

Annex 1: Measurement diagrams 20-1-0194901T11a-A1

Number of pages:	34	Date of Report:	2022-Mar-17
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:	Eliko Tehnoloogia Arenduskeskus OÜ
Product: Model:	Positioning device ELIKO ANCHOR		
FCC ID:	2AF2I-ANCHOR (Contains FCC ID: 2AC7Z- ESPWROOM32D)	IC:	--
Testing has been carried out in accordance with:	CFR Title 47, Chapter I, Subchapter A Part15 / Subpart F §15.517		

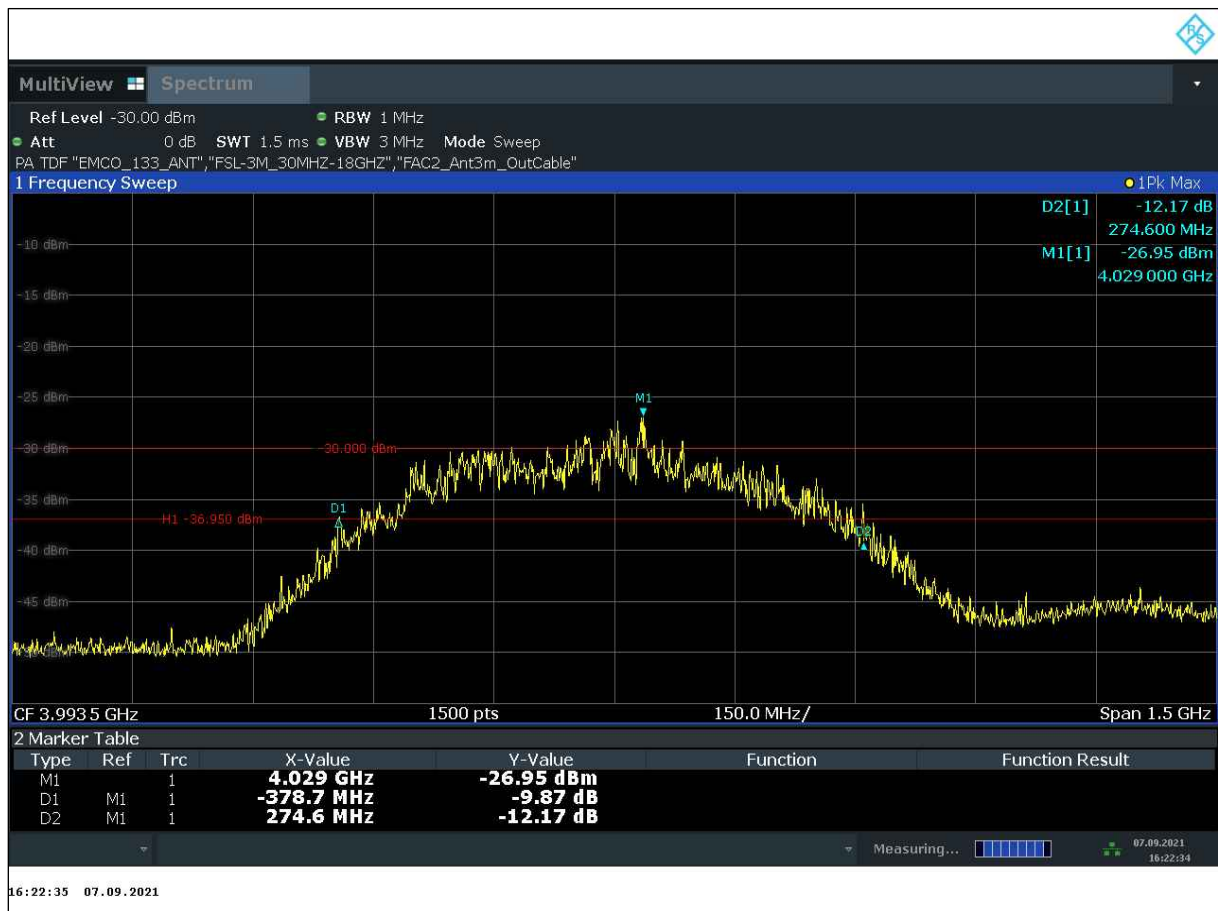
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1 Measurement diagrams

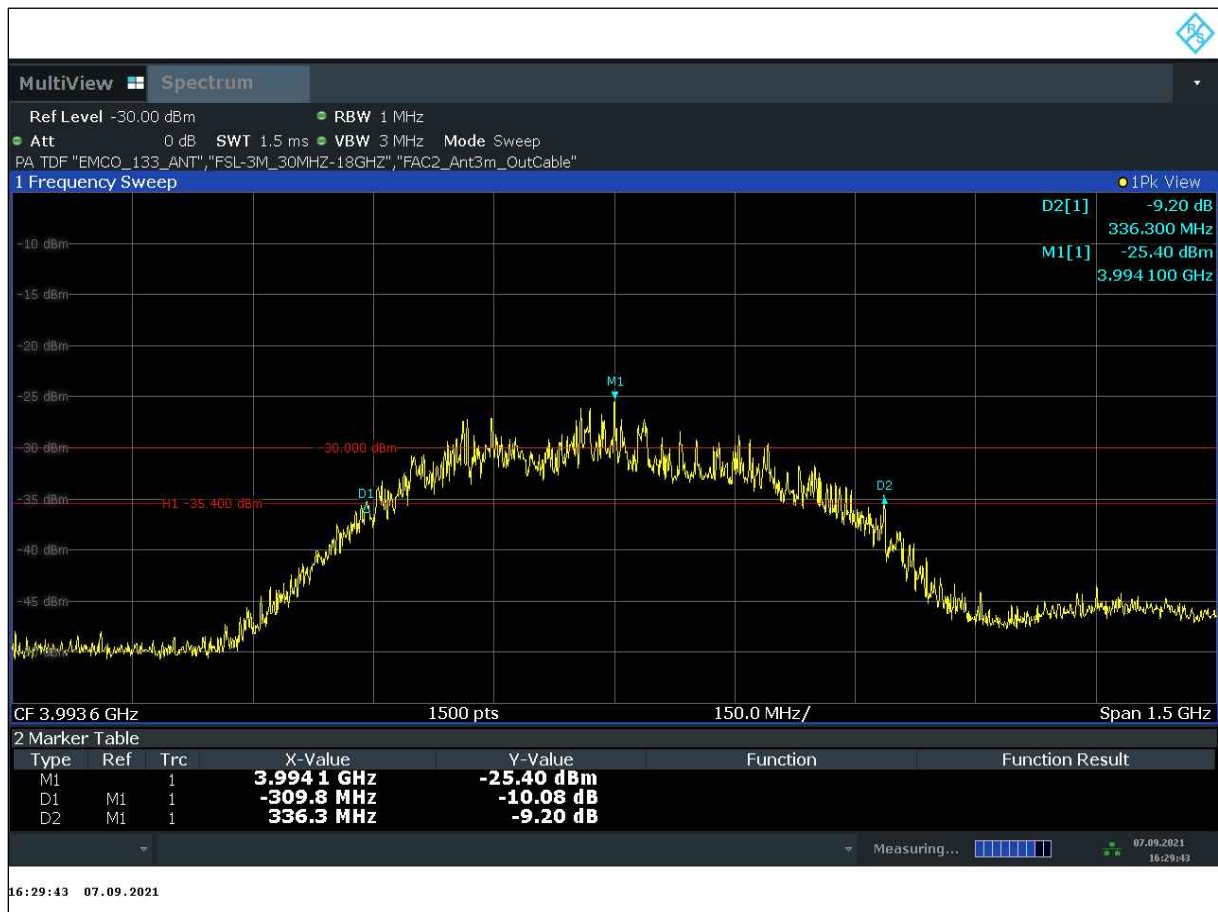
1.1 10dB bandwidth

D11_13a_OBW_10dBc_TX_Ch4_PWRSet_0x23232323_AntH



Bandwidth: 653.3 MHz

D11_13b_OBW_10dBc_TX_Ch4_PWRSet_0x23232323_AntV



Bandwidth: 646.1 MHz

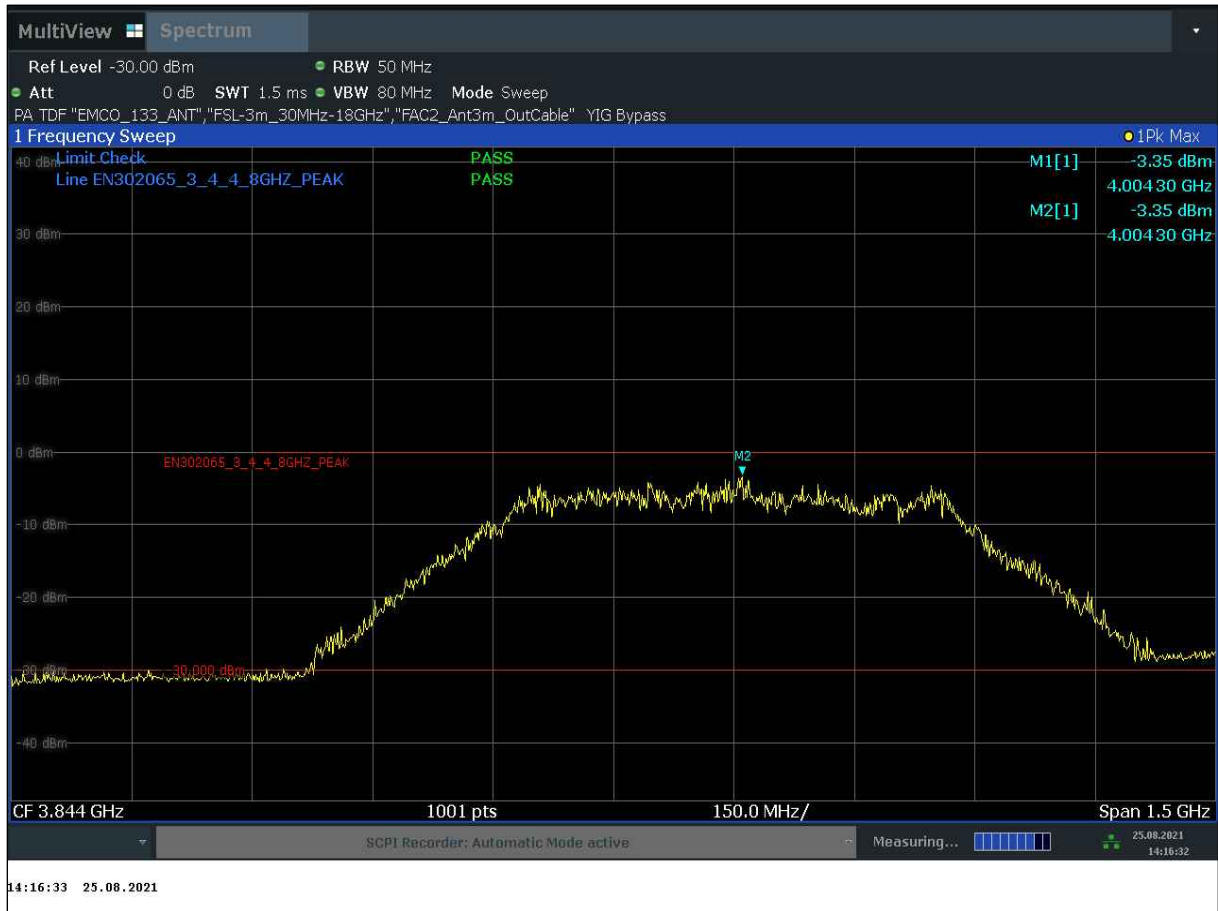
1.2 Peak power

D03_56a_PeakPWR_Ch4_PWR0x23232323_AntH



Value: -5.70 dBm

D03_56b_PeakPWR_Ch4_PWR0x23232323_AntV



Max. value: -3.35dBm

1.3 Magnetic field strength

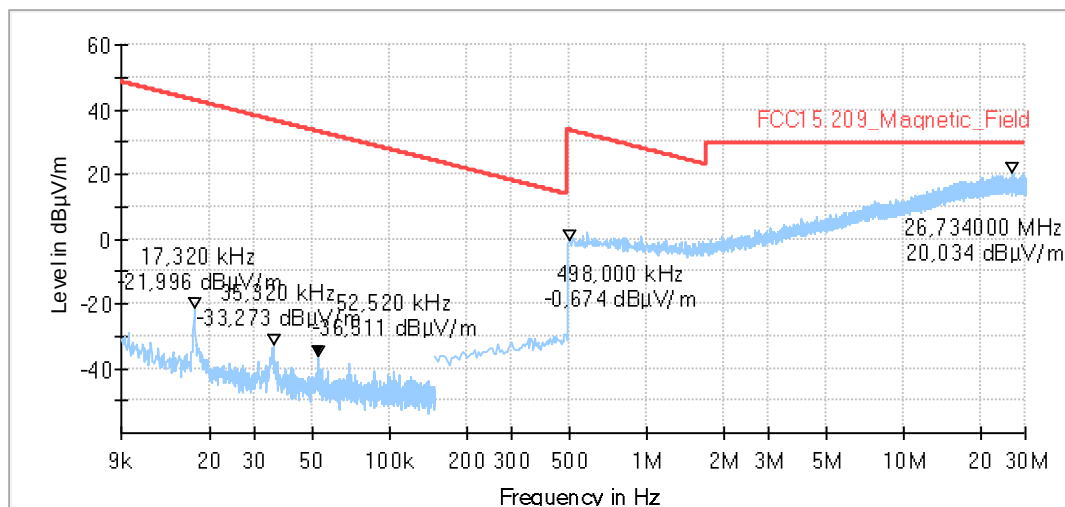
D11_3.03_RSE_TX_UWB_Ch_4_EUTlaying

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 5
Operator:	SSanthakum/Lor
Operating Mode:	Operating TX
Power during tests:	48V DC over PoE cable
Comment 1:	Channel 4
Environmental Conditions:	Humidity : 48%rH; Temperature: 20°C
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	20-1-01949S46_C02
	Full Spectrum



