



FCC Test Report

Test report

**On Behalf of
Aviron Interactive.**

For

Aviron 21.5 inch Touch Screen

Model No.: ATS4, BTS4

FCC ID: 2ASJ3-ATS4

Prepared For : Aviron Interactive.
265 Bartley Drive. North York, M4A2N7 Canada

Prepared By : Shenzhen HUAKE Testing Technology Co., Ltd.
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Date of Test: Jan. 18, 2024 ~ Jan. 31, 2024

Date of Test: Aug. 01, 2024 ~ Aug. 08, 2024

Date of Report: Aug. 08, 2024

Report Number: HK2408014304-2E



Test Result Certification

Applicant's name : Aviron Interactive.

Address : 265 Bartley Drive. North York, M4A2N7 Canada

Manufacturer's Name : Aviron Interactive.

Address : 265 Bartley Drive. North York, M4A2N7 Canada

Product description

Trade Mark: N/A

Product name : Aviron 21.5 inch Touch Screen

Model and/or type reference ... : ATS4, BTS4

Standards : 47 CFR FCC Part 15 Subpart C 15.247

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Date of Test :

Date (s) of performance of tests : Jan. 18, 2024 ~ Jan. 31, 2024

Date (s) of performance of tests : Aug. 01, 2024 ~ Aug. 08, 2024

Date of Issue : Aug. 08, 2024

Test Result : Pass

Testing Engineer :

(Len Liao)

Technical Manager :

(Sliver Wan)

Authorized Signatory :

(Jason Zhou)

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**** Modified History ****

Revision	Description	Issued Data	Remark
Revision 1.0	Initial Test Report Release	Jan. 31, 2024	Jason Zhou
Revision 2.0	Add models, radiation and conduction test data, and modify report numbers. Refer to the original report HK2401180403-2E	Aug. 08, 2024	Jason Zhou



1 Test Summary

1.1 Test Description

Test Item	Test Requirement	Result
Antenna Requirement	§15.203/§15.247(b)(4)	PASS
Conducted Emission	FCC Part 15.207	PASS
Radiated Emissions	FCC Part 15.205/15.209	PASS
Maximum Peak Output Power	FCC Part 15.247(b)	PASS
Power Spectral Density	FCC Part 15.247(e)	PASS
6dB Bandwidth & 99% Bandwidth	FCC Part 15.247(a)(2)	PASS
Spurious RF Conducted Emission	FCC Part 15.247(d)	PASS
Band Edge	FCC Part 15.247(d)	PASS



1.2 Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 2.71\text{dB}$
2	All emissions, radiated(<1G)	$\pm 3.90\text{dB}$
3	All emissions, radiated(>1G)	$\pm 4.28\text{dB}$

1.3 Information of the Test Laboratory

Shenzhen HUAKE Testing Technology Co., Ltd.

Add.: 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Testing Laboratory Authorization:

A2LA Accreditation Code is 4781.01.

FCC Designation Number is CN1229.

Canada IC CAB identifier is CN0045.

CNAS Registration Number is L9589.



2 General Information

2.1 General Description of EUT

EUT Name:	Aviron 21.5 inch Touch Screen
Model No:	ATS4
Series Model:	BTS4
Model Difference:	All model's the function, software and electric circuit are the same, only with a product model named different. Test sample mode: ATS4.
Trade Mark:	N/A
Operation Frequency:	2402 MHz to 2480 MHz
Channel Separation:	2MHz
Number of Channel:	40
Modulation Technology:	GFSK
Hardware Version:	V1.6
Software Version:	V1.6
Antenna Type:	Internal Antenna
Antenna Gain:	3dBi
Power Supply:	DC 12V From Adapter 1 DC 24V From Adapter 2

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. Antenna gain Refer to the antenna specifications.
3. The cable loss data is obtained from the supplier.
4. The test results in the report only apply to the tested sample.



Description of Channel:					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	14	2430	28	2458
1	2404	15	2432	29	2460
2	2406	16	2434	30	2462
3	2408	17	2436	31	2464
4	2410	18	2438	32	2466
5	2412	19	2440	33	2468
6	2414	20	2442	34	2470
7	2416	21	2444	35	2472
8	2418	22	2446	36	2474
9	2420	23	2448	37	2476
10	2422	24	2450	38	2478
11	2424	25	2452	39	2480
12	2426	26	2454		
13	2428	27	2456		

The EUT has been operated in modulations: GFSK independently.

NO.	Test Mode Description
1	Low channel TX
2	Middle channel TX
3	High channel TX
Note: 1. All the test modes can be supply by Built-in Li-ion battery, only the result of the worst case was recorded in the report if no any records. 2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.	



2.2 Description of Test Conditions

(1) E.U.T. test conditions:

For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

(2) Frequency range of radiated measurements:

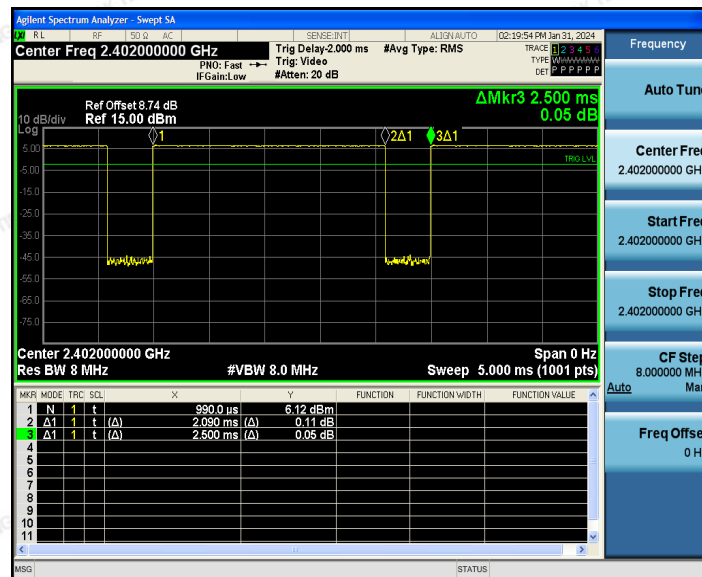
The test range will be up to the tenth harmonic of the highest fundamental frequency.

(3) Pre-test the EUT in all transmitting mode at the lowest (2402 MHz), middle (2440 MHz) and highest (2480 MHz) channel with different data packet and conducted to determine the worst-case mode, only the worst-case results are recorded in this report.

(4) Mode Test Duty Cycle

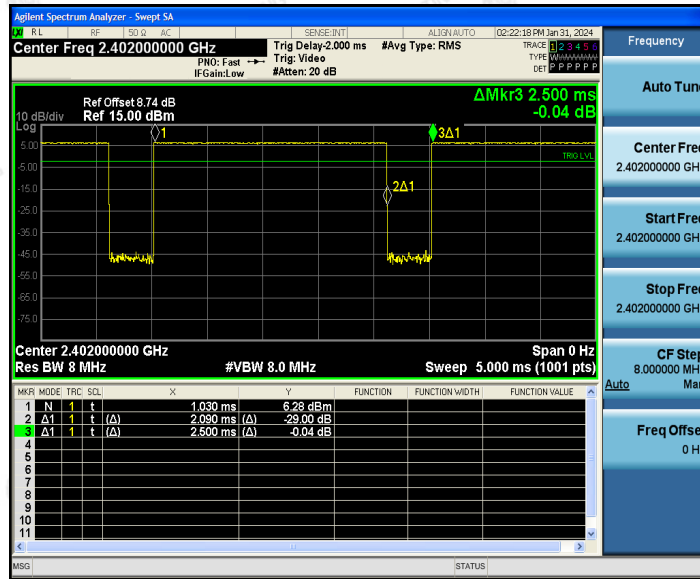
Mode	Duty Cycle	Duty Cycle Factor (dB)
BT-LE(1Mbps)-1M	0.84	-0.76
BT-LE(1Mbps)-2M	0.84	-0.76

1M





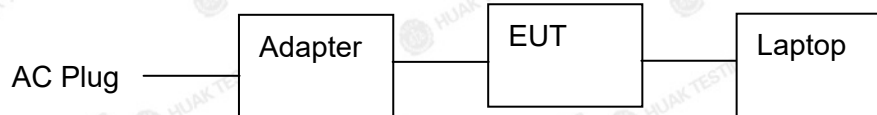
2M



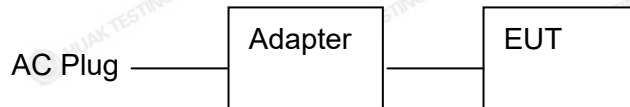


2.3 Description of Test Setup

Operation of EUT during conducted testing and below 1GHz radiation testing:



Operation of EUT during above 1GHz radiation testing:



The sample was placed (0.8m below 1GHz, 1.5m above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages. The worst case is X position.



