

Annex 202: Measurement diagrams 22-1-0057101T021-TR1-A202-R01

Number of pages:	23	Date of Report:	2024-Jul-09
Testing company:	cetecom advanced GmbH Im Teelbruch 116 45219 Essen Germany Tel. + 49 (0) 20 54 / 95 19-0 Fax: + 49 (0) 20 54 / 95 19-150	Applicant:	Zigpos GmbH
Product: Model:	RTLS anchor CorivaSat		
FCC ID: Contains FCC-ID:	2AHHJ-ZP-OXSAT1 Z64-CC3135MOD	IC: Contains IC:	32087-ZPOXSAT1 451I-CC3135MOD
Testing has been carried out in accordance with:	FCC Regulations Title 47 CFR, Chapter I, Subchapter A, Part 15 Subpart C Intentional Radiators § 15.203 Antenna requirement § 15.205 Restricted bands of operation. § 15.209 Radiated emission limits; general requirements Subpart F Ultra-Wideband Operation § 15.517 Technical requirements for indoor 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		
Test technology	UWB (RF-PathB)		

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1 Measurement diagrams RF-Path B

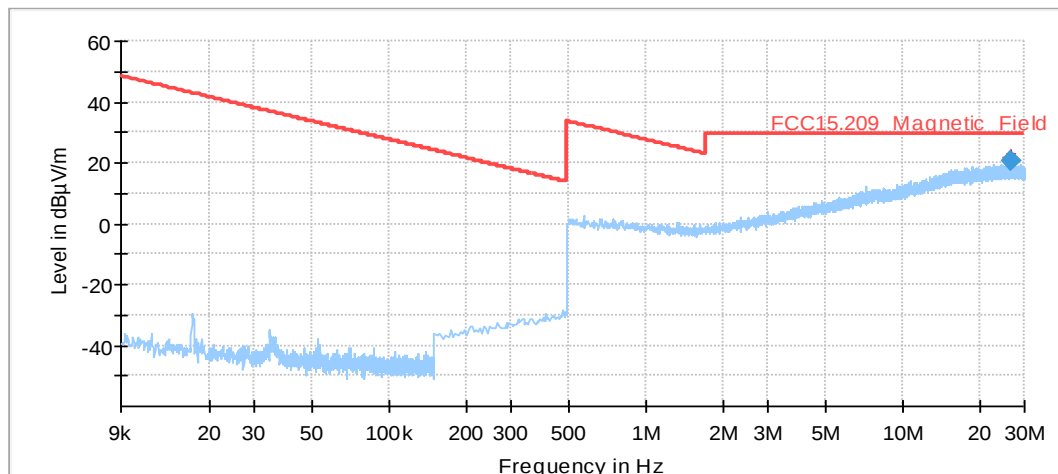
1.1 Magnetic field strength

TID507_Mg_RSE_TX_Ch9_9kHz-30MHz

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
Company/Location	CETECOM ADVANCED GmbH / Essen
Version of Testsoftware:	EMC32 V10.60.20
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-on Ch9 / RF-B activated/programmed
Power during tests:	24V DC / battery pack
Comment 1:	UWB Channel nominal=9 / Op.mode 2
Comment 2:	
Environmental Conditions:	Humidity: 49% rH; Temperature: 22.3 °C
EUT Setup:	2 (EUT S38) + Battery Pack
Verdict:	Passed

Full Spectrum



Final Result

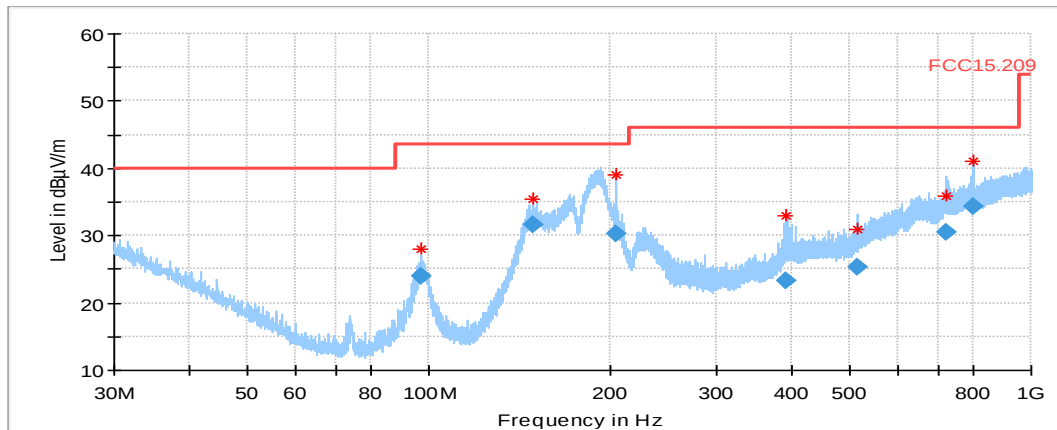
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Pol	Azimuth (deg)	Corr. (dB/m)	Comment
26.786000	20.74	29.54	8.80	9.000	H	117.0	2.1	15:37:39 - 28.06.2024

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

TID506a_RSE_TX_Ch9_30M-1GHz_EUT_standing

Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	SAC3
Company/Location:	CETECOM ADVANCED GmbH / Essen
Test Standard:	FCC 15.205&15.209 & RSS Gen. Issue 5
Antenna polarisation:	horizontal/vertical
Environmental Conditions:	Humidity: 49%rH; Temperature: 22.8C
Operator Name:	Lor
Set-up/EUT:	2 / Anchor S38 + battery pack
Operating Mode:	UWB Channel 9/ Op.Mode 2
Power supply:	24V DC by battery pack
Comment:	RF-B activated
Verdict:	Passed



Final Result

Frequency (MHz)	Quasi Peak (dBµV /m)	Limit (dBµV /m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)
97.070000	24.06	43.50	19.44	120.000	348.0	H	23.0	7.8	0.0
148.914000	31.68	43.50	11.82	120.000	116.0	V	301.0	8.1	0.0
204.602000	30.23	43.50	13.27	120.000	121.0	H	25.0	11.1	0.0
392.154000	23.36	46.00	22.64	120.000	112.0	H	305.0	19.4	0.0
516.022000	25.26	46.00	20.74	120.000	293.0	H	143.0	20.7	0.0
725.202000	30.52	46.00	15.48	120.000	247.0	V	309.0	25.1	0.0
799.886000	34.25	46.00	11.75	120.000	345.0	V	334.0	25.5	0.0

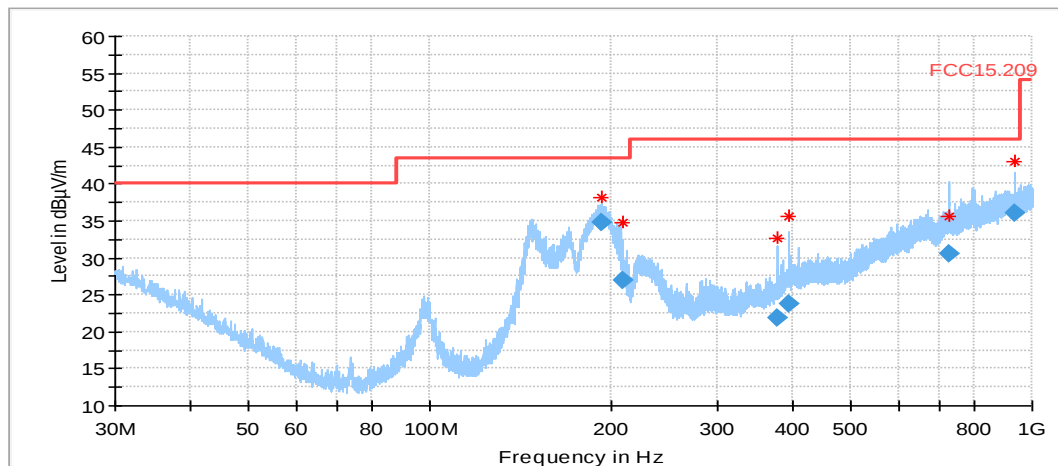
(continuation of the "Final_Result" table from column 17 ...)

