

Produkte
Products

Prüfbericht - Nr.: 19660335 001		Seite 1 von 53	
<i>Test Report No.:</i>		<i>Page 1 of 53</i>	
Auftraggeber: <i>Client:</i>		Stasis Labs Inc. 9121 Airdrome St, Los Angeles CA USA 90035	
Gegenstand der Prüfung: <i>Test item:</i>		Stasis Monitor	
Bezeichnung: <i>Identification:</i>	Monitor V1.0	Serien-Nr.: <i>Serial No.</i>	Engineering Sample
Wareneingangs-Nr.: <i>Receipt No.:</i>	1803233490	Eingangsdatum: <i>Date of receipt:</i>	04.05.2017
Prüfort: <i>Testing location:</i>		Refer Page 5 of 53 for test facilities	
Prüfgrundlage: <i>Test specification:</i>		FCC Part 15 Subpart C 15.247, ANSI C63.10-2013	
Prüfergebnis: <i>Test Result:</i>		Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n). <i>The test items passed the test specification(s).</i>	
Prüflaboratorium: <i>Testing Laboratory:</i>		TÜV Rheinland (India) Pvt. Ltd. 82/A, 3rd Main, West Wing, Electronic City Phase 1 Hosur Road, Bangalore – 560 100. India FCC Test Site Registration no.: 496599	
geprüft / tested by:		kontrolliert / reviewed by:	
06.03.2018 Pramod Sharma R Date Engineer		08.03.2018 Saibaba Siddapur Date Assistant Manager	
Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>
	Unterschrift <i>Signature</i>		Unterschrift <i>Signature</i>
Sonstiges / Other Aspects:		FCC ID: 2AOSR-STSLBMV1, On receipt the equipment was in good condition.	
Abkürzungen:		Abbreviations:	
P(ass) = entspricht Prüfgrundlage		P(ass) = passed	
F(ail) = entspricht nicht Prüfgrundlage		F(ail) = failed	
N/A = nicht anwendbar		N/A = not applicable	
N/T = nicht getestet		N/T = not tested	
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts.</i> <i>This test report does not entitle to carry any safety mark on this or similar products.</i>			

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TEST SUMMARY

Clause	Test item	Result	Remarks
Section 15.247(b)	Maximum peak conducted output power	Pass*	Note: BLE Module was tested by SGS Fimko Ltd, with FCC ID: QOQBLE121LR & report number 276131-2. Wi-Fi Module was tested by Bureau Veritas consumer products services with FCC ID: COFWMNBM11 & report number RF130520E14 Hence antenna port tests are excluded.
Section 15.247 (a)	Occupied Bandwidth	Pass*	
Section 15.247(e)	Power Spectral density	Pass*	
Section 15.247(d)	Conducted Spurious Emission	Pass*	
Section 15.247 (d) / (15.209 & 15.205)	Restricted bands of Emissions & Restricted Bands of Operation	Pass	-
Section 15.207	Conducted emission test on A.C mains lines	Pass	-

* - > Only Verification performed, refer the test results table.

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1 GENERAL REMARKS

1.1 Complimentary Materials

All attachments are integral part of this test report. This applies especially to the following appendix:

APPENDIX 1: TEST SETUP PHOTO

APPENDIX 2: EUT EXTERNAL PHOTO

APPENDIX 3: EUT INTERNAL PHOTO

APPENDIX 4: FCC LABEL AND LABEL LOCATION

APPENDIX 5: BLOCK DIAGRAM

APPENDIX 6: SPECIFICATION OF EUT

APPENDIX 7: SCHEMATIC DIAGRAMS

APPENDIX 8: BILL OF MATERIAL

APPENDIX 9: USER MANUAL

APPENDIX 10: MAXIMUM PERMISSIBLE EXPOSURE INFORMATION

2 TEST SITES

2.1 Testing Facilities

TUV Rheinland (India) Private Limited
108 , Beside ISBR Business School,
Electronic city Phase I
Bangalore - 560 100.

2.2 List of Test and Measurement Instruments

Table 1: List of test and measurement instruments

Equipment	Manufacturer	Model Name	Serial Number	Calibration Due Date	Periodicity	Used for Test Items
EMI Test Receiver	Rohde & Schwarz	ESU 40	100288	24-10-2018	Yearly	Radiated Spurious Emission
Baloon and Biconical Antenna	Schwarzbeck mess-elektronik	VHBB-9124 / BBA-9106	9124-656	09-01-2019	Yearly	
Log-Periodic Antenna	Schwarzbeck mess-elektronik	VUSLP-9111B	9111B-111	16-01-2019	Yearly	
Broadband Horn Antenna	Frankonia	HAX-18	HAX18-802	16-03-2018	Yearly	
Active Loop Antenna	Frankonia	LAX-10	LAX-10-800	15-01-2019	Yearly	
Semi Anechoic Chamber	Frankonia	-	-	-	-	
EMI Receiver	Rohde & Schwarz	ESR7	101133	16-01-2019	Yearly	Conducted Measurements
Signal Analyzer	Rohde & Schwarz	FSV7	101644	15-12-2018	Yearly	
LISN	Rohde & Schwarz	ENV216	100022	05-09-2018	Yearly	

3 GENERAL PRODUCT INFORMATION

3.1 Product Function and Intended Use

The Stasis Monitoring System consists of a compact six-parameter vital signs monitor that sits at patient bedside and communicates via Bluetooth with Android tablets running our proprietary application. System uses traditional wired sensor technology to acquire the vital signs. The primary data display and control for the monitoring system is on the Android tablet. The Stasis Monitoring System is intended for use by clinicians and medically qualified personnel for single or multi-parameter vital signs monitoring of adult patients (>20 years of age). It is indicated for 3 lead ECG, respiration rate (RESP), heart rate (HR), noninvasive blood pressure (NIBP), noninvasive monitoring of functional oxygen saturation of arterial hemoglobin (SpO2), pulse rate (PR), and skin temperature (TEMP) in hospital-based facilities; including, general medical-surgical floors, intermediate care floors, and emergency departments. The Stasis Monitoring System includes bedside Patient Monitors that communicate with mobile Tablets through wireless Bluetooth Low Energy (BLE) communication. The Stasis Monitoring System can generate alerts when rate-based cardiac arrhythmias such as asystole are detected, and when physiological vital signs fall outside of selected parameters. The Stasis Monitoring System has a notification system that communicates data and alarms to a Stasis Tablet. It is intended to supplement the primary alarms which originate at the patient-worn Stasis Monitor device.

3.2 Ratings and System Details

Table 2: Ratings and System Details

Operating Frequency Range	2400 MHz – 2483.5 MHz;
Radio Protocol	Wi-Fi (802.11 b/g/n), BLE
Number of antennas	2
Antenna Gain & Type	0dBi (BLE), 2dBi (Wi-Fi) & Printed
Supply Voltage to Product	5V, 2A DC
Dimensions	137.8 mm H x 107.8 mm W x 85.5 mm D
Environmental conditions	Operating Conditions: Temperature: 10° C - 40° C Storage Conditions: Temperature: -20° C - 50° C

3.3 Measurement Uncertainty:

Table 3: Measurement Uncertainty

Parameter	Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±1.5 dB
Power Spectral Density, conducted	±3 dB
Unwanted Emissions, conducted	±3 dB
All emissions, radiated	±6 dB
Temperature	±3 °C
Supply Voltages	±3 %
Time	±5 %

4 OPERATIONAL DESCRIPTIONS

The Stasis Monitoring System consists of a compact six-parameter vital signs monitor that sits at patient bedside and communicates via Bluetooth with Android tablets running our proprietary application. System uses traditional wired sensor technology to acquire the vital signs. The primary data display and control for the monitoring system is on the Android tablet.

5 TEST SET-UP AND OPERATION MODE

5.1 Principle of Configuration Selection

Transmission was enabled on highest possible duty cycled transmission on low, mid and high channel on all datarates to obtain maximum emissions.

5.2 Test Operation and Test Software

The below firmware are using while switching the channels.

- Main app and version: 1.3
- Test firmware and version: 2.4.1.3

5.3 Special Accessories and Auxiliary Equipment

-None

5.4 Countermeasures to achieve EMC Compliance

- None

Table 4: List of Center Frequencies (Wi-Fi)

Frequency Band (MHz)	Channel Number	Channel Frequency
2400 – 2483.5	1	2412
	2	2417
	3	2422
	4	2427
	5	2432
	6	2437
	7	2442
	8	2447
	9	2452
	10	2457
	11	2462

Note: For Wi-Fi, application manufacturer declared only 9dB power setting for all modes i.e IEEE 802.11bgn & for the same setting testing, was performed

Table 5: List of Center Frequencies (BLE)

Frequency Band (MHz)	Channel No.	Channel Frequency (MHz)
2400 – 2483.5	0	2402
	1	2404
	2	2406
	3	2408
	:	:
	:	:
	18	2438
	19	2440
	20	2437
	:	:
	:	:
	36	2474
	37	2476
	38	2478
	39	2480

Note: Sample used for testing as identified with below number.

Sample Serial No.10

Wi-Fi & Bluetooth Low energy are not transmitting simultaneously.

6 TEST METHODOLOGY

6.1 Radiated Emission Test

The radiated emission measurement was performed according to the procedures in ANSI C63.10-2013. The equipment under test (EUT) was placed at the middle of the 80 cm high turntable for below 1 GHz & 1.5 m height for above 1 GHz measurement, and the EUT is 3 meters far from the measuring antenna. The turntable was rotated 360° for obtaining the maximum emission. The height of the measuring antennas was scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained. The measurement above 1000 MHz was performed by horn antenna, The measurement below 30 MHz was performed by loop antenna.

