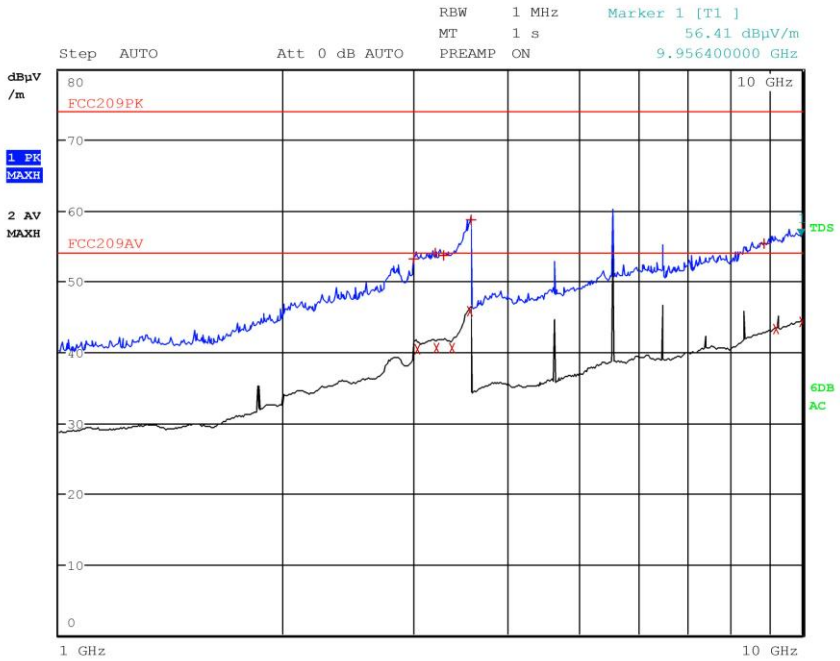
G15140758

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15140758
Test Spec	



CMC Centro Misure Compatibilità S.r.l.

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15140758
Test Spec	

Final Measurement

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

Trace	Frequency	Level (dBµV/m)	Detector	Delta Limit/dB
1	3.002000000 GHz	53.22	Max Peak	-20.78
2	3.034800000 GHz	40.37	Average	-13.63
1	3.200800000 GHz	53.97	Max Peak	-20.03
2	3.221600000 GHz	40.58	Average	-13.42
1	3.288400000 GHz	53.69	Max Peak	-20.31
2	3.384000000 GHz	40.57	Average	-13.43
2	3.575600000 GHz	45.81	Average	-8.19
1	3.587200000 GHz	58.72	Max Peak	-15.28
1	8.905600000 GHz	55.35	Max Peak	-18.65
2	9.207200000 GHz	43.20	Average	-10.80
1	9.984000000 GHz	57.45	Max Peak	-16.55
2	9.988800000 GHz	44.23	Average	-9.77

Result: The requirements are met

CMC Centro Misure Compatibilità S.r.l.

11.4 DTS bandwidth

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.247
- KDB 558074 D01 DTS Meas Guidance v03r03 cl. 8.1
- Internal procedure PM001
- See clause 4 of this test report

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 S108, CMC S136, CMC S164, CMC S227
Measurement uncertainty: See clause 7 of this test report

Test specification

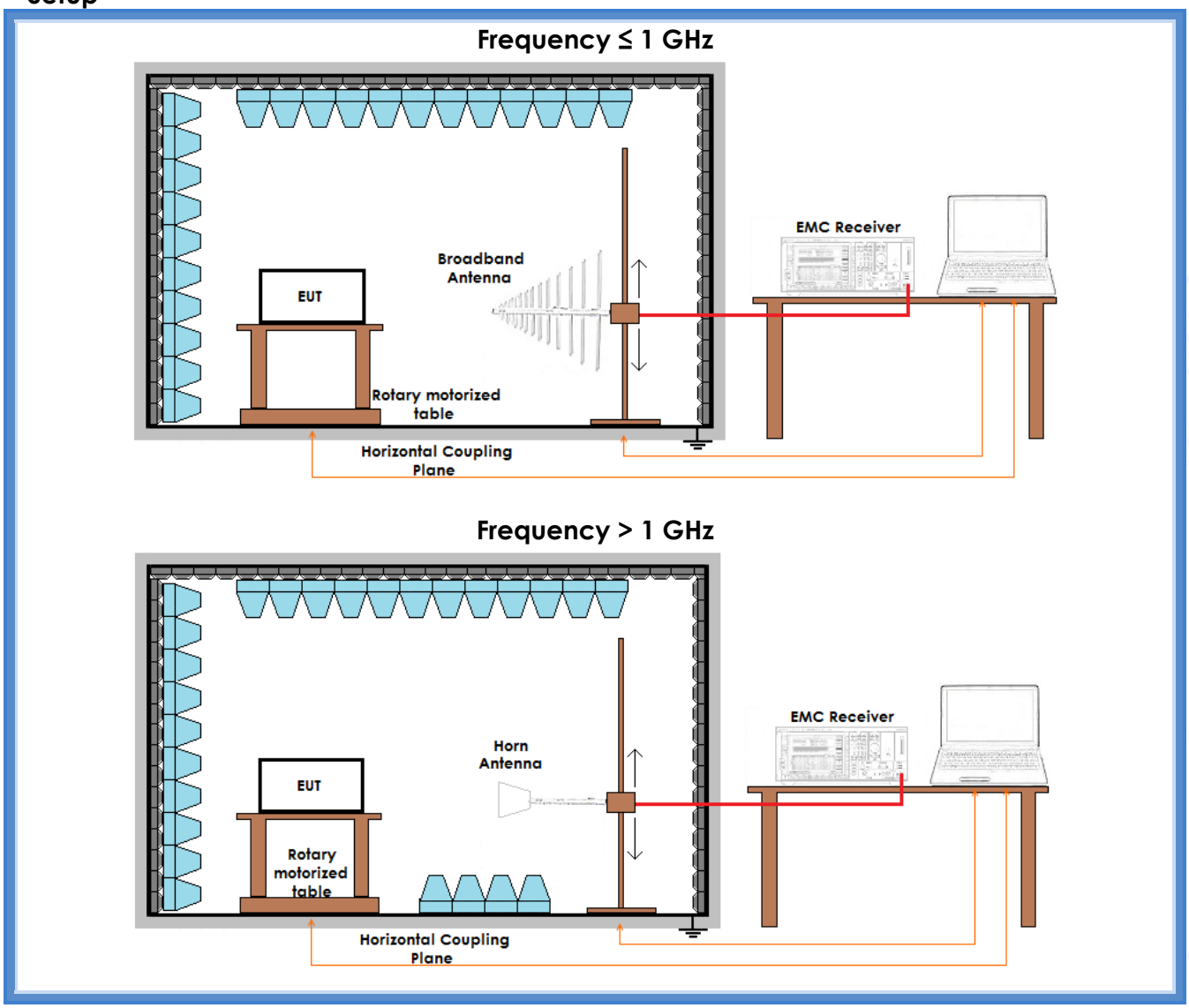
Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz

Environmental conditions

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

CMC Centro Misure Compatibilità S.r.l.

Setup



Result

Integrated antenna				
Channel	*Graphs*	*6 dB bandwidth (kHz)*	*Limits (kHz)*	*Results*
Lowest	G15140738	556,500	At least 500	Complies
Medium	G15140744	585,900	At least 500	Complies
Highest	G15140731	556,089	At least 500	Complies

CMC Centro Misure Compatibilità S.r.l.

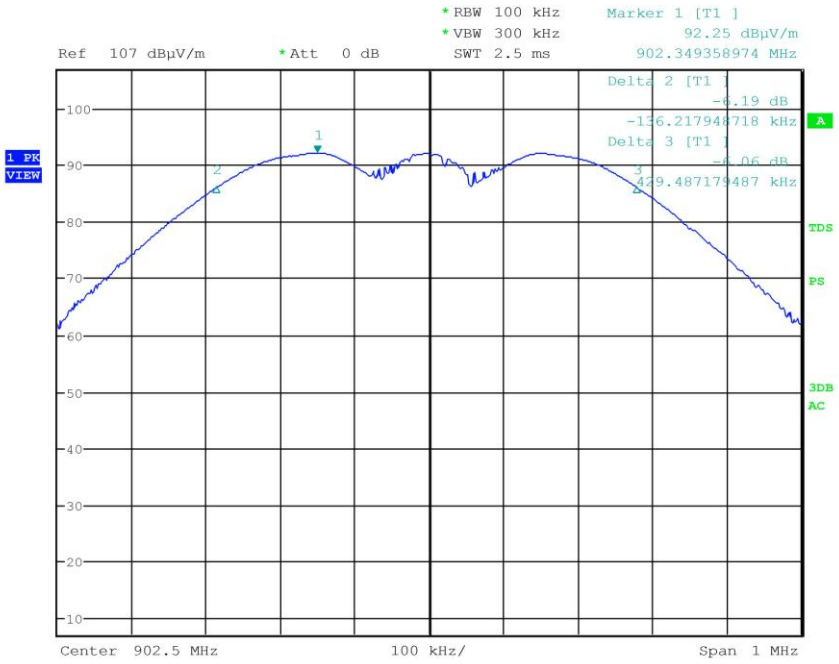
External antenna				
Channel	*Graphs*	*6 dB bandwidth (kHz)*	*Limits (kHz)*	*Results*
Lowest	G15140701	565,704	At least 500	Complies
Medium	G15140722	550,900	At least 500	Complies
Highest	G15140716	552,800	At least 500	Complies

CMC Centro Misure Compatibilità S.r.l.

