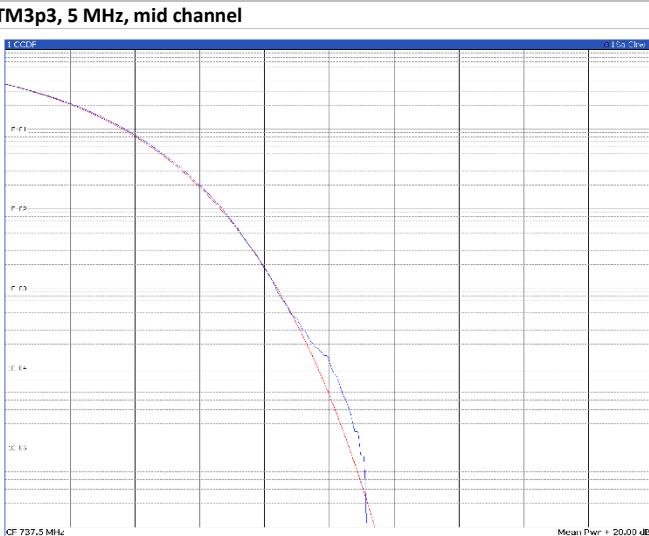


TM3p1a, 5 MHz, high channel

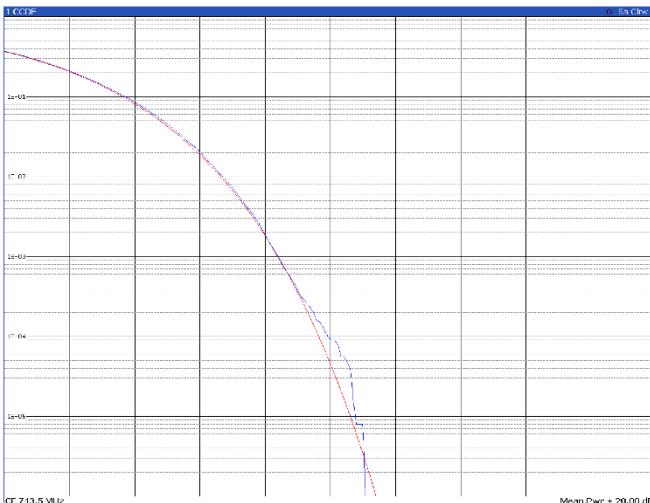

2 Result Summary							
	Mean	Peak	Crest	10%	1%	0.1%	0.01%
Trace 1	21.54 dBm	32.51 dBm	10.97 dB	3.58 dB	6.62 dB	± 2.28 dB	9.41 dB

TM3p3, 5 MHz, low channel
TM3p3, 5 MHz, low channel


2 Result Summary							
	Mean	Peak	Crest	10%	1%	0.1%	0.01%
Trace 1	21.05 dBm	32.15 dBm	11.10 dB	3.71 dB	6.72 dB	± 3.32 dB	9.86 dB



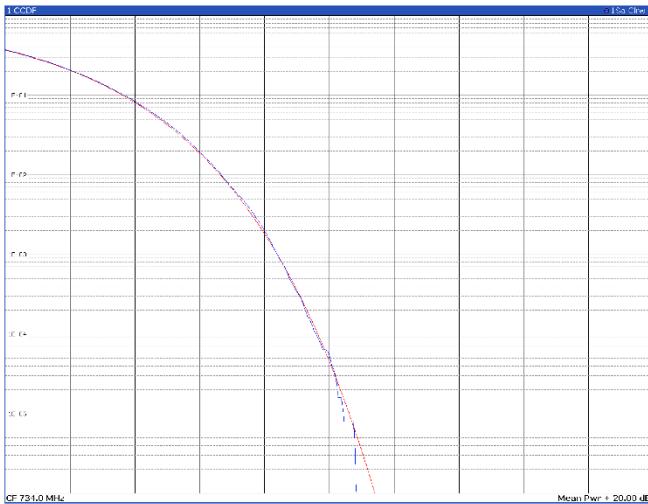
2 Result Summary							
	Mean	Peak	Crest	10%	1%	0.1%	0.01%
Trace 1	21.62 dBm	32.64 dBm	11.02 dB	3.70 dB	6.71 dB	± 3.16 dB	10.03 dB

TM3p3, 5 MHz, high channel


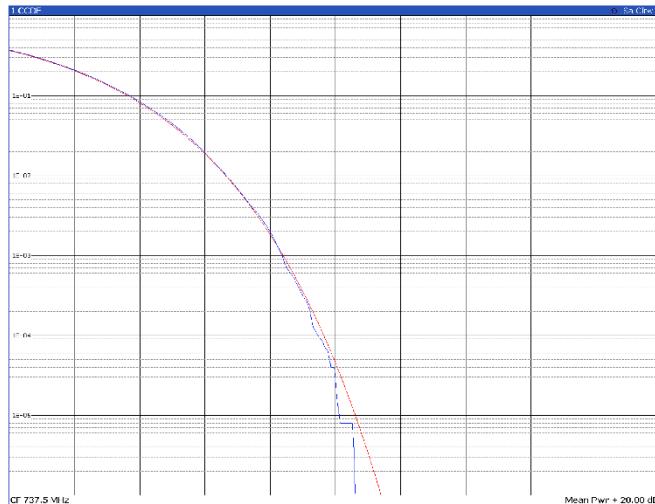
2 Result Summary							
	Mean	Peak	Crest	10%	1%	0.1%	0.01%
Trace 1	21.71 dBm	32.63 dBm	10.93 dB	3.71 dB	6.72 dB	± 3.35 dB	9.87 dB

Band B12

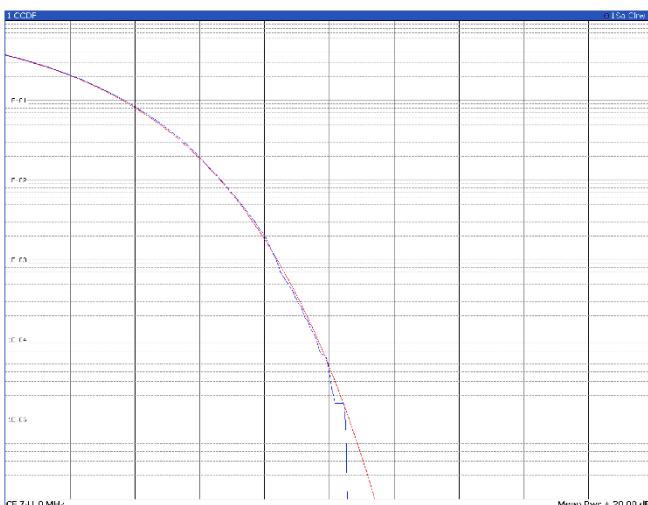
10 MHz

TM1.1, 10 MHz, low channel


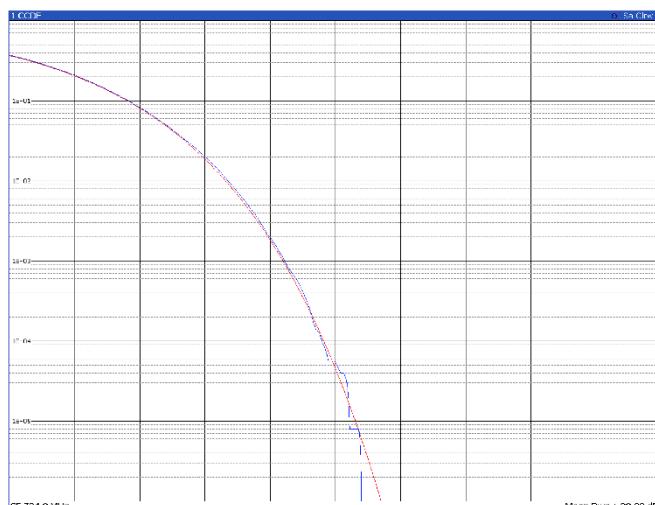
2 Result Summary									
Trace 1	Mean	Peak	Crest	10% 3.65 dB	1% 6.62 dB	0.1% 8.46 dB	0.01% 9.76 dB	Samples: 100000	
	18.08 dBm	28.62 dBm	10.74 dB	3.65 dB	6.62 dB	8.46 dB	9.76 dB		

TM1.1, 10 MHz, mid channel


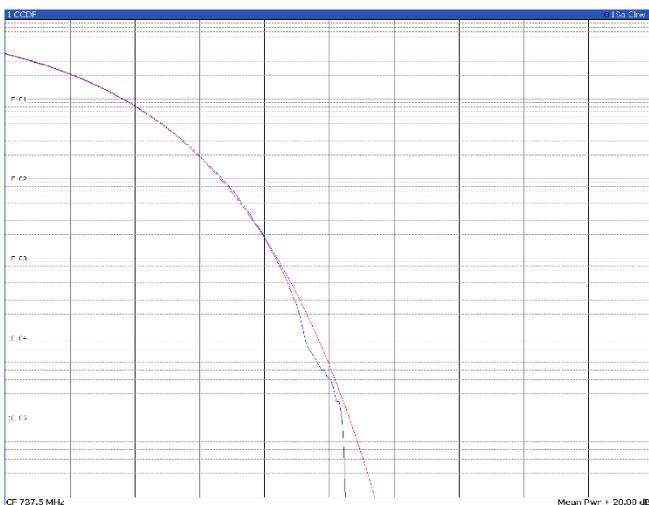
2 Result Summary									
Trace 1	Mean	Peak	Crest	10% 3.68 dB	1% 6.65 dB	0.1% 8.32 dB	0.01% 9.45 dB	Samples: 100000	
	18.40 dBm	28.90 dBm	10.50 dB	3.68 dB	6.65 dB	8.32 dB	9.45 dB		

TM1.1, 10 MHz, high channel


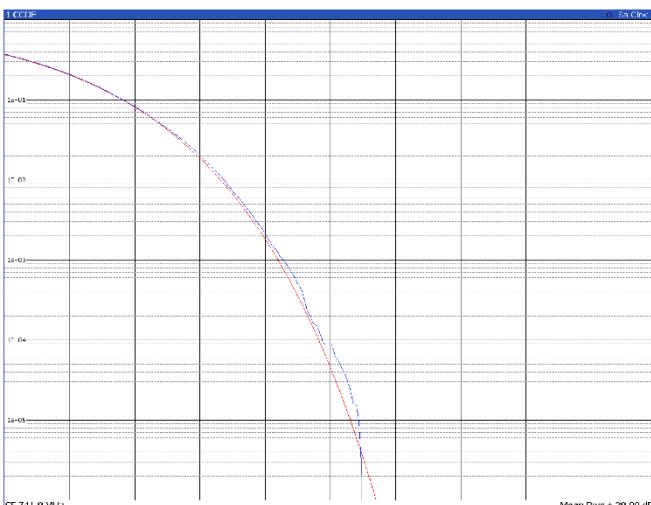
2 Result Summary									
Trace 1	Mean	Peak	Crest	10% 3.58 dB	1% 6.65 dB	0.1% 8.76 dB	0.01% 9.60 dB	Samples: 100000	
	18.84 dBm	29.30 dBm	10.45 dB	3.58 dB	6.65 dB	8.76 dB	9.60 dB		

TM3p1, 10 MHz, low channel


2 Result Summary									
Trace 1	Mean	Peak	Crest	10% 3.65 dB	1% 6.70 dB	0.1% 8.44 dB	0.01% 9.32 dB	Samples: 100000	
	18.19 dBm	28.93 dBm	10.74 dB	3.65 dB	6.70 dB	8.44 dB	9.32 dB		

TM3p1, 10 MHz, mid channel


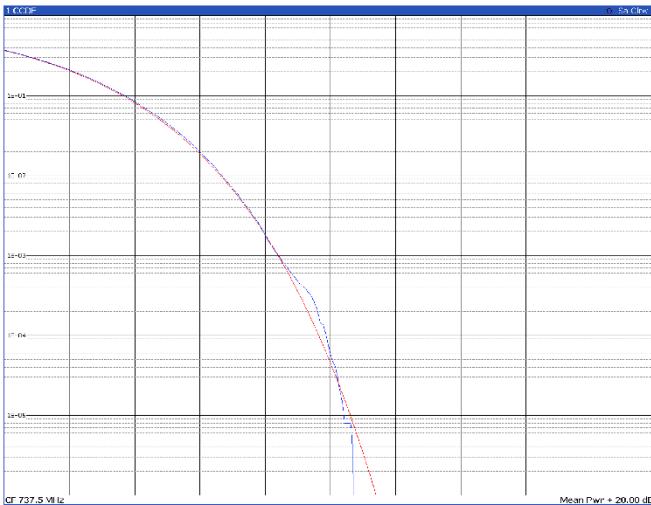
2 Result Summary							
	Mean	Peak	Crest	10%	10%	0.1%	0.01%
Trace 1	18.52 dBm	28.88 dBm	10.36 dB	3.73 dB	6.70 dB	6.71 dB	0.71 dB

TM3p1, 10 MHz, high channel


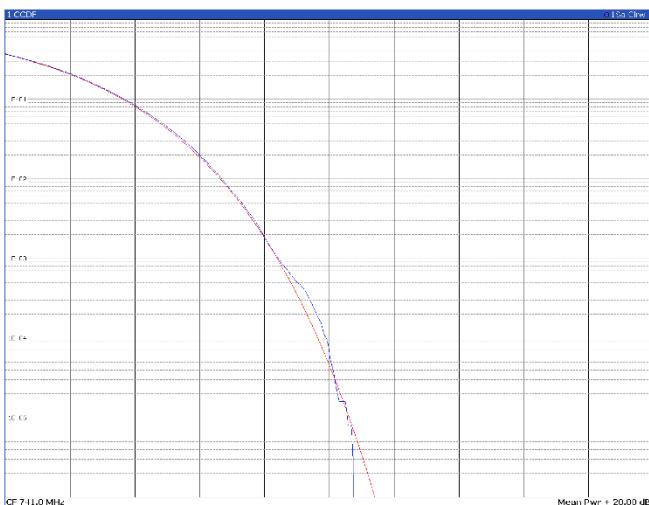
2 Result Summary							
	Mean	Peak	Crest	10%	10%	0.1%	0.01%
Trace 1	18.60 dBm	29.47 dBm	10.67 dB	3.74 dB	6.74 dB	6.72 dB	0.74 dB

TM3p1a, 10 MHz, low channel

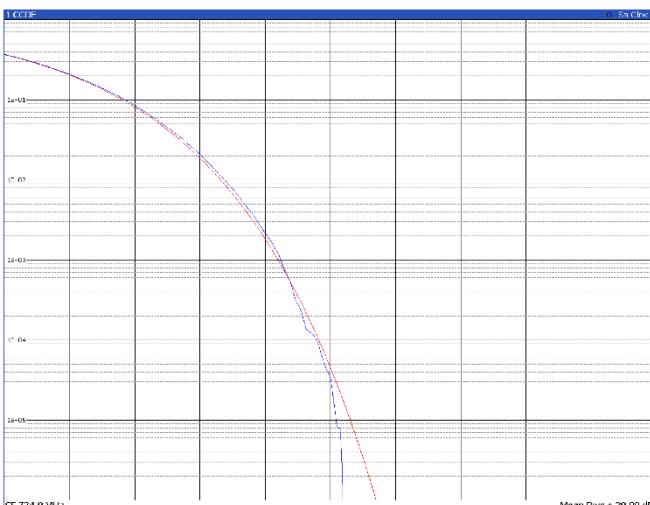

2 Result Summary							
	Mean	Peak	Crest	10%	10%	0.1%	0.01%
Trace 1	18.38 dBm	29.06 dBm	10.71 dB	3.79 dB	6.63 dB	6.78 dB	0.92 dB

TM3p1a, 10 MHz, mid channel


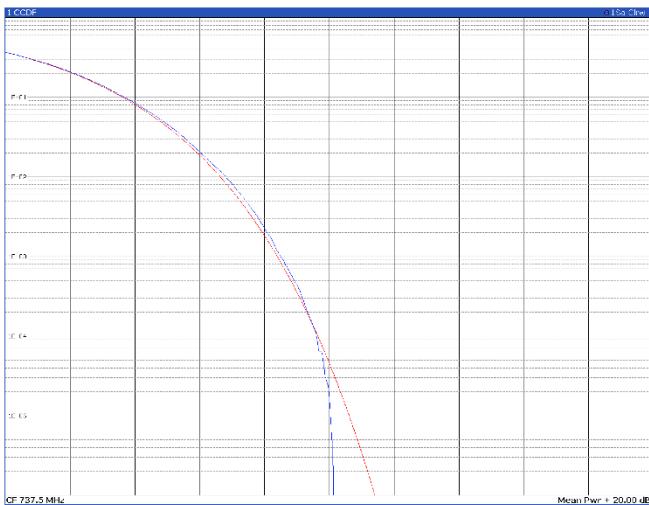
2 Result Summary							
	Mean	Peak	Crest	10%	10%	0.1%	0.01%
Trace 1	18.48 dBm	29.06 dBm	10.58 dB	3.65 dB	6.65 dB	8.47 dB	0.87 dB

TM3p1a, 10 MHz, high channel


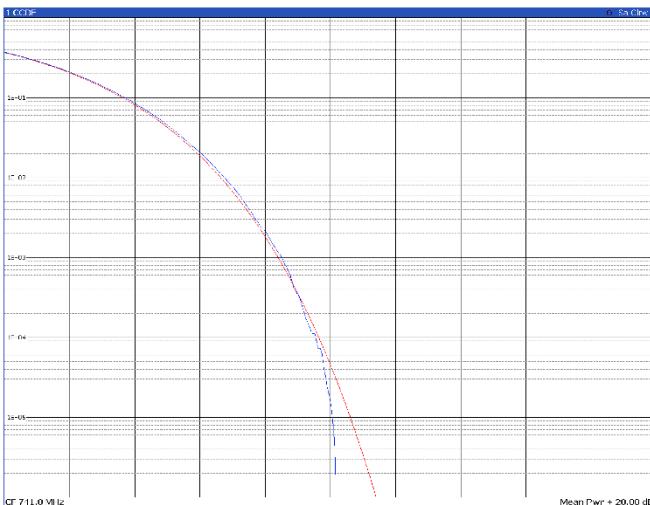
2 Result Summary							
	Mean	Peak	Crest	10%	1%	0.1%	0.01%
Trace 1	18.43 dBm	29.06 dBm	10.63 dB	3.58 dB	6.62 dB	8.47 dB	9.90 dB

TM3p3, 10 MHz, low channel


2 Result Summary							
	Mean	Peak	Crest	10%	1%	0.1%	0.01%
Trace 1	18.34 dBm	28.58 dBm	10.24 dB	3.71 dB	6.74 dB	8.45 dB	9.95 dB

TM3p3, 10 MHz, mid channel


2 Result Summary							
	Mean	Peak	Crest	10%	1%	0.1%	0.01%
Trace 1	18.59 dBm	28.61 dBm	10.02 dB	3.58 dB	6.65 dB	8.50 dB	9.90 dB

TM3p3, 10 MHz, high channel


2 Result Summary							
	Mean	Peak	Crest	10%	1%	0.1%	0.01%
Trace 1	18.59 dBm	28.61 dBm	10.05 dB	3.71 dB	6.74 dB	8.52 dB	9.95 dB

8.6 FCC §27.53(m) Emission Limits

8.6.1 Definitions and limits

(m) For BRS and EBS stations, the power of any emissions outside the licensee's frequency bands of operation shall be attenuated below the transmitter power (P) measured in watts in accordance with the standards below. If a licensee has multiple contiguous channels, out-of-band emissions shall be measured from the upper and lower edges of the contiguous channels.

(2) For digital base stations, the attenuation shall be not less than $43 + 10 \log (P)$ dB, unless a documented interference complaint is received from an adjacent channel licensee with an overlapping Geographic Service Area. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS No. 1 on the same terms and conditions as adjacent channel BRS or EBS licensees. Provided that a documented interference complaint cannot be mutually resolved between the parties prior to the applicable deadline, then the following additional attenuation requirements shall apply:

(v) For all fixed digital user stations, the attenuation factor shall be not less than $43 + 10 \log (P)$ dB at the channel edge.

(6) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed; for mobile digital stations, in the 1 megahertz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 megahertz or 1 percent of emission bandwidth, as specified; or 1 megahertz or 2 percent for mobile digital stations, except in the band 2495-2496 MHz). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. With respect to television operations, measurements must be made of the separate visual and aural operating powers at sufficiently frequent intervals to ensure compliance with the rules.

8.6.2 Test summary

Test start date	November 22, 2024	Temperature	21 °C
Test end date	December 13, 2024	Air pressure	1005 mbar
Test engineer	O. Frau	Relative humidity	64%
Verdict	Pass		

8.6.3 Observations, settings and special notes

EUT setup configuration	Table top
Test facility	3 m Semi anechoic chamber
Measuring distance	3m
Antenna height variation	1–4 m
Turn table position	0–360°
Measurement details	A preview measurement was generated with receiver in continuous scan or sweep mode while the EUT was rotated and antenna adjusted to maximize radiated emission. Emissions detected within 6 dB or above limit were re-measured with the appropriate detector against the correlating limit and recorded as the final measurement.

Receiver/spectrum analyzer settings for frequencies below 1 GHz:

Resolution bandwidth	120 kHz
Video bandwidth	300 kHz
Detector mode	<ul style="list-style-type: none"> – Peak (Preview measurement) – Quasi-peak (Final measurement)
Trace mode	Max Hold
Measurement time	<ul style="list-style-type: none"> – 100 ms (Peak preview measurement) – 5000 ms (Quasi-peak final measurement)

Receiver/spectrum analyzer settings for frequencies above 1 GHz:

Resolution bandwidth	1 MHz
Video bandwidth	3 MHz
Detector mode	Peak (Preview measurement) Peak and Coverage (Final measurement)
Trace mode	Max Hold
Measurement time	– 100 ms (Peak preview measurement) – 5000 ms (Peak and Coverage final measurement)

Spectrum analyzer settings (conducted test):

Resolution bandwidth	1 MHz
Video bandwidth	3 MHz
Frequency span	Sufficient for making an accurate measurement
Detector mode	RMS
Trace mode	Max Hold

This test was realized in two parts: one with a conducted setup and another one with a radiated setup.

The conducted test was made on one port at time, transmitting at max power and with the other one loaded with $50\ \Omega$ loads. For capturing the signal with the equipment, it was divided in two ranges, using a transducer factor to compensate the losses caused by a cable and attenuator used to protect the test equipment. The first range was measured from 30 MHz to 1 GHz where the fundamental signal is visible; the second range was selected from 1 GHz to 8 GHz. The evaluation was made using the three channels and all the modulations (TM1.1, TM3p1, TM3p1a, and TM3p3).

A 30 dB attenuator was placed between the EUT and spectrum analyzer and compensated for as a reference level offset. Additionally, to correct for MIMO consideration, an additional offset of $10\log(2) = -3.01$ dB was included to compensate for 2 correlated antennas output.

For band edge tests, in the 1 MHz region immediately outside of the authorized band, a resolution bandwidth of approximately 1 – 5 % of the 26 dB bandwidth measured was used.

The radiated test was made transmitting to max power too with the two ports terminated with $50\ \Omega$ loads. The scans were made from 30 MHz to 8 GHz considering all the channels but only the bandwidth and modulation with the highest power was showed.

Based on equation $43 + 10 \log_{10}(P)$ dB, the general emission limit is -13 dBm (conducted and radiated test) or the equivalent at 3m is 82.23 dB μ V/m above 1 GHz and 84.38 dB μ V/m below 1 GHz.

