DEKRA Certification, Inc.
405 Glenn Dr. Suite 12,
Sterling, VA 20164
United States of America

FCC LISTED, REGISTRATION NUMBER: 2764.01

ISED LISTED REGISTRATION NUMBER: 23595-1

Test report No:
3176ERM.001A1

Test report

FCC Rules and Regulations CFR 47, Part 15, Subpart B (10-1-19 Edition)
FCC Rules and Regulations CFR 47, Part 18, Subpart C (10-1-19 Edition)
&
ICES-001 Issue 5 – July (2020)
ICES-003 Issue 7 – October (2020)

(*) Identification of item tested	Wireless Charger
(*) Trademark	FoMoCo
(*) Model and /or type reference	WACM3
(*) Other identification of the product	FCC ID: L2C0084TR IC: 3432A-0084TR
(*) Features	Qi Baseline Power Profile (BPP) 5W
Manufacturer	Aptiv Services US, LLC 2151 Lincoln RD Kokomo, IN 46901, USA.
Test method requested, standard	FCC Rules and Regulations CFR 47, Part 15, Subpart B (10-1-19 Edition) FCC Rules and Regulations CFR 47, Part 18, Subpart C (10-1-19 Edition) ICES-001 Issue 5 – July (2020) ICES-003 Issue 7 – October (2020)
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Domingo Galvez EMC&RF Lab Manager Digitally signed by Domingo Galvez DN: cn=Domingo Galvez, o=DEKRA Certification Inc., ou=Regulatory Lab, email=dgalvez@dekra.com, c=US Date: 2021.06.22 18:47:28 -04'00'
Date of issue	06-22-2021
Report template No	FDT08_23 (*) "Data provided by the client"

Index

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.

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.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA Certification Inc.
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	0,009 - 30	3.00	dB
	30 - 1000	5.94	dB

Data provided by the client

The test sample consist of Qi Wireless Charger PTx, Baseline Power Profile (BPP) 5W, A32 PTx.

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 undergoing test have been selected by: The client.

Sample S/01 is composed of the following elements:

Control N. º	Description	Model	Serial N. º	Date of reception
3176/01	Wireless Charger Dev.220	WACM3	210330100018	5/26/2021
3176/13	DC Harness 1	-	-	5/26/2021

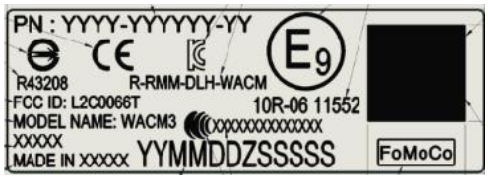
Following Accessory devices were used with DUT for execution of Radiated

Control Nº	Description	Model	Serial Nº	Date of reception
3176/05	Load for Charger	-	-	5/26/2021
3176/09	DUT Stand	-	-	5/26/2021

Sample S/01 was used in following testing: All the testing in Appendix A.

Test sample description

<table>
<tr><td rowspan="4">Ports…… :</td><td colspan="2" rowspan="2">Port name and description</td><td colspan="3">Cable</td></tr>
<tr><td>Specified max length [m]</td><td>Attached during test</td><td>Shielded</td></tr>
<tr><td colspan="2">Data Not provided</td><td></td><td>☐</td><td>☐</td></tr>
<tr><td colspan="2">Data Not provided</td><td></td><td>☐</td><td>☐</td></tr>
<tr><td colspan="2">Data Not provided</td><td></td><td>☐</td><td>☐</td></tr>
<tr><td>Supplementary information to the ports…… :</td><td colspan="5"></td></tr>
<tr><td rowspan="5">Rated power supply .....:</td><td colspan="2" rowspan="2">Voltage and Frequency</td><td colspan="4">Reference poles</td></tr>
<tr><td>L1</td><td>L2</td><td>L3</td><td>N</td><td>PE</td></tr>
<tr><td>☐</td><td>AC:</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td></tr>
<tr><td>☐</td><td>AC:</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td></tr>
<tr><td>☐</td><td colspan="5">DC:</td></tr>
<tr><td>Rated Power .....:</td><td>☒</td><td colspan="5">DC:13.8V</td></tr>
<tr><td>Clock frequencies .....:</td><td colspan="6">5W</td></tr>
<tr><td>Other parameters.....:</td><td colspan="6">105 kHz - 115kHz, 110kHz nominal</td></tr>
<tr><td>Software version .....:</td><td colspan="6">Data Not provided</td></tr>
<tr><td>Hardware version.....:</td><td colspan="6">A</td></tr>
<tr><td>Dimensions in cm (W x H x D)....:</td><td colspan="6">A</td></tr>
<tr><td rowspan="5">Mounting position.....:</td><td colspan="6">Data Not provided</td></tr>
<tr><td>☐</td><td colspan="5">Table top equipment</td></tr>
<tr><td>☐</td><td colspan="5">Wall/Ceiling mounted equipment</td></tr>
<tr><td>☐</td><td colspan="5">Floor standing equipment</td></tr>
<tr><td>☐</td><td colspan="5">Hand-held equipment</td></tr>
<tr><td>☒</td><td colspan="5">Other: Automotive</td></tr>
</table>

