Gantner Electronic GmbH

TEST REPORT

SCOPE OF WORK

RADIO TESTING – RFID TERMINAL [GT7.3700]

REPORT NUMBER
2241159KAU-003

ISSUE DATE

03-September-2021

PAGES
28

DOCUMENT CONTROL NUMBER
R_FCC 15-225_18-01 (25-January-2018)

TYPE:	GT7.3700
DESCRIPTION:	RFID Terminal
SERIAL NO (EUT 1):	**2040000084**
SERIAL NO (EUT 2)*:	**2016000121**

*The antenna of the RFID module was replaced by a terminating resistor.
All measurement results refer to the equipment which was tested

MANUFACTURER:	Gantner Electronic GmbH
CUSTOMER NAME:	Gantner Electronic GmbH
ADDRESS (CUSTOMER):	Bundesstr. 12 AT-6714 Nüziders AUSTRIA
REPORT NO:	2241159KAU-003
TEST RESULT:	The equipment complies to 47 CFR Part 15, Subpart C, Intentional radiators, section 15.207 and 15.209 / RSS-210, Issue 10 and RSS-GEN, Issue 5 for 125 kHz RFID module (Referring to the operating modes specified in this report). The 13.56 MHz RFID module was documented in another test report.
TEST LABORATORY:	Intertek Deutschland GmbH Innovapark 20, 87600 Kaufbeuren Germany
FCC DESIGNATION NUMBER:	DE0014
FCC TEST FIRM REGISTRATION NUMBER:	359260
ISED CAB IDENTIFIER:	DE0014
ISED #:	24854
TEST ENGINEER:	M. Bensaid Project Engineer
REVIEWER:	R. Dressler Technical Manager EMC/ Radio

Details about Accreditations/Acceptances

EMC / Radio National

DAkkS Deutsche Akkreditierungsstelle D-PL-12085-01-01	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** Registration Number (EMC Canada): **D-PL-12085-01-04** Registration Number (EMC FCC): **D-PL-12085-01-05**

International

IECEE CB SCHEME	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**
FCC Federal Communications Commission	The Intertek Deutschland EMC-Lab is listed at the Federal Communications Commission (FCC) Designation Number: **DE0014** Test Firm Registration Number: **359260**
Bundesnetzagentur BNetzA-CAB-16/21-10	The *Bundesnetzagentur* recognizes Intertek Deutschland GmbH as Conformity Assessment Body in the sector electromagnetic compatibility (EMC).
Innovation, Science and Economic Development Canada	The Intertek Deutschland EMC-Lab is accredited for Innovation, Science and Economic Development Canada (ISED) ISED CAB IDENTIFIER: **DE0014** ISED #: **24854**

Automotive

KBA 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**

SECTION 1
CONTENTS

SECTION 2
MEASUREMENT AND TEST SPECIFICATION

47 CFR Part 15, Subpart C, Intentional radiators, section 15.207 and section 15.209 / RSS-210, Issue 10 and RSS-GEN, Issue 5

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 GT7.3700 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:	2020-12-24 (EUT 1) and 2021-01-20 (EUT 2)	
Testing:	2020-12-30 to 2021-05-29	
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	24854

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.

At least at one emission test the margin to the limit is less than 6 dB. A minimum margin of 6 dB is recommended for a serial production.

As a wish of the manufacturer/customer the 125 kHz RFID module is only measured in one operating mode (send mode). Therefore the RFID module was not measured in standby mode.

In practice, the 13.56 MHz RFID module, the 125 kHz RFID module, the WLAN module and the Bluetooth module never transmit at the same time. The WLAN module is only for service purposes.

4.2 Identical types

The following variant models were not tested as part of this evaluation, but have been identified by the manufacturer as being electrically identical models to the model tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

The manufacturer/customer declared the following type(s) identical to the tested type:
GT7.3701
GT7.3700 Demo Kit

The differences are according to the manufacturer/customer:
The GT7.3701 is an GT7.3700 with a different housing. The housing materials are the same but in a slightly modified form.

The GT7.3700 Demo Kit is a GT7.3700 mounted on an Acrylic glass holder for presentation purposes.
GT7.3700 Demo Kit

4.3 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 (see section 7.7).

4.4 Document History

REVISION	DATE	REPORT	CHANGES	AUTHOR
Initial release	2021-09-03	2241159KAU-003	Initial issue	MBE

SECTION 5
TEST RESULTS – OVERVIEW

EMISSION	VERDICT	DATE	NO
Conducted emissions (0.15 MHz - 30 MHz)	P	2021-01-25 2021-05-29	3 4
Field strength and Radiated emissions (< 30 MHz)	P	2020-12-30	1
Occupied bandwidth test	P	2021-01-18	2

SECTION 6
INFORMATION ABOUT THE EUT

6.1 Description of the EUT

Device tested as:			
☒ table-top EUT		☐ floor-standing EUT	
Dimensions:	Height:	Width:	Length:
	127.1 mm	151.1 mm	24.7 mm
Firmware version:	Special Firmware for EMC Testing		
Hardware version:	4.1		
EUT version:	☒ Production	☐ Prototype	☐ Used
Description: The GT7.3700 is a Multi-functional RFID terminal with LEGIC advant, Proxy and iCLASS® Reader. It has a Color display with Touchscreen, Ethernet, PoE, 2 relay outputs, 1 status input, Wiegand, RS-232 and RS-485 interfaces. The EUT has a WLAN module, Bluetooth module, 13.56 MHz RFID module and 125 kHz RFID module.			