Graphs

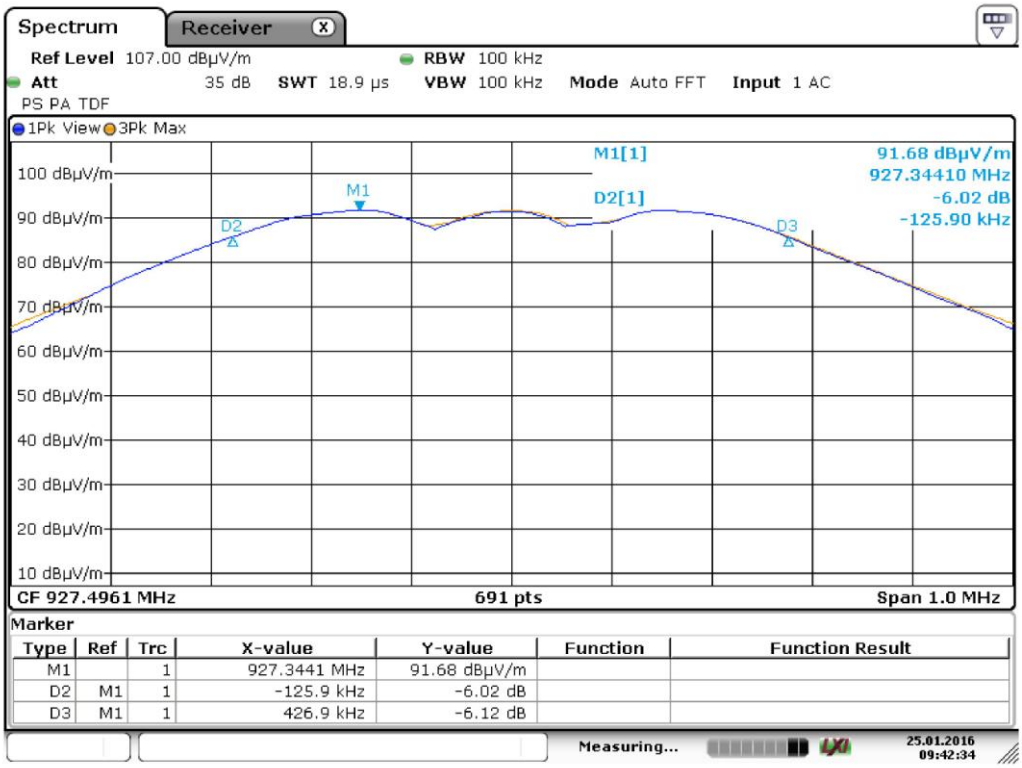
G15140701

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15140701
Test Spec	



CMC Centro Misure Compatibilità S.r.l.

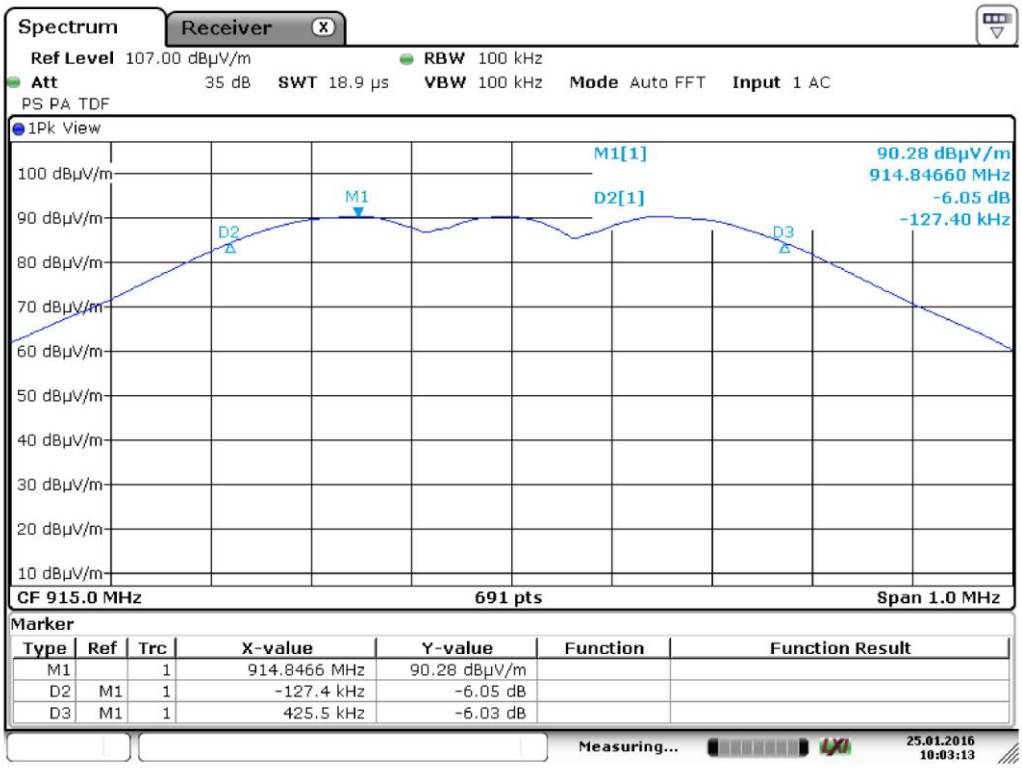
G15140716



Bertezzolo 15140716

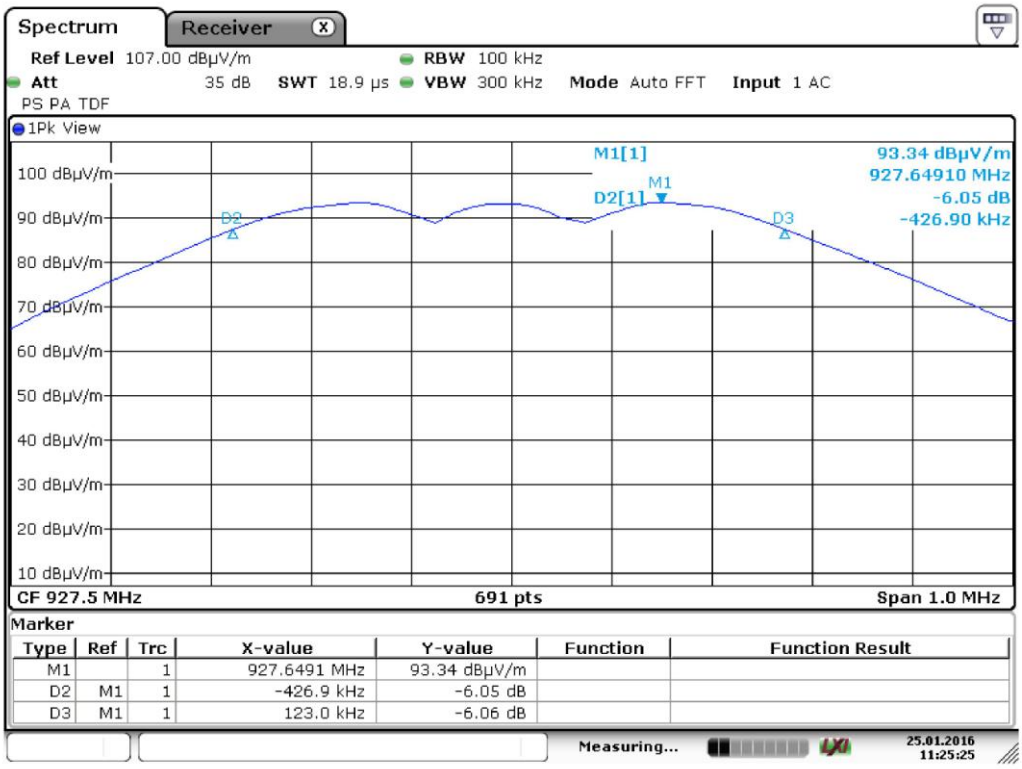
CMC Centro Misure Compatibilità S.r.l.

