Keystone Compliance, LLC
2320 Presidential Dr #101
Durham, NC 27703

Phone: 724-657-9940
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EBT Medical US Inc

2107-111C-3

Certificate #3293.03

FCC Accreditation Designation Number:
US1308

Innovation, Science and Economic Development Canada
Accreditation Site Number:
US0232

FCC Test Report 2107-111C-3 Rev. C

Test Standards: FCC Rule Part: 15.247 & ISED Canada Radio Standards Specification: RSS-247

For

EBT Medical US Inc

34 Hayden Rowe Suite 154
Hopkinton, Massachusetts 01748

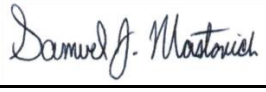
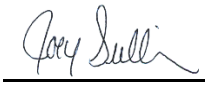
On

EBT Pulse Generator

FCC ID: 2A3S8-MODEL20010
Model Number: N/A ; Part Number: N/A ; Serial Number: PG-D0010 and PG-D0011

Performed By: Keystone Compliance, LLC.
2320 Presidential Drive, Suite 101
Durham, NC 27703

Keystone Compliance, LLC. does hereby certify that all inspections and tests have been performed in accordance with the documents referenced herein with exceptions as noted in this report. The results in this report pertain to the specified equipment tested. This report shall not be reproduced, except in full, without the written authorization of Keystone Compliance, LLC.

Prepared By:		**Date:**	**4/28/2022**
	Maria Rodgers, Report Writer		
Approved By:		**Date:**	**4/28/2022**
	Sam Mastovich, General Manager		
Approved By:		**Date:**	**4/28/2022**
	Joey Sullivan, Quality Manager		

Document History

Revision	Issue Date	Description of Modifications	Revised By	Approved By
N/C	11/22/2021	Initial release	N/A	A.S.
A	11/22/2021	Revised company name/address	HS	AS
B	3/9/2022	Revised to remove confidential pictures	MR	SM
C	4/28/2022	Revised test set up block diagram	MR	SM

Client Information	
Purchase Order	A000966904
Quote Number	2107-111C-3
EUT Arrival Date	9/20/2021 -- Recieved in good conditionRecieved in good condition
Company Name	Nextern
Address	1185 Birch Lake Boulevard North
City, State Zip	White Bear Lake, MN 55110
	EBT Medical US Inc
	34 Hayden Rowe Suite 154
	Hopkinton, Massachusetts 01748
Contact Name	Jon Lawson
Phone	(651) 203-2108
Email	Jon.lawson@nextern.com

Test Facility Information	
Test Laboratory	Keystone Compliance, LLC.
Address	2320 Presidential Drive, Suite 101
City, State, Zip Code	Durham, NC 27703
Phone	(919) 296-0098
Web Site	www.keystonecompliance.com
Contact Name	Al Servais
Title	Lab Manager
E-Mail Address	Al@keystonecompliance.com

TABLE OF CONTENTS

Introduction

This report documents the results of the EMC tests performed on the EBT Pulse Generator, Model Number: N/A; Part Number: N/A; Serial Number: PG-D0010 and PG-D0011, submitted by EBT Medical US Inc, EBT Medical US, Inc

The EMC test programs described herein were performed in accordance with the applicable requirements of FCC Rule Part: 15.247 & ISED Canada Radio Standards Specification: RSS-247.

All test data is included in 4 of this document.

All tests performed at Keystone Compliance Durham, NC EMC test facility. All tests were performed using the test set-ups of the relevant standard for tests performed in laboratory conditions.

Acronyms and Abbreviations

EMC – Electromagnetic Compatibility

EMI – Electromagnetic Interference

EUT – Equipment Under Test

M/N – Model Number

P/N – Part Number

S/N – Serial Number

Vac – Voltage Alternating Current

DC – Direct Curent

AM – Amplitude Modulation

dB – Decibel

deg – Degree

H/V – Horizontal or Vertical Polarity

m – Meters

cm – Centimeter

V/m – Volts per meter

dBuV/m – Decibel microvolts per meter

kV – Kilovolt

Hz – Hertz

kHz – Kilohertz

MHz – Megahertz

GHz – Gigahertz

pF – Picofarad

Ω – Ohm

QP – Quasi-Peak

N/A – Not Applicable

Configuration

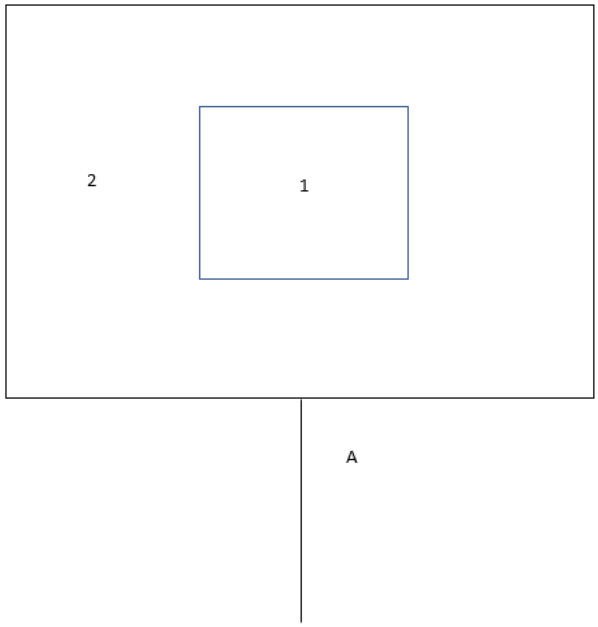
Testing performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations, and settings used to complete the evaluation. The actual test parameters specified in the test data; this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation indicated in the test data.

EUT		
Description		Manufacturer
EBT Pulse Generator		**EBT Medical US Inc**
FCC ID		
2A3S8-MODEL20010		
Model Number	Part Number	Serial Number
N/A	**N/A**	**PG-D0010 and PG-D0011**

Techinical Details	
Detail	Description
Frequency Range (MHz)	2402 - 2480
Number of Channels	40
Channel Spacing	2 MHz
Modulation Format	GFSK
Data Rates	1 Mbps, 2 Mbps
Operating Voltage	4 VDC
Antenna Type(s) / Gain(s)	On-board dipole, +2.1 dBi

Support Equipment				
Item	Equipment Type	Manufacturer	Model Number	Serial Number
1	EUT	EBT Medical US Inc	N/A	PD-0010/PD-0011

Cable Description				
Item	Cable Type	Length	Shield	Termination
None				



EUT
Test Setup Block Diagram

Section 1 – Test Conditions and Equipment

1.1 Instrumentation and Equipment

Keystone Compliance, LLC attests that the commercial sources providing calibration services on the above referenced equipment, other than the NIST Standards are in fact capable of performing the required services to the satisfaction of Keystone Compliance, LLC Quality Assurance. Certifications of all calibrations performed are retained on file in the Keystone Compliance, LLC Quality Assurance Department, and are available for inspection upon request by customer representatives.

The test equipment utilized during this test program is listed on individual Test Equipment Log located in Section 3 of this document.

1.2 Tolerances

All test conditions were maintained within all applicable specified tolerances.

1.3 Test Methodology and Considerations

All modes of operation, including all data rates, were evaluated and the data presented in this report represents the worst case where applicable.

For radiated emissions, the EUT was evaluated in three orthogonal orientations.

For antenna port conducted emissions, an SMA to U.FL connector was mounted directly onto the board to facilitate testing.

For power line conducted emissions, the EUT was evaluated mounted on the charger.

Power setting during test: 0

1.4 Radiated Emissions Test Description

1.4.1 Semi-Anechoic Chamber Test Site

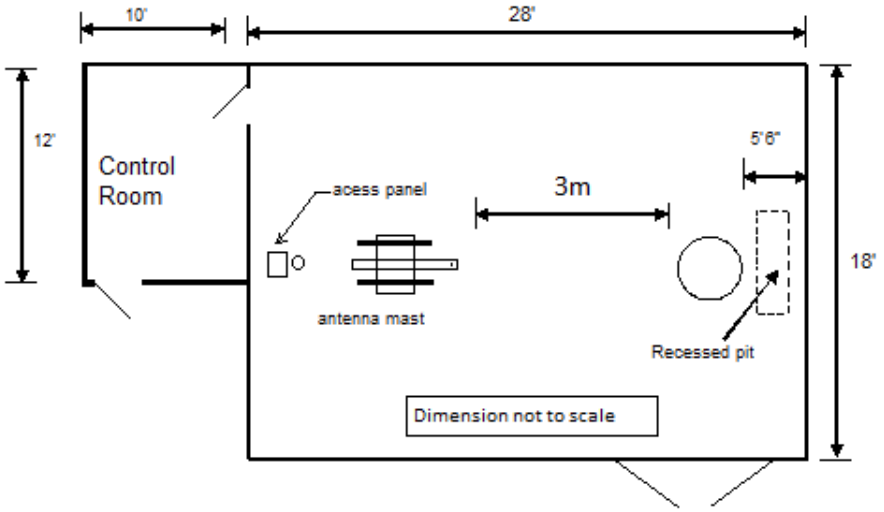
The Semi-Anechoic Chamber Test Site consists of a 18' x 28' x 18' shielded enclosure. The chamber is lined with Samwha Electronics Co. LTD Ferrite Absorber, model number SFA300 (HSN-1). The ferrite tile is 10cm x 10 cm and weighs approximately 1.4lbs. These tiles are mounted on steel panels and installed directly on the inner walls of the chamber. On top of the ferrite tiles is DMAS HT-45 (Dutch Microwave Absorber Solutions) hybrid absorber on all walls except the wall behind the antenna mast which has a shorter DMAS HT-25 absorber.

The turntable is 1.50m in diameter and is located 150cm from the back wall of the chamber. The chamber is grounded via 1 - 8' copper ground rod, installed at the center of the back wall, it is bound to the ground plane using short #6 copper wire. The turntable is all steel, flush mounted table installed in an all-steel frame. The table is remotely operated from inside the control room located 25' from the turntable. The turntable is electrically bonded to the surrounding ground plane via steel fingers installed on the edge of the turn table. The steel fingers make constant contact with the ground plane.

Behind the turntable is a 2' x 6' x 1.5' deep shielded pit used for support equipment if necessary. The pit is equipped with 2 - 4" PVC chase from the turntable to the pit that allow for cabling to the EUT if necessary. The underside of the turntable can be accessed from the pit so cables can be supplied to the EUT from the pit.

To comply with the requirements of the test methods given on page 4, RF absorbing foam was placed inside the chamber in a configuration that provided the best results. First, a 12ft X 12ft. patch of 10" tall absorber was placed on the floor between the turntable and the receiving antenna. This absorber meets the absorption requirements specified in ANSI C63.4:2009.

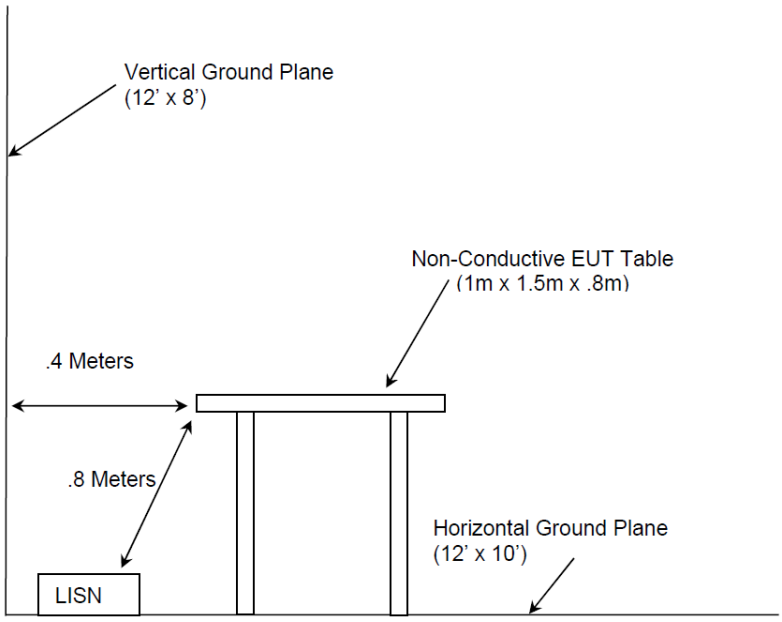
A diagram of the Semi-Anechoic Chamber Test Site is shown below:



1.5 Conducted Emissions Test Description

1.5.1 Semi-Anechoic Chamber Test Site

The site is of sufficient size to test tabletop and floor standing equipment in accordance with section 6.1.4 of ANSI C63.10.



Section 2 – References

2.1 Applicable Specifications

Reference Specification Title	**ANSI C63.10-2013** **American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices**
Reference Specification Title	**US Code of Federal Regulations (CFR): Title 47, Part 2, Subpart J** **Equipment Authorization Procedures, 2020**
Reference Specification Title	**US Code of Federal Regulations (CFR): Title 47, Part 15, Subpart C** **Radio Frequency Devices, Intentional Radiators, 2020 Fill In**
Reference Specification Title	**FCC KDB 558074 D01 DTS Meas Guidance v05r02** **Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247, April 2, 2019 Fill In**
Reference Specification Title	**ISED Canada Radio Standards Specification: RSS-247** **Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices, Issue 2, February 2017. Fill In**
Reference Specification Title	**ISED Canada Radio Standards Specification: RSS-GEN** **General Requirements for Compliance of Radio Apparatus, Issue 5, April 2018 + Amendment 1, March 2019 Fill In**

Section 3 – Test Equipment

3.1 Test Equipment

Equipment Log	
Customer:	**EBT Medical US, Inc**
Date:	**9/20/21 – 9/21/21**
Test Engineer:	**T. Leeson**

Test Equipment						
Asset No.	Description	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
CA000	3 Meter Chamber	ETS Lindgren	N/A	P32431/J.G.	N/A	N/A
CB001	Spectrum Analyzer	Hewlett Packard	E440A	MY44303432 FW: A.11.21	1/20/2021	1/20/2022
CB006	EMI Receiver, 1Hz - 40GHz	Rohde & Schwartz	ESW-44	102020	1/18/2021	1/18/2022
CC009	Pressure, Humidity and Temperature Meter	Extech	SD700	A.103649	1/29/2021	1/29/2022
CE001	Dual Ridged Horn Antenna	Astro Antenna	AHA-118S	3019	2/2/2021	2/2/2022
CE013	Active Loop Antenna 1 kHz – 30 MHz	EMCO	6507	0003-1430	1/28/2021	1/28/2022
CE017	Biconilog Antenna	Hewlett Packard	CBL6110B	1875	4/20/2021	4/20/2022
CG000	100kHz – 3000MHz RF Pre-Amplifier	Hewlett Packard	8347A	3307A02193	1/20/2021	1/20/2022
CG012	1-26.5GHz Preamplifier	Hewlett Packard	8449B	3008A01153	1/26/2021	1/26/2022
CK003	LISN (2 pieces)	Com-Power	LI1258C	20020018, 20020019	1/25/2021	1/25/2022
CN046	Transient Limiter	Com-Power	LIT-153A	22010080	8/31/2021	8/31/2022
CT009	RF Cable	Megaphase	EMC1-K1K1-192	N/A	2/22/2021	2/22/2022
CT012	N-Type (300 kHz – 18 GHz)	Suhner	Sucoflex 165500	165500	3/29/2021	3/29/2022
CT013	2 meer SMA to N type Cable	Suhner	Succoflex100	N/A	3/18/2021	3/18/2022
CT015	Cable, BNC to BNC	N/A	N/A	NEK-M17028	4/1/2021	4/1/2022
CT016	Cable, BNC to	Pomona	N/A	2249-C-480	4/1/2021	4/1/2022

Test Equipment						
Asset No.	Description	Manufacturer	Model	Serial No.	Last Cal.	Cal. Due
	BNC	Electronics				
CT017	Cable N-Type to N-Type	Suhner	Sucoflex 165500	N/A	4/6/2021	4/6/2022

UWCE: Used With Calibrated Equipment

Section 4 – Summary of Tests

Along with the tabular data shown below, plots were taken of all signals deemed important enough to document.

4.1 Antenna Requiremnt - FCC: 15.203

The EUT utilizes several different antenna options: the SMT Chip Antenna and PCB Trace Antenna are permanently affixed to the module; the external antenna options attach to the module via a U.fl cable permanently attached to the antenna.

4.2 Power Line Conducted Emissions - FCC: 15.207, ISED Canada: RSS-Gen 8.8

4.2.1 Measurement Procedure

Conducted emissions were performed from 150kHz to 30MHz with the spectrum analyzer's resolution bandwidth set to 9kHz and the video bandwidth set to 30kHz. The calculation for the conducted emissions is as follows:

Corrected Reading = Analyzer Reading + LISN Loss + Cable Loss Margin = Corrected Reading - Applicable Limit

4.2.2 Measurement Results

Performed by: Tyler Leeson

Conducted EMI Results - 120VAC/60Hz - Line 1

Frequency (MHz)	Corrected Reading		Limit		Margin	
	Quasi-Peak (dBµV)	Average (dBµV)	Quasi-Peak (dBµV)	Average (dBµV)	Quasi-Peak (dB)	Average (dB)
0.438	34.26	28.66	57.10	47.1	22.84	18.44
0.45375	36.37	30.35	56.81	46.81	20.44	16.46
0.54375	17.93	13.20	56	46	38.07	32.80
1.86675	13.90	7.89	56	46	42.10	38.11
4.96275	19.88	13.58	56	46	36.12	32.42
21.255	24.14	18.22	60	50	35.86	31.78

Conducted EMI Results - 120VAC/60Hz - Line 2

Frequency (MHz)	Corrected Reading		Limit		Margin	
	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
	(dBµV)	(dBµV)	(dBµV)	(dBµV)	(dB)	(dB)
0.4245	24.71	19.75	57.36	47.36	32.65	27.61
0.44475	28.14	21.80	56.97	46.97	28.83	25.17
0.465	24.69	19.15	56.60	46.60	31.91	27.45
3.9165	25.02	15.76	56	46	30.98	30.24
7.0665	23.69	16.16	60	50	36.31	33.84
20.535	28.17	20.22	60	50	31.83	29.78

4.3 6 db / 99% Occupied Channel Bandwidth - FCC: 15.247(a)(2), ISED Canada: RSS-247 5.2(a), RSS-GEN 6.7

4.3.1 Measurement Procedure

The 20dB bandwidth was measured in accordance with the FCC KDB 558074 D01 Section 8.2 which references Subclause 11.8 of ANSI C63.10. The Resolution Bandwidth (RBW) of the spectrum analyzer was set to 100 kHz. The Video Bandwidth (VBW) was set to ≥ 3 times the RBW. The trace was set to max hold with a peak detector active. The marker-delta function of the spectrum analyzer was utilized to determine the 6dB bandwidth of the emission.

The occupied bandwidth measurement function of the spectrum analyzer was used to measure the 99% bandwidth. The span of the analyzer was set to capture all products of the modulation process, including the emission sidebands. The resolution bandwidth was set from 1% to 5% of the occupied bandwidth and the video bandwidth set to at least 3 times the resolution bandwidth. A peak detector was used.