D11_3.04_RSE_TX_UWB_Ch_4_EUTstanding

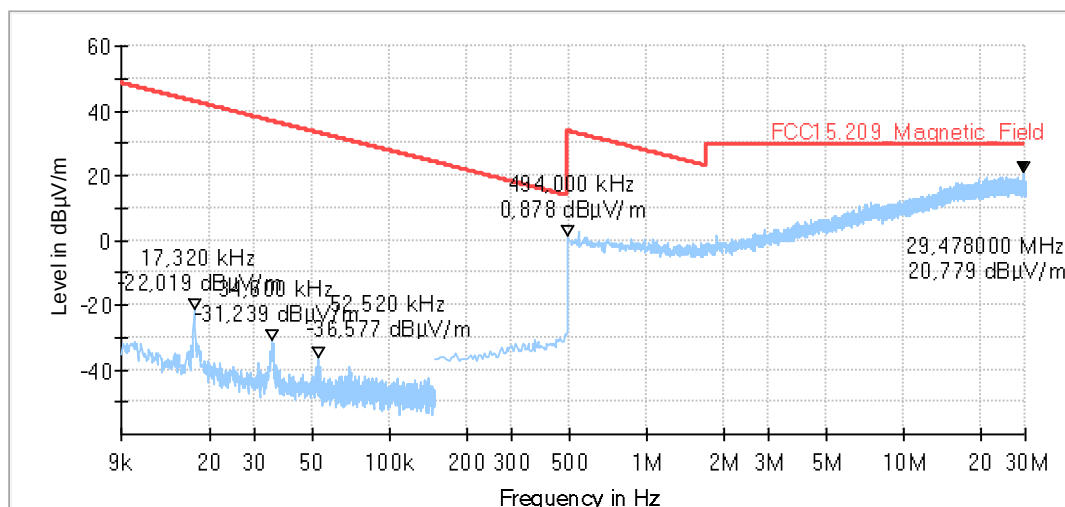
Common Information

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 5
Operator:	SSanthakum/Lor
Operating Mode:	Operating TX
Power during tests:	48V DC over PoE cable
Comment 1:	Channel 4
Environmental Conditions::	Humidity : 48%rH; Temperature: 20°C
EUT Setup:	1
Verdict:	Passed

EUT Information

PMT number:	20-1-01949S46_C02
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Full Spectrum



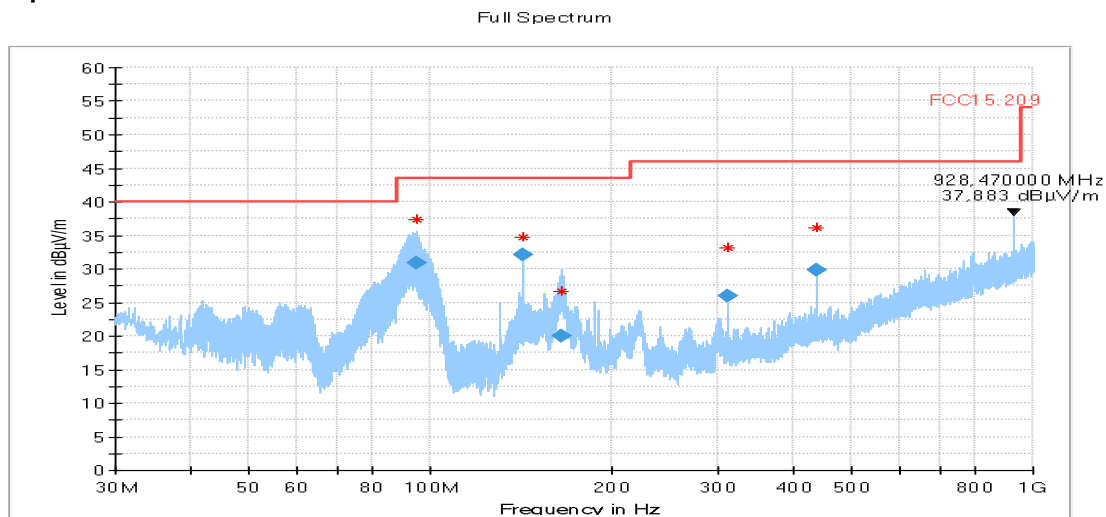
1.4 Electric field strength (30MHz < f < 960MHz)

D11_3.05_RSE_TX_UWB_Ch_4_EUTstanding_DC48V

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 : 51%rH; Temperature: 21°C
Operator Name:	Lor
EUT:	S46_C02
Operating Mode:	UWB TX Ch4
Power supply:	DC 48V (over DC cable)
Comment:	Channel 4
Verdict:	Passed

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)	Preamplifier (dB)	Trd Corr. (dB/m)
95.155000	30.90	43.50	12.60	120.000	109.0	V	217.0	8.2	0.0	0.9	7.3
142.555000	32.13	43.50	11.37	120.000	147.0	H	105.0	8.7	0.0	1.1	7.6
165.265000	19.92	43.50	23.58	120.000	120.0	V	127.0	9.8	0.0	1.3	8.5
311.999000	26.04	46.00	19.96	120.000	215.0	V	237.0	15.6	0.0	1.8	13.8
436.799000	29.80	46.00	16.20	120.000	117.0	V	170.0	19.4	0.0	2.2	17.2

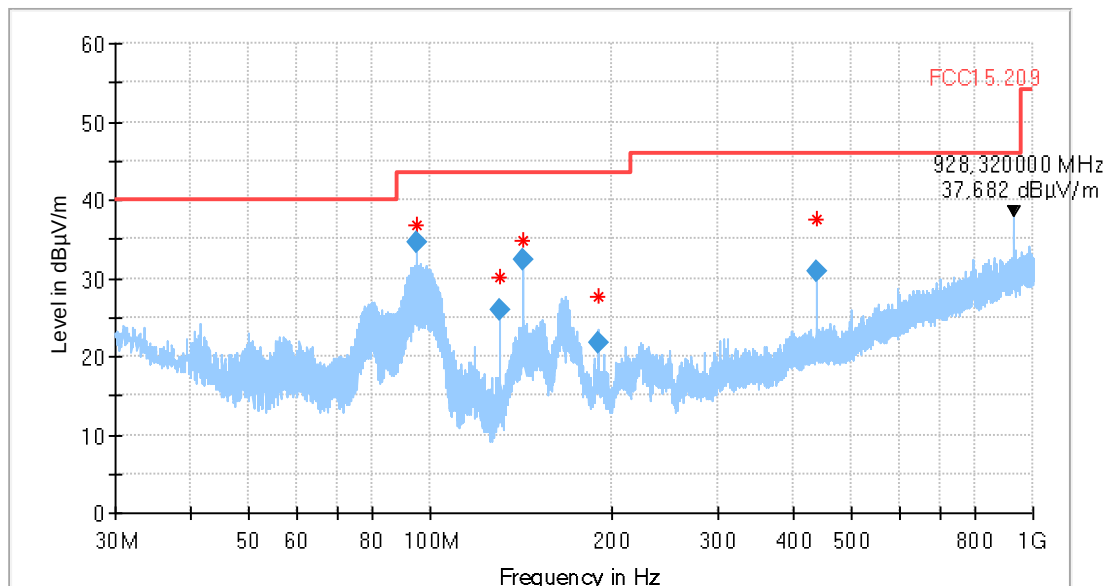
D11_3.06_RSE_TX_UWB_Ch_4_EUTlaying_DC48V

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 : 51%rH; Temperature: 21°C
Operator Name:	Lor
EUT:	S46_C02
Operating Mode:	UWB TX Ch4
Power supply:	DC 48V (over DC cable)
Comment:	Channel 4
Verdict:	Passed

Full Spectrum

Full Spectrum



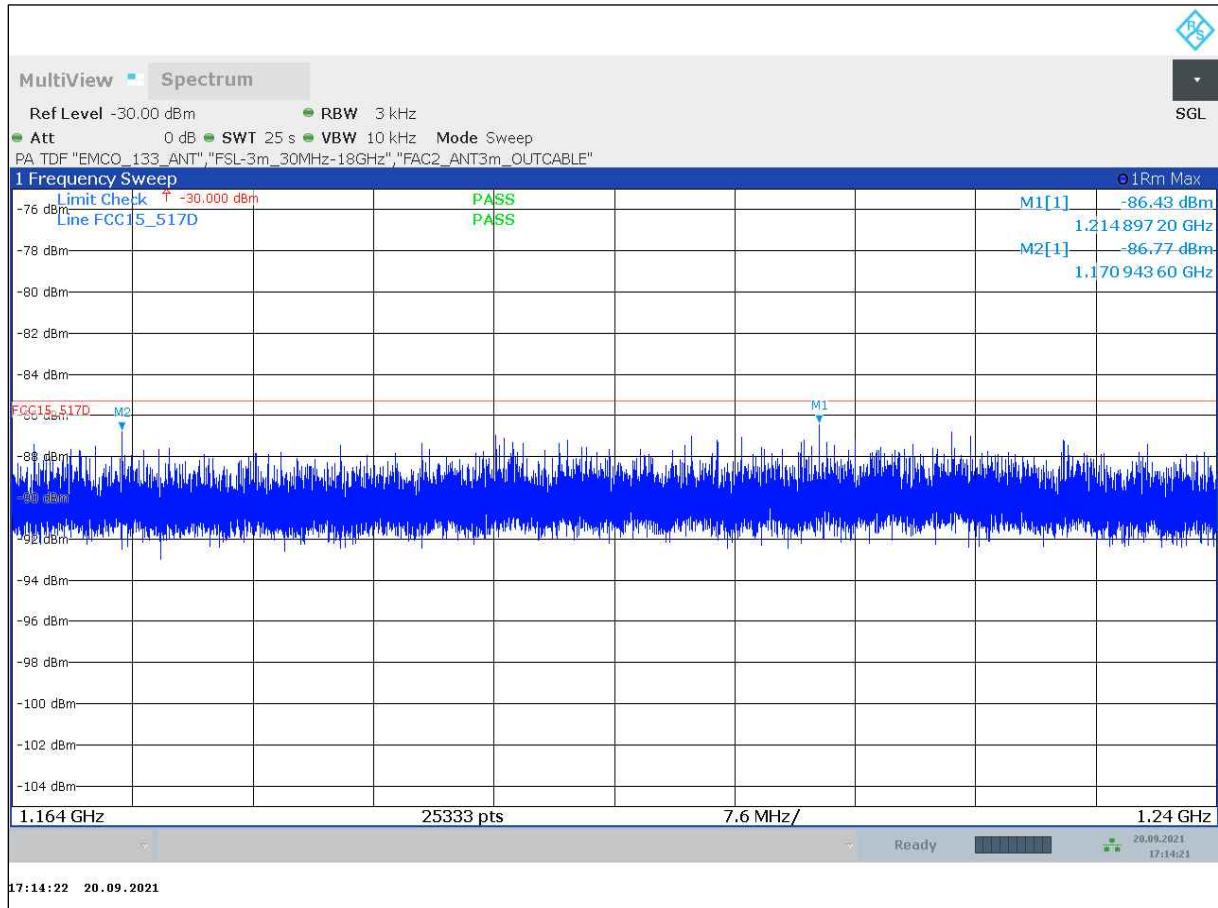
Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)	Preamplifier (dB)	Trd Corr. (dB/m)
94.709000	34.60	43.50	8.90	120.000	105.0	V	79.0	8.2	0.0	0.9	7.3
130.325000	26.01	43.50	17.49	120.000	112.0	V	115.0	9.0	0.0	1.0	8.0
142.135000	32.41	43.50	11.09	120.000	157.0	H	90.0	8.7	0.0	1.1	7.6
189.453000	21.77	43.50	21.73	120.000	109.0	V	73.0	11.4	0.0	1.3	10.1
436.799000	30.82	46.00	15.18	120.000	165.0	H	227.0	19.4	0.0	2.2	17.2

