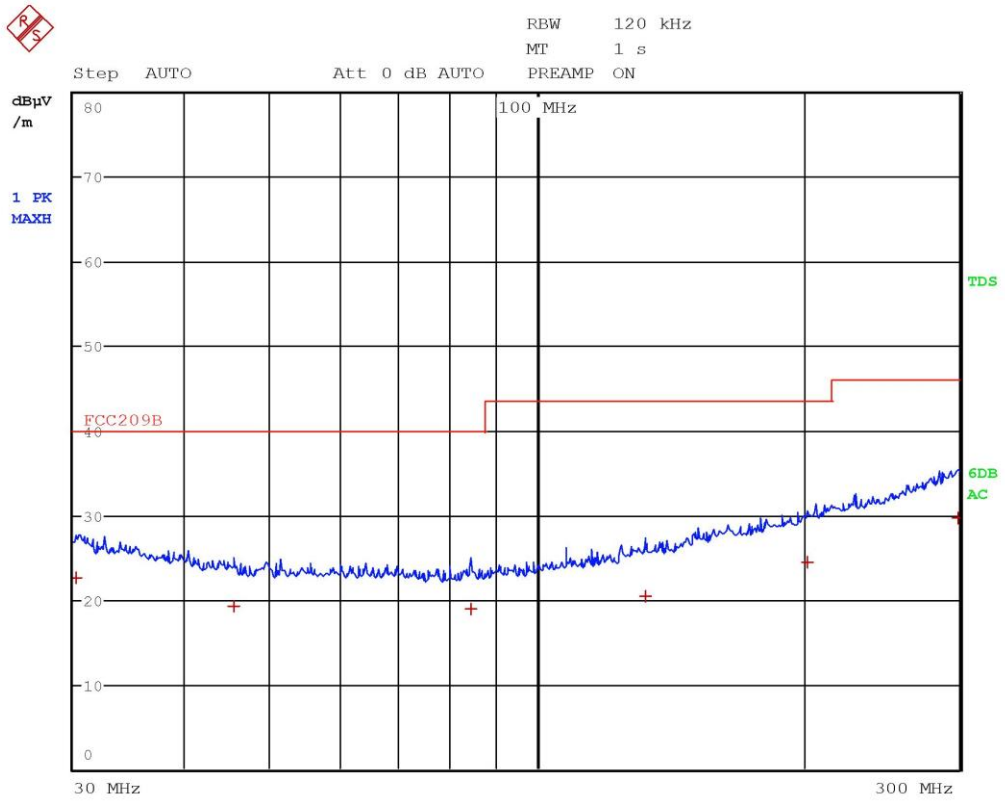


Segalla 20012468

CMC Centro Misure Compatibilità S.r.l.

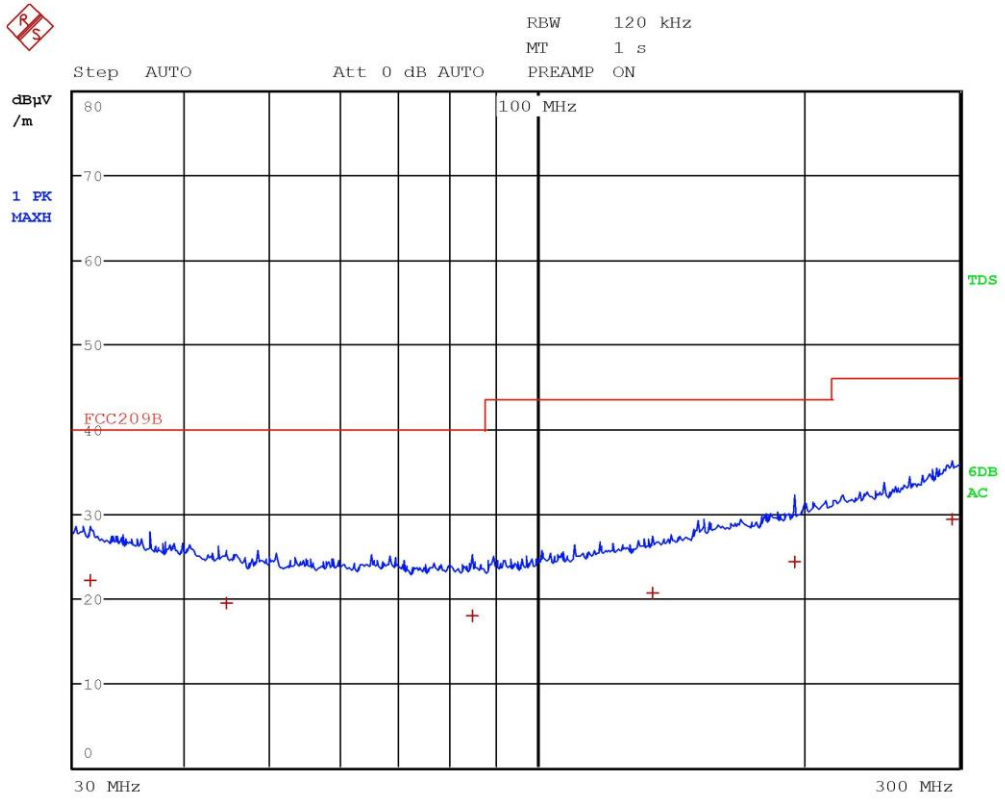
EDIT PEAK LIST (Final Measurement Results)

Trace1:	FCC209B
Trace2:	---
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	30.16 MHz	22.56	-17.43
1 Quasi Peak	45.52 MHz	19.32	-20.67
1 Quasi Peak	84.2 MHz	18.93	-21.06
1 Quasi Peak	132.76 MHz	20.42	-23.10
1 Quasi Peak	201.84 MHz	24.53	-18.98
1 Quasi Peak	299.32 MHz	29.68	-16.33

Segalla 20012468

CMC Centro Misure Compatibilità S.r.l.



Segalla 20012469

CMC Centro Misure Compatibilità S.r.l.

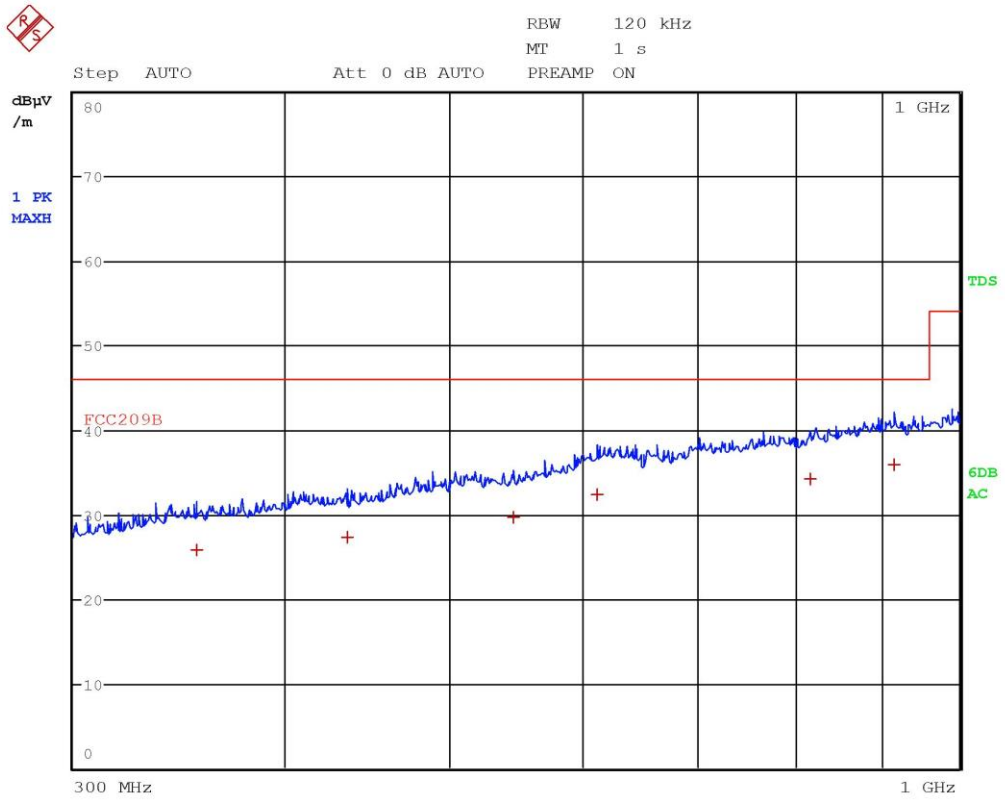
EDIT PEAK LIST (Final Measurement Results)

Trace1:	FCC209B
Trace2:	---
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	31.36 MHz	22.10	-17.89
1 Quasi Peak	44.68 MHz	19.46	-20.53
1 Quasi Peak	84.48 MHz	17.98	-22.02
1 Quasi Peak	135.4 MHz	20.57	-22.94
1 Quasi Peak	195.76 MHz	24.23	-19.28
1 Quasi Peak	294.72 MHz	29.33	-16.68

Segalla 20012469

CMC Centro Misure Compatibilità S.r.l.



Segalla 20012470

CMC Centro Misure Compatibilità S.r.l.

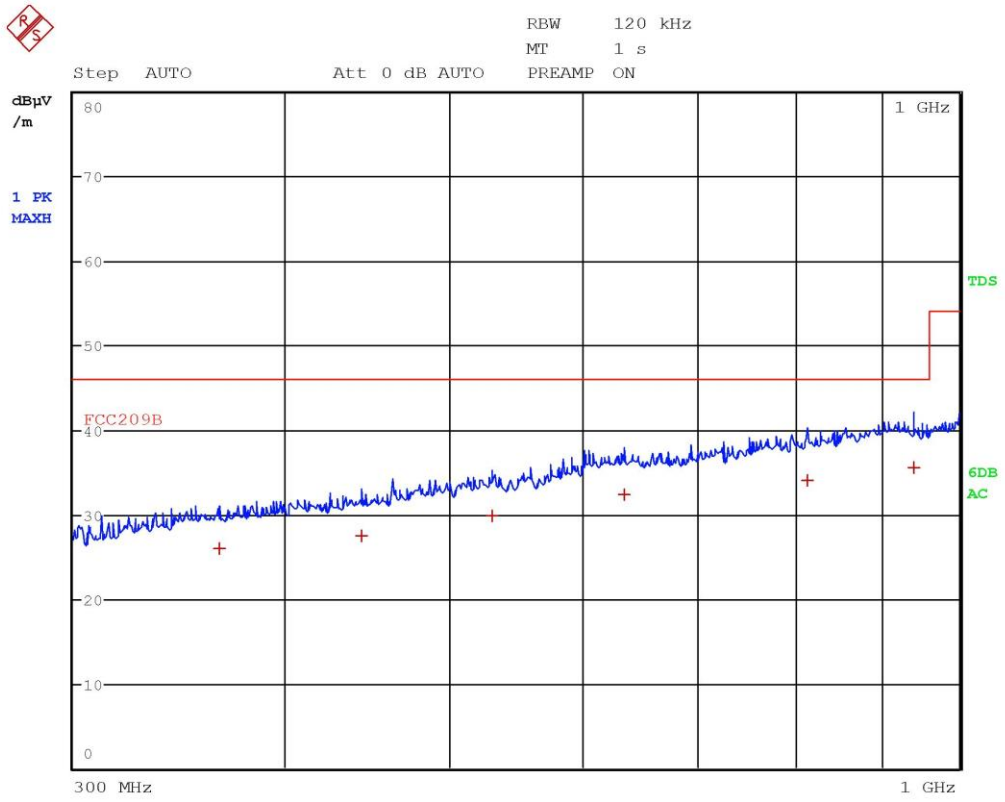
EDIT PEAK LIST (Final Measurement Results)

Trace1:	FCC209B
Trace2:	---
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	355.04 MHz	25.76	-20.25
1 Quasi Peak	435.12 MHz	27.31	-18.70
1 Quasi Peak	545.96 MHz	29.74	-16.28
1 Quasi Peak	611.04 MHz	32.38	-13.63
1 Quasi Peak	816.76 MHz	34.22	-11.79
1 Quasi Peak	914.6 MHz	35.89	-10.12

Segalla 20012470

CMC Centro Misure Compatibilità S.r.l.



