FCC TEST REPORT

For

Handheld Rugged Terminal

Model Number: HRT500i

FCC ID: SX3-HRT500I

Report Number : WT158002882

Test Laboratory	:	Shenzhen Academy of Metrology and Quality Inspection National Digital Electronic Product Testing Center
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TEST REPORT DECLARATION

Applicant	:	PRADOTEC CORPORATION SDN. BHD. (807780-P)
Address	:	IRIS Smart Technology Complex, Technology Park Malaysia, Bukit Jalil, Kuala Lumpur, Malaysia
Manufacturer	:	OPTIMA KLASIK SDN.BHD.(807783-T)
Address	:	IRIS Smart Technology Complex, Technology Park Malaysia, Bukit Jalil, Kuala Lumpur, Malaysia
EUT Description	:	Handheld Rugged Terminal
Model No	:	HRT500i
Trade mark	:	PRADOTEC
Serial Number	:	/
FCC ID	:	SX3-HRT500I

Test Standards:

FCC Part 15 15.207, 15.209 (2014)

The EUT described above is tested by Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory to determine the maximum emissions from the EUT. Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory is assumed full responsibility for the accuracy of the test results. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with FCC Rules Part 15.207, 15.209.

The test report is valid for above tested sample only and shall not be reproduced in part without written approval of the laboratory.

Project Engineer:	陈司林	Date:	Jun.16.2015
	(Chen Silin 陈司林)		
Checked by:	林奕翔	Date:	Jun.16.2015
	(Lin Yixiang 林奕翔)		
Approved by:	林斌	Date:	Jun.16.2015
	(Lin Bin 林斌)		

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1. TEST RESULTS SUMMARY

Table 1 Test Results Summary

Test Items	FCC Rules	Test Results
Occupied Bandwidth		Pass
Radiated Emission	15.209	Pass
Conducted emission test for AC power port	15.207	Pass
Antenna Requirment	15.203	Pass

Remark: “N/A” means “Not applicable.”

2. GENERAL INFORMATION

2.1. Report information

2.1.1. This report is not a certificate of quality; it only applies to the sample of the specific product/equipment given at the time of its testing. The results are not used to indicate or imply that they are application to the similar items. In addition, such results must not be used to indicate or imply that SMQ approves recommends or endorses the manufacture, supplier or use of such product/equipment, or that SMQ in any way guarantees the later performance of the product/equipment.

2.1.2. The sample/s mentioned in this report is/are supplied by Applicant, SMQ therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture or any information supplied.

2.1.3. Additional copies of the report are available to the Applicant at an additional fee. No third part can obtain a copy of this report through SMQ, unless the applicant has authorized SMQ in writing to do so.

2.2. Laboratory Accreditation and Relationship to Customer

The testing report were performed by the Shenzhen Academy of Metrology and quality Inspection EMC Laboratory (Guangdong EMC compliance testing center), in their facilities located at Bldg. of Metrology & Quality Inspection, Longzhu Road, Nanshan District, Shenzhen, Guangdong, China. At the time of testing, Laboratory is accredited by the following organizations:

China National Accreditation Service for Conformity Assessment (CNAS) accredits the Laboratory for conformance to FCC standards, EMC international standards and EN standards. The Registration Number is CNAS L0579.
The Laboratory is listed in the United States of American Federal Communications Commission (FCC), and the registration number are 446246 806614 994606(semi anechoic chamber).

The Laboratory is listed in Voluntary Control Council for Interference by Information Technology Equipment (VCCI), and the registration number are R-1974(open area test site) , R-1966(semi anechoic chamber),C-2117(mains ports conducted interference measurement) and T-180(telecommunication ports conducted interference measurement).

The Laboratory is registered to perform emission tests with Industry Canada (IC), and the registration number is 11177A-1 11177A-2.

TUV Rhineland accredits the Laboratory for conformance to IEC and EN standards, the registration number is E2024086Z02.

