



3.2 Radiated Spurious Emissions

(a) Measurement up to 30 MHz

Note: No Relevant emissions are expected in the frequency range 9 kHz to 30 MHz. Nevertheless a check using a near field probe was performed. No relevant emissions have been observed. Consequently no final measurement was performed.

(b) Measurement above 30 MHz

Calculation of test results:

Such factors like antenna factor and cable loss are already included in the provided measurement results. All results measured with peak detector.

Frequency [MHz]	Antenna Polarization	Result [dBμV/m]	Limit Field Strength [dBμV/m]	Margin (dB)
169.679	Vertical	33.46	43.5	10.04
187.395	Horizontal	34.35	55.62	21.27
200.00	Vertical	38.64	55.62	16.98
200.00	Horizontal	36.39	55.62	19.23
201.60	Vertical	36.87	55.62	18.75
201.60	Horizontal	31.86	55.62	23.76
629.65	Vertical	42.21	55.62	13.41
629.65	Horizontal	30.63	55.62	24.99
945.49	Vertical	26.04	55.62	29.58
945.49	Horizontal	29.93	55.62	25.69
*1571.14	Vertical	48.42	54.00	5.58
*1571.14	Horizontal	44.96	54.00	9.04
1889.77	Vertical	40.87	55.62	14.75
1889.77	Horizontal	39.41	55.62	16.21
*2202.40	Vertical	44.00	54.00	10.00
*2202.40	Horizontal	43.42	54.00	10.58

* This frequency fall into the restricted band.

Note: The limit is met. The measurement was performed up to the 10th harmonic.