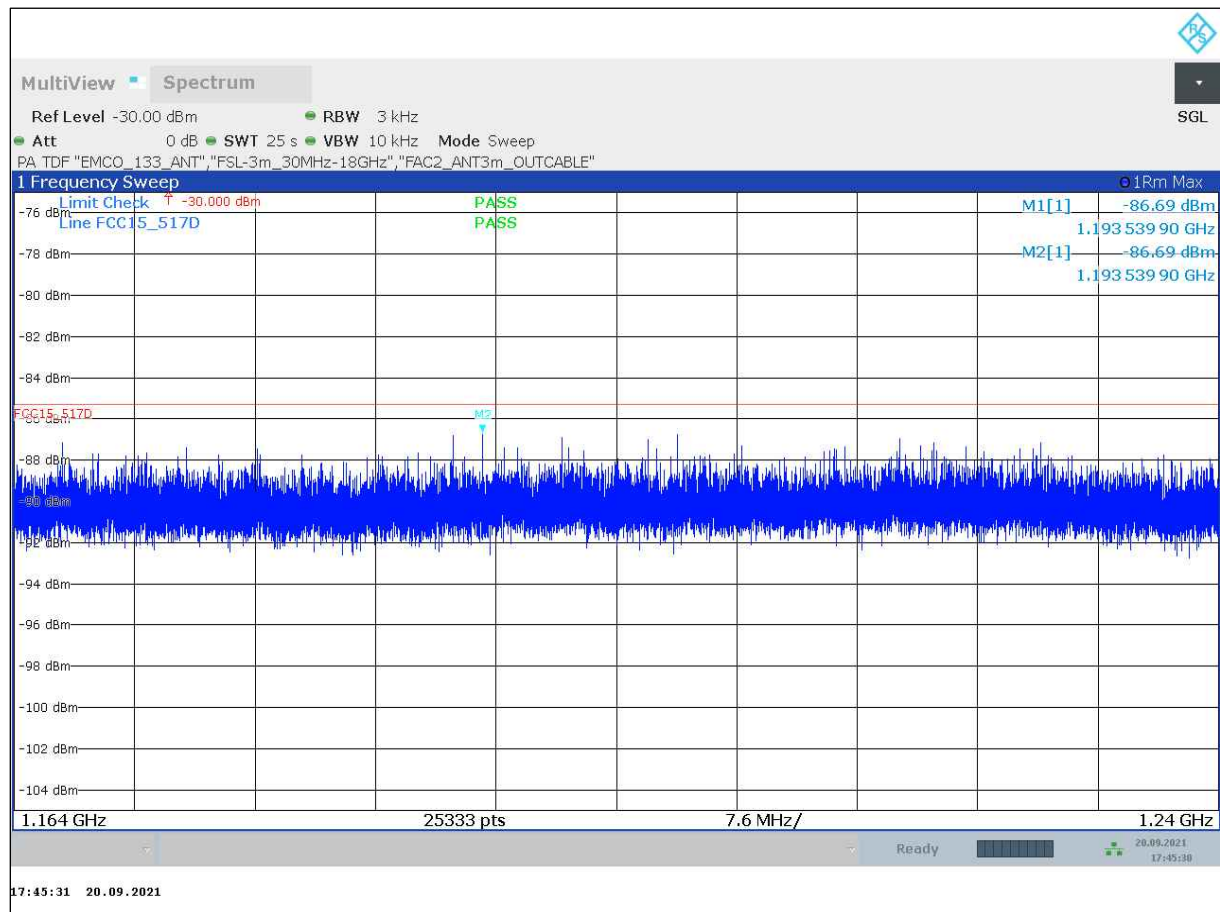
1.5 Spurious emission measurements (f > 960 MHz)