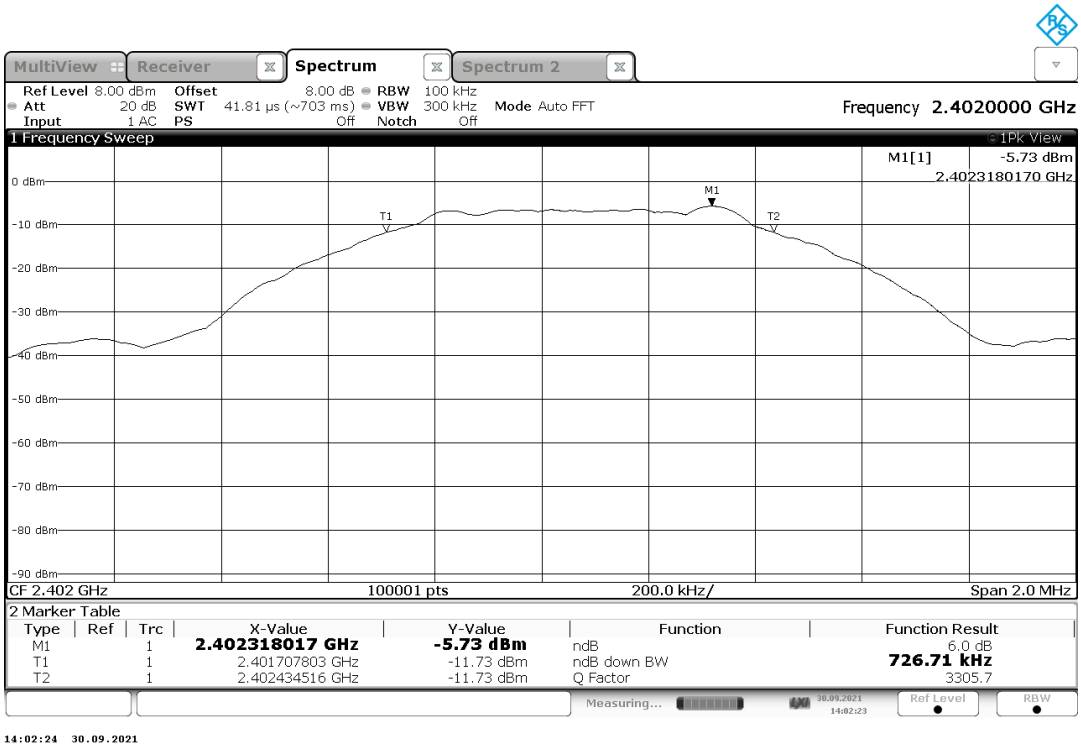
4.3.2 Measurement Results

Performed by: Tyler Leeson

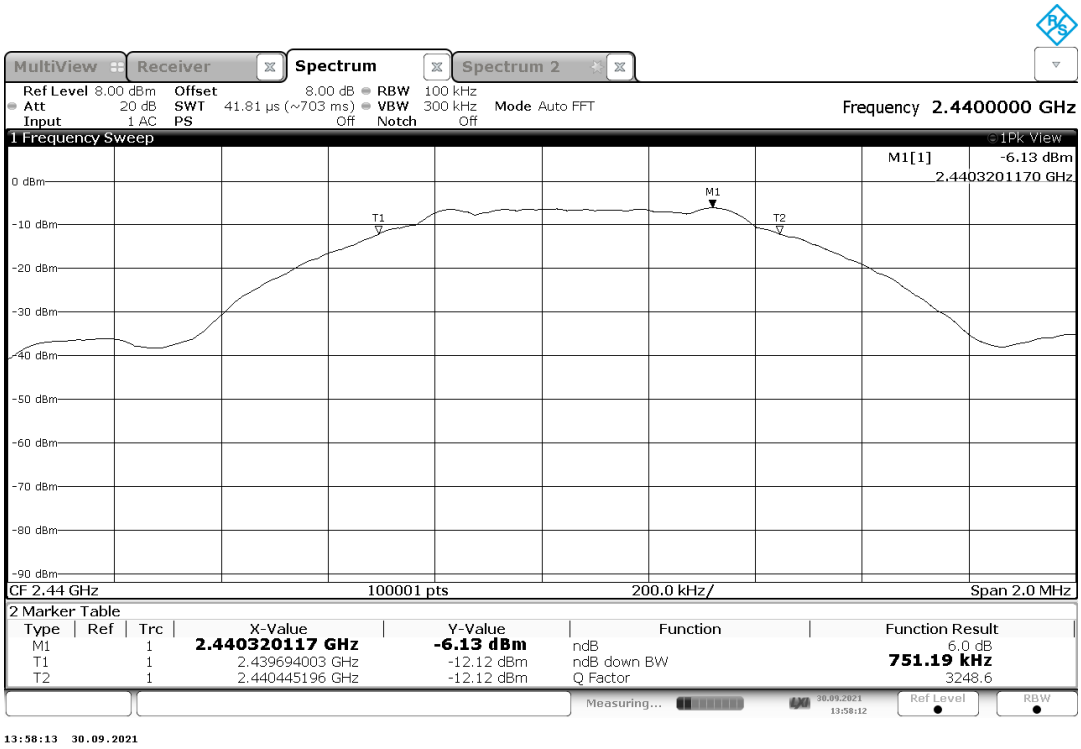
6dB / 99% Bandwidth

Modulation	Frequency (MHz)	6dB Bandwidth (kHz)	99% Bandwidth (MHz)
GFSK / 1Mbps	2402	726.71	1.03
	2440	751.19	1.04
	2480	154.61	1.04

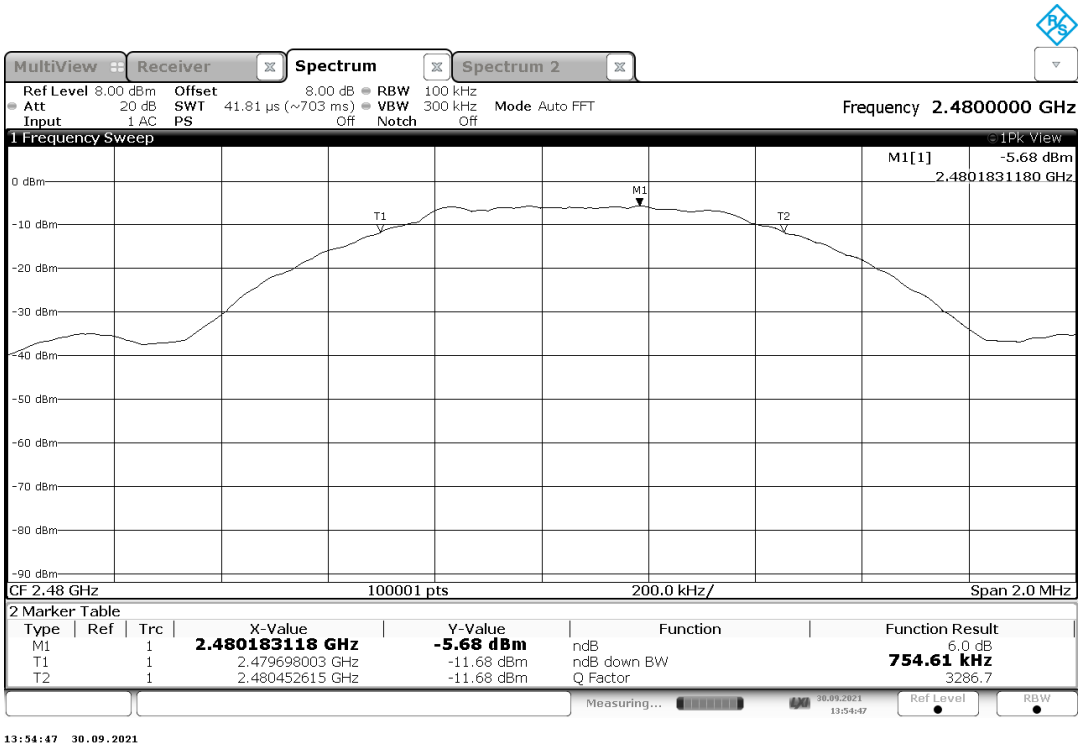
6dB BW - LCH


MultiView
Receiver
Spectrum
Spectrum 2
Ref Level 8.00 dBm Offset 8.00 dB RBW 100 kHz
Att 20 dB SWT 41.81 µs (~703 ms) VBW 300 kHz Mode Auto FFT
Input 1 AC PS Off Notch Off
Frequency 2.4020000 GHz
1 Frequency Sweep
1Pk View
M1[1] -5.73 dBm
2.4023180170 GHz
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
M1
T1
T2
CF 2.402 GHz
100001 pts
200.0 kHz/
Span 2.0 MHz
2 Marker Table
Type Ref Trc X-Value Y-Value Function Function Result
M1 1 2.402318017 GHz -5.73 dBm ndB 6.0 dB
T1 1 2.401707803 GHz -11.73 dBm ndB down BW 726.71 kHz
T2 1 2.402434516 GHz -11.73 dBm Q Factor 3305.7
Measuring...
30.09.2021
14:02:23
Ref Level
RBW
14:02:24 30.09.2021

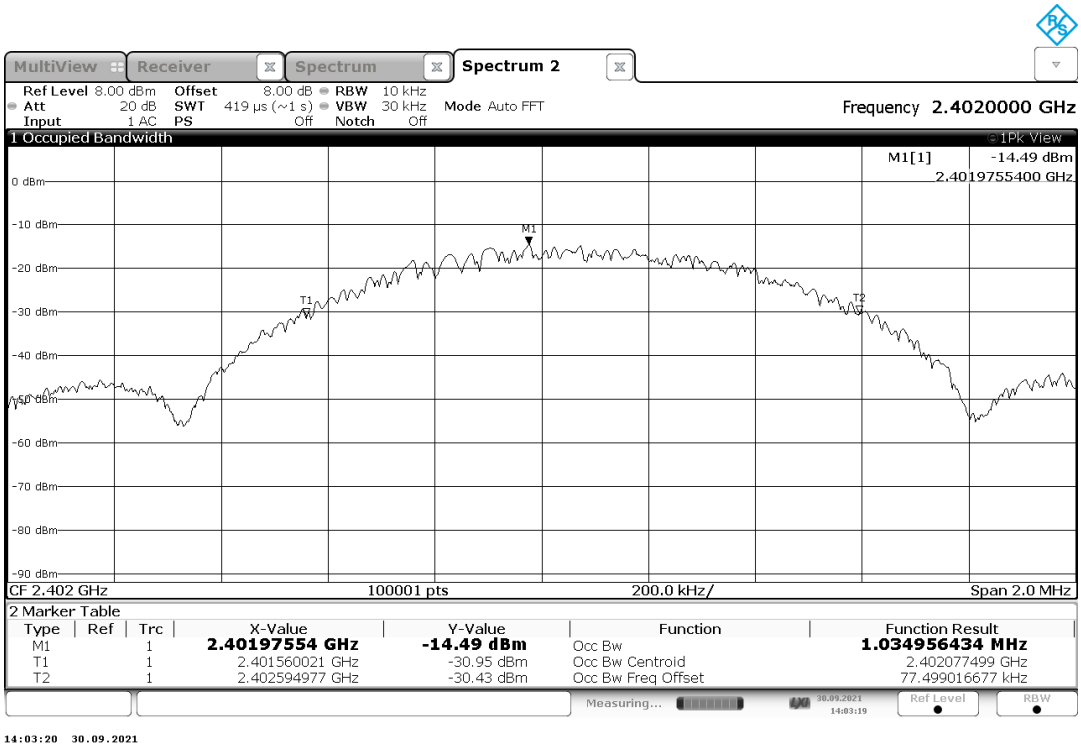
6dB BW - MCH


MultiView
Receiver
Spectrum
Spectrum 2
Ref Level 8.00 dBm Offset 8.00 dB RBW 100 kHz
Att 20 dB SWT 41.81 µs (~703 ms) VBW 300 kHz Mode Auto FFT
Input 1 AC PS Off Notch Off
Frequency 2.4400000 GHz
1 Frequency Sweep
1Pk View
M1[1] -6.13 dBm
2.4403201170 GHz
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
T1
M1
T2
CF 2.44 GHz
100001 pts
200.0 kHz/
Span 2.0 MHz
2 Marker Table
Type Ref Trc X-Value Y-Value Function Function Result
M1 1 2.440320117 GHz -6.13 dBm ndB 6.0 dB
T1 1 2.439694003 GHz -12.12 dBm ndB down BW 751.19 kHz
T2 1 2.440445196 GHz -12.12 dBm Q Factor 3248.6
Measuring...
Ref Level
RBW
13:58:13 30.09.2021

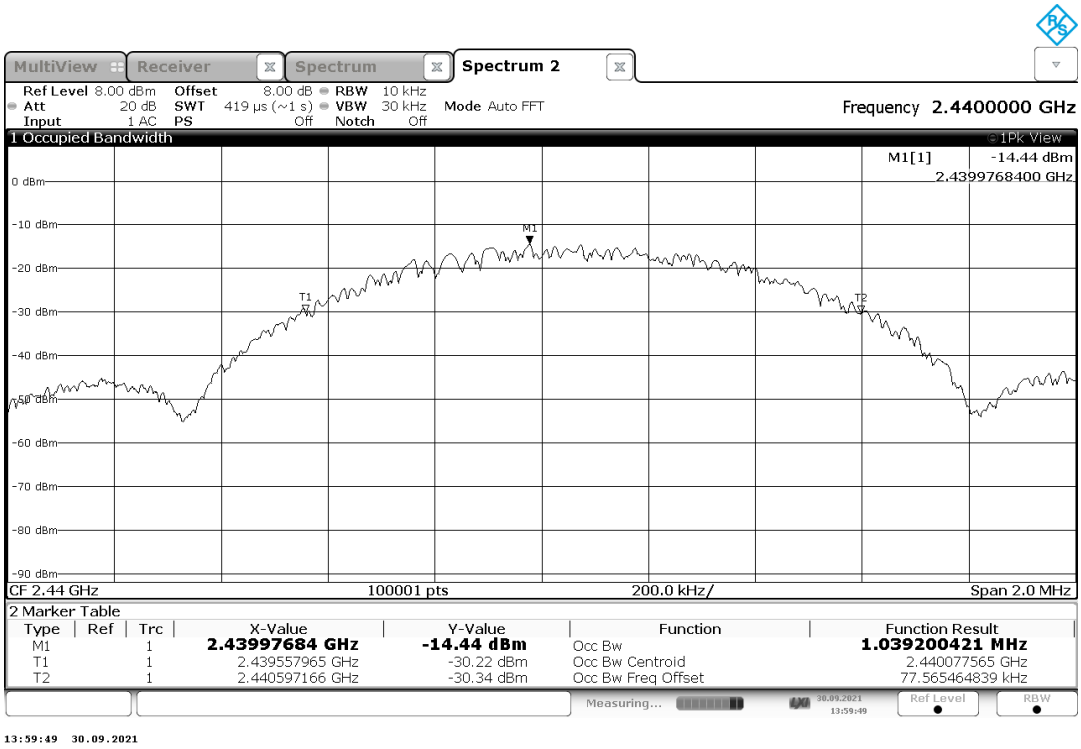
6dB BW - HCH


MultiView
Receiver
Spectrum
Spectrum 2
Ref Level 8.00 dBm Offset 8.00 dB RBW 100 kHz
Att 20 dB SWT 41.81 µs (~703 ms) VBW 300 kHz Mode Auto FFT
Input 1 AC PS Off Notch Off
Frequency 2.4800000 GHz
1 Frequency Sweep
1Pk View
M1[1] -5.68 dBm
2.4801831180 GHz
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
M1
T1
T2
CF 2.48 GHz
100001 pts
200.0 kHz/
Span 2.0 MHz
2 Marker Table
Type Ref Trc X-Value Y-Value Function Function Result
M1 1 2.480183118 GHz -5.68 dBm ndB 6.0 dB
T1 1 2.479698003 GHz -11.68 dBm ndB down BW 754.61 kHz
T2 1 2.480452615 GHz -11.68 dBm Q Factor 3286.7
Measuring...
30.09.2021
13:54:47
Ref Level
RBW
13:54:47 30.09.2021

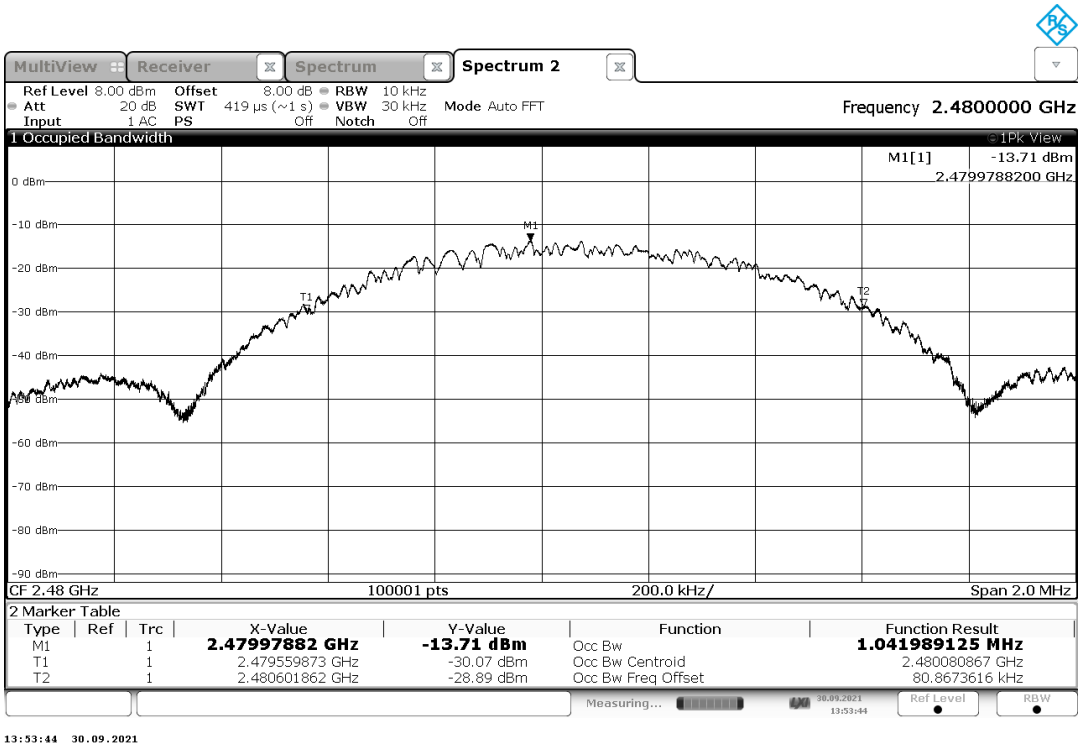
99% OBW - LCH


MultiView
Receiver
Spectrum
Spectrum 2
Ref Level 8.00 dBm Offset 8.00 dB RBW 10 kHz
Att 20 dB SWT 419 µs (~1 s) VBW 30 kHz Mode Auto FFT
Input 1 AC PS Off Notch Off
Frequency 2.4020000 GHz
1 Occupied Bandwidth
1Pk View
M1[1] -14.49 dBm
2.4019755400 GHz
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
M1
T1
T2
CF 2.402 GHz
100001 pts
200.0 kHz/
Span 2.0 MHz
2 Marker Table
Type Ref Trc X-Value Y-Value Function Function Result
M1 1 2.40197554 GHz -14.49 dBm Occ Bw 1.034956434 MHz
T1 1 2.401560021 GHz -30.95 dBm Occ Bw Centroid 2.402077499 GHz
T2 1 2.402594977 GHz -30.43 dBm Occ Bw Freq Offset 77.499016677 kHz
Measuring...
30.09.2021
14:03:19
Ref Level
RBW
14:03:20 30.09.2021

99% OBW - MCH


MultiView
Receiver
Spectrum
Spectrum 2
Ref Level 8.00 dBm Offset 8.00 dB RBW 10 kHz
Att 20 dB SWT 419 µs (~1 s) VBW 30 kHz Mode Auto FFT
Input 1 AC PS Off Notch Off
Frequency 2.4400000 GHz
1 Occupied Bandwidth
1Pk View
M1[1] -14.44 dBm
2.4399768400 GHz
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
M1
T1
T2
CF 2.44 GHz
100001 pts
200.0 kHz/
Span 2.0 MHz
2 Marker Table
Type Ref Trc X-Value Y-Value Function Function Result
M1 1 2.43997684 GHz -14.44 dBm Occ Bw 1.039200421 MHz
T1 1 2.439557965 GHz -30.22 dBm Occ Bw Centroid 2.440077565 GHz
T2 1 2.440597166 GHz -30.34 dBm Occ Bw Freq Offset 77.565464839 kHz
Measuring...
30.09.2021
13:59:49
Ref Level
RBW
13:59:49 30.09.2021

99% OBW - HCH


MultiView
Receiver
Spectrum
Spectrum 2
Ref Level 8.00 dBm Offset 8.00 dB RBW 10 kHz
Att 20 dB SWT 419 µs (~1 s) VBW 30 kHz Mode Auto FFT
Input 1 AC PS Off Notch Off
Frequency 2.4800000 GHz
1 Occupied Bandwidth
1Pk View
M1[1] -13.71 dBm
2.4799788200 GHz
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
M1
T1
T2
CF 2.48 GHz
100001 pts
200.0 kHz/
Span 2.0 MHz
2 Marker Table
Type Ref Trc X-Value Y-Value Function Function Result
M1 1 2.47997882 GHz -13.71 dBm Occ Bw 1.041989125 MHz
T1 1 2.479559873 GHz -30.07 dBm Occ Bw Centroid 2.480080867 GHz
T2 1 2.480601862 GHz -28.89 dBm Occ Bw Freq Offset 80.8673616 kHz
Measuring...
30.09.2021
13:53:44
Ref Level
RBW
13:53:44 30.09.2021

4.4 Fundamental Emission Output Power - FCC: 15.247(b)(3), ISED Canada: RSS-247 5.4(d)

4.4.1 Measurement Procedure

The maximum conducted output power was measured in accordance with FCC KDB 558074 D01 utilizing the RBW ≥ DTS Bandwidth method. The RF output of the equipment under test was directly connected to the input of the analyzer applying suitable attenuation. Worst-case power across all data rates is reported.

4.4.2 Measurement Results

Performed by: Tyler Leeson

Conducted Output Power

Modulation	Frequency (MHz)	Peak Power (dBm)
1 Mbps	2402	-4.61
	2440	-4.36
	2480	-3.76
2 Mbps	2402	-4.62
	2440	-4.52
	2480	-3.83

4.5 Power Spectral Density – FCC: 15.247(e), ISED Canada: RSS-247 5.2(b)

4.5.1 Measurement Procedure

The Power Spectral Density was measured in accordance with the FCC KDB 558074 D01 Section 8.4 which references Subclause 11.10 of ANSI C63.10. The Resolution Bandwidth (RBW) of the spectrum analyzer was set to 100 kHz. The Video Bandwidth (VBW) was set to ≥ 3 times the RBW. The trace was set to max hold with a peak detector active. A peak search was used to find the maximum Power Spectral Density.