2.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Trade Mark	Model/Type No.	Specification	Remark
1	Aviron 21.5 inch Touch Screen	N/A	ATS4	N/A	EUT
2	Power Line	N/A	N/A	Length:1.85m	Accessory
3	Adapter 1	N/A	SYS1546-3612-T3	Input: 100-240V, 50/60Hz, 1.5A Output: 12V, 3A	Accessory
4	Data Cable	N/A	N/A	Length:1.0m	Peripheral
5	Laptop	Lenovo	TP00096A	Input: DC 20V, 2.25A/3.25A	Peripheral
6	Adapter 2	N/A	SOY-2400630-454	Input: 100-240V, 50/60Hz, 2.5A Max Output: 24V, 6.3A 151.2W	Accessory

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.
3. For conducted measurements (Output Power, 6dB Emission Bandwidth, Power Spectral Density, Spurious Emissions), the antenna of EUT is connected to the test equipment via temporary antenna connector, the antenna connector is soldered on the antenna port of EUT, and the temporary antenna connector is listed in the Test Instruments.



3 Equipments List for All Test Items

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	R&S	ENV216	HKE-002	Feb. 17, 2023	1 Year
2.	L.I.S.N.	R&S	ENV216	HKE-059	Feb. 17, 2023	1 Year
3.	Receiver	R&S	ESR-7	HKE-010	Feb. 17, 2023	1 Year
4.	RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 17, 2023	1 Year
5.	Spectrum analyzer	R&S	FSP40	HKE-025	Feb. 17, 2023	1 Year
6.	Spectrum analyzer	Agilent	N9020A	HKE-048	Feb. 17, 2023	1 Year
7.	High gain antenna	Schwarzbeck	LB-180400KF	HKE-054	Feb. 17, 2023	1 Year
8.	Preamplifier	Schwarzbeck	BBV 9743	HKE-006	Feb. 17, 2023	1 Year
9.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	HKE-012	Feb. 17, 2023	1 Year
10.	Loop Antenna	Schwarzbeck	FMZB 1519 B	HKE-014	Feb. 17, 2023	1 Year
11.	Horn Antenna	Schwarzbeck	9120D	HKE-013	Feb. 17, 2023	1 Year
12.	Pre-amplifier	EMCI	EMC051845SE	HKE-015	Feb. 17, 2023	1 Year
13.	Pre-amplifier	Agilent	83051A	HKE-016	Feb. 17, 2023	1 Year
14.	High pass filter unit	Tonscend	JS0806-F	HKE-055	Feb. 17, 2023	1 Year
15.	Conducted test software	Tonscend	TS+ Rev 2.5.0.0	HKE-081	N/A	N/A
16.	Radiated test software	Tonscend	TS+ Rev 2.5.0.0	HKE-082	N/A	N/A
17.	RF test software	Tonscend	JS1120-B Version 2.6	HKE-083	N/A	N/A
18.	RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 17, 2023	1 Year
19.	RF test software	Tonscend	JS1120-4	HKE-113	N/A	N/A
20.	RF test software	Tonscend	JS1120-3	HKE-114	N/A	N/A
21.	RF test software	Tonscend	JS1120-1	HKE-115	N/A	N/A
22.	Spectrum analyzer	Agilent	N9020A	HKE-048	Feb. 17, 2023	1 Year
23.	Signal generator	Agilent	N5182A	HKE-029	Feb. 17, 2023	1 Year
24.	Signal Generator	Agilent	83630A	HKE-028	Feb. 17, 2023	1 Year
25.	Power meter	Agilent	E4419B	HKE-085	Feb. 17, 2023	1 Year

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by HUAKE, this document cannot be reproduced except in full with our prior written permission. The more details and the authenticity of the report will be confirmed at <http://www.cer-mark.com>.

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26.	Power Sensor	Agilent	E9300A	HKE-086	Feb. 17, 2023	1 Year
27.	RF Cable(below1GHz)	Times	9kHz-1GHz	HKE-117	Feb. 17, 2023	1 Year
28.	RF Cable(above 1GHz)	Times	1-40G	HKE-034	Feb. 17, 2023	1 Year
29.	RF Cable (9KHz-40GHz)	Tonscend	170660	N/A	Feb. 17, 2023	1 Year
30.	Shielded room	Shiel Hong	4*3*3	HKE-039	Dec. 09, 2021	3 Year
31.	High gain antenna	Schwarzbeck	LB-180400KF	HKE-054	Feb. 17, 2023	1 Year
32.	10dB Attenuator	Schwarzbeck	VTSD9561F	HKE-153	Feb. 17, 2023	1 Year

The calibration interval was one year.



Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	L.I.S.N.	R&S	ENV216	HKE-002	2024/02/20	1 Year
2	L.I.S.N.	R&S	ENV216	HKE-059	2024/02/20	1 Year
3	EMI Test Receiver	R&S	ESR	HKE-005	2024/02/20	1 Year
4	Spectrum analyzer	Agilent	N9020A	HKE-025	2024/02/20	1 Year
5	Spectrum analyzer	R&S	FSV3044	HKE-126	2024/02/20	1 Year
6	Preamplifier	EMCI	EMC051845S	HKE-006	2024/02/20	1 Year
7	Preamplifier	Schwarzbeck	BBV 9743	HKE-016	2024/02/20	1 Year
8	Preamplifier	A.H. Systems	SAS-574	HKE-182	2024/02/20	1 Year
9	6d Attenuator	Pasternack	6db	HKE-184	2024/02/20	1 Year
10	EMI Test Receiver	Rohde & Schwarz	ESR-7	HKE-010	2024/02/20	1 Year
11	Broadband Antenna	Schwarzbeck	VULB9168	HKE-167	2024/02/21	2 Year
12	Loop Antenna	COM-POWER	AL-130R	HKE-014	2024/02/21	2 Year
13	Horn Antenna	Schwarzbeck	9120D	HKE-013	2024/02/21	2 Year
14	EMI Test Software	Tonscend	JS32-CE 2.5.0.6	HKE-081	/	/
15	EMI Test Software	Tonscend	JS32-RE 5.0.0	HKE-082	/	/
16	RF Automatic control unit	Tonscend	JS0806-2	HKE-060	2024/02/20	1 Year
17	High pass filter unit	Tonscend	JS0806-F	HKE-055	2024/02/20	1 Year
18	Wireless Communication Test Set	R&S	CMU200	HKE-026	2024/02/20	1 Year
19	Wireless Communication Test Set	R&S	CMW500	HKE-027	2024/02/20	1 Year
20	High-low temperature chamber	Guangke	HT-80L	HKE-118	2024/06/10	1 Year
21	Temperature and humidity meter	Boyang	HTC-1	HKE-075	2024/06/10	1 Year
22	RF Test Software	Tonscend	JS1120-3 Version 3.3.23	HKE-083	/	/
23	10dB Attenuator	Schwarzbeck	VTSD9561F	HKE-153	2024/02/20	1 Year
24	RSE Test Software	Tonscend	JS36-RSE 5.0. 0	HKE-184	/	/

The calibration interval was one year.



