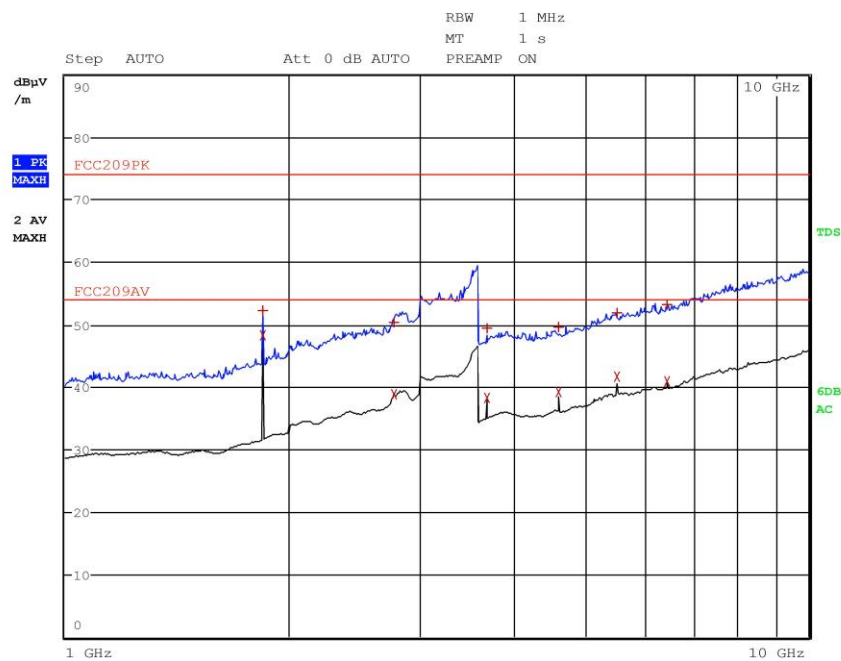




G16178819

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition Tx - Fmid
Operator Gandini 16178819
Test Spec
Horiz





Meas Type Emission
Equipment under Test
Manufacturer
OP Condition Tx - Fmid
Operator Gandini 16178819
Test Spec
Horiz

Final Measurement

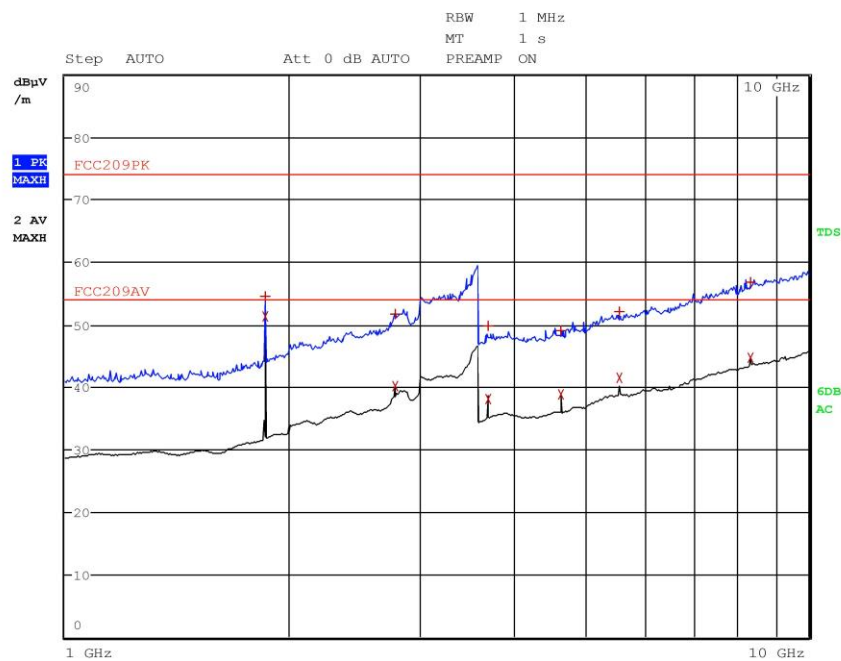
Meas Time: 1 s
Margin: 6 dB
Subranges: 12

Trace	Frequency	Level (dBμV/m)	Detector	Delta Limit/dB
1	1.842800000 GHz	52.35	Max Peak	-21.63
2	1.842800000 GHz	48.34	Average	-5.64
2	2.764400000 GHz	38.81	Average	-15.17
1	2.773200000 GHz	50.48	Max Peak	-23.50
1	3.686000000 GHz	49.41	Max Peak	-24.57
2	3.686000000 GHz	38.23	Average	-15.75
1	4.600000000 GHz	49.59	Max Peak	-24.39
2	4.607600000 GHz	39.22	Average	-14.76
1	5.522400000 GHz	51.99	Max Peak	-21.99
2	5.528800000 GHz	41.65	Average	-12.33
1	6.447600000 GHz	53.17	Max Peak	-20.81
2	6.450400000 GHz	40.91	Average	-13.07



G16178820

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition Tx - Fmax
Operator Gandini 16178820
Test Spec
Horiz





Meas Type Emission
Equipment under Test
Manufacturer
OP Condition Tx - Fmax
Operator Gandini 16178820
Test Spec
Horiz

Final Measurement

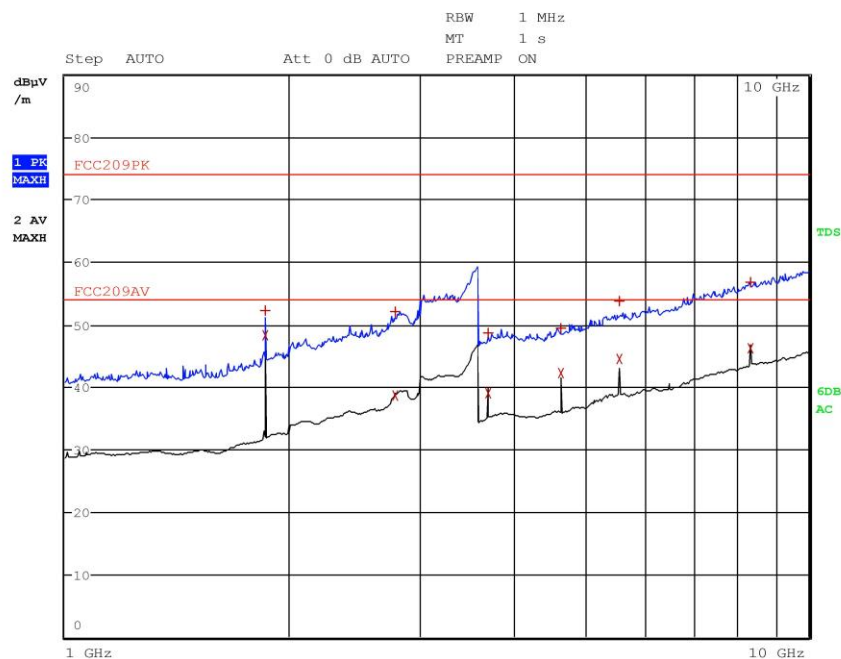
Meas Time: 1 s
Margin: 20 dB
Subranges: 12

Trace	Frequency	Level (dBμV/m)	Detector	Delta Limit/dB
2	1.855600000 GHz	51.27	Average	-2.71
1	1.855600000 GHz	54.63	Max Peak	-19.35
1	2.776800000 GHz	51.76	Max Peak	-22.22
2	2.783600000 GHz	40.12	Average	-13.86
1	3.711600000 GHz	49.83	Max Peak	-24.15
2	3.711600000 GHz	38.08	Average	-15.90
1	4.635600000 GHz	49.02	Max Peak	-24.96
2	4.639200000 GHz	38.92	Average	-15.06
1	5.552400000 GHz	52.04	Max Peak	-21.94
2	5.567200000 GHz	41.52	Average	-12.46
1	8.347200000 GHz	56.74	Max Peak	-17.24
2	8.350800000 GHz	44.70	Average	-9.28



