

Gandini 18185217

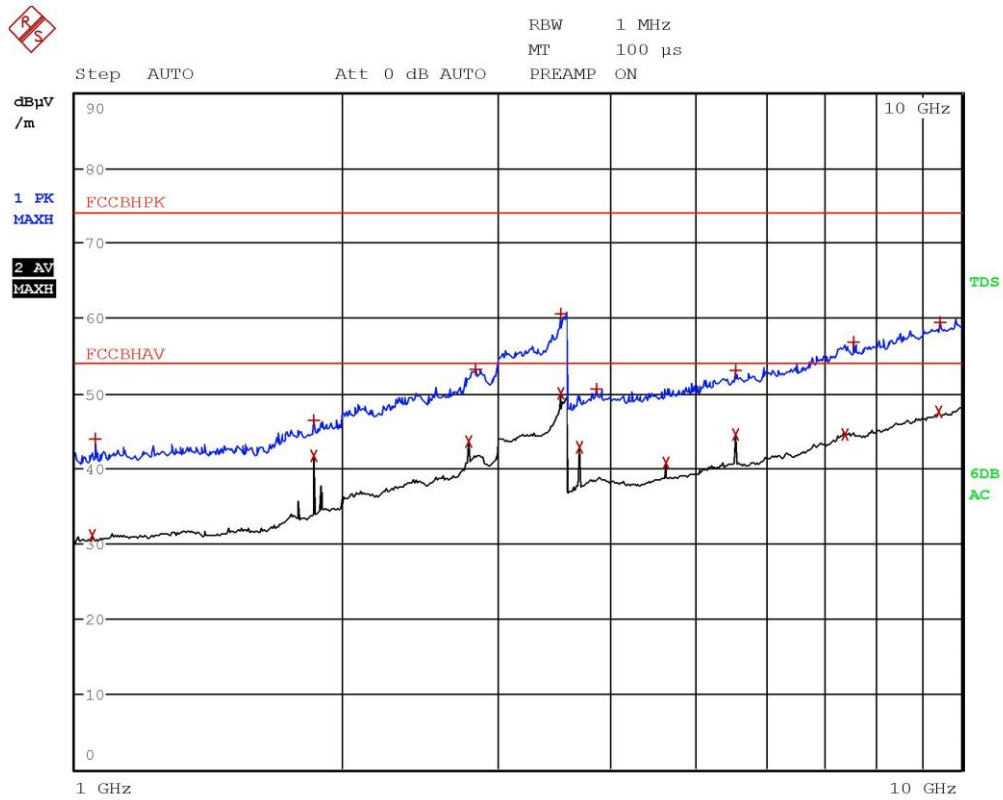
CMC Centro Misure Compatibilità S.r.l.



EDIT PEAK LIST (Prescan Results)			
Trace1:	FCCBHPK		
Trace2:	FCCBHAV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL d μ V/m	DELTA LIMIT dB
1 Max Peak	1.8428 GHz	46.80	-27.17
2 Average	1.8428 GHz	41.16	-12.81
2 Average	2.7644 GHz	44.81	-9.16
1 Max Peak	2.8328 GHz	53.07	-20.90
2 Average	3.5256 GHz	49.96	-4.01
1 Max Peak	3.5688 GHz	60.08	-13.89
2 Average	3.6856 GHz	43.72	-10.25
1 Max Peak	3.686 GHz	49.72	-24.26
1 Max Peak	4.5984 GHz	50.08	-23.90
2 Average	4.6072 GHz	40.79	-13.18
1 Max Peak	5.5284 GHz	52.65	-21.32
2 Average	5.5288 GHz	43.65	-10.33
2 Average	7.4812 GHz	44.26	-9.71
1 Max Peak	8.2256 GHz	57.27	-16.70
2 Average	9.4584 GHz	47.12	-6.85
1 Max Peak	9.4672 GHz	59.43	-14.54

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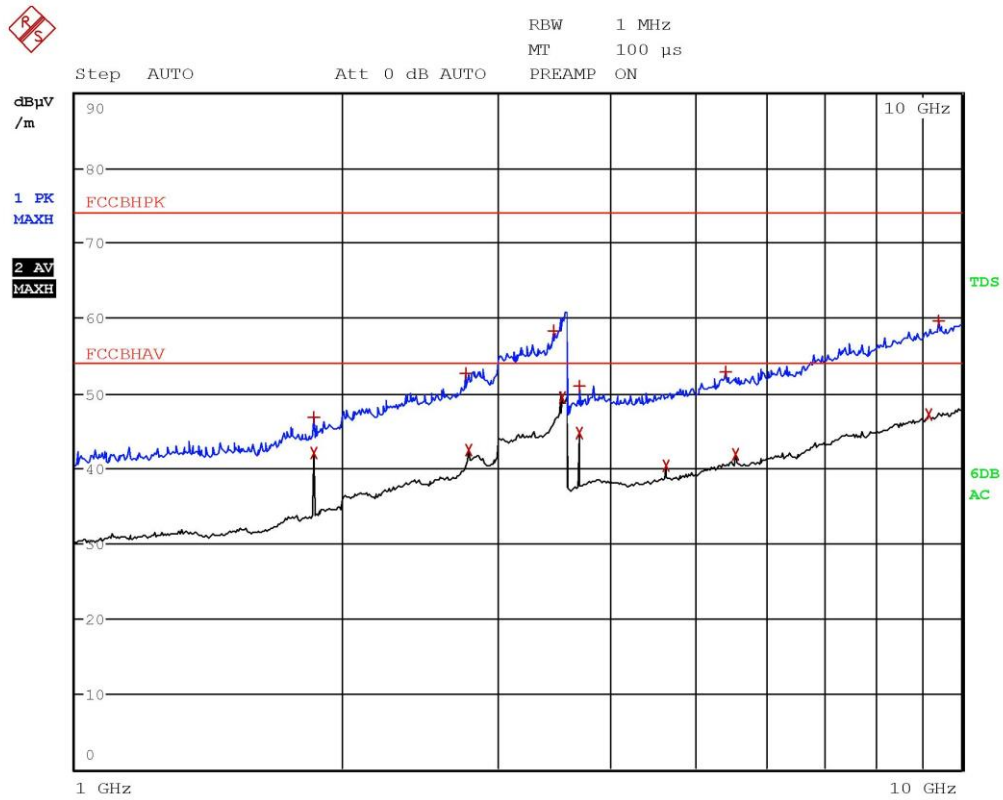
CMC Centro Misure Compatibilità S.r.l.



EDIT PEAK LIST (Prescan Results)			
TRACE1:	FCCBHPK		
TRACE2:	FCCBHAV		
TRACE3:	---		
TRACE	FREQUENCY	LEVEL dBμV/m	DELTA LIMIT dB
2 Average	1.0464 GHz	31.18	-22.79
1 Max Peak	1.052 GHz	43.91	-30.06
1 Max Peak	1.8556 GHz	46.47	-27.50
2 Average	1.8556 GHz	41.70	-12.27
2 Average	2.7836 GHz	43.64	-10.33
1 Max Peak	2.8276 GHz	53.18	-20.79
1 Max Peak	3.5256 GHz	60.66	-13.31
2 Average	3.5256 GHz	49.97	-4.00
2 Average	3.7112 GHz	42.81	-11.16
1 Max Peak	3.8764 GHz	50.55	-23.43
2 Average	4.6392 GHz	40.80	-13.17
2 Average	5.5668 GHz	44.55	-9.42
1 Max Peak	5.5672 GHz	53.01	-20.96
2 Average	7.3996 GHz	44.52	-9.45
1 Max Peak	7.5576 GHz	56.85	-17.12
2 Average	9.4396 GHz	47.47	-6.50
1 Max Peak	9.4544 GHz	59.52	-14.45

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EDIT PEAK LIST (Prescan Results)			
Trace1:	FCCBHPK		
Trace2:	FCCBHAV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL d μ V/m	DELTA LIMIT dB
1 Max Peak	1.8556 GHz	46.73	-27.24
2 Average	1.8556 GHz	41.98	-11.99
1 Max Peak	2.7568 GHz	52.56	-21.41
2 Average	2.7836 GHz	42.50	-11.47
1 Max Peak	3.464 GHz	58.29	-15.68
2 Average	3.548 GHz	49.36	-4.61
2 Average	3.7112 GHz	44.67	-9.30
1 Max Peak	3.7112 GHz	51.02	-22.95
2 Average	4.6392 GHz	40.29	-13.69
1 Max Peak	5.4168 GHz	52.79	-21.18
2 Average	5.5668 GHz	41.89	-12.08
2 Average	9.1912 GHz	47.08	-6.89
1 Max Peak	9.4364 GHz	59.74	-14.23

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Result: The requirements are met

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11.3 20 dB bandwidth

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.247
- ANSI C63.10 cl. 7.8.7
- 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 S295
 Measurement uncertainty: See clause 7 of this test report

