Annex 1: Measurement diagrams 20-1-0063601T08a-C01-A1

Number of pages:	15	**Date of Report:**	2022-Jan-19
Testing company:	CETECOM GmbH Im Teelbruch 116 45219 Essen Germany Tel. + 49 (0) 20 54 / 95 19-0 Fax: + 49 (0) 20 54 / 95 19-150	**Applicant:**	WITTE Velbert GmbH & Co KG
Product: **Model:**	**Automotive NFC Outer Door Handle** **DH421**		
FCC ID:	V2T-DH421	**IC:**	7575A-DH421
Testing has been carried out in accordance with:	**Title 47 CFR, Chapter I** **FCC Regulations, Subchapter A** Part 15, Subpart C: §15.225 **ANSI C63.10-2013 chapter 6.4/5/8/9** **ISED Regulations** RSS-Gen, Issue 5 + Amendment 2 RSS-210, Issue 10 Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method and limit".		

The test results relate only to the individual items which have been tested. This report shall not be reproduced in parts without the written approval of the testing laboratory © Copyright: All rights reserved by CETECOM

Table of Contents

1 Measurement diagrams....3

1.1 Radiated field strength emissions and emission mask....3

1.2 Radiated field strength emissions below 30 MHz....7

1.3 Radiated field strength emissions 30 MHz – 1 GHz....9

1.4 Occupied Channel Bandwidth 99%....11

1.4.1 OBW_TX_S10_TnomVnom....11

1.4.2 OBW_TXRX_S18_TnomVnom....11

1.5 Frequenzy stability....12

1.5.1 Voltage variation....12

1.5.1.1 TnomVnom....12

1.5.1.2 TnomVmin....12

1.5.1.3 TnomVmax....13

1.5.1.4 TnomV=13 V DC (worst case)....13

1.5.2 Temperatur variation....14

1.5.2.1 VnomTnom....14

1.5.2.2 VnomTmin at startup....14

1.5.2.3 VnomTmax at startup....15

1.5.2.4 VnomT=80 °C at 10 min (worst case)....15

1 Measurement diagrams

1.1 Radiated field strength emissions and emission mask

2.01_H_Field_TX_standing

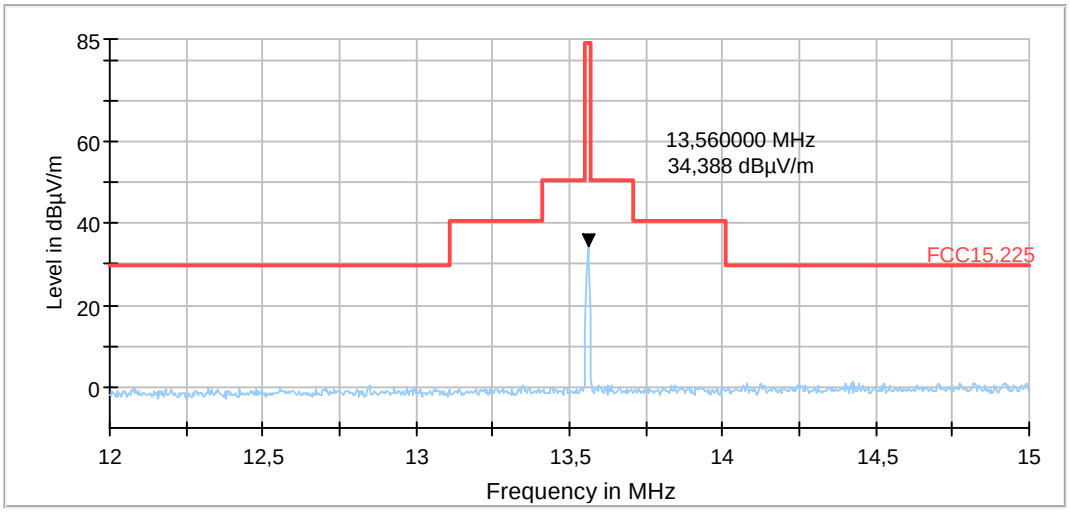
Common Information

Test Description:	Magnetic Field Strength Measurement related to 30 m distance
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Chamber (SAC1) with 3 m measurement distance
Version of Testsoftware:	EMC32 V10.50.0
Distance correction:	used accord. table, pls. see test report
Technical Data:	Please see page 2 for detailed data of measurement setup
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarisation
Used Filter:	bypass
Test Standard:	FCC 15.225; RSS-Gen: Issue 5
Operator:	TFra/SSanthakum
Operating Mode:	TX 13.56 MHz
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	20-1-00636S10_C01
Power Supply:	12 V DC

Full Spectrum



2.02_H_Field_TXRX_standing

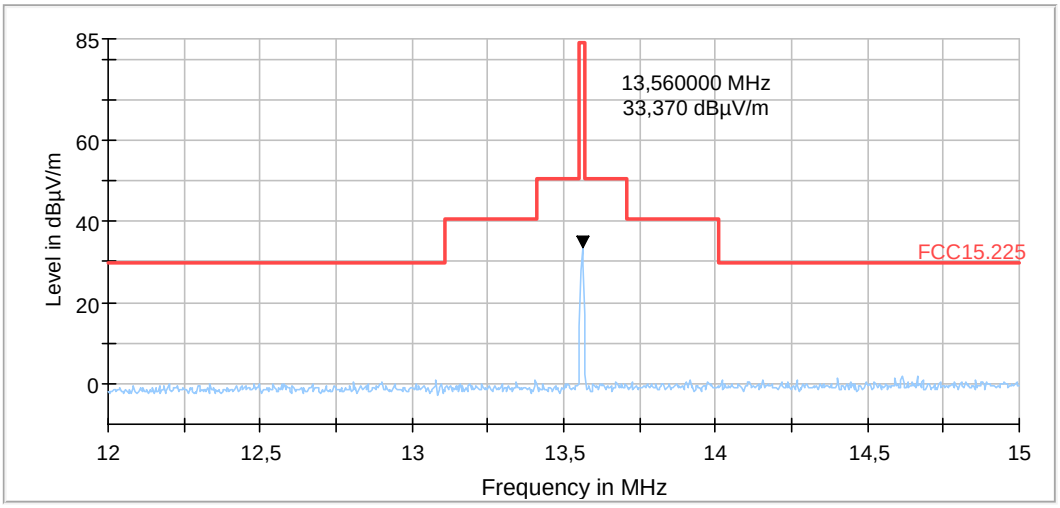
Common Information

Test Description:	Magnetic Field Strength Measurement related to 30 m distance
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Chamber (SAC1) with 3 m measurement distance
Version of Testsoftware:	EMC32 V10.50.0
Distance correction:	used accord. table, pls. see test report
Technical Data:	Please see page 2 for detailed data of measurement setup
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarisation
Used Filter:	bypass
Test Standard:	FCC 15.225; RSS-Gen: Issue 5
Operator:	TFra/SSanthakum
Operating Mode:	TXRX 13.56 MHz
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	20-1-00636S18_C01
Power Supply:	12 V DC