2.3. Measurement Uncertainty

Conducted Emission
9kHz~30MHz 3.5dB

Radiated Emission
30MHz~1000MHz 4.5dB
1GHz~26.5GHz 4.6dB

3. PRODUCT DESCRIPTION

3.1. EUT Description

Description	:	Handheld Rugged Terminal
Manufacturer	:	OPTIMA KLASIK SDN.BHD.(807783-T)
Model Number	:	HRT500i
Operate Frequency	:	125KHz
Antenna Designation	:	Integral antenna 0dBi

Remark: --

3.2. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: **SX3-HRT500I**, filing to comply with Section 15.207，15.209 of the FCC Part 15, Subpart C Rules.

3.3. Block Diagram of EUT Configuration

Figure 1 EUT setup

3.4. Operating Condition of EUT

The Radiated spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission (X plane).

3.5. Support Equipment List

Table 2 Support Equipment List

Name	Model No	S/N	Manufacturer
Adaptor for EUT	KSAS0250900300M2	--	Kuantech(Shenzhen)Co.,Ltd
Lithium polymer battery for EUT	N/A	--	SCUD (FUJIAN) Electronics Co., Ltd.

3.6. Test Conditions

Date of test：May.21, 2015- Jun.15, 2015
Date of EUT Receive：May.21, 2015
Temperature: (21-25) ℃
Relative Humidity: (40-53)%

3.7. Special Accessories

Not available for this EUT intended for grant.

3.8. Equipment Modifications

Not available for this EUT intended for grant.

4. TEST EQUIPMENT USED

Table 3 Test Equipment

No.	Equipment	Manufacturer	Model No.	Last Cal.	Cal. Interval
SB2603	EMI Test Receiver	Rohde & Schwarz	ESCS30	Dec.19, 2014	1 Year
SB3321	AMN	Rohde & Schwarz	ESH2-Z5	Jan.18, 2015	1 Year
SB2604	AMN	Rohde & Schwarz	ESH3-Z5	Nov.18, 2015	1 Year
----	Radiated Emissions Cable set	HUBER+SUHNER	---	Jan.19, 2015	1 Year
SB8501/09	EMI Test Receiver	Rohde & Schwarz	ESU40	Mar.19, 2015	1 Year
SB8501/04	Bilog Antenna	Schwarzbeck	VULB9163	Mar.19, 2015	1 Year
SB3435	Horn Antenna	Rohde & Schwarz	HF906	Jan.19, 2015	1 Year
SB5392/02	Horn Antenna	Amplifier Research	AT4560	May.15, 2015	1 Year
SB3345	Loop Antenna	Schwarzbeck	FMZB1516	Jan.20, 2015	2 Years
SB9721/02	Signal Analyzer	Agilent	N9020A	Jan.05, 2015	1 Year
----	Radiated Emissions Cable set	HUBER+SUHNER	---	Jan.19, 2015	1 Year
---	Radiated Emissions Cable set	HUBER+SUHNER	---	Jan.19, 2015	1 Year
SB8501/17	Preamplifier	Rohde & Schwarz	SCU-18	Mar.27, 2015	1 Year
SB8501/16	Preamplifier	Rohde & Schwarz	SCU-26	Mar.27, 2015	1 Year
SB9059	Preamplifier	Rohde & Schwarz	SCU-40	May.12, 2015	1 Year

5. OCCUPIED BANDWIDTH

5.1.TEST PROCEDURE

The emission bandwidth (×dB) is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated × dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth in the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3× the resolution bandwidth.

When the occupied bandwidth limit is not stated in the applicable RSS or reference measurement method, the transmitted signal bandwidth shall be reported as the 99% emission bandwidth, as calculated or measured.

The transmitter shall be operated at its maximum carrier power measured under normal test conditions.

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 3×RBW.

