



FCC LISTED, REGISTRATION
NUMBER: 2764.01

ISED LISTED REGISTRATION
NUMBER: 23595-1

Test report No:
3943ERM.001

Test report

FCC Rules and Regulations CFR 47, Part 15, Subpart B (2018)
&
ICES-003 ISSUE 7 – October (2020)

(*) Identification of item tested	Sense Line Assembly (SLA)
(*) Trademark	Visteon
(*) Model and /or type reference tested	SLAP3X12
Other identification of the product	FCC ID: NT8-SLAP3X12 IC: 3043A-SLAP3X12 HVIN: 1.3 FVIN: 1.0 Hw version: VPRAMU-14B115-AB / VPRAMU-14B115-EA Sw version: SWO100-28685-001F00
(*) Features	Cell Monitoring Unit in Wireless Battery Management
Manufacturer	Visteon Corporation One Village Center Drive, Van Buren Township, MI 48111, USA.
Test method requested, standard	FCC Rules and Regulations CFR 47, Part 15, Subpart B (2018) ICES-003 ISSUE 7 – October (2020)
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Domingo Galvez EMC&RF Lab Manager
Date of issue	4/28/2023
Report template No	FDT08_23 (* "Data provided by the client")

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Competences and guarantees

DEKRA Certification Inc. is a testing laboratory accredited by A2LA (The American Association for Laboratory Accreditation), to perform the tests indicated in the Certificate 2764.01

DEKRA Certification Inc. is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, DEKRA Certification Inc. has a calibration and maintenance program for its measurement equipment.

DEKRA Certification Inc. guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Certification at the time of performance of the test.

DEKRA Certification Inc. is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

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General conditions

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
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4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Certification Inc. and the Accreditation Bodies.

Uncertainty

Uncertainty (factor $k=2$) was calculated according to the DEKRA Certification internal document PODT000.

	Frequency (MHz)	U(k=2)	Units
Radiated emission	30 - 1000	5.94	dB
	1000-18000	5.89	dB

Data provided by the client

The DUT is an Electronic module intended to monitor battery module cell groups voltages and module temperatures from the High Voltage battery bus in addition to activate cell balancing to improve battery cells life.

DEKRA declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

Usage of samples

Samples used for test have been selected by **The Client**.

Sample S/01 is composed of the following elements:

Control N°	Description	Model	Serial N°	Date of reception
3943/21	Radiated sample (CMUp 3X12)	CMUp	-	11/28/2022

Following Auxiliary items were used with Sample S/01 to perform testing:

Control N°	Description	Model	Serial N°
DEKRA 01	Laptop DELL	Latitude 5400	89J57Y2

1. Sample S/01 was used for the following test(s): All tests indicated in the appendix A

Test sample description

Ports..... :	Port name and description	Cable				
		Specified length [m]	Attached during test	Shielded	Coupled to patient	
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Supplementary information to the ports..... :	No Data Provided					
Rated power supply	Voltage and Frequency	Reference poles				
		L1	L2	L3	N	PE
	<input type="checkbox"/>	AC:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	AC:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input checked="" type="checkbox"/>	DC: Minimum 24 V , Nominal 43.8 V , Maximum 52.8 V.				
<input type="checkbox"/>	DC:					
Rated Power	6 mA					
Clock frequencies.....	40 MHz					
Other parameters	No Data Provided					
Software version	SWO100-28685-001F00					
Hardware version	VPRAMU-14B115-AB / VPRAMU-14B115-EA					
Dimensions in cm (W x H x D)	369.2 mm x 131.1 mm x 649.43 mm					
Mounting position	<input type="checkbox"/>	Table top equipment				
	<input type="checkbox"/>	Wall/Ceiling mounted equipment				
	<input type="checkbox"/>	Floor standing equipment				
	<input type="checkbox"/>	Hand-held equipment				
	<input checked="" type="checkbox"/>	Other: Integrated in-side electric vehicle battery pack.				
Modules/parts..... :	Module/parts of test item	Type			Manufacturer	
	No Data Provided					
Accessories (not part of the test item)	Description	Type			Manufacturer	
	Harness					
	URT dongle					
	Fixtures					

Documents as provided by the applicant	Description	File name	Issue date
	Setup instructions	Setup instructions	Nov 29th, 2022
Copy of marking plate:			
None			

Identification of the client

VISTEON CORPORATION
 One Village Center Drive.
 Van Buren Township, MI. 48111
 USA

Testing period and place

Test Location	DEKRA Certification Inc.
Date (start)	11-28-2022
Date (finish)	04-05-2023

Document history

Report number	Date	Description
3943ERM.001	04-28-2023	First release

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

In the semi-anechoic chamber, the following limits were not exceeded during the test.

