Ecovacs Home Service Robotics Co., Ltd.

RF TEST REPORT

Report Type:
FCC Part 15.247 & ISED RSS-247 RF report

Model:
DEX54, DDX45

REPORT NUMBER:
2411B2087SHA-001

ISSUE DATE:
December 18, 2024

DOCUMENT CONTROL NUMBER:
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TEST REPORT

Report no.: 2411B2087SHA-001

Applicant:	**Ecovacs Home Service Robotics Co., Ltd.** **No.518 Songwei Road,Wusongjiang industry Park, Guoxiang Street, Wuzhong District, Suzhou, Jiangsu, China.**
Manufacturer:	**Ecovacs Home Service Robotics Co., Ltd.** **No.518 Songwei Road,Wusongjiang industry Park, Guoxiang Street, Wuzhong District, Suzhou, Jiangsu, China.**
Factory 1:	**Ecovacs Robotics Co., Ltd.** **No.518 Songwei Road, Wusongjiang industry Park, Guoxiang Street, Wuzhong District, Suzhou, Jiangsu, China**
Factory 2:	**Ecovacs Home Service Robotics Co., Ltd.** **No.518 Songwei Road, Wusongjiang industry Park, Guoxiang Street, Wuzhong District, Suzhou, Jiangsu, China.**
FCC ID:	**2A64B-DEX54**
IC:	**28593-DEX54**

SUMMARY:

The equipment complies with the requirements according to the following standard(s) or Specification:

47CFR Part 15 (2023): Radio Frequency Devices (Subpart C)

ANSI C63.10 (2013): American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

RSS-247 Issue 3 (August 2023): Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices

RSS-Gen Issue 5 (March 2019) Amendment 1: General Requirements for Compliance of Radio Apparatus

PREPARED BY:	**REVIEWED BY:**
	
Project Engineer Eric Li	Reviewer Wakeyou Wang

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Revision History

Report No.	Version	Description	Issued Date
2411B2087SHA-001	Rev. 01	Initial issue of report	December 18, 2024

TEST REPORT

Measurement result summary

TEST ITEM	FCC REFERANCE	IC REFERANCE	RESULT
Minimum 6dB Bandwidth	15.247(a)(2)	RSS-247 Issue 3 Clause 5.2	Pass
Maximum conducted output power and e.i.r.p.	15.247(b)(3)	RSS-247 Issue 3 Clause 5.4	Pass
Power spectrum density	15.247(e)	RSS-247 Issue 3 Clause 5.2	Pass
Emission outside the frequency band	15.247(d)	RSS-247 Issue 3 Clause 5.5	Pass
Radiated Emissions in restricted frequency bands	15.247(d), 15.205&15.209	RSS-Gen Issue 5 Clause 8.9&8.10	Pass
Power line conducted emission	15.207(a)	RSS-Gen Issue 5 Clause 8.8	Pass
Occupied bandwidth	-	RSS-Gen Issue 5 Clause 6.6	Tested
Antenna requirement	15.203	-	Pass

Notes: 1: NA =Not Applicable

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1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product name:	Floor Cleaning Robot
Type/Model/PMN/HVIN:	DEX54, DDX45
Description of EUT:	The EUT is a Floor Cleaning Robot, it supports Bluetooth and WIFI functions, there are two models, they are the same except DDX45 has no AI camera, the PCB board is also changed accordingly. We tested DEX54 and DDX45 and listed the worst results in this report.
Rating:	DC20V, 2A
Brand Name:	ECOVACS ROBOTICS, ECOVACS,
EUT type:	☐ Table top ☒ Floor standing
Software Version:	/
Hardware Version:	/
Sample Identification No.:	A241128-016-002
Sample received date:	2024.11.28
Date of test:	2024.11.28~2024.12.15

1.2 Technical Specification

Frequency Band:	2400MHz ~ 2483.5MHz
Support Standards:	IEEE 802.11b, IEEE 802.11g, IEEE 802.11n-HT20, IEEE 802.11n-HT40
Type of Modulation:	IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11n-HT20: OFDM (64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11n-HT40: OFDM (64-QAM, 16-QAM, QPSK, BPSK)
Channel Number:	11 Channels for 802.11b, 802.11g and 802.11n(HT20) 7 Channels for 802.11n(HT40)
Channel Separation:	5 MHz
Antenna:	FPC Antenna, 3.39dBi

1.3 Antenna information

Mode	Tx/Rx Function	Beamforming function	CDD function	Directional gain (dBi)
802.11b	1Tx/1Rx	NO	NO	-
802.11g	1Tx/1Rx	NO	NO	-
802.11n(HT20)	1Tx/1Rx	NO	NO	-
802.11n(HT40)	1Tx/1Rx	NO	NO	-

1.4 Description of Test Facility

Name:	Intertek Testing Services (Shanghai FTZ) Co., Ltd.
Address:	Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China
Telephone:	86 21 61278200
Telefax:	86 21 54262353

The test facility is recognized, certified, or accredited by these organizations:	CNAS Accreditation Lab Registration No. CNAS L21189
	FCC Accredited Lab Designation Number: CN0175
	IC Registration Lab CAB identifier.: CN0014
	VCCI Registration Lab Registration No.: R-14243, G-10845, C-14723, T-12252
	A2LA Accreditation Lab Certificate Number: 3309.02

2 TEST SPECIFICATIONS

2.1 Standards or specification

47CFR Part 15 (2023)
ANSI C63.10 (2013)
KDB 558074 (v05r02)
RSS-247 Issue 3 (August 2023)
RSS-Gen Issue 5 (March 2019) Amendment 1

2.2 Mode of operation during the test

While testing transmitting mode of EUT, the internal modulation and continuously transmission was applied.

Software name	Manufacturer	Version	Supplied by
Putty	-	-	Client

The lowest, middle and highest channel were tested as representatives.

Frequency Band (MHz)	Mode	Lowest (MHz)	Middle (MHz)	Highest (MHz)
2400-2483.5	802.11b	2412	2437	2462
	802.11g	2412	2437	2462
	802.11n(HT20)	2412	2437	2462
	802.11n(HT40)	2422	2437	2452

Data rate and Power setting:
The pre-scan for the conducted power with all rates in each modulation and bands was used, and the worst case was found and used in all test cases. After this pre-scan, we choose the following table of the data rata as the worst case.

