Image: Second system Image: Second system <td< th=""></td<>								
4 7 .	TEST REPORT							
BNetzA-CAB-02/21-102	BNetzA-CAB-02/21-102 Test report no.: 1-2594/21-01-04							
Testin	Testing laboratory Applicant							
CTC advanced GmbH			Continental Automotive GmbH					
Untertuerkheimer Strass	e 6 – 10		Heinrich-Hertz-Str. 45					
66117 Saarbruecken / Ge	ermany		78052 Villingen-Schwenningen / GERMANY					
Phone: + 49 681 5 98	-		Phone: +49 7721 94 72-0 Contact: Marion Grüner					
Fax: + 49 681 5 98			e-mail: <u>Marion.Gruener@continental-</u>					
Internet: <u>https://www.c</u> e-mail: mail@ctcadva			corporation.com					
according to DIN EN IS Deutsche Akkreditierung The accreditation is va procedures as stated in	(area of testing) is accredited O/IEC 17025 (2018-03) by the		Manufacturer Continental Automotive GmbH Heinrich-Hertz-Str. 45 78052 Villingen-Schwenningen / GERMANY					
	Test st	anc	lard/s					
FCC - Title 47 CFR Part	15 FCC - Title 47 of the Cod frequency devices	e of	Federal Regulations; Chapter I; Part 15 - Radio					
RSS - 210 Issue 10			Telecommunications Radio Standards npt Radio Apparatus: Category I Equipment					
For further applied test s	tandards please refer to section 3	of tł	nis test report.					
	Tes	t lte	em					
Kind of test item:	Access and Connected Car Mod	ule v	vith Remote Cloud Key					
Model name:	Model name: ACCM201-US4G-1B							
FCC ID:	2AJW5ACCM							
IC:	IC: 21979-ACCM							
Frequency:	312.0MHz to 318.0MHz, 431.9M 868.1MHz to 868.5MHz, 902.37		-					
Technology tested:	proprietary							
Antenna:	Integrated antenna							
Power supply:	9 V to 18 V DC by battery							
Temperature range: -20°C to +55°C								

This test report is electronically signed and valid without handwritten signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

Test report authorized:

Christoph Schneider	
Lab Manager	
Radio Communications	

Test performed:

Hans-Joachim Wolsdorfer Lab Manager Radio Communications



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2 General information

2.1 Notes and disclaimer

The test results of this test report relate exclusively to the test item specified in this test report. CTC advanced GmbH does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.

The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CTC advanced GmbH.

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This test report is electronically signed and valid without handwritten signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

2.2 Application details

Date of receipt of order:	2021-06-01
Date of receipt of test item:	2021-08-11
Start of test:*	2021-08-11
End of test:*	2021-11-12
Develop(a) avagent duwing the test.	/

Person(s) present during the test:

*Date of each measurement, if not shown in the plot, can be requested. Dates are stored in the measurement software.

2.3 Test laboratories sub-contracted

None



3 Test standard/s, references and accreditations

Test standard	Date	Description			
FCC - Title 47 CFR Part 15		FCC - Title 47 of the Code of Federal Regulations; Chapter I; Part 15 - Radio frequency devices			
RSS - 210 Issue 10	December 2019	Spectrum Management and Telecommunications Radio Standards Specification - Licence-Exempt Radio Apparatus: Category I Equipment			
RSS - Gen Issue 5 incl. Amendment	March 2019	Spectrum Management and Telecommunications Radio Standards Specification - General Requirements for Compliance of Radio Apparatus			
Guidance	Version	Description			
ANSI C63.4-2014 ANSI C63.10-2013	-/- -/-	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices			
Accreditation	Description	1			
D-PL-12076-01-04		elecommunication and EMC Canada tps://www.dakks.de/as/ast/d/D-PL-12076-01-04e.pdf			
D-PL-12076-01-05		mmunication FCC requirements vww.dakks.de/as/ast/d/D-PL-12076-01-05e.pdf			

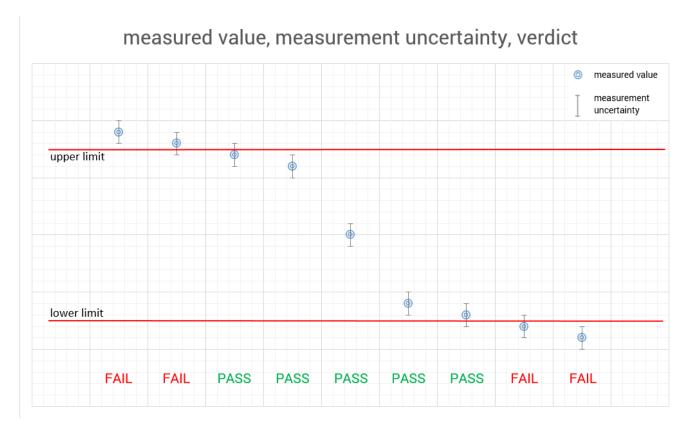
ISED Testing Laboratory Recognized Listing Number: DE0001 FCC designation number: DE0002



4 Reporting statements of conformity – decision rule

Only the measured values related to their corresponding limits will be used to decide whether the equipment under test meets the requirements of the test standards listed in chapter 3.

The measurement uncertainty is mentioned in this test report, see chapter 9, but is not taken into account - neither to the limits nor to the measurement results. Measurement results with a smaller margin to the corresponding limits than the measurement uncertainty have a potential risk of more than 5% that the decision might be wrong."





5 **Test environment**

		-	
		Tnom	+22 °C during room temperature tests
Temperature	:	T _{max}	+55 °C during high temperature tests
		T_{min}	-20 °C during low temperature tests
Relative humidity content	:		55 %
Barometric pressure	:		1021 hpa
		V_{nom}	12 V DC by battery
Power supply	:	V _{max}	18 V
		V_{min}	9 V

6 **Test item**

General description 6.1

Kind of test item :	Access and Connected Car Module with Remote Cloud Key
Model name :	ACCM201-US4G-1B
HMN :	-/-
PMN :	ACCM +
HVIN :	ACCM +
FVIN :	-/-
S/N serial number :	Rad. ACCMb74fc589a882b6ab
S/N Serial Humber .	Cond. ACCMb74fc589a882b6ab
Hardware status :	ACCM 6.0.11
Software status :	-/-
Firmware status :	-/-
Francisco de la contra	312.0MHz to 318.0MHz, 431.9MHz to 435.9MHz,
Frequency band :	868.1MHz to 868.5MHz, 902.375MHz to 927.675MHz
Type of radio transmission :	modulated carrier
Use of frequency spectrum :	
Type of modulation :	ASK, FSK
Number of channels :	12
Antenna :	Integrated antenna
Power supply :	9 V to 18 V DC by battery
Temperature range :	-20°C to +55°C

Additional information 6.2

The content of the following annexes is defined in the QA. It may be that not all of the listed annexes are necessary for this report, thus some values in between may be missing.

Test setup and EUT photos are included in test report:

1-2594/21-01-01_AnnexA 1-2594/21-01-01_AnnexB 1-2594/21-01-01_AnnexD



7 Description of the test setup

Typically, the calibrations of the test apparatus are commissioned to and performed by an accredited calibration laboratory. The calibration intervals are determined in accordance with the DIN EN ISO/IEC 17025. In addition to the external calibrations, the laboratory executes comparison measurements with other calibrated test systems or effective verifications. Weekly chamber inspections and range calibrations are performed. Where possible, RF generating and signaling equipment as well as measuring receivers and analyzers are connected to an external high-precision 10 MHz reference (GPS-based or rubidium frequency standard).

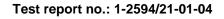
In order to simplify the identification of the equipment used at some special tests, some items of test equipment and ancillaries can be provided with an identifier or number in the equipment list below (Lab/Item).

Each block diagram listed can contain several test setup configurations. All devices belonging to a test setup are identified with the same letter syntax. For example: Column Setup and all devices with an A.

Agenda: Kind of Calibration

- k calibration / calibrated
- ne not required (k, ev, izw, zw not required)
- periodic self verification ev
- long-term stability recognized Ve
- vlkl! Attention: extended calibration interval
- NK! Attention: not calibrated

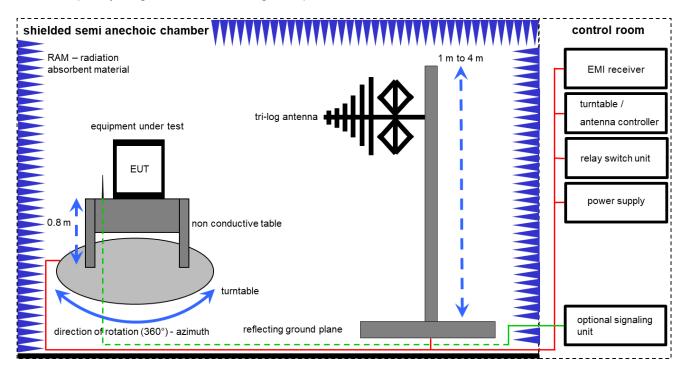
- limited calibration EΚ
- zw cyclical maintenance (external cyclical maintenance)
- internal cyclical maintenance izw
- blocked for accredited testing g
- *) next calibration ordered / currently in progress





7.1 Shielded semi anechoic chamber

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 30 MHz to 1 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber. The receiving antennas are conform to specifications ANSI C63. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test setups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received. The wanted and unwanted emissions are received by spectrum analyzers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.



Measurement distance: tri-log antenna 10 meter EMC32 software version: 10.59.00

FS = UR + CL + AF

(FS-field strength; UR-voltage at the receiver; CL-loss of the cable; AF-antenna factor)

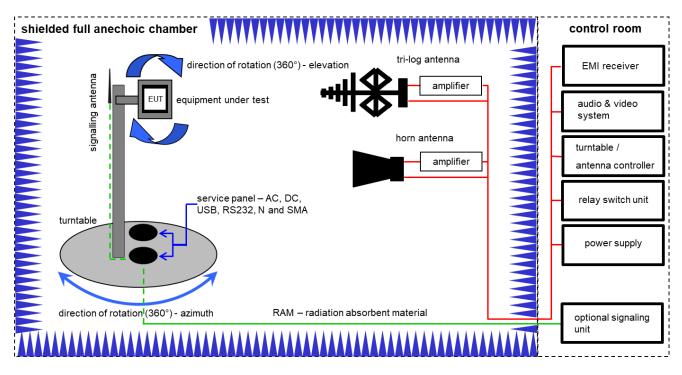
Example calculation: FS [dBµV/m] = 12.35 [dBµV/m] + 1.90 [dB] + 16.80 [dB/m] = 31.05 [dBµV/m] (35.69 µV/m)



Equipment table:

No.	Setup	Equipment	Туре	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	А	Switch-Unit	3488A	HP	2719A14505	300000368	ev	-/-	-/-
2	A	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP	2920A04466	300000580	ne	-/-	-/-
3	A	Semi anechoic chamber	3000023	MWB AG		300000551	ne	-/-	-/-
4	Α	Antenna Tower	Model 2175	ETS-Lindgren	64762	300003745	izw	-/-	-/-
5	A	Positioning Controller	Model 2090	ETS-Lindgren	64672	300003746	izw	-/-	-/-
6	A	Turntable Interface- Box	Model 105637	ETS-Lindgren	44583	300003747	izw	-/-	-/-
7	А	TRILOG Broadband Test-Antenna 30 MHz - 3 GHz	VULB9163	Schwarzbeck Mess - Elektronik	295	300003787	vlKli	21.04.2021	20.04.2023
8	Α	Turntable	2089-4.0	EMCO		300004394	ne	-/-	-/-
9	А	PC	TecLine	F+W		300004388	ne	-/-	-/-
10	А	EMI Test Receiver	ESR3	Rohde & Schwarz	102587	300005771	k	10.12.2020	09.12.2021

7.2 Shielded fully anechoic chamber



Measurement distance: tri-log antenna and horn antenna 3 meter

FS = UR + CA + AF

(FS-field strength; UR-voltage at the receiver; CA-loss of the signal path; AF-antenna factor)

Example calculation: FS [dBµV/m] = 40.0 [dBµV/m] + (-35.8) [dB] + 32.9 [dB/m] = 37.1 [dBµV/m] (71.61 µV/m)

OP = AV + D - G + CA

(OP-radiated output power; AV-analyzer value; D-free field attenuation of measurement distance; G-antenna gain+amplifier gain; CA-loss signal path)

<u>Example calculation:</u> OP [dBm] = -65.0 [dBm] + 50 [dB] - 20 [dBi] + 5 [dB] = -30 [dBm] (1 μW) CTC | advanced

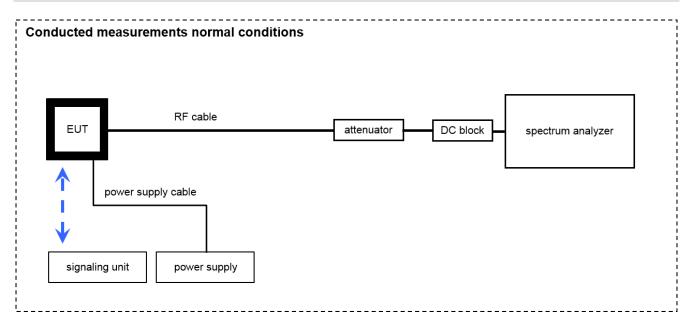
member of RWTÜV group



Equipment table:

No.	Setup	Equipment	Туре	Manufacturer	Serial No.	INV. No.	Kind of Calibration	Last Calibration	Next Calibration
1	A,B	DC power supply, 60Vdc, 50A, 1200 W	6032A	HP	2818A03450	300001040	vlKl!	09.12.2020	08.12.2023
2	А	Active Loop Antenna 9 kHz to 30 MHz	6502	EMCO	2210	300001015	vlKl!	13.06.2019	12.06.2022
3	A,B	Anechoic chamber	FAC 3/5m	MWB / TDK	87400/02	300000996	ev	-/-	-/-
4	В	Double-Ridged Waveguide Horn Antenna 1-18.0GHz	3115	EMCO	9107-3697	300001605	vlKl!	12.03.2021	11.03.2023
5	A,B	Switch / Control Unit	3488A	HP	*	300000199	ne	-/-	-/-
6	A,B	EMI Test Receiver 20Hz- 26,5GHz	ESU26	R&S	100037	300003555	k	11.12.2020	10.12.2021
7	В	Highpass Filter	WHK1.1/15G-10SS	Wainwright	3	300003255	ev	-/-	-/-
8	В	Broadband Amplifier 0.5-18 GHz	CBLU5184540	CERNEX	22049	300004481	ev	-/-	-/-
9	A,B	4U RF Switch Platform	L4491A	Agilent Technologies	MY50000037	300004509	ne	-/-	-/-
10	A,B	NEXIO EMV- Software	BAT EMC V3.20.0.26	EMCO		300004682	ne	-/-	-/-
11	A,B	PC	ExOne	F+W		300004703	ne	-/-	-/-

7.3 Conducted measurements



OP = AV + CA

(OP-output power; AV-analyzer value; CA-loss signal path)

Example calculation:

OP [dBm] = 6.0 [dBm] + 11.7 [dB] = 17.7 [dBm] (58.88 mW)

Equipment table:

No.	Setup	Equipment	Туре	Manufacturer	Serial No.	INV. No.	Kind of	Last	Next
	ootup	-4	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		001101100		Calibration	Calibration	Calibration
1	Α	RF Cable BNC	RG58	Huber & Suhner	-/-	400001209	ne	-/-	-/-
2	Α	Power Supply	HMP2020	Rohde & Schwarz	101961	300006102	k	04.08.2020	03.08.2022
3	А	Signal analyzer	FSW26	Rohde&Schwarz	101455	300004528	k	25.02.2021	24.02.2022
4	А	Loop Antenna	-/-	ZEG TS Steinfurt	-/-	400001208	ne	-/-	-/-

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8 Sequence of testing

8.1 Sequence of testing radiated spurious 9 kHz to 30 MHz

Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- If the EUT is a tabletop system, it is placed on a table with 0.8 m height.
- If the EUT is a floor standing device, it is placed directly on the turn table.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 3 m (see ANSI C 63.4) see test details.
- EUT is set into operation.

Premeasurement*

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna height is 1 m.
- At each turntable position the analyzer sweeps with positive-peak detector to find the maximum of all emissions.

Final measurement

- Identified emissions during the pre-measurement are maximized by the software by rotating the turntable from 0° to 360°.
- Loop antenna is rotated about its vertical axis for maximum response at each azimuth about the EUT. (For certain applications, the loop antenna plane may also need to be positioned horizontally at the specified distance from the EUT)
- The final measurement is done in the position (turntable and elevation) causing the highest emissions with quasi-peak (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. A plot with the graph of the premeasurement and the limit is stored.