Frequency (MHz)	Preamp (dB)	Trd Corr. (dB/m)	Raw Rec (dBµV)	Comment
97.070000	0.9	6.9	16.3	13:37:36 - 28.06.2024
148.914000	1.1	7.0	23.6	13:46:41 - 28.06.2024
204.602000	1.4	9.7	19.1	13:32:25 - 28.06.2024
392.154000	2.1	17.3	4.0	13:22:24 - 28.06.2024
516.022000	2.3	18.3	4.6	13:27:11 - 28.06.2024
725.202000	2.9	22.2	5.4	13:51:21 - 28.06.2024
799.886000	3.1	22.4	8.7	13:41:42 - 28.06.2024

TID506b_RSE_TX_Ch9_30M-1GHz_EUT_laying

Common Information

Test Description:	Radiated field strength emission in 3m distance
Test Site:	SAC3
Company/Location	CETECOM ADVANCED GmbH / Essen
Test Standard:	FCC 15.205&15.209 & RSS Gen. Issue 5
Antenna polarisation:	horizontal/vertical
Environmental Conditions:	Humidity: 49%rH; Temperature: 22.8C
Operator Name:	Lor
Set-up/EUT:	2 / Anchor S38 + battery pack
Operating Mode:	UWB Channel 9 / Op.Mode 2
Power supply:	24V DC by battery pack
Comment:	RF-B activated
Verdict:	Passed



Final Result

Frequency (MHz)	Quasi Peak (dBµV /m)	Limit (dBµV /m)	Margin (dB)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	Sig Path (dB)
193.174000	34.84	43.50	8.66	120.000	172.0	H	157.0	11.2	0.0
209.090000	26.85	43.50	16.65	120.000	212.0	H	172.0	11.3	0.0
377.274000	21.78	46.00	24.22	120.000	100.0	H	291.0	17.7	0.0
395.170000	23.72	46.00	22.28	120.000	104.0	H	291.0	19.6	0.0
725.826000	30.61	46.00	15.39	120.000	346.0	V	239.0	25.1	0.0
934.870000	35.98	46.00	10.02	120.000	133.0	V	224.0	27.1	0.0

(continuation of the "Final_Result" table from column 17 ...)

Frequency (MHz)	Preamp (dB)	Trd Corr. (dB/m)	Raw Rec (dBµV)	Comment
193.174000	1.5	9.7	23.7	14:45:08 - 28.06.2024
209.090000	1.5	9.8	15.6	14:49:50 - 28.06.2024
377.274000	1.9	15.7	4.1	14:35:16 - 28.06.2024
395.170000	2.2	17.4	4.2	14:39:59 - 28.06.2024
725.826000	2.9	22.2	5.5	14:54:18 - 28.06.2024
934.870000	3.4	23.7	8.8	14:59:29 - 28.06.2024

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

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

Sample S38 used, programmed for Path B.

Diagram no.: TID518a_RSE_SampleS38_PathB_Ch9_Value_0x86868686_EUT_standing_Anth.PNG

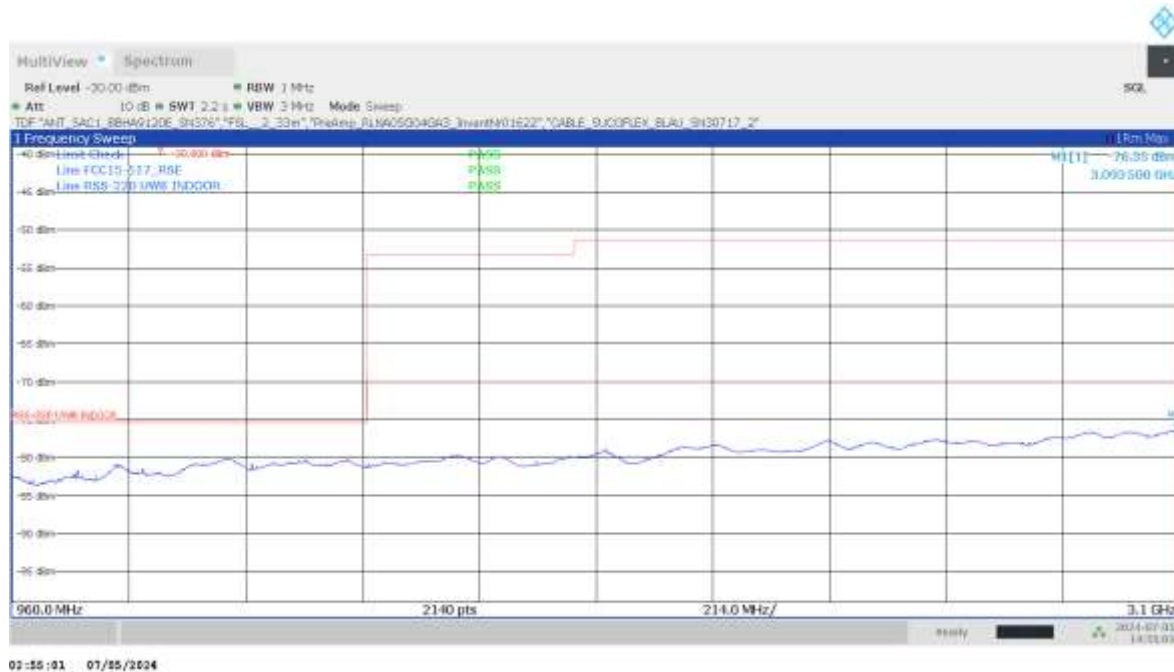
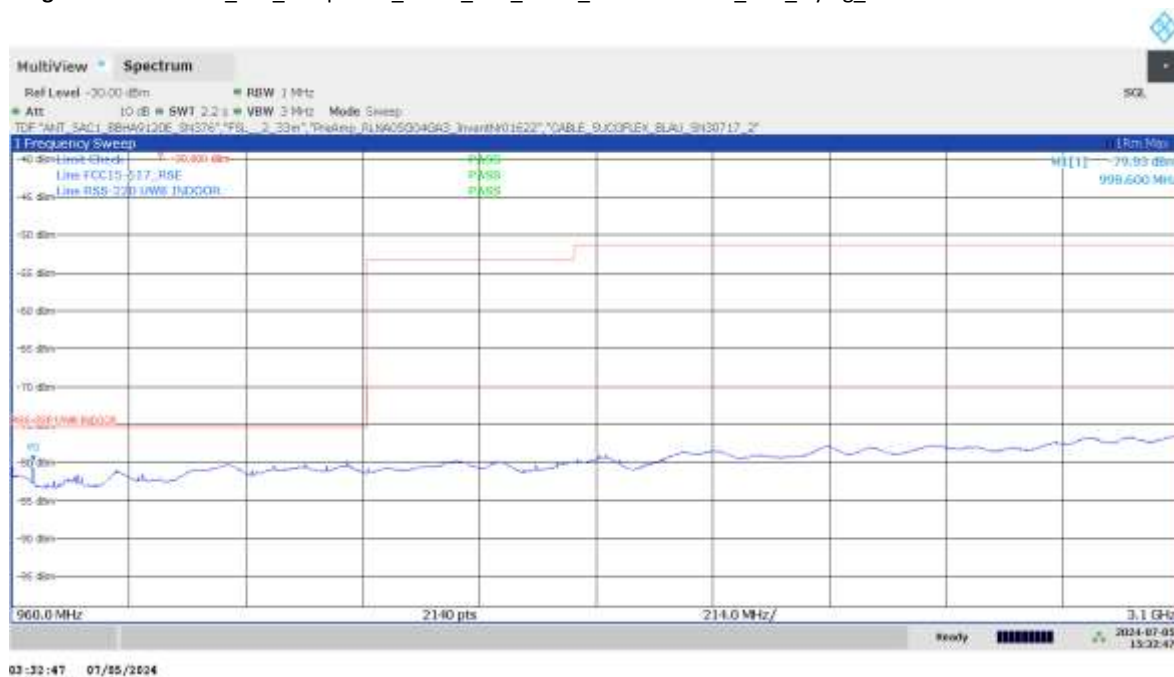


Diagram no.: TID518b_RSE_SampleS38_PathB_Ch9_Value_0x86868686_EUT_laying_Anth.PNG





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

Sample S38 used, programmed for Path B.