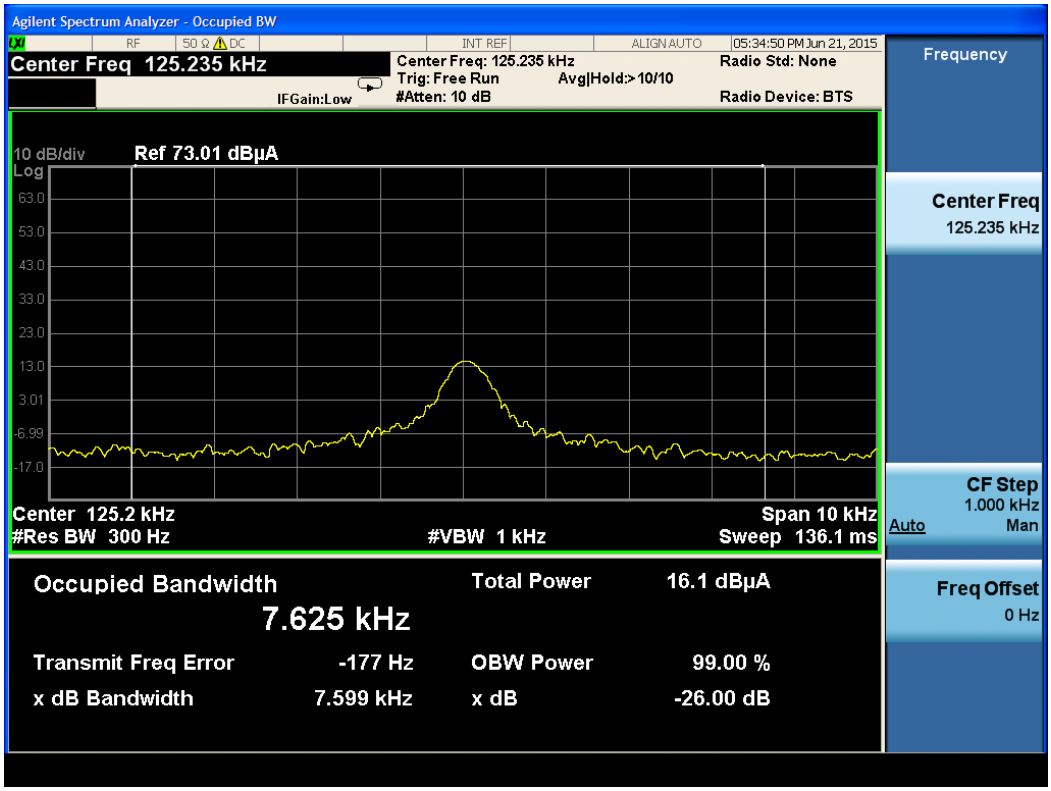
Note: Video averaging is not permitted.

A peak, or peak hold, may be used in place of the sampling detector as this may produce a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold may be necessary to determine the occupied bandwidth if the device is not transmitting continuously.

The trace data points are recovered and are directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded.

The difference between the two recorded frequencies is the 99% occupied bandwidth

5.2. Test Data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INT REF
ALIGN AUTO
05:34:50 PM Jun 21, 2015
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Center Freq: 125.235 kHz
Trig: Free Run
Avg|Hold:>10/10
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Radio Std: None
Radio Device: BTS
IFGain:Low
Frequency
10 dB/div
Log
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63.0
53.0
43.0
33.0
23.0
13.0
3.01
-6.99
-17.0
Center 125.2 kHz
#Res BW 300 Hz
#VBW 1 kHz
Span 10 kHz
Sweep 136.1 ms
Center Freq
125.235 kHz
CF Step
1.000 kHz
Auto
Man
Occupied Bandwidth
7.625 kHz
Total Power
16.1 dBµA
Transmit Freq Error
-177 Hz
OBW Power
99.00 %
x dB Bandwidth
7.599 kHz
x dB
-26.00 dB
Freq Offset
0 Hz

6. RADIATION DISTURBANCE TEST

6.1. Test Standard and Limit

6.1.1. Test Standard

FCC Part 15: Section 15.109

6.1.2. Test Limit

Table 4 Radiation Disturbance Test Limit for FCC (Class B)(9KHz-1GHz)

Frequency (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
960~1000	500	3

* The lower limit shall apply at the transition frequency.
* The test distance is 3m.

6.2. Test Procedure

The EUT is placed on a turntable, which is 0.8 meter above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna is used as a receiving antenna. Both horizontal and vertical polarization of the antenna is set on test.
Set RBW=100 kHz for f < 1 GHz; VBW >= RBW; Detector function = peak;
Set RBW = 1 MHz, VBW= 3MHz for f > 1 GHz for peak measurement.

6.3. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

6.4. Test Data

The emissions don't show in following result tables are more than 20dB below the limits, the test curves are shown in the next page.
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.