4 Test Result

4.1 Antenna Requirement

4.1.1 Standard Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 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. And according to FCC 47 CFR Section 15.247, if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

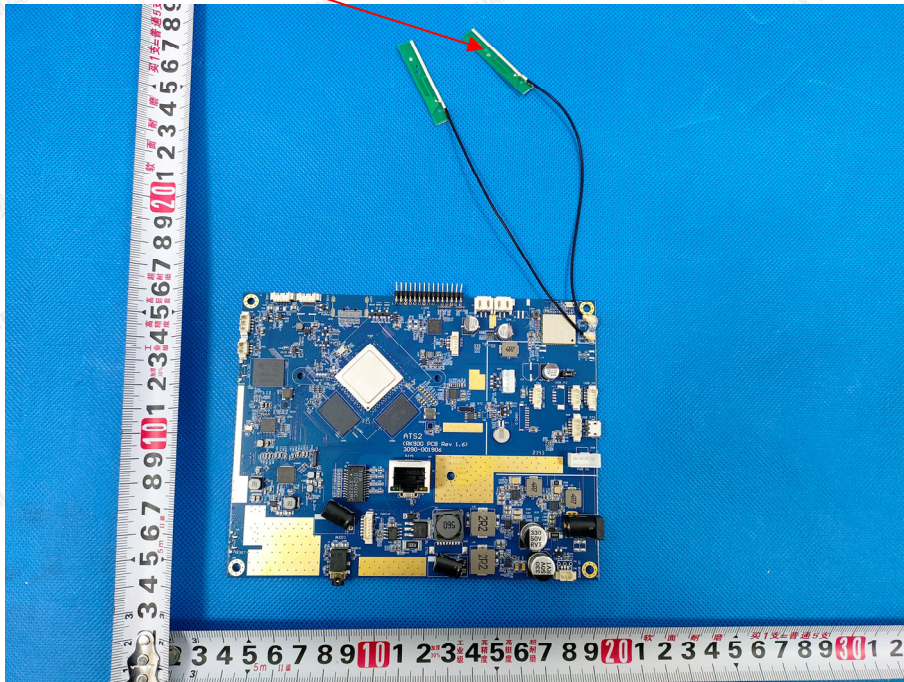
Refer to statement below for compliance.

The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

Antenna Connected Construction

The antenna used in this product is a Internal Antenna, need professional installation. It conforms to the standard requirements. The directional gains of antenna used for transmitting is 3dBi.

4.1.2 EUT Antenna





4.2 Conduction Emissions Measurement

4.2.1 Applied Procedures / Limit

According to FCC CFR Title 47 Part 15 Subpart C Section 15.207, AC Power Line Conducted Emissions Limits for Licence-Exempt Radio Apparatus as below:

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

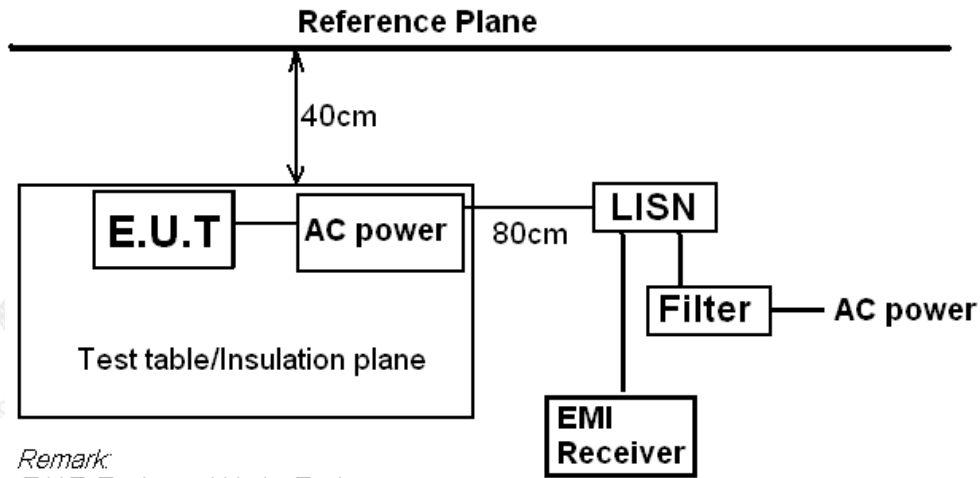
* Decreases with the logarithm of the frequency.

4.2.2 Test Procedure

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system; a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10:2013.
2. Support equipment, if needed, was placed as per ANSI C63.10:2013.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10:2013.
4. The adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.



4.2.3 Test Setup



Remark:

E.U.T: Equipment Under Test

LISN: Line Impedance Stabilization Network

Test table height=0.8m

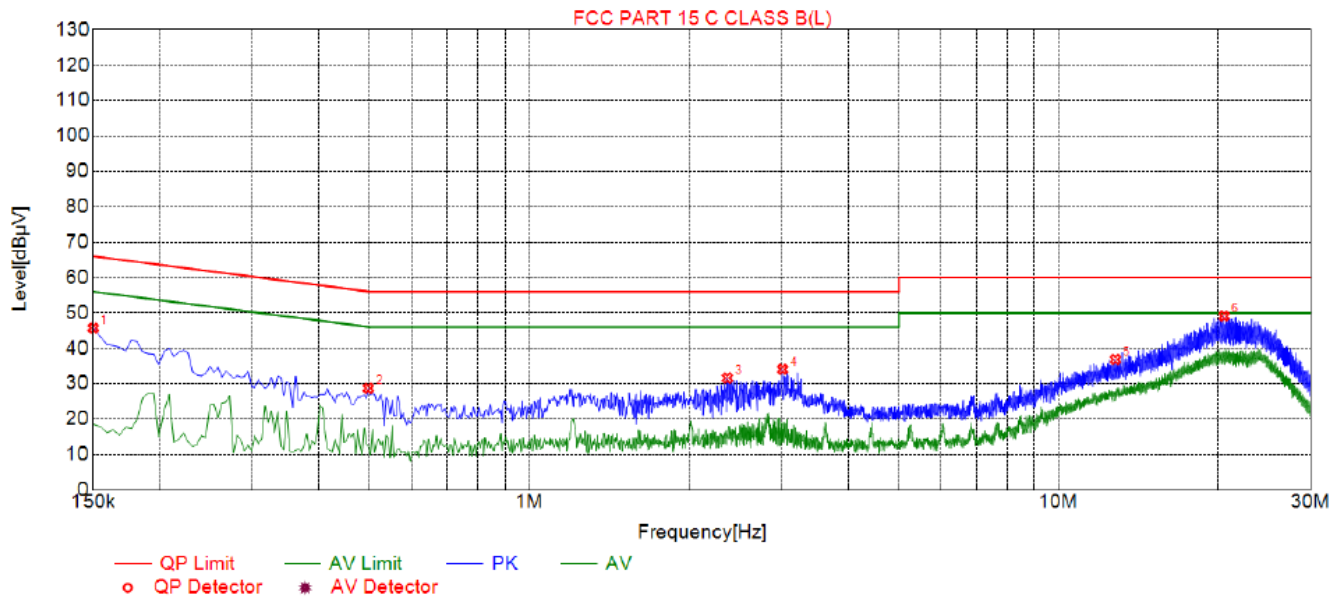


4.2.4 Test Results

PASS

Only the worst result of GFSK Low channel TX was reported as below:

Test Specification: Line



Suspected List

NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Reading [dBμV]	Detector	Type
1	0.1500	45.71	20.03	66.00	20.29	25.68	PK	L
2	0.4965	28.70	20.04	56.06	27.36	8.66	PK	L
3	2.3685	31.60	20.18	56.00	24.40	11.42	PK	L
4	3.0120	34.06	20.22	56.00	21.94	13.84	PK	L
5	12.8265	36.84	19.97	60.00	23.16	20.87	PK	L
6	20.5710	49.12	20.12	60.00	10.88	33.00	PK	L

