

TEST REPORT

Reference No...... : WTD22D01004910W001
FCC ID : 2ALCVER100501
Applicant..... : Emerson Radio Corp.
Address..... : 35 Waterview Blvd, Parsippany, New Jersey 07054, United States
Manufacturer : Huizhou Shangmeijia Electronic Technology Co., Ltd.
Address..... : Jiutan North Development Area, Yuanzhou Town, Boluo Country, Huizhou City, Guangdong, China.
Brand Name..... : Emerson
Product..... : Alarm Clock Radio with Bluetooth and Wireless Chargers
Model(s) : ER100501, ER100502, ER100503, CKSW1516
Standards..... : FCC 47CFR Part 15 Subpart C
Date of Receipt sample : 2022-01-26
Date of Test : 2022-01-26 to 2022-02-16
Date of Issue..... : 2022-04-08
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
WTD22D01004 910W001	2022-01-26	2022-01-26 to 2022-02-16	2022-04-08	original	-	Valid

4 General Information

4.1 General Description of E.U.T

Product..... : Alarm Clock Radio with Bluetooth and Wireless Chargers
Model(s)..... : ER100501, ER100502, ER100503, CKSW1516
Model Difference..... : The model names, cosmetics and display colors are different.
The test sample's model is ER100501
Hardware Version..... : MAIN BOARD: REV. 2.1
DISPLAY BOARD: REV. 1.0
WIRELESS CHARGER: REV. 1.0
Software Version..... : V32

4.2 Details of E.U.T.

Frequency Range..... : WPT 110-205kHz
Max. RF output power... : WPT 76.57dBμV/m@3m distance
Type of Modulation..... : Load Modulation
Antenna installation..... : Inductive loop coil Antenna
Ratings..... : DC 12V from adapter
DC 3V by CR2032 Lithium Battery (clock backup)
Top wireless output..... : 10W Max.
Side wireless output..... : 3W Max.
USB port output..... : USB-A: 5VDC 0.5A, USB-C: 5VDC 1.0A
Adapter..... : Input: 120V ~ 60Hz
Power consumption 36W

Note: please refer to user manual and EUT photos for more details.

4.3 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.

4.4 Subcontracted

Whether parts of tests for the product have been subcontracted to other labs:

☐ Yes ☒ No

If Yes, list the related test items and lab information:

Test Lab: N/A

Lab address: N/A

Test items: N/A

4.5 Abnormalities from Standard Conditions

None.

4.6 Test Mode

Test Mode	Descriptions
Idle mode (standby)	EUT alone powered by AC/DC adapter
Charging mode 1	Side ant. full-load
Charging mode 2	Top ant. full-load
Charging mode 3	Side ant. full-load + Top ant. full-load

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.

5 Test Summary

Test Items	Test Requirement	Result
Conducted Emission	FCC 47CFR part 15§15.207	PASS
Radiated Emission	FCC 47CFR part 15§15.209	PASS
20dB Bandwidth	FCC 47CFR part 15§15.215	PASS
Antenna Requirement	FCC 47CFR part 15§15.203	PASS
RF Exposure	FCC 47CFR part2 §2.1901 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						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date	Valid
1	EMI Test Receiver	R&S	ESCI	100947	2021-07-26	1Year
2	LISN	R&S	ENV216	100115	2021-07-26	1Year
3	Cable	Top	TYPE16(3.5M)	-	2021-07-26	1Year
4	Test software	EZ-EMC	RA-03A1-1	-	N/A	N/A
3m Semi-anechoic Chamber for Radiation Emissions (SAEMC)						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date	Valid
1	Spectrum Analyzer	R&S	FSP30	100091	2021-04-26	1Year
2	Tri-log Broadband Antenna	SCHWARZBECK	VULB9163	336	2021-08-23	1Year
3	Amplifier	Agilent	8447D	2944A10178	2021-07-26	1Year
4	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	2021-04-30	1Year
5	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	2021-07-26	1Year
6	Coaxial Cable	ZT26-NJ-NJ-8M/FA	1GHz-18GHz	NA	2021-04-26	1Year
7	Spectrum Analyzer	R&S	FSP40	100501	2021-08-13	1Year
8	Broad-band Horn	SCHWARZBECK	BBHA 9170	335	2021-07-30	1Year
9	Microwave Broadband Preamplifier	SCHWARZBECK	BBV 9721	100472	2021-07-30	1Year
10	Coaxial Cable	ZT40-2.92J-2.92J-2.0M	10MHz-40GHz	17100919	2021-04-26	1Year
11	Test software	EZ-EMC	RA-03A1-1	-	N/A	N/A
3m Semi-anechoic Chamber for Radiation Emissions (TDK)						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date	Valid
1	Test Receiver	R&S	ESCI	101296	2021-04-26	1Year
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	2021-10-31	1Year
3	Active Loop Antenna	Com-Power Corp.	AL-130R	10160007	2021-04-29	1Year
4	Amplifier	ANRITSU	MH648A	M43381	2021-04-26	1Year

5	Cable	HUBER+SUHNER	CBL2	525178	2021-04-26	1Year
7	Test software	EZ-EMC	RA-03A1-1	-	N/A	N/A
RF Conducting						
Item	Equipment	Manufacturer	Model No.	Serial No	Last Cal. Date	Valid
1	EXA Signal Analyzer	Malaysia Keysight	N9010A	MY50520207	2021-04-26	1Year
2	Spectrum Analyzer	R&S	FSP40	100501	2021-08-13	1Year

6.2 Description of Support Units

Equipment	Manufacturer	Model No.	Series No.
Wireless charging dummy load (5W)	Waltek	/	/
Wireless charging dummy load (15W)	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 47CFR part 15§15.207
Test Method: ANSI C63.10:2013
Test Result: PASS
Frequency Range: 150kHz to 30MHz
Limit:

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

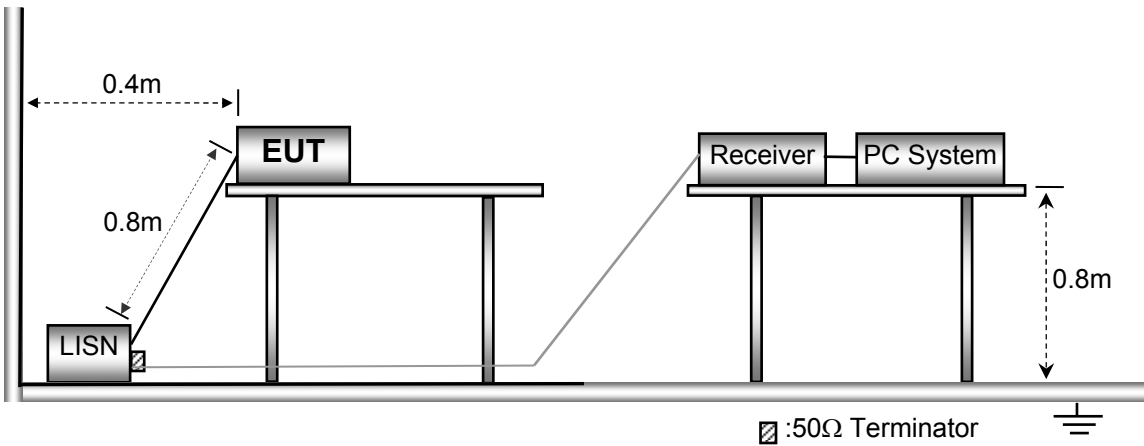
* Decreases with the logarithm of the frequency.

7.1 EUT Operation

Operating Environment:
Temperature: 21.6 °C
Humidity: 46.8 % RH
Atmospheric Pressure: 101.2kPa
EUT Operation: Charging mode 3