*)Note: The sequence will be repeated three times with different EUT orientations.



8.2 Sequence of testing radiated spurious 30 MHz to 1 GHz

Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.
- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 10 m or 3 m (see ANSI C 63.4) see test details.
- EUT is set into operation.

Premeasurement

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height changes from 1 m to 3 m.
- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement

- The final measurement is performed for at least six highest peaks according to the requirements of the ANSI C63.4.
- Based on antenna and turntable positions at which the peak values are measured the software maximize the peaks by changing turntable position ± 45° and antenna height between 1 and 4 m.
- The final measurement is done with quasi-peak detector (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit are recorded. A plot with the graph of the premeasurement with marked maximum final results and the limit is stored.



8.3 Sequence of testing radiated spurious 1 GHz to 18 GHz

Setup

- The equipment is set up to simulate normal operation mode as described in the user manual or defined by the manufacturer.
- If the EUT is a tabletop system, a 2-axis positioner with 1.5 m height is used.
- If the EUT is a floor standing device, it is placed directly on the turn table.
- Auxiliary equipment and cables are positioned to simulate normal operation conditions as described in ANSI C 63.4.
- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- Measurement distance is 3 m (see ANSI C 63.4) see test details.
- EUT is set into operation.

Premeasurement

- The turntable rotates from 0° to 315° using 45° steps.
- The antenna is polarized vertical and horizontal.
- The antenna height is 1.5 m.
- At each turntable position and antenna polarization the analyzer sweeps with positive peak detector to find the maximum of all emissions.

Final measurement

- The final measurement is performed for at least six highest peaks according to the requirements of the ANSI C63.4.
- Based on antenna and turntable positions at which the peak values are measured the software maximizes the peaks by rotating the turntable from 0° to 360°. This measurement is repeated for different EUT-table positions (0° to 150° in 30°-steps) and for both antenna polarizations.
- The final measurement is done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and RMS detector (as described in ANSI C 63.4).
- Final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit are recorded. A plot with the graph of the premeasurement with marked maximum final results and the limit is stored.



Measurement uncertainty 9

Measurement uncertainty						
Test case	Uncertainty					
Occupied bandwidth	± used RBW					
Field strength of the fundamental	± 3 dB					
Field strength of the harmonics and spurious	± 3 dB					
Receiver spurious emissions and cabinet radiations	± 3 dB					
Conducted limits	± 2.6 dB					

10 Summary of measurement results

\boxtimes	No deviations from the technical specifications were ascertained
	There were deviations from the technical specifications ascertained
	This test report is only a partial test report. The content and verdict of the performed test cases are listed below.

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TC Identifier	Description	Verdict	Date	Remark
	CFR Part 15			
RF-Testing	RSS 210, Issue 10	See table!	2021-12-10	-/-
	RSS-Gen, Issue 5			

Test specification clause	Test case	Temperature conditions	Power source voltages	С	NC	NA	NP	Remark
§ 15.35 (c) RSS-Gen, Issue 5	Timing of the transmitter (Duty cycle correction factor)	Nominal	Nominal	\boxtimes				-/-
§ 15.231 (a) (1) RSS-210 Issue 10	Switch off time	Nominal	Nominal	\boxtimes				-/-
§ 15.231 (b) (3) (c) RSS-210 Issue 10	Emission bandwidth	Nominal	Nominal	\boxtimes				-/-
§ 15.231 (b) RSS-210 Issue 10	Fieldstrength of Fundamental	Nominal	Nominal	\boxtimes				-/-
§ 15.209 RSS-210 Issue 10	Fieldstrength of harmonics and spurious	Nominal	Nominal	\boxtimes				-/-
§ 15.209 RSS-Gen, Issue 5	Receiver spurious emissions (radiated)	Nominal	Nominal			\boxtimes		-/-

Note: C = Compliant; NC = Not compliant; NA = Not applicable; NP = Not performed

10.1 Additional comments

Reference documents:	Customer Questionnair1_ACCM_kvde_20210421.docx
Special test software:	ACCM+ RCK test.exe (transmitter timing set in testsoftware)
Configuration descriptions:	test-bin file table (see page 107)



11 Measurement results

11.1 Timing of the transmitter

Measurement:

Measurement parameter						
Detector:	Peak					
Sweep time:	Depends on the pulse train					
Resolution bandwidth:	1 MHz					
Video bandwidth:	3 MHz					
Span:	Zero					
Trace-Mode:	Single sweep					
Test setup	7.3 A					

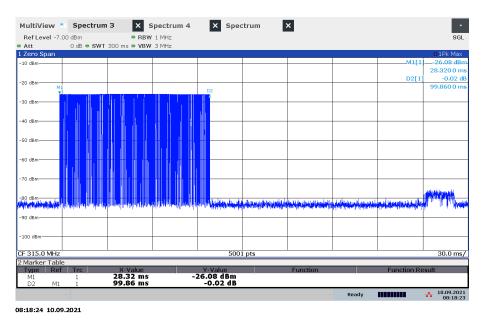
Limits:

FCC	IC
terms of the average value of the emission, and pulsed shall be determined by averaging over one complete p pulse train does not exceed 0.1 seconds. As an alterna 0.1 seconds) or in cases where the pulse train excee	eds 0.1 seconds, the measured field strength shall be a 0.1 second interval during which the field strength is g the average field strength shall be submitted with any

Results:

maximum frame length								
frequency	modulation	max. frame length / ms						
315.0 MHz	ASK	99.86						
515.0 MHZ	FSK	99.96						
433.9 MHz	ASK	99.73						
433:9 MHZ	FSK	102.4						
969 2 MU-	ASK	99.7						
868.3 MHz	FSK	99.4						
915.0 MHz	ASK	100.04						
910.0 MITZ	FSK	99.8						

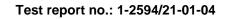
Plot 1: 315 MHz ASK max. frame length



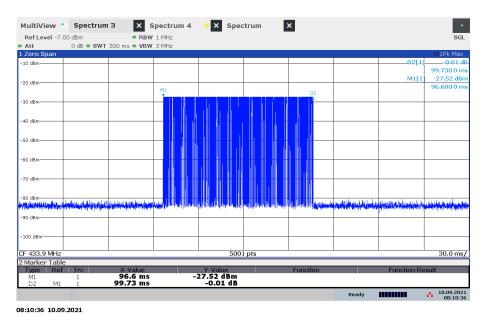
Plot 2: 315 MHz FSK max. frame length

ultiView	Spectrur	n 3 🗙 Spe	ectrum 4	Spectrum	×			-
Ref Level -7.0		RBW 1						SGL
Att	0 dB 🖷 SW1	🛙 300 ms 🖷 VBW 3	MHz					
Zero Span		- T					1	1Pk Max
10 dBm						-	D2[1]	
								99.960 0 m
20 dBm-							M1[1]	
	M1			D2				46.6200 n
30 dBm								
so ubiii								
40 dBm								
50 dBm								
60 dBm								
Jo dom								
70 dBm								
								la ma
80 dBm	al. a. (114			18.64.04.1	colling of the second	and the second second second	section and the second of the	Lister (10.
80.dBm	an a			ALCONOMIC TO A	heilige states for all an all an	is a subserve the second day	And the second second second	and the prime of the second
90 dBm	<u> </u>				· · · · · · · · · · · · · · · · · · ·			
100 dBm								
F 315.0 MHz				5001 pts				30.0 ms
Marker Table		W H-b	Y-Va		Function		Function Re	
Type Ref M1	Trc	X-Value 46.62 ms	-26.16		Function		Function Re	suit
D2 M1	i	99.96 ms	0.0	DidB				
								10.09.202

08:22:07 10.09.2021



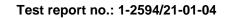
Plot 3: 433.9 MHz ASK max. frame length



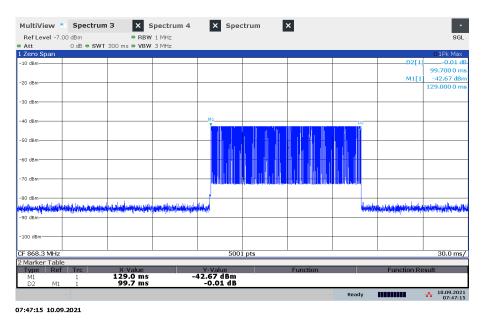
Plot 4: 433.9 MHz FSK max. frame length

MultiView	Spectrum 3	X Spec	trum 4	× Spec	trum	×				•
RefLevel -7.0	00 dBm	● RBW 1 M	Hz							SGL
Att	0 dB 🖷 SWT 30	00 m s 🗢 VBW 3 M	Hz							
Zero Span										 1Pk Max
10 dBm									M1[1]	-27.43 dBr
										102.4000 m
20 dBm-									D2[1]	0.00 d
20 0011			M1							99.930 0 m
			· · · · · ·				22 7			
30 dBm							T			
40 dBm			_							
50 dBm										
60 dBm-										
70 dBm			-				-			
80 dBm										
فالمعالية المالية المالية	والمصياة المعار التقتير أخاذ أراديك	d Hill man des weeks hand her her her	<u>u</u>				LUIN V	الأطبيب البغاء أتجاز فماته الأرجا	an filmen an	والمتل ومراجعاته والتراج
	1.00 C	all she wat manufactures and a she						الدارين ويستعمل ومطهرا	and a second state of a second second second	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1
90 dBm										
100 dBm										
F 433.9 MHz	'		'	5001	pts				· · · · · ·	30.0 ms
Marker Table	2									
Type Ref	Trc	X-Value		Y-Value		Function			Function Re	sult
M1	1	102.4 ms	-2	7.43 dBm						
D2 M1	1	99.93 ms		0.00 dB						
								Ready		10.09.202 08:14:4

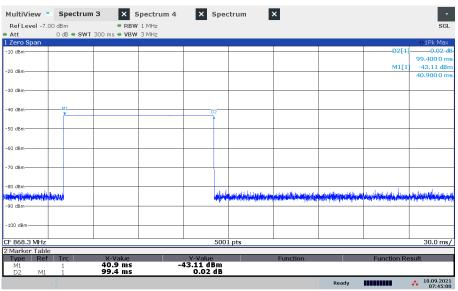
08:14:50 10.09.2021



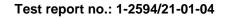
Plot 5: 868.3 MHz ASK max. frame length



Plot 6: 868.3 MHz FSK max. frame length

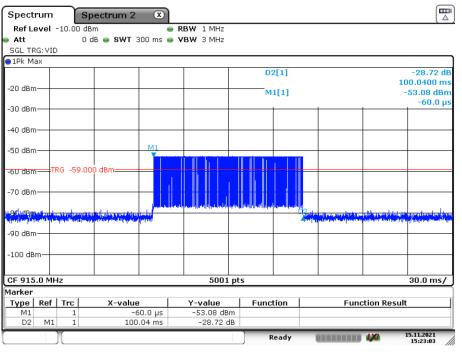


07:45:00 10.09.2021



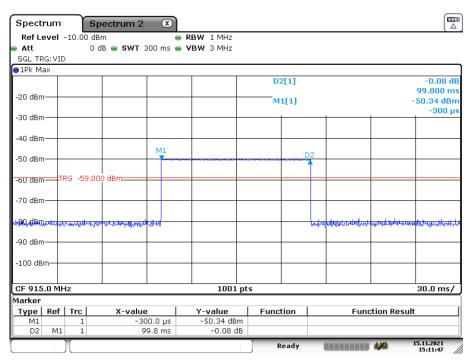


Plot 7: 915.0 MHz ASK max. frame length



Date: 15.NOV.2021 15:23:04

Plot 8: 915.0 MHz FSK max. frame length



Date: 15.NOV.2021 15:11:48



11.2 Switch off time

Measurement:

Measurement parameter						
Detector:	Peak					
Sweep time:	6s/11s					
Resolution bandwidth:	1 MHz					
Video bandwidth:	3 MHz					
Span:	Zero					
Trace-Mode:	Single sweep					
Test setup	7.3 A					
Measurement uncertainty	see chapter 9					

Limits:

FCC	IC				
A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.					

In addition, devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

Results:

The EUT automatically ceases transmission within 5000 ms after activation

transmitter ceasing time after activation (limit < 5 sec.)							
frequency	duty cycle	ceasing time					
315.0 MHz	10 ms	10 ms					
315.0 MHZ	100 ms	97.6 ms					
433.9 MHz	10 ms	10 ms					
433.9 MHZ	100 ms	100 ms					
969 2 MUL-	10 ms	10 ms					
868.3 MHz	100 ms	100 ms					
	10 ms	10 ms					
915.0 MHz	100 ms	100 ms					



Plot 1: TX on time 315 MHz low duty cycle

Date: 12.NOV.2021 13:03:00

Plot 2: TX on time 315 MHz high duty cycle

Att

SGL TRG: VID ⊖1Pk Max

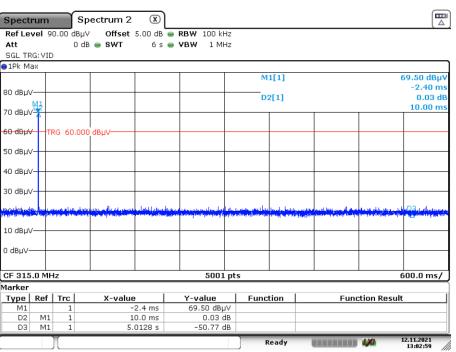
80 dBµV-

50 dBµV· 40 dBµV-

70 dBµV 💾

30 dBµV 10 dBµV-0 dBµV-CF 315.0 MHz 5001 pts Marker Type Ref Trc X-value Y-value 0.0 s 70.27 dBµV -0.08 dB -50.17 dB Μ1 1 97.6 ms D2 M1 5.0104 s D3 M1

Date: 12.NOV.2021 11:41:19



70.27 dBµ\ 0.00000

600.0 ms/

12.11.2021 11:41:18

1

Function Result

-0.08 di 97.60 ms

Spectrum 2

0 dB 👄 SWT

Ref Level 90.00 dBµV

60 dBuV TRG 60.000 dBuV

X

Offset 5.00 dB 😑 RBW 100 kHz

6 s 👄 **VBW** 1 MHz

M1[1]

D2[1]

Function

Ready



Plot 3: TX on time 433 MHz low duty cycle

Spect	rum	Ĩ	Spectrum	2 🗷	Spectrum 3	×			
Ref Lev	vel 9				😑 RBW 100 ki				
Att) dB 👄 SWT	6 s	😑 VBW 1 MF	Ηz			
SGL TR)							
⊖1Pk Ma	эх								
						M	1[1]		67.01 dBμV
80 dBµV				_					-2.40 ms
						D2	2[1]		0.00 dB
70 dBµV	M1			_					10.00 ms
	11								
60 dBµV	← +TF	RG 60	.000 dBµV						
50 dBµV	′ ++ -								
	.								
40 dBµV	(-								
NOL HOLM			يقير بعرائية المراسلين		a de la competition de	مريحة القريب	and the state of the	and a strategy of the second strategy of the	a and an an all the second as
	In the second	- Digital and	and the second	a production providence	and the second	example for the start of the st	phone setting the	- A POINT OF LAND AND AND AND AND AND AND AND AND AND	a new rest of the second standard stands
20 dBµV									
20 0004									
10 dBµV				_	_				
0 dBµV-	_			_					
CF 433	9 MF	17			5001	nts			600.0 ms/
Marker					5501				
Type	Rof	Trc	X-val		Y-value	Funct	ion	Eup	ction Result
M1	Ker	1	X-901	-2.4 ms	67.01 dBu\			run	scion ressure
D2	M1	1		10.0 ms	0.00 dB				
D3	M1	1		5.0128 s	-39.47 di				
	-						eady		12.11.2021
	<u> </u>					R	eauy		13:29:13

Date: 12.NOV.2021 13:29:14

Plot 4: TX on time 433 MHz high duty cycle

Spect			Spectrum 2		Spectrum 3		x					
Ref Le Att	vel 9		BµV Offset DdB — SWT		RBW 100 VBW 11	kHz ⁄IHz						
SGL TR			J UB 🖶 3WI	05		/IEZ						
OIL II		·										
							D	2[1]				0.27 dB 100.00 ms
80 dBh/	/						м	1[1]				66.77 dBµV
70 dBµ\	мње				_						1	-2.40 ms
60 dBµ\	/ 	RG 60	.000 dBµV									
50 dBµ\	,											
40 dBµ\	,											
and starls						L.L. Sheet	, his here		dias in the state		ار این اور	D3
20 dBµ\	/											
10 dBµ\	/											
0 dBµV-												
CF 433	1.9 MF	łz			5001	pts						600.0 ms/
Marker												
Туре	Ref		X-value		Y-value		Func	tion		Fund	ction Resul	t
M1 D2	М1	1		2.4 ms 0.0 ms	66.77 dBj 0.27							
D3	M1	1		0128 s	-36.51							
							R	leady				12.11.2021 13:30:26

