

TEST REPORT

4.7 Radiated Emissions

Test Requirement:	FCC Part 15 C section 15.247 section 15.247: (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).
Test Method:	ANSI C63.10: Clause 11.11, 11.12, 6.4, 6.5 and 6.6
Test Status:	Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)
Limit:	40.0 dBµV/m between 30MHz & 88MHz; 43.5 dBµV/m between 88MHz & 216MHz; 46.0 dBµV/m between 216MHz & 960MHz; 54.0 dBµV/m above 960MHz.
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: RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz VBW=10 Hz

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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:

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

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

Where:

FS = Field Strength in dBμV/m

RA = Receiver Amplitude (including preamplifier) in dBμV

AF = Antenna Factor in dB

CF = Cable Attenuation Factor in dB

AG = Amplifier Gain in dB

PD = Pulse Desensitization in dB

AV = 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 dBμV 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 dBμV/m.

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

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

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

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

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

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

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

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

Section 15.205 Restricted bands of operation.

(a) Except as shown in paragraph (d) of this section. Only spurious emissions are permitted in any of the frequency bands listed below:

FCC Part 15 C section 15.247

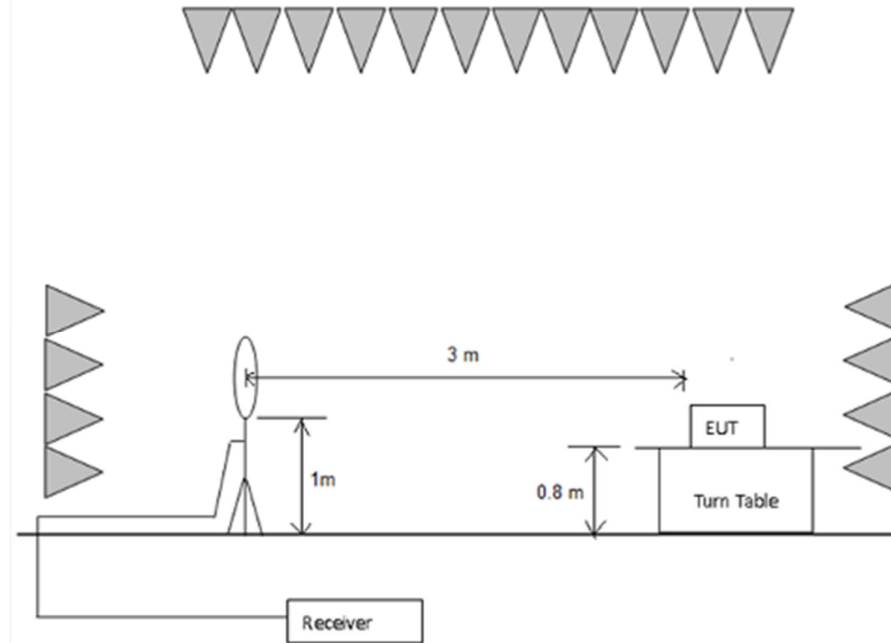
MHz	MHz	MHz	GHz
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0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
10.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	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		

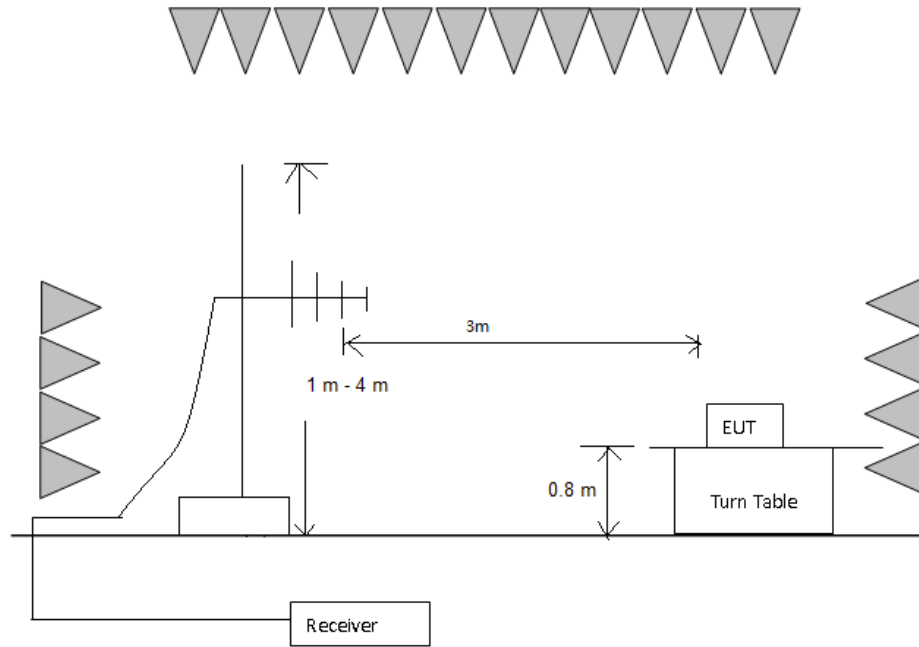
Test Configuration:

- 1) 9 kHz to 30 MHz emissions:

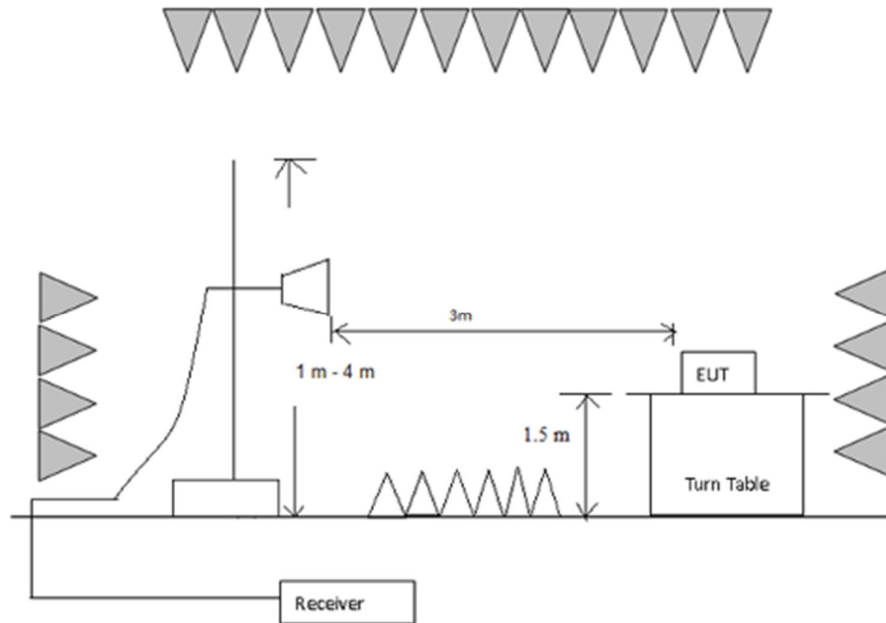


- 2) 30 MHz to 1 GHz emissions:

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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:

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For testing performed with the bi-log type antenna. The measurement was 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 25 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 1 m and 4 m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

4) The receiver was scanned from 9 kHz to 25 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:

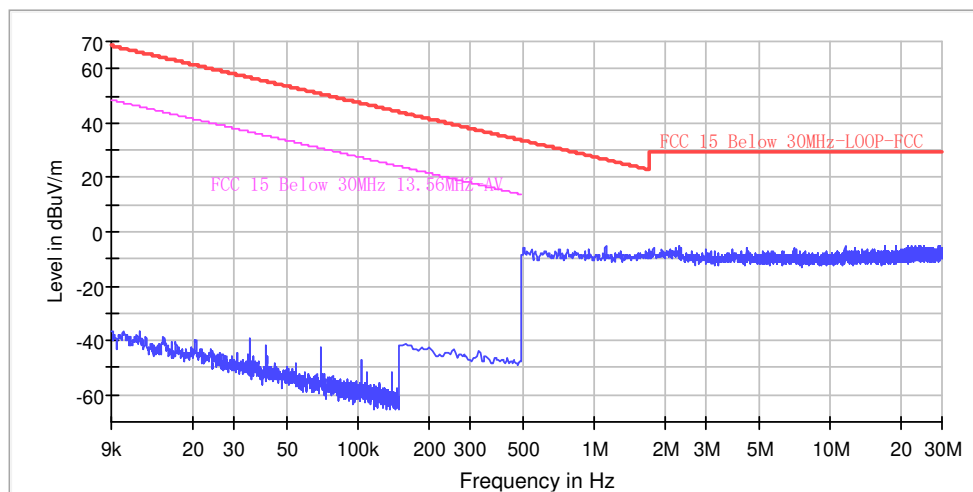
3m Semi-Anechoic Chamber, EMI Test Receiver (9 kHz~7 GHz), Signal and Spectrum Analyzer (10 Hz~40 GHz), Loop antenna (9 kHz-30 MHz). TRILOG Super Broadband test Antenna(30 MHz-3 GHz) (RX), Double-Ridged Waveguide Horn Antenna (800 MHz-18 GHz)(RX) and High Frequency Antenna & preamplifier(18 GHz~26.5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

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

Pre-scan all modes, worst case as below

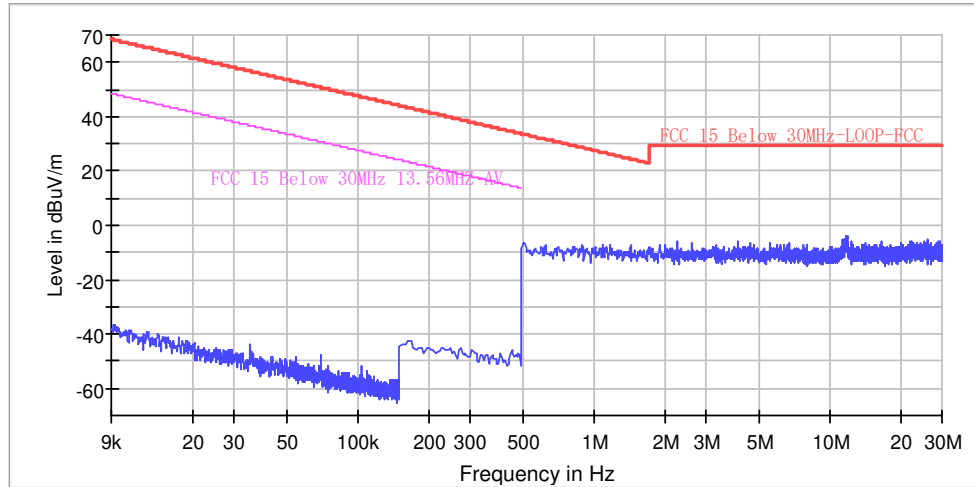
802.11b mode with 1Mbps data rate Test at Channel 1 (2.412 GHz) in transmitting status

Horizontal:



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Vertical:



Remark:

At frequencies below 30 MHz, measurements were performed at 3m and the data was extrapolated to the specified measurement distance using the square of an inverse linear distance extrapolation factor (40 dB/decade) as specified in §15.31(f)(2).

