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

ACCREDITED
Test Lab
Cert 2764.01

FCC LISTED, REGISTRATION NUMBER: 2764.01

ISED LISTED REGISTRATION NUMBER: 23595-1

Test report No:
2427ERM.001

Test report

FCC Rules and Regulations CFR 47, Part 15, Subpart B (10-1-18 Edition)
&
ICES-003 ISSUE 6 – Update April (2017)

Identification of item tested	High Performance Display Controller (HPDC)
Trademark	Panasonic
Model and /or type reference	HPDC
Other identification of the product	FCC ID: ACJ932A-HPDC IC: 216A-HPDC HVIN: HPDC
Features	LVDS, Ethernet, A2B, BT, Wi-Fi, USB
Manufacturer	Panasonic Automotive Systems Company of America 776 Georgia Hwy 74 Peachtree City, GA 30269
Test method requested, standard	FCC Rules and Regulations CFR 47, Part 15, Subpart B (10-1-18 Edition) ICES-003 ISSUE 6 – Update April (2017)
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: 2019.05.15 18:20:16 -04'00'
Date of issue	01-22-2019
Report template No	FDT08_21

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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.

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
30-180	3.82	dB
180-1000	2.61	dB
1000-18000	2.92	dB
18000-40000	2.15	dB

Data provided by the client

LVDS, Ethernet, A2B, BT, Wi-Fi, USB

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 Nº	Description	Model	Serial Nº	Date of reception
2427.06	HPDC Module	HPDC	GM:1118358000100042	1/11/2019

Following accessories were used with Sample S/01 to keep S/01 in testing mode

Control Nº	Description	Model	Serial Nº	Date of reception
2427.01	Power cable	-	-	1/11/2019
2427.02	Center Molex connector to Ethernet Interface cable	-	2M20181210-1304	1/11/2019
2427.03	Molex blue cable to Innolux Display	-	20181218-0958	1/11/2019
2427.04	Power cable for display	-	-	1/11/2019
2427.05	Innolux Display for HPDC unit	DD102ZA-01C	0139	1/11/2019

1. Sample S/01 used for Radiated Emission tests indicated in appendix A.

Test sample description

<table>
<tr><td rowspan="4">Ports…… :</td><td rowspan="2">Port name and description</td><td colspan="4">Cable</td></tr>
<tr><td>Specified max length [m]</td><td>Attached during test</td><td>Shielded</td><td>Coupled to patient(3)</td></tr>
<tr><td>Main Harness</td><td>2</td><td>☒</td><td>☐</td><td>☐</td></tr>
<tr><td></td><td></td><td>☐</td><td>☐</td><td>☐</td></tr>
<tr><td>Supplementary information to the ports…… :</td><td colspan="5"></td></tr>
<tr><td rowspan="6">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>☒</td><td colspan="5">DC: 14.4V</td></tr>
<tr><td>Rated Power .....:</td><td colspan="5">No Data provided</td></tr>
<tr><td>Clock frequencies .....:</td><td colspan="5">No Data provided</td></tr>
<tr><td>Other parameters.....:</td><td colspan="5">No Data provided</td></tr>
<tr><td>Software version .....:</td><td colspan="5">R7</td></tr>
<tr><td>Hardware version.....:</td><td colspan="5">PV</td></tr>
<tr><td>Dimensions in cm (W x H x D)....:</td><td colspan="5">10 x 10 x 3</td></tr>
<tr><td rowspan="5">Mounting position.....:</td><td>☐</td><td colspan="4">Table top equipment</td></tr>
<tr><td>☐</td><td colspan="4">Wall/Ceiling mounted equipment</td></tr>
<tr><td>☐</td><td colspan="4">Floor standing equipment</td></tr>
<tr><td>☐</td><td colspan="4">Hand-held equipment</td></tr>
<tr><td>☒</td><td colspan="4">Other: Vehicle Equipment</td></tr>
<tr><td rowspan="2">Modules/parts .....:</td><td colspan="3">Module/parts of test item</td><td>Type</td><td>Manufacturer</td></tr>
<tr><td colspan="3">CX-MG29N04D</td><td>HPDC</td><td>Panasonic</td></tr>
</table>

Accessories (not part of the test item) .....:	Description	Type	Manufacturer
	Not Provided Data		
Documents as provided by the applicant.....:	Description	File name	Issue date
	FDT30_14 Data Declaration Equipment Data		

Copy of marking plate:

Identification of the client

Panasonic Automotive Systems Company of America
776 Georgia Hwy 74 Peachtree City, GA 30269.