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

In the chamber for conducted measurements, the following limits were not exceeded during the test:

Temperature	Min. = 15 °C Max. = 35 °C
Relative humidity	Min. = 30 % Max. = 60 %
Air pressure	Min. = 860 mbar Max. = 1060 mbar

Remarks and comments

1. The tests have been performed by the technical personnel: Koji Nishimoto and Victor Albrecht

Testing verdicts

Not applicable :	N/A
Pass :	P
Fail :	F
Not measured :	N/M

Summary

Emission Test			
Report Section	Requirement – Test case	Verdict	Remark
A.1	Radiated emission test (30 MHz – 1000 MHz)	P	N/A
A.1	Radiated emission test (1 GHz – 18 GHz)	P	N/A
-	Radiated emission test (18 GHz – 40 GHz)	N/A	Refer 1
-	Conducted emission test (150 kHz to 30 MHz)	N/A	Refer 2
Supplementary information and remarks:			
<p>1) According with the requirements of FCC Rules and Regulations, title 47, Chapter I, Subchapter A, Part 15, Subpart A, §15.33 Frequency range of radiated measurements, (b) for unintentional radiators, (1) due to The Highest frequency generated or used in the device above 1000MHz, The Upper frequency of measurement range is up to 5th harmonic of the highest frequency or 40GHz, whichever is lower.</p> <p>2) Device is a Vehicular unit and get power from Vehicular battery. According with the requirements of FCC Rules and Regulations, title 47, Chapter I, Subchapter A, Part 15, Subpart B, §15.107 Conducted limits, (d) Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation, and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provision for, the use of battery chargers which permit operating while charging, AC adaptors or battery eliminators or that connect to the AC power lines indirectly, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.</p>			

List of equipment used during the test

CONTROL NUMBER	DESCRIPTION	MANUFACTURER	MODEL	LAST CALIBRATION	NEXT CALIBRATION
1461	Low Noise Preamplifier (1-18GHz)	Bonn Elektronik	BLMA0118-4A	2022-06-01	2024-06-01
1012	EMI Test Receiver	Rohde & Schwarz	ESR26	2023-01-18	2025-01-18
1058	Horn Antenna	ETS Lindgren	3115	2020-05-06	2023-05-06
1065	Biconical log Antenna	ETS Lindgren	3142E	2020-08-13	2023-08-13
1108	Ethernet SNMP Thermometer- CR Room	HW Group	HWg-STE Plain	2022-10-18	2024-10-18
1111	Ethernet SNMP Thermometer- SAC	HW Group	HWg-STE Plain	2022-10-18	2024-10-18
1179	Semi-Anechoic Chamber	Frankonia	SAC 3plus 'L'	N/A	N/A
1217	Transparent Test Table 1	Frankonia	FFT-Square	N/A	N/A
1314	Wireless measurement software EMC 32	Rohde & Schwarz	-	N/A	N/A

Appendix A: Test results

Appendix A Content

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DESCRIPTION OF THE OPERATION MODES

The operation modes described in this paragraph represent functionalities of the sample under test.

The following operation modes of the samples were used during the test executions:

OPERATION MODE	DESCRIPTION
OM#01(*)	Board 1 DUT ON. DC power supply 43.8 V. <ul style="list-style-type: none">• 2.4 GHz proprietary Protocol in IDLE mode.
OM#02(*)	Board 2 DUT ON. DC power supply 43.8 V. <ul style="list-style-type: none">• 2.4 GHz proprietary Protocol in IDLE mode.

* Worst case observed

A.1. RADIATED EMISSION ELECTROMAGNETIC FIELD

LIMITS:	Product standard:	FCC CFR 47, Part 15, Subpart B (2018), Secs. 15.109 & ICES-003 Issue 7 – October (2020)
	Test standard:	FCC CFR 47, Part 15, Subpart B (2018), Secs. 15.109 & ICES-003 Issue 7 – October (2020); ANSI C63.4 (2014)

Limits of interference Class B

The applied limit for radiated emissions, 3 m distance, in the frequency range 30 MHz to 40 GHz for class B equipment, according with the requirements of:

FCC Rules and Regulations 47 CFR Part 15, Subpart B, Secs. 15.109 (a) (2018).