G15140722



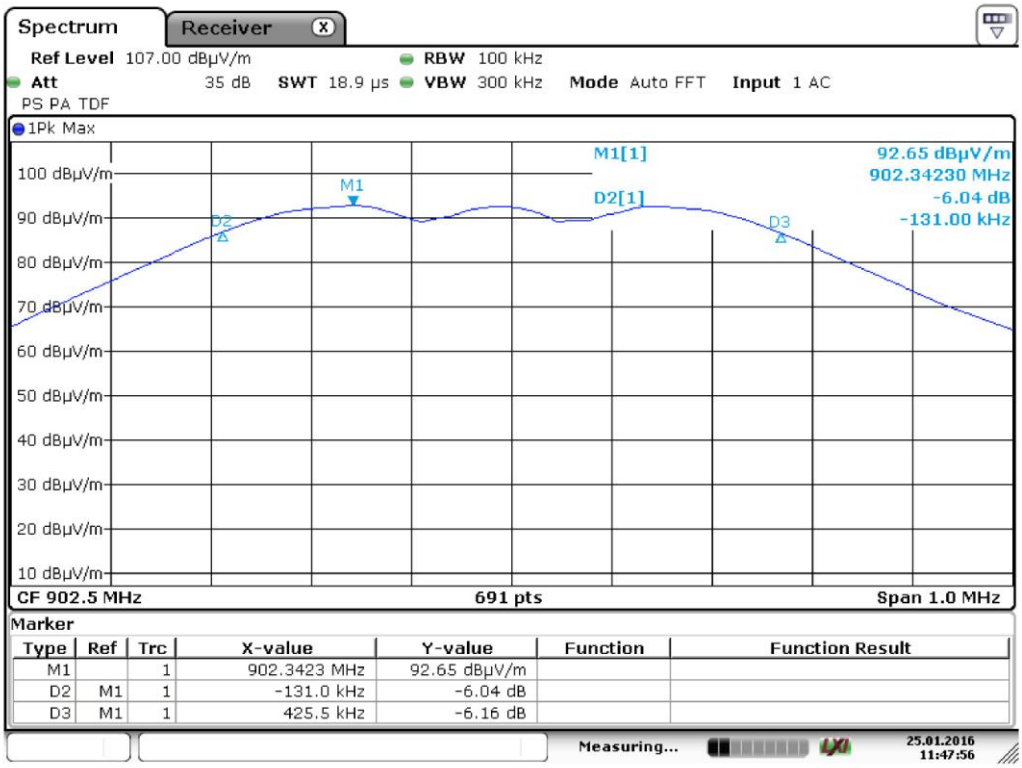
Bertezzolo 15140722

G15140731



Bertezzolo 15140731

G15140738

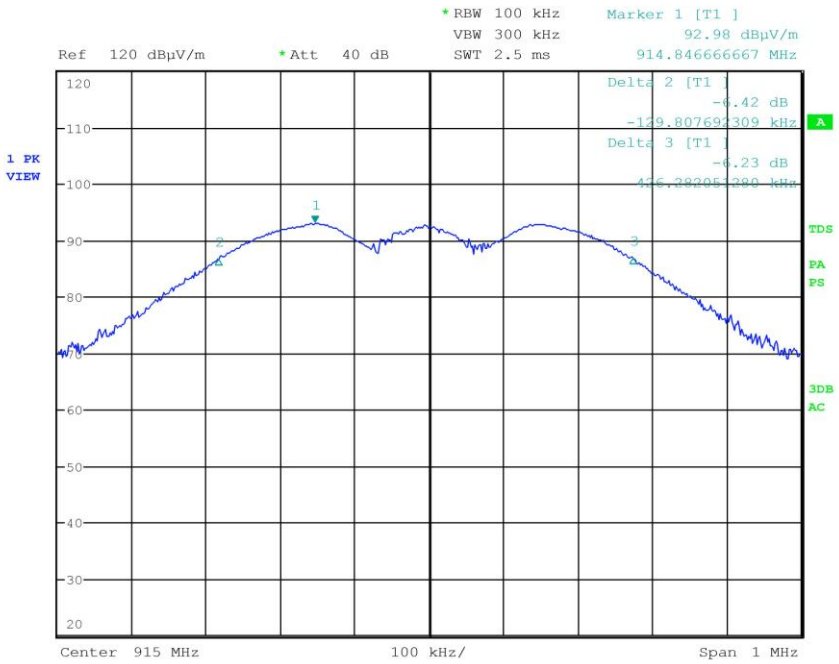


Bertezzolo 15140738

CMC Centro Misure Compatibilità S.r.l.

G15140744

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15140744
Test Spec	



Result: The requirements are met

CMC Centro Misure Compatibilità S.r.l.

11.5 Band edge

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.247 (d)
- KDB 558074 D01 DTS Meas Guidance v03r03 cl. 11.1(a) and 12.1
- Internal procedure PM001
- See clause 4 of this test report

EUT exercising

See clause 4 of this test report

Test specification

See FCC Part 15.247

Test configuration

Test site:
Semi-anechoic chamber

Auxiliary equipment:
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

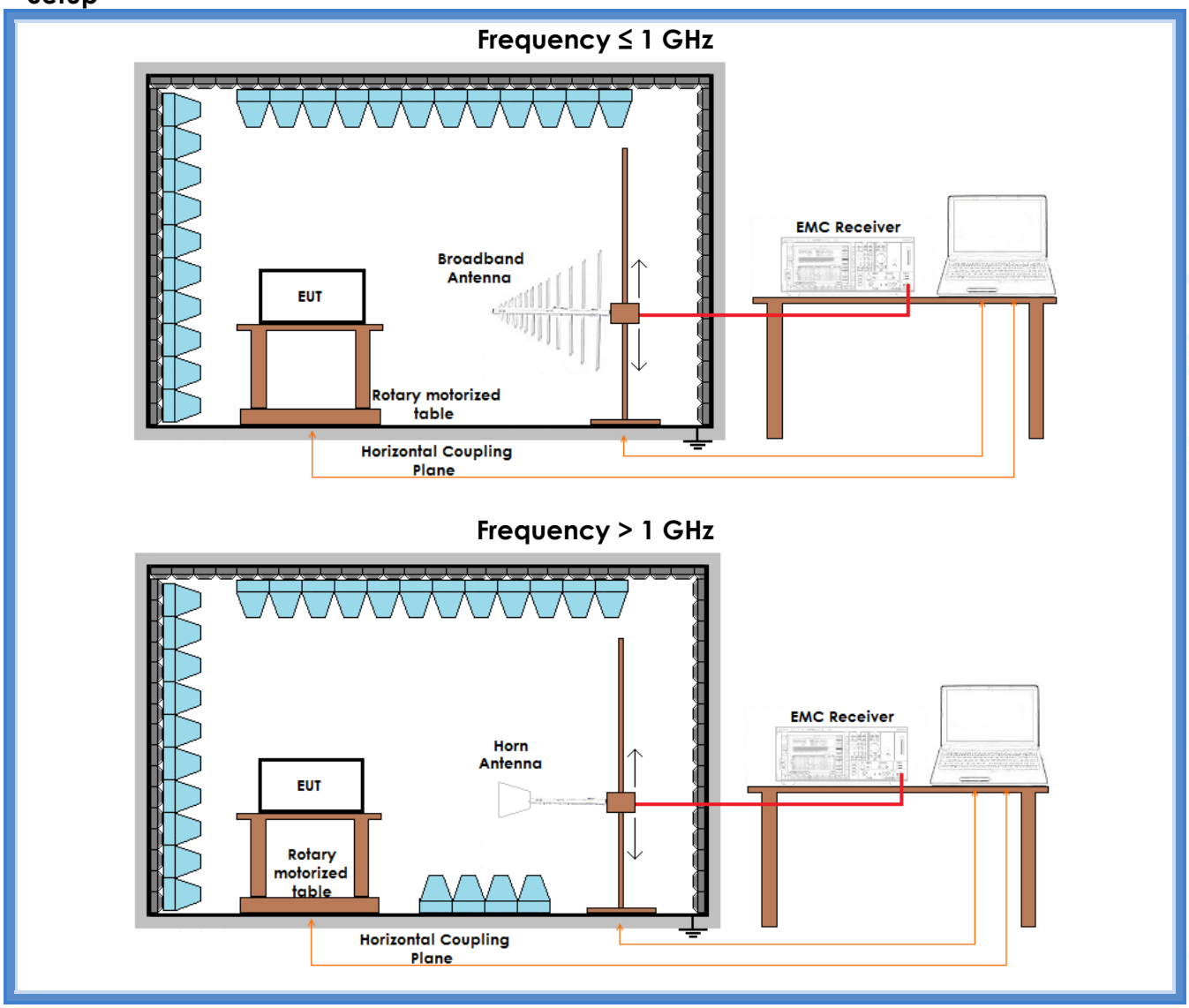
Environmental conditions

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

Acceptance limits: operation within the band 902 – 928 MHz

CMC Centro Misure Compatibilità S.r.l.

Setup



Result

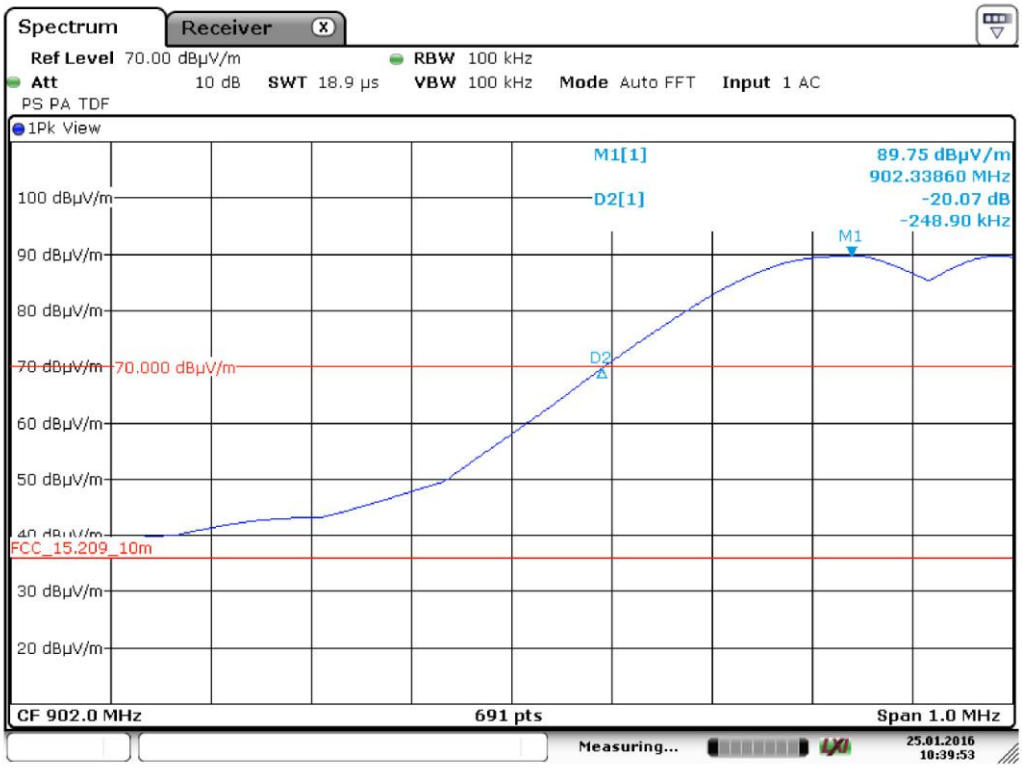
Integrated antenna				
Channel	*Bandwidth*	*Graph(s)*	*Results*	
Lowest	100 kHz	G15140737	902,0781 MHz	Complies
Highest	100 kHz	G15140736	927,9233 MHz	Complies

External antenna				
Channel	*Bandwidth*	*Graph(s)*	*Results*	
Lowest	100 kHz	G15140728	902,0897 MHz	Complies
Highest	100 kHz	G15140729	927,9175 MHz	Complies

CMC Centro Misure Compatibilità S.r.l.

Graphs

G15140728



Bertezzolo 15140728

CMC Centro Misure Compatibilità S.r.l.

