

TEST REPORT

Reference No...... : WTD22D12264616W
FCC ID : 2ALCVCKSW0555
Applicant..... : Emerson Radio Corp.
Address..... : 959 Route 46 East, Suite 210, 2nd Floor, Parsippany NJ 07054, USA
Manufacturer : WING HING ELECTRONICS CO LTD.
Address..... : 22 Ying Bin Boulevard, Xinfeng County, Ganzhou, Jiangxi
Product..... : Alarm Clock Radio
Model(s) : CKSW0555, CKSW0555X (where X denotes different LED display colors or cosmetics)
Brand Name..... : Emerson
Standards..... : FCC 47CFR Part 15 Subpart C
Date of Receipt sample : 2022-12-30
Date of Test : 2022-12-30 to 2023-03-08
Date of Issue..... : 2023-03-08
Test Result..... : **Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

Prepared By:

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3 Revision History

Test Report No.	Date of Receipt Sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTD22D12264616W	2022-12-30	2022-12-30 to 2023-03-08	2023-03-08	Original	-	Valid

4 General Information

4.1 General Description of E.U.T

Product:	Alarm Clock Radio
Model(s):	CKSW0555, CKSW0555X (where X denotes different LED display colors or cosmetics)
Model Difference:	All models are same in all respects. Only the model names and LED display colors or cosmetics are different for different market requirement. The model of test sample is CKSW0555.
Type of Modulation:	ASK
Frequency Range:	112-205kHz
Antenna installation:	Coil Antenna
Hardware Version:	CKSW0555 DISPLAY BOARD SUFFIX A REV-01
Software Version:	U07

4.2 Details of accessories

Ratings:	Input: 5V $\overline{\text{---}}$ 1.5A Output: 5V $\overline{\text{---}}$ 1.5A, 5W
Adapter:	Model : SMWHDOE-05015 Input : 120VAC, 60Hz, 11W

4.3 Test Mode

Test Mode	Descriptions
Standby mode	EUT alone powered by AC/DC adapter
Charging mode	Loading of 5W

Note:

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

4.4 Test Facility

The test facility has a test site registered with the following organizations:

ISED CAB identifier: CN0013. Test Firm Registration No.: 7760A.

Waltek Testing Group Co., Ltd. Has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files.

Registration number 7760A, October 15, 2016.

FCC Designation No.: CN1201. Test Firm Registration No.: 523476.

Waltek Testing Group Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration number 523476, September 10, 2019.

5 Test Summary

Test Items	Test Requirement	Result
Conducted Emission	47CFR part 15§15.207	PASS
Radiated Emission	47CFR part 15§15.209	PASS
20dB Bandwidth	47CFR part 15§15.215	PASS
Antenna Requirement	47CFR part 15§15.203	PASS
RF Exposure	FCC CFR 47 part1§1.1310 KDB 680106 D01 v03	PASS
Note: Pass=Compliance; NC=Not Compliance; NT=Not Tested; N/A=Not Applicable		

Note: -

6 Equipment Used during Test

6.1 Equipments List

Conducted Emissions Test Site 2#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	EMI Test Receiver	R&S	ESCI	101155	2022-08-01	2023-07-31
2	LISN	SCHWARZBECK	NSLK 8128	8128-259	2022-08-08	2023-08-07
3	Limiter	CYBERTEK	EM5010	261115-001-0024	2022-08-01	2023-07-31
4	Cable	Laplace	RF300	-	2022-08-08	2023-08-07
3m Semi-anechoic Chamber for Radiation Emissions Test site 2#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	Spectrum Analyzer	R&S	FSP30	100091	2022-04-28	2023-04-27
2	Amplifier	Agilent	8447D	2944A10178	2022-08-01	2023-07-31
4	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	2022-08-01	2023-07-31
5	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	2022-08-07	2023-08-06
6	Active Loop Antenna	Com-Power	AL-130R	10160007	2022-05-02	2023-05-01
RF Conducted Testing						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	2022-04-28	2023-04-27
2	Spectrum Analyzer	R&S	FSP40	100501	2022-08-01	2023-07-31

6.2 Description of Support Units

Equipment	Manufacturer	Model No.	Series No.
Wireless charging dummy load (5W)	Waltek	/	/

6.3 Measurement Uncertainty

Parameter	Uncertainty
Conducted Emission	± 3.64 dB (AC mains 150KHz~30MHz)
Radiated Spurious Emissions	± 5.08 dB (Bilog antenna 30M~1000MHz)
	± 5.47 dB (Horn antenna 1000M~25000MHz)
Radio Frequency	$\pm 1 \times 10^{-7}$ Hz
RF Power	± 0.42 dB
RF Power Density	± 0.7 dB
Conducted Spurious Emissions	± 2.76 dB (9kHz~26500MHz)
Confidence interval: 95%. Confidence factor: k=2	

6.4 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P. R. China.

7 Conducted Emission

Test Requirement: FCC CFR 47 Part 15 Section 15.207
Test Method: ANSI C63.10:2013
Test Result: PASS
Frequency Range: 150kHz to 30MHz
Class/Severity: Class B
Limit:

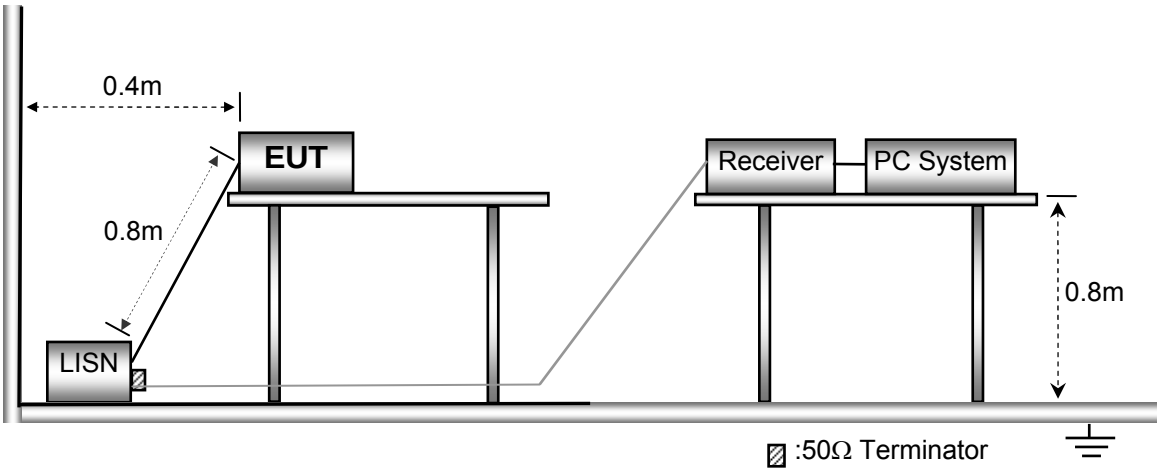
Frequency (MHz)	Limit (dBμV)	
	Quasi-peak	Average
0.15 o 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50
* Decreases with the logarithm of the frequency.		

7.1 EUT Operation

Operating Environment:
Temperature: 22.3 °C
Humidity: 45.5 % RH
Atmospheric Pressure: 101.4kPa
EUT Operation: Loading of 5W, Standby mode
Only the worst-case mode (Loading of 5W) were record in the report.

7.2 EUT Setup

The EUT was placed on the test table in shielding room.