Test specification

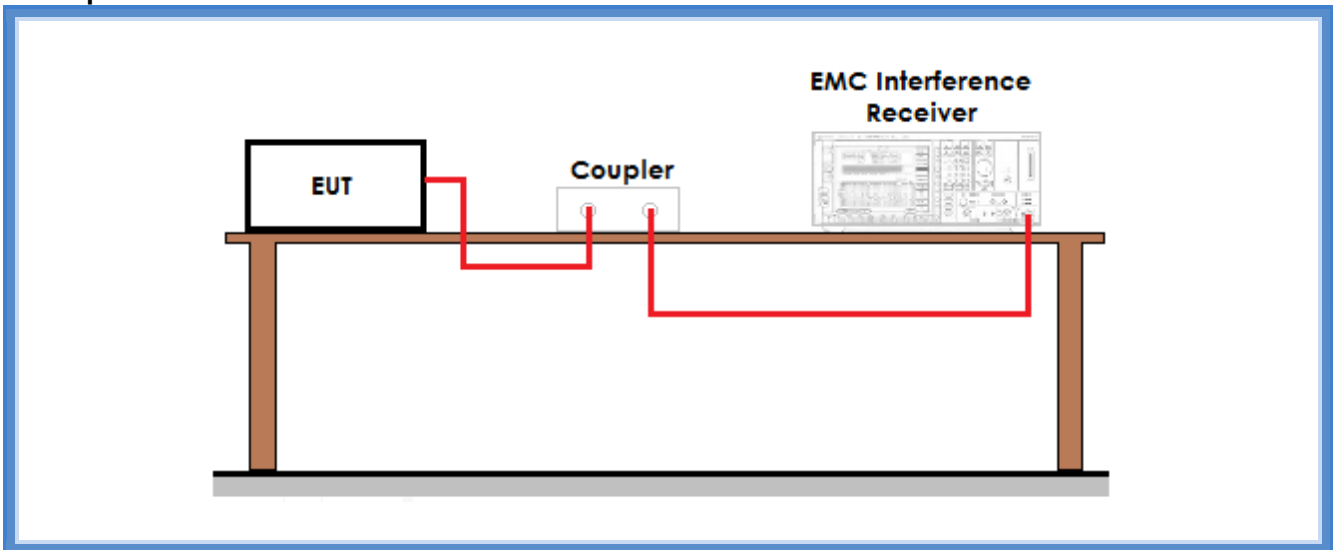
See FCC Part 15.247

Environmental conditions

<i>Temperature (°C)</i>	<i>Atmospheric pressure (kPa)</i>	<i>Relative humidity (%)</i>
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
915,075	G18185241	23,68	500	Complies
921,425	G18185232	23,58	500	Complies
927,825	G18185235	23,78	500	Complies



Graphs

Gandini 18185232



Gandini 18185235





Gandini 18185241



Result: The requirements are met



11.4 Channel separation

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.247
- KDB 558074 D01 15.247 Meas Guidance v05 cl. 9 b)
- ANSI C63.10 cl. 7.8.2
- 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 S295
 Measurement uncertainty: See clause 7 of this test report

Test specification

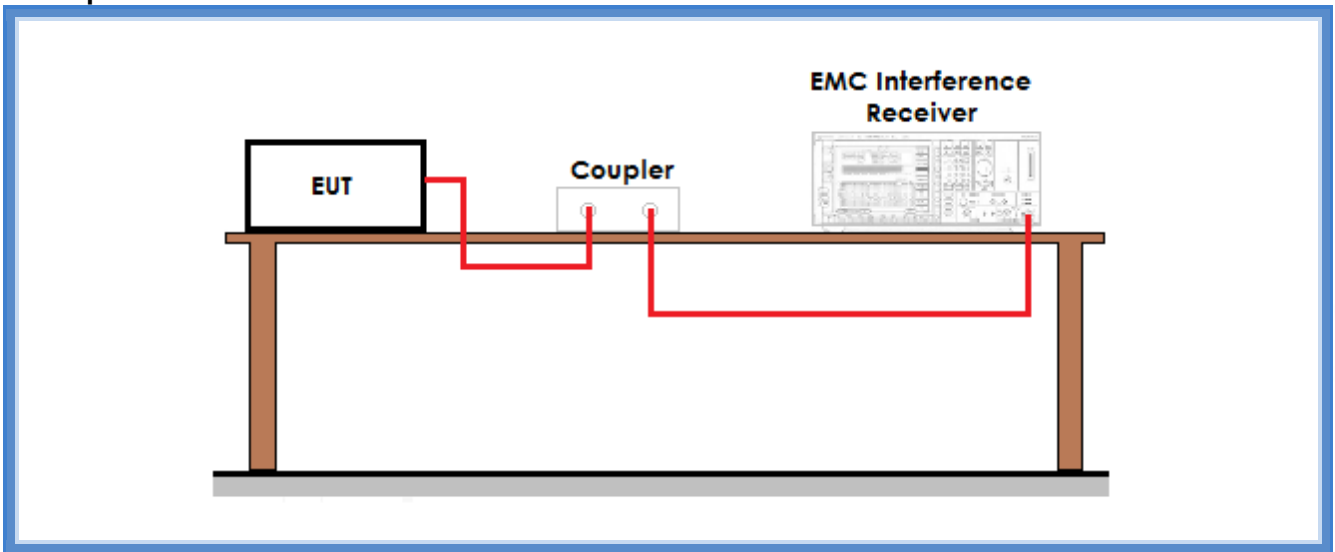
See FCC Part 15.247

Environmental conditions

<i>Temperature (°C)</i>	<i>Atmospheric pressure (kPa)</i>	<i>Relative humidity (%)</i>
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



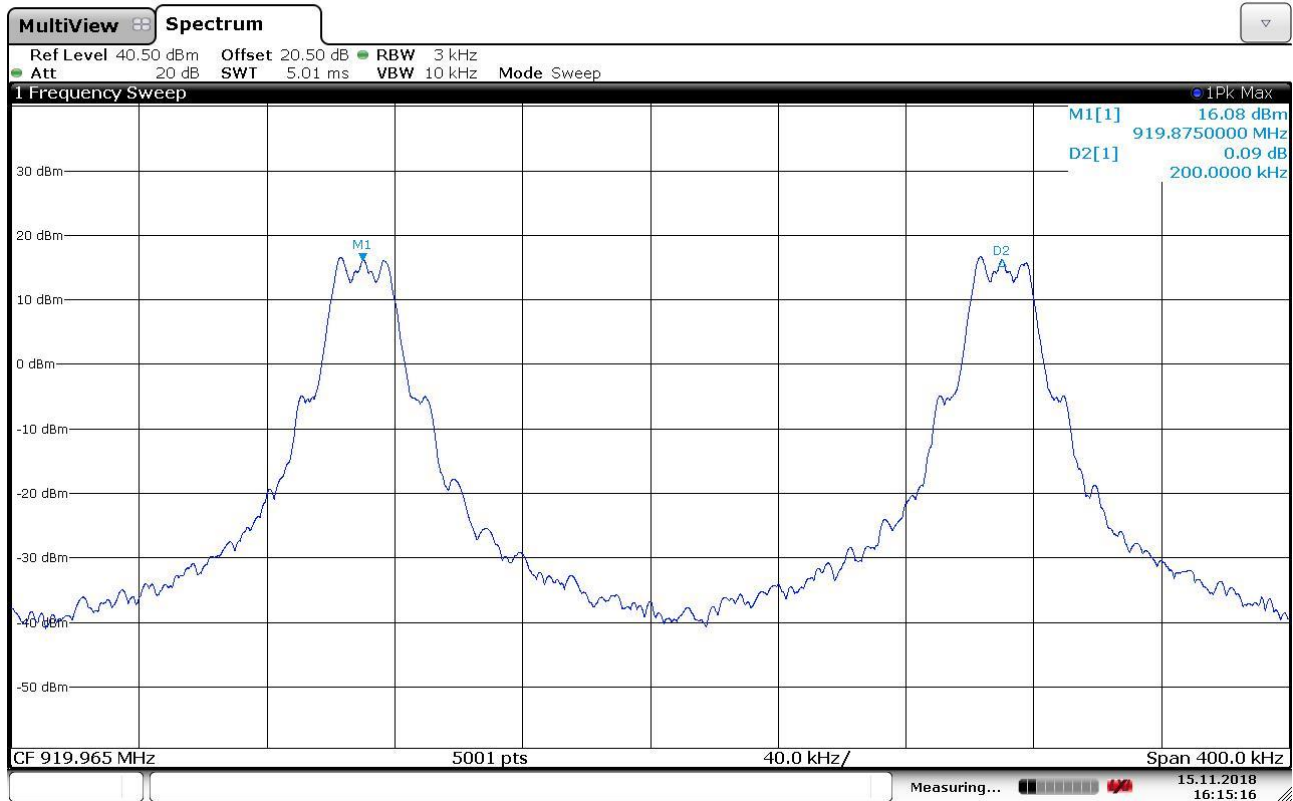
Result

Frequency band (MHz)	Graphs	Channel separation (kHz)	Minimum channel separation required (kHz)	Results
902 – 928	G18185227	200	25	Complies



Graphs

Gandini 18185227



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
- KDB 558074 D01 15.247 Meas Guidance v05 cl. 9 b)
- ANSI C63.10 cl. 7.8.3
- 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 S295
 Measurement uncertainty: See clause 7 of this test report

Test specification

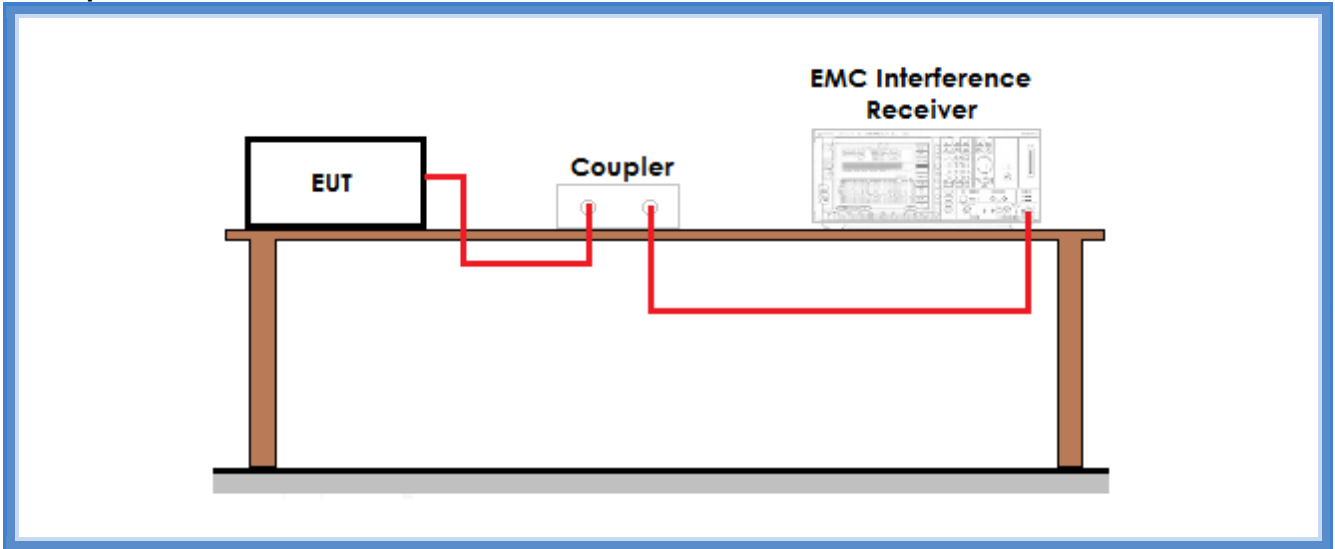
See FCC Part 15.247

Environmental conditions

<i>Temperature (°C)</i>	<i>Atmospheric pressure (kPa)</i>	<i>Relative humidity (%)</i>
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



