DAkkS Deutsche Akkreditierungsstelle D-PL-21375-01-00

LENHARDT WORLDWIDE | TESTING | CERTIFICATION

Bundesnetzagentur BNetzA-CAB-21/21-21

Test Report

Test report no.: 24060270-41017-2
Date of issue: 2024-12-19

Test result: The test item **- passed -** and complies with the listed standards.

Applicant
ACOEM France SAS

Manufacturer
IMBU BV

Test Item
1-1300/1-1301

Radio Frequency Testing according to:

Title 47
FCC Regulations Subpart 15C
§15.250

Tested by (name, function, signature)	*Piotr Sardyko* *Labor Manager*	signature
Approved by (name, function, signature)	*Andreas Bender* *Deputy Managing Director*	signature

Applicant and Test item details	
Applicant	ACOEM France SAS 200 chemin des Ormeaux, 69578 Limonest France
Manufacturer	IMBU BV Industriestraat 8, 6827BD Arnhem The Netherlands
Test item description	Wireless accelerometer with UWB and BLE. Time-keeper with UWB and BLE and wired connection to optical tachometer.
Model/Type reference	1-1300/1-1301

FCC ID	2AC3Z-11300-11301
Technology	UWB

Disclaimer and Notes

The content of this report relates to the mentioned test sample(s) only.
IBL-Lab GmbH does not take samples. The samples used for testing are provided by the applicant.
Without a written permit of IBL-Lab GmbH, this test report shall not be reproduced, except in full.
The last valid version is available at TAMSys®.
Signatures are done electronically, if signer does not match stated signer, it is signed per order.
Information supplied by the applicant can affect the validity of results. The data is marked accordingly.

Within this test report, a ☒ point / ☐ comma is used as a decimal separator.
If otherwise, a detailed note is added adjected to its use.

Decision rule:
Decision rule based on simple acceptance without guard bands, binary statement, based on mutually agreed uncertainty tolerances with expansion factor k=2.

1 TABLE OF CONTENTS

2 GENERAL INFORMATION

2.1 Administrative details

Testing laboratory	**IBL-Lab GmbH** Heinrich-Hertz-Allee 7 66386 St. Ingbert / Germany Fon: +49 6894 38938-0 Fax: +49 6894 38938-99 URL: https://ib-lenhardt.com/ E-Mail: info@ib-lenhardt.com
Accreditation / Designation	The testing laboratory is accredited by Deutsche Akkreditierungsstelle GmbH (DAkkS) in compliance with DIN EN ISO/IEC 17025:2018. Scope of testing and registration number: • Attachment to the accreditation certificate D-PL-21375-01-00 ○ Electronics ○ Electromagnetic Compatibility ○ Radio ○ Electromagnetic Compatibility and Telecommunication (FCC requirements) ○ Telecommunication (TC) and Electromagnetic Compatibility (EMC) for Canadian Standards ○ Automotive EMC Website DAkkS: https://www.dakks.de/ The Deutsche Akkreditierungsstelle GmbH (DAkkS) is also a signatory to the ILAC Mutual Recognition Arrangement. • Designations ○ FCC Testing Laboratory Designation No. DE0024 ○ ISED Company Number 27156 Testing Laboratory CAB Identifier DE0020 Kraftfahrt-Bundesamt KBA-P 00120-23
Testing location	**IBL-Lab GmbH** Heinrich-Hertz-Allee 7 66386 St. Ingbert / Germany
Date of receipt of test samples	2024-06-18
Start – End of tests	2024-06-18 – 2024-06-24

2.2 Possible verdicts of the results

Test sample meets the requirements	P (PASS) – the measured value is below the acceptance limit, AL = TL
Test sample does not meet the requirements	F (FAIL) – the measured value is above the acceptance limit, AL = TL
Test case does not apply to the test sample	N/A (Not applicable)
Test case not performed	N/P (Not performed)

2.3 Observations

No additional observations other than the reported observations within this test report have been made.

2.4 Opinions and Interpretations

No appropriate opinions or interpretations according ISO/IEC 17025:2017 clause 7.8.7 are within this test report.

2.5 Revision History

-0 Initial Version

-1:

- the test report was revised for FCC 15.250. Originally the report was compiled for FCC 15.519. Please comment in the Chapter 7.3. for changes.

-2:

- FCC ID was corrected

This test report 24060270-41017-2 **replaces the previous test report** 24060270-41017-1.

2.6 Further documents

List of further applicable documents belonging to the present test report:

Measurement plots:	24060270-41017-2_Annex A
EUT photographs:	24060270-41017-2_Annex B
Test setup photographs:	24060270-41017-2_Annex C

2.7 Formula for determination of correction values (E_C)

$E_C = E_R + AF + C_L + D_F - G_A$ (1)

$M = L_T - E_C$ (2)

E_C = Electrical field – corrected value
E_R = Receiver reading
M = Margin
L_T = Limit
AF = Antenna factor
C_L = Cable loss
D_F = Distance correction factor (if used)
G_A = Gain of pre-amplifier (if used)

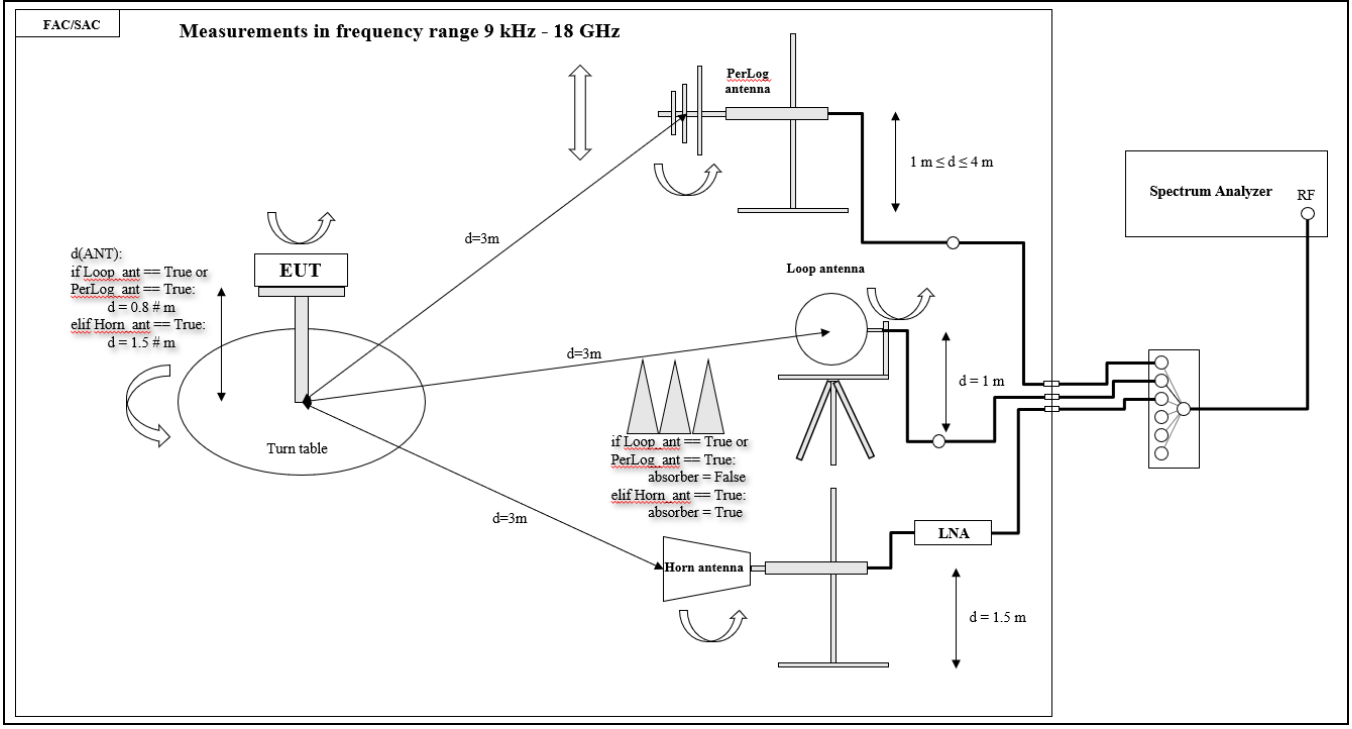
All units are dB-units, positive margin means value is below limit.

2.8 Software/Firmware used for measurements

All measurements were done directly with spectrum analyzer or SW R&S EMC32.
In some measurements (please see test equipment list for each test) R&S ESW 26 was used (please see chapter 8).
(Instrument) Firmware Version: **1.70**
In some measurements (please see test equipment list for each test) R&S FSW 50 was used (please see chapter 8).
(Instrument) Firmware Version: **4.61**
In some measurements SW R&S EMC32 was used.
Version: **11.10.00**

2.9 Block diagrams

Block diagram 1*:



* depending on limit line different horn antennas, correspondingly different measurement distances, can be used. If the case here, please see the annex C with test set-up photos.

3 ENVIRONMENTAL & TEST CONDITIONS

3.1 Environmental conditions of lab

Temperature	20°C ± 5°C
Relative humidity	25-75 % R.H.
Barometric Pressure	860-1060 mbar
Power supply	3.6 V battery

4 TEST STANDARDS AND REFERENCES

Test standard (accredited)	
FCC CFR Title 47 Part 15 Subpart C	---
ANSI C63.10: 2013	---

Test standard (not accredited)
None

Reference	**Description**
none	---

5 EQUIPMENT UNDER TEST (EUT)

5.1 Product Description*

Time-keeper and Wireless accelerometer with UWB and BLE. Timekeeper also has wired connection to optical tachometer.

*: declared by the applicant

5.2 Technical Data of Equipment*

Number of channel:	1
Channel tested:	f_{cent}: 6489.6 MHz
Device type:	Hand held UWB system
Number of channels:	1
Emission designator(s):	IEEE 802.15.4-2011 UWB
RF mode:	Tx / Rx
Antenna Type:	Internal
Max radiated emissions:	< -41.3 dBm
Antenna connector:	None
Equipment type:	Production model
Temperature range:	Tmin: -20 °C, Tmax: 60 °C
Type of power source:	Internal power battery (2.8V to 4.2V)

*: declared by the applicant

5.3 Test Item (Equipment Under Test) Description*

Short designation	EUT Model	EUT Description	ID	Hardware status	Software status
EUT A	1-1300/1-1301	Wireless accelerometer / Time-keeper with UWB	6D257A1F46DA9373	1.1	1.3.1

*: declared by the applicant

5.4 Auxiliary Equipment (AE) Description*

AE short designation	EUT Name (if available)	EUT Description	Serial number (if available)	Software (if used)
AE 1	1-1300/1-1301	Wireless accelerometer / Time-keeper with UWB	CC630D67E57EF41C	1.3.1

*: declared by the applicant

5.5 Test Item Operating Modes Description*

EUT operating mode no.	Description of operating modes	Additional information
op. 1	Continuous modulated	-
op. 2	Normal mode	-

*: declared by the applicant

5.6 Test Item Set-ups Description

set. 1	EUT A
set. 2	EUT A + AE 1

5.7 Test Conditions

Temperatur, [°C]		Voltage, [V]	
Tnom	20 ± 5	Vnom	3.6

5.8 Additional Information

Test items differences	-
Additional comments	All the tests were done with 3.6 V / 3.42 Wh Li-Ion batteries (see photos in Annex B).

6 SUMMARY OF TEST RESULTS

Test specification
FCC 15.250

FCC part	Requirement / Test Case	Test Conditions	Set-up	Opera-ting mode	Result / Remark	Verdict
-	Transmission time	Nominal	2	2	None	**Pass**
15.250(a,b)	10 dB bandwidth	Nominal	1	1	None	**Pass**
15.209 15.250(d1)	Radiated emissions	Nominal	1	1	None	**Pass**
15.250(d2)	Radiated emissions in the GPS bands	Nominal	1	1	None	**Pass**
15.250(d3)	Fundamental emission peak power	Nominal	1	1	None	**Pass**
15.203	Antenna requirement	-	-	-	-	**Pass**

Notes
None

Comments and observations
None

7 TEST RESULTS

7.1 Transmit time

Test equipment (Please see Chapter 8 for exact information of test equipment)
Radiated: R3, A3, C1, Amp2
Description*: Plot 1.1.: Door of the chamber is open all the time. EUT A and AE 1 are communicating. Plot 1.2.: Door of the chamber is closed at t=20 s (communication between AE1 and EUT A is interrupted through it). EUT A ceases transmission at t=27.95 s.
Limits A UWB device operating under the provisions of this section shall transmit only when it is sending information to an associated receiver. The UWB intentional radiator shall cease transmission within 10 seconds unless it receives an acknowledgement from the associated receiver that its transmission is being received. An acknowledgment of reception must continue to be received by the UWB intentional radiator at least every 10 seconds or the UWB device must cease transmitting.
Results*

Plot No	Set-up / Op.	Frequency, [MHz]	Measured value, [ms]	Limit**, [sec]	Result
1.2	2/2	6489.6	7.95	10	**Pass**

* Please see measurement plots in Annex A.

7.2 Occupied Bandwidth

Test equipment (Please see Chapter 8 for exact information of test equipment)

Radiated: R3, A3, C1, Amp2

Description

The measurement test set-up and test procedure are in accordance with the provisions described in ANSI 63.10: 2013, Chapter 10.1.
Please see test set-up photos in Annex C and block diagram in Chapter 2.9.
Please see Plots in Annex A for spectrum analyzer settings.
Measurement was done radiated.

Limits

The UWB bandwidth of a device operating under the provisions of this section must be contained between 3100 MHz and 10600 MHz.

Results*

Plot No	Set-up / Op.	f_{low}, [MHz]	f_{high}, [MHz]	Measured value (10 dB BW), [MHz]	Limit, [GHz]	Result
2.1.	1 / 1	6236.8	6781.1	544.3	5.925 – 7.25, OBW > 0.05	**Pass**

* Please see measurement plots in Annex A.