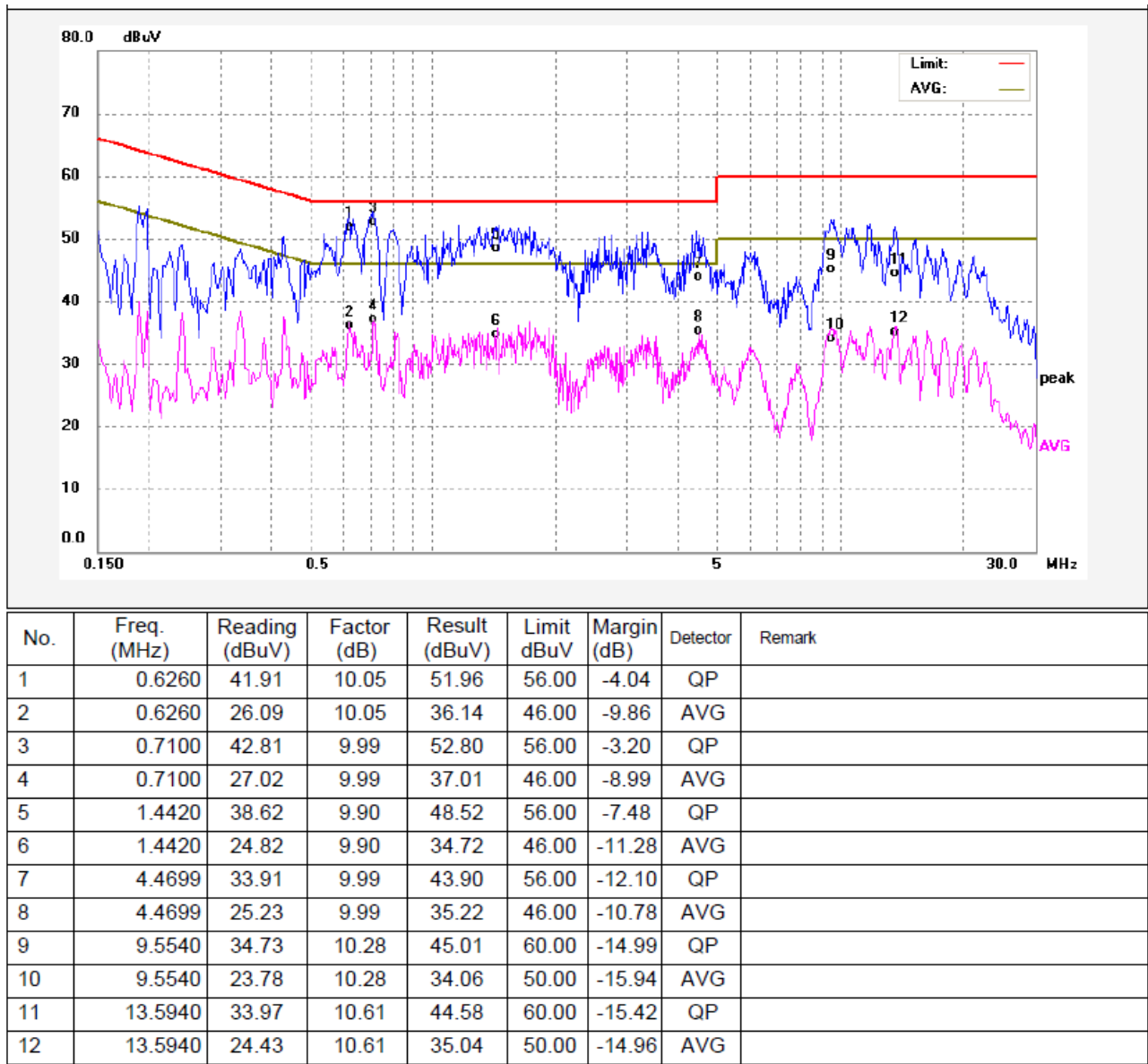


7.3 Measurement Description

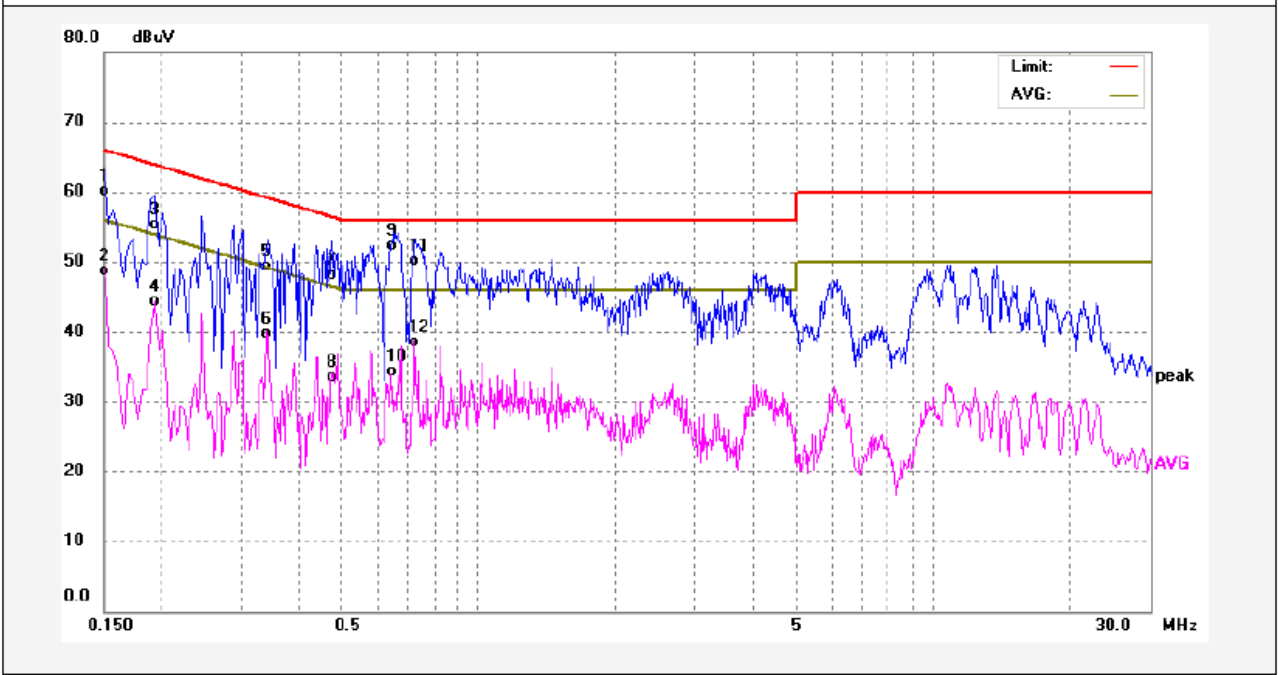
The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

7.4 Conducted Emission Test Result

Live line:



Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1500	49.64	10.44	60.08	65.99	-5.91	QP	
2	0.1500	38.36	10.44	48.80	55.99	-7.19	AVG	
3	0.1940	45.01	10.36	55.37	63.86	-8.49	QP	
4	0.1940	33.94	10.36	44.30	53.86	-9.56	AVG	
5	0.3420	39.02	10.28	49.30	59.15	-9.85	QP	
6	0.3420	29.49	10.28	39.77	49.15	-9.38	AVG	
7	0.4780	37.80	10.22	48.02	56.37	-8.35	QP	
8	0.4780	23.33	10.22	33.55	46.37	-12.82	AVG	
9	0.6540	42.29	10.11	52.40	56.00	-3.60	QP	
10	0.6540	24.14	10.11	34.25	46.00	-11.75	AVG	
11	0.7260	40.10	10.07	50.17	56.00	-5.83	QP	
12	0.7260	28.40	10.07	38.47	46.00	-7.53	AVG	

8 Radiated Spurious Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209

Test Method: ANSI C63.10:2013

Test Result: PASS

Measurement Distance: 3m

Limit:

FCC Part15 Paragraph 15.209

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	$\mu\text{V/m}$	Distance (m)	$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$
0.009 ~ 0.490	$2400/F(\text{kHz})$	300	$10000 * 2400/F(\text{kHz})$	$20\log^{(2400/F(\text{kHz}))} + 80$
0.490 ~ 1.705	$24000/F(\text{kHz})$	30	$100 * 24000/F(\text{kHz})$	$20\log^{(24000/F(\text{kHz}))} + 40$
1.705 ~ 30	30	30	$100 * 30$	$20\log^{(30)} + 40$
30 ~ 88	100**	3	100	$20\log^{(100)}$
88 ~ 216	150**	3	150	$20\log^{(150)}$
216 ~ 960	200**	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§15.231 and 15.241.

In the emission table above, the tighter limit applies at the band edges.

Note:

According to §15.209(d), the emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

According to §15.31(f)(2):

3m Measurement level ($\text{dB}\mu\text{V/m}$) = 300m Measurement level ($\text{dB}\mu\text{V/m}$) + $40\log(300/3)$ ($\text{dB}\mu\text{V/m}$).

8.1 EUT Operation

Operating Environment:

Temperature: 22.9 °C

Humidity: 49.5 % RH

Atmospheric Pressure: 101.2kPa

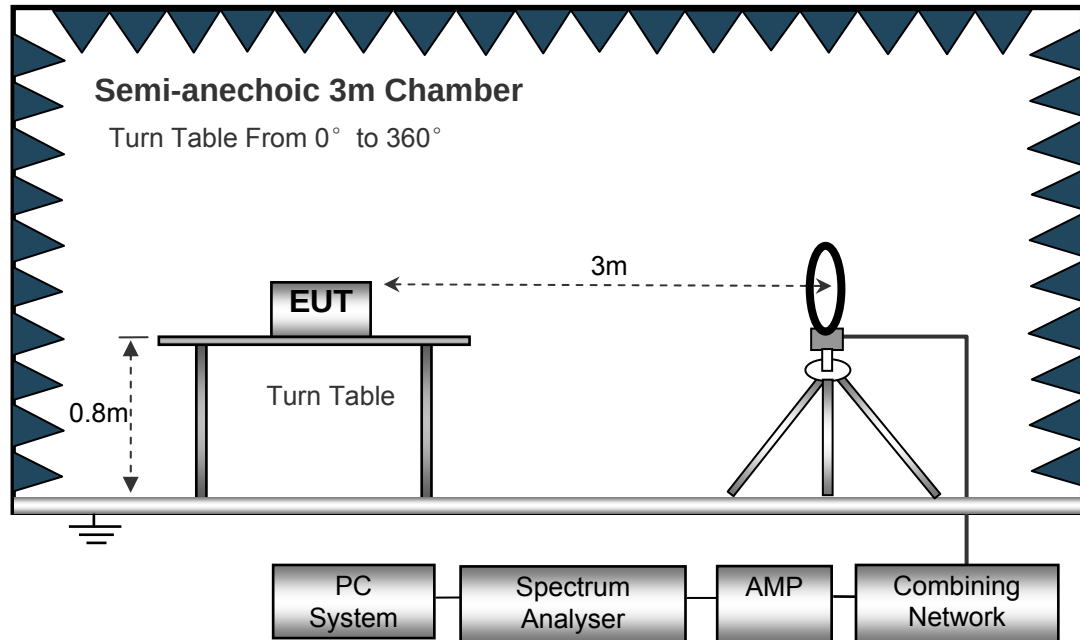
EUT Operation: Loading of 5W, Standby mode

Only the worst-case mode (Loading of 5W) were record in the report.

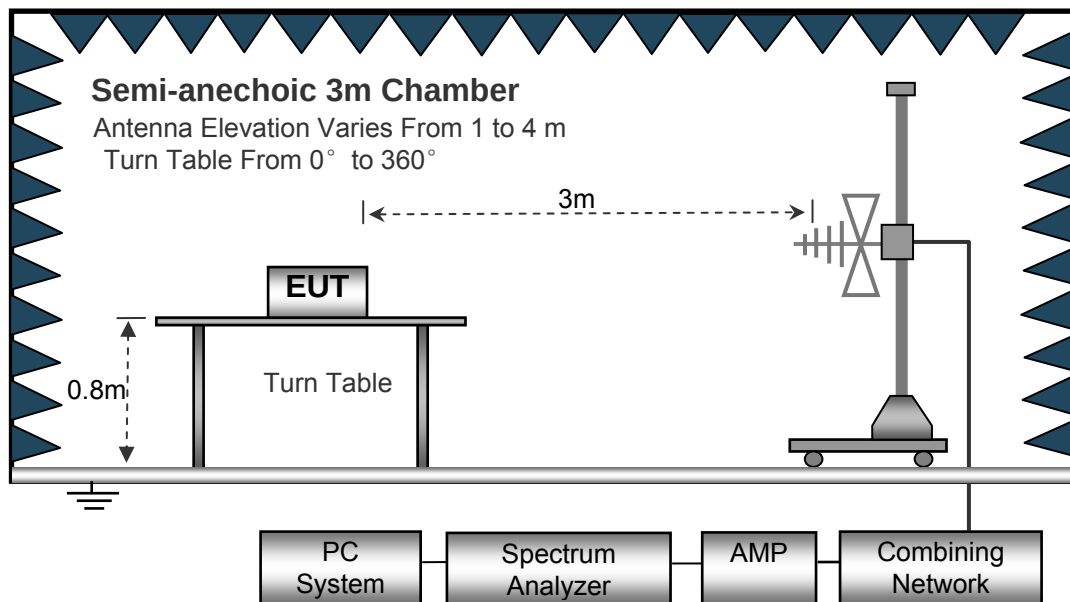
8.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI 63.10:2013.

The test setup for emission measurement below 30MHz.



The test setup for emission measurement above 30MHz and up to 1 000MHz.



8.3 Spectrum Analyzer Setup

Below 30MHz

Sweep Speed Auto
 IF Bandwidth..... 10kHz
 Video Bandwidth..... 10kHz
 Resolution Bandwidth..... 10kHz

Above 30MHz

Sweep Speed Auto
 Video Bandwidth..... 300kHz
 Resolution Bandwidth..... 100kHz

8.4 Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane, EUT is set 3m away from the receiving antenna, which is 1.0m above ground plane (Height of the centre of the loop above the GRP of the SAC is 1 m).
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And each emission was to be maximized by changing the polarization of receiving antenna both vertical coaxial and vertical coplanar.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are tested under 3-axes (X, Y, Z) position (X denotes lying on the table, Y denotes side stand and Z denotes vertical stand). After pre-test, it was found that the worse radiation emission was get at the Z position. So the data shown was the Z position only.

Note:

Although these test were performed other than open area test site, adequate comparison measurements were confirmed against 300m open area test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788 D01.