Emission Level (dBμV/m) @spec= Emission Level (dBμV/m) @3m- Distance Extrapolation Factor [dB]

Distance Extrapolation Factor [dB] = $20 \log_{10}(300/3)^2 = 80\text{dB}$ [For emissions within 9kHz-490kHz]

Distance Extrapolation Factor [dB] = $20 \log_{10}(30/3)^2 = 40\text{dB}$ [For emissions within 490kHz-30MHz]

All emissions are more than 20dB below the limit.

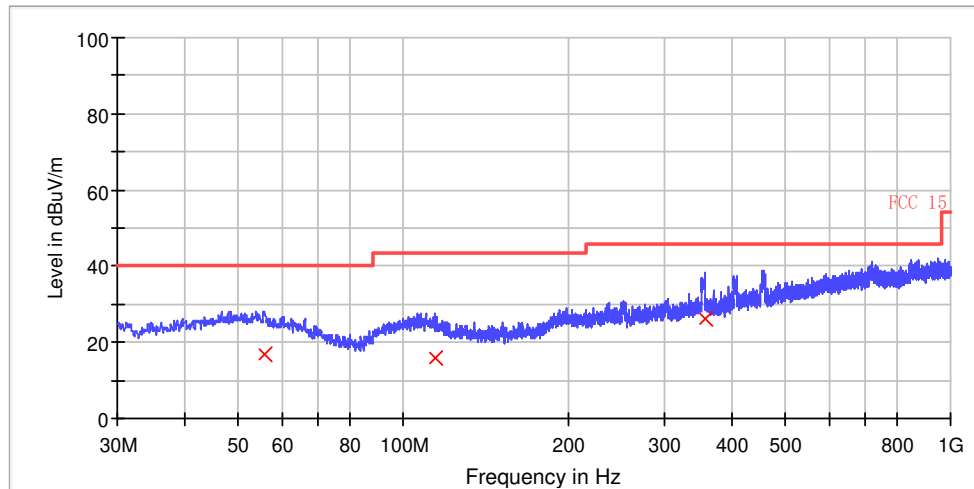
30 MHz~1 GHz Spurious Emissions. Quasi-Peak Measurement

Pre-scan all modes, worst case as below

802.11b mode with 1Mbps data rate Test at Channel 1 (2.412 GHz) in transmitting status

Horizontal:

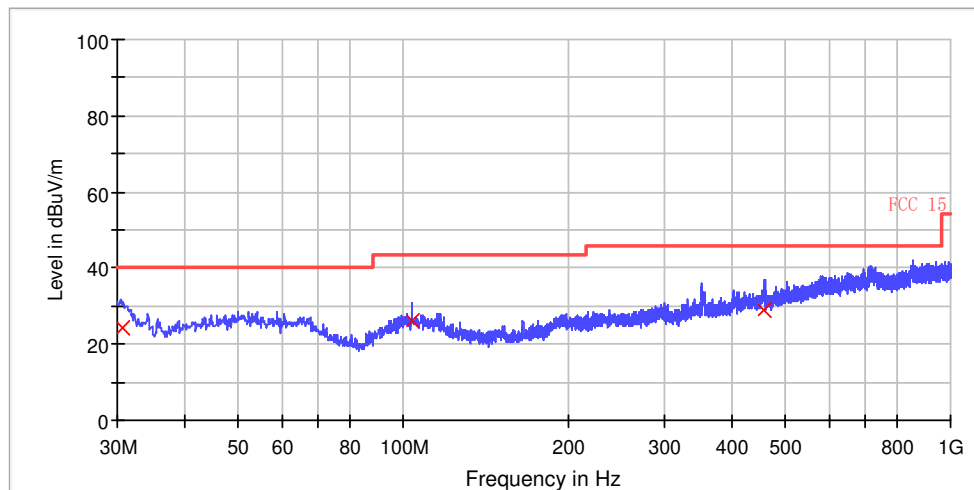
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QP

Frequency (MHz)	Quasi Peak (dBuV/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
55.600000	16.8	120.000	H	20.6	23.2	40.0
114.080000	16.0	120.000	H	18.1	27.5	43.5
356.000000	26.3	120.000	H	23.2	19.7	46.0

Vertical:



QP

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Frequency (MHz)	Quasi Peak (dBuV/m)	Bandwidth (kHz)	Pol	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
30.760000	24.5	120.000	V	17.3	15.5	40.0
103.640000	26.1	120.000	V	19.2	17.4	43.5
457.760000	29.2	120.000	V	25.1	16.8	46.0

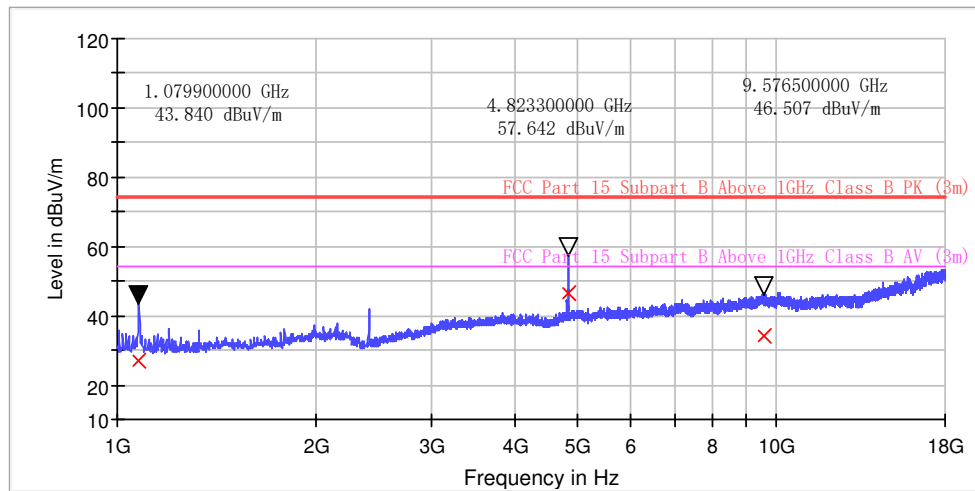
1~25 GHz Radiated Emissions.

802.11b mode with 1Mbps data rate as below:

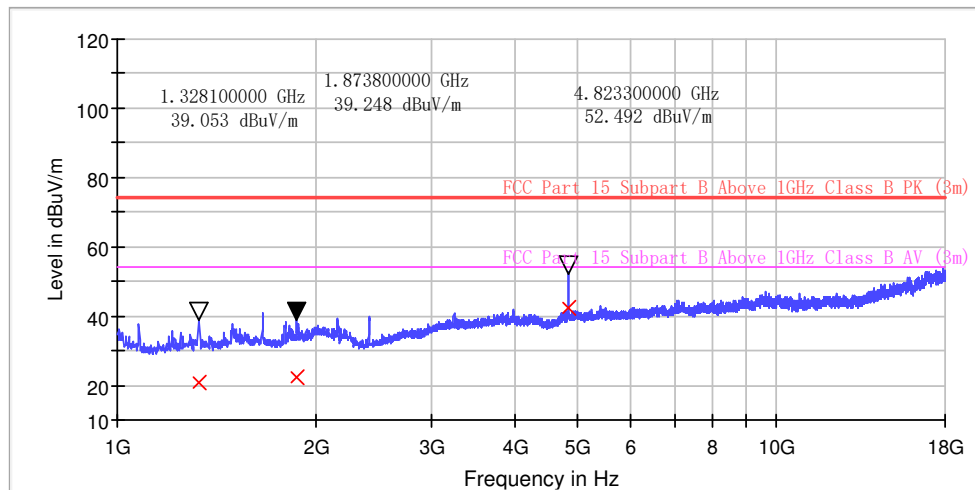
Test at Channel 1 (2.412 GHz) in transmitting status

1-18GHz:

Horizontal:



Vertical:

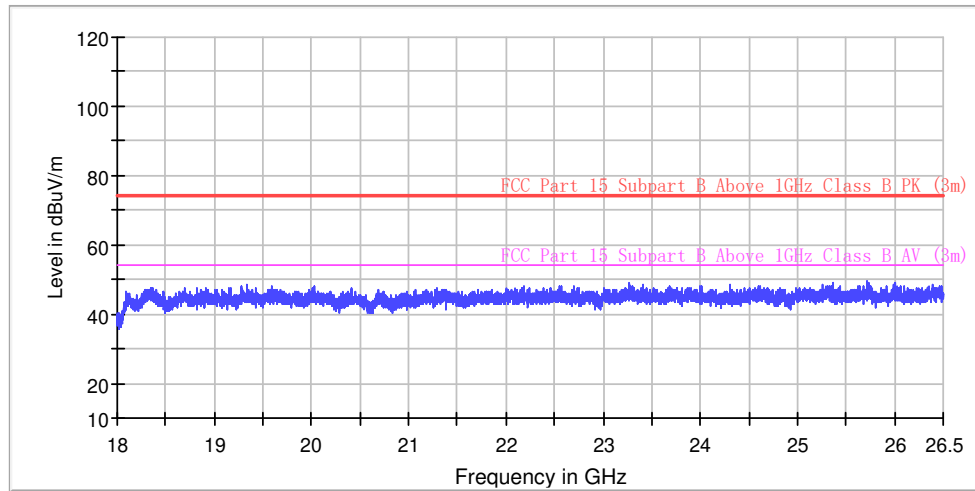


18GHz-26.5GHz

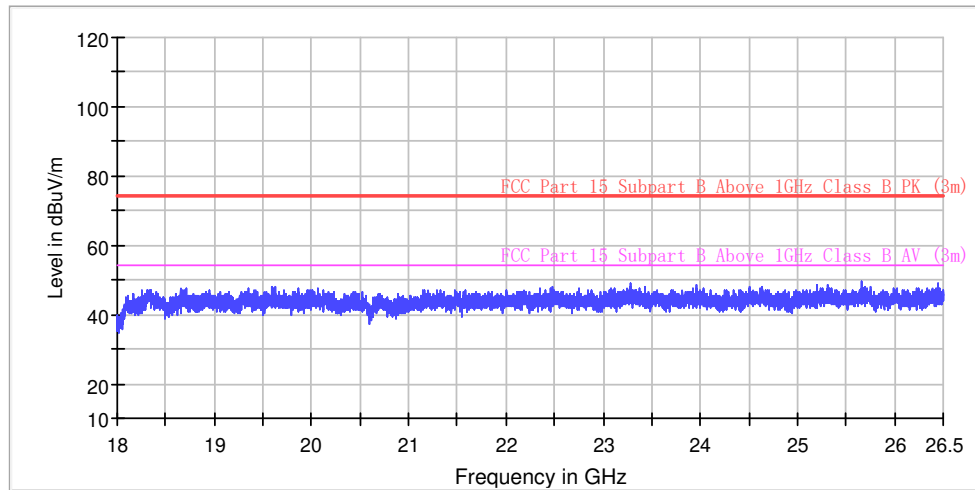
PK:

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Horizontal:



Vertical:



Peak emissions were found to be below the average limit (indicating a margin of at least 20 dB against the peak limit). Consequently, no average spectral plots or tabular data are necessary.