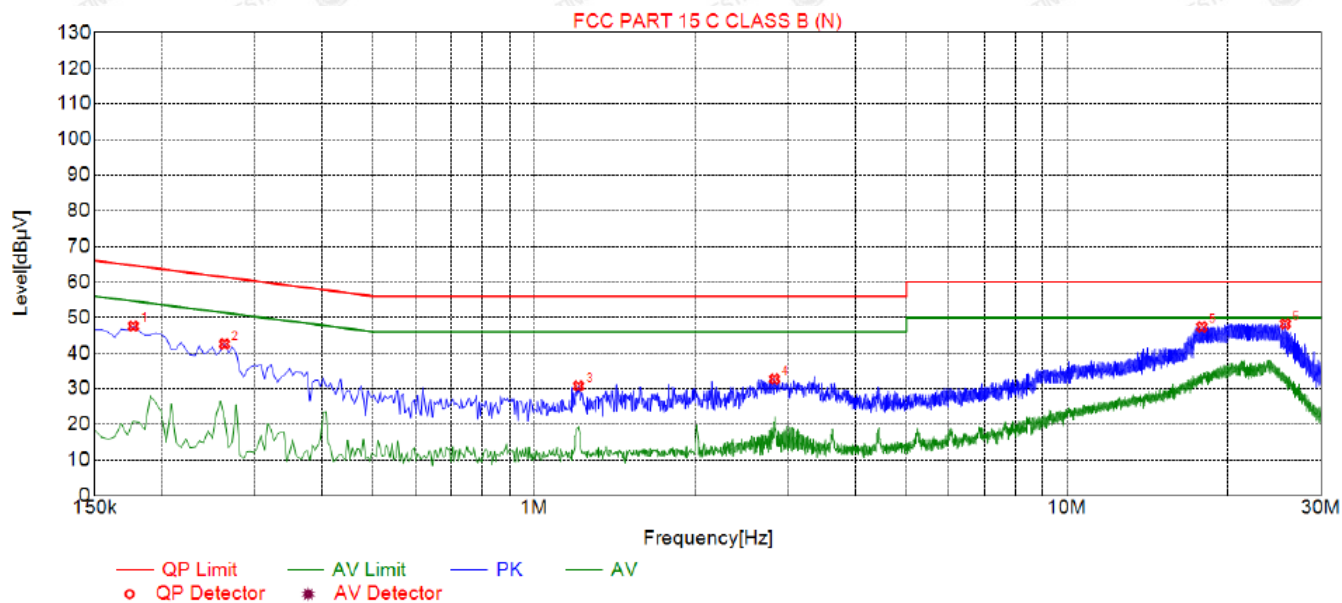
Remark: Margin = Limit – Level

Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor



Test Specification: Neutral



Suspected List

NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Reading [dBμV]	Detector	Type
1	0.1770	47.59	20.05	64.63	17.04	27.54	PK	N
2	0.2625	42.60	20.03	61.35	18.75	22.57	PK	N
3	1.2120	30.77	20.09	56.00	25.23	10.68	PK	N
4	2.8275	32.74	20.21	56.00	23.26	12.53	PK	N
5	17.9115	47.36	20.03	60.00	12.64	27.33	PK	N
6	25.6965	48.25	20.25	60.00	11.75	28.00	PK	N

Remark: Margin = Limit – Level

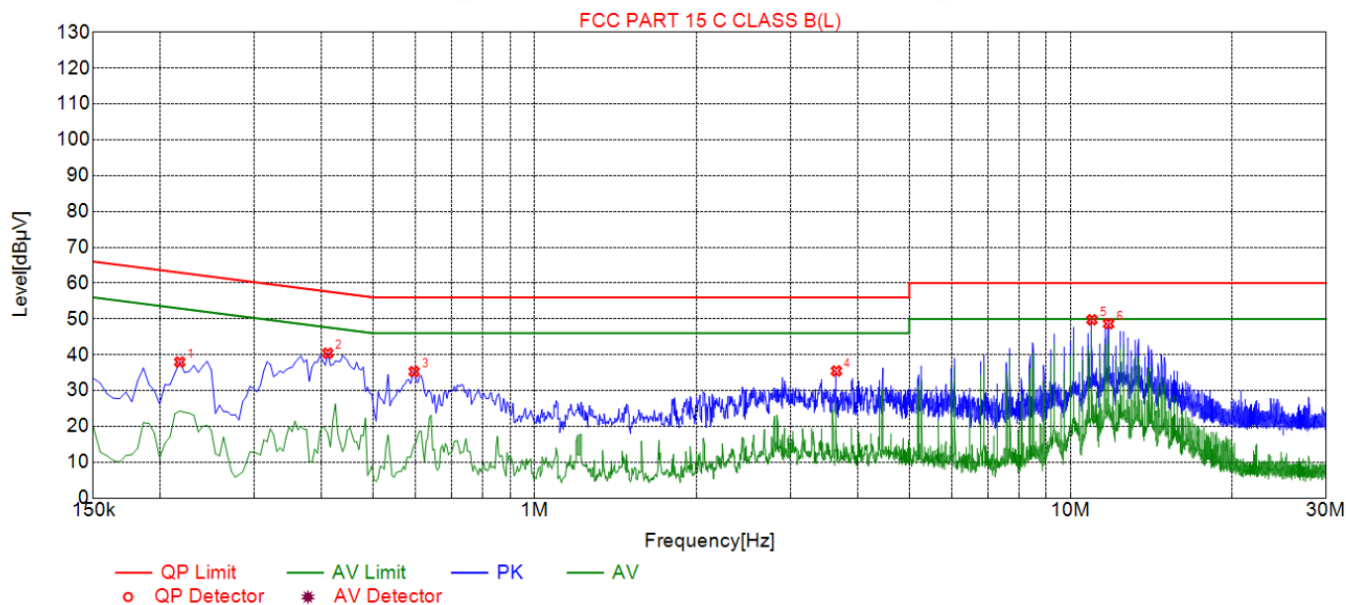
Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor



Add adapter 2:

Test Specification: Line



Suspected List

NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Reading [dBμV]	Detector	Type
1	0.2175	37.96	19.85	62.91	24.95	18.11	PK	L
2	0.4110	40.43	19.83	57.63	17.20	20.60	PK	L
3	0.5955	35.29	19.86	56.00	20.71	15.43	PK	L
4	3.6555	35.47	20.09	56.00	20.53	15.38	PK	L
5	10.9635	49.76	19.91	60.00	10.24	29.85	PK	L
6	11.7735	48.66	19.87	60.00	11.34	28.79	PK	L