Frequency Band (MHz)	Mode	Worst case data rate	Power Setting
2400-2483.5	802.11b	1Mbps	Default
	802.11g	6Mbps	Default
	802.11n(HT20)	MCS0	Default
	802.11n(HT40)	MCS0	Default

2.3 Test software list

Test Items	Software	Manufacturer	Version
Conducted emission	ESxS-K1	R&S	V2.1.0
Radiated emission	ES-K1	R&S	V1.71

2.4 Test peripherals list

Item No.	Name	Band and Model	Description
1	Laptop computer	DELL 5480	-
2	Docking station	CH2453I	-

2.5 Test environment condition:

Test items	Temperature	Humidity
Minimum 6dB Bandwidth	24°C	52%RH
Maximum conducted output power and e.i.r.p.		
Power spectrum density		
Emission outside the frequency band		
Occupied bandwidth		
Radiated Emissions in restricted frequency bands	25°C	51%RH
Power line conducted emission	24°C	52%RH

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2.6 Instrument list

Conducted Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Test Receiver	R&S	ESR7	EC 6194	2025-02-27
☒	Attenuator	Hua Xiang	Ts5-10db-6g	EC 6194-1	2025-12-07
☒	A.M.N.	R&S	ESH2-Z5	EC 3119	2025-11-19
☐	A.M.N.	R&S	ENV 216	EC 3393	2025-07-17
☐	A.M.N.	R&S	ENV4200	EC 3558	2025-06-05
Radiated Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Test Receiver	R&S	ESIB 26	EC 3045	2025-08-22
☒	Test Receiver	R&S	ESR	EC6501	2025-09-24
☐	Bilog Antenna	TESEQ	CBL 6112B	EC 6411	2025-09-12
☒	TRILOG broadband Antenna	Schwarzbeck	VULB9168	EC 6402	2025-02-14
☒	Pre-amplifier	R&S	AFS42-00101800-25-S-42	EC 5262	2025-06-15
☐	Pre-amplifier	Tonscend	tap01018050	EC 6432-1	2025-12-07
☐	Horn antenna	Tonscend	bha9120d	EC 6432-2	2025-02-15
☒	Horn antenna	ETS	3117	EC 4792-1	2025-09-15
☒	Horn antenna	TOYO	HAP18-26W	EC 4792-3	2026-09-12
☐	Active loop antenna	Schwarzbeck	FMZB1519	EC 5345	2025-07-16
☒	Horn antenna	ETS	3116c	EC 5955	2025-07-22
RF test					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	PXA Signal Analyzer	Keysight	N9030A	EC 5338	2025-03-07
☐	Power sensor	Agilent	U2021XA	EC 5338-1	2025-03-07
☐	Vector Signal Generator	Agilent	N5182B	EC 5175	2025-03-07
☐	Universal Radio Communication Tester	R&S	CMW500	EC5944	2025-03-07
☐	MXG Analog Signal Generator	Agilent	N5181A	EC 5338-2	2025-03-07
☐	Mobile Test System	Litepoint	Iqxel	EC 5176	2025-01-11
☐	Test Receiver	R&S	ESCI 7	EC 4501	2025-12-09
☐	Climate chamber	GWS	MT3065	EC 6021	2025-03-06

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☐	Spectrum Analyzer	Keysight	N9030B	EC 6078	2025-06-08
Tet Site					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Shielded room	Zhongyu	-	EC 2838	2025-01-11
☐	Shielded room	Zhongyu	-	EC 2839	2025-01-11
☒	Semi-anechoic chamber	Albatross project	-	EC 3048	2025-07-08
☐	Fully-anechoic chamber	Albatross project	-	EC 3047	2025-07-08
Additional instrument					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Thermo-Hygrograph	Testo	175h1	EC 6640	2025-08-28
☐	Thermo-Hygrograph	Testo	175h1	EC 6641	2025-08-28
☒	Thermo-Hygrograph	Testo	175h1	EC6642	2025-08-28
☒	Thermo-Hygrograph	Testo	175h1	EC 6643	2025-08-28
☐	Thermo-Hygrograph	Testo	175h1	EC 6644	2025-08-28
☐	Pressure meter	YM3	Shanghai Mengde	EC 3320	2025-08-16

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2.7 Measurement uncertainty

The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Test item	Measurement uncertainty
Maximum peak output power	± 0.74dB
Radiated Emissions in restricted frequency bands below 1GHz	± 4.90dB
Radiated Emissions in restricted frequency bands above 1GHz	± 5.02dB
Emission outside the frequency band	± 2.89dB
Power line conducted emission	± 3.19dB

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3 Minimum 6dB bandwidth

Test result: Pass

3.1 Limit

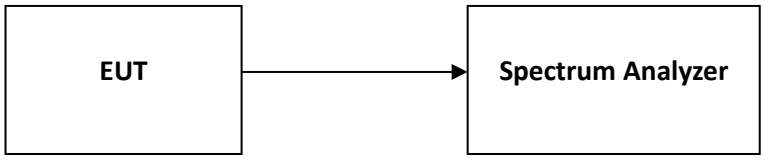
For systems using digital modulation techniques that may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz and 5725 - 5850 MHz bands, the minimum 6 dB bandwidth shall be at least 500 kHz.

3.2 Measurement Procedure

The EUT was tested according to Subclause 11.8 of ANSI C63.10.

a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 × RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

3.3 Test Configuration



3.4 Test Results of Minimum 6dB bandwidth

Please refer to Appendix A

4 Maximum conducted output power and e.i.r.p.

Test result: Pass

4.1 Limit

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 W. (The e.i.r.p. shall not exceed 4 W)

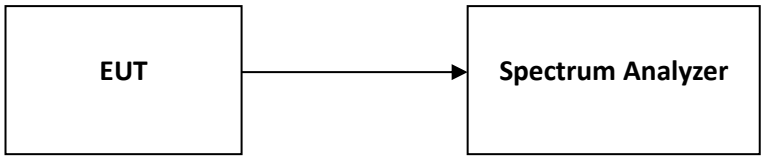
If the transmitting antenna of directional gain greater than 6dBi is used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi. If there have a beam forming type, the limit should be the minimum of 30dBm and 30+ (6 –antenna gain-beam forming gain).

4.2 Measurement Procedure

The EUT was tested according to Subclause 11.9.2.2 of ANSI C63.10.

a) Measure the duty cycle, x, of the transmitter output signal as described in Section 6.0.
b) Set span to at least 1.5 x OBW.
c) Set RBW = 1 % to 5 % of the OBW, not to exceed 1 MHz.
d) Set VBW ≥ 3 x RBW.
e) Number of points in sweep ≥ 2 x span / RBW. (This gives bin-to-bin spacing ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
f) Sweep time = auto.
g) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
h) Do not use sweep triggering. Allow the sweep to “free run”.
i) Trace average at least 100 traces in power averaging (i.e., RMS) mode; however, the number of traces to be averaged shall be increased above 100 as needed such that the average accurately represents the true average over the on and off periods of the transmitter.
j) Compute power by integrating the spectrum across the OBW of the signal using the instrument’s band power measurement function with band limits set equal to the OBW band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.
k) Add 10 log (1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times (because the measurement represents an average over both the on- and off-times of the transmission). For example, add 10 log (1/0.25) = 6 dB if the duty cycle is 25 %.

4.3 Test Configuration



4.4 Test Results of Maximum conducted output power

Please refer to Appendix A

5 Power spectrum density

Test result: **Pass**

5.1 Limit

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

If the transmitting antenna of directional gain greater than 6dBi is used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi. If there have a beam forming type, the limit should be the minimum of 8dBm/MHz and 8+ (6 –antenna gain-beam forming gain).

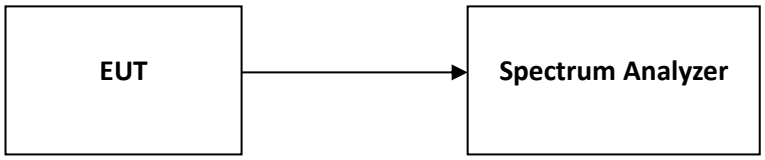
5.2 Measurement Procedure

The EUT was tested according to Subclause 11.10 of ANSI C63.10.

