

Produkte
Products

Prüfbericht - Nr.: 19660152 001		Seite 1 von 18	
<i>Test Report No.:</i>		<i>Page 1 of 18</i>	
Auftraggeber: <i>Client:</i>		MATRIX COMSEC PVT. LTD. 394 - GIDC, Makarpura, Vadodara, Gujarat 390 010, India	
Gegenstand der Prüfung: <i>Test item:</i>		COSEC CPM	
Bezeichnung: <i>Identification:</i>	COSEC CPM EM PROX	Serien-Nr.: <i>Serial No.</i>	M0814-0007324
Wareneingangs-Nr.: <i>Receipt No.:</i>	1803059549	Eingangsdatum: <i>Date of receipt:</i>	08.12.2014
Prüfort: <i>Testing location:</i>	Refer page 4 of 18 for test facilities		
Prüfgrundlage: <i>Test specification:</i>	FCC Part 15, Subpart C ANSI C63.10-2009		
Prüfergebnis: <i>Test Result:</i>	Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n). <i>The test item passed the test specification(s).</i>		
Prüflaboratorium: <i>Testing Laboratory:</i>	TÜV Rheinland (India) Pvt. Ltd. 82/A, 3rd Main, West Wing, Electronic City Phase 1 Hosur Road, Bangalore – 560 100. India FCC Registration No.: 176555		
geprüft / tested by:		kontrolliert / reviewed by:	
23.02.2015	Shrikanth S Naik Engineer	25.02.2015	Raghavendra Kulkarni Sr. Manager
Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>	Unterschrift <i>Signature</i>
Sonstiges / Other Aspects: FCC ID : 2ADHNC0SEC01			
Abkürzungen: P(ass) = entspricht Prüfgrundlage F(ail) = entspricht nicht Prüfgrundlage N/A = nicht anwendbar N/T = nicht getestet		Abbreviations: P(ass) = passed F(ail) = failed N/A = not applicable N/T = not tested	
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.</i>			

Test Result Summary

Clause	Test Item	Result
FCC 15.215 (c)	Occupied Bandwidth	-
FCC 15.209	Spurious Radiated Emissions	Pass
FCC 15.207	Conducted Emissions on A.C Power lines	Pass

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List of Test and Measurement Instruments

Testing Facilities

- 1) TÜV Rheinland (India) Pvt. Ltd.
82/A, 3rd Main, West Wing, Electronic City,
West Phase, Hosur Road
Bangalore – 560 100.

Equipment	Manufacturer	Model Name	Serial Number	Calibration Due Date	Periodicity	Used for Test Items
Spectrum Analyser	Agilent Technologies	E4407B	US4119277 2	27.03.2015	Yearly	Occupied Bandwidth

- 2) TUV Rheinland (India) Private Limited
108 , Beside ISBR Business School,
Electronic city Phase I
Bangalore - 560 100.

Equipment	Manufacturer	Model Name	Serial Number	Calibration Due Date	Periodicity	Used for Test Items
EMI Test Receiver	Rohde & Schwarz	ESU 40	100288	20.06.2015	Yearly	Spurious Radiated Emissions
Broadband Antenna	Frankonia	ALX-4000	ALX-4000-806	22.06.2015	Yearly	
Active Loop Antenna	Frankonia	LAX-10	LAX-10-800	22.06.2015	Yearly	
Anechoic Chamber	Frankonia	-	-	-	-	
LISN	Rohde & Schwarz	ENV216	100022	12.09.2015	Yearly	Conducted Emission on AC power lines
EMI Reciever	Rohde & Schwarz	ESR7	101133	19.11.2015	Yearly	

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General Product Information

Product Function and Intended Use

COSEC CPM EM PROX reader is a very compact reader module using contactless passive transponder cards offering long reading distance (max 8-12 cm) despite its compact dimensions. It is fully potted and therefore practically suitable for indoor and outdoor use like access control, parking.

COSEC CPM EM PROX reader module is connected to reader port of door controller (Host product) using RS 232 or wiegand interface. Power to this reader is supplied from the door controller directly to eliminate the need for separate power points at the installation site.