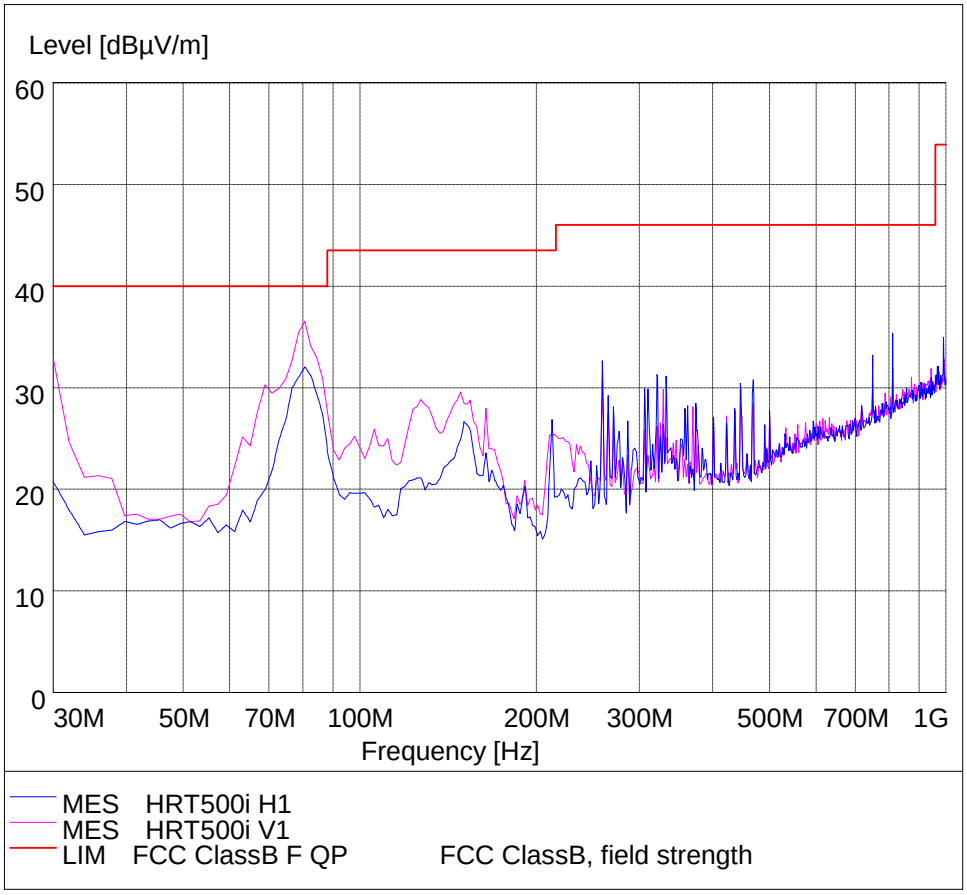
Table 9 Radiated Disturbance Test Data

Frequency MHz	Cable Loss +preamp(dB)	Antenna Factor(dB)	Readings(dBμV/m)	Level(dBμV/m)	Polarity(H/V)	Turntable Angle(deg)	Antenna Height(m)	Limits(dBμV/m)	Margin(dB)
80.541	0.9	8.5	17.3	26.7	H	5	1.0	40.0	13.3
166.072	1.5	8.7	19.0	29.2	H	15	1.0	43.5	14.3
265.21	1.9	12.1	19.1	33.1	H	346	1.0	46.0	12.9
288.537	2.0	12.7	21.2	35.9	H	355	1.0	46.0	10.1
366.292	2.2	14.3	17.8	34.3	H	35	1.0	46.0	11.7
599.559	3.1	16.6	19.8	39.5	H	350	1.0	46.0	6.5
33.887	0.7	12.3	16.8	29.8	V	350	1.0	40	10.2
37.775	0.7	12.3	15.6	28.6	V	45	1.0	40	11.4
80.541	0.9	8.5	20.3	29.7	V	330	1.0	40	10.3
469.318	2.7	15.6	13.3	31.6	V	51	1.0	46	14.4
553.466	2.9	16.6	13.6	33.1	V	58	1.0	46	12.9
751.182	3.5	18.8	11.8	34.1	V	17	1.0	46	11.9

