

DÜRR DENTAL SE TEST REPORT

SCOPE OF WORK

RADIO TESTING FCC – VISTASCAN NANO EASY

REPORT NUMBER

2232515KAU-012

ISSUE DATE

26-July-2018

PAGES

29

DOCUMENT CONTROL NUMBER

R_FCC 15-225_18-01 (25-January-2018)

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EMF TEST REPORT

TYPE: VistaScan Nano Easy
DESCRIPTION: **Image plate scanner**
SERIAL NO: **K380344001**

All measurement results refer to the equipment which was tested

MANUFACTURER: DÜRR DENTAL SE
CUSTOMER NAME: DÜRR DENTAL SE
ADDRESS (CUSTOMER): Höpfigheimer Str. 17
74321 Bietigheim-Bissingen
Germany

REPORT NO: 2232515KAU-012

TEST RESULT: The equipment comply to 47 CFR Part 15, Subpart C, Intentional radiators, section 15.225 / RSS-210, Issue 9 and RSS-GEN, Issue 5 (Referring to the operating modes specified in this report).

TEST LABORATORY: Intertek Deutschland GmbH
Innovapark 20, 87600 Kaufbeuren
Germany

**FCC DESIGNATION
NUMBER:** DE0014

**FCC TEST FIRM
REGISTRATION NUMBER.** 359260

**INDUSTRY CANADA
REGISTRATION.** 8882A-1; 8882A-2

TEST ENGINEER: U. Gronert
Senior Project Engineer

REVIEWER: R. Dressler
Technical Manager EMC/ Radio



Details about Accreditations/Acceptances

EMC / Radio National

	The Intertek Deutschland EMC-Lab is accredited by the Deutsche Akkreditierungsstelle GmbH (DAkkS) Registration Number (EMC general): D-PL-12085-01-01 Registration Number (EMC Med): D-PL-12085-01-03
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International

	The Intertek Deutschland EMC-Lab is accepted to participate in the IECEE (IEC Conformity assessment for Electrotechnical Equipment and Components) CB-Scheme CB Test Laboratory: TL118
	The Intertek Deutschland EMC-Lab is listed at the Federal Communications Commission (FCC) Designation Number: DE0014 Test Firm Registration Number: 359260
	The <i>Bundesnetzagentur</i> recognizes Intertek Deutschland GmbH as Conformity Assessment Body in the sector electromagnetic compatibility (EMC).
	The Intertek Deutschland EMC-Lab is listed at Industry Canada No. 8882A-1 (OATS) and 8882A-2 (3 m alternative test site)

Automotive

 Anerkennungsstelle Anerkannt unter KBA-P 00046-03	The Intertek Deutschland EMC-Lab is recognized as technical service of the Kraftfahrt-Bundesamt (KBA) Registration Number: KBA-P 00046-03
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SECTION 2

MEASUREMENT AND TEST SPECIFICATION

47 CFR Part 15, Subpart C, Intentional radiators, section 15.225 /
RSS-210, Issue 9 and RSS-GEN, Issue 4

Test methods in:

ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices

No additions, deviations or exclusions have been made from standards and accreditation.

The test results detailed in this report apply only to the VistaScan Nano Easy with the test setup described. Any modification such as a change, addition to or inclusion of another device into this product will require an additional evaluation.

The support equipment listed as part of the emission tests is required to properly exercise and test the device under test.

SECTION 3 GENERAL INFORMATION

Possible test case verdicts:

Test case does not apply to the test object: N/A (Not Applicable)

Test object does meet the requirement: P (Pass)

Test object does not meet the requirements: F (Fail)

Samples arrived: 2018-06-20

Testing: 2018-06-21 to 2018-07-25

Decimal separator: ☒ Point ☐ Comma

Environmental conditions during testing:

Temperature:	15 °C - 35 °C
Humidity:	20 % - 60 %
Atmospheric pressure:	900 mbar - 1000 mbar

If explicitly required by a basic standard the measured climatic conditions are documented in the corresponding test section.

Test sites:

Measurement Chamber	Type of chamber	IC Site filing #
ANECHOIC CHAMBER 1	Semi-anechoic 3 m	8882A-2

SECTION 4

SUMMARY OF TESTING

4.1 General annotation

The tests were performed in the order of the right column in the “Test Results – Overview” table.

4.2 Measurement uncertainty

For each test method, an uncertainty evaluation was carried out. The results of the evaluation can be provided upon request from Intertek Deutschland GmbH.

4.3 Identical types

Professional judgement:

All measurement results exclusively refer to the equipment type VistaScan Nano Easy which was tested.

The manufacturer/customer declared the following type(s) identical to the tested type:
ScanX Edge

The differences are according to the manufacturer/customer:

- shape of the top housing
- color of housing parts

4.4 Document History

REVISION	DATE	REPORT	CHANGES	AUTHOR
Initial release	2018-07-26	2232515KAU-012	Initial issue	UGR

SECTION 5

TEST RESULTS – OVERVIEW

EMISSION	VERDICT	DATE	NO
Conducted emission (150 kHz – 30 MHz)	P	2018-06-25	6
Field strength (13.110 MHz – 14.010 MHz)	P	2018-06-21	1
Radiated emissions (< 30 MHz)	P	2018-06-21	2
Radiated emissions (30 MHz - 1 GHz)	P	2018-06-21	3
Frequency Stability Test	P	2018-07-10 to 2018-07-12	5
Occupied bandwidth test	P	2018-07-10	4

SECTION 6

INFORMATION ABOUT THE EUT

6.1 Description of the EUT

☒ table-top EUT		☐ floor-standing EUT	
Dimensions:	Height:	Width:	Length:
Dimensions:	Height:	Width:	Length:
	23 cm	20 cm	15 cm
Software version:	1.0.0.2611		
Prototype or Product version: Prototype			
Description:			
VistaScan Nano Easy is a dental image plate scanner. The scanning of the image plate is performed with a 635 nm laser. The image signal is measured with an optical sensor and digitalized. The data is transferred to a PC via network connection. Before the image plate is ejected, the remaining image data is deleted via LEDs.			
The device included a 13.56 MHz RFID reader			
Transmitter frequency range: 13.56 MHz			
Frequency agile or hopping:	☐ Yes	☒ No	
Antenna:	☒ Internal antenna	☐ External antenna	
Antenna connector:	☒ None, internal antenna	☐ Yes, type	
EUT - Temperature range:	0°C to +35°C		
Transmitter stand by mode supported:	☒ Yes	☐ No	

6.1.1 Photo/ Sketch of the rating plate

EUT:



AC-Adaptor:



6.2 Power interface

MODE	VOLTAGE (V)	FREQUENCY (Hz)	COMMENT
1	120	60	4 quadrant amplifier

Power sources/associated test equipment

DEVICE	MANUFACTURER	TYPE	SN	ASSET NO.
4 quadrant amplifier	Spitzenberger & Spies	PAS 5000	826149/005	PM KF 2555

