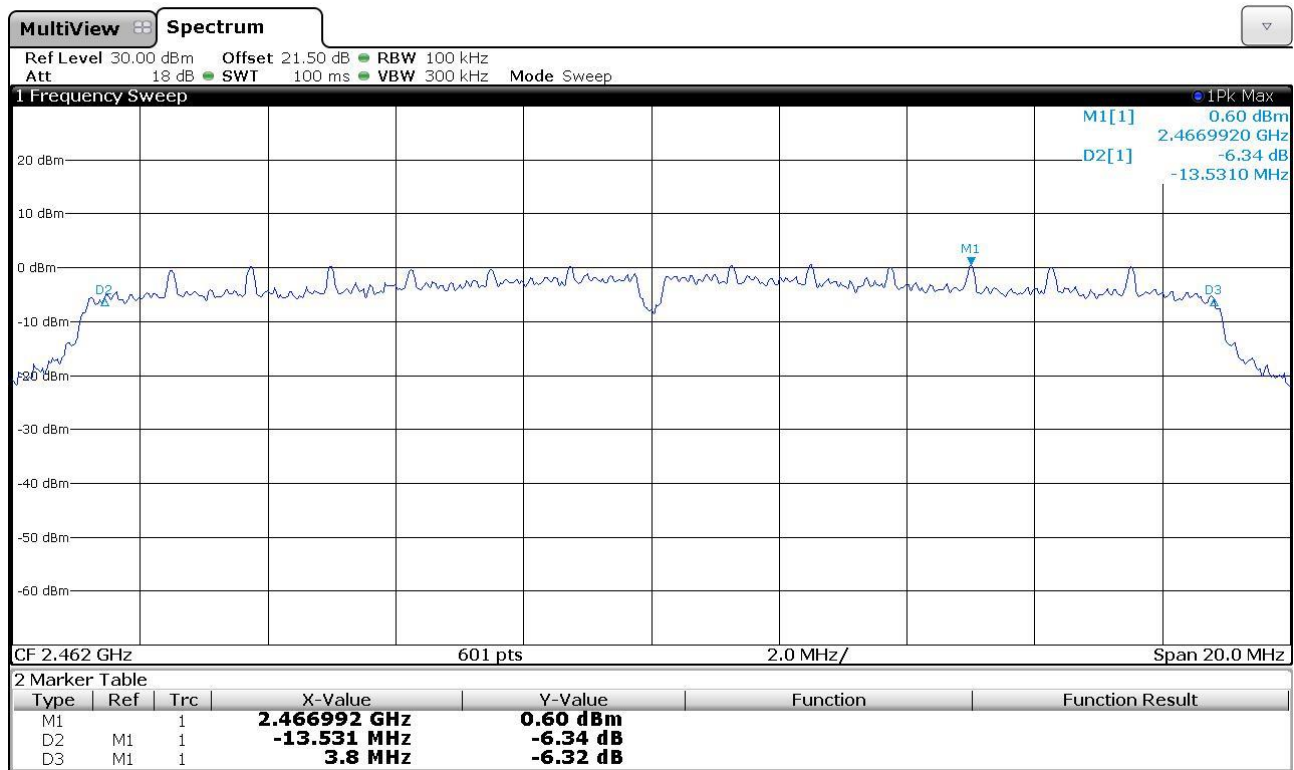




Bertezzo 172130_09



Result: The requirements are met



10.5 Band edge

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.247 (d)
- ANSI C63.10 cl. 11.13
- KDB 558074 D01 DTS Meas Guidance v04 cl. 13
- Internal procedure PM001
- See clause 4 of this test report
- Test date: December 21st, 2017
- Technician: A. Bertezolo

EUT exercising

See clause 4 of this test report

Test specification

See FCC Part 15.247
EUT height about the floor: 150 cm
EUT – Antenna distance: 3 m

Environmental conditions

Temperature (°C)	Atmospheric pressure (kPa)	Relative humidity (%)
21	100	45

Acceptance limits: operation within the band 2400 – 2483,5 MHz

Test configuration

Test site:
Semi-anechoic chamber

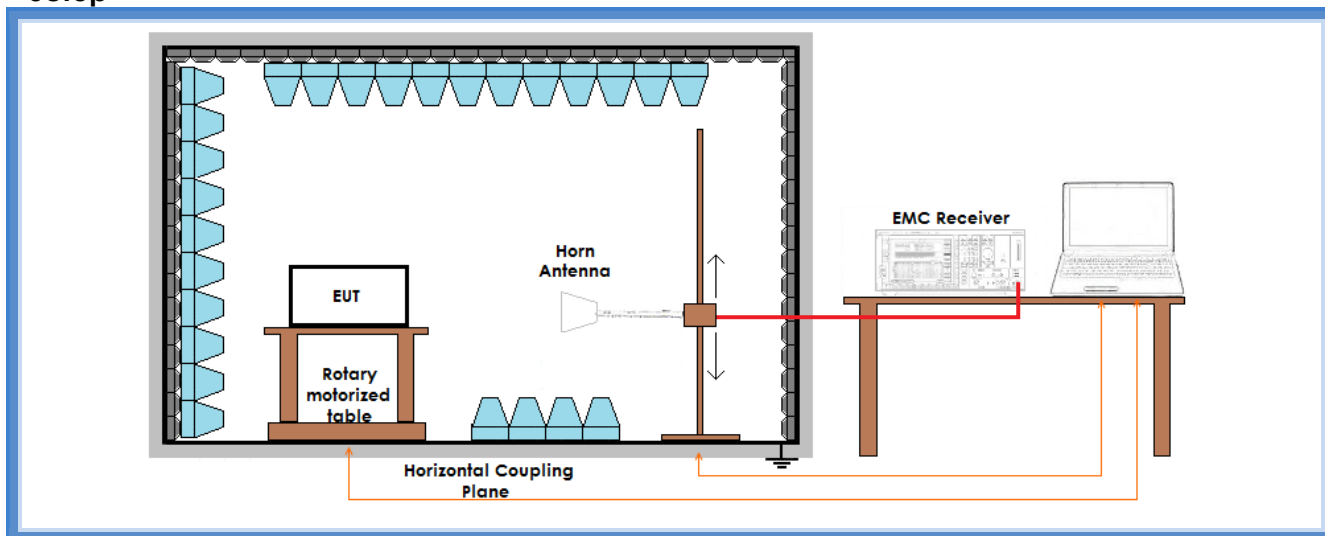
Auxiliary equipment:
See clause 4 of this test report

Test equipment used

CMC S108, CMC S136, CMC S164
Measurement uncertainty: See clause 7 of this test report



Setup



Result

WiFi b mode

Channel		Bandwidth	Graph(s)	Results	
Lowest	1 MHz	G17213073	2405,256411 MHz	Complies	
	1 MHz	G17213074			
	100 kHz	G17213075			
	100 kHz	G17213076			
Highest	1 MHz	G17213107	2468,676282 MHz	Complies	
	100 kHz	G17213108			
	100 kHz	G17213109			
Remarks: The vertical red line marked as F1 show the 2390 MHz frequency, end of the restricted frequency band below 2400 MHz					

WiFi g mode

Channel		Bandwidth	Graph(s)	Results	
Lowest		1 MHz	G17213071	2403,1250 MHz	Complies
		1 MHz	G17213072		
		100 kHz	G17213069		
		100 kHz	G17213070		
Highest		1 MHz	G17213106	2470,679487 MHz	Complies
		100 kHz	G17213104		
		100 kHz	G17213105		
Remarks: The vertical red line marked as F1 show the 2390 MHz frequency, end of the restricted frequency band below 2400 MHz					



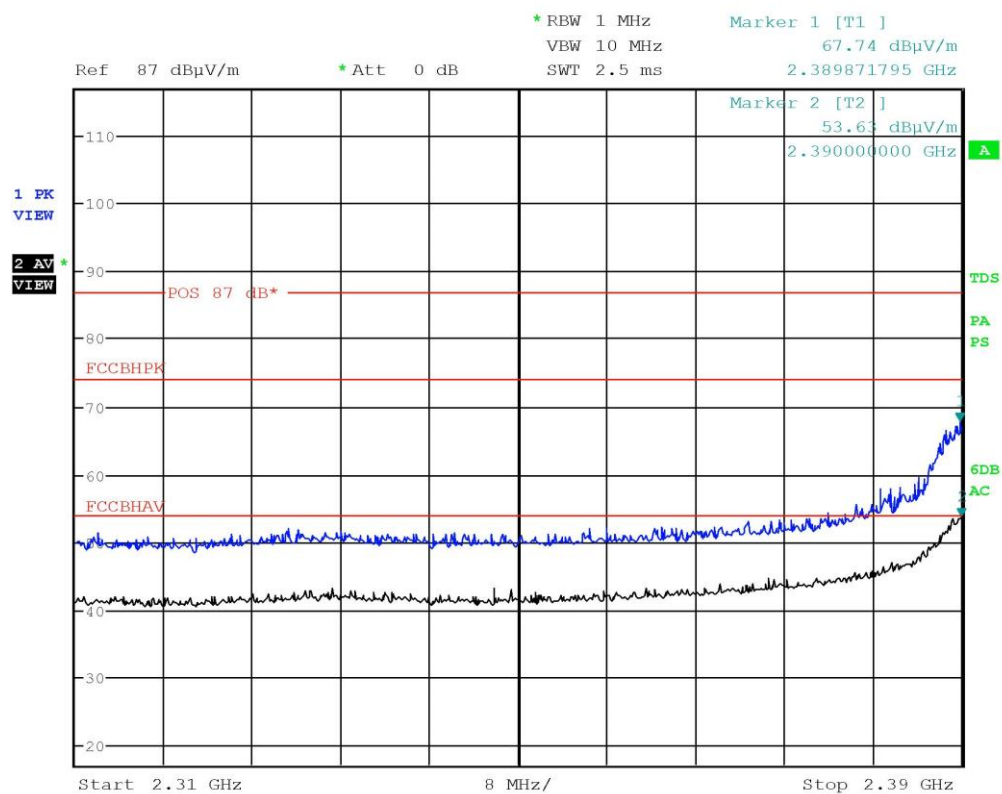
WiFi n mode

Channel		Bandwidth	Graph(s)	Results	
Lowest		1 MHz	G17213065	2402,564103 MHz	Complies
		1 MHz	G17213066		
		100 kHz	G17213067		
		100 kHz	G17213068		
Highest		1 MHz	G17213101	2471,400641 MHz	Complies
		100 kHz	G17213102		
		100 kHz	G17213103		
Remarks: The vertical red line marked as F1 show the 2390 MHz frequency, end of the restricted frequency band below 2400 MHz					