8.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

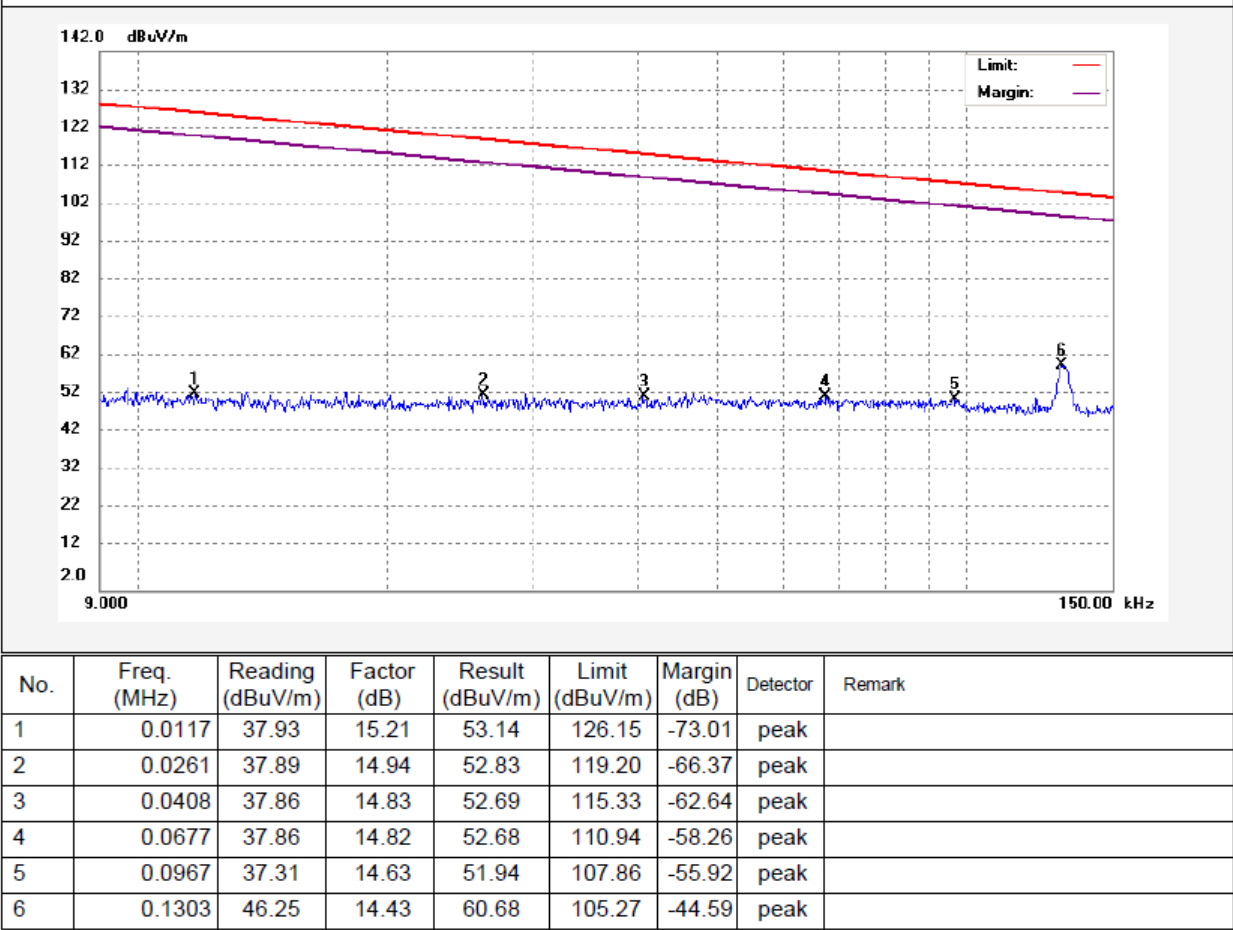
The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Limit}$$