Ratings and System Details

Operating Frequency	120kHz to 130.43 kHz		
Measured RF Output (Worst Case Power)	74.88 dBµV/m	-20.35 dBm	0.00922829 mW
Data rate	115200bps (default 9600bps)		
Modulation	Manchester modulation		
Number of Antennas	Four		
Antenna Type	Coil Antenna		
Supply Voltage	5VDC to 5.5 VDC		
Dimensions in mm	71.4 x 43.4 x 15.2		
Environmental (Storage and Operational conditions)	(-40 to 85°C) operating		

Test Conditions:

Test Voltage: 5 V DC from Adaptor

Environmental conditions: **Temperature:** +23 °C **RH:** 62%

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Operation Descriptions

The reader module continuously emits RF carrier signals, and keeps observing the received RF signals for data. The presence of a tag modulates the rf field, and the same is detected by the reader.

The passive tag absorbs a small portion of the energy emitted by the reader, and starts sending modulated information when sufficient energy is acquired from the rf field generated by the reader module. The reader demodulates the signals received from the tag antenna, and decodes the same for further processing.

RF Module is tested with following Host systems

1. COSEC DOOR PVR
2. COSEC PATH RDFE/DCFE
3. COSEC NGT FCX
4. COSEC VEGA CAX

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Test Set-up and Operation Mode

Principle of Configuration Selection

The test was performed under continuous transmit mode to obtain the maximum emissions.

Test Operation and Test Software

- NA

Special Accessories and Auxiliary Equipment

- NA

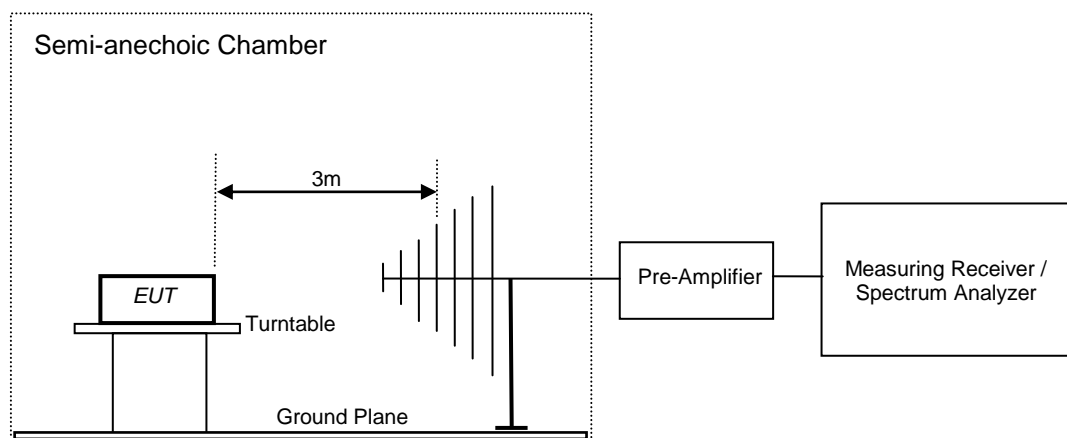
Note: Matrix COSEC EM PROX Module support the following frequencies

Sl. No.	Frequency (kHz)
1	120.00
2	121.21
3	122.45
4	123.71
5	125.00
6	126.32
7	127.66
8	129.03
9	130.43