8.6.4 Test equipment used

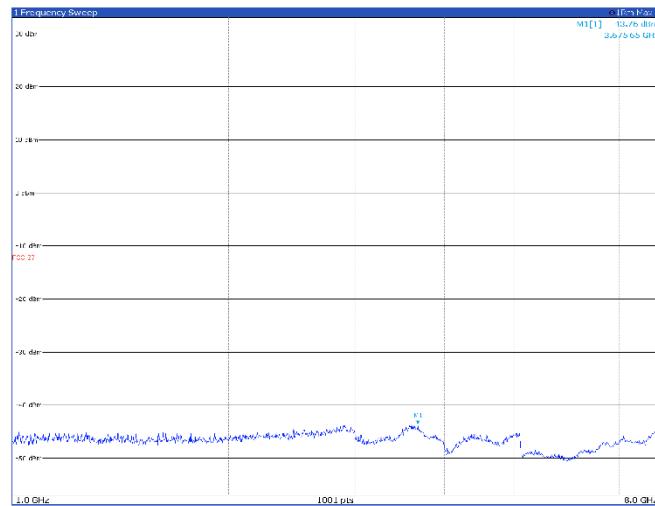
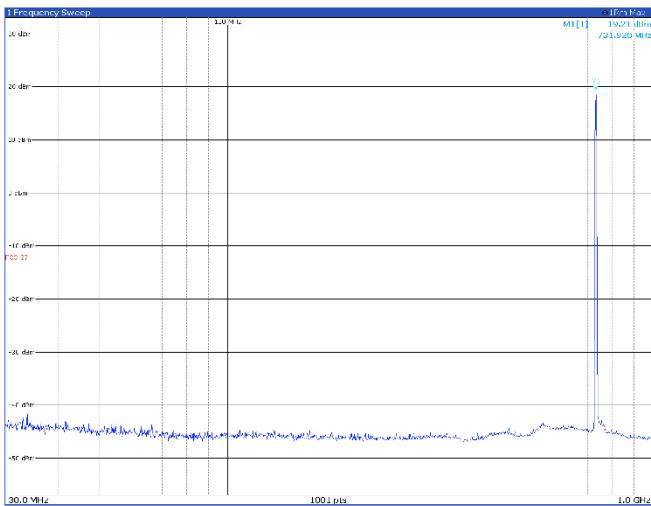
Equipment	Manufacturer	Model no.	Asset no.
Spectrum Analyzer	Rohde & Schwarz	FSW43	101767
EMI Receiver	Rohde & Schwarz	ESW44	101620
RF Vector Signal Generator	Rohde & Schwarz	SMBV100A	263254
RF Vector Signal Generator	Rohde & Schwarz	SMBV100A	263397
Antenna Trilog 25MHz – 8GHz	Schwarzbeck Mess-Elektronik	VULB9162	9162-025
Antenna 1 – 18 GHz	Schwarzbeck Mess-Elektronik	STLP9148	STLP 9148-152
Double Ridge Horn Antenna	RFSpin	DRH40	061106A40
Broadband Amplifier	Schwarzbeck Mess-Elektronik	BBV9718C	00121
Broadband Bench Top Amplifier	Sage	STB-1834034030-KFKF-L1	18490-01
Controller	Maturo	FCU3.0	10041
Tilt antenna mast	Maturo	TAM4.0-E	10042
Turntable	Maturo	TT4.0-5T	2.527

8.6.5 Test data

Band B12 – conducted emissions Antenna port 1

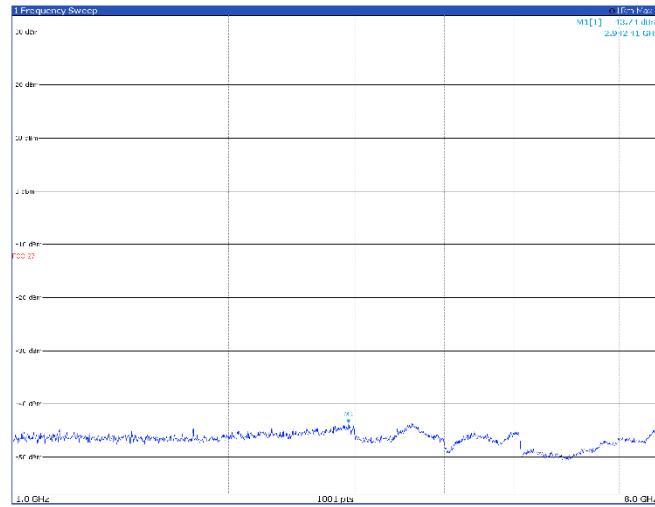
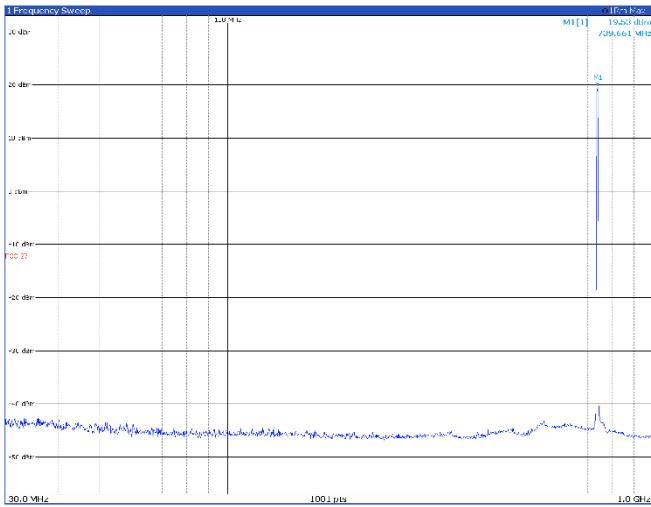
5 MHz

TM1.1, 5 MHz, low channel

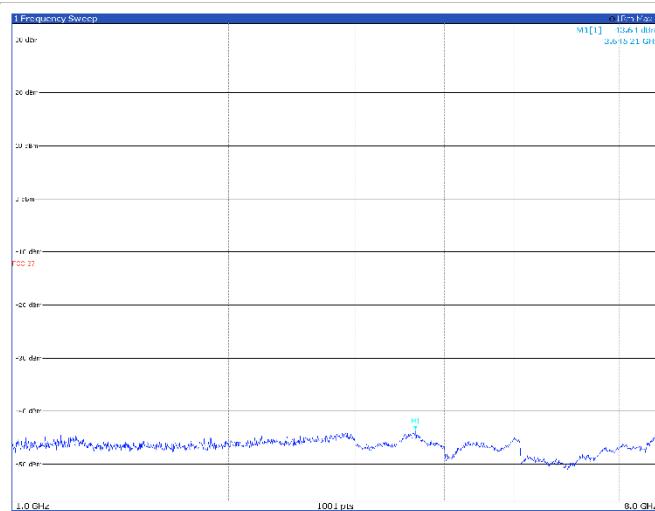
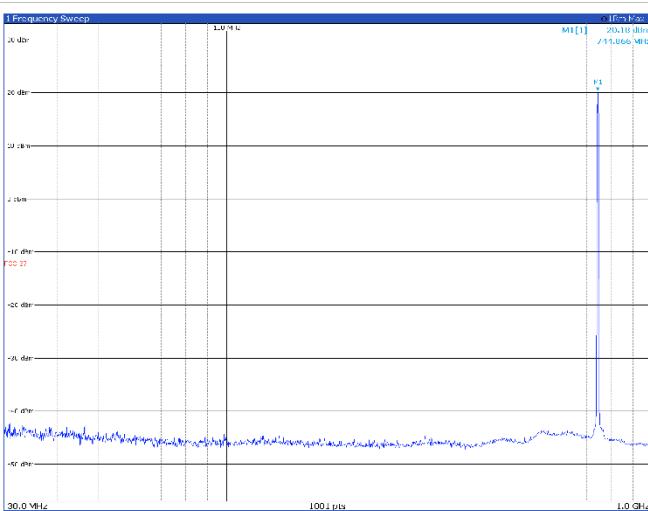


Limit exceeded by the carrier

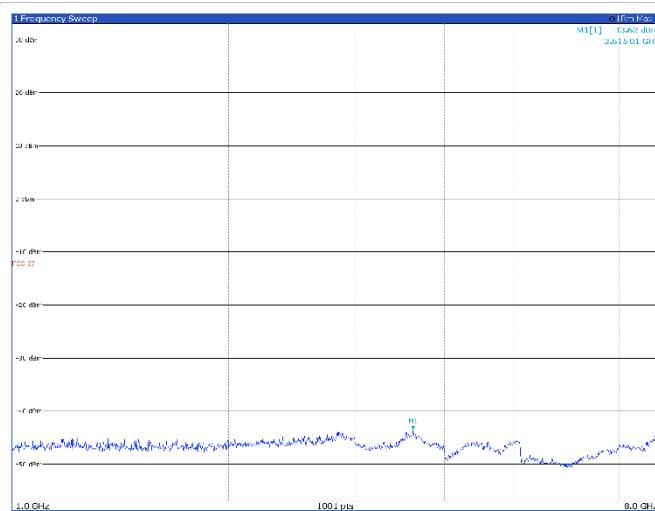
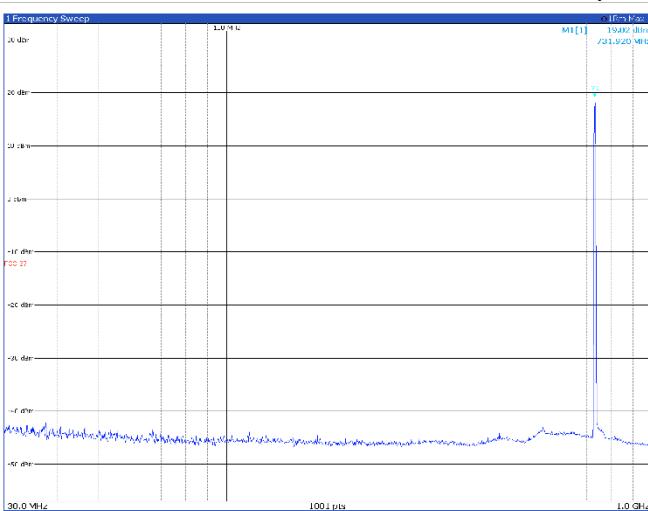
TM1.1, 5 MHz, mid channel



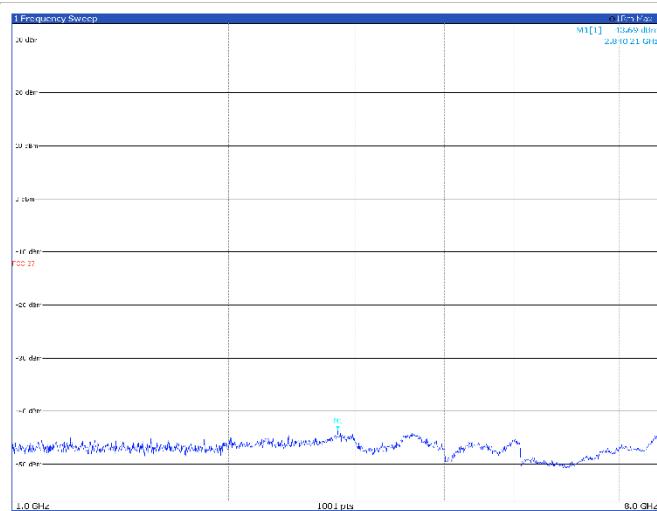
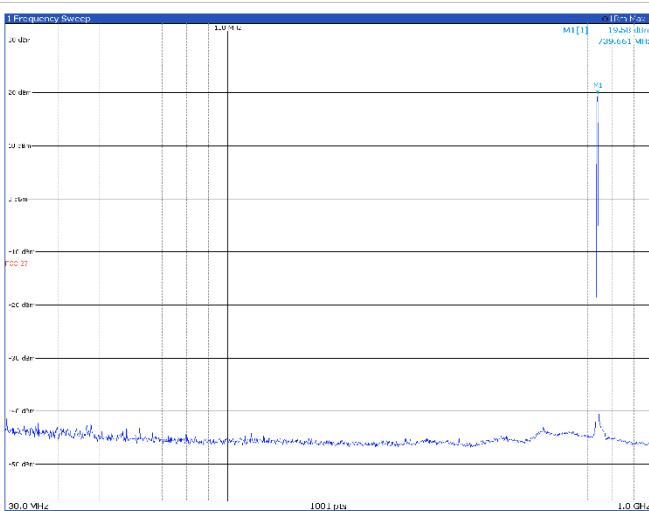
Limit exceeded by the carrier

TM1.1, 5 MHz, high channel


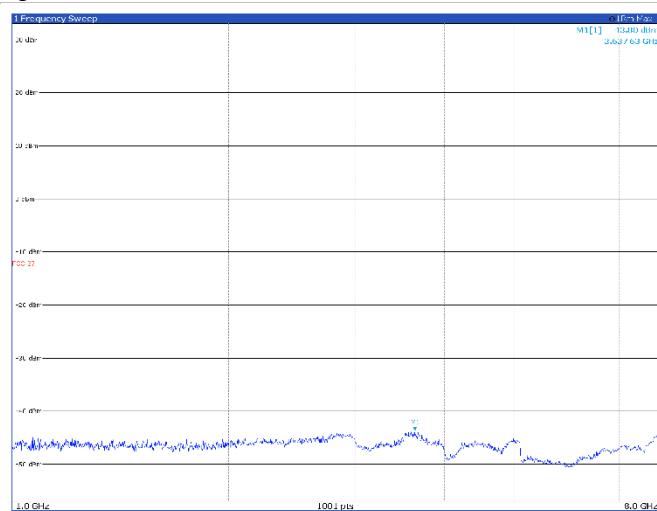
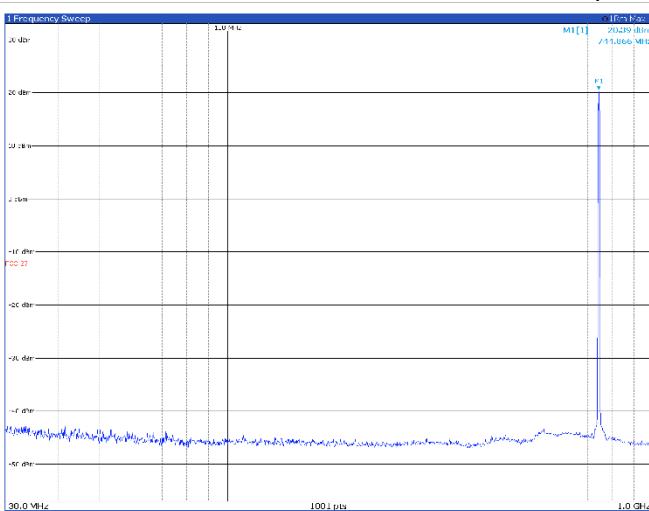
Limit exceeded by the carrier

TM3p1, 5 MHz, low channel


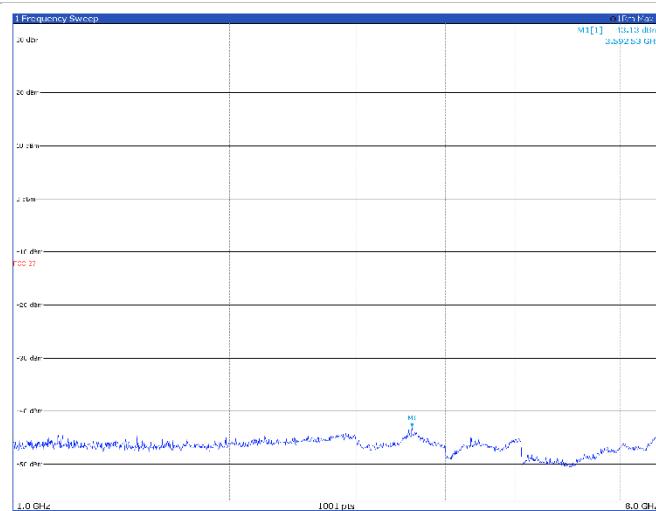
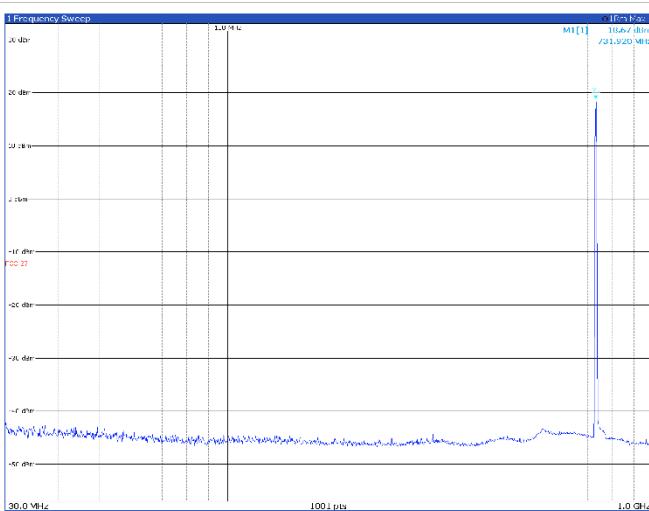
Limit exceeded by the carrier

TM3p1, 5 MHz, mid channel


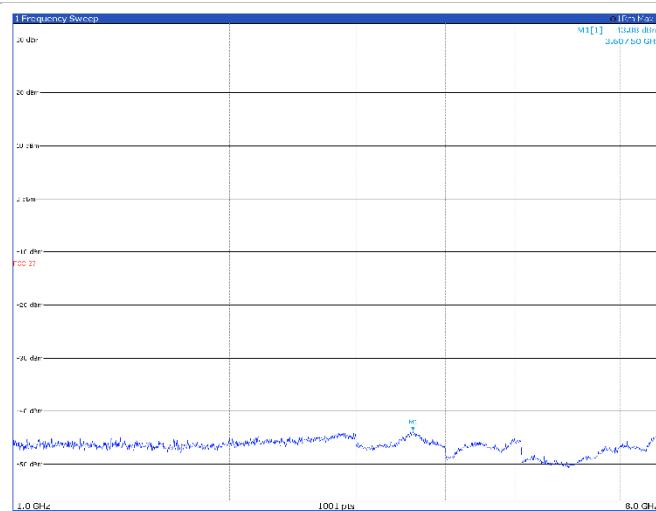
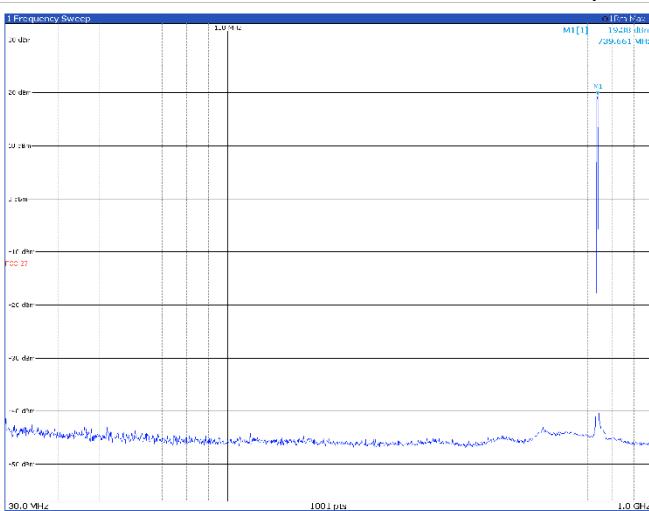
Limit exceeded by the carrier

TM3p1, 5 MHz, high channel


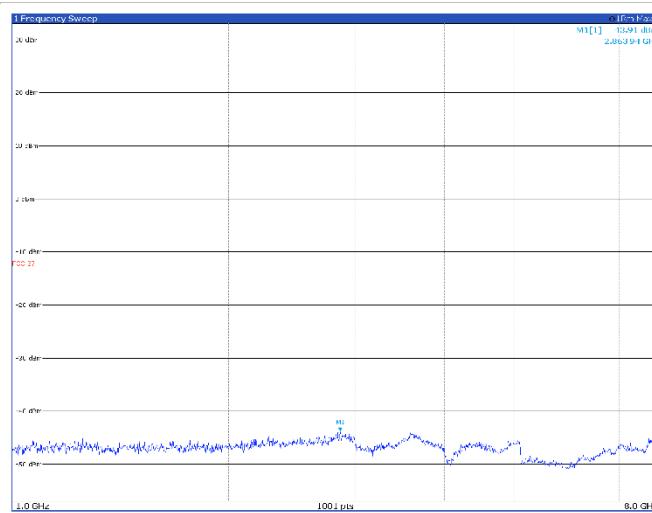
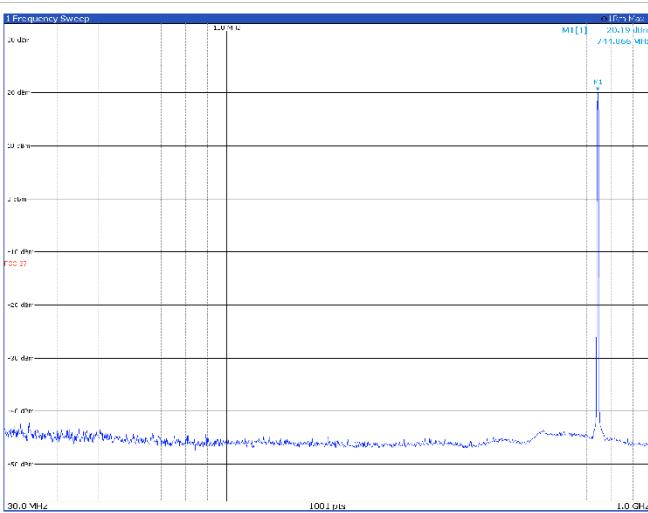
Limit exceeded by the carrier

TM3p1a, 5 MHz, low channel


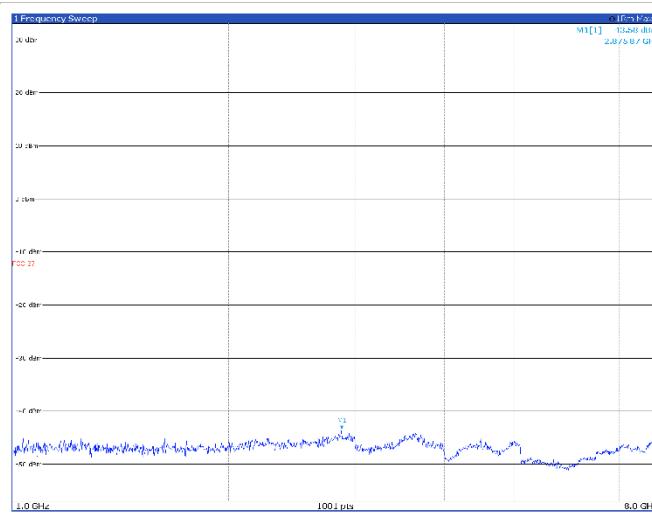
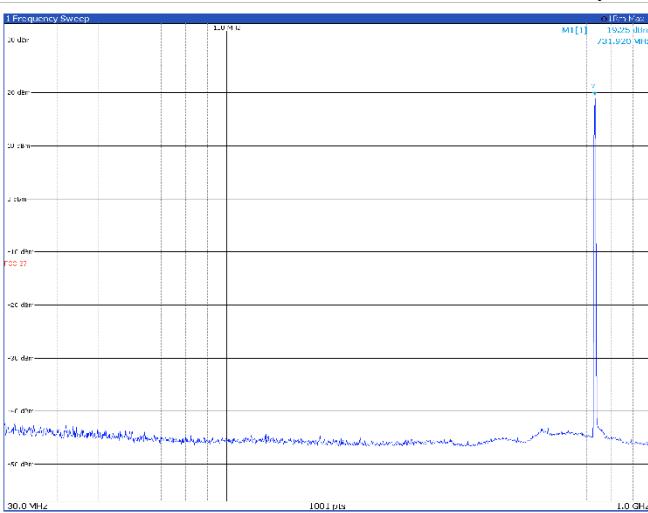
Limit exceeded by the carrier

TM3p1a, 5 MHz, mid channel


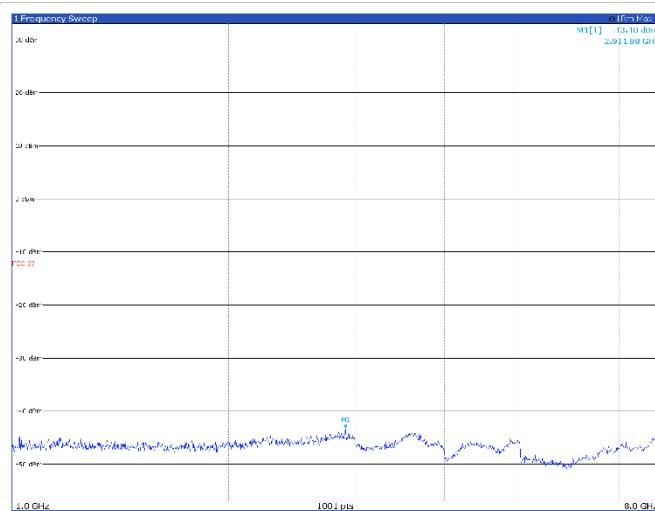
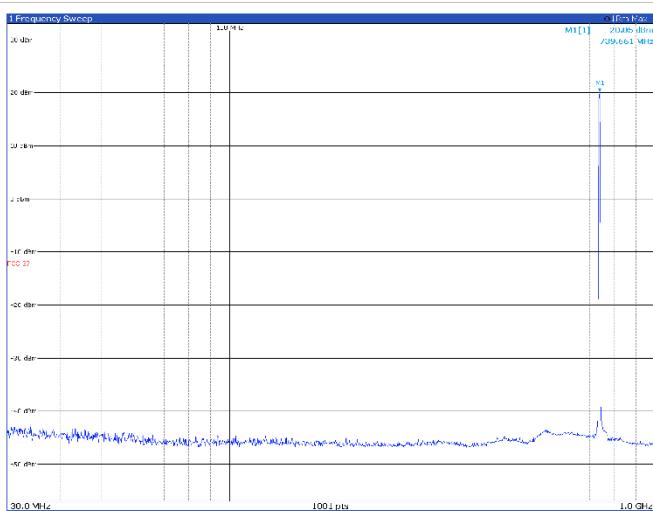
Limit exceeded by the carrier

