

LLW Enterprise, LLC

TEST REPORT

SCOPE OF WORK

EMC TESTING-XTR-250DC-SS-XX

REPORT NUMBER

220614133GZU-001

ISSUE DATE

13-January-2023

[REVISED DATE]

[-----]

PAGES

24

DOCUMENT CONTROL NUMBER

FCC part 15.231-e

© 2017 INTERTEK



TEST REPORT

Room 02, & 101/E201/E301/
E401/E501/E601/E701/E801 of
Room 01 1-8/F., No. 7-2. Caipin
Road, Science City, GETDD,
Guangzhou, Guangdong, China
Telephone: +86 20 8213 9688
Facsimile: +86 20 3205 7538
www.intertek.com.cn

Applicant Name & : LLW Enterprise, LLC
Address : 15486 N Nebraska Ave, Lutz, FL33549, US
Manufacturing Site : Same as Applicant
Intertek Report No: 220614133GZU-001
FCC ID: 2AI4G-TR-250DC-SS

Test standards**CFR 47, FCC PART 15 Subpart C: 2020 section 15.231****Sample Description**

Product : Underwater dock light controller
Model No. : xTR-250DC-SS-xx (See page 4 for model description)
Electrical Rating : 120VAC, 60Hz
Serial No. : Not Labeled
Date Received : 14 June 2022
Date Test Conducted : 11 October 2022-13 January 2023

Prepared and Checked By



Richard Liu

Engineer

Approved By:



Dean Liu

Project Engineer

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

TEST REPORT**CONTENT**

TEST REPORT	1
CONTENT	3
1.0 TEST RESULT SUMMARY	4
2.0 GENERAL DESCRIPTION	5
2.1 PRODUCT DESCRIPTION	5
2.2 RELATED SUBMITTAL(S) GRANTS	5
2.3 TEST METHODOLOGY	5
2.4 TEST FACILITY	5
3.0 SYSTEM TEST CONFIGURATION	6
3.1 JUSTIFICATION	6
3.2 EUT EXERCISING SOFTWARE	7
3.3 SPECIAL ACCESSORIES	7
3.4 MEASUREMENT UNCERTAINTY	7
3.5 EQUIPMENT MODIFICATION	8
3.6 SUPPORT EQUIPMENT LIST AND DESCRIPTION	8
4.0 MEASUREMENT RESULTS	9
4.1 ANTENNA REQUIREMENT	9
4.2 RADIATED EMISSIONS	10
4.3 OCCUPIED BANDWIDTH	18
4.4 DWELL TIME	19
4.5 CONDUCTED EMISSION TEST	21
5.0 TEST EQUIPMENT LIST	24

TEST REPORT**1.0 TEST RESULT SUMMARY**

Test Item	Test Requirement	Test Method	Result
Radiated Emission	FCC PART 15 section 15.231(b)	ANSI C 63.10: Clause 6.4, 6.5 and 6.6	PASS
Occupied Bandwidth	FCC PART 15 section 15.231(c)	ANSI C 63.10: Clause 6.9	PASS
Dwell Time	FCC PART 15 section 15.231(a)	FCC PART 15: Section 15.231(a)	PASS

Remark:

N/A: not applicable. Refer to the relative section for the details.

EUT: In this whole report EUT means Equipment Under Test.

Tx: In this whole report Tx (or tx) means Transmitter.

Rx: In this whole report Rx (or rx) means Receiver.

RF: In this whole report RF means Radio Frequency.

ANSI C63.10: the detail version is ANSI C63.10:2013 in the whole report

Model Similarity: All models have same mechanical, electronics construction and components used, difference among them are the trademark and versions of the product.

The prefix (x), up to four characters, denote the trademark, which is for commercial purposes only and is not safety significant, such as A denote AMP, V denote VOLT and so on.

The suffix (-xx) denotes different versions of the product, it can be blank, or any combination of letters and numbers.

Select the VTR-250DC-SS as the Full test.

TEST REPORT

2.0 General Description

2.1 Product Description

Operating Frequency	433.92 MHz
Type of Modulation:	FSK
Number of Channels	1 Channel
Channel Separation:	N/A
Antenna Type	Spring antenna
Power Supply:	AC 120V
Power cord:	1 m x 3 wires unscreened AC supply cable
Function:	Underwater dock light controller with 433 MHz as carrier.

2.2 Related Submittal(s) Grants

This is an application for certification of:
DSC - Part 15 Security/Remote Control Transmitter

Remaining portions are subject to the following procedures:

1. Receiver portion: Declaration of Conformity.

2.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10. Radiated emission measurement was performed in semi-anechoic chamber and conducted emission measurement was performed in shield room. For radiated emission measurement, preliminary scans and final tests were performed in the semi-anechoic chamber to determine the worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise.

2.4 Test Facility

All tests were performed at:

Intertek Testing Services Shenzhen Ltd. Guangzhou Branch
Room102/104, No 203, KeZhu Road, Science City, GETDD Guangzhou, China
Except Conducted Emissions was performed at:

Room 02, & 101/E201/E301/E401/E501/E601/E701/E801 of Room 01 1-8/F., No. 7-2. Caipin Road, Science City, GETDD, Guangzhou, Guangdong, China

TEST REPORT

A2LA Certificate Number 0078.10

Intertek Testing Services Shenzhen Ltd. Guangzhou Branch is accredited by A2LA and Listed in FCC website. FCC accredited test labs may perform both Certification testing under Parts 15 and 18 and Declaration of Conformity testing.

3.0 System Test Configuration

3.1 Justification

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, AC power line was manipulated to produce worst case emissions. It was powered by AC 120V/60Hz supply.

When below 30MHz, the measurement antenna was positioned with its plane perpendicular to the ground at the specified distance. When perpendicular to the ground plane, the lowest height of the magnetic antenna was 1 m above the ground and was positioned at 3m distance from the EUT. During testing the loop antenna was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane. For each measurement antenna alignment, the EUT shall be rotated through 0° to 360° on a turntable.

When above 30MHz, the antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. The spurious emissions more than 20 dB below the permissible value are not reported.

For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the frequency shown in the following table:

Frequency range of radiated emission measurements

Lowest frequency generated in the device	Upper frequency range of measurement
9 kHz to below 10 GHz	10th harmonic of highest fundamental frequency or to 40 GHz, whichever is lower
At or above 10 GHz to below 30 GHz	5th harmonic of highest fundamental frequency or to 100 GHz, whichever is lower
At or above 30 GHz	5th harmonic of highest fundamental frequency or to 200 GHz, whichever is lower, unless otherwise specified

TEST REPORT

Number of fundamental frequencies to be tested in EUT transmit band

Frequency range in which device operates	Number of frequencies	Location in frequency range of operation
1 MHz or less	1	Middle
1 MHz to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

3.2 EUT Exercising Software

N/A

3.3 Special Accessories

No special accessories used.