Segalla 20012471

CMC Centro Misure Compatibilità S.r.l.

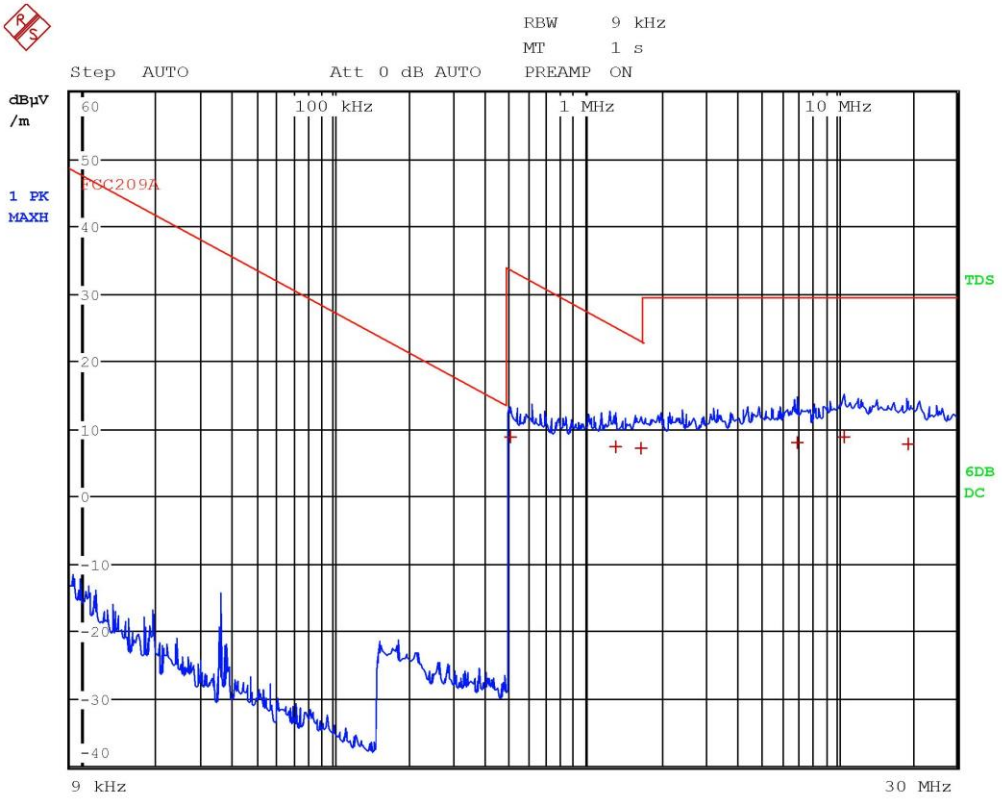
EDIT PEAK LIST (Final Measurement Results)

Trace1:	FCC209B
Trace2:	---
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	366.04 MHz	26.01	-20.00
1 Quasi Peak	443.8 MHz	27.49	-18.52
1 Quasi Peak	530.28 MHz	29.75	-16.27
1 Quasi Peak	633.96 MHz	32.39	-13.62
1 Quasi Peak	813 MHz	34.11	-11.90
1 Quasi Peak	939.52 MHz	35.61	-10.40

Segalla 20012471

CMC Centro Misure Compatibilità S.r.l.



Segalla 20012472

CMC Centro Misure Compatibilità S.r.l.

EDIT PEAK LIST (Final Measurement Results)

Trace1:	FCC209A
Trace2:	---
Trace3:	---

TRACE	FREQUENCY	LEVEL dBµV/m	DELTA LIMIT dB
1 Quasi Peak	502 kHz	8.85	-24.73
1 Quasi Peak	1.314 MHz	7.30	-17.92
1 Quasi Peak	1.67 MHz	7.25	-15.89
1 Quasi Peak	6.95 MHz	8.06	-21.47
1 Quasi Peak	10.734 MHz	8.81	-20.72
1 Quasi Peak	19.33 MHz	7.85	-21.69

Segalla 20012472

CMC Centro Misure Compatibilità S.r.l.

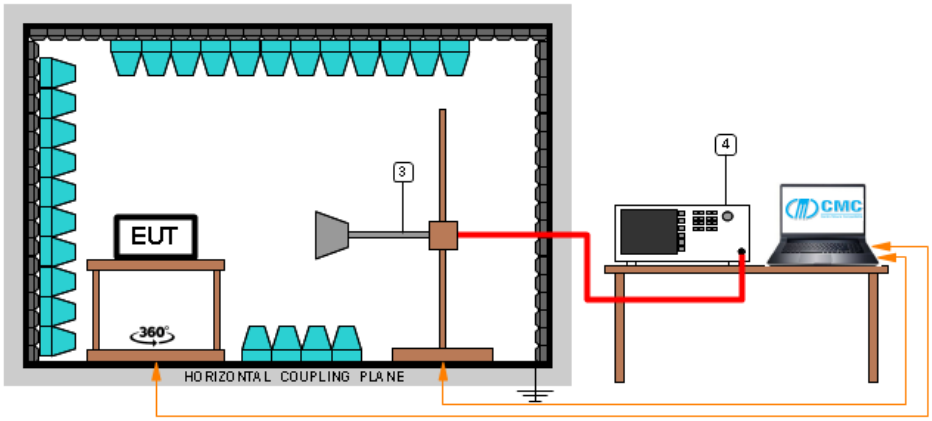
9.4 DTS bandwidth

Tested by ..... :	M. Segalla
Test date ..... :	19.02.2020
Test location (stand) ..... :	Semi-anechoic chamber (CMC A070)
Reference standards ..... :	FCC Rules and Regulation; Titles 47 Part 15.247 (a) (2) ANSI C63.10 cl. 11.8 KDB 558074 D01 DTS Meas Guidance v05r02 cl. 8.2
Supplementary test set-up description ..... :	--
Supplementary information..... :	--

Acceptance limits
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

Test setup

Frequency > 1 GHz



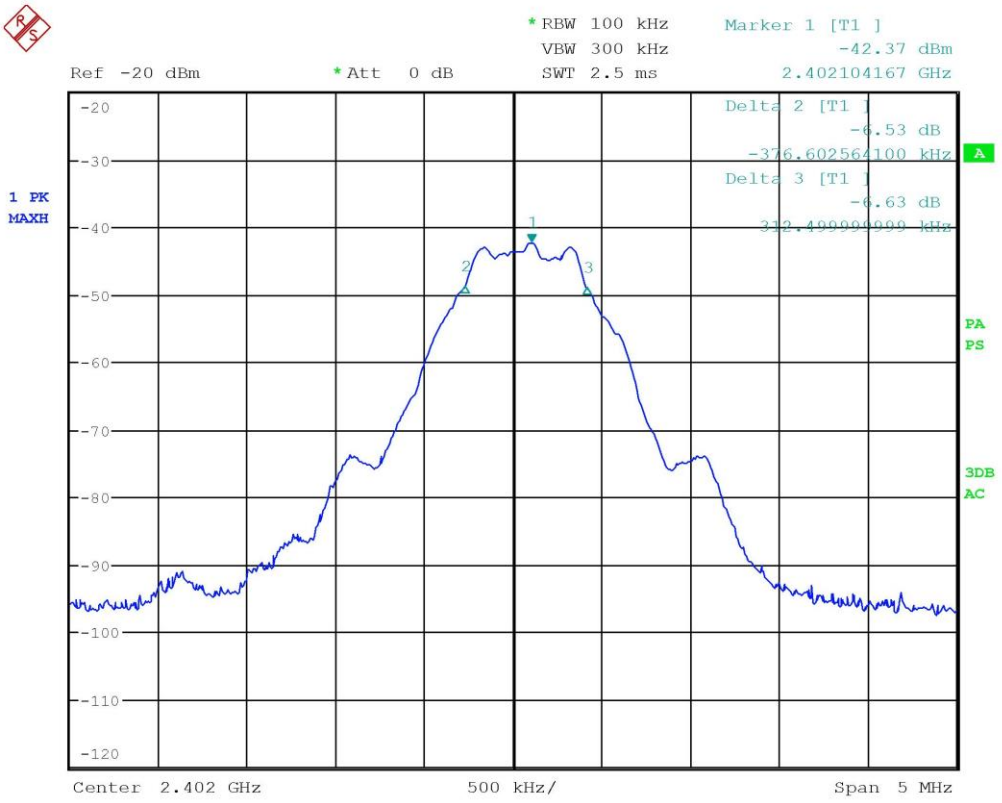
Test setup PE004_04				
Nr.	*Id. Number*	*Manufacturer*	*Model*	*Description*
4	CMC S164	Rohde & Schwarz	ESU26	Receiver 20 Hz - 26.5 GHz
3	CMC S108	Emco	3115	Waveguide antenna

Result – internal antenna

Frequency (MHz)	*Graphs*	*6 dB bandwidth (kHz)*	*Minimum 6 dB bandwidth allowed (kHz)*	*Results*
2402	G20012417	689,10	500	Complies
2440	G20012426	681,09	500	Complies
2480	G20012422	681,09	500	Complies

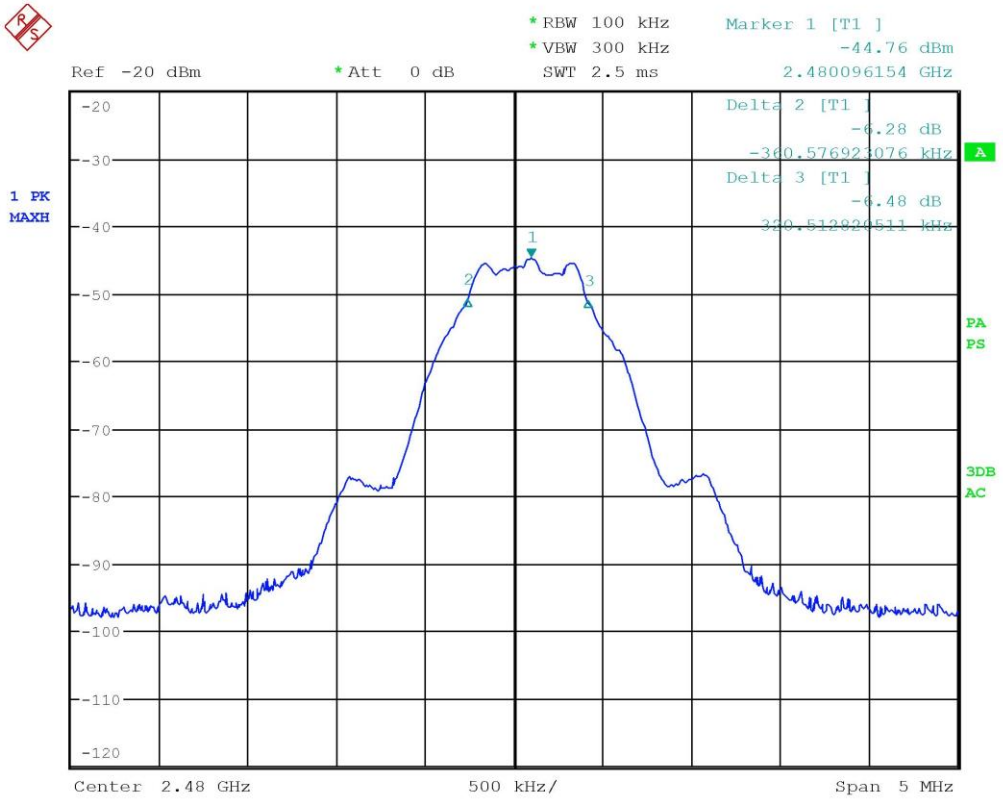
CMC Centro Misure Compatibilità S.r.l.

