

Annex 1: Measurement diagrams 22-1-0057101T028a-A1

Number of pages:	33	Date of Report:	2024-Apr-04
Testing company:	cetecom advanced GmbH Untertuerkheimer Str. 6-10 66117 Saarbruecken GERMANY	Applicant:	ZIGPOS GmbH
Product: Model:	RTLS mobile CorivaTag Plus		
FCC ID:	2AHHJ-ZP-OXTAG1	IC:	32087-ZPOXTAG1
Testing has been carried out in accordance with:	FCC Regulations Title 47 CFR, Chapter I, Subchapter A, Part 15 Subpart C Intentional Radiators § 15.207 Conducted limits Subpart F Ultra-Wideband Operation § 15.519 Technical requirements for hand held UWB systems § 15.521 Technical requirements applicable to all UWB devices ISED-Regulations Radio Standards Specifications RSS-Gen, Issue 5 General Requirements for Compliance of Radio Apparatus RSS-220, Issue 1 + Amendment 1 (July 2018) Devices Using Ultra-Wideband (UWB) Technology		

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1 Measurement diagrams

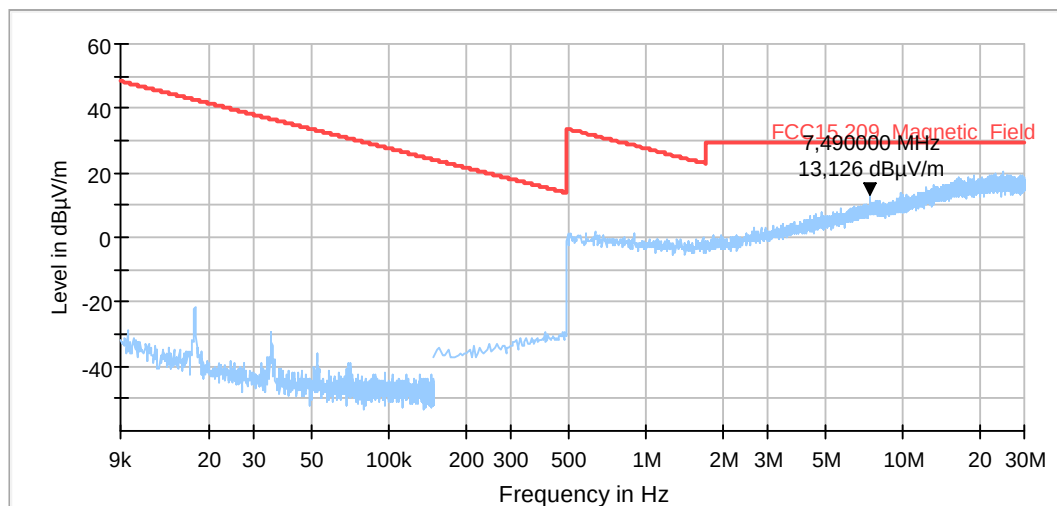
1.1 Magnetic field strength

2.03_EUT_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 5
Operator:	Lor
Operating Mode:	UWB Ch.9 TX
Power during tests:	Battery internal
Comment 1:	Channel nominal on 8GHz
Comment 2:	
Environmental Conditions:	Tnom, Vnom
EUT Setup/Sample:	S42_C01
Verdict:	Passed

Full Spectrum

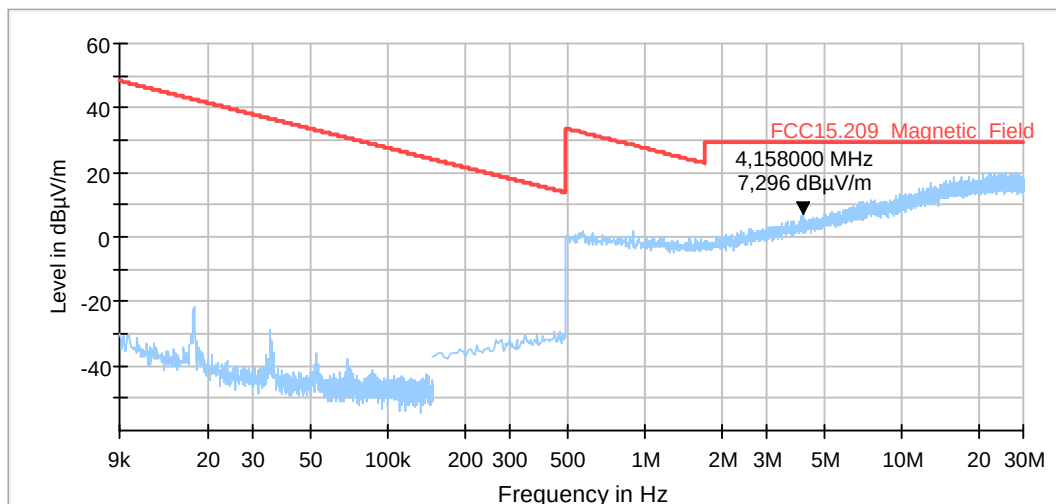


2.04_EUT_laying

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:	Lor
Operating Mode:	UWB Ch.9 TX
Power during tests:	Battery internal
Comment 1:	Channel nominal on 8GHz
Comment 2:	
Environmental Conditions:	Tnom, Vnom
EUT Setup:	S42_C01
Verdict:	Passed

Full Spectrum

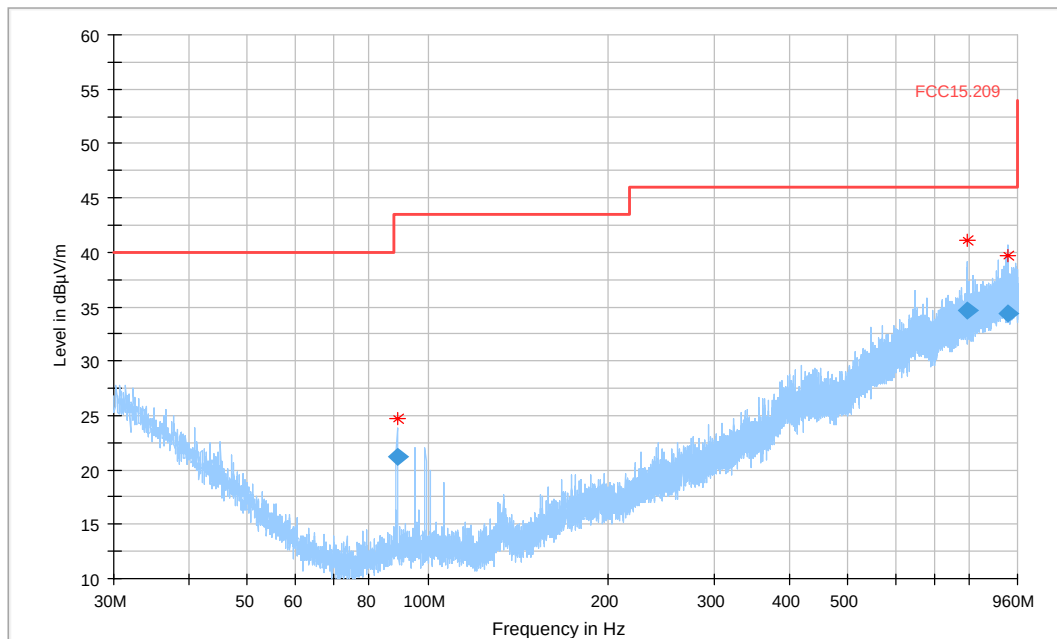


1.2 Electric field strength (30MHz < f < 960MHz)

3.03_EUT_standing

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: 68%rH; Temperature: 21C
Operator Name:	Lor
Operating Mode:	UWB TX on
Power supply:	Internal battery
Comment:	Nominal 8GHz
Verdict:	Passed
Set-up/EUT:	S42_C01



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)
88.790000	21.27	43.50	22.23	120.000	119.0	V	116.0	7.8	0.0	0.9
794.370000	34.69	46.00	11.31	120.000	206.0	V	77.0	25.6	0.0	3.1
927.710000	34.43	46.00	11.57	120.000	342.0	V	23.0	27.0	0.0	3.4

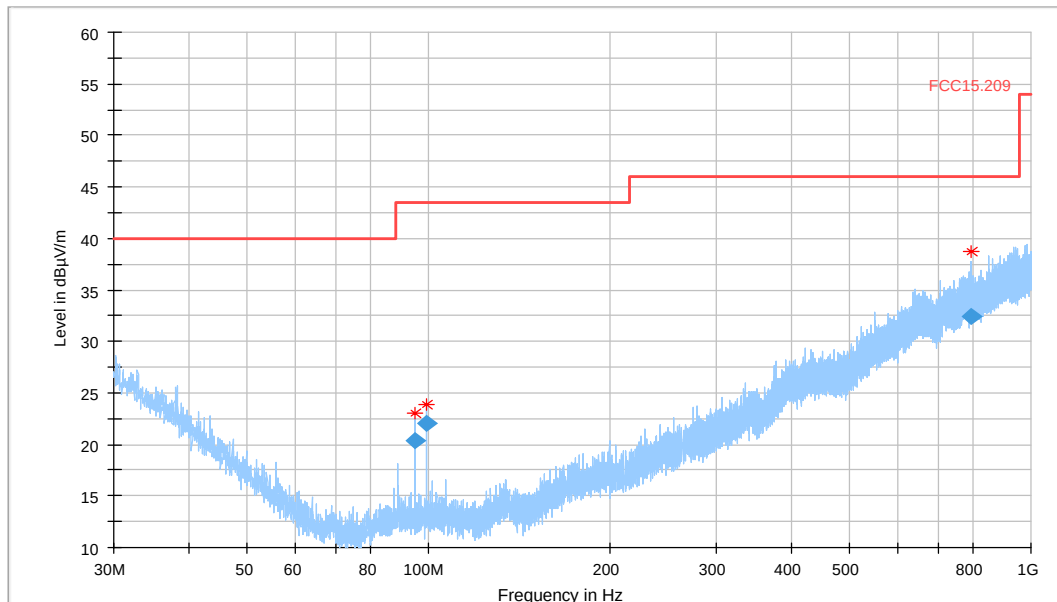
(continuation of the "Final_Result" table from column 18 ...)

Frequency (MHz)	Trd Corr. (dB/m)	Raw Rec (dBμV)	Comment
88.790000	6.9	13.5	15:01:23 - 22.06.2023
794.370000	22.5	9.1	15:06:38 - 22.06.2023
927.710000	23.6	7.5	15:12:05 - 22.06.2023

3.04_EUT_Laying

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: 68%rH; Temperature: 21C
Operator Name:	Lor
EUT:	S42_C01
Operating Mode:	UWB channel 9 TX
Power supply:	battery internal
Comment:	8GHz nominal
Verdict:	Passed



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)
95.110000	20.43	43.50	23.07	120.000	117.0	V	44.0	7.8	0.0	0.9
99.190000	22.11	43.50	21.39	120.000	119.0	V	34.0	7.7	0.0	0.9
795.070000	32.47	46.00	13.53	120.000	245.0	V	218.0	25.5	0.0	3.1

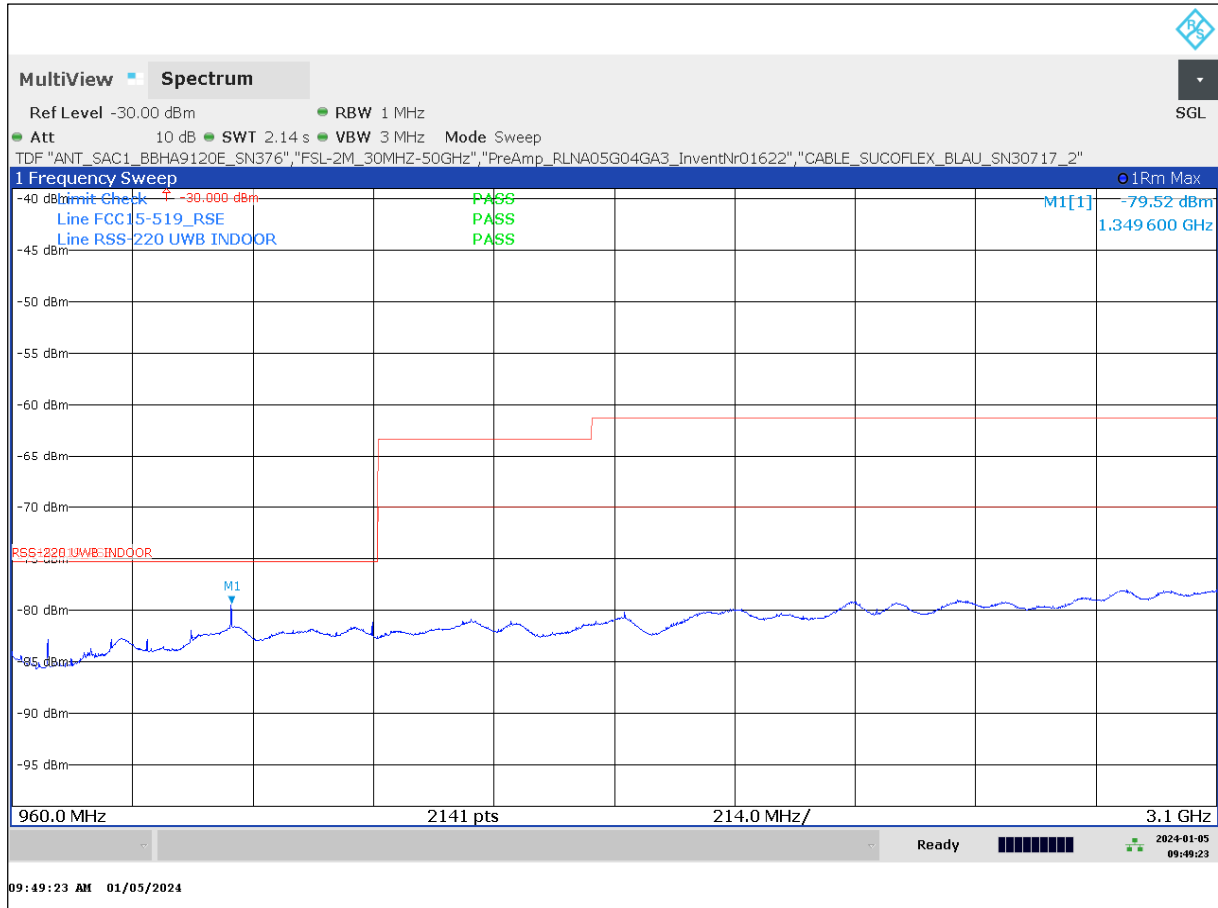
(continuation of the "Final_Result" table from column 18 ...)