6.3 Configuration mode

MODE	DESCRIPTION
1	EUT powered by power supply 1 AC-adapter: TEchnology ATM012T-W240V EUT connected via Ethernet to Notebook
2	EUT powered by power supply 1 AC-adapter: UES12LCP-240050SPA EUT connected via Ethernet to Notebook

6.4 Operation mode

MODE	DESCRIPTION
1	Standby mode, RFID transmitter off
2	Standby mode, RFID transmitter on

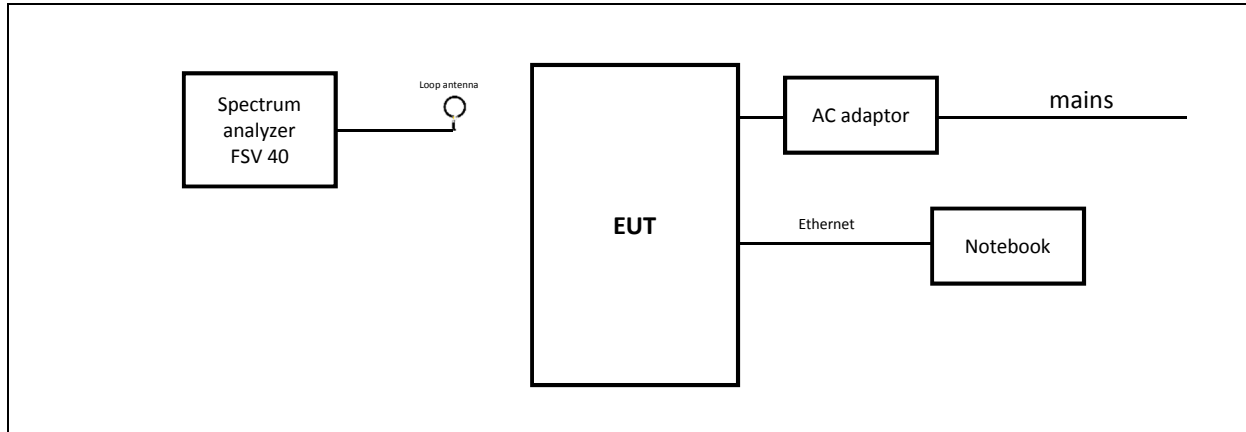
6.5 Peripheral devices used for testing

PRODUCT TYPE	MANUFACTURER/MODEL
Notebook	Lenovo / E540
Magnet loop antenna	R&S / HZ-10
Spectrum analyzer	R&S / FSV 40

6.6 Supply and interconnecting cables used for testing

LINE	LENGTH (cm)	SHIELDING
Mains	150	N
Ethernet	various	Y

6.7 Block diagram of the test setup



SECTION 7

7.1 Conducted emissions

NORMATIVE REFERENCES		RESULT
Limits according to Product Standard:	FCC §15.207 RSS-Gen 6.13, 8.8	P
Methods of measurement according to:	ANSI C63.10, section 6.2 RSS-Gen 6.13, 8.8	
Equipment mode	Power interface	1
	EUT configuration mode	1 and 2
	Operation mode	2
	Artificial hand applied?	---
	Position of artificial hand	---
Test requirements	Frequency range	150 kHz - 30 MHz

Test equipment

DESCRIPTION	MANUFACTURER	TYPE	SN	ASSET NO.	CALIBRATION
Shielded cabin	ETS LINDGREN	RFSD 100	3598	PM KF 2955-2	-
Pulse Limiter 10 dB 9 kHz - 200 MHz	Schwarzbeck	VTSD 9561-F N	9561-F N242	PM KF 3059	2018-02 (1 year)
Receiver 10 Hz - 7 GHz	Rohde & Schwarz	ESR7	101095	PM KF 2441	2017-10 (1 year)
V-Artificial mains- network, 2 Line	Rohde & Schwarz	ESH3-Z5	863367/018	PM KF 0142	2017-10 (2 years)
Test software	Rohde & Schwarz	EMC 32 V.8.54	-	PM KF 2983	-

Comment

In the following diagram the N and L line are merged.

Measurement results

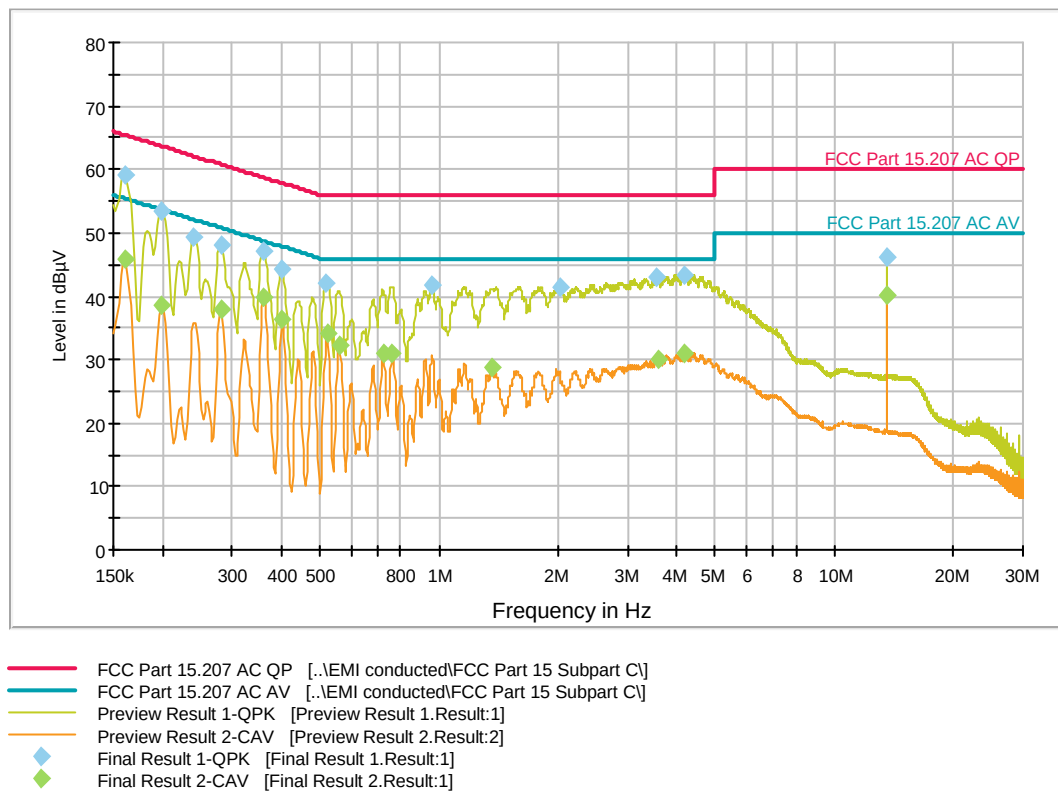
Conducted emissions AC port, AC adaptor: TEchnology ATM012T-W240V