Graphs



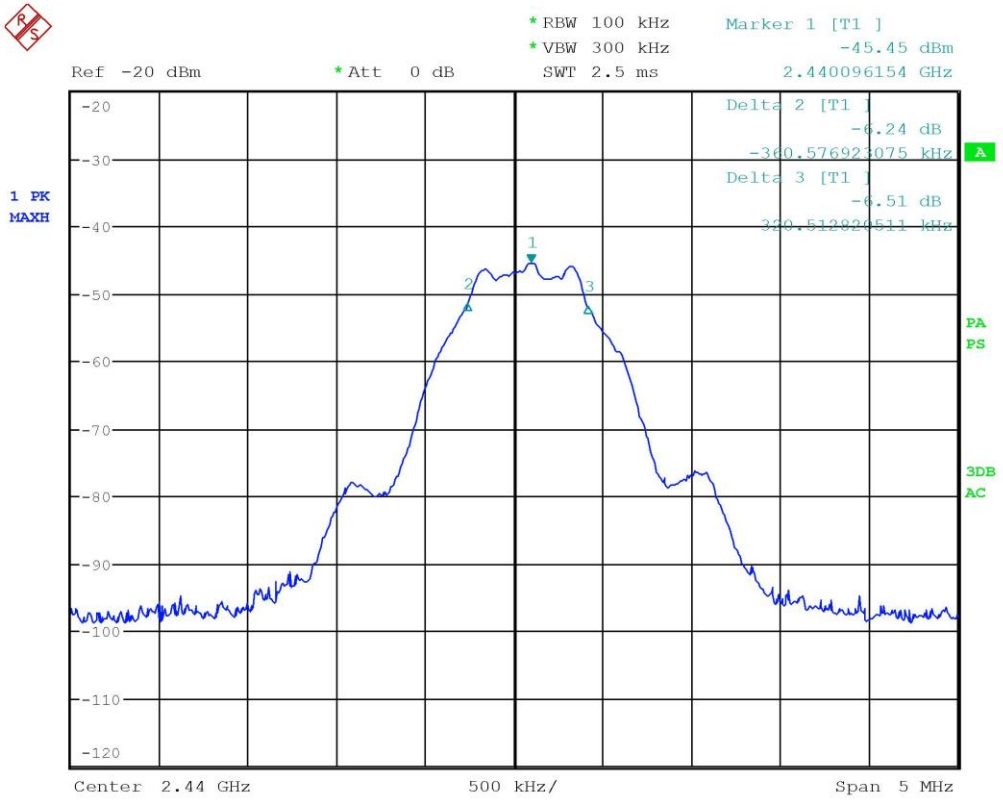
Segalla 20012417

CMC Centro Misure Compatibilità S.r.l.



Segalla 20012422

CMC Centro Misure Compatibilità S.r.l.



Segalla 20012426

CMC Centro Misure Compatibilità S.r.l.

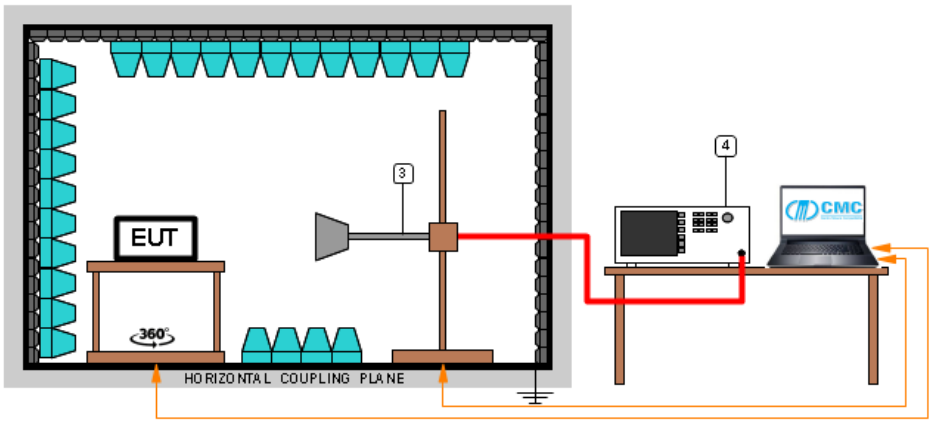
9.5 20 dB bandwidth

Tested by ..... :	M. Segalla
Test date ..... :	07.09.2020
Test location (stand) ..... :	Semi-anechoic chamber (CMC A070)
Reference standards ..... :	FCC Rules and Regulation; Titles 47 Part. 15.215 (c) ANSI C63.10 cl. 7.8.7
Supplementary test set-up description ..... :	--
Supplementary information..... :	--

Acceptance limits
Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated

Test setup

Frequency > 1 GHz

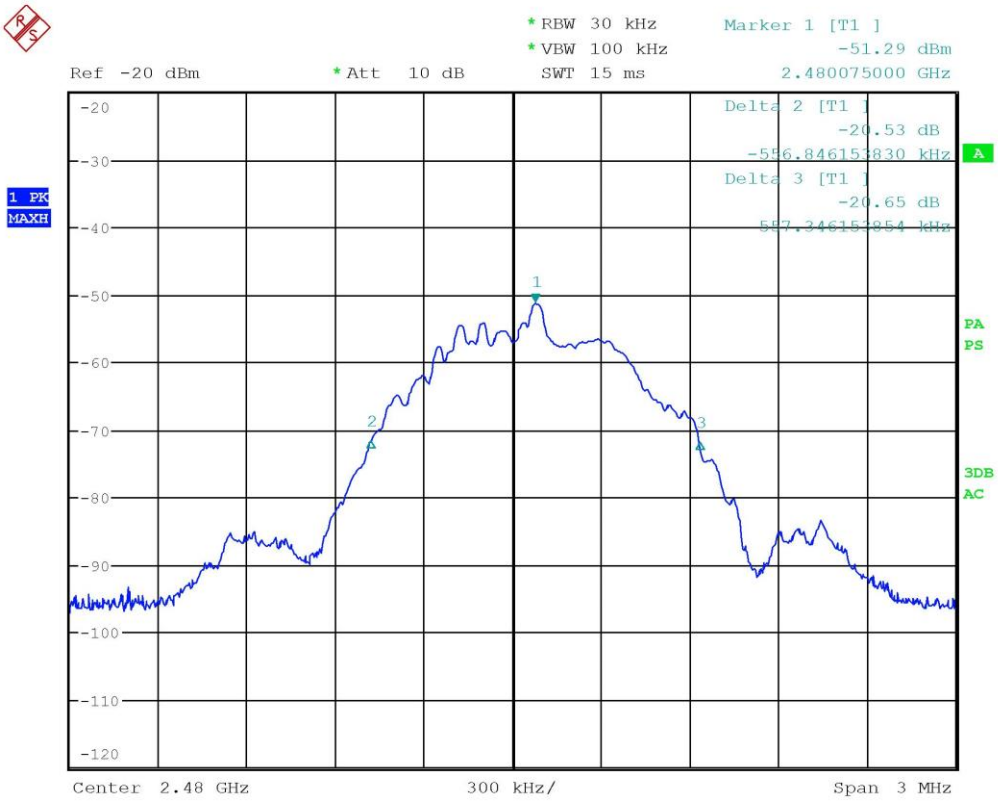


Test setup PE004_04				
Nr.	*Id. Number*	*Manufacturer*	*Model*	*Description*
4	CMC S164	Rohde & Schwarz	ESU26	Receiver 20 Hz - 26.5 GHz
3	CMC S108	Emco	3115	Waveguide antenna

Result – internal antenna

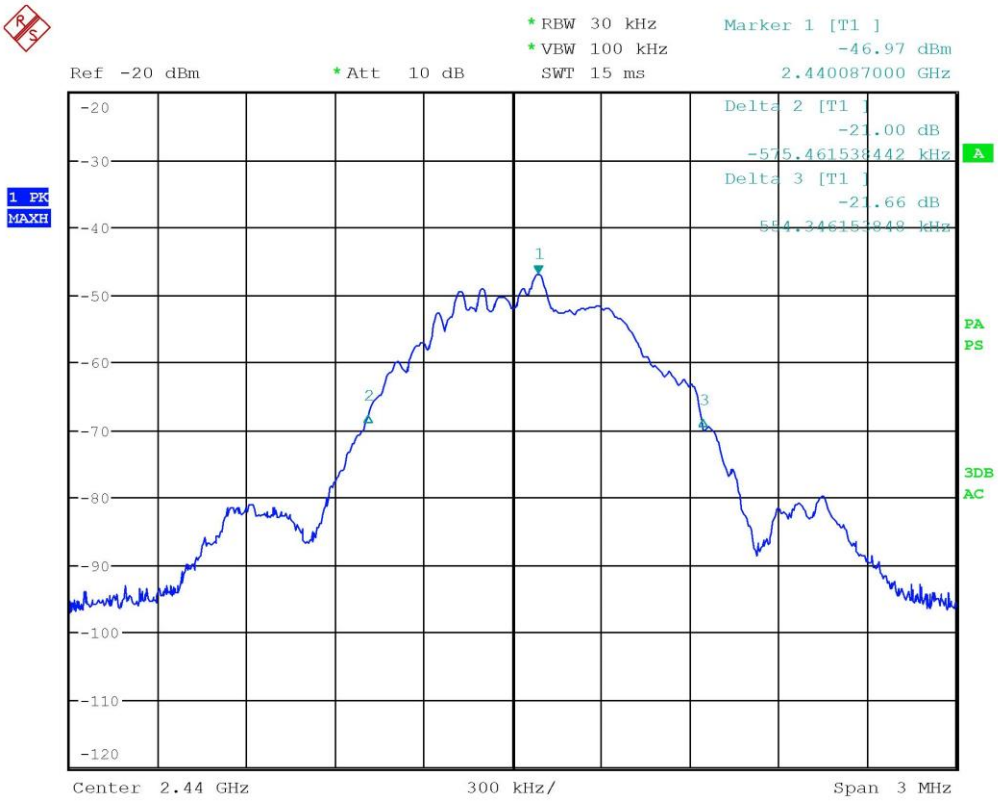
Frequency (MHz)	*Graphs*	*20 dB bandwidth (kHz)*	*Results*
2402	G20012439	1134,70	Complies
2420	G20012437	1129,80	Complies
2480	G20012435	1114,20	Complies

Graphs



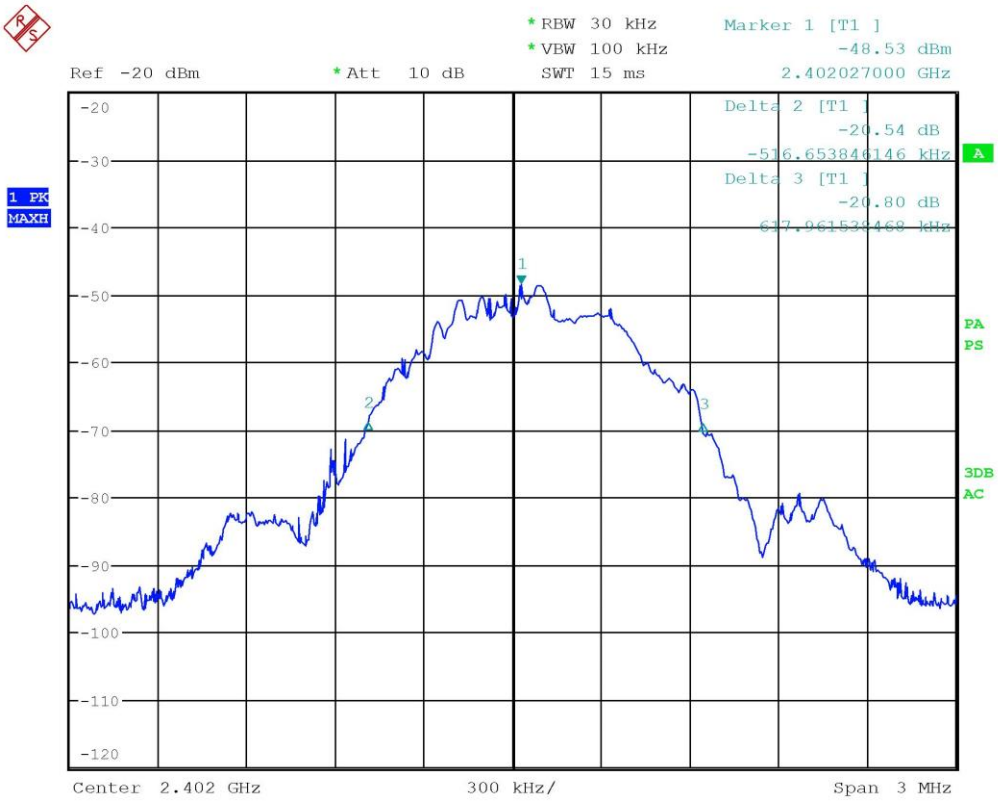
Segalla 20012435

CMC Centro Misure Compatibilità S.r.l.