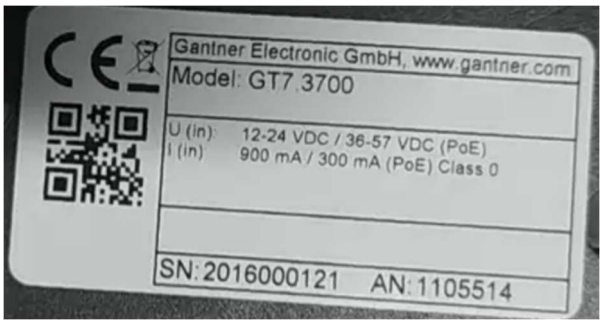
6.1.1 Technical data of the 125 kHz MHz-RFID module

Transmitter frequency range: 125 kHz

Frequency agile or hopping:	☐ Yes	☒ No
Antenna:	☒ Internal antenna	☐ External antenna
Antenna connector:	☒ None, internal antenna	☐ Yes, type
Antenna type:	Internal PCB antenna	
Antenna gain:	-	
Power rating:	-	
Channel spacing:	-	
Receiving only mode supported:	☐ Yes	☒ No

6.1.2 Photo of the rating plate and of the EUT

GT7.3700



6.2 Power interface

MODE	VOLTAGE (V)	FREQUENCY (Hz)	COMMENT
Rated	36-57	DC	PoE
1	120 V (AC) / 48 V (DC)	AC (60 Hz)/DC	PoE Injector

6.3 Peripheral devices used for testing

DEVICE	MANUFACTURER	TYPE	SN	FCC ID
PoE Injector	tP-link	TL-POE150S	22040D6006214	-
Power supply for PoE Injector	tP-link	T480050-2C1	-	-
Notebook	HP	HP ProBook 6560b	5CB20246BZ	QDS-BRCM 1043

6.4 Configuration mode

MODE	DESCRIPTION
1	The EUT was placed on the table and was connected to PoE Injector (see section 6.9). The Notebook was used for the setting of the RFID-modules.

6.5 Operation mode

MODE	DESCRIPTION
1	Normal operation and the 125 kHz RFID module of the EUT was in continuous wave mode. The 13.56 MHz RFID module, the WLAN module and the Bluetooth module were off. The RFID tag was placed in front of the EUT.
2	Normal operation. The antenna of the 125 kHz RFID module and the antenna of the 13.56 MHz RFID module were replaced by a terminating resistor. The WLAN module and the Bluetooth module were off.
3	Normal operation. The 125 kHz RFID module was in transmission mode and the RFID tag was placed in front of the EUT. The 13.56 MHz RFID module, the WLAN module and the Bluetooth module were off.

6.6 Clock frequencies of the EUT

SOURCE	FREQUENCY
Processor module ICNova A20	PII Main Processor: up to 1 GHz; 3 Crystals: 25 MHz, 24 MHz and 32 kHz
Camera module TD5640	8Bit RGB, 24 MHz Clock supply
RFID Reader 13.56 MHz	SPI @ 2 MHz
RFID Reader 125 kHz	UART 112 kbit
Co-Processor STM32L0	Crystal: 32 kHz
TFT Display	24Bit RGB, 9 MHz
Capacitive Touch Panel	I2C @ 400 kHz
BLE	2402 GHz – 2480 GHz
WLAN	2412 GHz – 2462 GHz

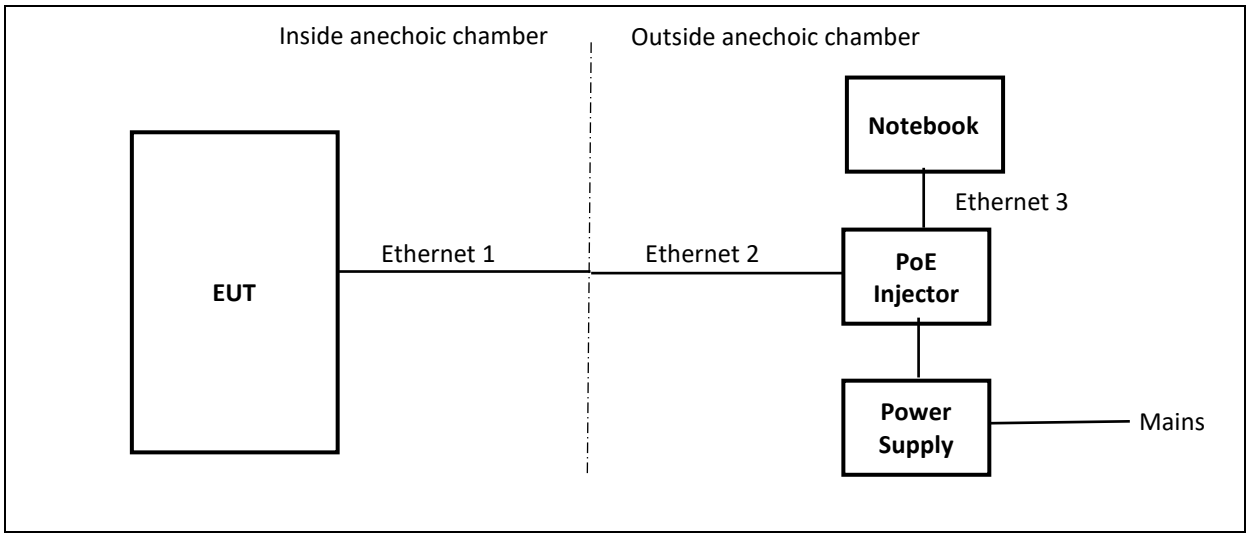
6.7 Supply and interconnecting cables used for testing