7.3 Radiated field strength / emissions

Test equipment

Frequency range 9 kHz – 30 MHz

Measurement in a semianechoic room with the distance between the EUT and the reference point of the antenna 3 m (see photos in Annex B). The measurement was done with software R&S EMC 32 V11.00.

Radiated: A1, C1, R1, SW2

Frequency range 30 MHz – 1 GHz

Measurement in a semianechoic room with the distance between the EUT and the reference point of the antenna 3 m (see photos in Annex B). The measurement was done with software R&S EMC 32 V11.00.

Radiated: A2, C1, R1, SW2

Frequency range 1 GHz – 40 GHz

The measurement was done directly with spectrum analyzer. Please see photos in Annex C for test set-up.

Radiated: (C1), R3, R4

Frequency range, [MHz]	Antenna	Measurement distance, [m]	Min Rayleigh (far-field) distance, [m]	Amplifier used	Is the measurement distance in m equal to or greater than the Rayleigh distance
960-1610	A3	1	0.99	Amp2	Yes
1610-2600	A3	2	1.59	Amp2	Yes
2600-3950	A5	1	0.35	Amp2	Yes
3950-5850	A6	0.7	0.28	Amp2	Yes
5590-10600	A3	3	3	Amp2	Yes
10600-15000	A7	1	0.97	Amp3	Yes
15000-18000	A8	1	0.62	Amp3	Yes
18000-26500	A9	0.5	0.48	Amp4	Yes
26500-40000	A10	0.32	0.31	Amp4	Yes

Description

The measurement test set-up and test procedure are in accordance with the provisions described in ANSI 63.10: 2013.
RBW for frequency range 9 kHz- 30 MHz: 200 Hz, 9 kHz.
RBW for frequency range 30 MHz- 1 GHz: 120 kHz.
RBW for frequency range 1 GHz- 40 GHz: 1 MHz.
See photos in Annex C for test Set-up and block diagram in Chapter 2.9.

Limits

According to FCC 15.209(a):

Frequency (MHz)	Magnetic field strength (HField) (µA/m)*	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	6.37/F (F in kHz)	2400/F(kHz)	300
0.490-1.705	63.7/F (F in kHz)	24000/F(kHz)	30
1.705-30.0	0.08	30	30
30-88	-	100	3
88-216	-	150	3
216-960	-	200	3

* the measurement was done with dBuV/m units. Please see the appropriate dBuV/m limits in the same table

Limits

According to FCC 15.250(d1) Radiated emissions:

Frequency [MHz]	EIRP in dBm	Measurement distance [meters]	Remarks
960-1610	-75.3	3	-
1610-1990	-63.3		
1990-3100	-61.3		
3100-5925	-51.3		
5925-7250	-41.3		
7250-10600	-51.3		
Above 10600	-61.3		

Test Results

Set-up / Op.	Frequency	Verdict
1 / 1	9 kHz – 40 GHz	**Pass**

All Readings below 1 GHz are Quasi-Peak or Peak detector, above 1 GHz with RMS detector.

Comment:	The test report was originally made for FCC 15.519. Later the test report was revised for FCC 15.250. The limits for spurious emissions from FCC 15.519 (c) mostly match the limits from FCC 15.250 (d)(1). Thus, only plots with not matching limits in Annex A were replaced with plots with the same results but with the new limits. Namely, plot 3.3.3 to 3.3.7 and 3.3.9. No new measurements were made. The measurements, where the spurious emissions are lying close to the limit line were done according to FCC 15.250 (e)(1). Please see plots 3.3.8 and 3.3.12 to 3.3.13. No other spurious emissions have been seen in frequency range 960 MHz – 40 GHz. The emissions in the plot 3.3.1 are the emissions coming from the tilt table, where the EUT was placed.

Verdict	**- PASS -**	For plots please see Annex A to current report

7.4 Radiated emissions in the GPS bands

Test equipment (Please see Chapter 8 for exact information of test equipment)

Radiated: R3, A3, C1, Amp2

Description

The measurement test set-up and test procedure are in accordance with the provisions described in ANSI 63.10: 2013, Chapter 10.3.10.
Please see test set-up photos in Annex C and block diagram in Chapter 2.9.
Please see Plots in Annex A for spectrum analyzer settings.
Measurement was done radiated.
Measurement distance: 3 m.

Limits

-85.3 dBm for frequency range 1164 MHz – 1240 MHz and 1559 MHz – 1610 MHz.

Test Results

Set-up / Op.	Frequency range, [MHz]	Verdict
1 / 1	1164-1240	**Pass**
1 / 1	1559-1610	**Pass**

All Readings were done with RMS detector.

Comment:	---

Verdict	**- PASS -**	For plots please see Annex A to current report

7.5 Fundamental emission peak power

Test equipment (Please see Chapter 8 for exact information of test equipment)
Radiated: R3, A3, C1, Amp2
Description The measurement test set-up and test procedure are in accordance with the provisions described in ANSI 63.10: 2013, Chapter 10.3.6. Please see test set-up photos in Annex C and block diagram in Chapter 2.9. Please see Plots in Annex A for spectrum analyzer settings. Measurement was done radiated. Measurement distance: 3 m.
Limits 0 dBm

Results*

Plot No	Set-up / Op.	fc, [MHz]	fmax, [MHz]	Pmax, [dBm]	Limit, [dBm]	Result
5.1.	1 / 1	6489.6	6493.73	-3.64	0	**Pass**

* Please see measurement plots in Annex A.

7.6 Antenna requirement according to FCC 15.203

The antenna is permanently affixed to the module.

Verdict	**- PASS -**	Please see internal photos of the EUT

8 MEASUREMENT EQUIPMENT

No	Equipment	Type	Manufacturer	Serial No.	Int. No.	Last Calibration	Next Calibration
Antennas (**A**):							
1.	Active Loop Antenna	HFH2-Z2E	Rohde & Schwarz	100108	LAB000108	2023-05-05	2026-05-05
2.	Ultrabroadband antenna	HL562E	Rohde & Schwarz	102005	LAB000150	2022-12-22	2025-12-22
3.	Double-Ridged Waveguide Horn Antenna	HF-907	Rohde & Schwarz	102899	LAB000151	2023-05-05	2026-05-05
4.	Rod Antenna	-	-	-	LAB000290	-	-
5.	Horn Antenna (2.6 GHz – 3.95 GHz)	PE9863/SF-10	Pasternack	-	LAB000312	2021-01-13	-
6.	Horn Antenna (3.95 GHz – 5.85 GHz)	PE9861/SF-10	Pasternack	-	LAB000264	2020-09-29	-
7.	Horn Antenna (10 GHz – 15 GHz)	PE9855 SF-20	Pasternack	-	LAB000263	2020-09-29	-
8.	Horn Antenna (12.4 GHz – 18 GHz)	62-HA20-A-SMF	TTE Europe	-	LAB000282	2020-09-29	-
9.	Horn Antenna (17.6 GHz – 26.7 GHz)	20240-20	Flann Microwave Ltd	266402	LAB000127	2020-06-29	-
10.	Horn Antenna (26.4 GHz – 40.1 GHz)	22240-20	Flann Microwave Ltd	270447	LAB000129	2020-06-29	-
11.	Horn Antenna (33 GHz – 50.1 GHz)	23240-20	Flann Microwave Ltd	273430	LAB000132	2020-07-01	-
12.	Horn Antenna (49.9 GHz – 75.8 GHz)	25240-20	Flann Microwave Ltd	272860	LAB000133	2020-07-01	-
13.	Horn Antenna (60.5 GHz – 91.5 GHz)	26240-20	Flann Microwave Ltd	273417	LAB000135	2020-07-01	-
14.	Horn Antenna (73.8 GHz – 114 GHz)	27240-20	Flann Microwave Ltd	273368	LAB000138	2020-07-01	-
15.	Horn Antenna (114 GHz – 173 GHz)	29240-20	Flann Microwave Ltd	273382	LAB000139	2020-07-01	-
16.	Horn Antenna (145 GHz – 220 GHz)	30240-20	Flann Microwave Ltd	273390	LAB000178	2020-08-01	-
17.	Horn Antenna (217 GHz – 330 GHz)	32240-20	Flann Microwave Ltd	273469	LAB000152	2020-08-01	-
18.	Horn Antenna (49.9 GHz – 75.8 GHz)	25240-20	Flann Microwave Ltd	272861	LAB000134	2020-07-01	-
19.	Horn Antenna (60.5 GHz – 91.5 GHz)	26240-20	Flann Microwave Ltd	273418	LAB000136	2020-08-01	-
Amplifiers (**Amp**)*:							
1.	Pre-Amplifier	BBV 9718 C	Schwarzbeck Mess-Elektronik OHG	84	LAB000169	-	-
2.	Low noise amplifier	BZ-01000900-111550-202320	B&Z Technologies	24336	LAB000296	-	-
3.	Low noise amplifier	BZ-08001800-180855-202020	B&Z Technologies	22105	LAB000297	-	-
4.	Low noise amplifier	BZ-18004000-270845-252525	B&Z Technologies	22449	LAB000298	-	-
Attenuator (**Att**)*:							
1.	Attenuator	25081-20 (49.9 GHz - 75.8 GHz)	Flann Microwave Ltd	234411	LAB000229	-	-

2.	Attenuator	27081-20 (73.8 GHz – 112 GHz)	Flann Microwave Ltd	270004	LAB000230	-	-
RF Cables (Cab)*:							
1.	Coaxial cable	LU7-022-1000	Rosenberger	33	LAB000153	-	-
2.	Coaxial cable	LU7-022-1000	Rosenberger	34	LAB000153	-	-
3.	Coaxial cable	SF101/1.5m	Huber & Suhner	503987/1	LAB000165	-	-
Chambers (C):							
1.	Semi/Fully Anecoic Chamber	SAC5	Albatross Projects GmbH	20168.PRB	LAB000235	2022-01-31	2025-01-31
2.	Climatic chamber	T-65/50	CTS GmbH	204002	LAB000110	2024-05-12	2025-05-12
3.	Shielding Cover	CMU-Z11	Rohde & Schwarz	100876	LAB000039	-	-
4.	Climatic chamber	T-70/350	CTS GmbH	194027	LAB000066	-	-
5.	Shielded room	Sputnik 1 (Schirmkabine)	Albatross Projects GmbH	-	LAB000257	-	-
Corner Reflector (CR):							
1.	Trihedral Corner Reflector	SAJ-080-S1	ERAVANT	04756-01	LAB000201	-	-
Directional coupler (DC):							
1.	Directional coupler	CPL-5230-10-SMA-79	Midwest Microwave	-	LAB000672	-	-
Distance meter (DM):							
1.	Laser distance meter	GLM 50 C	Bosch	-	-	-	-
2.	Laser distance meter	GLM 120 C	Bosch	-	-	-	-
Filter (F)*:							
1.	High-pass filter (84 GHz – 110 GHz)	10-WHPF-84.5-UG387	TTE	-	LAB000299	-	-
2.	High-pass filter (7 GHz – 23 GHz)	HPF 7-23	AtlantRF	-	LAB000444	-	-
3.	High-pass filter (3.3 GHz – 12.75 GHz)	HPF 3.3-11	AtlantRF	-	LAB000382	-	-
4.	High-pass filter (1.3 GHz – 12.75 GHz)	H1G713G1	Microwave Circuits Inc	46291	LAB000443	-	-
5.	High-pass filter (1.3 GHz – 12.75 GHz)	H1G713G1	Microwave Circuits Inc	1896-01	LAB000670	-	-
6.	Bandstop filter (30MHz – 3GHz for 900 MHz Band)	WRCG876/960-847/989-50/8SS	Wainwright Instruments GmbH	-	LAB000671	-	-
Harmonic mixers (H):							
1.	Harmonic Mixer	FS-Z60	Rohde & Schwarz	101350	LAB000375	2024-04-11	2025-04-11
2.	Harmonic Mixer	FS-Z75	Rohde & Schwarz	102015	LAB000112	2024-05-01	2025-05-01
3.	Harmonic Mixer	FS-Z90	Rohde & Schwarz	102020	LAB000113	2024-04-06	2025-04-06
4.	Harmonic Mixer	FS-Z110	Rohde & Schwarz	102000	LAB000114	2024-05-02	2025-05-02
5.	Harmonic Mixer	FS-Z170	Rohde & Schwarz	100996	LAB000126	2024-05-07	2025-05-07
6.	Harmonic Mixer	FS-Z220	Rohde & Schwarz	101039	LAB000116	2024-04-03	2025-04-03
7.	Harmonic Mixer	FS-Z325	Rohde & Schwarz	101015	LAB000117	2024-04-16	2025-04-16
LISN (L):							
1.	Two-line V-Network	ENV216	Rohde & Schwarz	102597	LAB000220	-	2024-09-07
2.	Two-line V-Network	ENV216	Rohde & Schwarz	102598	LAB000217	2024-06-06	2025-06-06
Multimeters (M):							
1.	Multimeter	U1242B	Keysight	MY59240021	LAB000187	2024-06-20	2026-06-20
2.	Multimeter	U1242B	Keysight	MY59160026	LAB000018	2023-09-20	2024-09-20
Multipliers (Mp):							
1.	Multiplier	SMZ75	Rohde & Schwarz	101307	-	2018-03-15	-
2.	Multiplier	SMZ110	Rohde & Schwarz	100001	-	2020-05-09	-
Power Supply (P):							
1.	Power Supply	PS 2042-10 B	Elektro-Automatic GmbH	2878350263	LAB000190	-	-

2.	Power Supply	PS 2042-10 B	Elektro-Automatic GmbH	2878350322	LAB000192	-	-
3.	Power Supply	E3640A	Agilent	MY40005693	LAB000036	-	-
Power meters (PM):							
1.	Power meter	NRP-Z81	Rohde & Schwarz	106194	LAB000120	2024-05-22	2025-05-22
2.	Power meter	NRP110T	Rohde & Schwarz	101151	LAB000119	2024-05-24	2025-05-24
Receivers and Spectrumanalyzers (R):							
1.	Test Receiver, SAC5	ESW-26	Rohde & Schwarz	101517	LAB000363	2024-01-22	2025-01-22
2.	Test Receiver	ESW-26	Rohde & Schwarz	101481	LAB000236	-	-
3.	Spectrum Analyzer 1 Hz – 50 GHz	FSW-50	Rohde & Schwarz	101450	LAB000111	2023-07-26	2024-07-26
4.	Spectrum Analyzer 2 Hz – 43 GHz	FSW-43	Rohde & Schwarz	101391	LAB000289	2024-06-04	2025-06-04
Signal Generators (SG):							
1.	Signal generator 8 kHz – 50 GHz	SMA100B	Rohde & Schwarz	103838	LAB000118	2024-06-28	2025-06-28
2.	Vector Signal Generator	SMW200A	Rohde & Schwarz	109775	LAB000870	2023-10-18	2026-10-18
3.	Signal generator 100 kHz – 20 GHz	SMB100A	Rohde & Schwarz	178175	LAB000276	2024-04-03	2025-04-03
Software (SW):							
No	Type	Name	Manufacturer	Version	Int. No.	Build	Rev
1.	Software	R&S Power Viewer	Rohde & Schwarz	11.3, 3.2.2020	-	7338	3230
2.	Software	R&S EMC32	Rohde & Schwarz	11.20	-	-	-
3.	Software	R&S Elektra EMC test software	Rohde & Schwarz	13.00	-	-	-

* The gain values of Amp and attenuation values of Cab and Att are remeasured annually internal.