Segalla 20012437

CMC Centro Misure Compatibilità S.r.l.



Segalla 20012439

CMC Centro Misure Compatibilità S.r.l.

9.6 Band edge

Tested by ..... :	M. Segalla
Test date ..... :	19.02.2020
Test location (stand) ..... :	Semi-anechoic chamber (CMC A070)
Reference standards ..... :	FCC Rules and Regulation; Titles 47 Part 15.205, 15.209, 15.247 (d) ANSI C63.10 cl. 11.11.1 and 11.12.1 KDB 558074 D01 DTS Meas Guidance v05r02 cl. 8.7
Supplementary test set-up description ..... :	--
Supplementary information..... :	--

Acceptance limits

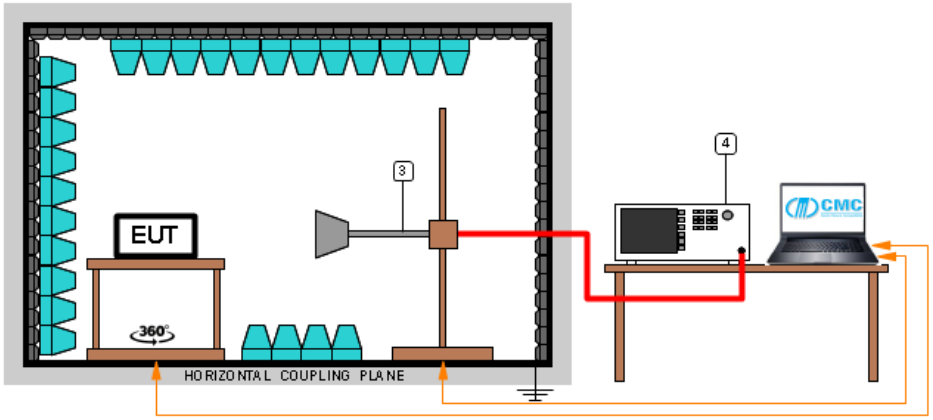
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Operation within the band 2400 – 2483,5 MHz

CMC Centro Misure Compatibilità S.r.l.

Test setup

Frequency > 1 GHz



Test setup PE004_04				
Nr.	*Id. Number*	*Manufacturer*	*Model*	*Description*
4	CMC S164	Rohde & Schwarz	ESU26	Receiver 20 Hz - 26.5 GHz
3	CMC S108	Emco	3115	Waveguide antenna

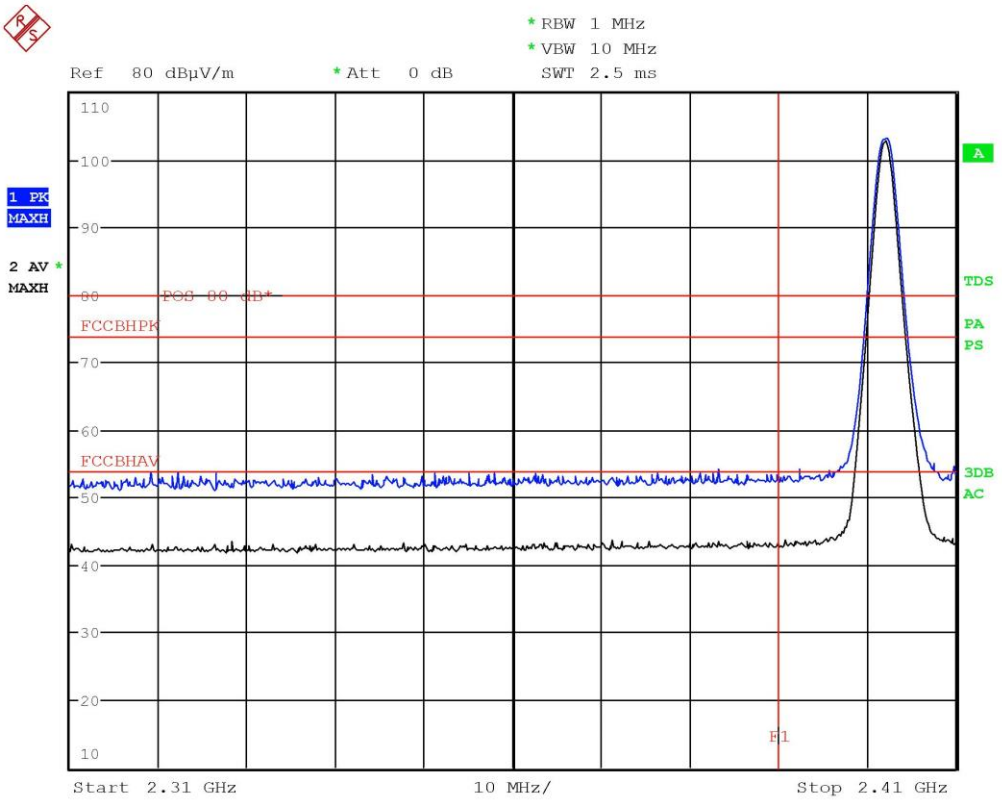
Result – internal antenna

Channel	*Bandwidth*	*Graph(s)*	*Results*	
Lowest	1 MHz	G20012420	--	*
Lowest	100 kHz	G20012421	2401,4664 MHz	Complies
Highest	1 MHz	G20012429	2483,4700 MHz	Complies
Highest	1 MHz	G20012430	--	**

*: this graph shows the emissions in 2310 – 2390 MHz restricted band
**: this graph shows the emissions in 2483,5 – 2500 MHz restricted band

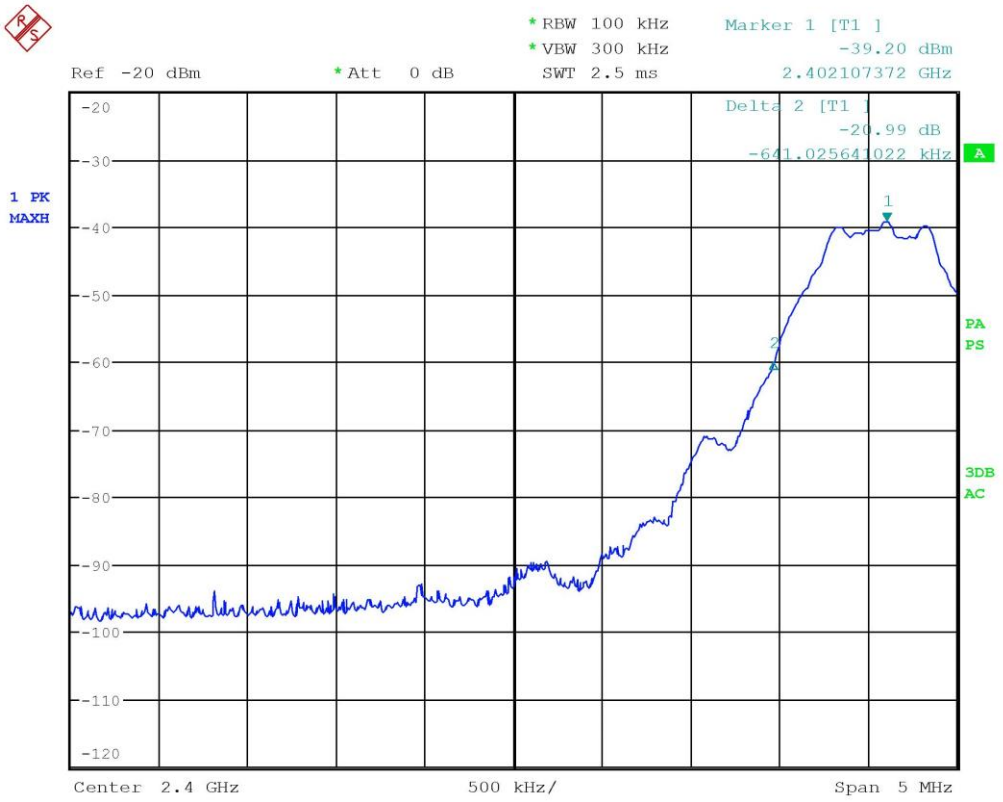
CMC Centro Misure Compatibilità S.r.l.

Graphs



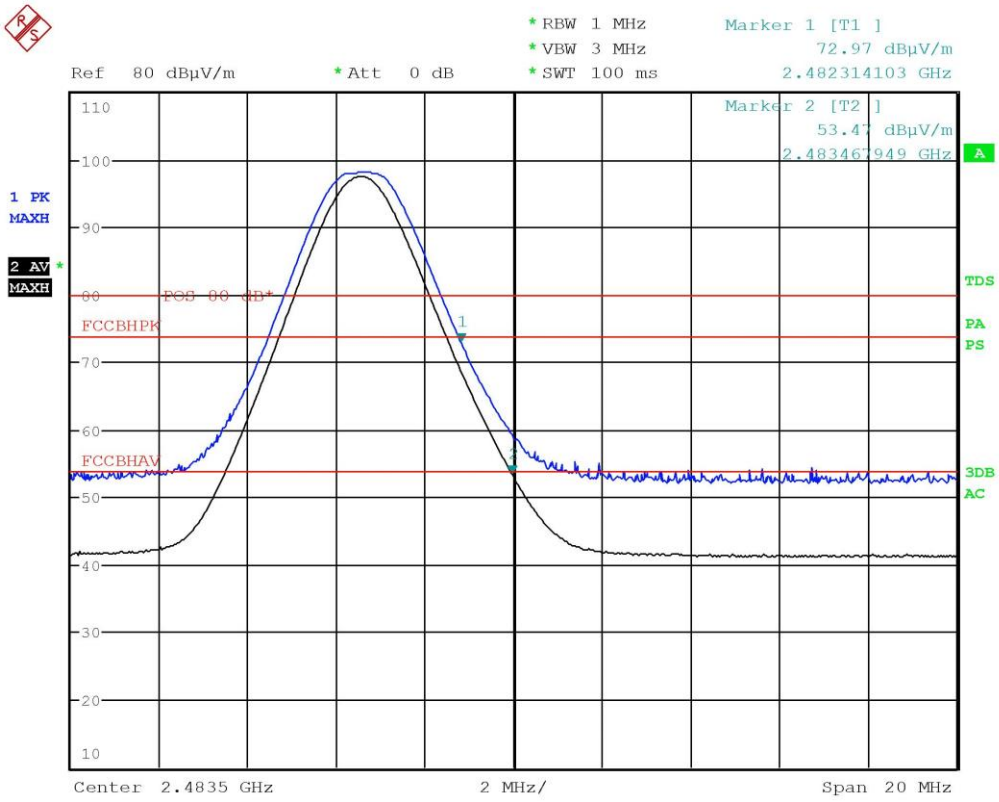
Segalla 20012420

CMC Centro Misure Compatibilità S.r.l.