Modules/parts .....:	Module/parts of test item	Type	Manufacturer
	Data Not provided		
Accessories (not part of the test item) .....:	Description	Type	Manufacturer
	Data Not provided		
Documents as provided by the applicant.....:	Description	File name	Issue date
	Declaration Equipment Data	FDT30_18 Declaration Equipment Data	5/27/2021
Copy of marking plate:			
			

Identification of the client

APTIV SERVICES US, LLC

5725 INNOVATION DR TROY, MI 48098 USA.

Testing period and place

Test Location	DEKRA Certification, Inc
Date (start)	05-26-2021
Date (finish)	05-27-2021

Document history

Report number	Date	Description
3176ERM.001	06-09-2021	First release
3176ERM.001A1	06-22-2021	Second release

Modifications to the reference test report

It was introduced the following modification in respect to the test report number 3176ERM.001 related with the same samples:

Clauses/ Sub-Clauses	Modification	Justification
Page 1, 4 & 6/Title Page, Usage of Samples and Copy of Marking plate	FCC/IC ID, Model name and label has been updated	According to Customer instructions

This modification test report cancels and replaces the test report 3176ERM.001.

Environmental conditions

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

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

Remarks and comments

The tests have been performed by the technical personnel: Koji Nishimoto & Lourdes María Valverde Malagón.

Testing verdicts

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

Summary

Emission Test FCC Part 15 / ICES 003			
Report Section	**Requirement – Test case**	**Verdict**	**Remark**
A.1.	Radiated emission electromagnetic field test (30 MHz – 1000 MHz)	P	N/A
-	Radiated emission electromagnetic field test (1 GHz – 18 GHz)	N/A	Refer 1
-	Radiated emission electromagnetic field 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:

1) As per standard 47 CFR §15.33 due to the highest frequency generated or used in the device is **below** 108MHz, the upper frequency of measurement range is 1,000 MHz.
2) DUT is DC powered Vehicular Device

Emission Test FCC Part 18 / ICES 001			
Report Section	**Requirement – Test case**	**Verdict**	**Remark**
B.1.	Radiated emission electromagnetic field test (0.009-30 MHz**)**	P	N/A
B.1.	Radiated emission test (30 MHz – 1000 MHz)	P	N/A
-	Radiated emission test (1 GHz – 18 GHz)	N/A	Refer 1
-	Conducted emission test (150 kHz to 30 MHz)	N/A	Refer 2

Supplementary information and remarks:

1) As per standard 47 CFR 18.309 due to the highest frequency generated or used in the device is below 500MHz the upper frequency of measurement range is up to 10^{th} harmonic of the highest frequency or 1,000 MHz, whichever is higher.
2) DUT is DC powered Vehicular Device

List of equipment used during the test

1. Equipment used for Radiated Emission

CONTROL NUMBER	DESCRIPTION	MANUFACTURER	MODEL	LAST CALIBRATION	NEXT CALIBRATION
1012	EMI Test Receiver	ROHDE & SCHWARZ	ESR26	2019/12	2021/12
1062	Active Loop antenna	ETS LINDGREN	6502	2020/05	2023/05
1065	Biconical log Antenna	ETS LINDGREN	3142E	2020/08	2023/08
1108	Ethernet SNMP Thermometer- CR Room	HW GROUP	HWg-STE Plain	2020/07	2022/07
1111	Ethernet SNMP Thermometer- SAC	HW GROUP	HWG-STE Plain	2020/08	2021/08
1179	SEMI-ANECHOIC CHAMBER	FRANKONIA	SAC 3plus 'L'	N/A	N/A
1314	WIRELESS MEASUREMENT SOFTWARE R&S EMC32	ROHDE & SCHWARZ	-	N/A	N/A

Appendix A: Test results
FCC Part 15 / ICES-003

Appendix A Content

DESCRIPTION OF THE OPERATION MODES

The operation modes described in this paragraph constitute a functionality of the sample under test for itself.