Full Spectrum



2.03_H_Field_TX_laying

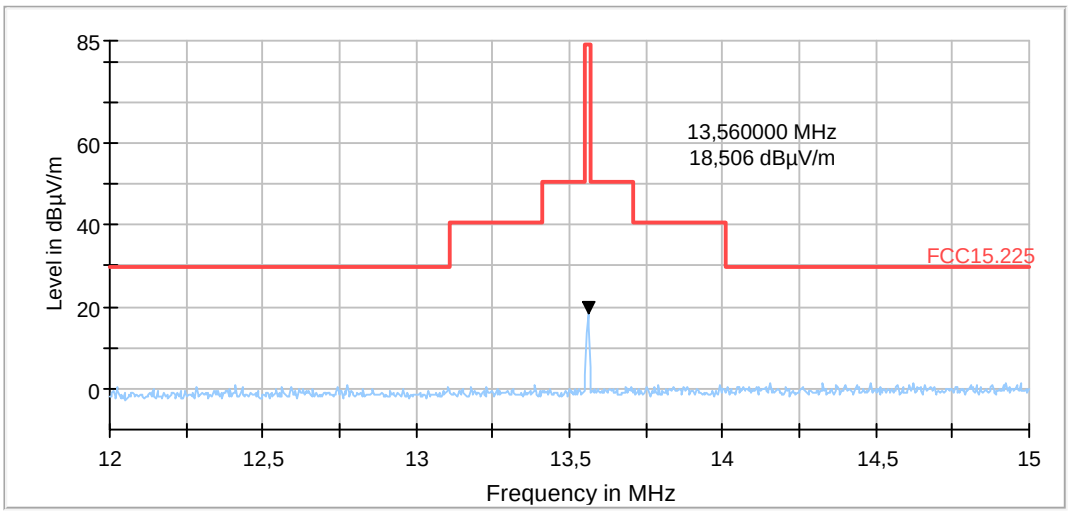
Common Information

Test Description:	Magnetic Field Strength Measurement related to 30 m distance
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Chamber (SAC1) with 3 m measurement distance
Version of Testsoftware:	EMC32 V10.50.0
Distance correction:	used accord. table, pls. see test report
Technical Data:	Please see page 2 for detailed data of measurement setup
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarisation
Used Filter:	bypass
Test Standard:	FCC 15.225; RSS-Gen: Issue 5
Operator:	TFra/SSanthakum
Operating Mode:	TX 13.56 MHz
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	20-1-00636S10_C01
Power Supply:	12 V DC

Full Spectrum



2.04_H_Field_TXRX_laying

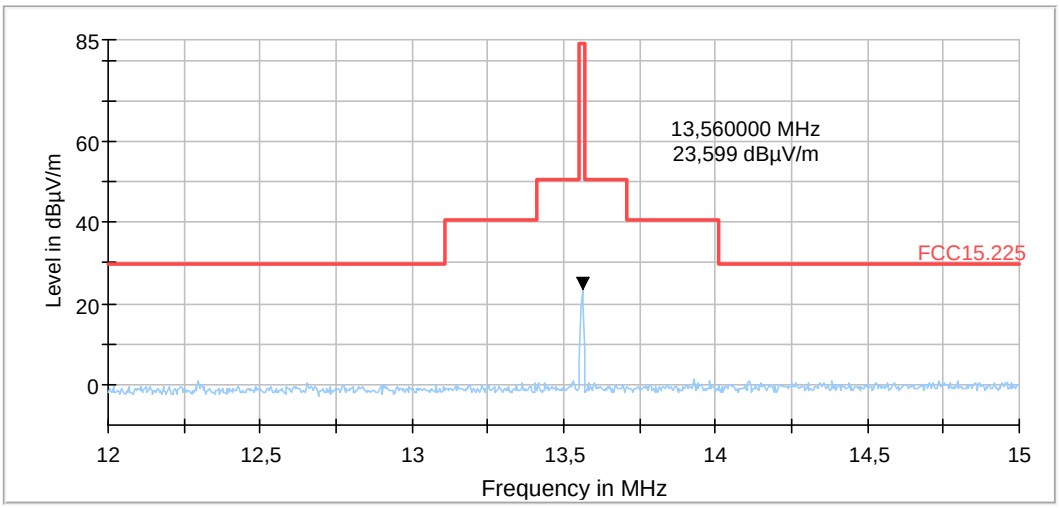
Common Information

Test Description:	Magnetic Field Strength Measurement related to 30 m distance
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Chamber (SAC1) with 3 m measurement distance
Version of Testsoftware:	EMC32 V10.50.0
Distance correction:	used accord. table, pls. see test report
Technical Data:	Please see page 2 for detailed data of measurement setup
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarisation
Used Filter:	bypass
Test Standard:	FCC 15.225; RSS-Gen: Issue 5
Operator:	TFra/SSanthakum
Operating Mode:	TXRX 13.56 MHz
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	20-1-00636S18_C01
Power Supply:	12 V DC