Diagram no.: TID519a_RSE_SampleS38_PathB_Ch9_Value_0x86868686_EUT_standing_Anth.PNG



Diagram no.: TID519b_RSE_SampleS38_PathB_Ch9_Value_0x86868686_EUT_laying_Anth.PNG



Diagram no.: TID519c_RSE_SampleS38_PathB_Ch9_Value_0x86868686_EUT_standing_AntV.PNG

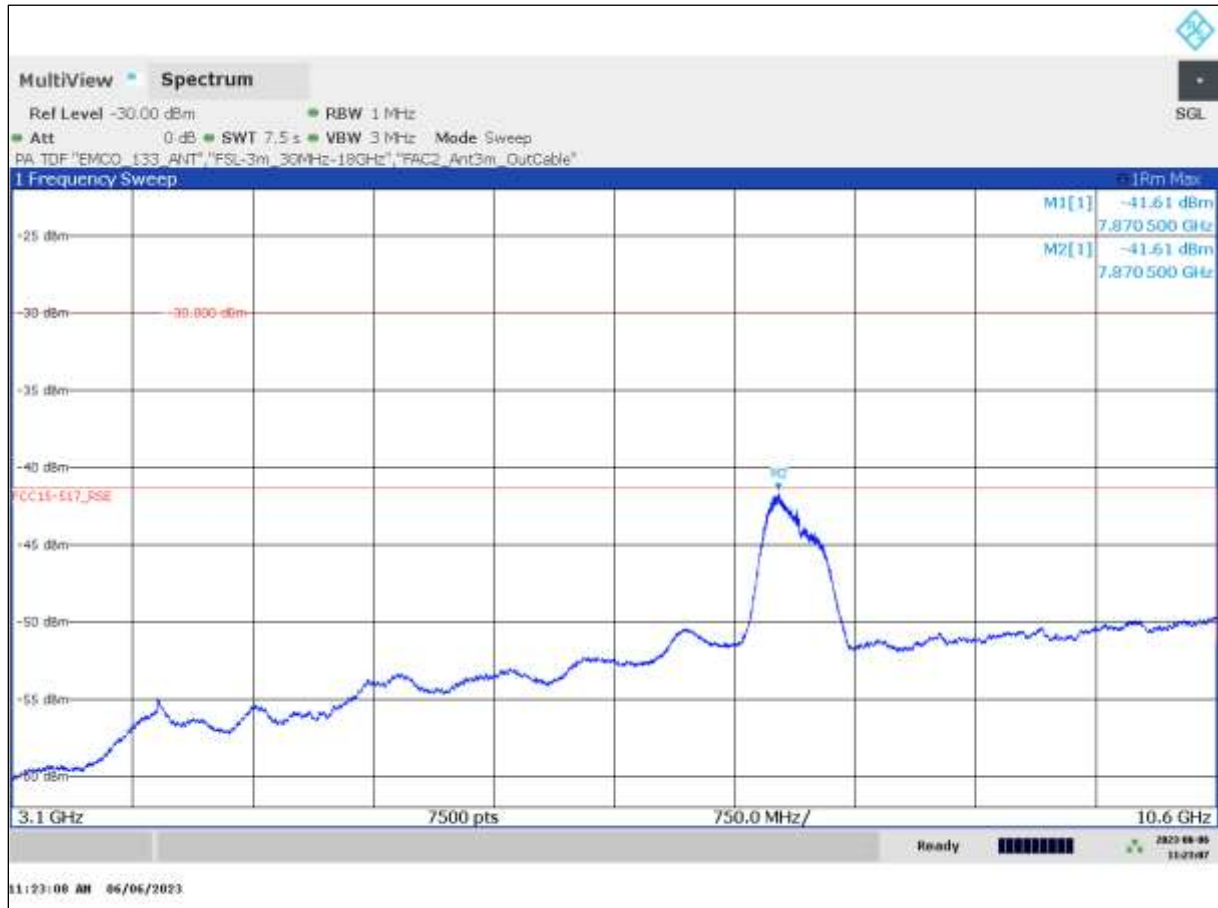


Diagram no.: TID519d_RSE_SampleS38_PathB_Ch9_Value_0x86868686_EUT_laying_AntV.PNG