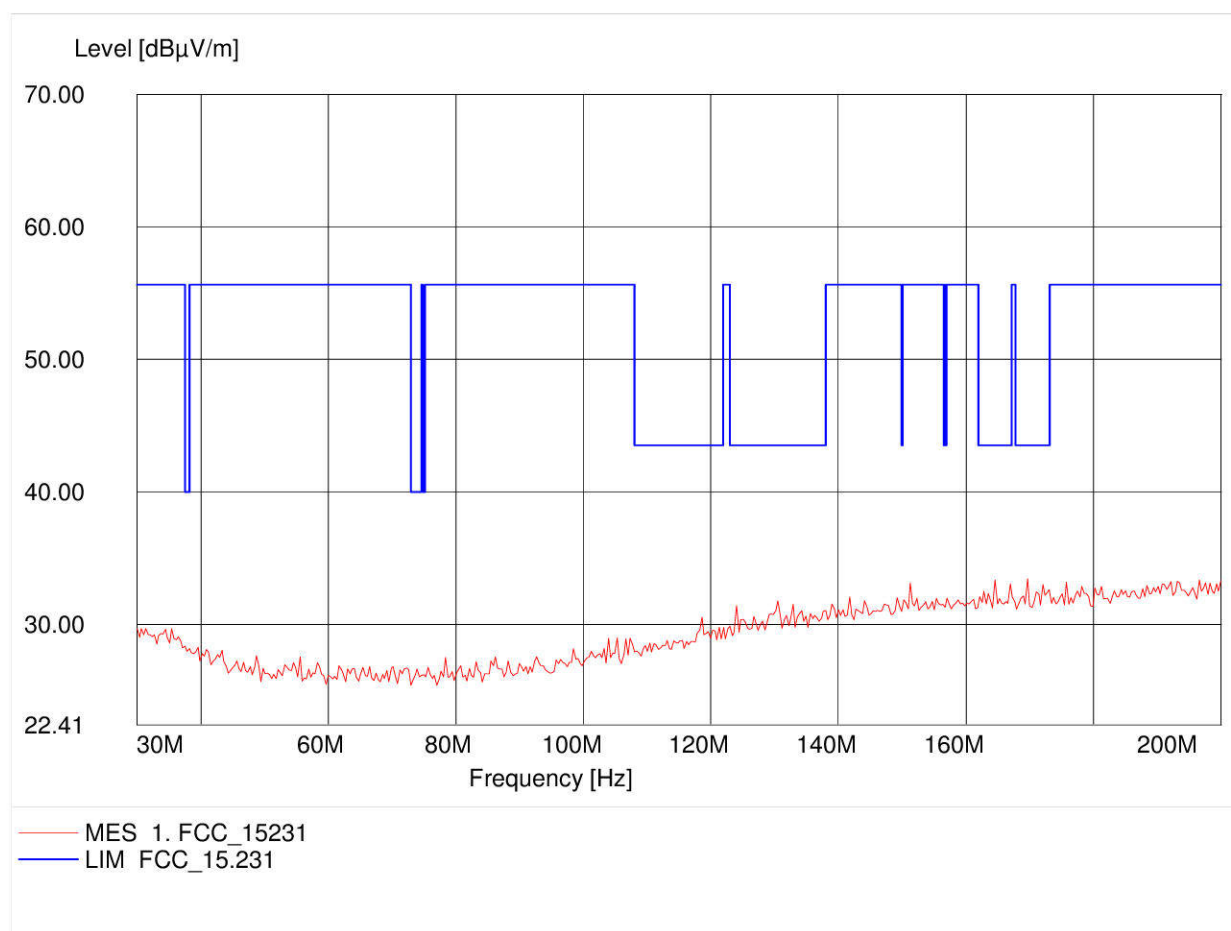


Measurement data

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Project No.: H1M20905-7424
Test Site / Operator: HKPC/Mr. Karl Lau
Temperature/Voltage: Temp.: 23°C/ Unom.: 4.5 VDC (3x AAA size battery)
Test Specification: according to Section15.231
Comment 1: Dist.: 3m, Ant.: HK 116 vertical, Peak detector
Freq: 169.679MHz, Emax: 33.46dBμV/m, RBW: 100kHz