3.4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	20 dB Bandwidth	2.3%
	6dB Bandwidth	
	99% Bandwidth	
2	Carrier Frequencies Separated	2.3%
3	Dwell Time	1.2%
4	Maximum Peak Conducted Output Power	1.5dB
5	Peak Power Spectral Density	1.5dB
6	Out of Band Conducted Emissions	1.5dB
7	Band edges measurement	1.5dB
8	Radiated Emissions	4.7 dB (25 MHz-1 GHz)
		4.8 dB (1 GHz-18 GHz)
		5.21dB (18GHz-26GHz)
9	Conducted Emissions at Mains Terminals	2.58dB
10	Temperature	0.5 °C
11	Humidity	0.4 %
12	Time	1.2%

The measurement uncertainty describes the overall uncertainty of the given measured value during the operation of the EUT.

TEST REPORT

Measurement uncertainty is calculated in accordance with ETSI TR 100 028-2001.
The measurement uncertainty is given with a confidence of 95%, k=2.

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

Uncertainty and Compliance – Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value

3.5 Equipment Modification

Any modifications installed previous to testing by LLW Enterprise, LLC will be incorporated in each production model sold / leased in the United States.

No modifications were installed by Intertek Testing Services Shenzhen Ltd. Guangzhou Branch.

3.6 Support Equipment List and Description

This product was tested with corresponding support equipment as below:

Support Equipment

Description	Model No.	Quantity	Rating	Supplied by
Cement resistor	--	3	1 Ω ,50W	Intertek
Cement resistor	--	3	2 Ω ,50W	Intertek
Cement resistor	--	6	10 Ω ,100W	Intertek
Slide rheostat	BX7-14	1	10 Ω ,100W	Intertek

Cable

Description	Model No.	Quantity	type	Supplied by
Electric wire	-	6	1 m(unshielded)	Intertek
Electric wire	-	1	1.2m(unshielded)	Intertek

The client made a continuous transmit sample for test, in actual use the product has duty cycle (detail information can refer to page 14-15)

TEST REPORT**4.0 Measurement Results****4.1 Antenna Requirement**

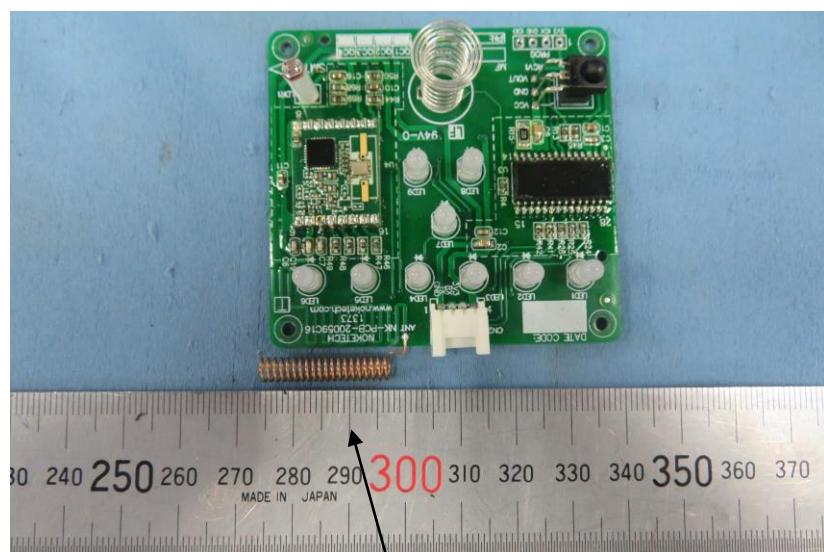
Standard requirement:

15.203 requirement:

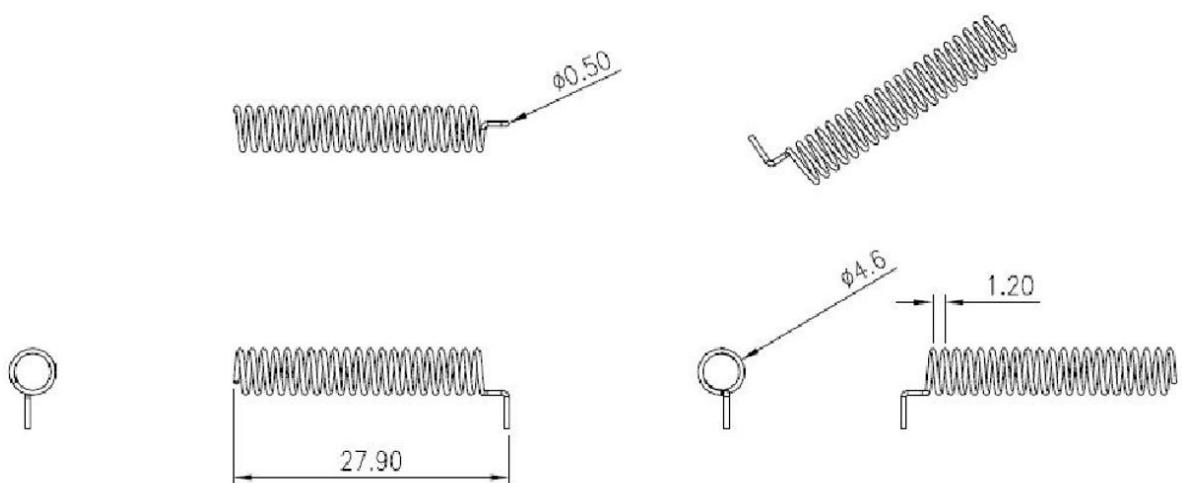
For intentional device. According to 15.203. an intentional radiator shall be designed to Ensure that no antenna other than that furnished by the responsible party shall be used with the device.

EUT Antenna

The antenna is an Spring antenna and no consideration of replacement.