6.1.1 Test Setup Configuration

Figure 1: Frequency Range 9 kHz- 30 MHz

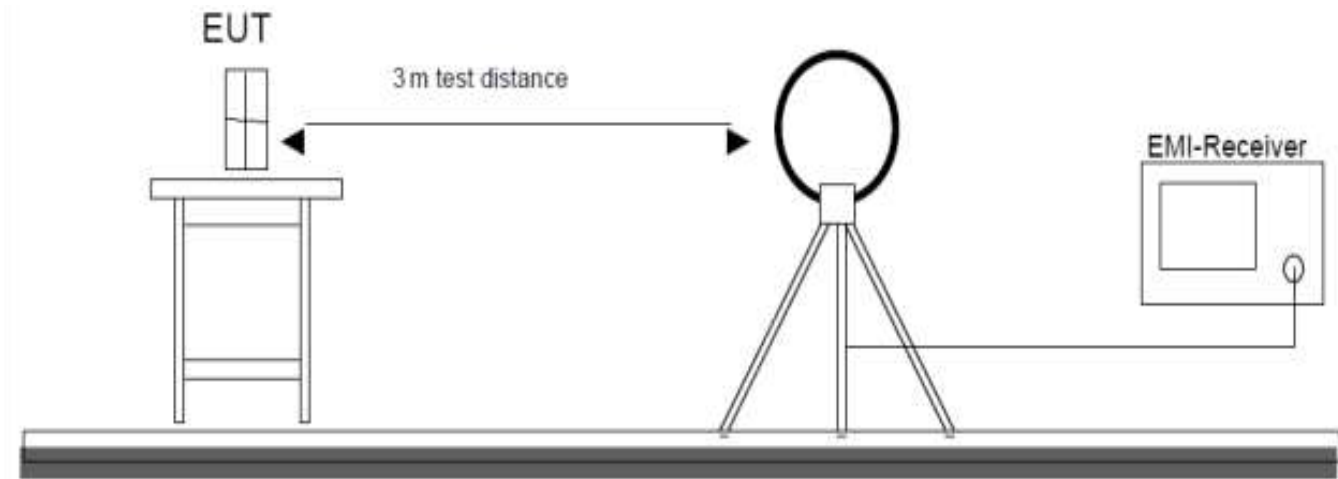


Figure 2: Frequency Range 30 MHz – 200 MHz

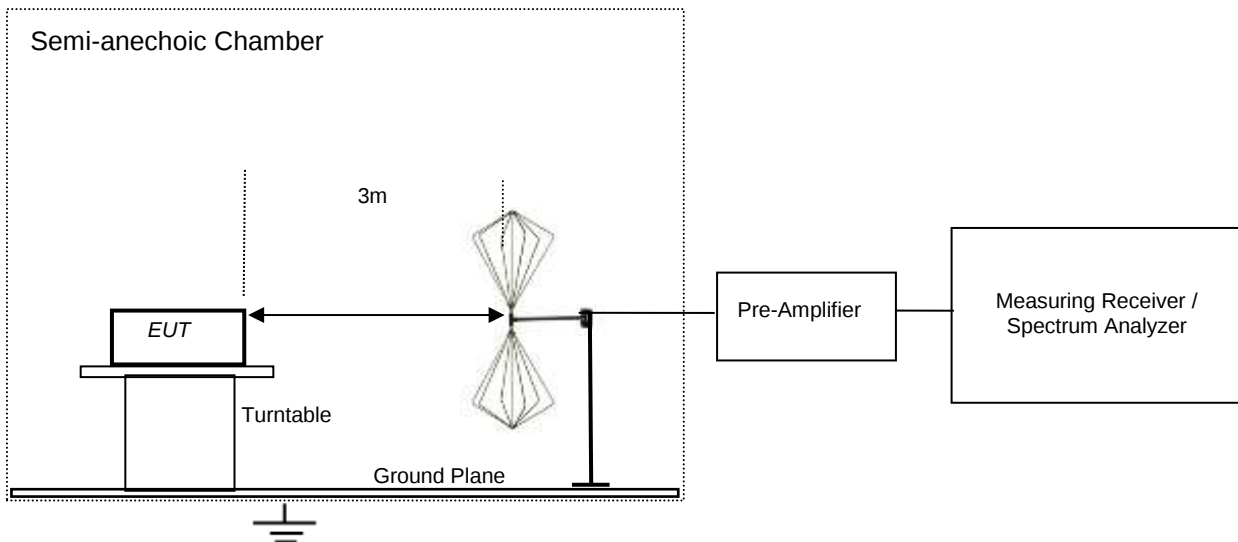


Figure 3: Frequency Range 200 MHz - 1GHz

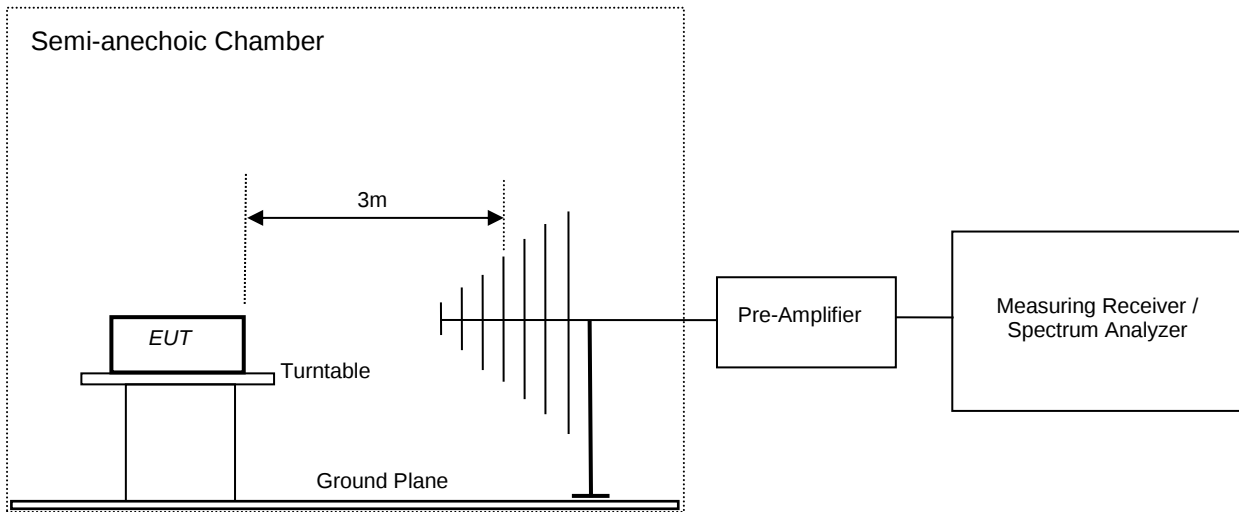
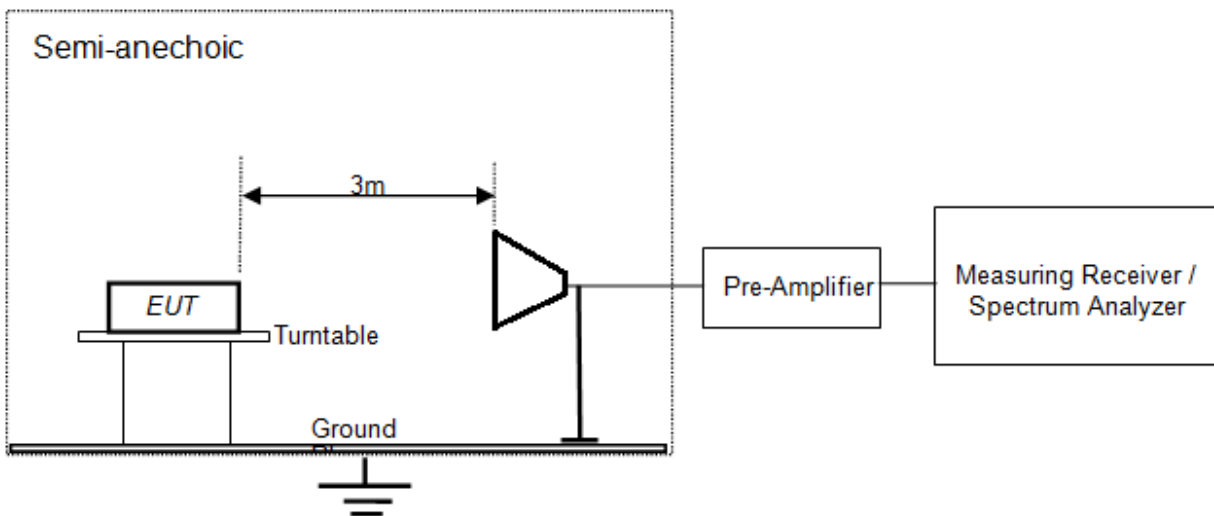


Figure 4: Frequency Range above 1 GHz

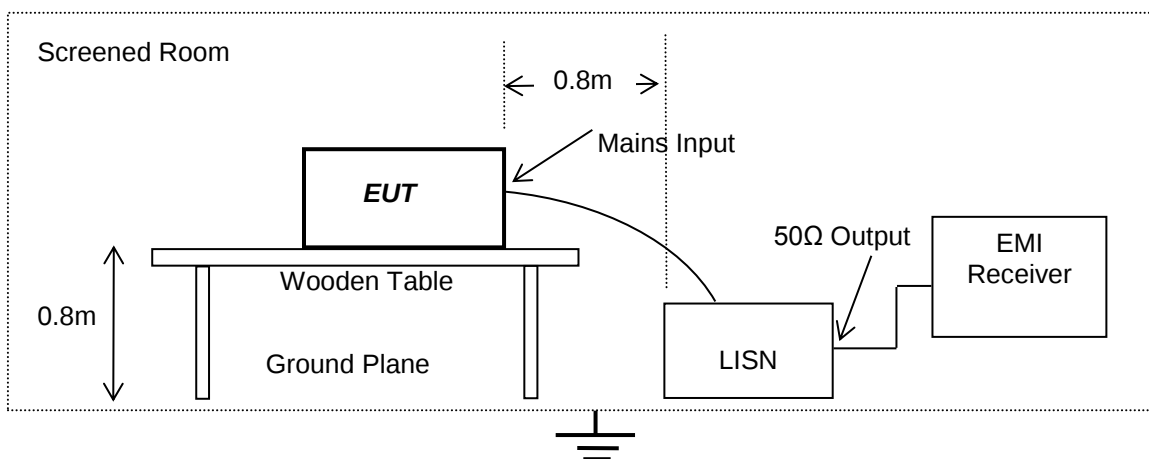


6.2 Conducted emission test on A.C mains lines

The equipment under test (EUT) was placed on a wooden table 80cm above the ground plane, the LISN was placed 80cm away from the EUT. The test was performed in accordance with ANSI C63.10 - 2013, with the following: an initial measurement was performed in peak and average detection mode on the live and neutral lines. The pre-scan was performed by peak detection on both live and neutral conductors. Any emissions recorded within 20dB of the relevant limit line were re-measured using quasi-peak and average detections, the 6 worst cases were recorded in the table of results.

6.2.1 Test setup configuration

Figure 4 : Conducted emission test on A.C Power lines



7 TEST RESULTS

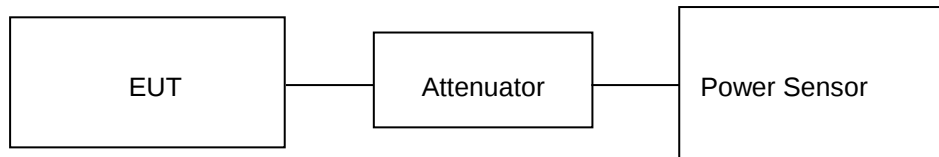
7.1 Maximum Peak Conducted Output Power

Result

Pass

Test Specification FCC Part 15.247(b) (3)
Measurement Bandwidth (RBW) 1MHz
Requirement ≤ 1 watt (30dBm).

Test Method:



Note: Attenuator (10dB) & cable loss(0.8dB) values are considered in the test results.

Test Result: b Mode 1Mbps

Table 5 : Maximum Peak Conducted Output Power

Channel Frequency (MHz)	Total Power (dBm)	Limit (dBm)
2412.00	8.99	30.00
2437.00	9.08	30.00
2462.00	9.22	30.00

Test Result: b Mode 11Mbps

Table 6 : Maximum Peak Conducted Output Power

Channel Frequency (MHz)	Total Power (dBm)	Limit (dBm)
2412.00	9.37	30.00
2437.00	9.39	30.00
2462.00	9.49	30.00

Test Result: g Mode 6Mbps

Table 7: Maximum Peak Conducted Output Power

Channel Frequency (MHz)	Total Power (dBm)	Limit (dBm)
2412.00	9.30	30.00
2437.00	9.59	30.00
2462.00	9.42	30.00

Test Result: g Mode 24Mbps

Table 8 : Maximum Peak Conducted Output Power

Channel Frequency (MHz)	Total Power (dBm)	Limit (dBm)
2412.00	8.97	30.00
2437.00	9.09	30.00
2462.00	9.0	30.00

Test Result: g Mode 54Mbps

Table 9: Maximum Peak Conducted Output Power

Channel Frequency (MHz)	Total Power (dBm)	Limit (dBm)
2412.00	9.11	30.00
2437.00	8.93	30.00
2462.00	9.06	30.00

Test Result: n Mode MCS 0

Table 10: Maximum Peak Conducted Output Power

Channel Frequency (MHz)	Total Power (dBm)	Limit (dBm)
2412.00	8.87	30.00
2437.00	8.92	30.00
2462.00	9.18	30.00

Test Result: n Mode MCS 4

Table 11: Maximum Peak Conducted Output Power

Channel Frequency (MHz)	Total Power (dBm)	Limit (dBm)
2412.00	8.95	30.00
2437.00	9.09	30.00
2462.00	9.16	30.00

Test Result: n Mode MCS 7

Table 12: Maximum Peak Conducted Output Power

Channel Frequency (MHz)	Total Power (dBm)	Limit (dBm)
2412.00	8.91	30.00
2437.00	9.16	30.00
2462.00	9.11	30.00

Test Result: BLE

Table 13: Maximum Peak Conducted Output Power

Channel Frequency (MHz)	Total Power (dBm)	Limit (dBm)
2402.00	-5.24	30.00
2440.00	-9.65	30.00
2480.00	-2.00	30.00

Note: To arrive the conducted power below equation used.

$$\text{EIRP} = E \text{ (dB}\mu\text{V/m)} + 20 \cdot \log(D) - 104.8$$

D → 3 meters distance

$$\text{ERP} = \text{EIRP} - 2.15$$

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7.2 Power Spectral Density

Result

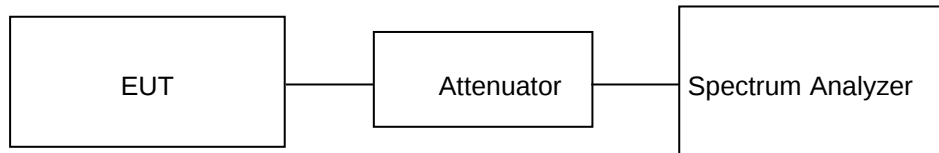
Pass

Test Specification FCC Part 15.247 (e)

Detector Function Peak

Requirement For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm.

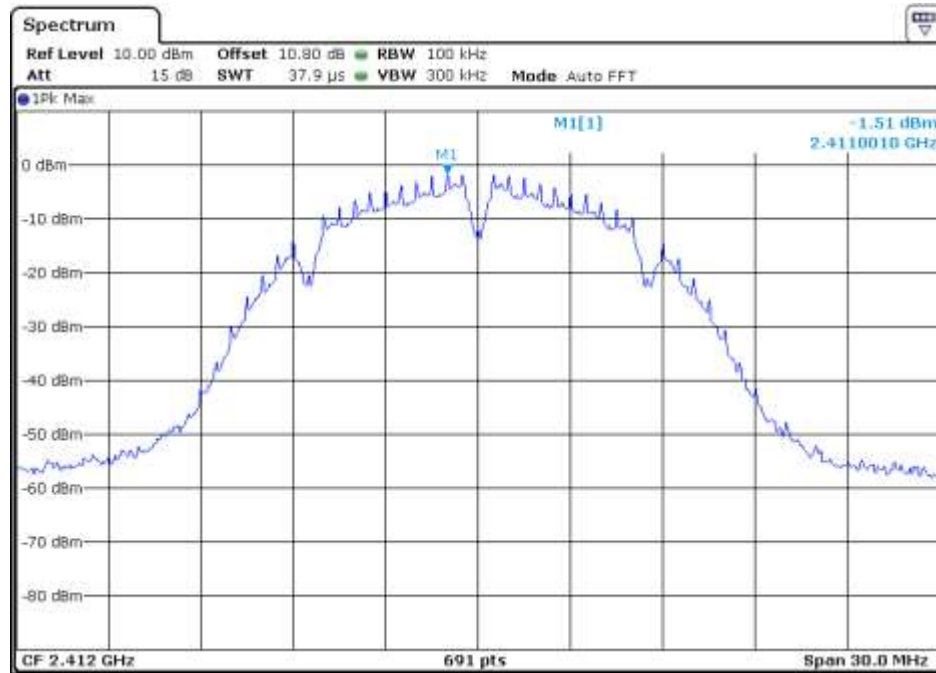
Test Method:



Note: Attenuator (10dB) & cable loss (0.8dB) values are considered in the test results.

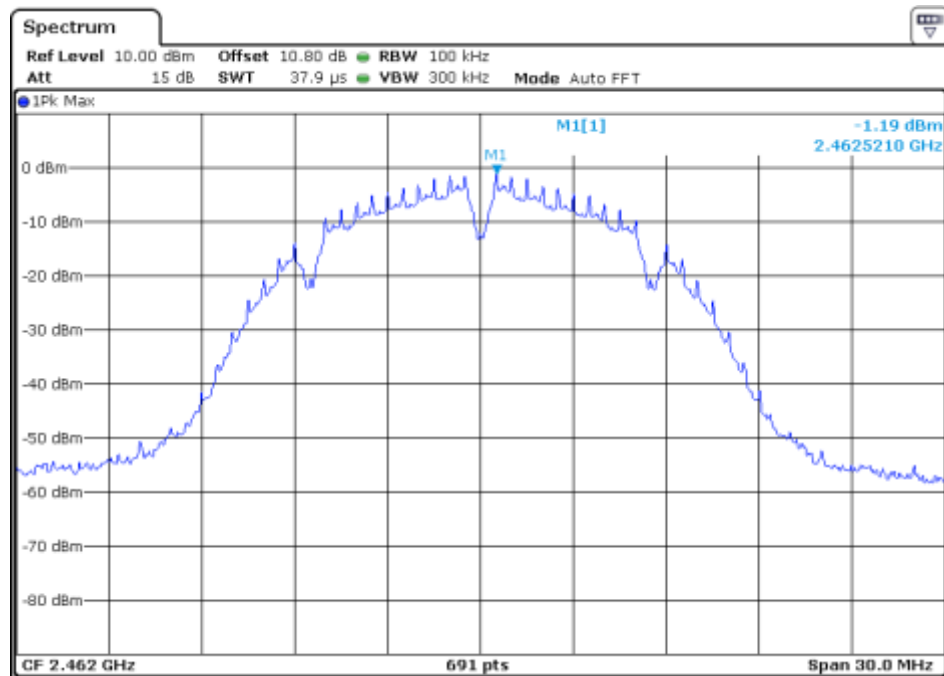
Test Result:

802.11 Protocol	Data Rate (Mbps)	Channel Frequency (MHz)	PSD (dBm)	Limit (dBm)
b	1	2412.00	-1.51	8
		2462.00	-1.19	8
	11	2412.00	-1.80	8
		2462.00	-1.14	8