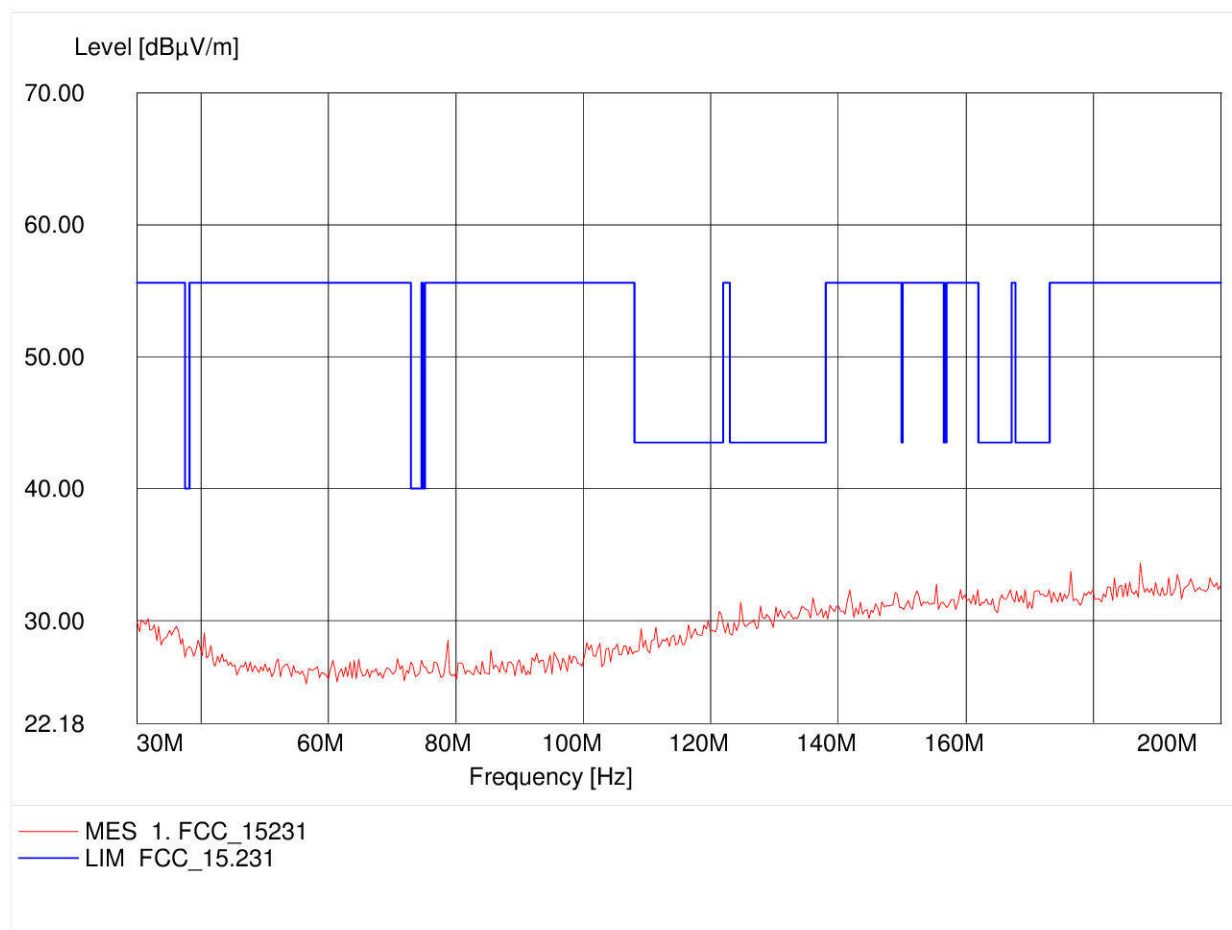




Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Project No.: H1M20905-7424
Test Site / Operator: HKPC/Mr. Karl Lau
Temperature/Voltage: Temp.: 23°C/ Unom.: 4.5 VDC (3x AAA size battery)
Test Specification: according to Section15.231
Comment 1: Dist.: 3m, Ant.: HK 116 horizontal, Peak detector
Freq: 187.395MHz, Emax: 34.35dBμV/m, RBW: 100kHz