Full Spectrum



1.2 Radiated field strength emissions below 30 MHz

2.05_RSE_TX_standing

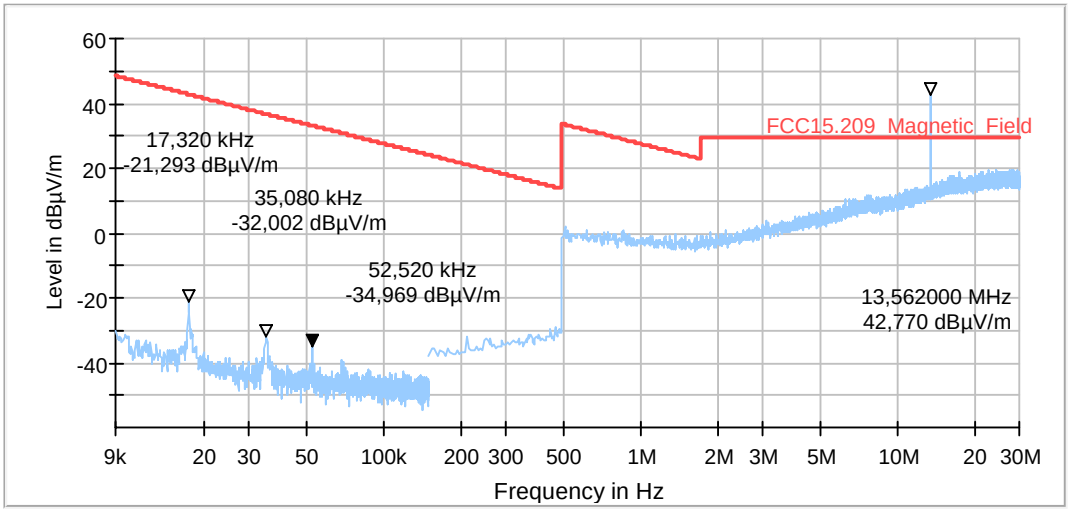
Common Information

Test Description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Chamber (SAC1) with 3 m measurement distance
Version of Testsoftware:	EMC32 V10.50.0
Distance correction:	used accord. table, pls. see test report
Technical Data:	Please see page 2 for detailed data of measurement setup
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarisation
Used Filter:	bypass
Test Standard:	FCC 15.205 § 15.209; RSS-Gen: Issue 4
Operator:	TFra/SSanthakum
Operating Mode:	TX 13.56 MHz
Environmental Conditions::	Humidity : 50%rH; Temperature: 20°C
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	20-1-00636S10_C01
Power Supply:	12 V DC

Full Spectrum



Remark: peaks in the frequency range up to ~100 kHz are caused by the electric motor of an antenna mast inside the chamber.

2.06_RSE_TXRX_standing

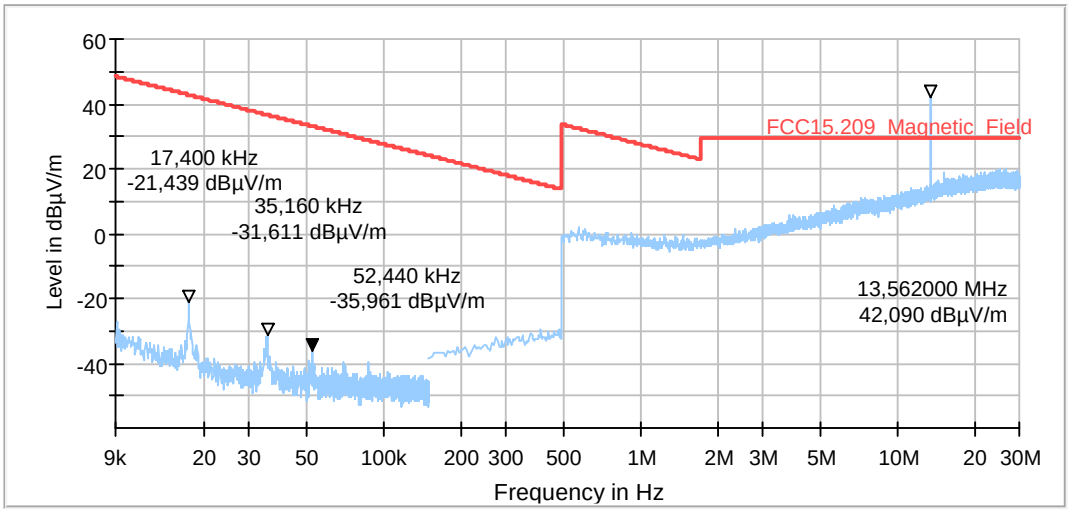
Common Information

Test Description:	Magnetic Field Strength Measurement related to 30/300 m distance
Test Site Location:	Ref.-Nr. 441 Semi Anechoic Chamber (SAC1) with 3 m measurement distance
Version of Testsoftware:	EMC32 V10.50.0
Distance correction:	used accord. table, pls. see test report
Technical Data:	Please see page 2 for detailed data of measurement setup
Rec. antenna (pre-scan):	height 1.00 m, parallel and 90° to EUT polarisation
Used Filter:	bypass
Test Standard:	FCC 15.205 § 15.209; RSS-Gen: Issue 4
Operator:	TFra/SSanthakum
Operating Mode:	TX 13.56 MHz
Environmental Conditions::	Humidity : 50%rH; Temperature: 20°C
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	20-1-00636S18_C01
Power Supply:	12 V DC

Full Spectrum



Remark: peaks in the frequency range up to ~100 kHz are caused by the electric motor of an antenna mast inside the chamber.

1.3 Radiated field strength emissions 30 MHz – 1 GHz

3.01_RSE_TX_RADIO_S10_standing_testbox-with-filter

Common Information

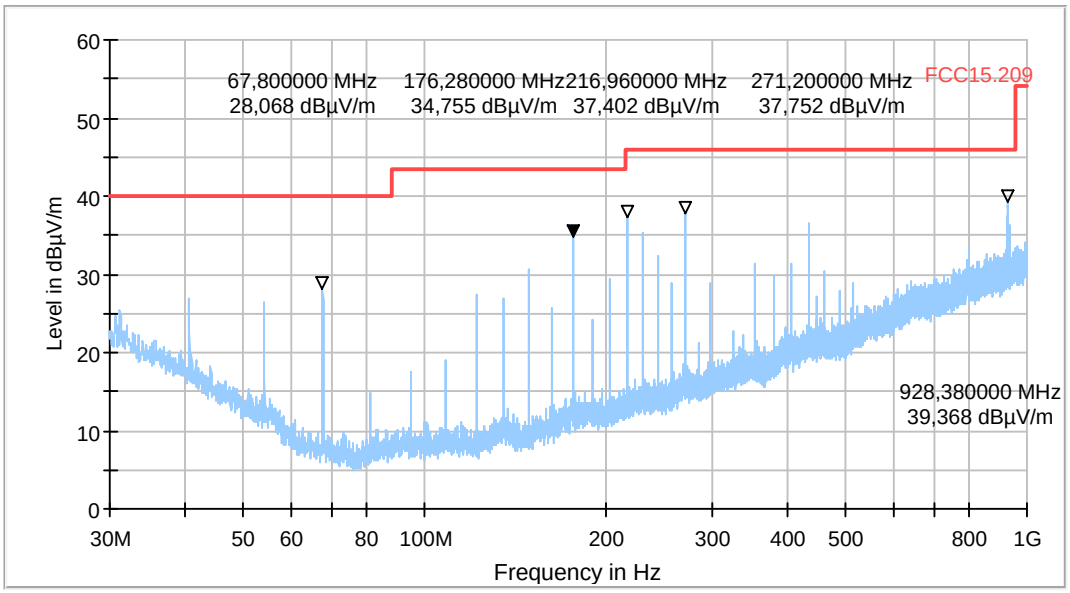
Test Description:	Radiated field strength emission in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.205&15.209 & RSS Gen. Issue 5
Antenna polarisation:	horizontal/vertical
Environmental Conditions::	Humidity : 50%rH; Temperature: 20°C
Operator Name:	TFra
Operating Mode:	TX 13.56 MHz
Verdict:	Passed