Date: 12.NOV.2021 13:30:27



Plot 5: TX on time 868.3 MHz low duty cycle

Spect	rum	5	Spectrum 2 (x) Spe	ectrum 3		×					
	vel 9	0.00 dB										
Att SGL TR	00.01		dB 👄 SWT	6 s 😑 🖌	'BW 1 №	IHZ						
	11Pk Max											
							D2	2[1]				0.05 dB
80 dBµ\	M1											10.00 ms
80 aBhA	T						M	1[1]				77.86 dBµV
70 dBµ\	/											-2.40 ms
/ 0 00 p												
60 dBµ∖	/+⊤	RG 60.0	00 dBµV									
50 dBµ\	/++-											
40 dBu)												
40 dBµ\	and in the	ماندليادي	is to be provide the second statements	أما تقريا مرقبة عد	ولم والسابية الكاسرة و	diam.	a line of the	In the state of	Not not be	المقام المرامية أبوا	dia managana ang ang ang ang ang ang ang ang	and the second second second
30 dBµ\	/	and a local differences	(in the second		and the state	al a constant		orth Million Internet		and the second states of the second states of the second second second second second second second second second	In the second second second second	Party and the second states
20 dBµ\	/											
10 dBµ\												
0 dBµV-												
ս սերչ-												
CF 868	.3 MF	lz			5001	pts						600.0 ms/
Marker		1 - 1										
Туре	Ref		X-value		<u>r-value</u>		Funct	tion		Fun	ction Resul	t
M1 D2	M1	1	-2.4 n 10.0 n		77.86 dBµ 0.05 d							
D2	M1	1	5.0128		-42.38 d	_						
	_						P	a a des	-		1.97	12.11.2021
		Л					R	eady			L)A	13:44:51

Date: 12.NOV.2021 13:44:51

Plot 6: TX on time 868.3 MHz high duty cycle

Spect	rum	Sp	ectrum 2	×s	pectrum 3	×				
	vel 9	0.00 dBµ\			RBW 100					
Att			s 👄 SML	6 s 🧉	VBW 1N	/Hz				
SGL TR)								
⊖1Pk M	ax									
						D	2[1]			0.69 dB
80 dBµ\	/					<u> </u>			_	100.00 ms
	МЪе					M	1[1]			0.96 dBµV −2.40 ms
70 dBµ\	14				+					-2.40 ms
<u>60 dBµ∖</u>	/ ⊤	RG 60.000) dBµV							
EQ JD.A	,									
50 dBµ\	/									
40 dBus	,									
40 dBµ\	AL 44	des à la suit de mission	الاستعمال المستعمر	ويتلفئنا للمراجع		ورار ومعتولية والمراجع	وباللوية أوهر فتعا	فجارتهم وستألفان الم	louid dean citing below	DB Hard Ander
30 dBu\		out the second of	and the second second		a standard for a standard	Contradiction of Males and Con-	distantia tana t			W. aufiliaria
· ·										
20 dBµ\	/									
10 dBμ\	/									
0 dBµV-										
CF 868	.3 MF	Ηz			5001	pts				i00.0 ms/
Marker										
Type	Ref	Trc	X-value	.	Y-value	Func	tion	Fund	tion Result:	
M1		1		2.4 ms	70.96 dBµ					
D2	M1			0.0 ms	0.69 (
D3	M1	1	5.	0128 s	-36.71 (1B				
)[]				F (teady		4,70	2.11.2021 13:43:47

Date: 12.NOV.2021 13:43:48

Plot 7: TX on time 915 MHz low duty cycle

Spectr	rum	Sp	ectrum 2 🛛 🛞	Spectrum 3	X			
Ref Lev	vel 9	0.00 dBµ∖	Offset 20.00 d	B 🖷 RBW 100 kH:	Z			
Att			6 SWT 6	s 😑 VBW 1 MH:	2			
SGL TR)						
⊖1Pk Ma	эх]
					D2	2[1]		0.01 dB
80 dBµV	M1							10.00 ms
	T				M	1[1]		76.90 dBµV
70 dBµV								-2.40 ms
60 dBµV	ті	RG 60.000) dBµV					
50 dBµV								
40 40.44								
40 dBµV	al brand		in the fart of the state of the	وي المانية المانية (حجر عليه الله المراجعة	Here and the street	والالتحر الدريم بلك	يقفل يعيرين أحربتهم ستخ أأفراه	a a ser a year a lateral de selle sont de laterales
30 dBµV		and approximately service			And an and a state of the second	and the second design of the second	and spinning his many	dependent of the second se
00 000								
20 dBµV	-							
10 dBµV	·——							
0 dBµV–	-							
CF 915.	.0 MF	łz		5001 p	ts			600.0 ms/
Marker								
Type	Ref	Trc	X-value	Y-value	Funct	tion	Fund	tion Result
M1		1	-2.4 ms	76.90 dBµV				
D2	M1	1	10.0 ms	0.01 dB				
D3	M1	1	5.0128 s	-40.43 dB				
)[]			R	eady		12.11.2021 13:47:40

Date: 12.NOV.2021 13:47:40

Plot 8: TX on time 915 MHz high duty cycle

Spect	rum	, T	Spe	ctrum 2	×s	pectr	um 3	X	ר					
Ref Le Att	vel	90.00 d		Offset SWT	20.00 dB	RBW								
SGL TR	G: VI			- on i	0.5		1.							
😑 1Pk M	ах													
									D:	2[1]				0.63 dB
80 dBµ\	MI													100.00 ms
	T A								M	1[1]			7	76.15 dBµ¥
70 dBµ\	/		\rightarrow			<u> </u>								-2.40 ms
60 dBµ\	H	TRG 60.	.000 d	ВµV		<u> </u>								
	.													
50 dBµ\	1													
40 dBus	,													
40 dBµ\		وفيارين إيطال	-	and the state of the second	New Heat	ور و و و و و و و و و و و و و و و و و و	ألأن ولان	in the last	-		and a	Lines also and	ويعدينها واستديه	Dan Ingesteller
30 dBµ\					and a later of the		A redu							
· ·														
20 dBµ\	/+		-+			<u> </u>								
10 dBµ\	/					<u> </u>	-							
0 dBµV-														
о ивру-														
CF 915	.0 M	Hz					5001	pts						00.0 ms/
Marker														
Туре	Ref	Trc		X-value		Y-va			unc	tion		Fund	tion Result	
M1 D2	M	1 1			2.4 ms 0.0 ms		15 dBµ 0.63 d							
D2	M.				0.0 ms 0128 s		1.18 d							
	1.1				0100 0		1.10 0							2.11.2021
									R	leady				13:46:40

Date: 12.NOV.2021 13:46:41



Results:

silent period between two transmissions > 10 seconds, see following plots

silent period bet	silent period between two transmissions (limit > 10 sec.)							
frequency	modulation	silent period						
315.0 MHz	ASK	> 10 sec.						
515.0 MHZ	FSK	> 10 sec.						
433.9 MHz	ASK	> 10 sec.						
433.9 MHZ	FSK	> 10 sec.						
868.3 MHz	ASK	> 10 sec.						
000.3 MITZ	FSK	> 10 sec.						
915.0 MHz	ASK	> 10 sec.						
915.0 MHZ	FSK	> 10 sec.						

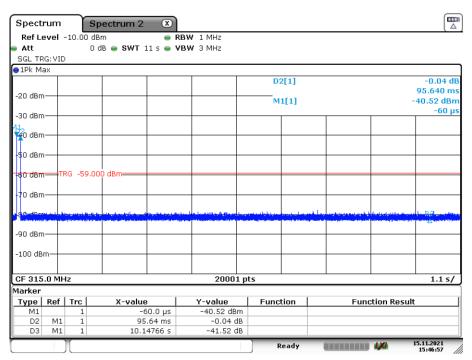


Plot 1: silent time 315 MHz ASK modulation

Spect	rum	\neg	Spectrum 2	× ×						
Ref L	evel -	10.00	l dBm	e Ri	3W 1 MHz					
Att			0 dB 😑 SWT	11 s 👄 🛛	BW 3 MHz					
SGL TR	G: VID									
1Pk M	ах									
						D2	2[1]			-0.04 dB
00 JD-										95.640 ms
-20 dBrr						M	1[1]			-41.50 dBm
-30 dBrr										-60 µs
d d d Brr									_	
1										
50 dBrr									_	
-60 dBn		RG -59	9.000 dBm====						-	
1										
70 dBrr										
South		latente a						in the state frame of	and the second	
-90 dBm										
-100 dB	m+									
CF 315	.0 MH	Iz	I		20001 p	ts				1.1 s/
4arker										
Type	Ref	Trc	X-valu	e	Y-value	Funct	tion	Fu	nction Res	ult
M1		1		·60.0 µs	-41.50 dBm					
D2	M1	1		5.64 ms	-0.04 dB					
D3	M1	1	10.	14766 s	-39.91 dB					
						R	eady		100	15.11.2021 15:45:57

Date: 15.NOV.2021 15:45:57

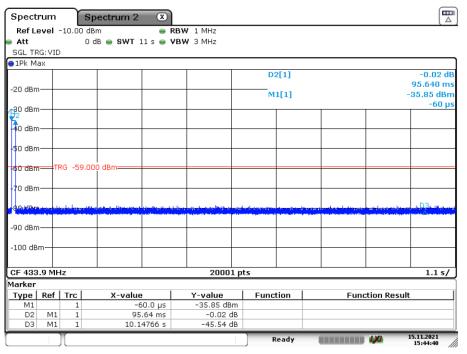
Plot 2: silent time 315 MHz FSK modulation



Date: 15.NOV.2021 15:46:57

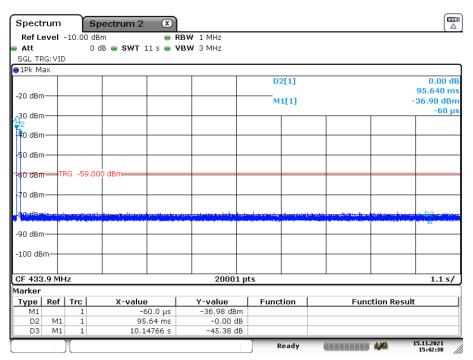


Plot 3: silent time 433.9 MHz ASK modulation



Date: 15.NOV.2021 15:44:40

Plot 4: silent time 433.9 MHz FSK modulation



Date: 15.NOV.2021 15:42:38

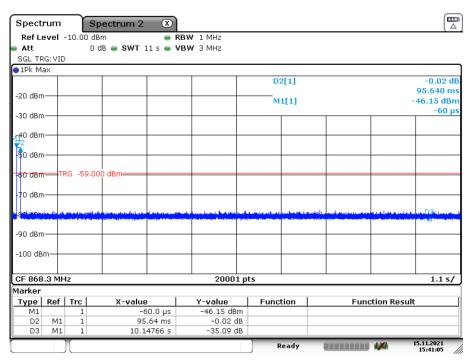


Plot 5: silent time 868.3 MHz ASK modulation

Spect	rum	\neg	Spectrum	2 🗴					
Ref Le	evel -	-10.00		_	SW 1 MHz				
Att			0 dB 👄 SW	T 11 s 👄 VE	3W 3 MHz				
SGL TR									
∎1Pk Ma	эх								
						D2[1]			-0.02 dB 95.640 ms
-20 dBm						M1[1]			-46.56 dBm
						wift]			-60 µs
-30 dBm									
40 dBm									
2	'								
50 dBm									
-60 dBm		RG -59	0.000 dBm===						
70 dBm									
ro abm									
g minutes de	وسأنوروه	والأصامية	فاحدت ويؤيد ساك وأساعاته	a culture come a com	A State of the second second second	وأبعا وأوللا ومستحد والمحافية	مقاسمت والمعالية	ويسرح ويعدونها أدفانهم	n ne se Right and an an
-90 dBm									
-100 dBi	m-								
CF 868	.3 MH	Iz			20001 p	s			1.1 s/
1arker									
Туре	Ref		X-va		Y-value	Function	F	unction Re	sult
M1		1		-60.0 µs	-46.56 dBm				
D2 D3	M1 M1	1	1	95.64 ms	-0.02 dB -33.24 dB				
				0.11100 5	55.24 GD		1		15.11.2021
		Л				Ready		1 , 1 , 0	15:39:49

Date: 15.NOV.2021 15:39:50

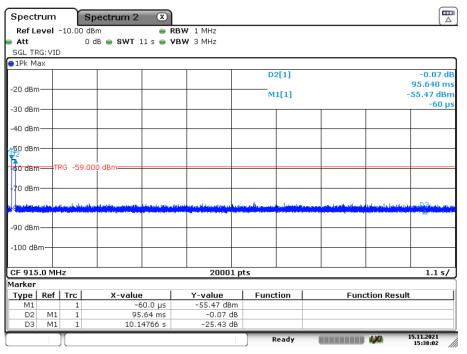
Plot 6: silent time 868.3 MHz FSK modulation



Date: 15.NOV.2021 15:41:05

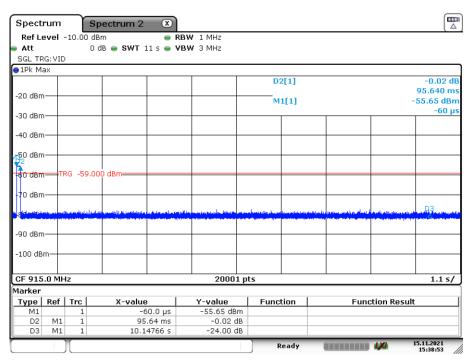


Plot 7: silent time 915.0 MHz ASK modulation



Date: 15.NOV.2021 15:38:03

Plot 8: silent time 915.0 MHz FSK modulation



Date: 15.NOV.2021 15:38:54



Measurement:

Measurement of the 99 % bandwidth of the modulated signal

Measurement parameter							
Detector:	Peak						
Sweep time:	see plots						
Resolution bandwidth:	1% to 5% of the OBW						
Video bandwidth:	3 x RBW						
Span:	500 kHz						
Trace-Mode:	Max. hold						

Limits:

	FCC	IC		
The OBW shall not be wider than 0.25% of the centre frequency in the frequency range 70 MHz to 900				
	and 0.50% ab	ove 900 MHz		

CTC I advanced



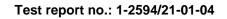
<u>Result:</u>

<u>ASK modulation</u>

	ASK modulation							
Center Frequency (MHz)	Signal bandwidth / kHz							
	OBW 99% limit 20 dB-bandwidth limit	OBW 99%	20 dB-bandwidth					
312.0	780.0	103.359	31.910					
318.0	795.0	104.916	31.870					
431.9	1079.75	108.872	31.990					
435.9	1089.75	107.538	31.960					
868.3	2170.75	115.291	31.870					
902.0	4510.00	117.362	31.830					
915.0	4575.00	125.626	31.790					
928.0	4640.00	125.500	31.910					

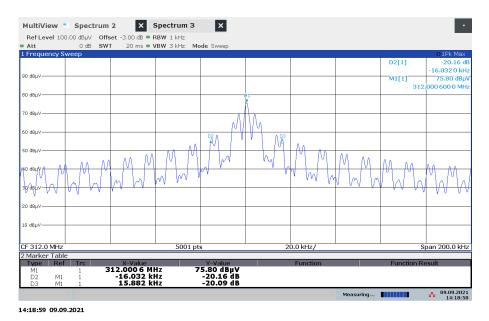
• FSK modulation

	FSK modulation							
Center Frequency	Signal bandwidth / kHz							
(MHz)	OBW 99% limit 20 dB-bandwidth limit	OBW 99%	20 dB-bandwidth					
312.0	780.0	109.576	107.880					
318.0	795.0	93.782	92.380					
431.9	1079.75	100.237	93.180					
435.9	1089.75	115.769	94.480					
868.3	2170.75	122.514	101.480					
902.0	4510.00	125.955	108.480					
915.0	4575.00	126.159	108.780					
928.0	4640.00	108.667	92.880					

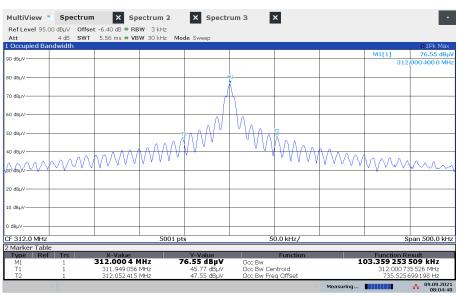




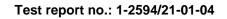
Plot 1: Emissions bandwidth - 312.0 MHz ASK



