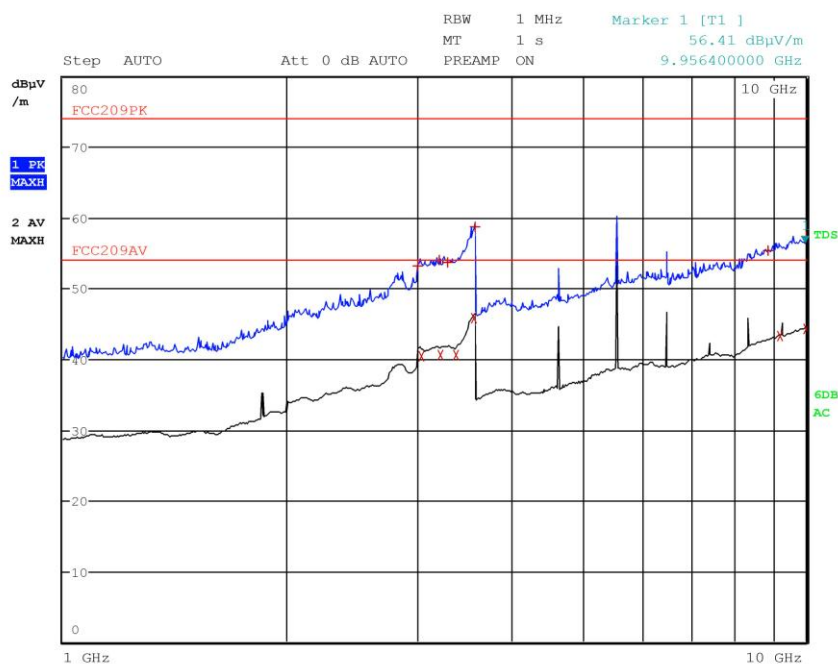




G15140758

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





Meas Type Emission
Equipment under Test
Manufacturer
OP Condition
Operator Bertezolo 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



