



FCC LISTED, REGISTRATION
NUMBER: 2764.01

ISED LISTED REGISTRATION
NUMBER: 23595-1

Test report No:
3192ERM.001

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 Power Consortium (Qi) compliant Baseline Profile (5W) power
(*) Trademark	Aptiv
(*) Model and /or type reference	WPC
(*) Other identification of the product	FCC ID: L2C0085TR IC: 3432A-0085TR
(*) Features	Qi BPP 5W wireless power transfer
Manufacturer	APTIV SERVICES US, LLC. 5725 Innovation Drive, Troy, Michigan 48098, 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
Date of issue	09-24-2021
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.

IMPORTANT: No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA Certification Inc.

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

WPC (Qi) BPP (5W) wireless power transmitter for charging consumer electronics devices compliant to the Qi wireless technology.

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 accessories:

Control N°	Description	Model	Serial N°	Date of reception
3192/02	Wireless charger	P32247782	S210628000012	08/30/2021
3192/06	Thermal Pad	--	--	08/30/2021
3192/10	DC Harness	--	--	08/30/2021

Sample S/01 is composed of the following accessories

Control N°	Description	Model	Serial N°	Date of reception
3192/15	Load	--	--	08/30/2021

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

Test sample description

Ports..... :	Port name and description		Cable				
			Specified length [m]	Attached during test	Shielded	Coupled to patient	
	Battery Pin 1		<5m	<input checked="" type="checkbox"/>	<input type="checkbox"/>	N/A	
	Ground Pin 5		<5m	<input checked="" type="checkbox"/>	<input type="checkbox"/>	N/A	
				<input type="checkbox"/>	<input type="checkbox"/>	N/A	
			<input type="checkbox"/>	<input type="checkbox"/>	N/A		
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"/>
	<input type="checkbox"/>	AC:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input checked="" type="checkbox"/>	DC: 12 Vdc Automotive Battery & Ground, 13.5Vdc nominal					
<input type="checkbox"/>	DC:						
Rated Power	Input power up to 10W when delivering 5W to consumer devices load						
Clock frequencies..... :	No Data Provided						
Other parameters	No Data Provided						
Software version	A						
Hardware version	A						
Dimensions in cm (W x H x D)	12.5 x 3.3 x 8.5						
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: Built- in automotive vehicle console					
Modules/parts..... :	Module/parts of test item		Type		Manufacturer		
	No Data Provided						
Accessories (not part of the test item)	Description		Type		Manufacturer		
	Qi PRx dummy test load at 5W		Wireless load		TI		

Documents as provided by the applicant.....:	Description	File name	Issue date
	WPC User Manual	WPC User manual	09/02/2021
	Declaration Equipment Data	FDT30_18 Declaration Equipment Data	09/20/2021

Copy of marking plate:



Identification of the client

Aptiv Services US, LLC.
5725 Innovation Drive,
Troy, Michigan 48098, USA

Testing period and place

Test Location	DEKRA Certification, Inc
Date (start)	09-02-2021
Date (finish)	09-03-2021

Document history

Report number	Date	Description
3192ERM.001	09-24-2021	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

The tests have been performed by the technical personnel: Nasir Khan and 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
<u>Supplementary information and remarks:</u> 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 below 108MHz, the upper frequency of measurement range is 1000 MHz. 2. 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.			

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
<u>Supplementary information and remarks:</u> 1. According with the requirements of FCC Rules and Regulations, title 47, Chapter I, Subchapter A, Part 18, Subpart C, §18.309 Frequency range of measurements, (a) For field strength measurements, due to the frequency band in which device operates below 500 MHz, the highest frequency of measurement range is 10th harmonic or 1,000 MHz, whichever is higher. 2. DUT is DC powered Vehicular Device According with the requirements of FCC Rules and Regulations, title 47, Chapter I, Subchapter A, Part 18, Subpart C, §18.307 Conduction limits, for the equipment designed to be connected to the public utility (AC) power line the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies shall not exceed the limits in the tables (a) All Induction cooking ranges and ultrasonic equipment, (b) All other part 18 consumer devices, (c) RF lighting devices. Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal using a 50 µH/50 ohms line impedance stabilization network (LISN).			