LINE	LENGTH (cm)	SHIELDING	FERRITE	TERMINATION
Ethernet 1	180	Y	N	-
Ethernet 2	100	Y	N	-
Ethernet 3	100	Y	N	-
Cable for power supply	160	N	N	-

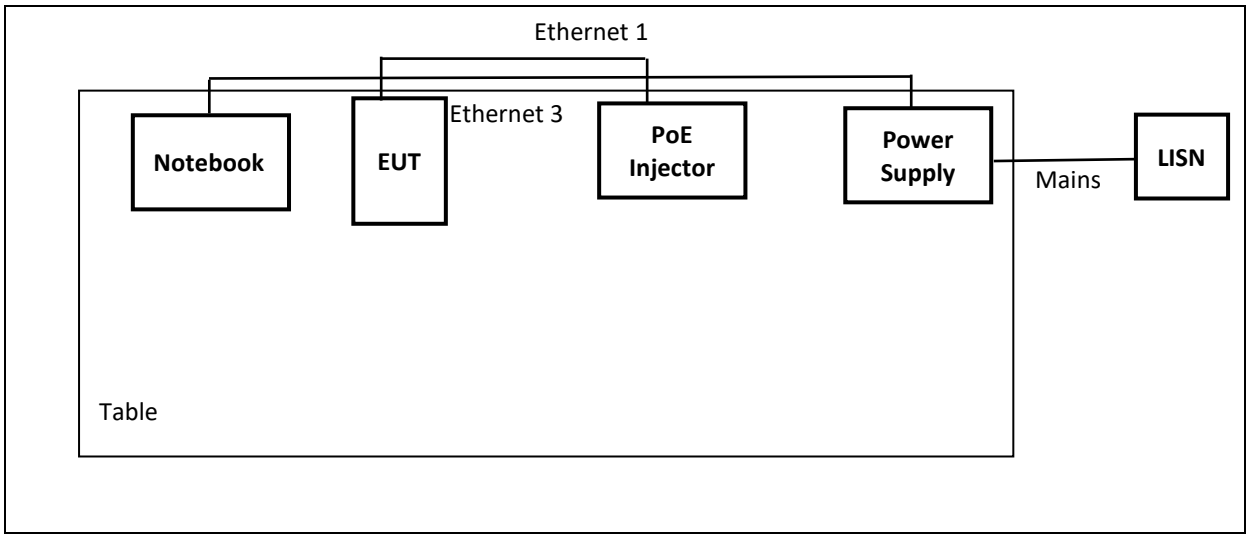
6.8 Antenna configuration

DESCRIPTION	
☐	Equipment with an external antenna connector
☒	Equipment without an external antenna connector (integral antenna)
☐	Equipment with more than one antenna

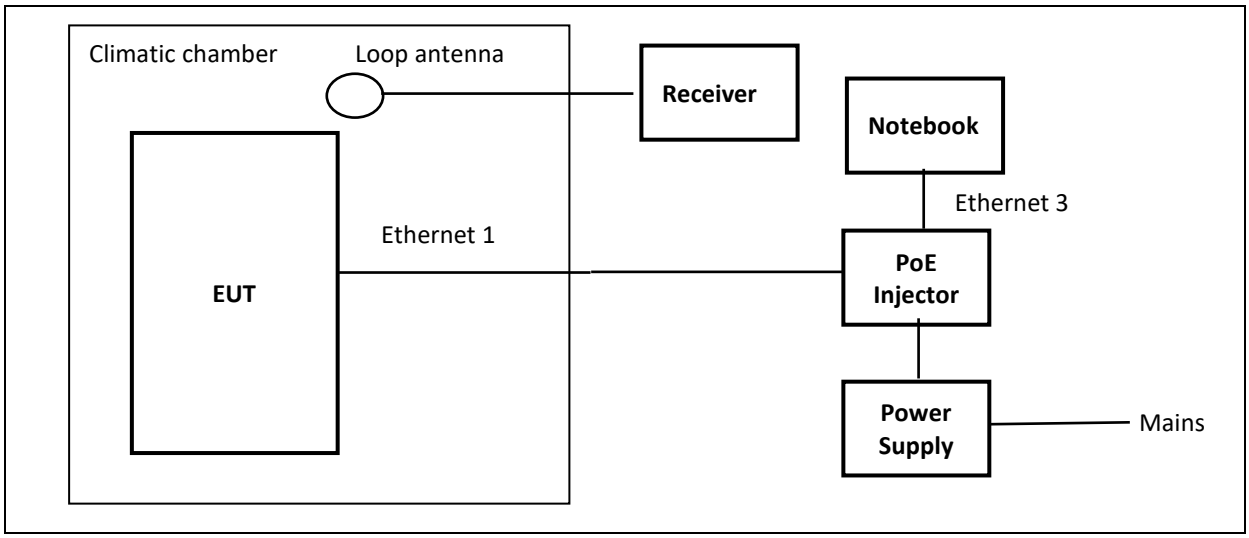
6.9 Block diagram of the test setup for radiated emissions