Test Methodology

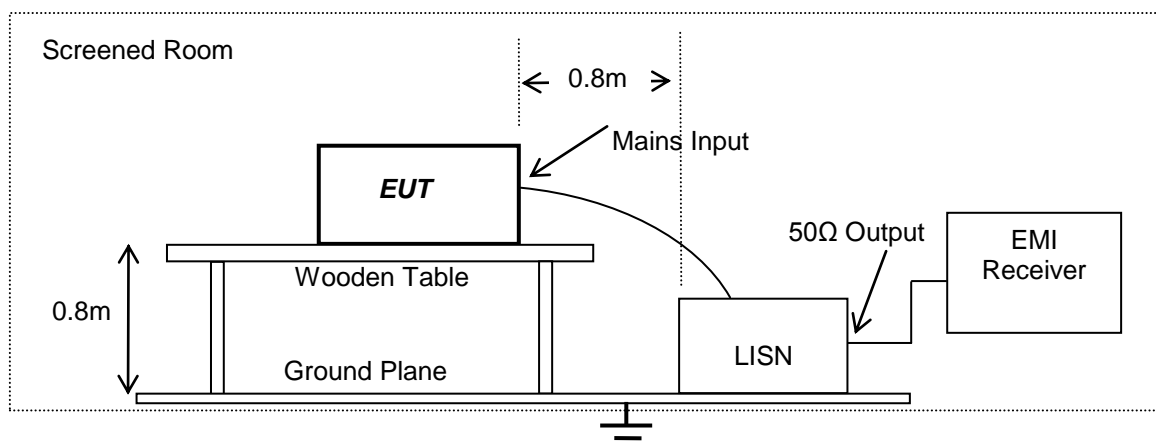
Radiated Emission Test

The radiated emission measurement was performed according to the procedures in ANSI C63.10-2009. The equipment under test (EUT) was placed at the middle of the 80 cm high turntable, and the EUT is 3 meters far from the measuring antenna. The turntable was rotated 360° for obtaining the maximum emission. The height of the measuring antennas was scanned between 1m and 4m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained. The measurement above 1000MHz was performed by horn antenna. The measurement below 30MHz was performed by loop antenna. The EUT was rotated around the X-, Y-, and Z-Axis and the results from worst case axis are recorded.



Conducted Emission Test on A.C. mains line

The equipment under test (EUT) was placed on a wooden table 80cm above the ground plane, the LISN was placed 80cm away from the EUT. The test was performed in accordance with ANSI C63.10: 2009, with the following: an initial measurement was performed in peak and average detection mode on the live and neutral lines. The pre-scan was performed by peak detection on both live and neutral conductors. Any emissions recorded within 20dB of the relevant limit line were re-measured using quasi-peak and average detections, the 6 worst cases were recorded in the table of results.



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Test Results

Occupied Bandwidth Measurement

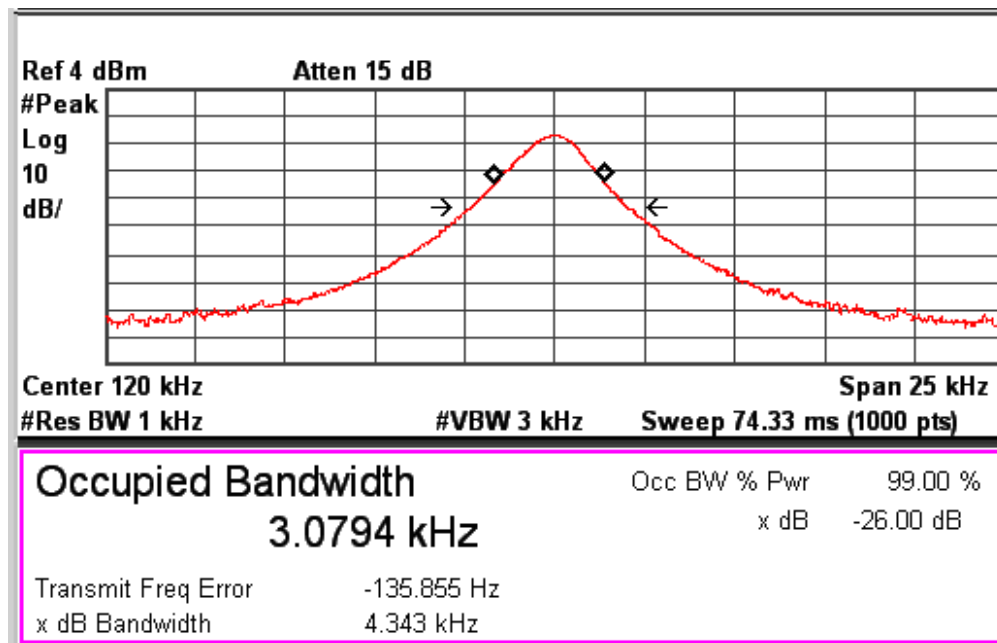
Section 15.215 (c)