Frequency (MHz)	Trd Corr. (dB/m)	Raw Rec (dBµV)	Comment
95.110000	6.9	12.6	15:32:50 - 22.06.2023
99.190000	6.8	14.4	15:38:23 - 22.06.2023
795.070000	22.4	6.9	15:43:45 - 22.06.2023

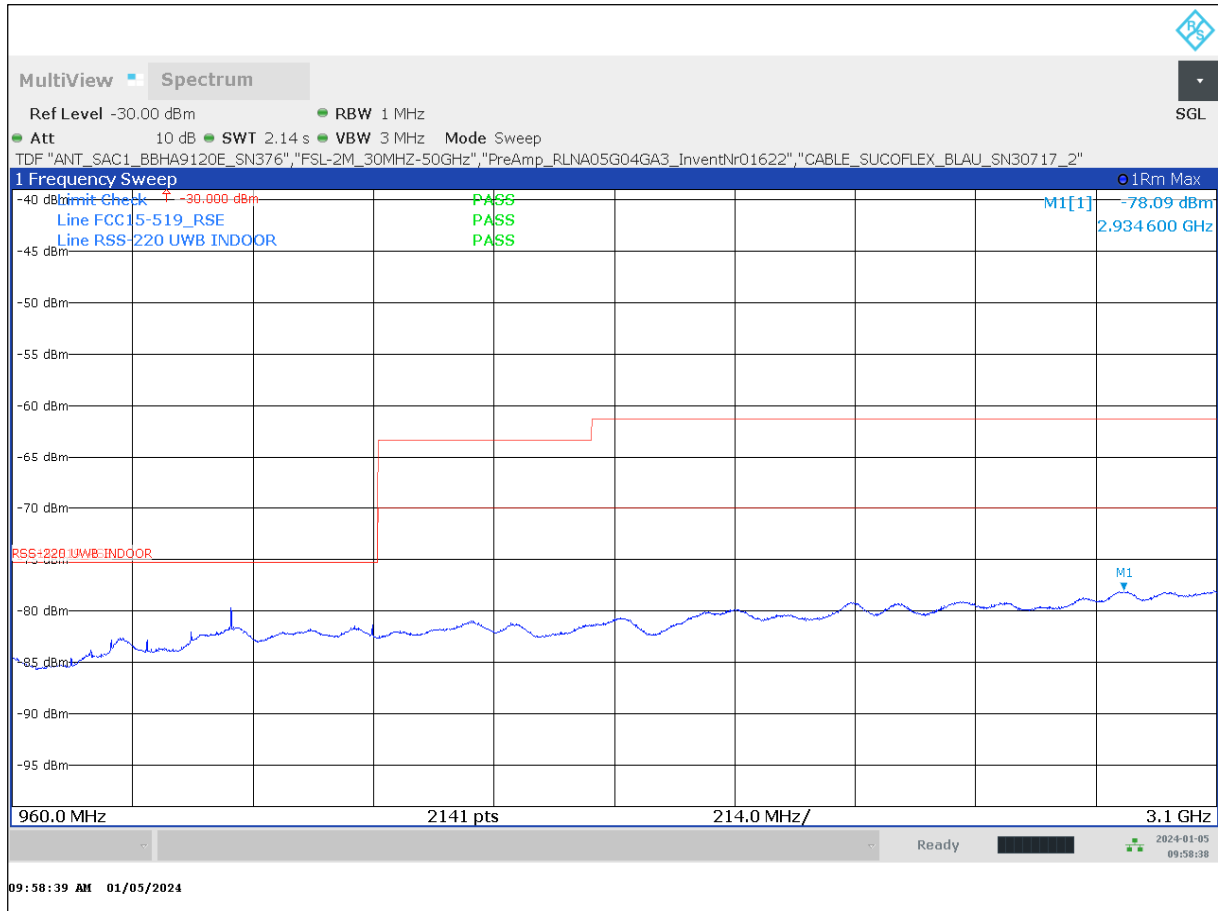
1.3 Measurements according FCC Part 15.517(c) and RSS-220 (§5.2.1(d))

1.3.1 Measurements in range: 960MHz < f < 3.1GHz (§15.517(c) & RSS-220)

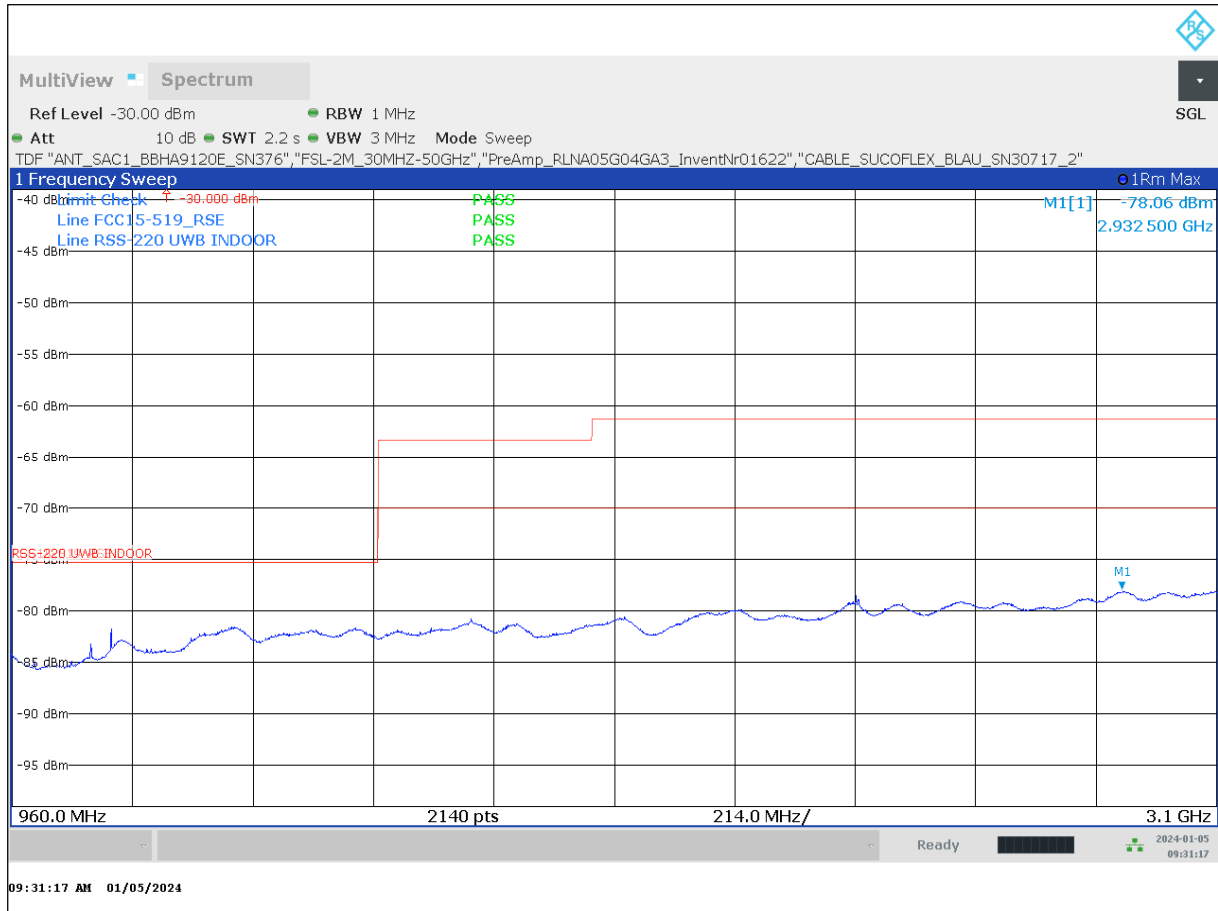
T028_D013a_RSE_TX_S52_Ch9_Value_0x45454545_EUT_laying__AntH



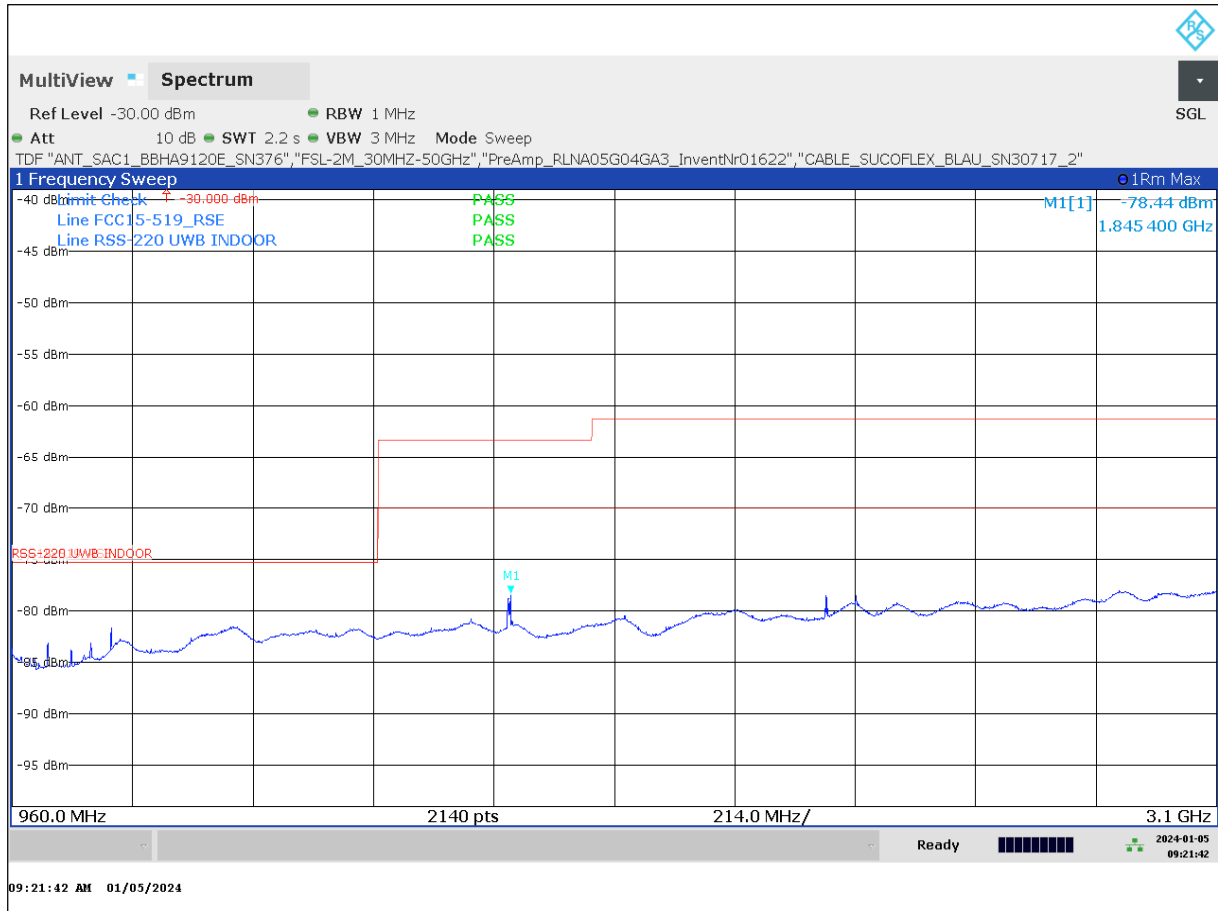
T028_D013a_RSE_TX_S52_Ch9_Value_0x45454545_EUT_standing__Anth