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	2020/08	2022/08
1111	Ethernet SNMP Thermometer- SAC	HW Group	HWG-STE Plain	2020/08	2022/08
1179	Semi-Anechoic Chamber	Frankonia	SAC 3plus 'L'	N/A	N/A
1217	Transparent Square Test Table 1	Frankonia	-	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

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A.1.RADIATED EMISSION. ELECTROMAGNETIC FIELD TEST13

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 13.5 Vdc <ul style="list-style-type: none">• 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	
	(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

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 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)

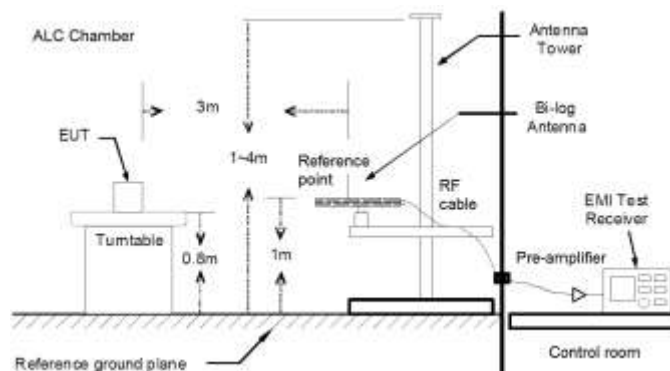


Fig A1: Generic setup for measurements from 30 to 1000MHz

TESTED SAMPLES:

S/01

TESTED OPERATION MODES:

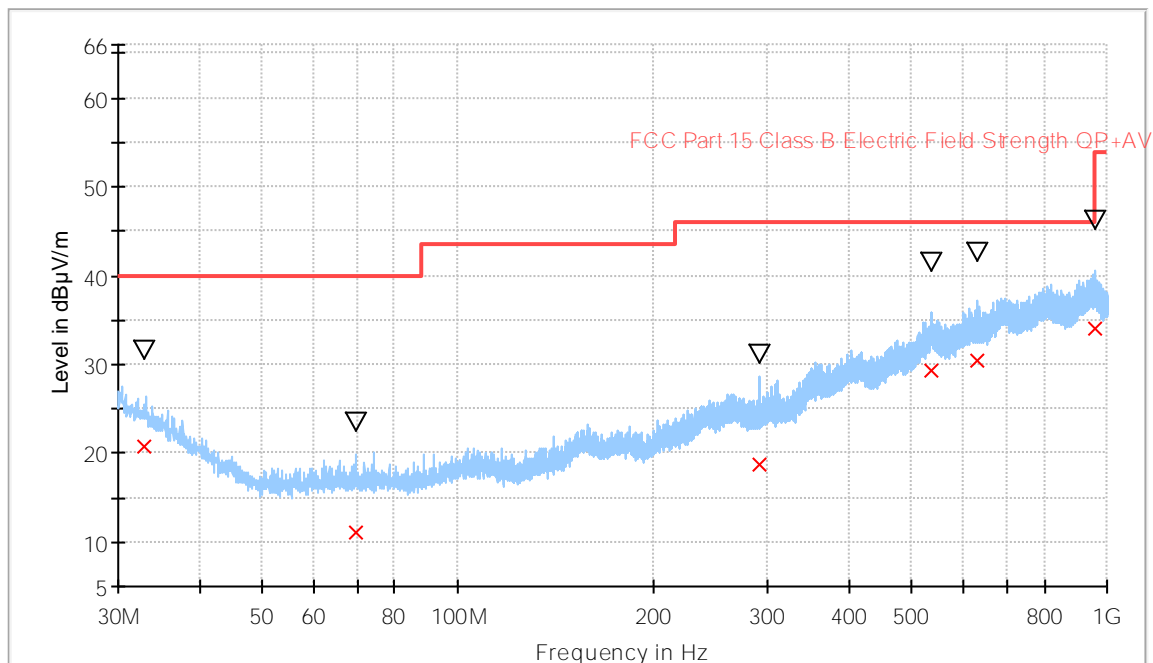
OM#01

TEST RESULTS:

CRmmnnxx_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
 x Final_Result QPK
 v Final_Result PK+

Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
32.812500	20.81	31.60	40.00	19.19	278.0	H	-136.0
69.663000	11.04	23.57	40.00	28.96	234.0	H	115.0
291.023500	18.79	31.18	46.00	27.21	174.0	H	-45.0
537.088500	29.23	41.49	46.00	16.77	100.0	V	-82.0
631.258500	30.36	42.53	46.00	15.64	265.0	H	134.0
955.833500	34.13	46.13	46.00	11.87	141.0	H	1.0

Appendix B: Test results

FCC Part 18 / ICES-001

Appendix B Content

DESCRIPTION OF THE OPERATION MODES.....18

B.1. RADIATED EMISSION. ELECTROMAGNETIC FIELD MEASURE19

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#01	DUT on. DC Powered 13.5 Vdc <ul style="list-style-type: none">• 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 $25 \times \text{SQRT}(\text{power}/500)$	300 ¹ 300
	Any non-ISM frequency	Below 500 500 or more	15 $15 \times \text{SQRT}(\text{power}/500)$	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	$2,400/\text{F}(\text{kHz})$ $2,400/\text{F}(\text{kHz}) \times \text{SQRT}(\text{power}/500)$	300 ³ 300
	490 to 1,600 kHz Above 1,600 kHz	Any Any	$24,000/\text{F}(\text{kHz})$ 15	30 30
Induction cooking ranges	Below 90 kHz	Any	1,500	⁴ 30
	On or above 90 kHz	Any	300	⁴ 30

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

Note 1: Limit 3m (dBuV/m) = Limit 300m (dBuV/m) + 40log(300m/3m) (Below 30MHz) according to 15.31

Note 2: Limit 3m (dBuV/m) = Limit 300m (dBuV/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 360°.

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.)