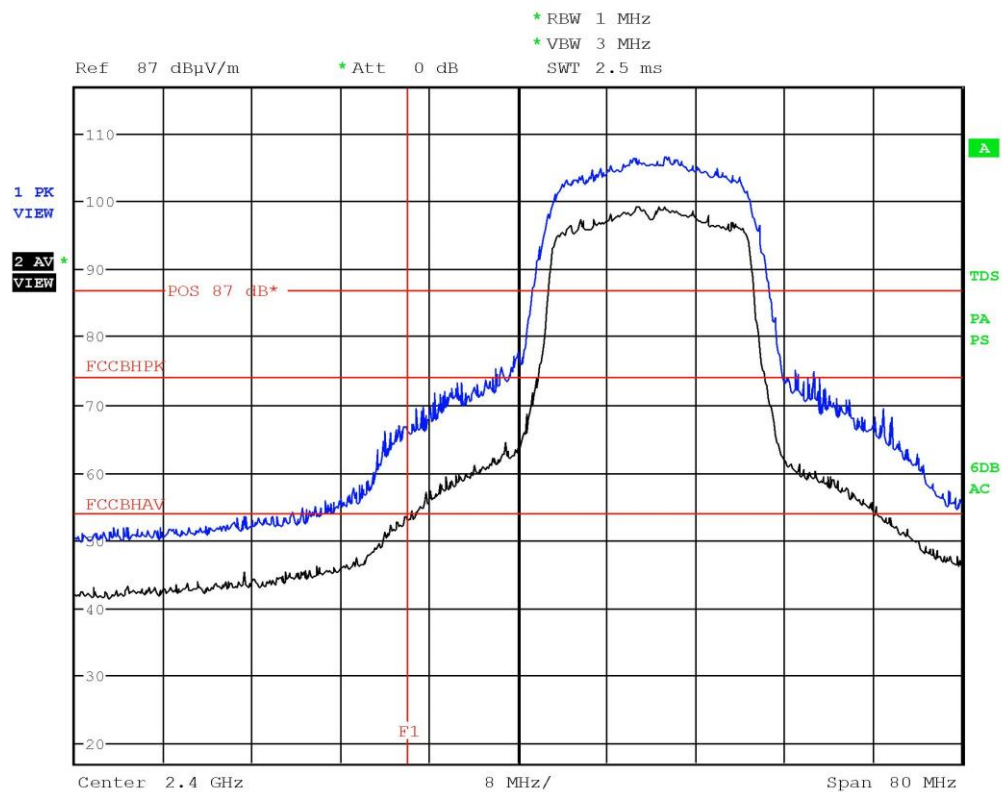




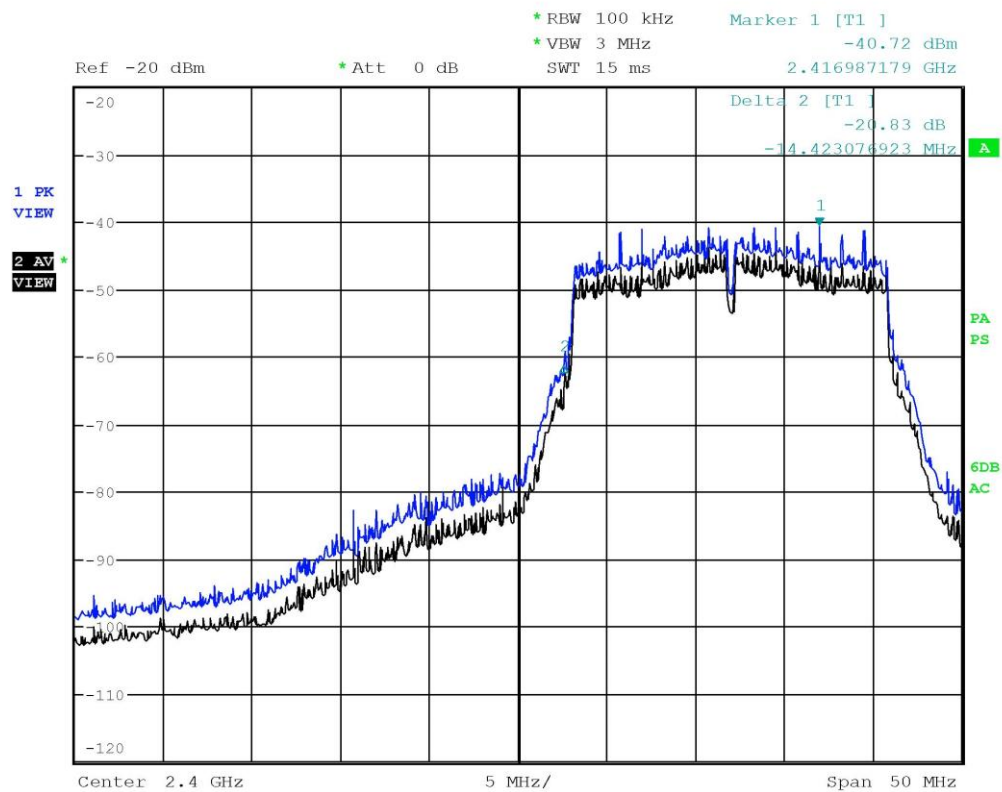
Graphs



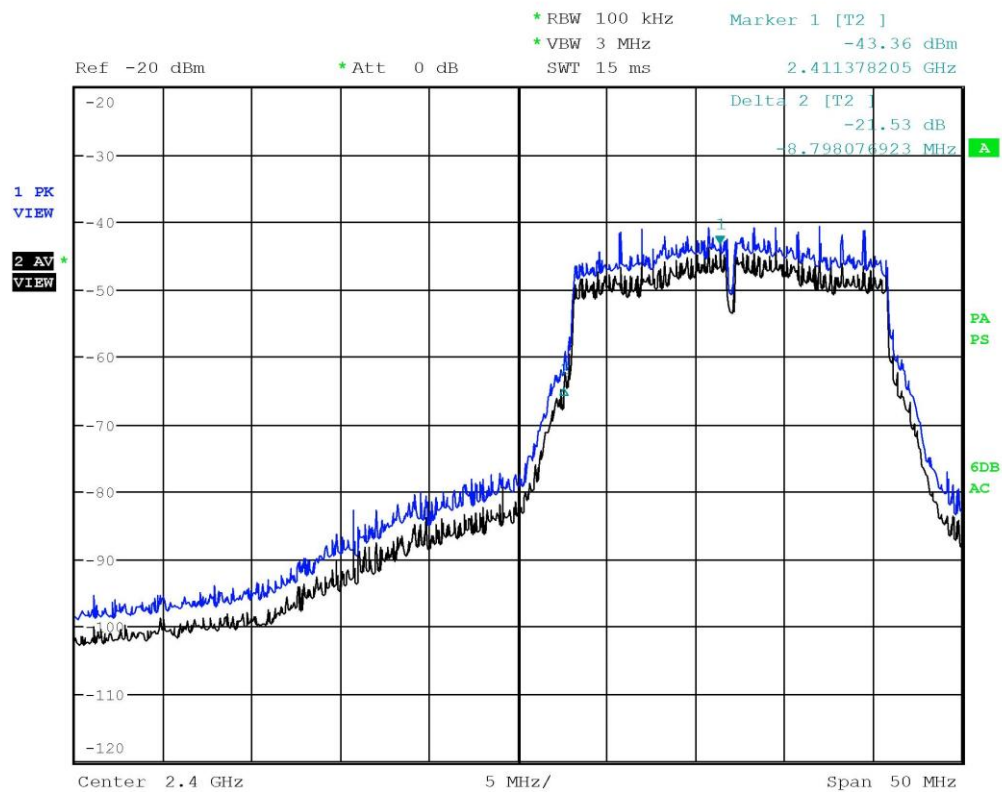
Bertezzo 17213065



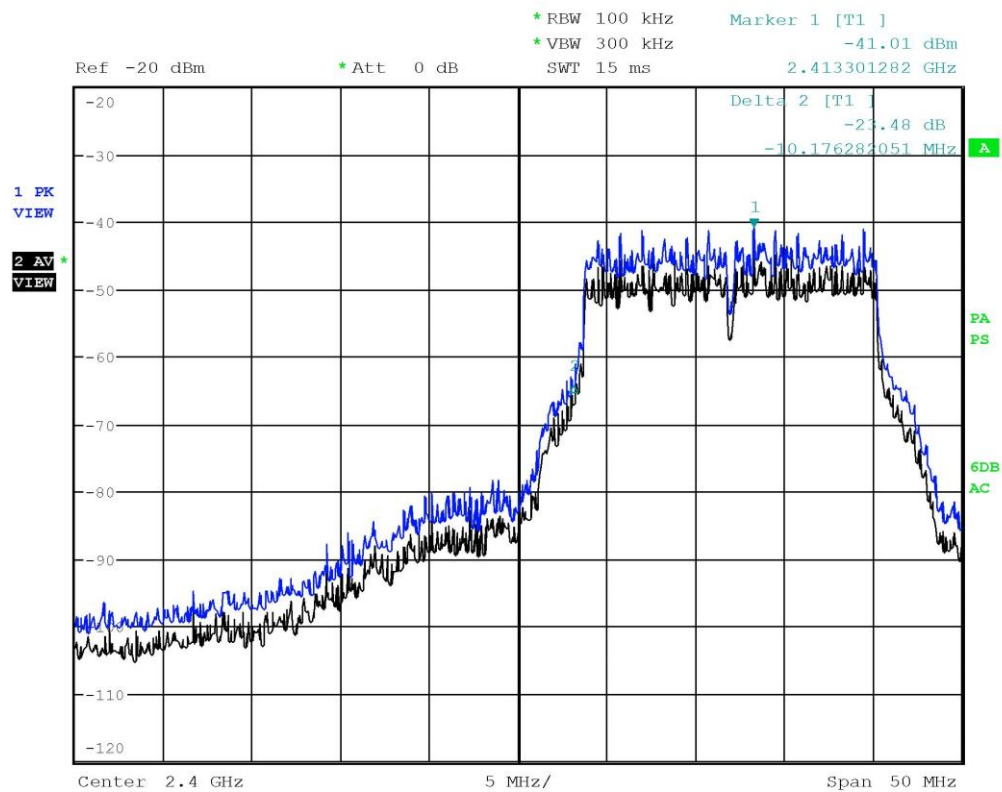
Bertezzolo 17213066



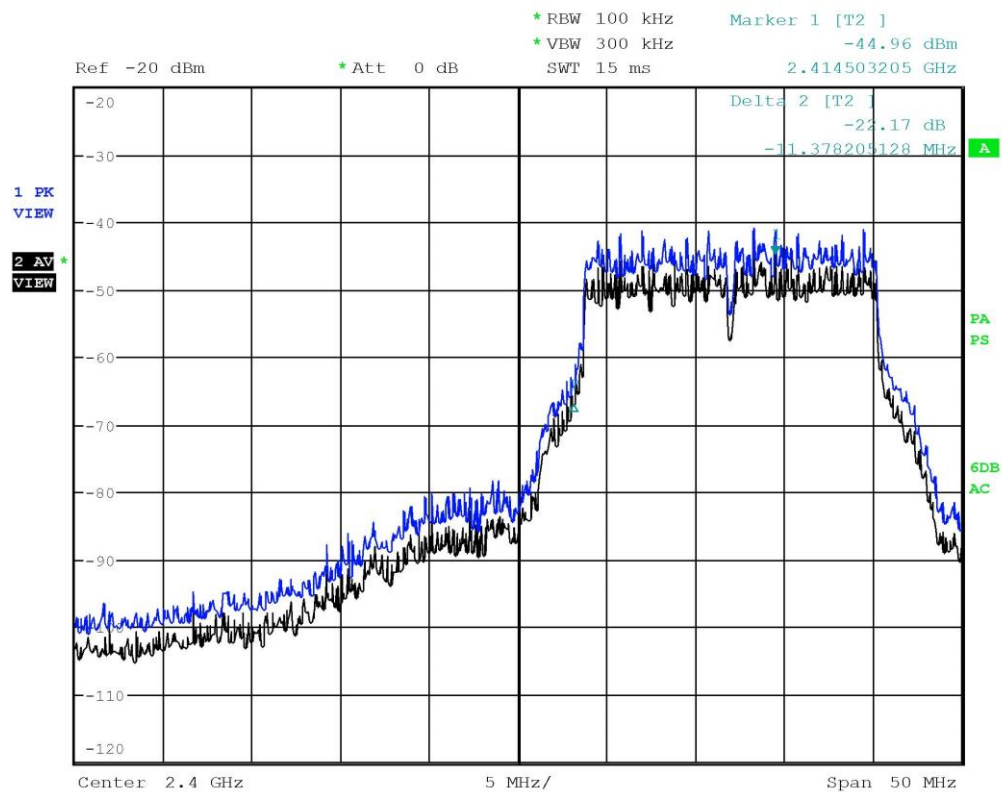
Bertezzolo 17213067



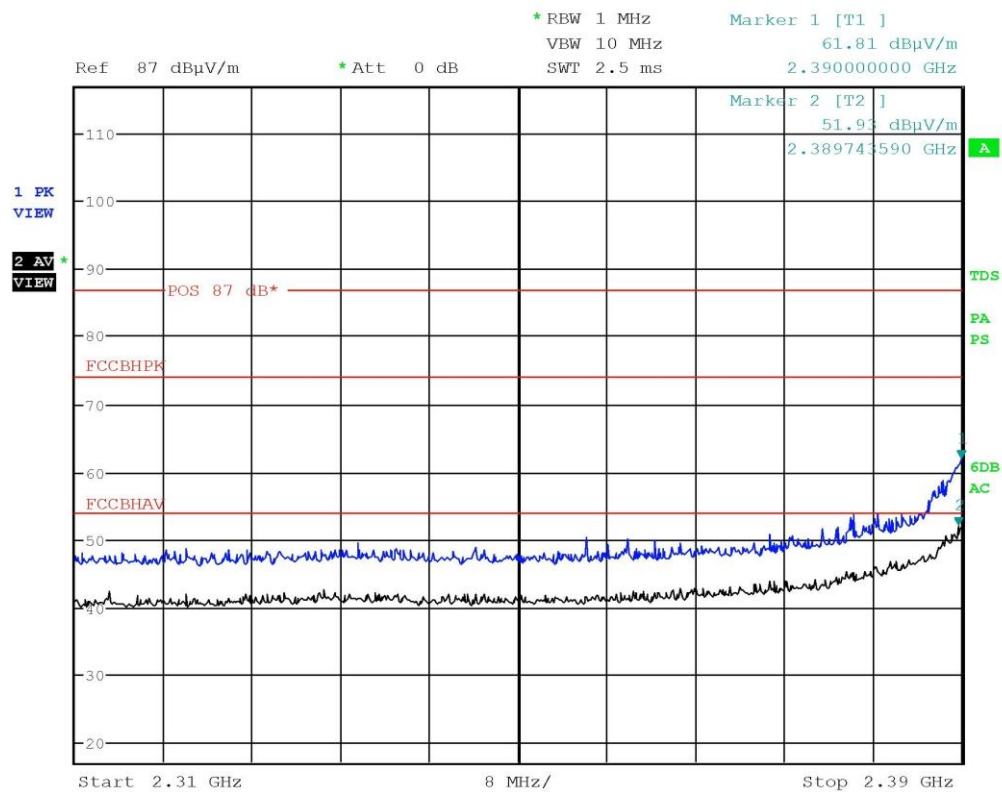
Bertezzolo 17213068



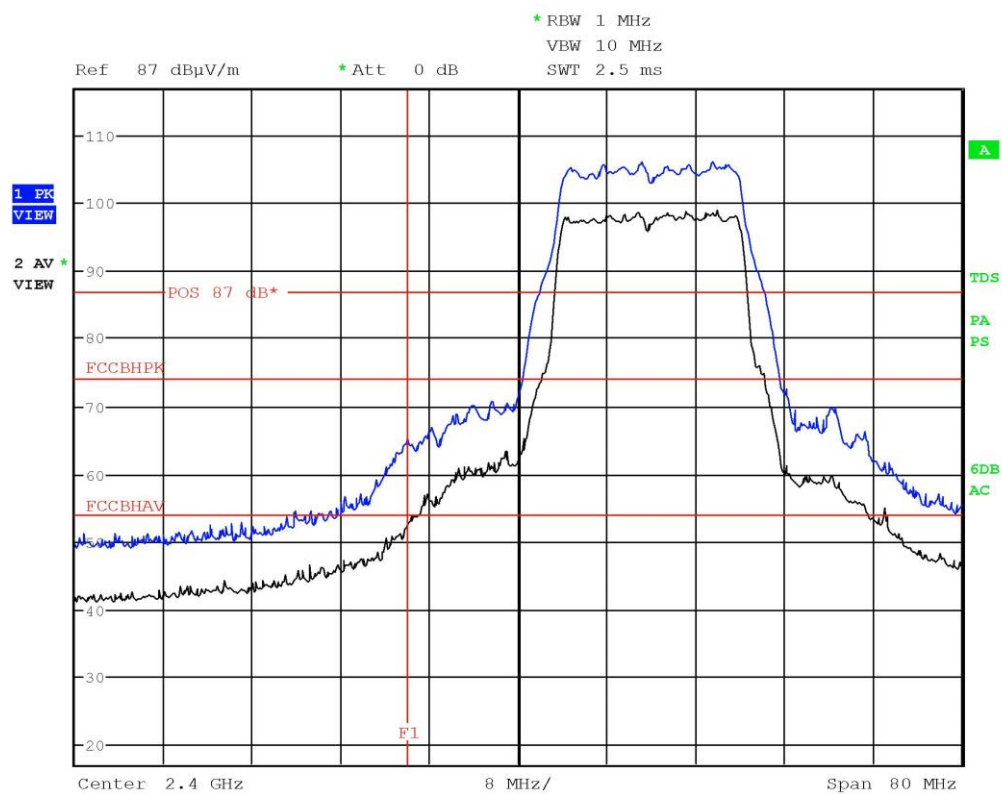
Bertezzolo 17213069



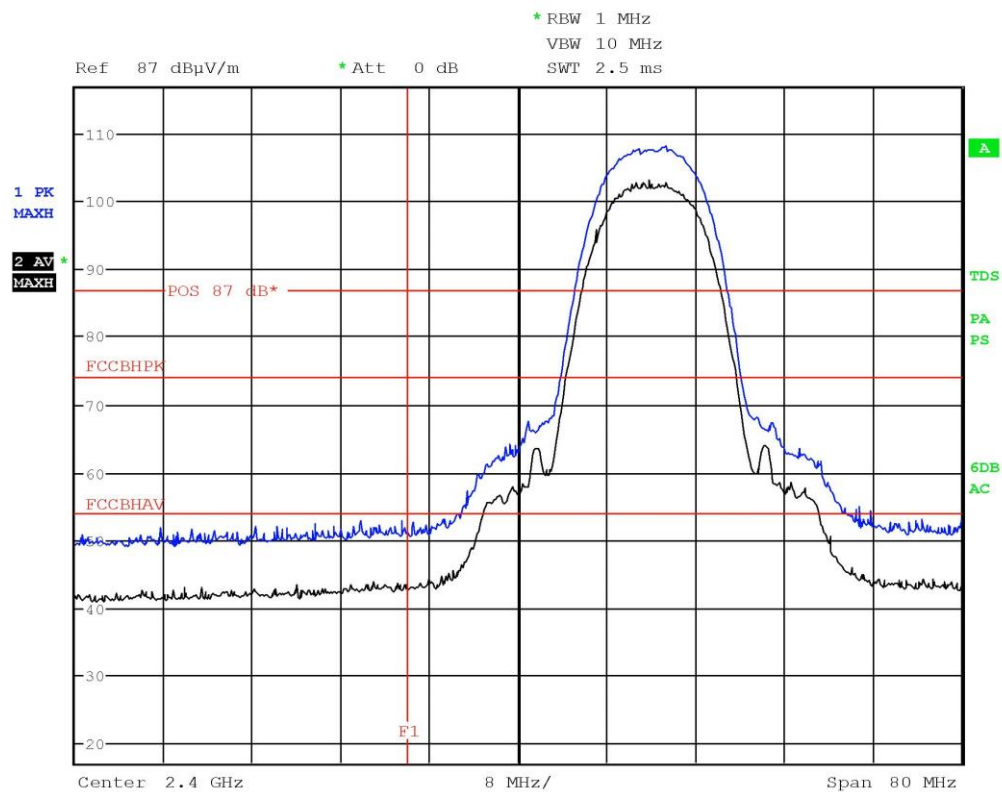
Bertezzo 17213070



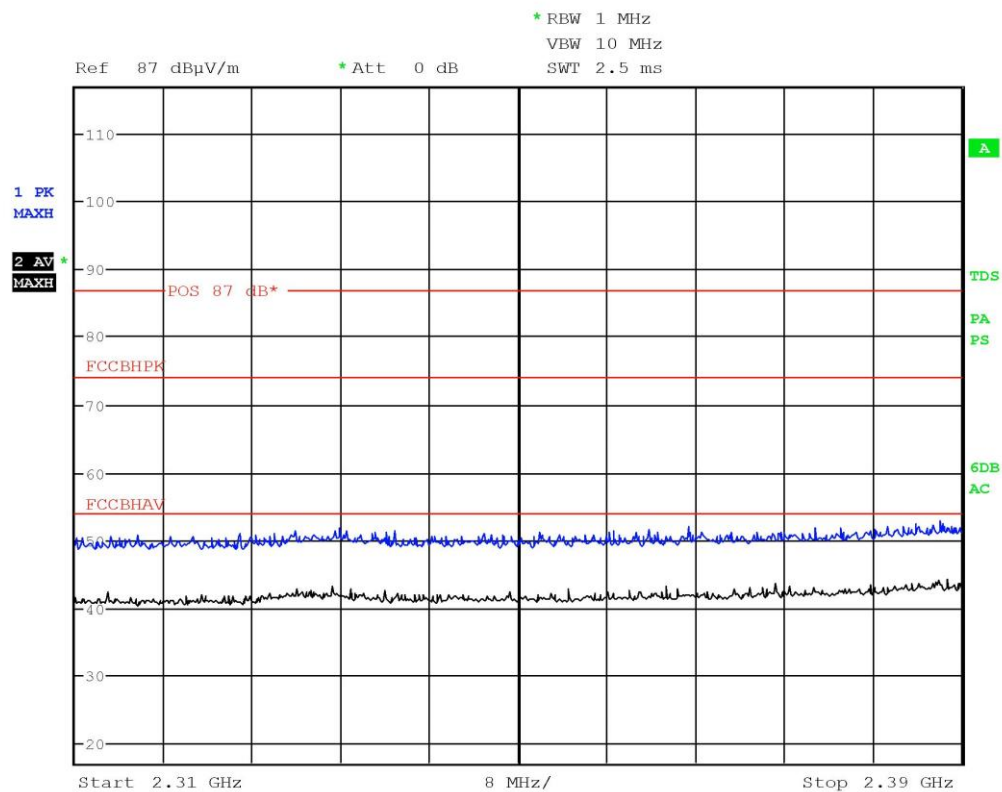
Bertezzo 17213071



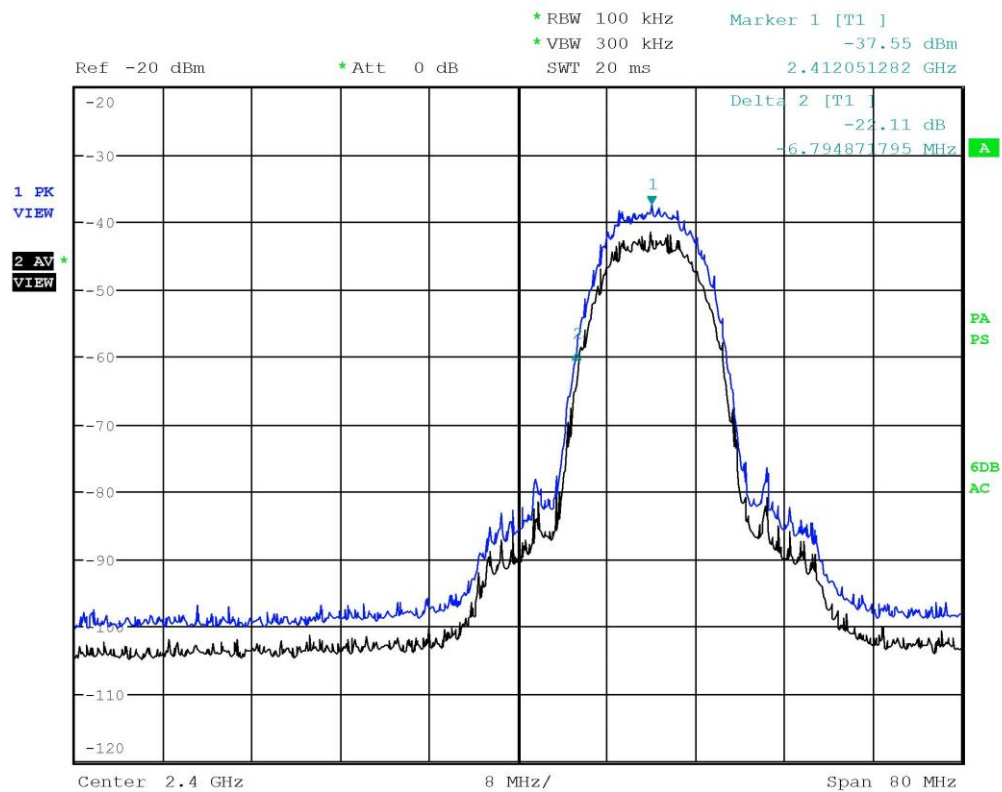
Bertezzolo 17213072



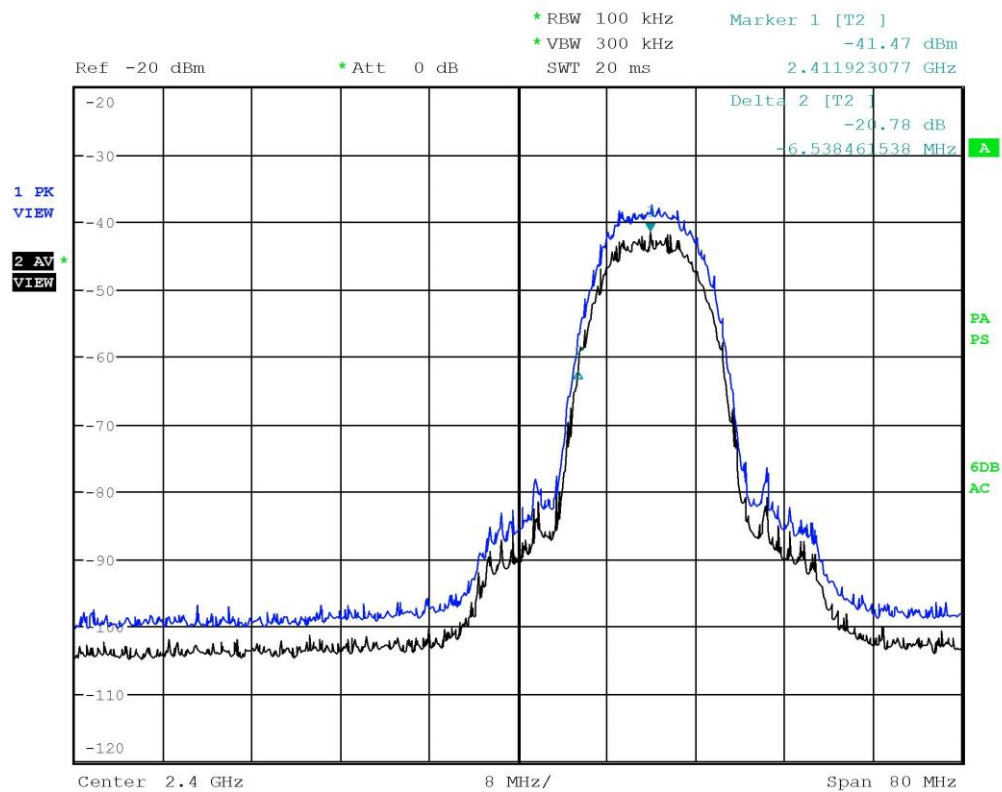
Bertezzolo 17213073



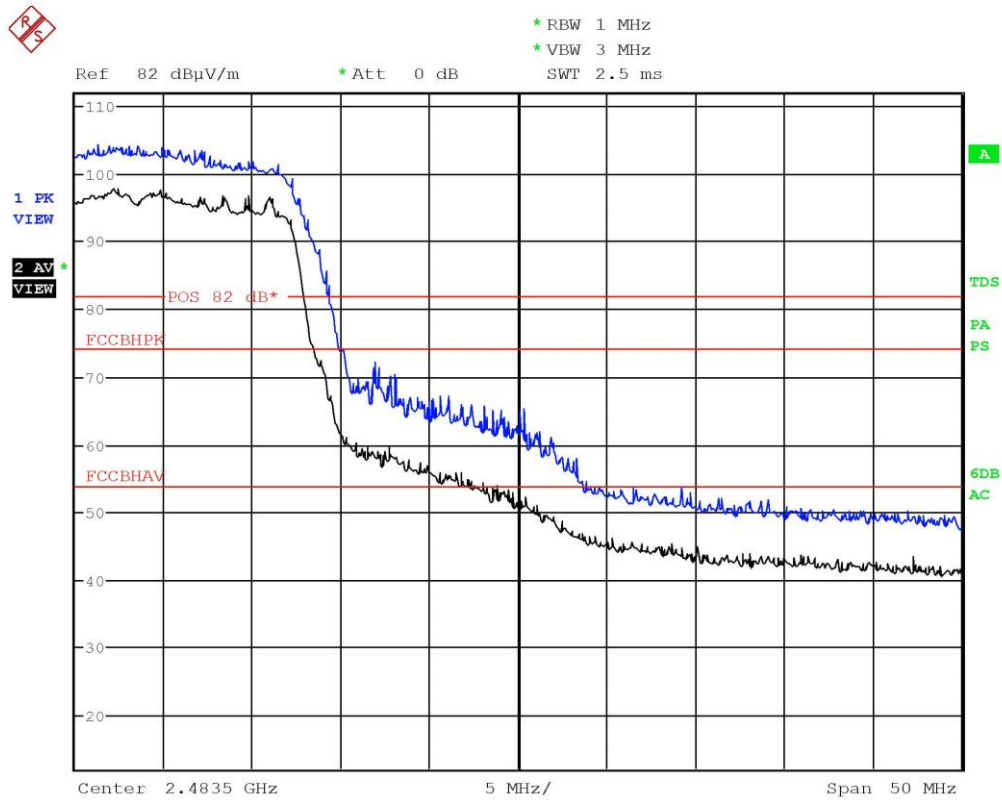
Bertezzolo 17213074



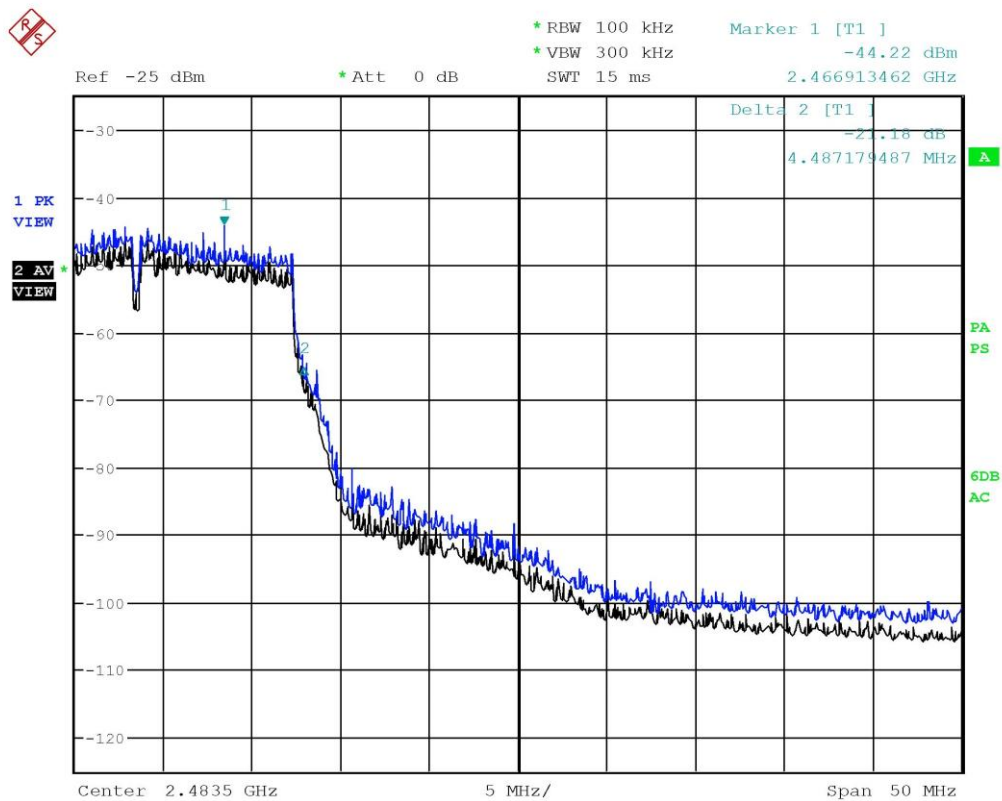
Bertezzolo 17213075



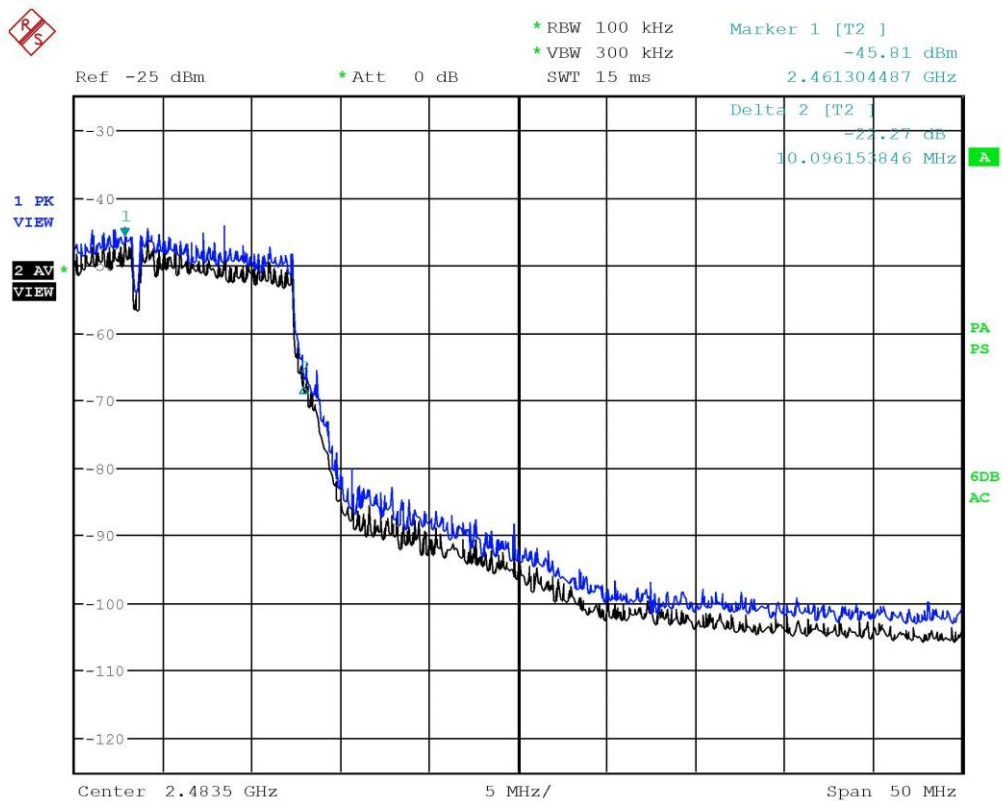
Bertezzolo 17213076



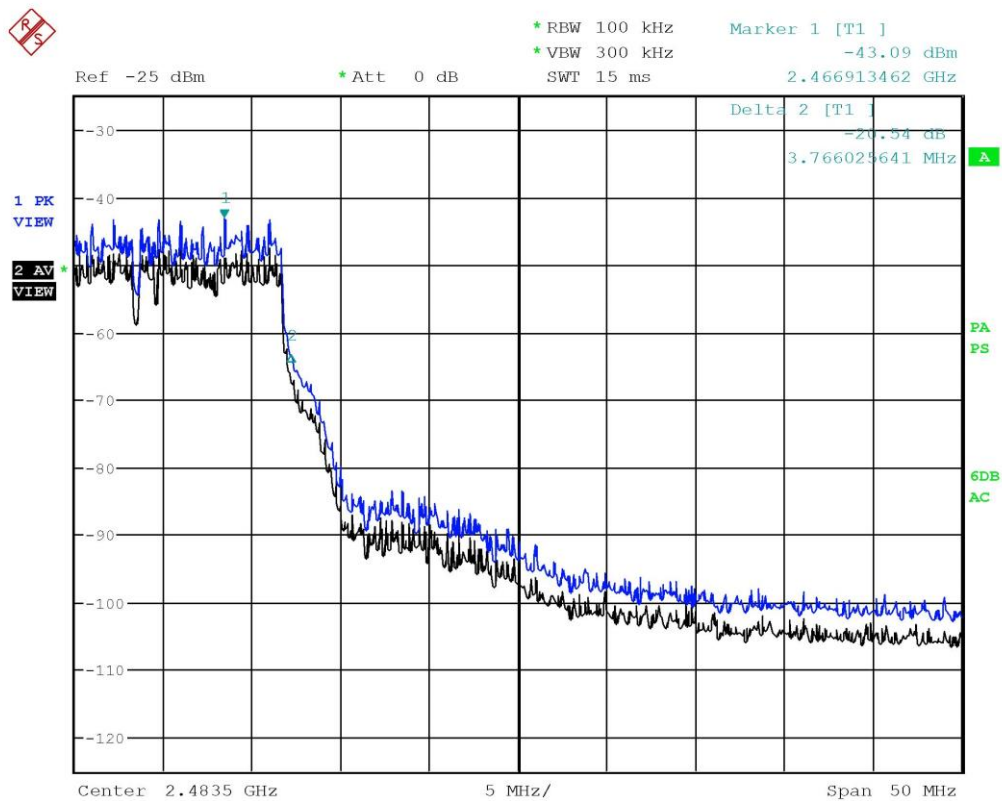
Bertezzo 172130101



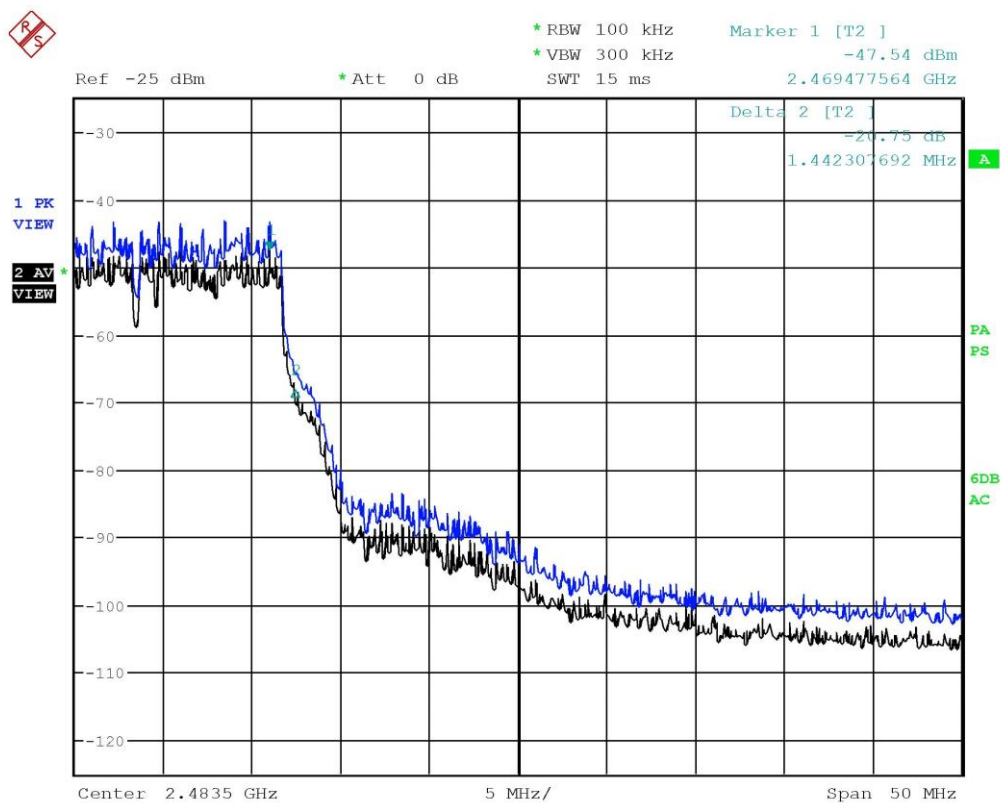
Bertezzolo 172130102



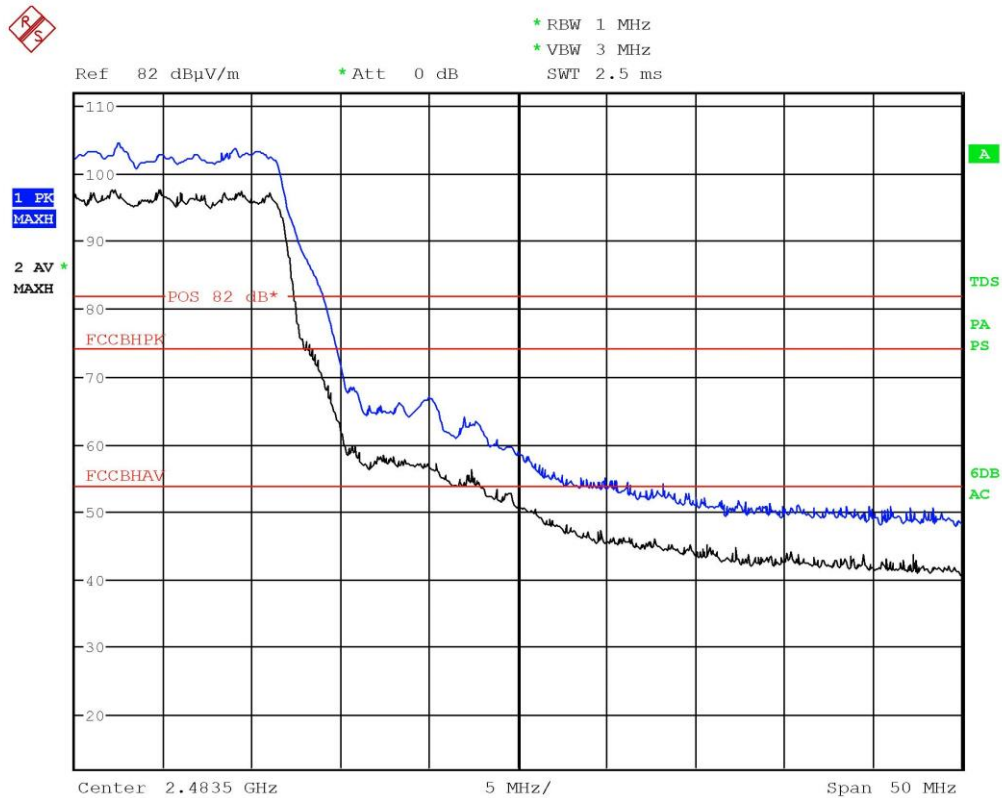
Bertezzolo 172130103



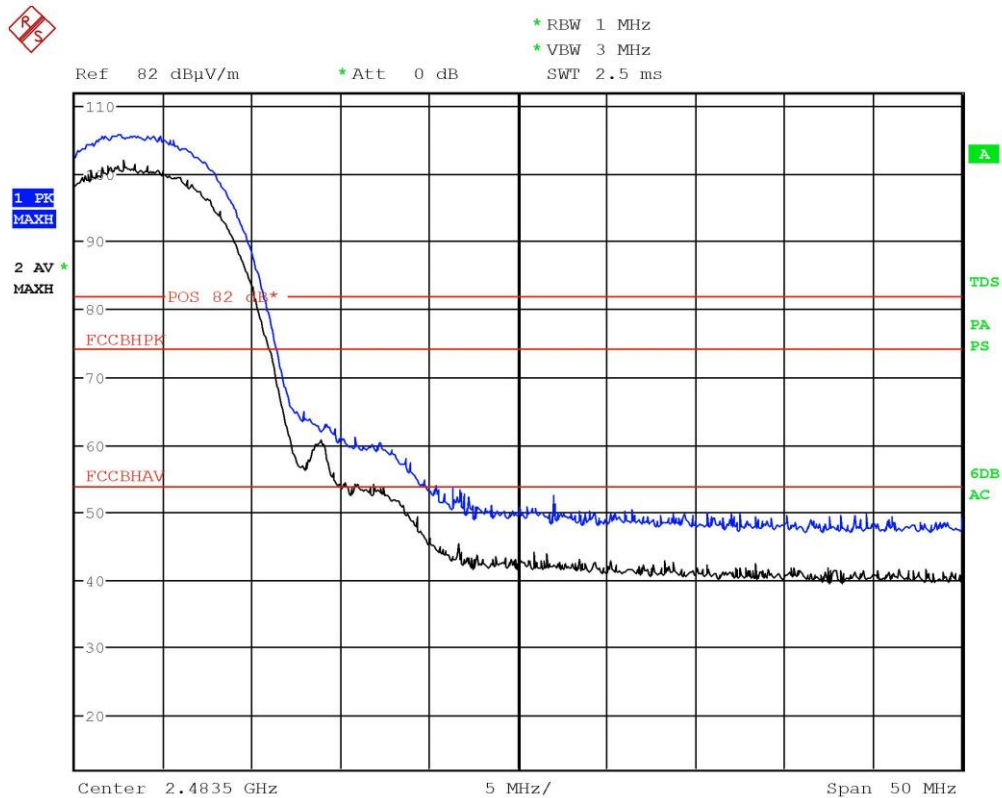
Bertezzolo 172130104



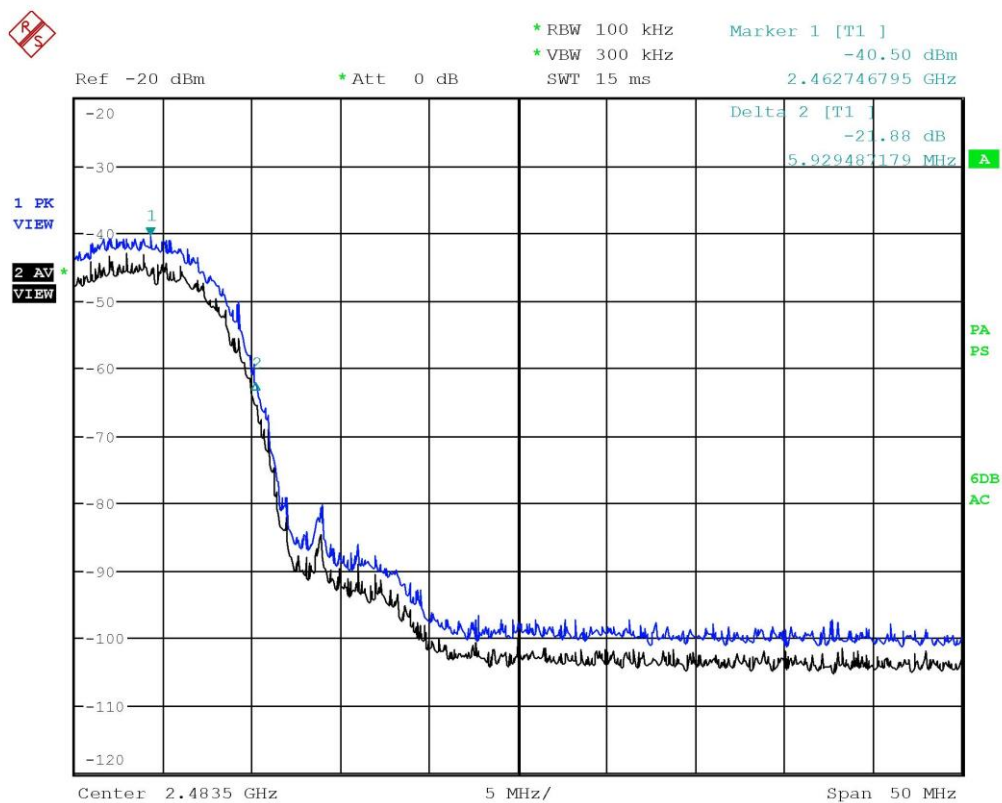