1.5.1 Emissions in GPS Band 1

D11_20a_RSE_TX_Ch4_PWRSet_0x23232323_GPS1_AntH

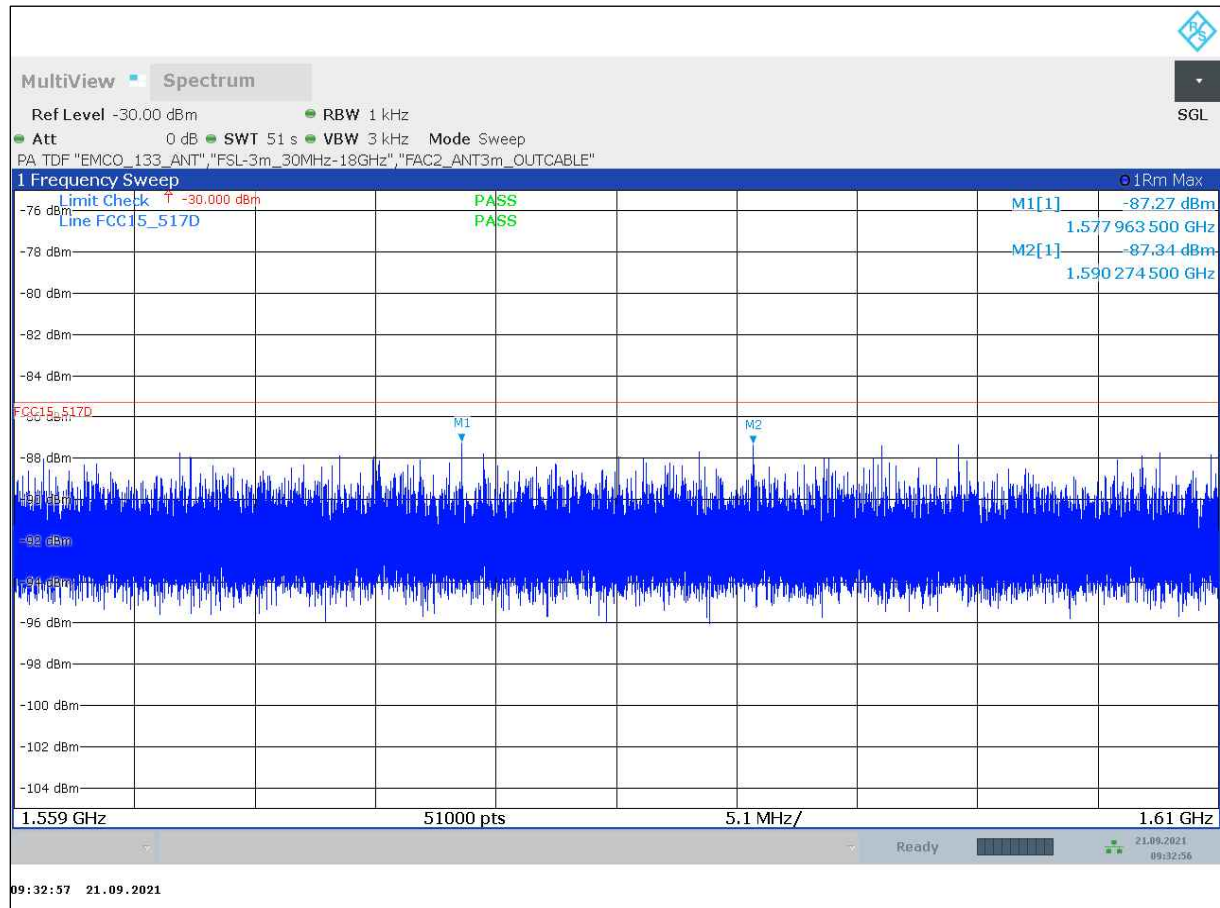


D11_20b_RSE_TX_Ch4_PWRSet_0x23232323_GPS1_AntV

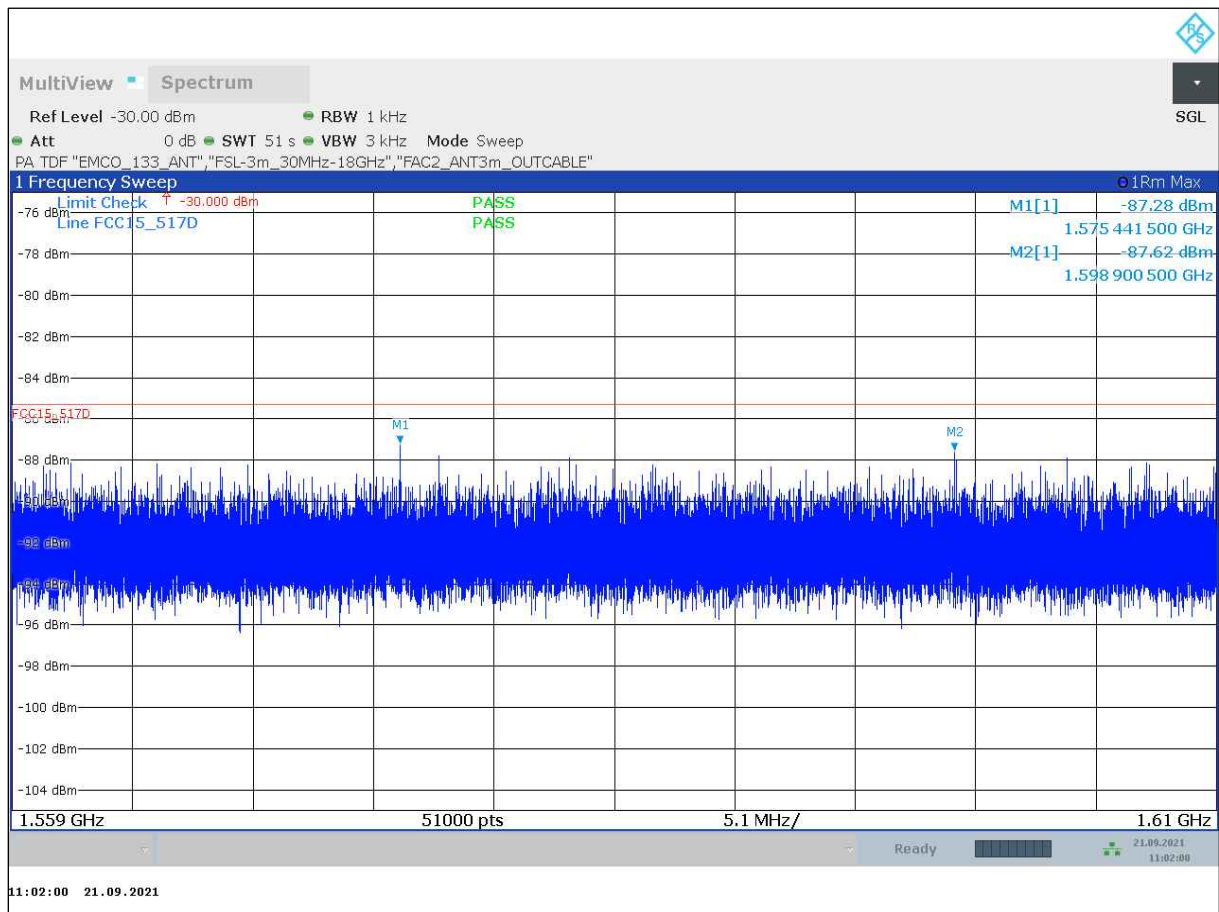


1.5.2 Emissions in GPS Band 2

D11_21a_RSE_TX_Ch4_PWRSet_0x23232323_GPS2_AntH

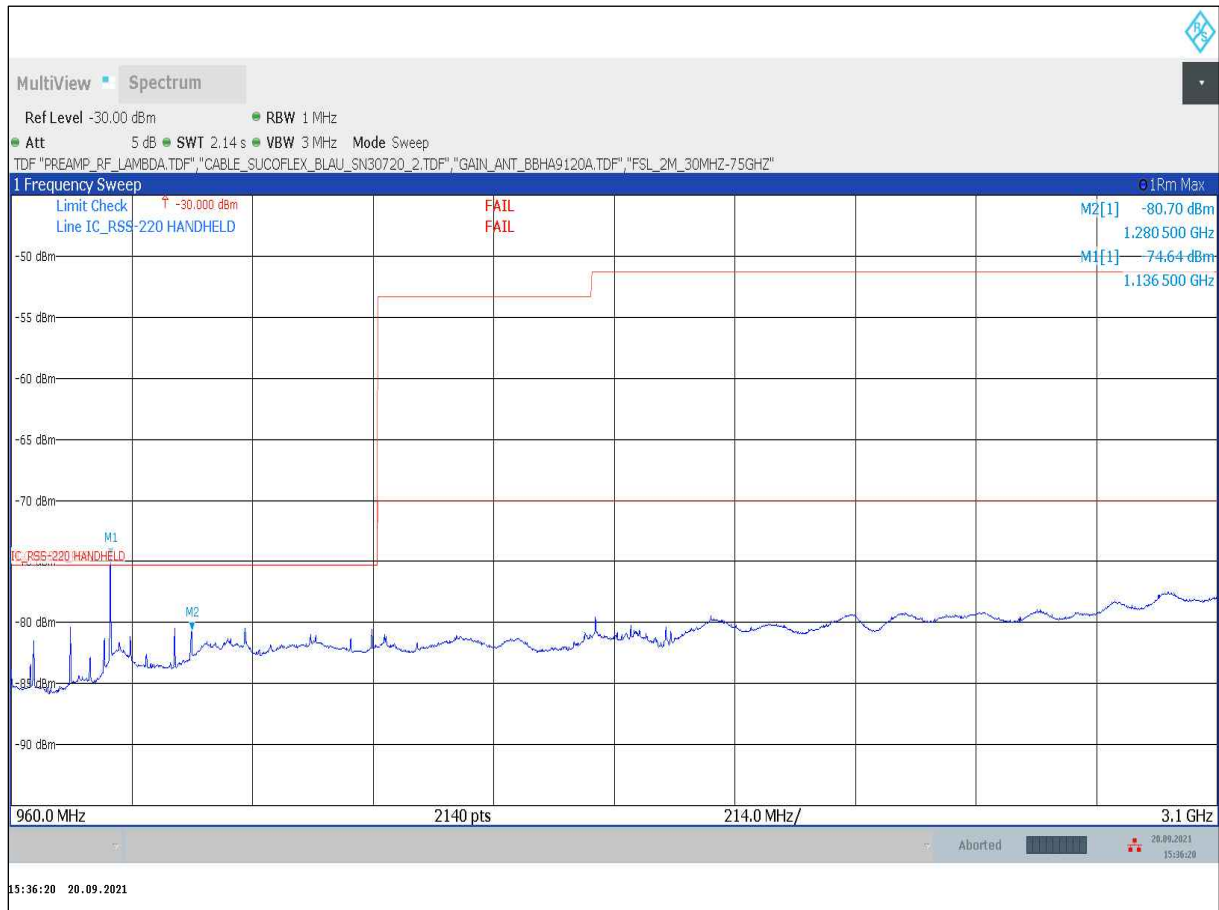


D11_21b_RSE_TX_Ch4_PWRSet_0x23232323_GPS2_AntV



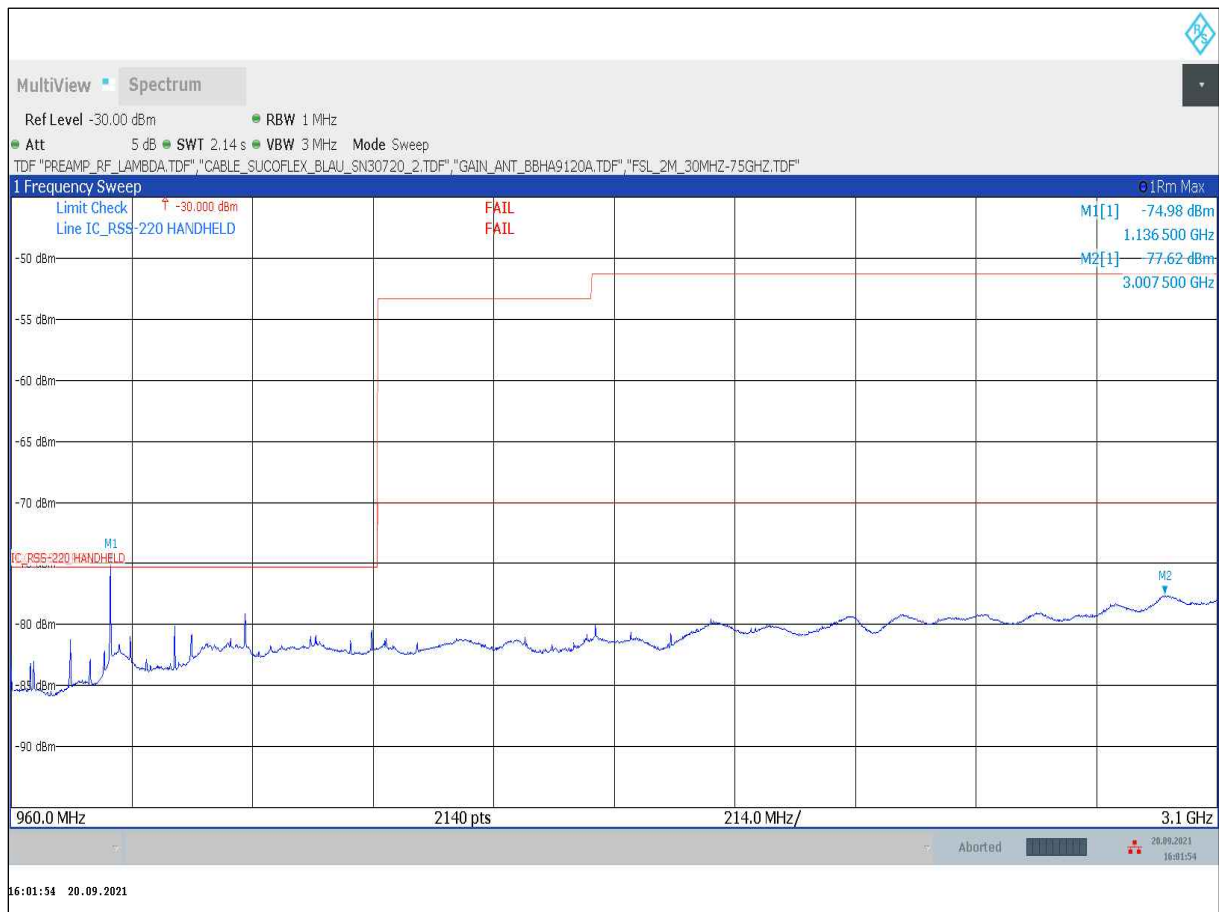
1.5.3 Emissions in range 960MHz < f < 3.1 GHz

D11_19a_RSE_TX_Ch4_PWR0x23232323_EUT_laying_AntH



Further investigation on critical frequency 1136.5MHz necessary

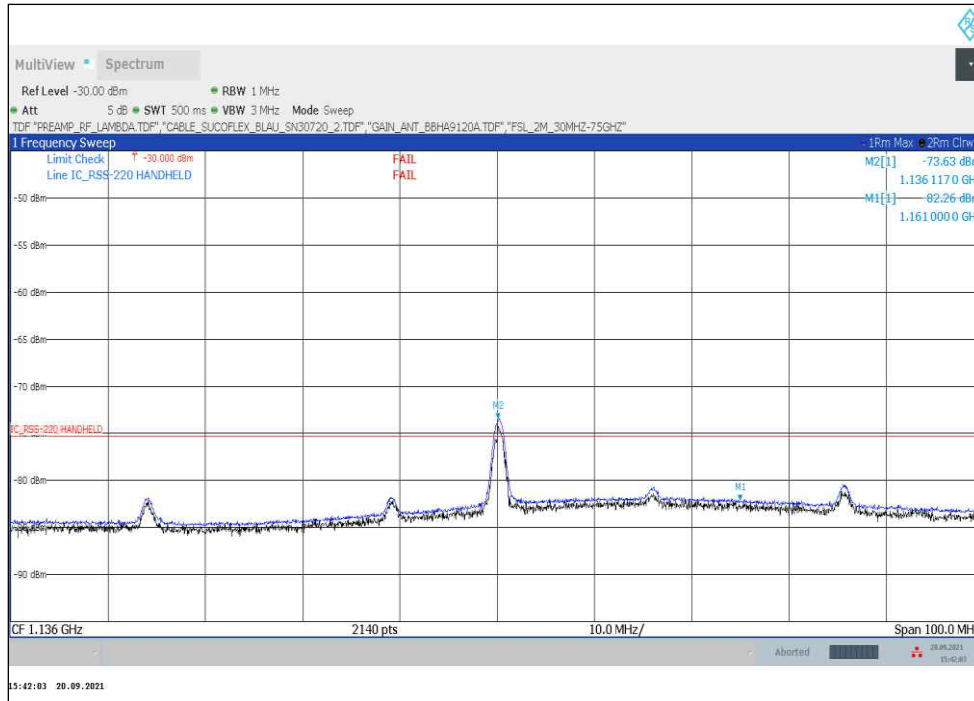
D11_19a_RSE_TX_Ch4_PWR0x23232323_EUT_standing_AntH



Further investigation on critical frequency 1136.5MHz necessary

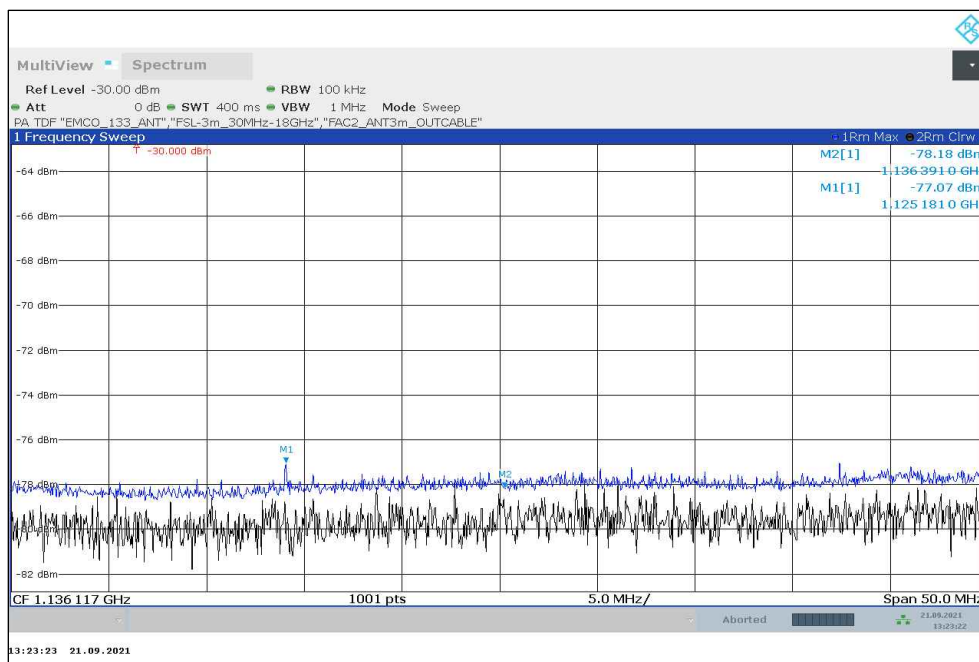
Investigation of 1136.117MHz emission:

D11_19a_f1_RSE_TX_Ch4_PWR0x23232323_EUT_laying_Anth



-73.63dBm = [21.57dBuV/m@3m](#) (Pass according FCC §15.109 limits)

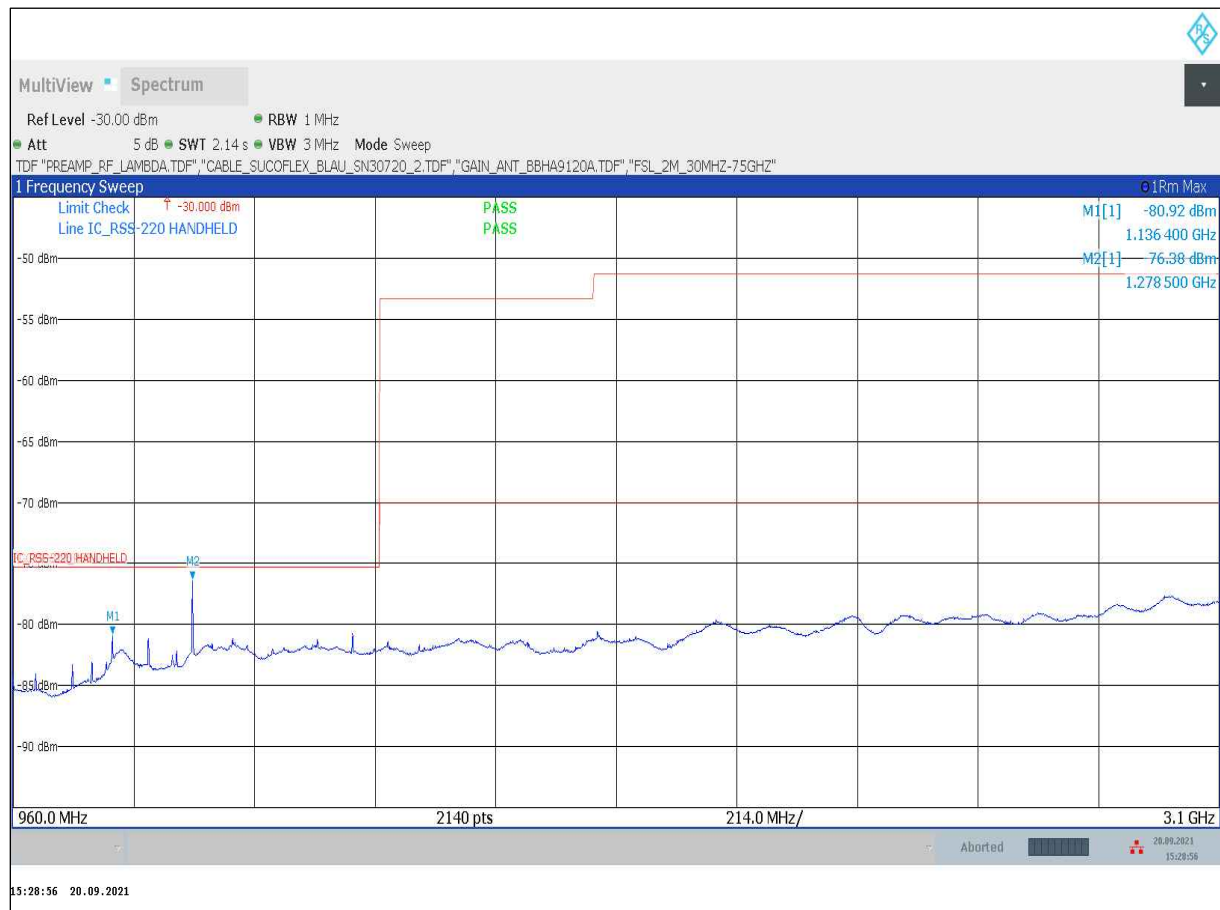
D11_19a_f1_RSE_Anth_FAC2_Measurement



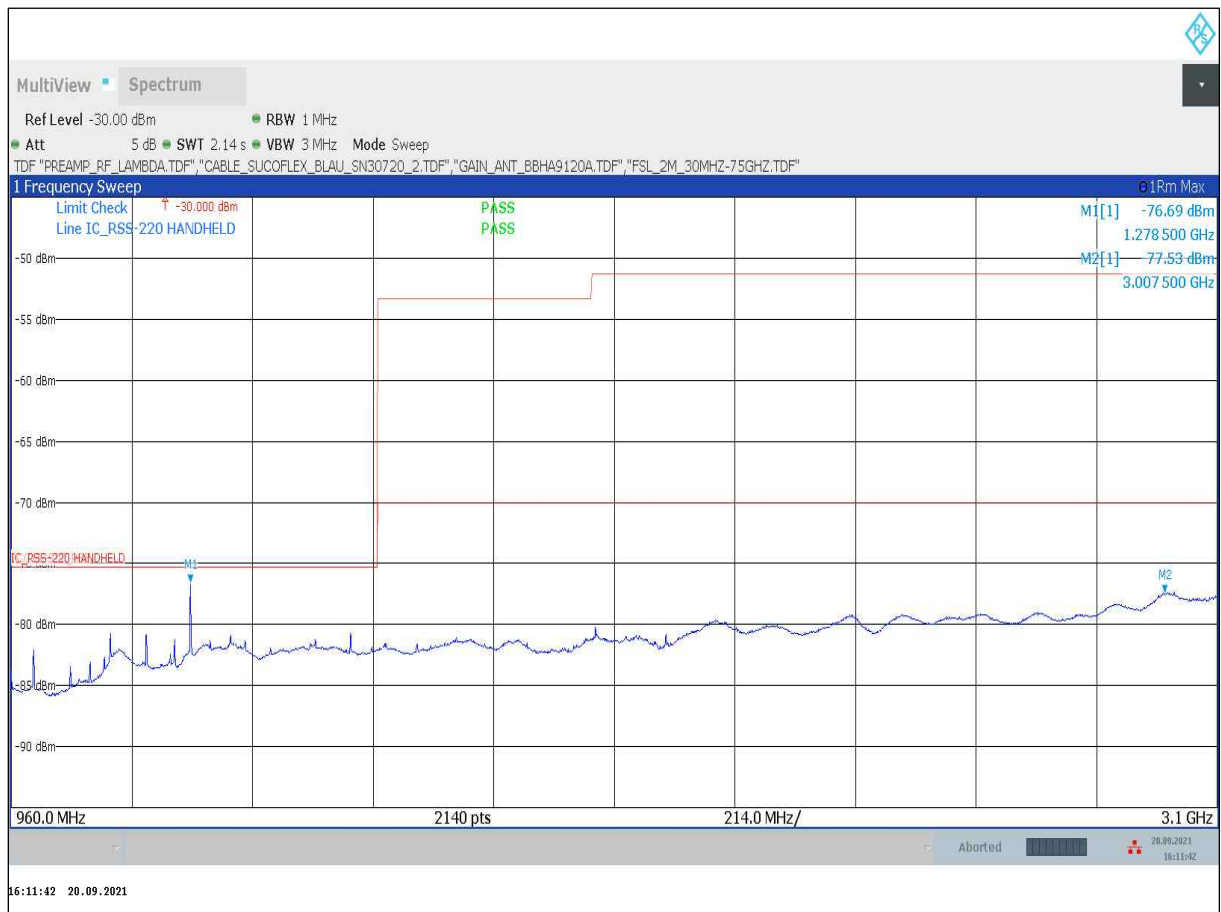
TX-off => emission still present

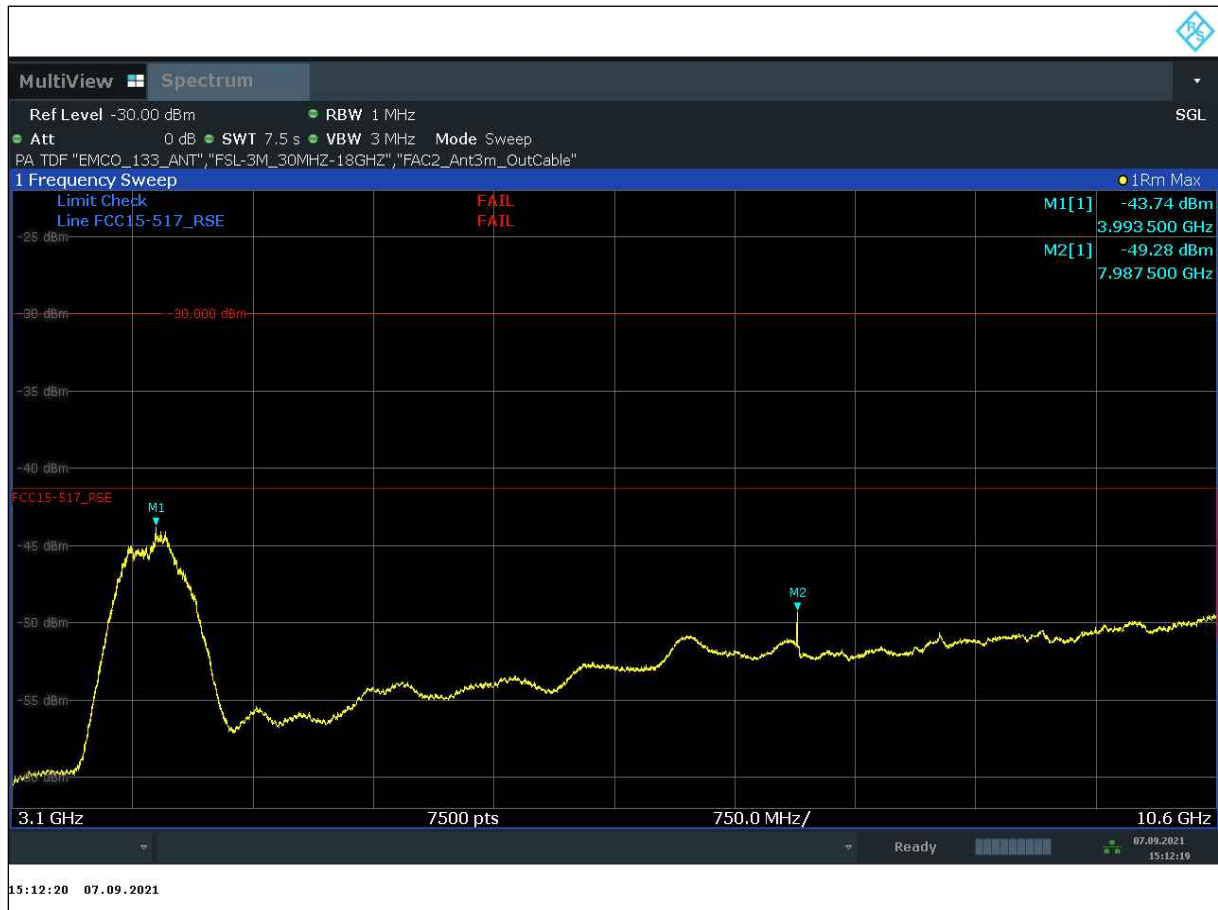
Digital Transmission -> FCC Part 15B Limits applicable