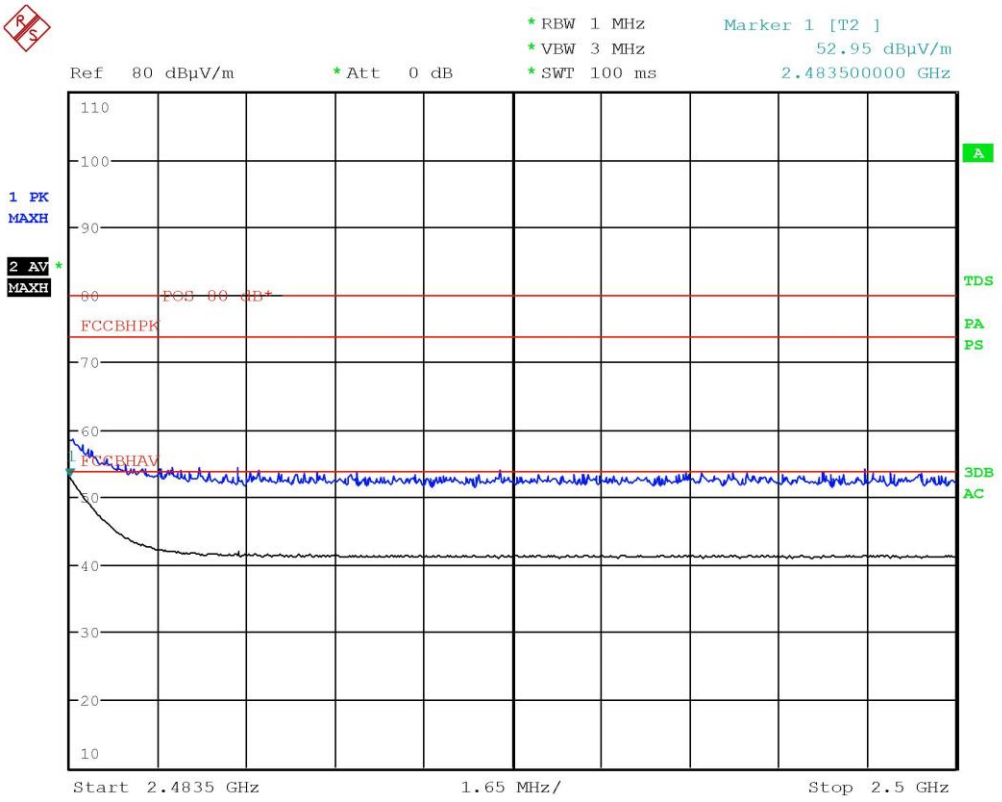
Segalla 20012421

CMC Centro Misure Compatibilità S.r.l.



Segalla 20012429

CMC Centro Misure Compatibilità S.r.l.



Segalla 20012430

CMC Centro Misure Compatibilità S.r.l.

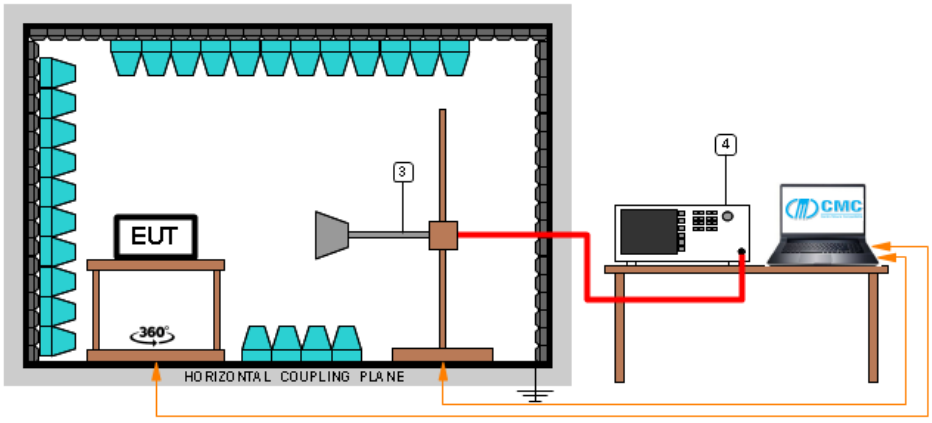
9.7 Fundamental emission output power

Tested by ..... :	M. Segalla
Test date ..... :	19.02.2020
Test location (stand) ..... :	Semi-anechoic chamber (CMC A070) Laboratory
Reference standards ..... :	FCC Rules and Regulation; Titles 47 Part 15.247 (b) (3) ANSI C63.10 cl. 11.9.1.1 KDB 558074 D01 DTS Meas Guidance v05r02 cl. 8.3.1.1
Supplementary test set-up description ..... :	EUT – antenna distance: 3 m
Supplementary information..... :	--

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

Test setup for internal antenna

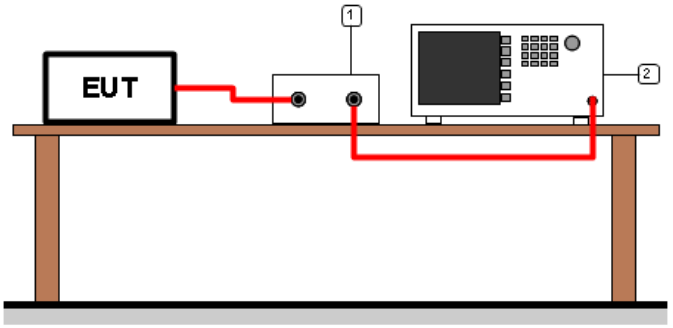
Frequency > 1 GHz



Test setup PE004_04				
Nr.	*Id. Number*	*Manufacturer*	*Model*	*Description*
4	CMC S164	Rohde & Schwarz	ESU26	Receiver 20 Hz - 26.5 GHz
3	CMC S108	Emco	3115	Waveguide antenna

CMC Centro Misure Compatibilità S.r.l.

Test setup for external antenna



Test setup PR002_01				
Nr.	*Id. Number*	*Manufacturer*	*Model*	*Description*
2	CMC S295	Rohde & Schwarz	FSW43	Spectrum Analyzer 43GHz
1	--	--	--	Cable + attenuator (calibrated before the test)

Result – internal antenna

Frequency (MHz)	*Polarization*	*Graphs*	*Measured level (dBµV/m)*	*Peak Output Power (mW)*	*Limit (mW)*
2402	Worst case	G20012418	103,20	3,141	1000
2440	Worst case	G20012427	103,61	3,452	1000
2480	Worst case	G20012431	98,19	0,991	1000

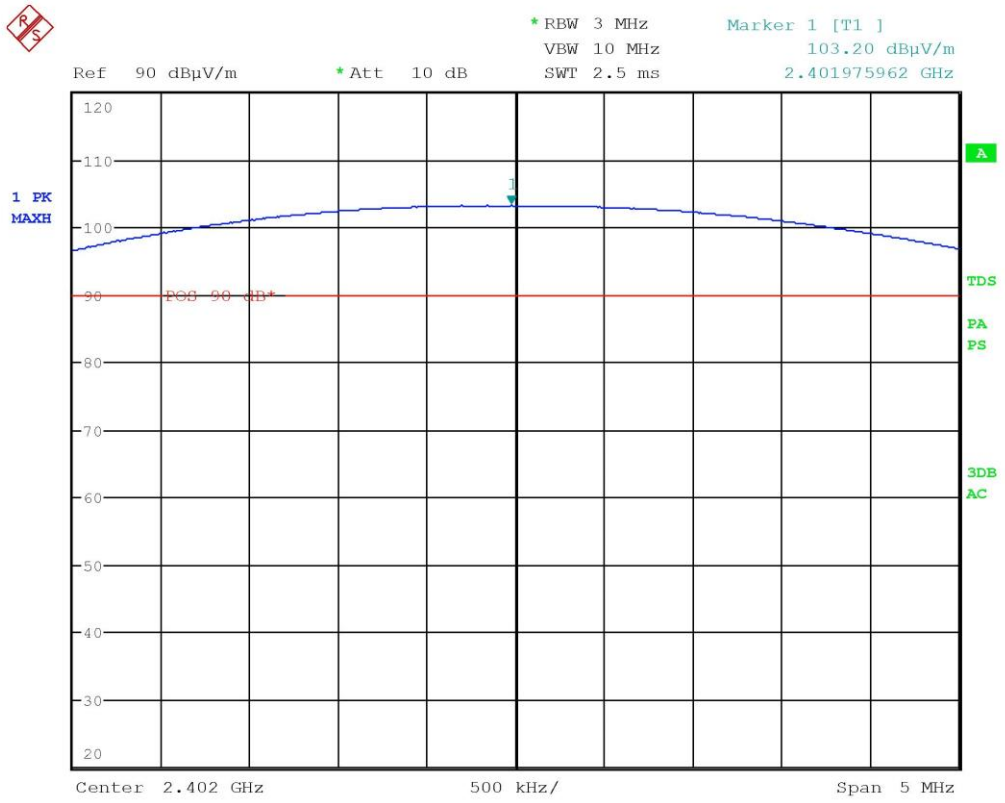
Remarks
$P = (E \times d)^2 / (30 \times G)$
Where:
E = the measured maximum fundamental field strength in V/m
G = the numeric gain of the transmitting antenna: 1,995 (3 dBi)
d = the distance in meters from which the field strength was measured (3 m)
P = the power in watts

Result – external antenna

Frequency (MHz)	*Graphs*	*Peak Output Power (dBm)*	*Peak Output Power (mW)*	*Limit (mW)*
2402	G20012473	5,00	3,16	1000
2440	G20012475	4,82	3,03	1000
2480	G20012477	4,68	2,94	1000

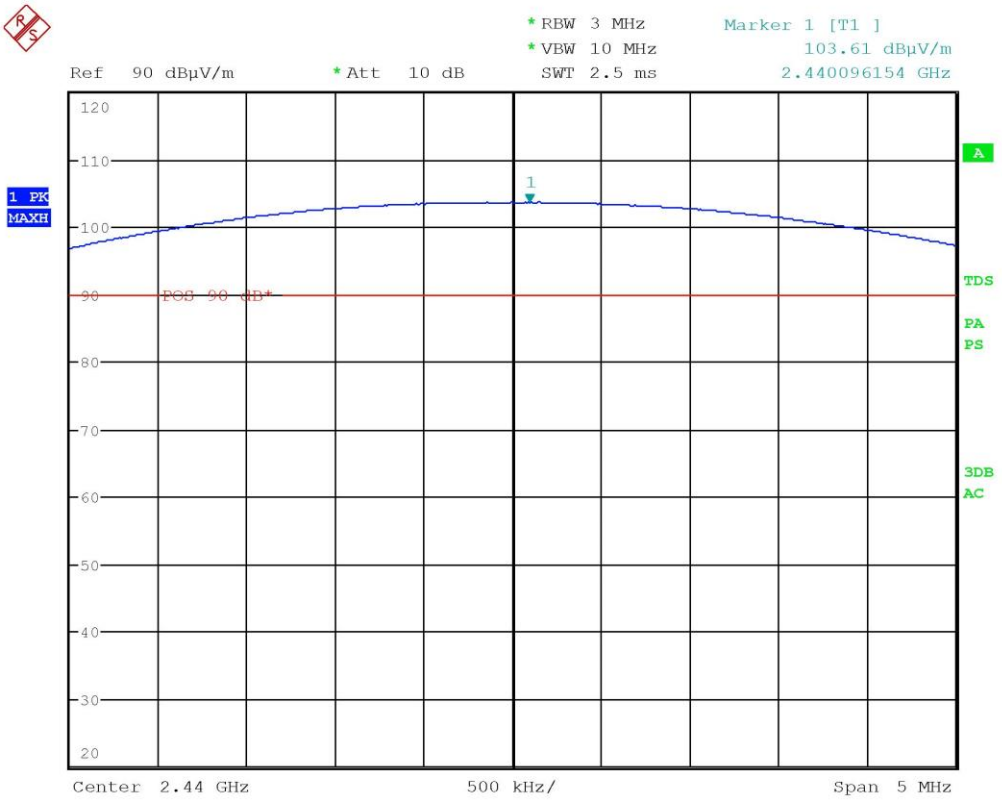
CMC Centro Misure Compatibilità S.r.l.