Bertezzo 172130105



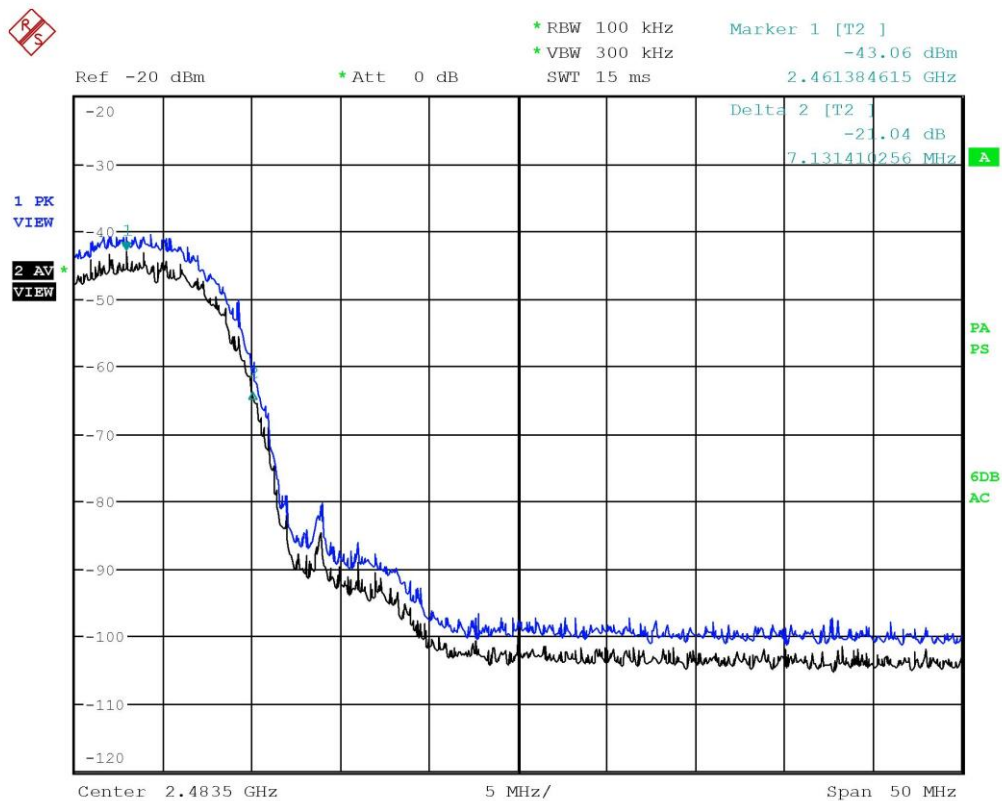
Bertezzolo 172130106



Bertezzo 172130107



Bertezzo 172130108



Bertezzo 172130109

Result: The requirements are met



10.6 Fundamental emission output power

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.247
- ANSI C63.10 cl. 11.9.1.1
- KDB 558074 D01 DTS Meas Guidance v04 cl. 9.1.1
- Internal procedure PM001
- See clause 4 of this test report
- Test date: September, 20th, 2018
- Technician: A. Bertezolo

Test configuration

Test site:
Laboratory

Auxiliary equipment:
See clause 4 of this test report

EUT exercising

See clause 4 of this test report

Test equipment used

CMC S295, 20 dB attenuator
Measurement uncertainty: See clause 7 of this test report

Test specification

Port: antenna connector

Environmental conditions

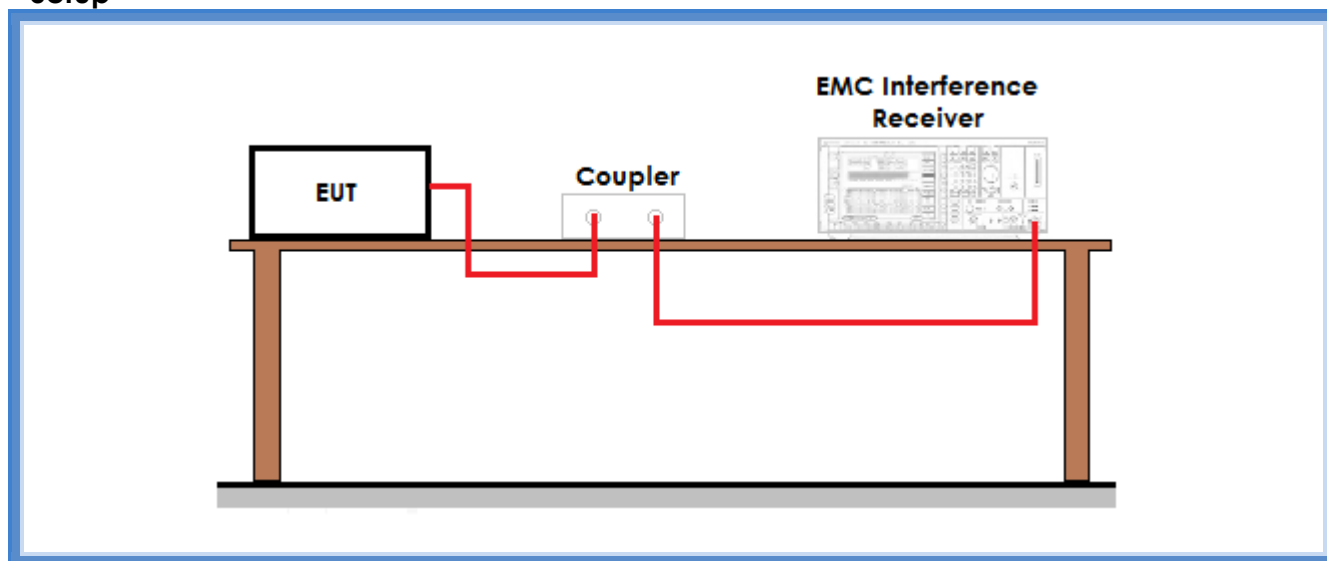
Temperature (°C)	Atmospheric pressure (kPa)	Relative humidity (%)
22	100	42

Acceptance limits:

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt



Setup



Result

WiFi b mode

Channel	Graphs	Measured level (dBm)	Calculated level (W)
Lowest	G172130_10	14,55	0,0285
Medium	G172130_11	14,45	0,0279