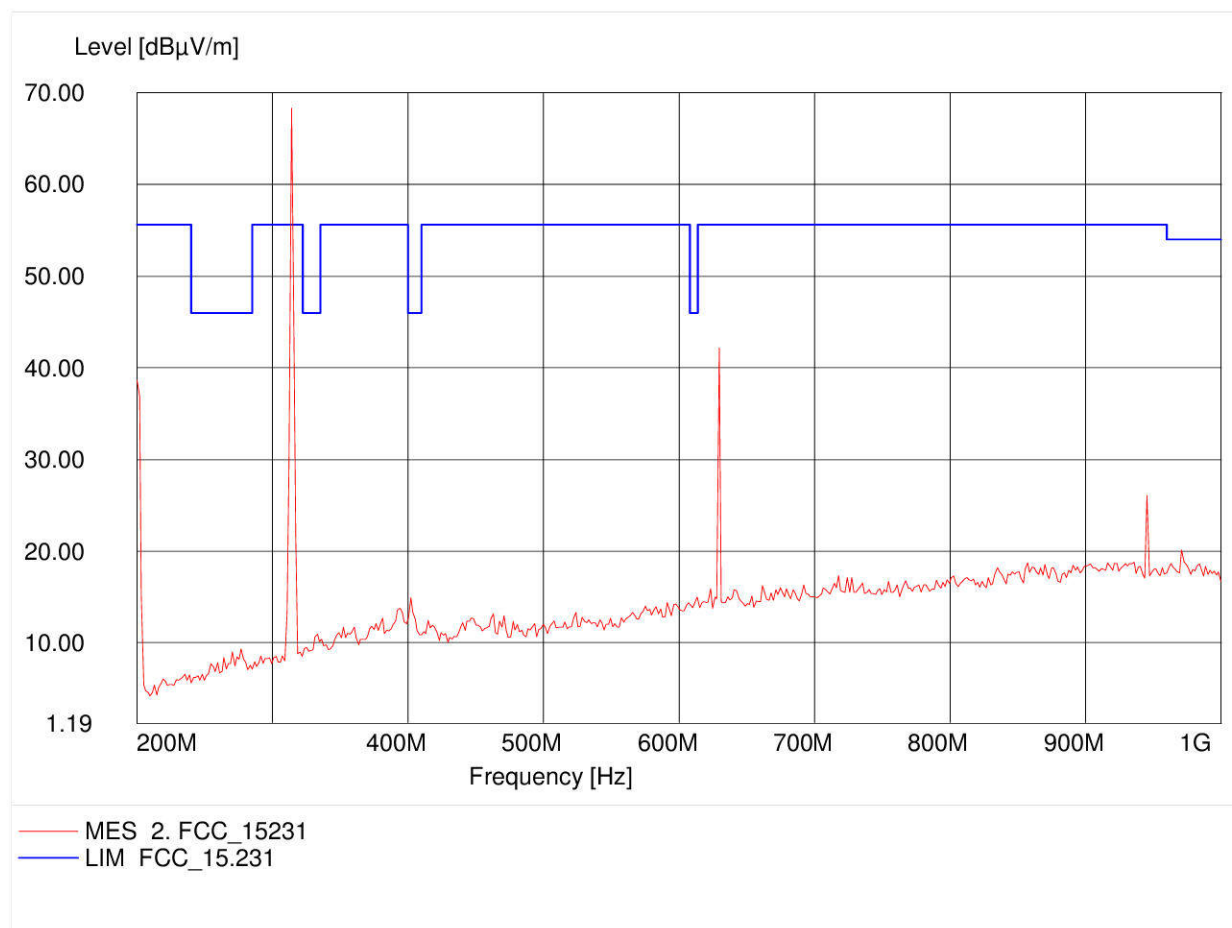




Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Project No.: H1M20905-7424
 Test Site / Operator: HKPC/Mr. Karl Lau
 Temperature/Voltage: Temp.: 23°C/ Unom.: 4.5 VDC (3x AAA size battery)
 Test Specification: according to Section15.231
 Comment 1: Dist.: 3m, Ant.: HL223 vertical, Amplifier, Peak detector
 Freq: 313.828MHz, Emax: 68.33dBμV/m, RBW: 100kHz



Frequency MHz	Level dBμV/m
200.000000	38.64
201.603206	36.87
629.659319	42.21
945.490982	26.04

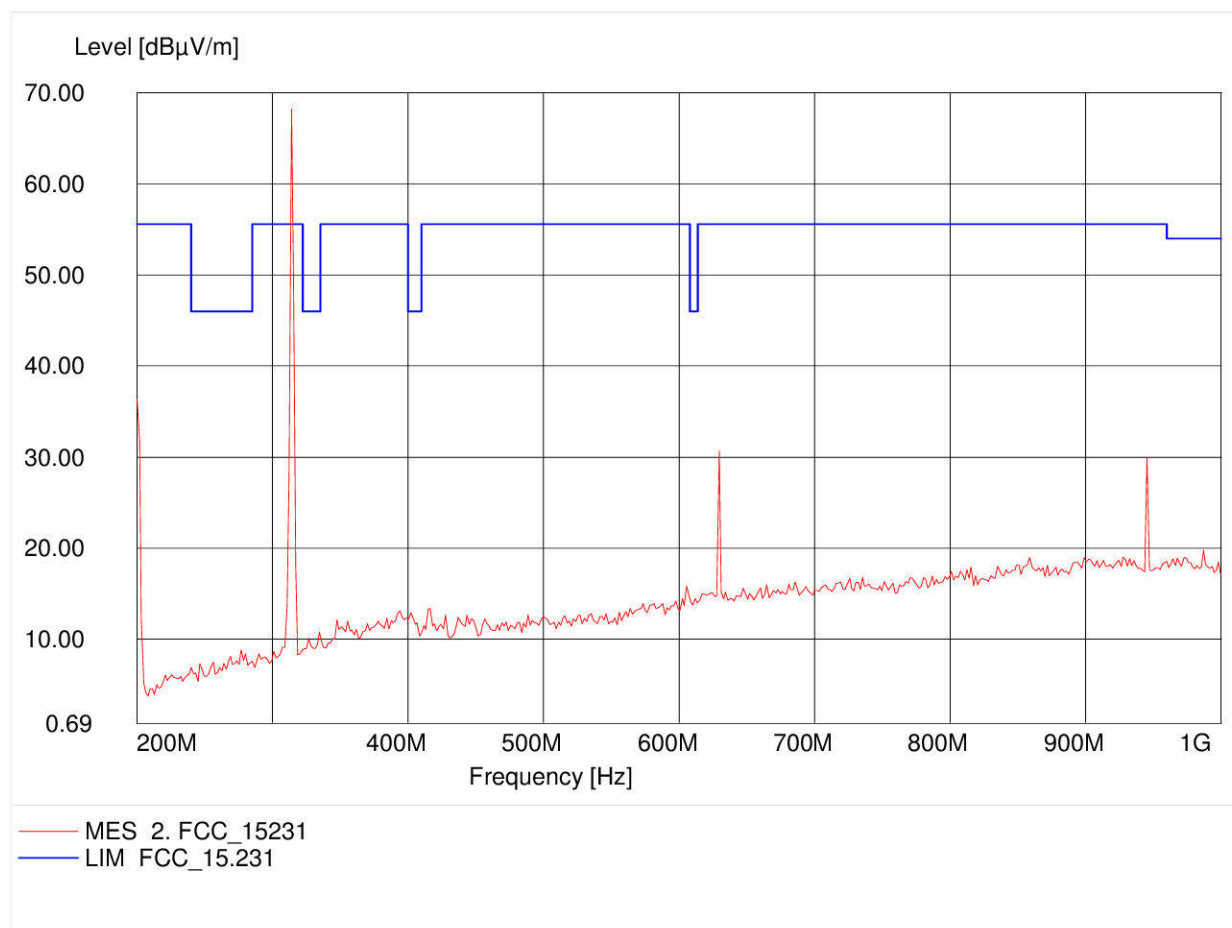
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Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Project No.: H1M20905-7424
Test Site / Operator: HKPC/Mr. Karl Lau
Temperature/Voltage: Temp.: 23°C/ Unom.: 4.5 VDC (3x AAA size battery)
Test Specification: according to Section15.231
Comment 1: Dist.: 3m, Ant.: HL223 horizontal, Amplifier, Peak detector
Freq: 313.828MHz, Emax: 68.27dBμV/m, RBW: 100kHz