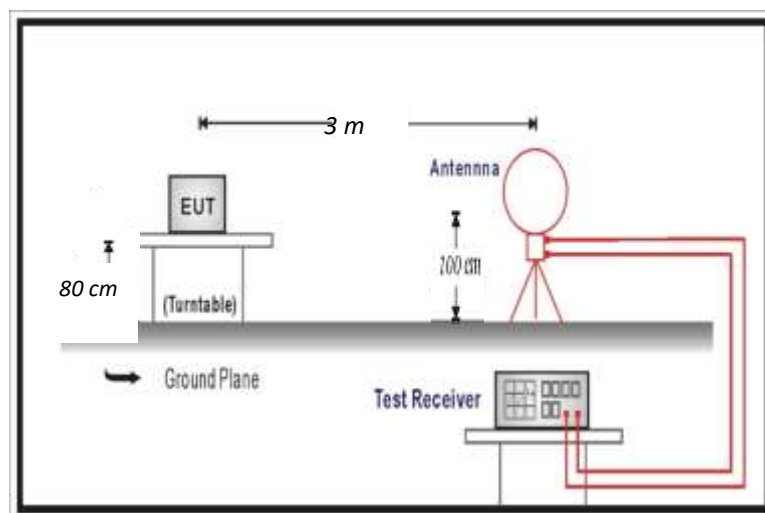


Fig B1: Generic setup for measurements from 9kHz to 30MHz

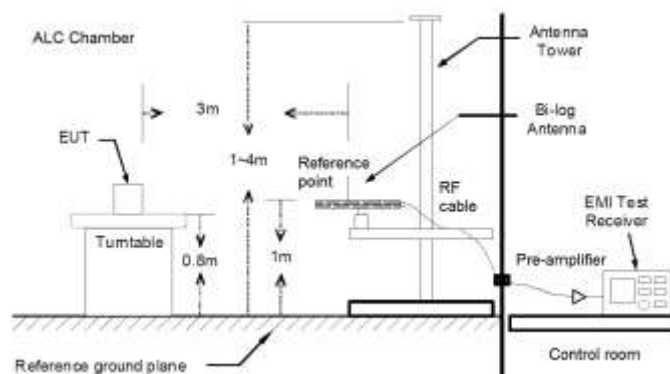


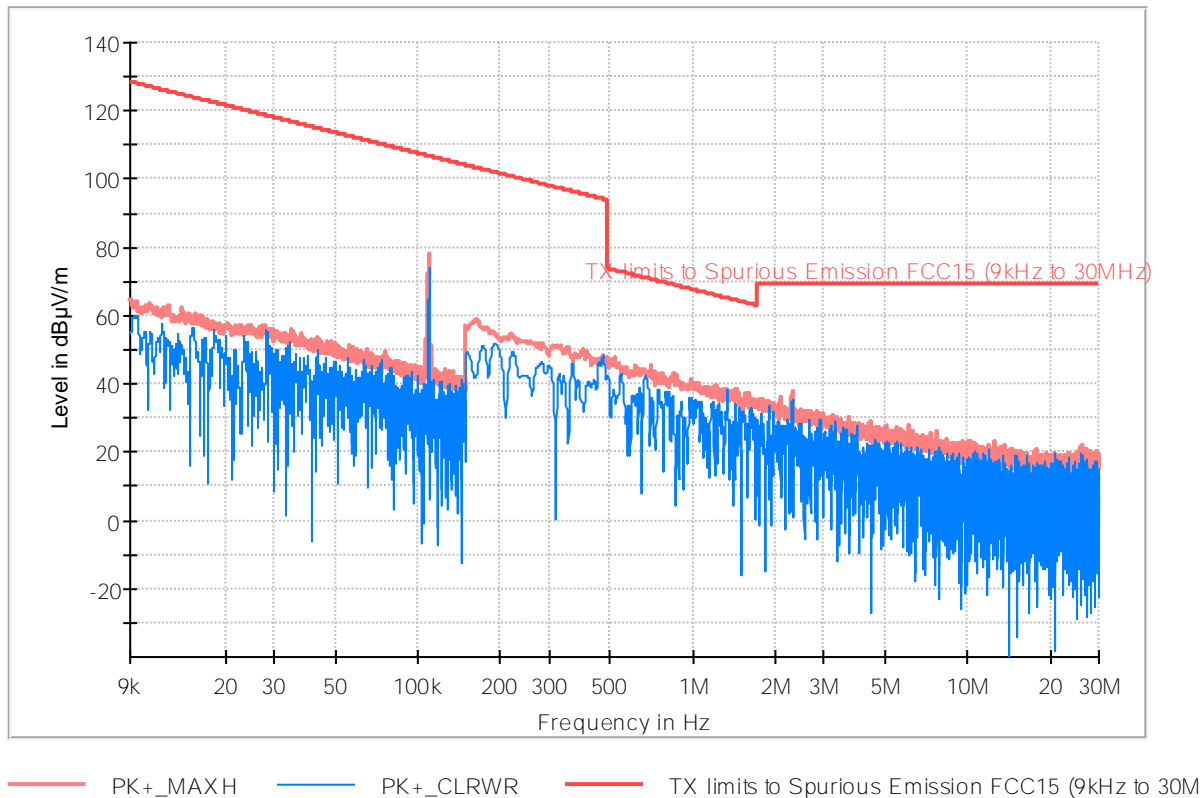
Fig B2: Generic setup for measurements from 30 to 1000MHz

TESTED SAMPLE	S/01
TESTED OPERATION MODES:	OM#02
TEST RESULTS:	CRmmnnxx_PP: CR, Radiation Condition: mm, Sample number: nn, Operation mode: xx, Range, PP: Polarization