PK Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna polarization
4823.3	58.0	-0.4	57.6	74	16.4	H
4823.3	52.8	-0.4	52.4	74	21.6	V

Remark: When Peak emission level was below AV limit, the AV emission level did not be record.

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AV Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna polarization
4823.3	47.1	-0.4	46.7	54	7.3	H

Test at Channel 6 (2.437 GHz) in transmitting status

PK Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna polarization
4872.6	50.6	-0.3	50.3	74	23.7	H
4874.3	49.3	-0.3	49.0	74	25.0	V

Remark: When Peak emission level was below AV limit, the AV emission level did not be record.

Test at Channel 11 (2.462 GHz) in transmitting status

PK Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna polarization
4923.6	48.3	-0.2	48.1	74	25.9	H
4923.6	44.9	-0.2	44.7	74	29.3	V

Remark: When Peak emission level was below AV limit, the AV emission level did not be record.

802.11g mode with 6Mbps data rate as below

Test at Channel 1 (2.412 GHz) in transmitting status

PK Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna polarization
4823.3	45.4	-0.4	45.0	74	29.0	H
9647.8	37.9	7.0	44.9	74	29.1	H
4823.4	43.6	-0.4	43.2	74	30.8	V
9647.9	41.3	7.0	48.3	74	25.7	V

Remark: When Peak emission level was below AV limit, the AV emission level did not be record.

Test at Channel 6 (2.437 GHz) in transmitting status

PK Measurement:

TEST REPORT

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna polarization
4874.0	45.1	-0.3	44.8	74	29.2	H
9748.2	38.1	7.1	45.2	74	28.8	H
4874.0	43.3	-0.3	43.0	74	31.0	V
9748.2	40.3	7.1	47.4	74	26.6	V

Remark: When Peak emission level was below AV limit, the AV emission level did not be record.

Test at Channel 11 (2.462 GHz) in transmitting status
PK Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna polarization
7171.0	39.9	3.7	43.6	74	30.4	H
9848.0	36.9	7.2	44.1	74	29.9	H
7171.0	39.1	3.7	42.8	74	31.2	V
9848.0	39.5	7.2	46.7	74	27.3	V

Remark: When Peak emission level was below AV limit, the AV emission level did not be record.

802.11n20 mode with 6.5Mbps data rate as below

Test at Channel 1 (2.412 GHz) in transmitting status

PK Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna polarization
4823.3	44.4	-0.4	44.0	74	30.0	H
9647.9	40.4	7.0	47.4	74	26.6	H
4823.3	44.1	-0.4	43.7	74	30.3	V
9647.9	39.9	7.0	46.9	74	27.1	V

Remark: When Peak emission level was below AV limit, the AV emission level did not be record.

Test at Channel 6 (2.437 GHz) in transmitting status

PK Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna polarization
5250.0	41.1	0.3	41.4	74	32.6	H
9748.2	37.8	7.1	44.9	74	29.1	H

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5250.0	40.7	0.3	41.0	74	33.0	V
9748.2	40.0	7.1	47.1	74	26.9	V

Remark: When Peak emission level was below AV limit, the AV emission level did not be record.

Test at Channel 11 (2.462 GHz) in transmitting status

PK Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna polarization
4924.0	44.7	-0.2	44.5	74	29.5	H
9848.5	35.5	7.2	42.7	74	31.3	H
4924.0	45.4	-0.2	45.2	74	28.8	V
9848.5	41.0	7.2	48.2	74	25.8	V

Remark: When Peak emission level was below AV limit, the AV emission level did not be record.

802.11n40 mode with 13.5 Mbps data rate as below

Test at Channel 3 (2.422 GHz) in transmitting status

PK Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna polarization
4844.0	43.3	-0.3	43.0	74	31.0	H
9688.5	35.1	7.0	42.1	74	31.9	H
4844.0	44.8	-0.3	44.5	74	29.5	V
9688.7	42.4	7.0	49.4	74	24.6	V

Remark: When Peak emission level was below AV limit, the AV emission level did not be record.

Test at Channel 6 (2.437 GHz) in transmitting status

PK Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna polarization
7985.3	39.7	4.9	44.6	74	29.4	H
9137.7	35.6	6.4	42.0	74	32.0	H
7985.3	37.2	4.9	42.1	74	31.9	V
9137.9	38.4	6.4	44.8	74	29.2	V

Remark: When Peak emission level was below AV limit, the AV emission level did not be record.

Test at Channel 9 (2.452 GHz) in transmitting status

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PK Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Emission Level (dBμV/m)	Limit	Margin (dB)	Antenna polarization
4908.3	50.2	-0.2	50.0	74	24.0	H
4903.2	47.8	-0.2	47.6	74	26.4	V

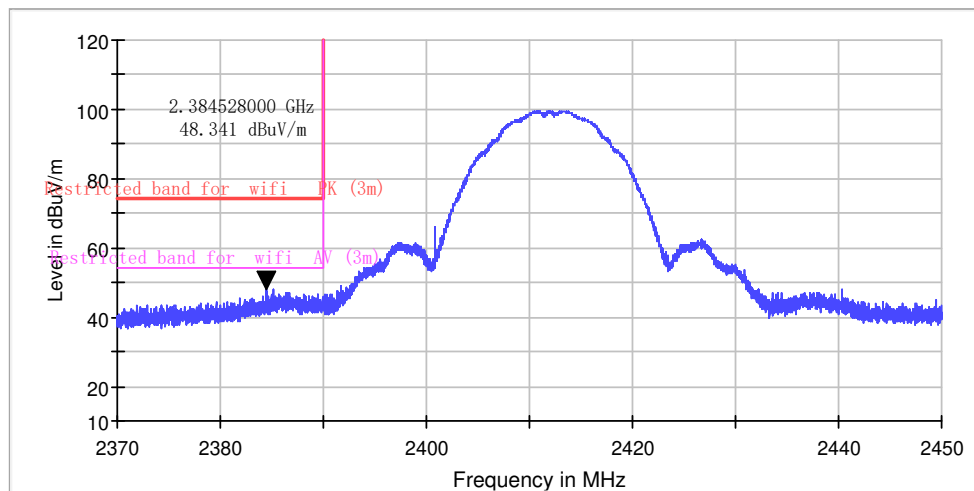
Remark: When Peak emission level was below AV limit, the AV emission level did not be record.

Band Edges Emission

802.11b mode with 1Mbps data rate

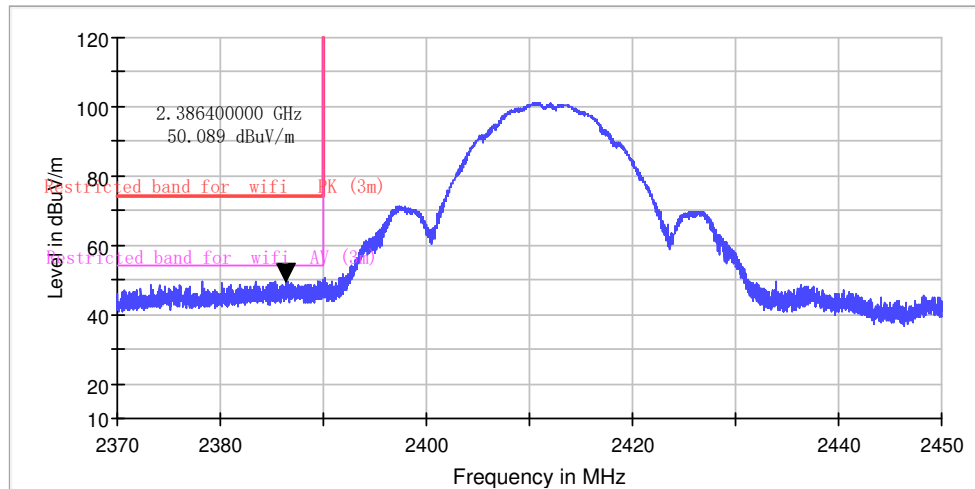
Test at Channel 1 (2.412 GHz) in transmitting status

Horizontal



Vertical

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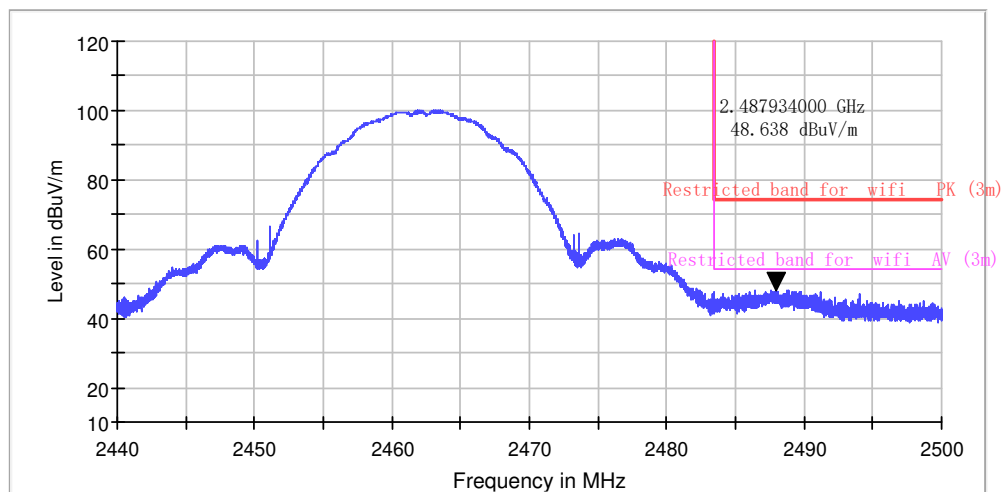