Data rate: 1 Mbps

Channel Frequency: 2412 MHz



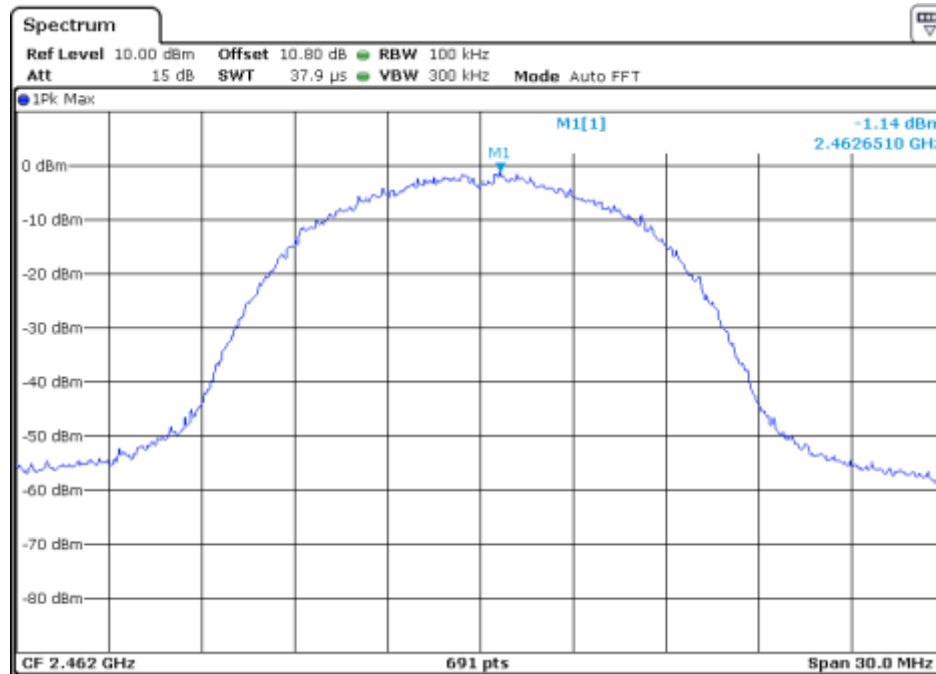
Data rate: 1 Mbps

Channel Frequency: 2462 MHz



Data rate: 11 Mbps

Channel Frequency: 2412 MHz



Data rate: 11 Mbps

Channel Frequency: 2462 MHz

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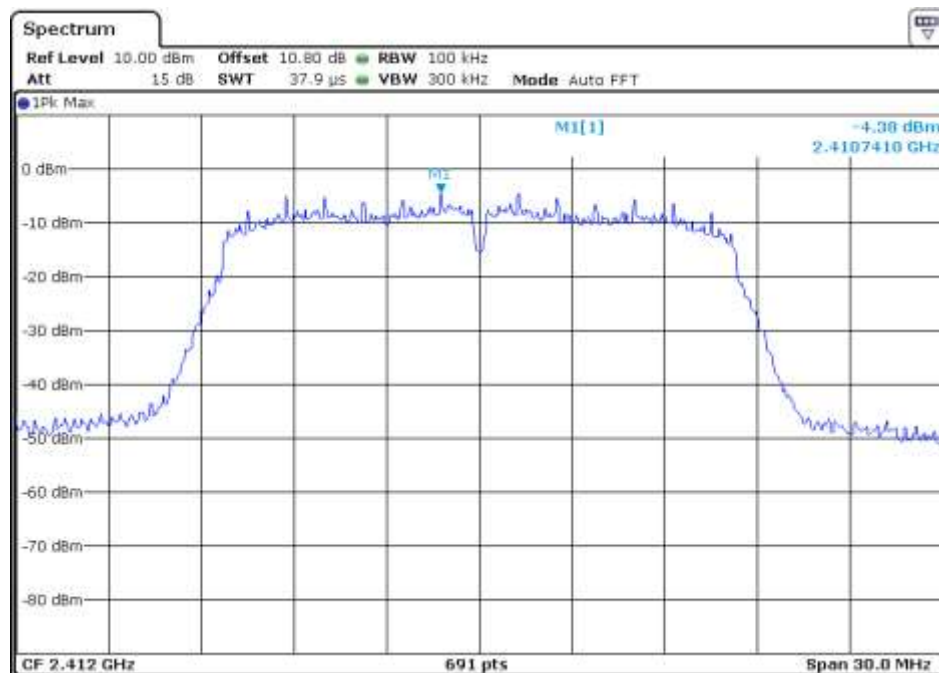
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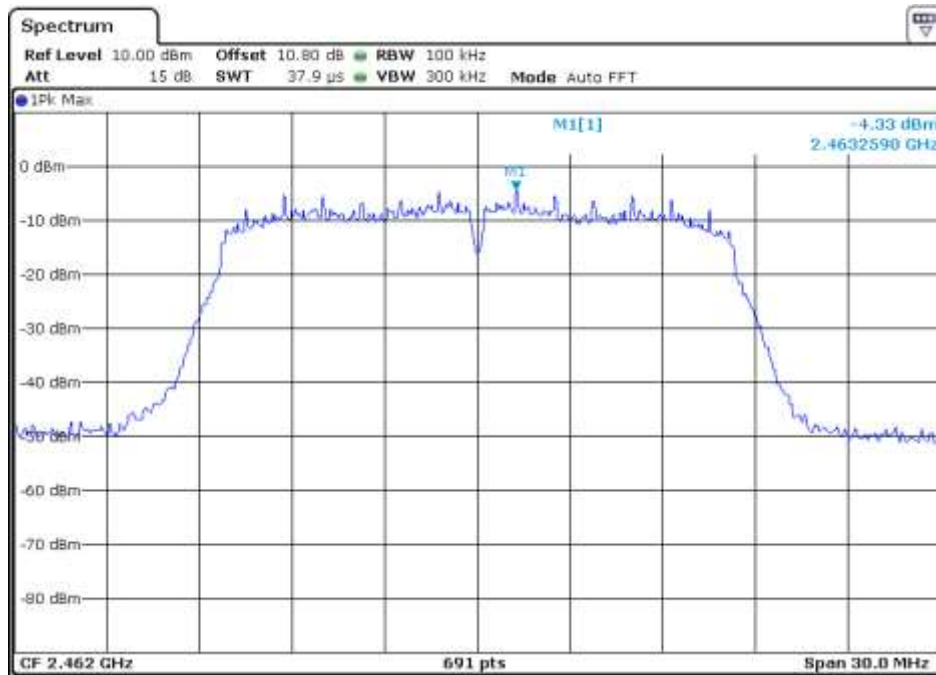
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802.11 Protocol	Data Rate (Mbps)	Channel Frequency (MHz)	PSD (dBm)	Limit (dBm)
g	6	2412.00	-4.38	8
		2462.00	-4.33	8
	24	2412.00	-4.34	8
		2462.00	-4.57	8
	54	2412.00	-4.46	8
		2462.00	-4.53	8