G15140729

Bertezzolo 15140729

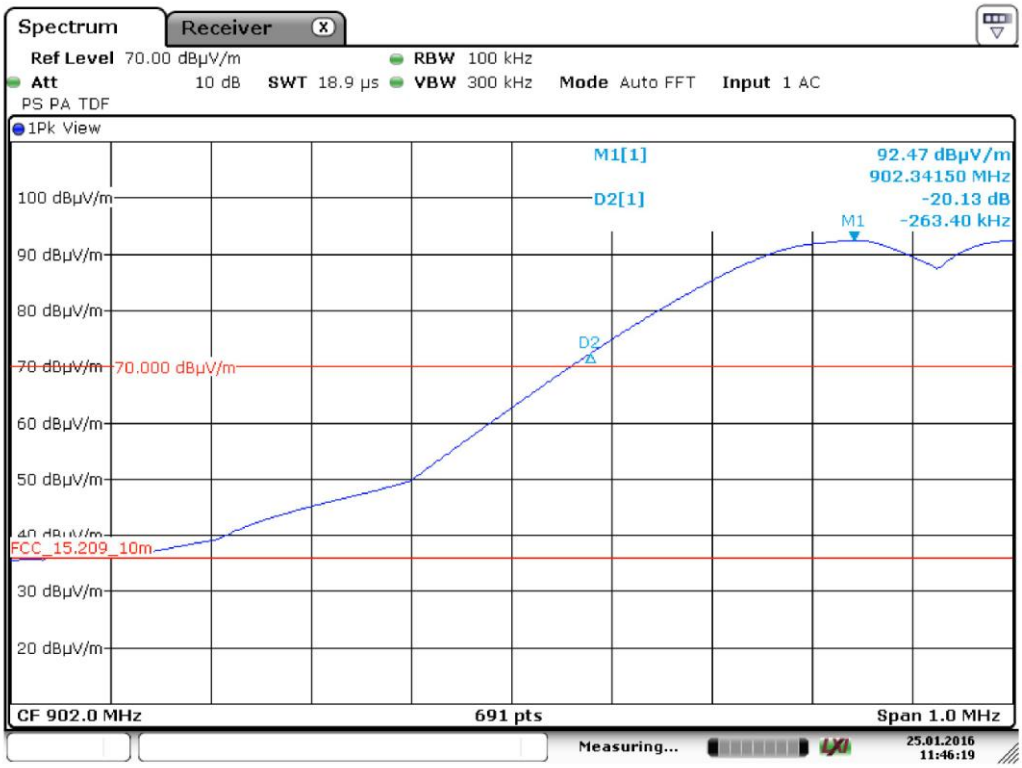
CMC Centro Misure Compatibilità S.r.l.

G15140736

Bertezzolo 15140736

CMC Centro Misure Compatibilità S.r.l.

G15140737



Result: The requirements are met

11.6 Fundamental emission output power

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.247
- KDB 558074 D01 DTS Meas Guidance v03r03 cl. 3.0 and 9
- Internal procedure PM001
- See clause 4 of this test report

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 S108, CMC S136, CMC S164, CMC S227
Measurement uncertainty: See clause 7 of this test report

Test specification

Port: Enclosure (conducted measurements are not applicable because the antenna connector is not available, see also cl. 3.0 of KDB 558074 D01 DTS Meas Guidance v03r02)
Antenna polarization: Horizontal (H) – Vertical (V)
EUT – Antenna distance: 10 m
EUT height about the floor: 80 cm

Environmental conditions

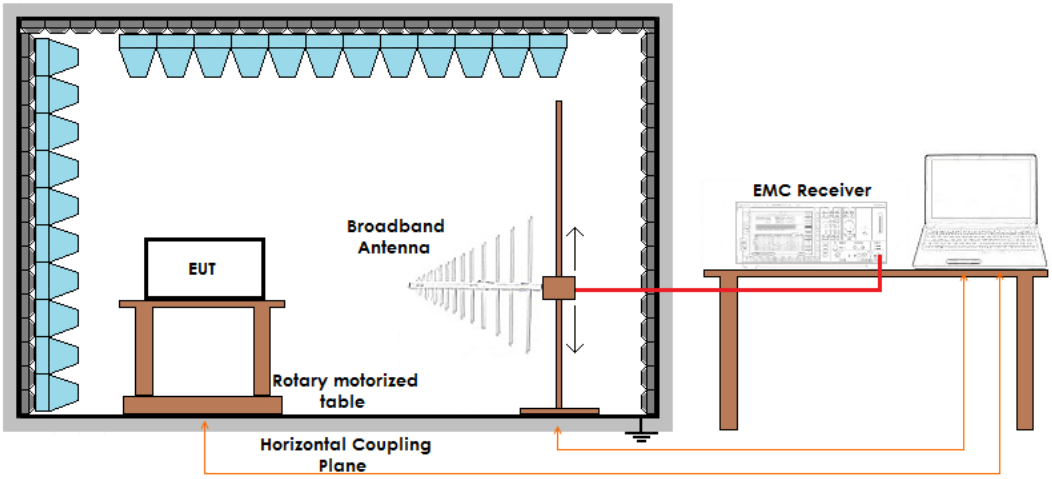
Temperature (°C)	*Atmospheric pressure (kPa)*	*Relative humidity (%)*
22	100	42

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

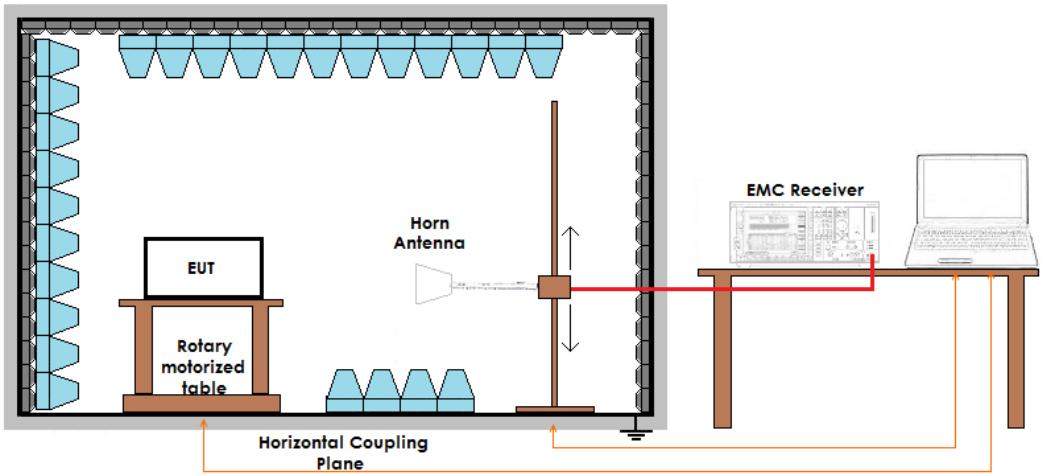
CMC Centro Misure Compatibilità S.r.l.

Setup

Frequency ≤ 1 GHz



Frequency > 1 GHz



CMC Centro Misure Compatibilità S.r.l.

Result

Integrated antenna					
Channel	*Polarization*	*Graphs*	*Measured PK level (dBµV/m)*	*Peak Output Conducted Power (mW)*	*Remarks*
Lowest	Worst case	G15140739	92,96	3,15	--
Medium	Worst case	G15140745	94,10	4,10	--
Highest	Worst case	G15140730	93,71	3,75	--

External antenna					
Channel	*Polarization*	*Graphs*	*Measured PK level (dBµV/m)*	*Peak Output Conducted Power (mW)*	*Remarks*
Lowest	Worst case	G15140702	92,38	2,76	--
Medium	Worst case	G15140721	90,75	1,90	--
Highest	Worst case	G15140715	92,10	2,59	--

Remarks: the above table shows the results of radiated measurements, in agreement with cl. 3.0 of KDB 558074 D01 DTS Meas Guidance v03r03.
Conducted measurements are not applicable because the antenna connector is not available.
The following formula, provided in document DA 00-705, has been used for the conversion between radiated to conducted values:

Conducted value = $(E \times d)^2 / (30 \times G)$

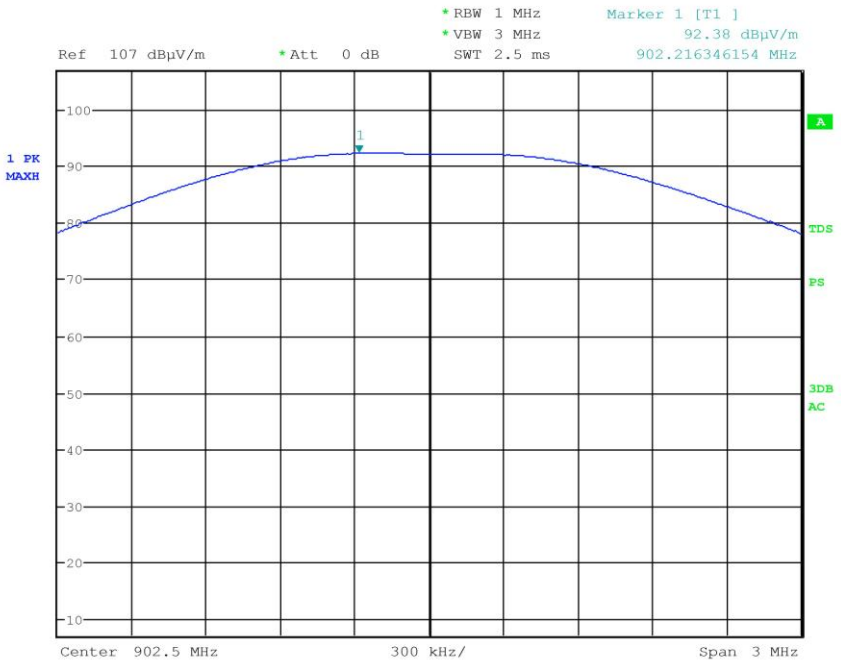
Where:
$E = (10^{(dB\mu V/m)/20})/1000000$, the maximum measured fundamental field strength in V/m
$G = 10^{dBi/10}$, the numeric gain of the transmitting antenna: 2,09 (3,2 dBi)
d = the distance in meters from which the field strength was measured (10 m)
P = the power in watts

CMC Centro Misure Compatibilità S.r.l.