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

EUT exercising

See clause 4 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

Test configuration

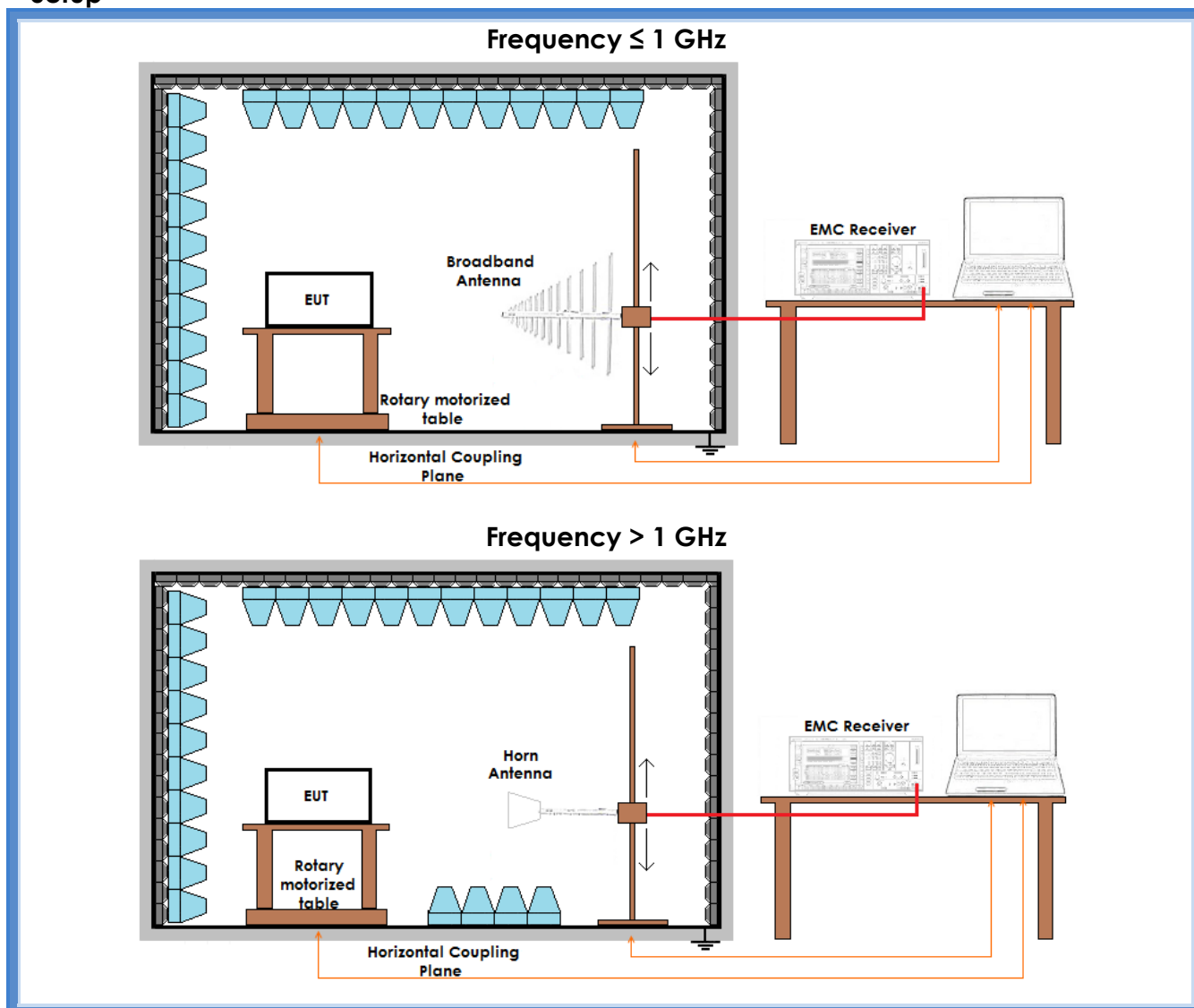
Test site:
Semi-anechoic chamber

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

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



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

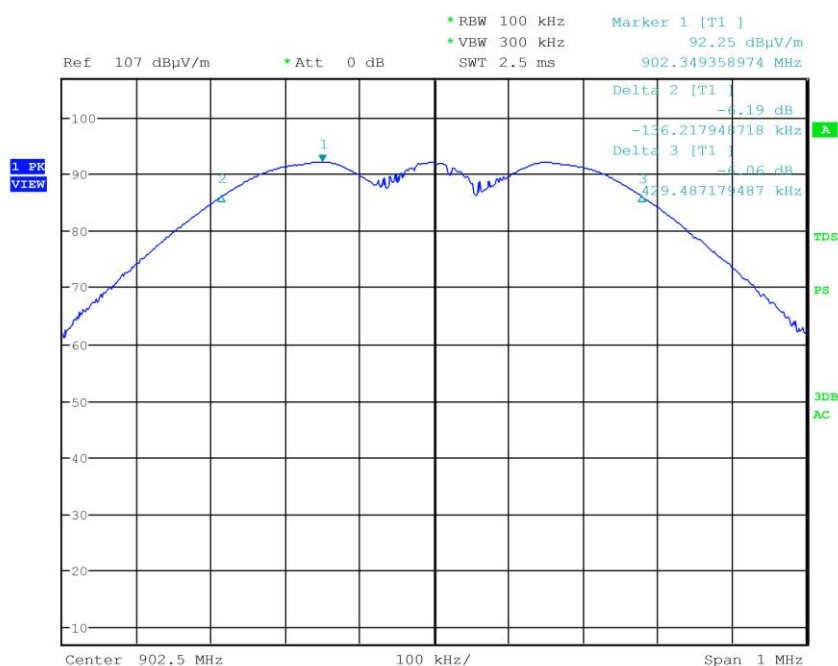




Graphs

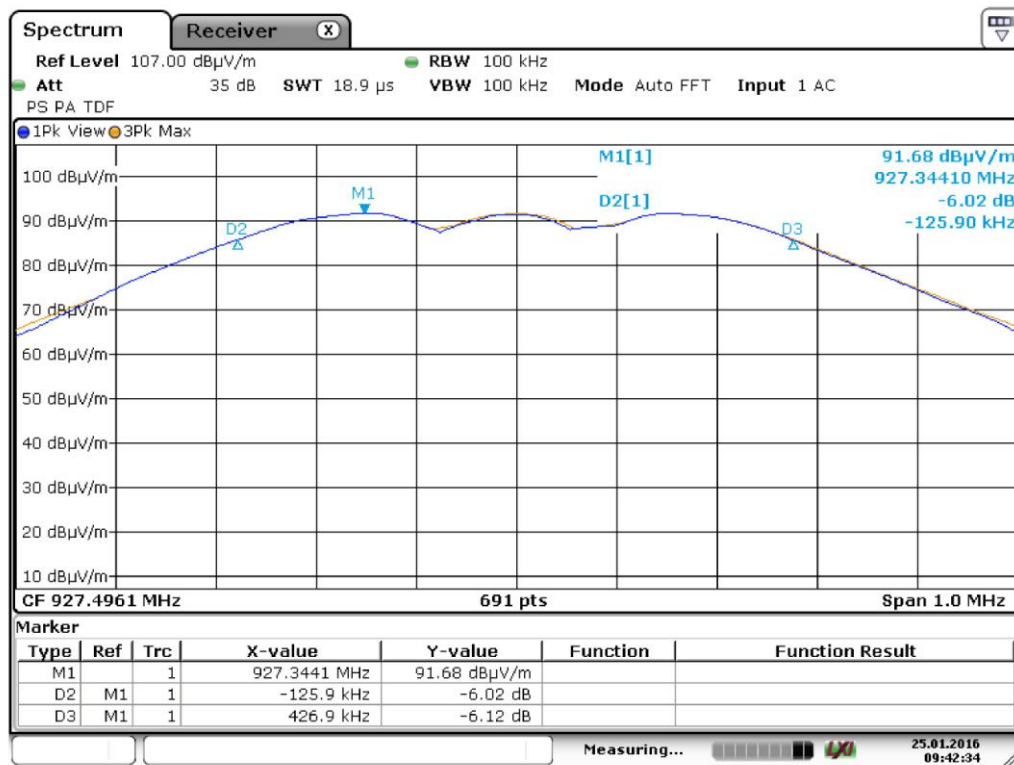
G15140701

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





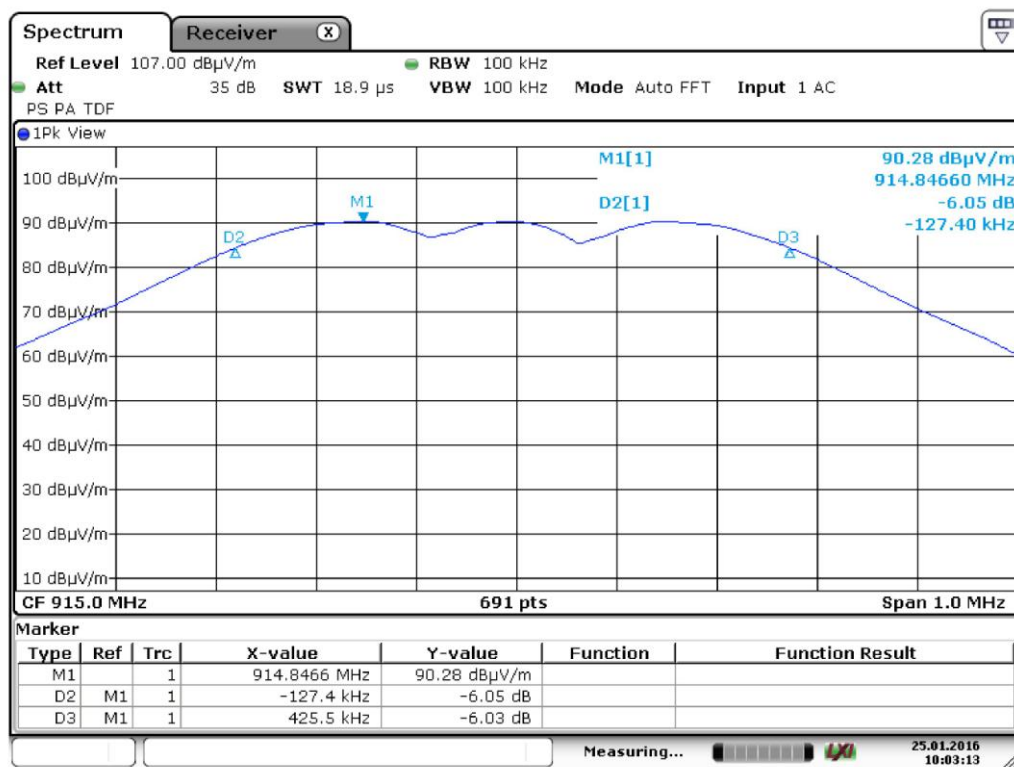
G15140716



Bertezzo 15140716



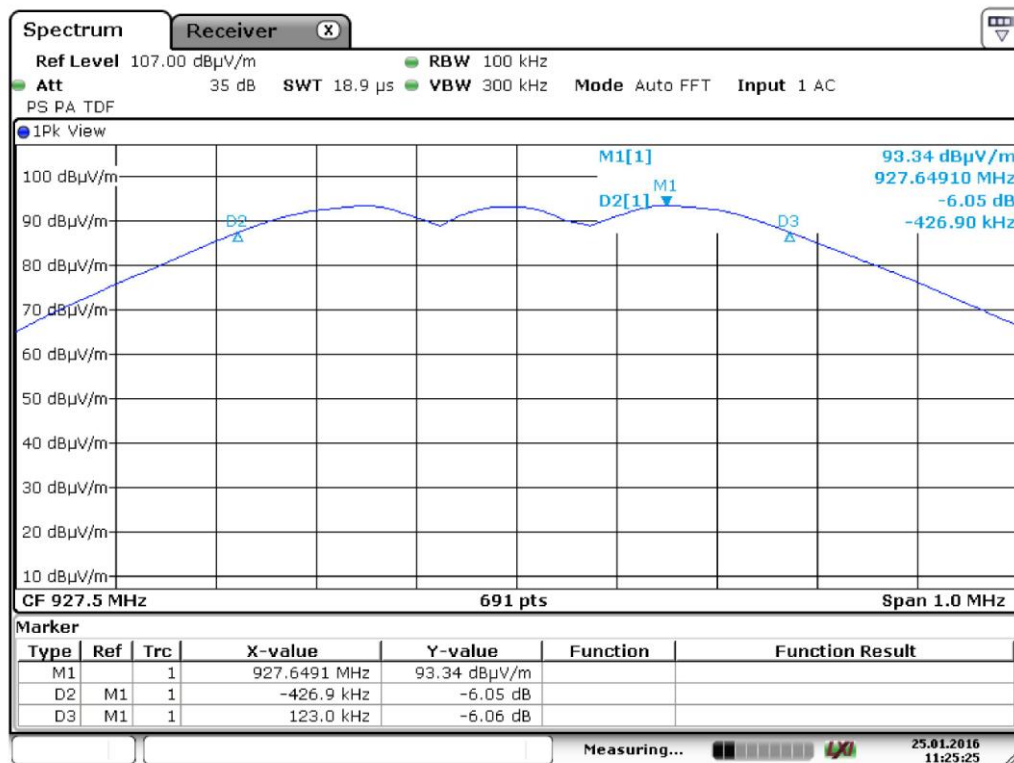
G15140722



Bertezzo 15140722



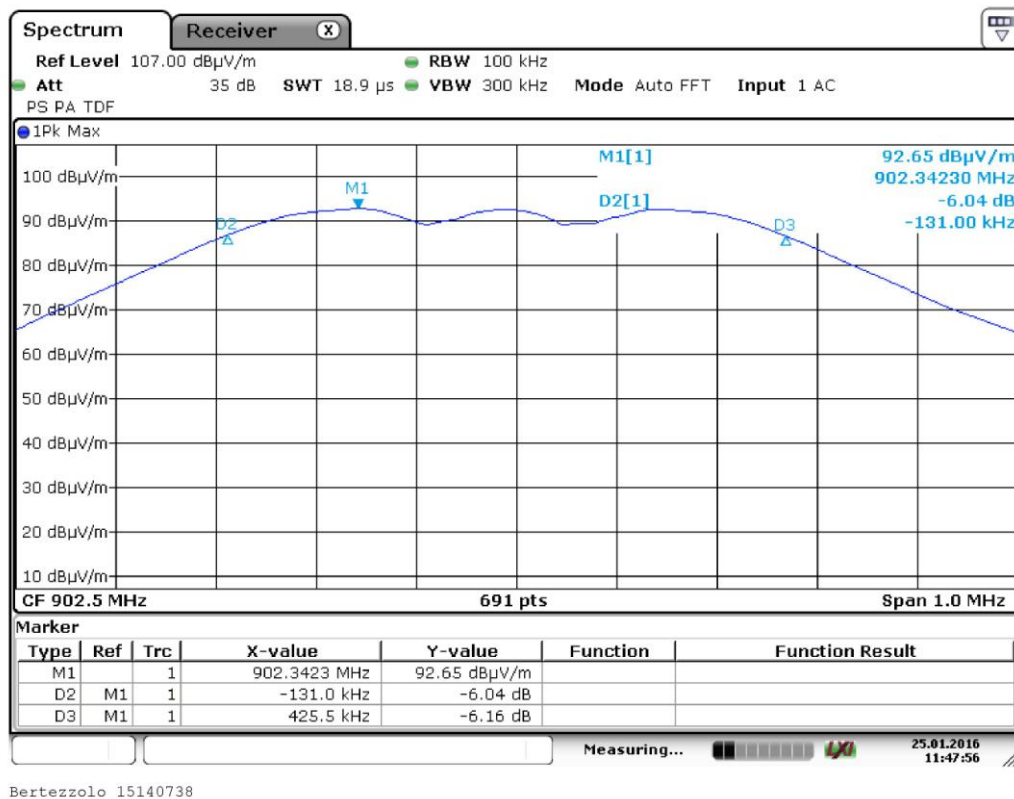
G15140731



Bertezzo 15140731



G15140738