Graphs



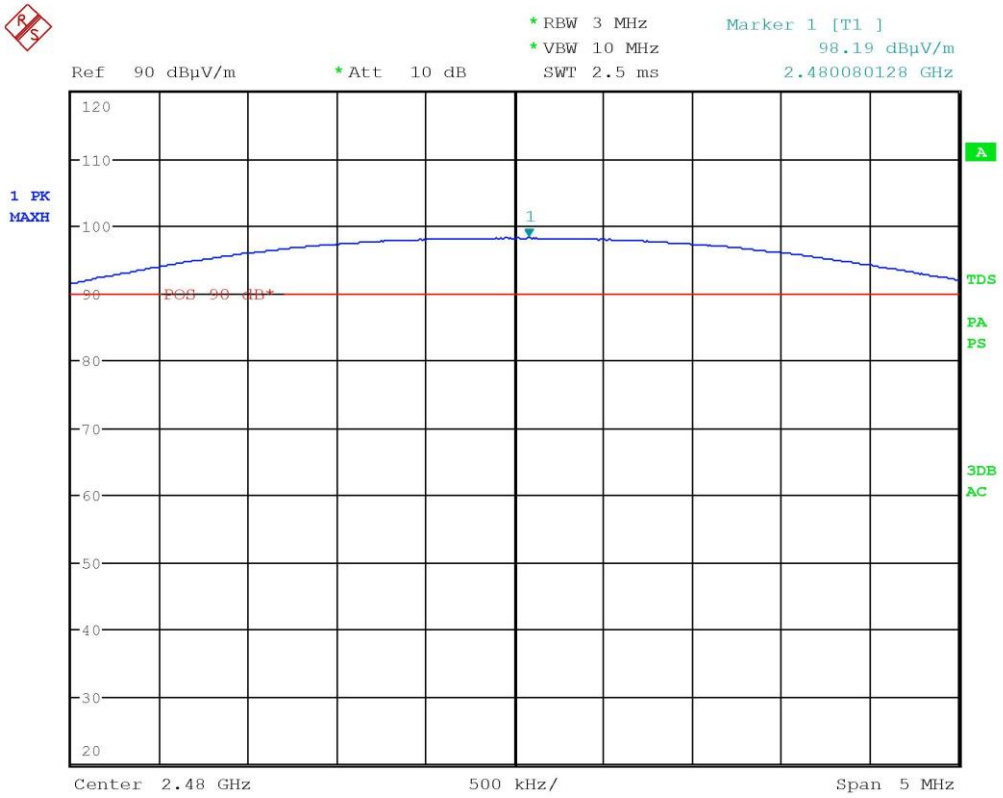
Segalla 20012418

CMC Centro Misure Compatibilità S.r.l.



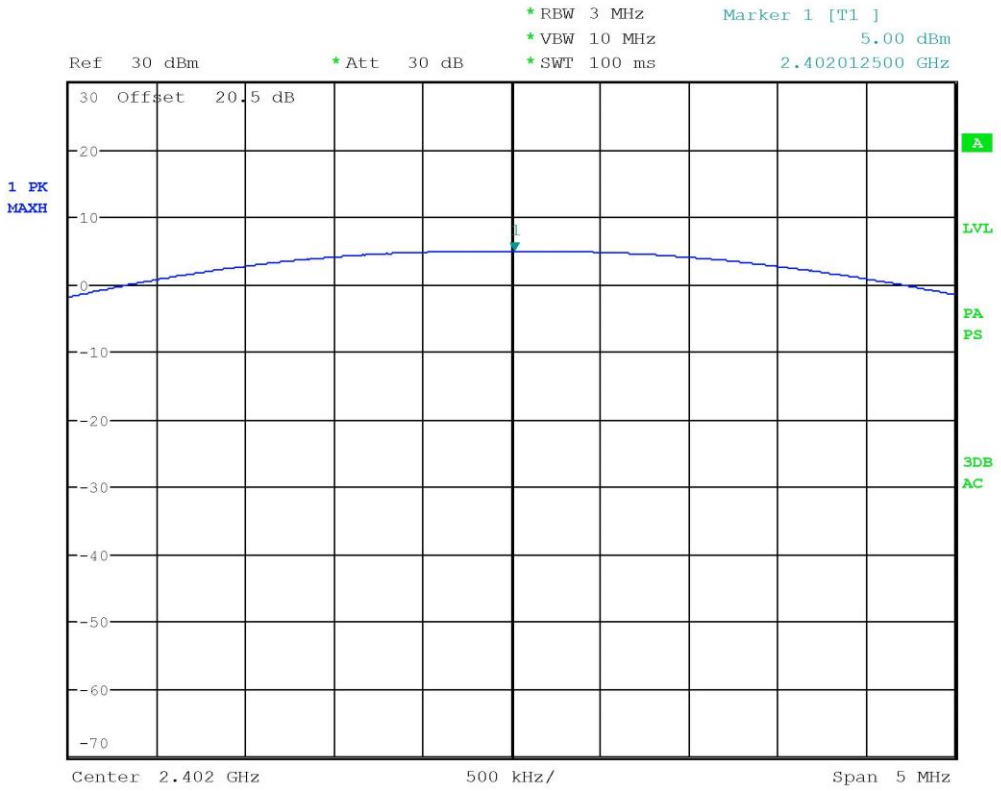
Segalla 20012427

CMC Centro Misure Compatibilità S.r.l.



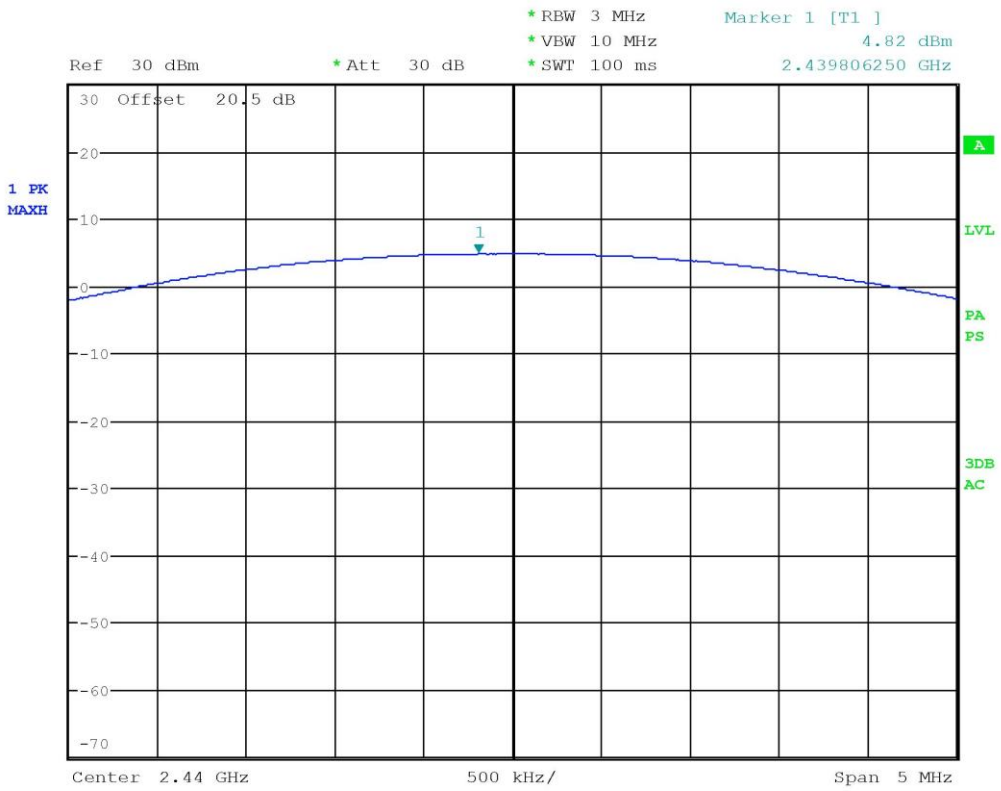
Segalla 20012431

CMC Centro Misure Compatibilità S.r.l.



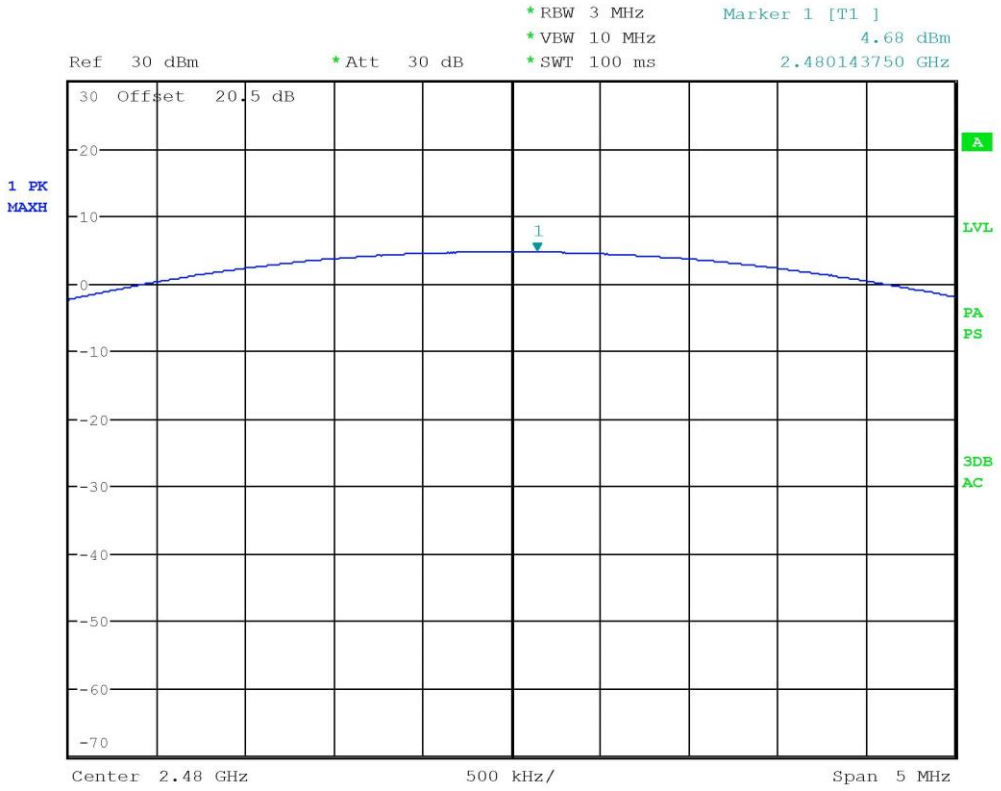
Segalla 20012473

CMC Centro Misure Compatibilità S.r.l.



Segalla 20012475

CMC Centro Misure Compatibilità S.r.l.



Segalla 20012477

CMC Centro Misure Compatibilità S.r.l.

9.8 Maximum power spectral density level in the fundamental emission

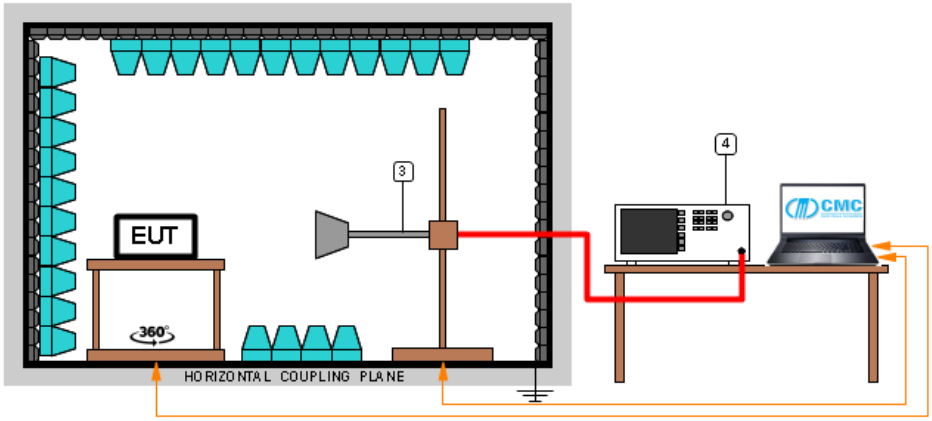
Tested by ..... :	M. Segalla
Test date ..... :	19.02.2020
Test location (stand) ..... :	Semi-anechoic chamber (CMC A070) Laboratory
Reference standards ..... :	FCC Rules and Regulation; Titles 47 Part 15.247 (e) ANSI C63.10 cl. 11.10.2 KDB 558074 D01 DTS Meas Guidance v05r02 cl. 8.4
Supplementary test set-up description ..... :	EUT – antenna distance: 3 m
Supplementary information..... :	--

Acceptance limits

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

Test setup for internal antenna

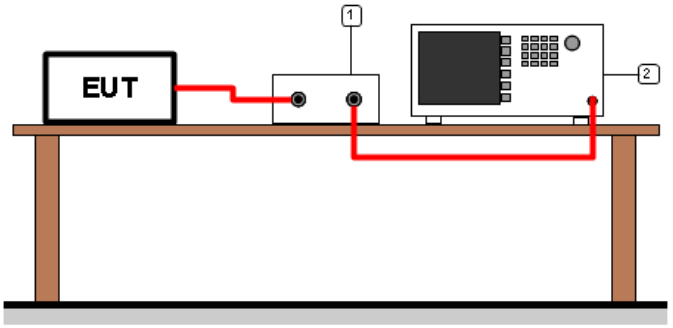
Frequency > 1 GHz



Test setup PE004_04				
Nr.	*Id. Number*	*Manufacturer*	*Model*	*Description*
4	CMC S164	Rohde & Schwarz	ESU26	Receiver 20 Hz - 26.5 GHz
3	CMC S108	Emco	3115	Waveguide antenna

CMC Centro Misure Compatibilità S.r.l.