Measurement procedure

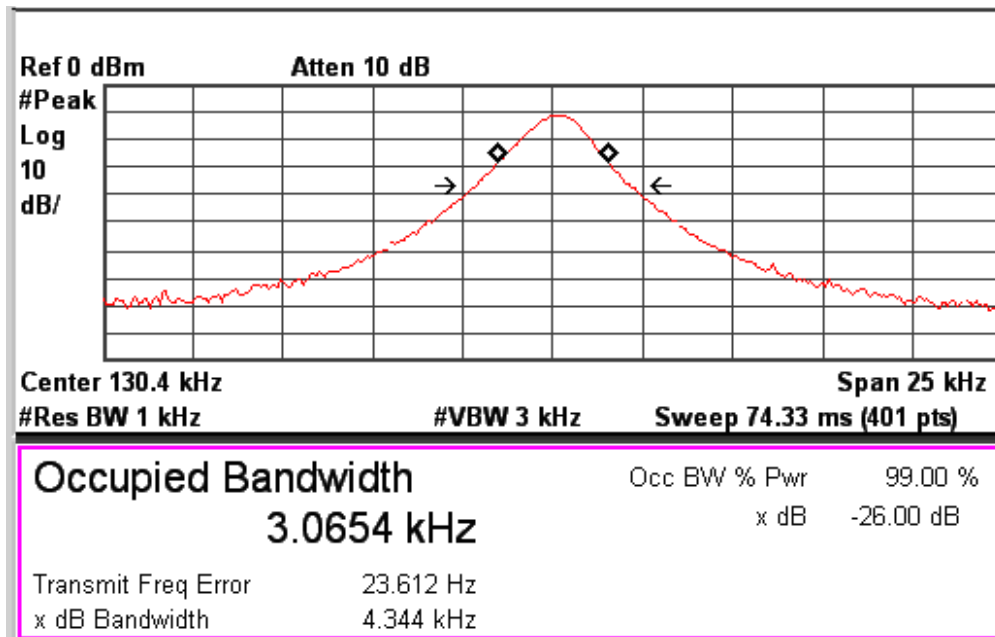
The 99% occupied bandwidth was measured with the spectrum analyzer span set to fully display the emission and approximately 20dB below the peak level. The trace was set to max hold with a peak detector active. The occupied bandwidth measurement function of the analyzer was used for the 99% bandwidth

Measurement Result

Centre Frequency (kHz)	Occupied Bandwidth (kHz)
120.00	3.079
130.43	3.065



Test Plot: Centre Frequency 120 kHz



Test Plot : Center Frequency 130.43 kHz

Spurious Radiated Emissions**Section 15.209****Result****Pass**

Test Specification	FCC Part 15 Section 15.209
Test Method	ANSI C63.10-2009
Supply Voltage	5V DC (Adaptor)
Measuring Frequency Range	9kHz – 1 GHz (Up to 10 th harmonic of the highest fundamental frequency)
Measuring Distance	3m
Requirement	To comply as per limits stated below

Limit for Radiated Emission of Section 15.209:

Frequency (MHz)	Field strength (μV/m)	Field strength (dBμV/m) at 3m range
0.009 – 0.490	2400/F(kHz) (300m range)	48.50 – 13.80 (300m range)*
0.490 – 1.705	24000/F(kHz) (30m range)	33.80 – 23.00 (30m range)*
30-88	100	40.0
88-216	150	43.5
216-960	200	46.0
Above 960	500	54.0

Remark: * Distance Correction for Measurements below 30 MHz – Part 15.31

Radiated measurements were performed at a distance closer than 300 meters and 30m as required, according to Part 15.209. Therefore a correction factor was applied to account for propagation loss at the specified distance. The propagation loss was determined by using the square of an inverse linear distance extrapolation factor (40dB/decade) according to 15.31. A sample calculation of the distance correction factor is shown below for limits expressed at a 300m measurement distance and a 30m measurement distance.