G16178821

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition Tx - Fmax
Operator Gandini 16178821
Test Spec
Vert





Meas Type Emission
Equipment under Test
Manufacturer
OP Condition Tx - Fmax
Operator Gandini 16178821
Test Spec
Vert

Final Measurement

Meas Time: 1 s
Margin: 20 dB
Subranges: 12

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
2	1.855600000 GHz	48.32	Average	-5.66
1	1.855600000 GHz	52.31	Max Peak	-21.67
1	2.782800000 GHz	52.15	Max Peak	-21.83
2	2.783600000 GHz	38.74	Average	-15.24
1	3.702800000 GHz	48.66	Max Peak	-25.32
2	3.711600000 GHz	39.13	Average	-14.85
2	4.639200000 GHz	42.23	Average	-11.75
1	4.641600000 GHz	49.47	Max Peak	-24.51
1	5.567200000 GHz	53.87	Max Peak	-20.11
2	5.567200000 GHz	44.47	Average	-9.51
2	8.350800000 GHz	46.20	Average	-7.78
1	8.356400000 GHz	56.76	Max Peak	-17.22

Result: The requirements are met



11.3 20 dB bandwidth

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.247
- DA 00-705
- Internal procedure PM001
- See clause 4 of this test report

Test configuration and test method

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 S108, CMC S136, CMC S227
Measurement uncertainty: See clause 7 of this test report

Test specification

See FCC Part 15.247

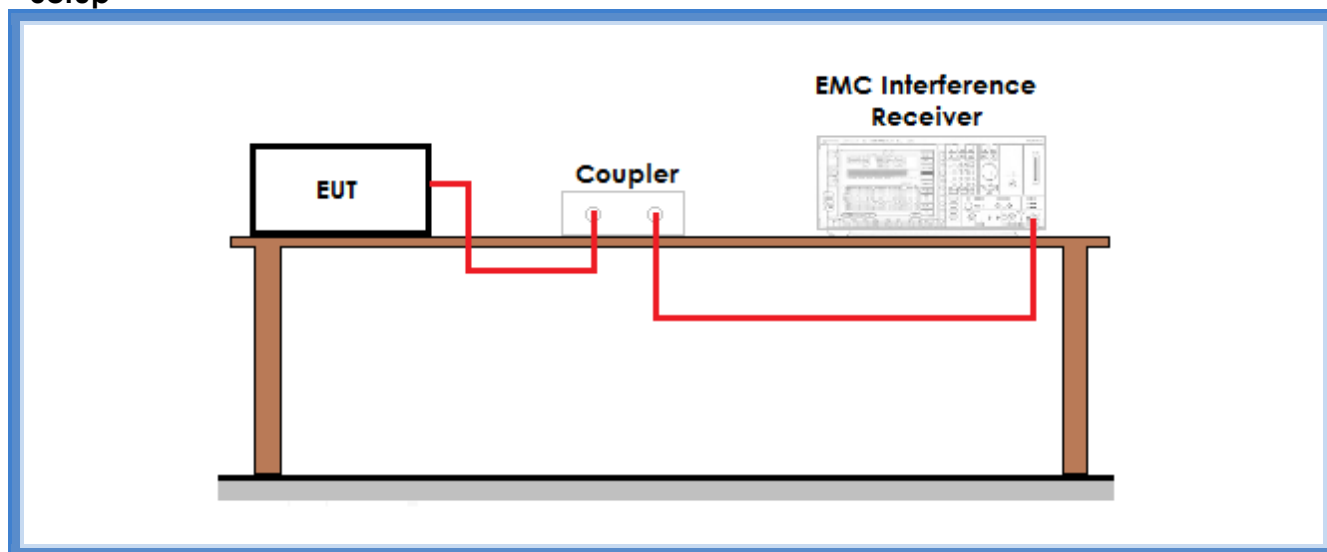
Environmental conditions

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

Acceptance limits: The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz



Setup



Result

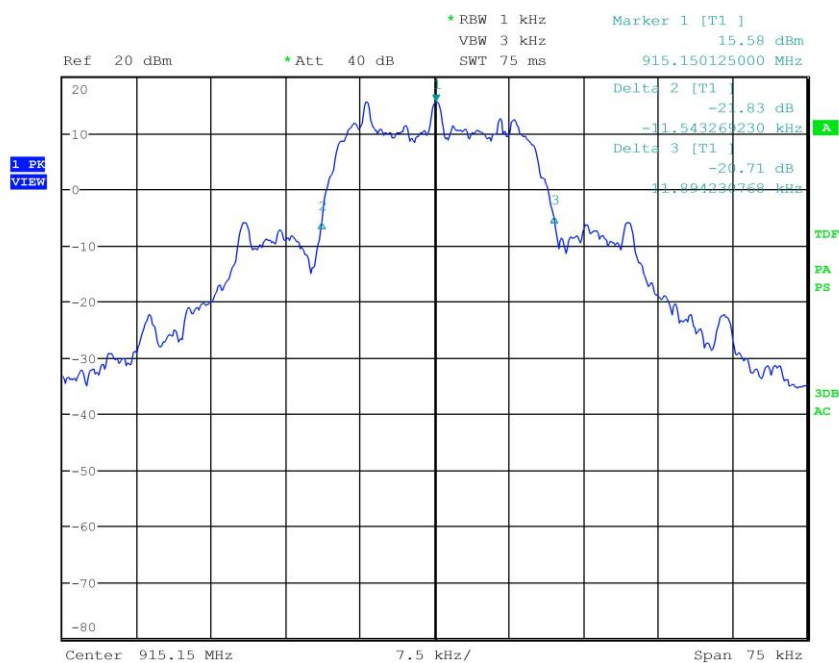
Frequency (MHz)	Graphs	20 dB bandwidth (kHz)	Maximum 20 dB bandwidth allowed (kHz)	Results
915,150	G16178837	24,437	500	Complies
921,500	G16178851	22,956	500	Complies
927,850	G16178854	24,037	500	Complies



Graphs

G16178837

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezzo 16178837
Test Spec





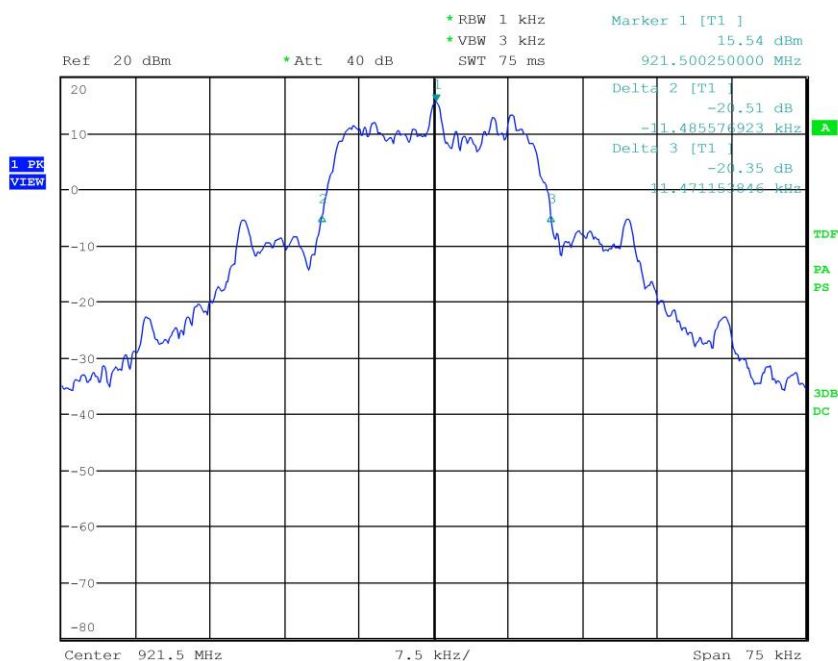
CMC
Centro Misure Compatibilità S.r.l.
Via della Fisica, 20
36016 Thiene (VI)