Frequency MHz	Level dBμV/m
200.000000	36.39
201.603206	31.86
629.659319	30.63
945.490982	29.93

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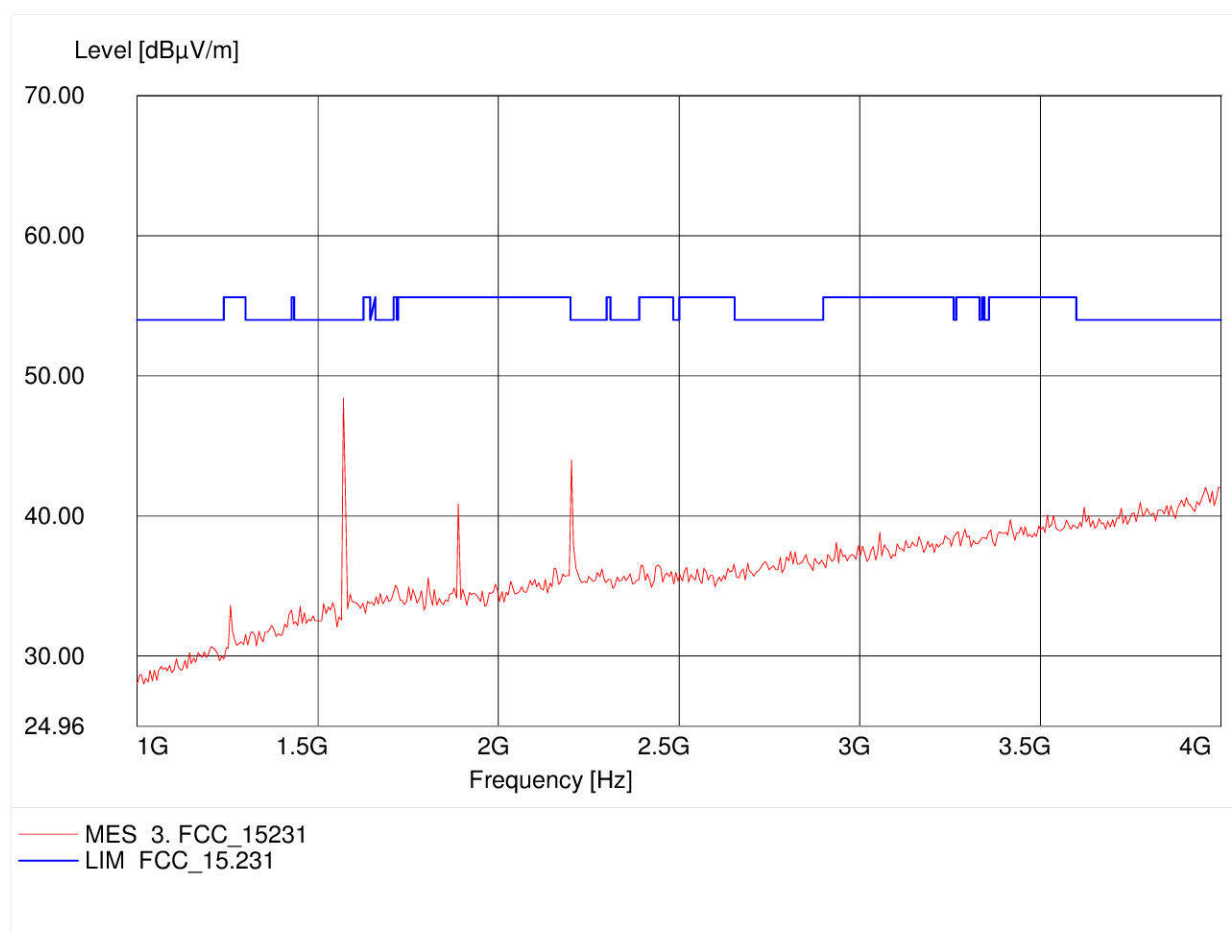
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Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Project No.: H1M20905-7424
Test Site / Operator: HKPC/Mr. Karl Lau
Temperature/Voltage: Temp.: 23°C/ Unom.: 4.5 VDC (3x AAA size battery)
Test Specification: according to Section15.231
Comment 1: Dist.: 3m, Ant.: HL025 vertical, amplifier, Peak detector
Freq: 1.571GHz, Emax: 48.42dBμV/m, RBW: 1MHz