Testing period and place

Test Location	DEKRA Certification Inc.
Date (start)	01-15-2019
Date (finish)	02-14-2019

Document history

Report number	Date	Description
2427ERM.001	04-04-2019	First release

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 semianechoic 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 & Poojita Bhattu

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	Refer 1
A.1-	Radiated emission test (18 GHz – 40 GHz)	P	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 above 1000MHz the upper frequency of measurement range is up to 5th harmonic of the highest frequency or 40GHz, whichever is lower.
2) The test is not applicable, not required by the standard.

List of equipment used during the test

1. Radiated Measurements

CONTROL NUMBER	DESCRIPTION	MANUFACTURER	MODEL	LAST CALIBRATION	NEXT CALIBRATION
1039	Signal Analyser	ROHDE & SCHWARZ	FSV40	2017/03	2019/03
1012	EMI Test Receiver	ROHDE & SCHWARZ	ESR26	2018/09	2020/09
1058	Horn Antenna	ETS LINDGREN	3115	2017/03	2020/03
1065	Biconilog Antenna	ETS LINDGREN	3142E	2017/03	2020/03
0981	Preamplifier	BONN ELEKTRONIK	BLMA 0118-2A	2017/05	2019/05
0980	Preamplifier	BONN ELEKTRONIK	BLNA 0360-01N	2017/05	2019/05
0982	Preamplifier	BONN ELEKTRONIK	BLMA1840-1M	2017/05	2019/05
1017	EMC measurement software	ROHDE & SCHWARZ	EMC32 V9.01	---	---

Appendix A: Test results

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. Every operation mode takes a failure criterion for the immunity test that they were applying to it and a monitoring to guarantee performance of the same ones.

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

OPERATION MODE	DESCRIPTION
OM#01*	EUT ON. Idle mode. Power Supply 14.4Vdc.

* Worst case detected

A.1 RADIATED EMISSION. ELECTROMAGNETIC FIELD MEASURE

LIMITS:	Product standard:	FCC CFR 47, Part 15, Subpart B (10-1-18 Edition), Secs. 15.109 & ICES-003 Issue 6 – Update April (2017)
	Test standard:	FCC CFR 47, Part 15, Subpart B (10-1-18 Edition), Secs. 15.109 & ICES-003 Issue 6 – Update April (2017); ANSI C63.4 (2014)

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 (10-01-18 Edition), Secs. 15.109 & ICES-003 Issue 6 – Update April (2017) 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

Frequency range (MHz)	AVG Limit for 3 m		PK Limit for 3 m
	(μV/m)	(dBμV/m)	(dBμV/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)

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) and at a distance of 1m for the frequency range 1-40 GHz (1 GHz-18 GHz and 18 GHz-40 GHz Double ridge horn antennas).

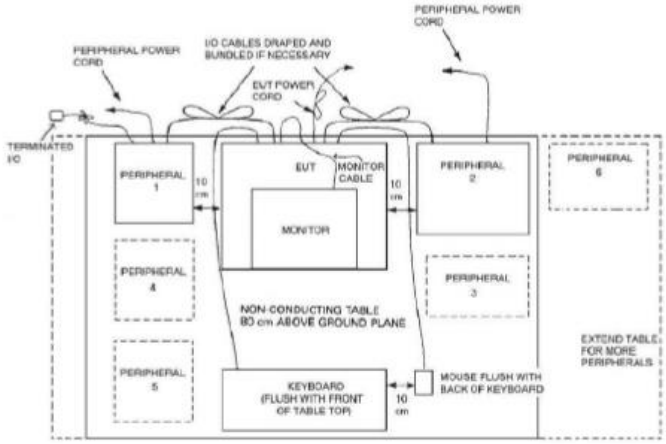
For radiated emissions in the range 1-40 GHz that is performed at a distance closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