9 MEASUREMENT UNCERTAINTIES

Test case	Measurement uncertainty*
Radiated field strength	≤ ± 6 dB
Occupied bandwidth	± 100 kHz
Time domain measurement	± 2.32 ms
DC and low frequency voltages	± 3 %
Temperature	± 1 °C
Humidity	± 3 %

*) The indicated expanded measurement uncertainty corresponds to the standard measurement uncertainty for the measurement results multiplied by the coverage factor k = 2. The true value is located in the corresponding interval with a probability of 95 %.

END OF THE REPORT

Annex A

Measurement plots

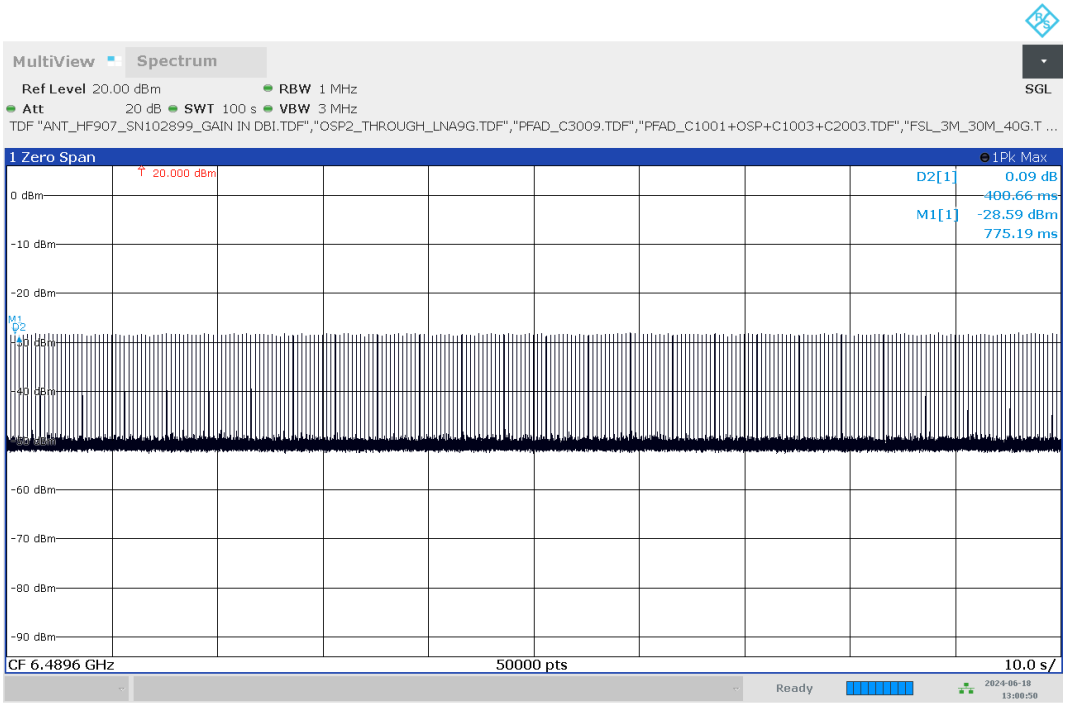
part of / in addition to

Test report no.: 24060270-41017-2

Table of contents:

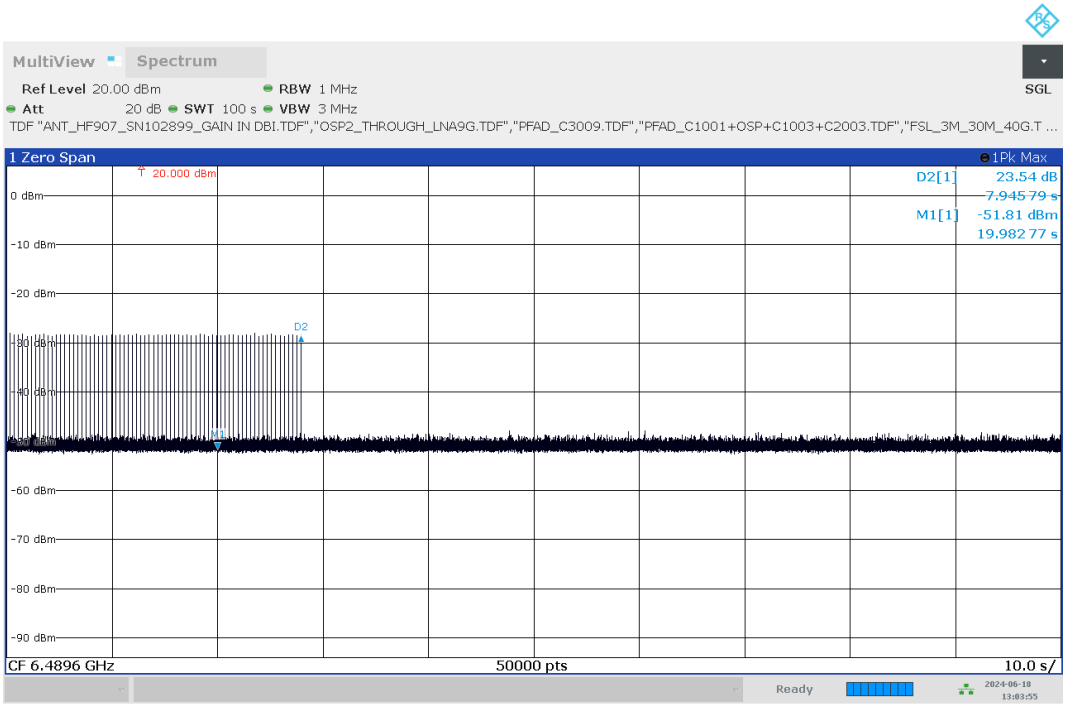
1 TRANSMISSION TIME MEASUREMENT

1.1 **Measurement 1:** Door of the chamber is opened all the time. EUT A and AE 1 are communicating.



01:00:51 06/18/2024

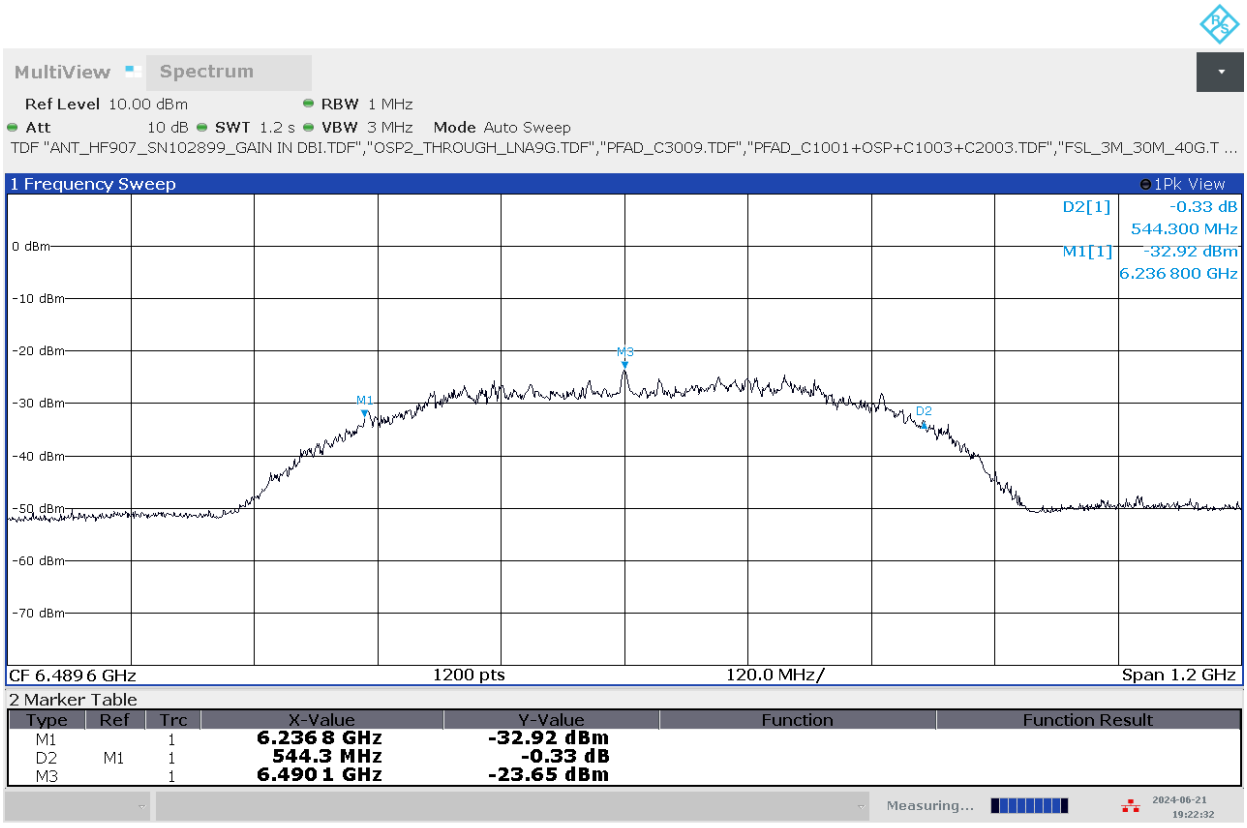
1.2 **Measurement 2:** Door of the chamber is closed at t=20 s (communication between AE1 and EUT A is interrupted through it). EUT A ceases transmission at t=27.95 s.