Frequency MHz	Level dBμV/m
1571.142285	48.42
1889.779559	40.87
2202.404810	44.00

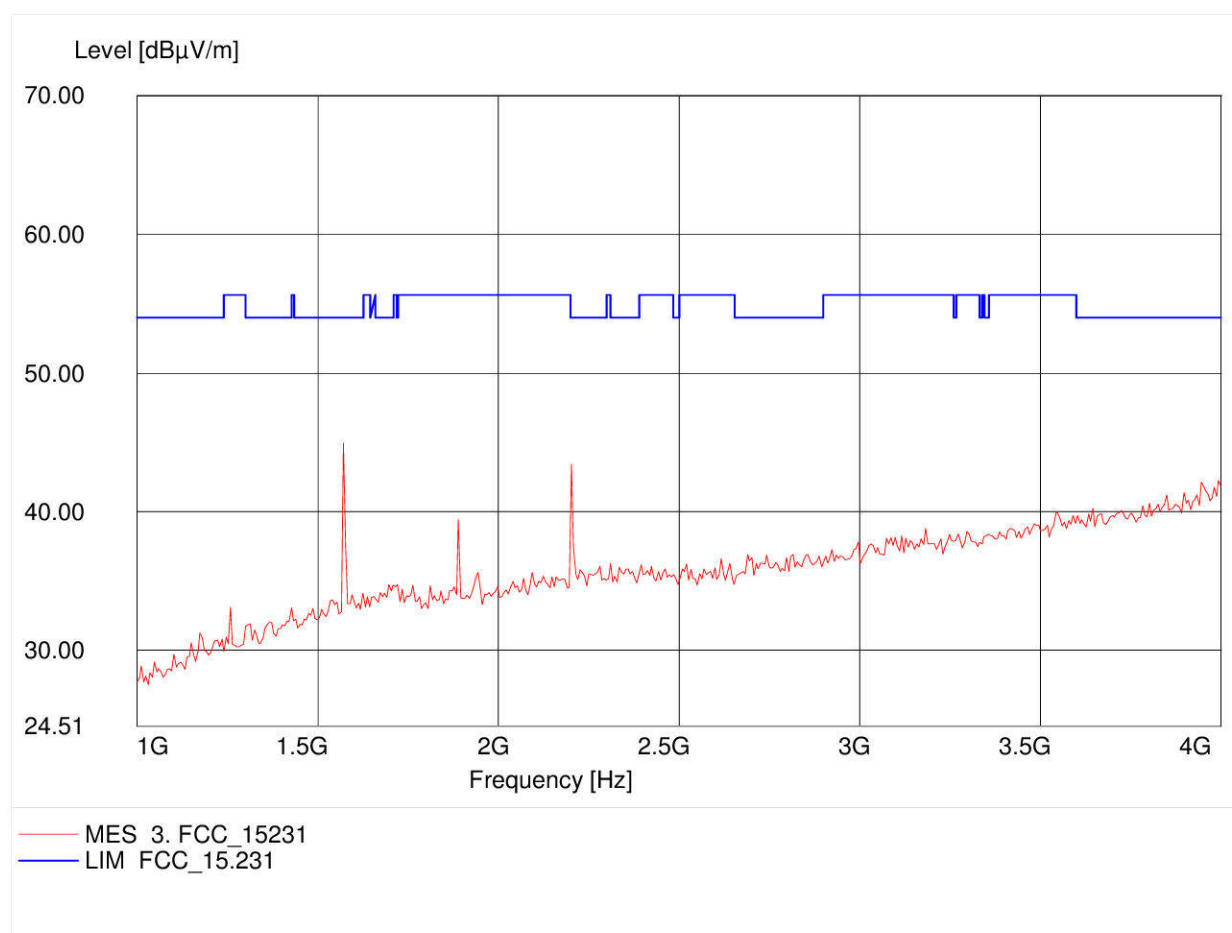
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Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Project No.: H1M20905-7424
Test Site / Operator: HKPC/Mr. Karl Lau
Temperature/Voltage: Temp.: 23°C/ Unom.: 4.5 VDC (3x AAA size battery)
Test Specification: according to Section15.231
Comment 1: Dist.: 3m, Ant.: HL25 horizontal, Amplifier, Peak detector
Freq: 1.571GHz, Emax: 44.96dBμV/m, RBW: 1MHz