Test setup for external antenna



Test setup PR002_01				
Nr.	*Id. Number*	*Manufacturer*	*Model*	*Description*
2	CMC S295	Rohde & Schwarz	FSW43	Spectrum Analyzer 43GHz
1	--	--	--	Cable + attenuator (calibrated before the test)

Result – internal antenna

Frequency (MHz)	*Polarization*	*Graphs*	*Measured level (dBm/3 kHz)*	*Limits (dBm/3 kHz)*
2402	Worst case	G20012419	4,491	8,00
2440	Worst case	G20012428	4,911	8,00
2480	Worst case	G20012432	-0,489	8,00

Remarks
P = 10 x log((E x d)^2/ (30 x G))
Where:
E = the measured maximum fundamental field strength in V/m
G = the numeric gain of the transmitting antenna: 1,995 (3 dBi)
d = the distance in meters from which the field strength was measured (3 m)
P = the power in dBm

Result – external antenna

Frequency (MHz)	*Graphs*	*Measured level (dBm/3 kHz)*	*Limits (dBm/3 kHz)*
2402	G20012474	4,54	8,00
2440	G20012476	4,37	8,00
2480	G20012478	4,14	8,00

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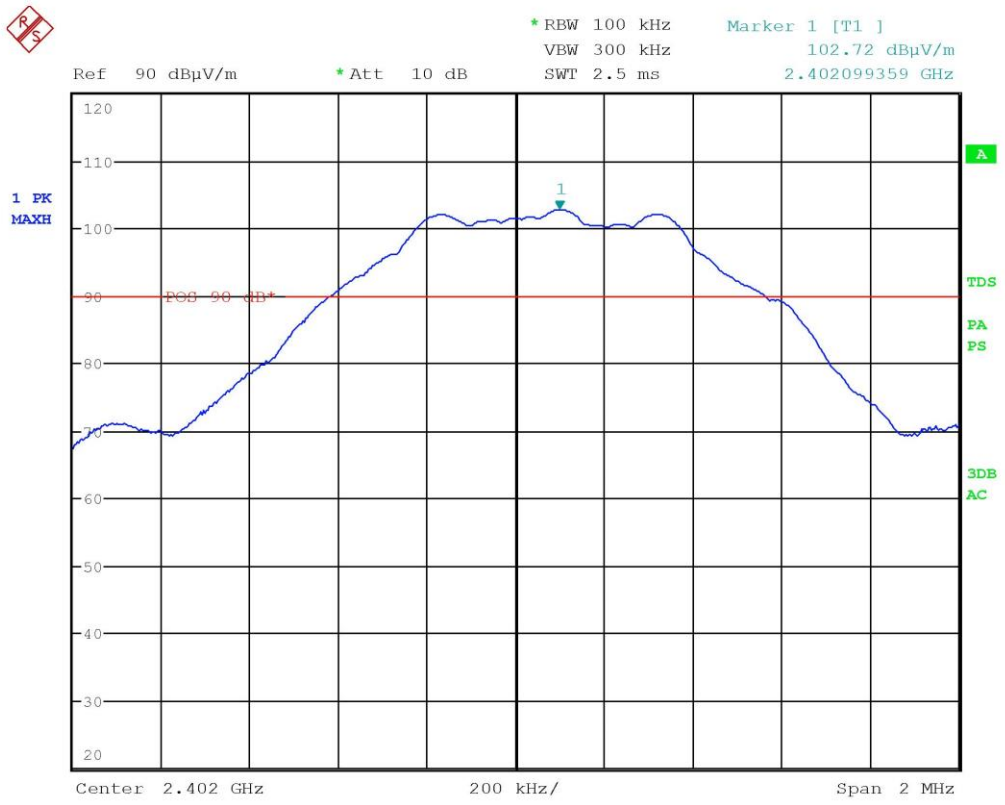
Graphs



Segalla 20012419

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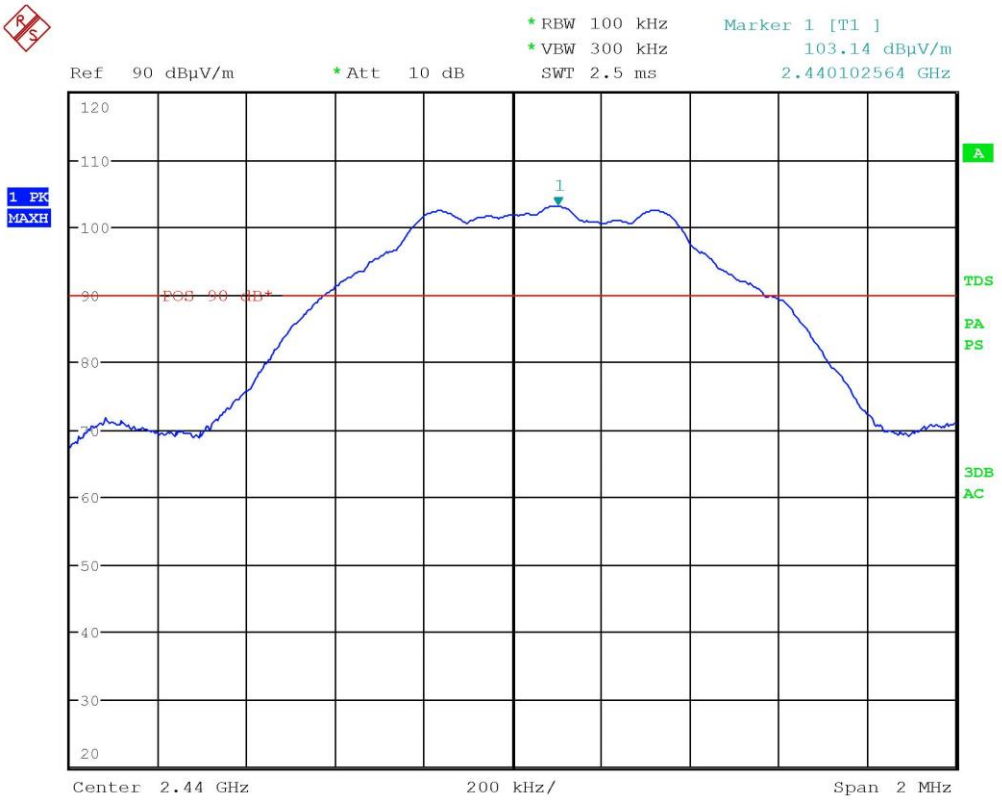
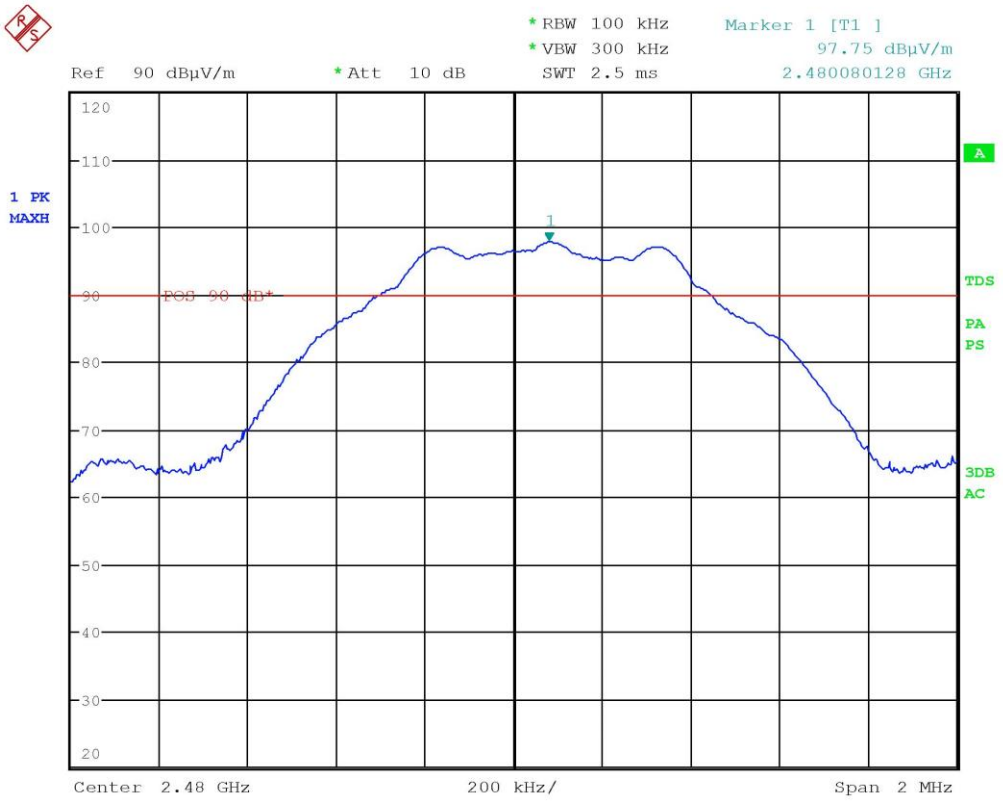


Segalla 20012428

CMC Centro Misure Compatibilità S.r.l.



Segalla 20012432

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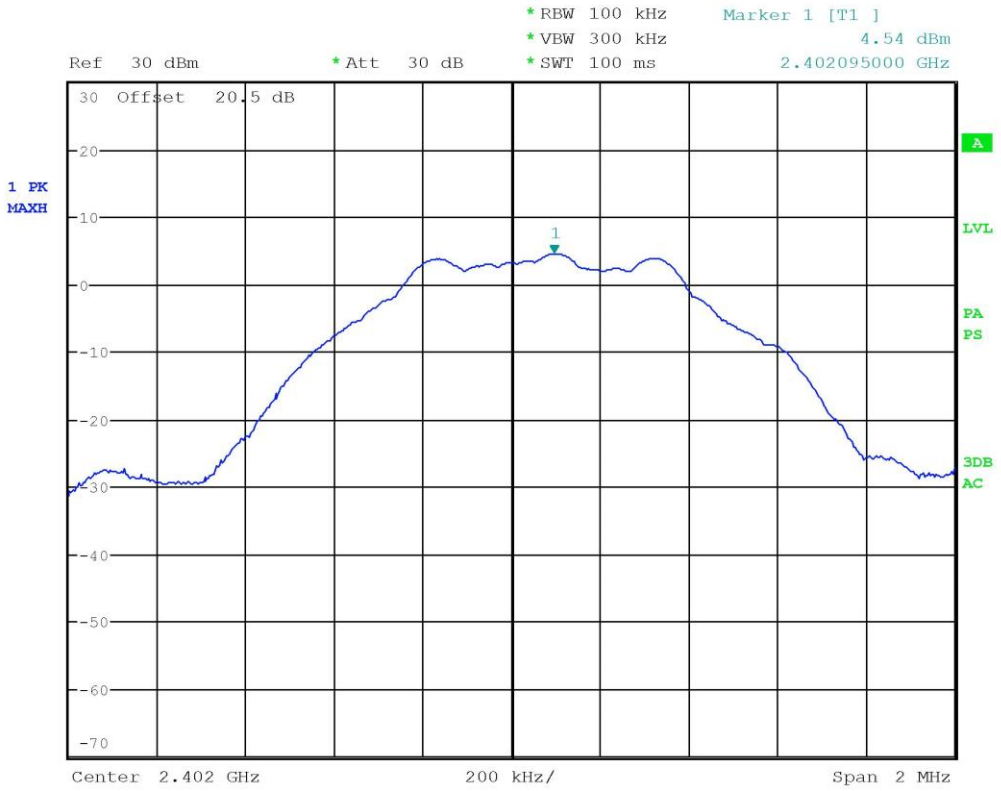
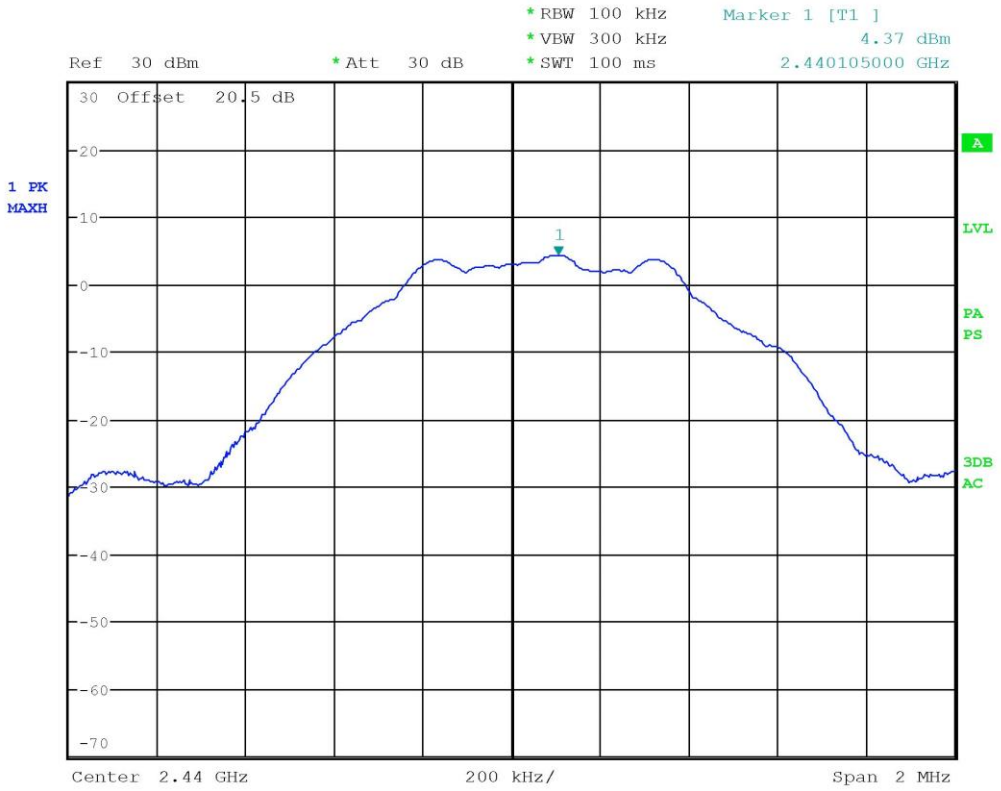