This procedure is applicable when the EUT cannot be configured to transmit continuously (i.e., duty cycle < 98 %), and when sweep triggering/signal gating cannot be used to measure only when the EUT is transmitting at its maximum power control level, and when the transmission duty cycle is constant (i.e., duty cycle variations are less than ± 2 %):

a) Measure the duty cycle (x) of the transmitter output signal as described in Section 6.0.
b) Set instrument center frequency to DTS channel center frequency.
c) Set span to at least 1.5 x OBW.
d) Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
e) Set VBW ≥3 x RBW.
f) Detector = power averaging (RMS) or sample detector (when RMS not available).
g) Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
h) Sweep time = auto couple.
i) Do not use sweep triggering. Allow sweep to “free run”.
j) Employ trace averaging (RMS) mode over a minimum of 100 traces.
k) Use the peak marker function to determine the maximum amplitude level.
l) Add 10 log (1/x), where x is the duty cycle measured in step (a, to the measured PSD to compute the average PSD during the actual transmission time.
m) If resultant value exceeds the limit, then reduce RBW (no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span in order to meet the minimum measurement point requirement as the RBW is reduced).

5.3 Test Configuration



5.4 Test Results of Power spectrum density

Please refer to Appendix A

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6 Emission outside the frequency band

Test result: **Pass**

6.1 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

6.2 Measurement Procedure

The EUT was tested according to Subclause 11.11 of ANSI C63.10.

Reference level measurement

Establish a reference level by using the following procedure:

a) Set instrument center frequency to DTS channel center frequency.
b) Set the span to ≥ 1.5 times the DTS bandwidth.
c) Set the RBW = 100 kHz.
d) Set the VBW ≥ 3 x RBW.
e) Detector = peak.
f) Sweep time = auto couple.
g) Trace mode = max hold.
h) Allow trace to fully stabilize.
i) Use the peak marker function to determine the maximum PSD level.

Emission level measurement

a) Set the center frequency and span to encompass frequency range to be measured.
b) Set the RBW = 100 kHz.
c) Set the VBW ≥ 3 x RBW.
d) Detector = peak.
e) Sweep time = auto couple.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use the peak marker function to determine the maximum amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements specified in 11.1 a) or 11.1 b). Report the three highest emissions relative to the limit.

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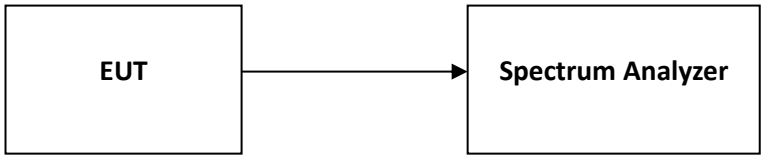
6.3 Test Configuration



6.4 The results of Emission outside the frequency band

Please refer to Appendix A

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7 Radiated Emissions in restricted frequency bands

Test result: **Pass**

7.1 Limit

The radiated emissions which fall in the restricted bands, must also comply with the radiated emission limits specified showed as below:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
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

7.2 Measurement Procedure

The EUT was tested according to Subclause 11.12 of ANSI C63.10.

For Radiated emission below 30MHz:

a) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters chamber room. For the floor-standing devices, the EUT was placed on the top of a rotating table 0.1 meters above the ground at 3 meters chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
b) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c) Both X and Y axes of the antenna are set to make the measurement.
d) For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e) The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

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For Radiated emission above 30MHz:

a) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters chamber room. For the floor-standing devices, the EUT was placed on the top of a rotating table 0.1 meters above the ground at 3 meters chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c) The height of antenna 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.

d) 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.

e) The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

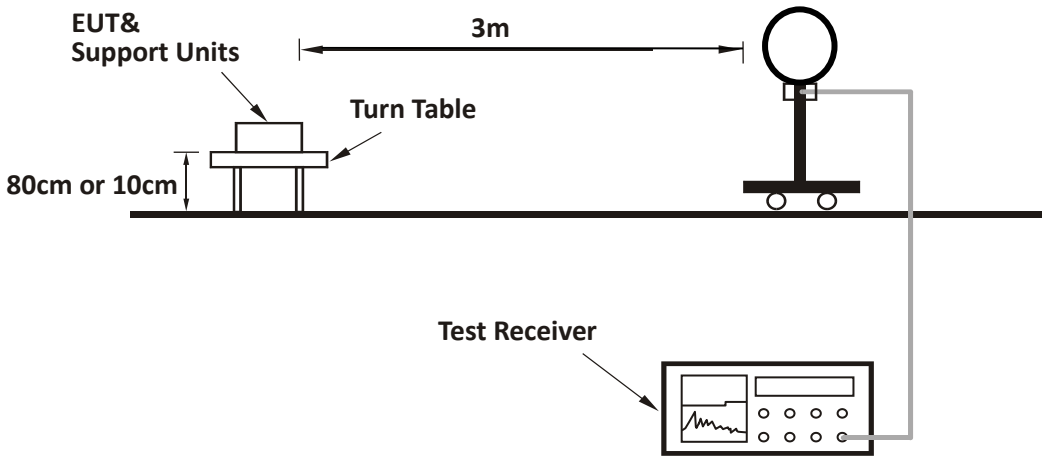
f) The test-receiver system was set to peak and average detector function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

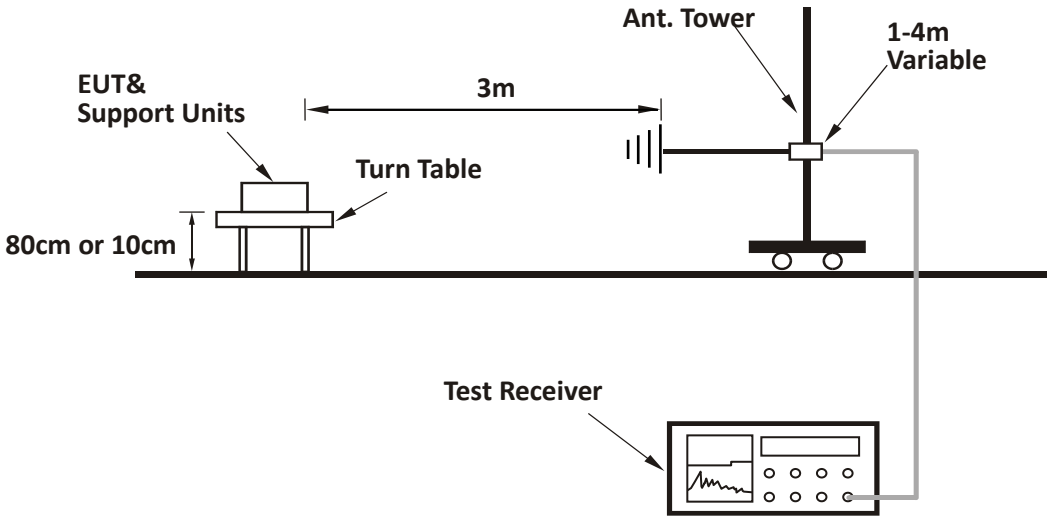
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 3 x RBW (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions were reported.