Antenna dimension design



TEST REPORT

4.2 Radiated Emissions

Test Requirement:	FCC Part 15 C section 15.231(b)		
Test Method:	ANSI C63.10: Clause 6.4, 6.5 and 6.6		
Measurement Distance:	3 m (Semi-Anechoic Chamber)		
Test Status:	Test the transmitter in continuous transmitting mode.		
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)		
Limit:	The field strength of emissions from intentional radiators operated under this Section shall not exceed the following:		

Fundamental Frequency MHz	Field Strength of Fundamental (dB μ V/m @ 3 m)	Field Strength of Harmonics and Spurious Emissions (dB μ V/m @ 3 m)
40.66 to 40.70	67.04	47.04
70 to 130	61.94	41.94
130 to 174	61.94 to 71.48**	41.94 to 51.48**
174 to 260	71.48	51.48
260 to 470	71.48 to 81.94**	51.48 to 61.94**
Above 470	81.94	61.94

** linear interpolations

[Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, uV/m at 3 meters = 56.81818(F) - 6136.3636; for the band 260-470 MHz, uV/m at 3 meters = 41.6667(F) - 7083.3333. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.]

The fundamental frequency of the EUT is 433.92 MHz

The limit for average or QP field strength dB μ V/m for the fundamental emission= 80.8 dB μ V/m

No fundamental is allowed in the restricted bands.

The limit for average field strength dB μ V/m for the spurious emission=60.8 dB μ V/m.

Spurious Emissions do not fall in the restricted bands must be less than 60.8 dB μ V/m or limits shown in Section 15.209, whichever limit permits a higher field strength.

Spurious Emissions appear within the restricted bands shall not exceed the limits shown in Section 15.209.

Field Strength Calculation: The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below:

$$FS = RA + AF + CF - AG + PD + AV$$

$$FS = RA + \text{Correct Factor} + AV$$

TEST REPORT

FS = Field Strength in dB μ V/m

Where:

RA = Receiver Amplitude (including preamplifier) in dB μ V
AF = Antenna Factor in dB/m
CF = Cable Attenuation Factor in dB
AG = Amplifier Gain in dB
PD = Pulse Desensitization in dB
AV = Average Factor in -dB
Correct Factor = AF + CF - AG + PD

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

$$FS = RA + AF + CF - AG + PD + AV$$

Assume a receiver reading of 62.0 dB μ V is obtained. The antenna factor of 7.4 dB/m and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted. The pulse desensitization factor of the spectrum analyzer was 0 dB, and the resultant average factor was -10 dB. The net field strength for comparison to the appropriate emission limit is 32 dB μ V/m.

$$RA = 62.0 \text{ dB}\mu\text{V}$$

$$AF = 7.4 \text{ dB/m}$$

$$CF = 1.6 \text{ dB}$$

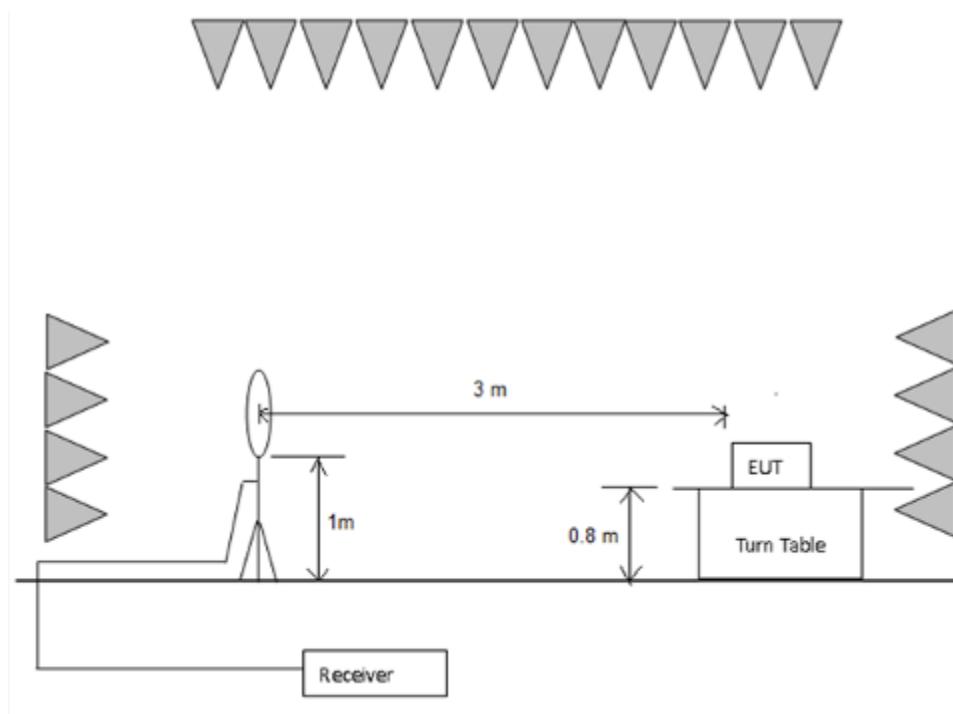
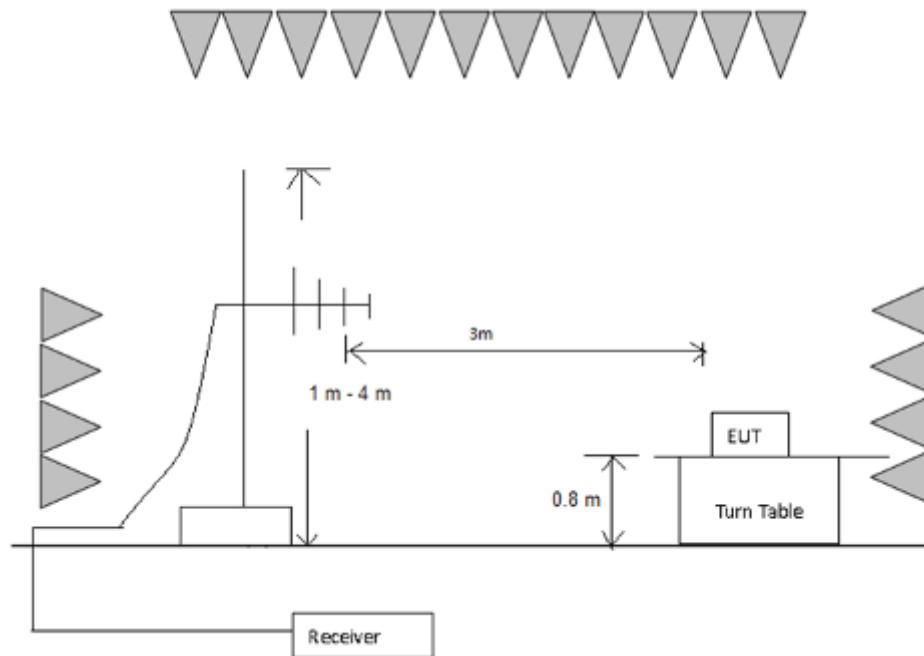
$$AG = 29.0 \text{ dB}$$