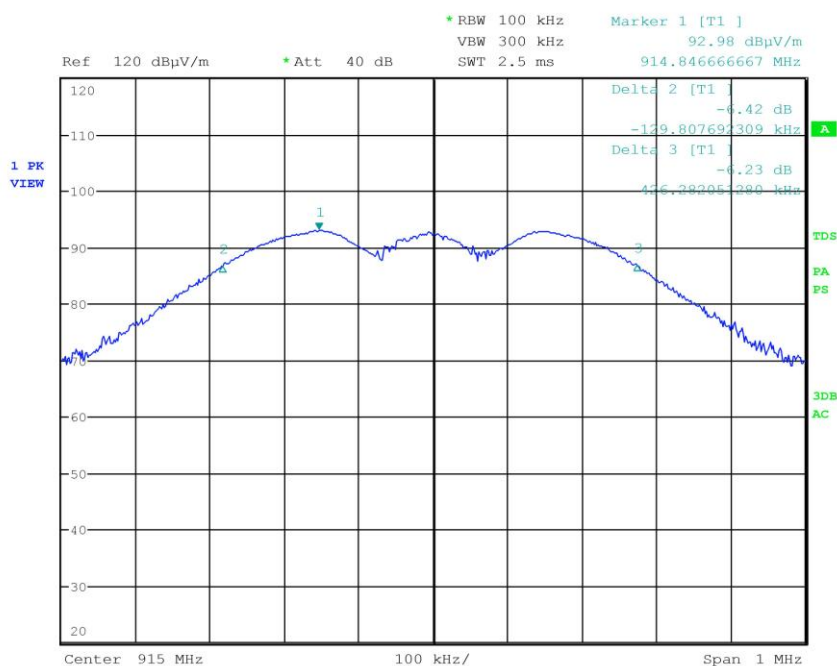


Bertezzo 15140738



G15140744

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



Result: The requirements are met



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

Environmental conditions

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

Acceptance limits: operation within the band 902 – 928 MHz

Test configuration

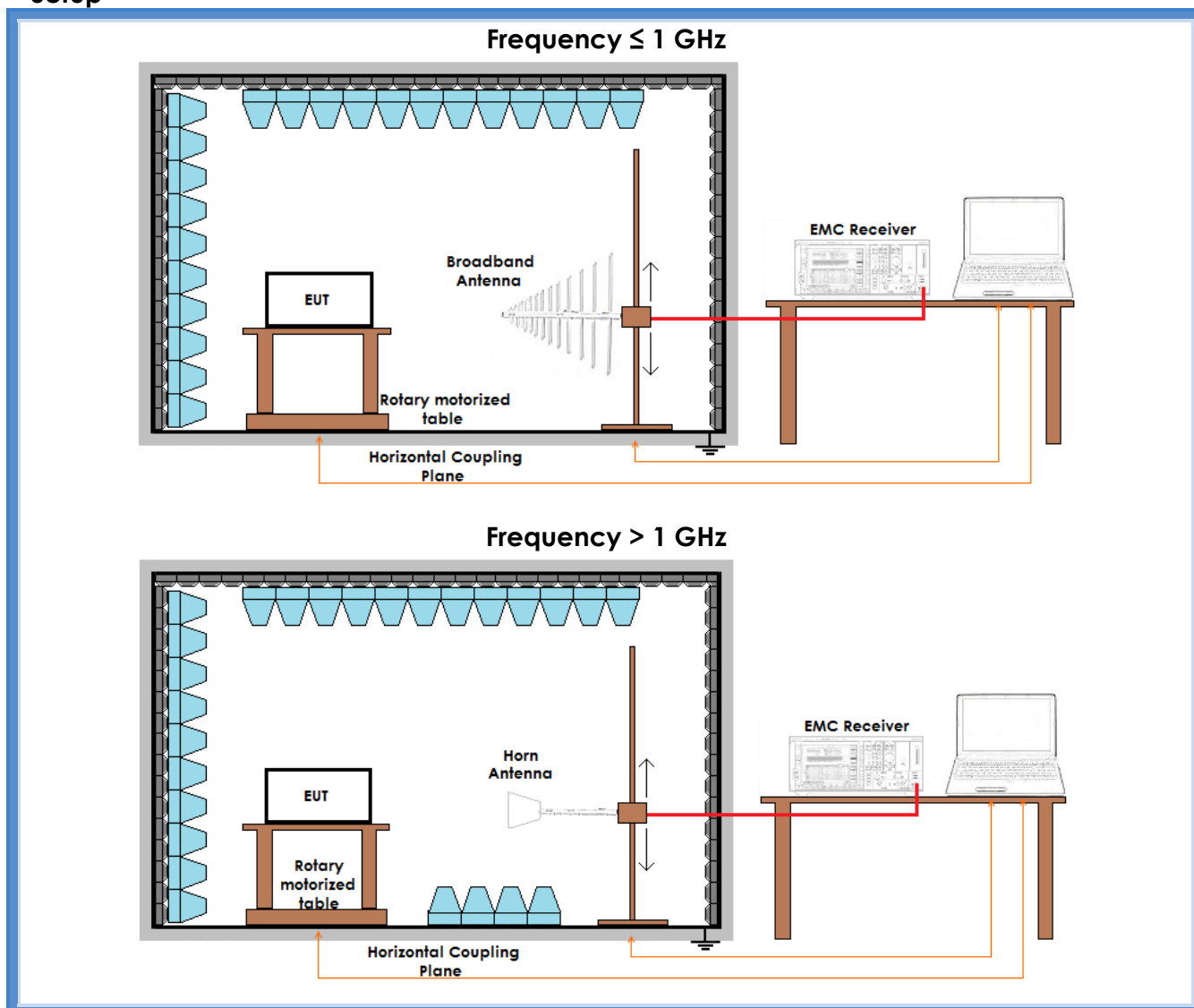
Test site:
Semi-anechoic chamber

Auxiliary equipment:
See clause 4 of this test report

Test equipment used

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

Setup



Result

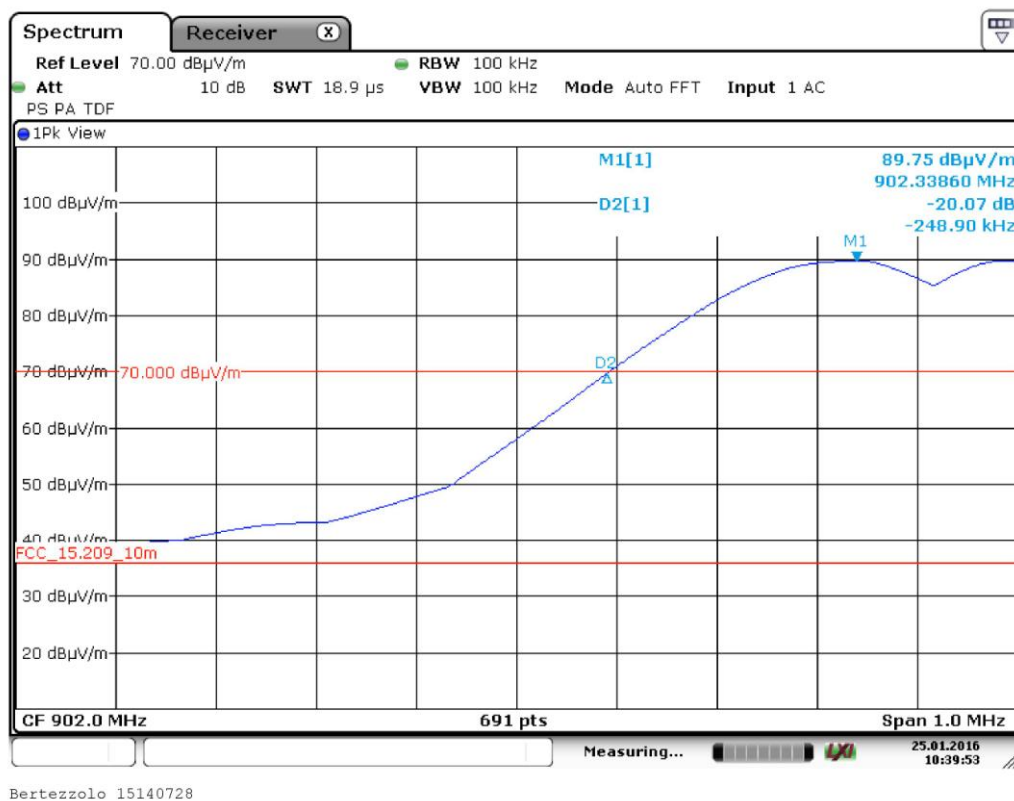
Integrated antenna				
Channel	Bandwidth	Graph(s)	Results	
Lowest	100 kHz	G15140737	902,0781 MHz	Complies
Highest	100 kHz	G15140736	927,9233 MHz	Complies