The operation modes used by the samples to which the present report refers, are shown in the following table:

OPERATION MODE	DESCRIPTION
OM#01*	DUT on. DC Powered 13.8Vdc, • WPT in Idle mode

*Worst configurations detected

A.1.RADIATED EMISSION. ELECTROMAGNETIC FIELD TEST

LIMITS:	Product standard:	FCC CFR 47, Part 15, Subpart B (10-1-19 Edition), Secs. 15.109 & ICES-003 Issue 7 – October (2020)
	Test standard:	FCC CFR 47, Part 15, Subpart B (10-1-19 Edition), Secs. 15.109 & ICES-003 Issue 7 – October (2020)

Part 15B Limits of interference Class B
The applied limit for radiated emissions, 3 m distance, according with the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (10-01-19 Edition), Secs. 15.109 & ICES-003 7 – October (2020) in the frequency range 30 MHz to 40 GHz for class B equipment.

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

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 30-1000 MHz (Bilog 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 360º 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)	

Radiated setup < 1 GHz

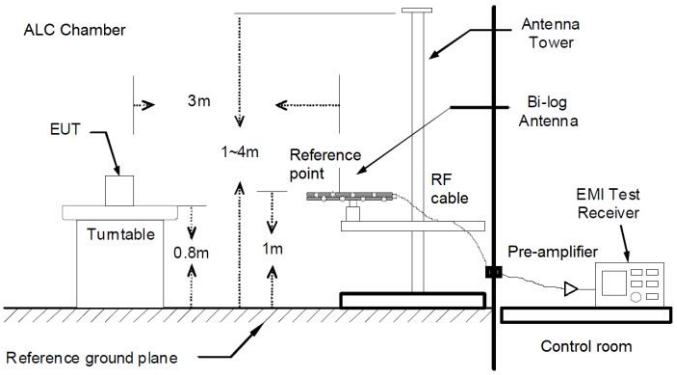
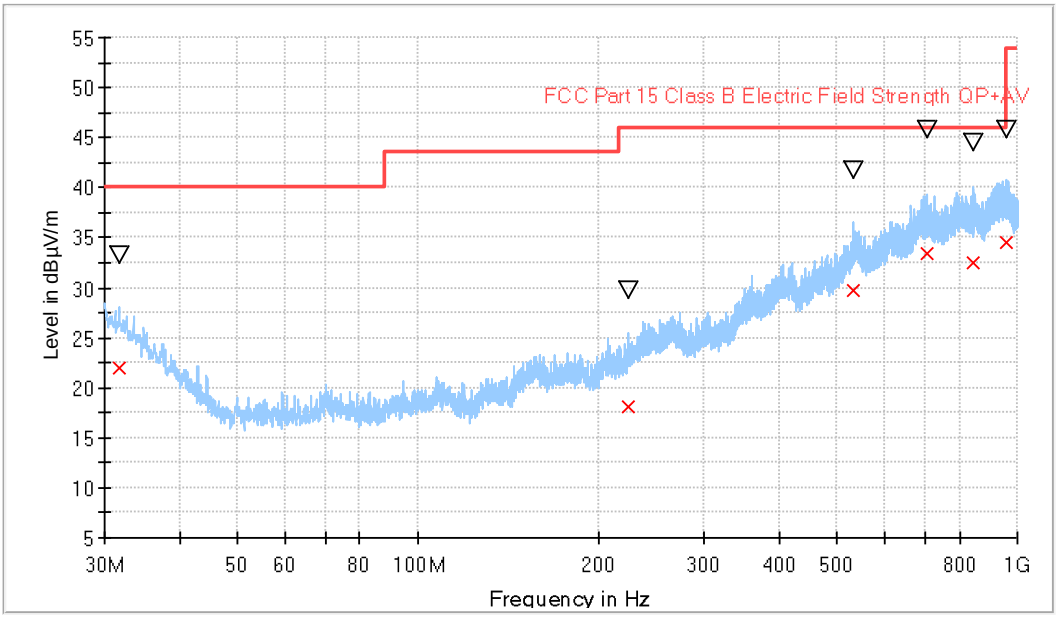