6.10 Block diagram of the test setup for conducted emissions



6.11 Block diagram of the test setup for Occupied bandwidth-test



SECTION 7

7.1 Conducted emissions

NORMATIVE REFERENCES			RESULT
Limits according to:	**FCC §15.207** **RSS-210, Issue 10**		**P**
Methods of measurement according to:	**ANSI C63.10** **RSS-Gen, Issue 5**		
Equipment mode	Power interface	1	
	EUT configuration mode	1	
	Operation mode	1 and 2	
Test requirements	Frequency range	150 kHz - 30 MHz	
	Class	A	

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	2020-12 (1 year)
Receiver 9 kHz - 7 GHz	Rohde & Schwarz	ESR7	101757	PM KF 3371	2020-04 (1 year) 2021-04 (1 year)
V-Artificial mains-network, 2 Line	Rohde & Schwarz	ESH3-Z5	863367/018	PM KF 0142	2019-10 (2 years)
Test software	Rohde & Schwarz	EMC 32 V.8.54	-	PM KF 2983	-

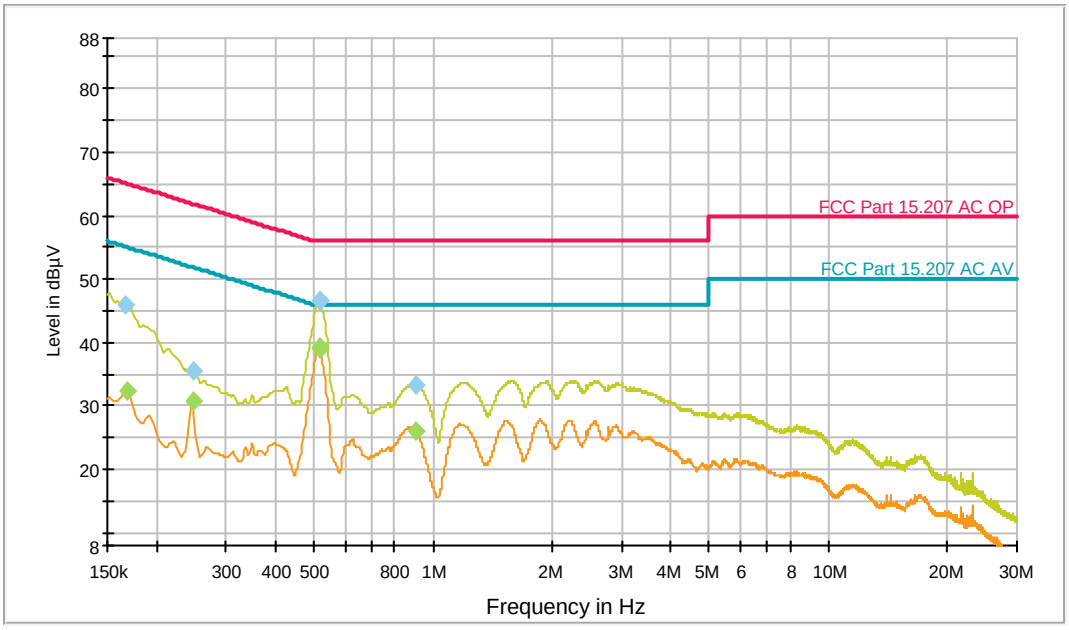
Comment
In the following diagram, the N and L line are merged.

Measurement results – Conducted emissions:

Common Information

EUT:	GT7.3700
Project No.:	41159
Test description:	Conducted Emissions
Test standard:	FCC 15 C
Tested port:	Mains
Test verdict:	Passed
Operating conditions:	Normal operation and the 125 kHz RFID module of the EUT was in continuous wave mode. The 13.56 MHz RFID module, the WLAN module and the Bluetooth module were off. The RFID tag was placed in front of the EUT.
Operator name:	MBE

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
0.165750	46.0	GND	N	10.2	19.1	65.2	
0.249000	35.6	GND	L1	10.2	26.2	61.8	
0.516750	46.7	GND	L1	10.2	9.3	56.0	
0.516750	46.7	GND	L1	10.2	9.3	56.0	
0.908250	33.4	GND	L1	10.2	22.6	56.0	