EUT Information

PMT number:	20-1-00636S10_C01
Power Supply:	12 V DC

Full Spectrum

Full Spectrum



3.03_RSE_TXRX_EMC_S18_standing_testbox-with-filter

Common Information

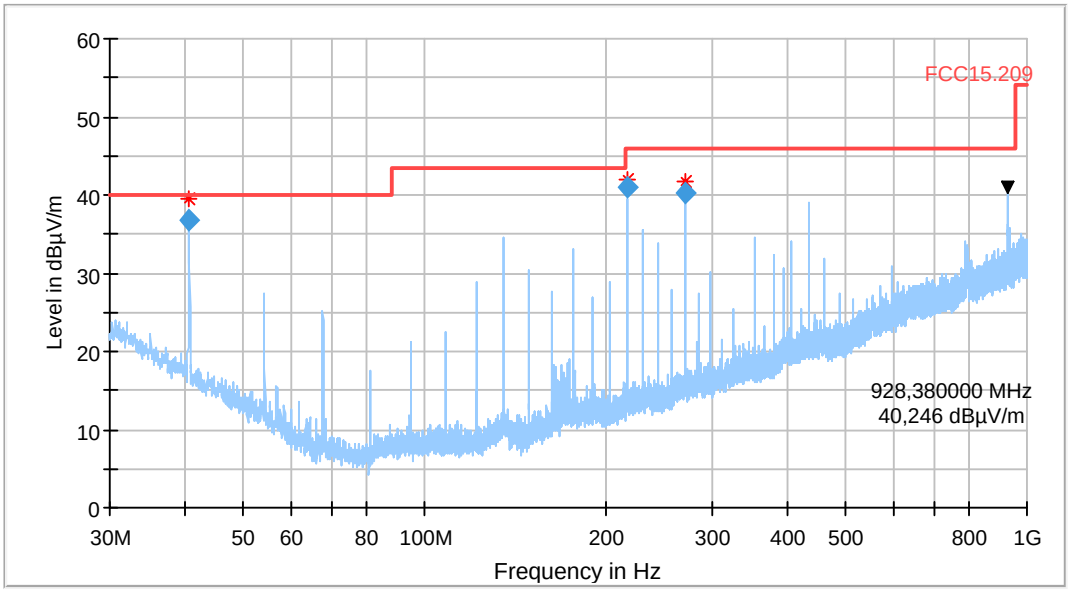
Test Description:	Radiated field strength emission in 3m distance
Test Site:	CETECOM GmbH Essen
Test Standard:	FCC 15.205&15.209 & RSS Gen. Issue 5
Antenna polarisation:	horizontal/vertical
Environmental Conditions::	Humidity : 50%rH; Temperature: 20°C
Operator Name:	TFra
Operating Mode:	TXRX 13.56 MHz
Verdict:	Passed