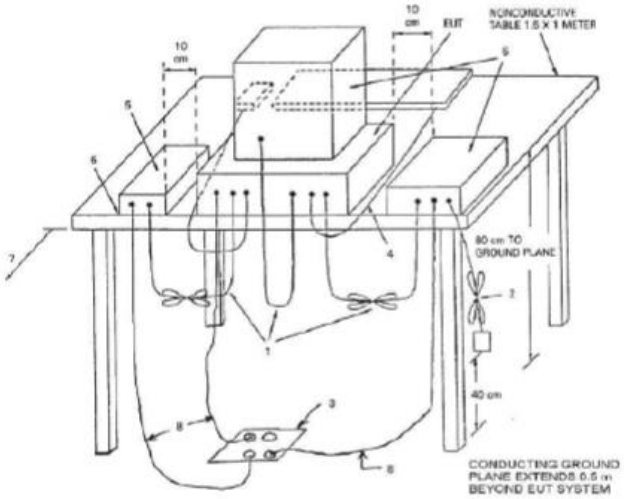
The equipment under test was set up on a non-conductive platform above the ground plane and the situation and orientation was varied to find the maximum radiated emission. It was also rotated 360º and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

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).	



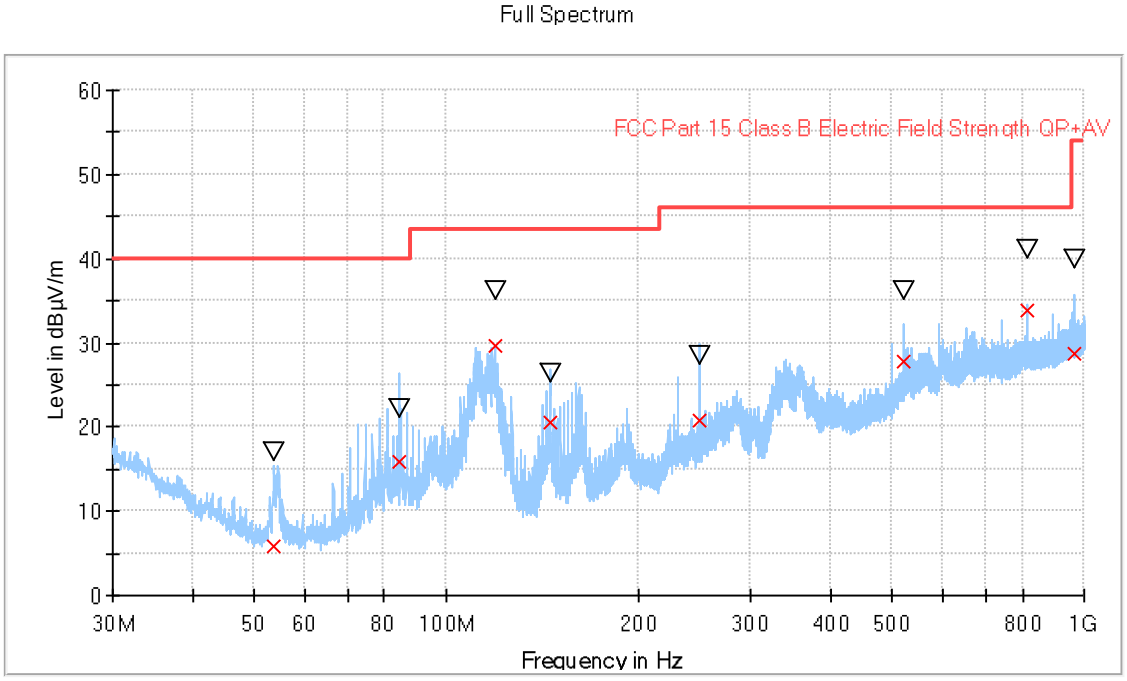


TESTED SAMPLES:	S/01
TESTED OPERATION MODES:	OM#01
TEST RESULTS:	**CR**mmnnxx: CR, Radiation Condition; mm: Sample number; nn: Operation mode.,xx:Range,