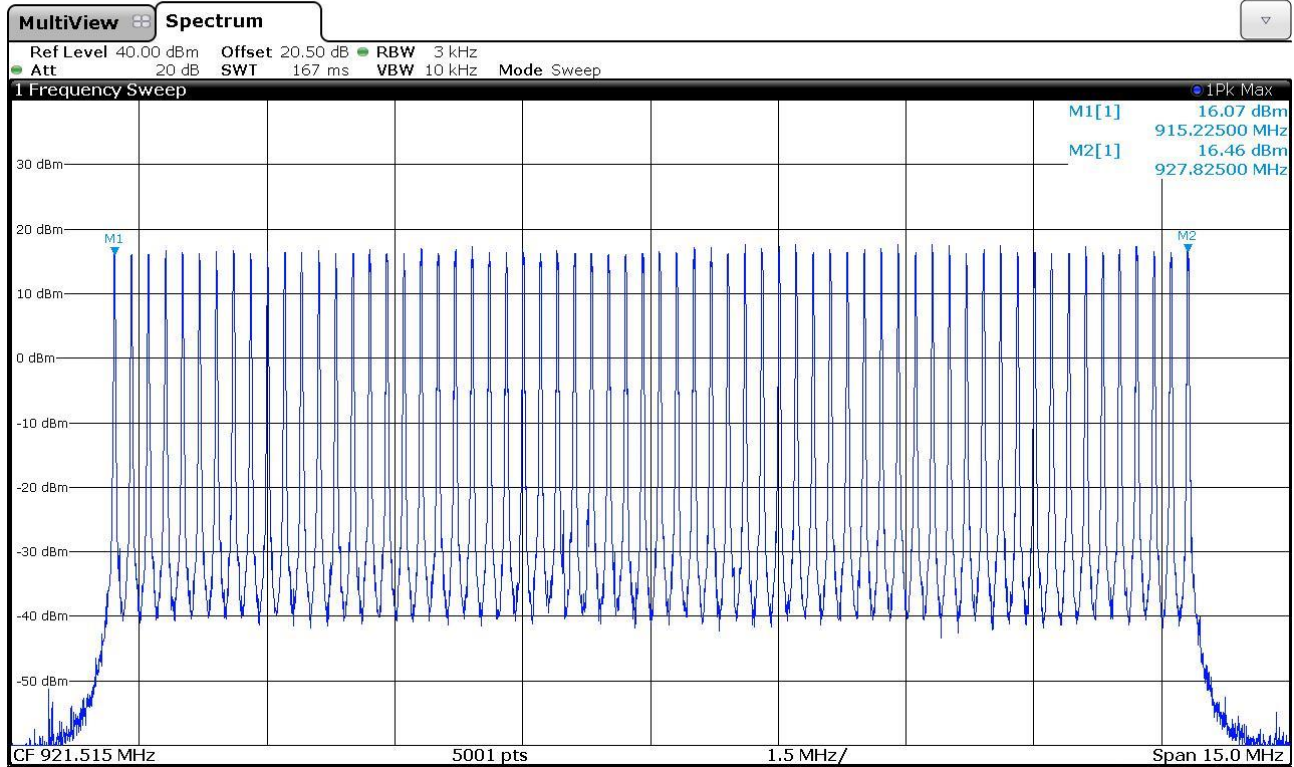
Result

Frequency band (MHz)	Graphs	Number of hopping channels	Minimum number of hopping channels required	Results
902 – 928	G18185225 and G18185226	64	50	Complies



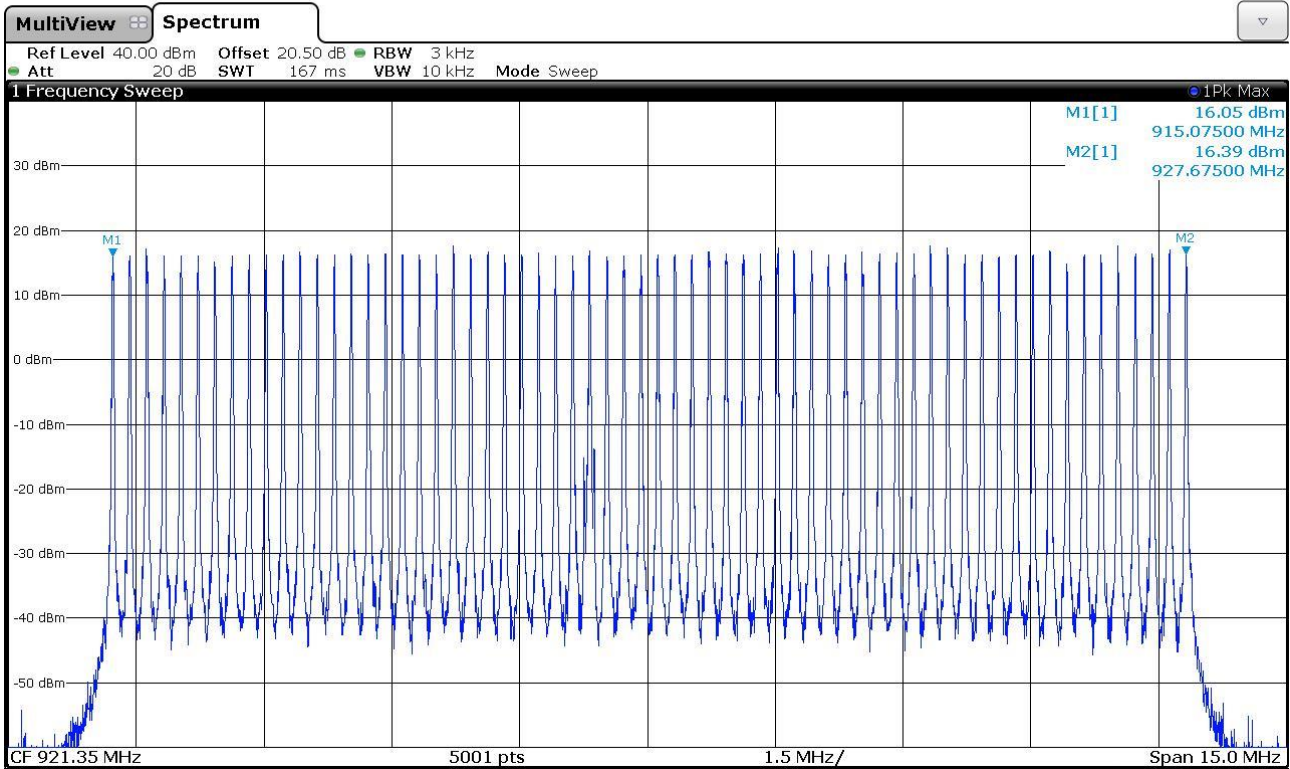
Graphs

Gandini 18185225





Gandini 18185226



Result: The requirements are met



11.6 Time of occupancy

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.247
- KDB 558074 D01 15.247 Meas Guidance v05 cl. 9 b)
- ANSI C63.10 cl. 7.8.4
- 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 S295
 Measurement uncertainty: See clause 7 of this test report

Test specification

See FCC Part 15.247

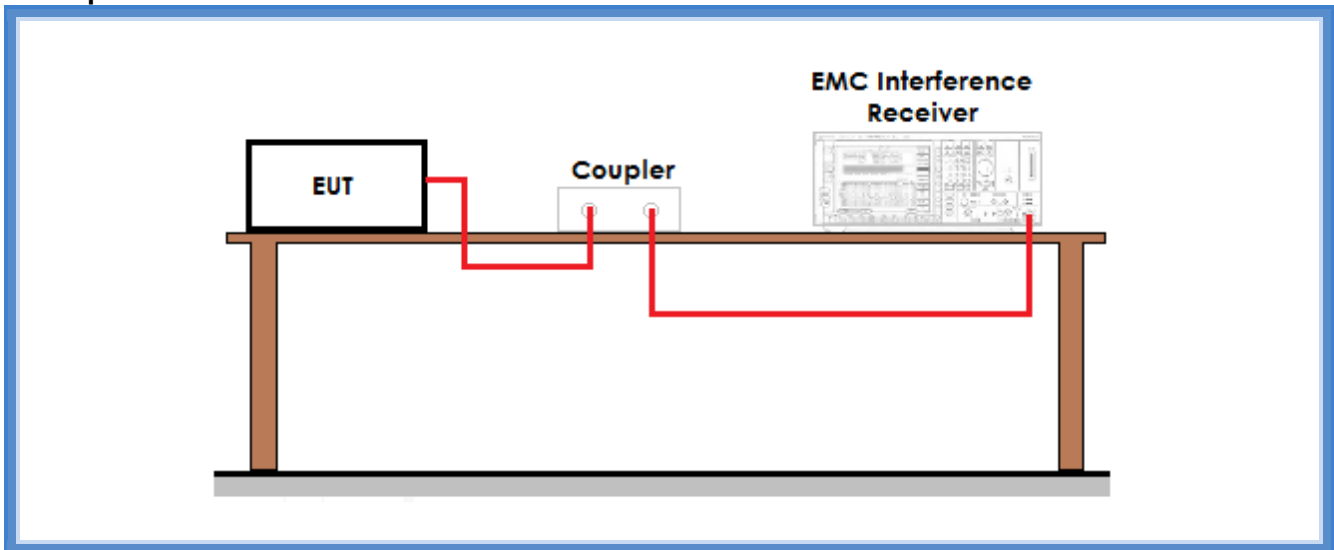
Environmental conditions

<i>Temperature (°C)</i>	<i>Atmospheric pressure (kPa)</i>	<i>Relative humidity (%)</i>
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