EUT Information

PMT number:	20-1-00636S18_C01
Power Supply:	12 V DC

Full Spectrum

Full Spectrum

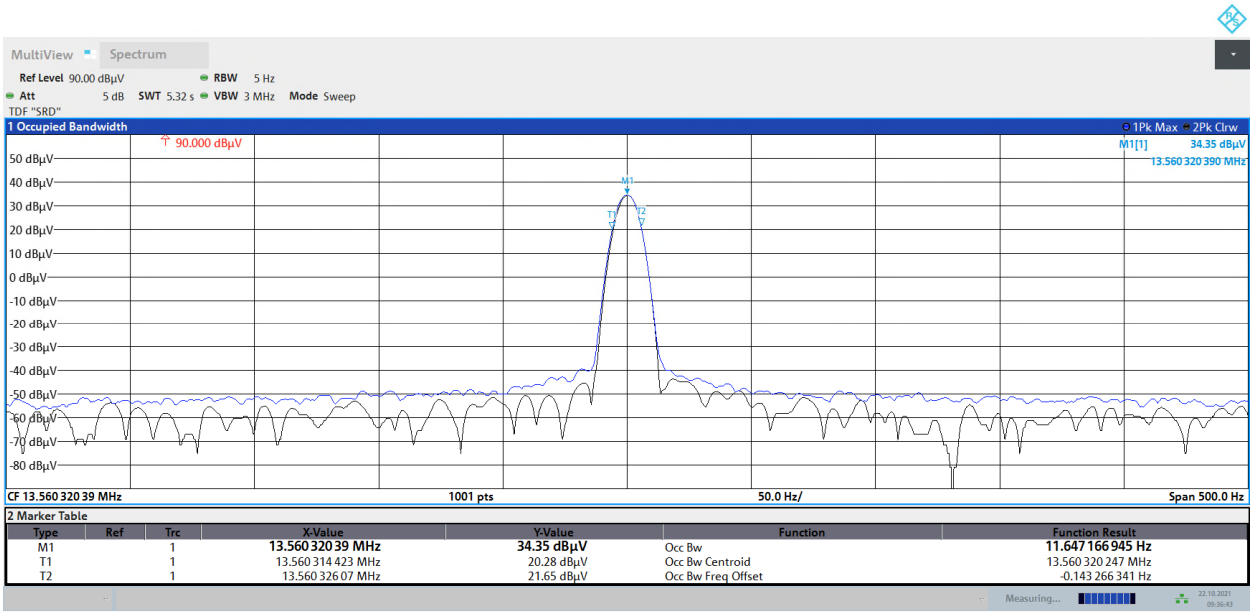


Final_Result

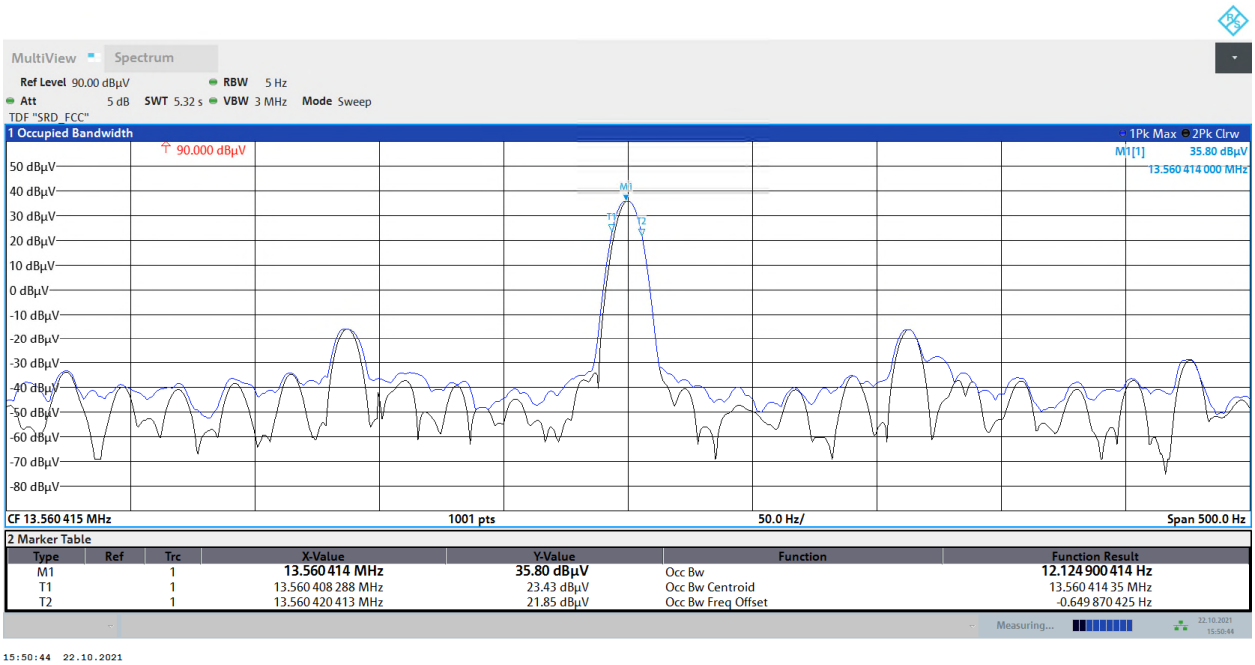
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Preamp (dB)	Trd Corr. (dB/m)
40.683000	36.84	40.00	3.16	120.000	105.0	V	268.0	16.8	0.0	0.6	16.2
216.965000	40.93	46.00	5.07	120.000	105.0	V	198.0	12.0	0.0	1.4	10.6
271.205000	40.20	46.00	5.80	120.000	105.0	V	28.0	14.6	0.0	1.6	13.0