Plot 2: 99 % emission bandwidth - 312.0 MHz ASK

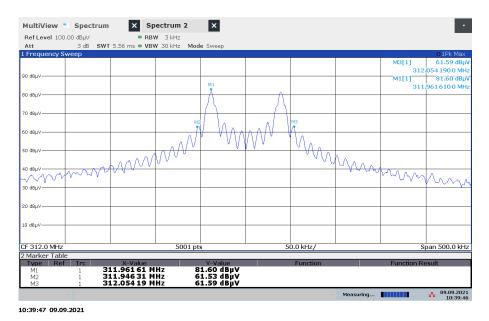


08:04:41 09.09.2021

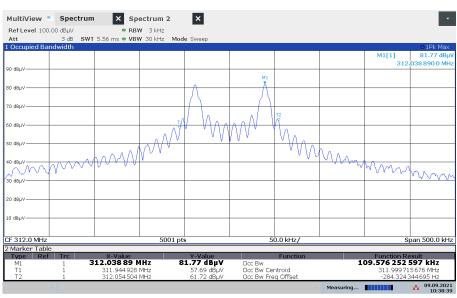




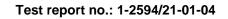
Plot 3: Emissions bandwidth - 312.0 MHz FSK



Plot 4: 99 % emission bandwidth - 312.0 MHz FSK

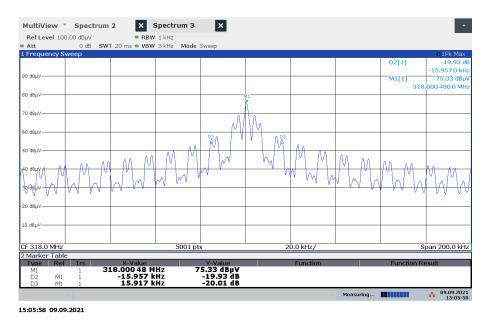


10:38:39 09.09.2021

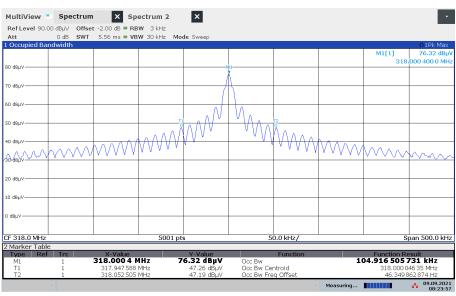




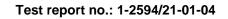
Plot 1: Emissions bandwidth - 318.0 MHz ASK



Plot 2: 99 % emission bandwidth - 318.0 MHz ASK

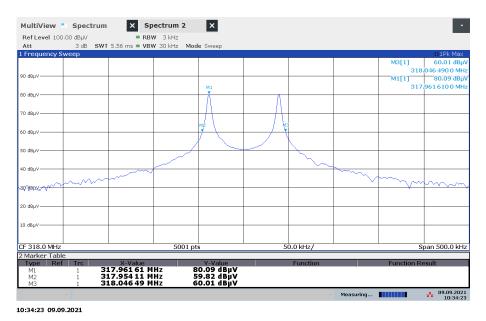


08:23:57 09.09.2021

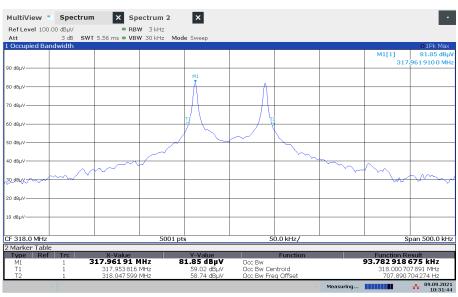




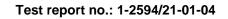
Plot 3: Emissions bandwidth - 318.0 MHz FSK



Plot 4: 99 % emission bandwidth - 318.0 MHz FSK

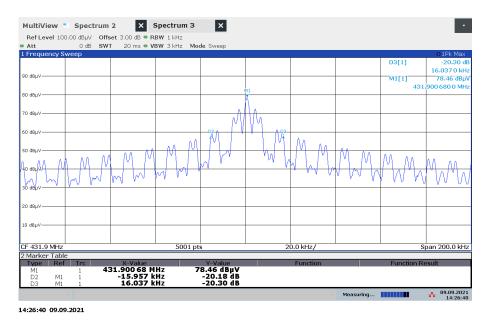


10:31:44 09.09.2021

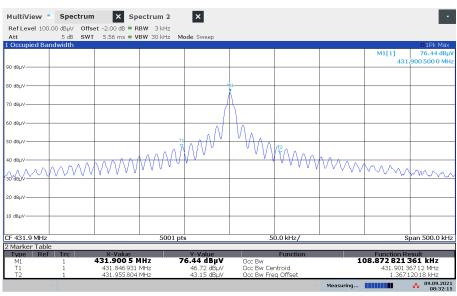




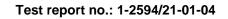
Plot 1: Emissions bandwidth - 431.9 MHz ASK



Plot 2: 99 % emission bandwidth – 431.9 MHz ASK

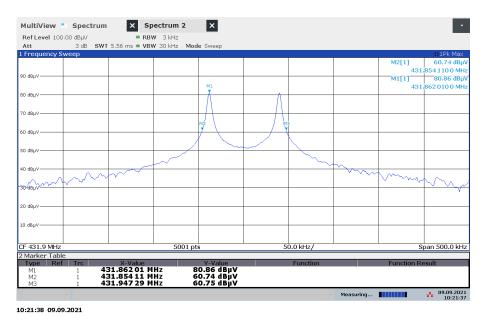


08:32:16 09.09.2021

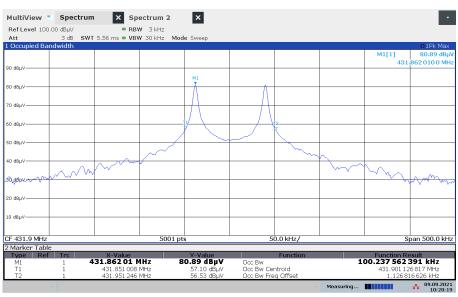




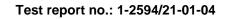
Plot 3: Emissions bandwidth - 431.9 MHz FSK



Plot 4: 99 % emission bandwidth - 431.9 MHz FSK

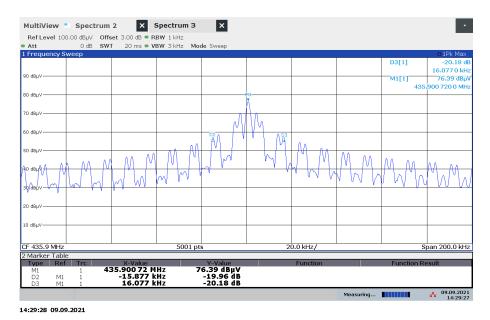


10:20:20 09.09.2021

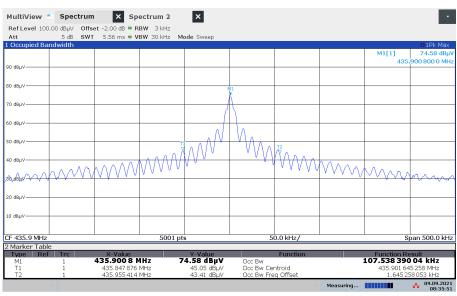




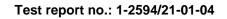
Plot 1: Emissions bandwidth - 435.9 MHz ASK



Plot 2: 99 % emission bandwidth - 435.9 MHz ASK

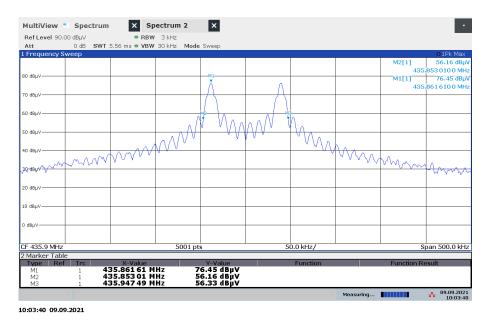


08:35:51 09.09.2021

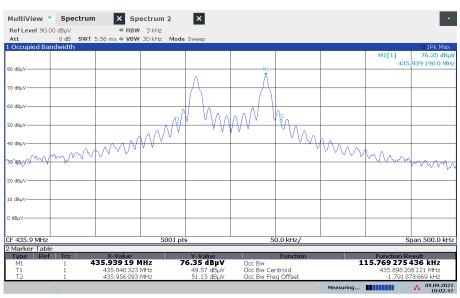




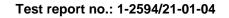
Plot 3: Emissions bandwidth - 435.9 MHz FSK



Plot 4: 99 % emission bandwidth - 435.9 MHz FSK

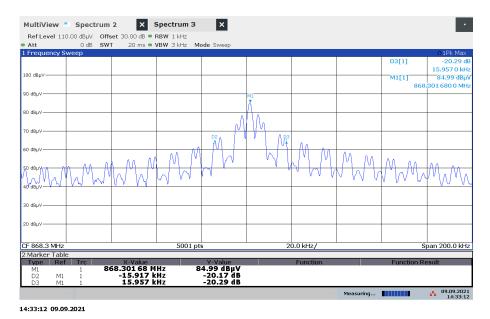


10:02:47 09.09.2021

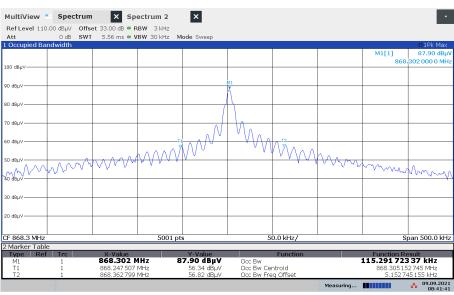




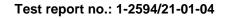
Plot 1: Emissions bandwidth - 868.3 MHz ASK



Plot 2: 99 % emission bandwidth – 868.3 MHz ASK

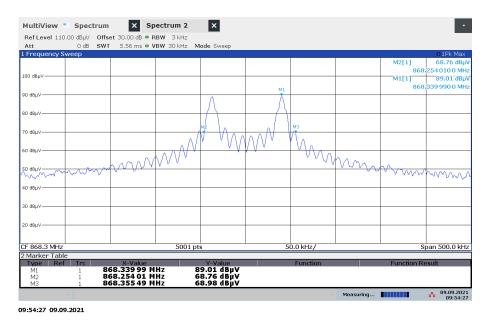


08:41:42 09.09.2021

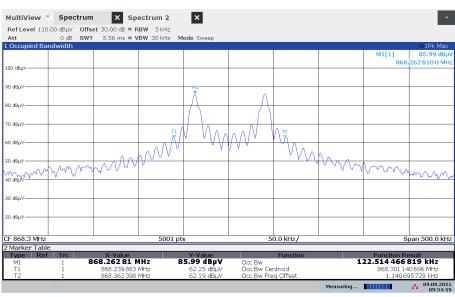




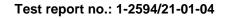
Plot 3: Emissions bandwidth - 868.3 MHz FSK



Plot 4: 99 % emission bandwidth - 868.3 MHz FSK

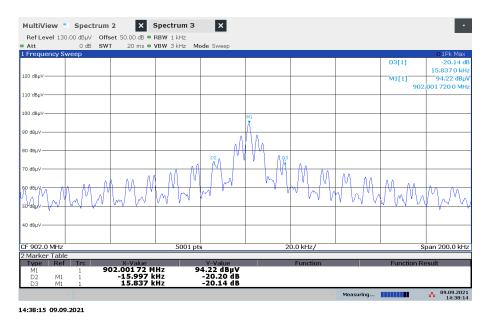


09:55:00 09.09.2021

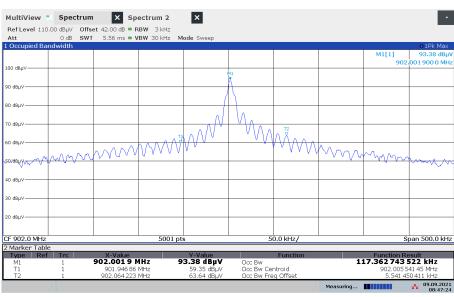




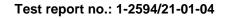
Plot 1: Emissions bandwidth - 902.0 MHz ASK



Plot 2: 99 % emission bandwidth – 902.0 MHz ASK

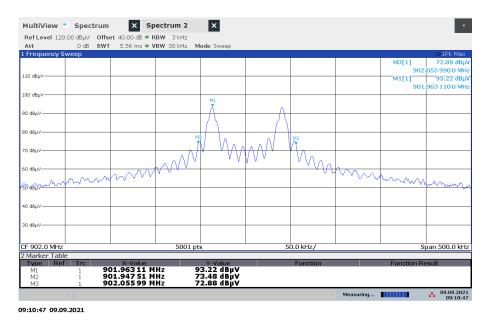


08:47:24 09.09.2021

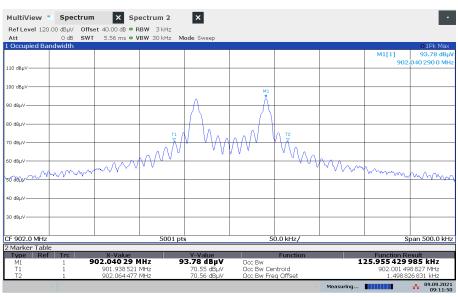




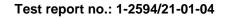
Plot 3: Emissions bandwidth - 902.0 MHz FSK



Plot 4: 99 % emission bandwidth – 902.0 MHz FSK

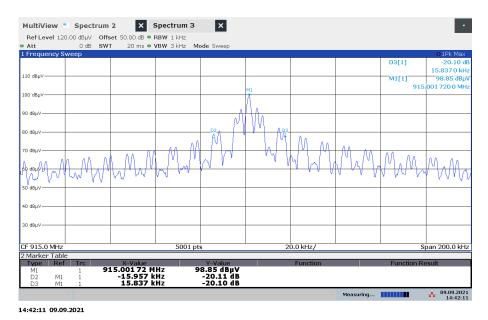


09:11:50 09.09.2021

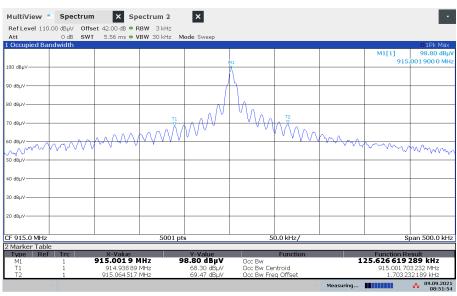




Plot 1: Emissions bandwidth - 915.0 MHz ASK



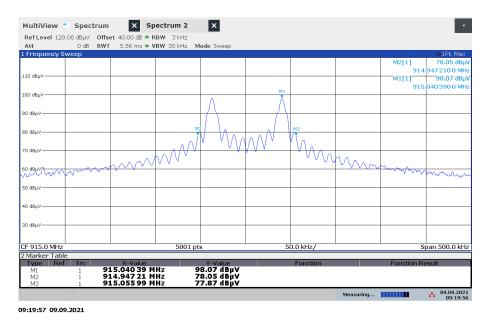
Plot 2: 99 % emission bandwidth - 915.0 MHz ASK



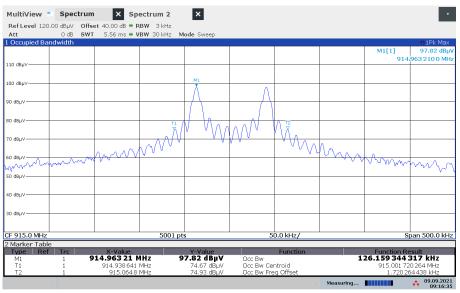
08:51:54 09.09.2021



Plot 3: Emissions bandwidth - 915.0 MHz FSK



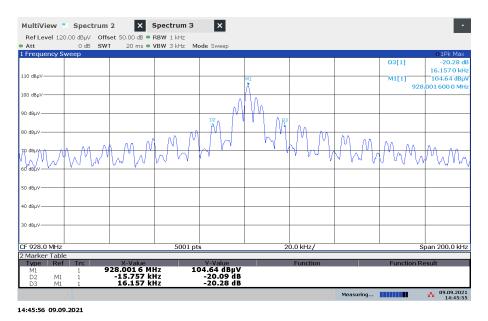
Plot 4: 99 % emission bandwidth - 915.0 MHz FSK



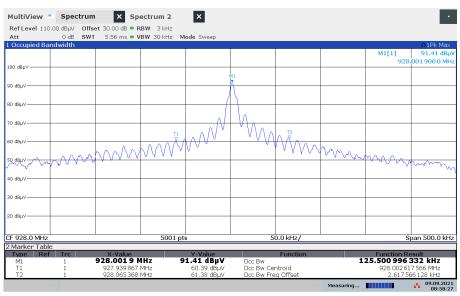
09:16:36 09.09.2021



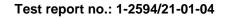
Plot 1: Emissions bandwidth - 928.0 MHz ASK



Plot 2: 99 % emission bandwidth - 928.0 MHz ASK

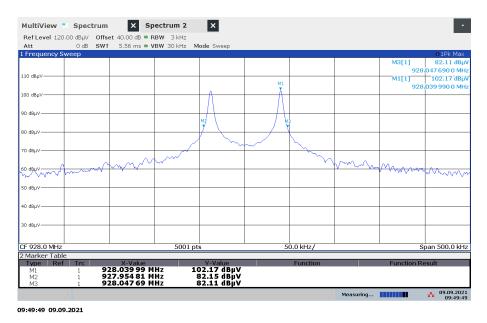


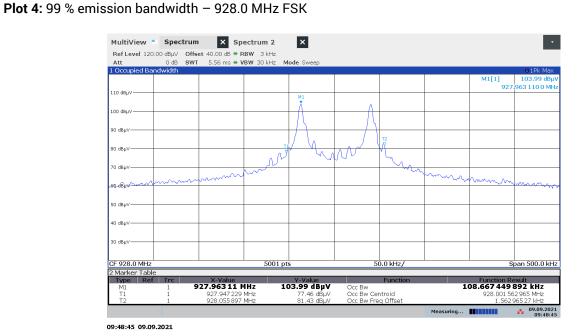
08:58:27 09.09.2021





Plot 3: Emissions bandwidth - 928.0 MHz FSK





Verdict: compliant



11.4 Field strength of the fundamental

Measurement:

Measurement parameter						
Detector:	Peak / pulse averaging / quasi peak					
Sweep time:	Auto					
Resolution bandwidth:	120 kHz					
Video bandwidth:	3 x RBW					
Span:	zero					
Trace-Mode:	Max. hold					
Test setup	7.1 A					
Measurement uncertainty	see chapter 9					

<u>Limits:</u>

FCC			IC					
Field strength of the fundamental.								
In addition to the provisions of Section 15.205, the field strength of emissions from intentional radiators								
operated u	operated under this Section shall not exceed the following:							
Fundamental Frequency (MHz)	Field strength of (µV/r		Measurement distance (m)					
40.66 - 40.70	2,25	0	3					
70-130	1,25	0	3					
130-174	1,250 to	3,750	3					
174-260	3,75	0	3					
260-470	3,750 to	12,500	3					
Above 470	12,5	00	3					

Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows:

- for the band 130-174 MHz, μV/m at 3 meters = 56.81818(F) 6136.3636;
- for the band 260-470 MHz, μ V/m at 3 meters = 41.6667(F) 7083.3333.