Intertek Test Report

Common Information

EUT:	VistaScan Nano Easy, power supply "Adapter TEchnology ATM012T-W240V"
Project No.:	32515
Test description:	Conducted Emissions
Test standard:	FCC Part 15.207
Tested port:	Mains
Test verdict:	Passed
Operating conditions:	120 V, 60 Hz / RFID transmitter on / EUT standby
Operator name:	UGR
Date of testing:	2018-07-25

EN-CE-R32-LN01



Final Result 1

Frequency (MHz)	QuasiPeak-ClearWrite (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.161250	59.3	GN	L1	10.2	6.1	65.4	
0.199500	53.5	GN	L1	10.1	10.1	63.6	
0.240000	49.4	GN	L1	10.2	12.7	62.1	
0.280500	48.1	GN	L1	10.2	12.7	60.8	
0.359250	47.1	GN	L1	10.2	11.6	58.7	
0.402000	44.1	GN	L1	10.2	13.7	57.8	
0.519000	42.1	GN	L1	10.2	13.9	56.0	
0.957750	41.7	GN	L1	10.2	14.3	56.0	
2.015250	41.5	GN	L1	10.3	14.5	56.0	
3.543000	43.0	GN	L1	10.3	13.0	56.0	
4.177500	43.5	GN	L1	10.3	12.5	56.0	
13.560000	46.1	GN	L1	10.9	13.9	60.0	

Final Result 2

Frequency (MHz)	CAverage-ClearWrite (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.161250	45.7	GN	L1	10.2	9.6	55.4	
0.199500	38.6	GN	L1	10.1	15.0	53.6	
0.280500	38.0	GN	L1	10.2	12.8	50.8	
0.361500	39.9	GN	L1	10.2	8.8	48.7	
0.402000	36.3	GN	L1	10.2	11.5	47.8	
0.521250	34.3	GN	L1	10.2	11.7	46.0	
0.559500	32.2	GN	L1	10.2	13.8	46.0	
0.721500	31.0	GN	L1	10.2	15.0	46.0	
0.762000	31.0	GN	L1	10.2	15.0	46.0	
1.362750	28.8	GN	L1	10.2	17.2	46.0	
3.574500	30.1	GN	L1	10.3	15.9	46.0	
4.188750	31.0	GN	L1	10.3	15.0	46.0	
13.560000	40.2	GN	L1	10.9	9.8	50.0	

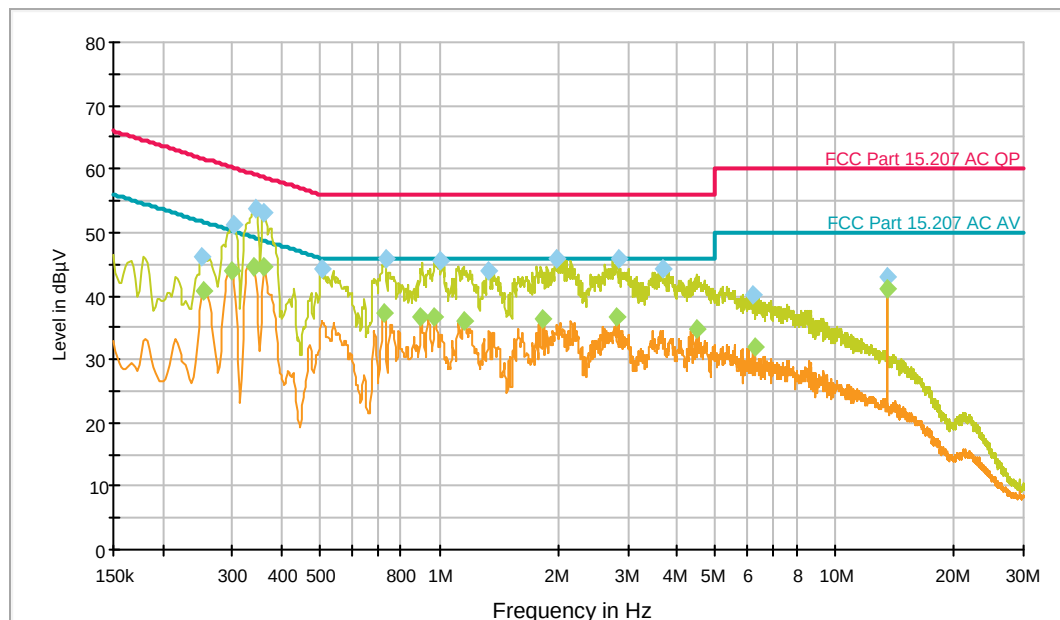
Conducted emissions AC port, AC adaptor: UES12LCP-240050SPA

Intertek Test Report

Common Information

EUT:	VistaScan Nano Easy, power supply "UES12LCP-240050SPA"
Project No.:	32515
Test description:	Conducted Emissions
Test standard:	FCC Part 15.207
Tested port:	Mains
Test verdict:	Passed
Operating conditions:	120 V, 60 Hz / RFID transmitter on / EUT standby
Operator name:	UGR
Date of testing:	2018-07-25

EN-CE-R32-LN01



—	FCC Part 15.207 AC QP	[..\EMI conducted\FCC Part 15 Subpart C]
—	FCC Part 15.207 AC AV	[..\EMI conducted\FCC Part 15 Subpart C]
—	Preview Result 1-QPK	[Preview Result 1.Result:1]
—	Preview Result 2-CAV	[Preview Result 2.Result:2]
◆	Final Result 1-QPK	[Final Result 1.Result:1]
◆	Final Result 2-CAV	[Final Result 2.Result:1]

Final Result 1

Frequency (MHz)	QuasiPeak-ClearWrite (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.251250	46.3	GN	N	10.2	15.4	61.7	
0.300750	51.4	GN	N	10.2	8.8	60.2	
0.343500	53.7	GN	L1	10.2	5.5	59.1	
0.359250	53.1	GN	N	10.2	5.7	58.7	
0.503250	44.4	GN	N	10.2	11.6	56.0	
0.732750	45.8	GN	L1	10.2	10.2	56.0	
1.000500	45.5	GN	L1	10.2	10.5	56.0	
1.335750	44.0	GN	N	10.2	12.0	56.0	
1.983750	45.9	GN	L1	10.3	10.1	56.0	
2.847750	46.0	GN	L1	10.3	10.0	56.0	
3.666750	44.2	GN	L1	10.3	11.8	56.0	
6.222750	40.2	GN	L1	10.4	19.8	60.0	
13.560000	43.1	GN	L1	10.9	16.9	60.0	

