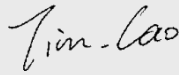


Test report No:
2660507R.701B

FCC TEST REPORT

Product Name	PEPS
Trademark	KOSTAL
Model and /or type reference	SMART KEY MODULE
FCC ID	2AYARBR1SKM
Applicant's name / address	Kostal (shanghai) Management Co.,Ltd. No.189 Xingting Road, Jiading District, Shanghai, P.R.China
Test method requested, standard	47 CFR FCC Part 15 Subpart F ANSI C63.10: 2020
Verdict Summary	IN COMPLIANCE
Tested By (name / position & signature)	Tim Cao / Project Manager 
Approved by (name / position & signature)	Frank He / Technical Manager 
Date of issue	2026-07-22
Report Version	V1.0
Report template No	Template_FCC Part 15F-RF-V1.0

INDEX

	page
Competences and Guarantees.....	4
General conditions.....	4
Environmental conditions	4
Possible test case verdicts.....	4
Abbreviations.....	5
Document History	6
Remarks and Comments	6
Used Equipment	7
Uncertainty	9
1 General Information	10
1.1 General Description of the Item(s).....	10
1.2 Channel List.....	11
2 Description of Test Setup	12
2.1 Auxiliary equipment /Accessories/Test software for the EUT.....	12
2.2 Power setting in test.....	13
3 Verdict summary section	14
3.1 Standards	14
3.2 Deviation(s) from the Standard(s) / Test Specification(s).....	14
3.3 Overview of results.....	15
3.4 Test Facility.....	16
4 TEST ITEMS OF LIMIT/SETUP/PROCEDURE	17
4.1 Radiated Emissions.....	17
4.1.1 Limit.....	17
4.1.2 Test Setup.....	19
4.1.3 Test Procedure.....	20
4.2 UWB Bandwidth.....	21
4.2.1 Limit.....	21
4.2.2 Test Setup.....	21
4.2.3 Test Procedure.....	21
4.3 EIRP(Equivalent Isotropic Radiated Power).....	22
4.3.1 Limit.....	22
4.3.2 Test Setup.....	22
4.3.3 Test Procedure.....	23
4.4 AC Power Line Conducted Emission	24

4.4.1 Limit	24
4.4.2 Test Setup	24
4.4.3 Test Procedure	24
4.5 Antenna Requirement	25
4.5.1 Limit:	25
4.5.2 Antenna Connector Construction:	25
4.6 Operational Limitations	26
4.6.1 Limit:	26
5 Test setup photo and EUT Photo	27
6 Test Result	28
Appendix A: -10dB Bandwidth	28
Appendix B: Equivalent Isotropic Radiated Power	29
Appendix C: Spurious Emissions	31
Appendix D: Spurious Emissions in GPS bands	35

COMPETENCES AND GUARANTEES

DEKRA 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 has a calibration and maintenance program for its measurement equipment.

DEKRA 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 in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA 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.

GENERAL CONDITIONS

Test Location	No. 99, Hongye Road, Suzhou Industrial Park Suzhou, 215006, P.R. China
Date(receive sample)	Jun. 16, 2026
Date (start test)	Jul. 01, 2026
Date (finish test)	Jul. 15, 2026

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.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA.

ENVIRONMENTAL CONDITIONS

The climatic conditions during the tests are within the limits specified by the manufacturer for the operation of the EUT and the test equipment. The climatic conditions during the tests were within the following limits:

Ambient temperature	15 °C – 35 °C
Relative Humidity air	30% - 60%

If explicitly required in the basic standard or applied product / product family standard the climatic values are recorded and documented separately in this test report.

POSSIBLE TEST CASE VERDICTS

Test case does not apply to test object	N/A
Test object does meet requirement	P (Pass) / PASS
Test object does not meet requirement	F (Fail) / FAIL
Not measured	N/M

ABBREVIATIONS

For the purposes of the present document, the following abbreviations apply:

EUT	: Equipment Under Test
QP	: Quasi-Peak
CAV	: CISPR Average
AV	: Average
CDN	: Coupling Decoupling Network
SAC	: Semi-Anechoic Chamber
OATS	: Open Area Test Site
BW	: Bandwidth
AM	: Amplitude Modulation
PM	: Pulse Modulation
HCP	: Horizontal Coupling Plane
VCP	: Vertical Coupling Plane
U_N	: Nominal voltage
T_x	: Transmitter
R_x	: Receiver
N/A	: Not Applicable
N/M	: Not Measured

DOCUMENT HISTORY

Report No.	Version	Description	Issued Date
2660507R.701B	V1.0	Initial issue of report.	2026-07-22

REMARKS AND COMMENTS

1. The equipment under test (EUT) does meet the essential requirements of the stated standard(s)/test(s).
2. These test results on a sample of the device are for the purpose of demonstrating Compliance with 47 CFR FCC Part 15 Subpart F.
3. The measurement result is considered in conformance with the requirement if it is within the prescribed limit, It is not necessary to account the uncertainty associated with the measurement result.
4. The test results presented in this report relate only to the object tested.
5. The test report shall not be reproduced without the written approval of DEKRA Testing and Certification (Suzhou) Co., Ltd.
6. This report will not be used for social proof function in China market.
7. DEKRA declines any responsibility with the following test data provided by customer that may affect the validity of result:
 - Chapter 1.1 General Description of the Item(s);
 - Chapter 1.2 Channel List;

USED EQUIPMENT

Conducted Test/ TR8

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date	Firmware Version	Software version
Wireless Connectivity Tester	R&S	CMW 270	102593	2026.05.10	2027.05.09	V 4.0.60	N/A
Coaxial Cable	N/A	N/A	2477	2026.06.10	2027.06.09	N/A	N/A
Coaxial Cable	N/A	N/A	2478	2026.06.10	2027.06.09	N/A	N/A
High and low temperature and fast temperature change test box	ASTUOD	ASTD-FBT-225K	N/A	2026.03.16	2027.03.15	N/A	N/A
Temperature/Humidity Meter	RTS	RTS-8S	RF07	2026.06.17	2027.06.16	N/A	N/A

Test system

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date	Firmware Version	Software version
MAX Signal Analyzer	Keysight	N9010A	MY48030494	2025.09.20	2026.09.19	A.14.03	N/A
RF Control Unit	Tonscend	JS0806-2	22G8060594	2026.01.26	2027.01.25	N/A	N/A
MXG-B RF Vector Signal Generator	Keysight	N5182B	MY61252529	2026.03.23	2027.03.22	B.01.96	N/A
Frequency extender for EXG or MXG	Keysight	N5182BX07	MY59362500	2026.03.23	2027.03.22	N/A	N/A
EXG-B MW Analog Signal Generator	Keysight	N5173B	MY61252566	2026.05.10	2027.05.09	B.01.95	N/A
Test Software	Tonscend	TS1120	JS1120-3	N/A	N/A	N/A	V3.0.22

Radiated Emission(9KHz-1GHz) / AC2

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date	Firmware Version	Software version
EMI Test Receiver	R&S	ESCI	100573	2026.01.11	2027.01.10	4.42 SP3	N/A
Loop Antenna	R&S	HFH2-Z2E	101149	2026.04.16	2027.04.15	N/A	N/A
Bilog Antenna	Teseq GmbH	CBL6112D	27611	2026.03.24	2027.03.23	N/A	N/A
Temperature/Humidity Meter	RTS	RTS-8S	AC2-TH	2026.06.17	2027.06.16	N/A	N/A
Coaxial Cable	Huber+Suhner	RTS-1909	THM-021	2026.04.30	2027.04.29	N/A	N/A
Anechoic chamber	Quietek	9m*6m*6m	AC2	2024.07.07	2029.07.06	N/A	N/A
Dekra test software	Dekra	N/A	N/A	N/A	N/A	N/A	3

Radiated Emission (1GHz-40GHz) / AC6

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date	Firmware Version	Software version
Signal analyzer	Agilent	N9020A	MY49100159	2026.05.10	2027.05.09	A 08.54	N/A
Power Amplifier	MVE	MPC1018.50	C30002D	2026.05.17	2027.05.16	N/A	N/A
DRG Horn Antenna	RFSPIN	DRH18-E	CE2C07A18EN	2025.12.07	2026.12.06	N/A	N/A
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9170	750	2025.11.24	2026.11.23	N/A	N/A
Pre-Amplifier	Schwarzbeck	BBV 9721	00114	2026.05.17	2027.05.16	N/A	N/A
TRILOG Broadband Antenna	SCHWARZBECK	VULB 9168	1231	2026.05.28	2027.05.27	N/A	N/A
TRILOG Broadband Antenna	SCHWARZBECK	VULB 9168	1231	2026.05.28	2027.05.27	N/A	N/A
Temperature/Humidity Meter	RTS	RTS-8S	RF04	2026.06.17	2027.06.16	N/A	N/A
Temperature/Humidity Meter	RTS	RTS-8S	RF08	2026.06.17	2027.06.16	N/A	N/A
Anechoic chamber	Quietek	9m*5.5m*5.5m	AC6	2024.06.30	2029.06.29	N/A	N/A
Test Software	Tonscend	JS36	JS36-RSE	N/A	N/A	N/A	5.0.0

UNCERTAINTY

Uncertainties have been calculated according to the DEKRA internal document. The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