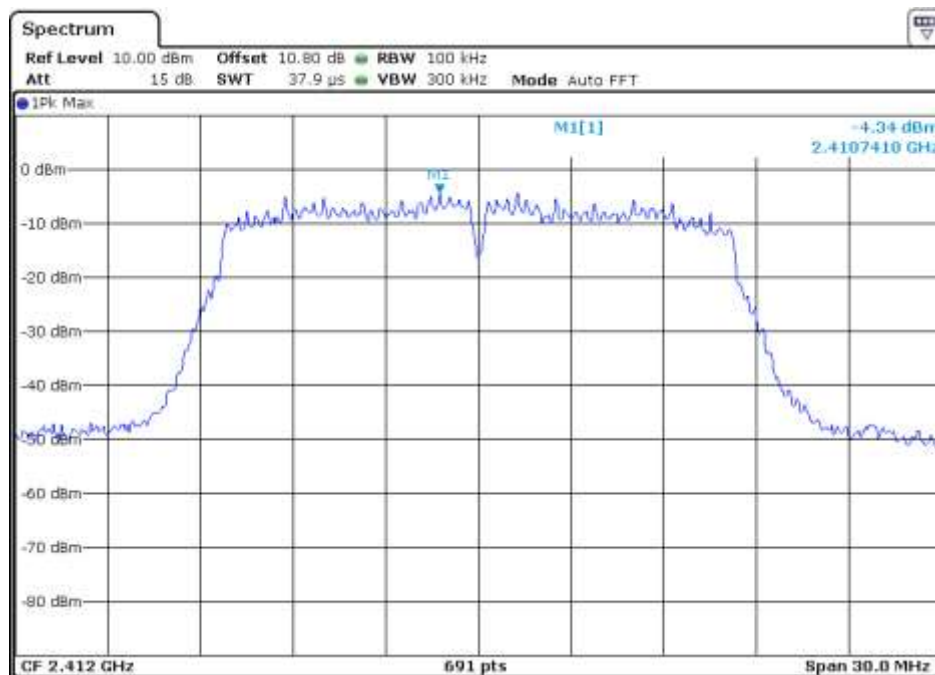
Data rate: 6 Mbps

Channel Frequency: 2412 MHz



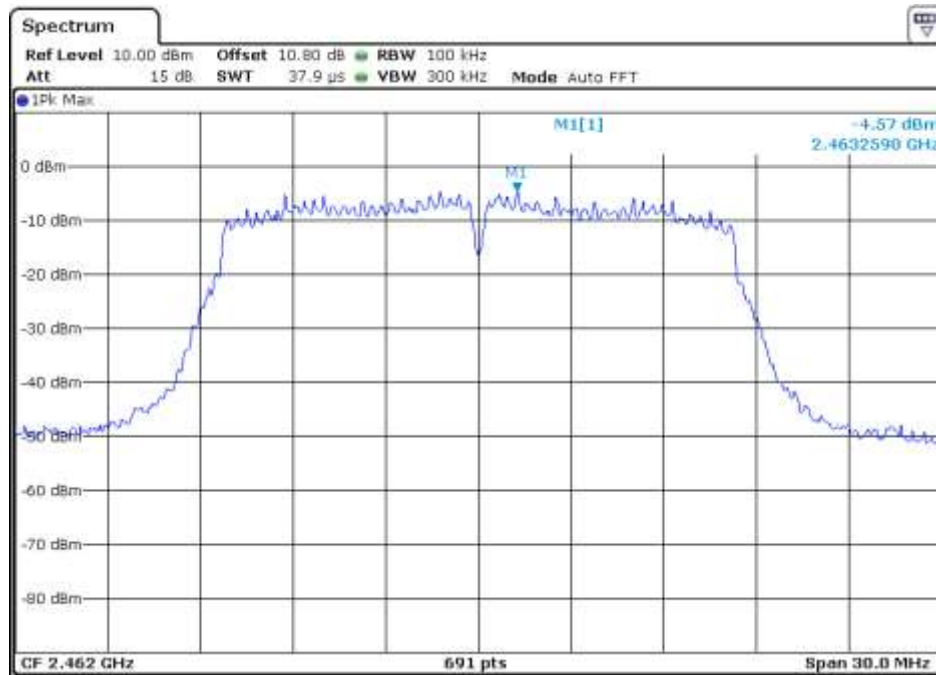
Data rate: 6 Mbps

Channel Frequency: 2462 MHz



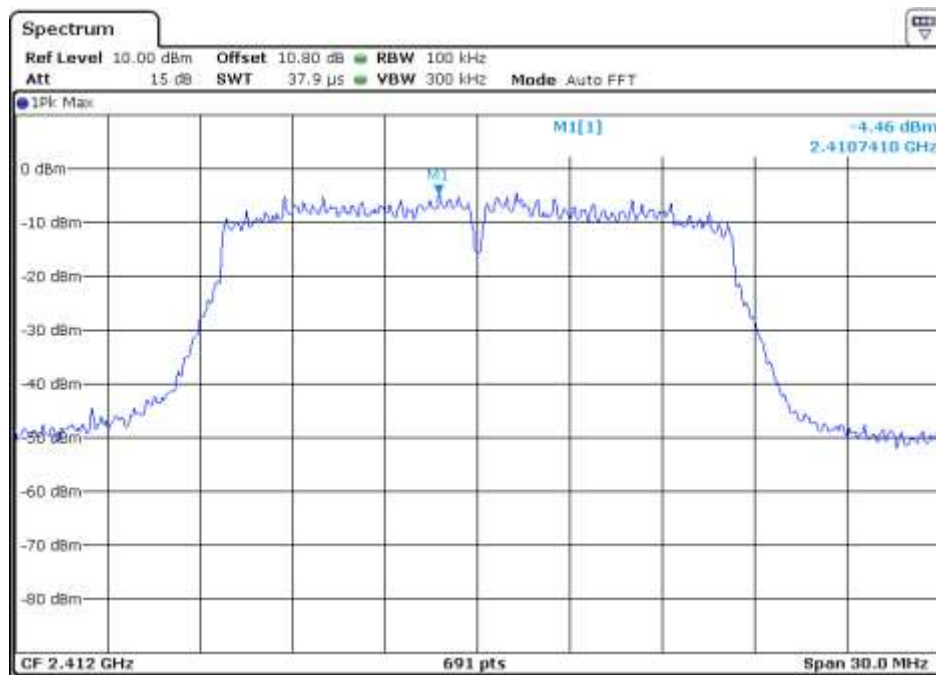
Data rate: 24 Mbps

Channel Frequency: 2412 MHz



Data rate: 24 Mbps

Channel Frequency: 2462 MHz



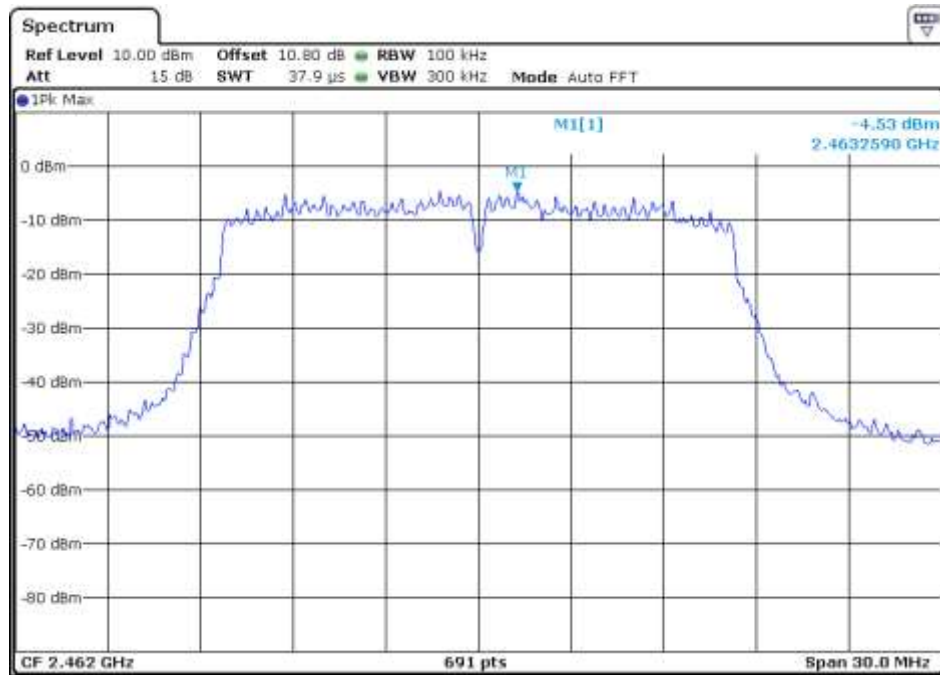
Data rate: 54 Mbps

Channel Frequency: 2412 MHz

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Data rate: 54 Mbps

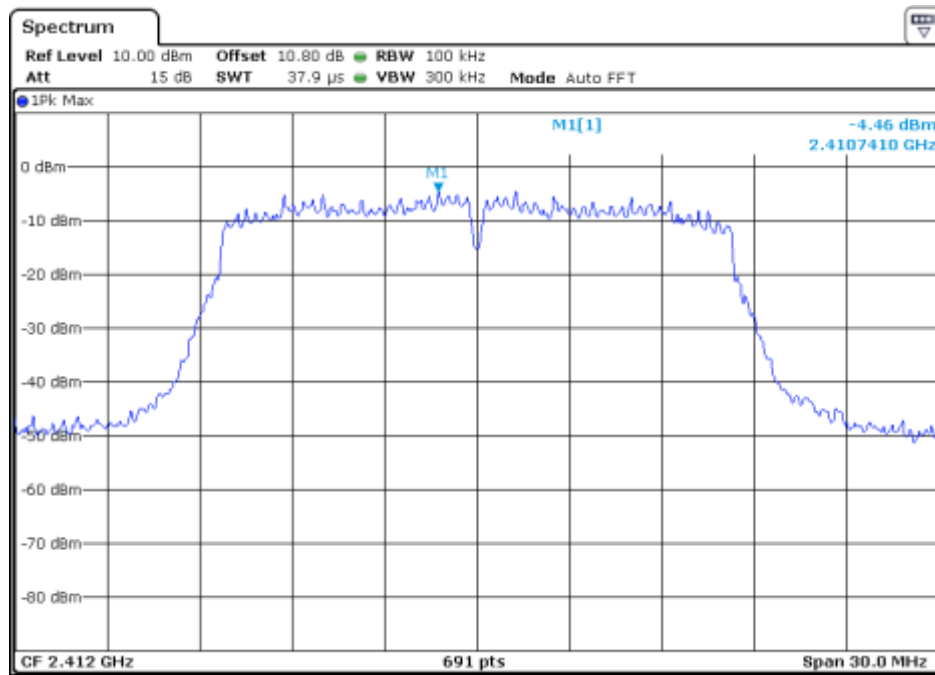
Channel Frequency: 2462 MHz

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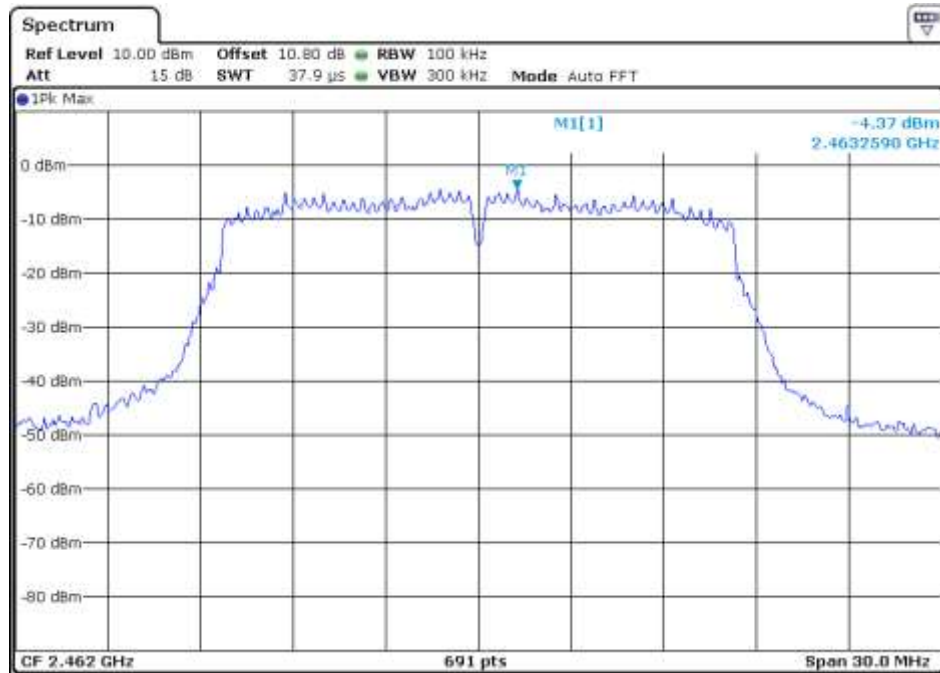
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802.11 Protocol	Data Rate (Mbps)	Channel Frequency (MHz)	Total PSD (dBm)	Limit (dBm)
n	MCS0	2412.00	-4.46	8
		2462.00	-4.37	8
	MCS4	2412.00	-4.33	8
		2462.00	-4.48	8
	MCS7	2412.00	-4.32	8
		2462.00	-4.45	8



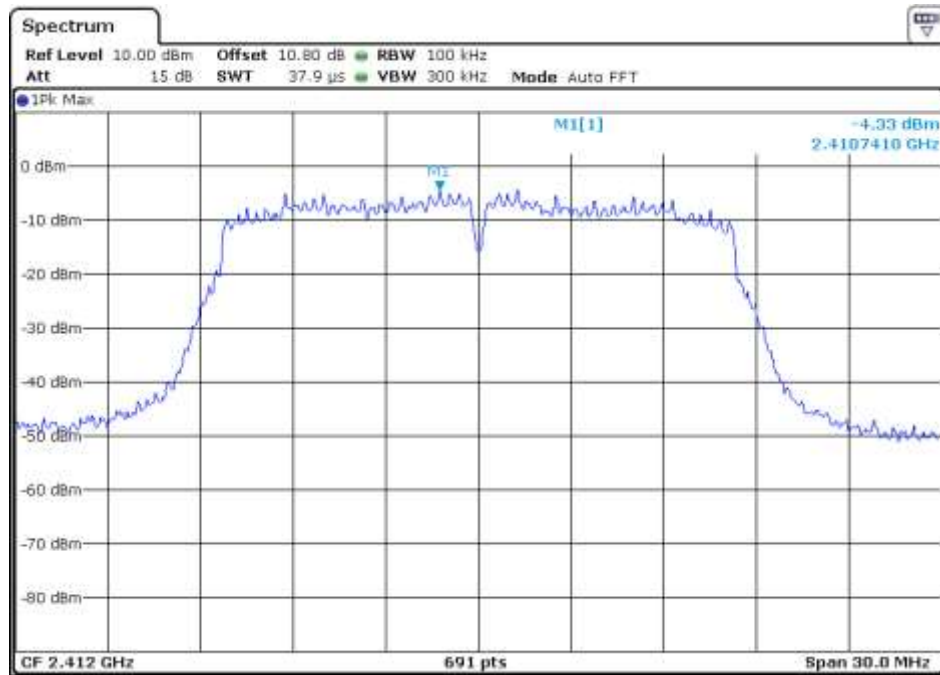
Data rate: MCS0

Channel Frequency: 2412 MHz



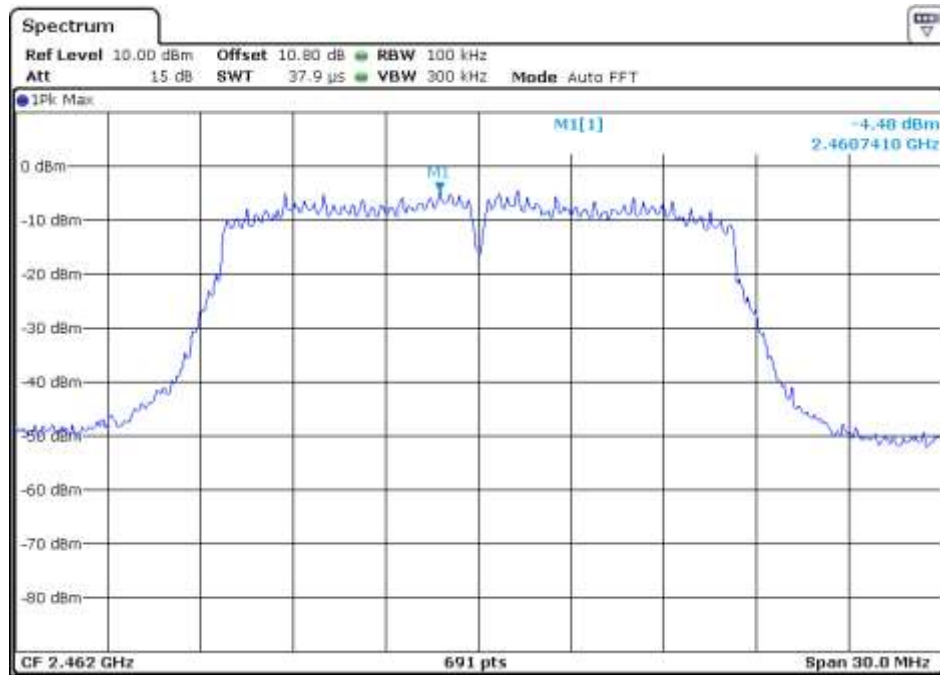
Data rate: MCS0

Channel Frequency: 2462 MHz



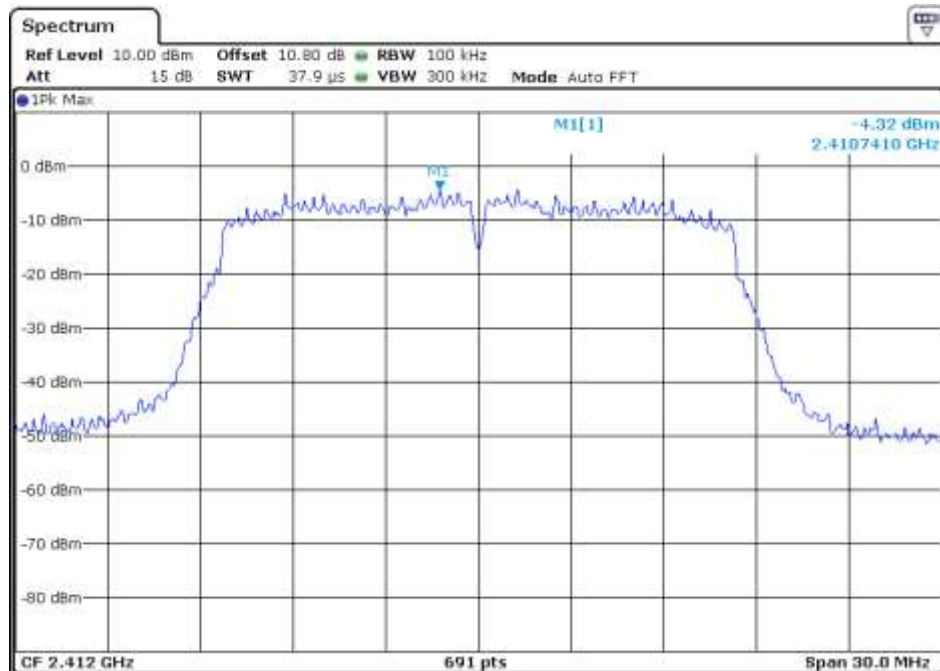
Data rate: MCS4

Channel Frequency: 2412 MHz



Data rate: MCS4

Channel Frequency: 2462 MHz



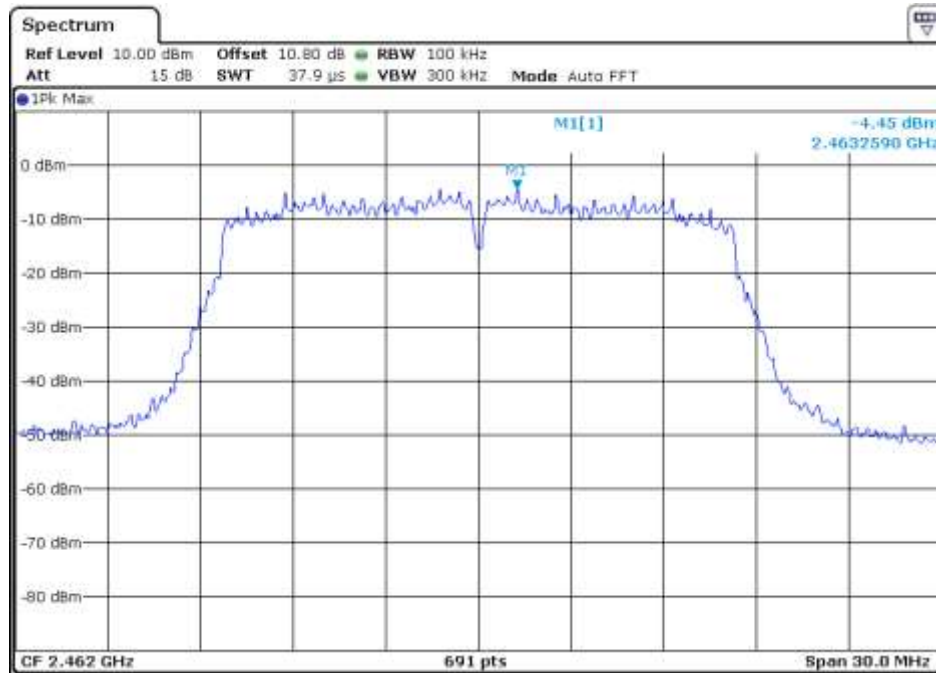
Data rate: MCS7

Channel Frequency: 2412 MHz

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Data rate: MCS7

Channel Frequency: 2462 MHz

7.3 Occupied Bandwidth

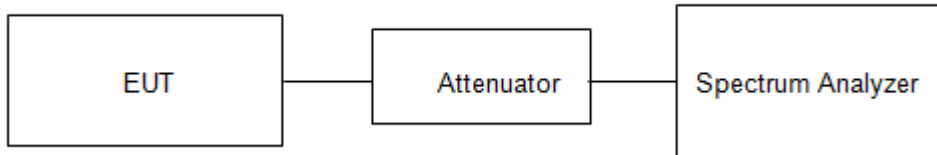
Result

Pass

Test Specification

FCC Part 15.247 (a)

Test Method:

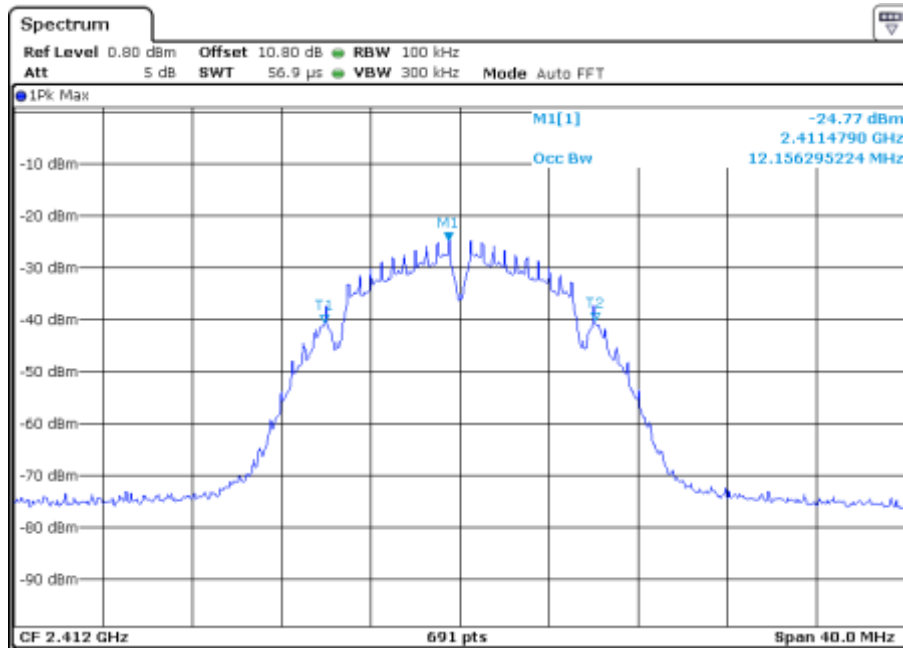


Note: Attenuator (10dB) & cable loss (0.8dB) values are considered in the test results.

