

JUST GREAT GROUP LIMITED

TEST REPORT

SCOPE OF WORK

EMC TESTING—SEE PAGE 2

REPORT NUMBER

220301046GZU-001

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[REVISED DATE]

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PAGES

48

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TEST REPORT

Applicant Name & : JUST GREAT GROUP LIMITED
Address : Dong Feng District, Xin Xu Town, HuiYang City, Hui Zhou, Guang
Dong, China, 516226
Manufacturing Site : same as applicant
Intertek Report No: 220301046GZU-001
FCC ID: 2A49S-3746737

Test standards

47 CFR PART 15 Subpart C:2020

Sample Description

Product : Lamp
Model No. : TLW09-Qi, TLW09B-Qi, TLW09BR-Qi, FLW062-Qi, FLW062B-
Qi, FLW062BR-Qi, TLW10-Qi, TLW10NA-Qi, TLW10WA-Qi, FEN201,
ATA007
Electrical Rating : 120VAC, 60Hz
Serial No. : Not Labeled
Date Received : 01 March 2022
Date Test : 26 October 2022-05 November 2022
Conducted

Prepared and Checked By



Elena Lei

Engineer

Approved By:



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Project Engineer

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TEST REPORT

CONTENT

TEST REPORT	1
CONTENT	3
1.0 TEST RESULT SUMMARY	4
2.0 GENERAL DESCRIPTION.....	6
2.1 PRODUCT DESCRIPTION	6
2.2 RELATED SUBMITTAL(S) GRANTS	6
2.3 TEST METHODOLOGY	6
2.4 TEST FACILITY.....	6
3.0 SYSTEM TEST CONFIGURATION	7
3.1 JUSTIFICATION	7
3.2 EUT EXERCISING SOFTWARE.....	8
3.3 SPECIAL ACCESSORIES.....	8
3.4 MEASUREMENT UNCERTAINTY.....	8
3.5 EQUIPMENT MODIFICATION	9
3.6 SUPPORT EQUIPMENT LIST AND DESCRIPTION	9
4.0 RADIATED EMISSION	10
5.0 OCCUPIED BANDWIDTH.....	31
6.0 CONDUCTED EMISSION TEST	37
7.0 TEST EQUIPMENT LIST	48

TEST REPORT

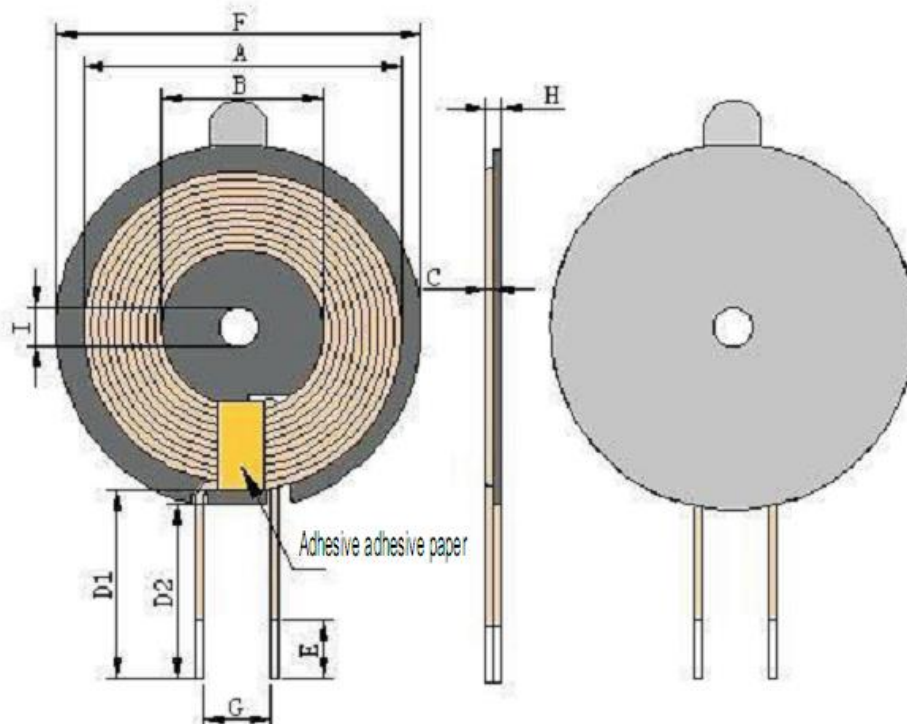
1.0 TEST RESULT SUMMARY

Test Item	Test Requirement	Test Method	Result
Conducted disturbance voltage at mains ports	FCC PART 15 C section 15.207	ANSI C63.10: Clause 6.2	PASS
Radiated Emission	FCC PART 15 C section 15.209	ANSI C63.10: Clause 6.4 & 6.5	PASS
20dB Bandwidth	FCC PART 15 C section 15.215	FCC PART 15 C section 15.215	PASS

Remark:

When determining the test results, measurement uncertainty of tests has been considered.
Models: TLW09-Qi, TLW09B-Qi, TLW09BR-Qi, FLW062-Qi, FLW062B-Qi, FLW062BR-Qi, TLW10-Qi, TLW10NA-Qi, TLW10WA-Qi differ only in appearance, color and model, The Model FEN201, ATA007 has the same wireless charging parts as other models. We tested the Lamp, Models: TLW10-Qi, FEN201, ATA007, TLW09-Qi, FLW062-Qi.

Antenna size design:(DIMENSION:(mm))



TEST REPORT

ATA007, FLW062-Qi,FLW062B-Qi,FLW062BR-Qi size:

A	41.0 ± 1.5
B	20.5 ± 0.5
C	1.2 ± 0.05
D1	37 ± 2
D2	35 ± 2
E	3.5 ± 1.5
F	50 ± 0.5
G	11.0 ref
H	2.6 ± 0.2
I	5.3 ref

TLW09-Qi,TLW09B-Qi,TLW09BR-Qi, TLW10-Qi,TLW10NA-Qi,TLW10WA-Qi, FEN201 size:

A	41.0 ± 1.5
B	20.5 ± 0.5
C	1.2 ± 0.05
D1	202 ± 2
D2	200 ± 2
E	3.5 ± 1.5
F	50 ± 0.5
G	11.0 ref
H	2.6 ± 0.2
I	5.3 ref

TEST REPORT

2.0 General Description

2.1 Product Description

Operating Frequency	118-147KHz
Type of Modulation:	ASK
Antenna Type	Inductive loop coil antenna
Power Supply:	120VAC ,60Hz
Power cord:	wires unscreened cable

2.2 Related Submittal(s) Grants

This is an application for certification of:
DCD-Part 15 Low Power Transmitter below 1705kHz

Remaining portions are subject to the following procedures:
The USB Charging function: FCC SDOC requirement (Refer to report 220301046GZU-003).

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. It was powered by AC 125V/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	10 th harmonic of highest fundamental frequency or to 40 GHz, whichever is lower
At or above 10 GHz to below 30 GHz	5 th harmonic of highest fundamental frequency or to 100 GHz, whichever is lower
At or above 30 GHz	5 th 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

N/A

3.4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Conduction Emission (9 kHz-150 kHz)	2.51 dB
2	Conduction Emission (150 kHz-30 MHz)	2.69 dB
3	Radiated Emission (9KHz-30MHz)	4.24 dB
4	Radiated Emission (30 MHz-1 GHz)	4.79 dB
5	Radiated Emission (1 GHz-6 GHz)	5.02 dB
6	Radiated Emission (6 GHz-18 GHz)	5.17 dB
7	20 dB Bandwidth	2.3%

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

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

TEST REPORT

3.5 Equipment Modification

Any modifications installed previous to testing by JUST GREAT GROUP LIMITED 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:

Equipment	Model No.	Rating	Supplier
light bulb	-	100-240~, 50/60Hz,	Intertek
WPT	-	5W,7.5W,10W	Intertek
Cement resistance*2	-	5 Ω , 5W	Intertek

Remark: WPT client was one of typical client devices, it's selected such that the EUT was fully exercised at maximum power from its transmitter. It will not be sold together.

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above evaluated respectively

Pre-test mode	Description	
Standby Mode	kept transmitting continuously	
Charging Mode	CH: Low	WPT client is charging at 1% battery power, 50% and 99% battery power respectively, keep transmitting continuously.
	CH: Middle	
	CH: High	

For AC port Conducted Emission:

Pre-test all modes listed above, find the worst case as: wireless charging for Mobile at 1% battery power with USB charging (full load).

For Radiated Emission:

Pre-test all modes listed above, find the worst case as: wireless charging for Mobile at 1% battery power with USB charging (full load).

TEST REPORT

4.0 Radiated Emission

Test Requirement:

FCC PART 15 C section 15.209 (a)(f)

§ 15.209 (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

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
Above 960	500	3

Field strength limits(below 30MHz) at 30 m and 300 m changed to 3 m by formula:

$$\text{Limit3m(dB}\mu\text{V)} = \text{Limit30m(dB}\mu\text{V)} + 40 * \log(30\text{m}/3\text{m})$$

$$\text{Limit3m(dB}\mu\text{V)} = \text{Limit300m(dB}\mu\text{V)} + 40 * \log(300\text{m}/3\text{m})$$

Frequency (MHz)	Field Strength (dB μ V/m @ 3m)
0.009-0.490	128-93.8
0.490-1.705	73.8-62.9
1.705-30.0	69.5
30-88	40
88-216	43.5
216-960	46
Above 960	54

(f) In accordance with §15.33(a), in some cases the emissions from an intentional radiator must be measured to beyond the tenth harmonic of the highest fundamental frequency designed to be emitted by the intentional radiator because of the incorporation of a digital device. If measurements above the tenth harmonic are so required, the radiated emissions above the tenth harmonic shall comply with the general radiated emission limits applicable to the incorporated digital device, as shown in §15.109 and as based on the frequency of the emission being measured, or, except for emissions contained in the restricted frequency bands shown in §15.205, the limit on spurious emissions specified for the intentional radiator, whichever is the higher limit. Emissions which must be measured above the tenth harmonic of the highest fundamental frequency designed to be emitted by the intentional radiator and which fall within the restricted bands shall comply with the general radiated emission

TEST REPORT

	limits in §15.109 that are applicable to the incorporated digital device.
Test Method:	ANSI C63.10: Clause 6.4 and 6.5.
Test Status:	Pre-Scan has been conducted to determine the worst-case mode from all possible configuration.
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)
Detector:	Quasi-Peak detector: RBW=2 kHz for 9 kHz to 150 kHz RBW=9 kHz for 150 kHz to 30 MHz RBW=120 kHz for 30 MHz to 1GHz Sweep = auto Trace = max hold
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: $FS = RA + AF + CF - AG + PD + AV$ $FS = RA + \text{Correct Factor} + AV$ $FS = \text{Field Strength in dB}\mu\text{V/m}$
Where:	$RA = \text{Receiver Amplitude (including preamplifier) in dB}\mu\text{V}$ $AF = \text{Antenna Factor in dB}$ $CF = \text{Cable Attenuation Factor in dB}$ $AG = \text{Amplifier Gain in dB}$ $PD = \text{Pulse Desensitization in dB}$ $AV = \text{Average Factor in -dB}$ $\text{Correct Factor} = AF + CF - AG + PD$

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 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.

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

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

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

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

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

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

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

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

TEST REPORT

Section 15.205 Restricted bands of operation.

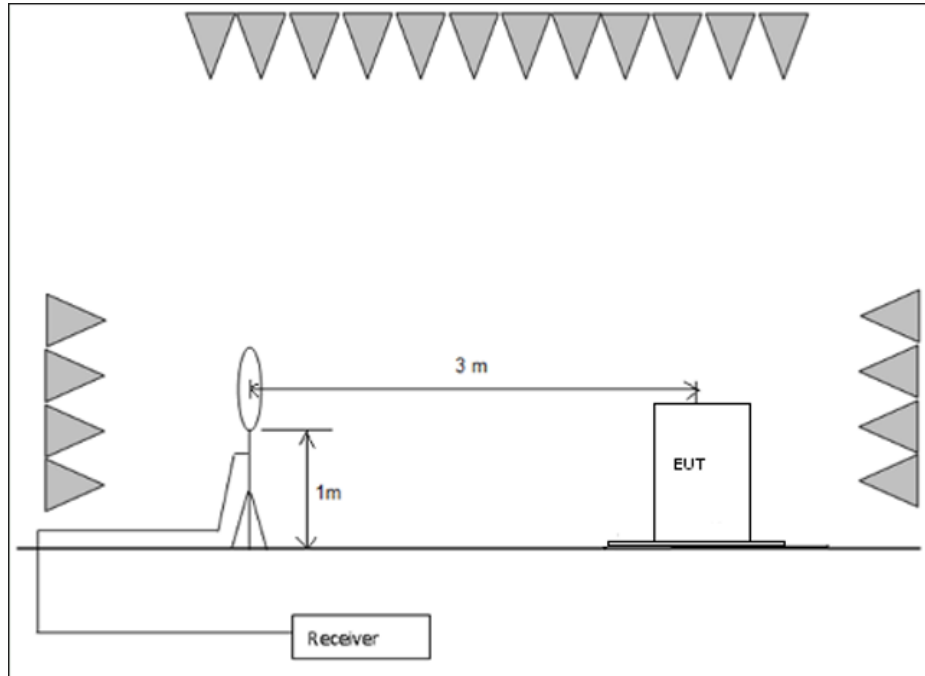
MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	
13.36 - 13.41	322 - 335.4		

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in 15.209.

