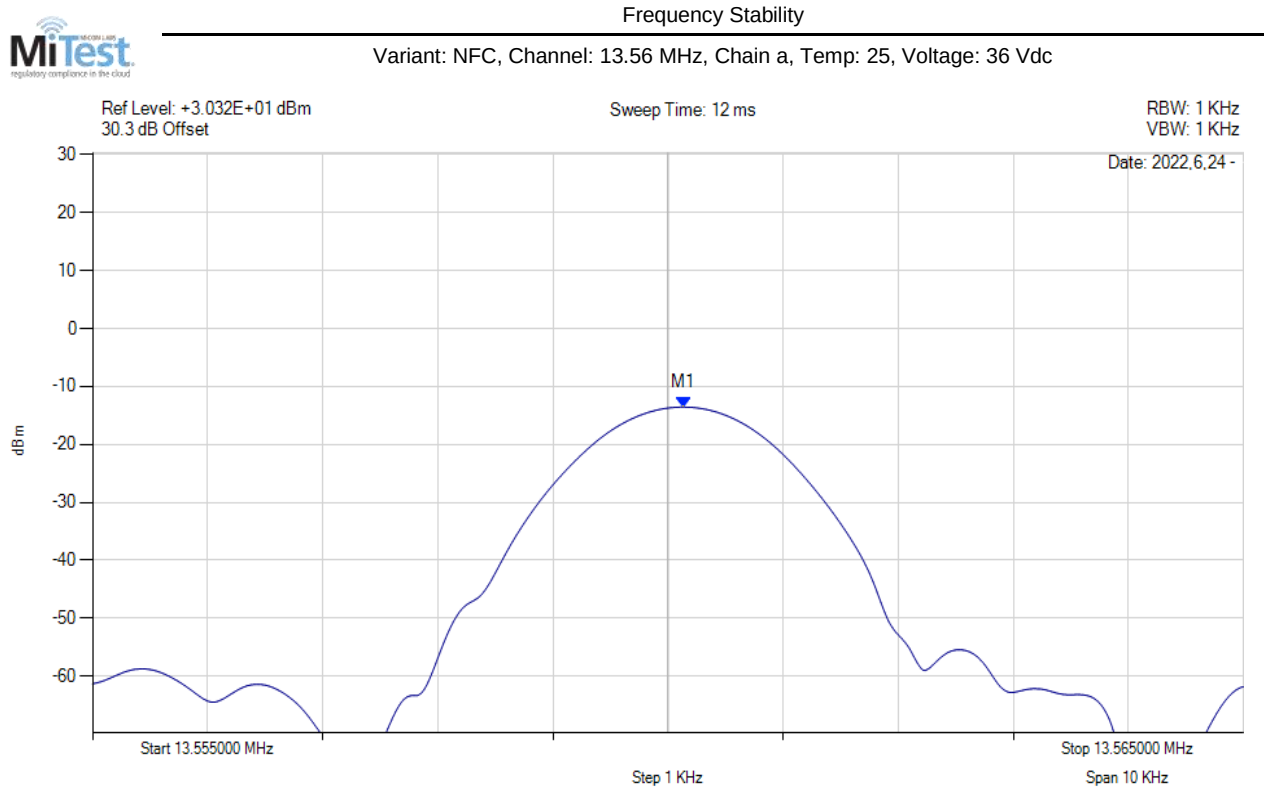


30.00 - 1000.00 MHz												
Num	**Frequency MHz**	**Raw dBµV**	**Cable Loss dB**	**AF dB/m**	**Level dBµV/m**	**Measurement Type**	**Pol**	**Hgt cm**	**Azt Deg**	**Limit dBµV/m**	**Margin dB**	**Pass /Fail**
1	32.00	27.72	3.55	-12.45	18.82	MaxQP	Vertical	397	230	40.0	-21.2	Pass
2	112.72	42.30	4.16	-18.38	28.08	MaxQP	Vertical	105	33	43.0	-14.9	Pass
3	153.87	42.07	4.36	-18.99	27.44	MaxQP	Vertical	98	109	43.0	-15.6	Pass
4	204.65	37.32	4.61	-19.86	22.07	MaxQP	Horizontal	128	100	43.0	-20.9	Pass