7.2 EUT Setup

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

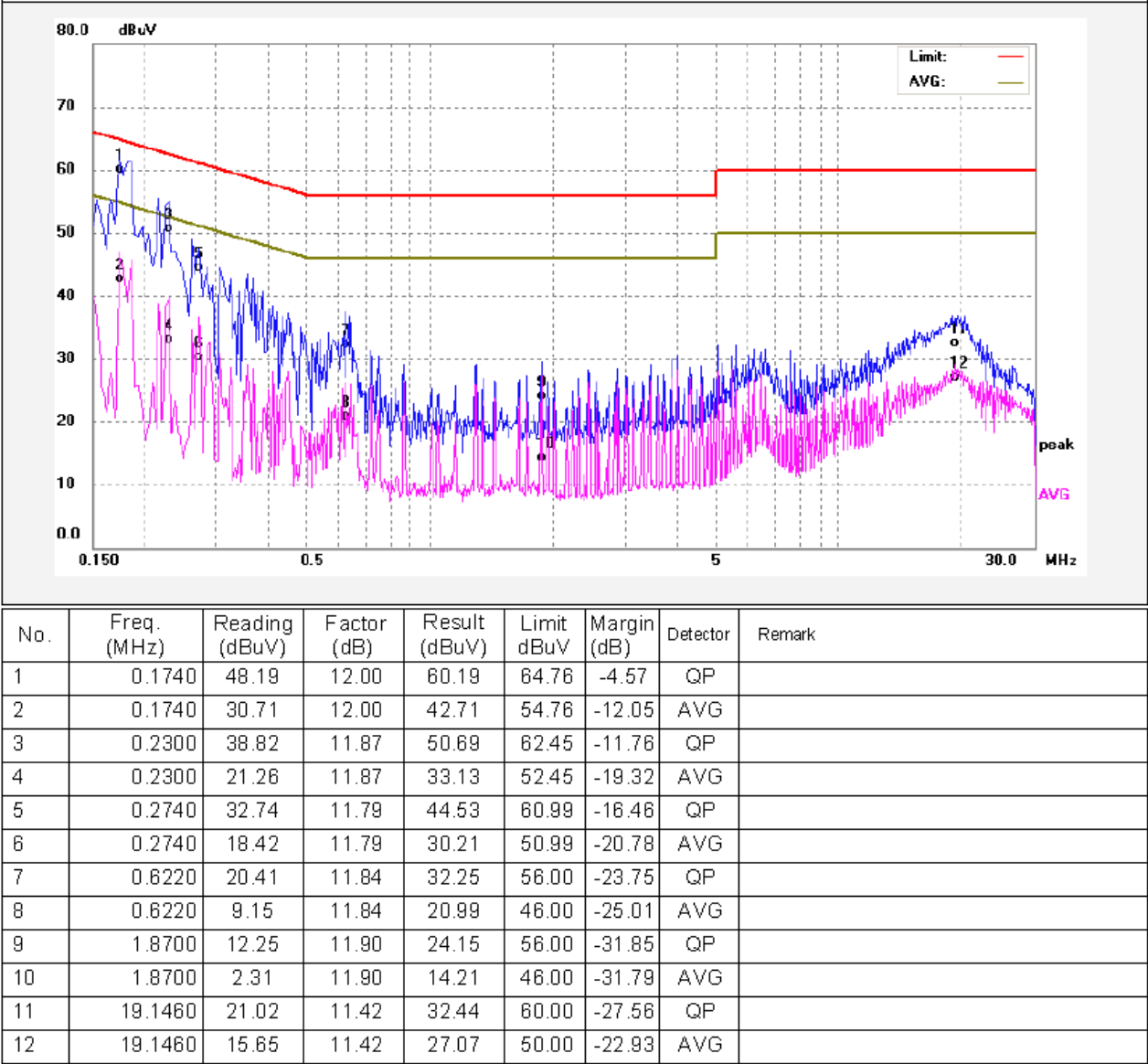


7.3 Measurement Description

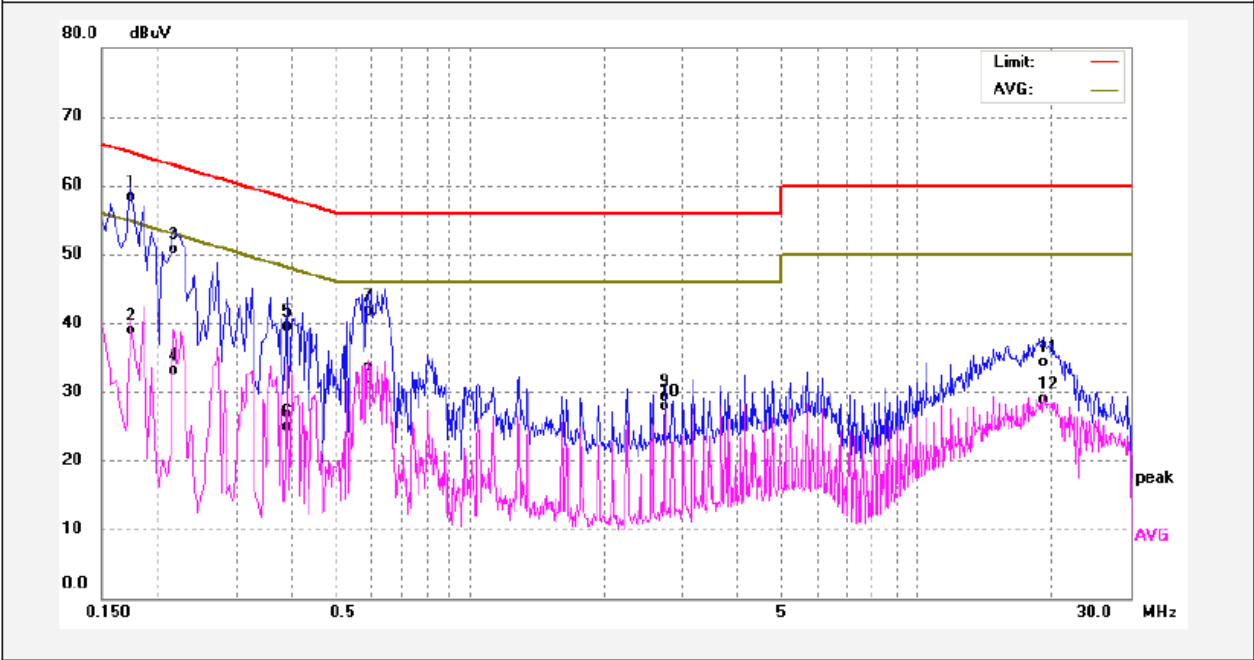
The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

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	0.1740	46.83	11.45	58.28	64.76	-6.48	QP	
2	0.1740	27.42	11.45	38.87	54.76	-15.89	AVG	
3	0.2180	39.46	11.32	50.78	62.89	-12.11	QP	
4	0.2180	21.74	11.32	33.06	52.89	-19.83	AVG	
5	0.3899	28.24	11.19	39.43	58.06	-18.63	QP	
6	0.3899	13.75	11.19	24.94	48.06	-23.12	AVG	
7	0.5940	30.46	11.22	41.68	56.00	-14.32	QP	
8	0.5940	19.59	11.22	30.81	46.00	-15.19	AVG	
9	2.7340	17.79	11.44	29.23	56.00	-26.77	QP	
10	2.7340	16.44	11.44	27.88	46.00	-18.12	AVG	
11	19.1420	23.02	11.28	34.30	60.00	-25.70	QP	
12	19.1420	17.63	11.28	28.91	50.00	-21.09	AVG	

8 Radiated Spurious Emissions

Test Requirement: FCC 47CFR part 15§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: 22.5 °C