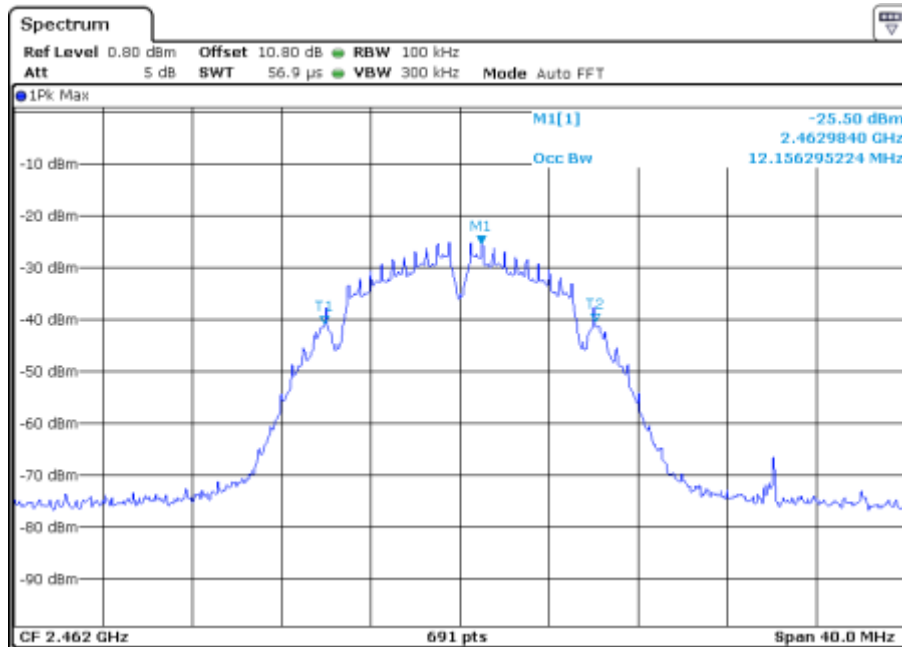
Test Result: b Mode 1 Mbps

Table 14: Occupied Bandwidth

Channel Frequency (MHz)	99% OBW (MHz)
2412.00	12.15
2462.00	12.15



Channel Frequency: 2412 MHz



Channel Frequency: 2462 MHz

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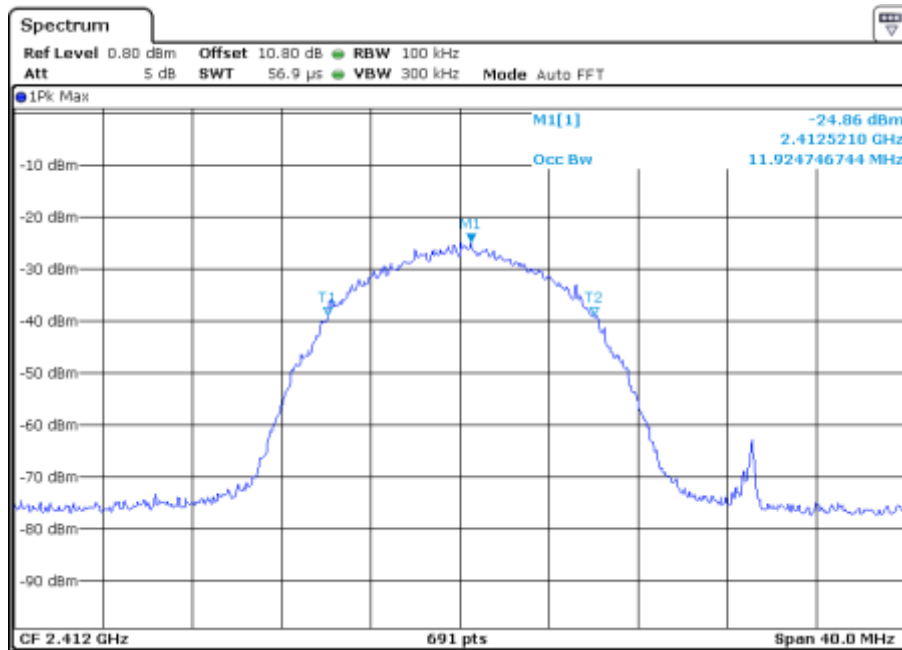
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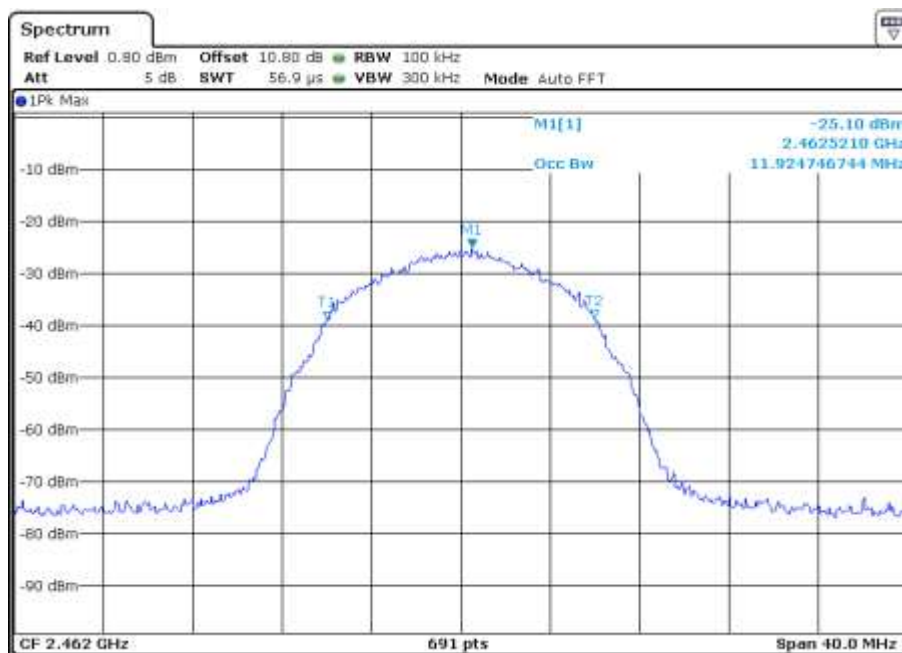
Test Result: b Mode 11 Mbps

Table 15: Occupied Bandwidth

Channel Frequency (MHz)	99% OBW (MHz)
2412.00	11.92
2462.00	11.92



Channel Frequency: 2412 MHz



Channel Frequency: 2462 MHz

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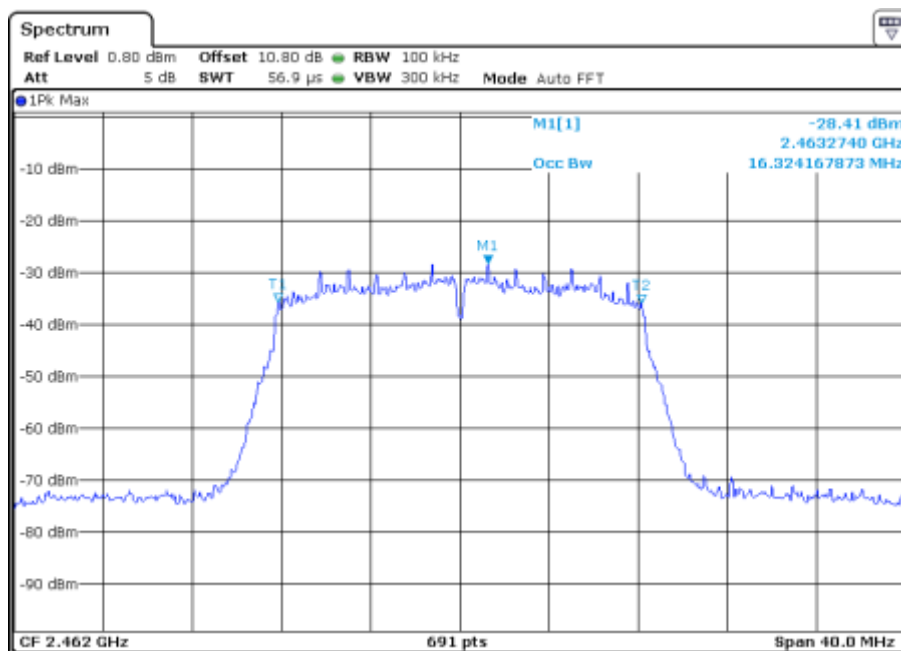
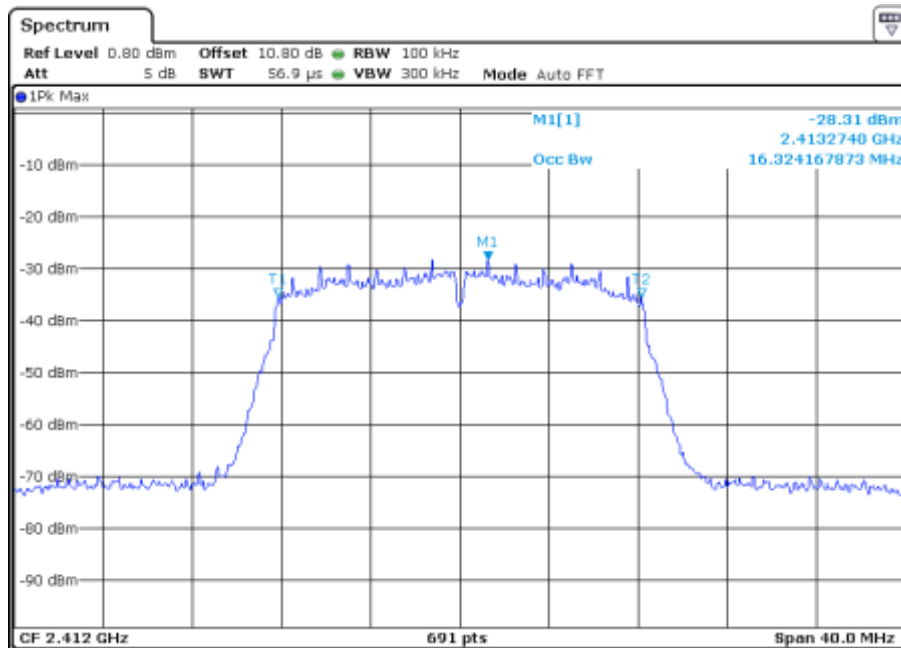
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Test Result: g Mode 6 Mbps

Table 16: Occupied Bandwidth

Channel Frequency (MHz)	99% OBW (MHz)
2412.00	16.32
2462.00	16.32



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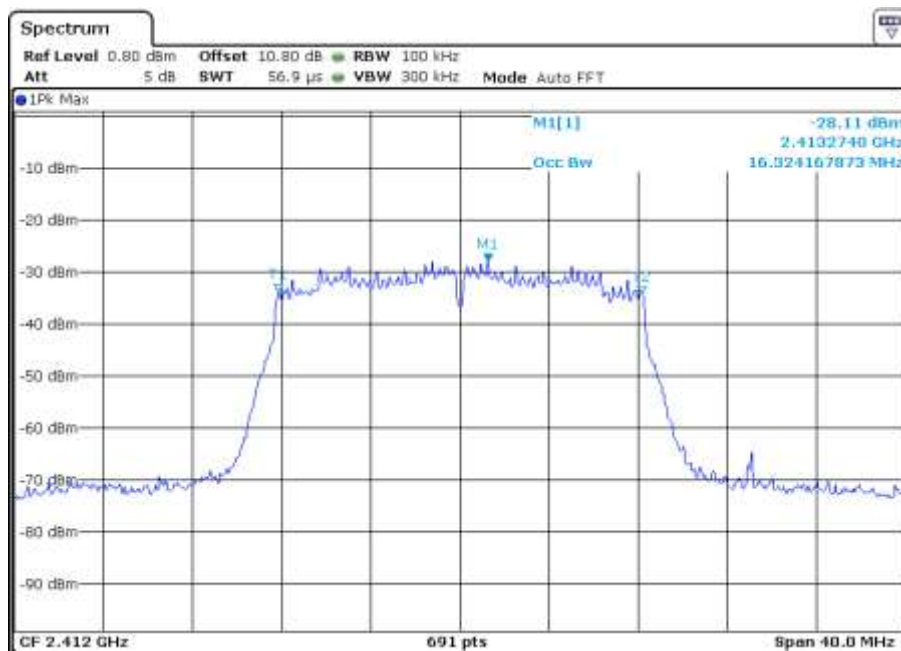
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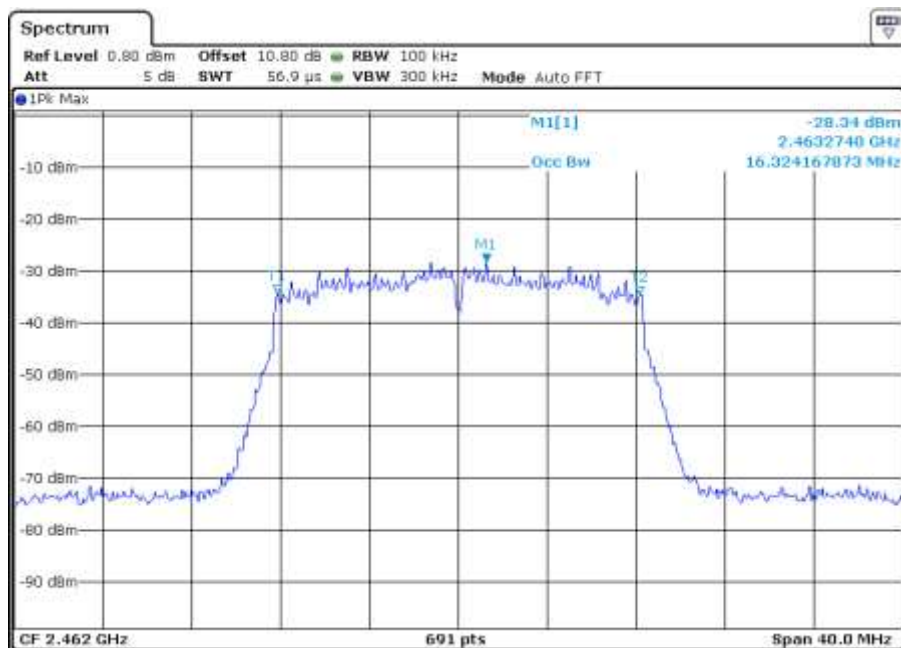
Test Result: g Mode 24 Mbps