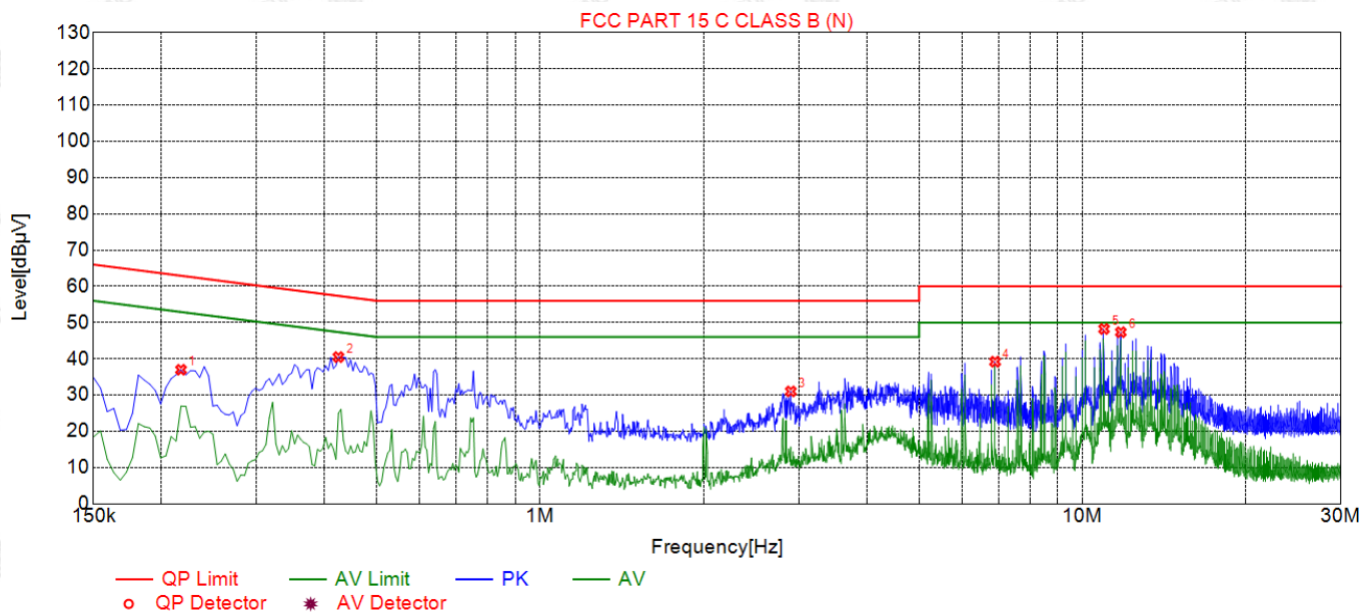
Remark: Margin = Limit – Level

Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor



Test Specification: Neutral



Suspected List

NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Reading [dBμV]	Detector	Type
1	0.2175	36.98	19.75	62.91	25.93	17.23	PK	N
2	0.4245	40.47	19.74	57.36	16.89	20.73	PK	N
3	2.8995	31.00	19.92	56.00	25.00	11.08	PK	N
4	6.9045	39.20	19.97	60.00	20.80	19.23	PK	N
5	10.9680	48.23	19.83	60.00	11.77	28.40	PK	N
6	11.7780	47.34	19.82	60.00	12.66	27.52	PK	N

Remark: Margin = Limit – Level

Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor



4.3 Radiated Emissions Measurement

4.3.1 Applied Procedures / Limit

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission out of authorized band shall not exceed the following table at a 3 meters measurement distance.

In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

Except when the requirements applicable to a given device state otherwise, emissions from license-exempt transmitters shall comply with the field strength limits shown in table below. Additionally, the level of any transmitter emission shall not exceed the level of the transmitter's fundamental emission.

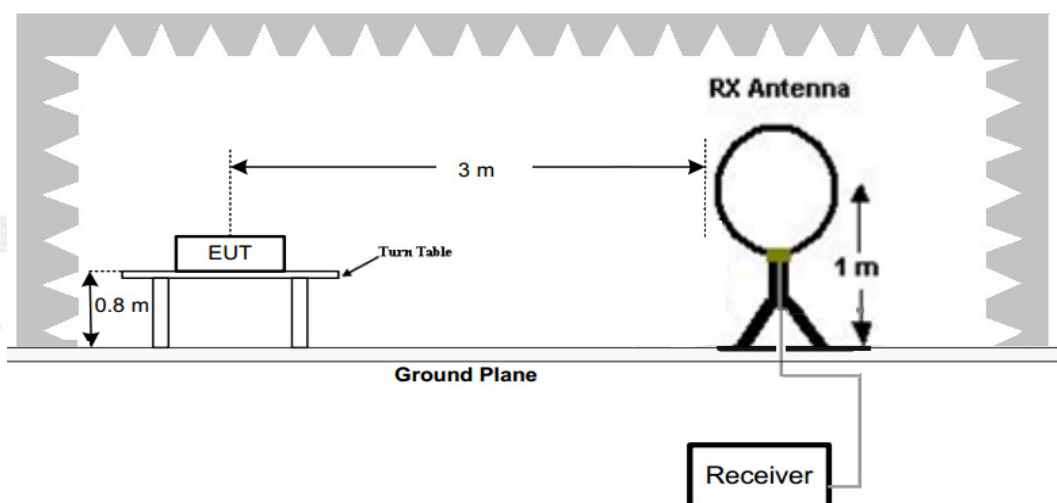
Radiated emission limits

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	$20\log(2400/F(\text{KHz}))+40\log(300/3)$	$2400/F(\text{KHz})$
0.49-1.705	3	$20\log(24000/F(\text{KHz}))+40\log(30/3)$	$24000/F(\text{KHz})$
1.705-30	3	$20\log(30)+40\log(30/3)$	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

4.3.2 Test Setup

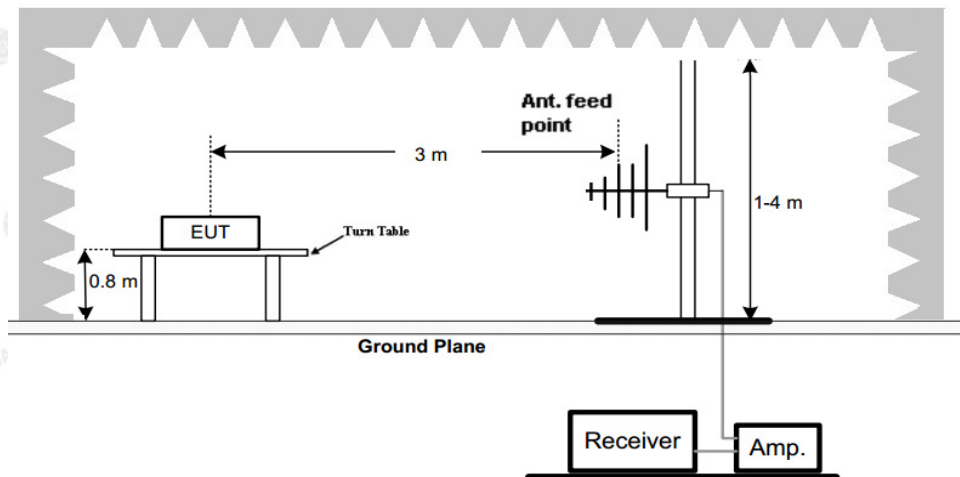
Test Configuration:

- 1) 9 kHz to 30 MHz emissions:

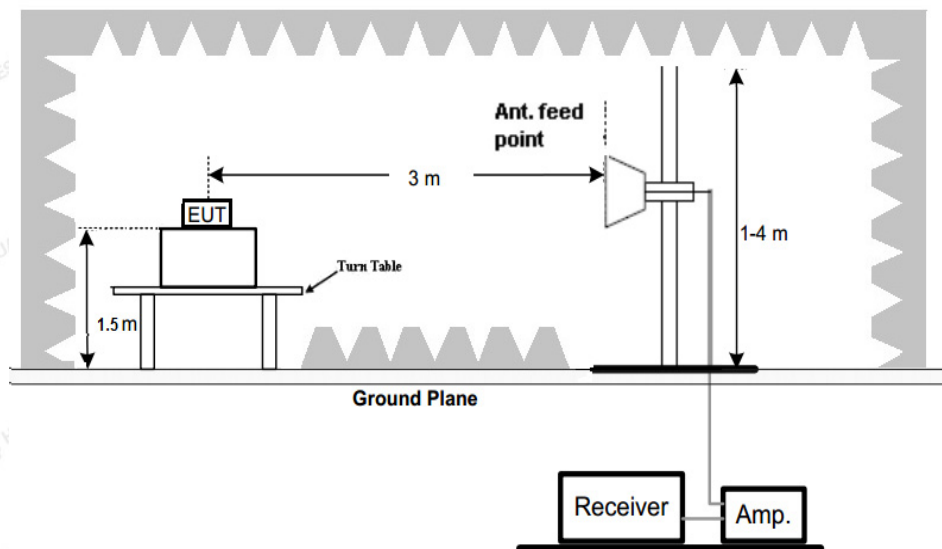




2) 30 MHz to 1 GHz emissions:



3) 1 GHz to 25 GHz emissions:

**Test Procedure**

1. The EUT was placed on turn table which is 0.8m above ground plane for below 1GHz test, and on a low permittivity and low loss tangent turn table which is 1.5m above ground plane for above 1GHz test.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0° to 360° to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.