Graphs

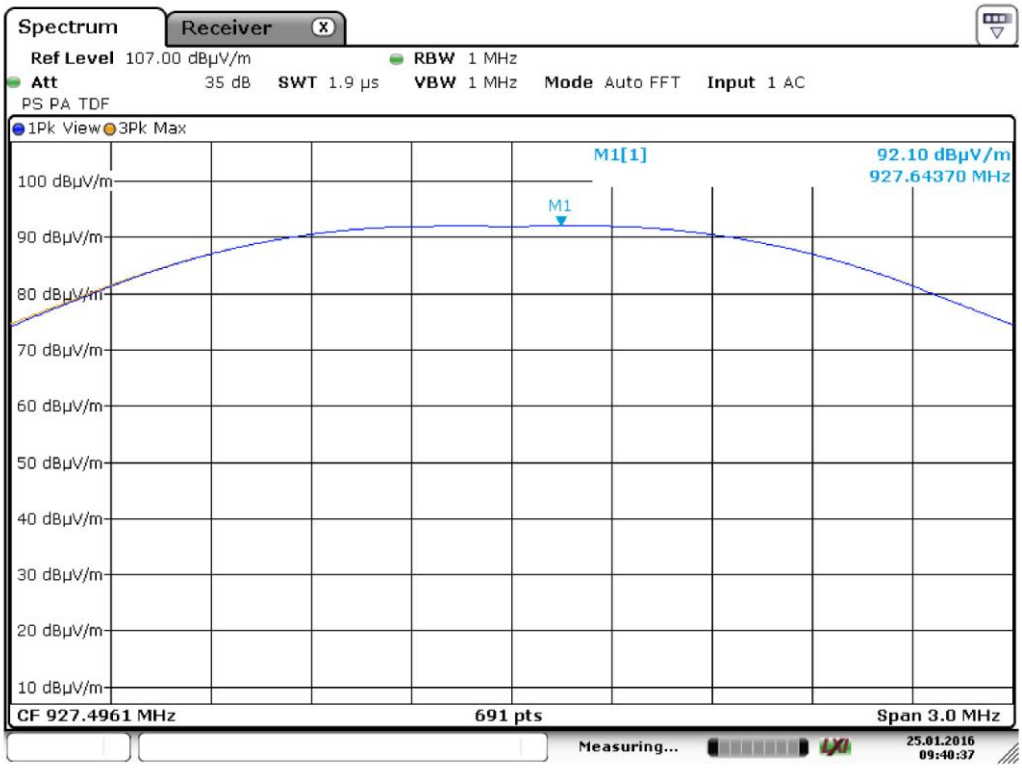
G15140702

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15140702
Test Spec	



CMC Centro Misure Compatibilità S.r.l.

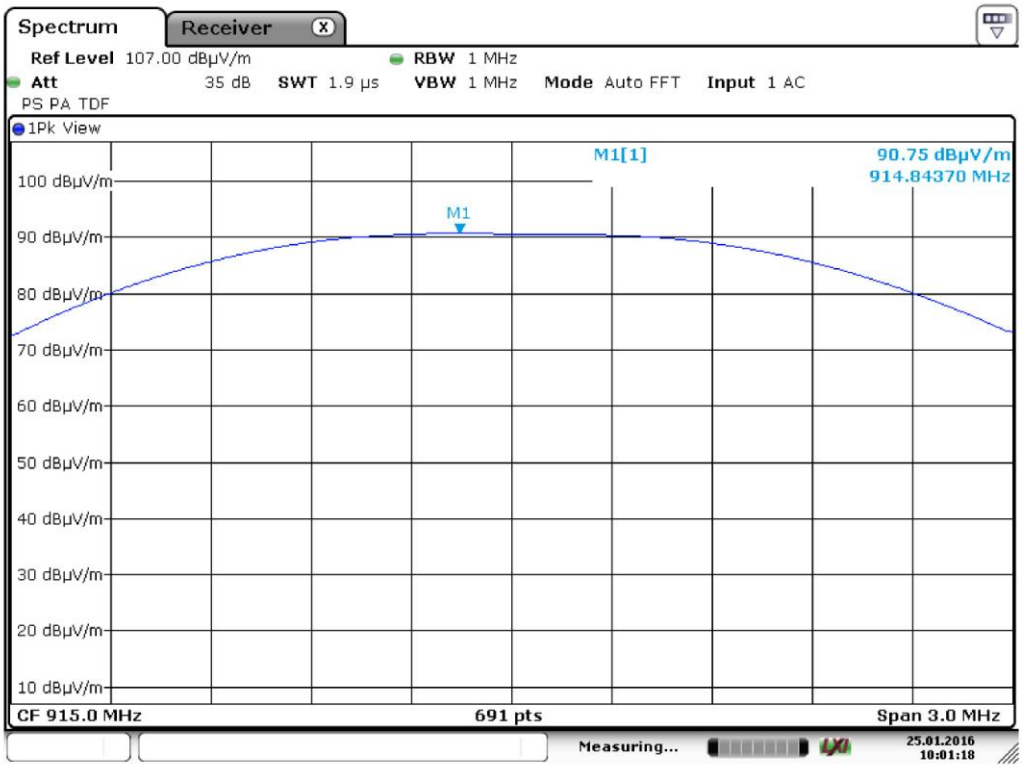
G15140715



Bertezzolo 15140715

CMC Centro Misure Compatibilità S.r.l.

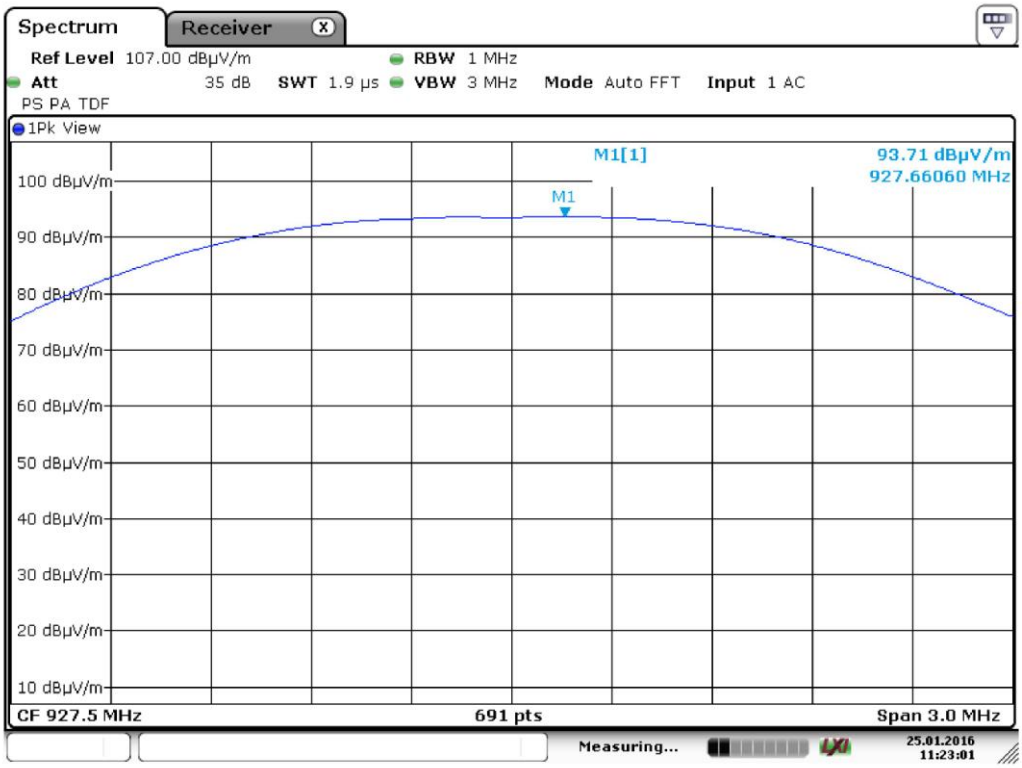
G15140721



Bertezzolo 15140721

CMC Centro Misure Compatibilità S.r.l.

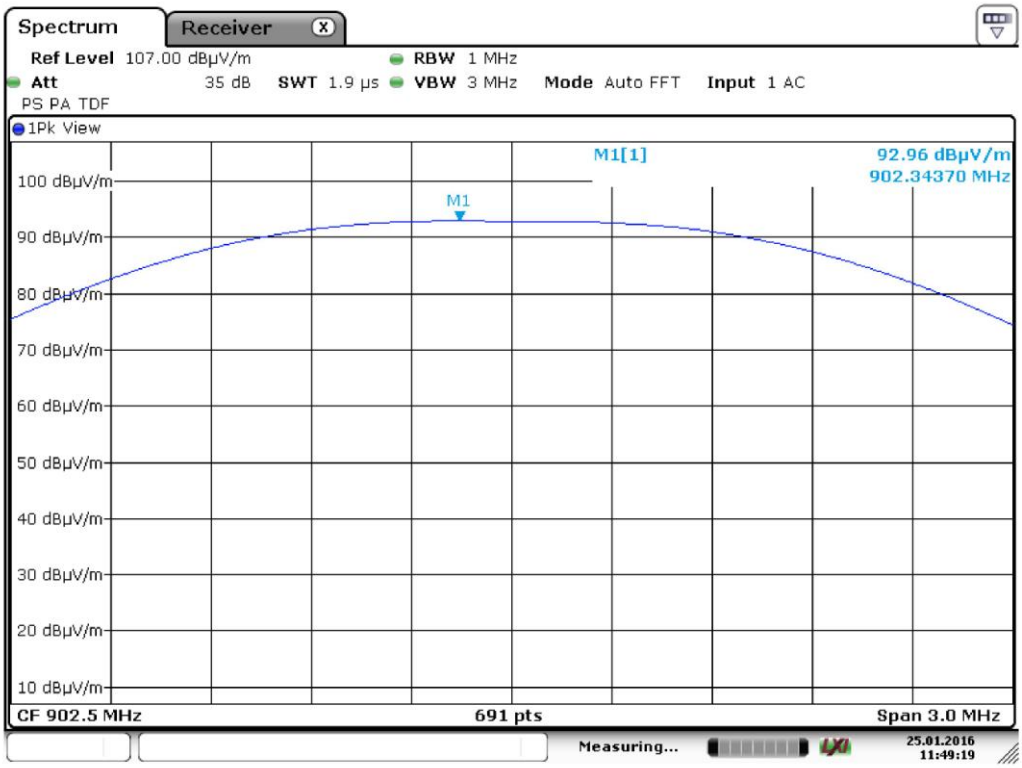
G15140730



Bertezzolo 15140730

CMC Centro Misure Compatibilità S.r.l.