01:03:56 06/18/2024

2 OCCUPIED BANDWIDTH

2.1 10 dB bandwidth, set-up 1, op. 1

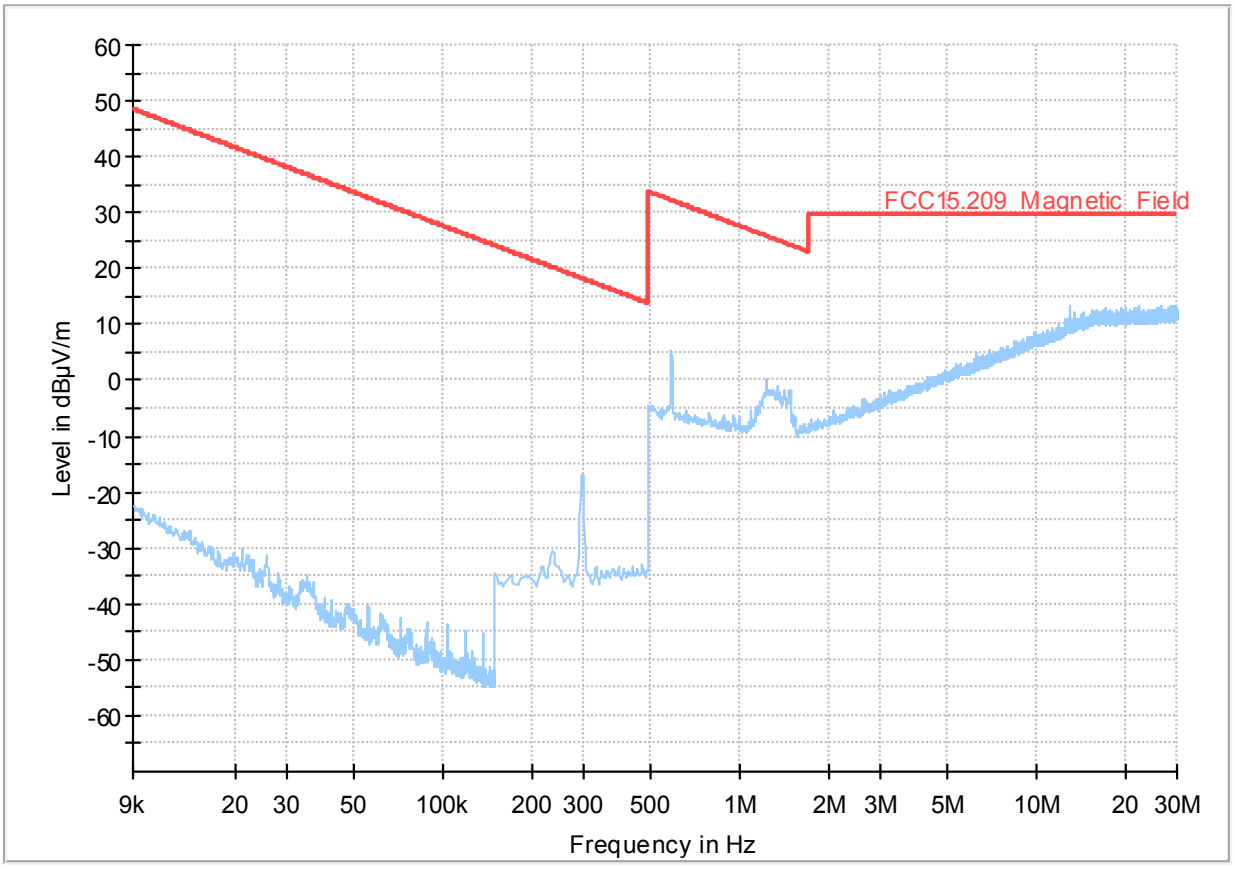


07:22:32 06/21/2024

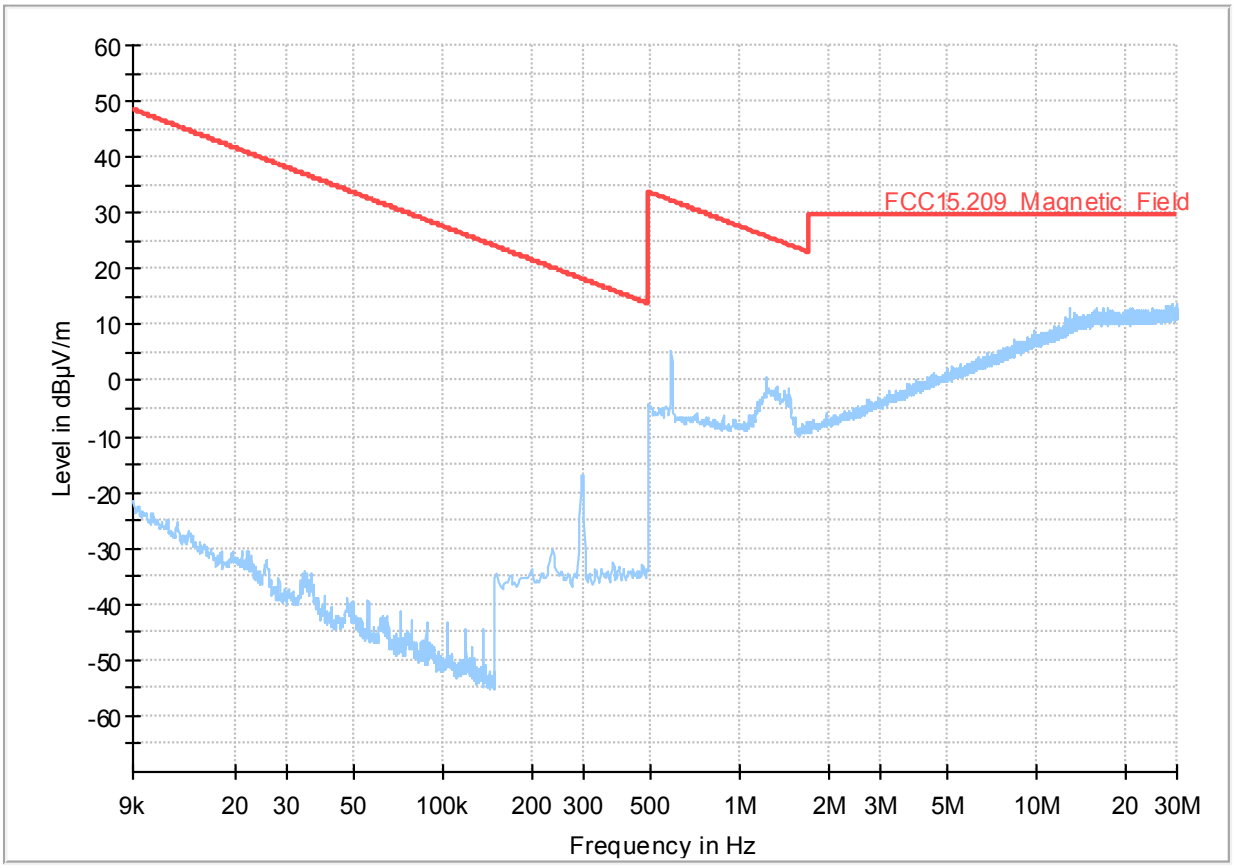
3 GENERAL LIMIT - RADIATED FIELD STRENGTH EMISSIONS, 9 kHz – 5 GHz

3.1 Radiated field strength measurements (f < 30 MHz)

3.1.1 Set-up 1, 9 kHz – 30 MHz, Op. 1, EUTs lying

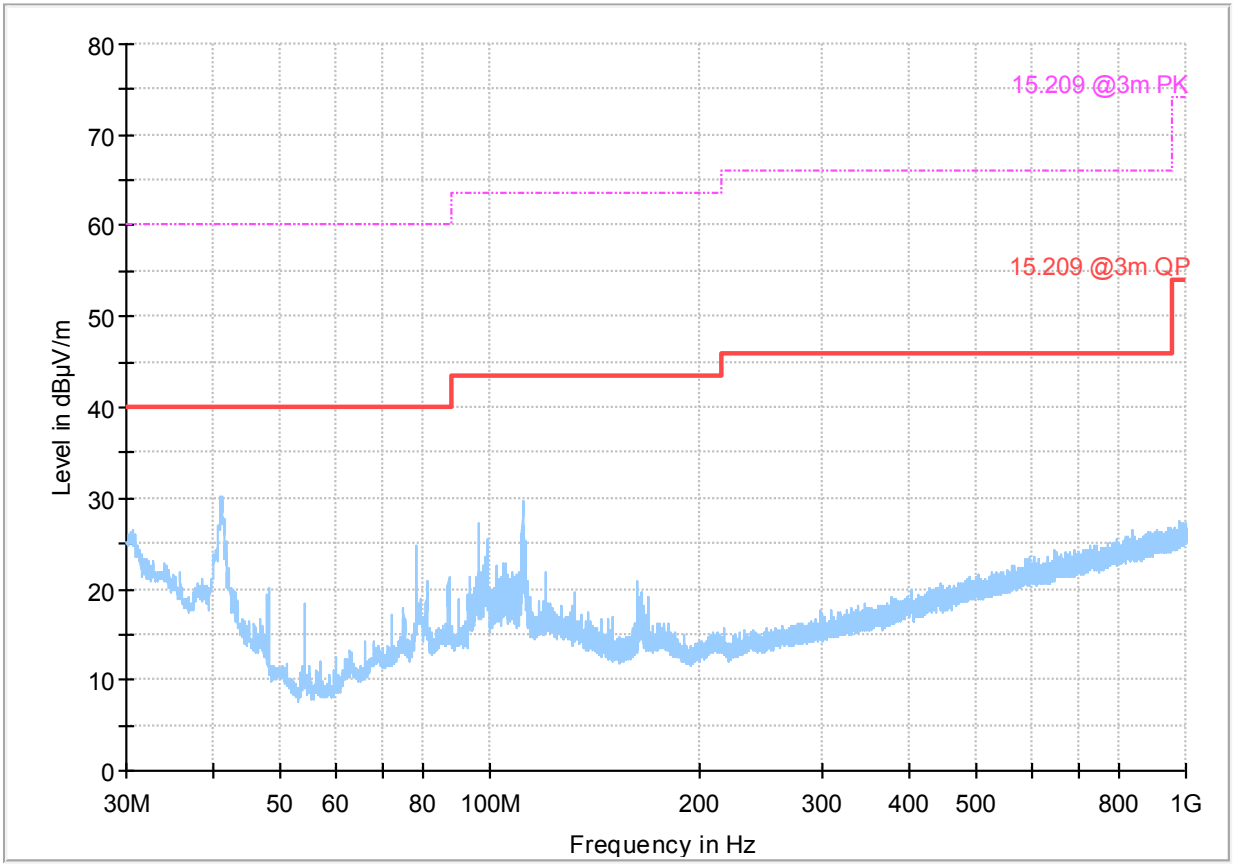


3.1.2 Set-up 1, 9 kHz – 30 MHz, Op. 1, EUTs staying



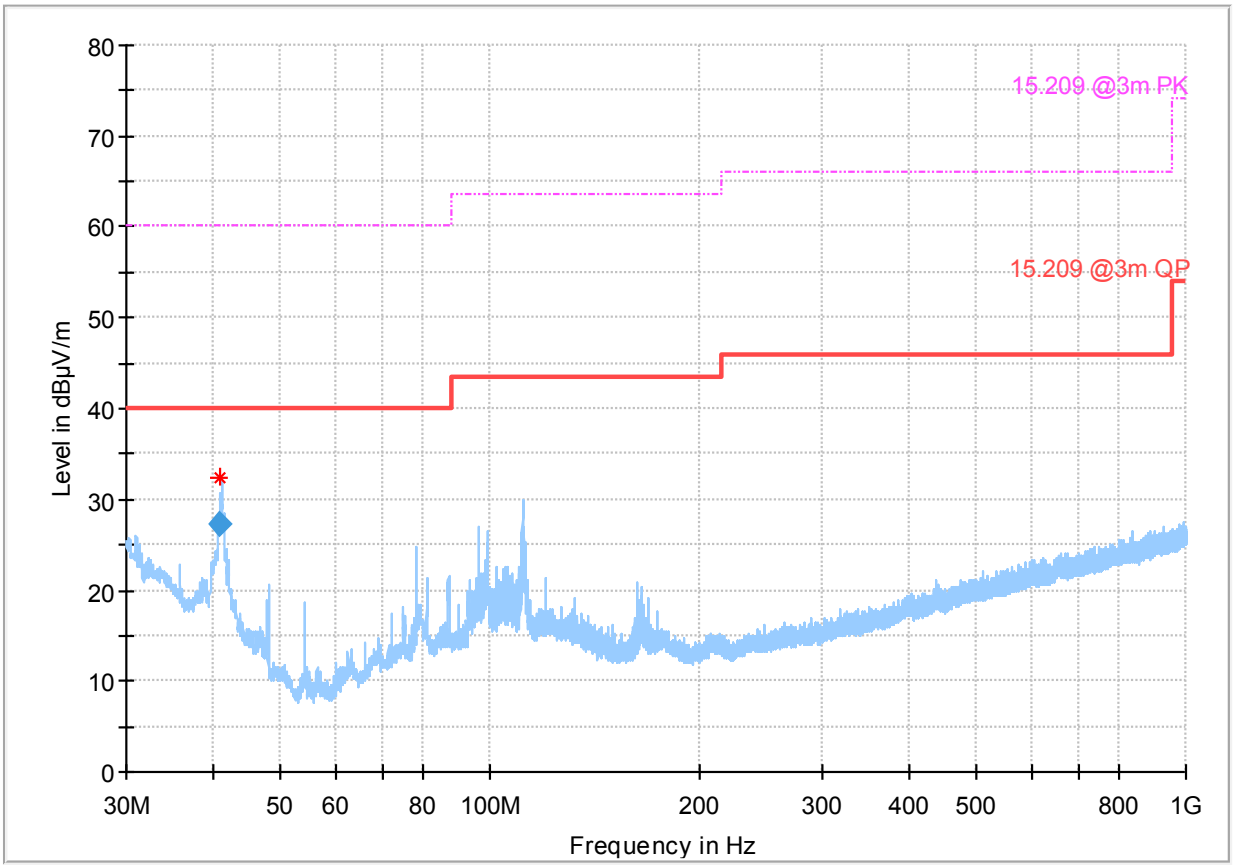
3.2 Radiated field strength measurements (30 MHz < f < 1000 MHz)

3.2.1 Lying, Set-up 1, Op. 1



Preview Result 1-PK+
15.209 @3m PK
Critical_Freqs PK+
Final_Result QPK
15.209 @3m QP