T028_D013b_RSE_TX_S52_Ch9_Value_0x45454545_EUT_laying__AntV

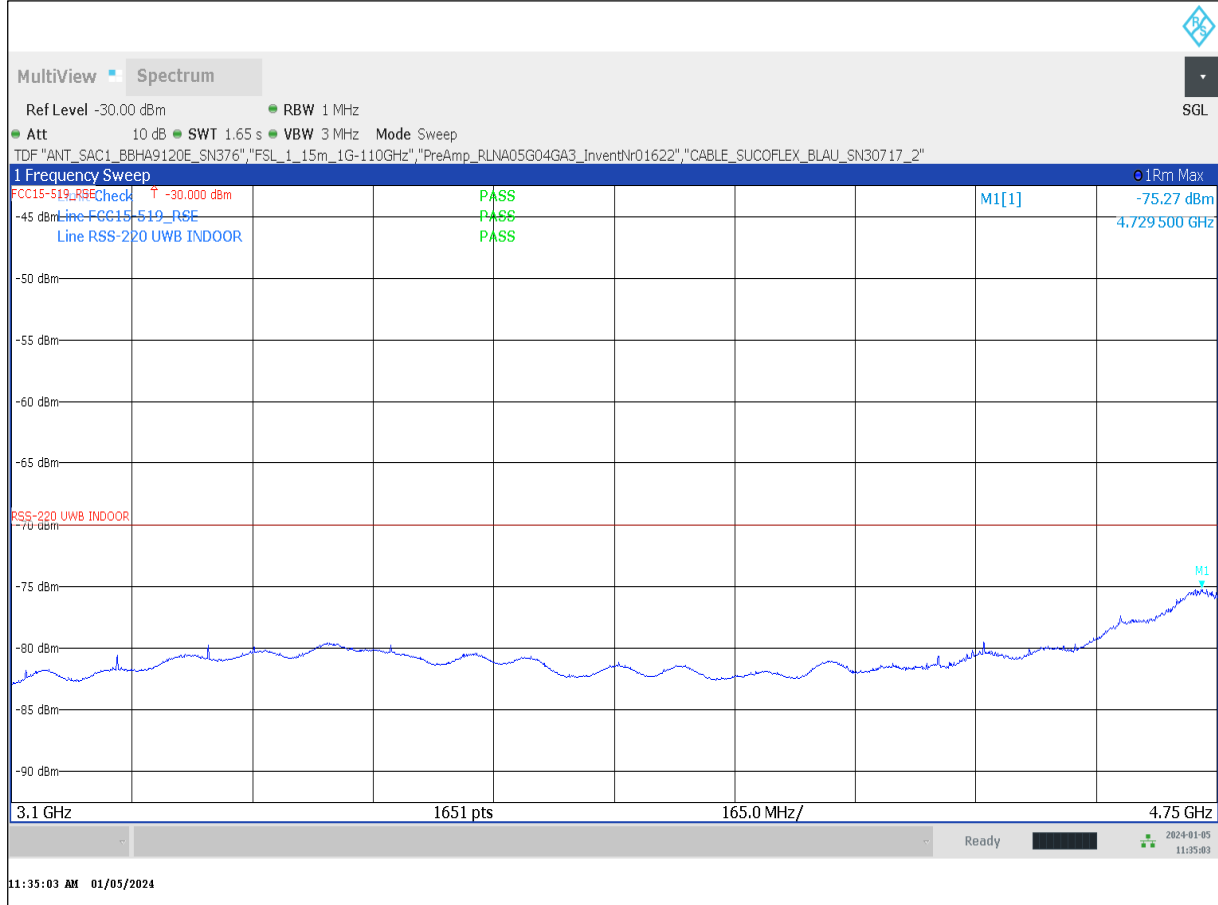


T028_D013b_RSE_TX_S52_Ch9_Value_0x45454545_EUT_standing__AntV



1.3.2 Measurements in range: 3.1GHz < f < 4.75GHz (RSS-220, §5.2.1 (d))

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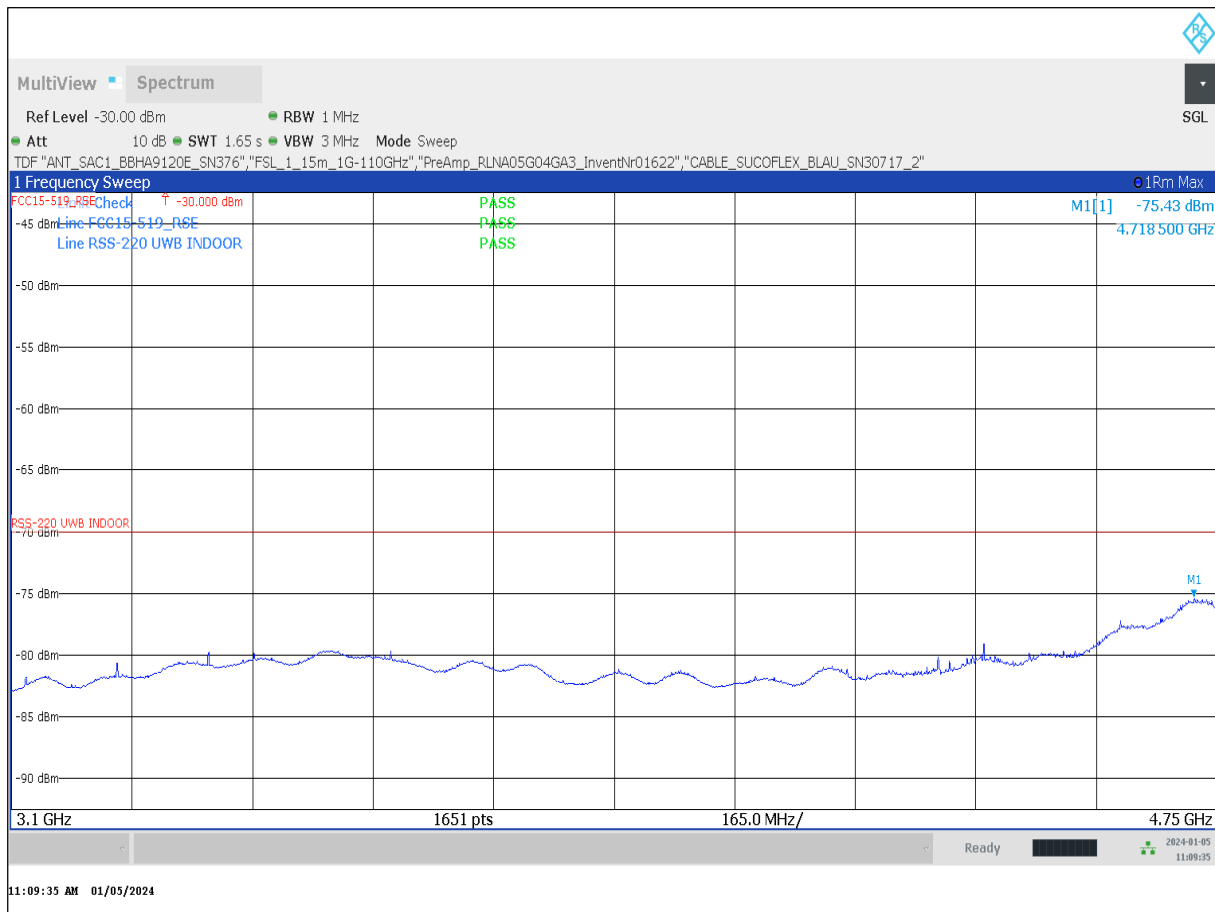
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T028_D014b_RSE_TX_S52_Ch9_Value_0x45454545_EUT_laying__AntV