G15140739

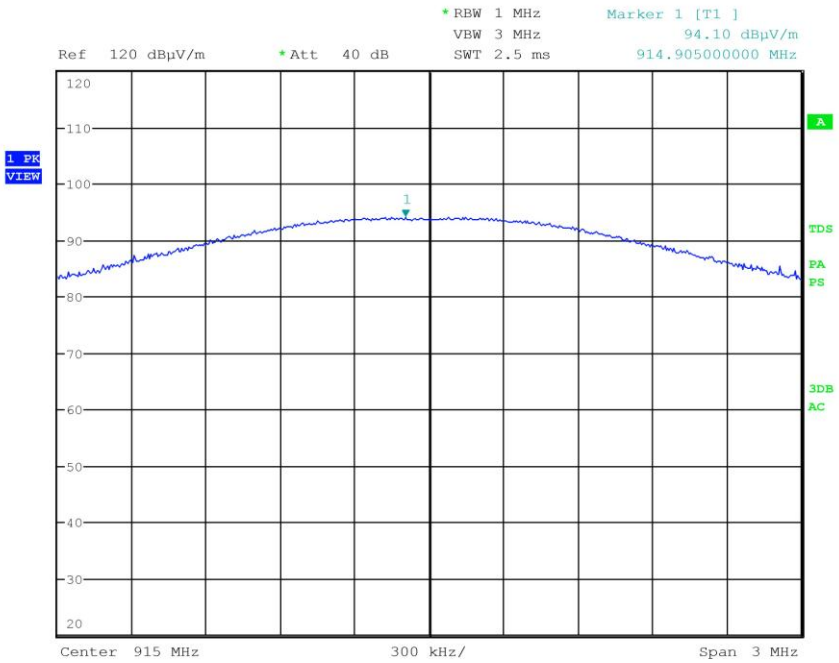


Bertezzolo 15140739

CMC Centro Misure Compatibilità S.r.l.

G15140745

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15140745
Test Spec	



Result: The requirements are met

CMC Centro Misure Compatibilità S.r.l.

11.7 Maximum power spectral density level in the fundamental emission

Test set-up and execution

- FCC Rules and Regulation; Titles 47 Part 15.247
- KDB 558074 D01 DTS Meas Guidance v03r03 cl. 10.2
- Internal procedure PM001
- See clause 4 of this test report

EUT exercising

See clause 4 of this test report

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

Test specification

Port: Enclosure
Antenna polarization: Horizontal (H) – Vertical (V)
EUT – Antenna distance: 10 m

Environmental conditions

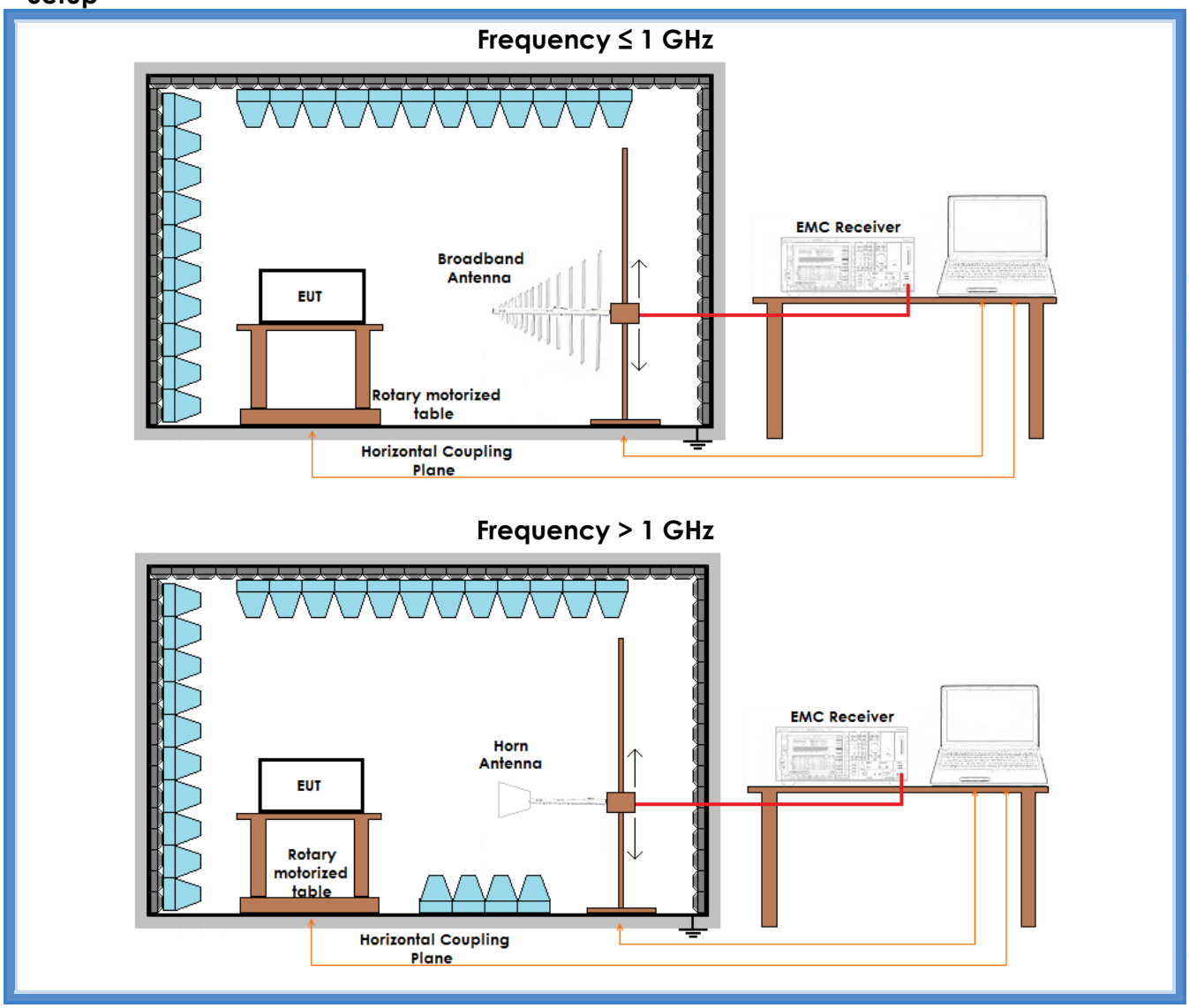
Temperature (°C)	*Atmospheric pressure (kPa)*	*Relative humidity (%)*
22	100	42

Acceptance limits:

Frequency Range	*Power Spectral Density*
902 – 928 MHz	8 dBm / 6,31 mW

CMC Centro Misure Compatibilità S.r.l.

Setup



CMC Centro Misure Compatibilità S.r.l.

Result

Integrated antenna					
Channel	*Polarization*	*Graphs*	*Measured PK level (dBµV/m)*	*Power Spectral Density (mW)*	*Remarks*
Lowest	Worst case	G15140740	92,60	2,90	--
Medium	Worst case	G15140746	92,85	3,08	--
Highest	Worst case	G15140732	93,34	3,44	--

External antenna					
Channel	*Polarization*	*Graphs*	*Measured PK level (dBµV/m)*	*Power Spectral Density (mW)*	*Remarks*
Lowest	Worst case	G15140703	92,25	2,68	--
Medium	Worst case	G15140723	90,28	1,70	--
Highest	Worst case	G15140717	91,68	2,35	--

Remarks: the above table shows the results of radiated measurements, in agreement with cl. 3.0 of KDB 558074 D01 DTS Meas Guidance v03r03.
Conducted measurements are not applicable because the antenna connector is not available.
The following formula, provided in document DA 00-705, has been used for the conversion between radiated to conducted values:

Conducted value = $(E \times d)^2 / (30 \times G)$

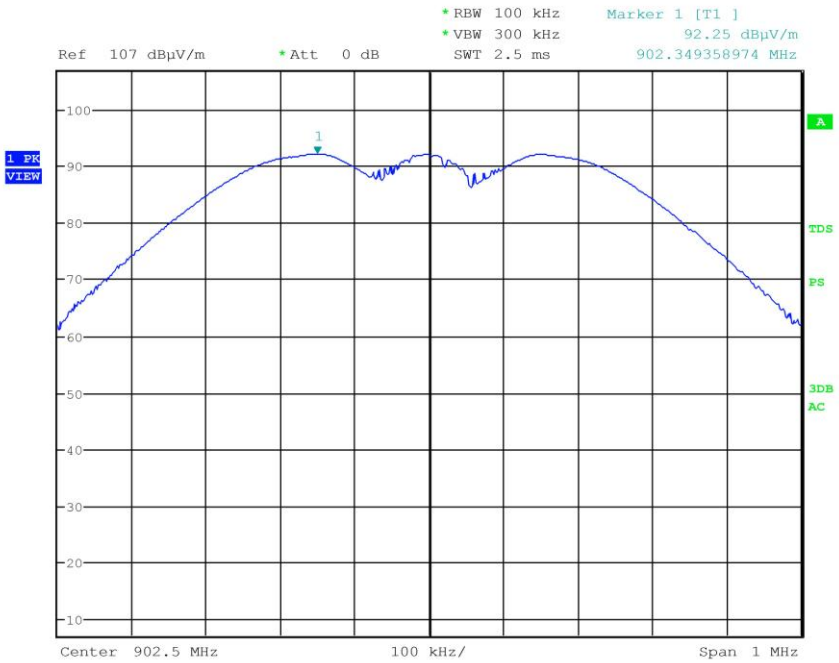
Where:
$E = (10^{(dB\mu V/m)/20})/1000000$, the maximum measured fundamental field strength in V/m
$G = 10^{dBi/10}$, the numeric gain of the transmitting antenna: 2,09 (3,2 dBi)
d = the distance in meters from which the field strength was measured (10 m)
P = the power in watts

CMC Centro Misure Compatibilità S.r.l.