Test Notes: BIT-01-2 powered by 36V AC/DC PS. NFC up and pulsing

A. Appendix A – Graphical Images

A.1. Frequency Stability

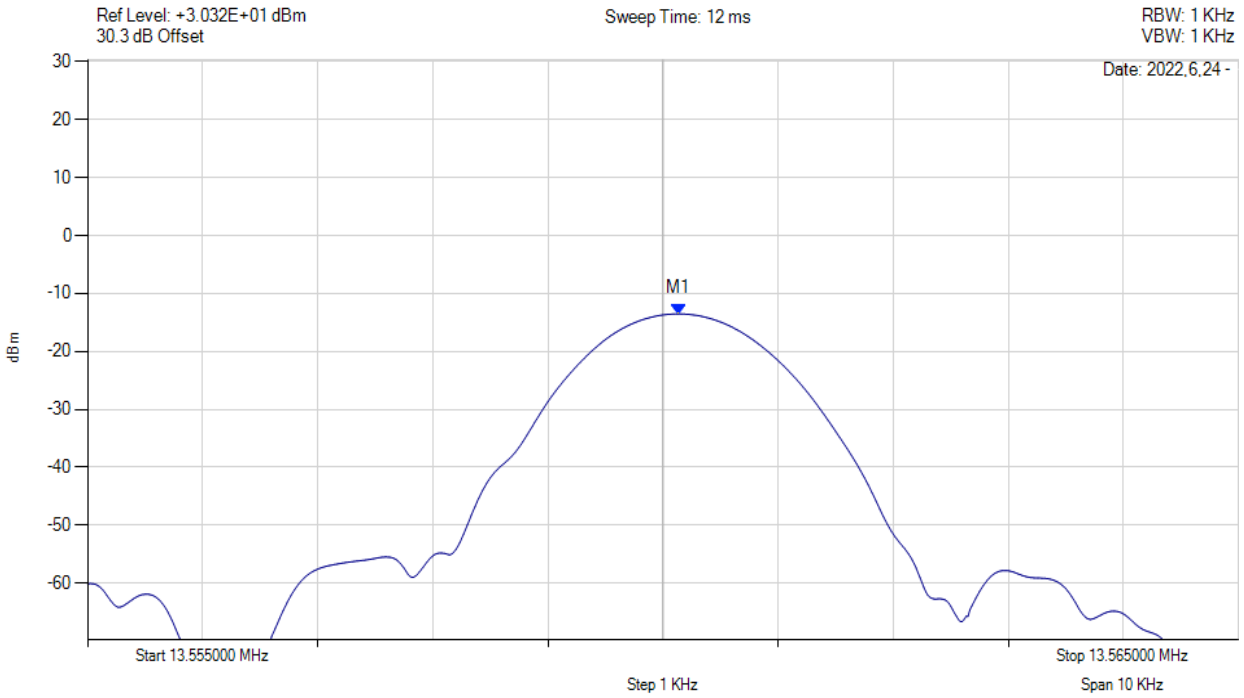


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = NORM Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = WRIT	M1 : 13.560 MHz : -13.557 dBm	Channel Frequency: 13.56 MHz