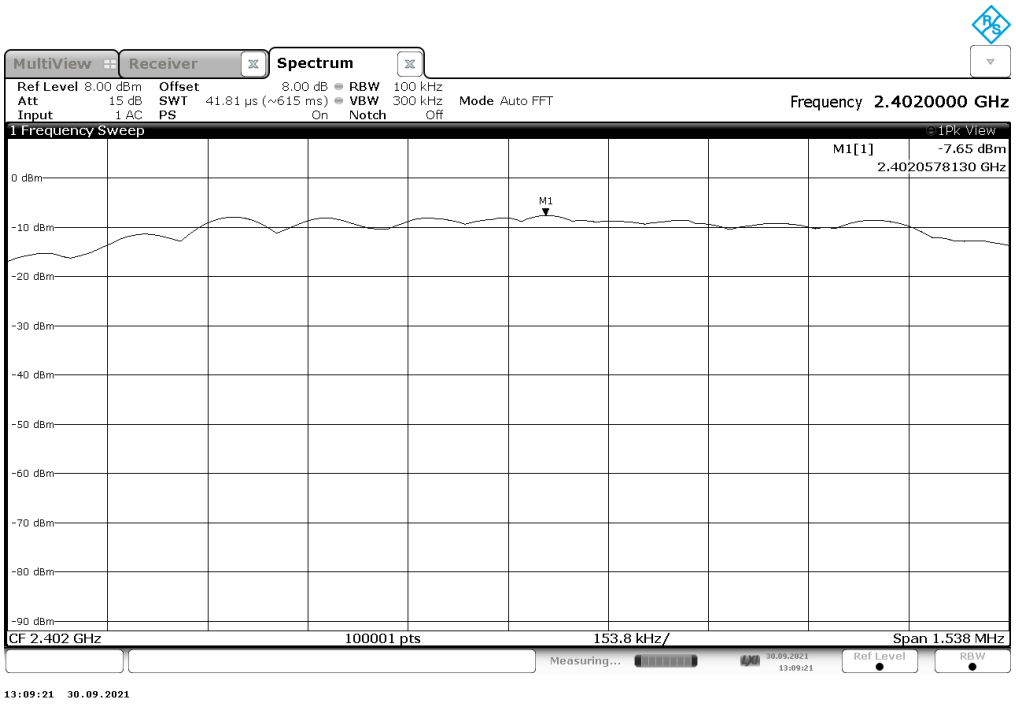
4.5.2 Measurement Results

Performed by: Tyler Leeson

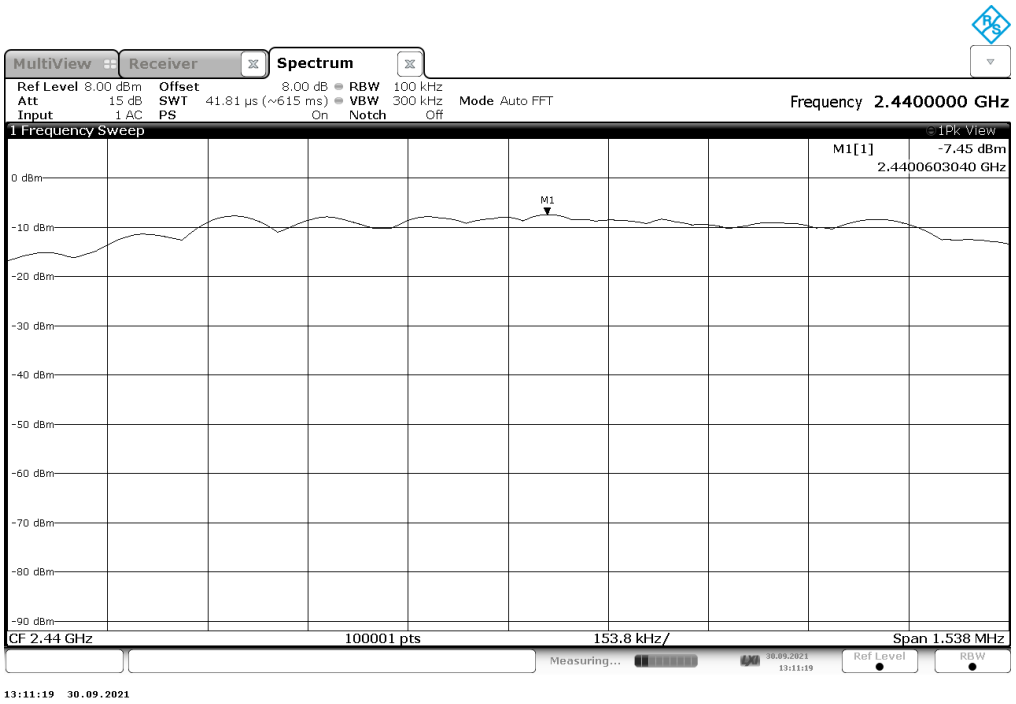
Number of Channels / Dwell Time

Modulation	Frequency (MHz)	PSD (dBm)
1 Mbps	2402	-7.65
	2440	-7.45
	2480	-6.8

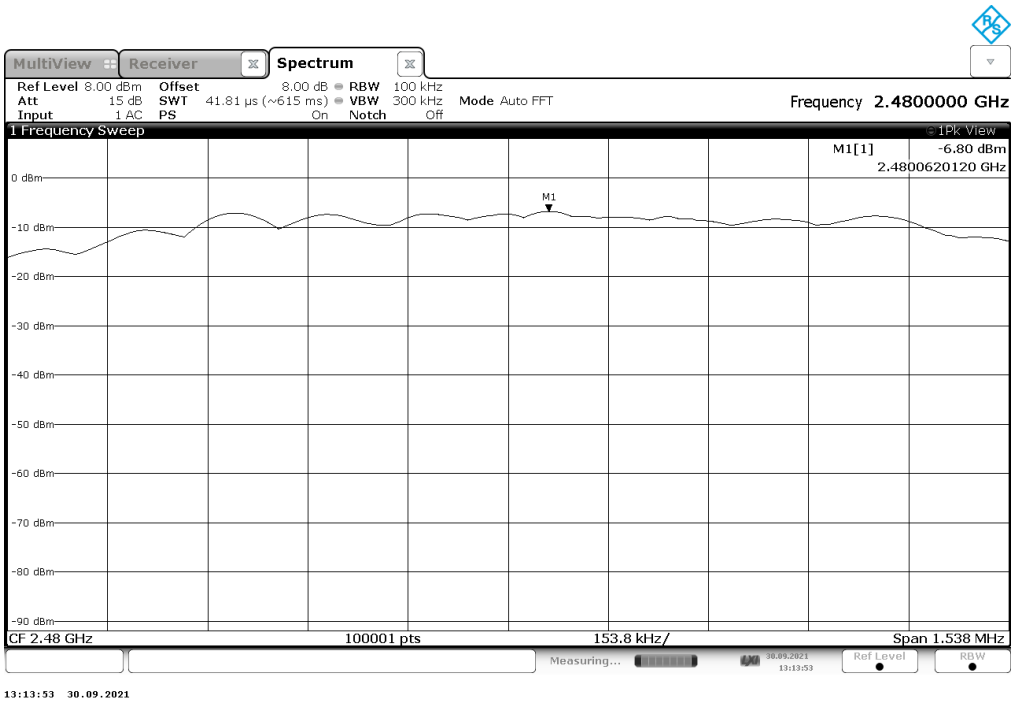
PSD - LCH


MultiView
Receiver
Spectrum
Ref Level 8.00 dBm
Offset 8.00 dB
RBW 100 kHz
Att 15 dB
SWT 41.81 µs (~615 ms)
VBW 300 kHz
Mode Auto FFT
Input 1 AC
PS On
Notch Off
Frequency 2.4020000 GHz
1 Frequency Sweep
1Pk View
M1[1] -7.65 dBm
2.4020578130 GHz
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
M1
CF 2.402 GHz
100001 pts
153.8 kHz/
Span 1.538 MHz
Measuring...
30.09.2021
13:09:21
Ref Level
RBW
13:09:21 30.09.2021

PSD - MCH


MultiView
Receiver
Spectrum
Ref Level 8.00 dBm
Offset 8.00 dB
RBW 100 kHz
Att 15 dB
SWT 41.81 µs (~615 ms)
VBW 300 kHz
Mode Auto FFT
Input 1 AC
PS On
Notch Off
Frequency 2.4400000 GHz
1 Frequency Sweep
1Pk View
M1[1] -7.45 dBm
2.4400603040 GHz
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
M1
CF 2.44 GHz
100001 pts
153.8 kHz/
Span 1.538 MHz
Measuring...
Ref Level
RBW
13:11:19 30.09.2021

PSD - HCH


MultiView
Receiver
Spectrum
Ref Level 8.00 dBm
Offset 8.00 dB
RBW 100 kHz
Att 15 dB
SWT 41.81 µs (~615 ms)
VBW 300 kHz
Mode Auto FFT
Input 1 AC
PS On
Notch Off
Frequency 2.4800000 GHz
1 Frequency Sweep
1Pk View
M1[1] -6.80 dBm
2.4800620120 GHz
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm
M1
CF 2.48 GHz
100001 pts
153.8 kHz/
Span 1.538 MHz
Measuring...
30.09.2021
13:13:53
Ref Level
RBW
13:13:53 30.09.2021

4.6 Emission Levels

4.6.1 Emissions into Non-restricted Frequency Bands - FCC: 15.247(d); ISED Canada: RSS-247 5.5

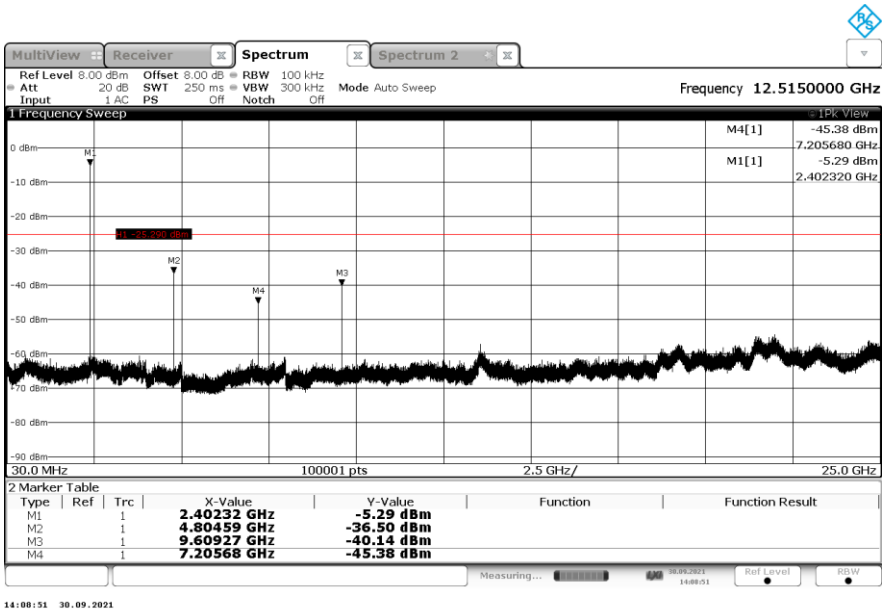
4.6.1.1 Measurement Procedure

The unwanted emissions into non-restricted bands were measured conducted in accordance with FCC KDB 558074 D01 Section 8.5. The RF output of the equipment under test was directly connected to the input of the spectrum analyzer applying suitable attenuation. The Resolution Bandwidth (RBW) of the spectrum analyzer was set to 1 MHz. The Video Bandwidth (VBW) was set to ≥ 3 MHz. The resulting spectrum analyzer peak level was used to determine the reference level with respect to the 20 dBc limit at the band edges. The spectrum span was then adjusted for the measurement of spurious emissions from 30MHz to 10GHz, 10 times the highest fundamental frequency. The worst-case for each data rate was investigated at the lower and upper band edges.

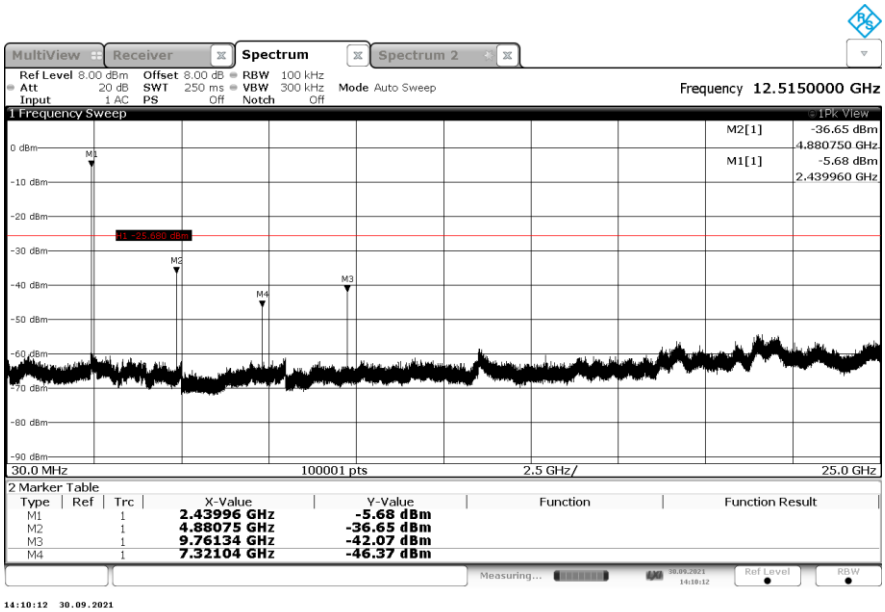
4.6.1.2 Measurement Results

Performed by: Tyler Leeson

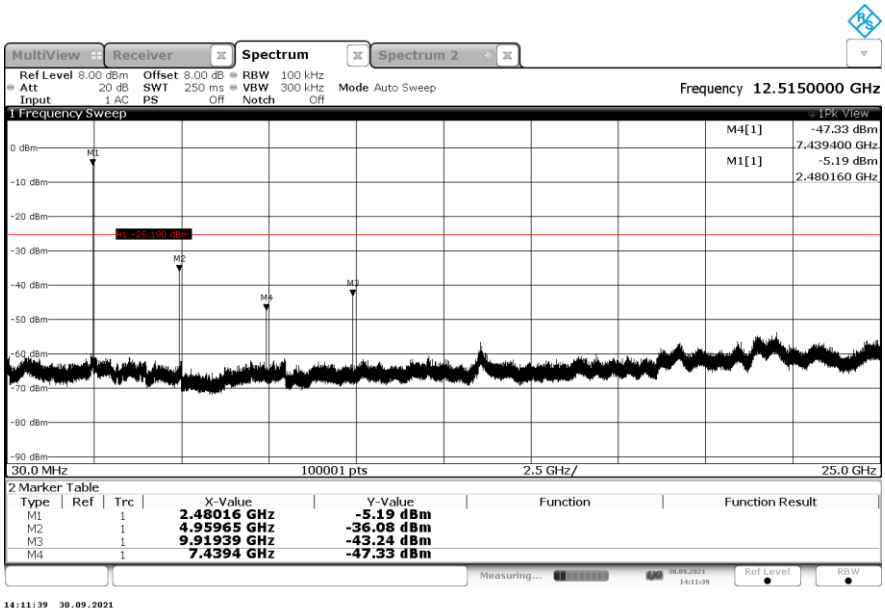
LCH - 30MHz-25GHz (1Mbps)



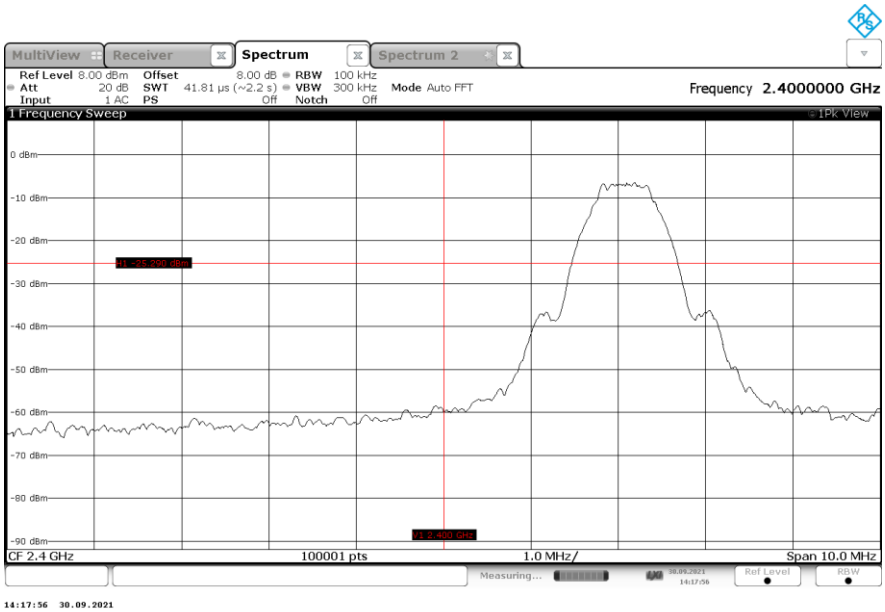
MCH - 30MHz-25GHz (1Mbps)



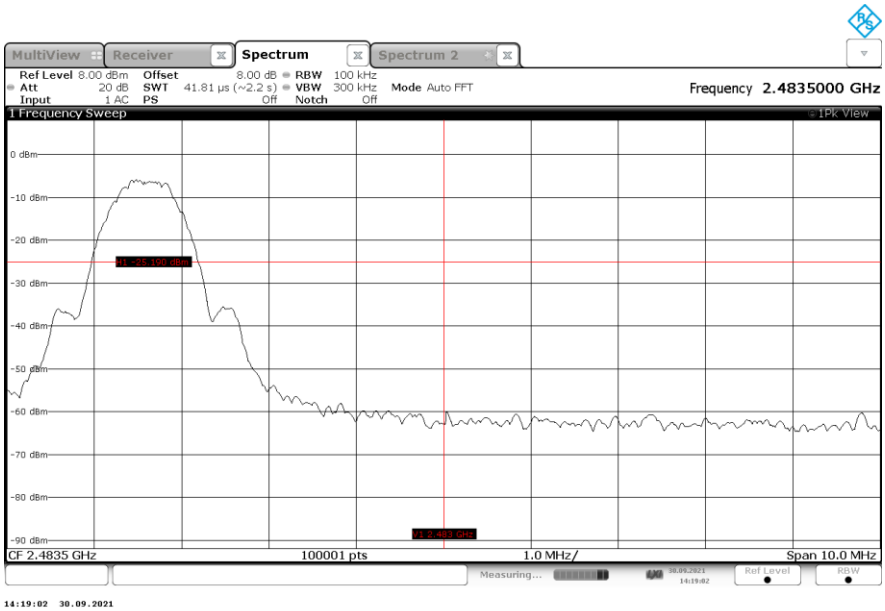
HCH - 30MHz-25GHz (1Mbps)



Lower Band-edge (1Mbps)



Upper Band-edge (1Mbps)



4.6.2 Emissions into Restricted Frequency Bands - FCC: 15.205, 15.209; ISED Canada: RSS-Gen 8.9 / 8.10

4.6.2.1 Measurement Procedure

The unwanted emissions into restricted bands were measured radiated over the frequency range of 9kHz to 25GHz, 10 times the highest fundamental frequency.

The EUT was rotated through 360° and the receive antenna height was varied from 1 meter to 4 meters so that the maximum radiated emissions level would be detected. For frequencies below 1000 MHz, quasi-peak measurements were made using a resolution bandwidth RBW of 120 kHz and a video bandwidth VBW of 300 kHz. For frequencies above 1000 MHz, peak and average measurements were made with RBW and VBW of 1 MHz and 3 MHz respectively.

Each emission found to be in a restricted band as defined by section 15.205, including any emission at the operational band-edge, was compared to the radiated emission limits as defined in section 15.209.

For testing, worst case data rate was determined to be 1 Mbps as per RF Conducted Output Power and the EUT in Y Position.

4.6.2.2 Measurement Results

Performed by: Tyler Leeson

Radiated Spurious Emissions Tabulated Data

Frequency (MHz)	Level (dBuV)		Antenna Polarity (H/V)	Correction Factors (dB)	Corrected Level (dBuV/m)		Limit (dBuV/m)		Margin (dB)	
	pk	Qpk/Avg			pk	Qpk/Avg	pk	Qpk/Avg	pk	Qpk/Avg
XPOS										
2390	46.00	31.80	H	-5.80	40.20	26.00	74.0	54.0	33.80	28.00
2390	46.80	32.60	V	-5.80	41.00	26.80	74.0	54.0	33.00	27.20
4804	48.20	41.00	H	1.02	49.22	42.02	74.0	54.0	24.78	11.98
4804	48.90	42.20	V	1.02	49.92	43.22	74.0	54.0	24.08	10.78
YPOS										
2390	45.90	31.70	H	-5.80	40.10	25.90	74.0	54.0	33.90	28.10
2390	46.40	31.70	V	-5.80	40.60	25.90	74.0	54.0	33.40	28.10
4804	47.80	41.10	H	1.02	48.82	42.12	74.0	54.0	25.18	11.88
4804	48.70	42.20	V	1.02	49.72	43.22	74.0	54.0	24.28	10.78
ZPOS										
2390	46.10	31.90	H	-5.80	40.30	26.10	74.0	54.0	33.70	27.90
2390	45.60	31.50	V	-5.80	39.80	25.70	74.0	54.0	34.20	28.30
2483.5	51.70	37.70	H	-5.29	46.41	32.41	74.0	54.0	27.59	21.59
2483.5	46.90	33.20	V	-5.29	41.61	27.91	74.0	54.0	32.39	26.09
4804	50.20	44.20	H	1.02	51.22	45.22	74.0	54.0	22.78	8.78
4804	44.70	34.80	V	1.02	45.72	35.82	74.0	54.0	28.28	18.18
4880	53.70	48.70	H	0.98	54.68	49.68	74.0	54.0	19.32	4.32
4880	48.00	41.10	V	0.98	48.98	42.08	74.0	54.0	25.02	11.92
4960	55.30	50.70	H	1.08	56.38	51.78	74.0	54.0	17.62	2.22
4960	48.70	41.60	V	1.08	49.78	42.68	74.0	54.0	24.22	11.32
7320	47.50	37.60	H	6.80	54.3	44.4	74.0	54.0	19.70	9.60
7320	44.30	32.70	V	6.80	51.10	39.50	74.0	54.0	22.90	14.50
7440	48.00	39.00	H	6.68	54.68	45.63	74.0	54.0	19.32	8.32
7440	45.10	34.70	V	6.68	51.78	41.38	74.0	54.0	22.22	12.62

4.6.2.3 Sample Calculation:

$R_C = R_U + CF_T$

Where:

CF_T	=	Total Correction Factor (AF+CA+AG)-DC (Average Measurements Only)
R_U	=	Uncorrected Reading
R_C	=	Corrected Level
AF	=	Antenna Factor
CA	=	Cable Attenuation
AG	=	Amplifier Gain
DC	=	Duty Cycle Correction Factor

Example Calculation: Peak – 4960 MHz – ZPOS – Horizontal

Corrected Level: 55.3 + 1.08 = 56.38dBuV/m
Margin: 74dBuV/m – 56.38dBuV/m = 17.62dB

Example Calculation: Average – 4960 MHz – ZPOS – Horizontal

Corrected Level: 50.7 + 1.08 - 0 = 51.78dBuV Margin:
54dBuV – 51.78dBuV = 2.22dB

Section 5 – Estimation of Measurement Uncertainty

The expanded laboratory measurement uncertainty figures (ULab) provided below correspond to an expansion factor (coverage factor) k = 1.96 which provide confidence levels of 95%.