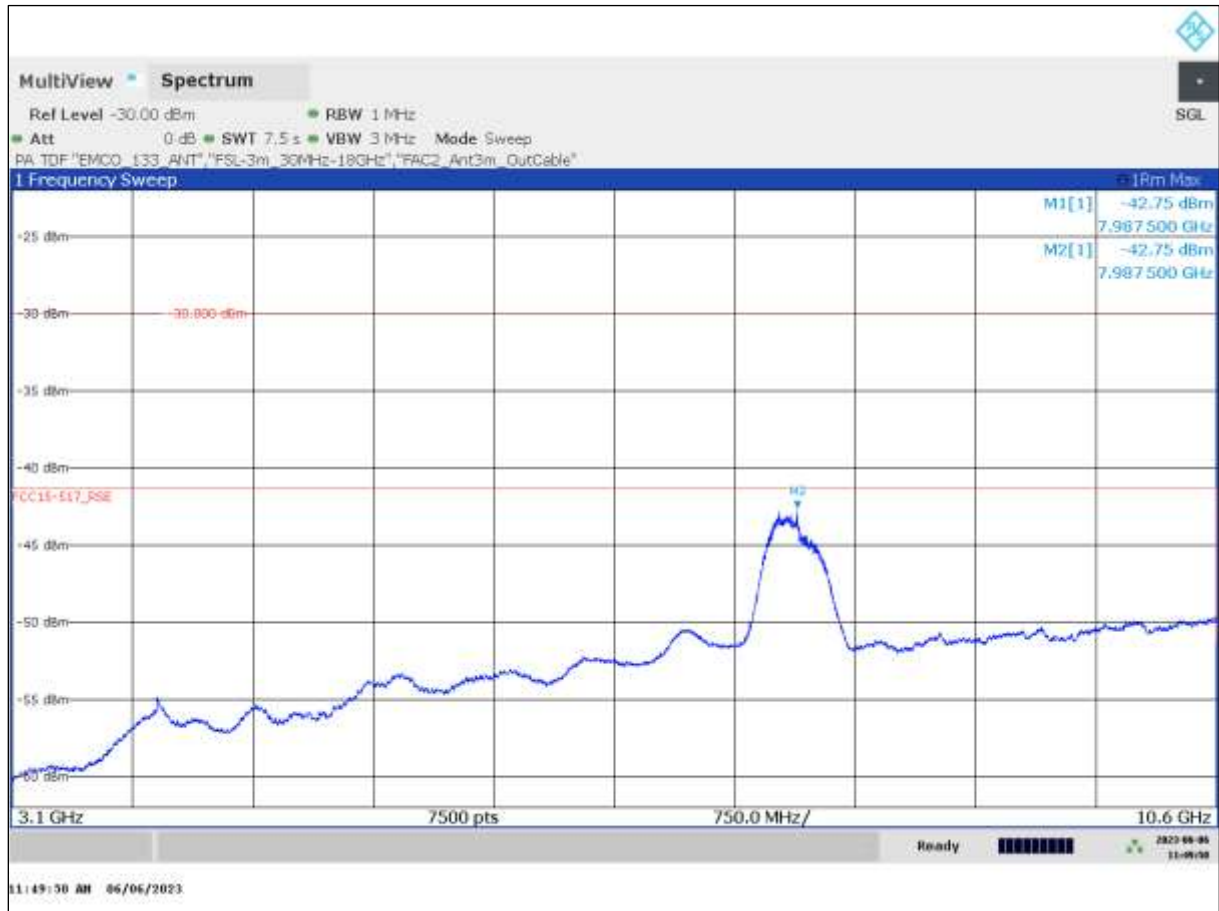


1.3.3 Measurements in range: $3.1\text{GHz} < f < 10.6\text{GHz}$

T021_D001a_RSE_Ch9_Value_0x86868686_AntH

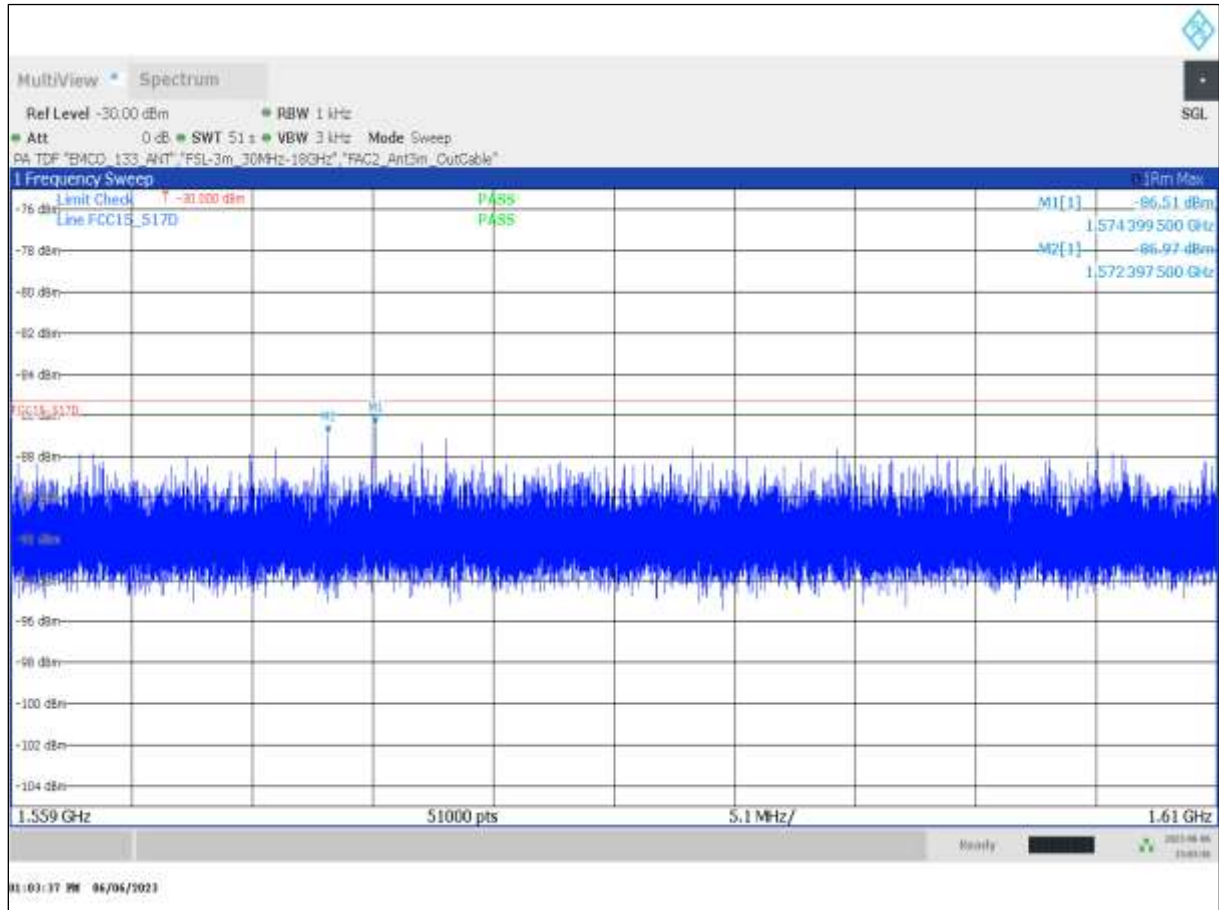


T021_D001b_RSE_Ch9_Value_0x86868686_AntV

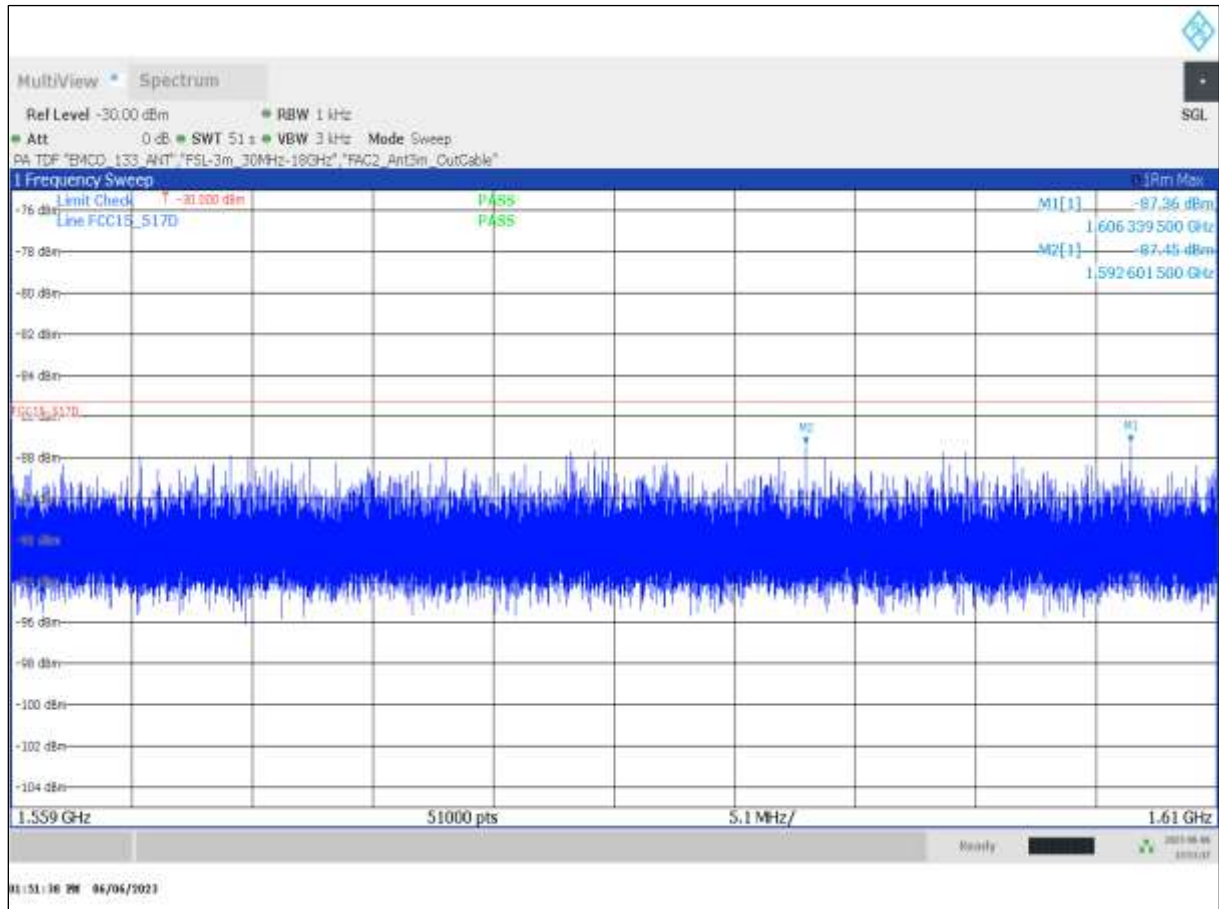


1.3.4 Measurements in range: $1.559\text{GHz} < f < 1.61\text{GHz}$

T021_D002a_RSE__GPS2_Ch9_Value_0x86868686_AntH