LAB N° 0168

G16178851

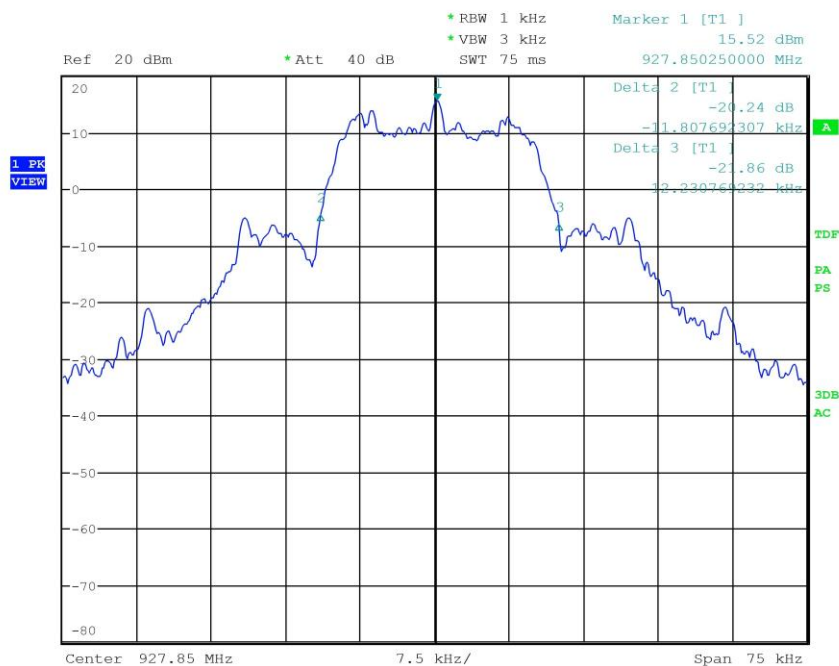
Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 16178851
Test Spec





G16178854

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezzo 16178854
Test Spec



Result: The requirements are met



11.4 Channel separation

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.247
- DA 00-705
- Internal procedure PM001
- See clause 4 of this test report

Test configuration and test method

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 S108, CMC S136, CMC S227
Measurement uncertainty: See clause 7 of this test report

Test specification

See FCC Part 15.247

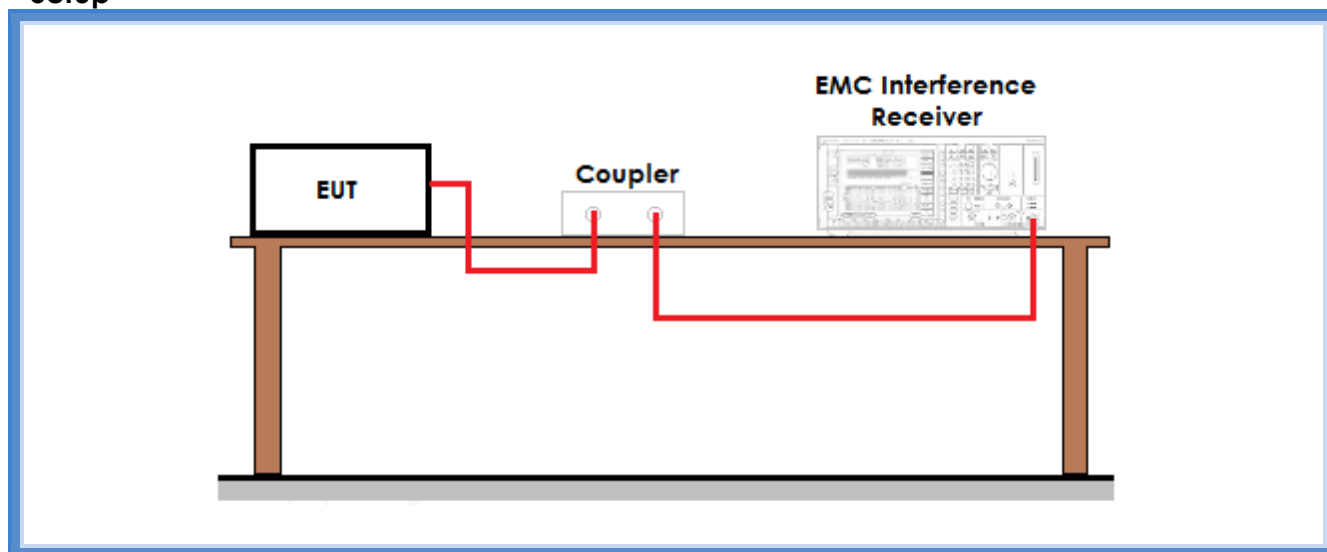
Environmental conditions

Temperature (°C)	Atmospheric pressure (kPa)	Relative humidity (%)
20	100	42

Acceptance limits: frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400–2483,5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW



Setup



Result

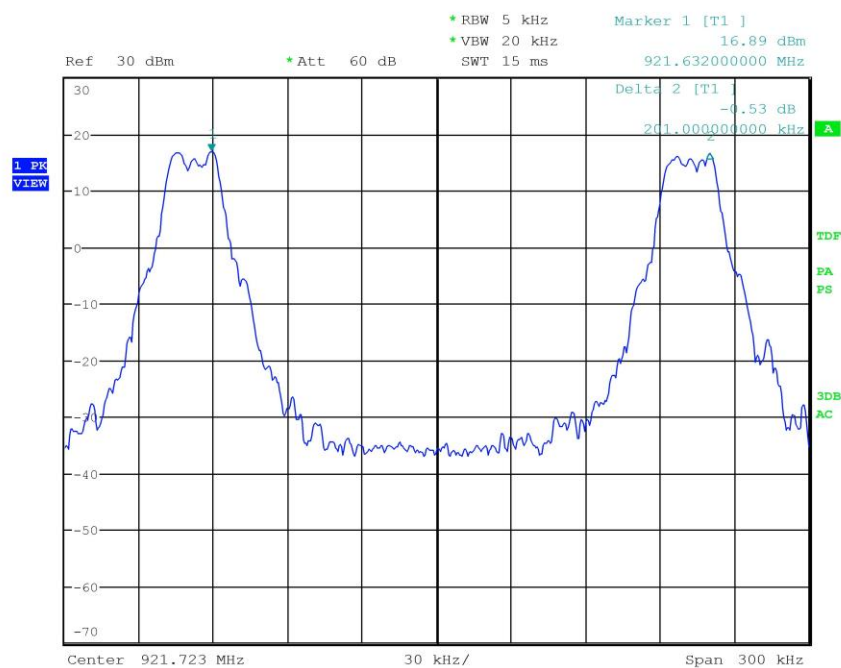
Frequency band (MHz)	Graphs	Channel separation (kHz)	Minimum channel separation required (kHz)	Results
902 – 928	G16178835	201,0	25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater	Complies



Graphs

G16178835

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezzolo 16178835
Test Spec



Result: The requirements are met



11.5 Number of hopping channels

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.247
- DA 00-705
- Internal procedure PM001
- See clause 4 of this test report