<u>Result:</u>

TEST CONDITIONS		MAXIMUM POWER (dBµV/	m at 3 m distance) *
frequency / mode	limit average	peak	average
312.0 MHz ASK	75.44 dBµV/m	71.51	69.27
312.0 MHz FSK	75.44 dBµV/m	71.64	69.30
318.0 MHz ASK	75.80 dBµV/m	75.55	73.25
318.0 MHz FSK	75.80 dBµV/m	74.50	72.33
431.9 MHz ASK	80.75 dBµV/m	77.80	76.08
431.9 MHz FSK	80.75 dBµV/m	76.63	74.51
435.9 MHz ASK	80.89 dBµV/m	77.63	76.03
435.9 MHz FSK	80.89 dBµV/m	76.63	74.51
868.3 MHz ASK	81.93 dBµV/m	81.17	79.50
868.3 MHz FSK	81.93 dBµV/m	79.65	78.05
902.0 MHz ASK	81.93 dBµV/m	76.24	73.89
902.0 MHz FSK	81.93 dBµV/m	75.13	72.85
915.0 MHz ASK	81.93 dBµV/m	77.36	75.57
915.0 MHz FSK	81.93 dBµV/m	75.59	73.26
928.0 MHz ASK	81.93 dBµV/m	79.77	77.25
928.0 MHz FSK	81.93 dBµV/m	79.60	77.29

* Calculated from 10 meter to 3 meter with 10.46 dB



11.5 Field strength of the harmonics and spurious

Measurement:

Measureme	nt parameter
Detector:	Peak / average / quasi peak
Sweep time:	Auto
Resolution bandwidth:	200 Hz / 9 kHz / 120 kHz
Video bandwidth:	3 x RBW
Span:	See plots
Trace-Mode:	Max. hold
Test setup	7.1 A, 7.2 A
Measurement uncertainty	see chapter 9

Limits: Part 15.231

In addition to the provisions of Section 15.205, the field strength of emissions from intentional radiators operated under this Section shall not exceed the following:

FCC			IC						
FCC Part 15.231									
Fundamental Frequency (MHz)	Field strength of s	spurious (µV/m)	Measurement distance (m)						
40.66 - 40.70	22	5	3						
70-130	12	5	3						
130-174	125 to	375	3						
174-260	37	5	3						
260-470	375 to	1,250	3						
Above 470	1,25	50	3						

Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in Section 15.209, whichever limit permits a higher field strength.

FCC			IC							
	FCC Part 15.209									
Frequency (MHz)	Field streng	th (µV/m)	Measurement distance (m)							
0.009 - 0.490	09 – 0.490 2400/F(kl		300							
0.490 - 1.705	24000/F	-(kHz)	30							
1.705 – 30	30)	30							
30 - 88	10	0	3							
88 – 216	15	0	3							
216 - 960	20	0	3							
above 960	50	0	3							



Results:

Spurious emissions within the restricted bands (Part15.205 & 15.209)

Fundamental Frequency	Spurious Frequency	Detector	Limit max. allowed [dBµV/m]	Amplitude of emission [dBµV/m]
312 MHz	1560.0 MHz	Peak	74	36.86
(ASK)	1 200.0 MHZ	AVG	54	25.16
	4210 22 MU-	Peak	74	50.06
431.9 MHz	4319.22 MHz	AVG	54	44.89
(FSK)		Peak	74	51.19
	4750.40 MHz	AVG	54	45.60
435.9 MHz		Peak	74	46.03
(FSK)	1418.32 MHz	AVG	54	30.12
868.1 MHz	1 410 70 MUL	Peak	74	46.21
(FSK)	1412.72 MHz	AVG	54	31.10
902.0 MHz		Peak	74	49.96
(ASK)	3607.73 MHz	AVG	54	45.50
928.0 MHz		Peak	74	51.98
(FSK)	8351.80 MHz	AVG	54	48.04

For emissions below 1 GHz, see table below the plots.



Fundamental Frequency	Spurious Frequency	Detector	Limit max. allowed [dBµV/m]	Amplitude of emission [dBµV/m]
312 MHz	1047 04 141-	Peak	-/-	49.99
(ASK)	1247.94 MHz	AVG	62	48.45
	1005 00 MUL	Peak	-/-	58.56
431.9 MHz		AVG	62	57.92
(FSK)		Peak	-/-	51.30
		AVG	62	49.85
435.9 MHz	1742.02 MU-	Peak	-/-	51.04
(FSK)	1743.82 MHz	AVG	62	49.54
868.3 MHz	1716 00 MU-	Peak	-/-	37.83
(FSK)	1716.38 MHz	AVG	62	25.71
	1707 10 MU	Peak	-/-	59.98
868.5 MHz	1737.10 MHz	AVG	62	59.47
(ASK)		Peak	-/-	61.69
	9553.9 MHz	AVG	62	59.22

<u>Results:</u> Spurious emissions outside the restricted bands (Part15.231)

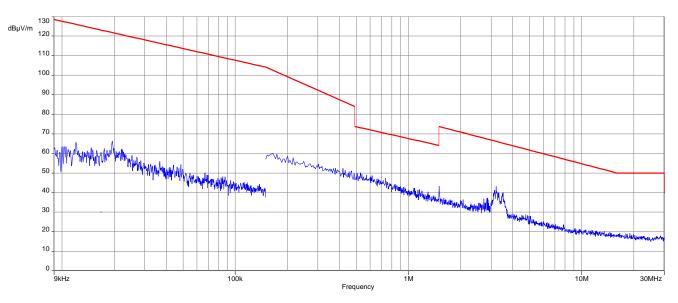
For emissions below 1 GHz, see table below the plots.



Plots:

• TX 312.0MHz

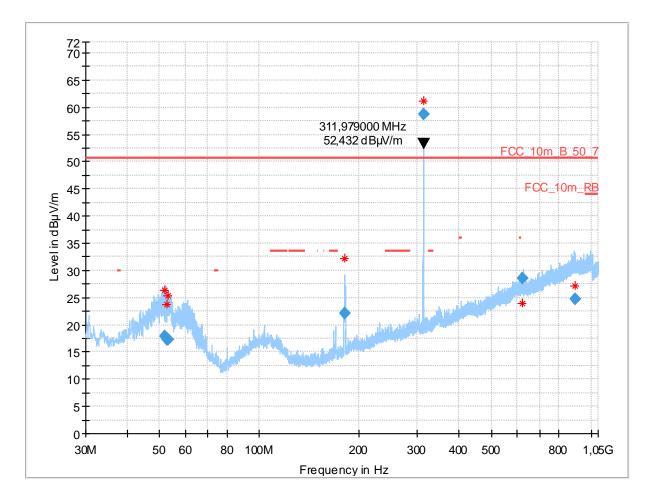
Plot 1: TX@312MHz, ASK, 9 kHz to 30 MHz



Test report no.: 1-2594/21-01-04



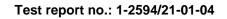
Plot 2: TX@312MHz, ASK, 30 MHz to 1000 MHz, vertical & horizontal polarisation



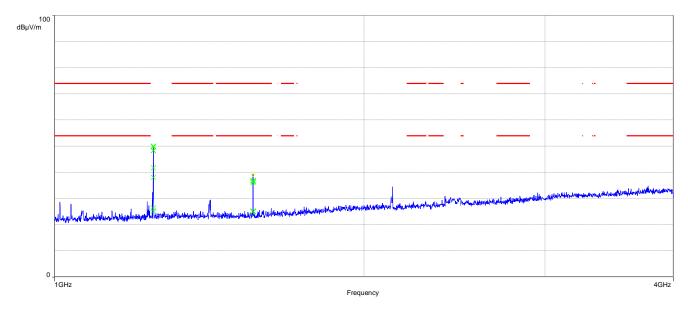
Final_Result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	
51.767	17.85	50.7	32.9	1000	120.0	98.0	V	68	15	
52.816	17.21	50.7	33.5	1000	120.0	98.0	V	104	15	
53.275	17.21	50.7	33.5	1000	120.0	170.0	V	95	15	
181.401	22.21	50.7	28.5	1000	120.0	170.0	V	292	11	
312.002		wanted signal								
623.084	28.64	50.7	22.1	1000	120.0	170.0	Н	157	22	
891.498	24.71	50.7	26.0	1000	120.0	170.0	Н	-22	25	

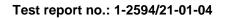
In addition to the limit according to Part 15.209 shown in the plot, the limit according to Part 15.231 also applies!







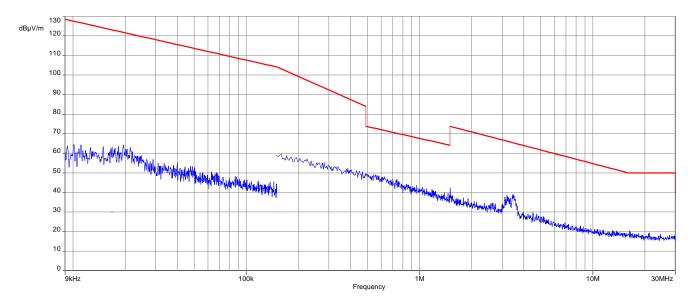
Plot 3: TX@312MHz, ASK, 1000 MHz to 6000 MHz, vertical & horizontal polarisation





• TX 312.0MHz

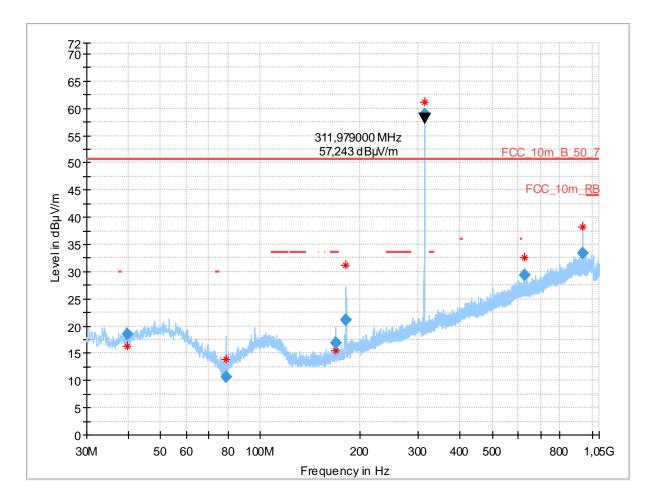
Plot 1: TX@312MHz, FSK, 9 kHz to 30 MHz



Test report no.: 1-2594/21-01-04



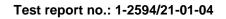
Plot 2: TX@312MHz, FSK, 30 MHz to 1000 MHz, vertical & horizontal polarisation



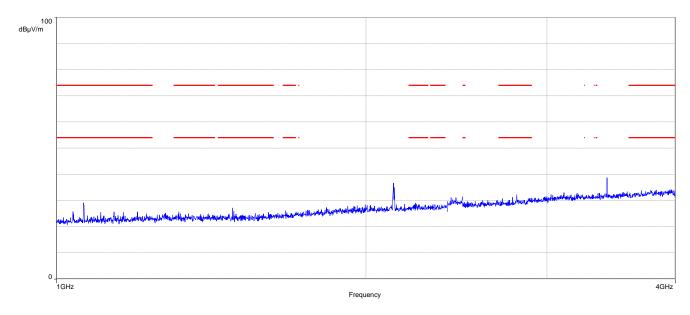
Final_Result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
39.679	18.52	50.7	32.2	1000	120.0	170.0	V	247	14
78.767	10.74	50.7	40.0	1000	120.0	170.0	V	192	8
169.081	16.83	50.7	33.9	1000	120.0	170.0	V	276	11
181.396	21.20	50.7	29.5	1000	120.0	121.0	V	292	11
312.071		wanted signal							
623.922	29.46	50.7	21.2	1000	120.0	170.0	V	105	22
935.910	33.35	50.7	17.4	1000	120.0	120.0	Н	165	26

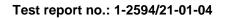
In addition to the limit according to Part 15.209 shown in the plot, the limit according to Part 15.231 also applies!







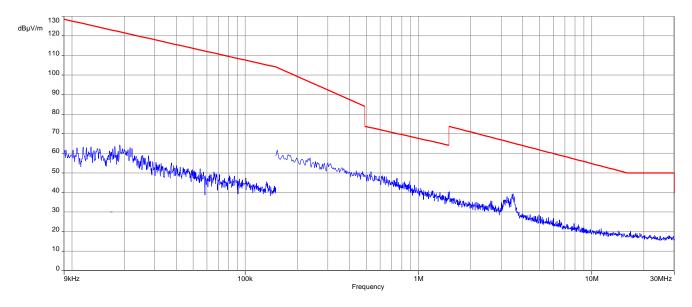
Plot 3: TX@312MHz, FSK, 1000 MHz to 6000 MHz, vertical & horizontal polarisation





• TX 318.0MHz

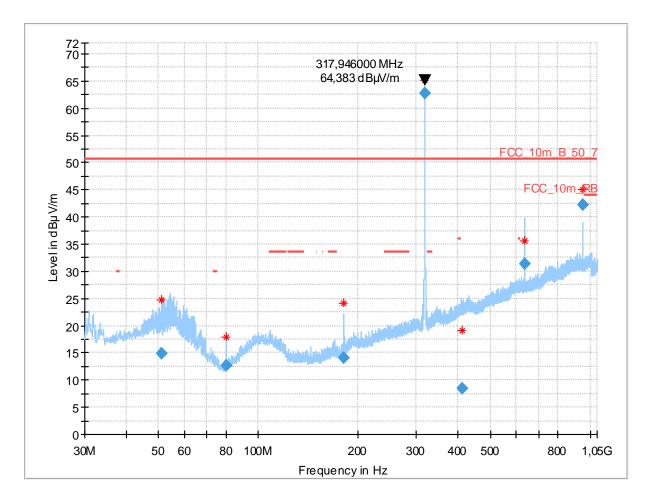
Plot 1: TX@318MHz, ASK, 9 kHz to 30 MHz



Test report no.: 1-2594/21-01-04



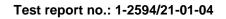
Plot 2: TX@318MHz, ASK, 30 MHz to 1000 MHz, vertical & horizontal polarisation



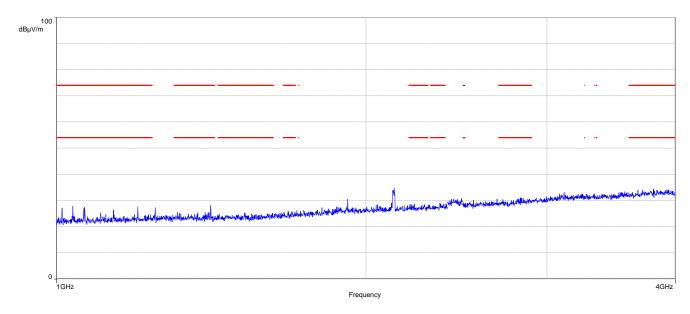
Final_Result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
51.230	14.90	50.7	35.8	1000	120.0	203.0	V	194	15
79.997	12.68	50.7	38.0	1000	120.0	328.0	V	110	8
180.870	14.05	50.7	36.7	1000	120.0	200.0	V	339	11
318.004				wante	ed signal				
410.306	8.37	50.7	42.3	1000	120.0	242.0	Н	184	18
635.944	31.33	50.7	19.4	1000	120.0	262.0	V	203	22
954.002	42.14	50.7	8.6	1000	120.0	200.0	V	166	25

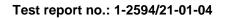
In addition to the limit according to Part 15.209 shown in the plot, the limit according to Part 15.231 also applies!