back to matrix

Frequency Stability

Variant: NFC, Channel: 13.56 MHz, Chain a, Temp: 25, Voltage: 30 Vdc

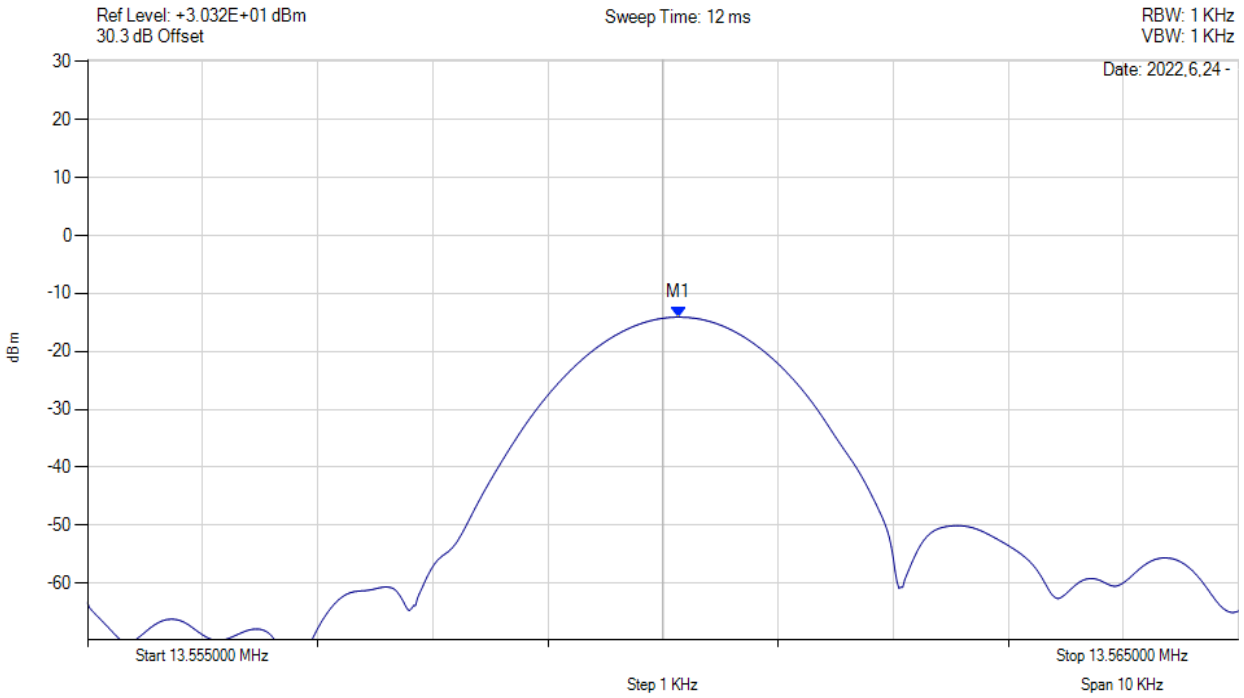


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = NORM Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = WRIT	M1 : 13.560 MHz : -13.528 dBm	Channel Frequency: 13.56 MHz

back to matrix

Frequency Stability

Variant: NFC, Channel: 13.56 MHz, Chain a, Temp: 25, Voltage: 42 Vdc

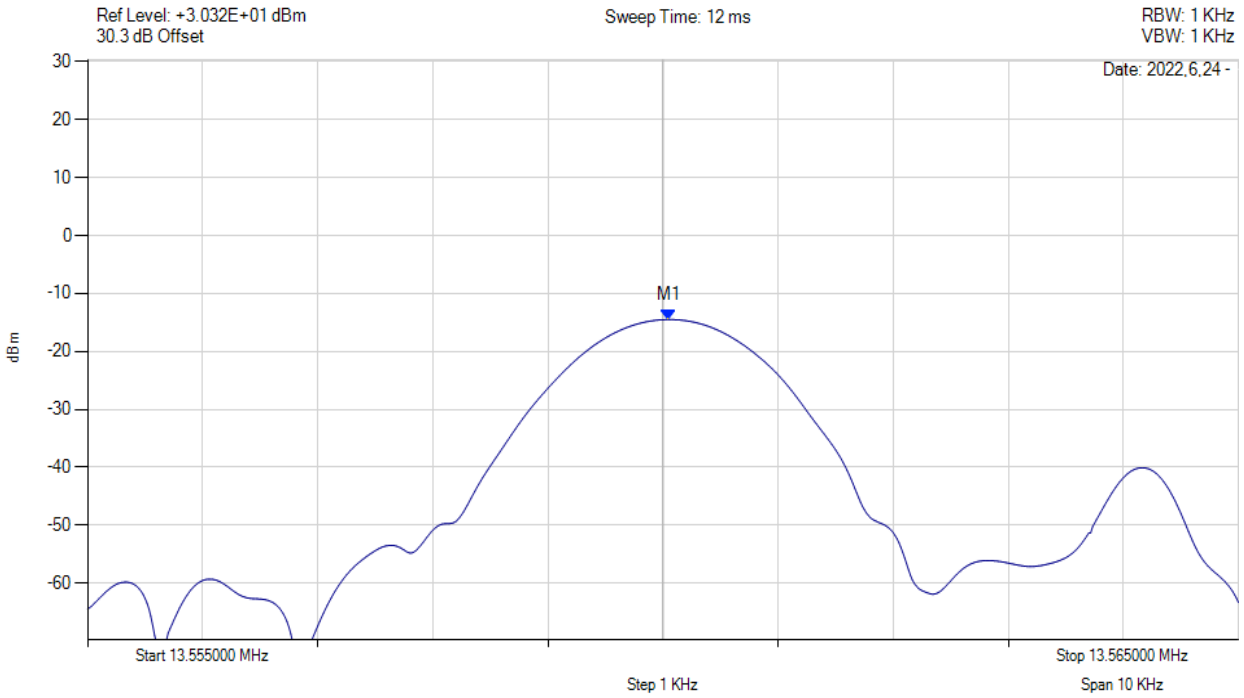


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = NORM Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = WRIT	M1 : 13.560 MHz : -14.087 dBm	Channel Frequency: 13.56 MHz