Fig A1: Generic setup for measurements from 30 to 1000MHz

TESTED SAMPLES:	S/01
TESTED OPERATION MODES:	OM#01
TEST RESULTS:	**CR**mmnnxx_PP: CR, Radiation Condition; mm: Sample number; nn: Operation mode.,xx:Range, ; PP: Polarization

CRmmnnxx_PP	Description	Result
CR0101LR_PH	Range: 30 MHz - 1000 MHz Horizontal Polarization	P
CR0101LR_PV	Range: 30 MHz - 1000 MHz Vertical Polarization	P

Radiated Emission. CR0101LR



Preview Result 1-PK+
FCC Part 15 Class B Electric Field Strength QP+AV
Final_Result QPK
Final_Result PK+

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
31.746408	22.04	33.22	40.00	17.96	200.0	V	95.0
224.000382	18.14	29.74	40.00	21.86	261.0	V	-36.0
533.624510	29.66	41.74	47.00	17.34	280.0	H	-159.0
709.145256	33.38	45.82	47.00	13.62	235.0	V	-101.0
845.041870	32.43	44.40	47.00	14.57	183.0	V	19.0
960.811000	34.50	45.82	47.00	12.50	203.0	H	-94.0

Appendix B: Test results
FCC Part 18 / ICES-001

Appendix B Content

DESCRIPTION OF THE OPERATION MODES

The operation mode described in this paragraph constitutes a functionality of the sample under test for itself.

The operation mode used by the samples to which the present report refers is shown in the following table:

OPERATION MODE	DESCRIPTION
OM#02	DUT on. DC Powered 13.8Vdc, • WPT in Charging mode

B.1. RADIATED EMISSION. ELECTROMAGNETIC FIELD MEASURE

LIMITS:	Product standard:	FCC CFR 47, Part 18, Subpart C (10-1-19 Edition) and ICES-001 Issue 5 – July (2020)
	Test standard:	FCC CFR 47, Part 18, Subpart C (10-1-19 Edition) and ICES-001 Issue 5 – July (2020)

According to 18.305, Field Strength limits mentioned as below,

Equipment	Operating frequency	RF Power generated by equipment (watts)	Field strength limit (uV/m)	Distance (meters)
Any type unless otherwise specified (miscellaneous)	Any ISM frequency	Below 500 500 or more	25 25 × SQRT(power/500)	300 [1]300
	Any non-ISM frequency	Below 500 500 or more	15 15 × SQRT(power/500)	300 [1]300
Industrial heaters and RF stabilized arc welders	On or below 5,725 MHz Above 5,725 MHz	Any Any	10 ([2])	1,600 ([2])
Medical diathermy	Any ISM frequency Any non-ISM frequency	Any Any	25 15	300 300
Ultrasonic	Below 490 kHz	Below 500 500 or more	2,400/F(kHz) 2,400/F(kHz) × SQRT(power/500)	300 [3]300
	490 to 1,600 kHz Above 1,600 kHz	Any Any	24,000/F(kHz) 15	30 30
Induction cooking ranges	Below 90 kHz On or above 90 kHz	Any Any	1,500 300	[4]30 [4]30

[1]Field strength may not exceed 10 µV/m at 1600 meters. Consumer equipment operating below 1000 MHz is not permitted the increase in field strength otherwise permitted here for power over 500 watts.
[2]Reduced to the greatest extent possible.
[3]Field strength may not exceed 10 µV/m at 1600 meters. Consumer equipment is not permitted the increase in field strength otherwise permitted here for over 500 watts.
[4]Induction cooking ranges manufactured prior to February 1, 1980, shall be subject to the field strength limits for miscellaneous ISM equipment.

Note 1: Limit 3m (dBµV/m) = Limit 300m (dBµV/m) + 40log(300m/3m) (Below 30MHz) according to 15.31
Note 2: Limit 3m (dBµV/m) = Limit 300m (dBµV/m) + 20log(300m/3m) (Above 30MHz) according to 15.31
Note 3: This product is a wireless charger which operated at (105 kHz - 115kHz, 110kHz nominal). So, the limit of miscellaneous with non-ISM frequency is applied.