$$\begin{aligned}\text{Distance correction factor (300m Specified Test Distance)} &= 40 \cdot \log(\text{Test Distance}/300) \\ &= 40 \cdot \log(3/300) \\ &= -80 \text{ dB}\end{aligned}$$

$$\begin{aligned}\text{Distance correction factor (30m Specified Test Distance)} &= 40 \cdot \log(\text{Test Distance}/30) \\ &= 40 \cdot \log(3/30) \\ &= -40 \text{ dB}\end{aligned}$$

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

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Test Results for COSEC CPM EM PROX module:

Spurious emissions in the frequency range 9 kHz to 30 MHz – Standard LF Coil Antenna

Spurious emissions are found to be worst for the fundamental frequency 130.43KHz & same are listed in the below table.

Antenna Polarization	Emission Frequency (kHz)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
Parallel	119.5*	68.48	106.05	-37.57
	130.6*	74.88	105.28	-30.40
	370.0	46.27	96.24	-49.97
	620.0	40.99	71.75	-30.76
	865.0	37.20	68.86	-31.66
	1114	35.03	66.66	-31.63
	1360	32.51	64.93	-32.42
Perpendicular	119.5*	64.12	106.05	-41.93
	130.6*	67.98	105.28	-37.30
	370.0	43.95	96.24	-52.29
	620.0	38.85	71.75	-32.90
	865.0	35.25	68.86	-33.61
	1114	32.38	66.66	-34.28
	1360	32.58	64.93	-32.35

* > Fundamental Frequency

Spurious emissions in the frequency range 9 kHz to 30 MHz – NGT LF Coil Antenna

Spurious emissions are found to be worst for the fundamental frequency 130.43KHz & same are listed in the below table.

Antenna Polarization	Emission Frequency (kHz)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)
Parallel	119.6*	60.05	106.04	-45.99
	130.3*	64.62	105.30	-40.68
	71.4	24.96	110.53	-85.57
	370.0	36.15	96.24	-60.09
	620.0	31.75	71.75	-40.00
Perpendicular	119.6*	55.76	106.04	-50.28
	130.2*	59.46	105.31	-45.85
	370.0	33.25	96.24	-62.99

* > Fundamental Frequency

Spurious emissions in the frequency range 9 kHz to 30 MHz – Premium LF Coil Antenna

Spurious emissions are found to be worst for the fundamental frequency 130.43KHz & same are listed in the below table.

Antenna Polarization	Emission Frequency (kHz)	Field Strength (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
Parallel	71.3	25.41	110.54	-85.13
	120.1*	62.12	105.31	-43.19
	130.4*	67.65	105.29	-37.64
	370.0	40.47	96.24	-55.77
	620.0	36.65	71.75	-35.1
	865.0	33.60	68.86	-35.26
Perpendicular	120.1*	61.78	105.31	-43.53
	130.3*	64.56	105.30	-40.74
	370.0	37.22	96.24	-59.02
	620.0	37.22	71.75	-34.53
	865.0	31.28	68.86	-37.58

* > Fundamental Frequency

Spurious emissions in the frequency range 9 kHz to 30 MHz – CDC FP LF Coil Antenna

Spurious emissions are found to be worst for the fundamental frequency 130.43KHz & same are listed in the below table.

Antenna Polarization	Emission Frequency (kHz)	Field Strength (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
Parallel	71.3	24.79	110.54	-85.75
	119.8*	59.56	106.03	-46.47
	129.9*	65.07	105.33	-40.26
	370.0	37.25	96.24	-58.99
	620.0	34.34	71.75	-37.41
Perpendicular	119.9*	58.58	106.03	-47.45
	129.8*	62.96	105.33	-42.37
	370.0	35.81	96.24	-60.43
	620.0	33.92	71.75	-37.83

* > Fundamental Frequency

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Worst case test results in the frequency range from 30MHz to 1000MHz

Worst case test configuration: COSEC CPM EM PROX module with Standard LF Coil Antenna

Antenna Polarization	Frequency (MHz)	Field Strength (dBuV/m)	Limit (dBuV/m)	Margin (dB)
Vertical	142.32	33.05	43.5	-10.45
	266.19	32.88	46.0	-13.12
Horizontal	141.74	38.51	43.5	-04.99
	264.44	41.51	46.0	-04.49

Test Results for COSEC CPM EM PROX Module with host device:

Note: COSEC CPM EM PROX module is tested with different host devices as listed in Page No. 6 of this report, only worst case test results are listed below.