7.3 Test Configuration

For Radiated emission below 30MHz:



For Radiated emission 30MHz to 1GHz:



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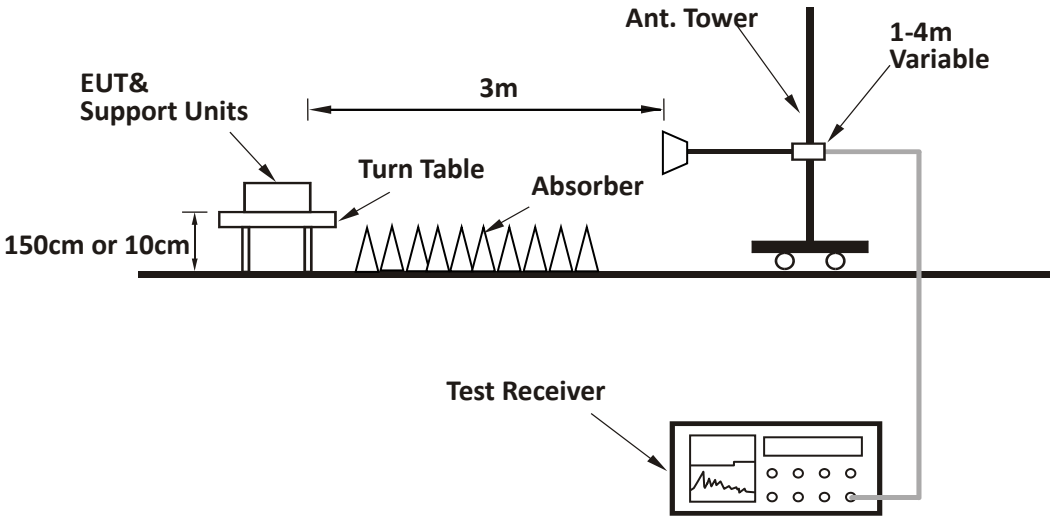
For Radiated emission above 1GHz:



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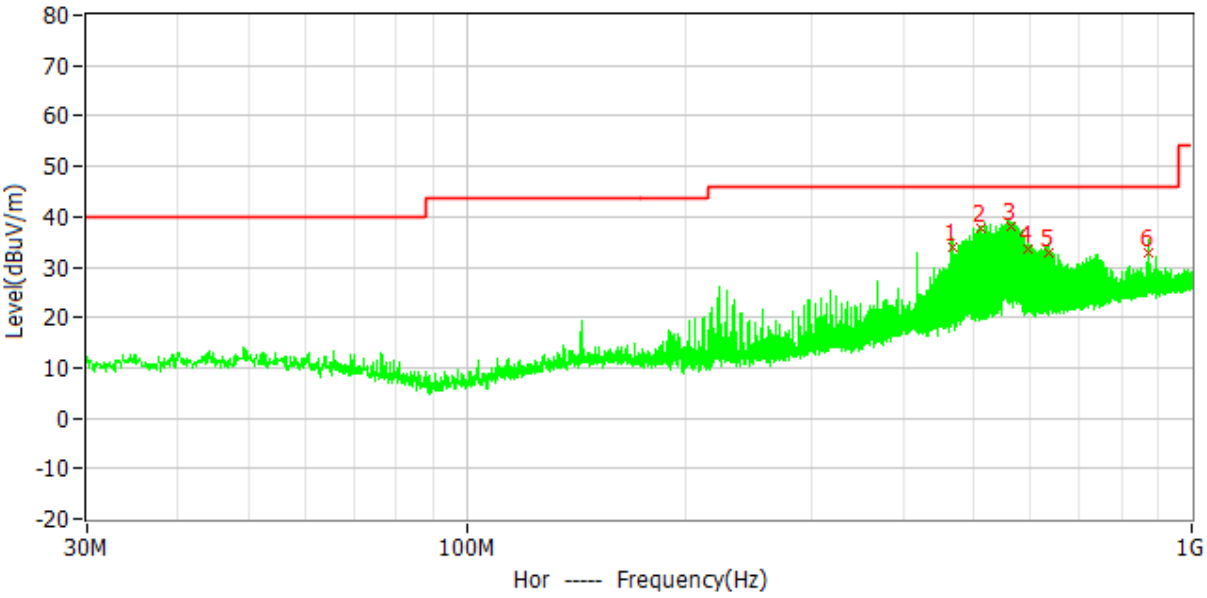
7.4 Test Results of Radiated Emissions

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

Test Curve of model DEX54:

Horizontal



No.	Frequency	Limit dBuV/m	Level dBuV/m	Delta dB	Reading dBuV	Factor dB/m	Detector	Polar
1	466.930MHz	46.00	33.76	-12.24	14.06	19.70	QP	Hor
2	513.158MHz	46.00	37.60	-8.40	16.80	20.80	QP	Hor
3	562.511MHz	46.00	37.89	-8.11	16.09	21.80	QP	Hor
4	594.067MHz	46.00	33.59	-12.41	11.09	22.50	QP	Hor
5	633.544MHz	46.00	32.96	-13.04	9.86	23.10	QP	Hor
6	869.109MHz	46.00	32.77	-13.23	6.07	26.70	QP	Hor

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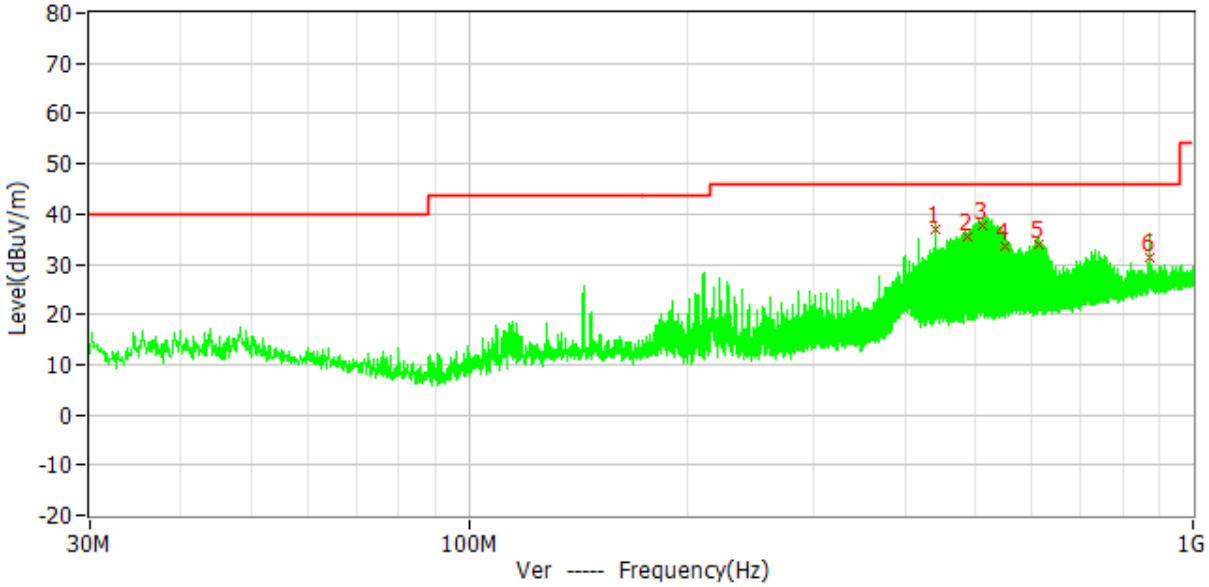
Vertical