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



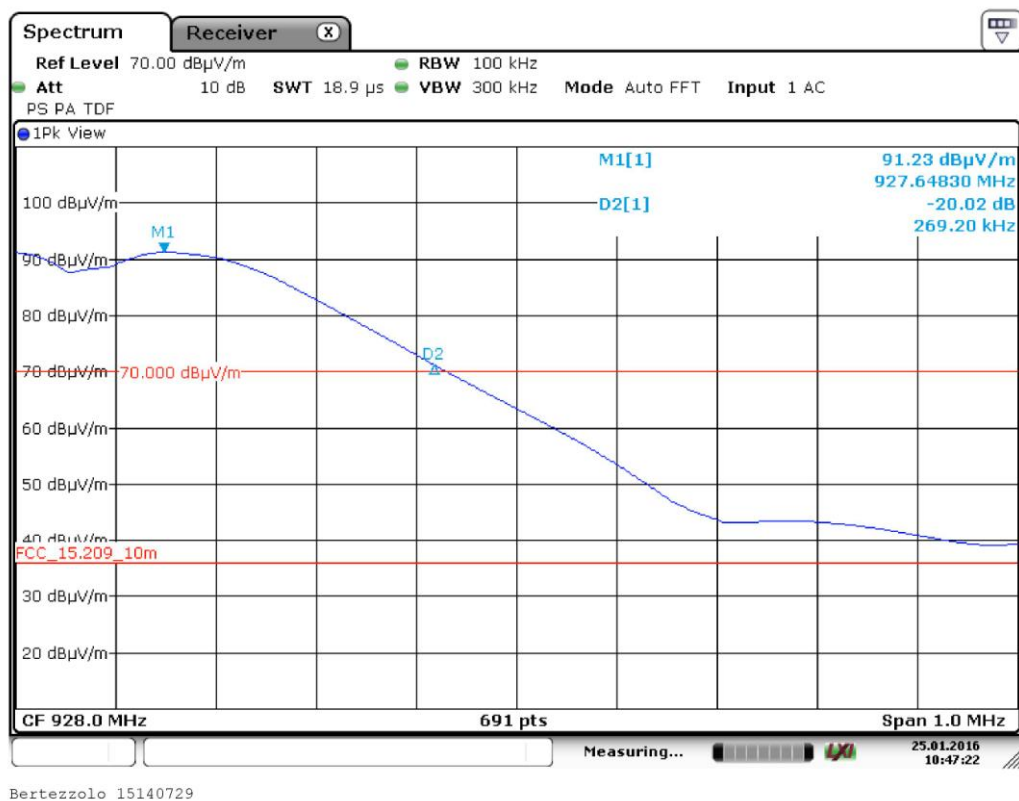
Graphs

G15140728



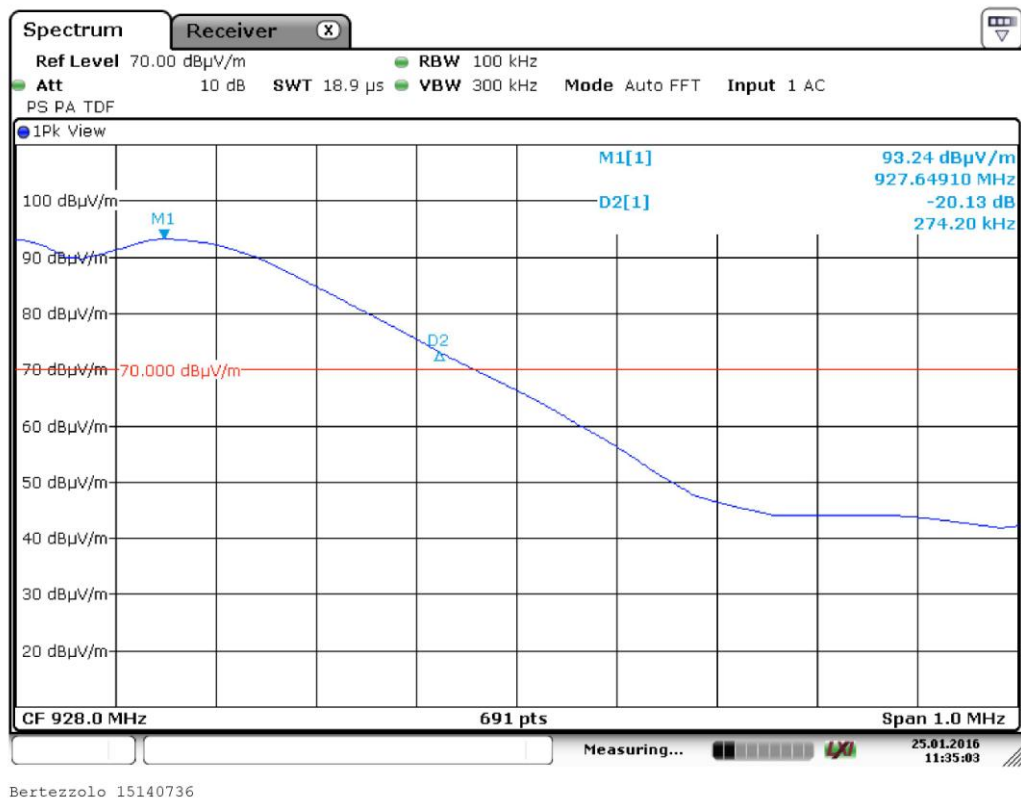


G15140729



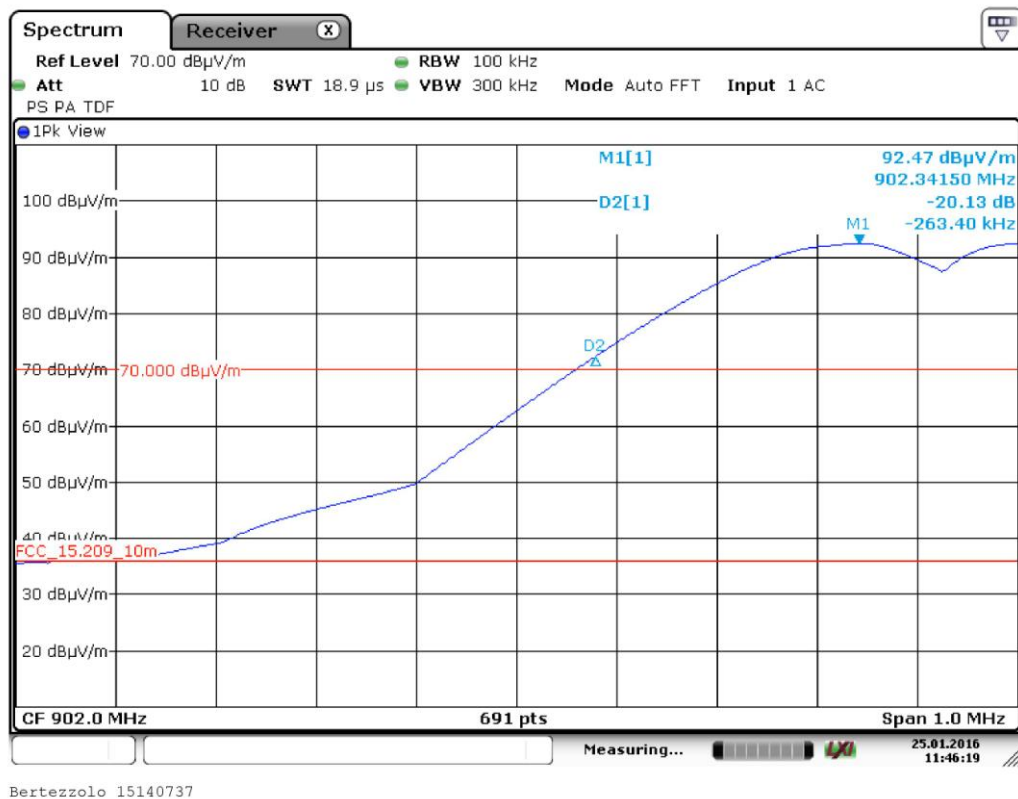


G15140736





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

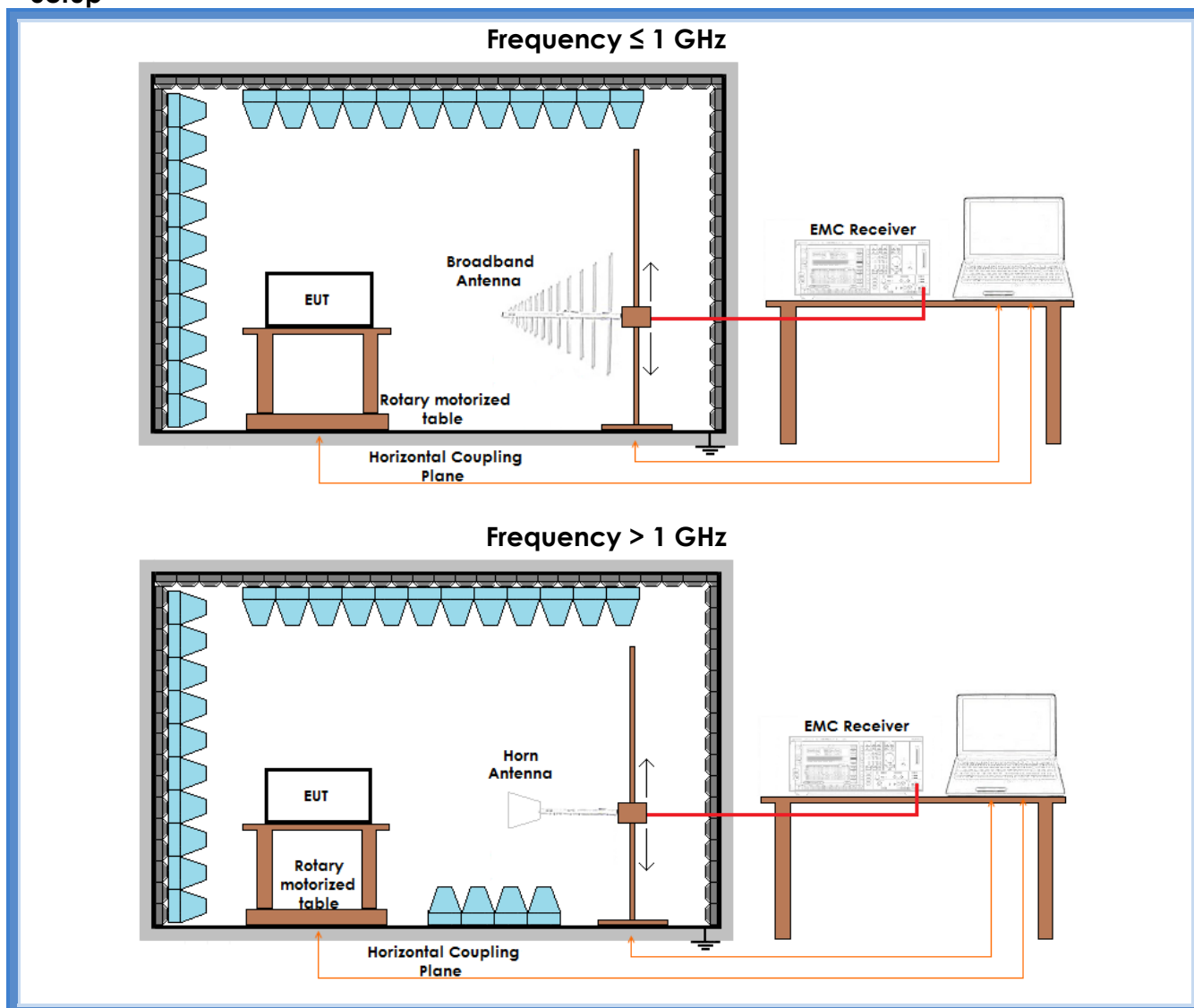
Environmental conditions

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

Setup





Result

Integrated antenna					
Channel	Polarization	Graphs	Measured PK level (dB μ V/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 (dB μ V/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:

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

Where:

E = $(10^{(\text{dB}\mu\text{V/m})/20})/1000000$, the maximum measured fundamental field strength in V/m

G = $10^{\text{dBi}/10}$, 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)

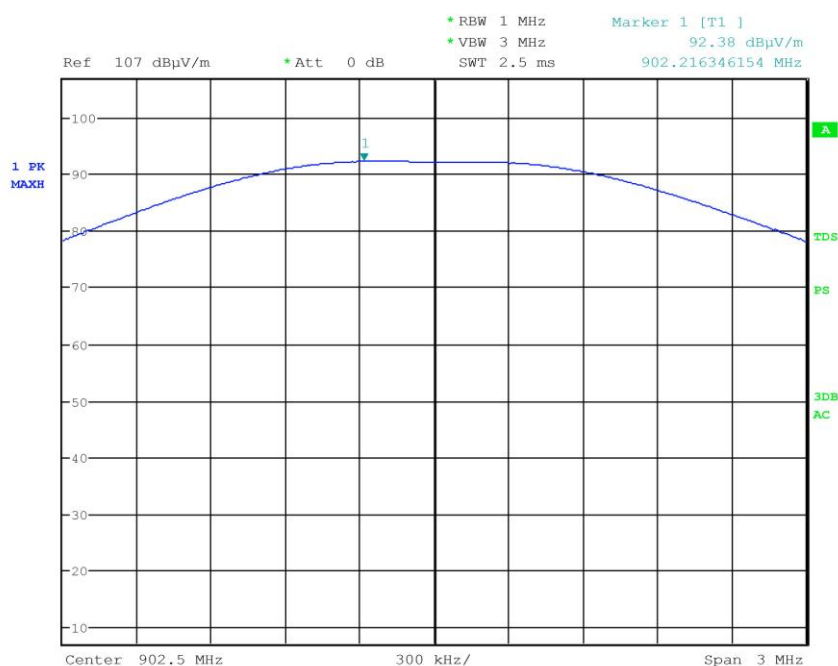
P = the power in watts



Graphs

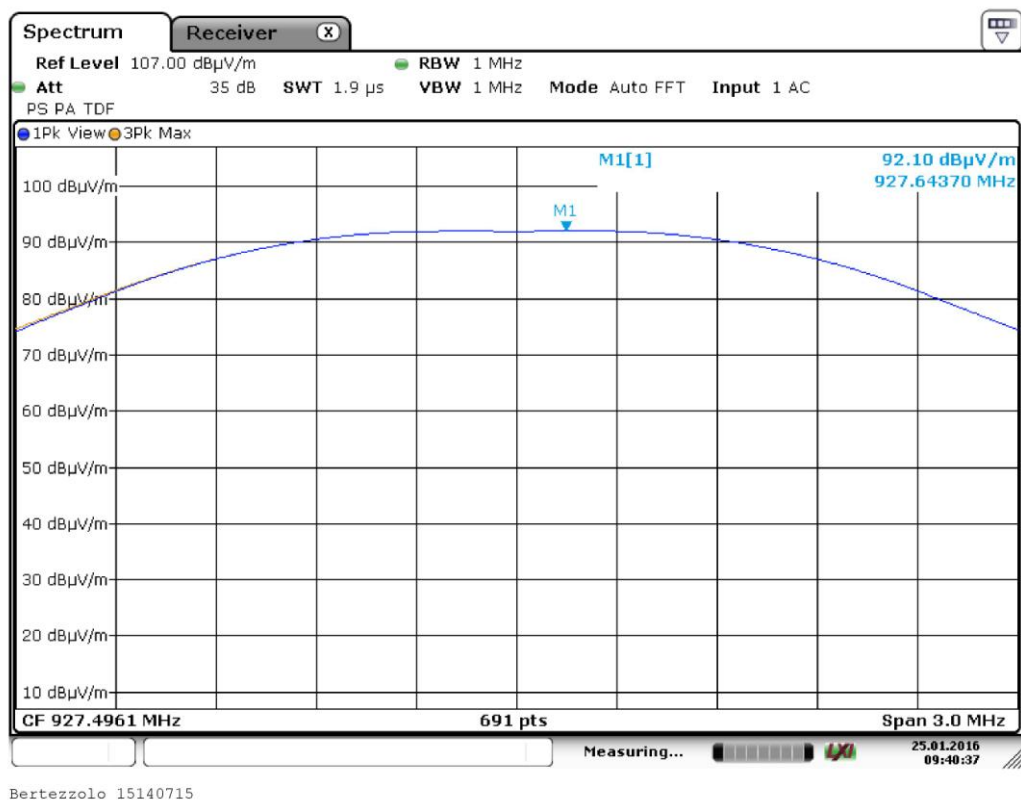
G15140702

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



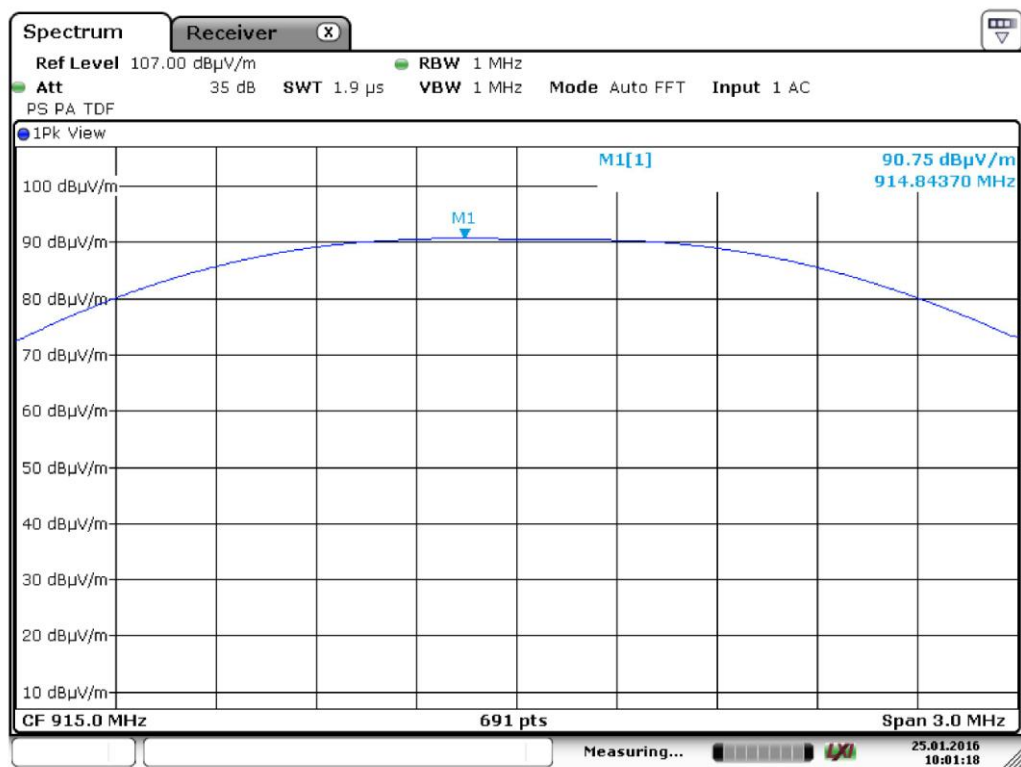


G15140715





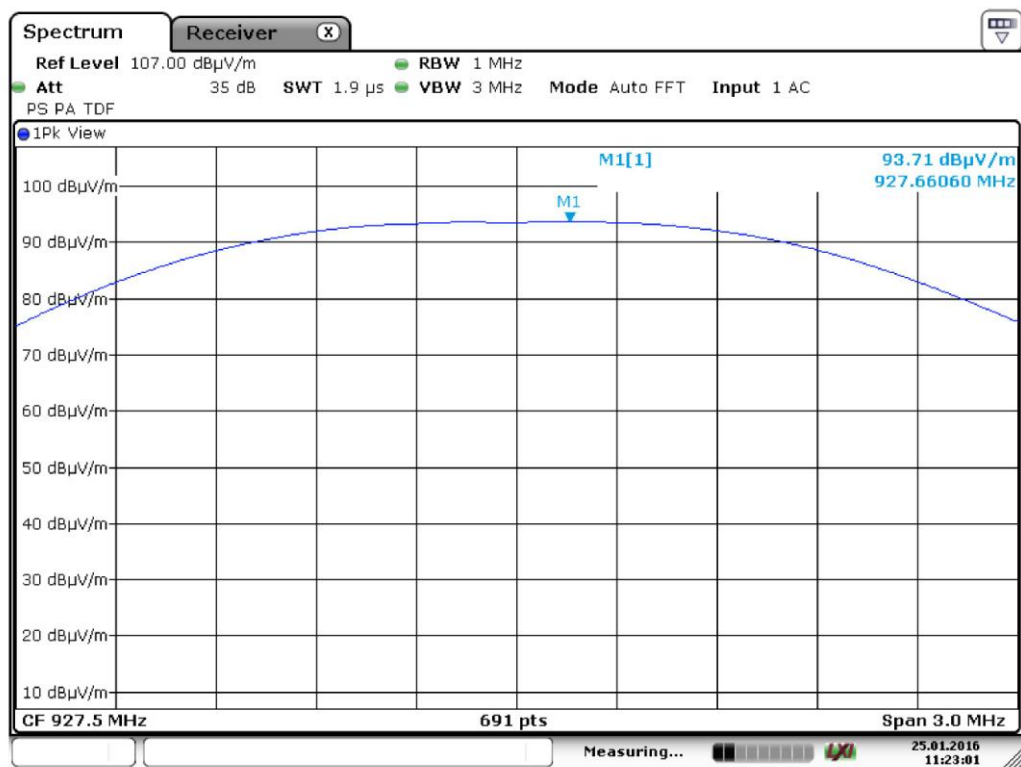