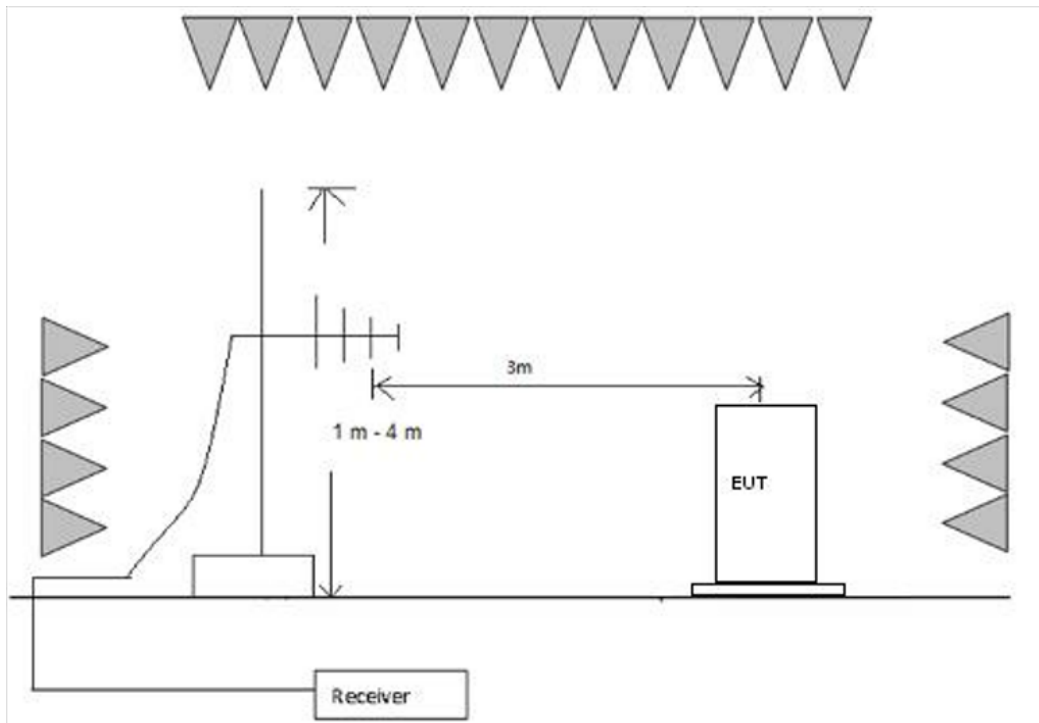
TEST REPORT

Test Configuration:

- 1) 9 kHz to 30 MHz emissions:



- 2) 30 MHz to 1 GHz emissions:



TEST REPORT

Test Procedure:

1) 9 kHz to 30 MHz emissions:

For testing performed with the loop antenna. The Lowest height 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) The receiver was scanned from 9 kHz to 1 GHz. When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. The worst case emissions were reported.

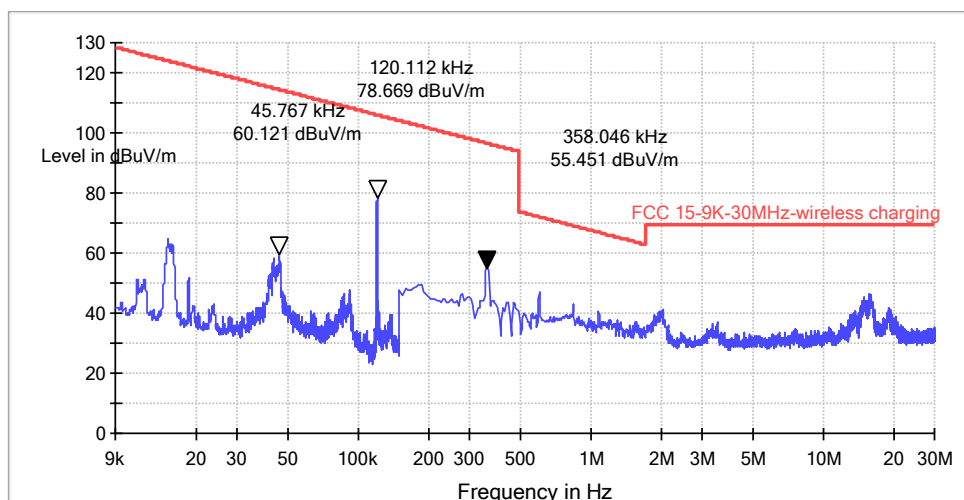
Used Test Equipment List:

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), Refer to Clause 4 Test Equipment List for details.

Radiated Emissions (Below 30 MHz)

MODEL: FEN201

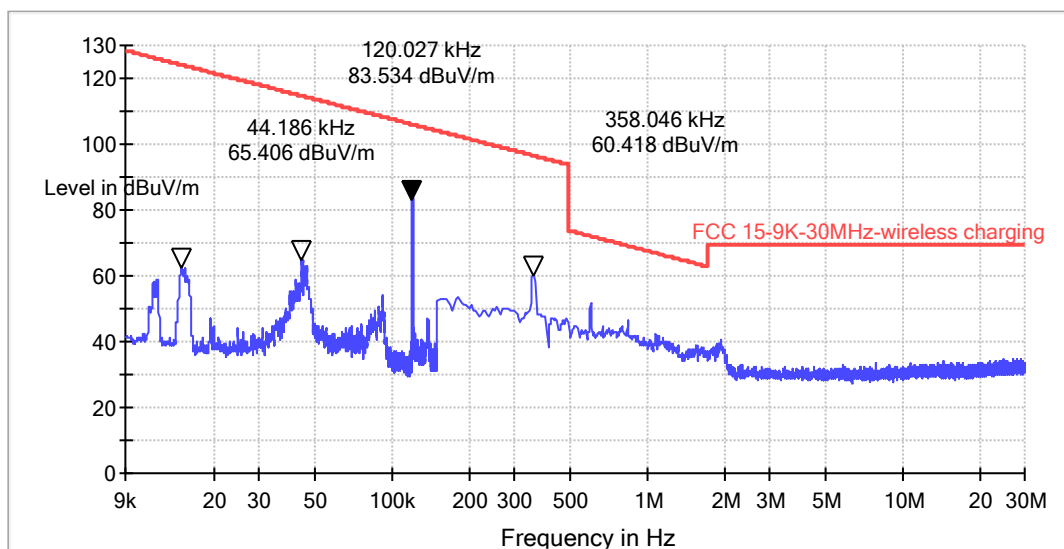
Vertical:



TEST REPORT

Frequency (MHz)	Read Level (dBμV)	Correction Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
0.046	40.9	19.2	60.1	114.35	54.25	PK
0.120	59.4	19.3	78.7	106.02	27.32	PK
0.358	36.1	19.4	55.5	96.53	41.03	PK

Horizontal:

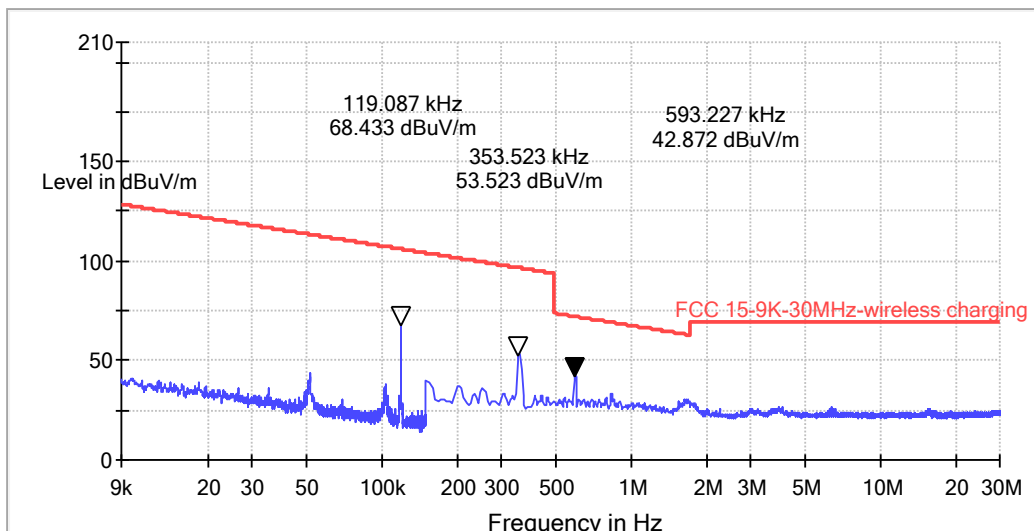


Frequency (MHz)	Read Level (dBμV)	Correction Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
0.044	46.3	19.2	65.5	114.74	49.24	PK
0.120	64.2	19.3	83.5	106.02	22.52	PK
0.358	41.0	19.4	60.4	96.53	36.13	PK

TEST REPORT

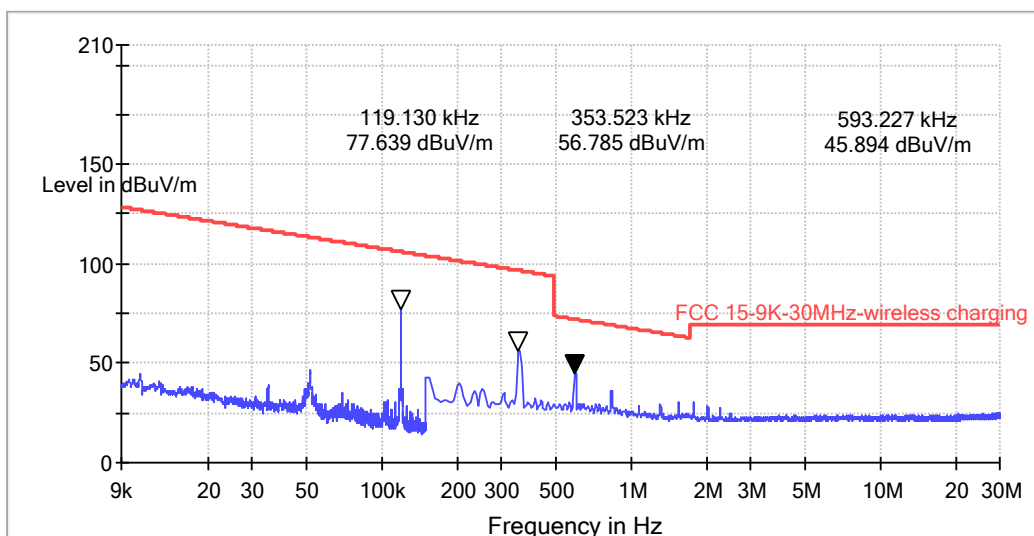
MODEL: TLW10-Qi

Vertical:



Frequency (MHz)	Read Level (dBμV)	Correction Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
0.119	49.1	19.3	68.4	106.1	37.7	PK
0.354	34.1	19.4	53.5	96.6	43.1	PK
0.593	23.3	19.6	42.9	72.1	29.2	PK

Horizontal:

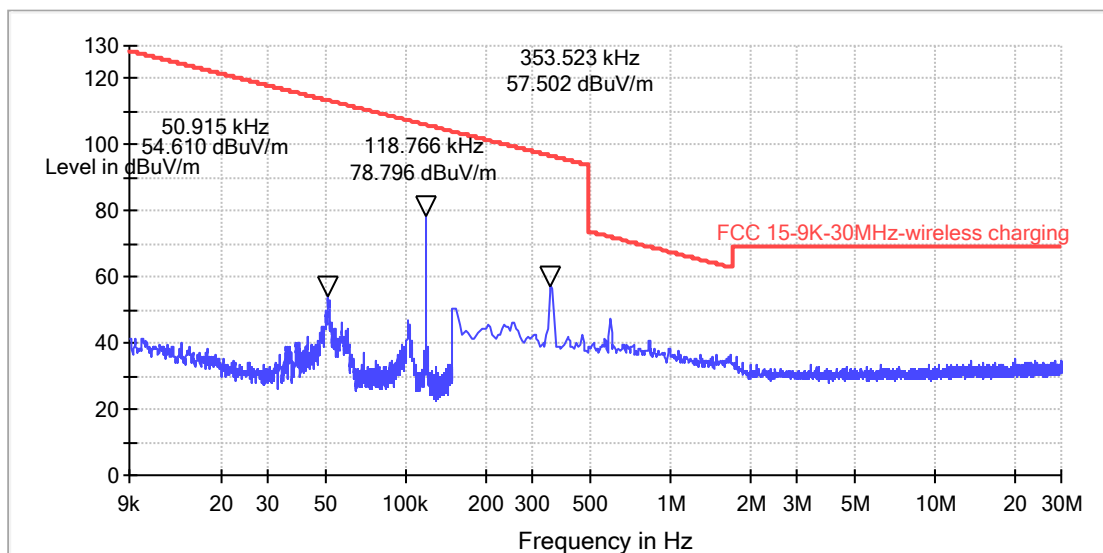


TEST REPORT

Frequency (MHz)	Read Level (dBμV)	Correction Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
0.119	58.3	19.3	77.6	106.1	28.5	PK
0.354	37.4	19.4	56.8	96.6	39.8	PK
0.593	26.3	19.6	45.9	72.1	26.2	PK

MODEL: ATA007

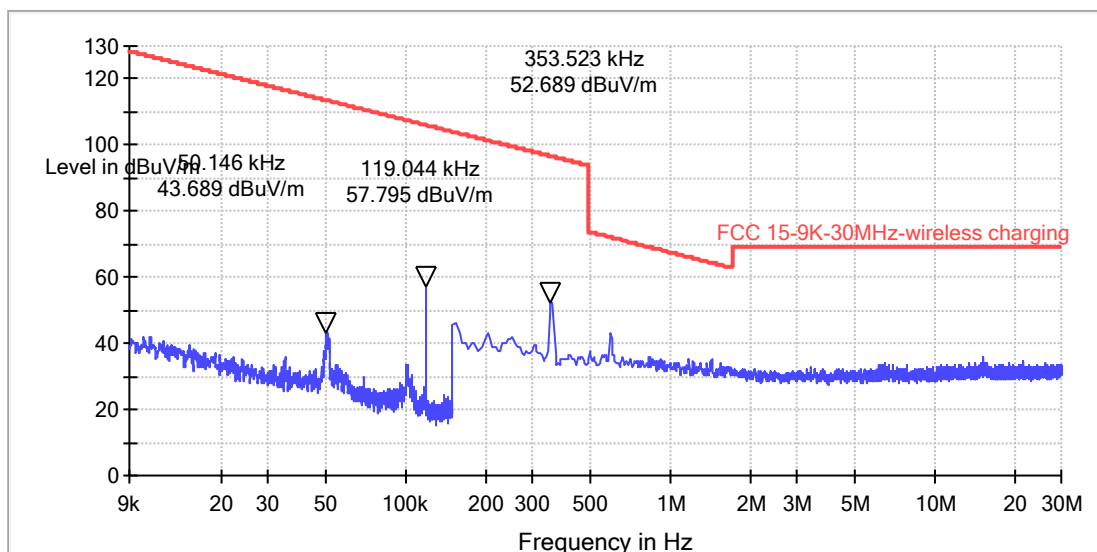
Vertical:



Frequency (MHz)	Read Level (dBμV)	Correction Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
0.051	35.4	19.2	54.6	113.5	58.9	PK
0.119	59.5	19.3	78.8	106.1	27.3	PK
0.354	38.1	19.4	57.5	96.6	39.1	PK