Test item	Uncertainty
AC Power Line Conducted Emission	± 2.92 dB
Peak Power Output	± 1.13 dB
Radiated Emission(30MHz~1GHz)	Horizontal: 30MHz~200MHz: 4.60 dB 200MHz~1GHz: 4.10 dB Vertical: 30MHz~200MHz: 4.80 dB 200MHz~1GHz: 4.10 dB
Radiated Emission(1GHz~40GHz)	Horizontal: 1GHz~18GHz: 5.00 dB Vertical: 1GHz~18GHz: 4.80 dB Horizontal: 18GHz~40GHz: 4.70 dB Vertical: 18GHz~40GHz: 4.60 dB
RF antenna conducted test	± 1.13 dB
Radiated Emission Band Edge	± 5.00 dB
DTS Bandwidth	± 279 Hz
Occupied Bandwidth	± 279 Hz
Power Density	± 1.13 dB

1 GENERAL INFORMATION

1.1 General Description of the Item(s)

Product Name	PEPS
Trademark	KOSTAL
Model No.	SMART KEY MODULE
Operating Temperature	-40°C - 85°C
Power Supply	12 Vdc
Test EUT	#1
Manufacturer.....	Kostal (shanghai) Management Co.,Ltd.
Manufacturer address	No.189 Xingting Road, Jiading District, Shanghai, P.R. China
Wireless specification.....	IEEE 802.15.4 (UWB)
Operating frequency range(s).....	6 GHz to 8.5 GHz
Type of Modulation.....	BPM/BPSK
Antenna Type.....	On board Antenna
Antenna Gain.....	-2 dBi

Remark:

As above information is provided and confirmed by the applicant. DEKRA is not liable to the accuracy, suitability, reliability or/and integrity of the information.

1.2 Channel List

IEEE 802.15.4(UWB)

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
01	7987 MHz	N/A	N/A	N/A	N/A	N/A	N/A

Note: The General Description of the Item, Channel List in clause 1 are provided and confirmed by the client.

2 DESCRIPTION OF TEST SETUP

2.1 Auxiliary equipment /Accessories/Test software for the EUT

Auxiliary equipment	Type / Version	Manufacturer	Supplied by
(1) Notebook	Think pad x220	Lenovo	Adapter
(2) USB Control Cable	N/A	N/A	N/A
(3) USB Control Cable	N/A	N/A	N/A
software	Type / Version		
TSMaster	N/A		

Accessories Information	Cable		
	Length used during test [m]	Attached during test	Shielded
(2)USB Control Cable	1	☒	☒
(3)USB Control Cable	8	☒	☒

2.2 Power setting in test

Mode	Channel	Frequency (MHz)	Power setting
UWB	09	7987	N/A

3 VERDICT SUMMARY SECTION

This chapter presents an overview of standards and results. Refer to the next chapters for details of measured test results and applied test levels.

3.1 Standards

Standard	Year	Description
FCC CFR Title 47 Part 15 Subpart F	2024	Ultra - Wideband Operation
ANSI C63.10	2020	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

3.2 Deviation(s) from the Standard(s) / Test Specification(s)

The following deviation(s) was / were made from the published requirements of the listed standards: N/A.

(Please define the deviations from the standard(s) if applicable)

3.3 Overview of results

Requirement – Test Item of FCC	Standard(s)	Verdict	Remark
Operational Requirements	47 CFR Part 15, Subpart F Section S15.519(a)	PASS	---
Equivalent Isotropic Radiated Power	47 CFR Part 15, Subpart F Section S15.519(c) & S15.519(e)	PASS	Test data please refer to Appendix
-10dB Bandwidth	47 CFR Part 15, Subpart F Section S15.503(a),(d) & S15.519(b)	PASS	Test data please refer to Appendix
Spurious Emissions Below 1GHz	47 CFR Part 15, Subpart F Section S15.209	PASS	Test data please refer to Appendix
Spurious Emissions Above 1GHz	47 CFR Part 15, Subpart F Section S15.519(c),(d) & S15.521(d)	PASS	Test data please refer to Appendix
AC Power Line Conducted Emission	FCC 15.207	N/A ^(See Note2)	N/A ^(See Note2)
Antenna Requirement	FCC 15.203	PASS	---
Note1: The radiation measurement is pre tested under X, Y, and Z axis positioning to find the worst placement for final testing.			
Note2: EUT is DC powered, not applicable.			

3.4 Test Facility

Test Location : FCC Designation Number: CN1199

4 TEST ITEMS OF LIMIT/SETUP/PROCEDURE

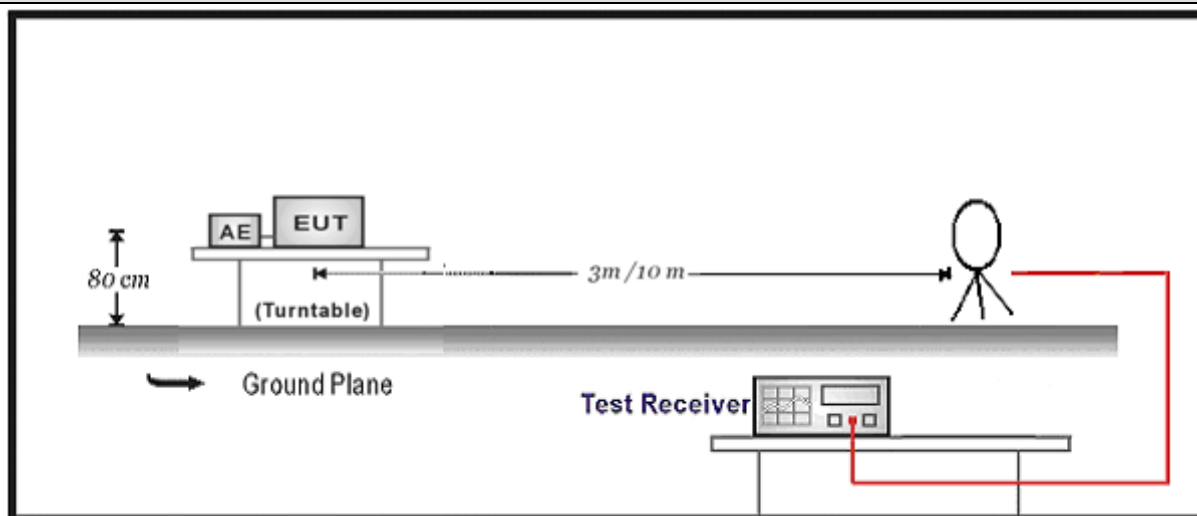
4.1 Radiated Emissions	VERDICT: PASS
-------------------------------	----------------------

4.1.1 Limit			
Standard		47 CFR Part 15, Subpart F Section §15.209.	
Restricted Bands of operation for FCC			
Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 – 0.110	16.42 – 16.423	399.9 – 410	4.5 – 5.15
0.495 – 0.505	16.69475 – 16.69525	608 – 614	5.35 – 5.46
2.1735 – 2.1905	16.80425 – 16.80475	960 – 1240	7.25 – 7.75
4.125 – 4.128	25.5 – 25.67	1300 – 1427	8.025 – 8.5
4.17725 – 4.17775	37.5 – 38.25	1435 – 1626.5	9.0 – 9.2
4.20725 – 4.20775	73 – 74.6	1645.5 – 1646.5	9.3 – 9.5
6.215 – 6.218	74.8 – 75.2	1660 – 1710	10.6 – 12.7
6.26775 – 6.26825	108 – 121.94	1718.8 – 1722.2	13.25 – 13.4
6.31175 – 6.31225	123 – 138	2200 – 2300	14.47 – 14.5
8.291 – 8.294	149.9 – 150.05	2310 – 2390	15.35 – 16.2
8.362 – 8.366	156.52475 – 156.52525	2483.5 – 2500	17.7 – 21.4
8.37625 – 8.38675	156.7 – 156.9	2690 – 2900	22.01 – 23.12
8.81425 – 8.81475	162.0125 – 167.17	3260 – 3267	23.6 – 24.0
12.29 – 12.293	167.72 – 173.2	3332 – 3339	31.2 – 31.8
12.51975–12.52025	240 – 285	3345.8 – 3358	36.43 – 36.5
12.57675–12.57725	322 – 335.4	3600 – 4400	Above 38.6
13.36 – 13.41	--	--	--
Restricted Band Emissions Limit			
Frequency (MHz)	Field strength (µV/m)	Field strength (dBµV/m)	Measurement distance (m)
0.009 - 0.49	2400/F(kHz)	48.5 – 13.8	300 ^(Note 1)
0.49 - 1.705	24000/F(kHz)	33.8 - 23	30 ^(Note 1)
1.705 - 30	30	29.5	30 ^(Note 1)
30 - 88	100	40	3 ^(Note 2)
88 - 216	150	43.5	3 ^(Note 2)
216 - 960	200	46	3 ^(Note 2)
Above 960	500	54	3 ^(Note 2)
Note 1: At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade).			
Note 2: At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field			