TM3p1a, 5 MHz, high channel


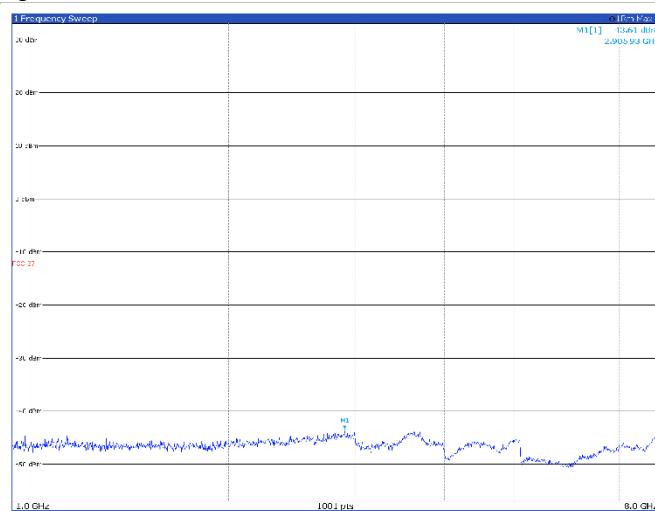
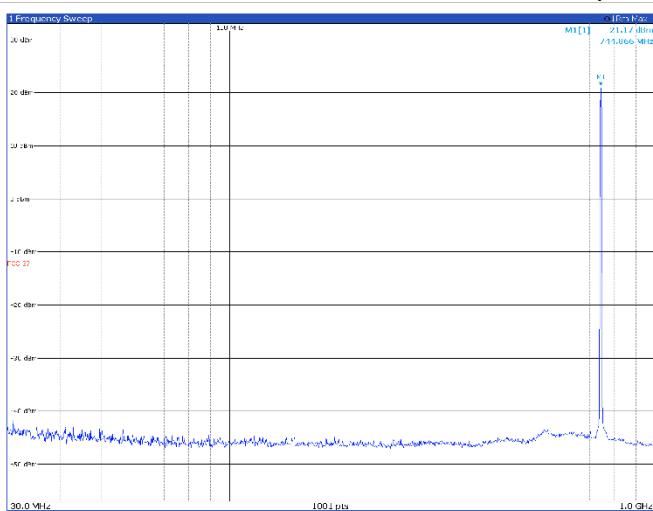
Limit exceeded by the carrier

TM3p3, 5 MHz, low channel


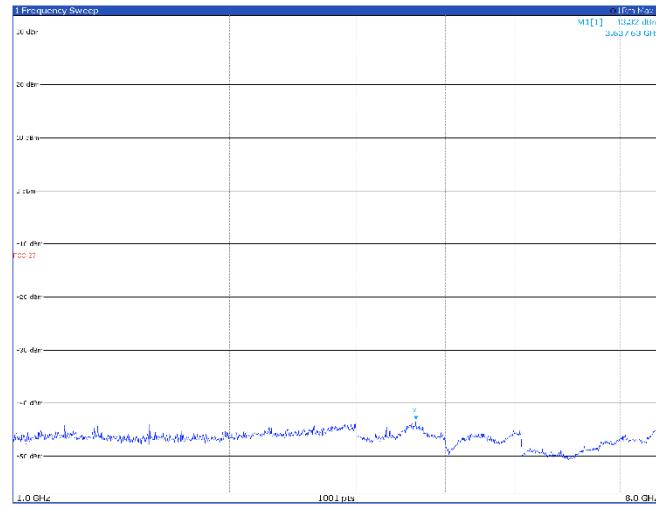
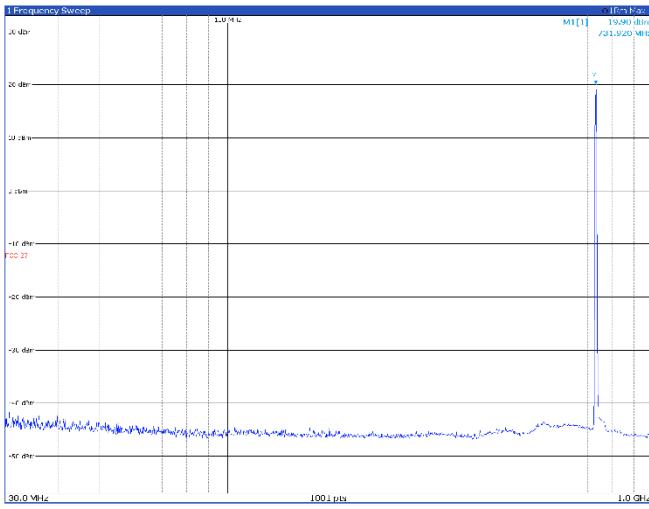
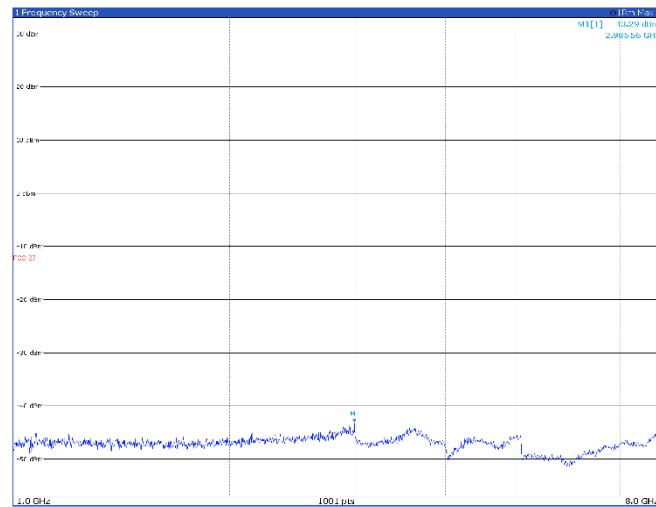
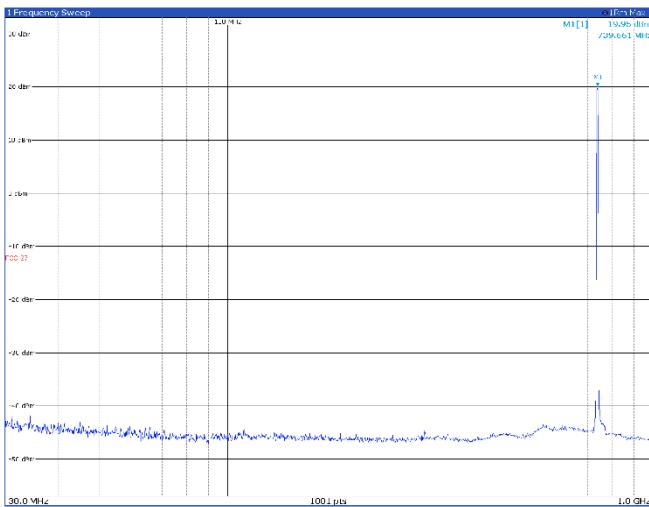
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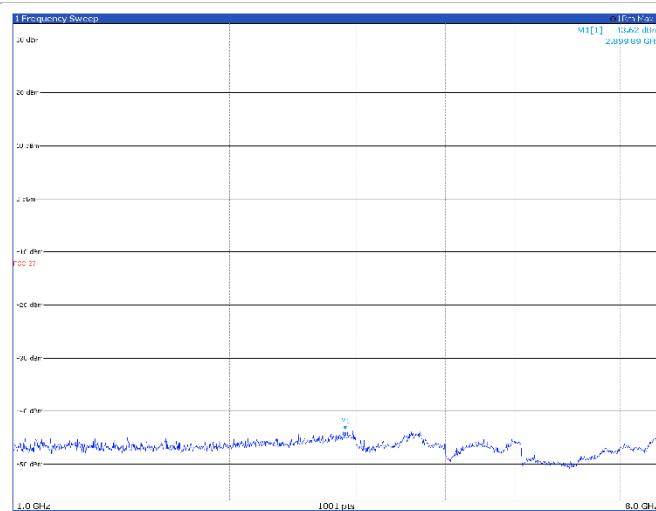
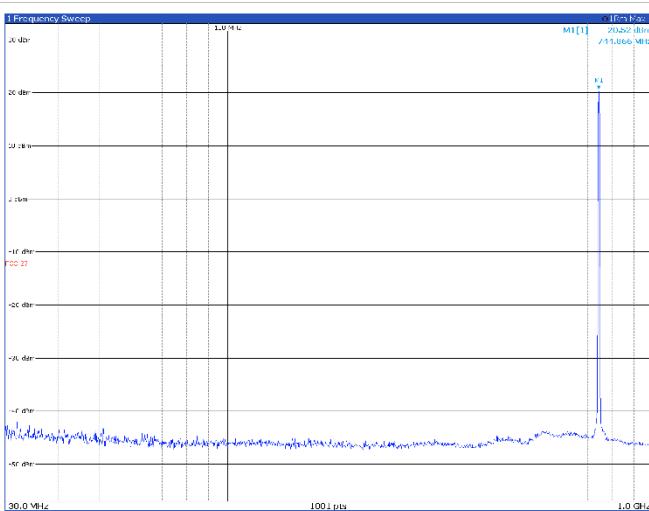
TM3p3, 5 MHz, mid channel


Limit exceeded by the carrier

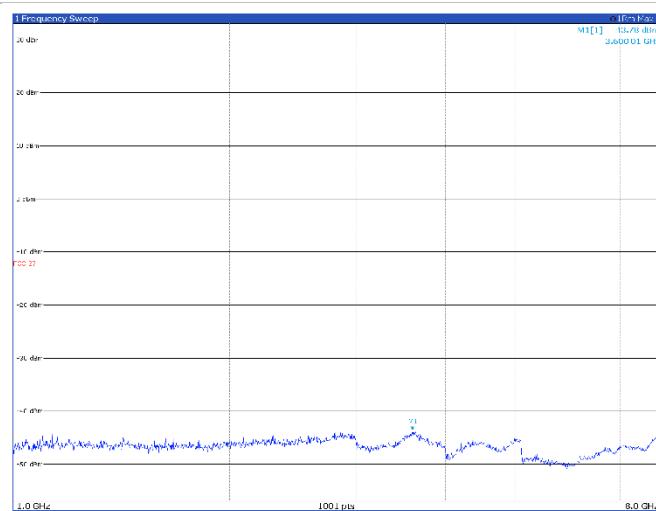
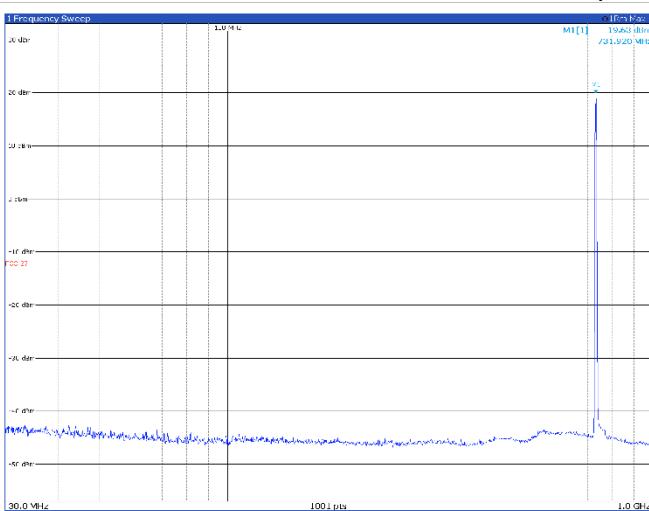
TM3p3, 5 MHz, high channel


Limit exceeded by the carrier

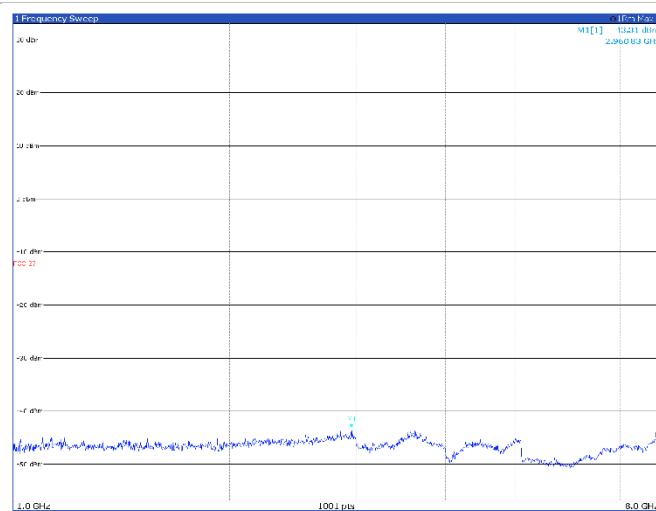
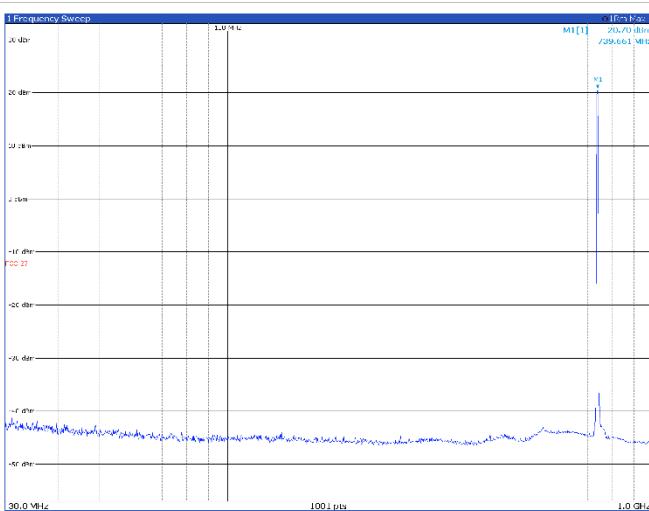
Band B12 – conducted emissions Antenna port 2
5 MHz
TM1.1, 5 MHz, low channel

Limit exceeded by the carrier
TM1.1, 5 MHz, mid channel

Limit exceeded by the carrier

TM1.1, 5 MHz, high channel


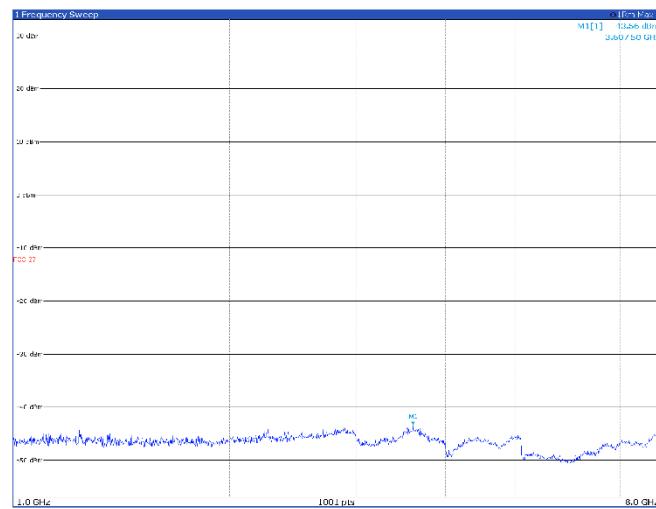
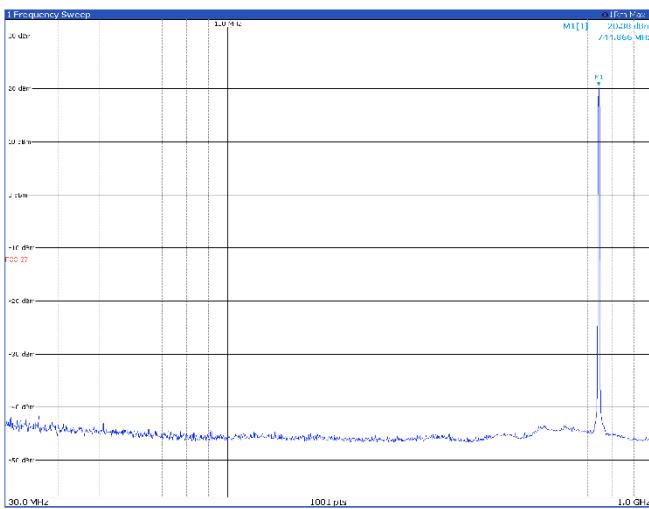
Limit exceeded by the carrier

TM3p1, 5 MHz, low channel


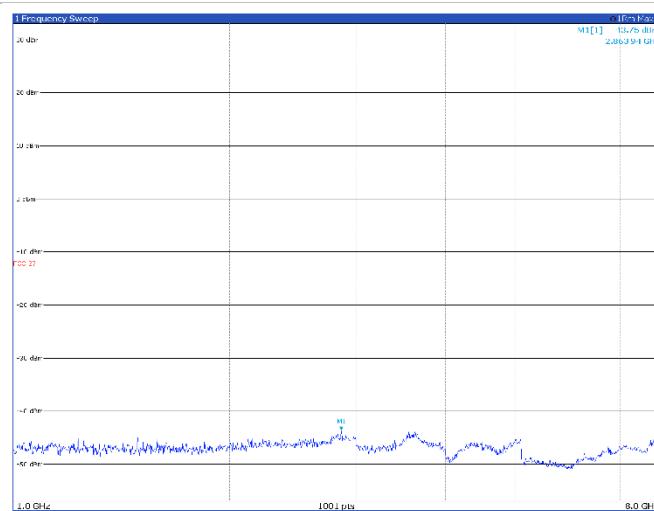
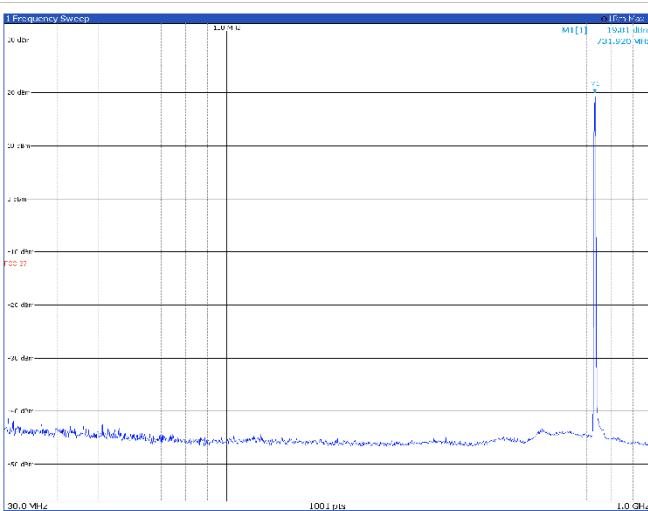
Limit exceeded by the carrier

TM3p1, 5 MHz, mid channel


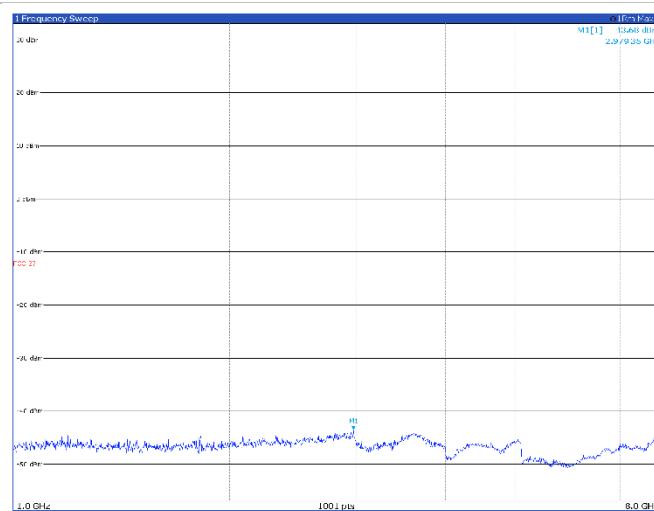
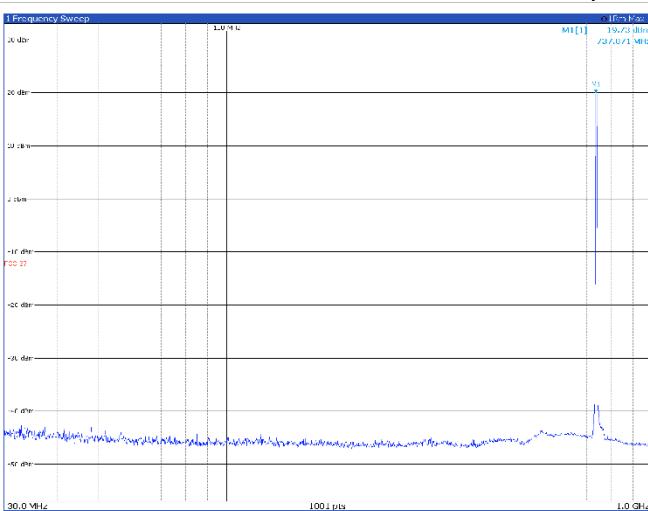
Limit exceeded by the carrier

TM3p1, 5 MHz, high channel


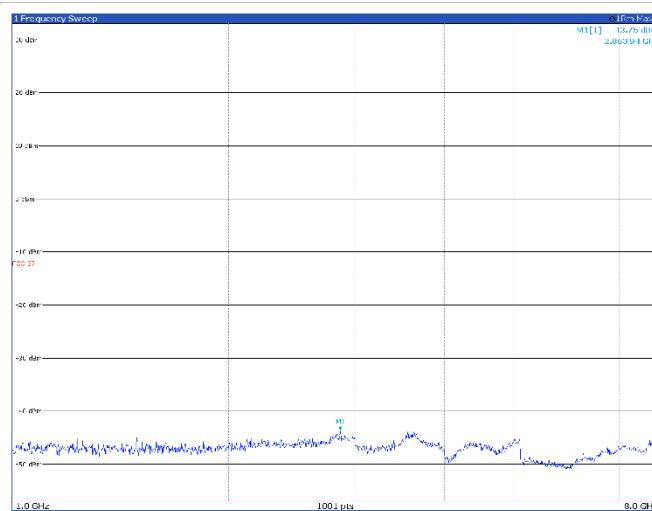
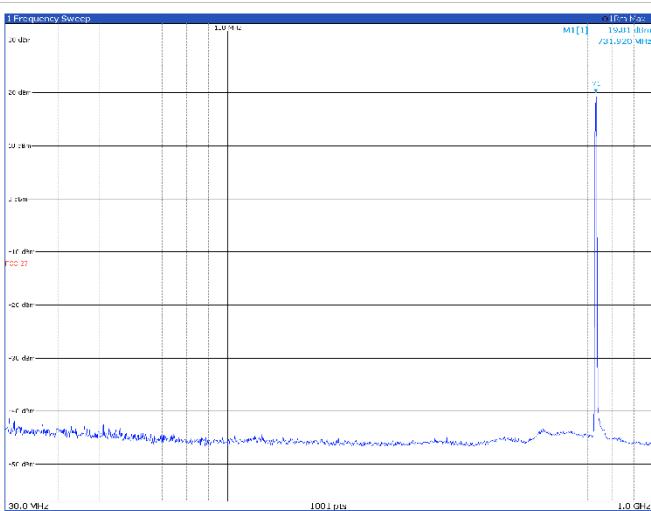
Limit exceeded by the carrier

TM3p1a, 5 MHz, low channel


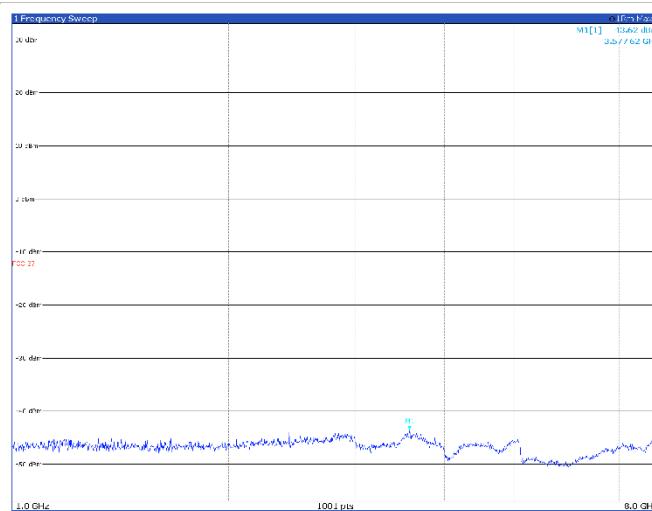
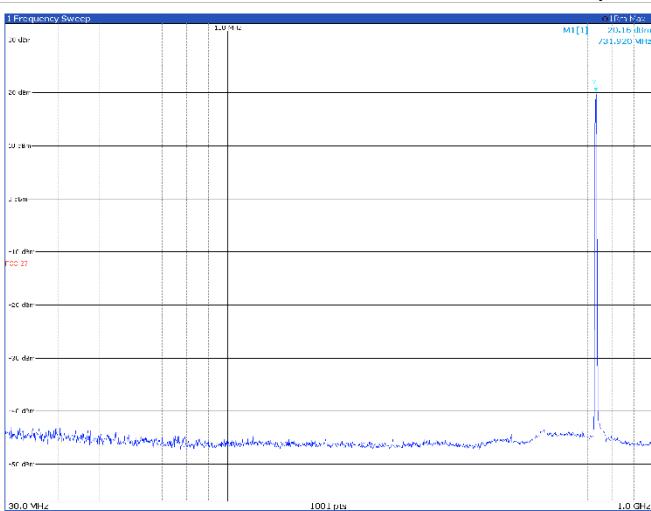
Limit exceeded by the carrier