Humidity: 44.5 % RH

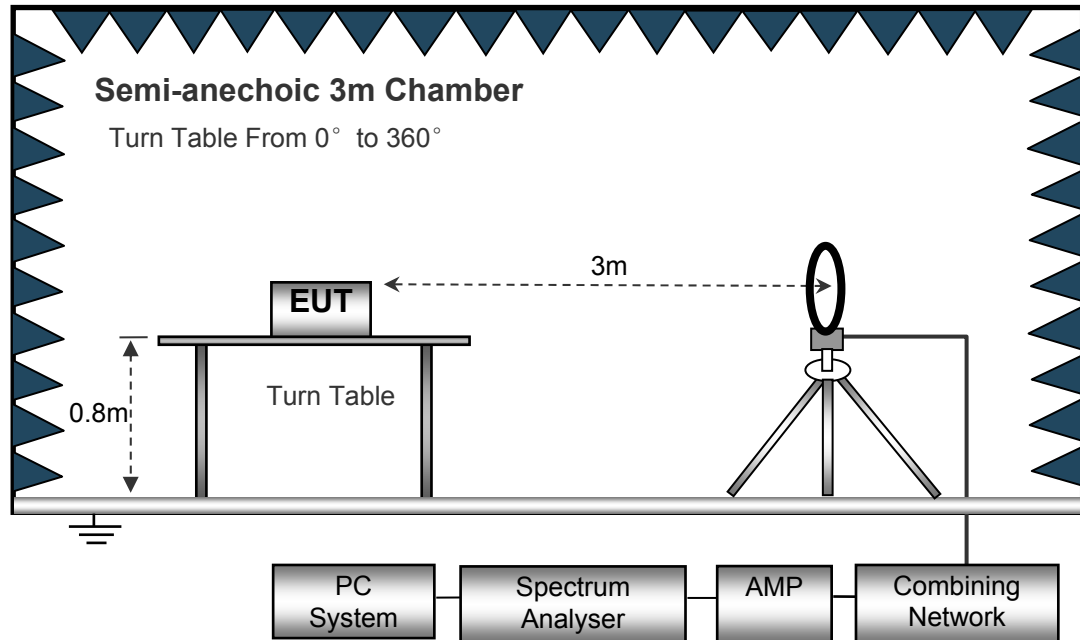
Atmospheric Pressure: 101.2kPa

EUT Operation: Charging mode 3

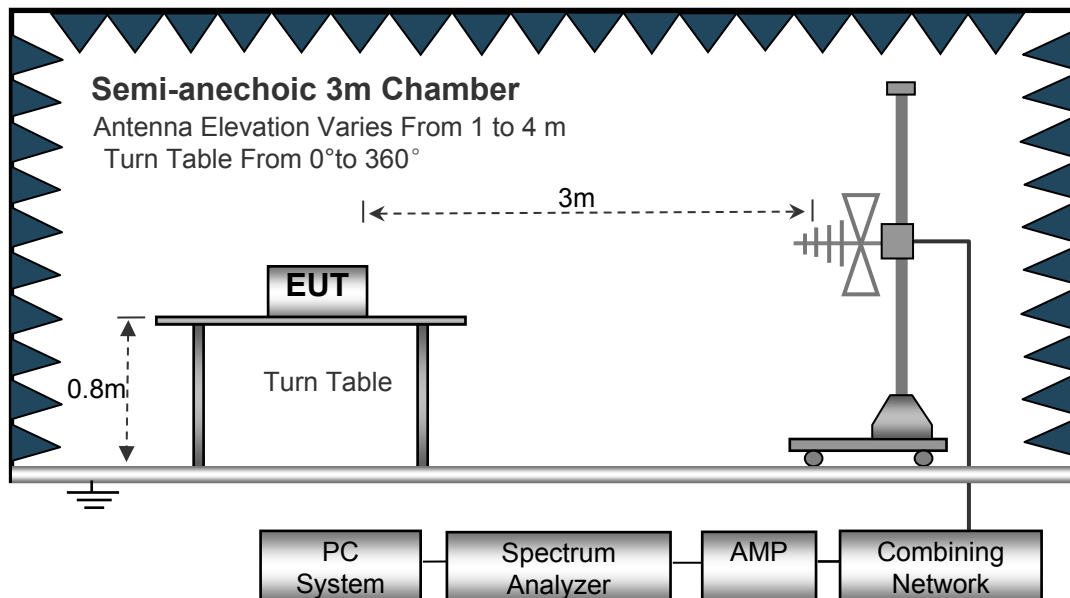
8.2 Test Setup

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

All bands	Sweep time.....Auto
9kHz to 150kHz	Resolution Bandwidth.....0.1kHz
	Video Bandwidth.....0.3kHz
150kHz to 30MHz	Resolution Bandwidth.....10kHz
	Video Bandwidth.....30kHz
Above 30MHz	Resolution Bandwidth.....100kHz
	Video Bandwidth.....300kHz

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:

Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

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:

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

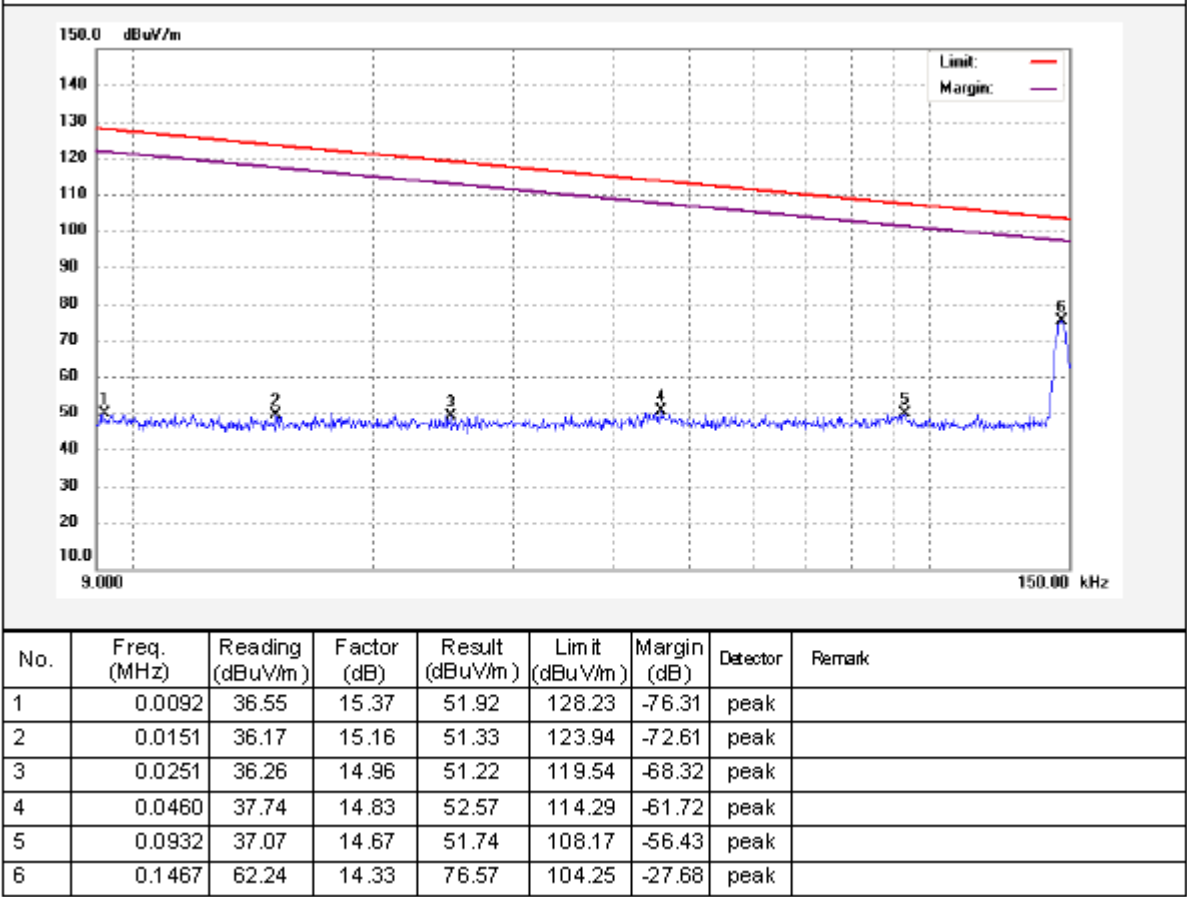
The "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit for Class B. The equation for margin calculation is as follows:

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

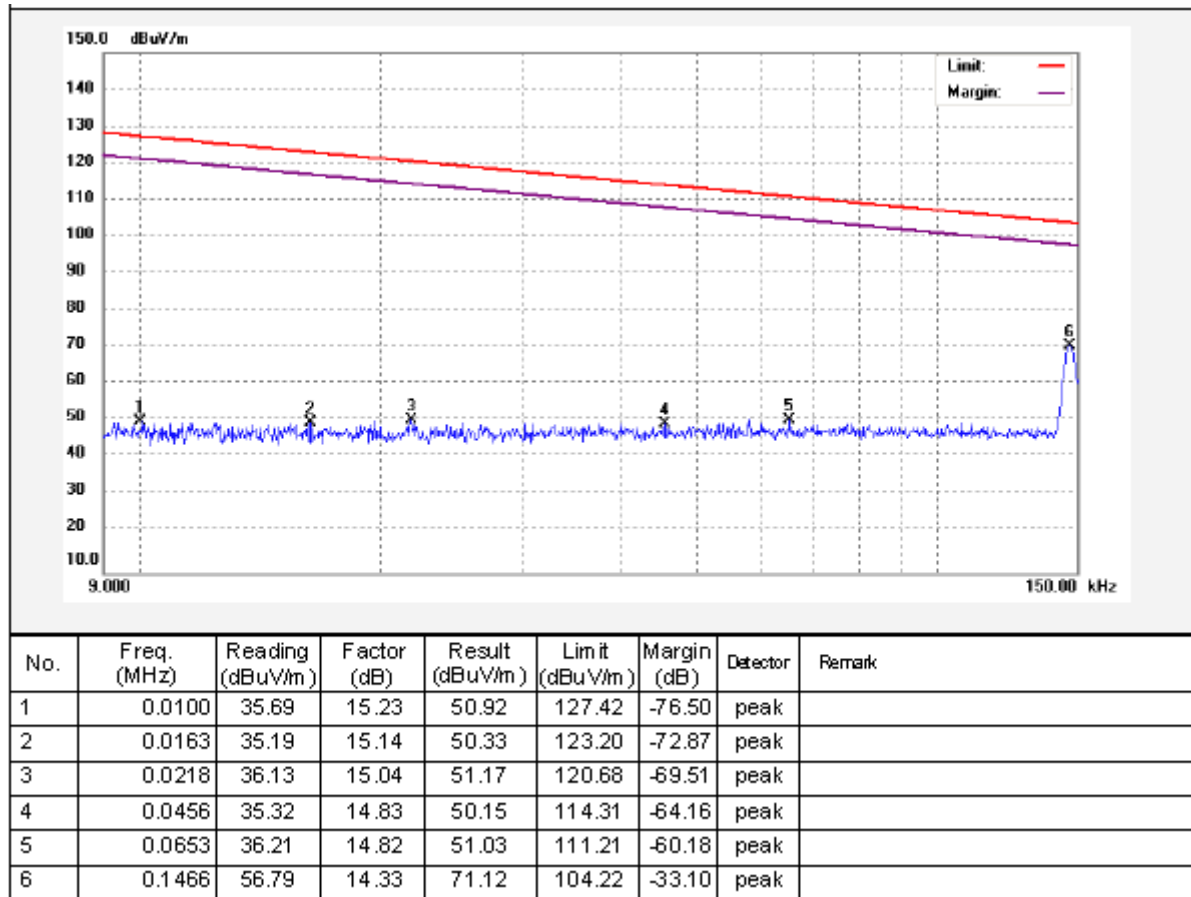
8.6 Summary of Test Results

Test Frequency: 9kHz ~ 150kHz

Antenna Polarization: 0°

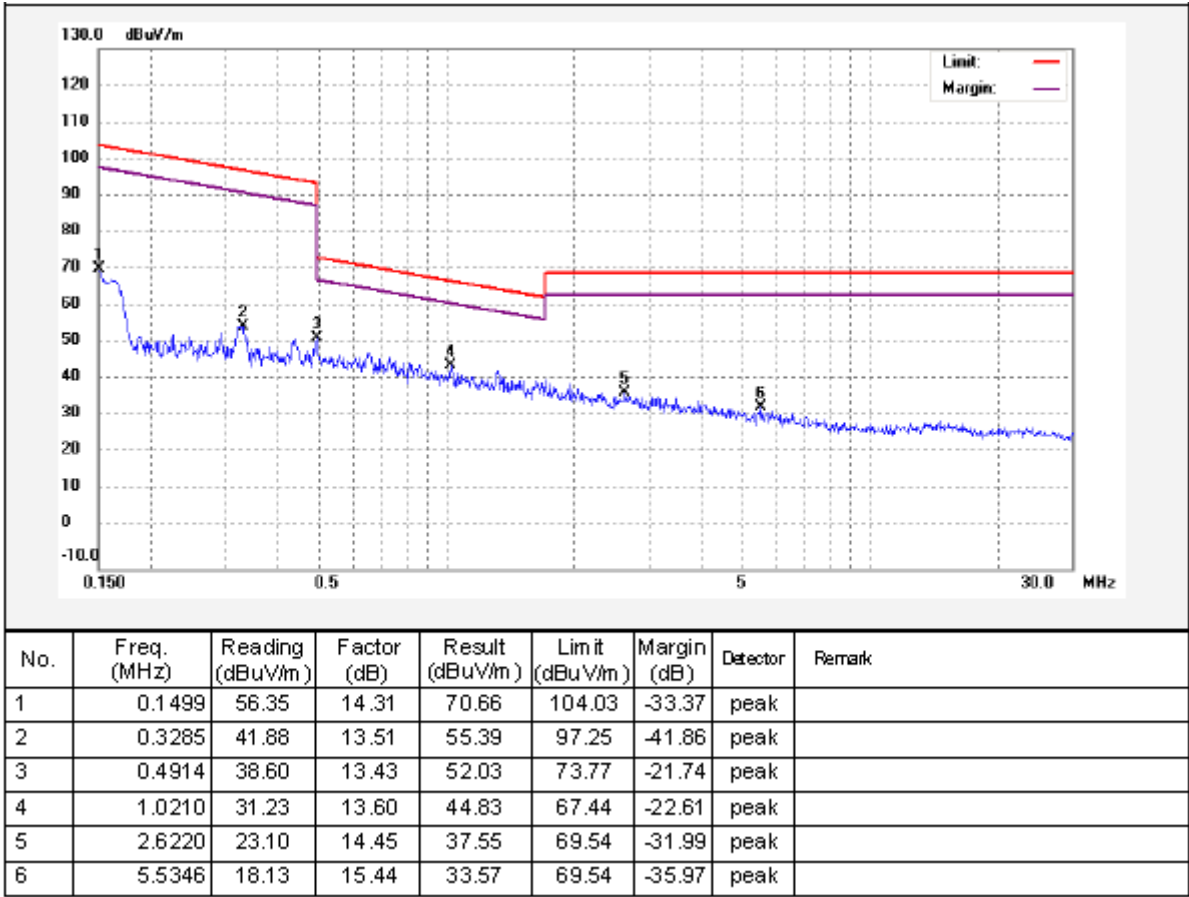


Antenna Polarization: 90°

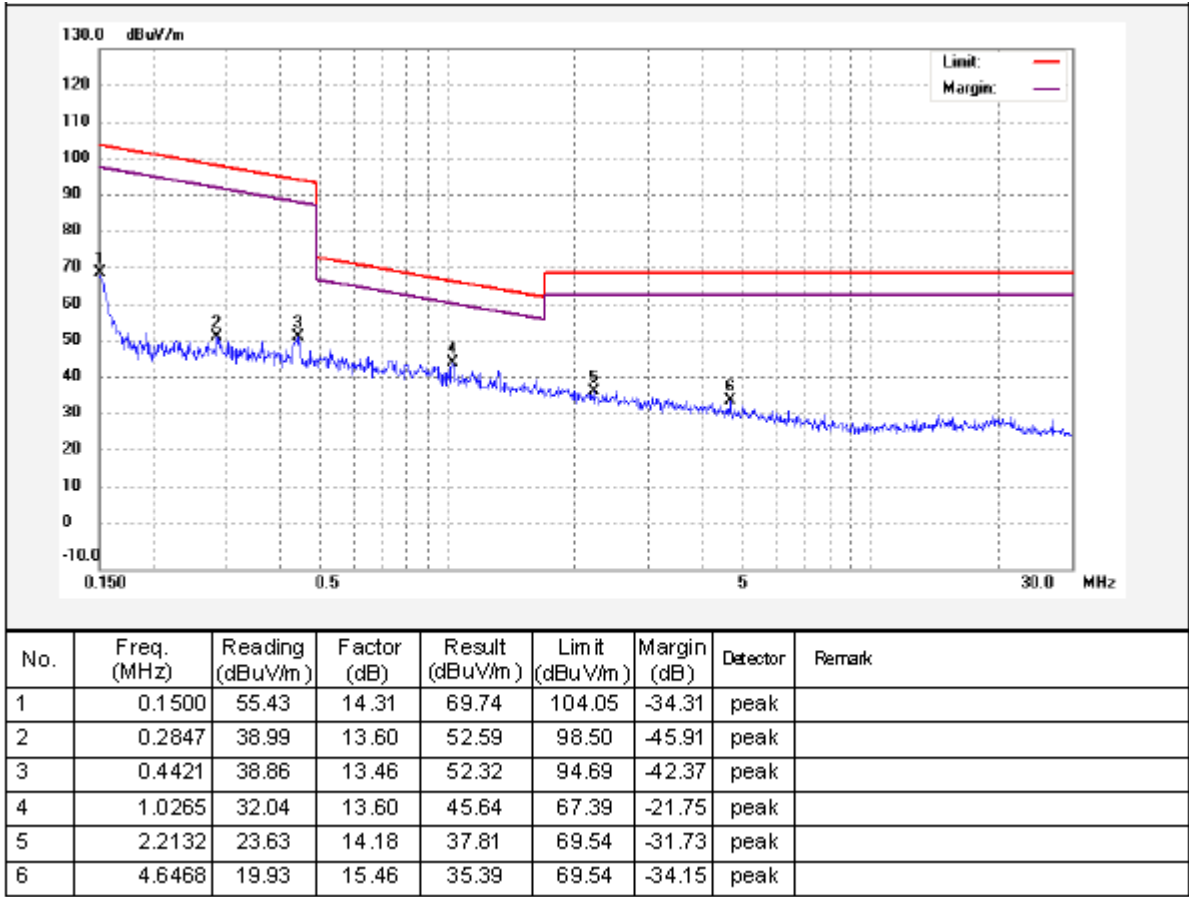


Test Frequency: 150kHz ~ 30MHz

Antenna Polarization: 0°