Test configuration and test method

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 S108, CMC S136, CMC S227
Measurement uncertainty: See clause 7 of this test report

Test specification

See FCC Part 15.247

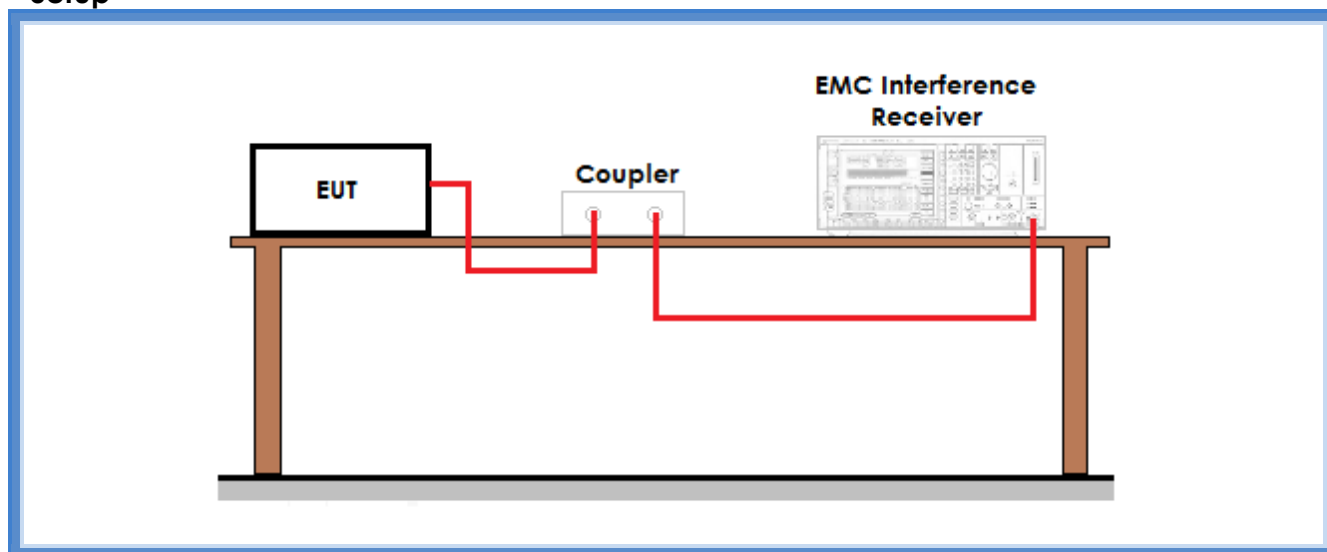
Environmental conditions

Temperature (°C)	Atmospheric pressure (kPa)	Relative humidity (%)
20	100	42

Acceptance limits: for frequency hopping systems operating in the 902–928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies. If the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies. Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.



Setup



Result

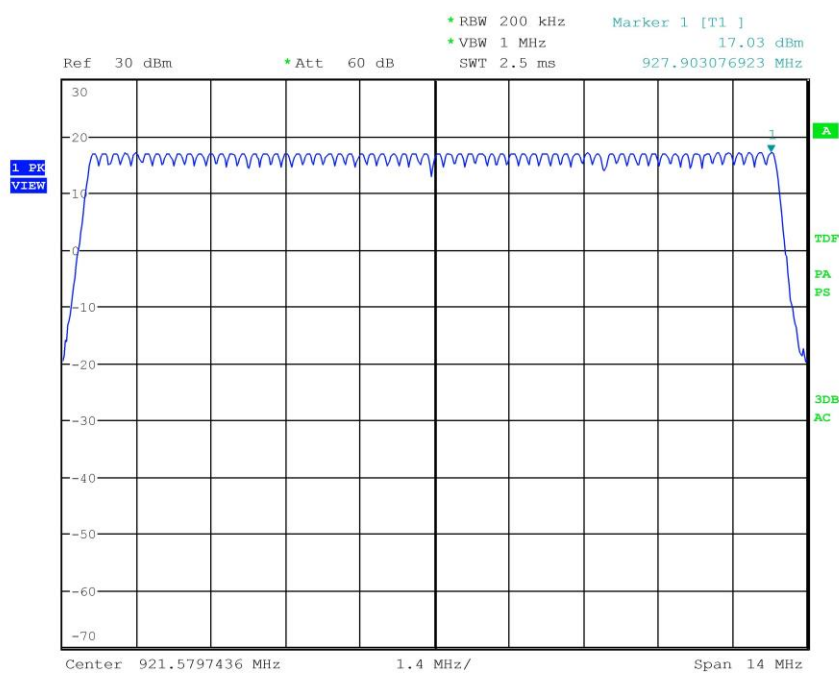
Graphs	Number of hopping channels	Minimum number of hopping channels required	Results
G16178834	64	50 if the 20 dB bandwidth is less than 250 kHz 25 if the 20 dB bandwidth is 250 kHz or greater	Complies



Graphs

G16178834

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezzolo 16178834
Test Spec



Result: The requirements are met



11.6 Time of occupancy

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.247
- DA 00-705
- Internal procedure PM001
- See clause 4 of this test report

Test configuration and test method

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 S108, CMC S136, CMC S227
Measurement uncertainty: See clause 7 of this test report

Test specification

See FCC Part 15.247

Environmental conditions

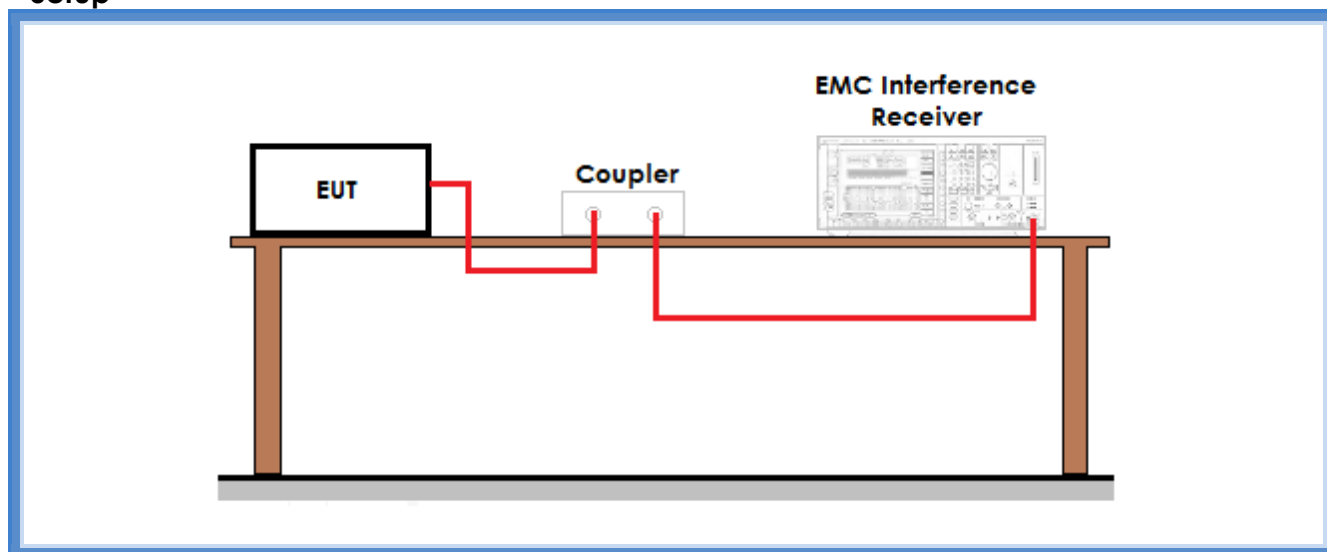
Temperature (°C)	Atmospheric pressure (kPa)	Relative humidity (%)
22	100	42