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4.3.3 Test Result

Below 1GHz Test Results:

All modes have been tested, only the worst mode of GFSK Low channel TX is reflected.

Antenna polarity: H



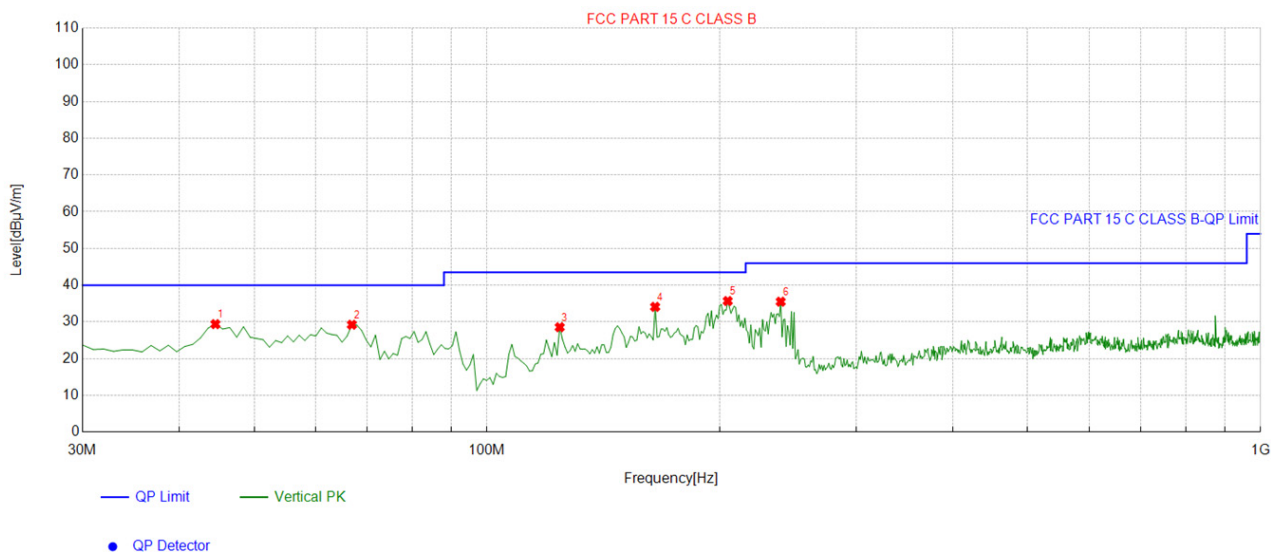
Suspected List

NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	48.448448	-14.83	41.80	26.97	40.00	13.03	100	191	Horizontal
2	90.2002	-16.88	40.99	24.11	43.50	19.39	100	204	Horizontal
3	111.56156	-15.07	43.65	28.58	43.50	14.92	100	182	Horizontal
4	215.45545	-14.42	48.15	33.73	43.50	9.77	100	94	Horizontal
5	384.40440	-10.45	45.94	35.49	46.00	10.51	100	199	Horizontal
6	847.55755	-1.25	29.58	28.33	46.00	17.67	100	309	Horizontal

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit – Level



Antenna polarity: V



Suspected List

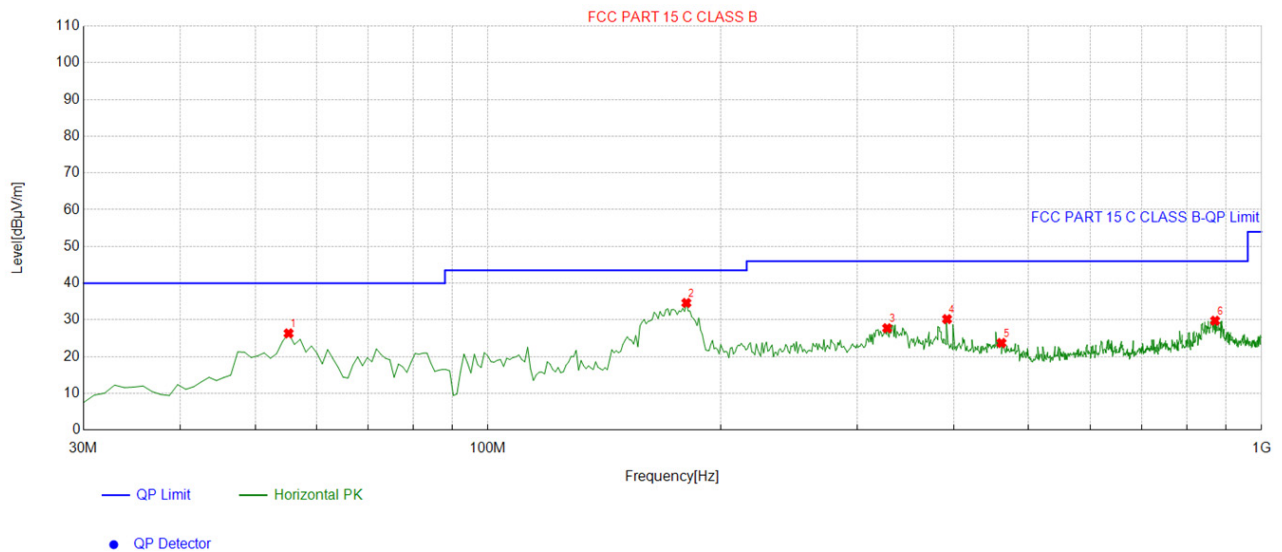
NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	44.564565	-15.07	44.47	29.40	40.00	10.60	100	255	Vertical
2	66.896897	-15.28	44.52	29.24	40.00	10.76	100	124	Vertical
3	124.18418	-16.08	44.64	28.56	43.50	14.94	100	50	Vertical
4	164.96496	-17.38	51.48	34.10	43.50	9.40	100	83	Vertical
5	204.77477	-14.64	50.33	35.69	43.50	7.81	100	14	Vertical
6	239.72973	-13.31	48.82	35.51	46.00	10.49	100	8	Vertical

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit – Level



Add adapter 2:

Antenna polarity: H



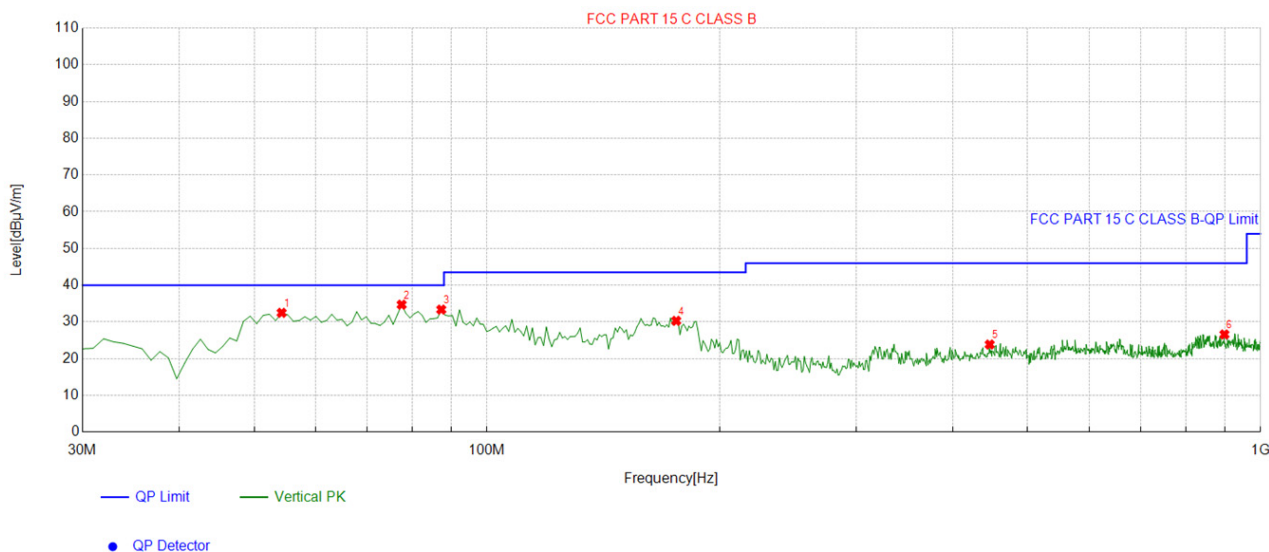
Suspected List

NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	55.245245	-14.00	40.34	26.34	40.00	13.66	100	205	Horizontal
2	180.50050	-16.33	50.95	34.62	43.50	8.88	100	96	Horizontal
3	328.08808	-10.93	38.68	27.75	46.00	18.25	100	171	Horizontal
4	392.17217	-9.40	39.62	30.22	46.00	15.78	100	198	Horizontal
5	461.11111	-8.91	32.63	23.72	46.00	22.28	100	327	Horizontal
6	870.86086	-1.72	31.50	29.78	46.00	16.22	100	317	Horizontal

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit – Level



Antenna polarity: V



Suspected List

NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	54.274274	-13.50	45.98	32.48	40.00	7.52	100	0	Vertical
2	77.577578	-18.02	52.71	34.69	40.00	5.31	100	225	Vertical
3	87.287287	-17.18	50.54	33.36	40.00	6.64	100	249	Vertical
4	175.64564	-16.78	47.08	30.30	43.50	13.20	100	6	Vertical
5	446.54654	-8.69	32.54	23.85	46.00	22.15	100	162	Vertical
6	898.04804	-1.05	27.64	26.59	46.00	19.41	100	148	Vertical

Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Limit – Level

Harmonics and Spurious Emissions

Frequency Range (9kHz-30MHz)

Frequency (MHz)	Level@3m (dBμV/m)	Limit@3m (dBμV/m)
--	--	--
--	--	--
--	--	--
--	--	--

Note: 1. Emission Level=Reading+ Cable loss+ Antenna factor-Amp factor.

2. The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement.

**For 1GHz to 25GHz**

CH Low (2402MHz)

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4804	53.85	-3.65	50.20	74.00	-23.80	peak
4804	44.12	-3.65	40.47	54.00	-13.53	AVG
7206	52.45	-0.95	51.50	74.00	-22.50	peak
7206	40.69	-0.95	39.74	54.00	-14.26	AVG
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4804	54.18	-3.65	50.53	74.00	-23.47	peak
4804	45.26	-3.65	41.61	54.00	-12.39	AVG
7206	50.47	-0.95	49.52	74.00	-24.48	peak
7206	43.17	-0.95	42.22	54.00	-11.78	AVG
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						



CH Middle (2440MHz)

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4880.00	52.14	-3.54	48.60	74.00	-25.40	peak
4880.00	43.74	-3.54	40.20	54.00	-13.80	AVG
7320.00	51.65	-0.81	50.84	74.00	-23.16	peak
7320.00	40.11	-0.81	39.30	54.00	-14.70	AVG
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4880.00	53.29	-3.54	49.75	74.00	-24.25	peak
4880.00	42.79	-3.54	39.25	54.00	-14.75	AVG
7320.00	51.87	-0.81	51.06	74.00	-22.94	peak
7320.00	40.22	-0.81	39.41	54.00	-14.59	AVG
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						



CH High (2480MHz)

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4960	55.16	-3.43	51.73	74.00	-22.27	peak
4960	42.67	-3.44	39.23	54.00	-14.77	AVG
7440	53.08	-0.77	52.31	74.00	-21.69	peak
7440	40.11	-0.77	39.34	54.00	-14.66	AVG
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
4960	54.14	-3.43	50.71	74.00	-23.29	peak
4960	45.28	-3.44	41.84	54.00	-12.16	AVG
7440	51.63	-0.77	50.86	74.00	-23.14	peak
7440	43.16	-0.77	42.39	54.00	-11.61	AVG
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Remark:

- (1) Measuring frequencies from 1 GHz to the 25 GHz.
- (2) "F" denotes fundamental frequency; "H" denotes spurious frequency; "E" denotes band edge frequency.
- (3) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (4) The emissions are attenuated more than 20dB below the permissible limits are not recorded in the report.
- (5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
- (6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.
- (7) All modes of operation were investigated and the worst-case emissions are reported.



Radiated Band Edge Test:

Operation Mode: TX CH Low (2402MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2310.00	54.26	-5.81	48.45	74	-25.55	peak
2310.00	/	-5.81	/	54	/	AVG
2390.00	53.87	-5.84	48.03	74	-25.97	peak
2390.00	/	-5.84	/	54	/	AVG
2400.00	51.66	-5.84	45.82	74	-28.18	peak
2400.00	/	-5.84	/	54	/	AVG
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
2310.00	56.03	-5.81	50.22	74	-23.78	peak
2310.00	/	-5.81	/	54	/	AVG
2390.00	55.41	-5.84	49.57	74	-24.43	peak
2390.00	/	-5.84	/	54	/	AVG
2400.00	51.89	-5.84	46.05	74	-27.95	peak
2400.00	/	-5.84	/	54	/	AVG
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						



Operation Mode: TX CH High (2480MHz)

Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.50	53.27	-5.81	47.46	74	-26.54	peak
2483.50	/	-5.81	/	54	/	AVG
2500.00	52.06	-6.06	46	74	-28	peak
2500.00	/	-6.06	/	54	/	AVG
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						

Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.50	54.33	-5.81	48.52	74	-25.48	peak
2483.50	/	-5.81	/	54	/	AVG
2500.00	51.09	-6.06	45.03	74	-28.97	peak
2500.00	/	-6.06	/	54	/	AVG
Remark: Factor = Cable loss + Antenna factor + Attenuator – Preamplifier; Level = Reading + Factor; Margin = Level-Limit.						
Remark: All the other emissions not reported were too low to read and deemed to comply with FCC limit.						

Remark:

1. If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.
2. In restricted bands of operation, the spurious emissions below the permissible value more than 20dB.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



4.4 Maximum Output Power Measurement

4.4.1 Limit

The Maximum Peak Output Power Measurement is 30dBm.

4.4.2 Test Procedure

The maximum peak conducted output power may be measured using a broadband peak RF automatic control unit. The RF automatic control unit shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

The maximum Average conducted output power may be measured using a wideband RF automatic control unit with a thermocouple detector or equivalent. The RF automatic control unit shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

4.4.3 Deviation From Standard

No deviation.

4.4.4 Test Setup



4.4.5 Test Results

Test Rate	Channel	Channel Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Result
1M	Low	2402	7.99	30	Pass
	Middle	2440	9.20		Pass
	High	2480	6.11		Pass
2M	Low	2402	8.32		Pass
	Middle	2440	9.41		Pass
	High	2480	8.28		Pass

Note: 1.The test results including the cable lose.



4.5 Power Spectral Density

4.5.1 Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

4.5.2 Test Procedure

Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.

Set the RBW =3 kHz.

Set the VBW =10 KHz.

Set the span to 1.5 times the DTS channel bandwidth.

Detector = peak.

Sweep time = auto couple.

Trace mode = max hold.

Allow trace to fully stabilize.

Use the peak marker function to determine the maximum power level.

If measured value exceeds limit, reduce RBW(no less than 3 kHz)and repeat.

The resulting peak PSD level must be 8 dBm.

4.5.3 Deviation From Standard

No deviation.