Peak Measurement:

Frequency (MHz)	Reading Level (dBuV)	Correct Factor	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna polarization
2384.5	56.1	-7.8	48.3	74	25.7	H
2386.4	57.9	-7.8	50.1	74	23.9	V

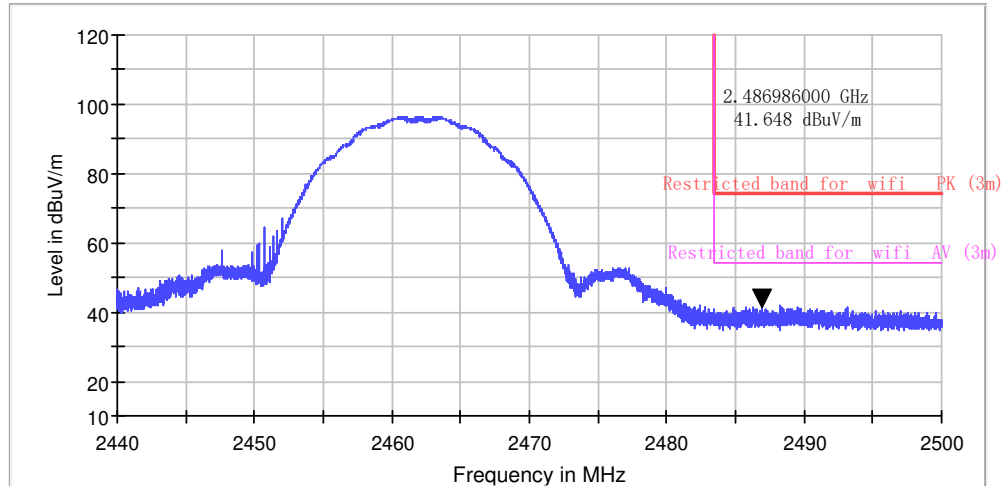
Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded.

Test at Channel 11 (2.462 GHz) in transmitting status
Horizontal



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Vertical



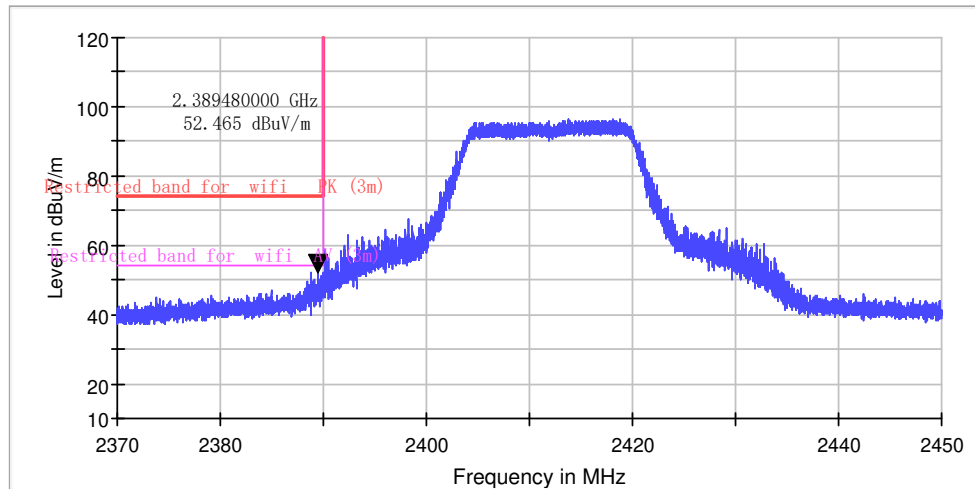
Peak Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna polarization
2487.9	56.0	-7.4	48.6	74	25.4	H
2487.0	49.0	-7.4	41.6	74	32.4	V

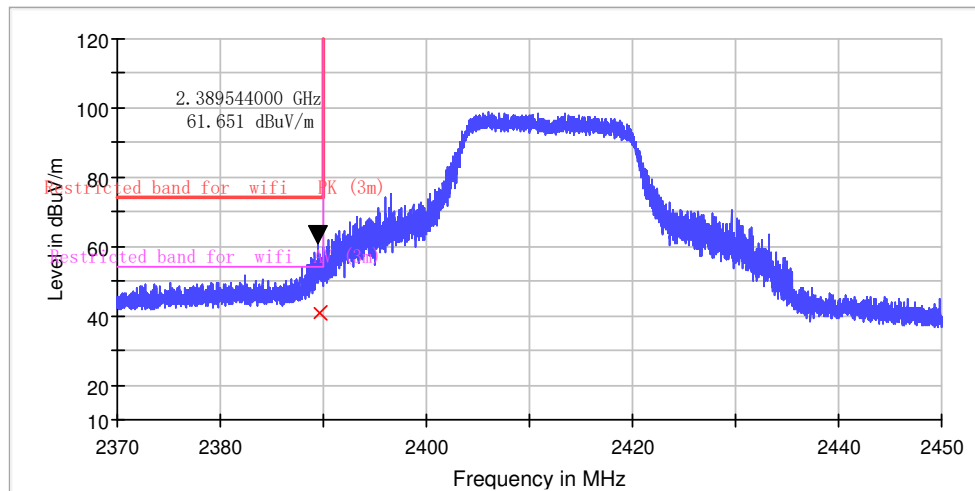
Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded.

802.11g mode with 6Mbps data rate
Test at Channel 1 (2.412 GHz) in transmitting status
Horizontal

TEST REPORT



Vertical



Peak Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna polarization
2389.5	60.2	-7.7	52.5	74	21.5	H
2389.5	69.4	-7.7	61.7	74	12.3	V

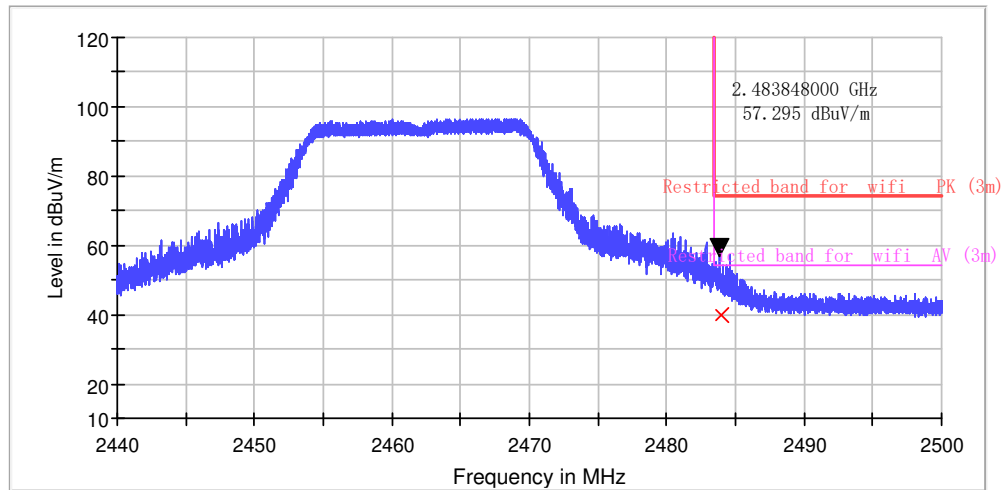
Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded.

Average Measurement:

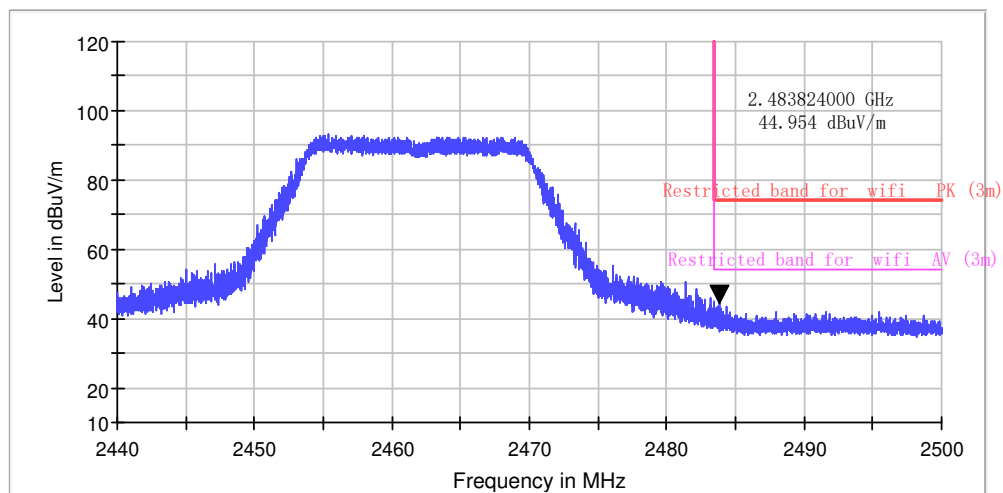
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Frequency (MHz)	Reading Level (dBμV)	Correct Factor	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna polarization
2389.5	48.5	-7.7	40.8	54	13.2	V

Test at Channel 11 (2.462 GHz) in transmitting status
Horizontal



Vertical



Peak Measurement:

Frequency (MHz)	Reading Level	Correct Factor	Emission Level	Limit (dBμV/m)	Margin (dB)	Antenna polarization
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	(dBμV)		(dBμV/m)			
2483.8	64.7	-7.4	57.3	74	16.7	H
2484.8	52.4	-7.4	45.0	74	29.0	V

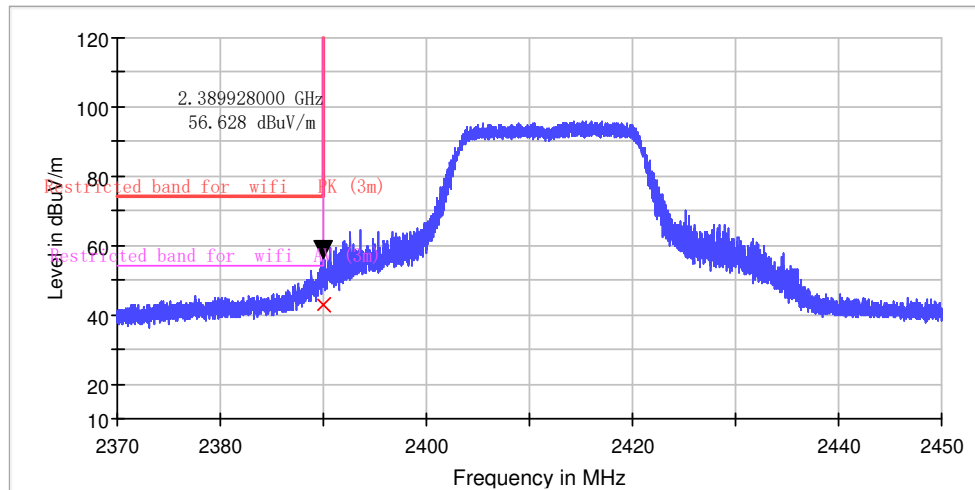
Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded.