Final Result 2

Frequency (MHz)	CAverage-ClearWrite (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)	Comment
0.253500	40.8	GN	N	10.2	10.8	51.6	
0.298500	43.9	GN	N	10.2	6.4	50.3	
0.339000	44.7	GN	L1	10.2	4.5	49.2	
0.361500	44.6	GN	N	10.2	4.0	48.7	
0.721500	37.2	GN	L1	10.2	8.8	46.0	
0.899250	36.7	GN	L1	10.2	9.3	46.0	
0.975750	36.8	GN	L1	10.2	9.2	46.0	
1.151250	36.1	GN	L1	10.2	9.9	46.0	
1.830750	36.4	GN	L1	10.2	9.6	46.0	
2.802750	36.6	GN	L1	10.3	9.4	46.0	
4.494750	34.7	GN	L1	10.4	11.3	46.0	
6.258750	31.8	GN	L1	10.5	18.2	50.0	
13.560000	41.2	GN	L1	10.9	8.8	50.0	

7.2 Field strength 13.110 MHz – 14.010 MHz (Emission Mask)

NORMATIVE REFERENCES			RESULT
Limits according to:	FCC §15.225 (a) – (c) RSS-210, Issue 9, section B4		P
Methods of measurement according to:	ANSI C63.10, section 6.3, 6.4 RSS-Gen 6.13, 8.9		
Equipment mode	Power interface	1	
	EUT configuration mode	1	
	Operation mode	2	
Test requirements	Frequency range	13.110 MHz – 14.010 MHz	
	Measurement time	1000 ms	
	Antenna height	1 m	

Limits

The limits below 30 MHz are given for different measurement distances. The limits below 30 MHz are converted to 3 m by using the extrapolation factor 40 dB/decade (according to §15.31).

Frequency (MHz)	Field strength (μV/m)	Field strength (dBμV/m)	Measurement distance (m)	Field strength (dBμV/m)	Measurement distance (m)
13.110 - 13.410	106	40.5	30	80.5	3
13.410 - 13.553	334	50.5	30	90.5	3
13.553 - 13.567	15848	84.0	30	124.0	3
13.567 - 13.710	334	50.5	30	90.5	3
13.710 - 14.010	106	40.5	30	80.5	3

Test setup details

Compliance with the spectrum mask is tested using a spectrum analyzer with resolution bandwidth set to 10 kHz or 9 kHz CISPR. The video bandwidth shall be at least three times greater than the resolution bandwidth.

The test was carried out automatically by the test receiver.

The EUT is a table-top EUT and was standing on a table made of Styrodur with a Pertinax plate on top and the dimensions 1.6 m x 1.0 m x 0.8 m (Length x Width x Height).

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector.

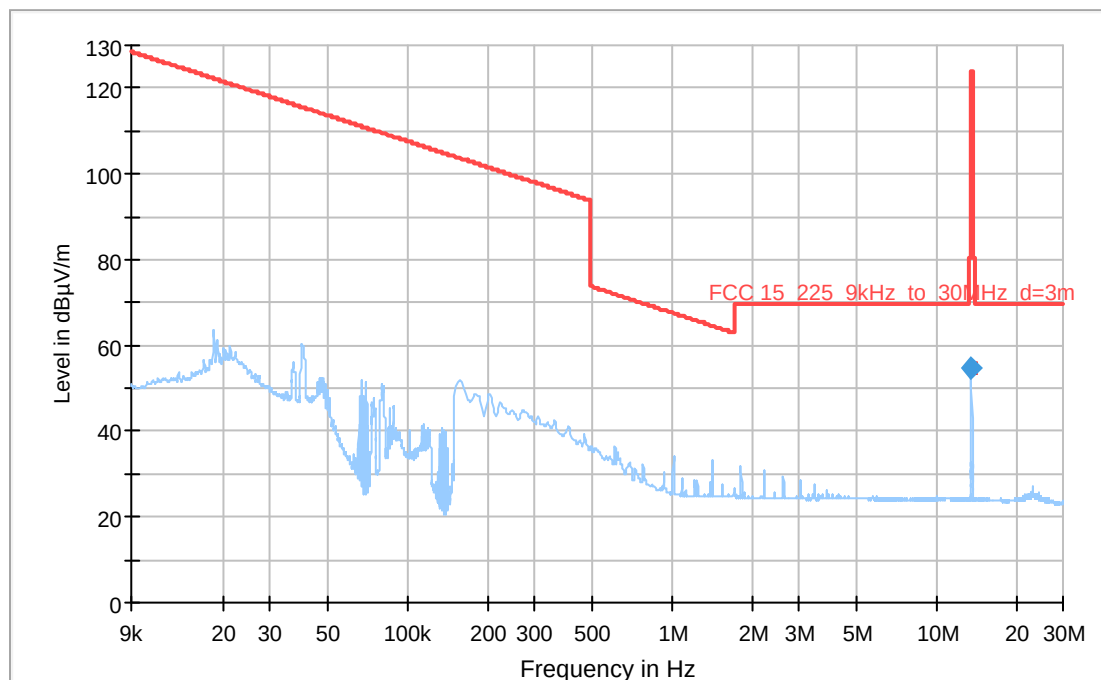
Test equipment

DESCRIPTION	MANUFACTURER	TYPE	SN	ASSET NO.	CALIBRATION
Semi-Anechoic chamber	Siepel	REF W460SLB	-	PM KF 1150-01	2016-12 (3 years)
Turntable	Inn-Co	-	-	PM KF 2949-04	-
Receiver 10 Hz - 7 GHz	Rohde & Schwarz	ESR7	101095	PM KF 2441	2017-10 (1 year)
Loop antenna 9 kHz- 30 MHz	Rohde & Schwarz	HFH2-Z2	881058/48	PM KF 1401	2017-10 (2 years)
Test software	Rohde & Schwarz	EMC 32 V.10.01.00	-	PM KF 2983-2	-

Radiated Emissions Test Report

Common Information

EUT:	VistaScan Nano Easy
Test Verdict:	Passed
Test Description:	Radiated emissions FCC Part 15C, 9 kHz to 30 MHz, TX
Operating Conditions:	RFID transmitter on
Operator Name:	UGR
Project Number:	32515
Date:	09.07.2018
Comment:	



Preview Result 1-QPK [Preview Result 1.Result:1]
 * Critical_Freqs AVG [Critical_Freqs.Result:5]
 * Critical_Freqs QPK [Critical_Freqs.Result:4]
 FCC 15_225_9kHz_to_30MHz_d=3m [.\zF radiated\FCC Part 15C]
 ◆ Final_Result QPK [Final_Result.Result:4]
 ◆ Final_Result AVG [Final_Result.Result:5]

Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Azimuth (deg)	Corr. (dB)
13.560000	54.87	---	124.00	69.13	1000	9	H	352.0	19.7

(continuation of the "Final_Result" table from column 15 ...)