back to matrix

Frequency Stability

Variant: NFC, Channel: 13.56 MHz, Chain a, Temp: 50, Voltage: 36 Vdc

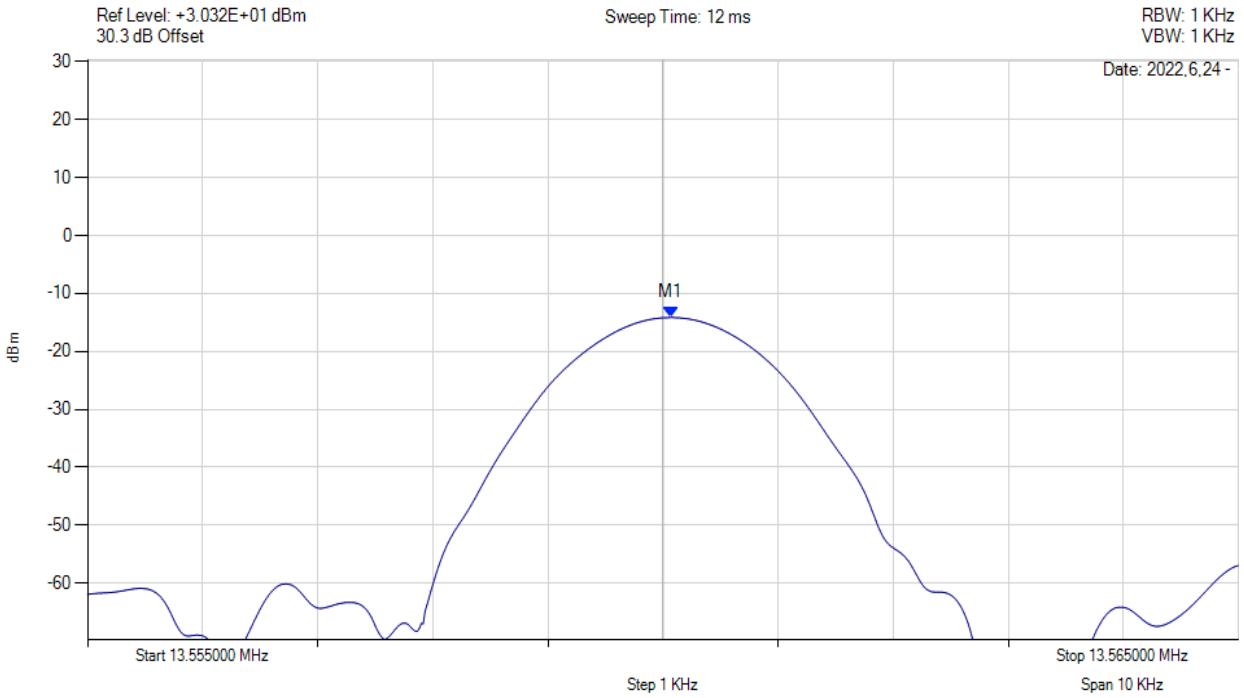


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = NORM Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = WRIT	M1 : 13.560 MHz : -14.496 dBm	Channel Frequency: 13.56 MHz