3.2.2 Staying, Set-up 1, Op. 1

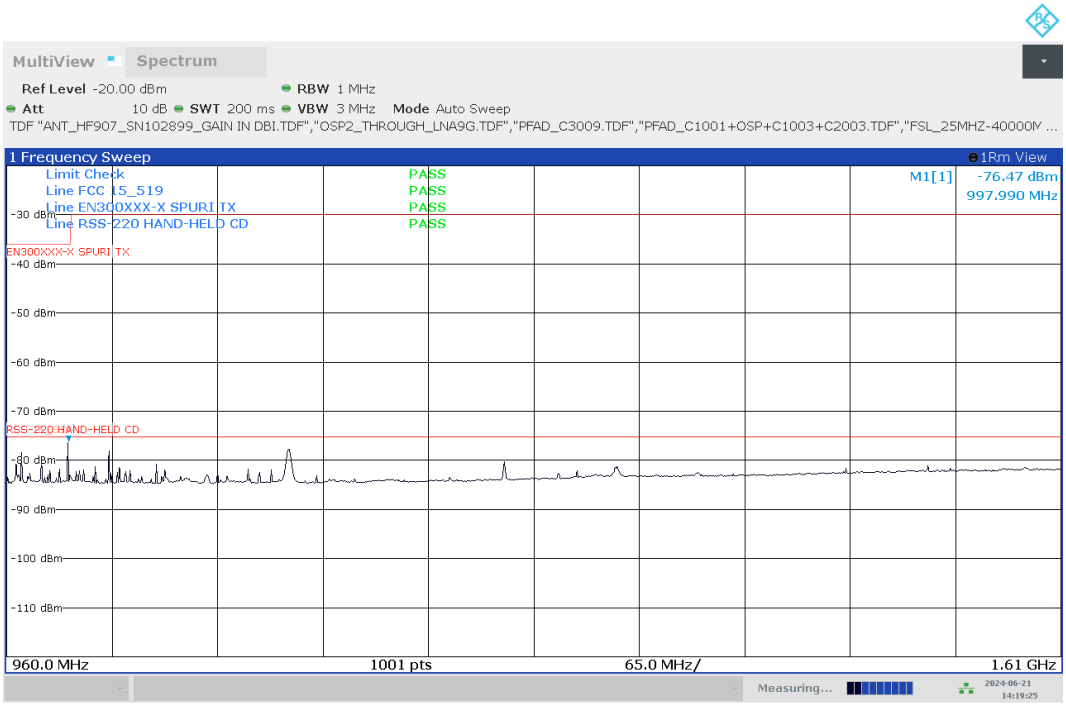


Final_Result

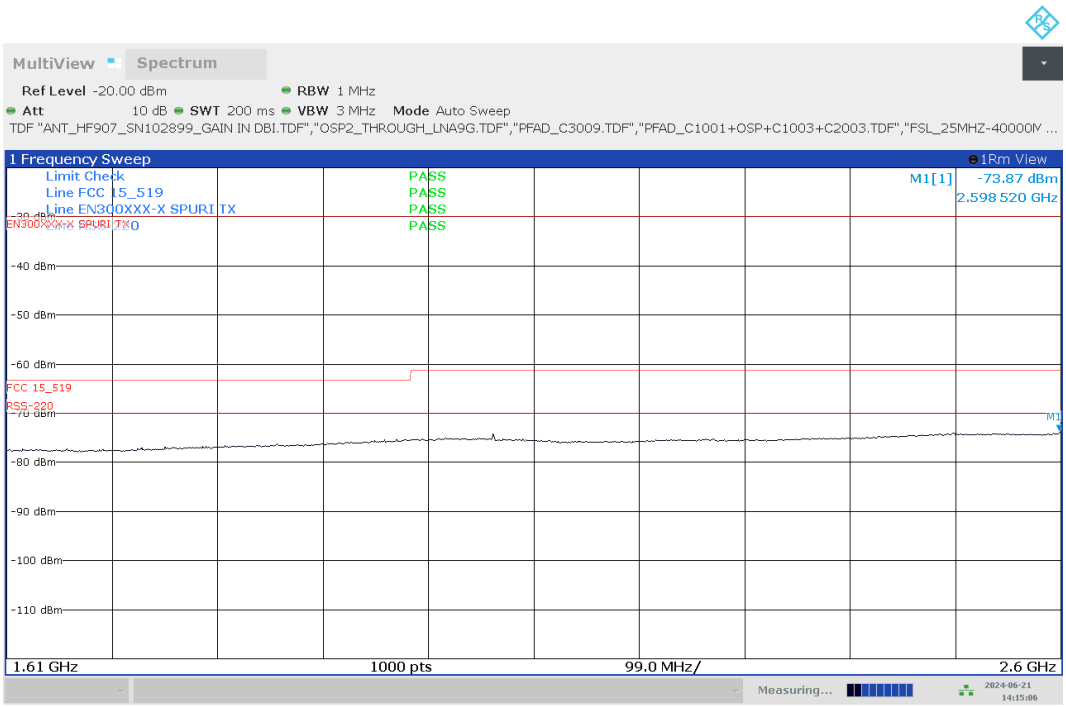
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
40.985000	27.36	40.00	12.64	100.0	120.000	104.0	V	13.0

3.3 Radiated field strength measurements (1 GHz < f < 40 GHz)

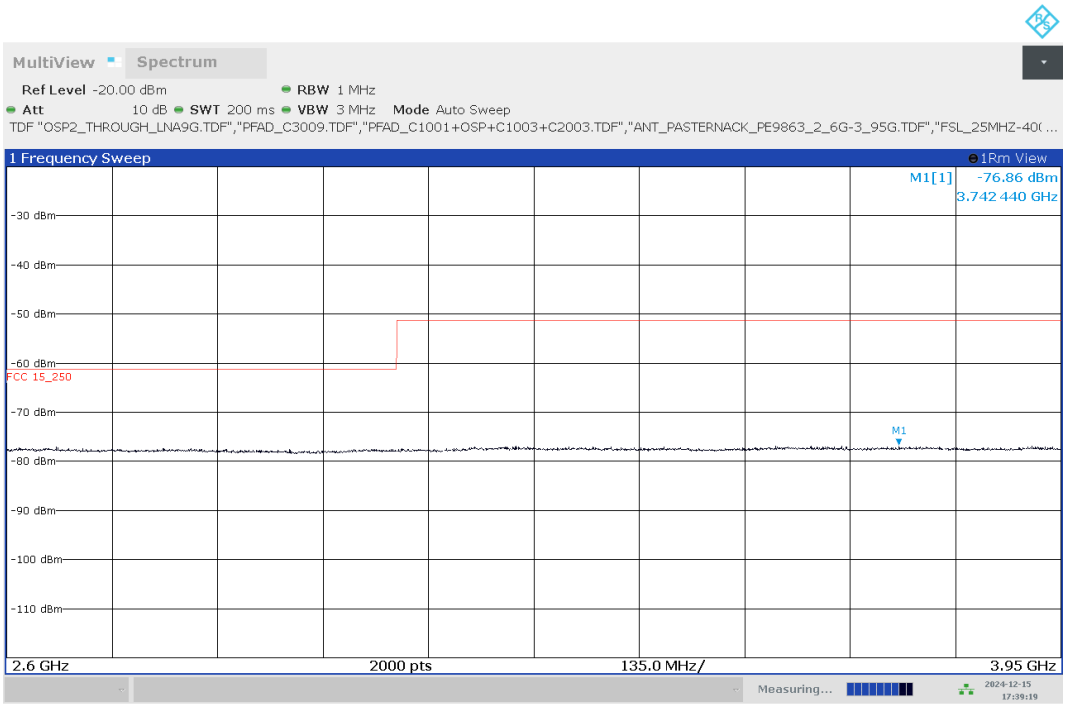
3.3.1 Other emissions, 960 MHz – 1610 MHz, Set-up 1, Op. 1