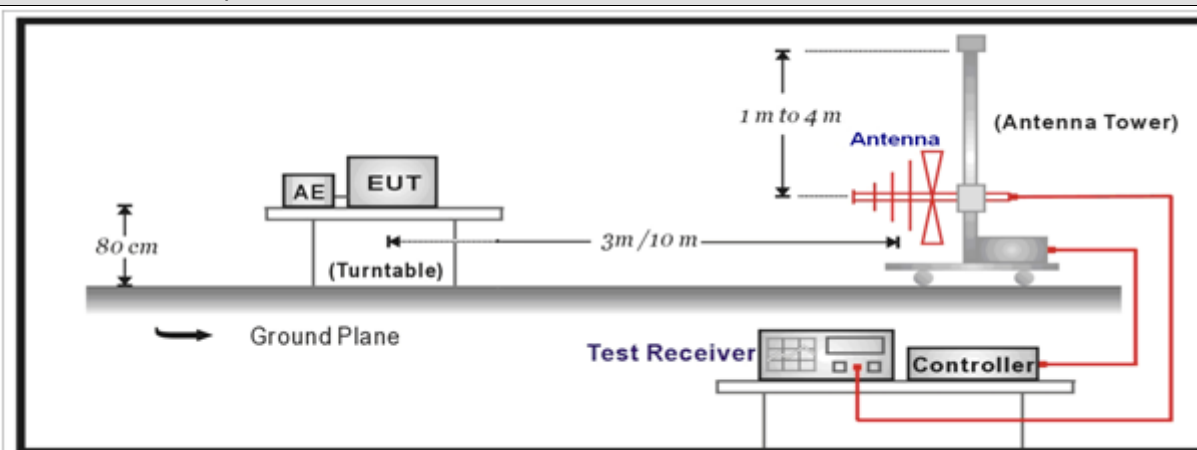
measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

4.1.2 Test Setup

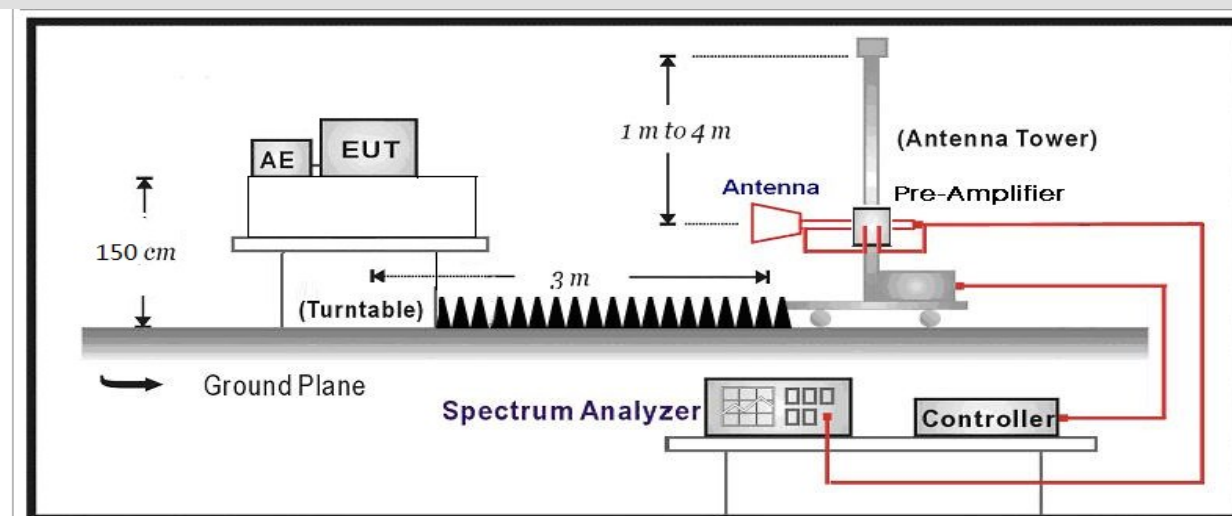
Below 30MHz Test Setup:



30MHz-1GHz Test Setup:



Above 1GHz Test Setup:



4.1.3 Test Procedure

- 1) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- 2) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 3) The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- 4) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- 5) The test-receiver system was set to Peak detector with Maximum Hold Mode. And use Quasi-Peak to measure the six highest frequencies.
- 6) Test the EUT in the lowest channel, the Highest channel and only recorded worst channel--Lowest channel in the test report.
- 7) The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.
- 8) Repeat above procedures until all frequencies measured was complete.

4.2 UWB Bandwidth

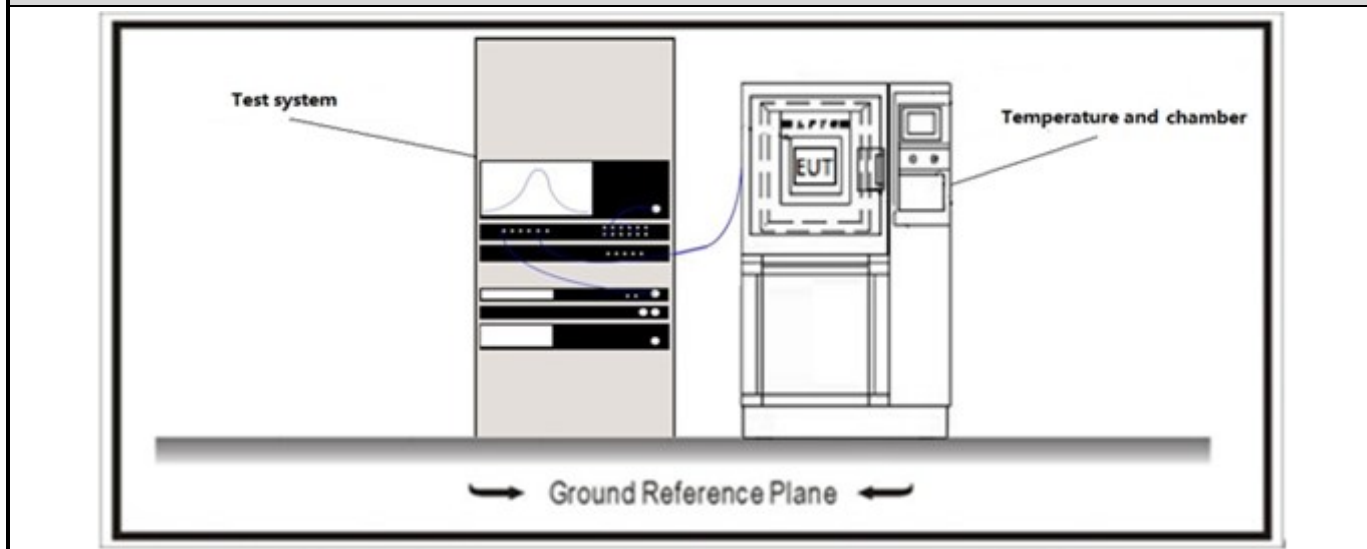
VERDICT: PASS

4.2.1 Limit

Standard	47 CFR Part 15, Subpart F Section § 15.503(a),(d) & 15.517(b) ANSI C63.10
-----------------	--

 $\geq 500\text{MHz}$

4.2.2 Test Setup



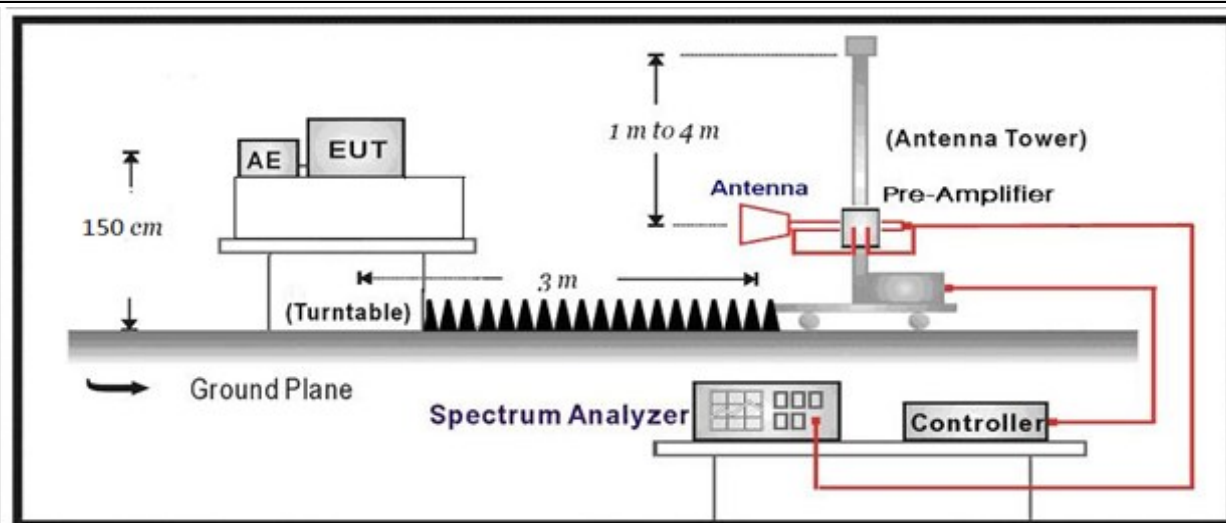
4.2.3 Test Procedure

The frequency at which the maximum power level is measured with the peak detector is designated f_M . The peak power measurements shall be made using a spectrum analyzer or EMI receiver with a 1 MHz resolution bandwidth and a video bandwidth of 1 MHz or greater. The instrument shall be set to peak detection using the maximum-hold trace mode. The outermost 1 MHz segments above and below f_M , where the peak power falls by 10 dB relative to the level at f_M , are designated as f_H and f_L , respectively:

- For the lowest frequency bound f_L , the emission is searched from a frequency lower than f_M that has, by inspection, a peak power much lower than 10 dB less than the power at f_M and increased toward f_M until the peak power indicates 10 dB less than the power at f_M . The frequency of that segment is recorded.
- This process is repeated for the highest frequency bound f_H , beginning at a frequency higher than f_M that has, by inspection, a peak power much lower than 10 dB below the power at f_M . The frequency of that segment is recorded.
- The two recorded frequencies represent the highest f_H and lowest f_L bounds of the UWB transmission, and the -10 dB bandwidth ($B - 10$) is defined as $(f_H - f_L)$. The center frequency (f_c) is mathematically determined from $(f_H - f_L) / 2$.
- The fractional bandwidth is defined as $2(f_H - f_L) / (f_H + f_L)$. e) Determine whether the -10 dB bandwidth $(f_H - f_L)$ is $\geq 500\text{ MHz}$, or whether the fractional bandwidth $2(f_H - f_L) / (f_H + f_L)$ is ≥ 0.2 .