back to matrix

Frequency Stability

Variant: NFC, Channel: 13.56 MHz, Chain a, Temp: 40, Voltage: 36 Vdc

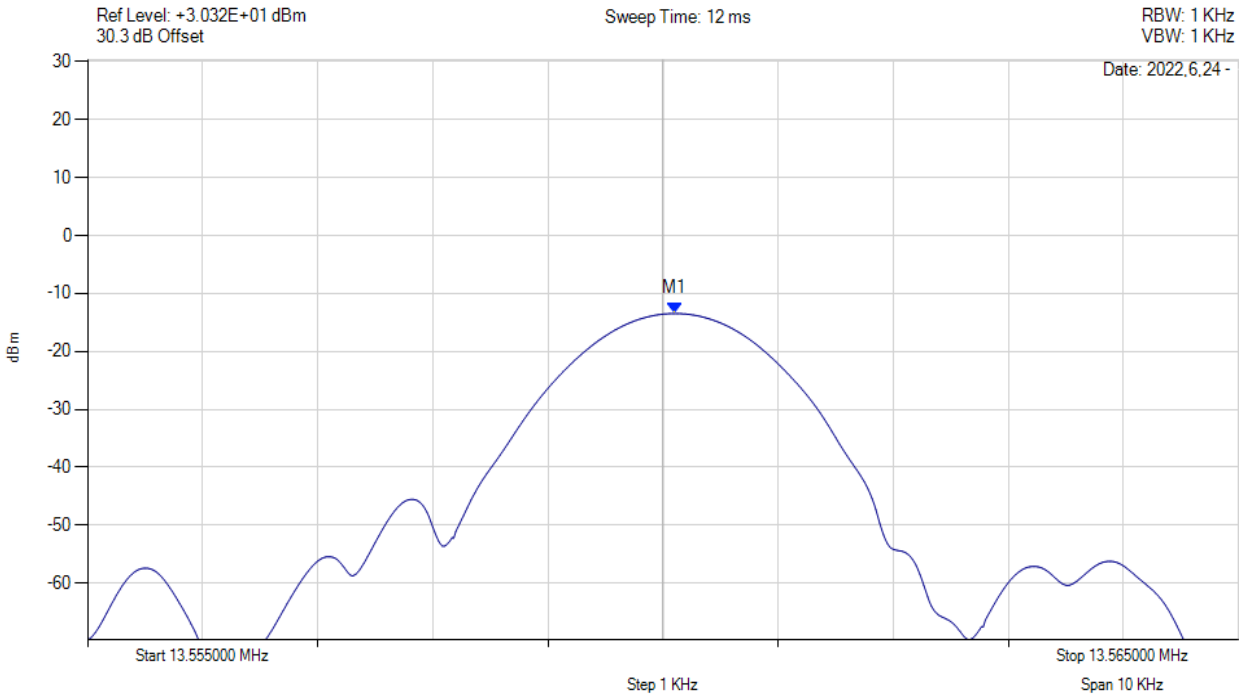


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = NORM Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = WRIT	M1 : 13.560 MHz : -14.154 dBm	Channel Frequency: 13.56 MHz

back to matrix

Frequency Stability

Variant: NFC, Channel: 13.56 MHz, Chain a, Temp: 30, Voltage: 36 Vdc

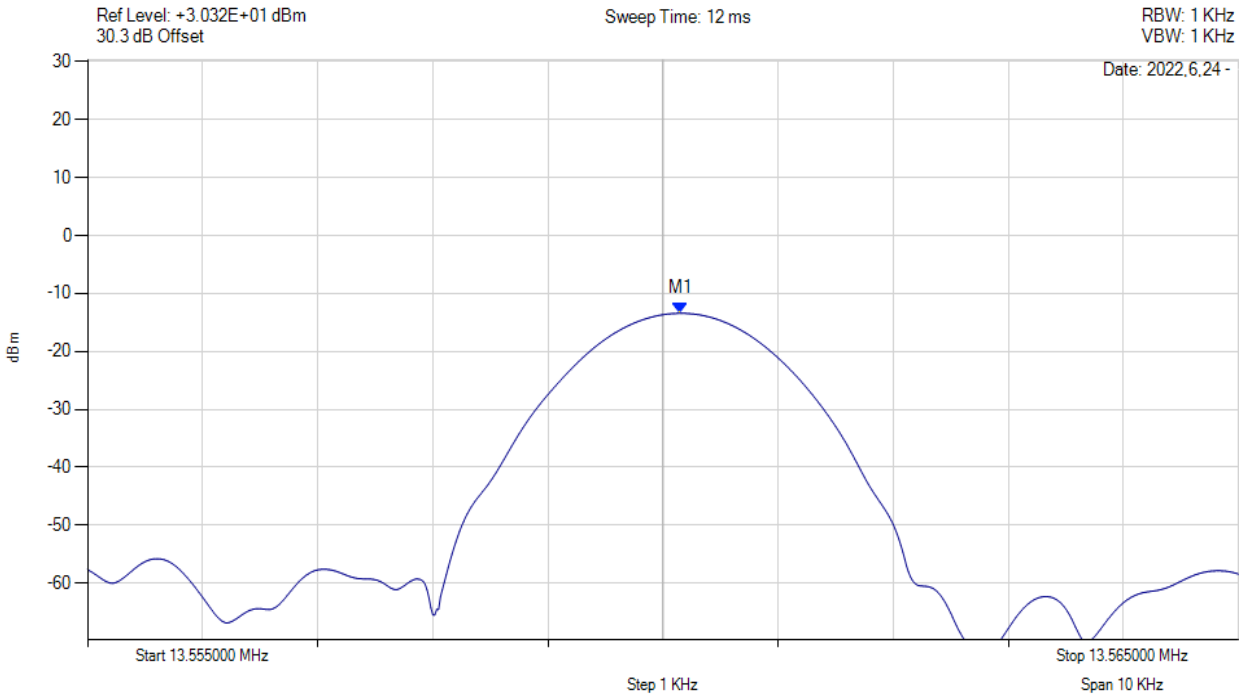


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = NORM Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = WRIT	M1 : 13.560 MHz : -13.463 dBm	Channel Frequency: 13.56 MHz