Frequency (MHz)	Comment
13.560000	Peak: 55,8 dBµV/m

7.3 Radiated emissions < 30 MHz

NORMATIVE REFERENCES			RESULT
Limits according to:	FCC §15.225 (d), §15.209 RSS-210, Issue 9, section B4		P
Methods of measurement according to:	ANSI C63.10, section 6.3, 6.4 RSS-Gen 6.13, 8.9		
Equipment mode	Power interface	1	
	EUT configuration mode	1	
	Operation mode	2 and 1	
Test requirements	Frequency range	9 kHz - 30 MHz	
	Antenna height	1 m	

Limits

The limits below 30 MHz are given for different measurement distances. The limits below 30 MHz are converted to 3 m by using the extrapolation factor 40 dB/decade (according to §15.31).

Frequency (MHz)	Field strength (μV/m)	Field strength (dBμV/m)	Measurement distance (m)
0.009 - 0.490	2400/F(kHz)	67.6 - 20 · log(F(kHz))	300
0.490 - 1.705	24000/F(kHz)	87.6 - 20 · log(F(kHz))	30
1.705 - 13.110	30	29.5	30
14.010 - 30.000	30	29.5	30
Additionally, the level of any unwanted emissions shall not exceed the level of the fundamental emission.			

Test setup details

Compliance with the spectrum mask is tested using a spectrum analyzer with resolution bandwidth set to 10 kHz or 9 kHz CISPR. The video bandwidth shall be at least three times greater than the resolution bandwidth.

The test was carried out automatically by the test receiver.

The EUT is a table-top EUT and was standing on a table made of Styrodur with a Pertinax plate on top and the dimensions 1.6 m x 1.0 m x 0.8 m (Length x Width x Height).

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.

Test equipment

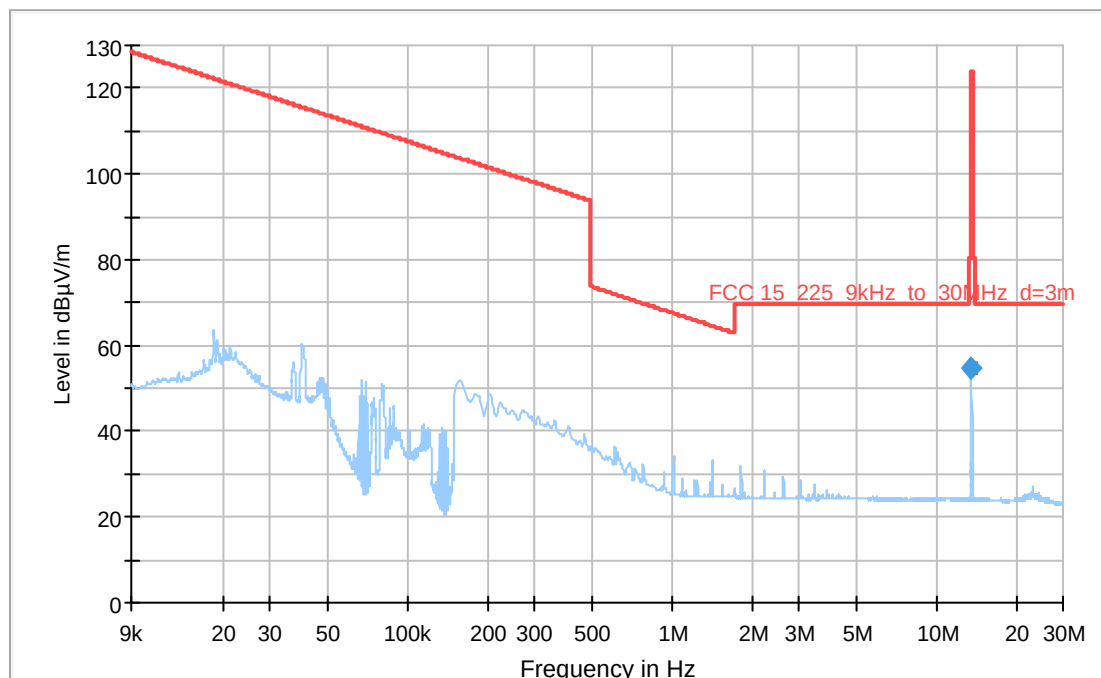
DESCRIPTION	MANUFACTURER	TYPE	SN	ASSET NO.	CALIBRATION
Semi-Anechoic chamber	Siepel	REF W460SLB	-	PM KF 1150-01	2016-12 (3 years)
Turntable	Inn-Co	-	-	PM KF 2949-04	-
Receiver 10 Hz - 7 GHz	Rohde & Schwarz	ESR7	101095	PM KF 2441	2017-10 (1 year)
Loop antenna 9 kHz- 30 MHz	Rohde & Schwarz	HFH2-Z2	881058/48	PM KF 1401	2017-10 (2 years)
Test software	Rohde & Schwarz	EMC 32 V.10.01.00	-	PM KF 2983-2	-

Measurement results – Radiated emissions < 30 MHz:

Radiated Emissions Test Report

Common Information

EUT:	VistaScan Nano Easy
Test Verdict:	Passed
Test Description:	Radiated emissions FCC Part 15C, 9 kHz to 30 MHz, TX
Operating Conditions:	RFID transmitter on
Operator Name:	UGR
Project Number:	32515
Date:	09.07.2018
Comment:	



Preview Result 1-QPK [Preview Result 1.Result:1]
 * Critical_Freqs AVG [Critical_Freqs.Result:5]
 * Critical_Freqs QPK [Critical_Freqs.Result:4]
 FCC 15_225_9kHz_to_30MHz_d=3m [.\zF radiated\FCC Part 15C]
 ◆ Final_Result QPK [Final_Result.Result:4]
 ◆ Final_Result AVG [Final_Result.Result:5]

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Azimuth (deg)	Corr. (dB)
13.560000	54.87	---	124.00	69.13	1000	9	H	352.0	19.7