4.5.4 Test Setup



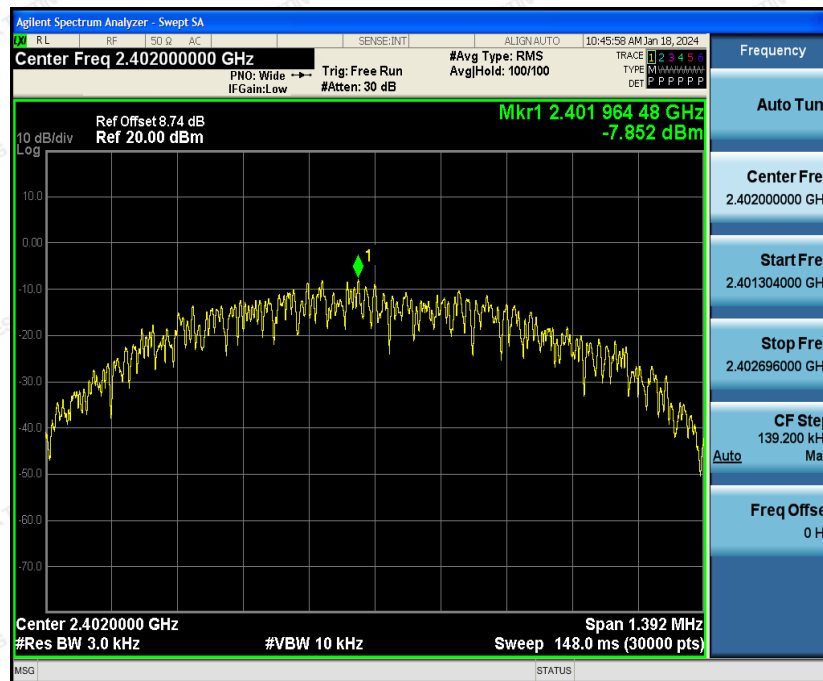


4.5.5 Test Results

Test Rate	Channel	Channel Frequency (MHz)	Test Result (dBm/3kHz)	Limit (dBm/3kHz)	Result
1M	Low	2402	-7.85	8.00	Pass
	Middle	2440	-6.72		Pass
	High	2480	-5.77		Pass
2M	Low	2402	-10.08		Pass
	Middle	2440	-8.93		Pass
	High	2480	-7.97		Pass

Note: PSD test result (dBm/3kHz)=8

1M: CH 00





1M: CH 19

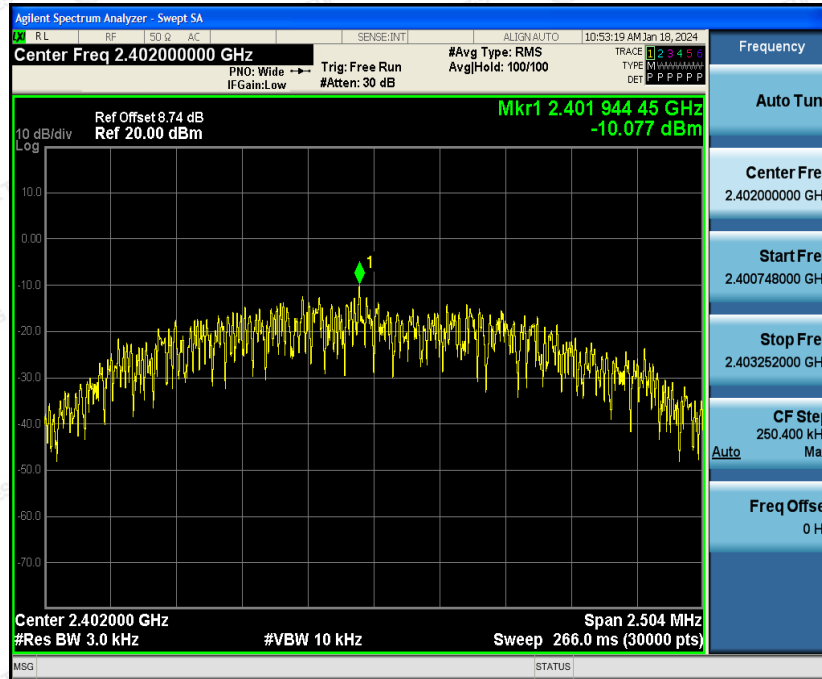


1M: CH 39

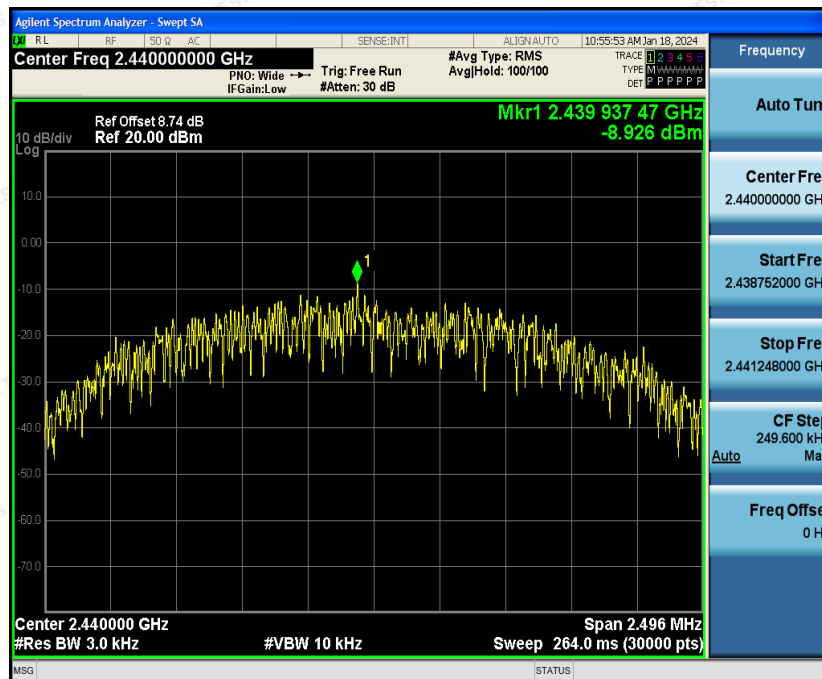




2M: CH 00

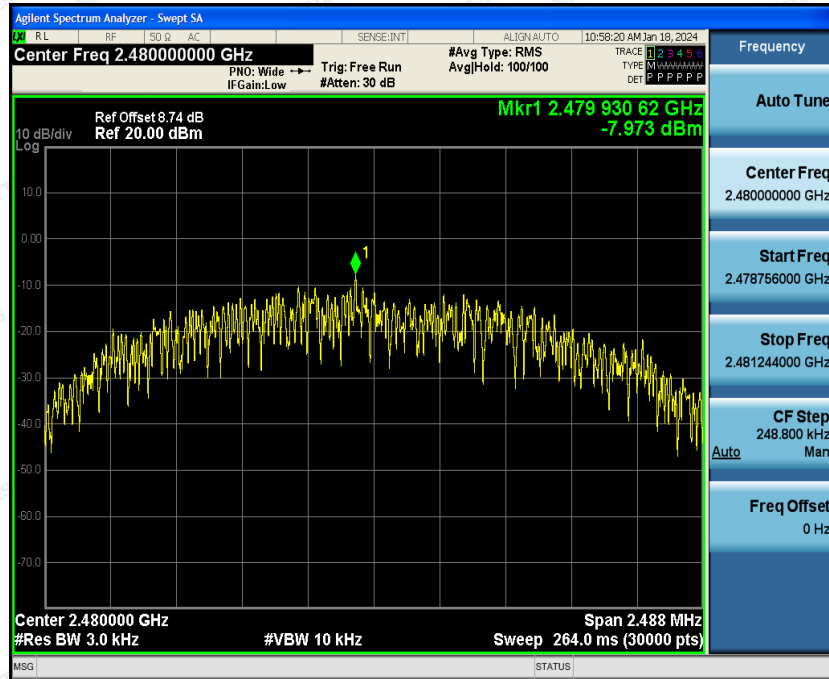


2M: CH 19





2M: CH 39



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