back to matrix

Frequency Stability

Variant: NFC, Channel: 13.56 MHz, Chain a, Temp: 20, Voltage: 42 Vdc

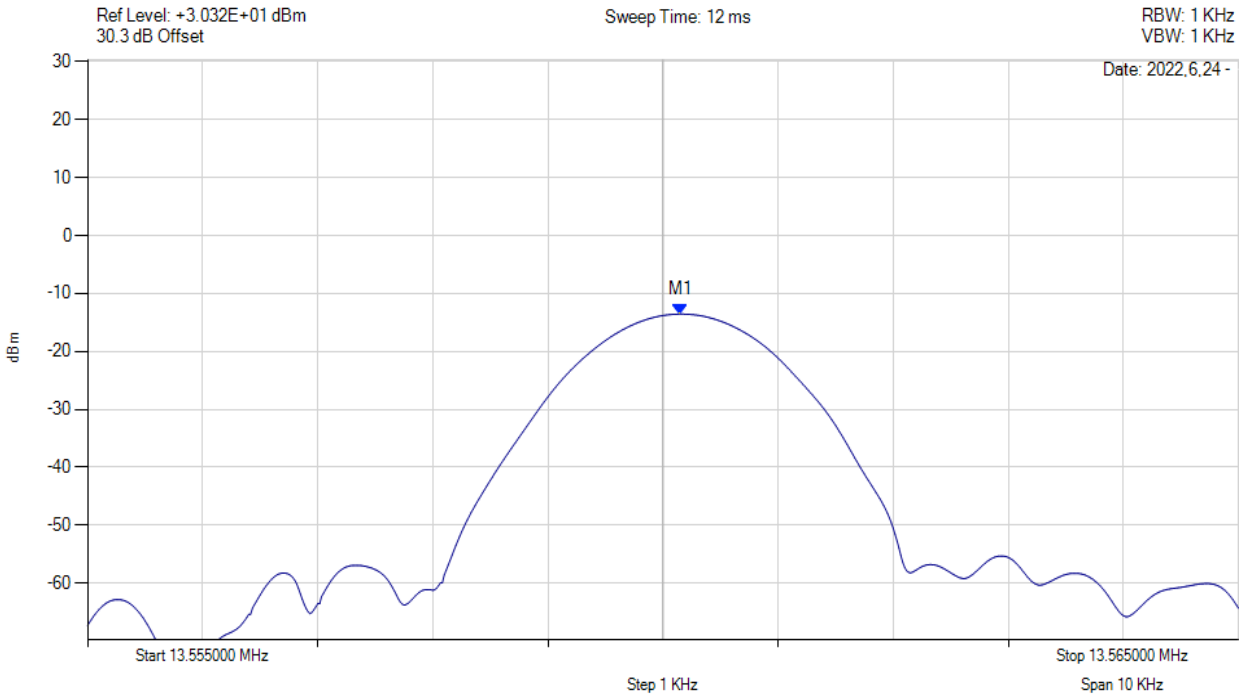


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = NORM Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = WRIT	M1 : 13.560 MHz : -13.424 dBm	Channel Frequency: 13.56 MHz