Frequency MHz	Level dBμV/m
1571.142285	44.96
1889.779559	39.41
2202.404810	43.42

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Limits for Spurious Emission:

1. Limit 15.231(b)

Fundamental Frequency [MHz]	Limit [dBμV/m]
315	55.62

Fundamental Frequency [MHz]	Field strength of Spurious Emission limit [μV/m]
40,66 – 40,70	225
70 - 130	125
130 - 174	125 to 375**
174 - 260	375
260 - 470	375 to 1,250**
Above 470	1,250

According to section 15.35(b), When average radiated emission measurements are specified, including emission measurement below 1000MHz, there also is limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit for the frequency being investigated.

2. A radiated emission test applies to harmonic/spurs that fall in the restricted bands as listed in § 15.205(a). The maximum permitted QP (< 1GHz) and average (> 1GHz) field strength is listed in § 15.209(a).

MHz	MHz	MHz	GHz
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 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	
13.36-13.41			

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3. FCC Part 15, Subpart C, §15.209, Radiated Emission Limits

Frequency of Emission [MHz]	Field strength [$\mu\text{V/m}$]	Field Strength [dB $\mu\text{V/m}$]
30 – 88	100	40.0
88 – 216	150	43.5
216 – 960	200	46.0
Above 960	500	54.0