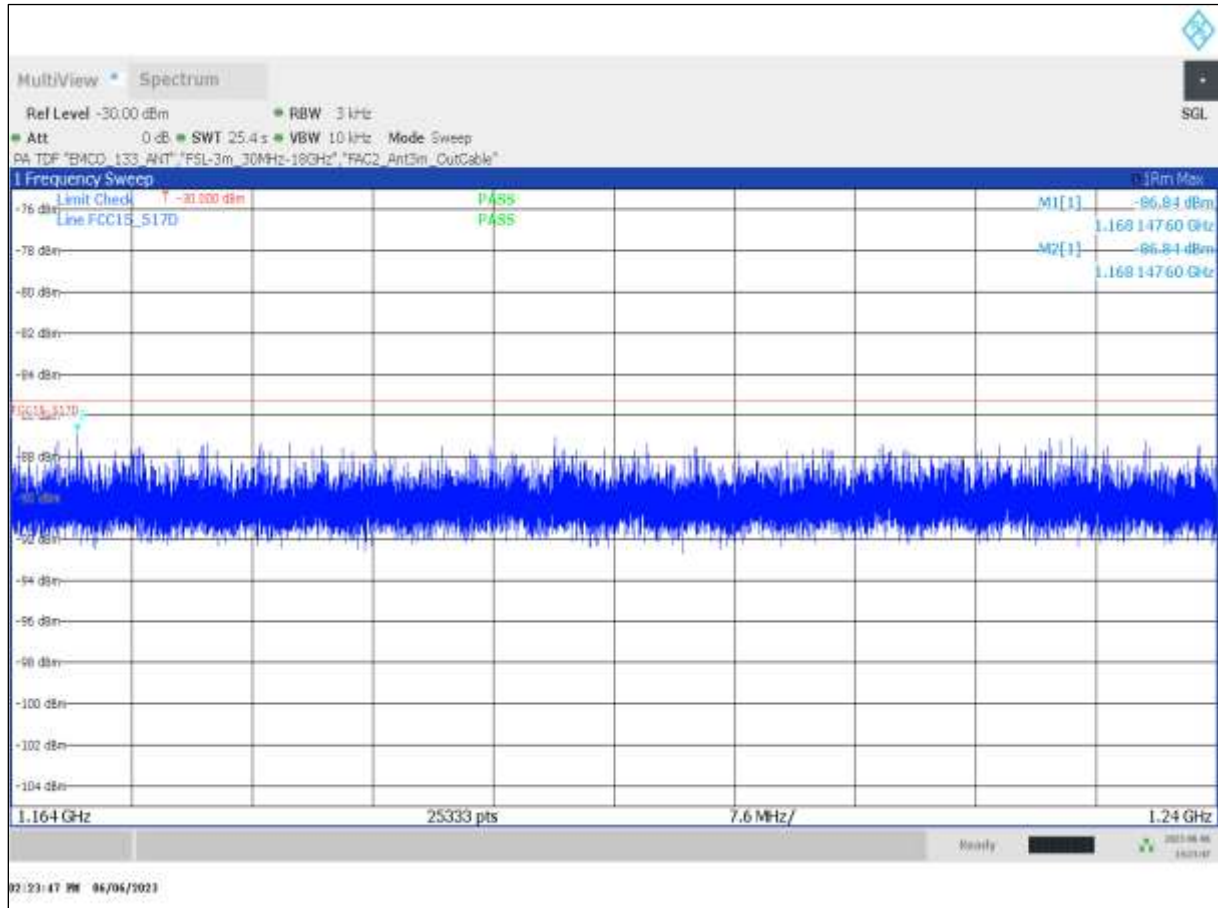


T021_D002b_RSE_GPS2_Ch9_Value_0x86868686_AntV

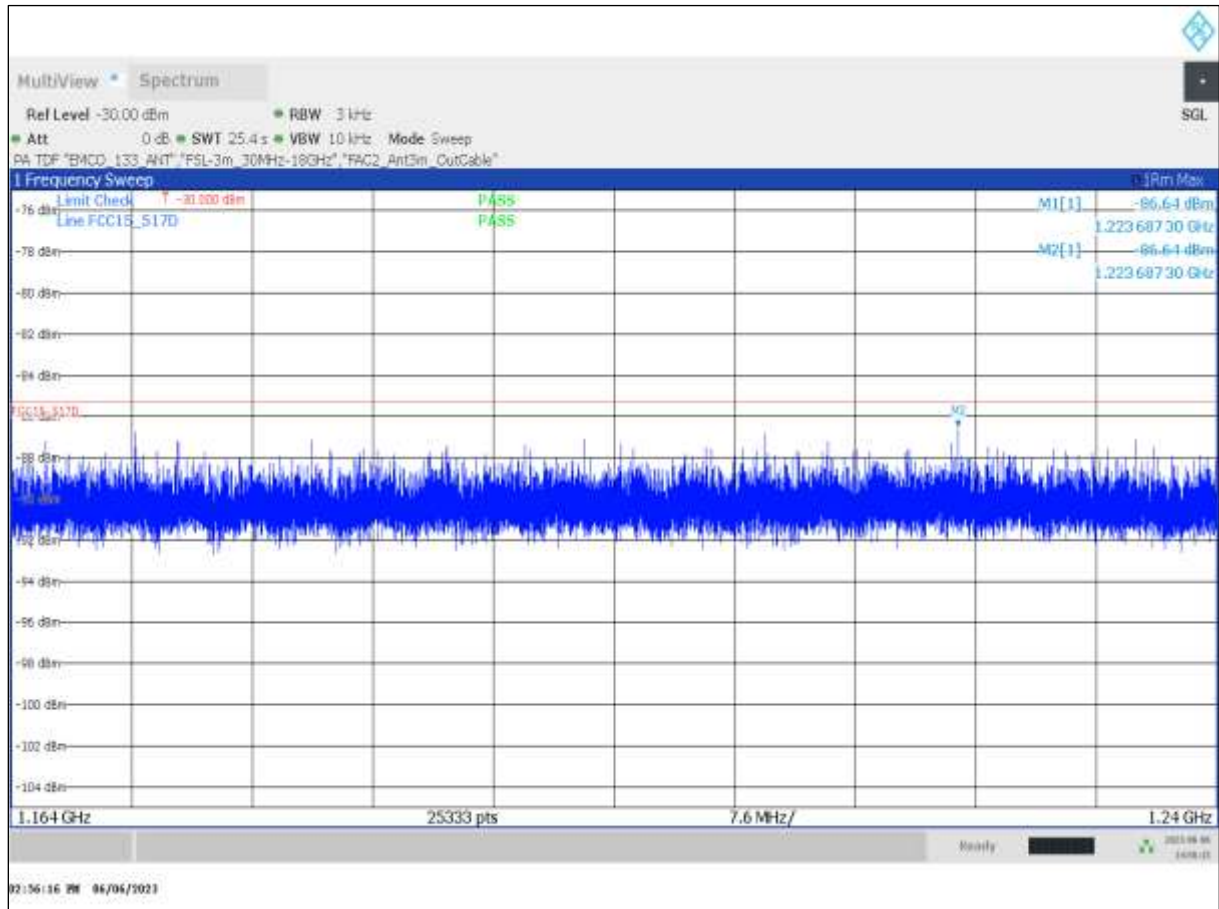


1.3.5 Measurements in range: $1.164\text{GHz} < f < 1.24\text{GHz}$

T021_D003a_RSE_GPS1_Ch9_Value_0x86868686_AntH



T021_D003b_RSE_GPS1_Ch9_Value_0x86868686_AntV



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

T021_D004a_RSE_TX_Ch9_Value_0x86868686_Anth