Frequency (MHz)	Graphs	Dwell time (ms)
921,275	G18185228	20,87

Frequency (MHz)	Graphs	Number of transmissions
921,275	G18185229 and G18185230	8

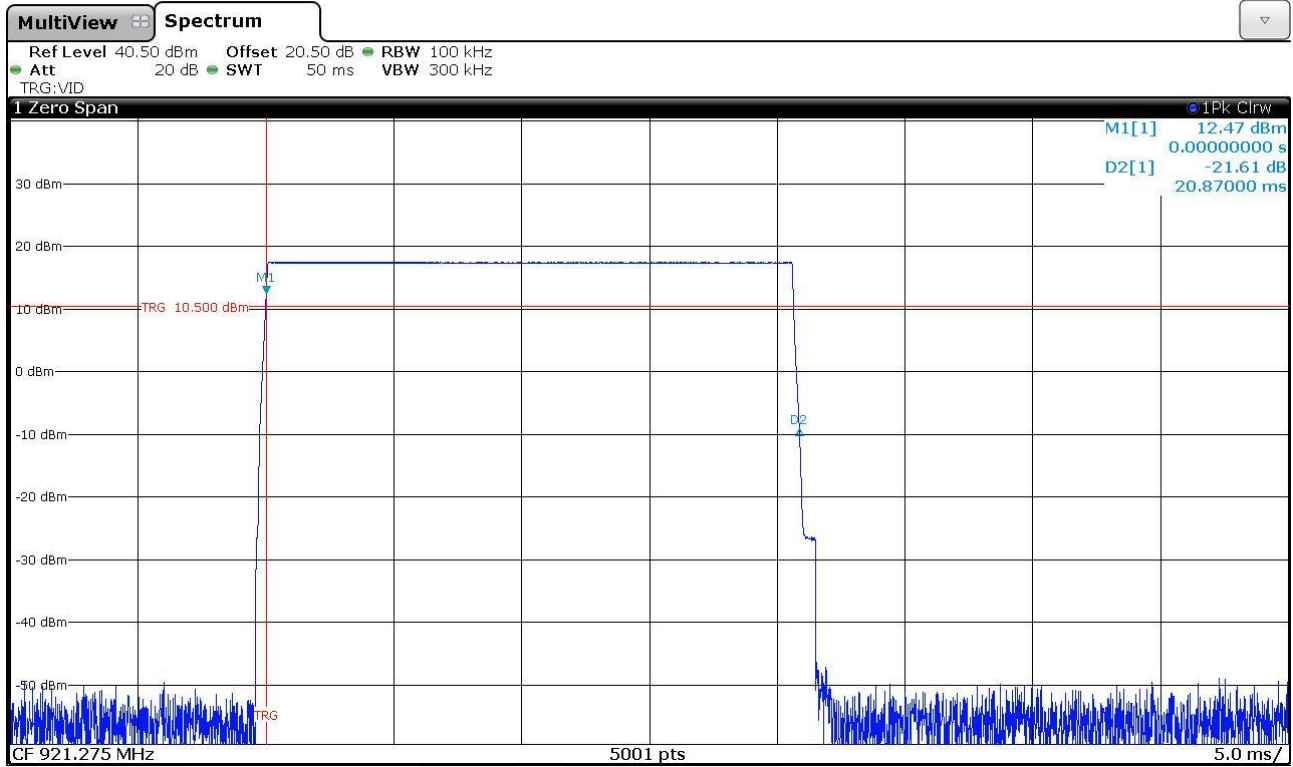
Remarks: only the highest peaks have been considered. The lowest peaks are due to the auxiliary receiver unit

Time of occupancy (Dwell time x Nr. transmissions)	Maximum allowed time of occupancy	Results
166,96 ms	400 ms	Complies

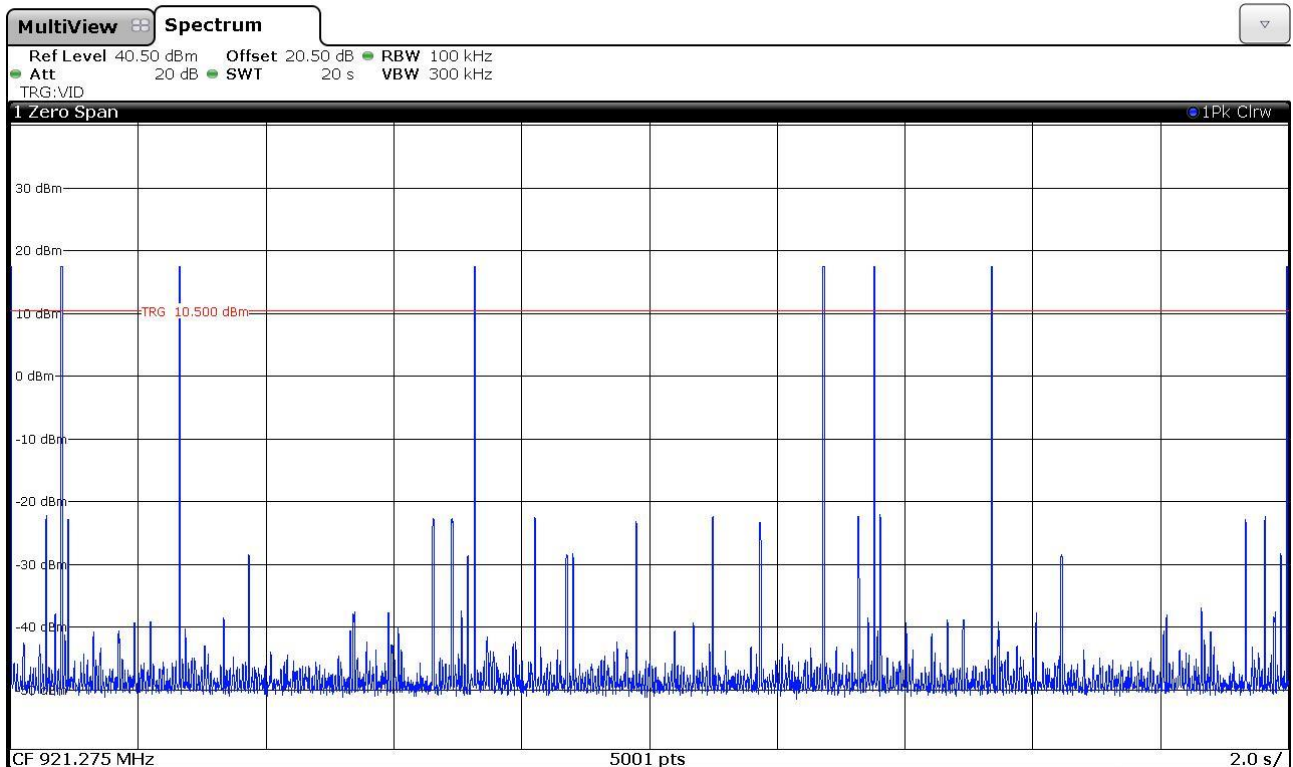


Graphs

Gandini 18185228



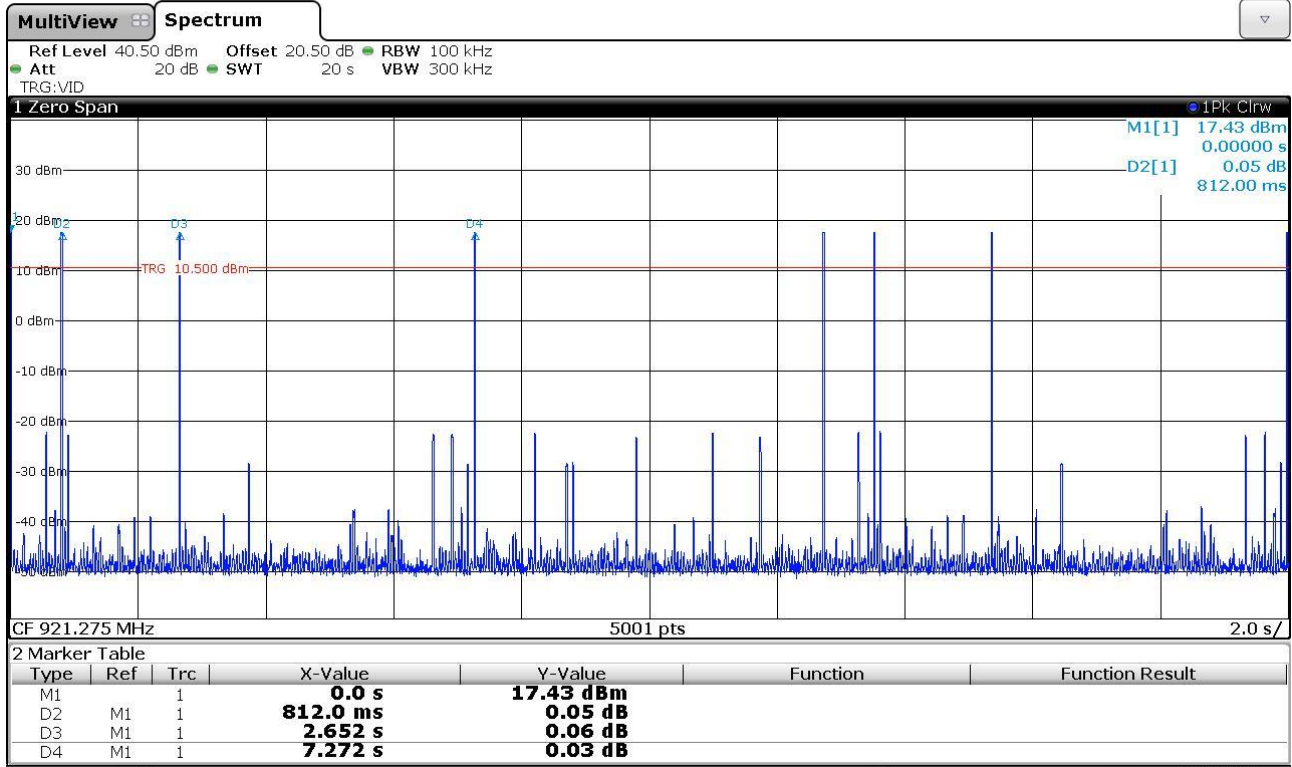
Gandini 18185229



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Gandini 18185230



Result: The requirements are met

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11.7 Band edge

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.247
- ANSI C63.10 cl. 7.8.6
- 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 S295
 Measurement uncertainty: See clause 7 of this test report