Graphs

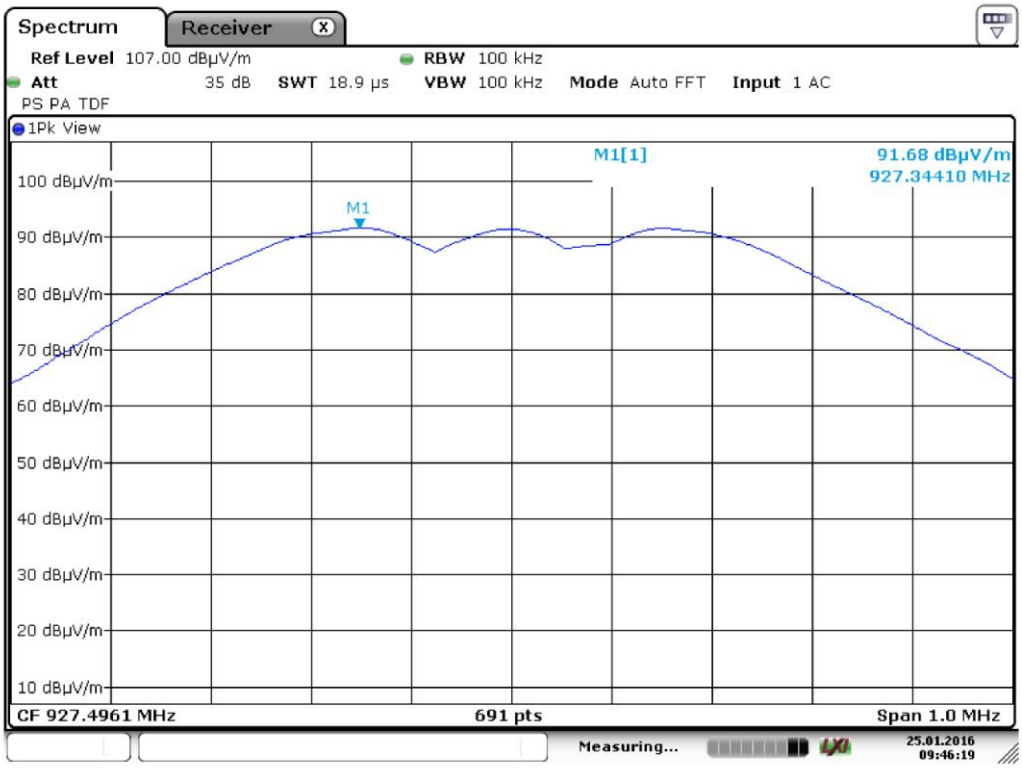
G15140703

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15140703
Test Spec	



CMC Centro Misure Compatibilità S.r.l.

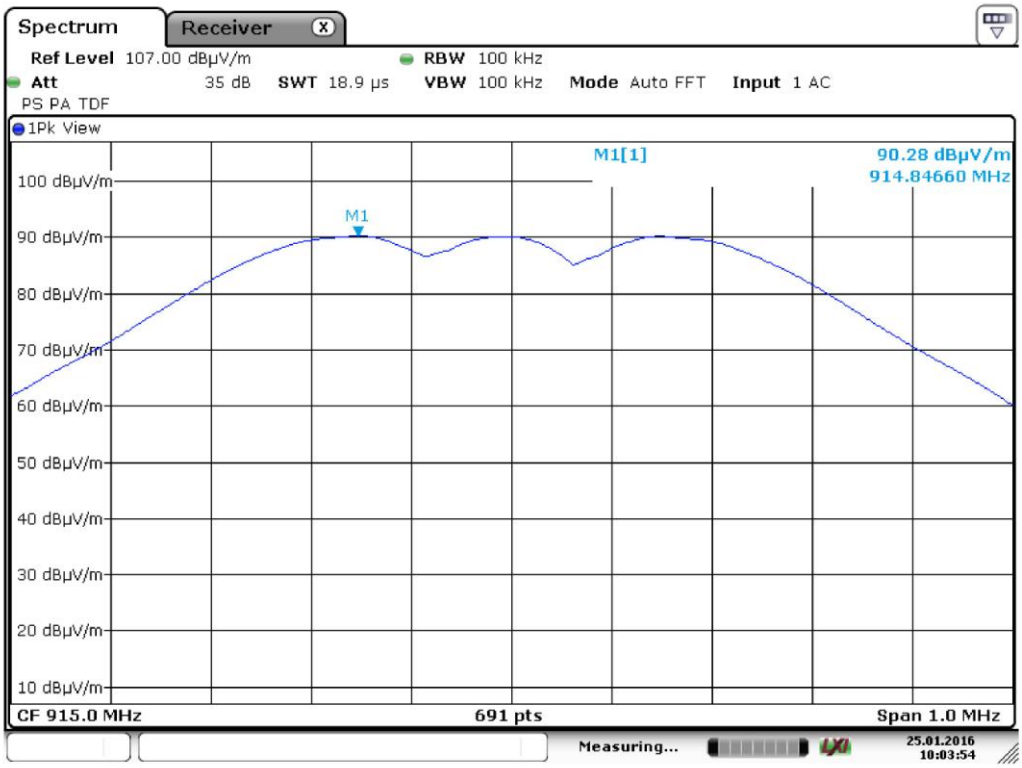
G15140717



Bertezzolo 15140717

CMC Centro Misure Compatibilità S.r.l.

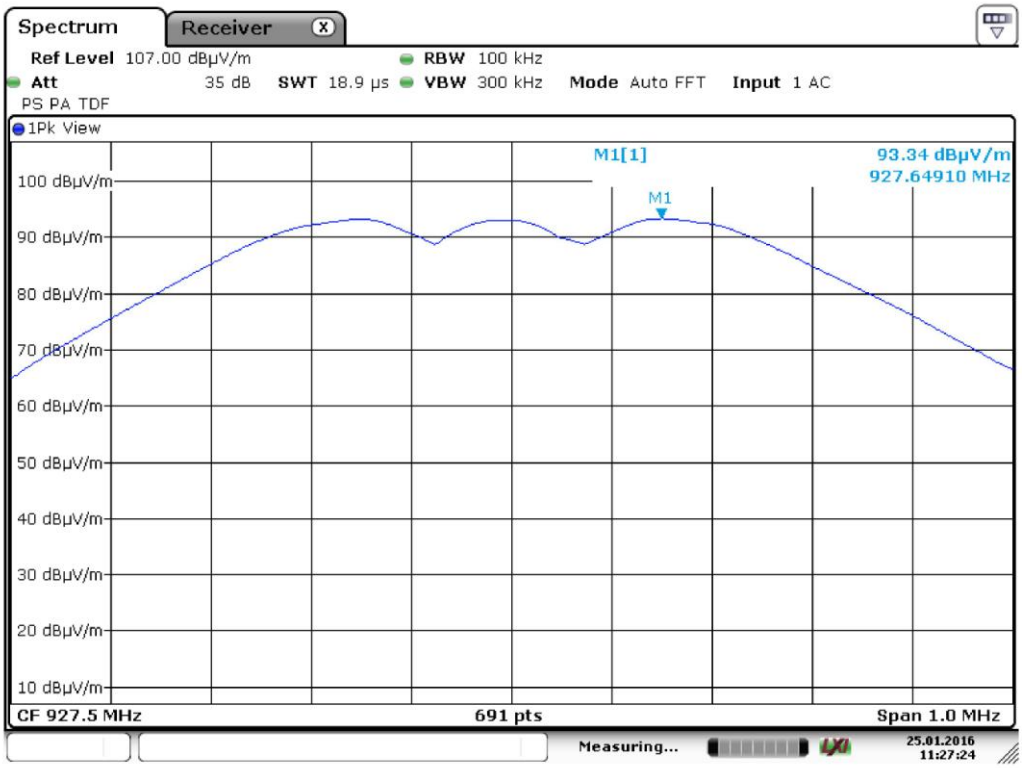
G15140723



Bertezzolo 15140723

CMC Centro Misure Compatibilità S.r.l.

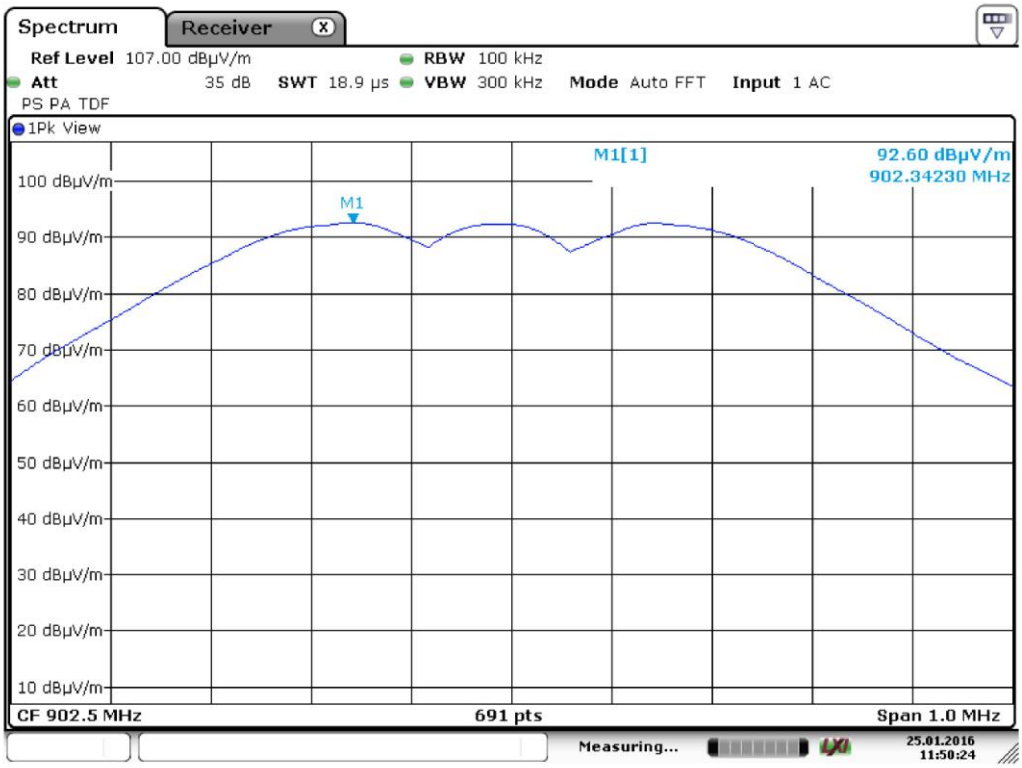
G15140732



Bertezzolo 15140732

CMC Centro Misure Compatibilità S.r.l.