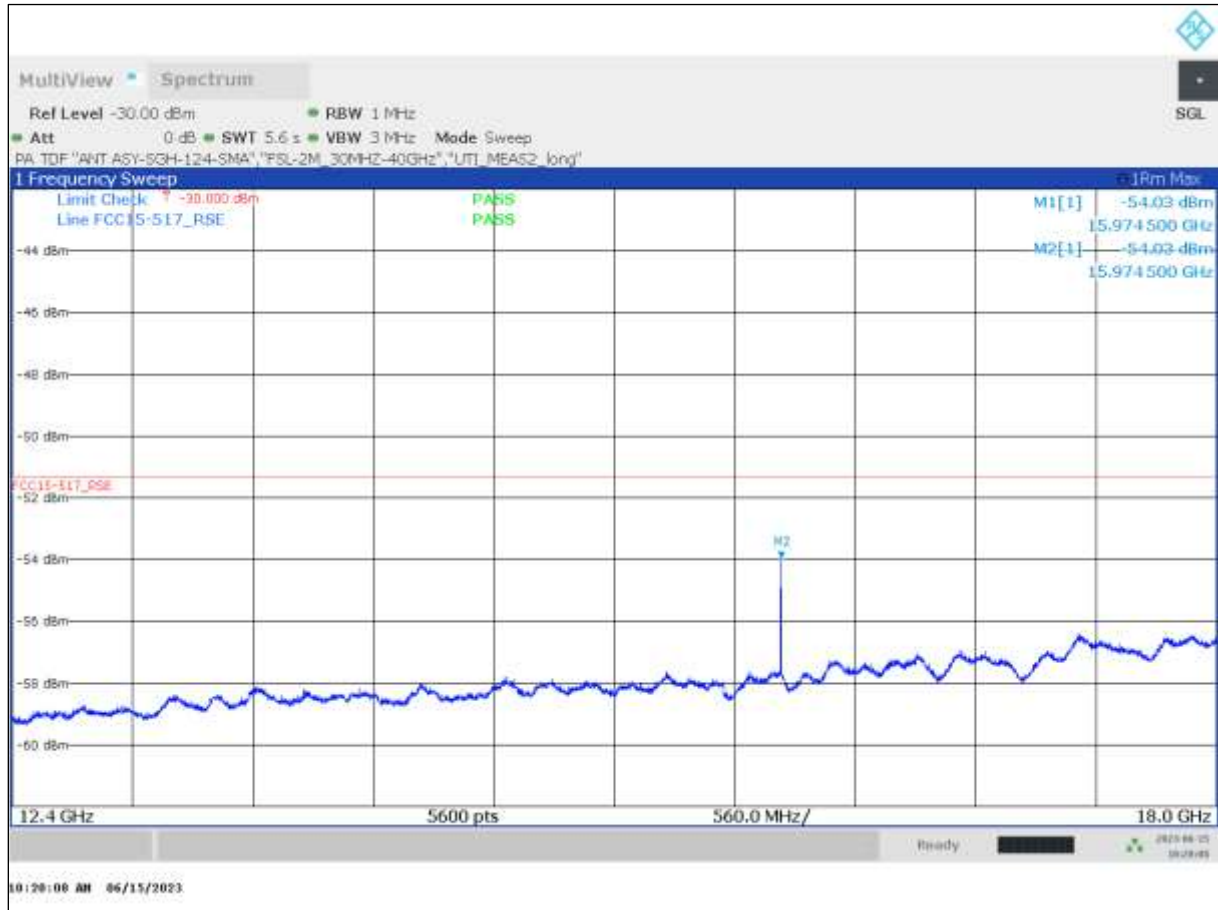


T021_D004b_RSE_TX_Ch9_Value_0x86868686_AntV

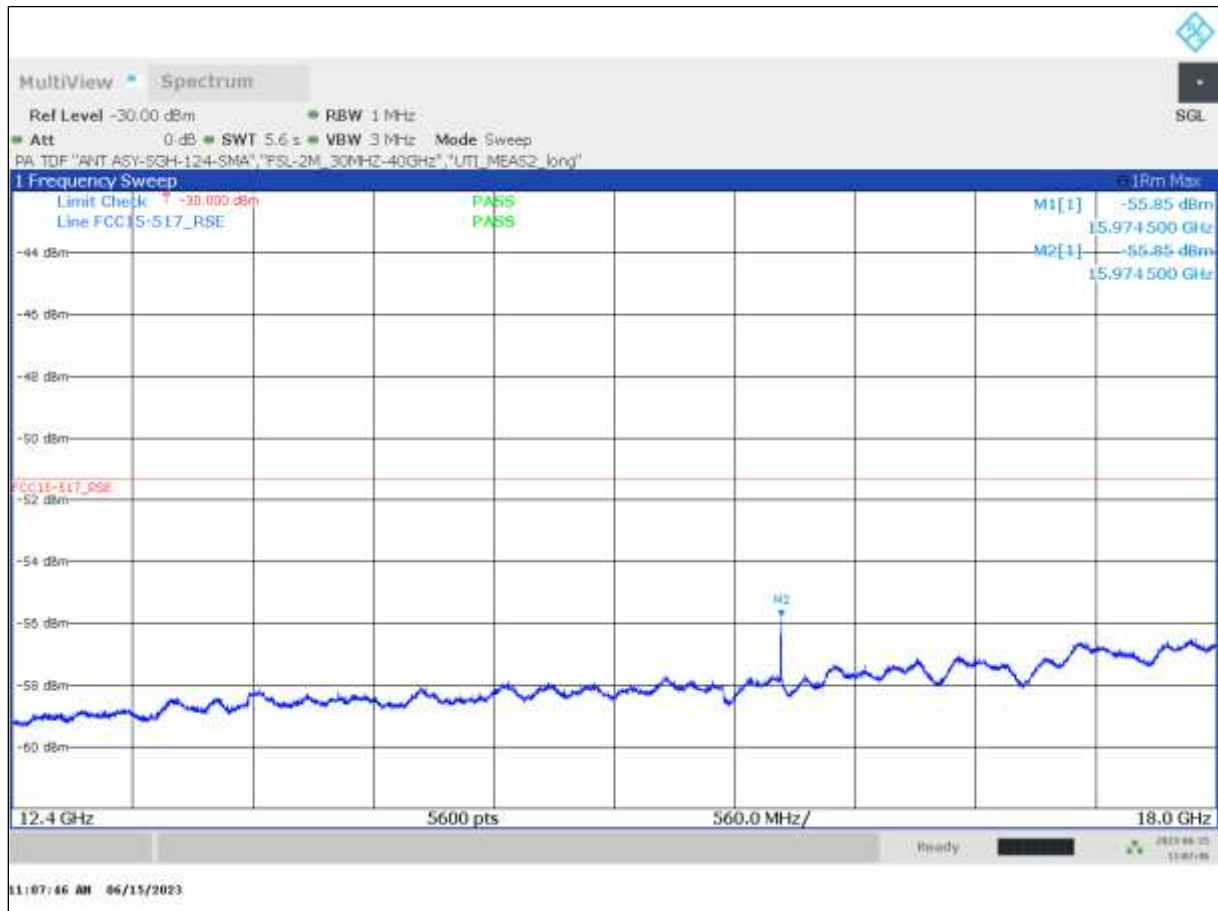


1.3.7 Measurements in range: 12.4GHz < f < 18GHz

T021_D005a_RSE_TX_Ch9_Value_0x86868686_Anth

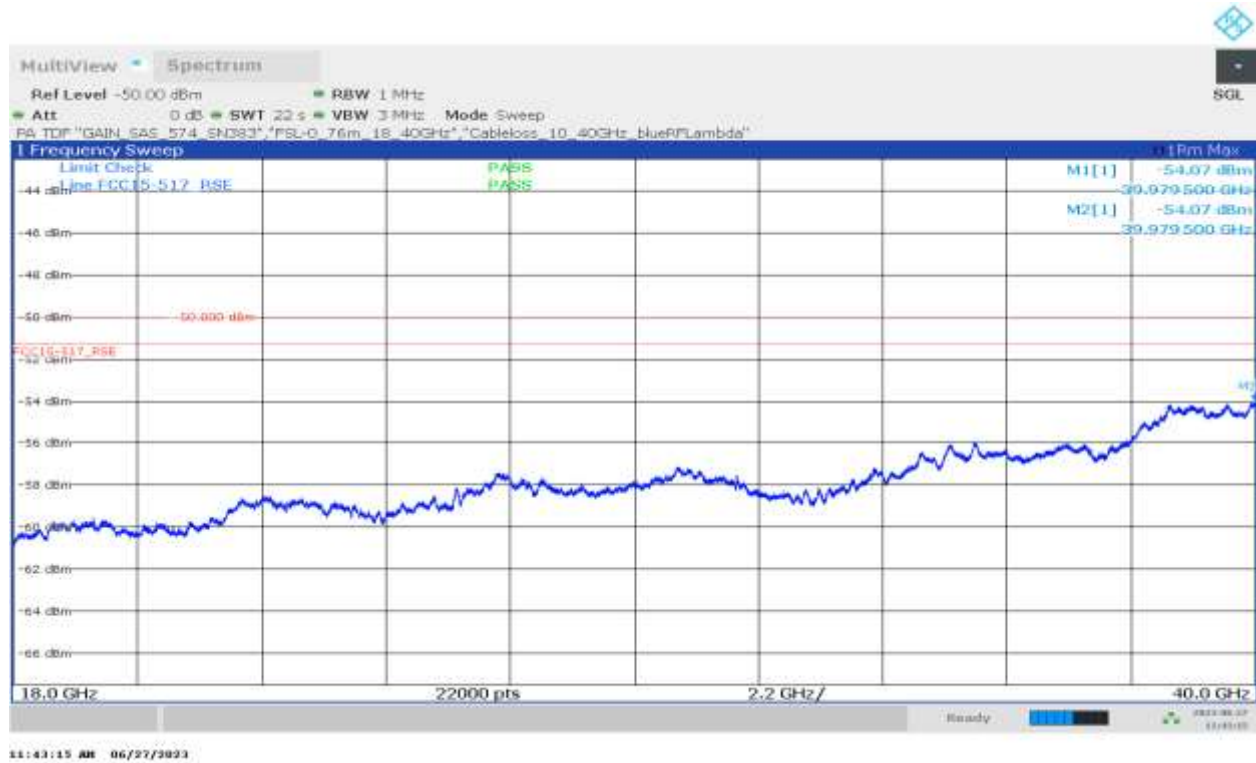


T021_D005b_RSE_TX_Ch9_Value_0x86868686_AntV

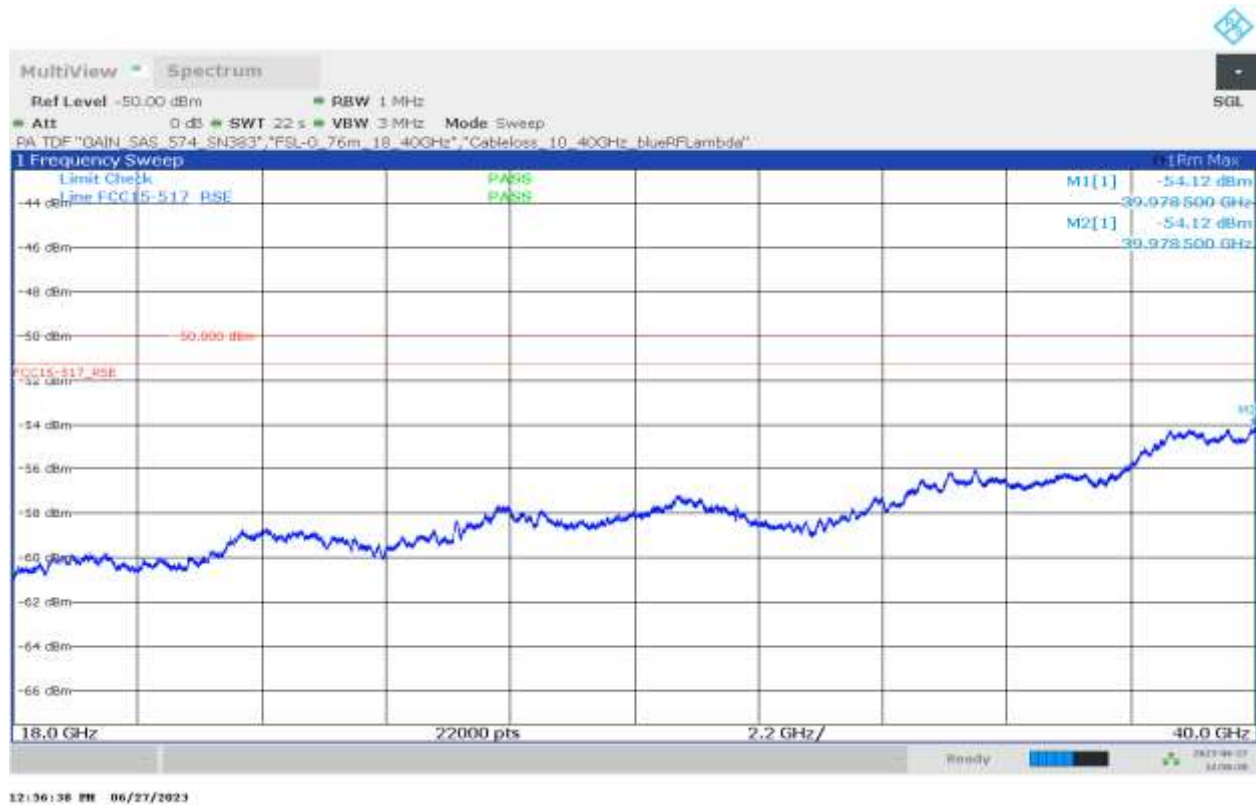


1.3.8 Measurements in range: $18\text{GHz} < f < 40\text{GHz}$