G15140721



Bertezzo 15140721



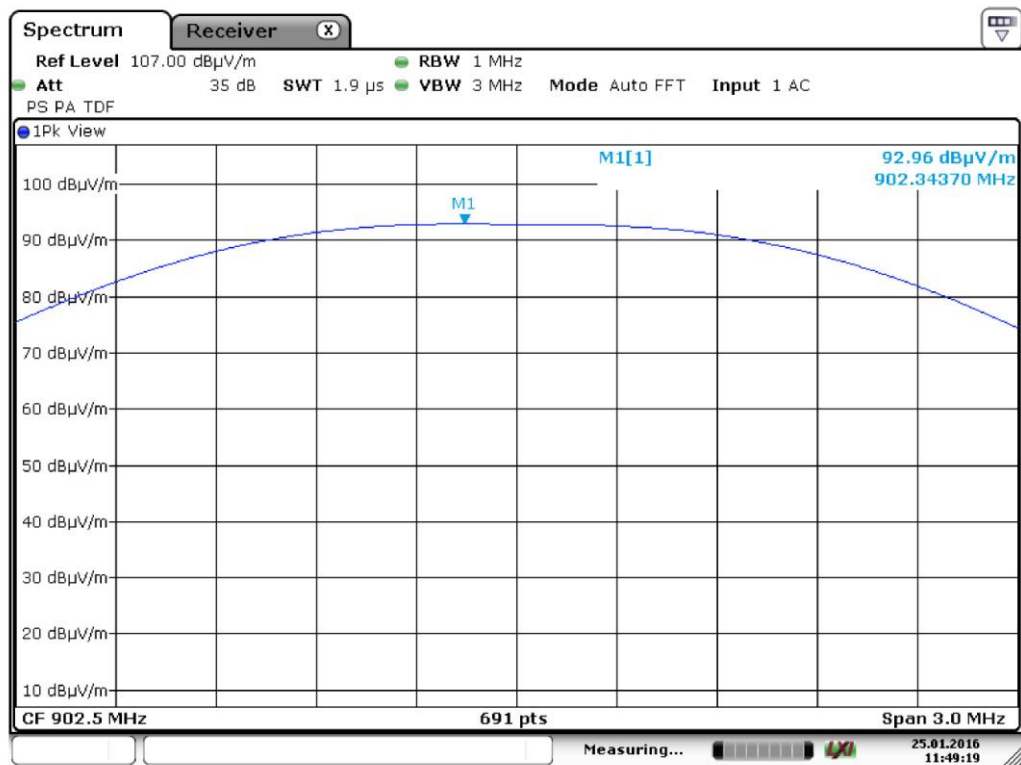
G15140730



Bertezzolo 15140730



G15140739

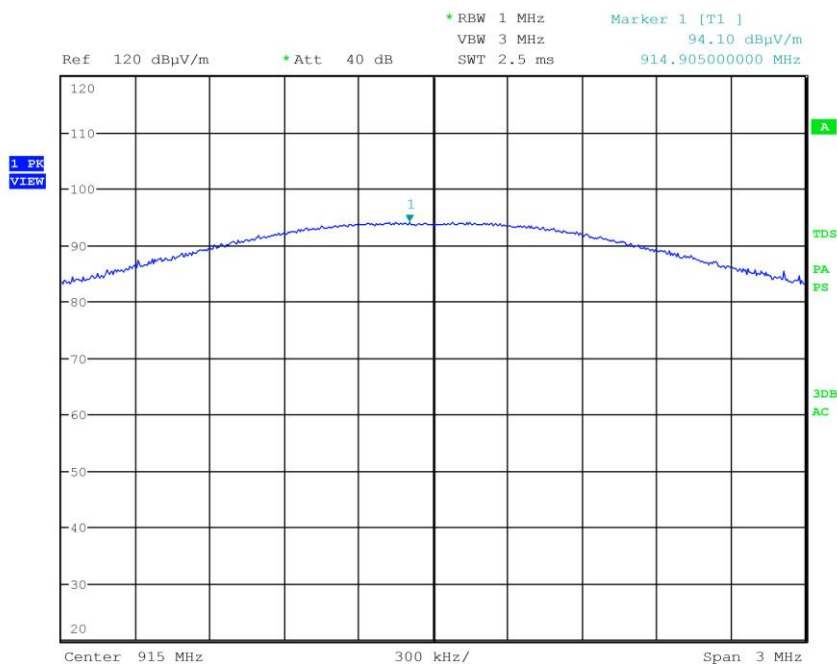


Bertezzo 15140739



G15140745

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



Result: The requirements are met



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

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

Environmental conditions

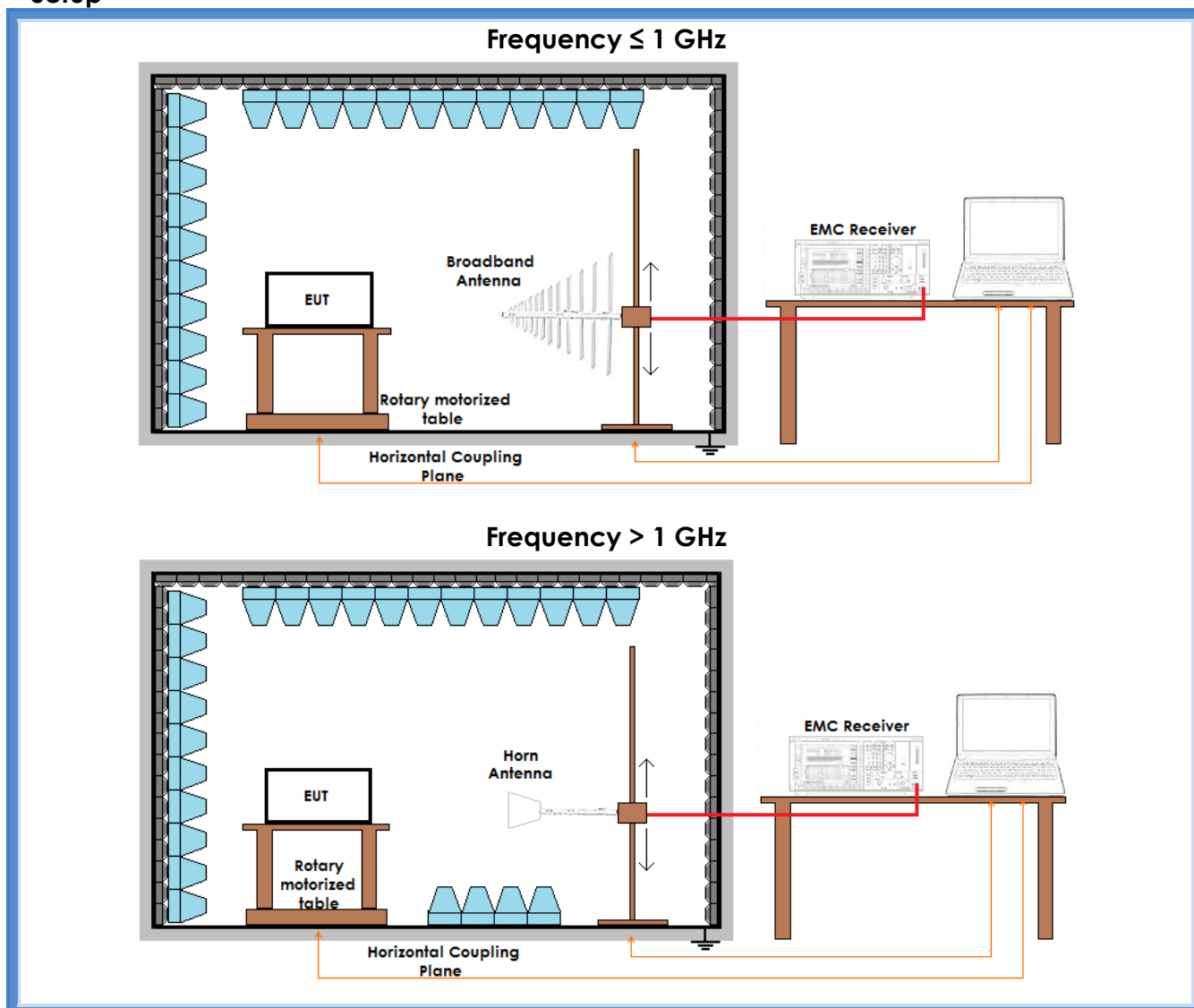
Temperature (°C)	Atmospheric pressure (kPa)	Relative humidity (%)
22	100	42