Test specification

See FCC Part 15.247

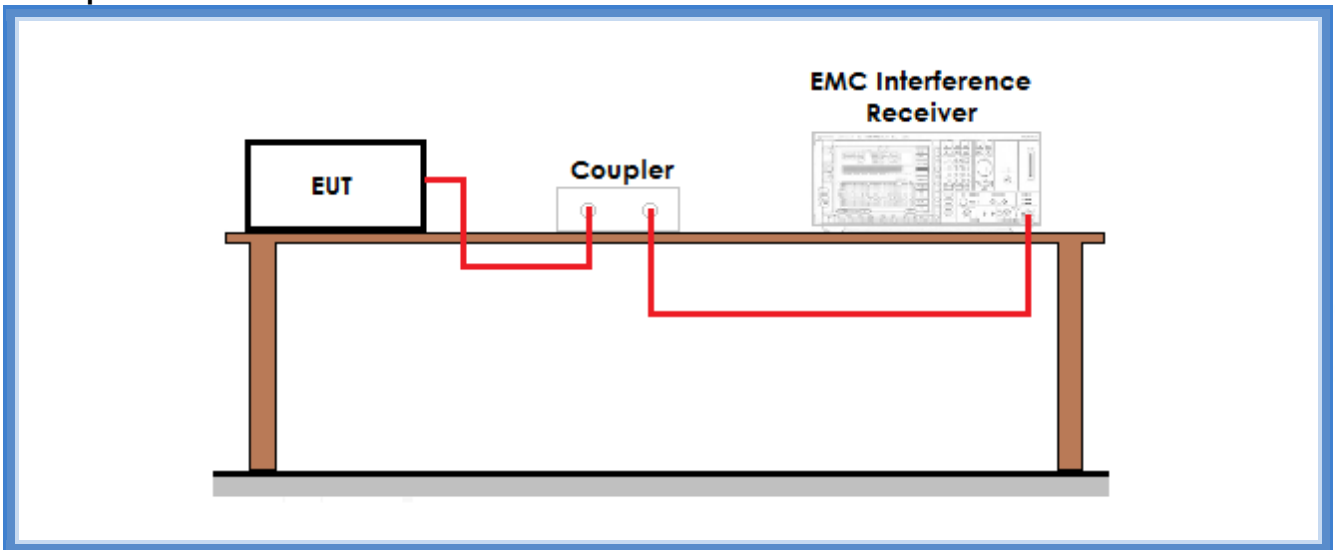
Environmental conditions

<i>Temperature (°C)</i>	<i>Atmospheric pressure (kPa)</i>	<i>Relative humidity (%)</i>
22	100	45

Acceptance limits: operation within the band 902 – 928 MHz

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Setup



Result

Frequency (MHz)	Graph(s) – Hopping	Results	
915,075	G18185222	F _L : 914,9351 MHz	Complies
	G18185224		
927,825	G18185223	F _H : 927,9660 MHz	Complies

Frequency (MHz)	Graph(s) – No hopping	Results	
915,075	G18185238	F _L : 914,9350 MHz	Complies
	G18185239		
927,825	G18185237	F _H : 927,9681 MHz	Complies



Graphs

Gandini 18185222



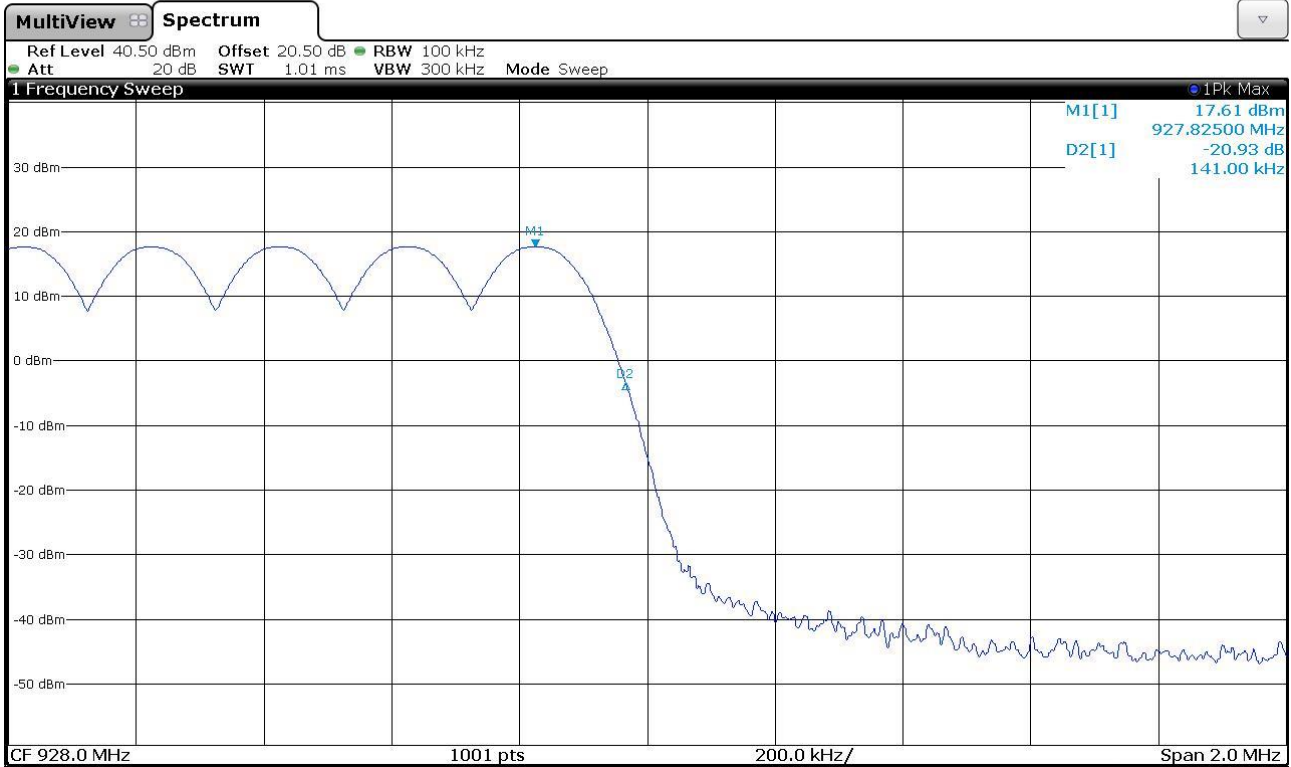


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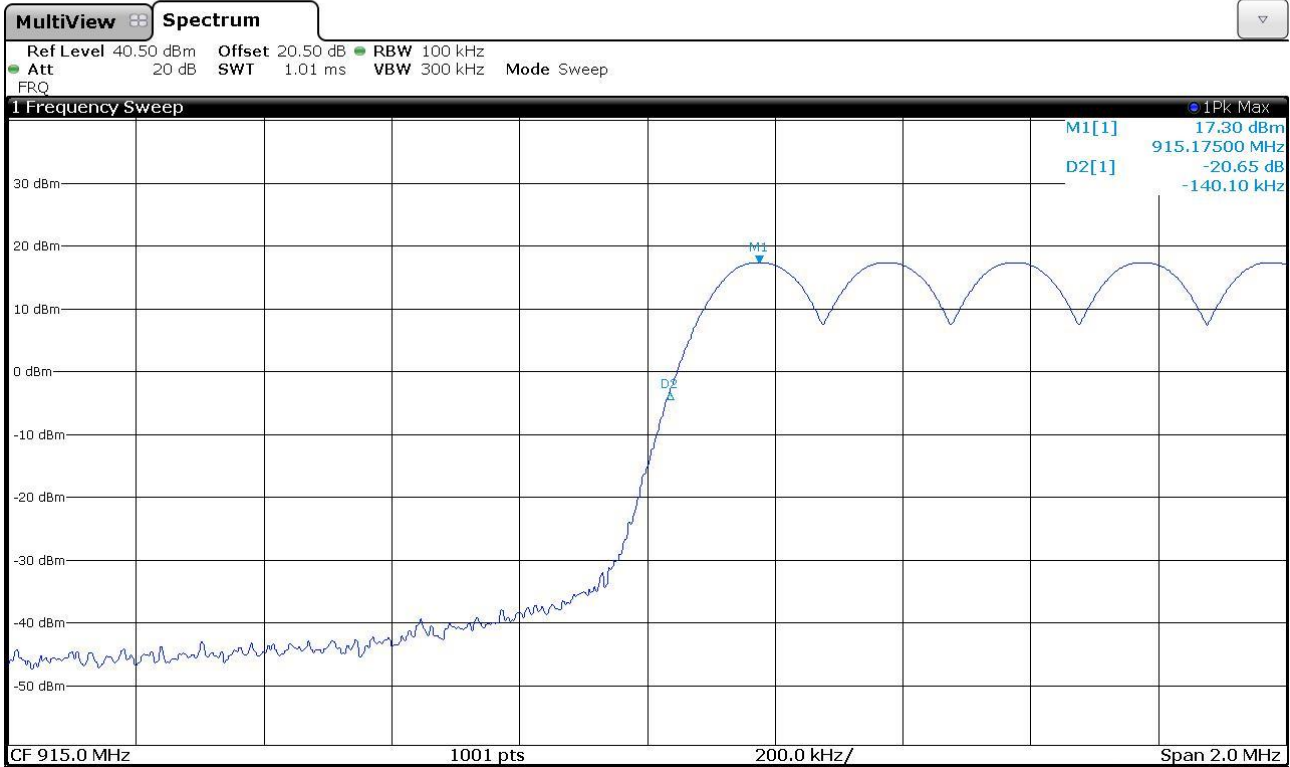
LAB N° 0168