3.3 Emission Bandwidth

Limit

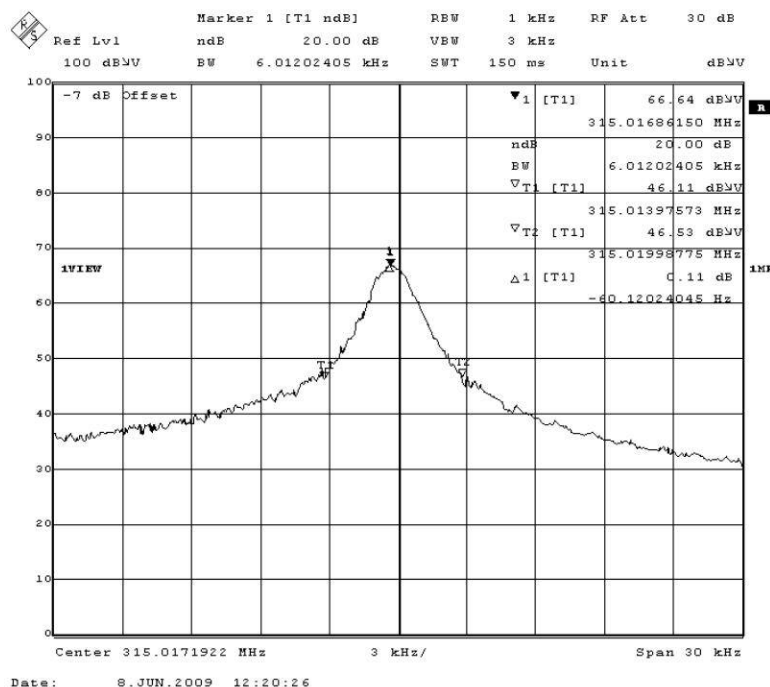
The bandwidth of the emission shall be no wider than 0.25% of the centre frequency for devices operating above 70 MHz and below 900MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the centre frequency. Bandwidth is determined at the points 20dB down from the modulated carrier.

Test result

Measurement of Necessary Bandwidth (BN)

Used Frequency	Measured Bandwidth	Limit	Verdict
315 MHz	6.012 kHz	787.5 kHz	Pass
Measurement uncertainty	<10Hz		

Measurement results



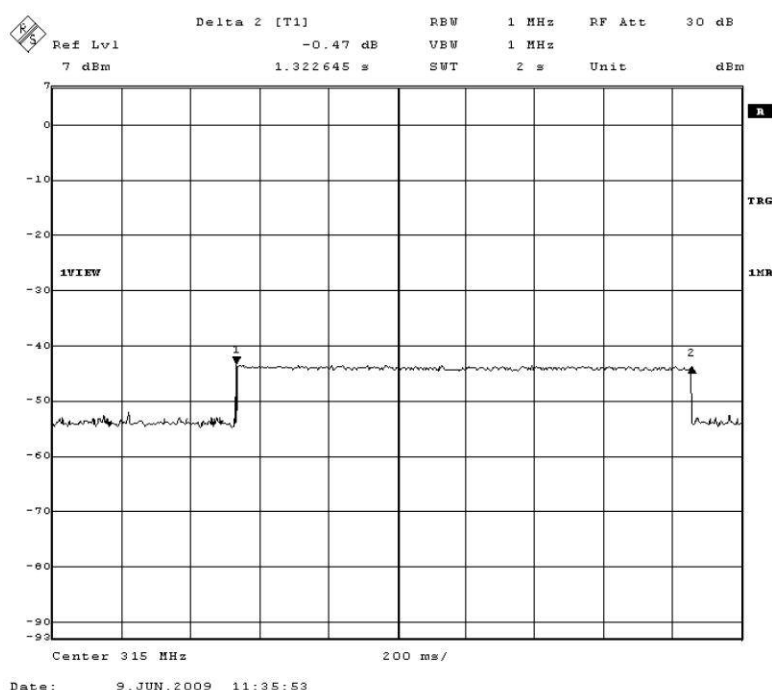
Emission bandwidth



3.4 Automatically Deactivation

This transmitter is activated manually by a switch and is deactivated automatically within 5 seconds after release the switch as confirmed by testing engineer.
It fulfills all requirements according Section 15.231(a).

Measured time	Limit	Verdict
1.32 s (The test was carry out with maximum possible length of text message)	5 s	Pass



The Diagram show the Transmitter turn Time after release the send button (marker 1)
Until the Transmitter turn off (marker 2)



4 Normative references

- /1/ FCC Rules 47 CFR PART 15: 2008
Radio Frequency Devices
- /2/ ANSI C63.4-2003
Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and
Electronic Equipment in the Range of 9 kHz to 40 GHz



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5.1 Revision Notes

This revised Report replaces the all former Test Reports based on number H1M20905-7424-P-15. These former Test Reports are not longer valid. Every Revision of the original report is recorded below and identified by the || symbol beside the text.

Revision No.	Revision
H1M20905-7424-P-15	Original Test Report