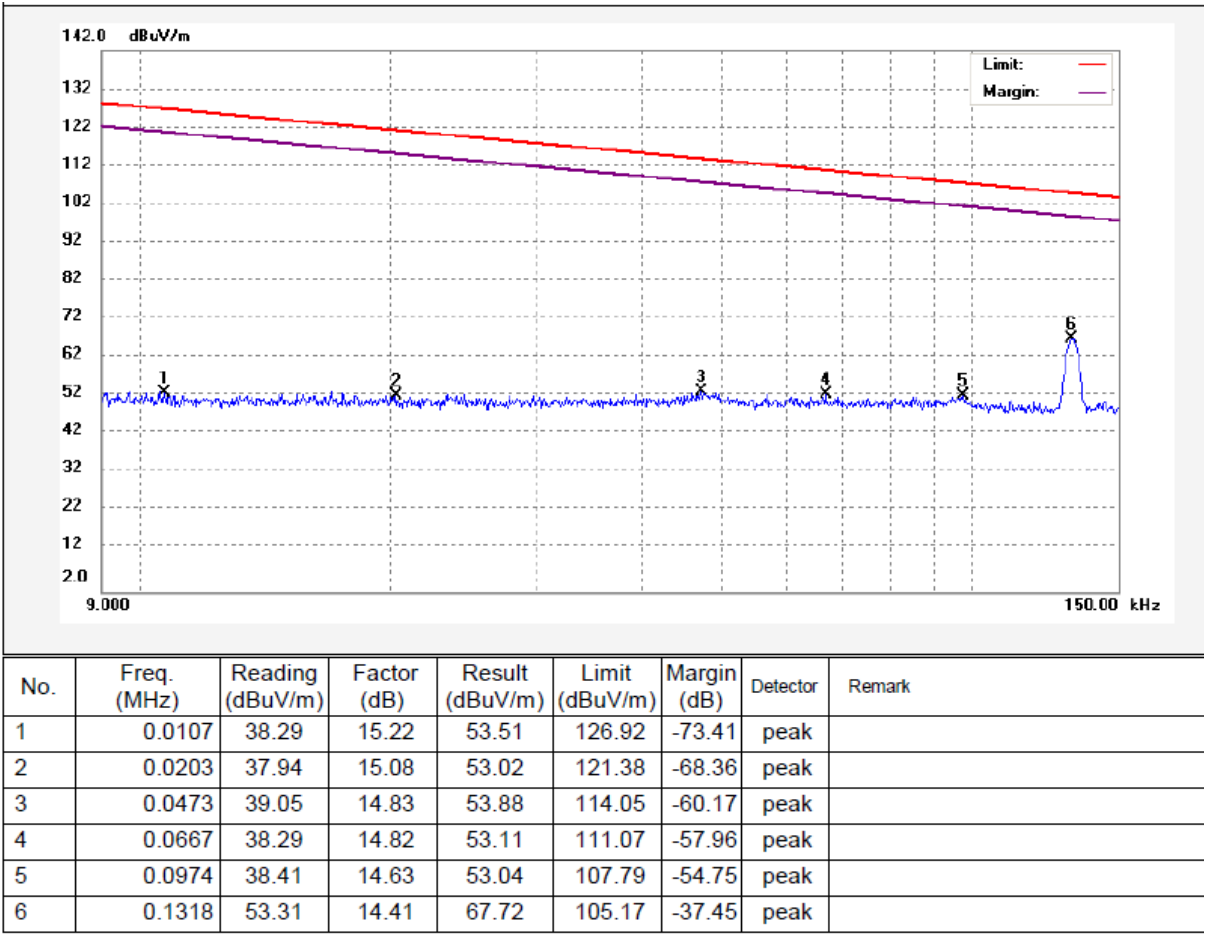
8.6 Summary of Test Results

Test Frequency: 9kHz ~ 150kHz

Antenna Polarization: 0°

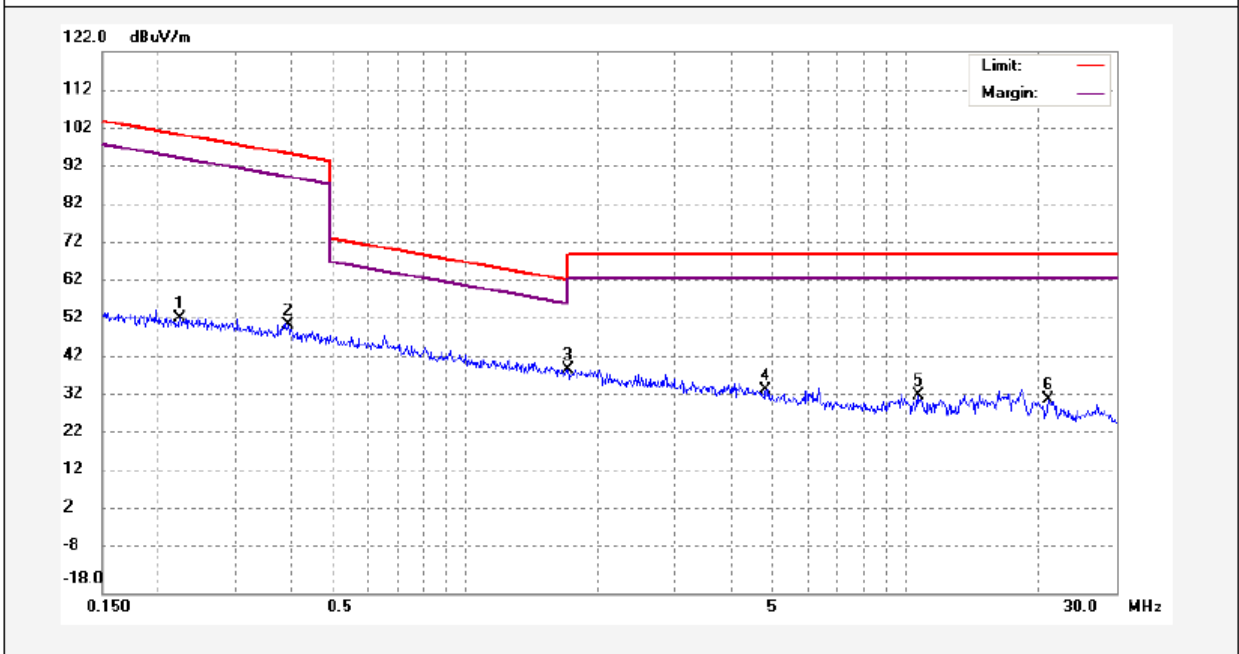


Antenna Polarization: 90°



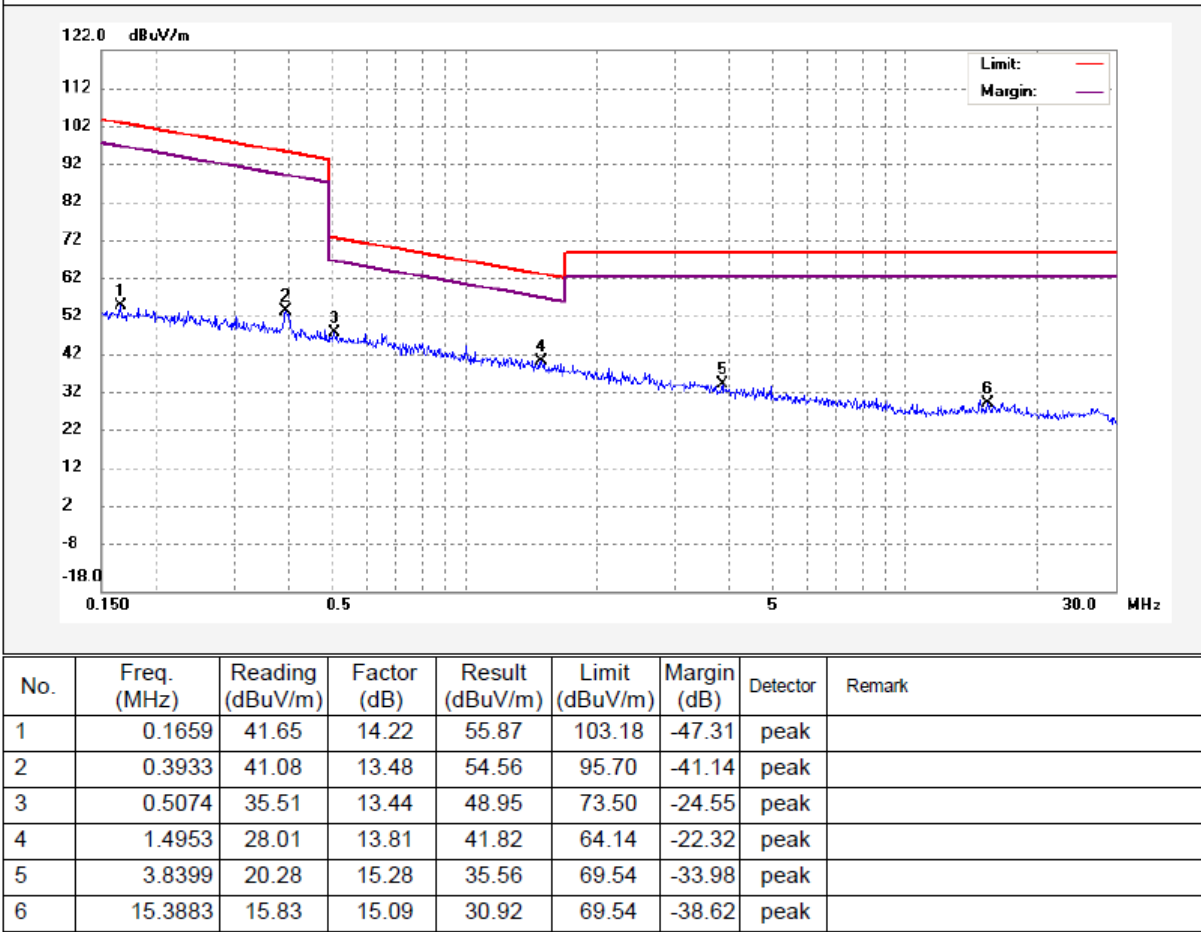
Test Frequency: 150kHz ~ 30MHz

Antenna Polarization: 0°



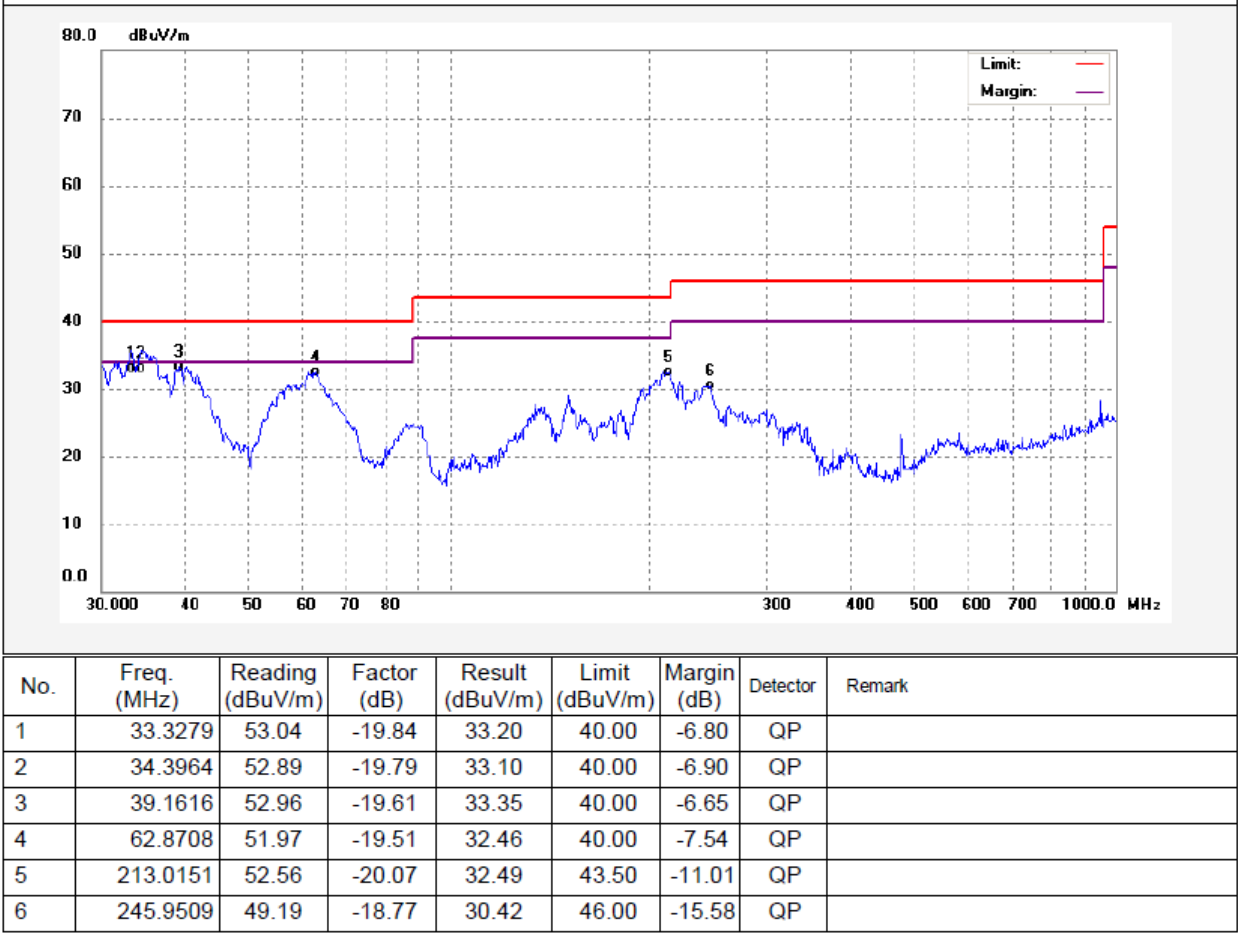
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	0.2244	39.44	13.90	53.34	100.56	-47.22	peak	
2	0.3955	37.99	13.48	51.47	95.65	-44.18	peak	
3	1.7071	26.18	13.90	40.08	69.54	-29.46	peak	
4	4.7969	19.26	15.48	34.74	69.54	-34.80	peak	
5	10.6198	18.66	14.57	33.23	69.54	-36.31	peak	
6	20.9243	18.41	13.85	32.26	69.54	-37.28	peak	