TM3p1a, 5 MHz, mid channel


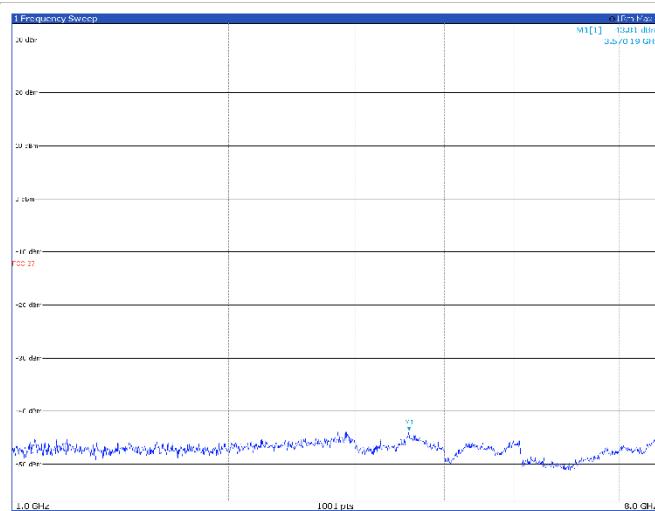
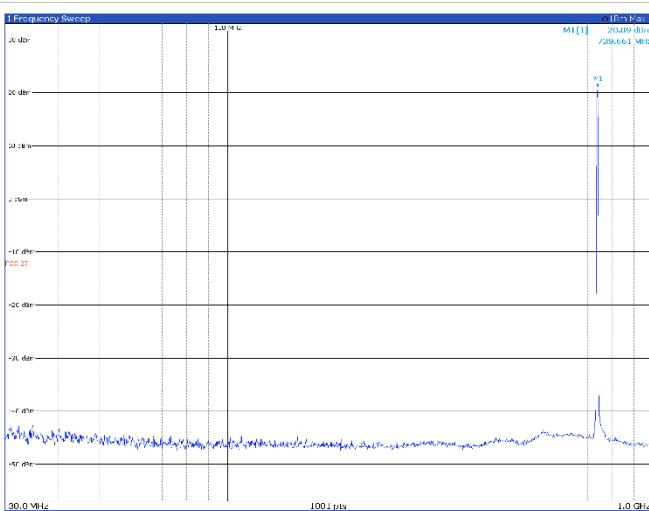
Limit exceeded by the carrier

TM3p1a, 5 MHz, high channel


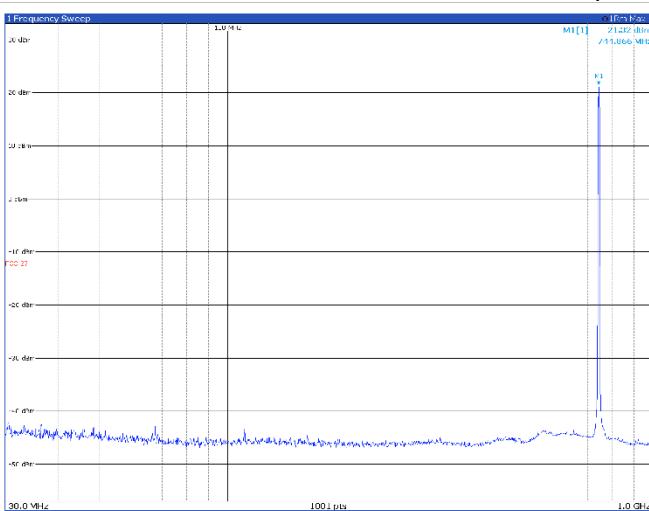
Limit exceeded by the carrier

TM3p3, 5 MHz, low channel


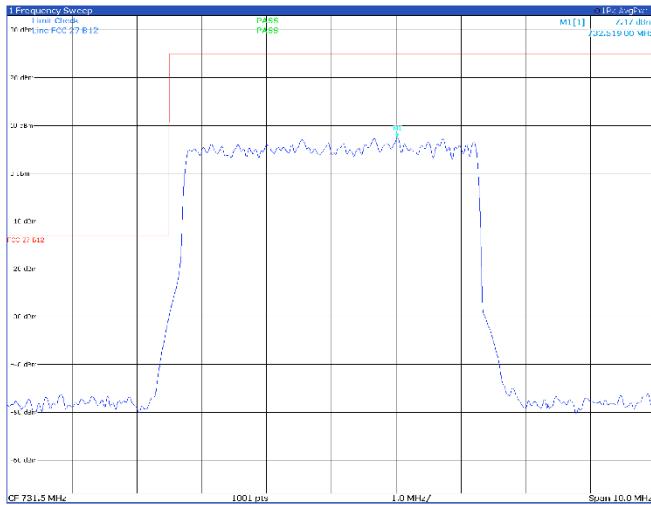
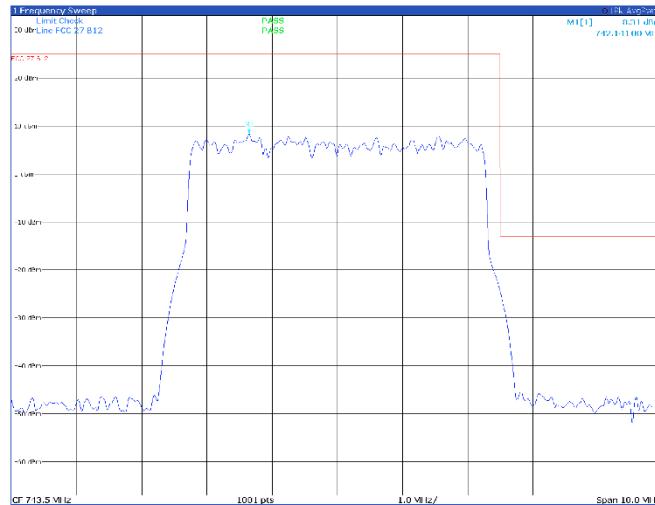
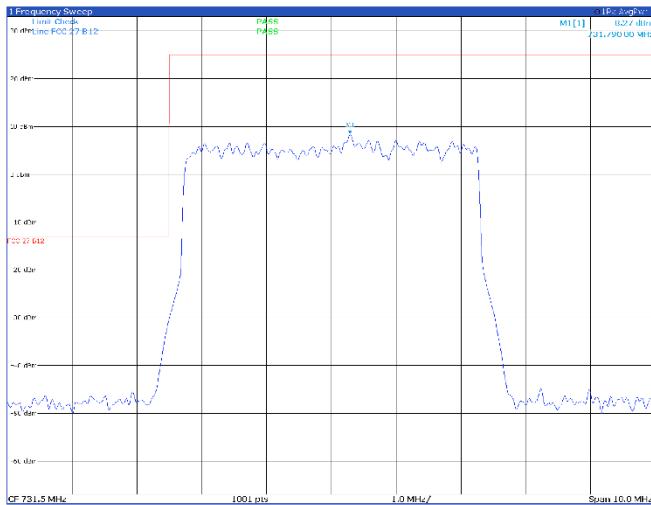
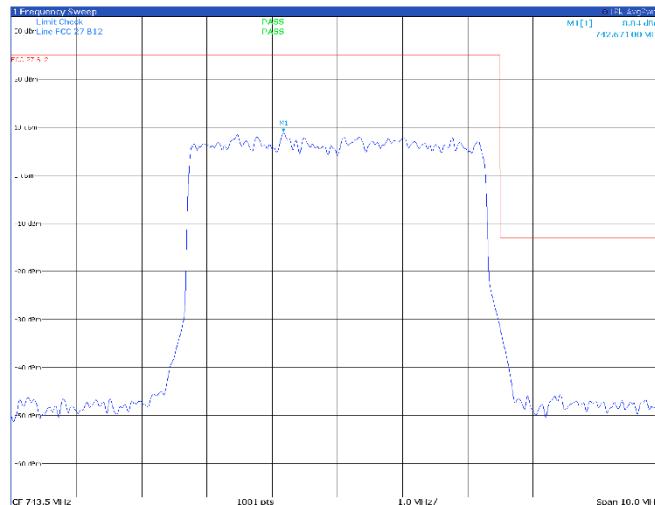
Limit exceeded by the carrier

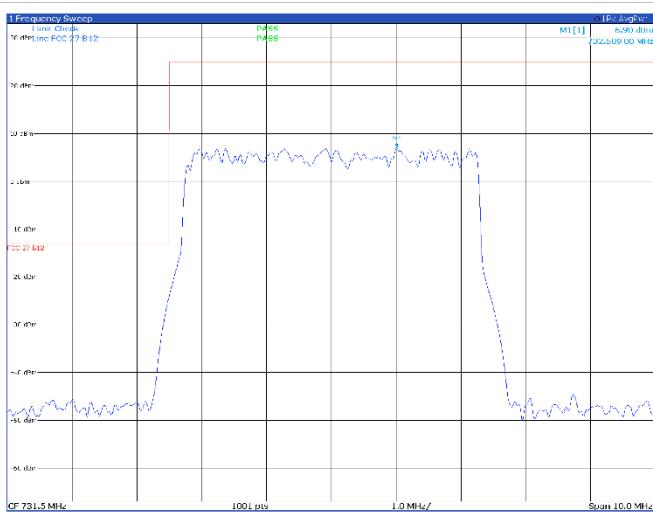
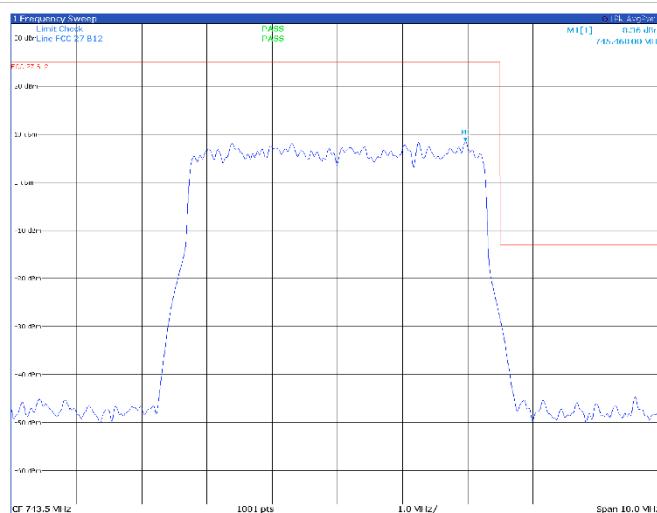
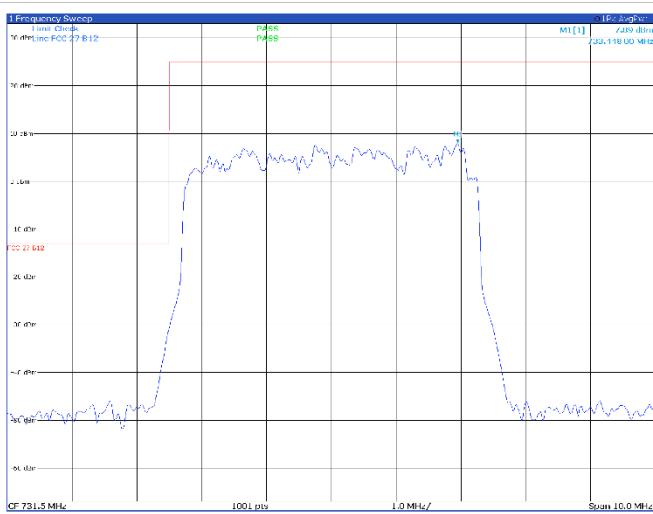
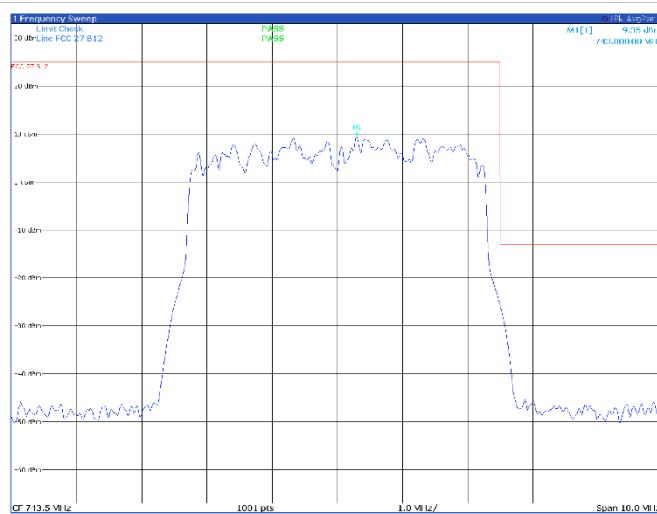
TM3p3, 5 MHz, mid channel


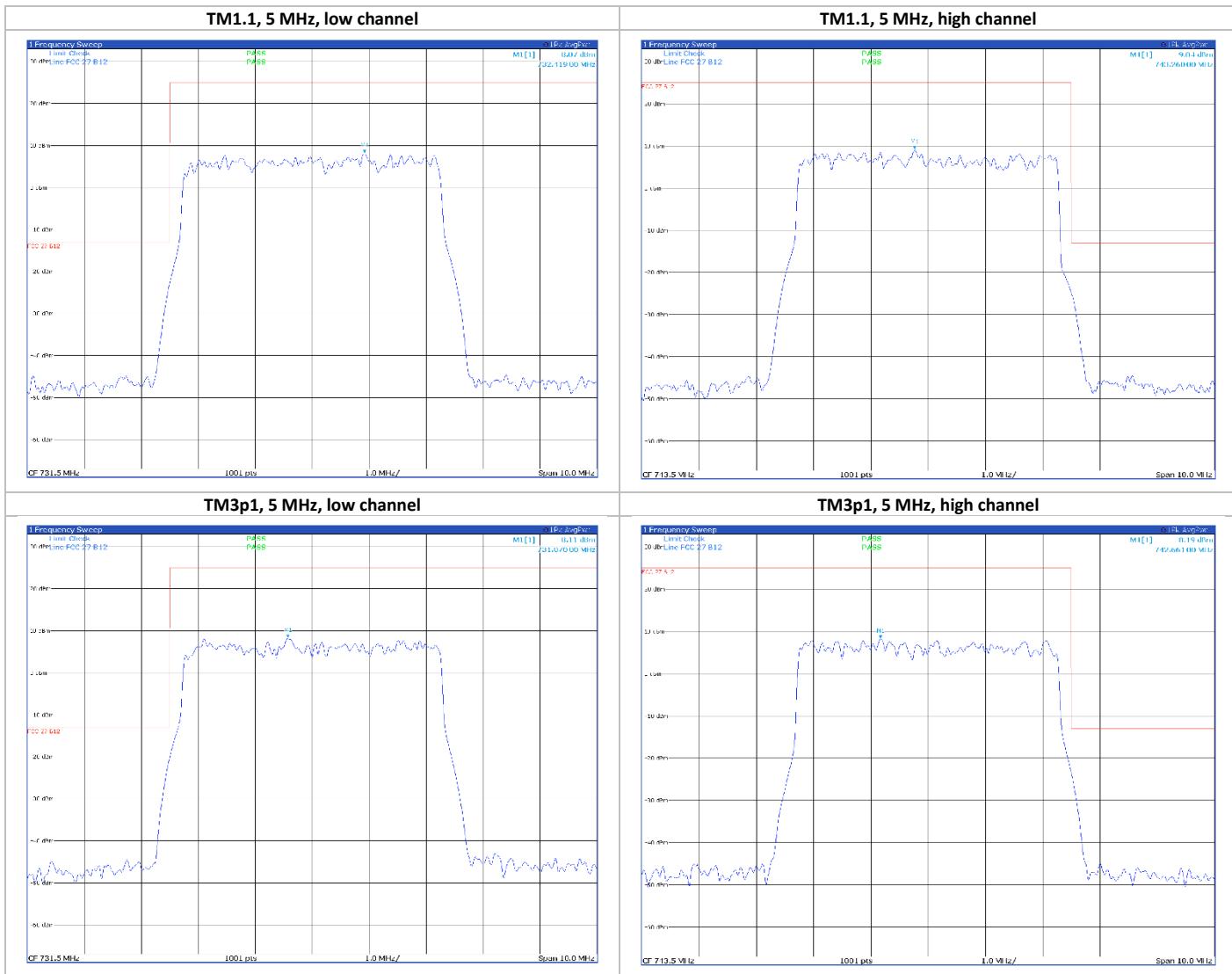
Limit exceeded by the carrier

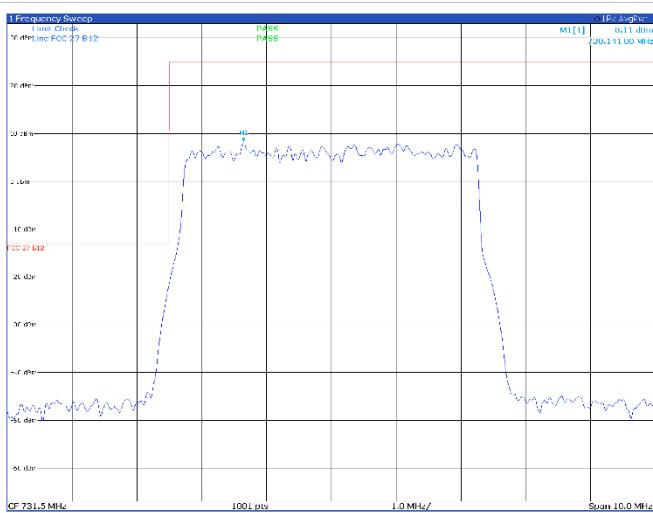
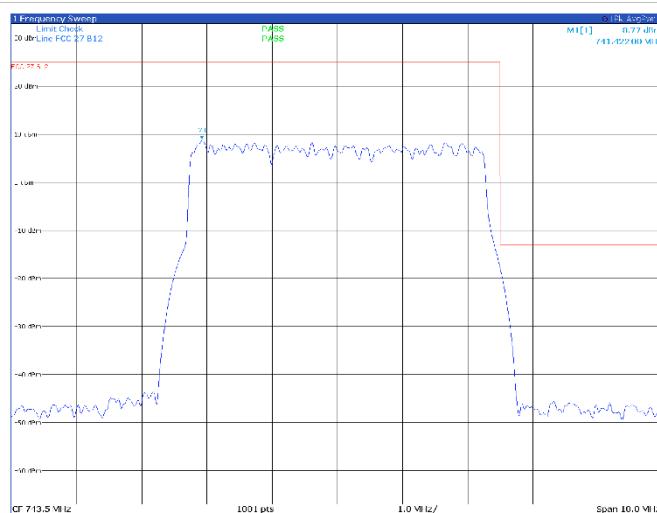
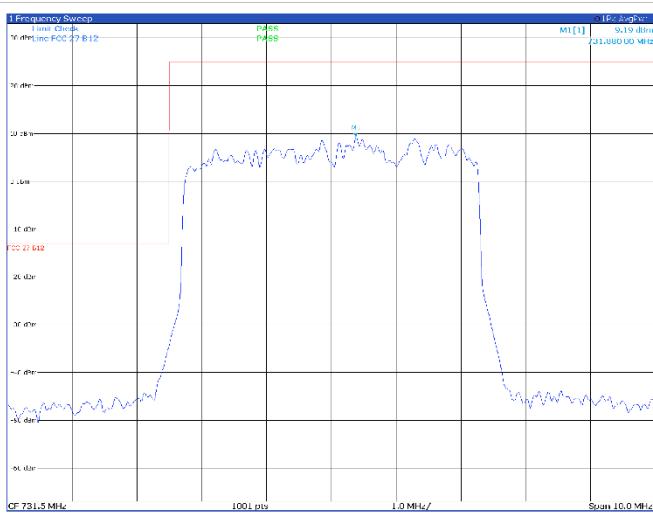
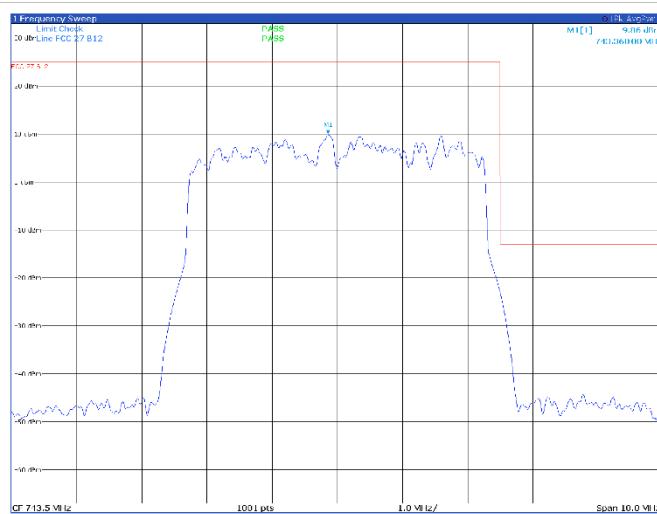
TM3p3, 5 MHz, high channel


Limit exceeded by the carrier

Band B12 – band edge Antenna port 1
5 MHz
TM1.1, 5 MHz, low channel

TM1.1, 5 MHz, high channel

TM3p1, 5 MHz, low channel

TM3p1, 5 MHz, high channel


TM3p1a, 5 MHz, low channel

TM3p1a, 5 MHz, high channel

TM3p3, 5 MHz, low channel

TM3p3, 5 MHz, high channel


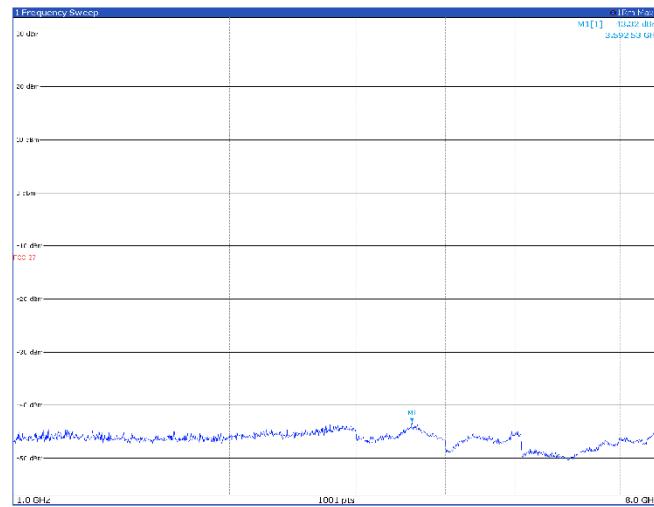
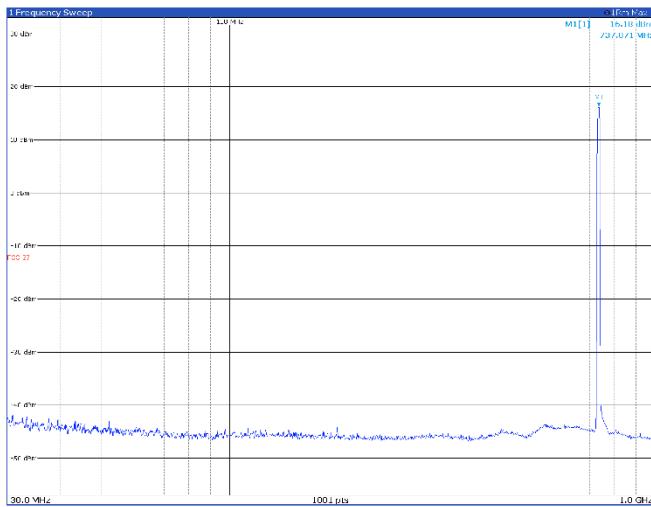
Band B12 – band edge Antenna port 2
5 MHz


TM3p1a, 5 MHz, low channel

TM3p1a, 5 MHz, high channel

TM3p3, 5 MHz, low channel

TM3p3, 5 MHz, high channel


Band B12 – conducted emissions Antenna port 1

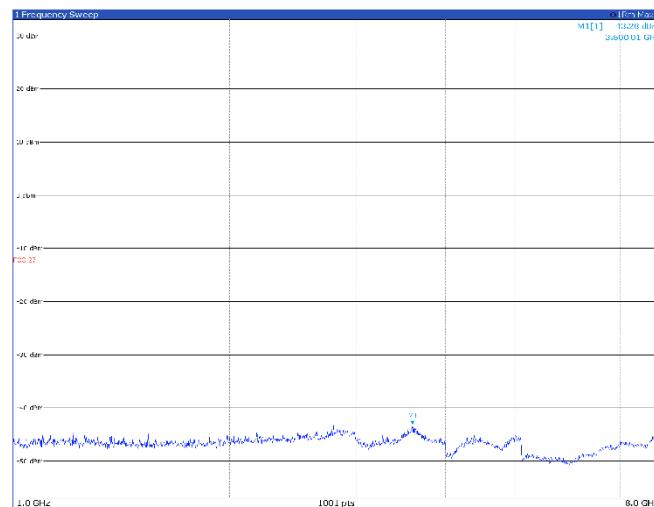
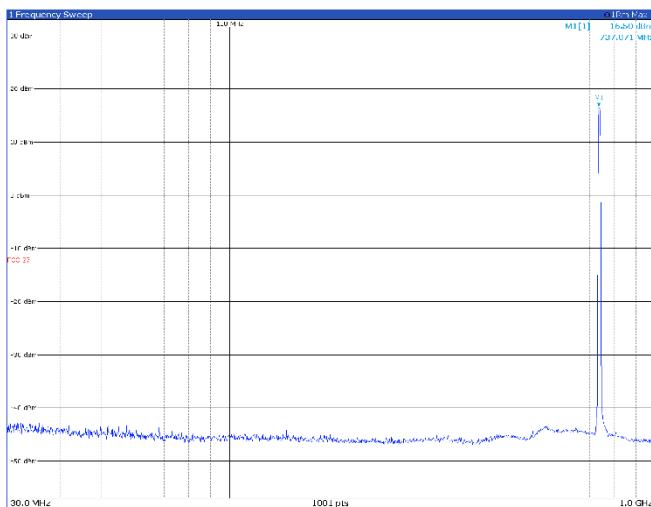
10 MHz