TEST REPORT

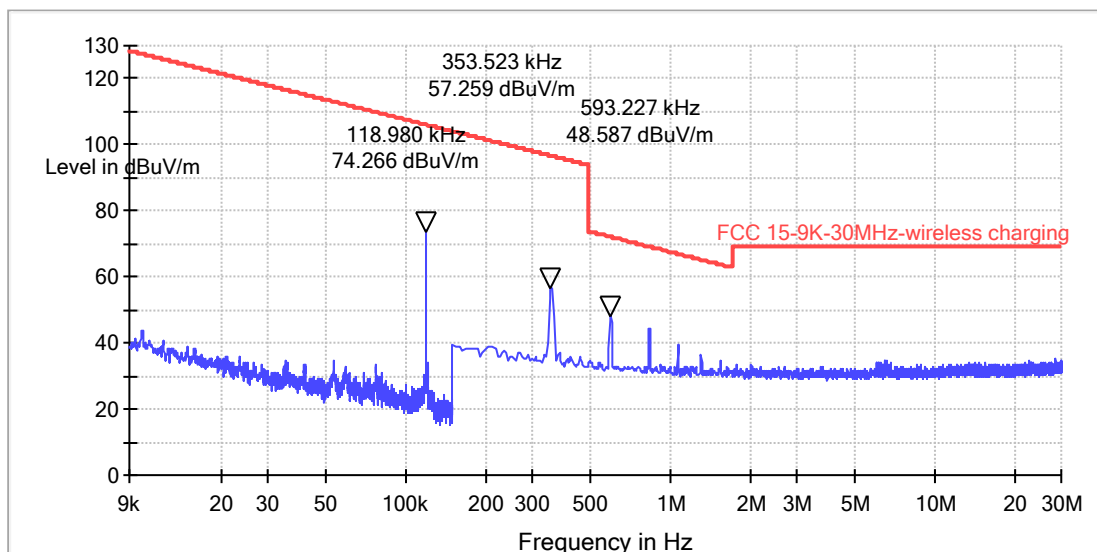
Horizontal:



Frequency (MHz)	Read Level (dBμV)	Correction Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
0.050	24.5	19.2	43.7	113.6	69.9	PK
0.119	38.5	19.3	57.8	106.1	48.3	PK
0.354	33.3	19.4	52.7	96.6	43.9	PK

MODEL: TLW09-Qi

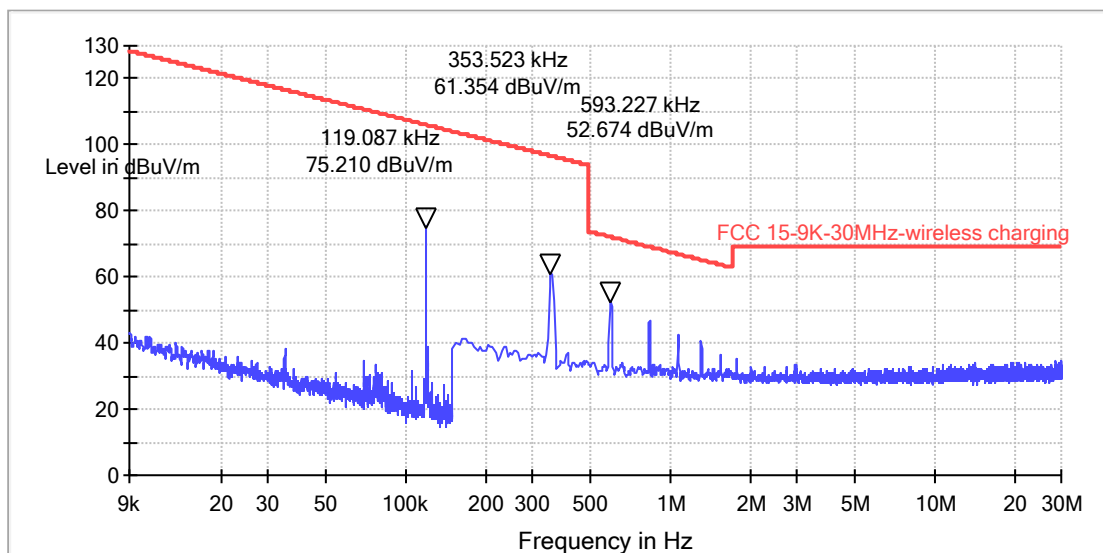
Vertical:



TEST REPORT

Frequency (MHz)	Read Level (dBμV)	Correction Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
0.119	55.0	19.3	74.3	106.1	31.8	PK
0.354	37.9	19.4	57.3	96.6	39.3	PK
0.593	29.0	19.6	48.6	72.1	23.5	PK

Horizontal:

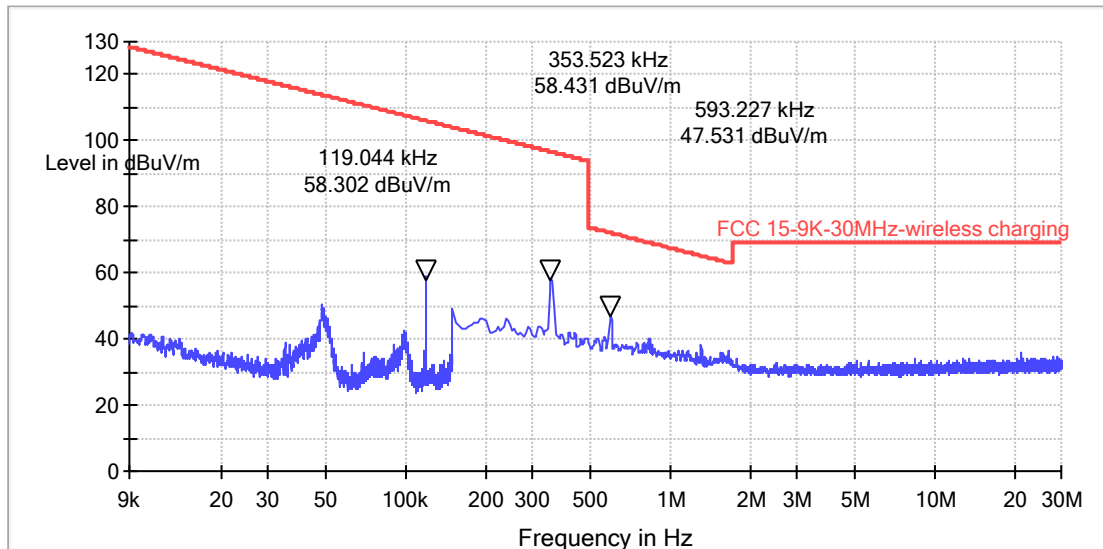


Frequency (MHz)	Read Level (dBμV)	Correction Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
0.119	55.9	19.3	75.2	106.1	30.9	PK
0.354	42.0	19.4	61.4	96.6	35.2	PK
0.593	33.1	19.6	52.7	72.1	19.4	PK

TEST REPORT

MODEL: FLW062-Qi

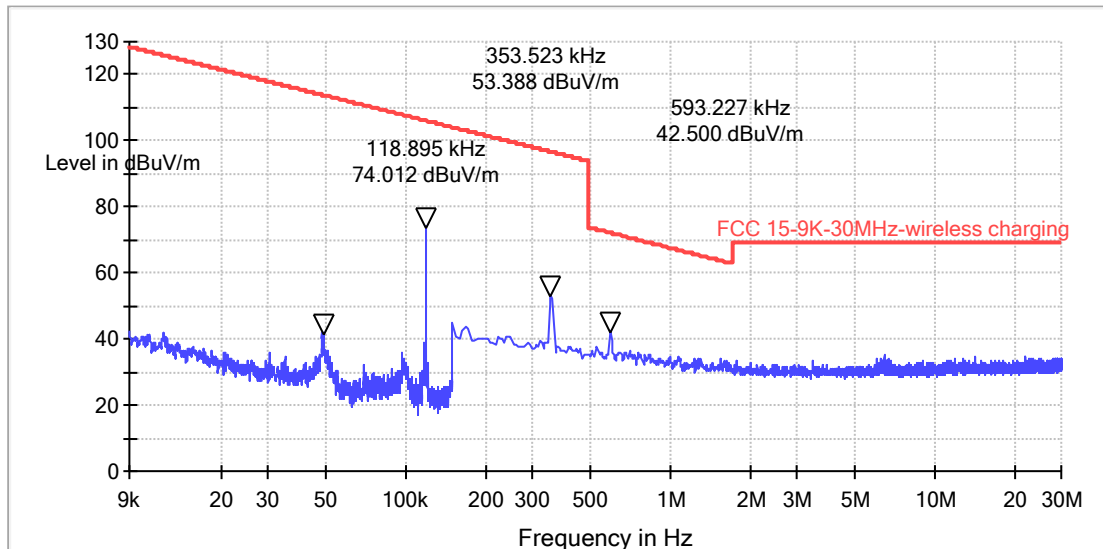
Vertical:



Frequency (MHz)	Read Level (dBμV)	Correction Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
0.119	39.0	19.3	58.3	106.1	47.8	PK
0.354	39.0	19.4	58.4	96.6	38.2	PK
0.593	27.9	19.6	47.5	72.1	24.6	PK

TEST REPORT

Horizontal:



Frequency (MHz)	Read Level (dBμV)	Correction Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
0.119	54.7	19.3	74.0	106.1	32.1	PK
0.354	34.0	19.4	53.4	96.6	43.2	PK
0.593	22.9	19.6	42.5	72.1	29.6	PK

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.

Remark:

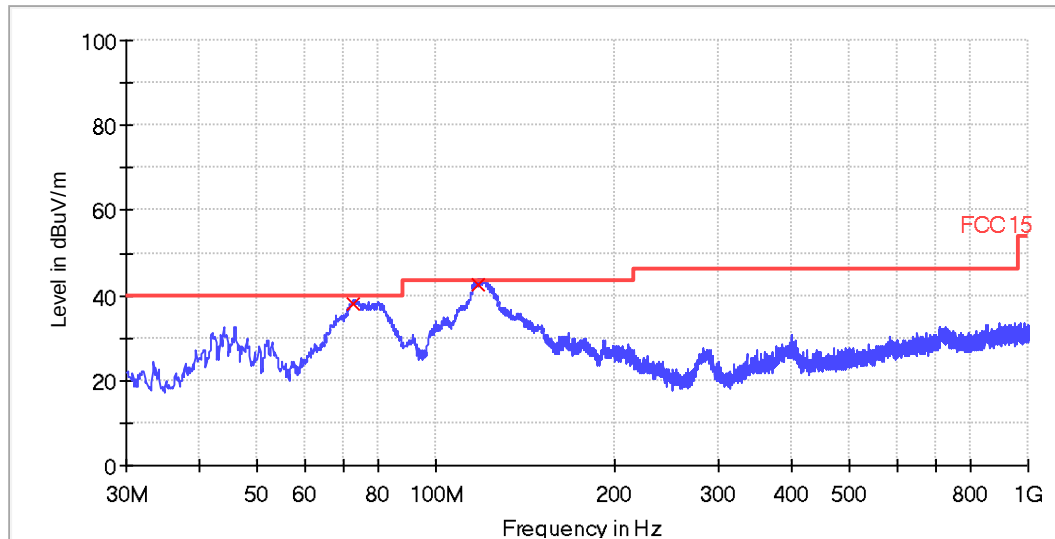
1. Corr. (dB) = Antenna Factor (dB) + Cable Loss (dB)
2. Level (dBμV/m) = Corr. (dB) + Read Level (dBμV)
3. Margin (dB) = Limit (dBμV/m) – Level (dBμV/m)
4. Only record the date closed to limit
5. When Peak emission level was below AV or QP limit, the AV and QP emission level did not be recorded.

TEST REPORT

30 MHz~1 GHz Spurious Emissions. Quasi-Peak Measurement

MODEL: FEN201

Vertical:



Frequency (MHz)	Receiver Reading Level (dBμV)	Correction factors (dB/m)	Emission Level (dBμV/m)	Limit (dBμV/m)
72.8	27.2	10.7	37.9	40.0
118.1	30.7	11.6	42.3	43.5

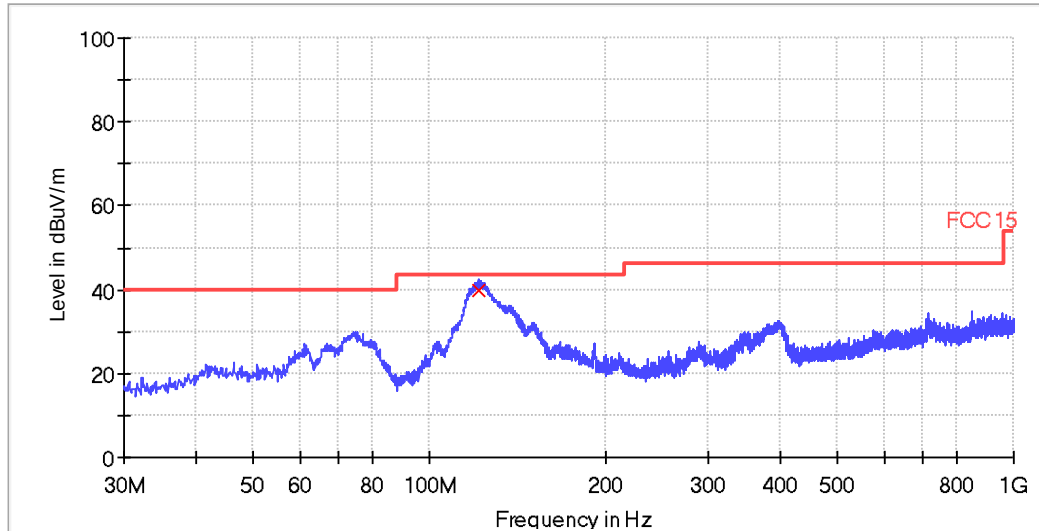
Remark:

Final Test Level = Receiver Reading + Correction Factor

Correction Factor = Antenna Factor + Cable Loss.