3.3.2 Other emissions, 1610 MHz – 2600 MHz, Set-up 1, Op. 1

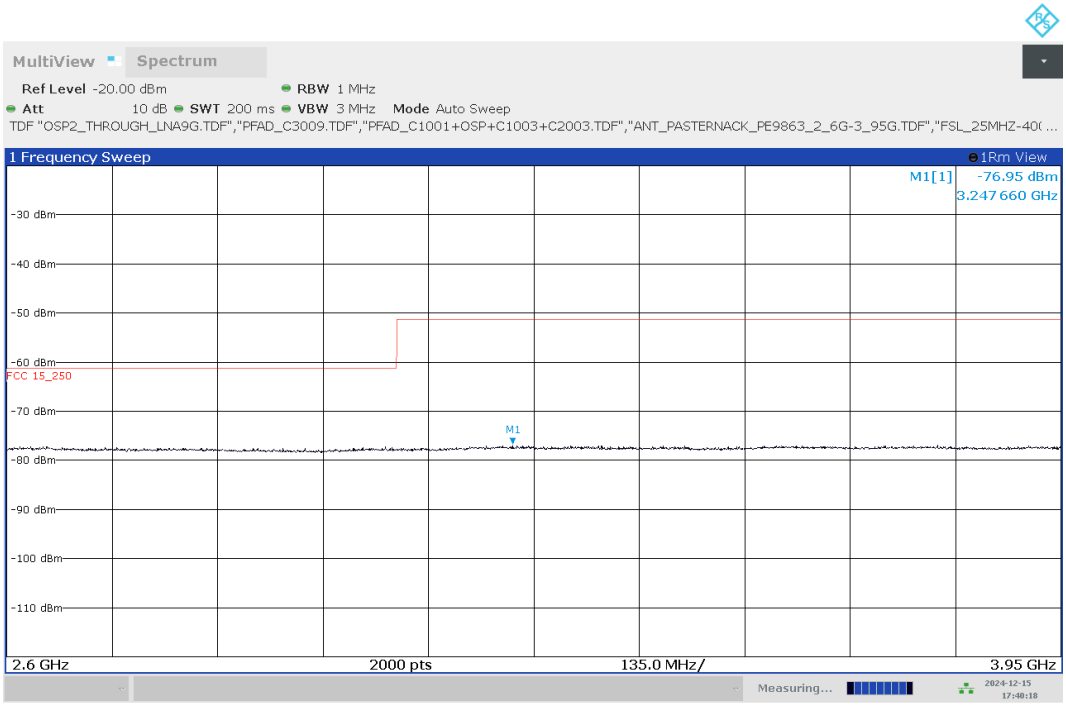


3.3.3 Other emissions, 2600 MHz – 3950 MHz, Set-up 1, Op. 1, ANT HOR



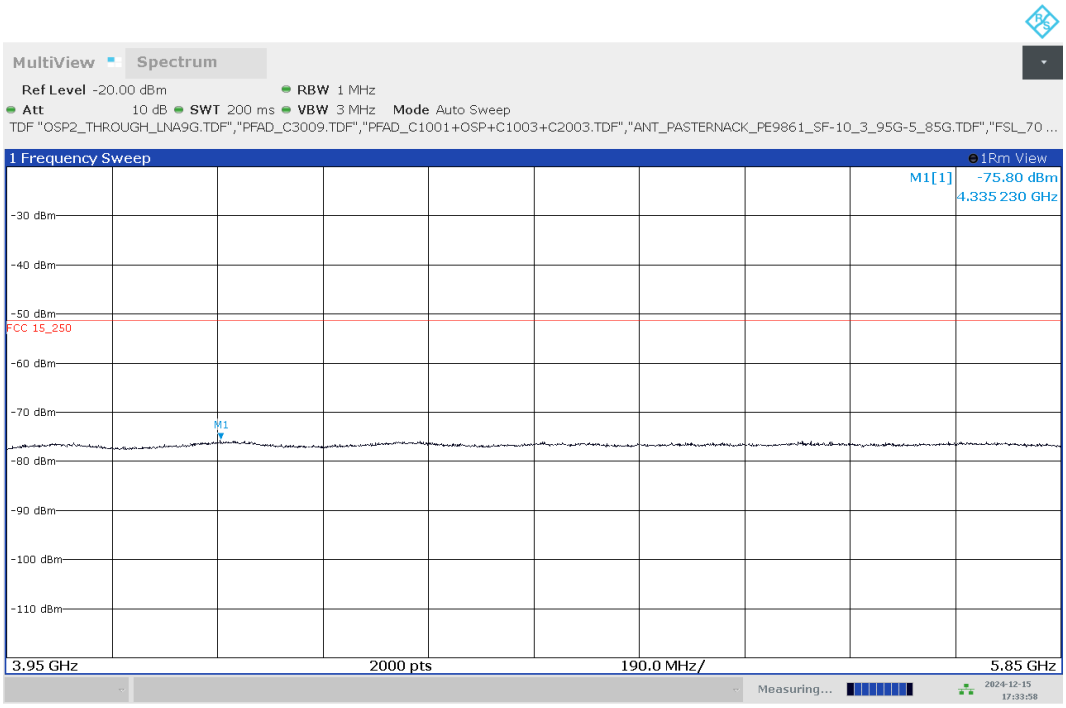
05:39:19 12/15/2024

3.3.4 Other emissions, 2600 MHz – 3950 MHz, Set-up 1, Op. 1, ANT VER



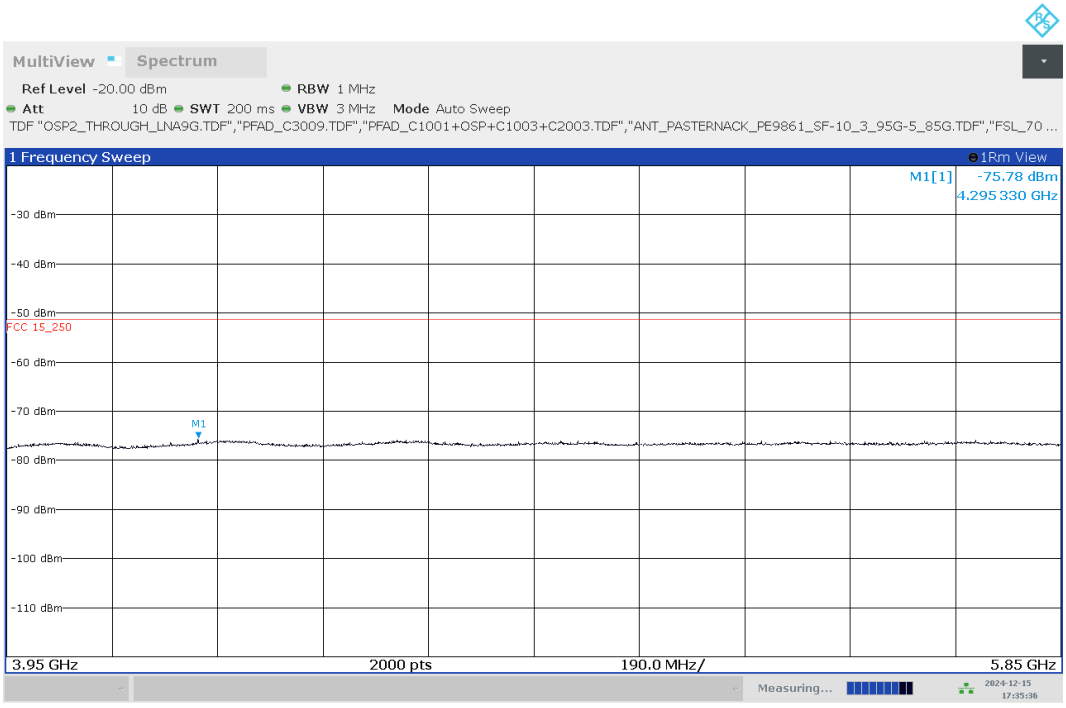
05:40:18 12/15/2024

3.3.5 Other emissions, 3950 MHz – 5850 MHz, Set-up 1, Op. 1, ANT HOR



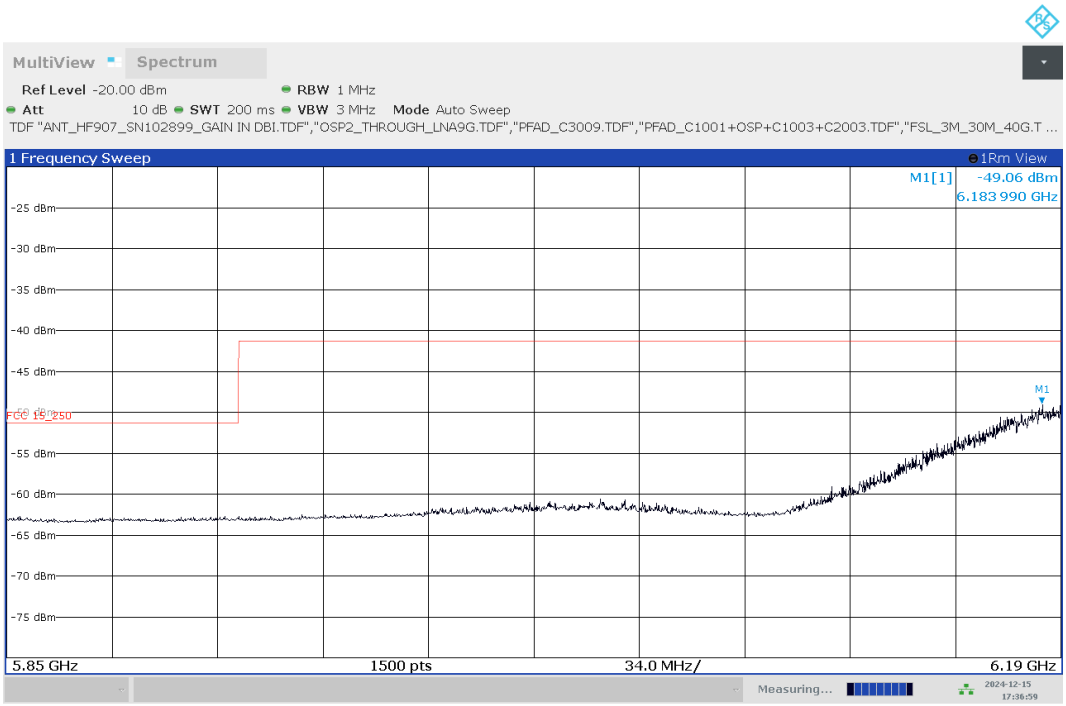
05:33:58 12/15/2024

3.3.6 Other emissions, 3950 MHz – 5850 MHz, Set-up 1, Op. 1, ANT VER



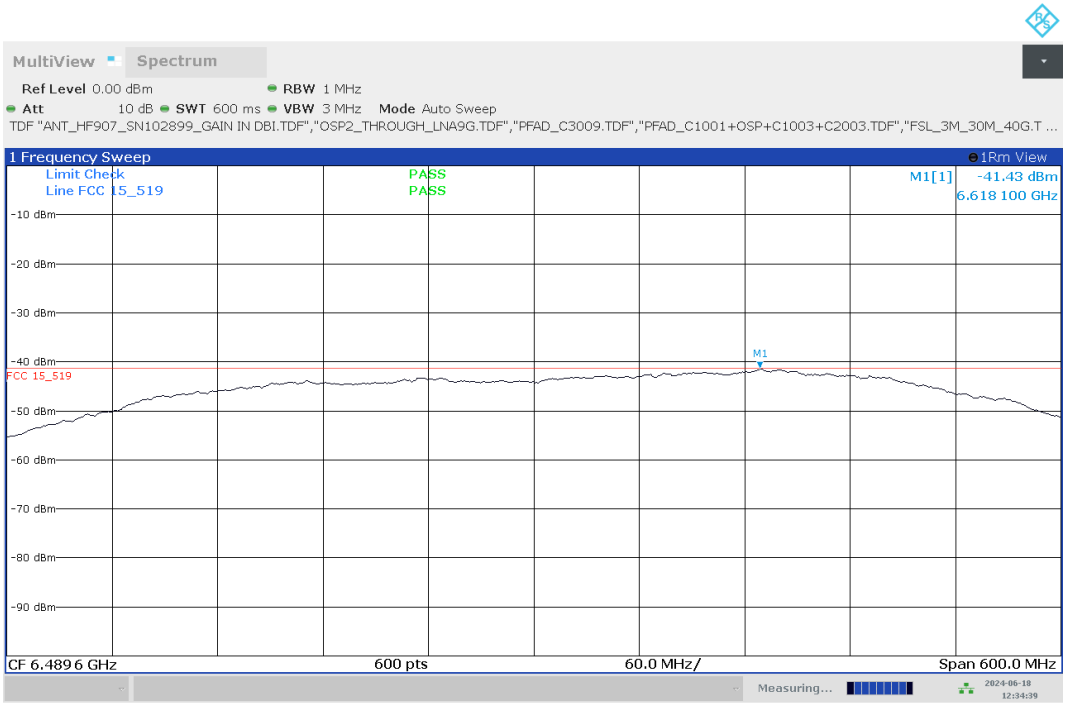
05:35:37 12/15/2024

3.3.7 Other emissions, 5850 MHz – 6190 MHz, Set-up 1, Op. 1



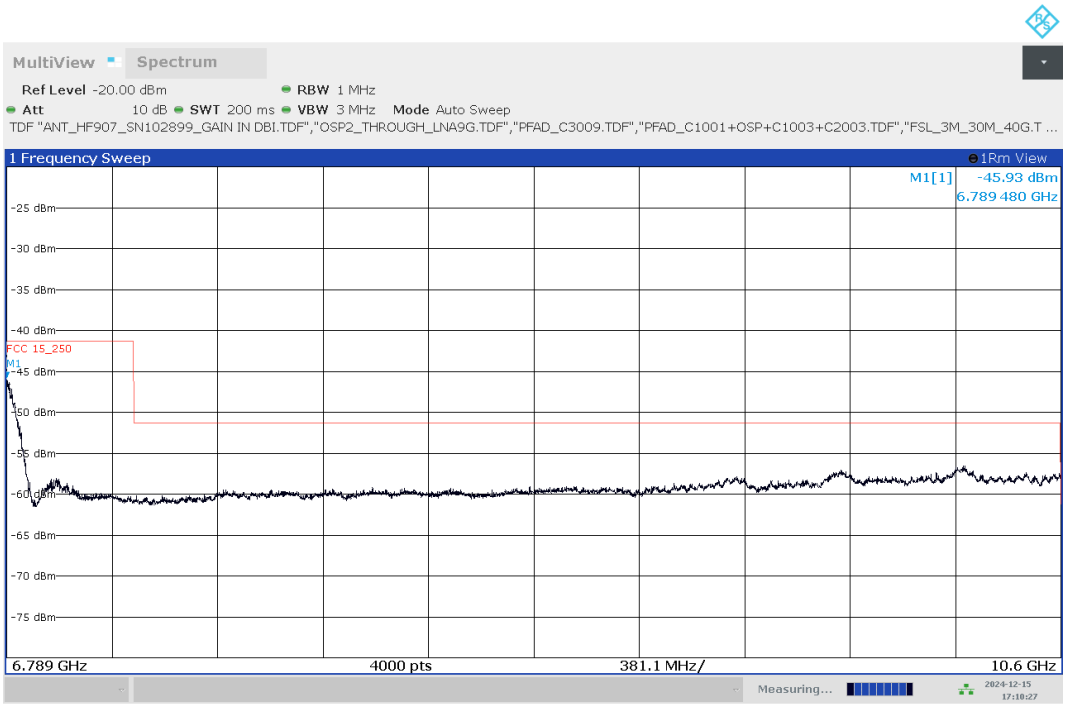
05:37:00 12/15/2024

3.3.8 Other emissions, fc=6489.6, span = 600 MHz, pts = 600, swt = 600 ms, Set-up 1, Op. 1*



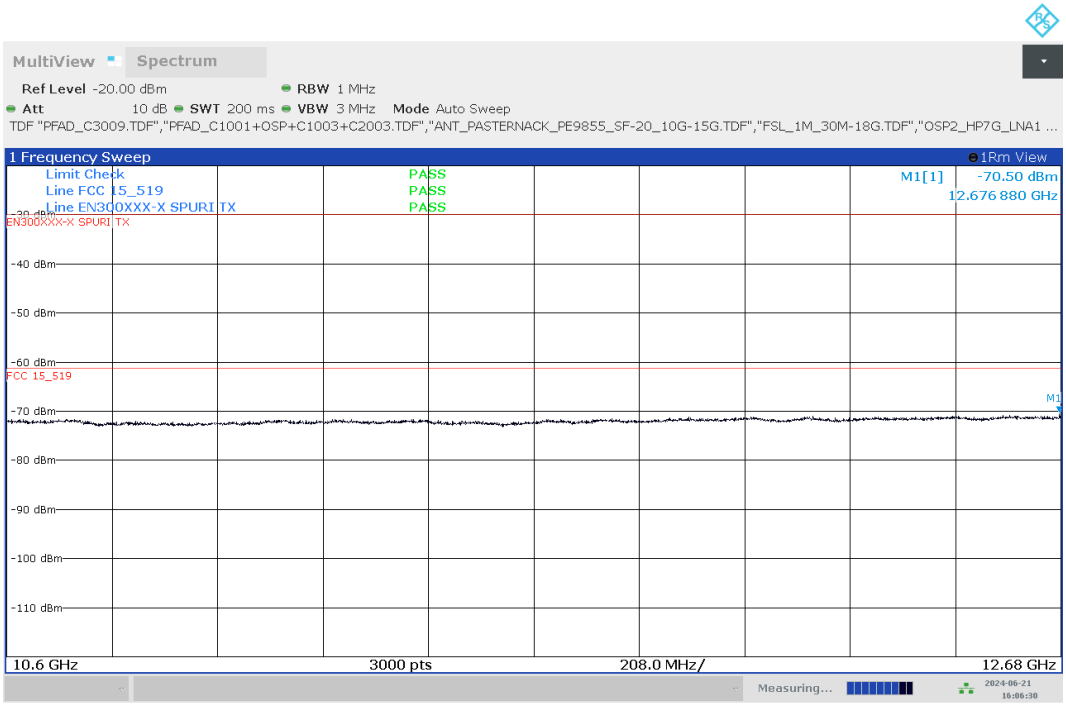
12:34:40 06/18/2024

3.3.9 Other emissions, 6789 MHz – 10600 MHz, Set-up 1, Op. 1