Acceptance limits:

For frequency hopping systems operating in the 902–928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0,4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0,4 seconds within a 10 second period



Setup



Result

Dwell time of transmission

Frequency (MHz)	Graphs	Dwell time (ms)
921,58	G16178836	21,634

Number of transmissions per period

Frequency (MHz)	Time between 2 transmission on different channels		Number of transmissions (20000 ms / 49,519 ms / number of channels)
921,58	G16178836	49,519 ms	6,31

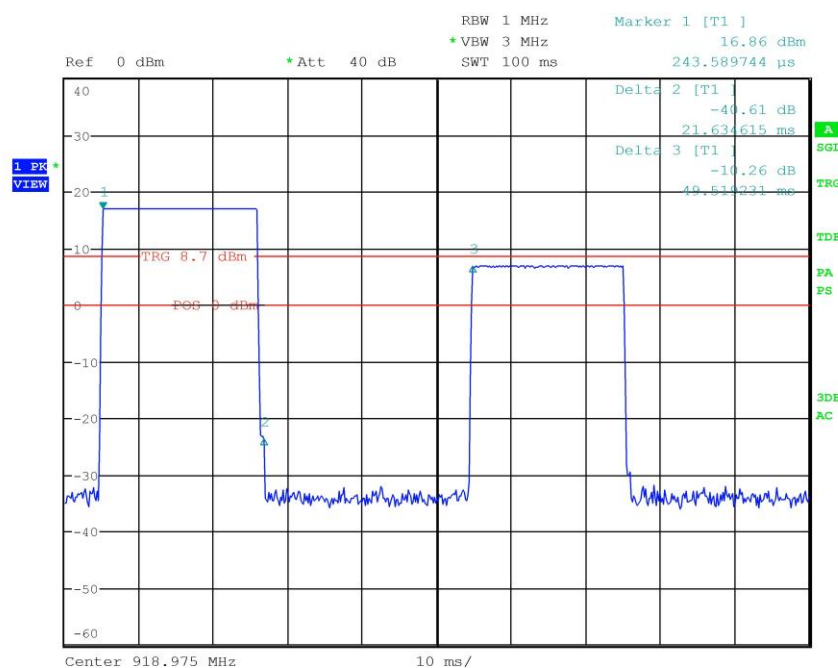
Time of occupancy (Dwell time x Number of transmissions)	136,53 ms
---	-----------



Graphs

G16178836

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezzo 16178836
Test Spec



Result: The requirements are met



11.7 Band edge

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.247
- DA 00-705
- Internal procedure PM001
- See clause 4 of this test report

Test configuration and test method

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 S108, CMC S136, CMC S227
Measurement uncertainty: See clause 7 of this test report

Test specification

See FCC Part 15.247

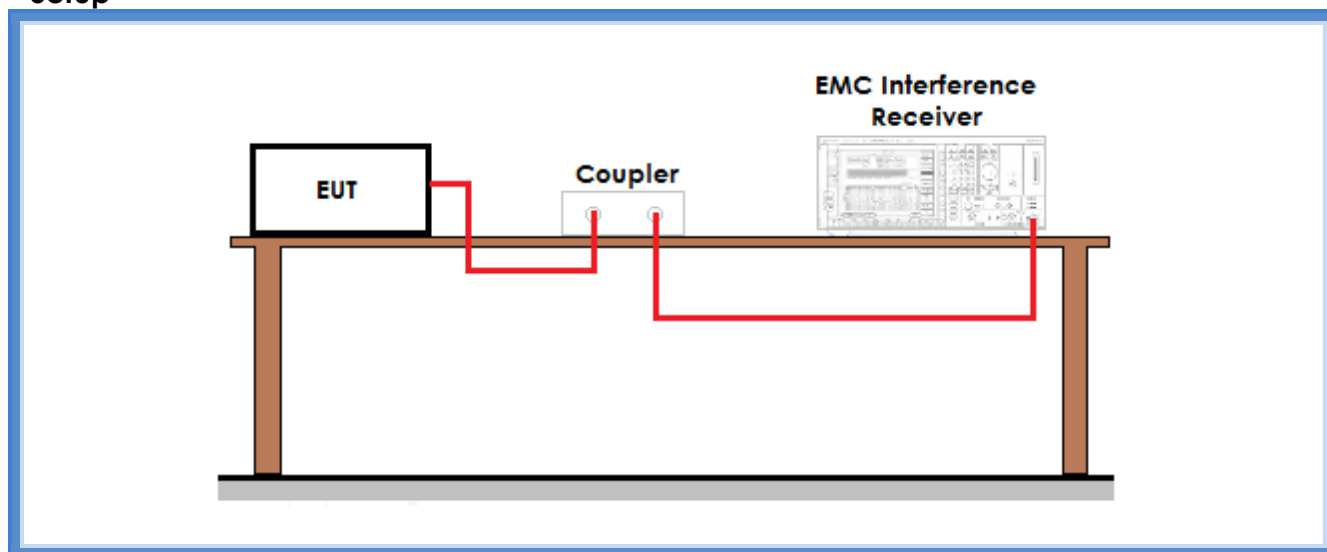
Environmental conditions

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

Acceptance limits: operation within the band 902 – 928 MHz



Setup



Result

Frequency (MHz)	Graph(s) – Hopping	Results	
915,15	G16178842	F _L : 915,126153 MHz	Complies
927,85	G16178858	F _H : 927,874717 MHz	Complies

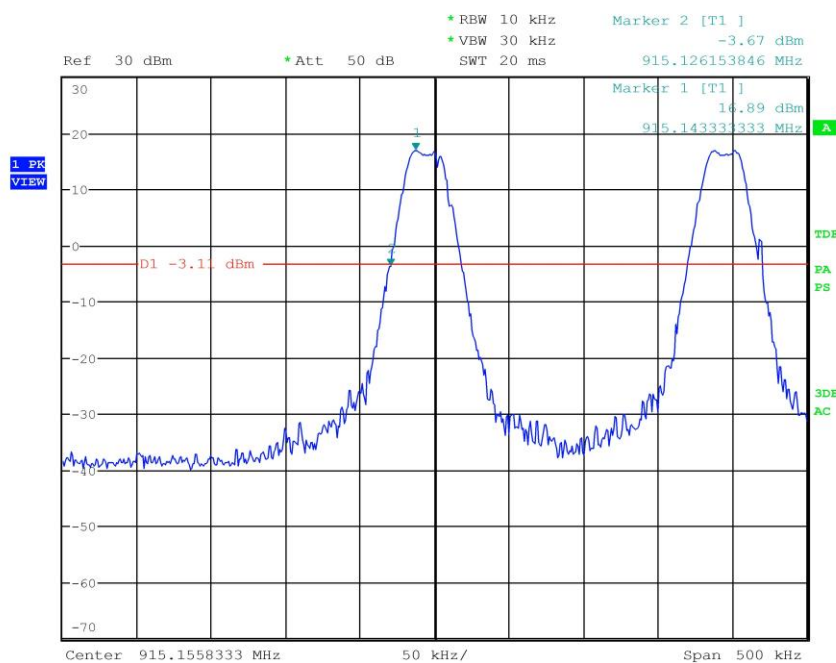
Frequency (MHz)	Graph(s) – No hopping	Results	
915,15	G16178843	F _L : 915,125352 MHz	Complies
927,85	G16178859	F _H : 927,876000 MHz	Complies