Final Result 2

Frequency (MHz)	CAverage-ClearWrite (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.168000	32.5	GND	N	10.2	22.6	55.1	
0.246750	30.7	GND	N	10.2	21.2	51.9	
0.514500	39.3	GND	L1	10.2	6.7	46.0	
0.519000	38.8	GND	L1	10.2	7.2	46.0	
0.908250	25.9	GND	L1	10.2	20.1	46.0	

EMI Auto Test Template: EN-CE-R32-LN01

Hardware Setup: EN-CE-R32-LN01
Measurement Type: 2 Line LISN
Frequency Range: 150 kHz - 30 MHz
Graphics Level Range: 0 dBµV - 80 dBµV

Preview Measurements:
Scan Test Template: EN-CE-R32-LN01_PRE

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	50 Hz	QPK; CAV	200 Hz	1 s	20 dB
150 kHz - 30 MHz	2.25 kHz	QPK; CAV	9 kHz	1 s	0 dB

Receiver: [ESR 7]

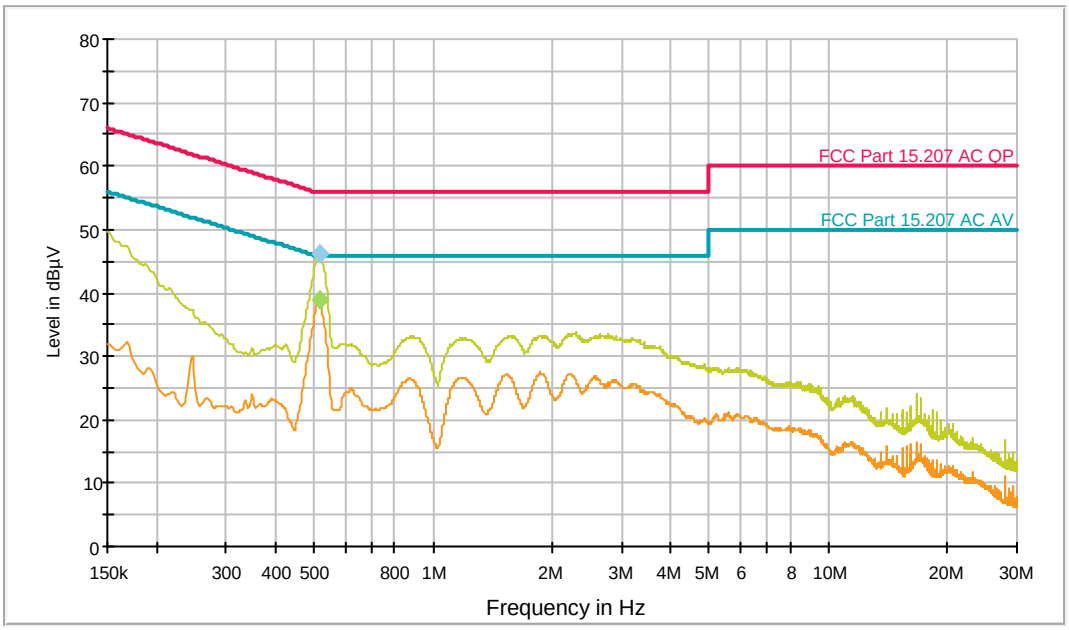
Data Reduction:
Limit Line #1: FCC Part 15.207 AC QP
Limit Line #2: FCC Part 15.207 AC AV
Peak Search: 6 dB , Maximum Results: 10
Subrange Maxima: 10 Subranges , Maxima per Subrange: 1
Acceptance Offset: -10 dB
Maximum Number of Results: 20
After Data Reduction: Interactive data reduction

Report Settings:
Report Template: Standard Report_EMC KF_Conducted Emission

Common Information

EUT:	GT7.3700
Project No.:	41159
Test description:	Conducted Emissions
Test standard:	FCC 15 C
Tested port:	Mains
Test verdict:	Passed
Operating conditions:	Normal operation. The antenna of the 125 kHz RFID module and the antenna of the 13.56 MHz RFID module were replaced by a terminating resistor.The Bluetooth module and the WLAN module were off.
Operator name:	MBE
Date of testing:	25.01.2021

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
0.516750	46.1	GND	N	10.2	9.9	56.0	

Final Result 2

Frequency (MHz)	CAverage-ClearWrite (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.514500	38.8	GND	N	10.2	7.2	46.0	

EMI Auto Test Template: EN-CE-R32-LN01

Hardware Setup: EN-CE-R32-LN01
Measurement Type: 2 Line LISN
Frequency Range: 150 kHz - 30 MHz
Graphics Level Range: 0 dBµV - 80 dBµV

Preview Measurements:
Scan Test Template: EN-CE-R32-LN01_PRE

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	50 Hz	QPK; CAV	200 Hz	1 s	20 dB
150 kHz - 30 MHz	2.25 kHz	QPK; CAV	9 kHz	1 s	0 dB

Receiver: [ESR 7]

Data Reduction:
Limit Line #1: FCC Part 15.207 AC QP
Limit Line #2: FCC Part 15.207 AC AV
Peak Search: 6 dB , Maximum Results: 10
Subrange Maxima: 10 Subranges , Maxima per Subrange: 1
Acceptance Offset: -10 dB
Maximum Number of Results: 20
After Data Reduction: Interactive data reduction

Report Settings:
Report Template: Standard Report_EMC KF_Conducted Emission

7.2 Field strength and Radiated emissions < 30 MHz

NORMATIVE REFERENCES			RESULT
Limits according to:	**FCC §15.209** **RSS-210, Issue 10**		**P**
Methods of measurement according to:	**ANSI C63.10** **RSS-Gen**		
Equipment mode	Power interface	1	
	EUT configuration mode	1	
	Operation mode	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.