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 ranges of 9kHz to 30MHz (loop Antenna) and 30-1000 MHz (Bilog 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. EUT was also rotated 360º.

For Bilog antenna; 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.

For Loop antenna; The antenna orientation was varied along X, Y and Z axes to find maximum radiated emissions.

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.)	

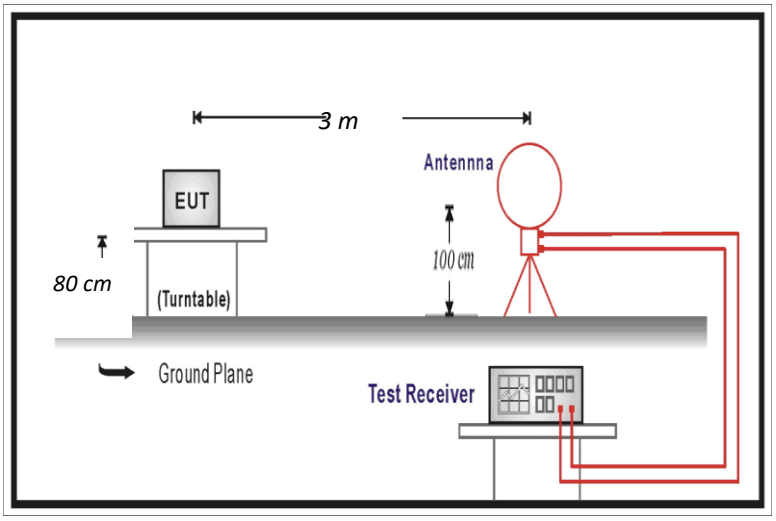


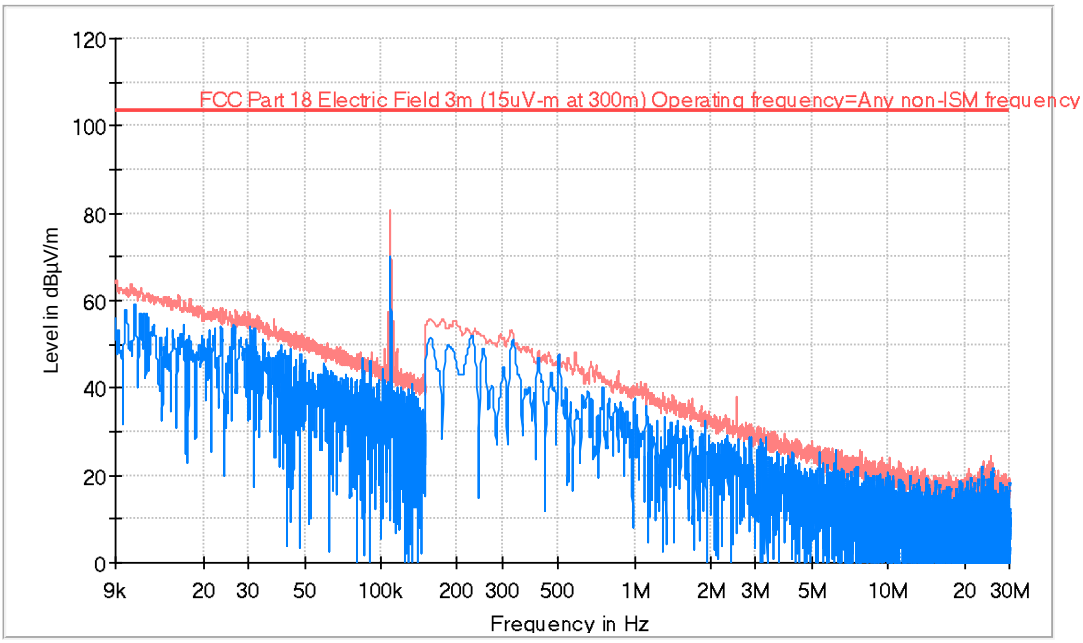
Fig B1.1: Generic setup for measurements from 9kHz to 30MHz