4.3 EIRP(Equivalent Isotropic Radiated Power)**VERDICT: PASS****4.3.1 Limit**

Standard	47 CFR Part 15, Subpart F Section §15.517(c) & §15.517(e) ANSI C63.10
(c) The radiated emissions at or below 960 MHz from a device operating under the provisions of this section shall not exceed the emission levels in § 15.209. The radiated emissions above 960 MHz from a device operating under the provisions of this section shall not exceed the following average limits when measured using a resolution bandwidth of 1 MHz:	
Frequency in MHz	EIRP in dBm
960–1610	-75.3
1610–1990	-53.3
1990–3100	-51.3
3100–10600	-41.3
Above 10600	-51.3

4.3.2 Test Setup

4.3.3 Test Procedure

- 1) The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semianechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- 2) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 3) The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- 4) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- 5) The test-receiver system was set to Peak detector with Maximum Hold Mode for Max Peak EIRP measurement and AV detector for Average EIRP measurement.
- 6) Test the EUT in the lowest channel, the Highest channel
- 7) The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is worse case.
- 8) Repeat above procedures until all frequencies measured was complete. Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

4.4 AC Power Line Conducted Emission**VERDICT: N/A****4.4.1 Limit**

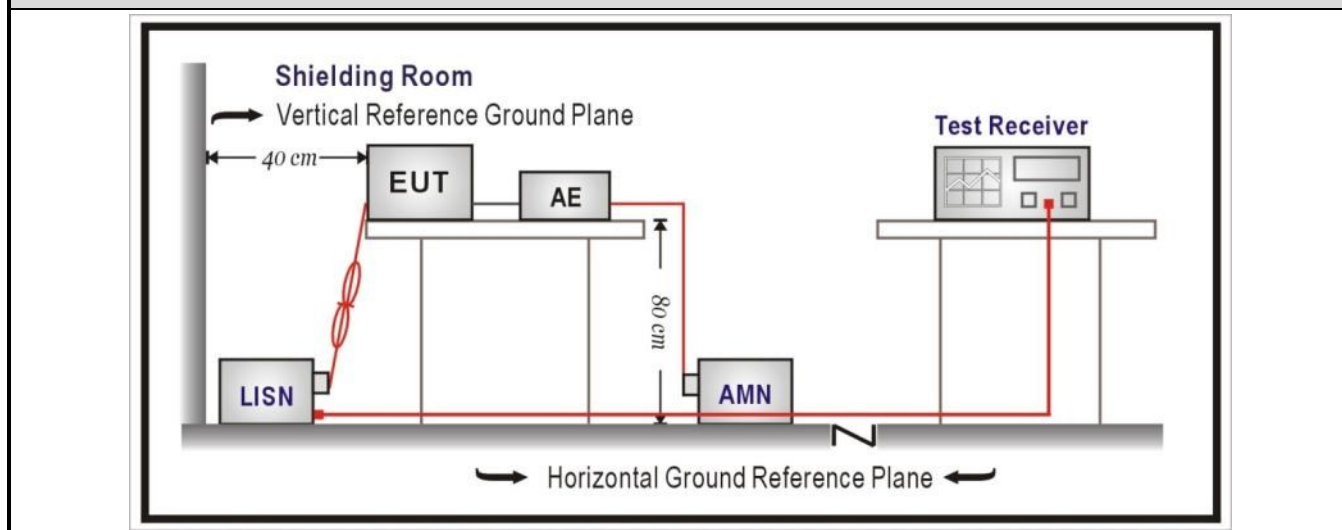
Standard	FCC Part 15 Subpart C Paragraph 15.207 ;	
Frequency range [MHz]	Limit: QP [dB(μV) ¹⁾]	Limit: AV [dB(μV) ¹⁾]
0,15 - 0,50	66 - 56 ²⁾	56 - 46 ²⁾
0,50 - 5,0	56	46
5,0 - 30	60	50

¹⁾ At the transition frequency, the lower limit applies.

²⁾ The limit decreases linearly with the logarithm of the frequency.

NOTE 1: The exclusion band for transmitters shall be considered for transmitters operating at frequencies below 30 MHz.

NOTE 2: Where the AC output port is directly connected (or via a circuit breaker) to the AC power input port of the EUT the AC power output port need not to be tested.

4.4.2 Test Setup**4.4.3 Test Procedure**

	References Rule	Chapter	Item
☐	ANSI C63.10	6.2	Standard test method for ac power-line conducted emissions from unlicensed wireless devices

4.5 Antenna Requirement**VERDICT: PASS****4.5.1 Limit:****Standard**

FCC Part 15 Subpart C Paragraph 15.203

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

4.5.2 Antenna Connector Construction:

- | | |
|-------------------------------------|--|
| ☒ | The use of a permanently attached antenna |
| ☐ | The antenna use of a unique coupling to the intentional radiator |
| ☐ | The use of a nonstandard antenna jack or electrical connector |

Please refer to the attached document "Internal Photograph" to show the antenna connector.

4.6 Operational Limitations	VERDICT: PASS
------------------------------------	----------------------

4.6.1 Limit:	
Standard	FCC Part 15 Subpart F Paragraph 15.519
FCC §15.519(a)(1) A UWB device operating under the provisions of this section shall transmit only when it is sending information to an associated receiver. The UWB intentional radiator shall cease transmission within 10 seconds unless it receives an acknowledgement from the associated receiver that its transmission is being received. An acknowledgment of reception must continue to be received by the UWB intentional radiator at least every 10 seconds or the UWB device must cease transmitting. The client has been informed of this requirement.	
FCC §15.519(a)(2) The use of antennas mounted on outdoor structures, e.g., antennas mounted on the outside of a building or on a telephone pole, or any fixed outdoors infrastructure is prohibited. Antennas may be mounted only on the hand held UWB device. The client has been informed of this requirement.	
FCC §15.519(a)(3) UWB devices operating under the provisions of this section may operate indoors or outdoors. The client has been informed of this requirement.	