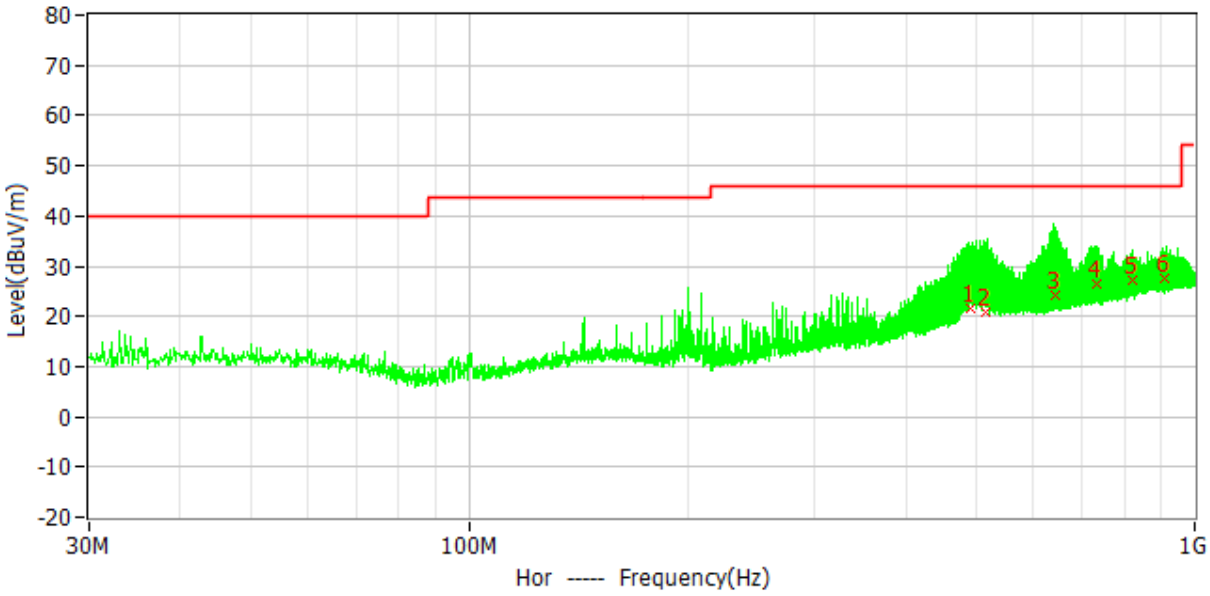


No.	Frequency	Limit dBuV/m	Level dBuV/m	Delta dB	Reading dBuV	Factor dB/m	Detector	Polar
1	442.356MHz	46.00	37.07	-8.93	17.97	19.10	QP	Ver
2	487.494MHz	46.00	35.46	-10.54	15.26	20.20	QP	Ver
3	513.137MHz	46.00	37.62	-8.38	16.82	20.80	QP	Ver
4	548.692MHz	46.00	33.68	-12.32	12.08	21.60	QP	Ver
5	611.840MHz	46.00	34.07	-11.93	11.27	22.80	QP	Ver
6	869.074MHz	46.00	31.21	-14.79	4.51	26.70	QP	Ver

TEST REPORT

Test Curve of model DDX45:

Horizontal

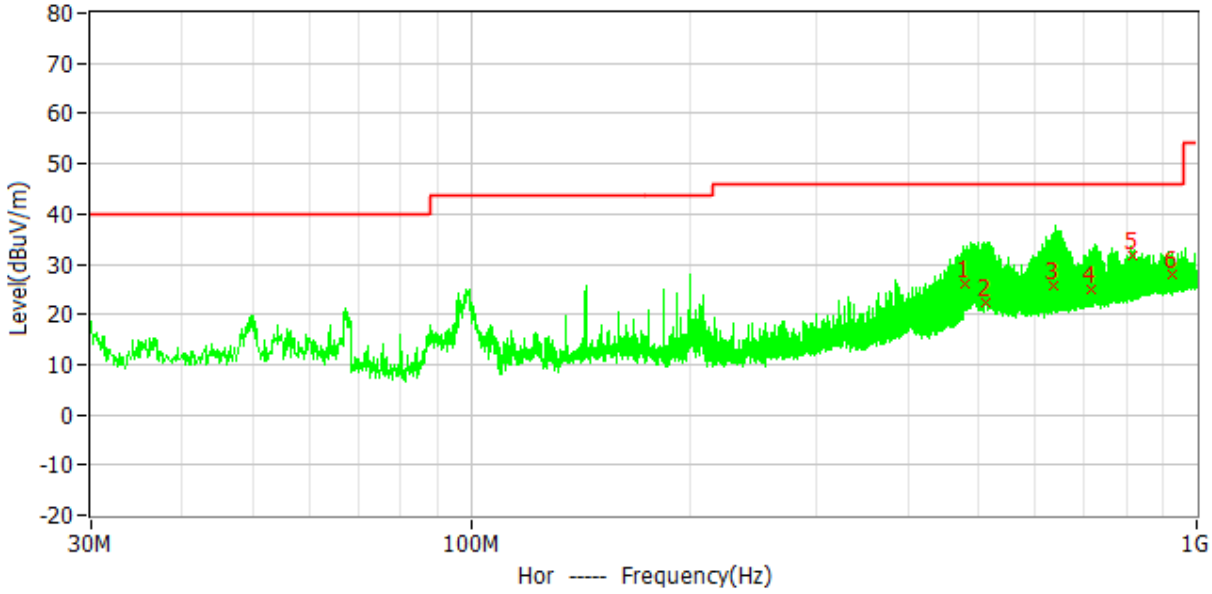


Test Data:

No.	Frequency	Limit dBuV/m	Level dBuV/m	Delta dB	Reading dBuV	Factor dB/m	Detector	Polar
1	492.414MHz	46.00	21.62	-24.38	1.22	20.40	QP	Hor
2	515.555MHz	46.00	20.96	-25.04	0.06	20.90	QP	Hor
3	643.030MHz	46.00	24.03	-21.97	0.73	23.30	QP	Hor
4	733.300MHz	46.00	26.32	-19.68	1.62	24.70	QP	Hor
5	823.386MHz	46.00	27.07	-18.93	0.97	26.10	QP	Hor
6	908.192MHz	46.00	27.64	-18.36	0.44	27.20	QP	Hor

TEST REPORT

Vertical



Test Data:

No.	Frequency	Limit dBuV/m	Level dBuV/m	Delta dB	Reading dBuV	Factor dB/m	Detector	Polar
1	479.198MHz	46.00	25.97	-20.03	5.97	20.00	QP	Hor
2	511.994MHz	46.00	22.30	-23.70	1.50	20.80	QP	Hor
3	634.973MHz	46.00	25.51	-20.49	2.41	23.10	QP	Hor
4	717.148MHz	46.00	24.80	-21.20	0.40	24.40	QP	Hor
5	815.206MHz	46.00	31.76	-14.24	5.76	26.00	QP	Hor
6	924.541MHz	46.00	27.77	-18.23	0.47	27.30	QP	Hor

Remark: 1. Correct Factor = Antenna Factor + Cable Loss (- Amplifier, for higher than 1GHz), the value was added to Original Receiver Reading by the software automatically.
2. Level = Original Receiver Reading + Correct Factor
3. Delta = Level - Limit
4. If the PK Corrected Reading is lower than AV limit, the AV test can be elided.