D11_19b_RSE_TX_Ch4_PWR0x23232323_EUT_laying_AntV



D11_19b_RSE_TX_Ch4_PWR0x23232323_EUT_standing_AntV



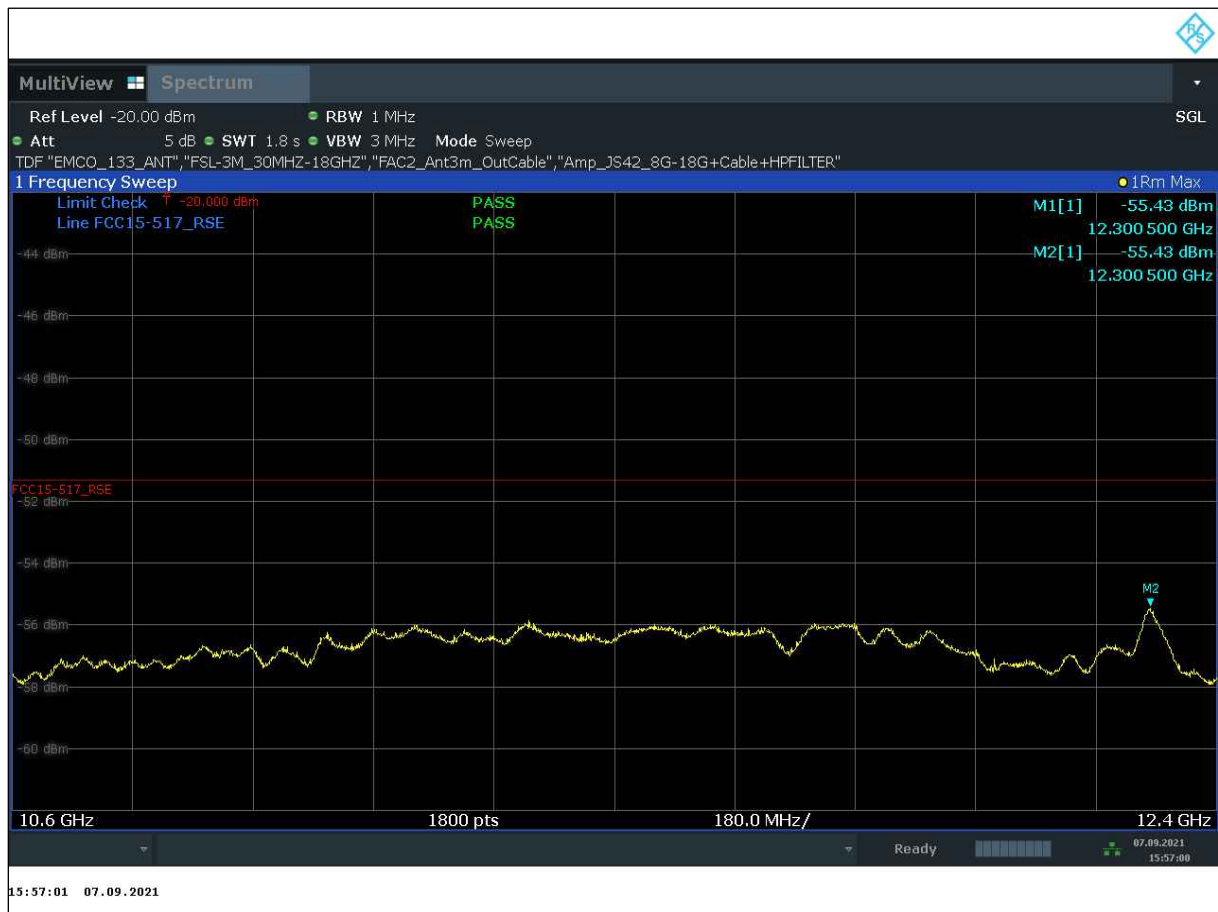
1.5.4 3.1 < f < 10.6GHz**D11_11a_RSE_TX_Ch4_PWRSet_0x23232323_3_1_10_6GHz_AntH**

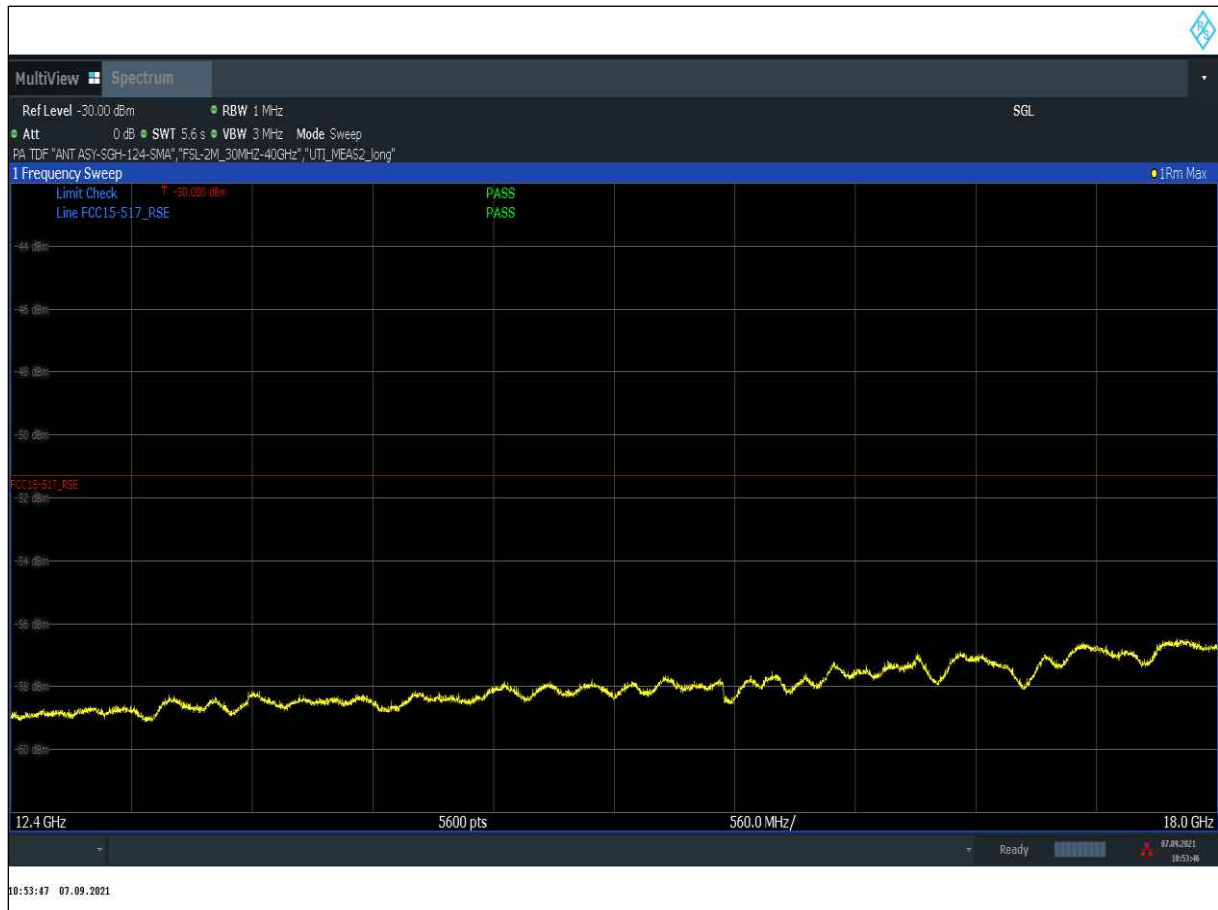
D11_11b_RSE_TX_Ch4_PWRSet_0x23232323_3_1_10_6GHz_AntV



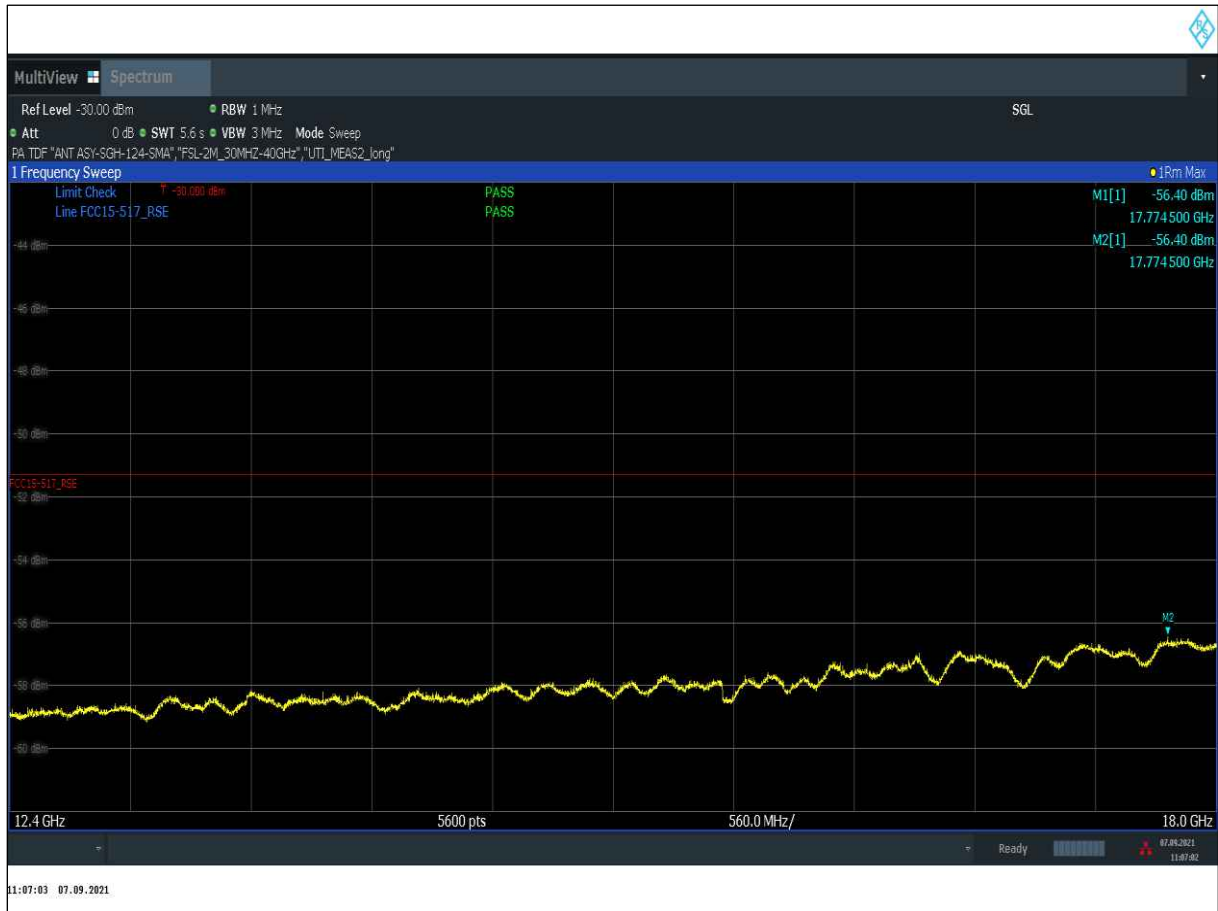
1.5.5 10.6GHz < f < 12.4GHz**D11_12a_RSE_TX_Ch4_PWRSet_0x23232323_10_6_12_4GHz_AntH**