CRmmnnxx	Description	Result
CR0101LR	Range 30 - 1000 MHz. Horizontal & Vertical Polarization.	P
CR0101HR1	Range 1 GHz - 18 GHz. Horizontal & Vertical Polarization.	P
CR0101HR2	Range 18 GHz - 40 GHz. Horizontal & Vertical Polarization.	P

Radiated Emission. CR0101LR

Project:	02427ERM001
Company:	Panasonic US
Sample:	S/01
Operation mode:	OM#01
Description:	EUT ON. IDLE. Power Supply 14.4Vdc. Both polarizations.

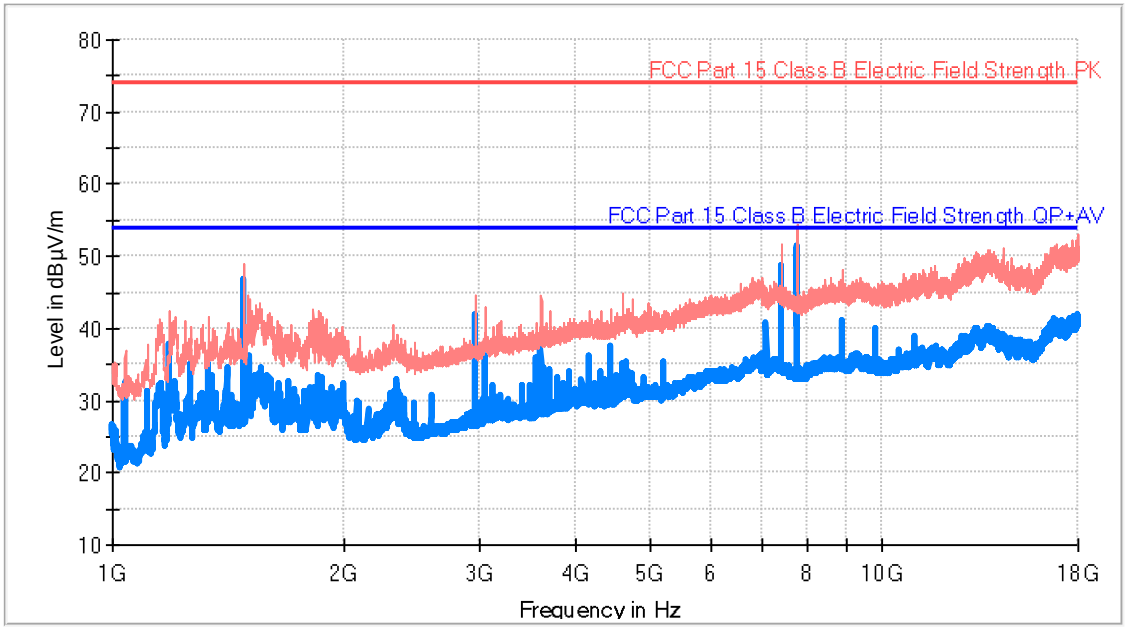


Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
53.800000	5.86	17.15	40.00	34.14	179.0	V	93.0
84.210000	15.93	22.17-	40.00	24.07	350.0	V	-70.0
119.020000	29.70	36.13	43.50	13.80	100.0	V	129.0
145.260000	20.62	26.38	43.50	22.88	231.0	H	149.0
250.010000	20.79	28.39	46.00	25.21	237.0	H	-22.0
519.730000	27.74	36.14-	46.00	18.26	134.0	V	101.0
816.720000	33.75	41.02	46.00	12.25	159.0	H	9.0
965.670000	28.60	39.93	53.90	25.30	114.0	V	-135.0

Radiated Emission. CR0101HR1

Project:	02427ERM001
Company:	Panasonic US
Sample:	S/01
Operation mode:	OM#01
Description:	EUT ON. IDLE. Power Supply 14.4Vdc. Both polarizations.