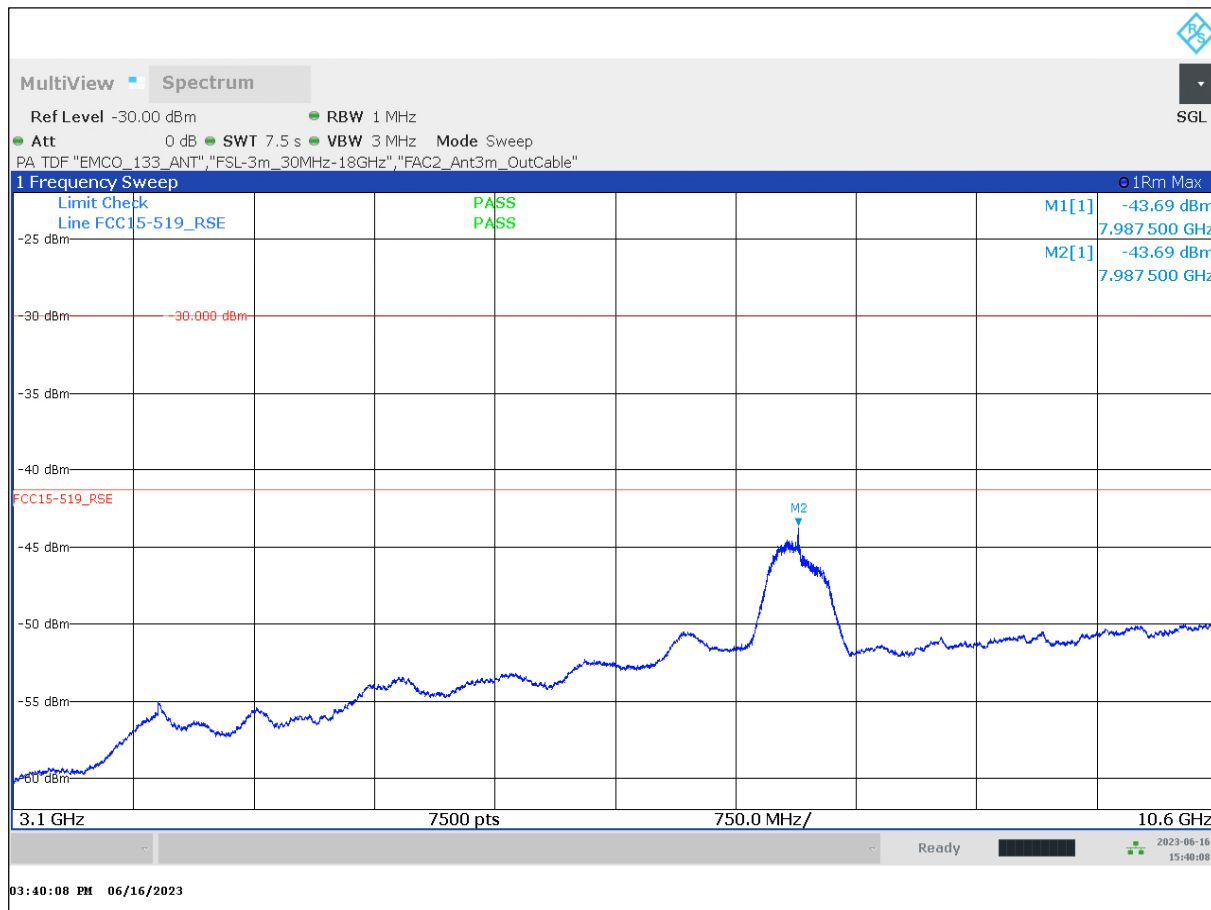


T028_D014b_RSE_TX_S52_Ch9_Value_0x45454545_EUT_standing__AntV

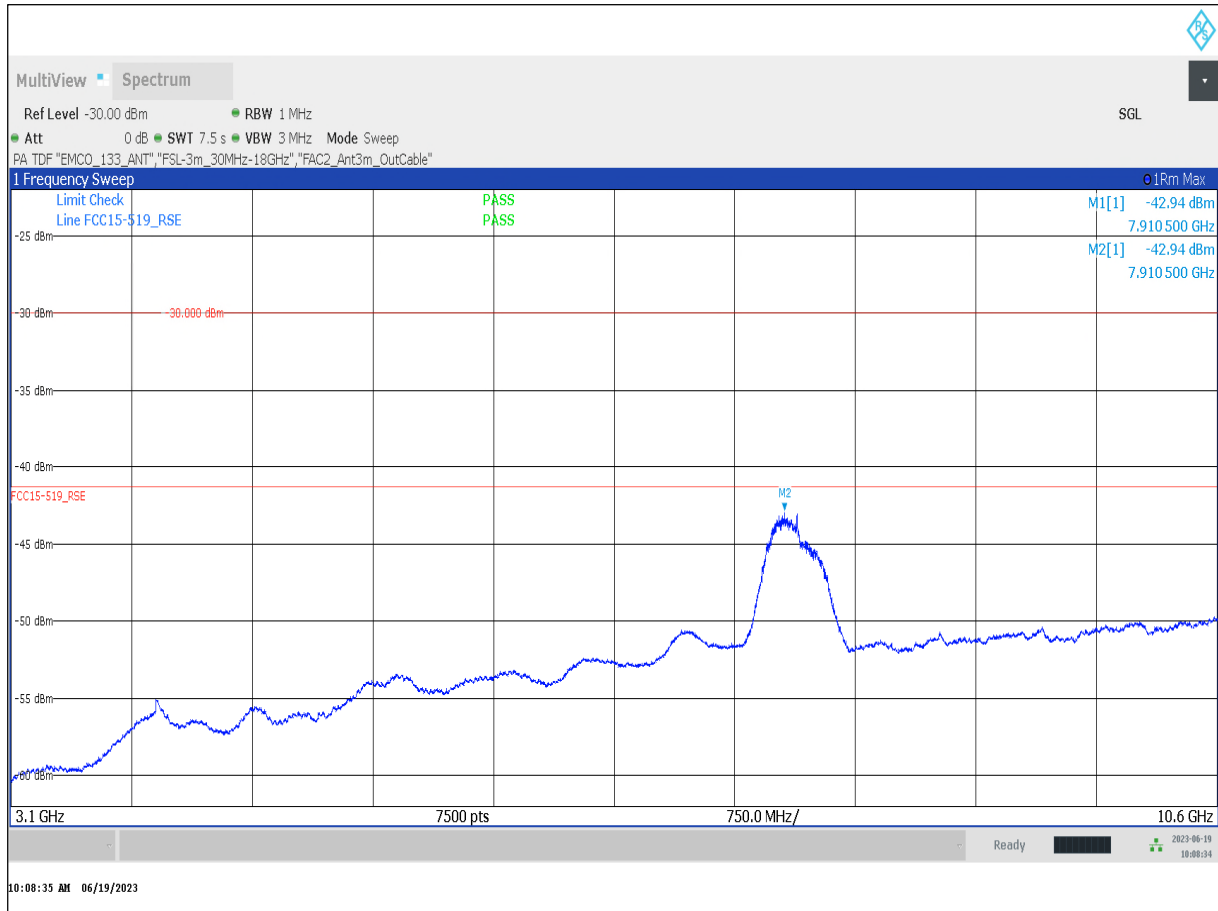


1.3.3 Measurements in range: 3.1GHz < f < 10.6GHz

T028_D003a_RSE_TX_Ch9_Value_0x45454545_Anth

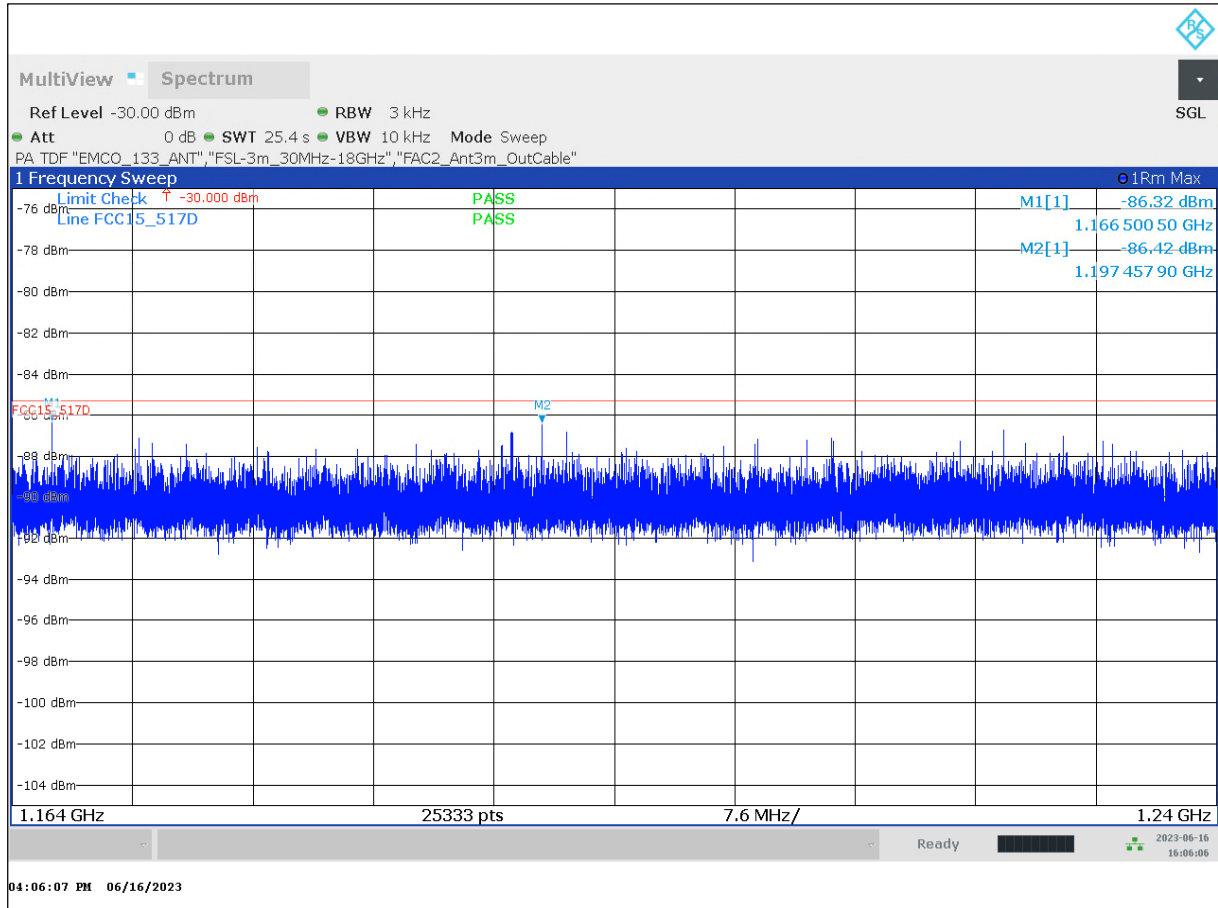


T028_D003b_RSE_TX_Ch9_Value_0x45454545_AntV_Retest

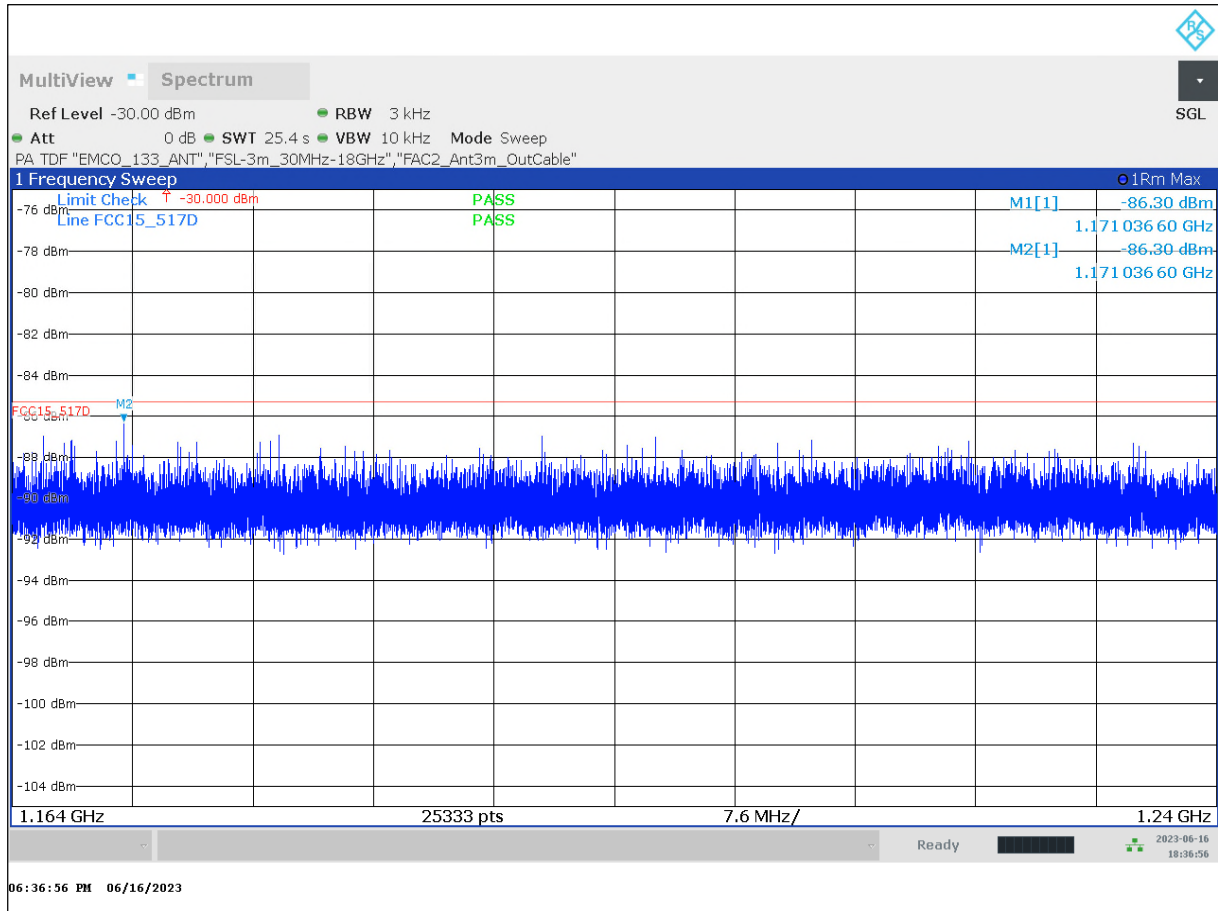


1.3.4 Measurements in range: 1.559GHz < f < 1.61GHz

T028_D008a_RSE_TX_GPS1_Ch9_Value_0x45454545_AntH

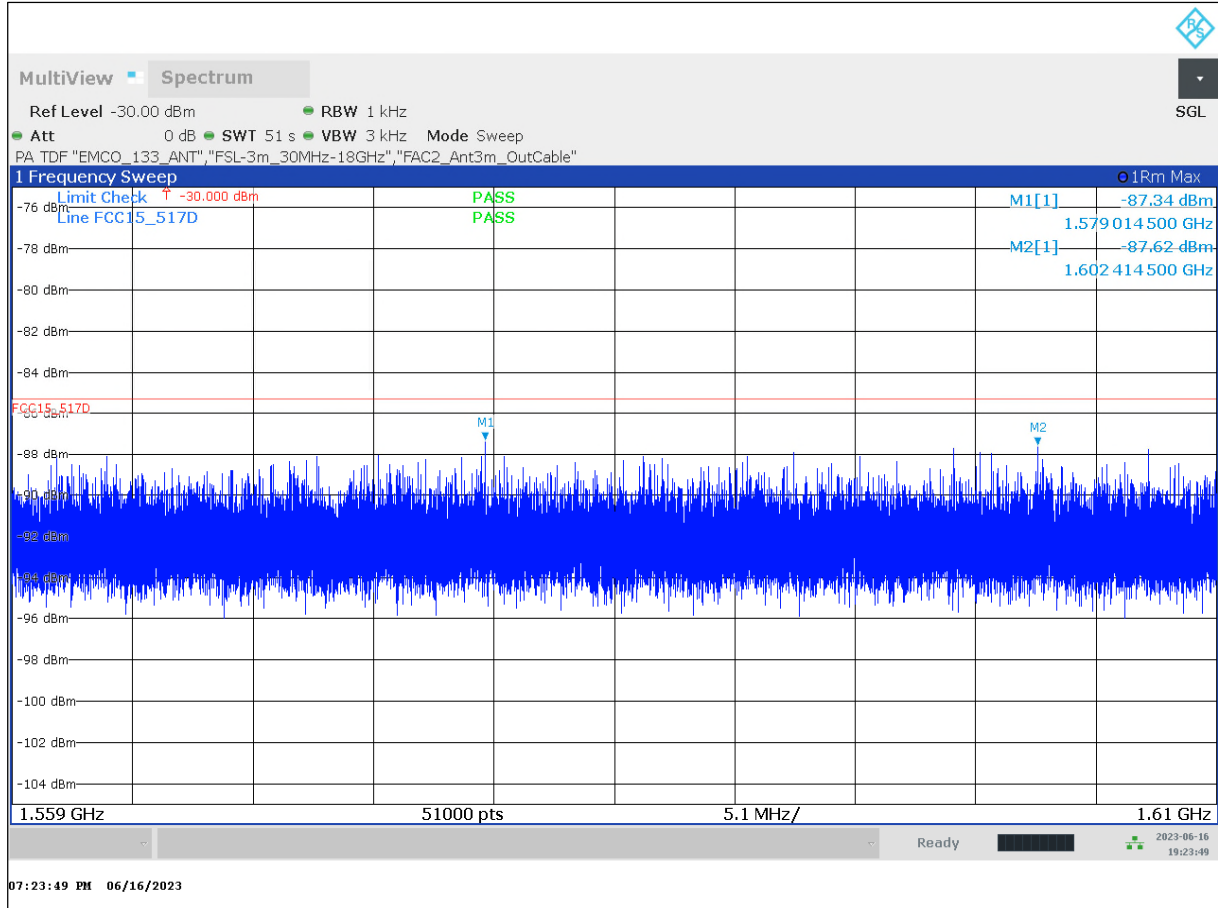


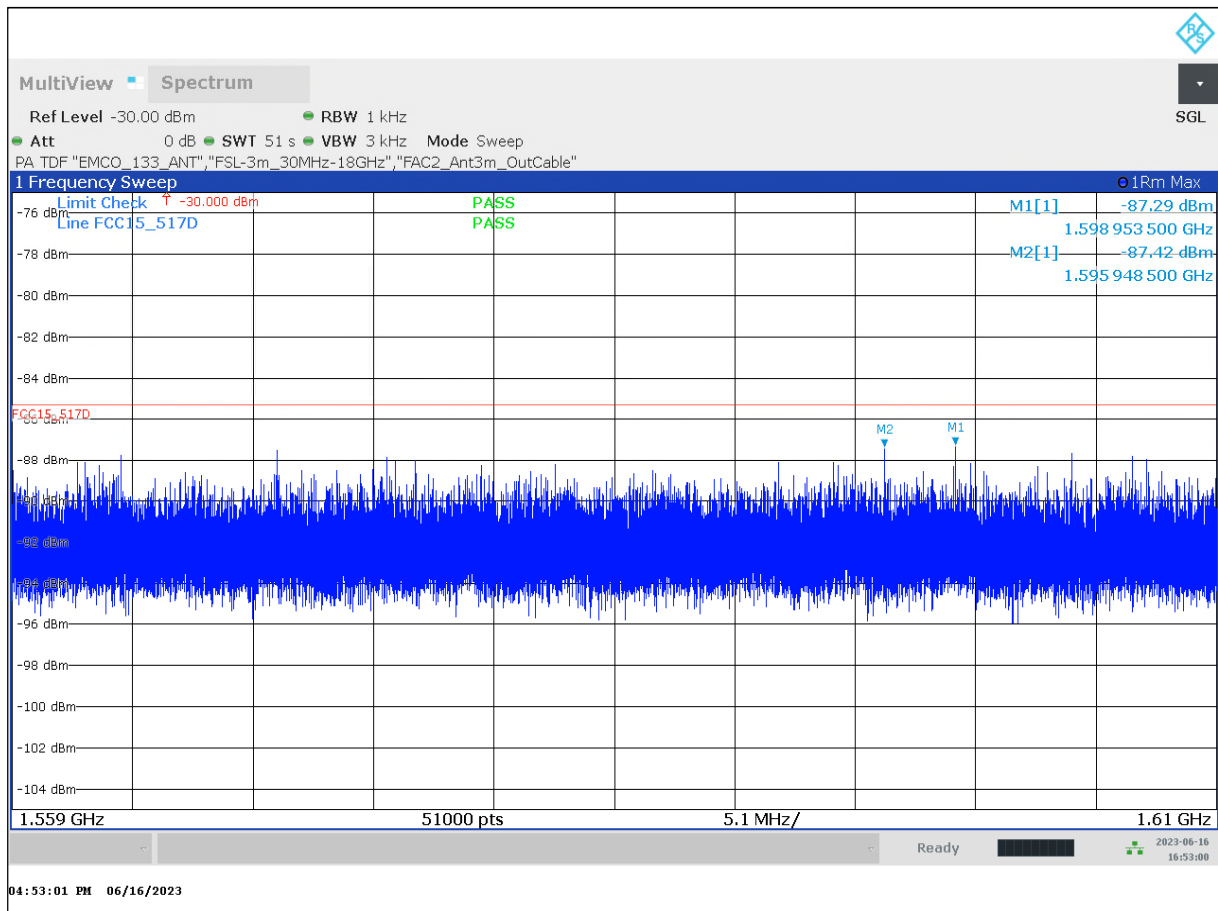
T028_D008b_RSE_TX_GPS1_Ch9_Value_0x45454545_AntV



1.3.5 Measurements in range: 1.559GHz < f < 1.61GHz

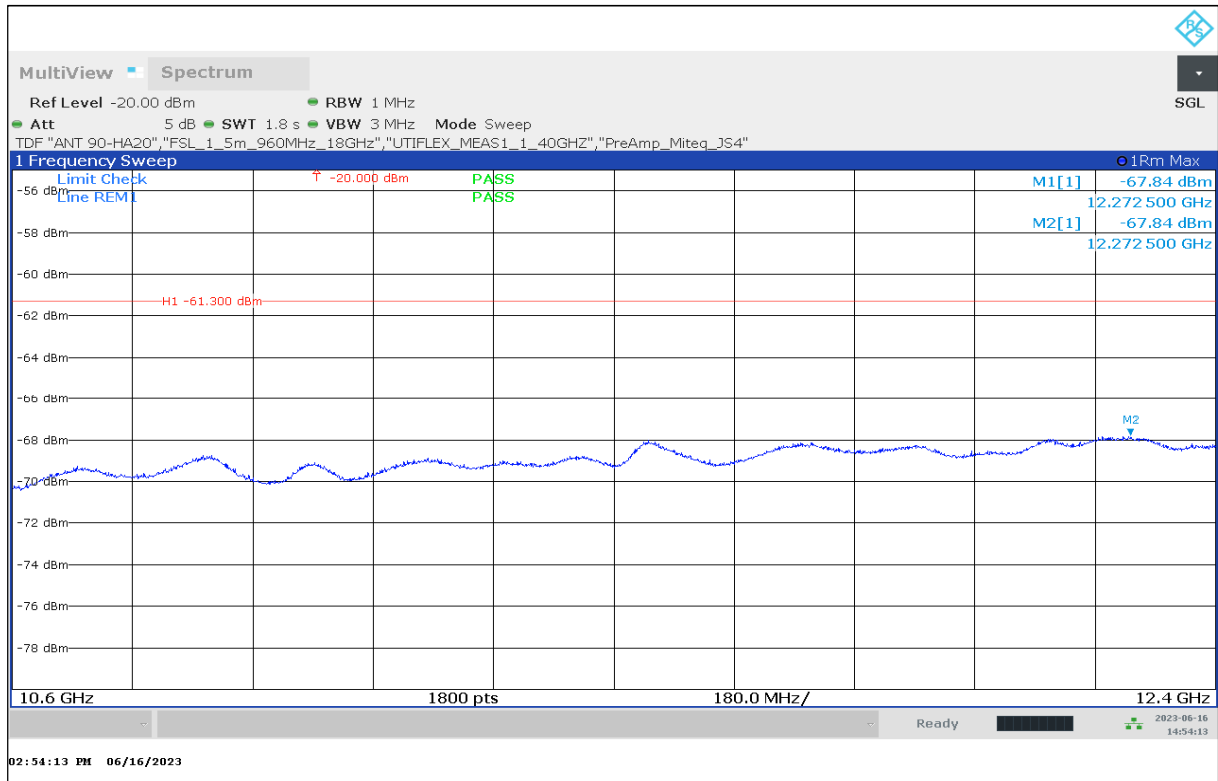
T028_D009a_RSE_GPS2_TX_Ch9_Value_0x45454545_AntH