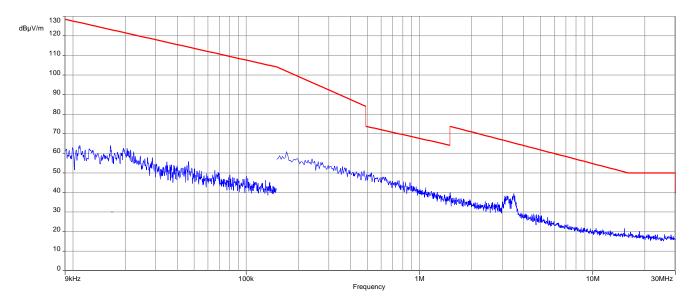
Plot 3: TX@318MHz, ASK, 1000 MHz to 6000 MHz, vertical & horizontal polarisation





• TX 318.0MHz

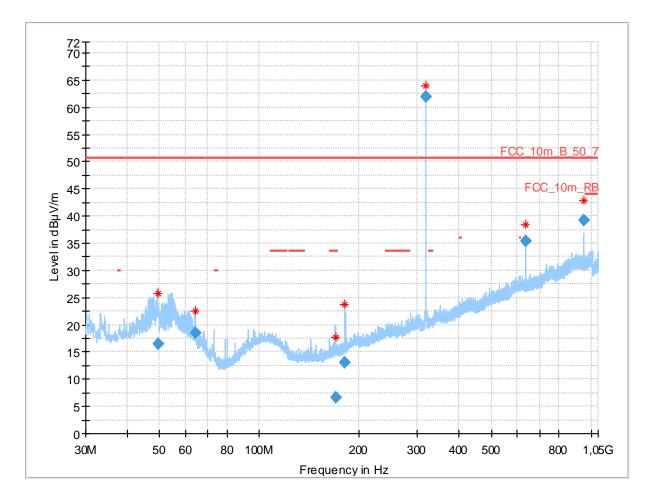
Plot 1: TX@318MHz, FSK, 9 kHz to 30 MHz



Test report no.: 1-2594/21-01-04



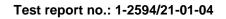
Plot 2: TX@318MHz, FSK, 30 MHz to 1000 MHz, vertical & horizontal polarisation



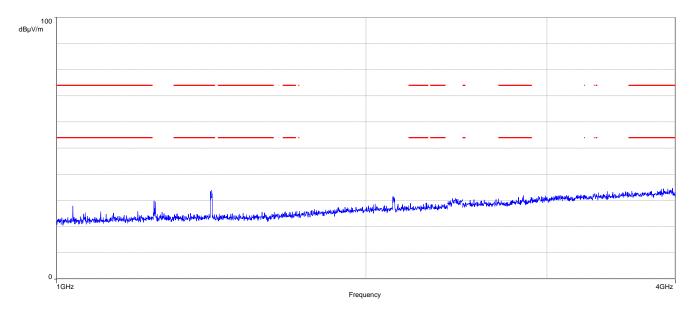
Final_Result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
49.758	16.56	50.7	34.1	1000	120.0	100.0	V	110	15
64.029	18.42	50.7	32.3	1000	120.0	255.0	V	164	13
169.559	6.73	50.7	44.0	1000	120.0	200.0	V	180	11
181.448	13.06	50.7	37.6	1000	120.0	120.0	V	12	11
317.966		wanted signal							
636.079	35.37	50.7	15.3	1000	120.0	268.0	V	225	22
953.846	39.24	50.7	11.5	1000	120.0	200.0	V	181	25

In addition to the limit according to Part 15.209 shown in the plot, the limit according to Part 15.231 also applies!





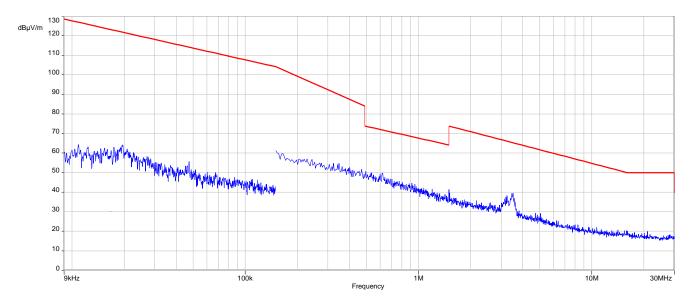


Plot 3: TX@318MHz, FSK, 1000 MHz to 6000 MHz, vertical & horizontal polarisation



• TX 431.9MHz

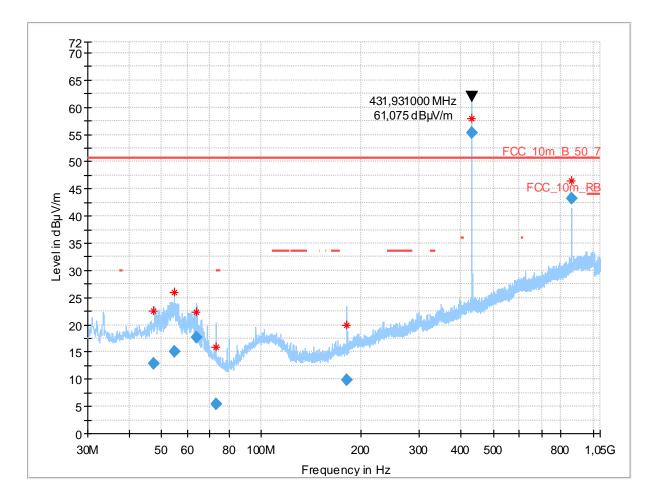
Plot 1: TX@431.9MHz, ASK, 9 kHz to 30 MHz



Test report no.: 1-2594/21-01-04



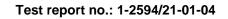
Plot 2: TX@431.9MHz, ASK, 30 MHz to 1000 MHz, vertical & horizontal polarisation



Final_Result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)	
47.264	12.85	50.7	37.9	1000	120.0	208.0	V	90	15	
54.728	15.02	50.7	35.7	1000	120.0	307.0	V	25	15	
63.988	17.64	50.7	33.1	1000	120.0	291.0	V	-45	13	
73.184	5.40	50.7	45.3	1000	120.0	400.0	V	112	9	
181.292	9.80	50.7	40.9	1000	120.0	200.0	V	167	11	
431.849	wanted signal									
863.818	43.26	50.7	7.4	1000	120.0	203.0	V	90	25	

In addition to the limit according to Part 15.209 shown in the plot, the limit according to Part 15.231 also applies!



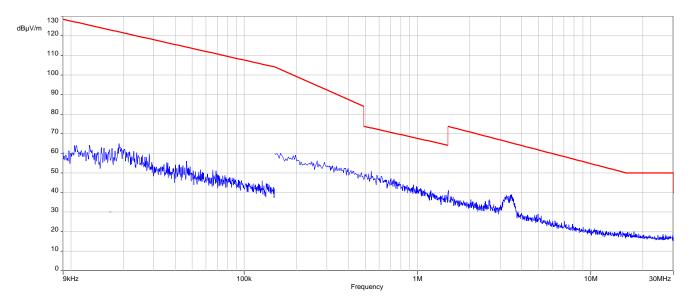


Plot 3: TX@431.9MHz, ASK, 1000 MHz to 6000 MHz, vertical & horizontal polarisation



• TX 431.9MHz

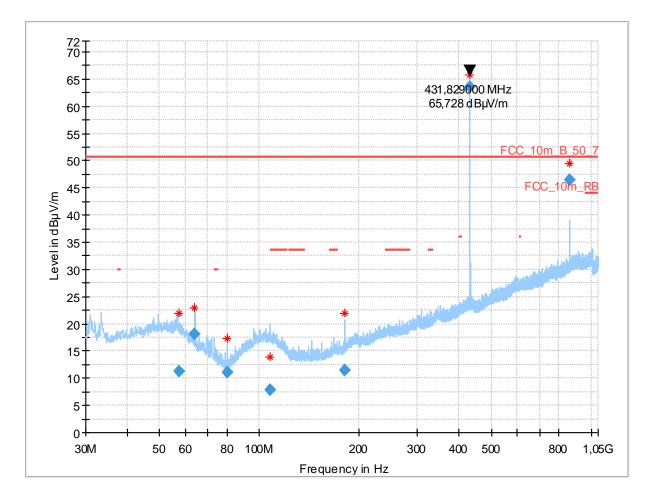
Plot 1: TX@431.9MHz, FSK, 9 kHz to 30 MHz



Test report no.: 1-2594/21-01-04



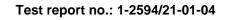
Plot 2: TX@431.9MHz, FSK, 30 MHz to 1000 MHz, vertical & horizontal polarisation



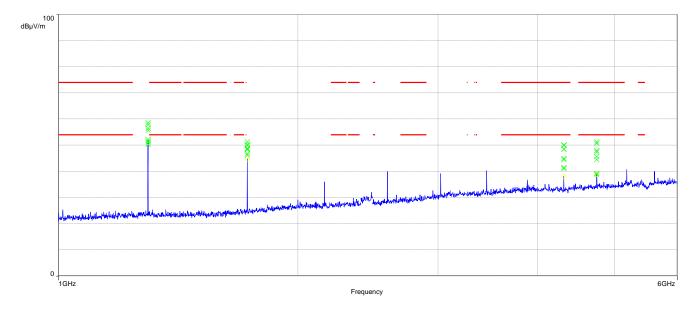
Final_Result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
57.167	11.33	50.7	39.4	1000	120.0	200.0	V	343	16
63.982	18.19	50.7	32.5	1000	120.0	246.0	V	135	13
80.000	11.07	50.7	39.6	1000	120.0	206.0	V	90	8
107.965	7.93	50.7	42.8	1000	120.0	200.0	V	11	14
180.940	11.40	50.7	39.3	1000	120.0	200.0	V	218	11
431.859	wanted signal								
863.722	46.55	50.7	4.2	1000	120.0	203.0	V	118	25

In addition to the limit according to Part 15.209 shown in the plot, the limit according to Part 15.231 also applies!



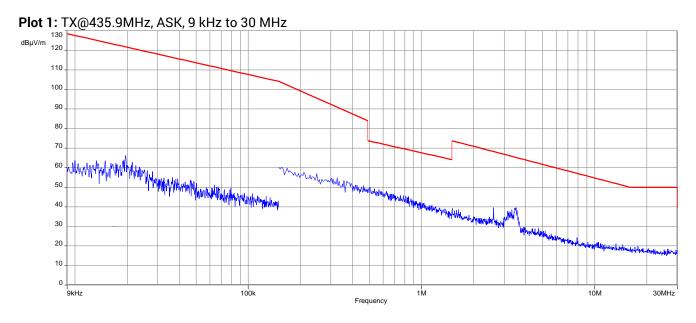




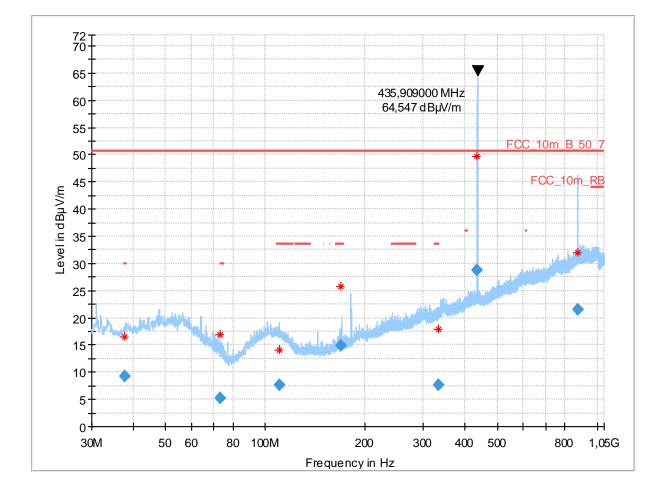
Plot 3: TX@431.9MHz, FSK, 1000 MHz to 6000 MHz, vertical & horizontal polarisation



• TX 435.9MHz



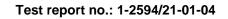




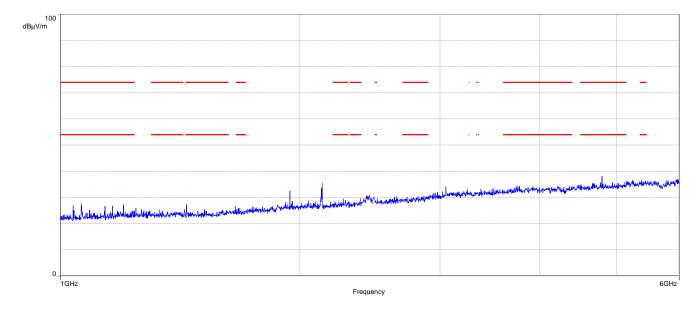
Plot 2: TX@435.9MHz, ASK, 30 MHz to 1000 MHz, vertical & horizontal polarisation

Final_Result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
37.820	9.33	50.7	41.4	1000	120.0	190.0	V	0	14
72.997	5.23	50.7	45.5	1000	120.0	400.0	V	299	9
110.512	7.61	50.7	43.1	1000	120.0	200.0	V	0	13
169.541	14.80	50.7	35.9	1000	120.0	135.0	V	136	11
332.019	7.64	50.7	43.1	1000	120.0	400.0	V	9	16
435.690				wante	d signal				
871.968	21.45	50.7	29.3	1000	120.0	111.0	Н	253	25





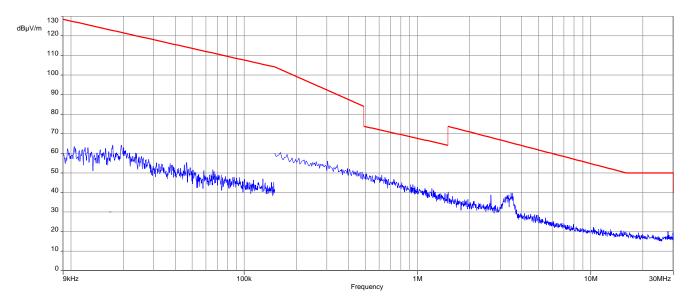


Plot 3: TX@435.9MHz, ASK, 1000 MHz to 6000 MHz, vertical & horizontal polarisation



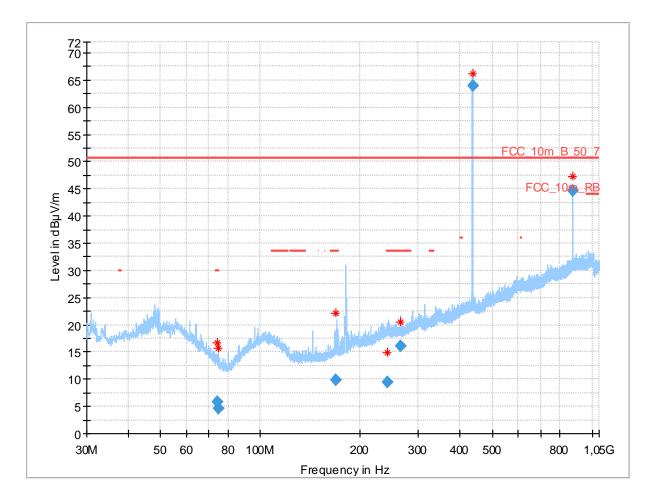
• TX 435.9MHz

Plot 1: TX@435.9MHz, FSK, 9 kHz to 30 MHz



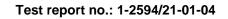


Plot 2: TX@435.9MHz, FSK, 30 MHz to 1000 MHz, vertical & horizontal polarisation

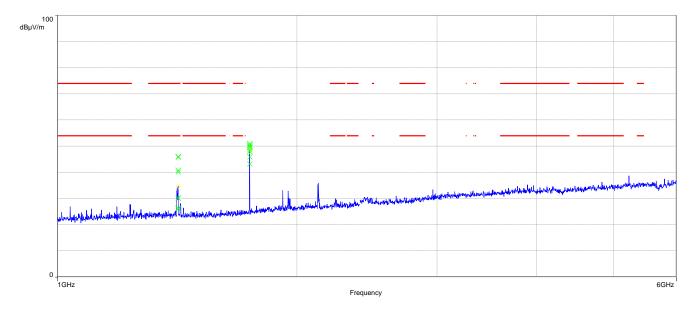


Final_Result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
74.228	5.74	50.7	45.0	1000	120.0	400.0	V	0	9
74.751	4.69	50.7	46.0	1000	120.0	400.0	V	137	9
169.510	9.82	50.7	40.9	1000	120.0	109.0	V	161	11
242.461	9.43	50.7	41.3	1000	120.0	289.0	V	83	14
264.014	16.05	50.7	34.7	1000	120.0	200.0	V	196	14
435.863				wante	ed signal				
871.730	44.56	50.7	6.1	1000	120.0	307.0	Н	243	25