TM1.1, 10 MHz, low channel



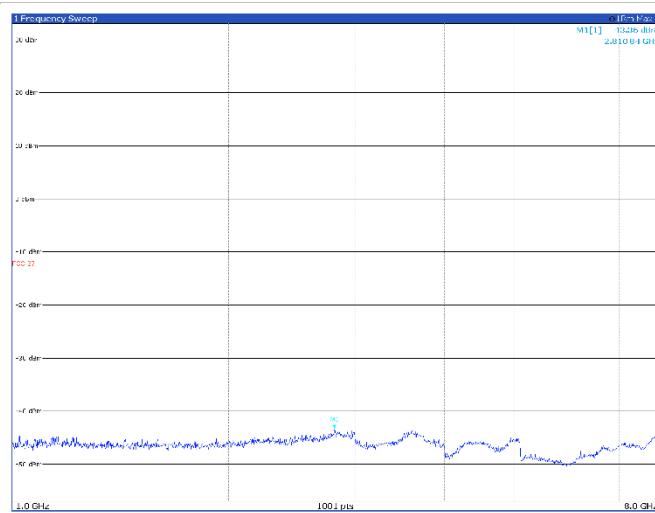
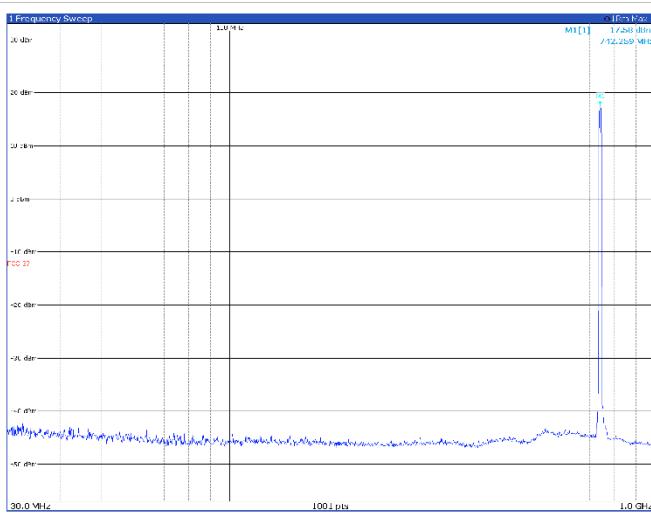
Limit exceeded by the carrier

TM1.1, 10 MHz, mid channel



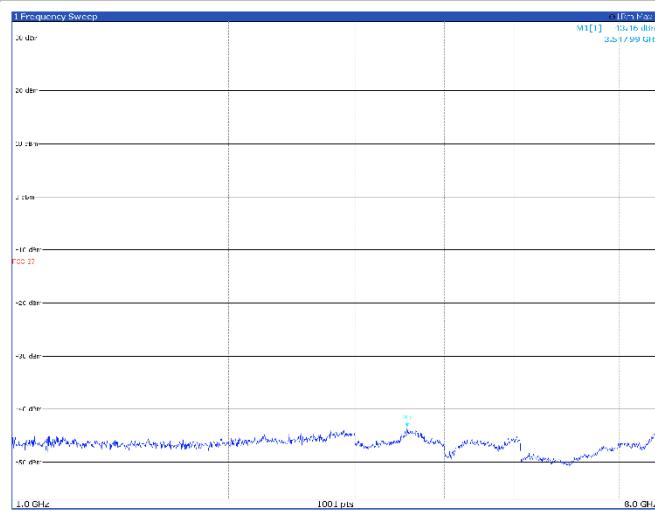
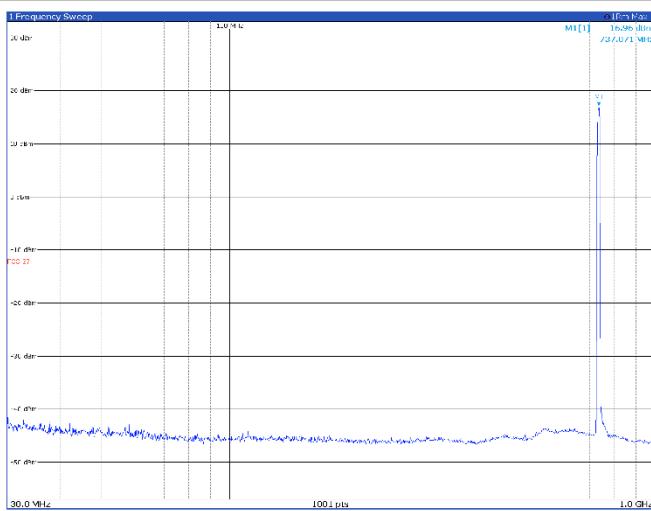
Limit exceeded by the carrier

TM1.1, 10 MHz, high channel

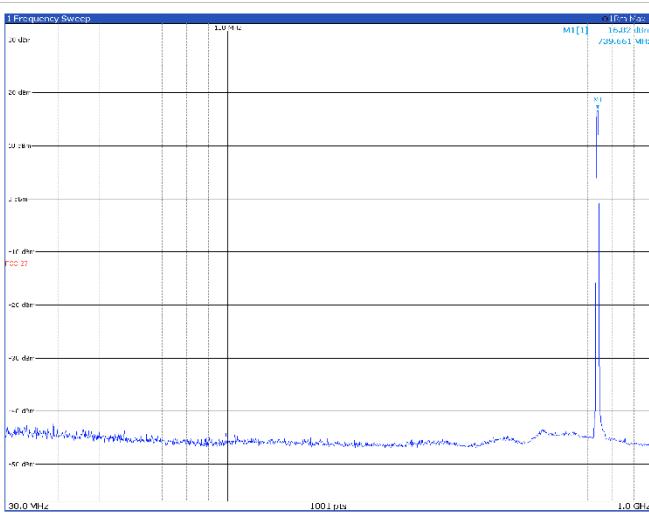


Limit exceeded by the carrier

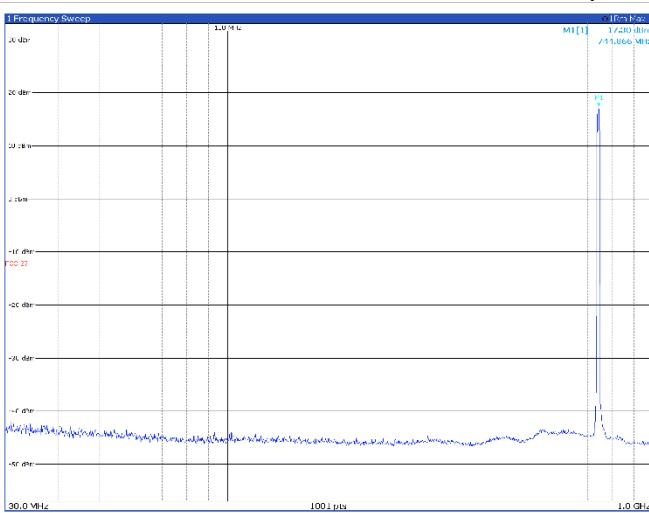
TM3p1, 10 MHz, low channel



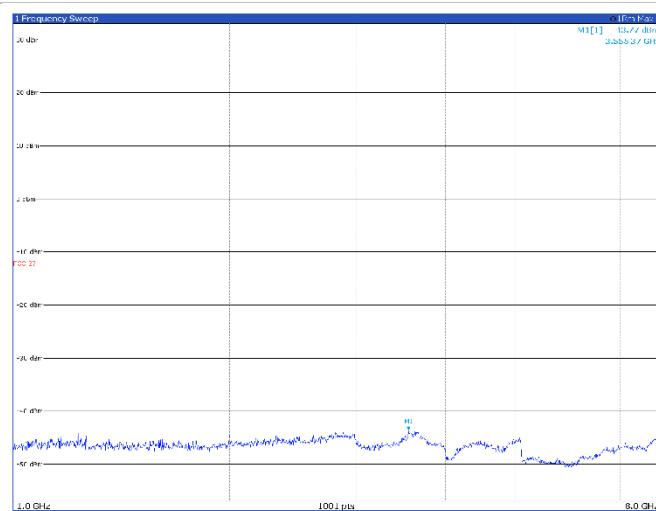
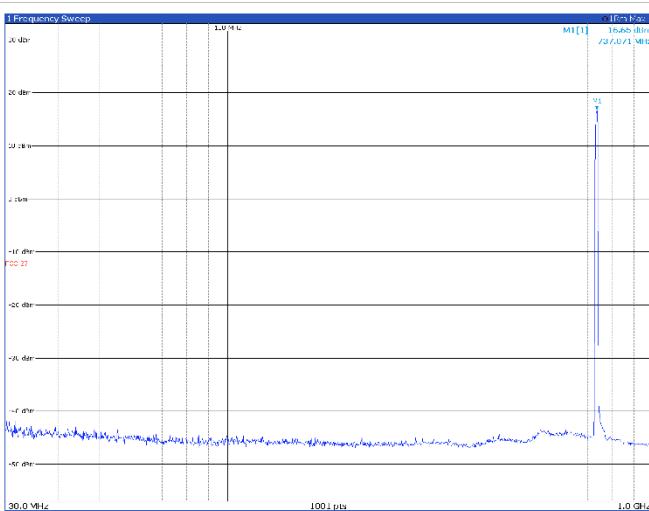
Limit exceeded by the carrier

TM3p1, 10 MHz, mid channel


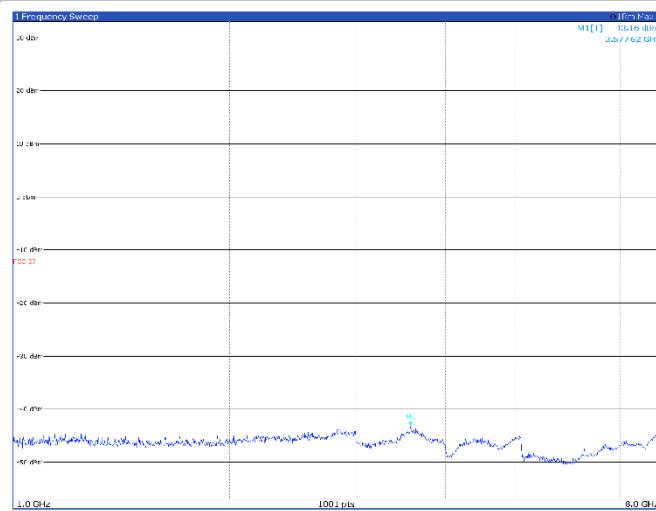
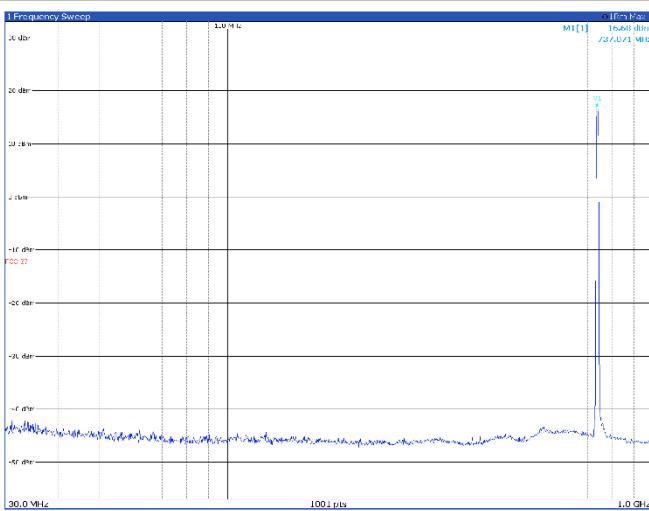
Limit exceeded by the carrier

TM3p1, 10 MHz, high channel


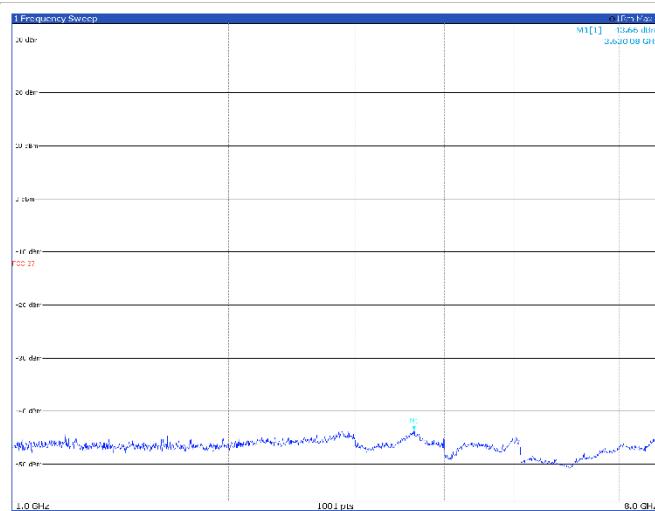
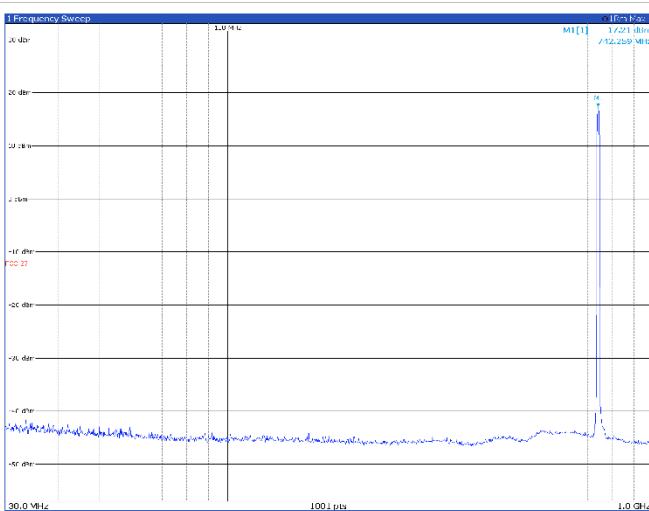
Limit exceeded by the carrier

TM3p1a, 10 MHz, low channel


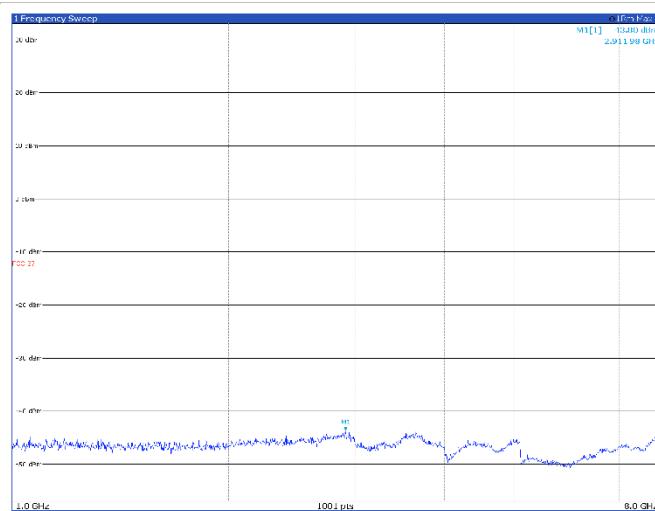
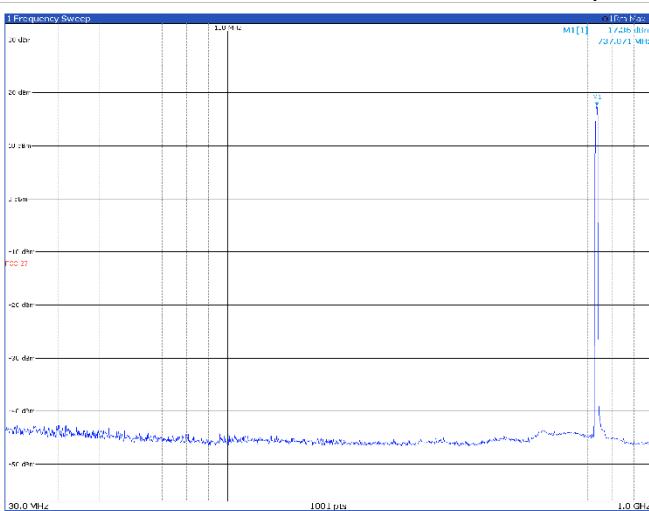
Limit exceeded by the carrier

TM3p1a, 10 MHz, mid channel


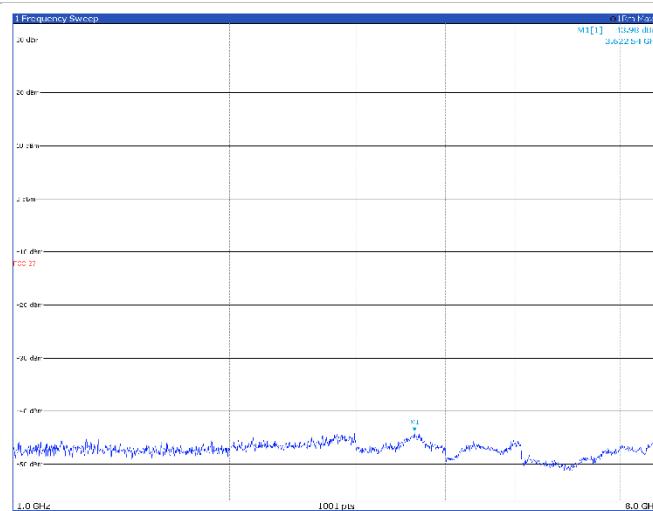
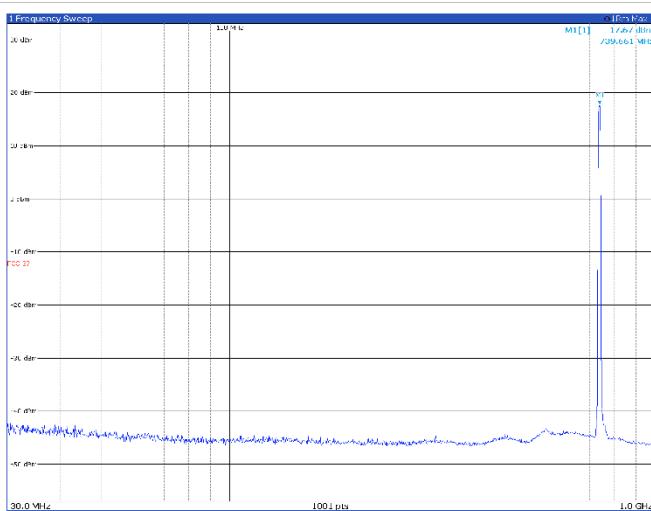
Limit exceeded by the carrier

TM3p1a, 10 MHz, high channel


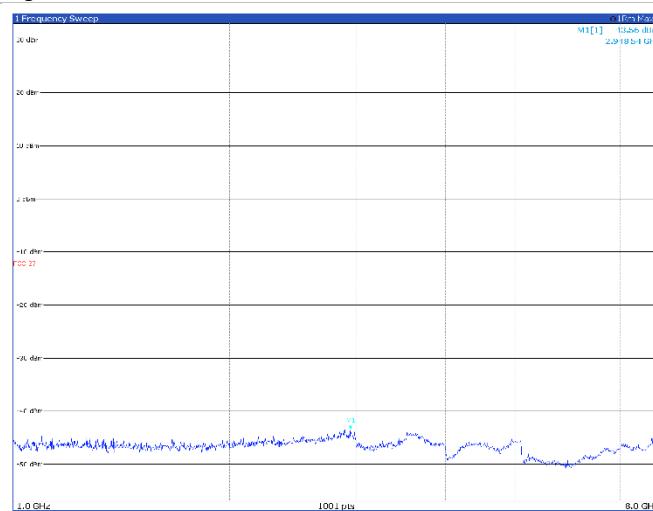
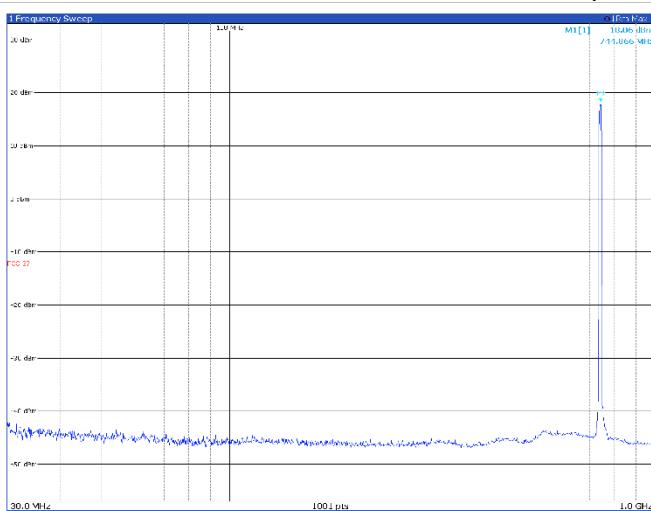
Limit exceeded by the carrier

TM3p3, 10 MHz, low channel


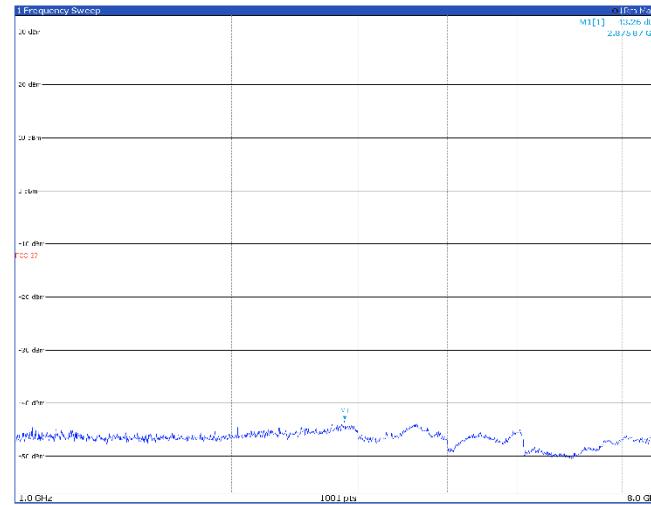
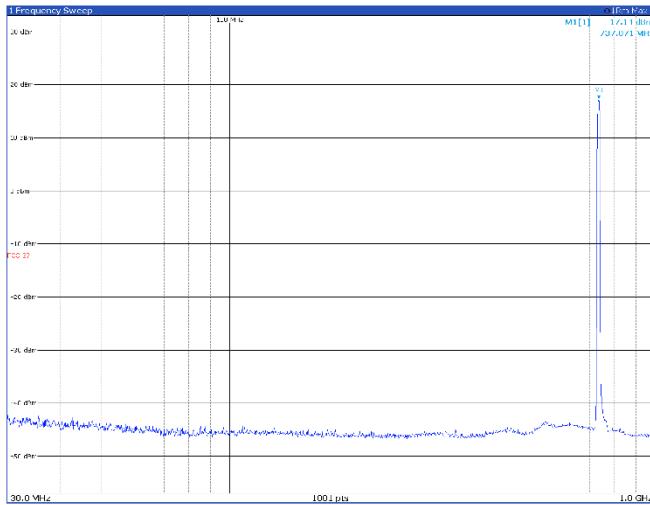
Limit exceeded by the carrier