Frequency range (MHz)	QP Limit for 3 m	
	(μ V/m)	(dB μ V/m)
30 to 88	100	40
88 to 216	150	43.5
216 to 960	200	46
Above 960	500	54

Frequency range (MHz)	AVG Limit for 3 m		PK Limit for 3 m (1)
	(μ V/m)	(dB μ V/m)	(dB μ V/m)
Above 1000	500	54	74

(1) Frequencies above 1 GHz, the limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test, as per §15.35(b)

ICES-003 Issue 7, Secs 3.2.2, table 2 & 4 (October 2020).

Frequency range (MHz)	QP Limit for 3 m	
	(μ V/m)	(dB μ V/m)
30 to 88	100	40
88 to 216	150	43.5
216 to 230	200	46
230 to 960	224	47
Above 960	500	54

Frequency range (MHz)	AVG Limit for 3 m		PK Limit for 3 m (1)
	(μ V/m)	(dB μ V/m)	(dB μ V/m)
Above 1000	500	54	74

TEST SETUP

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at a distance of 3 m for the frequency range 30-100 MHz (Bilog antenna) and 1-18 GHz (Double ridge horn antenna).

The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

TEST SETUP (CONT.)

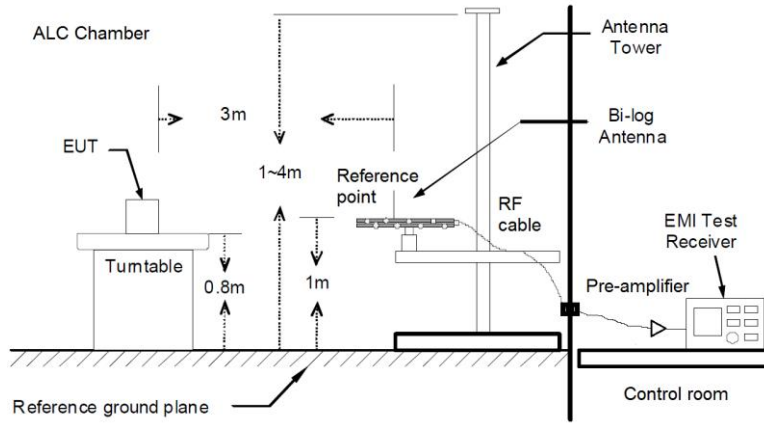


Fig A1: Generic setup for measurements from 30 to 1000MHz

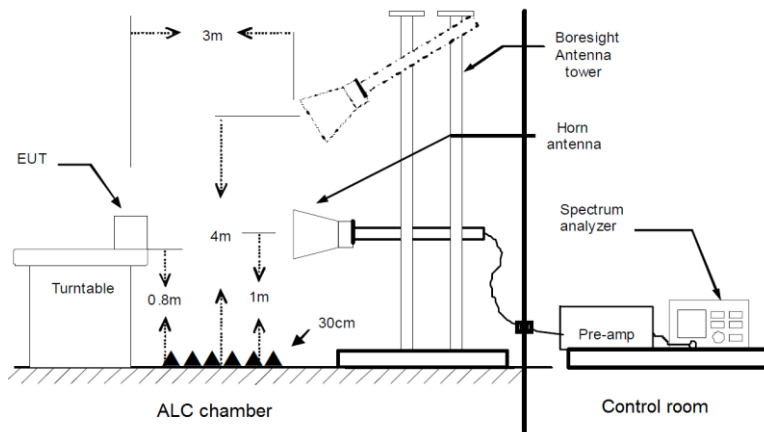


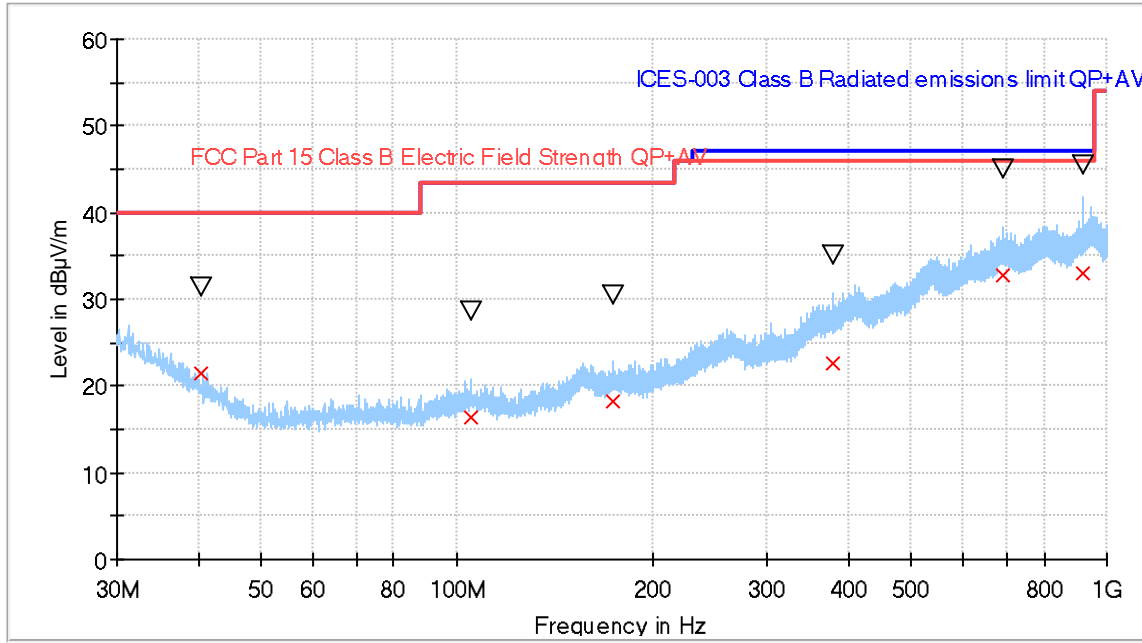
Fig A2: Generic setup for measurements from 1 to 18GHz

TESTED SAMPLES:	S/01
TESTED CONDITIONS MODES:	OM#01
TEST RESULTS:	CRmmnxx: CR: Radiation Condition, mm: Sample number, nn: Operation mode, xx: Frequency Range

CRmmnxx	Description	Result
CR0101LR	Range: 30 MHz - 1000 MHz Horizontal and Vertical Polarization	P
CR0101HR	Range: 1 GHz - 18 GHz Horizontal and Vertical Polarization	P

TEST RESULTS (Cont.):

CR0101LR

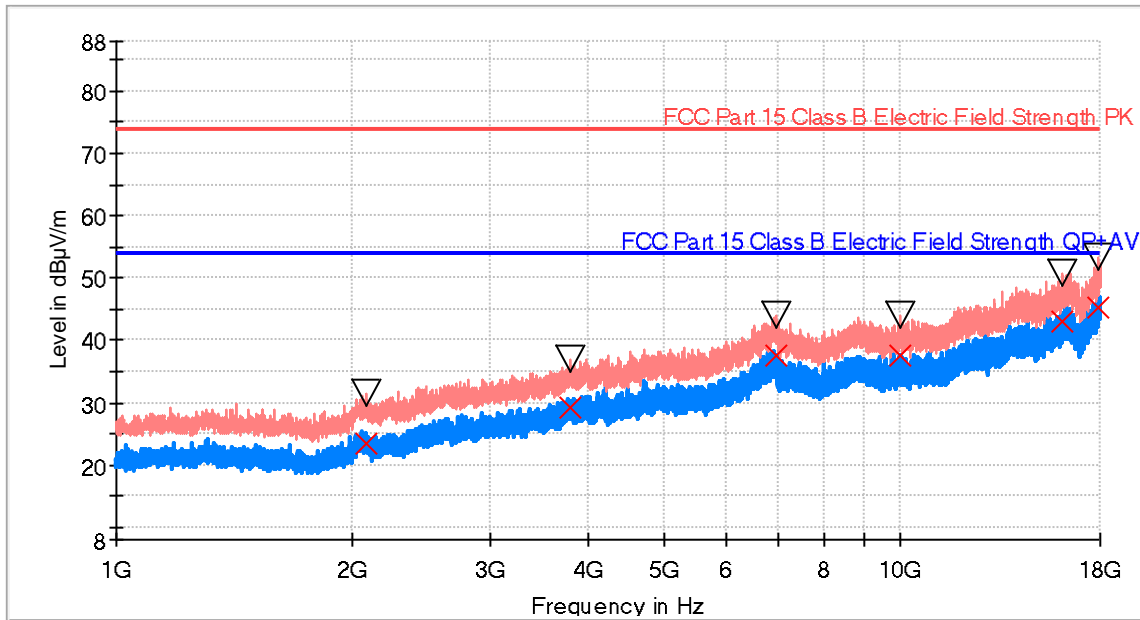


- Preview Result 1-PK+
- ICES-003 Class B Radiated emissions limit QP+AV
- FCC Part 15 Class B Electric Field Strength QP+AV
- x Final_Result QPK
- ▽ Final_Result PK+