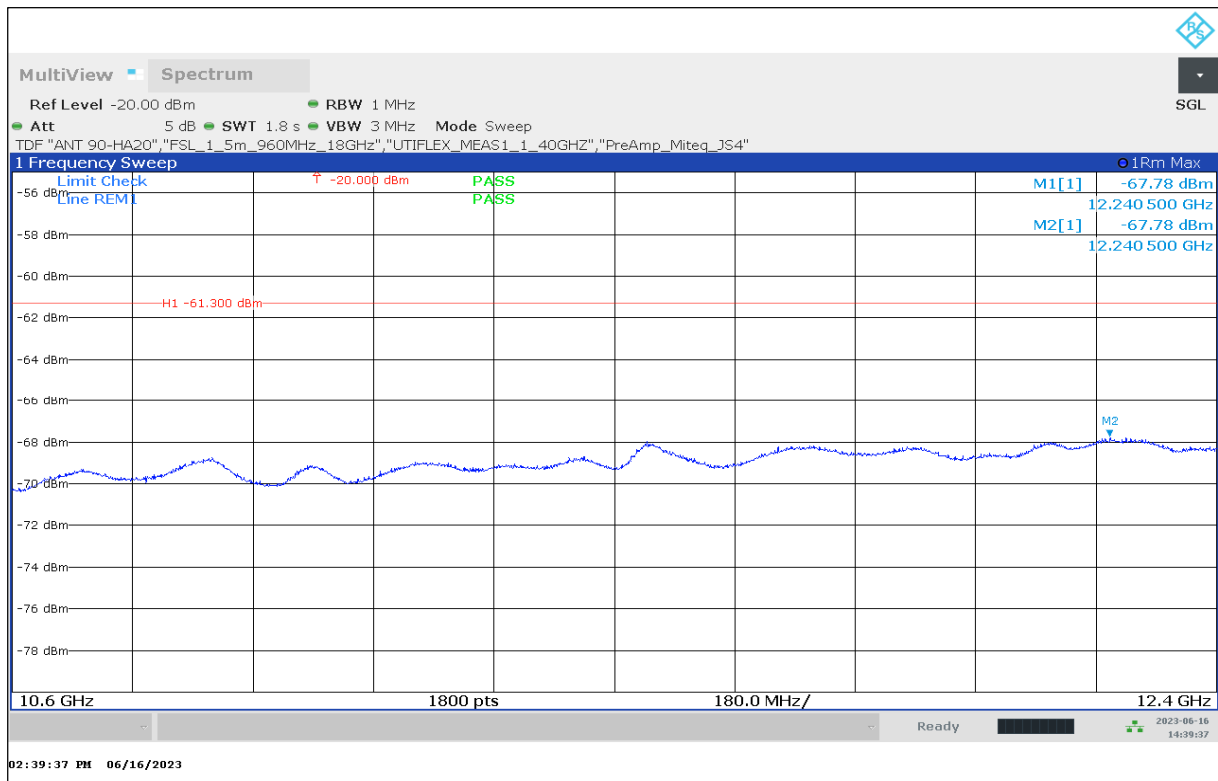
T028_D009b_RSE_GPS2_TX_Ch9_Value_0x45454545_AntV