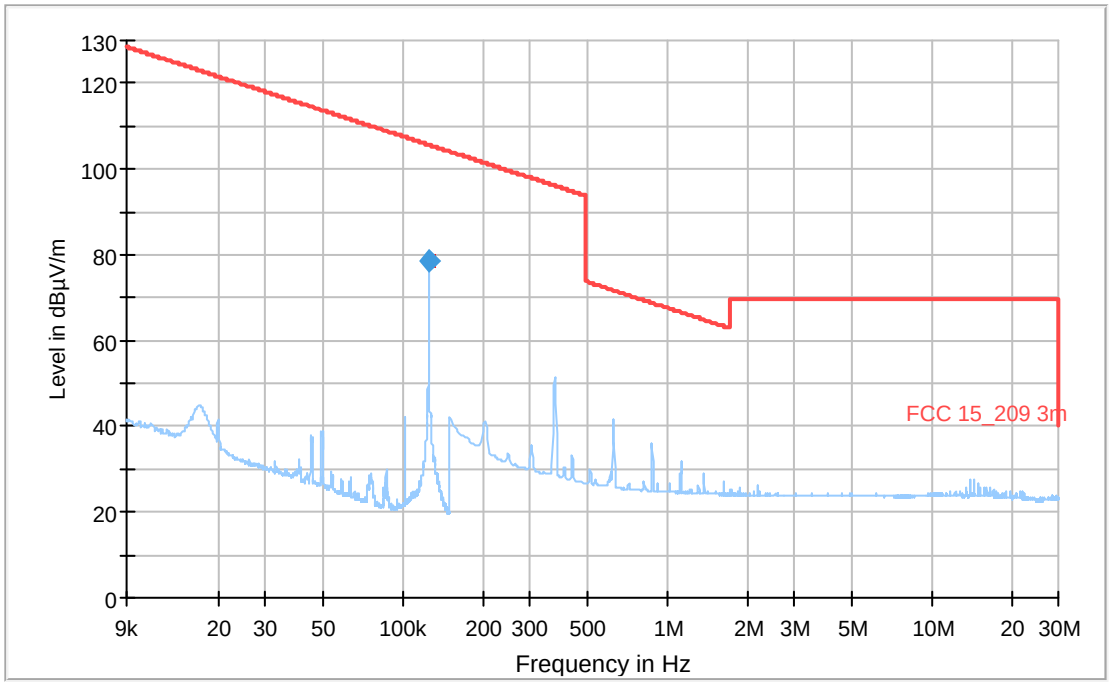
Test equipment

DESCRIPTION	MANUFACTURER	TYPE	SN	ASSET NO.	CALIBRATION
Semi-Anechoic chamber (30 – 1000 MHz)	Siepel	REF W460SLB	-	PM KF 1150-01	2019-12 (3 years)
Turntable	Inn-Co	-	-	PM KF 2949-04	-
Tower	Inn-Co	MA4484-XPET	-	PM KF 2949-03	-
Controller	Inn-Co	CO 3000	4970815	PM KF 2949	-
Receiver 9 kHz - 7 GHz	Rohde & Schwarz	ESR7	101757	PM KF 3371	2020-04 (1 year)
Loop antenna 9 kHz- 30 MHz	Rohde & Schwarz	HFH2-Z2	881058/48	PM KF 1401	2020-08 (1 years)
Test software	Rohde & Schwarz	EMC 32 V.10.50.40	-	PM KF 2983-2	-

Measurement results – Radiated emissions < 30 MHz:

Common Information

EUT:	GT7.3700
Test Verdict:	Passed
Test Description:	FCC Part 15 C, 9 kHz - 30 MHz
Operating Conditions:	Normal operation and the 125 kHz RFID module of the EUT was in continuous wave mode. The 13.56 MHz RFID module the WLAN module and the Bluetooth module were off.
Operator Name:	MBE
Project Number:	41159
Date	30.12.2020



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 [..\EMI 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)
0.125000	78.52	---	105.66	27.14	1000.0	0.200	V	176.0

(continuation of the "Final_Result" table from column 14 ...)