TM3p3, 10 MHz, mid channel


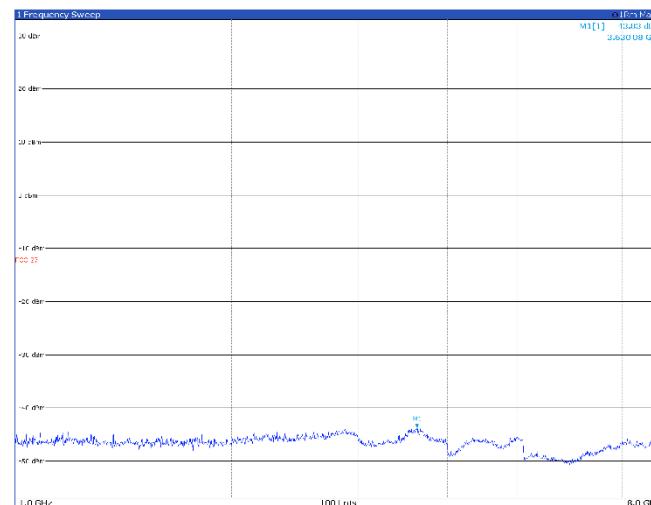
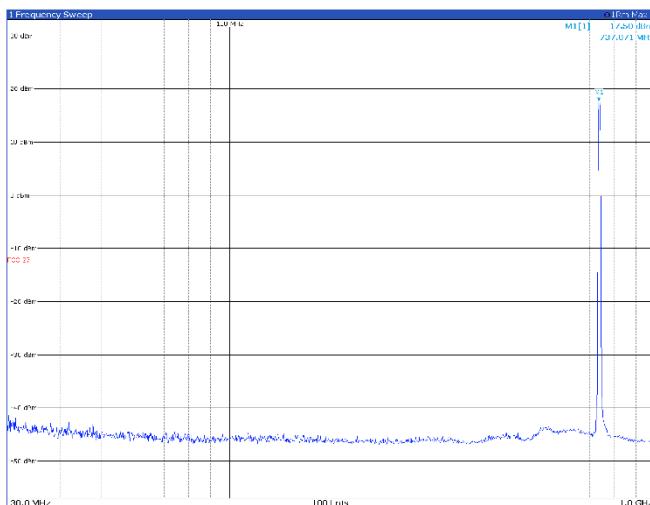
Limit exceeded by the carrier

TM3p3, 10 MHz, high channel


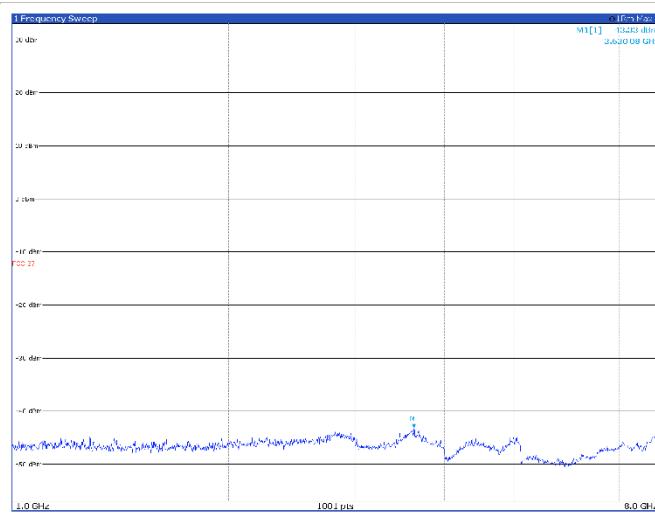
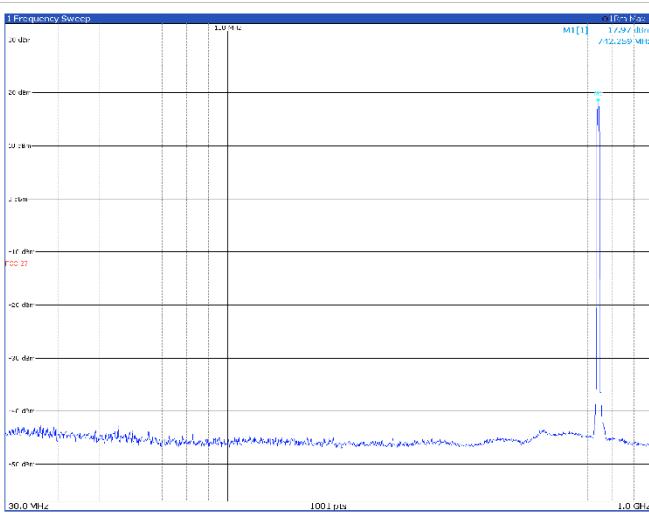
Limit exceeded by the carrier

Band B12 – conducted emissions Antenna port 2
10 MHz
TM1.1, 10 MHz, low channel


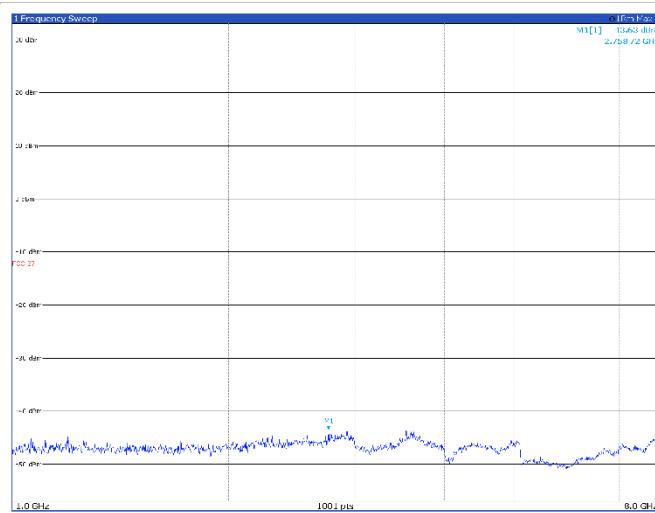
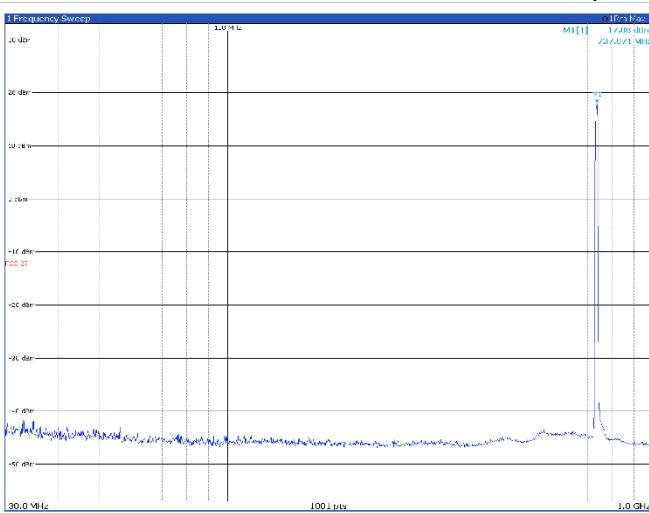
Limit exceeded by the carrier

TM1.1, 10 MHz, mid channel


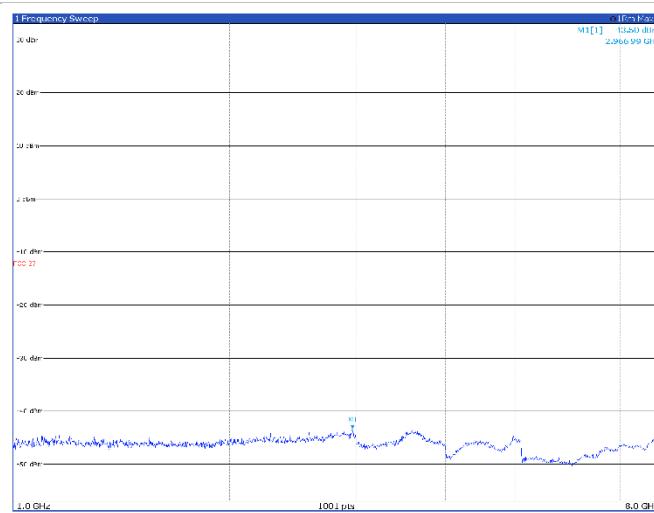
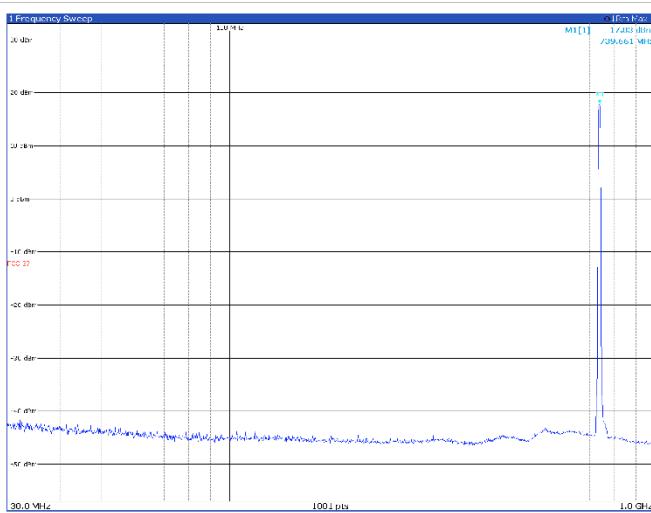
Limit exceeded by the carrier

TM1.1, 10 MHz, high channel


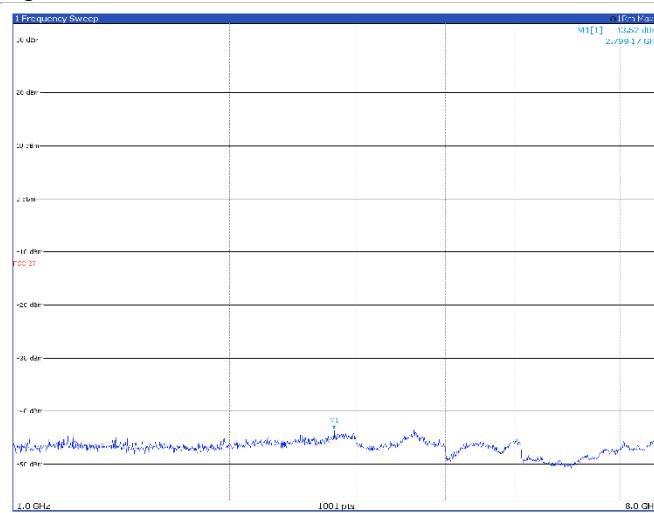
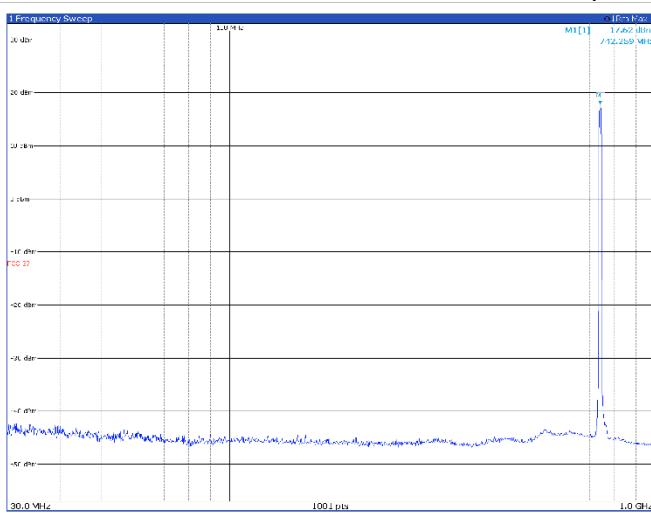
Limit exceeded by the carrier

TM3p1, 10 MHz, low channel


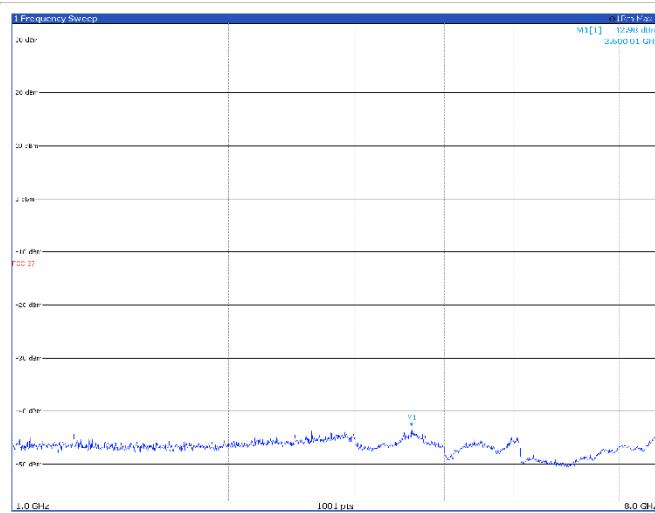
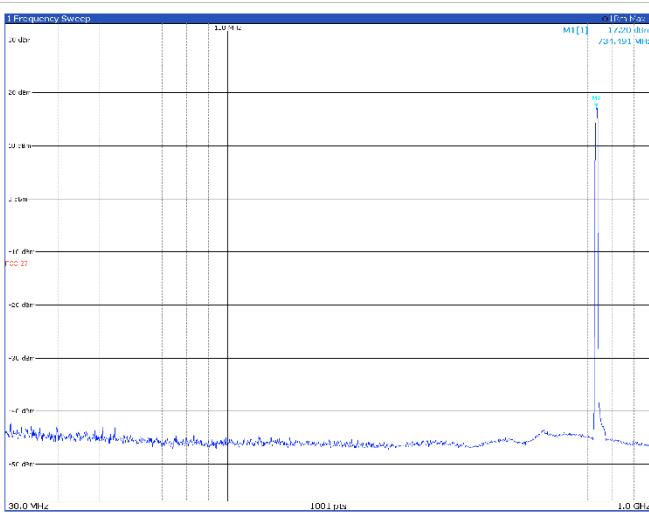
Limit exceeded by the carrier

TM3p1, 10 MHz, mid channel


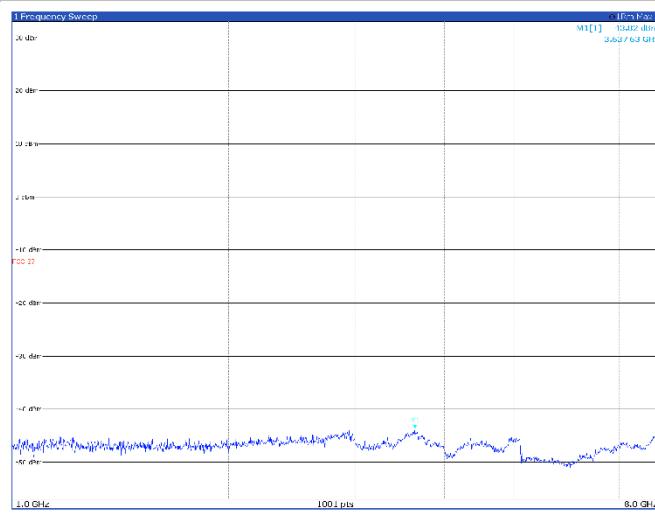
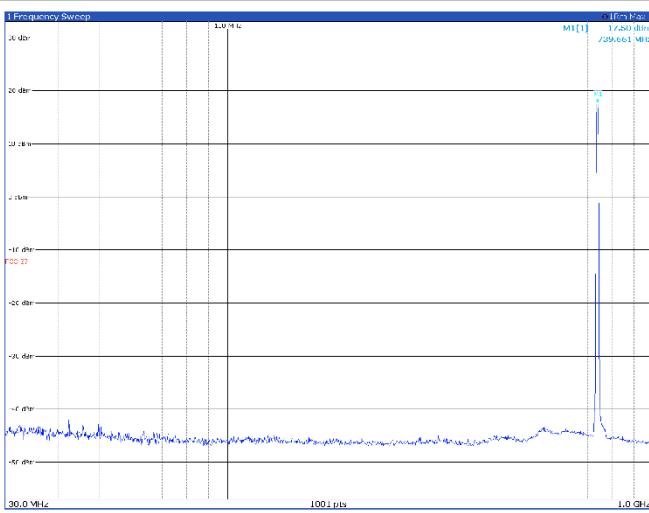
Limit exceeded by the carrier

TM3p1, 10 MHz, high channel


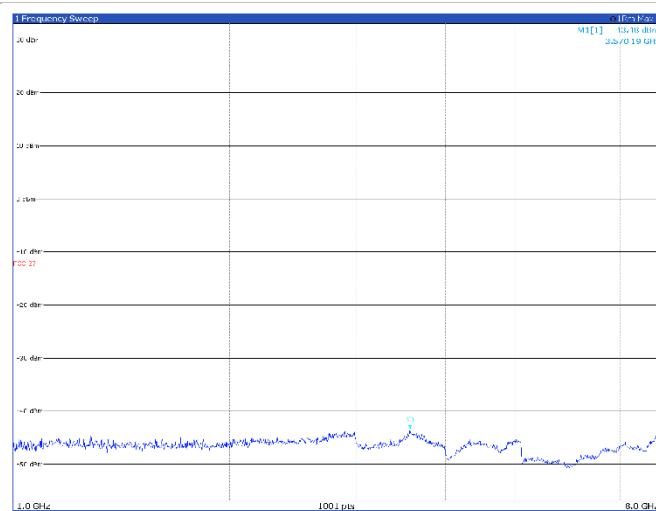
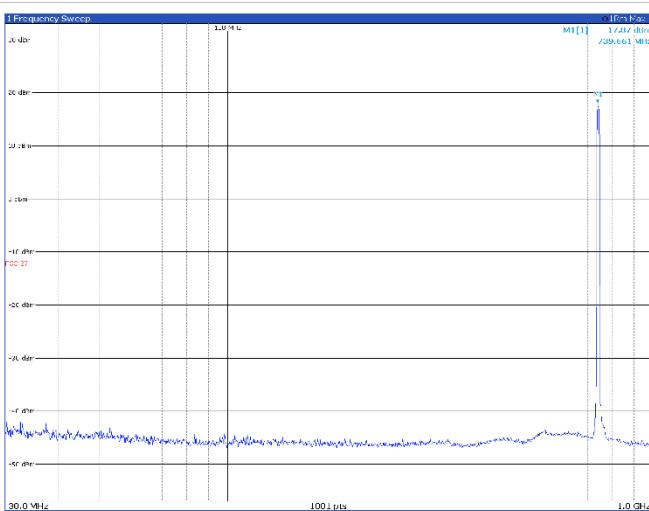
Limit exceeded by the carrier

TM3p1a, 10 MHz, low channel


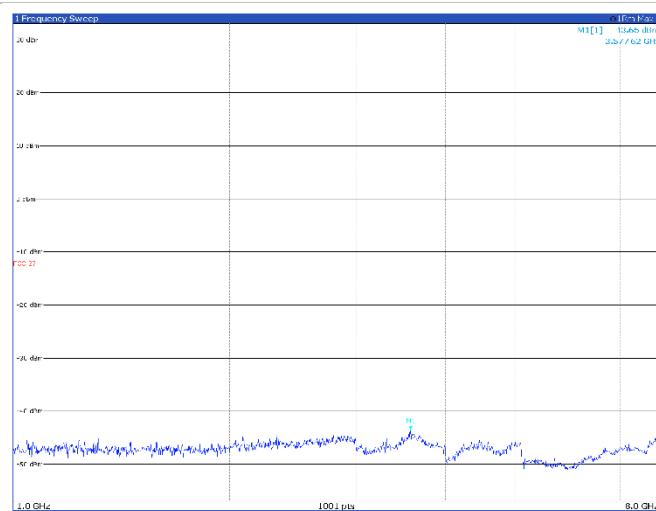
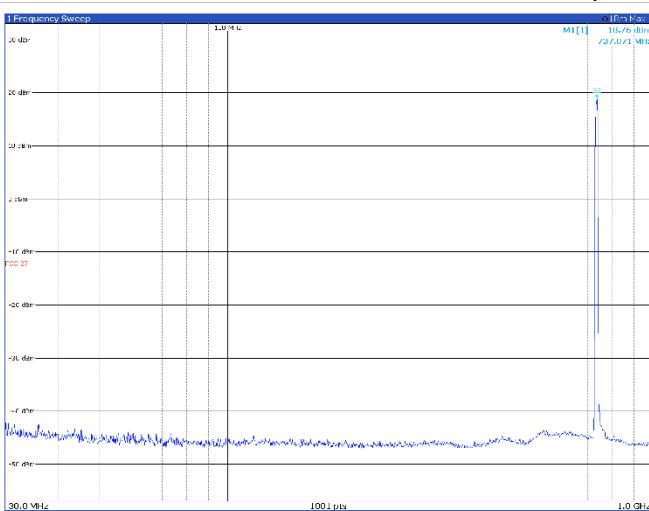
Limit exceeded by the carrier

TM3p1a, 10 MHz, mid channel


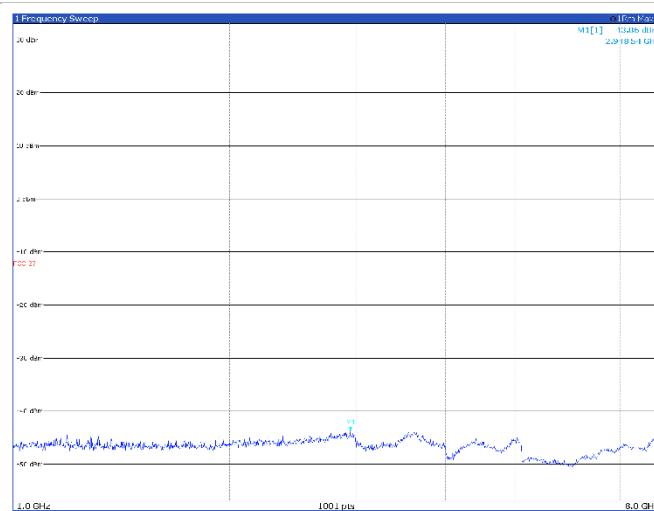
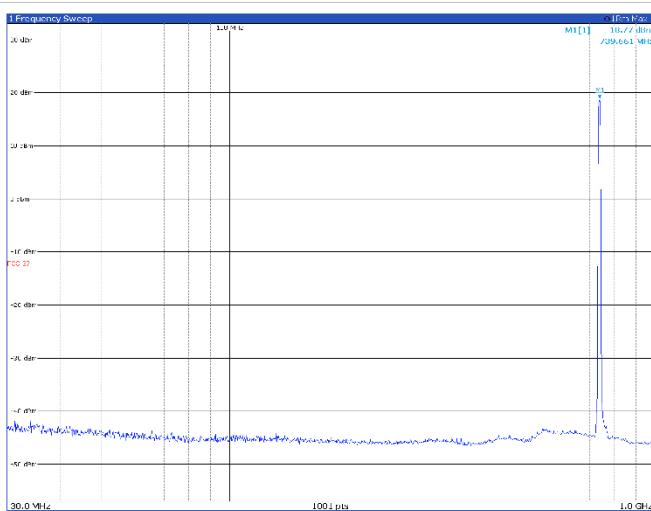
Limit exceeded by the carrier

TM3p1a, 10 MHz, high channel


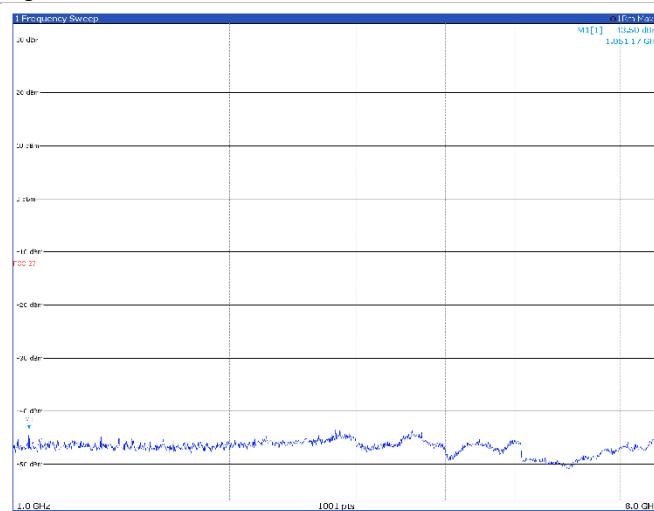
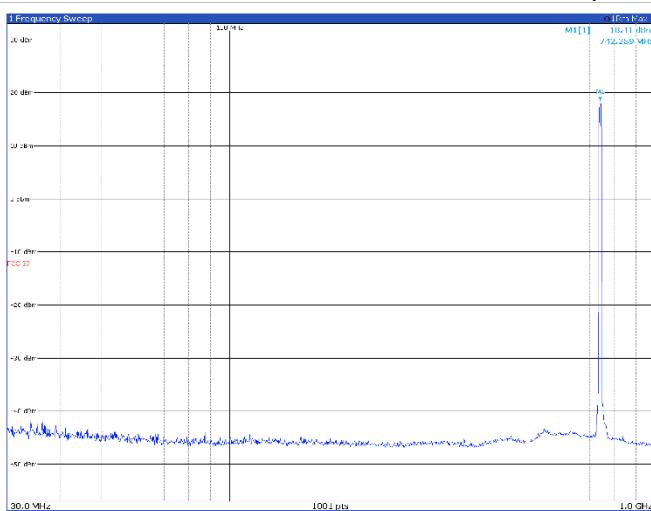
Limit exceeded by the carrier