D11_12b_RSE_TX_Ch4_PWRSet_0x23232323_10_6_12_4GHz_AntV

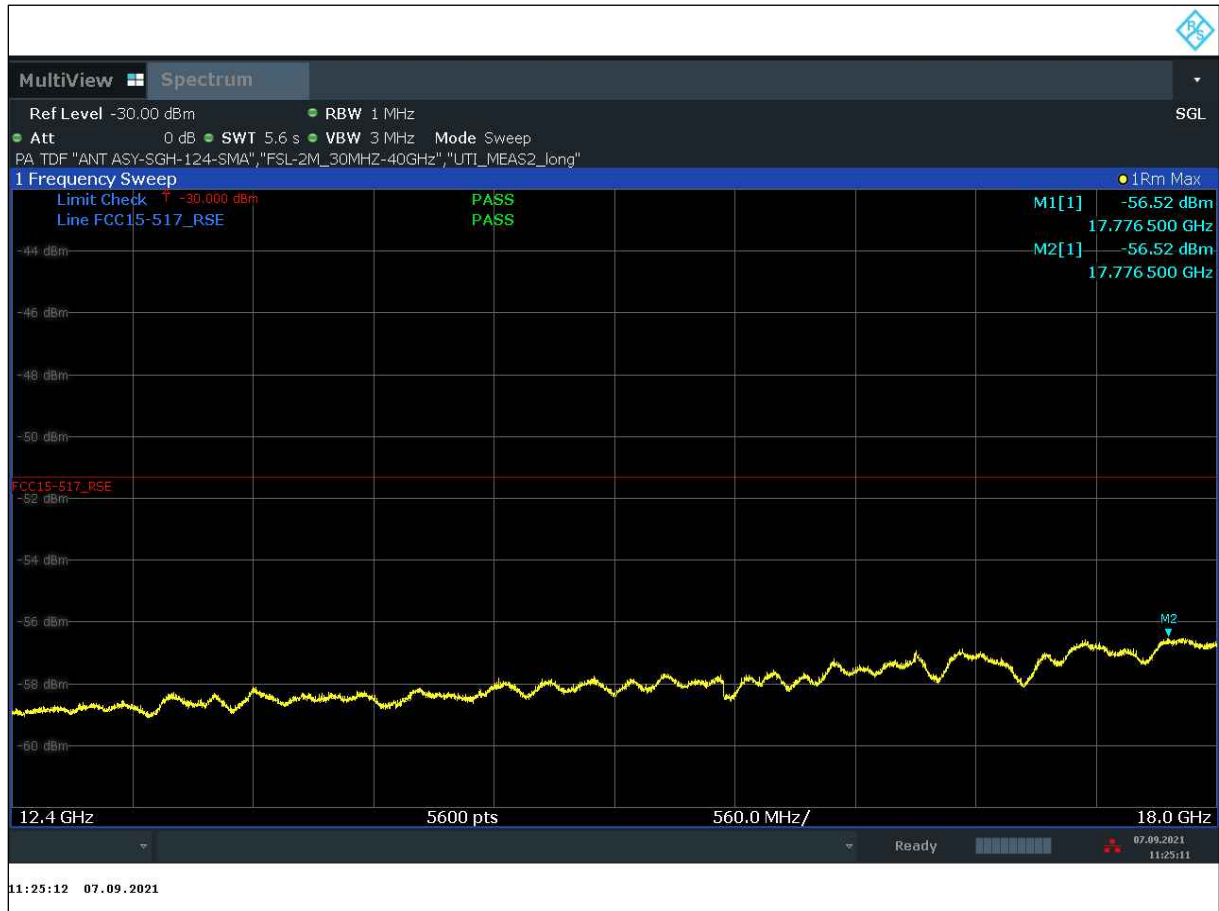


1.5.6 12.4GHz < f < 18GHz**D11_09a_RSE_TX_Ch4_PWRSet_0x23232323_12_4_18GHz_EUT_laying_Anth**

D11_09a_RSE_TX_Ch4_PWRSet_0xx23232323_12_4_18GHz_EUT_standing_Anth



D11_09b_RSE_TX_Ch4_PWRSet_0xx23232323_12_4_18GHz_AntV



1.5.7 18GHz < f < 40GHz

D11_10a_RSE_TX_Ch4_PWRSet_0xx23232323_18_40GHz_AntH

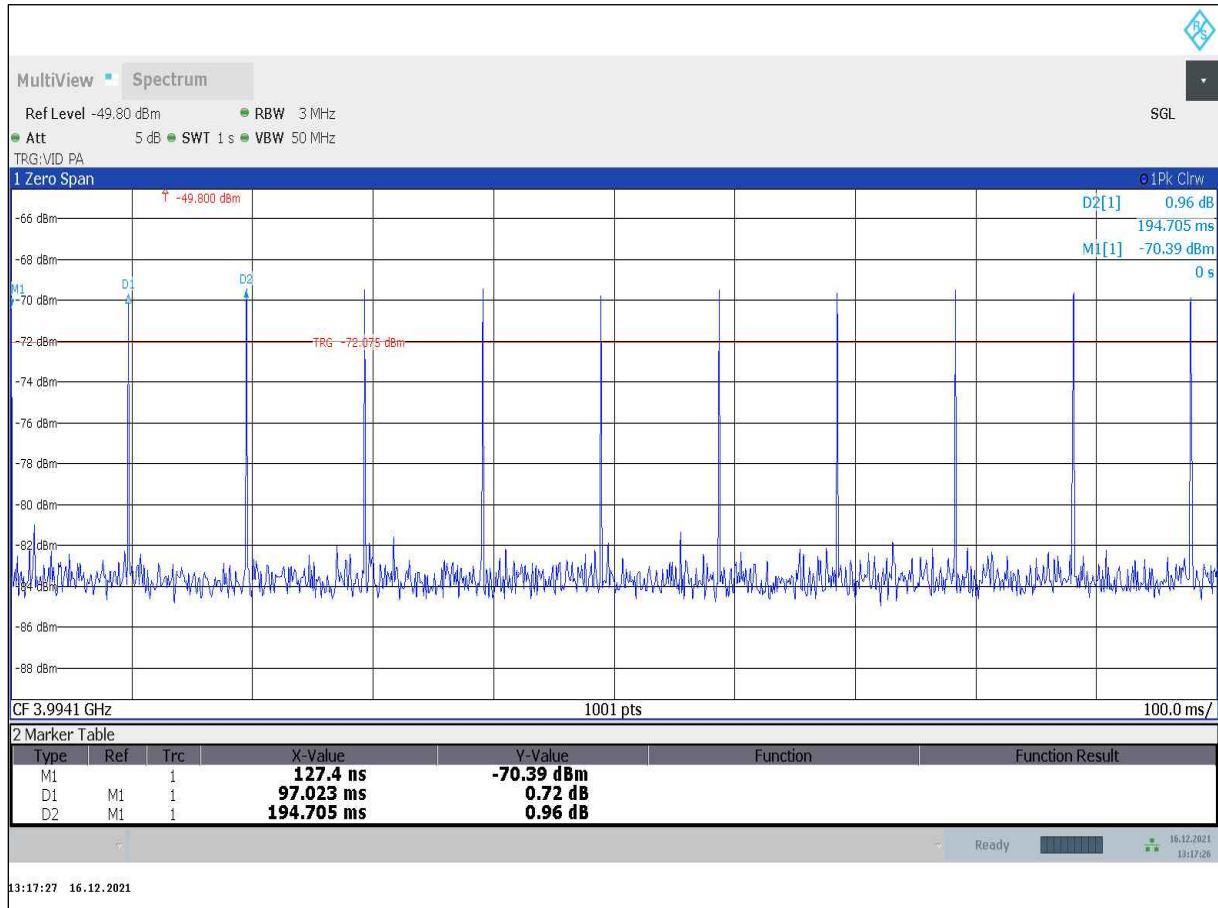


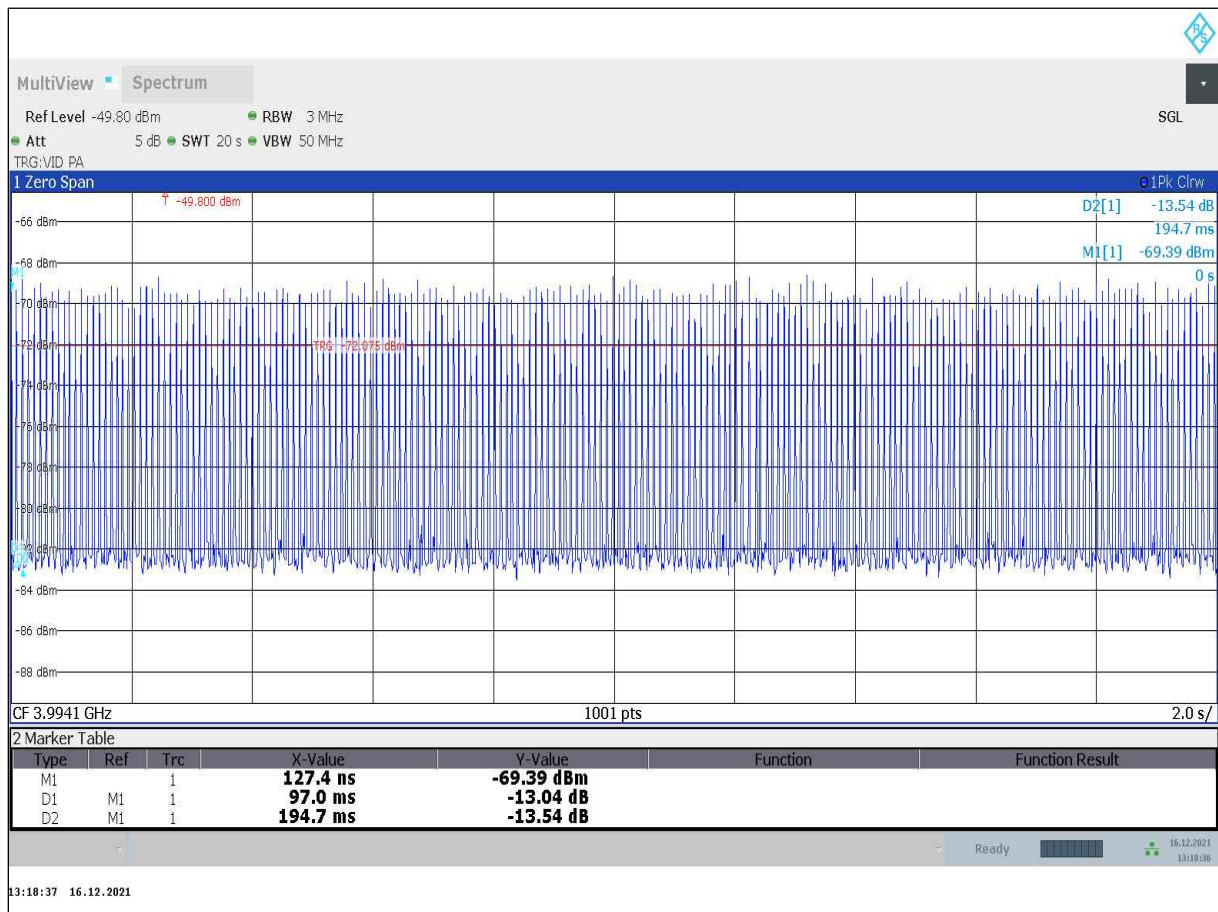
D11_10b_RSE_TX_Ch4_PWRSet_0xx23232323_18_40GHz_AntV