Gandini 18185223



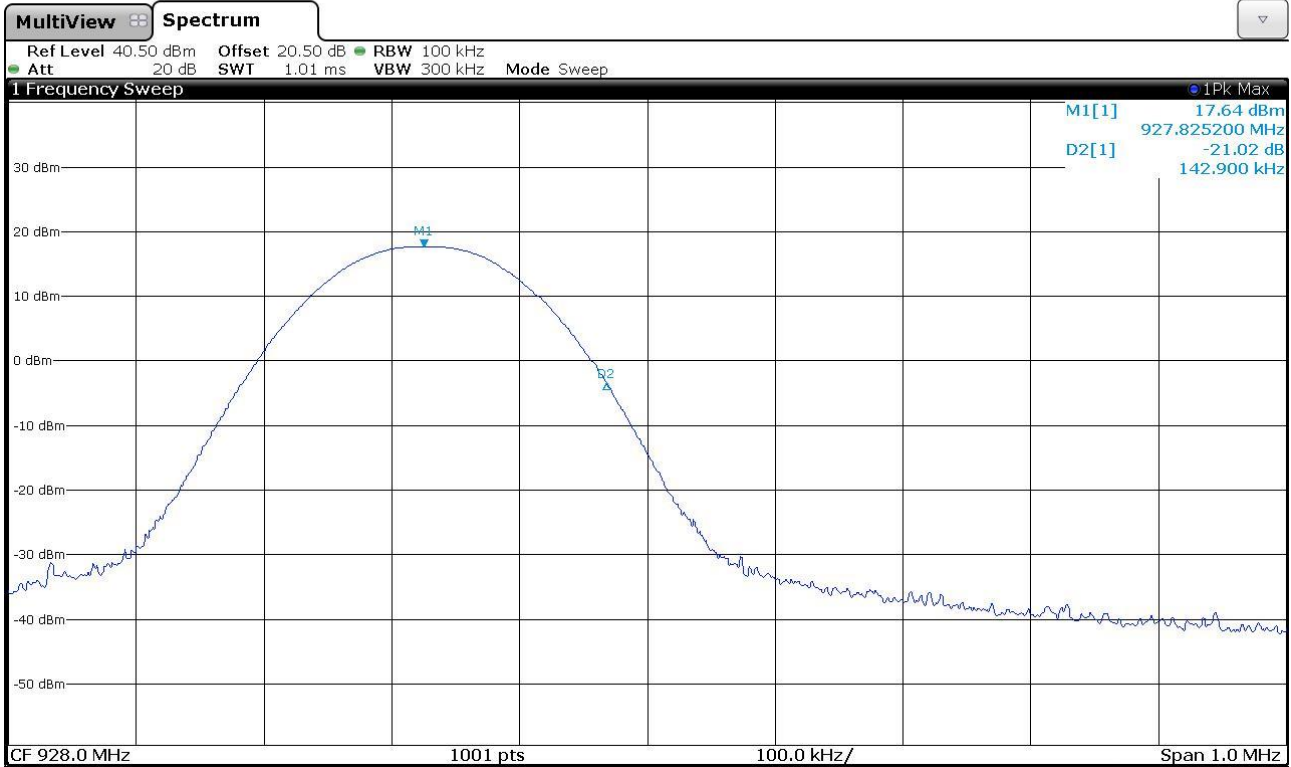


Gandini 18185224



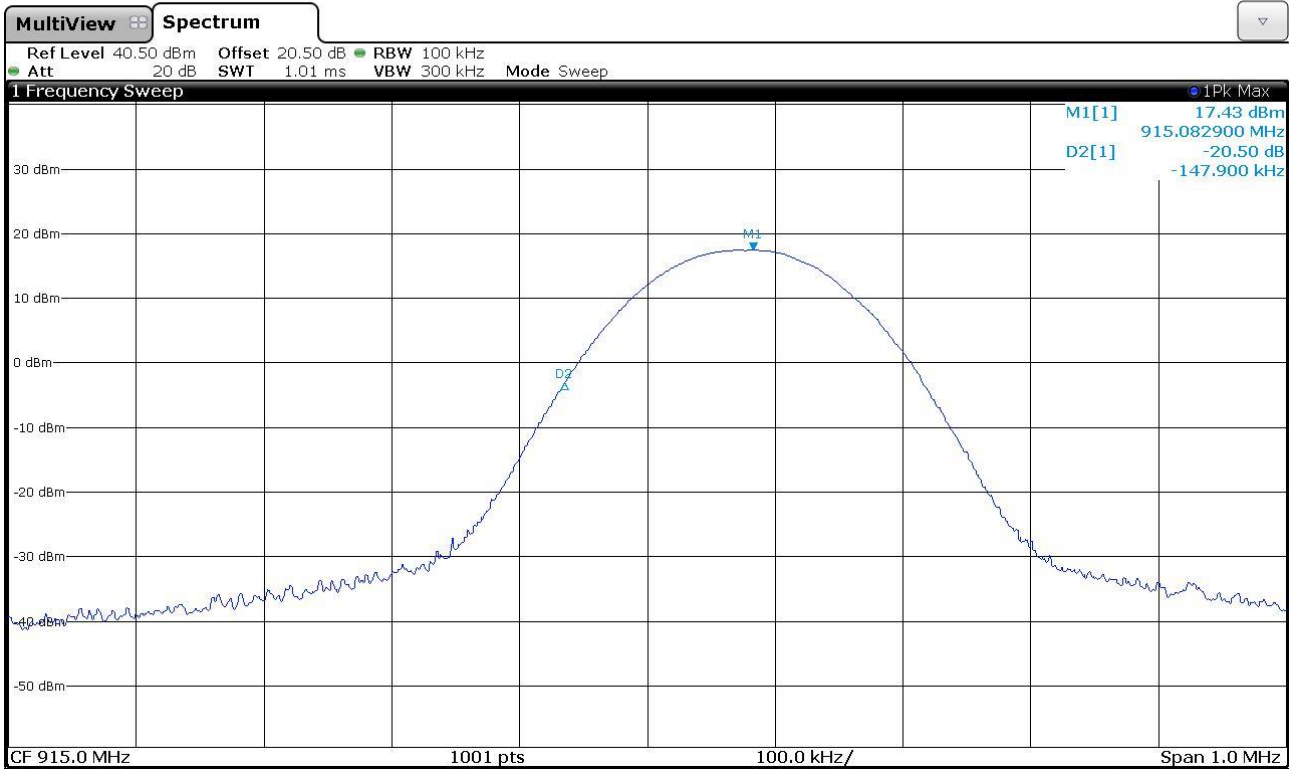


Gandini 18185237



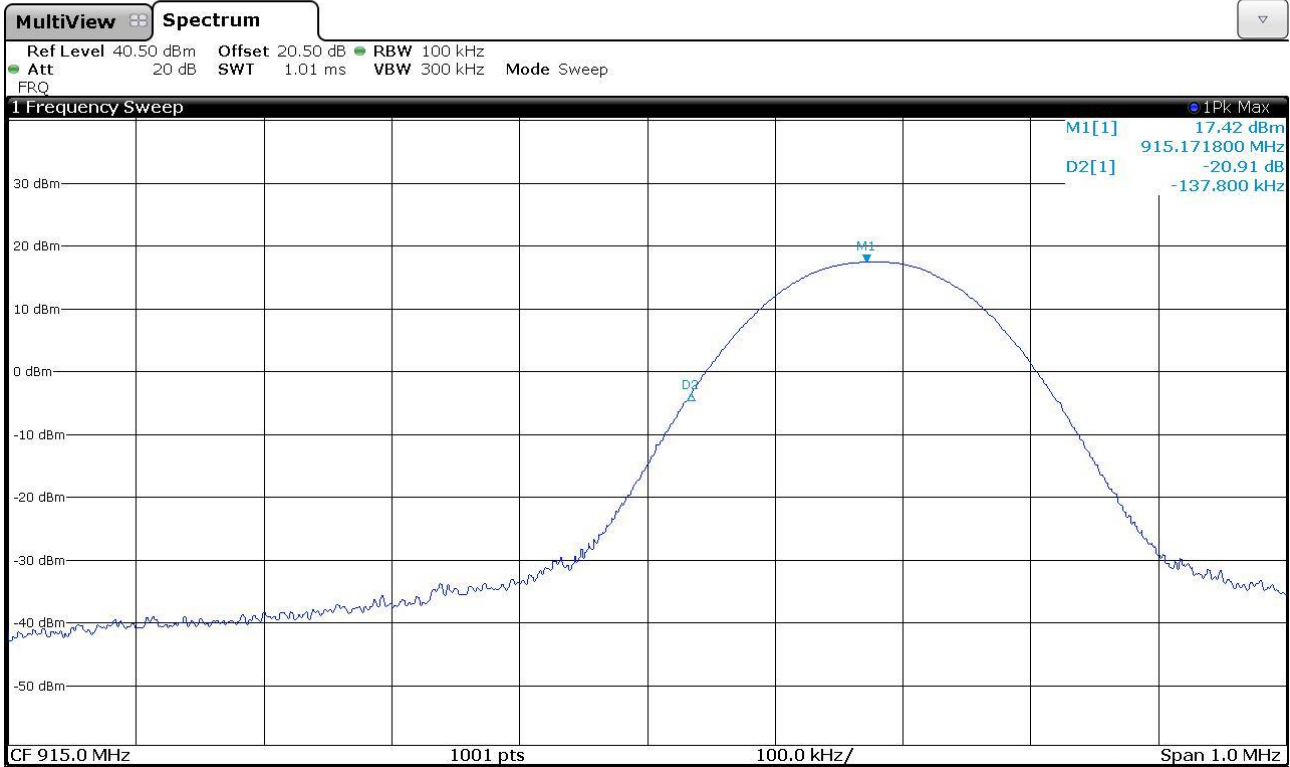


Gandini 18185238





Gandini 18185239



Result: The requirements are met



11.8 Peak Output Power

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.247
- KDB 558074 D01 15.247 Meas Guidance v05 cl. 2.2
- ANSI C63.10 cl. 7.8.5
- 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 S295
