



Project No.: TM-2211000289P
Report No.: TMWK2211004635KR

FCC ID: 2A3MR-OSA-79G-AL
Ref. No.: TMWK2111001137KR

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FCC 47 CFR PART 95 SUBPART M

TEST REPORT

For

79G RADAR

Model: OSA-79G-AL

Trade Name: AKT

Issued to

AKASAKATEC INC.

3F, Marina Plaza, 4-2 Shiraho, Kanazawa-ku, Yokohama-shi, Kanagawa, Japan

Issued by

Compliance Certification Services Inc.

Wugu Laboratory

No.11, Wugong 6th Rd., Wugu Dist.,

New Taipei City, Taiwan

Issued Date: December 27, 2022

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.
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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	November 29, 2021	Initial Issue	ALL	Doris Chu
01	December 27, 2022	See the following Note Rev.(01)	ALL	Allison Chen

Note:

Rev.(01)

1. Applicant change absorber location on schematic.

As per requested to verified radiated emission for 30MHz to 40GHz test data.

Other test data are referenced from cross authorization(s) measurement results in the original test report (TMWK2111001137KR) under issue date November 29, 2021) are fully leveraged in this test report.

2. Other information, please refer to TMWK2111001137KR and this test report.

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1. TEST RESULT CERTIFICATION

Applicant: AKASAKATEC INC.
3F, Marina Plaza, 4-2 Shiraho, Kanazawa-ku, Yokohama-shi,
Kanagawa, Japan

Equipment Under Test: 79G RADAR

Trade Name: AKT

Model: OSA-79G-AL

Date of Test: November 30, 2022

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 95 Subpart M	Compliance
Statements of Conformity	
Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.	

We hereby certify that:

All test results conform to above mentioned standards.

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10: 2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 95.3367, 95.3379 and FCC KDB 653005 D01.

The test results of this report relate only to the tested sample EUT identified in this report.

Approved by:



Shawn Wu
Supervisor



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2. EUT DESCRIPTION

Product	79G RADAR
Trade Name	AKT
Model Number	OSA-79G-AL
Model Discrepancy	N/A
Received Date	November 15, 2022
Power Supply	Power from host device. (DC 12V)
Frequency Band	78.1~79.78 GHz
Modulation	FMCW
Number of Channel	1
Antenna Designation	Patch antenna / Gain: 12.01dBi
Hardware Version	1A1G
Software Version	A1G

Remark:

1. The sample selected for test was production product and was provided by manufacturer.
2. Disclaimer: Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.



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3. TEST SUMMARY

Report Section	FCC Standard Section	Test Item	Result
-	95.3367	Equivalent Isotropically Radiated Power (EIRP)	N/A
8.1	95.3379(a)	Radiated spurious emissions	Pass
-	95.3379(b)	Frequency stability	N/A

4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10: 2013, ANSI 63.4 2014, ANSI 63.26:2015 and FCC CFR 47 Part 95.3367, 95.3379, FCC KDB 653005 D01.

4.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

4.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

4.3 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in ANSI C63.10: 2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 1.5 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in ANSI C63.10: 2013.

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4.4 DESCRIPTION OF TEST MODES

The EUT (model: OSA-79G-AL) had been tested under operating condition.

Software used to control the EUT for staying in continuous transmitting mode was programmed. The worst case data rate is determined as the data rate with highest output power.

The product does not transmits in stop condition.

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz and power line conducted emissions below 30MHz, which worst case was in normal link mode only.

Radiated Emission Measurement Above 1G	
Test Condition	Radiated Emission Above 1G
Power supply Mode	Mode 1: EUT power by DC (12V)
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4
Worst Position	☐ Placed in fixed position. ☐ Placed in fixed position at X-Plane (E2-Plane) ☐ Placed in fixed position at Y-Plane (E1-Plane) ☒ Placed in fixed position at Z-Plane (H-Plane)

Radiated Emission Measurement Below 1G	
Test Condition	Radiated Emission Below 1G
Power supply Mode	Mode 1: EUT power by DC (12V)
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4

Remark:

1. The worst mode was record in this test report.
2. EUT pre-scanned in three axis ,X,Y, Z and two polarity, for radiated measurement. The worst case(Z-Plane) were recorded in this report