Antenna Polarization: 90°

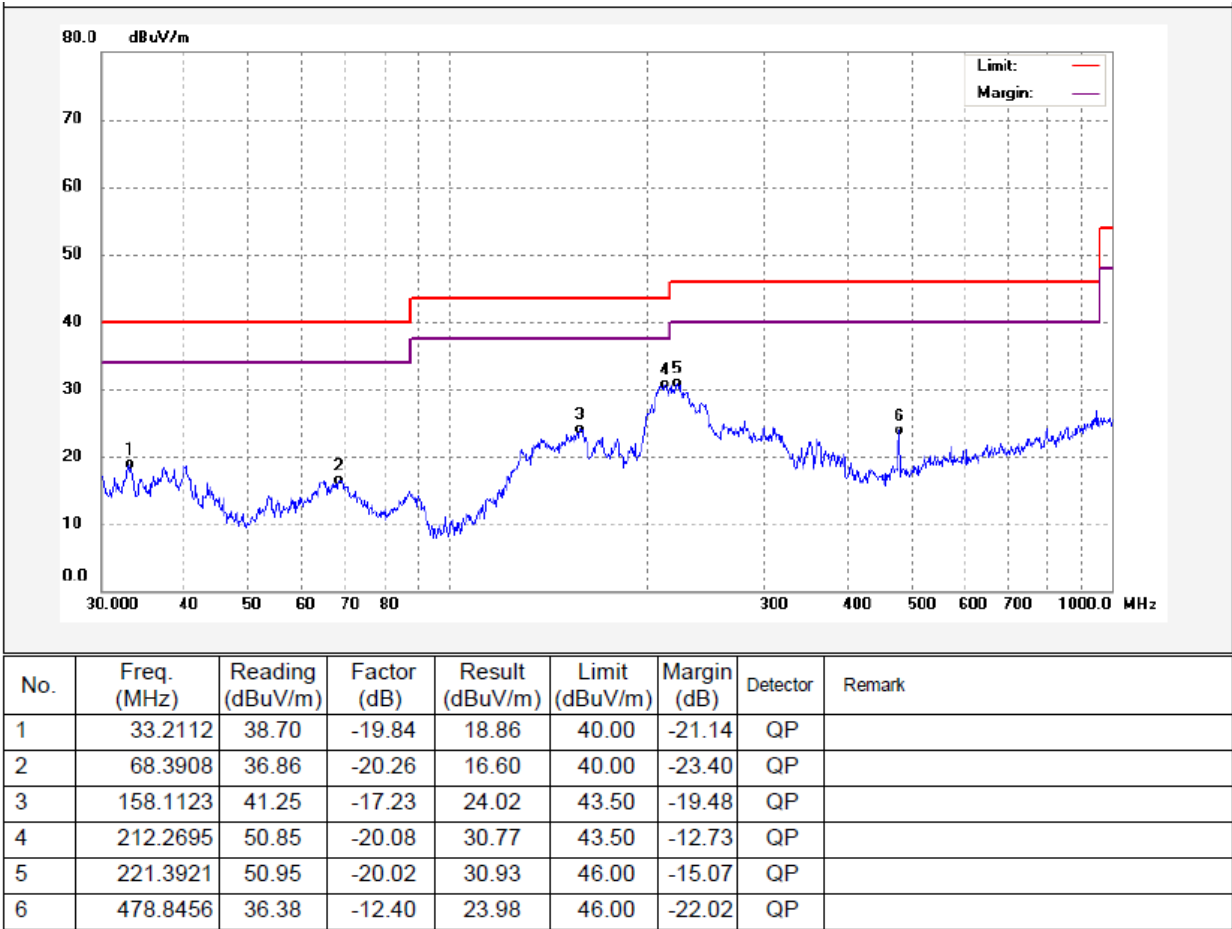


Test Frequency: 30MHz ~ 1 000MHz

Antenna Polarization: Vertical



Antenna Polarization: Horizontal



9 Bandwidth Measurement

Test Requirement: FCC CFR47 Part 15 Section 15.215
Test Method: ANSI C63.10:2013

9.1 Test Procedure

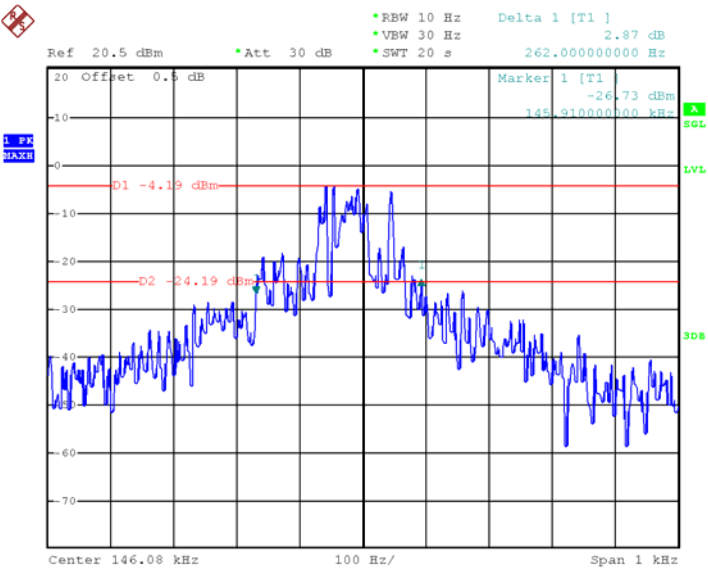
- 1 The transmitter shall be operated at its maximum carrier power measured under normal test conditions;
- 2. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.
- 3. Set the spectrum analyzer: RBW = 10Hz, VBW = 30Hz
- 4. Measured the spectrum width with power higher than 20dB below carrier Bandwidth.

9.2 Test Result

Test Channel (kHz)	20dB Bandwidth Emission(kHz)
146.08	0.262

Test result plot as follows:

20dB Bandwidth



Date: 8.MAR.2023 13:45:33

10 Antenna Requirement

According to the FCC Part 15 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 an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of an so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Note: Please refer to EUT photos for more details.

11 RF Exposure

Note: Please refer to RF Exposure test report: WTD22X12262059W.

12 Photographs of test setup and EUT

Note: Please refer to appendix: Appendix-CKSW0555-Photos.

===== End of Report =====