TEST REPORT

Test result above 1GHz:

The emission was conducted from 1GHz to 25GHz

802.11b

CH	Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	H	2390	50.70	74.00	23.30	PK
	V	2390	51.60	74.00	22.40	PK
	H	4824	45.60	74.00	28.40	PK
	V	4824	46.20	74.00	27.80	PK
M	H	4874	45.80	74.00	28.20	PK
	V	4874	46.70	74.00	27.30	PK
H	H	2483.5	51.20	74.00	22.80	PK
	V	2483.5	51.80	74.00	22.20	PK
	H	4924	45.60	74.00	28.40	PK
	V	4924	46.90	74.00	27.10	PK

802.11g

CH	Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	V	2390	59.10	74.00	14.90	PK
	V	2390	45.70	54.00	8.30	AV
	V	4824	46.40	74.00	27.60	PK
M	V	4874	46.80	74.00	27.20	PK
H	V	2483.5	58.90	74.00	15.10	PK
	V	2483.5	46.70	54.00	7.30	AV
	V	4924	46.80	74.00	27.20	PK

TEST REPORT

802.11n(HT20)

CH	Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	V	2390	61.60	74.00	12.40	PK
	V	2390	48.20	54.00	5.80	AV
	V	4824	46.30	74.00	27.70	PK
M	V	4874	46.60	74.00	27.40	PK
H	V	2483.5	62.50	74.00	11.50	PK
	V	2483.5	47.70	54.00	6.30	AV
	V	4924	46.40	74.00	27.60	PK

802.11n(HT40)

CH	Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	V	2390	67.40	74.00	6.60	PK
	V	2390	48.60	54.00	5.40	AV
	V	4844	46.40	74.00	27.60	PK
M	V	4874	46.30	74.00	27.70	PK
H	V	2483.5	67.60	74.00	6.40	PK
	V	2483.5	48.80	54.00	5.20	AV
	V	4904	46.90	74.00	27.10	PK

Remark: 1. Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz), the value was added to Original Receiver Reading by the software automatically.
2. Corrected Reading = Original Receiver Reading + Correct Factor
3. Margin = Limit - Corrected Reading
4. If the PK Corrected Reading is lower than AV limit, the AV test can be elided.

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,
Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10.00dBuV,
Limit = 40.00dBuV/m.
Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m;
Corrected Reading = 10dBuV + 0.20dB/m = 10.20dBuV/m;
Margin = 40.00dBuV/m - 10.20dBuV/m = 29.80dB.

Total Quality. Assured.

TEST REPORT

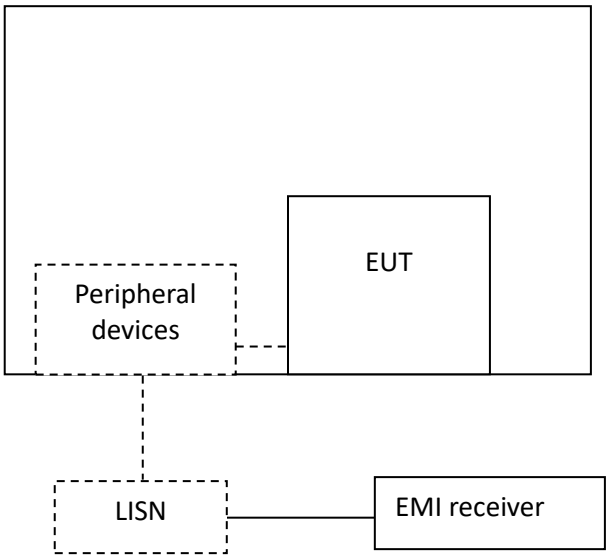
8 Power line conducted emission

Test result: **Pass**

8.1 Limit

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	QP	AV
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.		

8.2 Test Configuration



8.3 Measurement Procedure

Measured levels of ac power-line conducted emission shall be the emission voltages from the voltage probe, where permitted, or across the 50 Ω LISN port (to which the EUT is connected), where permitted, terminated into a 50 Ω measuring instrument. All emission voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord by the use of mating plugs and receptacles on the LISN, if used. Equipment shall be tested with power cords that are normally supplied or recommended by the manufacturer and that have electrical and shielding characteristics that are the same as those cords normally supplied or recommended by the manufacturer. For those measurements using a LISN, the 50 Ω measuring port is terminated by a measuring instrument having 50 Ω input impedance. All other ports are terminated in 50 Ω loads.

Tabletop devices shall be placed on a platform of nominal size 1 m by 1.5 m, raised 80 cm above the reference ground plane. The vertical conducting plane or wall of an RF-shielded (screened) room shall be located 40 cm to the rear of the EUT. Floor-standing devices shall be placed either directly on the reference ground-plane or on insulating material as described in ANSI C63.4. All other surfaces of tabletop or floor-standing EUTs shall be at least 80 cm from any other grounded conducting surface, including the case or cases of one or more LISNs.

The bandwidth of the test receiver is set at 9 kHz.

Total Quality. Assured.