Frequency (MHz)	Corr. (dB/m)	Comment
0.125000	20	16:40:06 - 30.12.2020

EMI Auto Test Template: FCC-RE-R17-AN23

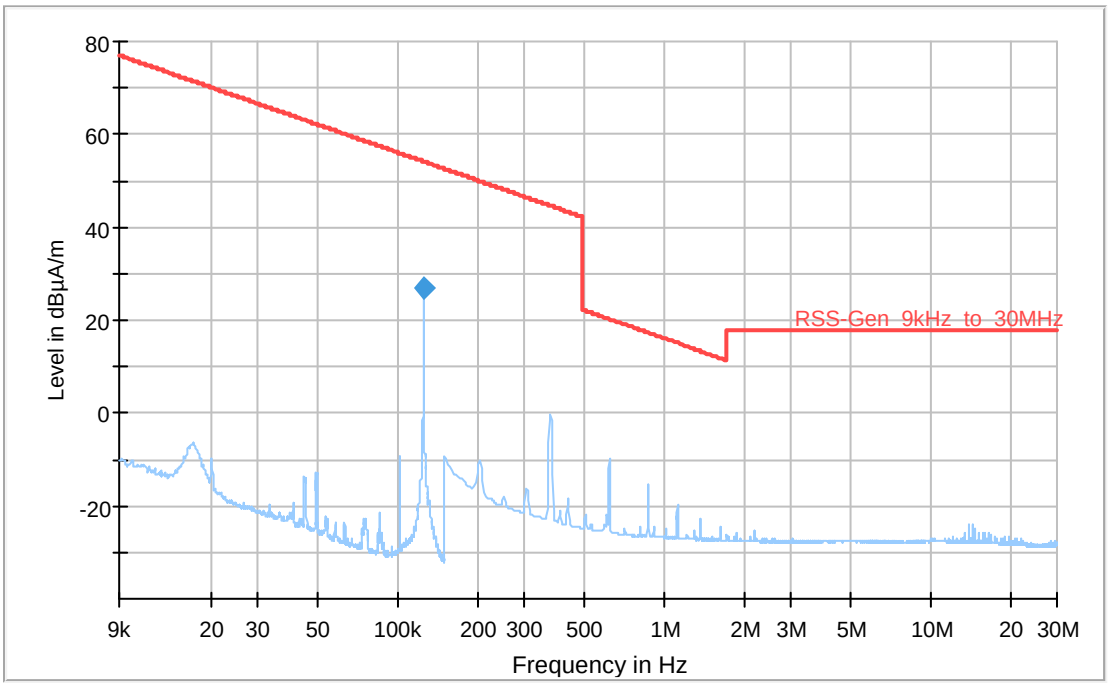
Hardware Setup: EN-RE-R12-AN23
Measurement Type: Open-Area-Test-Site (SAC/FAR)
Frequency Range: 9 kHz - 30 MHz
Graphics Level Range: 0 dBµV/m - 130 dBµV/m

Preview Measurements:
Antenna height: 0 - 1000 cm , Step Size = 0 cm , Positioning Speed = 1
Polarization: H + V
Turntable position: 0 - 352 deg , Step Size = 22 deg , Positioning Speed = 8
Scan Test Template: EN-RE-R12-AN23_PRE

Subrange	**Step Size**	**Detectors**	**IF BW**	**Meas. Time**	**Preamp**
Receiver: [ESR 7]					
9 kHz - 150 kHz	50 Hz	QPK	200 Hz	1 s	0 dB
150 kHz - 30 MHz	2,25 kHz	QPK	9 kHz	1 s	0 dB

Common Information

EUT:	GT7.3700
Test Verdict:	Passed
Test Description:	RSS-Gen, 9 kHz - 30 MHz
Operating Conditions:	Normal operation and the 125 kHz RFID module of the EUT was in continuous wave mode. The 13.56 MHz RFID module the WLAN module and the Bluetooth module were off.
Operator Name:	MBE
Project Number:	41159
Date	30.12.2020



Preview Result 1-QPK [Preview Result 1.Result:1]
RSS-Gen_9kHz_to_30MHz [..\zF radiated\RSS-Gen\]
QPK [Critical_Freqs.Result:4]
AVG [Critical_Freqs.Result:5]
Final_Result QPK [Final_Result.Result:4]
Final_Result AVG [Final_Result.Result:5]

Final_Result

Frequency (MHz)	QuasiPeak (dBµA/m)	Average (dBµA/m)	Limit (dBµA/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Pol	Azimuth (deg)
0.125000	27.02	---	18.04	-8.98	1000.0	0.200	V	176.0

(continuation of the "Final_Result" table from column 14 ...)

Frequency (MHz)	Corr. (dB/m)	Comment
0.125000	20.0	30.12.2020 16:40

EMI Auto Test Template: EN-RE-R17-AN24

Hardware Setup: EN-RE-R12-AN24
Measurement Type: Open-Area-Test-Site (SAC/FAR)
Frequency Range: 9 kHz - 30 MHz
Graphics Level Range: -40 dBµA/m - 80 dBµA/m

Preview Measurements:
Antenna height: 0 - 1000 cm , Step Size = 0 cm , Positioning Speed = 1
Polarization: H + V
Turntable position: 0 - 352 deg , Step Size = 22 deg , Positioning Speed = 8
Scan Test Template: EN-RE-R12-AN24_PRE

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
Receiver: [ESR 7]					
9 kHz - 150 kHz	50 Hz	QPK	200 Hz	1 s	0 dB
150 kHz - 30 MHz	2,25 kHz	QPK	9 kHz	1 s	0 dB

Anechoic chamber

Test procedure

The test site is an anechoic chamber suitable for radiated emission measurements in the frequency range of 9 kHz – 30 MHz It includes automatic turntable of radius 2 m. It enables manual and fully automatic measurements.
To find the highest level of radiation

- the height of the antenna is 1m with antenna in horizontal and vertical polarization;
- the turntable is rotated in range from 0° to 360°.