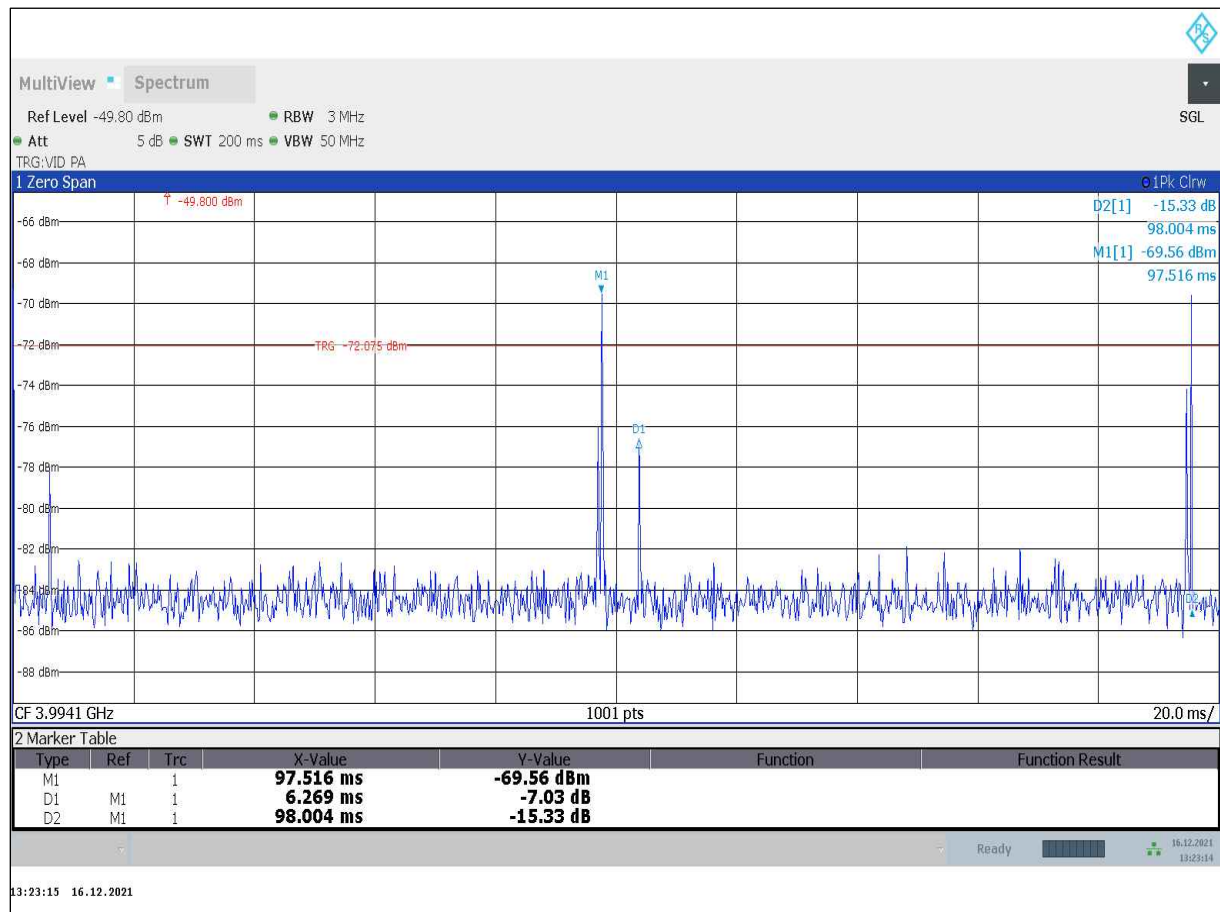
1.6 Timing tests

D11_030b_Timing_Anchor_DataCommunication_with_Tag



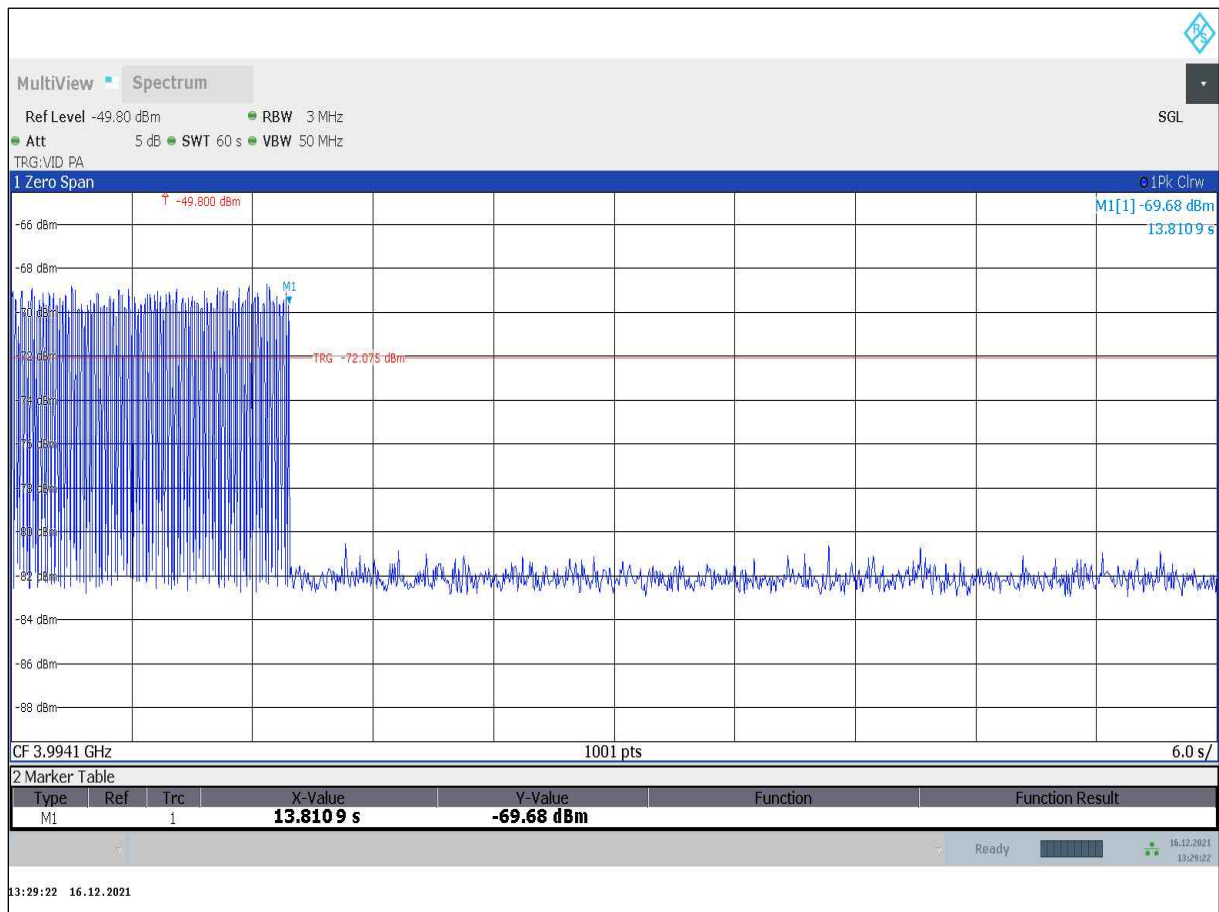
D11_031b_Timing_Anchor_DataCommunication_with_Tag_Cycle_over_20Seconds

D11_032b_Timing_Anchor_DataCommunication_with_Tag

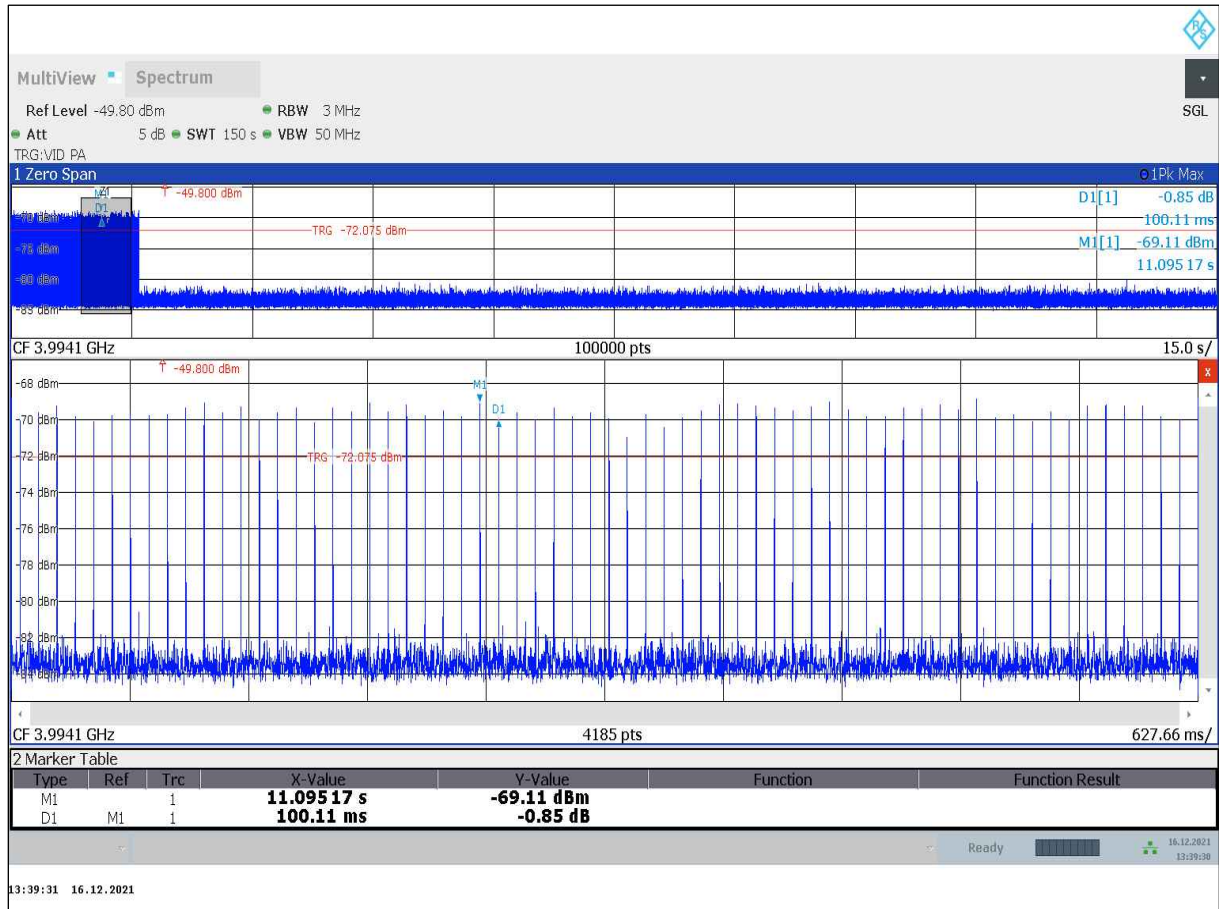


D1_Marker (lower value of signal) shows timing of tag response

D11_034b_Timing_Anchor_Tag_switching_off

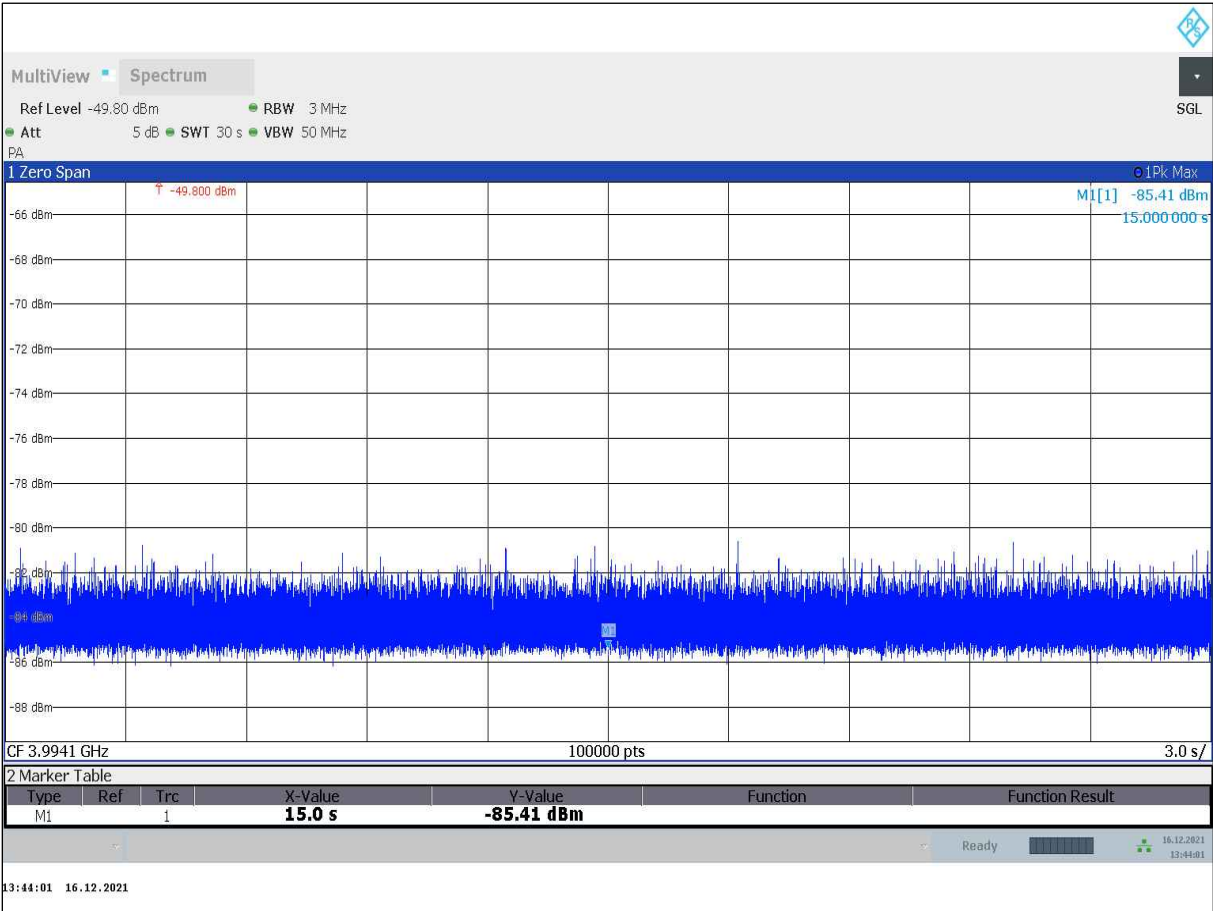


D11_036b_Timing_Anchor_Tag_switching_off_long_Sweep





D11_037b_Timing_Anchor_Switching_Anchor_on_15Seconds_point



End Of Annex 1