1. Emission level(dBuV)=Read Value(dBuV/m) + Antenna Factor(dB)+ Cable Loss +pre amp(dB)

Radiated Emission

EUT Name: HRT500i
Operating Condition: Data transmitter with PC by USB Port
Test site: SMQ NETC EMC Lab.3m Chamber
Antenna Position: Vertical & Horizontal
Comment: AC 120V60Hz



7. CONDUCTED EMISSION TEST FOR AC POWER PORT MEASUREMENT

7.1. Test Standard and Limit

7.1.1. Test Standard

FCC Part 15.207

7.1.2. Test Limit

Table 4 Conducted Disturbance Test Limit

Frequency	Maximum RF Line Voltage (dBμV)	
	Quasi-peak Level	Average Level
150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
500kHz~5MHz	56	46
5MHz~30MHz	60	50

* Decreasing linearly with logarithm of the frequency
* The lower limit shall apply at the transition frequency.

7.2. Test Procedure

The EUT is put on a table of non-conducting material that is 80cm high. The vertical conducting wall of shielding is located 40cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI test receiver (R&S Test Receiver ESCS30) is used to test the emissions form both sides of AC line. According to the requirements in Section 7 and 13 of ANSI C63.4-2003.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode.
The bandwidth of EMI test receiver is set at 9kHz.

7.3. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

7.4. Test Data

The emissions don't show in below are too low against the limits. Refer to the test curves.

Table 5 Conducted Disturbance Test Data

Model No.: HRT500i

Test mode: Charging and transmitter

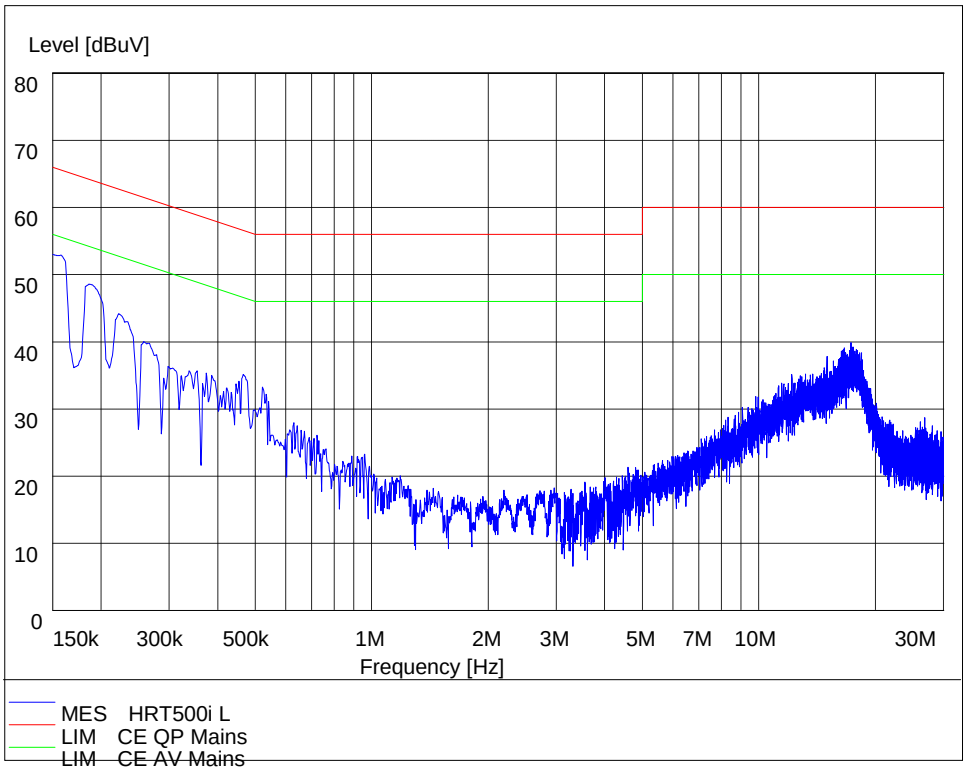
	Frequency (MHz)	Correction Factor (dB)	Quasi-Peak			Average		
			Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)
Line	0.156	9.7	40.0	49.7	65.7	24.8	34.5	55.7
	0.186	9.7	35.8	45.5	64.2	18.2	27.9	54.2
	0.222	9.7	31.2	40.9	62.7	14.1	23.8	52.7
	0.258	9.7	26.0	35.7	61.5	8.9	18.6	51.5
	0.466	9.7	20.1	29.8	56.6	7.0	16.7	46.6
	17.369	9.9	24.9	34.8	60	19.6	29.5	50
Neutral	0.158	9.7	39.5	49.2	65.6	25.9	35.6	55.6
	0.186	9.7	36.3	46	64.2	19.9	29.6	54.2
	0.218	9.7	33.8	43.5	62.9	18.2	27.9	52.9
	0.246	9.7	29.4	39.1	61.9	10.9	20.6	51.9
	0.282	9.7	28.1	37.8	60.8	12.2	21.9	50.8
	17.536	9.9	28.4	38.3	60	22.9	32.8	50