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Azimuth (deg)
40.381500	21.37	---	40.00	18.63	271.0	V
40.381500	---	31.49	---	---	271.0	V
104.832000	16.42	---	43.50	27.08	276.0	V
104.832000	---	28.73	---	---	276.0	V
174.208000	---	30.49	---	---	238.0	H
174.208000	18.21	---	43.50	25.29	238.0	H
378.406500	22.72	---	46.00	23.28	275.0	V
378.406500	---	35.07	---	---	275.0	V
689.848500	---	44.97	---	---	289.0	H
689.848500	32.66	---	46.00	13.34	289.0	H
920.491500	33.11	---	46.00	12.89	340.0	V
920.491500	---	45.50	---	---	340.0	V

TEST RESULTS (Cont.):

CR0101HR

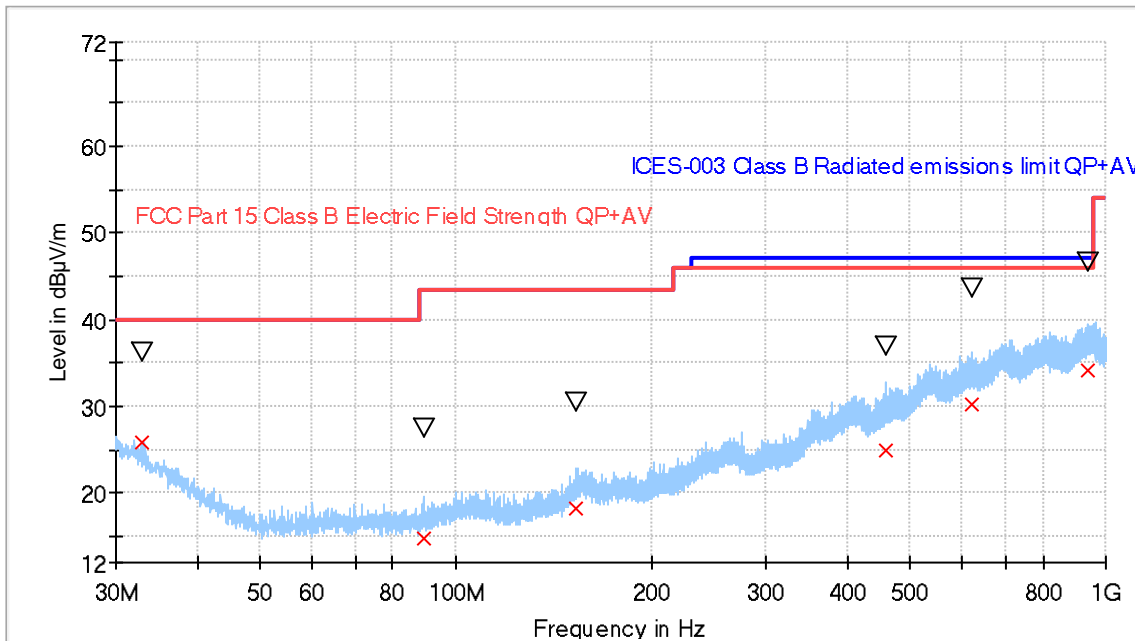


- AVG_MAXH
- PK+_MAXH
- ▽ Final Results_PK+
- × Final Results_AVG
- FCC Part 15 Class B Electric Field Strength PK
- FCC Part 15 Class B Electric Field Strength QP+AV

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
2078.500000	31.5	23.3	H	30.6	53.9
3801.500000	36.8	29.1	V	24.8	53.9
6931.000000	43.8	37.5	H	16.4	53.9
10005.000000	43.9	37.5	V	16.4	53.9
16129.000000	50.6	43.0	H	10.9	53.9
17905.500000	53.2	45.3	H	8.6	53.9

TESTED CONDITIONS MODES:	OM#02
TEST RESULTS:	CRmmnxx: CR: Radiation Condition, mm: Sample number, nn: Operation mode, xx: Frequency Range