 Measurement uncertainty: See clause 7 of this test report

Test specification

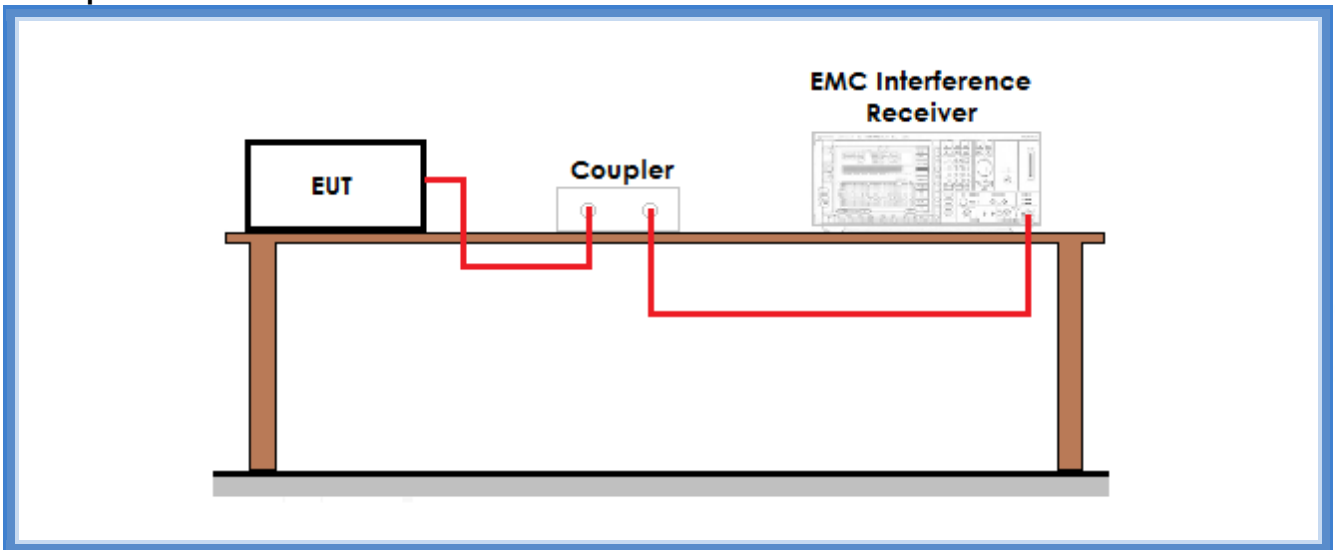
Port: Antenna

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



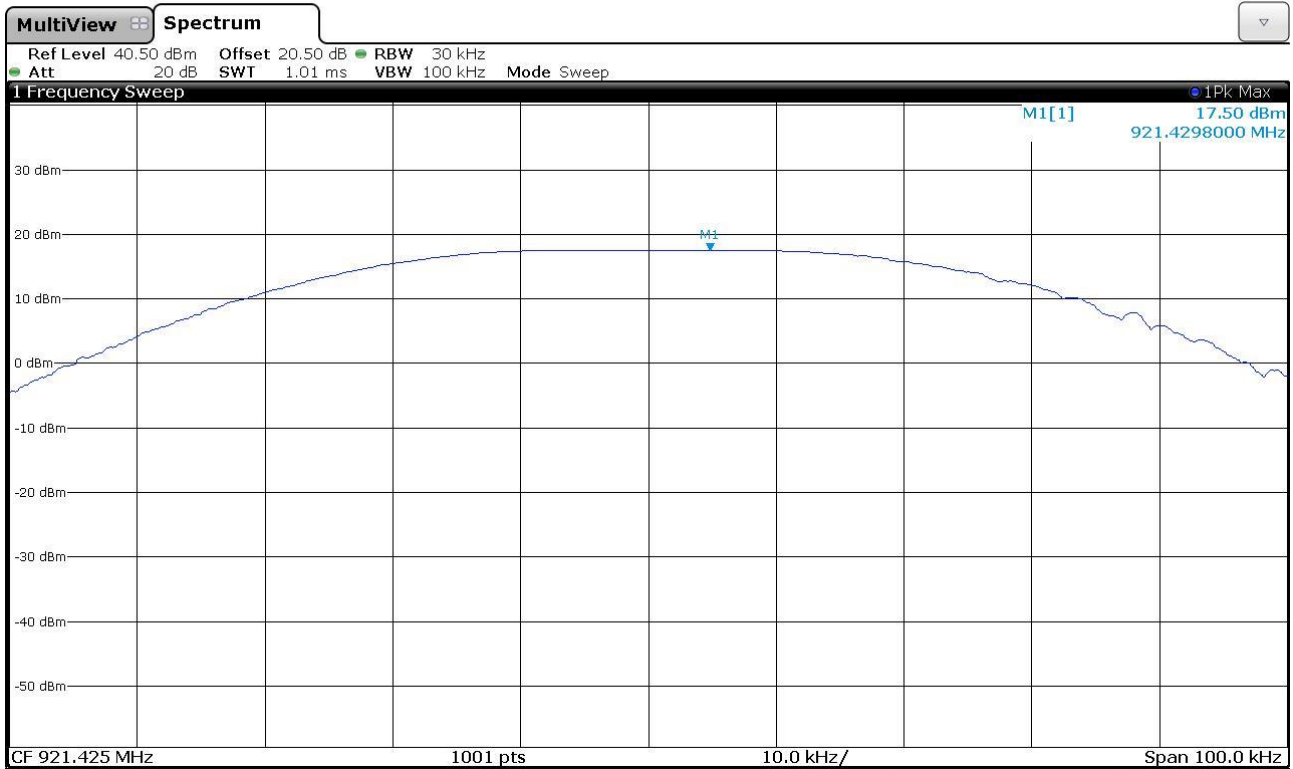
Result

Frequency (MHz)	Graphs	Conducted measured level (dBm)	Conducted power level (mW)	Limit (mW)	Verdict	Calculated radiated level (dB μ V/m)
915,083559	G18185240	17,35	54,33	1000	Pass	114,58
921,429800	G18185231	17,50	56,23	1000	Pass	114,73
927,831490	G18185236	17,62	57,81	1000	Pass	114,85