Graphs

G16178842

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezzo 16178842
Test Spec





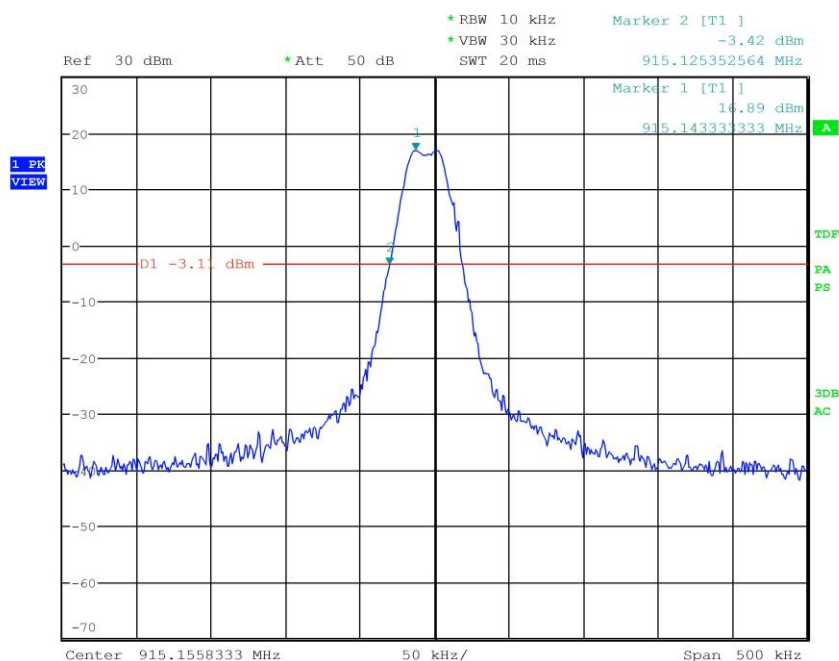
CMC
Centro Misure Compatibilità S.r.l.
Via della Fisica, 20
36016 Thiene (VI)



LAB N° 0168

G16178843

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezzo 16178843
Test Spec





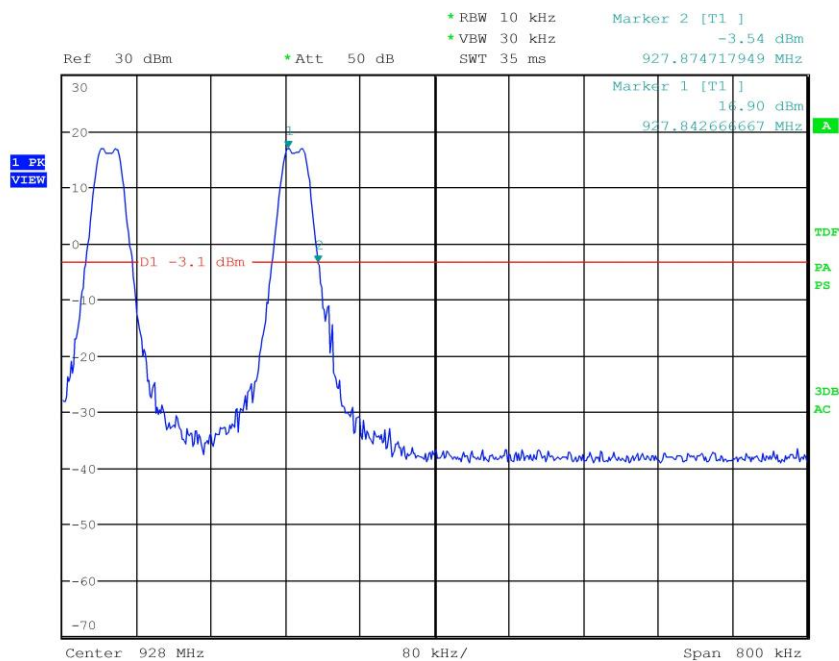
CMC
Centro Misure Compatibilità S.r.l.
Via della Fisica, 20
36016 Thiene (VI)



LAB N° 0168

G16178858

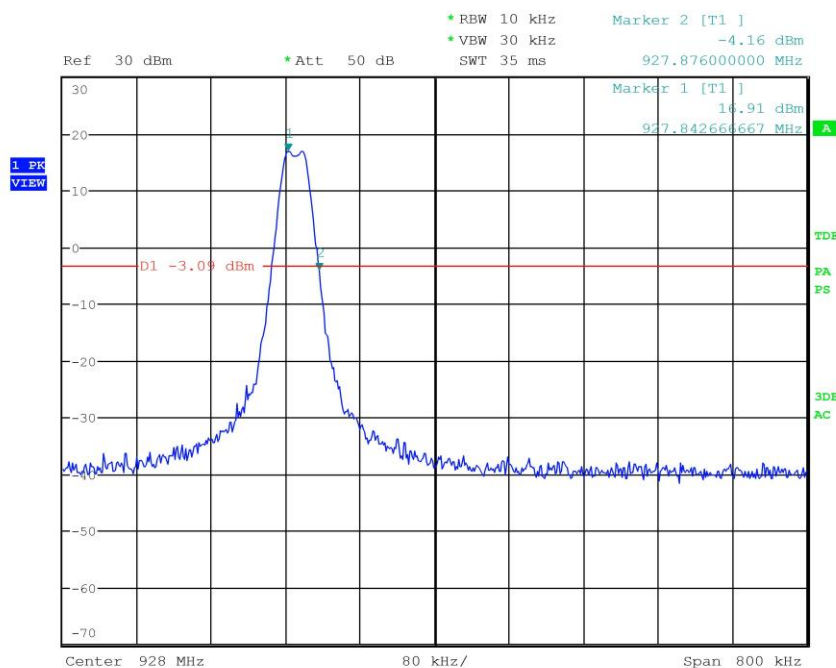
Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 16178858
Test Spec





G16178859

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezzo 16178859
Test Spec



Result: The requirements are met



11.8 Peak Output Power

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.247
- DA 00-705
- Internal procedure PM001
- See clause 4 of this test report

Test configuration and test method

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

Test specification

Port: Antenna

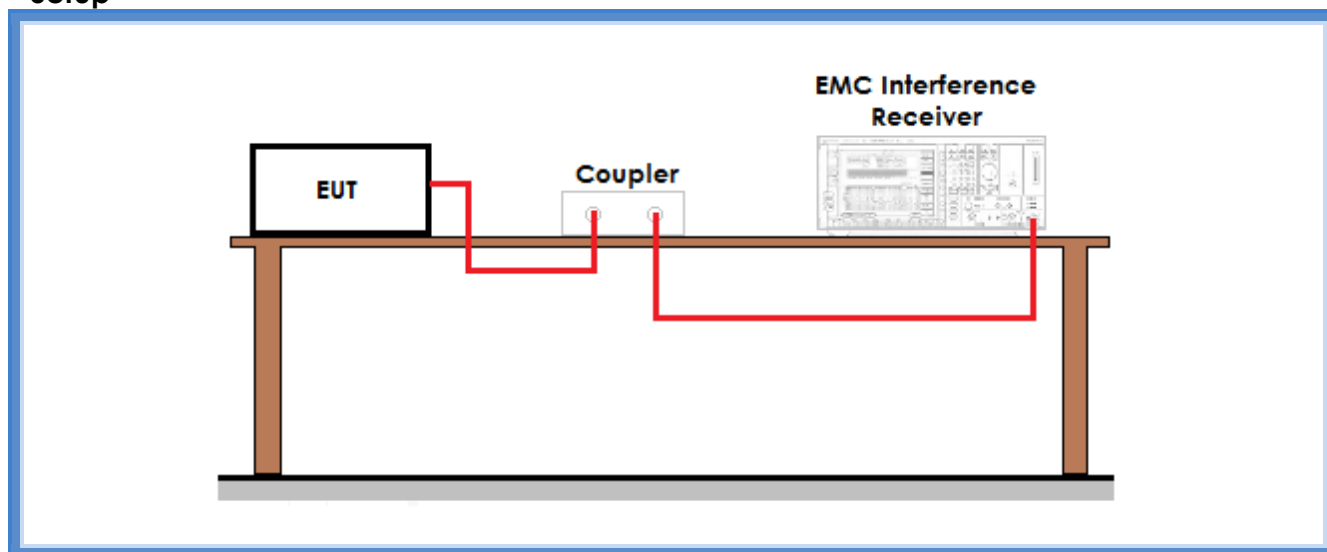
Environmental conditions

Temperature (°C)	Atmospheric pressure (kPa)	Relative humidity (%)
20	100	45

For frequency hopping systems operating in the 2400–2483,5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483,5 MHz band: 0,125 watts. For frequency hopping systems operating in the 902–928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0,25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels.