CRmmnxx	Description	Result
CR0101LR	Range: 30 MHz - 1000 MHz Horizontal and Vertical Polarization	P
CR0101HR	Range: 1 GHz - 18 GHz Horizontal and Vertical Polarization	P

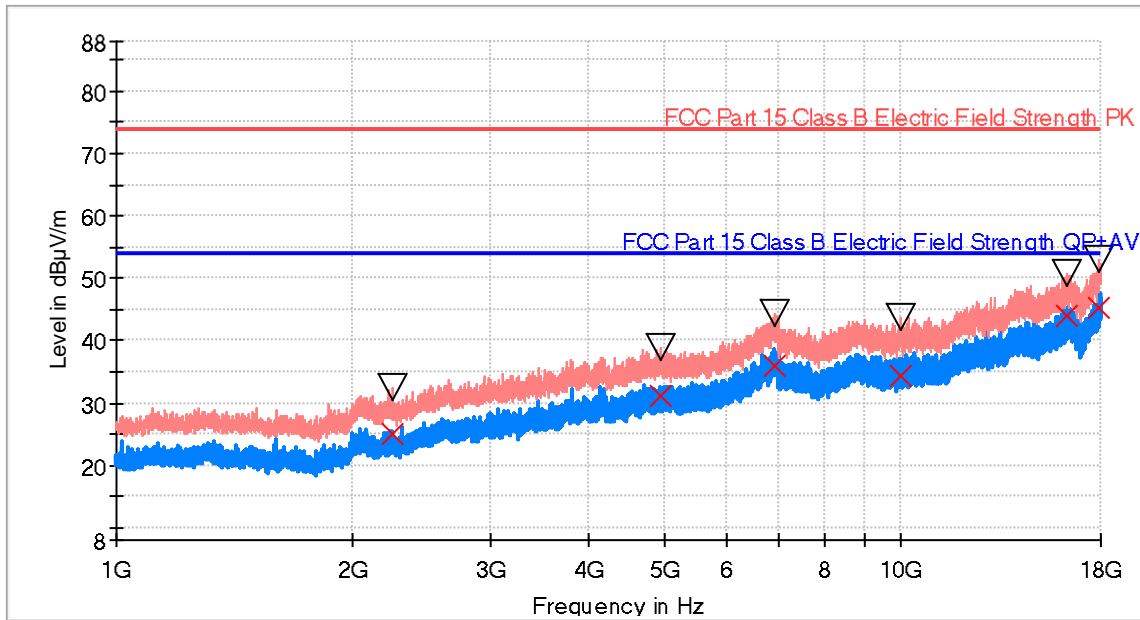


- ICES-003 Class B Radiated emissions limit QP+AV
- Preview Result 1-PK+
- FCC Part 15 Class B Electric Field Strength QP+AV
- x Final_Result QPK
- ▽ Final_Result PK+

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Azimuth (deg)
32.781000	---	36.19	---	---	V	-133.0
32.781000	25.86	---	40.00	14.14	V	-133.0
89.184500	14.87	---	43.50	28.63	H	-78.0
89.184500	---	27.57	---	---	H	-78.0
153.210000	---	30.46	---	---	V	11.0
153.210000	18.18	---	43.50	25.32	V	11.0
459.539000	---	37.00	---	---	H	15.0
459.539000	24.93	---	46.00	21.07	H	15.0
621.845000	30.29	---	46.00	15.71	V	18.0
621.845000	---	43.64	---	---	V	18.0
940.569500	---	46.57	---	---	H	-53.0
940.569500	34.13	---	46.00	11.87	H	-53.0

TEST RESULTS (Cont.):

CR0101HR



- AVG_MAXH
- PK+_MAXH
- ▽ Final Results_PK+
- × Final Results_AVG
- FCC Part 15 Class B Electric Field Strength PK
- FCC Part 15 Class B Electric Field Strength QP+AV

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Margin - AVG (dB)	Limit - AVG (dBµV/m)
2251.000000	32.3	25.0	H	28.9	53.9
4953.000000	39.0	31.2	V	22.7	53.9
6901.500000	44.3	35.8	H	18.1	53.9
10029.000000	43.5	34.4	H	19.5	53.9
16318.000000	50.6	44.1	H	9.8	53.9
17901.000000	53.0	45.4	H	8.5	53.9