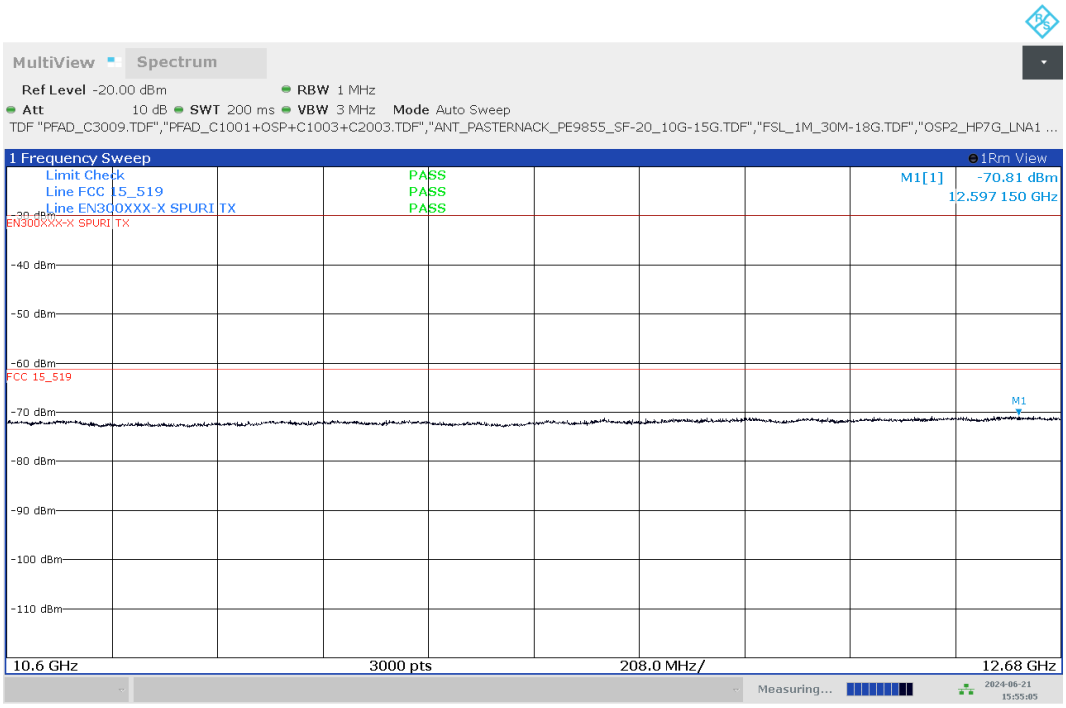
05:10:28 12/15/2024

3.3.10 Other emissions, 10600 MHz – 12680 MHz, Set-up 1, Op. 1, ANT HOR



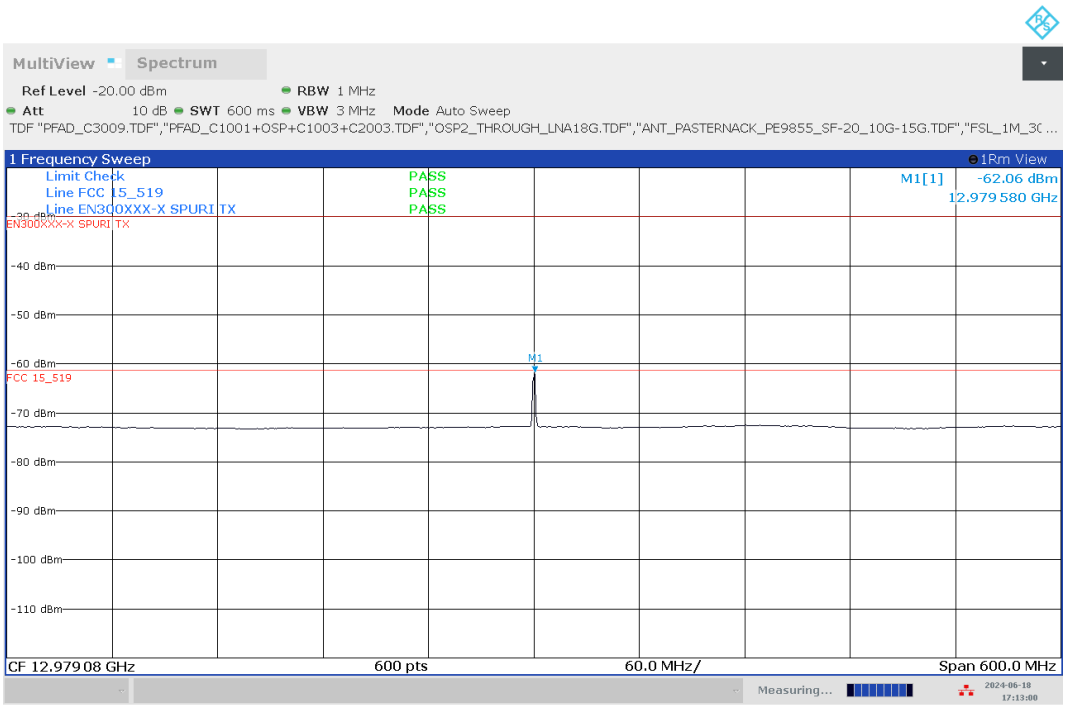
04:06:30 06/21/2024

3.3.11 Other emissions, 10600 MHz – 12680 MHz, Set-up 1, Op. 1, ANT VER



03:55:05 06/21/2024

3.3.12 Other emissions, fc=12979.2 (1. harmonic), span = 600 MHz, pts = 600, swt = 600 ms, Set-up 1, Op. 1, ANT HOR

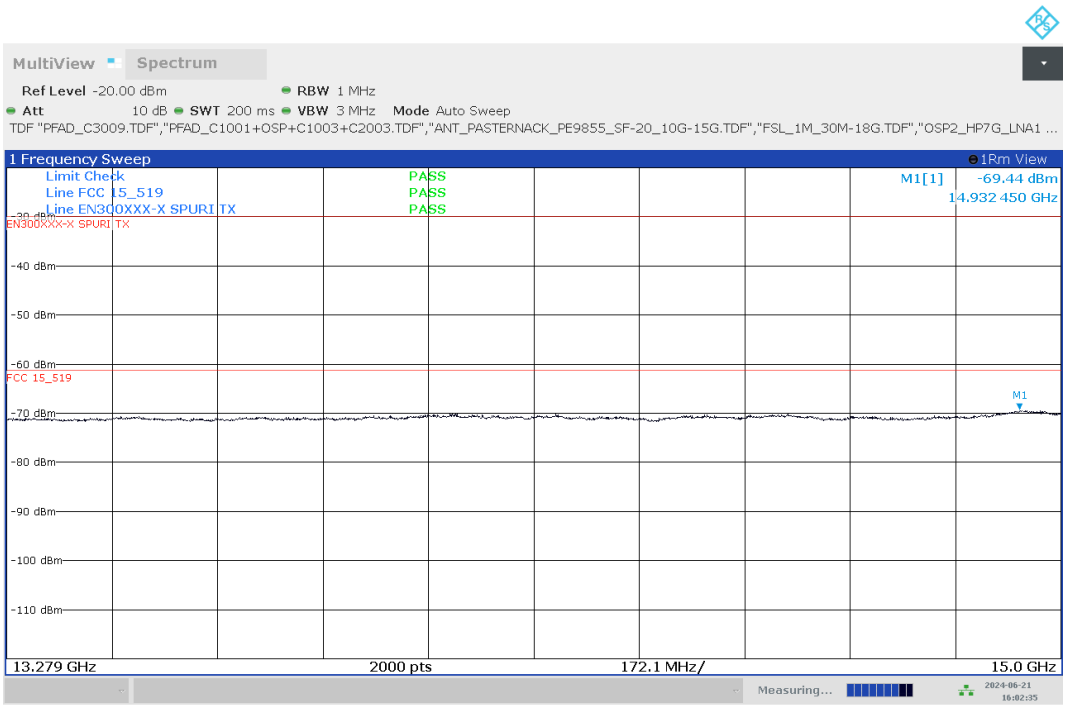


05:13:00 06/18/2024

3.3.13 Other emissions, fc=12979.2 (1. harmonic), span = 600 MHz, pts = 600, swt = 600 ms, Set-up 1, Op. 1, ANT VER

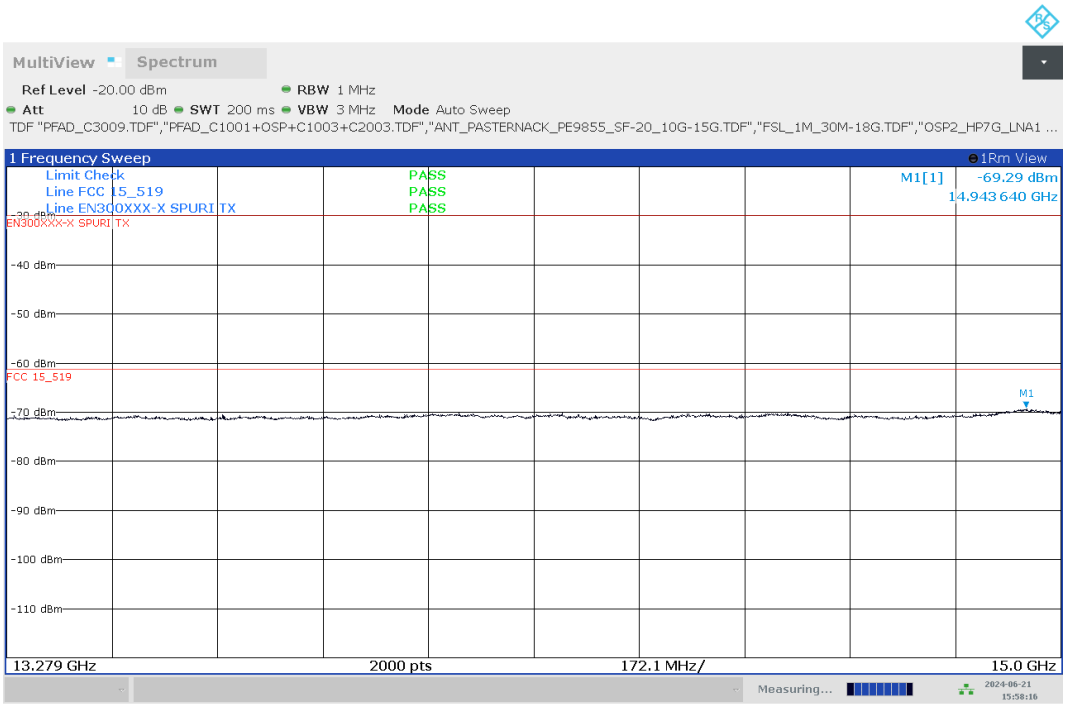
05:17:06 06/18/2024

3.3.14 Other emissions, 13279 MHz – 15000 MHz, Set-up 1, Op. 1, ANT HOR



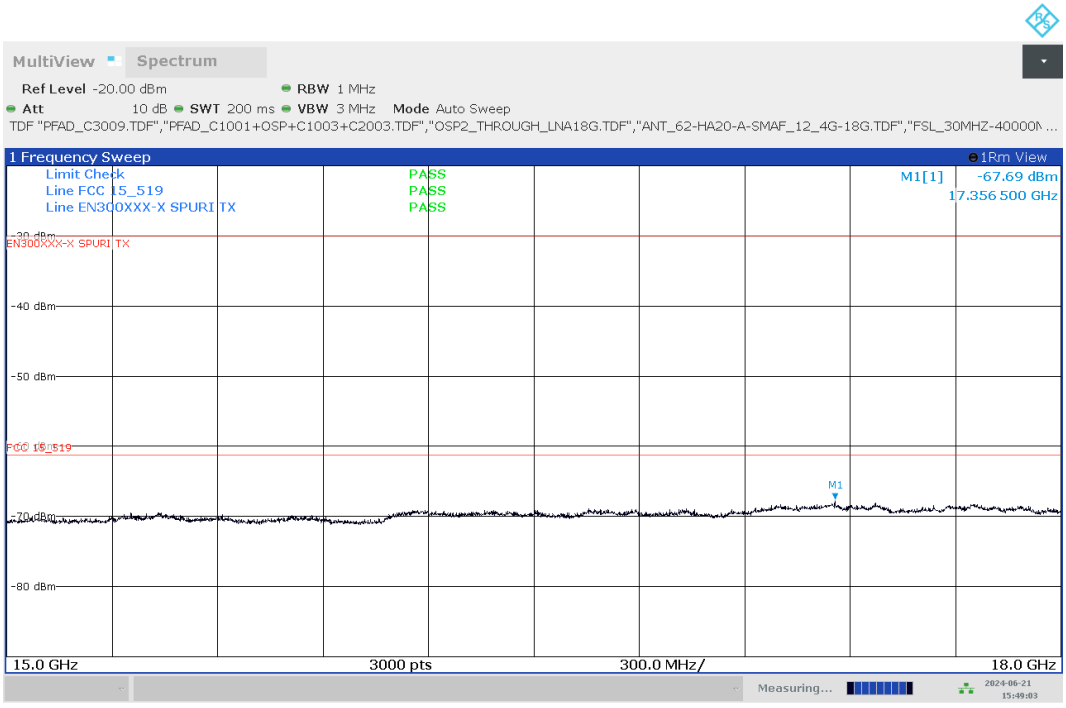
04:02:35 06/21/2024

3.3.15 Other emissions, 13279 MHz – 15000 MHz, Set-up 1, Op. 1, ANT VER



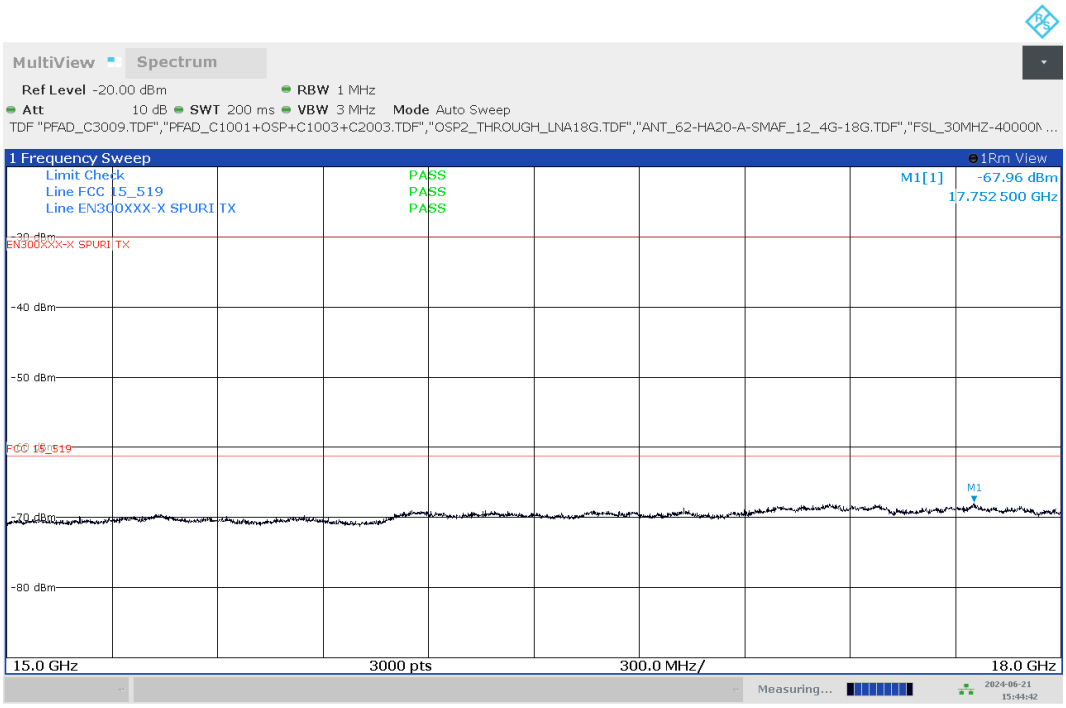
03:58:16 06/21/2024

3.3.16 Other emissions, 15000 MHz – 18000 MHz, Set-up 1, Op. 1, ANT HOR