Setup



Result

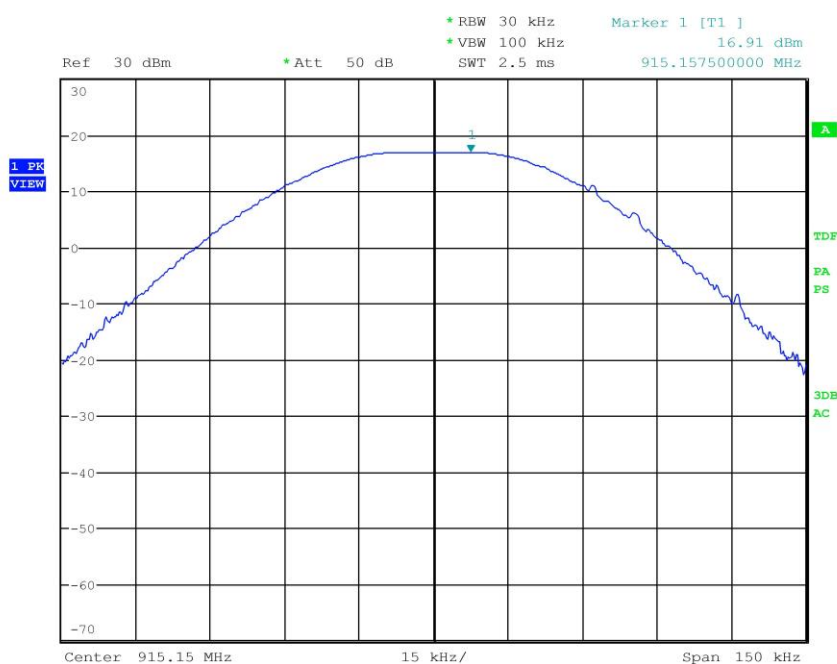
Frequency (MHz)	Graphs	Measured QP level (dBm)	Peak Output Power (mW)	Remarks
915,150	16178839	16,91	49,09	--
921,500	16178850	16,93	49,32	--
927,850	16178855	16,95	49,55	--



Graphs

G16178839

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 16178839
Test Spec





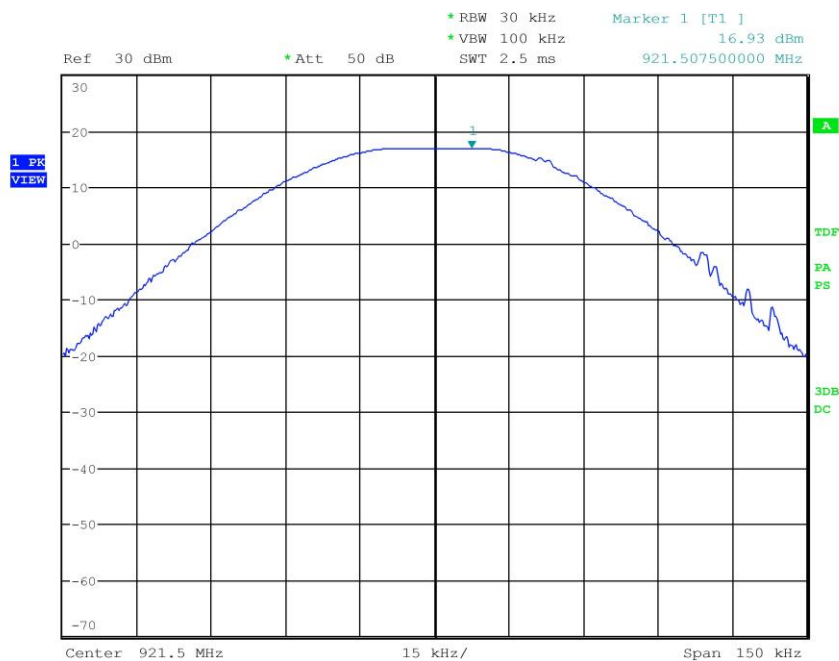
CMC
Centro Misure Compatibilità S.r.l.
Via della Fisica, 20
36016 Thiene (VI)



LAB N° 0168

G16178850

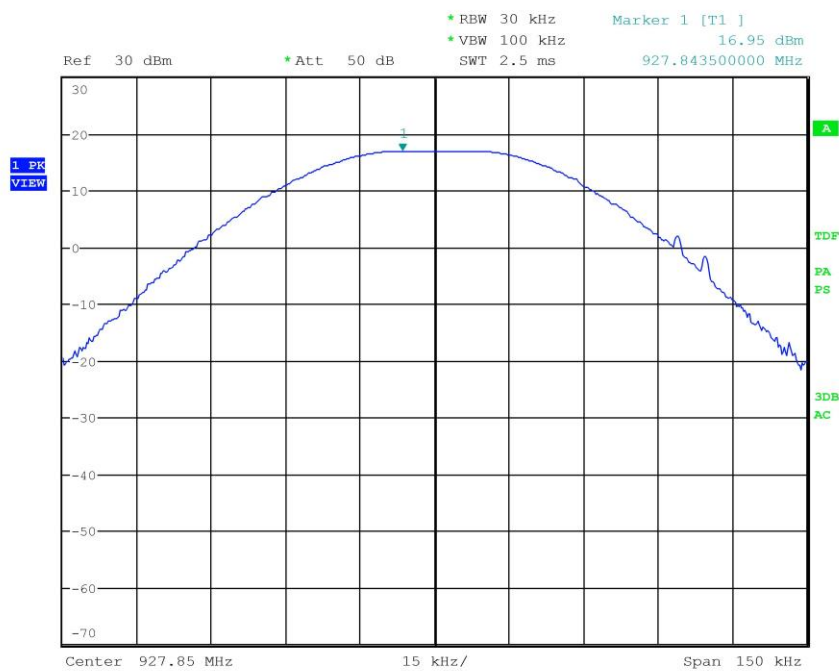
Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 16178850
Test Spec





G16178855

Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezzo 16178855
Test Spec



Result: The requirements are met



11.9 Spurious Emission

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.209
- DA 00-705
- Internal procedure PM001
- See clause 4 of this test report

Test configuration and test method

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

Test specification

Port: Enclosure
Antenna polarization: Horizontal (H) – Vertical (V)
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