T021_D0007a_RSE_TX_Ch9_PWR_0x86868686_AntH



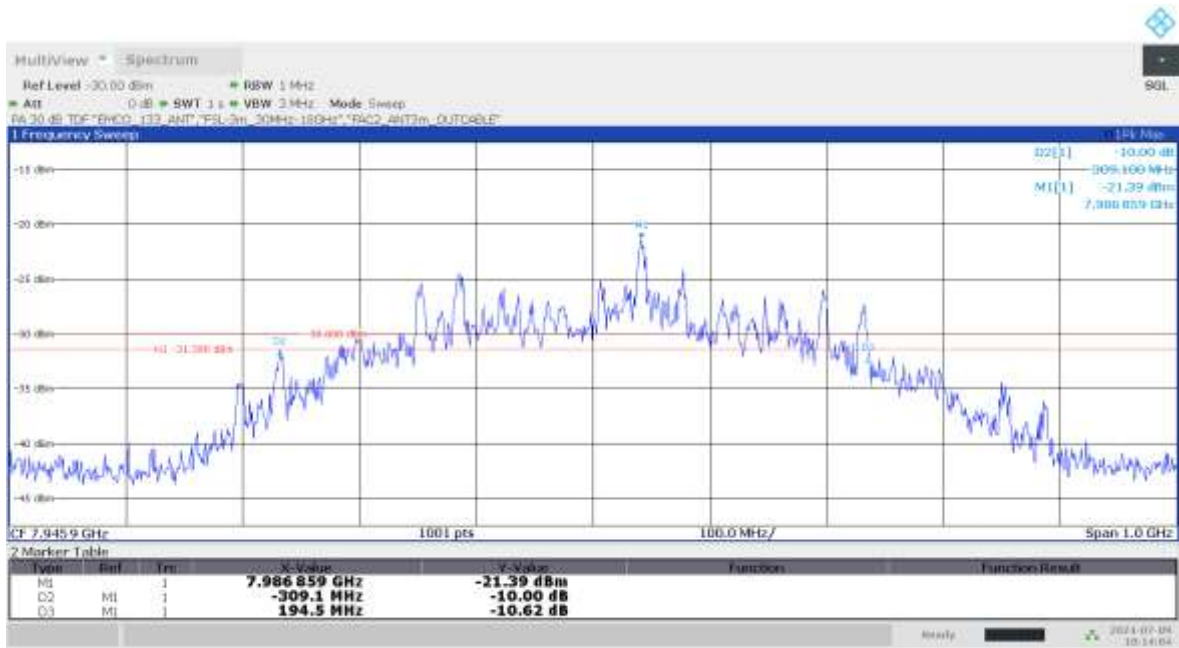
T021_D0007b_RSE_TX_Ch9_PWR_0x86868686_AntV



1.3.9 10dBc bandwidth

Test performed at Sample 38 with programming tool prior measurement

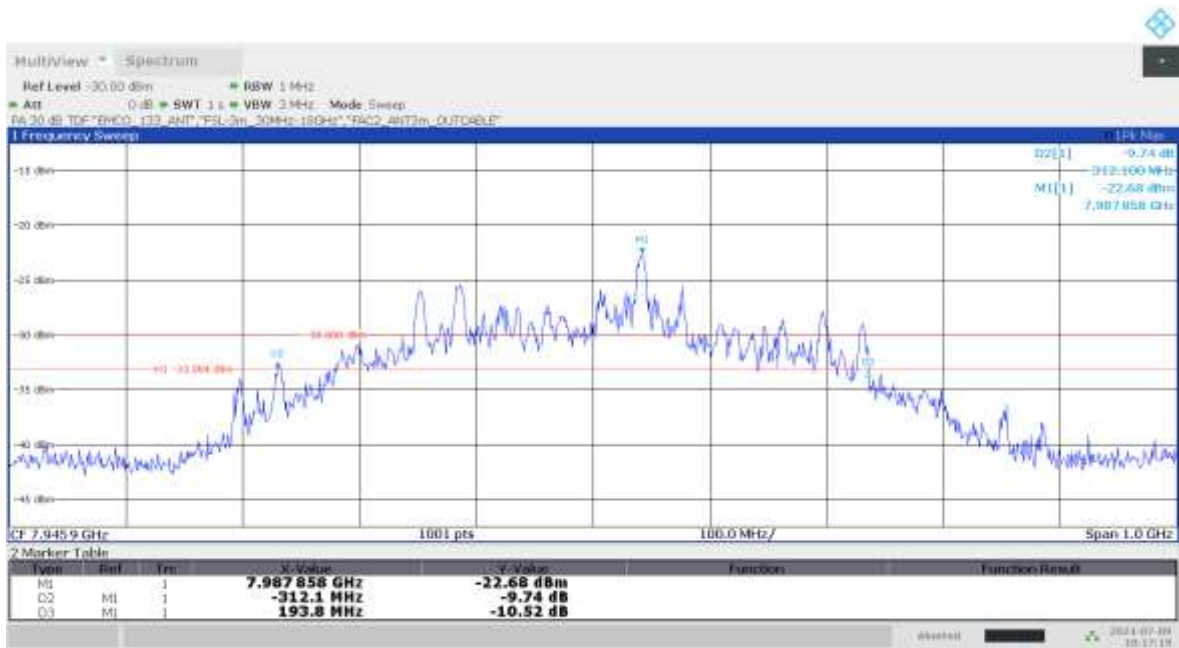
Diagram no.: TID521a_10dB_BW_SampleS38_PathB_BW_Ox2E_Ch9_Value_Ox8686868686_A_260deg_E_m50deg__AntH.PNG