1.4 Occupied Channel Bandwidth 99%

1.4.1 OBW_TX_S10_TnomVnom



1.4.2 OBW_TXRX_S18_TnomVnom

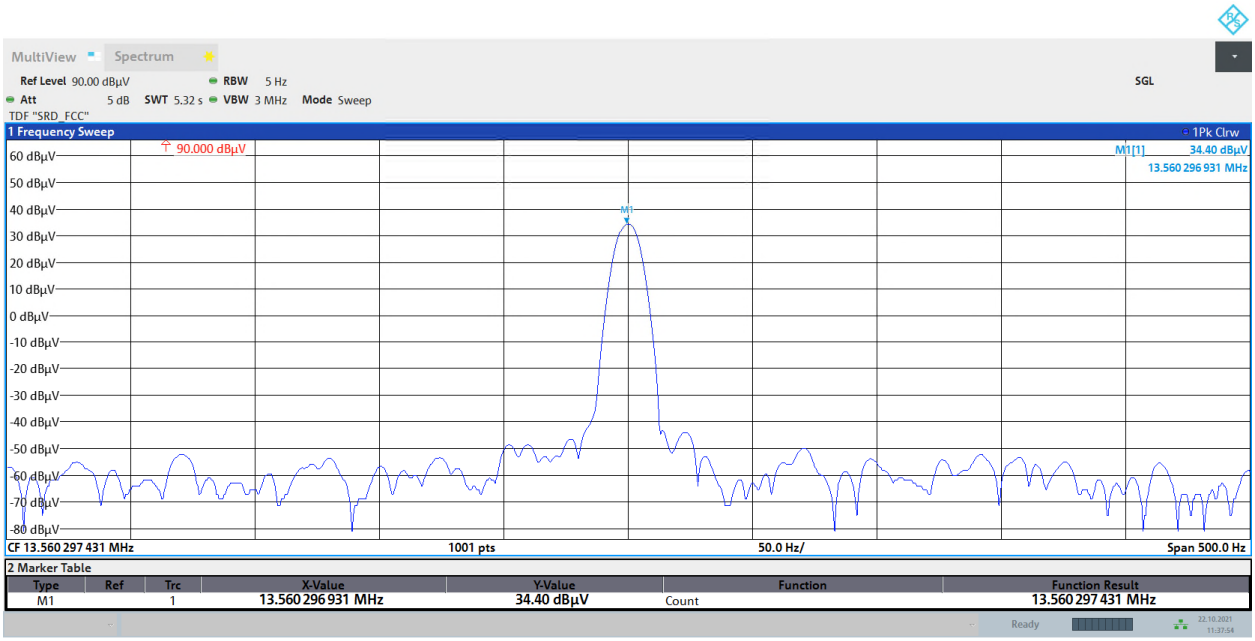


1.5 Frequenzy stability

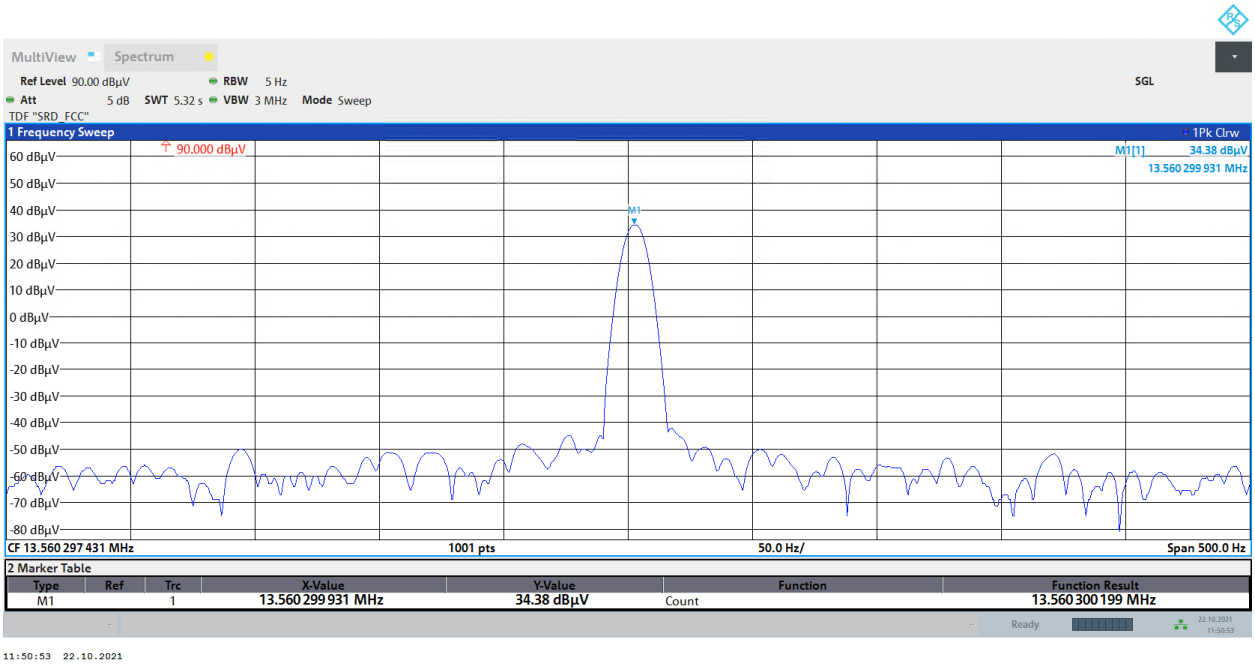
Only reference and worst-case measurement diagrams are shown