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5. INSTRUMENT CALIBRATION

5.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

5.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

3M 966 Chamber Test Site Below 1GHz					
Name of Equipment	Manufacturer	Model	Serial Number	Cal Date	Cal Due
Bi-Log Antenna	Sunol Sciences	JB3	A030105	2022-08-03	2023-08-02
Spectrum Analyzer	Agilent	E4446A	MY46180323	2021-12-06	2022-12-05
Thermo-Hygro Meter	WISEWIND	1206	D07	2021-12-28	2022-12-27
Preamplifier	EMEC	EM330	060609	2022-02-23	2023-02-22
Cable	Huber+Suhner	104PEA	20995+11112+182330	2022-02-23	2023-02-22
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Software	e3 6.11-20180419c				

Remark:

- Each piece of equipment is scheduled for calibration once a year.
- N.C.R. = No Calibration Request.

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3M 966 Chamber Test Site Below 40GHz					
Name of Equipment	Manufacturer	Model	Serial Number	Cal Date	Cal Due
Horn Antenna	ETS LINDGREN	3116	00026370	2021-11-30	2022-11-29
Thermo-Hygro Meter	WISEWIND	1206	D07	2021-12-28	2022-12-27
Signal Analyzer	R&S	FSV 40	101073	2022-08-25	2023-08-24
Spectrum Analyzer	Agilent	E4446A	MY46180323	2021-12-06	2022-12-05
Preamplifier	HP	8449B	3008A00965	2021-12-24	2022-12-23
Cable	Huber+Suhner	104PEA	20995+11112+182330	2022-02-23	2023-02-22
Coaxial Cable	EMCI	EMC105	190914+33953	2022-06-15	2023-06-14
Horn Antenna / Harmonic Mixer	A-INFOMW / ROHDE&SCHWARZ	FH-PP-110 / FS-Z110	10003 / 100096	2019-12-09	2022-12-08
Horn Antenna	ETC	MCTD 1209	DRH13M02003	2022-01-25	2023-01-24
Horn Antenna	SCHWARZBECK	BBHA9170	1047	2022-01-11	2023-01-10
Pre-Amplifier	EMCI	EMC184045SE	980860	2021-12-28	2022-12-27
Coaxial Cable	EMC	EMC101G-KM-KM-9000	211042	2021-12-23	2022-12-22
Coaxial Cable	EMCI	EMC101G-KM-KM-500	211041	2021-12-23	2022-12-22
Cable	Woken	WC12	E	2022-06-29	2023-06-28
Cable	Woken	WC12	F	2022-06-29	2023-06-28
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Software	e3 V9-210616c				

Remark:

- Each piece of equipment is scheduled for calibration once a year.
- N.C.R. = No Calibration Request.



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5.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
Radiated Emission_9kHz-30MHz	± 3.814
Radiated Emission_30MHz-200MHz	± 4.272
Radiated Emission_200MHz-1GHz	± 4.619
Radiated Emission_1GHz-6GHz	± 5.522
Radiated Emission_6GHz-18GHz	± 5.228
Radiated Emission_18GHz-26GHz	± 4.089
Radiated Emission_26GHz-40GHz	± 4.019

Remark: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

6. FACILITIES AND ACCREDITATIONS

6.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

☒ No.11, Wugong 6th Rd., Wugu Dist., New Taipei City, Taiwan

☐ No. 12, Ln. 116, Wugong 3rd Rd., Wugu Dist., New Taipei City, Taiwan

Tel: 886-2-2299-9720 / Fax: 886-2-2299-9721



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7. SETUP OF EQUIPMENT UNDER TEST

7.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.

7.2 SUPPORT EQUIPMENT

No.	Device Type	Brand	Model	Series No.	FCC ID
1	NB(J)	TOSHIBA	PT345T-00L002	N/A	PD97260H

Remark:

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.