Highest	G172130_12	14,27	0,0267

Remarks: the total attenuation value is due to the 20 dB attenuator and the cable provided by the manufacturer calibrated before the test. The measured value has been obtained by considering the attenuation value directly during the scan

WiFi g mode

Channel	Graphs	Measured level (dBm)	Calculated level (W)
Lowest	G172130_13	20,22	0,1052
Medium	G172130_14	20,33	0,1079
Highest	G172130_15	20,30	0,1072

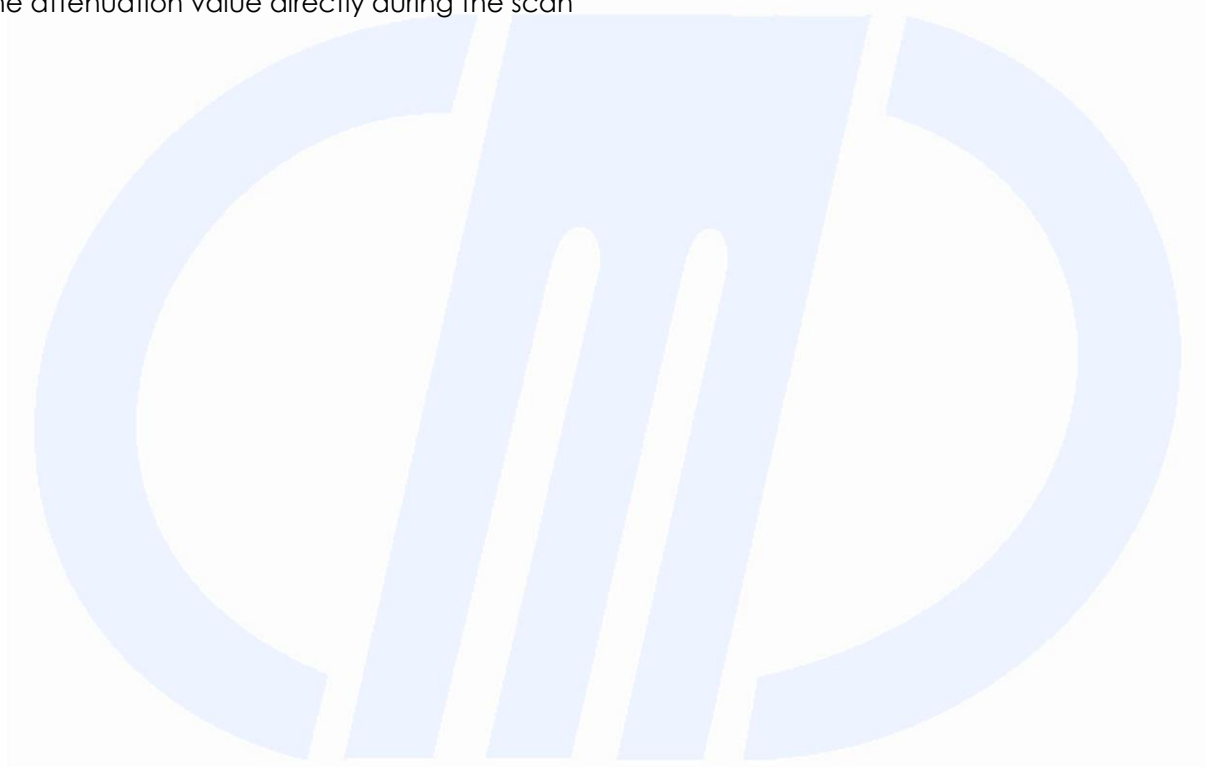
Remarks: the total attenuation value is due to the 20 dB attenuator and the cable provided by the manufacturer calibrated before the test. The measured value has been obtained by considering the attenuation value directly during the scan



WiFi n mode

Channel	Graphs	Measured level (dBm)	Calculated level (W)
Lowest	G172130_16	22,63	0,1832
Medium	G172130_17	22,46	0,1762
Highest	G172130_18	22,55	0,1799

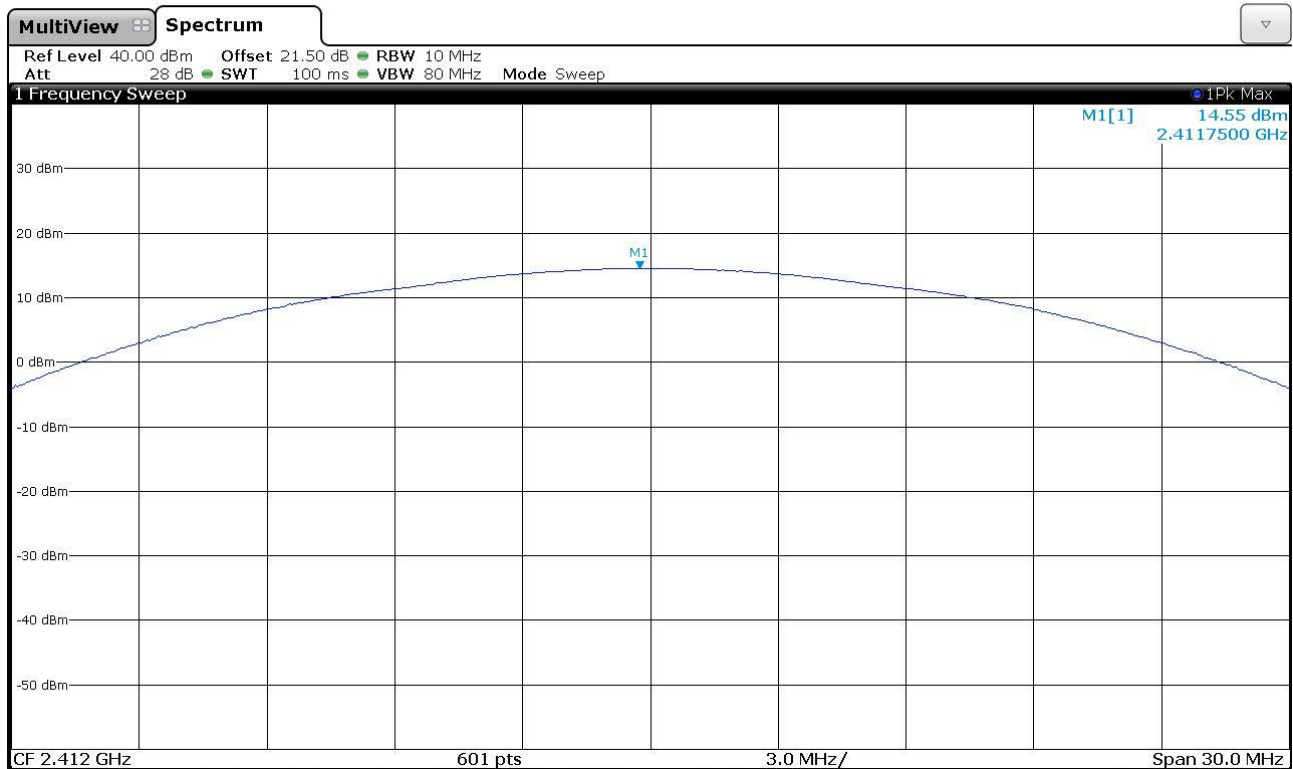
Remarks: the total attenuation value is due to the 20 dB attenuator and the cable provided by the manufacturer calibrated before the test. The measured value has been obtained by considering the attenuation value directly during the scan