Segalla 20012474

CMC Centro Misure Compatibilità S.r.l.



Segalla 20012476

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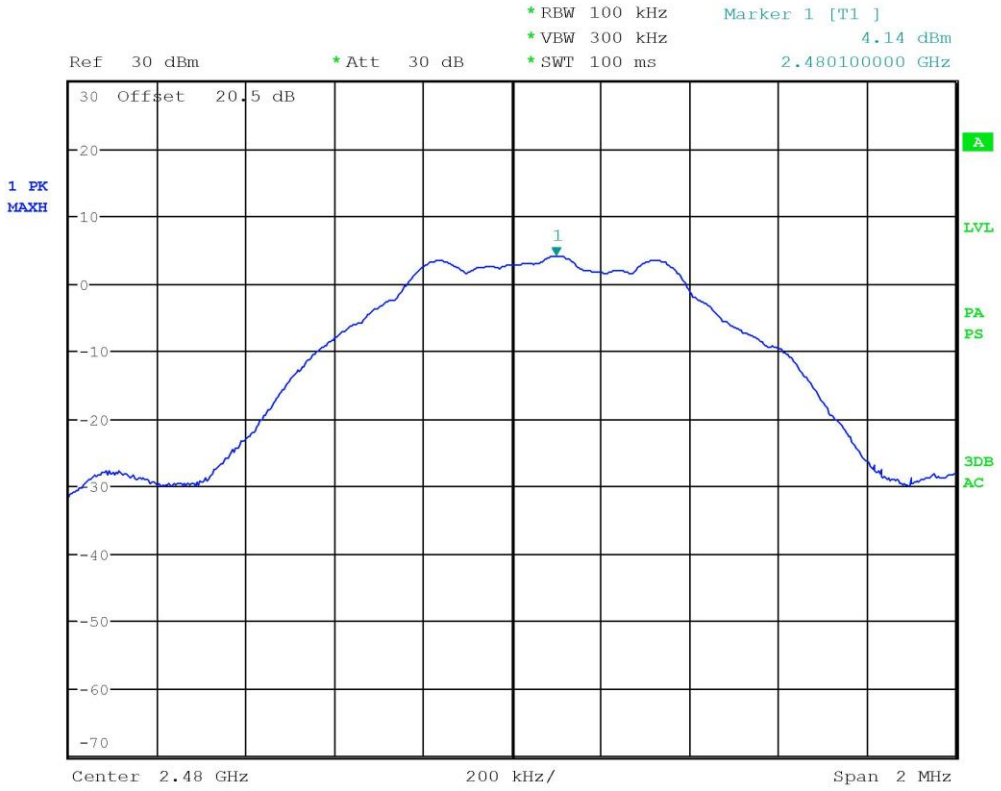

Segalla 20012478

CMC Centro Misure Compatibilità S.r.l.

Attachment 1

Instruments list

Id. number	*Manufacturer*	*Model*	*Description*	*Serial number*	*Last calibration*	*Due date calibration*
CMC S010	Rohde & Schwarz	ESH3-Z2	Impulses Limiting Device	- - -	January '20	January '21
CMC S108	EMCO	3115	Horn Antenna	9811-5622	June '19	June '22
CMC S127	Schaffner	HLA6120	Loop Antenna	1191	November '18	November '23
CMC S164	Rohde & Schwarz	ESU26	EMC interference receiver	100052	January '20	January '21
CMC S200	Schwarzbeck	NSLK 8128	V-LISN	8128-273	January '20	January '21
CMC S206	Rohde & Schwarz	ESCI 7	EMC Receiver 9KHz-7GHz	100781	January '20	January '21
CMC S260	CMC	Wfr_N	Shielded Cable	Wfr_ant10-1	November '19	November '20
CMC S261	CMC	Wfr_N	Shielded Cable	Wfr_ant20-1	November '19	November '20
CMC S262	CMC	Wfr_N_fix	Shielded Cable	Wfr_fix32-1	November '19	November '20
CMC S263	CMC	Wfr_N_fix	Shielded Cable	Wfr_fix31-1	November '19	November '20
CMC S264	CMC	Wfr_N	Shielded Cable	Wfr_ext03-1	November '19	November '20
CMC S271	Schwarzbeck	BBA 9106 + VHBB 9124	Biconical Antenna (30-300MHz)	831	June '19	June '22
CMC S287	Schwarzbeck	VUSLP 9111B	Log-periodic Antenna (200 MHz-3Ghz)	9111B-203	June '19	June '22
CMC S288	CMC	W_sma_white	Joint Shielded Cable	W_001	November '19	November '20
CMC S295	Rohde & Schwarz	FSW43	Spectrum Analyzer 43GHz	104059	November '19	November '22

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Attachment 1

Measurement uncertainty

Test	*Test Setup*	*Expanded uncertainty*	*Note*
Conducted emission CISPR 16 LISN 50uH 0,009-0,0150 MHz	PE001_01	3,4 dB	1
Conducted emission CISPR 16 LISN 50uH 0,150-30,0 MHz	PE001_01	3,0 dB	1
Conducted emission CISPR 16 Voltage Probe 0,15-30 MHz	PE001_02	2,9 dB	1
Conducted emission CISPR 16 Current Probe 0,15-30 MHz	PE001_03	2,6 dB	1
Conducted emission CISPR 16 ISN 0,15-30 MHz	PE001_04	4,7 dB	1
Clic CISPR 16 LISN 50uH 0,150-30,0 MHz	PE001_05	2,9 dB	1
Radiated Emission CDNE 30-300 MHz	PE001_06	3,3 dB	1
Disturbance Power 30-300 MHz	PE002_01	3,6 dB	1
Radiated Emission LAS 0,15-30 MHz	PE003_01	2,0 dB	1
Radiated Emission CISPR 16 Loop Ant. 0,15-30 MHz	PE004_01	4,0 dB	1
Radiated Emission CISPR 16 Bicon. Ant. 30-300 MHz	PE004_02	3,9 dB	1
Radiated Emission CISPR 16 LogP. Ant. 300-1000 MHz	PE004_03	3,8 dB	1
Radiated Emission CISPR 16 Horn Ant. 1-18 GHz	PE004_04	4,2 dB	1
Human Exposure to electromagnetic fields	PE005_01	23,6 %	1
Harmonics	PE006_01	10 mA + 2,6 %	1
Flicker	PE007_01	4,79 %	1
Radiated Immunity 80 MHz - 6 GHz	PE102_XX	1,95 dB 0,75 V/m a 3V/m	1
Conducted Immunity 0,15 - 230 MHz	PE105_XX	1,20 dB 0,44 V a 3V	1
AC Magnetic field	PE106_01	1,55 % 0,15 A/m a 10A/m	1
Pulse Magnetic field	PE107_01	6,25 % 18,7 A/m a 300A/m	1
Dumped Magnetic field	PE108_01	6,25 % 1,87 A/m a 30A/m	1
Common mode conducted immunity	PE112_01	2,21 % 0,22 V a 10V	1

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Attachment 1

Test	Test Setup	Expanded uncertainty	Note
Power/Spurious 9kHz-30MHz	PR001_01	4,0 dB	1
Power/Spurious ERP 30-1000MHz d=10m	PR001_02+03	4,7 dB	1
Misura della potenza EiRP 1-18GHz d=3m	PR001_04+05	4,7 dB	1
Misura della potenza EiRP 18-40GHz d=3m	PR001_06	5,4 dB	1
Frequency error	PR002_01+02	< 1x10-7	1
Timing zero span (1001pts.)	PR002_01+02	0,2 % SWT	1
Modulation bandwidth	PR002_01+02	< 1x10-7	1
Conducted RF power and spurious emission	PR002_01+02	1,1 dB	1
Adjacent channel power	PR002_01+02	1,1 dB	1
Blocking	PR002_01+02	1,1 dB	1

Test	Test Setup	Expanded uncertainty	Note
Electrostatic discharge immunity test	PE101_0X		2
Electrical fast transients / burst immunity test	PE103_0X		2
Surge immunity test	PE104_0X		2
Short interruption immunity test	PE109_01		2
Ring Wave immunity test	PE110_01		2
Low frequency immunity test	PE111_01		2
Dumped Oscillotary immunity test	PE113_01		2
Rev_20_02 date 24/02/2020			

Note 1:

The expanded uncertainty reported according to the document EA-4-02 is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of p = 95%

Note 2:

It has been demonstrated that the used test equipment meets the specified requirements in the standard with at least a 95% confidence, covering factor k=2

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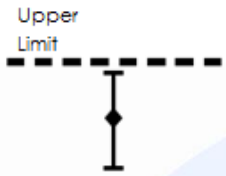
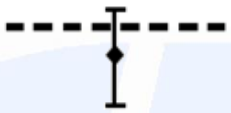
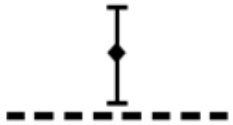
Attachment 1

Judgement of compliance

Case 1	Case 2	Case 3	Case 4
			
The sample complies with the requirements. The measurement results is within the specification limit when the measurement uncertainty is taken into account.	The sample complies with the requirements. It is not possible to state compliance using a 95% coverage probability for the expanded uncertainty although the measurement result is below the limit.	The sample does not comply with the requirements. It is not possible to state compliance using a 95% coverage probability for the expanded uncertainty also the measurement result is upper the limit.	The sample does not comply with the requirements. The measurement results is outside the specification limit when the measurement uncertainty is taken into account.

In agreement with ILAC-G8: 03/2009 Guidelines on the Reporting of Compliance with Specification

Quality manual references – Internal procedure

Internal Procedure PM001 rev. 3.0 (Quality Manual)	Measure procedure
Internal Procedure INC_M rev. 9.1 (Quality Manual)	Measurement uncertainty calculation

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