CRmmnnRR_PP	Description	Result
CR0101LR_OX	Range: 9 kHz -30 MHz , Orientation X	P
CR0101LR_OY*	Range: 9 kHz -30 MHz , Orientation Y	P
CR0101LR_OZ	Range: 9 kHz -30 MHz , Orientation Z	P
CR0101LR_PH	Range: 30 MHz - 1000 MHz Horizontal Polarization	P
CR0101LR_PV	Range: 30 MHz - 1000 MHz Vertical Polarization	P

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

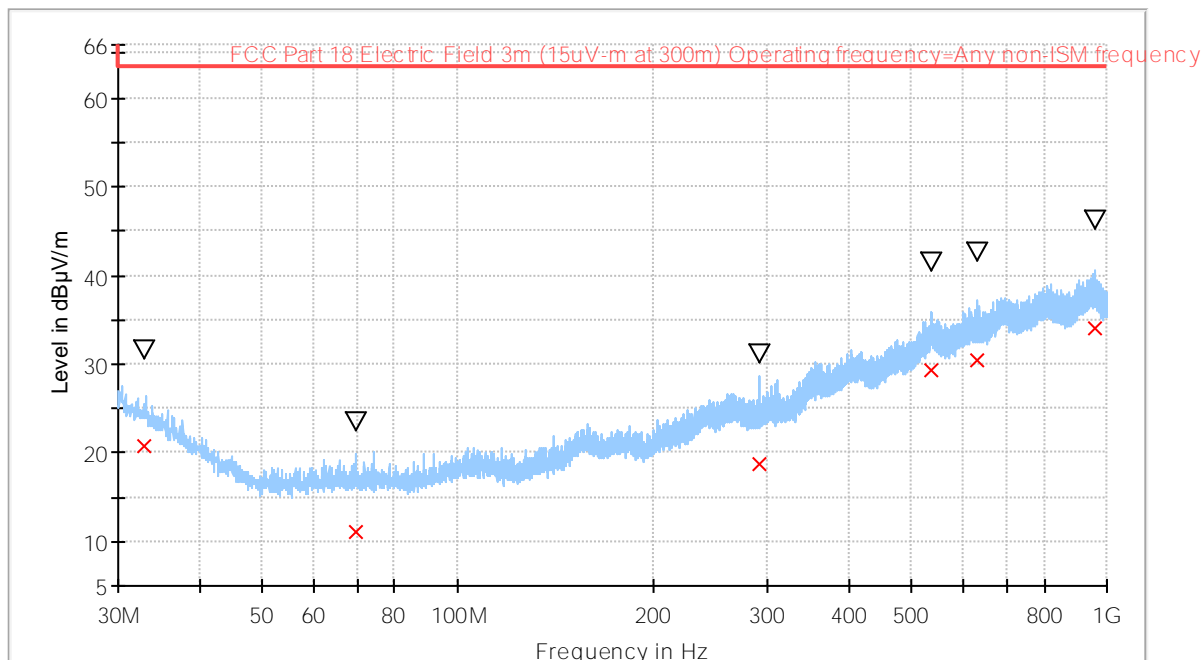
Radiated Emission. CR0101LR_OY



Limit and Margin

Frequency (MHz)	PK+_CLRWR (dBμV/m)	PK+_MAXH (dBμV/m)	Margin - PK+ (dB)	Limit - PK+ (dBμV/m)	Comment
0.109806	72.9	78.0	---	---	Fundamental
2.308155	33.5	37.7	31.8	69.5	

Radiated Emission. CR0101LR



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

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
32.812500	20.81	31.60	63.52	42.71	278.0	H	-136.0
69.663000	11.04	23.57	63.52	52.48	234.0	H	115.0
291.023500	18.79	31.18	63.52	44.73	174.0	H	-45.0
537.088500	29.23	41.49	63.52	34.29	100.0	V	-82.0
631.258500	30.36	42.53	63.52	33.16	265.0	H	134.0
955.833500	34.13	46.13	63.52	29.39	141.0	H	1.0