Worst case test configuration: Worst case test results for COSEC CPM EM PROX module were observed with the host device COSEC DOOR PVR.

Test results for frequencies in the range 9 kHz to 30 MHz

Spurious emissions are found to be worst for the fundamental frequency 130.43KHz & same are listed in the below table.

Antenna Polarization	Spurious Emission (kHz)	Field Strength (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
Parallel	119.9*	60.86	106.03	-45.17
	130.3*	70.67	105.30	-34.63
	390.0	43.08	95.78	-52.70
	650.0	37.66	71.34	-33.68
	1175	32.97	66.20	-33.23
Perpendicular	119.5*	57.20	106.05	-48.85
	130.2*	66.27	105.31	-39.04
	390.0	41.03	95.78	-54.75
	650.0	35.72	71.34	-35.62
	1175	30.51	66.20	-35.69

* - > Fundamental Frequency

Test results for frequencies in the range 30 MHz to 1 GHz

Antenna Polarization	Frequency (MHz)	Field Strength (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
Vertical	60.94	31.07	40.0	-8.93
	255.91	31.55	46.0	-14.45
	350.0	33.19	46.0	-12.81
	399.95	39.78	46.0	-6.22
	450.01	34.83	46.0	-11.17
Horizontal	53.76	31.00	40.0	-9.00
	249.99	30.59	46.0	-15.41
	400.05	37.69	46.0	-8.31

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**Conducted Emission Test on A.C. Power Line
Result**

**Section 15.207
Pass**

Test Specification : FCC Part 15 Section 15.207
Test Method : ANSI C63.10-2009
Testing Location : Screened room
Measurement Bandwidth : 9kHz
Frequency Range : 150kHz – 30MHz
Supply Voltage : 120VAC,60Hz

Limit of section 15.207

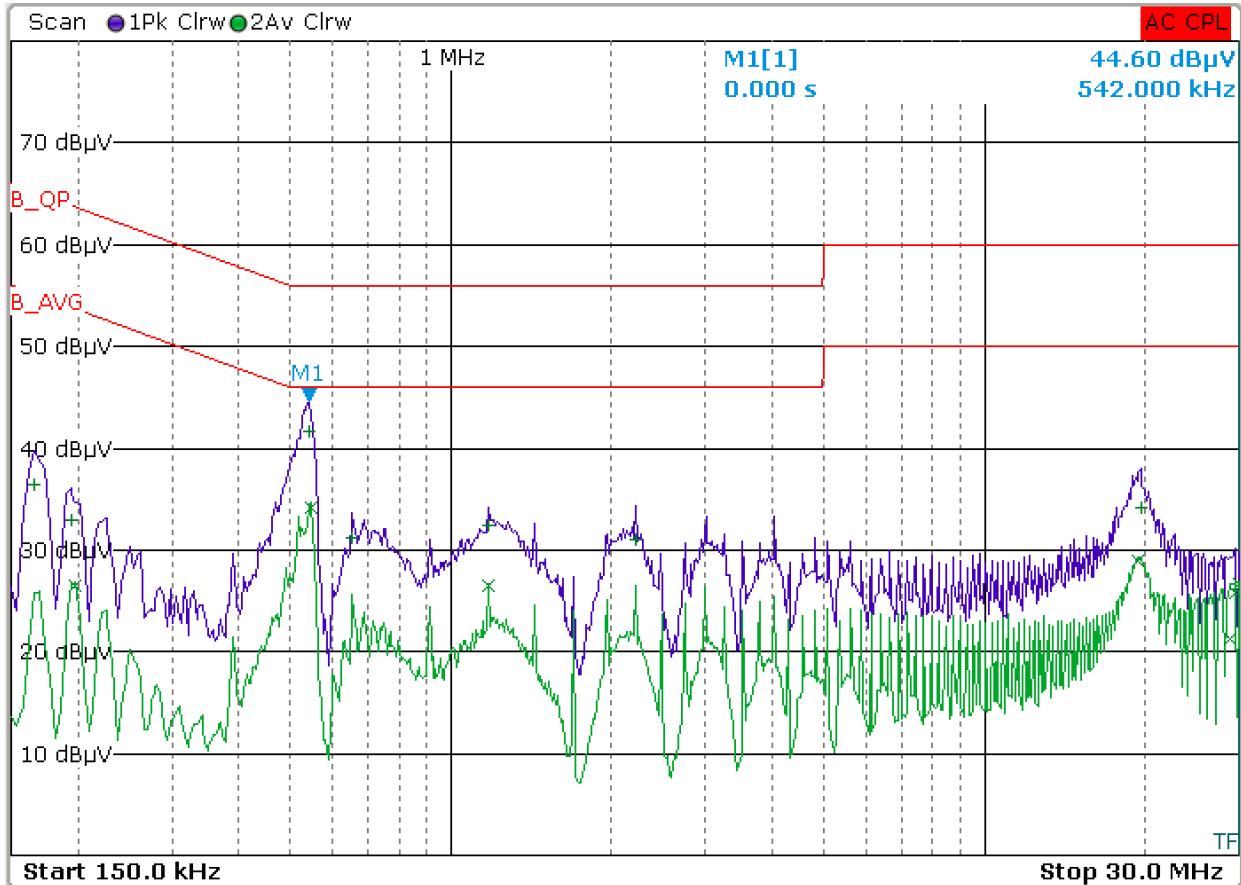
Frequency Range (MHz)	QP Limit (dBµV)	AV Limit (dBµV/m)
0.15 – 0.5	66 – 56*	56 – 46*
0.5 – 5	56	46
5 – 30	60	50