Table 17: Occupied Bandwidth

Channel Frequency (MHz)	99% OBW (MHz)
2412.00	16.32
2462.00	16.32



Channel Frequency: 2412 MHz



Channel Frequency: 2462 MHz

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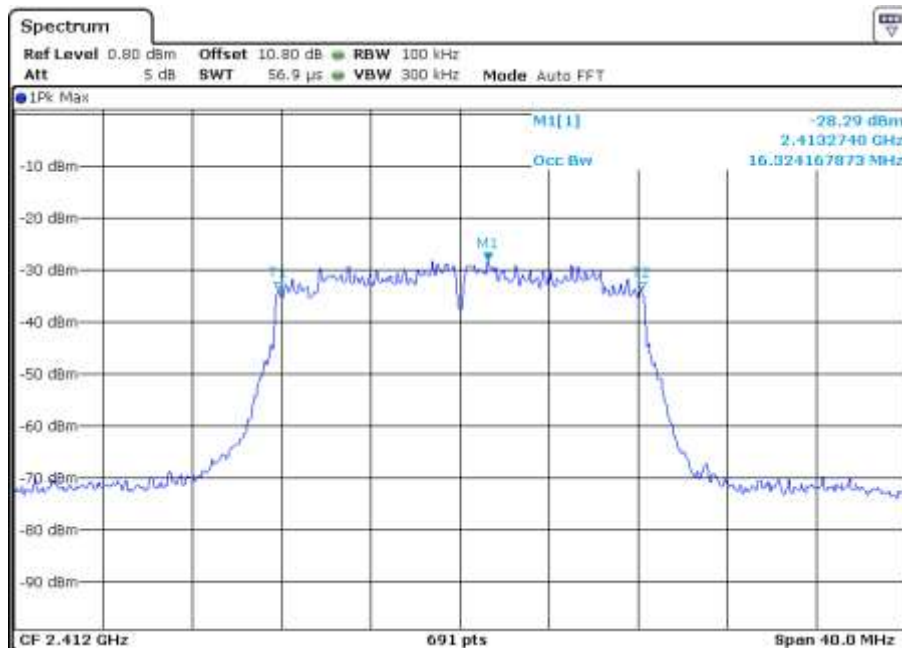
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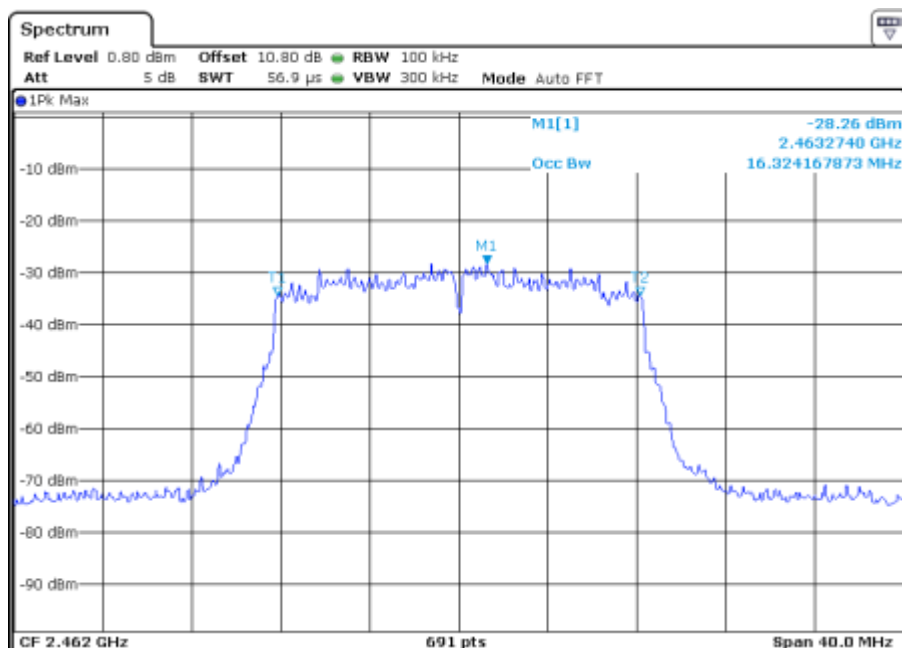
Test Result: g Mode 54 Mbps

Table 18: Occupied Bandwidth

Channel Frequency (MHz)	99% OBW (MHz)
2412.00	16.32
2462.00	16.32



Channel Frequency: 2412 MHz

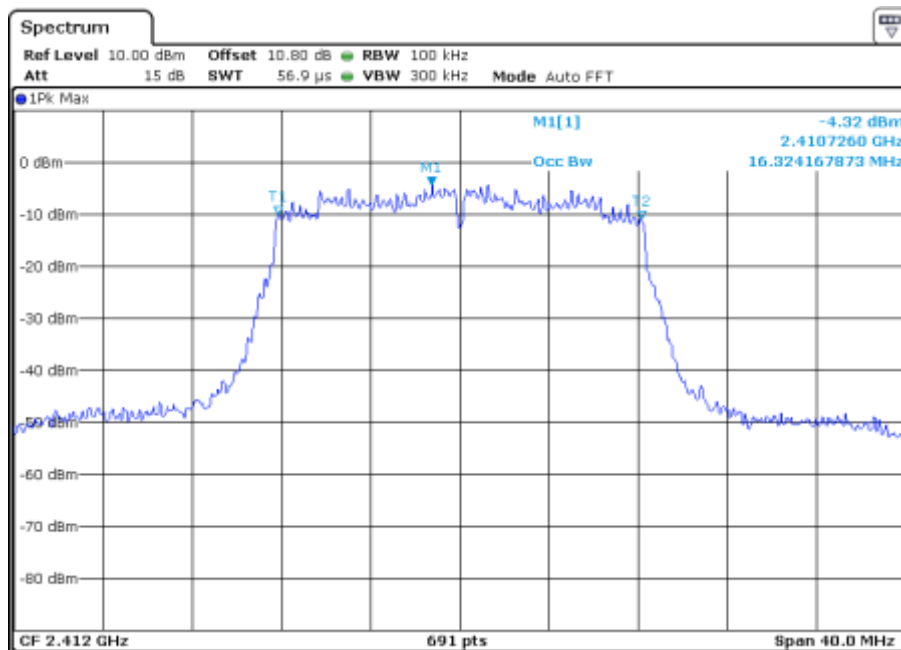


Channel Frequency: 2462 MHz

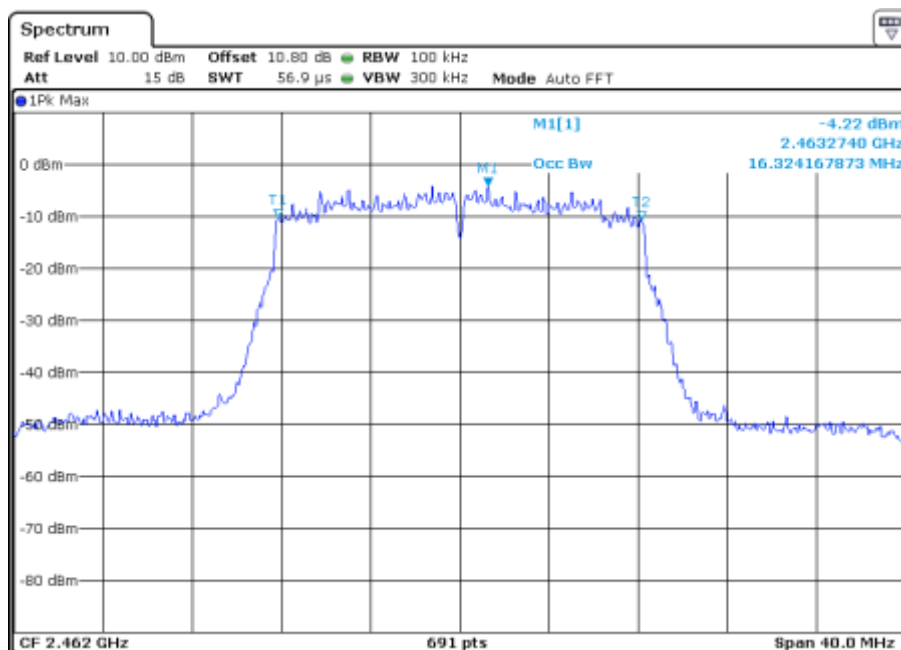
Test Result: n Mode MCS 0

Table 19: Occupied Bandwidth

Channel Frequency (MHz)	99% OBW (MHz)
2412.00	16.32
2462.00	16.32



Channel Frequency: 2412 MHz



Channel Frequency: 2462 MHz

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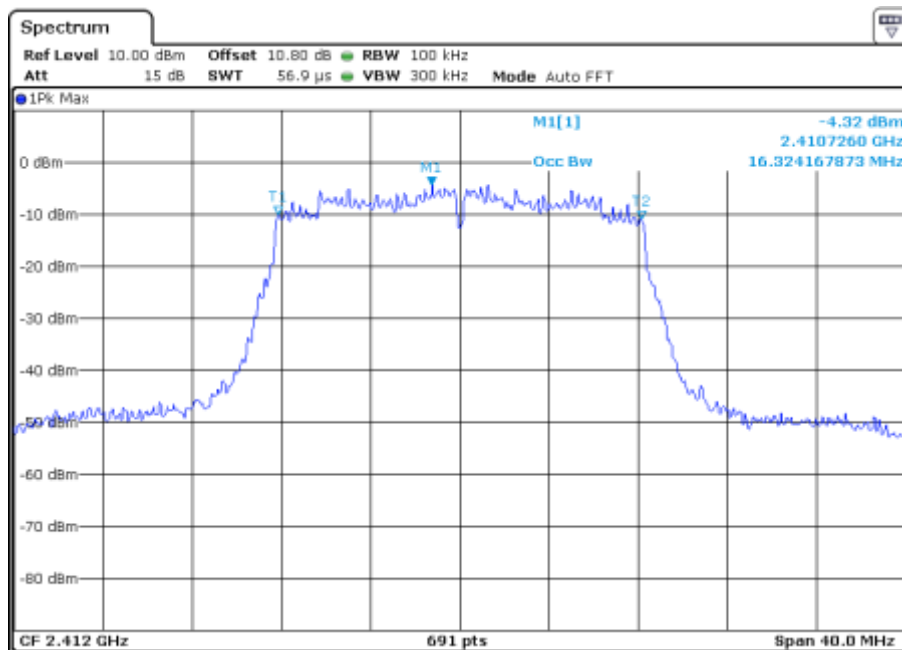
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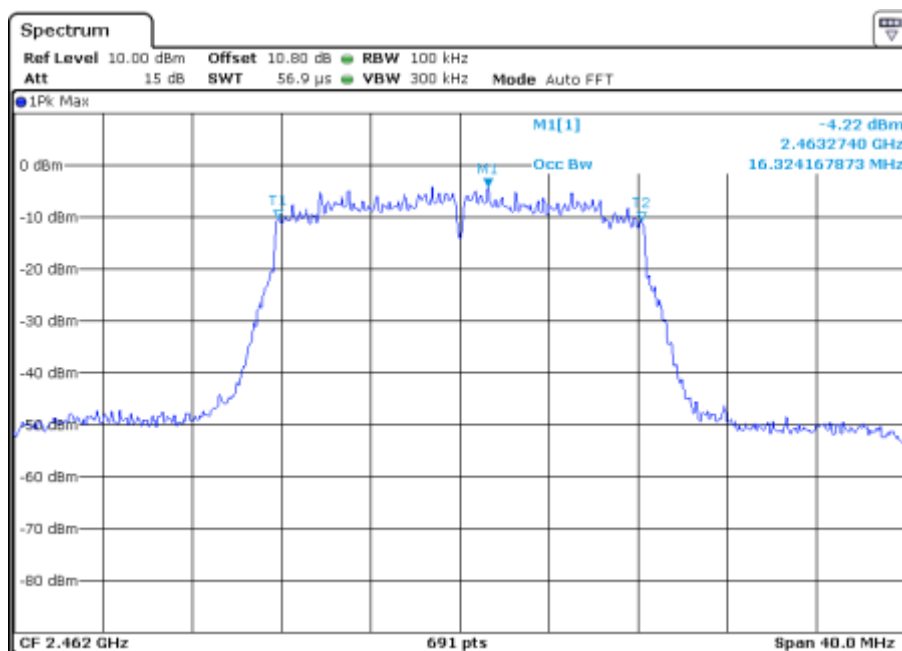
Test Result: n Mode MCS 0

Table 20: Occupied Bandwidth

Channel Frequency (MHz)	99% OBW (MHz)
2412.00	16.32
2462.00	16.32



Channel Frequency: 2412 MHz



Channel Frequency: 2462 MHz

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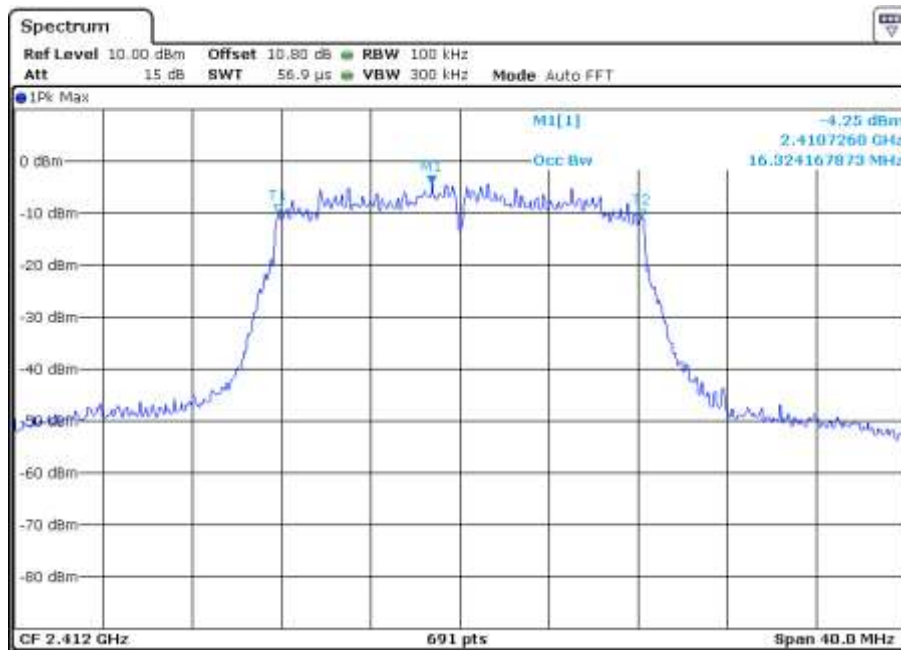
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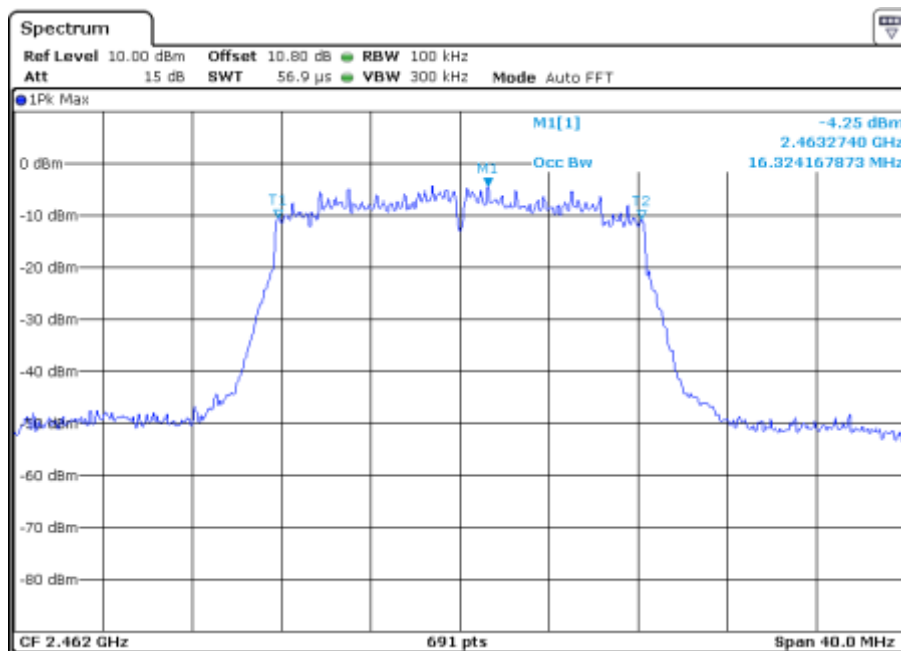
Test Result: n Mode MCS 4