8. TEST REQUIREMENTS

8.1 SPURIOUS EMISSIONS

8.1.1 Radiated Emissions

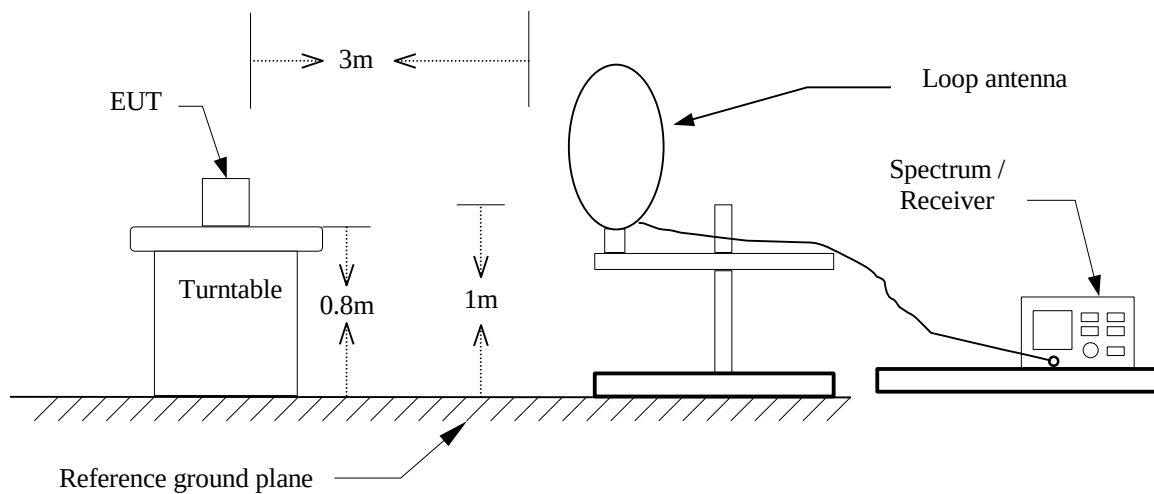
LIMIT

1. According to FCC PART 95.3379(a), Radiated emissions below 40 GHz shall not exceed the field strength as shown in the following emissions table.

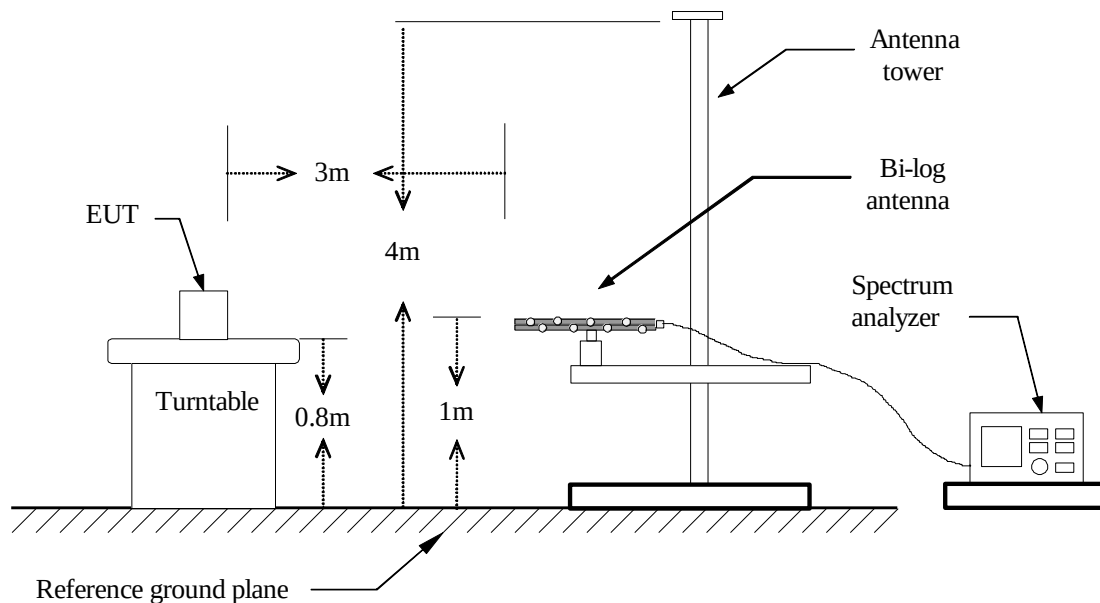
Frequency (MHz)	Field Strength (μ V/m)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Configuration