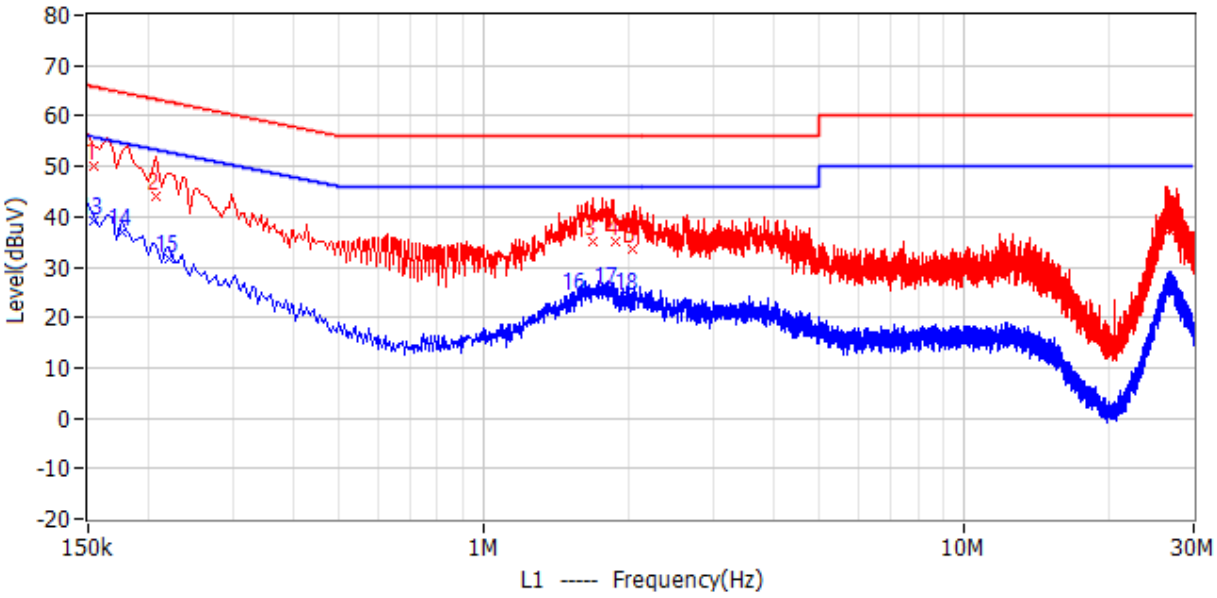
TEST REPORT

8.4 Test Results of Power line conducted emission

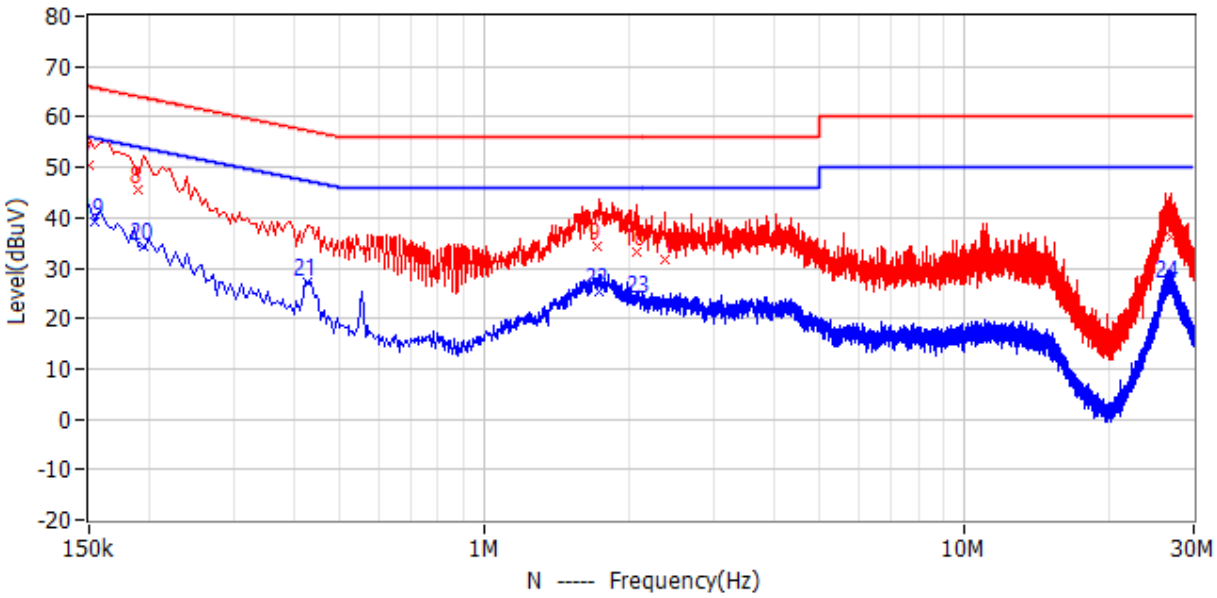
Test Voltage: AC 120V, 60Hz

Test Curve of Model DEX54:

L Line



N Line



TEST REPORT

Test Data:

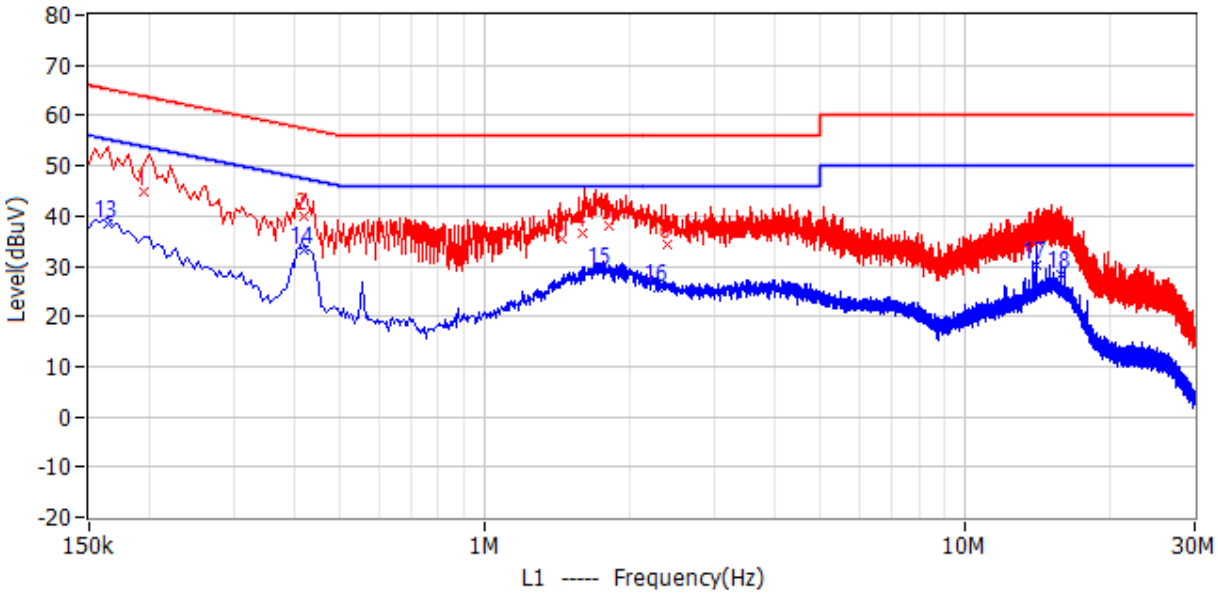
No.	Frequency	Limit dBuV	Level dBuV	Delta dB	Reading dBuV	Factor dB	Detector	Phase
1	154.500kHz	65.75	50.11	-15.64	43.91	6.20	QP	L1
2	208.500kHz	63.26	43.93	-19.33	37.73	6.20	QP	L1
3	1.689MHz	56.00	34.98	-21.02	28.78	6.20	QP	L1
4	1.878MHz	56.00	34.89	-21.11	28.69	6.20	QP	L1
5	2.045MHz	56.00	33.63	-22.37	27.43	6.20	QP	L1
6	26.606MHz	60.00	37.21	-22.79	29.51	7.70	QP	L1
7	150.000kHz	66.00	50.56	-15.44	44.36	6.20	QP	N
8	190.500kHz	64.01	45.49	-18.52	39.39	6.10	QP	N
9	1.712MHz	56.00	34.30	-21.70	28.10	6.20	QP	N
10	2.072MHz	56.00	33.30	-22.70	27.10	6.20	QP	N
11	2.369MHz	56.00	31.58	-24.42	25.38	6.20	QP	N
12	26.957MHz	60.00	36.23	-23.77	28.63	7.60	QP	N
13	154.500kHz	55.75	39.01	-16.74	32.81	6.20	CAV	L1
14	177.000kHz	54.63	36.78	-17.85	30.68	6.10	CAV	L1
15	222.000kHz	52.74	31.69	-21.05	25.49	6.20	CAV	L1
16	1.550MHz	46.00	24.32	-21.68	18.12	6.20	CAV	L1
17	1.811MHz	46.00	25.30	-20.70	19.10	6.20	CAV	L1
18	2.009MHz	46.00	24.11	-21.89	17.91	6.20	CAV	L1
19	154.500kHz	55.75	39.28	-16.47	33.08	6.20	CAV	N
20	195.000kHz	53.82	34.16	-19.66	27.96	6.20	CAV	N
21	429.000kHz	47.27	27.33	-19.94	21.13	6.20	CAV	N
22	1.734MHz	46.00	25.45	-20.55	19.25	6.20	CAV	N
23	2.108MHz	46.00	23.65	-22.35	17.45	6.20	CAV	N
24	26.741MHz	50.00	26.77	-23.23	19.17	7.60	CAV	N

Total Quality. Assured.