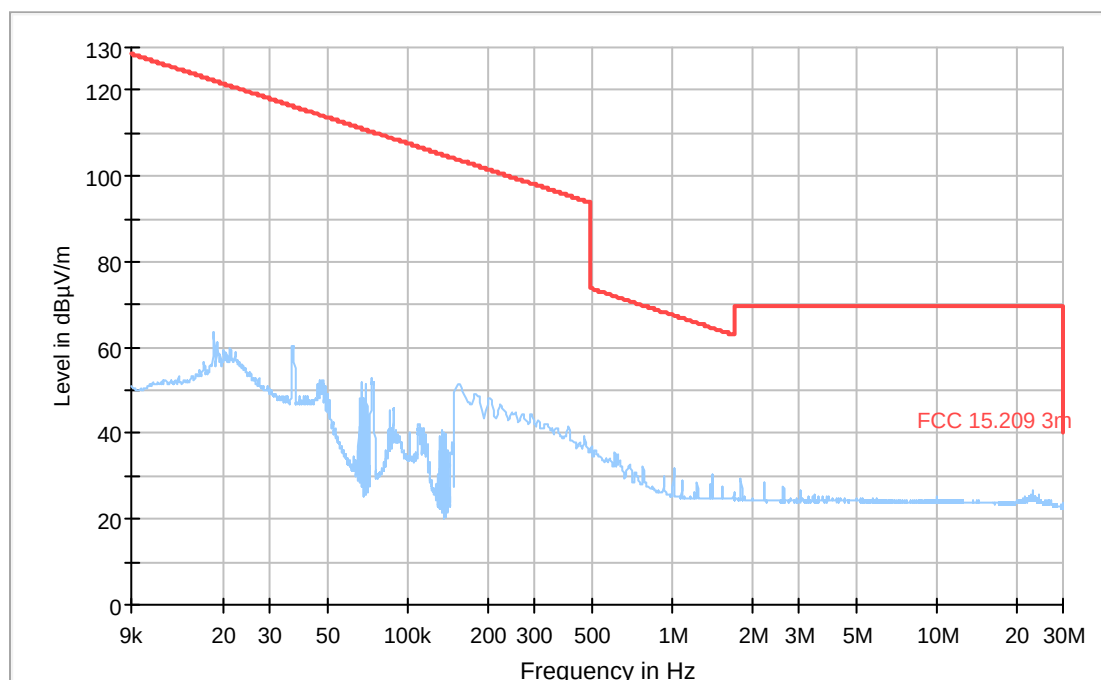
(continuation of the "Final_Result" table from column 15 ...)

Frequency (MHz)	Comment
13.560000	Peak: 55,8 dBµV/m

Radiated Emissions Test Report

Common Information

EUT:	VistaScan Nano Easy
Test Verdict:	Passed
Test Description:	Radiated emissions FCC Part 15C, 9 kHz to 30 MHz, Standby
Operating Conditions:	RFID transmitter off (standby)
Operator Name:	UGR
Project Number:	32515
Date:	09.07.2018
Comment:	



Preview Result 1-QPK [Preview Result 1.Result:1]
 * Critical_Freqs AVG [Critical_Freqs.Result:5]
 * Critical_Freqs QPK [Critical_Freqs.Result:4]
 — FCC 15.209 3m [..\zF radiated\FCC Part 15C\
 ◆ Final_Result QPK [Final_Result.Result:4]
 ◆ Final_Result AVG [Final_Result.Result:5]

7.4 Radiated emissions 30 MHz to 1 GHz

NORMATIVE REFERENCES			RESULT
Limits according to:	FCC §15.225 (d), §15.209 RSS-210, Issue 9, section B4		P*
Methods of measurement according to:	ANSI C63.10, section 6.3, 6.5 RSS-Gen 6.13, 8.9		
Equipment mode	Power interface	1	
	EUT configuration mode	1	
	Operation mode	2 and 1	
Test requirements	Frequency range	30 MHz – 1 GHz	
	Antenna height	1 m	

*Pass with modification explained in section 8

Limits

Frequency (MHz)	Field strength (μV/m)	Field strength (dBμV/m)	Measurement distance (m)
30 – 88	100	40.0	3
88 – 216	150	43.5	3
216 – 960	200	46.0	3
Above 960	500	54.0	3

Test setup details

The EUT is a table-top EUT and was standing on a table made of Styrodur with a Pertinax plate on top and the dimensions 1.6 m x 1.0 m x 0.8 m (Length x Width x Height).

Overview sweeps performed with peak detectors and final measurement with quasi-peak detectors.

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector.

Test equipment

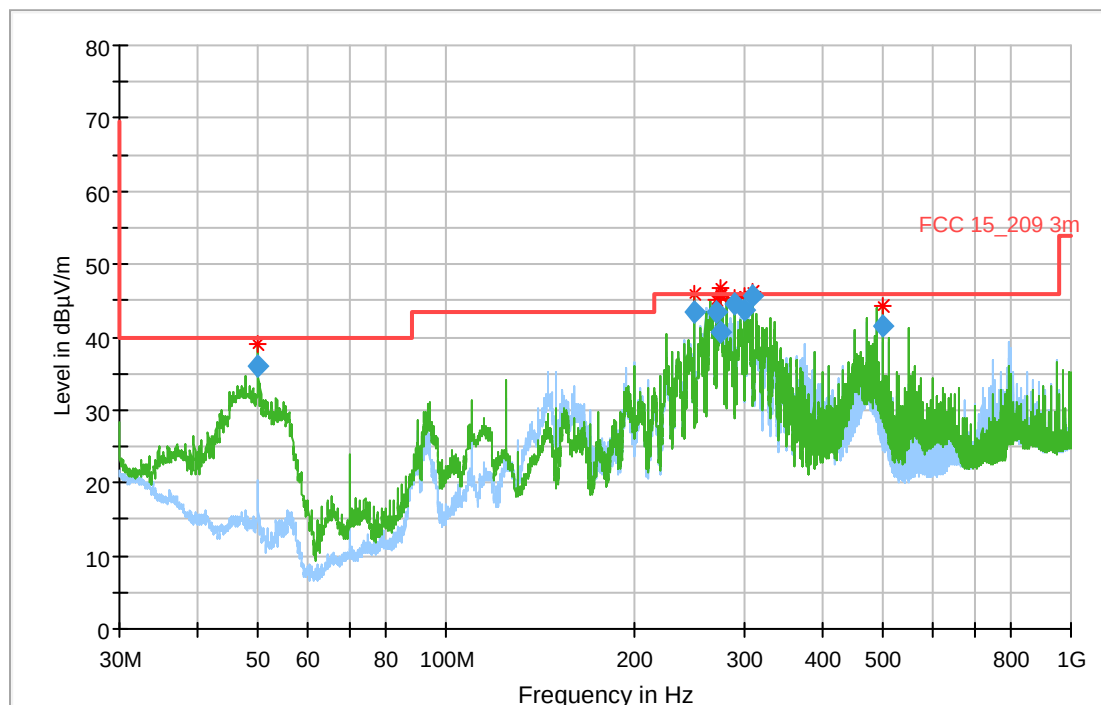
DESCRIPTION	MANUFACTURER	TYPE	SN	ASSET NO.	CALIBRATION
Semi-Anechoic chamber	Siepel	REF W460SLB	-	PM KF 1150-01	2016-12 (3 years)
Turntable	Inn-Co	-	-	PM KF 2949-04	-
Receiver 10 Hz - 7 GHz	Rohde & Schwarz	ESR7	101095	PM KF 2441	2017-10 (1 year)
Antenna 30 MHz - 3GHz	Rohde & Schwarz	HL 562	100354	PM KF 1123	2018-03 (2 years)
Test software	Rohde & Schwarz	EMC 32 V.10.01.00	-	PM KF 2983-2	-

Measurement results – Radiated emissions 30 MHz to 1 GHz:

Radiated Emissions Test Report

Common Information

EUT: VistaScan Nano Easy
Test Verdict: pass
Test Description: Spurious emission radiated
Operating Conditions: RFID transmitter on
Operator Name: UGR
Project Number: 32515
Date: 2018-06-21
Comment: AC power supply ATM012T-W240



— Preview Result 1H-PK+ [Preview Result 1H.Result:2]
— Preview Result 1V-PK+ [Preview Result 1V.Result:2]
* Critical_Freqs PK+ [Critical_Freqs.Result:4]
— FCC 15_209 3m [..\EMI radiated\FCC Part 15C\]
◆ Final_Result QPK [Final_Result.Result:4]

All final results are emissions of the basic unit and not of the RFID module and are to be evaluated according to FCC §15.109

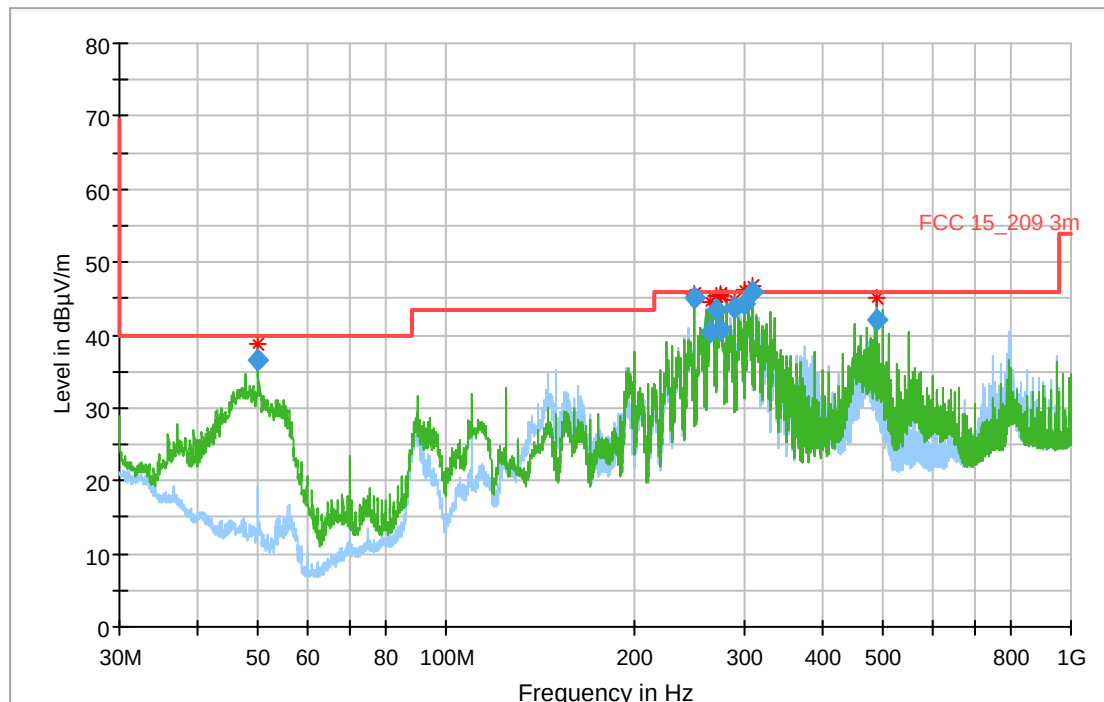
Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
50.010000	36.15	40.00	3.85	1000.0	120.000	100.0	V	323.0	8.0
250.020000	43.38	46.02	2.64	1000.0	120.000	100.0	V	26.0	11.8
270.000000	43.50	46.02	2.52	1000.0	120.000	181.0	V	174.0	12.3
275.010000	40.72	46.02	5.30	1000.0	120.000	104.0	H	96.0	12.4
290.010000	44.62	46.02	1.40	1000.0	120.000	187.0	V	37.0	12.9
300.000000	43.79	46.02	2.23	1000.0	120.000	99.0	H	50.0	13.1
309.990000	45.60	46.02	0.42	1000.0	120.000	162.0	V	222.0	13.5
500.010000	41.45	46.02	4.57	1000.0	120.000	108.0	V	257.0	17.6

Radiated Emissions Test Report

Common Information

EUT: VistaScan Nano Easy
Test Verdict: pass
Test Description: Spurious emission radiated
Operating Conditions: RFID transmitter off (standby)
Operator Name: UGR
Project Number: 32515
Date: 2018-06-21
Comment: AC power supply ATM012T-W240



— Preview Result 1H-PK+ [Preview Result 1H.Result:2]
— Preview Result 1V-PK+ [Preview Result 1V.Result:2]
* Critical_Freqs PK+ [Critical_Freqs.Result:4]
— FCC 15_209 3m [.\EMI radiated\FCC Part 15C\
◆ Final_Result QPK [Final_Result.Result:4]

All final results are emissions of the basic unit and not of the RFID module and are to be evaluated according to FCC §15.109.

Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
50.010000	36.52	40.00	3.48	1000.0	120.000	99.0	V	345.0	8.0
250.020000	45.09	46.02	0.93	1000.0	120.000	99.0	V	21.0	11.8
265.590000	40.37	46.02	5.65	1000.0	120.000	117.0	H	335.0	12.1
270.000000	43.54	46.02	2.48	1000.0	120.000	160.0	V	183.0	12.3
275.010000	40.67	46.02	5.35	1000.0	120.000	104.0	H	101.0	12.4
290.010000	43.71	46.02	2.31	1000.0	120.000	165.0	V	143.0	12.9
300.000000	44.23	46.02	1.79	1000.0	120.000	121.0	H	52.0	13.1
309.990000	46.02	46.02	0.00	1000.0	120.000	159.0	V	226.0	13.5
489.990000	42.11	46.02	3.91	1000.0	120.000	104.0	V	269.0	17.5

7.5 Frequency stability measurement

NORMATIVE REFERENCES			RESULT
Limits according to:	FCC §15.225 (e) RSS-210, Issue 9, section B6 RSS-Gen Issue 4, section 6.11		P
Methods of measurement according to:	ANSI C63.10, section 9.14		
Equipment mode	Power interface	1	
	EUT configuration mode	1	
	Operation mode	1	

Limits

Limit:	The frequency tolerance of the carrier signal shall be maintained within $\pm 0.01\%$ (± 100 ppm) of the carrier frequency under nominal conditions.
EUT temperature range:	0°C to +35°C
Test temperature range:	-30°C to +55°C

Test equipment

DESCRIPTION	MANUFACTURER	TYPE	SN	ASSET NO.	CALIBRATION
Temperature chamber	Heraeus-Vötsch	HT4010	45021	PM KF 1402	2018-02 (1 year)
Spectrum analyser	Rohde & Schwarz	FSV40	837356/012	PM KF 2783	2017-09 (1 year)
Near field probes	EMCO	EMCO 7405	1405	PM KF 0139	2017-12 (1 year)

Measurement results – Frequency stability measurement:

Temperature °C	Carrier MHz	Upper limit:	13,561356 MHz
		Lower limit:	13,558644 MHz
		Measured value under temperature influence:	
+55	13.560	13.56048	
+50	13.560	13.56046	
+40	13.560	13.56044	
+30	13.560	13.56043	
+20	13.560	13.56046	
+10	13.560	13.56051	
0	13.560	13.56054	
-10	13.560	13.56059	
-20	13.560	13.56059	
-30	13.560	13.56060	

Comment

The variation of the AC voltage from 100 to 240 V at a temperature of 20°C had no influence on the frequency of the carrier.