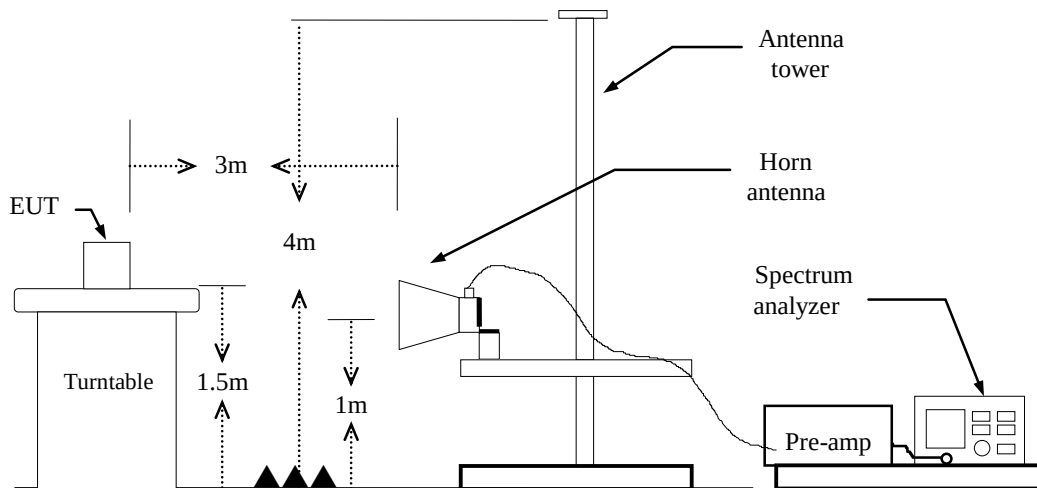
9kHz ~ 30MHz



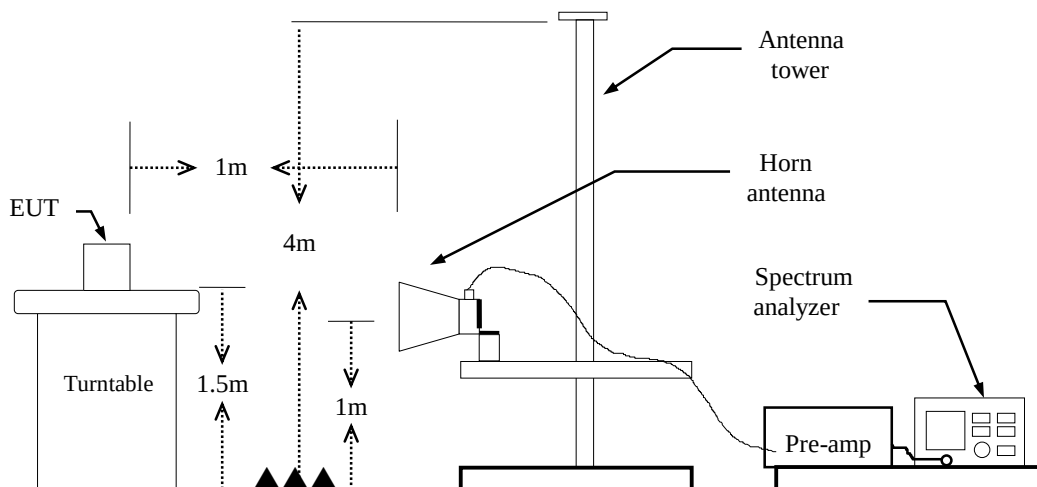
30MHz ~ 1 GHz



Above 1 GHz ~ 18GHz



18GHz ~ 40GHz



TEST PROCEDURE

1. The EUT is placed on a turntable, which is 1.5m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:

Below 1GHz:

RBW=100kHz / VBW=300kHz / Sweep=AUTO

Above 1GHz:

(a)PEAK: RBW=1MHz / VBW=3MHz / Sweep=AUTO

(b)AVERAGE: RBW=1MHz,

Above 40GHz:

RBW = 1 MHz, VBW= 3 MHz,

Detector = Peak, Trace mode = max hold, Sweep = AUTO.

7. Repeat above procedures until the measurements for all frequencies are complete.

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Below 1 GHz

Operation Mode: TX

Polarity: Ver. / Hor.