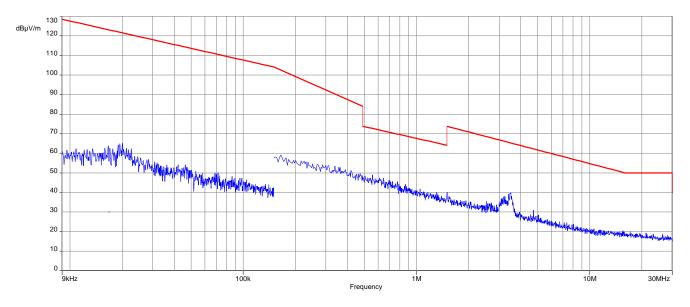


Plot 3: TX@435.9MHz, FSK, 1000 MHz to 6000 MHz, vertical & horizontal polarisation

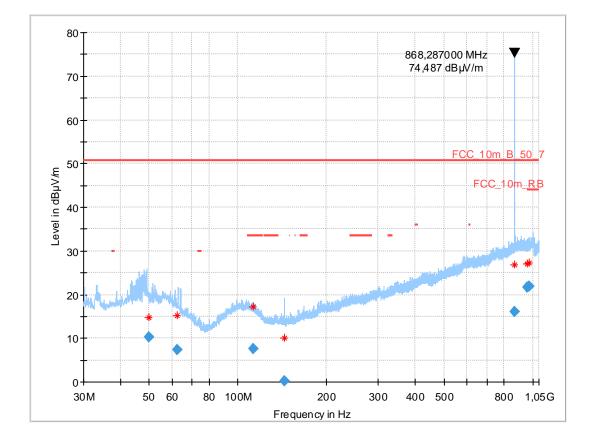


• TX 868.3MHz

Plot 1: TX@868.3MHz, ASK, 9 kHz to 30 MHz



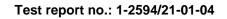




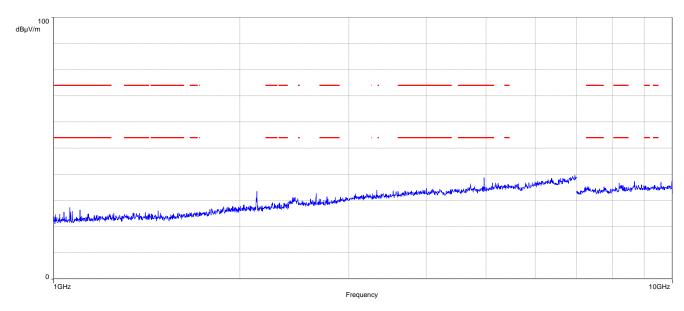
Plot 2: TX@868.3MHz, ASK, 30 MHz to 1000 MHz, vertical & horizontal polarisation

Final_Result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
49.784	10.23	50.7	40.5	1000	120.0	104.0	V	22	15
62.109	7.40	50.7	43.3	1000	120.0	200.0	V	225	13
112.659	7.50	50.7	43.2	1000	120.0	194.0	Н	60	13
143.977	0.23	50.7	50.5	1000	120.0	200.0	V	-37	10
868.010				wante	ed signal				
961.943	21.61	50.7	29.1	1000	120.0	112.0	V	-45	25
974.155	21.94	50.7	28.8	1000	120.0	400.0	Н	135	26





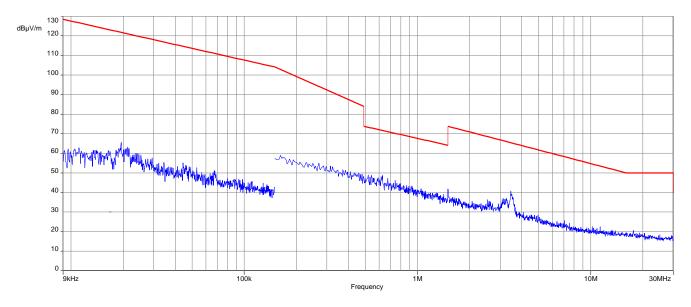


Plot 3: TX@868.3MHz, ASK, 1000 MHz to 6000 MHz, vertical & horizontal polarisation

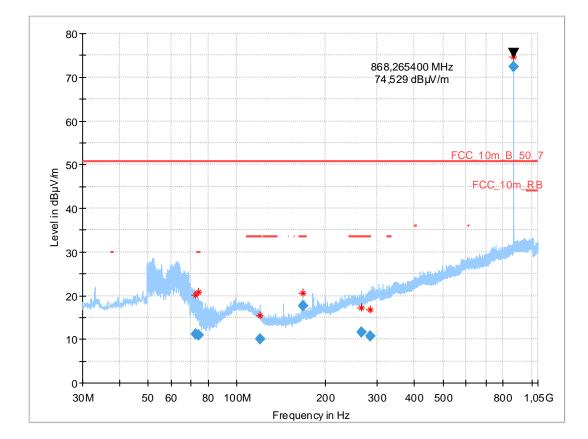


• TX 868.3MHz

Plot 1: TX@868.3MHz, FSK, 9 kHz to 30 MHz



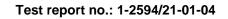




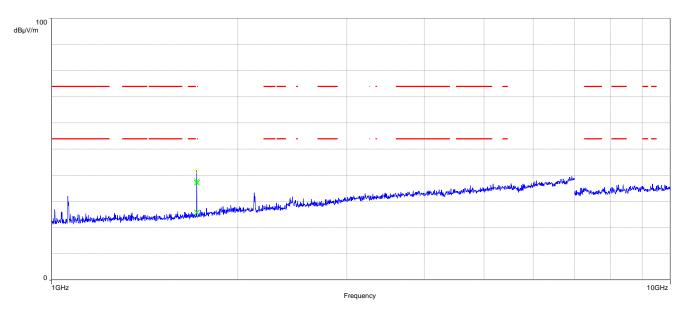
Plot 2: TX@868.3MHz, FSK, 30 MHz to 1000 MHz, vertical & horizontal polarisation

Final_Result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
72.786	11.20	50.7	39.5	1000	120.0	186.0	V	205	10
74.247	11.03	50.7	39.7	1000	120.0	200.0	V	180	9
119.997	10.14	50.7	40.6	1000	120.0	135.0	V	90	11
168.001	17.74	50.7	33.0	1000	120.0	106.0	V	193	11
264.002	11.73	50.7	39.0	1000	120.0	118.0	V	180	14
283.909	10.62	50.7	40.1	1000	120.0	200.0	V	22	15
868.265		wanted signal							



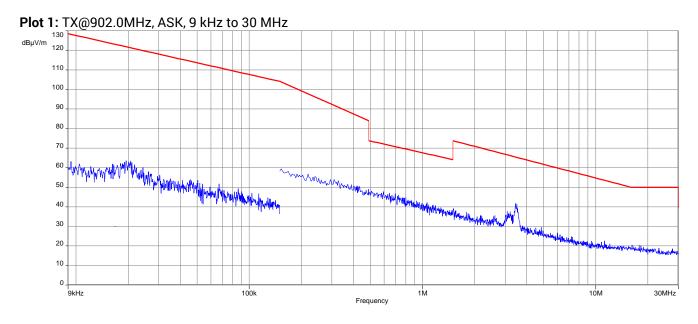




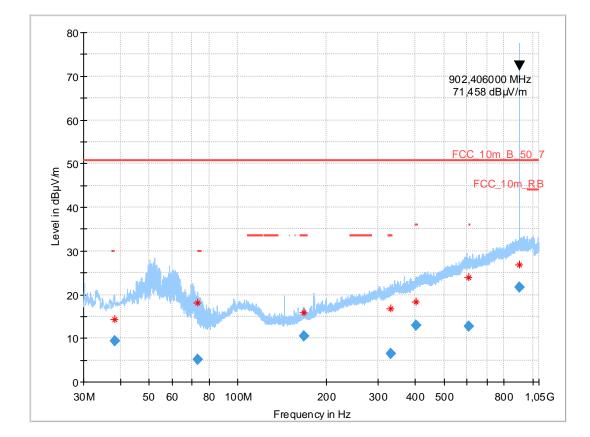
Plot 3: TX@868.3MHz, FSK, 1000 MHz to 6000 MHz, vertical & horizontal polarisation



• TX 902.0MHz



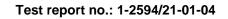




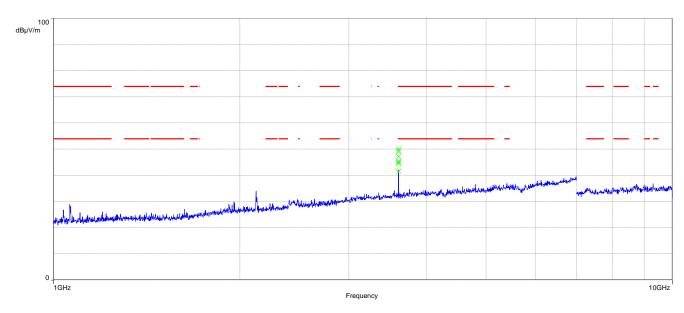
Plot 2: TX@902.0MHz, ASK, 30 MHz to 1000 MHz, vertical & horizontal polarisation

Final_Result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
38.179	9.41	50.7	41.3	1000	120.0	203.0	V	90	14
73.026	5.13	50.7	45.6	1000	120.0	382.0	V	315	9
168.011	10.52	50.7	40.2	1000	120.0	116.0	V	266	11
330.953	6.45	50.7	44.3	1000	120.0	200.0	V	11	16
401.193	13.00	50.7	37.7	1000	120.0	196.0	Н	-45	18
609.158	12.82	50.7	37.9	1000	120.0	325.0	Н	-45	22
902.552				wante	ed signal				



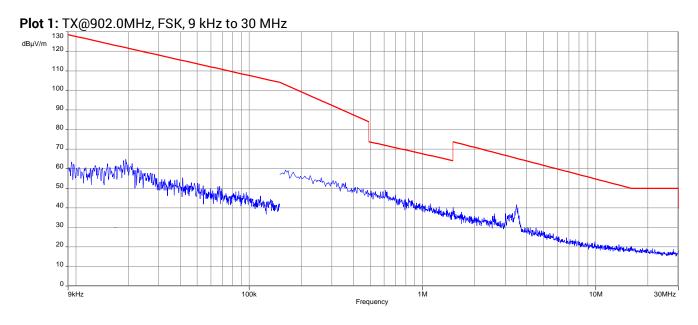




Plot 3: TX@902.0MHz, ASK, 1000 MHz to 6000 MHz, vertical & horizontal polarisation



• TX 902.0MHz





88 80 70 70 901,947000 MHz 79,701 dBµV/m 60 60 60 FCC 10m B 50 7 FCC_10m B 50 7 FCC

Plot 2: TX@902.0MHz, FSK, 30 MHz to 1000 MHz, vertical & horizontal polarisation

Final_Result:

10

0 + 30M

50 60

80 100M

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
37.777	9.39	50.7	41.3	1000	120.0	200.0	V	170	14
73.733	11.88	50.7	38.8	1000	120.0	400.0	V	122	9
108.684	7.90	50.7	42.8	1000	120.0	357.0	Н	225	13
171.237	7.72	50.7	43.0	1000	120.0	221.0	V	243	11
333.926	11.41	50.7	39.3	1000	120.0	200.0	V	-45	16
405.305	13.14	50.7	37.6	1000	120.0	400.0	V	45	18
902.044	wanted signal								

200

Frequency in Hz

*

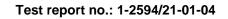
300

400

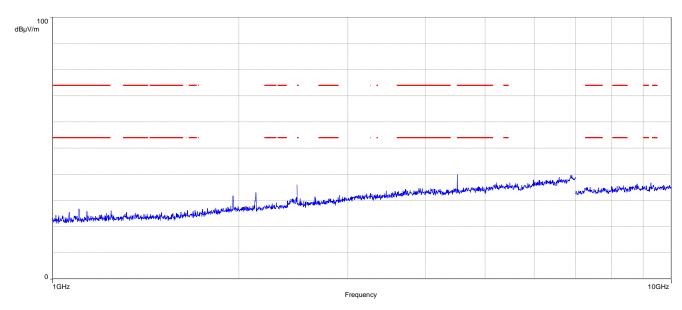
500

800

1,05G



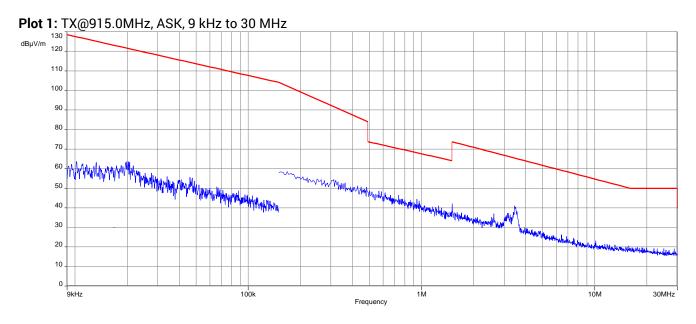




Plot 3: TX@902.0MHz, FSK, 1000 MHz to 6000 MHz, vertical & horizontal polarisation

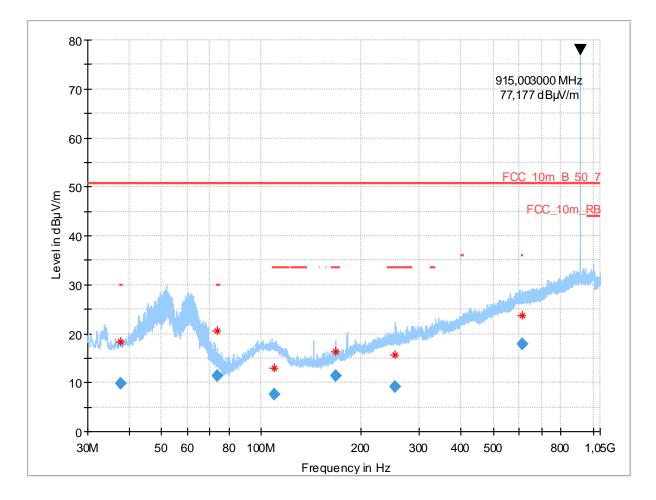


• TX 915.0MHz



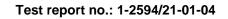


Plot 2: TX@915.0MHz, ASK, 30 MHz to 1000 MHz, vertical & horizontal polarisation

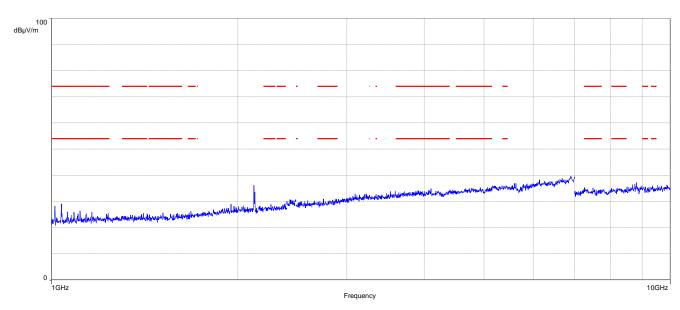


Final_Result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
37.762	9.73	50.7	41.0	1000	120.0	123.0	V	225	14
73.766	11.32	50.7	39.4	1000	120.0	200.0	V	90	9
109.784	7.58	50.7	43.1	1000	120.0	209.0	Н	135	13
168.006	11.40	50.7	39.3	1000	120.0	111.0	V	180	11
252.640	9.21	50.7	41.5	1000	120.0	376.0	V	32	14
610.873	17.82	50.7	32.9	1000	120.0	400.0	V	193	22
915.002				wante	ed signal				