TESTED SAMPLE	S/01
TESTED OPERATION MODES:	OM#02
TEST RESULTS:	**CRmmnnRR_PP:** CR, Radiated Condition; mm: Sample number; nn: Operation mode; RR: Range; PP: Orientation/Polarization

CRmmnnRR_PP	Description	Result
CR0102LR_OX	Range: 0.009-30 MHz , Orientation X	P
CR0102LR_OY*	Range: 0.009-30 MHz , Orientation Y	P
CR0102LR_OZ	Range: 0.009-30 MHz , Orientation Z	P
CR0102LR_PH	Range: 30 MHz - 1000 MHz Horizontal Polarization	P
CR0102LR_PV	Range: 30 MHz - 1000 MHz Vertical Polarization	P

*Worst case orientation observed, and the plot is shown below

Radiated Emission. CR0102LR_OY

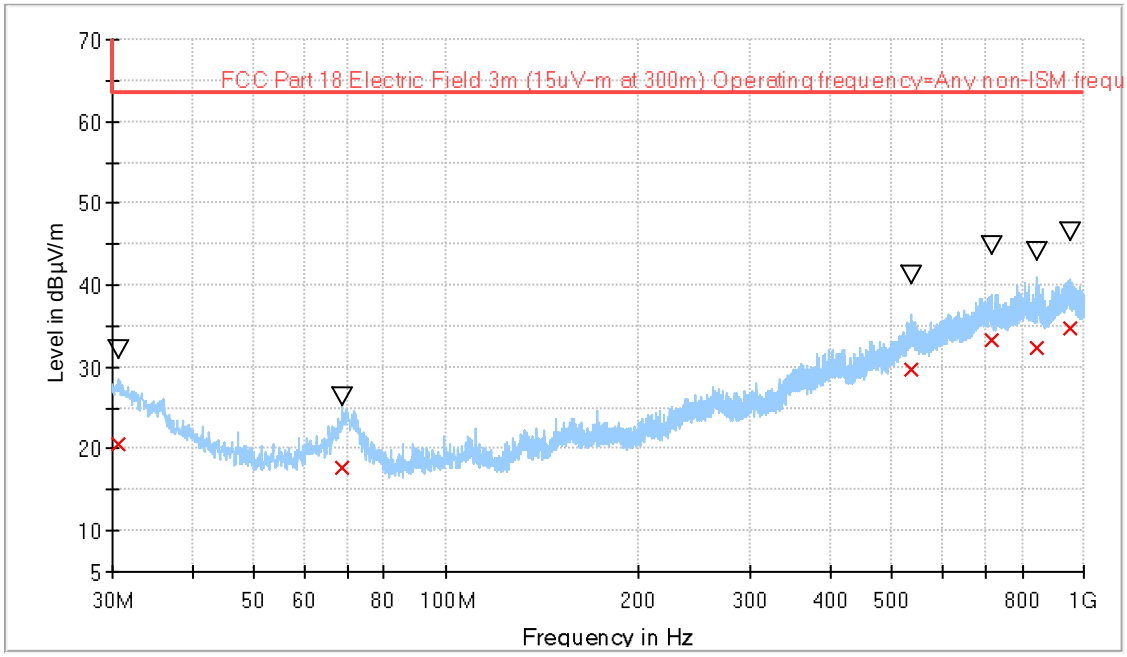


PK+_MAXH
PK+_CLRWR
FCC Part 18 Electric Field 3m (15uV-m at 300m) Operating frequency=Any non-ISM frequency

Limit and Margin

Frequency (MHz)	PK+_MAXH (dBµV/m)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)	Comment
0.109500	80.6	---	---	Fundamental
0.328105	53.3	50.2	103.5	

Radiated Emission. CR0102LR



Preview Result 1-PK+
FCC Part 18 Electric Field 3m (15uV-m at 300m) Operating frequency=Any non-ISM frequency
Final_Result QPK
Final_Result PK+

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
30.679373	20.71	32.08	63.52	42.81	135.0	V	-108.0
68.800005	17.69	26.43	63.52	45.83	100.0	V	143.0
534.594055	29.75	41.21	63.52	33.77	146.0	H	-40.0
717.585381	33.34	44.77	63.52	30.18	268.0	V	-44.0
846.206453	32.38	44.16	63.52	31.14	268.0	H	-107.0
948.299094	34.75	46.57	63.52	28.77	241.0	V	172.0