Estimation of Measurement Uncertainty

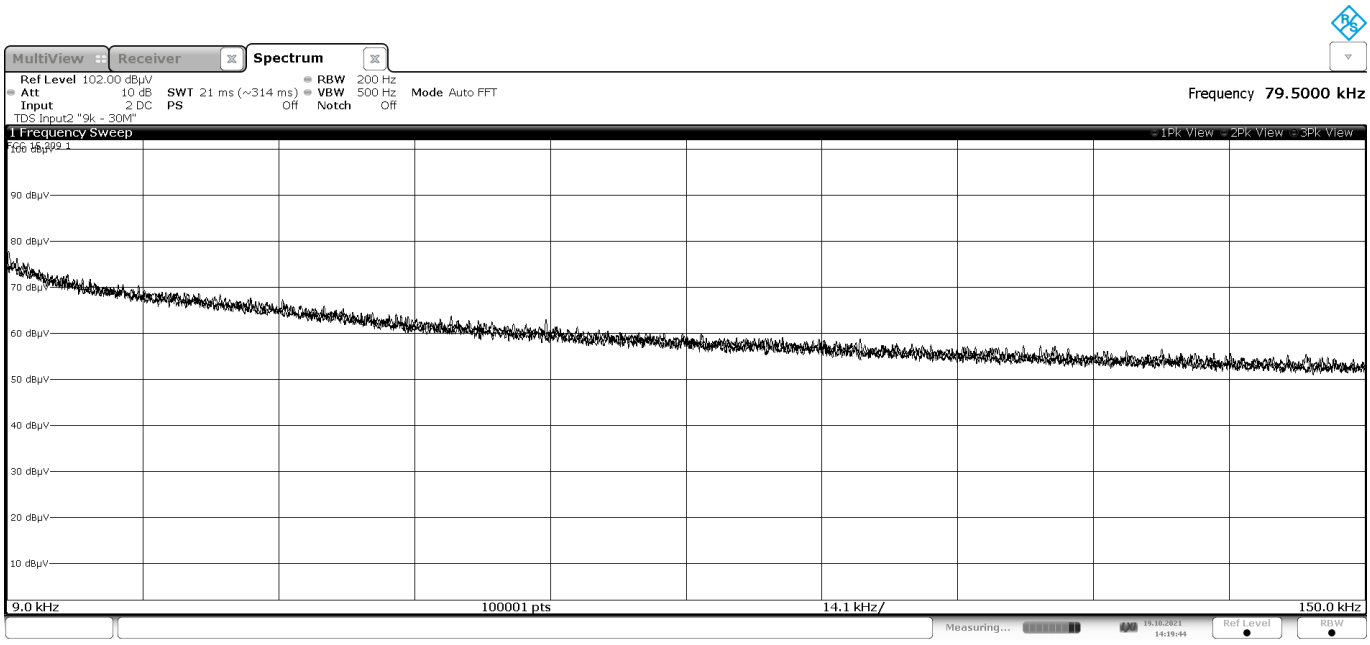
Parameter	Ulab
Occupied Channel Bandwidth	±0.009%
RF Conducted Output Power	±0.689 dB
Power Spectral Density	±0.367 dB
Antenna Port Conducted Emissions	±2.717 dB
Radiated Emissions ≤ 1 GHz	±5.877 dB
Radiated Emissions > 1 GHz	±5.877 dB
Temperature	±0.860 ºC
Radio Frequency	$\pm 2.832 \times 10^{-8}$
AC Power Line Conducted Emissions	±1.90 dB

Section 6 – Conclusion

In the opinion of Keystone Compliance, LLC the EBT Pulse Generator, manufactured by EBT Medical US Inc, meets the requirements of FCC Part 15 subpart C and ISED Canada's Radio Standards Specification RSS-247 for the tests documented herein.