Temperature: 23.7°C

Test Date: November 30, 2022

Humidity: 62% RH

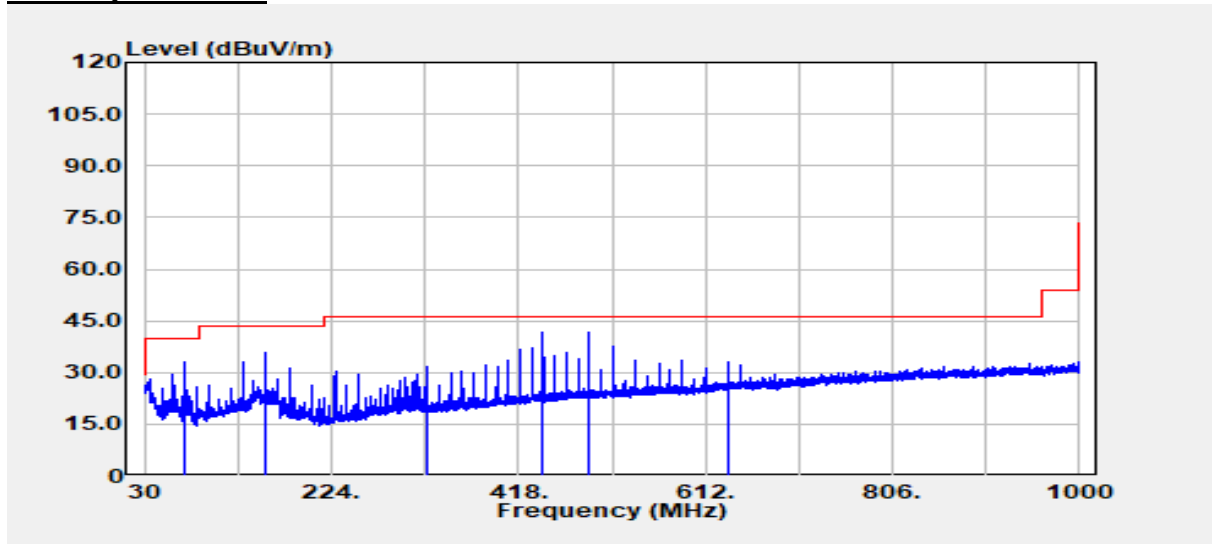
Tested by: Ray Li

Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit dBμV/m	Margin dB	Ant. Pol. (H/V)
71.95	Peak	48.67	-15.52	33.16	40.00	-6.84	V
155.86	Peak	46.29	-10.71	35.58	43.50	-7.92	V
323.79	Peak	39.84	-8.34	31.50	46.00	-14.50	V
443.71	Peak	46.72	-5.01	41.71	46.00	-4.29	V
491.72	Peak	45.63	-3.84	41.79	46.00	-4.21	V
635.64	Peak	34.08	-1.03	33.04	46.00	-12.96	V
71.95	Peak	52.80	-15.52	37.28	40.00	-2.72	H
167.86	Peak	50.86	-11.18	39.68	43.50	-3.82	H
299.78	Peak	48.91	-8.85	40.06	46.00	-5.94	H
419.70	Peak	44.48	-5.38	39.10	46.00	-6.90	H
443.71	Peak	45.35	-5.01	40.33	46.00	-5.67	H
635.64	Peak	37.65	-1.03	36.62	46.00	-9.38	H