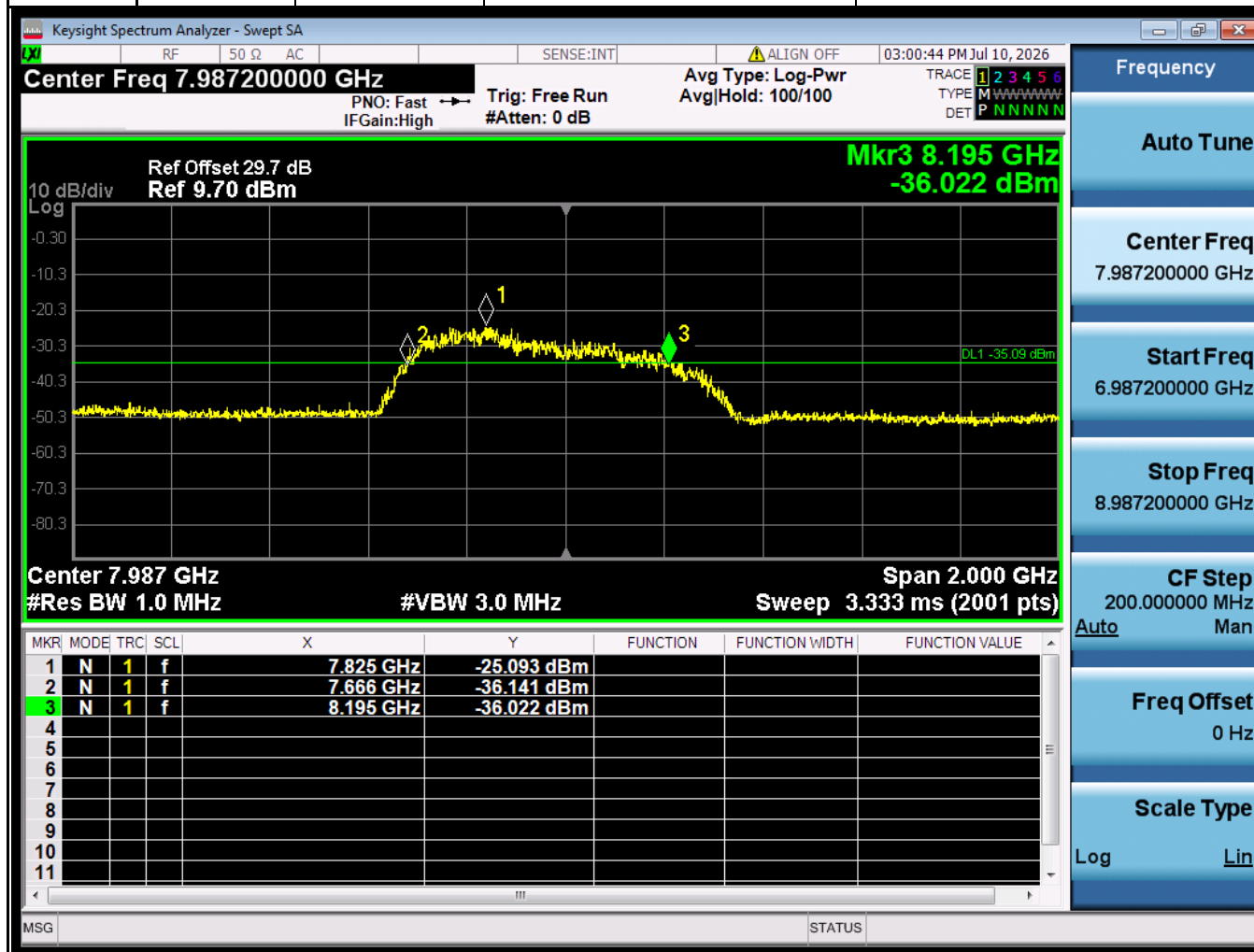
5 TEST SETUP PHOTO AND EUT PHOTO

Remark: The test setup photo and EUT Photo please see appendix.

6 TEST RESULT

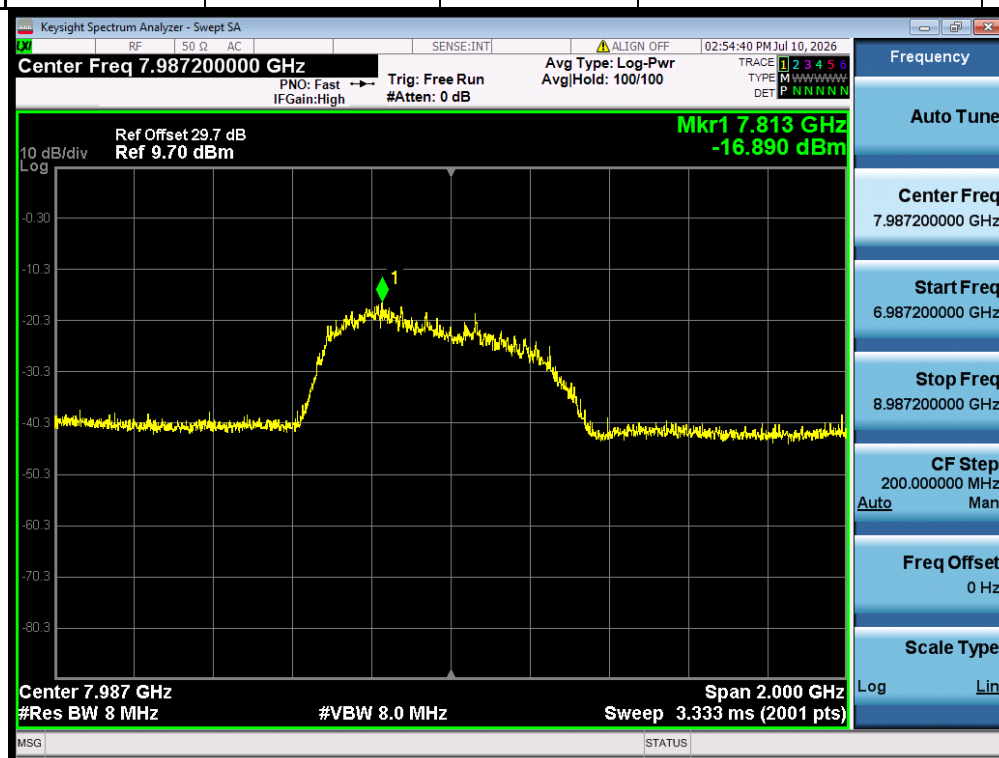
Appendix A: -10dB Bandwidth

Test Mode	Frequency (MHz)	10dB Bandwidth (MHz)	f_L (MHz)	f_H (MHz)
UWB	7987	529	7666	8195

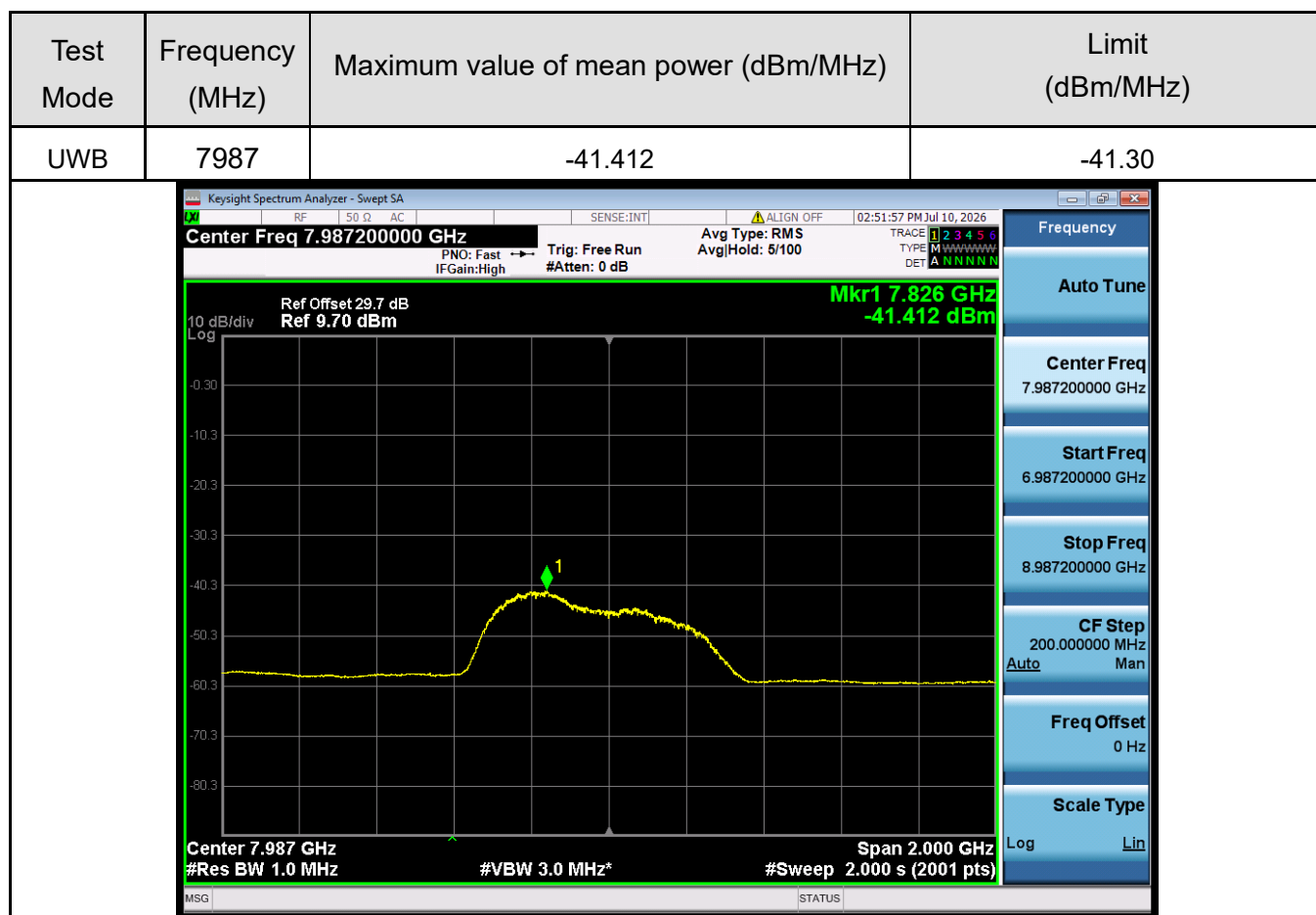


Appendix B: Equivalent Isotropic Radiated Power

Test Mode	Frequency (MHz)	Measure Values (dBm)	Corr _{dB}	Maximum value of peak power(dBm)	Limit (dBm)
UWB	7987	-16.89	15.92	-0.97	0