1.5.1 Voltage variation

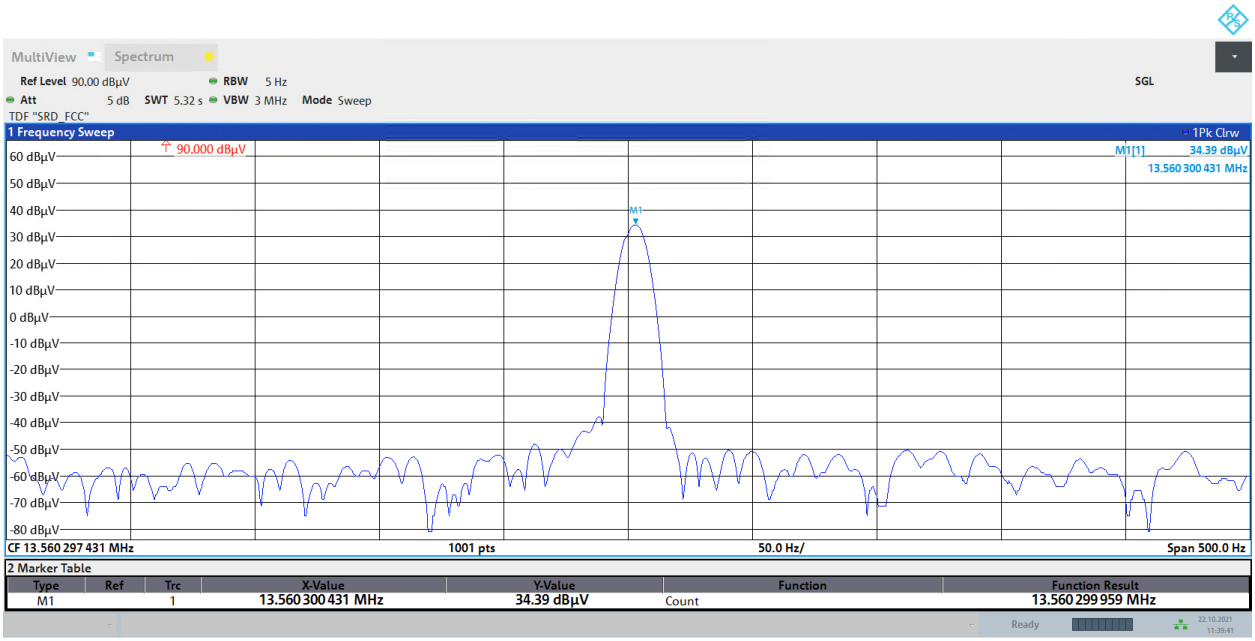
1.5.1.1 TnomVnom



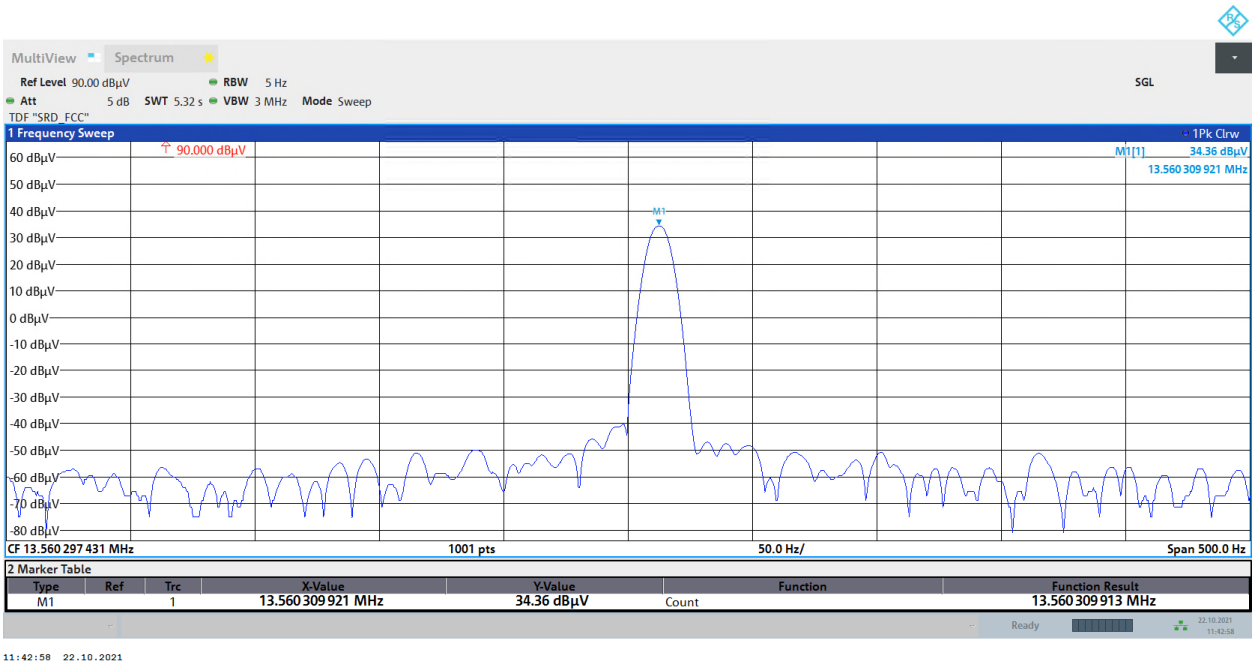
1.5.1.2 TnomVmin



1.5.1.3 TnomVmax

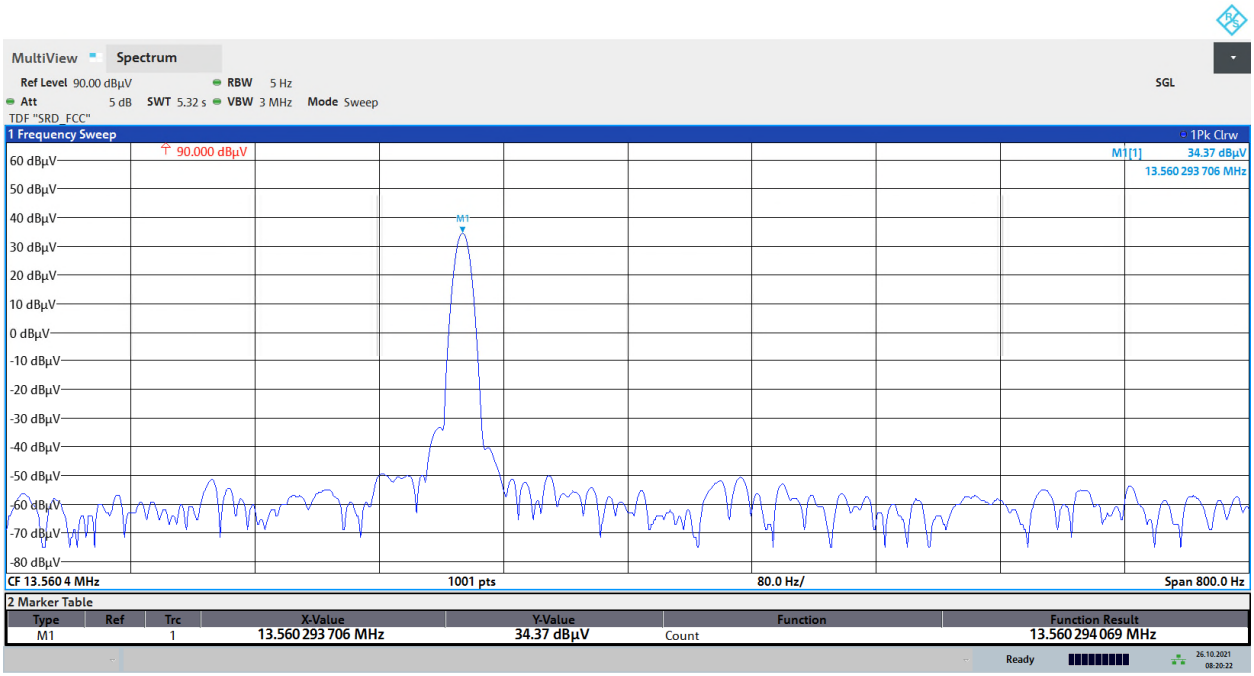


1.5.1.4 TnomV=13 V DC (worst case)



1.5.2 Temperatur variation

1.5.2.1 VnomTnom



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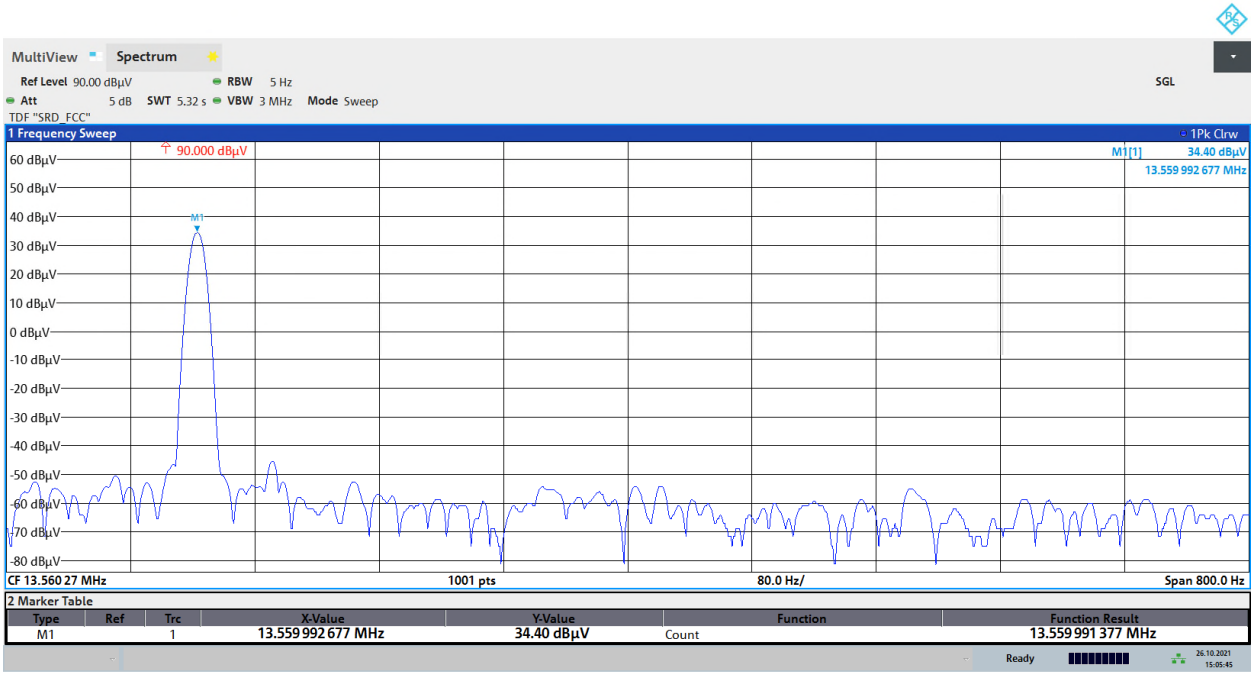
1.5.2.2 VnomTmin at startup