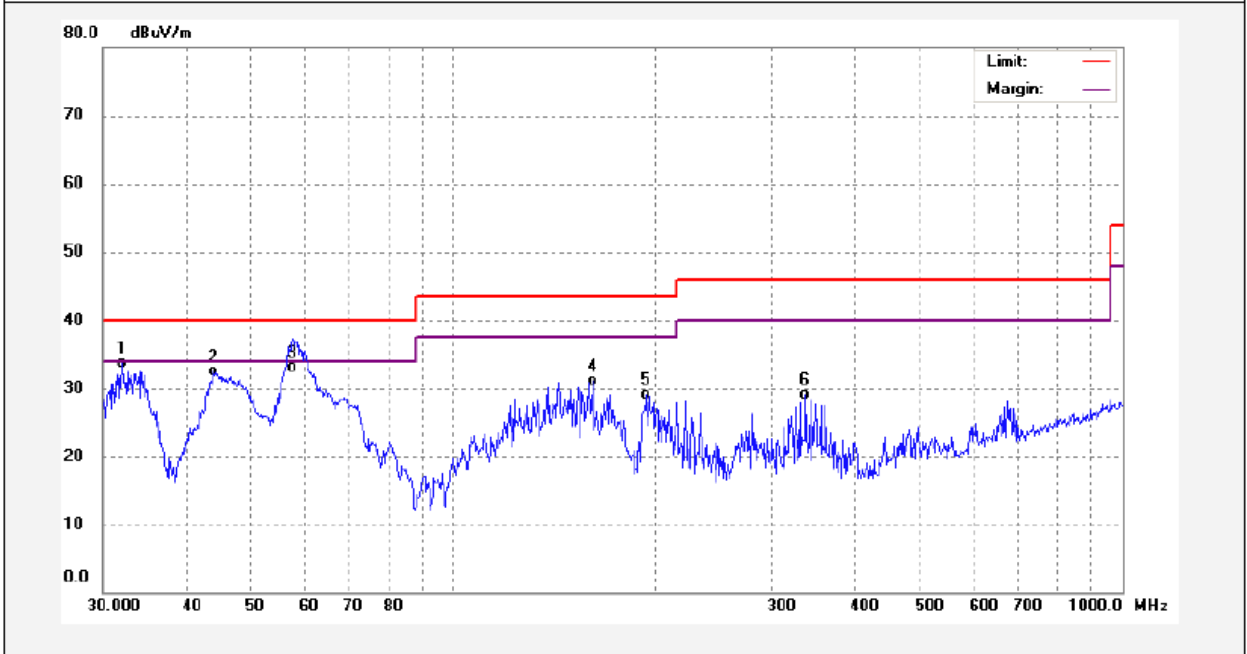


Antenna Polarization: 90°



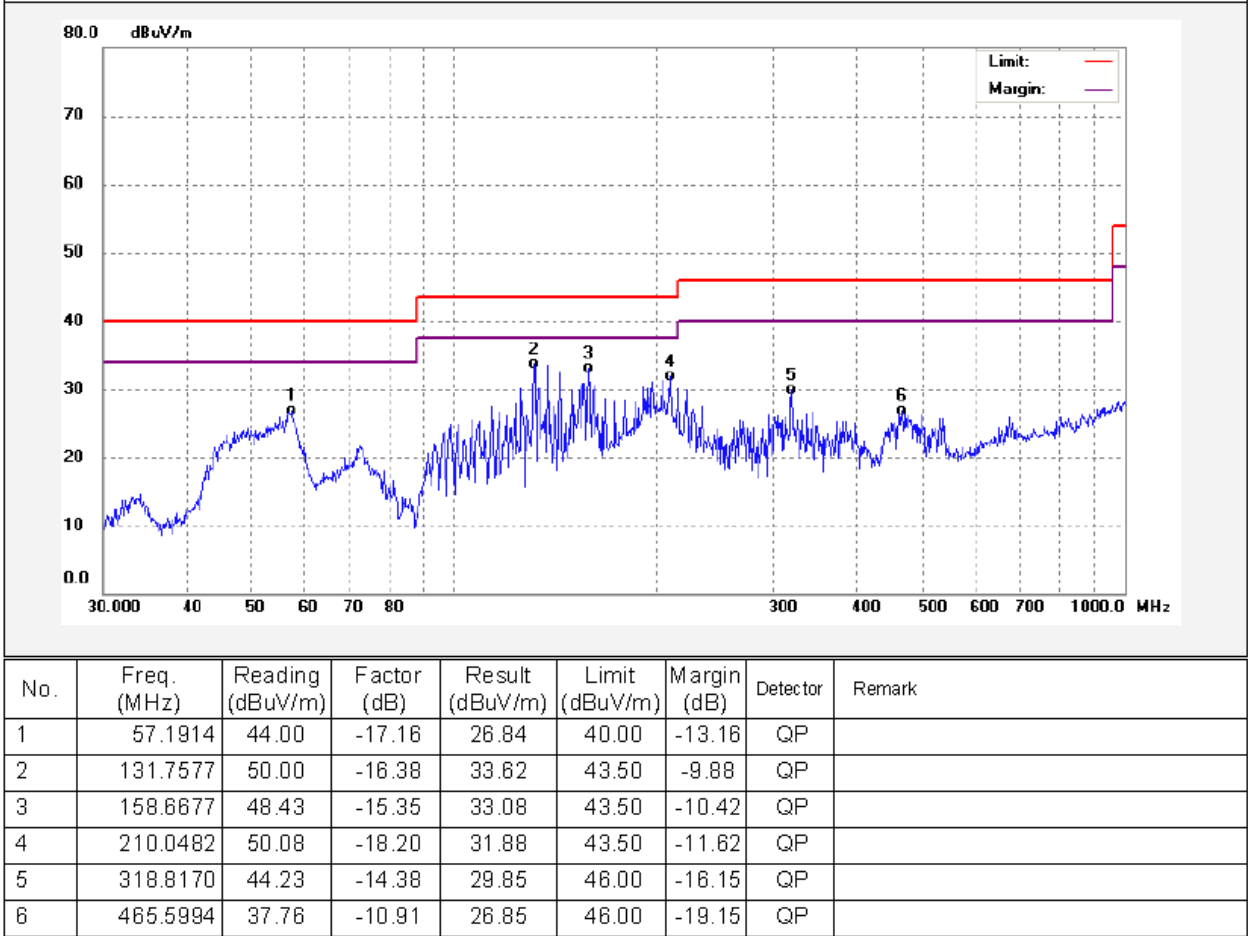
Test Frequency: 30MHz ~ 1 000MHz

Antenna Polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	32.0667	51.78	-18.08	33.70	40.00	-6.30	QP	
2	43.9658	49.92	-17.43	32.49	40.00	-7.51	QP	
3	57.5939	50.28	-17.18	33.10	40.00	-6.90	QP	
4	161.4740	46.48	-15.43	31.05	43.50	-12.45	QP	
5	194.4534	47.11	-18.07	29.04	43.50	-14.46	QP	
6	336.0351	43.03	-14.01	29.02	46.00	-16.98	QP	

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. The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW), video bandwidth (VBW) is set to approximately 3 times of the RBW.
4. Measured the spectrum width with power higher than 20dB below carrier and 99% Bandwidth.