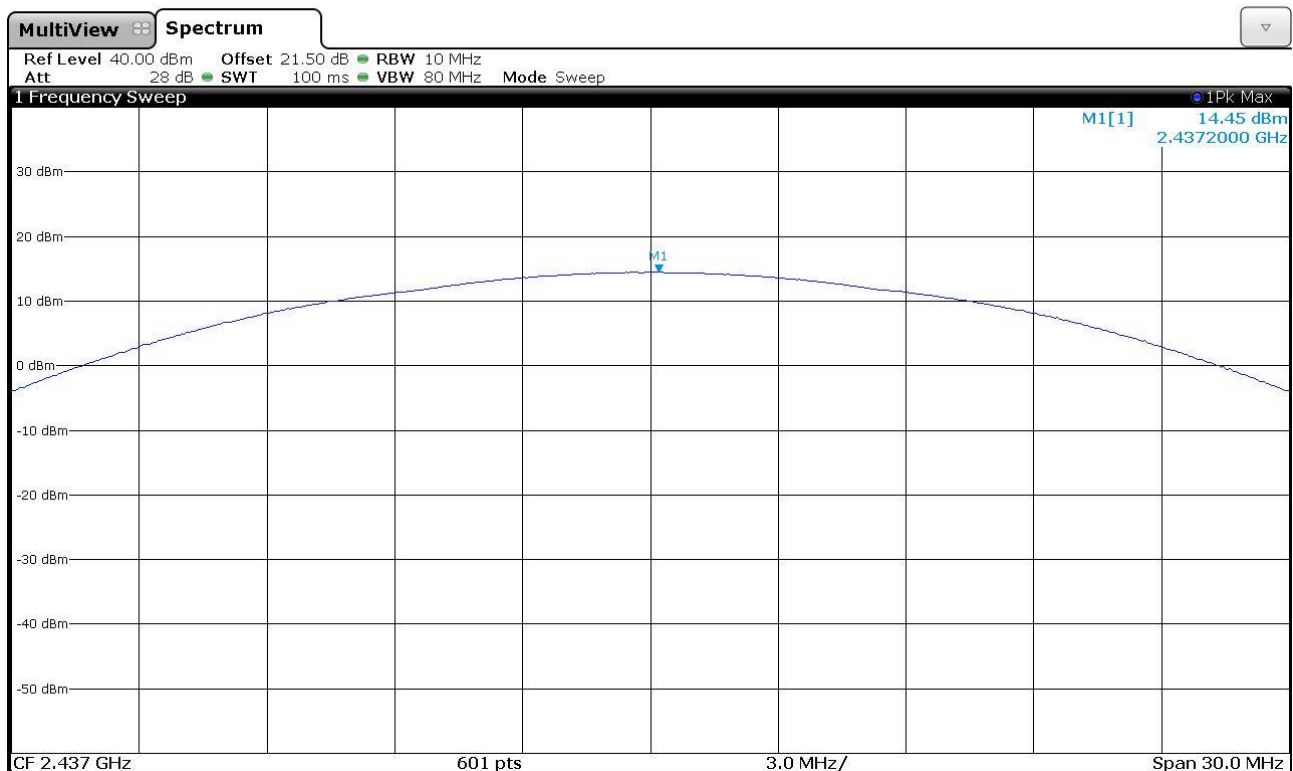


Graphs

Bertezzo 172130_10

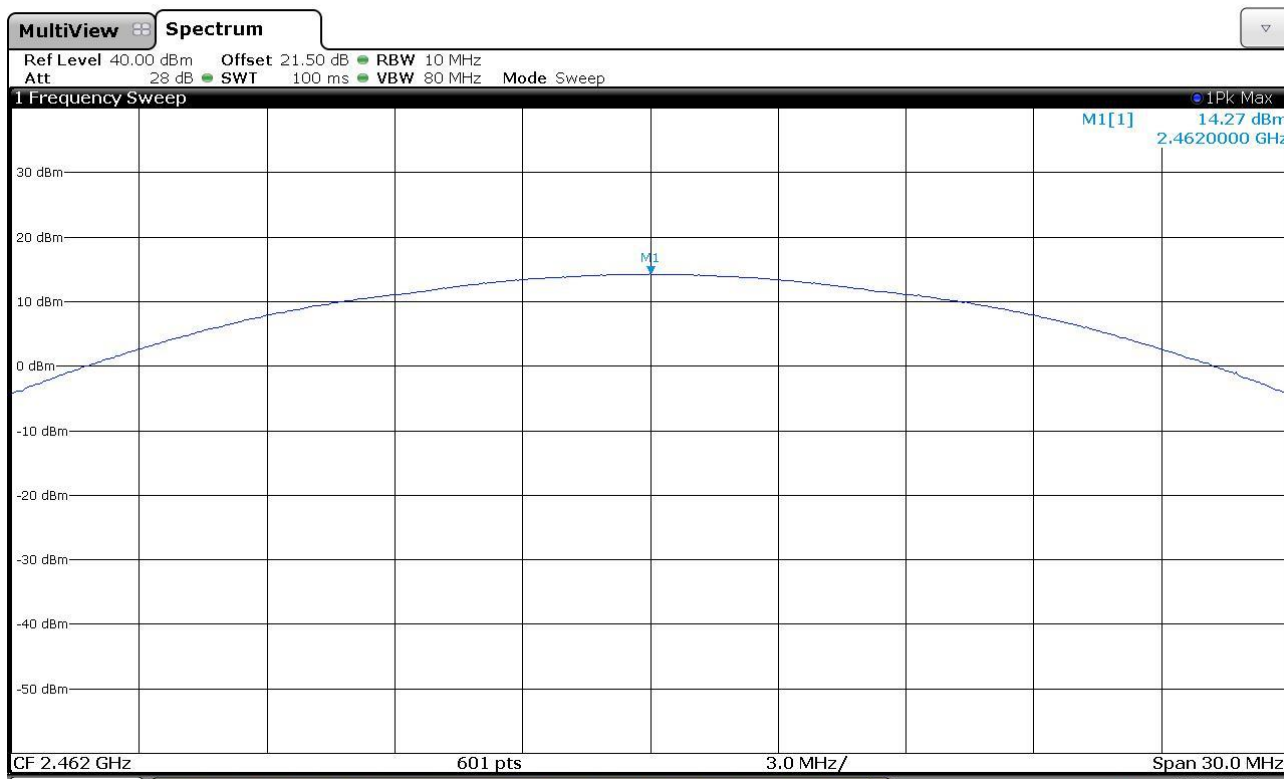


Bertezzo 172130_11

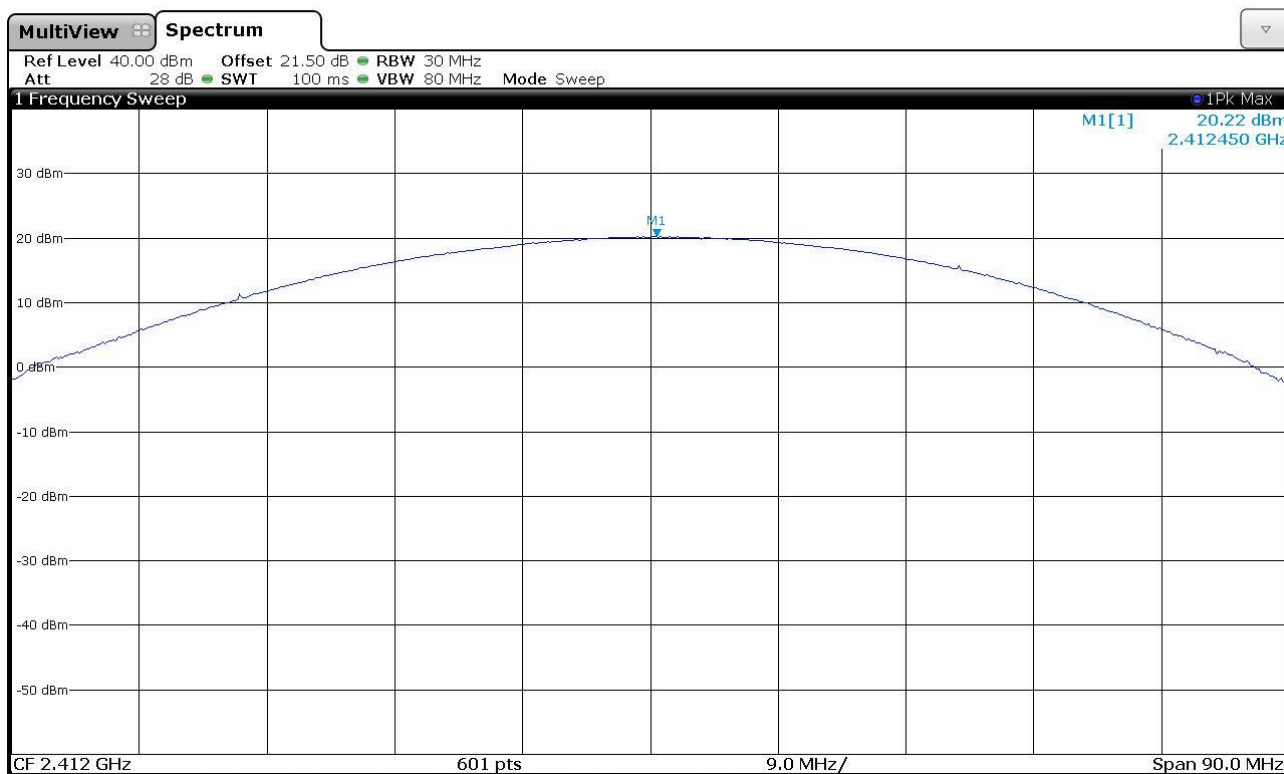




Bertezzo 172130_12

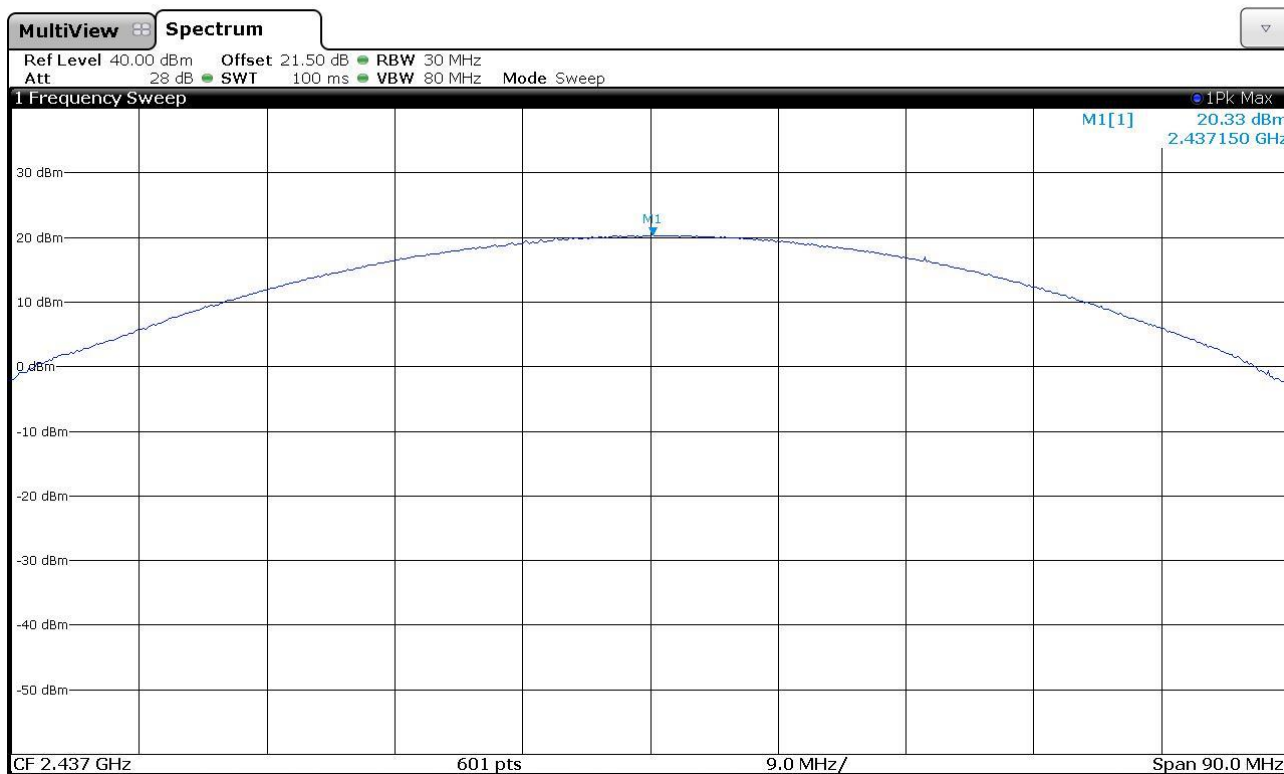


Bertezzo 172130_13

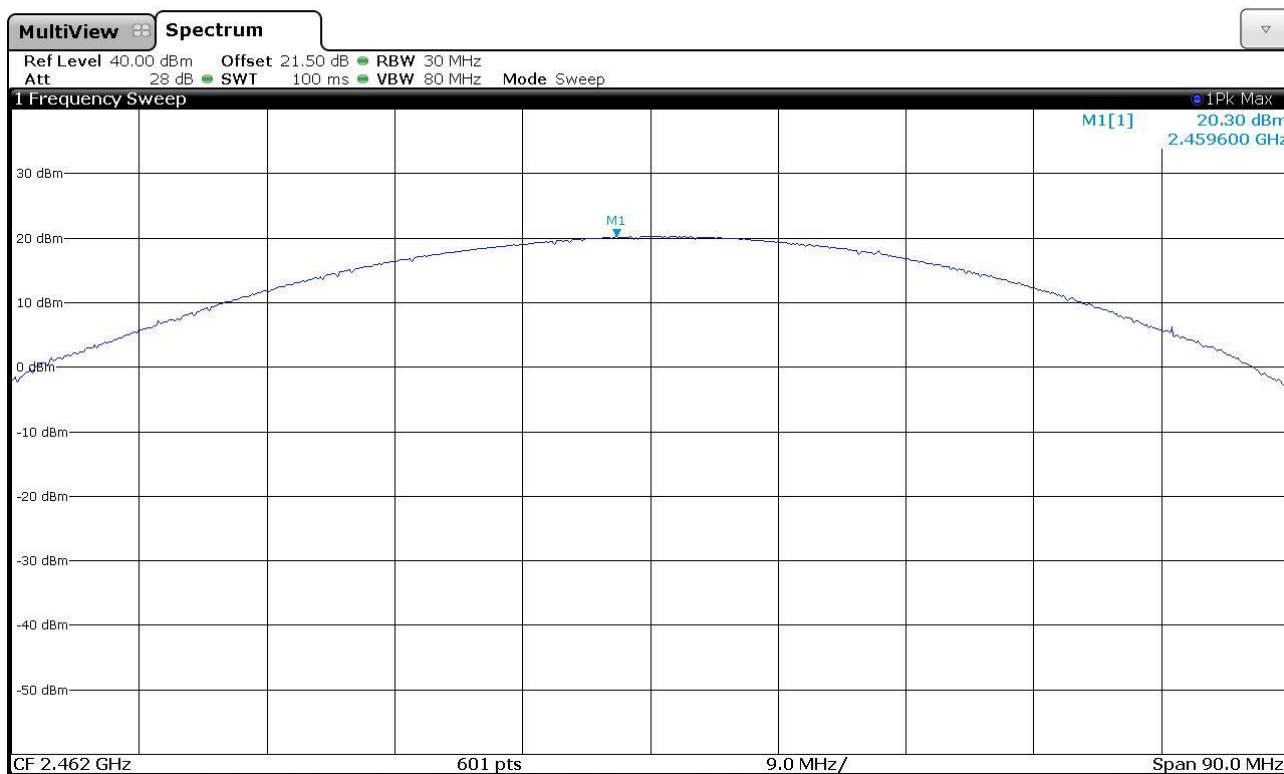




Bertezzolo 172130_14

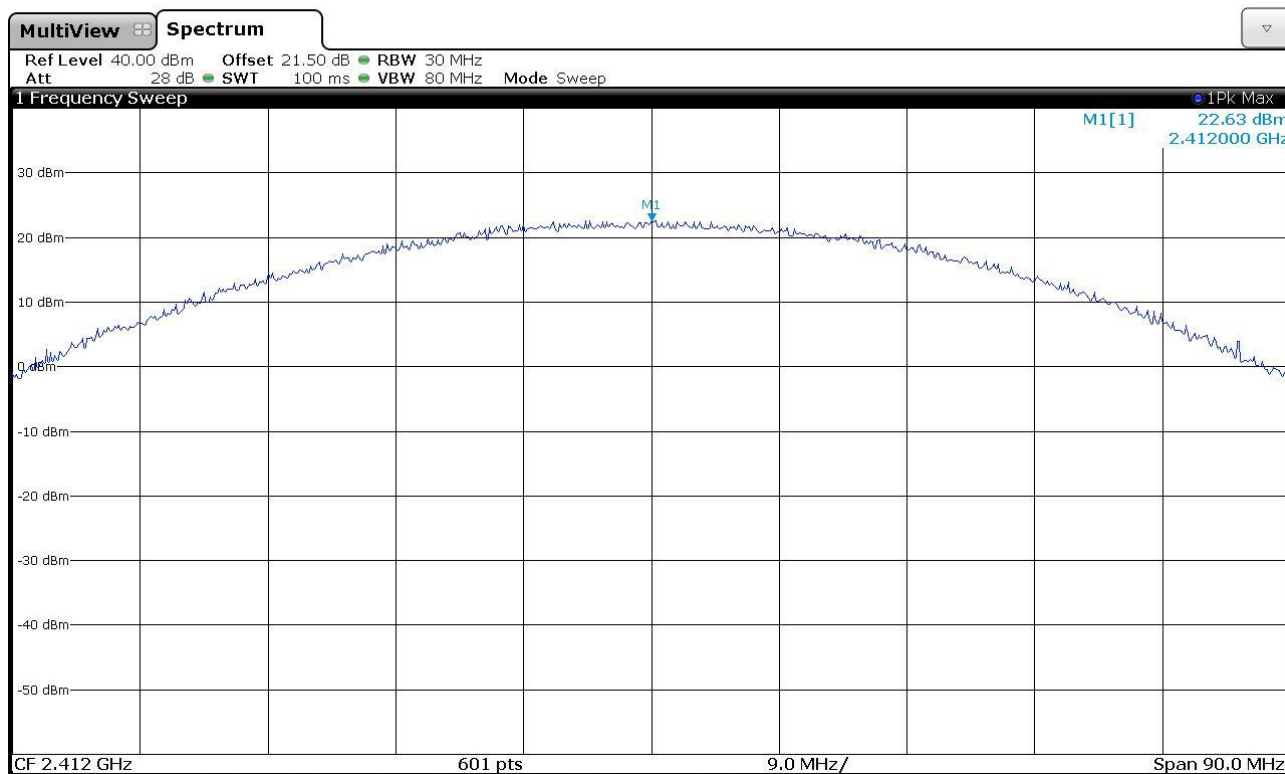


Bertezzolo 172130_15

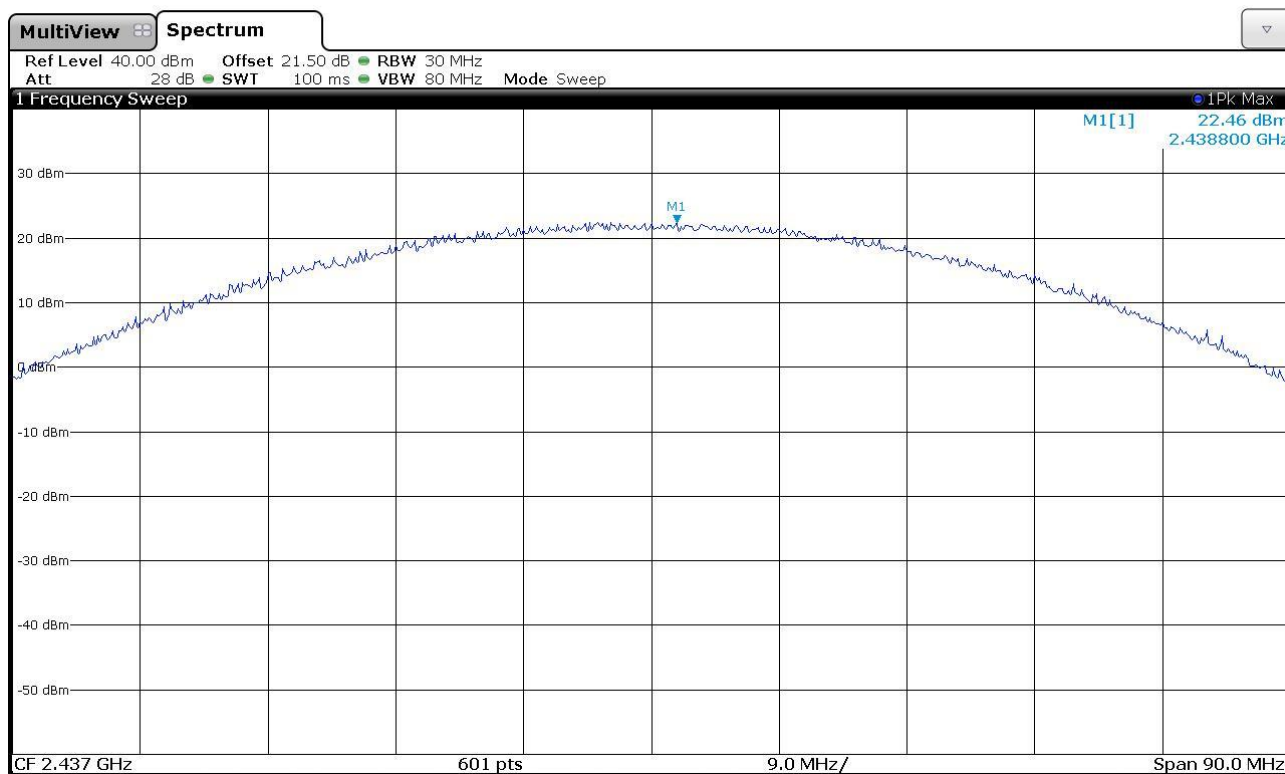




Bertezzo 172130_16

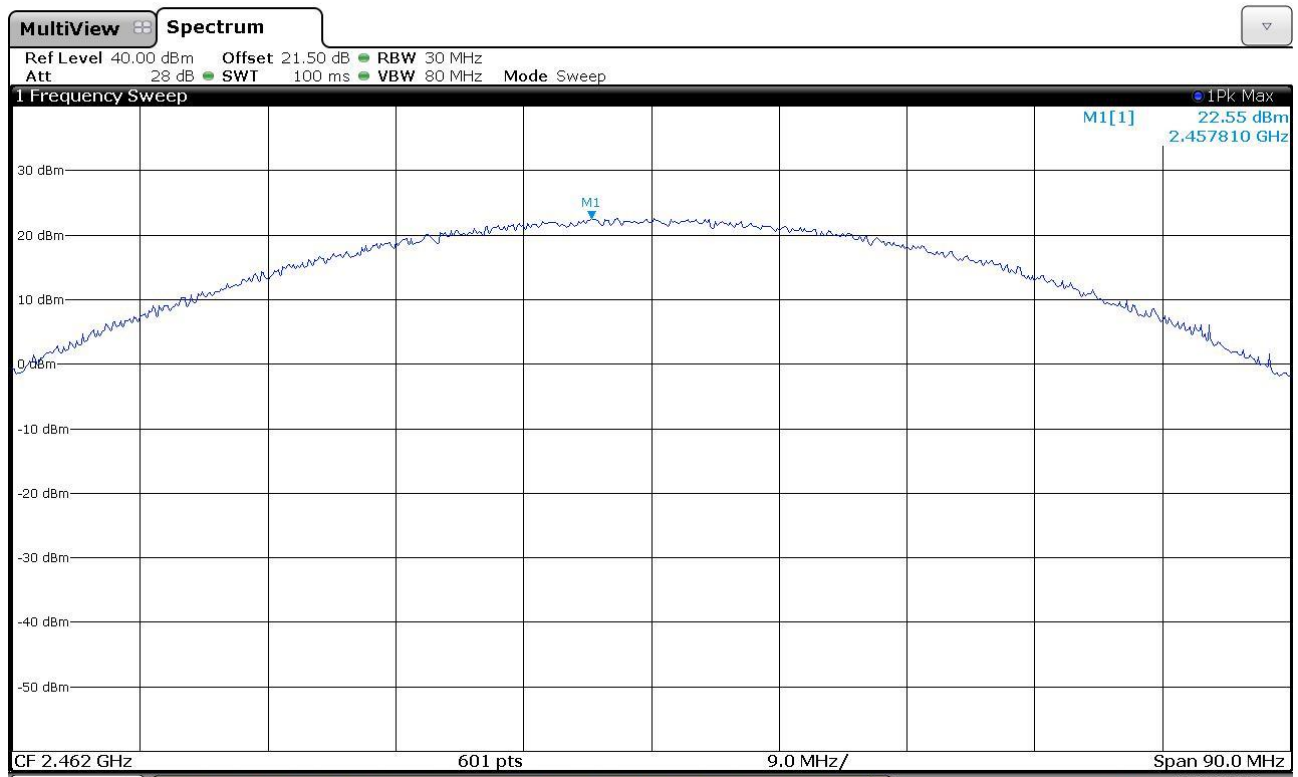


Bertezzo 172130_17





Bertezzo 172130_18



Result: The requirements are met



10.7 Maximum power spectral density level in the fundamental emission

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.247
- ANSI C63.10 cl. 11.10
- KDB 558074 D01 DTS Meas Guidance v04 cl. 10.2
- Internal procedure PM001
- See clause 4 of this test report
- Test date: February 15th, 2018
- Technician: A. Bertezolo

Test configuration

Test site:
Laboratory

Auxiliary equipment:
See clause 4 of this test report

EUT exercising

See clause 4 of this test report

Test equipment used

CMC S295, 20 dB attenuator
Measurement uncertainty: See clause 7 of this test report

Test specification

Port: antenna connector

Environmental conditions

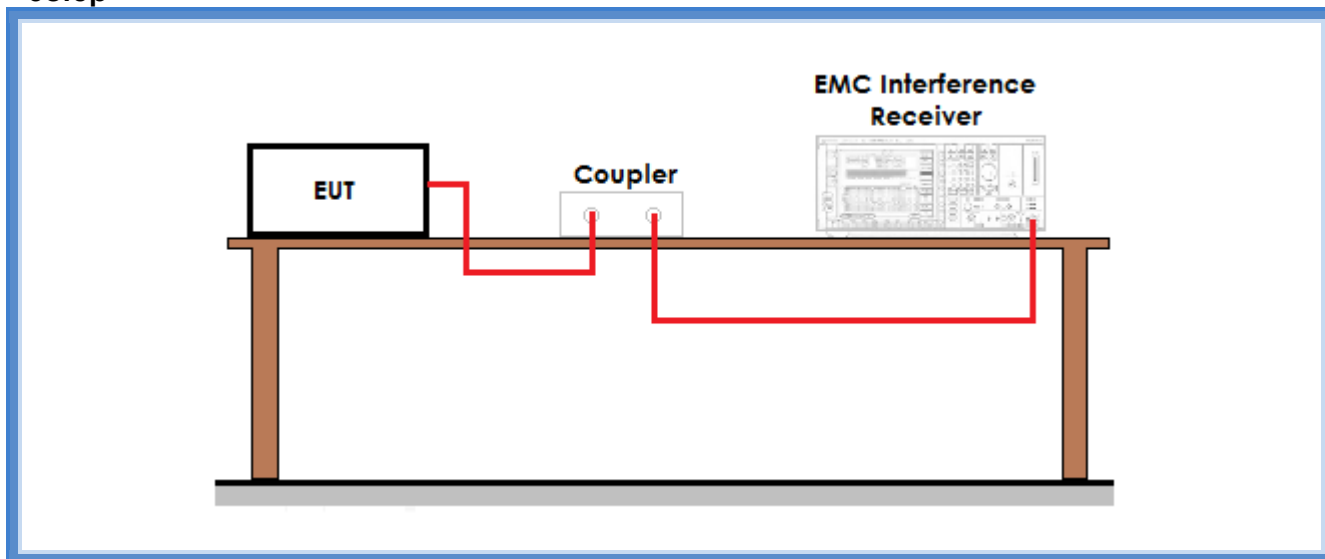
Temperature (°C)	Atmospheric pressure (kPa)	Relative humidity (%)