Table 21: Occupied Bandwidth

Channel Frequency (MHz)	99% OBW (MHz)
2412.00	16.32
2462.00	16.32



Channel Frequency: 2412 MHz



Channel Frequency: 2462 MHz

Prüfbericht - Nr.:

Test Report No.:

19660335 001

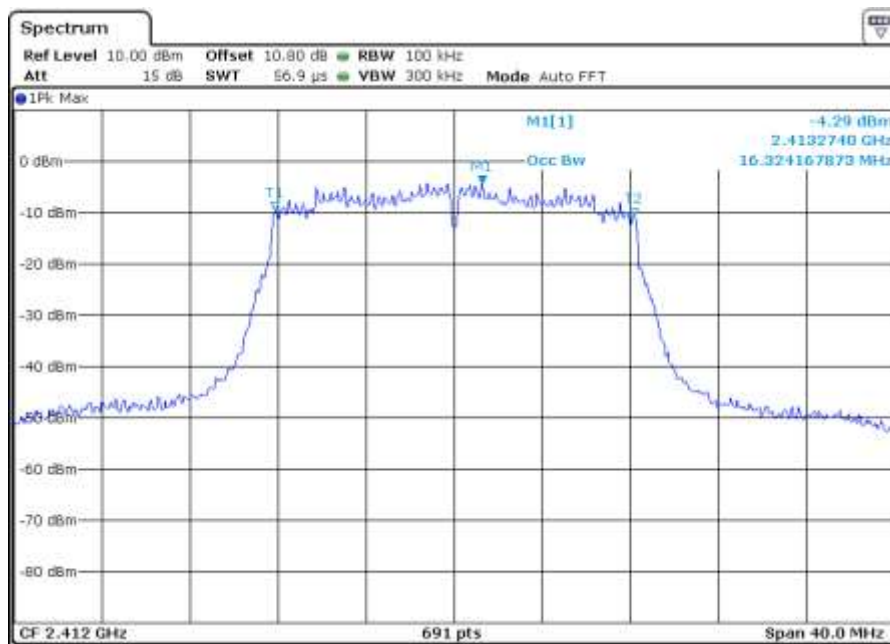
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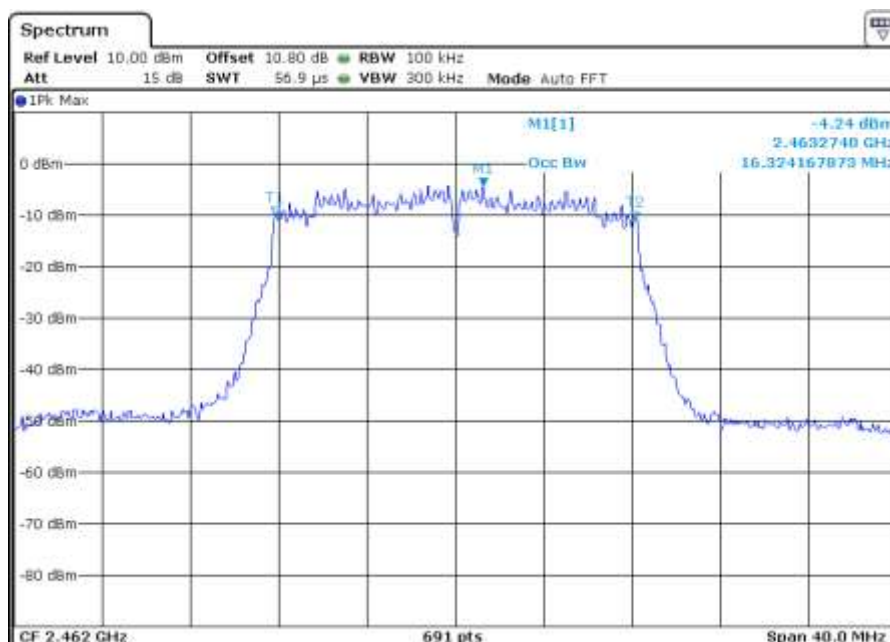
Test Result: n Mode MCS 7

Table 22: Occupied Bandwidth

Channel Frequency (MHz)	99% OBW (MHz)
2412.00	16.32
2462.00	16.32

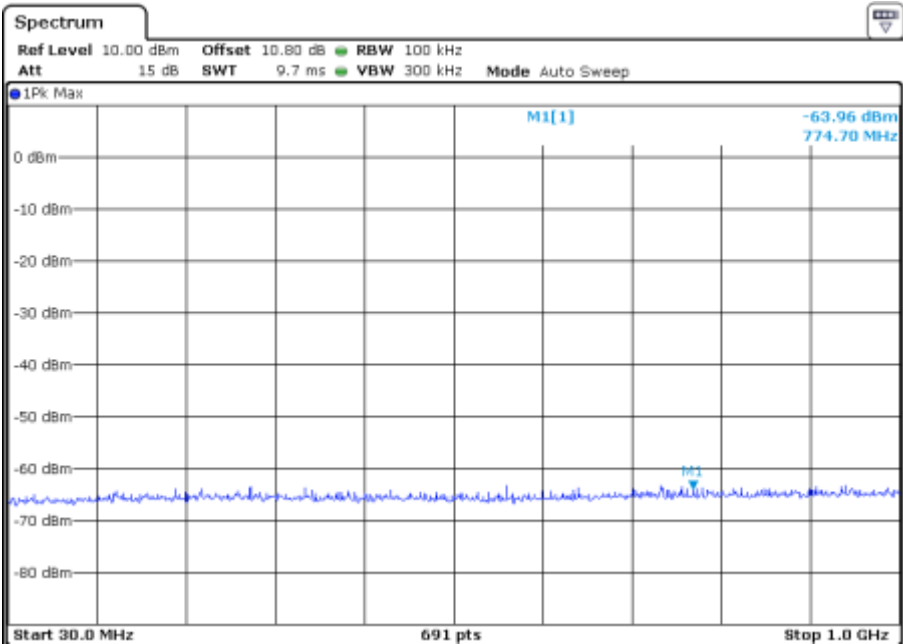


Channel Frequency: 2412 MHz

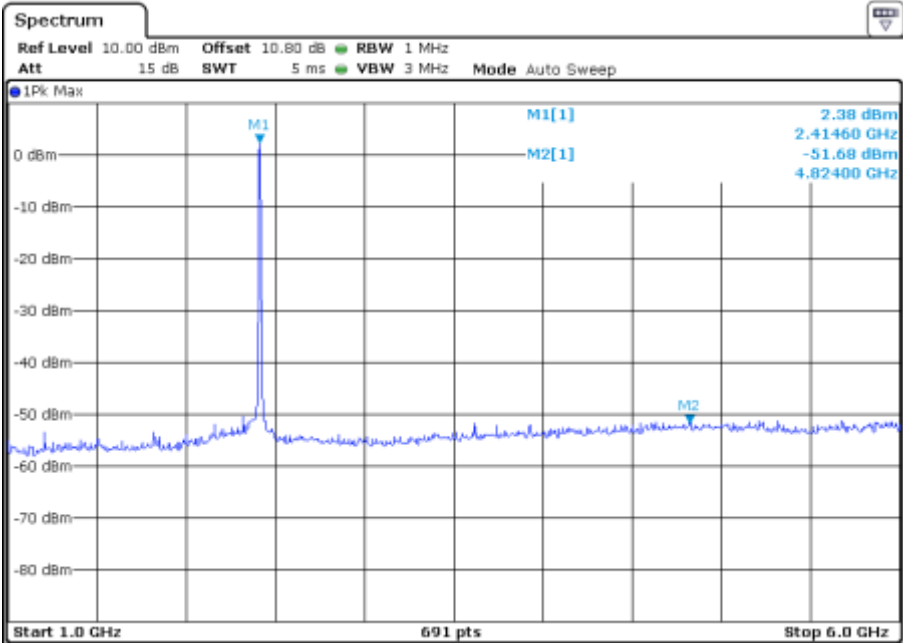


Channel Frequency: 2462 MHz

Conducted spurious Emission



Below 1GHz



Above 1GHz

8 TEST RESULTS

8.1 Restricted bands of Emissions & Restricted Bands of Operation

Result

Pass

Test Specification	FCC part 15 Subpart C Section 15.247 (d) / (15.209 & 15.205)
Test Method	ANSI C 63.10 - 2013
Measurement Location	Semi Anechoic Chamber
Measuring Distance	3 m
Detector	QP for frequency below 1 GHz, average for frequency above 1 GHz
Requirement	As per the limits mentioned in the below table

Table 23: Transmitter limits for Radiated emission of Section 15.209

Frequency (MHz)	Field strength (μV/m)	Field strength (dBμV/m)	Distance of Measurement (m)
0.009 – 0.490	2400/F(kHz)	48.50 – 13.80	300*
0.490 – 1.705	24000/F(kHz)	33.80 – 23.00	30*
1.705 -30	30	29.54	30*
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

Remark: * The limit shows in the table above of frequency range 0.009 – 0.490, 0.490 – 1.705 MHz and 1.705-30MHz is at 300 meter, 30 meter and 30 meter range respectively, which corresponds to 128.51 – 93.80, 73.80 – 62.96 and 69.54 dBμV/m at 3m range by extrapolation calculation and the measurement of loop antenna.

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.

Environmental conditions:

Temperature: +25 °C RH: 62 %

Test results:

No emissions found in frequency 9 kHz to 30 MHz

Table 24: Test results for the frequency 30 MHz – 1GHz

Polarization	Frequency (MHz)	Field Strength (dBµV/m)	limit (dBµV/m)	Margin (dB)
Vertical	88.48	25.39	43.50	-18.11
	103.21	21.97	43.50	-21.53
	132.71	28.22	43.50	-15.28
	162.22	27.85	43.50	-15.65
	191.73	21.11	43.50	-22.39
	265.44	16.64	46.00	-29.36
	368.64	16.5	46.00	-29.5
Horizontal	73.74	18.63	40.00	-21.37
	88.49	29.98	43.50	-13.52
	103.21	28.44	43.50	-15.06
	132.71	31.98	43.50	-11.52
	162.19	36.95	43.50	-6.55
	191.70	25.32	43.50	-18.18
	221.12	29.65	46.00	-16.35
	324.40	26.32	46.00	-19.68

Test results for the frequencies above 1 GHz are reported in below table.

Table 25: 802.11 b 1Mbps

Channel	Polarization	Frequency (MHz)	Field Strength (dBμV/m)	limit (dBμV/m)	margin (dB)
Low	Vertical	2390(Pk)	49.80	74	-24.20
		2390(Av)	38.05	54	-15.95
		2412(Pk)	95.93	-	-
		2412(Av)	93.19	-	-
		4824(Pk)	50.98	74	-23.02
		4824(Av)	39.11	54	-14.89
	Horizontal	2390(Pk)	49.22	74	-24.78
		2390(Av)	37.00	54	-17.00
		2412(Pk)	90.39	-	-
		2412(Av)	87.67	-	-
		4824(Pk)	50.87	74	-23.13
		4824(Av)	38.35	54	-15.65
Mid	Vertical	2437(Pk)	104.42	-	-
		2437(Av)	102.12	-	-
		4874(Pk)	51.11	74	-22.89
		4874(Av)	40.74	54	-13.26
	Horizontal	2437(Pk)	98.77	-	-
		2437(Av)	95.97	-	-
		4874(Pk)	50.19	74	-23.81
		4874(Av)	49.74	54	-4.26
High	Vertical	2483.5(Pk)	53.27	74	-20.73
		2483.5(Av)	48.97	54	-5.03
		2462(Pk)	104.52	-	-
		2462(Av)	101.74	-	-
		4924(Pk)	51.41	74	-22.59
		4924(Av)	37.71	54	-16.29
	Horizontal	2483.5(Pk)	50.20	74	-23.80
		2483.5(Av)	43.01	54	-10.99
		2462(Pk)	98.96	-	-
		2462(Av)	96.25	-	-
		4924(Pk)	50.51	74	-23.49
		4924(Av)	37.98	54	-16.02

Table 26: 802.11b 11Mbps

Channel	Polarization	Frequency (MHz)	Field Strength (dBμV/m)	limit (dBμV/m)	Margin (dB)
Low	Vertical	2390(Pk)	58.96	74	-15.04
		2390(Av)	47.36	54	-6.64
		2412(Pk)	106.00	-	-
		2412(Av)	99.03	-	-
		4824(Pk)	49.74	74	-24.26
		4824(Av)	37.88	54	-16.12
	Horizontal	2390(Pk)	54.39	74	-19.61
		2390(Av)	41.66	54	-12.34
		2412(Pk)	102.41	-	-
		2412(Av)	94.76	-	-
		4824(Pk)	50.63	74	-23.37
		4824(Av)	36.72	54	-17.28
Mid	Vertical	2437(Pk)	103.74	-	-
		2437(Av)	99.36	-	-
		4874(Pk)	50.14	74	-23.86
		4874(Av)	37.69	54	-16.31
	Horizontal	2437(Pk)	99.23	-	-
		2437(Av)	94.65	-	-
		4874(Pk)	50.04	74	-23.96
		4874(Av)	36.93	54	-17.07
High	Vertical	2483.5(Pk)	50.05	74	-23.95
		2483.5(Av)	37.85	54	-16.15
		2462(Pk)	96.17	-	-
		2462(Av)	93.40	-	-
		4924(Pk)	50.43	74	-23.57
		4924(Av)	39.26	54	-14.74
	Horizontal	2483.5(Pk)	48.89	74	-25.11
		2483.5(Av)	37.10	54	-16.9
		2462(Pk)	89.52	-	-
		2462(Av)	86.79	-	-
		4924(Pk)	50.78	74	-23.22
		4924(Av)	38.04	54	-15.96