Average Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna polarization
2483.8	47.5	-7.4	40.1	54	13.9	H

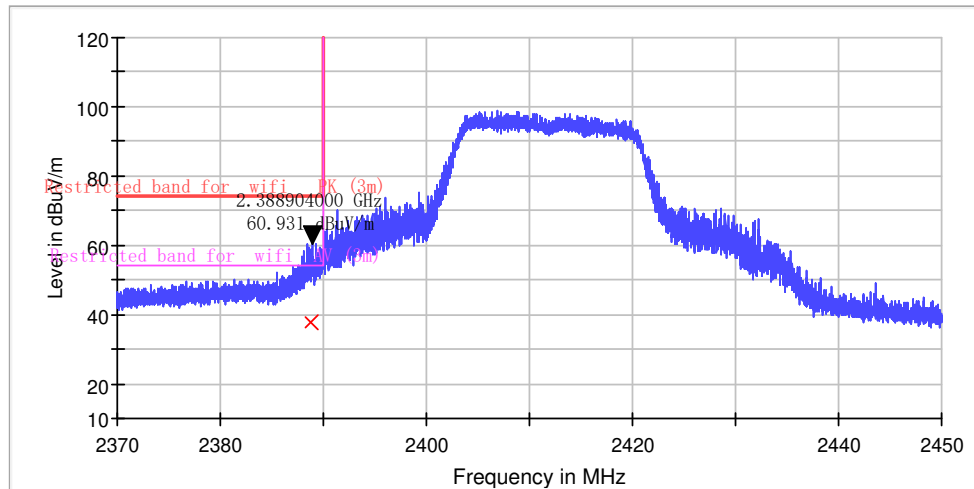
802.11n (HT20) mode with 6.5Mbps data rate
Test at Channel 1 (2.412 GHz) in transmitting status

Horizontal



Vertical

TEST REPORT



Peak Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna polarization
2390.0	64.3	-7.7	56.6	74	17.4	H
2388.8	68.6	-7.7	60.9	74	13.1	V

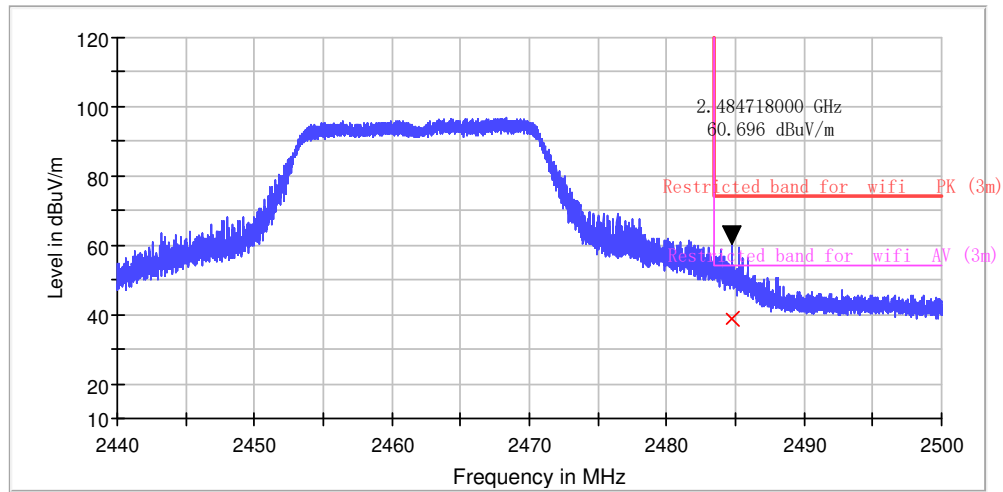
Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded.

Average Measurement:

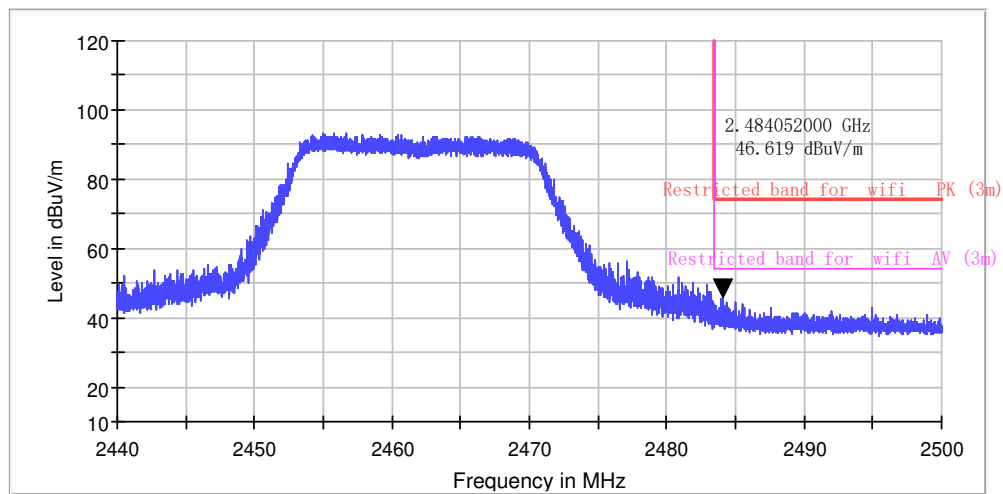
Frequency (MHz)	Reading Level (dBμV)	Correct Factor	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna polarization
2390.0	50.6	-7.7	42.9	54	11.1	H
2388.8	45.5	-7.7	37.8	54	16.2	V

Test at Channel 11 (2.462 GHz) in transmitting status
Horizontal

TEST REPORT



Vertical



Peak Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna polarization
2484.7	68.1	-7.4	60.7	74	13.3	H
2484.1	54.0	-7.4	46.6	74	27.4	V

Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded.

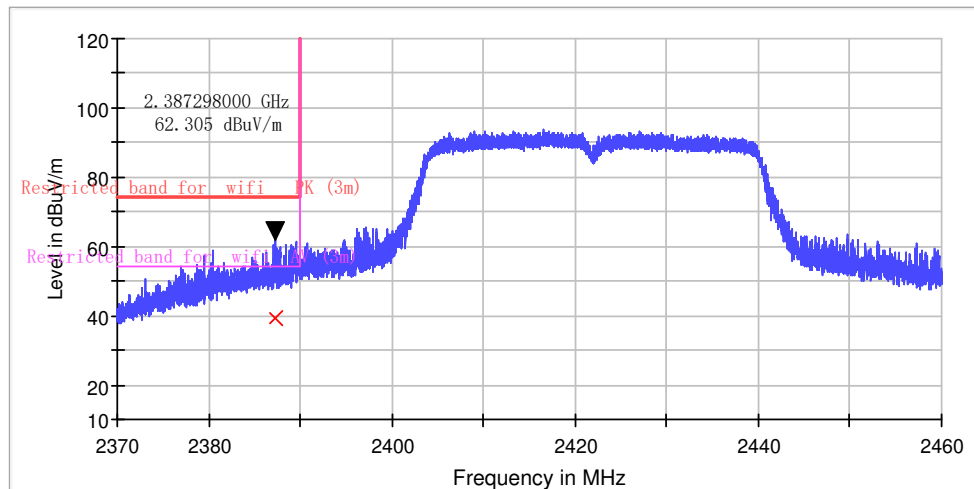
Average Measurement:

TEST REPORT

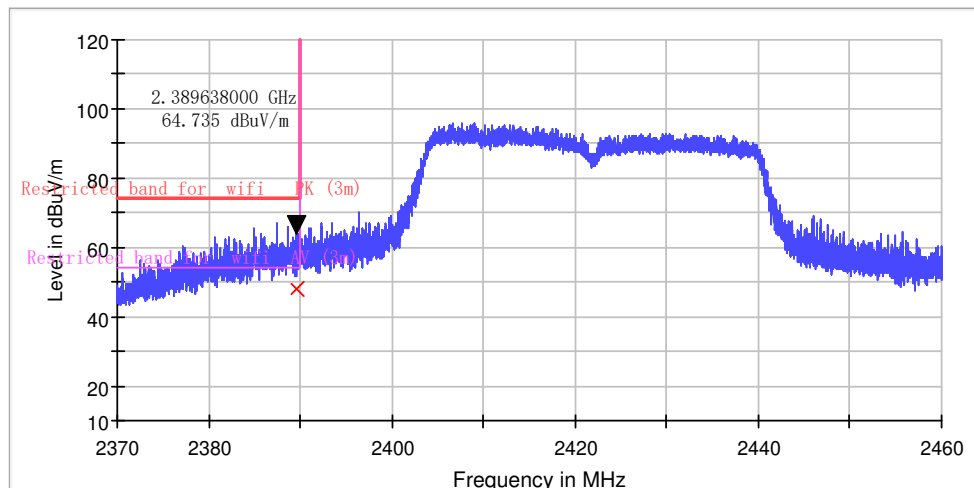
Frequency (MHz)	Reading Level (dBμV)	Correct Factor	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna polarization
2484.7	46.3	-7.4	38.9	54	15.1	H

802.11n (HT40) mode with 13.5Mbps data rate
Test at Channel 3 (2.422 GHz) in transmitting status

Horizontal



Vertical



Peak Measurement:

TEST REPORT

Frequency (MHz)	Reading Level (dBμV)	Correct Factor	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna polarization
2387.3	70.1	-7.8	62.3	74	11.7	H
2389.6	72.4	-7.7	64.7	74	9.3	V

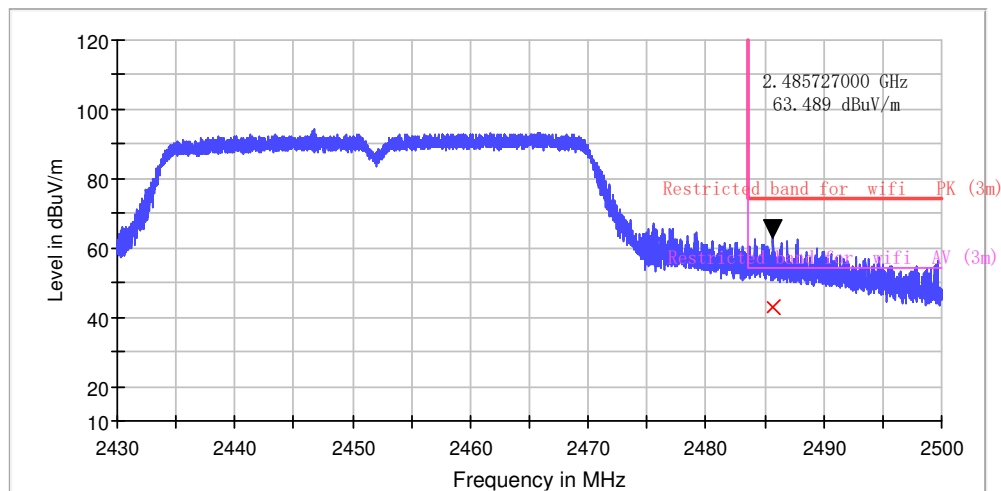
Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded.