22	100	42

Acceptance limits:

Frequency Range	Power Spectral Density
2400 – 2483,5 MHz	8 dBm/3 kHz 6,31 mW/3 kHz



Setup



Result

WiFi b mode

Channel	Graphs	Measured level (dBm/100 kHz)
Lowest	G172130_19	4,46
Medium	G172130_20	3,76
Highest	G172130_21	3,26

Remarks: the total attenuation value is due to the 20 dB attenuator and the cable provided by the manufacturer calibrated before the test. The measured value has been obtained by considering the attenuation value directly during the scan

WiFi g mode

Channel	Graphs	Measured level (dBm/100 kHz)
Lowest	G172130_22	0,93
Medium	G172130_23	0,87
Highest	G172130_24	0,87

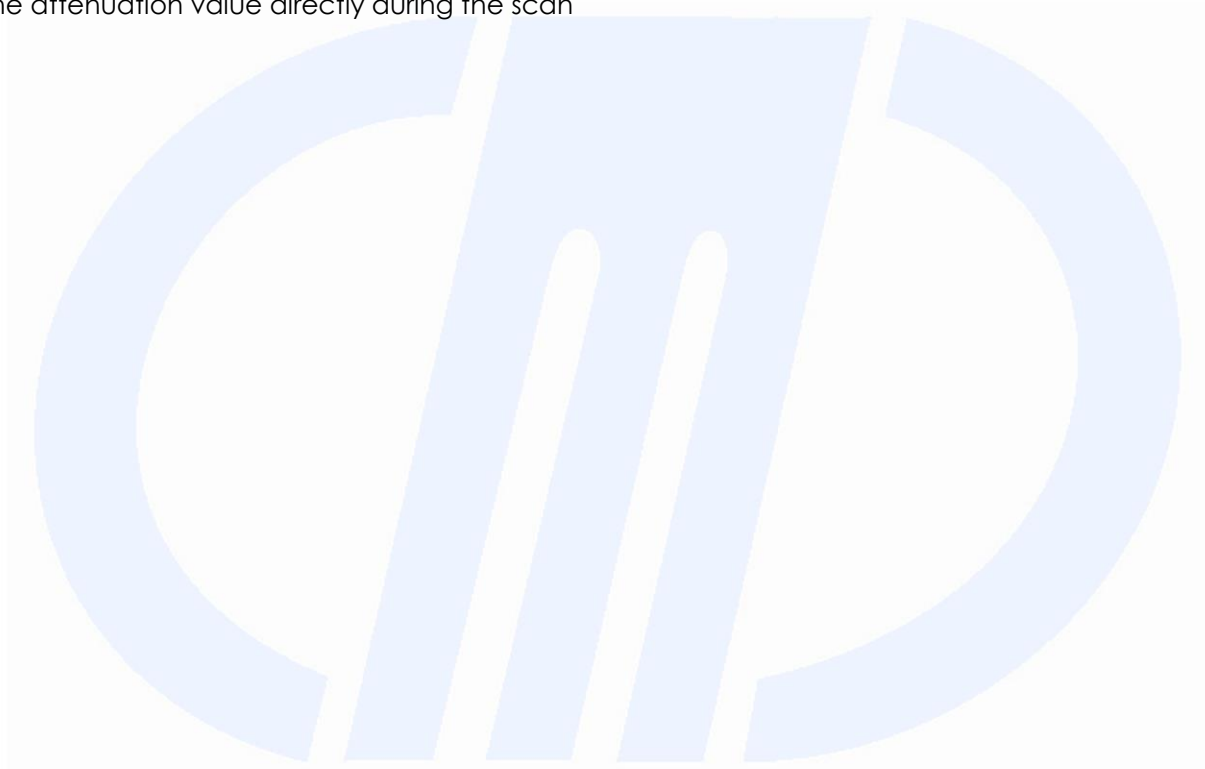
Remarks: the total attenuation value is due to the 20 dB attenuator and the cable provided by the manufacturer calibrated before the test. The measured value has been obtained by considering the attenuation value directly during the scan



WiFi n mode

Channel	Graphs	Measured level (dBm/100 kHz)
Lowest	G172130_25	0,97
Medium	G172130_26	0,66
Highest	G172130_27	0,73

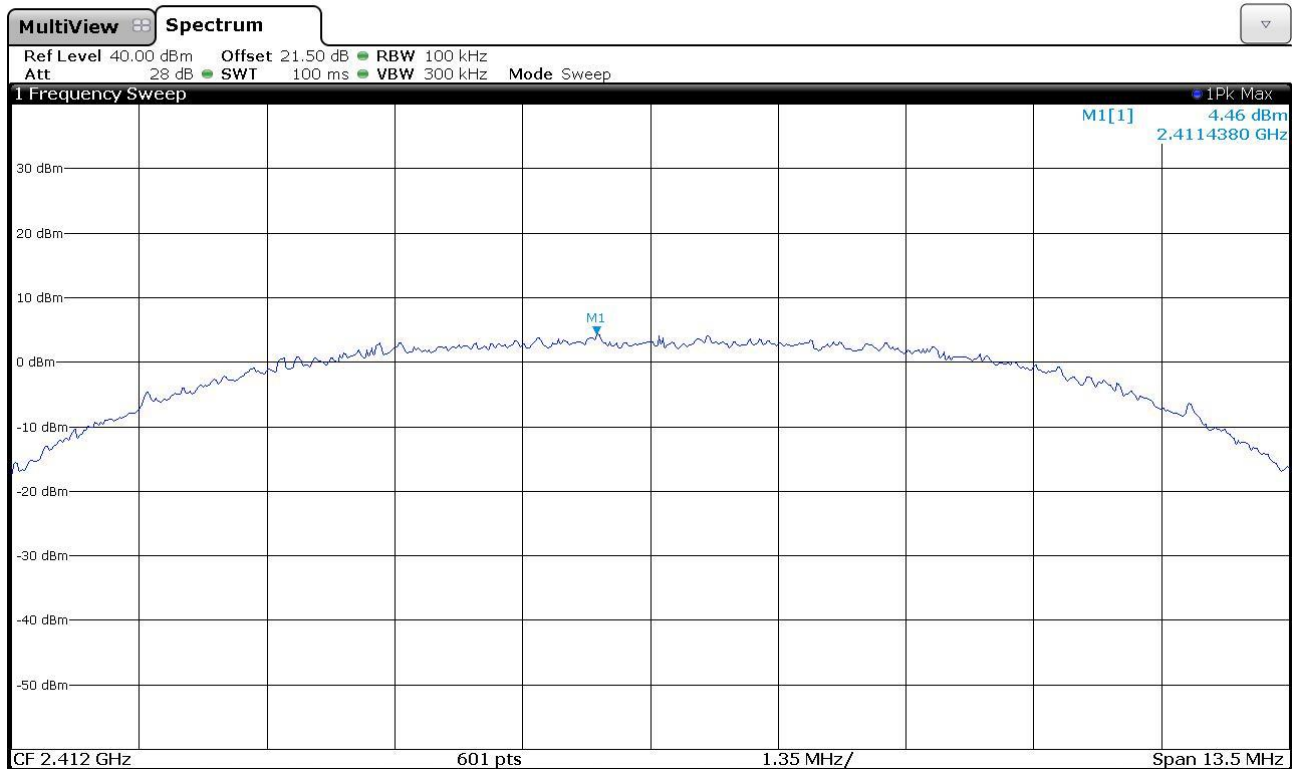
Remarks: the total attenuation value is due to the 20 dB attenuator and the cable provided by the manufacturer calibrated before the test. The measured value has been obtained by considering the attenuation value directly during the scan