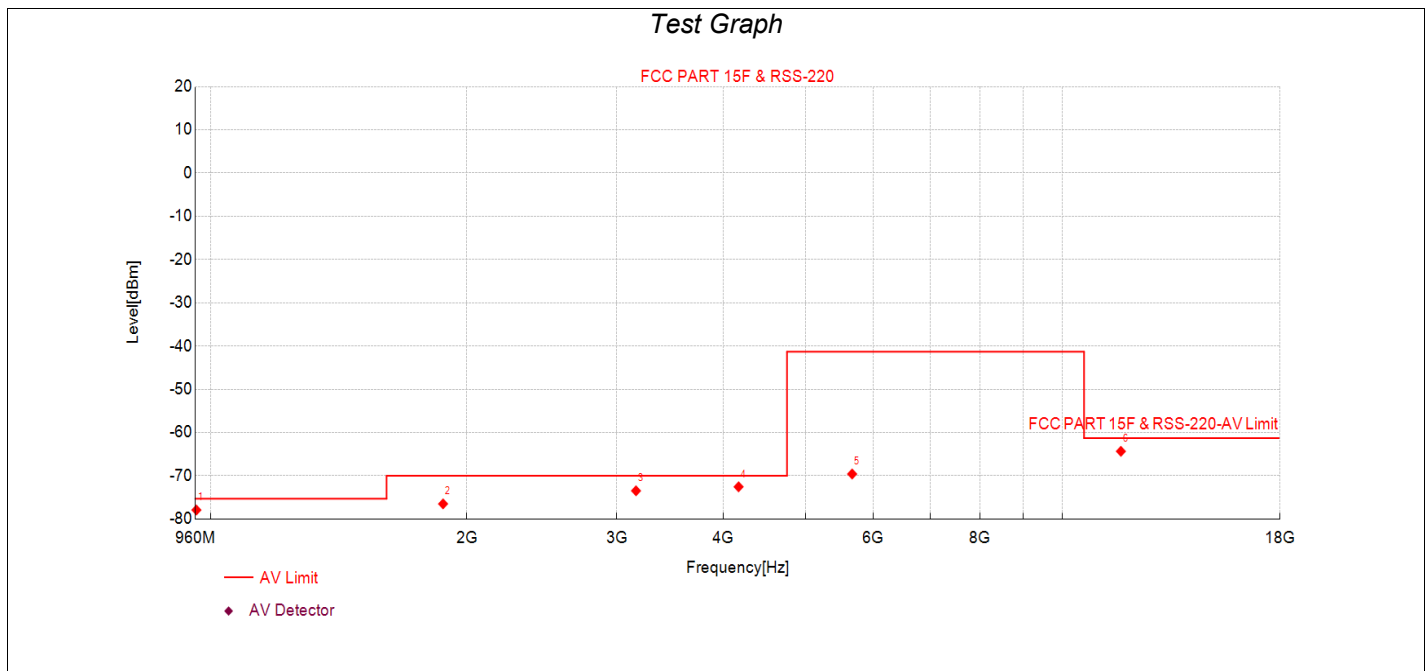


Note: $\text{Corr}_{\text{dB}} = 20 \cdot \log_{10}(50\text{MHz}/\text{RBW}_{\text{used}})$, $\text{RBW} = 8\text{MHz}$.



Appendix C: Spurious Emissions

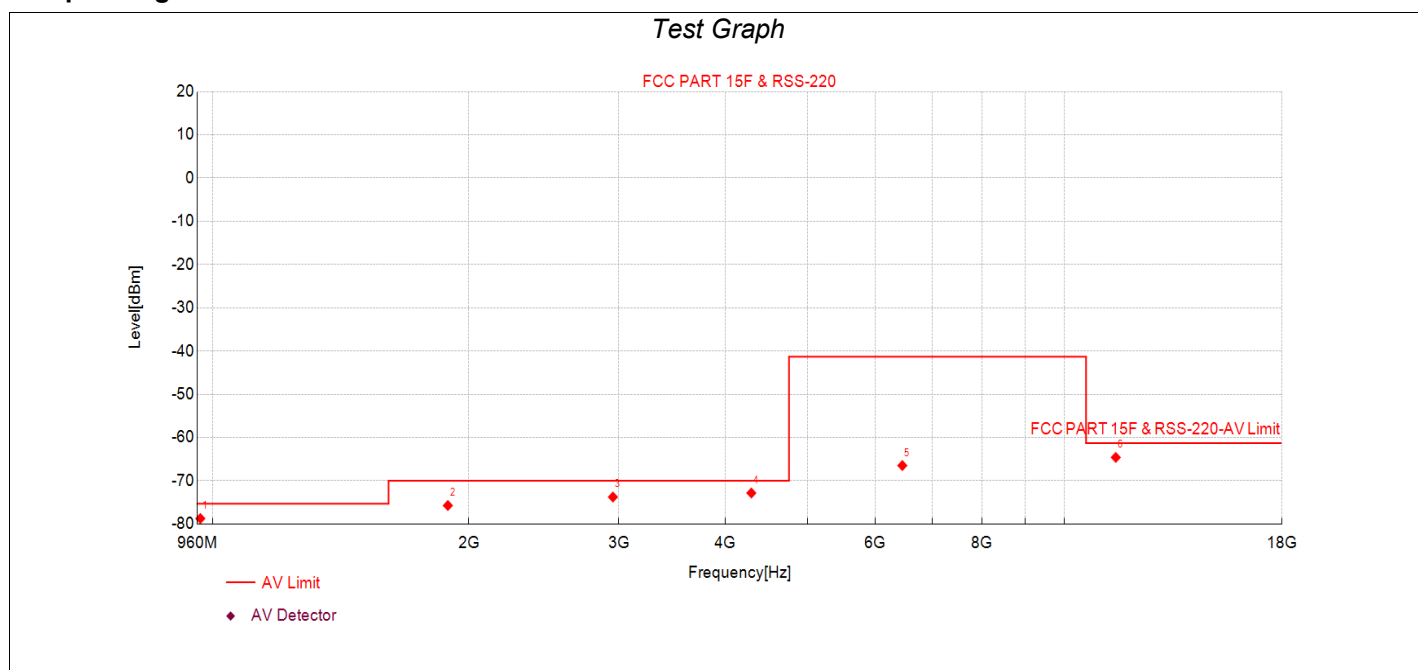
Operating



Data List

NO	Frequency [MHz]	Reading [dBμV]	Level [dBm]	Factor [dB/m]	Limit [dBm]	Margin [dB]	Det	Pol	Verdict
1	963.02	23.7	-77.91	-101.620	-75.30	2.61	AV	Horizo	PASS
2	1875.56	21.1	-76.49	-97.620	-70.00	6.49	AV	Horizo	PASS
3	3158.94	19.0	-73.47	-92.470	-70.00	3.47	AV	Horizo	PASS
4	4167.96	16.4	-72.55	-88.970	-70.00	2.55	AV	Horizo	PASS
5	5664.41	14.2	-69.58	-83.780	-41.30	28.28	AV	Horizo	PASS
6	11710.29	25.4	-64.34	-89.720	-61.30	3.04	AV	Horizo	PASS

Operating



Data List

NO	Frequency [MHz]	Reading [dBμV]	Level [dBm]	Factor [dB/m]	Limit [dBm]	Margin [dB]	Det	Pol	Verdict
1	968.04	22.9	-78.72	-101.620	-75.30	3.42	AV	Vertic	PASS
2	1889.63	21.8	-75.72	-97.480	-70.00	5.72	AV	Vertic	PASS
3	2951.91	19.0	-73.75	-92.750	-70.00	3.75	AV	Vertic	PASS
4	4290.57	15.8	-72.82	-88.590	-70.00	2.82	AV	Vertic	PASS
5	6452.33	13.8	-66.47	-80.250	-41.30	25.17	AV	Vertic	PASS
6	11486.57	25.4	-64.59	-90.030	-61.30	3.29	AV	Vertic	PASS

Note:

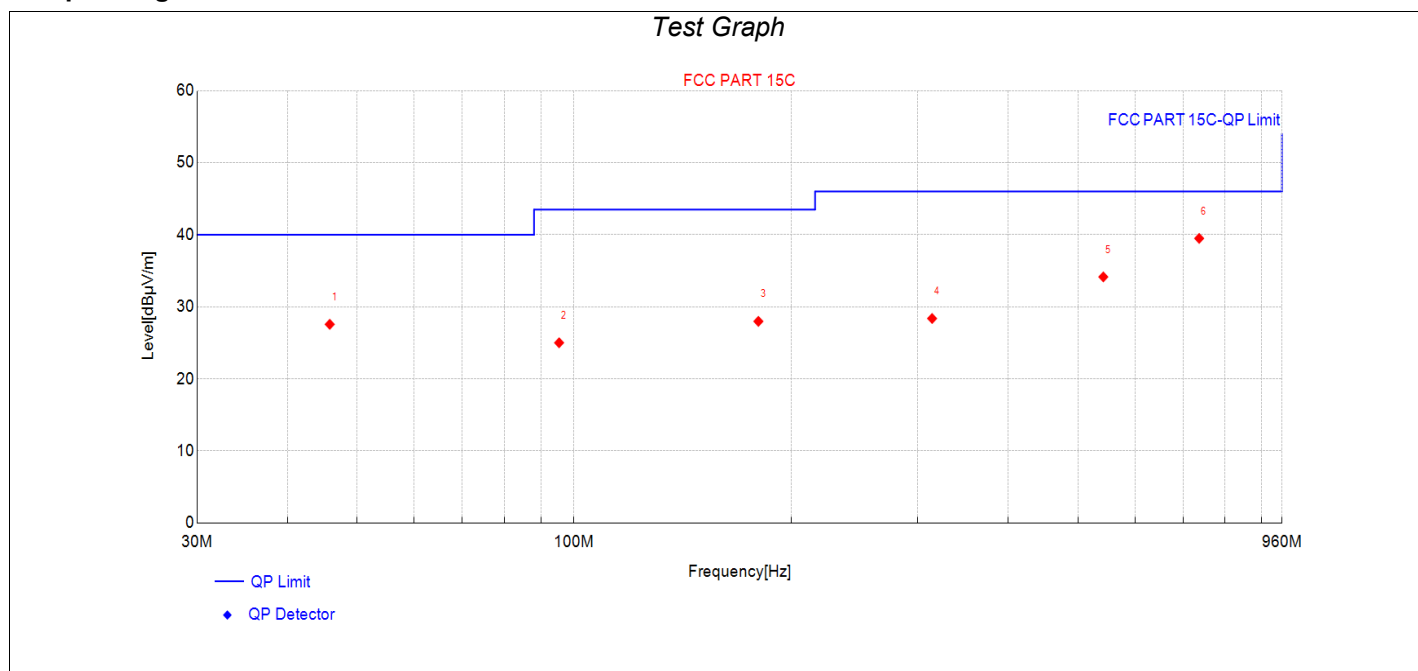
1. Level = Reading + Factor

2. Margin = Limit - Level

3. The test frequency range, 9kHz~30MHz, worst case are at least 20dB below the limits, therefore no data appear in the report.