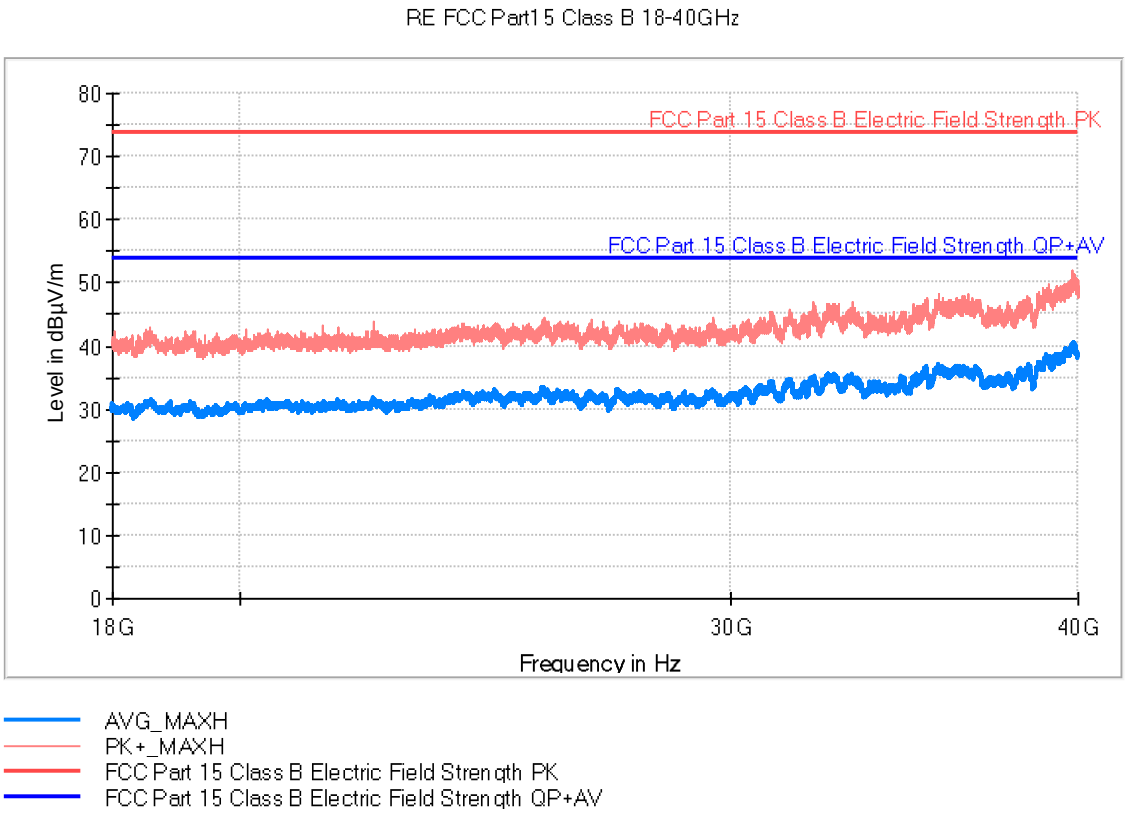
AVG_MAXH
PK+_MAXH
FCC Part 15 Class B Electric Field Strength PK
FCC Part 15 Class B Electric Field Strength QP+AV

Maximizations

Frequency (MHz)	PK+_MAXH (dBµV/m)	AVG_MAXH (dBµV/m)	Pol	Azimuth (deg)
1484.500000	48.8	46.9	V	-49.0
7767.062500	54.2	51.3	V	-12.0

Radiated Emission. CR0101HR2

Project:	02427ERM001
Company:	Panasonic EU
Sample:	S/01
Operation mode:	OM#01
Description:	EUT ON. IDLE. Power Supply 14.4Vdc. Both polarizations.



No spurious observed in 18GHz to 40GHZ Range