$$PD = 0 \text{ dB}$$

$$AV = -10 \text{ dB}$$

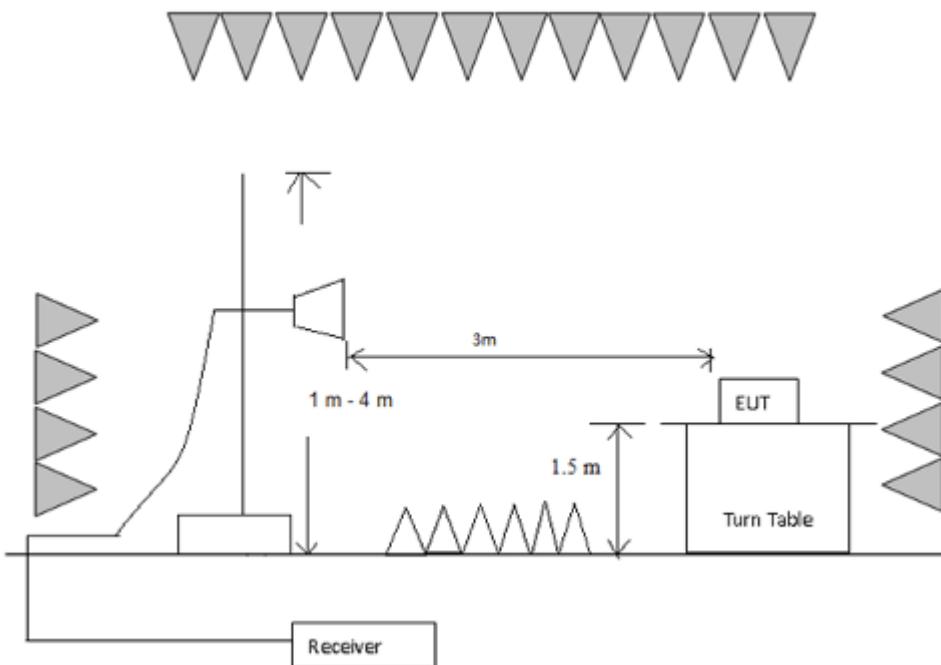
$$\text{Correct Factor} = 7.4 + 1.6 - 29.0 + 0 = -20 \text{ dB/m}$$

$$FS = 62 + (-20) + (-10) = 32 \text{ dB}\mu\text{V/m}$$

TEST REPORT**Test Configuration:**1) 9 kHz to 30 MHz emissions:2) 30 MHz to 1 GHz emissions:

TEST REPORT

3) 1 GHz to 40 GHz emissions:



Test Procedure:

1) 9 kHz to 30 MHz emissions:

For testing performed with the loop antenna. The lowest of the loop was positioned 1 m above the ground and positioned with its plane vertical at the special distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane.

2) 30 MHz to 1 GHz emissions:

For testing performed with the bi-log type antenna. The measurement is performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

3) 1 GHz to 40 GHz emissions:

Test site with RF absorbing material covering the ground plane that met the site validation criterion called out in CISPR 16-1-4:2010 was used to perform radiated emission test above 1 GHz.

For testing performed with the horn antenna. The measurement is performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

TEST REPORT

Detector:

For Peak and Quasi-Peak value:

RBW = 1 MHz for $f \geq 1$ GHz,

200 Hz for 9 kHz to 150 kHz

9 kHz for 150 kHz to 30 MHz

120 kHz for 30 MHz to 1GHz

VBW \geq RBW

Sweep = auto

Detector function = peak for $f \geq 1$ GHz, QP for $f < 1$ GHz

Trace = max hold

For AV value:

Average = Peak value + 20log (Duty cycle)

The average correction factor is computed by analyzing the on time in 100ms over one complete pulse train. Analysis of the remote transmitter on time in one complete pulse train, therefore the average value of fundamental frequency is: Average = Peak value + 20log (Duty cycle), where the duty factor is calculated from following formula:

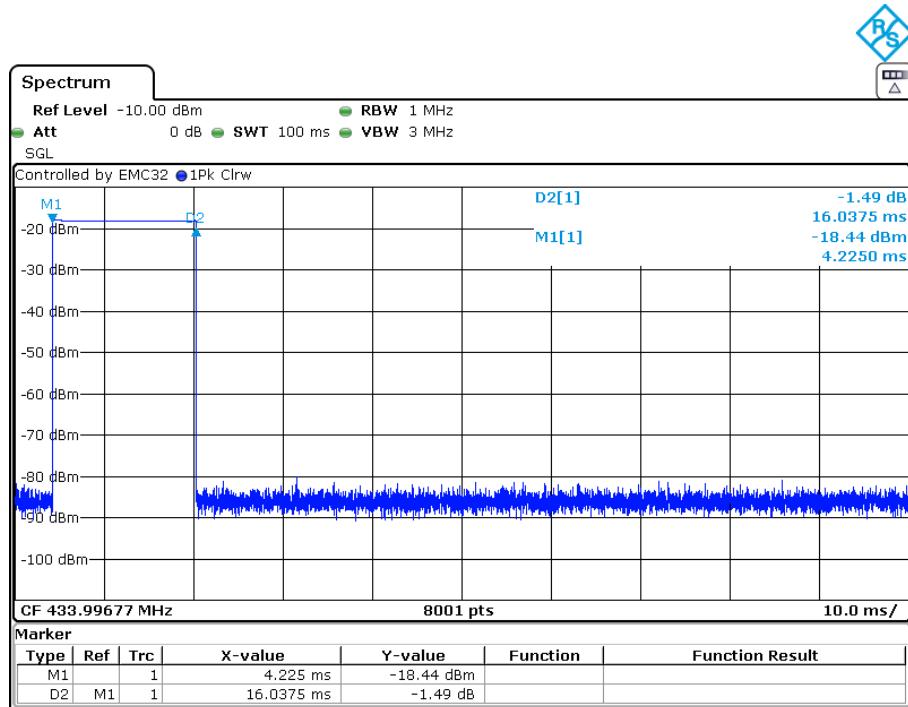
The duration of one cycle = 116.9ms

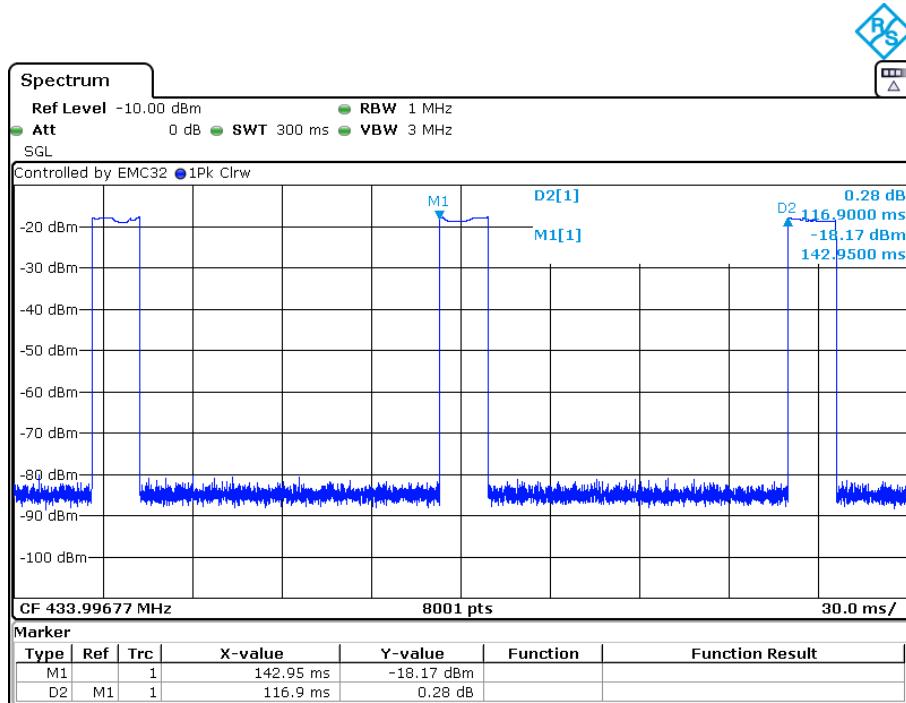
Effective period of the cycle = 16.038 ms

DC = 16.038/100 = 0.1604 or 16.04%

Therefore, the averaging factor is found by $20\lg 0.1604 = -15.90$

Please refer to below plots for more details.



TEST REPORT

Used Test Equipment List:

3m Semi-Anechoic Chamber, EMI Test Receiver (9 kHz~7 GHz), Signal and Spectrum Analyzer (10 Hz~40 GHz), Loop antenna (9 kHz-30 MHz). TRILOG Super Broadband test Antenna(30 MHz-3 GHz) (RX), Double-Ridged Waveguide Horn Antenna (800 MHz-18 GHz)(RX) and High Frequency Antenna & preamplifier(18 GHz~26.5 GHz) (RX). Refer to Clause 5 Test Equipment List for details.

1) Fundamental emission:

Polarization	Frequency (MHz)	PK Reading (dBuV)	Correction Factor(dB)	PK value (dBuV/m)	PK limit (dBuV/m)	Margin (dB)
Horizontal	433.91	58.1	18.3	76.4	100.8	24.4
Vertical	433.91	64.8	18.3	83.1	100.8	17.7

Polarization	Frequency (MHz)	PK value (dBuV/m)	Average Factor(dB)	AV value (dBuV/m)	AV limit (dBuV/m)	Margin (dB)
Horizontal	433.91	76.4	-15.9	60.5	80.8	20.3
Vertical	433.91	83.1	-15.9	67.2	80.8	13.6

Y: rotate EUT by 90° vertically.

X: rotate EUT by 90° clockwise.

TEST REPORT

Z: EUT as Radiated Emission test setup photograph.

1. Corr. (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB)
2. Level (dB μ V/m) = Corr. (dB/m) + Read Level (dB μ V/m)
3. Margin (dB) = Limit Line (dB μ V/m) – Level (dB μ V/m)

2) other emissions:

The receiver was scanned from the lowest frequency generated within the EUT to 5 GHz.

The field strength is calculated by adding the Antenna Factor, Cable Factor & Peramplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor –Peramplifier Factor.

The following test results were performed on the EUT.

If the peak emission level is lower than the average limit, the average emission level does not need to show.

Test the EUT in transmitting mode:

9 kHz~30 MHz Field Strength of Unwanted Emissions. Peak or Quasi-Peak measurement.

The measurements with active loop antenna were greater than 20dB below the limit, so the test data were not recorded in the test report.

30 MHz~5 GHz Field Strength of Unwanted Emissions. Peak or Quasi-Peak measurement:

Polarization	Frequency (MHz)	PK Reading (dB μ V)	Correction Factor(dB)	PK value (dB μ V/m)	PK limit (dB μ V/m)	Margin (dB)
Horizontal	867.98	22.3	24.5	46.8	80.8	34.0
Vertical	867.98	27.4	24.5	51.9	80.8	28.9
Horizontal	1302.0	65.3	-12.9	52.4	74.0	21.6
Horizontal	1736.5	45.7	-10.8	34.9	80.8	45.9
Horizontal	2907.5	45.2	-6.3	38.9	80.8	41.9
Vertical	1302.0	54.8	-12.9	41.9	74.0	32.1
Vertical	1736.0	53.2	-10.8	42.4	80.8	38.4

Polarization	Frequency (MHz)	PK value (dB μ V/m)	Average Factor(dB)	AV value (dB μ V/m)	AV limit (dB μ V/m)	Margin (dB)
Horizontal	867.69	46.8	-15.9	30.9	60.8	29.9
Vertical	867.69	51.9	-15.9	36.0	60.8	24.8
Horizontal	1302.0	52.4	-15.9	36.5	54.0	17.5
Horizontal	1736.5	34.9	-15.9	19.0	60.8	41.8
Horizontal	2907.5	38.9	-15.9	23.0	60.8	37.8

TEST REPORT

Vertical	1302.0	41.9	-15.9	26.0	54.0	28.0
Vertical	1736.0	42.4	-15.9	26.5	60.8	34.3

Remark:

According to 15.35 (b) When average radiated emission measurements are specified in the regulations, including emission measurements below 1000 MHz, there is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules, e.g., see Section 15.255.

TEST REPORT

4.3 Occupied Bandwidth

Test Requirement: FCC Part 15 C section 15.231 (c)
 Test Method: ANSI C63.10: Clause 6.9
 Test Status: Test in transmitting mode at lowest and highest channel.
 Requirements: 15.231 (c) The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.
 Method of measurement: The useful radiated emission from the EUT was detected by the spectrum analyzer with peak detector. Record the 20 dB bandwidth of the carrier.

Used Test Equipment List:

Spectrum Analyzer. Refer to Clause 5 Test Equipment List for details.