TEST REPORT

Horizontal:



Frequency (MHz)	Receiver Reading Level (dBμV)	Correction factors (dB/m)	Emission Level (dBμV/m)	Limit (dBμV/m)
121.0	28.5	11.4	39.9	43.5

Remark:

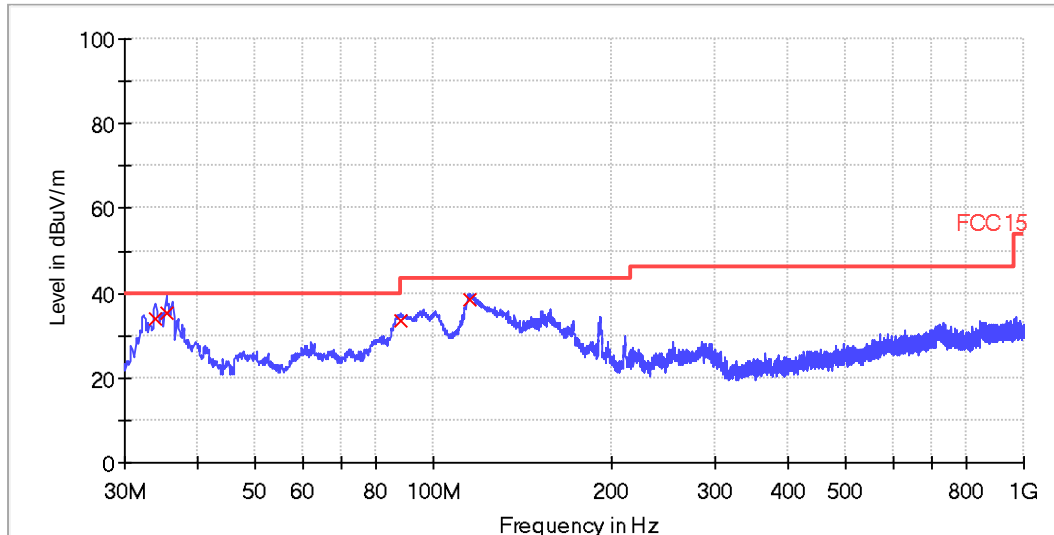
Final Test Level = Receiver Reading + Correction Factor

Correction Factor = Antenna Factor + Cable Loss.

TEST REPORT

MODEL: TLW10-Qi

Vertical:



Frequency (MHz)	Receiver Reading Level (dBμV)	Correction factors (dB/m)	Emission Level (dBμV/m)	Limit (dBμV/m)
33.9	22.3	11.7	34.0	40.0
35.3	23.1	12.1	35.2	40.0
87.8	22.1	11.3	33.4	40.0
115.2	22.3	11.8	38.4	43.5

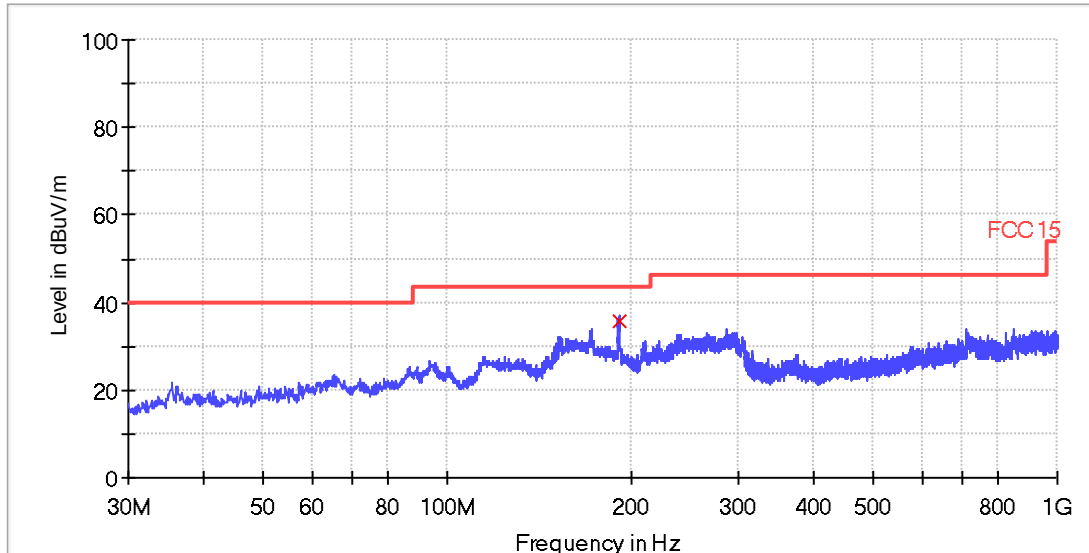
Remark:

Final Test Level = Receiver Reading + Correction Factor

Correction Factor = Antenna Factor + Cable Loss.

TEST REPORT

Horizontal:



Frequency (MHz)	Receiver Reading Level (dBμV)	Correction factors (dB/m)	Emission Level (dBμV/m)	Limit (dBμV/m)
190.9	23.4	12.2	35.6	43.5

Remark:

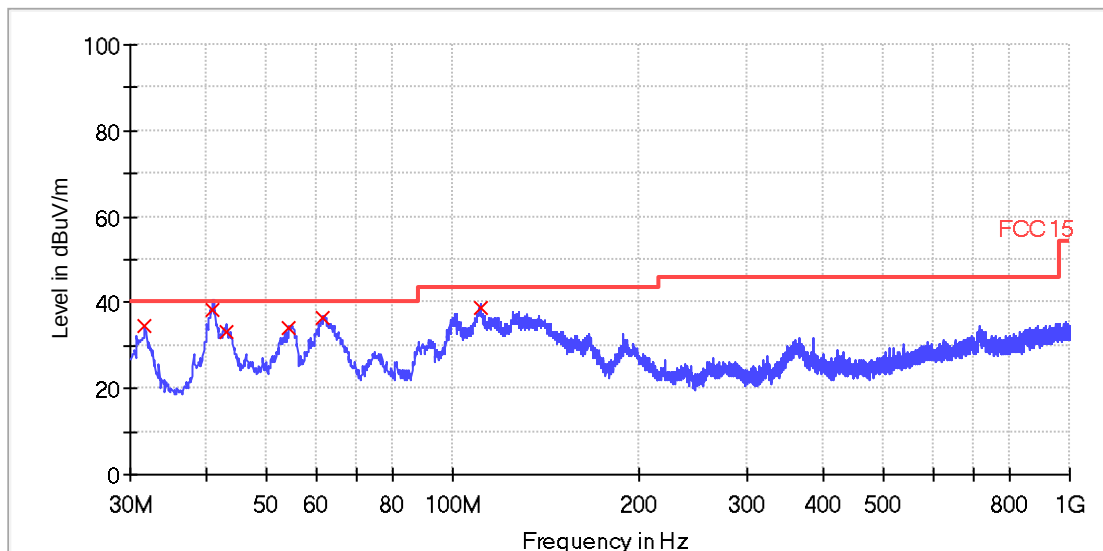
Final Test Level = Receiver Reading + Correction Factor

Correction Factor = Antenna Factor + Cable Loss.

TEST REPORT

MODEL: ATA007

Vertical:



Frequency (MHz)	Receiver Reading Level (dBμV)	Correction factors (dB/m)	Emission Level (dBμV/m)	Limit (dBμV/m)
31.6	21.3	13.2	34.5	40.0
40.7	25.5	13.0	38.5	40.0
43.1	19.9	13.1	33.0	40.0
54.2	20.1	13.8	33.9	40.0
61.7	22.7	13.6	36.3	40.0
110.8	26.8	12.2	39.0	43.5

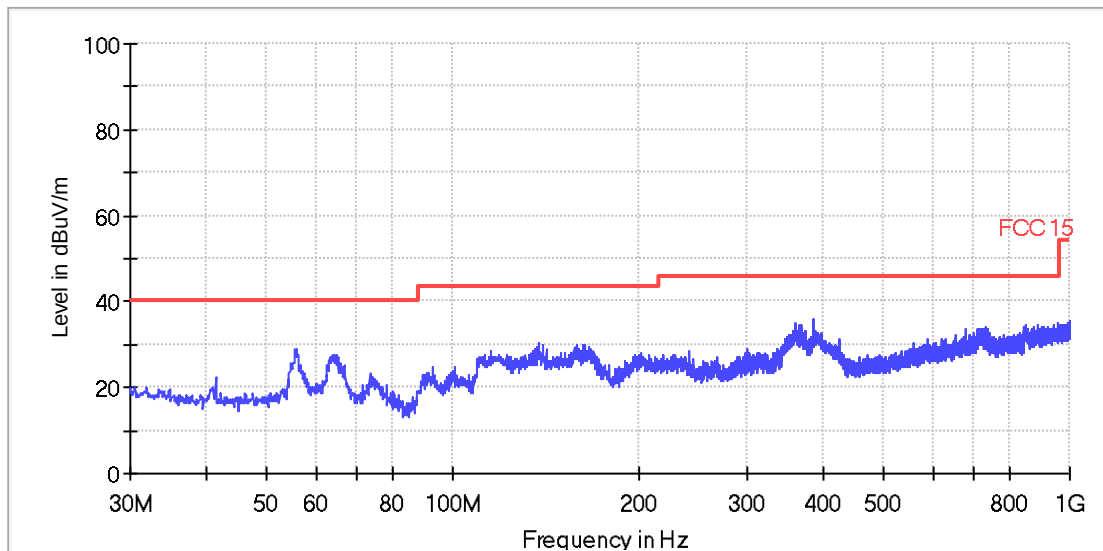
Remark:

Final Test Level = Receiver Reading + Correction Factor

Correction Factor = Antenna Factor + Cable Loss.

TEST REPORT

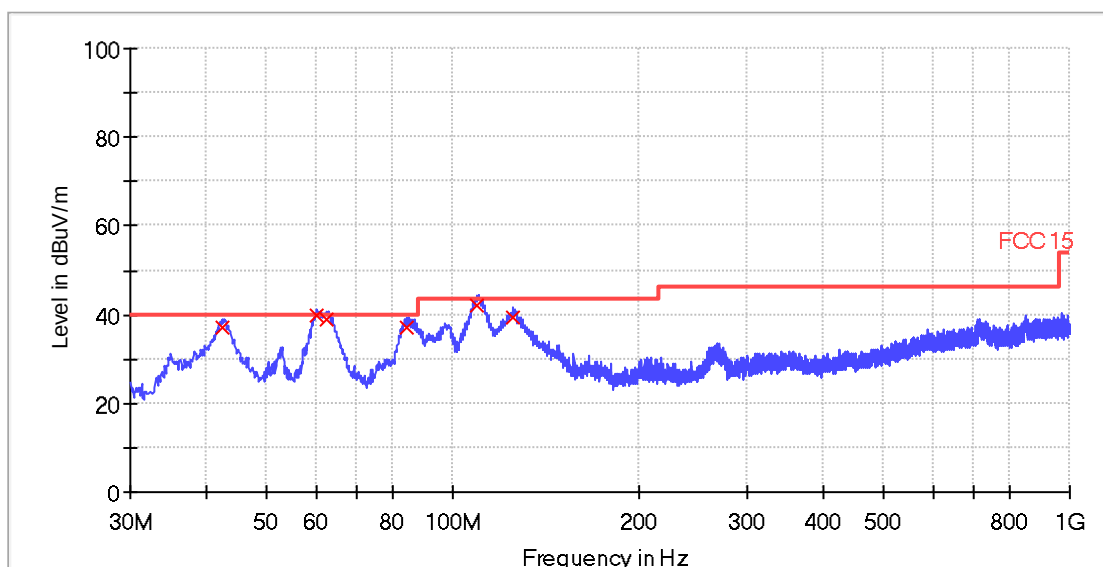
Horizontal:



All emission levels are more than 6 dB below the limit.

MODEL: TLW09-Qi

Vertical:



TEST REPORT

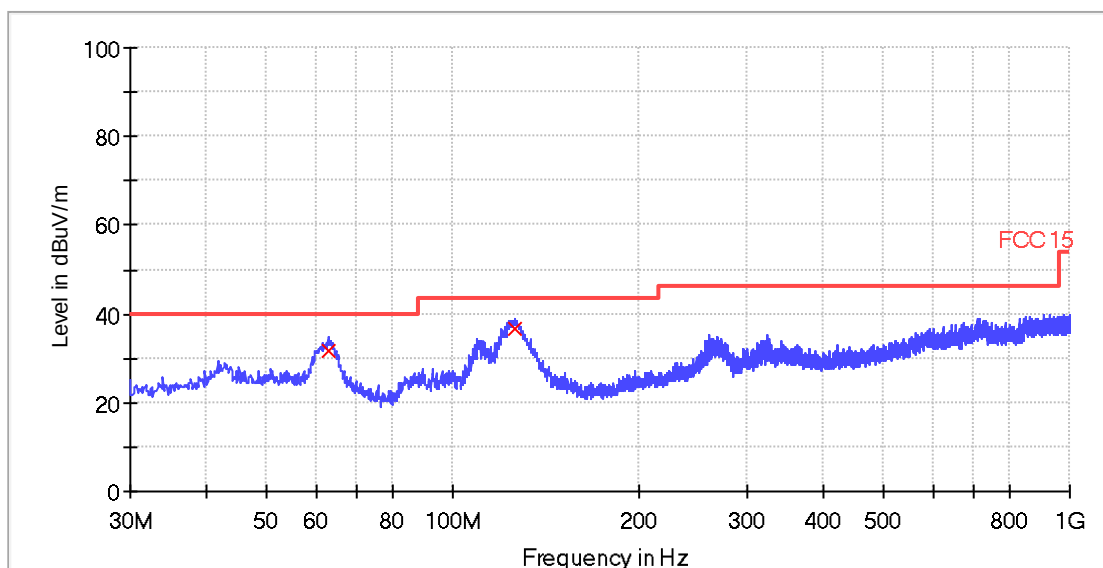
Frequency (MHz)	Receiver Reading Level (dBμV)	Correction factors (dB/m)	Emission Level (dBμV/m)	Limit (dBμV/m)
42.2	17.2	20.1	37.3	40.0
60.3	20.4	19.4	39.8	40.0
62.5	20.2	18.7	38.9	40.0
84.3	21.9	15.2	37.1	40.0
109.6	23.5	18.5	42.0	43.5
125.4	23.0	16.2	39.2	43.5

Remark:

Final Test Level = Receiver Reading + Correction Factor

Correction Factor = Antenna Factor + Cable Loss.