The worst case of Radiated Emission below 1GHz:

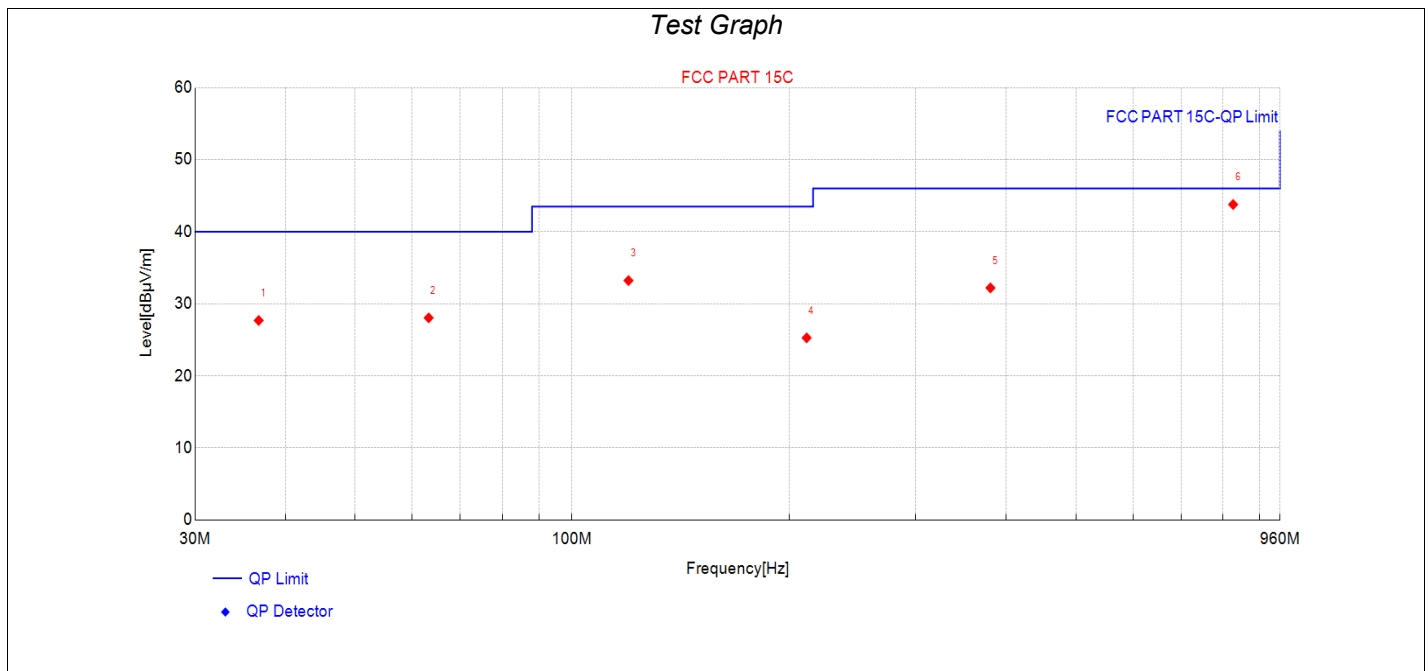
Operating



Data List

NO	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Det	Pol	Verdict
1	45.81	13.5	27.57	14.120	40.00	12.43	PK	Horizo	PASS
2	95.33	16.1	25.01	8.960	43.50	18.49	PK	Horizo	PASS
3	180.20	15.7	27.98	12.330	43.50	15.52	PK	Horizo	PASS
4	313.88	13.9	28.38	14.470	46.00	17.62	PK	Horizo	PASS
5	542.43	14.7	34.15	19.440	46.00	11.85	PK	Horizo	PASS
6	736.80	16.5	39.49	22.980	46.00	6.51	PK	Horizo	PASS

Operating



Data List

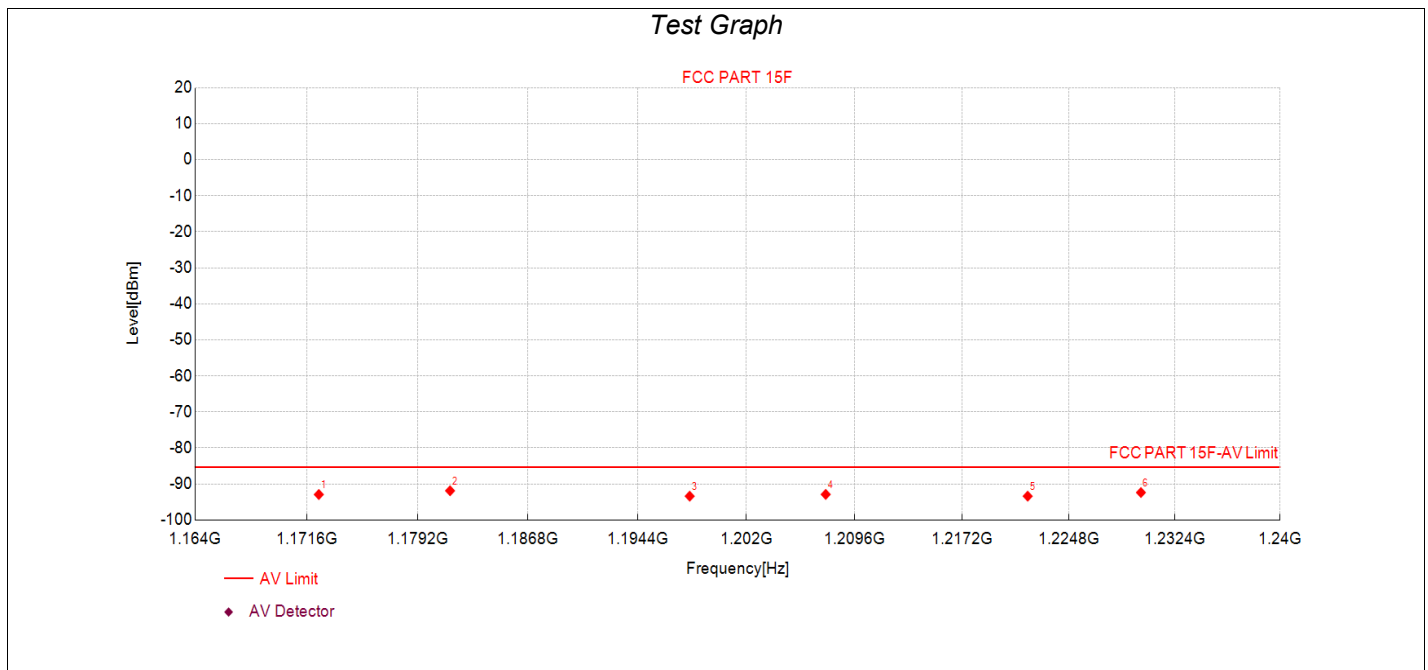
NO	Frequency [MHz]	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Det	Pol	Verdict
1	36.74	14.1	27.69	13.570	40.00	12.31	PK	Vertic	PASS
2	63.25	15.2	28.05	12.900	40.00	11.95	PK	Vertic	PASS
3	119.75	21.5	33.23	11.780	43.50	10.27	PK	Vertic	PASS
4	211.58	14.3	25.28	11.010	43.50	18.22	PK	Vertic	PASS
5	380.61	16.2	32.21	16.030	46.00	13.79	PK	Vertic	PASS
6	826.55	20.0	43.78	23.800	46.00	2.22	PK	Vertic	PASS

Note:

1. All Readings below 1GHz are PK, PK as an alternative to CISPR quasi-peak measurements or average measurements.
2. Level=Reading+Factor.