Table 27: 802.11g 6Mbps

Channel	Polarization	Frequency (MHz)	Field Strength (dBμV/m)	limit (dBμV/m)	margin (dB)
Low	Vertical	2390(Pk)	73.24	74	-0.76
		2390(Av)	51.27	54	-2.73
		2412(Pk)	101.94	-	-
		2412(Av)	91.25	-	-
		4824(Pk)	50.69	74	-23.31
		4824(Av)	37.06	54	-16.94
	Horizontal	2390(Pk)	65.96	74	-8.04
		2390(Av)	44.86	54	-9.14
		2412(Pk)	95.05	-	-
		2412(Av)	82.99	-	-
		4824(Pk)	50.48	74	-23.52
		4824(Av)	37.26	54	-16.74
Mid	Vertical	2437(Pk)	102.32	-	-
		2437(Av)	90.02	-	-
		4874(Pk)	54.27	74	-19.73
		4874(Av)	43.62	54	-10.38
	Horizontal	2437(Pk)	98.76	-	-
		2437(Av)	89.08	-	-
		4874(Pk)	53.01	74	-20.99
		4874(Av)	39.02	54	-14.98
High	Vertical	2483.5(Pk)	71.02	74	-2.98
		2483.5(Av)	51.62	54	-2.38
		2462(Pk)	101.75	-	-
		2462(Av)	90.89	-	-
		4924(Pk)	50.87	74	-23.13
		4924(Av)	37.08	54	-16.92
	Horizontal	2483.5(Pk)	63.91	74	-10.09
		2483.5(Av)	44.75	54	-9.25
		2462(Pk)	94.82	-	-
		2462(Av)	83.47	-	-
		4924(Pk)	50.11	74	-23.89
		4924(Av)	37.07	54	-16.93

Table 28: 802.11g 24Mbps

Channel	Polarization	Frequency (MHz)	Field Strength (dBμV/m)	limit (dBμV/m)	margin (dB)
Low	Vertical	2390(Pk)	68.27	74	-5.73
		2390(Av)	49.02	54	-4.98
		2412(Pk)	103.28	-	-
		2412(Av)	95.62	-	-
		4824(Pk)	49.46	74	-24.54
		4824(Av)	36.76	54	-17.24
	Horizontal	2390(Pk)	63.07	74	-10.93
		2390(Av)	45.45	54	-8.55
		2412(Pk)	99.06	-	-
		2412(Av)	89.65	-	-
		4824(Pk)	49.68	74	-24.32
		4824(Av)	36.66	54	-17.34
Mid	Vertical	2437(Pk)	101.87	-	-
		2437(Av)	93.20	-	-
		4874(Pk)	50.81	74	-23.19
		4874(Av)	37.07	54	-16.93
	Horizontal	2437(Pk)	97.56	-	-
		2437(Av)	88.62	-	-
		4874(Pk)	55.87	74	-18.13
		4874(Av)	45.98	54	-8.02
High	Vertical	2483.5(Pk)	71.87	74	-2.13
		2483.5(Av)	50.05	54	-3.95
		2462(Pk)	100.62	-	-
		2462(Av)	90.03	-	-
		4924(Pk)	50.52	74	-23.48
		4924(Av)	37.02	54	-16.98
	Horizontal	2483.5(Pk)	69.89	74	-4.11
		2483.5(Av)	49.67	54	-4.33
		2462(Pk)	97.45	-	-
		2462(Av)	89.43	-	-
		4924(Pk)	50.32	74	-23.68
		4924(Av)	37.05	54	-16.95

Table 29: 802.11g 54Mbps

Channel	Polarization	Frequency (MHz)	Field Strength (dBµV/m)	limit (dBµV/m)	margin (dB)
Low	Vertical	2390(Pk)	70.68	74	-3.32
		2390(Av)	49.69	54	-4.31
		2412(Pk)	101.94	-	-
		2412(Av)	89.81	-	-
		4824(Pk)	50.15	74	-23.85
		4824(Av)	36.75	54	-17.25
	Horizontal	2390(Pk)	62.23	74	-11.77
		2390(Av)	42.6	54	-11.40
		2412(Pk)	93.77	-	-
		2412(Av)	81.49	-	-
		4824(Pk)	49.88	74	-24.12
		4824(Av)	36.71	54	-17.29
Mid	Vertical	2437(Pk)	103.64	-	-
		2437(Av)	92.65	-	-
		4874(Pk)	49.87	74	-24.13
		4874(Av)	36.9	54	-17.10
	Horizontal	2437(Pk)	96.32	-	-
		2437(Av)	89.23	-	-
		4874(Pk)	50.67	74	-23.33
		4874(Av)	36.88	54	-17.12
High	Vertical	2483.5(Pk)	70.97	74	-3.03
		2483.5(Av)	51.47	54	-2.53
		2462(Pk)	102.01	-	-
		2462(Av)	88.87	-	-
		4924(Pk)	49.94	74	-24.06
		4924(Av)	37.05	54	-16.95
	Horizontal	2483.5(Pk)	65.15	74	-8.85
		2483.5(Av)	45.53	54	-8.47
		2462(Pk)	94.21	-	-
		2462(Av)	81.76	-	-
		4924(Pk)	50.90	74	-23.10
		4924(Av)	36.99	54	-17.01

Table 30: 802.11n MCS0 (referred as 6.5Mbps)

Channel	Polarization	Frequency (MHz)	Field Strength (dBμV/m)	limit (dBμV/m)	margin (dB)
Low	Vertical	2390(Pk)	71.90	74	-2.10
		2390(Av)	49.87	54	-4.13
		2412(Pk)	101.89	-	-
		2412(Av)	89.64	-	-
		4824(Pk)	49.35	74	-24.65
		4824(Av)	36.86	54	-17.14
	Horizontal	2390(Pk)	65.72	74	-8.28
		2390(Av)	44.67	54	-9.33
		2412(Pk)	94.41	-	-
		2412(Av)	81.11	-	-
		4824(Pk)	49.44	74	-24.56
		4824(Av)	36.68	54	-17.32
Mid	Vertical	2437(Pk)	102.67	-	-
		2437(Av)	93.78	-	-
		4874(Pk)	50.81	74	-23.19
		4874(Av)	36.98	54	-17.02
	Horizontal	2437(Pk)	96.87	-	-
		2437(Av)	91.26	-	-
		4874(Pk)	50.49	74	-23.51
		4874(Av)	36.95	54	-17.05
High	Vertical	2483.5(Pk)	70.32	74	-3.68
		2483.5(Av)	51.31	54	-2.69
		2462(Pk)	101.62	-	-
		2462(Av)	88.78	-	-
		4924(Pk)	50.92	74	-23.19
		4924(Av)	37.06	54	-17.02
	Horizontal	2483.5(Pk)	63.57	74	-10.43
		2483.5(Av)	45.47	54	-8.53
		2462(Pk)	95.35	-	-
		2462(Av)	81.68	-	-
		4924(Pk)	50.36	74	-23.51
		4924(Av)	37.05	54	-17.05

Table 31 : 802.11n MCS4 (referred as 39Mbps)

Channel	Polarization	Frequency (MHz)	Field Strength (dBµV/m)	limit (dBµV/m)	margin (dB)
Low	Vertical	2390(Pk)	71.38	74	-2.62
		2390(Av)	50.22	54	-3.78
		2412(Pk)	102.07	-	-
		2412(Av)	89.76	-	-
		4824(Pk)	49.46	74	-23.64
		4824(Av)	36.74	54	-16.95
	Horizontal	2390(Pk)	65.01	74	-8.99
		2390(Av)	44.48	54	-9.52
		2412(Pk)	94.33	-	-
		2412(Av)	82.42	-	-
		4824(Pk)	49.68	74	-24.32
		4824(Av)	36.71	54	-17.29
Mid	Vertical	2437(Pk)	101.29	-	-
		2437(Av)	93.87	-	-
		4874(Pk)	50.81	74	-23.19
		4874(Av)	36.86	54	-17.14
	Horizontal	2437(Pk)	96.8	-	-
		2437(Av)	91.19	-	-
		4874(Pk)	50.67	74	-23.33
		4874(Av)	36.94	54	-17.06
High	Vertical	2483.5(Pk)	70.89	74	-3.11
		2483.5(Av)	50.26	54	-3.74
		2462(Pk)	100.79	-	-
		2462(Av)	89.02	-	-
		4924(Pk)	50.46	74	-23.54
		4924(Av)	36.94	54	-17.06
	Horizontal	2483.5(Pk)	69.82	74	-3.11
		2483.5(Av)	48.23	54	-3.74
		2462(Pk)	99.82	-	-
		2462(Av)	87.61	-	-
		4924(Pk)	50.19	74	-23.81
		4924(Av)	37.05	54	-16.95

Table 32: 802.11n MCS7 (referred as 65Mbps)

Channel	Polarization	Frequency (MHz)	Field Strength (dBµV/m)	limit (dBµV/m)	margin (dB)
Low	Vertical	2390(Pk)	71.37	74	-2.63
		2390(Av)	49.03	54	-4.97
		2412(Pk)	101.61	-	-
		2412(Av)	89.46	-	-
		4824(Pk)	49.45	74	-24.55
		4824(Av)	36.76	54	-17.24
	Horizontal	2390(Pk)	63.74	74	-10.26
		2390(Av)	43.41	54	-10.59
		2412(Pk)	95.61	-	-
		2412(Av)	82.73	-	-
		4824(Pk)	50.10	74	-23.90
		4824(Av)	36.66	54	-17.34
Mid	Vertical V	2437(Pk)	100.03	-	-
		2437(Av)	92.43	-	-
		4874(Pk)	50.04	74	-23.96
		4874(Av)	36.91	54	-17.09
	Horizontal	2437(Pk)	97.02	-	-
		2437(Av)	91.75	-	-
		4874(Pk)	50.67	74	-23.33
		4874(Av)	36.86	54	-17.14
High	Vertical	2483.5(Pk)	72.14	74	-1.86
		2483.5(Av)	51.2	54	-2.80
		2462(Pk)	102.4	-	-
		2462(Av)	89.09	-	-
		4924(Pk)	50.48	74	-23.52
		4924(Av)	37.06	54	-16.94
	Horizontal	2483.5(Pk)	63.2	74	-10.80
		2483.5(Av)	45.53	54	-8.47
		2462(Pk)	95.27	-	-
		2462(Av)	82.04	-	-
		4924(Pk)	51.17	74	-22.83
		4924(Av)	37.04	54	-16.96

Table 33: BLE

Channel	Polarization	Frequency (MHz)	Field Strength (dBµV/m)	limit (dBµV/m)	margin (dB)
Low	Vertical	2390(Pk)	42.57	74	-31.43
		2390(Av)	25.23	54	-28.77
		2402(Pk)	92.16	*	*
		2402(Av)	86.94	-	-
		4804(Pk)	50.10	74	-23.90
		4804(Av)	36.52	54	-17.48
	Horizontal	2390(Pk)	39.10	74	-34.90
		2390(Av)	24.94	54	-29.06
		2402(Pk)	89.63	*	*
		2402(Av)	84.43	-	-
		4804(Pk)	49.75	74	-24.25
		4804(Av)	36.48	54	-17.52
Mid	Vertical	2440(Pk)	87.75	*	*
		2440(Av)	87.69	-	-
		4880(Pk)	50.80	74	-23.20
		4880(Av)	38.02	54	-15.98
	Horizontal	2440(Pk)	83.42	*	*
		2440(Av)	83.35	-	-
		4880(Pk)	50.33	74	-23.67
		4880(Av)	37.58	54	-16.42
High	Vertical	2483.5(Pk)	59.46	74	-14.54
		2483.5(Av)	28.65	54	-25.35
		2480(Pk)	95.40	*	*
		2480(Av)	89.90	-	-
		4960(Pk)	51.04	74	-22.96
		4924(Av)	39.07	54	-14.93
	Horizontal	2483.5(Pk)	52.46	74	-21.54
		2483.5(Av)	25.37	54	-28.63
		2480(Pk)	88.11	*	*
		2480(Av)	82.60	-	-
		4960(Pk)	50.25	74	-23.75
		4960(Av)	37.01	54	-16.99

Pk – Peak Detector

Av – Average Detector

* - -> Fundamental operating frequency

8.2 Conducted Emission Test on A.C. Power line

Result

Pass

Test Specification	FCC Part 15 Subpart C Section 15.207
Test Method	ANSI C63.10 - 2013
Measurement Location	Screen Room
Measuring Frequency Range	150 kHz to 30 MHz
Measuring Bandwidth	9 kHz
Supply voltage	120 VAC, 60 MHz
Requirement	As per the limits mentioned in the below table

Table 34: Conducted Test Limits for 15.207

Frequency of emission (MHz)	Conducted limit (dBuv)	
	Quasi peak	Average
0.15 – 0.5	66 to 56 *	56 to 46*
0.5 - 5	56	46
5 - 30	60	50

- Decreases with the logarithm of the frequency

Environmental conditions:

Temperature: +25 °C RH: 62 %

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Test results:

Test Graph 17 : Test Graph for CE Positive



Table 35: Test results for CE Positive

Trace	Frequency	Level (dBμV)	Phase	Detector	Delta Limit/dB
2	678.000000000 kHz	37.34		Average	-8.66
2	654.000000000 kHz	31.07		Average	-14.93
2	5.798000000 MHz	32.98		Average	-17.02
1	162.000000000 kHz	47.98		Quasi Peak	-17.38
1	22.506000000 MHz	41.78		Quasi Peak	-18.22
1	5.762000000 MHz	40.96		Quasi Peak	-19.04
1	4.494000000 MHz	35.04		Quasi Peak	-20.96
1	22.090000000 MHz	38.46		Quasi Peak	-21.54
1	22.930000000 MHz	37.81		Quasi Peak	-22.19
1	2.738000000 MHz	33.33		Quasi Peak	-22.67
1	10.946000000 MHz	36.48		Quasi Peak	-23.52
2	22.510000000 MHz	26.34		Average	-23.66
2	22.930000000 MHz	26.06		Average	-23.94
2	22.090000000 MHz	25.91		Average	-24.09
2	21.670000000 MHz	25.08		Average	-24.92
1	23.354000000 MHz	33.39		Quasi Peak	-26.61
2	23.354000000 MHz	22.79		Average	-27.21

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Test Graph 2: Test Graph for CE Negative



Table 36: Test results for CE Negative

Trace	Frequency	Level (dBμV)	Phase	Detector	Delta Limit/dB
2	22.894000000 MHz	44.38		Average	-5.62
2	22.474000000 MHz	43.76		Average	-6.24
2	23.738000000 MHz	40.80		Average	-9.20
2	22.058000000 MHz	38.50		Average	-11.50
1	22.474000000 MHz	48.42		Quasi Peak	-11.58
1	22.894000000 MHz	48.30		Quasi Peak	-11.70
2	23.318000000 MHz	37.59		Average	-12.41
1	22.058000000 MHz	46.30		Quasi Peak	-13.70
2	21.638000000 MHz	33.51		Average	-16.49
1	23.318000000 MHz	43.36		Quasi Peak	-16.64
2	5.734000000 MHz	32.46		Average	-17.54
1	158.000000000 kHz	47.63		Quasi Peak	-17.94
2	678.000000000 kHz	27.96		Average	-18.04
1	4.414000000 MHz	37.47		Quasi Peak	-18.53
1	210.000000000 kHz	44.31		Quasi Peak	-18.90
1	5.762000000 MHz	40.61		Quasi Peak	-19.39
2	12.398000000 MHz	27.22		Average	-22.78
2	23.354000000 MHz	18.28		Average	-31.72

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