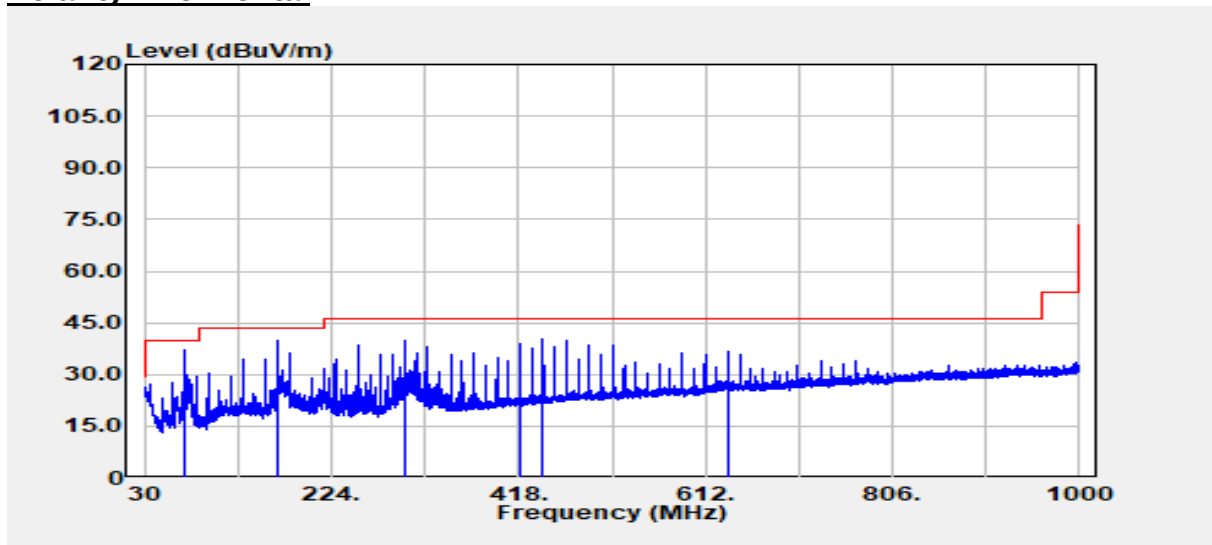
Remark:

1. No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).
2. Radiated emissions measured were made with an instrument using peak/quasi-peak detector mode.
3. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. Margin (dB) = Remark result (dBuV/m) – Quasi-peak limit (dBuV/m).

Polarity : Vertical



Polarity : Horizontal



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Above 1 GHz

Operation Mode: TX

Polarity:

Ver. / Hor.

Temperature: 23.7°C

Test Date:

November 30, 2022

Humidity: 62% RH

Tested by:

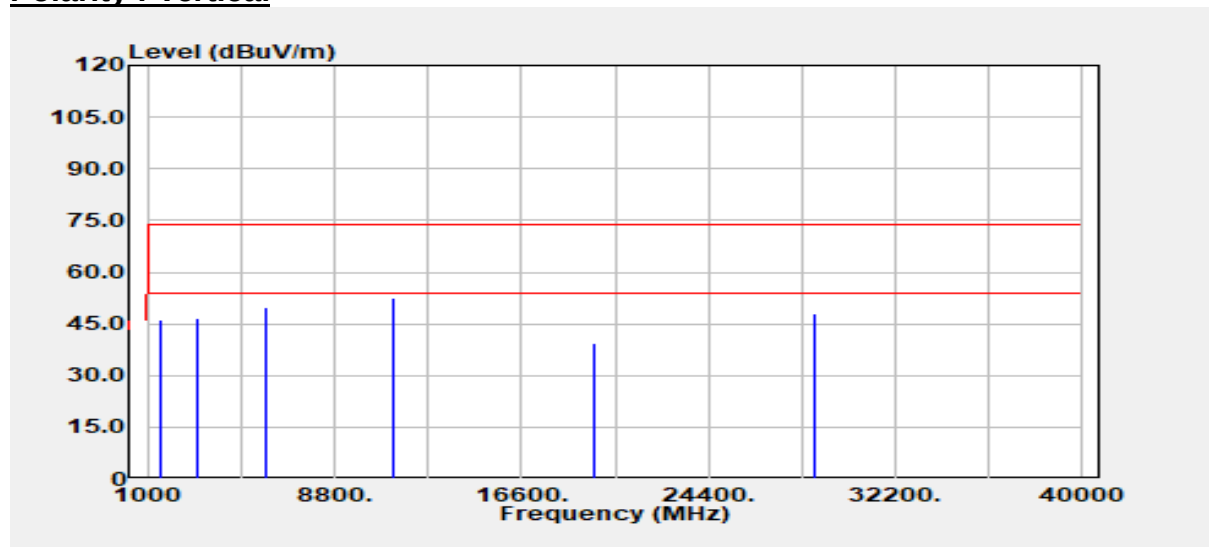
Ray Li

Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit dBμV/m	Margin dB	Ant. Pol. (H/V)
1535.69	Peak	51.88	-5.50	46.39	74.00	-27.61	V
1535.69	Average	50.01	-5.50	44.51	54.00	-9.49	V
3071.66	Peak	45.83	0.67	46.50	74.00	-27.50	V
3071.66	Average	44.45	0.67	45.12	54.00	-8.88	V
5987.60	Peak	39.77	10.07	49.84	74.00	-24.16	V
5987.60	Average	37.31	10.07	47.38	54.00	-6.62	V
11221.93	Peak	32.97	19.42	52.39	74.00	-21.61	V
11221.93	Average	26.62	19.42	46.04	54.00	-7.96	V
19646.44	Peak	51.24	-11.70	39.54	74.00	-34.46	V
28799.90	Peak	55.60	-7.53	48.07	74.00	-25.93	V
28799.90	Average	53.25	-7.53	45.72	54.00	-8.28	V
1535.69	Peak	54.57	-5.50	49.07	74.00	-24.93	H
1535.69	Average	47.38	-5.50	41.88	54.00	-12.12	H
3071.66	Peak	42.72	0.67	43.39	74.00	-30.61	H
3071.66	Average	41.25	0.67	41.92	54.00	-12.08	H
10345.66	Peak	33.21	18.27	51.48	74.00	-22.52	H
10345.66	Average	27.23	18.27	45.50	54.00	-8.50	H
11991.83	Peak	33.53	19.06	52.59	74.00	-21.41	H
11991.83	Average	26.82	19.06	45.88	54.00	-8.12	H
19686.73	Peak	51.16	-11.63	39.53	74.00	-34.47	H
28799.90	Peak	58.37	-7.53	50.84	74.00	-23.16	H
28799.90	Average	58.01	-7.53	50.48	54.00	-3.52	H

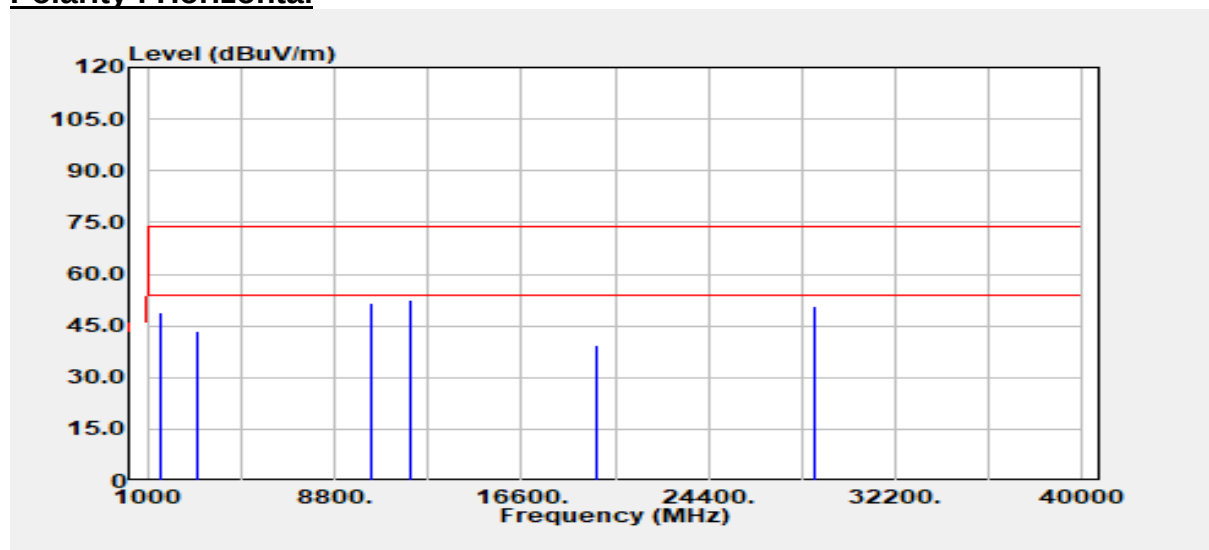
Remark:

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
- Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
- Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
- Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

Polarity : Vertical



Polarity : Horizontal



- End of Test Report -