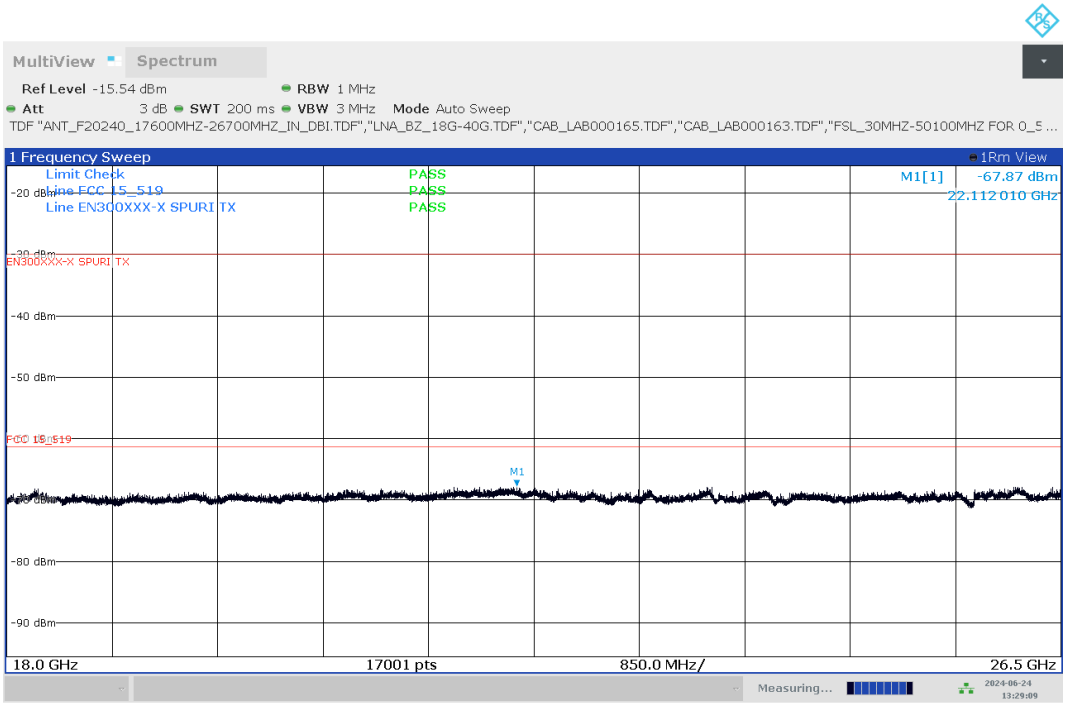
03:49:03 06/21/2024

3.3.17 Other emissions, 15000 MHz – 18000 MHz, Set-up 1, Op. 1, ANT VER



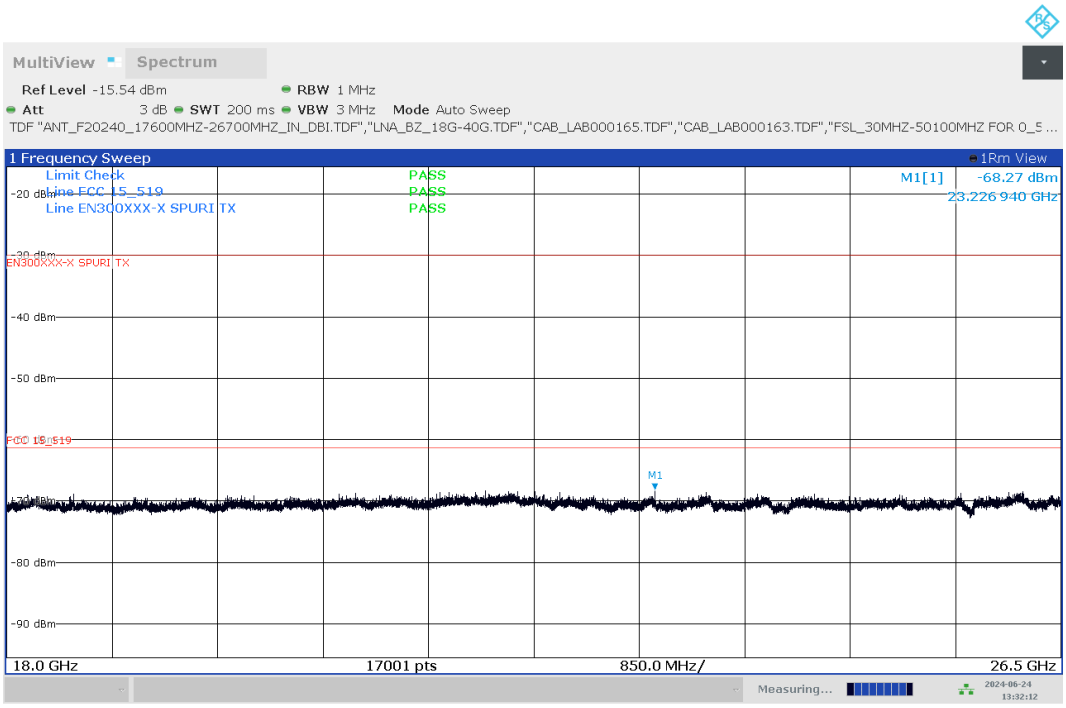
03:44:43 06/21/2024

3.3.18 Other emissions, 18000 MHz – 26500 MHz, Set-up 1, Op. 1, ANT HOR



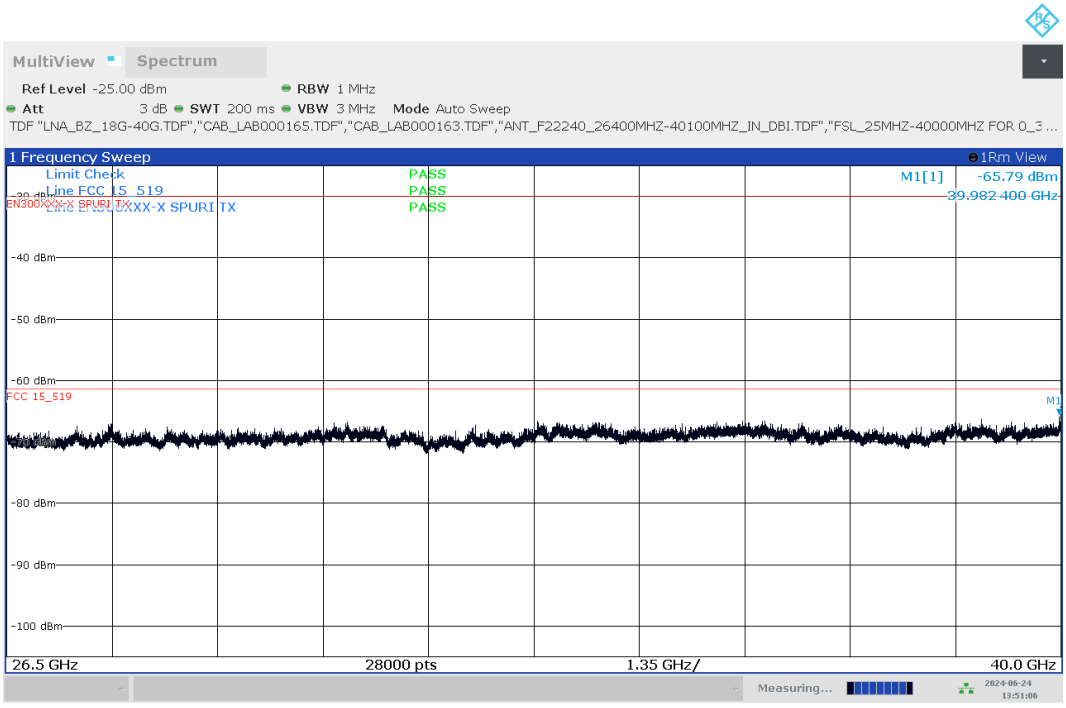
01:29:09 06/24/2024

3.3.19 Other emissions, 18000 MHz – 26500 MHz, Set-up 1, Op. 1, ANT VER



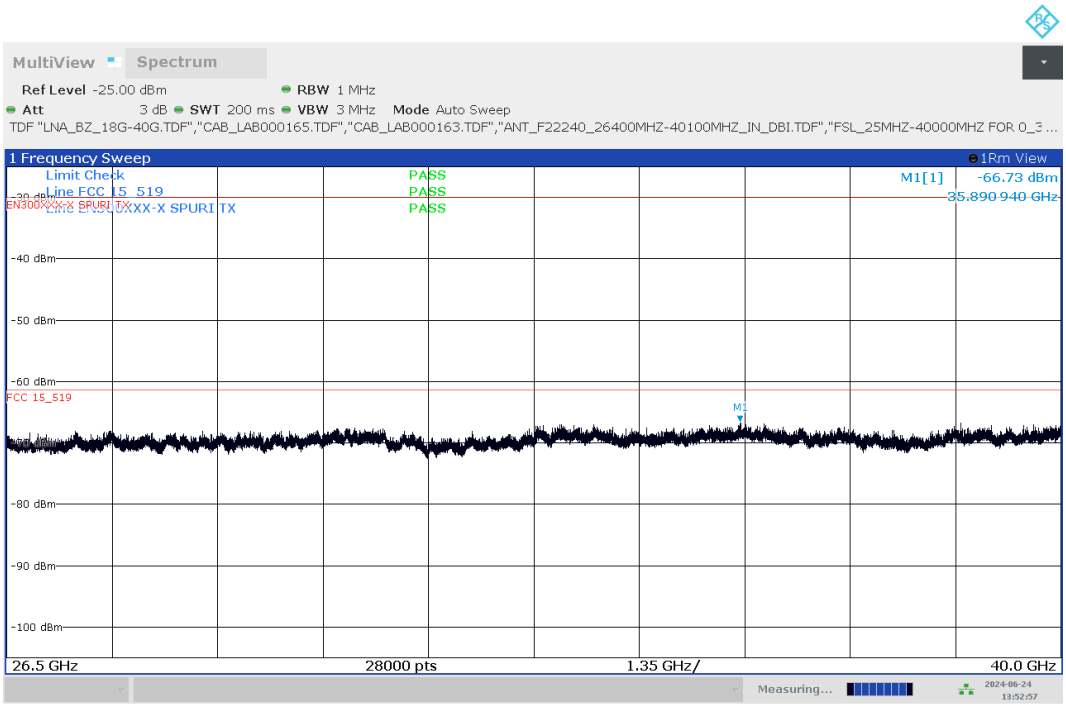
01:32:12 06/24/2024

3.3.20 Other emissions, 26500 MHz – 40000 MHz, Set-up 1, Op. 1, ANT HOR



01:51:06 06/24/2024

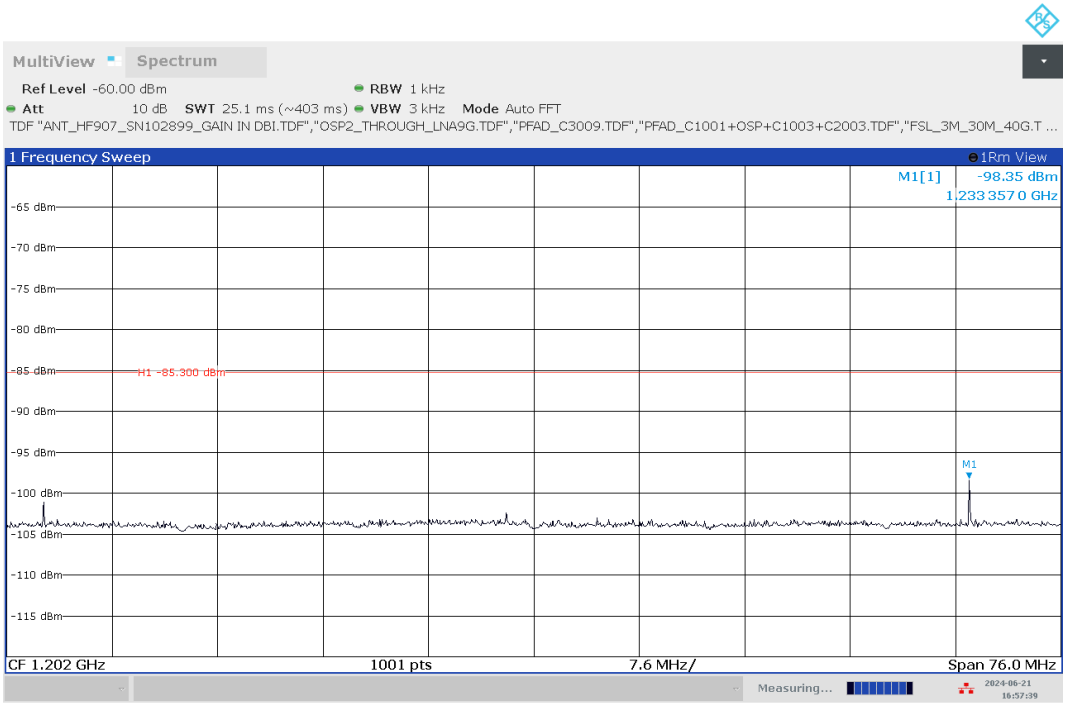
3.3.21 Other emissions, 26500 MHz – 40000 MHz, Set-up 1, Op. 1, ANT VER



01:52:57 06/24/2024

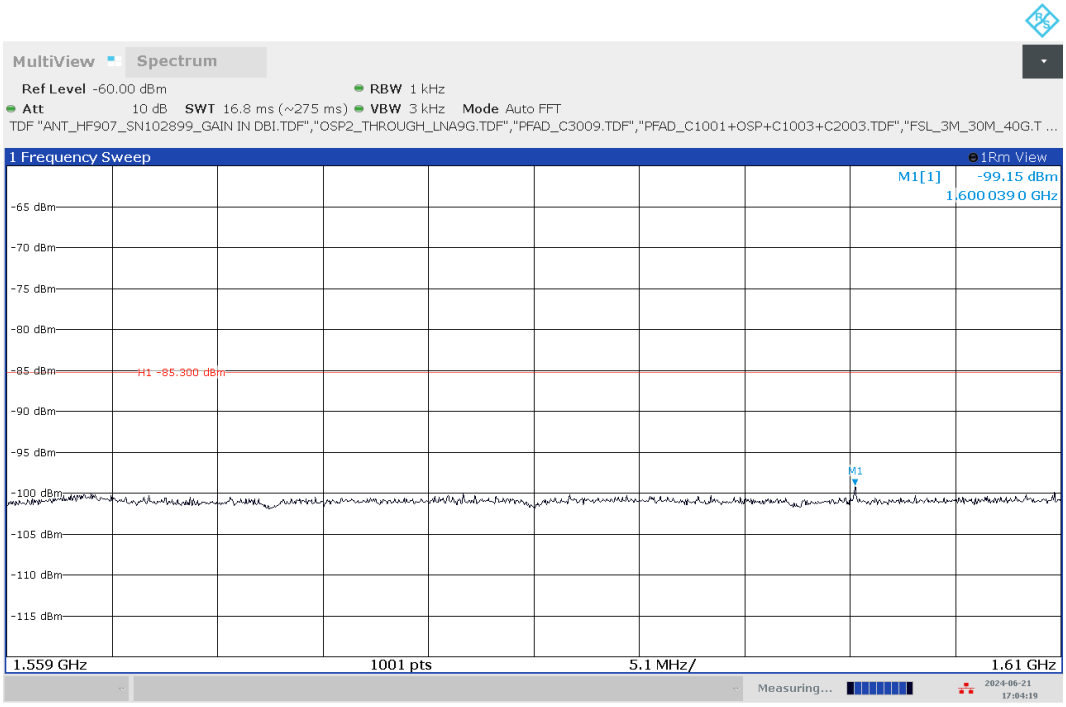
4 FUNDAMENTAL EMISSIONS IN THE GPS BAND

4.1 Frequency range 1164 MHz – 1240 MHz, Set-up 1, Op. 1



04:57:39 06/21/2024

4.2 Frequency range 1559 MHz – 1610 MHz, Set-up 1, Op. 1



05:04:19 06/21/2024

5 FUNDAMENTAL EMISSION PEAK POWER

5.1 Set-up 1, Op. 1