1.3.6 Measurements in range: 10.6GHz < f < 12.4GHz

T028_D004a_RSE_TX_Ch9_Value_0x45454545_AntH

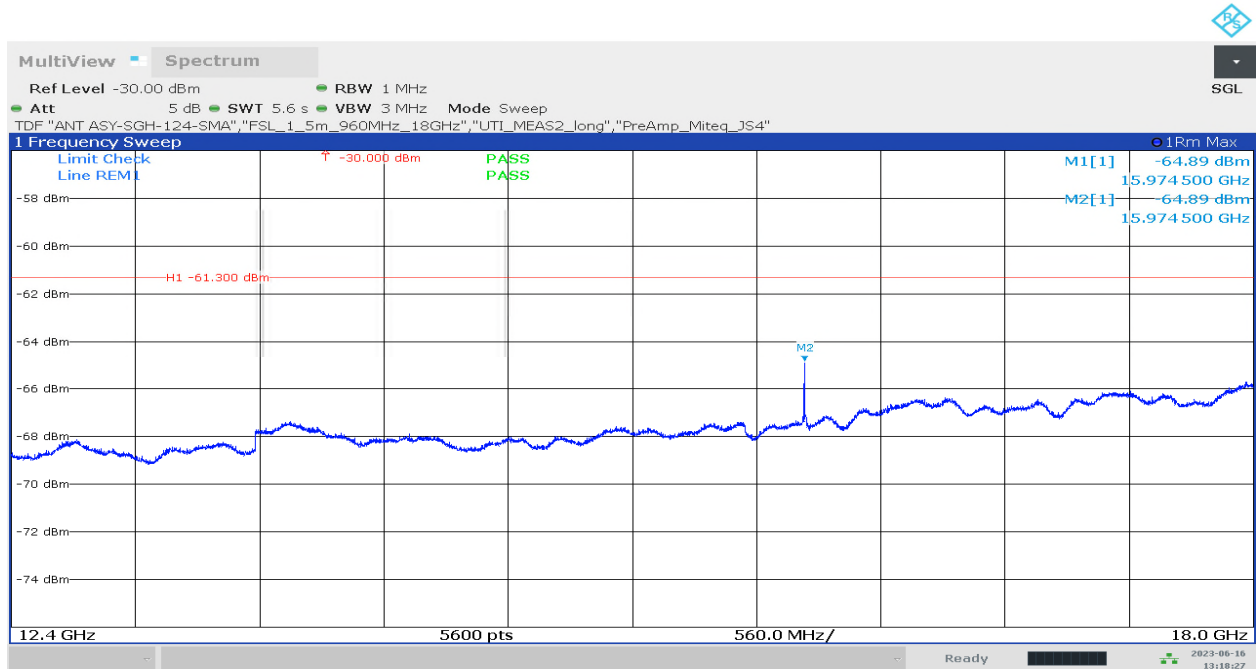


T028_D004b_RSE_TX_Ch9_Value_0x45454545_AntV

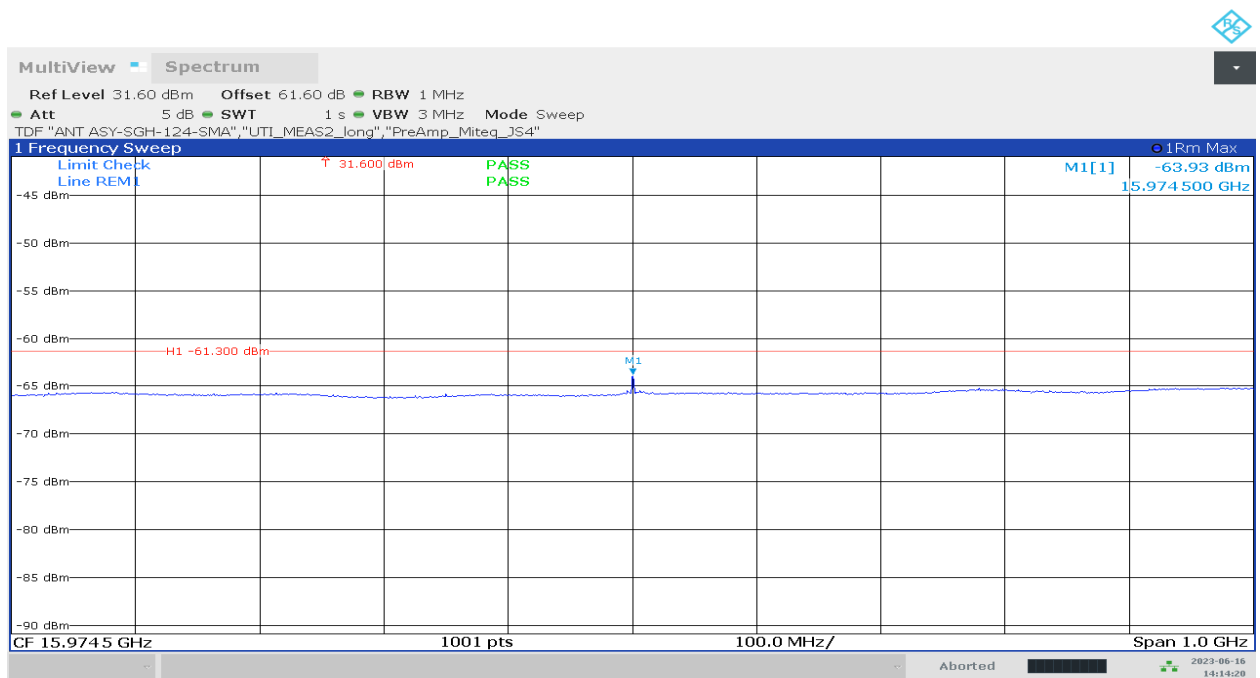


1.3.7 Measurements in range: 12.4GHz < f < 18GHz

T028_D005a_RSE_TX_Ch9_Value_0x45454545_AntH

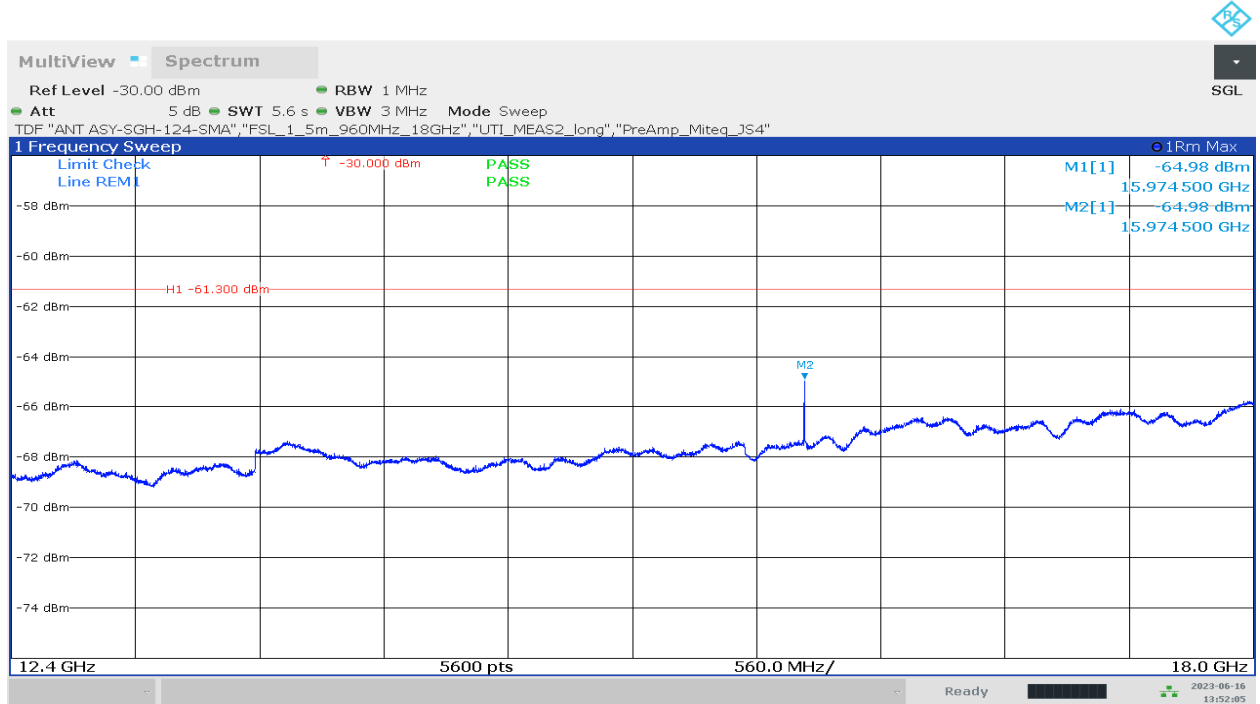


T028_D005a_k1_1.5m_RSE_TX_Ch9_Value_0x45454545_AntH



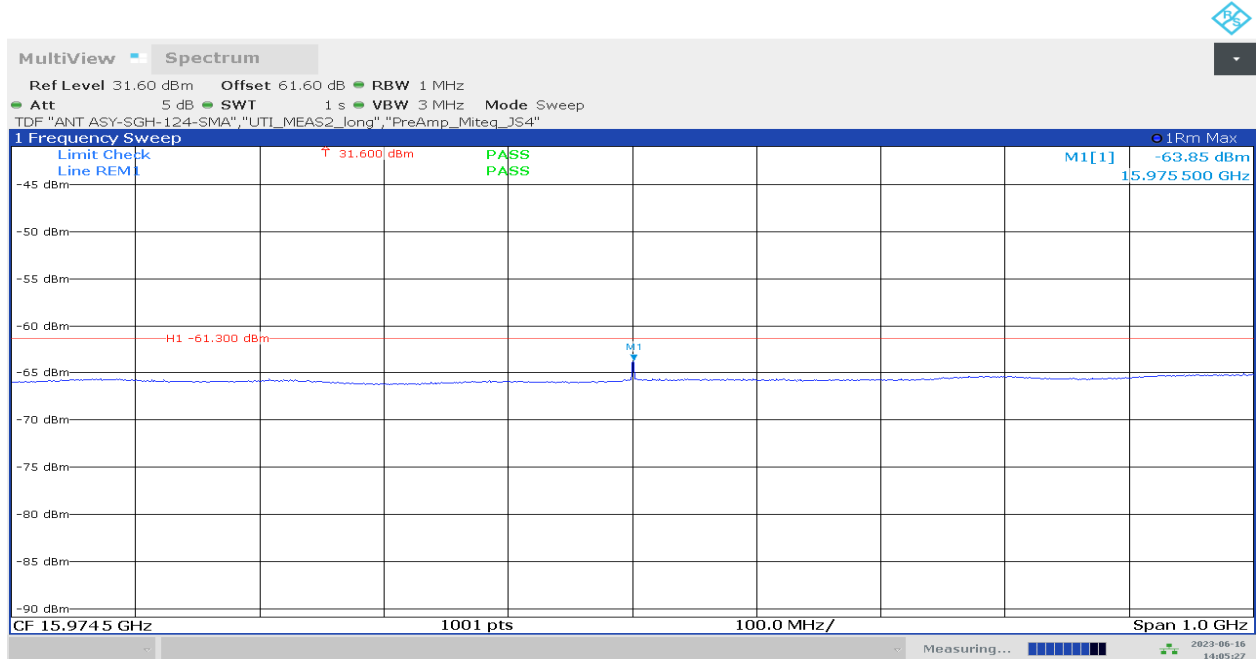
Maximization of emission: -63.93dBm

T028_D005b_RSE_TX_Ch9_Value_0x45454545_AntV



01:52:05 PM 06/16/2023

T028_D005b_k1_1.80m_RSE_TX_Ch9_Value_0x45454545_AntV

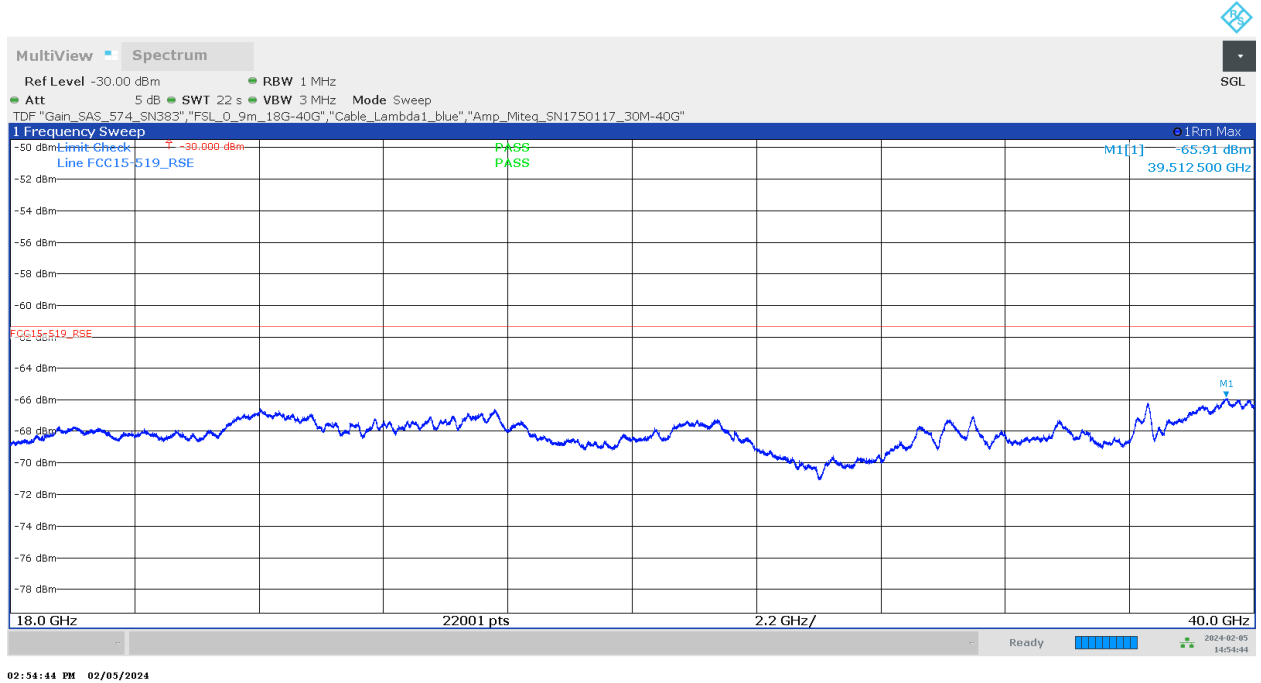


02:05:27 PM 06/16/2023

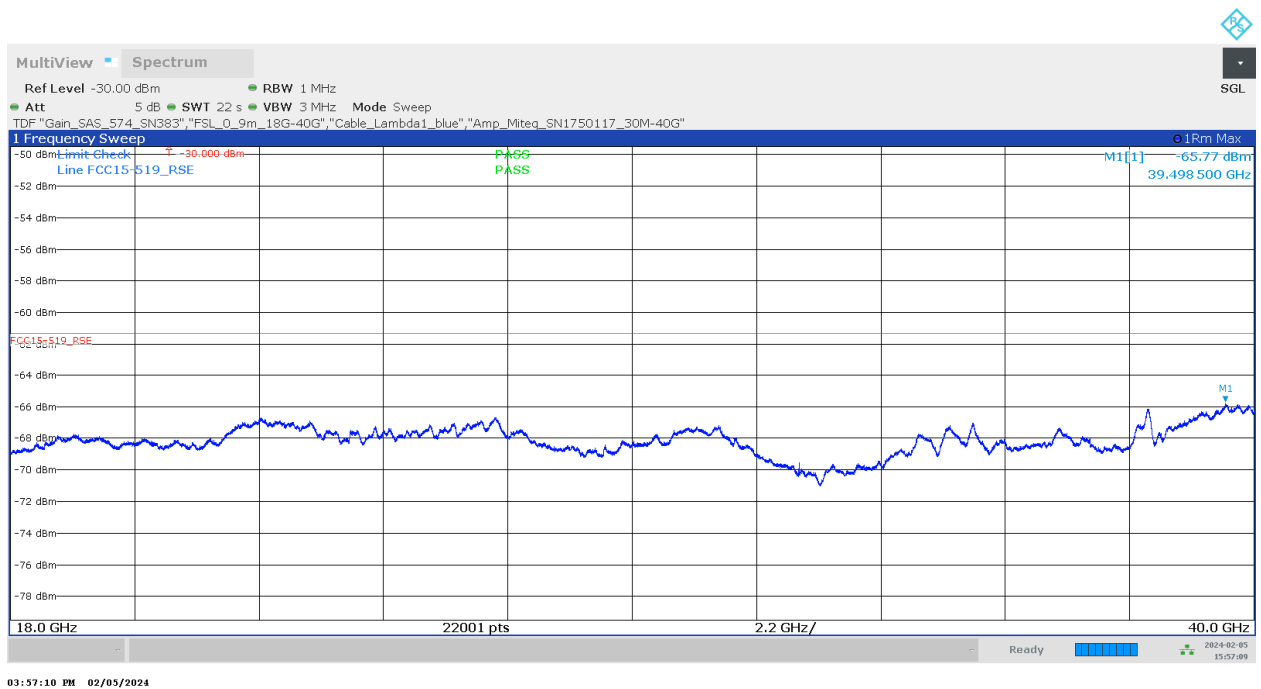
Maximization of emission: -63.85dBm

1.3.8 Measurements in range: 18GHz < f < 40GHz

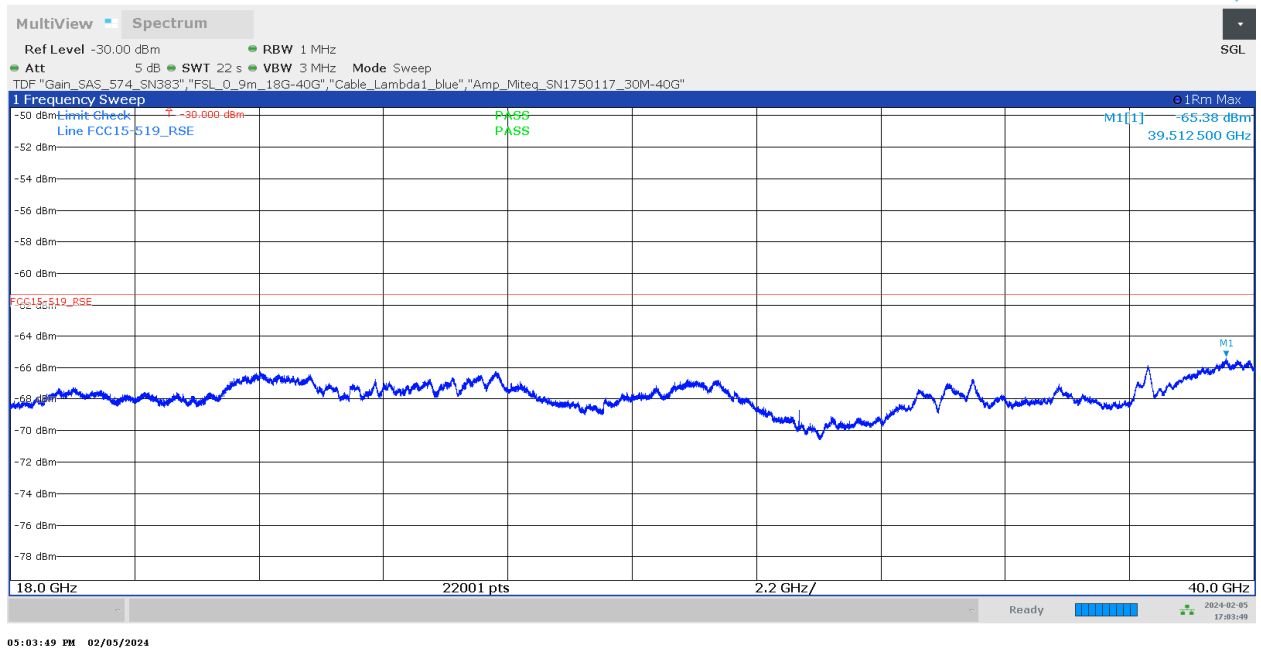
T028_D020a_RSE_S52_Ch9_PWRValue_0x45454545_AntH



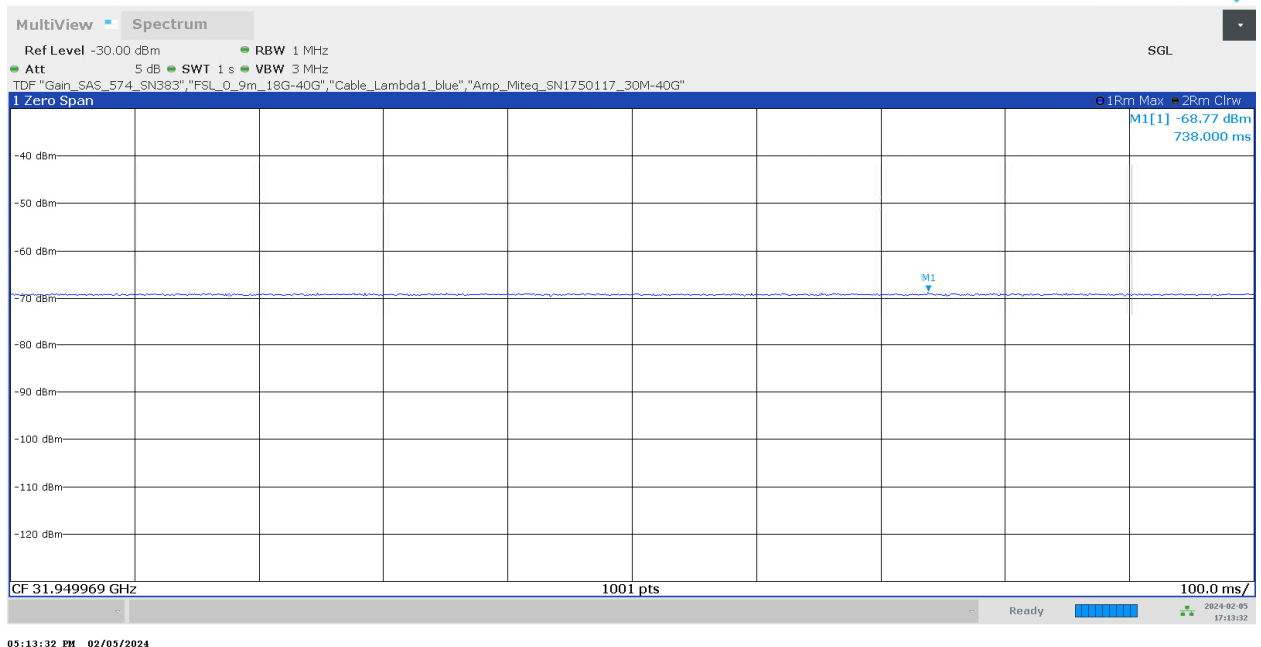
T028_D020b_RSE_S52_Ch9_PWRValue_0x45454545_EUT_laying_AntV