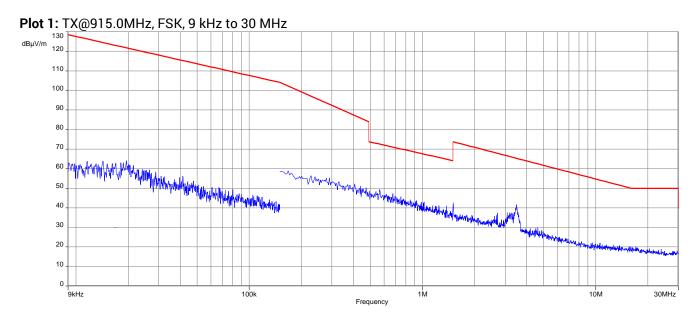




Plot 3: TX@915.0MHz, ASK, 1000 MHz to 6000 MHz, vertical & horizontal polarisation

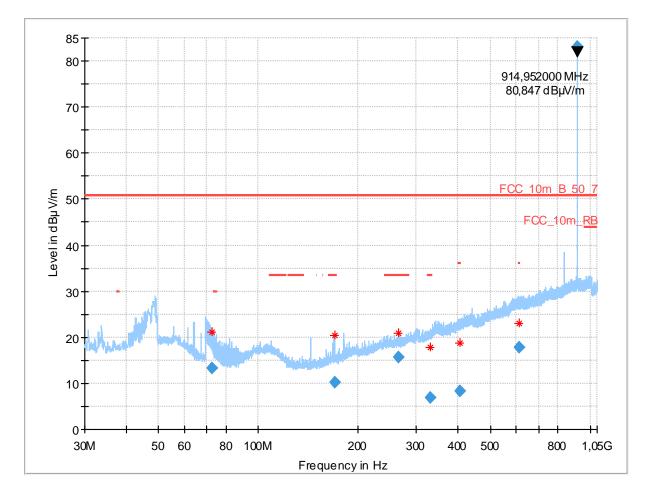


• TX 915.0MHz



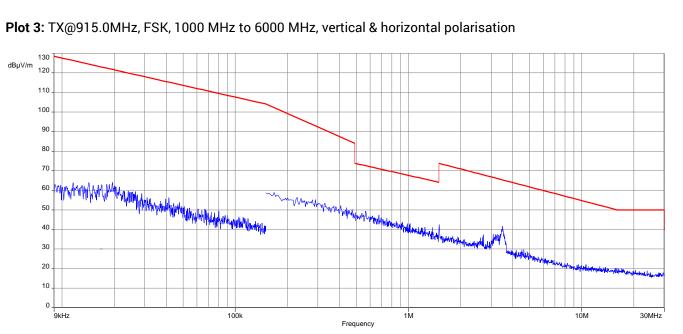


Plot 2: TX@915.0MHz, FSK, 30 MHz to 1000 MHz, vertical & horizontal polarisation



Final_Result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
72.704	13.24	50.7	37.5	1000	120.0	400.0	V	77	10
169.901	10.12	50.7	40.6	1000	120.0	121.0	V	140	11
264.014	15.64	50.7	35.1	1000	120.0	400.0	V	-9	14
329.867	6.79	50.7	43.9	1000	120.0	322.0	V	112	16
405.904	8.23	50.7	42.5	1000	120.0	400.0	V	0	18
611.201	17.79	50.7	32.9	1000	120.0	400.0	V	180	22
914.962				wante	ed signal				

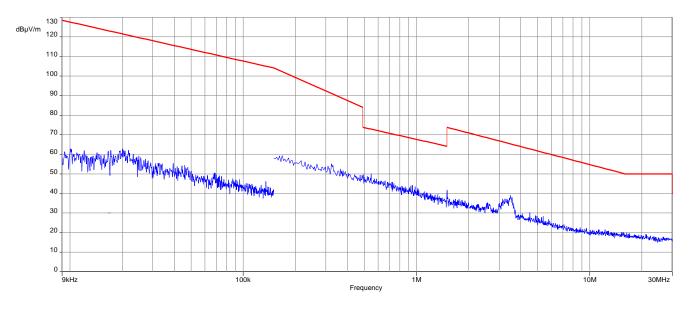






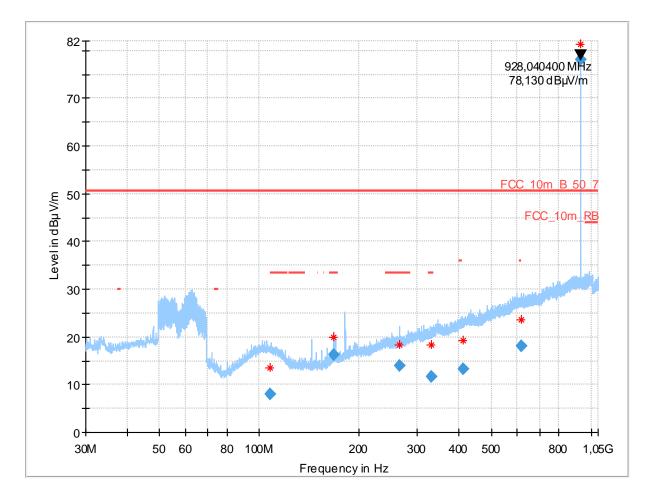
• TX 928.0MHz

Plot 1: TX@928.0MHz, ASK, 9 kHz to 30 MHz



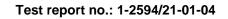


Plot 2: TX@928.0MHz, ASK, 30 MHz to 1000 MHz, vertical & horizontal polarisation



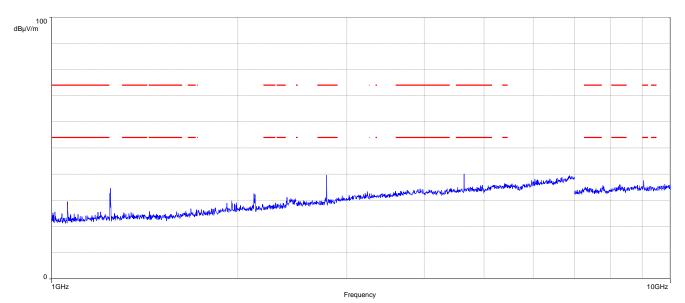
Final_Result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
108.149	8.08	50.7	42.6	1000	120.0	128.0	V	135	14
167.984	16.15	50.7	34.6	1000	120.0	150.0	V	253	11
264.006	13.88	50.7	36.8	1000	120.0	400.0	V	90	14
330.277	11.75	50.7	39.0	1000	120.0	200.0	V	33	16
410.133	13.33	50.7	37.4	1000	120.0	215.0	Н	180	18
614.637	18.06	50.7	32.6	1000	120.0	200.0	Н	180	22
928.040				wante	ed signal				





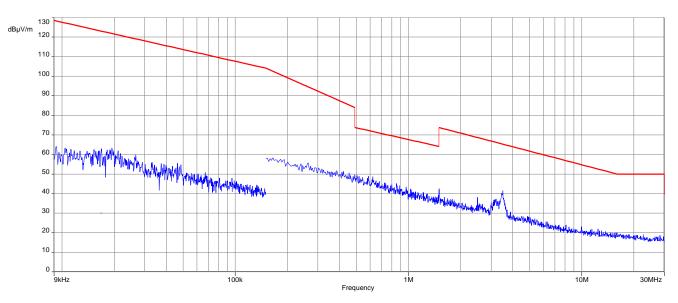
Plot 3: TX@928.0MHz, ASK, 1000 MHz to 6000 MHz, vertical & horizontal polarisation





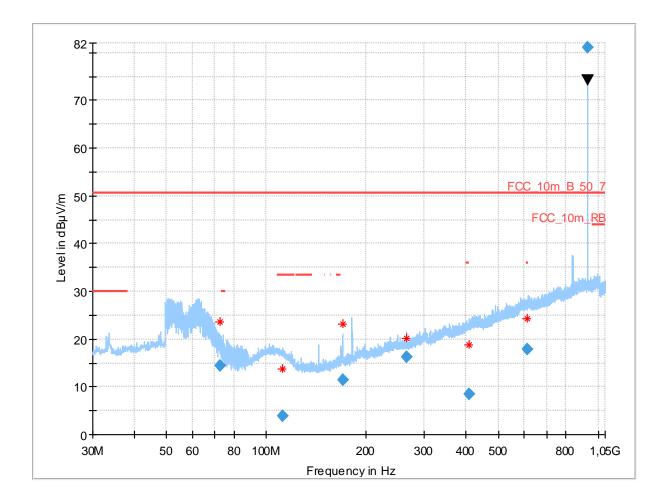
• TX 928.0MHz

Plot 1: TX@928.0MHz, FSK, 9 kHz to 30 MHz



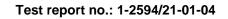


Plot 2: TX@928.0MHz, FSK, 30 MHz to 1000 MHz, vertical & horizontal polarisation



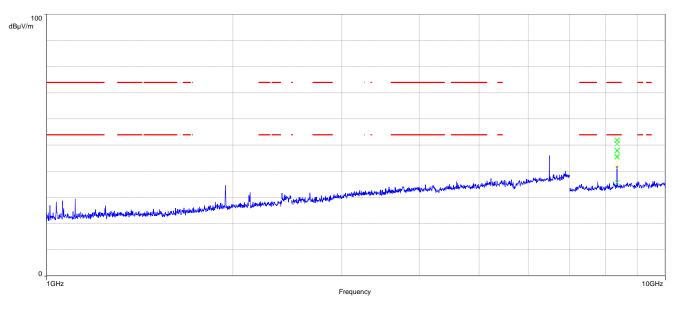
Final_Result:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
72.726	14.38	50.7	36.3	1000	120.0	400.0	V	215	10
112.012	3.85	50.7	46.9	1000	120.0	281.0	V	48	13
170.219	11.49	50.7	39.2	1000	120.0	159.0	V	208	11
263.998	16.17	50.7	34.5	1000	120.0	308.0	V	180	14
409.784	8.38	50.7	42.3	1000	120.0	200.0	Н	225	18
613.712	17.91	50.7	32.8	1000	120.0	330.0	V	188	22
928.041				wante	ed signal				











12 Observations

No observations except those reported with the single test cases have been made.



13 Test bin file tables

bin files ASK modulation
FCC_CM_ASK_100ms_9.6KHz_312.0MHz_0x77.bin
FCC_CM_ASK_100ms_9.6KHz_315.0MHz_0x77.bin
FCC_CM_ASK_100ms_9.6KHz_318.0MHz_0x77.bin
FCC_CM_ASK_100ms_9.6KHz_431.9MHz_0x77.bin
FCC_CM_ASK_100ms_9.6KHz_435.9MHz_0x77.bin
FCC_CM_ASK_100ms_9.6KHz_868.3MHz_0x63.bin
FCC_CM_ASK_100ms_9.6KHz_902.0MHz_0x57.bin
FCC_CM_ASK_100ms_9.6KHz_915.0MHz_0x58.bin
FCC_CM_ASK_100ms_9.6KHz_928.0MHz_0x54.bin

bin files FSK modulation
FCC_CM_FSK_100ms_9.6KHz_312.0MHz_0x77.bin
FCC_CM_FSK_100ms_9.6KHz_315.0MHz_0x77.bin
FCC_CM_FSK_100ms_9.6KHz_318.0MHz_0x77.bin
FCC_CM_FSK_100ms_9.6KHz_431.9MHz_0x77.bin
FCC_CM_FSK_100ms_9.6KHz_435.9MHz_0x77.bin
FCC_CM_FSK_100ms_9.6KHz_868.3MHz_0x63.bin
FCC_CM_FSK_100ms_9.6KHz_902.0MHz_0x57.bin
FCC_CM_FSK_100ms_9.6KHz_915.0MHz_0x58.bin
FCC_CM_FSK_100ms_9.6KHz_928.0MHz_0x54.bin

FCC_CM_FSK_10ms_9.6KHz_315.0MHz_0x77.bin		
FCC_CM_FSK_10ms_9.6KHz_433.2MHz_0x77.bin		
FCC_CM_FSK_10ms_9.6KHz_868.3MHz_0x6f.bin		
FCC_CM_FSK_10ms_9.6KHz_915.0MHz_0x6f.bin		



14 Glossary

EUT	Equipment under test
DUT	Device under test
UUT	Unit under test
GUE	GNSS User Equipment
ETSI	European Telecommunications Standards Institute
EN	European Standard
FCC	Federal Communications Commission
FCC ID	Company Identifier at FCC
	Industry Canada
PMN	Product marketing name
HMN	Host marketing name Hardware version identification number
HVIN	
FVIN	Firmware version identification number
EMC	Electromagnetic Compatibility
HW	Hardware Saftware
SW	Software
Inv. No.	Inventory number Serial number
S/N or SN	
C	Compliant
NC	Not compliant
NA	Not applicable
NP PP	Not performed Positive peak
QP AVG	Quasi peak
OC AVG	Average Operating channel
OCW OCW	Operating channel bandwidth
OBW	Occupied bandwidth
OOB	Out of band
DFS	Dynamic frequency selection
CAC	Channel availability check
OP	Occupancy period
NOP	Non occupancy period
DC	Duty cycle
PER	Packet error rate
CW	Clean wave
MC	Modulated carrier
WLAN	Wireless local area network
RLAN	Radio local area network
DSSS	Dynamic sequence spread spectrum
OFDM	Orthogonal frequency division multiplexing
FHSS	Frequency hopping spread spectrum
GNSS	Global Navigation Satellite System
C/N ₀	Carrier to noise-density ratio, expressed in dB-Hz
0/110	

15 Document history

Version	Applied changes	Date of release
-/-	Initial release	2021-12-10

16 Accreditation Certificate – D-PL-12076-01-04

first page	last page
DAKKS Deutsche Deutsche Akkreditierungsstelle GmbH	Deutsche Akkreditierungsstelle GmbH
Entrusted according to Section 8 subsection 1 AkkStelleG in connection with Section 1 subsection 1 AkkStelleGBV Signatory to the Multilateral Agreements of EA, ILAC and IAF for Mutual Recognition Acccreditation	Office Berlin Office Frankfurt am Main Office Braunschweig Spittelmarkt 10 Europa-Allee 52 Bundesallee 100 10117 Berlin 60327 Frankfurt am Main 38116 Braunschweig
The Deutsche Akkreditierungsstelle GmbH attests that the testing laboratory CTC advanced GmbH Untertürkheimer Straße 6-10, 66117 Saarbrücken is competent under the terms of DIN EN ISO/IEC 17025-2018 to carry out tests in the following fields: Telecommunication (TC) and Electromagnetic Compatibility (EMC) for Canadian	
Standards The accreditation certificate shall only apply in connection with the notice of accreditation of 09.06.2020 with the accreditation number D-PL-32076-01. It comprises the cover sheet, the reverse side of the cover sheet, and the following annex with a total of 07 pages.	The publication of extracts of the accreditation certificate is subject to the prior written approval by Deutsche Akkrediterungsstelle GmbH (DAkkS). Exempted is the unchanged form of separate disseminations of the cover a beet by the conformity assessment body mentioned overlead. No impression shall be made that the accreditation also extends to fields beyond the scope of accreditation attested by DAkS. The accreditation was granted pursuant to the Act on the Accreditation Body (AkdStelleG) of 31 July 2009 (Federal Law Gazette Ip. 2625) and the Regulation (EC) No 765/2008 of the European Include and a start of the Council of 5 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products. (Difical Journal of He European Include), p.2010 DAkkS is a signatory to the MultiMateral Agreements for Mutual Recognition of the European co-operation for Accreditation (Fg). Intermational Accreditation around Accreditation and the Cauching Council Accessible accessi
reverse side of the cover sheet and the following annex with a total of 07 pages. Registration number of the certificate: D-PL-12076-01-04 Frankfurt am Main, 09.06.2020 by order for an of the certificate by order for an of the certificate of	Cooperation (ILAC). The signatories to these agreements recognise each other's accreditations. The up-to-date state of membership can be retrieved from the following websites: EA: www.ueopean-accreditation.org ILAC: www.laCorg IAF: www.laf.nu
The cerrificate together with its annex reflects the status at the time of the date of issue. The current status of the scope of accorditation can be found in the database of according backs of Devisiche Aktraditionungsstelle OmbAI. https://www.dkks.de/en/content/accredited-backs-datks tensors wand.	

Note: The current certificate annex is published on the websites (link see below).

https://www.dakks.de/files/data/as/pdf/D-PL-12076-01-04.pdf

or

https://ctcadvanced.com/app/uploads/2020/06/D-PL-12076-01-04_Canada_TCEMC.pdf

17 Accreditation Certificate – D-PL-12076-01-05

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Note: The current certificate annex is published on the websites (link see below).

https://www.dakks.de/files/data/as/pdf/D-PL-12076-01-05.pdf

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https://ctcadvanced.com/app/uploads/2020/06/D-PL-12076-01-05_TCB_USA.pdf