G15140740

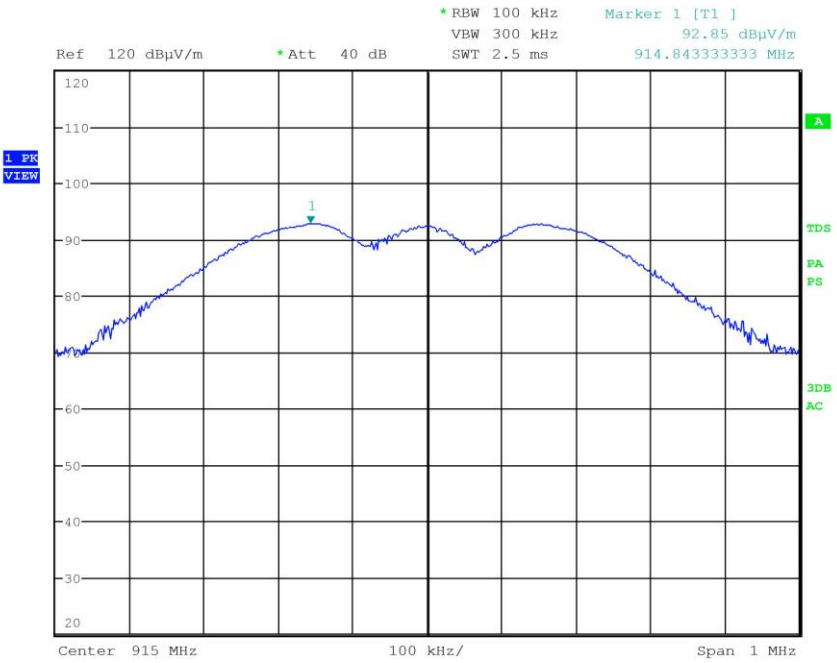


Bertezzolo 15140740

CMC Centro Misure Compatibilità S.r.l.

G15140746

Meas Type	Emission
Equipment under Test	
Manufacturer	
OP Condition	
Operator	Bertezzolo 15140746
Test Spec	



Result: The requirements are met

CMC Centro Misure Compatibilità S.r.l.

11.8 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

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: 10 m
EUT height about the floor: 80 cm
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

CMC Centro Misure Compatibilità S.r.l.

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			

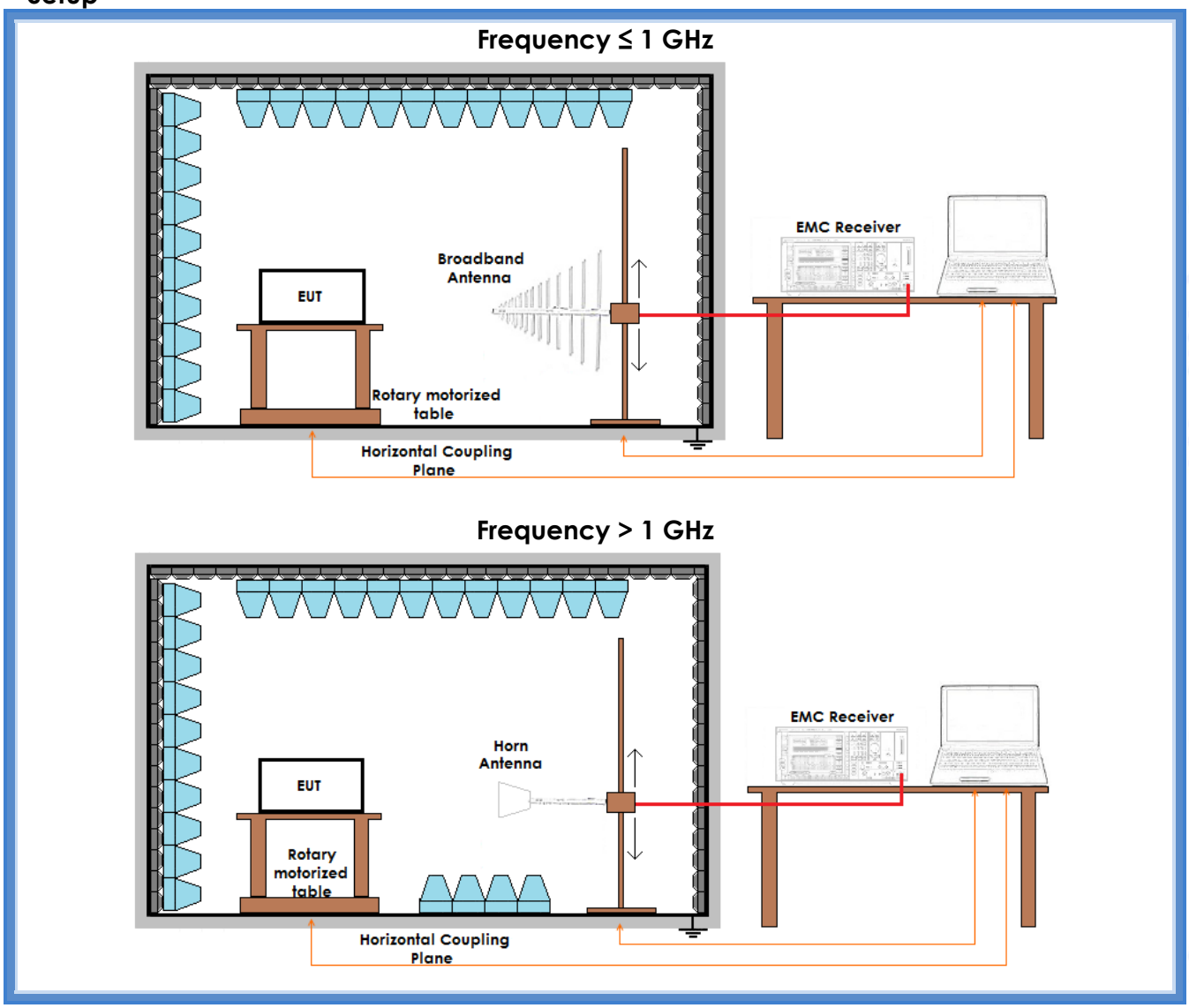
Acceptance limits for emissions in non-restricted frequency bands

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:

a) 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
b) 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.
c) In either case, attenuation to levels below the 15.209 general radiated emissions limits is not required

CMC Centro Misure Compatibilità S.r.l.

Setup



CMC Centro Misure Compatibilità S.r.l.

Result – AV detector

Integrated antenna							
Harmonic	Lowest channel		Medium channel		Highest channel		Results
	Level (dBµV/m)	Limits (dBµV/m)	Level (dBµV/m)	Limits (dBµV/m)	Level (dBµV/m)	Limits (dBµV/m)	
II	49,70*	72,60	49,90*	72,90	50,30*	73,30	Complies
III	46,20*	72,60	46,80*	72,90	46,80*	73,30	Complies
IV	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
V	51,50	54,00	51,00	54,00	50,20	54,00	Complies
VI	49,50	54,00	49,30*	72,90	49,90*	73,30	Complies
VII	51,30*	72,60	51,70*	72,90	52,60*	73,30	Complies
VIII	More than 20 dB below limit*	72,60	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*	73,30	Complies
Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest values. The emission values marked with * have been detected in non-restricted frequency bands							

External antenna							
Harmonic	Lowest channel		Medium channel		Highest channel		Results
	Level (dBµV/m)	Limits (dBµV/m)	Level (dBµV/m)	Limits (dBµV/m)	Level (dBµV/m)	Limits (dBµV/m)	
II	51,80*	72,30	52,30*	70,30	52,10*	71,70	Complies
III	43,60*	72,30	44,50*	70,30	43,70*	71,70	Complies
IV	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
V	51,60	54,00	51,90	54,00	51,80	54,00	Complies
VI	52,90	54,00	53,30*	70,30	52,40*	71,70	Complies
VII	51,60*	72,30	52,10*	70,30	52,30*	71,70	Complies
VIII	More than 20 dB below limit*	72,30	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*	71,70	Complies
Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest values. The emission values marked with * have been detected in non-restricted frequency bands							

CMC Centro Misure Compatibilità S.r.l.

Result – Peak detector

Integrated antenna							
Harmonic	Lowest channel		Medium channel		Highest channel		Results
	Level (dBµV/m)	Limits (dBµV/m)	Level (dBµV/m)	Limits (dBµV/m)	Level (dBµV/m)	Limits (dBµV/m)	
II	51,20*	92,60	51,50*	92,85	52,30*	93,34	Complies
III	48,50*	92,60	48,90*	92,85	49,50*	93,34	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	53,50	74,00	53,00	74,00	52,50	74,00	Complies
VI	51,60	74,00	51,90*	92,85	51,90*	93,34	Complies
VII	53,50*	92,60	53,20*	92,85	51,40*	93,34	Complies
VIII	More than 20 dB below limit*	92,60	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*	93,34	Complies
Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest values. The emission values marked with * have been detected in non-restricted frequency bands							

External antenna							
Harmonic	Lowest channel		Medium channel		Highest channel		Results
	Level (dBµV/m)	Limits (dBµV/m)	Level (dBµV/m)	Limits (dBµV/m)	Level (dBµV/m)	Limits (dBµV/m)	
II	53,50*	92,25	53,90*	90,28	54,10*	91,68	Complies
III	46,00*	92,25	44,50*	90,28	46,90*	91,68	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	53,40	74,00	54,00	74,00	54,20	74,00	Complies
VI	55,60	74,00	56,00*	90,28	56,10*	91,68	Complies
VII	54,10*	92,25	54,30*	90,28	55,50*	91,68	Complies
VIII	More than 20 dB below limit*	92,25	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*	91,68	Complies
Remarks: EUT was tested in 3 orthogonal planes. The results in this table show the highest values. The emission values marked with * have been detected in non-restricted frequency bands							

Result: The requirements are met

CMC Centro Misure Compatibilità S.r.l.

11.9 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/cm2)	*Output Power (mW)*	*Antenna Gain (G)*	*Power Density at 20 cm (mW/cm2)*	*Remarks*
1,00	4,10	2,09	0,00170	Measured
Remarks: Power Density = (P x G) / (4πR^2)				

Result: The requirements are met

CMC Centro Misure Compatibilità S.r.l.