* Decreases with the logarithm of the frequency

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Test Results:

Worst case test configuration: COSEC CPM EMPROX module with Standard LF Coil Antenna along with the host device COSEC DOOR PVR.



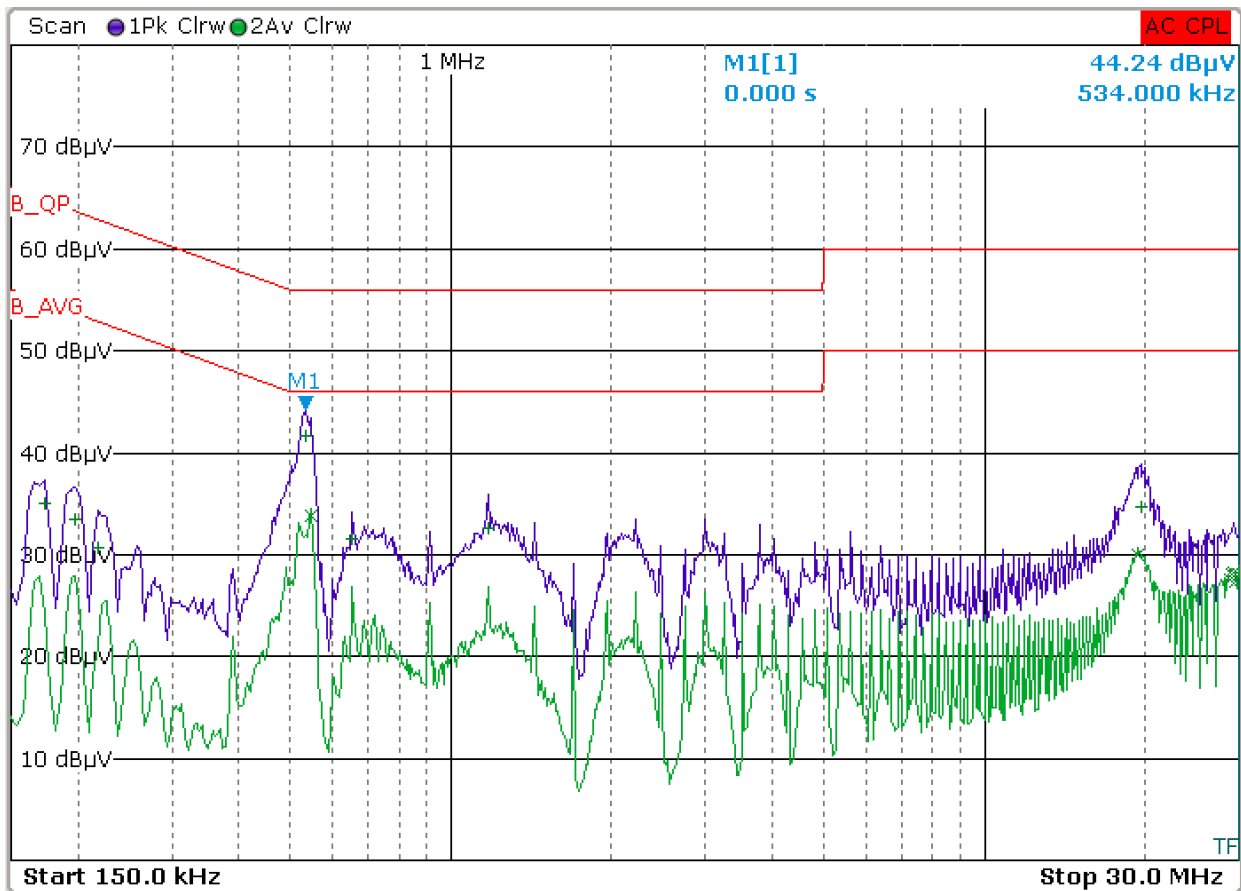
Final Results

Meas Time 1.0 s
Margin 6.0 dB
Peaks 7

Trace	Frequency	Level (dBμV)	Phase	Detector	Delta Limit/dB
2	546.00000000 kHz	34.14	L1	Average	-11.86
1	542.00000000 kHz	41.73	L1	Quasi Peak	-14.27
2	1.174000000 MHz	26.54	L1	Average	-19.46
2	19.450000000 MHz	28.93	L1	Average	-21.07
2	29.890000000 MHz	26.68	L1	Average	-23.32
1	1.174000000 MHz	32.34	L1	Quasi Peak	-23.66
2	29.630000000 MHz	25.72	L1	Average	-24.28
1	654.00000000 kHz	31.28	L1	Quasi Peak	-24.72
1	2.218000000 MHz	30.94	L1	Quasi Peak	-25.06
1	19.710000000 MHz	34.12	L1	Quasi Peak	-25.88
2	198.00000000 kHz	26.44	L1	Average	-27.25
1	166.00000000 kHz	36.51	L1	Quasi Peak	-28.65