7.6 Occupied bandwidth

NORMATIVE REFERENCES			RESULT
Limits according to:	RSS-Gen, Issue 4, 6.6		P
Methods of measurement according to:	RSS-Gen, Issue 4, 6.6		
Equipment mode	Power interface	1	
	EUT configuration mode	1	
	Operation mode	1	

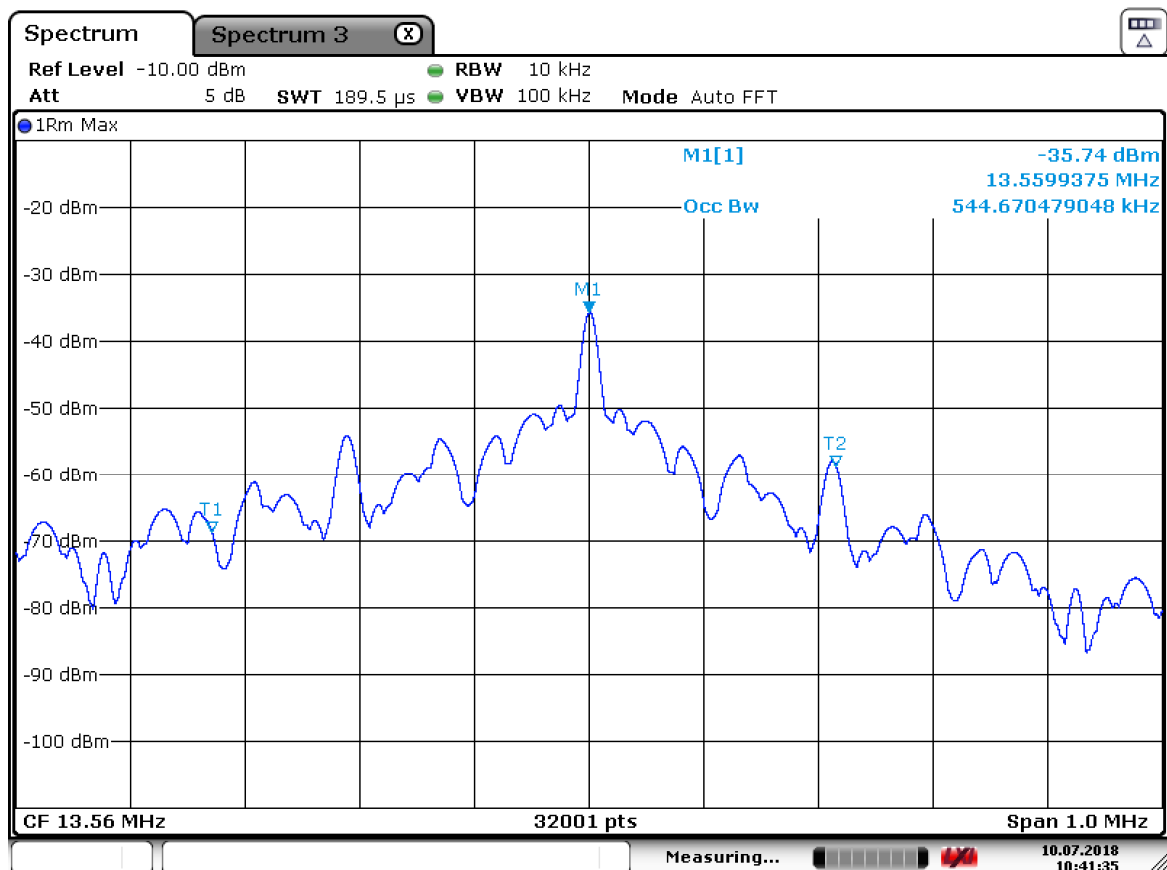
Test equipment

DESCRIPTION	MANUFACTURER	TYPE	SN	ASSET NO.	CALIBRATION
Spectrum analyser	Rohde & Schwarz	FSV40	837356/012	PM KF 2783	2017-09 (1 year)
Near field probes	EMCO	EMCO 7405	1405	PM KF 0139	2017-12 (1 year)

Comment

The 99% occupied bandwidth is 544.67 kHz.

Measurement results – 99% occupied bandwidth:



Date: 10.JUL.2018 10:41:35

SECTION 8

MEASUREMENT UNCERTAINTY EVALUATION

Measurement uncertainty for radiated magnetic field, 9 kHz – 30 MHz	± 3.2 dB
Measurement uncertainty for radiated emission, 30 MHz - 1000 MHz	
Uncertainty for the frequency range 30 to 300 MHz using a biconical or a combination antenna at 3 m	± 4.9 dB
Uncertainty for the frequency range 300 to 1000 MHz using a logperiodic or a combination antenna at 3 m	± 4.7 dB
Measurement uncertainty for radiated emission 1 to 26 GHz	
Uncertainty for the frequency range 1 to 18 GHz	± 6.1 dB
Uncertainty for the frequency range 18 to 26,5 GHz	± 6.5 dB
Measurement uncertainty for conducted disturbances at the antenna port on radio equipment	
Frequency range 9 kHz - 1 GHz	± 1.9 dB
Frequency range 1 GHz - 18 GHz	± 3.0 dB
Frequency range 18 GHz -26,5 GHz	± 3.6 dB
Measurement uncertainty for Frequency error	± 1 x 10 ⁻⁸
Measurement uncertainty for Output power (Conducted), 9 kHz - 18 GHz	± 1.0 dB
Measurement uncertainty for RF Power density	
Frequency range 9 kHz - 1 GHz	± 1.9 dB
Frequency range 1 GHz - 18 GHz	± 3.0 dB
Frequency range 18 GHz -26,5 GHz	± 3.6 dB
Measurement uncertainty for humidity	± 4 %
Measurement uncertainty for temperature	± 0.5 °C
Measurement uncertainty for voltage	
DC	± 0.1 %
AC up to 10 kHz	± 1.8 %
Measurement uncertainty for time	± 0.058 %
Measurement uncertainty for conducted emissions, LISN, 150 kHz -30 MHz	± 2.3 dB
Measurement uncertainty for OBW	± 4.3 %
601 points resolution (Spectrum analyzer)	± 0.83 %
30000 points resolution (Spectrum analyzer)	± 0.016 %

End of test report