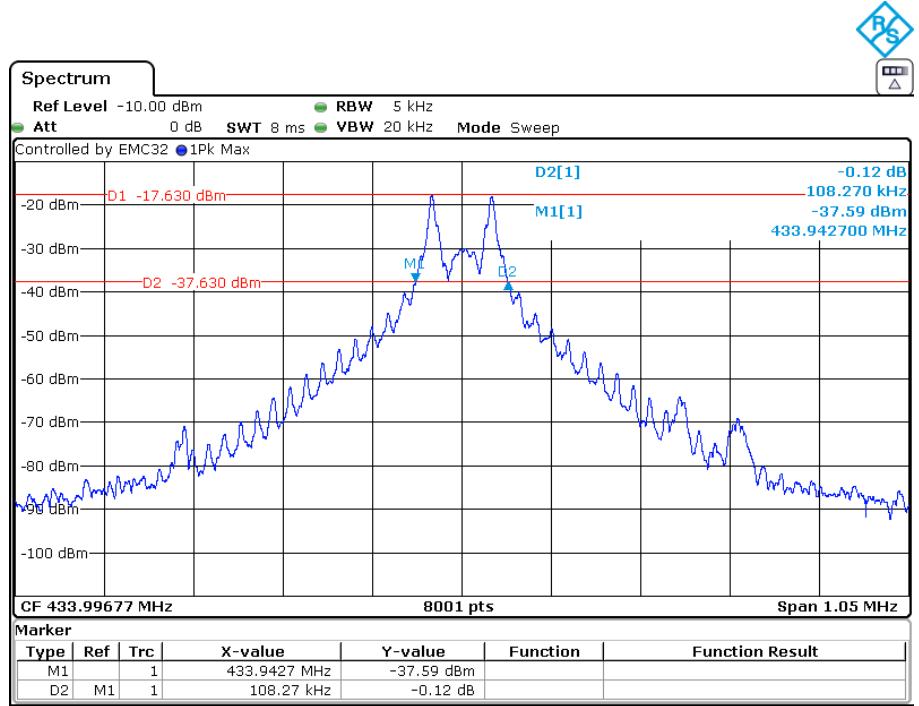
Test result:

Test Channel	bandwidth	Limit
433.997 MHz	108.27 kHz	1.08 MHz

Remark:

The bandwidth limit is $433.997 \times 0.0025 = 1.08$ MHz

Test plot:



TEST REPORT

4.4 Dwell Time

Test Requirement: FCC Part 15 C section 15.231(a)

Test Method: FCC Part 15 C section 15.231(a)

Test Status: Test in transmitting mode.

Requirements:

1. Regulation 15.231 (a) The provisions of this Section are restricted to periodic operation within the band 40.66 40.70 MHz and above 70 MHz. Except as shown in paragraph (e) of this Section, the intentional radiator is restricted to the transmission of a control signal such as those used with alarm systems, door openers, remote switches, etc. Radio control of toys is not permitted. Continuous transmissions, such as voice or video, and data transmissions are not permitted. The prohibition against data transmissions does not preclude the use of recognition codes. Those codes are used to identify the sensor that is activated or to identify the particular component as being part of the system.

Result:

The EUT is a remote switch without audio or video transmitted.

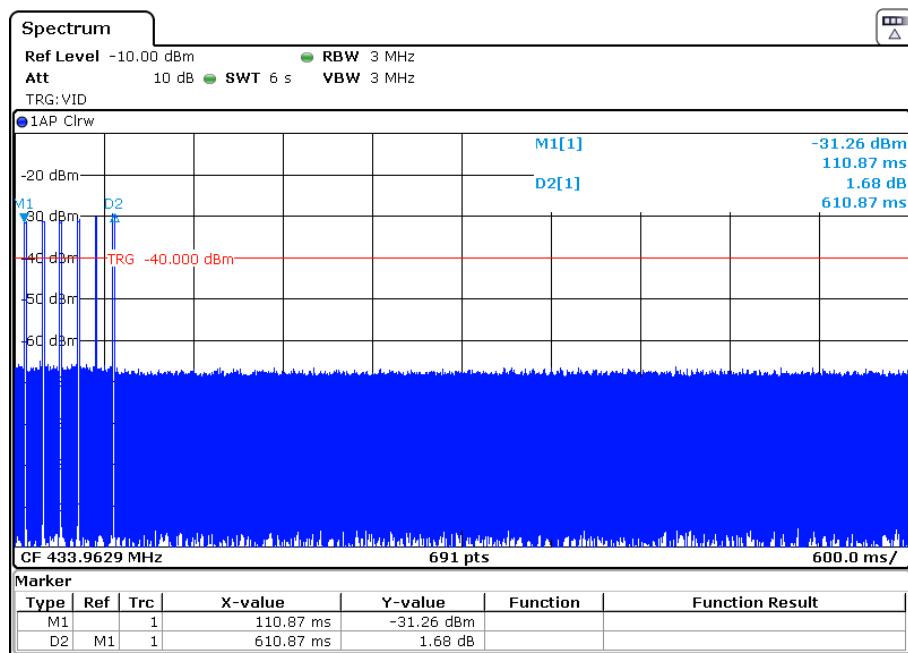
The EUT meets the requirements of this section.

2. Regulation 15.231 (a1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

Result:

Carrier Frequency	Shutdown Time	Limit
433.95MHz	0.6s	≤5s

Result plot as follows:



TEST REPORT

3. Regulation 15.231 (a2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.

Result:

The EUT does not have automatic transmission.

4. Regulation 15.231 (a3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions to determine system integrity of transmitters used in security or safety applications are allowed if the periodic rate of transmission does not exceed one transmission of not more than one second duration per hour for each transmitter.

Result:

The EUT does not employ periodic transmission.

5. Regulation 15.231 (a4) Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition.

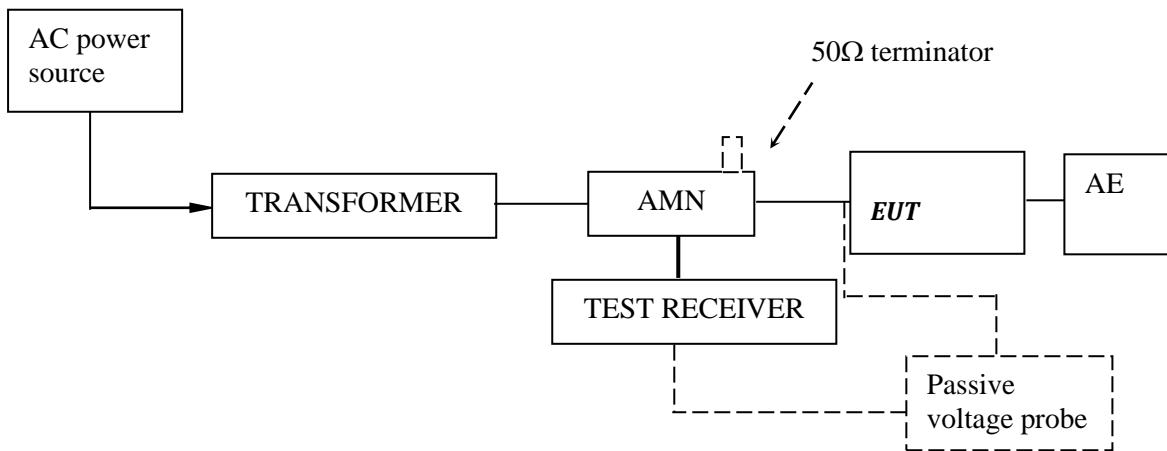
Result:

This section is not applicable to the EUT.