10:14:04 07/09/2024

Resulting bandwidth: 503.6MHz

Diagram no.: TID521b_10dB_BW_SampleS38_PathB_BW_Ox2E_Ch9_Value_Ox8686868686_A_156deg_E_79deg__AntV.PNG

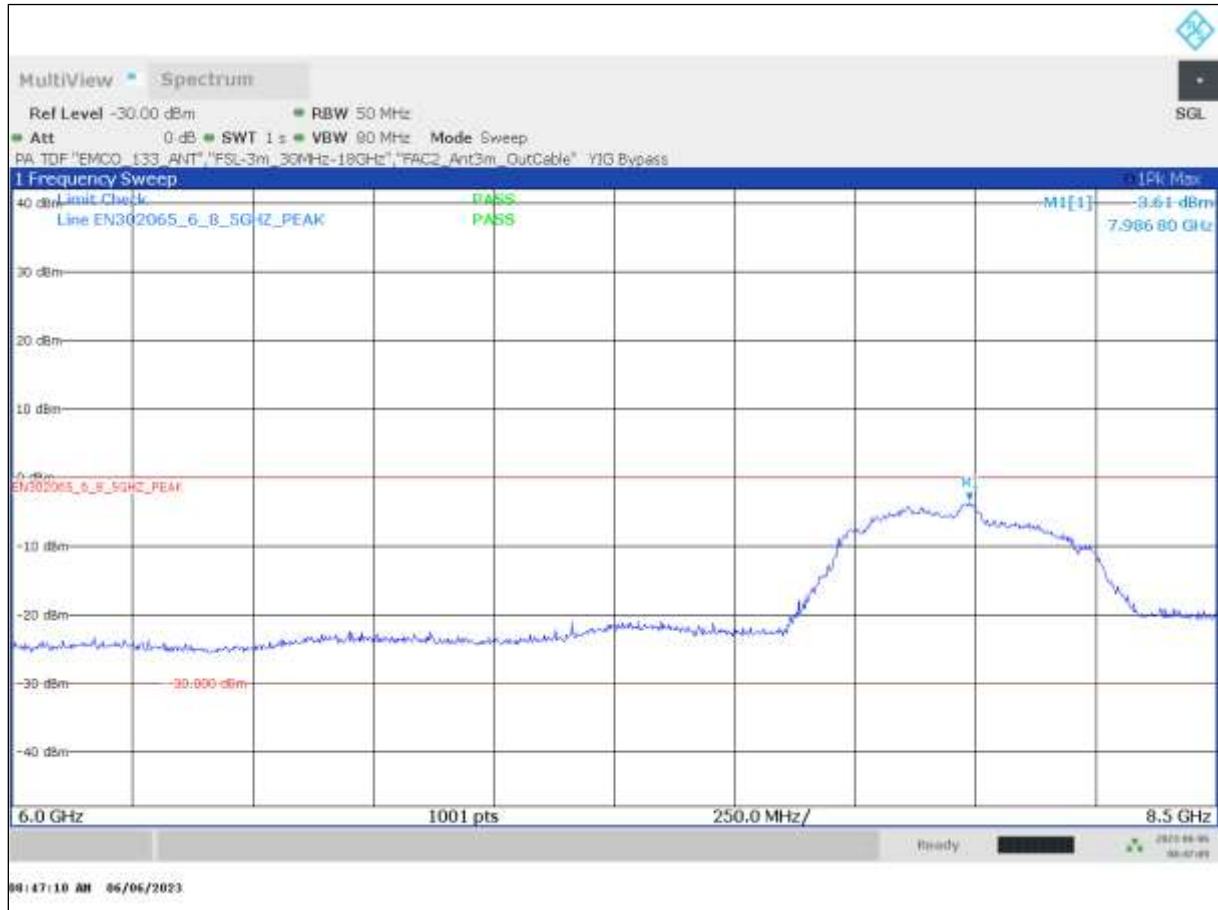


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Resulting bandwidth: 505.9MHz

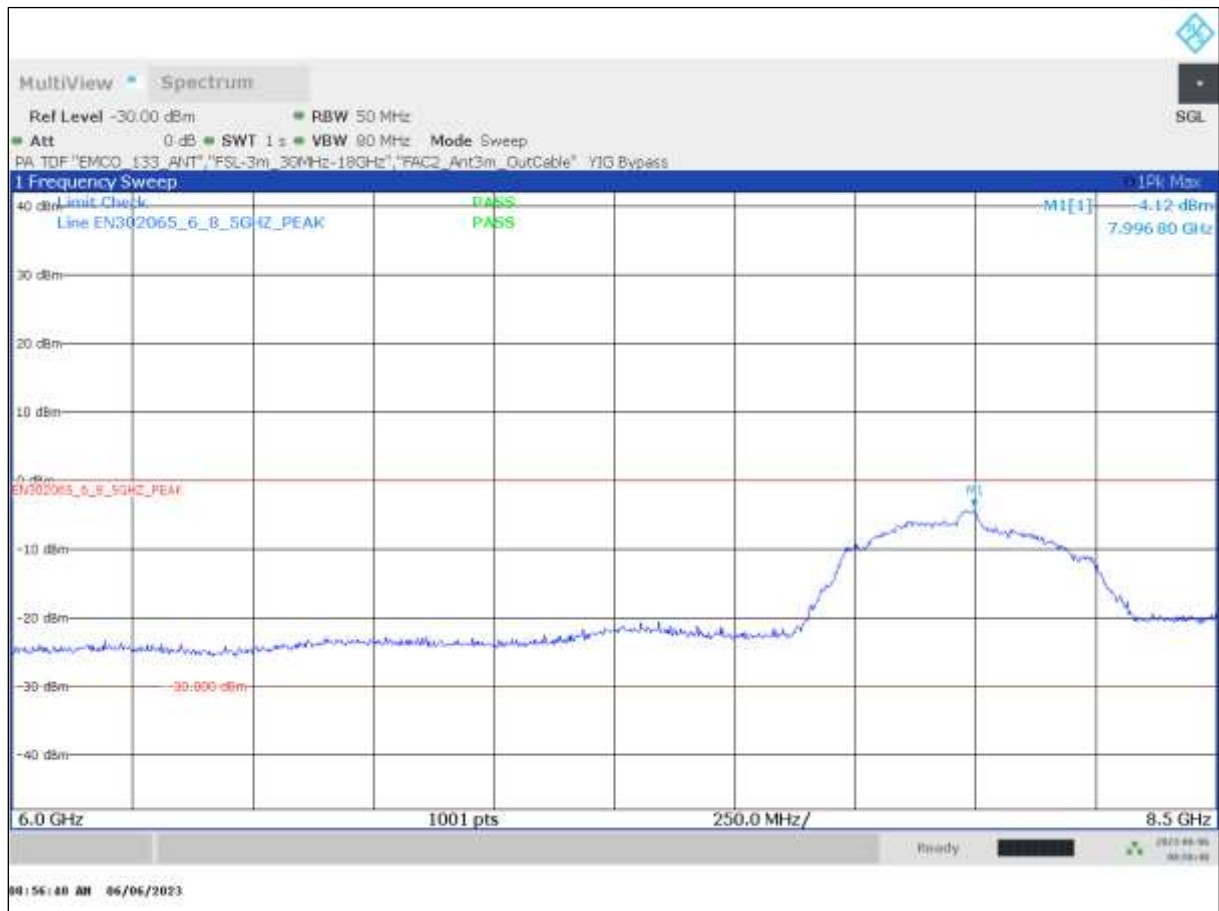
1.3.10 Peak power

T007_D011a_PWR_Peak_Ch9_Value_0x86868686_AntH



Value: -3.61 dBm/50MHz

T007_D011b_PWR_Peak_Ch9_Value_0x86868686_AntV



Value: -4.12 dBm/50MHz

End Of Annex 1