Horizontal:



Frequency (MHz)	Receiver Reading Level (dBμV)	Correction factors (dB/m)	Emission Level (dBμV/m)	Limit (dBμV/m)
62.8	13.1	18.6	31.7	40.0
126.2	20.7	16.1	36.8	43.5

Remark:

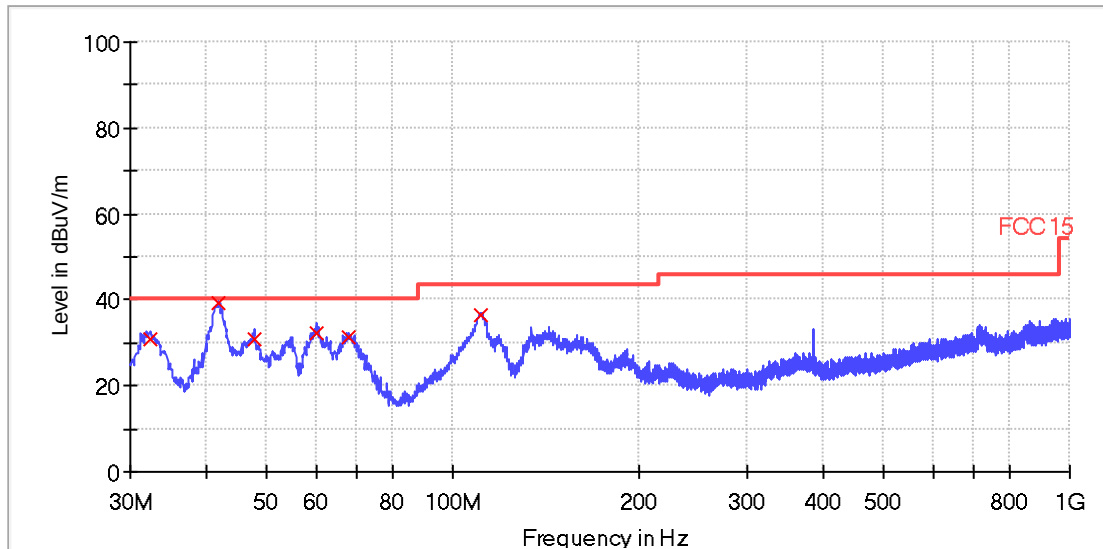
Final Test Level = Receiver Reading + Correction Factor

Correction Factor = Antenna Factor + Cable Loss.

TEST REPORT

MODEL: FLW062-Qi

Vertical:



Frequency (MHz)	Receiver Reading Level (dBμV)	Correction factors (dB/m)	Emission Level (dBμV/m)	Limit (dBμV/m)
32.4	17.8	13.2	31.0	40.0
41.7	26.3	13.0	39.3	40.0
47.6	17.7	13.3	31.0	40.0
60.1	18.1	14.3	32.4	40.0
67.7	20.5	10.9	31.4	40.0
111.4	24.0	12.3	36.3	43.5

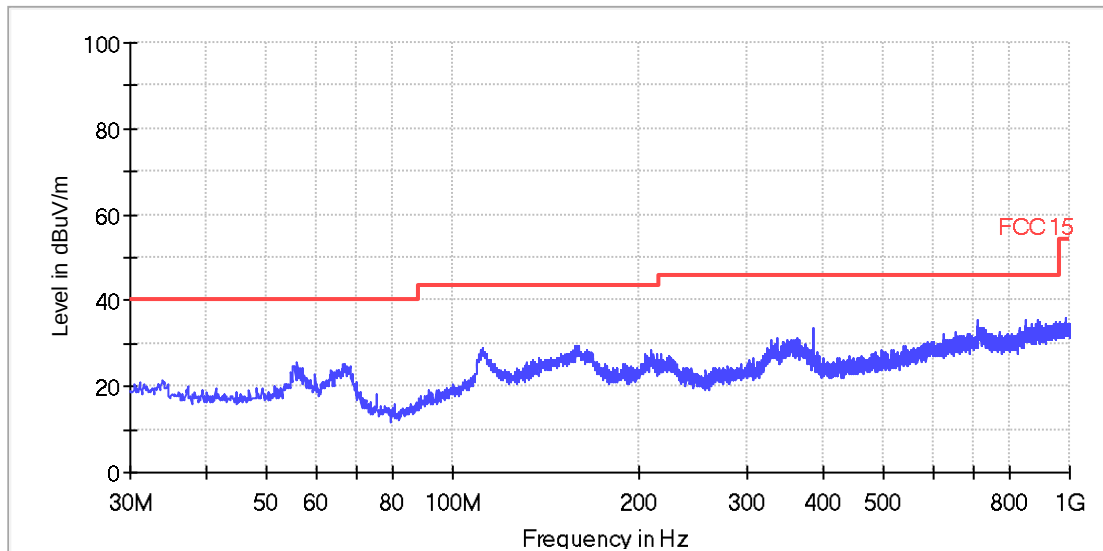
Remark:

Final Test Level = Receiver Reading + Correction Factor

Correction Factor = Antenna Factor + Cable Loss.

TEST REPORT

Horizontal:



All emission levels are more than 6 dB below the limit.

TEST REPORT

5.0 Occupied Bandwidth

Test Method: FCC PART 15 C section 15.215

Test Status: Test in transmitting mode.

Requirements: Bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

Method of measurement: The useful radiated emission from the EUT was detected by the spectrum analyzer with peak detector. Record the 99% bandwidth of the main frequency.

Used Test Equipment List

Spectrum Analyzer. Refer to Clause 7 Test Equipment List for details.

Test result:

MODEL: FEN201

Test Channel	bandwidth	Limit
Lowest channel (119.0kHz)	10.04Hz	/
Highest channel (146.0kHz)	271.27Hz	

MODEL: TLW10-Qi

Test Channel	bandwidth	Limit
Lowest channel (119.0kHz)	9.43Hz	/
Highest channel (146.0kHz)	248.64Hz	

MODEL: ATA007

Test Channel	bandwidth	Limit
Lowest channel (119.0kHz)	10.41Hz	/
Highest channel (146.0kHz)	184.13Hz	

MODEL: TLW09-Qi

Test Channel	bandwidth	Limit
Lowest channel (119.0kHz)	9.57Hz	/
Highest channel (146.0kHz)	100.99Hz	

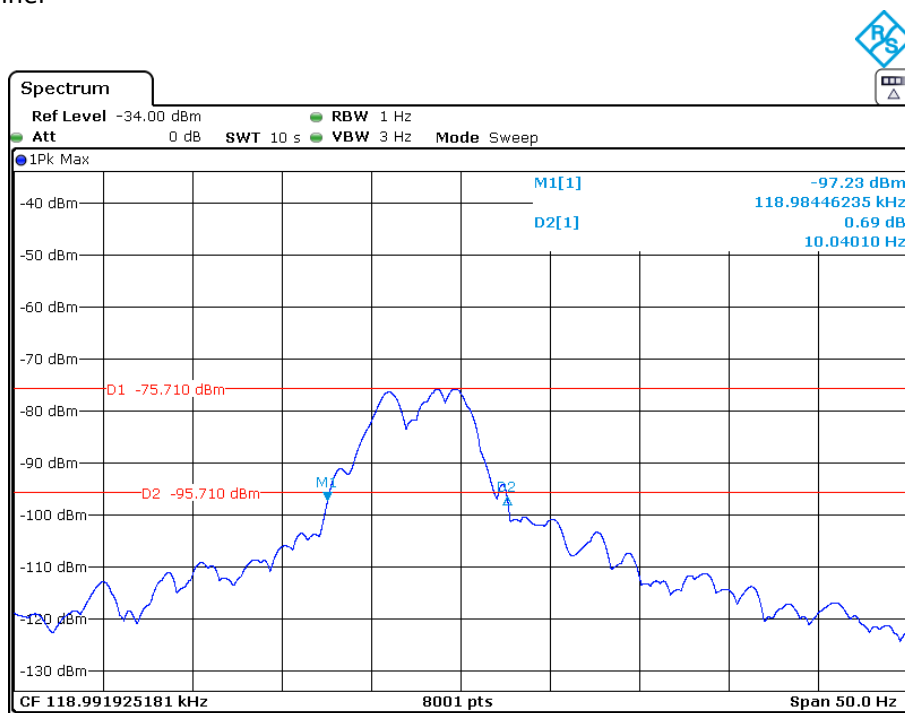
MODEL: FLW062-Qi

Test Channel	bandwidth	Limit
Lowest channel (119.0kHz)	9.11Hz	/
Highest channel (146.0kHz)	273.34Hz	