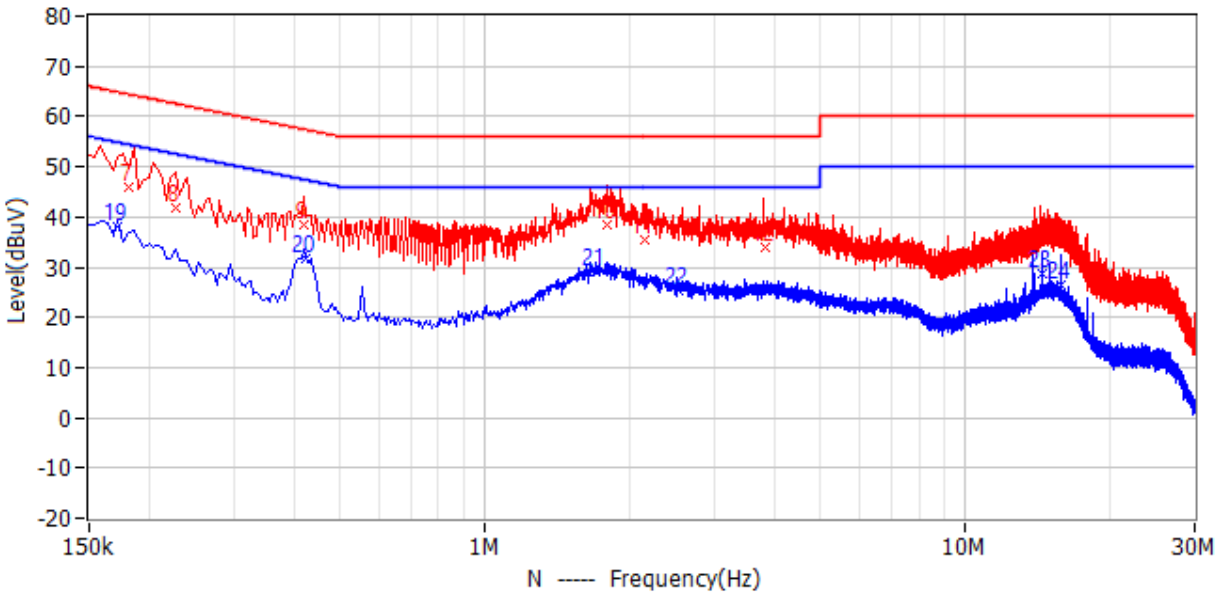
TEST REPORT

Test Curve of Model DDX45:

L Line



N Line



TEST REPORT

Test Data:

No.	Frequency	Limit dBuV	Level dBuV	Delta dB	Reading dBuV	Factor dB	Detector	Phase
1	195.000kHz	63.82	44.91	-18.91	38.71	6.20	QP	L1
2	420.000kHz	57.45	39.79	-17.66	33.59	6.20	QP	L1
3	1.446MHz	56.00	35.35	-20.65	29.15	6.20	QP	L1
4	1.595MHz	56.00	36.51	-19.49	30.31	6.20	QP	L1
5	1.806MHz	56.00	37.94	-18.06	31.74	6.20	QP	L1
6	2.400MHz	56.00	34.18	-21.82	27.98	6.20	QP	L1
7	181.500kHz	64.42	46.10	-18.32	40.00	6.10	QP	N
8	226.500kHz	62.58	41.92	-20.66	35.72	6.20	QP	N
9	420.000kHz	57.45	38.42	-19.03	32.22	6.20	QP	N
10	1.788MHz	56.00	38.55	-17.45	32.35	6.20	QP	N
11	2.153MHz	56.00	35.46	-20.54	29.26	6.20	QP	N
12	3.831MHz	56.00	33.82	-22.18	27.52	6.30	QP	N
13	163.500kHz	55.28	38.33	-16.95	32.13	6.20	CAV	L1
14	420.000kHz	47.45	33.14	-14.31	26.94	6.20	CAV	L1
15	1.752MHz	46.00	29.21	-16.79	23.01	6.20	CAV	L1
16	2.297MHz	46.00	25.67	-20.33	19.47	6.20	CAV	L1
17	14.096MHz	50.00	30.09	-19.91	23.19	6.90	CAV	L1
18	15.860MHz	50.00	28.46	-21.54	21.46	7.00	CAV	L1
19	172.500kHz	54.84	37.95	-16.89	31.85	6.10	CAV	N
20	424.500kHz	47.36	31.72	-15.64	25.52	6.20	CAV	N
21	1.703MHz	46.00	29.11	-16.89	22.91	6.20	CAV	N
22	2.531MHz	46.00	25.14	-20.86	18.94	6.20	CAV	N
23	14.388MHz	50.00	28.78	-21.22	21.88	6.90	CAV	N
24	15.860MHz	50.00	26.62	-23.38	19.62	7.00	CAV	N

Remark: 1. Correct Factor = LISN Factor + Cable Loss, the value was added to Original Receiver Reading by the software automatically.

2. Level = Original Receiver Reading + Correct Factor

3. Delta = Level - Limit

4. If the PK Corrected Reading is lower than AV limit, the AV test can be elided.

Total Quality. Assured.

TEST REPORT

9 Occupied Bandwidth

Test result: **Tested**

9.1 Limit

None

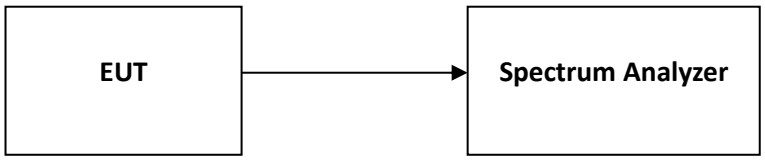
9.2 Measurement Procedure

The occupied bandwidth per RSS-Gen Issue 4 Clause 6.6 was measured using the Spectrum Analyzer.

The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.

The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3x RBW.

9.3 Test Configuration



9.4 The results of Occupied Bandwidth

Please refer to Appendix A

Total Quality. Assured.

TEST REPORT

10 Antenna requirement

Requirement:
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.

Result:
EUT uses permanently attached antenna to the intentional radiator, so it can comply with the provisions of this section.

********** END **********