Average Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna polarization
2387.3	47.2	-7.8	39.4	54	14.6	H
2389.6	55.9	-7.7	48.2	54	5.8	V

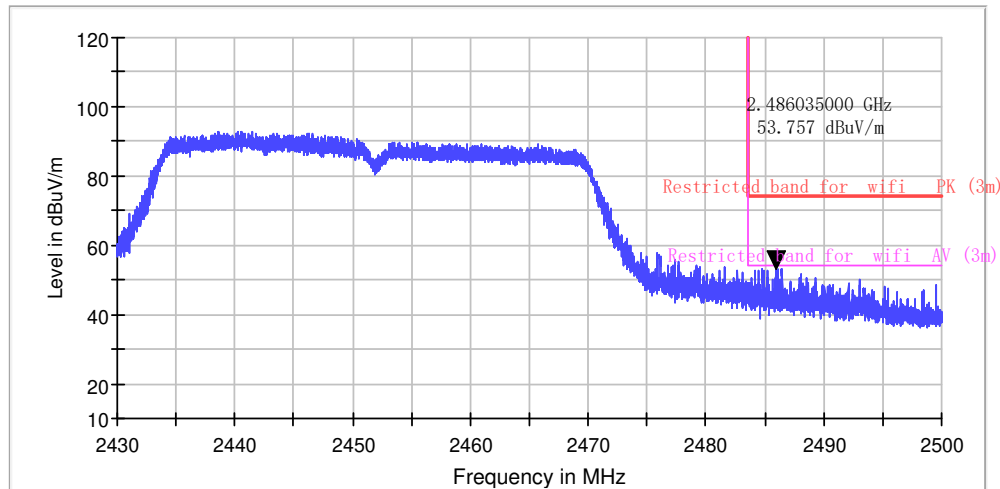
Test at Channel 9 (2.452 GHz) in transmitting status

Horizontal



Vertical

TEST REPORT



Peak Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna polarization
2485.7	46.8	-7.4	63.5	74	10.5	H
2486.0	55.6	-7.4	53.8	74	20.2	V

Average Measurement:

Frequency (MHz)	Reading Level (dBμV)	Correct Factor	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Antenna polarization
2485.7	50.2	-7.4	42.8	54	11.2	H

Remark: When Peak emission level was below AV limit, the AV emission level did not be recorded.

4.8 Band Edges Requirement

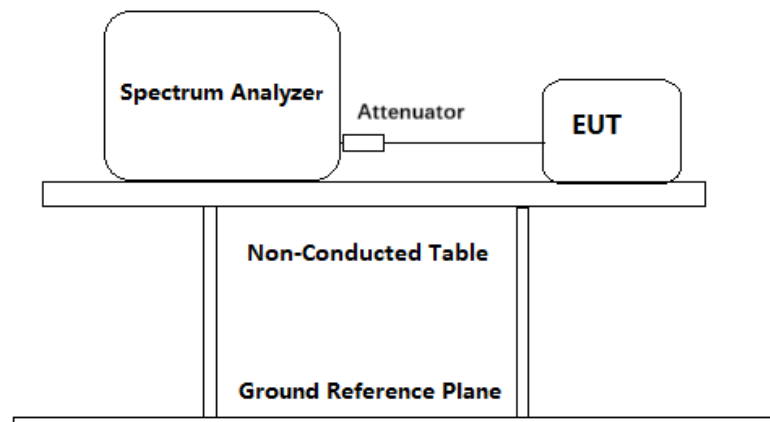
Test Requirement: FCC Part 15 C section 15.247

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of

TEST REPORT

the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Frequency Band: 2400 MHz to 2483.5 MHz
Test Method: ANSI C63.10: Clause 11.11 and 11.12
Test Status: Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.
Test Configuration: For Band Edges Emission in Radiated mode, please refer to clause 4.7



Test Procedure: For Band Edges Emission in Radiated mode, Please refer to clause 4.7

1. Remove the antenna from the EUT and then connect a low RF cable (cable loss =1 dB, with a 10dB attenuator) from the antenna port to the spectrum analyzer.
 - a) Set instrument center frequency to the frequency of the emission to be measured (must be within 2 MHz of the authorized band edge).
 - b) Set the center frequency and span to encompass frequency range to be measured.
 - c) RBW = 100 kHz.
 - d) VBW $\geq$ [3 $\times$ RBW].
 - e) Detector = peak.
 - f) Sweep time = auto.
 - g) Trace mode = max hold.

TEST REPORT

- h) Allow sweep to continue until the trace stabilizes (required measurement time may increase for low-duty-cycle applications).
- i) For radiated Band-edge emissions within a restricted band and within 2 MHz of an authorized band edge, integration method is considered.
2. Repeat until all the test status is investigated.
3. Report the worst case.

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.

Test result with plots as follows:

For conduct mode:

The band edges was measured and recorded Result:

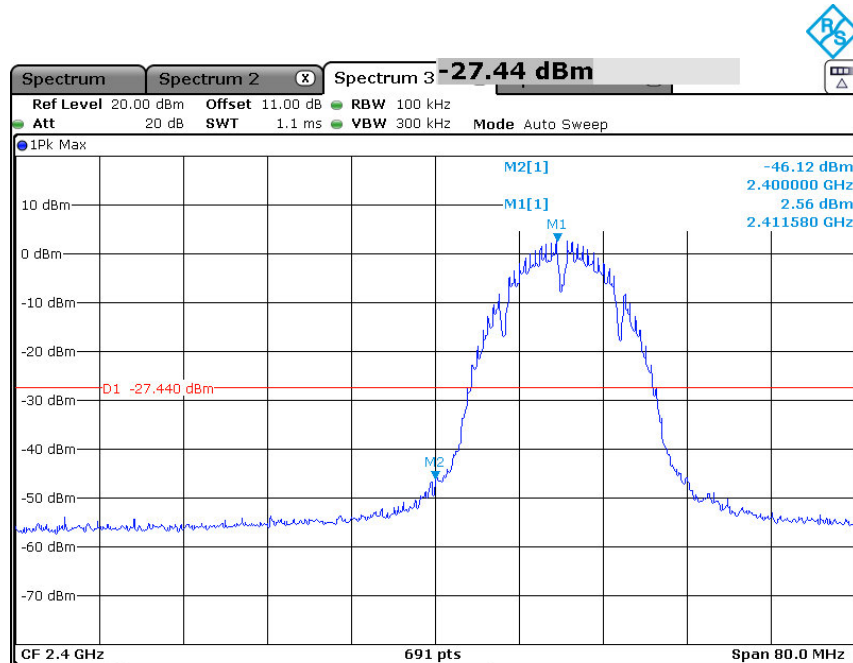
The Lower Edges attenuated more than 30dB.

The Upper Edges attenuated more than 30dB.

Result plots as follows:

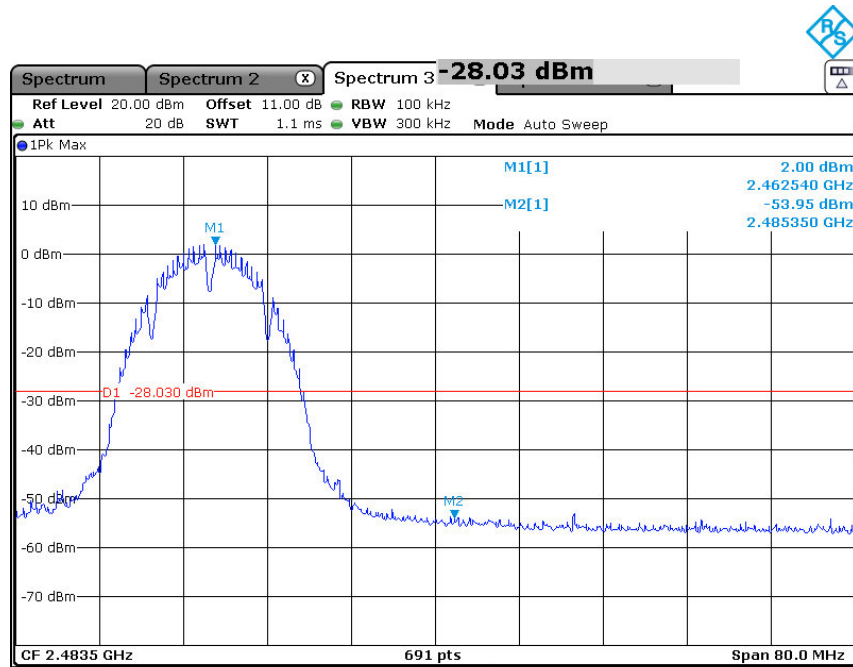
802.11b mode with 1 Mbps data rate

Channel1: 2.412 GHz



Channel 11: 2.462 GHz

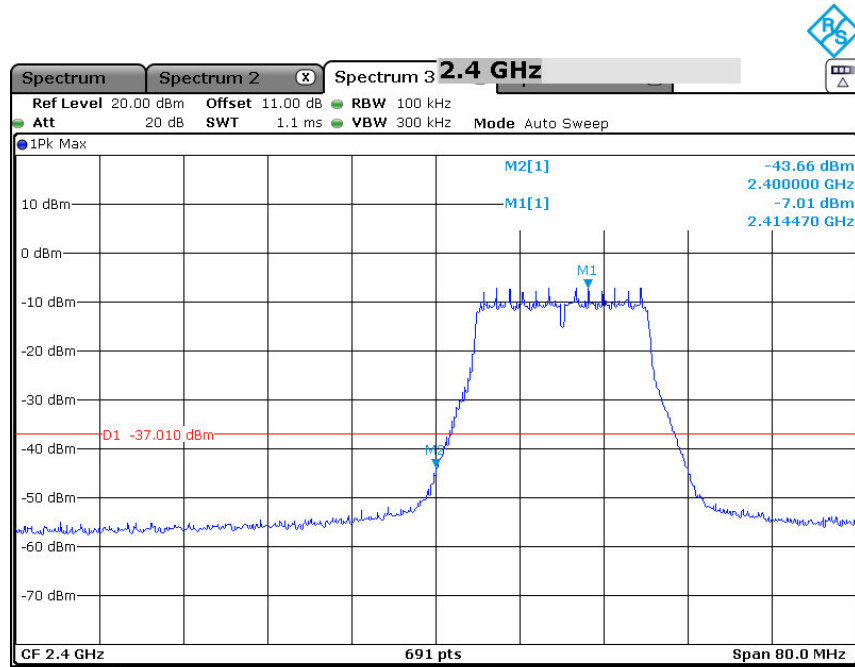
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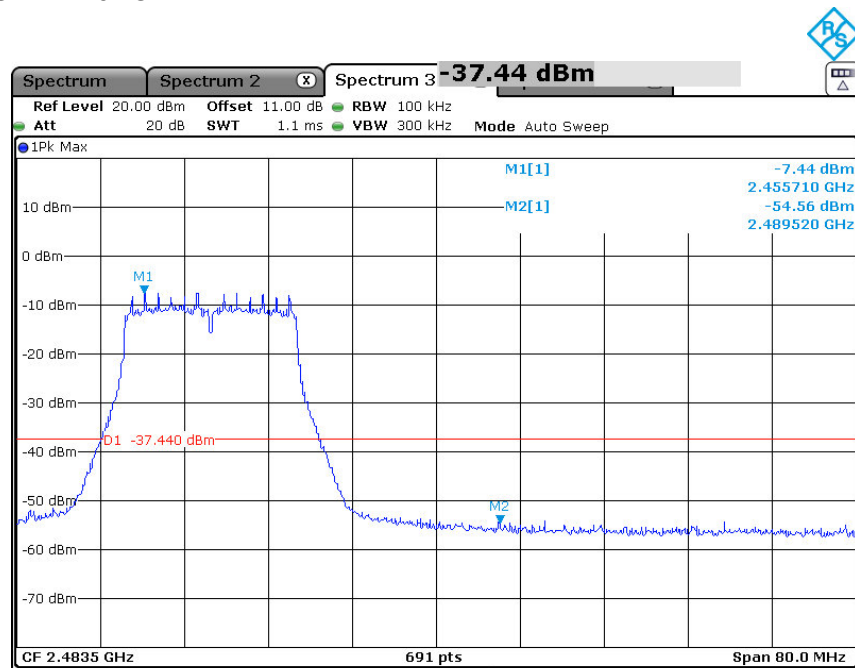
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802.11g mode with 6 Mbps data rate