TM3p3, 10 MHz, low channel


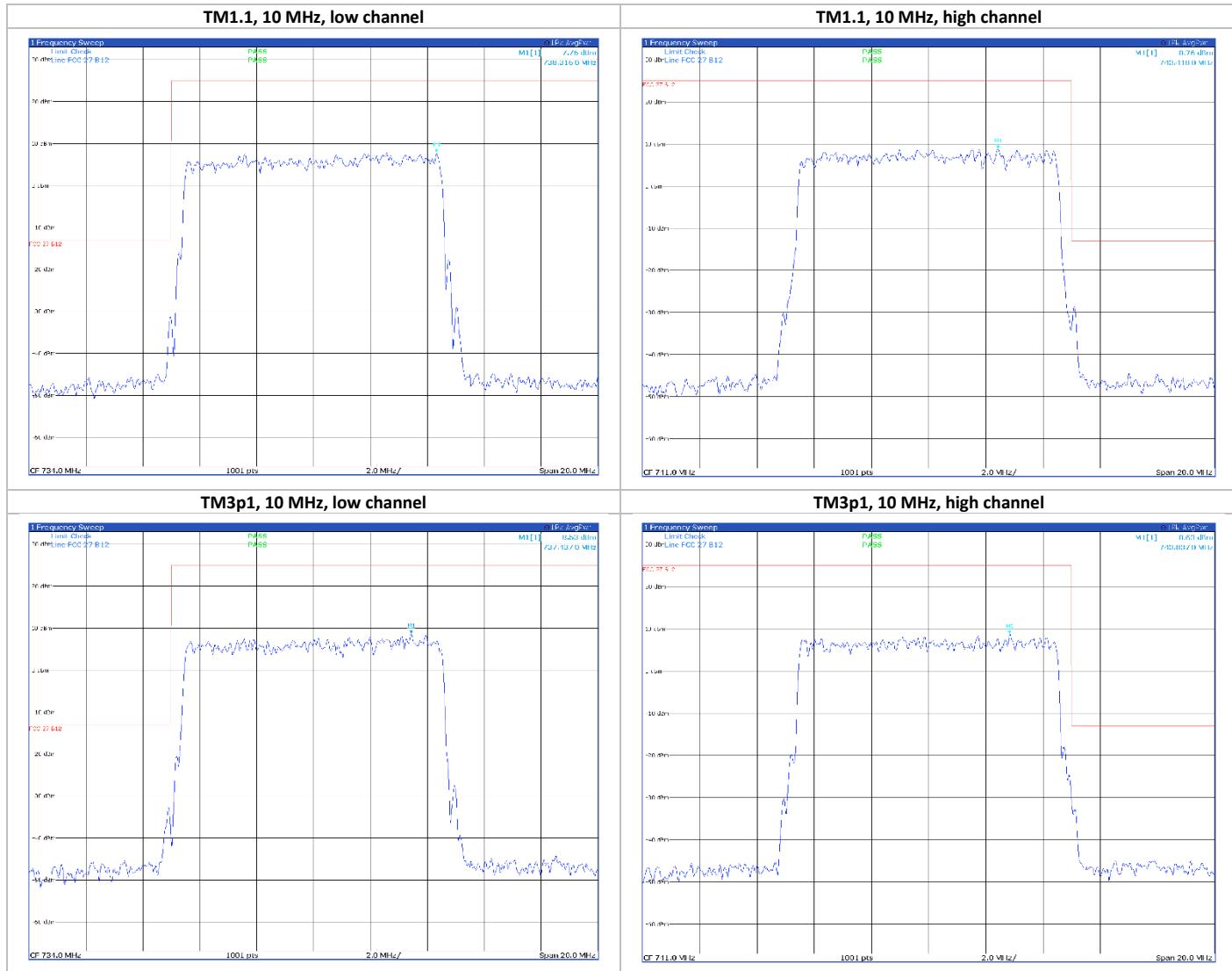
Limit exceeded by the carrier

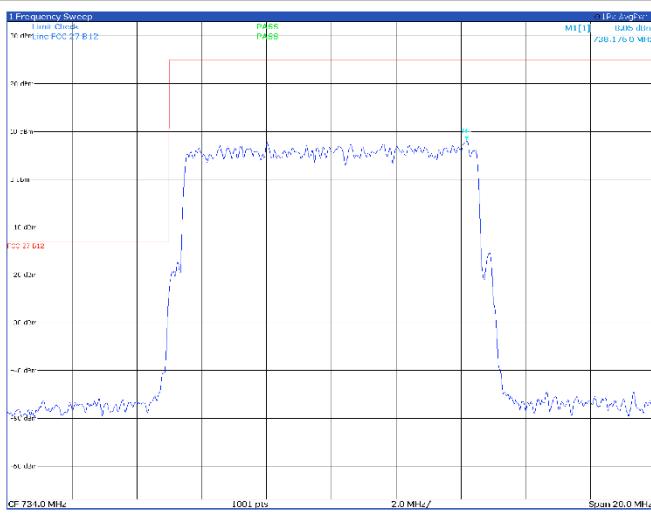
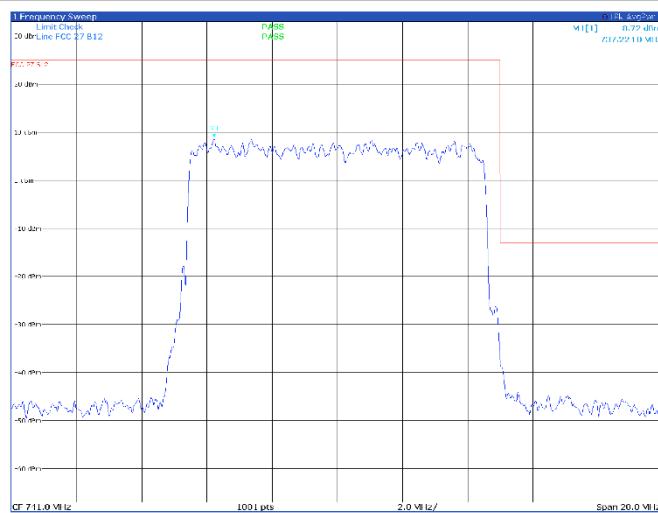
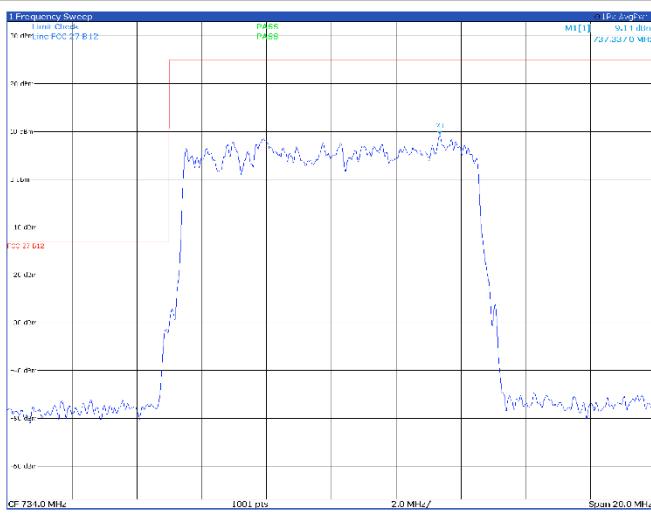
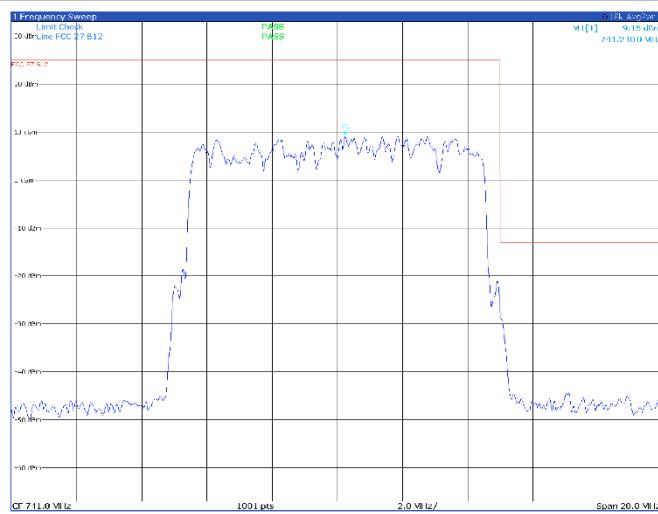
TM3p3, 10 MHz, mid channel


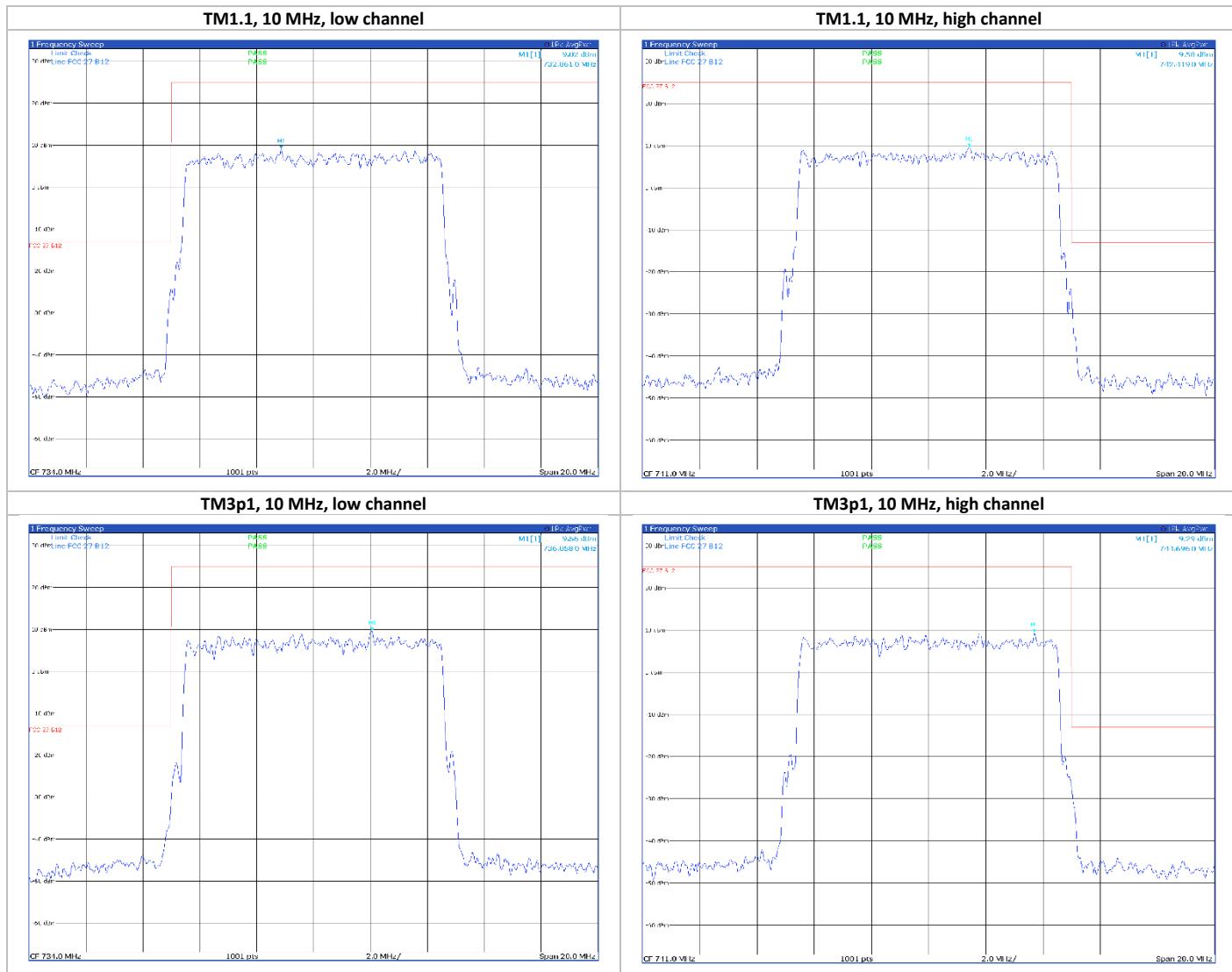
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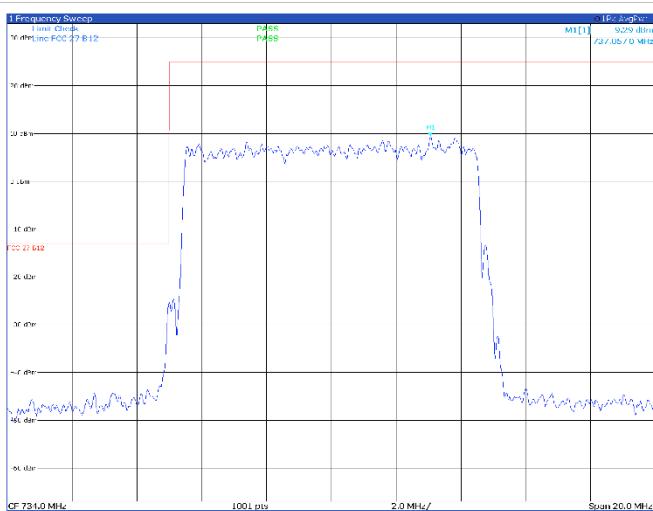
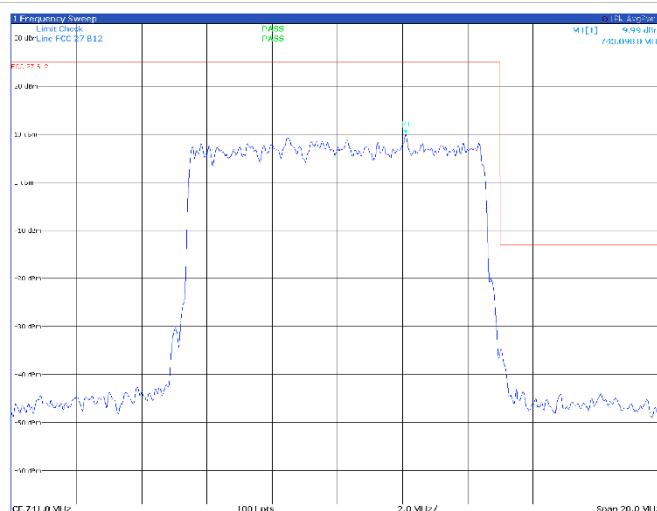
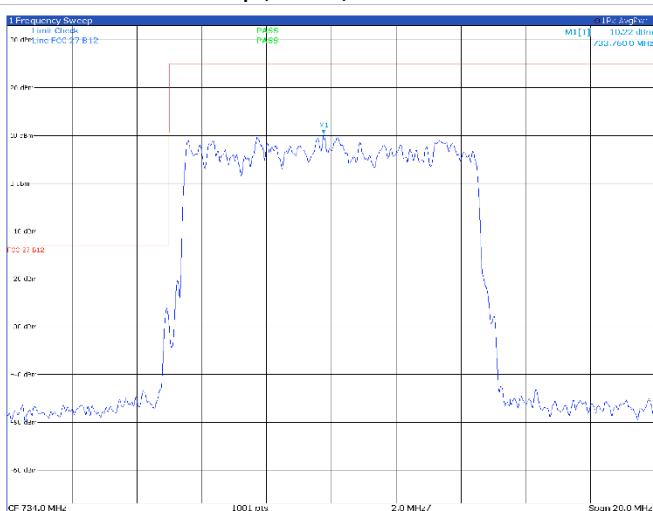
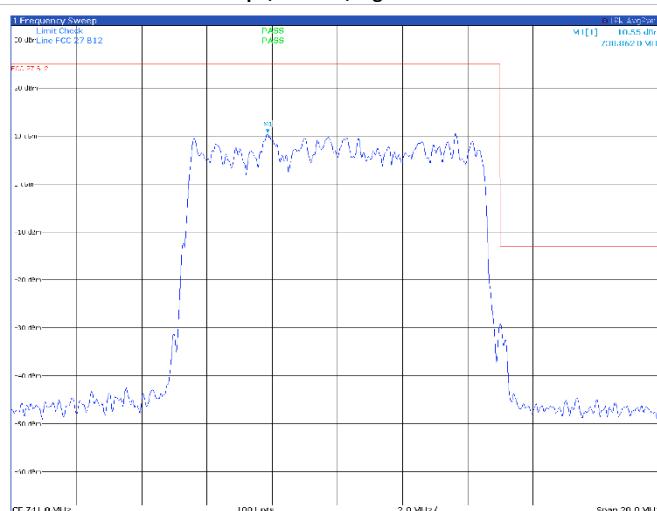
TM3p3, 10 MHz, high channel


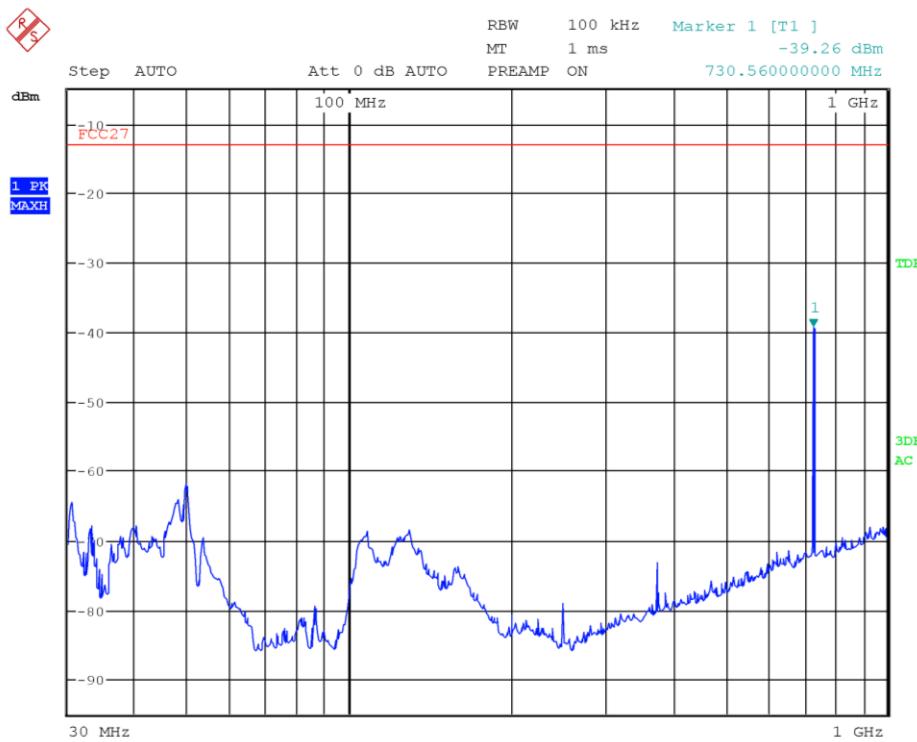
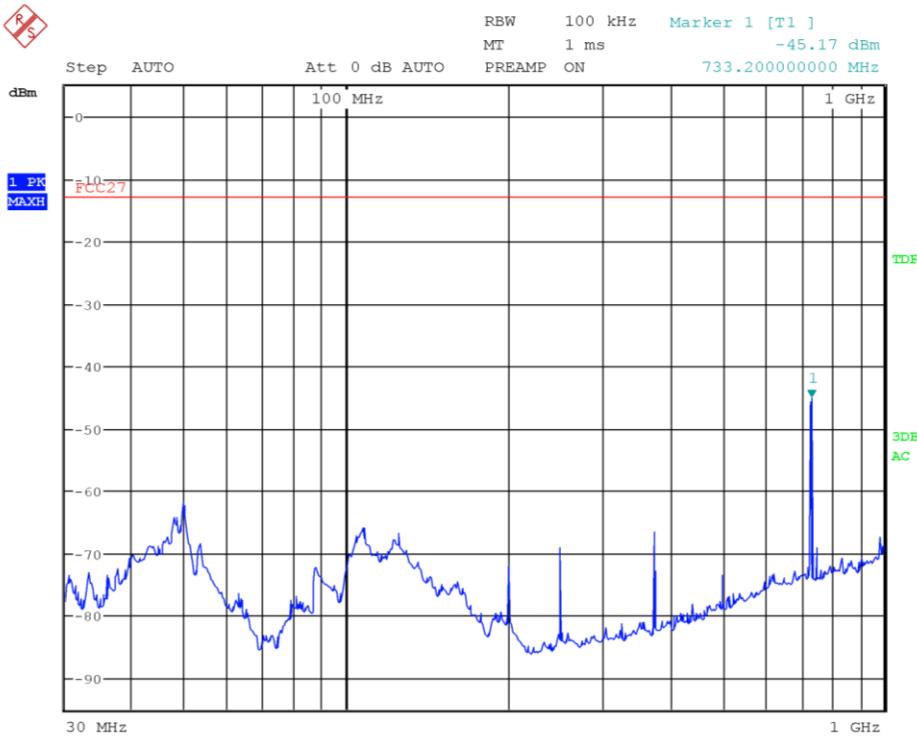
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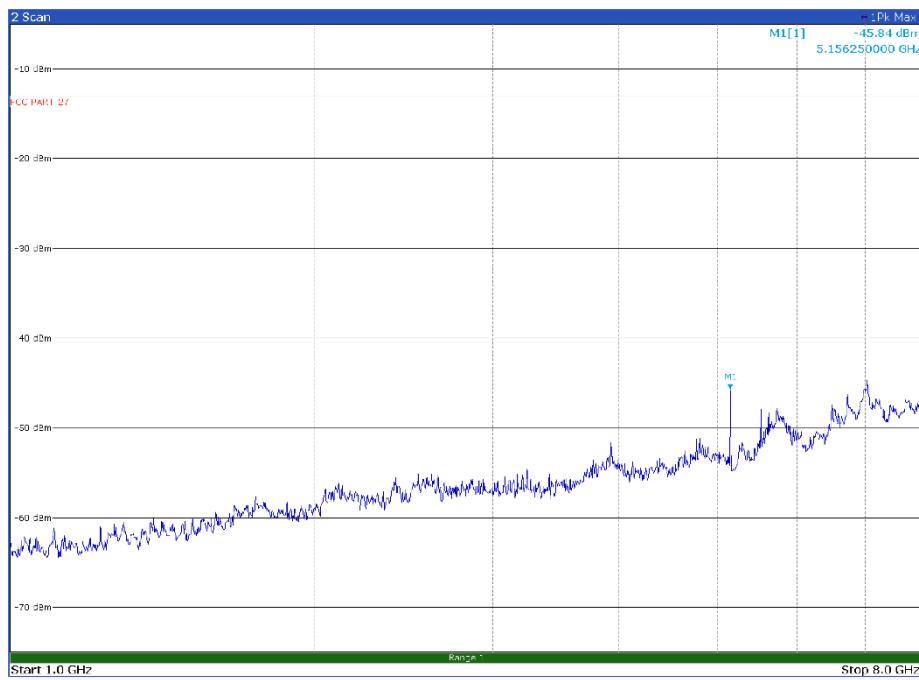
Band B12 – band edge Antenna port 1
10 MHz


TM3p1a, 10 MHz, low channel

TM3p1a, 10 MHz, high channel

TM3p3, 10 MHz, low channel

TM3p3, 10 MHz, high channel


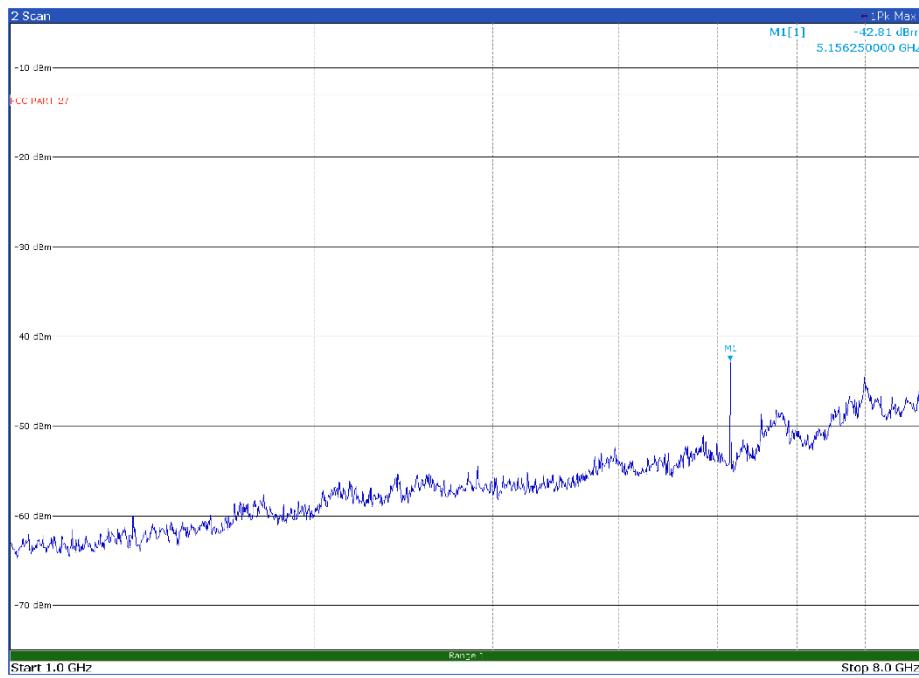
Band B12 – band edge Antenna port 2
10 MHz