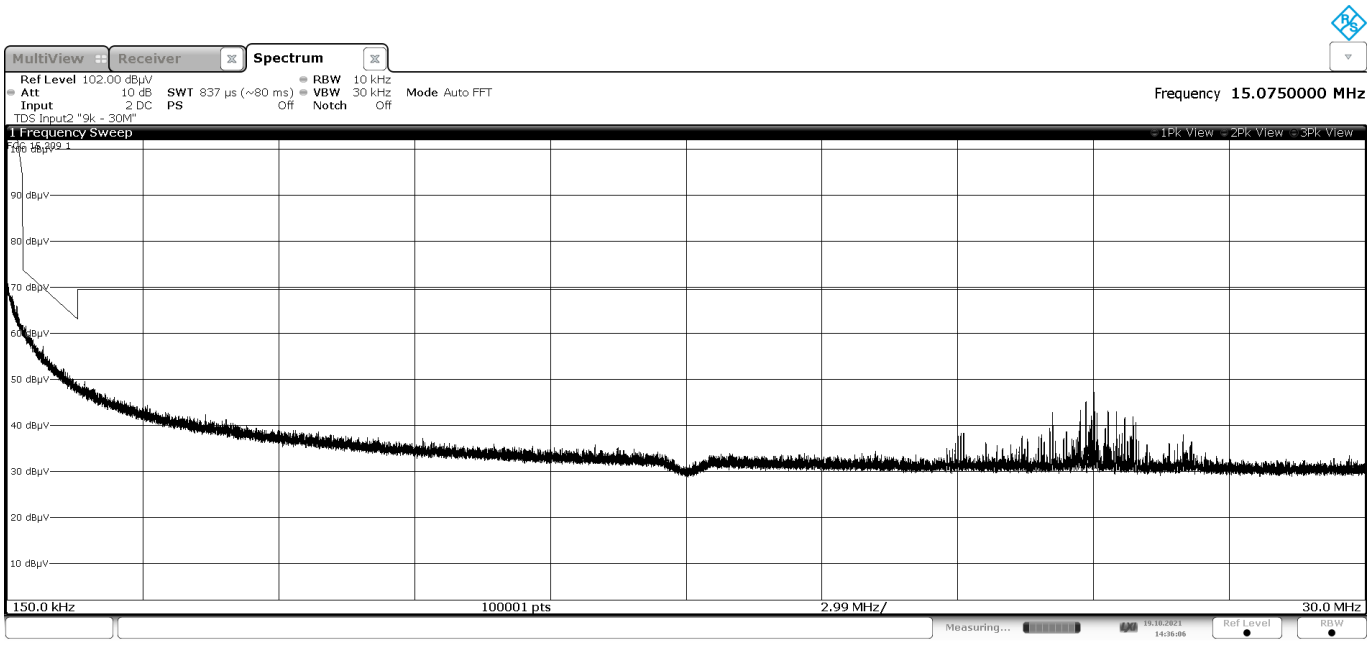
Appendix A: Plots

9kHz-150kHz – LCH – ZPOS



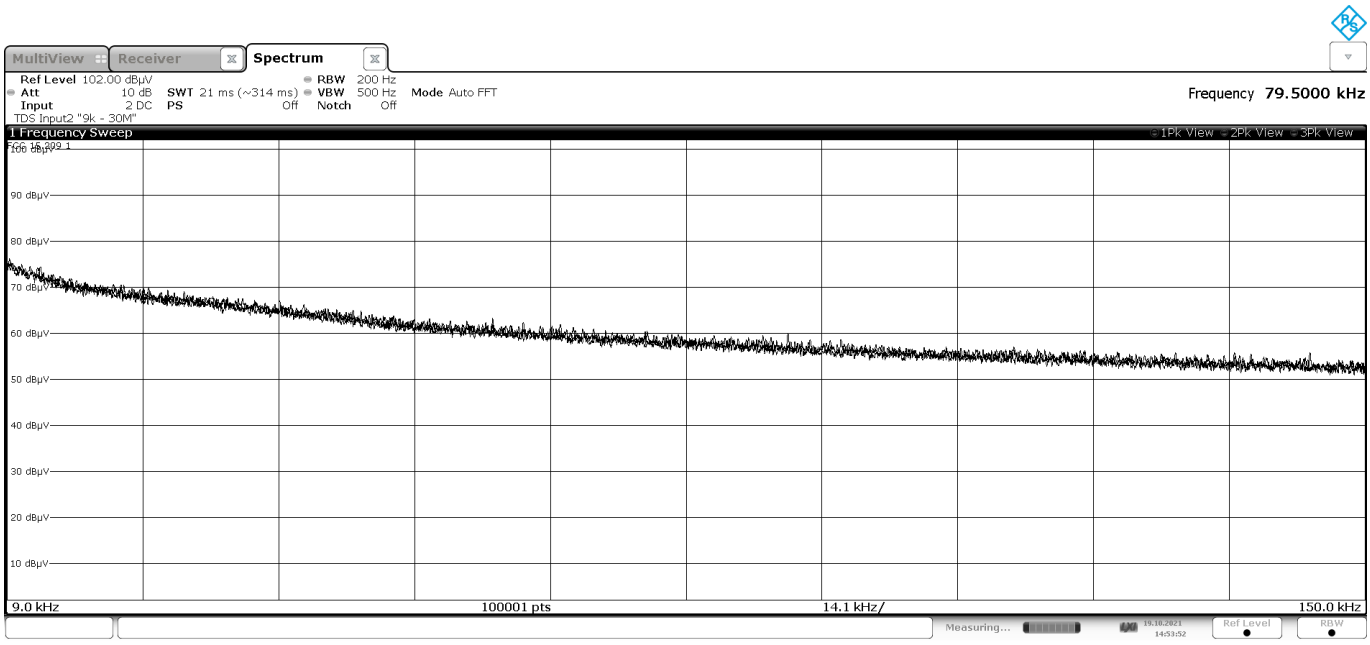
14:19:45 19.10.2021

150kHz-30MHz - LCH – ZPOS



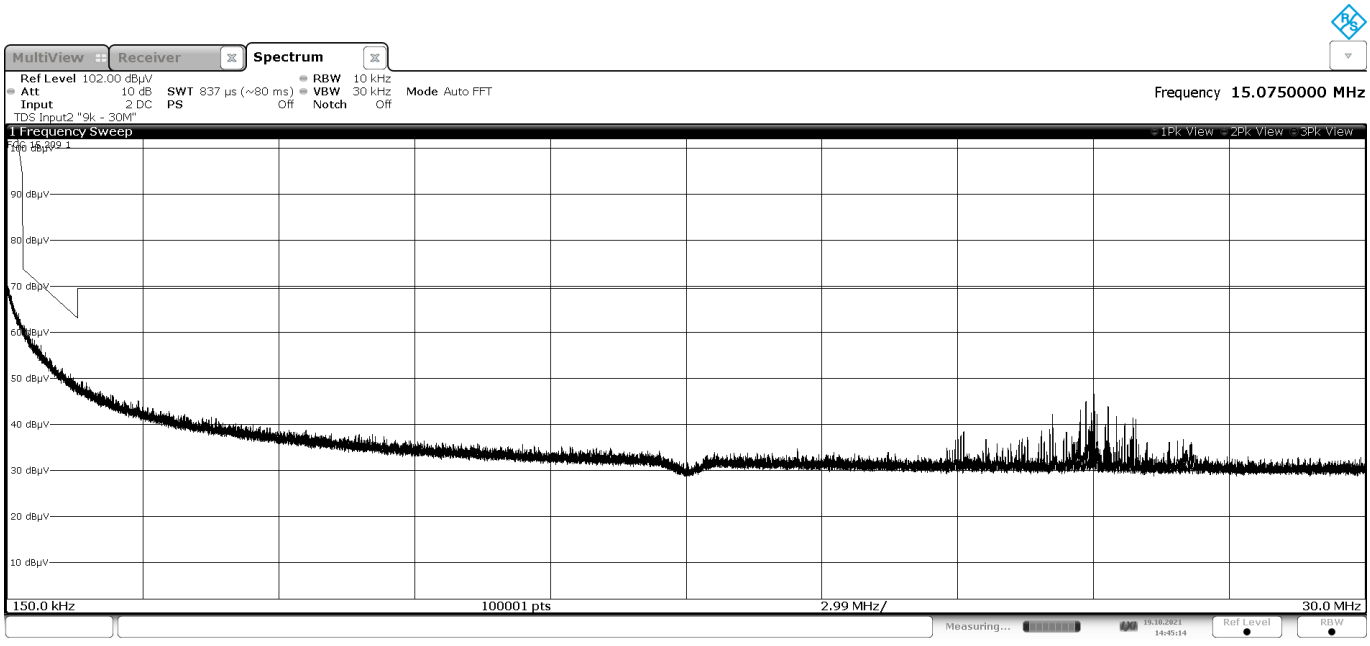
14:36:07 19.10.2021

9kHz-150kHz - MCH – ZPOS



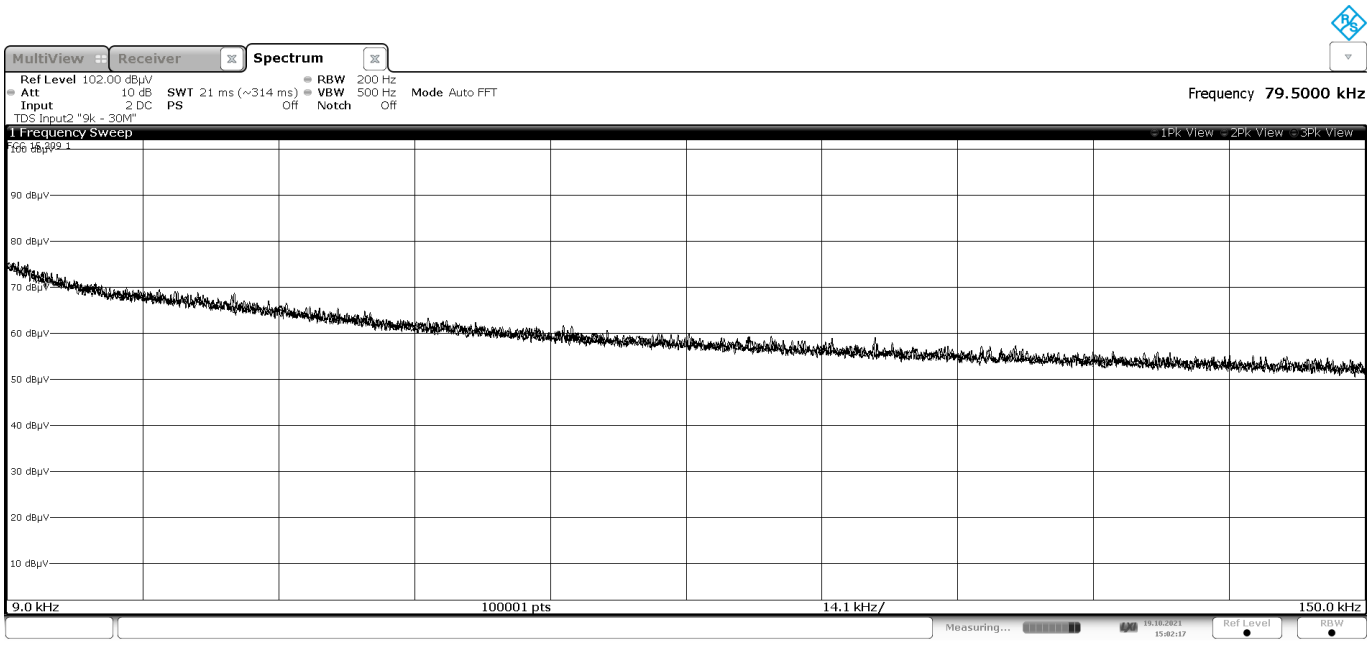
14:53:53 19.10.2021

150kHz-30MHz - MCH – ZPOS



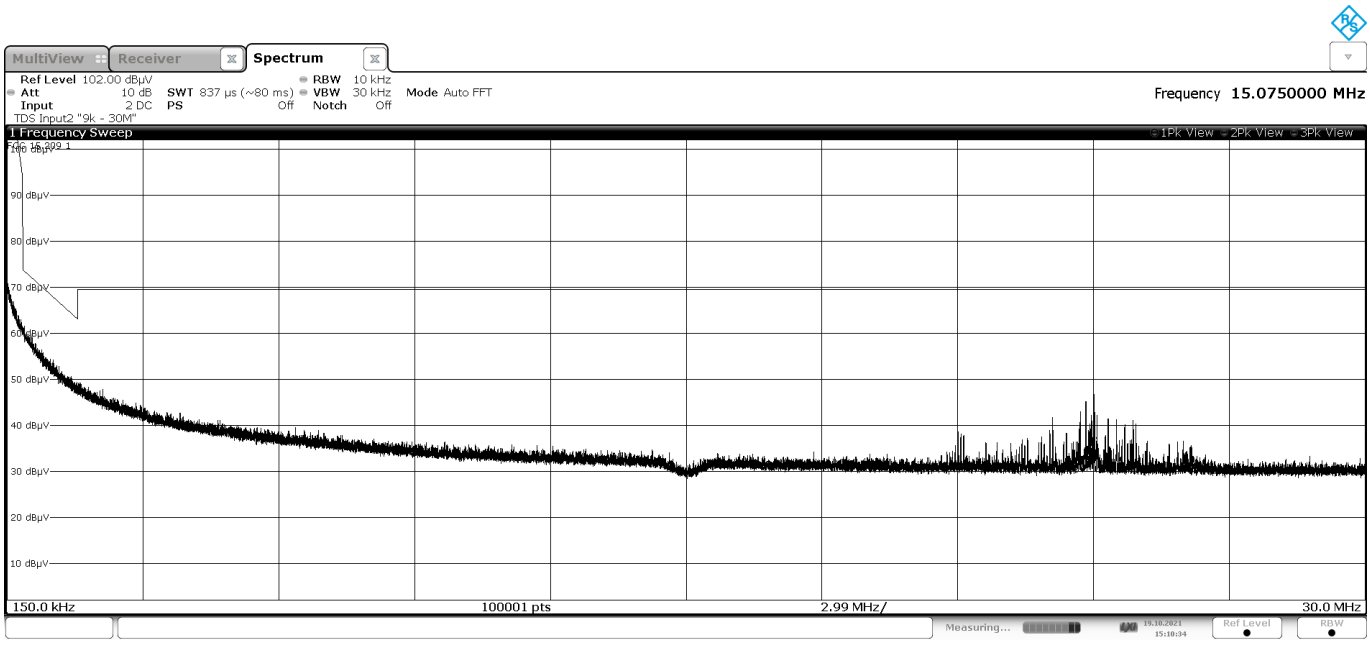
14:45:14 19.10.2021

9kHz-150kHz - HCH – ZPOS



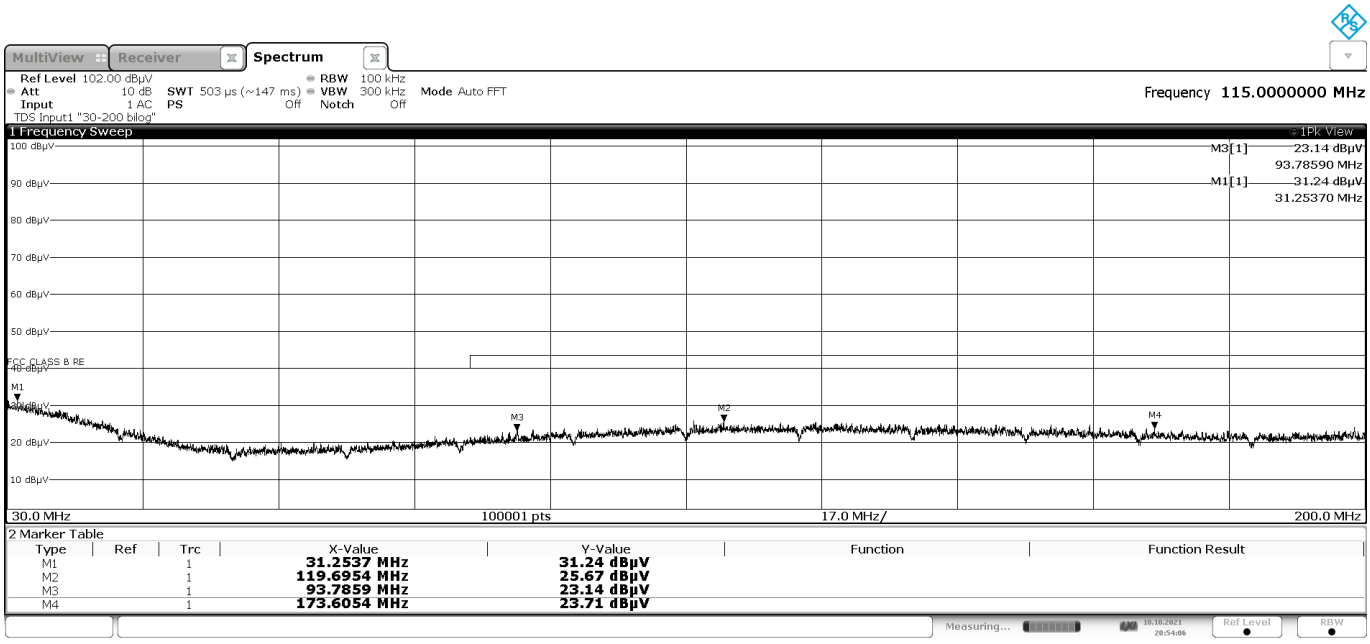
15:02:17 19.10.2021

150kHz-30MHz - HCH – ZPOS

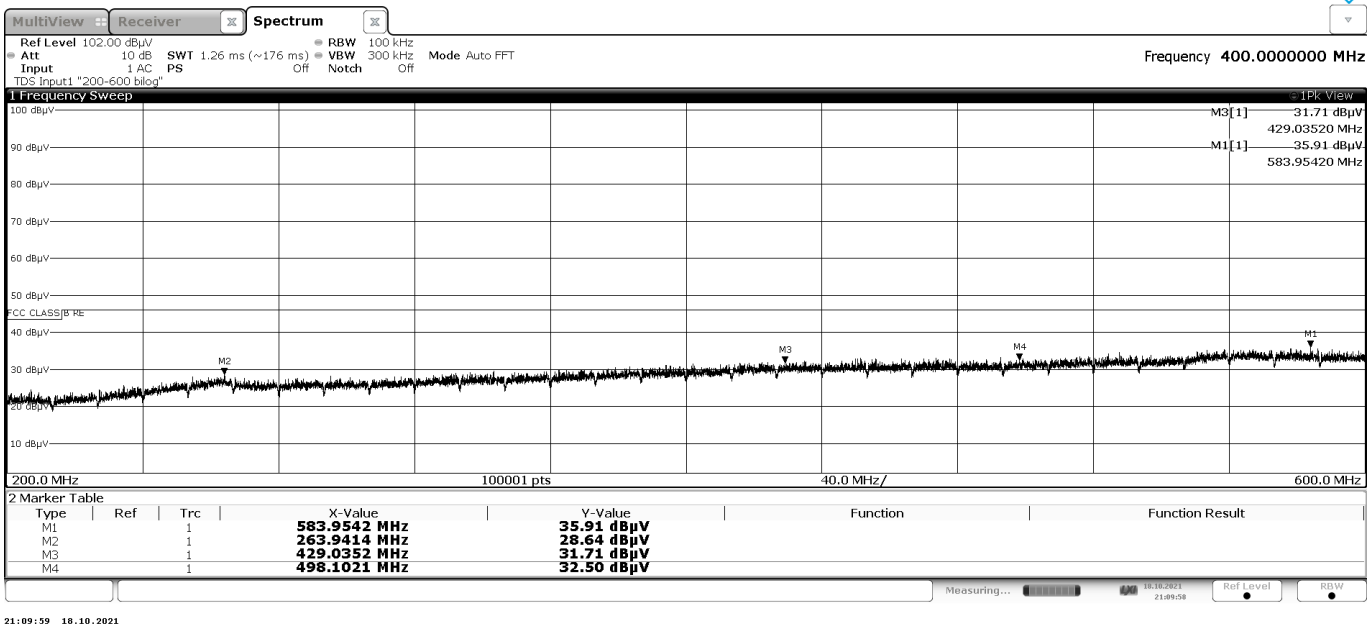


15:10:34 19.10.2021

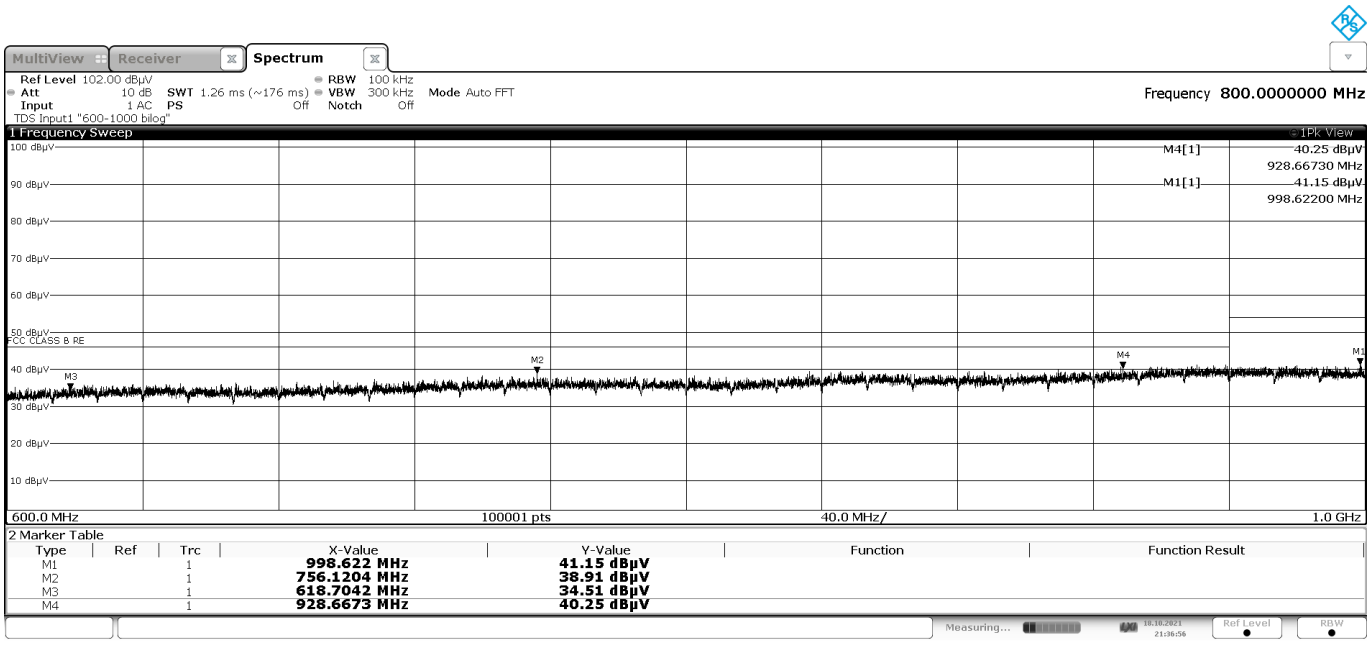
30MHz-200MH – LCH – ZPOS