back to matrix

Frequency Stability

Variant: NFC, Channel: 13.56 MHz, Chain a, Temp: 10, Voltage: 36 Vdc

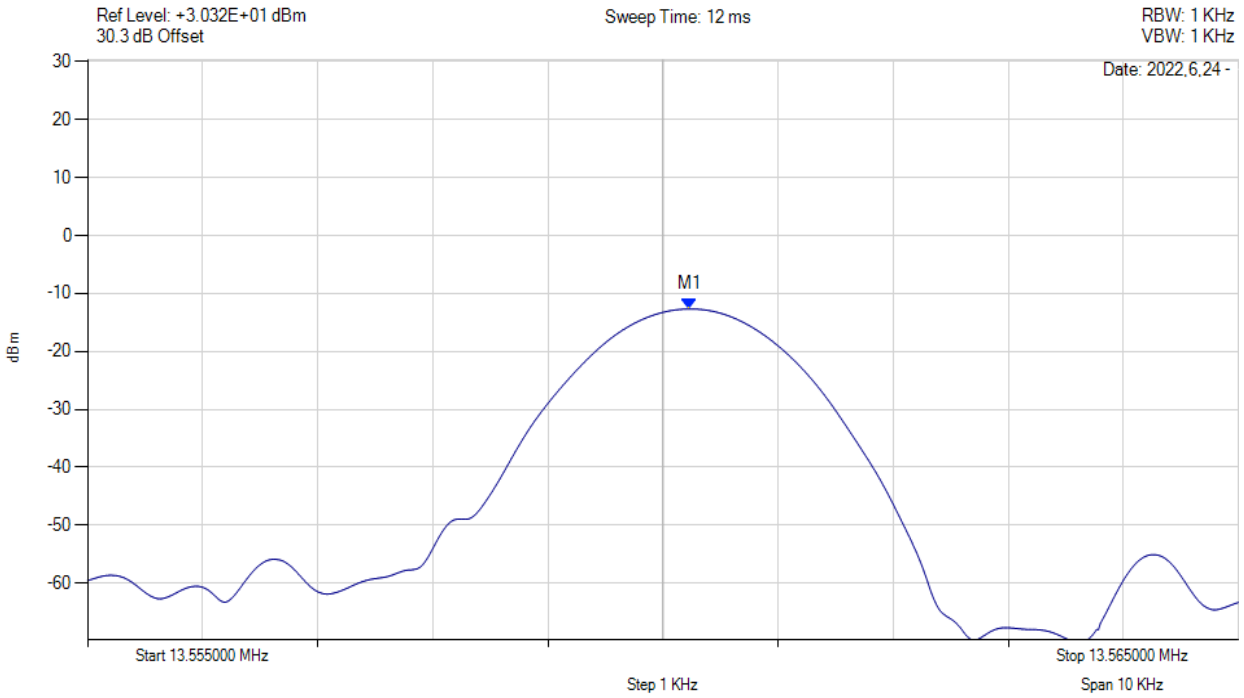


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = NORM Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = WRIT	M1 : 13.560 MHz : -13.555 dBm	Channel Frequency: 13.56 MHz