Acceptance limits:

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



Setup





Result

Integrated antenna					
Channel	Polarization	Graphs	Measured PK level (dB μ V/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 (dB μ V/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:

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

Where:

E = $(10^{(\text{dB}\mu\text{V/m})/20})/1000000$, the maximum measured fundamental field strength in V/m

G = $10^{\text{dBi}/10}$, 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.
Via della Fisica, 20
36016 Thiene (VI)

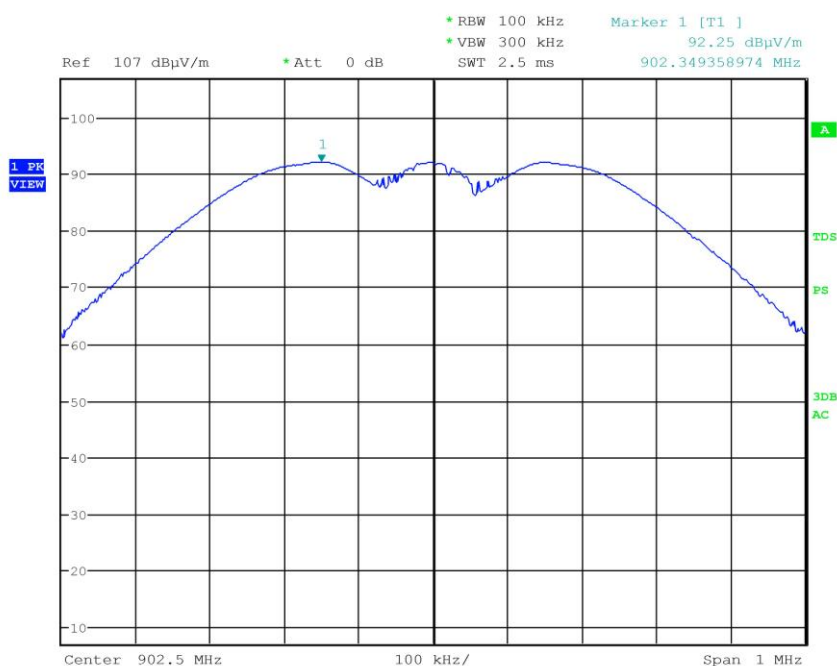


LAB N° 0168

Graphs

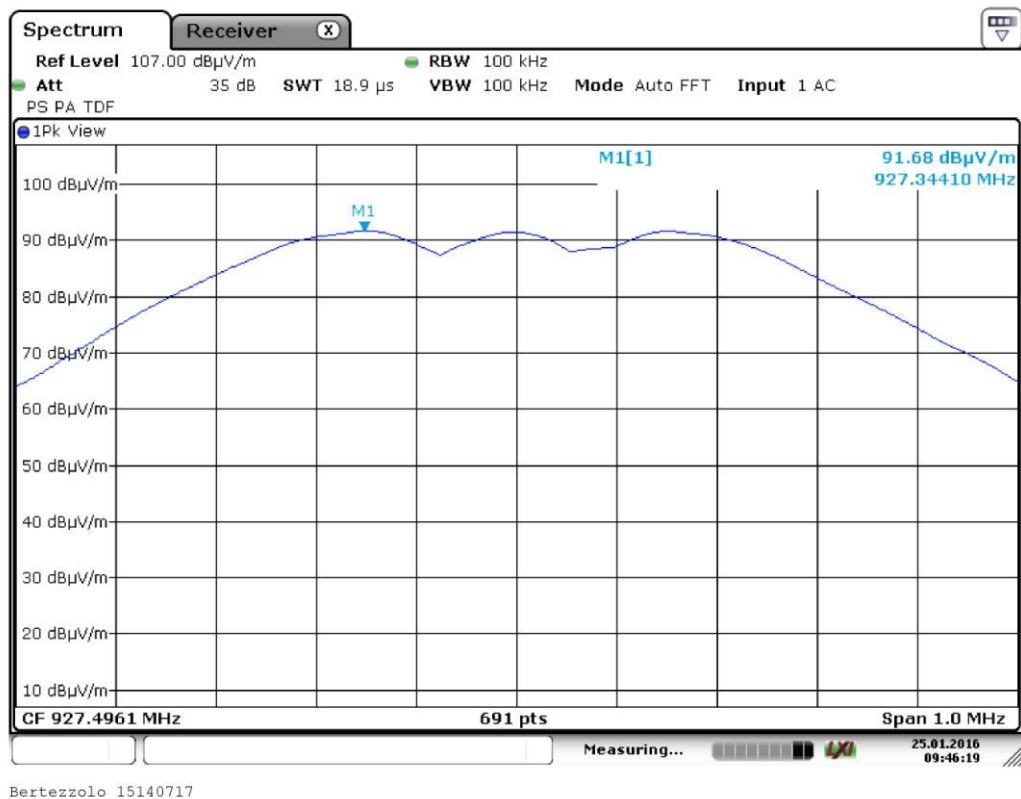
G15140703

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



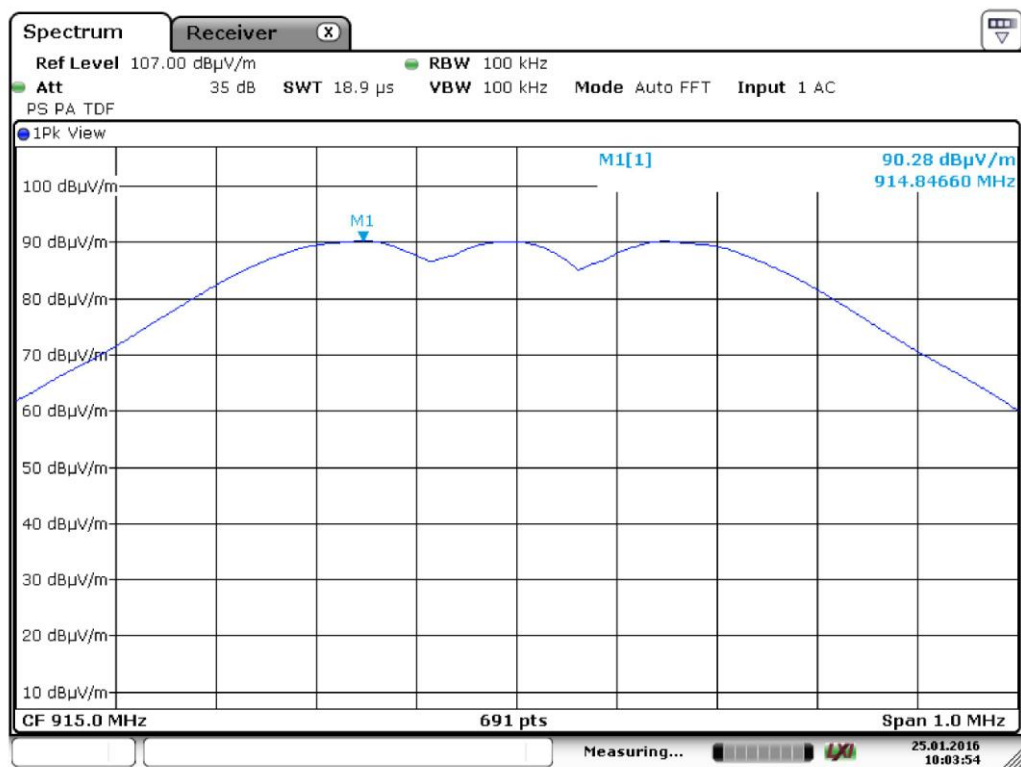


G15140717





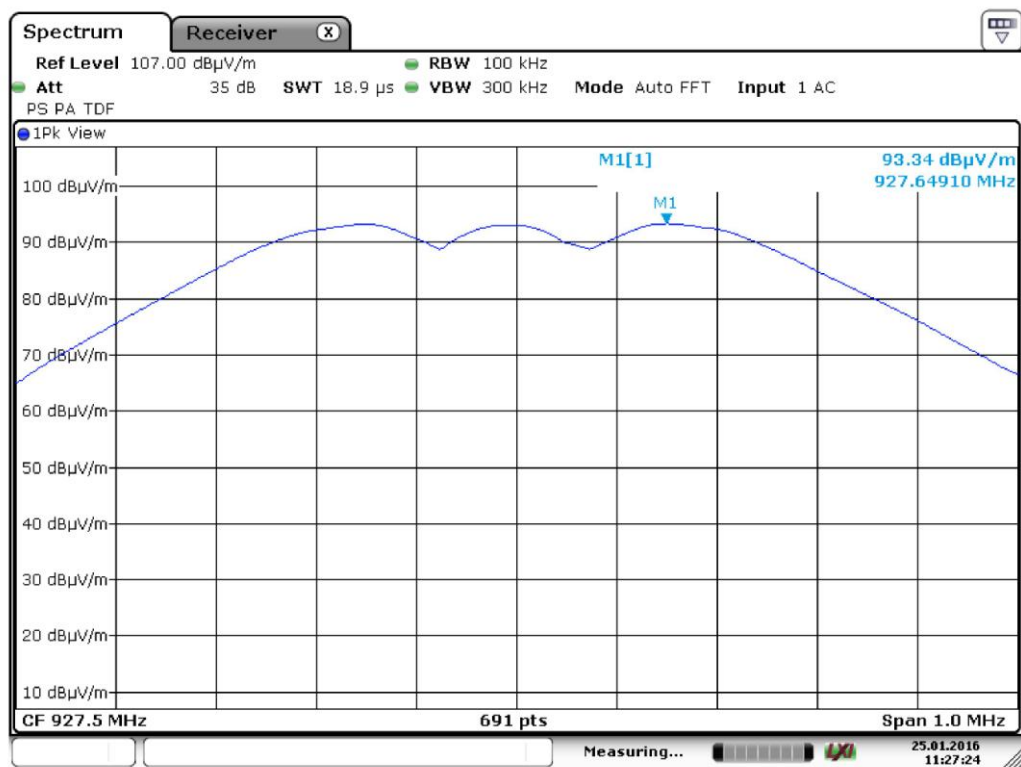
G15140723



Bertezzo 15140723



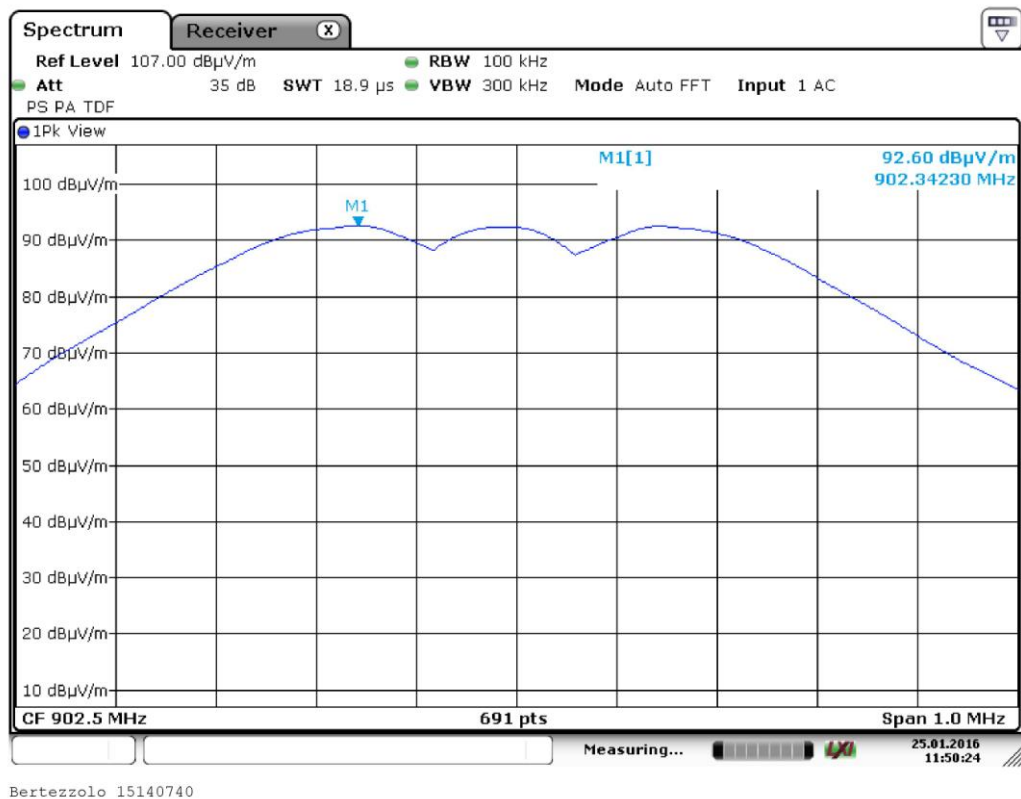
G15140732



Bertezzo 15140732



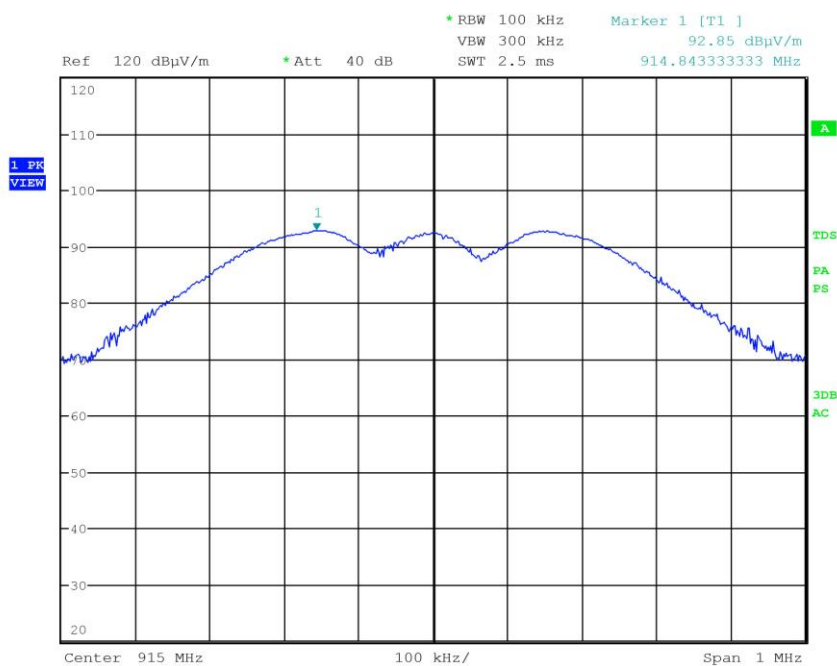
G15140740





G15140746

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