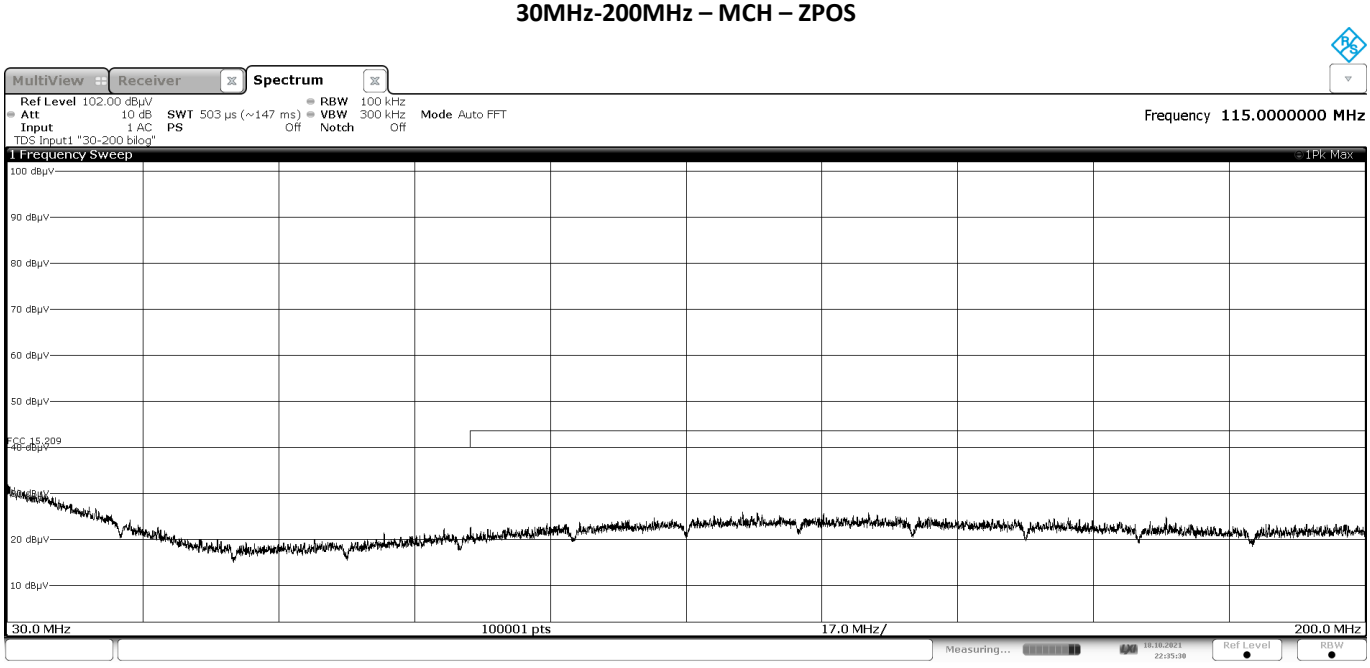
200MHz-600MHz – LCH – ZPOS



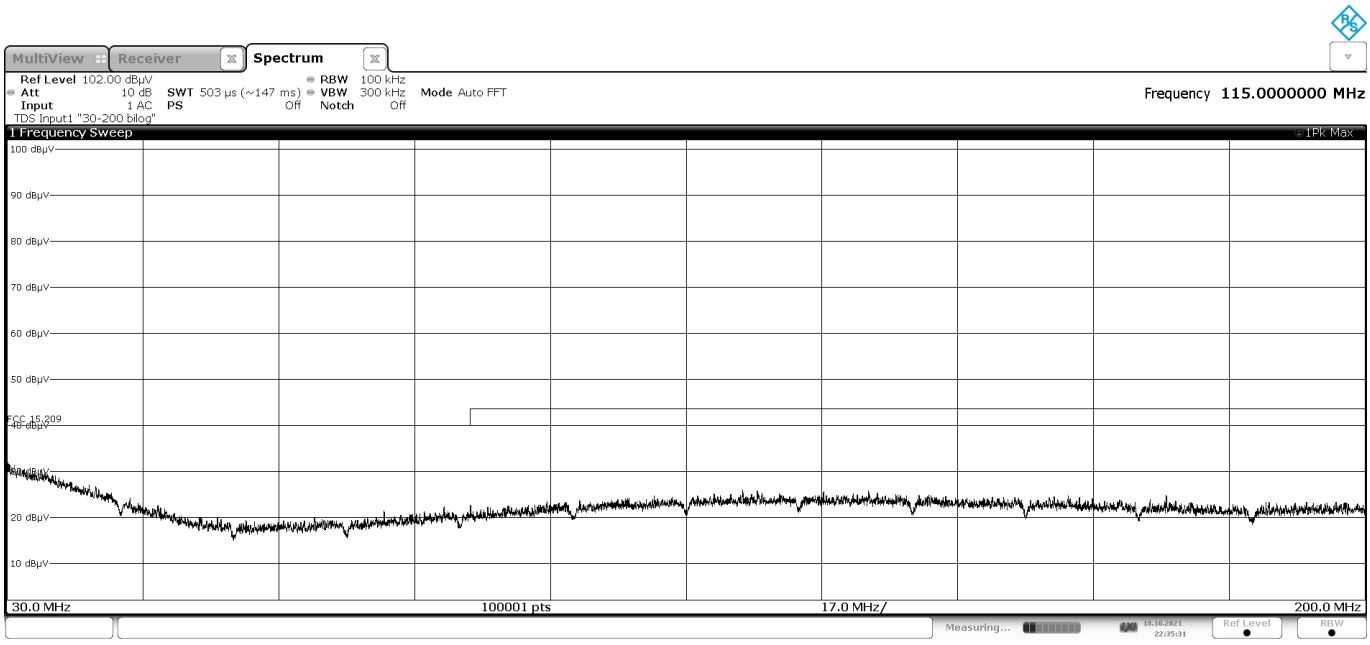
600MHz-1GHz – LCH – ZPOS



30MHz-200MHz – MCH – ZPOS

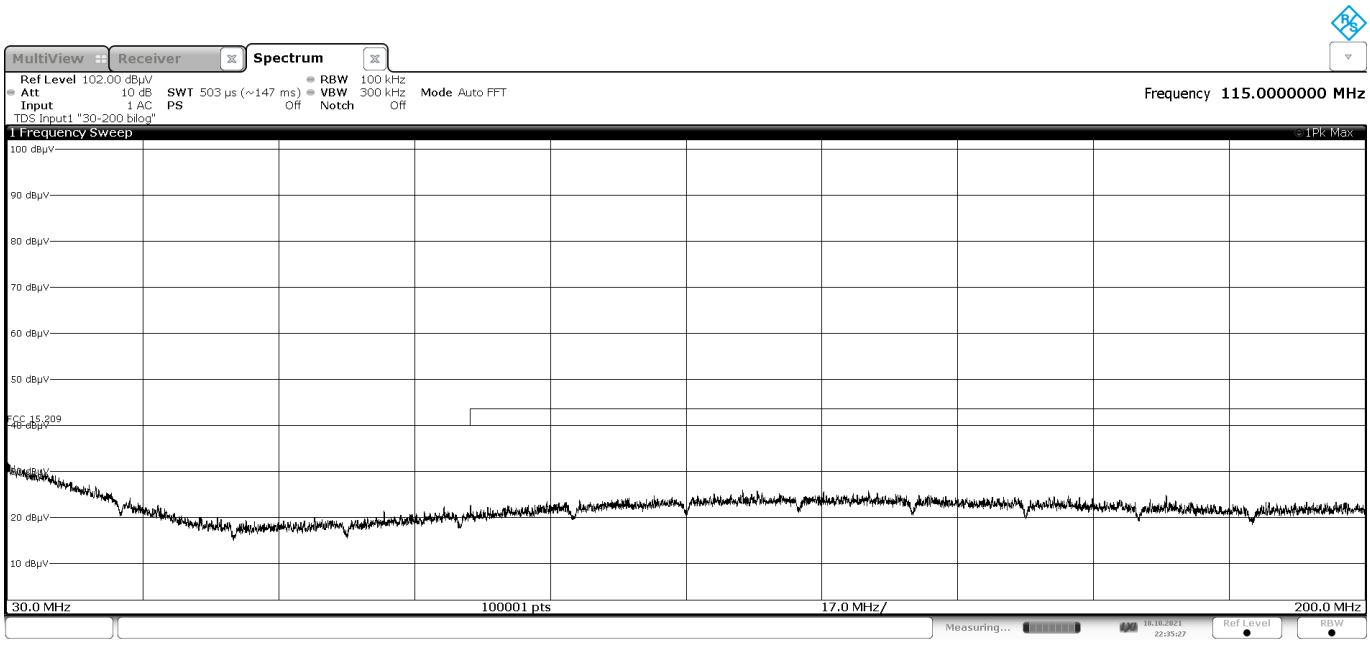


200MHz-600MHz – MCH – ZPOS



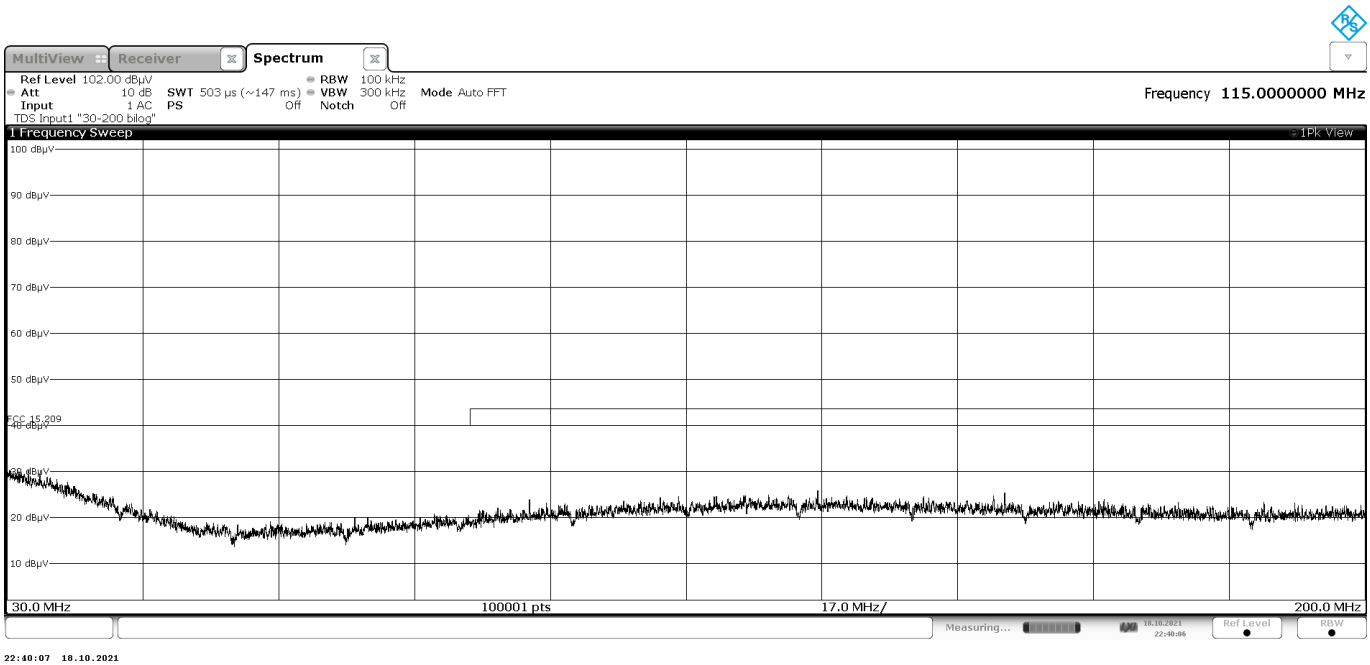
22:35:32 18.10.2021

600MHz-1GHz – MCH – ZPOS

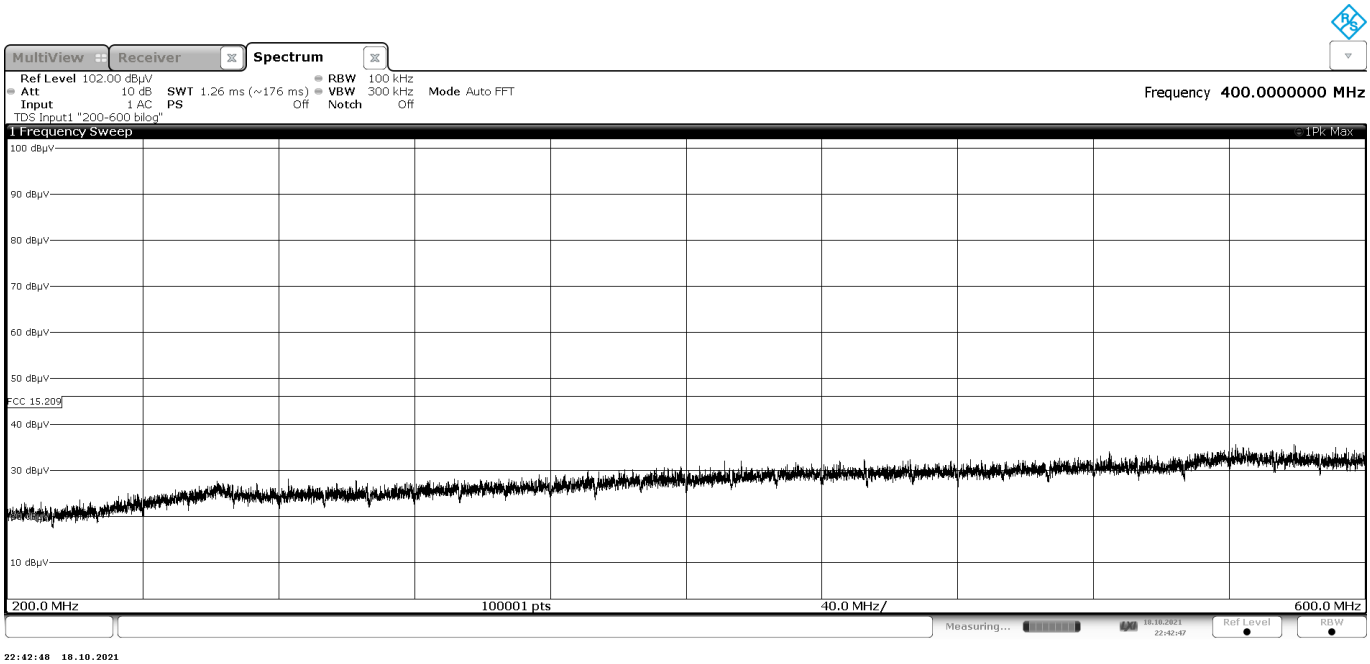


22:35:28 18.10.2021

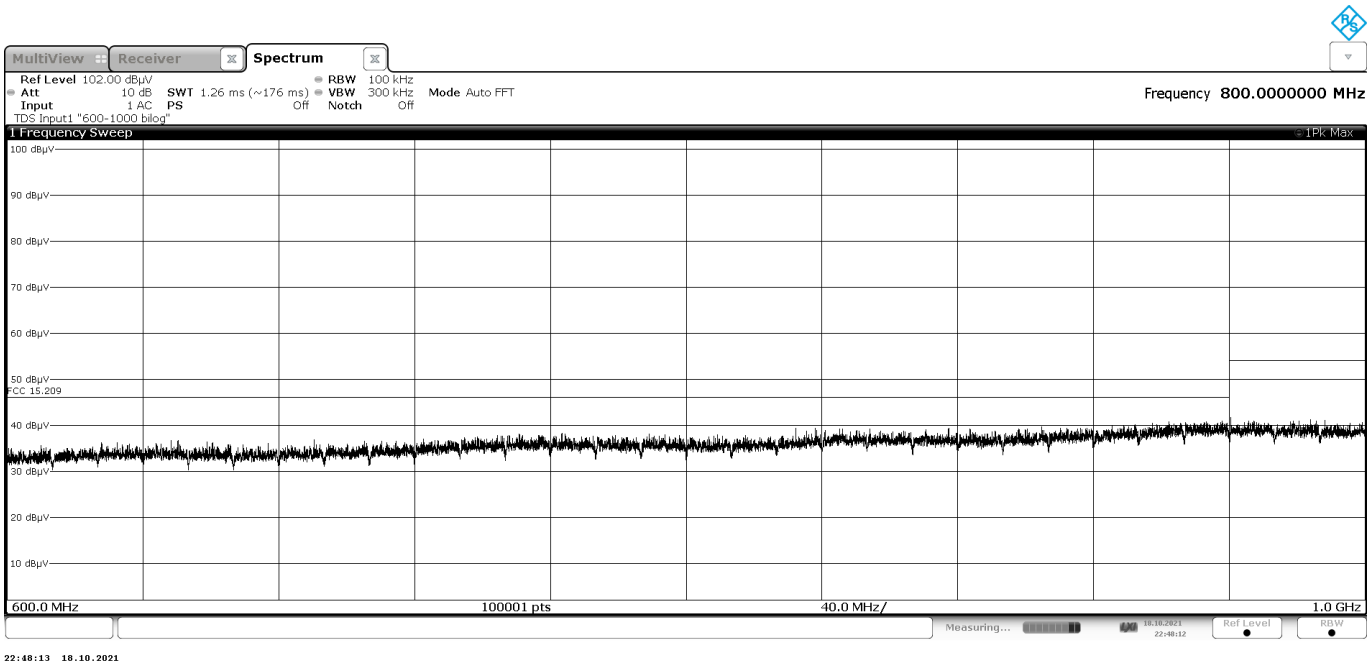
30MHz-200MHz – HCH – ZPOS



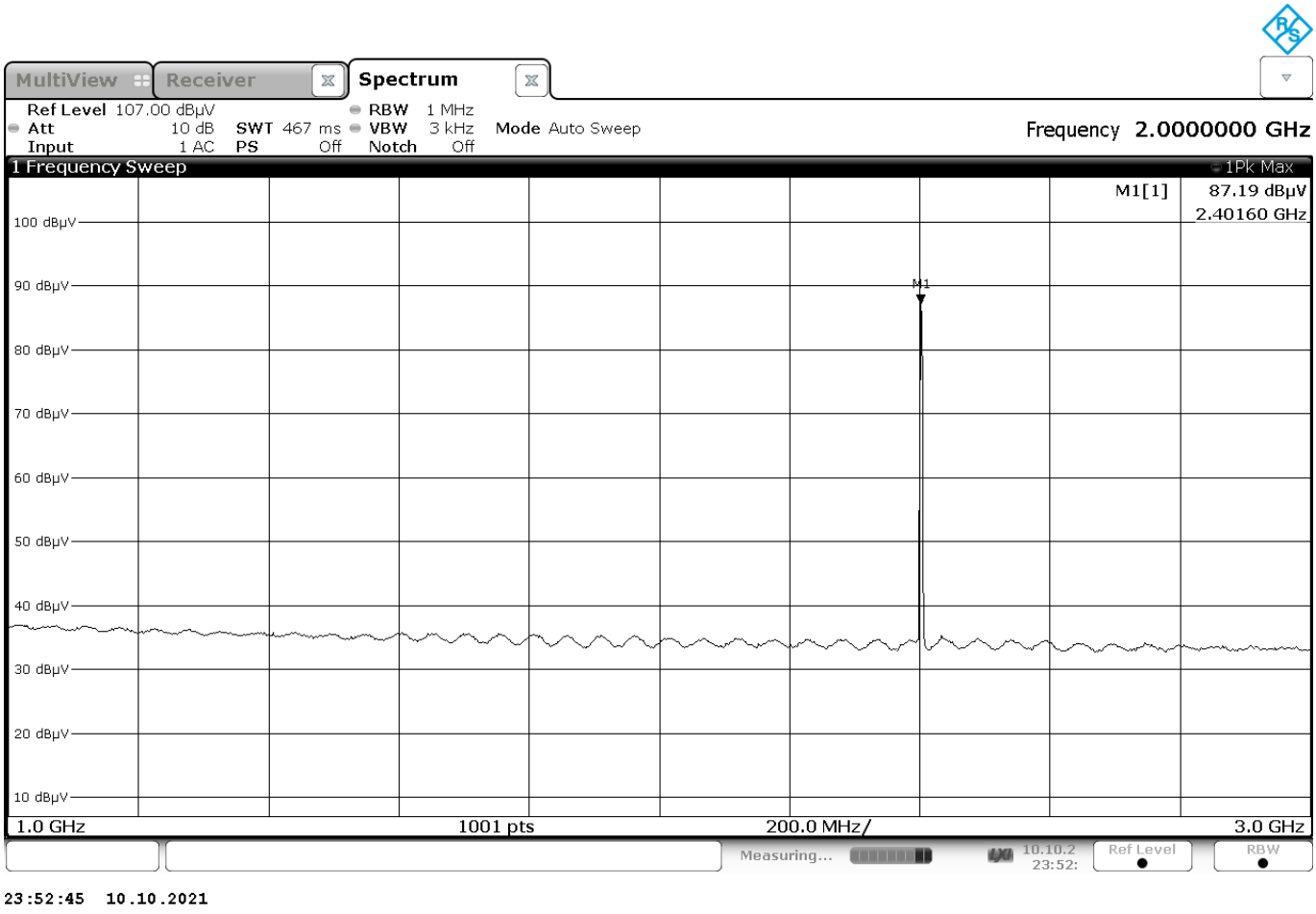
200MHz-600MHz – HCH – ZPOS



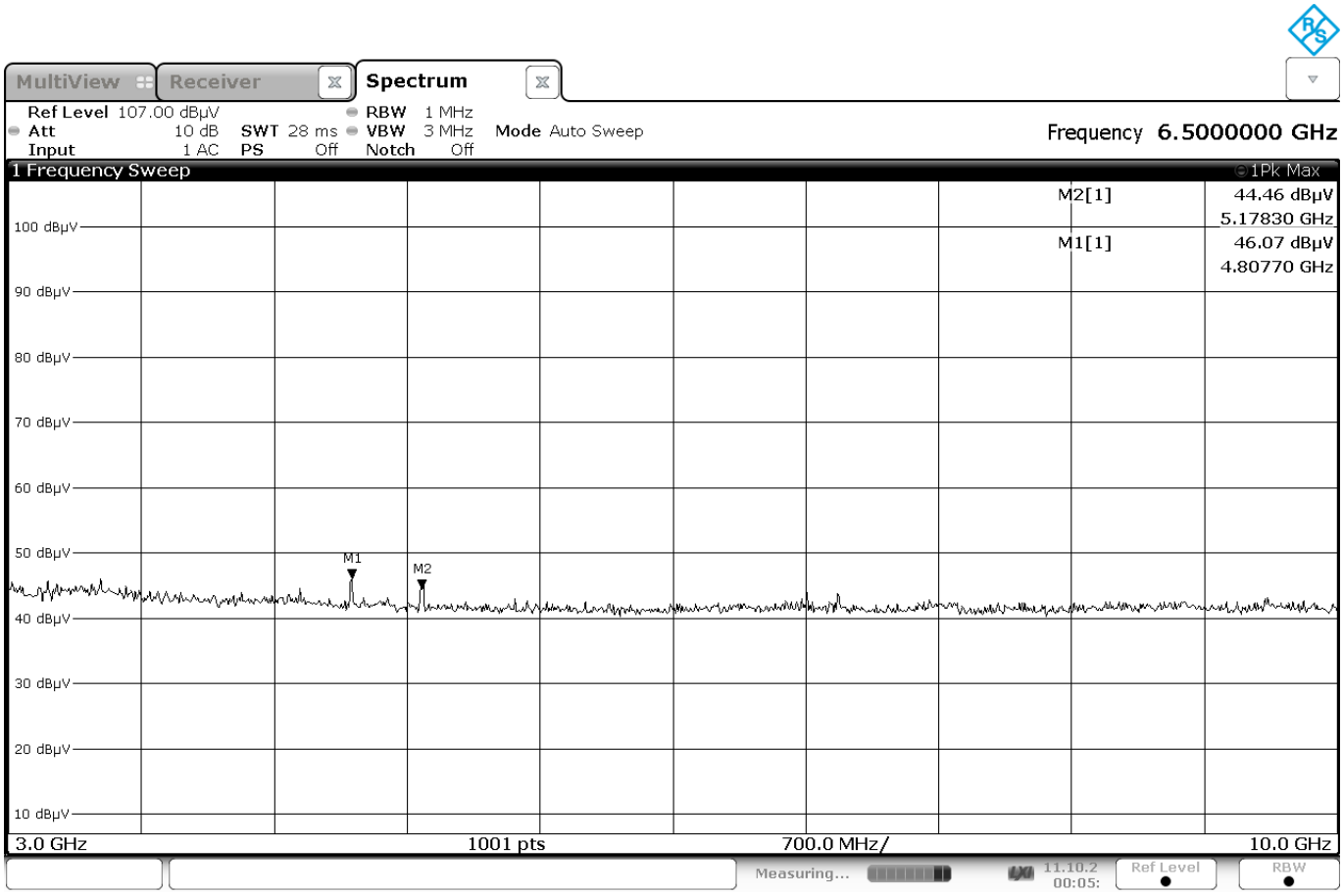
600MHz-1GHz – HCH – ZPOS



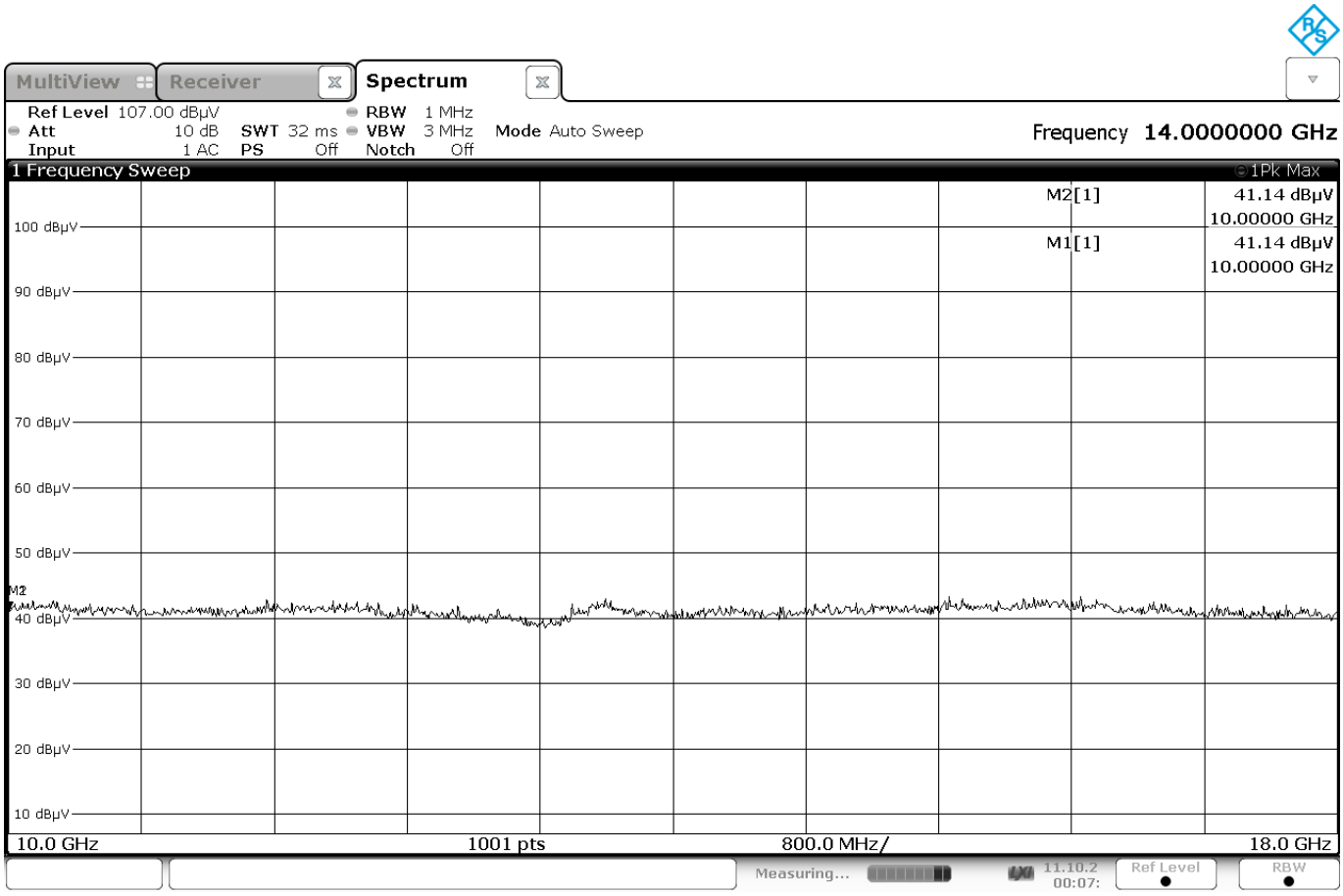