The system was configured for testing in a typical worst case fashion (as a customer may use it). All interface cables were moved to determine the position which resulted in the highest emission levels.

Correction factors

The field strength is calculated by adding the antenna factor and cable attenuation.
The calculations are performed automatically by the measurement software EMC 32.
As example consider the following input values and result:

FREQUENCY (MHZ)	RECEIVER READING U (dBµV)	ANTENNA FACTOR AF (dB/m)	CABLE ATTENUATION A (dB)	CORRECTION ANTENNA + CABLE (dB)	RADIATED FIELD STRENGTH E (dBµV/m)
30.0	20	20.6	0.8	21.4	41.4

E = U + AF + A

7.3 Occupied bandwidth

NORMATIVE REFERENCES			RESULT
Limits according to:	**RSS-Gen, Issue 5, 6.7**		**P**
Methods of measurement according to:	**RSS-Gen, Issue 5, 6.7**		
Equipment mode	Power interface	1	
	EUT configuration mode	2	
	Operation mode	3	

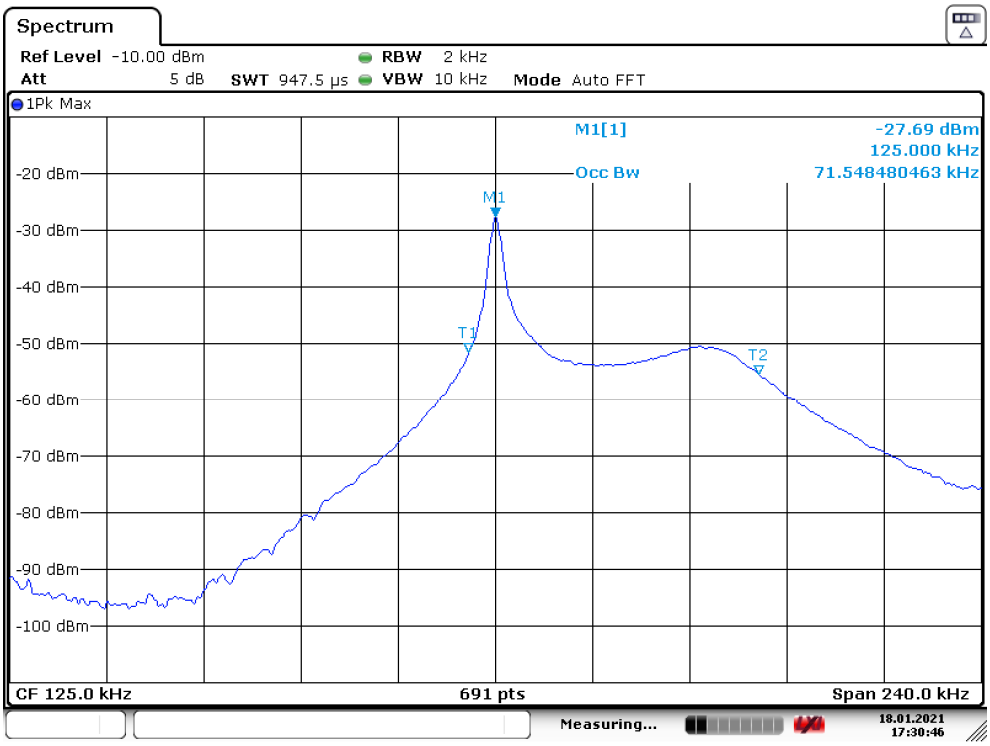
Test equipment

DESCRIPTION	MANUFACTURER	TYPE	SN	ASSET NO.	CALIBRATION
Temperature Chamber	HT4010	Heraeus-Vötsch	45021	PM KF 1402	2020-03 (1 year)
Receiver 10 Hz - 40 GHz	Rohde & Schwarz	FSV40	101400	PM KF 2783	2020-08 (1 year)
Loop antenna	Rohde & Schwarz	HZ-10	100055	PM KF 0965	2020-05 (3 year)

Comment

The 99% occupied bandwidth is 71.55 kHz.

Measurement results – 99% occupied bandwidth:



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7.4 Measurement uncertainty evaluation

Measurement uncertainty for conducted emissions, LISN, 150 kHz -30 MHz	± 2.3 dB
Measurement uncertainty for radiated magnetic field, 9 kHz – 30 MHz	± 4.9 dB
Measurement uncertainty for radiated emission, 30 MHz - 1000 MHz	± 5.9 dB
Measurement uncertainty for OBW	± 4.3 %
601 points resolution (Spectrum analyzer)	± 0.83 %
30000 points resolution (Spectrum analyzer)	± 0.016 %
Measurement uncertainty for Frequency error	± 1 x 10^{-8}

End of test report