2	28.842000000 MHz	21.22	L1	Average	-28.78
1	194.00000000 kHz	32.86	L1	Quasi Peak	-31.00

Mode: Line

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Final Results

Meas Time 1.0 s
Margin 6.0 dB
Peaks 7

Trace	Frequency	Level (dBµV)	Phase	Detector	Delta Limit/dB
2	546.000000000 kHz	33.88	N	Average	-12.12
1	534.000000000 kHz	41.67	N	Quasi Peak	-14.33
2	19.446000000 MHz	30.04	N	Average	-19.96
2	29.362000000 MHz	28.21	N	Average	-21.79
2	29.102000000 MHz	28.13	N	Average	-21.87
2	29.886000000 MHz	28.06	N	Average	-21.94
2	28.842000000 MHz	27.49	N	Average	-22.51
2	29.626000000 MHz	27.38	N	Average	-22.62
1	1.174000000 MHz	32.60	N	Quasi Peak	-23.40
1	654.000000000 kHz	31.59	N	Quasi Peak	-24.41
1	19.702000000 MHz	34.77	N	Quasi Peak	-25.23
1	174.000000000 kHz	35.08	N	Quasi Peak	-29.69
1	198.000000000 kHz	33.55	N	Quasi Peak	-30.14
1	218.000000000 kHz	30.73	N	Quasi Peak	-32.16

Mode: Neutral

End of Test Report