1GHz-3GHz – LCH – XPOS



3GHz-10GHz – LCH – XPOS

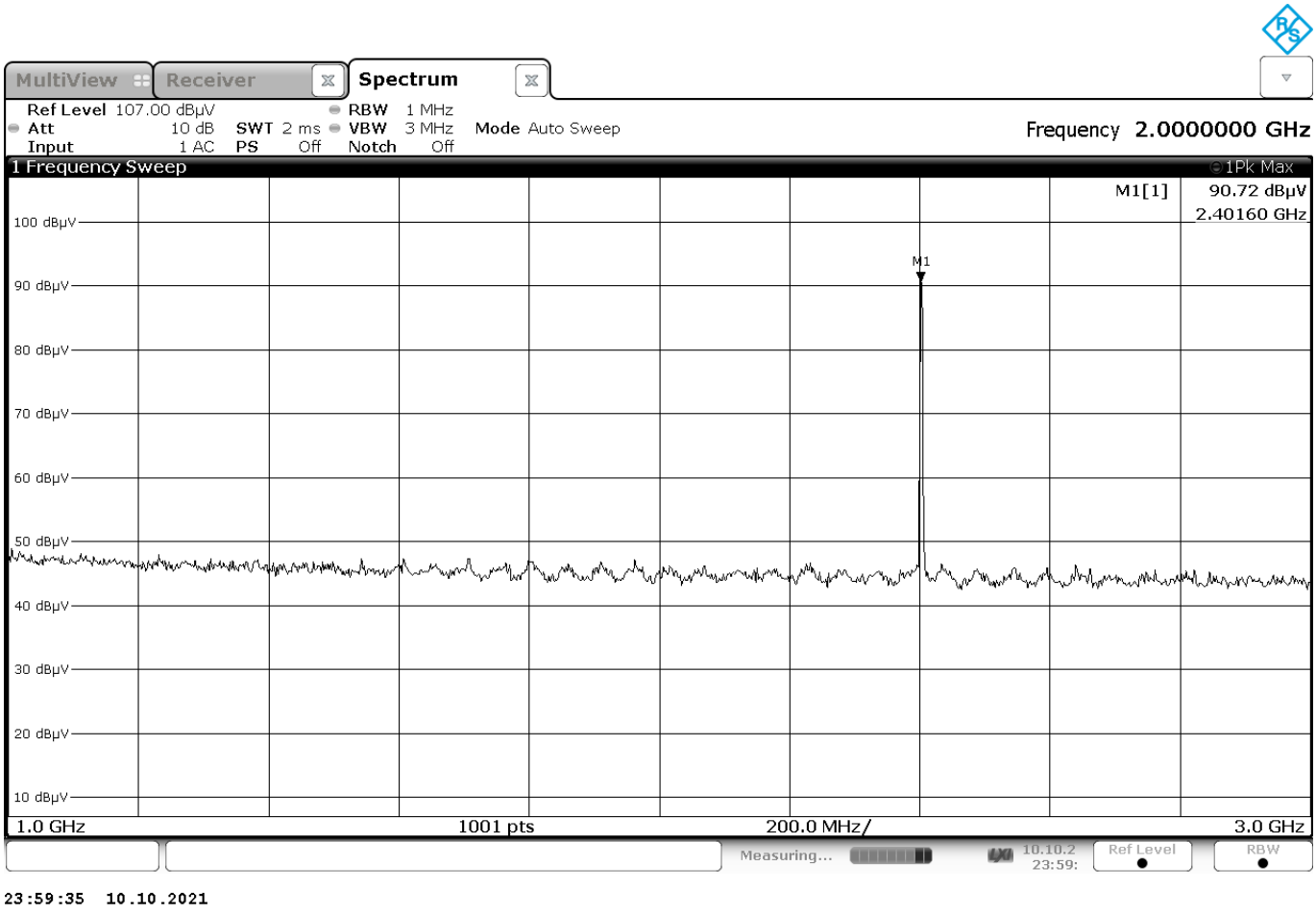


10GHz-18GHz – LCH – XPOS

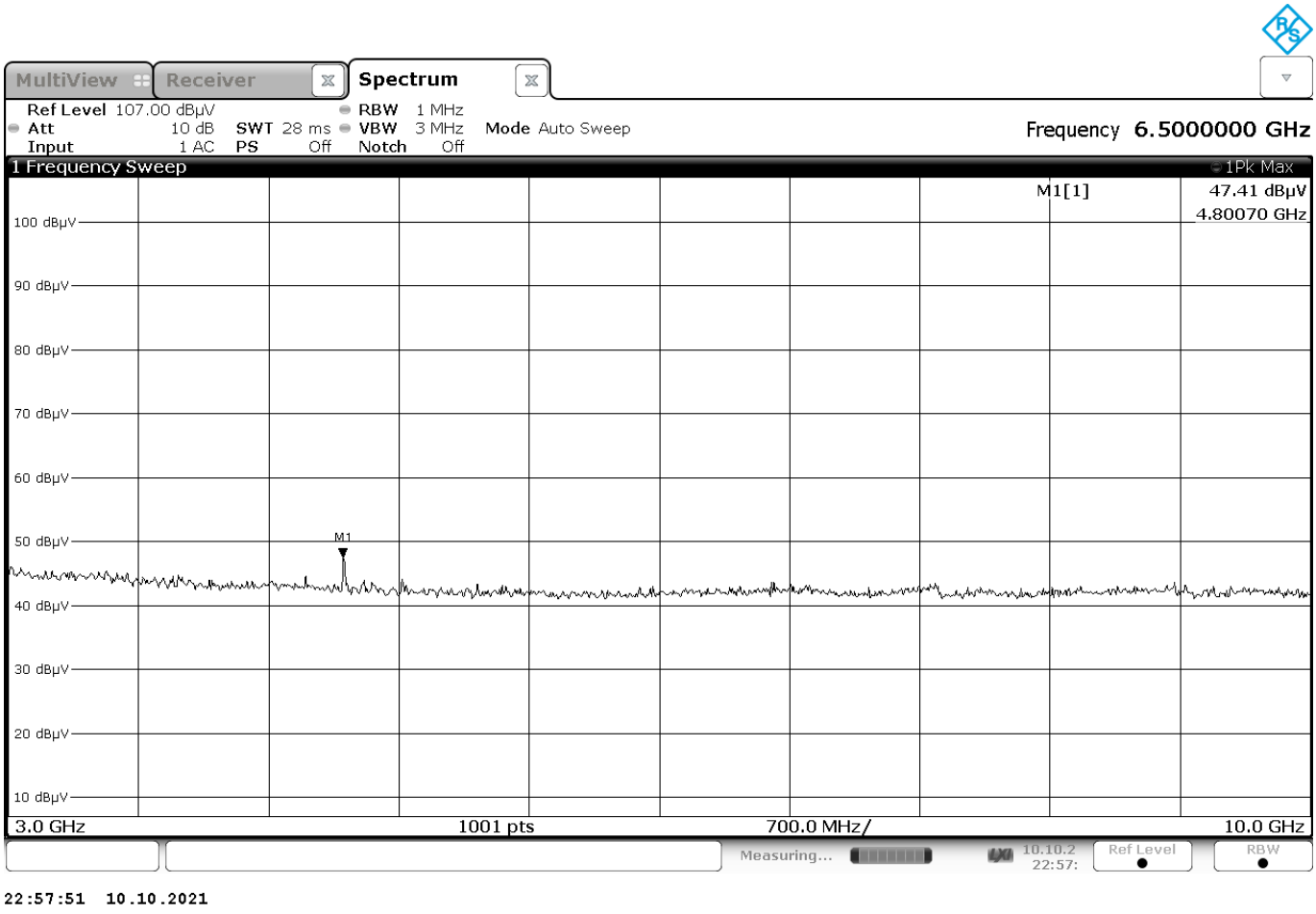


00:07:32 11.10.2021

1GHz-3GHz – LCH – YPOS

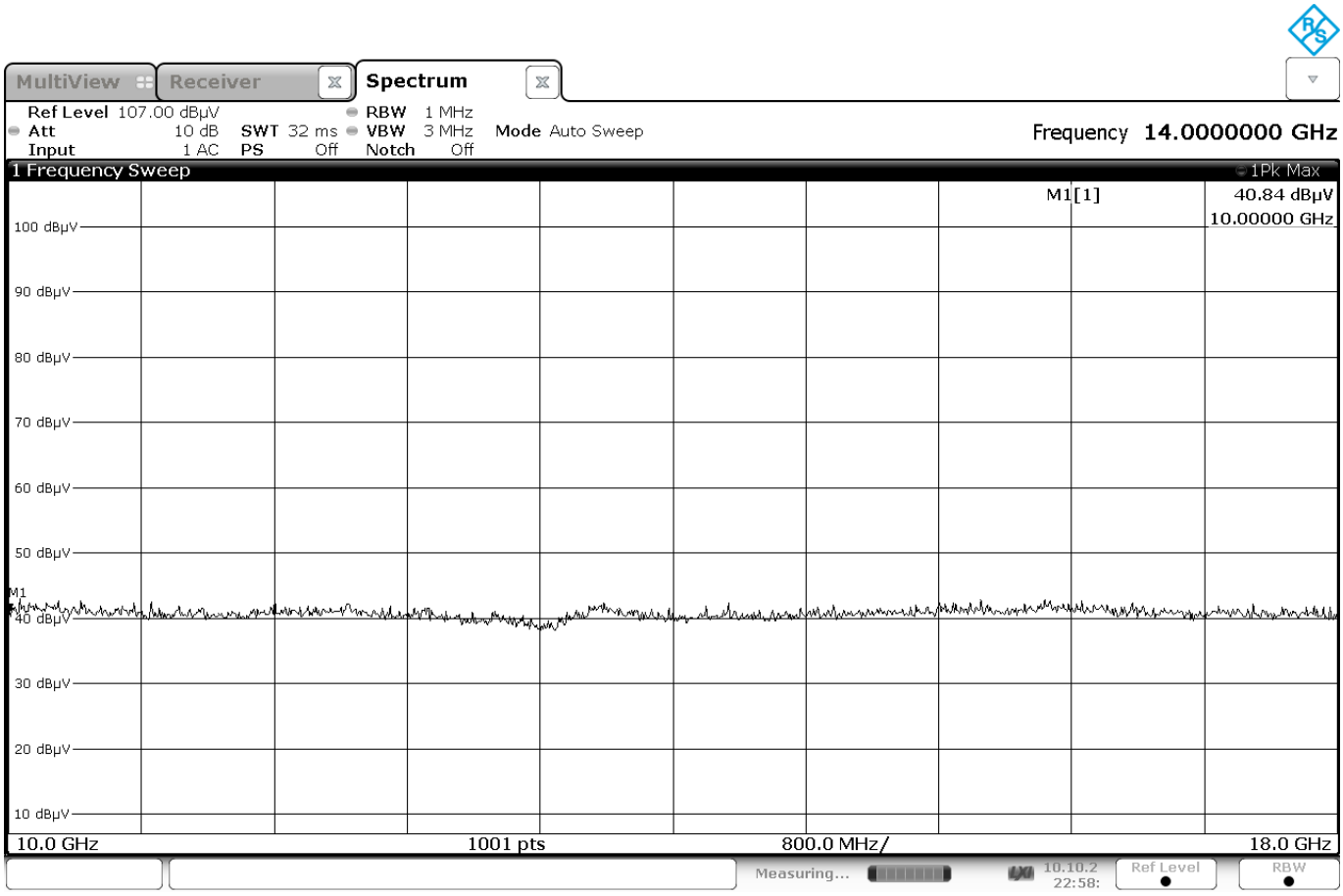


3GHz-10GHz – LCH – YPOS



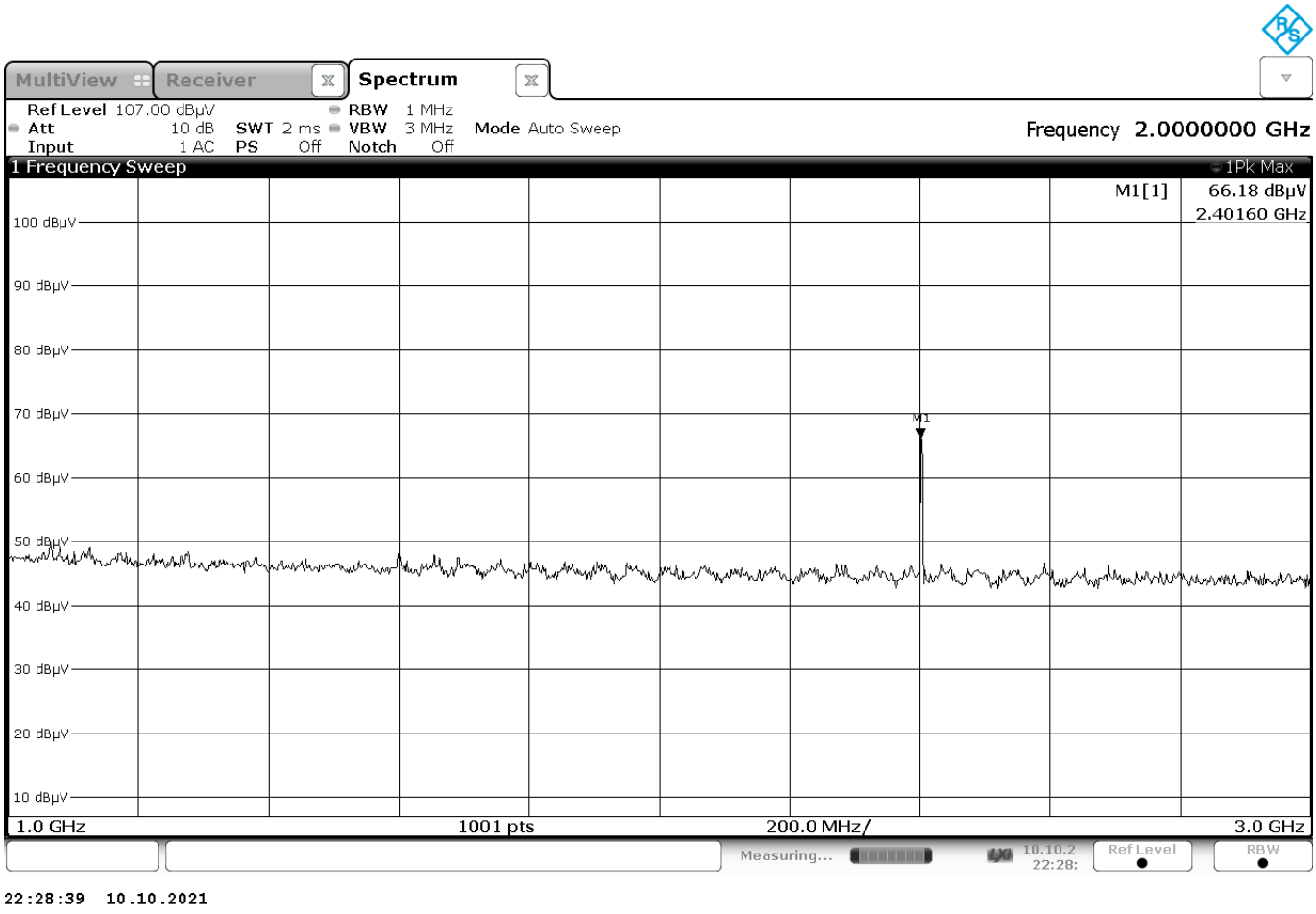
22:57:51 10.10.2021

10GHz-18GHz – LCH – YPOS



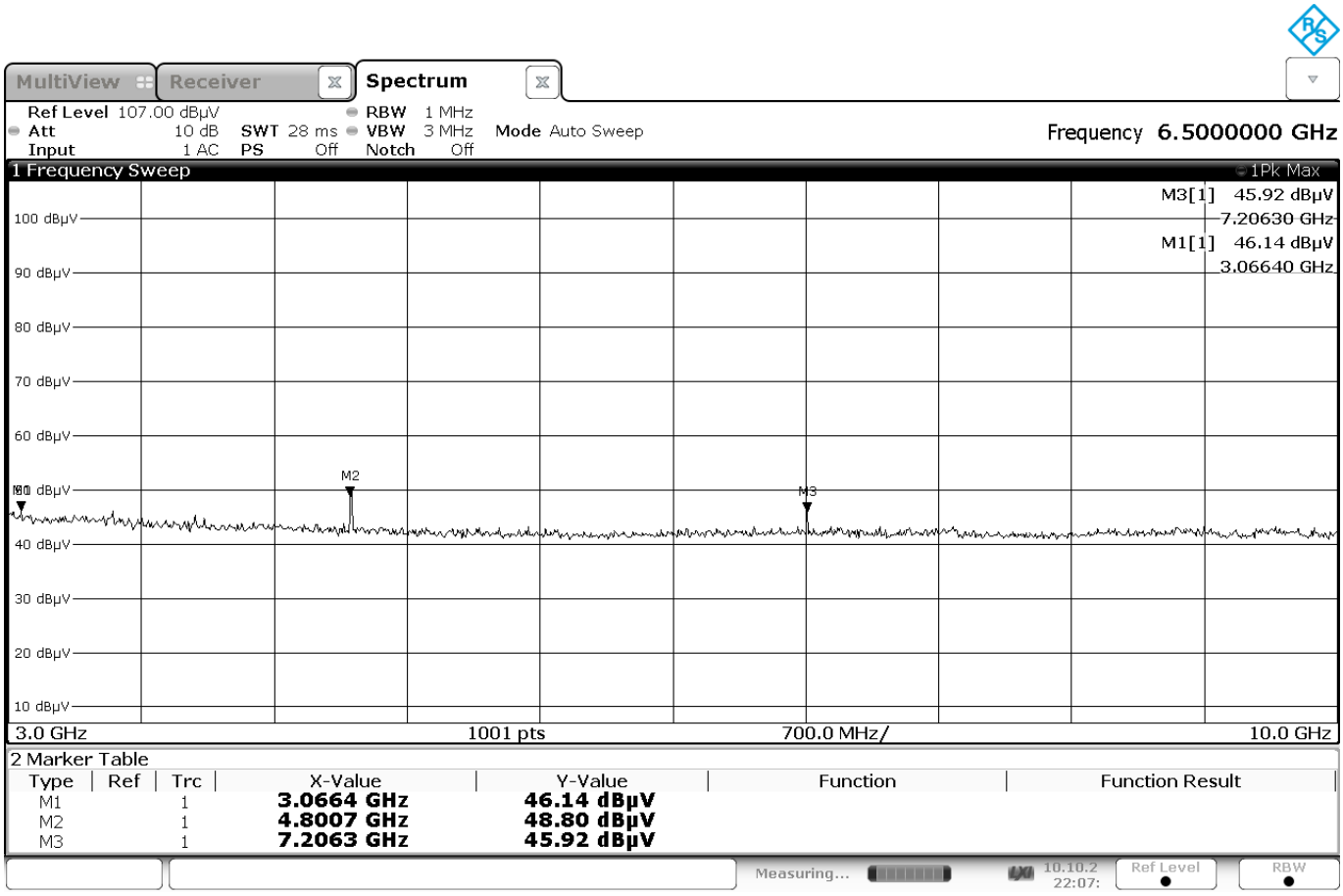
22:58:51 10.10.2021

1GHz-3GHz – LCH – ZPOS

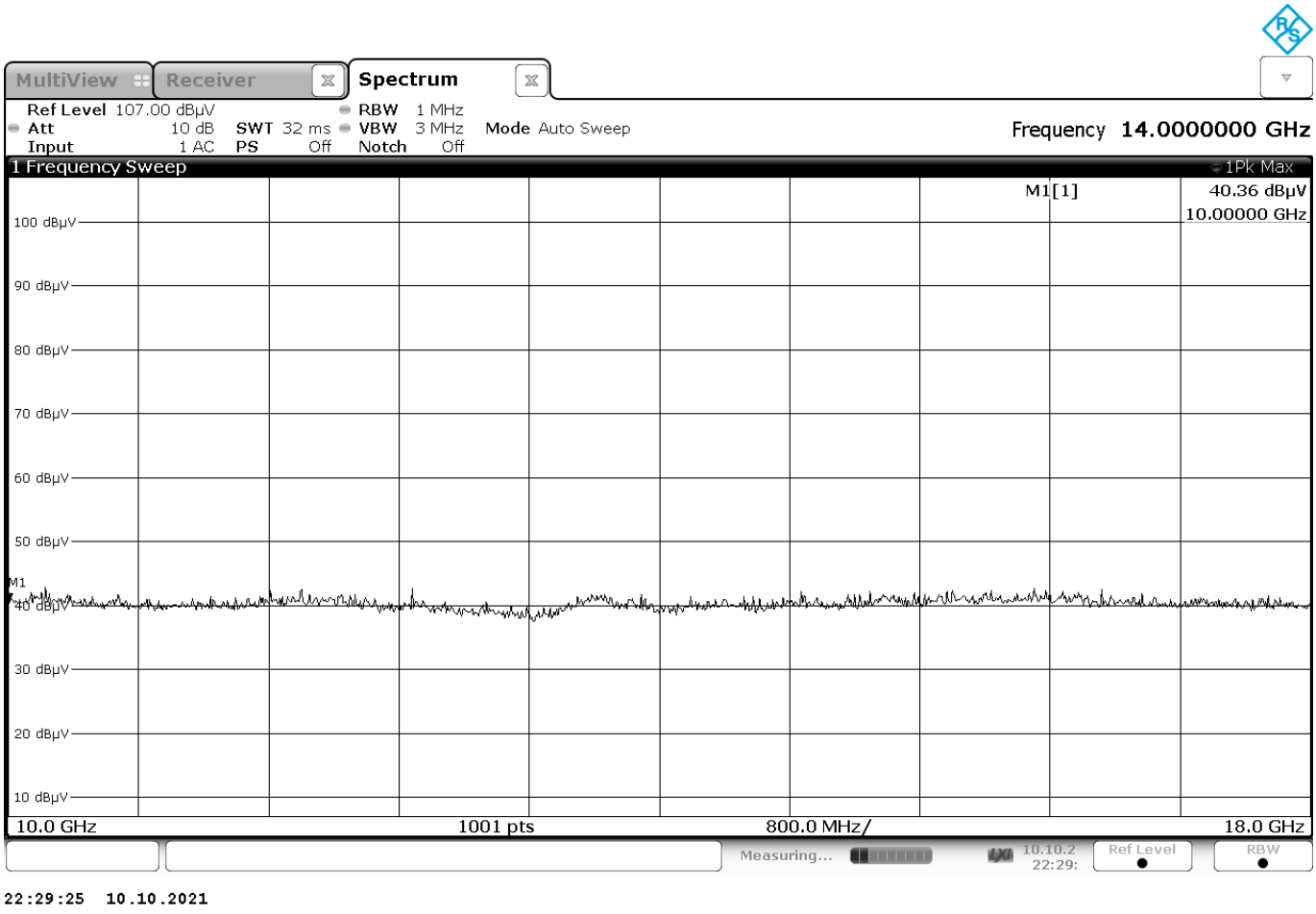


22:28:39 10.10.2021

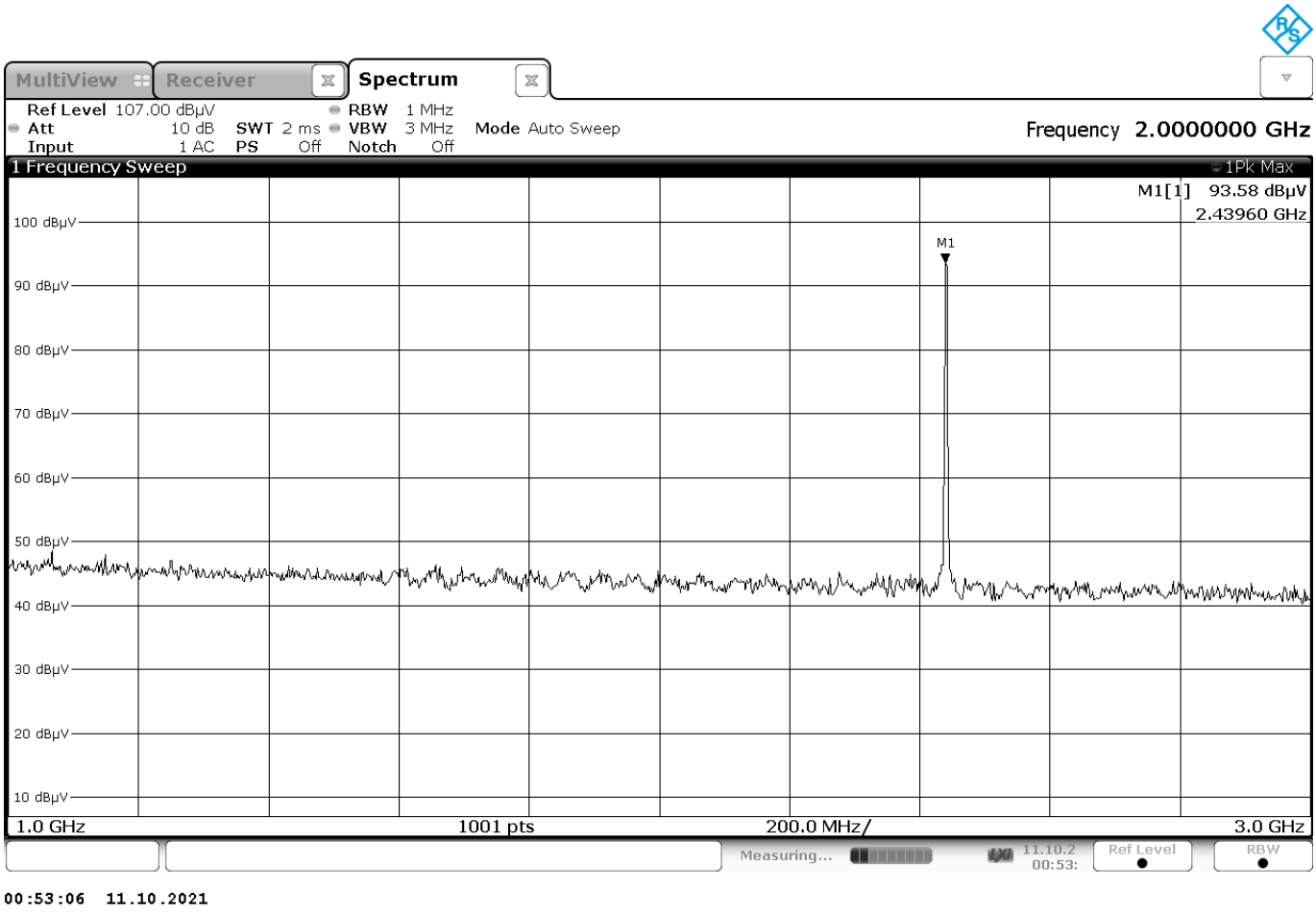
3GHz-10GHz – LCH – ZPOS



10GHz-18GHz – LCH – ZPOS

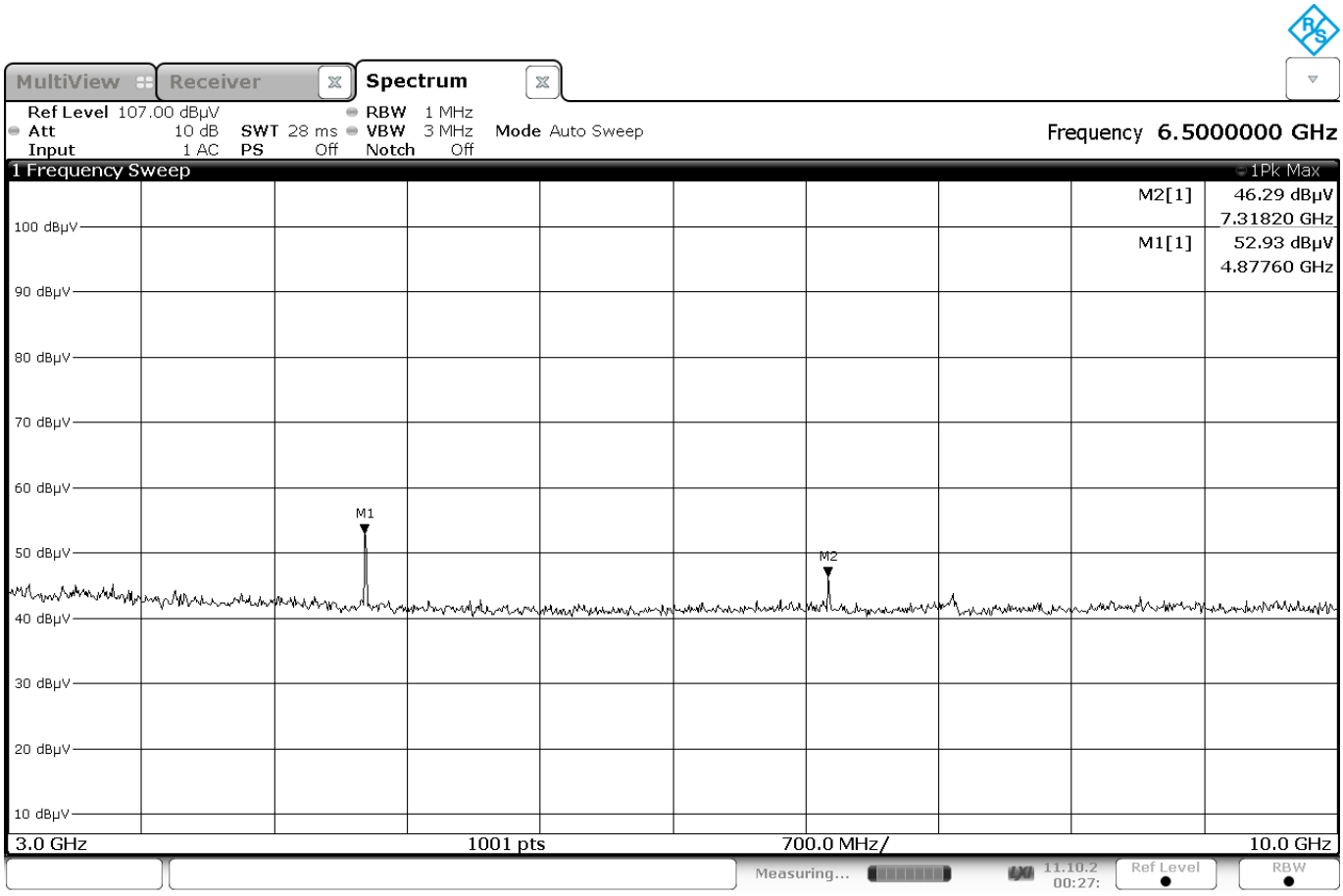


1GHz-3GHz – MCH – ZPOS