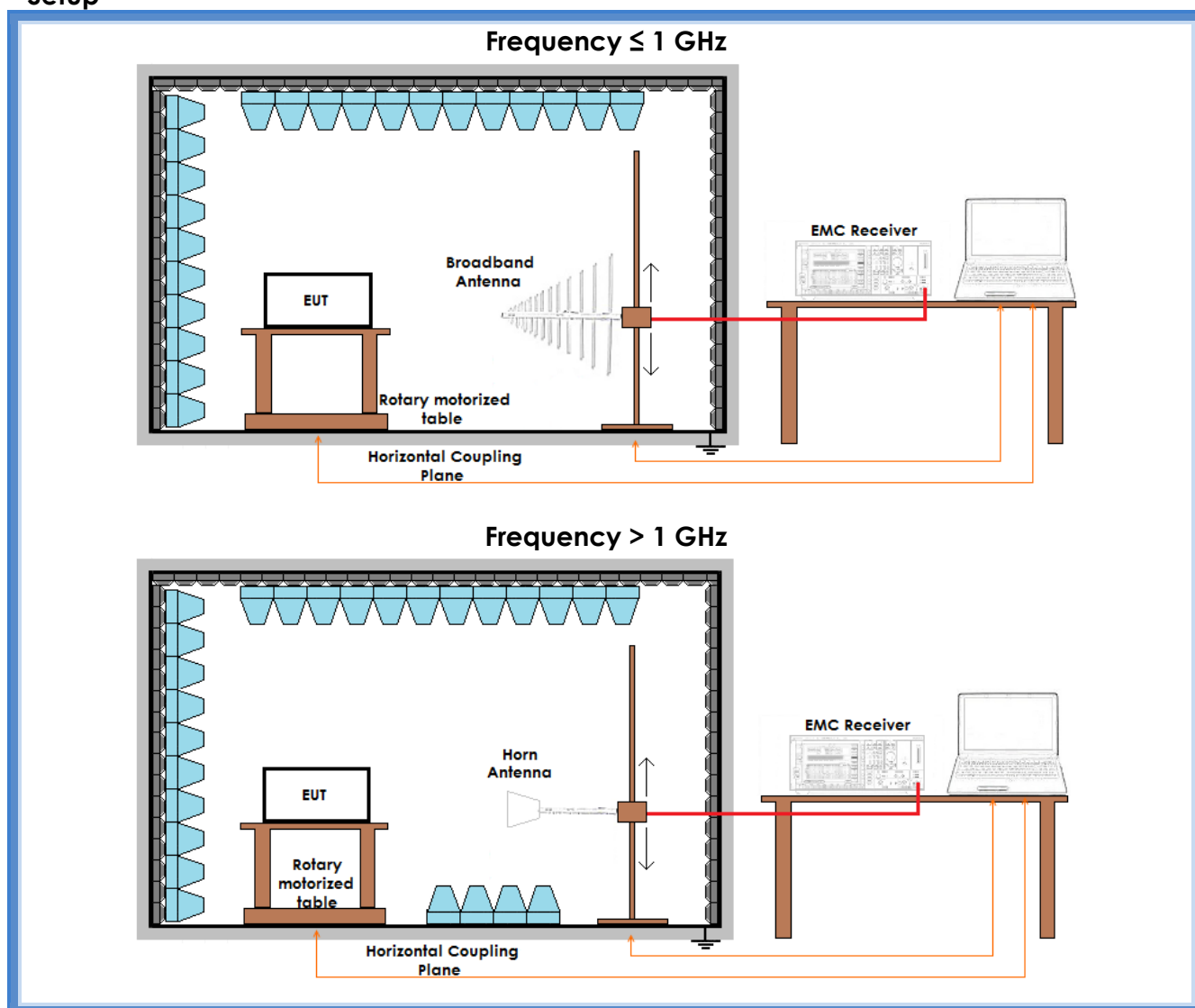
MHz	MHz	MHz	GHz
0,090 – 0,110	16,42 – 16,423	399,9 – 410	4,5 – 5,15
0,495 – 0,505	16,69475 – 16,69525	608 – 614	5,35 – 5,46
2,1735 – 2,1905	16,80425 – 16,80475	960 – 1240	7,25 – 7,75
4,125 – 4,128	25,5 – 25,67	1300 – 1427	8,025 – 8,5
4,17725 – 4,17775	37,5 – 38,25	1435 – 1626,5	9,0 – 9,2
4,20725 – 4,20775	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
8,37625 – 8,38675	156,7 – 156,9	2690 – 2900	22,01 – 23,12
8,41425 – 8,41475	162,0125 – 167,17	3260 – 3267	23,6 – 24,0
12,29 – 12,293	167,72 – 173,2	3332 – 3339	31,2 – 31,8
12,51975 – 12,52025	240 – 285	3345,8 – 3358	36,43 – 36,5
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

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.



Setup





Result – AV detector

Harmonic	Lowest channel		Medium channel		Highest channel		Results
	Level (dB μ V/m)	Limits (dB μ V/m)	Level (dB μ V/m)	Limits (dB μ V/m)	Level (dB μ V/m)	Limits (dB μ V/m)	
II	48,20	54,00	50,44	54,00	51,27	54,00	Complies
III	More than 20 dB below limit	54,00	38,81	54,00	40,12	54,00	Complies
IV	38,53	54,00	40,13	54,00	39,13	54,00	Complies
V	38,91	54,00	39,67	54,00	42,23	54,00	Complies
VI	49,07	54,00	46,96	54,00	44,47	54,00	Complies
VII	41,42	54,00	40,91	54,00		54,00	Complies
VIII	More than 20 dB below limit	54,00	More than 20 dB below limit	54,00	More than 20 dB below limit	54,00	Complies
IX	45,27	54,00	45,68	54,00	46,20	54,00	Complies
X	More than 20 dB below limit	54,00	More than 20 dB below limit	54,00	More than 20 dB below limit	54,00	Complies
Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest values							

Result – Peak detector

Harmonic	Lowest channel		Medium channel		Highest channel		Results
	Level (dB μ V/m)	Limits (dB μ V/m)	Level (dB μ V/m)	Limits (dB μ V/m)	Level (dB μ V/m)	Limits (dB μ V/m)	
II	More than 20 dB below limit	74,00	More than 20 dB below limit	74,00	54,63	74,00	Complies
III	More than 20 dB below limit	74,00	More than 20 dB below limit	74,00	More than 20 dB below limit	74,00	Complies
IV	More than 20 dB below limit	74,00	More than 20 dB below limit	74,00	More than 20 dB below limit	74,00	Complies
V	More than 20 dB below limit	74,00	More than 20 dB below limit	74,00	More than 20 dB below limit	74,00	Complies
VI	More than 20 dB below limit	74,00	More than 20 dB below limit	74,00	More than 20 dB below limit	74,00	Complies
VII	More than 20 dB below limit	74,00	More than 20 dB below limit	74,00	More than 20 dB below limit	74,00	Complies
VIII	More than 20 dB below limit	74,00	More than 20 dB below limit	74,00	More than 20 dB below limit	74,00	Complies
IX	55,84	74,00	55,99	74,00	56,74	74,00	Complies
X	More than 20 dB below limit	74,00	More than 20 dB below limit	74,00	More than 20 dB below limit	74,00	Complies
Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest values							

Result: The requirements are met



11.10 Maximum permissible exposure

Test set-up and execution

- FCC Rules and Regulation;
Titles 47 Part 1.1310
- Internal procedure PM001
- See clause 4 of this test report

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

Test specification

Port: Antenna

Acceptance limits	1 mW/cm ² max at 20 cm of distance
--------------------------	---

Result

Power Density Limit (mW/cm ²)	Maximum Output Power (mW)	Antenna Gain (G)	Power Density at 20 cm (mW/cm ²)	Remarks
1,00	49,55	1,585	0,016	Measured
Remarks: Power Density = $(P \times G) / (4\pi R^2)$				

Result: The requirements are met