T028_D020b_RSE_S52_Ch9_PWRValue_0x45454545_EUT_standing_AntV

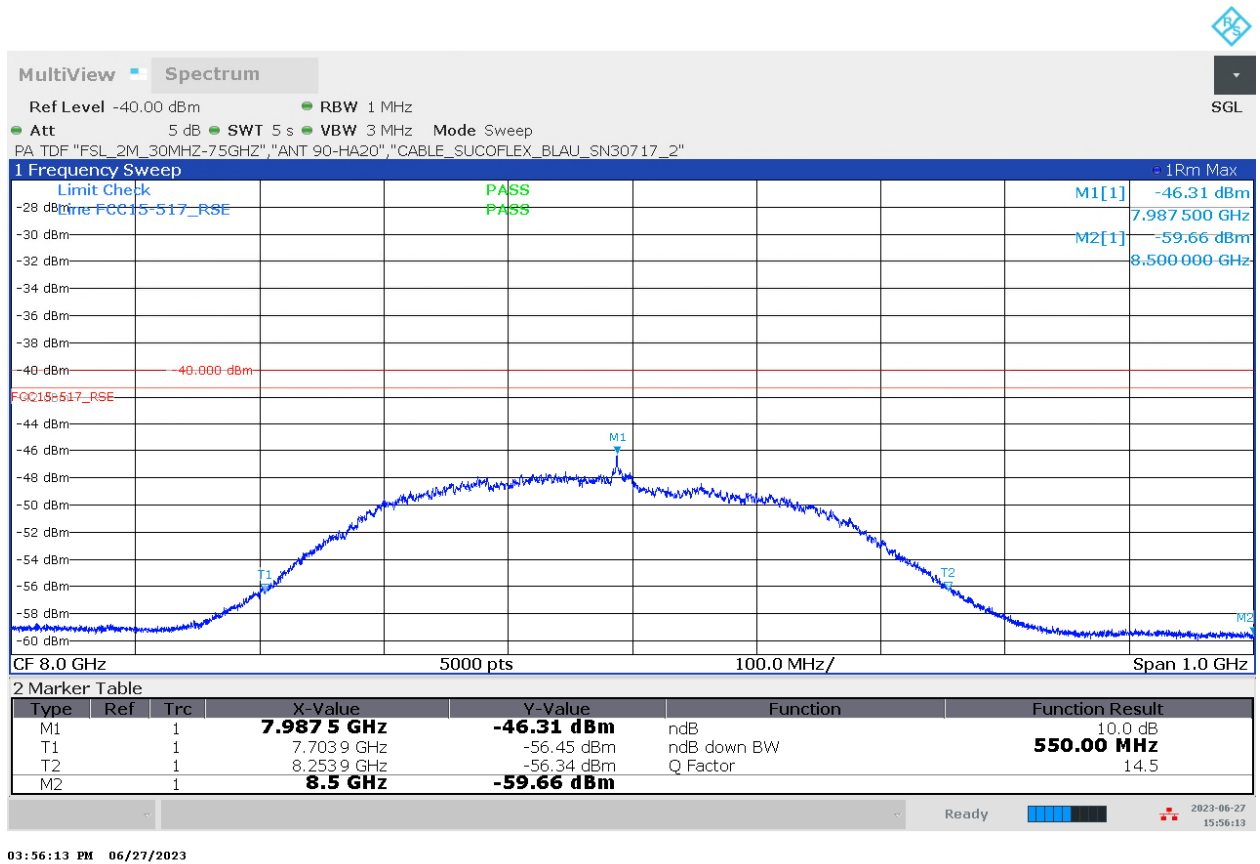


T028_D020b_01_k1_S52_Ch9_PWRValue_0x45454545_A15_E90__AntV



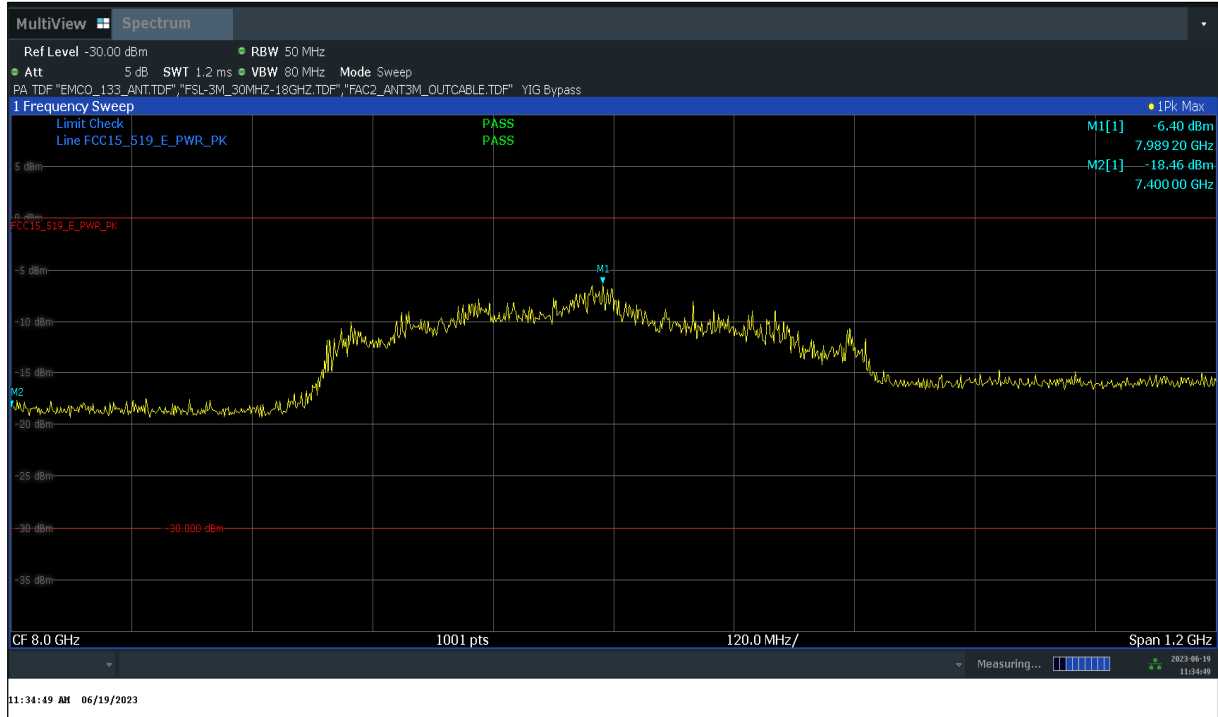
Final measurement in ZERO-SPAN Mode

1.3.9 10dBc bandwidth

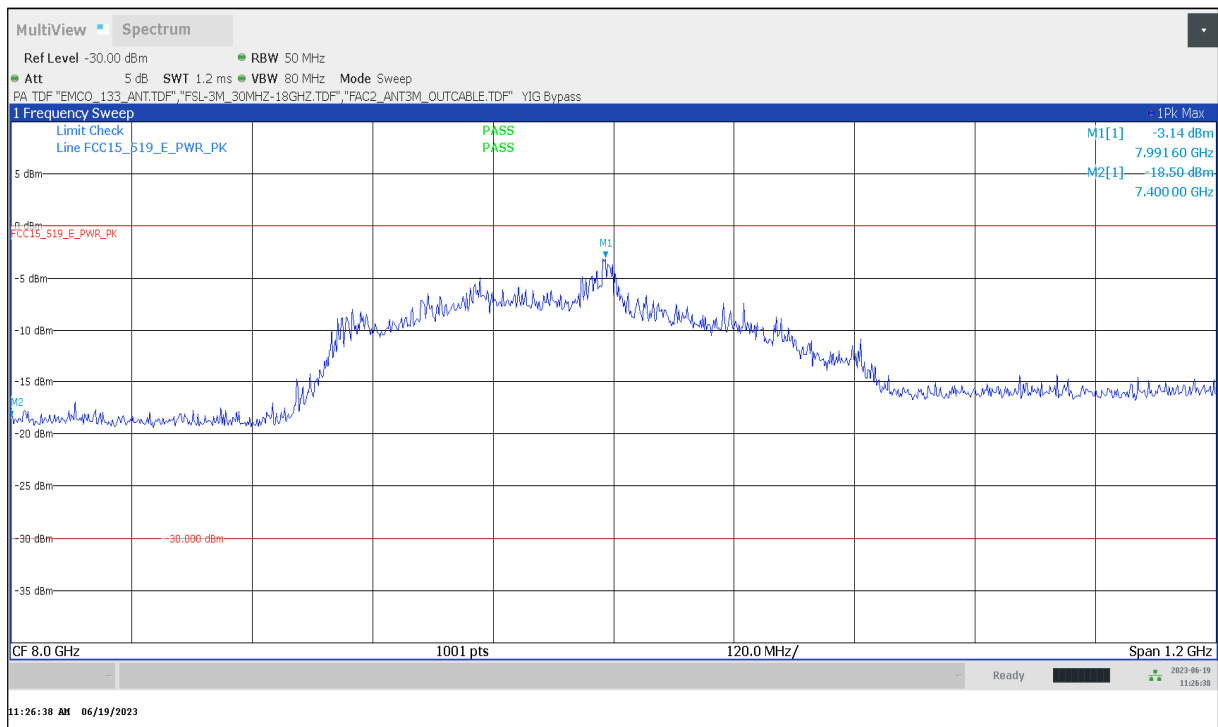


1.3.10 Peak power

T028_D007a_PKPWR_Ch9_Value_0x45454545_AntH



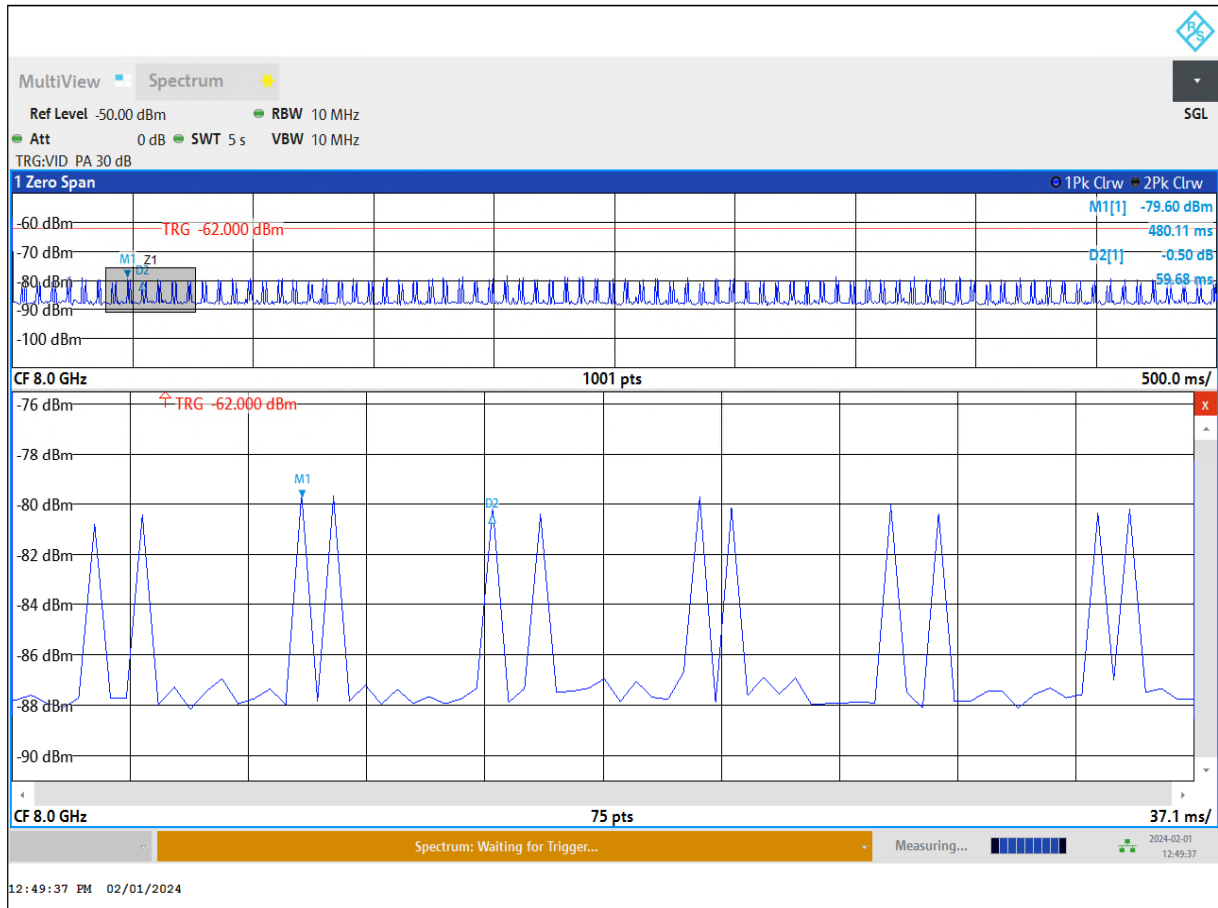
T028_D007b_PKPWR_Ch9_Value_0x45454545_AntV



Max.-Value: -3.14dBm/50MHz

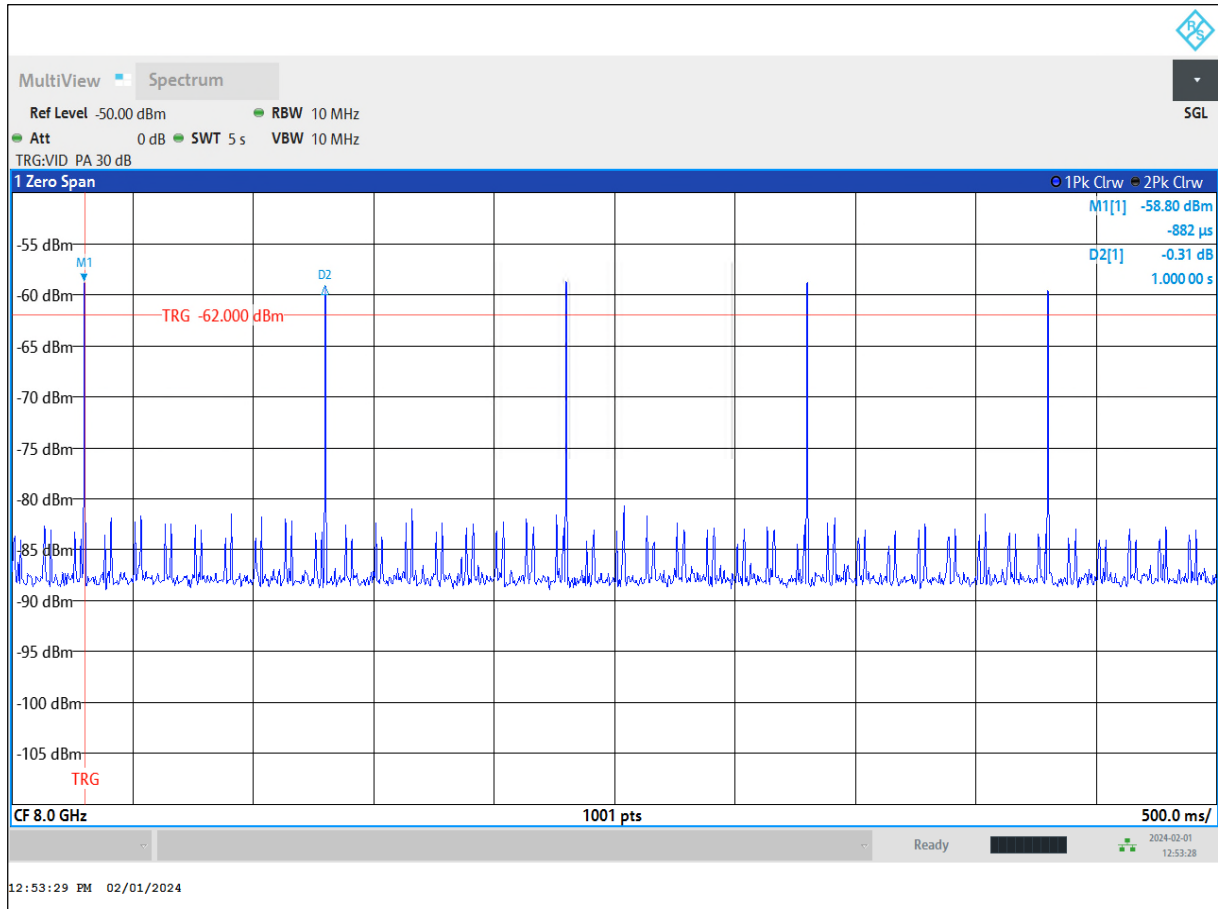
1.4 Timing of transmissions

TID00010_Timing_Tag_noMovement



Absence of tag emissions when tag detects no movement. Emissions originate from satellite device (AE4) only.