TEST REPORT

4.5 Conducted Emission Test

Test Configuration:



Test Setup and Procedure:

Test was performed according to ANSI C63.10 Clause 6.2. The EUT was set to achieve the maximum emission level. The mains terminal disturbance voltage was measured with the EUT in a shielded room. The EUT was connected to AC power source through an Artificial Mains Network which provides a 50Ω linear impedance Artificial hand is used if appropriate (for handheld apparatus). The load/control terminal disturbance voltage was measured with passive voltage probe if appropriate.

The table-top EUT was placed on a 0.8m high non-metallic table above earthed ground plane (Ground Reference Plane). And for floor standing EUT, was placed on a 0.1m high non-metallic supported on GRP. The EUT keeps a distance of at least 0.8m from any other of the metallic surface. The Artificial Mains Network is situated at a distance of 0.8m from the EUT.

During the test, mains lead of EUT excess 0.8m was folded back and forth parallel to the lead so as to form a horizontal bundle with a length between 0.3m and 0.4m.

The bandwidth of test receiver was set at 9 kHz. The frequency range from 150 kHz to 30MHz was checked.

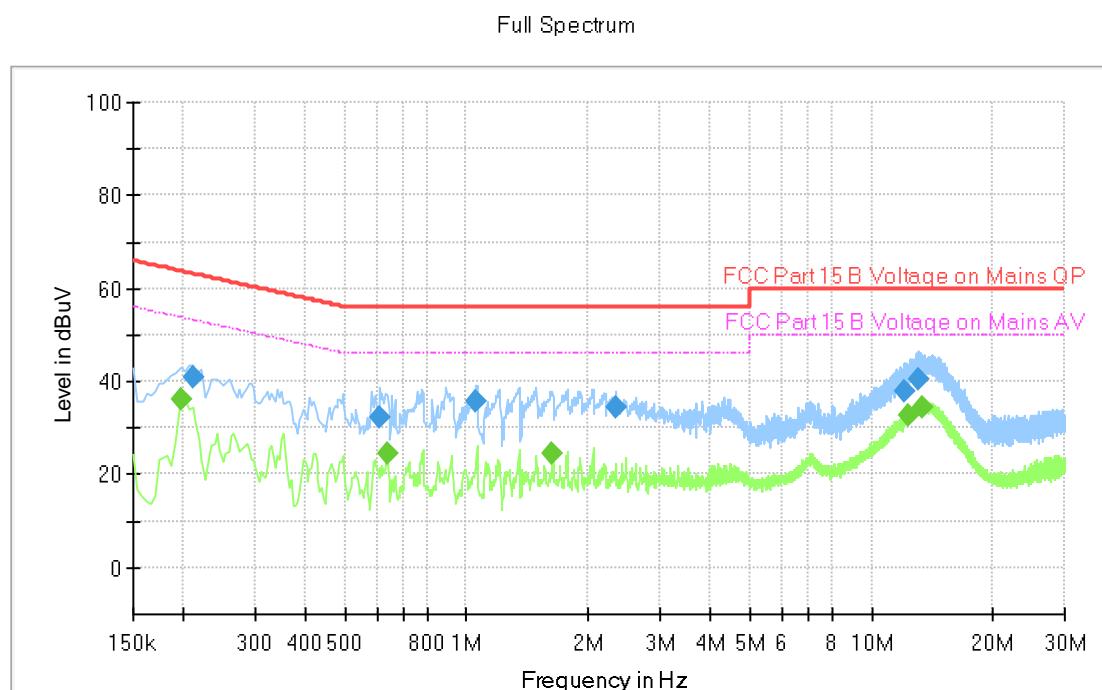
TEST REPORT

Test Data and Curve

At main terminal: Pass

Tested Wire: Live

Operation Mode: transmitting mode


Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.198000	---	36.36	53.69	17.33	1000.0	9.000	L1	ON	9.7
0.210000	41.03	---	63.21	22.17	1000.0	9.000	L1	ON	9.7
0.610000	32.41	---	56.00	23.59	1000.0	9.000	L1	ON	9.8
0.634000	---	24.46	46.00	21.54	1000.0	9.000	L1	ON	9.8
1.054000	35.66	---	56.00	20.34	1000.0	9.000	L1	ON	9.8
1.626000	---	24.72	46.00	21.28	1000.0	9.000	L1	ON	9.8
2.334000	34.35	---	56.00	21.65	1000.0	9.000	L1	ON	9.8
12.026000	37.94	---	60.00	22.06	1000.0	9.000	L1	ON	10.1
12.366000	---	32.57	50.00	17.43	1000.0	9.000	L1	ON	10.1
13.034000	40.32	---	60.00	19.68	1000.0	9.000	L1	ON	10.1
13.334000	---	34.49	50.00	15.51	1000.0	9.000	L1	ON	10.1