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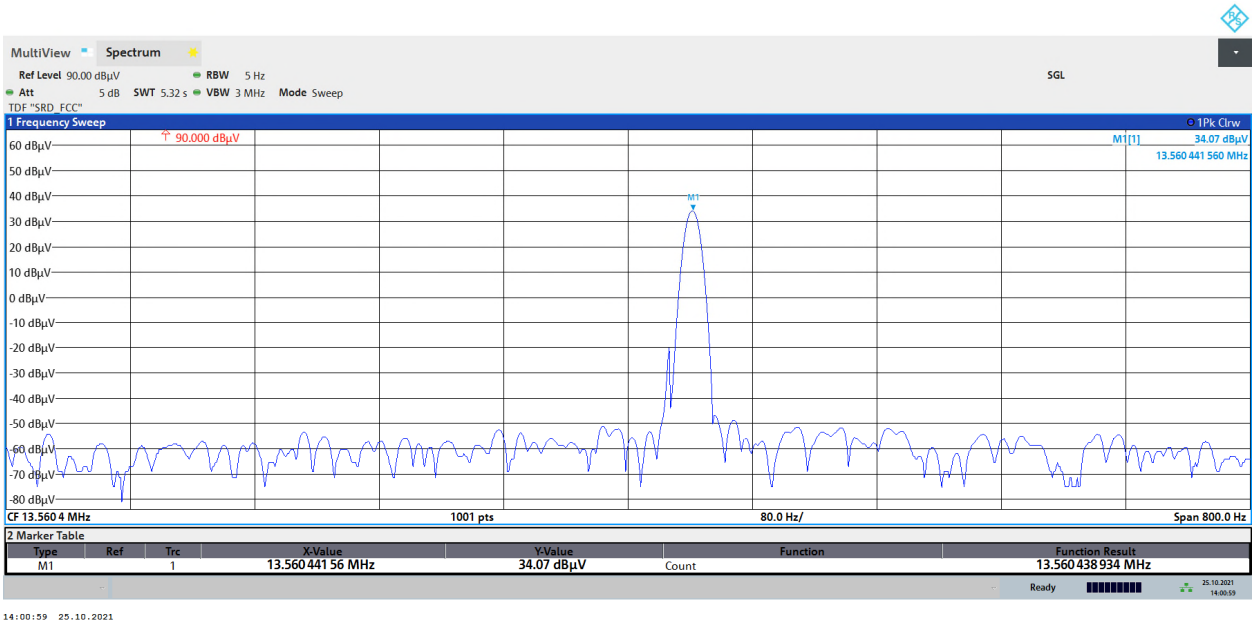
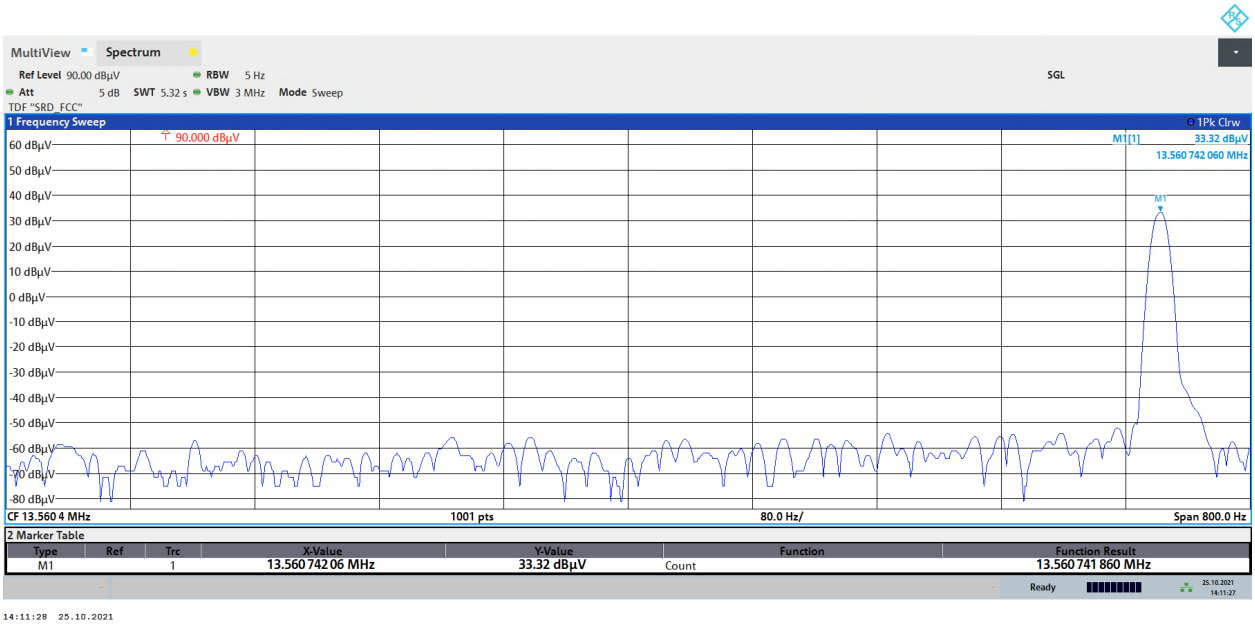
1.5.2.3 VnomTmax at startup



1.5.2.4 VnomT=80 °C at 10 min (worst case)



End Of Annex 1