9.2 Test Result

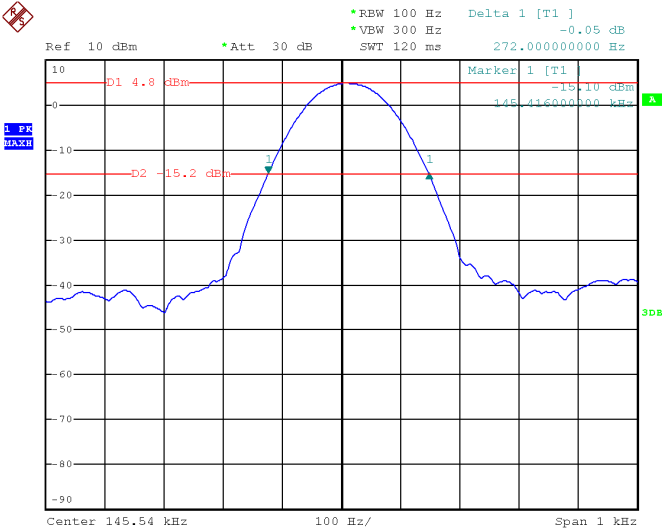
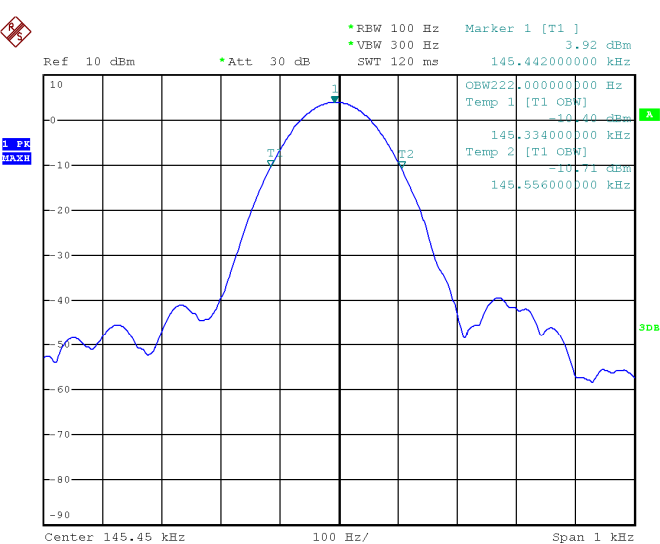
Wireless Charger	Test Channel (kHz)	99% Bandwidth (kHz)	20dB Bandwidth Emission(kHz)
Side	145.45	0.222	0.272
Top	143.70	0.238	0.282

Test result plot as follows:

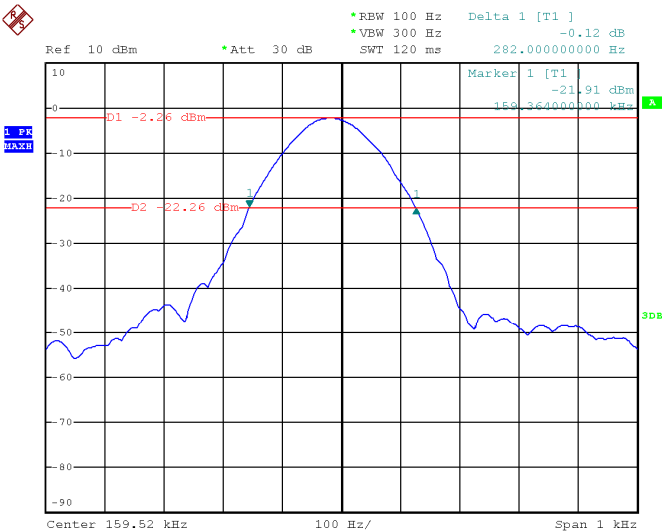
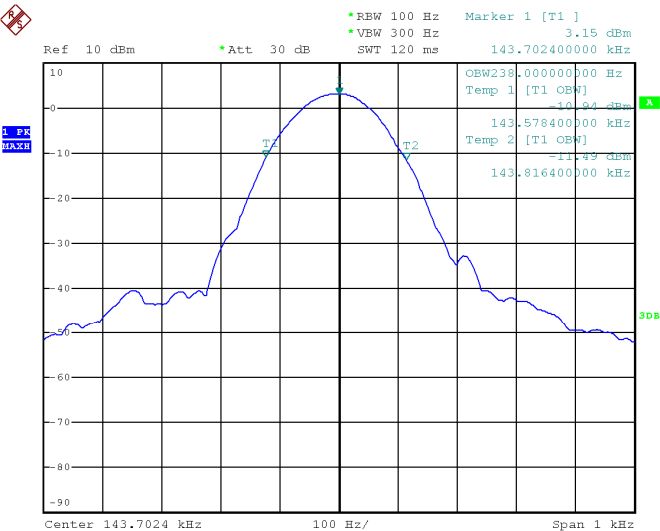
99% Bandwidth

20dB Bandwidth Emission

Side wireless charger



Top wireless charger



10 Antenna Requirement

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.

This product has an integrated antenna fulfil the requirement of this section.

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement.

Antenna location: Refer to Appendix (Internal Photos).

11 RF Exposure

Note: Please refer to RF Exposure test report: WTD22D01004910W002.

12 Photographs of test setup and EUT

Note: Please refer to appendix: Appendix-ER100501-Photos.

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