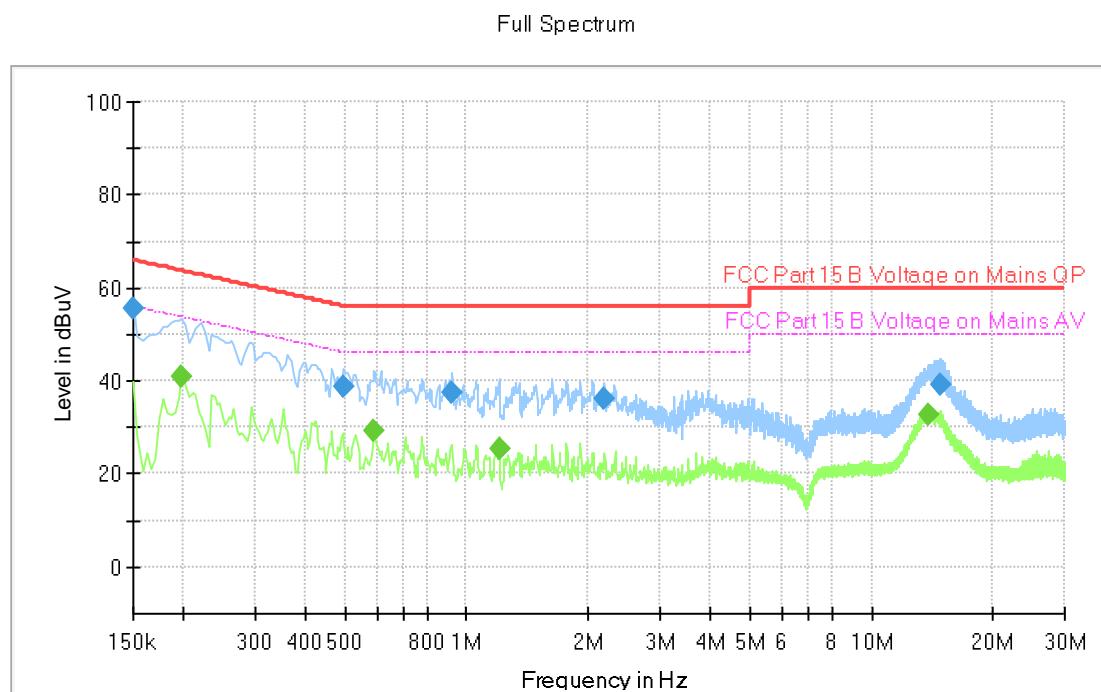
Remark:

1. Corr. (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Level (dB μ V) = Corr. (dB) + Read Level (dB μ V)
3. Delta Limit (dB) = Level (dB μ V)-Limit (dB μ V)

TEST REPORT

Tested Wire: Neutral

Operation Mode: transmitting mode


Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.150000	55.42	---	66.00	10.58	1000.0	9.000	N	ON	9.8
0.198000	---	40.99	53.69	12.70	1000.0	9.000	N	ON	9.8
0.494000	38.86	---	56.10	17.24	1000.0	9.000	N	ON	9.8
0.590000	---	29.24	46.00	16.76	1000.0	9.000	N	ON	9.8
0.922000	37.55	---	56.00	18.45	1000.0	9.000	N	ON	9.8
1.202000	---	25.30	46.00	20.70	1000.0	9.000	N	ON	9.8
2.194000	36.28	---	56.00	19.72	1000.0	9.000	N	ON	9.8
13.894000	---	32.77	50.00	17.23	1000.0	9.000	N	ON	10.2
14.886000	39.08	---	60.00	20.92	1000.0	9.000	N	ON	10.2

Remark:

1. Corr. (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Level (dB μ V) = Corr. (dB) + Read Level (dB μ V)
3. Delta Limit (dB) = Level (dB μ V)-Limit (dB μ V)

TEST REPORT
5.0 Test Equipment List
Radiated Emission/Radio

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (YYYY-MM-DD)	Calibration Interval
EM030-04	3m Semi-Anechoic Chamber	9×6×6 m ³	ETS-LINDGREN	2023-04-07	1Y
EM031-02	EMI Test Receiver (9 kHz~7 GHz)	R&S ESR7	R&S	2023-11-15	1Y
EM031-03	Signal and Spectrum Analyzer (10 Hz~40 GHz)	R&S FSV40	R&S	2023-11-15	1Y
EM011-04	Loop antenna (9 kHz-30 MHz)	HFH2-Z2	R&S	2023-06-27	1Y
EM061-03	TRILOG Super Broadband test Antenna (30 MHz-1.5 GHz) (TX)	VULB 9161	SCHWARZBECK	2023-06-26	1Y
EM033-01	TRILOG Super Broadband test Antenna(30 MHz-3 GHz) (RX)	VULB 9163	SCHWARZBECK	2023-10-25	1Y
EM033-02	Bouble-Ridged Waveguide Horn Antenna (800 MHz-18 GHz)(RX)	R&S HF907	R&S	2023-06-26	1Y
EM033-03	High Frequency Antenna & preamplifier(18 GHz~26.5 GHz) (RX)	R&S SCU-26	R&S	2023-04-16	1Y
EM033-04	High Frequency Antenna & preamplifier (26 GHz-40 GHz)	R&S SCU-40	R&S	2023-04-16	1Y
EM031-02-01	Coaxial cable(9 kHz-1 GHz)	N/A	R&S	2023-04-08	1Y
EM033-02-02	Coaxial cable(1 GHz-18 GHz)	N/A	R&S	2023-04-08	1Y
EM033-04-02	Coaxial cable(18 GHz~40 GHz)	N/A	R&S	2023-04-15	1Y
EM031-01	Signal Generator (9 kHz~6 GHz)	SMB100A	R&S	2023-07-17	1Y
EM040-01	Band Reject/Notch Filter	WRHFV	Wainwright	N/A	1Y
EM040-02	Band Reject/Notch Filter	WRCGV	Wainwright	N/A	1Y
EM040-03	Band Reject/Notch Filter	WRCGV	Wainwright	N/A	1Y
EM022-03	2.45 GHz Filter	BRM50702	Micro-Tronics	2023-05-06	1Y
SA016-29	Climatic Test Chamber	MHU-80L	JIANQIAO	2023-01-20	1Y
SA012-74	Digital Multimeter	FLUKE175	FLUKE	2023-10-07	1Y
EM010-01	Regulated DC Power supply	PAB-3003A	GUANHUA	N/A	1Y
SA040-22	Regulated DC Power supply	IT6721	ITECH	2023-09-04	1Y
EM084-06	Audio Analyzer	8903B	HP	2023-04-11	1Y
EM046-05	Power meter	NPR6A	R&S	2023-04-20	1Y
EM046-06	Power meter	NPR6A	R&S	2023-04-20	1Y
EM045-01-01	EMC32 software (RE/RS)	V10.01.00	R&S	N/A	N/A
EM045-01-09	EMC32 software (328/893)	V9.26.01	R&S	N/A	N/A

Conducted emission at the mains terminals

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (YYYY-MM-DD)	Calibration Interval
EM080-05	EMI receiver	ESCI	R&S	2023-06-08	1Y
EM006-05	LISN	ENV216	R&S	2023-06-05	1Y
EM006-06	LISN	ENV216	R&S	2023-09-05	1Y
EM006-06-01	Coaxial cable	/	R&S	2023-04-08	1Y
EM004-04	EMC shield Room	8m×3m×3m	Zhongyu	2023-01-06	1Y

****End of the test report*****