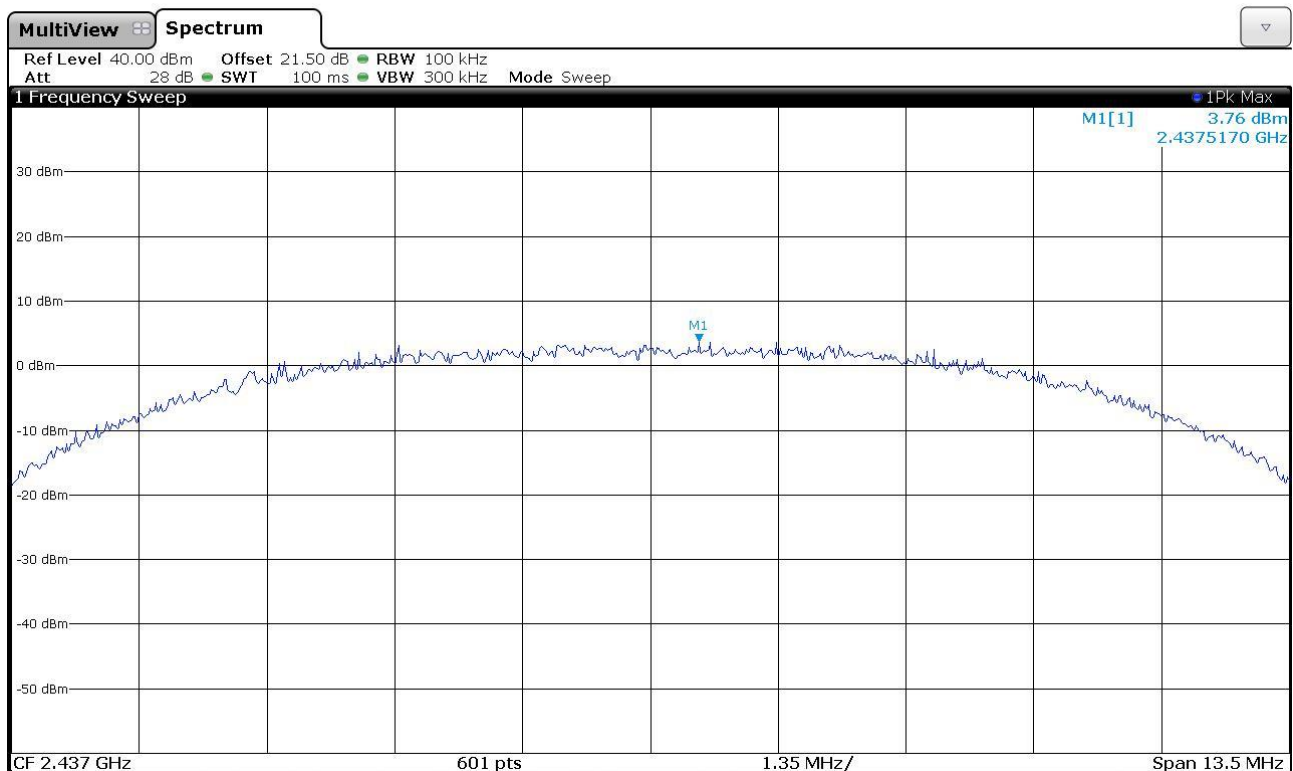


Graphs

Bertezzo 172130_19

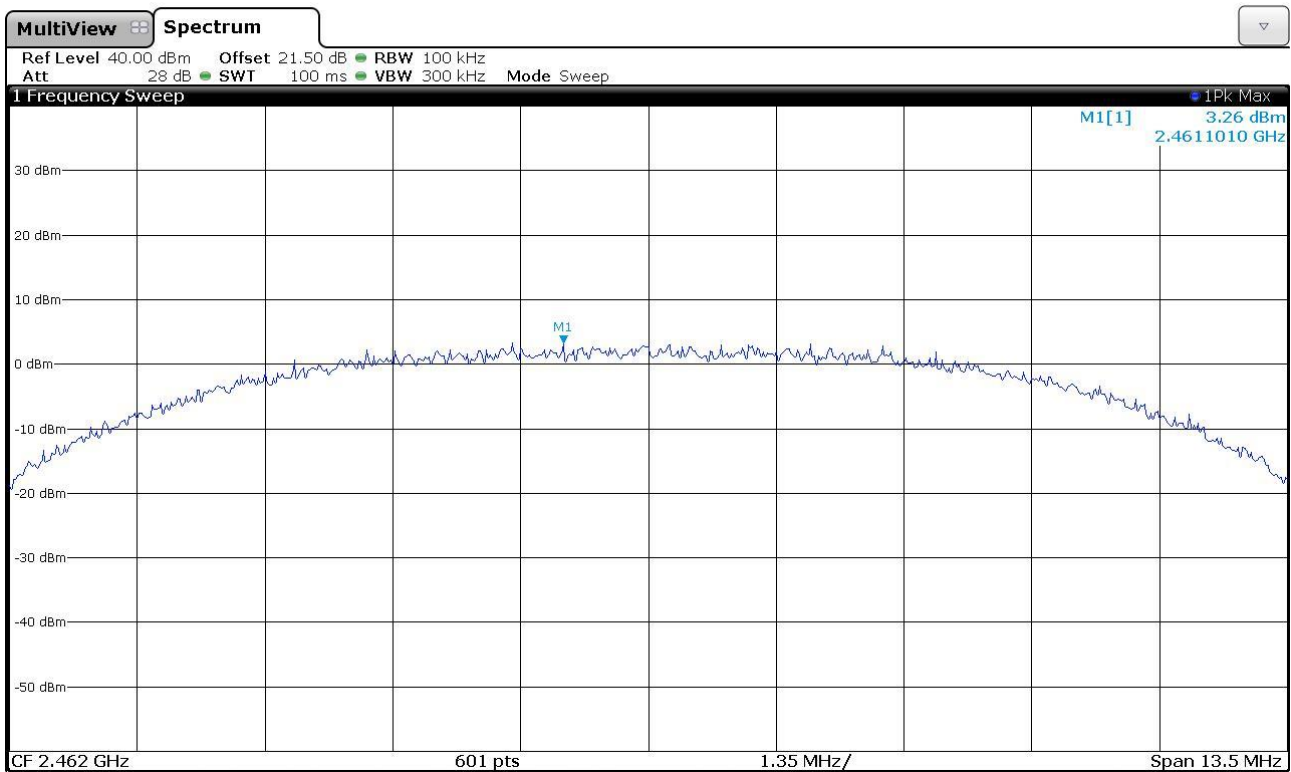


Bertezzo 172130_20

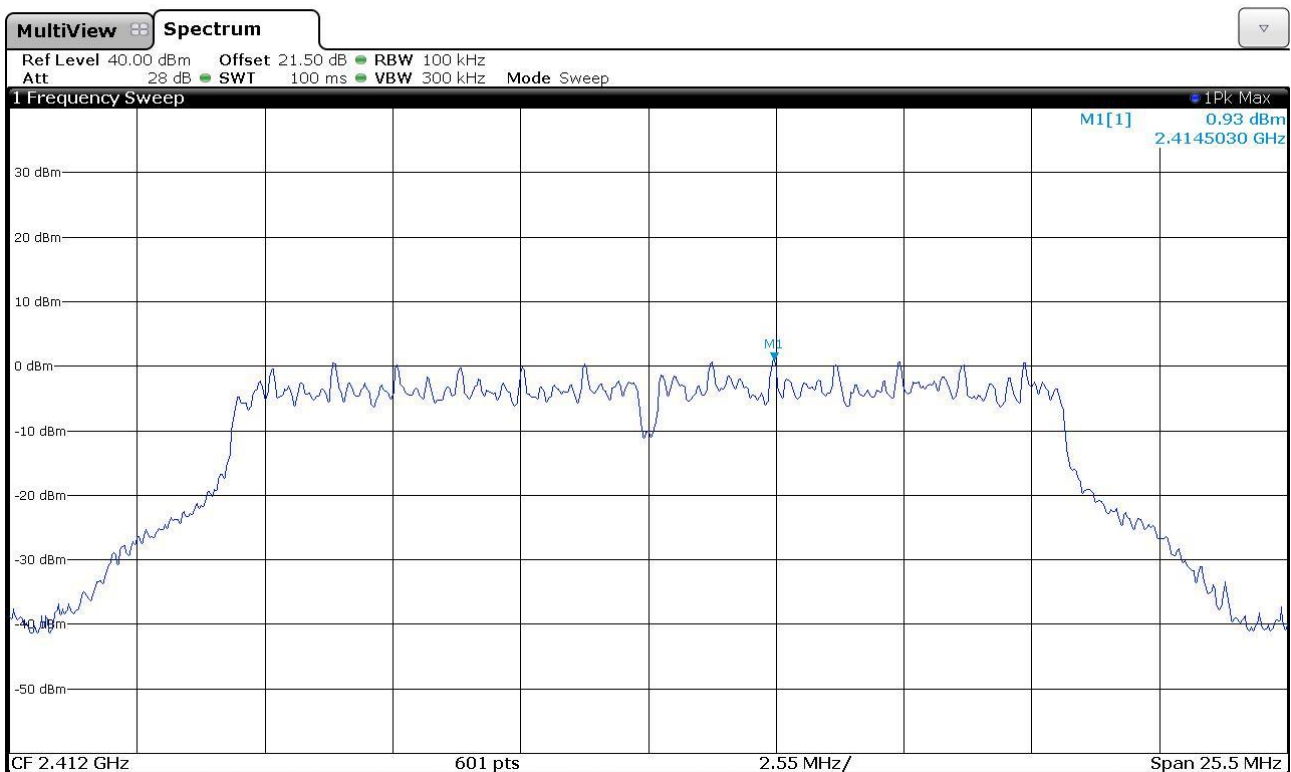




Bertezzo 172130_21

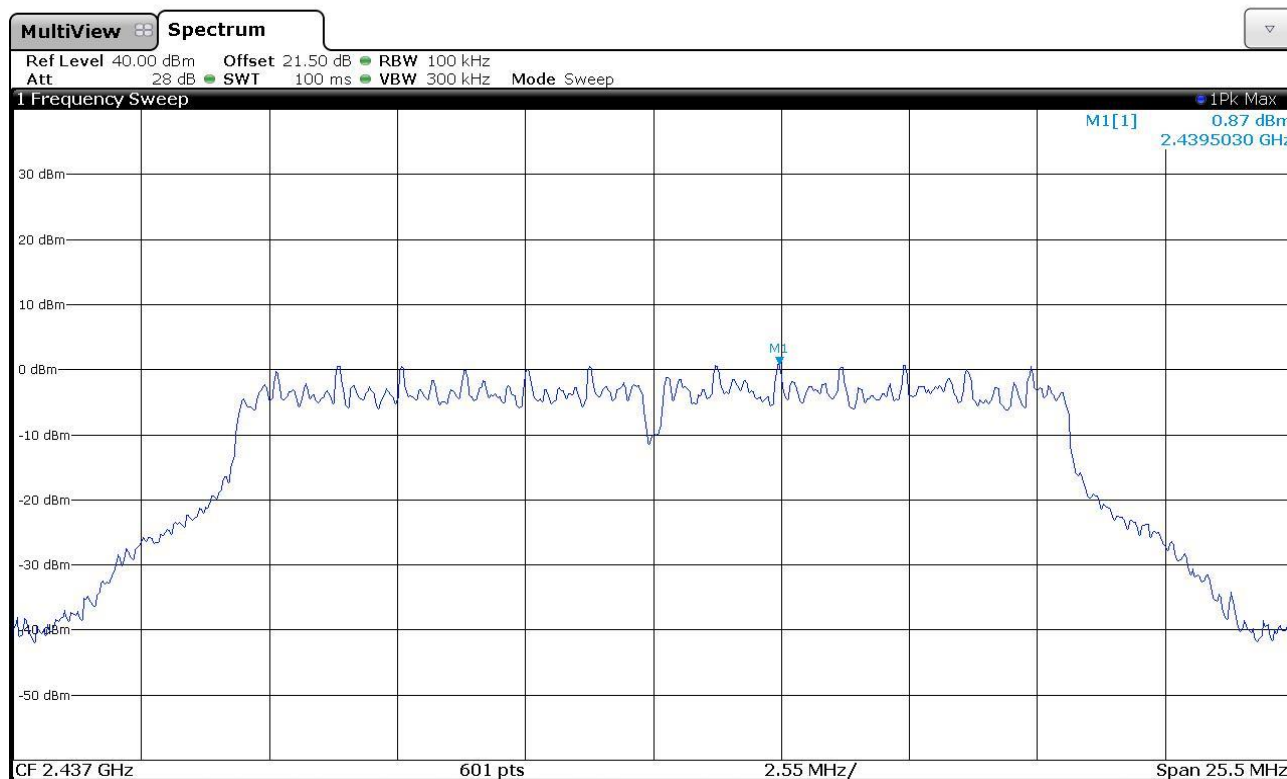


Bertezzo 172130_22

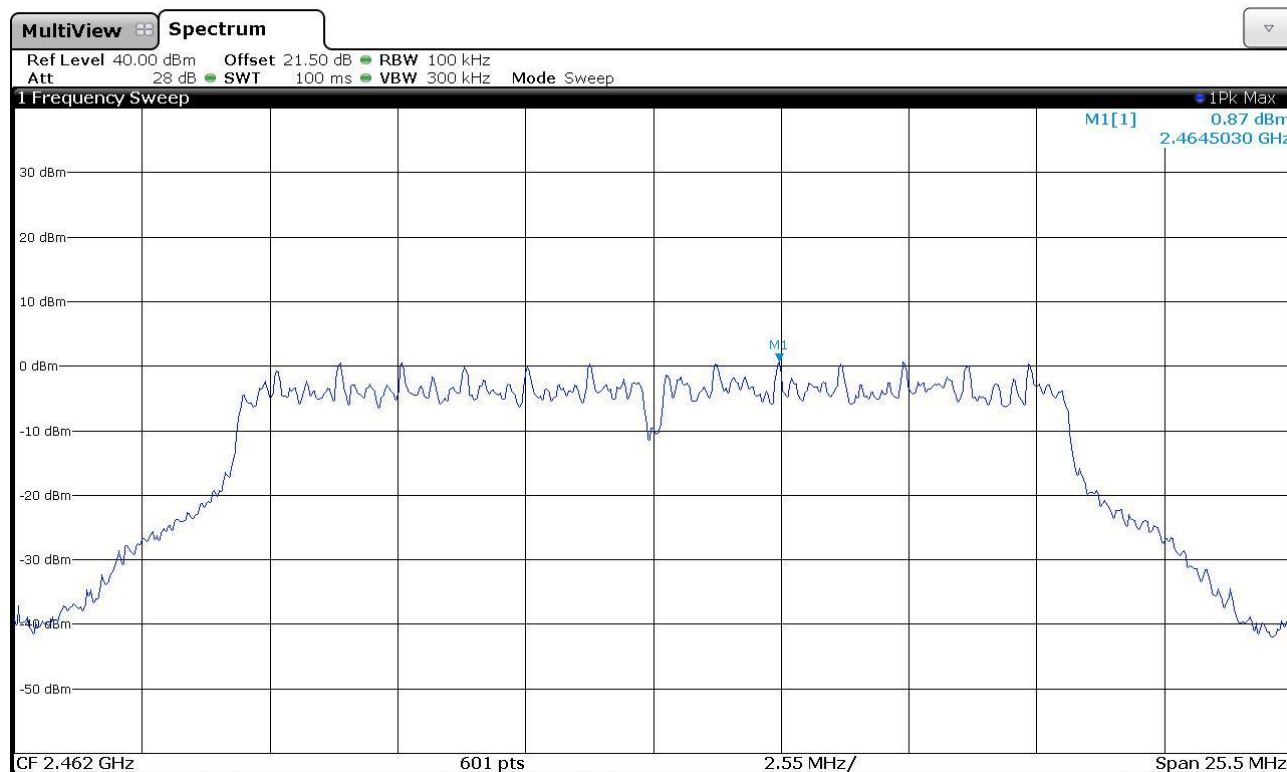




Bertezzo 172130_23

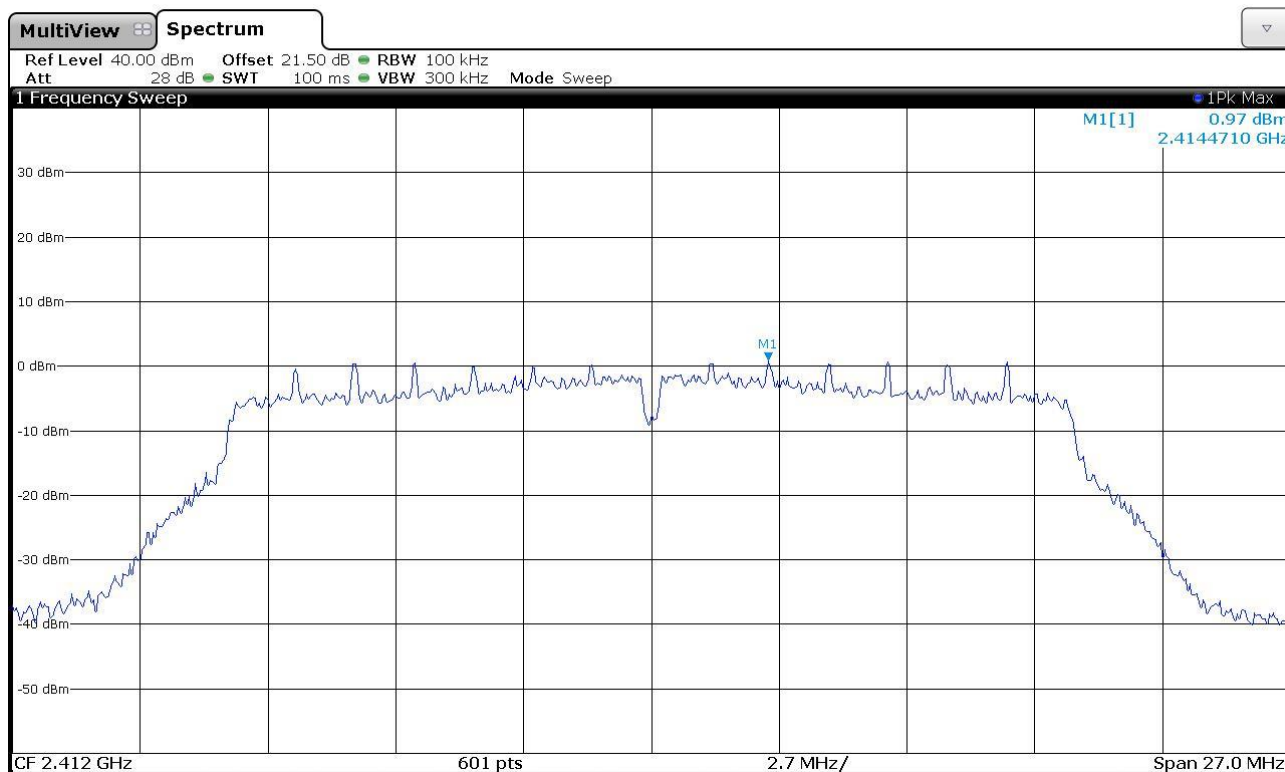


Bertezzo 172130_24

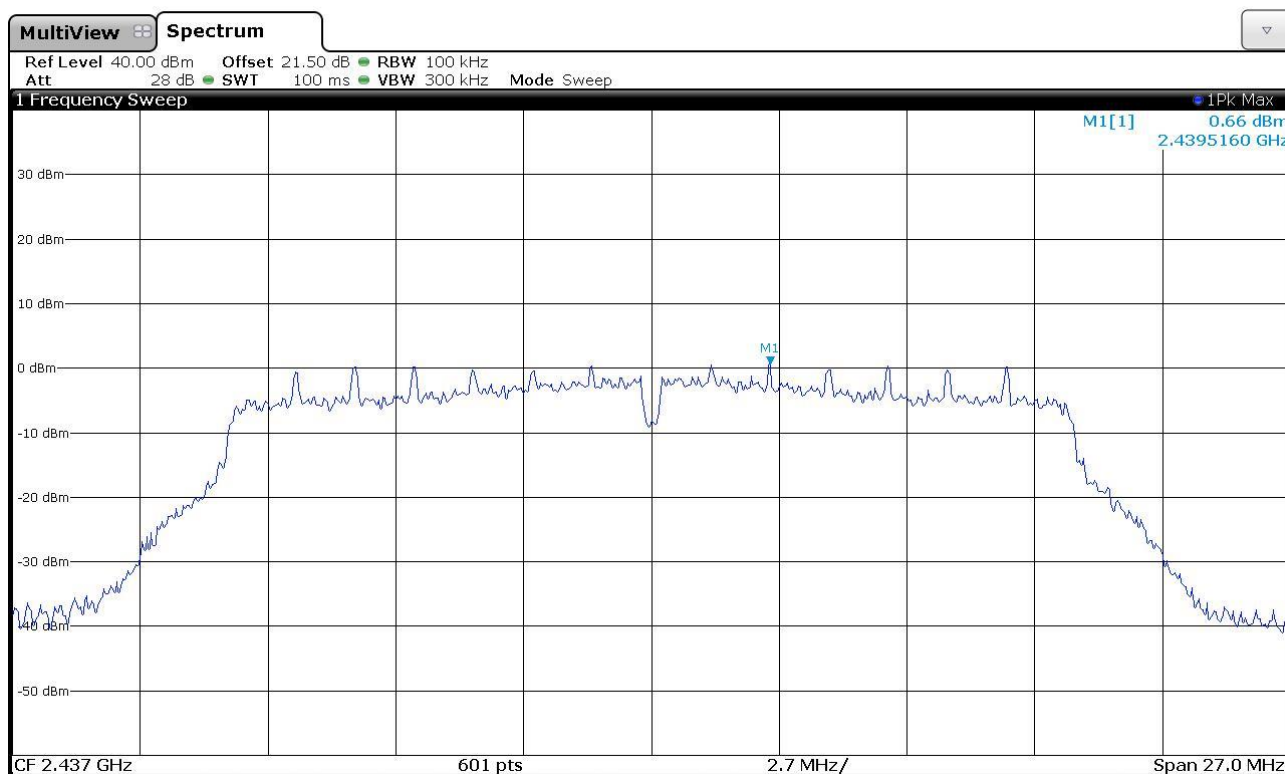




Bertezzo 172130_25

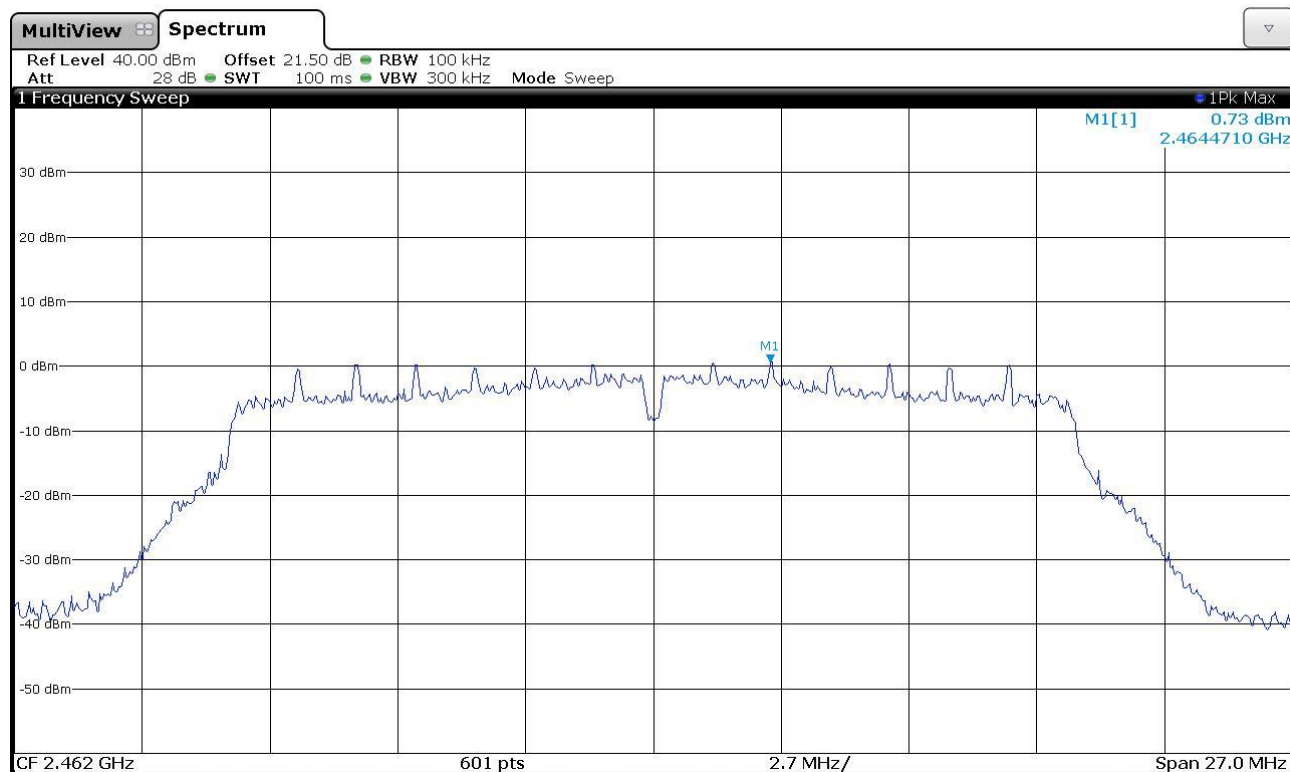


Bertezzo 172130_26





Bertezzo 172130_27



Result: The requirements are met



10.8 Spurious Emission

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part. 15.209
- KDB 558074 D01 DTS Meas Guidance v04 cl. 11 and 12
- ANSI C63.10 cl. 6.6
- Internal procedure PM001
- See clause 4 of this test report
- Test date: December 18th, 2017
- Technician: A. Bertezolo

Test configuration

Test site:
Semi-anechoic chamber

Auxiliary equipment:
See clause 4 of this test report

EUT exercising

See clause 4 of this test report

Test equipment used

CMC S164, CMC S241, CMC S251, CMC S290,
CMC S298
Measurement uncertainty: See clause 7 of this test report

Test specification

Port: Enclosure
Antenna polarization: Horizontal (H) – Vertical (V)
EUT height about the floor: 150 cm
EUT – Antenna distance: 3 m
Detector AV + Peak

Environmental conditions

Temperature (°C)	Atmospheric pressure (kPa)	Relative humidity (%)
22	100	45

Acceptance limits

Acceptance limits for emissions in restricted frequency bands		
Frequency (MHz)	AV limits [dB(μV/m)]	Peak limits [dB(μV/m)]
> 1000	54	74



The restricted frequency bands are listed in the following table

MHz	MHz	MHz	GHz
0,09 – 0,110	16,42 – 16,423	399,9 – 410	4,5 – 5,15
0,495 – 0,505	16,69475 – 16,69525	608 – 614	5,35 – 5,46
2,1735 – 2,1905	16,80425 – 16,80475	960 – 1240	7,25 – 7,75
4,125 – 4,128	25,5 – 25,67	1300 – 1427	8,025 – 8,5
4,17725 – 4,17775	37,5 – 38,25	1435 – 1626,5	9,0 – 9,2
4,20725 – 4,20775	73 – 74,6	1645,5 – 1646,5	9,3 – 9,5
6,215 – 6,218	74,8 – 75,2	1660 – 1710	10,6 – 12,7
6,26775 – 6,26825	108 – 121,94	1718,8 – 1722,2	13,25 – 13,4
6,31175 – 6,31225	123 – 138	2200 – 2300	14,47 – 14,5
8,291 – 8,294	149,9 – 150,05	2310 – 2390	15,35 – 16,2
8,362 – 8,366	156,52475 – 156,52525	2483,5 – 2500	17,7 – 21,4
8,41425 – 8,41475	162,0125 – 167,17	3260 – 3267	23,6 – 24
12,29 – 12,293	167,72 – 173,2	3332 – 3339	31,2 – 31,8
12,57675 – 12,57725	322 – 335,4	3600 – 4400	Above 38,6
13,36 – 13,41			

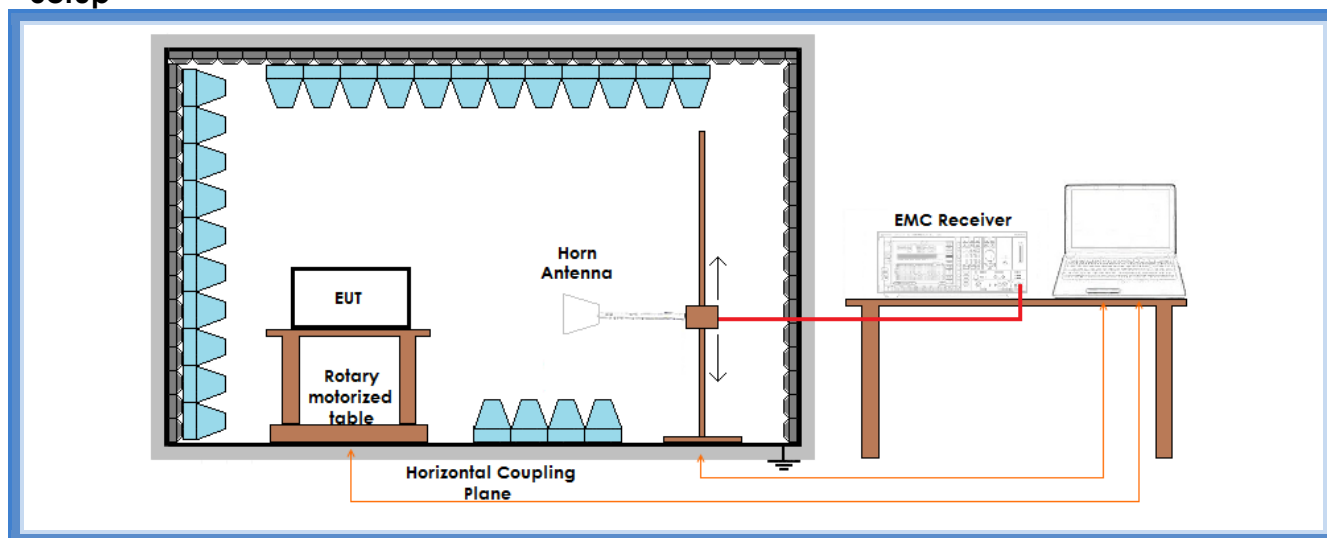
Acceptance limits for emissions in non-restricted frequency bands

The DTS rules specify that in any 100 kHz bandwidth outside of the authorized frequency band, the power shall be attenuated according to the following conditions:

- If the maximum peak conducted output power procedure was used to demonstrate compliance as described in 9.1, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz
- If maximum conducted (average) output power was used to demonstrate compliance as described in 9.2, then the peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz.
- In either case, attenuation to levels below the 15.209 general radiated emissions limits is not required



Setup



Result – AV detector

WiFi b mode

Harmonic	Limits (dB μ V/m)	Level (dB μ V/m)			Results
		Lowest channel	Medium channel	Highest channel	
II	54	34,10	41,32	37,32	Complies
III	54	35,92	35,82	34,83	Complies
IV	54	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
V	54	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
VI	54	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
VII	54	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
VIII	54	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
IX	54	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
X	54	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies

Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest values. No spurious other than harmonics have been found. The results have been extrapolated to the specified distance using an extrapolation factor. For all harmonics it was considered the limit of 54 dB μ V/m as a worst case.



WiFi g mode

Harmonic	Limits (dB μ V/m)	Level (dB μ V/m)			Results
		Lowest channel	Medium channel	Highest channel	
II	54	33,10	33,93	33,76	Complies
III	54	48,41	49,08	46,69	Complies
IV	54	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