TID00011_Timing_Tag_Movement

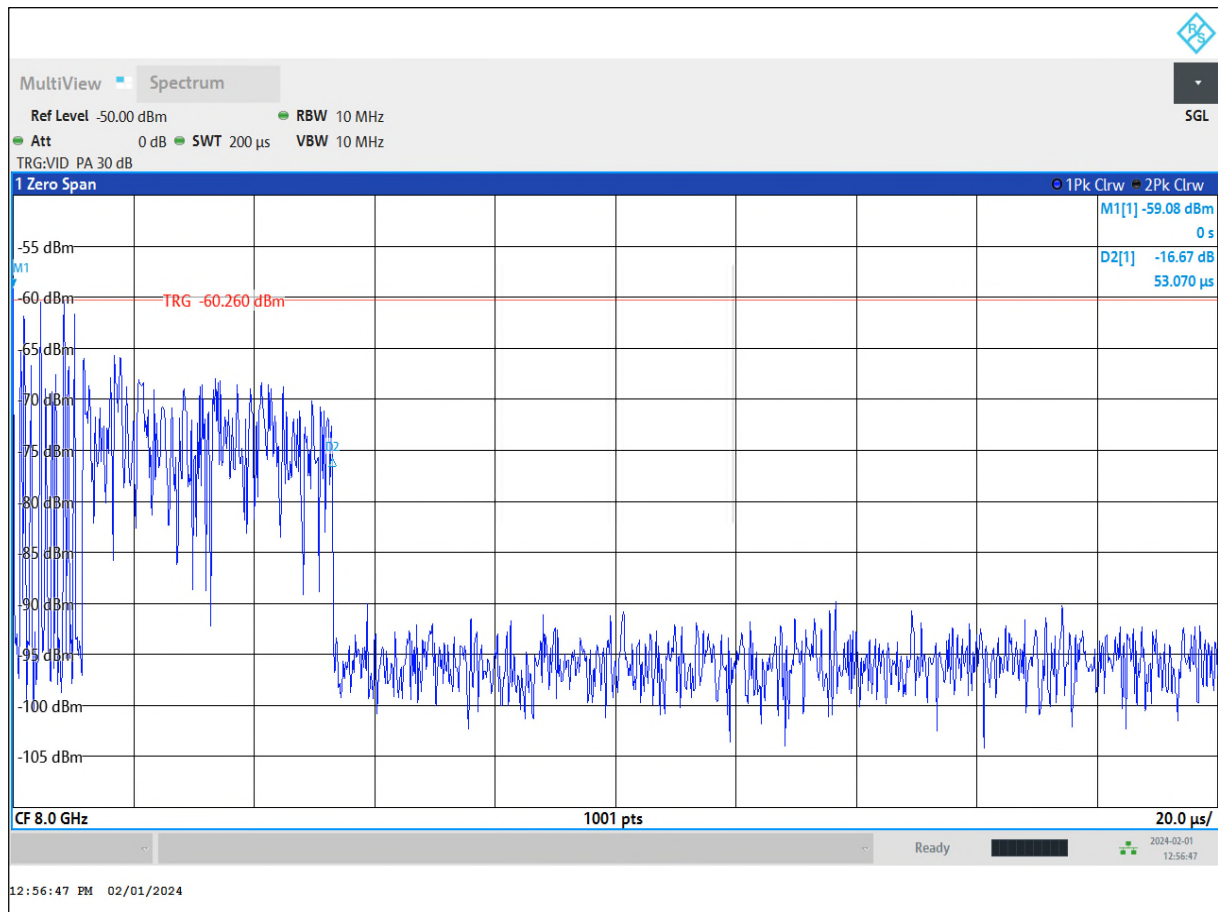


Cycle time of tag emissions: 1.0 second. Trigger on Tag emissions

Lower emissions are satellite AE4 emissions.

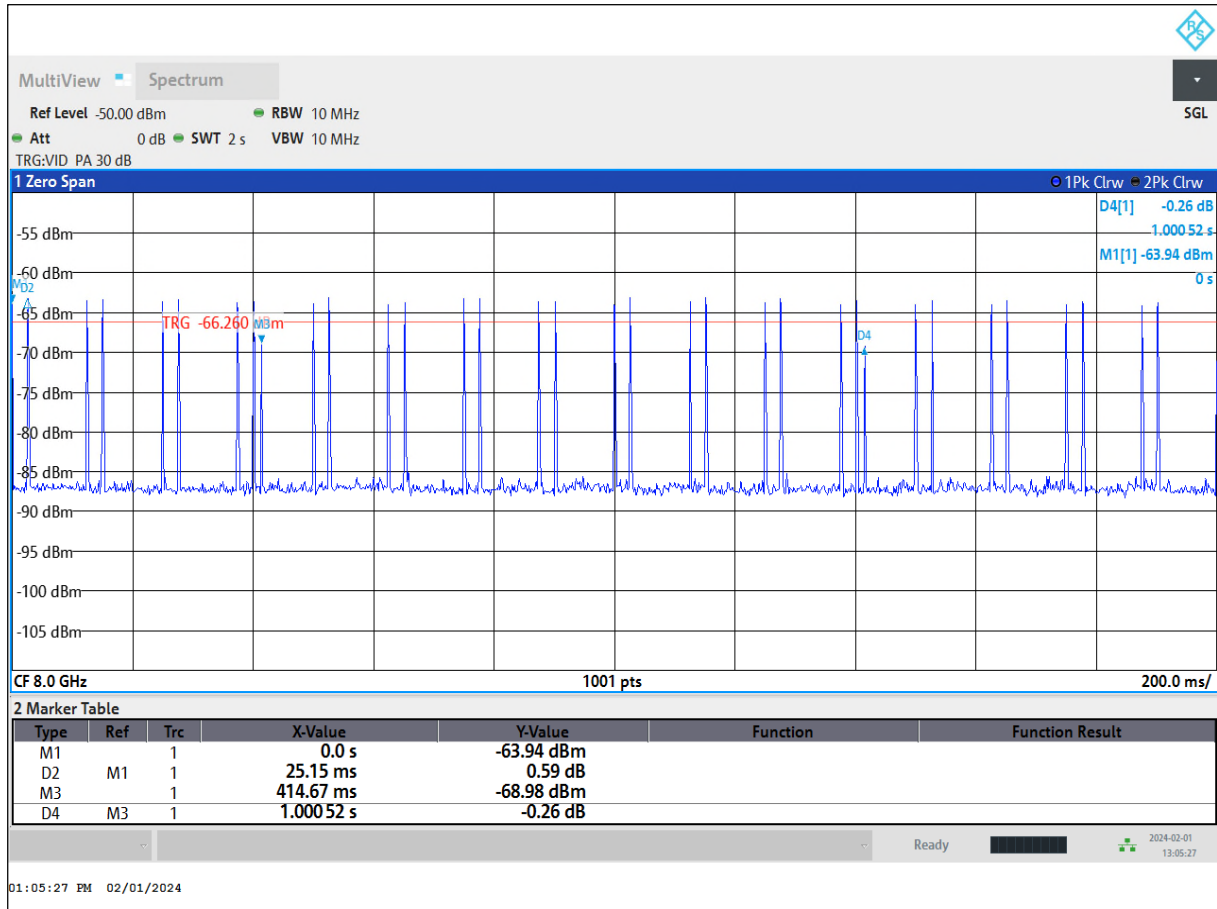
Remark: movement of tag necessary in order to generate emissions.

TID00012_Timing_Tag_Movement_Burst_Length



Burst length of one tag emission: 53.07 μs

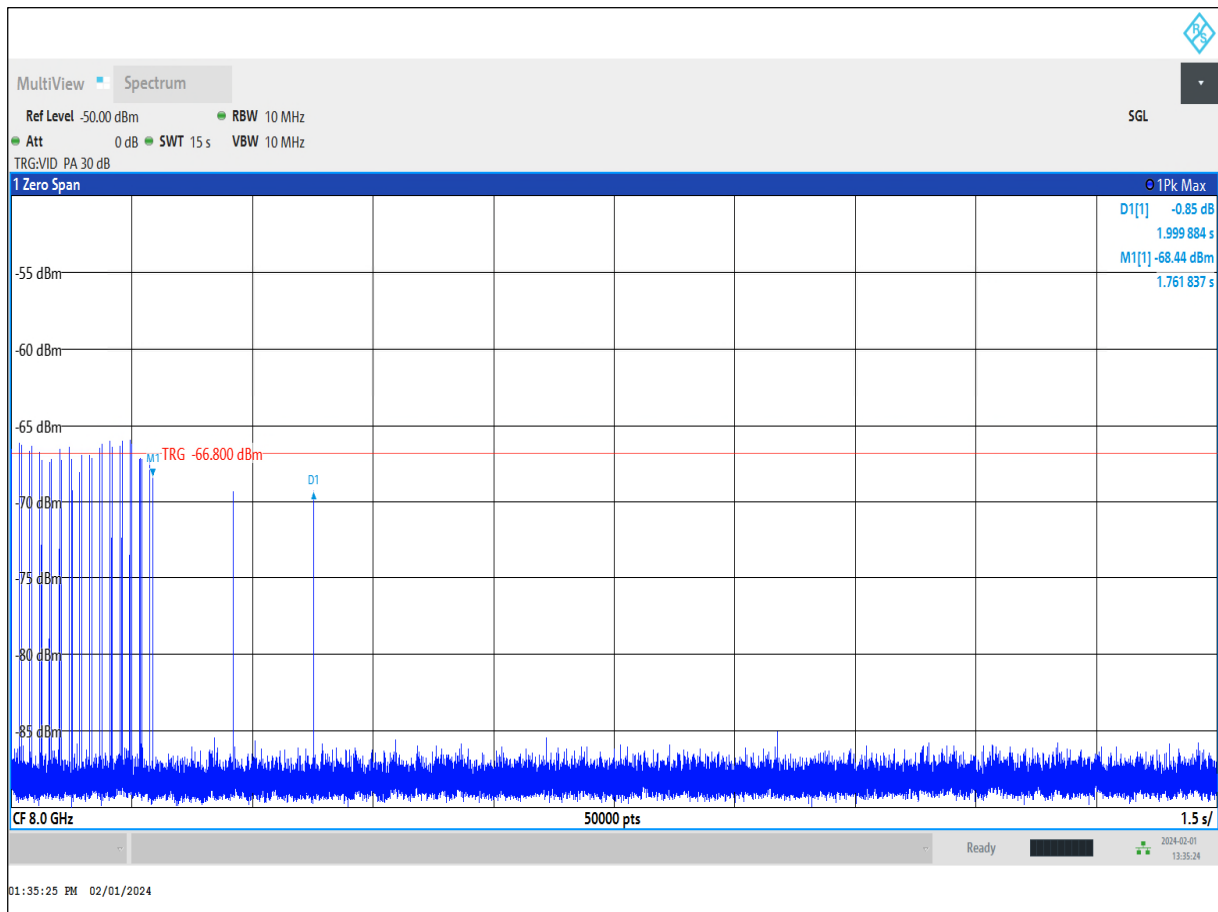
TID00013_Timing_Tag_Transmissions_Satellite_Tag_during_Movement_Tag



Marker M1&D2: Bursts originate from satellite AE3 (Master)

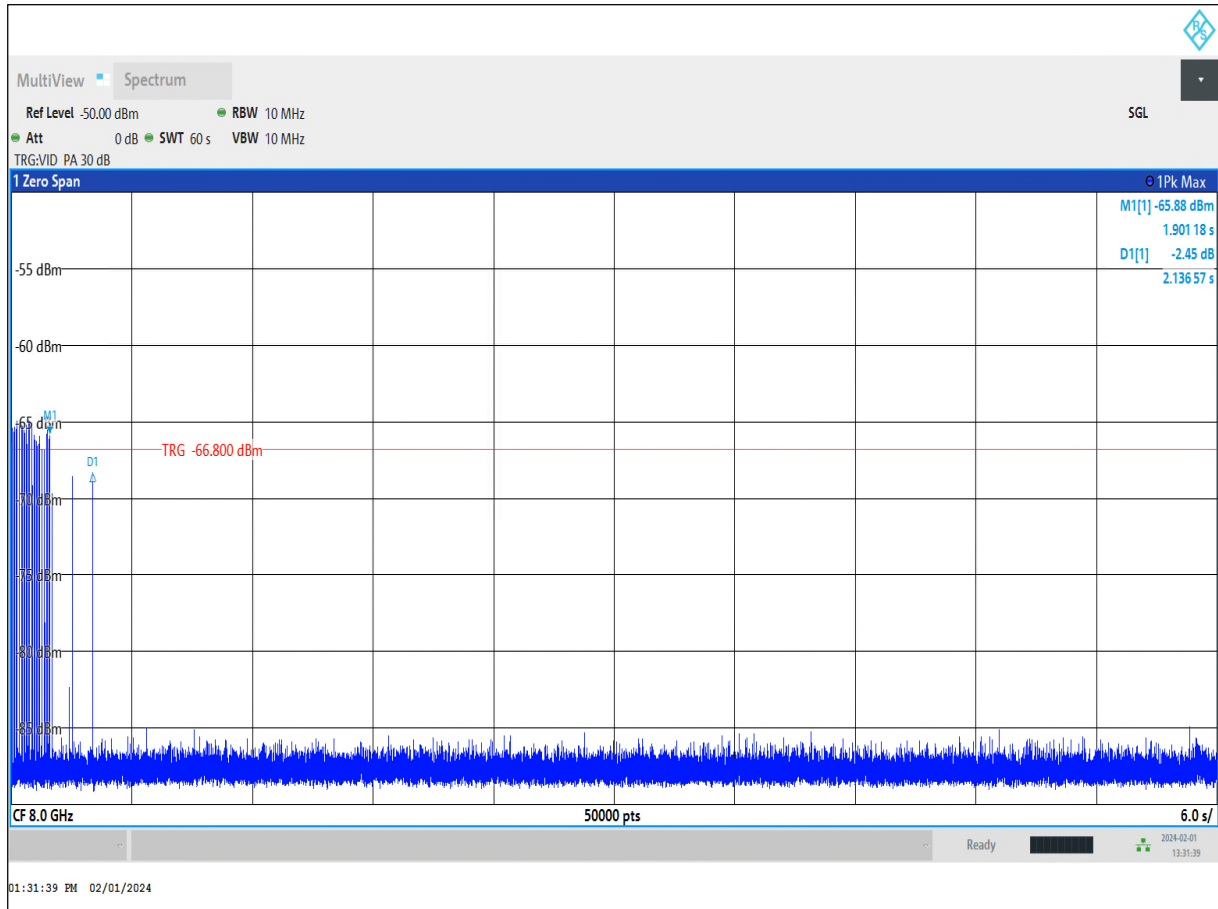
Marker M3&D4: Bursts originate from Tag with period time of 1.0 seconds

TID00014_Timing_TagDisconnect_Satellite



Last sending burst of Tag at 1.99s after power-off the satellite. Limit is 10seconds.

Verdict: Pass

TID00015_Timing_TagDisconnect_Satellite_Check60_Seconds


Longer Trace shot for 1 minute: last sending burst of Tag at 2.13s after power-off the satellite.
Limit is 10seconds.

Verdict: Pass

End Of Annex 1