00:53:06 11.10.2021

3GHz-10GHz – MCH – ZPOS



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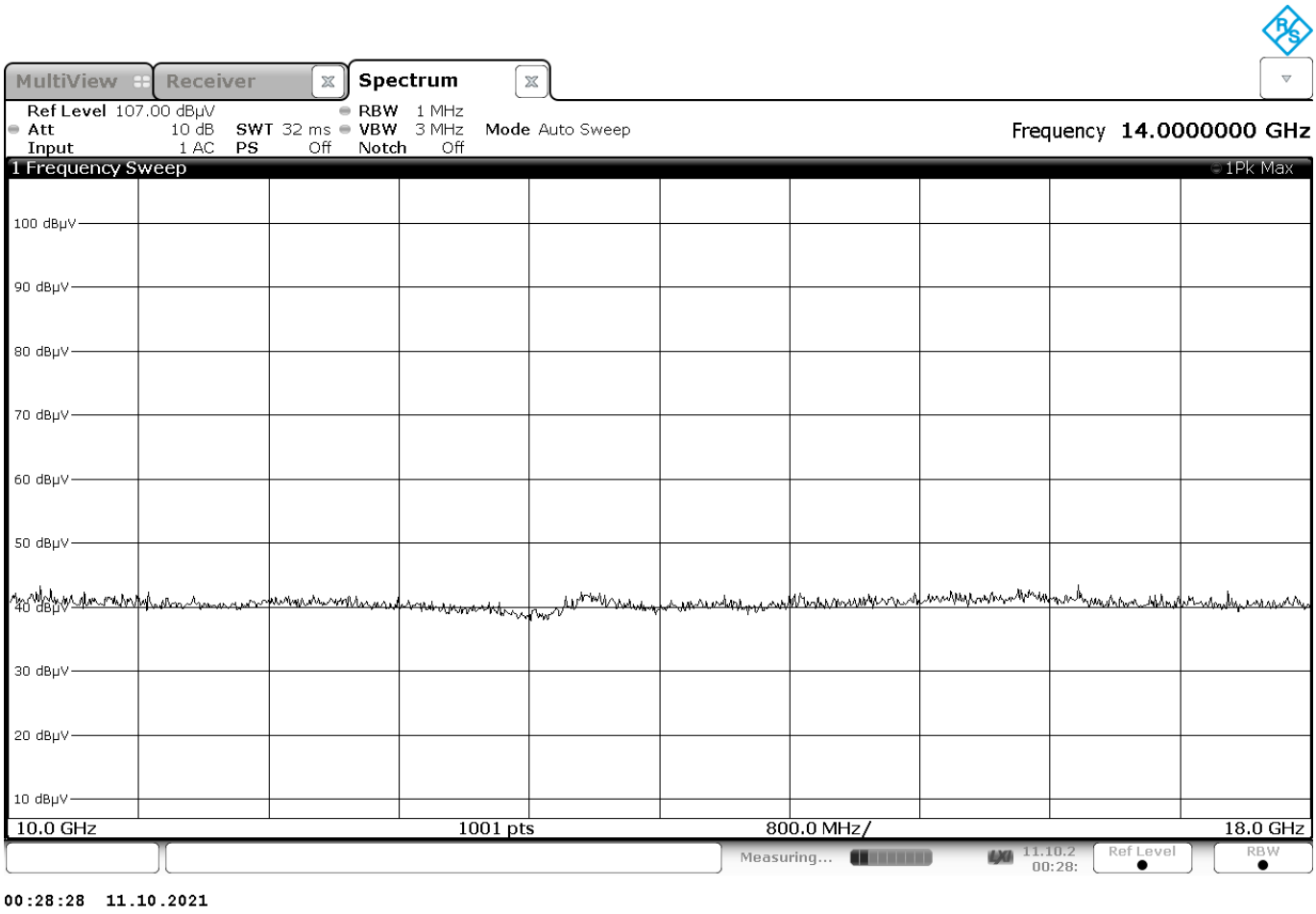
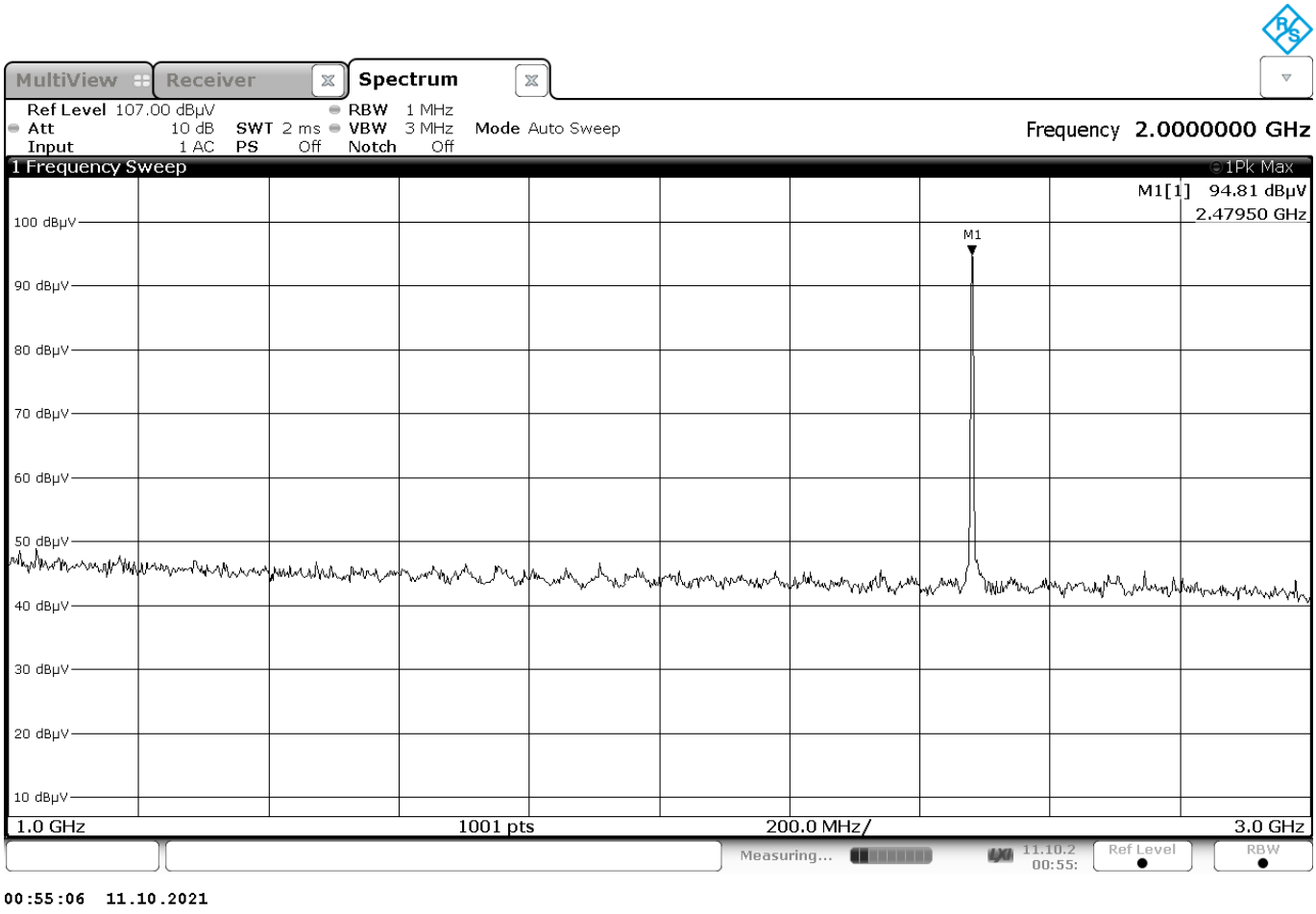
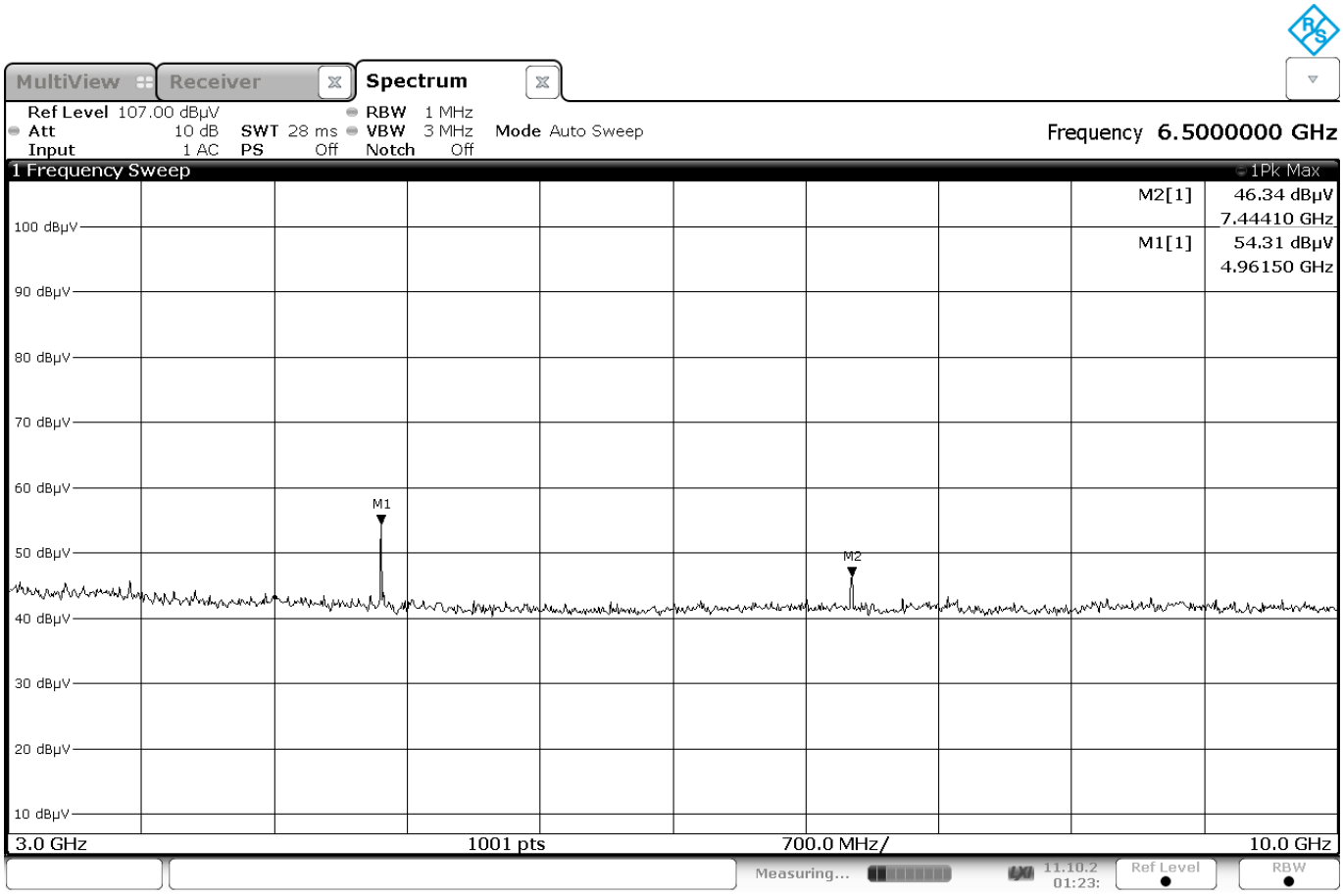
10GHz-18GHz – MCH – ZPOS



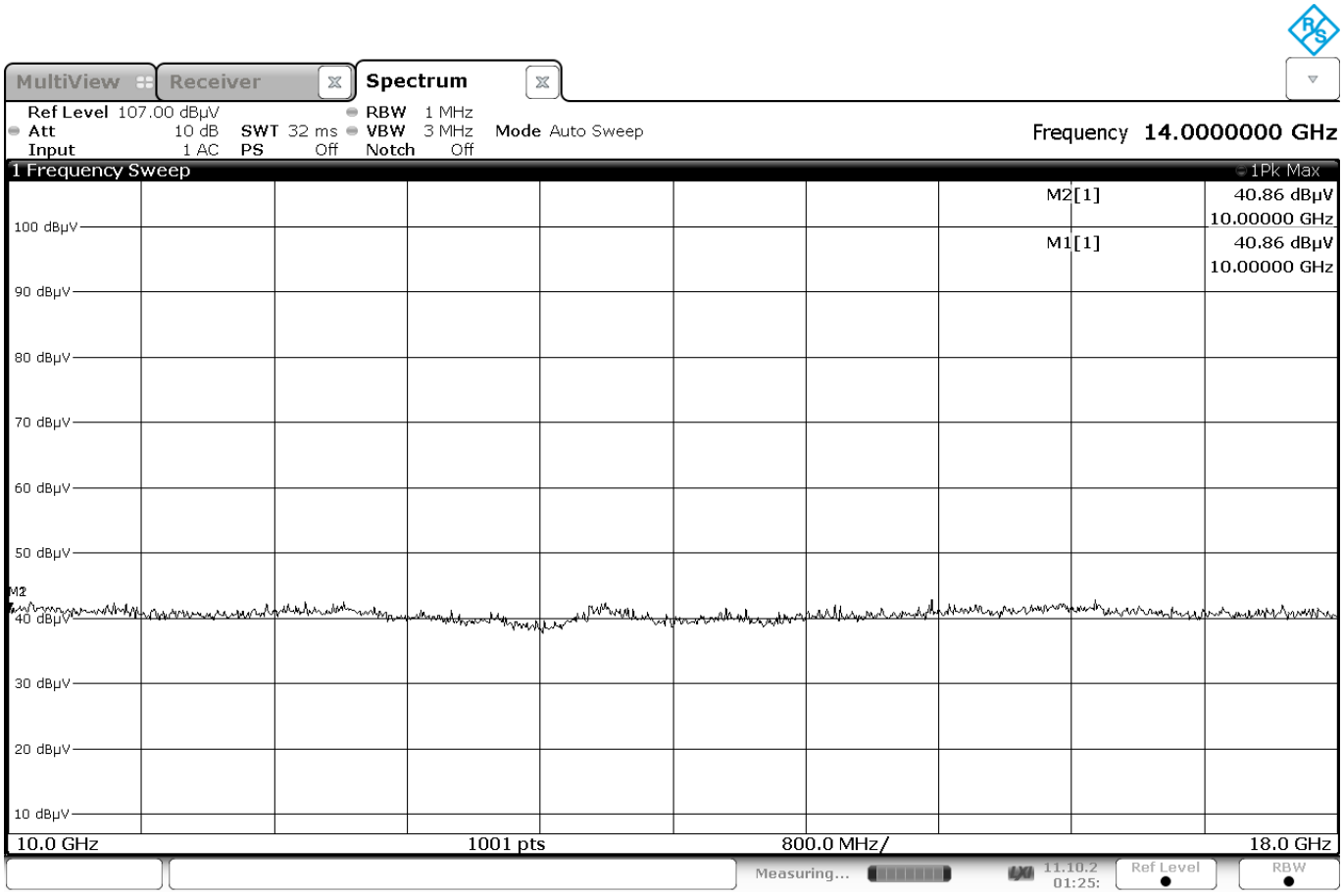
1GHz-3GHz – HCH – ZPOS



3GHz-10GHz – HCH – ZPOS



10GHz-18GHz – HCH – ZPOS



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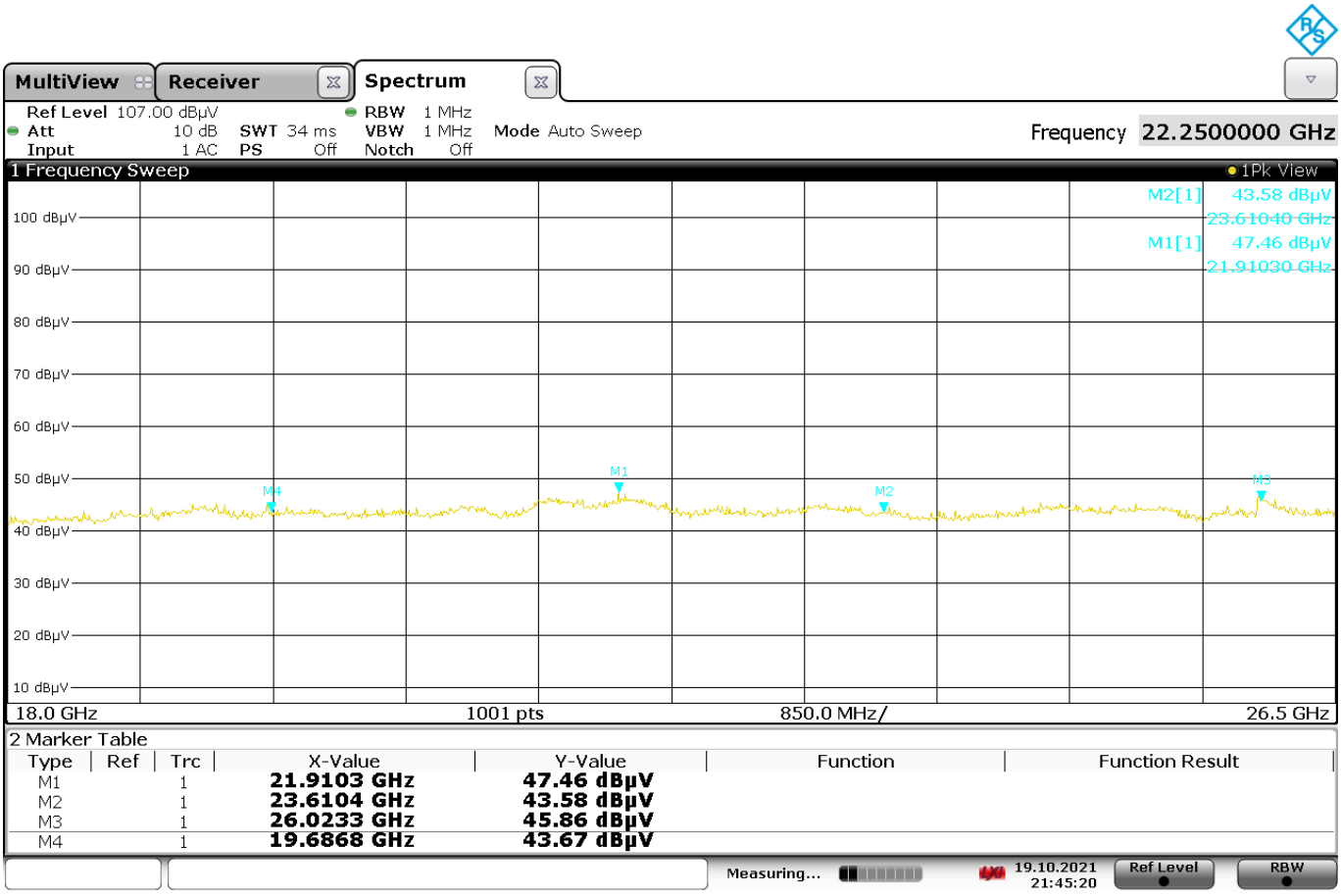
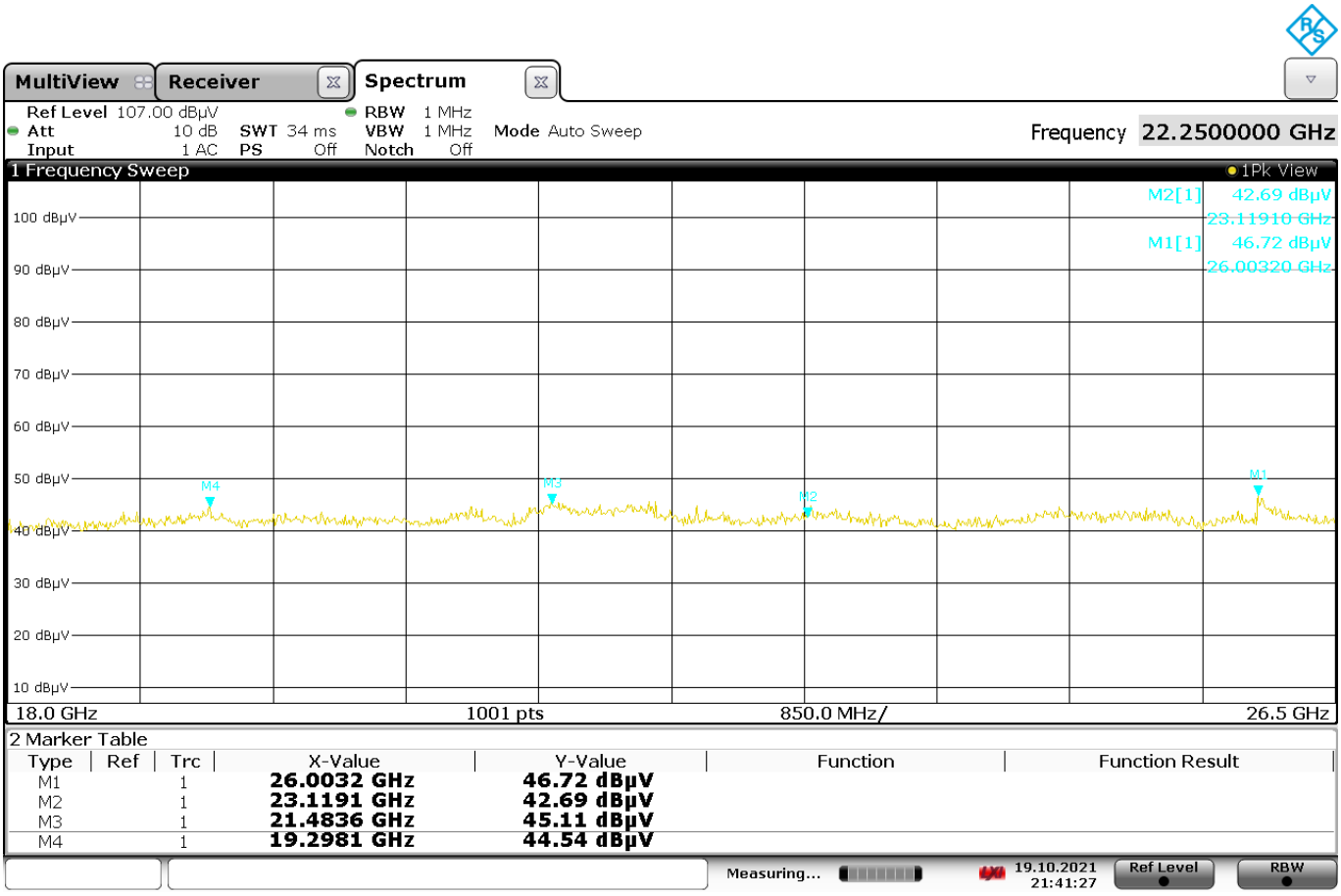
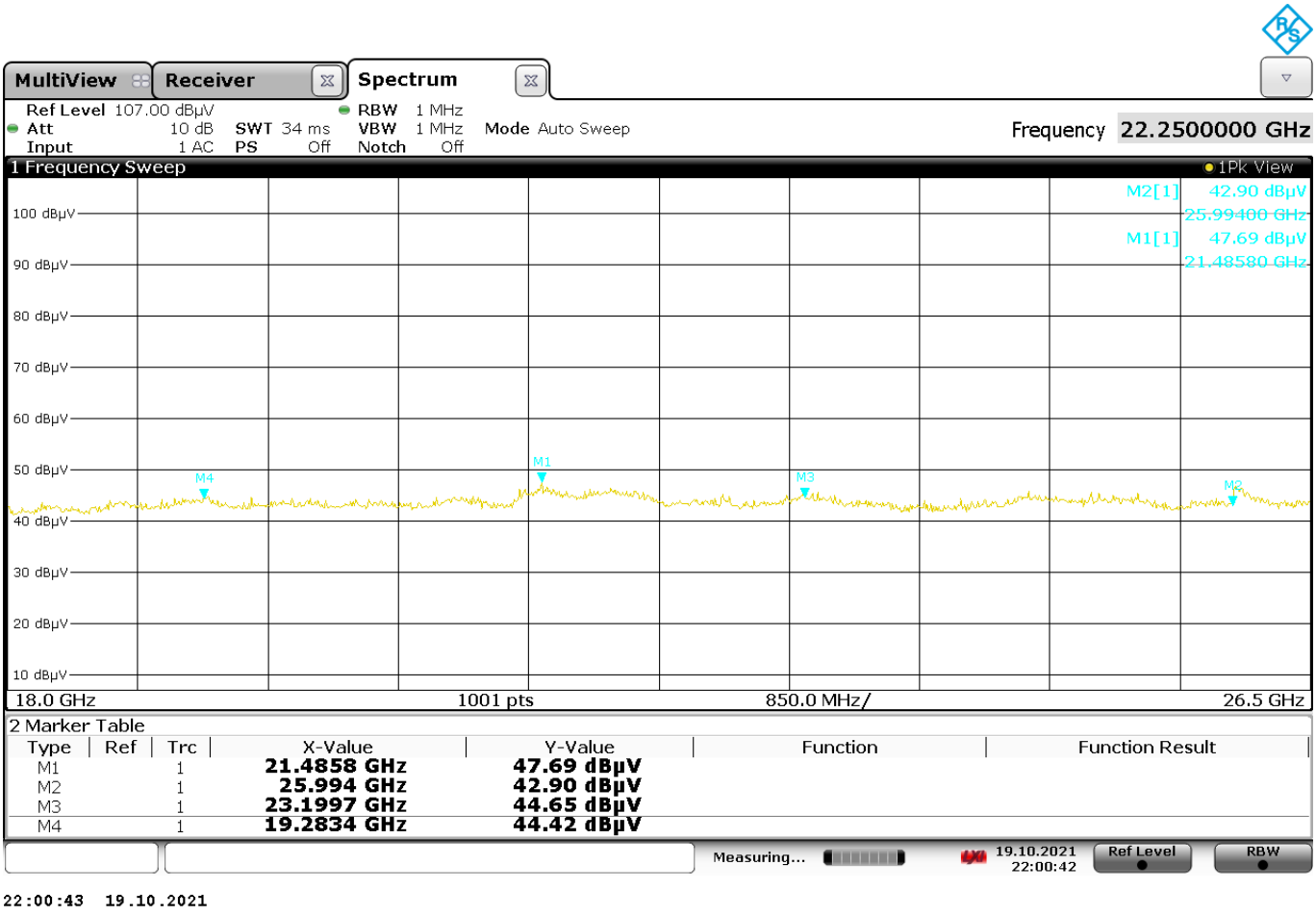
18GHz-26.5GHz – LCH – ZPOS



18GHz-26.5GHz – MCH – ZPOS



18GHz-26.5GHz – HCH – ZPOS



End of Report