V	54	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
VI	54	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
VII	54	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
VIII	54	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
IX	54	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
X	54	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies

Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest values. No spurious other than harmonics have been found. The results have been extrapolated to the specified distance using an extrapolation factor. For all harmonics it was considered the limit of 54 dB μ V/m as a worst case.



WiFi n mode

Harmonic	Limits (dB μ V/m)	Level (dB μ V/m)			Results
		Lowest channel	Medium channel	Highest channel	
II	54	33,08	34,44	34,46	Complies
III	54	48,50	49,24	48,82	Complies
IV	54	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
V	54	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
VI	54	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
VII	54	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
VIII	54	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
IX	54	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
X	54	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies

Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest values. No spurious other than harmonics have been found. The results have been extrapolated to the specified distance using an extrapolation factor. For all harmonics it was considered the limit of 54 dB μ V/m as a worst case.



Result – Peak detector

WiFi b mode

Harmonic	Limits (dB μ V/m)	Level (dB μ V/m)			Results
		Lowest channel	Medium channel	Highest channel	
II	74	43,62	46,17	44,96	Complies
III	74	More than 20 dB below limit	46,01	46,07	Complies
IV	74	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
V	74	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
VI	74	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
VII	74	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
VIII	74	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
IX	74	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
X	74	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies

Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest values. No spurious other than harmonics have been found. The results have been extrapolated to the specified distance using an extrapolation factor. For all harmonics it was considered the limit of 74 dB μ V/m as a worst case.



WiFi g mode

Harmonic	Limits (dB μ V/m)	Level (dB μ V/m)			Results
		Lowest channel	Medium channel	Highest channel	
II	74	43,92	43,42	43,61	Complies
III	74	66,12	67,29	66,62	Complies
IV	74	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
V	74	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
VI	74	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
VII	74	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
VIII	74	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
IX	74	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
X	74	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies

Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest values. No spurious other than harmonics have been found. The results have been extrapolated to the specified distance using an extrapolation factor. For all harmonics it was considered the limit of 74 dB μ V/m as a worst case.



WiFi n mode

Harmonic	Limits (dB μ V/m)	Level (dB μ V/m)			Results
		Lowest channel	Medium channel	Highest channel	
II	74	44,89	45,79	46,97	Complies
III	74	71,25	71,50	69,98	Complies
IV	74	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
V	74	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
VI	74	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
VII	74	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
VIII	74	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
IX	74	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies
X	74	More than 20 dB below limit	More than 20 dB below limit	More than 20 dB below limit	Complies

Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest values. No spurious other than harmonics have been found. The results have been extrapolated to the specified distance using an extrapolation factor. For all harmonics it was considered the limit of 74 dB μ V/m as a worst case.

Result: The requirements are met