Result: The requirements are met



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



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			

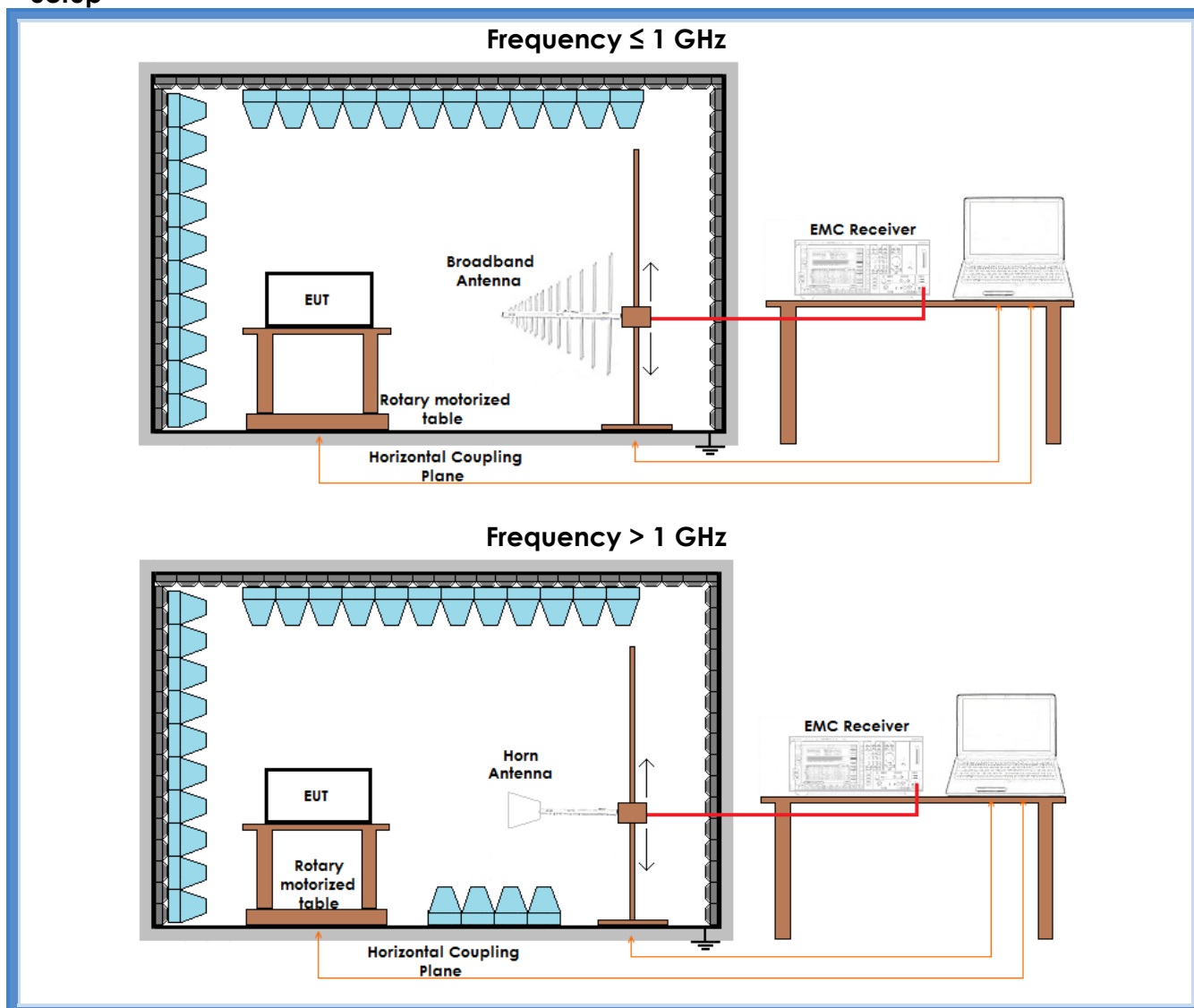
Acceptance limits for emissions in non-restricted frequency bands

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:

- 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

Integrated antenna							
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	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 (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	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							



Result – Peak detector

Integrated antenna							
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	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 (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	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



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/cm² max at 20 cm of distance

Result

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

Result: The requirements are met