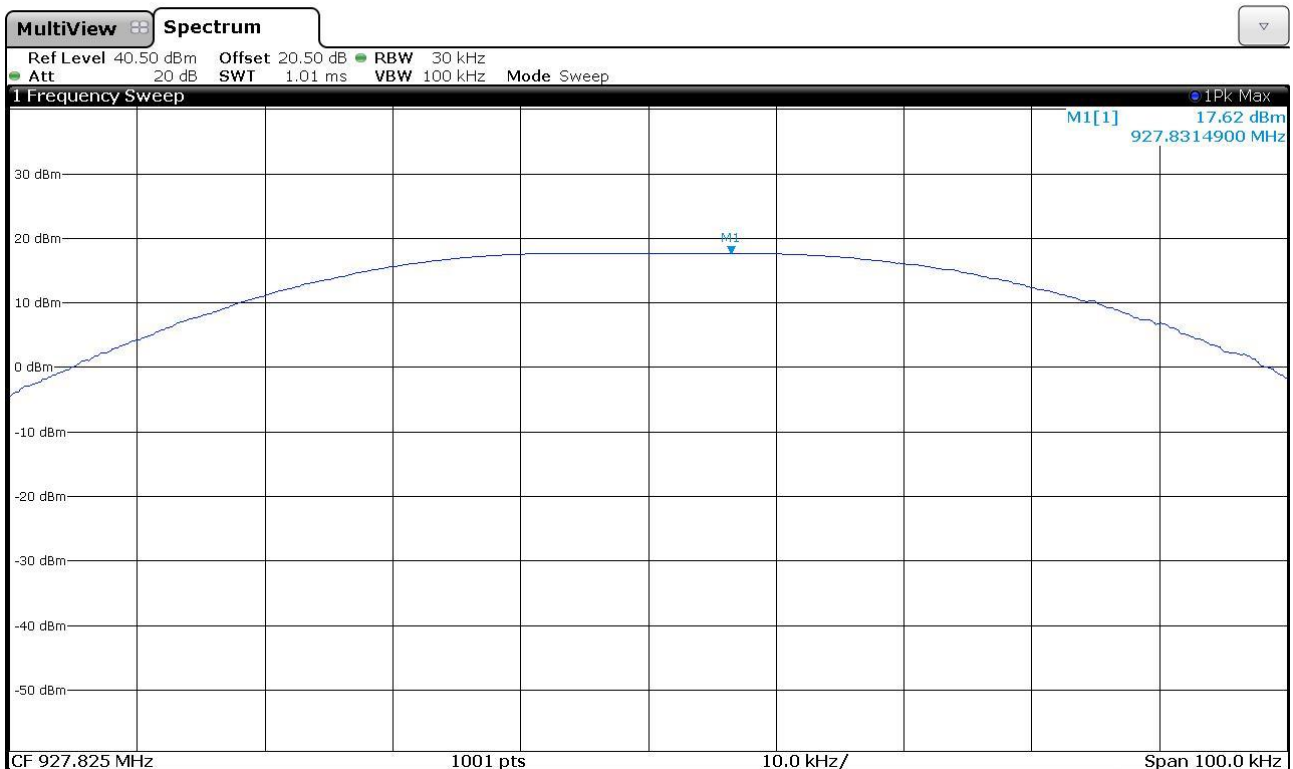


Graphs

Gandini 18185231

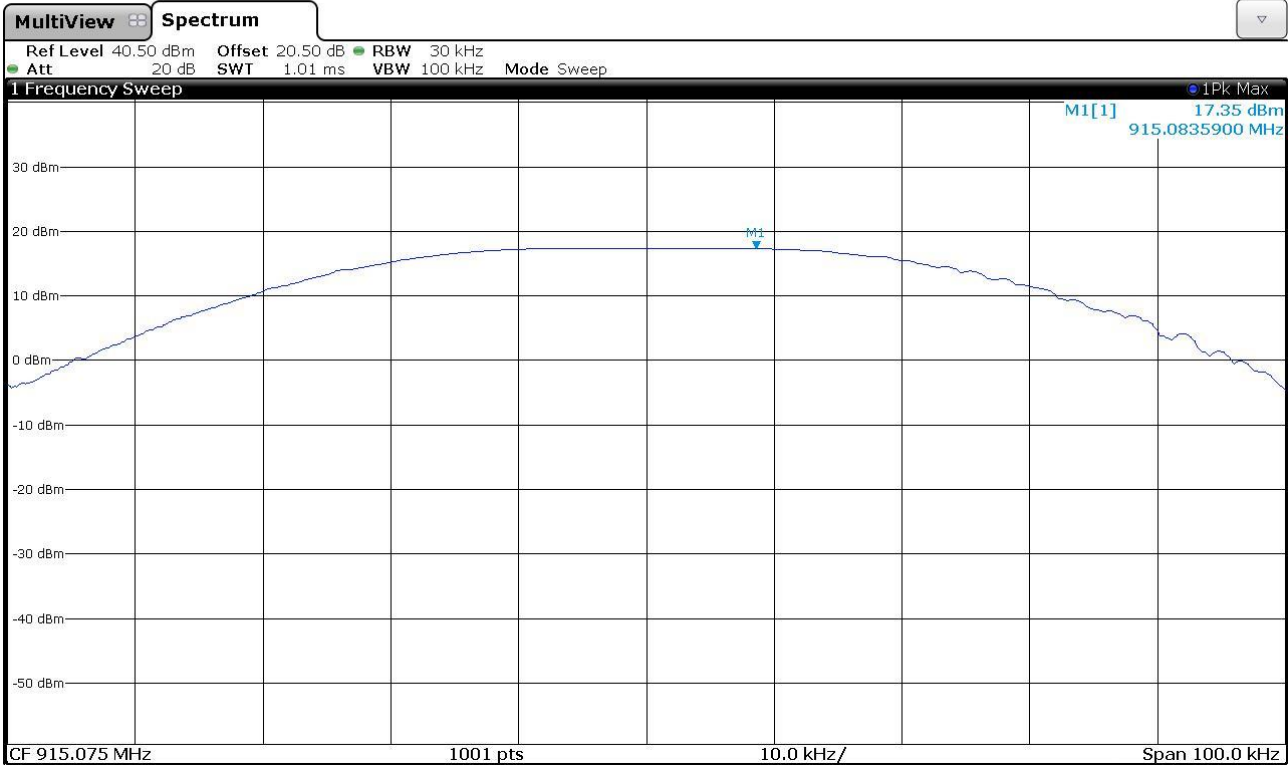


Gandini 18185236





Gandini 18185240



Result: The requirements are met

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11.9 Spurious Emission

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.209
- 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
Frequency range: 0,009 MHz – 10000 MHz
Antenna polarization: Horizontal (H) – Vertical (V)
10 m for frequencies ≤ 30 MHz
3 m for frequencies > 30 MHz

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

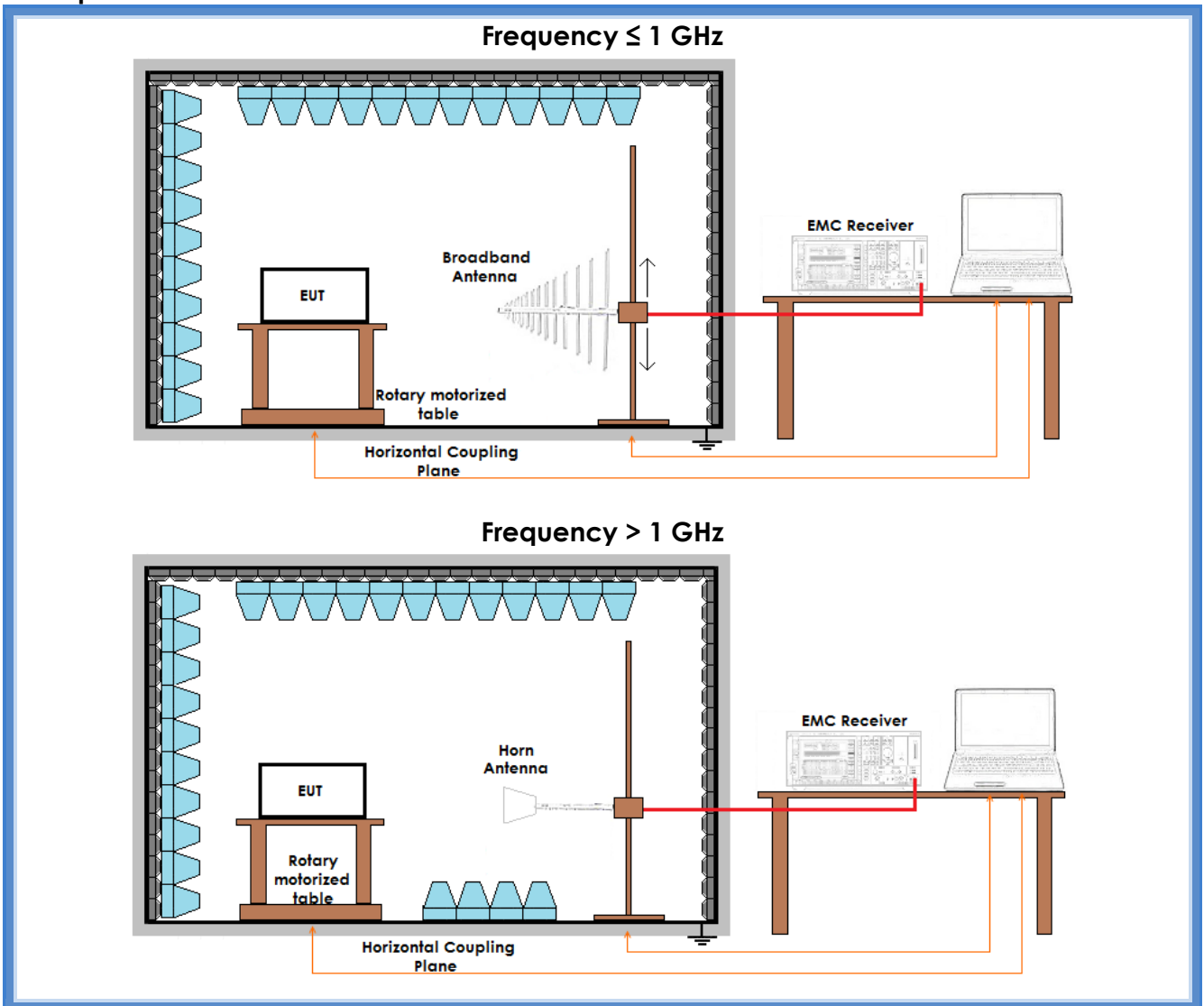
MHz	MHz	MHz	GHz
0,090 – 0,110	16,42 – 16,423	399,9 – 410	4,5 – 5,15
0,495 – 0,505	16,69475 – 16,69525	608 – 614	5,35 – 5,46
2,1735 – 2,1905	16,80425 – 16,80475	960 – 1240	7,25 – 7,75
4,125 – 4,128	25,5 – 25,67	1300 – 1427	8,025 – 8,5
4,17725 – 4,17775	37,5 – 38,25	1435 – 1626,5	9,0 – 9,2
4,20725 – 4,20775	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	40,57	54,00	42,13	54,00	41,98	54,00	Complies
III	42,81	54,00	44,81	54,00	43,64	54,00	Complies
IV	46,40	54,00	47,43	54,00	44,67	54,00	Complies
V	39,92	54,00	40,79	54,00	40,80	54,00	Complies
VI	46,40	54,00	43,65	54,00	44,55	54,00	Complies
VII	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
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	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
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. 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 worse case.

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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	46,50	74,00	46,84	74,00	46,73	74,00	Complies
III	More than 20 dB below limit	74,00	More than 20 dB below limit	74,00	52,56	74,00	Complies
IV	50,31	74,00	51,72	74,00	51,02	74,00	Complies
V	50,42	74,00	50,08	74,00	More than 20 dB below limit	74,00	Complies
VI	53,37	74,00	52,65	74,00	53,01	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	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
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. 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 worse case.

Result: The requirements are met