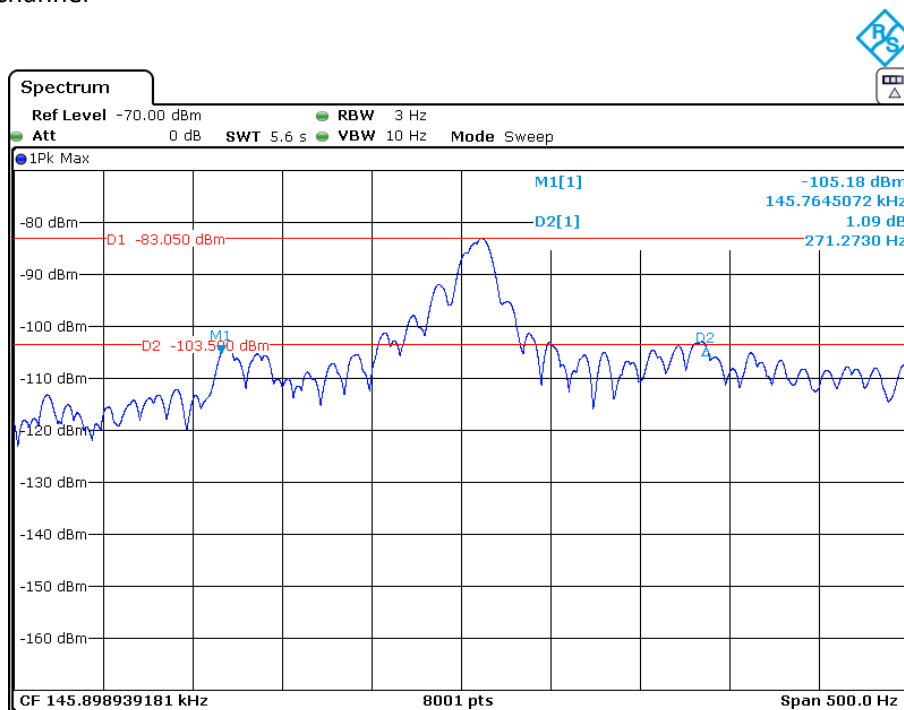
TEST REPORT

MODEL: FEN201

Lowest channel



Highest channel

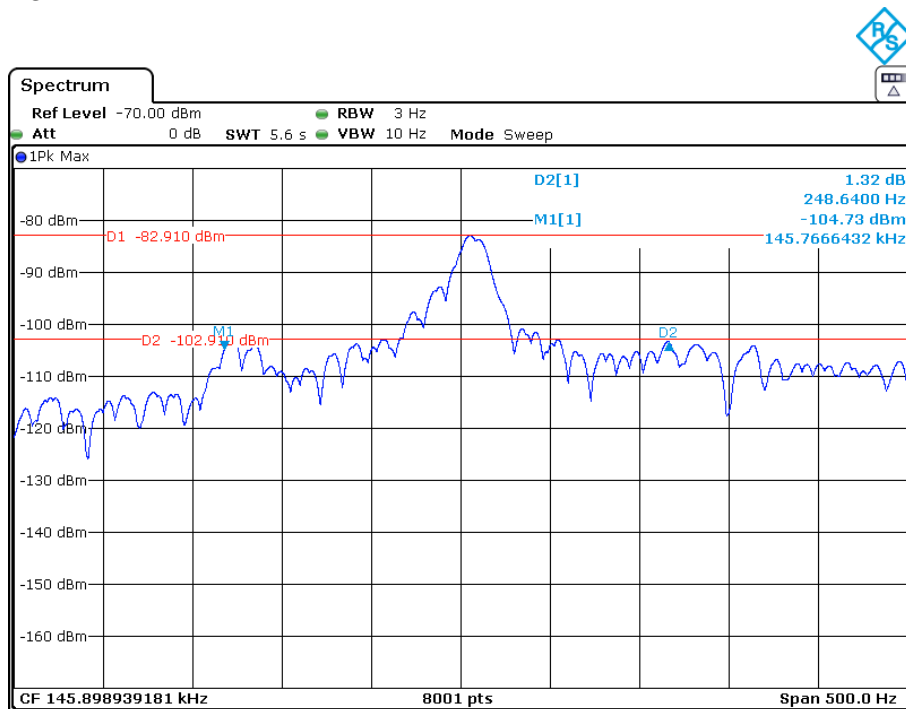


TEST REPORT

MODEL: TLW10-Qi
Lowest channel

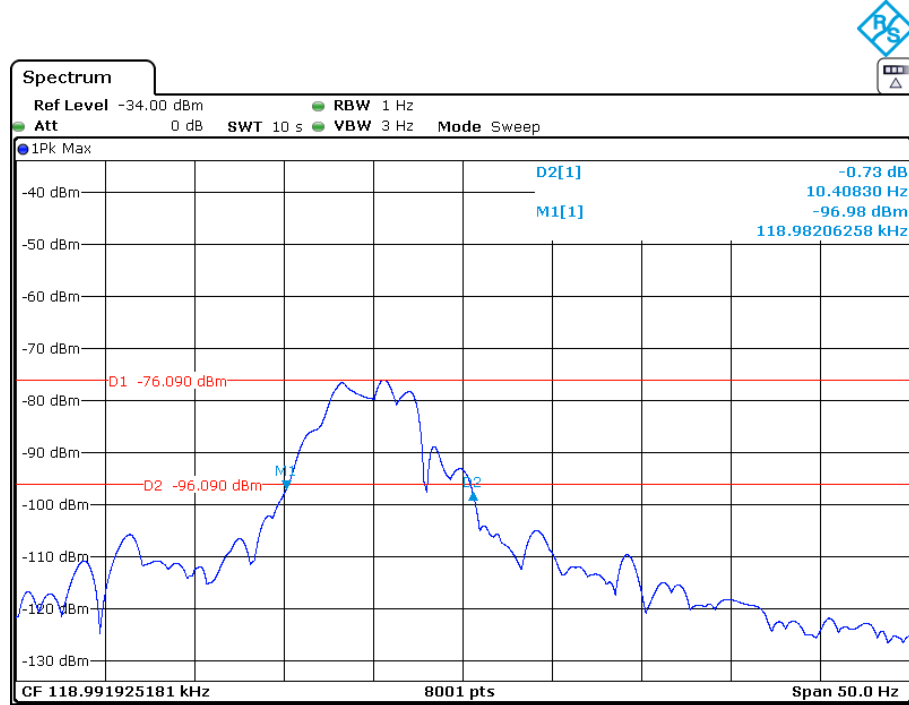


Highest channel

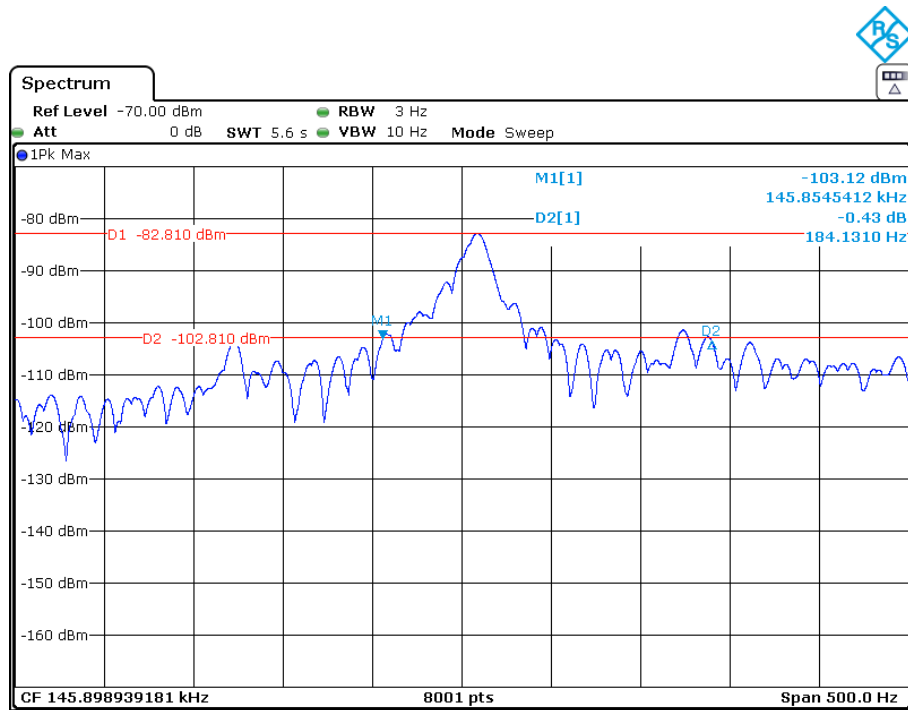


TEST REPORT

MODEL: ATA007
Lowest channel

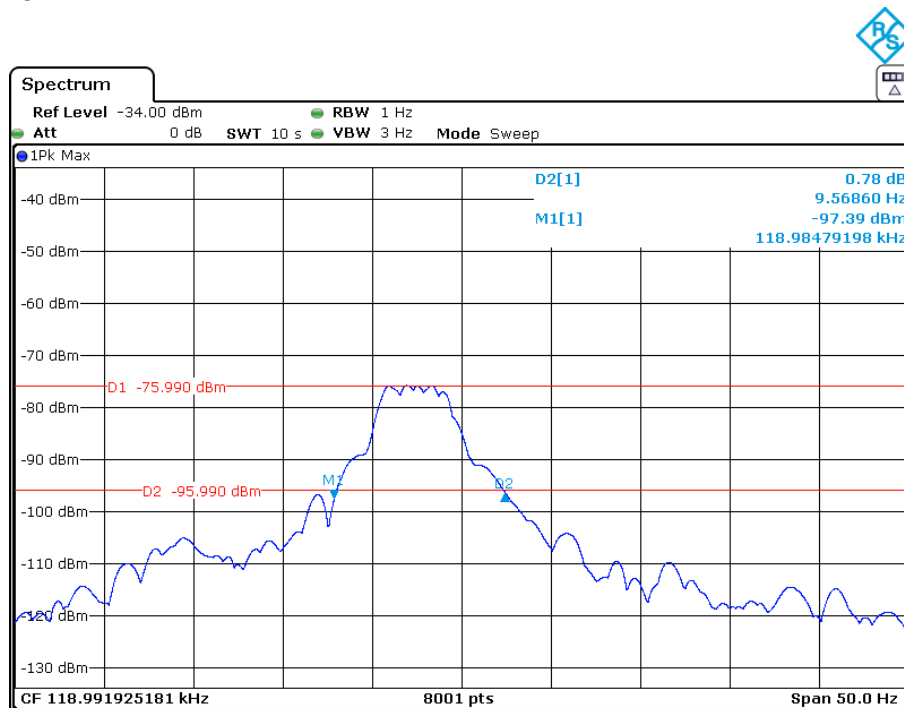


Highest channel

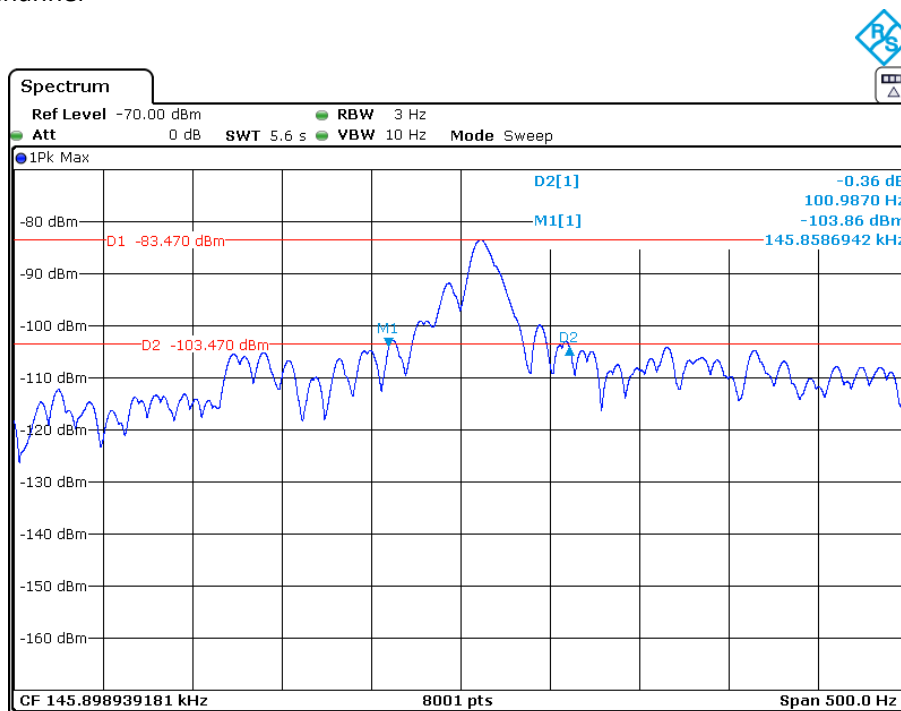


TEST REPORT

MODEL: TLW09-Qi
Lowest channel



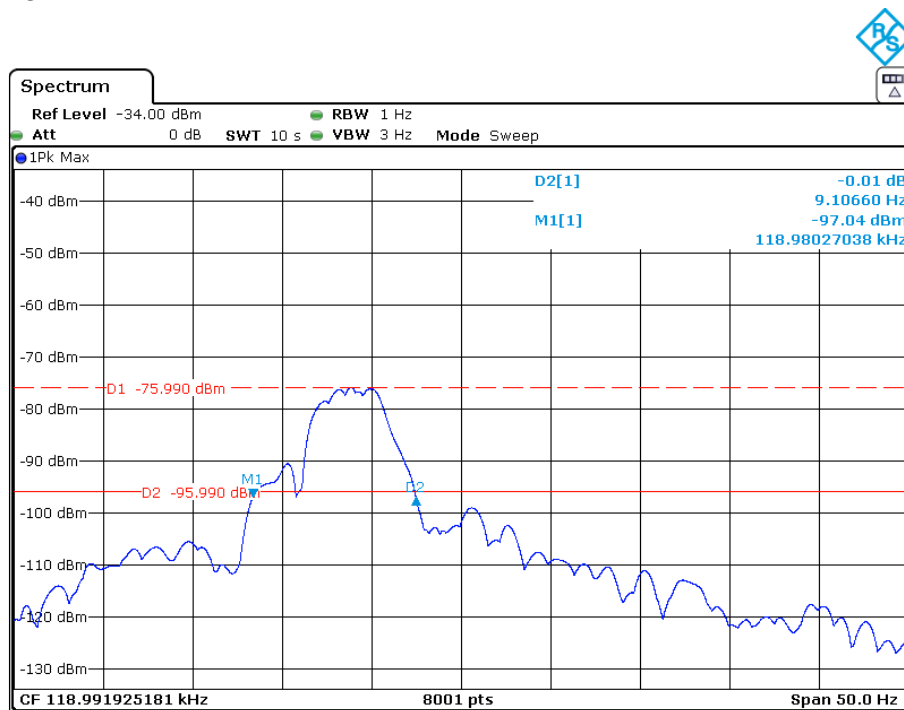
Highest channel



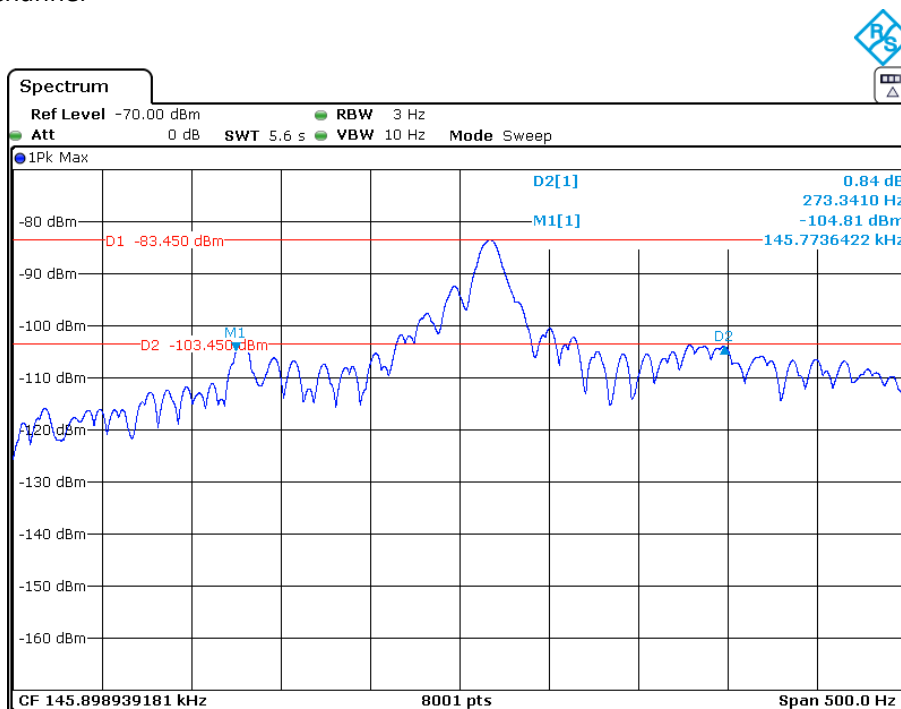
TEST REPORT

MODEL: FLW062-Qi

Lowest channel



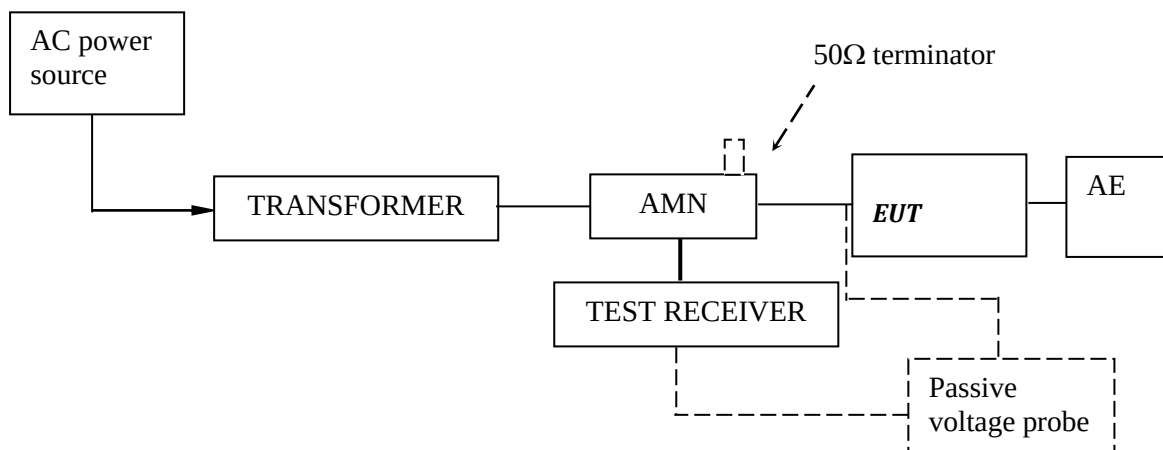
Highest channel



TEST REPORT

6.0 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

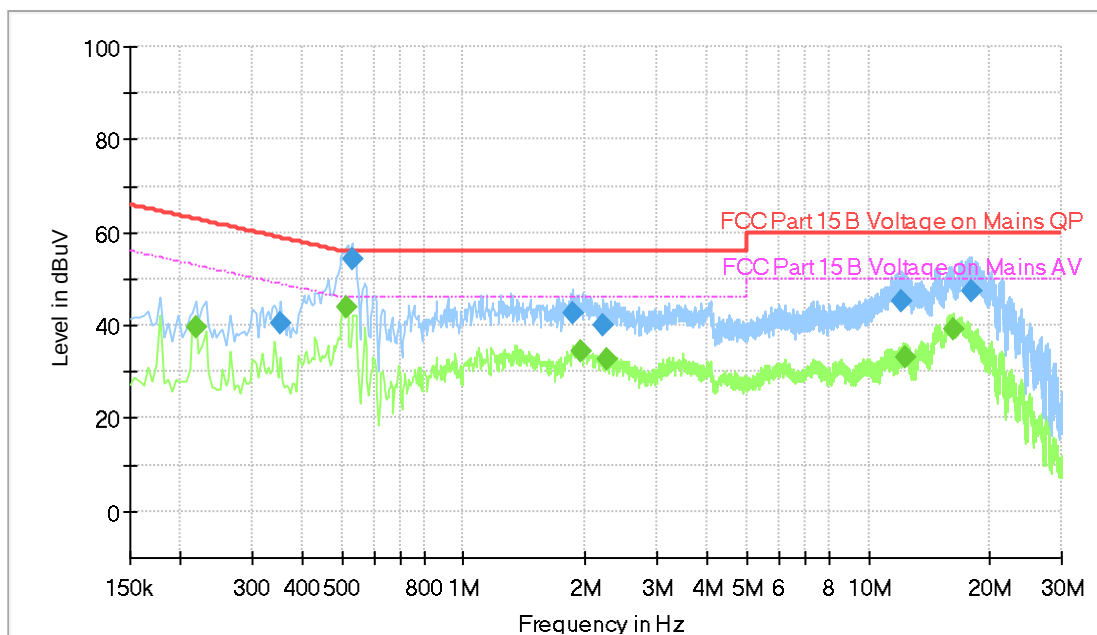
At mains terminal:

MODEL: FEN201

Tested Wire: Live

Operation Mode: EUT on with full load

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.218000	---	39.68	52.90	13.21	1000.0	9.000	L1	ON	9.8
0.354000	40.29	---	58.87	18.57	1000.0	9.000	L1	ON	9.8
0.514000	---	43.77	46.00	2.23	1000.0	9.000	L1	ON	9.8
0.530000	54.43	---	56.00	1.57	1000.0	9.000	L1	ON	9.8
1.858000	42.71	---	56.00	13.29	1000.0	9.000	L1	ON	9.8
1.950000	---	34.44	46.00	11.56	1000.0	9.000	L1	ON	9.8
2.202000	40.01	---	56.00	15.99	1000.0	9.000	L1	ON	9.8
2.250000	---	32.59	46.00	13.41	1000.0	9.000	L1	ON	9.8
11.994000	45.21	---	60.00	14.79	1000.0	9.000	L1	ON	10.1
12.310000	---	33.18	50.00	16.82	1000.0	9.000	L1	ON	10.1
16.146000	---	39.02	50.00	10.98	1000.0	9.000	L1	ON	10.2
17.870000	47.30	---	60.00	12.70	1000.0	9.000	L1	ON	10.2

Remark:

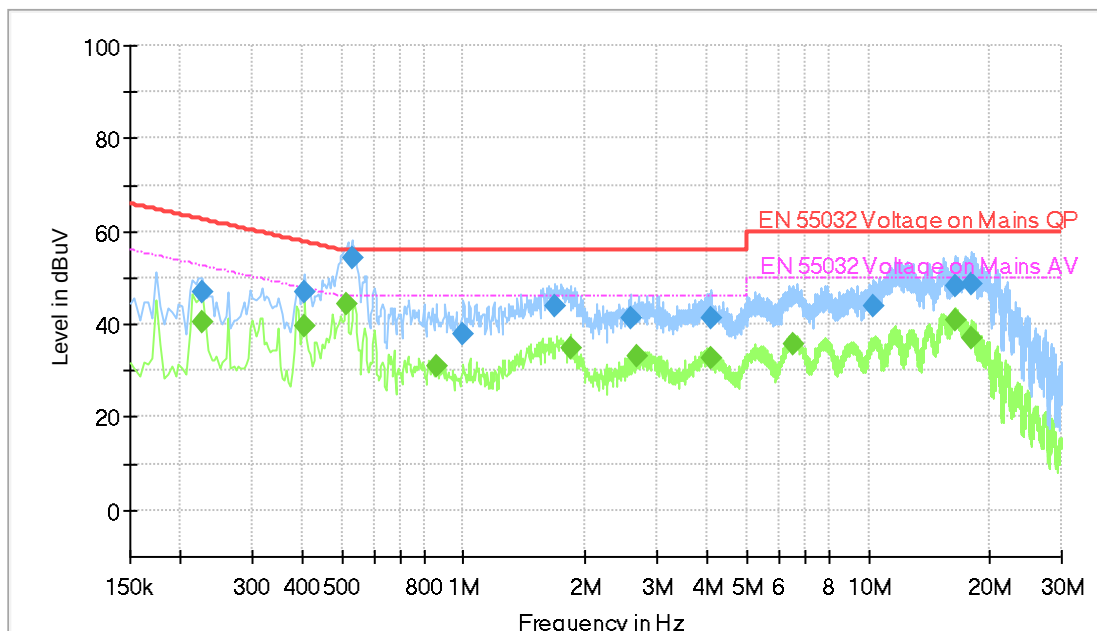
1. Corr. (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Level (dBμV) = Corr. (dB) + Read Level (dBμV)
3. Delta Limit (dB) = Level (dBμV)-Limit (dBμV)

TEST REPORT

Tested Wire: Neutral

Operation Mode: EUT on with full load

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.226000	---	40.45	52.60	12.14	1000.0	9.000	N	ON	9.8
0.226000	47.04	---	62.60	15.56	1000.0	9.000	N	ON	9.8
0.406000	---	39.66	47.73	8.07	1000.0	9.000	N	ON	9.8
0.406000	47.07	---	57.73	10.66	1000.0	9.000	N	ON	9.8
0.514000	---	44.33	46.00	1.67	1000.0	9.000	N	ON	9.8
0.530000	54.41	---	56.00	1.59	1000.0	9.000	N	ON	9.8
0.862000	---	30.97	46.00	15.03	1000.0	9.000	N	ON	9.8
0.998000	37.84	---	56.00	18.16	1000.0	9.000	N	ON	9.8
1.682000	43.98	---	56.00	12.02	1000.0	9.000	N	ON	9.8
1.830000	---	35.03	46.00	10.97	1000.0	9.000	N	ON	9.8
2.578000	41.37	---	56.00	14.63	1000.0	9.000	N	ON	9.8
2.678000	---	33.26	46.00	12.74	1000.0	9.000	N	ON	9.9
4.062000	---	32.87	46.00	13.13	1000.0	9.000	N	ON	9.9
4.070000	41.17	---	56.00	14.83	1000.0	9.000	N	ON	9.9
6.490000	---	35.86	50.00	14.14	1000.0	9.000	N	ON	10.0
10.282000	44.13	---	60.00	15.87	1000.0	9.000	N	ON	10.1
16.314000	48.22	---	60.00	11.78	1000.0	9.000	N	ON	10.3
16.358000	---	40.95	50.00	9.05	1000.0	9.000	N	ON	10.3
18.050000	---	37.04	50.00	12.96	1000.0	9.000	N	ON	10.3
18.050000	48.81	---	60.00	11.19	1000.0	9.000	N	ON	10.3

Remark:

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

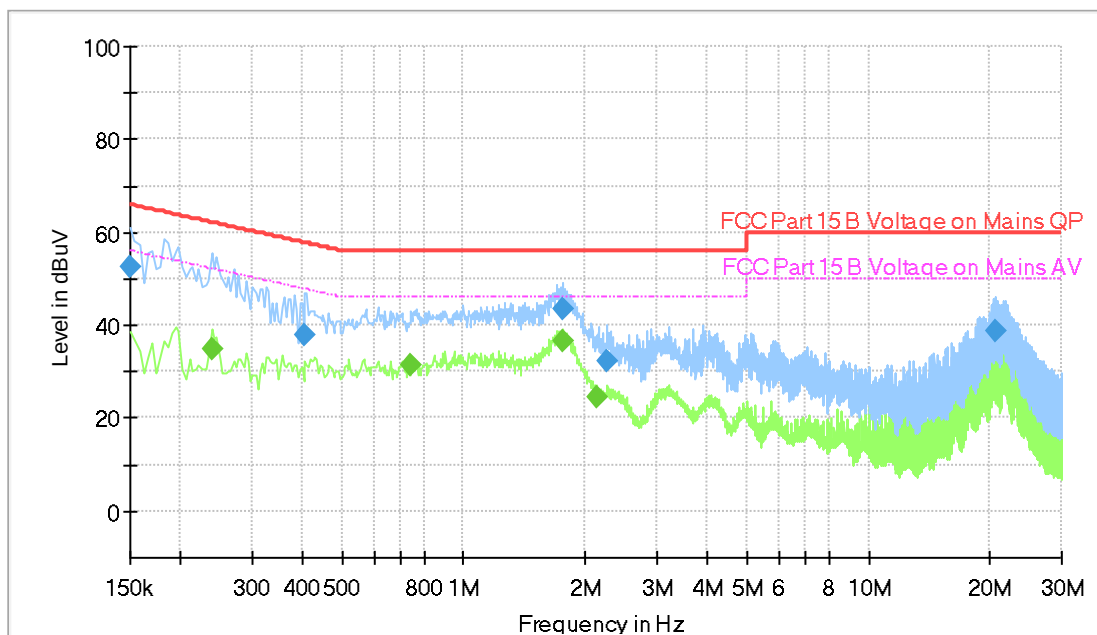
TEST REPORT

MODEL: TLW10-Qi

Tested Wire: Live

Operation Mode: EUT on with full load

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.150000	52.51	---	66.00	13.49	1000.0	9.000	L1	ON	9.7
0.238000	---	34.69	52.17	17.47	1000.0	9.000	L1	ON	9.7
0.406000	38.00	---	57.73	19.73	1000.0	9.000	L1	ON	9.7
0.742000	---	31.25	46.00	14.75	1000.0	9.000	L1	ON	9.8
1.758000	43.60	---	56.00	12.40	1000.0	9.000	L1	ON	9.8
1.766000	---	36.67	46.00	9.33	1000.0	9.000	L1	ON	9.8
2.122000	---	24.64	46.00	21.36	1000.0	9.000	L1	ON	9.8
2.258000	32.33	---	56.00	23.67	1000.0	9.000	L1	ON	9.8
20.510000	38.74	---	60.00	21.26	1000.0	9.000	L1	ON	10.3

Remark:

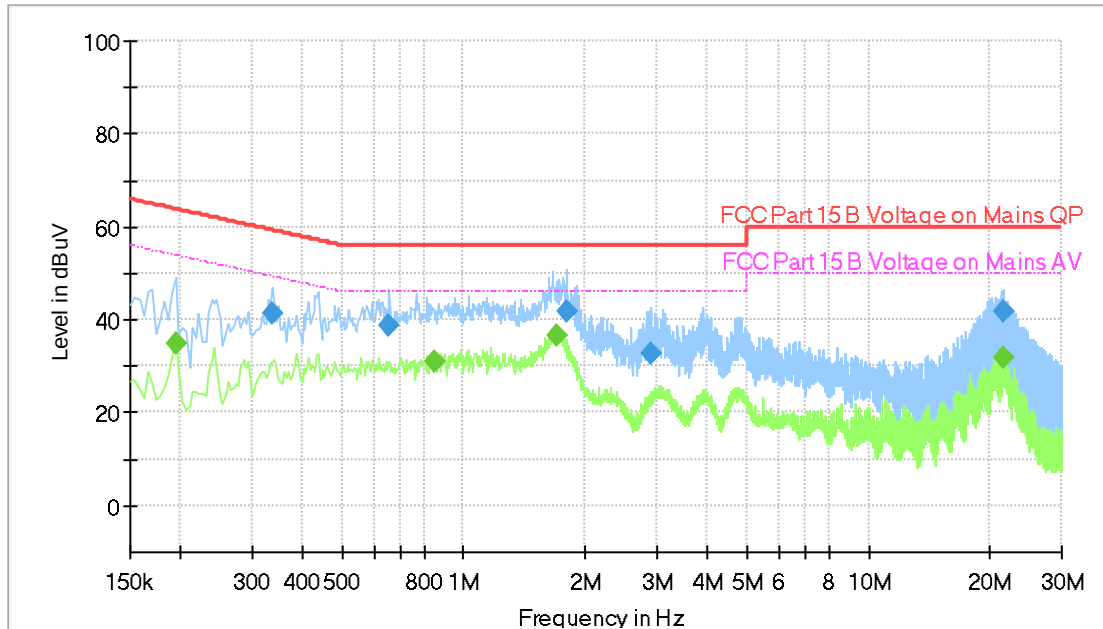
1. Corr. (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Level (dBμV) = Corr. (dB) + Read Level (dBμV)
3. Delta Limit (dB) = Level (dBμV)-Limit (dBμV)

TEST REPORT

Tested Wire: Neutral

Operation Mode: EUT on with full load

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.194000	---	34.84	53.86	19.03	1000.0	9.000	N	ON	9.8
0.338000	41.42	---	59.25	17.84	1000.0	9.000	N	ON	9.8
0.654000	38.79	---	56.00	17.21	1000.0	9.000	N	ON	9.8
0.846000	---	31.00	46.00	15.00	1000.0	9.000	N	ON	9.8
1.702000	---	36.55	46.00	9.45	1000.0	9.000	N	ON	9.8
1.794000	41.58	---	56.00	14.42	1000.0	9.000	N	ON	9.8
2.886000	32.77	---	56.00	23.23	1000.0	9.000	N	ON	9.8
21.438000	---	31.92	50.00	18.08	1000.0	9.000	N	ON	10.4
21.438000	41.84	---	60.00	18.16	1000.0	9.000	N	ON	10.4

Remark:

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

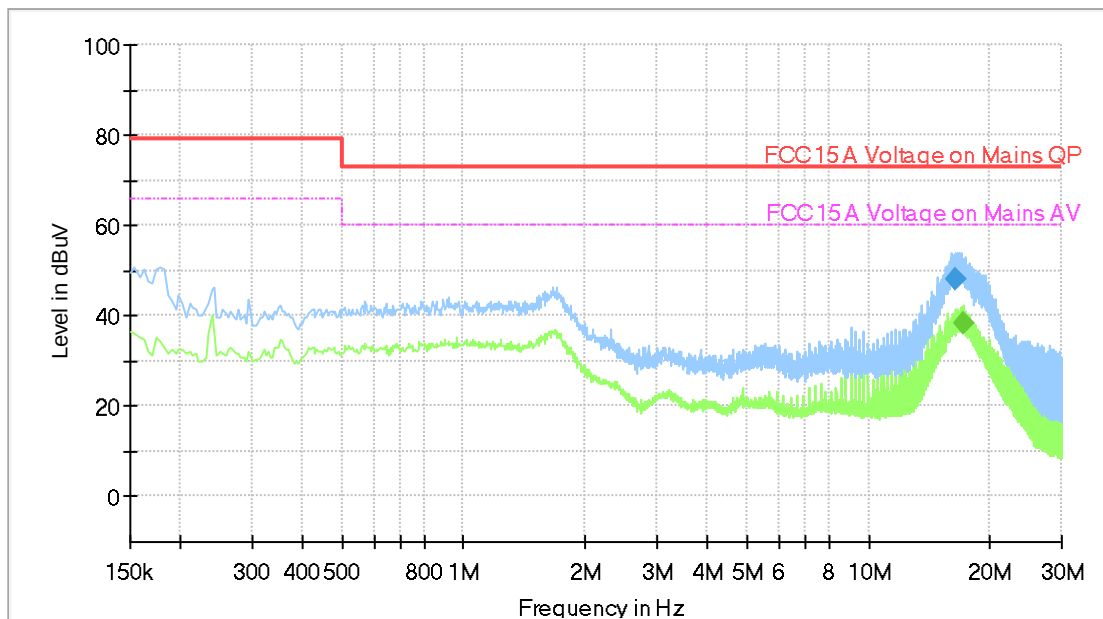
TEST REPORT

Model: ATA007

Tested Wire: Live

Operation Mode: EUT on with full load

Full Spectrum



Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
16.406000	48.21	---	73.00	24.79	1000.0	9.000	L1	ON	10.1
17.122000	---	38.14	60.00	21.86	1000.0	9.000	L1	ON	10.2

Remark:

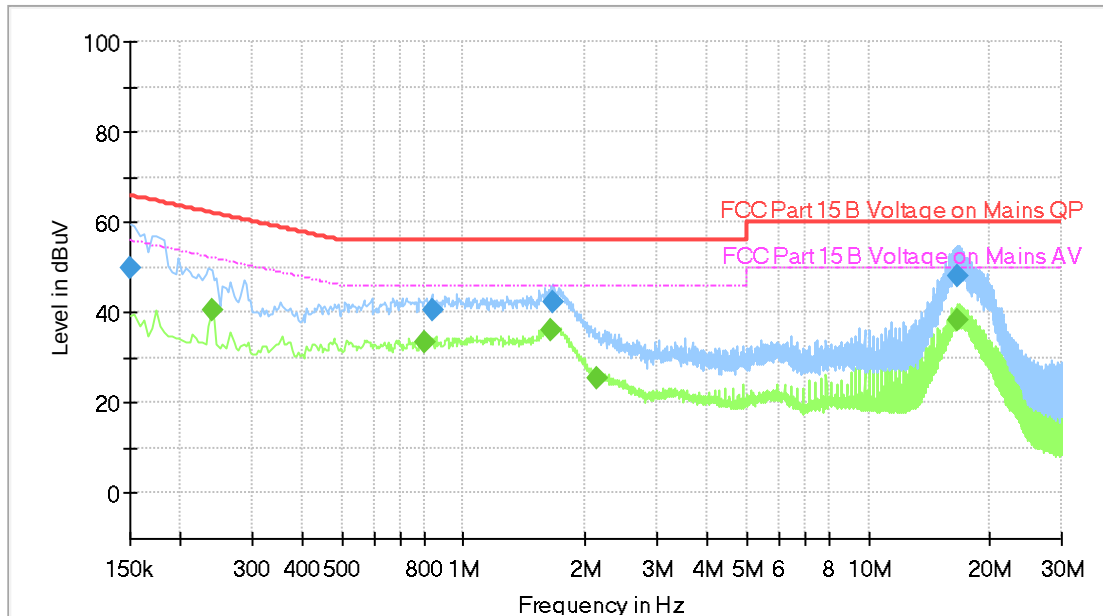
1. Corr. (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Level (dBμV) = Corr. (dB) + Read Level (dBμV)
3. Delta Limit (dB) = Level (dBμV)-Limit (dBμV)

TEST REPORT

Tested Wire: Neutral

Operation Mode: EUT on with full load

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.150000	49.70	---	66.00	16.30	1000.0	9.000	N	ON	9.8
0.238000	---	40.45	52.17	11.71	1000.0	9.000	N	ON	9.8
0.798000	---	33.29	46.00	12.71	1000.0	9.000	N	ON	9.8
0.834000	40.35	---	56.00	15.65	1000.0	9.000	N	ON	9.8
1.646000	---	35.97	46.00	10.03	1000.0	9.000	N	ON	9.8
1.666000	42.39	---	56.00	13.61	1000.0	9.000	N	ON	9.8
2.134000	---	25.54	46.00	20.46	1000.0	9.000	N	ON	9.8
16.554000	---	38.37	50.00	11.63	1000.0	9.000	N	ON	10.3
16.670000	47.95	---	60.00	12.05	1000.0	9.000	N	ON	10.3

Remark:

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

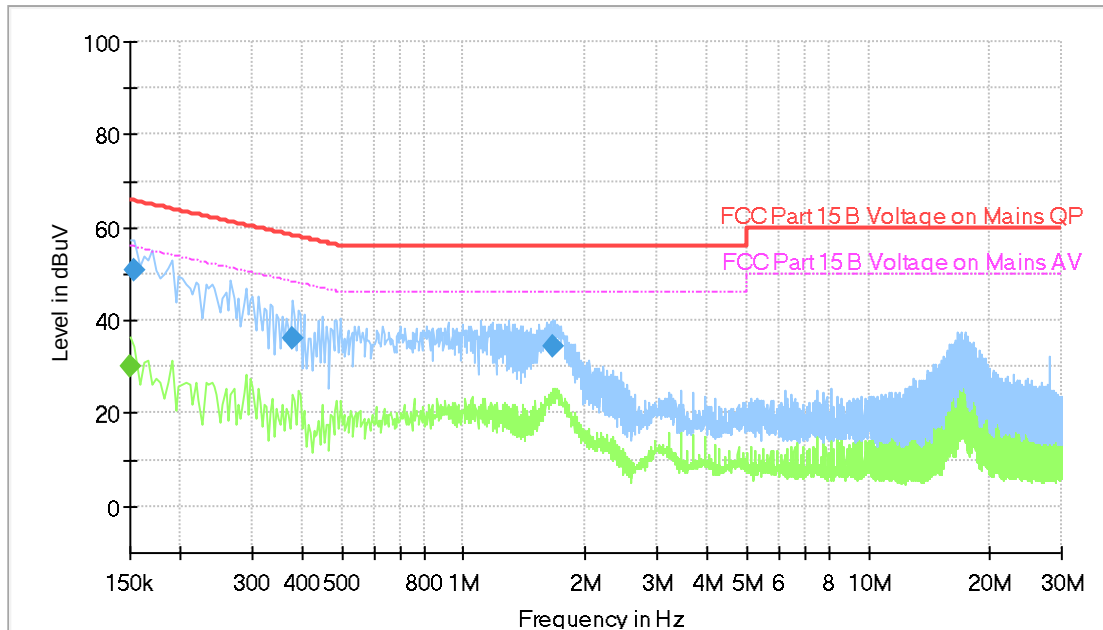
TEST REPORT

Model: TLW09-Qi

Tested Wire: Live

Operation Mode: EUT on with full load

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.150000	---	29.92	56.00	26.08	1000.0	9.000	L1	ON	9.7
0.154000	50.83	---	65.78	14.95	1000.0	9.000	L1	ON	9.7
0.378000	36.12	---	58.32	22.20	1000.0	9.000	L1	ON	9.7
1.654000	34.41	---	56.00	21.59	1000.0	9.000	L1	ON	9.8

Remark:

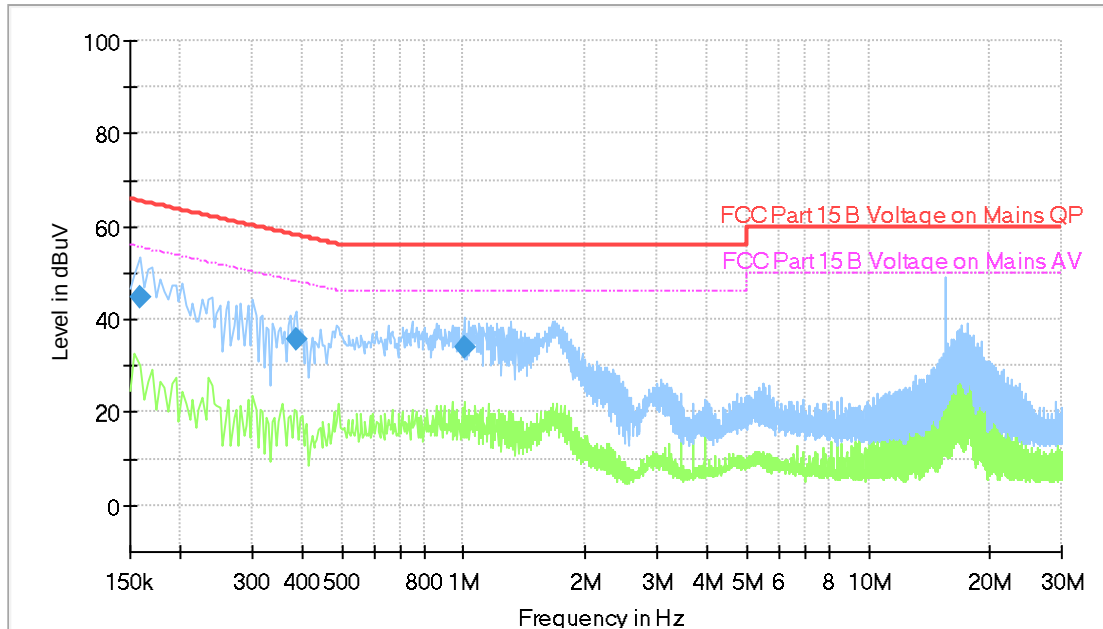
1. Corr. (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Level (dBμV) = Corr. (dB) + Read Level (dBμV)
3. Delta Limit (dB) = Level (dBμV)-Limit (dBμV)

TEST REPORT

Tested Wire: Neutral

Operation Mode: EUT on with full load

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.158000	44.96	---	65.57	20.61	1000.0	9.000	N	ON	9.8
0.386000	35.59	---	58.15	22.56	1000.0	9.000	N	ON	9.8
1.002000	34.05	---	56.00	21.95	1000.0	9.000	N	ON	9.8

Remark:

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

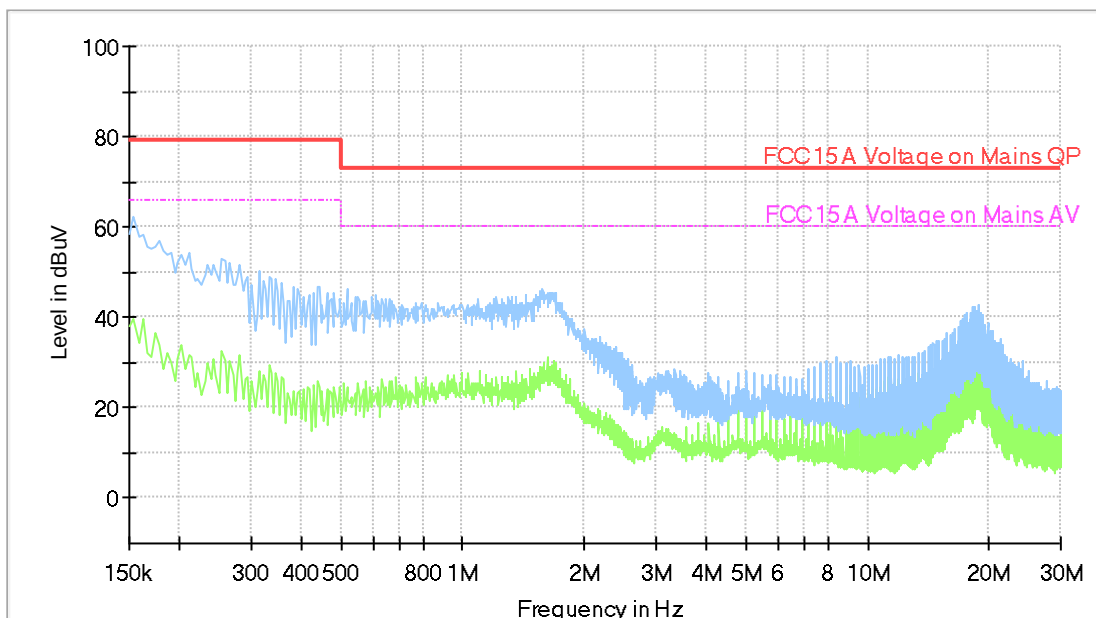
TEST REPORT

Model: FLW062-Qi

Tested Wire: Live

Operation Mode: EUT on with full load

Full Spectrum

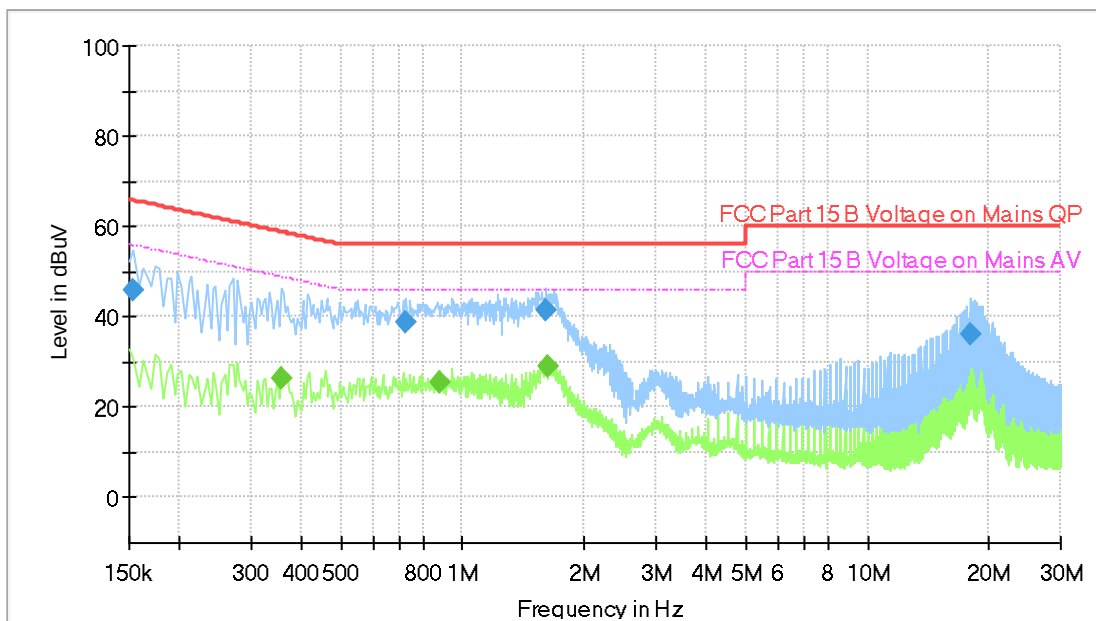


All emission levels are more than 10 dB below the limit.

Tested Wire: Neutral

Operation Mode: EUT on with full load

Full Spectrum



TEST REPORT

Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.154000	46.05	---	65.78	19.73	1000.0	9.000	N	ON	9.8
0.358000	---	26.59	48.78	22.19	1000.0	9.000	N	ON	9.8
0.726000	38.96	---	56.00	17.04	1000.0	9.000	N	ON	9.8
0.874000	---	25.32	46.00	20.68	1000.0	9.000	N	ON	9.8
1.606000	41.56	---	56.00	14.44	1000.0	9.000	N	ON	9.8
1.614000	---	28.91	46.00	17.09	1000.0	9.000	N	ON	9.8
17.870000	36.27	---	60.00	23.73	1000.0	9.000	N	ON	10.3

Remark:

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

TEST REPORT

7.0 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	2022-11-16	1Y
EM031-03	Signal and Spectrum Analyzer (10 Hz~40 GHz)	R&S FSV40	R&S	2022-12-23	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	SCHW ARZBECK	2023-06-26	1Y
EM033-01	TRILOG Super Broadband test Antenna(30 MHz-3 GHz) (RX)	VULB 9163	SCHW ARZBECK	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*****