Appendix D: Spurious Emissions in GPS bands

Operating

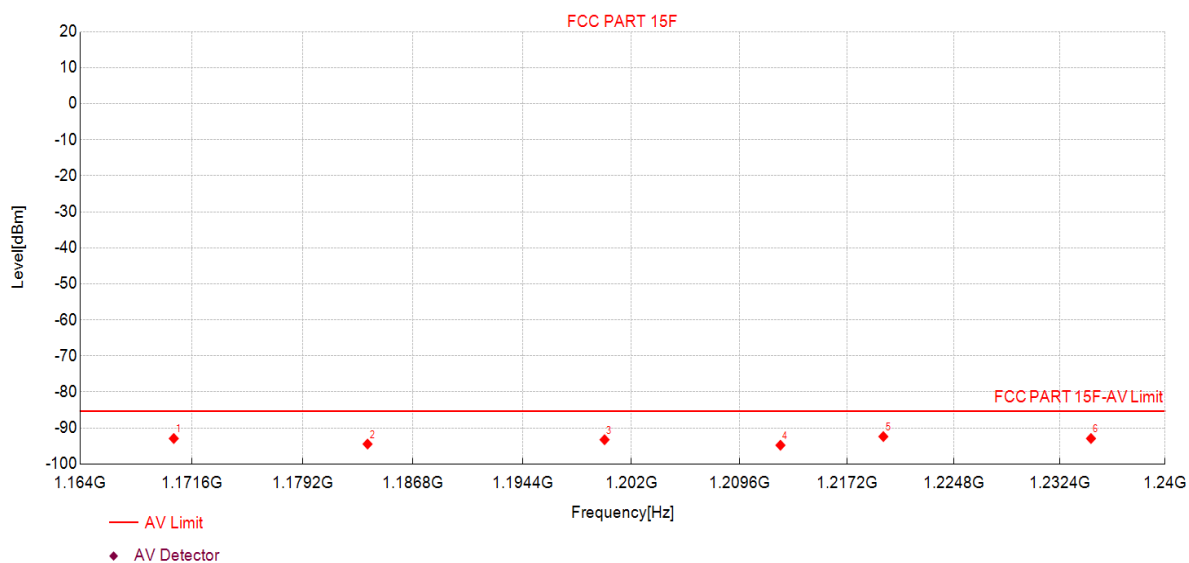


Data List

NO	Frequency [MHz]	Reading [dBμV]	Level [dBm]	Factor [dB/m]	Limit [dBm]	Margin [dB]	Det	Pol	Verdict
1	1172.42	7.8	-92.92	-100.740	-85.30	7.62	AV	Horizo	PASS
2	1181.42	8.8	-91.87	-100.650	-85.30	6.57	AV	Horizo	PASS
3	1198.05	7.2	-93.38	-100.560	-85.30	8.08	AV	Horizo	PASS
4	1207.59	7.6	-92.88	-100.490	-85.30	7.58	AV	Horizo	PASS
5	1221.89	7.0	-93.38	-100.390	-85.30	8.08	AV	Horizo	PASS
6	1229.99	7.9	-92.37	-100.310	-85.30	7.07	AV	Horizo	PASS

Operating

Test Graph

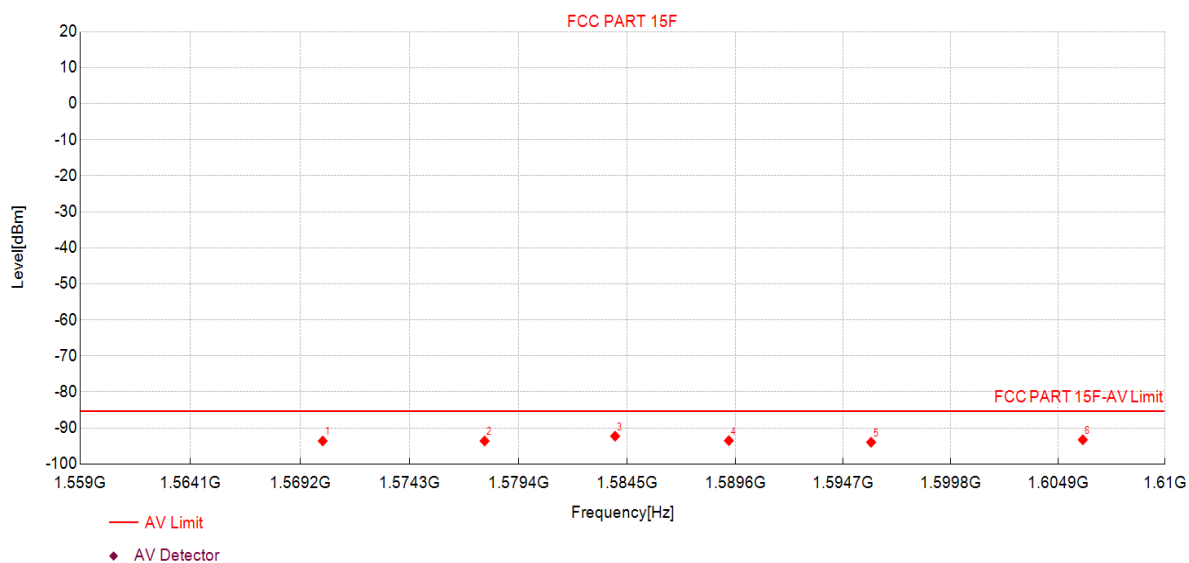


Data List

NO	Frequency [MHz]	Reading [dBμV]	Level [dBm]	Factor [dB/m]	Limit [dBm]	Margin [dB]	Det	Pol	Verdict
1	1170.37	7.8	-92.92	-100.750	-85.30	7.62	AV	Vertic	PASS
2	1183.67	6.2	-94.46	-100.650	-85.30	9.16	AV	Vertic	PASS
3	1200.14	7.3	-93.25	-100.540	-85.30	7.95	AV	Vertic	PASS
4	1212.51	5.7	-94.78	-100.460	-85.30	9.48	AV	Vertic	PASS
5	1219.80	8.0	-92.38	-100.400	-85.30	7.08	AV	Vertic	PASS
6	1234.66	7.3	-92.92	-100.260	-85.30	7.62	AV	Vertic	PASS

Operating

Test Graph

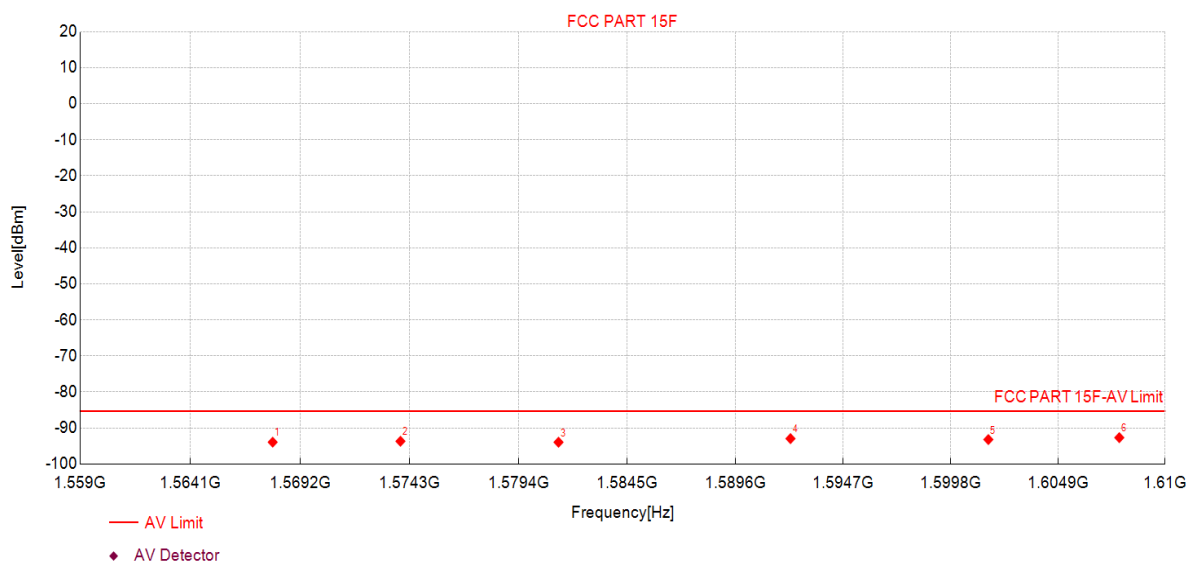


Data List

NO	Frequency [MHz]	Reading [dBμV]	Level [dBm]	Factor [dB/m]	Limit [dBm]	Margin [dB]	Det	Pol	Verdict
1	1570.26	5.4	-93.60	-99.030	-85.30	8.30	AV	Horizo	PASS
2	1577.82	5.4	-93.61	-99.000	-85.30	8.31	AV	Horizo	PASS
3	1583.94	6.7	-92.27	-98.980	-85.30	6.97	AV	Horizo	PASS
4	1589.30	5.5	-93.50	-98.980	-85.30	8.20	AV	Horizo	PASS
5	1596.02	5.0	-93.96	-98.970	-85.30	8.66	AV	Horizo	PASS
6	1606.08	5.7	-93.27	-98.980	-85.30	7.97	AV	Horizo	PASS

Operating

Test Graph



Data List

NO	Frequency [MHz]	Reading [dBμV]	Level [dBm]	Factor [dB/m]	Limit [dBm]	Margin [dB]	Det	Pol	Verdict
1	1567.93	5.1	-93.93	-99.050	-85.30	8.63	AV	Vertic	PASS
2	1573.89	5.3	-93.68	-99.020	-85.30	8.38	AV	Vertic	PASS
3	1581.28	5.0	-93.95	-98.990	-85.30	8.65	AV	Vertic	PASS
4	1592.21	6.0	-92.95	-98.970	-85.30	7.65	AV	Vertic	PASS
5	1601.58	5.8	-93.21	-98.970	-85.30	7.91	AV	Vertic	PASS
6	1607.82	6.3	-92.67	-98.970	-85.30	7.37	AV	Vertic	PASS

_____ The End _____