Channel1: 2.412 GHz



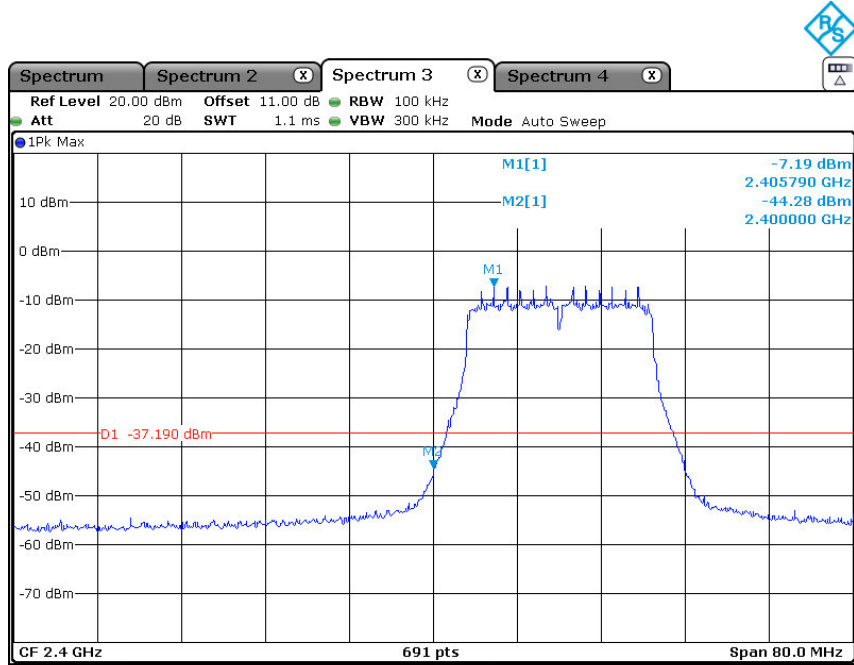
Channel 11: 2.462 GHz



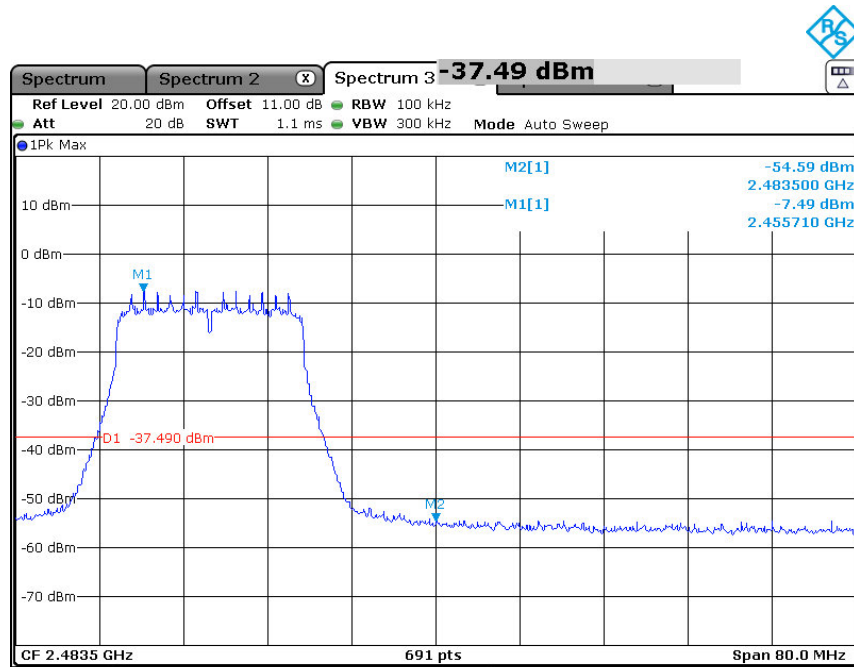
TEST REPORT

802.11n(HT20) mode with 6.5 Mbps data rate

Channel 1: 2.412 GHz



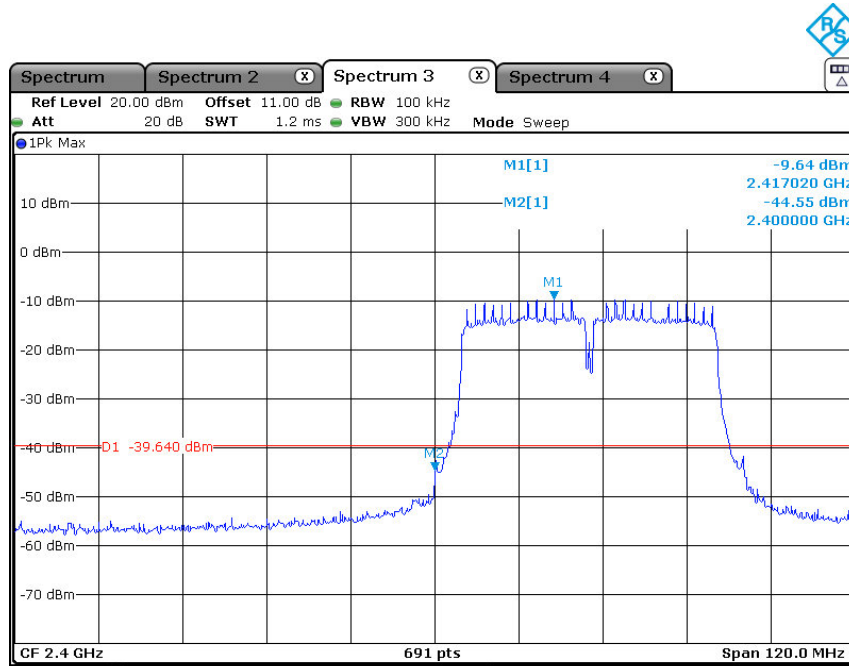
Channel 11: 2.462 GHz



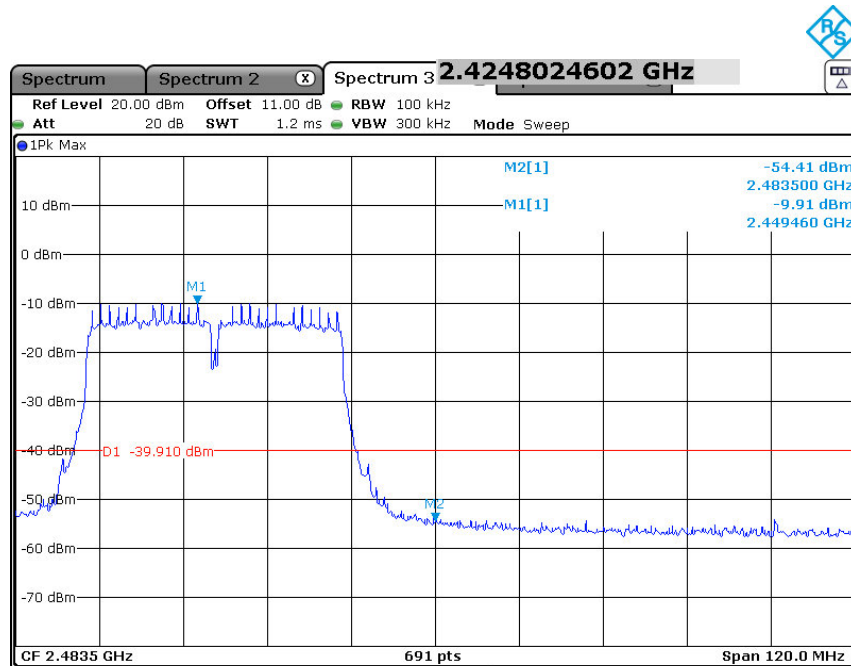
TEST REPORT

802.11n(HT40) mode with 13.5 Mbps data rate

Channel 3: 2.422 GHz



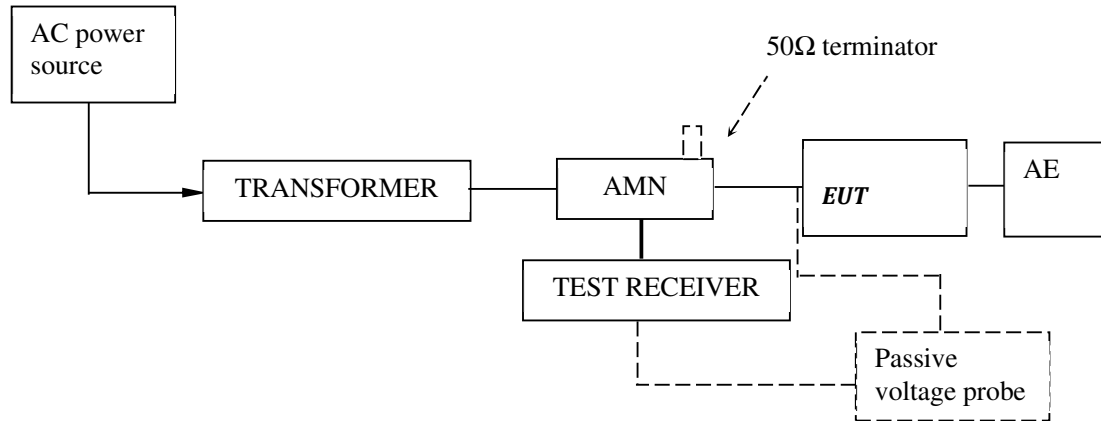
Channel 9: 2.452 GHz



TEST REPORT

4.9 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 Data and Curve

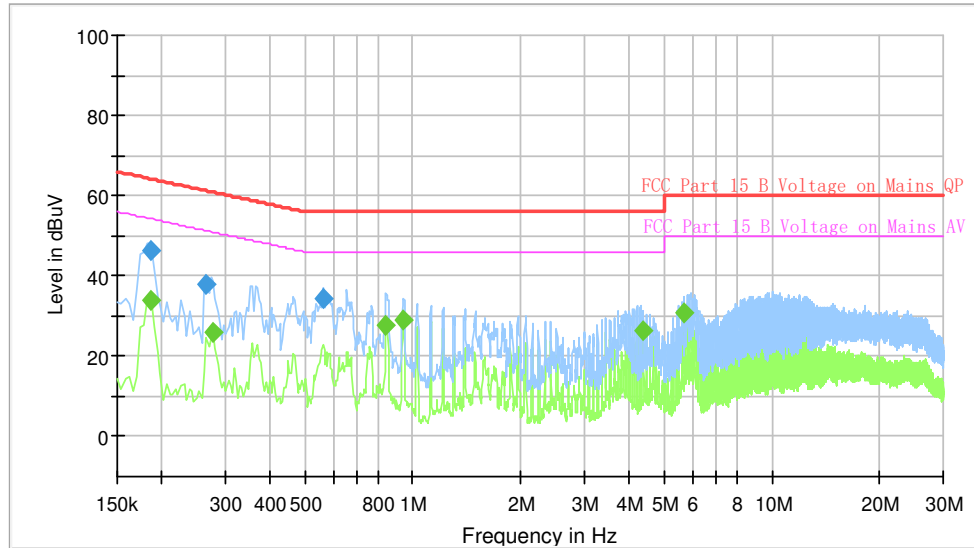
At main terminal: Pass

TEST REPORT

Tested Wire: Live

Operation Mode: transmitting mode

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.186000	---	34.08	54.21	20.13	1000.0	9.000	L1	ON	9.6
0.186000	46.34	---	64.21	17.87	1000.0	9.000	L1	ON	9.6
0.266000	37.81	---	61.24	23.43	1000.0	9.000	L1	ON	9.6
0.278000	---	26.14	50.88	24.73	1000.0	9.000	L1	ON	9.6
0.562000	34.37	---	56.00	21.63	1000.0	9.000	L1	ON	9.6
0.842000	---	27.51	46.00	18.49	1000.0	9.000	L1	ON	9.6
0.938000	---	29.20	46.00	16.80	1000.0	9.000	L1	ON	9.6
4.390000	---	26.57	46.00	19.43	1000.0	9.000	L1	ON	9.7
5.694000	---	30.70	50.00	19.30	1000.0	9.000	L1	ON	9.7

Remark:

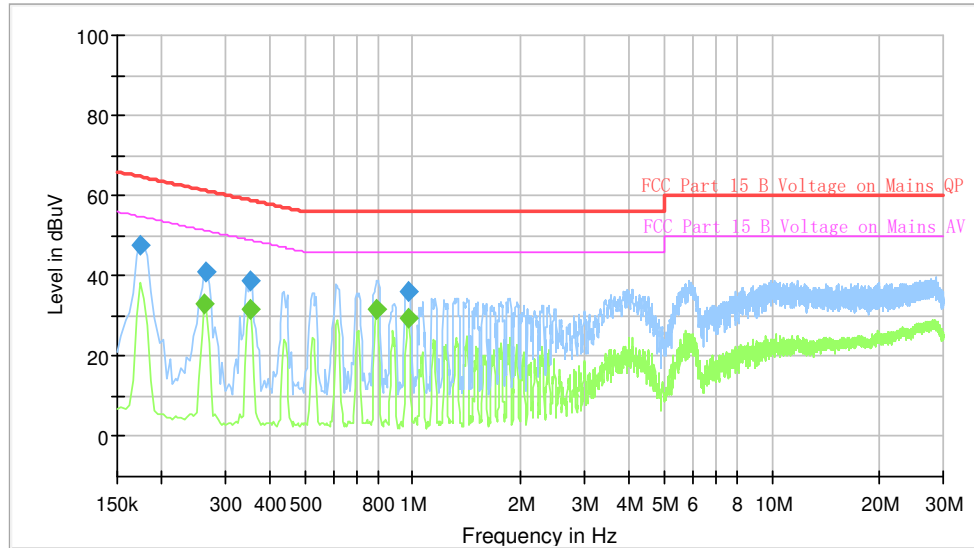
1. Corr. (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Level (dBμV) = Corr. (dB) + Read Level (dBμV)
3. Margin (dB) = Limit (dBμV) - Level (dBμV)

TEST REPORT

Tested Wire: Neutral

Operation Mode: transmitting mode

Full Spectrum



Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.174000	47.45	---	64.77	17.32	1000.0	9.000	N	ON	9.6
0.262000	---	32.90	51.37	18.47	1000.0	9.000	N	ON	9.6
0.266000	40.89	---	61.24	20.35	1000.0	9.000	N	ON	9.6
0.354000	---	31.91	48.87	16.96	1000.0	9.000	N	ON	9.6
0.354000	39.01	---	58.87	19.86	1000.0	9.000	N	ON	9.6
0.790000	---	31.54	46.00	14.46	1000.0	9.000	N	ON	9.6
0.970000	---	29.28	46.00	16.72	1000.0	9.000	N	ON	9.6
0.970000	36.17	---	56.00	19.83	1000.0	9.000	N	ON	9.6

Remark:

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

TEST REPORT

5.0 Test Equipment List

Equipment No.	Equipment	Model	Manufacturer	Cal. Due date (DD-MM-YYYY)	Calibration Interval
EM030-04	3m Semi-Anechoic Chamber	9×6×6 m ³	ETS•LINDGREN	08/04/2027	1Y
EM031-02	EMI Test Receiver (9 kHz~7 GHz)	R&S ESR7	R&S	05/11/2026	1Y
EM031-03	Signal and Spectrum Analyzer (10 Hz~40 GHz)	R&S FSV40	R&S	05/11/2026	1Y
EM011-04	Loop antenna (9 kHz-30 MHz)	HFH2-Z2	R&S	08/07/2027	1Y
EM061-11	TRILOG Super Broadband test Antenna(30 MHz-3 GHz) (RX)	VULB 9163	SCHWARZBECK	24/11/2027	2Y
EM033-02	Bouble-Ridged Waveguide Horn Antenna (800 MHz-18 GHz)(RX)	R&S HF907	R&S	09/07/2027	1Y
EM033-03	High Frequency Antenna & preamplifier(18 GHz~26.5 GHz) (RX)	R&S SCU-26	R&S	28/04/2027	1Y
EM033-04	High Frequency Antenna & preamplifier (26 GHz-40 GHz)	R&S SCU-40	R&S	28/04/2027	1Y
EM031-02-01	Coaxial cable(9 kHz-1 GHz)	N/A	R&S	08/04/2027	1Y
EM033-02-02	Coaxial cable(1 GHz-18 GHz)	N/A	R&S	08/04/2027	1Y
EM033-04-02	Coaxial cable(18 GHz~40 GHz)	N/A	R&S	28/04/2027	1Y
EM031-01	Signal Generator (9 kHz~6 GHz)	SMB100A	R&S	09/11/2026	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	13/05/2027	1Y
SA016-29	Climatic Test Chamber	MHU-80L	JIANQIAO	04/01/2027	1Y
EM046-05	Power Sensor	NPR6A	R&S	08/04/2027	1Y
EM046-06	Power Sensor	NPR6A	R&S	12/05/2027	1Y
EM031-04-01	EMC32	V10.01.00	R&S	N/A	N/A
EM045-01-10	10dB Attenuator	N/A	R&S	17/12/2026	1Y
EM046-06-01	Power Viewer	V11.0.5.11.2018	R&S	N/A	N/A

Conducted Disturbance-Mains Terminal (2)

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Equipment No.	Equipment	Model	Manufacturer	Cal. Due date	Calibration
				(DD-MM-YYYY)	Interval
EM031-04	EMI receiver	ESR3	R&S	04/01/2027	1Y
EM006-06	LISN	ENV216	R&S	12/08/2027	1Y
SA047-111	Digital Temperature-Humidity Recorder	RS210	YIJIE	20/10/2026	1Y
EM004-06	EMC shield Room	8.5m×4.9m×3.5m	MAORUI	09/06/2027	1Y
EM031-04-01	EMC32	V10.01.00	R&S	N/A	N/A

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