TM3p1a, 10 MHz, low channel

TM3p1a, 10 MHz, high channel

TM3p3, 10 MHz, low channel

TM3p3, 10 MHz, high channel


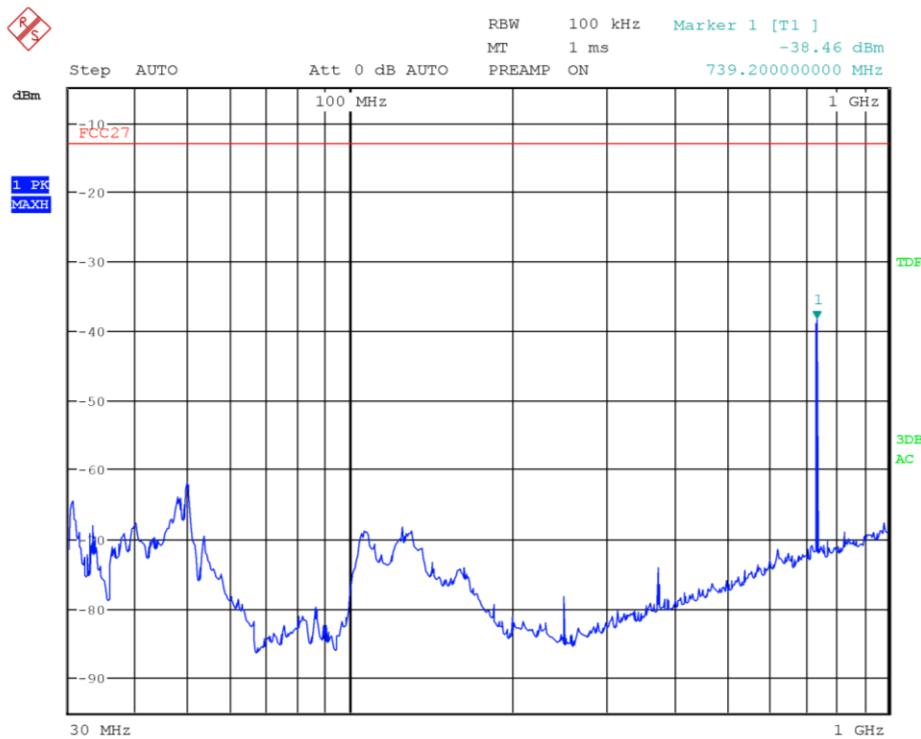
Band B12 – radiated spurious emissions
5 MHz

Radiated emissions spectral plot (30 MHz - 1 GHz), vertical polarization, low channel, TM3p1a modulation

Radiated emissions spectral plot (30 MHz - 1 GHz), horizontal polarization, low channel, TM3p1a modulation



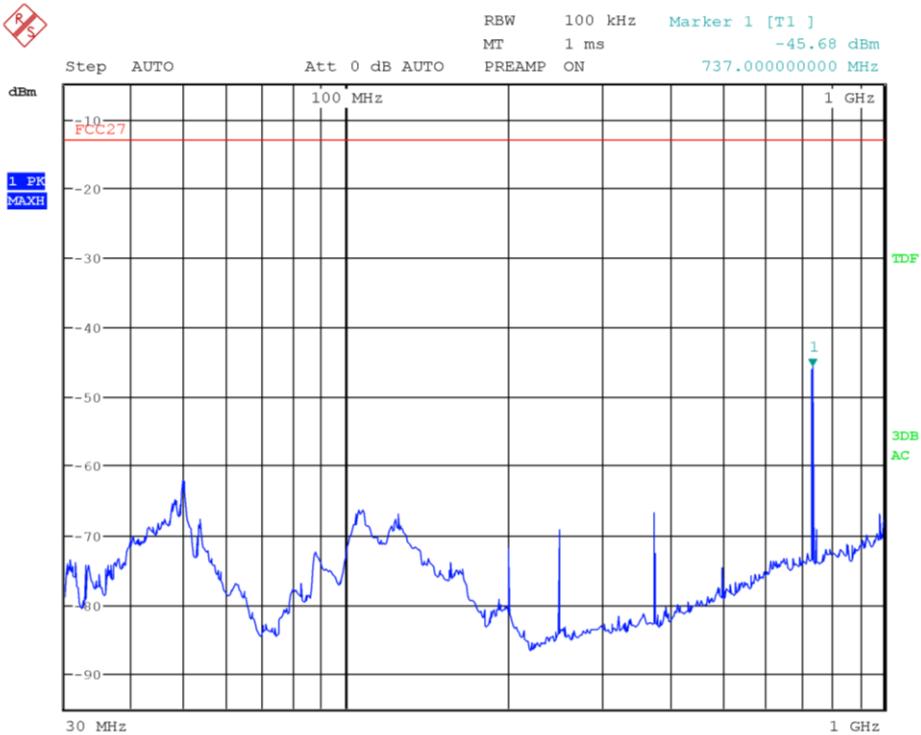
Radiated emissions spectral plot (1 GHz - 8 GHz), vertical polarization, low channel, TM3p1a modulation



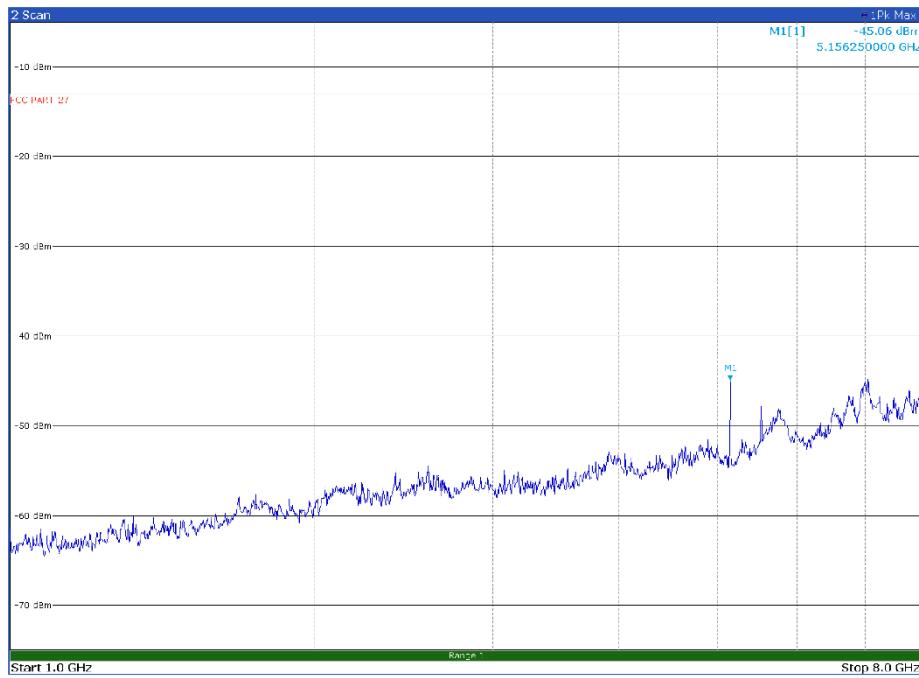
Radiated emissions spectral plot (1 GHz - 8 GHz), horizontal polarization, low channel, TM3p1a modulation



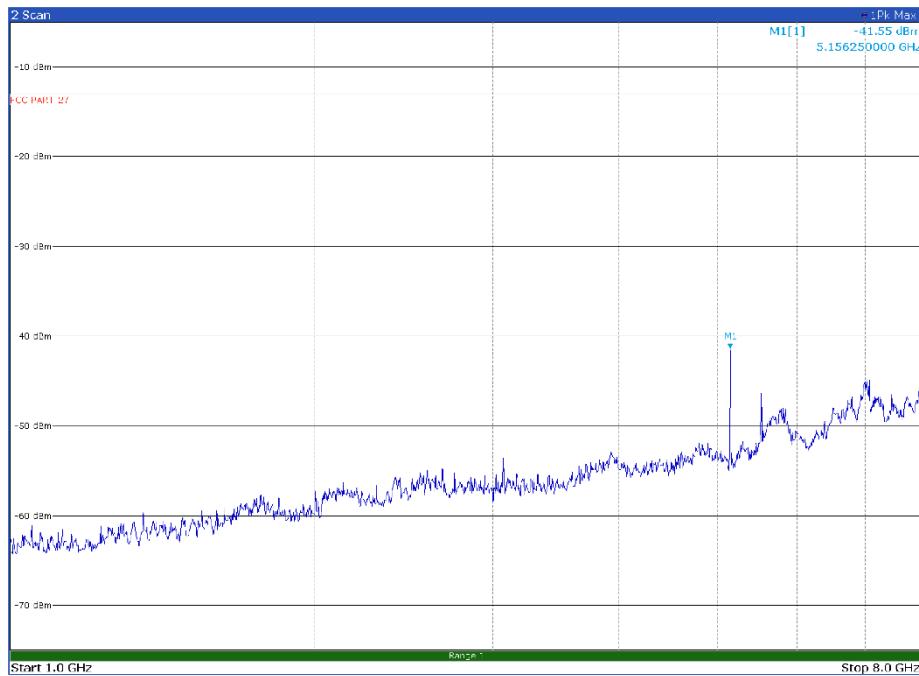
Radiated emissions spectral plot (30 MHz - 1 GHz), vertical polarization, mid channel, TM3p1a modulation



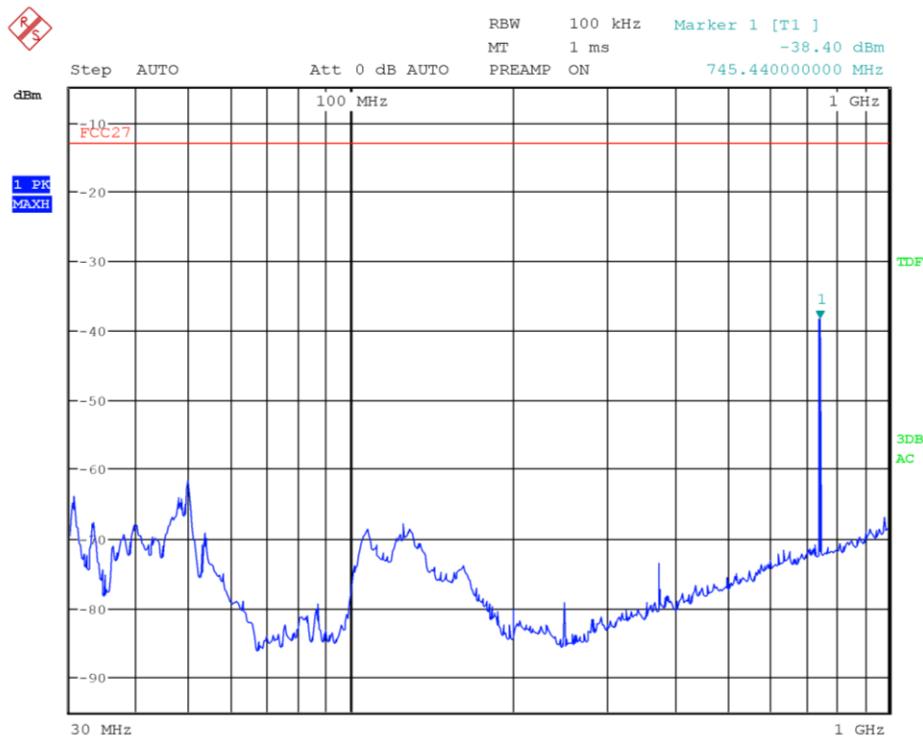
Radiated emissions spectral plot (30 MHz - 1 GHz), horizontal polarization, mid channel, TM3p1a modulation



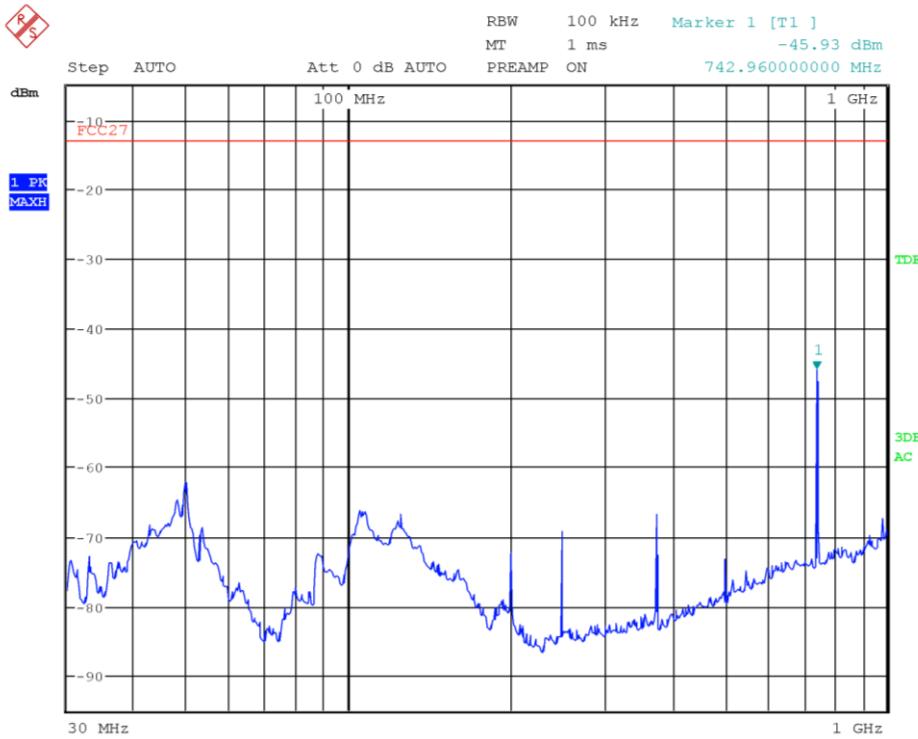
Radiated emissions spectral plot (1 GHz - 8 GHz), vertical polarization, mid channel, TM3p1a modulation



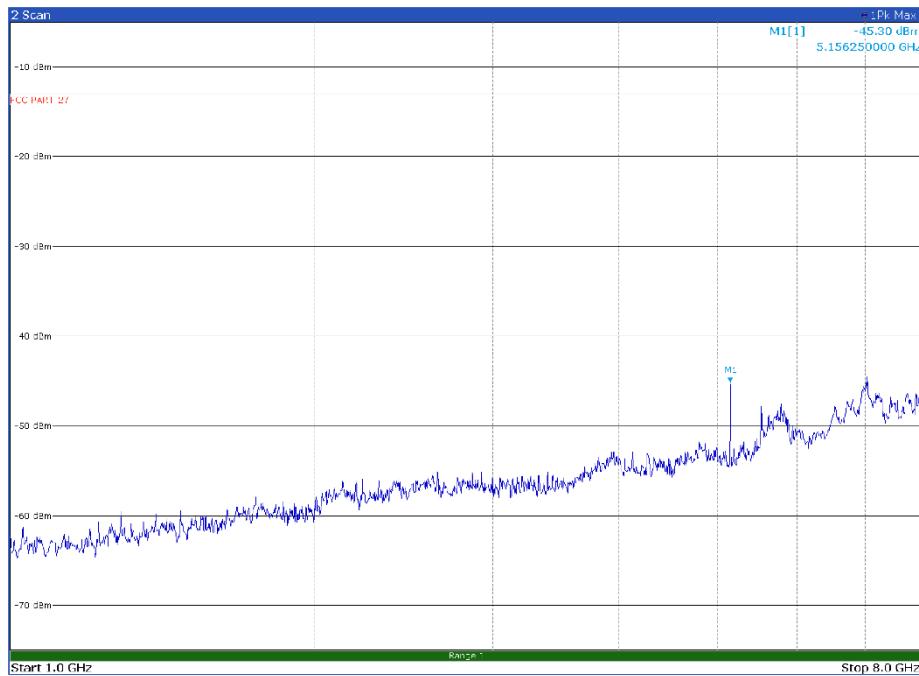
Radiated emissions spectral plot (1 GHz - 8 GHz), horizontal polarization, mid channel, TM3p1a modulation



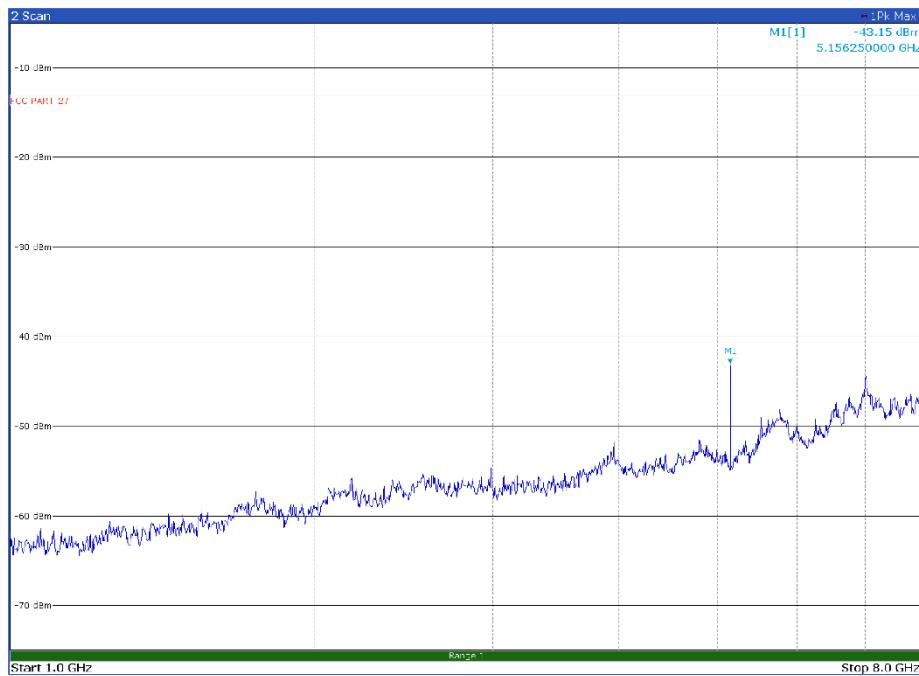
Radiated emissions spectral plot (30 MHz - 1GHz), vertical polarization, high channel, TM3p1a modulation



Radiated emissions spectral plot (30 MHz - 1GHz), horizontal polarization, high channel, TM3p1a modulation



Radiated emissions spectral plot (1 GHz - 8 GHz), vertical polarization, high channel, TM3p1a modulation



Radiated emissions spectral plot (1 GHz - 8 GHz), horizontal polarization, high channel, TM3p1a modulation

8.7 FCC §27.54 Frequency Stability

8.7.1 Definitions and limits

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

8.7.2 Test summary

Test date	November 21, 2024	Temperature	21 °C
Test engineer	O. Frau	Air pressure	1005 mbar
Verdict	Pass	Relative humidity	64%

8.7.3 Observations, settings and special notes

The EUT was configured to continuously transmit an un-modulated continuous wave signal. The frequency measurement was performed using the marker-signal count functionality of the spectrum analyzer. The only requirement from Part 27 is that the carrier stays within the allocated band.

8.7.4 Test data

Band B12:

Table Errore. Per applicare Heading 2 al testo da visualizzare in questo punto, utilizzare la scheda Home. -1: Frequency stability results, band B12

Test conditions	Frequency, Hz	Drift, Hz	Drift, ppm
+50 °C, Nominal	737491000.0	990.0	1.34
+40 °C, Nominal	737490360.0	350.0	0.47
+30 °C, Nominal	737489550.0	-460.0	-0.62
+20 °C, +15%	737490410.0	400.0	0.54
+20 °C, Nominal	737490010.0	Reference	Reference
+20 °C, -15%	737490340.0	330.0	0.45
+10 °C, Nominal	737489470.0	-540.0	-0.73
0 °C, Nominal	737490190.0	180.0	0.24
-10 °C, Nominal	737490300.0	290.0	0.39
-20 °C, Nominal	737490870.0	860.0	1.17
-30 °C, Nominal	737490680.0	670.0	0.91

Section 9. Block diagrams of test setups

9.1 Conducted emissions set-up

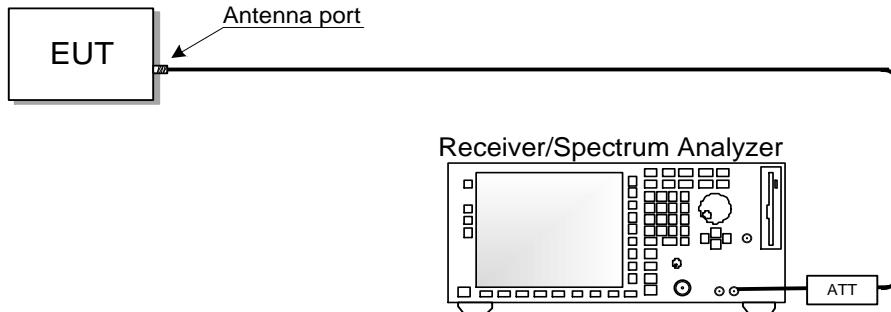


Figure 9.1-1: Conducted setup

9.2 Radiated emissions set-up

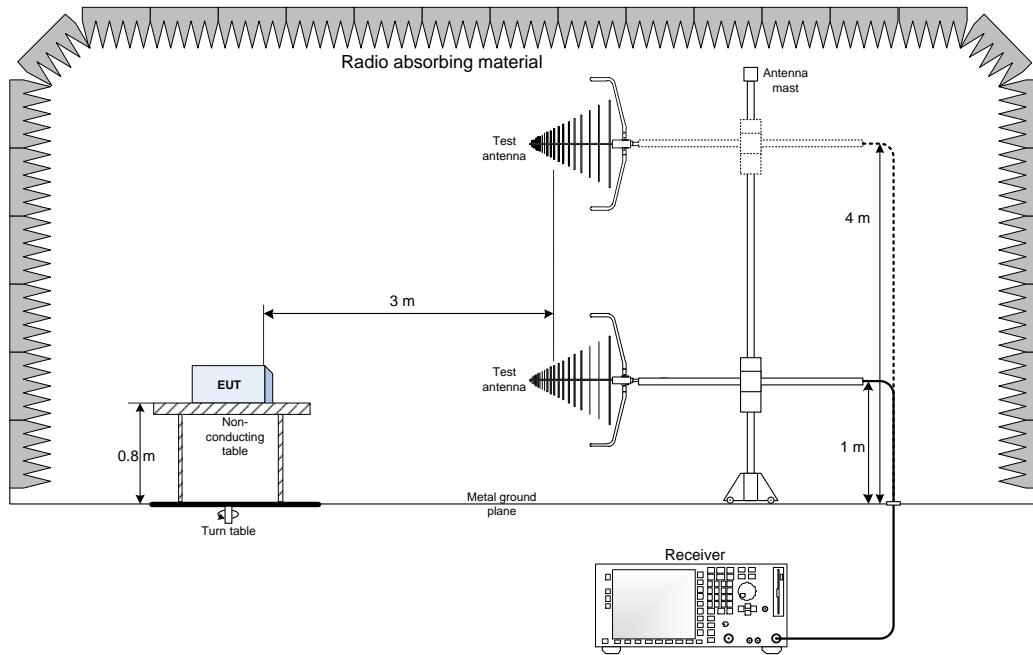


Figure 9.2-1: Below 1 GHz setup

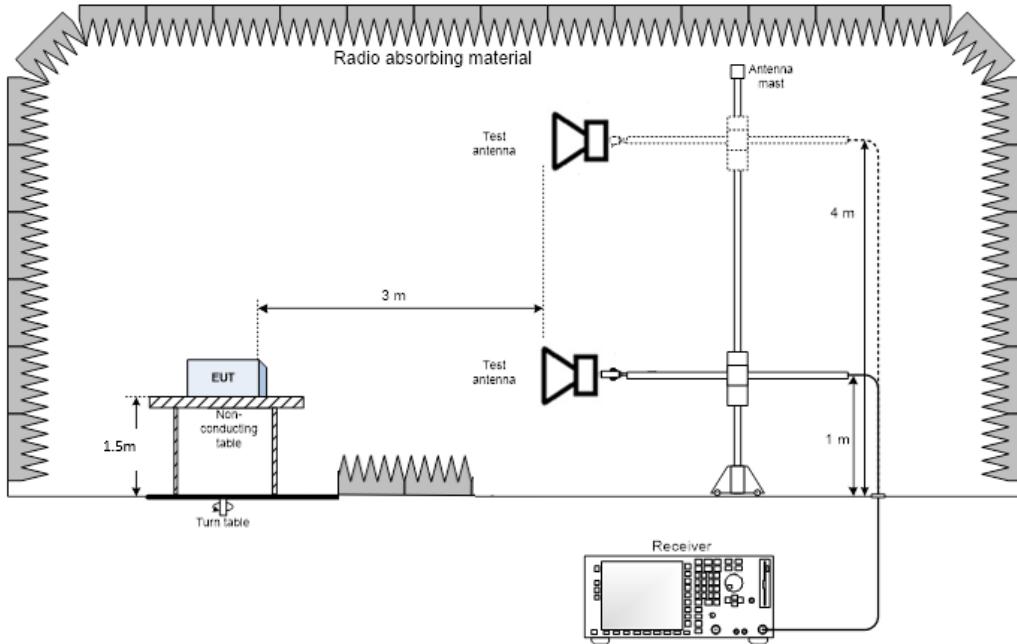


Figure 9.2-2: Above 1GHz setup

End of Report