REMARKS: 1. Emission level(dBuV)=Read Value(dBuV) + Correction Factor(dB)

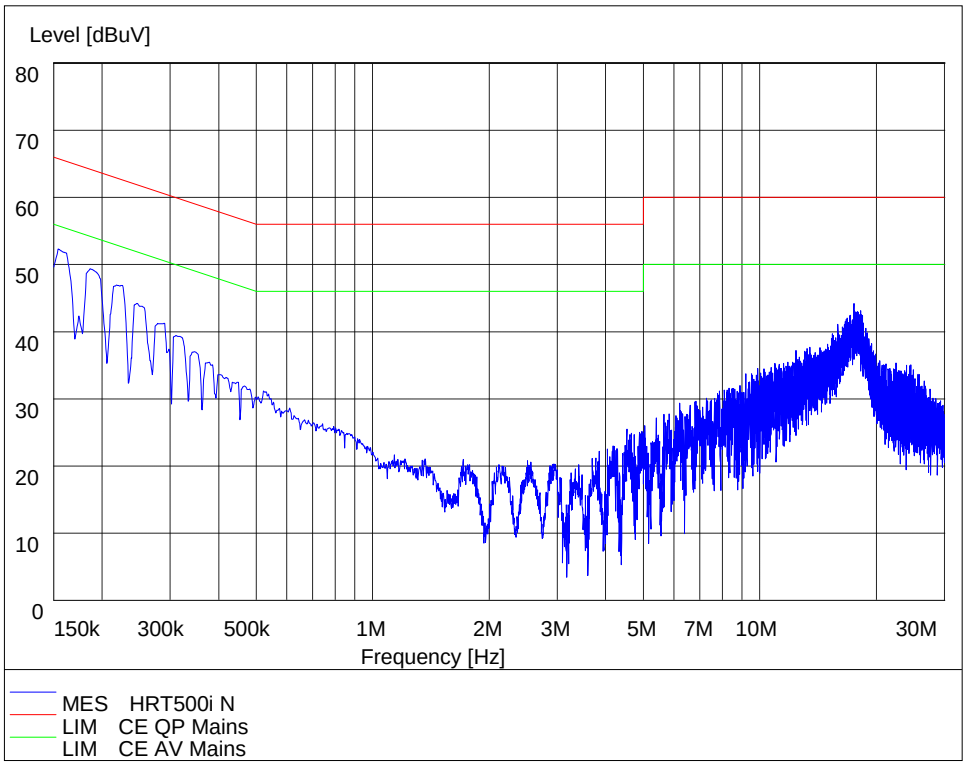
2. Correction Factor(dB) =LISN Factor (dB) + Cable Factor (dB)+Limiter Factor(dB)

3. The other emission levels were very low against the limit.

EUT: HRT500i
Manufacturer:
Operating Condition: Charging and transmitter
Test Site:
Operator:
Test Specification: L
Comment: AC 120V/60Hz



EUT: HRT500i
Manufacturer:
Operating Condition: Charging and transmitter
Test Site:
Operator:
Test Specification: N
Comment: AC 120V/60Hz



8. ANTENNA REQUIREMENT

According to 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.

The EUT has a built in antenna which is integrated inside the enclosure, this is permanently attached antenna and meets the requirements of this section.