back to matrix

Frequency Stability

Variant: NFC, Channel: 13.56 MHz, Chain a, Temp: 0, Voltage: 36 Vdc

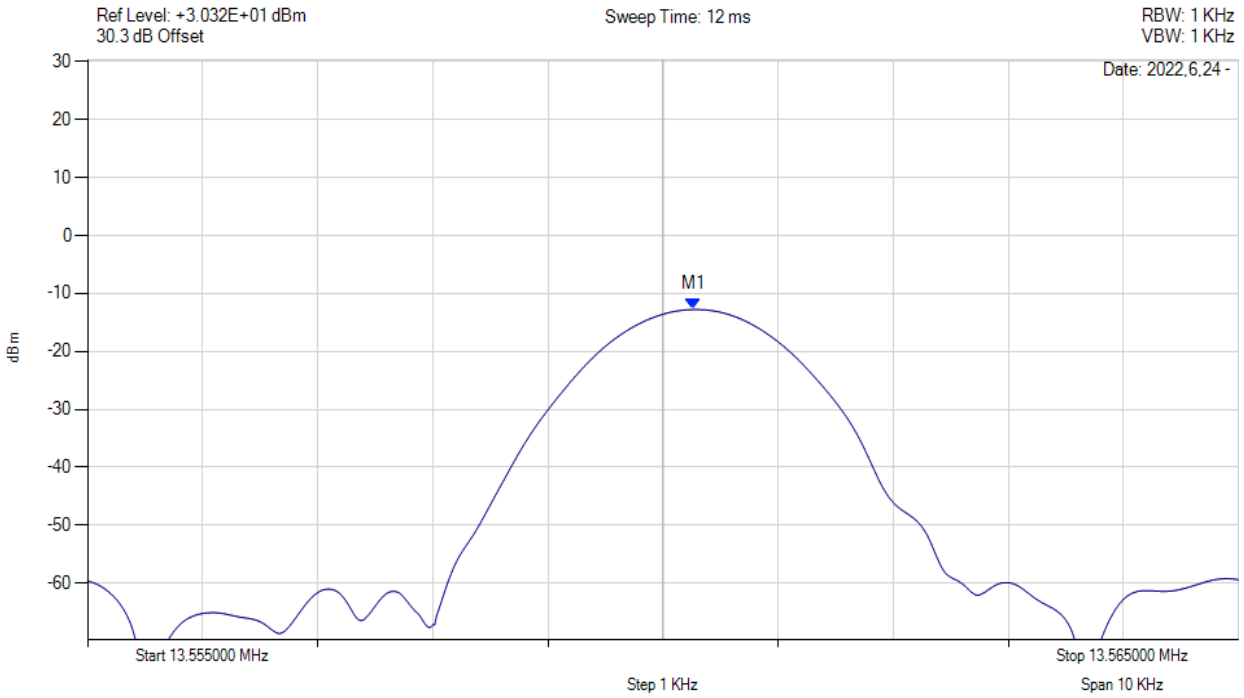


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = NORM Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = WRIT	M1 : 13.560 MHz : -12.677 dBm	Channel Frequency: 13.56 MHz

back to matrix

Frequency Stability

Variant: NFC, Channel: 13.56 MHz, Chain a, Temp: -10, Voltage: 36 Vdc

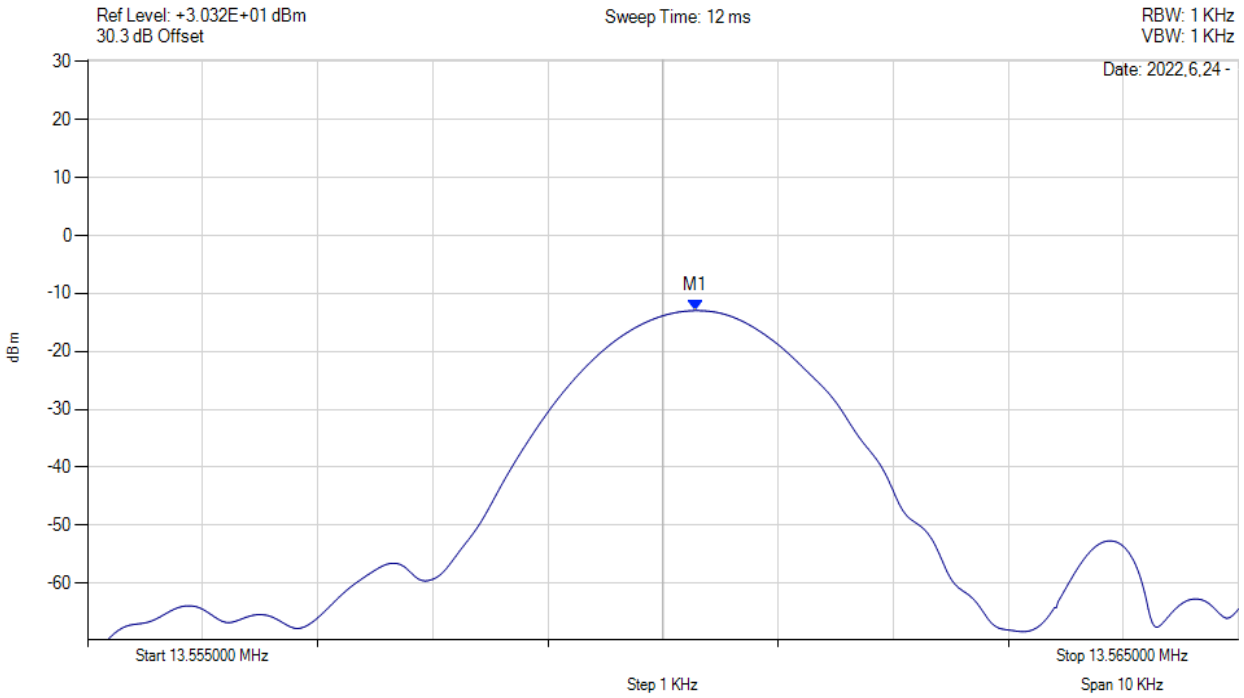


Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = NORM Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = WRIT	M1 : 13.560 MHz : -12.771 dBm	Channel Frequency: 13.56 MHz

back to matrix

Frequency Stability

Variant: NFC, Channel: 13.56 MHz, Chain a, Temp: -20, Voltage: 36 Vdc



Analyzer Setup	Marker:Frequency:Amplitude	Test Results
Detector = NORM Sweep Count = 0 RF Atten (dB) = 20 Trace Mode = WRIT	M1 : 13.560 MHz : -12.959 dBm	Channel Frequency: 13.56 MHz

back to matrix

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